CIVIL DEFENCE INSTRUCTOR'S COURSE

CONTENTS

Lesson no.	Subject	Page	
		Fm	To
1.	Modern warfare and defence potential of a nation	4	6
2.	Civil defence	7	10
3.	High explosive bombs-construction, types & effects	11	15
4.	Incendiary bombs-types, effects and protection	16	21
5.	Fire spread and control: general organisation civil defence firefighting service	22	25
6.	Stirrup pump-use care and drill	26	30
7.	Chemical extinguishers	31	38
8.	Setting up a fire hut, fire control in a closed room and smoke chamber	39	44
9.	Detection of unexploded bombs, safety precaution and reporting procedure	45	51
10.	Nuclear warfare-atom and hydrogen bomb explosions, heat and blast effects	52	59
11.	Nuclear warfare -radiation effects	60	65
12.	Principles of protection, standard of protection taking cover, shelters, refuge room, trenches and sandbagging	66	73
13.	Chemical warfare-types of war gases, their effects and first aid, use of respirators	74	79
14.	Biological war fare	80	84
15.	System of air raid warning	85	93
16.	Basic principles of civil defence organisation, civil defence organisation at all levels	94	98
17.	Civil defence for industries	99	105
18.	Home guards organisation – its role, training and functions	106	114
19.	Local civil defence training	115	137
20.	Setting, production and umpiring of exercises umpires and directors etc. Conference	138	147

21.	How to set map, conventional signs	148	156
22.	Maintance of essential services	157	161
23.	Organisation and functioning of control /sub control centre	162	173
24.	Duties of the staff of a control sub-control centre and circulation of messages	174	184
25.	Reporting procedure and types of forms in c.d.	185	193
26.	Control of an incident by day and night-duties of an incident control officer, allocation of services	194	199
27.	Wardens service-organisation and functions	200	209
28.	Organisation and duties of reconnaissance parties' hints for detailed	210	214
29.	Depot and transport service	215	219
30.	General organisation and operational functions of civil defence engineering services	220	224
31.	Ropes-care of ropes-splicing and whipping etc. Of ropes	225	232
32.	Ropes-knots and lashings	233	243
33.	Stretcher- harness improvised stretcher lashings and securing casualty to stretcher	244	246
34.	Buildings general principle reference of construction with reference to rescue operations forms of building collapse	247	251
35.	Types of survey and stages of rescue	252	255
36.	Precautions on entering damaged building method of search debris tunnelling and debris clearance	256	261
37.	Use of levers and Jacks in rescue work	262	267
38.	Precautions on entering damaged building method of search debris tunnelling and debris clearance	268	273
39.	Emergency methods of rescue	274	281
40.	Cutting through walls and methods of demolition	282	284
41.	Rescue in confined places with small tools	285	287
42.	Elementary principles of shoring	288	291
43.	Use of blocks, tackles and pulleys in rescue work	292	297
44.	Lowering or raising a casualty by rope and pulley-jib method	298	299
45.	Loading and unloading of rescue – rescue lorry drill	300	303
46.	Derricks, sheers gyns, hold easts and pickets	304	311
47.	Rescue from heights-leaning ladder method	312	314

48.	Rescue from heights-ladder hinge method	315	317
49.	Rescue from heights-sliding stretcher on two parallel ropes	318	319
50.	Rescue from heights- sliding stretcher on one or two ladders	320	322
51.	Two point and four-point suspension methods	323	323
52.	Rescue from voids	324	326
53.	Rescue from high buildings – the flying fox method	327	328
54.	General organisation and functions of civil emergency medical and health services	329	335
55.	Elements of bandaging	336	342
56.	Carriage of casualties	343	350
57.	Faking injuries for exercise	351	356
58.	Problems of disposal of dead and the organisation to deal with the dead	357	361
59.	Water-purification	362	367
60.	Food-sanitation	368	373
61.	Disposal waste matter, need for urgent action disposal of garbage, emergency drainage	374	377
62.	General organisation and functions of civil defence welfare service	378	382
63.	Psychological warfare	383	386
64.	Panic, its causes consequences prevention and control crowd behaviour and psychological first aid	387	390
65.	Problems of evacuation	391	397
66.	Types of tents, striking, pitching and packing of tents	398	401
67. 1	Need for leadership-attributes of leadership, qualities selection and training of leaders	402	406
68.	Problems of mass feeding, procurement of supplies, maintance of records and accounts, reports and returns scale of rations, preparation and cooking of meals distribution of meals	407	414
69.	Problems of emergency lodging	415	416
70.	Registration and inquiry organisation	420	423

CHAPTER NO. 1
MODERN WARFARE AND DEFENCE POTENTIAL OF A NATION

1. **Object**:

"If you wish for peace, understand war". War is no longer a series of battles; it is a test of the strength not only of the Armed Forces, but the whole strength of the nation. War is process by which a nation endeavours to impose its will on its opponent. Military operations are merely one of methods to achieve same. Linked closely to the Armed Forces there the political and economic war. Political war aims at weakening morale and authority and Economic war aims at starving the enemy war production (Lord Tedder). Modern warfare is a complex and complicated after requiring the unity of efforts of nation for total or near total involvement in air, on land and sea and complete mobilisation of the defence potentialities of a nation. We will, therefore, study some of the important aspects of warfare which affect the planning of civil defence measures in a country.

2. **War Potential**:

The evolution of warfare has always been a race between ever increasing power of weapons to destroy and the efficiency defence measures to protect against such destruction. Modern science, has changed and is changing nature of warfare. The development of the air power and the nuclear weapons during and since World War II has changed the whole concept of war. It was during World War II, that the civilian population and the industries were bombed from the air. "Radar, Jet Aircraft, Guided Missiles, Atom Bombs, Proximity Fuses appeared while we were fighting the last war. They determined the outcome of battles and campaigns even though their deterring nature was not fully exhibited in that test. Over the horizon now looms Radiological and Biological Warfare, new kinds of ships, planes, new world moons; a totally new concept of what might be the result of a future war." (Modern Arms and Free Men by V. Bush). Latest addition to the above-mentioned weapons are Napalm Bomb, Multimegaton nuclear weapons, the Concussion bomb and the laser and T.V. Guided Missiles. The air power not only helps tactically the Navy and the Army in the battle fields, but also plays an important strategical role in the Political and Economic Warfare. Modern warfare involves all the political, economic and military elements and resources of the nation and therefore, the successful conduct of the operations war lies in the best combination. Speedy mobilisation is the key to preparedness of war. it is not merely the training and expansion of military resources, but also the maximum utilisation of all industrial efforts and the entire Defence Potential of nation, which brings about success in any war. The defence potential of a nation includes the following:

(i) The will of the nation to fight and withstand war and the morale of the nation. This also includes maintenance of national policy and aim, diplomatic and political integrity, good administration backed by the people's will to win the war.

(ii) Economic potential which also mainly includes the industrial resources, commerce's, production, self-sufficiency, scientific development, intelligence and research, availability of technical man-power.

(iii) The armed forces of the nation, their efficiency and morale, security of bases, leadership and weapons. Availability of physically fit man power.

3. **Air Power:**

Before World War II, air power was negligible and therefore it was used in the tactical role only. Rapid progress was made during the two wars and during World War II capacity of the air power to destroy civilian population and the industrial economy of a nation was proved beyond doubt. Superiority in the Air is the main pre-requisite for successful prosecution of a war. The air superiority may be local and temporary or may

be widespread and sustained. Air power cannot be used to the best till the air superiority is achieved. The Air Force of a nation can be used in the following roles:

(i) Strategic long-range bombers and escort fighters.
(ii) Tactical short-range bombers and fighters and reconnaissance planes.
(iii) Support transportation of arms and troops etc.

The air attacks may be:

(i) **Precision**: Day light attacks on the selected" targets. This is only possible if a nation has complete air superiority.

(ii) **Saturation attacks:** Imply release of sufficient weight of missiles in a large number of raids carried frequently and over a sufficiently long period of time. These can be carried out in darkness. To be above the range of the Anti-aircraft gun the planes have to fly at height of 40,000 ft. or more.

4. The flexibility of Air Force is one of its permanent and important characteristics. From one's base area it can strike at many targets over a wide area and from widely separated bases it can strike at a single target or target system. Target system means a number of targets all related to a single target. Given centralised control of Air Force, the flexibility brings with it an immense power of concentration which is unequalled in any other form of the warfare. The target systems for air attack may be divided into point targets or targets of common denominators.

5. **Capabilities and limitations of Air Power:**

With advanced bases and air refuelling facilities, offensively, the air power can be used strategically anywhere in any country. The escorting friendly fighters can fight the enemy fighters and Thus, enable the bombers to deliver their bombs on pre-determined targets. With the use of the transport planes and para-troops the supplies can be dropped anywhere even behind the enemy front lines. The Radar facilities assist the pilots to recognise the targets from great heights and during darkness. Radar devices on the other hand also assist in locating the enemy aircraft, flying over a country. The general principles of air defence, therefore are:

(i) Destroy enemy air fleet on the ground and in the making.
(ii) Intercept the enemy bombers before they reach the target by the use of own fighters. Antiaircraft fire and Guided Missiles etc.
(iii) Good Radar System and Radio counter measures

6. **Economic Warfare**:

To destroy the ability of a nation to fight a war, economic blockades have been used since time immemorial. The destruction of the industrial production in a country is another form of economic warfare. During the last war air-power played important role in this connection. Accurate appreciation of materials, man-power, stage of industrial development, communication and supply system of a country is essential for the conduct of economic warfare. There are some industries which if curtailed have little effect on the front-line strength, except over a period of generations. Time also plays an important factor in this respect. Communication system, defence research installations and the industries if destroyed also affect the conduct of the war.

7.**Psychological Warfare:**

The aim of this type of warfare is to lower the morale of the nation and Thus, adversely affect the will of a nation to fight. The enemy will use all available means of spreading rumour and carrying out propaganda. The bombing of the industrial or other which are thickly populated is also sometimes to lower the morale of the population.

8. **Biological and Chemical Warfare**:

Although no country can afford to ignore Biological and Chemical Warfare, in its scheme of defence. It is unlikely that any serious plans exist for using such weapons as part an offensive strategy. We shall continue to hear the development of more powerful gases to destroy body and mind and of fresh research into the effect of germs and bacteria. The bulk of future effort will be on preventive measures to meet the use of such these weapons. There will be the temptation to use these weapons against countries badly disrupted by battle or bombardment and against backward countries who are particularly vulnerable to this kind of warfare. The efficiency of this warfare from the air is highly speculative and weapons highly untried. As the Biological Weapon could be mass produced cheaply they will always be there in stock as potential threat and C.D. for countering the same may have to be studied.

9. **Classification of Warfare:**

(i) **Conventional Warfare**: This means the war which involves the use of the conventional weapons like High Explosive and Incendiary Bombs and rockets etc. The pattern of this type of war is similar to World War II.

(ii) **Nuclear Warfare**: includes the use of nuclear weapons and rockets fitted with atomic warheads. Such a war may unlimited in it objects and scope. The growth of such weapons acts as a deterrent to a global nuclear strike. The destruction will be on enormous scale and the war complete destruction, may come to an end as soon as it is started. The survival is only possible if the defence potential of the nation is so mobilised, that it is capable of second strike after the enemy attack with rockets.

(iii) **Near-Conventional War**: a war of this type is substantially bigger than the usual conventional warfare. It is likely that tactical nuclear missiles may be used in such wars but such pons may confine to military targets only.

DEFENCE POTENTIAL OF A NATION

NATIONAL POTENTIAL
Maintenance of national policy and aim, Diplomatic and political integrity. Efficient administration will to fight and withstand war and to win high morale.

ECONOMIC AND INDUSTRIAL POTENTIAL Scientific development, Intelligence, Economic Technological research, material, Technical physically fit power.

FIGHTING POTENTIAL
Regular Army, Navy and Air forces, Reserve and Auxiliary force and volunteers, Security of base. Military intelligence Leadership, morale, training, modern weapon and scientific research, co-ordination.

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CHAPTER NO. 2

CIVIL DEFENCE

1.**Object**:

The ultimate aim of war is to force the national will on the enemy. This is done by destruction of his Armed Forces on the battle field and crippling his capacity to withstand war, demoralising the civilian population, destroying the industries and means of communication etc. The aim of the active military defence the Armed Forces is to destroy the enemy bombers before they reach targets and deliver the bombs. But it is almost impossible for any active defence system to stop all the enemy bombers from reaching the targets. Some of the bombers will always succeed in bombing the civilian population and the industries etc. The morale of the civilian population has a great effect on the war efforts on the nation and the national character plays an important role to keep up the morale. But continuous raids, resulting in the destruction of life and property will always have an adverse effect on the morale of the civilian population. Therefore, efforts have to be made to minimise the sufferings caused by the enemy air raids. The aim of all the Civil Defence measures is to protect the human life and property and to maintain the continuity of production Thus, minimise the effect of enemy action on man and material. In this precis we will study the problems and scope of Civil Defence, the history of Civil Defence and the lessons learnt in Civil Defence during the last war.

2. **What is Civil Defence?**

Civil Defence is the measures adopted by the civilian population. Government, local self-bodies, Voluntary agencies etc, during a war to minimise the effects of enemy action on men and material and these measures Thus, help the country and its Armed Forces to win the war in the battle fields. C.D. is essentially the defence of the citizen by the citizen and it is not the defence of the civil population by the Military. It is concerned with the general public and the local authority and hence it is essentially civil. Defence is a military term and is always progressive. Defence must always be well planned. C.D. is organised in most countries on a voluntary basis. It is a curious psychological phenomenon that as soon as a country engages in war there develops or is created among the masses a frenzy of patriotic excitement. Therefore, C.D. if well planned in peace time, will get everyone's support as and when there is a war.

3. **Scope of Civil Defence:**

Enemy air attacks affect many aspects of community life. Some of the important effects of air raids are given in the attached appendix. From the experience of last war, we have evolved the measures of protection against the H. E. and I bombs. The menace in a future war may be not only from these, but also from the Atom Bombs and various types of Guided Missiles etc. If new measures for the defeat of a new menace are to be evolved, they cannot be evolved from nothing. Unpreparedness of a nation to deal with the menace of enemy attacks on their cities will not only lower the morale of the population but will also create confusion. This will adversely affect the will of the people to fight. Therefore, the planning for C.D. must continue in peace and also the nucleus of C.D. Services trained in peace time so that the enemy cannot succeed in shattering the will of the nation to fight, by launching a sudden lightning attack. During the last war, the civilian population all over the world had shown that they were capable of facing any type of air raid and also heavy concentrated raids over a

period of not only days but months. The first shock of the attack is always very severe and hence preparedness in C.D. is a must.

4. C.D. is much misunderstood subject because it is often confused with A.R.P. (Air Raid Precautions) which signifies only those measures which are to be taken immediately before and during an air raid to deal with the damage caused by such raids. Many other measures are also necessary to deal with the indirect effects of Air Raids and such measures cannot be disassociated from the C.D. measures. All these measures are jointly termed as C.D. Measures and consist of the following:

(i) **Protective and preventive Measures**: These measures which may be taken before an air raid include, dispersion of population and industries, camouflage, evacuation, provision of arrangements for blackout and dimout of street and other lights, shelters, including trenches warning and training etc.

(ii) **Control Measures:** The measures which are taken as soon as a raid occurred include, reconnaissance and reporting of damage and UXB's. rescue of casualties, provision of F.A. and arranging for their transport, controlling the services at the incident, clearance of debris, controlling fires etc.

(iii) **Restorative Measures**: The restorative measures which become necessary after an air raid include, arranging for emergency feeding, clothing and sheltering, salvage of property, disposal of dead, disposal of UXB's. control of infection and contamination, repairs of damage to utility services etc.

5. **Industrial C.D:**

To win a war the continuity of production is essential and therefore the Civil Defence in Industries form a very important part of the total Civil Defence Plan of a nation. In war the industries have to process for the war requirements in addition to the normal community requirements. Some industries may have to change over to the production of war material only. Proper location and siting of industries during planning stage is essential from C.D. point of view. The industries should prepare a plan and evolve a suitable organisation for self-protection and the resumption of production after an air-raid. On the efficient Civil Defence measures will depend the morale of the industrial workers and capability of maintaining the continuity of production.

6. **History of Civil Defence:**

In India during World War II, C.D. Measures were carried out to a certain extent but were negligible as compared to other countries like the U.K. Before the World War, the C.D. Department in India was created mainly as a result of the growing threat of aerial bombing on Indian cities. In August, 1937, it was decided to set up a Central Air Raid Precautions Committee, consisting of the Secretary to the Governor General (Public) as Chairman and Representatives of a few other departments as members. The functions of this Committee were to study and explore the need for Air Raid Precautions in certain defined areas and make recommendations for initiation and coordination of requisite protective measures. Soon after the subject of A.R.P. was handed over by the Governor General to the Home Department, where a cell was set-up to deal with the subject. The actual creation of C.D. Department was postponed till 24th October, 1941, when the first C.D. member of the Governor General's Executive Council, Dr. Raghavindra Rao arrived from England. There was a rapid expansion of the department in the year 1942 and the peak figure of the staff was reached in February, 1943. The main functions of the C.D. Department were:

(i) To determine the general policy of A.R.P. to be pursued by the Departments of Government of India and by the provinces.

(ii) To advise the Central Government Departments and provinces on technical matters by producing manuals, films etc, setting up C.D. School.

(iii) To provide certain articles of equipment not procurable locally e.g. Trailer Pumps, Stirrup Pumps etc.

(iv) Arrange for experts from overseas for employment in the Training Schools. Fire Fighting and Provincial A.R.P Officers.

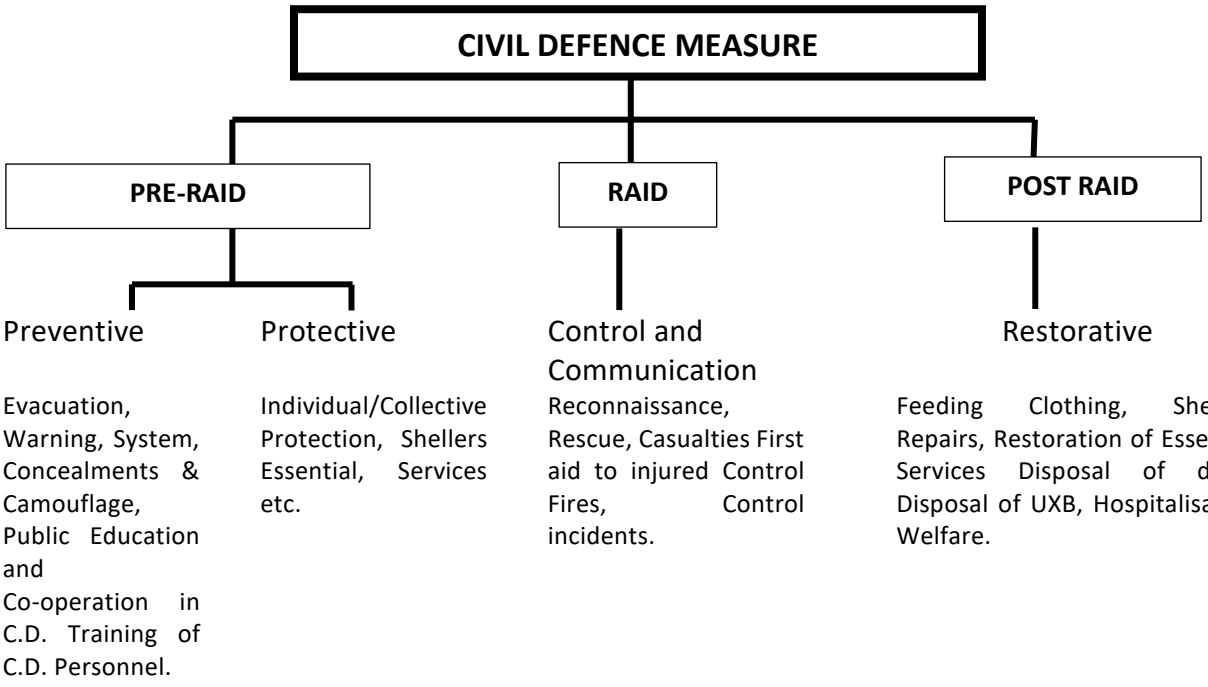
(v) To coordinate measures and secure unity in C.D. Provinces through India.

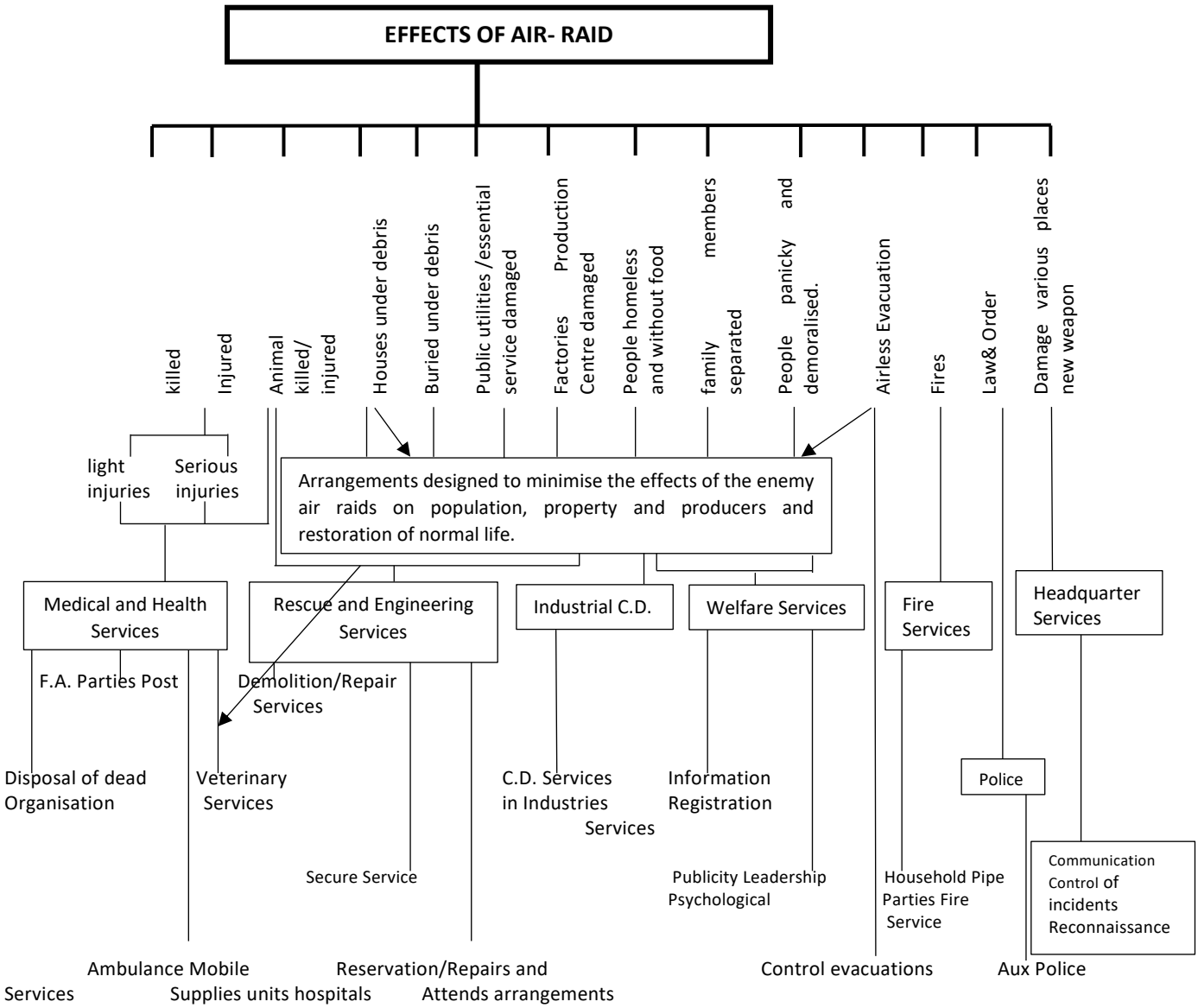
In September, 1943, C.D. Departments became the C.D. branch under Defence Department. August, 1945, the C.D. Branch further was reduced and was transferred Home Department 1946.

7**. Important lessons learnt during last War**:

As result experiences gained in the organisation of Civil Defence it has been observed that only thorough and early planning will help in the creation of a C.D. Organisation capable meeting the requirements in the actual time of emergency. Even though the air raids posed variety of problems in the past it was found that prevention and control of fires in the face of enemy's changing tactics, maintenance of communications under raiding conditions and need for closer cooperation with Defence Services, establishment of proper air raid warning system and training of volunteers and education of the public at large were of special significance.

Civil Defence operational plan should be flexible and well-practiced through experiences. Damages caused enemy raids should be quickly evaluated and experience reports circulated to all concerned in Civil Defence areas. Dispersed and well-thought out placements C.D. forces is of vital importance to prevent all forces from being knocked out of action by a single attack.


CIVIL DEFENCE MEASURE
PRE-RAID
RAID
POST RAID
Preventive
Protective
Control and Communication
Restorative
Evacuation, Warning, System, Concealments & Camouflage, Public Education and Co-operation in C.D. Training of C.D. Personnel.
Individual/Collective Protection, Shellers Essential, Services etc.
Reconnaissance, Rescue, Casualties First aid to injured Control Fires, Control incidents.
Feeding Clothing, Shelter, Repairs, Restoration of Essential Services Disposal of dead, Disposal of UXB, Hospitalisation Welfare.


EFFECTS OF AIR- RAID
killed
Injured
Animal killed/ injured
Houses under debris
Buried under debris
Public utilities /essential service damaged
Factories Production Centre damaged
People homeless and without food
family members separated
People panicky and demoralised.
Airless Evacuation
Fires
Law& Order
Damage various places new weapon
light injuries
Serious injuries
Arrangements designed to minimise the effects of the enemy air raids on population, property and producers and restoration of normal life.
Medical and Health Services
Rescue and Engineering Services
Industrial C.D.
Welfare Services
Fire Services
Headquarter Services
F.A. Parties Post
Demolition/Repair Services
Disposal of dead Organisation
Veterinary Services
C.D. Services in Industries
Information Registration
Police
Secure Service
Publicity Leadership Psychological
Household Pipe Parties Fire Service
Communication Control of incidents Reconnaissance
Ambulance Mobile Services
Supplies units hospitals
Reservation/Repairs and Attends arrangements
Control evacuations
Aux Police

CHAPTER NO. 03

HIGH EXPLOSIVE BOMBS-CONSTRUCTION, TYPES & EFFECTS

1. Aim:

The aim of this lesson is to study simple construction, types and effects of H. E. Bombs.

2. **Explosion**:

Fundamentally, explosion is a sudden burning with noise. High explosive substance is one which is capable of violent explosion. "Low or High" explosive denotes the speed at which the solid is converted into gas. Artillery propellants like gun-powder etc. are low explosives as they are converted into gas in 1/30th of a second, while substance like TNT (Tri Nitro Toluene) of a H.E. Bomb requires only 1/10,000th second. Such a rapid explosion is called "Detonation".

3. **High Explosive Bombs-Construction:**

A high explosive Bomb (also termed as a high explosive missile) consist of mainly three parts. The nose, body and the tail unit. These bombs are designed for dropping from the air with the help of bombers.

4. **The Nose:**

(i) **The Exploder System**: The nose part of the bomb consists of the exploder system which usually has got four parts. The fuse, initiator, detonator and booster. Here a small spark is converted into the explosive energy which is required to detonate the main filling of the bomb. It is usually the fuse which protrudes outside the main body of the nose and the other three parts are inside the body. There could be more than one fuse fitted on other parts of the body. In some of cases it may be even at the tail.

(a) **Fuse**: Provides initial energy for explosion. It may be mechanically or electrically operated. It may be designed to detonate at a pre-selected moment.

(b) **Initiator**: It is frequently incorporated in the fuse. It is generally a very sensitive explosive like ASA mixture (Lead azide, Lead Styphnate and Aluminium powder) or fulminate of mercury.

(c) **Detonator**: It is usually a little less sensitive explosive. It may contain layers of two or more explosives and may contain a powder pellet between two layers of sensitive explosives to produce delay before the firing of the booster. The explosives are usually tetryl, lead oxide or PETN wax (Penta Erythrite Tetra Nitrate).

(d) **Booster**: It varies considerably in size depending upon the size of the bomb. The commonly used explosives are tetryl, picric acid or granular TNT. At times it is also laced through the main filling.

(ii) **Types of fuses**: For a bomb to achieve the required effect, different types of fuses are used. At times more than one type of fuse could be fitted in the bombs. The common types are:

Proximity: Operates within a pre-set distance from the target.
Impact: Operates on impact.

Shor tdelay: Operates a few seconds after impact.
Long delay: Operates at a pre-determined time after impact. It may be hours, days or even weeks.
Anti-disturbance device: The fuse gets commissioned only after the bomb has come to rest and operates when a particular type of influence is received.

(iii) **Fusing Procedure:** The fuses are not inserted into the bomb until it is prepared for operational use. Pockets are made in the bomb casing to receive fuses. These may provided in nose, body or tail of the bomb. All fuses carry safety device incorporated in them and are not made alive till the bombs are dropped clear of the aircraft.

5. **The Body:**

(i) **The Case:** The body is made of steel casing with a carrying lug and carrying band. The primary function of the casing is to hold the high explosive main filling and the exploder system intact until the predetermined moment of explosion. The thickness, the shape, composition and manner of construction depend upon the type of the bomb. Near the tail unit usually there is a hole for the high explosive, known as the filling plug. The casing will also have the marking on it showing the type and date of manufacture, batch number etc. with the help of the coloured bands and stampings.

(ii) **The main filling**: The basic requirements of a main filling are that it should be a powerful, insensitive and that even a commercially available one should do the job. The most commonly used substance is the TNT. This is usually cast filled inside the casing through the filling plug. The ratio between the weight of the main filling to that of the bomb is known as "Charge/weight" ratio (C/W).

6. **The Tail Unit:**

The tail unit, usually in the form of fins or circular drums is fitted to the body. The idea is to maintain stability and accuracy in flight. The unit is usually revetted, welded or screwed to the case and therefore usually gets detached when the bomb hits some target or penetrates inside. The shape size material and method of construction depend upon the types of the bomb.

Effects of H.E. Bombs.

H.E. Bombs cause damage on account of:

7. **Impact**:

This is the force with which the bomb strikes the target. It is dependent upon the weight of the bomb and the height from which it is dropped.

8. **Penetration**:

The depth to which the bomb will penetrate is dependent upon its angle of incidence, its shape, nature of target it strikes and how the surface of the target is supported.

9. **Blast**:

(i) **Nature of Blast:** When a high explosive charge in a bomb detonate, each cubic inch of explosive is instantly converted into gas, about 10,000 times its original volume. The enormous pressure (about 500 tons per square inch) developed, shatters the metal bomb case into fragments liberating the compressed gas into the atmosphere. An intense air pressure of "shock wave" is formed in the air immediately surrounding the exploding bomb. This sudden air pressure is known as "blast". The shock wave appears in two phases.

"**Positive Pressure Phase**": which lasts for 0.005 seconds, and
"**Suction or Negative Pressure Phase**": which lasts for 0.025 seconds.

(ii) **Effect of Blast on Buildings**:

(a) **Blast in open air:** These two phases together cause damage to buildings, over a wide area. Walls, windows, glass panes, doors and roofs are broken and damaged by being forced either inwards during the pressure phase of outwards during the suction phase. Independent walls or fence may be toppled over. Some tiles and roofs may be blown off the buildings. Trees are often stripped of their leaves but tree trunks, chimneys and other well anchored objects with small surface area (around which the blast can easily flow) are frequently left undamaged quite close to the explosion. Glass splinters and pieces of debris fly in all directions.

(b) **Blast indoors:** With a bomb exploding inside, a building with heavy walls and a few closed windows will in general be damaged to a greater extent than a building with lighter walls and large open windows.

(iii) **Effect of blast on human beings:**

(a) **Direct Effects**: The blast is strong enough to strike a severe blow to a human body standing within 30 to 50 feet. This blow affects mainly the internal organs on that side of the body which faces the explosion and may cause bleeding from them-especially from the lungs. The blast may lift and throw a human being in most unimaginable spots. Rupture of ear drums is quite common if the direction from which the explosion occurs is suitably located.

(b) **Indirect Effects**: Persons may suffer from crushing injuries, fractures of bones and suffocation as a result of being trapped under buildings which may fall as a result of the blast. The pieces of debris or glass pieces of window. panes may act as missiles and cause injuries. Many of these pieces attain very high speeds and lead to penetrating injuries of the human body.

10. **Fragmentation**:

When a bomb detonates, its case is shattered into a large number of fragments or splinters which are thrown away violently from the centre of explosion at high velocities. Splinters fly outward and upward. Owing to the rough and jagged edges of bomb fragments and their erratic paths of penetration they produce very large and painful wounds which cause a high percentage of deaths and permanent disabilities. The irregularly shaped, very fast travelling fragments of the bomb case cause severe types of penetrating and perforating injuries. These are usually misleading in their extent as there could be no set route to be followed by them inside the human body. They cause pock marks on the surrounding walls and can also puncture metal containers.

11. **Earth Shock:**

When a bomb explodes below the surface of the ground series of shock waves are set up through the earth. This breaks the underground pipes and cables and the foundations of the nearby buildings are damaged seriously. In contrast to the effect of blast, chimneys of houses are the first to suffer.

Types of H. E. Bombs.

H. E. Bombs can be divided into the following types in accordance with the purpose for which used:

12. **Blast Bombs**:

These are thin case bombs fitted with impact or proximity fitted fuses. The charge weight ratio is about 80 percent. It is used against area targets (such as industrial towns). It produces maximum blast effect. Generally large in size, 2,000 lbs. or more and do not have streamlined shape.

13. **Fragmentation or Anti-Personnel Bomb:**

Designed to cause damage and casualties by splinters. Casing is comparatively thick and grooved. Sizes commonly used are 20 lbs. and 50 lbs. Large sizes (up to 500 lbs.) are designed to be used against concentrated targets to cover a large area, generally scattered in large numbers from containers. Certain types are fitted with devices to slow up their descent and to prevent penetration in the ground when use with delayed fuses. These may also be fitted with anti-disturbance fuses.

14. **The Penetration and Armour Piercing Bombs**:

These are usually designed to penetrate the objects and therefore have a strong body and pointed nose. Fuses, usually delayed and seldom fitted at the nose. The armour piercing ones usually have 7-20 percent charge to weight ratio and weight 2,000 to 5,000 lbs. and used against heavily protected targets like capital ships, important buried installations and shelter. The Penetration bombs are usually heavy about 20,000 lbs. or so and 40 percent C/W ratio used against massive underground targets where move earth shock is essential for their destruction.

15. **General Purpose Bombs:**

Designed to cause damage by earth shock, blast and fragmentation. Effective against fairly dispersed residential buildings, industrial targets railways, docks and shipping. Charge weight ratio 50-60 percent. The weight may be 500-8000lbs. It may be with one two or more fused fitted in nose, tail or side. Impact and short delay fuses are most commonly used. It has the characteristic midway between those of blast and penetration type.

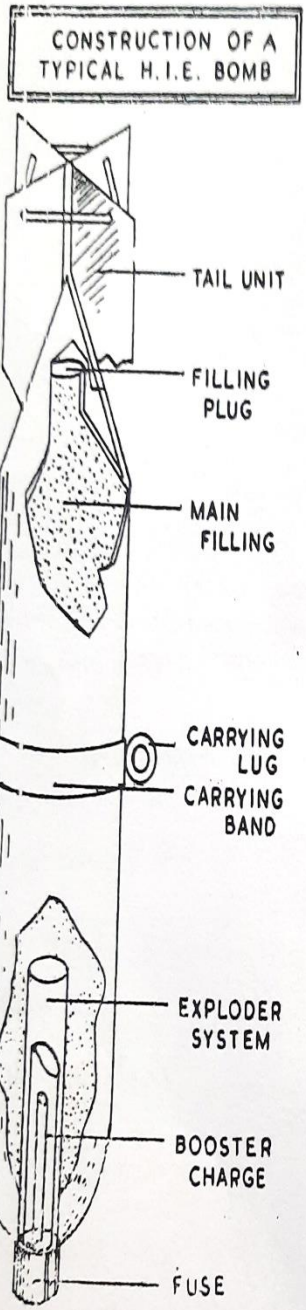
16. **Classification according to thickness of casing:**

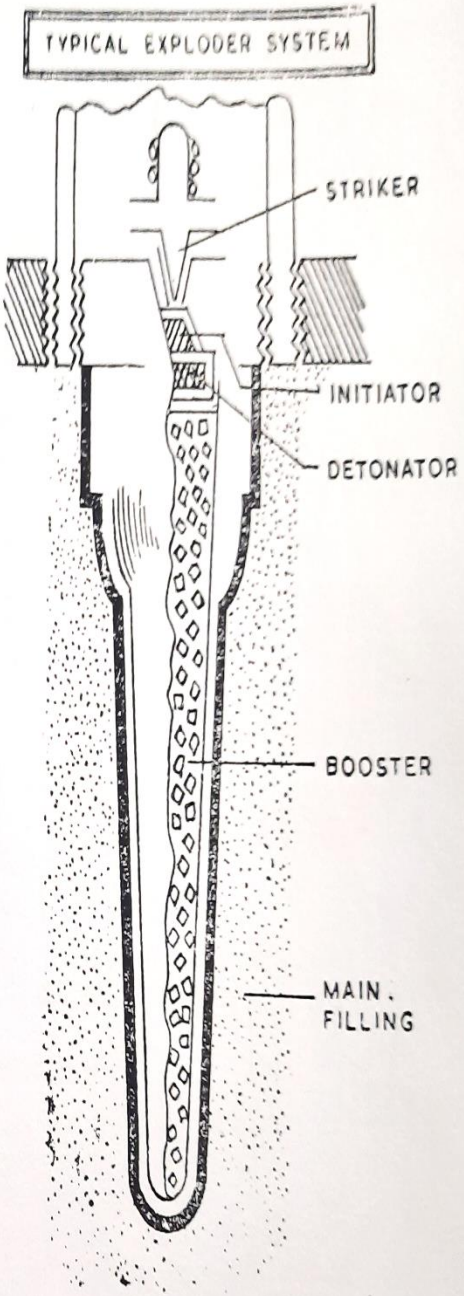
H.E Bombs can be broadly speaking, divided into the following three main types according to thickness of casing.

(i) Light Case Bombs (Blast Bombs).

(ii) Medium Case Bombs (G.P and fragmentation Bombs).

(iii) Heavy Case (Armour piercing and penetration Bombs).


CONSTRUCTION OF A TYPICAL H.I.E. BOMB
TAIL UNIT
FILLING PLUG
MAIN FILLING
CARRYING LUG
CARRYING BAND
EXPLODER SYSTEM
BOOSTER CHARGE
FUSE


TYPICAL EXPLODER SYSTEM
STRIKER
INITIATOR
DETONATOR
BOOSTER
MAIN FILLING

CHAPTER NO. 04

INCENDIARY BOMBS-TYPES, EFFECTS AND PROTECTION

1.**Aim**:

The aim of this precis is to study the types of incendiary bombs, their effects and protective measures against the same.

2.**Construction**:

A typical incendiary bomb consists of a container, usually a metal case, filled with an incendiary agent and fitted with a fuse to ignite the same on impact. The casing sometimes is made of a material which itself will catch fire and burn fiercely. This may start fires at places wherever the burning pieces of the casing are scattered. An incendiary agent is a chemical capable of getting ignited quickly and in turn setting fires to materials and causing burns to people. During combustion of such an agent, sufficient heat and flames are generated to set fire to ordinary combustible material. The different types of incendiary agents are discussed below.

3. **Incendiary Agents:**

These agents can be divided into four classes:

(i) **Spontaneously inflammable material**: Phosphorous is the most important material under this head. On exposure to air it combines with Oxygen and gets ignited spontaneously, adheres to clothing, causing burns and burns with a pungent smell.

(ii) **Metallic Oxides**: Thermite/Thermate is an important incendiary agent, in this class. This is used in industries for welding iron and steel.

(iii) **Oxidising combustible material:** Magnesium is an important metal in this category. It burns with a dazzling light. It cannot be quenched with water.

(iv) **Flammable material**: Resins, solid oil and flammable oils like petrol fall under this category. These can be used either as liquid primary incendiary agents or secondary incendiary material to propagate and prolong incendiary action of the primary material in a bomb.

4. **Types of Incendiary Bombs:**

Generally small bombs are dropped in a scatter type to saturate the area targets. The bombing is done intensively for specific buildings which are more difficult to ignite and heavier type of bombs are used.

(i) **Phosphorous Bombs**: These are small bombs containing Phosphorous. During the last war they were used by the Japanese. Phosphorous is harmless when wet, but it ignites as soon as it becomes dry.

(ii) **Solid Oil Bombs (6 lbs.):** Consists of light sheet metal casing filled with solid oil. The bomb is opened by a small explosive ejection igniter, which ignites and expels the fillings. The incendiary effect is entirely upwards and therefore not very effective.

(iii) **Kilo-Electron Bombs**: This was the most effective incendiary missile used during the last war. It consists of magnesium case filled with Thermite. The Thermite filling is ignited first and burns at a temperature of 3000°C. for about a minute melting and setting fire to the magnesium casing which in turn burns for about 10 minutes at a temperature of about 1300°C. It looks violent for the first minute and therefore causes fear and panic in the public. There being no explosion when it falls, it is not easily noticeable. After ignition it can penetrate through wood and metals and Thus, spread fire in places not easily accessible. Chemical Extinguishers are not very effective against these bombs. The weight being very light a large number can be

carried in one bomber. Since Thermate contains its own Oxygen it cannot be extinguished by quenching or smothering.

(iv) **Magnesium Bomb with High Explosive Attachment**: Explosive attachment when attached to a Magnesium Bomb controls, turns it into a potential lethal weapon. Such an attachment assists in the rapid spread of fire because when the explosion takes place the burning fragments of the bomb are flung in all directions and each of these may start a fire.

(v) **Large Solid Oil Bombs (250-500 lbs.)**: Consist of light casing filled with heavy oil or oil and petrol mixture and containing a small explosive charge to detonate the bomb. In this category is a bomb called Napalm Bomb described below:

(vi) **Napalm Bomb**: Napalm Bomb combines in one single missile, characteristics of an incendiary and an anti-personnel bomb. The size of Napalm Bomb is expressed in terms of the capacity of its filling in litres. The bomb commonly used has a filling of 455 litres. The body of the bomb is usually made of Aluminium alloy.

The filling is in the form of a gel-90% of which is mechanical transport fuel i.e. petrol. The gelling agents often used are Alco-Soap. Napalm Bombs and Palmitate or Pyridine and Xylenol and account for the remaining 10% of the filling of the bomb.

5. **Effects of Incendiary Bombs:**

(a) A large number of incendiary bombs could be carried in a plane and dropped over a city, resulting in simultaneous outbreak of fires at a number of places. It becomes impossible for the regular fire services to attend to so many fires at different places and at the same time. Most of these fires turn into major conflagrations causing wide-spread destruction to life and property and in case of a saturation attack in a compact built up area, large number of such bombs are dropped with a view to set on fire every possible structure. When large number of buildings in an area are on fire, a great column of heated air and swirling smoke rising from the centre of the area causes inward rush of wind at high velocity. Sometimes the velocity of the wind rushing towards the centre of the conflagration is great enough to hamper the progress of firefighting and rescue operations. This wind might limit the area of fire, but on the other hand, it feeds the fire with such a large supply of Oxygen that it is practically uncontrollable. Such a condition in an area of burning materials is termed as "fire storm".

(b) **Effects of Napalm Bomb:** The Napalm Bomb is preferred to conventional incendiary bomb because it can be dropped by an aircraft from low altitude without risk of blast and splinters. When a bomb is dropped from air, its filling is ignited and scattered in all directions causing several fires around the ground burst. Besides, there is also a possibility of a large fire starting at the point of explosion. The flames from a Napalm Bomb shoot up to 9 to 12 M in 8-10 seconds on explosion and the burning contents are spread all round. The area affected is elliptical, about 40 M long and 15 M across. The scatterings from the bomb keep on burning for about 10 minutes. The temperature reached in the fire caused by Napalm Bomb is about 1500°C. The bomb also produces high concentrations of carbon monoxide which can be lethal in closed structures or built up areas.

Napalm Bomb is likely to set ablaze all combustible or inflammable objects which may be hit by its burning contents. In case the burning gel falls on personnel, it sticks to the body like coal tar keeps on burning and produces very serious burns.

6. **Destruction by L.B. in second world war:**

Incendiary bombs were used during the last war in ever increasing quantities. In July 1943, the British attack on the German city of Hamburg by Incendiary bombs was responsible for the destruction of about 60 percent of the city. In March and April 1945, the incendiary bomb attack on Tokyo left practically the entire city in ruins. It is estimated that about 80 percent of the damage done to the cities during the last war was due to Incendiary Bombs.

7. **Principles of protection against Incendiary Bombs and resultant fires:**

The following are the important measures that should be taken for protection against Incendiary Bombs:

(i) Removal of inflammable material from the buildings especially the top floors and roof spaces.

(ii) **Dispersion of important inflammable stores**: These should be kept where the risk of fire is least.

(iii) **Observation:** Early information about the falling of the bomb helps to control the fire and hence the necessity of fire watching.

(iv) **Means of access**: Arrangements made to reach all parts of the buildings.

(v) **Small fire-fighting equipment**: Like buckets of water and sand, stirrup pumps, shovels and axes etc. should be readily available at positions known to all users.

(vi) **Training:** Every able-bodied man and woman should understand the action to be taken to deal with the incendiary bombs and fires.

(vii) **Water**: Storage of water should be arranged.

(viii) **Chemical Fire Extinguishers**: The use of the fire extinguishers should be known to all where these extinguishers are supplied to deal with the fires.

8. **Methods of dealing with incendiary bombs**:

(i) **Magnesium Bombs**:

(a) **Sand Method**: In this method the bomb is smothered with a three-quarter filled sand bag and then removed to a safe place. This method is used if the bomb can be reached before surrounding materials have caught fires and/or if the bomb falls in close proximity to stores which might be damaged by the spluttering caused by the water method. When using sand, the bomb should be approached crouching by a man wearing eye-shields, carrying a three-quarter filled sand bag across his face and body. The sand bag should be placed on the bomb and the sand NOT poured out.

(b) **Water Method**: In this method a fine spray of water is played on the bomb casing causing it to react violently and burn itself out in a comparatively short time. This is done by means of a hand stirrup pump and hose fitted with an immediate change over nozzle for spray and jet. At first the surrounding fire is extinguished by playing a jet of water on it. This jet should not be used on the bomb itself. which must be extinguished with the spray as soon as the material fire has been put out. If the water is applied in a larger volume, either in the form of a jet or from a bucket of water, the effect is that while the accelerated combustion takes place, the burning magnesium will be violently scattered in all directions. Water applied in the form of a fine spray does not cause this violent scattering.

(c) **Magnesium Bomb with High Explosive attachment**: A certain proportion of incendiary bombs may contain an explosive charge. When this type of bomb explodes it scatters molten magnesium and steel splinters over considerable distance and the steel splinters are capable of causing lethal wounds at close quarters and serious wounds at 50 feet. Whilst burning, these bombs behave in the same way as the ordinary incendiary bomb until explosion takes place. They generally explode within about 2 minutes after the bomb starts to burn. If an incendiary bomb falls on the premises in which it would quickly cause a serious fire, the risk that the bomb may be of the explosive type must be accepted and the bomb must be tackled alone. If it is

necessary to attack the bomb from close quarters, use should be made of Cover which is available.

(ii) **Solid Oil Bombs**: The methods employed for small Magnesium bombs are also applicable to dealing with small solid oil bombs. As burning oils float on water care should be taken not to direct a stream of water on a pool of oil and Thus, spread the fire. Chemical extinguishers, particularly those of the foam type are specially effective against burning oil.

(iii) **Phosphorous Bombs**: Fires caused by Phosphorous filled bombs are easily extinguished with sand or water but they reignite on drying. It is therefore necessary after extinguishing a Phosphorous fire with water to keep all contaminated material wet until it can be removed. In removing phosphorous in sand or when wet with water great care should be taken because phosphorous causes dangerous burns.

(iv) **How to deal with fires caused by Napalm Bombs**: The following action should be taken to control the fires caused by Napalm Bombs:

(a) If the main body of the fire is at a place where no combustible material is likely to be set alight either directly or by the radiated heat from the burning gel, it should be left alone to burn itself out. However, if the radiated heat from the fire is likely to endanger the surrounding property which may be of a combustible nature such property should be cooled down by spraying water over it with the help of stirrup pumps or by hand.

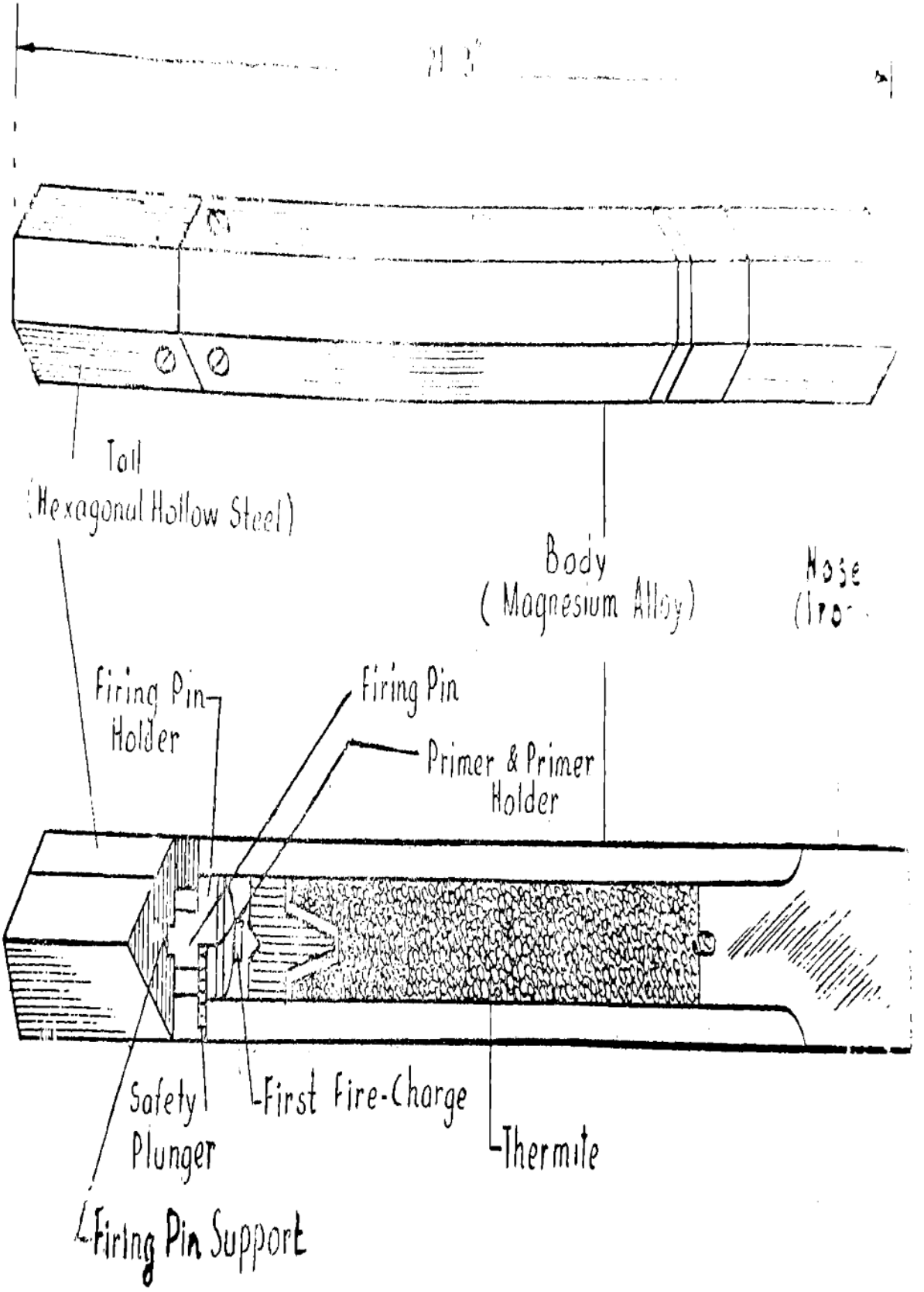
(b) If the main body of fire has already involved a large quantity of combustible material. It is safer to call the Fire Brigade immediately.

(c) Small fires in scatterings of the bomb should be tackled immediately with the help of sand or dry loose earth. If Dry Powder Fire Extinguishers are readily available, several small fires in the scatterings could be extinguished with spectacular rapidity by a single extinguisher.

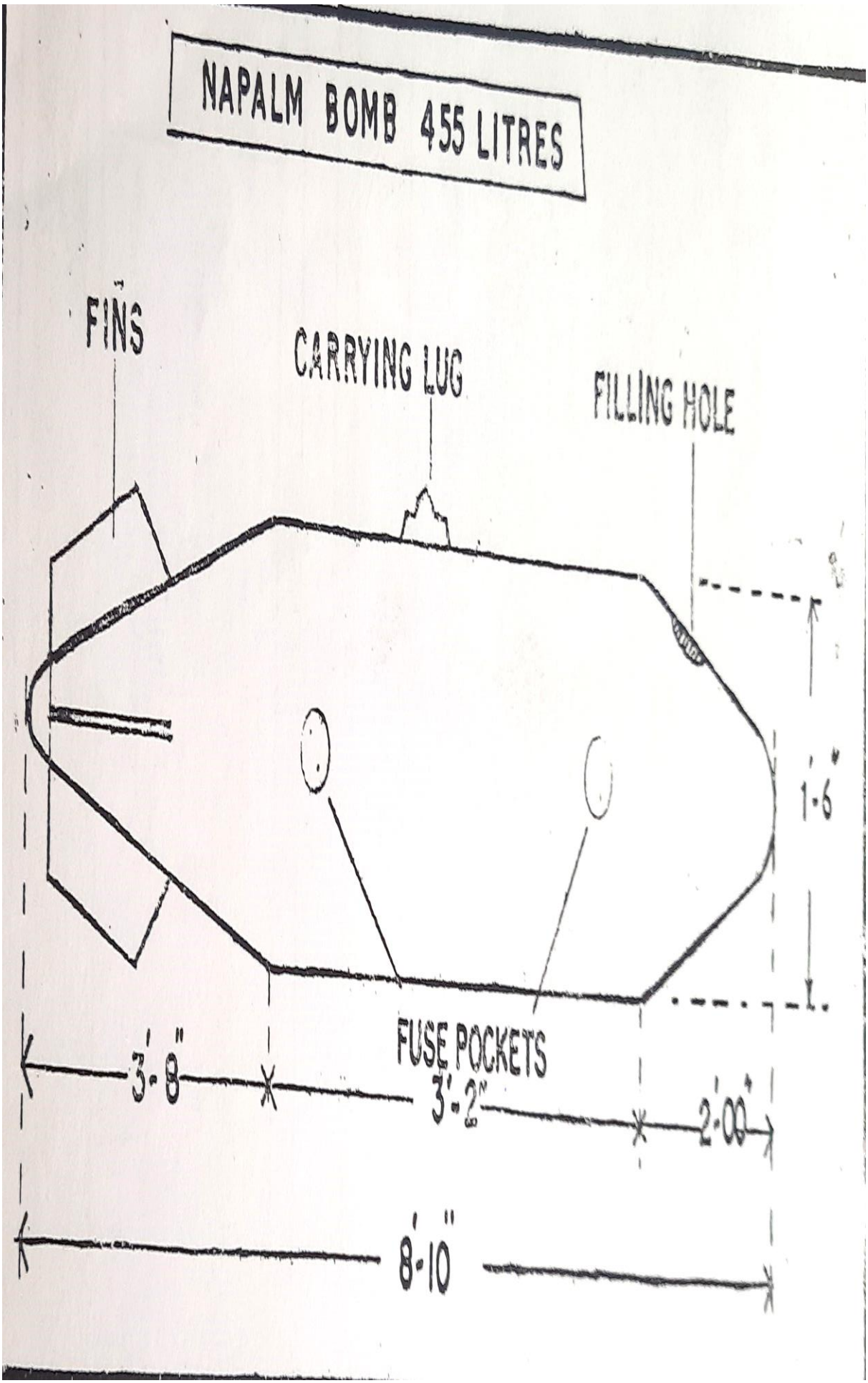
(d) If the burning gel hits any person(s), an attempt should be made to dislodge the burning gel from the body with the help of a stick. Simultaneously an attempt should be made to extinguish the burning gel by throwing sand or dry loose earth on it. The burning clothing should not be extinguished with water. The affected person should lie down on the floor and roll. He should also be wrapped in a blanket or any thick sheet.

9**. First-aid:**

Burns caused by burning gel from a Napalm bomb cause severe third degree burn injuries. Suitable burn dressings should therefore be kept handy for immediate first aid and the affected person(s) removed to hospital immediately for further treatment.



MAGNESIUM INCENDIARY BOMB (4 LBS.)


NAPALM BOMB 455 LITRES
FINS
CARRYING LUG
FILLING HOLE
1'-6"
FUSE POCKETS
3'-8"
3'-2"
2'-00"
8'-10"

CHAPTER NO. 05

FIRE SPREAD AND CONTROL: GENERAL ORGANISATION CIVIL DEFENCE FIREFIGHTING SERVICE

1. **Object**:

In the event of an Incendiary Bomb attack large number of fires may be started simultaneously. The existing services in a town will not be able to meet the situation unless they are supplemented by Auxiliary Fire Services and House Fire Parties Each House holder will also have to do his best to control the fire and not allow the fire to spread. It will help to control the fire if all concerned with the Civil Defence know the basic principles of the process of combustion and the modes of spread of fire.

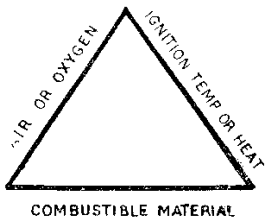
2. **Fire**:

When light and/or flame are/is produced during combustion, it is called 'Fire.'

A combustible substance must heated to a certain temperature before it can burn. The following three elements are essential for combustion and its continuation.

(i) Oxygen.
(ii) Sufficient heat to raise the temperature of the fuel to its burning point (ignition temperature).
(iii) Combustible or burnable material (solid, liquid or gas).

It should, therefore, be remembered that three things or conditions are necessary to start a fire and to sustain it-fuel, oxygen (air) and sufficient heat to raise the temperature of the fuel to its burning point (ignition temperature) and these three must be present at the same place and time. This is analogous to the geometrical figure of a triangle given below: -



It following from the above that fire can be extinguished if anyone or more of the three things or condition is/or are removed from the scene. The fire can Thus, be extinguished by: -

(i) **Starvation:** This implies removal of fuel and can be achieved by:

(a) Segregation of fire and unburnt fuel by removing either of them e.g. removing unburnt combustible material from a room on fire switching off fuel to an air craft engine on fire etc.
(b) Sub-division of large fire into smaller ones to prevent the radiated heat from setting alight combustible material at some distance.

(ii) **Cooling**: Cooling implies removal of heat to lower the temperature of burning material to a point below its ignition point. This is usually done with water. When water is applied to a burning material, it absorbs heat, becomes hot and flows away from the fire or is converted into steam. The burning substance loses the heat which is absorbed by water and if the application of water is continued its temperature comes down to below its ignition temperature and the fire is extinguished.

(iii) **Smothering**: 'Smothering' means restricting the supply of oxygen (air). This is also called 'blanketing' and is done by sealing off the burning material from oxygen (air) by covering it with sand/dry earth/foam by creating an atmosphere over the fire heavier-than -air of inert gas.

3. **Modes of Fire spread and its prevention:**

It has been recognised that fire spreads by the transmission heat in one or any combination of the following four ways: -

(i) **Conduction**: Many materials which will not burn easily themselves, particularly metals are good conductors for transmitting heat. In case fire, these materials on being heated by the fire may ignite other combustible materials with which these may be in contact though there may be distance between the material and the source of heat. In order to prevent this either is to be extinguished or the conducting material is to be removed or cooled.

(ii) **Convection**: Hot smoke and gases tend to rise until a ceiling or roof is reached after which they spread sideways or in mushroom manner and ignite combustible materials located at higher levels than the original fire e.g. fire spreading in top floor of a closely built up urban locality, while there is no fire on the ground or the middle floors of the same building. The best method to check this remove or cool the combustible material. These fires call for professional help of the fire service.

(iii) **Radiation**: The transmission of heat from the source of fire, without heating the midway media, e.g. air is called radiation. This can be experimented by placing a piece of paper in front of a fire in a grate where the hot gases are going up chimney the paper will char. The effects of radiant heat be countered by forming a "Water Curtain" between the burning building and the object to be protected or alternatively the combustible material or the object to be protected or alternatively the combustible material or the object may be removed or cooled.

(iv) **Direct burning**: This is self-explanatory. Direct burning is often due to a combination of the above two or three viz. conduction, convection and radiation. Most fires spread because of direct burning. It may be necessary to seek professional advice about the structures regard to their susceptibility to direct fire.

4. **Flying Sparks/Brands:**

The heated air above the fire carries small pieces of flaming material. These are sometimes carried to great heights and the wind may also drive these to other places located at considerable distances from the original source of fire. These sparks alighting on flammable material will ignite it. In the event of a fire the occupiers of premises on the periphery of the original fire especially those who are likely to receive fire sparks on account of the direction winds etc. should be warned to keep a careful watch on all points where further outbreak of fire might develop.

The risk that fire will spread to adjoining building depends on many factors such as nature and of construction, position of windows and other openings the width of streets and court-yards, open spaces, parks etc. Windows are of particular importance, in event of a fire, as heat rapidly shatters glass and allows the flames to escape into the windows on the higher floors.

5. **Auxiliary Fire Services (Trailer Pump Parties):**

(i) **Organisation**: An Auxiliary Fire Service will consist of Trailer Pump Parties. Each Trailer Pump Party should have one Leader, one Driver-Mechanic, six Firemen and one Messenger. These are to be manned by Home Guards.

(ii) **Scale**: The scale is one Trailer Pump Party per 25,000 population with the provision of a 25% reserve.

(iii) **Equipment**: The equipment authorised at present comprises one Trailer Pump Unit per party. The auxiliaries etc. may be seen in the Ministry of Home Affairs publication entitled "Master Plan for Civil Defence". The present scale of equipment to gether with the whole question of auxiliary fire services is under consideration in the Ministry of Home Affairs.

(iv) **Location**: The Auxiliary Fire Service Units should be located near enough the fire risk areas but sufficiently away from the likely targets. For this purpose, various localities in a town or city may be classified according to the following risk categories.

(a) **Class "A" Risks**: Large business premises, warehouses, large retail shops and stores, large works, ammunition stores and factories Aeroplane stores, docks, timber yards, railway depots, oil and petrol depots, refineries and similar risks.

(b) **Class "B" Risks**: Localities containing small factories, medium sized shops, warehouses not exceeding three storeyed store yards (excluding timber yards), public garages, small oil depots and similar risks.

(c) **Class "C" Risks**: Localities containing residential and small shop properties.

6. **House Fire Parties:**

(i) **Organisation**: A House Fire Party consists of four persons. The House Fire Parties should be regarded as an extension of the Wardens Service and the Chief Warden and the Divisional Wardens will also be responsible for the organisation of the House Fire Parties, recruitment training and the storage maintenance and distribution of the equipment. In each Warden Post area under a Post Warden, his deputy will be in-charge of the Hose Fire Parties located within the area.

(ii) **Scale**: One Party per 500 of the population may be set up. This scale may however, be reduced as considered appropriate by the Directors of Civil Defence at their discretion.

(iii) **Equipment**: The equipment for each party comprises one Stirrup Pump. 2 buckets, one torch and one hand axe. One steel helmet and one whistle the per member is envisaged as personal equipment. A reserve of 10 % should be provided.

(iv) **Training**: Members of House Fire Parties should be trained in the use Stirrup Pump and to deal with the Incendiary Bombs the resultant fires. In order to enable them to discharge their duties efficiently their training should include instruction in principles of combustion, fire extinction, modes of spread fire and fire prevention. They should also be trained in the use of different types of portable chemical fire extinguishers.

(v) **Fire Watching**: Members of House Fire Parties will act as "Fire Watchers" i.e. to watch for the fall of the Incendiary Bombs and the fires caused by them, so that these fires could be dealt with in their incipient stages.

7. **Water supply:**

Adequate supply of water is vitally important for fighting a fire. Without adequate water supply all other arrangements howsoever well organised these may be, will become ineffective. The following action should, therefore be taken: -

(i) Exploration of every possible natural source of water supply -lakes, ponds, pools etc.

(ii) Installation of fixed tanks in principal fire risk areas.

(iii) Provision of tanks reservoirs and wells.

(iv) Advice to the house-holders to store sufficient water at all times.

8. The requirements for water supply for fire-fighting during air raids should be worked out on the scale given below: -

Scale	Water supply required for fire fighting	Gallons
For C.D town with three lakh population:		
a) Peace time		
At 4000 GPM per 50,000 population	100 minutes @2400 GPM	supply 2,40,000
(b) Extra for wartime		
At 250 GPM per 25,000 population	100 minutes @300 GPM	supply 3,00,000
	Total	5,40,000

Note: The above formula is applicable to all C.D towns of and below 3 lakh population.
For C.D. towns with six lakh population:

(a) Peace time		
At 4000 GPM per 50,000 population for first 3 lakhs and at 400 GPM per 1,00,000 subsequent population.	100 minutes @3600 GPM	supply 3,60,000
(b) Extra for wartime		
At 250 GPM per 25,000 population	100 minutes @600 GPM	supply 6,00,000
	Total	9,60,000

NOTE: -

1. The above formula is applicable to all C.D. towns having a population of over three lakhs.
2. The above yardstick is for general guidance only. Actual quantity of water required has to be assessed after taking account other factors, like the layout of the built-up area, topography and special risks.

CHAPTER NO. 06

STIRRUP PUMP-USE CARE AND DRILL

1. **Object**:

After an Incendiary Bomb attack a large number of small fires may be started simultaneously. For extinguishing these fires by water, stirrup pump is the best first aid firefighting equipment. The object of this lesson is to study the use of Stirrup Pump its care and maintenance and drill.

2. **Introduction**:

The Stirrup Pump is an excellent piece of first aid firefighting equipment essentially designed for use on small fire. It is capable of making very effective use of limited water supplies. The Pump would prove to be very useful in localising and controlling fires. It can be used in an emergency by two people and even by one. The normal Stirrup Pump team however should be of four.

3. **Construction**:

The pump is of very simple construction. There are only three moving parts viz.
(i) the plunger tube, to the bottom of which is fitted the piston.

(ii) the metal ball which acts as the non-return valve in the piston.

(iii) the metal ball which acts as the foot valve in the metal strainer of the base of the barrel.

In the bottom of the pump is a strainer which can be unscrewed and taken out if necessary for cleaning. The pump is provided with not less than 8 metres (=26 feet) length of half inch bore rubber tube to which a dual-purpose nozzle is fitted for getting a jet or spray by working its slide. With 45 double strokes per minute and the nozzle held horizontally at a height of 1.5 metres (= about 5 feet) from the ground the jet will hit the ground at a horizontal distance of not less than 9 metres (=29 ½ feet) from the nozzle. The consumption of water will be about 1 to 1 ½ gallons per minute and if spray is used the range of fine spray will be about 15 to 20 feet water consumption 3/4 gallons per minute.

4. **General Uses:**

Stirrup Pump can be used to extinguish any small fire for which water is suitable. Spray may be used on small oil fires to cut off oxygen and for cooling the surroundings of scene of fire.

5. **Testing**:

Stirrup Pump should be tested with water preferably once a week. There are only a few things which can go wrong and if a fault develops it is probably one of the following:

(i) **Rusted ball valves**: The strainer at one end of the pump barrel and the pump handle at the other should be removed and plunger pulled out at the lower end. The ball valves are then accessible and the rust can be removed with a pocket knife or emery paper.

(ii) **Ball valves stuck to the seating**: They can usually be freed by pushing a pin or piece of wire up through the strainer.

(iii) **Choked Strainer**: This is easily cleaned out with a pin or a piece of wire.

(iv) **Choked hose nozzle**: This should be cleaned by unscrewing the nozzle and cleaning out the holes.

6. **Care and Maintenance**:

(i) No strong disinfectant or chemical sprays should on any account be passed through the pump as they are likely to cause corrosion and clogging of the barrel and deterioration of the delivery rubber tubing.

(ii) After emptying the hose should not be left loose, it should be properly coiled and attached to the pump by the strap or the string.

(iii) When not in use, the pump should preferably be hung on a wall bracket about 5 feet from the ground.

(iv) If water leaks from the top of barrel when a pump is in use screw down the gland collar a little lighter to stop the leak. If the leak does not stop unscrew the gland collar and repack with soft cord soaked in oil.

(v) Lubricate the inner surface by pouring a small quantity of lubricating oil into the pump through the wire mesh at the foot valve working the pump full strokes.

(vi) After drying the plunger rod apply grease all over the inner surface.

(vii) Keep the pump in a cool place.

7. **Stirrup Pump Drill for a Team of Four:**

Training to the members of the house fire party in use of stirrup pump and extinction of small fire is imparted in drill form to enable them to come in action confidently during emergencies as well practice can be carried out on standard lines. It should not assumed that the routine when fighting a fire will necessarily be the same as in the drill, since the actions required at a fire will be dictated by circumstances. The pattern must be decided in those circumstances by the leader of the team who will give orders accordingly. In the drill, the orders given below may be given either by the instructor taking the drill or by No. 1 of the team. All other orders are given by No. 1.

Preliminary:

The four members of the team fall in single rank and number off from the right. No. is the team leader.

"Get to work":

No. I lead the team.

No. 2 carries the pump.

No. 3 and 4 each carry, two filled buckets of water.

No. 1 when near the fire gives orders as to the working position of the pump and proceeds further in the direction of the fire to carry out reconnaissance.

No. 3 and 4 place their buckets.

No.3 lays out the delivery tubing in the direction of the fire.

No. 2 places the pump in one of the buckets and pumps a few strokes to charge the delivery tubing.

No1. returns after reconnaissance is over picks up the nozzle and orders water on.

"Water on":

No.2 pumps.

No. 3 and 4 maintain the water supply.

No. 3 keeps in touch with No. 1 from time to time if the latter is not in sight of the pump acts as messenger.

"Water off":

No.2 stops pumping.

"Change round":

When No. 2 requires to be relieved from pumping he gives the order "Change round."

No. 3 then takes the duties of No.2 and No. 4. of No. 3 and No. 2 of No. 4 Pumping must not stop during the change.

"Knock-off and Make-up":

No. 2 removes the pump from the bucket and clears the hose by pumping, and gear is made up, the hose being coiled and secured.

8. Stirrup Pump Drill for a Team of Three:

Preliminary:

The three members of the team fall-in in single rank and number off from the right. No. 1 is the team leader.

"Get to work":

No. 1 leads the team.

No. 2 carries the stirrup pump and one filled bucket and No. 3 carries two filled buckets of water.

No. 1 when near the fire gives orders as to the working position of the pump and proceeds further in the direction of the fire to carry out reconnaissance.

No. 3 places his buckets and lays out the delivery tubing in the direction of the fire.

No. 2 places the pump in one of the buckets and pumps a few strokes to charge the hose.

No. 1 returns after the reconnaissance is over, picks up the nozzle and orders water on.

"Water on":

On this command from No.1, No. 2 pumps. No. 3 maintains the water supply and keeps in touch with No. 1 form to time if No. 1 is not in sight of the pump and acts as messenger.

"Water off":

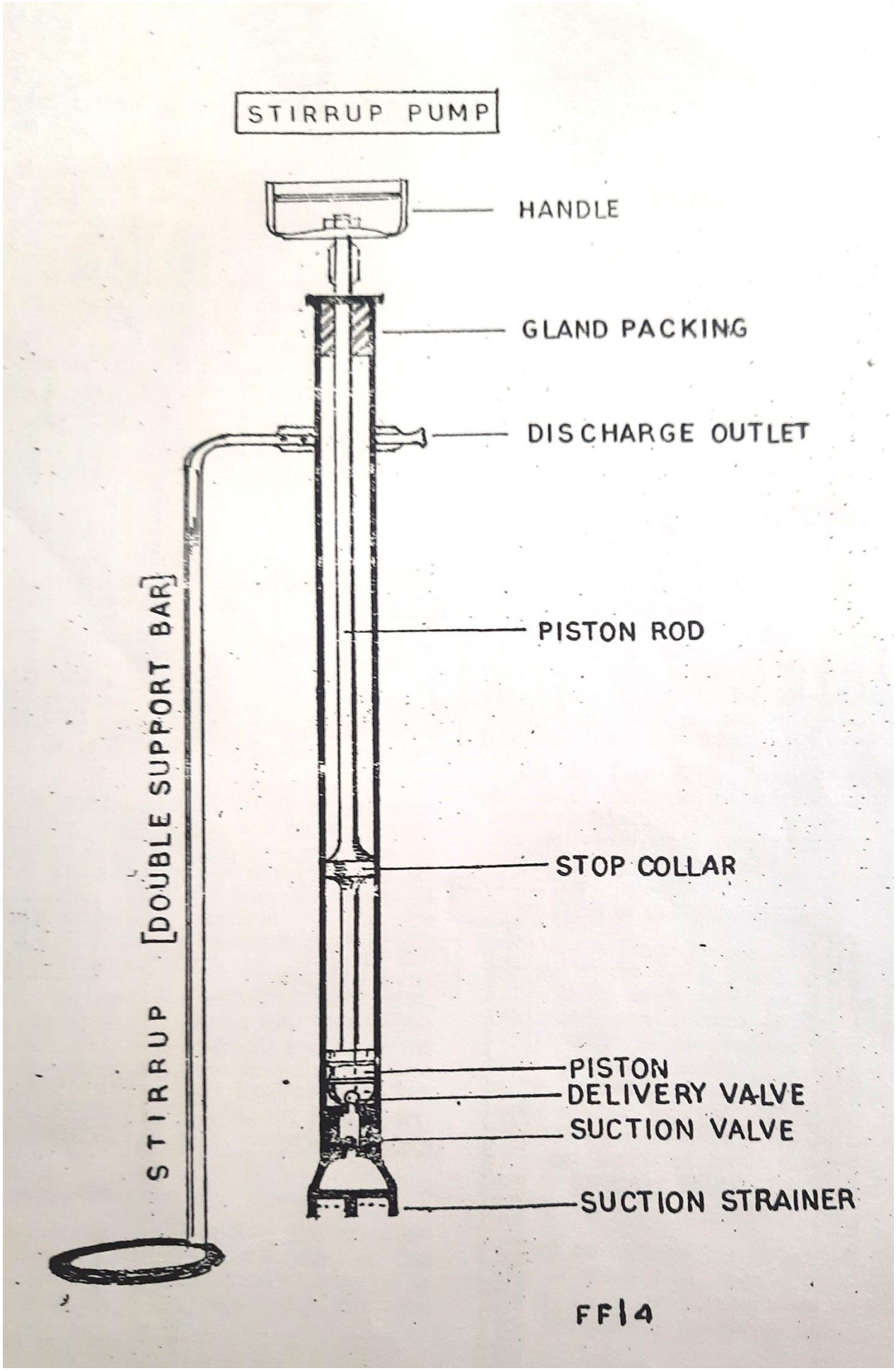
No. 2 stops pumping.

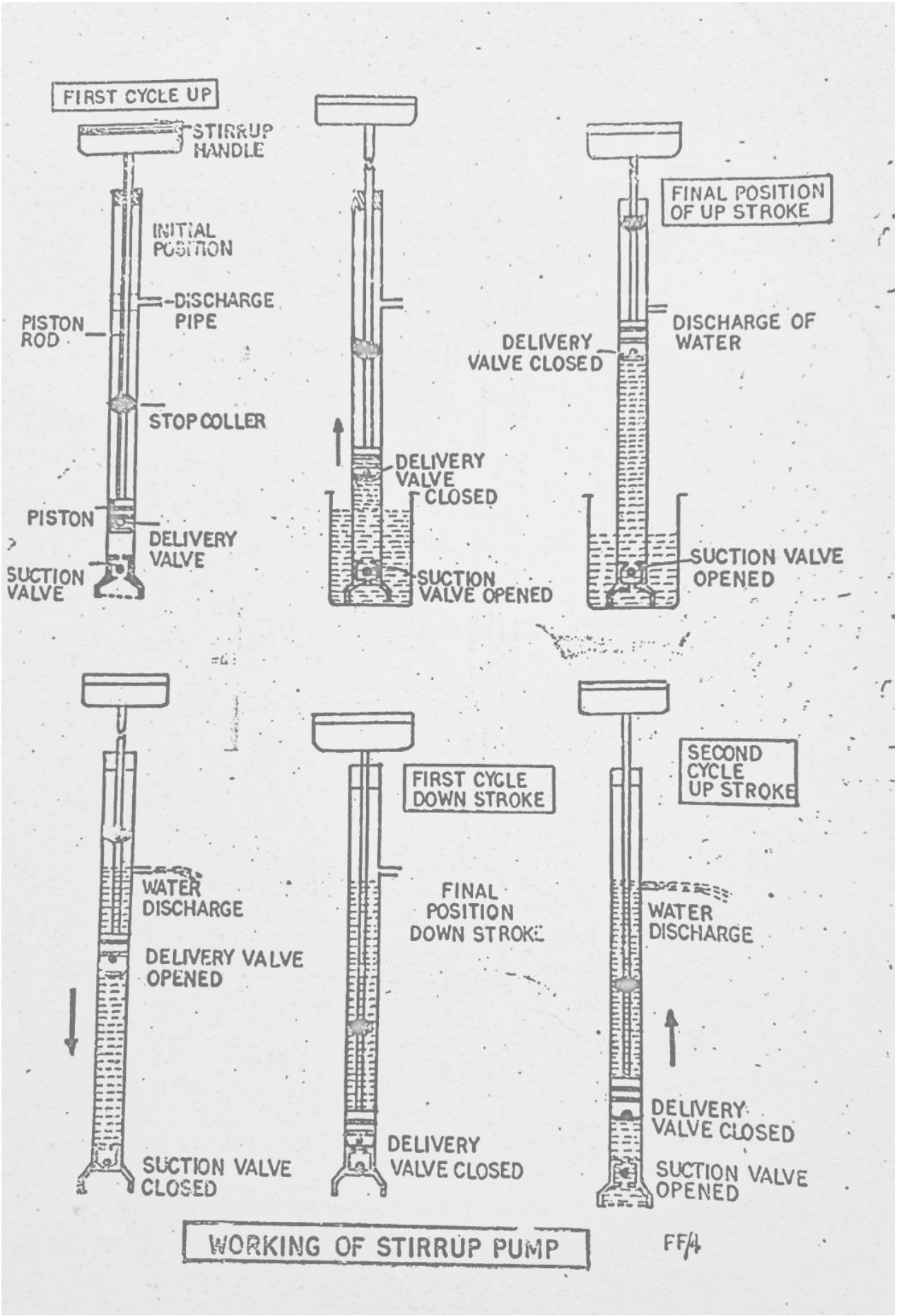
"Change round":

When No. 2 requires to be relieved from pumping he gives the order "change round". Nos. 2 and 3 then exchange duties. Pumping must not stop during the change.

"Knock-off and Make-up":

No. 2 removes the pump from the bucket and clears hose by pumping and gear is made up, the hose being coiled and secured.


STIRRUP PUMP
HANDLE
GLAND PACKING
DISCHARGE OUTLET
PISTON ROD
STOP COLLAR
PISTON
DELIVERY VALVE
SUCTION VALVE
SUCTION STRAINER
STIRRUP [DOUBLE SUPPORT BAR]
FF14


FIRST CYCLE UP
STIRRUP HANDLE
INITIAL POSITION
DISCHARGE PIPE
PISTON ROD
STOP COLLER
PISTON
DELIVERY VALVE
SUCTION VALVE
DELIVERY VALVE CLOSED
SUCTION VALVE OPENED
FINAL POSITION OF UP STROKE
DISCHARGE OF WATER
DELIVERY VALVE CLOSED
SUCTION VALVE OPENED
WATER DISCHARGE
DELIVERY VALVE OPENED
SUCTION VALVE CLOSED
FIRST CYCLE DOWN STROKE
FINAL POSITION DOWN STROKE
DELIVERY VALVE CLOSED
SECOND CYCLE UP STROKE
WATER DISCHARGE
DELIVERY VALVE CLOSED
SUCTION VALVE OPENED
WORKING OF STIRRUP PUMP
FF/4

CHAPTER NO. 07

CHEMICAL EXTEINGUISHERS

1. **Object**:

Like Stirrup Pump there are some other first aid firefighting appliances used for extinguishment of small fires. These are chemical fire extinguishers. The knowledge of their use care and maintenance etc. is very essential for the members of house fire parties, so that in case they come across such appliances during emergencies they will be in a position to use them efficiently for extinguishment of small fires. The object of this lesson is to study the use, care and maintenance of different types of chemical extinguishers.

2. **Introduction**:

For the convenience of study, the extinguishers may be grouped up a follow: -

(i) Chemical Extinguishers for extinguishing fires involving ordinary combustible materials, where the quenching and cooling effects are achieved by water or solutions containing large percentage of water are of primary importance. Under this group come "Soda Acid Extinguisher".

ii) Chemical Extinguishers with chemicals, solutions or dry exclusively meant for extinguishing fires involving inflammable liquids such as oils, fats, grease etc. where blanketing the fire to completely isolate it from the supply of oxygen is essentially required. Under this group comes "Chemical Foam and Dry Chemical Powder Extinguishers."

(iii) Chemical Extinguishers with chemicals, either liquid, gas or dry, mainly to fight fires involving "Live" electrical equipment etc. where the use of an electrically non-conductive extinguishing agent is of fore-most importance. Under this group comes C.T.C., Co_2 and Dry Chemical Extinguishers.

3. **Soda acid extinguishers:**

Generally, this is of nine litres (two gallons) capacity. The principle involved in the working of this extinguisher is to throw water at some pressure on to the fire at a distance. They are divided into two groups:

(i) Those which are operated in their normal up right or nearly upright position and

(ii) Those which are inverted to initiate the action and which are operated in this position.

The shape of this extinguisher varies from manufacturer to manufacturer and usually there are two types in common use. One is conical and the other cylindrical in shape though the principle of working is the same in both.

4. **Parts of soda acid extinguisher**:

(i) **Outer Container:** This is made of mild steel sheets and tested at pressure of 25 kg per square cm. for five minutes. The capacity is about nine litres. It contains a solution of carbonate or Bicarbonate of soda or both in water. To prevent corrosion the internal surface of the container is given anticorrosive and acid and alkali resistant treatment. There is a nozzle fitted on the container for the discharge of the water.

(ii) **Inner Container:** This is generally nothing but a suitably shaped metal cage to hold the glass bottle containing sulphuric acid. The acid and the alkali shall be in correct proportions so that when the contents are expelled the discharge liquid shall be 'alkaline'. This is fitted at the neck of the outer container from inside. It is perforated to allow the acid to mix with the sodium-bi-carbonate solution when the bottle is broken.

(iii) **The Cap:** There is a cap made of brass or gun metal which can be screwed on at the top of the outer container. There is a plunger rod fitted to this cap which when struck will break the acid bottle Thus, actuating the chemical reaction.

5. **Working of the extinguisher:**

It is very simple to operate this extinguisher. The plunger at the top is struck which breaks the acid bottle in the inner container. The acid mixes with the soda-bi-carb solution in the outer container and the chemical action produces carbon-di-oxide gas in large quantify. Being in a confined space the gas inside the container builds up pressure and forces the water solution to come out through the nozzle in jet form which can reach a distance of 6 metres. The CO_2 gas generated inside the extinguisher plays no part in extinguishment of the fire but acts as expelling agent.

With the extinguisher in hand approach the fire as near as possible and then operate the same. Direct the jet on to the burning material in the heart of the fire disregarding the flames and the smoke.

6. **Safety Devices**:

Precautions against losses due to expansion-When an upright type extinguisher is left standing fully charged an increase in the temperature of the room causes the fluid and the air to expand inside the container. Under ordinary circumstances the expansion would force some of the fluid up through the discharge tube and out through the nozzle. The water evaporates and leaves bicarbonate of soda in solid form in the orifice of the nozzle. If this process is continued the nozzle would eventually become solidly blocked and would render the extinguisher ineffective.

To prevent this a snifter valve is provided in the plunger rod of the extinguisher. This is a valve communicating between the air space in the extinguisher and the atmosphere outside and permits the very small quantity of air to escape when the internal pressure rises slightly. A ball rests lightly on an orifice provided in the plunger rod of the extinguisher and allows the air to seep past and away to atmosphere. When the extinguisher is operated, the high internal pressure lifts the ball firmly against a seating which completely seals the outlet.

Vent Holes: These holes are provided on the plunger cap of the extinguishers. As the cap is unscrewed these holes communicate with the interior of the container and any residual gas pressure or the pressure created inside due to choked nozzle will discharge through them whilst the cap is still held in position by the threads.

7. Advantages and disadvantages:

The advantages of the soda-acid extinguishers are:

(i) For first attack on a fire it is often the most readily accessible firefighting appliance.

(ii) Only one person is needed to work it.

(iii) When kept in good working order it is reliable.

(iv) It is almost instantaneous in action.

The disadvantages are:

(i) Once the extinguisher is actuated you cannot stop the discharge mid way.

(ii) As the liquid discharged is a good conductor of electricity it should not be used on live electrical fires.

(iii) At low temperatures the chemical reaction is retarded as well as some times the water solution freezes. Anti-freezing solutions cannot be added to prevent freezing as it also affects the chemical reaction.

(iv) The liquid ejected contains a chemical (sodium) sulphate) which acts chemically on costlier fabrics such as terylene silk etc. and damages it so this extinguisher is not suitable for extinguishment of fires in such fabrics.

8. **Care and Maintenance**:

(i) The extinguisher should be opened up every quarter for inspection and the solution in the outer container to be stirred well.

(ii) The vent holes in the cap nozzle and snifter valve should be cleaned.

(iii) The moving parts such as the cap and plunger should be lightly greased.

(iv) Annually the extinguisher should be discharged and recharged.

(v) Outer container should be tested for 25 kg per square centimetre pressure for a period of five minutes once in two years.

9. **Foam Extinguisher**:

Use and General Description: This type of extinguisher is mainly used on small oil fires. The effect of this is to blanket the burning liquid and cut off the oxygen supply and extinguish the fire by smothering effect. The shape of this extinguisher is cylindrical and the capacity is nine litres. Generally, the extinguishers are required to be turned over for operation.

There are two containers in this extinguisher. The solution in the inner container is generally aluminium sulphate dissolved in water whilst in the outer container solution of bicarbonate of soda together with a stabiliser such as saponin liquorice or turkey-red oil. The stabilisers are used to strengthen the walls of the bubbles and make them more stable, so that they do not break easily while coming out from the nozzle or when they come in contact with the heat of the fire. The mouth of the inner contained is kept closed by a spring-loaded plunger, which prevents the contents of the inner container from coming out and mixing with the contents of the outer container while in transit.

10. **Working**:

Lift the spring-loaded plunger and keep it in open position, then invert the extinguisher thereby both the solutions in the containers get mixed in with each other starting the chemical action which liberates CO_2 gas in largo quantity which in turn produces foam and discharges it through the nozzle. The jet reaches a distance of about 6 metres and discharge time is 30 to 90 seconds. Do not direct the jet of foam at the seat of the flames but direct it on the wall of the container, so that it flows down on to the burning liquid without stirring it up, blankets the surface and extinguishes the fire by smothering effect.

11. **Care and Maintenance:**

(i) The extinguisher should be opened up every month and the solutions stirred with separate stirrers.

(ii) The vent holes in the cap and nozzle should be cleaned.

(iii) The moving parts such as the cap and plunger should be lightly greased.

(iv) Annually the extinguisher should be discharged and re-charged.

(v) Once in two years the outer container should be tested for 25 kg. per square centi-meter internal pressure for a period of five minutes.

12. **Advantages and disadvantages:**

The foam extinguisher has many advantages in common with the soda-acid type in addition:

(i) It coats the burning surface of the substance and excludes oxygen.

(ii) It has considerable heat-resisting qualities as an insulator and serves to prevent re-ignition.

(iii) Foam floats on most liquids and is Thus, suitable for quenching many liquid fires.

Its principal disadvantages are that:

(i) Foam mixes with certain liquids and renders them unusable.

(ii) The use of foam is limited in case of fires in certain types of liquids only.

13. **Carbon-di-oxide extinguisher:**

Carbon-di-oxide is a colourless odourless gas is non-supporter of combustion and does not burn also. If this gas is present in the atmosphere near the fire in the ratio of 19 to 29% it excludes the oxygen which results in the extinction of the fire. This percentage is known as inhibitory factor. This is in gaseous state at normal temperature and pressure but when compressed in cylinders under very high pressure it is converted into liquid. When released the liquid is reconverted into gas. The rapid expansion lowers the temperature and part of the gas solidifies in small fine particles. CO_2 hand extinguishers are available in cylinders of sizes having capacities of from 1 kg. to 6 kg of liquid gas filled under pressure of about 200 kg. per square cm. at 27° +2°C. The working of this type of extinguisher differs from manufacturer to manufacturer. In some the gas is released by means of piercing a sealing disc with a pointed plunger in others by operating a valve or by a lever device. A discharge horn is fitted to the cylinder sometimes with a discharge tube. Its main purpose is to prevent the air from mixing with the CO_2 and also it reduces the velocity of the CO_2. If the discharge horn is not fitted do not operate the extinguisher.

14. **Testing**:

CO_2 extinguishers are tested by weighing. The weight of the empty cylinder is stamped on the collar. Each extinguisher when received from the manufacturer is carefully weighed and the weight of the gas filled is determined and recorded. If a loss of more than 10 per cent of the gas is noticed the extinguisher should be returned to the manufacturer for recharging.

15. **Advantages and disadvantages:**

The chief advantages of CO_2 as an extinguishing agent are:

(i) It is extremely rapid in action and its action is independent of atmospheric temperature.

(ii) Cleanliness. Being an inert gas, it quickly disperses leaving no trace behind. It has no chemical action under normal conditions and no damage is caused by its use.

(iii) It is a non-conductor of electricity. This combined with its cleanliness makes it of particular value in fires involving electrical apparatus.

(iv) It may be used in their incipient stages on fires in a number of highly inflammable liquids.

(v) Being a gas it will penetrate into otherwise inaccessible places.

The chief disadvantages are:

(i) The total weight of the extinguisher in comparison with the weight of gas discharged is much more.

(ii) There is no visible check on the contents.

(iii) They must be sent away for recharging.

It should be noted that CO_2 extinguishers cannot be used on magnesium type incendiary bombs as the metal will burn as readily in this gas as in air.

16. **Carbon tetra chloride (CT.C.) extinguisher**:

Brief Description and Use: The extinguisher consists of a brass cylinder in which a double acting force pump is fitted. There is a discharge nozzle at the bottom and a refill cap at the top side. The pump is worked by the handle at the top of the extinguisher. The cylinder is filled with carbon-tetra chloride which is a volatile liquid and non-conductor of electricity. The capacity is one or two litres.

By operating the pump, the liquid is discharged through the nozzle in jet form. When it comes in contact with the heat of the fire is evaporates quickly. The vapour so formed is non-supporter of combustion, does not burn itself and is about five times heavier than air. This vapour remains around the fire in the air, and forms a blanket, cutting off the supply of oxygen to the seat of fire. Fire is Thus, extinguished by smothering effect. If the fire is in a confined place, and the vapour of C.T.C. is present in the atmosphere in the ratio of 15% which partially excludes oxygen, the air becomes inert and fire is extinguished. This extinguisher is most useful on small electrical fires because the liquid is a non-conductor of electricity. For fires in motor vehicles this extinguisher is of outstanding value. In this class the majority of fires occur under the bonnet, where the C.T.C. vapour is caught in a confined space whilst the operator remains in the open air. This substance is closely related to chloroform and possesses very similar anaesthetising properties. If this extinguisher is used for extinguishment of fires in confined place, vacate the place as soon as the fire is out and come out in the open. Do not direct the jet of this liquid on red hot metals, as on contact with red hot metals a deadly poisonous gas Phosgene is formed. On no account should a C.T.C. Extinguisher be used in dealing with magnesium bomb fires. The action of this chemical on burning magnesium is to give a slightly explosive reaction will the generation of clouds of poisonous phosgene gas.

"It may be added here that because of the toxic hazards of these extinguishers the Indian Standard Specification No. 935 in respect of C.T.C. Fire Extinguishers has been withdrawn by the Indian Standards Institution and the use of these extinguishers should be discouraged.

The use of C.T.C. Extinguishers has however not been officially banned by the Government so far. The extinguishers of this type already in service will therefore, continue to be used for quite some time. But the hazards associated to its use must be fully understood.

In case of an electrical fire the correct procedure would be to first switch off the current and then fight the fire with the most suitable extinguishers."

17. **Care and maintenance:**

Water should not be used to clean any part of this extinguisher. If used hydrochloric acid is formed which will attack the metal of the container with serious results. For lubricating the moving parts of the pump use glycerine.

18. **Dry powder extinguishers:**

The main constituent of the powder in general use is Sodium Bicarbonate with which is mixed a water proofing agent such as a metallic stearate. Sodium bicarbonate is extremely hygroscopic and if kept in the open, cake formation is there. The action of the stearate is to coat each particle of the carbonate with a thin layer to prevent moisture absorption and sub sequent caking of the powder, and also to prevent the corrosion of the container which might occur through the liberation of an acid or gas caused by the action of dampness on the bicarbonate. When this powder is directed on fire in cloud formation, due to heat of the fire (if the temperature is little higher than the boiling point of water) it dissociates into carbon dioxide and water vapour remains around the fire and extinguishes it by smothering effect. For dealing with carbonaceous fires, borax is used. Borax in contact with the heat of the fire, loses the water con tents, forms a crust over the burning material and smothers the flames. (In most cases, however, the crust must be left undisturbed for some time to enable the metal to cool down below its ignition temperature). For extinguishing metal fires (magnesium, aluminium, uranium, titanium etc.) powders have now been developed which are capable of controlling and/or extinguishing these fires in the above manner.

One such powder is a combination of sodium potassium and barium chlorides, which have been proved efficient for uranium, plutonium and magnesium alloy fires. The melting point of the ternary mixture is comparatively low and the capacity for absorbing the latent heat from the metal relatively high. The powder melts and forms a fused skin over the metal preventing contact with the oxygen in the atmosphere and at the same time absorbs heat from the burning metal and cools it below its ignition temperature.

19. **Brief description and use:**

There are three main parts of this extinguisher:

(i) Cylindrical body.
(ii) Cap assembly and
(iii) Air or gas Cartridge.

These extinguishers are available in sizes containing 1 kg. to 10 kg. of dry powder. The dry powder used is non-toxic and retains its free-flowing properties under normal storage conditions in the extinguisher. The method of expelling the powder from the container is by a charge of compressed dry air or gas which when released, fluidifies the powder and conveys it through the discharge tube to the outlet and expels it in a cloud formation. This extinguisher is very good for extinguishing "running fires" in highly inflammable liquids. It is a very desirable alternative to foam extinguisher. For dealing with metal fires this is the suitable extinguisher and hence has gained popularity in Fire protection, at aerodromes.

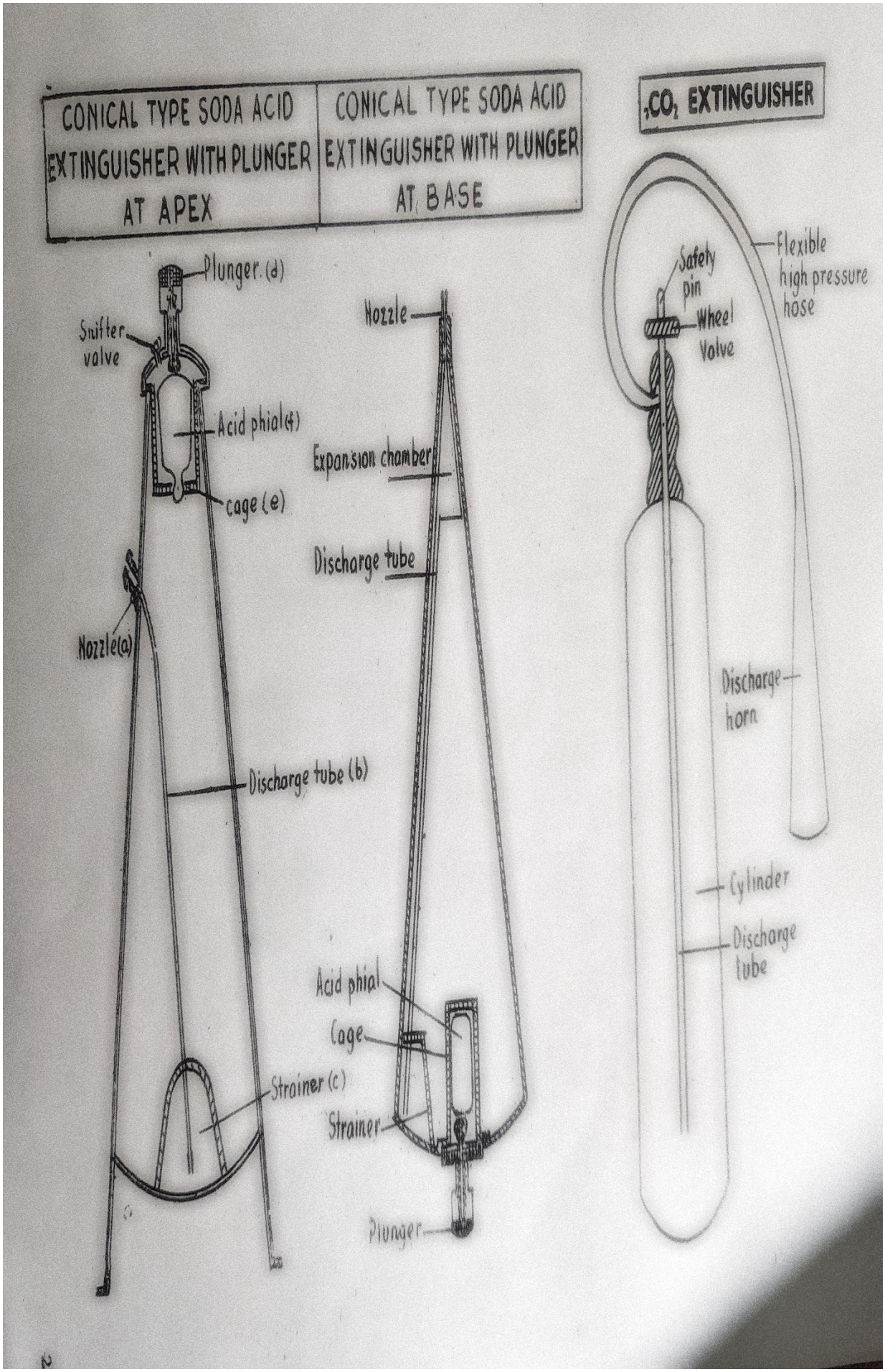
20. **General to All extinguishers**:

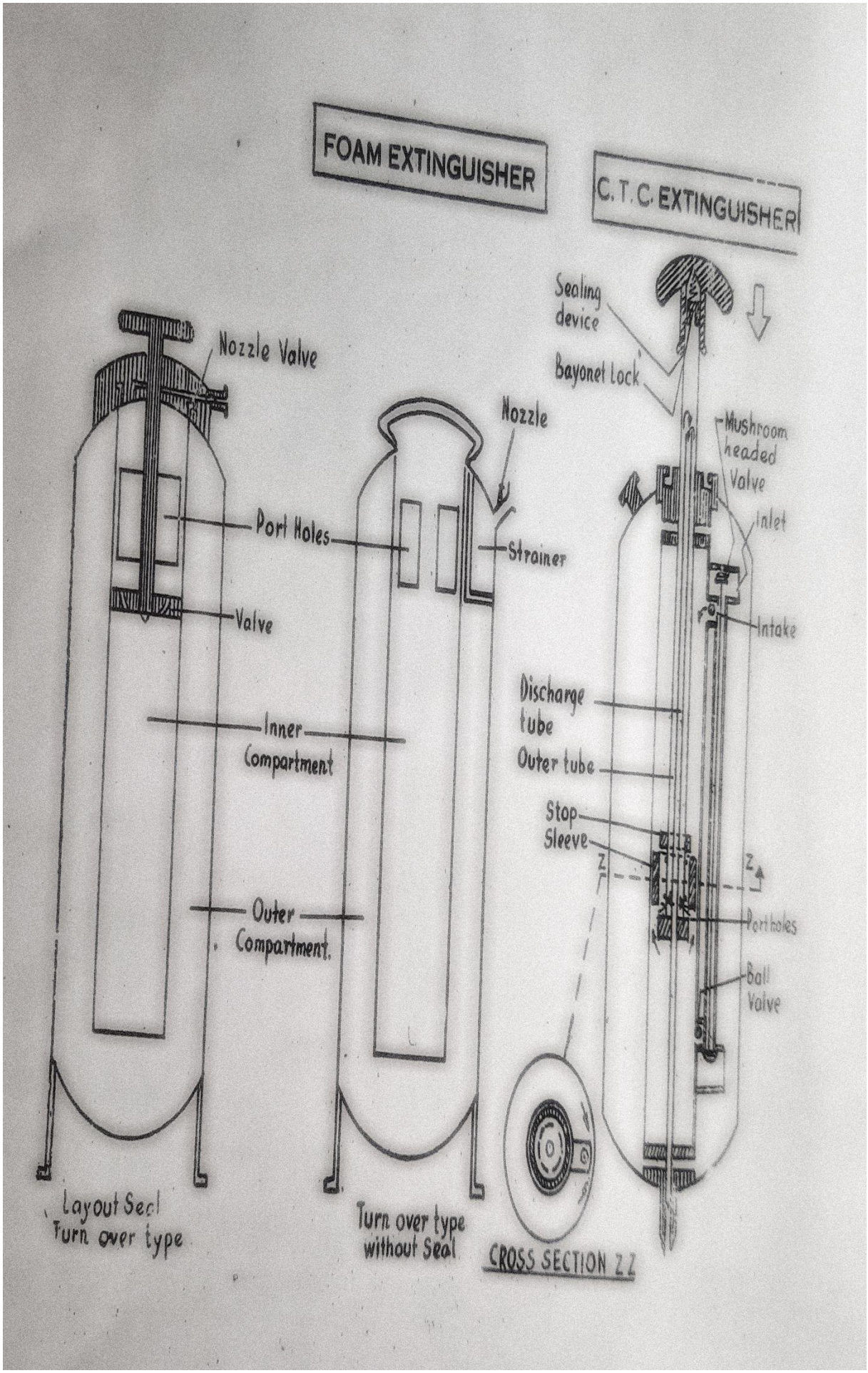
Advantages:

(i) Easy to operate and quick in action.
(ii) Needs only one man to operate and can be carried to another place.
(iii) Very useful in the initial stages of a fire.

Disadvantages:

(i) The use is limited as the duration of the working of the extinguisher is approximately one to two minutes.
(ii) The cost of these extinguishers is comparatively prohibitive and the low-income group house holders cannot afford to provide them in their houses.
(iii) These extinguishers require constant care and careful maintenance which a common man may forget.


CONICAL TYPE SODA ACID EXTINGUISHER WITH PLUNGER AT APEX
CONICAL TYPE SODA ACID EXTINGUISHER WITH PLUNGER AT BASE
Plunger (d)
Sniffer valve
Acid phial (f)
cage (e)
Nozzle(a)
Discharge tube (b)
Strainer (c)
Nozzle
Expansion chamber
Discharge tube
Acid phial
Cage
Strainer
Plunger
CO_2 EXTINGUISHER
Safety pin
Wheel Valve
Flexible high pressure hose
Discharge horn
Cylinder
Discharge tube


FOAM EXTINGUISHER
C.T.C. EXTINGUISHER
Nozzle Valve
Port Holes
Valve
Inner Compartment
Outer Compartment
Layout Seal Turn over type
Nozzle
Strainer
Turn over type without Seal
Sealing device
Bayonet Lock
Mushroom headed Valve
Inlet
Intake
Discharge tube
Outer tube
Stop Sleeve
Z
Z
Portholes
Ball Valve
CROSS SECTION ZZ

CHAPTER NO.08

SETTING UP A FIRE HUT, FIRE CONTROL IN A CLOSED ROOM AND SMOKE CHAMBER

1. **Object**:

When a building catches fire, normal conditions are greatly upset, breathing becomes difficult, visibility is reduced and movement restricted to a great extent. When the fire is inside a closed room and it is necessary to enter the same for fighting the fire or effecting a rescue, it is worse still. Any hasty action on the part of a fire fighter or rescuer may result in injury to the operator and the fire may also get out of control. Everybody connected with the C.D. Fire-fighting Services should, therefore, know the different points to be observed in controlling a fire in a closed room or in effecting a rescue from therein.

2. **Reconnaissance**:

A thorough though rapid reconnaissance is a vital preliminary to attack the fire. Time so spent is never wasted. In making this reconnaissance the leader will ascertain, the location, type of fire, its likely fire spread. He will assess if there is any special risk or danger involved & will think of a suitable method to attack the fire. When the fire is extinguished, all debris must be cooled with water and a final reconnaissance made to ensure that there are no hot spots which might flare up after the fire fighters have left. The first reconnaissance may show that the fires are too large for the capacity of the appliances available, if so, additional help should be summoned and the available appliances used to keep the fire under control, by preventing it from spreading. pending the arrival of reinforcement.

3**. Methods of entry**:

Behaviour of the fire will greatly vary according to the construction of the room, access of air inside the room, the combustible materials present etc. The method to be adopted in entering the room also varies in each case. There are, however, certain guiding principles which should be followed in different situations:

(i) When the fire is suspected in a closed room and the door opens outwards, heated gas, smoke inside the room, may be awaiting release. Therefore, if the door is opened suddenly & without taking cautions, the hot gas and smoke gushing out, may knock out the operator. Therefore, when opening the door, the operator should place his one (normally right) foot firmly against the closed door, stoop low and then gently open the door. In doing so his foot is preventing the door to be flung out suddenly, and whatever gas or heat comes out, is passing above his head.

(ii) When door opens inwards-in this case the outrush of hot gases will be lesser and chances of getting knocked out is also reduced. However, if door is opened fully at once the heated gas and smoke will come out over-whelming the operator. The safe method, therefore, is to open slowly.

4. **Other points to note before entering**:

(i) **Cutting off Supplies**: For a building on fire. it is always advisable to cut off supplies of electricity, gas etc. as unless this is done these may present additional hazard.

(ii) **Portable Extinguishers**: Before entering the room on fire it should be ensured that adequate first aid firefighting equipment is available to tackle the fire. These may be in the form of water or sand buckets or chemical extinguishers etc.

5. **Smoke**:

Quite a small fire can produce a large volume of smoke. Unless the smoke is very thick it is not normally a danger to life provided the trapped persons can get away from it without delay. It can however produce feelings of panic which must be avoided. A wet cloth or handkerchief placed over the mouth and nose will give some measure of protection against the discomfort in breathing, checking a large number of harmful particles from entering the lungs. It does not of course avoid the ill effects of lack of oxygen, excess of carbon-dioxide or the poisonous carbon-monoxide to which prolonged breathing of smoke may give rise.

6. **On entry**:

The room is to be entered in a crawling position as this position will allow the rescuer to avoid the smoke. The door behind him must be closed as this will prevent further ingress of fresh air containing oxygen which will fan the fire. If the room is too hot, it will be useful to open the door as otherwise the fire inside may overwhelm him. He should keep his head and face well down as this will enable him to breath fresh air and see things clearly. As soon as the fire is discovered it should be attacked at the heart with the fire extinguishers or stirrup-pump. While controlling the fire it is to be seen unnecessary damage is caused either by the use of excessive water or fire extinguishers.

7. **Searching a building:**

When possible, it is advisable to work in pairs while entering a smoke-filled room or building. This gives confidence and makes it possible for one to assist the other. People trapped by fire or smoke particularly children, often take refuge under beds or in cupboards in which they hide to escape the smoke and flames. Searching through swift should be thorough. Every room should be investigated and no possible hiding place, however unlikely, should be overlooked.

8. **Searching a room:**

Searching a smoke-filled room is not an easy task and it is unlikely to be successful unless carried out with a definite plan. Once inside the room a complete round should be made, keeping close to the wall, feeling under and on the beds, and opening and feeling inside cup-boards, wardrobes and other articles of furniture. Finally, the room should be crossed diagonally to make sure that no one is lying inside in the centre (see chart). It should always be remembered that floors immediately above the fire may have been weakened sufficiently to become dangerous and care should be taken while searching the centre of the room. Whether or not the windows should be opened to obtain fresh air depends on the circumstances. Only when it is known that the fire is in a distant part of the building and is being tackled or the atmosphere is cool. it is safe to open the windows.

9. **Some firefighting hints:**

(i) Attack the fire as quickly as possible.

(ii) Always attack the heart of the fire rather than the mere spectacular looking flames.

(iii) All combustible materials near the fire should be removed or cooled from time to time by spraying water to check the spread of the fire.

(iv) If the fire is spread over the floor start at the end nearest to you.

(v) When the fire is out cool down all debris and make a final survey to ensure that there are no hot embers or hot spots which might flare up afterwards.

(vi) In case of electrical fires, switch off the mains first. Do not attack electrical fires unless you are sure that the circuit is dead.

(vii) Do not use water on fire involving petrol, oil etc. Smother it with earth or sand.

(viii) If your clothes catch fire, lie down immediately cover your face with your palms and roll yourself on the ground. Never run.

(ix) If somebody else's clothes catch fire, cover him with a blanket or knock him down and roll him on the ground. Do not put water on him.

(x) Exclude air by keeping doors and windows closed when possible.

(xi) In a building damaged by fire or blast, keep near the walls, where ceiling and stairs are strongest.

(xii) Attack fires at the clossest possible range.

(xiii) Take advantage of whatever cover is available, and fight the fire from behind a door or any large piece of furniture, provided he can still direct his jet straight into the heart of fire from the protected position.

(xiv) Remember that phosphorous will reignite when dry.

(xv) Do not enter a burning building or room, except to save life without firefighting appliances.

(xvi) Before leaving be sure that all fires are out.

10. **Hints on rescuing a person caught in five electrical wires:**

(i) In addition to putting off the main switch wear rubber boots and rubber gloves. (The gloves must be absolutely leak-proof as even a small hole in it may prove dangerous. Make sure by blowing the gloves).

(ii) If the victim is lying on wet ground, get hold of a wooden platform. A wooden ladder or a door panel can be used. Place the same on wet ground and then tread on it.

(iii) Try to earth the electric supply by dropping a long metal object across the wire between the victim and the sources of supply.

(iv) Do not let your body touch the wire or the metal object or water when it comes into contact with the wire, but simply drop it loosely.

(v) Get a fire hook and pull the wire off the victim. (The wooden handle will provide the necessary protection).

(vi) Even after this, do not touch victim's body with bare hands, as there may still be an accumulated or static charge in his body. Use rubber gloves.

11. **Details of demonstrations:**

(i)**Firefighting demonstration**: Smoke chamber drill and control of fire in a hut are two outstanding demonstrations which besides being instructional also hold the interest of the public. If properly staged these demonstrations have considerable propaganda value. The demonstrations also familiarise the trainees with the type of conditions they are likely to encounter & therefore give them confidence in tackling fires.

(ii) **Fire Hut**: A fire hut is required for two purposes namely (a) demonstrations such as smoke chamber drill and (b) practical training in firefighting. For demonstration the hut should be constructed in such a way that its one side or end can be easily detached, so that as many people as possible are able to see it. For practical training in the fire fighting the hut should be completely closed, as it is important that the trainees should have experience of heat and smoke in a room on fire. Suitable dimensions of a fire hut are 12 ft. x 10 ft. x 8 ft., with a corridor measuring approximately 3 ft. wide through which the trainees will have to go in order to reach the room in which the fire is burning. It can be made of creosoted timber framing with any sheet or corrugated iron sheet nailed on the inside. No external sheeting to the framing will be required. A door and a wired glass window should be fitted to the hut. A hole should be bored in the floor to drain muddy water away (for diagram and specifications of fire hut, see appendix).

(iii) **Fire Baskets**: In order to create a realistic yet controlled fire and smoke effect two baskets will be needed. A fire basket is made of expanded metal 1 ft. x 2 ft. x 2 ft. supported on an angle iron frame with 6" legs.

(iv) **Furniture:** It is recommended that some old unserviceable furniture should be used for decorating fire huts, or furniture may be improvised by using old wooden cases properly covered with some old pieces of cloth. As for bed, an old iron cot may be provided on which some improvised bedding consisting of grass and an old bed-sheet can be spread, pillow may be similarly improvised of a gunny bag stuffed with grass.

(v) **Material for fires in fire huts**: To get a good fire/smoke effect, waste materials such as rags, old jute bags, discarded straw/palm mats, waste paper, cotton waste, wood shaving, grass unserviceable wooden cases etc. should be used.

(vi) **Protection for Instructor:** As Instructors have to go frequently in the fire hut to give confidence to the trainees and to guide them it is necessary that they should take additional precautions to protect their eyes and lungs from constant exposure to smoke, heat and toxic gases. This protection can easily be secured by putting on a wet cloth over the face and using goggles, during training. Besides, the practical training in fire hut should be so staged that the Instructors do not have to go in the hut for more than 4 or 5 times on any single day. Additional help may be sought from other Instructors when necessary.

(vii) **Protection for trainees**: When the Instructor does not accompany the trainees in the fire hut, a rope should be attached to trainee's waist so that the trainee can give it a pull and at the same time put on a wet cloth or handkerchief and get protection from heat and fumes. A first aid box should be kept handy for treating burns and minor cuts. All fuel and flammable articles should be kept away from the fire hut preferably in an independent room/enclosure,

12. **Smoke Chamber:**

The purpose of smoke chamber is to simulate conditions likely to be encountered by the fire fighters while actually working in a smoke-filled building and practice the different techniques of firefighting under such conditions.

13**. Method of working:**

Much will depend on the particular type of building. materials, intensity of fire etc. However, certain guiding principles common to all such fires, can be laid down. These are:

(i) **Breathing**: In a smoke-filled building breathing is rather difficult. If, however, some hazardous poisonous articles are involved, then inadvertent in halation of poisonous fumes may cause a fatality. For that purpose, the following precautions should be taken:

(a) do not enter a room without proper air breathing apparatus, if poisonous gases are known or suspected. Remember that wet face & wet clothes do not afford any protection against such gases.

(b) Always work in pairs in thick smoke, as this not only gives confidence, but also makes it possible for one man to assist the other in an emergency.

(ii) Smoke also reduces visibility and the only course left open may be to work by touch. In such circumstances great caution is necessary.

(iii) In such circumstances, men must not walk, but shuffle, i.e. slide their feet forward and weight of the body should be kept poised on the rear foot until the advancing foot has tested that it is safe to move forward.

(iv) In ordinary smoke i.e., non-poisonous smoke the air will always collect near the floor as heated smoke tends to rise higher. It is, therefore, desirable to advance on all fours i.e. crawling in such circumstances.

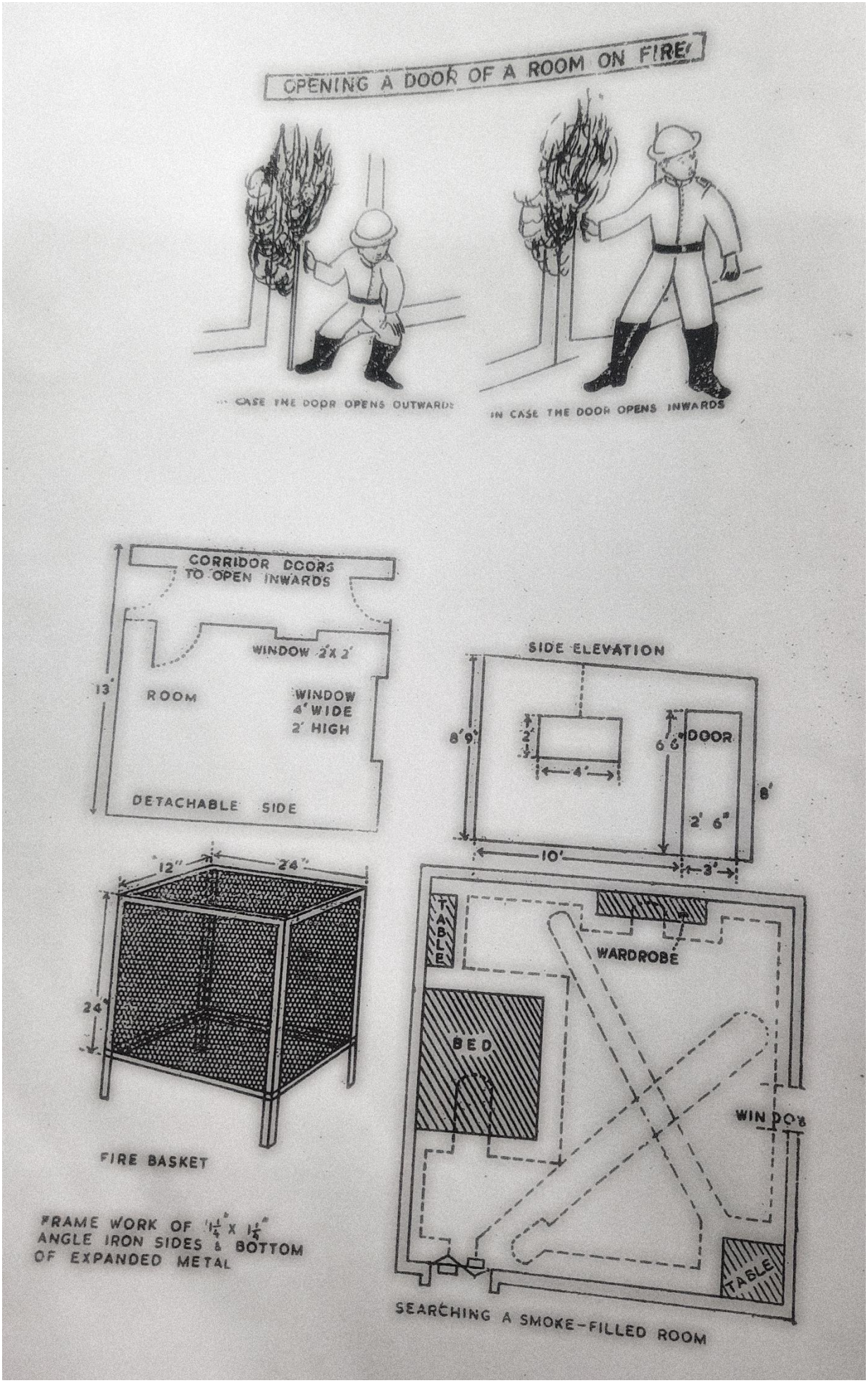
(v) As one crawls forward, he should raise the free. hand in his front, lightly clinched, with the back uppermost, to feel for obstruction. In an affected building, electric installation may often be seriously dislocated so that live electric wires may be hanging at odd places. In such cases, there is risk of electrocution, unless the fire-fighter is extremely careful.

(vi) When getting down the stairs, in a smoke filled and dark building, it is better to proceed back-wards down stairs. This has the advantage that the stairs can be grasped with hand, thereby preventing a fall in case of a slip.

(vii) One should not remain in smoke longer than what he can endure. If the work is of a longer duration, it should be carried on a relay system, each pair being inside for 5 to 10 minutes at a time.

(viii) Possibility of getting lost in a smoky building should always be borne in mind. While entering therefore, a mental note should be made of any feature which may assist in retracing the route to safety. A very simple way is to tie one end of a long 1 line. to his waist and the other end tied to some secure objects outside the building.

(ix) When entering a dark and smoky building. always try to keep near the wall. This is safe.


OPENING A DOOR OF A ROOM ON FIRE
IN CASE THE DOOR OPENS OUTWARDS
IN CASE THE DOOR OPENS INWARDS
CORRIDOR DOORS TO OPEN INWARDS
WINDOW 2'X 2'
13'
ROOM
WINDOW 4' WIDE 2' HIGH
DETACHABLE SIDE
SIDE ELEVATION
8'9"
2'
4'
6"
DOOR
8'
2' 6"
10'
3'
12"
24"
24"
FIRE BASKET
FRAME WORK OF 1¼" X 1¼" ANGLE IRON SIDES & BOTTOM OF EXPANDED METAL
TABLE
WARDROBE
BED
WINDOWS
TABLE
SEARCHING A SMOKE-FILLED ROOM

CHAPTER NO. 09

DETECTION OF UNEXPLODED BOMBS, SAFETY PRECAUTION AND REPORTING PROCEDURE

1. **Aim**:

The aim of this lesson is to study the detection safety precautions and reporting procedure for the unexploded bombs.

2. **Introduction**:

During an air raid a number of bombs may be dropped by the enemy. All the bombs dropped may not explode and those which do not explode are known as UXB's (Unexploded bombs). This may be due to defective construction, fuse or may be fitted with delayed fuse, commonly known as time bombs. Therefore, all the UXB's should be considered as time bombs. The presence of an UXB is a potential source of danger and creates panic amongst the people, dislocates war effort and important lines of communication and, therefore all the UXB's should be properly detected, suitable safety, precautions taken and correctly reported to the proper authorities for their disposal.

3. **Detection of UXB's:**

The presence of an UXB is confirmed by

(1) the positive signs of its presence, and
(2) absence of signs of explosion.

One of the positive proofs of an UXB is the presence of part or whole of the bomb lying on the surface. This may also be identified by the entry hole, if it has penetrated inside the ground. In case the entry hole is taken to be the sign of presence of the bomb, the surrounding should also be checked up for an exit hole, as it is quite possible that a bomb which penetrates the earth with sufficient speed, on getting rebound at a hard surface may come out and make an exit hole, and may be lying nearby or might have exploded. The positive proof of explosion are therefore:

(i) the formation of the crater.

(ii) presence of jagged steel splinters near the place of explosion (the tail unit might be still lying intact elsewhere on being detached from the Bomb).

(iii) doors and windows of the nearby houses will be broken if the bomb has exploded on the surface. There will be cracks in the walls due to the earth shock effect if the bomb has exploded underground.

(iv) around the place of explosion there will be smell of the burnt explosive and black earth.

(v) the flash of explosion will be visible during the night and the smoke will be observed during the day.

(vi) the underground structures and services will be damaged.

4. **Craters**:

When a bomb explodes on the surface or just below the surface a depression is formed on the ground which is called a Crater. Depending upon the position of explosion of the bomb three types of craters are formed.

(i) **Type 'A'**: In case the bomb explodes at the surface, inverted cone like excavation will be formed. This will not be very deep. It will have smooth walls with very little or no rubble at the bottom. Black soil due to burnt explosive will be found around the edges.

(ii) **Type 'B':** If the bomb explodes in a partially buried condition, the crater will be more wide at the mouth and deeper than Type 'A'. The lips will have a 45° elevation and it will be nearly half filled with rubble and black soil around the neck. This is type 'B'.

(iii) **Type 'C:** If the bomb explodes little deep inside the ground, the crater formed will be deeper than Type B but the mouth will be narrow and it will be practically filled up to the neck with rubble and black soil all around. This is known as Type C. It apparently looks like type 'A'.

5. **Camouflet**:

When a bomb explodes so much deep under the ground that the force of explosion is in-sufficient to expel surface plug, a Camouflet is formed. The signs of formation of a Camouflet may or may not be visible on the surface depending upon whether it is a shallow or a deep one and type of the surface. Therefore, in case the entry hole is to be taken as a proof of the presence of UXB, it should not be associated with a Camouflet.

6. **Safety Precautions**:

Since the presence of UXB is a potential source of danger suitable safety precautions should immediately be taken to minimise the damage due to explosion. These are:

(i) **Prevention of disturbance**: In case the bomb has not exploded due to a defective fuse, a slight disturbance to the bomb may set the fuse right and it may explode. Therefore, on detection of an UXB the area should immediately be cordoned off and any running heavy machinery or vehicular traffic nearby should be stopped.

(ii) **Evacuation**: Population from the areas around an UXB, which can be affected by blast in case of explosion, should be immediately evacuated. The degree of evacuation will depend upon the size of the bomb and whether a bomb is buried or unburied. In case of big buildings at certain distances from the place of explosion the effect of the blast will be more in that portion which is facing the place of explosion than the portions on the reverse sides. In such buildings at certain distances it may not be necessary to have complete evacuations but only have the partial evacuation of the persons from the front portion/ flats etc. Similarly, the effect of the blast is reduced by keeping the doors and windows in direct line of explosion open. For all buried bombs up to 2000 kg there should be complete evacuation up to a radius of 50 metres of UXB, partial evacuation up to 100 metres and doors and windows of all the buildings up to 100 metres should be thrown open. In case of unburied bombs since the dangers are more the degree of evacuation will be different and a rough guide is given below:

Bomb weight in kgs.	**Radius of Complete**	**Evacuation Partial**	**Windows Thrown open**
	Metres	**Metres**	**Metres**
50 to 250	50	150	150
250 to 500	100	300	300
500 to 2000	300	600	800

(iii) **Protective Work**: These are undertaken when the UXB is near an important building, or an under -ground utility service. Some of the protective works which may be undertaken are the protective walls, protective trenches and abutments. Protective walls are built to safeguard important buildings from blast and splinter effects of the bombs. The wall is made in between the bomb and the building, beyond the expected crater zone. The protective trenches are dug to limit the earth shock in case of underground utility service. Protective abutments are made of sand bag walls built on the inside of the basement wall up to the roof. This is done when the digging of a protective trench is impracticable i.e. when the bomb is very near the building. The other type of protective works are those which are undertaken by Bomb Disposal Unit only. In case they intend to destroy the bomb on the spot, they may make protective vents in case of buried bomb, protective mounds around an unburied bomb and protective surrounds of sand bags in case of small anti-personnel bombs.

7. **Responsibility for Detection and Disposal**:

The responsibility of detection of UXB's is that of local C.D. Organisation and actual disposal is done by Military Bomb Disposal Unit. Since the Bomb Disposal Units are very limited and there will be very large number of UXB's to be disposed off, their disposal is taken up according to the priority categories allotted to them. The priority categories are recommended by the District Magistrate and finally allotted by the State Government.

8**. Reporting Procedure:**

If the members of the public see or suspect an UXB, they should report to the nearest Warden Post/ Police or Home Guards. Otherwise it is the duty of a Warden to recee the area after an air raid and report about the UXB's if any. The Warden reports to the Sub-Control/Control Centre. The Officer-in charge Sub-Control Centre/Control Centre may then send the Reconnaissance party to confirm the existence of the UXBs. On confirmation and report by the Reconnaissance Party the report is sent to the C.D. Controller/District Magistrate. The reporting form is at Appendix A. At the same time the Officer-in Charge Sub-Control Centre/Control Centre informs the police and the other heads of the essential services who may have to take action regarding the diversion of traffic or protective measures. The District Magistrate then recommends the priority categories for disposal and sends the report to the State Government by the quickest means of communication. Considering the overall situation in the State, the State Government may confirm priority or may alter it. It is then sent to the nearest Military authorities who send the Bomb Disposal Unit to deal with the Bomb. The Bomb Disposal Units report to the C.D. Controller who then gives the information regarding the location of the bomb etc. on a proforma as shown in Appendix 'B'. The CD. Controller also arranges for any help, if required from the C.D. services etc. After the bomb has been dealt with one copy of the above proforma is signed by the Commander of the Bomb Disposal Unit and returned to the C.D. Controller.

9. **Disposal Priorities:**

UXBS can be allotted four priority categories i.e. A, B, C and D from the disposal point of view. The priority will be suggested/recommended or accorded taking into consideration the urgency with which the disposal of an UXB is essential; in the interest of the public safety or prevention of damage to public utility services. The four categories are as follows:

(i) Category 'A': Immediate disposal essential to war effort. This priority should be recommended only if the unexploded bomb is completely holding up or endangering important means or lines of communication or is impending war work and protective work does not lessen dangers.

(ii) Category 'B': Disposal important to war efforts, but not so urgent as to justify immediate action e.g. unexploded bombs at important production centres contributing to war effort.

(iii) Category 'C: Disposal necessary from the point of view of maintenance of public morale e.g. unexploded bombs affecting essential services, busy centres etc.

(iv) Category 'D': These unexploded bombs will be disposed of after all unexploded bombs of the other three categories have been dealt with and if time can be spared by the personnel of the Bomb Disposal Unit i.e. unexploded bombs in open field area on the out-skirts of the town etc.

10. **UXBs IN VITAL Places:**

(i) **Railways**: Reconnaissance and reporting of UXB on Railway Premises (including stations, workshop, yards, etc., having their own CD Organisation) will be done by the Railway C.D. Authorities. The Railway authorities will inform the State Governments direct indicating the priority recommended by them and at the same time endorse a copy of the report to the Local District Magistrate. In case of small stations which do not have full-fledged C.D. organisation this action will be taken by the District Magistrate who while communicating the UXB report to the State Government will also endorse copy to concerned Railways Divisional Head Quarters for information.

(ii) **Factories and Industrial Installations**: If it is known that an UXB has fallen in factory premises, the factory authorities should immediately report the matter to the nearest Wardens Post who will arrange to obtain the services of the Bomb Disposal Unit in the normal channel. Where, however, such factories etc. have their Control Post, the report on UXB may be sent by the authorities-in-charge of such posts direct to the Town's Civil Defence Controller who will arrange to obtain the services of the Bomb Disposal Unit through the District Magistrate.

(iii) **Port, Harbour, Aerodrome and such other vital installations which have their own C.D. Organisation**: Report on UXBs found in the premises of ports Harbours, Aerodromes etc. will be communicated by the C.D. Controllers of the Posts etc., concerned direct to the State Government. A copy of the report should also be endorsed to the District Magistrate so that the latter may arrange to inform the Heads of Public Utility Services that may be affected.

APPENDIX-"A" UXB/9

Report on unexploded bombs

To……. (The State Government concerned)

Copy to----------(the nearest bomb disposal units if aware abouts known for advance information)

1. Exact Location……
   B.D. Division/Area Member……
   Nearest Warden's Post……

2. Date and hour of falling……..
   (If not known, the time of discovery) ……..

3. Say if in.
   (i) Open ground, fields etc……
   (ii) Built up area……..
   (iii) Building…… (State type)
   (iv) Naval, Army of Air Force Lands or Railway, Air port

4. What is the effect of the Unexploded Bomb on:
   (i) Civil Population.....
   (ii) General Industry
   (iii) Communication, Railway etc.
   (iv) Industrial War Effort.
   If nothing is effected, say so……

5. State
   (i) Can bomb be seen?
   (ii) Diameter of entry hole.
   (iii) Estimated size and depth.
   (v) Type of ground.
   (v) Cap water be seen in bottom of hole? Or give the depth of water below ground in nearby wells.
   (vi) Can the Bomb Disposal Lorries approach the spot?
   (vii) If not, how near can they come?

6. Give distance of the Bomb from:
   (i) Buildings (State Type).
   (ii) Water Mains
   (iii) Sewers
   (iv) Telephone or Electricity Mains

7. If near a Railway, give distance from

A. (i) Running tracks.
   (ii) Bridges.
   (iii) Railway Buildings and their nature.

B. Have trains been stopped?

8. **Describe**:

(i) Type of Bomb (if possible).

(ii) Any part of parts of bomb found.

(iii) Colours and markings of any part or parts visible.

9. Any special remarks, give full details, such as: Difficulties of reaching site, roads flooded, state-of road if out of way place etc.

10. Give sketch if possible (showing distance from buildings etc).

Signature of the Officer-in-Charge Reconnaissance
Party or others

Rank ……..
Officer making report

Date…….

To be filled in by District Magistrate (or other authorised authorities).

Suggested category

Officer to whom the Bomb Disposal Unit should report with full address in English and local script etc.

Signature of District Magistrate.

Date Time

To be filled in by authority for deciding priority of disposal.
Bomb Category allotted…….
Passed for action to Commander, B.D. Division/Area etc....

Time……. For State Government

Date

APPENDIX "B"

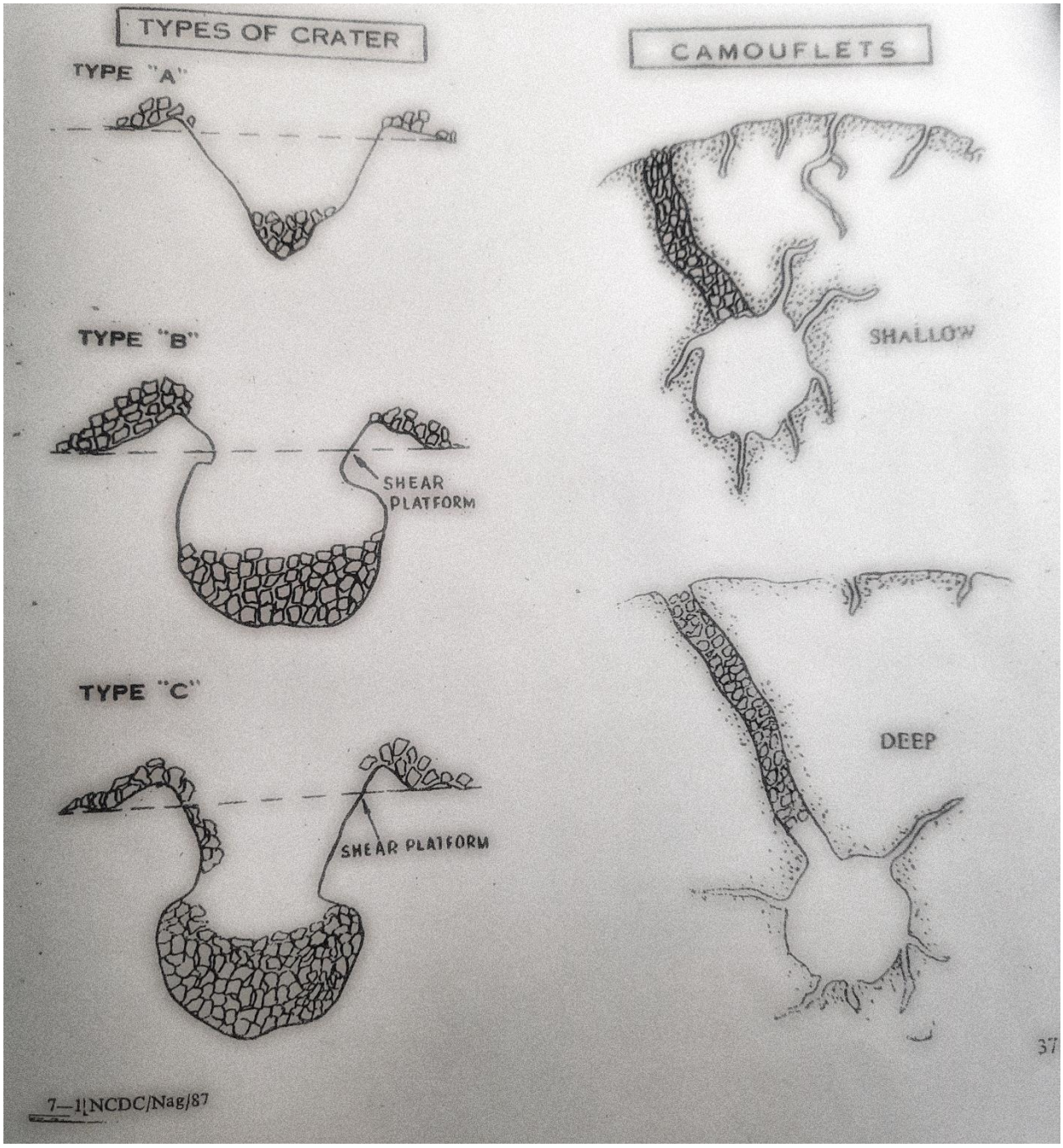
(Form of Card to be handed over to officer- in -charge, Bomb Disposal unit on his arrival)

1. C.D Controller…….

2. Exact place at which U.X.B lies……..

3. Report of the Bomb Disposal Unit……..

Date……..
Sig……..
O.C. No…….
B.D Unit…….



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CHAPTER NO. 10

NUCLEAR WARFARE-ATOM AND HYDROGEN BOMB EXPLOSIONS, HEAT AND BLAST EFFECTS

1. **Object**:

When a nuclear weapon detonates, the entire bomb is rapidly transformed into a hot expanding ball of fire, which keeps on expanding forming the characteristic mush-room cloud. The energy released manifests itself in the form of:

(i) Light and heat radiation
(ii) Blast
(iii) Immediate and delayed radiation.

The object of this lesson is to study the first two effects which conventional high explosives also exhibit but on a much lesser scale.

2. **Introduction**:

Nuclear weapons include Atom Bombs as used at Hiroshima, and Nagasaki during the 2nd World War and much more destructive Hydrogen Bomb produced since then. The Atom Bomb used on Hiroshima on 6th August, 1945 severely damaged 5 square miles of area, killed 78,000 people, injured 40,000 and rendered a very large number of people homeless; 55,000 houses were burnt, down by fire and 7,000 completely destroyed. The energy liberated during this explosion was equivalent to the explosion of 20,000 tons of T.N.T. This is known as a nominal or 20 KT Bomb. The Hydrogen Bomb is much more powerful. The one 500 times more powerful than the nominal bomb is known as a ten megaton or 10 MT bomb.

3. In nuclear explosions energy comes out of the inner core or the nucleus of the atom (for technical details please see appendix attached) by the conversion of matter into energy. Only a few of the known heavy elements like Uranium and Plutonium can liberate energy like this. Weight for weight, the nuclear explosives liberate wastly greater amounts of energy as compared to conventional high explosives. The total disintegration of one kg. of uranium 235 produces an energy equivalent to the explosion of 20,000 tons of T.N.T.

4. **The Atom Bomb:**

Uranium 235 or Plutonium 239 when bombarded by neutrons release tremendous amounts of nuclear energy in the form of heat, Gamma rays, X-rays and visible light which comes out in the form of a light flash. The temperature reached is of the order of ten million degrees Centigrade which practically melts everything around it and produces a pressure of several millions of atmospheres and come in the form of a blast. The flash of light is the first thing which is observed after the explosion and it lasts for a few milli seconds only.

5. **Hydrogen Bomb:**

Second in the series of nuclear weapons is the Hydrogen Bomb. The process of liberation of energy in a H-Bomb is just opposite of Atom Bomb. In this, isotopes of light elements like Hydrogen Lithium unite form heavier one, this reaction takes place at temperature of the sun i.e. the of millions of degrees centigrade with the liberation of tremendous amounts of energy. This is known as fusion. Since temperatures of this order are produced by the Atom Bomb, it forms the inner core the H-Bomb. The A-Bomb explodes first gives initial energy for fusion. This is surrounded by isotopes of Hydrogen which fuse to form Helium and hands the name hydrogen or fusion-bomb.

6. Weight for weight the fusion bomb liberates about two and a half times more energy than Atom bomb. Another important fact about fusion bomb is that there is no theoretical upper limit of the size of the bomb, whereas the energy liberated in fission bomb is limited by the critical size of the nuclear fuel. When a Hydrogen Bomb having an atom bomb in the core, is encased in a heavy container of Uranium. This heavy casing also undergoes fission after the detonation of the Hydrogen Bomb, liberating still higher energies. This is known as fission-fusion bomb or dirty bomb.

7. **Types of Burst:**

Nuclear weapons can be burst in the air, on or near the ground and in shallow or deep water depending upon the nature of target to be destroyed and the intended hazards for the population. The distances of damage and the areas affected are increased from the point vertically below the place of explosion known as Ground Zero or G.Z.

(i) **Air Burst**: When the bomb is burst in the air above the critical height i.e. the fire ball does not touch the ground, the blast acts vertically downwards. This causes maximum structural damage and, therefore, the Atom bomb is usually exploded in the air. There will be no significant fallout hazard except at places of heavy rainfall.

(ii) **Ground Burst**: When the bombs are exploded on or near the ground, a huge crater is formed and a lot of earth and other material is sucked up by the fire ball in the mushroom cloud. It causes serious damage to underground services and installations. Since an appreciable amount of total energy is used up in forming the crater and some of the initial heat and nuclear radiation is absorbed by the material lifted from the crater, the ranges of damage due to blast, fire, skin burn and the initial nuclear radiation are less as compared to air burst. Bigger weapons like Hydrogen Bombs are, therefore, exploded on or near the ground so that they may cause serious fallout problems without seriously affecting the ranges of damage due to blast, earth shock and fire which is still enough to destroy a large size city.

(iii) **Under-ground Burst**: When the bomb is burst below the surface of ground a large crater is formed causing severe earth tremors and damage to building foundations. The fallout will be very limited.

(iv) **Under water burst**: The bomb bursting under water would cause damage to port, facilities, flooding and rain in the neighbourhood due to water thrown high up in the sky which could be contaminated by fission products.

8. **Designation of Hydrogen Bombs:**

The power of a nuclear weapon is designated as tons of T.N.T. which can liberate energy equivalent to the energy liberated by the explosion of a particular nuclear weapon. Thus, the bomb dropped on Hiroshima is known as a 20 KT bomb. Hydrogen bombs can be made of varying powers to suit a particular size and type of target. Bombs up to 500 KT are designated as kilo-ton weapons and the ones above it as megaton i.e. 500 KT is 1/2 MT, 1,000 KT is 1 MT and so on. A Bomb 500 times the nominal bomb is designated at 10 MT Bomb.

9. **Heat Effects:**

When a nuclear weapon detonates 35 percent of the total energy appears in the form of intense heat and light and is emitted from the fire ball. For an Atom Bomb the pulse of heat lasts for about 1.5 seconds, but the major damage is done during the first half a second. This comes in the form of a flash and travels with the speed of light, the sensation is like the momentary opening of a furnace door. The duration of this pulse increases according to scaling laws. For a 10 MT bomb it lasts for about 20 seconds and the major damage due to this is caused during the

first 10 seconds. Because the thermal radiation is similar to light in behaviour it can be stopped by any -opaque material. The variations in atmospheric conditions i.e. cloud, haze, fog and industrial dust will reduce the intensity of heat radiations considerably.

10. **Primary and Secondary Fires:**

Around the ground zero up to a certain distance everything is completely destroyed by fire, this is known as the main fire zone. Around this will be a zone in which all combustible material will catch fire and other non-combustible material will be heated to such a temperature that the combustible material in their contact will also catch fire. Fires started like this are known as primary fires. For a nominal atom bomb, air burst this will range from ½ to 15/8th of a mile. For a 10 MT H-Bomb ground burst this may extend from 3 ½ to 12 miles.

11. Fires will also be caused due to collapse of building domestic fires, breaking of gas pipes and short circuiting of electric wiring. These are known as secondary fires.

12. Many isolated fires are caused due to the primary and secondary reasons. in case of nominal bomb air-burst such isolated fire will be caused up to about 2 miles and for a 10 MT H-Bomb ground burst up to about 17miles. The table-A below gives the range of the main fire zones and the limit of isolated fires for air and ground burst of nominal and the 10 MT weapons. It will be noted that air burst causes must greater damage than ground burst. The main fire zone is ring shaped within this range many fires will be extinguished by the general destruction of the houses and buildings.

TABLE-A

Ranges of main fire zone and limit of isolated fires for 20 KT and 10 MT Bombs ground and air burst in miles.

	20 KT		10 MT	
	Air burst	Ground burst	Air burst	Ground burst
Main fire zone	1/2 to 15/8	3/8 to 1	14 to 28	3 to 17
Limit of isolated fires	2.5			1/2 to 12

13. **Effects of Heat Flash on Human Body**:

Due to the heat flash skin burns of various degrees of severity will be caused at various distances. There may be mere reddening (first degree) or a more painful blistering (Second degree) to a still more sever charring of the skin (Third degree). The burns will depend upon the total amount of heat, area on which it falls and the duration of application of this quantity of heat to the surface. The ranges of heat effects on people exposed in the open for 20 KT and 10 MT bombs air and the ground burst are given in Table-B below.

TABLE -B

Ranges of heat effect on people exposed in the open for 20 KT and 10 MT Bombs ground and airburst in miles.

Type of burn	20 KT		10 MT	
	Air burst	Ground burst	Air burst	Ground burst
3rd degree	13/8	7/8	22	13
2nd degree	1 ¾	1	25	15
1st degree	2 ½	1 ½	35	21

14. **The Blast Effect**:

When the nuclear bombs detonate 45 percent of the total energy papers in the form of blast and shock wave. The blast is of excessive over pressure of the order of thousands of atmospheres. With the air burst this is added up by the wave reflected from the ground. This appears in two phases. The pressure and the suction phase. Whereas in case of H.E. Bombs the suction phase is responsible for the structural damage, in case of nuclear explosions most of the damage is done in the pressure phase itself which acts as a gigantic hammer on all objects. The pressure phase in case of H.E. Bomb lasts for 0.005 seconds, in case of nominal bomb it is ten to fifteen times more i.e. about 0.7 to 1 second and for 10 MT bomb it lasts for about 5 seconds.

15. The ability of a building to withstand the shock of the blast wave depends on the strength, shape and openings in the building. The openings serve to relieve the pressure on the outside walls. The structural damage can be divided into four zones i.e. (A) Complete destruction, (B) Irreparable damage, (C) Moderate to severe damage, and (D) Light damage around the ground zero.

16. In case of Hydrogen Bombs a ground or near ground burst is more likely since it creates additional fall-out hazard without seriously affecting the blast and heat effects, which still cover greater than most likely built up targets. The table-C below shows the A, B, C and D damage ranges for 20 KT and 10 MT Ground burst. Since the range of blast damage is much greater for an air burst than for ground burst, for practical purposes the ranges given in the table may be increased by 30 per cent to get ranges for air burst at optimum height.

TABLE-C

Comparative blast damage to houses and blockage of streets for 20 KT air burst and 10 MT Bombs grounds burst in miles.

Damage/ Zones	20 KT	10 MT
A. Damage Zone Houses totally destroyed, streets impassable.	0- ½	0-3 ½
B Damage Zone-Houses irreparably damaged, streets blocked until cleared by mechanical aid.	½ - ¾	3 ½ -5
C Damaged Zone-Severe to moderate damage to houses. Progress in streets made difficult by debris	¾-2	5-13
D Damage Zone-Houses lightly damaged, street, open but some glass and files	2-3	13-20

17. **The Effects of Blast on Human Body:**

Since the human body can withstand pressures better than structures, there will not be much injuries due to direct blast but many people will be injured due to indirect effects of blast such as collapse of buildings, falling debris, flying glass and splinters. For a nominal bomb air burst these would occur up to about 2 miles. At greater distances the casualties due to flying glass will be more.

TECHNICAL APPENDIX

1. **Atom**:

An atom is the tiniest particle of any chemical element that can exist by itself and retain the qualities that make it as that element. No one has seen an atom and probably no one ever will for it is too small and too nebulous, but you can think of it as made up of a sun (nucleus) at the centre and planets (electrons) around it, much like a solar system. 10,000,000 atoms could be placed side by side in row across a pin head.

2. **Neutron**:

Neutron is a particle without an electrical charge in the nucleus or core of the atom, except that of hydrogen. Having no charge, it can penetrate the electrical "defences" of other atoms and invade the nucleus. Its presence cause an upheaval. It can split the atom as in the case of uranium or make it throw out particles or rays, as in radio-active isotopes i.e. render them artificially radio-active.

3**. Electrons and Protons:**

An electron is a negative particle of electricity. It is present in every atom and is one of the fundamental building blocks of matter. A proton is a positively charged particle in the nucleus, just about as heavy as the neutron.

Characteristics of Atomic Particles

Name	Electrical Charge	Mass
Electron	Negative-I	0.000548 MU*
Proton	Positive +1	1.007575 MU
Neutron	Nil	1.00893 MU

(*an atomic Mass Units (MU) is 1-66x 10^{-34}grams)

4. **Isotopes**:

There are a hundred and five chemical elements natural and artificial. Different forms of the same element can have the same number of protons in the nucleus but different number of neutrons; in the case of Hydrogen, Deuterium and Tritium (all isotopes of Hydrogen) all the three have only one proton in the nucleus, but one, two and three neutrons respectively. Chemically these are similar but differ in physical properties. Other examples are uranium 235 and 238.

5. **Fission Chain Reaction and the Critical Mass:**

Certain isotopes of heavy element Uranium exhibit the property of breaking up into roughly two halves when hit by the sub-atomic particle 'neutron'. This is known as Fission. Moreover, the fission of an U-235 atom is accompanied by release of neutrons of sufficient energy to break up the neighbouring atoms of U-235. In this way a chain reaction could be started in pure mass of U-235 provided there is a crowd of atoms. With less number of atoms the neutrons may fly outside the crowd and the chain reaction would die down. The quantity of material required to sustain chain reaction in pure U-235 is known as critical mass. In the construction of an atom bomb sub-critical lumps of pure U-235 are suddenly brought together

to make the assembly over critical when a stray neutron starts the chain reaction. The entire mass is held together for millionth of second by the heavy bomb casing in which large number of U-235 atoms undergo fission and energy is released in an explosive form. The loss of neutrons is also reduced by provision of reflecting surfaces in the inside of the casing.

6. **Cobalt '60':**

Gamma rays are used to irradiate cancers and stop their growth. Radium is the greatest source of natural radio-activity. But a sort of "artificial" radium, Cobalt-60, an isotope of the metal cobalt, is a far cheaper and more easily available source of gamma radiation. It is made in atomic reactors, by bombarding ordinary cobalt with neutrons. If the bomb casing is made up of cobalt the residual radio activity would increase. This is a 'Cobalt Bomb' added to nuclear weapon terminology.

7. **Fission Products:**

With the splitting or fissioning of the plutonium or uranium atoms of Atoms and Hydrogen Bombs, there are formed some 200 atomic fragments, called fission products. They include isotopes of probably 35 different elements. All these atomic fragments or fission products probably are radio-active. Fission product radio-activity consists in giving off nuclear radiation in the form of Beta particles and Gamma rays. In addition to these fission products, there may remain from the explosion small amounts of unexploded unfissioned uranium or plutonium their atoms give off alpha particles as they decay. Eventually, the decay of these radio-active atoms will end in the formation of stable atoms which are not radio-active and which do not decay further.

8. **Fusion**:

Energy is liberated when two light nuclei joint together to form a heavier one. The fusion reaction for isotopes of Lithium and Hydrogen are as follows: -

1. Lithium+Neutron = Helium 4+ Helium 3+ energy
2. Tritium+ Deuteron =Helium 4 + Neutron + energy

9. **Thermo-Nuclear Bomb:**

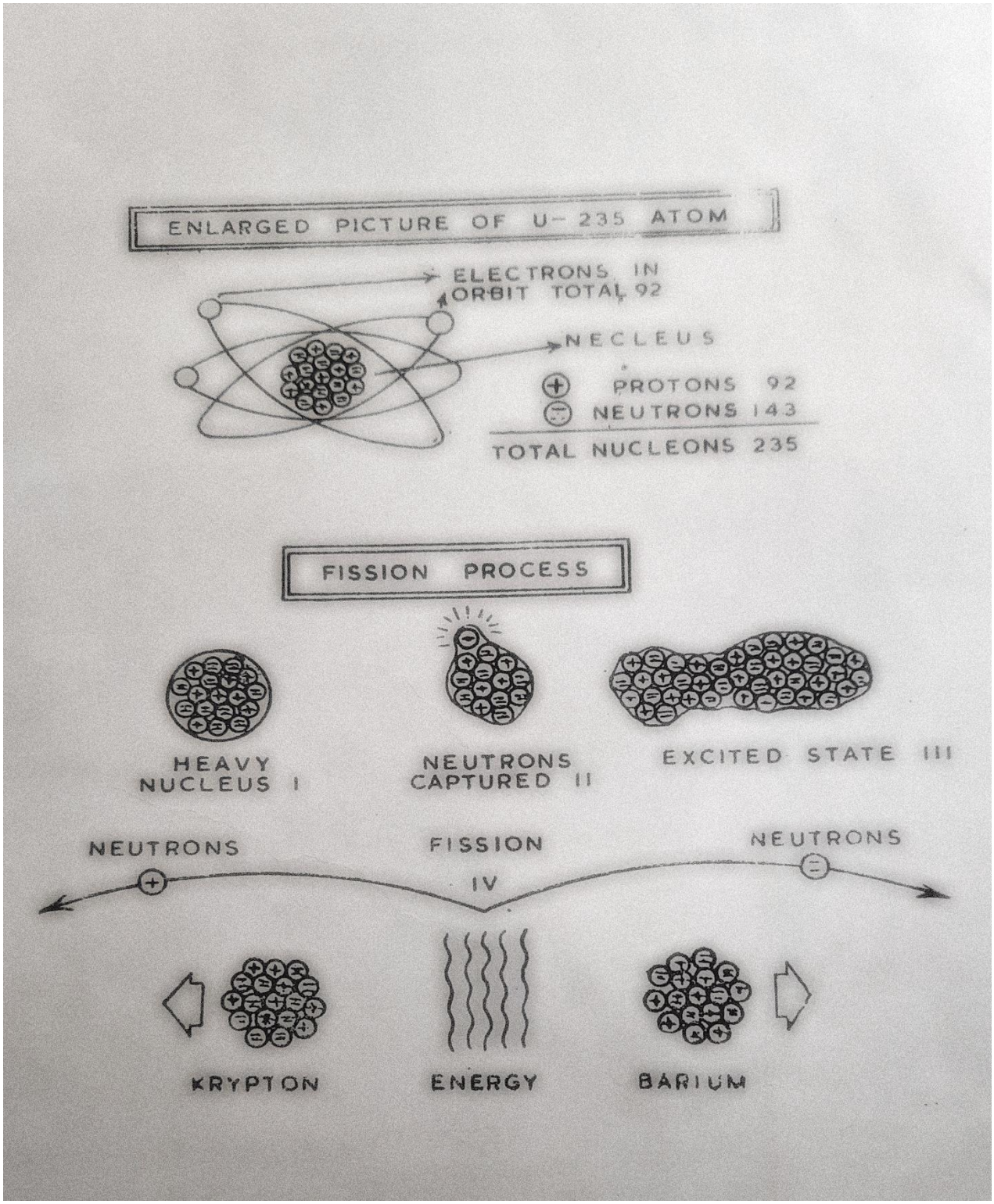
Fusion bomb i.e. Hydrogen bomb. The energy is obtained by reaction of atomic nuclei at very high temperatures.

10. **Critical and Optimum Heights of Detonation:**

Critical height is the height of detonation at which the fire-ball just touches the ground. Optimum height is that height of detonation at which there is maximum blast damage. This is always greater than the critical height.

11. **The Scaling Laws:**

The duration of blast and the linear distances of destruction vary as the cube root of the weapon yield i.e. to double the damage distances the size of the bomb will have to be increased eight times. In case of a Hydrogen Bomb which is 500 times the nominal bomb, the blast pressure lasts 8 times 0.7 seconds i.e. about 5 seconds and the distances for A, B, C and D will also increase 8 times.


ENLARGED PICTURE OF U-235 ATOM
ELECTRONS IN ORBIT TOTAL 92
NECLEUS
PROTONS 92
NEUTRONS 143
TOTAL NUCLEONS 235
FISSION PROCESS
HEAVY NUCLEUS I
NEUTRONS CAPTURED II
EXCITED STATE III
NEUTRONS
FISSION
IV
NEUTRONS
KRYPTON
ENERGY
BARIUM

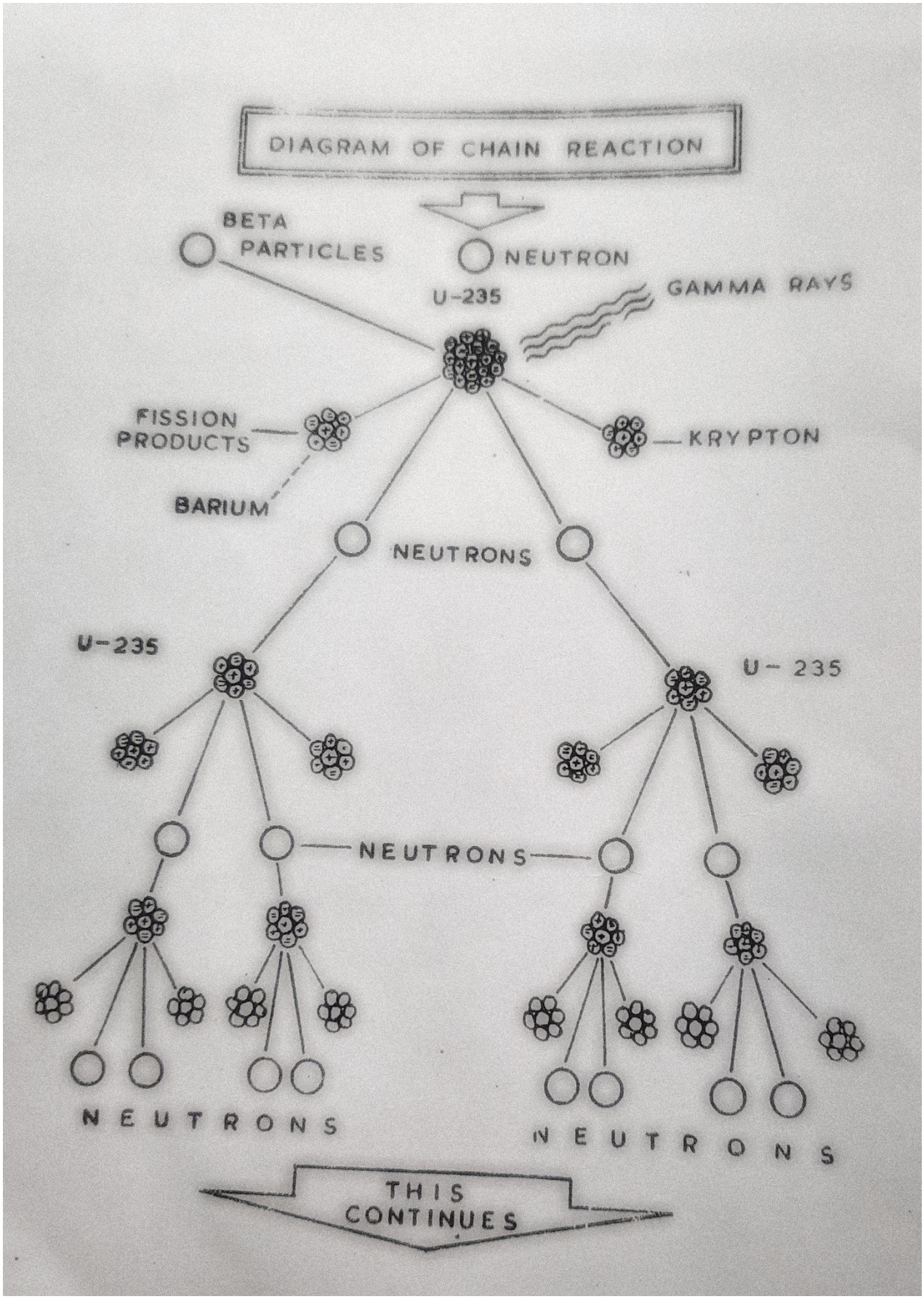


DIAGRAM OF CHAIN REACTION
BETA PARTICLES
NEUTRON
U-235
GAMMA RAYS
FISSION PRODUCTS
KRYPTON
BARIUM
NEUTRONS
U-235
U-235
NEUTRONS
NEUTRONS
NEUTRONS
THIS CONTINUES

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CHAPTER NO. 11

NUCLEAR WARFARE -RADIATION EFFCTS

1. **Object**:

On detonation of a nuclear weapon on or near the ground a lot of earth and other material is sucked up in the rising fireball. All this is turned radioactive and falls down over a large area over which the mushroom cloud moves. This is known as residual radiation or fallout and constitutes 3/4th of the total radioactive energy released. The part of the radioactive energy released within a minute or so of detonation is known as Immediate radiation and is only 1/4th of the total radioactive energy. The fallout constitutes the major radiation hazard as it continues to come out of the products of explosion for long periods. The object of this lesson is to study the Radiation effects of nuclear explosion.

2. **Introduction**:

Some of the elements like Radium give out radiations by themselves. The phenomenon is known as natural radio-activity. Elements can also be made to give out radiations by making their nucleus un stable by the bombardment of neutrons and other particles. This is known as artificial or induced radio-activity. In natural radio-activity alpha and beta rays which are particles and gamma rays which are radiations like X-rays are given out. But in artificial radio-activity along with the above three neutrons may also be given out.

3. In a nuclear fission about 200 isotopes of some 35 elements are released. Practically all of them are radio-active and give out radiations. At the same time a lot of dust and other material that is sucked up in the mushroom cloud is also turned radio-active. Heavier particles fall down quickly, but the lighter ones keep on moving along with the cloud and fall over a large area down wind. This is known as fallout. After the explosion radiations are emitted from the fire ball, from the radio-active articles in the cloud and finally from the radio-active fallout material deposited on the ground.

4**. Nature of Radiation-Radio-Active Decay:**

Immediate radiation consists of neutrons and gamma rays, this is added up by the newly formed and intensely radio-active fission products in the fire ball. Most of the neutrons are captured by the nuclei of neighbouring atoms after slowing down, turning them radioactive. All the radio-active particles ultimately disintegrate giving out alpha, beta and gamma rays and decay ultimately into a stable form." The time re quired for this varies from a few micro-seconds to millions of years. The process of decay cannot be influenced by heat, pressure or any chemical reaction.

The rate of decay can of course be measured and is expressed as half-life (please see Appendix) and is constant for a particular isotope. Radiation is measured in Roentgen (R) and the quantity of radioactive material in Curie. As immediately at the time of explosion it is not possible to measure the radio-activity, for the sake of comparison, the standard is usually taken as the strength at one hour or seven hours after burst. The rate of decay follows a seven tenths rule i.e. if R is the strength at one hour after burst, after 7 hours it will be R/10 roentgen, after 7x7 i.e. 49 hours it will be R/100, at 7x7x7 i.e. about 2 weeks it will be R/1000 and so on. Thus, it is evident that most of the decay takes place within first two days.

5**. Effect of Radiations on Human Beings:**

The damage caused by the nuclear radiations to human body is by killing the body cells. This depends upon the amount of radiation received (called dose) and the part of the body which receives it. The biological effects of radiation on whole body may become apparent in four successive phases.

(i) **Radiation Sickness**: This is caused by the damage to gastro-intestinal tract. It may develop within a few hours to 24 hours depending upon the dose received. It may last for 2-3 days. Usually radiation sickness occurs at doses of 150 R and above. The earlier symptoms are fatigue, nausea, indigestions, loss of appetite which may develop to vomiting, diarrhoea, may be with blood etc. with higher doses.

(ii) **Delayed Effects**: The delayed effects like loss of body hair with appearance of blood spots due to haemorrhages under the skin, occur after about four weeks or so, when the blood forming system is injured by radiation.

(iii) **Long-term Injuries**: These are anaemia, blood cancer, bone or tissue cancer and tumours which usually develop many years after exposure. Premature ageing may occur. These dangers are not imminent below a dose of 100 R.

(iv) **Genetic Damage**: When the reproductive organs and germ cells which transmit the heritable characteristic to future generations are affected, genetic damage is caused. The damage caused by radiation is directly proportional to total dose received by the population i.e. whether a few get high doses or a larger number get lesser doses.

6. **Radiation Hazard Due to Atom Bomb Explosion:**

Initial Radiation: These travel outward from the centre of explosion. They consist mainly of Gamma rays. Gamma rays are penetrating and they will produce dosage in the case of a nominal air burst bomb as follows: -

Distance from GZ	Total Dose	Effect on Human Body
At ½ mile	5000 r	Certainly fatal.
¾ mile	500 r	50% lethal. Majority victim get sick
1 mile	100 r	Less than 1% few get sick.
1 ½ miles	5 r	Nil. No sickness

In the case of underground and underwater burst initial radiation would be practically absent due to containment by earth and water.

7. **Residual Radiations- The Fallout**:

In the case of nominal air-burst A-Bomb explosion the products of explosion are sucked up very high and dispersed in the atmosphere. By the time these come down to earth much time (years) is elapsed so that the radio-activity is reduced to below harmful. level. Hence no immediate fallout problem arises. However, when a bomb is exploded near ground level radio-active particles contaminate larger and heavier particles of earth etc. and these are deposited. quickly on ground. The deposited radio-active material in the fallout area creates radiation hazard. If it comes into contact with body or clothing acute skin burns which are difficult to heal may result. In case it enters body through inhalation, or ingestion it is one of the deadliest poisons and will cause acute radiation sickness, genetic troubles and death due to these radiations. The radio-active deposits might contaminate exposed food, water and crops and create serious problems of protection, control and decontamination. In the case of a nominal bomb ground burst, this may extend to a couple of miles down ward.

The table below gives the various doses of Gamma radiation received in a single exposure and the probable effects on human beings.

Probable effects on people of a single exposure to Gamma Radiation

Single doer range in Roentgen (R)	Mortality at 24 hours	Mortality at 6 weeks	Number incapacitated within 24 hours	Probable time of unfitness for any duties of those affected
0-25	0	0	Negligible	2-3 days
25-75	0	0	A few	2-3 days
75-100	0	Less than 0.1 %	Up to half	1-2 weeks
100-150	0	Less than 0.5 %	At least half	About 3 weeks
150-200	0	up to 5%	At least three fourths	Not loss than 3 week some very ill
200-400	Unlikely to be any	About one third	Probably all	Not less than 3 months
400-600	Perhaps a few	About half	Probably all	Do
Over 600	Likely to be some	Almost all	Probably all	Do

8**. Radiation Hazard From H-Bomb Explosion:**

Initial Radiation Hazard:

With the larger bombs the radioactivity also increases. However, distance and shielding effect of intervening media do not allow the range of 50 percent lethal dose for a 10-megaton bomb to go beyond 2 ½ miles and beyond 4 miles from ground zero there is no significant risk. Since these distances are within or near-about the range of total destruction due to blast, the hazard from initial radiation could be ignored.

9. **Residual Effects:**

However, fallout from explosion of larger bombs can be very extensive and poses a serious threat to cities, villages, industries etc. Which lie in the fallout area. The US Atomic Energy Commission in report stated that the H-Bomb exploded at Bikini Island on 1st March 1954, contaminated cigar-shaped area extending approximately 220 miles down wind and varying in width up to 40 miles.

10. **Permissible Dose of Radio-Activity**:

The peacetime permissible dose for people working in atomic energy station is 0.3 R per week. This is not likely to create any long-term effect on the body tissue or reproductory system. The wartime dose is likely to be about 25 R absorbed in a continuous spell of a few hours. This can be increased to 60 R if uniformly spread over 3 days. The dose received for C.D. workers should be checked frequently to avoid over exposure.

11. **Detection and Measurement of Radiation**:

The atomic radiations cannot be seen, heard, tested smelt or felt by touch. They are detected by their ionising effects on gases. Three types of radiac instruments are used in Civil Defence.

(i) The individual dosimeter measures the total radiation received by an individual in a particular period. It is available in two ranges 0-5 and 0-50 Roentgen.

(ii) The radiac survey meter measures the rate at which radiations are being received at a place. This is used for survey. The ranges are usually 0-20,0-30, and 0-300 Roentgen.

(iii) The contamination meter is a very sensitive instrument, it measures the contamination of a penned equipment, food or other things.

12. **Protection against Fall-out:**

The protection from fall-out depends upon three factors-time, distance and screening.

(i) **Time**: Radio-activity decays fast. As already mentioned it becomes 1/100 of its value within about 2 days and therefore if the fallout is likely to reach the area after about 2 days or so it would have already decayed possibly below harmful level.

(ii) **Distance**: From an uniformly contaminated area $^1/_3$rd of the total dose comes from a radius of 12 ½ feet, half the total dose comes from a radius of 25 feet and ¾ th of the total dose comes from a radius of 100 feet. If within these radii there are walls, obstructions or other buildings this dose will be reduced and hence it will be safer to be inside and safest inside a shelter or a trench possibly with overhead cover.

(iii) **Screening**: The screening provided by various materials in reducing the dose depends upon their density. 2.2 inches of concrete reduces the dose by half, another 2.2 inches to one fourth, and so on. 6 inches of concrete is equivalent to $7^1/_2$ inches of brick or 9 inches of earth. Thus, in the centre of a two storied brick building it becomes one fortieth, in a slit trench with one foot earth overhead to one hundredth and in a basement shelter to two to three hundredth.

13. **Detection of Radio Active Fall-out Areas:**

The direction of movement of the mushroom cloud and the area likely to be affected can be predicted with the help of meteorological data. Besides, Radiological Survey Teams would be active in these areas for detection of abnormal increase in the radiation levels in the atmosphere and on the ground. The radiological survey meters will be constantly on the watch. Some of these will be remotely controlled so that the intensity of radiation is known while the observer is at a safe distance. The areas contaminated by the fallout could Thus, be delimited by suitable sign boards and adequate information supplied to Civil Defence Control Centre to issue suitable information to the public in general so that people can take protective measures. The people likely to be affected by the fall-out would have to be issued with suitable warnings regarding probable time of commencement of the fallout, actual beginning of fallout, completion of fallout and No-fall-out risk warnings.

TECHNICAL APPENDIX
Characteristics of Nuclear Radiation

Radiation Type		Mass	Electrical charge	Remarks
Alpha	Particle	Roughly four times the nuclear of a Hydrogen Atom	+2	Identical to Helium atom stripped of its electrons
Beta	Particle	Roughly 1/1800th of a Hydrogen Atom nucleus.	-1	Identical to a high-speed electron
Gamma	Wave	None	None	Electromagnetic wave of energy
Neutron	Particle	Roughly equal to the nucleus of Hydrogen Atom.	Nil	--

Geiger Counter:

The Geiger tube is filled with inert gas which get ionised when radiation passes through the tube producing a pulse of current which activates an electric circuit. Their primary use in Civil Defence Operations would be for monitoring food, water and people for radio-active contamination. They are particularly adaptable for training since they can be operated in weak radiation fields minimizing radiation exposures to trainees.

Alpha Particles: Nuclear radiation consisting of two protons and two neutrons and having a double positive charge. It is identical to a helium nucleus. Alpha particles can be stopped in a few inches of air, by a sheet of paper or the dead surface layer of the skin.

Beta Particles: A negatively charged particle emitted from the nucleus of an atom and having a mass and charge equal in magnitude to an electron. Beta radiation may penetrate about a half centimetre into the skin producing an effect similar to a burn. Beta particles are more highly ionising.

Curie (C): The amount of radio-active material which decays at the rate of 37,000 million disintegrations per second. A millicurie (mc) is one thousandths of a curie a microcurie (µc) one millionth.

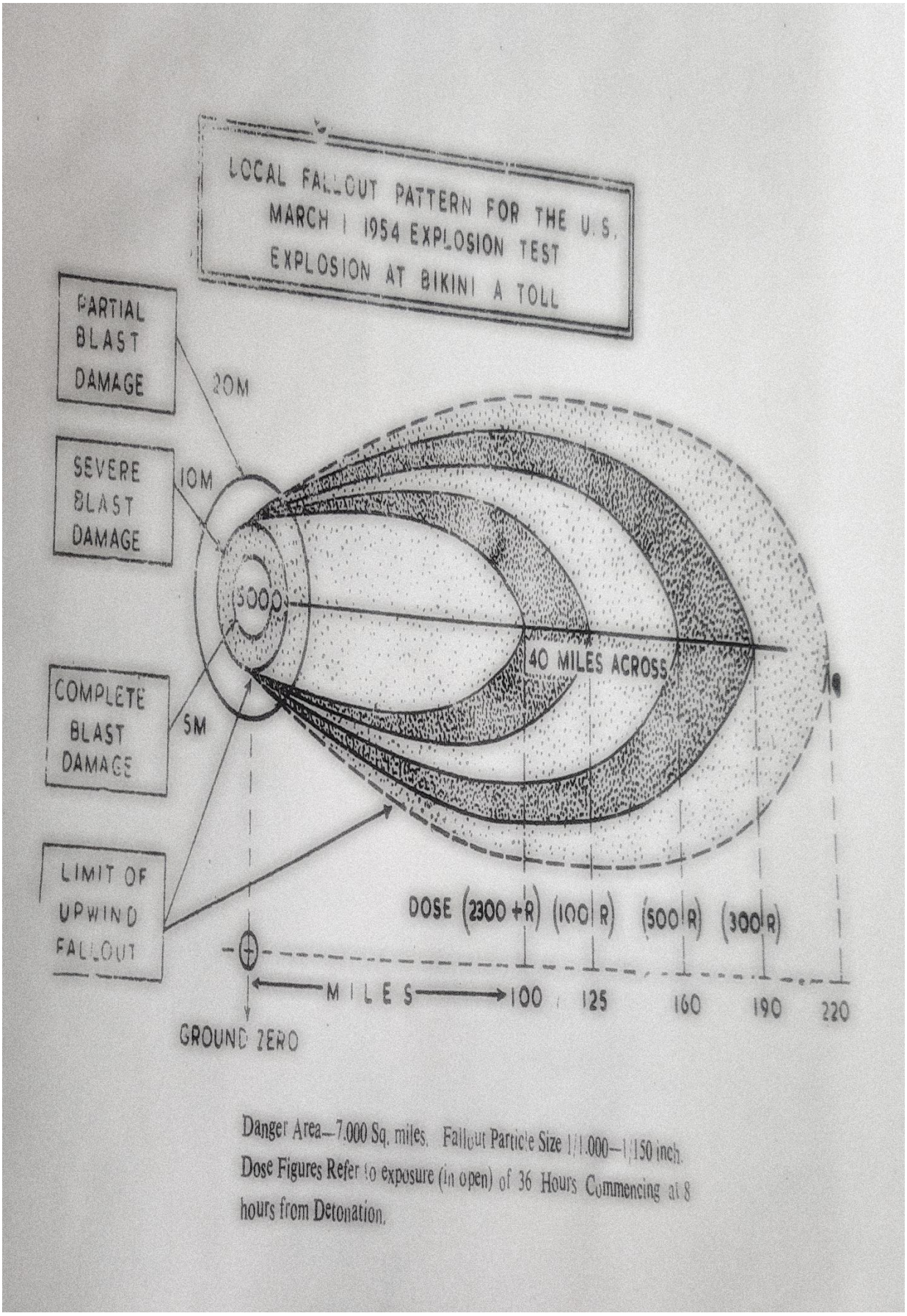
Half-life Period: The time required for a radioactive substance to lose 50 percent of its activity by decay. Each radio-active isotope has its own characteristic half-life it ranges from a millionth of a second to billions of years.

Ionization: The process by which a neutral atom or molecule acquired either a positive or negative charge. A high-speed particle passing through matter may cause the atom or molecule to divide into positive and negative parts called ions, destroying the electrical balance.

Roentgen: A unit of radiation quantity, defined as that amount of X or Gamma radiation which produces one electrostatic unit of charge of either sign in one cubic centimetre of air at normal temperature and pressure.

X-rays: Penetrating electro-magnetic radiation identical to Gamma rays, but generally less energetic. X-Rays originate in the electron structure of an atom and may be produced by the sudden slowing down of high-speed electrons in the X-ray machine or by the 'jumping' of electrons from an outer to an inner orbit.

Dirty and Clean Bombs: When the nuclear weapons leave behind material which is highly radioactive, it is known as a dirty bomb and when the material left over is not radio-active, it is known as a clean bomb. Hydrogen Bombs are usually dirty bombs.



Danger Area—7,000 Sq. miles. Fallout Particle Size 1/1,000—1/150 inch. Dose Figures Refer to exposure (in open) of 36 Hours Commencing at 8 hours from Detonation.

CHAPTER NO. 12

PRINCIPLES OF PROTECTION, STANDARD OF PROTECTION TAKING COVER, SHELTERS, REFUGE ROOM, TRENCHES AND SANDBAGGING

1. **Object**:

The effects of high explosive bomb explosions are very destructive over a certain distance but moderate and minor damage occurs beyond this zone of heavy destruction. These effects could be reduced by following certain well-known principles of protection which are discussed in this lesson.

2. **Principles of protection**:

The important principles of protection is to interpose between the point of explosion of the bomb and the object to be protected anything which can neutralise the destructive effects of the bomb. To think in terms of absolute protection against the destructive effects of modern weapons is not a practical proposition. However, it must be understood that it is not impossible to provide some degree of protection so as to minimise casualties and damage to a considerable extent. Even such a protection may not be possible for all persons and all structures at all places and would have to be selective in order to reduce expenditure to the minimum. The object should be to have a reasonable protection at minimum cost than to have no protection at all. Such a protection would be necessary to maintain the morale of the people and services at a high level and enable them to continue their normal work in offices, business establishments, factories houses etc. The actual method of protection to be adopted would not be one but would be a combination of more than one method as described below:

3**. Methods of protection:**

(i) **Dispersion**: By this the congestion in the target area is reduced. The personnel, vital plants, stores etc. are dispersed in the target area in such a way that by a single bomb explosion not more than one building, plant, stores, shelter etc. is affected at a time. Even those who are on essential duty should not be allowed to live within 500- or 1000-yards radius of targets such as Ammunition Factories, Aerodromes etc. Similarly shelter should not accommodate more than 50 persons at one place. Larger shelter may be divided by walls of adequate thickness to conform to this rule.

(ii) **Provision of shelter for individuals and communities**: Besides providing public shelters, the public has to be assisted in converting parts of their homes as strong rooms or "Refuge Rooms" which could be used as shelters.

(iii) **Training of general public**: This includes the general public showing an immediate, automatic and correct response to an air-raid warning.

(a) The people must be trained in taking cover in the absence of a shelter nearby.

(b) The general public must be trained in, how to save themselves from glass splinters of their own house-windows etc."

(iv) **Structural precautions and protection to vital plants and Essential Services**: This includes strengthening of floors, walls or roofs of existing building, of the plants, incorporating additional protective structures in and around the building such as protective walls or trenches against earth-shock effects etc.

4. **Standards of lateral and over-head protection:**

Near the point of explosion of a 500 lbs. General Purpose Bomb, the effects are very destructive but beyond a certain distance these effects are not so destructive. Even then a number of persons would be injured or killed and damage to property would result at greater distances from the bomb explosion if they are not, protected. Protection required at the point of explosion is very costly. A 5 to 7 feet thick reinforced concrete roof will be required to withstand a direct hit from 500 lbs. G.P. Bomb, Protection of such scale is prohibitive in cost, labour and time. Therefore, the protection to be sought is from the blast and splinters which fly along the ground, known as the Lateral Protection. The thickness of more common materials required to withstand the blast and splinter effects of 500 lbs. G.P. Bomb at a distance of 50 feet or greater are shown below. The overhead protection aimed at is against the fall of debris thrown up by bomb explosion and of anti-aircraft shell splinters, small incendiary bombs etc.

Material	Thickness		Remarks
	Lateral protection	Over-head protection	
(a) Mild Steel Plates	1 ½ inches	5/6 inches	Composite plates to be bolted together.
(b)Reinforced concrete.	12 inches	6 inches	--
(c)High quality brick work or sound stone work	13 ½ inches	9 inches	Over-head protection in the form of arch.
(d) Concrete	15 inches	**-----	----------
(e) Ballast or single inches single (broken stones)	24 inches	18 inches	If between boards, G.I. sheets or in bags.
(f) Sand or earth 30 inches	30 inches		Sand in bags earth if solidly compact,
(g) Timber	36 inches	---	if solidly stacked

*** If in a compact form.

The standard of over-head protection mentioned is against, the fall of small objects. In case there is danger of fall of debris on the roof from nearby buildings or the super-structure, the roof would need adequate further strengthening depending upon the amount of load and the height through which it is likely to fall on the roof.

5. **Shelters-General**:

The shelters for the people could be of two categories one to shelter large number of people called the public shelters and the other to shelter families. Both of these types could be either especially constructed or selected from the existing structures in the area. Since construction of shelters would take long time with drain on national resources it would be necessary to select shelters from within the existing buildings or by digging trenches in the open if it is not possible to do so. The shelters should be select ed on the following considerations: -

(i) **Degree of Protection**: It should provide the standard lateral and over-head protection. For this purpose, the walls should be of adequate thickness and roof strengthened to prevent from collapse under falling debris. All the openings should be closed by barricades of suitable strength in case they are not used as exists, entrances or ventilators. Doors and windows would be protected from blast effect by construction of baffle walls. All glass panes from ventilators, sky lights etc. should be removed.

(ii) **Entrance and Exits**: Entrances should be wide enough for ease of entry. They should not be less than 30 inches in width. There should be more than one exit for each shelter and some rescue tools to cut an emergency exit in case they get blocked by falling debris.

(iii) **Siting**: The shelter should not be close to pipes, tanks, containers of steam, gas, chemicals as accidental damage to these would endanger the safety of the occupants of the shelter.

(iv) **Spacing**: In order to minimise the number of casualties likely to result from direct hit the sizes and spacing of the shelters should be such that any circle of 50 feet radius should not contain more than 50 persons.

(v) **Accessibility**: The shelters should be within easy reach of those for whom they are meant. Everyone should be able to get into the shelter within the warning time i.e. as soon as the air raid alarm is sounded and the planes are heard/seen over-head. This time will be not more than 5 minutes.

(vi) **Ventilation**: All-natural means of ventilation including fans should be employed. In cases where shelters are meant for longer stays the air space provided per individual should be increased unless air circulation by artificial means is available.

(vii) **Lighting**: Independent source of lighting should be available in each shelter. This could be achieved by means of hurricane lanterns in small shelters and petromax lights in large shelters.

6. **Facilities in a shelter**:

There is no limit to the facilities that could be provided for a comfortable stay inside a shelter. However, the following are few which, if denied to the occupants might cause hardships to them:

(i) Drinking water supply.
(ii) Sanitary arrangements such as a chemical closet.
(iii) First-aid equipment.
(iv) Arrangements for recreation such as playing of records, cards, carrom boards etc.

7. **Shelters inside building refuge rooms:**

The existing building could provide suitable places which could be used as Refuge Rooms. Generally, rooms on the ground floor and facing away from the open spaces such as streets, parks etc. should be selected. They should provide adequate lateral protection. All openings should be protected by baffle walls and the roof strengthened to withstand fall of debris. Inner rooms with windows masked by neighbouring buildings, internal passages, corridors etc. may be the obvious choice. Basement if selected should be guarded against flooding by water from broken sewage or water-mains, the refuge rooms should satisfy the conditions for shelters and facilities as far as possible as mentioned above.

8. **Shelters independent of building:**

(i) Shelters could be built above the ground with walls having standard thickness and a proper roof. These surface shelters are constructed of brick. Concrete or reinforced concrete walls of standard thickness and strong roof. They should be away from the buildings so as not to be affected by falling debris

(ii**) Siit Trenches:** It is a narrow excavation without overhead protection. These are dug out at short notice on open area, under the branches of tree. Their dimensions are 8-10' long 2'-2' 6" wide and 4' 6" deep. The depth is measured from bottom to the top of parapet. Eight to ten feet long units are dug in zig zag form with an angle of 80-100 degrees bet ween each leg.

9. **Taking cover:**

In order to get the maximum protection, one must get to a shelter selected and prepared for the purpose but when one is caught in a situation where there is no time to take advantage of a nearby shelter the following measures may be adopted to minimise the risk of injury. Since most of these actions have to be taken at short notice and at a time of confusion everyone must be drilled in the same by having frequent practices.

(i) **In the open**: The worst thing is to run for cover. There will usually be a few seconds left for fall of the bomb and a running person is greatly exposed. Instead throw yourself flat wherever you happen to be. Life with face downward resting on elbows with hand clasped behind the head so that the chest is not in contact with the ground. Put a rolled handkerchief in between the teeth, or a piece of cork. Then watch the ground around you from the corner of the eye for any low-lying area such as a ditch hollow ground or gutter. If near enough, manage to roll into it.

(ii) **On the Road**: While walking over a road in the open, the best place to take shelter would be to get into gutter or hole nearby the road and remain there taking can to ensure that no part of the body rises above the nearby ground level.

(iii) **If in a car, bus, or vehicle**: Park the vehicle in a side lane, or by the left-hand side of the road, if you are the driver, leave the ignition key in its place and take cover as it in open. The others in the vehicle should get out and take cover as if in open.

(iv) **If near a building or other type of cover**: Get inside the building. A wall and door-way will give some protection but avoid resting head directly against a wall and do not be in line with glass panes facing the street or open areas.

(v) **When inside a building:** Prefer to be near an inside wall than an outside one. Also avoid being in a direct line with an out-side window or door pane. The places below stair-cases, under archway, doorways, corners between two walls and under cots should be preferred to other parts of the building.

(vi) **If in a bullock-cart or tonga**: The animals should be unyoked and tied to the nearest lamp post or in the absence of one, to the wheel and cover taken as above. The cart or tonga should be parked in side lane or to one side of the road.

(vii) **If in train**: Turn off the lights and crawl under seats. On no account look outside of the windows.

(viii) **If in a theatre**: In case you are in a Cinema Hall, theatre or any such crowded place keep sitting on your seat.

10. **Perfection from glass splinters:**

All unprotected glass is a potential source of danger as it is smashed by the blast and the splinters fly at gear, speed. These splinters may injure human beings and damage property and machinery. At night the light may shine out of such windows and vitiate the blackout. Also, the normal purpose of the glass to keep weather away is defeated. following measures should be taken: -

(i) **Complete removal of glass**: All glass should he removed and replaced by wooden shutters, especially where men are working and in rooms used as shelters.

(ii) **Anti-splinter measures**: Where complete removal of glass is not practicable ant splinter protection provided by ½" wire netting, light weight framed screens of plywood and similar material which are fixed very close to the glass.

(iii) **Anti-scatter measures**: Where the above methods cannot be used a strong textile netting of fabric may be pasted to the glass securely by a suitable adhesive which is mixed with preservative against rot. Glass properly covered by adhesive anti-scatter treatment may remain in place under mild blast even if badly cracked but may fall out bodily under severe blast. Under no circumstances paper is to be substituted for fabric. It may be worth-while to use both anti-splinter and anti-scatter measures at the same time.

11. **Methods of protecting opening in wall:**

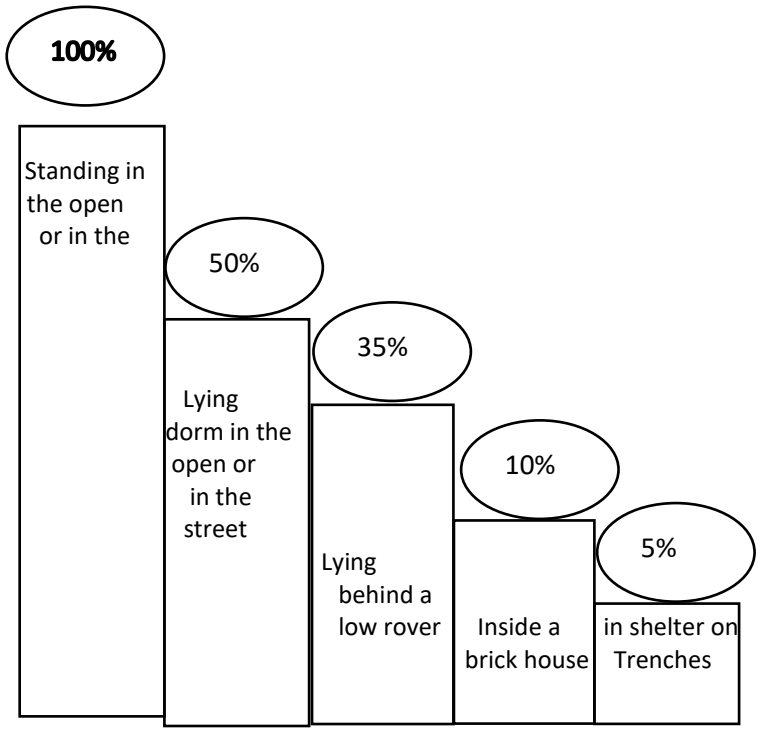
The blast and splinters might travel through the opening like doors and windows and would cause injuries to the persons inside and also damage to property. To prevent this the door openings and windows have to be screened by walls, called baffle walls. These are constructed up to a height of 6-8 feet above the floor level of the room to be protected. The thickness of the wall would depend upon the material used, in case of brickwork they are $13^1/_2$ inches thick. These walls could also be constructed with sand filled bags as described below: -

12**. Sand-bag wall:**

Sand filled in bags of size 33" x 14" could be conveniently handled. The thickness of wall required to give standard protection is 30 inches. These bags could be conveniently stored and wall constructed at short notice without much skilled labour. The bag is filled three quarters full when it would weight about 30-40 lbs. and measures 20" x 10" x5". The base should be wide enough to make the wall stable and the wall goes on tapering from one or both sides to the top. These walls withstand the blast effect very well but the bomb splinters cut the cloth and the wall needs repairs. The rules of constructing a sandbag wall are given in the appendix.

THE VALUE OF TAKING COVER

The percentage of risk of becoming a causality in an Air Raid under different circumstances of expo sure,



APPENDIX

Rules to be followed in filling and Laying of Sandbags.

(i) **The filling of sandbag:**

(a) The earth or sand should be as dry as possible.

(b) They should be filled to three-fourth and their necks or chokes should be tied (Alternatively, they can be filled in half and the necks folded under them in which case tying of necks is not required).

(c) Three men are necessary for filling, one for shovelling and the other two to hold the bags and tie them. About 60 to 90 bags can be filled an hour.

(d) Bags should be filled as close to the building site as possible to avoid long distance in carrying.

(ii) **The laying of the sandbags.**

(a) The foundation of the wall should be formed of a strong material e.g. dry laid bricks, stones or concrete.

(b) Bags must be laid carefully so as to fit together and beaten a rectangular shape.

(c) "Headers" and "Stretchers" are laid in alternate rows to get the correct bonding.

(d) Seams and "Chockes" (Necks) must be inside.

(e) The joints must "broken".

(f) The corners of bags should be tucked in. This prevents seams from splitting.

(g) As the wall increases in height and therefore, decreases in width, it will be necessary to introduce partly filled bags keep "bond" correctly.

(iii) **Design of walls:**

(a) They stability of the wall depends upon the thickness at the bottom.

(b) The minimum thickness to give protection against splinters is 30 inches (2’-6"). This should be the measurement at the top of the wall

(c) The slope (batter) of the wall should be 1 in 4 if only one side is sloped and 1 in 6 if both sides are sloped.

(d) The thickness of the wall at the base, therefore, depends upon the height of the wall and the degree of slope needed. Thus, for a traverse as isolated wall giving lateral protection, 12 feet high and 1:6 slope on either side, the top will be 2 feet 6 inches and the base 6 feet 6 inches thick.

(iv**) Number of Sandbags and man-hours:**

(a) For a sandbag wall 6' in height and batter of 1:4 on one side only 40 bags are needed per running foot.

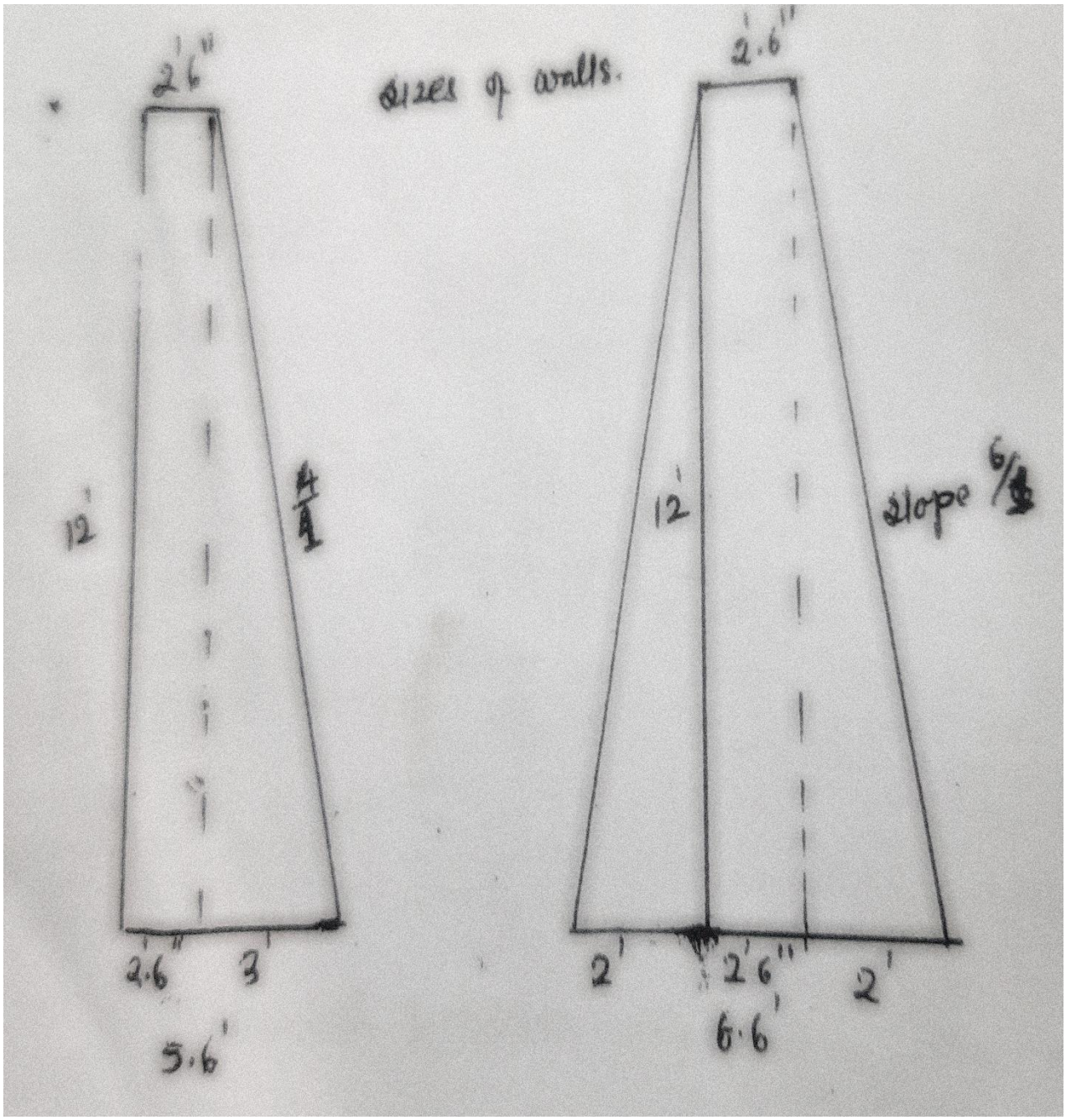
(b) Two men working together can lay 40 to 60 bags in one hour, if the carrying party is separately provided.

NOTE: The stability of the walls is not of high order and need frequent attention. They are of large dimensions and require considerable amounts of sand. The sandbags deteriorate quickly and are also easily punctured by bomb splinters and create lot of dust and dirt. To minimise some of these effects the following steps may be taken: -

(a) Avoid fine sand and dust.

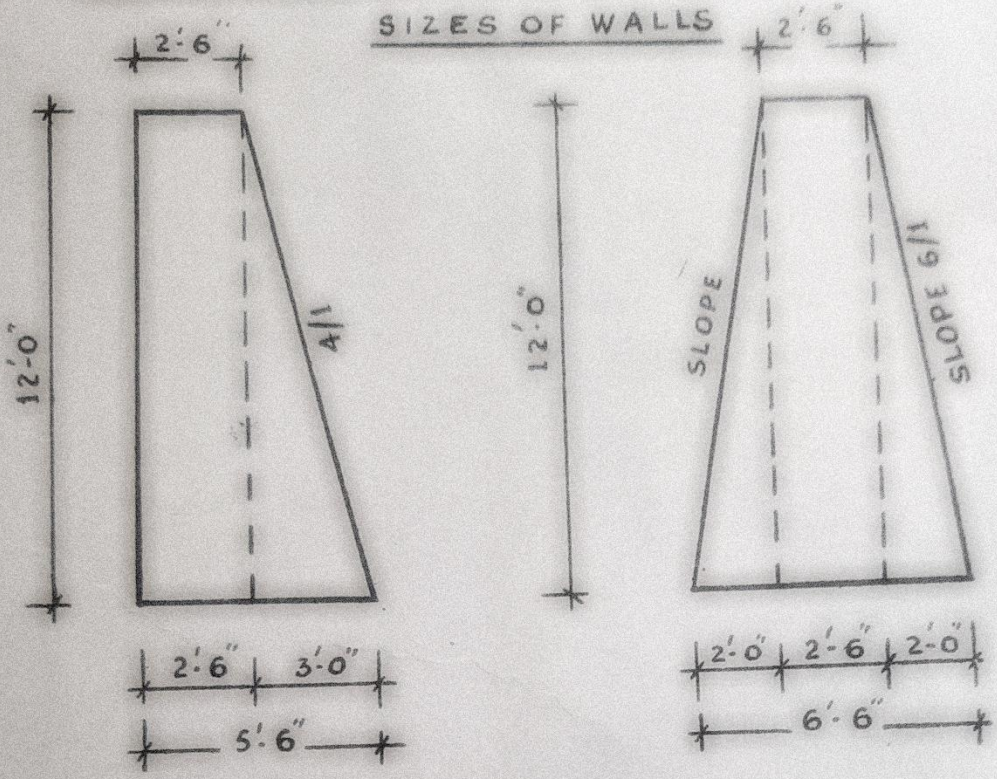
(b) Cover the top of sandbags pile by waterproof and also provide a base of bricks.

(c) Spray rot-proofing chemical such as creosote 25 percent or copper sulphate 0.5 percent.



SAND BAGS AND SAND BAGGING

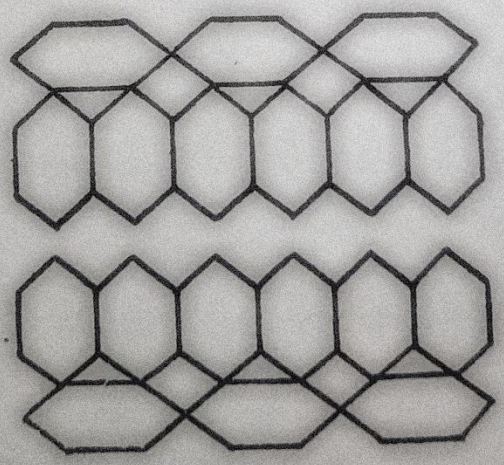
SIZES OF WALLS



METHOD OF LAYING SAND BAGS

(i) Plan of courses Bottom Layer

(ii) Plan of courses Next Layer



CHAPTER NO. 13

CHEMICAL WARFARE-TYPES OF WAR GASES, THEIR EFFECTS AND FIRST AID, USE OF RESPIRATORS

1. **Object**:

The use of chemical gas against civilian population in any future war cannot be altogether ruled out because of their advantages over other types of weapons. It has a great demoralising effect on the people and though some of them may not be poisonous still they have a harassing value and herein lies the advantage over other weapons as they temporarily in capacitate workers. In view of this it is essential for all concerned with Civil Defence work to study the nature of chemical warfare, the first-aid necessary and use of respirators etc.

2. **History of "Gas" or Chemical Warfare:**

Chemical warfare, in the modern sense, was first used by the German army against the Allied Armies in April, 1915 on the western front in Europe. This being the first of its kind, it caught the allied armies unaware and this unexpected, surprise attack caused many casualties as protective measures were not thought of. The gas used at that time was Chlorine. Due to immediate improvisation of protective measures, mainly in the form of respirators, the German Army had to try other types of gases to penetrate the protective measures improvised by the allies. Thus, they tried "Phosgene" gas in December, 1915 and when this too was met with effectively, they resorted to "Nasal Irritants" (Arsenicals) and "Blister Gas (Mustard Gas)". Chemical Warfare was not used by any country during World War II. It may be of interest to note that the use of chemical warfare is prohibited by the GENEVA CONVENTIONS, (Geneva Gas Protocol of 1925).

3. **Terminology**:

(i) **Gas**: While dealing with chemical warfare, the use of the term "gas" is made rather loosely. Thus, this term is applied to any substance, whether solid, liquid or true gas, which may be used in chemical warfare for its irritant, blistering, burning, corrosive, choking or any other type of poisonous effect on the human body.

(ii) **Contamination**: "Contamination" in chemical warfare means the coming in contact of human body. Clothing, food, vehicle ground, furniture or any other inert item, with any of the "gases" in whatever concentrations.

4**. Types of Gases:**

These gases are divided into various groups.

(i) **General**: The division of gases into "persistent" and "non-persistent" groups is convenient as it is possible to decided whether the area in which the gas has been liberated requires special treatment or otherwise.

(a) **Persistent Gases**: These are in liquid form and give off dangerous vapours until the liquid dries up and becomes harmless.

(b) **Non-persistent Gases**: These are used in the form of a vapour and are, therefore, rapidly dispersed by the wind. They are, therefore, dangerous at any spot, only for a short time.

(ii) **Classification based on their specific effects on human body:** In order of importance, they are:

(a) **Nerve Gases**: The members of this group such as "TABUN" or "SARIN" are persistent or semi persistent liquids which give rise to invisible vapours. These vapours have no smell. They are absorbed through the eyes, breathing passages and skin and cannot be detected except by their effects. But, the liquid can be absorbed through the skin and will penetrate through the clothing without causing any blistering or irritation. The symptoms begin with contraction of pupils, headache and tightness in chest. They cause death due to action on the nervous system.

(b) **Blister Gases**: These are generally liquids giving off invisible vapours. They are persistent and penetrate through the clothing. Mustard gas and Lewisite belong to this group. The onset of gas effects is rather slow but prolonged contact with vapour and liquid will cause serious injuries to exposed parts. "Mustards" produce painful blisters on the skin immediately as also damage the body cells, to produce lukemia and cancer as long-term effects. Besides causing burning of the skin wherever the gas comes in contact, they may lead to permanent damage to the eye-sight by action on the conjunctivae.

(c) **Choking Gases**: Members of this group are liquid or true gases such as chlorine, phosgene. They cause coughing and choking. As they also cause swelling of the breathing passages, they are dangerous to life.

(d) **Tear Gases:** The gases in this group take the form of solid invisible particles or as invisible vapour from persistent liquids. Ethyliodo-acetate (K.S.K.) and Bromo-benzyl Cyanide (B.B.C.) belong to this group. They have a harassing effect as they cause profuse flow of tears and intense spasm of eye-lids. They do not cause any death.

(e) **Nose-Gases:** These are solid arsenical compounds dispersed by heat or explosion. They cause intense pain in the nose and chest. They have mainly harassing effect on the victims. Diphenylamine Chlorarsine (D.M.) and Diphenyl-cynarine (D.M.) belong to this group.

(f) **Hallucinogens**: These form a more recent group of chemicals which act on the mind and are also called psycho-chemicals. Lysergic acid diethyl amide (LSD) was the first of the compounds thought to be used. An agent code named BZ, probably a substituted glycollate ester of an amino alcohol has been mentioned in the literature. These compounds are intended to produce aberrant human behaviour.

5**. Protection:**

The respirator, in case it is in a serviceable condition and, having a proper fit, will protect eyes and breathing passages against nerve and mustard gases. Since, however, these gases act through exposed parts of the body, the whole body should be protected with suitable anti-gas clothing. For the remaining three types complete protection is afforded by the respirator.

6. **Likely Methods of Attack:**

(i) **Aerial**: The most likely method of gas "attack" on civilian population would be by air. In this method, the chemicals are dropped down from an aeroplane in the form of a bomb which would burst open on falling on the ground and release the contents in a gaseous or liquid form. Persistent liquid gases will be sprayed from containers carried in aeroplanes as aerosols i.e. fine droplets suspended in the air which will fall like a short, shape shower or rain over a fairly wide area.

(ii) **Ground**: There is also a possibility of enemy agents (saboteurs) releasing these "gases" at suitable places, on the ground itself. These, of necessity, would be used on a very limited scale. This will cause direct contamination of ground, buildings or roads or sources of water supply and food godowns.

7**. Factors Governing the Attacks:**

(i) **Air movement**: It is obvious that a strong wind will rapidly dilute and disperse all concentrations of non-persistent gases, while in the case of a persistent gas, the rate of evaporation will be increased due to increased air movement. On the other hand, with very little wind velocity, a high local concentration of gas may be obtained, with both types of gases.

(ii) **Temperature**:

(a) **Warm weather**: Warm, sunny weather reduces the effectiveness of a gas (non-persistent) as it causes diffusion of the gas by convection currents. Persistent gas in liquid state will evaporate faster and unless strong wind is blowing may form dangerous concentrations locally.

(b) **Cold weather**: Very cold weather, too reduces the immediate effectiveness of persistent gases by reducing the rate of evaporation of the liquid gas. Tarmac road surfaces, when warmed by hot sun readily absorb persistent gases.

(iii) **Rain and Humidity:**

(a) Rain tends to destroy the persistent gases.

(b) Humidity retards the evaporation.

(iv) **Terrain**: All gases hang about built-up areas, jungles, valley etc., where they are less exposed to sun and wind. It can be said that persistent gases penetrate and persist in sandy or soft ground but evaporate easily from a hard-open surface.

8. **Characteristics of Gases used in Chemical War fare:**

The physical and chemical characteristics of gases likely to be employed for chemical warfare need a close study as this knowledge will help greatly in recognising the gases easily. For example, in absence of elaborate chemical apparatus the most reliable method of recognising 'Mustard gas' is by sense of smell. Further, the knowledge of penetrating powers of individual gases gives a general idea of the types of protective measures needed against each. A summary of all such important physical and chemical characteristics and the effects they produce is given in appendix "A". A careful study of these properties will enable us to handle the next task, i.e. devising more intelligent and efficient protective measures.

9**. Use of Respirators:**

Respirators give protection to face, mouth and breathing passages.

(i) **Working**: The respirator is an apparatus which affords protection to the breathing passages of the human body against poisonous gases, vapours or smoke. It is fitted on the face in such a way that it affords protection to the eyes also. The respirators which are used as a defence measure against chemical warfare operate by separating the poisonous substance from the air (with the help of absorbents and filters located in containers), leaving pure air for breathing. A non-return valve is fitted to prevent exhaled air from passing through the cannister containing filters. Respirators are designed to give protection against war gases and they will not

give protection against gases met in industrial process viz. Carbon Monoxide present in exhaust fumes of motor car. (For the design of a Respirator see diagram).

(ii) **Care of Respirators**: Respirator is a costly item of equipment and needs careful storage and maintenance. Besides needing storage in a dry, cool and well-ventilated place (not inside a box), its rubber parts need a weekly massage with French chalk. The respirator must be checked periodically for its serviceability.

(iii) **Improvisation**: In the absence of a proper respirator a certain degree of protection of air passages against vapours of gas (especially nerve-gases) can be secured by breathing through a towel or a large handkerchief saturated with alkaline solution.

10. **First-Aid Measures**:

The first-aid to be given to a casualty suffering from exposure to gas should be done with the object of alleviating the suffering and to prevent casualty. becoming worse. It would be desirable to remember the following general steps:

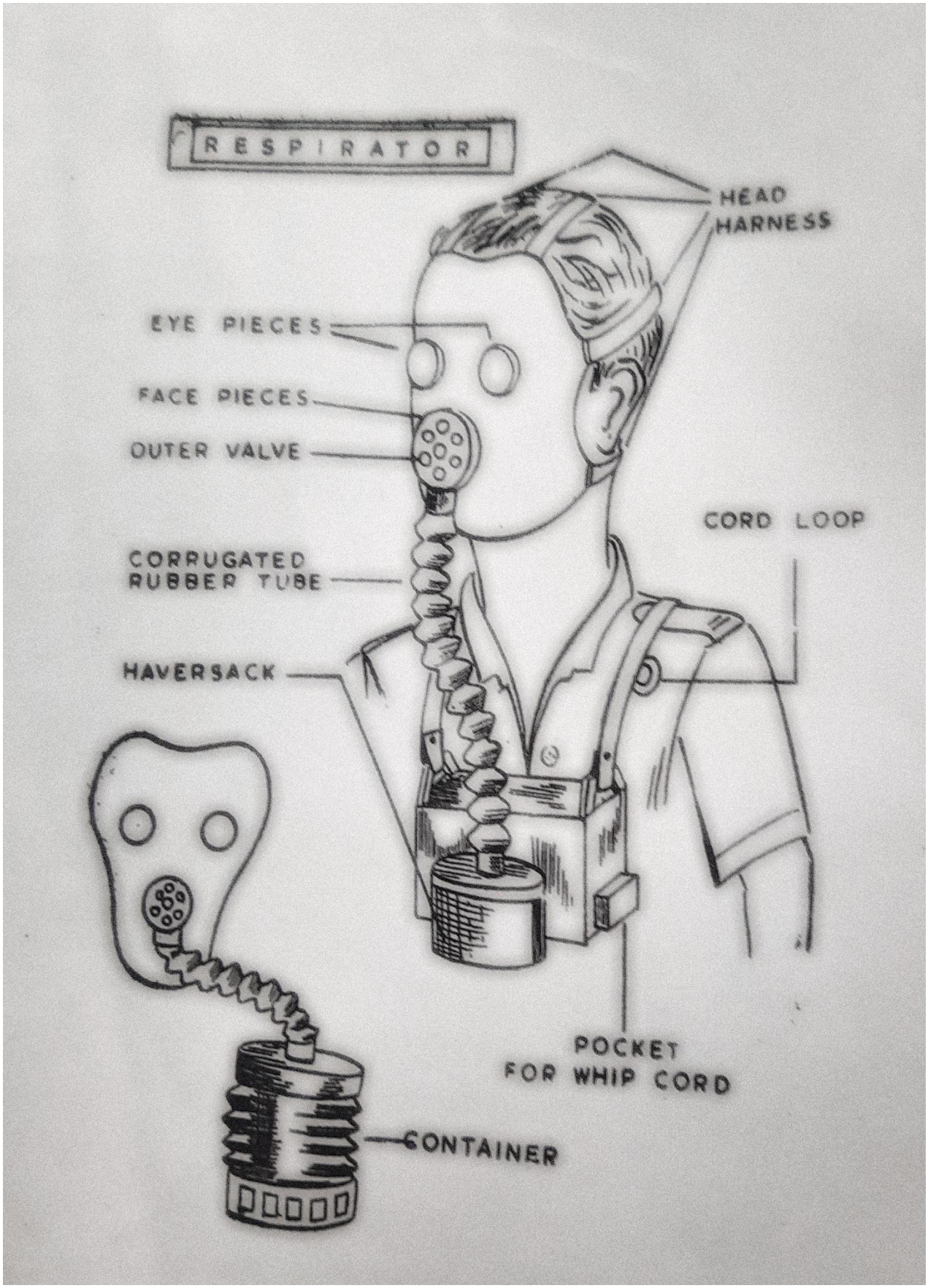
(i) Allow plenty of fresh air.
(ii) Give complete rest.
(iii) Keep the patient warm.
(iv) Give a hot sweet drink.
(v) In case of breathing difficulties give artificial respiration.
(vi) Apply suitable antidote to neutralise the chemical when in contact with the skin.
(vii) Remove clothing.

In case of contamination of the eye, wash with plain water and apply castor oil. In the case of contamination of the skin by the liquid, gently dab away the visible liquid and quickly wash with soap and water. If any liquid is swallowed, the patient should be made to vomit by giving him large amount of salt-water to drink. After vomiting, an alkaline drink such as milk of magnesia in water should be given to the patient to drink. The casualty should be sent to hospital in all cases of serious contamination.

APPENDIX-"A"

Physical and Chemical characteristics of gases used in chemical warfare

Gas	Properties	Method of Recognition	Effects on human body
1	2	3	4
(i)	Nerve Gases		
	(a) TABUN Derivative of Cyano-phosphoric acid. Colourless, mobile liquid.	Very very faint fruity smell Normally not detectable by smell but by chemical tests.	Disturbance with vision. Tightness of throat and chest. Lung Oedema, cyanosis sweating, diarrhoea, death.
	(b) SARIN: Derivative of Fluor phosphoric acid. Colourless, mobile liquid.	Odourless, detected by special chemical reactions.	Same as above.
(ii)	"Blister Group"		
	(a) Mustard Gas. Oily liquid. Dark brown to straw colour. Penetrates rubber, leather, cloth, wood, very persistent. Easily neutralised by chlorine (i.e., bleaching powder).	Smells of garlic, onions or reddish or mustard.	Vapour effects: Eyes get inflamed and swollen. Skin gets red and blistered. Cough, loss of voice and later bronchitis or pneumonia. Liquid Effects Eyes-no immediate sensation but very serious symptoms follow in a few hours. Skin-redness in 2 hours and blisters in 12 to 24 hours.
	(b) Lewisite (Arsenic preparation): Colourless liquid in pure form but brown in crude form. Gives off an invisible gas. Greatly penetrative and persistent bulkily destroyed by water and alkalies.	Smell of geraniums (flowers)	Vapour: Irritation of nose, eyes and lungs Less effective on skin in comparison to mustard gas. Liquid: Immediate and grave effects on eyes. Blisters develop on skin more rapidly than with mustard gas.
(iii)	Choking Gases		
	(a) Phosgene: Almost invisible gas. Corrodes metals. Non-persistent.	Smell of decaying wet grass. smoking becomes unpalatable.	Highly dangerous to life. First effects are cough flow of tears, pain in chest, difficulty in breathing. Later, pulmonary oedema. Effects noticeable within 24 hours.
	(b) Diphosgene: Colourless liquid, semipersistent.	Like phosgene.	Like phosgene.
	(c) Chlorine: Greenish coloured gas, corrodes metal, non-persistent.	Smell like bleaching powder.	Effects are similar to those of phosgene but more irritant and less toxic.
	(d) Chloropicrin: Colourless, volatile liquid, semipersistent.	Pungent smell.	Similar to chlorine but more dangerous.
(iv)	Tear Gases:		
	(a) K.S.K. Dark brown liquid, invisible in gases outs state. Persistent.	By onset of effect. Fruity smell.	Similar to C.A.P. (below) but no effect on skin.
	(b) B.B.C. (Bromo-benzyl cyanide): Yellow brown crystals in pure state. But usually used as brown liquid, persistent.	By onset of effects. Pungent penetrating smell.	Same as K.S.K. above. (No danger to life).
	(c) C.A.P. (Chloro-aceto-phenome): Colourless crystals, invisible in gaseous state, nonpersistent.	Onset of effects.	Stinging of eyes, immediate and profuse skin irritation to some extent.
(v)	Nose-Gases		
	Diphenyl-chlorasine(D.A.) (D.M. & D.C. are similar) Colourless or bright yellow crystals. When heated give out odourless smoke. Invisible except near source. Non-persistent.	By onset of effects only.	Sneezing, Burning, and aching pain in the chest, throat, nose and gums. Later mental depression. But effects take place within 5 minutes.


RESPIRATOR
HEAD HARNESS
EYE PIECES
FACE PIECES
OUTER VALVE
CORD LOOP
CORRUGATED RUBBER TUBE
HAVERSACK
POCKET FOR WHIP CORD
CONTAINER

CHAPTER NO. 14

BIOLOGICAL WAREFARE

1. **Object**:

The Biological Warfare is the purposeful use of living disease producing germs or their products to cause death, disability or damage to the people, to the domestic and stock animals or to the crops of an enemy country. So far biological warfare has not been used by any nation against their enemies but from the knowledge of natural spread of the diseases it can be said that the potentialities in this direction are enormous. The object of this lesson is to study what is Biological Warfare, its characteristics and potentialities and protection from it.

2. **Possibility of its use**:

Unlike the development of the Atomic Bomb and other secret weapons of the war the development of agents for biological warfare is possible in many countries, large or small, involving very much less labour and money. Moreover, this development might take place as a normal peacetime medical and bacteriological research.

3**. Characteristics**:

There are hundreds of diseases producing organisms which could be used as biological agents but the organism must satisfy certain conditions to be really effective against the enemy. These requirements are: -

(i) **Virulence**: The germ must be virulent so that even small doses produce infection.

(ii) **Power to produce disability:** The germ must be capable of producing diseases which lead to death or prolonged incapacitation. In case of crops it should cause considerable damage to crops

(iii) **Stability**: The germ must be stable under ordinary conditions of light, heat and humidity. It should withstand destruction and at the same time retain its virulence. It should be capable of storage and withstanding the explosion by which the organisms might be liberated from a bomb.

(iv**) Resistance of people**: The population on which it is to be let loose must be susceptible to the disease and not immune to the same.

(v) **Transmissibility**: The germ must be such that it can be disseminated in a convenient manner e.g. by air or through water, milk or food etc.

(vi) **Availability**: The germ must be capable of mass production. Examples of germs which may meet these requirements are given at Appendix "A".

4**. Types of Biological Agents**:

The biological warfare agents likely to be used would be of one of the known types of disease producing germs. Like chemical agents these could be classified as persistent and not-persistent.

(i**) Persistent agents**: These are comparatively few and more resistant. They are spore bearing germs and like a seed can lie dormant for periods, for long periods for examples spores of Anthrax.

(ii) **Non-persistent agents**: These are non-spore bearing and consequently tend to die rapidly under adverse conditions.

5. **Enemy Intention**:

Biological warfare will be waged particularly at the time of evacuation of people or movement of troops and camps times as at these times there is general deterioration in the standards of sanitation and personal hygiene. The object enemy will be: -

(i) Lowering morale and creation of panic.

(ii) Incapacitation of selected groups of population such as industrial workers etc.

(iii) As a part of general attack on the population.

(iv) In order to create food shortage through attacks on crops and livestock. India being an agricultural country there is a danger in this direction.

6. **Methods of Dissemination and Channels of Infection**:

The likely methods of dissemination to be used by the enemy are:

(i) **Through Air attack**: In this, the germs would be let loose by air burst B.W. Bomb. They could also be released from low flying planes as "Aerosols" taking advantages of favourable wind conditions.

(ii) **Through Saboteurs**: The enemy agents may contaminate water supplies, milk supplies or any other item of community feeding. They may also introduce arthropods (insects) which are carriers of certain diseases. Disease producing germs which would attack animals and crops may be easily introduced in this manner without much suspicion being aroused.

7**. Defence Against B.W.:**

Biological Warfare is ghastly affair. The defence measures required to be taken against a possible B.W. attack are somewhat comparable to those against chemical warfare. They include measures of a general nature as well as individual measures. All these are discussed in succeeding paragraphs.

8**. Preventive Measures:**

Prevention of a B.W. attack is largely a military problem but prevention of sabotage will require the vigilance of every citizen as well as the military, police and health authorities. Water and food supplies would have to be rigidly protected. Thus, frequent bacteriological analysis and adequate chlorination of water supplies may be found to be extremely helpful in this matter.

9. **Detection of an Attack:**

The bomb used for B.W. purposes may look similar to a gas bomb and on bursting would slowly give out a spray or a mist or liquid which may or may not be visible. The only other way it could be detected is when unusually large number of people become sick in a particular area due to the same disease.

10. **Protection of Community**:

Protection of community fortunately would not be an unusual problem. Thus, measures that are normally required to be taken in case of a naturally occurring epidemic would be found to be equally effective and useful for control of man-made or wilful spread of infection. These measures, generally speaking fall into under-mentioned categories.

(i) Notification.
(ii) Isolation of suspected cases.
(iii) Quarantining of contacts.

(iv) Disinfection measures as regards (ii) and (iii).
(v) Additional laboratory facilities to check samples of contaminated food, water etc.
(vi) Strict supervision over food and water supplies.
(vii) Active immunization of the community, if vaccine exists against the disease concerned (e.g. typhoid, plague, cholera etc.).
(viii) Destruction of certain such field crops and live-stock, as get heavily infected.
(ix) **Making available large stocks of antibiotic and Chemo-therapeutic drugs**: The edge of the biological warfare would be considerably blunted if hospitals have adequate stocks of these drugs.
(x) **Decontamination:** Personal hygiene and cleanliness in essential. Contaminated places should be washed and sprayed with disinfectants.

11. **Individual Protection:**

The germs find entry into human body through ingestion in food and water, inhalation and by skin contact or through insect bites. As such all hygienic measures necessary in respect of food and drink are to be taken. Protection against air-borne germs can be had by tight fitting face masks such as respirators. Nose pads impregnated with antiseptics may prove useful substitutes. Clothing impregnated with antiseptics worn all over the body may prevent contact of germs with the skin. Also shelters used for protection from effects of H.E. Bombs will need sealing of cracks and crevices and arrangements for supply of germ-free air.

12. **Conclusion**:

Although Biological Warfare has not been used by any nation as yet as a weapon against its enemy, our country cannot afford to neglect the possibility of such an attack in the future for reasons given below: -

(i) Modern sanitation and hygiene in itself is a defence against B.W. but in India, we cannot claim to have uniformly high standards of sanitation. It means that areas having poor sanitary conditions would fall an easy prey to B.W. attacks.

(ii) The resistance of individuals who are under fed or ill-fed would be definitely weaker than those who are well-fed. In our country due to various reasons-economic, social and cultural, large groups of people remain under-nourished. They would show easy susceptibility to or poor resistance against germ attack.

(iii) India being a vast country, mainly agricultural, and having some waste lands and deserts, enemy would try to send saboteurs & infiltrators without being detected.

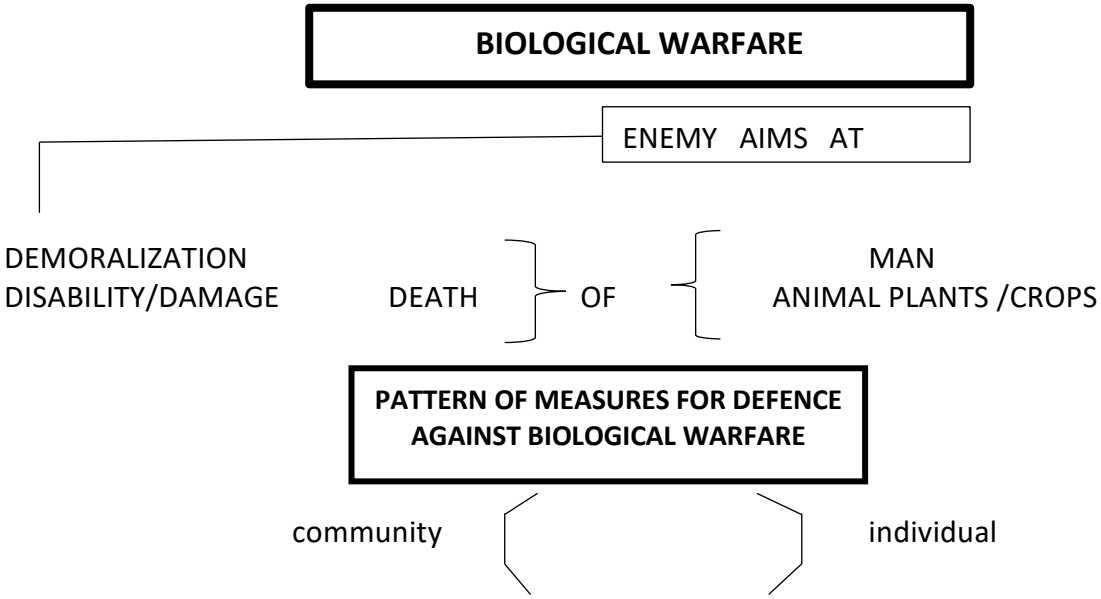
(iv) The masses of India, still do not fully understand the relationship of germs to diseases.

In face of a sudden epidemic, they are likely to become panicky blaming everything else except germs as the cause of the epidemic. The enemy's object of causing panic and demoralisation would be rather easily achieved if we are not prepared.

APPENDIX- "A"

Example of Germs likely to be used in Biological Warfare

A.	Against Man.	
(i)	Bacteria:	
	(a) Bacillus Authracis	(Anthrax)
	(b) Salmonella Typhose	(Typhoid)
	(c) Pastreurella Pestis	(Plague)
	(d) Vibrio Comma	(Cholera)
(ii)	Viruses:	
	(a) Influenza Virus	(Influenza)
	(b) Virus of Infective Hepatitis	(Janundice)
	(c) Variola Virus	(Small Pox)
(iii)	Rickettsiae :	
	Rickettsial Prowa zeki	(Epidemic Typhus)
(iv)	Toxins:	
	(a) Botulinum Toxin	(Brucellosis)
	(b) Staphylococous Taxin	Food poisoning
B	Against Animals	
	(i) **Bacteria**:	
	(a) Bacillus Anthracis	(Anthrax)
	(b) Brucella Group	(Brucellosis)
	(ii) Viruses	
	(a) Foot and mouth diseases	(Virus)
	(b) Rinderpest Virus	(Cattle Plague)
C	Against Plants and	
	(a) Helminthosporium oryzae	(Against rice)
	(b) Piricularia oryzae	(Against rice)
	(c) Corynelacterium sepedonicum	(Against Potatoes)



1. PREWARNED IS PRE- ARMED — PSYCHOLOGICALLY
2. INHALATION PREVENTED — RESPIRATORS STANDARD / IMPROVISED
3. INGESTION PREVENTED — STRICT SUPERVISION OF WATER SUPPLIES & FOOD
4. SKIN INFECTION PREVENTED — GENERAL CLEANLINESS / OVERALLS
5. BODY DEFENCES BUILT UP — ACTIVE IMMUNIZATION
6. GUARDING AGAINST — SABOTEURS
7. STOCK -PILING — CHEMO -THERAPEUTICS / ANTI- BIOTICS / INSECTICIDES / DISINFECTANTS

CHAPTER NO. 15

SYSTEM OF AIR RAID WRNING
(External and Internal Warning)

1. **Object**:

In times of war, implementation of civil defence measures effectively depends upon perfect warning systems in the civil defence towns. For these measures to be effectively implemented it is imperative that adequate signal communications are available to the civil defence staff concerned at all levels. An effective warning system for the passage of air-raid warnings is the life blood of civil defence organisation in any country. Warming of approaching enemy air planes affords time for the people to take shelter and to enforce various civil defence measures including crash blackout. Also, warnings regarding the withdrawal of the threat are required for the people to come out of shelter and resume their normal activities. Hence an efficient warning system will ensure sufficient warning time to lake adequate civil defence measures. The object of this lesson is to study the civil defence warning system and the types of warning messages in case of enemy air-raids.

2. **Warning Systems:**

In order to obtain a proper warning for a target area a watch has to be kept on the skies for all times. As soon as the enemy planes are spotted at a certain distance approaching the target area the warning can be issued. Defence of our skies is the job of Air Force and they have to keep vigilance on the skies all along the border, in order to check violation of our air-space. Since our borders extend to hundreds of miles on all sides the information is collected at certain selected points wherefrom the warnings originate and are transmitted quickly to threatened areas. The collection and transmission of messages are included in the External Warning System and dissemination of these warnings in an area under the jurisdiction of a C.D. Town Control Centre constitutes Internal Warning System. Due to the high speed at which the aircrafts fly and the nearness of our potential enemy it may not always be possible to give more than a few minutes warning. In certain cases, it may not be possible to give any warning.

3. **External Warning System:**

The air-crafts are detected with the help of radar. From the time the enemy air-craft is picked up by the radar unit to the time the warning is received in a town civil defence control centre, a system of communication is planned which is designated as External Warning System. The system is dividing into two parts, viz.

(i) The GD Liaison officer at the air defence directing centre (ADDC) of the IAF pass air-raid warning to the Regional Civil Defence Control Centres (RCDCC).

(ii) The Regional Civil Defence Control Centres after receiving the warning transmit the same to a number of Town Civil Defence Controls depending on RCDCC through a specially built P&T telephone network as well as through high frequency radio net. At the Air Force end the information obtained through radar is plotted on a large map at the ADDC and defensive counter measures are put into action. Each ADDC in addition to its own active air defence action will pass air-raid warning to the Regional Civil Defence Control Centre responsible for the region. The target areas will be divided into zones according to the convenience of the communication facilities available in the particular area. The warning received from the Sector Operation Centre is intended for the zone surrounding the

receiving point and should not be conveyed to the neighbouring or other zones for whom it is not intended.

4. **Salient Features of External Warning System:**

From each ADDC of Indian Air Force station, the warning first goes to the Regional Civil Defence Control Centre over telephone and VHF radio link. The air force unit and RCDCC are connected by direct non-exchange telephone lines (2 pairs) as well as by VHF radio link as stand-by. While transmitting warning the air force unit first gives an audible and visual signal to RCDCC by operating a special warning key. On receipt of the visual warning RCDCC converse with the air force station unit over the hand set provided. This unit is termed as "**Speaker and warning Unit**". Thus, transmission of warning messages from ADDC with the RCDCC is instantaneous. From the RCDCC the warning is disseminated to a number of Town Civil Defence Control Centres (TCDCCs) through land line as well as HF radio communication system. For this purpose, the RCDCC is connected to the local trunk exchange by direct non-exchange lines. The trunk exchange at RCDCC point is designated as Controlling Trunk Exchange. Each Controlling Trunk Exchange makes use of public trunk circuits existing to a number of other trunk exchanges of C.D. Town in the zone. These distant trunk exchanges are designated as Controlled Trunk Exchanges which in turn are connected to local Town Civil Defence Control Centre (TCDCC) by direct non-exchange lines. So whenever warning message is transmitted to TCDCC, the RCDCC sends audio visual warning to the controlling trunk exchange by lifting the hand set of the telephone specially provided. This audio-visual indication (i.e. a tone) is sent automatically to all the controlled trunk exchanges and Town Control Centres, without the intervention of trunk exchange operators either at Controlling Trunk Exchange or at distant controlled trunk exchange. This facility is termed as "Conference Call facility". The affect is a light and buzzer operated at controlling and controlled exchanges. On receipt of this audio-visual warning, the Monitor in the trunk exchange immediately attends to the call of RCDCC. RCDCC thereafter asks for the Outstations (TCDCC) to be contacted over trunk call for the passage of emergency messages. The controlling trunk exchanges are provided with special equipment to afford conference call facilities to the RCDCC. Under this system the RCDCC will be connected to the desired number of TCDCCs through the controlled exchanges for dissemination of air raid warning to all the stations at a time. Where such facilities are not available, warning messages are transmitted by trunk calls under "Clear the Line Priority". Under this facility as soon as RCDCC wants to converse with any particular station the call-in progress on the trunk line is immediately disconnected and the concerned station is connected to RCDCC through controlled exchanges immediately. Under this system simultaneous broadcast of messages to all the stations is not possible. Each station is to be conveyed the message one after another. Some of the TCDCCs will have the responsibility of relaying the warning messages to other towns where direct trunk circuits are not available. Such TCDCCs are designated as Secondary Civil Defence Control Centres (SCDCC). For Relaying warning to other TCDCCs the SCDCCs will avail of "Clear the Line Priority".

Since line communication system is not fully reliable due to variety of reasons, e.g., sabotage, enemy air raid, system failure, line fault and so on, provision of an alternative warning system is imperative. Hence the necessity of radio communication. While the RCDDC is connected to AFS by VHF radio link besides direct line communication the TCDCCS on the other hand will be connected to RCDCC by HF radio link. A VHE link is provided where the distance between the two stations does not exceed 30 KMs. Since distance between RCDCCS and TCDCCs exceeds that limit. HF link needs to be provided. This system is known as External Radio Warning System. Under this system warning is passed to the TCDCCs directly from RCDCCS simultaneously

with the warning issued over P&T line circuits. Under this radio communication system radio terminals working at both RCDCC and TCDCCs are allotted call signs. TCDCCs are called by their call sign number for proper identification.

5. **Internal Warning System:**

On receipt of warning at the Town Civil Defence Control Centre it will be disseminated to the public (if it falls under that category) and other authorities and factories located within that zone. For this purpose, a reliable means of warning system is provided which is designated as 'Internal Warning System'. For adequate dissemination of warning, important officials, factory managers, warden posts and other subscribers of local Telephone network are grouped and warning is given to them by simultaneous broadcast facility (S. B. F.). This is done through the ARP equipment located in the P & T exchange. If the public are to be warned then it is done through a system of sirens located in the town. These are centrally operated through ARP equipment from the Town Control Room. This is called the Central Control of Sirens (C.C.S.) This is explained further in the next para.

6. **Dissemination of Warning within a Town**:

Each selected town will receive the air-raid warning messages through the external warning system as described earlier. The warning messages received by the control centres will be further communicated to the other CD units in the area, police, railways, factories, essential services, etc. The messages will be sent to local recipients by telephones as well as by VHF radio link and through messengers in case of such places as are not connected with telephones/ radio or in case the telephone lines get damaged. A warning which is meant for the general public will be conveyed through appropriate signals by sounding sirens. In order to facilitate quick dissemination of warning messages over telephone to more than subscribers on the warning list simultaneously. use of simultaneous broadcast system (S. B. F.) may be made. Such a device will reduce time in sending messages to many recipients by simultaneous broad cast of messages to all of them. Similarly, a civil defence town may be having a number of sirens for dissemination of warning to the public. When it is intended to issue warning to the public over sirens all the sirens need to be sounded simultaneously. Hence for the purpose of simultaneous broadcast over telephone and central control of all the sirens in a town, an equipment known as ARP equipment manufactured by I. T. I. Bangalore is deployed. The salient feature of the I.T.I. ARP equipment is as follows: -

The ARP equipment comprises of:

(i) a control equipment installed in the TCDCC.
(ii) main station equipment installed in the P & T telephone exchange.
(iii) sub-station equipment installed in other exchanges in the town.
(iv) a contractor unit fitted to the siren point.

All these equipment and sirens are connected by pairs of non-exchange lines. The control unit installed in the TCDCC has the following keys for operation:

(a**) General broadcast key**-By operating this key the control centre may start broadcast announcements. All telephone subscribers connected to the main station equipment are disconnected from any conversations and are switched over to the ARP system. Immediately the subscriber's telephone will ring at the frequency of two seconds on and two seconds off. On hearing the ring the subscriber may take up the receiver and (or if already engaged in conversation) listen to the broadcast.

(b) **Special broadcast key**: This is operated for issuing warning to the selected subscribers as per special broadcast list. The operation is the same as above.

(c) **Warning Key:** This is operated for dissemination of warning through sirens and telephones simul tenuously.

(d) **All clear signal:** This is operated for issuing all clear signal on sirens and telephones.

(e) **Cancel all signal keys**: This is operated for each cancellation of warning signal “Red” which may result due mechanical faults.

There are two types of ARP equipment’s:

(i) Standard type and
(ii) Small type.

A standard type equipment consists of a control unit, a main station equipment, and can provide connection to another four sub-station equipment and one satellite station equipment.

The main station equipment caters for a maximum of 144 SBF subscribers of the public telephone exchange and sounding 24 sirens simultaneously. A Civil Defence town having more than 24 sirens needs to be provided with a sub-station equipment besides the main station equipment’s. The sub-station equipment is capable of sounding 24 more sirens at a time and disseminating warning messages to additional 72 subscribers of the public telephone exchange on SBF. Hence the requirement of sub-station unit besides the main station unit for a standard type of ARP equipment depends upon the number of sirens and telephone subscribers in the town. The sub-station unit is connected to the main station unit and cannot work independently. As soon as the key is operated in the control unit from the control centre both the main station and sub-station units are actuated simultaneously. The small type of ARP equipment comprises of:

(i) a control unit
(ii) ARP unit
(iii) Contactor unit

This equipment is capable of controlling up to the maximum of 4 sirens at a time and transmitting warning messages to 12 subscribers on SBF of the public telephone exchange. The control unit is installed in the control centre and the ARP unit in the telephone exchange. Facilities are same as in the standard type of equipment. A town having not more than 4 sirens may, therefore, be provided with a small type of ARP equipment.

7**. Types of Air Raid Warning Messages:**

(i) **Preliminary Caution**: The message is a preliminary one and is confidential. It is a forecast of raiders movement. Arrangements must be made for an unobtrusive movement of Civil Defence Services on receipt of the Preliminary Caution. The text of the message is "Air Raid Message-Yellow". The object of keeping this message confidential is to minimise public alarm. It is received by a limited number of officials on the special warning list such as Headquarters of Civil Defence Organisation, Police, Fire Brigade, important factories, public utility concerns, and Railways. Recipients may inform such of their subordinate as they consider necessary. This preliminary caution will remain in force until cancelled by "Cancel Caution" i.e. "Air Raid Message-White."

(ii) **Action Warning**: This is a warning that raiding aircraft are heading towards certain towns which may be attacked within a few minutes and is a confirmation of the "Preliminary Caution". The text of the message is "Air Raid Message Red". The message is received by those in the Action Warning List of threatened towns. The message is passed on by telephones to those

on the Action Warning List, some of whom will be responsible for sounding the public warning signals. The various signals used are given in Annexure I.

(iii) **Raiders Passed:** This message means that raiding aircraft have left the towns warned, or no longer appear to threaten these towns. The text of the message is "Air Raid Message-Green", and is conveyed to all recipients of "Action Warning". This message is passed by telephone to recipients on the Action Warning List some of whom will sound the "Raiders Passed" signal. The signals used are given in Annexure 1.

(iv) **Cancel Caution**: This means the Preliminary threat has passed, and the text of this message "Air Raid Message-White". This message is confidential-it will be passed on to all those who received the "Preliminary Caution (irrespective of whether or not they received the Action Warning and Raiders Passed) messages". On receipt of this message normally is resumed.

(v) **I. B. Attacks**: This warning is given by air raid wardens and police by means of a succession of short blasts on a whistle. The type of signals used are given in Annexure I.

8**. Recipients of Message:**

The telephone numbers of persons who are to receive Warning Messages, will be recorded in Warning Lists as follows:

(i) **Special Warning List-**This list will show the telephone numbers of those who are eligible to receive the air-raid messages 'Yellow' and 'White'.

(ii) **Action Warning List**-This list will show the telephone numbers of those eligible to receive the air raid messages 'Red' and 'Green'.

(iii) **Messengers' Warning List**-This list will consist of the Civil Defence and other Organisations, eligible for warning under (i) and (ii) above, which can be warned quickly by a messenger in order to relieve the load on the telephones and to provide for places which have no telephones.

Note: It may however, be noted that the S. B. F. of the I. T. I., ARP equipment provides arrangements to contact only one set of subscribers and therefore preferably it should be used for Special Warning List.

9**. Factory Hooters**:

Factory Hooters not included in the layout public Warning Signals could, and should be sounded an air attack after the public warning has been heard, for passing on the air raid warning to workers in the factories, and incidentally, for supplementing the scheduled public signals. The use of factory hooters for purposes other than air raid warnings will be prohibited. Internal warnings should not be audible outside the factory. Supplementary warning arrangements should also be considered for such concerned, firms or institutions whose location or process of working would make it difficult for public siren to be heard clearly.

10. **Sirens**:

Instruments suitable for air raid warning signals are of three general types:

(i) Steam sirens and whistles.
(ii) Rotary compressed air sirens, power driven.
(iii) Rotary self-governing sirens, electrically driven.

Where 4 H.P. electrically operated sirens are available they should be provided on the scale of 01per square mile area. The actual location of sirens will have to be finalised after carrying out the audibility test. The maximum use should be made of the existing factory hooters, sirens etc. by including them in the public alarm system of the town. Hand operated sirens may be allotted at a scale of one per warden post.

11. **Siren Control:**

Normally sirens are operated central control from TCDCC through the ARP equipment. However, there may be occasions to operate the siren locally to failure central control. Hence local switch should be provided. This must be located at a secure place to avoid unauthorised operations the sirens is normally connected to local mains power supply. However, effort should be made to make a use of power supply available with private parties as stand-by power supply in case of failure of main supply.

ANNEXURE-I

NO. CD/24

Public Warning Signals

	Types of Warning	General Alarm System etc.	Local Alarm System. Whistles etc
1.	Action Warning (Red)	A signal of 2 minutes durations consisting of EITHER a fluctuating or "Warbling" note of varying pitch in which frequency range is not less than 10% above and below the mean pitch, the complete cycle of each fluctuation to extant over a period of about 3 to 5 second OR a succession of intermittent blasts of about 4 second duration separated by a silent period of above 4 seconds.	A short blast followed by a long blast repeated at intervals of 3 seconds for 2 minutes. Or A visual signal may be used viz both arms raised above and waved or any other method decided upon locally.
2	Raiders Passed Green	A continuous signal of 2 minutes duration at a steady pitch.	2 long blasts on the whistle repeated at intervals of 3 second for 2 minutes.
3.	Incendiary Bomb Attack		A succession of short blasts on whistle.

ANNEXURE -II

No.CD/24

Air Raid Warning Messages

Situation	Message	Test	whom sent	Remarks
1	**2**	**3**	**4**	**5**
Raiding aircraft are approaching a zone.	preliminary caution	"Air Raid Message YELLOW"	Recipients on the special Warning List.	The message is only preliminary one and is intended to be confidential. Recipients may however advice such of their subordinates at they consider necessary.
Raiding aircraft are heading towers certain towns which may be attached within five minutes.	Action Warning	"Air Raid Message RED"	Recipients on the special Warning List.	Message passed to authorities on the warning List some of whom will be responsible for sounding the air-raid warning signal.
Raiding aircraft have left the towns and no longer appear to threaten those towns.	Raiders passed	"Air Raid Message GREEN"	All recipients of Action Warning.	Message passed to authorities on the warning List some of whom will be responsible for sounding the Raider passed signal.
The Preliminary the at has passed.	Cancel Caution	"Air Raid Message WHITE"	All recipients of Preliminary Caution (Whether or not they have received Action Warning and Raider Passed Messages.)	This message is intended to be confidential. It will be passed on only to those who received the Preliminary Caution.

ANNEXURE -II

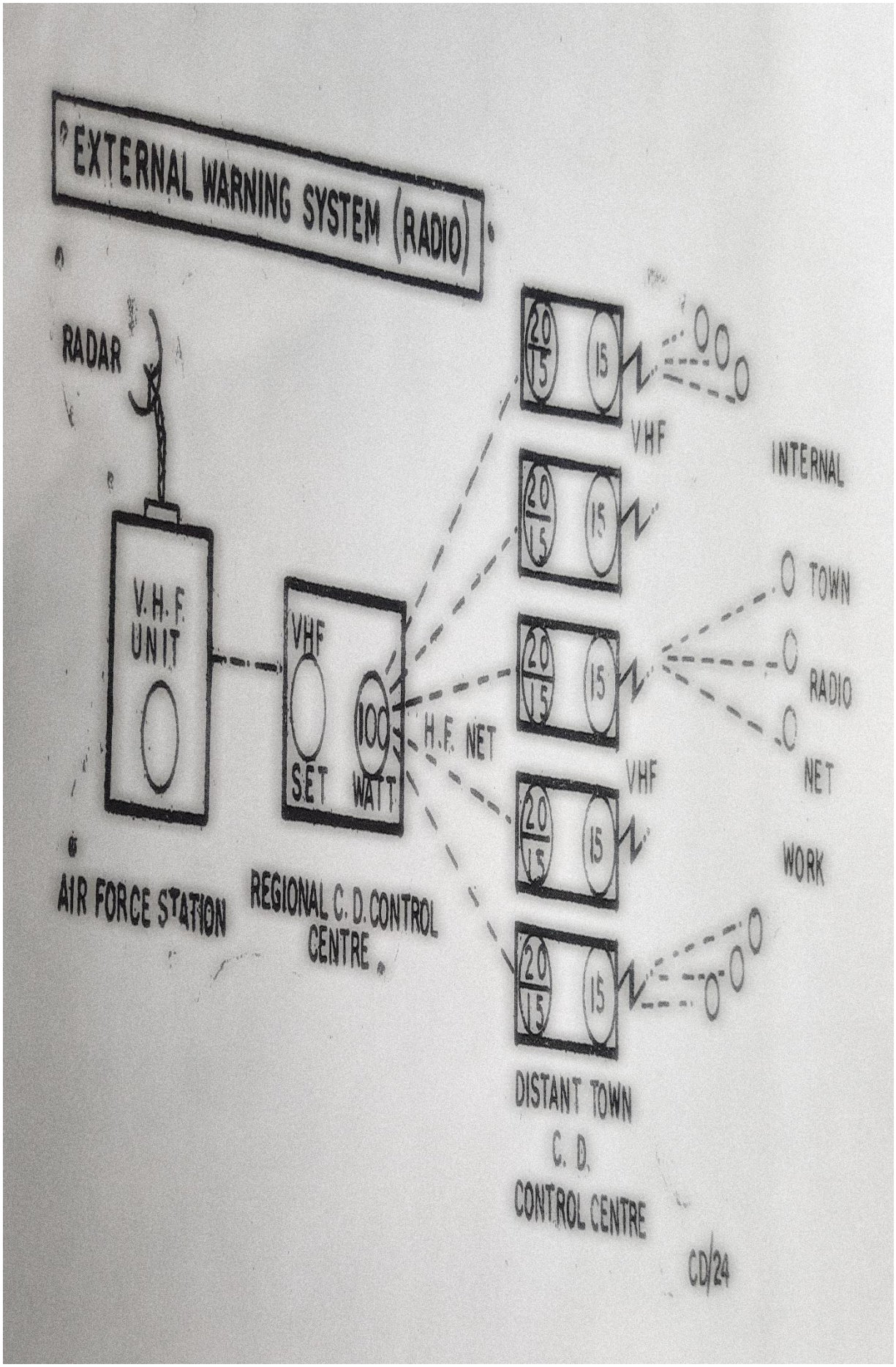
No.CD/24

Categories of recipients of warning message

Recipients	Whether eligible for special list Yellow /White	Whether eligible for Action Lists		Responsibility for conveying warning	Whether also responsible for informing another recipient	Remarks
		in all circumstances Red/Green	Only if not within earshot of a public signal			
1	2	3	4	5	6	7
1. Raj Bhawan	Yes	Yes	..	*C/C		
2. C.D. Controller	Yes	Yes	..	-do-		
3. District Magistrate	Yes	Yes	..	-do-		
4. Local Naval, Military and Air Force H.Q's	Yes	Yes	..	-do-		
5. Ordnance Factories	Yes	Yes	..	-do-		
6. Sub-Control Centres	Yes	Yes	..	-do-		
7. Operators of Public Warning Signals	Yes	Yes	..	-do-		
8. Police Hqrs.	Yes	Yes	..	-do-		
9. Fire Hqrs.	Yes	Yes	..	-do-		Only Gas producing work to be included Detached Gas Holders will not be included.
10. Port Trust	Yes	Yes	..	-do-		
11. Railways	Yes	Yes	..	-do-		
12. Telephones Exchange	Yes	Yes	..	-do-		
13. Electricity Generation Station	Yes	Yes	..	-do-		
14. Gas Works	Yes	Yes	..	-do-		
15. Water Works	Yes	Yes		-do-		
16. Oil Installations	Yes	Yes	..	-do-		
17. Aerodrome Officers (At Civil Aerodromes)	Yes	Yes	..	-do-		
18. Heads of C.D. Services	Yes	Yes	Yes	-do-		
19. A.I.R. Station	Yes	Yes	..	-do-		
20. Cantonments	Yes	Yes	..	-do-		
21. Municipal Hqrs.	Yes	Yes	..	**SC/C		
22. Mints & Security Press	Yes	Yes	Yes	-do-		
23. G.P.O and C.T. O	Yes	Yes	Yes	-do-		
24. Hospitals	Yes	No	Yes	-do-		
25. Jails	Yes	No	Yes	-do-		
26. Wardens Posts (First aid Posts, Depots)	Yes	No	..	-do-		

*C/C- Control Centre

**S C/C – Sub- Control Centre


EXTERNAL WARNING SYSTEM (RADIO)
RADAR
V.H.F. UNIT
VHF
SET
100
WATT
H.F. NET
VHF
VHF
INTERNAL
TOWN
RADIO
NET
WORK
20/15
15
AIR FORCE STATION
REGIONAL C. D. CONTROL CENTRE
DISTANT TOWN C. D. CONTROL CENTRE
CD/24

CHAPTER NO. 16

BASIC PRINCIPLES OF CIVIL DEFENCE ORGANISATION, CIVIL DEFENCE ORGANISATION AT ALL LEVELS

1. **Object**:

Civil Defence is the defence by the people to minimise the effects of enemy air raids on civilian population so that the overall war effort continues without interruptions. Civil Defence will have to be organised at all levels throughout the country. The object of this lesson is to study the basic principles of Civil Defence Organisation and the Organisation at Central, State and Local levels.

2. **Basic Principles**:

The responsibility for Civil Defence rests squarely on the shoulders of every individual, family, community, institution, agency, organisation, industry, corporate body along with the Government. It is the combined effort of all that makes Civil Defence a success. The fundamental considerations to be borne in mind in organising Civil Defence are: -

(i) Each individual is responsible for his own self-preservation. However, in case of large calamities relief is obtained through mutual aid plans at all levels.

(ii) Existing agencies whether they are Governmental or non-official, should be utilised.

(iii) Responsibility for Civil Defence measures must be shared by each level of Government administration. The measures necessary for Civil Defence are an extension of the peacetime functions of the Government to suit war-time requirements. Therefore, each department of Government shares responsibility for Civil Defence in the subject which it administers normally.

3. **Organisation at Central Level:**

The role of the Central Government in Civil Defence is primarily one of supervision and coordination, laying down broad principles and policies on matters like shelter policy, protection in general and assisting the private agencies and the public to carry out their res possibilities in this matter. The Government of India in the Ministry of Home Affairs are responsible for the preparation of a blue print of Civil Defence Plan - and for coordination of all matters concerning Civil Defence between the various Ministries and the State Government and private agencies. In this Government is advised by the Advisory Committee consisting of the representatives of various Ministries of the Central Government and the State Government and eminent personalities with the Home Minister as its Chairman and Director General Civil Defence as its member and ex-officio Secretary.

4. **Civil Defence Committee:**

The Home Secretary is the Chairman of this Committee with representatives of other Ministries as Members. The Committee advises the Government of India on Civil Defence policy matters.

5. **Civil Defence Joint Planning Staff:**

The Joint Planning Staff consists of the Director General of Civil Defence as Chairman and representatives of various Ministries at Deputy Secretary level as members. This Committee co-ordinates the implementation of Civil Defence Policy and suggests specific measures for reorganisation and strengthening of the Civil Defence Organisation in the country.

6. **Director General of Civil Defence:**

The Ministry of Home Affairs have under them the Director General of Civil Defence who advises on all matters relating to Civil Defence Organisation training, planning, and other technical problems. Various Ministries of the Government of India are responsible for Civil Defence Measures in establishments working under them. They are also required to provide for Civil Defence requirements on their respective subjects. For example, Ministry of Defence & Works, Housing and Supply will help the Directorate General of Civil Defence by providing technical advice on construction of shelters, and Communication and Transport Ministry will undertake to provide communication facilities for Civil Defence. In addition to co-ordination, organisation, planning etc. the Ministry of Home Affairs would be responsible for fire services, liaison with military and railways, C.D. legislation in consultation with the Minister of Law and the organisation of Central Civil Defence Stores Depots. The Ministry of Defence will be responsible for C.D. in Cantonments and Ordnance factories and for the disposal of un-exploded bombs and crashed air crafts. Ministry of Labour and Employment will be responsible for C.D. in factories, Labour-legislation and war injuries scheme. Ministry of Health will be responsible for Emergency Hospital, Organisation. Public Health and Sanitation. Ministry of Railways for Civil Defence Measures on Railways, Railway Colonies, Rail transport for evacuation and movement of supplies. Similarly, the scope of activity of each Ministry would be enlarged to assume war-time responsibilities.

7. **Functions of the Central Civil Defence Organisation:**

For general functioning and the broad matters on basic policies the Central Civil Defence Organisation receive directions from the Cabinet. The important functions of the Central C.D. Organisation, inter-alia are:

(i) Preparation of lists of towns/cities and vital plants and installations requiring Civil Defence measures to meet enemy air attack.

(ii) to lay down general policy for Civil Defence in India.

(iii) to co-ordinate civil defence work amongst various Ministries of Government of India, State Governments and All India Social Welfare Agencies.

(iv) provision of reliable warning system.

(v) to lay down scales of manpower (including reserves and training wastages), equipment and vehicles, required for civil defence.

(vi) constitution and composition of Civil Defence Organisation at the Central, State and town level-authorising wholetime paid posts at various levels.

(vii) policy and procedure or indenting, procurement, storage, inspection, care and maintenance, supply and issue of civil defence equipment.

(viii) to ensure uniformity of practice and procedure and to indicate the action which should be taken in any town as and when an emergency arises, to prepare draft Civil Defence Legislation manuals and literature on precautionary and protective measures and for protection of life and property, reimbursement of Central share of expenditure incurred by the States on civil defence measures.

(ix) to keep constant watch on the implementations of C.D. measures by State Governments and public sector, undertakings located in C.D. Towns.

(x) to issue orders for mobilisation of C.D. Organisations by stages in an emergency.

8. **Civil Defence Organisation at State Level:**

At the State level the subject of Civil Defence is mainly entrusted to the Home Department and other departments are expected to play their own roles in Civil Defence as it is done at the Centre. The State Government may appoint a Director of Civil Defence for purpose of advising, planning, co-ordinating and enforcing various C.D. activities in the State. As Home Guards and Civil Defence are complementary organisations the State Governments/Union Territory Administrations have been advised to combine them wherever possible. At Headquarters of States and Union Territories, therefore, provision has been made separately for staff and transport for both combined" Home Guards and Civil Defence Organisations. A suitable Advisory Committee may be set-up at State level and entrusted with the work of creating and sustaining public interest in Civil Defence activities, recruitment and training. Such committees could help in the procurement of vehicles, buildings and stores on hire, or in the form of gifts and donations. The Home Department will be responsible for organisation, planning, co-ordination and also for liaison with Central Government establishments at State level. Government of India will be kept informed through regular reports on air-raids. Home Department will be responsible for procurement and distribution of C.D. equipment, making plans for evacuation, arranging for C.D. publicity and propaganda. The local Self-Government Department will be responsible for fire-fighting, maintenance of municipal roads, water supply and conservancy. The Medical Department will be responsible for Emergency Hospital and Medical Stores. The Public Works Department will be responsible for provision of the terms, sand-bags, trenches, salvage, repairs and demolition. The Labour Department will be responsible for C.D. in factories, control of labour and legislation for the same. Similarly, the departments under State Government will be entrusted with the responsibilities corresponding to their subjects.

States etc. have been authorised to set up Central Training Institutes where local instructors, staff officers in-charge and leaders of C.D. Teams etc. will be trained.

9. **Civil Defence Organisation at the Local Level:**

In a district the District Magistrate is the ultimate authority on Civil Defence. He is designated as the Controller of Civil Defence. But in certain cases, it may be necessary to appoint separate. Controllers/ Deputy Controllers to give additional assistance to local authorities. The Controller commands the C.D. Corps in a district and is responsible for implementing all C.D. measures laid down from time to time.

State Governments etc. are also authorised to appoint full time Deputy Controllers and instructors at the District Headquarters having Civil Defence towns and in certain other C.D towns with ancillary staff and vehicles as laid down by the Government of India. All communications from the Government regarding Civil Defence matters are sent to or through the District Magistrate, or failing this, copies are endorsed to him for information even though a separate Controller may have been appointed. The D.M./C.D. Controller designate appoints the various departmental heads in the district as in charge of various Civil defence Services. Departmental officers such as Civil Surgeon Superintendent of Police, P.W.D. Engineer, Publicity Officers etc. should be placed in-charge of Civil Defence Services and measures similar to their peace-time duties. The D.M./C.D. Controller co-ordinates the work of these departments in respect of planning of various C.D. Measures by calling regular meetings. The District Magistrate also constitutes an Advisory Committee. The members of this Committee chosen out of the people possessing qualities of leadership and discipline are able to arouse and sustain public interest in the Civil Defence Services. The C.D. Organisation at the Sub-Divisional level should follow the pattern of C.D. Organisation at the District level.

10**. Statutory Provision:**

The Civil Defence Act (Act 27 of 1968) provides for the raising of a Civil Defence Corps and for making Rules and Regulations for Civil Defence. Rules and Regulations under the Act have been framed and issued.

11. **Civil Defence Services**:

At the local level the various existing agencies will be responsible for organising the suitable C.D. Service in the subject entrusted to the agency in normal times e.g. Civil Surgeon In charge of Casualty Service, Civil Supplies Officer-in-charge of Supply Service and soon. The functions of the important C.D. Services will be as follows:

(i) **Head Quarter Service**: In large metropolitan cities a whole-time Controller with a few clerks and chowkidars are provided. In smaller towns the Controller is formed from the existing organisation.

(ii) **Warden's Service:** It is a link between the public and the authorities. Wardens advise people on Civil Defence, organise self-help parties, check lighting restrictions, send reports of damages, control small incidents and guide homeless to Rest Centres. To organise House Fire Parties is also an important duty of the Warden in his area.

(iii) **Fire Fighting Service**: This consists of House Fire Parties. They detect small fires started by Incendiary Bombs and put out the same.

(iv) **Casualty Service**: The functions of this Service are:

(a) Rendering first-aid on the spot.

(b) Providing transport to causalities for short distances.

(c) Send serious casualties for further treatment.

A Medical Officer has been authorised in certain towns.

(v) **Communication Service -This Service performs three functions:**

(a) Receipt and dissemination of air raid warning.

(b) Receipt and evaluation of damage report at Control Centre, despatch of necessary assistance and provision of coordination and control facilities,

(c) Provision of communication between Wardens Posts, Control/Sub-Control Centres, Combined Depots etc. messengers, telephone or other means of communications.

(vi) **Training Service** -Training in subjects special to C.D. Service is the responsibility of C.D. Officer. He is helped in the discharge of the duties by a special training officer assisted by instructors. In all vulnerable towns paid Civil Defence instructional staff is authorised at the scale of two whole-time Instructors, one clerk, and one messenger for 1 lakh population with a minimum of one team per town. This staff can also be used for the purposes of planning, organisation and execution of C.D. measures.

(vii) **Rescue Service**- Their duty is to rescue the casualties trapped under debris and recover the dead from damaged buildings. To provide temporary support or demolish dangerous structures, to arrange salvage if no separate organisation is set-up.

(viii) **Welfare Service**-The functions of Welfare Service are:

(a) To supply information regarding missing relatives dead etc.

(b) To provide Rest Centres where affected people are given temporary shelter, food and clothing.

(c) To arrange for evacuation of population from vulnerable areas to safer areas.

(ix) **Depot and Transport Service**: Depot Service is intended to despatch C.D. Service to the affected localities in a short time. Civil Defence Services are stationed and equipment is maintained at C.D. Depots the Transport Officer is responsible for procuring transport by hire, requisition or voluntary offer and maintaining the same in an efficient and road-worthy condition, training drivers, providing petrol, oil, lubricants and making arrangements or quick repairs.

(x) **Salvage Service**: After the bomb damage the property left behind is salvaged and kept in safe custody by the members of this Service.

(xi) **Corpse Disposal Service:** At the scene of damage human bodies or their parts are required to be collected, identified and cleared from the Police and Medical Practitioner before these are disposed off. Corpse Disposal Squads are organised for this purpose.

(xii) **Supply Service:** This Service is responsible for:

(a) Planning organising and procuring necessary equipment for C.D. Services.

(b) Proper storage and quick distribution of the equipment at the time of need.

(xiii) **Other Services:**

Besides the above Services local C.D. Organisation will be required to set-up Repairs and Demolition Parties, and arrangements for care of animals through appropriate existing agencies within the town. The co-ordination of these Services will be achieved through the head-quarter service under the C.D. Controller.

12. **Home Guards for C.D. Services**:

In certain cities C.D. Services such as Incident Control, Reconnaissance Parties (to the extent possible), Rescue Parties, Trailer Pump Parties, Mobile Canteen and Part-time instructors are to be provided by Home Guards. In certain other towns additionally, the following Services viz. Rescue, Supply, Welfare, Depot including Transport. Corpse Disposal and Salvage are to be formed, to the extent actually required, by State Government/Union Territories Administrations from amongst the Home Guards. The necessary equipment however will be provided by Civil Defence. In other towns Civil Defence arrangements are to take the form of training Home Guards in air-raid precautions, and other C.D. duties.

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CHAPTER NO. 17

CIVIL DEFENCE FOR INDUSTRIES

1. **Object**:

In modern wars the ability of a country to with stand war depends to a large extent on the Industrial self-sufficiency and maintenance of regular supplies of equipment for the fighting forces in addition to meeting the country's normal demands for day to day life. The objective of enemy air-raids is to cripple the industrial production of essential goods and war material. The object of this lesson is to study the Civil Defence Measures necessary in an industrial undertaking in order to mitigate the effect of air raids and protect vital plant, machinery and key personnel.

2. **The Problems of Industries**:

The collapse of an important workshop, apart from its effects on personnel may result in damage to essential and irreplaceable machinery. Incendiary bombs and hazardous stores will start fires in a factory after the air raid damage occurs. Generally, raw material and waste is stacked in crowded places due to shortage of storage space and due to sudden expansion taking place in the factory output. This adds to the fire risk. The available water supplies and trained men fall short of the demands placed due to war conditions. Thus, fire is known to have caused much more damage to industrial output than effects of high explosive bombs. With the breakage of glass from windows not only the lying splinters cause damage to machinery and personnel but both the blackout integrity and protection from weather are lost. Sometimes damage occurs to the source of water or power supply which causes breakdown of manufacturing processes. As a result of casualties, increased hours of work and panic evacuation, the requisite number of key personnel and workers may not be present necessitating closure of the factory. With the obscuration of lights and protective works carried out, the work and transport is slowed down and suitable means have to be devised to overcome these difficulties. Also, during wartime, the essential supplies and spare parts do not reach the factory in time with the result that production goes down for some time. The above are some of the difficulties the factory management will have to face during and should be prepared to meet with these difficulties.

3. **Necessity of Industrial CD. Organisation:**

The damage caused by the aerial bombardment can only be met with and controlled by a well organised and trained organisation at a factory. Since the air attacks are delivered with great suddenness it is impossible to devise necessary protective, control and rest oratory measures at short notice. The confusion and haphazard improvised measures rarely survive the great destructive power of the modern weapons which are capable of inflicting serious losses and crippling blows to industry with little chance for recovery.

4. **Outline of CD. Measures in Industry:**

With a view to safeguard lives of workers to limit bomb damage to machinery and buildings to the minimum extent practicable and to maintain production at the highest possible rate during air raids it will be necessary to consider the following C. D. Measures well in advance of the actual out-break of an emergency.

(i) **Protective Measures:**

(a) Protection of vital installation and equipment, shelter for the personnel close to their place of work combined with the adequate system of warning, shelters for families of workers, protection of records.

(b) Dispersal of factories combined with concealment, obscuration of lights, dispersal of personnel, vital installations and equipment with in factories and by camouflage.

(ii) **Organisation:**

(a) Provision of an efficient and adequate organisation for Civil Defence, Fire Defence, Repair and Restoration, including arrangement for calling outside assistance on sufficient scale.

(b) Provision of efficient means of control and communications with appropriate authorities with alternatives.

(c) Arrangements for welfare of employees after attack at their place of employment or at their houses.

(iii) **Alternative:**

(a) Alternatives, spares and improvisations to all stages of production and distribution.

(b) Alternative for electricity, gas, water supplies and other essential public services.

(c) Alternative transport arrangements for products, supplies and employees.

5. **Special Consideration for Industrial C. D.**

Because of the difference in conditions and responsibilities of a factory management and Civil administration the CD. Organisation of a factory will be an independent unit working in general frame work of the C.D. Organisation of the District. The main considerations are that factories are more compact and singled out for concentrated attack. They have special legislation in matters of labour welfare, Industrial hazard, fire precautions etc. Security conditions in some types of factories may not permit entry of any outsiders. Also, in some factories shelters may have to be provided for the cent per cent workers. Thus, there exists a need for separate C. D. Organisation for factory and other residential areas. There is also the need for evolving special C. D. measures for each Industry e.g. Steel Oil Ordnance factories to ensure that quick restorative capability is developed so as to maintain continuity of production, even if the plant or a part thereof is damaged.

6**. Organization:**

In Industrial undertakings no separate C.D. organisation need, be set up but the existing organisation for the purpose of production should be geared up to tackle the problem of Civil Defence during war time. The factory C. D. Controller should be the same executive who is responsible for production during normal times. Similarly, in particular concern the Shop Managers or Foremen are the right persons to act as Post Wardens or so. The controller will delegate responsibility for organising and training of various services to officers nominated for the purpose they will be chiefs of services. The C.D. Organisation for industry will inter alia provide for:

(i) **Control and Communication Service**: In time of emergency a Control Post will be the centre from which the controller will direct all C. D. Operations. This Post will be manned for 24 hours and arrangements for receipt of warnings and their dissemination either through telephone or messenger will be available. This Post will have adequate structural protection and alternate post will be earmarked to replace it in case of accidental damage. All reports to local C. D. Organisation and request for mutual aid etc., will be made by the Control Post. The control and communication service will be headed by the Communication Officers.

(ii) **Wardens**: The factory will be divided into sectors (roughly of 250 workers each) each of which will be patrolled by a pair of Wardens who will be responsible for reporting damage to the factory Control Post. The Warden Service of the factory will be headed by Chief Warden (factory). Wardens will be generally responsible for the welfare of the workers.

(iii) **Casualty**: The Medical Officer of the factory will be Officer-in-Charge of this section. In case a dispensary exists, it will be used as F.A. Post. Besides F.A. Post, First Aid Parties and Ambulance teams will be formed. F.A. Parties will be located in various sectors. The factory vehicles will be used as ambulances to transport casualties.

(iv) **Fire Fighting**: For the purpose of controlling fires Trailer Pump Parties, Stirrup Pump Parties and Fire Watchers will have to be provided. The Factory Fire Brigade Officer will head these Services. The Fire Watches will watch for the fall of incendiaries and communicate with the Stirrup Pump Parties who will promptly extinguish any small fires before they become large conflagrations.

(v) **Rescue and Salvage**: Rescue and Salvage vices of the factory will be headed by the factory engineer. Rescue Parties will be responsible for rescuing the trapped persons. They will also be engaged in salvage operations and repairs to essential services such as water, gas, etc.

(vi) **Repair Parties**: The head of the plant engineering and maintenance department should be responsible for this service. This service will be responsible for effecting quick repairs to damaged machinery, plant, instruments, etc. The number of parties required and the equipment to be provided will depend upon the size and type of factory and the nature of work.

(vii) **Training**: There will be a training officer of the factory who will be responsible for general training of the volunteers and workers. Each head of service will, however be responsible for specialised training of the particular service.

7. **Protection of building, machinery and records:**

Standard structural protection will have to be provided to vital plants and machinery viz, steam boilers, electricity generation station, essential gas, water supply mains, telephone cables, switch board Records which are absolutely essential etc. for getting back into production should be duplicated and copy kept at a safe distance.

8**. Fire Precautions:**

The fire prevention methods such as storing hazardous materials at a safe distance, provisions of additional water supplies, determining accessibility to all parts of premises, automatic fire alarm systems should be included under this measure.

9. **Protection of workers:**

The workers should be provided shelter near their place of work. Not more than 50 workers should be sheltered at one place. Large shelters if any may be compartmentalised for this purpose. Shelter accommodation is to be provided for all the workers in one shift.

10. **Obscuration and removal of glass**:

In following the blackout regulations prescribed, the comfort of workers in respect of adequate lighting and proper ventilation should not be ignored. All glass must be removed and replaced by opaque screens. In order to maintain adequate ventilation exhaust fans or air conditioning may have to be provided in certain sections of the factory.

11. **Dispersion and camouflage:**

Vulnerability to attacks from the air could be considerably reduced by dispersing factories and various departments in a factory over a wide area." The other methods of saving the factory is by camouflaging it. The camouflage is a technical subject and schemes will be prepared by experts only.

12. **Essential stores and spares**:

The stock-pilling should not be limited to materials and spare parts used in repairing buildings, machinery and utilities but also essential raw material. The equipment, may be categorised as building materials, electrical equipment, gas and water supplies, repair and miscellaneous equipment.

13. **Relationship with Director C. D. of the State**:

Central Government establishments like Railways, Posts & Telegraphs, Cantonments, Ordnance Factories, Air Force Installations, Civil Aerodromes, Port Trust areas and public sector undertakings such as locomotive and coach building factories, Heavy Electricals etc. and also large private sector industries like Tata Iron and Steel Works etc. will be treated as Civil Defence areas in themselves and will adopt their own C. D. measures and have their own Civil Defence Organisation in consultation with the Director Civil Defence of the concerned State in which these are located.

As regards smaller industries both in public and private sector the Director Civil Defence may decide to group them into suitable C.D. Units.

Very small industrial units especially when isolated and employing less than 100 employees will be treated like households and should adopt similar C. D. measures.

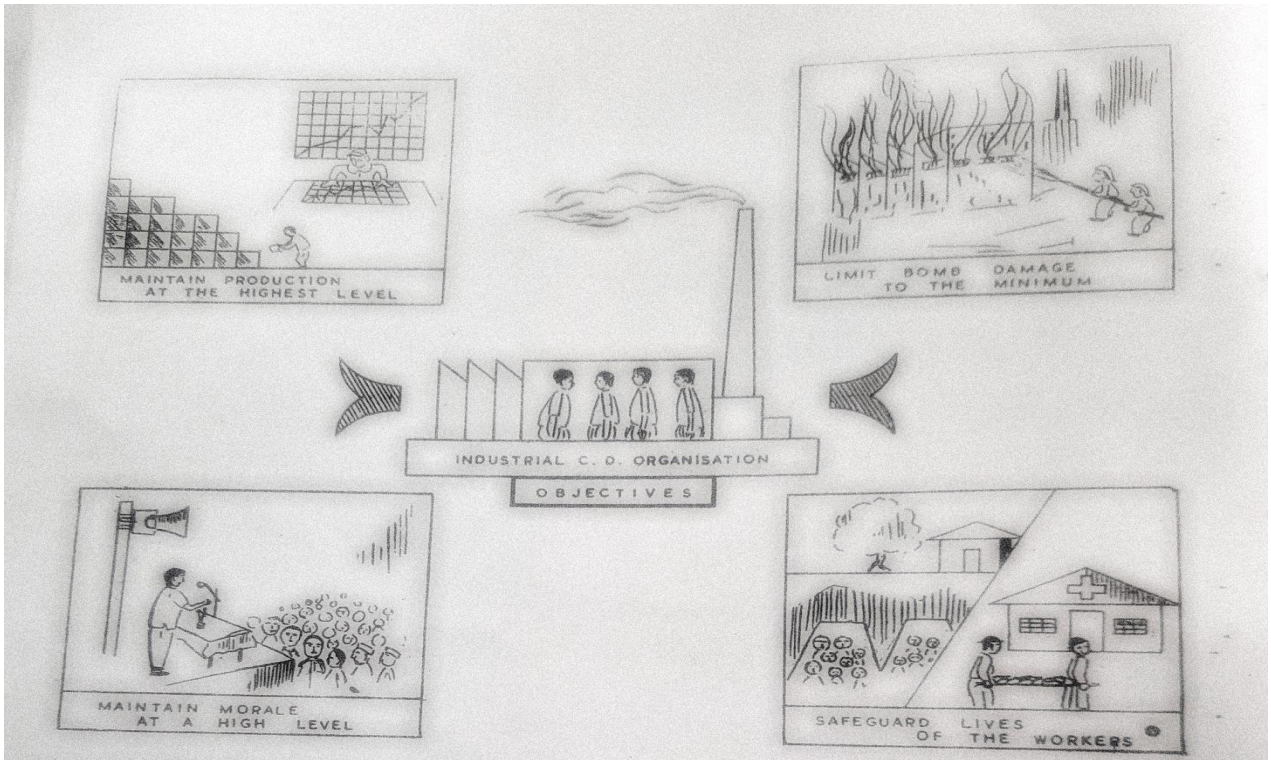
14. **Relationship with the town C. D. Controller**:

Within the Industrial premises the C.D. Controller (Industry) will be responsible for adoption of suitable measures and provision of Civil Defence Services. However, all damages will have to be reported to the local C.D. Controller (Town) for record. C.D. Controller (Industry) should also prepare mutual aid plans with other industrial C.D. Organisation and with local (Town) C.D. Organisation.

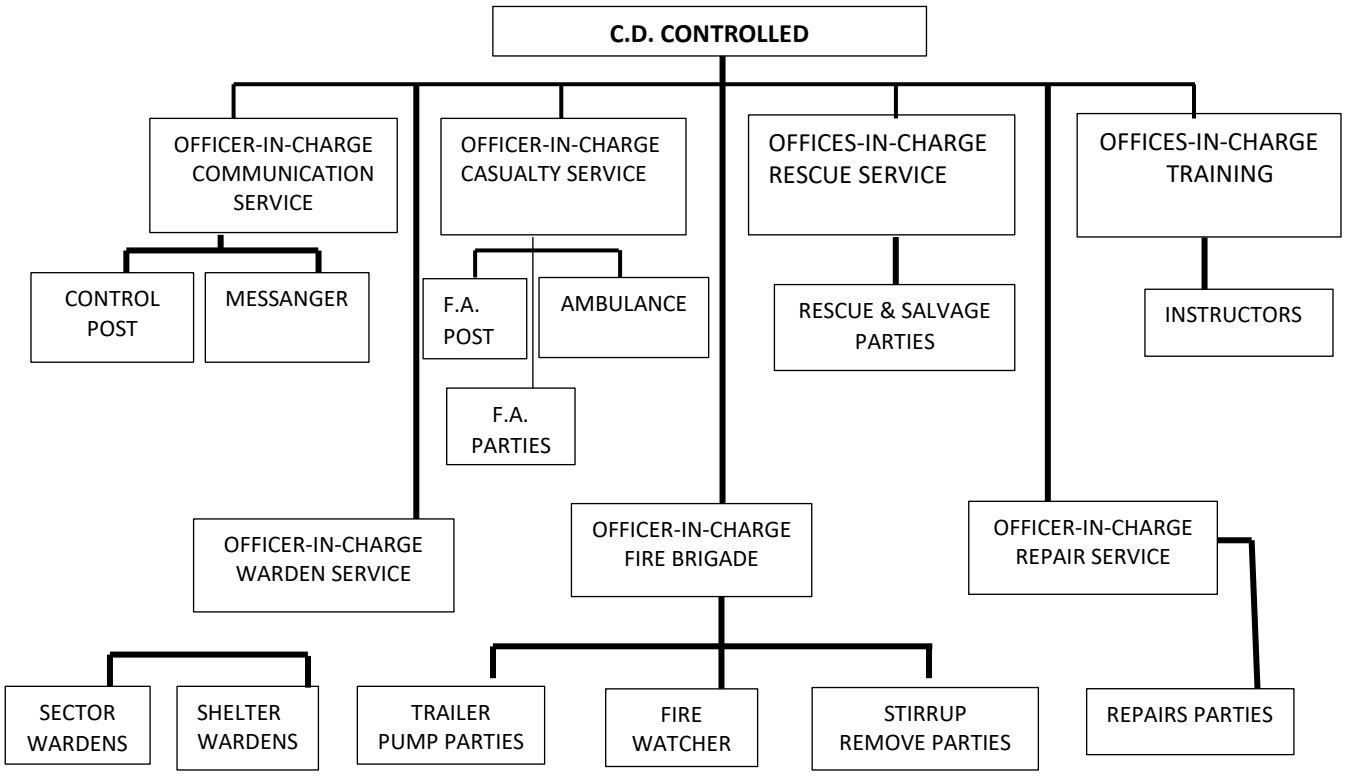
15. **Conclusion:**

The arrangements must be such as will stand the test of the time of emergency and crisis. The details will vary with each undertaking according to the character of the buildings occupied, the location of the buildings the class of work carried, on the nature of the materials handled the age and sex of the workers employed as well as their number. The requirements of steel works, for instance, different will be very different from those of cotton mill. Again, a good deal will depend upon whether all business can be stopped until the danger is past or whether there are processes which would have to be kept going.

The organisation and C.D. Measure suggested are for general guidance which will be of use to all classes of undertaking, but it must rest with those who are responsible to select the means of protection which are applicable to their own case and to frame a complete scheme in which emphasis is laid on the measures more appropriate to their particular needs. This will best be done, indeed can only be done, with success if a responsible member of officer of the management sets himself to visualise the kind of difficulties which might arise and the necessary steps to cope with them.



ORGANISATION CHART FOR C.D. IN INDUSTRY



App to CD/17

Table showing important Units and Scales in numbers

Type of personnel	**Scale of C.D Personnel**					**Remarks**
	Where maximum shift is					
	100 to 500	500 to 999	1000 to 1999	2000 to 4999	5000	
Control	Minimum 2 increased as required for larger factories					
Telephone Operators	1	2	2	3	4	
Senior Warden, deputies and Assistants	2	2	4	8	20	
First Aid Centres Personnel	6 (1x6)	8 (1x8)	14 (1x8) (1x6)	16 (2x8)	38 (2x15) (1x8)	Figures within brackets show No. of Centres **X** the No. of personnel in each centre.
WARDENS (Shelter marshals) up to	10	10	20	40	100	1 per 50 persons.
First Aid Parties	4 (1x4)	8 (2x4)	12 (3x4)	20 (5x4)	28 (7x4)	-do-
Rescue Parties	4 (1x4)	10 (1x10)	20 (2x10)	30 (3x10)	40 (4x10)	-do-
Stirrup Pump Parties		3 (8,000)	6 (20,000)	9 (50,000)	12 (1,00,000)	No. of personnel increases according to the roof areas in sq. ft figure shown with in brackets underneath.
Fire Watchers	Parties of 2 as required					Not to be posted singly.
Trailer Pump Parties	5 men + leader for light Trailer Pump 8 men + leader for larger Trailer Pump. Total number of personnel required will be = no. of personnel for each pumps x No. of Trainer pumps required for each installation.					
Hydrant parties	Parties of 3,1 party to every 3 Hydrants					
Massagers	3	4	7	12	24	

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CHAPTER NO. 18

HOME GUARDS ORGANISATION – ITS ROLE, TRAINING AND FUNCTIONS

1. **Object**:

The object of this precis is to study the aims objects, functions, training and organisation of Home Guards, and its role as an agency for Civil Defence work.

2. **Aims, Objects and Role:**

The conditions created by an air attack call for concerted effort on the part of the Government, the local administration and the people at large to render the maximum possible assistance to the victims, to restore normalcy of life and to strengthen the will of the people to stand up hardship in the country hour of need. Home Guards is one of the important organisations which is expected to undertake certain Civil Defence duties. They are raised on a uniform pattern under the Home Guards Act/Statute of the State and they are assigned the following roles:

(i) They will serve as an auxiliary to the police and generally help in maintaining internal security.
(ii) They will help the community in any kind of emergency e.g. an air raid, a fire, a flood, an epidemic and so on.
(iii) The Home Guards may also have functional units to provide essential services, such as motor transport, pioneer and engineer groups. Fire brigades, nursing and first aid. operation of water and power supply installations etc.

3. **Role During Wartime**:

In category I towns, urban Home Guards have to man the following Civil Defence services:

(i) Incident control and Reconnaissance parties (to the extent possible).
(ii) Rescue parties.
(iii) Trailer pump parties.
(iv) Mobile Canteens.
(v) Part-time instructors.

In category II towns excepting six Civil Defence services, namely, Headquarters, Wardens, Communications, Casualty, Training and Fire Service, rest of the CD Services are to be provided by the Home Guards but only to the extent actually required.

In places other than category I and II towns, Home Guards are to be trained in air raid precautions & general Civil defence duties to serve as a nucleus of disciplined and trained personnel for use in an emergency. They may also be required to perform certain additional roles. Such as providing personnel to act as air-craft spotters for raising of auxiliary battalions of the B.S.F.

Urban Home Guards are recruited from among all classes of and from all walks of life but mostly persons having regular occupations such as service, industrial employment, business or profession are pointed. They will normally be used in their own cities or towns and as a rule they will be called up for part-time duty only. In an emergency however, they might be called up for longer spells of duty and be sent out if necessary, and on such occasions also they are paid the prescribed duty allowance in addition to their normal wages.

The Organisation is broad-based and free front political affiliations and consists of people who give their spare time for the betterment of the community and in view of this no unemployed persons are enrolled to safeguard the interest of this organisation. In rural areas where reliance has to be placed mainly on the agricultural community this condition cannot obviously apply.

4. **Border Wing:**

Border Wing Home Guards also been organised in the States of Punjab and Rajasthan. They gave a good account of themselves during the last conflicts with Pakistan. They fought side by side with the BSF/ARMY and earned good reputation.

5**. Women's Wing:**

The women wing units of Home Guards are also organised in most of the urban areas. The strength of this wing is determined within the overall target by each State depending on the number of volunteers available and the need for which women can perform with greater aptitude than men such as welfare, communication, first aid services, of Civil Defence.

6. **Manpower:**

It is suggested that the age group for initial recruitment to the Home Guards be 18-50 years with relaxations in favour of those specially qualified to act as instructors/leaders, specialised personnel and member of the existing organisations.

A high degree of physical fitness being essential for Home Guards. State Government /UTs may like to follow, broadly, the Home Guards will have liability for service within the State. In an emergency, those who volunteer may, however, be drafted for special duties outside their State. When Home Guards are called for duty and have to be paid any allowance the cost will be borne by the Centre or the State Government depending on the nature of the task assigned. In urban areas, for every 25000 of population and in rural areas for every Community Development Block, a company of 110 men may be raised. A rural/urban Home Guards Company consists of 3 Platoons with 5 personnel namely Coy. Commander, Coy 21/C, CHM, COMH/ clerk and runner, at Company HQ. There are 3 sections each of 11 Home Guards in a Platoon in addition to the Platoon Commander and the Platoon Sergeant.

7. **Targets**:

In regard to manpower, the practical targets have been prescribed. The revised target at present is 6.03 lakhs whereas the raised strength is 5,98,126 (up to April, 1973).

8. **Pay and Allowances for Training Staff:**

Provision has been made for appointment of paid staff at the State and District levels and for the training of the Home Guards at the State Central Institute and the Dist. Training Centre. A Commandant General Home Guards is authorised for each State/ UT. He is also authorised a Deputy of the rank of Senior Superintendent of Police for 30,000 Home Guards and for every additional 15,000 to 30,000 Home Guards and additional Senior Staff Officer to look after the administration and a suitable number of Junior Staff Officers. Where Divisional Commandants Home Guards exist at Hqrs. of Divisional Commissioners in these States, the additional Senior Staff Officer for over 30,000 Home-Guards will not be provided.

Large cities having more than 20 Companies of Home Guards may have an Inspecting Officer, on the scale of one per unit of 20 Companies and in the scale of pay of an Inspector of Police/Subedar or equivalent scale applicable in the respective States/ UTS. At the district level, there should be a Dist. Commandant who will have an assistant and small clerical staff. In larger States, it may be necessary to have Divisional Commandants In-Charge of an area equivalent to a Commissioner's Division.

Regional/District Training Centre should normally be established at the scale of one Centre per district. (See chart). It will have a permanent staff including the Centre Commander in the rank of Captain/ Dy. SP, Inspectors, Platoons Commanders and various other members of the staff including clerical staff, cooks, sweepers and other Class IV. For Urban areas, the training staff will generally be found by employing volunteers from amongst ex-servicemen and retired police officers. All such Instructors should be given an honorarium to cover-out of-pocket expenses which could be linked up with a minimum average attendance at parades, during a month of 50% of the total strength. The honoraria for the instructors should be on the scale as suggested below: -

Section Leader	Rs. 10.00 pm
Platoon Hawaladar	Rs. 15.00 pm
Platoon Commander	Rs. 30.00 pm
Company Commander	Rs. 50,00 pm

Out of pocket allowance is to be paid to rural Home Guards at Rs. 1.00 per day plus free board and lodging while undergoing training in camps the Dist. Training Centres. The rate of duty allowance will be Rs.5.00 per day. An additional allowance of Rs. 1.00 per day may be given to rural and urban home guards when they have to perform duty outside their community development Block or beyond 8 kilo meters from their Hqrs. respectively.

8. **Uniform**:

A common uniform for Home Guards has been prescribed consisting of the following items: -

Shirt-Khaki Cellular	1
Trousers-Khaki Drill	1 pair
Belt-web or Canvas	1
Anklets Wests or Canvas	1 pair
Socks	1 pair
Boots ankle Black	1 pair
Beret cloth	1
Shoulder Titles	1
Cap Badge	1 pair
Whistle with Lanyard	1
Hackle white & black colour	1
Beret cloth	1

Uniform for Urban Home Guards should be issued on the basis one set per man and should remain in his custody who should be expected to keep in good condition and maintain it out of the daily parade allowance to which he is entitled. One additional set of washable items of uniform, consisting of khaki cellular shirt, one pair of trousers khaki drill and one pair sock at total estimated cost of Rs. 15.80 may be issued to every urban Home Guard. In rural areas, the uniform should not be issued individually to Home Guards, but should only made available to them during training and a 'Mobilisation Store' should be maintained in addition so that Home Guards called for duty can fitted out without delay. The training reserve of uniforms will have to be on a slightly higher scale than the actual requirement 240 sets for every 110 Home Guards, so that varying sizes could be fitted out and reserve kept ready subsequent batch trainees. The Mobilisation Store' may cater for 25% of the Rural strength in any area with suitable adjustment for fitting out varying sizes. In regions where there is regular snowfall in the winter months, each Home Guard may be provided with a quilted type of dress at a cost not exceeding Rs. 100.00 each. In areas north of latitude 22 degree (N) the scale of great coat may be increased from 10 to 25 percent of the actual raised strength of the Home Guards therein at a cost not exceeding Rs. 90 per coat.

10. **Training**:

(i) **Basic training**: The training of the urban and rural HGs will have to be taken up separately for obvious reasons and more time will have to be allotted to the training of rural Home Guards. The Urban Home Guards will be trained outside the normal working hours with the training extending over a fairly long period to be followed by a ten days camp for first year and 8 days camp for second year. In the rural areas, the Home Guards are expected to be called to a camp for intensive training for about a month. In the training camp they may be required to a minimum of 40 training days.

The training should be part-time and imparted at parades of 1 $^1/_2$ hours to $2^1/_2$ hours each day to complete the basic training and followed by a camp of 10 days duration in case of Urban Home Guards. If camps are not feasible then the parades should be intensified and more time devoted to compensate for the training at camp. The basic training of the Urban Home Guards and the Rural Home Guards with number of periods for each subject are given in the attached Appendix 'A'.

(ii) **Refresher training & Advance training:** Refresher training of Home Guards both Urban and Rural is quite essential for maintaining the efficiency of the members of the force. For the Urban Home Guards Refresher training will be a continuous process after the basic training has been completed. Urban Home Guards will attend at least preferably 2 to 3 parades of duration of 2 ½ hrs. Every week to keep them in a state of efficiency and preparedness thereafter. The emphasis should in this phase be on practical exercises and route marches etc. and some additional subjects and exercises should also be gradually introduced as a part of the advanced training. The Rural Home Guards, Refresher training should be in a camp in the Training Centre for a period of 15 days which in fact means that the actual training will be of 12 working days. This may be supplemented by a further training of two days every two months i.e. 10 days per year (See TRAINING CHART). The objective being the same as for the Urban Home Guards mentioned above i.e. emphasis on practical exercises, route marches etc. To build up and to maintain interest in the training subjects such as unarmed combat, control room duties and where possible a fire power demonstration should also be included which may if possible also include a demonstration of firing of automatic weapons such as sten-guns and light machine guns.

The Rural Home Guards with 40 days training alone, it is felt, will not be fit enough to perform some of the duties of Police and it will, therefore, be necessary to provide a more intensive training to them in case they have to be used effectively for the purpose. As an initial step, in each Community Development Block, roughly one Platoon strength of 40 Rural Home Guards should receive advanced training, so that they could perform the Police duties and similarly in Urban areas, a similar proportion should receive advanced training, at part-time parades of about 100 periods. The duration of advanced training to selected Home Guards may be increased from 30 days to 45 days per year, in the border States and Union Territories.

(iii) **Leadership training**: In rural areas, Section and Platoon Leaders are trained for 21 days duration at the Regional Training Centres. Company Commanders courses of 30 days duration are run at the Central Training Institute in the State/UTs. In urban areas, the training of Section and Platoon Leaders for 21 days and for Company Commanders for 30 days is conducted at the Regional Training Centres/Central Training Institute for Home Guards.

11. **Arms and Ammunition:**

Rifles are issued at the scale of 30% in the case of border States/UTs and 20% in respect of the non-border States UT's. In Manipur, as a special case, rifles are authorised at 100%. 22 rifles are authorised at 10% of the total entitlement of 303 rifles for initial training. Border Wing Home Guards Battalions of Punjab and Rajasthan are authorised arms at 100%.

FINANCIAL AID

All States excepting Assam and 5 northern districts of West Bengal and UTs which are reimbursed expenditure at 100%, 50% of the expenditure incurred on authorised items are reimbursed by the Centre. In the case of Border Wing Home Guards of Punjab and Rajasthan the ratio of reimbursement is 75:25.

In recognition of conspicuously good work or work of outstanding nature, grant of cash awards to Home Guards can be allowed. DGCD is empower ed to grant Rs. 1,000 and CGHG/DCD/Dy CGHG/ Dy CD can grant Rs. 250.00 in any one case or any one occasion.

To improve the standard of performance and to sustain morale and esprit-de-corps among Home Guards, contingents of selected Home Guards from different States participate in the Republic Day Parade every year.

To improve the professional standards of Home Guards and to promote esprit-de-corps among the volunteers of HGs and CD Organisations. All India HGs and CD Professional and Sports Meet is held annually in different States where awards of trophies/cup/certificates are awarded to the winners and runners-up in the various professional and sports items.

12. **Home Guards as an Agency for Civil Defence:**

Home Guards have a thorough training for dealing with all emergencies and it has been accepted that this is one of the best organisations to deliver the goods in the event of an emergency and render all the services in connection with the Civil Defence.

Thus, HGs as an agency for Civil Defence will expand to perform the various functions in the fields such as communication, rescue welfare services, first aid and so on. Of course, the organisation finally will be responsible to the local administrative authorities and will work under their guidance and control according to well-chalked out plan of the local civil administration set up for rendering relief to the victims of calamities arising out of natural or manmade causes.

APPENDE 'A'

Syllabus and duration of Courses for Rural and Urban HGs

Urban Home Guards

Subjects:

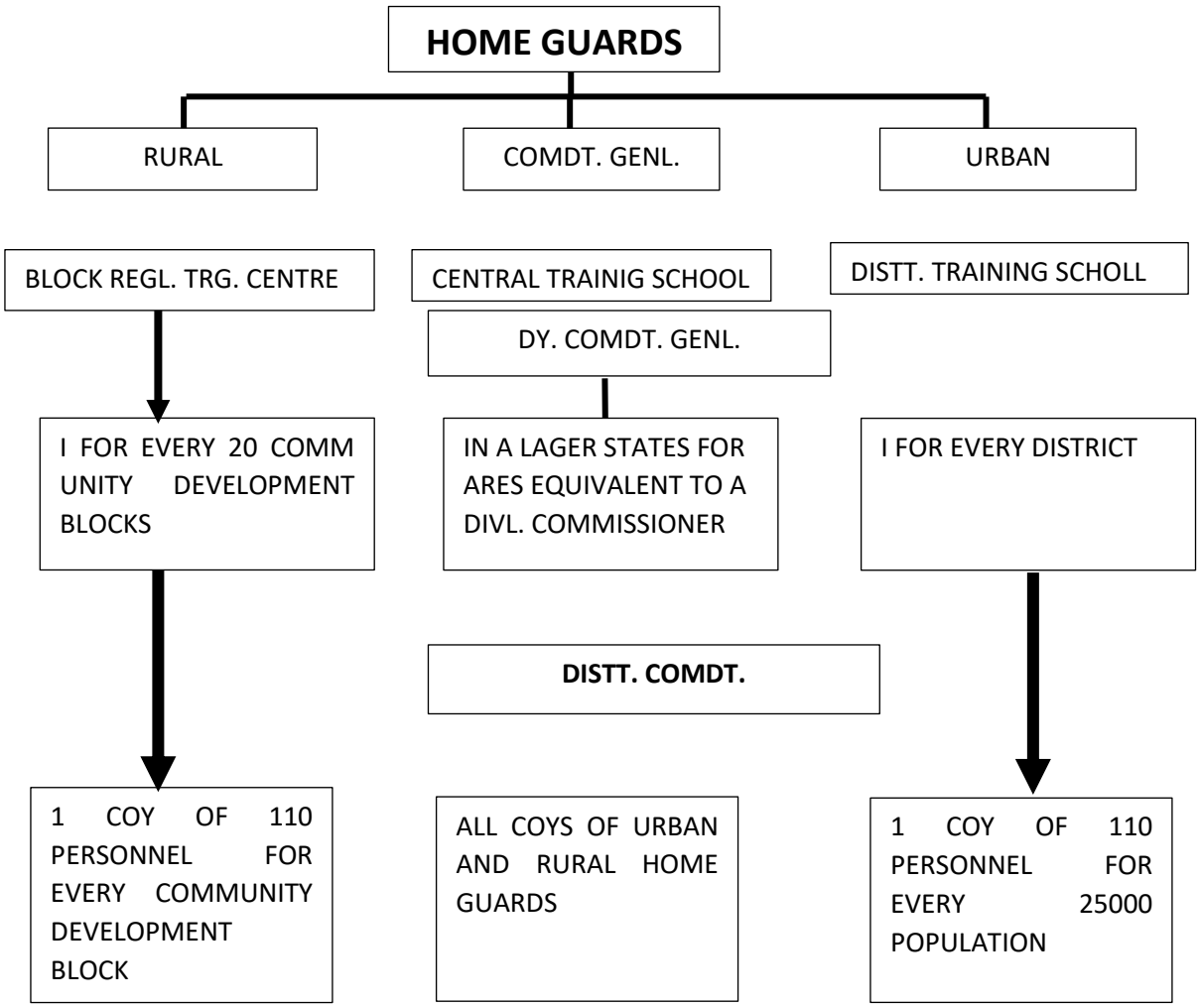
(a) P.T.	12
(b) Drill without arms	40
(c) Drill with arms	
(d) Weapon training	20
(e) Fire discipline	2
(f) Lathi Drill	10
(g) Crowd Control	
(h) Traffic Control	5
(i) Field Craft	4
(j) Guards duties	2

(k) Patrolling	6
(1) Map Reading	6
(m) Message Writing	1
(n) Duties and responsibilities	6 (See note 2 below)
(o) Route Marches	6
Total	120
Civil Defence Training	
(p) First year Urban Home Guards	34 parades (102 periods)
Subject	Periods
(q) Fire Fighting	22
(r) Rescue 34	34
(s) First Aid -	16
(t) A.R.P. measures	5
(u) Flood Relief	25 (in area liable to floods only)
Total	102
Rural Home Guards	
Duration of Periods	40 Working days -320 periods. Periods of 45 mts. each.
(1) P.T.	20
(2) Drill without arms.	70
(3) Drill with arms.	
(4) Lathi Drill Control	14
(5) Riot Drill-Crowd	
(6) Village Resistance Group	10
(7) Field Craft and Exercises	38
(8) Patrolling	
(9) Guard Duties	10
(10) Message writing	2
(11) Weapon training	40 (including Range firing)
(12) Bayonet training.	15
(13) Map reading	6
(14) Duties and responsibilities.	20 (See note 2 below)
(15) Route Marches	25
(16) Ceremonial parades and passing out	10
(17) Firing fighting	40
(18) Rescue	
(19) Flood Relief in areas liable to floods)	
(20) Principles of Civil Defence	
(21) First Aid	
Total	320

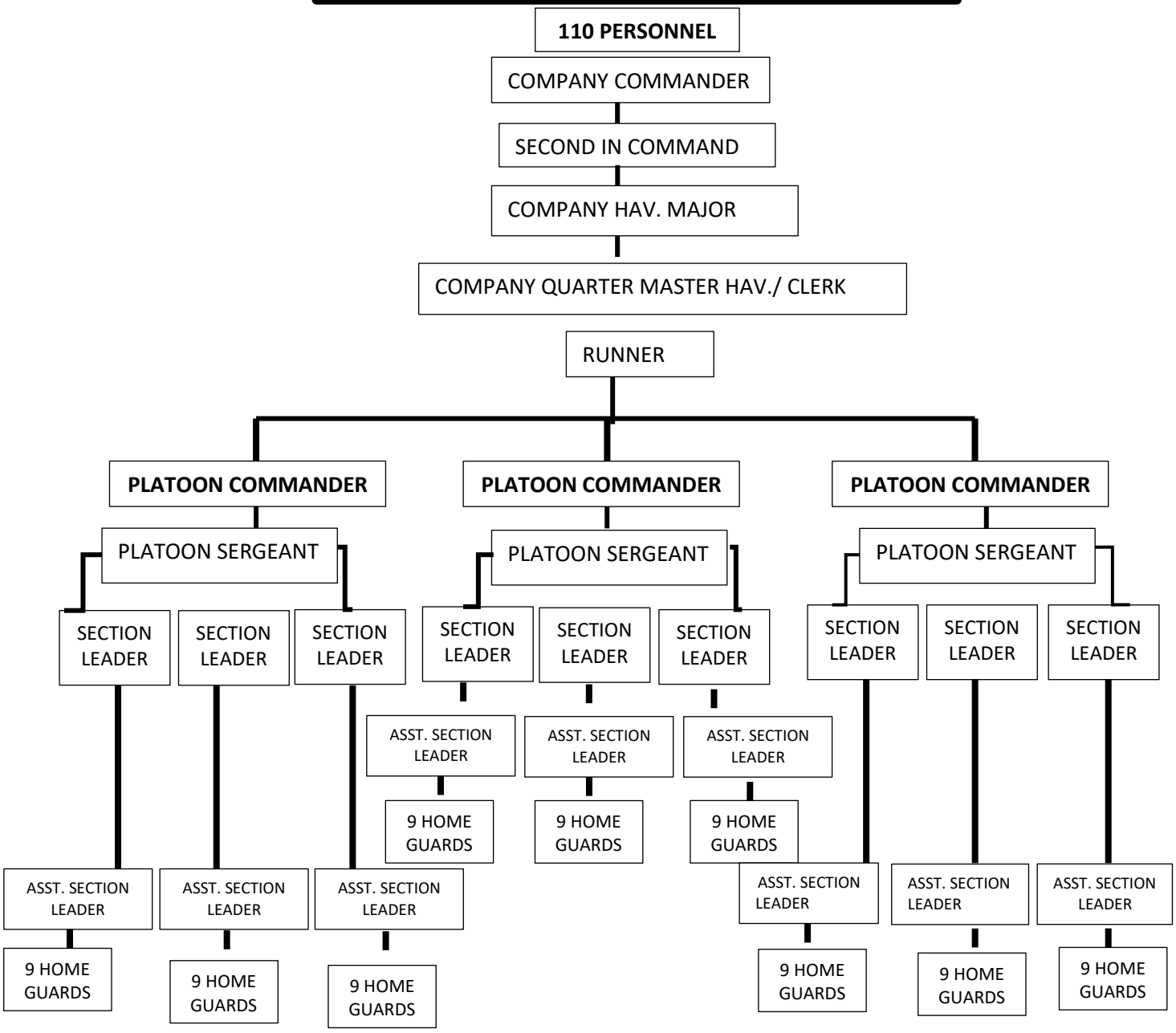
NOTES:

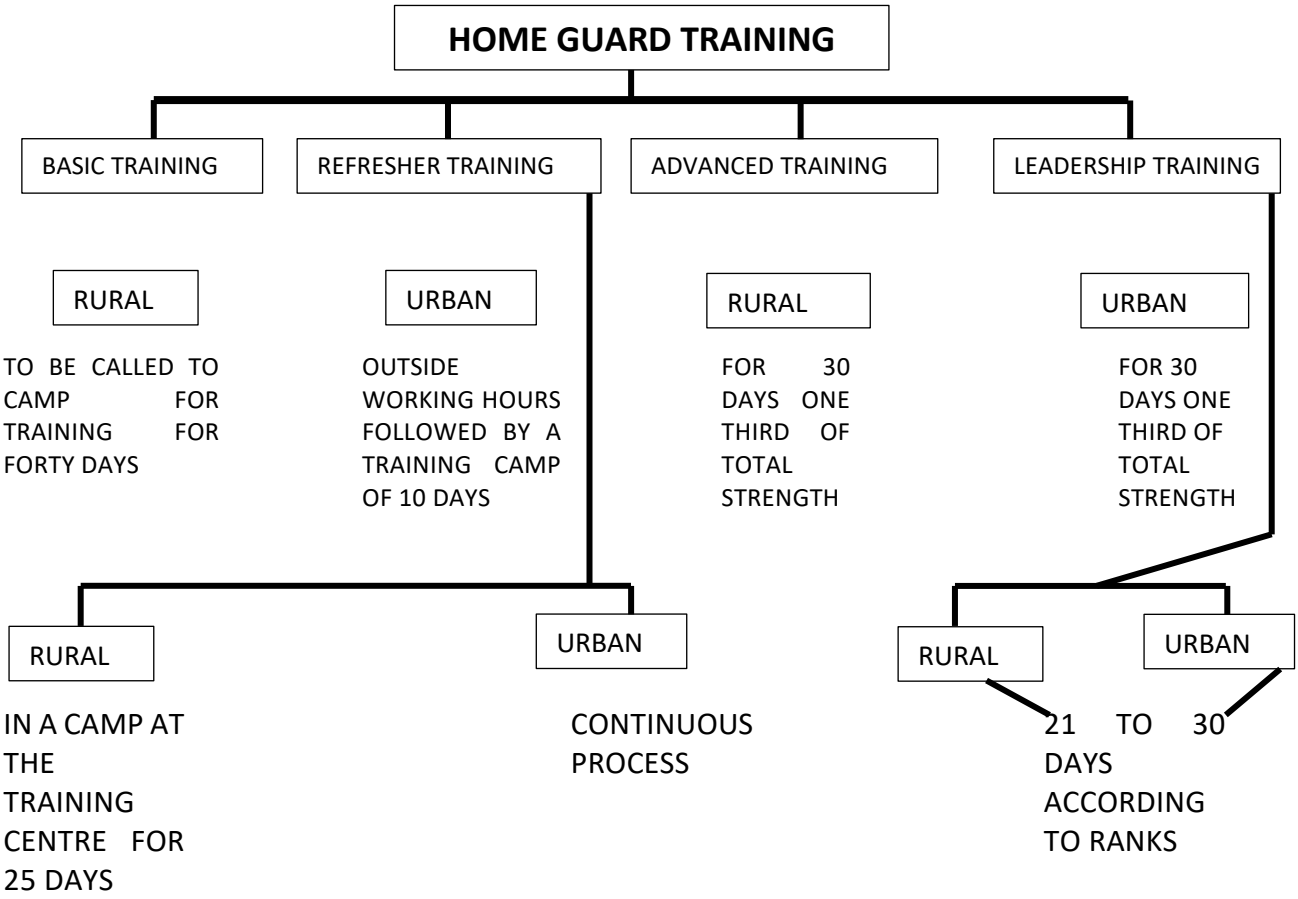
1. The training of Women's Wings of Urban Home Guards should be broadly in line with the training suggested for men and only a few items, such as bayonet training, lathi drill etc. may be omitted.

2. This training in duties and responsibilities is very different from the routine subjects and they are meant to inculcate the spirit of sacrifice and selfless service. It is expected that the Home Guards will play a very important part in maintaining national cohesion, promoting communal peace and keeping up the morale of the people by their own exemplary behaviour. This could be done by giving 10 minutes talk every day after physical training period in the camps of the Rural Home Guards in the evening.


HOME GUARDS
RURAL
COMDT. GENL.
URBAN
BLOCK REGL. TRG. CENTRE
CENTRAL TRAINIG SCHOOL
DISTT. TRAINING SCHOLL
DY. COMDT. GENL.
I FOR EVERY 20 COMM UNITY DEVELOPMENT BLOCKS
IN A LAGER STATES FOR ARES EQUIVALENT TO A DIVL. COMMISSIONER
I FOR EVERY DISTRICT
DISTT. COMDT.
1 COY OF 110 PERSONNEL FOR EVERY COMMUNITY DEVELOPMENT BLOCK
ALL COYS OF URBAN AND RURAL HOME GUARDS
1 COY OF 110 PERSONNEL FOR EVERY 25000 POPULATION

STRENTH OF A COMPANY OF HOME GUARDS




HOME GUARD TRAINING
BASIC TRAINING
REFRESHER TRAINING
ADVANCED TRAINING
LEADERSHIP TRAINING
RURAL
TO BE CALLED TO CAMP FOR TRAINING FOR FORTY DAYS
URBAN
OUTSIDE WORKING HOURS FOLLOWED BY A TRAINING CAMP OF 10 DAYS
RURAL
FOR 30 DAYS ONE THIRD OF TOTAL STRENGTH
URBAN
FOR 30 DAYS ONE THIRD OF TOTAL STRENGTH
RURAL
IN A CAMP AT THE TRAINING CENTRE FOR 25 DAYS
URBAN
CONTINUOUS PROCESS
RURAL
URBAN
21 TO 30 DAYS ACCORDING TO RANKS

CHAPTER NO. 19

LOCAL CIVIL DEFENCE TRAINING

1. **Introduction**:

In accordance with Section 5(1) of the Civil Defence Act, 1968 read with Regulation No. 3 of the Civil Defence Regulations, 1968, all Indian citizens (including subjects of Sikkim, Nepal and Bhutan) who have attained a minimum age of 18 years and have at least passed primary standard (relax able by Controller at his discretion) are eligible to get themselves enrolled for a tenure of 3 years, in a voluntary capacity. These volunteers are entitled to a small out-of-pocket allowance at the prescribed rates to cover their travelling and out-of-pocket expenses during civil defence training, rehearsals and duty.

2. The duties of the members of CD. Corps, in the various services, to which they may be attached during peacetime and during and after an air-raid are defined in CD. handbook entitled "General Principles of Civil Defence" and/or the Lectures Notes issued by National Civil Defence College. The aim of the Civil Defence training, therefore, becomes as follows:

(i) to equip the volunteer with the necessary, knowledge of his exact duties and responsibilities in peacetime and war and to acquaint him with the practice, procedures and technical know how about efficient discharge of his duties.

(ii) to imbibe in the volunteer the required discipline and esprit de corps to enable him to function harmoniously within the service to which he belongs and also a member of an integrated C.D. Corps of the area.

(iii) to make the training sufficiently interesting and useful in peacetime which will not only keep with the interest of the volunteer but also make him a better citizen.

3. **Magnitude of the Training problem**:

The scales of Civil Defence Services are laid down in the Civil Defence manuals entitled "Master Plan for Civil Defence" and "General Principles of Civil Defence". The number of various categories of Civil defence personnel, for a town having three lakhs population have been worked out at the prescribed scales at "Annexure III". It will be seen that the basic manpower requirements work out at 2613(comprising 336 supervisory and 2277 others). (Civil Defence being a voluntary force, the incidence of training wastage is bound to be high and it will, therefore, be necessary, even at the basic stage, to plan for the training of the basic number and 25% reserve or training wastage which in our example will come to 3226 or say 3.000 i.e. 1% of the population. This should be taken as the immediate target.

4. **General Principles for training**:

The following are some of the principles on which Training in Civil Defence is based:

(a) The standard of training must be high in order to ensure efficiency amongst the C.D. workers, and infuse confidence among the general public.

(b) Suitable machinery, on a uniform basis, must be devised for the provision of instructional personnel, accommodation, equipment, syllabus and inspection.

(c) The methods of training must be uniform so that:

(i) the training organisation, establishment, pamphlets and equipment could be standardised.

(ii) Experience in organising and imparting training can be shared by C.D. authorities in different States.

(iii) Mutual Aid by Home Guards and C.D. volunteers within the State and if required, outside their own States is facilitated.

(d) Training must be of a type which helps to maintain interest and discipline among C.D. workers so that they become useful to the community in peace and war. This is an important factor in maintaining the morale and esprit de corps of the volunteers.

(e) Training must be progressive and planned in distinct stages to maintain systematic progress throughout.

5. **Training Stages:**

Training, if it is to be successful, must be progressive. Each step of training should be well consolidated before the next stage is attempted. The training must proceed from simple to complex and more advanced stages. The various stages in which the training should be divided are outlined below:

(a) Basic Training.
(b) Service and Team Training.
(c) Combined Training.

6. **Basic Civil Defence Training:**

Until the new recruit has had some training he is of little use to C.D. Services. He is, therefore, trained in the bare essentials of the various aspects with which he is to deal. The courses covered at this stage will be:

(a) **Basic Civil Defence**: This will include instruction in Local CD. Organisation. Elementary Protection against High Explosive Bomb, Protective measure against air raids.

(b) **Basic Fire Fighting:** This stage covers elements of firefighting causes outbreak of fires centenary agents and use of stirrup hand pumps.

(c) **Basic Rescue**: This stage will cover basic rescue, reconnaissance and elementary methods of rescue.

(d) **Basic First Aid**: This course intended give the CD. workers just the sufficient knowledge to take necessary action as matter of urgency the absence of fully qualified First Aider. It includes first aid treatment for shock, bleeding, suffocation, burns, artificial respiration, insensibility, and stretcher handling. Besides, there will thorough practice in the use of bandages. Every volunteer should undergo training the course (a) to and such Course may be called "Basic Civil Defence Training Course". A suggested syllabus given Annexure-I. The total duration the course is hours. All members of C.D. Corps will be eligible and expected to qualify the basic Civil Defence Course. The details suggested course are given below:

(a) Name the Course Basic Civil Defence Course, (b) Officer responsible for Controller/Dy. Controller. the course.	
(c) Instructors	Paid whole time instructors/ Honorary Home Guards/Civil Defence instructors/Red Cross instructors who have done instructors staff course at N.C.D.C., State C. T. I's etc.
(d) Duration of Course	30 hours. (it is suggested that the course may conducted in about 7 days).
(e) Suggested Capacity per course	30-40 Trainees.
(f) Suggested places for holding the course	Schools Colleges, Community Centre etc. (Note: the courses should be arranged near the residence of volunteers).
(g) Phasing of the training	(i) The annual training programme during peacetime may cater to 1/3 of target strength i.e. about 1,000 trainees per year in town having 3 lakhs population. (ii) Taking the course capacity 33-34 trainees about 30 Courses will required per year. (iii) As town of lakhs population will authorised 6 whole time instructors. Three clerks and a messenger, one wholetime instructor will have to take basic Civil Defence Courses per year in peacetime.

SERVICE AND TEAM TRAINING

7. **Object**:

After a volunteer has undergone the Basic Course in Civil Defence he will be put on to the training relating to his particular service. He will be taught the technical know-how of his service which will be followed by practical's wherein he will work as a member of his team. At the end of this training, a volunteer will be familiar with not only his own individual role but the roles of his team-mates and that of the leader too. It will help him to imbibe comradeship and mutual confidence which produces team spirit and also train leaders to exercise such powers of leadership as will command respect and confidence of their teams. Service and Team Training will generally include the following subjects:

(a) Duties of CD. workers (i) Before Raid (ii) During Raid (iii) After Raid
(b) Operational Duties i.e. Action to be taken.
    (i) On receipt of various air raid warnings.
    (ii) On receipt of a call out at an incident.
    (iii) On Mutual Aid Reinforcement Calls.

(c) Details of Organisation and technique of the service to which a member is allocated.
(d) Practical Training-training will include practical work of the following: -

(i) Drills and practice involving the use of one team to train it to work as a team under its Leader and to impart a detailed knowledge of the various tasks its members may have to perform.

(ii) Practices involving the use of two or more teams of the same service to train them to work in cooperation with each other.

8**. Training in Common Subjects**:

While each section will naturally have certain training, which is peculiar to itself, there are certain matters which are common to a few sections for example map reading, damage, control and general reconnaissance.

9. **Nature and Scope of Service and Team Training**:

Service and Team training consists of special training in the service of choice and practical work conducted outdoors by means of exercises. The training should be imparted in progressive stages starting with set drill and simple exercises involving use of one team only and gradually working up to large exercises involving more than one team. The conditions under which a team may have to work should be made more and more difficult as the trainee attains proficiency in his work. As proficiency is attained the additional handicaps like darkness, lack of equipment etc. should be added until the teams are capable of carrying out advance to work specially under adverse conditions.

10. **Organisation of Service and Team Training:**

Although Team Training should be initiated at the bottom of the scale i.e., in each party, separately, it is essential that organisation of training should be done at the top by Heads of the Service concerned who should give instructions regarding the programme of training and the syllabus to be followed over a given period.

Training programmes should be chalked out well in advance to give those responsible for conducting them sufficient time for proper preparation.

11. **Place of Leader in Service and Team Training:**

When the programme to be followed over a given period has been settled the next step is to be well prepared. As far as possible the Leader of the Team acting as Instructor should be made responsible for the preparation and conduct of the exercise. There is no better way to teach him his work and train him in leadership. When the Leader acts as instructor he should appoint his Deputy to act as Leader. Occasionally the Deputy should conduct the exercise and the Leader should act in his proper role.

12. **Service and Team Training Syllabi**:

Illustrative syllabi and suggested duration for Team Training are given at Annexure II. A break up of service and Team training requirement for 3 lakhs population is given at Appendix III. The drills and exercises could be suitably modified if necessary depending upon the facilities available in each local area. There is much scope for local talent to make practical training as varied and realistic as possible.

13. **Responsibility for Service and Team Training:**

Controller/Dy. Controller are ultimately responsible for the training. In actual practice the training will be imparted by respective heads of services and honorary or paid Civil Defence and Home Guards instructors.

14. **Combined Training:**

This is imparted through combined exercises and rehearsal in which Civil Defence Services, the police and other services concerned with Civil Defence are exercised. It is advisable not to attempt large scale exercises at the first stage. In the initial stages it is better to exercise the Wardens of a single Post Area together with the Control/Sub-Control Centre and as many other services as may be required. The exercises should first be simple and be gradually worked up to be more elaborate. In this early stage, it is suggested that incidents are set where there is little likelihood of attracting a large number of spectators from the public. Many mistakes will be made and there is therefore the risk of incurring the ridicule of the spectators which is discouraging both to the members of the services and also may bring them into disrepute. After the whole area has been covered by a series of Post Area Exercises, it should be possible to extend the scope of exercises gradually until the state of training justified the very considerable preparations and arrangements necessary for Combined Exercise covering the whole or a great part of the Area. It is also suggested that the exercises may be carried out in daylight before attempting in the more difficult conditions of darkness. Combined Exercises at night in which all the services at the disposal of the Officer-in-Charge of Civil Defence of the town take part, represent the final stage of training. The setting and conduct of a combined Exercise even on a small scale, require careful and detailed preparations if it is to be of real instructional value. The length of Combined Training is a local arrangement subject to a minimum of sixteen hours.

15. **Refresher Training:**

It is important that Refresher Courses for Civil Defence personnel should be held in the subjects in which they have been trained. The object is to ensure that the past training is not forgotten and any new information which may bring previous training up-to-date is made known to the personnel. The syllabus for Refresher Courses should be prepared by the Dy. Controller or Head of the Service, as the case may be, and should be suited to the type of persons who compose the class. It should generally be the recapitulation of salient features of training previously given combined with any latest information on techniques. The course should cover:

(a) The treatment of Old Subjects. This will include:

(i) Brief recapitulation of old subjects. The more elementary parts of the original C.D. Course need not be dealt with again in detail but important points must be brought to mind and candidates reminded that they may be tested at the examination in their knowledge of even the elementary facts of such subjects.

(ii) Instruction formations on old subjects included in the original training at the NCDC/State CTIs.

(iii) Up-to-date information on the lessons to be taught in the practical part of the Civil Defence Course.

(iv) Hints and tips on the method of teaching old subjects.

(v) Answering questions.

(b) Instruction on how to give accurate and up-to date information in detail of entirely subjects not included in the original course. new

(c) The art of imparting good instruction.

(d) Examination.

16. **Suggested quantum of Training in the first year:**

Every member of CD Corps will Thus, receive in the first year of his tenure the following training:

To be carried as early as possible in the first half of the year.

1. Basic Civil Defence Training (Refer to Annexure 1)	*30 hours
2. Service and Team Training (average) (Refers to Annexure II-A to II-K)	*20 hours
3. Combined Training (in exercise & rehearsals).	*16 hours
	66 hours

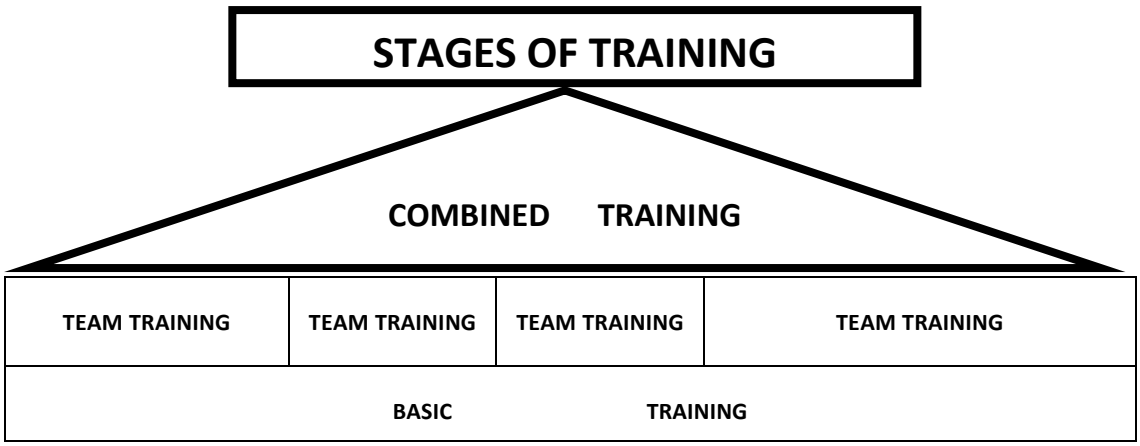
Each roughly spaced over a period of 15-30 days.

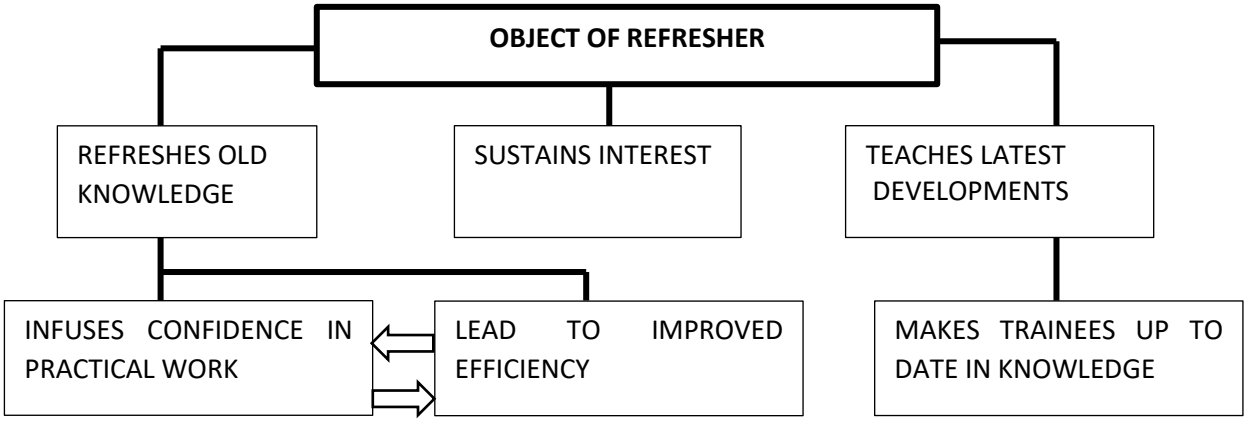
In the subsequent years, the members of C. D. Corps should receive training as under:

Refresher Training.	12 hours
Combined Training	16 hours
	28 hours

17. **Reference material:**

Reference material for preparing notes and lesson plans for conducting each stage of Local Training are listed at Annexure-IV.





TRG -12

ANNEXURE- I

No. 19/14/0-DGCD(CD)
Type of Training LOCAL -BASIC-INDIVIDUAL
Name of Course CIVIL DEFENCE BASIC TRAINING COURSE
Duration 30 hours (period 40) (45 minutes each)

Subject	(L) Lecture (D)Demonstration (P)Practical	Number of Period	Duration in Minutes
(A) **Basic Civil Defence**			
BC 1, Civil Defence Organisation 'I' Why Civil Defence is necessary. what is Civil Defence. Method of Attack.	L	1	45 minutes
BC 2. Effects of Enemy Air Raid Problems likely to crop up	L	1	45 minutes
BC3 & 4. Civil Defence Organisation II Civil Defence organisation in a town-Role of various Civil Defence Service	L	2	90 minutes
BC 5. Warning system	L/D	1	45 minutes
Types of Bombs and Protective measures HE/IB BC 6 & 7. Types and Effect H.E. Missiles/IB	L	2	90 minutes
BC 8 & 9. Protective measures HEB/IB Standards of protection- Protection of walls and windows-Sand Baggins, Obrution light-Handling and disposal of I.B.		2	90 minutes
BC 10. Taking Convers (a) Correct Method (b) Incorrect method.	L/D/P	1	45 minutes
BC 11. Trenches and erection of sand bag wall: Utility of Trenches and sand bag baffle walls. Taking shelter in a trench.	L/D	1	45 minutes
BC 12 Nuclear Weapons General idea of nuclear weapons-effects and methods of protection.	L	1	45 minutes
Total			**12 periods**
(B) **Base Fire Fighting**			
BC 13 & 14 Fire Prevention and Control Principles of combustion and extinguishing fires. Methods of controlling and dealing with incipient fires	L	2	90 minutes
BC 15 & 16 Stirrup Pump, construction, use, care and maintenance and drill	L/D/P	2	90 minutes
BC 17 & 18 IB Control/ Fire Fighting Hints Search of house on fire, opening the door, fire-escape rescuing of an unconscious person. smoke chamber and control of I.B.	D/P	2	90 minutes
TOTAL			6 periods
(C) **Basic Rescue**			
BC 19. General Principles of rescue, knowledge and use of simple rescue equip	L/D	1	45 minutes
BC 20. Emergency methods of rescue, i.e., fireman's crawl, human crutch, pick-a-back, fore and aft methods, hand carriages	L/D	1	45 minutes
BC 21. Ditto	P	1	45 minutes
BC 22 Stretchers, to improvise and securing a casualty to a stretcher	D/P	1	45 minutes
BC 23. Use of Ropes and Knots	D/P	1	45 minutes
BC 24. Use of Ladders	D/P	1	45 minutes
BC 25. Precautions in entering damaged buildings	L/D	1	45 minutes
BC 26 & 27. Simple methods of Rescue from heights, self-Rescue and improvised rescue	L/D/P	1	45 minutes
TOTAL			**9 periods**
(D) **Basic First Aid**			
BC 28. Principles of first aid: F.A. equipment and how to improvise it	L/D	1	45 minutes
BC 29. Knowledge of wounds, fractures and haemorrhage	L	1	45 minutes

BC 30. Knowledge of burns, scalds, shock, insensibility, asphyxia snake and insect bites"	L	1	45 minutes
BC 31. Artificial respiration	D/P	1	45 minutes
BC 32. Use of bandages and aligns	L/D	1	45 minutes
BC 33. Use of bandages and slings	L/D	1	45 minutes
BC 34. Use of stretcher-improvisation	L	1	45 minutes
BC 35. Use of stretcher-improvisation	D/P	1	45 minutes
TOTAL			**8 periods**
(E) **Miscellaneous**			
BC 36. Civil Defence Act. Rules and Regulation	L	1	45 minutes
BC 37. & 38. Visit to Control/Sub Control/Centre, Wardens Posts Depot, first Aid Posts and Fire Brigade where possible.	D	2	90 minutes
BC 39 & 40. The lecture, should be supplemented by suitable film shows wherever possible Film suggested to be shown are: - (a) Civil Defence (b) You and Black out (c) Fire (d) What, why and How of First Aid All produced Films Poddar Road, Bombay Every film show commentary by Instructor and followed by a discussion with the trainees about the practical utility of the film.	--	2	90 minutes
TOTAL			**5 periods**

TRG-12
ANNEXURE-II
LIST-A

No. 19/14/70-DGCD(CD)
Type of training: SERVICE AND TEAM TRAINING (LOCAL LEVEL)
Name of Course: CIVIL DEFENCE WARDENS COURSE
Duration: 40 periods (45 minutes each)

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Lesson No.	Subject	(L) Lecture (D) Demonstration (P) Practical	No. of Periods	Total Duration
1	2	3	4	5
WS 1	Wardens Organisation-Need for a Warden Service qualities of a warden. Sector warden-warden post. Organisation of house fire parties.	L	1	45 minutes
WS 2	Duties of wardens: (a) During peace time (b) Immediately before an air raid. (c) During an air- raid (d) After an air raid.	L	2	90 minutes
WS 3	Equipment's wardens: (i) Personal equipment } care and maintenance (ii) Post equipment	L	1	45 minutes
WS 4	Study of Area: Facts about Localities, Fire alarms, police, vulnerable points, public utility services. Stores, Doctors, Chemists, important personalities etc.	L	1	45 minutes
WS 5	Warning system: External and Internal Warning System, Air raid Warnings by Yellow, White Red and Green -Sirens and their Control, Warning by wardens, central control of Sirens–Simultaneous Broadcasting Facilities.	L	2	90 minutes
WS 6	Control and Sub-Control Centres, Staff and equipment-Massager Service. Working of a Control Centre during an emergency.	L	1	45 minutes
WS 7	Communications Services: Importance of Communications- Channels Communications different type of communications and their impotence Wireless and radio telephones – Transistorised Loud speakers.	L	1	45 minutes
WS 8	Lighting Restrictions-Importance of Lighting Restrictions-Need for the same Detailed instructions regrading lighting restrictions to be enforced during an actual emergency.	L	2	90 minutes
WS 9	Practical Exercises of-Lighting restrictions (a) Domestic lights (b) Vehicle lights (c) Other light	P	2	90 minutes
WS 10	Reconnaissance Importance of reconnaissance. Preliminary Reconnaissance Detailed reconnaissance. Practical difficulties.	L	1	45 minutes
WS 11	Map reading: Reading of maps- preparation of sketches, preparation of small maps – sketching of wardens post/Sector area.	L/D	1	45 minutes
WS 12	Wardens post Records and registers, Household register, record of domestic equipment's available, record of vital installations and vulnerable locations-Logbooks and diaries.	L	1	45 minutes
WS 13	Fire Services, General Organisation of Local Fire Service -Demonstration of trailer pump, General Fire Fighting hints.	L/D	1+1	90 minutes
WS 14	Essential Services: Action to be taken by warden pending arrival of Services. Assistance to services – Assistance to public.	L/P	1	45 minutes

WS 15	Welfare and other post Raid Services. Information Central Evacuation. Care of homeless – Rest-cum-Rescue Centres -Disposal of dead-public health and sanitation.	L	1	45 minutes
WS 16	Panic Control: Cases of Panic- effects-Prevention and control - rumour, propaganda.	L	1	45 minutes
WS 17	Un-exploded bombs and crashed aircrafts-I Warden duties-bomb disposal organisation. Reconnaissance and recognition of UXBs. Action on Fall of UXB.	L/D	1	45 minutes
WS 18	Un-exploded bombs and crashed aircrafts-II Safety precautions against UXBs -unburied bombs-buried-bombs-evacuation, traffic control - protective measures.	L/D	1	45 minutes
WS 19	Co-operation with Defence personnel, Police and Public.		1	45 minutes
WS 20	Incident Control- Assembly point, Control posts Control posts, Guides-Allocation of services – marshalling of Vehicles-Assistance to services-post red services.	L/D	1	45 minutes
WS 21	Civil Defence Act and powers there under	L	1	45 minutes
WS 22	Duties and routine of Civil Defence Service Posts in emergency.	L	1	45 minutes
WS 23	Marshalling of vehicles at an incident in the absence of police. Marshalling of vehicles at an incident in co-operation with the police.	Tactical Training followed	1	45 minutes
WS 24	Control of incidental involving one seat of damage (during day and night)	Exercise	2	90 minutes
WS 25	Control of incident involving more than seat for damage (during day and at night)	Exercise	2	90 minutes
WS 26	Message writing and Reporting -I Essentials of a good report -Express 'Report and Fire reports',	L/P	1	45 minutes
WS 27	Message writing and Reporting -II Air Raid damage reports: (i) Fire incidents alone (ii) H.E incident alone (iii) Complicated incidents.	L/P	1	45 minutes
WS 28	Message writing and reporting -III Supplementary, Final and Raid reports, Crashed aircrafts and UXB reports.	P	1	45 minutes
WS 29	Message writing and reporting -IV correct way of using telephones- Reporting of Air Raid damage.	L/P	2	90 minutes
WS 30	Trenches /Refuge room/ concealment of lights The following film shows are recommended. (a) Incident Control. (b) You and black cut	L/D	1	45 minutes
	(c) Civil Defence Each film show should be of 45 minutes duration-Film shows should be followed by discussion with the class about the practical utility what has been shown in the film.	F	3	135 minutes

TRG-12
ANNEXURE-II
LIST-A

No. 19/14/70-DGCD(CD)
Type of training: SERVICE AND TEAM TRAINING FOR FIRST AID AND PERSONNEL OF FIRST AID POST.
Name of Course: CIVIL DEFENCE CASUALTY SERVICE COURSE (i.e. FULL FIRST AID)
Duration: 34 periods (45 minutes each)

Lesson	Subject Important point to be covered	(L) Lecture (D) Demonstration (P) Practical	No. of Periods	Total Duration
1	2	3	4	5
FA/1	General organisation of Casualty Service— organisation of F.A. parties.	L	1	45 minutes
FA/2	F.A. Posts Hospital organisation and Co-operation with other C.D. Services	L	1	45 minutes
FA/3	F.A. Equipment-Care, Supply, Improvisation			
FA/4	Care and maintenance of F.A. Equipment. Loading drill	L/D/P	1+1	90 minutes
FA/5	Action to be taken at First Aid Post, Hospital, Depots etc, on receipt of various types of warnings.	L/P	1	45 minutes
FA/6	Principle of F.A. structure and functions of the Human body.	L	1	45 minutes
FA/7	Examination of casualty-shock-points to remember.	L/P	1	45 minutes
FA/8	Circulation of blood, wounds and haemorrhage internal haemorrhage Pressure Points to stop bleeding.	L /P	1	45 minutes
FA/9	Wounds of chest and abdomen, crush injuries	L/D	1	45 minutes
FA/10	Bandage, dressings and slings	P	1	45 minutes
FA/11	Skeleton-Claus of bones	L	1	45 minutes
FA/12	Fractures-simple	L	1	45 minutes
FA/13	Fractures-Compound	D	1	45 minutes
FA/14	Special Fractures	D	1	45 minutes
FA/15	Fractures-practice with improvisations	P	1	45 minutes
FA/16	Injury of joints-sprains and muscles	L	1	45 minutes
FA/17	Insensibility and poisoning	L	1	45 minutes
FA/18	Respiratory system	L	1	45 minutes
FA/19	Artificial respirations methods	D/P	1	45 minutes
FA/20	Burns and scalds	L/D/P	1	45 minutes
FA/21	Snake bites and bites by positions on insects.	L/D/P	1	45 minutes
FA/22	Initial disposal of casualty-labels, records.	L/D/P	1	45 minutes
FA/23	Exercise with stretchers and position of casualty on a stretcher	P	1	45 minutes
FA/24	Carriage of casualties without stretchers and on improvise stretcher.	P	1	45 minutes
FA/25	Disposal of the dead.	L	1	45 minutes
FA/26	Duties of Ambulance drivers and attendants.	L	1	45 minutes
FA/27	Transport of casualties- Loading unloading and crossing of various hurdles.	P	1	45 minutes
FA/28	Loading and unloading.	P	1	45 minutes
FA/29	Film shows on First Aid	F	1	80 minutes
	Summery			
	Lectures	L	12 periods	
	Practical and Demonstrations	P & D	16 periods	
	Film shows	F	4 periods	
	General Discussions		2 periods	
		Total	**34 periods**	

TRG-12
ANNEXURE-II
LIST-C

No. 19/14/70-DGCD(CD)
Type of training: SERVICE AND TEAM TRAINING
Name of Course: RESCUE
Duration: 60 periods (45 minutes each)

Lesson No.	Subject	(L) Lecture (D) Demonstration (P) Practical	Period
1	2	3	4
RS/1	General Organisation -Local Organisation Depots	**L**	1
RS/2	General duties work likely to be encountered, Do and Don'ts Rescue work	**L**	1
RS/3	Equipment-Scale-personal, party, care and miniatous improvising of equipment.	**L**	1
RS/4	Loading drill	**Drill**	1
RS/5	Action on receipt of various warning messages	**L**	1
RS/6	Action on receipt of Yellow messages	**Drill**	1
RS/7	Action on hearing public warning signal or fall of bombs	**Drill**	1
RS/8	Action on arrival at the scene of damage	**L**	1
RS/9	Action on arrival at the scene of damage	**P**	1
RS/10	Elementary Building, Construction, types of building, Form of collapse	**L**	1
RS/11	Reconnaissance of damage and search of casualties, Five stages of Rescue	**Exercise**	3
RS/12	Knots and lashing	**L**	1
RS/13	The use of ropes, Fibre rope, handling rope, receiving tackle	**Drill**	**2**
RS/14	Knots and lashings	**D/P**	**2**
RS/15	Sheer legs, Gyns, derricks	**L**	1
RS/16	Sheer legs, Gyns, derricks	**D/P**	**2**
RS/17	Use of ladders	**D/P**	**2**
RS/18	Lifting gear (a) Jacks (b) Lifting gear	**L/D**	**2**
RS/19	Lifting gear jacks and Rope tackle	**P**	1
RS/20	The use of equipment and tackle for effecting Rescue	**L**	1
RS/21	Ladder Rescue- Fireman's lift	**P**	1
RS/22	The use of Single pole standing derrick	**P**	1
RS/23	Rescue by sliding ladder method	**P**	1
RS/24	Standing derrick and swinging pole	**P**	1
RS/25	The use trestle or sheer legs	**P**	1
RS/26	The use of tripod	**P**	1
RS/27	The use of life line and breeches buoy for Rescue work	**P**	1
RS/28	Jib rescue-methods of securing jib	**P**	1
RS/29	Rope Rescue-Lowering stretchers from height	**P**	1
RS/30	The use of staging for rescue work	**P**	1
RS/31	Bridging	**P**	1
RS/32	Handling light debris and extricating casualties	**L/P**	3
RS/33	Extricating casualty from heavy debris	**P**	1
RS/34	Demolition (a) manual labour (b) Explosive	**P**	1
RS/35	Demolition	**P**	1
RS/36	Oxyacetylene flame cutting safely regulation	**P**	1
RS/37	Assembly of portable outfit and flame setting	**D/P**	2
RS/38	Cutting precautions in rescue work	**D/P**	1
RS/39	Remote breathing apparatus	**D/P**	1
RS/40	Damage to public utility service hazards-their shutting off	**L/D/P**	3
RS/41	Man pack equipment use	**L/D/P**	1
RS/42	Leadership-duties and responsibilities	**L**	1
RS/43	Leadership-during 5 stages of Rescue	**L**	1
RS/44	*Introduction to vehicle, driving hints and practice	**L**	1
RS/45	*Care maintenance, lubrication of vehicles	**L/P**	2
RS/46	* Loading and fastening of equipment, storage, parking	**L/D**	2
		TOTAL	60

* These lessons are for drivers only.
NOTE: Lecture to be supplemented by Film shows where necessary.

TRG-12
ANNEXURE-II
LIST-E

No. 19/14/70-DGCD(CD)
Type of training: SERVICE AND TEAM TRAINING
Name of Course: DEPOT AND TRANSPORT SERIVCE
Duration: 30 periods (45 minutes each)

Lesson No.	Subject	(L) Lecture (D) Demonstration (P) Practical	Period
1	2	3	4
TS/1	General Organisation Routine Duties. Operational Duties and Action to be taken on receipt of various raid warning- mutual aid and reinforcements. Personnel equipment, care, minters and inspection-Procedure for receipt and issue of equipment - equipment card. Action to be takes on taking over a new vehicle.	L/D	6
TS/2	May Reading Scale-direction-conventional signs--finding places from map directions	L/D/P	4
TS/3	Use of Log Books, Journey slips, Transport Indent forms etc.	L/D	1
TS/4	Marshalling of vehicles	L/D	2
TS/5	Action to be taken on receipt of warning. Yellow, Red, Green and White	L	1
TS/6	Action to be taken on "Call Out" from Depot and return to Depot.	L	1
TS/7	Action to be taken on arrival at a scene of incident and in departure from incident,	L	1
TS/8	Marshalling of vehicles-Practice	P	1
TS/9	March-Discipline, when proceeding in a convoy	D/P	4
TS/10	Action to be taken on Mutual Aid and Reinforcement calls	L	1
TS/11	Action to be taken when vehicles break down on the way	L	1
TS/12	Test runs between various parts to familiarise with main routes	D/P	6
TS/13	Loading and unloading drill	P	1

TRG-12
ANNEXURE-II
LIST-F

No. 19/14/70-DGCD(CD)
Type of training: SERVICE AND TEAM TRAINING
Name of Course: WELFARE SERVICE
Duration: 48 periods (45 minutes each)

Lesson No.	Subject	(L) Lecture (D) Demonstration (P) Practical	Period
1	2	3	4
	(a) Evacuation		
WS/1 & 2	Types of evacuation: Priority categories: phases: identity tags	L/D	2
WS/3 & 4	Panic, law and order, assembly points, general arrangements	L	2
WS/5 & 6	Exodus by rail, by roads by water and by air, movements transport	L	2
WS/7 & 8	Reception. luggage, lost property, regression, medical examination, sanitation	L/D	2
WS/9 & 10	Types of camps, layout, site scales of feeding, clothing and sheltering, medical, public hash & sanitation	L/D	2
WS/11 & 12	Duties of evacuation stat-wont officers, guides, escorts etc	L	2
WS/13 & 14	Equipment and supplies for camps, accounting procedures for camps	L/D	2
WS/15 & 16	Opening and closing of camps.	L	2
	(b) Emergency feeding		
WS/17 & 18	Object, feeding arrangements, meal centres	L	2
WS/19 & 20	Mobile canteens, fair price shops, staff requirements and their duties	L/D	2
WS/21 & 22	Kitchen hygiene, nutrition diets, emergency diets and substitutes	L/D	2
WS/23 & 24	Special kitchen equipment, ovens, supplies and reserves stocks	L/D	2
WS/25 & 26	Feeding operation, obtaining supplies, preparation, distribution and serving of meals	L/D	2
WS/27 & 28	Care of Animals, evacuation arrangements and supply of fodders	L/D	2
WS/29 & 30	Accounting of meals and foodstuffs	L/D	2
	(c) Emergency Sheltering		
WS/31 & 32	General outline of emergency sheltering service, temporary shelters-types, arrangement to be made, layout.	L	2
WS/33 & 34	Procurement of supplier arrangements for cooking, scales of rations, emergency and improvised kitchen equipment	L/D	2
WS/34 & 36	Sanitation and medical facilities	L/D	2
WS/37 & 38	Maintenance of records and accounts.	L	2
	(d) Emergency Clothing		
WS/39 & 40	object: Clothing habits, scale of issue: collection, sorting and mending of clothing	L	2
WS/41 & 42	Staff requirements and duties sources of procurement, accounting and distribution of clothing.	L	2
	(e) Information and Registration		
WS/43 & 44	Object and scope: types of information to be supplied, collection, consolidation and dissemination of information, registration of inquiries.	L	2
WS/45 & 46	Information Offices: layout, equipment, handling of inquires	L/D	2
WS/47 & 48	Forms and register: their use signified and maintenance	L/D	2

TRG-12
ANNEXURE-II
LIST-G
Service of Team Training

No. 19/14/70-DGCD(CD)
Name of Course: C.D INCIDENT CONTROL OFFICERS COURSE
Duration: 20 PERIODS (45 MINUTES EACH)

Lesson No.	Subject- Important points to be covered	(L) Lecture (D) Demonstration (P) Practical	No. of Period	Total duration
1	2	3	4	5
IC/1	What is an incident –Problems faced in an incident -Need for Incident Control-Incident Control Officer and his qualities.	L	1	45
IC/2	Duties of Incident control Officer I Before an incident: (i) Get to know of the various localities within his sphere of duties. (ii) Keep a note of various vulnerable points and source of assistance. (iii) Studying the topography of the area. II. During an Incident (a) Arrival at the site with services (b) Setting up IC Post at suitable location and arranging communication facilities. (c) Reporting to Control Centre. (d) Collecting detailed information from Warden (e) Quick reconnaissance & allocation of duties to leaders of parties (f) determine sites for parking vehicles, loading points, dealing with injured, dead and homeless persons. (g) Assessing requirements & arranging reinforcements (h) General supervision of operations (i) Progress reports (j) Diversion of traffic & cordoning off (k) Keeping up to date records at site (l) Safe custody of salvaged property & valuables (m) Dealing with UXBs. (n) Setting up information Centre () Closing of the incident	L	2	90
IC/3	The need for systematic incident control (a) Essential requirements (b) Types of incidents (i) Simple incident (ii) Multiple incident (iii) Area Damage (iv) Damages to public utility services (v) Damage to strategic installations (c) Methods of control for various types of incidents	L	2	90
IC/4	General Information about Local Organisation (a) Police (b) Home Guards (c) Fire Brigade (d) St. John's Ambulance Brigade (e) Local public Welfare organisations (f) Public Utility services (g) Strategic Installations (h) Armed Forces	L	2	90
IC/5	Emergency Arrangements: (a) Summoning of Services (b) Assessing Services and re-enforcements required (c) Selecting deployment points (d) Record of dispositions (e) Important Incidents (Spl. Ref.). (f) Coordination with all services (g) Relief arrangements to service	L	1	45
IC/6	Special Problem mat with during incident control: (a) Effects of blast & fragmentation bombs	L	1	45

	(b) Antipersonnel bombs (c) Leakage of inflammable/poisonous gas (d) Flooding of area (e) Unexploded bomb (f) Proximity to Railway lines.			
IC/7	Incidents close to public utility services, vital installations & Armed Forces Role of I.C.O. (a) Pooling local resources (b) Guidance to management of installations (c) Spl. parking arrangements & loading points. (d) Liaison & coordination with management (e) Coordination with services (f) Mutual aid & reinforcement	L	1	45
IC/8	Welfare arrangements at site: (a) Setting up Information centre (b) Coordination with welfare service (c) Welfare of Services deployed (d) Relief-arrangement	L	1	45
IC/9	Practice on preparation of allocation of services cards, writing of reports other written instructions to services.	P	2	90
IC/10	Complete rehearsal of incident control on send model table	D	2	90
IC/11	Practical exercise on complete incident control in the field (project work)	P	4	180
IC/12	Film show on incident control	F	1	45
	Lectures	L	11	
	Demonstration	D	2	
	Practical's	P	6	
	Film	F	1	
			20 periods	

TRG-12
ANNEXURE II
"LIST-J"

Type of Training: Name of Court: SERVICE AND TEAM TRAINING
Name of Course: HOUSE FIRE PARTIES
Duration: 22 PERIODS

Lesson No.	Subject- Important points to be covered	(L) Lecture (D) Demonstration (P) Practical	No. of Period	Duration
1	2	3	4	5
HF/1	Organisation of House Fire Parties and its need-study of locations covered by the wardens-Duties of members of the parties-collection of information regarding available source of water supply and household equipment.	L	1	45 minutes
HF/2	Theory of combustion-combustible material-ignition point-causes of fire-Tringle of fire.	L	1	45 minutes
HF/3	Principles of firefighting-classification of fire-methods of dealing with various types of tires-precautions against fire-localising of fires.	L	1	45 minutes
HF/4	Incendiary Bombs-types, construction and effects, precautions again in diary Bomb attack	L/D	1+1	90 minutes
HF/5	Equipment of House fire party, care and maintains	L/D	1	45 minutes
HF/6	Use of stirrup pump against (a) Ordinary fire (b) Incendiary bombs	L	1	45 minutes
HF/7	Stirrup pump drill: (a) for 4 persons (b) for 3 persons	P	1	45 minutes
HF/8	Chemical fire extinguishers, type their -construction and method of un-care and maintains of chemical extinguishers.	L	3	135 minutes
HF/9	Practical exercises of use of all types of chemical extinguishers	P	2	90 minutes
HF/10	Ladders and their use-Ladder drill	L/D/P	1+1	90 minutes
HF/11	Ropes and their uses-different types of Knots	L	1	45 minutes
HF/12	Basic Rescue practice: (a) Firemen's lift (b) Rescue from smoke filled room-different methods (c) Improvised methods of rescue (d) Emergency rescue methods (e) Self rescue	P	4	180 minutes
HF/13	Film show on House Fire parties	P	1	45 minutes
	Summary			
	Lectures	L	10	
	Demonstration	D	2	
	Practical's	P	8	
	Film shows	P	1	
	General Discussion		1 22 periods	

TRG-12
ANNEXURE-III
LIST – 'K'

Type of Training: SERVICE AND TEAM TRAINING
NAME OF COURSE: UXB-RECONNAISSANCE AND PRECAUTIONARY MEASURES
Duration: 22 PERIODS

Lesson No.	Subject	(L) Lecture (D) Demonstration (P) Practical	No. of Period	Duration
1	2	3	4	5
UXB/1	UXBs and problems connected with UXBs	L	1	45 minutes
UXB/2	Introduction to Bomb Disposal organisation-later-service responsibilities	L	1	45 minutes
UXB/3	High Explosive Bombs-types and construction-identification of Bombs colour, marking	L	1	45 minutes
UXB/4	Tally units-carrying devices-Fuses- Special attachment to Bombs	L	1	45 minutes
UXB/5	Fragmentation Bombs-different types and construction-Anti personnel bombs	L	1	45 minutes
UXB/6	Incendiary bombs-types and construction-clusters and containers	L	1	45 minutes
UXB/7	Detection of UXB-and action at various levels	L	2	45 minutes
UXB/8	Craters and camouflets	L	1	45 minutes
UXB/9	Safety precautions and protective works on detection of UXB	L/D	2	45 minutes
UXB/10	Evacuation-safety distances, Evacuation plan	L/D	2	45 minutes
UXB/11	Bomb Disposal Policy-responsibility and allotment of priorities	L	1	45 minutes
UXB/12	Procedure to be adopted for reporting presence of UXB Reporting forms-practice of filing forms	L/P	2	45 minutes
UXB/13	Protective works against UXBs (a) Protective walls (b) Protective trenches (c) Protective abutments (d) Protective Vents (e) Protective mounds and surrounds	L	3	45 minutes
UXB/14	Practical exercise of detection and UXB and protective measures	P	3	45 minutes
UXB/15	Film on UXB (if available)	F	1	45 minutes
		L-14 D-2 P-4 F-1 TOTAL 21 periods		
	General Discussions	1 period		
		22 periods		

TRG-12
ANNEXURE-III
LIST-G
MINISTRY OF HOME AFFAIRS

No. 19/14/70-DGCD(CD)

(C.D Training Study Team -February 1971)

Lesson No.	Unit and Scale for C.D Services (As per Appendix- 'A', the abridged & Revised MPCED	Number of Supervisory Personnel (**)	No. of Other	Remarks
1	2	3	4	5
I	Head Quarters	2	5	
	1. CD. Controller**	1		
	2. Dy. C.D. Controller	1		
	3. Stenographer	1		
	4. Clarks	2		
	5. Messenger	2		
	TOTAL (I)	7		
II	Warden Serve	39	379	
	6. Sector Wardens	300		
	7. Post Wardens	30		
	8. Dy. Divisional Wardens**	3		
	9. Div. Wardens	3		
	10. Dy. O/C Warden	1		
	11. O/C Warden	1		
	12. Staff Officers	4		
	13. Messengers	60		
	14. Incident Officers	12		
	15. Clerks	4		
	TOTAL(II)	418		
III	Casualty Service	143	376	
	16. O/C Casualty	1		
	17. Clarks	1		
	18. Peon	1		
	First Aid Posts			
	19. Doctors	40		
	20. Nurses.	40		
	21. First Aiders	120		
	22. Clerks	20		
	23. Sweepers	20		
	24. Drivers	8		
	First Aid Parties			
	25. Leaders**	60		
	26. First Aiders	180		
	27. Drivers	20		
	Mobile First Aid Post			
	28. Doctor	1		
	29. Nurse	1		
	30. First Aider	1		
	31. Driver	1		
	32. Messengers	4		
	TOTAL(III)	**519**		
IV	Communications Service	11	6	
	33. O/C Communications**	1		
	34. Clerk	1		
	35. Officer-in-Charge	1		
	36. Plotting Clerk/Chart Writers**	1		
	37. Tally Board Clerk/Records Clerk**	1		
	38. IN Messengers	1		
	39. Message Supervisor**	1		
	40. Telephonist**	4		
	41. OUT Messenger	2		
	42. Recce Officers	2		
	TOTAL (IV)	17		
V	Training Service	7	6	
	43. O/C Training**	1		

	44. Instructors Wholetime		6	
	45. Clerks		3	
	46. Messengers		3	
		TOTAL(V)	13	
VI	Fire Fighting Service		7	6
	47. Staff Officers		3	
	48. Clerks		3	
	Auxiliary Fire Service Fire Pump Parties			
	49. Leaders Trailer**		12	
	50. Firemen**		72	
	51. Drivers/Mechanics		12	
	52. Messengers		12	
	House Fire Parties			
	53. Leaders		300	
	54. House Fire Party Members		900	
		TOTAL (V)	1314	
VI	Rescue Service		87	127
	55. O/C Rescue**		1	
	56. Group Leader**		1	
	57. Staff Officer**		1	
	58. Clerk		1	
	59. Leaders Rescue Parties		12	
	60. Skilled men		24	
	61. Un-skilled men		48	
	62. Driver		2	
		TOTAL (VI)	90	
VIII	Depot & Transport		7	30
	63. O/C Depot		1	
	64. Depot Supdt**.		1	
	65. Dy. Depot Supdt		1	
	66. Clerks		3	
	67. Storeman		1	
	68. Sweepers		2	
	69. Messenger		6	
	70. Transport Officer**		1	
	71. POL Officer**		1	
	72. Tram pons Supervisor		1	
	73. Clerks		3	
	74. P.O. L		1	
	75. Vehicle Repair personnel		3	
	76. Messing		10	
	77. Telephonists		2	
		TOTAL(VIII)	37	
IX	Welfare Service		17	130
	78. Welfare**		1	
	79. Staff		1	
	80. Information** Office		3	
	81. Enquiry		3	
	82. Clerks		29	
	83. Messengers/Attendants, Guards		21	
	84. Superintendents Rest		3	
	85. Miscellaneous Staff		86	
		TOTAL (IX)	147	
X	Corpse Disposal			
	86. Leaders		3	
	87. Attendants		12	
	88. Drivers		3	
		TOTAL(X)	18	
XI	Salvage		4	19
	89. Leaders**		3	
	90. Attendants		12	
	91. Drivers		3	
	92. Acett., Godown		1	
	93. Clerk		1	
	94. Attendant		1	
	95. Watchman		1	
	96. Custodian**		1	
		TOTAL(XI)	23	

XII	Supply Service		2	15
	97. O/C Supply		1	
	98. Stores Clerks		6	
	99. Attendants		6	
	100. Watchmen		3	
	101. Supervisor		1	
		TOTAL (XII)	17	
		GRAND TOTAL	2,613	
		add 25 % reserved	653	
			3,266	
		or say 3,000 i.e. 1% of the population		

TRG 12
ANNEXURE IV

Reference material for preparing Instructional notes and lesson plan for Basic Civil Defence and for Service and Team Training

I. Hand Books, Manual etc.

(1) General Principles of Civil Defence.
(2) Master Plan for Civil Defence
(3) Civil Defence for Home Holders
(4) N.C.D.C.- Lecture Notes for instructors Course.
(5) N.F.S.C.-Lecture Notes for Civil Defence Instructors Course in elementary Fire Fighting.

II. Charts

1. Sectional Diagram for the following bombs:
   (a) 1 Kilo I.B.
   (b) 500 lbs H.E
   (c) 1000 lbs H.E
   (d) Civil Defence Organisation in a Town
   (e) Control Centre.
   (f) Pakistan & Chine Aircraft Chart (published & issued by MHA)

NOTE: * Theses Charts can be made on any scale from diagrams given in G.P.C.D. & N.C.D.C. precis. Some firms e.g. M/s Army Book Depot, Ambala Cant, and N.C.Kaneli Co. Model Basti, New Delhi-5, have also published these Charts on commercial basis.

III Documentary films on Civil Defence, Fire Fighting & First aid

(i) Indigenous film

(a) Film for which prints are available with Officer in Charge, Distribution, Films Division, 32 Apollo Street Bombay-1 against payment (MHA. Letter No. 15/5/67-DGCD (ii), dated 31-1-1968 refers).

	Nam of films	Version which available	Cost per print 16mm Rs.	35 mm Rs.
Film on Civil Defence	1. Your Home Defence Homs Guards (162 mts 16 mm and 406 Mts. 35 mm.) .	English, Hindi, Bengali	250	535
	2. During and After Air Raid (16 mm & 35 mm).	All the 14 languages	250	600
	3. Civil Defence (161 Mts 16 mm and 403 mts 35 mm).	English, Hindi, Bengali	250	535
	4. You and Civil Defence (16 & 35 mm).	All the 14 language	250	600
Films on Fire Fighting	5. Fire fighting in villages (64 Mts. 16 mm & 167 Mts 35 mm .)	English only	160	340
	6. Fire Fighting at sea (365 Mts. 16mm & 913 Mts. 35 mm)	English, Hindi, Bengali	552	1,207
	7. Fire (100 Mts. 16 mm & 476 Mts. 35 mm).	-Do-	275	600
	8. Fire and You (16mm & 35 mm)	All the 14 language	250	600
Film on First Aid	9. Care of Burns (156 Mts. 16 mm & 395 Mts. 35 mm)	English, Hindi, Bengali	225	490
	10. Care of Asphyxia (stoppage of Breathing) (208 Mts. 16 mm & 521 Mts. 35 mm)	-do-	300	670
	11. Care of Injuries and Fractures (197 Mts. 16 mm & 493 mts 35 mm)	English, Hindi, Bengali	275	600
	12 Care of shock and Unconscious 174 Mts. 16 mm & 435 Mts. 36 mm	-do-	250	535
	13. When the Unexpected Happens (110 Mts. 15 mm & 294 Mts. 36 mm.)	-do-	175	375
	14 Control of Bleeding (137 Mts 16 mm & 342 Mts. 35 mm).	English, Hindi, Bengali	200	425
	15. Why and How of First Aid (187 Mts, & 467 Mts. 35 mm)	-do-	275	600

(b) Films which are under production.

1. Duties of citizen in the matter of Civil Defence.
2. Fire in Industries.

Foreign Films/ Film Scripts

Which have been circulated to all the States by rotation side M.H.A. letters Mo. 1:1/15/63-DGCD, dated 16/08/1963; 15/08/66- DGCD
(ii) dated 25-7-1966; 15/06/68 -DGCD (ii), dated 27-4-1968.

1. Technical Training Rescue.
2. Team Training of Rescue.
3. Are you safe at Home.
4. Our cities must fight.
5. Fire Fighting for House holders.
6. 150 ft. Cartoons.
7. Civil Defence Operational Control-Part I Organisation.
8. Civil Defence Operational Control-Part II Action
9. If you are in open.
10. For those at School.
11. For those at work.
12. For those in Vehicles.
13. For those at home.
14. Five stages of rescue.
15. Rehearsal for disaster.
16. Debris clearance.

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CHAPTER NO. 20

SETTING, PRODUCTION AND UMPIRING OF EXERCISES UMPIRES AND DIRECTORS ETC. CONFERENCE

1. **Object**:

Exercises are a method of training in which a large number of volunteers actively put into practice the training already received by them. These are unrehearsed except, for the briefing part. If the trainees have to receive maximum benefit out of participation in an exercise, the letter are to be set and conducted with great care and thought, as much training and practical experience is needed in ensuring that each exercise is a success. All those concerned with training of volunteers should have a good knowledge of the setting, production and umpiring of exercises.

2. **Need for methodical approach**:

Even a small exercise calls for much careful and detailed preparation. Whether, therefore, an exercise is on a small scale or a large one each one of these must be approached methodically, dividing it into 3 phases viz. preparation or setting, conduct and analysis.

3**. Preparation of Exercise**:

(i) **Object of Exercise**: The first step is defining the object. When this is done, the subsequent problems of the type and scope become easy to solve. The common mistake done is that of framing the exercise first and then finding a suitable "object" for it. Along with the object the lessons to be taught should also be clarified. In many cases the object mentioned in details, may cover the lessons to be brought out. The object, after being finalised, must be mentioned at the top of any communication issued about the exercise.

(ii) **The scope of the Exercise**: The scope of the exercise is naturally dependent upon the object of the exercise but it also depends upon other factors such as the strengths of volunteers in services likely to be made available, the degree of their training and also the facilities in the form of equipment etc. that may exist. Although normally the scope should be related to the training already given to volunteers, sometimes a new aspect of subject already taught may be taught through the exercise itself.

(iii) **Time-Table for preparation**: The training officer, who would normally be required to organise these exercises, should set out prepare a time-table to avoid last minute rush of work. This may be on these lines.

(a) D-day (i.e. day of exercise) minus 28 days... Preliminary meeting of heads of services and other concerned to discuss the draft exercise.
(b) D-24 days.....Selecting staff for exercise.
(c) D-18 days... Visit to scene of director, chief umpire, producer etc.
(d) D-14 days … Finalisation of exercise by the Director.
(e) D-10 days. Second meeting of heads of services others to finalise administrative arrangements for exercise.
(f) D-7 days…… Sending out of administrative orders for exercise.
(g) D-day Exercise.

(iv) **Selecting stall for exercise**: This need to be done as early as possible for many reasons. Early selection of staff may make possible, the allotment of define duties and decentralisation of tasks. Another reason for early selection is the fact that the scope of the exercise may have to be modified if it is found that sufficient number of experienced persons, especially for umpiring are not forth-coming.

(a) **The Director**: The Director acts as the Senior Officer-in-Charge of planning and preparation. He has a lot of say in the matter of deciding the type and scope of the exercise. The exercise orders are usually signed by him. He has his staff to assist him. He has a distinguishing armband and if he moves in a vehicles a distinguishing flag.

(b) **The Chief Umpire and his staff:** These are appointed for the purpose of watching the work of the volunteers and noting down the mistakes or good work done by them. They have also to do the work of "painting of pictures" if the producer's staff is not adequate in number. Bad umpiring can spoil even the best planned exercise. Therefore, they must be selected with care. Sometimes, they must have to be had on reciprocal arrangements from neighbouring authorities.

(c) **Chief Producer and his staff**: Their main task is setting the stage for the exercise on the ground and to produce the effects of realism during the exercise e.g. lighting of fires at appropriate times, introducing casualties (live or dummy), laying on debris etc. In smaller exercises, the Director and the Chief Producer may be one and the same person.

(v) **Spectators**:

(a) Members of Advisory Committee and other directly concerned with the work may be invited to attend some important exercises. They would need conducting round by some responsible persons who fully knows the sequence of events of the exercise.

(b) Newly joined volunteers may sometimes be asked to witness an exercise. This may arose interest and Thus, animas amongst them.

(c) Volunteers of one service, already fully trained may benefit by watching those of other services. Thus, message room staff of a Control/ Sub Control Centre may like to see the conditions under which the reporting agents/Incident-Control officers send their reports and the latter may like to see how their messages are handled by the Control/Sub Control Centre Staff.

(vi) **Exercise Orders**: The exercise orders are mainly administrative orders meant to ensure that all concerned with the exercise are present at right place, at the right time and with the right equipment and preparation. These orders must be short and very clear with no chance for misunderstanding due to ambiguity. Most of the large-scale exercises are given a name e.g. "Exercise Sparrow" Giving of name serves to fix the occasion in the minds of volunteers, makes it possible to refer to the exercise by a brief name and also to associate the purpose of the exercise e.g. "training of communication services", with the name. The exercise order should cover the following aspects.

(a) The object of the exercise,
(b) Date and time for commencing and termination,
(c) Scope of exercise,
(d) Services taking part,
(e) Places where each service has to report,
(f) Dress,
(g) Equipment,
(h) Transport arrangements,
(j) General conduct of exercise,
(k) Telephones to be used for alternative communication,

(l) Alternatives in case of rains,
(m) Time of conference at end of exercise,
(n) Distribution list.

A specimen exercise order id given Appendix "D".

(vii) **Final arrangements before an Exercise:**

These include various things:

(a) Briefing of umpires and issuing of cards, if exercise is on a large scale.

(b) Briefing of producers.

(c) Arrangements for faking and placing human casualties.

(d) Laying on of materials for fires, smoke, noise, etc.

(e) Finalising transport arrangements where needed.

4. **Conduct of exercise:**

A good exercise is that which is presented in a smooth, unbroken continues manner from beginning to end this cannot be achieved unless imaginative attention is given to detail beforehand. Most of the defects that may spoil the exercise become apparent when the exercise is already on and it is too late to do anything. One way of reducing last minute hitches is decentralisation at the top. The director should not try to do everything himself be because he cannot be at all places simultaneously. The following are some of the hints that may help to wards good presentation of an exercise.

(i) Punctuality: The exercise should start and end on time.

(ii) Casualties: The live casualties may get bored and be uncomfortable and next time they may not be too willing to come. Their comfort should be looked after by a person specially detailed for the purpose.

(iii) Faking of casualties: Faking of casualties is valuable from point of spectators and for training of rescue and first-air parties.

(iv) Dress: The dress of personnel taking part should be appropriate.

(v) Delays and mistakes: There should not be long periods of inactivity by any group of volunteers in the exercise. If any delay is caused due to late arrival of message etc. the umpires should be authorised to give message by a quicker route.

(vi) Aids to realism: Smoke, fires and crackers should be used to produce realism but their timing must be adjusted very carefully.

5. **Functions of staff during an exercise**:

(i) **The Director:**

(a) The Director usually has to move from place to place, but he must leave his representative at the Control Centre and keep him informed of his movements from time to time.

(b) The Director should not interfere with the course of the exercise even if some slight mistake has occurred, unless that mistake is going to affect the course of the exercise.

(c) In case of unforeseen occurrences, he may issue verbal or written instructions at very short notice to umpires and producer.

(d) He keeps an overall control over the exercise by following up the time-table worked out for the exercise.

(ii) **Umpires**:

(a) The success and value of the exercise depends to a large extent on the initiative and imagination of the umpires.

(b) Although the umpire's main task is to watch and note the actions of volunteers carrying out various duties, they may have to interfere tactfully where time is being wasted over an unnecessary course of action or where an altogether wrong course of action is being taken.

(c) The umpires have to see that the time table of the whole exercise is not upset by delay or unusual haste by a certain group. They must try to keep the volunteers' action with in the timings indicated in the "fore-cast of events" (Appendix "A") received by them from the chief umpire. All deviations, omission, mistakes are noted down by them on the "umpire log" (Appendix "B").

(iii) **Some Do's and Don’ts for Umpires**:

Do's:

(a) Keep on following the general progress of the exercise.

(b) Take prompt action on negligence or care lessness.

(c) Tactfully point out all mistakes, wrong techniques or errors of judgment.

(d) Stop any operation that is going out of hand. It is better to stop, think and amend than to have a "farce".

(e) Keep volunteers interested by supplying "painting of pictures" where permissible within the scope of the exercise.

(f) Send your report to the Chief Umpire in time.

Don'ts:

(a) Do not give orders to in charge of different parties.

(b) Do not interfere unless necessary.

(c) Do not give away information regarding next step of the exercise as that may be the exercise secret.

(d) Do not indicate location of hidden casualties by gesticulations etc. at the beginning. You may have to point out the location at the end if the volunteers are unable to locate them.

(e) Do not leave the operation in the middle unless properly handed over to another umpire.

(f) Do not forget that success of the operation may depend largely on your work.

(iv) **Producers**: Their main task is producing effect for realism at the right place and at the right time. They get their instructions from the Chief Producer/Director on a card (see Appendix "C"). The timing of effects is most important, Thus, a fire lit too early or a cracker exploding too late may spoil the effect as the exercise may be depending upon certain moves to be taken by the Fire Brigades at certain hour only.

6. **The Analysis of the exercise:**

This is the last but an important phase of the exercise. Without it half the value of the exercise may be lost. This analysis is done through the medium of a succession of conference.

(i) **Conference of directors and umpires**: Immediately after the exercise, the director may have a conference with the umpires to hear their reports and analyse them before holding a general conference.

(ii) **Director's Conference:** At this conference, where the training officer, the Chief Umpire, the Chief Producer and the heads of services are present, the director gives a brief account of how the events in the exercise actually took place and points out the defects and the lessons learnt. He Thus, initiates a discussion on the exercise.

7. **Dissemination of Lessons Learnt:**

(i) The heads of services should ensure that all those who took part in the exercise are informed about degree of success of the exercise, the good work done by the volunteers and the lessons to be learnt for the future.

(ii) The training officer should write a short report on the exercise bringing out the lessons learnt and any other important points relating to the exercise. This report should be recorded and also circulated for general information of the organisation.

8**. Planning and organisation of exercise as a long-term programme**:

When it becomes necessary to hold exercises at least once a month in each area of a large city, dozens of exercises may have to be run. This task ap pears to be a formidable one at first thought. If however, a long term plan of exercises for city services is to be drawn out, the task becomes comparatively less difficult by using following methods:

(i) The exercises should be on a small scale.

(ii) The exercises should be "stock" ones i.e. a set of dozen exercises would be enough for the purpose.

(iii) The location of each succeeding exercise should be in a different area and the volunteers in adjacent areas may be asked to attend, as spectators.

(iv) If multiple small exercises are to be run, they should be in the adjacent areas and their timings should be adjusted so that the same producers and even the same umpires may be able to work at 2 or more small exercises in a day.

APPENDIX- "A"

FORECAST OF EVENTS FOR UMPIRES

Serial No.	Time	Event	Instructions for Umpires	Remarks

APPENDIX- "B"

UMPIRE'S LOG

Time	S. No.	Event	Action By	Remarks and Comments of the Umpire

General Comments

APPENDIX-"C"

PRODUCER'S DIRECTIONS

Location	Type of damage	Casualties			Damage	Production	Lessons	Service Expected
		No.	Type	Position				
"X" Road	Roof collapse, fire etc.	9	Stretcher cases Sitting cases etc.	Against wall on Electric Cable etc	North wall of the house has collapses etc.	No. of dummies Live Electric Wire etc.	TRG-19 etc.	1. Rescue Party etc. 2. Ambulance etc.

Properties required ---------- Dummies---------- No. 6 trapped, 11 others etc.

Electric wire---------- Old furniture---------- Old timber----------

APPENDIX "D"

SPECIMEN ADMINISTRATIVE ORDERS FOR "A COMBINED-OUT DOOR EXERCISE" DISTRICT OF NAGPUR

C.D. Headquarters (Training Centre)
EXERCISE "SHANTI"
Administrative order No.

1. **Object**:

The object of this exercise, which will be called "SHANTI" is to develop team work within the various parties of C.D. Services and to give the volunteers an opportunity of exercising in active role in an earthquake. The services given below will be tested as follows:

(i) **Incident control officer**: Reconnaissance, reporting and allocation of services.

(ii) **First-aid Parties**: First Aid treatment of various injuries, labelling of casualties and despatch of casualties, co-operation with other services.

(iii) **Rescue Parties:** Reconnaissance by leader's extrication of casualties rescue from high buildings and cooperation with other services.

2. **Date, Time and place**:

The exercise will be held in Sitabuldi Fort area from 0900 hours to 1230 hours on date. The exercise will be limited to the area surrounded by Nagpur-Bombay Railway Line, X-ray Road, Fort Road and Gandhi Road.

3. **Scope of the exercise:**

The government flats under construction on North of Fort Road will be used to show the structural damage and rescue of casualties from high buildings. There will be enough casualties and structural damages to engage the attention of all taking part. There will be sufficient material to light fires etc.

4. **Services taking part:**

The following Services/personnel will take part in the exercise. The Heads of Services etc. concerned will detail their personnel/parties to be present at the positions and timings as given below:

(i) Control Centre	:	Staff and Messengers (2 shifts)
(ii) Incident Control	:	Three officer
(iii) Rescue Parties	:	Four
(iv) First Aid Parties	:	Eight
(v) Ambulances	:	Four
(vi) Welfare Mobile Canteen	:	One
(vii) Police	:	Three police squads will be available at District Police Lines Katol Road. One Police Liaison Officer will be stationed at Control centre,
(viii) house fire parties	:	will be available in the area of damage.
(ix) Hospital	:	Mayo Hospital.
(x) First aid -post	:	one medium.

5. **Preliminary positions:**

(i) **Location**:

(a) Control Centre-Nagpur Control Centre at the Tahsil office will be uses.

(b) CD. Services Depot – at M.L.A Rest House No. 2

(c) First Aid Post –(Medium)- at sitabuldi Fort.

(ii) Personnel taking part in the exercise will be present at the following position by 0930 hours.

Date----------

(a) Control Centre Staff at ---------- Control Centre

(b) Deport staff, Incident Control Officer, CD Services, Rescue Parties, Ambulance and Mobile Canteen etc. at the Depot.

(c) First aid Post (Medium) at Sitabuldi Fort. First aid Post.

(iii) The umpires, production and the "casualties" will assemble at Depot at 0730 hours on Date ----------and then move to their areas/places allotted.

6. **Communications**:

The Communication will be by telephone and through messengers. The following are the telephone numbers to be used:

Control Centre	:	25789
Depot	:	33987
Mayo Hospital:	27685	
District Magistrate	:	25398(office)
		35397 (Residence)
District police Line	:	37788

Telephones available in areas of exercise: 33977 M/s Calcium Bros 23897 Nagpur Hotel.

7. **Dress:**

(i) All personnel taking part will wear their usual uniforms and equipment.

(ii) The Director will wear pale blue armlet on each arm.

(iii) The umpires will wear blue armlet on the left arm only.

(iv) The producers will wear yellow armlet on left arm only.

8. **Directing staff:**

The Director of the exercise will be Shri…… He will be assisted by the following officers:

Chief Umpire…….
Incident Control Umpire……..
Producer Casualty Umpire……
Police Umpire……..
House Fire Parties Umpire……..

9. **Conduct of exercise:**

(i) The Exercise will commence at 0900 hours on Date…… when the Officer-in-Charge Control Centre receives "Air Raid Message Raid" call on telephone from the Director. The exercise will end at 1230 hours or when the Director issues the call "SHABASH" on telephone, to the Control Centre whichever is earlier. The Control Centre will communicate these orders to all taking part in the exercise.

(ii) In case of very heavy rain, an indoor sand model exercise will be held in the main hall of tahsil building.

(iii) Narrative and specific instructions for this exercise will be communicated shortly to all concerned by the Director of the Exercise.

10. **Conferences**:

After the exercise the following conferences will be held at the C.D. Headquarters at the Tahsil Buildings.

(i) Conference of umpires, producer and the director at 1330 hours on Date…….

(ii) Discussion between Heads of Services and their personnel at the conclusion of (i) above.

(iii) Conference of Heads of Services, Director, C.D. Officer and the District Magistrate at 1500 hours.

(iv) All persons who have taken part in the exercise will attend in the large hall in the tahsil building to hear the Director's report and final observations on the exercise at 1600 hours.

11. **Spectators**:

(i) Should any of C.D. Volunteers not taking part in the exercise wish to witness the exercise, they may do so in uniform but they will wear white armlets on left arms.

(ii) The Heads of Services will give to the C.D. Officer the list of those persons whom they like to invite to witness the exercise.

SD/-
C.D. Controller

Distribution:

1. District Magistrate (for information).
2. Heads of all C.D. Services (including O. I/C Control Centre and Depot Superintendent etc).
3. The District Superintendent of Police.
4. Directing Staff as per para 8 above. MR/I

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CHAPTER NO. 21

HOW TO SET MAP, CONVENTIONAL SIGNS

1. **Object**:

Maps will be found useful in Civil Defence work both during the planning and operational stages. Some of the important uses of Maps (of the area concerned) are: -

(i) Preparing the C. D. relief plans and explaining them intelligently and accurately to various local authorities and representatives of non-official bodies from time to time.

(ii) Sending accurate information to higher authorities at State and Central levels regarding location and extent of damage caused by enemy air raids, or a natural calamity such as floods.

(iii) Controlling the relief operations from the Control Centre, deciding upon likely approaches to the place of disaster etc.

2. **What is a Map? Limitation of a Map**:

A Map is simply a pictorial representation of a piece of country on the flat surface of a paper. A good map will be able to give a clear idea to the reader about the piece of country with all details about its hills, road, jungle, rivers, village etc. But there are two limitations to a map. Firstly, a map cannot possibly show everything that exists on the ground because there is no room to do so. Secondly, a map cannot be completely up-to-date, because of the buildings, roads and bridges built since the map was made.

3. **How Maps are made:**

All modern map making is based on aerial photography of the area concerned. Based on the general pattern supplied by aerial photography, detail are filled in after survey-parties have verified the information by surveying the actual ground concerned. In India, the map-making is carried out by Government of India Survey Department.

4. **Reading a Survey of India Map:**

If one examines a Survey of India Map, one is bewildered by the details given in the map proper as well as by the wealth of information given in the map proper as well as by the wealth of information given in the margins all around. The more use one makes of this information, the more accurate and more useful becomes the map reading. A peculiarity of the marginal information lies in the fact that these pieces of information usually appear in some fixed positions or corners of the margin and it is useful to know where look for them as shown below:

(i) On top centre (see Appendix 'A'):

Time of sheet e.g. "C.P. and Berar".

(ii) **On top right**:

(a) The sheet number e.g. 550/4. All maps are referred to by such numbers which are their identifying numbers and must be quoted in referring to the maps for any purpose.

(b) Variations about magnetic and grid north from true north.

(iii**) On top left:**

The year of Survey of the Map. This gives an indication that all roads, bridges and buildings etc. built subsequent to this date are not expected to be found in the map.

(iv) **Bottom Centre:**

(a) Name of publishers e.g. Survey of India.
(b) The year of "Publishing" the map as against the year of survey mentioned above it at (iii).
(c) Explanation of how to use the grid reference (Map reference) and contours.

5. **Conventional Signs:**

A conventional sign is the name given to the symbol which is used to indicate on the map a feature or object that occurs or exists on the ground. All important features whether natural or man-made have to be shown and their names written down on the map. It would be too great a task to sketch every tree building or bridges exactly as they are on a single sheet of map. Therefore, the map makers about a "short-hand" method and use a symbol to represent the feature. Thus, a circle is drawn to represent a well, parallel lines for pucca road and rectangle for a building. Each common object has a fixed symbol. In selecting these symbols or conventional signs, the appearance of the feature, as seen from the air, is mainly taken into consideration. A list of the more common general conventional signs is given at Appendix 'B'.

6. **Scale**:

It is obvious that it will be impossible to make a map of the size of the country it represents. Everything on the map must be of a reduced size and the extent to which the size is reduced constitutes the scale. Thus, scale can be defined as the proportion which the distance between two points on the map bears to the distance between the same two points on the ground. The scale of any particular map will be found written at the centre of the bottom of the map and will be found expressed in the following two ways:

(i) **In words e.g. "One inch to a mile"**: Meaning that one inch on the map represents one mile on the ground.

(ii) **As a representative fraction (R.F.) e.g**.: 1:63,360, meaning that one unit on the map represents 63,360 units on the ground. It may mean one inch on the map is equivalent to 63,360 inches on the ground or one centimetre on the map is equivalent to 63,360 centimetres on the ground.

7. **Common Scales in Use**:

The Survey of India Maps in common use are of the scale of 1 inch to a mile. The cities and towns need maps with greater details. These are usually large scaled such as 6 inches to a mile or even 16 inches to a mile.

8. **Contours**:

The map is a plain piece of paper while the country side has high and low areas indicated by hills, valleys and plains. Showing of hilly areas as against plain areas and indicating the exact difference in, height has been one of the most difficult jobs for the map-maker. The problem is solved, in Survey of India Maps, by use of contour lines. These are thin, pale-brown coloured lines drawn on the maps, each line joining up point of equal height above sea-level. On, the 1-inch map, the contour lines are usually drawn in every 50 feet, and only the alternate lines have the figures written in. The rise between successive contour lines is known as the "Vertical interval" (V. I.).

9. **Gradient**:

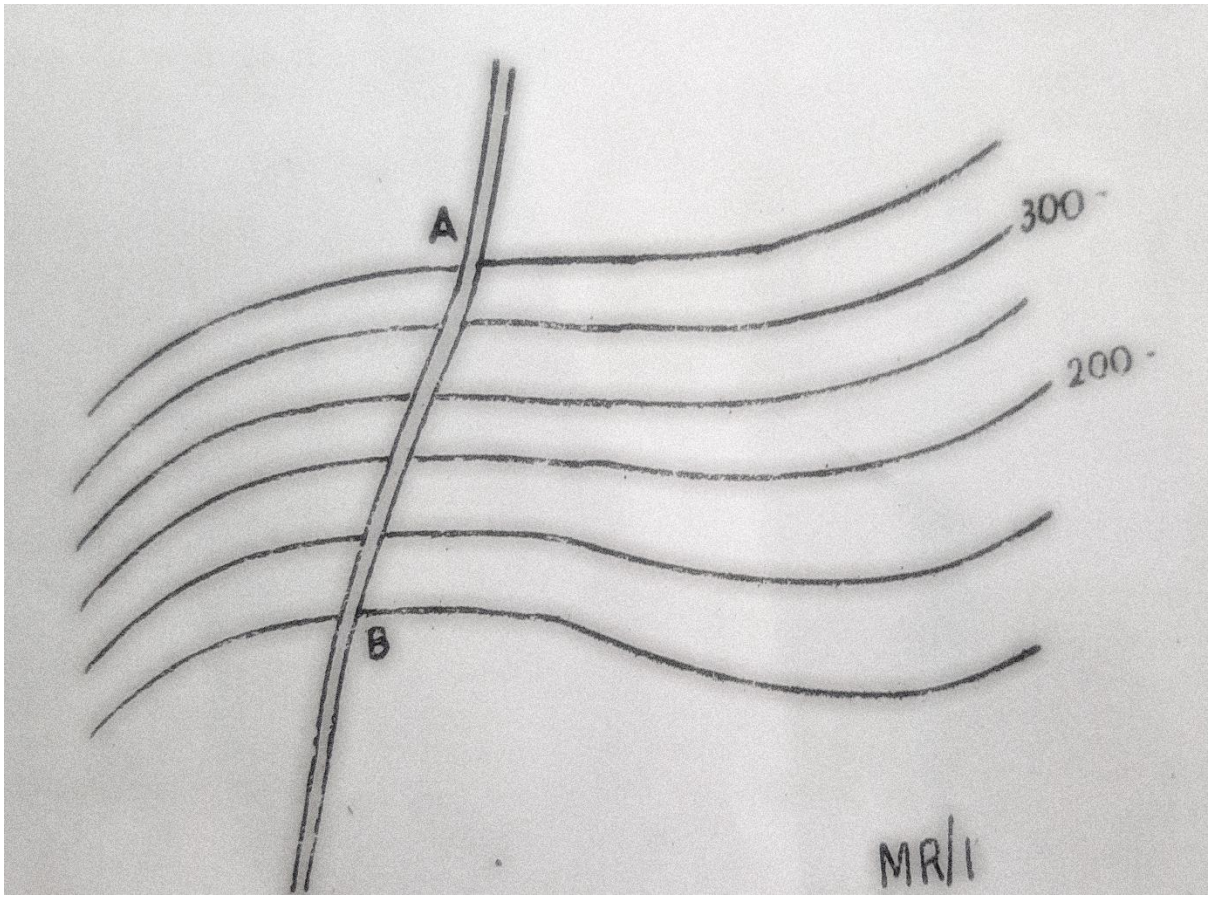
(i) A gradient' is a slope expressed as fraction. If we say that a slope has a gradient of 1 in 7, we mean that for every 7 feet of horizontal distance, the slope rises or falls 1 foot vertically. It follows that the smaller the horizontal distance, the steeper is the slope. A simple formula enables a 'gradient' to be calculated from the map. This formula is: -

VI (Vertical Interval) } --Gradient
HE- (Horizontal Equivalent) }

(ii) **Example**: In figure 'D' below, it is required to calculate the gradient of the road from B to A. It is assumed that on the map the distance measured from B to A is 600 yards.

The VI from B to A is 350:59 ft. = 200 ft.
The HE from B to A is 600 yards = 1800 ft.
Therefore, the gradient = $\frac{200}{1800}$ =1/9

The gradient of slope B A is 1 in 9. The horizontal equivalent is obtained by measurement on the map and the vertical interval by subtracting the lower from the higher contour figures.



10. **Map References:**

(i) **Grid-lines**: The first thing that strikes the observer of a Survey of India Map is the network of parallel lines, some running North and South and the others East to West, giving effect to a number of small squares on the map. All these squares are equal in size. These squares from the "grid-system" and replace the parallels of latitude's and meridians of longitudes seen on the geographical maps. They serve the purpose of locating and fixing the positions of features or objects on the map. The sides of each square of the grid system (in the one-inch-to-a-mile map) are 1,000 yards long. Appendix C gives an. example of grid system. Each line is numbered with two digits and the (horizontal) lines passing East West are numbered from South to North and are named Northings while the (vertical) lines passing North-South are numbered from West to East and are known as Eastings. The Eastings and Northings serve as coordinates and enable us to locate and fix position of objects on maps.

(ii) **Map reference**: The detaining of a position of an object on the map with reference to the grid lines is known as the map reference of the object. This map reference can be given as a four-figure map reference or a six-figure map reference as shown below:

(a) **Four figure map reference:** At Appendix C the village Wihirgaon is shown in a square bounded by Eastings 04 and 05 and by Northings 52 and 53. The square into which the village is located will be referred to as 0452, no dash or dot separating the two-digit figures, making it a four-figure number. This is the four-figure map-reference of the village Wihirgaon.

(b) **Six-figure map reference**: For a small sized object, such as a tree or well or a road-junction, it may become necessary to pin-point it to avoid it being mistaken for another object in the same square. In such cases, a six-figure map reference is given. In this the square concerned as imagined to be divided into 100 parts by ten equidistant lines East-West and ten equidistant lines North-South, as indicated at one of the squares in the South-East corner of the sketch at Appendix 'C. The object is then given a smaller square of 100 yards length and breadth for location and the figure is expressed in 6 digits being made up of a pair of 3 digits. Thus, the "well in square 0857 will have six figure map reference 083575, being made up of 08.3 and 57.5.

(iii) **Sheet number**: While giving the map-reference of a place in verbal or written messages, the sheet number of the map must be quoted before referring to other details. This sheet number is invariably given at the top right corner of every map.

11. **Setting the Man**:

Before a map can be put to any use, it has to be "set". Setting a map means arranging it on the ground in such a position that it can be read most easily in relation to the ground it represents. A map can be easily set if the observer's position is easily recognizable in the map or when one or more prominent figures can be identified. In the absence of these conditions, the map can be set with the help of the compass. The different methods suitable under various conditions are given below:

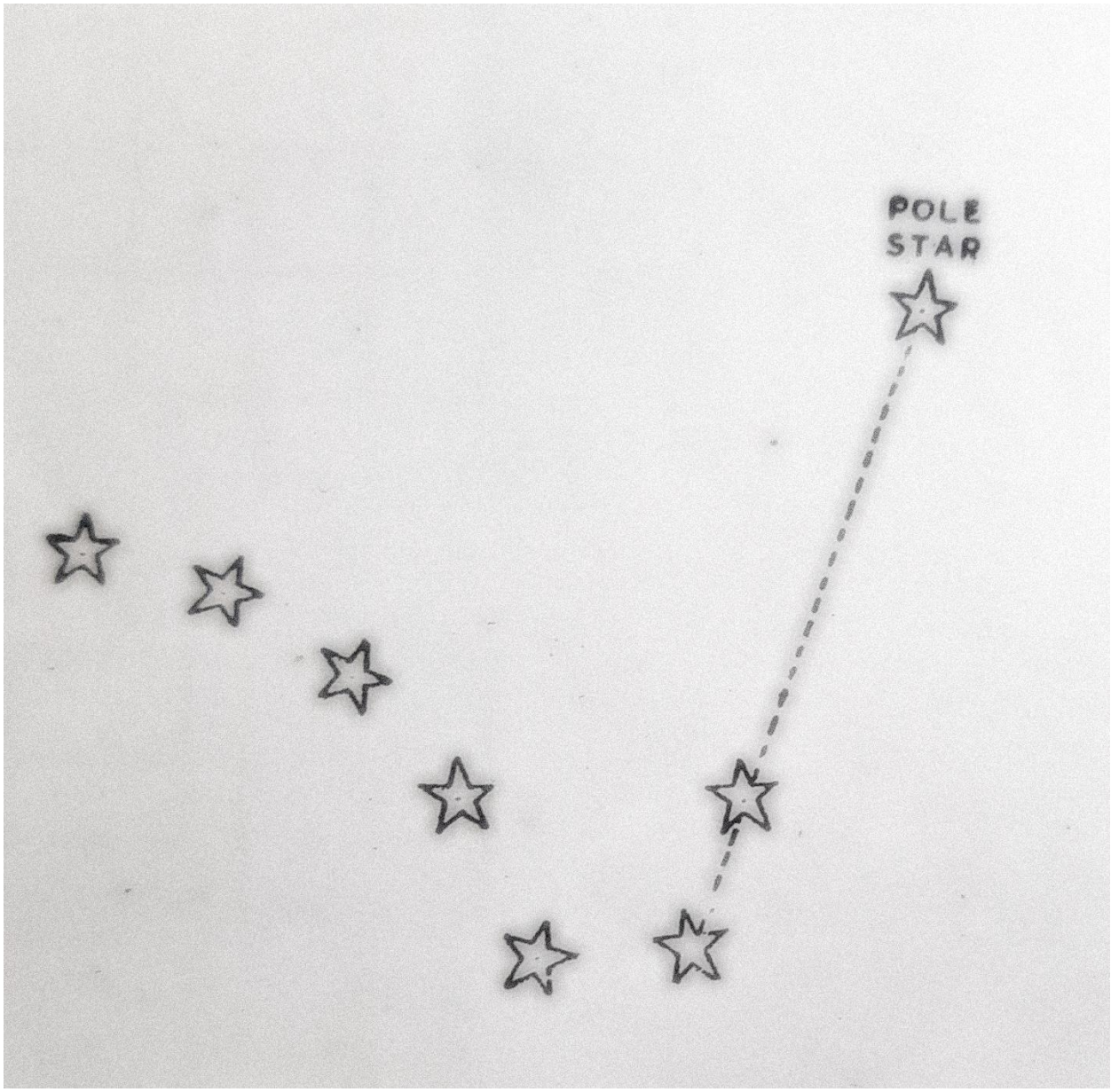
(i) **Setting the map with the help of prismatic compass**: In this method, the compass, with its lid open is placed in such a way that its hair line lies along the magnetic north line of the map. The map is then turned around till the compass needle, when steady, points along the hair-line. The map is then set.

(ii) **Setting the map without compass**:

(a) Own position not known but a straight feature e.g. road or rail-line available: Under such circumstances, spread and rotate the map on the ground in such a way that the road on the be upside down."

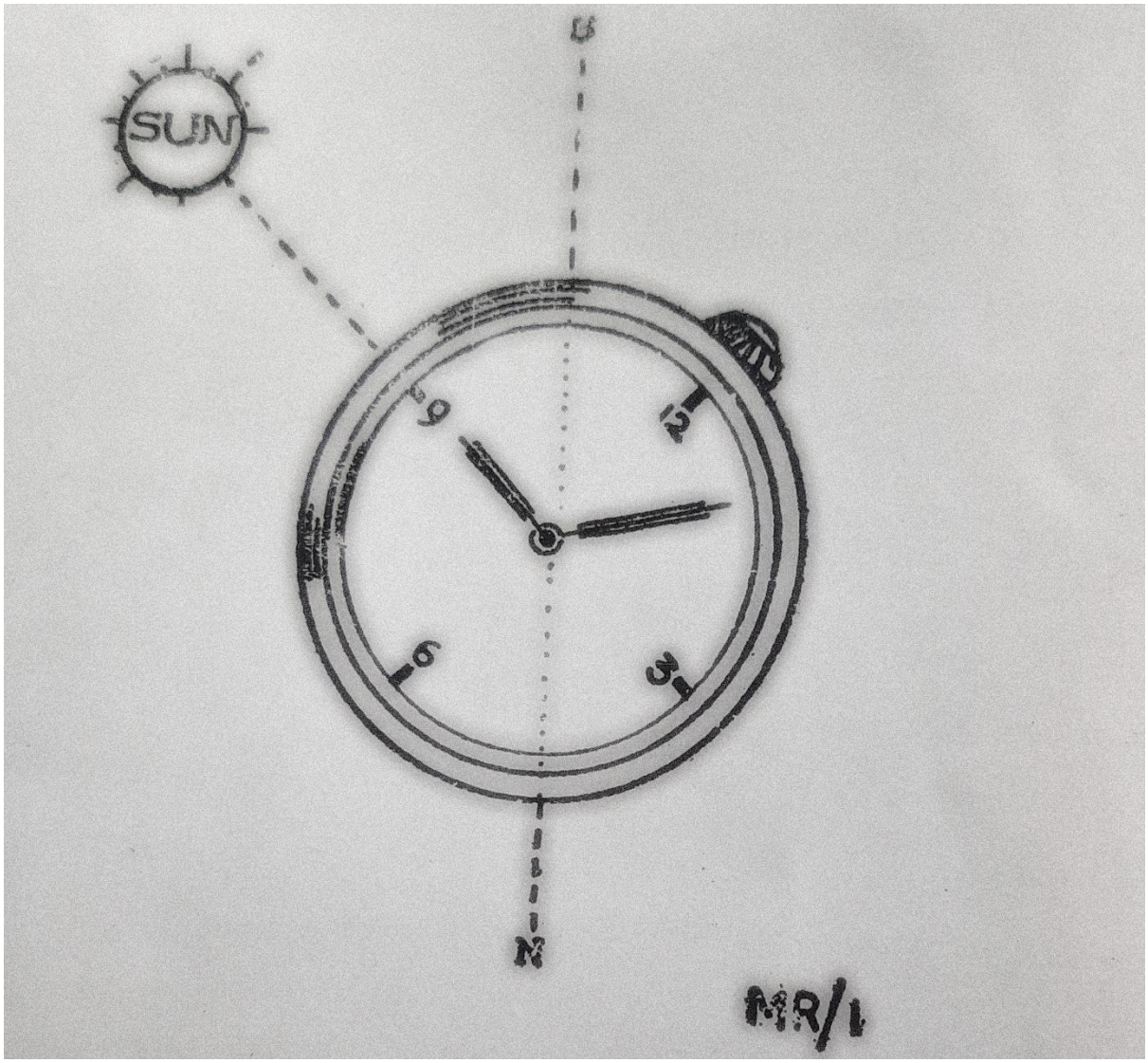
(b) **With the help of two prominent features**: When two objects present in the map are identified the ground, the position where the two objects the ground the however, features this cannot be done, the features on the map are connected by a pencilled and map adjusted in such way that the pencilled line is parallel to the straight imagine connecting the two features on the ground. The map then set approximately.

(c) **Night with the help of stars**: group of seven called the plough' or 'Great turn around bright star called Star' which indicates position True North to can found by producing from the 'Pointers Along this extended line the pole be found slightly the side and away from remaining stars of the 'Great Bear (see sketch below):

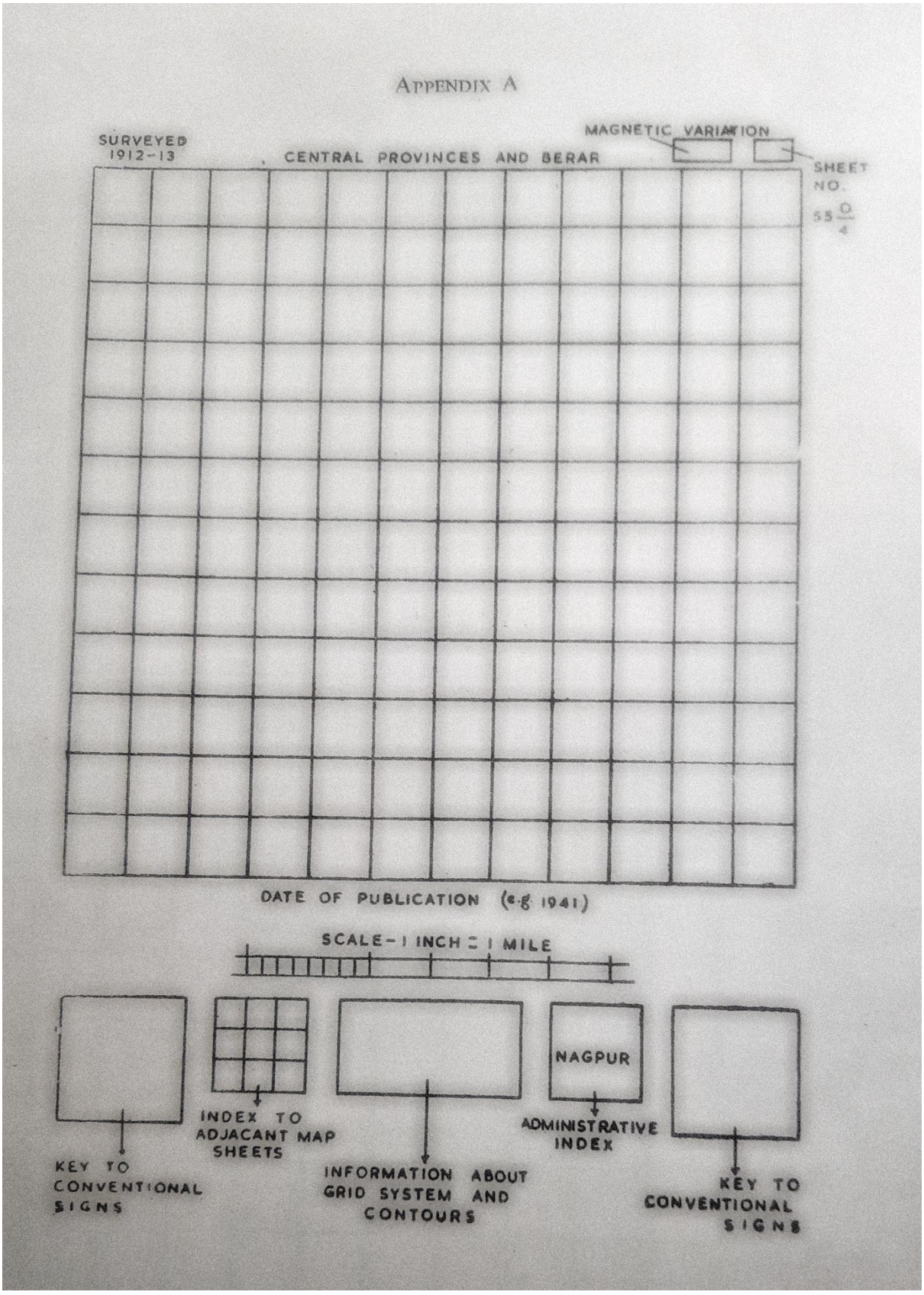


(d) **With the help of watch**: The North can also be determined on a sunny day with the aid of a watch. The watch should be held horizontally in such a way so that the hour needle points towards the sun. The line which be sects the angle formed by the hour -needle and the imaginary line connecting the centre of the watch with "12" on the dial points approximately towards the geographical North-south line. The extension of the bisector on the opposite side of the angle indicates to the North direction.

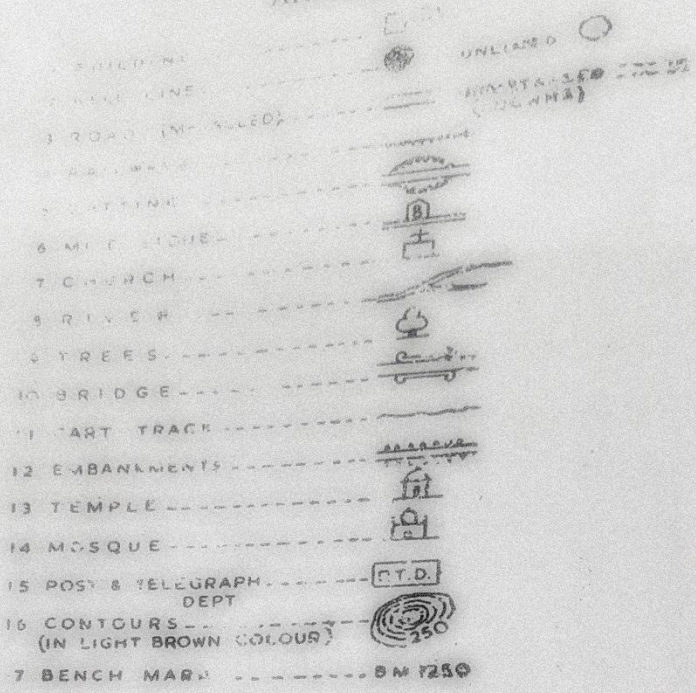
Note: **Confirmation**: By whatever method the map is set, its setting must be confirmed by checking prominent features on the ground against those in the map and vice-versa. while doing this, it must be remembered that objects which have been constructed since the map survey was made are not expected to be present in the map.


SUN
S
9
12
6
3
N
MR/1

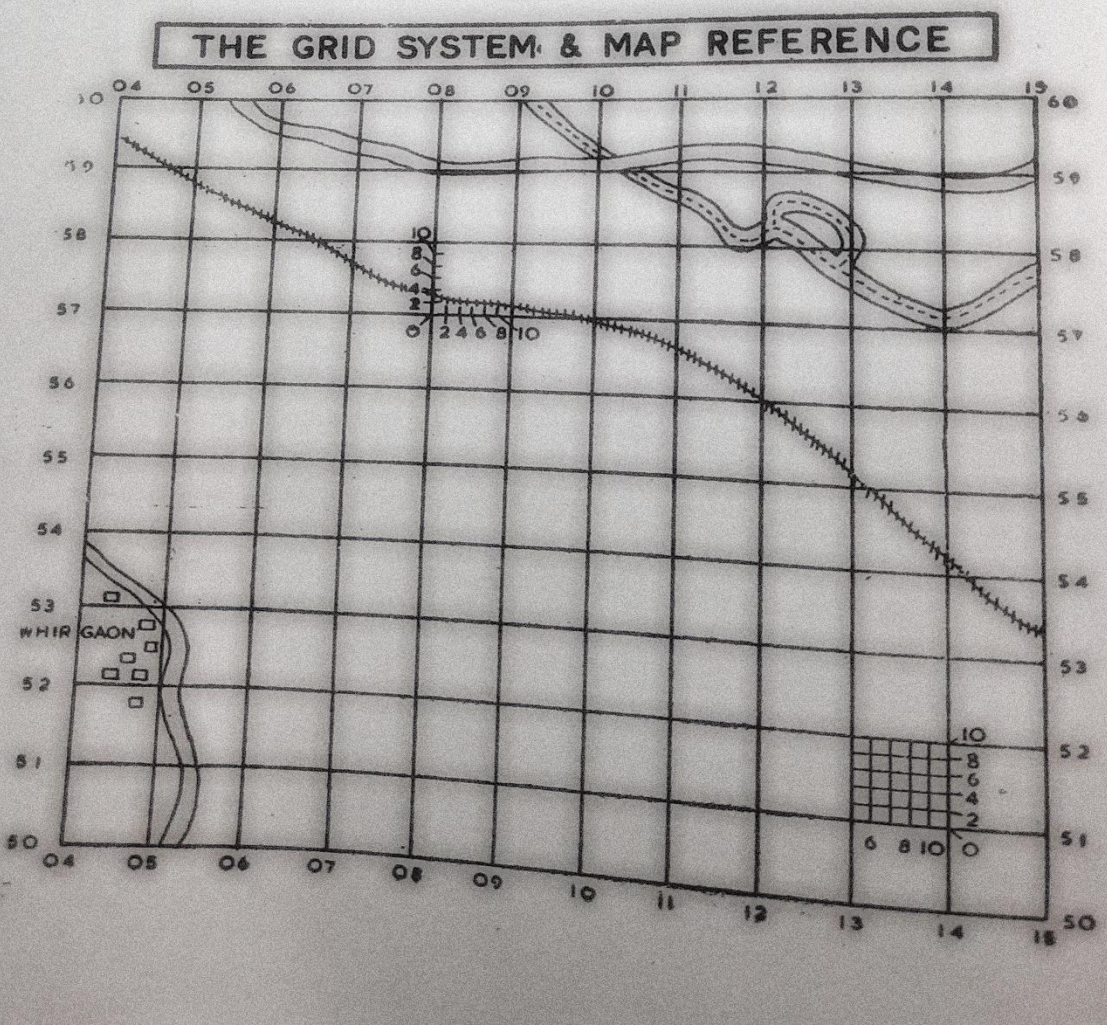
APPENDIX A


SURVEYED 1912-13
CENTRAL PROVINCES AND BERAR
MAGNETIC VARIATION
SHEET NO. 55 O/4
DATE OF PUBLICATION (e.g 1941)
SCALE - 1 INCH = 1 MILE
NAGPUR
KEY TO CONVENTIONAL SIGNS
INDEX TO ADJACANT MAP SHEETS
INFORMATION ABOUT GRID SYSTEM AND CONTOURS
ADMINISTRATIVE INDEX
KEY TO CONVENTIONAL SIGNS

APPENDIX B



APPENDIX C



CHAPTER NO. 22

MAINTANCE OF ESSENTIAL SERVICES

1. **Object**:

The object of this lesson is to study the importance of maintenance of Essential Services in an emergency and the provision of measures for quick repairs in the event of an essential service having been seriously damaged.

2. **Introduction**:

The High Explosive Bombs and Incendiary Bombs dropped by the enemy affect the essential services and their lines of distribution. With the disruption of electricity, water, telephone services etc., the morale of the civilian population will be adversely affected. Moreover, the damage caused to the essential services may be of such a nature as to endanger the life and property in its neighbourhood. Also the installations of these services present attractive targets to enemy planes and subversive elements. The main services in a city are electricity, water, gas, telephone and sewage system.

3. **Problems created:**

(i) **Water Supplies:**

(a) Low lying areas may get flooded.
(b) Lack of water for fire-fighting, drinking and sanitation.
(c) Stoppage of water supply to essential services such as hospitals, factories etc., which may disrupt their work.

(ii) **Gas undertakings:**

(a) Broken gas mains may get ignited.
(b) In confined places escaping gas may cause asphyxiation of the trapped victims and also when mixed with air it would form an explosive mixture.
(c) Stoppage of gas may disrupt work in institutions dependent upon this service.

(iii) **Electrical undertakings:**

(a) Broken electric mains will be potential sources of danger to people.

(b) The factories engaged in war production and dependant on electricity will be affected adversely.

(iv) **Telephones:**

Telephone lines may be damaged causing dislocations in communication system.

(v) **Sewage:**

(a) Broken sewage may cause flooding.

(b) In case water mains are also broken there will be contamination of water and danger of outbreak of epidemics.

(c) Cause problems of sanitation in the locality.

4. **General measures for Civil Defence in essential services:**

It will be necessary to adopt suitable measures well in advance to meet the likely problems created by disruption and damage to public utility services. The responsibility for restoration of these services in case of damage will be that of the respective management concerned. The existing facilities to deal with damage to machinery, building etc., will have to be augment ed at short notice. Each utility service should work in close cooperation with C.D. Organisation of the town and its representative should be present at the Control Centre to advise Controller in case of dam age. The following steps will be necessary in general:

(i) Survey the plants machinery etc., to ascertain which points need protection.

(ii) Estimate the extra labour which would be required to cope with the increased demand for repair consequent on air-raid damage, arrange for its recruitment and training and generally augment arrangements for repairs. In estimating manpower need possibility of casualties amongst the personnel should always be considered. (All repair units of essential services are required to be mobile. They must be equipped with suitable vehicles).

(iii) Obtain stocks of spares considered necessary. Arrange for the dispersal of stores to different stores/yards and take precautions against fire.

(iv) Consider whether any obsolete plant should be renovated in view of the possibility of damage to the existing plant.

(v) Arrange for the housing of essential key-personnel near the premises of the undertaking.

(vi) Arrange for independent power supply (like Diesel or Steam power supply etc.) where necessary, to supply motive power for plants which worked on electricity.

(vii) Arrange for alternative sources of water supplies for fire-fighting etc.

(viii) Assess the extent of dependence of the utility on other services (e.g. proper sewage disposal is de pendent upon adequate water supply, which in turn may be dependent upon power supply) and plan alternative sources of essential requirements (e.g. standby power plant etc.).

(ix) Make arrangements for mutual aid with neigh burning utility concerns so that in the event of severe damage to one of them, assistance could be secured from other concerns.

(x) Select personnel for emergency duties during air raid and prepare a chart showing the assignment of each individual and the way he will function. Prepare a suitable insignia (i.e., arm band etc.) to allow for easy identification and unobstructed movement of the staff during an emergency. Work out procedures for action to be taken when attack is imminent and when it is over.

(xi) Consider the need for setting up an alternate head-quarters of the utility concern in case the existing one is destroyed and make suitable arrangements for spares, personnel, furniture, communications, records, maps, map boards etc. Take steps to provide a safe repository for all essential records and maps or duplicate them and keep the duplicate in some other locality.

Essential Services-their maintenance, precautionary and alternative measures

5. **Electrical undertakings:**

The Central Water and Power Commission have already issued necessary instructions relating to Civil Defence and providing special civil defence measures in power houses with a view to ensuring that supplies are maintained without interruption.

(i**) Alternative Measures:**

(a) Alternative measures may be planned by having interconnection between different neighbouring electrical undertakings.

(b) Wherever possible provision should be made for portable generating sets. Ample stocks of emergency repair equipment should be provided.

(ii) **Precautionary Measures**: It is essential that protection to plant and equipment should be provided, wherever the conditions of normal operation allow e.g. for generating stations, switch houses, transformers, pumps and motors and oil reserves etc.

6. **Water undertakings:**

Maintenance of water supply is most essential in war time, as water be needed for firefighting, drinking, cooking and washing, sanitation and for several industrial undertakings.

(i) **Alternative Measures**:

(a) Use of wells and hand-pumps should be restore to as much as possible. Where old wells already exist but are not being used they may be covered with concrete slab with a main in the centre so that the could be used in an emergency.
(b) Development of natural ponds and tanks.
(c) Provision of more water tanks and reservoirs.
(d) Carting of pure drinking water supplies to certain distribution points in areas of scarcity.
(e) Laying of over-ground mains during emergency.
(f) Relaying of water by fire pumps both for firefighting purpose and augmenting water supplies.

7. **Sewage disposal system:**

It is essential that measures should be devised whereby disposal of sewage can be maintained, should any part of the system get damaged by enemy air attack.

(i) Preparing list of vital places, buildings, culverts etc. to erect splinter-proof partitions and to divert a sewage to other pumping stations.
(ii) Preparing a general plan of the sewage system indicating all sluices, penstocks and valves by which the sewage can be diverted.
(iii) Provision of portable pumps.
(iv) Cross connections, where practicable between sewages.
(v) Arranging for services of sweepers.

8. **Telephones**:

(i) Wherever considered necessary duplicate switch boards should be provided or kept in reserve.
(ii) Alternative means of communication e.g. ratio, telephones etc. should be explored.
(ii) Arrangements may be made for setting up duplicate exchanges to function in case the existing exchange is put out of action.
(iv) An extensive messenger service will perhaps be the best solution so far as the local C.D. Services are concerned.

9. **Gas undertakings:**

Damage to gas may give rise to the possible risk of fire and explosion. Maintenance of this service will also help to solve fuel problem which may become acute during war time. The only alternative for the gas, which is used for fuel purposes, would be coal firewood etc. As for precautionary measures they are almost the same as for electrical undertakings, the provision of spare parts for repairs in case of an emergency will have to be slightly different.

C.D CONTROLLER

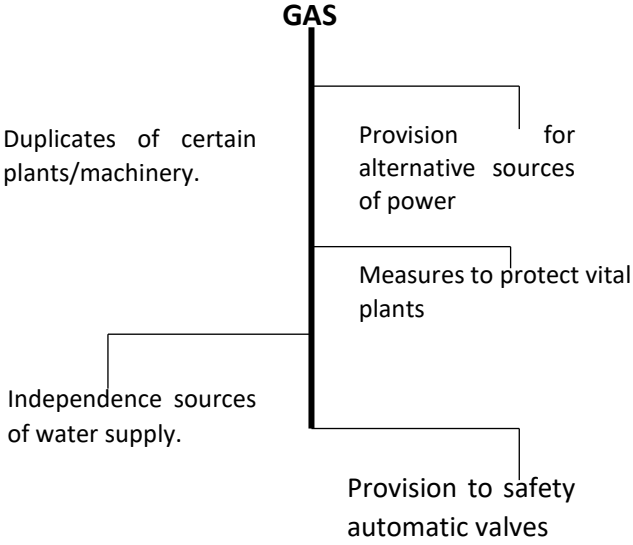
Representatives of Essential Service

General measures for Maintenance of Essential Services

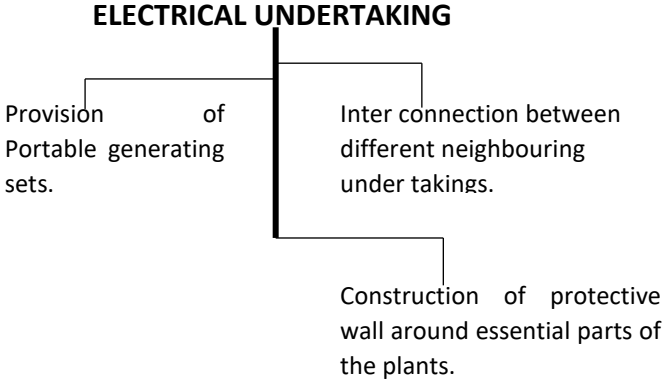
1. Survey of vital plant or machinery needing protection.
2. Arrange for alternative sources for water supply for firefighting.
3. Estimation of extra manpower required for repairs etc. during an emergency.
4. Obtain stocks of spares considered necessary.
5. Arrangement for mutual aid with neighbouring Utility Services.
6. Consideration of renovation of obsolete plants.
7. Arrangement for the housing of essential Key personnel within the premises of the undertaking.
8. Arrange for independent power supply than electricity.

ESSENTIAL SERVICES /MAINTENANCE/ALTERNATIVE MEASURES

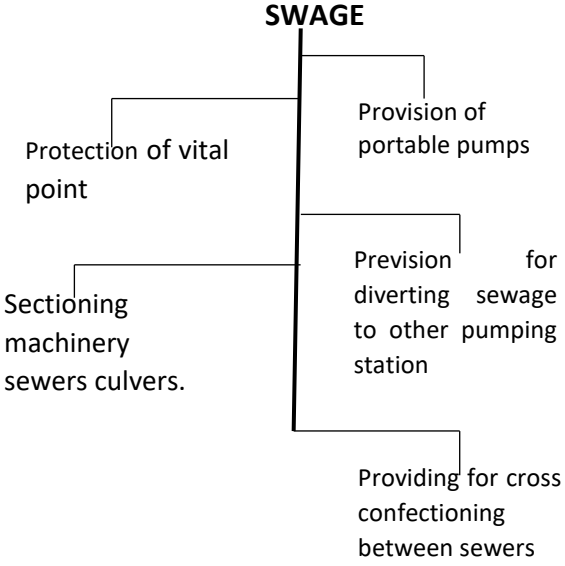
GAS



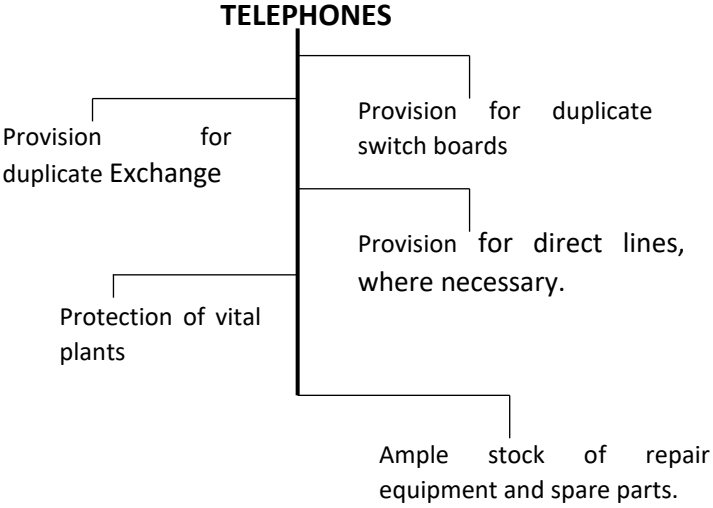
ELECTRICAL UNDERTAKING



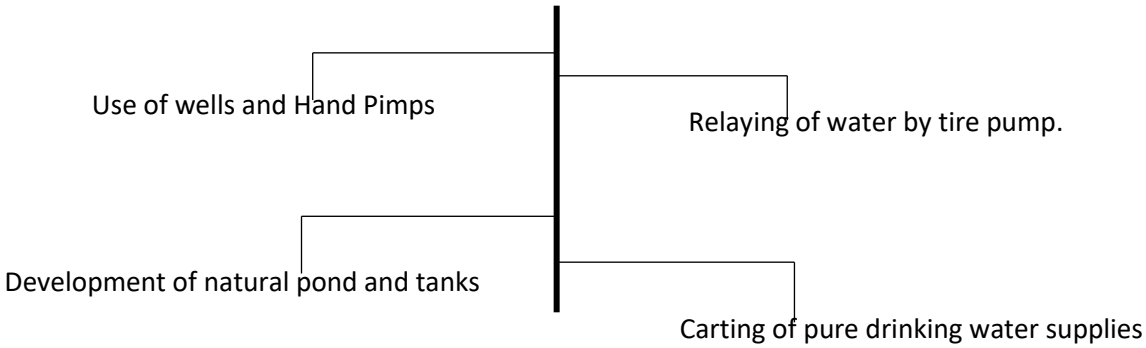
SWAGE



TELEPHONES



WATER UNDERTAKINGS



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CHAPTER NO. 23

ORGANISATION AND FUNCTIONING OF CONTROL /SUB CONTROL CENTRE

1. **Object**:

In case of air raids various localities in a town may be affected. Relief has to be provided by the Civil Defence Services which have been organised and trained during the pre-raid period. The responsibility of the coordination of relief operations in different localities is that of the head of the Administration/C.D. Controller concerned. The Control/Sub-Control Centres assist in the efficient coordination of the relief operations. Communications and the Control and Sub Control Centre must be very well planned and organised in advance. In the following paragraphs, we will learn the necessity for organising these centres, the staff requirements, the layout and proper functioning of these centres.

2. **General**:

In order that the District Magistrate/Controller of Civil Defence or his representative may control and coordinate action required as a result of an air-raid and come to quick decisions for the proper deployment of the Services concerned, there must be a Headquarter where:

(a) They can meet and decide on the action to be taken and where they can be found for consultation with others.

(b) They have a speedy access to all essential information effecting the situation, and

(c) There are means of communicating orders and information to all concerned.

This headquarter is known as the Control Centre of the town. Each town big or small will have only one Control Centre. Bigger towns are provided with a number of Sub-Control Centre to assume proper control and provision or relief measures without delay. Towns with more than 3 lakhs of population are divided into smaller areas having 3 lakhs of population each. Every one of these areas are put under a Sub-Control Centre with an Officer-in-charge as head. The Control Centre also has got 3 lakh of population under it and Thus, a Sub-Control Centre attached to it. The Control/Sub Control Centres will have one depot each in this area. In case of air-raids the warden will report the damage to the Sub-Control Centres. The Officer-in-Charge-of the Sub-Control Centre are delegated the powers of deployment of services from their depots to the science of damage and are responsible for the conduct of relief operations in their area. The C.D. Controller continues to be responsible for planning and provision of assistance from one area to another or procurement of re enforcement from outside. He will also look after problems of mutual interest between these areas such as matters pertaining to hospitals. First Aid Posts, care of homeless, repairs to essential services, clearance of debris and disposal of UXB's. Since the Services available in one depot may not be enough to meet the requirements of the area after air raids, mutual aid and reinforcement has got to be planned by the C.D. Controller, for this, all the Sub-Control Centres must keep the Control Centre posted with an up-to-date picture of the situation. The Control/Sub-Control Centres must have a very carefully devised organisation and well-trained staff to produce quick and accurate working. Since the available buildings to be converted to these centres may vary from place to place no hard and fast rules can be framed regarding the procedure and planning, however, the broad outlines can be laid down. The Head of the communications services is responsible for planning and establishment of these centres.

3. **Essentials of Control/Sub-Control Centre:**

The main war-time essentials of Control and Sub Control Centres are:

(i) At any time of the day or night, for so long as enemy action may necessitate, the Control and Sub-Control Centres must be in a position to receive and deal with reports of air-raid damage or other messages.

(ii) A picture of the situation in the area must be maintained as a map record.

(iii) Messages reporting fires must be dealt with immediately.

(iv) Provision must be made for information which might affect the operation of any service e.g. (blocking of roads, destruction of bridges etc.) to be not only readily available, but also to be notified to all concerned as a matter of routine.

(v) A simple and ready system should be instituted whereby the Controller and the Heads of Services can see at a glance the where about of the parties which are available for duty at their depots.

(vi) The organisation should be such that under heavy bombing conditions when local resources may be insufficient to deal simultaneously with all the damage which has occurred, a decision may be taken on how these resources may be best employed and also on the order of priority in which the damage awaiting attention is to be dealt with as resources become available. An agreed decision should be arrived at by all Heads of Civil Defence and Essential Services involved, reference being made to the District Magistrate and to the Civil Defence Controller if a difference of opinion arises.

(vii) Arrangements must be made for the preparation and despatch of reports required by higher authorities.

4. **Communication Services**:

The responsibility for Control and Sub-Control Centres is vested in the Officer Commanding Communication Services who is in charge of the Civil Defence Communications System in a town. He is not only responsible for preparing local plans for Communication Services, and the planning for the Control and Sub-Control Centres, but he is also responsible for the enrolment, organisation, administration and training of personnel required for the communications services. The Communication Services cater for a well organised force of messengers for the transmission of messages in case of failure of telephone lines, maintenance, installation and care of sirens for air raid warning, maintenance of wireless and telephone communications between places of damage and Control/Sub Control Centres and provision and maintenance of field telephones to coordinate action at the place of damage or an alternative means of communication between places of damage and Control/Sub-Control Centre.

5. **Location of Control/Sub-Control Centres**:

The location will depend on the availability of suitable accommodation which can be procured considering the required standard of protection and the vulnerability of the area. It must be easily accessible to the messengers coming from all parts of the, town and should be suitable from the point of view of telephonic communications.

6**. Layout of Control/Sub-Control Centres:**

The diagrammatic layout of a Control Centre and Sub-Control Centre is given in the attached appendix. It is recommended that Control/Sub-Control Centre should be located in two or three adjoining rooms which should have a door or hole in the adjoining wall for keeping big trays (hatch). There should be place where the messengers on duty can wait. During the war the Centre is to function day and night by three shifts of staff and therefore, there must be provision for a place where the staff not on duty can take rest. In addition to the provision for a Canteen where the staff can have their tea and meals etc. sleeping accommodation for those who are to take over duty at night should also be provided. In a Control Centre, the representatives of the essential Services should be located in a room adjoining the Map Room of the Centre. In the Map Room the heads of the Services will sit while in the Message Room the arrangements for receipt and despatch of messages will be made.

(i) **Map Room:** In the Map Room sufficient space should be available to display a large-scale map of the whole area. Space should also be allotted for placing the Tally Board. The Officer-in-Charge of the Control/Sub-Control Centre and his staff will work here. In case of the Control Centre, the District Magistrate and the Heads of the various services will also sit in this room.

(ii) **Message Room**: In this room only, the reception and transmission of messages will be dealt with Provision must be made to accommodate "IN" and "OUT" Telephonists and the Message Supervisor in this room.

(iii) **Room for representatives of Essential Services**: In this room accommodation must be provided for the representatives of water, gas, electricity, telephones, roads and bridges and sewers etc. services. The maps of the Essential Services should also be displayed in this room. The representatives should be available for consultation with the C.D. Controller (for diagrammed tic layout please see Annexure I(A) and I(B) attached).

7. **Number of Control/Sub Control Centres Shadow Control Centre**:

There will be one Control Centre in every town. For towns over 3 lakhs of population they will be divided into areas having 3 lakhs of population each and will be put under Sub-Control Centres. The Control Centre having 3 lakhs under it and the rest under Sub-Control Centres. If the terrain and layout so require a higher scale may be adopted by the State Governments with concurrence of the Director General Civil Defence. The possibility of Control Centre being put out of action by a chance direct hit should be considered and one of the Sub-Control Centres be designated to assume the functions of Control Centro also. Similarly, any Sub-Control Centre should be able to assume the functions of neighbouring Sub-Control Centre, when need arises. Where there is only a Control Centre it is necessary to make arrangements for an alternative Control Centre (i.e. Shadow Control Centre) with similar facilities as for the main Control Centre. The staff who should man the shadow control centre on receipt of warning may be designated in advance.

8**. Staff and Equipment:**

For staff requirement of Control/Sub-Control Centres please see Annexure II attached. The following equipment are required for Control/Sub-Control Centres.

(i) Time piece, normal office furniture, stationery, cub-board and canteen/rest room furniture.

(ii) Very large-scale map of the town mounted on material through which pins may be easily inserted.

(iii) Maps showing the layout of different Essential Services for the representative of each service.

(iv) Damage Indicators-Pins with different coloured heads to denote type of incident on the map.

(v) (a) Incident Pins (1 ½ inches long) different coloured heads.

Navy blue -	--	-	-	to represent H.E.
Red	-	-	-	to represent fire still burning
Blue with white spot	-	-		to represent UX
Silver white	-	-	-	to represent crashed air craft.

(b) Two sets of Incident Tabs-serially numbered small discs.
(c) Road Block Pins- with heads, differently shaped from incident Pins.
(d) Road Closed Pins – with black and white heads.

(vi) **Personnel Equipment-one Helmet per head.**

(vii) Tally Board -About 5ft x 8 ft. fixed with small pegs to hold tallies and discs, denoting units of various Services by different colours as given below. Size of tally 1"x 1 ¼ " with a hole at top and disc is of 1" diameter with a hole. The colour code is as given below: -

Rescue parties	**Blue**
F.A. parties	White with light green bar
Mobile F.A Post	White with green bar
Ambulance	White with light red bar
Incident Officers	Light blue with white bar
Reconnaissance Parties	Deep grey with white bar
Fire services	Red
Police Station	Brown
Bomb Disposal Squads	Blue with red bar
Repair parties of Essential Services	Light grey with letter representing each service (G-Gas Mains) (Wa-Water) (Rd-Road etc.)

(viii) **Telephones**.

(ix**) Printed message from and other registers.**

9. **Static Damage Map**:

The Control and Sub-Control Centres should have special map for those incidents which have not been cleared by the midnight of next day of the occurrence and where the damage is so great that some time may elapse before the damage is repaired or the incident cleared. Even if the Wardens have been withdrawn after having given over charge to Essential Services, Police or Military and the incidents have been cleared from the Civil Defence point of view but in fact, still some work has to be done by Non-Civil Defence Services and such work will take some time before the incidents are cleared finally, such an incident will be taken off the map where the day to day incidents are plotted and the same will be replotted on the Static Damage Map. The Static Damage Map will show at glance to the Controller and other officers, the incidents which are static and not cleared up.

10. The following category of incidents may have to be plotted on Static Damage map.

(i) Un-exploded Bombs.
(ii) Crashed Air-craft.
(iii) Big Fires.
(iv) Fires controlled or extinguished but which have flared up again.
(v) Roads blocked owing to crater fall of heavy buildings.
(vi) Damage to:
  (a) Water Reservoirs.
  (b) Generating Stations.
  (c) Bridges etc.

11. The Intelligence Officer and Officer-in-Charge of the Sub-Control Centres will write in short, adopting the Express Message Style, the details of incidents on a card specially meant for Static Damage Map showing such incidents. In the card, they will write:

(i) Number and date.
(ii) Location.
(iii) Nature of Damage.
(iv) Action taken.

12. **Duties of Control/Sub-Control Centre Staff:**

(i) **District Magistrate/Civil Defence Controller:** The District Magistrate/Civil Defence Controller exercises general control of Civil Defence planning and operations in a town. He is responsible for the mutual support between the various Sub-Control Centres or from neighbouring areas. He keeps the higher authorities informed of the situation in a town.

(ii) **Heads of Civil Defence Services and their deputies**: The heads of the services exercise general control and supervision over the services under them. They consult each other but do not intervene in the activities of others. They or their representatives are always available in the Control Centre.

(iii) **Representatives of Essential Services**: They are available at the Control Centre for consultation with the C.D. Controller. They keep their head-quarters informed of the position of their services, arrange for immediate action if necessary.

13. **Officer-in-Charge:**

The Officer-in-Charge is responsible for the operation, efficient organisation, training of staff, allotment of duties and relief in the Control/Sub-Control Centuries. He deploys CD. services from his depot and informs the C.D. Controller for reinforcements immediately as the strength in the depot is depleted to one-third.

14. **Intelligence Officer:**

The Intelligence Officer is provided in the Control Centre and he maintains a diary of all-important events and record of incidents with action taken. He is responsible for preparation of static damage cards and keeping the static damage map up-to-date. He prepares reports on use of new weapons and new tactics used by the enemy and reports to be sent to higher authorities as required by the C.D Controller. When not provided the duties are done by the Officer-in charge.

15. **Plotting Clerk-cum-Chart Writer**:

The Plotting Clerk-cum-Chart Writer maintains the record of all "IN" messages and gives them the incident numbers. He plots the incidents on the map and also maintains the static damage map. He distributes the copies of the "IN" messages to the various people in the Map room. In case of fire he sends a copy of the message immediately on receipt to the Fire Liaison Officer or Officer-in-Charge without giving Incident number which is given after it comes back.

16. **Tally Board-cum-Record Clerk**:

The Tally Board-cum-Record Clerk is responsible for the maintenance of Incident Files for which he gets a copy of all "IN" and OUT" messages. He maintains a Log Book for the important events of the day. On receipt of "OUT" messages, ordering out C.D. Services from the depot he makes the necessary alterations on the Tally Board. He also maintains other files regarding the messages coming from or going out to the higher or lower authorities. He keeps the Officer-in-Charge informed about any undue delay in the action taken or despatch of a message.

17**. Message Supervisor:**

The Message Supervisor is in-Charge of the message room and looks after the training, duty roster, telephoning and message procedure, proper receipt and despatch of messages. He gets the messages despatched as per the priorities allotted by the Officer-in Charge and may order OUT messages to go through IN telephones or through messengers whichever is best possible under the circumstances. He maintains registers for all IN and OUT messages. He sends the copies of all OUT messages, or despatch slips to the Tally Board-cum-Record Clerk after the messages have been despatched.

18. **Telephonists Outdoor Messengers:**

The telephonists are responsible for correct receipt and transmission of messages asper message procedure. The IN telephonists are responsible for making the required number of copies of all IN messages where received through a messenger or telephone, which are then passed on to message supervisor for record and then onward transmission to the map room. There are 04 telephonists (2 IN and 2 OUT) Sub-Control Centre and telephonists IN and OUT) in a sub Control Centre and 6 telephonist (3 IN and 3 OUT) in a control centre having a population Lakhs under them. The scale of outdoor messengers is the same as for telephonists.

19. **Circulation of Messages and their Records**:

(i) "**IN" Messages:**

The IN telephonist makes 4 copies in a Control Centre and 3 copies in a Sub-Control Centre of every message whether received by telephone or through a messenger. He puts his initials and time of receipt on the message and passes them on to the Message Supervisor. The Message Supervisor makes entry in the IN-message register and passes on to the Map Room. In the Map Room the IN messenger picks up the messages from the IN hatch and gives to the Chart writer-cum-Plotting Clerk, who makes a record in his register, gives the Incident number to the message and marks it on all the copies. In a Control Centre he gives one copy to the C.D. Controller, one copy to the Officer-in-Charge, one copy to the representatives of the Essential Services, then after plotting the incident passes on the fourth copy to the Tally Board cum-Record Clerk. In a Sub-Control Centre, he gives one copy to the Officer-in-Charge, one to the Tally Board-cum-Record Clerk and keeps the third copy with him for plotting on the map.

(ii) "**OUT" Messages:**

The out messages are prepared on CDM-3. The number of copies are two more than the number of addressees. They are initiated by the C.D. Controller or Officer-in-Charge in a Control Centre and the Officer-in-Charge in a Sub-Control Centre. One copy is kept by the Officer-in-Charge, one is given to the Tally Board-cum-Record Clerk which goes to the Incident File, and the copies for addressees are sent to the message room through the out hatch. The IN Messenger in the message room picks up the out messages and gives them to the Message Supervisor, who passes them on to the OUT telephonist after making the records in his 'Out' register. After despatch the telephonists put their initials and time of despatch, the copies are then sent back to the Tally Board-cum-Record Clerk, who then replaces the previous copies by the one initialled by the out telephonist. In case the messages is sent through an out messenger the Message Supervisor notes down the Incident number, addressed to, copies to etc. on a slip and sends it to the Tally Board-cum-Record Clerk to be kept in the Incident file.

NOTE: Proforma for the records of incidents by the Chart Writer, IN and OUT message register of the message supervisor and the message supervisors slip in case message is sent through a messenger are attached to the precis.

ANNEXURE—I(A)

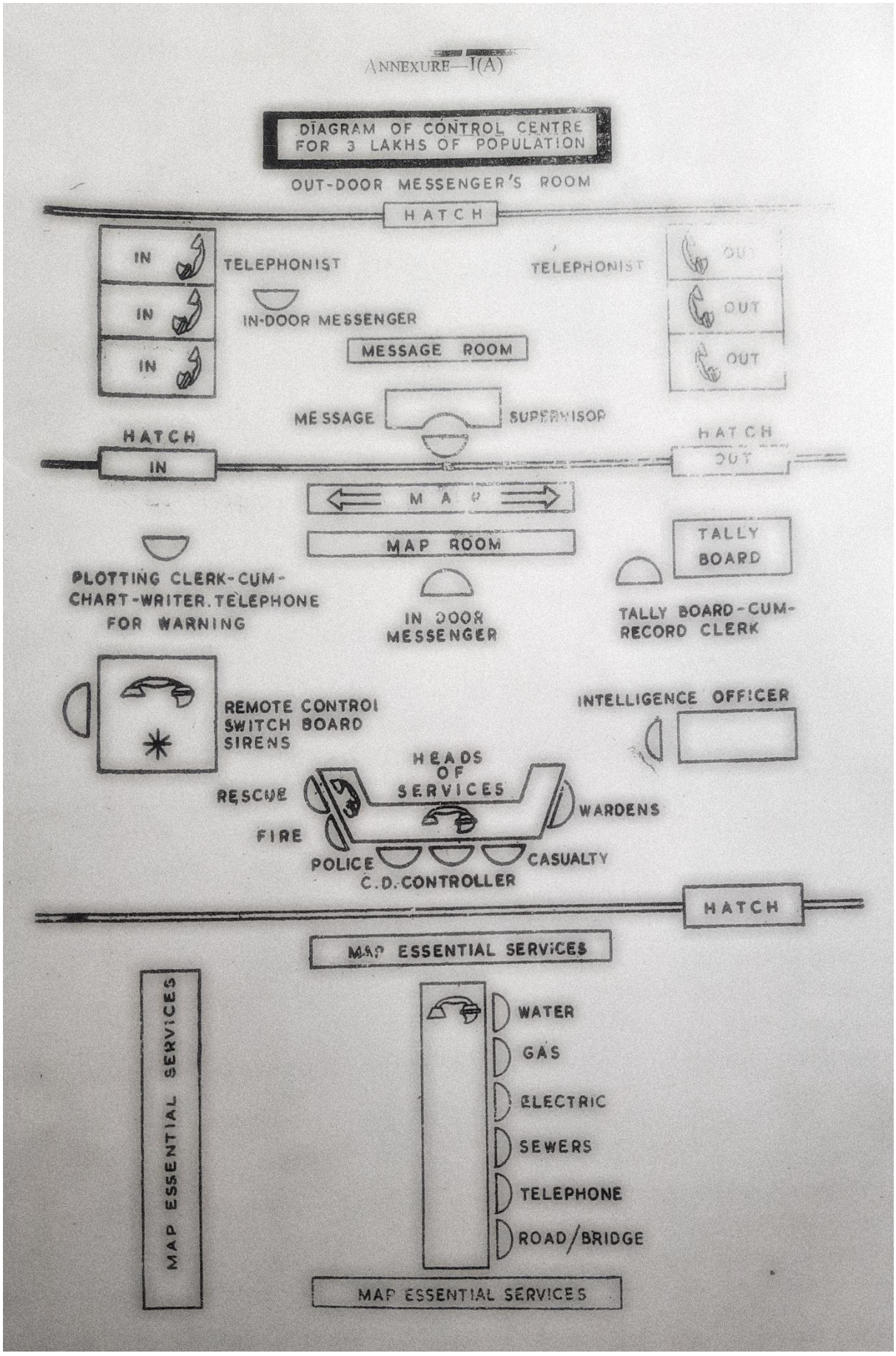
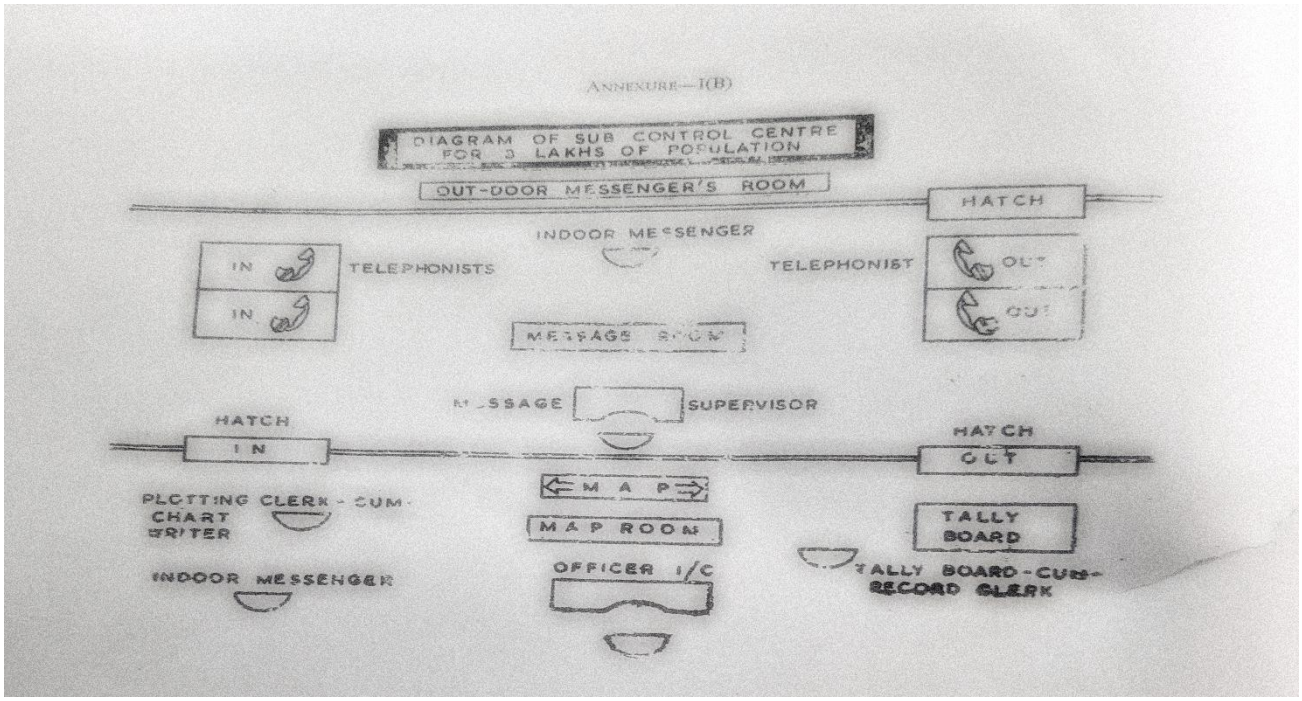


DIAGRAM OF CONTROL CENTRE FOR 3 LAKHS OF POPULATION
OUT-DOOR MESSENGER'S ROOM
HATCH
IN
IN
IN
TELEPHONIST
IN-DOOR MESSENGER
MESSAGE ROOM
TELEPHONIST
OUT
OUT
OUT
MESSAGE
SUPERVISOR
HATCH
IN
HATCH
OUT
MAP
MAP ROOM
PLOTTING CLERK-CUM-CHART-WRITER. TELEPHONE FOR WARNING
IN DOOR MESSENGER
TALLY BOARD
TALLY BOARD-CUM-RECORD CLERK
REMOTE CONTROL SWITCH BOARD SIRENS
INTELLIGENCE OFFICER
HEADS OF SERVICES
RESCUE
FIRE
POLICE
CASUALTY
WARDENS
C.D. CONTROLLER
HATCH
MAP ESSENTIAL SERVICES
MAP ESSENTIAL SERVICES
WATER
GAS
ELECTRIC
SEWERS
TELEPHONE
ROAD/BRIDGE
MAP ESSENTIAL SERVICES



ANNEXURE-II

STAFF OF CONTROL /SUB CONTROL CENTRES -DETAILS OF ONE SHIFT

	Sub Control Centre		Combined Control and sub-Control Centre		
	30 Posts	10 Posts	50 Posts	30 Posts	10 Posts
Officer-in-charge	1	1	1	1	1
Intelligence Officer	-	-	1	-	-
Plotting Clerk-cum-Chart Writer	1	1	1	1	1
Tally Board-cum-Record Clerk	1	1	1	1	1
"IN' Messenger	1	1	1	1	1
(a) Total of Map Room Staff	4	4	5	4	4
Message Supervisor	1	NIL	1	1	NIL
Telephonists	4	2	10	6	2
'IN' Messengers	1	NIL	1	1	1
(b) Total of Message Room Staff	6	2	12	8	3
(c) Total of 'OUT' Messengers	4	2	10	6	2
Total in Shift i.e. total of (a), (b) and (c)	14	8	27	18	9

Besides the above staff there should be one Reconnaissance Party per shift in each Control/Sub Control Centre. Each Party will consist of 2 persons. Extra accommodation should be provided for them in Control/Sub Control Centres. The Reconnaissance Parties are to be provided by the Home Guards, where as other will be qualified persons from industries and educational institution etc.

ANNEXURE – III

RECORD OF INCIDENTS BY PLOTTING CLERK CUM CHAR WRITER IN MAP ROOM IN CONTROL/SUB CONTROL CENTRE.

Record of Incidents

Date	Number of Incident	Details of incident and area	Remarks (by whom reported when information received in control/Sub Control Centre)
	1		
	2		
	3		
	4		
	5		

FROM TO BY SENT BY MESSAGE SUPRVISOR WHEN "OUT" MESSAGE" IS SENT THROUGH MESSENGER.

Indent Number
Date
Number and Time of origin of message
Time of despatch completed
Address to
Addressed from

ANNEXURE-IV

SUGGESTED PROFORMA

Suggested proforma for "Out" Message Register in a Control /Sub Control Centre.

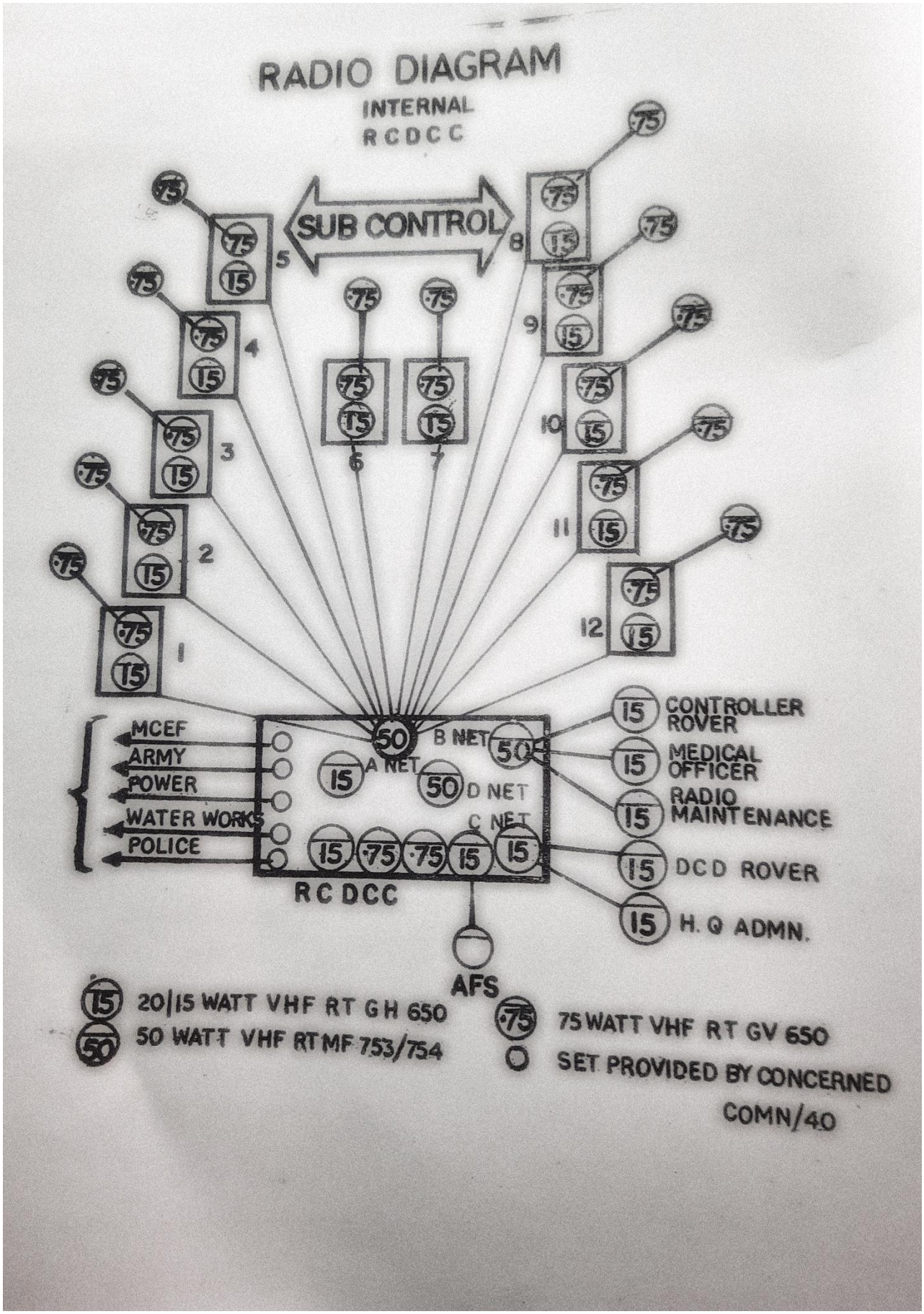
Date:

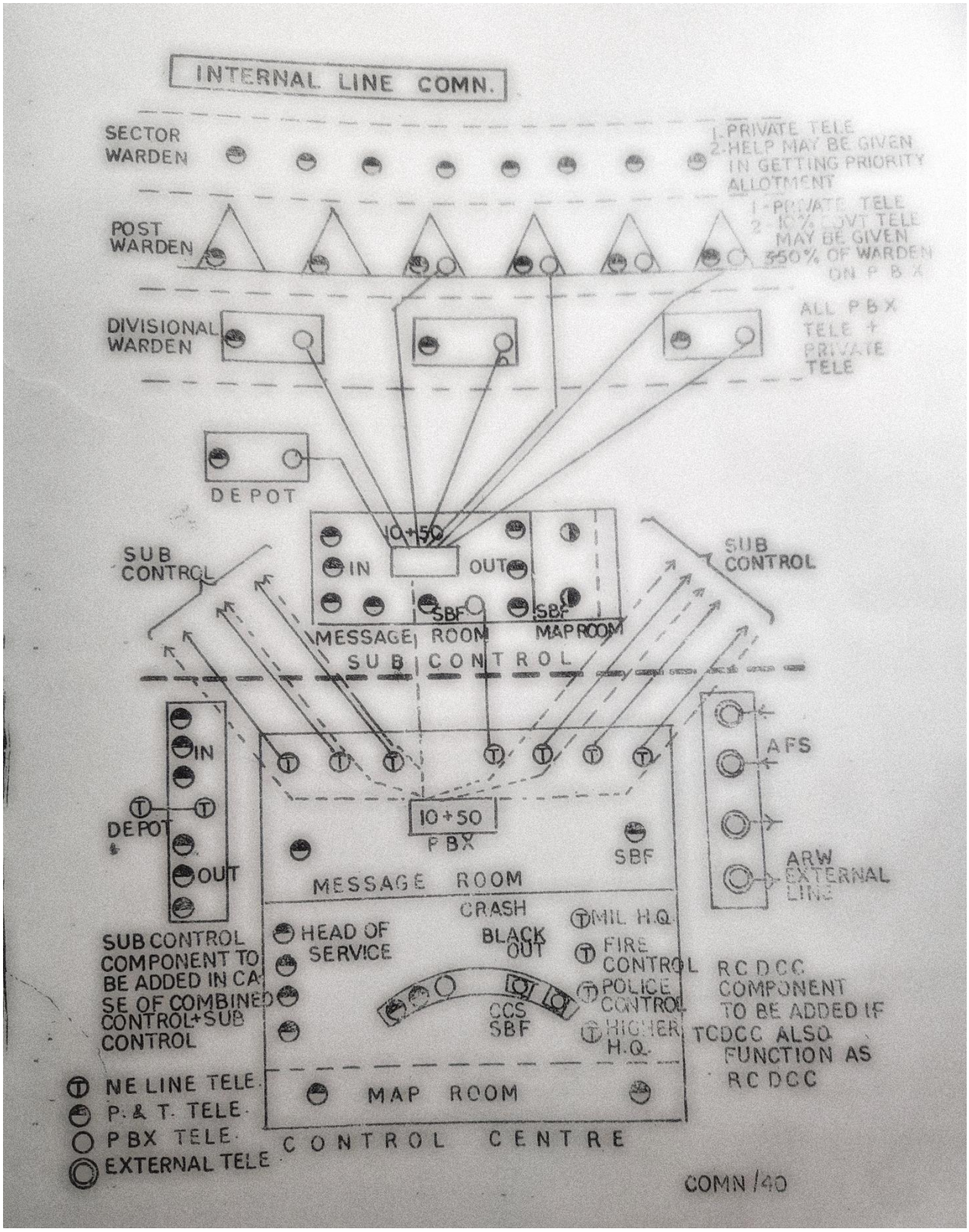
Address to	Copies to	Incident No.		Sent by and time of Despatch		Remarks
			W/T	Telephone	Messenger	

Suggested proforma for "In" Message Register in a Control /Sub Control Centre.

Date:

Originator	Originator No. date and time	Received through and time			Remarks
		W/T	Telephone	Messenger	


RADIO DIAGRAM
INTERNAL
RCDCC
SUB CONTROL
MCEF
ARMY
POWER
WATER WORKS
POLICE
B NET
A NET
D NET
C NET
RC DCC
AFS
CONTROLLER ROVER
MEDICAL OFFICER
RADIO MAINTENANCE
DCD ROVER
H. Q ADMN.
20/15 WATT VHF RT GH 650
50 WATT VHF RT MF 753/754
75 WATT VHF RT GV 650
SET PROVIDED BY CONCERNED
COMN/40


INTERNAL LINE COMN.
SECTOR WARDEN
1-PRIVATE TELE
2-HELP MAY BE GIVEN IN GETTING PRIORITY ALLOTMENT
POST WARDEN
1-PRIVATE TELE
2-10% GOVT TELE MAY BE GIVEN
50% OF WARDEN ON P B X
DIVISIONAL WARDEN
ALL P B X TELE + PRIVATE TELE
DEPOT
10+50
IN
OUT
SBF
SBF
MESSAGE ROOM
MAP ROOM
SUB CONTROL
SUB CONTROL
SUB CONTROL
IN
DEPOT
OUT
10+50
P BX
SBF
MESSAGE ROOM
AFS
ARW EXTERNAL LINE
CRASH BLACK OUT
HEAD OF SERVICE
MIL H.Q
FIRE CONTROL
POLICE CONTROL
HIGHER H.Q.
CCS
SBF
SUB CONTROL COMPONENT TO BE ADDED IN CASE OF COMBINED CONTROL+SUB CONTROL
RCDCC COMPONENT TO BE ADDED IF TCDCC ALSO FUNCTION AS RCDCC
MAP ROOM
NE LINE TELE
P. & T. TELE
P BX TELE
EXTERNAL TELE
CONTROL CENTRE
COMN/40

****

CHAPTER NO. 24

DUTIES OF THE STAFF OF A CONTROL SUB-CONTROL CENTRE AND CIRCULATION OF MESSAGES

1. **Object**:

The object of this lesson is to give the detailed duties of the staff of the Control/Sub-Control Centres, records kept by the various members of the staff and the circulation of messages.

2. **Staff of Control/Sub-Control Centres**:

Over and above the C.D. Controller, the various heads of the Services and the representatives of the Essential Services, the Control/Sub-Control Centres will need, Officer-in-Charge, Intelligence Officer, Messages Supervisor, Telephonists. Messengers, Plotting clerk-cum-Chart Writer and Tally-Board-Cum Record Clerk.

3. Duties of Control/Sub-Control Centre Staff: (i) District Magistrate/Civil Defence Controller:

(a) To exercise general control of all action to be taken as a result of an air raid and will keep in touch with the general situation.

(b) To take decisions on matters of major importance. Where the functions of the District Magistrate and C.D. Controller are not performed by one Officer, the District Magistrate has the responsibility for taking the final decision on any matter, should a difference of opinion arise between any of the concerned.

(c) To arrange for mutual support between the Sub Control Centres or from neighbouring areas.

(d) To make reports as required to higher authorities.

(ii**) Heads of Civil Defence Services and their Deputies**:

(a) To exercise general control and supervision over the work of their services.

(b) To consult with one another on matters affecting more than one service and to decide, if necessary after reference to the District Magistrate and C.D. Controller, on the action to be taken.

(c) They do not intervene in the action of Sub-Control Centres unless it is necessary to allocate the Services to incidents in order of priority or for some other good reason.

(d) They, or their representatives, sit in the Map Room of a Control Centre.

(iii) **Representatives of Essential Services**:

(a) To keep their headquarters in touch with the situation and to inform them of any matter which affects the particular service.

(b) To arrange for any action necessary to be taken by their Services.

(c) To be available for consultation with the District Magistrate/C.D. Controller.

(d) To maintain a report of progress of repair work.

(e) They will sit in a room adjacent to the Map Room of a Control Centre.

4**. Officer-in-Charge:**

(i) He is responsible for the operation of Control and Sub-Control Centre. He will be directly ordinate to the District Magistrate/C.D. Controller sub and may deputise for the latter when he is not available.

(ii) If the situation is such that the order of priority in which incidents should be attended is to be decided he will take instructions from the District Magistrate/C.D. Controller. He will be responsible for the subsequent detailed action.

(iii) If necessary, he will decide on the priority of despatch of messages.

(iv) He will ensure that all clocks and watches are synchronised at regular times each day with Post Office, Radio or Railway Time.

(v) He will be responsible for the efficient organisation of the Centre, training of the staff, maintenance of roster of duties and provision of reliefs.

(vi) He will see that arrangements for alternative lighting and other precautions are satisfactory.

(vii) The Officer-in-Charge in a Sub-Control Centre will make the best use of the Services in the Depot in his area, but he should not allow the Depot strength to be depleted to less than one-third of the sanctioned strength. In case his sanctioned strength is reduced below one-third, he should at once ask for reinforcements. If necessary, he will detail a "Guide" to guide the reinforcements to the proper destinations. It will be useful to arrange for a Dispersal Point Officer in case the Services come from another town/ district.

(viii) He will work as Intelligence Officer when no such Officer is authorised on the establishment.

5. **Intelligence Officer:**

(i) He will maintain a diary of all-important events and a record of each incident showing the action taken.

(ii) He must be ready to give at any time an up-to date and accurate appreciation of the situation.

(iii) He will prepare drafts of such reports as have to be sent to higher authorities. To enable him to do this, he should see every "IN" and "OUT" message and have ready access to the files maintained by the Tally Board Clerk.

(iv) It is desirable that anyone in the Control and Sub-Control Centre may at any time see what has been done about any incident. The Intelligence Officer, will therefore, after noting the contents of 'IN' and 'OUT' messages which he receives from the Officer-in-Charge, place them together in the order in which they are received or despatched and hang them on pegs fixed at a suitable place on the wall of the Map Room.

(v) In smaller Control Centres where no Intelligence Officers are provided, the above duties will be per formed by the Officer-in-Charge of the Centre.

(vi) He will prepare reports on the use of new weapons and new enemy tactics as required by the C.D. Controller.

(vii) He will keep up-to-date static damage cards and maps.

6. **Plotting Clerk-cum-Chart Writer:**

(i) He receives all the copies of 'IN' messages and allots a serial reference number to each incident and enters it on the bottom right hand corner of each 'IN' message form. To avoid confusion between the incidents of different days, the date of occurrence should be given after it, e.g. 5/16 which means Incident No. 5 of 16th. Any messages which are received and which relate to the same incident must be similarly marked with the number previously given to that incident. A copy of any message reporting a fire must be passed on without delay to the Fire Liaison Officer or in his absence, to the Officer-in-Charge of the Centre, if necessary, without marking the incident number. This can be done later.

(ii) The record which he keeps is called a 'Chart'.

(iii) He is responsible for plotting the situations on the wall map and ensuring that it gives a correct picture of the situation as it has been reported up to any given moment.

(iv) As reports come in, he must determine whether they relate to fresh incidents or to the incidents which have already been reported. If it is a fresh incident, he will allot a serial reference number.

(v) He will plot the incident on the map using the incident tabs and pins provided for the purpose. The appropriate coloured pins should be inserted on the map at the point where the incident has occurred and tab bearing the number of the incident should be hung on it.

(vi) He will remove the pins from an incident when it has been reported as cleared, but he should consult the Officer-in-Charge before doing so. Pins indicating unexploded bombs, roads blocked and closed roads should not be removed until the bombs have been disposed off or the incident removed to the Static Damage Map. The incident tabs should be removed when the incident has been reported as 'dealt with' and in any case at 21.59 hours on the day following that in which the incident occurred.

7**. Tally Board-cum-Record Clerk:**

(i) He operates the Tally Board under the immediate supervision of the Officer-in-Charge.

(ii) He is responsible for keeping the Tally Board up-to-date so that it correctly shows the distribution of the civil defence services. To enable him to do this, he must see copies of all 'IN' and 'OUT Messages.

(iii) He files all 'IN' and 'OUT' messages in files numbered to correspond with the reference number of the incident to which they refer. He has Thus, available for reference a complete record of all reports and the action taken in respect of each incident. He will also maintain a Log Book for recording the main events of the day.

(iv) He should file a duplicate copy for all 'OUT messages passed for despatch and attach to the original a slip with the space for 'date', 'time' of despatch and telephonist's initials' completed. Thus, anyone consulting the file can see whether an 'OUT" messages has been despatched or not. There should be a separate file for each incident.

(v) All incidents should be properly recorded and suitably indexed. A sheet of coloured paper should be used to separate messages relating to fresh incidents. Record should also be maintained for messages to and from the next higher or lower authority and other miscellaneous messages which do not relate to any particular incident.

(vi) After mid-night a new set of files will be started for fresh incidents occurring during the next 24 hours. After the incident on a file has been closed. It should be arranged date-wise in serial order of incident number.

(vii) He should be continually scrutinising his files with a view to: (a) Verifying that all messages included have been correctly filed and that any superfluous copies are removed, and (b) Detecting and bringing to the notice of the Officer-in-Charge any incident in regard to which action is unaccountably slow or incomplete.

8. **Message Supervisor:**

(i) He is in-charge of the Message Room and is responsible to the Office-in-Charge for the training of its staff.

(ii) He will arrange the daily roster of duties for all the Message Room personnel so that a small skeleton staff is always on duty and full staff is available at a very short notice by day or night.

(iii) He will supervise the work of the Message Room generally to ensure that it is carried out with accuracy and rapidity, that the messages are legible and that the message procedure is correct.

(iv) He will inform the Officer-in-Charge of any interruptions or congestion of the communication system.

(v) If congestion occurs he will ensure that the messages are despatched according to the order of priority ordered by the Officer-in-Charge.

(vi) During period of congestion he will authorise the use of IN telephone for 'OUT in messages.

(vii) He will ensure that the messages are despatched by the most expeditious means, e.g. by telephone or by messenger, as may be deemed best at the time.

(viii) He will ensure that each telephonist has a list of all telephone numbers which it may be necessary to call. The names and addresses with the authorised abbreviations of the subscribers should be in alphabetical order for easy reference.

(ix) He will see that all messages completed with the particulars concerning the date, time at which the receipt or despatch of message was 'completed and telephonist's initials'.

(x) He will see that the 'OUT' messages after despatch are promptly returned duly completed, to the record clerk for filing and that when messages are sent by messenger the necessary details of despatch are sent to the record clerk.

(xi) If messages are received by messenger, he will ask the Officer-in-Charge if he wishes to question him before he departs.

(xii) He will answer the telephone himself in case of difficulty with any caller.

9. Telephonists and Out-door Messengers:

(i) The telephonists will write down and transmit messages correctly end rapidly and in accordance with the rules for message procedure.

(ii) Messages must be checked back by Telephonists to ensure accuracy and after completion they will be handed over to the Indoor Messenger for check by the Message Supervisor.

(iii) The telephonists will be provided in Sub Control Centres at the scale of per 10 posts (e.g. 1 lakh population). In order to ensure that there is even distribution for 'IN' and 'OUT Telephonists. the number will be kept even by adding one where necessary. The scale for Control Centre will be 2 tele phoniest per 10 posts (i.e. 1 lakh population).

(iv) Out-door messengers will be provided at the same scale as the telephonists.

10. **Circulation of messages and their records:**

(i) IN' Messages:

(a) The 'IN' message will be received either by telephone/wireless or through a messenger in the Message Room of a Control/Sub-Control Centre. In the former case the 'IN' Tele phoniest/Wireless at the Control Centre makes 4 copies of the message for being passed the Message Supervisor further circulation. In the latter the Message arranges get 4 At this stage the Message Supervisor will enter this subsequent "IN" Messages in the IN' Register of the Message Supervisor before Map of Control/Sub-Control Centre. (The proforma of the Register is given in the attached chart). All "Express/Air Raid Damage" messages received are copied on the CDM-2 form printed red. The Supplementary and Final Reports are always noted on CDM-4 form printed red.

(b) The four copies are then passed through the Hatch to the Plotting Clerk-cum-Chart Writer, who inserts the incident numbers on each message Thus, received. He also keeps a record of number of incidents serially in his Register (Proforma is attached). The fresh numbering is resorted to every 24 hours.

(c) If the message reports 'fire' the Plotting-Clerk cum-Chart Writer will pass a copy, which normally goes to the Officer-in-Charge to the Fire Liaison Officer immediately without delaying it for the insertion of the incident number. The Fire Liaison Officer or the Officer-in-Charge will, after having taken action, pass this copy to the Plotting Clerk-cum-Chart Writer for insertion of the incident number.

(d) When all copies have been given the incident number by the Chart Writer, they are ready for circulation. After plotting the incident one copy is passed on to the Tally Board-cum-Record Clerk, who makes the necessary alterations on the Tally Board and keeps the copy on the Record File. The second copy is passed on to the Officer-in-Charge. The Officer-in-Charge then passes the copy on to the Intelligence officer who finally keeps it on the clip file. The third copy is placed on the table of the C.D. Controller and Heads of Services and the fourth copy is passed on to the representatives of Essential Ser vices sitting in the adjacent room. When no longer required, these copies are passed on to the Tally Board-cum-Record Clerk who destroys them to avoid unnecessary accumulation of papers.

NOTE: In a Sub-Control Centre three copies will be made instead of four and their distribution and the course of circulation will be as shown below:

1 copy-Plotting Clerk-cum-Chart Writer.
1 copy-Officer-in-Charge.
1 copy-Tally Board-cum-Record Clerk.

(ii) **'OUT' Messages**: The 'OUT' Messages are initiated at the table of the D.M./C.D. Controller or the Officer-in-Charge. The messages are written on the Form CDM-3. The number of copies prepared is always equal to the number of recipients plus 2 extra. Theses copies are then circulated as follows:

(a) One copy is passed on to the Officer-in-Charge who passes it on to the Intelligence Officer, if one is authorised on the establishment.

(b) One copy is passed on to Tally Board-cum-Record Clerk, who makes the necessary changes on the Tally Board and then he keeps the copy on Record File.

(c) The Message Supervisor on receiving copies of these 'OUT' messages will enter them in the Register (Proforma is attached) and all subsequent messages are also registered thus. He will then distribute them to the 'OUT Telephonists or send them by out messengers. After the despatch by the 'OUT' Telephonist is completed, the copies duly initialled by them are passed on to the Message Supervisor. The Message Supervisor after recording the time at which the despatch of the message was completed in the Register as mentioned above passes it on to the Tally Board-cum-Record Clerk, who attaches these confirmations on the copy of the 'OUT' Message, in each of his concerned incident files. If the Message is sent by Messenger, the Message Supervisor will intimate the fact to Tally Board-cum-Record Clerk on a special form.

NOTE: In Sub-Control Centre the distribution and course of circulation of an 'OUT Message will be as follows:

1 copy-for each addressee.
1 copy -for Tally Board -cum Record clerk.
1 copy -for Officer-in-Charge.

RECORD OF INCIDENT BY PLOTTING CLERK CUM CHART WRITER IN THE MAP ROOM OF A CONTROL CENTRE

Record of incidents

Date	No. of incident	Details of incident and area	Remarks (by whom reported)
	1.		
	2.		
	3.		
	4.		
	5.		

FROM TO BE SENT BY MESSAGE SUPERVISOR WHEN 'OUT MESSAGE' IS SENT THROUGH MESSENGER.

Incident No……..

Date…….

No. and time of origin of message……..

Time of Despatch completed……

Address to……

Address from……..

SUGGESTED PROFORMA FOR THE "IN MESSAGE" REGISTER IN A CONTROL/ SUB-CONTROL CENTRE.

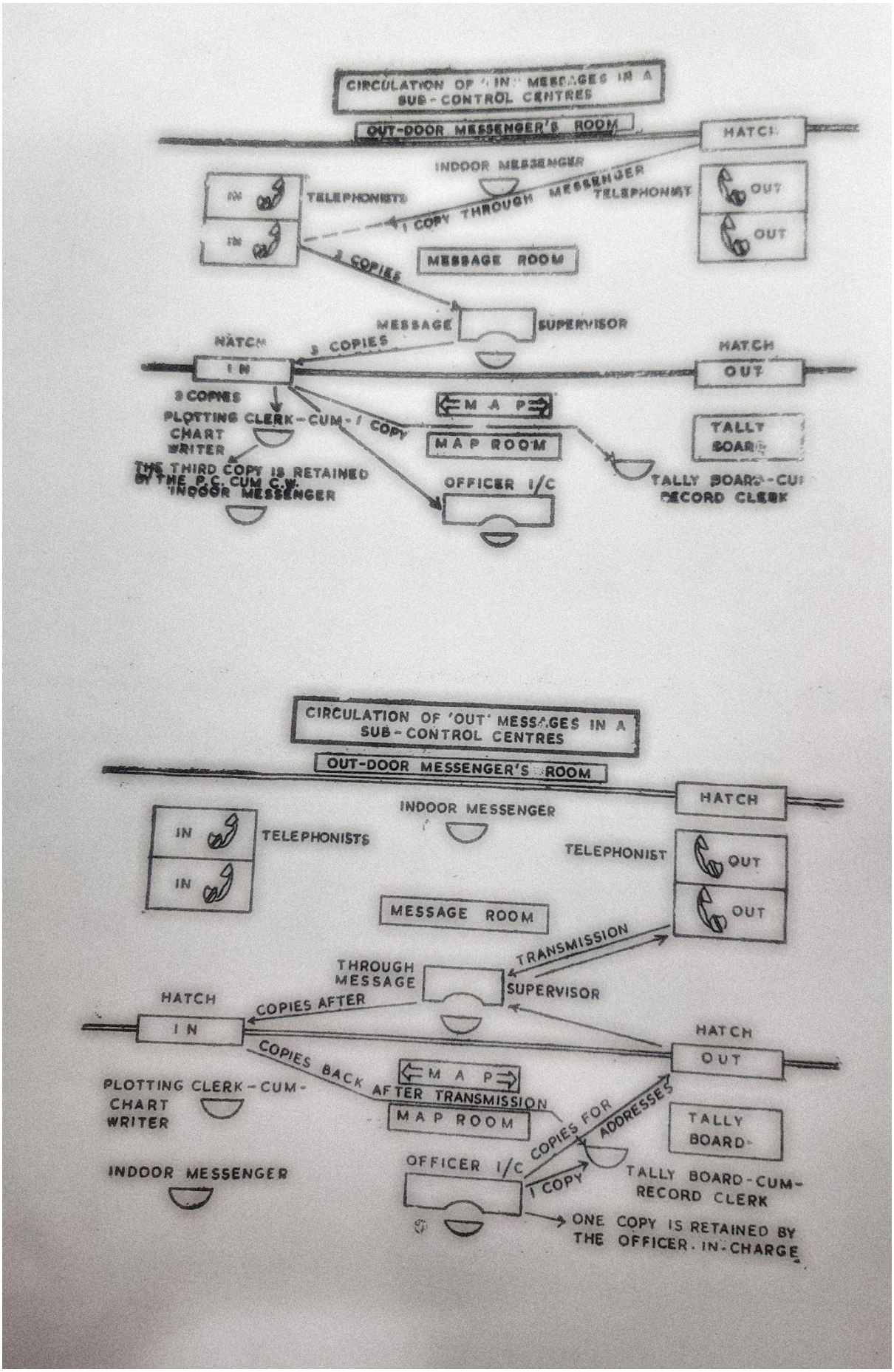
Date:

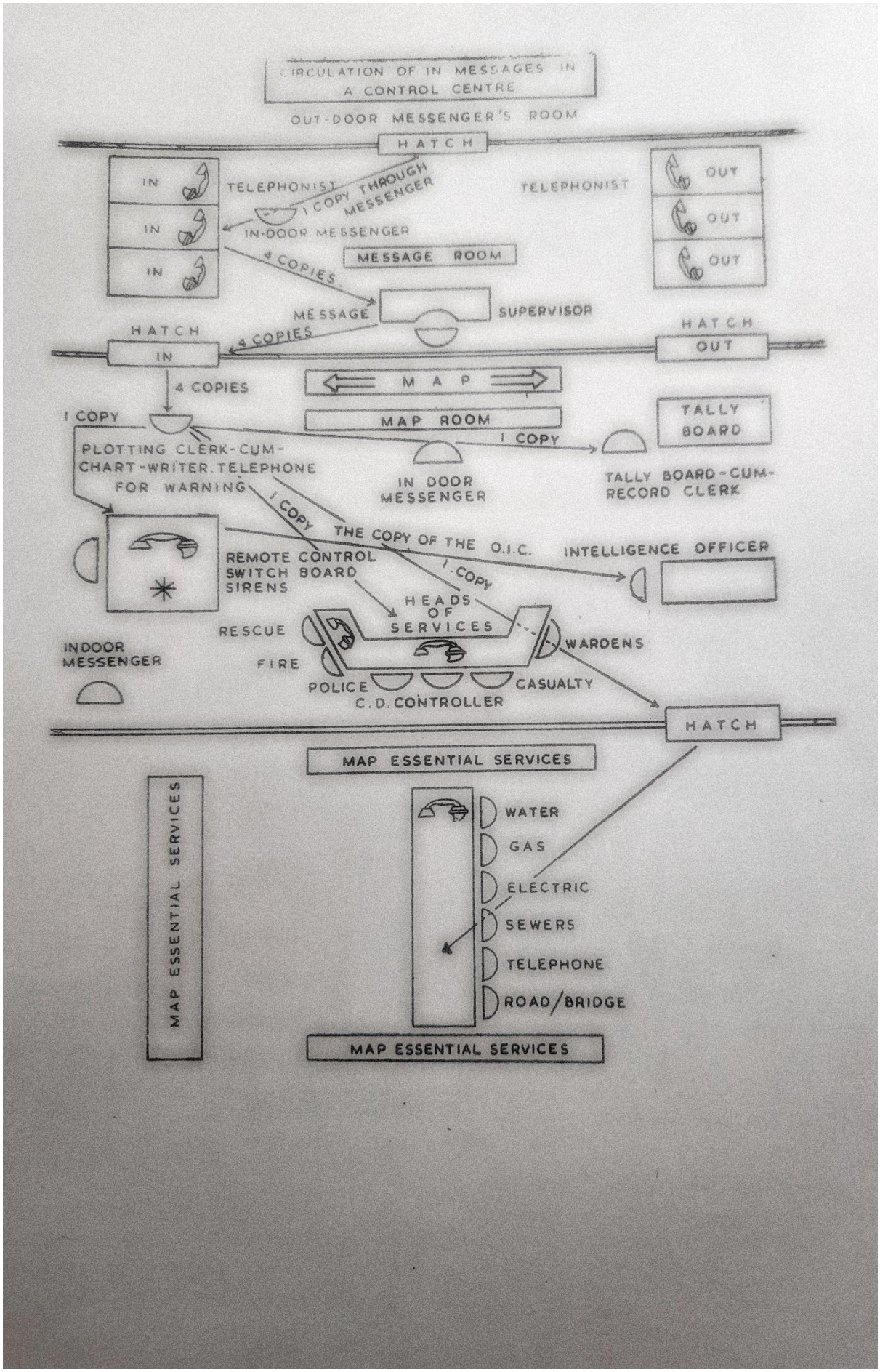
Originator	Originator No. date and time	Received through and time			Remarks
		W/T	Telephone	Messenger	

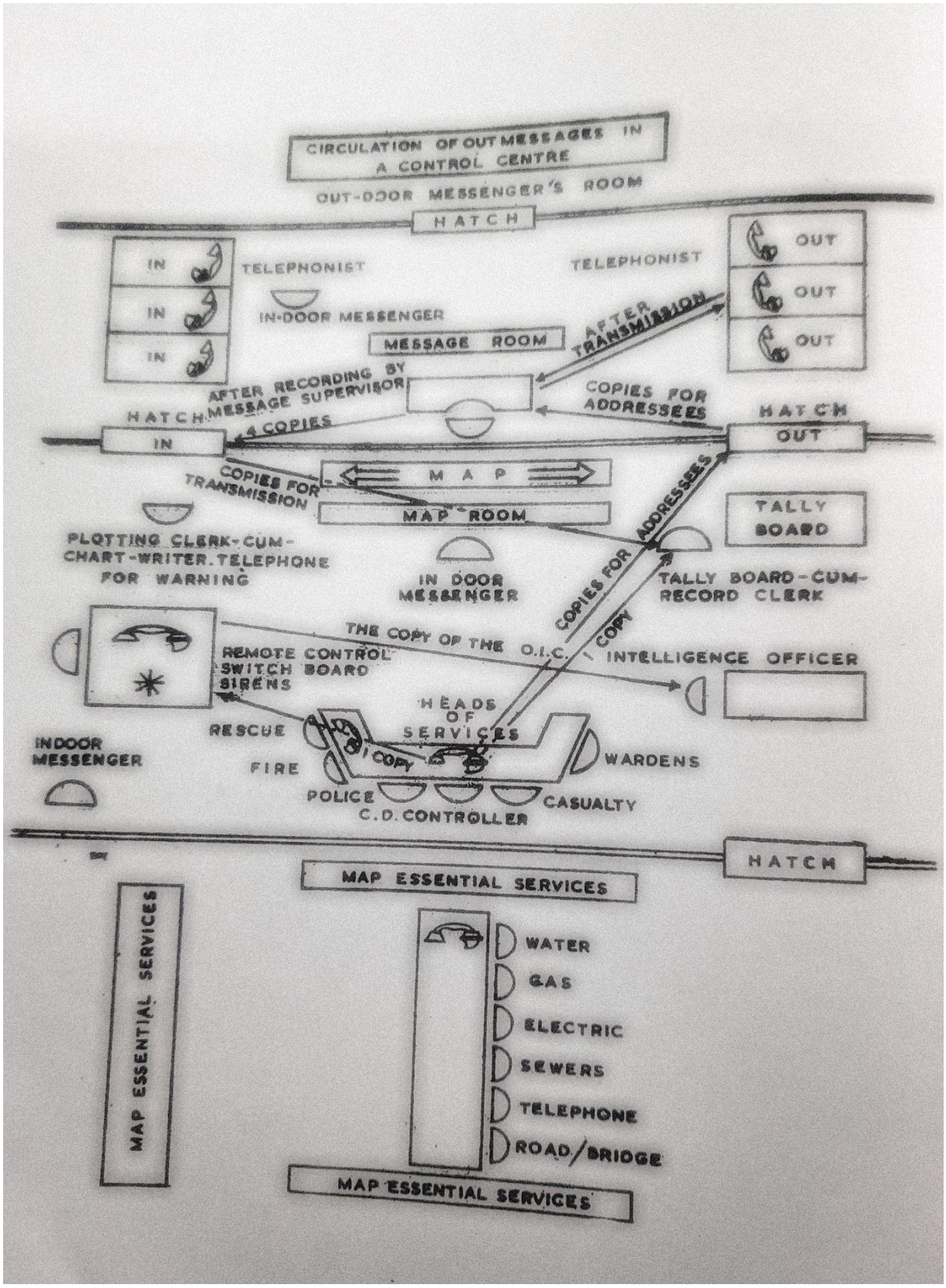
SUGGESTED PROFORMA FOR THE "OUT MESSAGE" REGISTER IN A CONTROL/ SUB-CONTROL CENTRE.

Date:

Address to	Copies to	Incident No.	Sent by and time of Despatch			Remarks
			W/T	Telephone	Messenger	


CIRCULATION OF 'IN' MESSAGES IN A SUB-CONTROL CENTRES
OUT-DOOR MESSENGER'S ROOM
HATCH
INDOOR MESSENGER
TELEPHONISTS
IN
IN
1 COPY THROUGH MESSENGER
TELEPHONIST
OUT
OUT
3 COPIES
MESSAGE ROOM
MESSAGE
SUPERVISOR
HATCH
IN
3 COPIES
HATCH
OUT
3 COPIES
M A P
PLOTTING CLERK-CUM-CHART WRITER
1 COPY
MAP ROOM
TALLY BOARD
THE THIRD COPY IS RETAINED BY THE P.C. CUM C.W.
INDOOR MESSENGER
OFFICER I/C
TALLY BOARD-CUM-RECORD CLERK
CIRCULATION OF 'OUT' MESSAGES IN A SUB-CONTROL CENTRES
OUT-DOOR MESSENGER'S ROOM
HATCH
INDOOR MESSENGER
IN
IN
TELEPHONISTS
TELEPHONIST
OUT
OUT
MESSAGE ROOM
TRANSMISSION
THROUGH MESSAGE
SUPERVISOR
HATCH
IN
COPIES AFTER
HATCH
OUT
M A P
COPIES BACK AFTER TRANSMISSION
PLOTTING CLERK-CUM-CHART WRITER
MAP ROOM
TALLY BOARD
COPIES FOR ADDRESSES
INDOOR MESSENGER
OFFICER I/C
1 COPY
TALLY BOARD-CUM-RECORD CLERK
ONE COPY IS RETAINED BY THE OFFICER-IN-CHARGE


CIRCULATION OF IN MESSAGES IN A CONTROL CENTRE
OUT-DOOR MESSENGER'S ROOM
HATCH
IN
IN
IN
TELEPHONIST
1 COPY THROUGH MESSENGER
IN-DOOR MESSENGER
4 COPIES
MESSAGE ROOM
TELEPHONIST
OUT
OUT
OUT
MESSAGE
SUPERVISOR
4 COPIES
HATCH
IN
HATCH
OUT
4 COPIES
MAP
MAP ROOM
1 COPY
PLOTTING CLERK-CUM-CHART-WRITER. TELEPHONE FOR WARNING
1 COPY
IN DOOR MESSENGER
TALLY BOARD
TALLY BOARD-CUM-RECORD CLERK
1 COPY
THE COPY OF THE O.I.C.
INTELLIGENCE OFFICER
REMOTE CONTROL SWITCH BOARD SIRENS
1 COPY
HEADS OF SERVICES
RESCUE
FIRE
POLICE
CASUALTY
WARDENS
C.D. CONTROLLER
INDOOR MESSENGER
HATCH
MAP ESSENTIAL SERVICES
MAP ESSENTIAL SERVICES
WATER
GAS
ELECTRIC
SEWERS
TELEPHONE
ROAD/BRIDGE
MAP ESSENTIAL SERVICES


CIRCULATION OF OUT MESSAGES IN A CONTROL CENTRE
OUT-DOOR MESSENGER'S ROOM
HATCH
IN
IN
IN
TELEPHONIST
IN-DOOR MESSENGER
TELEPHONIST
OUT
OUT
OUT
MESSAGE ROOM
AFTER TRANSMISSION
AFTER RECORDING BY MESSAGE SUPERVISOR
4 COPIES
HATCH
IN
COPIES FOR ADDRESSEES
HATCH
OUT
COPIES FOR TRANSMISSION
MAP
MAP ROOM
TALLY BOARD
PLOTTING CLERK-CUM-CHART-WRITER.TELEPHONE FOR WARNING
IN DOOR MESSENGER
COPIES FOR ADDRESSEES
TALLY BOARD-CUM-RECORD CLERK
THE COPY OF THE O.I.C.
1 COPY
INTELLIGENCE OFFICER
REMOTE CONTROL SWITCH BOARD SIRENS
HEADS OF SERVICES
RESCUE
INDOOR MESSENGER
FIRE
1 COPY
WARDENS
POLICE
CASUALTY
C.D. CONTROLLER
HATCH
MAP ESSENTIAL SERVICES
MAP ESSENTIAL SERVICES
WATER
GAS
ELECTRIC
SEWERS
TELEPHONE
ROAD/BRIDGE
MAP ESSENTIAL SERVICES

****

CHAPTER NO. 25

REPORTING PROCEDURE AND TYPES OF FORMS IN C.D.

1. **Object**:

The object of this lesson is to study the Reporting Procedure and types of Forms in CD. It will also be discussed in brief here the method of filling in the various forms and the essentials of Reporting and Telephoning while conveying them on telephone.

2. **Introduction**:

Reporting within the communication services is a essential feature of the Civil Defence Organisation. without which the operational work cannot proceed systematically. To render effective and immediate relief to the victims the controlling authorities must have immediate reports from the place of damage and send reports to higher authorities for further help as and when necessary. This can best be done by a correct and a comprehensive procedure of reporting. The efficient system of reporting is necessary for the following reasons.

(i) It enables C. D. Authorities to deploy services efficiently and in time.

(ii) It helps to effect proper coordination amongst the various C. D. Services.

(ii) It helps to arrange for mutual aid in time.

3. Essentials of Reporting and Hints on Message Writing:

(i) Essential of Reporting:

(a) Reports must be sent quickly with the maxi mum speed possible.
(b) Reports must be brief and must exclude all irrelevant details.
(c) Reports must be accurate and should contain no exaggeration.
(d) Reports must be sent through reliable means of communications.

(ii) **Hints on Message Writing**:

(a) Be brief, but not inaccurate or ambiguous.

(b) Be clear and not vague if the answer to a particular column is 'NIL', this must be filled in and neither left blank nor just a line drawn in the column.

(c) Use simple language. Short and easily recognisable words of one or two syllables should be used.

(d) Must be written in legible hand.

(e) Do not use unauthorised abbreviation.

(f) Punctuate the report properly.

(g) Time in reports must be described by reference to 24 hours.

(h) Describe area by taking the northern most-point first and remaining points in clockwise direction Avoid use of right left or front behind etc.

(i) Describe area by taking the northern most-point first and remaining points in clockwise direction. Avoid use of right. left or front. behind etc.

4. **Types of Reports:**

The process of reporting commences from the moment a warning about an air-raid is received. There after as soon as the damage takes place the Wardens start sending the various reports. Reports are also made to higher authorities. Following are some of the important reports in C. D.

(i) **Warning Reports**: Air-raid message, Yellow, Red, Green and White on which action is taken at the Control/Sub-Control Centres.

(ii) From place of damage:

(a) Fire Report.
(b) Express Report.
(c) Air Raid Damage Report.
(d) Supplementary Reports.
(e) Final Report.
(f) U.X.B. Report.
(g) Crashed or Force Landed Aircraft Report.
(h) Air Raid Report from Warden's Post.

(iii**) Communications Services-Internal Reports: ***

(a) Damage report from Sub-Control Centre to Control Centre.
(b) Despatch and return of services, report from Sub-Control Centre to Control Centre.
(c) Special reports regarding out-break of panic etc., from Sub-Control Centre to Control Centre.

(iv) **Reports Higher Authorities**: Situation reports from Control to District Magistrate, State Government and Central Government.

(v) **Special Reports:** Special report may be sent by Reconnaissance Parties to Control/Sub-Control Centre, abnormal damage essential service, special and new type of weapons used by enemy and any other heavy damage and regarding reinforcement required.

5**. Reporting Procedure and Their Forms:**

Fire Report in C. D. is sent direct to Fire Brigade Stations in case of fire. Express Report is an urgent report giving only broad picture of the situation, so that some help is rushed immediately to the place of damage. Fire and Express Reports are written on CDM-1 (Proforma is attached). "The Air Raid Damage Report" is more detailed report of the damage and is sent on CDM-1 filling all the twelve columns with proper details/additions etc. The Express and Air Raid Damage reports which are prepared by the Wardens on CDM-1 is copied at the Control/Sub-Control Centre on CDM-2 printed red with the same columns (Proforma attached). The supplementary reports give progress of an incident from time to time. The Final report is sent after all the C. D. Services have finished their work at the place of damage. Both these reports are prepared by the ICO, on CDM-3 and are copied at the Control/Sub-Control Centre on CDM-4.

6**. Method of Writing Reports:**

(i) **Fire Report**: This is written on CDM-1 and is sent to Fire Station direct. General instructions for filling up the columns are given below. Only first eight and column 12 are filled up.

(a) Encircle the word "Fire" to show this is Fire Report.
(b) Designation of Reporting agent mention War. den's Post number.
(c) **Time of incident**: It is the time at which the incident took place.
(d) **Place of Incident**: Describe clearly using the name of familiar roads and their junctions giving distances in metres and direction by North, South etc.
(e) **Cause of damage**: Draw a ring round the type of bomb/bombs used.
(f) Casualties Indicate whether casualties are there or not. No numbers are necessary at this stage.
(g) **Type of fire**: Say House/Electrical/Cinema/Petrol Fire etc.
(h) **Names of roads completely blocked**: Only such roads should be mentioned as are impassable. Distinguish it from roads closed.
(i) **Remarks**: In this such information as may have a bearing on the control of fire may be mentioned.

NOTE-Below is given a specimen Fire Report,
(1) Fire Report.
(2) KBI
(3) 1808 hrs.
(4) Junction of Gurdwara Road and Arya Samaj Road.
(5) HE
(6) Few, also under wreckage and fire.
(7) House Fire.
(8) Nil
(12) Nil

Message Ends.

(ii**) Express Report**: A short report written in the same manner as Fire Report is sent to the Control/ Sub-Control Centre for calling immediate help from depot. A specimen "Express Report" is given below.

(1) Express Report.
(2) KBI
(3) 1808 hrs,
(4) Junction of Gurdwara Road and Arya Samaj Road,
(5) HE
(6) Few, also under wreckage and fire,
(7) House Fire.
(8) Nil
(12) Karol bagh Fires Station informed.

Messages Ends

(iii) **Air Raid Damage Report**: This report is sent immediately after the Express Report by the Warden/ Incident Control Officer on the basis of his detailed reconnaissance. In this report all the columns are filled. The columns in which there is difference from those of Express Report and the additional columns filled in are described below.

(a) **Casualties**: Here as far as possible the exact number of casualties should be mentioned. Also give the number separately of those trapped, injured or under wreckage and so on.

(b) **Position of U.X.B.:** This should be given as precisely as possible.

(c) **Services on the spot or coming:** Give total number of parties and not the personnel numbers of different parties.

(d) **Remarks**: In this mention the damage to buildings and the number involved. Mention also the extent of crater due to bombs, suspected U.X.B. Giving size, whether buried or unburied, number of persons killed, unusual objects found, food stuff damaged, broken glass on roads etc., and any other relevant information like wind direction etc.

NOTE. A Specimen "Air Raid Damage Report" is given below.

1. Air Raid Damage.
2. KBI
3. 1808 hours
4. Junction of Gurdwara and Arya Samaj Road.
5. H.E.
6. 16, including 4 trapped under wreckage and 3 by fire.
7. House Fire.
8. Nil
9. Water Mains U.G.
10. Nil
11. One Rescue Party, 2 F.A. Parties and Fire Service.
12. Two persons killed.

Message Ends.

(iv) **Supplementary Report**: This report on CDM-3 from Warden's Post about the progress of work at the place of damage give more details of damage progress of incident and the measure taken to deal with it. It also conveys requests for further assistance if any. A specimen Supplementary Report as below.

Address to: Sub-Control Centre Civil Lines

Type of Message:
Supplementary report

Incident number (Time and place of incident if number not known)

20 more casualties trapped,
send one more Rescue Party,

Message Ends

Time of origin of message -1030 hrs.
Address from: WP-KB-I Incident Officer
Signature----------incident No.----------

(v) **Final Report**: Final Report in C. D. is sent in the same form as Supplementary Report but it gives the following information in details and is sent when the incident is closed.

(a) Total number of casualties.
(b) Number of casualties sent to Hospital, F. A. Post and to their homes.
(c) Number of dead
(d) Whether or not Police have taken over after the Incident Officer decides to depart.

7. **Telephoning Procedure:**

In case of an Air Raid, large number of messages will start passing on the lines of communication. The most frequently used communication will be on telephone. The objective to be achieved in passing these messages is, least of inaccuracy with maximum of brevity and speed. This will in turn depend upon the efficient procedure of telephoning. Following are some of the hints which may be followed in so for as telephone procedure is concerned.

(i) **Salutation:**

(a) IN and OUT telephonist whenever they contact each other should open the conversation by disclosing their respective identities to avoid any confusion and irksome questioning.
(b) The person conveying the message should then start with the words. "There is a message for you", and he should always name the type of report such as Fire, Express, Supplementary etc. This will enable the receiving telephonist to be ready to take down the message on the appropriate form.

(ii) **Control of Messages**: The sender must conform to the speed at which the receiver can take down the message. The recipient is, therefore, in charge of the message and controls the speed at which it is sent.

(iii) **Repetition**: All the messages must be read back from top to bottom by the recipient for check by the sender. Each message should end with a word "Message Ends".

(iv) **Time**: The time of origin of message and the time of completion must always be given at the appropriate place on the form.

(v) (a) **Passing a Number**: In giving the number adopt the general rule of saying each digit, Thus, 4 8 3 2 "Four-Eight-Three Two" and not "Four thousand eight hundred and thirty-two"-where two digits occur twice use the word "double" for giving the number.

(b) Articulation is very important as it is much easier for a mistake to be made over the telephone than in personal conversation. For example, 5 sounds like 9 and ought and not sound like 8. Thus,, in saying these always accentuate the appropriate letters in a word.

(vi) **Spelling Words**: When any word is not intelligible over the telephone and if it is to be spelt, it is important that the recognised name of the alphabet is made use of to avoid confusion. The P & T and Military have their own phonetic codes and they are given in the attached chart.

(vii) **Use of standard phrases**: In order to avoid lengthy procedure of transmission and at times irrelevant or irksome questions it is necessary that some set phrases should be used by the persons while conveying or receiving a message on telephone. Following are some of the phrases which may be practised during training and used by all the telephonists in an emergency.

Phrase	Meaning or Use
(a) I say again	When repeating a message
(b) I spell	When spelling a word or sending letters. (Word as complete is not given when it is desired to spell it).
(c) Figures	Whenever speaking out Figures they should be preceded by the phrase "Figure",
(d) Say again	Use by the receiver to obtain repetition of a transmission.
(e) All after (f) All before	When asking for repetition or giving out verification or correction.
(g) Correction	Whenever conveying a correction this is always preceded by the phrase "correction".

PHONETIC ALPHABET

Letters of Alphabet	Military	P & T Department
A	Alfa	Army
B	Bravo	Brother
C	Charlie	Cinema
D	Delta	Doctor
E	Echo	English
F	Foxtrot	Father
G	Golf	Gold
H	Hotel	Hotel
I	India	India
J	Juliet	Jam
K	Kilo	King
L	Lima	Lady
M	Mike	Mother
N	November	Navy
O	Oscar	Orange
P	Papa	Paper
Q	Quebec	Queen
R	Romeo	Raja
S	Serra	Sister
T	Tango	Table
U	Uniform	Uncle
V	Victor	Victory
W	Whiskey	Water
X	X-ray	X-ray
Y	Yankee	Yellow
Z	Zulu	Zero

MESSAGE FROM C.D.M-1

From of Report to Control/Sub Control Centre or Fire Station

Date:		Time of origin
1. (Commence report with the words)	FIRE/EXPRESS/AIR RAID DAMAGE REPORT	
2. Designation of Reporting Agent (e.g. Warden's Post Number).		
3. Time of Incident		
4. Place of Incident		
5. Cause of Damage:	H.E. IB.	Cr. Aircraft
6. Casualties (if any trapped under wreckage or fire, say so)		
7. Type of fire, if any		
8. Names of roads completely blocked		
9. Damage to Mains:	Water Gas Overhead/Underground	Sewers Electric Cables
10. Position of unexploded bombs		
11. Services already on the spot or coming		
12 Remarks		
(Finish with the words).		"MESSAGE ENDS"
ORIGIONAL /DUPLICATE	These words are for use with a report sent by Messenger, delete whichever does not apply	

*put a ring round the actual damage and leave others alone.
NOTE: For Express or Fire Report use only columns 1 to 8 and where necessary column 12 also.

MESSAGE FORM C.D.M.2
(For use at Control/Sub-control Centre)

(PRINTED RED)

Date	Time at which receipt of message was completed			Telephonist's initials
1.	*(Commence report with the words)	FIRE/EXPRESS/AIR RAID DAMAGE REPORT		
2.	Designation of Reporting Agent (e.g. Warden's Post Number)			
3.	Time of Incident			
4.	Place of Incident			
5.	Cause of Damage	H.E.	I.B.	Cr. Aircraft
6.	Casualties (if any trapped under wreckage or fire, say so)			
7.	Type of fire if any			
8.	Names of roads completely blocked			
9.	*Damage to Mains	Water Overhead/Underground	Gas	Sewers Electric Cables
10.	Position of unexploded bombs			
11.	Service already on the spot or coming:			
12.	Remarks			

Serial Number of Incident
(Inserted in the Map Room)

(Finish with the words) "MESSAGE ENDS"

*put a ting round the actual damage and leave others alone.

MESSAGE FORM C.D.M -3

Date	Time at which despatch of message was completed	Telephone's/ Report's initials
Address to:		
Text to Message:		
Time of origin of Message: Address from: Signature (of official authorising the despatch of an "OUT Message")		Serial Number of Incident (Inserted in the Map Room)

(PRINTED RED)

MESSAGE FORM C.D.M -4

Date	Time at which despatch of message was completed	Telephone's/ Report's initials
Address to:		
Text to Message:		
Time of origin of Message: Address from:		Serial Number of Incident (Inserted in the Map Room)

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CHAPTER NO. 26

CONTROL OF AN INCIDENT BY DAY AND NIGHT-DUTIES OF AN INCIDENT CONTROL OFFICER, ALLOCATION OF SERVICES

1. **Object**:

The object of this lesson is to study the duties of an Incident Control Officer and the procedure for controlling an Incident.

2. **Introduction**:

During enemy air-raids various seats of damages are likely to occur in an area where devastation may range from local to widespread. The damage at a localised place in a limited area is termed as an Incident. As soon as the damage takes place the Civil Defence personnel (Wardens) as per their organisation and pre-determined functions rush to the scene of damage. Here they mobilise of the help local people and available local resources to deal with the situation. More often the damage may be of such a nature that C.D. Services from depots may have to be called at the place of damage to reinforce the local effort. A few other services like, Fire, Police the personnel of the Essential Services may also be required. Thus, in case of a wide spread damage it will become necessary to have a more responsible coordination of the work of the various services at the place of damage. This is done by deputing Incident Officers from Civil Defence Combined Depots. The Incident Officer immediately on arrival takes over charge from the Wardens and starts controlling the incident. The main functions of Incident Control Officer are as follows:

(i) To coordinate and control the operations of the different C.D. Services without going into the technical details of the work done by respective services.

(ii) To ensure that there is the closest cooperation of various services with Police and Fire Services.

(iii) To ensure that operations proceed systematically and according to a well chalked out programme.

(iv) To keep the Sub-Control/Control Centre fully informed of the progress of work at the incident from time to time.

3. **Incident Officers:**

Suitable persons from higher ranks of Wardens Services and Instructional Staff who have no other operational function during an air-raid should be selected to perform the functions of an Incident Control Officer. One Incident Officer per 25,000 population may be selected and trained. A reserve of 25 percent of Incident Officers should be provided. Staff Officers or some of the Instructional staff may be designated as Incident Officers and hence no fresh recruitment may be necessary. They should have detailed knowledge of topography power to command, coolness in danger, ability to size up situation and plan etc. They should have detailed knowledge of topography of affected areas and Civil Defence Organisation and Operations. It is desirable to accommodate them in Combined Depots and not in Wardens Posts. Until arrival of Incident Officer, Post Warden or senior-most Warden present will coordinate the activities.

4. **Duties of an Incident Control Officer:**

(i) **Setting up of a Post**: It is important that the Incident Control Officer should set up his Post as soon as possible after his arrival at the place of incident, yet it is most essential that he should set up this Post taking certain important points into consideration. The Incident Officer must report his arrival to the Control/Sub-Control Centre and give the position of the Post and the telephone number he is using or the number of the Warden's Post through which messages will pass. Control/Sub-Control Centres are authorised wireless sets and hence all available wireless sets should be issued to "ICOS" for establishing wireless link with the Control/Sub-Control Centre. If an ordinary subscriber's telephone is to be brought into use the Control/Sub-Control Centre must be informed in order to ensure that it will be made available during the operation. The position of the post should be determined taking into consideration some of the following points.

(a) It should be established at a point where it can easily be found by the leaders of incoming services.
(b) It should be close enough to the damage and to the casualty loading point to enable touch to be maintained with operations, but not so near as to be lost among the working parties.
(c) Where there are several seats of damage it should be placed in as central a position as possible.
(d) It should be usually set up, up-wind of the occurrence to avoid smoke from fire etc.

(ii) **Reconnaissance and Information**: Information must be readily available with the Incident Officer regarding the number of casualties in the collapsed buildings and where the same are likely to be found. For this the Incident Officer immediately deputes Wardens to the damaged places who will perform the following duties.

(a) Collect all information and pass it on to the Incident Officer.
(b) To give help to casualties rescued locally and till such time as C.D. Services arrive.
(c) To help the leaders of various parties and pass on all information regarding casualties at the place of damage to them.
(d) To act as a link between various C.D. Parties and the Incident Officer and arrange for such additional help as may be necessary
(e) To acquaint Incident Officer of the progress made in the clearance of casualties etc. from time to time.
(f) To keep a record of all such casualties as may be cleared by the C.D. Services.

(iii) **Progress Reports**: The Incident Control Officer must also keep the Sub-Control/Control Centre fully informed about the progress of control of an Incident and this he should do by periodically sending progress reports.

(iv) **Suspension of Operations**: As a rule, no operation at a place of damage will ever be suspended unless it is found that the continuance of the same will be dangerous for the life of those who are working. In any case the suspension of operation will not be resorted to unless formal permission is granted by Sub-Control/Control Centres.

(v) **Closing of an Incident and Final Report**: An Incident will not be closed by the Incident Officer until all casualties have been removed and missing persons either accounted for, or the fact that they are not trapped established beyond all doubt, by a thorough search of the debris. The decision to close an incident must be confirmed by the Controller or his Deputy. Finally, he sends a final report to the Sub Control/Control Centre before leaving the place of damage and hands over the charge to local Police Officer, if necessary.

(vi) **Setting up of Damage Enquiry Point**: At the place of damage the victims and their relatives and friends will be asking for the information about the lost, injured, dead or trapped relatives. The Incident Control Officer will do his best to answer these enquiries by setting up what is termed as a Damage Enquiry Point and depute some Wardens to deal with such rush of enquiries from the people.

(vii) **Organisation at the Incident**: At the place of damage the Incident Officer to be successful has got to organise his operations and Thus, build up a small organisation of his own to deal with the varied problems that are likely to be faced. The following in this connection are worth noting.

(a) **Wardens**: Wardens should be directed as early as possible to each seat of damage and instructed to maintain contact with the Incident Officer. The Wardens, besides, performing various usual duties will provide an effective liaison amongst the point of damage, the parties, the victims and the Incident Officer.

(b) **Diversion of Traffic**: Contact should be established as early as possible with the police, who will require full information, will require full information, if this has been already been obtained by them. They saw help in traffic control and marshalling vehicles.

(c) **Dealing with the homeless**: Homeless member of the public may require direction to avail Rest Centres. Besides, there will be many more enquiries from the people. It is obvious the Incident Officer cannot deal with all of them. He should, therefore, organise Incident Damage Enquiry Point where enquiries can be dealt with.

(d) **Disposal of Dead**: If it is known of suspected that some persons have died, a suitable place should be selected in advance, where bodies can be placed under cover and away from the public gaze.

(e) **Relief for Services**: It is understood that the services working at a place of damage must be relieved at convenient intervals as they cannot be expected to work ceaselessly. The Incident Officer should see that the relieved party leaves all the relevant information with the relieving party to enable the latter to resume its work efficiently and quickly. He should arrange for refreshment at suitable times by calling mobile canteens or with the help of local resources.

(f) **Disposal of Valuables**: Money, Jewellery or other valuables recovered from damaged property in the course of relief operations should be collected by the Incident Officer, a list made handed over to the Police or Officer-in-Charge/Custodian Salvage.

5. **General Supervision of Operations**:

Besides performing the duties as mentioned above at the place of damage, the Incident Control Officer will have to do a very close supervision of operations at the place of damage, to see that the relief operations proceed systematically according to a well-set out plan. Some of the following points in this connection may therefore be looked into by the Incident Control Officer in regard to the supervision of operations at the place of damage.

(i) In the beginning as soon as the Incident Officer reaches the place of damage, he must remain at Post so that the Services can be directed and deployed without any delay.

(ii) Having allocated the Services to the place of damage, the Incident Officer should then move to the scene of Incident to have a first-hand knowledge of the operations. Before going, he must always leave his assistant at the Post.

(iii) From time to time he may have to confer with the technical officers of the Services on the spot and may have to consider some of the following with a view to achieve efficient control of an Incident.

(a) Whether the Services should be reallocated.

(b) Whether any more help by way of reinforcements is necessary or is there need to relieve any services.

(c) Is there any need of special technical advice from outside in dealing with the damage at the Incident.

(d) Whether any heavy equipment like cranes or bull-dozers etc., can be procured and are they required, so that the relief operations could be facilitated.

6. **Allocation of Services**:

The Incident Officer must at all times have in his mind a clear picture of general situation and must keep a note of the parties required at each point and those which have already arrived and allocated. He must also know what Services are needed and where and in what strength. These particulars should be recorded by the Incident Officer or his assistant on the Allocation of Services Card, a copy of which is attached as an Appendix. While preparing the card a rough sketch of the area is first made giving the names of essential streets and other important features such as blocked roads and other important details. This sketch serves to convey to the parties the quickest possible way to the place at which the Services are required and the best ways of reaching them. The instructions to services are given by the Incident Control Officer in the "Form of Instructions to Services" a copy of which is attached herewith. As the Incident progresses, any redistribution of Services which may become necessary is noted together with any future further information affecting operations such as reduction of casualties by clearance, or additional parties required or parties released. In this way the Incident Officer has at all times a correct appreciation of the general position throughout the damaged areas.

FORM OF INSTRUCTION TO SERVICES

Place Date……

Rescue Party No……..

You are required to attend to casualties at position shown and report when all are cleared

Position of occurrence	Causalities involved	Road Blocks	Remarks
1.			
2.			
3.			
4.			
5.			

Signature ……

For use of Party Leader:

All causalities at positions shown above now cleared

Date……. Signature ……

Time……. (Party leader)

ALLOCATION OF SERVICES CARD

Place ---------- Date----------

position of occurrence	Causalities and damage	Services Required – Allocated	Remarks
1.			
2.			
3.			
4.			
5.			

ORGANISATION AT THE INCIDENT BY INCIDENT OFFICER

Establishment of Control

(Simple and Multiple incidents)

Arrival

Establish post an inform Sub-Control Centre

Appoint Assistant & Check Reports

Information	Organisation	Instruction to Services	Co-ordination	Progress
Main seats and damage Number or position of casualties.	Warden at each seat of damage.	Where to operate	Police	Latest record of deployment of Services.
Craters and Mains damaged UXB 's (Unexploded Bombs).	Immediate assistance to casualties.	Where to operate	Fire Services	Progress Reports. Reinforcement of Services.
Gas escapes or flooding.	Arrangement with Police & traffic control.	Issue instruction to services forms.	Leaders and officers in charge of C.D Services	Canteen.
Wind direction.	Loading point for casualties.			Release of Service Final Reports.
Dangerous buildings Hydrants & tank.	Marshalling of vehicles Arrange for guides.			
Accommodation for Casualties and Mobile F.A Posts.	Calling up of Services			
Sites for temporary mortuary.	Arrangement for Homeless.			
	Preparation of Allocation of Services Card.			

INCIDENT CONTROL

Functions of Institutions of Incident Control

To control and co-ordinate the operation of C.D. Services.

To ensure there is proper co-operation with Police Fire and other services.

To ensure that operations proceed systematically.

To keep the Control/Sub-Control fully informed from time to time

Duties of an Incident Officer/Relief Co-ordinator.

1. Set up a post.
2. Make a rapid survey to collect information.
3. Send reports regularly.
4. Mobilise local help.
5. Marshalling of vehicles and location of loading points.
6. Arrange for relief and Welfare of C.D. services personnel.
7. Reception of Services and parties.
8. Allocation of Services.
9. Disposal of dead.
10. Put in safe custody the salvaged property.
11. Set up damage enquiry point.
12. Dealing with Homeless.

CHAPTER NO. 27

WARDENS SERVICE-ORGANISATION AND FUNCTIONS

1. **Object**:

Wardens Service is the backbone of the C.D. Organisation. To minimise the effects of air raid and to keep up the morale of the people, it is essential that they are properly guided and advised before, during and after an air raid, as to what they should do. The success of the Civil Defence measures will greatly depend upon such guidance and advice. The War dens Service is organised to perform these functions. In this lesson, we will study the duties of the Wardens and the organisation of the Wardens Service.

2. **Duties of Wardens**:

He is the friend, philosopher and guide of the people in his area. He is the eyes and ears of the Civil Defence Authorities in an area. He advises people on the various aspects of Civil Defence and protection. He has to get Cooperation of the people through his personality and not by a show of power. This functions before, during and after an air raid are as follows:

(i) **Duties before raids:**

(a) He must make himself familiar with his sector both during day and night.

(b) He must know the people in his sector thoroughly.

(c) He must prepare a house-hold register.

(d) He must know the location of the C.D. Depot public shelters, first-aid posts and Police Stations etc.

(e) He must advise people regarding precautionary measures to be taken for an air raid. He should guide them in the use and construction of trenches/household shelters, selection of refuge rooms taking cover, lighting restrictions, and action in case of attack by new weapons e.g. gas.

(f) He must impress upon the people, the importance of observing instructions given by C.D. Authorities from time to time.

(g) Organise house-fire parties and other assistance for relief work by organising self-help parties.

(h) To help in the recruitment of volunteers for C.D. Services.

(i) He must keep his C.D. Dairy up-to-date.

(ii) **Duties during an Air Raid:**

(a) Immediately on receipt of Air Raid Warning he will report himself to the Warden Post.

(b) After reporting at the Post, he should take his equipment and advise people on the streets and other moving about, to take shelter.

(c) Since sirens may not be audible in certain areas the Warden will use certain visual signs or whistle etc. to give warning to the inhabitants of his Sector. When necessary, he should see that lighting restrictions are observed by the people.

(d) Immediately after the bombs have dropped, he should come out and go out for a survey with a view to find out the details of bombs which have fallen and the consequent damage caused by them.

(e) Thereafter, the first duty is to report the incident to the control/sub control centre through the Warden Post, using either the telephones or the messenger service. This is done in prescribed form.

(f) Till such time as Services do not arrive at place of incident, the warden will attend to such preliminary details as fighting small fires, attending to casualties, rendering first-aid and rescuing some trapped people.

(g) If an unexploded bomb has fallen in the locality, he must report the fact to the Control/ Sub Control Centre and with police help get the people in the threatened areas evacuated to safe places and divert the traffic within such areas to safer areas.

(h) During the Control of an incident, the Warden provide valuable information to the leaders of various parties working on the sport and serves as effective link between the people and Incident Officer and helps the Incident Officer in mobilising local for the various parties to conduct their relief operations.

(iii) **Duties after Air Raid:**

(a) Immediately after an air raid he shall direct the homeless ones and give them information regarding the various facilities arranged for them by the C.D Services of the area. For this he must have a complete knowledge of the plans and activities of C.D as a whole and the Welfare Services in particular.

(b) Warden has another important role to play after air raid e.g. to control panic amongst the people. This he can do by constantly reassuring the people and by setting an example coolness.

(iv) It is possible, that immediately after an air raid the Warden will find Essential Services disrupted in his Sector. The various repair parties for different Essential Services will be sent, on receipt of a damage report from a Warden through the Control/Sub-Control Centre. Thus, a Warden has an important role to play in seeing that the Essential Services are restored as soon as possible. The action to be taken by a Warden in the event of such a damage will be in four distinct stages:

(a) Recognition of damage.

(b) Estimation of damage.

(c) Reporting of such damage to Control/Sub-Control Centre,

(d) Action to be taken pending the arrival of Repair Parties. In this he will take such immediate action as will not harm the people further, for example, he will ensure that people do not try to pour water on electric wires lying on the ground as it, may result in serious consequences, for those who are pouring water.

3. **Qualities of a Warden**:

For efficient performance of the above duties we require persons of influence, courage and personality, with a sound knowledge of the locality and full knowledge of Civil Defence who can advise and help their neighbours and generally to serve as a link between the public and the authorities. It is essential that those persons who are liable to be called up for Defence Service or have undertaken to join the Police, Fire Services or Home Guards or have undertaken any other Statutory obligation in an Emergency, should not be enrolled as Wardens.

4. **Organisation of Wardens Services:**

(i) **Sector**: There will be two Wardens per Sector of 2000 population. In very much congested areas. two wardens may be provided per 4000 population. Where there are large blocks of flats and tenements with 100 residents or more, special Wardens should be appointed for each block, chosen from those living in those premises. These Block Wardens will help the Sector Wardens. In such a case the Sector may consist of more than 2000 population.

(ii) **Wardens Post:** The unit of organisation in the Wardens' Services is the Wardens' Post which serves 5 sectors. In thinly populated areas and on the out skirts of towns, a minimum of one Post per square mile should be organised.

5. **Control and Training of Wardens:**

(i) The C.D. Controller will depute a responsible officer to exercise supervision and control of this service. This Executive Head of the Wardens' Service is called a Chief Warden or Officer Commanding Wardens Service. He will have a Deputy. Ten Warden Posts should normally be grouped in a Division under a Divisional Warden. Where the Chief Warden and Divisional Warden are volunteer officers, they may be provided the assistance of one whole-time. Staff Officer per Division. The Staff Officer will take charge of the routine duties and will also impart training and ensure efficiency of Warden's Service. Clerical assistance may be provided according to necessity. One clerk per Staff Officer may be necessary. The Staff Officer should preferably be a Specialist Instructor and should be trained for the assignment. Each Warden Post will be placed in-charge of a Post Warden and one of the Sector Wardens should be appointed as Deputy Post Warden, The Post Warden will be in-charge of the Wardens in the Post Area.

(ii) The Chief Warden, the Divisional Wardens and the Post Warden should take part in arranging for the training of the Wardens and should be responsible for allotting them to Posts and arranging Duty Rosters. With the exception of the Post Warden, they would not constitute a chain of communication in time of air raids. The Wardens will send their reports direct or through the Post Warden. When an incident has occurred in close proximity to the Depot, the Wardens may directly contact the C.D. Depot to get the C.D. Services, Wardens should however, take the earliest opportunity to inform the Control/Sub-Control Centre on the appropriate form adding the details of Ser vices requisitioned direct from the Depot. A Warden needs training in basic C.D., Elementary First Aid, Rescue, Fire-fighting and Control of an Incident. He must participate in combined training through exercises and practices. The training will be organised by Staff Officer, who should be a trained Instructor.

(iii) Industrial and commercial concerns not having their own Control Posts should request for assistance through the nearest. Warden's Post to the Control/Sub Control Centre and the concerns having their own Control Post should make such requests direct to the Control/Sub-Control Centre.

6. **Numbering of Wardens Posts**:

Each group of posts should be distinguished by the name of the Division or a symbol. The Posts belonging to a Division will be indicated by the name of that Division or a symbol coupled with a number Thus, the Post in the "Karol Bagh" division would be numbered KB1, KB2, KB3 and so on. It is preferably, for administrative convenience, that the numbering series KB1, KB2, etc., should be the number of the Posts, not of the Sector which may be otherwise distinguished if considered necessary e.g. Sectors attached to Post KB1 might be known as Sectors KB1(a), KB (1) (b) etc.

7. **Man-Power Requirements**: The basic requirements of Warden Service in a typical town with 1 lakh population will be as follows:

Wardens (2 per 2000 population) 50 Sectors	100
Post Wardens (10 Posts).	10
Chief warden (Divisional Warden)	1
Deputy Chief Warden	1
Staff Officer/Specialist Instructor	1
Clerk	1
	114

Each Wardens Post should also have two outdoor Messengers.

8**. Control of an Incident by Warden:**

The Warden reaches the place of damage and sends the reports of damage to Control/Sub-Control Centre. After sending a report he would be required to organise relief work on the spot through the help of the local volunteers. In an isolated incident when the casualties may not be many, the control of relief operations will be done by the senior Warden on the spot. He will have to take the following action to carry out systematic relief operations.

Duties of Warden at an Incident:

(i) Senior most Warden assumes control of operations and selects a place from where he carries on his work.

(ii) By carrying out a reconnaissance, he knows the extent of damage and the location of casualties as also dangerous points.

(iii) He allots the available relief parties to do specific work.

(iv) As the Services start arriving from the Depot, he arranges to receive them and guide them to the place of damage.

(v) He selects parking places and casualty collecting points.

(vi) He also utilises local Home Guards/Police in keeping away the public as also in controlling the traffic or effecting evacuation of dangerous buildings.

(vii) He keeps the Control/Sub-Control Centre informed regarding the progress of work and maintains contact with the Wardens Post of the area.

(viii) He arranges to get any additional help required by the Services working at the place of damage in respect of equipment, labour and in technical personnel.

(ix) He arranges for relief of personnel engaged in relief operations.

(x) He also arranges to give information to the people regarding the location of Rest Centre, F.A. Posts etc.

(xi) He will send a final report on the conduct of relief operations to the Control/Sub-Control Centre through the Wardens Post.

WARDENS POST AND ITS FUNCTIONS:

9. **General Functions**:

The Wardens Post is the place, at which Wardens allotted to the Post assemble on 'Action Warning' and from where they send messages to the Control/ Sub-Control Centre. The Post should be in a prominent position and situated as near as possible to the centre of the group of sectors which it serves. The Post should be large enough to provide a Message Room with telephone, if possible, and the necessary furniture. This room should provide protection against blast and splinter effect of 1,000 lbs. H.E. Bomb falling 75 ft. away and also the protection against the fall of debris.

Wardens of far off Sectors may assemble at the pre-arranged place in these Sectors in case they cannot reach the Post before the bombs might be expected to fall. All warnings and other important events are entered in the Post Log Book immediately on occurrence. The Post should provide accommodation for Post and individual equipment, sleeping accommodation for Wardens on night duty, place for cooking and lavatory arrangements.

10. **Equipment of Wardens Post:**

The Post will have necessary furniture, crockery, message pads, pencils and time-piece etc. It will also have:

(i) **The Notice Board**: On the Post Notice Board are displayed Standing Orders for the Post, notices for forthcoming events and also the latest instructions received from the C.D. Controller or the Chief Warden.

(ii) **The Telephone**: Alongside the telephone there must be records of the telephone numbers of Control/Sub-Control Centres (According to the channel of communication in force in a popular local authority area), the number of the Post and adjoining Posts and a list of other important telephone numbers and addresses, those for example, of the Headquarters, of the Senior Officers of the Warden Organisation, Police Station, Fire Stations, Depots, Hospitals etc.

(iii) **The Map**: On the Post map as much as possible of this information should be recorded. Such a map is indispensable. The ideal map of this sort shows the boundaries of the Post area with its streets, roads and lanes and houses and the exact position of each shelter if such exists. The map should show portion of areas from adjacent posts. Besides the map should show the following:

(a) Fire Stations.

(b) C.D. Depots.

(c) Hospitals.

(d) Special danger risks such as timber godowns petrol storage etc.

(e) Railway lines and bridges.

(f) Fire Service Hydrants and Static Water Tanks.

11. **Post Records:**

The following are some of the records maintained at a Post:

(i) **Post Log Book**: Every Post must have a Log Book which is required for the following purposes:

(a) To keep a record of Wardens reporting for and dismissing from duty.

(b) To keep a record of important business transacted at the Post, including messages sent to or received, visits from senior officers and other C.D. personnel notes on training exercises and of Wardens meetings.

(c) To keep record of all equipment issued to the Post by the local authority, and of that issued by the Post Warden or his representative to the individual Wardens.

(d) It will often be convenient in order to prevent confusion to maintain more than one Log or Record Book. Equipment records are most conveniently kept in a file since all receipt must be retained. There is however, always one rule to be observed every entry must be signed by the Warden who makes it and the date and time at which it is made should be recorded. (The proforma of the Log Book is attached).

(ii) **House-hold Registers:** These will prove their value and save rescue parties many hours of needless work by giving them at once the information they need. These registers are completed by Wardens and checked by them periodically. The household index cards for each family separately, are prepared from these Registers.

(iii) **Other Records**: There should be separate Registers for showing Rotas of Wardens, Standing Instructions by Post Wardens and a connected account of incident after it has been cleared up showing details of casualties and the action taken by Post. When the Post is manned 24 hours, the Post Routine should also be prepared for compliance.

12. **Reporting by Post Warden**:

(i) **Operational Reports**: Wardens Post is well equipped and is well in a position at all times to despatch the reports from the Post is desired to be sent by the Warden/Incident Officers. These reports are the 'Fire', 'Express', 'Air Raid Damage', 'Supplementary', and 'Final' and are sent from the Post to the Fire Brigade/Sub-Control Centre. These are mainly the Operational reports concerning a particular incident. Several such reports may have to be sent by the Post Warden from different incidents in his Post areas.

(ii) **Raid Report**: After an air raid is over the Post Warden will have to send a detailed report concerning whole of his Post. This report will form a basis of other reports to be prepared and despatched by the Control/Sub-Control Centres.

appendix I to WS/II

Warden's diary -Nature of information compiled

1. General Information	Post No. Telephone No. of Post, Extent of post Area.
2. Adjacent Warden Post	Post No., Address, Telephone Number.
3. Public Shelters	Location, Maximum accommodation.
4. First Aid Post	Situation, Telephone Numbers.
5. Nearest Fire Station	Location Telephone No.
6. Fire, Police and Public 'T' Phone	Full details of Numbers.
7. Home Face Parts	Number, Location, Name of Leader, Beat area.
8. Hydrants and Tins Cocks	Location.
9. Doctors, Nurses, Chemists and Veterinary Surge	Name: Address Telephone Number.
10. Most danger spots, Day and Night	Location, Particulars of danger.
11. Places of worship, schools and colleges etc.	Vocation, hours of work, Number of students and gathering.
12. Hotels and Restaurants	Name, Location, Peak Hours, Slack hours, capacity
13. Cinemas and Theatres	Names, Location, Seating accommodation.
14. Factories and Industrial Premises	Name, Address, Number of Staff, Shelter accommodation, house of shift, having own C.D. organisation or not.
15. Public and Private Hospital and Nursing Homes	Name, address, telephone number, capacity.
16. Private Shelters	Location and details.
17. Stirrup Pump, Ladders etc.	Owner, address, details of equipment.
18. Duty Roster	Date, time, stand by duty.
19. Names and address of Location	Chief Warden, Div. Warden, Control, Sub-Control Centre, Rest Centre, Depot.
20. Telephones number of local C.D. Organisation	Information Centre etc.

APPENDIX II TO WS/11

Suggested wardens Household Register

Post
Street
Telephone Number if any

Name of Head of Family Name of Occupants.	Male or Female Age	Number of House or shelter used	Name of location	Profession and place of employments with Telephone Number if any (State if day or night work)
1. Name and address of nearest relative or friend				
2. Next to kin.				Remarks
3. Number of informs, invalids and old men				(Those who require assistance for movement)
4. Warden's Signature				
5. Original date				
6. Date Card revised				

General Information

(Record here numbers and particulars of stirrup pumps, shovels ladder etc. available with house holder)

Stirrup pumps	shovels
Buckets	Pick axes
Ladders	First -aid- Boxes

APPENDIX III

Warden Personal and Post Equipment

(A) *Post equipment:	
One First Aid Box containing Bandages, triangular	6
Canes, for tightening improvised tourniquets	3
Dressing Shell	6
Safety Pins (large) cards of 6	3
Scissors	1 pair
Tourniquet.	1 pair
Hurricane Lamp	1
Stirrup Pump	1
Buckets	2
Light Blue Helmet cover	1
Flag, light blue, 24 in. x 18 in.	1
Small Lamp with pale Blue glass	1
Wax candle large size	6
Ladder, Bamboo (12 ft.)	2
$1^1/_2$ in. Fibre rope (20 ft. length)	2
Flags Red (for signifying closed roads by day).	2
Red Lamps (for signifying closed roads at night)	2
(B) Personal Equipment:	
Badge	1
Steel Helmet	1
Report Forms	1 pad
Electric Torch	1
Whistle	1
Water-bottle with sling	1
Pencil	1
Warden's Diary	1

NOTE- The uniform will be as for a Home Guard less anklets black-shoes in place of black boot and shoulder titles and badges of C.D Services.

A reserve of 10 % of the equipment should be provided.
*Where the Posts are required to be manned for 24 hours.
Time -piece may be provided as a part of Post Equipment's.

APPENDIX IV

Specimen post Routine and Log Book

7-0 a.m Synchronizing of the Post Clock with the Control/ Sub-Control Centre Clock and winding the clock.
7-5 a.m. Cleaning of post and washing and dressing.
8-0 a.m. Roll call and physical drill in uniform.
9-0 a.m. Tactical Table Exercise.
10-0 a.m. Stirrup Pump Drill, refilling of buckets and water bottles.
11-0 a.m. Map Reading and Reporting Exercise with neigh burning Post.
11-30 a.m. Break.
3-0 p.m. Bandage Practice and first-aid.
4-0 p.m. Checking and cleaning of equipment.
4-30 p.m. Post warden's talk with Wardens explaining latest circulars, solving Warden's difficulties.
5-0 p.m. Outdoor games.
6-0 p.m. Sector Duties (contacting and advising people in the locality on Civil Defence matters, collecting of Sector data and checking of household register for corrections if any).

8-0 p.m. Comparing Sector notes and recording in the Post Register.
8-30 p.m. Break.
9-0 p.m. Retire (But remember to keep one man at the tele phone by turn.).

Log- Book will have the following columns

Date and time	Particulars	Initials

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CHAPTER NO. 28

ORGANISATION AND DUTIES OF RECONNAISSANCE PARTIES HINTS FOR DETAILED

1. **Object**:

The general reconnaissance carried out by the War dens etc. in case of small-scale raids is sufficient for sending up of a fairly accurate report to the Control/ Sub-Control Centre. In cases of very heavy damage and saturation raids or use of new weapons by the enemy specialised reconnaissance becomes essential. This has to be carried out by highly trained personnel grouped together in the form of reconnaissance parties. In the following paragraphs, we will discuss the organisation and functions of these reconnaissance parties as well as certain aspects of specialised reconnaissance.

2. **The need of Reconnaissance:**

The relief operations are like battle operations. A battle cannot be fought successfully unless its commander can appreciate the situation quickly and with reasonable accuracy. Similarly, reconnaissance must be carried out at all the places of damage to assess the real extent of damage. A correct assessment is important for optimum deployment of the limited C.D. services, Firefighting. Hospital facilities etc. Specially trained people, who can go around the place of damage and collect the necessary details of the damage accurately and quickly, provide the requisite information to the C.D. Controller to form his plan of action. Time spent in reconnaissance always amounts to better relief to the people and more lives saved as compared to a haphazard and unplanned action. The reconnaissance provides the C.D. Controller with the following:

(i) the best appreciation of the situation for correct deployment of the available services quickly and planning for the reinforcement of more C.D. Services from neighbouring towns.

(ii) confirmation of the presence of unexploded missiles and the probable extent of the danger.

(iii) information about the new types of weapons used by the enemy, their location and details.

3. **Types of Reconnaissance**:

The reconnaissance should be done in two stages. Preliminary and Detailed.

(i) **Preliminary reconnaissance**: The first stage of reconnaissance should be collection of such relevant information only which is required for immediate deployment of C.D. services at the place of damage. This should be collected as quickly as possible.

(ii) **Detailed Reconnaissance:** Once a preliminary idea about the damage has been supplied to the C.D. Controller the reconnaissance should be continued to find out the exact extent of damage. This information will help the C.D. Controller in making an accurate plan for the deployment of C.D. and other Services and calling reinforcement if necessary.

4. **Specialised reconnaissance:**

This type of reconnaissance is usually carried out by Reconnaissance parties where viz. severe damage occurs, or some special types of weapons (e.g. A.B.C. Weapons) are suspected to have been used or confirmation regarding unexploded bombs is required.

5**. Method of conducting reconnaissance:**

The reconnaissance parties are trained to give the right type of information in such a way that the C.D. Controller can make a quick appreciation of the situation. This needs correct assessment of the relevant details and can be achieved by keeping in mind the following:

(i) Who requires this information and

(ii) What use will be made of it. Once this has been understood, the next step should be the assessment of the priority of the information required. The information should be collected in three categories:

(a) Those of top priority to be collected during preliminary reconnaissance for immediate plan of action.

(b) More details about the information already collected and information on other aspects which is required for correct assessment of the situation. This should be collected during the detailed reconnaissance phase.

(c) Which is important from defence and offence point of view but not of an immediate necessity e.g. types and effects of new weapons on people and shelters etc.

6. **Organisation of reconnaissance parties:**

The report of a damage is first received at the Control/Sub-Control Centre from the Wardens. If the report of the warden does not contain full details of the damage or is beyond the technical capability of a warden or is about the presence of unexploded bombs, where a thorough reconnaissance is necessary. Reconnaissance Parties are sent to carry out reconnaissance by the officer-in-charge who commands and controls them. The scale of these reconnaissance parties is one party per shift i.e. three in Control/Sub-Control Centre. The members of the reconnaissance parties are taken from the Senior Warden, instruction staff and specialists. Every party consist of two officers. They need proper training in their jobs. In general, they have to be trained in the identification of different types of bombs used by the enemy, special aspects of H.E damage detection and reporting of U.X.B.'s map reading wireless communication message writing etc.

7. **Type of personnel needed**:

The requirement of specially trained personnel for reconnaissance duties may be roughly grouped into two.

(i) In the first group, the persons needed should be physically fit and capable of carrying out a quick survey over a large area and capable of picking up only the essential information and sending out a concise report. They will be dealing with areas of heavy damage, cause by normal (conventional) weapons.

(ii) The second group would be needed to deal with highly technical and scientific matters. This latter group has to be recruited from persons with special qualifications, though a certain amount of training to orientate the personnel is necessary even for highly skilled people & Specialists.

8**. Equipment for the reconnaissance party**:

The technical equipment to be carried for any particular task by a particular reconnaissance party may be different but the minimum equipment generally recommended is as under:

(a) Motor Cycle	One per party
(b) Helmet	One per member
(c) Water Bottle	Do.
(d) Probe	Do.
(e) Torch	Do.
(f) Paper pad and pencil	Do.

9**. Procedure and planning of reconnaissance:**

The value of reconnaissance depends greatly on the speed with which it is carried out. The information collected for sending to control centre has also to be accurate and thoroughly checked. A certain amount of procedure and planning has therefore, to be adopted to achieve both speed and accuracy. As for any other simpler reconnaissance, the special reconnaissance too must follow the stages of preliminary and detailed reconnaissance. The undermentioned steps would be found useful in planning and undertaking any reconnaissance task:

(i) Decide upon the method of reconnaissance to be adopted in that particular case. This would lead to the decision about splitting or reinforcing of the party and the transport most suitable etc.

(ii) Study the purpose of the reconnaissance and collect all necessary information relevant to the aim including a study of the map, if provided.

(iii) Carry all necessary equipment with them. Thus, if a sketch is to be made to go with the report they must carry the equipment for it e.g. note book, compass, pencils. rubbers etc.

(iv) Throughout the reconnaissance, continuously ask those questions who wants this information and to what use he will put it to?

10. **Reconnaissance reports**:

The detailed report of an U. X. B. is sent on a special proforma. In all other cases the report should be sent on the following lines.

(i) These reports may be written on ordinary paper but they should generally follow the pattern laid down in CDM-3.

(ii) The reports should contain indication about the source of information where it is not personally verified by the party members. This will put the reliability of the information in its correct perspective. (See appendix "A" for suggested pattern of report).

11. **Hints for detailed reconnaissance**:

(i) **HE Damage**: If the raid has taken place after the warning has been sounded, large number of casualties may be found in the shelters and refuge rooms near the place of explosion otherwise casualties would be found in large numbers near the centre of burst of the bomb as well as at distant places as the fragments and broken glass reach quite long distances. The information may be collected on the following points:

(a) Location, size and type of crater formed.
(b) Whether bomb has exploded underground and if there are signs of a camouflet.
(c) Whether there were public shelters near the place of explosion.
(d) Distances at which people are lying killed, seriously injured, thrown away by blast etc. and their number.
(e) Expected number of people trapped in the voids and debris.
(f) Whether ambulances can reach the place of damage or how near can they come.
(g) Distance at which casualty loading points and parking places for the vehicles can be fixed up.
(h) Number of houses damaged and expected number of people rendered homeless.

(ii) **Incendiary Bombs**: In very large fires, reconnaissance personnel may not be able to get very near to the site of fire but they must try to get information on the following points:

(a) Direction in which the fire is spreading.
(b) Direction of the wind.
(c) Threat to important buildings, structures, factories located in the vicinity (nearby).
(d) Condition approach roads the fire for the benefits for fire engines.
(e) Casualties involved.

(iii) **Road Reconnaissance,**

(a) Exact location of the damage.
(b) Type of construction and classification of road.
(c) Length, width etc. of the road.
(d) Possibility of alternative route being establishment close or parallel to the main road nature of ground alongside the road.
(e) Approximate man hours likely to be required to carry out repairs. Availability of materials for repairs nearby.
(f) Condition and nature surface of the road metal or otherwise.
(g) Gradian of the road, steepness etc.
(h) State of telegraph/telephone and electricity lines running along the road.
(i) State of water and gas mains, evidence of leaking of water, gas and sewage pipes.

(iv) **Railway line damage**:

(a) Gauge and number of lines.
(b) Nature of ground on both sides.
(c) Bridge or culverts if any are involved.
(d) Embankments and bridges.
(e) Length of track damage.

(v) **Structural Damage:**

(a) Length, width, shape, plan/sketch of area /locality:
(b) Number of inhabitants, name of head of family.
(c) Water supply and power lines.
(d) Location of depots Godowns of petrol, oil, supplies, food and forage.
(e) Approaches and parking places,
(f) Type of structure, framed or unframed, steel framed etc.
(g) Degree of/and type of damage to roofs, walls, floors, stair-cases etc.
(h) Position of animals and transport.

(vi) **Water supply:**

(a) Size of mains, areas served by them, timings of water supplied through the mains.
(b) Places of junctions of mains with distances and localities served as also population of locality.
(c) Position of other sources of water supply:
(d) Can mains be repaired temporarily?
(e) Type of ground, low or high (question of flooding),
(f) Nearness to roads, streets, etc.

(vii) Electricity:

(a) High- or low-tension wire (voltage if known),
(b) Over head or underground,
(c) Areas or localities affected with population,
(d) Alternative sources of lighting or energy (if industrial area is involved):
(e) Length of wire damaged, damage to poles.
(f) Nearness to roads and streets and whether roads and streets are usually busy or not.

(viii) **Gas Mains/Telephones:** The Reconnaissance after damage to gas mains or telephone lines should be carried out as suggested above for water supply and electricity.

APPENDIX "A"

Suggested Pattern for Reconnaissance Reports

Reconnaissance Report on.....
by date and time..... at (place).....
1. Object of reconnaissance…….
……
……..

2. Detailed reconnaissance under various heads under separate Paras/Sub-paras
……
……
Sources of information.

Note: 1. Always attach sketch and give map reference.
2. Form CDM-3 can very conveniently used write down the report. Otherwise, it may be written on plain paper. When plain paper is used the above should be the pattern of the report.

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CHAPTER NO. 29

DEPOT AND TRANSPORT SERVICE

1. **Object**:

Civil Defence Services are organised in civil defence towns and areas, to provide quick relief to the people during enemy action or other emergencies. Most of these Services are to be located at a Central place called the Civil Defence Depot. A large number of vehicles, will be required by these services. The object of this lesson is to study the organisation, functions of the Depot and Transport Service.

2. **Functions**:

(i) **Civil Defence Depots: The functions of Civil Defence Depots are to provide:**

(a) accommodation for whole-time C.D. workers and place of assembly for part-time volunteers.

(b) parking place and arrangements for maintenance of C.D. vehicles.

(c) storage point for equipment.

(d) training facility for local C.D. Services volunteers, on mobilization, when not employed for actual relief operations.

(ii) **Transport Service**: The Transport Service is responsible for maintenance and efficiency of C.D. fleet of vehicles. The functions are:

(a) to provide efficient means of transport and maintain them in road-worthy condition.

(b) to procure vehicles for C.D. by hire, requisitioning, voluntary offer and arrange for insurance against. Third Party Risk and settlement, of such claims as may arise.

(c) to provide and train drivers.

(d) to provide and control issue of petrol, oils and lubricants.

(e) to make arrangements for quick repairs and servicing of vehicles.

3. **Layout of a depot:**

Taking into consideration the functions of a depot described in para 2 above, a depot must have the undermentioned distinct divisions with adequate accommodation for each purpose.

(i) Administrative Office.

(ii) **Operational Office (with telephone):** This must be rendered safe against blast and splinter effects. In certain cases, the administrative and operational office may be combined, if a large enough safe room made available.

(iii) **Rest and Recreation Rooms:** There should be sufficient space for all personnel based on the depot Part of this room should be such that it could b used for instructional purposes.

(iv) **Shelter area**: This should be sufficient for all depot-based personnel.

(v) Sleeping accommodation for all depot base personnel.

(vi) **Dining halls**: Of sufficient size to permit meals to be taken by all persons, in two shifts.

(vii) Kitchens, latrines, washing and bathing places.

(viii) Store rooms, including reserve stores rooms.

(ix) Vehicle Park.

(x) Out-door training area and sports area (where available).

(xi) Separate petrol strong room.

4. **Location of the depots:**

(i) Depots should be located well away from any likely target.

(ii) Depots should be easily accessible to vehicles and must have sufficient turn around space.

(iii) Too many small depots will create difficulties in respect of administration, control, provision of communication and also result in avoidable duplication of facilities. While a large depot promotes better discipline and better growth of comradeship and economy in operation.

5. **Organisation of depot and transport Services:**

Officer-in-Charge of the depot-service is in overall charge of the depot services in a city. There will be one depot under each Sub-Control/Control Centre which is placed under the charge of a Depot Superintendent. All transport in various depots will be looked after by a Transport Officer. The Transport Officer is responsible for technical efficiency and serviceability of all the vehicles but these are placed under the operational control of respective Depot Superintendents. The Transport Officer has under him Transport Supervisors, who work in the depots and assist the Depot Superintendents in the matter of keeping the vehicles in road-worthy condition, making provision of drivers Supply and accounting of petrol, oil and lubricant he staff at the Depot will be as follows:

(a) Depot Superintendent	1 per Depot
(b) Dy. Depot Superintendent	1 per Depot
(c) Telephonists	1 with 2 Relief
(d) Clerk	1
(e) Store Clerk	1
(f) Messing Staff	1 per 30 inmates of the Deputy
(g) Sweepers -	2

(h) Transport Supervisors	1	per 50 vehicles
(i) P.O.L. Clerk	1	
(j) Vehicle repair party consisting of one mechanic, one fitter and one electrician	1	

The vehicle repair party is provided with a motor cycle amongst them.

A reserve of 25% of the personnel should be provided.

6. **C.D. Services located at a depot:**

The following services are usually stationed at the Depot. C.D Controller may, however, decide to allot any other service to any depot. In additional to these the reinforcements received from outside the town may be temporarily allotted to any depot.

(a) First Aid Parties under a group leader.
(b) Ambulances under a group leader.
(c) Rescue Parties under a group leader.
(d) Mobile First Aid Post.
(e) Mobile Surgical Unit
(f) Mobile Canteens

7. **Command and Control**:

The Depot and Transport Services are placed under an experienced officer designated as the Officer Commanding Depot and Transport Services. In smaller towns with less than one lakh of population, the duties of Officer Commanding Depot and Transport Services may be given to the Officer Commanding Communication Services. He is responsible for:

(i) Number and location of C.D. Depots in the entire town.

(ii) Planning the layout of each depot.

(iii) Allotting accommodation for each depot and carrying out necessary alteration and provision of protective construction.

(iv) Periodical inspection of the depots.

(v) Issue of standing orders for smooth working of the depot.

8. **Depot Superintendent-Duties**:

He is responsible for prompt despatch of CD. Services on receipt of orders from Control/Sub-Control Centre. He will have to ensure that the men are physically fit, mentally alert and the services have and complete equipment. He will organise the deputy and supervise its general working. His duties will be:

(i) Practising frequently, all services, in action to be taken on receipt of Air Raid Warning and also carrying out fire drill.

(ii) Laying down and following up a set routine. This keeps all men occupied in work and afford them time for recreation by rotation and, sure timely meals and adequate rest periods.

(iii) Inspecting equipment for its serviceability and ensuring correct periodical maintenance.

(iv) General Welfare of the depot-based personnel, their messing etc.

(v) Cooperating with instructional staff in carrying out technical training of first-aid parties, rescue parties etc.

(vi) Providing for depot guards and esuriently security of premises.

9. **Medical and Sanitation arrangements**:

One of the rooms in the Depot should be set aside as a sick room where beds at a scale of 4 per 100 should be provided. Some of the members of the F.A. Parties may take up the duties of the sick room attendants when necessary. Necessary medical supplies may be provided. The Medical Officer allotted to the depot will attend to the sick and may even refer the patient to hospital if necessary. The depot ambulance may be used for that purpose. The Medical Officer will advise the Depot Superintendent on matters concerning sanitation and health conditions in the Depot.

10. **Depot Routine**:

The C.D. Services located at the Depot should have men who are physically fit at all times and who are also alert, efficient and disciplined in their work by constant training, practice etc. To achieve this a set depot routine, as suggested herein, should be laid down from dawn to dusk. In the early morning there should be physical exercises and drills. After the breakfast they should have various training classes and outdoor practices till lunch break. Lunch should be followed by a period of rest and then by individual training in specialist subject, as well as general C.D. work Before tea-break there should be vocational training and after tea break they should play games. In the evening, before dinner, they should have talks on general subjects. By ten O'clock at night everyone should go to bed.

11. **Working of a depot**:

(i) **Records maintained,**

(a) A register of all personnel stationed at the depot will be kept by the Depot-Superintendent who will arrange to have two roll-calls a day once in the morning, and once at night.

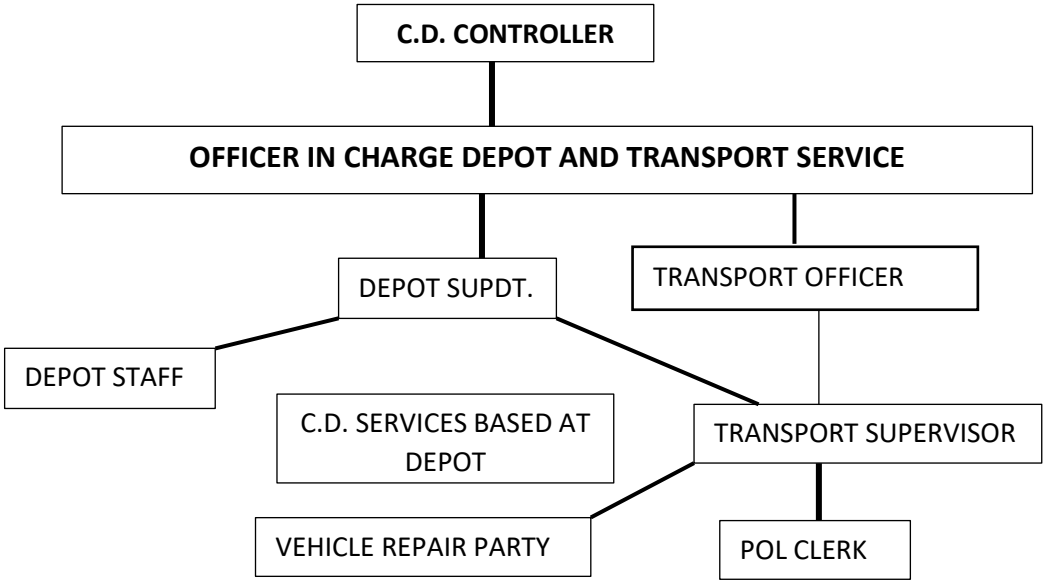
(b) A Tally Board is maintained showing the state of services in the depot at any time of the day. At a fixed hour in the day the depot Superintendent will inform the state of the services to the Control/Sub-Control Centres.

(c) Clerical Staff of depot is trained in taking action on the types of air raid messages to be received from Control/Sub-Control Centre etc.

(ii) **Operations**:

The operational duties in a depot start from the receipt of the Action Warning till the receipt of the message from the Control/Sub-Control Centres that all the incidents have been closed and return of the civil defence services and vehicles to the depot. On receipt of the Action Warning every member of the Depot takes up his allotted position. On receipt of message regarding movement of services the parties take up their positions in their vehicles and immediately as the message is passed on to them, giving details of the road blocks etc., the services concerned move out to the place of incident. On return to the Depot the parties check up their equipment and replenish any shortages etc. Everyone remains at his position and nobody is allowed to go home till the Control/Sub-Control Centre permits them to do so.

INTER RELATION OF DEPOT AND TRANSPORT SERVICE



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CHAPTER NO. 30

GENERAL ORGANISATION AND OPERATIONAL FUNCTIONS OF CIVIL DEFENCE ENGINEERING SERVICES

1. **Object**:

The object of this lesson is to study the general organisation and operational functions of Civil Defence Engineering Services and detailed organisation, equipment and functions of Rescue Parties.

2. **Engineering Services**:

As a result of enemy air raids, many buildings will be damaged. A large number of people may be buried under debris and a good number may find themselves trapped on upper floors of high buildings etc. The essential services like water, electricity, gas, sewage etc., will be damaged. The craters formed on the ground will block a number of roads, which will disorganise the normal life of citizens. The main functions of Engineering Services are to rescue trapped persons from damaged buildings, salvage the property, repair and restore the essential services, demolish those buildings which are in dangerous conditions and repair those which are badly damaged.

3. **Rescue Service:**

(a) **Functions**:

The functions of this Service are.

(i) To rescue living persons trapped beneath debris or from the damaged buildings.

(ii) To render first-aid to such trapped persons or persons so released, and to send them for further medical attention.

(iii) To take such immediate steps as may be necessary for the temporary support or demolition of damaged structure, the collapse of which is likely to endanger life or to obstruct, or hinder the work of the Service itself.

(iv) To cut off supplies of water, gas and electricity from damaged buildings.

(v) To recover the dead bodies from damaged buildings.

(b) **Organisation**:

There will be one O.C, Rescue Service per town. To assist him there will be one staff officer per 15 rescue parties. The clerks will be one per O.C, and one per each Staff Officer. There will also be a Group Leader in a Depot.

The Rescue Service will be provided by the Home Guards Organisation. The Rescue Parties are to be formed by earmarking suitable Home Guards and giving them requisite training for being able to perform the task of rescuing people in emergencies.

(i) **Composition** -A Rescue Party will consist of:

Leader	One (Two must)	
Members	Six be skilled	Total 8
Driver	One	

The vehicle driver will act as Store Keepers of the Party equipment.

(ii) Scale -One Party of eight per 25.000 population should be provided.

(iii) Equipment-For equipment of Rescue Party see Appendix "A".

(iv) Vehicle- A vehicle having sufficient capacity to carry the personnel and the equipment should be provided to a Rescue Party. For Rescue Work, an open lorry is preferable to a closed one. It should have tarpaulin covering supported on an angle iron frame.

(v) Location-Rescue Parties should be located in Civil Defence Depots.

(vi) Training-The training in rescue technique and rescue operation will be imparted by the Instructors who will be trained specially for this purpose.

(c) **Operational Procedure:**

On receipt of a report of damage during an air raid from the Warden, mentioning that some casualties are trapped, the Officer-in-Charge, Control/Sub-Control Centre orders for the despatch of the required number of Rescue Parties from the Depot to the place of incident. Immediately on arrival at the site, the Rescue Party Leader reports to the Warden or the Incident Control Officer and collects necessary information regarding the number and the whereabout of the casualties trapped. The leader carries out the reconnaissance, based on "Information" and "Observation and formulates his line of action and starts rescue operations systematically. The people who are injured and need further attention after rescue are given in the charge of a First Aid Party. The dead are collected and passed on to the Corpse Disposal Squads. The Party may also have to carry out temporary shoring or demolition in the interest of safety. It should not normally undertake extensive demolitions.

4. **Salvage Service:**

In damaged houses, large quantities of valuable property will be buried under the debris and the owners may become casualties or may run away out of fear. The function of this Service is to salvage properties from houses and for taking care of such properties and their eventual disposal or return to the owners. These Services will be provided by the local P.W.D./ C.P.W.D./Police.

5. **Repair and Demolition Services**:

(i) **Repair to property-** After an air raid, a large number of buildings may become damaged rendering occupants of those buildings homeless. Though, Rest Centres will be organised where such people will be given temporary shelters, the solution lies in repairing the houses and making them habitable. Such repairs should not extend beyond that which is necessary to render the building fit for habitation.

(ii) **Repairs to roads, buildings etc**- Roads, bridges and culverts are likely to be damaged by high explosive bombs during air raid and if they are not quickly repaired they would affect communication between different parts of a town and be a severe handicap to Civil Defence Services.

(iii) **Demolitions**-Some buildings damaged during, air raids might be standing in a dangerous condition and might constitute potential source of danger to the public. Their presence near road side might endanger lives and traffic on the roads. Such buildings may, therefore, have to be demolished in the larger interest of the community.

Arrangements must, therefore, be made with the local Public Works Department authorities, who should set up Repair and Demolition Squads for the purpose, under their control to ensure that the necessary stock of materials and implements are available to undertake the repairs as soon as possible.

6. **Services for the Repairs of Essential Services:**

The destruction and damage caused to the Essential Public Utility Services, as a result of enemy air raids, would not only seriously impede the working of other. Services but also disrupt, the normal life of the citizens. It is essential to war effort to keep the essential public utility services going. The responsibility for repair and restoration of essential services will be that o the Utility Managements concerned, who should work in close cooperation with the Civil Defence authorities for coordination of the emergency repair and restoration of the services. The following are the main public utility services:

(i) Water.
(ii) Electricity.
(iii) Town gas.
(iv) Sewage System.

(i) **Water**: Maintenance of water supply is most essential in war time, as water will be needed for firefighting, for drinking, cooking and washing, sanitation and for industrial undertakings.

(ii) **Electricity**: Electricity has so permeated every phase of modern life that it will be difficult to be without it even for a short time. Functioning of production machines, essential hospital equipment and some of the public utility services in many cases depend on uninterrupted supply of electricity. Therefore, any interruption of this service will affect several other services which must be kept going.

(iii) **Town gas:** Damage to gas may give rise to the possible risk of fire and explosion. Maintaining of this service in order will also help to solve fuel problems which may become acute during war time.

(iv) **Sewage system**: Failure of sewage system can have very serious repercussions on public health and wellbeing. It will also severely hamper the carrying out of essential civil defence operations. It is, therefore, essential that measures should be devised where by the disposal of sewage can be maintained.

APPENDIX "A"

Rescue Equipment

(i) Per Rescue Party:

Iron shod levers 10 ft (3 m) long	2
Heavy block for fulcrums	1
Crowbars	2
Picks	2
Shovel (or Phawrah)	2
Half round files	2
Sledge Hammer	1
Heavy exe	1
Light exe	1
Two handled cross cut saw	1
Hand saw	1
100 ft (30 m) length 3 in (76-2 mm) fibre rope	1
100 ft (30 m) length 5/8 in (15-85) mm) wire rope	1
40 ft (30) length $1^1/_2$ in (38-1 mm) fibre lashing 16	2
Chain tackle	1
Single sheave snatch block	1
20 ft(6 m) bamboo ladder	2
Petromax lamp	2
Torches Electric	2
Jerrycan-lanterns	2
Tarpaulined 12'x12'03-6 mx 3-5 m)	1
Box of miscellaneous Tools	1
Set of rope tackle. 3 sheave, 2 sheaves	1
Jacks with 5-ton (50:30 kgs) lift	1
20 ft (60 m) length fibre rope 3” or 4” (76.2mm or 101.6 mm) where needed	6
Stretcher harness (set)	1
Scaffold poles for sheer-legs	3
Debris baskets	6
Fireman's axes (with carrying pouches)	1
Short ladder (8 to 10 ft) (2-4 m to 3 m^3	1
Buckets	3
Tarpaulins or stout canvas sheet 12' x 12'(3:6mx 36 m) (to protect trapped persons from falling debris until released)	1
Leather gloves	2 pairs
First aid pouches	2
First aid Box	1
Stretchers	2
Blankets	4

(ii) Personal equipment per member of party	
Steel helmet	1
Water bottle with sling	1
(iii) Heavy equipment maintained in the Depot: (normally 2 sets per Depot)	
3 ton (30.48 kgs) lifting tackle	1
6ft (1.8 m) chain (3 ton 30-48 kgs lift)	2
Portable acetylene cutting out fit (where needed with asbestos blanket)	1
Extension ladder 35 ft (10,50 m)	1
Hydron Keys	2 sets
Air Breathing Apparatus	**2**
(iv) Contents of Pouch for a Rescue Party:(2 per party)	-
Bandages triangular	9
Canes for tightening improvised tourniquets	3
Dressing shell	6
Dressing first-field	6
Labels, casualty identity, packets of 20	1 packet
Safety pins (large) cards of 6	3
Scissors	1 pair
Tourniquet	1
(v) Contents of Pouch for a Rescue Party:(1 per party)	--
Bandages triangular	12
Canes for tightening improvised tourniquets	3
Dressing shell	6
Dressing first-fi eld	6
Lint unmedicated in squares about 18"x 18" (45-72 m x 45-72 m)	6
Safety pins (large) cards of 6	4
Clasp knife	1
Tourniquet	2
Splints leg	2 sets
Straps of leg splints	14

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CHAPTER NO. 31

ROPES-CARE OF ROPES-SPLICING AND WHIPPING ETC. OF ROPES

1. **Object**:

Ropes form an important item in Rescue equipment. Since an insecure or a wrong rope, or bad splice or a wrong knot, which will not carry the required strain, may cause considerable delay in operations and also involve risk, the proper selection of ropes and their appropriate uses is a matter of great importance. It is, therefore, essential to have some knowledge regarding the materials used in making ropes, the mode of their construction, the various types in use, their limitations and proper care and maintenance.

2. **Requirements**:

Rescue parties may be equipped with the under mentioned types and sizes of ropes.

(i) Two 200 feet (60.96 M) length of 3" (76.20 mm) rope-these are principally used along with tackles and pulleys for raising or lowering persons or articles etc.

(ii) Ten 40 feet (12.19 M) length $1^1/_2$" (38.10 mm) lashings-these are used for securing casualties to stretchers, as guy ropes in the construction of der ricks and sheers, as guide ropes etc.

(iii) Eight 15 feet (4.5 M) length of 1" (25.40 mm) sash cord-used as short lashing for all general and light works.

(iv) One coil of steel wire rope 100 feet (30.48 M) long 5/8" (17.30 mm) used for heavy work such as demolition of dangerous buildings etc.

3. **Cordage and Ropes in General**:

The term 'rope' is used for both fibre and wire ropes, while the term cordage is used to denote fibre ropes only. Cordage and ropes which are in general use are made principally of Hemp and Manila, and to a lesser extent of sisal, coir and cotton and other vegetable fibres. Rope is also made of steel wire. Hemp when wet is less likely to swell, and for reasons of softness of its fibres and flexibility has longer life and can be used over short radial curves. Manila is practically water-proof and as such is also used for making net for fishing industry. The strands of these ropes will maintain their lay when opened out. This makes them easy to handle in splicing and are, therefore, particularly suited for rescue work. Sisal, though of the same strength as Manila, swells when wet and becomes slippery. Coir, owing to its buoyancy, will float on water. It is noted for elasticity but lacks in strength. Cotton is more susceptible to damage from chafing. It is also most difficult to splice and its strands will not retain their lay when undone.

4. **Construction and Laying of Ropes:**

The first process in the manufacture of ropes consists of combining of fibres on a series of special machines, so that they are arranged roughly parallel, in which stage it is known as 'Sliver'. The next process is spinning when a permanent twist is mechanically imparted to the sliver which is then known as yarn. It is the smallest divisible part of a laid rope. A series of yarns twisted together from strands, and three or more strands twisted together form a rope (See figure 1-A). Rope is normally made in lengths not exceeding 120 fathoms, or 720 feet (219.46 M).

5. The manner in which yarns, strands or ropes are twisted together to form larger units of cordage is known as 'laying'. Rope may be laid up' right hand or left hand, and is then known as having a right hand lay' or 'left hand lay' respectively. The lay can be determined by looking at the rope. Most rope is three stranded and usually laid up right handed i.e. the strands run from the bottom left hand to the top right hand in a clockwise direction. This is called 'hawser-laid rope'. A hawser-laid rope is the strongest rope. When four strands are laid up right-handed some-times around a centre core or heart, the rope Thus, formed is called a 'shroud-laid rope'. The central core is made up of short strands and acts as a former' only. Three hawser-laid ropes laid up together left handed, with or without a central core, is called a cable-laid rope. Cable laid and shroud-laid ropes are weaker than hawser laid ropes (Please see figures 1-B, C and D).

6. **Measurement of Ropes:**

Ropes are measured by their circumference and are described as such in inches (millimetres). The word rope is usually applied to rope of one-inch (25.40 mm) circumference and above. Smaller sizes are known as cord or line.

7**. Strength of Rope:**

Strength of rope and its ability to withstand strain and stress depend upon the following factors:

(i) The materials of which it is made.
(ii) How it is made?
(iii) How rope is used?
(iv) Care and preservation during and after its use.

8. Roughly the safe working load for used hemp ropes can be taken as being equal in cwts. to the square of the circumstance in inches e.g. the safe working load for a hemp rope 2" circumference will be 2x2 cwts, or 4 cwts.

ln C.G.S. system roughly the safe working load in kilograms for used hemp rope can be determined by the following formula: -

C^2x0.0787 where
C is in millimetres

The safe working load for old ropes will be two thirds that of new ropes.

9. **Weakening Effects:**

Knots, turns and hitches weaken a rope by forming a bend which distribute the strain on the fibres unequally e.g. an eye splice weakens a rope by 10 percent, a short splice by 20 percent, a timber hitch by 35 percent, and a reef knot or single sheet bend by 50 percent.

10**. Care of Ropes:**

(i) **Fibre Ropes:**

(a) Keep all fibre ropes as dry as possible. When damp they should be dried in shade before coiling and stacking, to avoid danger by mildew. No rope should ever be stored wet.

(b) A stiff and hard rope gives trouble. Stretch a new rope throughout its length before using it. Remove the twists and pull at both ends.

(c) Remove kinks out of a new rope before using it, by uncoiling it and recoiling it in the opposite direction, for two to three times as kinking tends to draw the fibres apart and weakens them.

(d) Always coil a rope in the direction of its lay, e.g. a hawser laid rope is coiled in the clock wise direction. After coiling, tie with hemp at least in three places.

(e) Keep all rope coils hung on poles or bamboos. Keep each type labelled, so that the correct size of ropes can be taken out of the stores when necessary. All lashings should be kept in bags or bundles.

(f) Avoid permanent knots in a rope as this reduces the strength of a rope. Do not attempt to force a thick rope through block made for a smaller size. This produces strain and reduces the strength of the rope. Also avoid sudden jerks.

(g) Ensure that ropes do not come in contact with any chemicals or materials containing chemicals or strong alkali such as Creosote. Also protect the ropes from rats.

(h) Avoid dragging the rope along the ground, as it drives grit into the fibres and subsequent internal movement between the strands will cause the grit to cut into the fibres and seriously weaken them. Also avoid chafing against sharp edges.

(ii) **Steel Wire Rope**:

(a) Steel wire rope should be cleaned with a rag after and well-oiled before keeping it the store.

(b) When a steel wire rope has to be coiled, ensure that the coil must not below recommended diameter i.e. times the circumference of steel wire rope, otherwise strands may get damaged.

11. **Inspection of Ropes**:

Ropes should be regularly inspected to ensure that their condition is good, since the risk involved in rescue work is already great and bad ropes will make the matters worse. Therefore, look for the following defects while inspecting the ropes.

(i) **Surface Defects** -

(a) Broken fibres	These can be seen easily by visual inspection.
(b) Wear	Thinner than the usual circumference-uneven surface.
(c) Cuts	These can be seen and felt while coiling.
(ii) Internal Defects:	
(a) Broken fibres	At places where there is a bulge in the rope untwist and see for this.
(b) Mildew of Mould	When the ropes are used in wet weather or when they get wet and if they are not properly dried before storing mildew or mould sets in-untwist and smell-mildew can also be seen from outside deposited on the affected points.
(c) Change in colour	Seen from outside-usually the colour changes to grey or bluish grey-untwist the strains to find out the damage.

12. **Testing of Lines:**

Rescue lines should be tested monthly, after use at an incident and before use at a live rescue drill.

The test is usually carried out as follows:

One end of the line should be secured in such a way that any splices incorporated in it will be subjected to the test. Six men should take up positions spaced out an interval of about five feet (1.52 M) at free end of the line. When all are in position the front man should apply a steady pull until the line is being tested by the combined strength of all six men. This should be maintained for about 20 seconds and then, in succession, the men should release the load. The test should then be repeated with the line reversed. Each leg of lowering line with spliced legs should be tested separately. Guide lines should be tested in a similar manner except that the pull of only two men should be applied.

On completion of the test the line should be minutely examined for any defect.

13. **Splicing**:

Splicing means to join rope by interweaving strands. Splicing differs from knotting. In splicing strands are interwoven, whereas in knotting the rope as a whole is used Rope joined by splicing can pass through a block and splicing weakens the rope by 10 percent only. Whereas rope joined by knotting cannot be passed through a block and its weakening effect is sometimes up to 50 percent as in the case of reef knot and single sheet bend. Cordage and ropes sometimes require to be joined in such a way that there should be no substantial difference in their diameter and no weakening of their strength. This can only be done by splicing. No splice can be as strong as a rope of which it is made. However, a well-made splice is stronger than a knot. The principles underlying all splicing work is that of interweaving of strands of a loose end of rope with the strands of a standing part in such a way that as soon as any strain comes upon either, the strands of the standing part will nip the interlocked loose ends and prevent them from drawing out. The tools required for splicing are few-a knife for cutting and spike or 3-inch nail for opening the strands of the rope.

14. **Short Splice:**

A short splice is used where there is not much strength required and when there is not much time to make a long splice. To make a short splice, unlay the strands of each rope for a length of about 6 times the circumference of the rope. Marry the strands i.e. bring the ends together so that the separated ends fit into each other, one strand being in the space between two strands of the opposite rope (see figure 2 (F. 1)). The strands of the line (a) are then tucked into those of lines (b) and those of the line (b) into line (a) working all the time against the lay. Figure 2 (F. 2). (F. 3) and F. 4 shows the other stages of a short splice. If the rope has to pass through a block this splice is unsuitable and a long splice must be used.

15. **Long Splice**:

This splice is stronger than the short splice, but uses more rope and has the advantage of not increasing the thickness of the rope. For three strand ed rope, the minimum length of rope unlaid should be 6-7 times that of the circumference of the rope and for the four stranded rope 10 times the circumference. For normal use, in making a long splice, unlay the ends of both the ropes for a length of 12-14 times the circumference. Marry them as for short splice (Figure 3 (a)). Without disturbing the other strands, choose one strand and begin to unlay it. filling up the room it leaves with the corresponding strand of the other. Rope, working

to within a few, inches of its end. Repeat with another pair of strands but working the opposite way, (Figure 3(b)). Let the remaining strand stay put out. The ends of the strands now have to be locked as shown in the figures 3(c), (d) and (e). A long splice should be well stretched and rolled before the ends of the strands are finally cut off.

16. **Eye Splice:**

This is used in rescue work most frequently. It is used for making an eye in a rope round a timber or block and is formed by unlaying the end of a rope for short distance and then interweaving the three unlaid ends with the standing part so as to form the size of eye required.

17. **Construction of an Eye Splice:**

To make an eye splice in three stranded rope (figure 4) unlay the strands for a short distance and bend the rope to form an eye, placing two end strands across at right angle to the lay of the standing part of fire rope, and the other strand behind (A). Then take the centre strand under the nearest strand of the standing part (B), under the remaining strand of the standing part, going in where the first strand, comes out (D). You now have an end strand projecting from each space of the standing part (E). With this the first tuck is over. Take the first end strand under the next strand going in where the second strand comes out (C). Turn the rope over and tuck third strand. Tuck each strand in turn over and under the one and make two full tucks and two tapper tucks.

18. **Use of an Eye Splice:**

An eye splice is valuable on the end of rope e.g. when erecting blocks and tackles on sheer legs, if the straps or slings have eye spliced ends, it is simply necessary to pass hook of the tackle through the eye and save much time. Stretcher slings can be made from two short pieces of rope with spliced eyes at each end. All that is required is that they have to be passed over the ends of the stretcher. This saves time and labour and increases efficiency, which is important in rescue operations.

19**. Running Splice:**

This means replacing a damaged or chafed strand in a rope, by inserting a fresh strand. This enables the rope to be passed through the block and the rope is almost normal. The strand for repairs should preferably be taken from one end of the rope as this makes the job easy.

20. **Whipping**:

Ropes should never be cut, as a rule. When it is cut as a mere necessity, its ends should be preserved. It is important that the ends of all ropes and lashings used in the rescue work are properly secured, from fraying and untwisting. This may be done, temporarily by a thumb knots, a figure of eight knot or a back splice. Then such ropes look clumsy with unusually thick ends. For thicker ropes back splice as this is much useful and superior. Whereas ends of ropes of lesser circumferences should be secured by whipping.

21. **Methods of Whipping:**

There are many ways of whipping. The most common whipping used by rescue parties is the simplest to put on. Take a length of waxed seaming twine about 18 inches in length. Lay one end of this along the rope's end and hold it in place with the thumb. Now wind tightly

the loose part of the twine round it and the ropes end. Carry on these turns until within half an inch of the bare end of the rope. Then lay back the other end of the twine, along the rope's end (Figure 5) and take another four or five tight turns round it and the rope. Finally, the outer end of the twine is put inside the loop formed and the two ends of the twine are pulled and made taut, through the last few turns and cut off both twine ends close to the whipping.

The best and the most durable method of whipping is the method adopted by the Sail Makers (Figure 6). Under this method the two ends of the twine is passed through the rope in such a way that loop is found and a strand of the rope remains with in the loop. The loop and the ends of the twine are then adjusted in such a way that the lengths of the loop and the lower end of the twine becomes slightly more than the end position of the rope to be whipped. The round turns are then taken along the end of the rope going upwards with the larger end of the twine. When the end of the rope is reached, the loop is taken up along the direction of the twist of the strand which is within it and put around the strand. The loop is then made taut by pulling the lower end of the twine. Thereafter the same end is also taken up along the twist of a strand and putting over the free end of the rope it is brought to a position where it can meet the other end of the twine with which round turns were taken. A reef knot is then made inside the strands taking the ends and the spare ends of the twine are cut off.

22. **Seizing: (See Figure 7-A, B, C.)**

When a rope is to be unlaid for splicing, a band with a piece of hemp is put across the rope to stop further unlaying. This is called 'Seizing. Seizing is also employed to secure the ends of ropes coming out of the knots to the main or fall with a piece of hemp, so that the knot does not get loose, or untied.

23. **Moussing**:

In rescue work when ropes are used along with blocks. many times the ropes are hitched and to prevent such a hitch from working up the hook, or to prevent on any occasion a hook from becoming unhooked, the hook is moussed. Turns of yarn are passed round the bill and back of a hook and then knotted in a place. This is called 'moussing". (See Figure 8).

24. **Conclusion**:

In the above paras we have discussed ropes, the strength of ropes, weakening effects, care of ropes, inspection of ropes, different splices, whipping of rope ends, seizing and moussing. It is needless to stress that the rescue party should possess the full knowledge of ropes, be proficient in the use and care of rope as the efficiency with which the rescue is conducted depends entirely on this.

Fig. 1

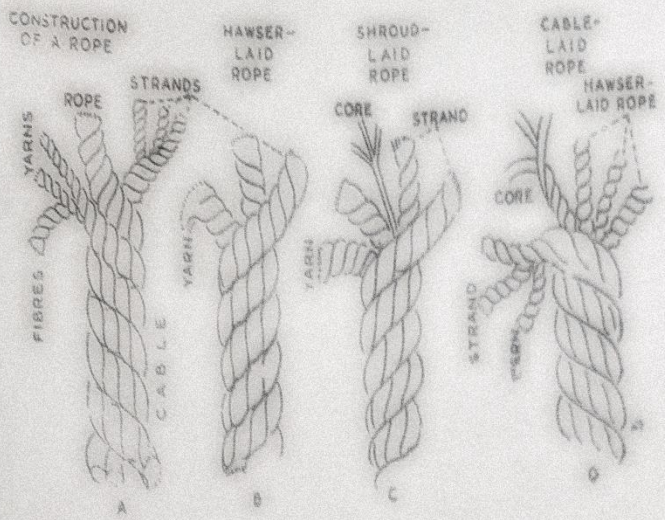


Fig. 2

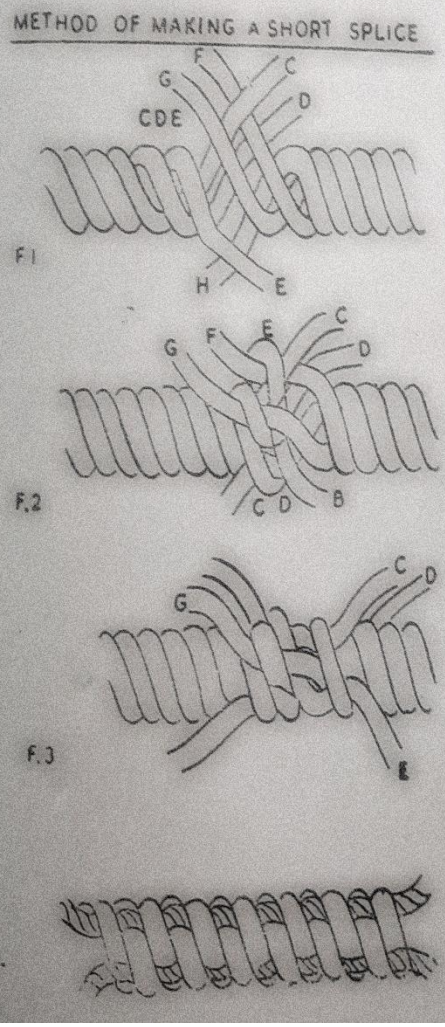
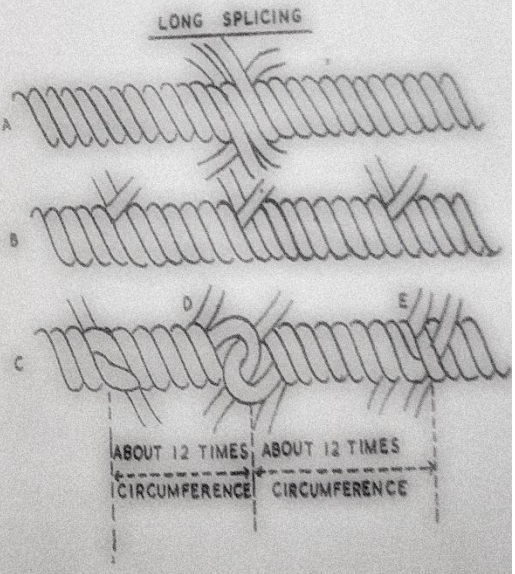


Fig. 3



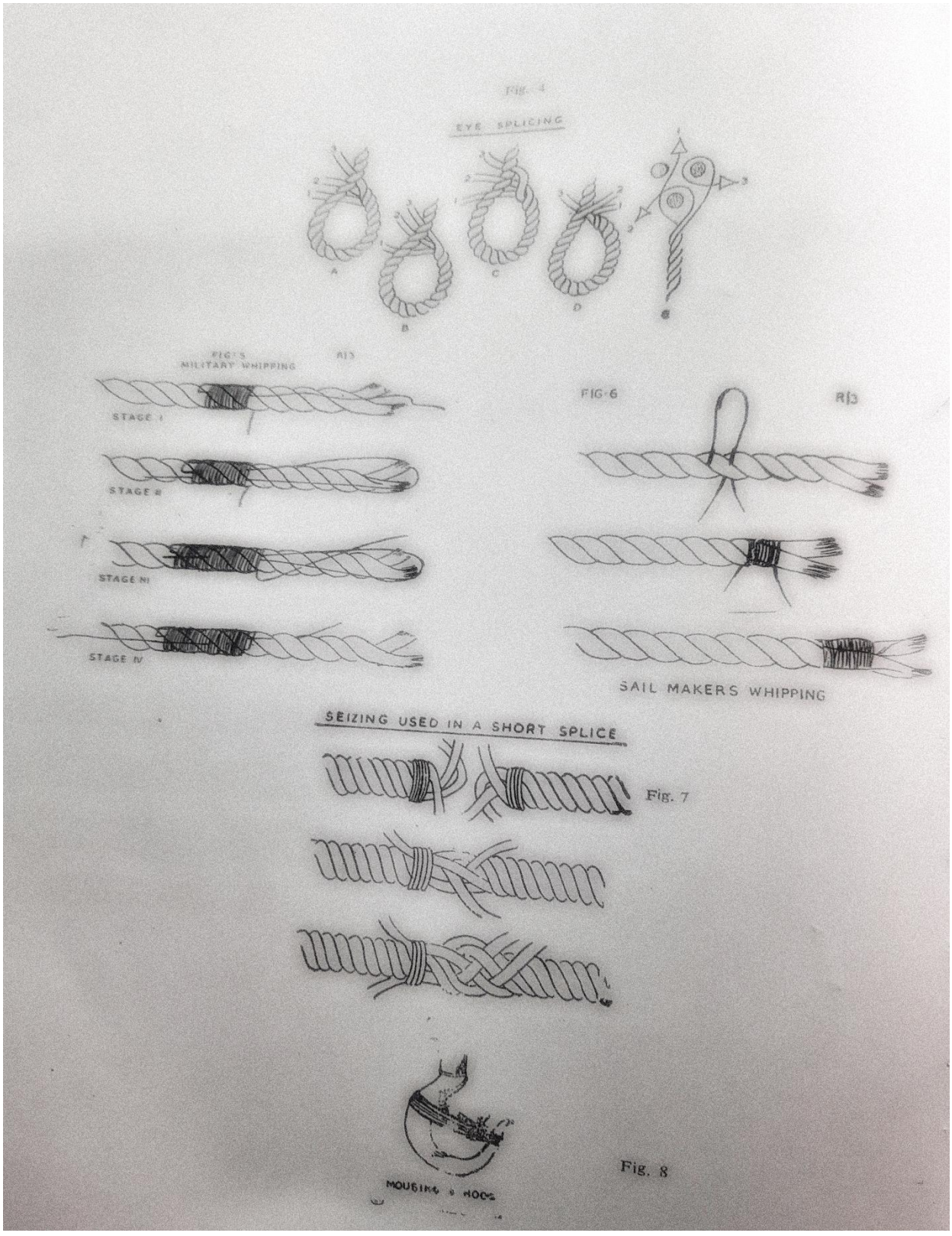


Fig. 4
EYE SPLICING
A
B
C
D
E
FIG. 5
MILITARY WHIPPING
A|3
STAGE I
STAGE II
STAGE III
STAGE IV
FIG. 6
A|3
SAIL MAKERS WHIPPING
SEIZING USED IN A SHORT SPLICE
Fig. 7
MOUSING & HOOK
Fig. 8

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CHAPTER NO. 32

ROPES-KNOTS AND LASHINGS

1. **Object**:

In Rescue Work knotting and lashings are required for joining and securing ropes and for fastening ropes around objects and persons, and to lower, hoist or secure with safety. Knots must be tied tightly.

2. As knotting and lashing is to be done, on the spot, where the party is fighting against time, in darkness, in smoke, when people are killed or dying and when civilian population is panic stricken, it is very necessary for everyone in the Rescue Party to learn knotting and lashing, so thoroughly that it becomes a habit and they should be able to, do this under all such abnormal conditions.

3. **Terms used in connection with Ropes**:

(i) **Anchored**: Fastened to any immovable object e.g. large tree, post or picket well driven into firm ground for this purpose.

(ii) **Bight**: An open loop in a rope.

(iii) **Frapping**: The binding together of a rope or lashing between the poles.

(iv) **Haul**: The act of pulling a rope.

(v) **Hitch**: A closed loop on a rope. It means simple fastening of a rope around any object by winding and crossing one turn over another turn so that one bites on the other without actually knotting the rope.

(vi) **Parcelled**: When any rope or part of it is parcelled to prevent chafing, it is called 'parcelled'.

(vii) **Paying out**: To ease off or slacken a rope.

(viii) **Reeve**: The act of threading of ropes through pulley or blocks.

(ix) **Running End**: The free end of a rope with which the knot is made.

(x) **Standing part:** That part of the rope which is taking the load.

4. **Thumb Knot:**

It is formed by making a loop and passing one end through it. It is useful when tied at the end of a rope to prevent the rope from fraying, as a temporary measure or to stop it from passing through a pulley block.

5. **Figure of eight Knot**:

This is formed by an over hand and an under-hand knot over-lapping each other with the loose end passed though the loop. When driven tight its resemblance is that of figure eight.

6 **Half Hitch**:

This is formed by passing the short end of a rope around the spar or another rope and under the standing part, so that, when pulled, one part of the rope binds the other. In effect this forms the beginning of a timber hitch.

7. **Timber Hitch:**

This is made quickly and temporarily to secure a rope to a plank or a spar. Make a half hitch on the standing part of the rope leaving a long end which is twisted back and given a minimum of three turns. When used for lifting planks and spars, this hitch should be used along with a half hitch at the upper end of the plank or spar.

8**. Clove Hitch:**

This hitch is formed by forming two loops in the centre of rope, one in the left hand, the other in the right, one opposite to the other in direction. Then the right hand one is passed in front of the other loop. Both are now passed over the spar and drawn tight. If the clove hitch is to be made at the end of a rope, pass the running end round the spar, bringing it out underneath the standing rope. Pass the running end round the spar again above the first half hitch, bringing the running end under itself to tighten pulling both the running end and the standing part. This forms the basis of many securing knots and can be used in the end or in the centre of a rope.

9. **Round turn and two half Hitches**:

This is also useful for securing a rope to a spar or ring and is formed by a round turn on the spar or ring with two half hitches on the standing part of the rope.

10**. Draw Hitch:**

It is formed as follows, a bight is passed around the spar and a second bight, which is then formed on the standing part of the rope, is passed through the first bight. A third bight is formed with the short end and passed through the second bight and whole tightened up by pulling on the standing part. The bights should be tightened as much as possible at each stage. This is quite satisfactory on a round spar but not reliable on a square timber. This hitch will stand a considerable amount of strain on the standing part and yet can be easily released by jerking the free end. It is useful for self-rescue and then recover the rope very easily.

11. **Reef Knot:**

This is useful for joining two ropes of equal sizes. It is useful for general purposes. It should be used for joining 2 dry ropes of the same size, when the pull is constant. This is tied as two thumb knots tied in reverse direction left over right, then right over left.

12**. Sheet Bends:**

There are two types-1. Single sheet bend. 2 Double sheet bend. Both are useful for uniting two ropes of different thickness and they do not slip when the rope is wet.

13. **Single sheet bend:**

Single sheet bend is formed by making a loop in the thicker one of the two ropes, and holding this in the left hand, the end of the thinner rope is passed upwards through the loop forming a half hitch round the two thickness as of the thicker rope.

14. **Double sheet bend:**

This is a little more secure than the single sheet bend. It is used when there is a great difference in the size of the ropes. It is formed somewhat like the single sheet bend, except that after having made the half hitch with the thinner rope, continue turning its short end to make another round turn around the two thicknesses of the thicker rope and towards the bight.

15. **Chair Knot:**

Chair knot is very important in rescue work and is used as a sling in which a person may readily be lowered from heights. Chair knot may also be used as a stretcher sling, made by forming a chair knot complete with half hitches in the centre of a 40 ft. lashing. It is formed by grasping the rope near its centre, in the left-hand palm downwards. About a yard from the left hand take the rope in the right-hand palm upwards. Turn the left-hand palm up wards forming a loop (anti-clockwise) turn the right-hand palm down forming a loop. Pass the standing part through the loops of the opposite hand pulling them through, Thus, forming two loops with a knot in the centre. Adjust the loop and make a half hitch on each loop.

16. **Bowline**:

Take the running end of the rope in a right hand, pull it across the upturned palm of the left hand, through the fingers of the left hand, forming a loop to required size, pass the running end, which is held in the right hand, up through the loop in the left hand, then underneath the standing rope and back down through the loop. Tighten the two ends. This is useful in recovering casualties from under the debris or basements, where the rescuer has to crawl to the casualty and back again.

17**. Rolling Hitch:**

It is a variant of the clove hitch and is commenced and finished in the same manner, but there is an inter mediate round turn between the two half-hitched. This intermediate round turn passes over the standing part. The round turns should be made on the same side of the standing part as that on which the strain is to be applied.

This knot has the advantage that it will not slip in the direction in which the double turn is applied, if it is subjected to a sideways pull.

18. **Fisherman's Bend:**

This is related to the round turn and two half hitches and is made by forming a round turn on the spar or other line to be secured, and making a half hitch round the standing part of the line in such a way that it passes through the round turn. A further half hitch is next made with the end on the standing part. The end should be seized to the standing part. This is also used for securing a line to a spar or to another line.

19. **Running Knot or Slippery Hitch:**

The knot/hitch is made by putting a half hitch on the object to be secured, and pulling a bight of the free end of the line through the hitch. The knot can be released immediately by pulling on the end. It does not hold so securely as a draw hitch and is normally used for a temporary fastening

20. **Carrick Bend**:

This is made by forming a bight on the first line by passing the running end back and under the standing part. The running end of the second line is then passed up through the bight, down between the running end and standing part of the first line, and up again through the bight on the left of its own standing part. The running end of each line is then secured.

It is used to join two lines together, especially when the knot may be required to pass around a post, since it lies evenly and does not from an obstruction to the paying out of the line.

21. **Ship Shank**:

It is formed by gathering up the amount by which it is desired to shorten the line. Half hitches are then thrown round the ends of each bight. The two bights then should be seized.

It may also be used for avoiding a point in a rope without cutting it.

22**. Running Bowline:**

It is made by forming a bight in the end of the line and passing it under the standing part. A bowline is then made at the point "C" on the bight so formed, Thus, making a running noose.

A running bowline can be put on a ring bolt, spar or other object, the ends of which are secured so that the noose cannot be slipped over by passing the line round the object, leading it under the standing part and back, and then tying a bowline on the loop so formed.

23. **Bowline on the Bight**:

It is formed by first making bight (a) in the end or centre, of the line. The bight then used in the same way as the free end is used when making an ordinary bowline, and half hitch (b) formed on the standing parts of the line. The part of the bight (a) which has been passed through the half hitch is then opened out and taken in the direction indicated by the arrow (i.e. behind the remain der of the knot) and then brought up to the two standing parts. The knot is then hauled taut and will appear as shown in the figure.

This knot is used as sling for rescue purposes. The smaller loop is passed under the arm pits and the larger loop is passed under the knees of the person to be rescued."

24**. Midshipman's Hitch:**

It is made by putting half hitch well up on the shank of the book of a pulley block and the part (a) of the hitch is then placed over the bill of the hook as shown in the figure.

25. **Waterman's Hitch or Lighterman's Hitch:**

It is made by taking several turns round bollard or bitt, passing the running end over and under the standing part and then pulling out bight (a) which is dropped over the bollard, Thus, forming figure-of-eight and making taut.

The Waterman's Hitch is used to secure skiff to the towing bitt of fire boat. Its virtue is that it can be both made and cast off when under strain on the standing part.

26**. Bale Sling:**

It is used for slinging cask in upright position. The cask is placed vertically on one end of the line. An overhead knot is then formed with both ends of the line on the top of the cask and opened out. The bight so formed is passed over the head of the cask and hauled taut, the ends being tied above the cask by a reef knot.

27. **Lashings:**

These are mainly used to lash or secure two or more poles together. There are four common types of lashings.

(i) **Square Lashing**: This is used for lashing together two poles that touch and cross at right angles, e.g. cross head and the derrick spar ledger and gyn legs.

(ii) **Diagonal Lashing**: This is used for lashing two poles where they cross at an angle and the poles are likely to spring apart when put under load or strain.

(iii) **Figure. of Eight Lashing**: This is used for lashing three poles together to form a tripod or gyn.

(iv) **Round Lashing**: This is used for lashing two poles together, when they are kept parallel to each other e.g. sheer legs. This is also called sheer lashing.

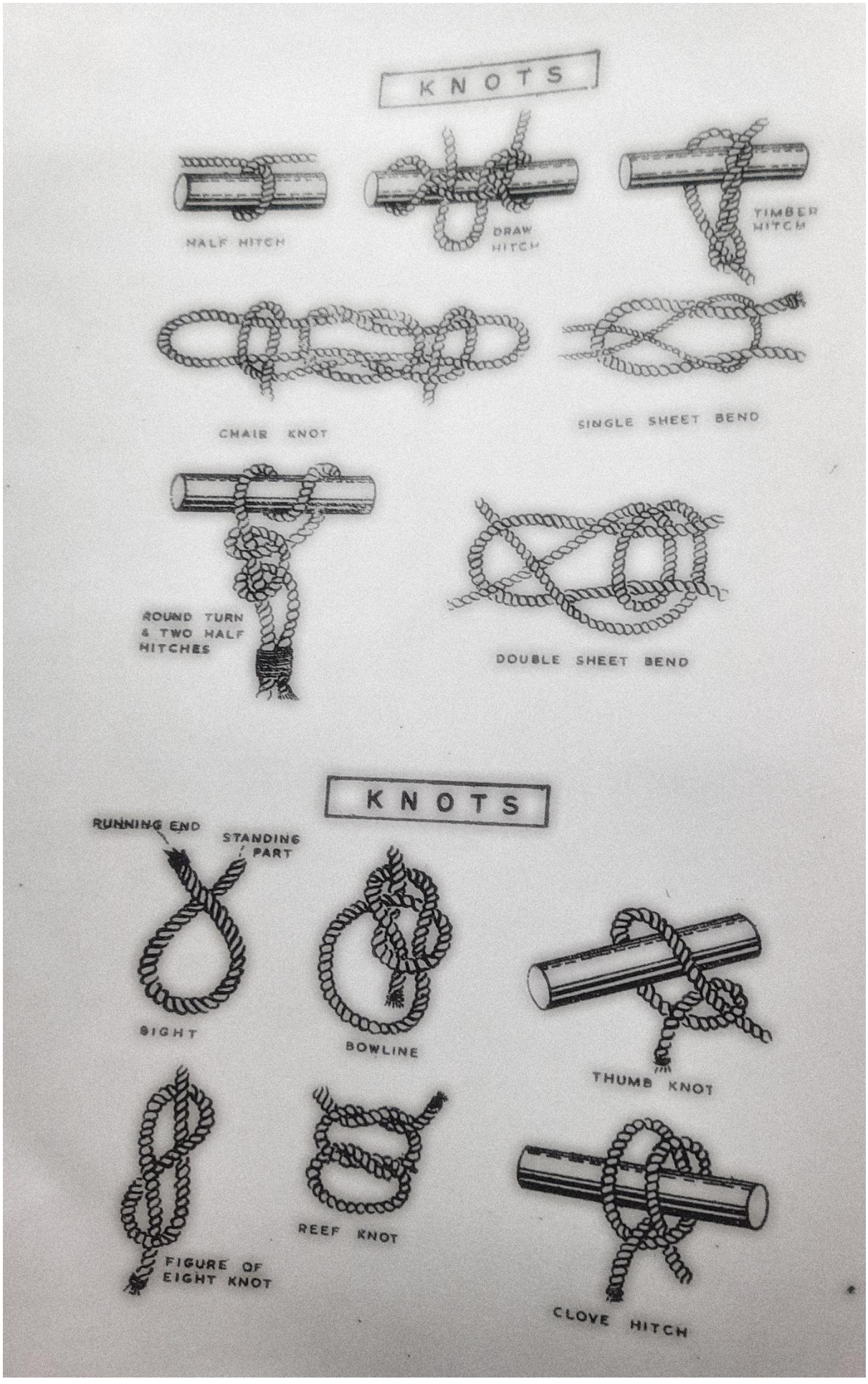
28. **Method:**

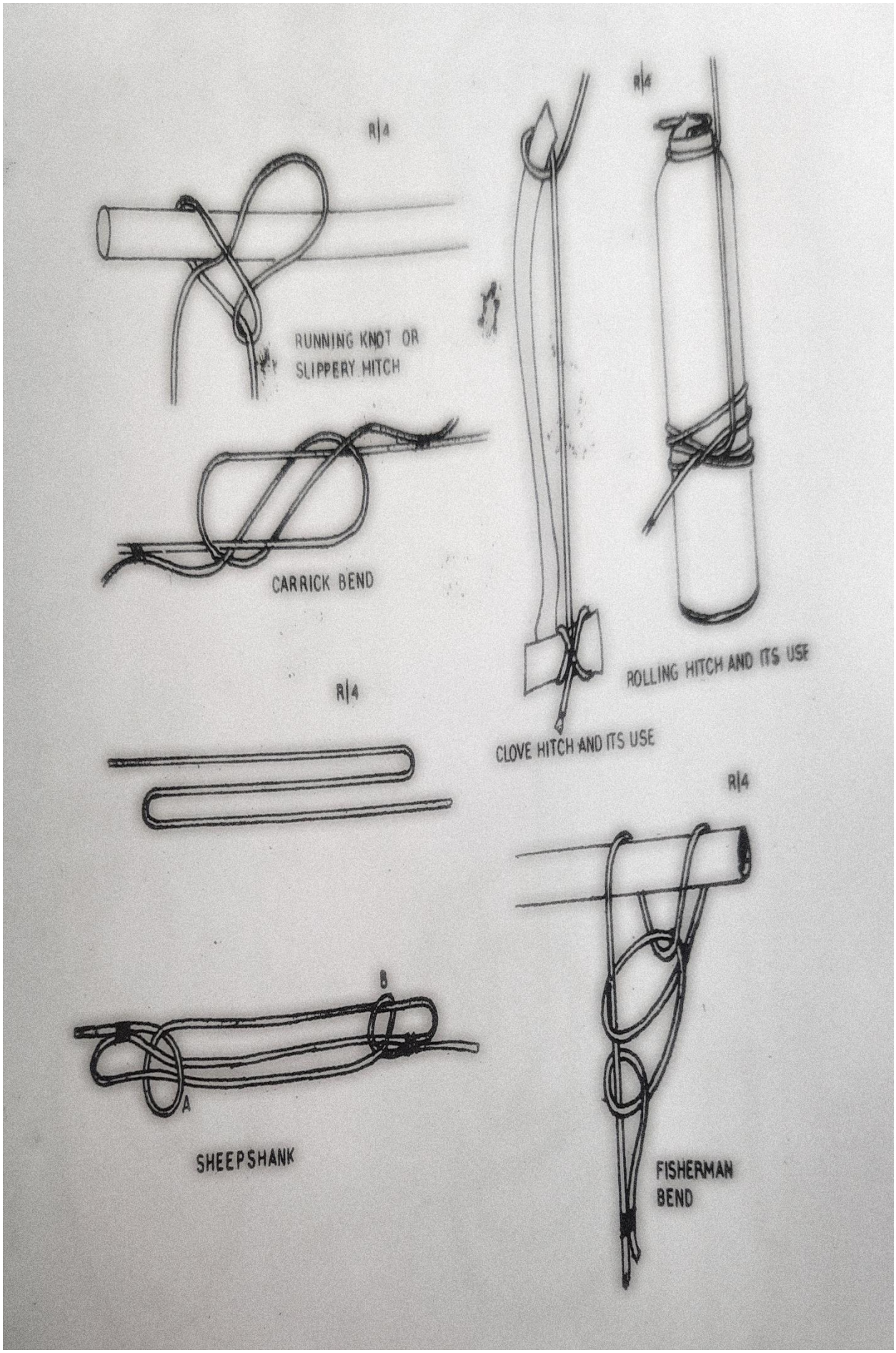
(i) **Square Lashing**: Put a clove hitch to start with around the spar or leg and below the cross head or ledger. Marry the running end to standing parts, take up and around both the poles, as shown in the figure by means or arrows. Repeat this circuit three to four times, drawing the rope as taut as possible. Then take three to four frapping turns around the whole lashing but between the poles. Draw taut. Finish off with a clove hitch on the vertical pole above the horizontal (Figure No. 1).

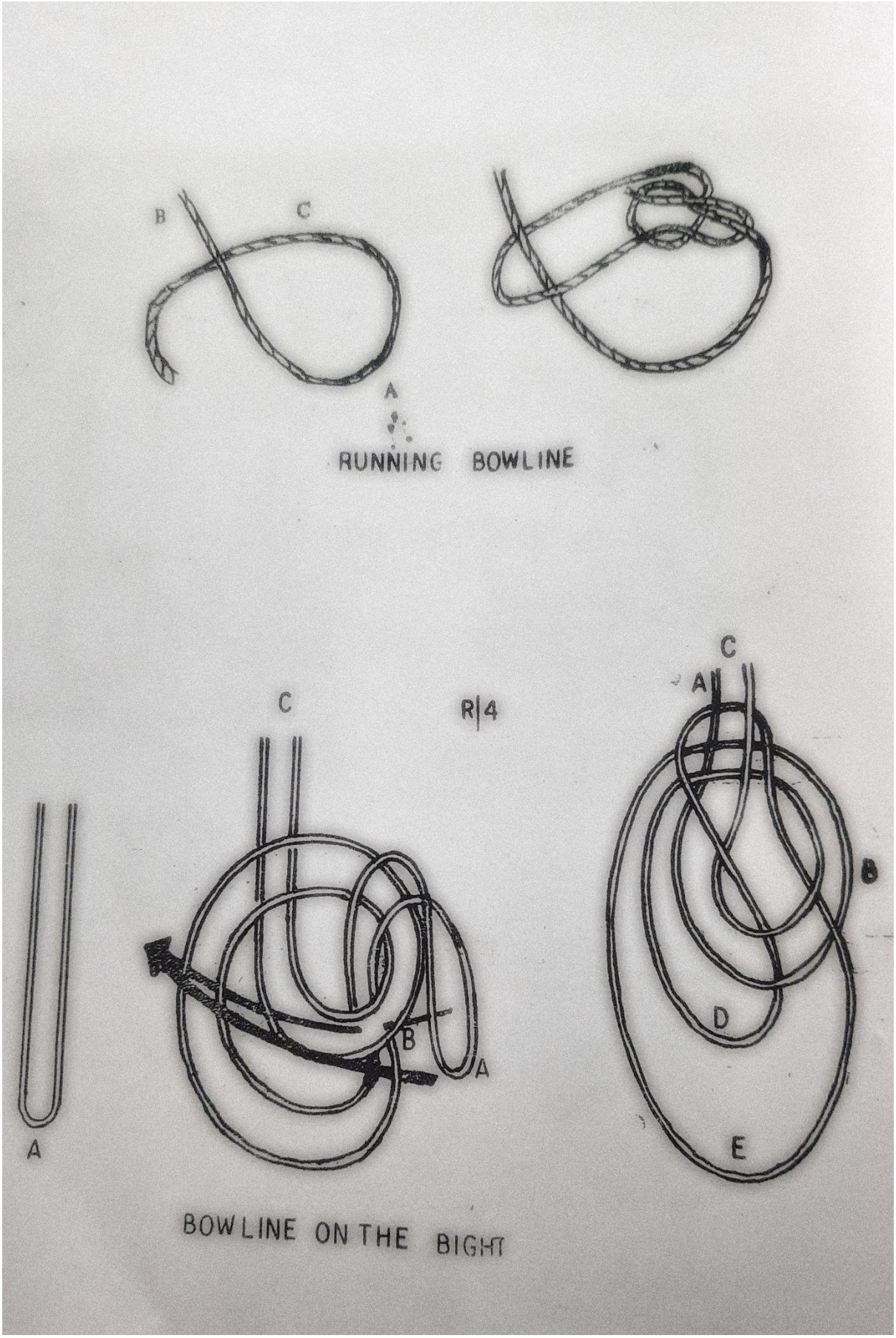
(ii) **Diagonal Lashing**: Put a timber hitch around both the poles horizontally. Then take four vertical turns and draw them taut. Then take four horizontal turns and draw them taut. To finish off put four frapping turns over the lashing and between the poles. Draw them taut and end with a clove hitch. (Figure No. 2).

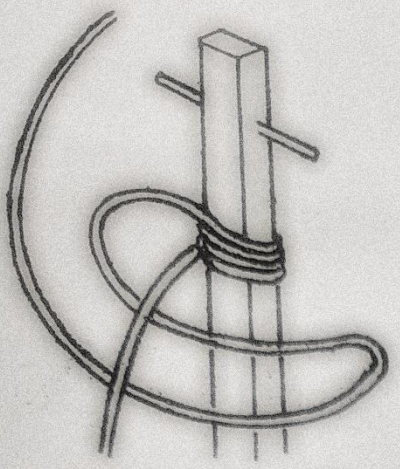
(ii) **Figure of Eight Lashing**: Before lashing insert spacers between the poles. (Where you have marked the pole). The thickness of spacers should be half that of the poles, marry the ends and working upwards continue lashing in the figure of eight fashion with 6-8 turn. Add two to three frapping turns between each pole and round the lashing. Finish with a clove hitch above and on the opposite pole to the starting pole. (Figure No. 3).

(iv) **Round Lashing**: Before starting insert spacers between the poles. The thickness of the spacers should be approximately half the diameter of the poles. Put a clove hitch around one pole, marry the ends and continue with 6-8 close turns round both the poles going upwards. Add two or three frapping turns round the lashing and between the poles. End with a clove hitch above and on the opposite pole to the starting pole. (Figure No. 4).


KNOTS
HALF HITCH
DRAW HITCH
TIMBER HITCH
CHAIR KNOT
SINGLE SHEET BEND
ROUND TURN & TWO HALF HITCHES
DOUBLE SHEET BEND
KNOTS
RUNNING END
STANDING PART
BIGHT
BOWLINE
THUMB KNOT
FIGURE OF EIGHT KNOT
REEF KNOT
CLOVE HITCH

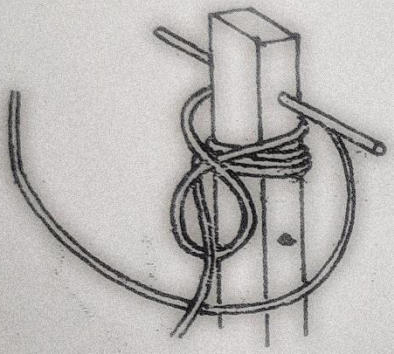

R/4
RUNNING KNOT OR
SLIPPERY HITCH
CARRICK BEND
R/4
ROLLING HITCH AND ITS USE
CLOVE HITCH AND ITS USE
R/4
B
A
SHEEPSHANK
R/4
FISHERMAN
BEND


B
C
A
RUNNING BOWLINE
C
R|4
A
B
A
C
A
B
D
E
BOWLINE ON THE BIGHT

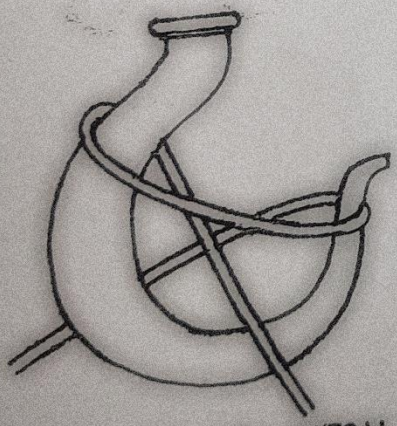


WATERMANS HITCH

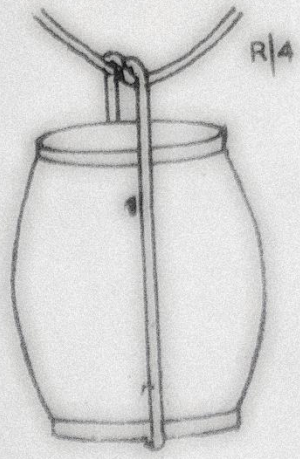
R|4



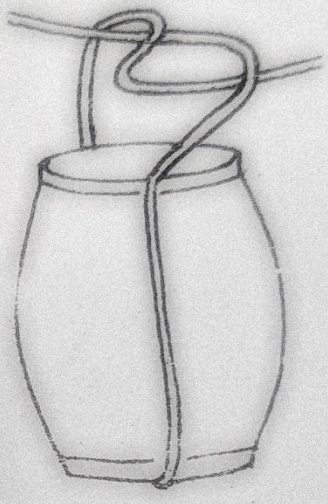
WATERMANS HITCH

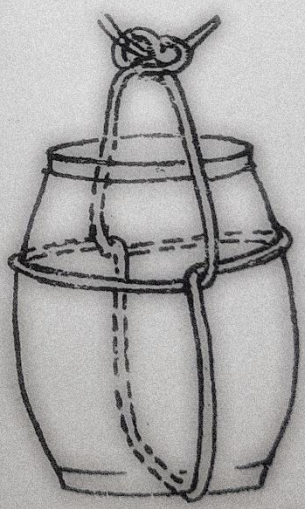


MID SHIPMANS HITCH



R|4

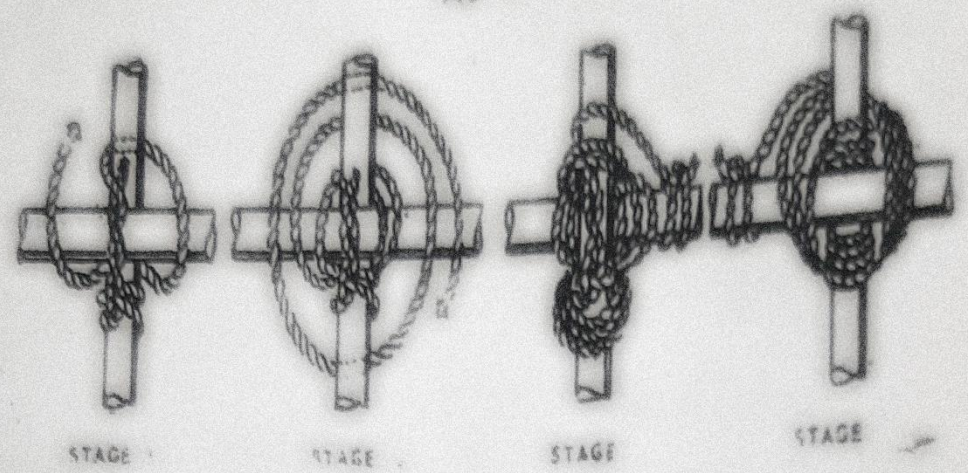




BALE SLING METHOD
OF HOISTING A CASK.

SQUARE LASHING

FIG 1



DIAGONAL LASHING

FIG. 2

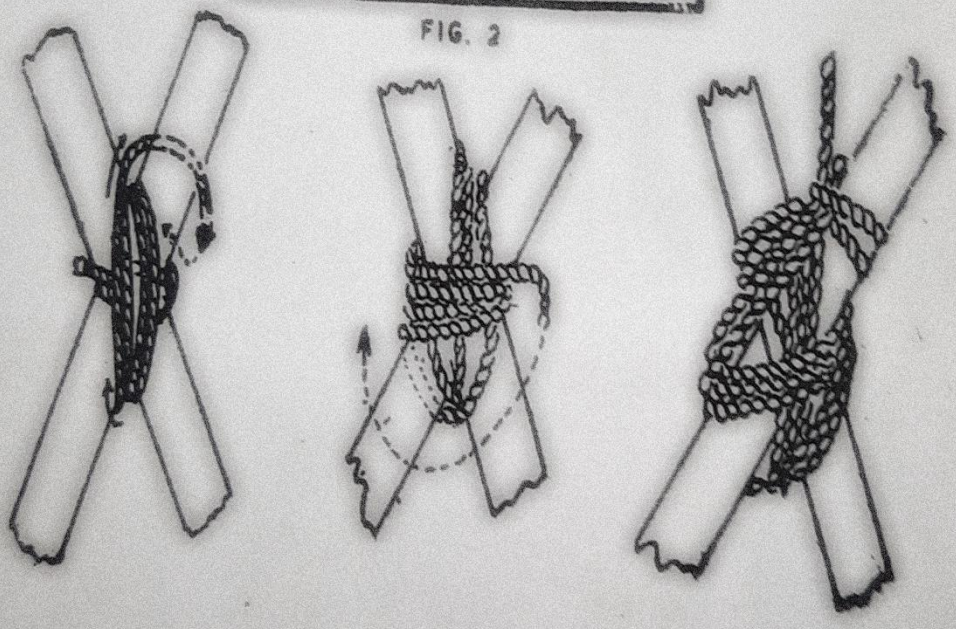


FIGURE OF EIGHT LASHING

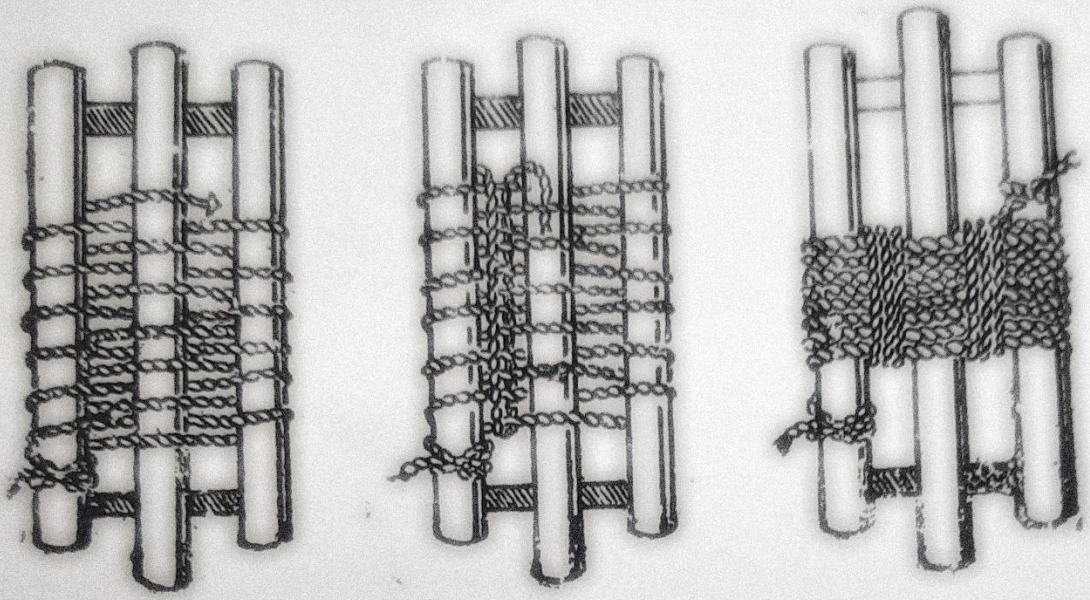
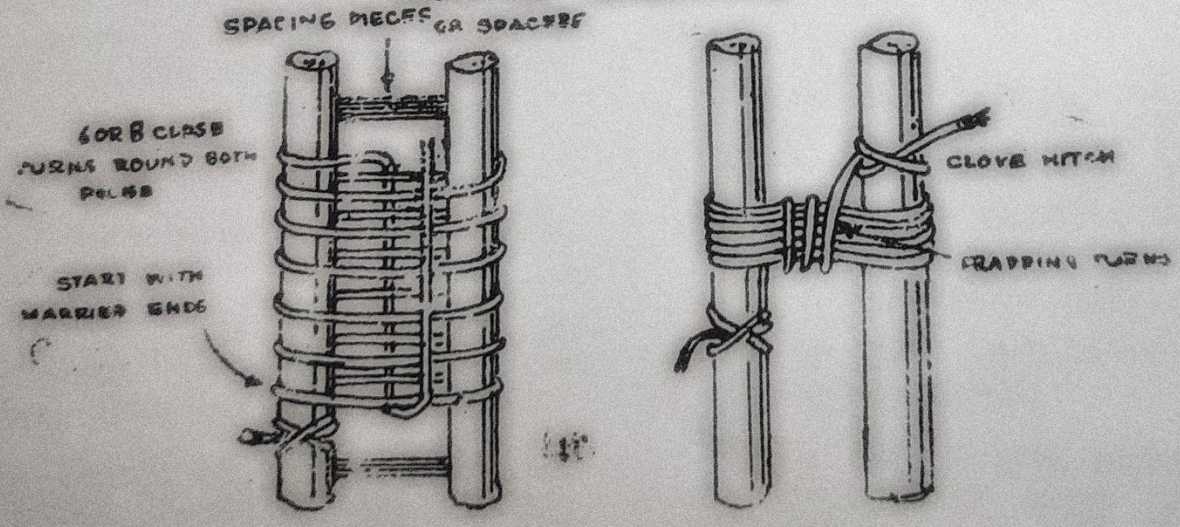


FIG. 8

ROUND LASHING



CHAPTER NO. 33

STRETCHER- HARNESS IMPROVISED STRETCHER LASHINGS AND SECURING CASUALTY TO STRETCHER

1. **Object**:

When casualties are required to be removed on stretches from confined places, high buildings, through narrow passages, over rough round or with lesser bearers, it becomes necessary to adopt additional measures to ensure safety of the casualty during its removal on stretcher as well as making it convenient for the bearers. Use of stretcher harness and lashing the stretchers are two important measures that can be adopted for such purposes. All members of the rescue Parties and First-aid Parties must be fully conversant with the use of these.

2. **Stretcher Harness:**

Normally four people are needed to carry a stretcher, although two are sufficient when the ground is level and there are no obstacles. But sometimes, a casualty is required to be carried over rubble or piles of debris by two bearers and when their hands must be free to support and balance themselves in moving about with the stretcher over the obstacles. In the circumstance's stretcher harness is made use of by the bearers. The standard harness is prepared from broad canvass straps and is adjustable. Each bearer uses a pair of this which is worn across the chest from one shoulder to the other side. The bearers must wear the harness before they lift the stretcher with the casualty in case their use becomes necessary. When attaching the harness to the stretcher both the bearers should co-ordinate their action. The lower ends of the harness i.e. the loops, are slipped over the handles of the stretcher, and in order to prevent their slipping away, a leather belt is passed through 'D' (runner) to the stretcher.

3. **Improvisation of stretcher harness:**

If proper canvass stretcher harness is not available, this can be improvised as follows:

(i) Using places of ropes with 'spliced' 'eyes' or "bowlines' to provide loops for slipping over the handles of the stretcher. This can be done as under:

(a) 'Spliced Eyes'-Serviceable pieces taken out of 40-$1^1/_2$" (12.10 M-38.10 mm) lashing rope, sufficient to be worn by the stretcher bearer across his chest from one shoulder to the other side with both ends of the rope spliced before-hand to provide two loops for slipping over the handles of the stretcher. A pair of this is required by each of the two bearers.

(b) **'Bowlines'**-In place of 'spliced eyes', as described above, bowline knots can be made at the ends of ropes, on the spot, to provide similar loops for securing to the handles of the stretcher.

(ii) **Using triangular bandages**: A few triangular bandages joined together can be used likewise for securing to the stretcher handles by using clove hitches, and worn by the stretcher bearers.

4. **Securing casualties to a stretcher**:

(i) **Need**: A normal blanketed casualty lying horizontally on a stretcher and carried by four bearers on a level ground has no danger of slipping upwards and downwards. Under the following circumstances, however, the casualty needs securing to the stretcher to prevent slipping.

(a) To be carried through a narrow passage, when it may be necessary to bend tilt or turn the stretcher sideways.

(b) To be brought up from basement etc.

(c) To be lowered from an upper floor.

(d) To be carried over rough ground when the bearers may stumble and the casualty may be thrown off the stretcher.

(ii) **Equipment**: Casualties can be secured to the stretcher with a manifold stretcher harness made up of canvass strappings but in absence of that, it can be most efficiently secured to the stretcher with help of 40 feet (12.19 M) long $1^1/_2$ inches (38.10 mm) rope.

(iii) **Method**: Only two persons are required to carry out the work. The knots used are the clove hitch and the halt-hitch only. The procedure should be Thus,:

(a) The main operator sits on the right side of the stretcher near the head end with the rope in his hands, while his assistant sits facing him on the opposite side, (the casualty should have been blanketed beforehand. if not it can be blanketed now)

(b) The clove hitch is tied on the right head side stretcher-handle.

(c) The rope is then passed down the side of the stretcher for about 18 inches and taking a complete turn over the chest of the casualty and under the stretcher a half-hitch is formed.

(d) Passing the rope further down the right side, a second complete turn is given around the casualty at the hip level, ending again with a half hitch.

(e) A third turn and a half hitch is similarly placed just below the knees.

(f) The ankles and the feet are then secured with a hitch and the rope passed under the ankles on the other side.

(g) The rope is now on the other (left) side it is then hitched through each loop formed around the casualty and the other end tied with a clove-hitch on the handle.

(iv) **Disposal of the loose-end**:

On completing this "lashing" or the casualty, a length of the 40 feet (12.19 M) rope is usually left over, depending upon the size of the casualty, but it is usually 3 to 4 feet (.91 to 1.22 M) long. This loose length must be carefully secured otherwise it may become a danger to the bearer at the head of stretcher as it may get under his feet and make him stumble and loose balance and Thus, indirectly be dangerous to the casualty. There are two methods recommended for the disposal of this loose end.

(a) It is passed downwards and secured under the loops of the lashing or,

(b) It is passed through the fold of a pillow (made from a blanket) made at the top end and drawn taut and secured to the standing end by any securing knot. This method has the added advantage of preventing the dislodgement of the pillow which may occur when passing through narrow passages or over rough ground, or.

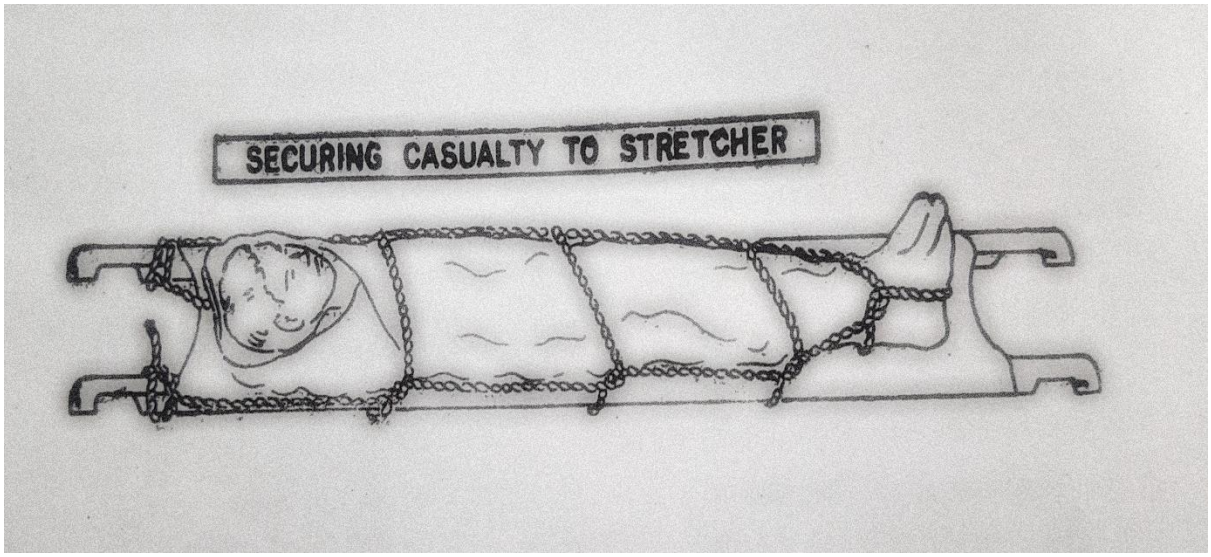
(c) It is coiled and placed beneath the blanket under the heads of the casualty to serve as a rough pillow.

(v) **Releasing the Casualty**: To release the casual ty quickly from the stretcher, two men, one on either side of the stretcher remove the clove-hitches from the stretcher handles. Working in unison, they proceed towards the casualty's feet, gently releasing by a slight pull on the lashing, the turns around the casualty. They then remove the turn around the feet and release the lashing from under the stretcher.

(vi) **Precautions**:

(a) The lashing should not be secured so tightly around the casualty as to hurt the injured part or to interfere with the breathing.

(b) The hitch around the feet and ankle must be sufficiently tight to hold the casualty firmly. when the stretcher is held up vertically.



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CHAPTER NO. 34

BUILDINGS GENERAL PRINCIPLE REFERENCE OF CONSTRUCTION WITH REFERENCE TO RESCUE OPERATIONS FORMS OF BUILDING COLLAPSE

1**. Object:**

The object of this lesson is to study the elements of building construction and forms of collapse.

2. **Introduction:**

Rescue Parties, during the operations, often have to search for the casualties in various collapsed portions of different types of structures. As such, the Rescue Party personnel should have the basic knowledge of elementary principles of building construction, types of buildings and how they collapse in the event of damage as a result of enemy air-raids.

3. **Types of buildings:**

(i) **Unframed Buildings (Load-bearing walls):** The majority of buildings are of this type, though the number of framed buildings is on the increase due to the greater use of steel and reinforced concrete. The term 'unframed' means there is no skeleton of steel or reinforced concrete taking the load. The walls carry the weight of floors and roof as well as their own weight and give protection from elements. The most familiar type of unframed building is the dwelling house. Some important points in their construction are as follows:

(a) **Foundations**: These are the feet on which the building stands and are formed by digging shallow trenches along the lines of the walls, and partially filling them with concrete etc, to avoid it sinking.

(b) **Walls**: The outer walls are usually built of either brick or stone which are laid over lapping one another. By this method, called 'bonding, the vertical joints do not run through successive courses in the wall. This gives more strength to the wall.

(c) **Roof**: These may be of timber or concrete when these would usually be flat and be constructed similarly to the floors.

(d) **Floors**: These may be of precast concrete type or concrete laid in position reinforced with steel bars for strengthening. The precast type of floor is not likely to hold together as one slab so well as the "cast position" type should the walls collapse.

(e) **Services**: They comprise drains, water, gas and electricity, pipe works etc., and often have stop cocks provided in the pavement or path in front of the house so that supplies may be cut off when necessary or at the matters which are generally to be found under the stair or in cupboards in the scullery, kitchen or basement.

(f) **Basements**: They are provided to some houses, and it is desirable before entering a damaged house to look for indications of the existence of a basement.

(ii) **Unframed Buildings of Stone-masonry construction**: Where stone is available in plenty foundations and walls are often constructed out of stone rather than brick. Unlike the brick, the stone has irregular shape and is larger in size. Therefore, the walls in stone masonry are naturally thicker than that of brick walls.

(iii) **Partially framed buildings**: These have the characteristics of both framed and unframed buildings. Usually, the outer walls are of unframed sections, since they are load bearing. The framed sections are those comprising the posts or beams built in place of load bearing internal walls. This system allows more floor space. Floors are either of timber or of low brick arches. Roofs may be flat or pitched.

(iv) **Fully-framed buildings**: These have a skeleton frame which carries all the loads including that of the weight of the wall. The frame may be made of steel or reinforced concrete. Each stanchion will have an individual foundation. These are of comparatively small blocks of solid concrete, large reinforced concrete or steel joints encased in concrete. When the frame is of reinforced concrete, mild steel rods will be incorporated in the concrete in place of stanchions and beams. Floors are laid on the beams and may be constructed of reinforced concrete. Floors are also made of precast concrete beams. Roofs may be flat or partially pitched or partly flat. The walls may be erected after the floors or roofs are in position. Staircases are also usually of concrete reinforced and cast in position or formed of precast reinforced concrete steps.

(v) **Monolithic buildings:** As the name implies, these are built in one piece starting from the foundations. In these, the frame, the walls, floors, staircases and roofs are formed of reinforced concrete on the site as they occur in the building as it rises.

4. **Damage to buildings due to air raids**:

(i**) To unframed buildings:** The resistance to bomb blast of brick structures is rather poor. The floors and roofs, with some of the internal walls, are deprived of support due to blast effect and collapse in a heap separated only by the furniture and such portions of the wall as remain standing.

(ii) **To framed buildings**: Steel framed and reinforced concrete buildings stand up well to the blast, as in both cases the skeleton frame work is rigidly knitted together. The panel walls are damaged, but the roofs and floors may stay in position because they are supported by the frame work. Parts of the frame work, which catch the full force of the blast may be ripped away. Due to the light construction of the panel walls (which are not load bearing) the amount of debris likely to fall is less and lighter in weight than that from the load bearing walls of an unframed building. When the bomb hits the building, the floors and roof may be damaged in addition to the walls, frame work remains more or less intact. Reinforced concrete buildings distort but do not collapse to the same extent, as the reinforcement binds the whole structure together. In consequence, when any one is trapped under reinforced concrete wreckage, the work of cutting through is considerable. As the concrete is held together by steel rods it is very heavy and difficult to lift in one piece.

5**. Damage to buildings by fire**:

(i) **To unframed buildings**: Due to the extreme heat of fire, the wooden parts of the house are burnt and if the roof etc., are of wood, there is every likelihood of the roof collapsing if the fire persists for a while. In the case of reinforced concrete roofs, it is likely that cracks develop in the roof or floors. There is also the chance of the wall collapsing due to the heat and consequent formation of large cracks.

(ii) **To framed buildings:** The heat of the fire expands the metal frame and the first visible sign is that the skin of the concrete plaster falls off leaving the steel frame exposed. It is likely that the whole steel frame work may tilt to one side depending upon the part affected by fire.

6. **Types of collapse**:

(i) **Lean to collapse**: When floors drop on one side and hang to the wall on the other, a 'lean-to void" is formed. They are often large and are relatively easy to reach.

(ii) **Flat collapse**: Occasionally, when the walls spread out words, the flour falls straight down, often it is stopped by furniture and shallow flat void is formed at the bottom. This type of void is extremely hard to reach. It is often dangerous.

(iii) **"V" shaped collapse:** Usually floors of normal dwelling houses are not so constructed to take heavy loads and this may therefore bend or break across at the centre of the joint span. The floor or roof then falls in the form of "V" Voids are formed on either side.

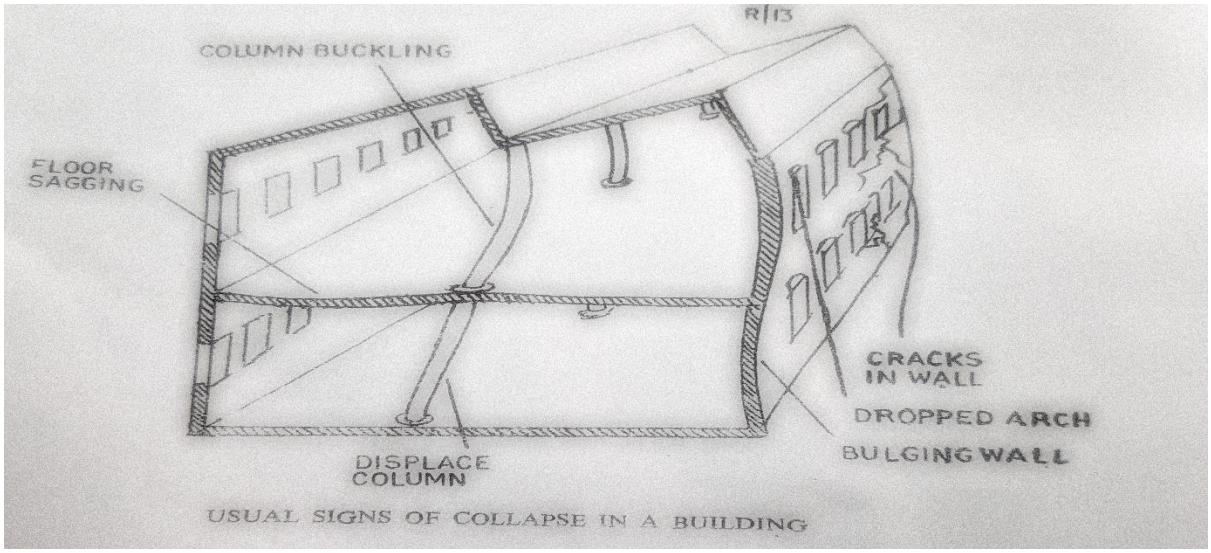
(iv) **"A" shaped collapse:** Sometimes the centre of the floor holds up and both sides collapse forming an "A" shaped void. These voids are more difficult to reach.

7. **Signs of Building Collapse:**

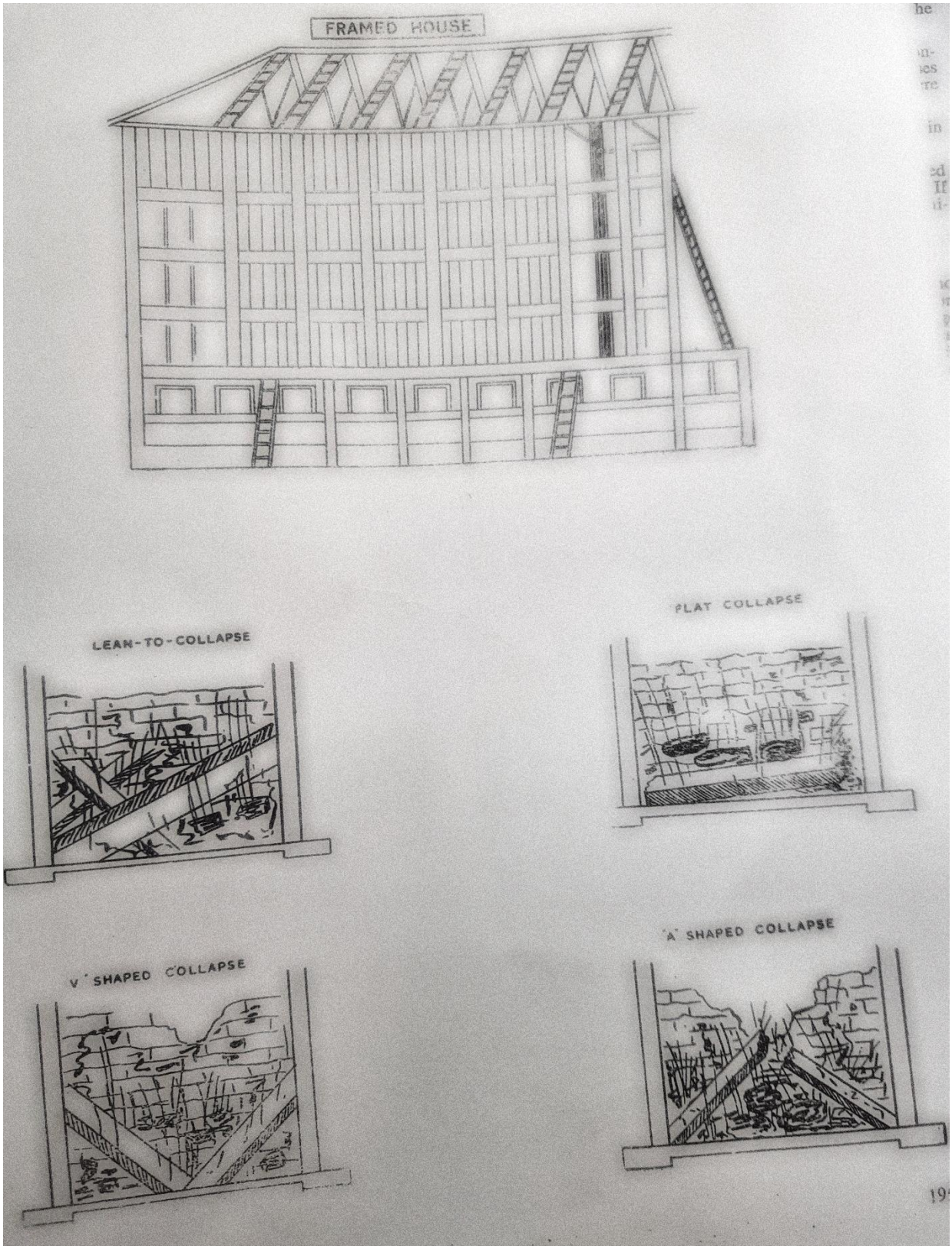
The buildings before collapse develop certain signs, noticing which the rescue party members may take adequate precautions. The principle signs of collapse of a building are, therefore, listed below:

(i) Cracked or dropping arches over doors, windows and other openings.
(ii) Spalling of stone-work, falling of cornices etc., particularly on buildings with heavy facings of ornamental stone.
(iii) Sagging floors or beams or gaps between the edges of floors and the walls.
(iv) Displacement of steel or cast-iron pillars supporting joints or beams.

Immediately the Leader is satisfied that the signs are such that collapse is probable, he should not risk the lives of his men, but he should order them out clear of danger.



USUAL SIGNS OF COLLAPSE IN A BUILDING


FRAMED HOUSE
LEAN-TO-COLLAPSE
FLAT COLLAPSE
'V' SHAPED COLLAPSE
'A' SHAPED COLLAPSE

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CHAPTER NO. 35

TYPES OF SURVEY AND STAGES OF RESCUE

1. **Object**:

Most of the Rescue Works has to be carried out under adverse conditions, such as confusion, panic, smoke, fire darkness, debris, etc. All this go to make the scene very difficult. The leader of the Rescue Party on arrival at a place of damage should quickly appreciate and form a true picture of the situation. In order to do this, he has to set about his business very systematically. This is called "Survey".

2. **Types of Survey:**

Survey is a systematic process through which accurate assessment can be arrived at as quickly as possible, so that a plan of action could be formulated. Time spent on survey can never be a waste, since it enables a quick plan of action and eliminates haphazard work and wastage of efforts. Survey can be divided into three types.

(i) **Preliminary Survey:** The leader of the Party goes around the scene and write down all important points, makes a quick appreciation of the situation and plans his action. Details his party to carry out rescue operations while he continues to carry on with his survey.

(ii) **Detailed Survey:** During this period the leader having made a preliminary plan and encouraged by the early commencement of rescue work, he goes on to detailed survey to collect more and important details. During this stage he is likely to get more information from the casualties, if they are infit condition, his party members, the police authorities etc. This will help him to make a detailed plan so that he can employ his men and other volunteers, to get better results, and therefore, can save all the lives trapped in the damaged buildings or the debris.

(iii) **Specialised Survey:** It is most likely that in majority of cases where the damage to buildings is extensive due to natural calamities, intensive air raids, the essential services such as water supply, gas and electric supply may also be damaged. In certain cases even, the communication may be affected. Under such circumstances, the help of the representatives of the Essential Services who are technically qualified will be necessary, so that these damaged services can be cut off. If this is not done, the places where the trapped personnel are likely to be, may be flooded or the Essential Services Thus, damaged may pose a danger to the Rescue Parties.

3. **Methods of Survey**:

In this procedure on gathering facts two important methods are used, which lead to the correct analysis of a situation and formulation of definite plans for Rescue Work. The leader should collect the following formation.

(i) The approximate nature and extent of the damage.
(ii) Approaches to the place of damage.
(iii) Loading points for the ambulance.
(iv) Particulars of occupants of damaged building or those who have been removed to safer place or those who have left the place.
(v) The probable location of those trapped inside.
(vi) Whether there are any known dangers e.g. electricity, water etc.
(vii) Whether a doctor is present.

(a) **Information**: Information about the occupant of the damaged buildings may be had from the survivors, casualties who can cooperate to give information local fire service or police and, in some cases, the Municipal or census registers may also be in a position to give this information. The plans of the buildings with the local architect or the Municipal engineer cannot be of great value to find out the type of buildings, how collapsed and therefore the likely places where people are trapped.

(b) **Observation**: Rescue Parties should be trained to understand the different types of buildings so that they can understand and analyse how a building has collapsed. This helps to make plans for extricating trapped persons. Observers can also point out the dangers arising out of damages to essential services. This helps the rescuers to take precautions while carrying out rescue work. Observation along with silence and listening will help locating trapped personnel.

4. **Survey-The Basis of Planning**:

If the survey is not done systematically, thoroughly and rapidly, it will not be an easy job to assess the following:

(i) Manpower.

(ii) Equipment.

(iii) Methods employed.

5. Stages of Rescue:

After assessing and planning for work, it has to be done in progressive stages, so that no casualty is left under the debris or trapped in damaged buildings.

Stage I:

Dealing with surface casualties: The Rescue work must start from the outer edge of the place of damage to locate surface casualties. They must be rescued, given first aid and made comfortable. Some of the surface causalities may be only slightly injured or suffering from a shock. Simultaneously the leader carries on with his survey to find out danger from flooding, gas, electricity, over-hanging roofs, walls etc., and collect facts about the location of suspected casualties.

Stage II:

Searching slightly damaged buildings: After dealing with the surface casualties, the leader moves on to search slightly damaged buildings. During this stage it may be that some trapped persons can be contacted but they cannot be reached easily. Contact with such persons should be maintained while the leader is deciding on the best way of extricating them. A careful examination of the debris and etc, is necessary to decide on the safest way of approach to the trapped persons.

Stage III:

Exploration of likely survival point: All possible places must be searched where any persons could be trapped or injured and alive. Every method such as tapping, calling etc. should be adopted to contact per sons trapped in likely survival places, so that plans can be made to extricate them.

Stage IV:

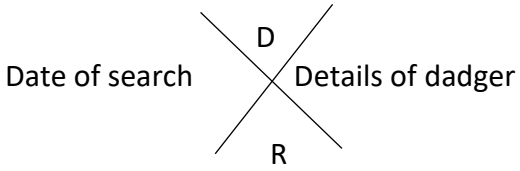
Selected debris clearing: After Stage I to III, if persons are still missing, the search should continue until all persons are extricated and accounted for. This involves the clearing of debris at selected places where the leader presumes that casualties may be trapped there. By the silence period where the casualties are I called out and listened to, their position may be revealed. Such persons can only be reached by clearing the debris.

Stage V:

General debris clearance: When all the possible ways of contacting the trapped personnel have failed and they have yet to be accounted for, it will become necessary that general debris clearance must be carried "out by methodically cutting out lanes or tunnels leading to likely places or entrances before concluding the Rescue Operations.

6. **Termination of Survey**:

On concluding the survey of each building the Rescue Party should mark the buildings to show that a particular building has been searched. The leader should satisfy that all the casualties have been extricated from a building and mark a building to indicate that the building has been searched. This avoids duplication of work Marking is done as follows:



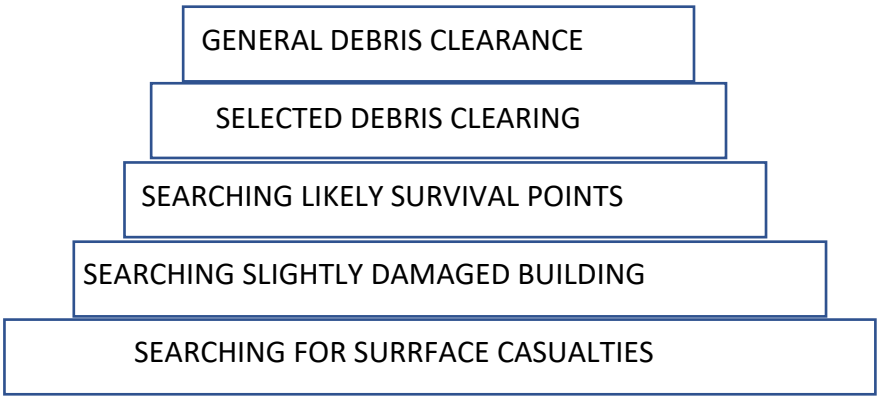
The "D" indicates 'Danger" and "R" denotes that the search has been carried out by Rescue Parties.

7. **Rescue "Do's":**

(i) Do keep yourself calm and cool.
(ii) Do carry survey before starting rescue work.
(iii) Do examine casualty before removal and see that you give it the proper first-aid.
(iv) Do free nose and mouth of the casualty from dust and grit to facilitate breathing.
(v) Do protect a casualty from falling debris and dust by using blankets, tarpaulins, corrugated iron sheets etc., if the casualty cannot be immediately removed from the site.
(vi) Do be careful how you remove debris from the vicinity of a casualty.
(vii) Do keep a casualty warm and so reduce shock and leave it undisturbed.
(viii) Do exercise great care while using sharp tool for removal of debris.
(ix) Do give plenty of water to a pinned down casualty before releasing him.
(x) Do keep as close as possible to the wall when on damaged stairs and upper floors.
(xi) Do arrange for proper medical attendance of the casualty as early as possible.

8. **Rescue "Don'ts":**

(i) Don't move an injured person without rendering first-aid, unless he is in immediate danger.
(ii) Don't crawl over the debris or disturb part of the damaged structures unless you are compelled to do so by circumstances.
(iii) Don't touch live electric wiring.
(iv) Don't pull timber out of the wreckage indiscriminately or you may cause further collapse.


GENERAL DEBRIS CLEARANCE
SELECTED DEBRIS CLEARING
SEARCHING LIKELY SURVIVAL POINTS
SEARCHING SLIGHTLY DAMAGED BUILDING
SEARCHING FOR SURRFACE CASUALTIES

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CHAPTER NO. 36

PRECAUTIONS ON ENTERING DAMAGED BUILDING METHOD OF SEARCH DEBRIS TUNNELLING AND DEBRIS CLEARANCE

1. **Object**:

Rescue Parties may often have to enter into a damaged building for rescuing casualties who are trapped within. Safety precautions should be adopted in all such rescue work due to the fact that even the slightest vibration caused during rescue work or a careless step by any member, may cause further collapse of the damaged building. Rescue work will be hampered and as a result many lives, which would otherwise have been saved, would perish.

2. **Precautions**:

The precautions to be observed by Rescue members can conveniently be placed into three phases, as follows:

(i) **Phase I**: Precautions before entering damaged building:

(a) Observe the construction of the building and how it has collapsed. Check-up which is in precarious condition and then enter the building.

(b) Check-up whether the walls or floor require any supporting before extricating the casualties.

(c) Be on the alert for any utility hazards e.g. live electric wires etc.

(ii) **Phase II**: Precaution on entering damaged building:

(a) Always wear a helmet.

(b) Work in pairs if possible.

(c) Listen to possible sounds from casualties.

(d) Keep calling

(e) Don't touch any damaged wall or blocked door or any such structure, which is broken and projecting.

(f) Do not disturb any broken glass panes or door panes.

(g) Treat all naked wires as live wires and do not touch them with naked hands.

(iii) **Phase III**: Precautions while moving inside damaged building:

(a) Do not strike match or smoke.

(b) Smell for any existence of gas etc.

(c) Always walk as close to the wall as possible when on damaged stair-case or upper floors.

(d) Keep off debris as much as you can lest the natural voids may be destroyed by further collapse.

(e) Avoid indiscriminate and careless movement over the debris or on collapsed parts of the building.

(f) Do not pull any timber parts out of the wreckage indiscriminately, as this will cause further collapse.

(g) Use of guideline when entering dark and dangerous or smoky places.

(h) Obey all instructions implicitly.

3**. How to Search Building on Fire for Trapped Persons**:

(i) Ascertain from neighbours whether there is any one still in the burning house, if so, the probable number.

(ii) If possible work in pairs.

(iii) Start searching from the top of the building, so that you may be nearer the fresh air at the end of your job.

(iv) Search swiftly but thoroughly. Do not overlook any possible hiding place. People trapped by fire or smoke, particularly children, often take cover under beds or in cupboards to escape the smoke and flames.

4. How to Search a Smoke-Filled Room for Trapped Persons:

(i) Do not throw open the door of the room suddenly. The heated gas and smoke inside may overwhelm you.

(ii) Open the door slowly with yourself in a crouching position. This will allow the hot gases and smoke to pass over your head.

(iii) In case the door of the room opens outwards, place one foot against the bottom of the door and open gently. This will protect you from injury from sudden outward swing of the door as a result of considerable pressure on it due to the expansion of the heated gases inside the room.

(iv) Enter the room in a crawling position as there is less smoke and less hot air near the floor. This enables you to breathe comparatively fresh air and see things in the room clearer.

(v) Always move in a crawling posture while inside the room.

(vi) Keep yourself also to the wall while moving.

(vii) Make a complete circuit in the room.

(viii) Feel under and on the beds.

(ix) Open and feel inside cupboards, wardrobes and other likely places of hiding.

(x) Cross the room diagonally to make sure that no one is lying in the middle.

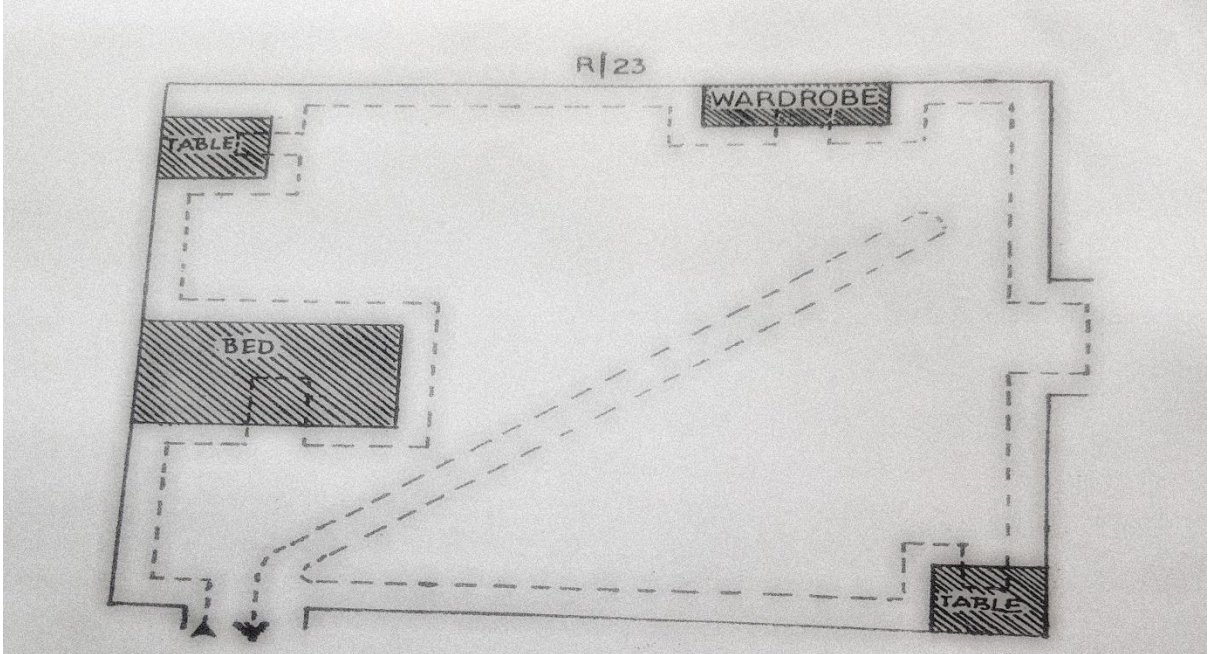

DIAGRAM SHOWING CORRECT METHOD OF SEARCHING A ROOM

5. **How to Remove a Casualty from Electrical Contact:**

(i) Contact with high voltage electric current causes death. Current used for domestic purposes though of low voltage can produce severe shock.

(ii) Remove the person at once from the contact of the circuit or

(iii) Cut off the current at once.

6. **Precautions**:

It is very dangerous to touch a person who is in contact with a live electric wire without taking proper precautions. Take the following precautions before you touch such a person.

(i) Switch off the current before you touch the casualty.

(ii) Stand on a dry wooden piece or on any article which is non-conductor of electricity, such as a thick pad of dry newspaper mackintosh coat or sheet and other things of like nature.

(iii) Protect the hands with some form of insulating materials such as rubber gloves, a mackintosh coat or sheet or some dry woollen material.

(iv) Remove the casualty from the wire or apparatus or push or pull the wire, electrical apparatus from the person with a dry stick.

7. **Debris Tunnelling:**

(i) The building may often get collapsed in such a manner that from outward it may seem a complete devastation with nothing but debris of collapsed building in view. However, it is often possible that casualties may still be trapped inside, although the fallen debris may have completely blocked the normal means of access to him. In such circumstances the Rescue Party are to resort to tunnel a crawl-way through such debris to reach the casualty in such a way that it is rendered safe for rescue worker and also is large enough for extricating a man through it.

(ii) Points to be borne in mind in debris tunnelling:

(a) Make sure of the spot which is to be reached by debris tunnelling.

(b) As tunnelling advances, it should be supported by strutting and lining with materials available on site. Such strutting or lining must be strong enough to withstand any possibility of the tunnel collapsing after the rescuer has advanced through the crawl-way. For such jobs propping jacks may be used very effectively.

(c) All key pieces i.e. removal of which may lead to collapse of tunnel, should be left undisturbed as far as possible.

(d) The key pieces, if necessary, should be secured in position, so as to avoid accidental movement, by fixing a prop or other timber under them in such a way as to leave free passage for a man to continue work beyond them.

(e) Constant watch must be kept for key timbers, beams and girders, disturbance of which could cause movement of the pile and collapse of the tunnel.

(f) To avoid any accidental movement horizontal pieces should be secured by a prop placed under them, still allowing passages of both men and stretchers.

(g) Bracing, everything in the tunnel, as the work proceeds, will help prevent accidents.

(h) Wherever possible crawl-way should be driven along against a wall, as this will greatly simplify the operations of strutting and lining.

(i) Size of the tunnel should be sufficient to allow a stretcher to be passed through it.

(j) For metallic obstructions e.g. pipes, beams etc. Oxy-acetylene may be used. Care must be taken, however, of the possibility of dangerous gases being present. A stirrup pump also may be used to soak any combustible material present.

(k) For removing the spoils during debris tunnelling, best result may be obtained by working in formation of human chain.

(iii) **General precautions in debris tunnelling:**

(a) Where dust is troublesome, put a handkerchief over nose.

(b) Steel helmets must be worn for safety of head and face.

(c) Put on dust goggles.

(d) The man working at the face should have a life line tied round his waist with a bowline, so that he can be traced if the debris collapses after him. The life line will also serve as a means of communication, for which pre-determined signals should be used.

(e) Put on debris gloves for protection of hands.

(f) When nearing a trapped person, take adequate precaution in using the debris tools so that the casualty may not receive injury.

(g) Wear oxygen breathing apparatus or self-contained masks for protection against toxic gases or deficiency in oxygen, as tunnel atmosphere may be contaminated.

(h) Because of the danger of explosives gases in the tunnel, do not use any open flames.

(i) Do not cut service pipes, water-lines or buried electric conduits encountered in a tunnel. If workers from Utility Undertakings are available, let them work on these lines.

8. **Debris Clearance:**

The debris clearance may be necessary when no information is available as to the approximate position of the trapped persons. General debris clearance (stage 5 of the Rescue) will have to be done. Sometimes, debris may have to be removed to clear a road block at the site of damage. Such debris clearance could be undertaken at leisure and the mechanical means can be used for this purpose. Whenever there is a reasonable chance of recovering casualties, the debris clearance should be carried out by Rescue Parties. The debris should, if possible, be moved clear of the damaged building and not merely from one part of the site to another. Whenever it is possible, the general clearance of the debris to make a path for lorries etc., and rescue operations, should be carried out simultaneously. The Incident Officer should try to get the assistance of the public for this purpose as far as possible.

9. The debris can be removed by loading into baskets by hand and man-handling the same to the vehicle or a selected spot and where the debris is to be dumped. When removing debris in a confined place or over obstacles, it is best to form a human chain. Debris should not be dumped near fire hydrants as fire engines may have to be brought there. The dumping sites of the debris must be indicated to the Incident Officer.

10. **General Precautions in Debris Clearance:**

(i) Great care must be exercised in the use of tools, especially picks, to avoid injury to the casualty under the debris.

(ii) Debris in the immediate vicinity of the casualty should be removed by hand.

(iii) Rescue Parties, unless efficiently controlled, may degenerate into a disorganised crowd of men, picking here and digging there, without any set plan of action. Therefore, the leader must map out his work.

(iv) Men must not climb about on top of a pile of debris during the clearing operations unless it becomes absolutely essential.

(v) Timber should only be withdrawn from debris where it is certain that no further collapse will be caused.

(vi) When the debris clearance operations are pro longed, it is essential to ensure continuity of work from shift to shift and therefore all necessary information must be passed from leader to leader.

(vii) Where it is essential to clear debris from the top downwards, men should be stationed in such a position that they can pass timbers and other pieces of debris to one another without having to climb over the debris.

(viii) The leader should allocate sections of the work to specified men and see that each man gets on with and sticks to his own particular job.

(ix) Debris should not be dumped into a creator.

(x) Avoid the use of mechanical grabs and other machinery when clearing debris from sites where people are still trapped, though cranes can usefully be brought into action for the removal of heavy materials such as blocks of masonry, concrete and steel-work.

(xi) Speed is unquestionably a most important factor in all stages of rescue operations, but speed without safety to both the rescuer and victims may quite easily defeat its own ends. The ideal is speed with safety.

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CHAPTER NO.37

USE OF LEVERS AND JACKS IN RESCUE WORK

1**. Object:**

The object of this lesson is to study the use of levers and jacks in rescue work.

2. **Introduction:**

The rescue party members while extricating casualties from under the debris are likely to be confronted with very heavy loads. These may be steel girders, cement concrete slabs or blocks of brick work. An average person should not normally attempt to lift more than 80 percent of his own body weight. Thus, it will be seen that very heavy weights cannot be lifted unless some mechanical devices are made use of. Besides, the weights to be lifted may be so bulky and difficult to grasp that they are not capable of being dealt with by manual lifting alone, and at times portions of the building may be required to be held fast to prevent it from collapsing. Hence to provide rests for such heavy loads the use of mechanical devices is inevitable. In the following paragraphs we shall study the details and the methods of use of some of the most common mechanical lifting devices used by rescue parties in lifting and moving heavy weights.

3. **Description of levers**:

A lever is a simple lifting device employed in Rescue work that gains power by sacrificing distance. A lever consists of two parts i.e., a long rod or spar called the lever rod is the first part and second part is called the fulcrum. Any solid piece is used as fulcrum. This mechanical device is usefully employed when the object is too heavy for man handling or too bulky or difficult to grasp.

Mechanical advantage of a machine can be calculated by the formula: -

Mechanical Advantage (M.A.), W/E where ‘W’ is the weight and ‘E’ is the effort.

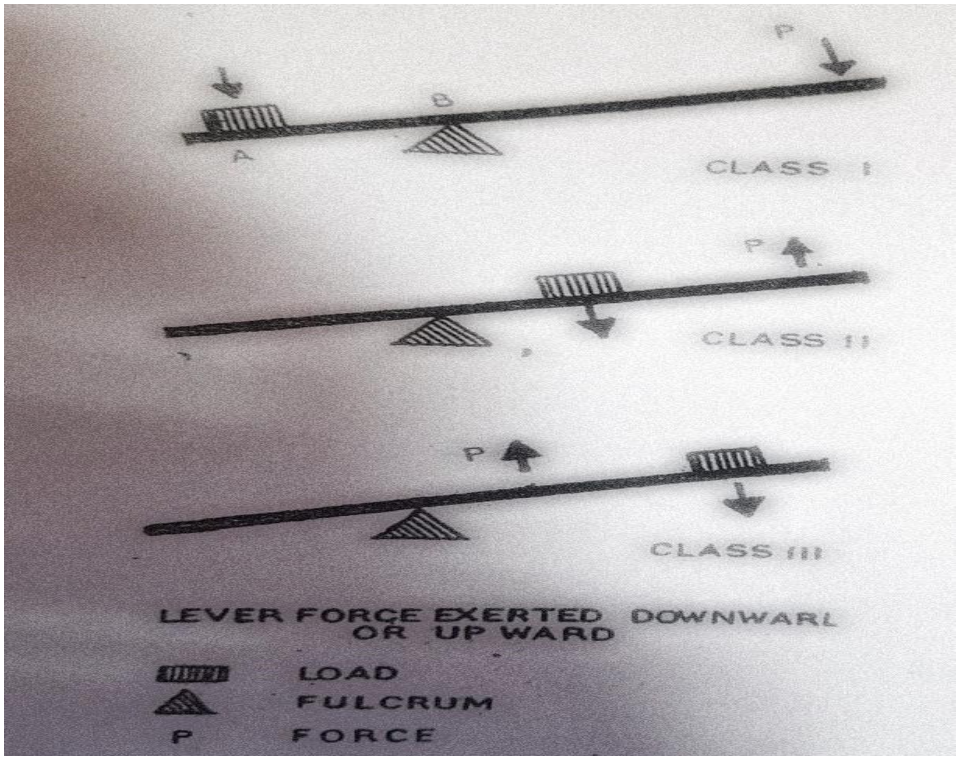
4. **Classification of Levers**:

The levers are of 3 classes.

(i) **Class I Lever**: The load and the applied force act in the same direction but from the opposite sides of the fulcrum. Example: pickaxe.

(ii) **Class II Lever**: The load and the force act in opposite directions but from the same side of the fulcrum, the effort arm is longer than the resistance arm. Examples: Nut cracker.

(iii) **Class III Lever**: The load and the applied force act in opposite directions from the same side of the fulcrum, but the effort arm is shorter than the resistance arm. Example: Forup.



5. **Use of levers:**

Levers are useful for lifting, moving or preventing the movement of objects. There are two distinct ways of using the levers. Principally (a) by exerting the force upwards and (b) exerting the force downwards. In both the ways, the advantage gained depends on the ratio of force from fulcrum and the distance of object from fulcrum. The advantage increases or decreases as the fulcrum is moved nearer or away from the object.

The force required at a distance from the fulcrum can be calculated with the help of the formula given below:

$$\text{Load/ Applied Force} = \frac{\text{Lever arm of the force}}{\text{Lever arm of the load.}}$$

How much force will be required to be applied at a distance BC 9" (2.70 M) from the fulcrum to lift a weight of 720 lbs (326 .59 kgs) placed at a distance of AB 1" (.30 M) from the fulcrum when the lever 12' (3.04 M) long.

Solution

Suppose, the force required to applied is X lbs. Then applying the formula,

$$X = \frac{720\ (326.59)}{6\ (2.70)} \times .30M)$$

+80 lbs. (36.28 kgs).

6. **Method of using levers:**

Always the force applied to the lever should be as near to the end of lever as possible. Objects should be packed up as they are lifted to take the weight of the lever rod. This will also enable to obtain an additional mechanical hold to raise the object higher. The packing material should be uncrushable and the packing should be even throughout the entire surface of the lift. In case more than one lever is used, the levers should be used in such a way that the object does not tilt on lifting and force applied should be even. The lifting should be well co-ordinated and controlled by the leader.

7. **Objects that can be used as leve**r:

As far as possible the rescue parties should improvise the levers on the spot at the place damage. Sometimes the rescue parties are issued with a 10 feet iron shod lever in their equipment. However, the stress should be on improvisation some of which are mentioned below.

(i) Pinch point crow bar.
(ii) Claw and wrecking bar.
(iii) Pick.
(iv) Any substantial section of lumber.

8. **Fulcrum blocks:**

A fulcrum block should be of wood (hardwood if possible), never of brick or other crushable material. It must be resting on a firm base, which should be as large as possible so as to distribute the weight to be lifted. The fulcrum must be placed as near to the weight as is possible under the circumstances and it should never be placed at any point where there is a possibility of a casualty being fried immediately below.

It should, however, be remembered that there is a limit of strength to all levers, and either the weight to be lifted or the applied force both are not with in this limit there is a distinct possibility of the lever collapsing. It cannot be stressed too highly that such à collapse of equipment whilst attempting to effect a rescue is not only the worst possible thing that could happen so far as the casualty is concerned, but is also a clear demonstration of lack of leadership, team work, and training.

9. **Lifting Jacks:**

The jacks that are issued to the Rescue Parties are mainly of two types. The more important and common type of jack is the screw jack. This type as the name indicates works on the principle of a screw which is rotated to raise loads with the help of a lever. This type is very simple and compact and in this the chance of slip back is almost absent. Three main types as could be used in rescue work are described in de tails below.

(i) **Ratchet Jacks**: With this type of jack the load is raised by means of a long lever working against a ratchet. This jack, though simple in action, has the disadvantage that because of the ratchet it is some- what tall in construction and consequently cannot be used where the space is restricted. Ratchet jacks are fitted with a toe so as to get a lift from very near the ground. This toe, however is generally capable of carrying only ratchet, thus allowing the weight to come on to the lever. To avoid accidents, the jack is so constructed that the ratchet cannot be released until the weight is taken by the lever.

(ii) **Screw Jacks**: As the name implies, this type of jacks works on the screw principle. A lever is used to rotate the screw which in turn raises or lowers the load. The screw jack is very compact and safe in operation as it almost eliminates any risk, or slip back which in rescue work might cause serious accidents.

(iii) **Hydraulic Jacks**: These jacks are constructed on the principle of the hydraulic ram. The body consists of the cylinder into which the ram or piston is fitted.

By means of a hand pump operated by a lever, oil is forced into bottom of the cylinder and exerts a pressure on the underside of the piston which in turn raises the load. To prevent the oil from flowing back a non-return valve is fitted between the pump and the cylinder. To lower the jack a controllable valve is fitted between the cylinder and the oil reservoir in the body of the jack to permit the oil to flow back into the reservoir again, thereby releasing the load at a speed controlled by the control valve.

The hydraulic jack is not so simple in construction as the other two types. It is, however, very compact and can be constructed to have almost any degree of power without undue mechanical difficulties.

10. **Use of Jacks:**

For the effective and safe use of jacks, the following points must always be observed.

(i) The jacks should stand on timber or other footing of sufficient size to distribute the load, otherwise instead of lifting the load, the jacks will be forced into the ground.

(ii) As the weight is lifted, solid material supports should be placed under it to prevent damage if the Jacks should fail. The weight of raised sections of walls and floors should not be allowed to rest entirely on the jack while rescue workers crawl under. Cribs should be set under heavy weights or sections of floors to prevent setting after lifting operations is completed. Cribbing can be done with timbers of various sizes ranging from 2 to 8 feet in length, depending on the weight to be supported and the available working space. Be sure that the ground is level at the point where the crib is to be set. (It is better to level off high spots than to fill low ones). The crosstie crib (as in attached chart) will be in frequent use, since it is a safe method of supporting heavy weights. Space several timbers well apart and parallel, then put another level of timber on top of and at right angles to the ones on the first level. Each added level is at right angles to the one below it. The number of layers need ed will depend on how high the load is to be lifted (pack as you jack).

(iii) Suitable packing, such as sound or hard timber and folding wedges, should always be used between the head of the jacks and the surface of any load liable to slip, such as when a metal contact occurs.

(iv) Every effort should be made to operate the jacks in a plumb position, but if this is not possible, suitable packing should be used to obviate slipping or skidding when the load is applied.

(v) Ratchet and other tall jacks are fitted with a toe so as to get a lift from very near the ground. This toe, however, is generally capable of carrying only one-third of the total jack load.

(vi) Where two or more jacks are used simultaneously to raise the same load, they must be operated evenly to avoid tilting the load and also to avoid bringing too much weight on to one jack with consequent risk of failure.

(vii) All jacks must be kept perfectly clean, well-oiled and greased. They should be examined and tested under load at frequent intervals.

11. **Estimating loads:**

For rescue purpose it is seldom necessary to make more than a very rough estimate of the weight of any load. In this connection the following approximations are useful.

(i) 9 in (22.86 cms) brick-work, per square foot 84 lbs.(37.80 kgs).

(ii) 13 ½ in (34.29 cms) brick-work, per square foot 126 lbs (56.90 kgs).

(iii) Concrete and masonry, per cubic foot (.03 cm) 120/160 lbs. (54/72 kgs).

(iv) Breeze partitions 3 ft. x 3 ft. x 3 in (90 cm x 90 cm x 70.50 cm) 152 lbs. (68.40 kgs.)

(v) Breeze partitions 3 ft. x 30 x 4 in (90 cm x 90 cm 10.10 m) 216 lbs. (97.20 kgs.).

(vi) Floors, 2 in x 4 in (5.08 cm x 10.16 cm) timber joists and flooring per square ft. 6/10 lbs.

(vii) Floors 2 in. x 7 in (5.05 cm x 17.52 cm) or 2 in ft. x 9 in 5.88 cm x 22.57 cm) timber joists and flooring per square ft. 10/18 lbs. (4.50/8.10 kgs.)

NOTES: - The above approximate weights are for dry materials and allowance must be made for an increase in weights approximately 20 percent, when some of these materials are wet.

12. Approximate weights of 10 ft lengths of steel sections, joists and channels with average thickness web and flanges are:

(i) 10 in x 6 in (25.4 cm x 15.00 cm) Rolled steel Joists 400 lbs, (180 kgs)

(ii) 9 in 4 in. (22.57 cm x 10.16 cm) Rolled Steel Joists,210 lbs (94.50 kg.)

(iii) 7 in x 3 in. (17.52 cm x 7.50 cm) Rolled Steel Joists 150 lbs. (67.50 kgs.)

(iv) 6 in x 8 in. (15.24 cm x20.30 cm) Rolled Steel Channel,125 lbs (56.25 kgs)

(v) 7 in. x 8 in. (17.52cm x 20.32 cm) Rolled Steel Channel 140 lbs. (63 kgs)

(vi) 8 in. x 8 in. (20.32 cm x 20.32 cm) Rolled Steel Channel 160 lbs (72 kgs) .

(vii) 2 in. 4 in. x $^1/_2$ in. (5.08 cm x 5.80 cm x 64 cm) Steel angle 30 lbs (13kgs.)

(viii) 8 in. x 3 in. x 3/8 in. (20.38 cm x 7.50 cm x 0.94 cm Steel angle 70 lbs. (31.50 kgs)

(ix) Steel roof trusses, 20 ft. (6.10 m) span (average) 250 lbs. (112.50 kgs)

(x) Steel roof trusses, 30 ft. (9.00 m) span (average) 600 lbs, (270 kgs.)

(xi) Steel roof trusses, 40 ft. (12.00 m) span (average) 1200 lbs. (540 kgs)

(xii) Steel roof trusses, 20 ft. (1800 m) span (average) 2400lbs (1080 kgs)

(xiii) Timber trusses 20 ft. (6.00 m) span (average) 350 lbs. (157 kgs.)

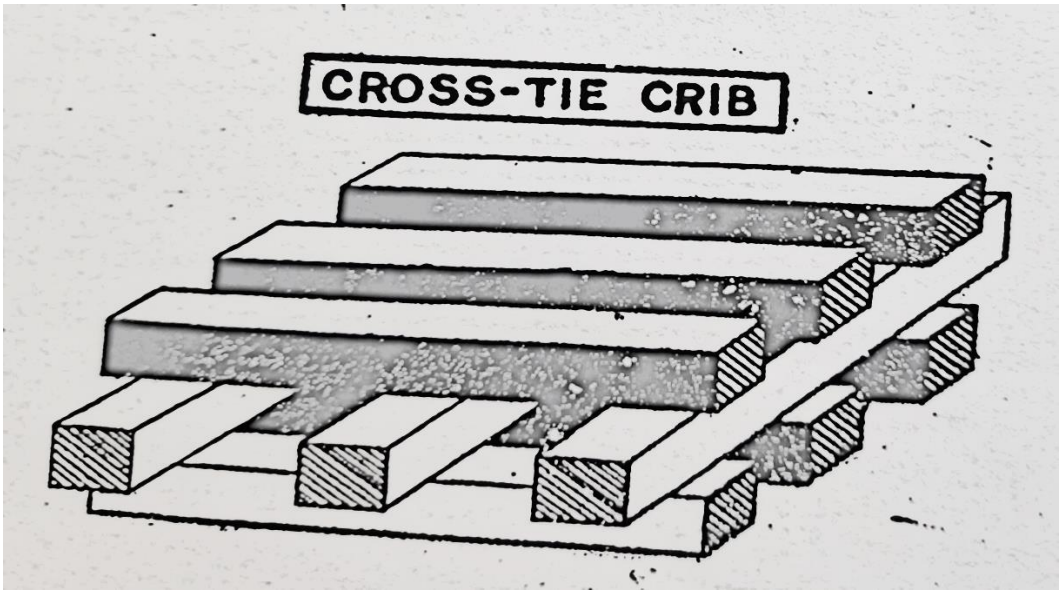
(xiv) Timber trusses, 30 ft. (9.00 m) span 800 lbs. (average) (360 kgs.)

(xv) Timber trusses, 40 ft. (12.00 m) span (average) 1500 lbs. (675 kgs.)

(xvi) Timber trusses, 60 ft, (18.00 m) span (average),3500 lbs. (1075 kgs.)

13. **Safety precautions:**

(i) Work from a good foundation.
(ii) Use wedges as a safety chock.
(iii) Never leave a jack under load-lest it may slip and cause a serious accident.
(iv) Raise or lower jacks evenly whenever there are more than one jack employed in raising the object.
(v) Always remove the jack handle when it is not in use.
(vi) While lifting objects of metal use timber packing between the head/toe of the jack or the tip of the iron shod lever.
(vii) Ensure that the 'UP' and 'DOWN' latches of the jacks are in working condition. (In the case of ratchet jacks).



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CHAPTER NO. 38

PRECAUTIONS ON ENTERING DAMAGED BUILDING METHOD OF SEARCH DEBRIS TUNNELLING AND DEBRIS CLEARANCE

1. **Object**:

Ladder is one of the most important pieces of equipment used by the Rescue Party. The members of CD. Rescue and Fire Fighting Organisation must therefore, be not only acquainted with the ladders but also proficient in handling and using them.

2. **Use of Ladders:**

(i) Rescuing casualties from upper storeys or basements.
(ii) For bridging a gap.
(iii) As a stretcher.
(iv) As a derrick.

3. **Types of Ladders used by Rescue Parties**: -

(i) **Short Ladders**: The types of short ladders used by the Rescue Parties are of 8 or 10 feet. (2.40 M or 3.00 (M) length. If necessary, two short ladders may be lashed together to form a longer ladder.

(ii) **Bamboo or Wooden Ladders**: These are ordinary Bamboo/wooden ladders of 20 feet (6.00 M) length. In emergency, two such ladders can be lashed together with an overlapping of 5 feet (1.50 M) to give a maximum length of 35 feet (10.50 M). A 15 feet (4.50 M) long ladder also can be used instead.

(iii) **Extension Ladders**: These do not form part of Rescue Party equipment. 35 feet (10.50 M) extension ladders are, however, maintained at the Depot. There are two sections one sliding on the other. There is one extending rope passing over a pulley which is used to extend the ladder and there are two pawls fitted on a rotating shaft to hold the section in place when ex tended. Four men are required for extending it. No. 3 extends the ladders by pulling the extending line and No. 4 takes his position coming from behind.

4. **Joining Two Ladders and points to Note:**

Sometimes two ladders may be joined together to form one longer ladder. To do this, one end of the ladder is placed on and overlapping one end of the other ladder. A clove hitch is given around the strings of both the ladders on one side. The loose ends are then married together and the rope taken around the strings of both the ladders and coming downwards one or two rounds and then crossing over to the other side. On the other string it proceeds in the same way but upwards and is finished with a clove hitch parallel to the first one. The points to be noted are:

(i) Start with a clove hitch and finish with a clove hitch.
(ii) The lashing should be tight.
(iii) Keep sufficient over-lapping between the two ladders.

5. **Erecting the Bamboo Ladders-Single or Lashed (three men):**

No. 1 is at the heel of the ladder and Nos. 2 and 3 work on the head side. No. 1 places the heel of the ladder near the wall and firmly foots it. Nos, 2 and 3 then raise the ladder from the head side. No. 1 then puts the ladder into position as required.

6. **Erecting the Ladder (two men):** The ladder may be erected by placing the heel of the ladder against some firm object under running it and then drawing the heel away from the wall.

7. **Erecting a Ladder (one man):** The ladder may even be erected by one man. The heel of the ladder is placed against some firm object. The ladder is then erected by under running and the heel is drawn away from the wall.

8. **Carrying a Ladder (two men):**

(i) The ladder is laid flat on the ground. Two men stand, one near the top and the other near the bottom of the ladder turns it on its side and pass an arm through the round and raise it on their shoulders.

(ii) In the same way, as above, two men can also carry a ladder at waist level.

9. **Carrying a Ladder (four men):**

Four men take a "close up" position (Fig. 5), two at the head and two at the heel of the ladder. They then, stoop down and lift the ladder on to their shoulders. They then move off holding the ladder on to the shoulder by passing the hand through the rounds.

10. **Angle of the Ladder:**

When a ladder is pitched, the angle which it makes with the ground should not be too great or too acute. As a general rule, the bottom of the ladder should be placed at the distance from the base of the wall, equal to one-fourth of the height to be reached.

11. **Securing the Head and Heel:**

If the ladder is to be unattended and to be made more secure and steady the heels and the head of the ladder should be secured by ropes as follows:

(i) **Heels**: Drive in two small irons pickets into the ground by the side of the heels of the ladder one on either side. Take a sash cord [15' (4.5 M) long 1" (2.54 cm) rope) and make a clove hitch on the picket, marrying the ends of the rope and giving about six turns over the heel and the picket in the form of Figure of Eight, finishing with a clove hitch on the heel of the ladder, Thus, securing the heel of the ladder to the picket. Similarly, the other heel of the ladder is also to be secured.

(ii) **Head**: Fasten the end of a rope to a rung on the head of the ladder by means of a clove hitch and then tie the other end of the rope to some suitable object on the higher floor by a clove hitch. Thus, securing the head of the ladder.

12**. Climbing a Ladder**:

The ladder should be climbed steadily, keeping the body erected, the head upright and the arms straight. The climbing is to be done by placing the ball of the foot not the arch, on the rung.

13**. Leg Lock:**

When working from a ladder, it may sometimes become necessary to keep both hands free to haul up any sundry tool of equipment. A rescuer should not release his hold unless he has secured himself by taking a "leg-lock". To take a "leg-lock" the man should stand on one round and place the other leg through the ladder over the second round above the round on which he is standing. Then he should bend the leg and use the inside of the knee and back of the calf of the leg for steadying purposes. If the length of leg so permits, it may be possible for him to bring the foot back through the ladder between the rounds and place the toe of the foot under the round above the one on which he is standing.

14. **Shoulder Stand:**

When a ladder is a little too short to reach a certain height, it may be necessary to adopt the "Shoulder stand" by which one man is unable to reach the desired position by being mounted on the shoulders of the man underneath him on the ladder. To do this, two men mount the ladder, one above the other. Near the top the other man steps back and, guided by one hand of the lower man places his in steps in turn upon the shoulders of the lower man who continues to ascend slowly with the first man on his shoulders until the upper man reaches the necessary height. After he can no longer grasp the rounds of the ladder the upper man must cling to or palm up the wall with his hands, leaning lightly forward to obviate falling backwards or sideways.

15. **Bridging a Gap-How to do it?**

At places of incident, rescues may sometimes have to go over from one position of a damaged building to another where there is a gap in between. In these circumstances, a ladder would prove to be very useful in bridging the gap. To do this, the ladder will be placed across, the two ends of the ladder resting on the two structures of the buildings over the gap, on either side with sufficient overlap, and the rescuer may then crawl or walk over the ladder Thus, crossing the gap in between. Boards may be placed over the rungs to improve the footing.

16. **Care of Ladder:**

Ladders are liable to deterioration from strain in use and their exposure to the weather. They should, therefore, be periodically examined for any looseness of the rungs or any cracks in the timber or the bamboos. Constructional joints of the wooden ladder should be kept water resisting by close fitting and sound coatings of varnish to prevent moisture penetrating the mortice and rotting the timber forming the tenon. If the varnish is worked off, a fresh coat of varnish should be applied, special attention being given to ends of the tenons on the outside of the strings.

17**. Testing of a 35 it (10.50 M) Extension Ladder:**

(i**) Test of the Ladder**: The ladder should be pitched to its full working height with the head resting against a building, the heel being approximately eight feet (2.44 M) away from it. A line is then to be made fast to each string at two adjacent rounds at the centre of the overlap of the two sections of the ladder, and is to be so arranged that the weight of three men in all can be applied, as nearly as possible equally to the two strings, and then released. The ladder should then return to its normal position. Under no circumstances should the line be made fast to a round only. After this test, in case of wooden ladders only, a man should ascend the ladder and jump the rounds.

(ii) **Test of the Extending Rope**: The extending rope is to be tested by applying the weight of two men. This is carried out by pitching the ladder without extending against a wall of a building. The weight of two men is then applied to the rope as for extending the ladder, as low as practicable, while two other men apply their weight to the extension to prevent it moving. The remaining part of the rope is tested by applying the weight of two men as before but with the ladder fully extended.

The ladders should be tested monthly and after use at an incident. All the ladders should be more frequently tested if used for drill.

18. **Hoisting a Ladder:**

At times it is necessary to hoist a ladder or a section of a ladder up the face of a building. In doing this it is advisable to maintain the ladder in as perpendicular a position as possible, at the same time keeping it clear of any projections. Several methods employing a line can be used to achieve this.

(i) A bow-line tied into the ladder as shown in Fig. 6.

(ii) The bight of a bow-line passed through the ladder under the top round and the over the tops of the strings as shown in Fig. 7.

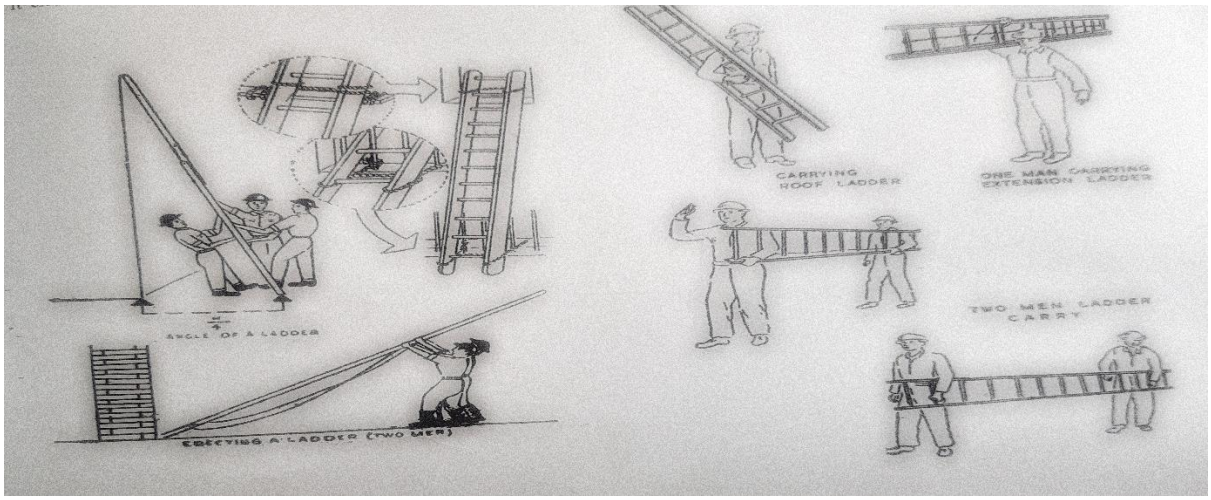
(iii) A clove hitch made fast on a convenient round.

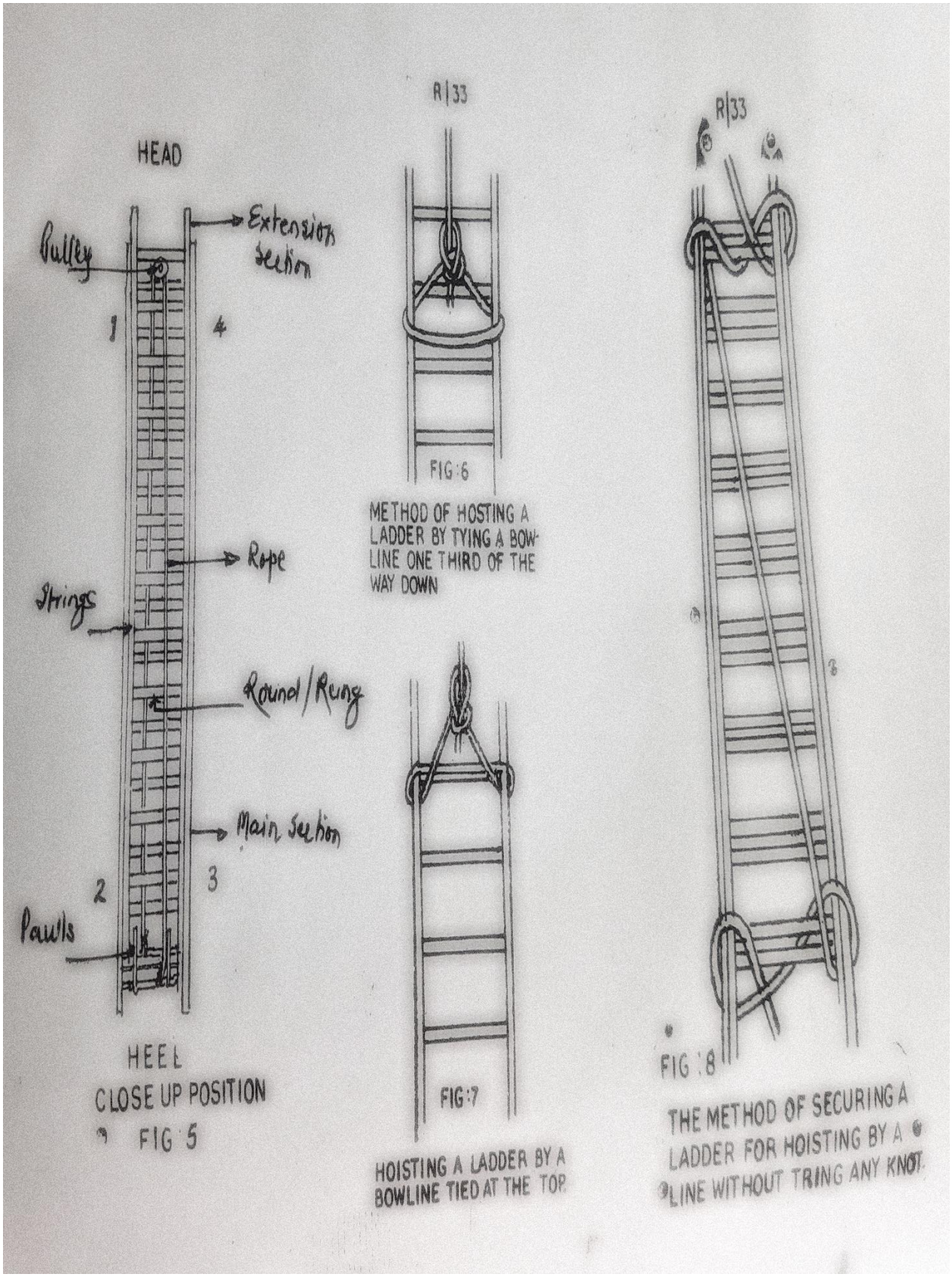
(iv) A timber hitch and half hitches.

(v) Depending upon the height it is required to haul the ladder, a method which does not require the tying of any knots is to secure the ladder in the centre of the line. This is done by passing a bight of the rope through the rounds and over the strings at each end of the ladder, as shown in Fig. 8. With this method the lower part of the line may be used as a guide line.

To prevent the ladder causing damage, and to keep it clear of any projections on the face of the building it is always advisable to attach a guide line, which should preferably be made fast immediately above the securing knots the hoisting line.

When attaching the hoisting line to the ladder in methods (i), (iii) and (iv) above, it will be advantage out if the line is secured approximately one-third from the top to facilitate levering the ladder over a balcony or into a window.


ANGLE OF A LADDER
ERECTING A LADDER (TWO MEN)
CARRYING ROOF LADDER
ONE MAN CARRYING EXTENSION LADDER
TWO MEN LADDER CARRY


HEAD
Pulley
Extension Section
1
4
Rope
Strings
Round / Rung
Main Section
2
3
Pawls
HEEL
CLOSE UP POSITION
FIG 5
R|33
FIG:6
METHOD OF HOSTING A LADDER BY TYING A BOW-LINE ONE THIRD OF THE WAY DOWN
FIG:7
HOISTING A LADDER BY A BOWLINE TIED AT THE TOP
R|33
FIG:8
THE METHOD OF SECURING A LADDER FOR HOISTING BY A LINE WITHOUT TRING ANY KNOT.

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CHAPTER NO. 39

EMERGENCY METHODS OF RESCUE

1. **Object**:

There may be occasions when a stretcher is not available or it is impossible to use a stretcher. Therefore, some other means must be used to lift and move the casualty. There are various methods by which a casualty can be moved. These are known as Emergency Methods of Rescue. The object of this lesson is to study these methods.

2. **Choice of Methods:**

The choice of method depends upon the following circumstances:

(i) Nature of casualties injuries i.e. slight or serious, conscious or unconscious.

(ii) Position in which casualty is found i.e. ample space, narrow void, limited head room.

(iii) Number of rescuers.

3. Methods Suitable for one Rescuer:

(i) **Homan Crutch:** When the casualty can help himself, the rescuer stands at his injured side and places the casualty's arm around his shoulders grasping the wrist with his hand. At the same time, he passes his other hand around the casualty's waist, grips his clothing at the hip, and Thus, assists him by acting as a Crutch.

(ii) **Pick-a-back**: Another very easy method of re moving a casualty, who is conscious and able to help. is by the Pick-a-back. In this method:

(a) The casualty climbs on the back of the rescuer holding around the waist and neck of the rescuer with his (casualty's) legs and hands respectively.

(b) The rescuer passes both his hands behind his back and supports the casualty.

(iii) **Pick-a-back (Reverse):**

(a) The rescuer and casualty stand back to back.

(b) The rescuer passes both his hands backwards and grips around the waist of the casualty.

(c) He then leans forward and lifts the casualty off the feet and upon his back.

(iv) **Fireman's Lift**: The method is very suitable for removing casualties from high buildings by ladder. The method is as follows:

(a) If the casualty is lying on his back the rescuer kneels on one knee (usually the right) and turns the casualty on to his face gently, supporting the face of the casualty with the hand and the fore-arm of the rescuer.

(b) The rescuer then places his hands underneath the armpits of the casualty and lifts the chest of casualty first on one of the rescuer's knee and then gradually lifts the casualty up to a kneeling position of the casualty.

(c) The hands of the rescuer are then passed around the body of the casualty and the casualty is lifted on to his feet, his body being supported against the body of rescuer.

(d) The rescuer than faces the casualty sideways and holds the right wrist of the casualty, passed over the shoulder of the rescuer, with his left hand. He then stoops down and picks up the casualty on to his shoulders, the right hand of the rescuer now passing in between the legs of the casualty and holding the right wrist of the casualty. The left hand of the rescuer is now free.

(v) **Rescue Crawl**: If a rescuer finds an unconscious casualty, a casualty who is unable to help himself, or one who is too heavy, the Rescue Crawl can be used.

(a) Turn the casualty on to his back and tie his wrists together using a triangular bandage or a neck-tie.

(b) Kneel astride him facing his head and placed your head through the loop formed by his arms.

(c) By crawling on your hands and knees you can drag him with you.

(vi) **Removal Downstairs:**

(a) To move a casualty downstairs, lay him on his back and tie his wrists together. With his head pointing downwards on the stairs, place your arm under his armpits so that his head rests on the crook of your arm and ease him downstairs.

(b) As an alternative method, lay the casualty on his back and tie his wrists together. With his head pointing downwards on the stairs, place your head through the loop Thus, formed by his arms. Place your hands under his armpits so that his head rests on your chest and ease him gently downstairs.

(vii) **Bowling Drag**:

(a) Turn the casualty on his back and tie his wrists together using a triangular bandage or a neck-tie.

(b) Using one length of 15 feet (4.5 M) sash cord or 40 ft. (12 M) lashing, tie bowline at each end to form the loops.

(c) Place one loop over the casualty's chest and under his armpits, with the knot resting under his head, so that it will keep his head off the ground while he is being pulled.

(d) The other loop goes on the rescuer, over his shoulders and under his armpits, to form a harness with the knot in line with the centre of his back or between his shoulders.

(e) The rescuer crawls on his hands and knees and drags the casualty out.

(viii) **Toe Drag**:

(a) Turn the casualty on his back and tie his wrist together using a triangular bandage or a neck-tie.

(b) The rescuer sits down at the casualty's head and places his feet under the casualty's armpits.

(c) With both hands free the rescuer pulls himself back and at the same time drags the casualty with his feel.

4. Methods Suitable for more than one Rescuer:

(i) **Two-handed seat:**

(a) Two rescuers face one another on either side of the casualty, bend down, and each passes his nearest arm under the casualty's back just below the shoulders and, if possible, grips his clothing.

(b) The casualty's back is raised and the rescuers slip their other arms under the middle of his thighs clasping their hands with a hand grip.

(c) The casualty is lifted and the rescuers step off with short paces.

(ii) **Three-handed seat**: This method is used for carrying a casualty and supporting either of his lower limbs, when he is able to use one or both of his arms.

(a) Two rescuers face each other on two sides of the casualty.

(b) The rescuer on the side of the injured limb keeps his hand nearest to the limb free.

(c) With the other hand he grips the corresponding wrist of the other rescuer, that hand in turn being used by the other rescuer to grip his wrist of the other hand (own). This hand of the second rescuer is then used to grip the wrist of the first rescuer Thus, forming a three-handed seat.

(d) The casualty sits or this three-handed seat supporting himself with his arms. He is carried and his injured limb supported by the rescuers.

(iii) **Four-handed seat:**

(a) Two rescuers face each other and each grasps his own left wrist with his right hand. Their hands are then put together, the free left hand grasping the right wrist of the man opposite.

(b) The casualty then sits on the seat so formed and puts one arm or both arms around the neck of the rescuers. The rescuers then lift the causality and step off with short paces.

(iv) **Fore and Aft Method:**

(a) The casualty is placed on his back.

(b) One rescuer raises the casualty's shoulders and passes his hands under the arms from behind clasping them in front of the chest.

(c) The other rescuer takes one leg under each arm and the casualty is carried feet first. If a leg is broken, both legs should be tied together, or put in splints, and carried under one arm.

(v) **Two-man Human Crutch:**

(a) Two rescuers take up their positions, one on each side of the casualty.

(b) They place the casualty's arms round their shoulders and grasp his wrists with their outside hands.

(c) They pass their arms round the casualty's waist, grasping his clothing at the hip and Thus, assist him by acting as crutches.

This method can be used for an unconscious casualty.

(vi) **Clothes Lift:**

(a) Normally four bearers are required for this lift. Two bearers kneel on each side of the casualty at the shoulders and hips and turn him on his back.

(b) At the command 'Prepare to Lift', the bearers grasp the casualty's clothing. Those at the shoulders will grasp the collar of his coat or shirt behind the neck with one hand and with the other grasp the clothing at his side.

(c) The bearers at his hips will grasp his clothing at the hips with one hand, and at the same time they will insert one finger in his sleeves in order to control the casualty's arms. With the other hand they grasp the casualty's trousers, Thus, supporting his legs. The casualty is now ready to be lifted.

(vii) **Blanket Lift:**

(a) A blanket is placed lengthwise on the ground in line with the casualty and rolled up half its width.

(b) The casualty is then carefully turned on his side.

(c) The rolled-up portion of the blanket is then placed close to the casualty and he is gently replaced on his back upon the unrolled portion of the blanket.

(d) The rolled portion is then unrolled so that he lies in the centre of the blanket.

(e) The two edges of the blanket are then rolled up against the casualty's body, grasped by two bearers on each side of the casualty, Thus, supporting the head, shoulders, hips and legs.

5. **Improvised Stretchers:**

(i) When there is shortage of stretchers, it is better to improvise then to handle the casualty unnecessarily.

(ii) Blankets, sheets or rugs salvaged from the site are particularly useful in confined spaces.

(iii) If space permits, a more rigid form of stretcher can be improvised from a light door, sheet of corrugated iron, single mattress or a short ladder. Rigid street cheers can be placed on or slid over rubble and debris. It may be necessary to lash the casualty to the improvised stretcher for negotiating corners and doorways or when carrying over debris and other obstacles. Whenever possible, the improvised stretcher should be blanketed to provide warmth and further security to the casualty.

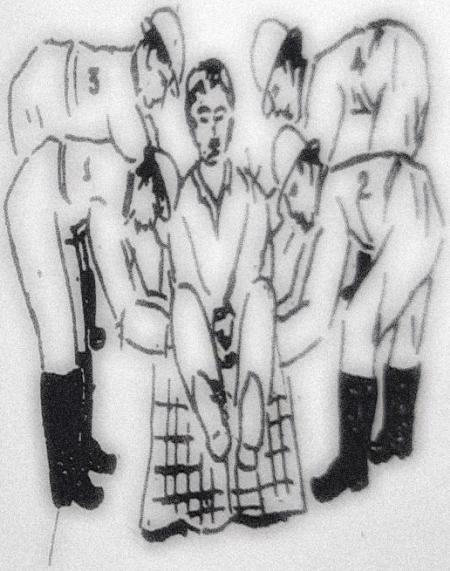
(iv) Ordinary chairs also can be used for carrying a casualty. With the casualty sitting in the chair, one rescuer will take hold of the chair at the back, the other will grasp the chair at the front legs. Both rescuers facing ahead will move off, the chair being tilted back forming an improvised stretcher.

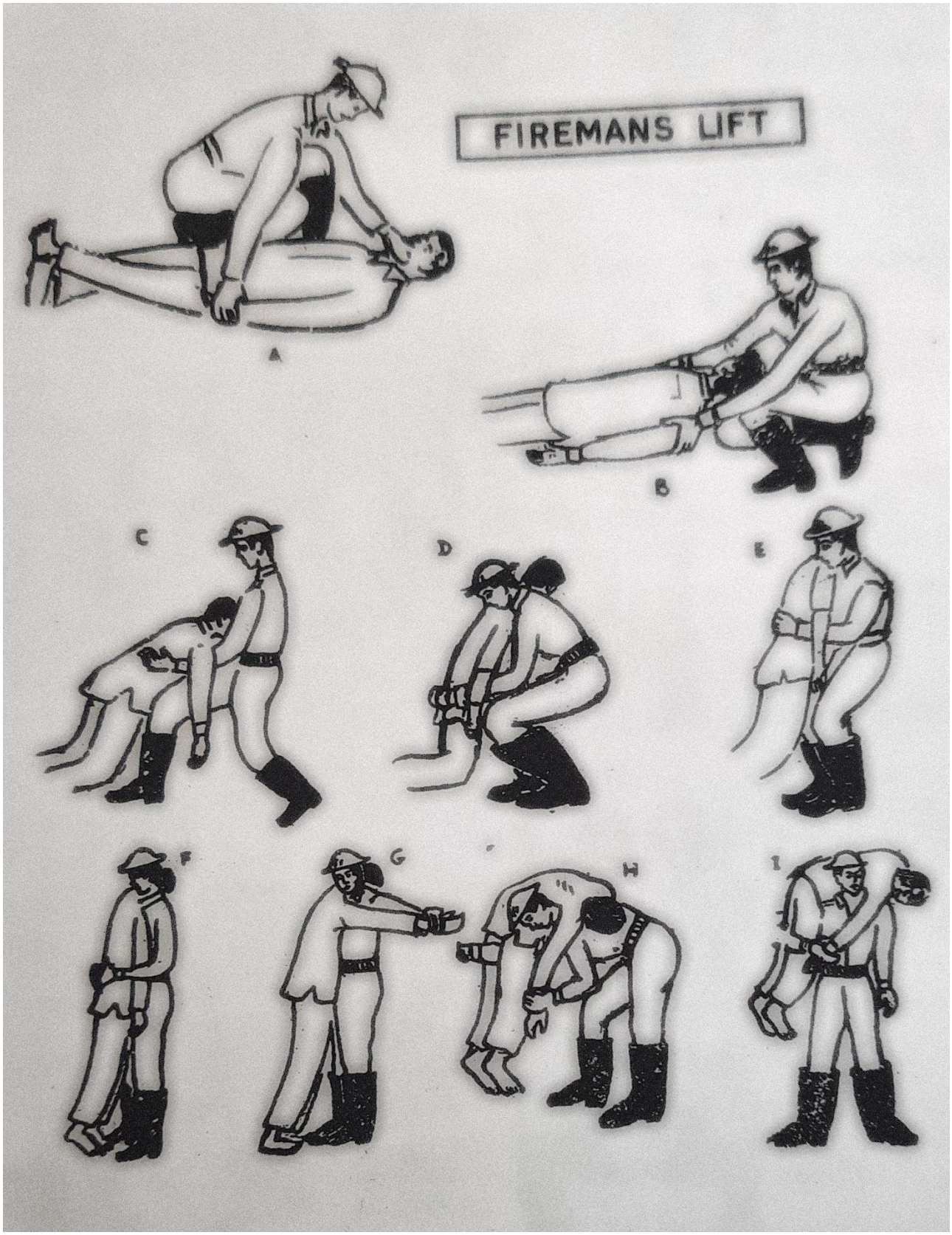
(v) If no rigid platform can be found, but blankets are available, a stretcher capable of carrying a casualty some distance can be improvised. Fold the blanket into three and use three or four pins or nails on each side to pin the edges of the blanket together. Two small poles, broom handles etc., are passed through the folds for side supports and the improvised stretcher is ready for use.

IMPROVISED STRETCHER

PLACING PATIENT ON BLANKET

BLANKET LIFT




FIREMANS LIFT
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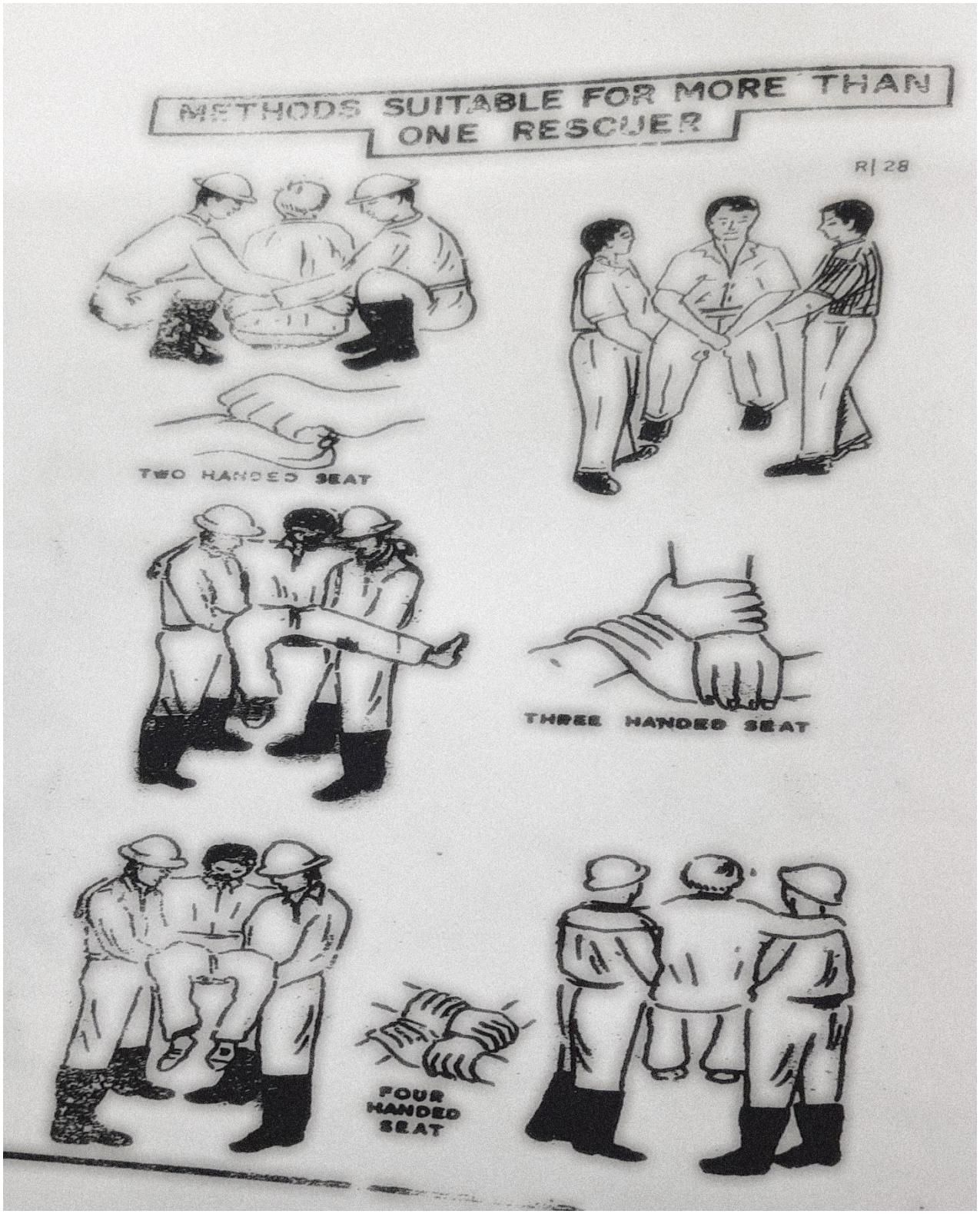
METHODS SUITABLE FOR MORE THAN ONE RESCUER
R| 28
TWO HANDED SEAT
THREE HANDED SEAT
FOUR HANDED SEAT

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CHAPTER NO. 40

CUTTING THROUGH WALLS AND METHODS OF DEMOLITION

1. **Object**:

It would be necessary for the rescue party to cut through walls in order to reach the casualty and to evacuate the same to safety. The method of cutting a wall depends mostly on its structure. Walls are usually constructed as follows:

(i) Brick wall with lime mortar.
(ii) Brick wall with cement mortar.
(iii) Stone wall with lime/cement mortar.
(iv) Concrete wall.
(v) Reinforced concrete wall.

2. **Methods of Cutting Through Walls:**

(i) **Brick wall with lime mortar**: Walls of this type, especially if they are old, are easy to cut through. The bricks can be withdrawn whole without any difficulty. Mark the wall with an inverted "V". Make small hole and enlarge it to the required size. While removing bricks cut at the joints and prise out brick by brick. In case there is any danger of the wall collapsing it may be necessary to use a head piece to prevent the wall or bricks immediately above the hole, from collapsing.

(ii) **Brick wall with cement mortar:** Since this type of construction is much stronger than the brick wall with lime mortar, holes large enough for rescue purposes can be made easily and without any special precautions. Except for this the procedure is the same as for cutting through brick walls with lime mortar.

(iii) **Stone Walls:** Stone walls are difficult to cut. Therefore, choose a place where the wall is likely to be thin (at places where there are built-in cup-boards). If a wall is made up of small stone or rubble and a hole is made in it, a head piece may be needed at the head.

(iv) **Concrete and reinforced concrete walls**: Unlike other types of walls, while cutting through cement walls, it is better to make a cut round the edge of the hole and remove it as a piece. Reinforcing bars should be cut with hacksaw or oxy-acetylene cutter.

3. **Precautions**:

Adequate precautions are required while carrying out rescue operations, more so when cutting through a wall in an already damaged building. The following points are worth noting:

(i) Study the structure of the building and consult an architect if available. Do not cut at a place where the cut might weaken the structure and cause a collapse.

(ii) Cause less vibration and use the tools effectively. In case of brick walls try and prise out the bricks rather than hitting against the face of the wall.

(ii) Try and insert a wooden frame where a large hole is to be made.

(iv) Horizontal cracks are more dangerous, so do not make a hole underneath this.

4. **Elementary Demolitions:**

Rescue parties are concerned with Elementary Demolitions of urgent nature. Some of the reasons for undertaking demolitions are as follows:

(i) To protect the public from dangerous buildings or part of buildings, which are likely to collapse.

(ii) To prevent obstructions to thorough-fares.

(iii) To protect Rescue partly members and members of C.D. Services, who may have to work near the dangerous buildings.

(iv) To enable members of public utility services, to approach their work.

5. **Methods of Demolition**:

There are two methods of demolitions. These are:

(i) Systematic demolition of the whole building using explosives or heavy mechanical aids e.g., winches and cranes.

(ii) Piece meal demolition by manual labour, removal piece by piece working from top to bottom.

6. **The method adopted depends upon the following factors:**

(i) Accessibility.
(ii) Degree of urgency.
(iii) Working space available.
(iv) Type of building-extent of damage,

7. Even though it takes more time and labour, the piece meal system of elementary demolition, is the safest. The following safety measures should be adopted while carrying out elementary demolitions.

(i) Ensure all casualties have been cleared from the building or structure.

(ii) Cordon off the area so that no one comes in the way.

(iii) Any fixtures of the building that can be quickly removed should be stacked clear of the site.

(iv) The brick and rubble are dropped inside the building and collected at intervals and removed. (This would reduce the dust to some extent).

(v) When ropes are used, ensure that timber packing is given wherever necessary to prevent the ropes from cutting/chaffing.

(vi) When pulling down, try to do the work in small lots, then to pull down a big piece.

(vii) Ensure that the falling pieces do not fall on the members pulling it.

(viii) Use a steel wire rope in preference to a fibre rope.

8. **Use of Heavy Mechanical Equipment in rescue Work**:

It will be found necessary to use Heavy mechanical equipment in Rescue work where the devastation due to enemy air raids is so concentrated and speed in Rescue. Work becomes paramount. Of course, this will have to be in support of normal Rescue Operations. The purposes where this could be used to greater advantage are as follows:

(i) Quick removal of heavy debris.

(ii) Lift heavy blocks of brick or concrete and create access to voids.

(iii) Clear important road blocks of debris.

(iv) Take the weight of collapsed floors and heavy steel work and make Rescue in confined places less Strut hazardous, and thereby speed up exploration and extrication of casualties.

(v) Haul up twisted and heavy steel work which obstructs rescue operations.

(vi) Assist in the removal of persons injured or trapped. At this stage mainly heavy plant is needed, particularly mobile cranes with sufficient length of boom or jib to reach for long distances over the wreckage of buildings.

(vii) Enable C. D. vehicles and fire appliances to reach areas where major rescue and other problems exist and require urgent operational action.

(viii) Take certain safety measures-e.g., pull down unsafe structures.

(ix) Help to restore communications and afford access for the repair of damaged mains and pipes beneath the streets and pavements by clearing them.

9. **Use of Steel Cables and Hauling Gear in Demolition:**

In many incidents, it may be found that the explosion has so disrupted buildings that many parts, walls, chimneys, stanchions and floors are cut off or left in a state of great instability, with likelihood of possible further collapse, risk to life and damage to ad accent property. These conditions call for prompt and skilled action, involving the controlled direction of the fall of the unsafe parts, by the use of slowly applied power exerted through wire cables.

10. **Types of Mechanical Heavy Equipment:**

(i) Bull-dozers Angle dozers.	Dozing heavy debris
(ii) RB-19 Mechanical Jib or Mobile cranes	For extricating casualties where it is impossible otherwise.
(iii) Dragline and shovel	To load vehicles with debris so that it can be taken away from the side.
(iv) Compressors	For breaking heavy concrete.
(v) Winches	For pulling down structures.

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CHAPTER NO. 41

RESCUE IN CONFINED PLACES WITH SMALL TOOLS

1. **Object**:

On many occasions the rescue party will be required to work in small and confined places, where very limited space is available to carry the arduous job of cutting, tunnelling and removal of obstructions, to reach to the man to be extricated. It is therefore very important for all rescue members to have a full working of such situations.

2. **Difference of working in confined places**:

The first difference that will strike everybody is the difference in working condition. As the rescuer will have to work in a cramped position, only not his speed but his efficiency will also suffer. Secondly, there will be a difference in the tools. As ordinary equipment's like shovels, pickaxes etc., cannot be effectively used in confined places so the equipment's used will be of the smaller type. Moreover, there may be some special dangers also.

3. **Equipment for rescue in confined places**:

(i) Hammer club 2½ (1.12 kgs.) with handle.
(ii) Cold chisel flat, cast steel 8 in/12 (20.32 cms./30.48 cms.).
(iii) Bars wrecking 24" (60.96 cms.).
(iv) Chisels carpenter ¼", ½ '' and 1'' (.63 cm 1.27cm .. 2.54 cms)
(v) Mallet carpenters.
(vi) Pliers side cutting 8" (20.32 cms.) insulated.
(vii) Braces carpenter with set of 5 bits
(viii) Hacksaw adjustable with blades.
(ix) Saw purging double edged 18m (45.72 cms) long.
(x) Saw hand 24/26" (60.00) cms/65.00 cms.).
(xi) Pipe cutter ½ to 2' (11.27cm to 5.08 cms)
(xii) Small axe/Fireman's axe.
(xiii) Miner's tools.

4. (i) **Type work and suitable**:

(a) Cutting through brick work-small hammers, cold chisel prying bar, club hammer, bars wrecking and miner's tools are some of the important items of equipment which are used in cutting through brick work.

(b) Cutting through timber work-Carpenter's tools such as handsaw, pruning saw chisels braces and bits etc. are very useful. Small axe and the hammer are also employed.

(c) Cutting through metal parts-Hacksaw with blades can be used more usefully than cold chisel and hammer, as the use of hacksaw produces less vibration.

(ii) When a member is working in a dangerous position any 40 ft. 1½" (12 m 38.1 mm.) lashing or such cord may be used as signalling line, if communication is otherwise not possible. One end is tied to the rescuer's waist and the other end is tied to the hand of his mate standing outside. Pre-arranged signals can be communicated whenever necessary, with the help of the signalling line.

5. **Precautions to be observed:**

(i) As the man working at the head is working in a difficult and dangerous position and where there is no supply of fresh air, frequent changes, are to be made amongst the members of the rescue party so that everybody in turn goes and works at the head.

(ii) Change is to be made at regular intervals and not waiting till the man asks to be changed as the man may underestimate the danger.

(iii) If the man is working in a dangerous position the signal line is to be tied to his waist.

(iv) Beware of special dangers like gas, flooding etc.

(v) Air compressors etc., should not be used as they may cause further collapse by their vibrations.

(vi) Care should be taken against the dangers involved in using oxy-acetylene cutting set, if at all they are to be used.

(vii) Objects to be cut should be well supported by props or head pieces in order to ensure the safety of Rescue Workers as well as casualties. Rescue Workers must ensure while cutting a beam or support, they are not releasing a collapsing floor or wall or additional debris which will collapse on themselves or the casualties.

(viii) After each operation, ensure that all your tools have been brought back from the confined place, as it is not desirable to go in again into the confined place for this purpose only.

6. **Lighting arrangements:**

For operations in darkness or during nights some lighting arrangements would be necessary. The Rescue Party members are equipped with six 2 cell hand torches, hurricane lamps and petromax lamp. Hurricane lamp and petromax are not suitable to be carried right into the confined place, since they have a flame and might cause accidents in case any gases are present. Lighting arrangements may be improvised by using vehicle inspection lamps.

7. **Removal of casualties**:

(i) It is very difficult to use the usual method of carrying a casualty out by stretcher as the space is very much restricted. The stretcher therefore is to be dragged and not carried.

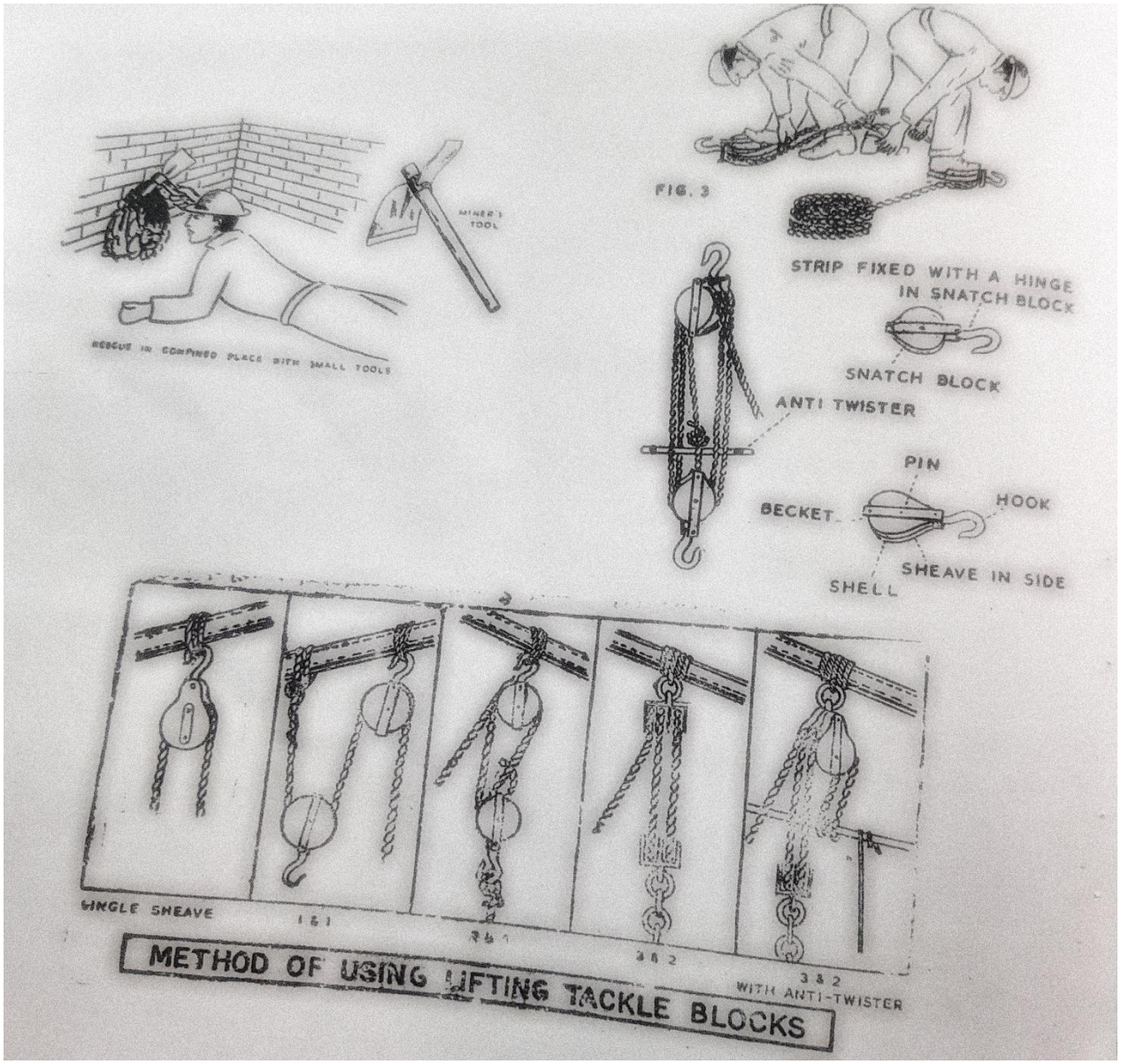
(ii) The casualty may also be removed by using a blanket as a stretcher.

(iii) The casualty may also be removed on a wooden board.

8. **Standard Line Signals:**

Though the line signals can be arranged by the members on the spot, it would be better if all the rescue parties follow some standard signals. The following are the standard signals followed by the Fire Brigade Members when they work in darkness and those signals may also be conveniently adopted by the C.D. Rescue Parties:

Signals	Meaning when given by the wearer	Meaning when given by the mate outside
1-Pull	I am all right.	Are you, all right?
2-Pulls	Pay out more line.	I am paying out more line.
2-Pulls-pause-2. pulls	Stop paying out lowering.	I am ceasing paying out or lowering.
3-Pulls	Haul up or haul in slack line.	I am hauling up or I am hauling in slack line
Repeated sharp Pulls	Danger-help me out.	Danger-I am hauling up as quickly as possible.



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CHAPTER NO. 42

ELEMENTARY PRINCIPLES OF SHORING

1. **Object**:

The object of this lesson is to study some of the principles of elementary shoring as may be useful to rescue parties at a place of damage to extricate casualties safely.

2. **Introduction**:

Enemy air raids may cause such damage as may completely demolish some buildings. However, some structures in damaged buildings may remain dangerously erect capable of falling at any time. Under such circumstances the rescue parties cannot carry out their work without potential danger to the lives of the personnel of a rescue party. Besides there may be huge damaged walls, buildings and other structures which may be quite beyond the capacity of a rescue party to deal with. This in fact will be the responsibility of the demolition squads who will be specially trained and properly equipped to deal with such problems of demolition of big and dangerous structures.

On the contrary it cannot be expected of the demolition squads to go to innumerable places of damage in different buildings to help the rescue parties to deal with small dangerous structures. Thus, it inevitably falls on the rescue party to handle this problem. In dealing with the same any rescue party has the following aims:

(i) To enable the Rescue personnel to carry out their duties in damaged buildings with safety.

(ii) To prevent further injury to casualties.

(iii) To obviate danger to the public through the collapse of the building into a highway or other public places.

3. From what has been stated above it is clear that the rescue parties may be adequately trained to deal with such small dangerous structures as may involve the risks mentioned above. This the rescue parties do mainly by shoring, propping and strutting the dangerous walls of buildings etc. In the succeeding paragraphs we will therefore study the elementary principles of shoring with their types etc.

4. **Elementary Shoring and its Principles:**

(i) What is shoring? Elementary shoring as applied to Rescue Work means the erection of a series of timbers used to strengthen a wall and prevent further collapse of a damaged building which might otherwise endanger the execution of Rescue Operations.

(ii) The purpose of elementary shoring is not to force the damaged part of the structure and restore it back to its original position. Any such attempt to force back the damaged structures will cause a further collapse. However, it is important to secure all shores into position, using cleats, wedges and jacks where necessary.

(iii) **Material for shoring**: Generally, there will be plenty of timber available from the damaged buildings. Some of the damaged buildings might be having suitable pieces of timber required for shoring. When suitable timber is not available, small lengths can be joined together, with staggered joints so that the stress and strain does not affect the shoring.

(iv) **Types of Shoring:**

(a) Raking Shore,

(b) Flying Shore, and

(c) Dead Shore.

Types of Shores, their principal parts and methods of erection of each

5. **Raking Shore:**

This is used to prevent a wall or vertical part of a building from bulging or falling away (see figure 1 in the attached chart).

(i) **Principal parts of a raking shore**:

(a) The raker.

(b) Wall Plate.

(c) Sole piece.

(d) Cleats.

(e) Struts.

(f) Wedges.

(For illustration of the parts see figure 1 A in the attached chart).

(ii) **Methods of erecting**:

(a) A cleat is first nailed to the wall plate at a point just above the common meeting point of the raker and load bearer.

(b) The sole-piece should be, placed in such a position, that it takes the thrust of the raker at an angle exceeding a right angle so that when tightening up is done a right angle is formed. Tightening should never be done with a hammer and only a small rebate should be cut from the foot of the raker to enable a lever to be inserted in order to tighten it up, or folding wedges could be inserted between the foot of the raker and the cleat. To give the necessary angle soft ground can be excavated sloping towards the unsafe wall. On hard ground the sole-piece will have to be built up to the required angle and spiked or wedged to prevent movement outwards. (see figure 1B).

(c) **Wall Plate**: The wall-plate would be as far as possible continuous throughout its length and when used against a building wall should be backed with timber packing pieces in order to give it continuous bearing throughout its length. The cleat having been nailed in position, the wall-plate is now held against the wall while the raker is being fixed.

(d) **Ráker**: Rakers are best formed with square timbers. Depending upon the height of the wall to be supported and the weight the wall is bearing, the number varies from one to four. There should be one raker for each floor carried by the wall. When the raker is set it should form an angle of 60° to 70° with the ground. The centre line of the raker should meet at a common point with the centre lines of the wall and floor. The top of the raker is then place underneath the cleat. The foot is placed on the sole-piece. Then it is gently levered into the correct position. A cleat is nailed on the sole piece, behind the raker. Wedges must be used if the raker edges are not cut to the required shape.

(e) **Strut (or Brace):** The strut or brace is then fixed. Any movement by the foot or the wall plate is prevented by this and the wall plate is checked from riding up the wall under stress. The strut should be spiked and if necessary dogged to the raker and wall plate.

(f) In supporting a wall, wall plates and rakers should be usually placed at intervals from 8 to 12 feet (2.40 M to 3.60 M). This largely de pends on the circumstances type of wall and degree of damage.

Max. Height	Raker	Wall Plate	Sole-piece	Strut
15" (4.60 M)	4"x4" (10.16 cm x 10.16 cm)	9''x3" (23.16 cm x 5.08 cm)	9''x3'' (23.16 cm x 7.62 cm)	4"x2" (10.16 x 5.08 cm)
20" (6.00 M)	5"x5" (2.16 cm x 2.16 cm)	9''×3" (23.16 cm X 7.62 cm)	9''x3'' (23.16 cm X 7.62 cm)	4"x2" (10.16 cm x 5.08 cm)
25" (7.50 M)	6"x6" (15.24 cm x 15.24 cm)	9''x3" (23.16 cm x 7.62 cm)	9''x3'' (23.16 cm x 7.62 cm)	6"x4" (15.24 cm x 10.16 cm)

Note:

These can be either of solid timber size as stated or can be made up by different size timbers i.e. two 4" x 2" (10.16 cm x 5.08 cm) joists strapped and dogged together would form a 4" x 4" (10.16 cm x 10.16 cm) raker.

6**. Flying Shore**:

This is used between the walls of the two buildings

(i) **Principal Parts**: The principal parts are the horizontal beam, wall plate and struts. Other items necessary for the erection of the Flying Shore are cleats and wedges and straining pieces . Suitable sizes for these are given below :-

Max Span	Horizontal Beam	Wall Plates	Struts
0' (3.00 M)	6"x4" (56.24cm x 10.16cm)	7''x2" (17.78cm x 5.08cm)	4"x4" (10.16cm x 10.16cm)
5'(4-50M)	1"x4" (15.24cm x 10.16 cm)	7" x 2" (17.78cm x 5.08cm)	4" x 4" (10.16cm x 10-16cm)
20'(6-00M)	6" x 6" (16.24cm x 16.24cm)	9" x 9" (23.16cm x 5.08cm)	4" x 4" (10.16cm x 10.16cm)

(ii) **Method of erection**: The cleats are nailed to their positions on the wall-plates, the first pair to support the horizontal shore and the other pair to support the struts. These struts should be at an angle not greater than 45° to the horizontal beam, and should be kept apart on the horizontal beam by straining pieces. The length of these straining pieces is determined

by the length of the horizontal beam. It is advisable to set the job out on the ground before erection so that attention can be given to measurements and angles. While the wall-plates are being held in position the horizontal beam with the straining pieces temporarily lashed to it, is placed on the centre cleats and tightened by folding wedges inserted between the beam and the wall plate. The struts the next placed in to position between the cleats and the straining pieces, being tightened by wedges. If wedges are necessary to the lower struts they should be placed between the tops of lower cleats and the lower struts. Timber dogs may be used the brace the shore rigidly.

7. **Dead Shore**:

A dead shore carries the vertical load of the wall or floor.

(i) **Principal Parts**: The principal parts are sole-piece, head-piece and vertical and vertical or dead shore. Other items used are braces, wedges and dogs.

(ii) **Method of erecting**: The sole piece is laid down in position taking care that it is placed on a solid foundation. The head-piece is held in position and the vertical or dead shores are then placed upright between the head piece and the sole-piece and secondly wedged by a pair of folding wedges inserted bet ween the dead shore and sole piece. These wedges should be tightened simultaneously. In using folding wedges care should be taken that the wedges are "married" before tightening is attempted, (“married” means that one point overlaps the other after insertion of the wedges). Where braces are necessary they should be long enough to extend diagonally from the head-piece across the shore to the sole-piece and nail ed to each in turn. (See figure 3). It must be re membered that vertical or dead shores may be carrying the full weight of the structure above whereas raking and flying shores mainly oppose the overturning tendency. It is very important, therefore, to have a solid bearing for sole-piece. The piece must be broad and as long possible order to spread the load. mate what shore will the following rules may help: -

(a) The shorter the length, the greater the load it will carry.
(b) The strength is increased if the ends are cut square to fir on the head and sole-piece.

8. **Safety Precaution:**

(i) Do not try to force a wall or beam back intis its original position.

(ii) Use levering and wedges or cleats to tighten the rakers or struts.

(iii) Hammering of cleats should be done before the wall plates are erected.

(iv) While raising or supporting beams or mention of floors ensure that the stability of the rest of the building is not disturbed.

(v) Ensure all raised sections are firmly supported by struts or cribbing before allowing any one of crawl underneath it.

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CHAPTER NO. 43

USE OF BLOCKS, TACKLES AND PULLEYS IN RESCUE WORK

1.**Object**:

The object of this lesson is to study some of the details of blocks and tackles as used in rescue work.

2. **Introduction**:

In addition to the number of casualties which be found on heights or at the rescue parties working at a place of damage are also likely to come across many casualties trapped under very heavy loads. On more than one occasion they would like to lift/lower maximum loads and casualties minimum available man power. Thus, for gaining power and changing the direction of ropes, the use of blocks and tackles will be found almost useful rescue parties while extricating trapped casualties under the debris or heights etc.

3. **Blocks**:

(i) Blocks (see figure 1) are used for the purpose of changing the direction of ropes and when made up into tackles, of gaining power.

(ii) The essential parts of a block as used in rescue work are generally made of malleable cast iron or steel. The important parts are as follows:

(a) **Shell**: The case containing the sheave.

(b) **Sheave/pully**: The wheel upon which the line travels.

(c) **Bush**: The metal centre of sheave, often with metal roller.

(d) **Pin**: The shaft upon which the sheave revolves.

(e) **Becket**: To which rope is fixed above the block.

(f) **Hook**: The hook of a block is always secure to the crown.

(iii) Ropes to be used for blocks depend on the diameter of the sheave, if the sheave is too small, the strength of the rope, especially wire rope, is seriously diminished and a proportion of power is lost. On the other hand, the smaller the sheave the lighter the block. For wire ropes the diameter of the sheave should be at least six times the circumference of the rope.

(iv) Blocks are called single, double or triple according to the number of sheaves in the frame. As a rule, either the safe load or the test load should be stamped on the block.

(v) Snatch blocks are single blocks with an opening in one side of the shell, in order that a rope can be inserted without passing the end through it. This opening is closed by a hinged strap.

4. **Tackles**:

Tackles are composed of one or more blocks, rove with a rope or fall. Those most commonly used are shown in figure 2 in the attached chart. They are described as single, double, treble tackles and are denoted 2/1 or 3/2. The following terms are used in this connection.

(i) Fall is the term used for the rope connecting the blocks.
(ii) Reeving is the operating of passing the fall round the sheaves of the blocks.
(iii) The standing end is the end of the fall made fast to one of the blocks at the becket.
(iv) The running end is the loose end of the fall to which the power is applied.
(v) The returns are the parts of the fall between the blocks.
(vi) To overhaul a tackle is to separate the blocks. With heavy tackles, the block from which the running end comes off should be secured to a holdfast, and a hand-spike should be placed in the hook of the other block with a dragrope, should be manned, while one or two men over haul the returns from the standing block. The hand-spike is intended to keep the tackle out of the dirt which would otherwise clog the sheaves.
(vii) When the blocks are as close as they will go, they are said to be choc-a-bloc.
(viii) to rack a tackle, any two opposite returns should be fastened together with a seizing so that the blocks will retain their relative position even if the running end is let go.
(ix) A lifting tackle is one in which the running end of the fall comes off the fixed block, it is normally used vertically.
(x) A runner tackle is one in which the running end of the fall comes off the moveable block, it is normally used horizontally.
(xi) A leading block is used to change the direction of the running end in order that the power may be favourably applied. As a rule, leading blocks are required for lifting tackles and not for runner tackles. They should be made so fast as to give a good lead to the fall which runs through it. Snatch blocks are normally used.
(xii) The power is applied to the running end by which or capstan, or by men pulling directly on the fall. Men cannot grip wire rope sufficiently well to apply power equal to the strength of the rope.

5. **Reeving of a Tackle**:

A tackle is rove by two men standing back to back 6 ft. (1.80 M) apart (see figure 3) Each man places a block on its side between his feet, hooks to the front, and the coil of rope to the right of that block at which there are to be the greater number of returns. Beginning with the lowest sheave of this block, the end of the fall which is to be the standing end is passed successively through the sheaves from right to left and then made fast to the becket with two-half-hitches and seizing. The half-hitches should be as close up as possible, and very little spare end left for seizing. so that the blocks may not become choc-a-bloc unnecessarily soon. All tackles should be rove in this manner except, that in the case of long heavy tackles, it is better to reeve the blocks the working distance apart to save overhauling after reeving. Care must be taken to prevent mud and grit getting into the sheaves.

6. **Anti-Twisters:**

(i) All tackles are liable to twist when the power is applied due to the lay of the rope and not to the method of reeving the tackle. Although many methods of reeving have been tried to prevent the twist, none are satisfactory, and it is necessary to fit some form of anti-twister to the tackle. Long tackles and new ropes are more liable to twist than short ones and

old ropes. New ropes should be well stretched and as much twist as possible taken out of them by making one end fast to a swivel and pulling on the other.

(ii) The most suitable type of anti-twister at a moving block in a horizontal or sloping tackle, consists of a maul with the helve passed through the loop of the first half-hitch of the standing end on the becket and projecting at least 6 inches (15.00 cm.) above the returns of the tackle (figure 4). To fix it, make a split clove hitch round the head of the maul, pass the double end of the spun yarn up the helve and secure it to the helve with two half-hitches take a round turn through the becket, and one turn of a square lashing with the double spun yarn round the helve and the loop of the standing end. Finish off with frapping turns made with each part of the spun yarn in opposite directions and tie a reel knot.

(iii) The tackle is prevented from a twisting by the suspended weight of the maul. In long tackles, or if the head of the maul is too light, an additional weight must be secured to the bottom of the maul or a crow bar may be used instead, the crow-bar should be se curried in a similar, way except that no split clove hitch can be used.

(iv) A vertical tackle cannot be prevented from twisting by the maul, anti-twister. In this case, a light bar such as a picket or hand-spike, should be placed through the loop of the standing end and fixed to the becket. The tackle is prevented from twisting by men holding the reins attached to each end of the bar.

7. **Care of Tackles:**

If tackles are to work efficiently, and produce the estimated power gain, all friction losses must be reduced to a minimum by observing the following points:

(i) Block must be well lubricated and free from grit and dirt. If blocks complain, i.e. make a noise, they are not in good working order.

(ii) The fall must be free from kinks and two and must run freely over the sheaves.

(iii) Tackles should be carried and not dragged along the ground (for method, see chart).

(iv) Tackles must be prevented from twisting. The power required is increased by over 40 percent if a tackle is allowed to twist one complete turn.

(v) The correct size of block for the rope must be used.

8. **Use of Tackles:**

The following practical points in the use of tackles should always be observed:

(i) When calculating the type of tackle, provide plenty of spare power to allow for easy working.

(ii) Remember to allow for the space taken up by a tackle when choc-a-bloc, and the space to quired for the hauling team.

(iii) The final pull should be horizontal if more than two men are to pull.

(iv) Men should be trained to pull together and hold what they get. Sometimes, where a smooth pull is required, instead of heaving it may be desirable for the hauling party to walk away with the fall after the first heave. The fall should be double banked in order to keep the pull in a straight line.

9**. Safety Precautions:**

The following safety precautions should be taken while using blocks and tackles in rescue work.

(i) Ensure that the rope selected is suitable to lift the weight required.

(ii) Be sure that you have enough length of right type of rope to be used.

(iii) Check that the right size of the rope is used for the blocks.

(iv) Ensure that the blocks are greased properly and always kept free from grit.

(v) When pulling a load ensure that all the men exert a steady pull on the fall and that they do not jerk. The leader should give the orders, and all the members should pull simultaneously and hold on to the gain. The men should stand alternatively and keep the rope in a straight line.

(vi) When fixing lifting tackle to a spar or a hauling tackle to a post, ensure that the spar or post can take the strain of the weight of the object, of and the pull exerted on from it.

(vii) The members should be pulling away from the lifting tackle, so that they will not be hurt in case the support fails.

(viii) When pulling on a fall, ensure that all the men pull in a direct line with the sheaves of the block. If possible, the pull should be downhill.

(ix) When paying out the fall it should be smooth, easy and without jerks. A turn should be taken with running end around the picket or hold fast, to prevent the weight on the tackle acquiring the charge due to momentum. Likewise, precaution is necessary when taking in a tackle. One man should be made responsible for taking in spare end and to keep a round turn on the picket. A suspended weight should be eased of uniformly and not with jerks.

(x) When the fall is taut it should not be struck are trodden by men.

(xi) While the tackle is being used the return near the sheaves of the blocks should not be touched. The fingers of the men may get caught between the returns and the sheaves. When absolutely necessary, the return away from the blocks can be eased.

(xii) After lifting a weight, do not leave the tackle with the strain on release the strain by lowering tackle an inch or two, so that stress is distributed equitably among all the returns.

(xiii) Never use wire rope in a block meant for fibre rope are wise-versa.

Tackle Calculations:

10**. Lifting Tackle:**

A lifting tackle has the weight attached to a moving block (the lower block) and the running coming off the fixed block (or upper block). When calculating the strength of a lifting tackle, it must first be realised that only the returns between the blocks are assisting to lift the weight and that running end is not helping in the lifting. The power is exerted directly on it and in the opposite direction, to that in which weight is moving. The factors to be taken consideration in calculating the strength of lifting tackle are: -

(i) The unit strength of the fall (circumference x circumference CWTS) (C^2 in, mm x0.789x kgs.)

(ii) The number of returns at the moving block (including the standing part if it is made fast to the moving blocks.)

(iii) The loss of efficiency of the tackle owing to friction one third reduction is allowed. For example, using a 3/2 tackle. Reeved with a 3" (76.2 mm) fibre rope, the strength will be calculated as below.

(Unit strength of rope) x (Returns at moving block) x 2/3 (friction loss) which is (circumference X circumference) x (returns at the moving blocks).

(3x3) x5=45x2/3-30 CWTS (or in C.G.S, system,
(76.2 x 76.2x0.789) x5x2/3=1526.66 kgs).

11. **Hauling Tackle:**

A hauling tackle is one in which the running end of the fall comes off the moving block to which the weight being hauled is attached. The fixed block is made fast to a hold fast or otherwise anchored. While calculating the strength of hauling tackle it must be remembered that the running end of the fall is pulled in the same direction as the weight to be moved and assists the returns to move the weight. The running end must, therefore, be included in the calculation assessing the number of returns at the movable block.

For example, using a 3/2 tackle reeved by a 3-inch fibre rope, the strength will be as follows:

(Unit strength of rope) x (returns at moving block plus running end) x 2/3 (friction loss) (circumference x circumference) x (5+1) x 2/3=54x2/3 =36 CWTS (or in C.G.S. system where Circumference is in mm, (76.2 x 76.2x.0789x(5+1) x 2/3= 458x6x2/3=1832 Kgs.)

12. **Length of rope Required for a Tackle:**

The longest length of rope carried on a rescue vehicle is 200 feet. It is, therefore, necessary to know the maximum length of a tackle that can be reeved with this rope and also as to how to calculate the length of rope required for a tackle that will move a weight through any given distances. The following are taken into consideration for calculating the same:

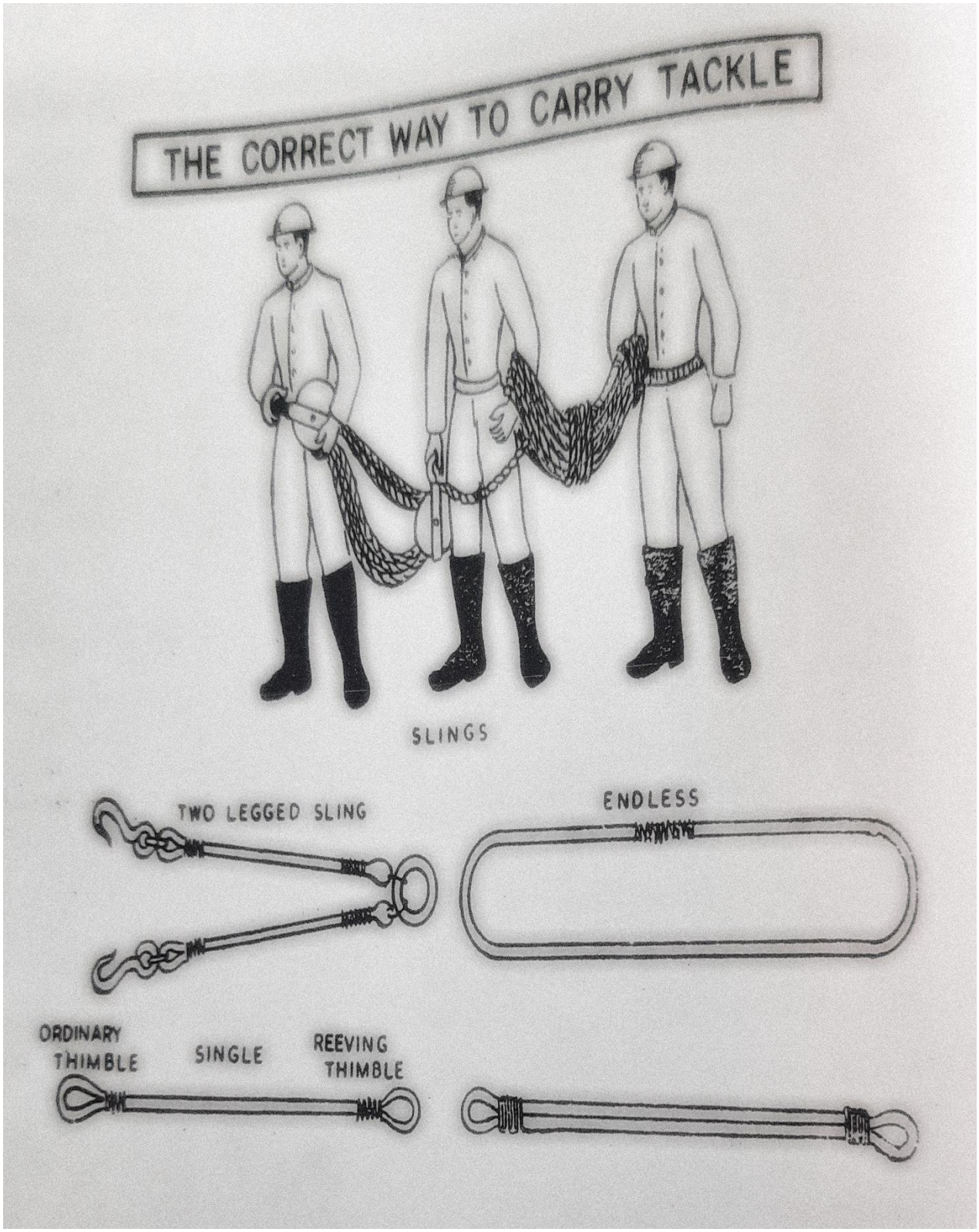
(i) The number of returns between the blocks plus the running end. (This is quickly assessed by counting the total number of sheaves in the blocks and adding one for the rope required as a running end).

(ii) The distance that the weight has to be moved either vertically or horizontally,

(iii) The overall length of a tackle when choc-a-bloc (normally a constant of 4 ft. (1.20 M) when measured from hook to hook).

(for example, if a weight is to be moved a distance of 26 ft. (7.80 M) by means of a 3/2 tackle, the length of the rope required will be as follows):

(Number of sheaves + 1) X (Distance to be moved +choc-a-bloc).
(5+1) x (26+4)....
6X30=180 ft. length of rope (or in C.GS. system, (5+1) x (7.80 x 1.20) =6x9-54 M.


THE CORRECT WAY TO CARRY TACKLE
SLINGS
TWO LEGGED SLING
ENDLESS
ORDINARY THIMBLE
SINGLE
REEVING THIMBLE

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CHAPTER NO. 44

LOWERING OR RAISING A CASUALTY BY ROPE AND PULLEY-JIB METHOD

1. **Object**:

In certain cases when it is not practicable to use ladders or when the ladders are not available for rescue work, it would become necessary to use other equipment of rescue parties such as ropes and pulleys.

2**. Snatch Block and Rope Method**:

In this method the basic principle applied is the same as that of the jib method which is described below. A suitable place is found to suspend the snatch block. Care should be taken to see that the structure to which the snatch block is fixed, is not weak or damaged and can withstand the strain that comes on it when a loaded stretcher is lowered from it. Care must be taken to ensure that the rope must be well manned at least by three men. In some cases it is preferable to ease the strain by taking the lowering line around the picket or some strong suitable object. Then the lowering is done in the same way as a pot is lowered into a well.

3**. Jib Method:**

When it is not possible to find a place, which is suitable to fix the snatch block, it will become necessary to use a jib.

4. **Description**:

Jib as used in rescue work is a strong pole one end of which is fixed or secured and the other end, which is the butt end carrying the snatch block extends over the damaged wall, sufficiently allowing the casualty to be lowered by means of rope and pulley.

5. **Where to Fix a Jib:**

The actual method of fixing, a jib varies with each case. It may be possible to extend it over the sill or coping resting on a piece of wood to distribute the load. It may not be possible to get a satisfactory position in this way, then the jib is made to rest on sheer legs or a short trestle at a window opening.

6. **Method**:

(i) The tail end of the jib should be secured to rafters or floor boards. Where this is not possible, the tail end should be weighed down by means of counter weight, using chunks of debris or heavy furniture such as cupboards etc. It is important that the counter weight should be much more than the weight of match block, rope, stretcher, stretcher-harness, blanket, casualty and the lashings all put together.

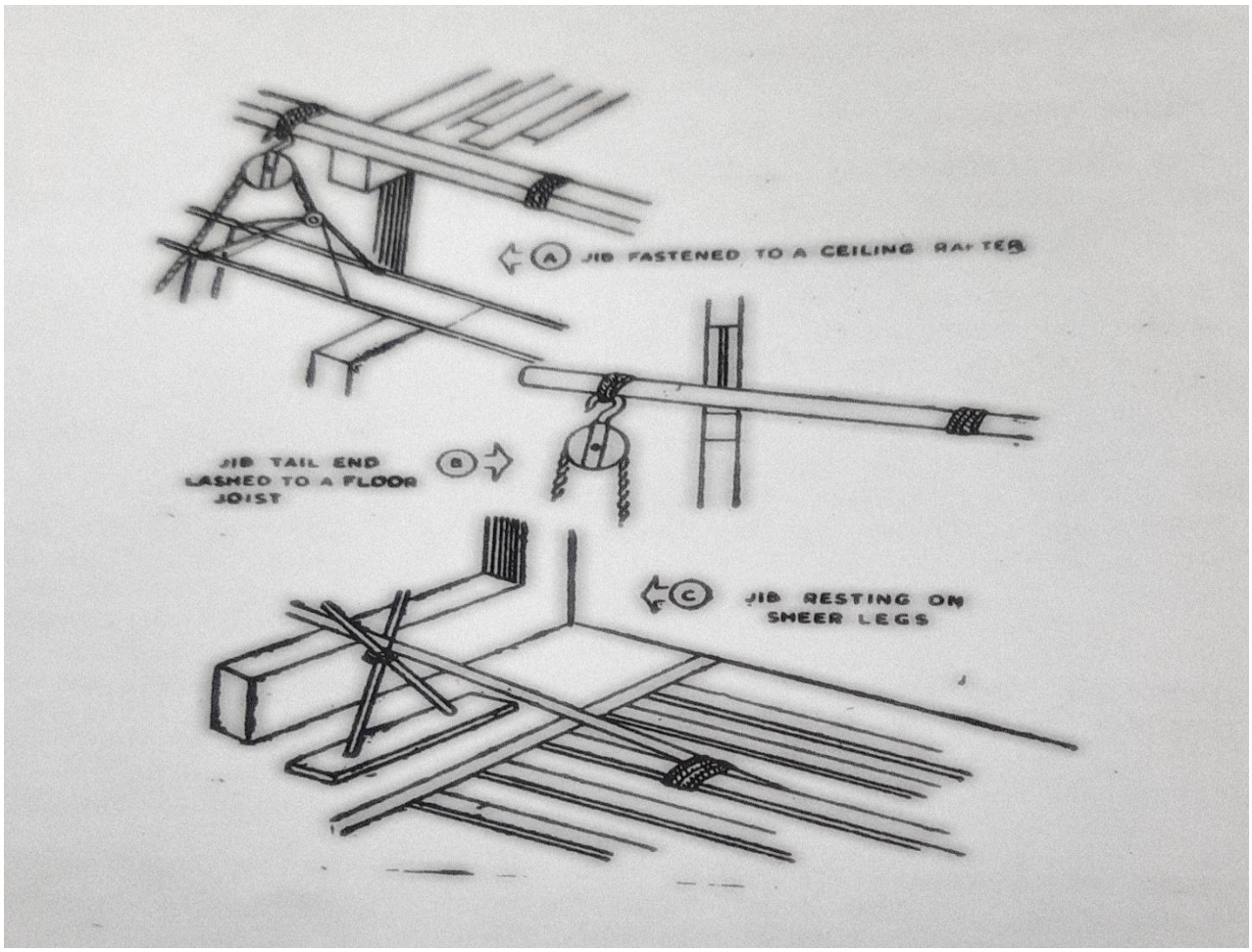
(ii) The butt end should be used for suspending an arch block, through which the lowering fine is passed before extending it away from the wall or building Care should be taken to see that the jib is extended over the support, just enough to get the clearance required and not over projected, as every additional length increases the leverage on the tail counter weight.

(iii) Whenever the situation permits, the jib should be erected on the floor above the one from which the casualties are to be recovered. Where this is not possible, sufficient room must be created by placing the jib on sheer legs as high as possible (to get sufficient working place and height).

(iv) Jibs may be improvised by choosing a robust piece of wood if available from the damaged building. It should be tested before use.

(v) **Special knots and lashings**: The special knots and lashings used in this method are:

(a) Fixing the snatch block	Round lashings.
(b) Tailidg down the jib	Square lashing if being tied to a rafter or round lashing with an improvised sling around the counder weight.
(c) Sheer legs when used	Sheer lashing.
(d) Loweridg line to stretcher harness	Round turn and two half kitchens with proper seizing.
(e) Guide ropes to stretcher handles	Bowline



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CHAPTER NO. 45

LOADING AND UNLOADING OF RESCUE – RESCUE LORRY DRILL

1. **Object**:

The rescue party equipment have to be carried by the Rescue Parties in their vehicles. These have to be unloaded and reloaded into the vehicle under very strenuous and confused circumstances. In order to ensure that the members of Rescue Parties can do this task with speed, and without confusion, it is essential that some drill for the purpose is introduced and practiced by them. The following drills have been designed to give the required practice to the Reserve designed to give the required practice to the Rescue Parties.

2. **Drill No. 1** -Falling in and Numbering:

"Fall In"

Order: Leader gives the command "Fall in".

Action by the Rescue Party-All members proceed to the vehicle and form up in single rank. The Deputy Leader to the rear and the driver to the vehicle front, on the off side, approximately one pace from the vehicle facing outwards (See figure No. 1).

"Numbering".

Order: Leader gives the command.

Action by the Rescue Party-The members commence to number as follows:

Number 1 calls out "ONE" followed by the remainder of the party calling out "TWO", "THREE", "FOUR" etc. in succession up to Number 7 the driver.

3. Drill No. 2-Mounting: (Fig. 3)

Order: Leader gives the command "Party Mount".

Action by the Party-The whole Party, except the Lender will turn towards the REAR of the vehicle and proceed as follows:

(i) Number 7 (driver) takes up his position behind the driving wheel after closing the tail board along with the Leader.

(ii) Number 6 enters the vehicle from the rear and takes up his seat on the offside, as far "FORWARD" as possible.

(iii) Numbers 5 and 4 follow Number 6 and take their seats in that order, Number 5 in the centre and Number 4 nearest the rear.

(iv) Numbers 2 and 3 enter the vehicle and take their seats on the near side as follows. Number 3 in the centre and Number 2 nearest the rear,

(v) Number 1 enters vehicle and takes his seat as far FORWARD as possible, passing in front of Number 2 and 3 as he does so.

(vi) The Leader enters the driving cabs on the neat side and sits next to the driver after closing the tail board with the driver.

4. **Drill Number** 3-Dismounting:

Order: On arrival at the chosen position for drills etc., the Party Leader will dismount, take up a position facing the vehicle approximately 3 to 4 paces from It and give the command "Party Dismount".

Action by the Party-The whole party will leave their seats, dismount in the following order:

(i) Number 1, 2 and 3 from the NEAR SIDE followed by Numbers 4, 5 and 6 from the OFF SIDE. Number 7 from Driver's seat.

(ii) They will then "FALL IN" in single rank as detailed in Drill Number 1.

5**. Drill Number 4**-Preparing to Unfoldment: (For Inspection only):

Order: Party Leader gives the command "Prepare to unload". Action by the Party-The whole Party turns to the REAR of the vehicle and take up positions as follows:

(i) Number 7 (driver) enters vehicle from the REAR and proceeds to unload all boxes/lockers.

(ii) Number 6 follows and also enters vehicle to assist Number 7.

(iii) Number 5 positions himself opposite to the Rear off-side, facing inwards.

(iv) Number 4 proceeds to the rear of the vehicle and positions himself at the rear off side facing the vehicle.

(v) Number 3 proceeds as for Number 4 and positions himself at the Rear Centre of the vehicle facing it.

(vi) Number 2 proceeds as for Numbers 3 and 4 and positions himself at the Rear Near side facing the vehicle.

(vii) Number 1 proceeds to the position opposite the Rear Near Side facing No. 5 inward (Nee Figure No. 2).

6. **Drill Number 5**-Unloading Equipment:
Order Party Leader gives the command "UNLOAD EQUIPMENT"

Action by the Party: -

(i) Number 6 releases the Extension ladder, which is lowered by him and received by Numbers 2 and 4.

(ii) Number 6 lowers short ladders, iron shod levers and derrick poles, which are received by Numbers 2 and 4.

(iii) Number 7 assisted by Number 6 unloads all equipment from inside vehicle, commencing from the rear and working forward, handing equipment to Numbers 2, 3 and 4 who place it in the inspection position on the ground.

(iv) Number 5 remove equipment stored on off side and place it in the inspection positions on the ground.

(v) Numbers 4, 3 and 2 will take over equipment handed out from the inside of the vehicle by Numbers 7 and 6 and place it in the inspection position on the ground.

(vi) Number 1 will remove equipment stored on ear side and place it in the inspection position on the ground. When all equipment has been unloaded, the members of the party return to the "Fall In" positions. The equipment is then inspected and checked by the Party Leader.

7. **Drill Number 6**-Preparing to Load Equipment:

Order: When equipment has been inspected and checked, the Party Leader will give the command "PREPARE TO LOAD".

Action by the Party-All members will proceed to the positions as detailed in Drill Number 5 (Preparing to unload equipment) and will await further commands

8. **Drill Number 7-Loading Equipment:**

Order: Leader gives the command "LOAD EQUIPMENT.

Action by the Party

(i) All members will load on to the vehicle the equipment previously unloaded by them.

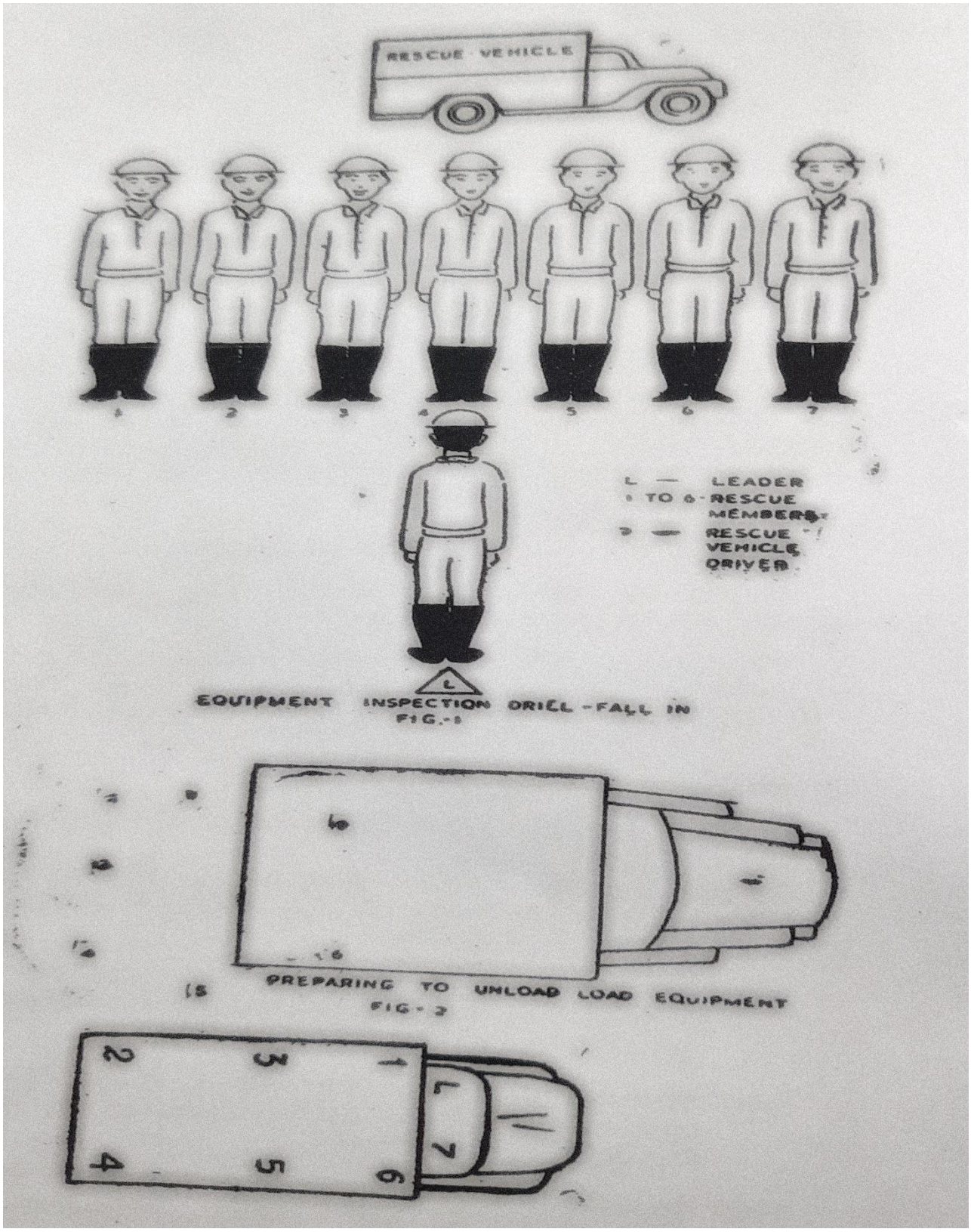
(ii) Numbers 7 and 6 proceeding inside the vehicle store equipment as it is handed in by Number 2, 3 and 4.

(iii) Equipment from the top of the vehicle, such as ladders etc., will be loaded last and secured by Number 7 assisted by Number 5,

(iv) When vehicle is loaded, Number 7 will secure all lockers/boxes. The crew will "FALL IN" and Number 1 reports to Leader.

9**. Laying out equipment Inspection:**

To enable the Leader to check up easily, equipment is laid out the same position as it was in the vehicle, i.e., equipment from the sides to be the kept to the sides on the ground, equipment from the centre to be kept at the centre and all the stores and ladders to be kept at the centre leaving a clear space between the rows of equipment, so that the checker can easily go around without tramping the equipment. To ensure that equipment is not laid out too close to the vehicle, the Leader will take two full paces from rear of the vehicles to make the position of the head of the ladder.



EQUIPMENT INSPECTION DRILL - FALL IN
FIG.-1

FIG - 2

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CHAPTER NO. 46

DERRICKS, SHEERS GYNS, HOLD EASTS AND PICKETS

1. **Object**:

In Rescue Work, Derricks, Sheers and Gyns will be used for lowering casualties and objects from heights and lifting heavy weights. These are used with tackles for lifting and also for lowering. Each one of them is used in a each of apparatus, it is essential to ensure that different way. While selecting the poles for they are long and strong enough to enable the load to be lifted to the required height after making allowances for the check-a-block and the length of sling and the height of the object being lifted. When selecting the poles for sheers and gyns additional allowance should be made for the slope of the legs. Knowledge of holdfasts and pickets is important, since derricks and sheers are held vertical by means of guys which are tied to hold fasts or pickets.

2. **Standing Derrick:**

A standing derrick a single vertical pole with a lifting tackle lashed to its head. The butt i.e. the thick end of the pole rests on the ground or sole piece and the pole is held vertically with three or four guys attached to the tip and tied to the holdfast or picket. is used for raising or lowering objects where the radius of action required is small. The weight can be lifted and moved to the right or left, to the front or rear, but only to a limited distance.

3. **Layout and Preparation:**

Choose a position C for the derrick foot and layout a line FCB to mark the direction of the fore and back guys. Layout second line RCL at right angles to FCB to mark the side (see Fig. 1). Let CH represent the effective length of the spar. Measure distances, CF, CR, CB and CL each equal to 2CH. Provided the ground is flat, F, B, L and R represent position of the holdfasts. If the ground this must be allowed for so that the slope of the guy may be 1:2.

4. Lay the derrick a line from the footing to the fore guy holdfast, with the but nearly over the footing. Tie foot-rope the butt and to a hold fast the same side the footing as the derrick and close to it. Then the guys should be made fast to the tip of the derrick and the holdfasts. Then fix the cross tree or head to the derrick by using square lashing, to support the lifting tackle and to prevent it from binding on the derrick pole. Cross tree should normally be fixed 1 ½ to 2 feet (45 to 60 cm.) from the tip of the pole. Pickets or holdfasts should be prepared and kept ready to attach the guys to them during and after erection. Care must be taken to see that pickets or holdfasts prepared are suitable to with stand the pull coming on to them.

5. **Selection of Spar:**

The length and diameter of a spar depends upon the height from which a weight has to be picked up and the height to which has to be raised. It also depends on the distance from the base at which the weight has to be handled. A simple method to decide the length is as follows:

	Feat	Inches	Metres
Height of the object (say 3 ft.)	3	0	.90
Sling on weight or object (say 2 ft.)	2	0	.70
Allowance for check-a-block	4	0	1.20
Allowance for attachment to spar	1	0	.30
Working clearance	1	0	.30
Effective length	11	0	3.30
ADD	**Feat**	**Inches**	**Metres**
Height of ambulance or Rescue Truck	3	6	1.05
Spar at tip	2	0	.05
1 foot in ground	1	0	.30
Total length of Spar	17	6	5.25
Say	18	0	5.00

From the Table given below select the spar.

6. **Raising**:

Raise the tip of the derrick as high as possible by hand, supporting after each lift on packing or on a light timber frame or a ladder, which is moved gradually inwards. Haul in on the back guy and pay out on the fore guy until the derrick is in the required position. The side guys and foot ropes must be adjusted as necessary while the derrick is being raised.

7. **Leaning**:

Leaning or luffing are usually necessary in rescue work when stretchers bearing the casualties have to be cleared over a wall or an obstruction. To do this, each guy lines must be controlled under the direct supervision of the leader and no one else. All orders to haul or slacken the guys will be given by the leader and the man responsible for the guys will act on the leader's orders only, as otherwise confusion might arise and lead to accident. The initial luffing should not exceed one fifths of the effective height of the derrick to allow for stretch in the guy lines when the derrick is first loaded. The maximum permissible luff at any time is one third the effective height of spar.

8. **Walking a derrick:**

Derricks can be walked after erecting them in one place. A short spar should be lashed at right angles to the derrick spar and about 2 ft. 6 inches (.75 M) from its base with square lashings. The guys are then slackened off, and the butt of the derrick can be moved by lifting on the short spar at the same time lowering the butt of the derrick with a hand spike. The butt must be controlled with foot ropes.

9. **Lowering:**

The lowering may be carried out in a similar manner to raising it, except that the process is reversed. Packing must be placed to support the derrick as it comes down. The foot ropes must be taken in as the derrick comes down. When the derrick is not heavy a plank may be used as a lever with one end butted to the feet of the derrick and the other under the standing part of the guy. The plank should be nearly vertical.

10. **Guys:**

In case ft. 1½ inches (12 M 38.10 mm.) lashings are used as guys, join two of them by a double sheet bend and then make a clove hitch in the Centre of the joint rope and attach it to the spar. In case 200 ft. 2 in. (60 M 5.08 mm.) rope is being used, make a clove hitch in the centre and then attach it to the top of the spar. Four guys i.e. fore and back, right and left guys, each at right angles to the other, are required.

11**. Holdfasts:**

These are required, one for each guy. The distance between the holdfast and the foot of the derrick is normally twice the effective height of the derrick. Holdfasts are also required for two-foot ropes.

12. **Lifting Tackle and Anti-twisters:**

This is attached above the cross tree, firmly, by a lashing sling or chain. Anti-twisters should be fixed to the lifting tackle. The fall of the lifting tackle is passed through the leading block, which is attached to the spar above the butt.

13. **Foot Ropes:**

Then attach foot ropes to the foot of the derrick. Foot ropes are necessary during erection and also while the derrick is standing. They may be single or double, splayed at 90°, according to the condition of site and to the direction of the heel of the derrick. Except for very light weighs 3" (76.20 mm) cordage 3/2 tackles should be used. The foot of the derrick must rest on a sole piece or a base plate to ensure that the foot does not sink into the ground.

14. **Slings and Strops:**

Strong lashing 1½ inch (38.10 mm.) two or four-fold may be used for small derricks. These are required for attaching the runner tackles to the holdfast, when they are used. They are also used for the object to be raised or lowered. Care should be taken to prevent these from chaffing.

15. **General Precaution in use of Slings**:

The method of slinging any given object must vary according to circumstances, but certain general rules and precautions, as enumerated below, should be observed to ensure safe working.

(i) The size, and therefore the strength of the sling selected, will be governed by the weight of the load.

(ii) The efficient use of a sling is governed by the angle between the legs of the sling or the position in which it is used.

(iii) Timber packing must be inserted between the sling and the edges of the load to prevent the sling coming in contact with sharp edges."

(iv) Hooks must be moused.

(v) Carelessness in hoisting e.g. shock-lifting or snatching must be avoided.

(vi) Slings should not be dragged along a floor or the ground, and should never be pulled from under a load, which, when lowered, is resting on the sling.

16. **Precautions:**

Mark the ground properly. Use correct method of lashing. Ensure that everyone understands his work. Only the leader gives the orders and there I should be no one else controlling the erection of a derrick. Follow the correct sequence in raising and lowering. Ensure that the leaning of the spar is never more than one third the effective length of the spar.

17. **Precautions:**

Sheer legs consist of two poles of equal length. Their tops are lashed together, using round lashing. When erected it looks like an inverted "V" (See Fig. 2). They are held steady by a fore and back guy. Sheer can often be employed where the erection of a derrick is impossible. But they can only be used to move the weights in a straight line by swinging the load between the legs, until the sheers are leaning at the limiting slope of 3:1.

18**. Layout and Preparation:**

Lay two spars of equal length with their butts flush together, on the ground and keep the tips resting on a piece of timber, keep a pick helve as a spacing block. Use round lashing on the tips. Open out the legs to one third the distance between the but and the lashing and secure them with a ledger and use square lashing. Pass a sling over the spars, to rest on the spars and not the lashing. Hook the lifting tackle into the sling.

19. **Guys:**

The guys are similar to those required for derrick. They should be made fast near the tips of the spams with clove hitches. Use 40 ft. 1½ inches (12 M 38.10 mm) lashings for small sheers. The fore guy should be fixed to the rear spar and the back guy to the front spar.

20. **Foot Ropes**:

Foot ropes will be required as in the use of derricks.

21. **Walking Sheers**:

Sheers may also be walked as in the case of derricks.

22. **Raising and Lowering:**

Sheers may also derrick. It should be remembered that usually they are heavy to be raised by hand.

23.**Gyns:**

A gyn the tips, the butts forming an equilateral triangle, on the ground (see figure space required for this small comparatively and no guys are required. Only a vertical lift is possible.

24. **Method of Construction**:

Layout three spars point where the centre of the lashing will come, about from tip of spars. Leave two outer spars apart and turn centre spar so that the lays the opposite direction. Ensure that the marks on the tips are line. the tips on block of wood. Keep spacers. Lash them together with gyn lashing. Cross the two others until their buts distance equal half the effective length of spars. Lash ledger with the about one foot from the butts with square lashing. the sling lashing right angles the spars, with the centre sling in the centre of lashing. Leading block is tied to the centre spar to ground as possible and just below the ledger lashing.

25. **Raising and Lowering:**

The head should lift "hand and the centre spar brought in towards the centre of the already fixed, either by hand lashed across it or by tackle. When the butts form an equilateral triangle, two more ledgers should lashed across the butts of the legs. To lower the gyn, reverse the process of raising.

26. **Practical Points:**

(i) The three feet should be the same level, and properly supported. They must be secured from slipping.

(ii) The gyn should be placed with its head over the centre of gravity of the weight to be raised. If the weight has to be swung, the head should symmetrical about the points raising and lowering the weights.

(iii) Hauling the load either to flank are taking a swinging lift, is liable to cause the Gyn capsize. The lower block should not allowed come outside the line joining the centre spar and the side spars.

27. **Holdfasts and Pickets:**

In rescue work holdfasts and pickets are used for making fast a line or guy rope etc. which will be under strain. These are of two types. Those that are found on the site e.g. big trees gate-posts are metal fencing etc. and those which have to be erected e.g. by way of pickets or baulks.

28. **Precautions**:

While using any type of pickets or holdfasts, to prevent chaffing of ropes, the pickets must be packed, usually by means of sacking or sand bags. The timber used as pickets must be strong enough to withstand the strain. The normal size of picket is 3 inches 4 inches diameter (76.2 mm-101.6 mm) and 5 ft. (1.50 M) long.

29. **Pickets**:

In normal ground pickets are suitable as holdfasts since these are quick to erect, and can be used for strains up to 2 tons. They may be used as single picket or a combination of 1 and 1, 2 and 1, or 3, 2 and 1, according to the need. (Figure 4 shows 3, 2 and 1 arrangement). The pickets should be driven into the ground at right angles to the pull. Two thirds of the length should be driven into the ground. The strongest picket should be the nearest to the pull. In the combination of pickets, the lashing connecting the pickets should be at right angles to the pickets and should come from the head of the picket in front to the heel or ground level of the picket at the back. The distance between the pickets should be not less than 3 ft. (90 cm). Guys should be made fast with a round turn and two half hitches One man should always be at the picket, when the load is coming on it, to watch and warn against any weakness in the pickets.

30. **Safe Loads for Pickets:**

In ideal conditions, the safe loads that can normally be loaded on to pickets are as follows: Hard wood pickets 3"-4" dia x 5 ft. (76.20 mm-101.6mm x 1.50M).
Single x 6-7 CWT (304.80-355.60 kgs.)
Combination of 1 to 1= 12.14 CWT (609.60-711.20 kgs.).
Combination of 2 to 1=18.20 CWT(914.40-1016.00 kgs.)
Combination of 3, 2 to 1=40 CWT (203-20 kgs.)

31. **Other Types of Holdfasts**:

(i) Buried Holdfasts- Buried holdfasts are constructed by burying a baulk of timber or a girder in a trench cut with a front face at 90° to the pull. A connecting trench to take the guy should be cut to accommodate the slope of the guy. The ends of the trench should be filled in and rammed over the baulk but it is advisable to leave the guy fastening visible for inspection (Figure 5).

(ii) Baulk Holdfasts:

(a) In addition to driven pickets and baulk hold fasts, many improvisations can be made and secure anchorage obtained. Baulks of timber placed across openings in buildings and between strong brick piers and other strong objects may be utilised. Always ensure that the timber used is long enough to give ample bearing on each side of the opening so as to distribute the load adequately. A baulk of timber under the opening of a street man-hole to act as a spreader makes a good improvised holdfast. Here again, the bearings of the timber must be adequate. (Figure 6).

(b) Among other holdfasts frequently to be found on the site suitable for use as anchorages are lamp standards or posts. Reinforced concrete or steel standards used as lighting or cable bearers are strong and reliable and make good anchorages. A telegraphy is equally suitable and forms a good round bearing for a fibre rope.

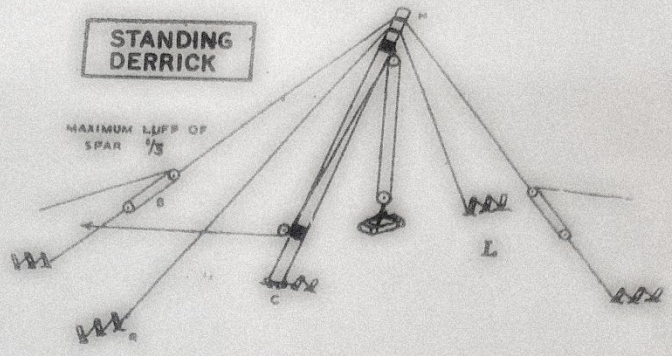

Fig. 1

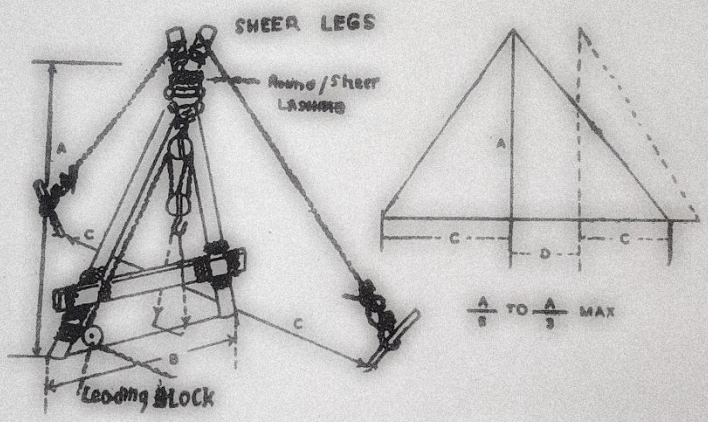

Fig. 2

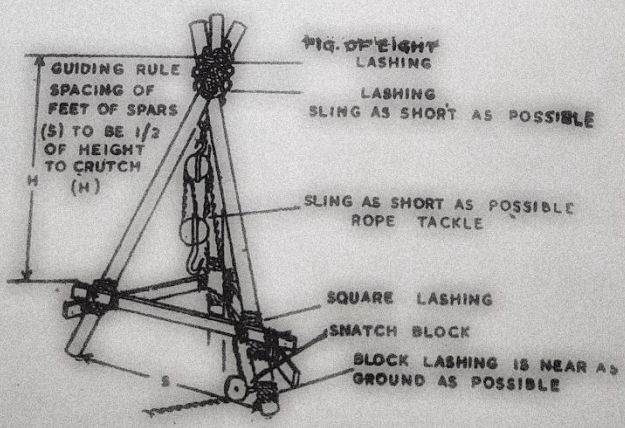

Fig. 3

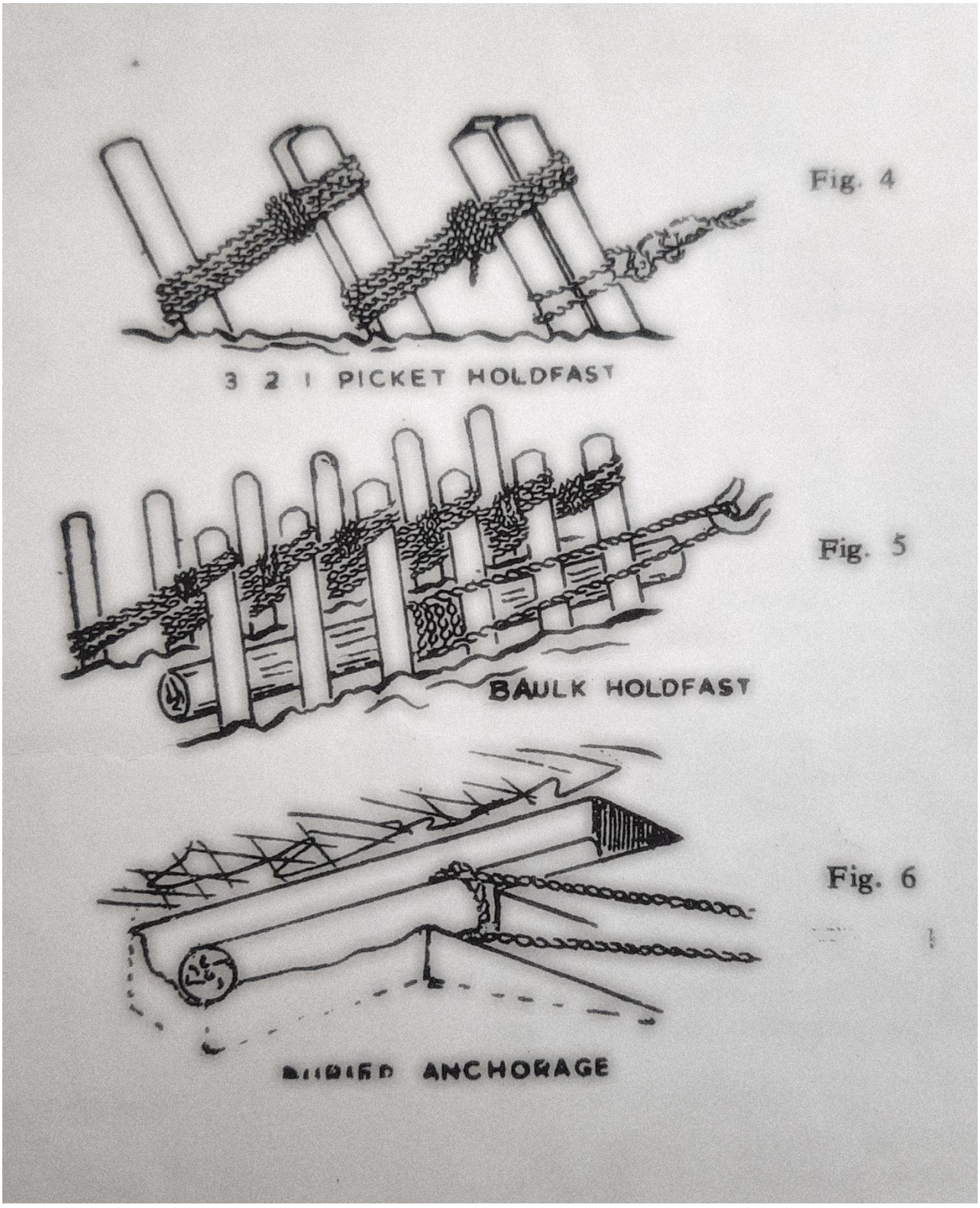

Fig. 4

Fig. 5

Fig. 6

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CHAPTER NO. 47

RESCUE FROM HEIGHTS-LEANING LADDER METHOD

1. **Object**:

As a result of enemy air raids, many buildings will be damaged and a good number of persons may find themselves trapped on upper floors of high buildings. There are various methods adopted in lowering casualties from high buildings. One such method, known as Leaning Ladder Method, is explained below:

2. **Circumstances**:

This method is suitable where a casualty has to be removed through a window or an opening on the upper floor, (say, first floor) and where the condition of the wall is such that the ladder can be made to rest against it.

3. **Man power required:**

Six persons.

4. Equipment required:

a)	Extension ladder 35” (10-50 M)	1
b)	Snatch block/Single sheave pulley block	1
c)	40” length 1 ½” (12M 38.10mm) fibre lashing ropes	4
d)	100” length 3” / 1 ½ ” (30M 76.202 mm) fibre ropes	1
e)	String of Hemp for mousing	1
f)	Stretcher	1
g)	Blanker	1
h)	Stretcher sling	1
i)	Small Iron Pickets	2
j)	Sash Cords 15”x1” (4.50 M 25.40mm)	3

5. **Operation**:

In this method the ladder rests against the wall with the top of the ladder at a sufficient height above the window to give enough clearance so that a stretcher with a casualty lashed to it can be cleared. Keep the ladder on the ground with the heels of the ladder towards the building. Tie a snatch block or a single sheave pully block to the second or third rung of the top of the ladder by means of a lashing rope by the following method.

Securing pulley block to ladder

Commence lashing by making a clove hitch over the left string of the ladder-marry the ends-take. Four clockwise horizontal turns over both the strings-take two frapping turns over the horizontal turns take two turns over the rung of the ladder above the horizontal turns-insert the hook of the pulley block -diagonally cross over the hook-take two turns again over the same rung-then take two turns over the horizontal turns, and finish with a clove hitch diagonally opposite over the right string, and lastly complete by moussing the hook.

A 3"/2½" (76.20 mm/63.50 mm) rope, used as a lowering line, is passed through the pully. The ladder is then raised by four men to the vertical position and extended, if necessary, to the required height, and rested against the wall. Care should be taken to keep the heels of the ladder on firm ground or secured to pickets driven in the ground by the side of the heels, or the two men there should hold it to prevent from slipping. The upper end of the lowering line is fastened to the stretcher sling and the other end is passed below the lowest rung of the ladder and held by two persons. Two guide ropes are attached to the stretcher handles away from the wall before lowering it. The stretcher with the casualty, properly blanketed and secured, is allowed to be lowered by two rescuers on the upper floor. The two persons at the base of the ladder pay out the lowering line gradually from below, allowing the stretcher to come down, Guide ropes, held by two persons, are used to keep the casualty away from the wall. (See figure 1). As the stretcher nears the ground, the two per sons who were holding the guide ropes approach the stretcher, place it on the ground and remove it from the site after unfastening the stretcher sling.

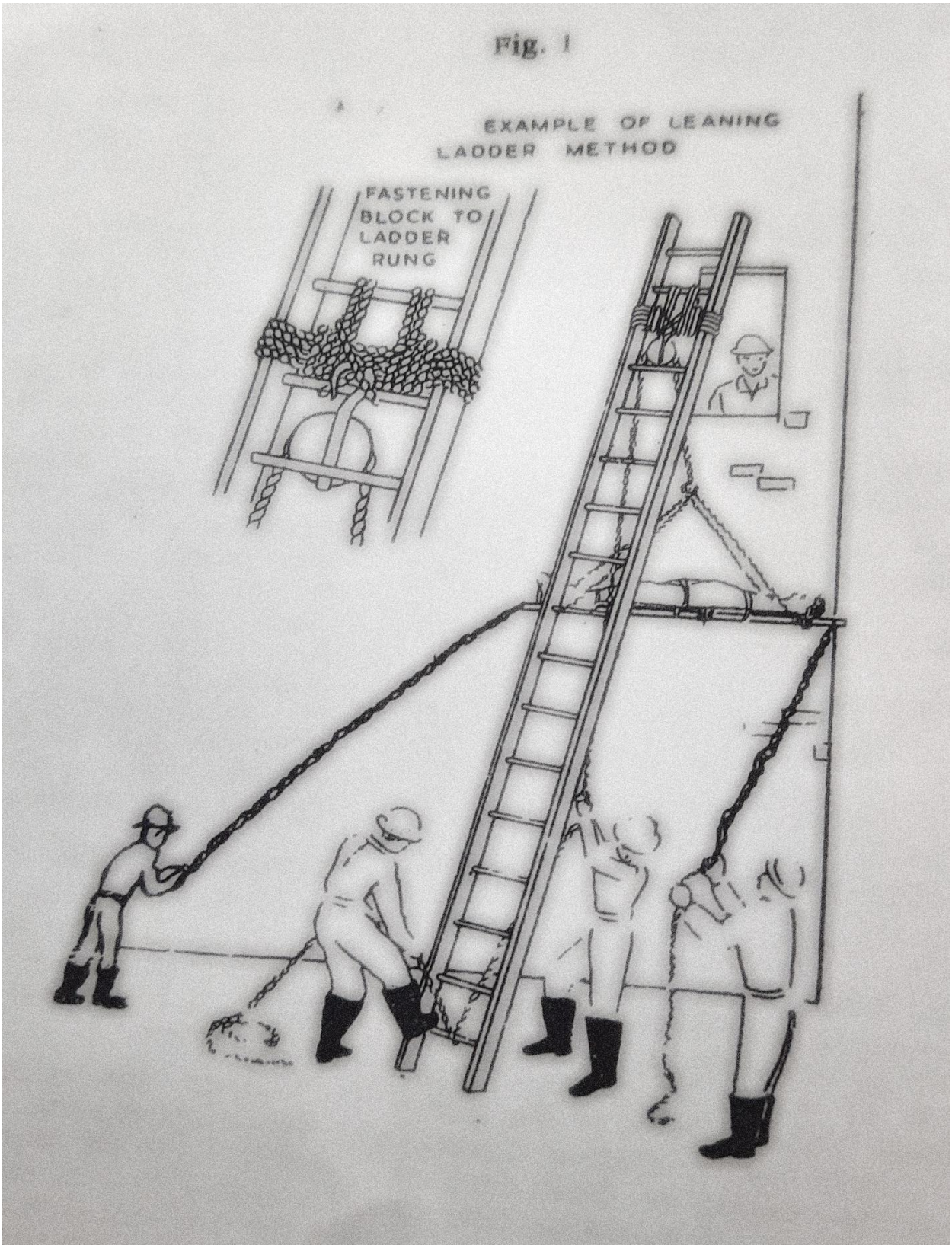
Special situations:

(i) Instead of two persons holding the guide ropes to keep the stretcher away from the building, only one person may be employed to hold both the guide ropes, if it becomes necessary to curtail the required man power.

(ii) In place of the two persons, at the base of the ladder, as at present, only one person may be engaged to pay out the lowering rope, and the second person required to hold the lowering rope behind the ladder will not be necessary there, as the rope is being paid out from under the bottom rung of the ladder which provides a braking action. This may become necessary where the required man power has to be further curtailed.

Note: According to circumstances equipment and man-power requirement may vary.

Fig. 1


EXAMPLE OF LEANING LADDER METHOD
FASTENING BLOCK TO LADDER RUNG

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CHAPTER NO. 48

RESCUE FROM HEIGHTS-LADDER HINGE METHOD

1. **Object**:

There are several methods adopted in lowering casualties from high buildings. Where a casualty has to be removed through a window or an opening on the first floor of a building, a method known as Ladder Hinge Method may be adopted.

2. **Circumstances**:

This method is suitable where a ladder can be brought to the site, but it cannot be rested against the wall as it may be damaged and will not take the thrust of the ladder. But the ladder can be employed by keeping it vertical.

3**. Man power required:**

Four persons.

4 Equipment required:

a)	20” (60M) (or 15” (4.50 M) long ladder, if sufficient) or Extension ladder 35” (10.50M) from Depot.	1
b)	40” length, 1 ½” (12M 38.10mm) fibre lashing ropes	3
c)	Pick Handle	1
d)	15” length 1” (4.50 M 25.04mm) fibre sash card	3
e)	Stretcher	1
f)	Blanket	1

5. **Operation**:

The ladder is kept vertically against the face of the wall, and held stable by two rescuers at the base by applying their hands and feet. The top of the ladder should be about one foot above the window sill or the parapet of the opening.

Before raising the ladder from the ground, a pick handle is tied to the ladder at the top by means of square lashings by using sash cords. The casualty is blanketed and secured to the stretcher in the usual way. The foot-ends of the stretcher are made to rest on the projecting ends of the pick handle already tied at the top of the ladder, and secured by making bowlines, one on each side, ensuring to secure it through the stretcher. Ds or bar, and that there is enough slack to permit the "hinge" action between the stretcher and the ladder. Lashing ropes are tied to the head side of the stretcher handles by making bowlines and two half hitches over each handle, to be used as guide ropes by the two rescuers on the top, while lowering the casualty. The casualty is now ready for lowering. The operation is as follows:

(i) Two rescuers stand at the foot of the ladder holding the ladder firmly at the sides. As the lowering begins they move back slowly supporting the sides of the ladder with their hands raised above their head, allowing it to drop at an angle, the foot being hard against the base of the wall, which forms the fulcrum point.

(ii) The other two rescuers who are at the rear end of the stretcher pass the casualty through the window, taking the stretcher to ride out clear of the weight on the two guide ropes and allowing the stretcher to ride out clear of the window.

(iii) Lowering is continued smoothly, by under running it, keeping the stretcher horizontal all the while and until the Ladder lies on the ground with the stretcher on top of it.

The two rescuers then unfasten the stretcher and the guide ropes and remove the casualty from the site. (See sketches A, B and C).

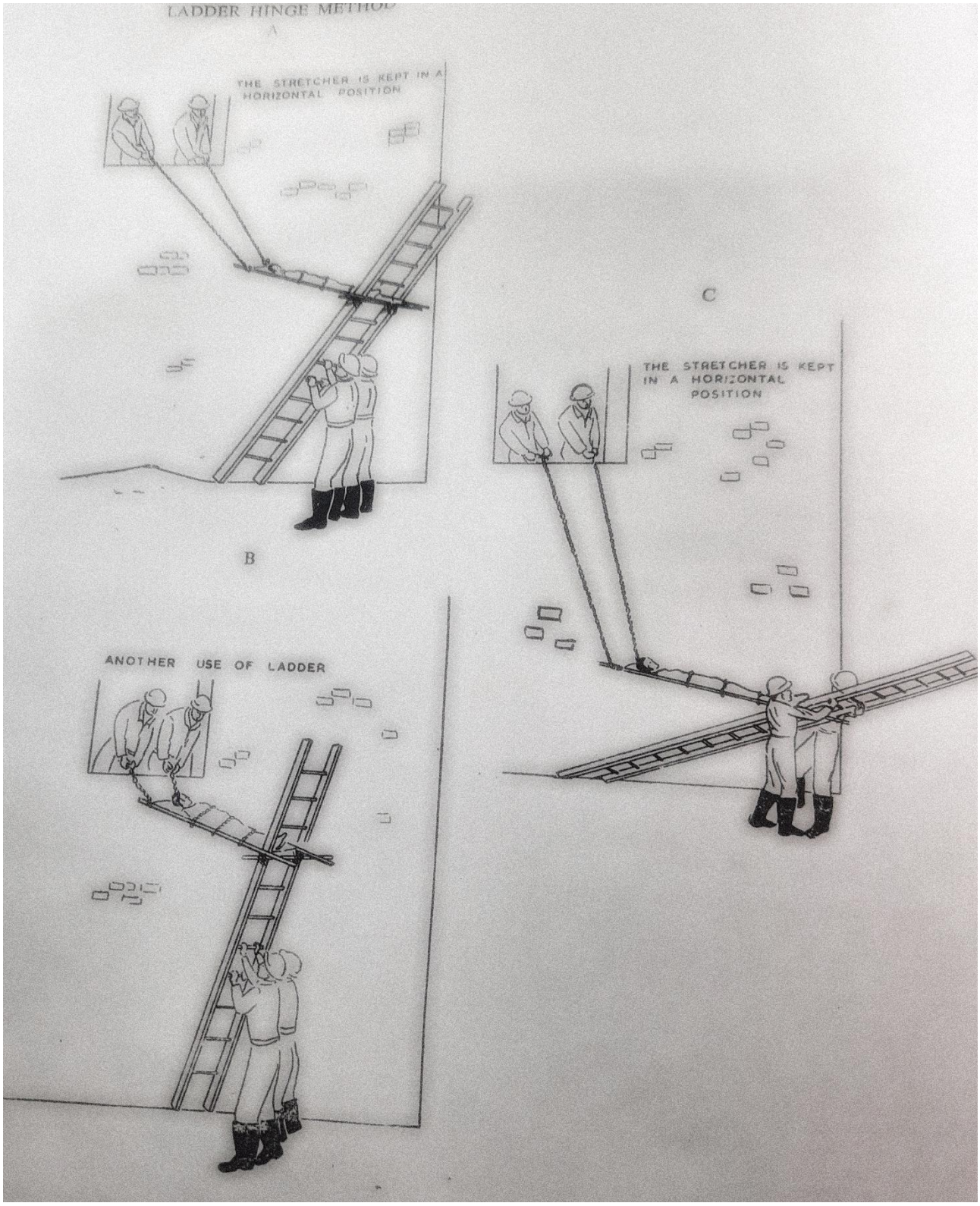
6. **Special situations:**

(i) In case the two rescuers lowering the ladder have to move on uneven ground or over some debris etc. where they are apt to lose control of the ladder and the ladder is likely to swing sideways, then two more guide ropes may be secured to the head of the ladder and held by two extra rescuers, one on either side of the ladder to help in lowering it safely. In these circumstances, two more lashing ropes and two more rescuers will be needed.

(ii) In case a pick handle, or an iron spike or a piece of bamboo etc. is not readily and quickly available for securing to ladder, this arrangement may be done away with, and the following procedure may be adopted:

In this method, the ladder has just to be raised by two men and held stable vertically, as usual, without tying the pick-handle to the ladder, before raising it, as is done at present. The stretcher handles on the feet side of the casualty are then secured to the ladder on both sides by making bowlines, using just one sash cord. This can be done quickly by any trained man. These bowlines provide the hinging action, and work in the normal way to facilitate lowering of the stretcher. The guide ropes are to be secured to the head side in the usual way. Now, the casualty is ready to be lowered by following the usual procedure.

Note: According to circumstances the equipment and man-power requirement may vary.


LADDER HINGE METHOD
A
THE STRETCHER IS KEPT IN A HORIZONTAL POSITION
B
C
THE STRETCHER IS KEPT IN A HORIZONTAL POSITION
ANOTHER USE OF LADDER

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CHAPTER NO. 49

RESCUE FROM HEIGHTS-SLIDING STRETCHER ON TWO PARALLEL ROPES

1. **Object**:

It is possible that the walls of the building in which the casualties have been trapped are in severely damaged conditions. In such circumstances it would be necessary to adopt measures where the walls are least disturbed. One such method which will suitable is known as "Sliding Stretcher on two Parallel Ropes".

2. **Circumstances:**

This method is suitable for rescuing casualties from greater heights, or when the condition of walls does not permit resting of ladders against them, or where these cannot be brought the site, or cannot be worked because of huge piles of rubble, wreckages, crater etc.

3. **Man power required:**

Four persons

4**. Equipment required:**

a)	200”/100” length. 3” /2 ½’’ ropes (60 M/30 M 70.2mm /63.56mm)	2
b)	40” length ½” (12M 38.10 mm) shin ropes	9 (if 200” (60M) long ropes are used) 5 (if 100’ (30M) long ropes are used)
c)	Crowbars /Picket	2
d)	Stretcher	1
e)	Blanket	1
f)	String or Hemp for seizing	1
g)	Hammer	1

5. **Operation**:

The two ends of the 3”/ 2 ½’’ (76.20 mm /63.50mm) ropes are tied to some firm object of the above floor and the lower ends are tied to pickets/hold-fasts at right angles, as far as possible or to some natural object on the ground. The ropes are tied to the pickets by using round turn and two half hitches, and are kept parallel to each other. The casualty is secured to the stretcher in the usual manner. The foot ends of the stretcher are first placed on the parallel ropes and secured to them by lashing ropes by passing them in between the canvas and the stretcher bar, and bowlines around the handles, (or timely through the Ds) and then applying one or two half hitches over the stretcher handles.

The spare ends of the lashing ropes are held by the men on top to prevent stretcher from sliding, later will be used as guide ropes by two persons on the ground. The stretcher handles at the top are also secured to the parallel ropes as before, by using two lashing ropes which will serve as upper guide ropes. The stretcher is then allowed to slide down the parallel ropes slowly, the speed being controlled by the two men on top (See sketch).

6. **Safety Precautions**:

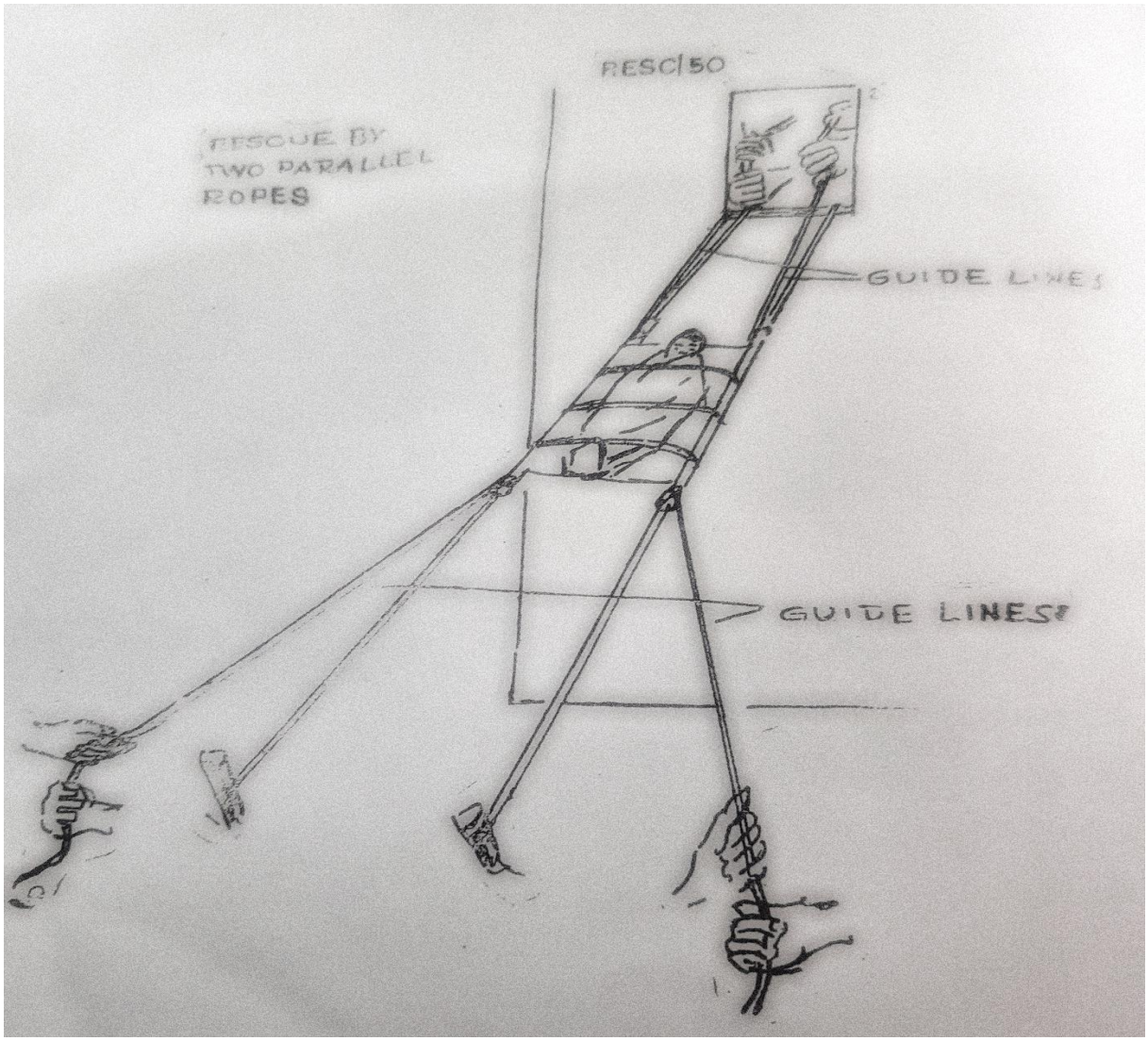
(i) The casualty should always be lowered feet first.

(ii) The two parallel ropes must be parallel and equally taut before the weight is applied. The width between the ropes should be just enough allow the stretcher "Ds" to go on either side.

(iii) The object on the upper-floor which the ropes are tied should be strong enough to take the strain. The pickets should also be strong enough.

(iv) The leader should co-ordinate the work, control and ensure smooth working.

Note : According to circumstances man-power and equipment requirement vary.



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CHAPTER NO. 50

RESCUE FROM HEIGHTS- SLIDING STRETCHER ON ONE OR TWO LADDERS

1. **Object**:

Ladders are used for removing casualties wherever it is practicable. Here two methods of sliding a stretcher down one ladder or two ladders are described as may be applicable.

2. **Sliding stretcher down one ladder:**

(i**) Circumstances**:

This method is suitable where the height of a window sill, or an opening, permits. By this method, the casualty is brought down in inclined position.

(ii) **Manpower required:**

5 persons

(iii) **Equipment required:**

a)	35 (10-50M) Extension ladder	1
b)	Lashing 1½”-40 ft. (38-10 mm-12M)	3
c)	Pick handles	2
d)	Blanket	1
e)	Stretcher	1
f)	Sash Cords/15 ft.-1” (4-50 M-25-4 mm)	4
g)	Pickets	2

(iv) **Operation**:

Two rescuers reach the casualty through the window or the opening by using the ladder after its heals are secured to the pickets or placed into holes dug into the ground. They carry with them the stretcher, blanket, lashings and pick handles, while two hold the ladder against the wall.

The two rescuers on the upper floor place the casualty on the stretcher, blanket it and secure it in the normal manner. Then they fasten a 40 ft. (12 M) lashing by bowline knots to each of the stretcher "Ds" or making bowlines passing the ropes in between the stretcher canvas and the stretcher bar.

Then make fast by applying one or two half hitches on the pick handles. The rest of the rope is now available as guide ropes on either side. A pick handle at each end of the stretcher is essential the one at the foot to keep the lower traverse bar from fouling any part of the ladder and thereby tending to close the stretcher. The head one helps the stretcher to slide smoothly on the strings of the ladder. Pick handles must be secured with equal projection on both sides of the stretcher.

One rescuer gets up the ladder and is now at the window sill to receive the stretcher, foot end first. One of the rescuers at the base of the ladder applies his feet, and the other gets under the ladder and braces it from underneath. The rescuer on the ladder holds the

handles of the stretcher and slides it down the ladder, slowly and gently, easing it over any obstructions, while the top rescuers help to get over such obstructions by lifting on the restraining ropes i.e. the 2 guide ropes when necessary. Finally, the two rescuers on the ground move round the sides of the ladder, when the stretcher arrives within the reach from the ground, remove the restraining ropes and pick-handles and carry the stretcher away. The top rescuers come down the ladder and assist to lower the ladder, coil the ropes and take them away.

(v) **Special situation:**

If the required man power of five persons is not available, the number can be reduced by one, and only four persons may be employed, provided the heels of the ladder are properly anchored-not shown in the sketch.

3. **Sliding stretcher down two ladders:**

(i) **Circumstances:**

This method is also suitable where the height of a window, or an opening permit. This is however far slower than the other one. But the main advantage. in this case, is that the stretcher is kept horizontal by two men descending on two ladders, and helped by two men from above with the help of ropes, and the casualty comes down gently. This method will be more appropriate, where the casualty has to be brought down horizontally, and the condition near the base of the wall does not permit the use of Ladder Hinge Method.

(ii) **Man power required:**

6 persons:

(iii) **Equipment required:**

(a) 20 ft. or 15 ft. (6M or 4.50 M) long ladder, if sufficient	2
or	
35” (10-50 M) Extension ladder (separated to serve as 2 ladders)	1
(b) Lashing 1 ½”-40ft. (38-10MM-12M).	5
(c) Stretcher	1
(d) Blanket	1
(e) Pickets	4
(f) Sash Cords (15-1) (4-50 M-25-4 MM)	4

(iv) **Operation**:

The six rescuers form two groups and place two ladders against the wall, side by side so that the "Ds" of the stretcher would be slightly beyond the outer strings of the two ladders. The heels of the ladder would be secured to the pickets, or placed into holes dug into the ground.

[Note: According to circumstances man-power and equipment may vary.]

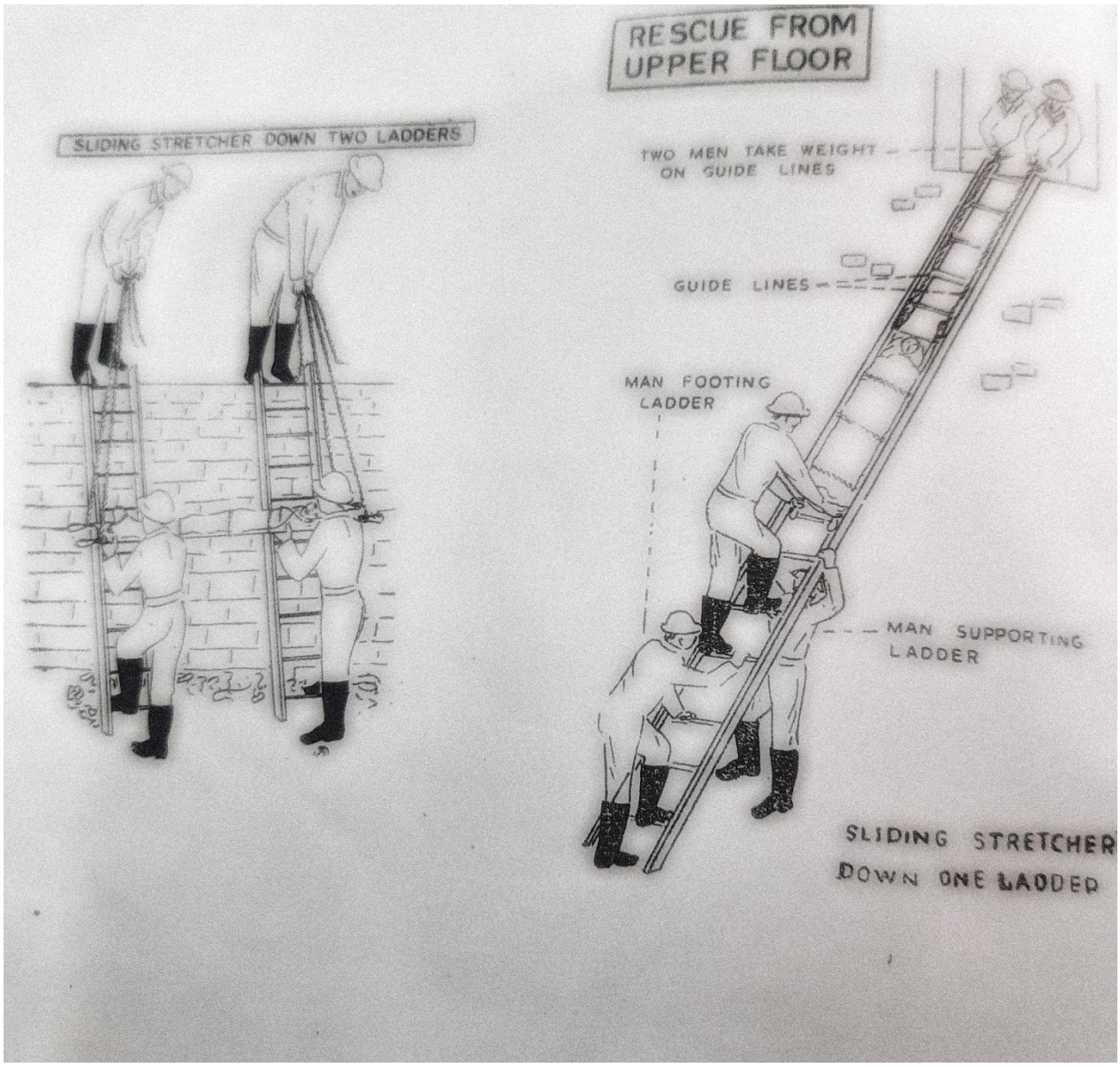
Two rescuers go up the ladder with stretcher blanket and three 40 ft. (12 M) lashings and approach the casualty. Tie the casualty to the stretcher in the normal manner, and secure the ropes to the stretcher handles, as for one ladder method.

Two other rescuers mount the ladders, place their arms beneath the stretcher and hold to the strings of their ladder and descend slowly, run by run, keeping time with their face nearer to the other person, while the men above take the weight of the stretcher, holding both ropes together in both hands and pining out hand over hand until the casualty is lower.

As the casualty is lowered, the stretcher is received by the remaining two rescuers, holding the lade from underneath, and carried away from the site.

(v) **Special situation:**

The required man power of six men, if not available can be curtailed to four men, but the heels of the ladders must be properly anchored-not show in the sketch.



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CHAPTER NO. 51

TWO POINT AND FOUR POINT SUSPENSION METHODS

1. **Object**:

In the absence of ladders or where they cannot probably be used in Rescue work, the stretcher issues suspended by means of ropes for lowering or raising a casualty. There are two methods of suspension i.e. two-point suspension method and four-point suspension method. These can be adopted in lowering a casualty from a window opening or a hole in the upper flooring of a damaged house etc. The hole or opening should be big enough or enlarged as required to allow the stretcher to pass. When making a new hole in the floor, it should be made as near to the wall as possible.

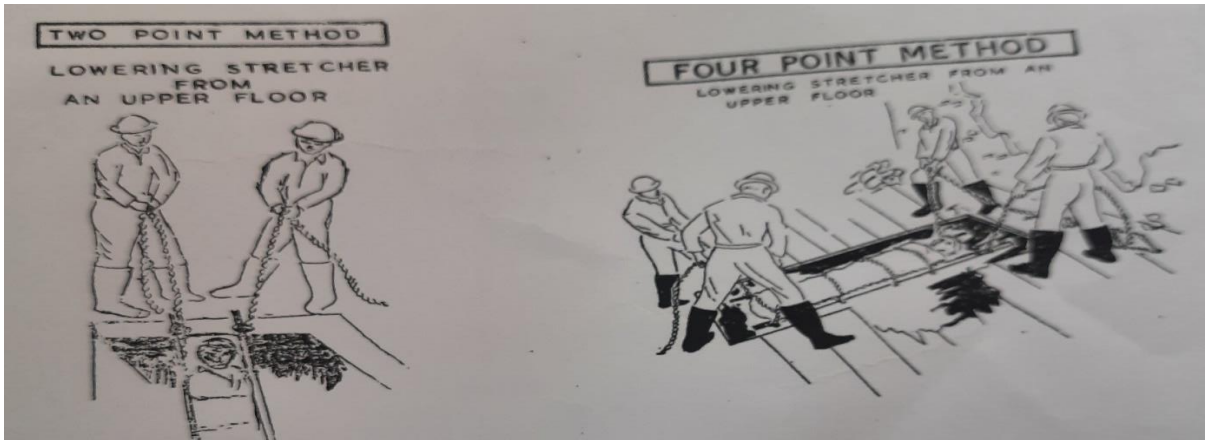
2. **Two-Point Suspension Method**:

The two-point method requires a smaller whole through which the casualty lashed to a stretcher can be lowered. The hole need be slightly more than the width of a stretcher. In this method the casualty can only be raised or lowered in a vertical position. The casualty is properly lashed to the stretcher in the normal way. Each end of 40 feet (12 M) lashing is fastened through each 'D' at the head of the stretcher, using bowline knot. The stretcher is carefully passed through the opening or the hole, feet first and lowered gently and without any jerk, the rope being paid out hand over hand. Two men should be ready to receive the stretcher as it reaches them at the lower end. In case the distance of lowering is more, two 40 feet (12 M) lashings should be used instead of one.

3. **Four-Point Suspension Method**:

The four-point method requires a larger openings or hole than the two-point method but has the advantage of lowering or raising the casualty in a horizontal position. The casualty is secured to the stretcher in the normal way. Two to four 40 feet (12 M) lashing are tied at each end of the stretcher fastened to the 'Ds' as in the case of two-point method. One person should handle each rope at the four corners of the stretcher and then the stretcher is lowered gently and without jerks, the four men paying out the ropes hand over hand, in order to keep the stretcher steady. Care should be taken to keep the stretcher in a horizontal position. Two men should be ready to receive the casualty as it nears the lower end.

[Note: According to circumstances equipment and man-power requirement may vary.]



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CHAPTER NO. 52

RESCUE FROM VOIDS

1. **Object**:

The object of this lesson is to introduce the trainees to the various methods of effecting a rescue from voids.

2. **General**:

When a building collapses due to any unusual violence, the outside face of it may be completely filled with rubbles and similar debris and apparently it will present a picture of complete devastation, with no soul living still. However, it has been found by experience that when a building collapses, it creates a number of voids of different formation, due to such collapsing, and most surprisingly the trapped persons may be still lying in such voids very slightly injured or even unhurt, waiting to be rescued by the Rescue Parties. Once the casualties are reached, however, actual rescue is not a difficult job. The access to voids in a collapsed building is often achieved by tunnelling through the fallen debris, which must be made with utmost care. Once the void has been reached the manner in which it has been formed should be studied with a view to ascertain the method of extricating the person who may have been sheltered by such voids and are waiting to be rescued. Voids formed due to collapse of a building are quite different from rescue point of view than the constructional void like Basements etc.

3. **Preliminary Survey**:

The first task is to try and discover the layout and extent of the void, the location of the entrance and emergency exit and whether or not there are other suitable methods of entry like basements in the adjoining buildings. Steps should also be taken to determine from an examination of the outside whether or not the ceiling has collapsed and if so in what way and what type of void has been created.

4. **Methods of Reaching Voids:**

(i) Debris clearance.
(ii) Debris Tunnelling.
(iii) Constructing a shaft.

5. **Debris Clearance**:

The easiest way to reach the void is to clear the debris from the entrance, but this is only possible if the pile of debris is not too high.

6. **Debris Tunnelling: The following points are to be noted:**

(i) The tunnel is to be strutted or lined whenever necessary.

(ii) The size of the tunnel should be such that the casualty can be brought out but at the same time is to be taken to make job more difficult making tunnel big.

(iii) The men should be employed in turn. Or the whole party may be divided into two groups and one group will work while the other takes rest."

(iv) Obstacles in general are to be cut or removed but if any piece is found which cannot be easily re moved or which is supporting the weight of debris, then instead of cutting or removing it, the tunnel is to be diverted.

(v) The spoil from inside the tunnel is to be removed by the human chain method and dumped clear of the site.

(vi) Handkerchief or a piece of cloth will protect the nose and mouth and goggles will protect the eyes from dust. Debris gloves and helmets should be worn. A life line is to be tied to the waist of the rescuer. Extra precaution is to be taken in using sharp edged tools on nearing a trapped person.

7. **Digging A Shaft:**

In certain types of voids, it becomes easier to dig shaft or hole lined with hoardings in the adjoining ground in order to enter the void. The shaft may be either vertical or inclined but, in either case, it must be properly lined and strutted.

8. **Methods of entry to basements:**

(i) By breaking through the wall from an adjoining basement which has not been so severely damaged. It is to be done at a point near the corner of the basement taking into consideration the construction and thickness of the wall.

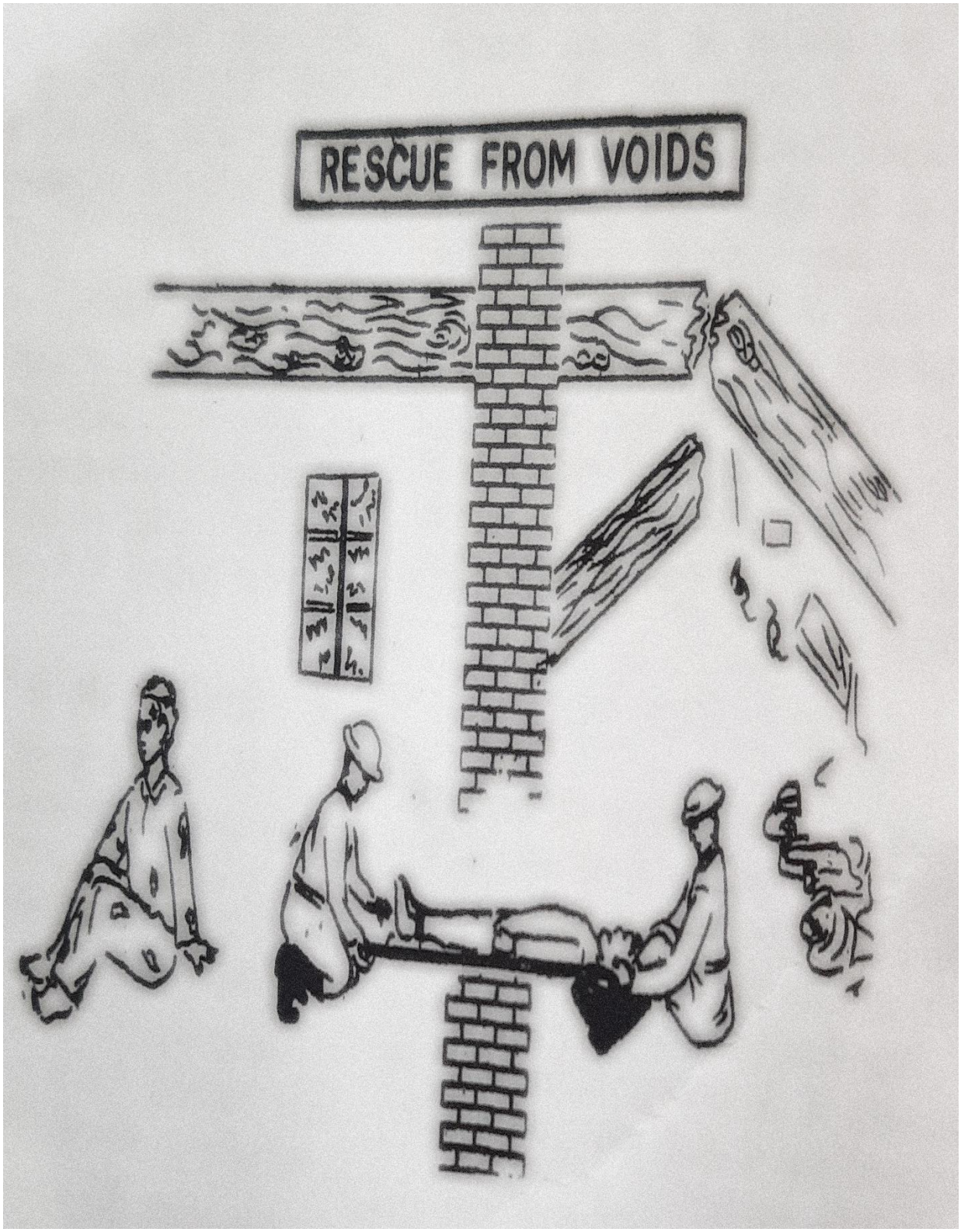
(ii) A man-hole or emergency exist leading from the basement outside may be cleared of debris and an entrance effected this way.

(iii) Where the ground floor has not collapsed, a small area may be cleared either by tunnelling to the spot or by removing the debris from the outside and cutting a hole in the floor to give access into the basement.

(iv) Where the basement ceiling has completely collapsed, a tunnel or hold may be driven from the edge of the debris downwards to floor of the basement.

(v) An improvised shaft or ramp may be sunk in the ground immediately outside the building, and, if possible, alongside the outer face of the basement wall, through which a hole can then be broken.

9. Once the void has been reached, it should at once be made safe with props and other timbers against the possibility of further collapse. This can be done by competent men whilst others are busy removing and attending to casualties.


RESCUE FROM VOIDS

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CHAPTER NO. 53

RESCUE FROM HIGH BUILDINGS – THE FLYING FOX METHOD

1. **Aim**:

One of the methods of rescuing casualties from high buildings is a "Flying Fox". By this method casualties could be brought down under the circumstances which would not permit the use of ladders.

2. **Equipment required:**

(i) One 3”-200 ft. (76.20 mm-60 M) rope.
(ii) One snatch block.
(iii) Seven 1 ½” 40 ft. (38.10 mm-12 M) lashings.
(iv) Two crowbars/pickets.
(v) One stretcher.
(vi) One blanket.
(vii) One 1 ½ "-40 ft. (38.10 mm-12 M) stretcher lashing
(viii) One sledge hammer.

3. **Man Power**:

A team of 5 men-two on ground and three on the upper floors.

4. **Setting up the flying fox:**

(i) The end of a 40 ft. (12 M) lashing is dropped from the floor where the casualties are located, to the ground. (It may be necessary to join a number of lashings together). The ground party makes the 3" (76.20 mm) rope fast to the lashing and it is hauled up.

(ii) The 3" (76.20 mm) rope is then adequately secured to either a ceiling joist or point that will allow sufficient space between the rope and the window sill, or the base of the opening on the floor, to allow the stretcher to pass cleanly beneath the rope. Two feet six inches (75 cm) should be regarded as a minimum distance between the rope and the sill. The rope should be made fast some 10 feet (3 M) inside the building so that the snatch block can be placed on the rope before the stretcher loaded with the casualty passes out through the window.

(iii) A holdfast, either improvised or pickets, is organised on the ground. The 3" (76.20 mm) rope then hauled tight and made off on the holdfast the a round turn and two half hitches.

(iv) The casualty is blanketed and lashed to the stretcher in the usual way and a stretcher sling applied to it by making a chair knot on a lashing rope, the actual knot of the chair knot is attached to the hook of the snatch block, and the two free ends of the chair knot lashing are used to secure it to the hook. For this purpose, a cross-over lashing is used taking at least two turns around the hook and the knot, and the lashing finished off with a reef knot. (Fig. 1).

(v) Two guide ropes 40 feet (12 M) lashings joined together) sufficiently long to cover the full span of the 3" (76.20 mm) rope are then secured to the head and foot of the stretcher-through the two "D"s under the stretcher handles by making a bowline. A safety line is attached to the collar of the hook to control the speed of a loaded stretcher while lowering down the 3" (76.20 mm) rope. The rope on foot of the stretcher is then passed out of the window or the opening and taken up by the two men on the ground.

(vi) The stretcher is now lifted up by two men on either side, the third man securing the snatch block over the 3" (76.20 mm) rope, and making sure the pin is in position.

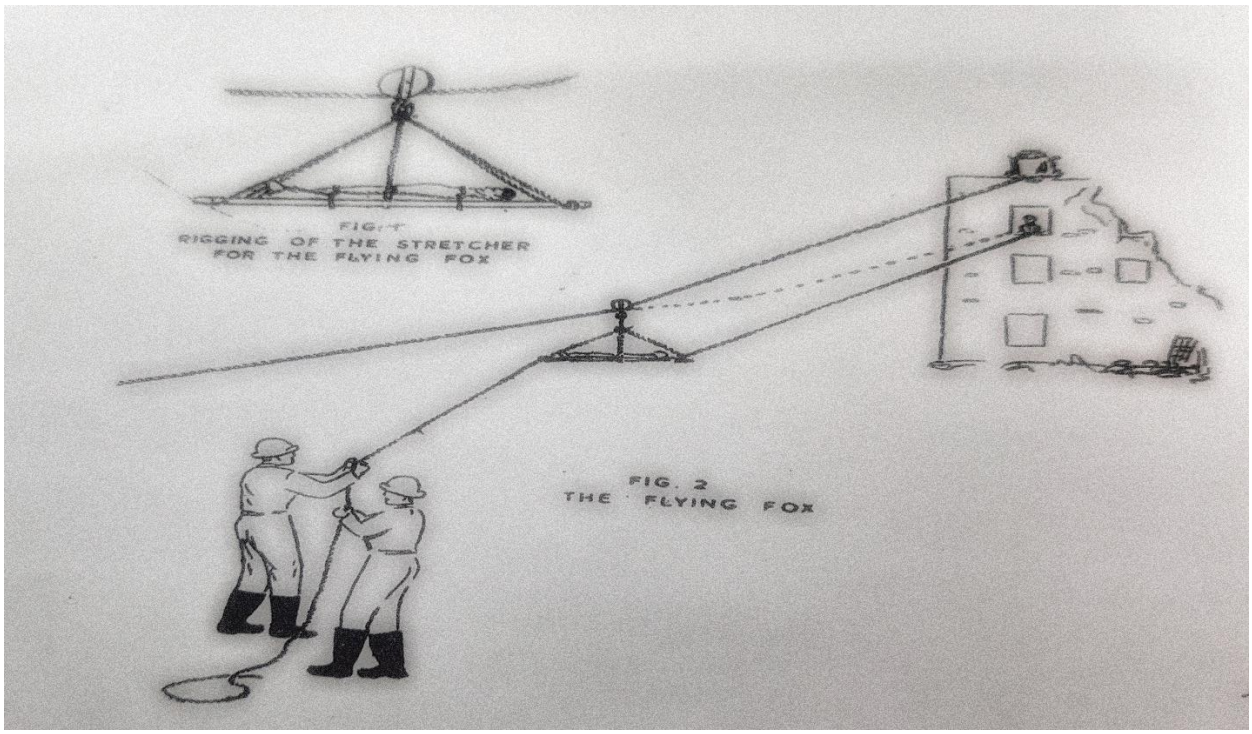
(vii) The lowering operation now commences with the three men on the upper-floor lowering away hand over hand and the two-man ground party taking in the slack in a similar fashion (Fig. 2).

(viii) As the stretcher reaches the ground, the chair knot slings and guide lines are removed from the loaded stretcher. The loaded stretcher is then taken away. In case any more casualties are to be brought down, a new stretcher be attached to the chair knot slings, the two guide lines secured to the head and the foot of the stretcher and then hauled up with a blanket and lashing for lowering the next casualty. The same procedure will be followed in lowering another casualty.

5. **Safety precautions:**

There should be no slack in the guide lines, as these not only control the descent of the stretcher but also act as safety lines. Should the 3" (76.20 mm) rope, chair knot or snatch block carry away, the stretcher can still be supported by the guide/safety lines, but only if the two teams are fully prepared for the sudden additional weight.

Note: According to circumstances equipment and man-power requirement may vary.



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CHAPTER NO. 54

GENERAL ORGANISATION AND FUNCTIONS OF CIVIL EMERGENCY MEDICAL AND HEALTH SERVICES

1. **Aim**:

The knowledge that the vulnerable areas have a well-trained and efficient organisation to administer First Aid and Medical treatment to the victims of disaster has a definite encouraging effect on the morale of people. Further during disasters and when the displacement of population takes place the normal sanitation and public health service may be dislocated and need augmentation. In this lesson we will study the general organisation of Civil Emergency Medical and Health Services and their functions.

2. **Organisation at the Centre and State Level:**

The responsibility of coordinating Central Emergency Medical and Health Services at the Centre is that of the Ministry of Health. The executive functions are delegated to the Director General of Health Services. They coordinate the emergency health plans for various States and assist the States in training and equipping their health services. They also arrange for mutual support between various States. Civil Emergency Health Services Organisation at State level should follow the pattern of that at the Centre. The Health Department of a State is responsible for the organisation and functioning of Civil Emergency Health Services under the coordination and control of the Chief/Home Secretary. The Director of the Medical/Health Services is responsible for the planning of Emergency Health Services within the States and to coordinate the plans of the various Districts in the States and further provision for adequate equipment and personnel for the training and otherwise."

3. **Organisation at the District Level:**

The District Medical Officer (Civil Surgeon) should be made responsible for the Civil Emergency Medical and Health Services of the District under the guidance and control of the District Magistrate/C. D. Controller. The assistance and active cooperation of all voluntary organisations such as Red Cross Society, the St. John Ambulance Association. Women's wing of Home Guards, Ramkrishna Mission etc must be sought for. The Services to be organised would be:

(i) Casualty Services.

(ii) Hospital Services.

(iii) Public Health Measures.

(iv) Medical Stores Reserve Depot.

(v) Care of animals or Veterinary Services.

(vi) Disposal of Dead Organisation.

4. **Casualty Services**:

(i) **General functions**: The Medical treatment can be carried out only under the supervision of the fully trained medical personnel and is therefore, carried out in hospitals under the Emergency Hospital Service. The Casualty Services are responsible for rendering first aid on the spot of damage and augmenting first-aid facilities to relieve of hospitals from treating minor cases and transporting casualties by ambulance cars from the place of damage to the hospitals and by ambulance trains etc., from hospitals in very vulnerable areas to hospitals in safer area.

(ii) **Command and control**: The Controller of Civil Defence will appoint a Medical Officer in-charge of the Civil Emergency Casualty Services. His duties will include printing of stationery, organisation, supervision of first-aid parties, posts, ambulances and stores depots, training of all personnel, maintaining liaison with the Superintendent of hospitals, keeping himself informed of the available vacant beds, ensuring issue of Red Cross Identity Certificates to all and that the emblem is displayed by all units and vehicles. He will arrange for the training of volunteers through Red Cross etc. The Casualty Services will consist of the following:

(a) **First-aid Parties:** They render first-aid to the casualties at the place of damage and provide conveyance by stretchers or another emergency means. Each first-aid party consists of one Leader, one Driver and three First-aiders. They should all he trained in first-aid and invariably provided with one car or an ambulance or any other converted vehicle which will be utilised by them to carry the patients when necessary. Since First Aid Parties will work in three shifts one ambulance will serve three parties. The F. A. Parties are located at the Civil Defence Depots from where on receipt of orders they reach the place of incident. After rendering the necessary first-aid they either send the casualty home or despatch the walking, less seriously injured cases and the other cases to First-aid Post. They label all the casualties and also decide on the priority of movement of the cases.

(b) **Ambulance Services**: The Ambulance Services provide transport facilities in ambulance vehicles/trains for the casualties. The ambulance vehicles have to be improvised. In the ambulance vehicles in addition to the driver of the vehicle one attendant trained in first-aid is provided to look after the casualties during transit. The ambulance vehicles are located at the Civil Defence Depots and are under the control of Officer-in-Charge Casualty Services. One ambulance is provided per 3 Static E.A. Posts In more vulnerable towns 2 ambulances for 5 FA Posts. Transport by rail will be required to move the casualties from seriously damaged areas, after their treatment in the Casualty Clearing Hospitals in those areas, to other hospitals in their District/State. about 200 casualties are to be moved at a time, when complete ambulance train is utilised. These trains are arranged by the authorities at the Centre, Ambulance coaches are used, which carry about 20 casualties, when lesser number of casualties are to be moved from one hospital. to the other.

(c) First-aid Posts are designed to treat the lightly. Wounded, Thus, relieving the congestion at the hospitals and to provide outpatient treatment to such of those not requiring hospitalisation. They act as screens for the hospitals. E.A. Posts may he Static or mobile. A Static F. A. Post is located at a Government or Charitable Dispensary in the area. The Mobile F. A. Posts are provided with vehicles by which they can be transported to any place where large number of casualties can be given initial medical care. Their equipment is carried in por table cupboards. Each F. A. Post Static or Mobile in-charge of a qualified doctor, and therefore more specialised treatment can be given at these posts than on the spot by the F. A. Parties. The Mobile E A. Posts are not only very useful in large cities but also in rural areas, and are provided on the scale of 1 per Sub-Control Centre in addition to Static F.A. Posts. The F. A. Posts have to work Found the clock and hence should have personnel for relief duties also. Proper casualty re cords are maintained at the F. A. Post.

(d) The prescribed scale for the F. A. Parties and First-aid Posts (Static) will be 3 F. A. Parties per LF. A. Post (Static) which in turn is provided for every 20.000 population. In more vulnerable cities/towns 1 F. A. Post per 10,000 is provided for the first one lakh population and thereafter one per 20,000 population or part thereof. In addition to the prescribed Casualty Service Units, the C.D. authorities in the States could manage to raise some more F. A. Parties earmarked for particular localities, through the help of doctors, and other medical workers of those particular localities, they should raise the additional units provided the raising of these units does not in any way affect the raising of normal prescribed quota for the locality in accordance with the scale laid down and provided further that these local units are raised on a purely voluntary basis.

5. **Operations**:

All casualties seen by first-aid parties requiring attention by a doctor are transported or directed to report to a static first-aid post. Here the injured is seen by a doctor for the first time, who may dispose him off in one of the three ways.

(i) If the injury is trivial, it is attended to and the patient allowed to go home.

(ii) If the injury is moderate but does not require admission to hospital, it is treated and patient is allowed to go home but directed to report at the post daily or more often as required. This will ensure that only those urgently in need of admission are sent to hospital."

(iii) If the injury is severe and requires immediate treatment, the patient is transported in the first aid post ambulance to the nearest hospital. The doctor-in-charge of the first-aid post will have to keep a daily bed state tally card of the hospitals in his area as furnished to him by the M.O. Casualty Service, so that he knows which hospital has vacant beds. In large towns where the number of burn cases is likely to be high. Superintendent of Hospital Services may designate one of the hospitals as the Burns Centre to which all burn cases from all first-aid posts can be sent.

6. **Emergency Hospital Service:**

During conditions of emergencies, the requirement of medical facilities, at the place of damage increase. The neighbouring areas/States will have to provide the mutual support and accept the casualties from the affected areas in their hospitals. Immediately on occurrence of a disaster the old patients will have to be transferred to the hospital outside the area, and additional accommodation provided in the existing hospitals by utilising verandas and other available accommodation in the hospitals. Some tented hospitals if possible, in the vicinity of the existing hospitals, will have to be provided by the Emergency Hospital Services. Such hospitals will act as the Casualty Clearing Hospitals i.e. to provide hospitalisation to the casualties for a shorter duration before they are moved to the other hospitals which may be termed Base Hospitals in the safer areas. Those hospitals which are earmarked as Reserve may be termed as Reserve Hospitals. Provisions are required to be made for one bed per 750 population. Casualty clearing hospitals, if established, will have to bear the burden of 75% cases immediately for a short period, while the base hospitals, will have to accommodate the remaining 25% cases. Besides, the Emergency Hospital Ser vices will also have to plan for Mobile Medical Units and augmentation of the facilities for operation theatre, X-ray and Blood Bank. Some of the steps for which the Superintendent of Hospital will be responsible are given below:

(i) Keep a record of beds available in the hospitals and nursing homes in the area and in the vicinity up to 10 miles, including Government Municipal, Missionary, Private and Charitable Hospitals.

(ii) Decide in consultation with the Controller, the date from which all hospitals will be required to keep 15 per cent of the authorised number of beds vacant to receive air-raid casualties premature discharge of suitable cases.

(iii) Ensure that such cases as are prematurely discharged, receive adequate nursing and also proper medical attention.

(iv) If it becomes necessary to transfer patients to other hospitals, to keep 15 per cent of the hospital beds vacant, arrange their transfer by special transport or improvised ambulance trains to other hospitals, in the outlying Districts.

(v) Ensure that all casualties received from first aid posts are admitted without delay into the hospital.

(vi) Liaise with Medical Officer, Casualty Service and keep him informed regularly of the number of vacant beds in each of the hospitals in the area.

(vii) Ensure that each hospital maintains a Blood Bank Where a Blood Bank is not feasible, panel of blood donors will be maintained.

(viii) Issue Red Cross Identity Cards to all hospitals including ambulance drivers.

(ix) Ensure that all hospitals and ambulances dis play the Red Cross Emblem prominently, so as to be visible from the air also.

(x) Where there is a large number of burn cases one of the hospitals should be marked as Burns Hospital to which all burn cases are evacuated from first-aid posts.

(xi) Assist the hospitals to maintain a six months' reserve of Medical Stores and equipment.

(xii) Supervise the training in hospitals, in first-aid and home nursing of volunteers and others.

(xiii) Issue certificates to hospitals that they are civilian hospitals and the buildings are not used for any military purpose and are, therefore, entitled to protection against attacks under the terms of the Geneva Conventions.

7. **Emergency Public Health Measures:**

After any type of disaster, the normal public health services are disrupted. The Public Health Service have also to be provided in the emergency lodging places. During the periods of disruption, the out-breaks of in factious diseases etc. are likely to occur unless effective measures are taken to the restoration of the normal services. In addition to training in the first-aid and home nursing, all personnel working in F. A. Posts and Parties should also be trained in the Essentials of Public Health Measures such as simple methods of purification and sterilisation of drinking water and disposal of night soil and refuge. In all mass movements of population excremental diseases to be feared most are cholera, dysentery and typhoid which can be controlled by proper attention to water supply, control of flies and disposal of night soil. Prophylactic inoculations are also effective against cholera and typhoid. For supplementing the efforts of authorities, voluntary help will be needed in these matters.

8. **Veterinary Service:**

Nature does not spare any one. Each disaster, therefore causes death and injury to so many animals. Animals under conditions of excitement and strain are capable of biting human beings and cause serious injuries. Therefore, the Veterinary Services with the assistance of the Society for the Prevention of Cruelty to Animals should organise for the care of animals and destruction of seriously injured animals and disposal of dead animals etc.

9**. Organisation for the Disposal of the Dead**:

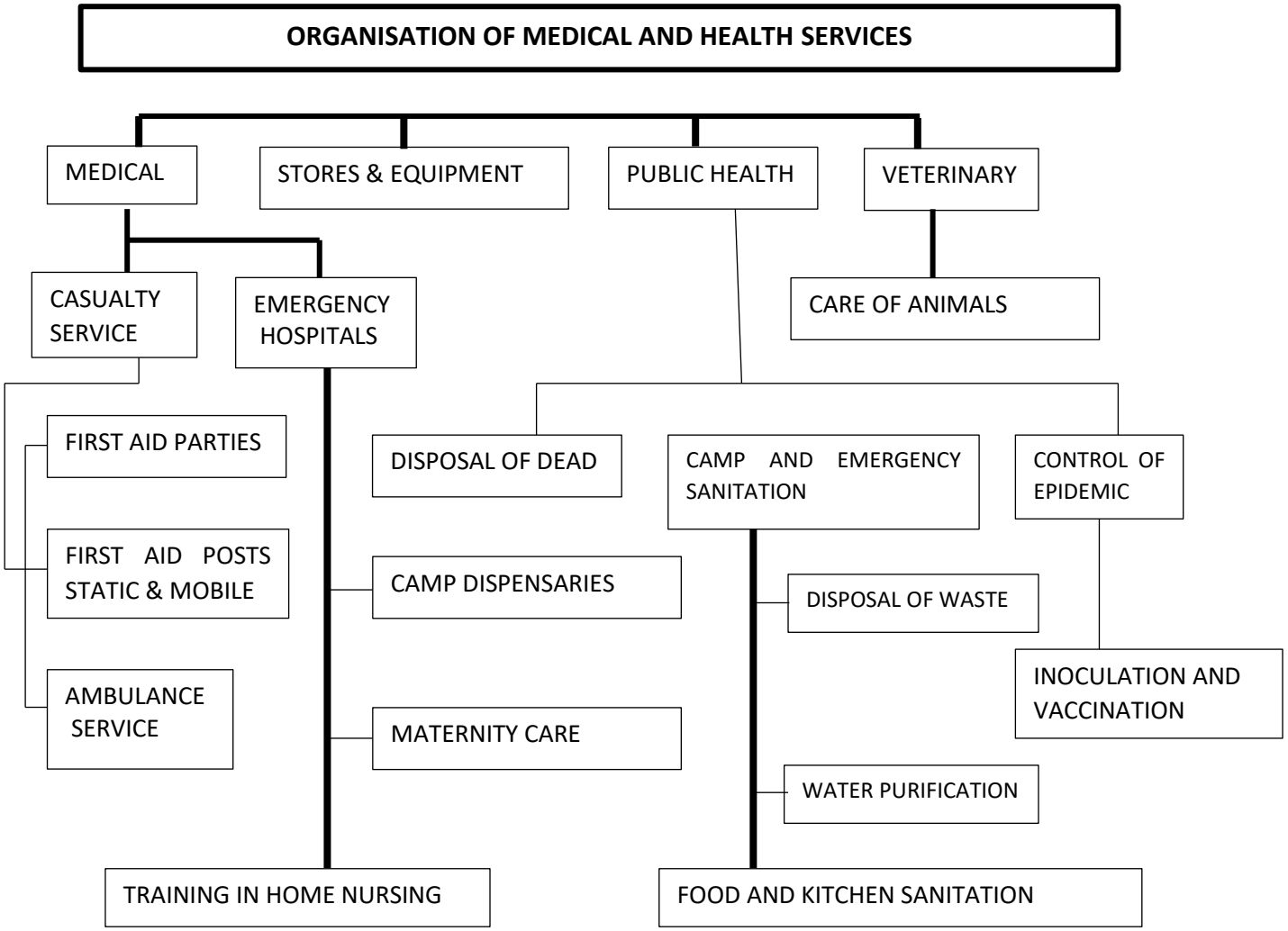
The dead bodies will soon start decomposing and unless the relatives come forward to take the bodies away for disposal, the disposal of the unclaimed bodies will have to be arranged for. to keep up the morale of the population and to maintain the hygiene of the community. These services with the assistance of the police, will carry out the job of identification of dead bodies, maintenance of records and disposal of dead bodies.

10. **Medical Stores Reserve Depot:**

All the Services will need medical and public health drugs, medicine, chemicals and certain types of equipment. These would be best catered for by building six months reserve of Essential Medical Stores by the Medical Officer Casualty Service. Three rooms in his office should be set apart for this purpose.

11. **Planning and Training:**

Proper advance planning is necessary for the provision of effective Civil Emergency Health Services during a disaster. Manpower, materials and training of volunteers is to be carefully thought of. The type of volunteers will differ for the various services. Many volunteers for these purposes. The need for recruitment should be co-ordinated with other services, because it may be that those services may also be ear marking the same source of volunteers for their purposes. The need for materials which is of so varied and wide a range, should be carefully planned for not forgetting of course the reserves. Lives may be lost because of not the delayed relief, but because of the improper relief, and, therefore, the proper training of the volunteers for the various services in the pre-emergency period is the most important and essential requirement of an efficient and effective medical relief during a disaster.



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CHAPTER NO. 55

ELEMENTS OF BANDAGING

1. **Introduction**:

It is an amazing fact that a piece of cloth such as bandage, properly utilised can save a life in emergencies such as severe bleeding from limbs or snakebites. The proper utilisation of these pieces of cloth called bandages, however, need some training mostly practical. It is, therefore, essential that the volunteers of first-aid parties as well as other service learn all abound theses bandages.

2. **Use of Bandages**:

Bandages are used for various purposes. These can be summarised Thus: -

(i) To control bleeding.

(ii) To control swelling-as due to contused injuries.

(iii) To keep an injured at rest and support by sling. To secure limb to a splint e.g. in cases of fractures, lacerated wounds.

(iv) To hold dressings place.

(v) To give support rest to a joint which is sprained.

(vi) To protect wounded of the body from exposure.

3. Types bandages:

There are many types of bandages in use but the most common types, especially useful in large scale emergency work are the triangular and the roller ones.

4. **The triangular bandage**:

(i) **Peculiarities the triangular bandage:**

(a) It is easy to apply.
(b) It holds temporary dressings better compared to roller bandage.
(c) It can be used for almost every purpose for which a bandage is needed.
(d) It can be improvised out any suitable material.

(ii) **Parts a triangular bandage:**

(For diagram see attached chart). The bandage has an apex or point a base or longest side and two sides of equal length (100 cms) and two ends. It can be used as open unfolded, broad-based or narrow folded. Each form is suitable for application for different purposes.

(iii) **Rules for applying triangular bandage**:

(a) The bandage must be reasonably clean and correctly folded as per the requirement e.g. narrow broad etc.
(b) The injured part or limb must not be disturbed or moved to any great extent for purposes of bandaging.
(c) Once the bandage is fixed its position should not be changed by pulling or pushing it.
(d) The knots should be tied carefully and in such a way that they do not rub, irritate or cause pain.

5. **Triangular bandage as a sling**: (see **selected on the chart**):

(i) **The large arm sling: This is applied in the following manner:**

(a) Stand in front of the patient.
(b) Apply the open triangular bandage to the front of the chest, with apex towards the injured arm.
(c) Place the upper end of the bandage over the other shoulder with the other end hanging down towards the ground.
(d) Carry the upper end round the back of the neck and forward over the shoulder of the injured side.
(e) Then bend the injured arm carefully at the elbow and place the forearm across the chest with the hand pointed towards opposite shoulder.
(f) Lower end of the bandage can now be brought over the forearm and tied to the upper end, in front of the shoulder on the injured side just below the collar bone.
(g) The apex is then folded towards the elbow and fixed with a safety pin.

(ii) **The small arm sling**:
This is applied in a way similar to above but in this case the bandage is used in its broad fold and no safety pin is used anywhere.

6. **Other uses of open triangular bandage**:

(i) **On the head**: This is used to keep a dressing in place on the scalp or forehead, particularly when the dressing is large or there are several wounds.

(ii) **For hand or feet:** This bandage is particularly useful when the injury is extensive and the dressing is of considerable size as in a case of extensive burns.

(iii) **For chest or back**: This bandage is used to bold dressings on burns or wounds of the chest or back. Place the point of bandage over the shoulder on the injured side, carry the bandage down over the chest or back so that the middle of the base is directly 10 the base as far up as you desire. Carry the ends around the body and tie them directly below the shoulder with a square knot. This leaves one long and one short end. Carry the long end up to the shoulder and tie to the point.

(iv) **For shoulder or blip or face**: The open triangular bandage can also he used for holding dressings over shoulder or hens, Further, in case of burns of the face, the triangular bandage can be used to cover the entire face, after cutting two holes for eyes.

7. **Triangular bandages as a broad fold:**

This can be used for various purposes, such as tying the splints and over dressings on the following parts of the body.

(i) Head and ear.
(ii) Neck.
(iii) Arm, forearm. thigh or leg.
(iv) Cheek or ear.
(v) Elbow or knee.

8. **Triangular bandage as a narrow fold:**

As "Narrow fold" is made by folding the broad fold bandage to half its breath, it increases in thick ness proportionately and also becomes quite strong. For these reasons, it can be most conveniently used for purposes:

(i) Keeping dressings in place over small areas over the limbs.

(ii) Applying pressure to wounds for purposes of stopping bleeding.

(ii) For holding the standard wooden or improvised splints in place.

(iv) For padding splints at places where they are likely to cause pressure.

9**. The roller bandage:**

(i) **Materials used:**
(a) Cotton.
(b) Unbleached calico.
(c) Gauze.
(d) Flannel.
(e) Muslin.
(f) Adhesive plaster.
(g) Parts of a bandage:

(ii) **Parts of a bandage:**
(a) Head or rolled part.
(b) Tail or "free end".

(iii) **Varieties of bandaging procedures:**
(a) Simple spiral for wrist and ankle.
(b) Reversed spiral for fleshy parts
(e) Figure of eight for joints.
(d) Spica for hip, shoulder and thumb.

(iv) Widths and lengths of Roller Bandage commonly used:

Parts to be bandaged	Width in inches/Cm	Length in yards Meters
Finger	1/2.5	2/1.8
Arm	2-2 ½ (5-6)	4-6/(3.5-5.25)
Leg	3-3 ½ (7-8)	6-8/(5.25-7.0)
Body (Trunk	4-6/(10-15)	8.7
Head	2-2 ½ (5-6)	6/5.25

10. **Rules for bandaging with a roller bandage**:

(i) Bandage limbs from below upwards and from within outwards over their fronts and in position in which they are to remain.

(ii) The bandage should be first securely fixed by couple of turns round the limbs.

(iii) Each turn should over-lap 2/3rd the ending turn, margins to be kept parallel.

(iv) Bandage the chest from below upwards and abdomen from above-downwards.

(v) Bandage evenly and firmly but not with such pressure as to interfere with the circulation. Do not cover tips of fingers or toes, as their appearance helps to judge state of circulation in the limb.

(vi) The joints are not to be bent after bandaging Therefore bandage the knee in straight or slightly bent position and elbow at right angles.

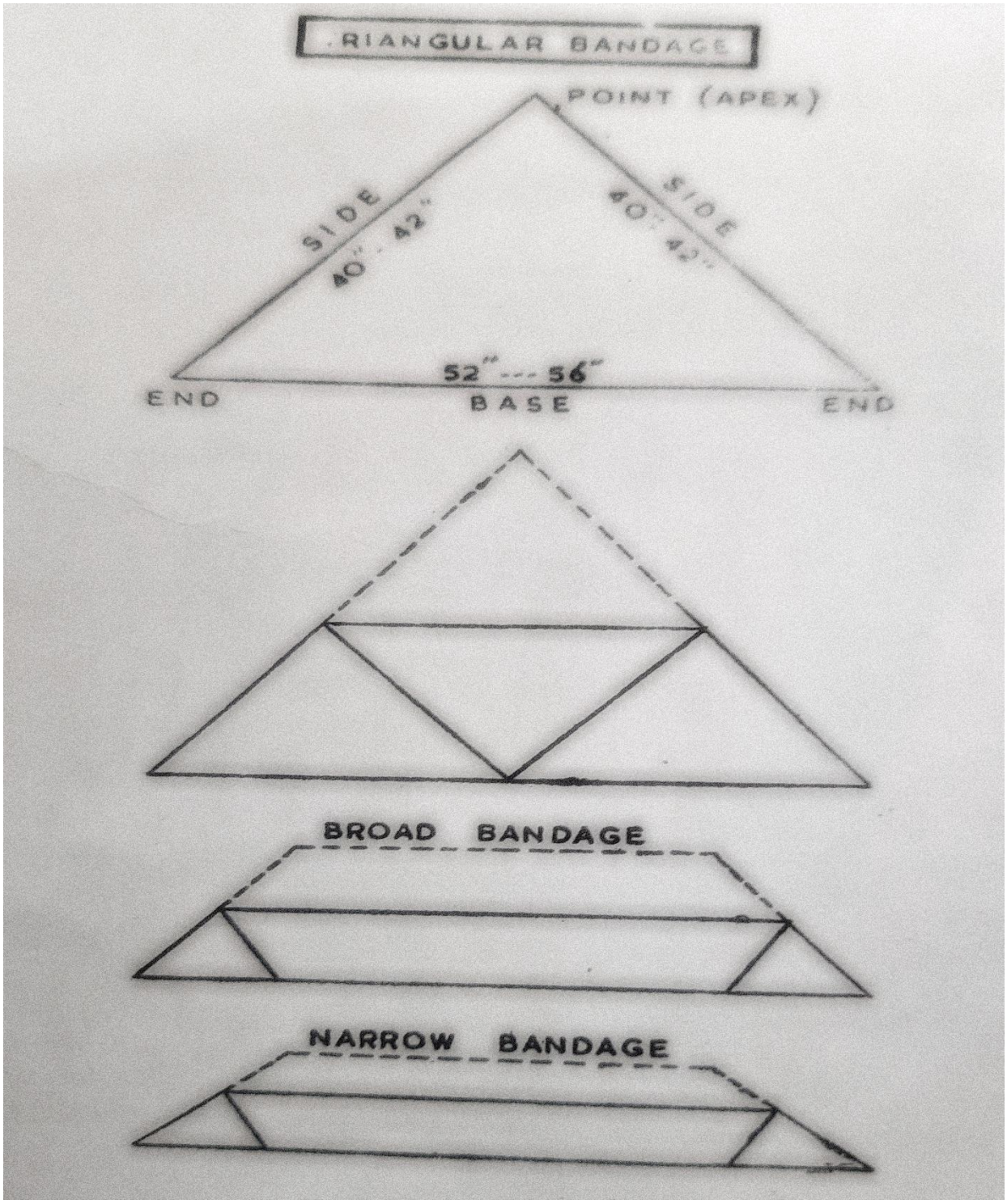
(vii) The end must be secured with a safety pin or with a stitch. The latter method is especially useful in case of children.

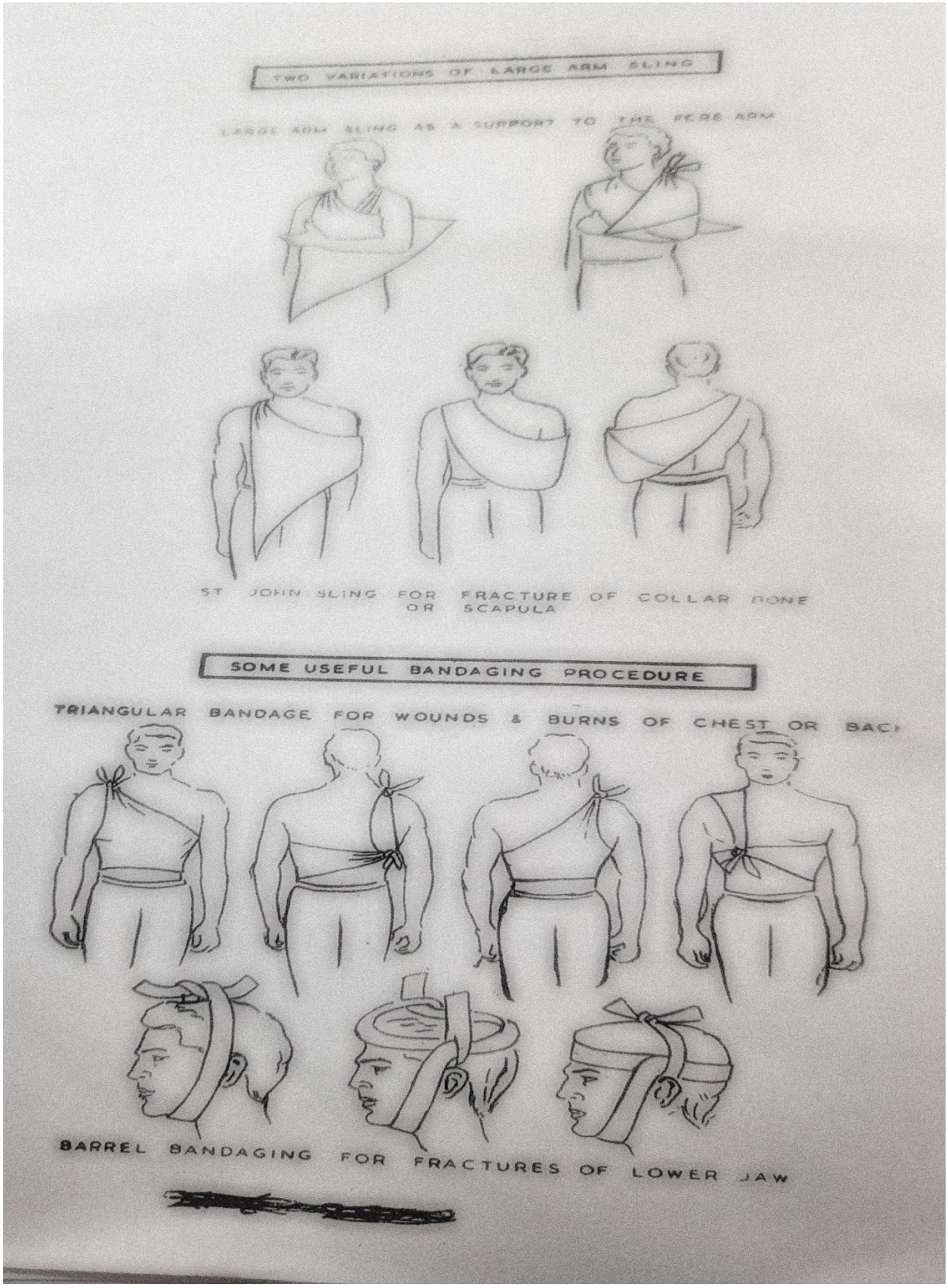
Table showing the kinds of Roller bandage to be Applied to different parts

Part to be bandaged	Kind of Bandage	Object of the Bandage
1 Head	Capelin	To retain dressings. To exert pressure on a pad placed over a bleeding wound, and to retain dressings. To give support, exert pressure, or retain dressings.
2 Chest	Spiral	To give support, exert pressure, or retain dressings
3 Breast	Spica	To give support.
4 Abdomen	Spiral	To give support, exert pressure, or retain dressings
5 Thumb	Spica	For sprain of the thumb, or to arrest haemorrhage
6 Figures	Spiral known as the continuous Finger Bandage,	To retain dressings, especially in case of burns or scalds
7 Hand	Figure of 8	To give support, exert pressure, or retain dressings
8 Wrist	Spiral	-do-
9 Fore-arm	Reverse Spiral	-do-
10 Elbow		
(a) To cover the point	Divergent Spica	To keep the forearm bent, as in fracture or in injuries about the elbow-joint.
(b) To leave the point uncovered	Figure of 8	To retain dressings or exert pressure
11 Upper Arm		
(a) For the lower par	Spiral	To retain dressings, fix splints etc.
(b) For the upper part	Reverse Spiral	-do-
12 Shoulder	Spica	To retain drawings, or to exert pressure
13 Great Toc	Figure of 8	For sprains, haemorrhage from the pair
14 Fool	Figure of 8 followed by the spiral and the reverse spiral.	To retain dressings, or exert pressure of fix splints
15 Heel		
(a) To cover the point	Divergent Spica	To retain dressing or exert pressure or fix splints
(b) To leave the point uncovered	Figure of 8	-do-
16 Ankle	Spiral	-do-
17 Log	Reverse Spiral	-do-
18 Knee:		
(a) To cover it	Divergent Spica	To give support to the joint
(b) To leave it uncovered	Figure of 8	To retain dressings
19 Thigh Gruel	Reverse Spiral	To retain dressing or to fix splints
20 Groin	Spica	To retain dressing or to exert pressure

BANDAGE ARE USED FOR FOLLOWING PURPOSES

1. To keep an injured part at rest and to support its weight e.g. by means of a sling.
2. To secure a limb to a splint, to the trunk or to its fellow.
3. To control bleeding or swelling by making and maintaining firm pressure.
4. To keep dressing in place.
5. To protect wounded parts from exposure.




TWO VARIATIONS OF LARGE ARM SLING
LARGE ARM SLING AS A SUPPORT TO THE FORE ARM
ST JOHN SLING FOR FRACTURE OF COLLAR BONE OR SCAPULA
SOME USEFUL BANDAGING PROCEDURE
TRIANGULAR BANDAGE FOR WOUNDS & BURNS OF CHEST OR BAC
BARREL BANDAGING FOR FRACTURES OF LOWER JAW

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CHAPTER NO. 56

CARRIAGE OF CASUALTIES

i. **Object**:

An injured person is normally apprehensive of any movement of his body especially the wounded part. A well-trained squad of first-aid volunteers can however, reduce the degree of apprehension by their confident yet careful and clever handling of the limb or body and gain the trust and cooperation of the injured. Allaying fears of the injured and reducing movements to minimum, help considerably towards preventing traumatic shock. The knowledge of correct methods of handling of stretchers, removal and loading of casualties on to stretchers and use of blankets and hot water bottles, therefore, will be an asset to all concerned, with first-aid of the injured.

2. **The Ambulance Stretcher:**

The most common type of stretcher used in the ambulance is the stretcher with wooden poles and canvas material for holding the patient. Certain figures may be of interest and practical value to all.

These are:

(i) Length of pole	7 ft.-9 inch (230 cms)
(ii) Length of Canvas. 6 ft. (180 cms)	6 ft. (180 cm)
(iii) Total width	1 ft. 11 inch (57 cms)
(iv) Height above ground	0 ft. 6 inch (15 cms)
(v) Weight	30 lbs. 0 to 32 lbs. (14 kg).

3. **Hand Carriage and Shoulder Carriage**:

(i) In hand carriage four bearers carry the stretcher each grasping a handle and carrying at full length of arm. When only 3 bearers are available, two bearers are kept at the head end (which is heavier) and one at the foot-end. Two bearers can also carry the load ed stretcher but this can only be done over very short distances. Longer "carry" is possible with two bearers with the help of shoulder slings which take-off weight from the hands.

(ii) In shoulder carriage, 4 bearers support one handle each on their inner shoulders steadying the stretcher with the outer hand. To keep the stretcher level, it is desirable that all four bearers should be of the same height. Further they should walk in step with inner feet of all touching ground together. This prevents jerking of the injured lying on the stretcher.

4. **Use of Blankets**:

In all cases of serious injuries "shock" is likely to develop. Rest, fluids and warmth are usual measures "for prevention of the same. Warmth can be given with help of blankets and hot water bottles. It must be remembered, however, that in hot humid climate, "the application of too much of warmth will cause the patient to sweat and make his condition of shock worse. One, two or three blankets can be used with a patient. It is worthwhile to know how to make best use of the blankets available to provide maximum amount of warmth.

(i) **One-Blanket method (see sketch**):

(a) Place the blanket diagonally on the stretcher.

(b) Place the patient on the blanket.

(c) Fold over the leg end of the blanket tucking it between feet.

(d) Wrap the two sides over the patient, the right side first and tuck in.

(e) Wrap the head end of the blanket round the neck of the patient and secure the neck of the patient and secure the end in-front with a safety pin.

(ii) **Two-blanket method**:

(a) Place the first blanket breadth-wise across the top of the stretcher.

(b) Fold the second blanket length-wise into three and place it on the first blanket folding back the corners at the lower end.

(c) Place the patient on the stretcher.

(d) Wrap the opened-out portion of the second blanket over the patient's feet, first the lower end and then the right and left flaps, tucking them in.

(e) Wrap the end of the first blanket over the patient, at the same time turning back the upper corner to form a coat collar over the chest.

(iii) **Three-blanket method:**

(a) Prepare the stretcher as for two-blanket method.

(b) Fold the third blanket length-wise into three equal folds and place it over the patient before the other two blankets are folded back 12 inches (30 cm) over the chest and the lower end tucked in under the feet.

(iv) **Special precautions in blanketing:**

(a) The blankets must not be wrapped so tightly as to interfere with the breathing.

(b) If it rains or if more warmth is required, a ground sheet or waterproof should be placed over the blankets. The edges of these should project beyond the edge of the stretcher.

(c) In the event of a long-distance carriage, the bearers should improvise pads for their shoulders.

5**. Approach Extrication and Removal of Casualty**:

The task of extrication of a casualty from under a debris etc. is that of the rescue party whose members are specially trained in the methods concerned. The first-aiders key word in approaching and removal of casualty should be "Gentleness". At places, it may not be possible to take the stretcher very near the casualty. Further, some harm may be caused to the patient if care is not taken at time of loading casualty on to the stretcher. In view of these considerations some standard methods have been evolved for loading a casualty on the stretcher. These are as under:

(i) **Loading with four bearers**: Leaving the stretcher on the ground, 3 to 4 ft. distant from the casualty, all four bearers double to the casualty and take up a half-kneeling position alongside the casualty, with 2, 3 and 4 bearers on one side. The patient is lifted simultaneously by all four on to the knees of 2, 3 and 4 bearers. The leader then places the stretcher under the patient and all four bearers lower the patient on to the stretcher.

(ii) **Loading with two bearers**: Both bearers carry the blanketed stretcher forward and place it near the head of the patient and in line with him. The bearers now stand astride the patient, one at the head end and the other at the foot end. Together they lift the patient, who if conscious, will assist by clasping his hands round the neck of the bearer. They then move forward and lower the patient gently on the stretcher.

(iii) **Crossing of a wall or fence**: No attempt should be made to carry patient over a wall or fence if it can be avoided. Even if it involves a longer carry, a gap should be sought. If no gap is available, the front handles of the stretcher should be rested on the wall or the fence and the stretcher maintained in a position by the bearers in rear, the front bearers crossing the wall. All bearers lifting together the stretcher is moved forward until the rear handles can be rested on the wall and maintain level by the bearers in front. The rear bearers then cross the wall and the normal carry is then resumed.

(iv**) Crossing a ditch**: On arrival at a ditch, the stretcher will be lowered as near the edge as possible. The two bearers at the front end of the stretcher get into the ditch. All four bearers lifting together, the stretcher is moved forward until the rear handles can be rested on the near edge of the ditch. The rear bearers now enter the ditch. Again, all working together, the stretcher is lifted until the front handles are resting on the front side. By similar movements the stretcher is lifted out of the ditch on the far side and the carry is resumed.

(v) In hilly country, the injured extremity should be carried, as far as possible, at a higher level than the uninjured e.g. a patient with head injuries should be carried head first. One with fracture or wound of the lower limb, head first when going down the hill.

6. **Special methods of loading casualties having certain types of injuries.**

Although, normally a patient is removed from the scene of accident on his back on a stretcher, with some support under his neck, certain types of injuries will be made worse during the removal of the casualty, if carried in this position. These few positions can be easily remembered and the life of a patient may Thus, be saved by carrying him in an ideal position for further treatment.

(i**) Fracture of the Dorsal or lumbar spine** blanket should be gently eased, as far as under the patient, who is then rolled face de the blanket and placed face down on the str. The chest and head should be elevated by a consisting of a folded blanket or pack, which should be placed in position before the patient is lowered to the stretcher.

(ii) **Fracture of the cervical spine**: The patient should be placed on his back on the stretcher with a pad under the shoulders. While lifting the patient on to the stretcher, one stretcher bearer should be detail ed to keep the head steady and extend the neck. To maintain traction on the head, a strap made from a folded triangular bandage should be passed under the chin and the end secured to the runners on either side. Pads should then be placed on either side of the head.

(iii) **Abdominal wounds**: The patient should be placed on his back propped up and the tension on abdominal wall relieved by flexing the knees over folded blankets.

(iv) **Chest wounds:** The patient should be placed on his back and propped up as far as possible and inclined slightly towards the injured side. A folded blankets or pack resting against a suspension bar is an easy method of propping the patient up.

(v) **Wounds of the face**: The patient should be placed face downwards with his head projecting over the end of the canvas and his fore-head supported by a broad bandage tied between the two poles. The object of this is to prevent suffocation from loss of control of the tongue or due to haemorrhage.

(vi) **Head wounds**: Care must be taken to see that the patient is so placed that the injured part does not press against any part of the stretcher. If necessary, pads may be placed at the side of the head to prevent movement of the head during transit.

7. **Hand-carriage of casualties**:

(i) **The need**: Ideally the full first-aid treatment of all injuries should be given on the spot and the casualty should be loaded and carried on a stretcher right from the place he was discovered. But if there is imminent danger to his life if he is allowed to stay there longer, or if sufficient first-aiders are not avail able or if the space available and exit route does not permit carrying of a stretcher, then the casualty will have to be hand carried to some distance at least.

(ii) **Choice of method**: Most of the methods recommended are similar to those used by the fire-fighting and rescue-workers for extricating casualties and are known by the phrase "emergency methods of rescue". The choice of method will depend upon the following factors:

(a) The nature of the injury e.g. fractures, shock. burns etc.
(b) The severity of the injury.
(c) The number of helpers available.
(d) The distance involved.
(e) The nature of route to be traversed.

8. **The Methods**:

The undermentioned method are comparatively safe and are recommended for use by first- aiders.

(i) **Carriage by a single person**:

(a) Human Crutch.
(b) Human cradle.
(c) Pic-aback.
(d) Fireman’s lift.
(e) Pic -a back.

(ii) **Carriage by two persons:**

(a) Fore- and – Aft carry.
(b) Hand -seats-2.3 and 4.
(c) Three man lift and carry.

APPENDIX-"A"

DRILL FOR LOADING AND UNLOADING OF STRETCHERS

1. **Selection and numbering of bearers**:

A squad is of 4 bearers. They should preferably be of same height. They are numbered 1,2,3 and 4 from tallest to shortest No. 1 is the leader of the squad and is responsible for the welfare of the patient until he is seen by a doctor or handed over to another responsible person. All stretcher bearers must be able to take over the duties of No. 1. When a large number of volunteers are to be trained, the stretcher squads may be formed by adopting the following drill movements.

(i) Stretcher bearers "Attention".
(ii) Tallest the right, shortest the left in single "**Size**"
(iii) From the right a half pace interval "**Extend**".
(iv) Form the right in fours, "**Number**".
(v) Nos. 3 and 4 three paces step back two paces right close "**March**"
(vi) By squad's report.
(vii) Squad-leaders "Carry-**on**".

2. **Collecting blankets and stretchers:**

(All **orders are given by No. 1 of the squad**)

No. 1, No. 3 collect blankets, No. 4 collect stretchers, No.3 and 4 right turn, "Quick-March ". No. 3 and 4 reach stacks of blankets and stretchers: No. 3 folds the blankets neatly and carries is over his right arm and No. 4 carries the stretcher at the slope on the right shoulder, No. 4 places the stretcher on the ground with its runners turned away from himself and from No. 2

3. **Lifting Stretchers and Collecting Casualties**:

(i) **"Lift Stretchers**":

No. 2 and No. 4 stoop together lift stretcher in their right hands.

(ii) "**At the double-collect casualty":**

At this the squad will double with the equipment and halt near the patient about No. 2 paces from head of patient No. 1 will double to the right of the patient and ask No. 3 to help me) No. 3 hands over the blanket to No. 4 and proceeds.

(iii) **"Prepare and blanket stretcher":**

No. 2 and 4 who have kept stretcher on the ground open it and blankets it.

(iv) **"Help me**"

No.2 and 4 now to and sit on either side of No. 3 and facing No. 1 No.2 near the foot and No. 4 near the head of the patient.

All three will go down on the left knee nearest to the fact of the patient i.e. on the left knee. They place their forearms research the casualty.

(v) "**Lift Casualty":**

The casualty is lifted gently and is placed on the knee of No. 4, 3 and 2. No.1 then goes to bring the stretcher with his left hand across and resting and the near hand across resting the near pole on his left hip, and places it below the casualty.

(vi) **"Lower Casualty":**

The casualty will be raised slightly from the knees of No. 2,3 and 4 and is lowered gently on to the foot of the stretcher on the right No. 2 steps forward opposite No. 1.

4. **Carrying loaded stretcher:**

(i) **Hand-carriage by 4 bearers**:

Lift stretcher.

(a) "Hand-carriage by bearers, lift stretcher".
(b) "Advance"-step off on 'inner step.
(c) "Retire"-by wheeling around.
(d) "Halt",

(ii) **Hand-carriage by bearers:**

(a) "Hand-carriage by two bearers-lift stretcher" No. 2 and No. take side step over the handle of the stretcher.
(b) "Advance"".
(c) "Retire"
(d) If using slings. "Adjust slings" before advancing.

5. **Relieving bearers by changing numbers**:

This order is given only after the stretcher is lowered. No. 1 and 3 will turn about and all of them will then step off together and all move around places, clock-wise. The new 1 and 3 now turn left about so that all now face foot of stretcher.

6. **Unloading Stretcher:**

"**Unload Stretcher"**

The bears will adopt process similar to that used for loading of casualty.

7. **Returning Blankets and Stretchers:** (At end of training lesson):

"No 3 return blankets, No. 4 return stretchers, No. 3 and 4 right turn, quick march".

APPENDIX-"B"

DRILL FOR LOADING AND UNLOADING AMBULANCES

1. **General directions**:

(i) Casualties are loaded generally "head first" in the ambulances.

(ii) The four berths or racks are loaded in the order upper right, upper-left, lower-left and lower-right. When unloading, the reverse order is used.

(iii) The attendant of the ambulance unit should be inside the vehicle to help the loading operation. He must remove stretchers and blankets from the ambulance so that an empty rack is made available for loading the casualty. The stretchers and blankets removed will be placed one on top of the other at the side of the ambulance, where they will not be in the way of loading. These blankets and stretchers will be exchanged with the blankets and stretchers brought in by the First Aid Party along with the casualty brought in for loading. Where the attendant is not present, his duties will be performed by No. 1 of the squad. He will remove blankets and stretchers from the racks, while the casualty is still on the ground, then re-join the squad and after the stretcher has been partly loaded will leave the rear of the stretcher to No. 2 and again get inside the ambulance to help the loading. In exceptional circumstances the driver of the vehicle may be required to carry out these duties.

2. **Procedures:**

(i) The stretcher is brought to the ambulance by four bearers, in hand carriage. As they come near the rear of the ambulance they wheel about, so that the head of the casualty towards the ambulance. The stretcher is then lowered to t ground one pace from and in line with the vehicle.

(ii) After No. 1 bearer has satisfied himself that the ambulance is ready for loading, he takes up his position and gives the common "load".

(iii) The bearers then turn inwards, stand on a broader base stoop down, and grasp the handle and the pole of the stretcher with hands wide apart and palms upper-most,

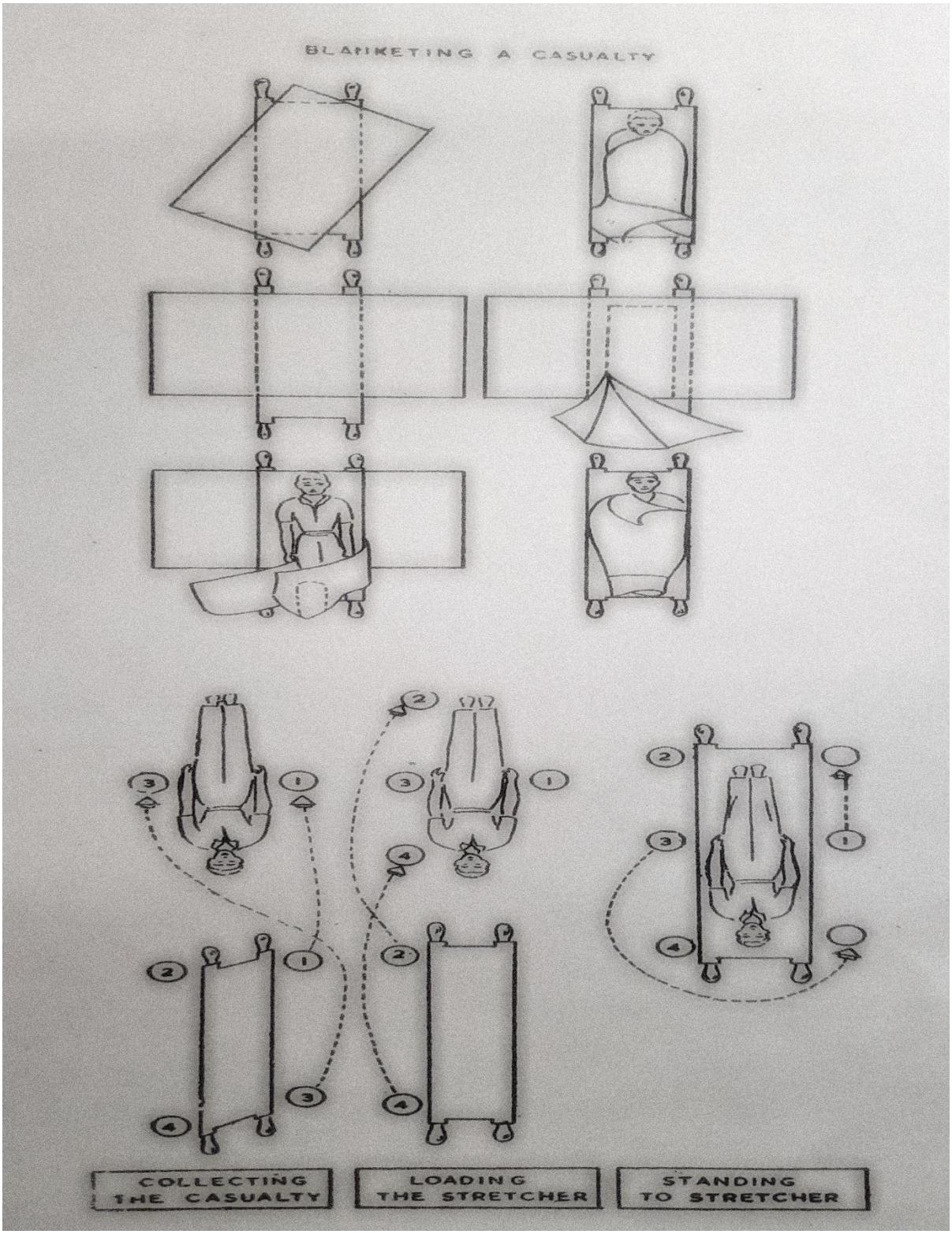
(iv) They then rise slowly, ensuring that the stretcher is levels. They lift the stretcher to the required height and take a side-step or steps towards the ambulance.

(v) The front bearers (Nos. 3 and 4) place runners in the groove of the stretcher frames, first outer, then inner and then assist the rear bearers in pushing the stretcher into its place.

(vi) The attendant then secures the runners of the stretcher to the frame with the straps provided.

(vii) The squad returns to bring and load next casualty.

3. The unloading process is similar to that of loading, but in the reverse order.


BLANKETING A CASUALTY
COLLECTING THE CASUALTY
LOADING THE STRETCHER
STANDING TO STRETCHER

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CHAPTER NO. 57

FAKING INJURIES FOR EXERCISE

1. **Object**:

Any measure taken to add to the realism increases the usefulness of any method of instruction including outdoor exercises. Having "living" casualties instead of dummies is one step towards realism in matter of casualty production. The realism will be further increased if the living casualties are made to have injuries looking like real ones. This can be done with the help of "make up" materials used for theatrical performances. This process of making up person in such a way that a typical injury is imitated and pretended to be true and original is known as "Faking" of injuries. This faking of injuries is extremely useful in training of Rescue and First Aid work also, it helps in making the training interesting and easily remembered. All those concerned, therefore, with the production of outdoor exercises and training of first-aiders and rescuers must have a good idea of the methods by which faked injuries are built up.

2. **Value in First Aid and Rescue Training**:

(i) The faked living casualty can be used in routine lectures and each lecture can be turned into a series of living pictures more instructive than many hours of study.

(ii) During exercises, the first-aiders and rescuers are required to recognise and diagnose the type of injury by their own observation and not by just seeing the label on a casualty. Thus,, they are forced to learn in a way as near real conditions as possible.

(iii) The first aid worker who acts as the casualty himself benefits greatly from playing the part of a casualty and finds, much satisfaction and even enjoyment in the accomplishment. The fuller knowledge and understanding of the condition and especially of the feeling of the victim of an accident inevitably makes for sympathy with an actual sufferer and increases knowledge, ability and usefulness as a first-aider.

3. **Factors that add to the value of Faking**:

Mere make up of a casualty is only one step towards faking of the injury. The effect of the makeup will be enhanced if the volunteer acting as the casualty acts as an injured person, has been wearing clothes suited to the narrative and is placed in sur rounding’s appropriate to the occasion.

(i) **Acting**: The person who is volunteering to "become a casualty must have sufficient knowledge of the signs and symptoms of the condition. In other words, he must act the part. Otherwise much of the realism sought for will be lost. For this reason, these casualties must have thorough briefing by a doctor and understand fully the exact nature of the injury, the signs and symptoms and the feeling of the patient having such an injury in real life.

(ii) **The setting of the incident**: The realistic set ting of the incident such as heap of debris, fallen ladders, collapsed buildings, may help the casualty in playing his part correctly as under such circumstances, he can feel that he has actually sustained an accident besides making the rescuers and first-aiders feel the "atmosphere" of the incident.

(iii) **Use of costume**: The supposed victim should be dressed up to fit the part. It is advisable therefore to build up a stock of old garments that can be torn or blood soaked, if necessary.

(iv) **Selection of injuries**: Injuries chosen for the purposes of faking should be such as to be reasonably expected to have been received on the site at which the casualty has been placed, Thus, burns in case of fire disaster, fractures, crush injuries in cases of house collapse etc.

4**. Methods and Materials used:**

It is a general impression that casualty faking is an artist's job. This is incorrect as it has been found in practice that many people who have never previously handled theatrical cosmetics or used any colours can produce the required effects with a few simple materials and easily learn the technique involved. The majority of the materials used are quite common in daily use and much can be done by just the trial and error method. Help of a person who knows uses of theatrical cosmetics may be taken occasionally but it is the doctor who can actually certify the perfection of the imitation. Faked injuries can be built up from four basic materials. Each has its ad vantages and peculiarities.

(i) **Putty**: This forms a good material to act as a base for injuries. It gets easily moulded to the required shape. Its advantage lies in the fact that it is very much realistic as it moves with the muscles. and any simulated becomes part of the body. Its disadvantages are:

(a) Messiness.

(b) Can be used once only.

(c) Needs time and labour to build up.

(ii) Card-board: With card-board, as well as with rubber base [mentioned below at para 4. (iii)] more or less permanent wounds can be made and used with a little more time initially to make but are not “messy” and once can be used dozens of times.

(iii) **Rubber**: Rubber bases make realistic wounds and are easier and quicker to make in comparison with card board. Rubber being flexible these permanent faked injuries can be made to fit several parts of the body. Such is not the case with card-board bases which are to be shaped to a certain part of the body only.

(iv**) Plastic Materials**: Faked injuries made up (permanently) from plastic materials are also being manufactured recently. As plastic take up all types of colours readily the effects are likely to be convincing.

5. **Methods of Making up injuries**:

The methods of preparing permanent wounds with the help of rubber and card-board are given at appendix "A". The procedure of using putty as the base of all types of wounds is explained in succeeding paragraphs. A list of items required for "putty" base faked injuries is given at appendix "B".

6. **Preparation of materials for "Putty Base" injuries**:

Before some of the materials can be used, a little preparation is necessary. This is quite a simple procedure and is carried out in the following manner:

(i) Carmine (red) Nos. 1, 2 and 3 are all used mixed with Vaseline, two parts of the latter to one part of grease stick. This not only increases the amount of each colour, but also facilitates application. All that is necessary is to take the carmines one by one, and place each colour and the Vaseline in the proportions given, into a tin or jar which is then placed in a receptacle of hot water. When the two substances have melted they are thoroughly mixed by stirring with a piece of stick, the mixture should then be allowed to cool. The other grease paints are used in stick form as obtained.

(ii) The putty which when obtained from the bazar is usually pasty yellow in colour, needs to be given a flesh tint. To do this, add to it, a small amount at a time a little carmine No. I until the tint closely matches that of the human skin. Before use, putty must always be worked up a little to restore it to its plastic stage, but this must not be overdone, or as sometimes happens with a very fresh supply. it becomes too soft for proper control.

(iii) To imitate blood, mixture of castor oil and carmine are used. Carmine No. 2 gives the bright red colour of arterial blood, and No. 3 the purple red of venous bleeding. The mixtures can be conveniently prepared in small bottles, half filled with castor oil and stood in hot water. To one bottle is added a piece of Carmine No. 2, about one inch in length and to the other a similar quantity of Carmine No. 3. When the pigment is dissolved, the mixture is shaken. vigorously. If the resultant fluid is too stiff when cold, it should be warmed again and a little more castor oil added.

7. Suggested Types of injuries:

Certain types of injuries are easy to imitate. The beginners should first master the technique of reproducing injuries such as lacerations or superficial burns and then try other injuries.

(i**) Laceration of fore-arm**:

(a) First, lightly grease the skin with a little vase line, not to make it very greasy but just enough to feel slightly sticky when touched with a palm or the hand. Next, take a small piece of putty and shape it like a sausage. Place this in position on the limb and roughly press it down around the edges. Then take a little Vaseline on the thumbs or forefingers and smooth away the edges of the putty until no hard line is visible and the substance blends into the con tours of the limb.

(b) A ridge or mound of putty will remain along the centre line after the smoothing process but this should not be distributed at this stage as it is subsequently to become the swelling around the wound. The modelling tool is now brought into play, and a cut with ragged edge is made along the ridge. Care should be taken to avoid cutting right down to the skin of the arm as if this is done, the putty is liable to roll back under its own weight and spoil the planned effect.

(c) Now all is ready for the colours, and the first of these, Carmine No. 1 mixed with Vaseline, is used. A little at a time lightly smeared over the putty until desired amount of "red" (erythema) is obtained.

(d) A fairly liberal coating of theatrical powder should next be applied to give the model that degree of dryness and firmness of texture to make it appear to be a part of the flesh on which it is situated. Powder can be applied at later stage if desired, but once the blood mixture has been used, great care. must be taken to prevent damage to the work.

(e) Carmine No. 2 mixed with Vaseline should now be picked up on the stick and liberally applied into the cut to imitate bleeding edges of the skin, follow ed by a few small drops of Carmine No. 3 mixture to represent blood clots or because of its dark colour, to give the effect of depth to the wound.

(f) A few light touches with the black grease stick around the edges of the wound will make it appear a little older, as if the blood has dried at these points. Next. the whole length of the cut should be tapped with the point of the modelling tool to make the vase line and colour mixture stand up like torn muscle fibres.

(g) Finally, a little of the liquid blood mixture is poured in the wound and allowed to tickle out under its own weight in whichever direction it is naturally guided. There should be no attempt to try and influence its flow.

(ii) **Making up for burns and scalds**:

(a) There is a difference in the external' appearance of burns and scalds. In the case of the former, the skin is roasted, and in the latter, it is boiled. These facts must be borne in mind when planning the makeup of faked casualties injured by heat. Moreover, it is important to appreciate the degree of burning as this greatly influences the type of make up to be used. For example, while first degree burns show slight swelling of the part and redness and are very painful and tender, the second degree burns exhibit blistering of the skin in addition to the above signs and symptoms.

(b) The makeup of a first-degree burn presents no difficulty being a simple unbroken swelling, coloured to an angry pink with Carmine No. 3 and finished with a liberal coating of powder. Second degree burns can be faked in several ways, the most simple and effective being as follows. The part selected for the burn should first be treated as just described for first degree burning. On this are a number of unevenly shaped white blisters surrounded perhaps by a light-coloured ring of partially damaged skin must be created. These blisters can be faked easily by allowing the melting wax from a lighted candle to fall in uneven blobs on to the previous reddened area. Several drops should be built up on each spot, and when the wax has cooled, a thin white line can be drawn round the circumference of each at the point where the edge of the wax meets the skin. Grease stock Number 1 should be used for this at it is almost white although a white grease lining stick is better and being thinner, much easier to control.

8. **Training Volunteers Technique of Faking**:

(i) It is advisable that 3 or4 persons be trained simultaneously for following reasons:

(a) One person alone will not be able to complete the makeup.
(b) Comparison, criticism and competition helps in achieving better result.

(ii) **Skin colours**: The skin coloured powders available the volunteer casualty, charcoal powder or from chullah may powders.

(iii) **Use dust**: Dust used often on and around wound to add the realism.

PREPARING CARD-BOARD OR RUBBER BASED WOUNDS

(i) **Card-board Base:**

The selected piece of card-board should be soaked in a week solution of a good quality gum. Then it is moulded over the contour of the limb where the wound is to be faked and is allowed to try. A pad of tissue papers is then made and glued to the card board base. Then an opening is cut through the pad whilst the glue is still wet. The wound edges are then suitably coloured with paints. The card-board is fixed to the limb with the help of tape which pass through the holes to be punched along the edge of the card-board base. Just before use, the wound can be treated with some fresh blood made up in the usual way from castor-oil and Carmine paint mixture.

(ii) **Rubber Base:**

The base of the wound is cut from a sheet of any type of rubber such as old motor car tube etc. On it is glued a piece of sponge of suitable thickness and size with edges thined off and stuck to the rubber base with rubber solution. The wound is then cut through the sponge and the rubber base. The wound is then suitably coloured. The remaining rubber base is then painted with flesh coloured paint. The wound is fixed to the limb with tapes passing through holes to be punched from edges of the base. These permanent wounds produce a good effect when they are seen through a torn clothing worn by the casualty.

PREPARING CARD BOARD OR RUBBER BASED WOUND

1. Putty or modelling clay.
2. A good sized mirror.
3. Modelling stick.
4. Adhesive tape.
5. Grease paints.
   (a) Red.
   (b) Dark-red.
   (c) Black.
   (d) White.
6. Vaseline.
7. Face powders with different skin-shades.
8. Castor oil or liquid paraffin.
9. Wax-candles.

10. Cotton Wool.
11. Plinth of soft -cloth
12. Charcoal Powder.
13. Ash or dust according to back-ground.

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CHAPTER NO. 58

PROBLEMS OF DISPOSAL OF DEAD AND THE ORGANISATION TO DEAL WITH THE DEAD

1. **Object**:

In cases of disasters such as the floods, fires, earth quakes, railway accidents and the air raids the disposal of the dead bodies becomes a great problem due to various reasons, especially, if the disaster is on the large scale. The dead bodies have to be disposed off quickly before they start decomposing. Late disposal of dead bodies not only endangers the public health of the community but it also affects the morale of the people. It therefore becomes essential for the Emergency Relief Organisation to handle this problem in a methodical and organised manner. The object of this lesson is to study the problems of disposal of dead and the organisation to deal with the dead.

2. **Problems of Disposal:**

In normal times the disposal of the dead due to accident or otherwise is done after the necessary legal formalities are over by the relatives of the deceased or if unclaimed, by some religious body or by the municipality. However, conditions are very much different in case of a disaster. Some of the reasons that make disposal of dead bodies a problem during an emergency are given below:

(i) The relatives who would normally carry out the disposal of the dead may have left the place in a hurry to save their lives.

(ii) The relatives may be present but are unable to carry out the task of disposal e.g., in cases when the only survivor out of a family, is a child.

(iii) The number of dead may be so large that the organisations such as Municipal/Religious bodies that would normally dispose off unclaimed bodies unable to cope with the situation.

(iv) There occurs some delay and difficulty in the identification of the dead bodies due to various reasons such as:

(a) **Mutilation of the body**: This may occur in case of fire, railway disaster etc.

(b) **Decomposition of the body**: A decomposed body changes its colours and contours in such a way that even the near relatives are unable to recognise the body.

(c) **Absence of relatives nearby**: This would happen in case of a train disaster, or in cases where the bodies are washed away due to floods.

3. **Suggested Organisation:**

The disposal of large number of dead bodies should only be done through an organisation called Corpse Disposal Organisation which should be on the following lines: -

(i) **Corpse Disposal Squads**: The organisation will consist of many small units called Corpse disposal squads. Each squad will consist of one leader and four members. The main responsibility for the disposal of the dead will be that of the person in charge of the Medical and Public Health in the action committee. He may, for the sake of convenience and efficient functioning, appoint a sub-committee consisting of representatives of the local municipal bodies, the police authorities and any local Religious bodies, with himself as the chairman.

(ii**) Number of Units and location:** The number of squads per town/tahsil would have to be decided after considering the vulnerability of the area to disaster and the population of the place. These should be located at a convenient place i.e. near the municipal office where death pass is issued and should have a telephone nearby if possible.

(iii) **Tasks of corpse disposal squads**:

(a) **Assisting in tasks normally carried out by the police**: These are the holding of summery enquiries (inquests, panchanamas) which in clued identification of the dead, taking custody of valuables and personal effects and completing the records needed.

(b) **Tasks normally carried out by the relatives or in their absence, by the municipal or religious bodies**: These include removal of dead bodies to burial ground or the burning ghats and arranging for final disposal at these places according to religious denomination of the dead.

(iv) **Equipment for Corpse Disposal Squads:**

(a) **Transport**: This is the most important requirement of the corpse disposal squads, as in an emergency, physical carrying of dead bodies is neither feasible nor desirable. The dead bodies are to be carried in such a manner that the public do not see them while being transported. Further, the disposal has to be quick enough to prevent bodies getting de composed. For these reasons, load carrying vehicles with tarpaulin covers are desirable. In the absence of these or to supplement these, bullock carts and other means of conveyance can also be used provided proper covers are made available.

(b) **Equipment for loading of Dead Bodies**: Ropes, stretchers or substitutes, sheets or cloth to cover the bodies will have to be supplied.

(c) **Personal protection equipment**: Certain items such as hand gloves, towels, disinfecting fluids, nose pads will be required to be issued to the volunteers to keep themselves free from possible infection.

(d) **Burial/burning ghat necessities**: These may have to be arranged. Thus, spades, picks, baskets are required at the burial ground. Also cloth, fire wood, ghee etc. for disposal of bodies according to religious rites.

(e) **Identification duty equipment:** Equipment needed to take finger prints and photographs of the unidentified dead may have to be issued.

(v) **Training of member of Corpse Disposal Squads**: The volunteers would require training in doing their jobs properly. They will have to be told about the law of the land regarding inquest or panchanama to be hold. They must know how to recognise signs of death, what to do with the valuables of the deceased, how to initiate records for identification, the working of the organisation, the disposal of bodies and disinfection of mortuaries and vehicles and personal hygiene. The training should be arranged by a sub committee consisting of representative of Police, a medical practitioner. Head of Corpse Disposal Organisation and C.D. Training Officer.

4. **Working of Corpse Disposal Organisation**:

Members of the C.D. Squads in each town will be required to collect the dead bodies or their remains lying superficially at the scene of disaster. They will also take over the bodies extricated by the members of Rescue Parties who would furnish necessary information to C.D. Squads regarding name, place, time, valuables etc., found on the person of the dead body. All these bodies will be carried to a well-covered protected place where they will be kept pending identification. However, the above work by C.D. Squads will be started only after a Police Official/Magistrate has arrived on the spot and has order ed collection of dead bodies, as in all cases of un natural death they have to hold a summary enquiry and prepare necessary records. Since the number of police available for doing these duties will not be enough the members of C.D. Squad will have to assist them in preparation of records and listing the valuables found on the dead body.

5. **Temporary Mortuary:**

The bodies are brought to the temporary mortuary which may be located at some shed, godown or vacant building. It should be a place well protected from public view as the sight of large number of bodies have a very demoralising effect on the on-lookers. After the necessary records have been completed at the mortuary and the medical officer (or a trained volunteer) has certified death and police satisfied that the death has not occurred due to any foul play, the bodies which are identified will be handed over to the relatives or friends who claim them, after obtaining their signatures. The valuables and other personal property will be handed over to the nearest relative on order from the police who are the custodian for the same.

6. **Unclaimed dead-Disposal of:**

Those bodies which are not claimed by any one or where relatives are not in a position to receive them as it may happen in the case of a child who is the sole survivor, the C.D. Squads will have to arrange for their disposal. For this purpose, they will have to be provided with necessary facilities for transport of the dead to the cremation ghat or burial ground. At the cremation ghats/burial places a religious person viz. a priest or Granthi, Mulla etc. should be available to perform the last rites of the deceased. The necessary material for disposal of the body i.e. fire wood, ghee, cloth, digging implements along with the necessary labour etc. should be available. Indiscriminate disposal of the bodies may lead to demoralisation amongst the public as such a step would injure their feelings.

7. **Unidentified Dead:**

Some of the bodies recovered and kept at mortuary may not be identified by any one. The person in charge of the mortuary will be faced with the difficulty of keeping such bodies for unlimited length of time which will be impracticable from health and sanitation point of view. Bodies may have to be kept pending arrival of the relatives who might have been informed. All such bodies may be properly arranged to minimise unnecessary viewing. They should be so kept that decomposition is minimum. A cool well-ventilated place, protected from direct sun shine considerably helps to slow down the process of decomposition. When bodies have to be kept longer under unfavourable conditions artificial means for preservation such as ice packs, chemical preservatives etc. may be used. In most cases however, it would be desirable to dispose off bodies as early as possible after the completion of necessary records as mentioned in the subsequent paragraphs.

8**. The problem of determination of religious denomination**:

(i) It may happen, in some cases of unidentified bodies that their religious denomination is not obvious. It should be the responsibility of the Officer-in-Charge Morgue to give orders in this respect after consideration of the circumstantial evidence in each case of doubt. He should make entry to this effect in the labels attached to dead body and Thus, indicate as to which place-Burial or Cremation Ground the body should be carried.

(ii) The In-charge of the burial or cremation ground should make entries in his register from the labels attached to each corpse. Disposal of bodies without these labels should not be permitted. The labels attached to dead bodies will be removed and returned to proper authorities duly completed by the In-Charge of burial or cremation grounds.

9**. Identification and Records:**

If the dead body is disposed off without its identification being established, it may give rise to some legal problems of inheritance besides hurting the feelings of relatives and friends as and when they come to know about it. Every effort should, therefore, be made to establish the identity of a dead body before disposal. With a view to facilitate identification it would be necessary to take the following steps right from the beginning the body is recovered.

(i) Note the place, time and situation under which the body was found. If the body was handed over by Rescue Party they should furnish the above information on a card and sign the same.

(ii) Description of clothes worn, contents of pockets, letter etc.

(iii) List of valuables such as rings, wrist watch, bangles, earrings etc. found on the body.

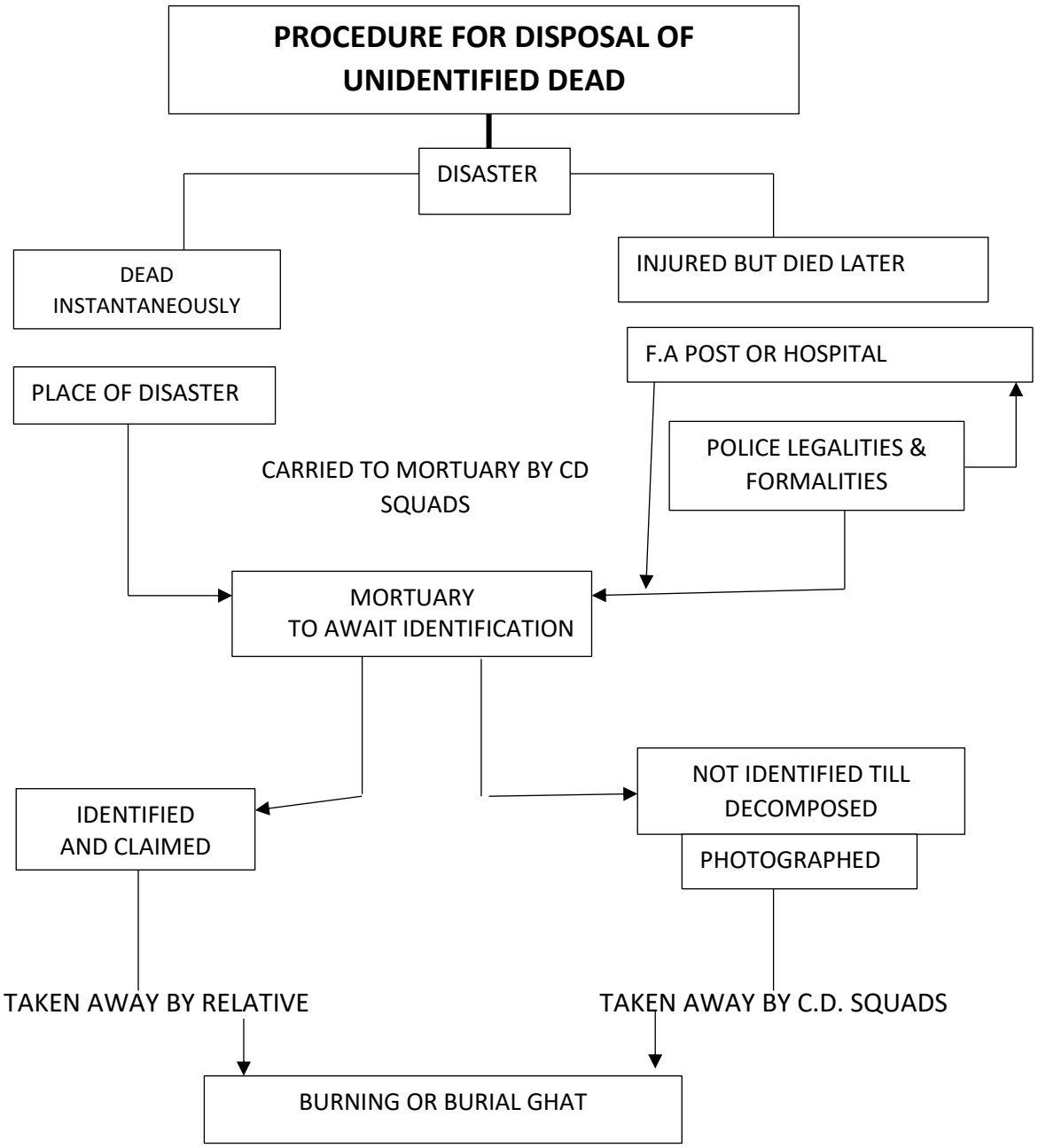
(iv) General description of the body such as age, sex, identification marks, colour of hair and eyes, complexion, height, deformities, vaccination marks, dentures, occupational marks etc.

(v) Finger Prints-These may perhaps in certain cases and may take death.

(vi) Photograph-Whenever photograph taken should done before decomposition in.

10. **Conclusion:**

It would Thus, be realized that disposal of dead bodies produces many problems and the suggested procedure will obviate all unnecessary delay in the disposal. All the same in view of the legal, religious and moral aspect of the problem the task should be undertaken with all possible care and seriousness.



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CHAPTER NO. 59

WATER-PURIFICATION

Water -supply, methods of purification in temporary shelters and camps

1. **Object**:

Water is essential for continuation of life. Therefore, in any camp arranged for Emergency Relief purposes, the supply of safe drinking water becomes a matter of high priority. If sufficient attention is rot paid to purification of water there is danger of spread of epidemics of water borne diseases such as Cholera, Typhoid fevers etc., in the inmates of the camp and more lives may be lost due to these diseases than those lost by the disaster itself. The knowledge about how water gets polluted and how it can be rendered safe for use is worth having by all those concerned with the duties related to camps organised for E. R. 2. Sources of Water:

2. **Source of Water:**

For supply of water to a camp, the following are the possible sources from which it may be obtained.

(i) Wells, deep and shallow.
(ii) Tube-wells.
(iii) Rivers.
(iv) Lakes or ponds.
(v) Piped water supply originating mainly from upland lakes.

3. **Why Water Needs Purification**:

(i) **Contamination of Water**:

Water may get contaminated at various places and these may be summarized Thus:

(a) **At the source**: The contamination may come from flood water etc.

(b) **During transit:** The open canals etc. may get contaminated through people who use the water, or by flood or rain water.

(c) **During Storage**: Through the medium of dust, insects etc.

(d) **During distribution** e.g. leaky pipes, contaminated utensils, vessels etc.

(ii) **General protective measures:**

In view of possibilities of pollution and contamination explained above, the measures to be adopted for protection of water supplies can be grouped as under:

(a) Protection at source by patrolling, fencing etc.
(b) Check on health of workers employed in water duties.
(c) Frequent analysis and check of the water.
(d) Purification methods based on
(e) above.

4. **Protection of the source of water**:

Each type of source of water gets contamination in a typical way and the measures to be adopted for its production, therefore, differs from source to source.

(i) **Wells**:

A deep well is a safer source of water supply than a shallow well. Deep wells tap water from a water bearing layer situated below the first impermeable stratum while shallow wells tap water that is situated between the surface and the first impermeable layer of the ground. Shallow well, therefore, can easily get contaminated from any latrine etc, situated within a radius of 100 feet, through underground currents that travel through cracks in the ground. They may also get flood-water overflowing into them. When selecting a well as a source of drinking water, if a choice exists, one should look for the maximum characteristics of an ideal well which are these:

(a) Sunk below the impermeable geological stratum i.e. a deep well.
(b) Well-lined with stone or brick set in concrete or cement.
(c) Lining carried above the surface into a parapet wall.
(d) Covered with a dust-proof and water-proof Cover.
(e) Provided with a sloping platform, to prevent Washings flowing into it.
(f) Fitted with a pump in preference to a Persian wheel etc.
(g) Of sufficient depth to ensure thorough sedimentation and a good quantity of water.
(h) No possible source of pollution e.g. latrines within 100 yards (at least 30 yards).
(i) Fenced from all sides.

(ii) **River as a source of water supply:**

River-water gets polluted from the villages, towns or habitations situated upstream of the place of drawing of water. Fortunately, however, river water gets purified automatically to some extent due to dilution, oxygenation effects as also due to plant life and sun's rays. There is, however, every reason to take precaution against pollution in the immediate vicinity of the drawing point. The following arrangements would prove to be of great help in cases of small rivers and streams. The river/stream bank should be patrolled and guarded for a few hundred yards upstream of the camp. The bank should then be divided into following zones and each zone prominently indicated by different coloured flags. These should be from upstream to downstream.

(a) **Drinking water drawl zone:** Here the water must be pumped out into the distribution tanks and not allowed to be drawn directly.

(b) **Animal water zone**: This zone may not be necessary in many camps.

(c) **Washing/bathing zone**: Persons using this area must be warned that use the water for drinking purposes.

(iii) Ponds lakes will get contamination through fouling the catchment areas. The rains infective material down slopes to the water.

(iv) **Piped water-supply**:

This may get infected at the source or sometimes passage underground. Such occurrence favoured especially after an earthquake, when the water-pipes and drainage-pipes may both get cracked their contents may mixed due to proximity of two types of pipes.

5. **Purification Water, different Stages:**

The term purification includes all processes that help rendering water for drinking. Thus, includes:

(i) **Removal of suspended matter e.g. turbidity**: A simple test of acceptable degree of turbidity like this. Look at printed matter through thickness of water-column under test. If the type cannot be read, then the water is too turbid needs settlement or sedimentation with the help of alum rate to 1 oz, alum per 100 gallons water. Alum very its even E.R. work, least for the water.

(ii**) Removal of hardness water**: Hardness water is due presence Magnesium Calcium Salts. They lead to diarrhoea or constipation. Boiling of water and/or addition of quick-lime removes the work, separate action need be taken to treat the hardness water. If sterilising powder used purification purposes, as given in para (iii) below, the existing proportions some extent removal hardness water.

(iii) **Sterilization of Water**: This should normally be the sole process involved in purification of water camps. The aim of this to all germs the water and Thus, it safe for drinking Sterilization can done by boiling or by addition of chemicals such as Chlorine, Iodine and Permanganate. Boiling of water and use of Iodine can done on very small scale (household methods) while Pot, Permanganate can be used large collections wells and most effective against Cholera germs, dose 1 oz. per 1,000 gallons. The most effective, well tried and cheaper method of sterilization water that chlorination of water. the water.

6**. Principles behind the Chlorination water**:

The principle underlying the chlorination of water that chlorination amounts such one part 10 million parts of water, has the property it.

The chemical process involved is believed to be Thus: -

(i) Ca (OC1), CI $+H_2$ O$+CO_2= CaCO_3$+HCI+HCIO
(ii) HCIO-HCI+O

Thus, when the hypochlorous acid (HCIO) being extremely unstable, breaks up immediately into HC and O the nascent Oxygen (O) acts as the lethal agent in this process.

7. **Limitations of Bleaching Powder**:

Although chlorination can be carried out in three ways, i.e. with bleaching powder. with chloramine or with liquid chlorine, for ER. purposes, bleaching powder will be found to be quite convenient and effective, provided its limitations are realized.

(i) The first is that bleaching powder is unstable and loses its potency on exposure to air. Addition of 20% quick-time improves its stability. Any sample to be must have a content of minimum 25% available chlorine.

(ii) The second limitation is that chlorine in water is absorbed by all oxidizable matter and it is not until the needs for chlorine by oxidizable matters are satisfied that free chlorine will persist in the water. This varies from water to water and therefore the amount of chlorine required has to be worked out for each type of sample of water. This usually works out to 1 to 3 oz. of bleaching powder per 1,000 gallons of water. The Hordocks Box is a simple device for finding out the exact dose.

(iii) The third defect is the fact that even slight over-dose leads to bad taste and odour to the drinking water and the dose must be worked out quite accurately.

8. **Chlorination Process**:

(i**) General process**: Chlorination of water can only be done on a known quantity of water. The process, therefore, involves following steps:

(a) Estimation of quantity of water in the well, tank, container to be chlorinated.

(b) Estimation of the quantity of bleaching powder needed for the quantity of water.

(c) Mixing up the bleaching powder in the water, by first making a paste of it and then distributing the same equally in all corners of the container etc.

(ii) **Estimating volume of water in circular and square well etc**.

(a) In the case of circular wells, the amount of water can be easily worked out by using the formula 5 X D X W-gallons of water, in which D-diameter in feet and W-depth of water column in feet.

(b) In case of square, rectangular wells, tanks, etc. the volume of water can be worked out by multiplying the length, breadth and height of water columns. This would give the volume of water in cubic feet. Multiply this figure by 6.25 to convert it into gallons.

(iii) **Chlorination of water in small containers**:

It may sometimes become necessary to chlorinate water stored in smaller containers e.g. 40-gallon tanks etc. or even water stored in buckets of 3 gallons capacity. Under such circumstances, measurements used for 1,000 gallons would have to be modified. Instead of 1 oz. per 1,000 gallons, the quantity required should be calculated at the rate of 2 level teaspoonfuls of bleaching powder per 100 gallons. Then for distribution in small containers e.g. 3-gallon buckets or even smaller containers, the following method should be adopted. Measure 2 level teaspoonfuls of bleaching powder in a tumbler. To this powder add 100 teaspoons of water. Each teaspoonful of this suspension therefore, contains sufficient bleaching powder to chlorinate one gallon of water. Therefore, add one teaspoonful of this sus pension for each gallon of water to be chlorinated.

9. **Requirements of Water per head**:

In camps arranged for E.R. purposes the amount of purified water made available may not be comparable to that made available in normal times in towns and cities and there may be a comparative shortage of water supply. Under such circumstances, it becomes necessary to take into consideration the minimum requirements per head per day. It has been worked out that a minimum of 3 gallons of water must be provided per head per day for cooking and drinking purposes. must be remembered, in this context that economy water supplies bound lead lowering standards of personal hygiene, which a camp life are usually below par. Therefore, a supply 10 to12 gallons water per day per head should be aimed at for all purpose.

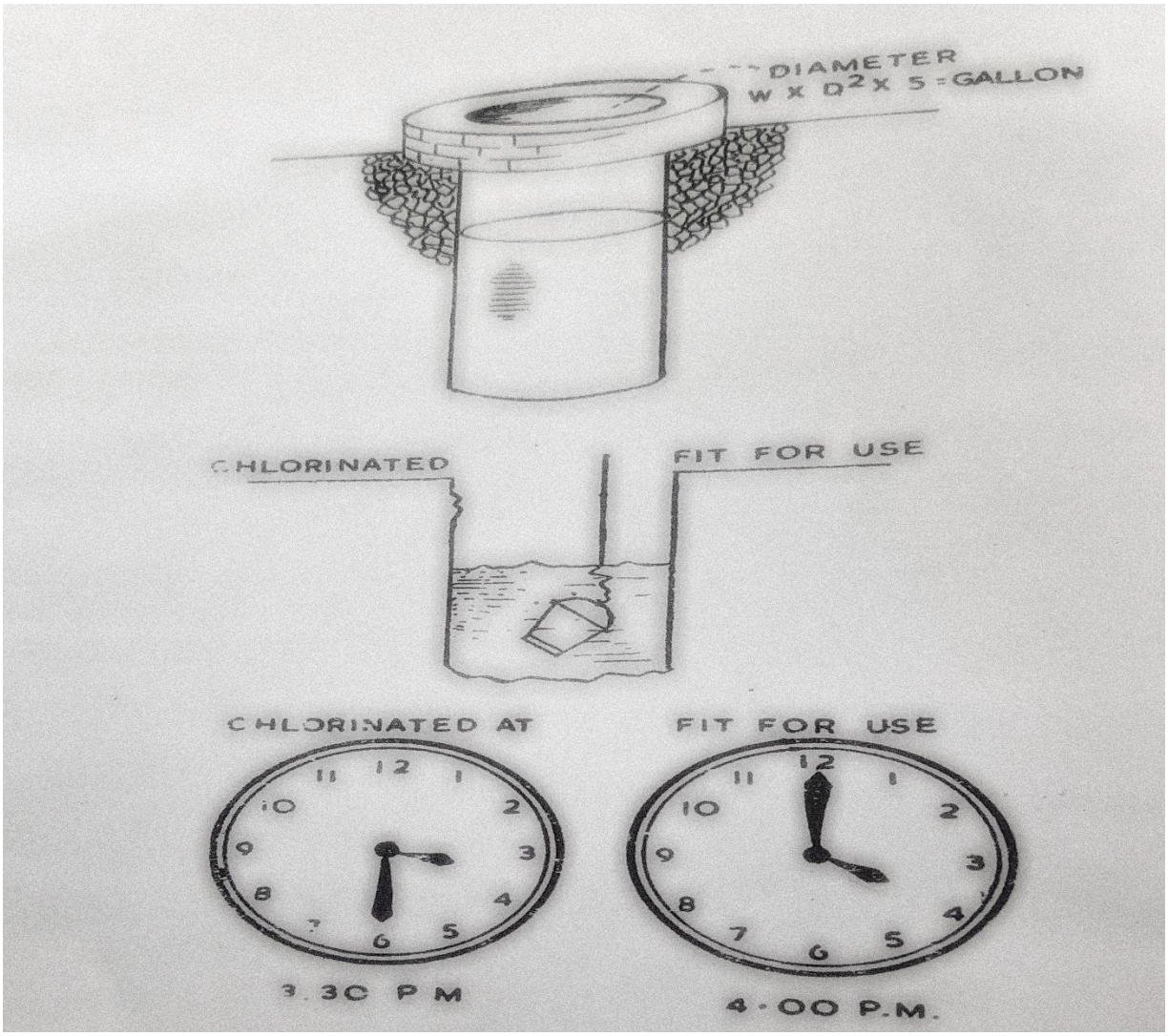
WATER PURIFICATION

Sources Water:

(i) Wells, deep and shallow
(ii) Tube wells
(iii) Rivers streams
(iv) Springs
(v) Lakes ponds
(vi) Piped water supply originating from a lake or river.

Diseases Spread by Water:

(i) Typhoid group of fevers
(ii) Cholera
(iii) Dysenteries
(iv) Poliomyelitis (Infantile paralysis)
(v) Infective Hepatitis (Jaundice)
(vi) Guinea-worm and other worms.



TECHINIQUE OF CHLORINATION OF WELL-WATER

1. Work out Volume of water in the well by using the formal.
2. Measure quantity of bleaching powder needed and mix in a small amount of water
   in a bucket. I oz of bleaching powder will be used per 1000 gallons of water.
3. Lower the bucket in the well- water and snake well.
4. Do not permit use of this water till half an hour has elapsed.

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CHAPTER NO. 60

FOOD-SANITATION

(Kitchen Sanitation in an emergency, enforcement of sanitation during disaster and in camps, method of food preservation)

1. **Object**:

Quite a large number of diseases are communicated from the sick to the healthy persons through the medium of food. In our homes and families, such infections are avoided through good habits and customs established through generations. When mass feeding is involved, clean habits may not be followed by all unless strict supervision is present. In mass feeding under disaster conditions, the principles of sanitation will have to be followed under difficult conditions and a breakout of an epidemic disease is to be avoided. All officials and volunteers concerned with mass feeding, must be thoroughly conversant with the subject of food and kitchen sanitation.

2. **Stages of Food-sanitation in Rest Centres, Shelters and Camps:**

(i) Sanitation of food and milk supplies in their raw stage i.e. before they are cooked. This will include inspection of food-stuff such as Atta, Rice, Dal, Tinned and fresh milk, vegetables and fruits for any obvious condition that may require rejection of the stuff for cooking purposes.

(ii) Sanitation of the kitchen i.e. while preparing and cooking of the food in relation to the sanitation of personnel, utensils, equipment and surroundings.

(iii) Preservation of food after its cooking and before it is served. This will be especially needed where cooked food is to be carried over long distances or balance of food cooked at one meal time is to be served at next meal. This will also include consideration of storage of fresh milk etc., after initial boiling.

3. **Inspection of Food before Cooking:**

(i) **Alfa and Flour**: The following points are to be noted:

(a) **Date of milling**: With very old stocks the "Chapattis" are likely to taste bitter. Further the atta may develop defects noted below.

(b) **Rancidity**: This result due to oxidative changes in the fat of atta. cause for rejection. This is no cause for rejection.

(c) **Mustiness:** This is caused by presence of flour-mite, an invisible creature whose presence is judged indirectly by irregular circles which get raised on a surface of atta made smooth (by say a knife). If the musty smell is present, the atta is unfit for human consumption.

(d) **Weevils**: These are present usually in rainy season. These beetles can be sieved away. With heavy infestation the excreta or larvae may render it objectionable. This beetle lays down webs of silky material.

(e) **Mould Infection**: This occurs due to a network of mycelia. If these lumps are removed by sieving, without breaking them, no harm can be done.

(ii) **Rice**: The insect infestation is of the same type as for atta. If moulds develop in sacks of rice exposed to rain, the rice at the centre of the sack can be used, as the moulds will stick to the sack mainly.

(iii) **Milk**: As fresh milk is always boiled before use in India, no diseases can be transmitted through milk. Some consideration of the tinned milk is, however, necessary. Two types of tins are in use.

(a) The commoner type has ends which have been simply soldered to the body without crimping, though the side seam is both crimped and soldered. This type is rather fragile and with rough handling, is liable to develop leaks at the end seams.

(b) The other type has crimped and soldered seams and is less likely to develop leaks. But etching (corroding) on the outside or inside of the tin is not sufficient cause for rejection of the contents. But the contents of leaking tins are liable to rapid deterioration. "Blown" tins i.e. those bulging from internal pressure should be condemned.

(c) **Unsweetened tinned milk**: Increase in acidity is very common. This leads to sour taste and Thus, makes it unfit for consumption. But sometimes, the fat gets separated leading to appearance of clotted cream. Sometimes de posit of calcium lactate is present. Such milk is quite wholesome and fit for use.

(d) **Sweetened tinned milk**: This is not likely to deteriorate due to bacterial action, but in hot climates caramelisation tends to occur resulting in brownish discolouration or even in reparation of sugar crystals. This is harmless and is not a cause for rejection.

(e) **Milk Powder**: This may be prepared from whole milk or skim milk (i.e. milk, less fat). The former is liable to develop rancidity if not kept under dry and cool conditions. For inspecting purposes dried milk should be reconstituted, by making a thin smooth paste with a little water and then adding 7 to 8 volumes of water. Defective milk powder forms streetlamps changes to a brownish yellow colour.

(iv) **Tinned Fruits**: "Blown" tins should not be condemned indiscriminately as the condition may due to:

(a) **Hydrogen swell**: Due to interaction of acid of fruit on the steel of the tin.

(b) **Fermentation**: Due to carbon-di-oxide from sugar fermentation.

In the above cases, the hydrogen, if carefully allowed to escape will catch fire. Such tins i.e. those due bulging due to hydrogen swell are quite fit for use.

4. **Sanitation of Kitchen and Surroundings**:

(i) **Personal hygiene of cooks and helpers**: This is one of the most important aspects for a check. All personnel employed in food handling should be examined by a Medical Officer to see that persons suffering from conditions such as common cold, sore throats, coughs, skin-infections, diarrhoeas and those with recent history of dysentery, cholera, typhoid or infective jaundice are not allowed to work in the kitchen. To ensure this, a nominal roll of all personnel examined by the M.O. and permitted to handle food should be displayed prominently near the kitchen. The undermentioned precautions should be taken to ensure that the standards of personal hygiene are kept up by all these personnel.

(a) A daily check of finger nails etc. should be carried out. Facilities should be provided to permit washing and rubbing hands.

(b) Where possible, separate clothing should provide for cooks and helpers. Where such be clothing is provided all personal clothing and belonging of cooks/helpers should be kept away from kitchen.

(c) Smoking or chewing of tobacco should not be allowed inside kitchen or eating places.

(d) "Aprons" should be provided in adequate numbers.

(ii) **Prevention of handling of food**: All unnecessary handling of food should be avoided. This can be made possible if sufficient number of ladles, spoons, kerchis etc. etc. are provided.

(iii) **Cleanliness of utensils**: All utensils should be freed from grease, cleaned and dried after each meal and placed for drying at a fly-proof, dust free place. Utensils should not be cleaned with earth. Ash from chullahs or baked sand is much more hygienic.

(iv) **Preparation of vegetables**: The usual tendency, in camp life, to use any surface to chop vegetables should be curbed and phattas, planks or some such surface which can be thoroughly cleaned before and after use, be taken into use.

(v) **Precautions after cooking of food**: After the food is cooked but before it is served, the food must be protected from contamination. The main sources of danger are the flies and the dust. Full protection against flies and partial protection against dust can be ensured even under disaster conditions, with the use of mosquito-nets. At the time of serving. full use of ladles, spoons and tongs should be encouraged to minimise food handling.

(vi) **Cleanliness of surroundings:**

(a) Food-scraps, vegetable peelings and all types of kitchen garbage should be properly disposed off in pits dug not very far off. If these are far off, refuse bins will have to be provided for near kitchen and cutting place.

(b) Proper arrangements should be provided for washing and cleaning of cooking utensils. The sullage water should be disposed off into a soakage pit.

(c) The 3-Ash pit system may be provided for cleaning of eating and drinking utensils.

(d) The drinking water point should be conveniently located and well protected against flies, dust and contamination with hands. A long handled large sized ladle should be provided for the purpose of serving water.

(e) The fly population must be controlled by periodic spraying of insecticides like D.D.T. or gammaxene around the kitchen and eating place area.

5. **Methods of Food Preservation**:

These have a limited meaning here. Cooked food of the type Dal, Potato or meat preparations sour easily and are capable of fermentation in hot weather. They should not normally be held over, for the next meal. But if the necessity arises they can be preserved to some extent by keeping them in a cool and well-ventilated place. The cooling effect can be had by keeping the utensils in a bigger vessel containing some water. Milk can be preserved over night by similar methods but boiling it for a few minutes after addition of some sugar before allowing to cool helps preservation considerably. When foods are to be preserved for a longer period than this, then more elaborate methods such as refrigeration, dehydration, salting and pickling, heating and canning and addition of chemicals such as salicylic, benzoic acid, or boric acid have to be resorted to.

6. **Enforcement of Sanitation:**

This will have to be done continuously, tactfully and intelligently by trained volunteers especially de tailed for this work. Co-operation from camp in mates will have to be ensured. The has to be spread over three stages of food sanitation, viz. inspection of uncooked rations, preparation and cooking of food, and distribution or storage and preservation of cooked food. Briefly stated, the following items are to be checked every morning and therefore, the work should be divided amongst members of squads specially appointed for this purpose.

(i) General cleanliness of kitchen and that of personnel working there.

(ii) Cleanliness of cooking and serving utensils.

(iii) Cleanliness of boards or planks where vegetables are prepared for cooking.

(iv) Disposal of sullage water from kitchen area and place where utensils are washed.

(v) Examination of fresh or tinned milk and raw ration to be cooked during the day.

7. **Rules for the Kitchen :**

To remind and guide all concerned with public health aspect of mass feeding a summary of important rules relating to kitchen hygienic should be displayed at all kitchen and dinning places. Theses are given at appendix “A”.

APPENDIX-"A"

RULES FOR THE HYGIENE OF THE KITCHEN

(i) No one will be employed in any capacity in the cook house or in handling of food who is a carrier of typhoid or para-typhoid fever or is suffering from or is under treatment for dysentery, diarrhoea or other communicable diseases. Before men are so employed they must be certified as fit by a Medical Officer.

(ii) An up-to-date nominal roll of all men employed in the cook house will be maintained. This roll will contain the inoculation and vaccination state as well as the medical inspection of the personnel and will be displayed prominently in the cook-house.

(iii) Personnel employed in cooking of food will be provided with the authorised clothing. Aprons will always be worn at work. They will be kept as clean as possible, and change when
dirty.

(iv) Running clean water (hot during winter) soap, a nail brush and clean towel will be provided in each cook house. All men employed as cooks and in the handling of food will keep their nails clipped short and will invariably wash their hands before they handle the food and after visit to latrines.

(v) No personal clothing, necessaries or private property of men employed in the cook house will be kept there, nor will men perform their toilet or wash and dry their under-clothing in the cook house. Clothes which are taken to the cook house and removed before overalls are put on, will be kept in a special place provided for the purpose.

(vi) Smoking in the cook house is forbidden.

(vii) There should always be sufficient supply of "Jharons" available for washing and drying dishes and cooking utensils. (The "Jharons" used for handling hot and sooty vessels will be separate and distinct). After the last meal, these clothes must be boiled in water containing washing soda and hung up to dry.

(viii) All posts and pans will be freed from grease, cleaned and dried after the last meal and placed on a shelf on their sides with their interiors exposed to the air and to view.

(ix) The cook house tables, chopping blocks, cutting up boards, knives, forks and spoons and all other utensils will be kept as clean as possible when in use and will be thoroughly cleaned after the last meal. All utensils, when not in use, will be kept in the places allocated for them and will be available for inspection at any time.

(x) Only food which is to be used during the current day will be kept in the cook house. When not in process of cooking or in preparation for cooking it will be protected from flies and dust.

(xi) Food-scraps, Vegetable peelings and such like refuse will not be thrown on the floor, but deposited in covered refuse bins provided for the purpose.

(xii) All cutting up of meat and vegetables will be done on the cutting up boards provided for the purpose.

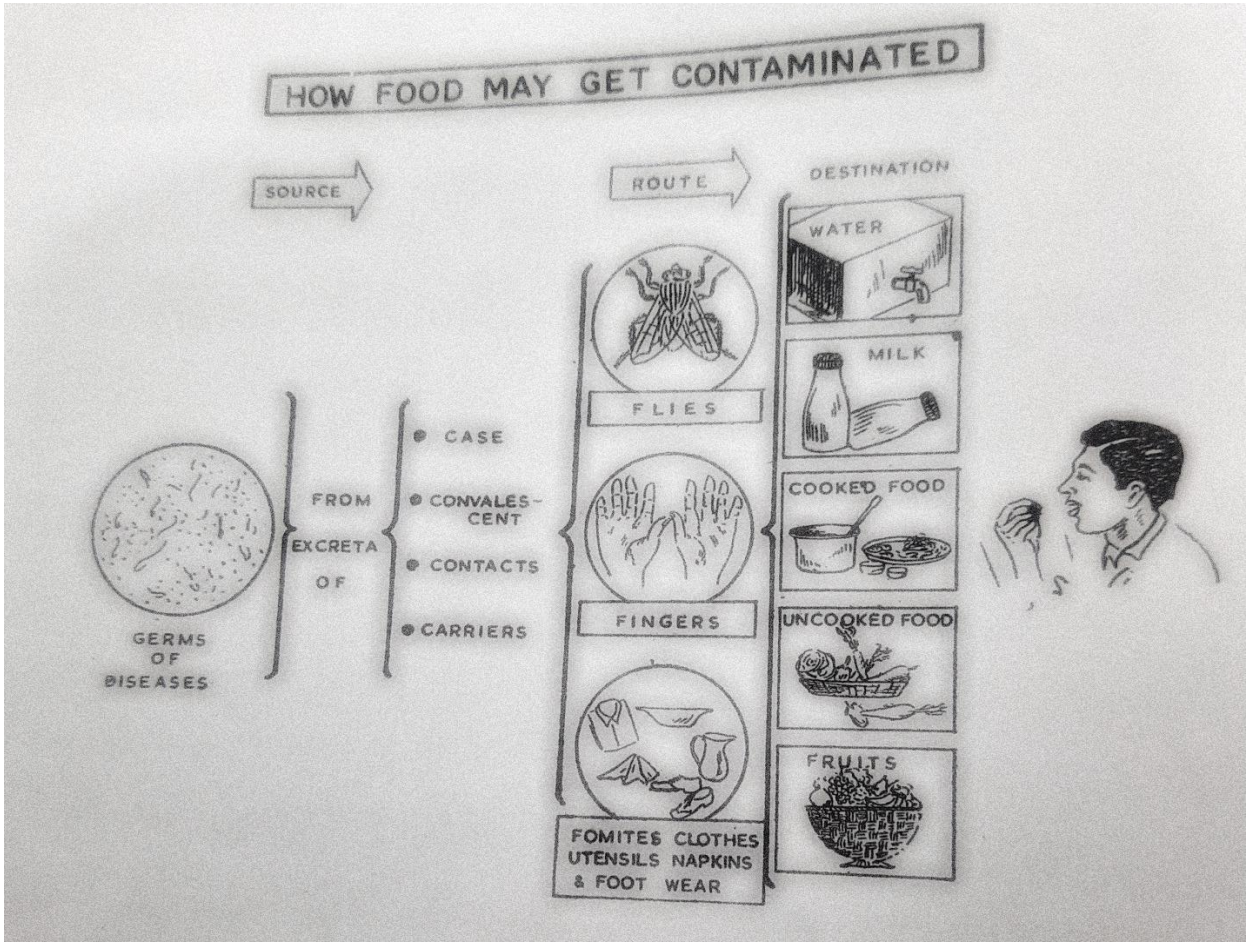
(xiii) The menu for the day will be displayed in the cook house.

(xiv) Adequate arrangements will be made for the cleaning and washing of eating and drinking utensils. The three-ash pits method is recommended.

(xv) The food must be served in such a manner that it will not be contaminated during the process of serving.

(xvi) The method of serving should enhance or at least not lessen the acceptability of the food or its appeal.

(xvii) The food should be served in such a manner as to reduce wastage to minimum.



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CHAPTER NO. 61

DISPOSAL WASTE MATTER, NEED FOR URGENT ACTION DISPOSAL OF GARBAGE, EMERGENCY DRAINAGE

1. **Object**:

In the general considerations for the public health in camps, it would be seen that the preventive measures are mainly focussed on wholesome water supply, safe food supply, hygienic cooking arrangements and lastly the sanitary disposal of waste matters especially human excreta.

2. **Definition**:

What constitutes waste matter in a camp? It can be divided into following groups:

(i) Human excreta.
(ii) Human urine.
(iii) Kitchen Cabbage.
(iv) Paper and other dry refuse.
(v) Animal litter.

3**. Need for urgent disposal:**

Human excreta can carry many intestinal diseases through flies. It is superfluous to say that it must be disposed of urgently. There are many reasons why the waste matter other than human excreta should also be disposed of urgently. These are:

(i) Organic matter within the waste undergoes rapid putrefaction leading to offensive smell.

(ii) It's presence is unsightly and objectionable.

(iii) It is breeding place for flies, while the garbage can become food for rats.

(iv) If rains occur, even the dry refuse and kitchen garbage will get washed away and cause nuisance elsewhere.

4. **Disposal of Human Excreta:**

These types of latrines are suitable for camps to be established for E.R. purposes. These are the shallow trench, the deep trench and the bore-hole latrines.

(i) **Shallow trench latrines**: These are to be used for camps which are not expected to be occupied for more than a week. These can also be used for camps for longer duration, as an immediate emergency measure, till the deep trench latrines described in (ii) below, are ready for use. The shallow trench Tartini system consists of a row of trenches arranged in parallel, each trench being 3 ft. long, 2 ft. deep. 1 ft. broad and 2 ft. away from its neighbour. The sods and earth removed in digging each trench should be neatly piled at its head end. The campers must be compelled to use the trench by squatting across it with a foot on either side. This is most important to avoid fouling of the edges. After each visit, the excreta must be carefully covered by loose earth heaped at the end of the trench and for this purpose some

sort of Shovel or scoop must be provided for each pair of trenches. It is important that users be explained the necessity of obeying this rule and that they should understand that not only fly-breeding will occur (if this rule is not followed) but that flies will carry infection from these latrines to the kitchen The number of trenches required are about 5% of the strength of the camp, separate rows may be kept for men and women. The trenches should be filled in after 24 hours or after they are half fall and a new row of trenches dug in front of the previous row i.e.. near the camp, to avoid walking of people across the filled in trenches. When filling in the earth should be well rammed and the sods re placed. The latrine area must be regularly patrolled by members of the camp sanitation squad to see that each user carries out the instructions mentioned above,

(ii) **The deep trench latrines**: This needs quite a lot of digging. Thus, for a 4 seated latrine, a trench 3 ft. wide, at least 8 ft. deep and 10 ft. long is required to be dug. The length can be increased at the scale of $2^1/_2$ ft. per seat. Further the ground for a distance of 4 ft. all round the trench should be dug to a depth of 3 inches and the loosened soil removed. Strips of oiled sacking each 5 ft. wide should be spread over this prepared area. The edge of the sacking next to the trench for a distance of 6 inches should be sunk into the ground to a depth of 6 inches and fastened in position with wooden pegs. Fly proof wooden super-structure is placed on the top of the trench. The loose soil which had been removed is mixed with heavy oil, replaced on the top of the trench, sacking and well rammed down into a hard-impervious layer. This device prevents the coming out of flies which may have bred in the trench. Once constructed, these latrines should work 6 months at least, if properly maintained. If latrine is of the necessary 8 ft. depth, liquefaction of the faces occurs, owing to the digestive action of a germ which lives at that depth below ground, where the amount of oxygen in the atmosphere is reduced. On this depends the proper working of the latrines. Therefore, on no account must any disinfectant which will kill this useful germ, be put actually in the trench. The liquefaction may, however, be hastened by pouring a bucketful of waste-water through each opening once daily for the 1st few days after the latrine is first put into use.

(iii) **Disadvantages of deep trench latrine:**

(a) It takes time to construct.

(b) Digging to the necessary depth may be impossible.

(c) The superstructure needs wood and a lot of carpentry work.

(iv) **Advantages of a deep trench latrines**: It however, is quite effective in serving the three-fold purpose for which any latrine is constructed in a camp i.e.

(a) To keep the flies away from reaching the infected faeces.

(b) To keep away the flies from breeding.

(c) It soils as little ground as possible.

(v) **The bore-hole latrine**: In this type of latrine, the earth is bored to a depth of 10 ft. to 20 ft. with an "auger" of a diameter varying from 4" to 16". A suitable small wooden superstructure is enough to keep the flies away as the darkness at the bottom of the pit does not attract flies. These latrines need not be sited very far away from the camp, and they last for a few weeks. The procurement of augers at a short notice, however, may not always be possible. Further, deep boring may not be possible in pebbly or rocky grounds.

5. **The siting of latrines**:

As a general rule, latrines should be sited on the leeward side of the camp, about 100 yds. away from living area and must have good approach road well lighted at night. A water point should be made available nearby.

6. **Urinals**:

These can be made out of empty ghee tins put over a soakage pit with gunny screens put around. Alternatively, an unclosed soakage pit, with gunny screen around it, can be used directly, without the necessity of having ghee-tins etc. This latter type will be found more convenient for women and children.

7. **Kitchen Garbage and other Dry Refuse:**

There are two possible methods for their disposal. These are burying or burning. If the weather is dry and the dry refuse is present in larger amounts then burning will be possible. This can be done in a large mud, chulla, specially constructed, with holes on all sides for ventilation or in a forty-gallon barrel, without bottom and having side windows. If the weather is likely to be wet or the refuse is not likely to-burn by itself, then it will have to be buried in pits specially dug for it. Each pit should be 4x4x4 ft. in size and at the end of each day, a thin layer of earth should be put over the contents of the pit.

8. **Sullage-water and emergency drainage**:

Sullage-water is the name given to waste-water which forms at washing, bathing and kitchen and dining hall areas.

(i) The kitchen utensils should be washed at a pace near a soakage pit into which all washings are carried away. At the dining place water point where the campers may wash their plates etc. the wastage of water can be reduced by providing hot ash from chulla in pits placed on a raised platform, and encouraging dry cleaning of the plates as is done in Rajasthan and Jammu and Kashmir, even in normal times. This ash, fresh from chulla, is much more hygienic than earth taken from anywhere. The latter may contain many types of worms or their eggs.

(ii) The waste-water from washing and bathing places will be too much for a soakage pit to absorb. Therefore, it should be led away in open, narrow drains to any low-lying area or divided into 7 drains, in a "Herringbone" style, using one branch every day and allowing other 6 to dry up, by rotation.

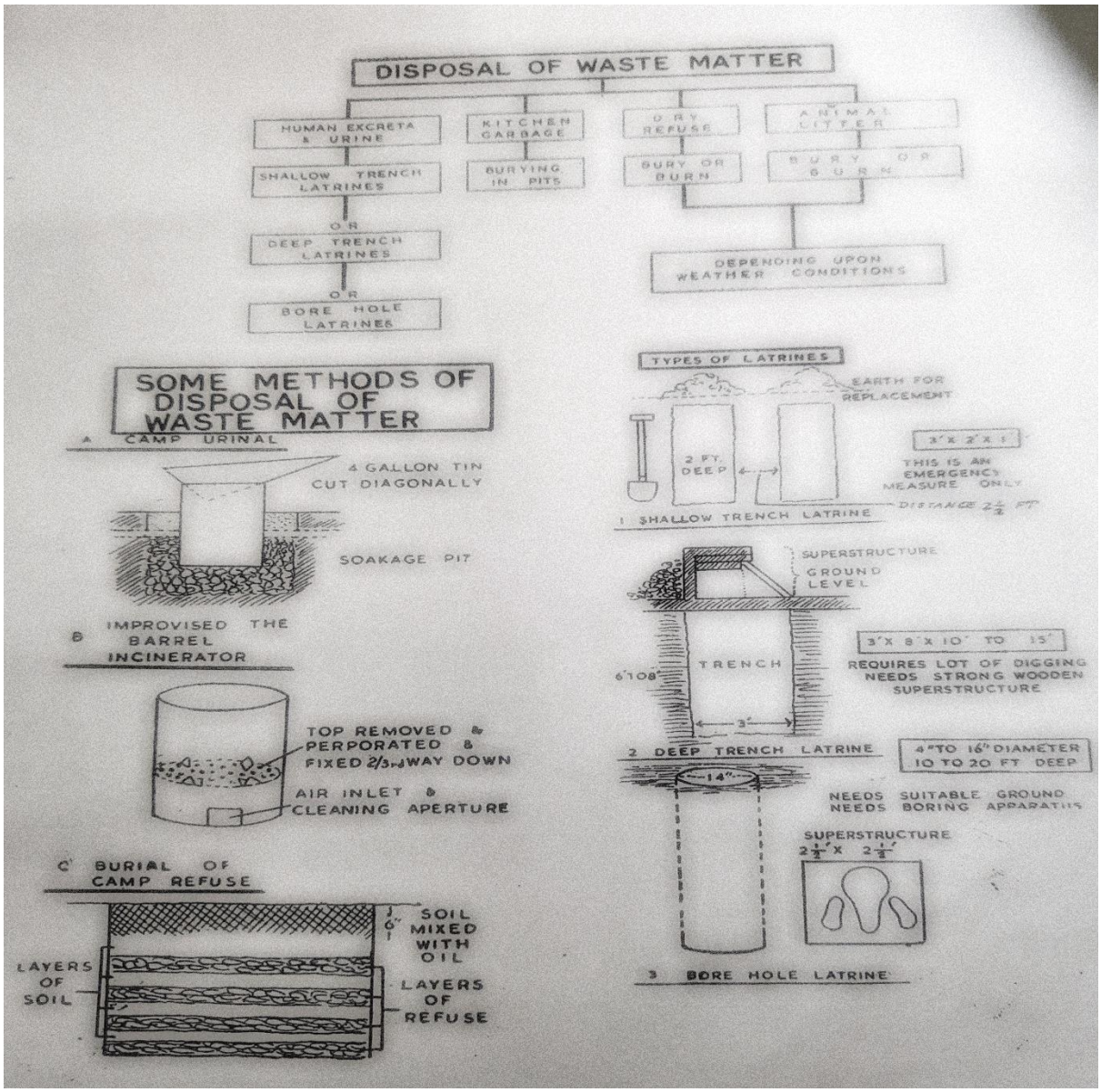
(iii) **The rain-water drainage**: If a camp is tent ed, unless special precautions are taken to ensure that, in case of rains, no water comes inside the tents or collects in pools, there will be hardship campers due to having a wet floor to sleep on, and to the due also to breeding of mosquitoes in the rain water collections. It is, therefore, extremely essential that immediately after tents are pitched, two types of sur face drains are dug. These will be:

(a**) Drains around the tents:** These should be roughly 6" broad and 4 inches deep. The inner edge of this drainage should be flush with the outer fly of the tent, but the excavated earth should be heaped on the away side of the drain. This will prevent damage of ten flies due to white-ants.

(b) A second larger drainage of rain water should be dug through length and breadth of the camp. taking into consideration the slope of the ground. All the smaller drains from around each tent should be made to drain into this larger drain and all rain water is Thus, carried outside the camp and if necessary, it can be treated with oil or D.D.T. for control of mosquito breeding etc.

9. **The Construction of a Soakage Pit:**

A soakage pit consists of a pit 4 ft. cube, the soil at the bottom being loosened and the pit filled to within 6 inches of the surface with empty Ghee tins burnt and perforated, or stones graded with larger ones near the bottom and smaller ones at top. The top of the stones is covered by a layer of oiled sacking with one more suitable opening in it, de pending on the number of openings there are to be for urine to flow into the pit. When the urinal is in position, the soil is replaced on top of the sacking, up to ground level, and beaten down hard. It is of advantage to mix the top layer of soil with oil to give a hard, waterproof surface.



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CHAPTER NO. 62

GENERAL ORGANISATION AND FUNCTIONS OF CIVIL DEFENCE WELFARE SERVICE

1. **Object**:

The object of this lesson is to study the general organisation and functions of the Civil Defence Welfare Services.

2. **Introduction**:

Air Raids render a large number of persons homeless. The morale of the community is adversely affected. There is panic and confusion. There are many persons without food and clothing. Members of families are separated from each other, there may be many who are either killed or have been injured and removed to the hospital without intimation to their friends and relatives. In a way, the whole community after a disaster has to be rehabilitated to bring about the normalcy of life. The Civil Defence Welfare Services aim to minimise the sufferings of the community in respect of the above-mentioned effects of the disasters. Besides this, Welfare Services play a decisive role in raising the morale of the civilian population in the event of war through information and publicity.

3. **Functions of the service:**

The functions of this Service in general are:

(i) **Information**: Supply of information regarding missing relatives, dead etc., nature of facilities and assistance available for affected people, enrolment in Civil Defence Service and such other matters. To deal with the panicky people and restore public morale by giving the victims the authentic information and the correct advice. Also, to deal with individual cases of terror and under extreme pressure of stress and strain of an air raid by giving them psychological first aid.

(ii) **Care of homeless**: Provision of Rest Centres where people whose homes are destroyed by air raids may be given temporary shelter, food and clothing.

(iii) **Exodus**: A large number of people in panicky conditions may resolve to leave certain areas and this could result in a very haphazard movement and a confused state of affairs. The assistance will have to be provided in the event of such an eventuality to assist people to move in unorderly fashion and make arrangements for them during transit and at the destination.

4. **Organisation of the Welfare Services:**

Following are some of the Welfare Services measures which constitute the general organisation of the Welfare Service in Civil Defence

(i**) C.D. Information Office**: In each town, where C.D. is organised C.D. Information Offices will have to be set up and in large towns more than one Office may be required. The primary function of the Information Office will be to give information to enquiries. on all matters connected with Civil Defence both before and after raids, to collect information regarding casualties and to publish casualty lists for the information of the public. This part of the service under the Information Office may be termed as "Registration and Enquiry

Organisation". In this, information about the dead, injured, missing, lost and those accommodated in various camps and Rest Centres is communicated to one Central Office which further disseminates the required information to the concerned centres for their use for answering individual public enquiries. At this Information Centre some skeleton staff will be required to deal with the public and Information Officers will have to be carefully selected for their tact and patience as these qualities will be needed in dealing with the enquiries especially after raids. The exact kind of information that should be available at the Information Office is as in the Appen dix.

(ii) **Housing**: As far as possible vacant buildings, schools etc., should be used for housing those rendered homeless. Emergency Camps should be set up only in exceptional cases. When people evacuate themselves on a large scale the arrangements will have to be made for their shelter, in camps etc. till such time as they can return back to their homes.

(iii) **Feeding**: The Rest Centres will normally cater to the needs of people whose homes have been temporarily rendered unfit for habitation. Serving of refreshments on the spot to the people affected by a disaster helps considerably in reassuring people and in toning up their morale. The general public will need rationed foodstuff and fuel. Usually after an emergency either the shops close down or the black marketeers indulge in profiteering. Arrangements will have to be made so that a few shops dealing in essential commodities can be taken over immediately. There will also be need for some emergency meals centres which can serve cooked meals to a fairly large number of populations. Home Guards may be willing to man these services and use should, therefore, be made of their assistance. Feeding of personnel working in Civil Defence Services and not stationed in Depots may be done through Mobile Canteens. To ensure against failure of water supply it may be necessary to rush drinking water in Mobile Water Tanks.

(iv) **Clothing**: People who are required to leave their homes all of a sudden or those whose houses are completely destroyed, are left sometimes almost without clothes. The Welfare Services take steps to provide adequate clothing to the people in accordance with the needs of each depending upon the tea son and availability of a large number of clothes for this purpose. To meet the needs of the people in respect of clothing, the collection drives may be organised and it may be considered that Wardens would be able to assist very much when they are not otherwise engaged. It is envisaged under this measure in Welfare Service that there will be collection organiser who should be made specifically responsible for emergency clothing who should organise such collection drives from time to time, arrange for the clothes to be mended, washed etc., and should stock them with the Supply Service. The Supply Service would issue the supply of clothing as and when necessary to the Rest Centres where they will be issued to the deserving people.

(v) **Evacuation**: In the event of an air travel their e part may result what is called the panic flight on the of a large number of residents in an area. Even though no sponsored movement is envisaged yet the efforts will have to be made to regularise such haphazard movement on the part of the people and provide such facilities as transport and personnel from the Welfare Services as will help people to move out smoothly without undue loss of life, confusion and panic etc.

APPENDIX

The kind of information that should be available at the Information offices is as follows:

(i) **Information and advice regarding:**

(a) Enrolment in the Civil Defence Services.

(b) Procuring sand, sand-bags, and stirrup pumps.

(c) Structural precautions choice of refuge room, carrying out lighting restrictions, repairs to gas, water or electric installations in private premises. assistance in matters of sanitation and public health, assistances in repairs to slightly damaged houses and in pulling down dangerous buildings and clearance of debris.

(d) Supply of official technical manuals and hand books another C.D. literature.

(e) Voluntary evacuation.

(ii) Information as to what to do before during and after an air raid.

(iii) **Information regarding the location of:**

(a) Warden's Posts and the area served by each.

(b) First aid posts and the area served by each.

(c) Fire Brigade Stations and the area served by each.

(d) Police Stations and the area served by each.

(e) Salvage Headquarters and details of salvage scheme?

(f) Government or Municipal controlled food shops.

(g) Rest Contras and Emergency Meal Centres.

(h) Hospitals.

(i) Mortuaries, burial and burning grounds.

(j) Routes for leaving the town and advice regarding voluntary evacuation.

For this purpose, a Map on a scale as large as possible with information plotted on it is most desirable.

(iv) Names, addresses and telephone numbers of all Post Wardens and other Civil Defence Officers of equal or higher ranks along with the details of the area they serve.

In addition, there should be an abundant stock of all civil defence leaflets and hand books, priced publications as well as those to be distributed free of charge to the general public. The Office should also be prepared to receive complaints and suggestions from the public, to deal with the n courteously and expeditiously and to transmit them to the appropriate authority for the necessary action. It is advisable that responsible Executive Officers of the Post-raid Relief Service, such as War Injury Claims, Repairs to house Salvage. Care of Homeless should be located in or close to the same premises so that enquiries need

not be re-directed to several separate Offices, perhaps some distance away from the Information Office.

(v) **Post Raid Information:** The Information Officers should be able to give the following information:

(a) Whereabouts of persons who are reported missing after" an air-raid.

(b) What assistance, Government or private, is available for persons whose homes have boom bombed e.g. location of emergency feeding centres. Rest Centres and accommodation available therein.

(c) Information about facilities available for repairs, in case where people can return to their homes after minor repairs.

(d) The particulars and necessary application forms for getting monetary assistance under the War Injuries Scheme to enable the persons affected by air-raids to rehabilitate themselves.

(e) Location of emergency Government or Municipal food grain or Ration Shops.

(f) Information regarding persons injured or dead and their disposal. Advise on problems such as loss of ration cards, clothing and chattels, pension papers, identity cards, insurance and valuable documents.

ORGANISATION OF WELFARE SERVICES

UNPONDERED EVACUATION
POOL UP TRANSPORT LIAISON WITH FEEDING AND HOUSING SECTIONS PROVIDING GUIDES TO EVACUATE PEOPLE TRAFFIC ARRANGEMENTS CARE OR CATTLE

HOUSING
VACANT BUILDING SCHOOLS
EMERGENCY CAMPS

FEEDING PROCUREMENT OF FOOD GRAIN THIS MAY BE
A RATIONED-OUT OR
B SUPPLIED AS COOKED FOOD

CLOTHING REQUIREMENT SHOULD BE
A ESTIMATED
B PROCURED AND
C DISTRIBUTED

PUBLICITY AND INFORMATION GENERAL INFORMATION ON RELIEF OPERATIONS DETAILS INFORMATION REGARDING SERVICE ARRANGEMENTS AND MISSING PERSONS.

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CHAPTER NO. 63

PSYCHOLOGICAL WARFARE

1. **Object**:

The object of this Lesson is to discuss some of the important aspects of Psychological Warfare and the role of the Civil Defence Services in keeping the morale of the population high.

2. **Psychological Warfare and its Objectives:**

In the present times a nation stands threatened by its enemies not only by the armed might and the use of force, but also by successful use of diplomacy and propaganda against it to the point of jeopardising its freedom and destroy its independence. The weapon primarily concerned with affecting these forces has been called Psychological Warfare. The latest thinking on the use of this weapon has led to great strides both in peace and war with the result that the name psychological warfare given to it very much diminishes its scope since it is not logical to call it so when used for friends in peace. Today it may be more aptly described as a "Political Communication". In war when used against enemy its aim is to spread panic, lower morale, disrupt discipline, team-spirit and mutual co-operation, create internal disturbances and spread false rumours to keep people at unrest. Following are some of the methods used in peace time for waging Psychological Warfare/Political Communication.

(i) By undermining the authority of a collective and mutually accepted institution for settling all disputes in peace time and then individually intimidate the concerned members to force them to agree to dictated or desired solution of the one trying to force its will.

(ii) By destroying the unity of certain groups of nation which see eye to eye with each other in their general policies. This is done by misinterpreting the economic or other efforts of aid and help amongst themselves and arousing suspicion in one weak against the one who is powerful.

(iii) By arousing the deep-seated racial prejudices and Thus, creating trouble by causing wide spread confusion, born out of fighting and non-cooperation amongst the various groups.

(iv) By creating internal division. This is done by arousing the resistance by opposition political parties against them, otherwise progressive and accepted social and economic policies of the party in power.

(v) By making consistently the conflicting statements addressed to the enemy nation and its people at large. This tends to create a psychological set back in the minds of the people who are otherwise strongly united in their “Will” to resist any insidious moves of the mischief monger.

3. **Some Techniques and Methods of Psychological Warfare Operations against Civilians**

Some of the methods and techniques of Psychological Warfare against the civilians are listed below:

(i) **Radio**: A big radio network both short and standard wave is organised and varied programme of news, recreational programmes, and other feature programmes are transmitted which affect the opinions and actions of the people. In this, there will also be possibility of "Black Radio" coming into operation wherein the enemy agents in the homeland may be transmitting as if the news were coming from the station of the homeland.

(ii) **Communication through the mails**: Under this enemy will send enormous quantity of propaganda material through the mails sometime postage-free and in this effort are also made through enemy agents to finance certain friendly organisations and associations of the enemy to procure and distribute all pro-enemy literature and material etc. to the civilian population. This method was used in the Second World War but it was particularly more successful in the World War I.

(iii) **Leaflets**: The Psychological Warfare operates by leaflets and they are most commonly used and in this the following types of communications are addressed through leaflets:

(a) Communications from the legitimate authorities (whether Government in exile, underground or friendly quisling) of the civilians addressed.

(b) Novelty materials appealing to children and in this the use of colour-printing, vivid illustrations, pictures of air-battles, how it works, diagrams of weapons and so forth.

(c) Gifts: Soaps, salts, needles, matches, chocolates and similar articles dropped to civilian populations. (This demonstrates the wealth and benevolence of the giver).

(d) Leaflets exclusively appealing to women are likely to be more helpful as normally 50% population of women anywhere is likely to go up in the event of war, when men folk will be away at the battle front. This figure in war may rise to from 60 to 70 per cent. The women face the social and economic situations more than do men, because the responsibility for maintaining homes and children normally falls on them, and Thus, such leaflets having more appeal will be successful and serve as potential propaganda material.

(iv) **Pamphlets**: Where air dropping facilities are plentiful leaflets can be supplemented by pamphlets. Pamphlets have the advantage of giving propagandist more space for text or pictures enabling him to tackle enemy arguments in details or in depth."

(v) **Subversive Operations**: In this the effort will be made to direct propaganda to friendly civilians whose country has been over-run by the enemy and it can be effectively promoted in collaboration with local patriots. Another effort of subversive operations is by bold black propaganda operations. The dropping of few hundred tons of well counterfeited currency would tend to foul up any fiscal system. There are a number of other effective measures which can be taken under the subversive operations.

(vi) **Motion Pictures**: Though these can be very effective in actual operations in a war yet they are limited by financial and commercial control plus censorship.

4. **Propaganda and Rumour and Psychological Warfare:**

Propaganda in Psychological Warfare plays a very important role and with its help conscious attempts by words and actions are made to influence the attitudes and the actions of persons towards a predetermined end. From the time of its launching some time has to claps before it can have its effect in changing the opinions of the people. However, there are some objectives which are designed to achieve quickly and on a short-term basis. The former is term ed as Strategical and latter Tactical Propaganda which has to be highly specialised and this is made of those activities in the field of propaganda and the psychological warfare that a Government orders to be undertaken behind its back and if they are detected. Government generally speaking, will, if it can, disown them. Many examples of such black propaganda are available in the Second World War where the broadcasts in German were being beamed at the people in Germany purporting to be coming from German stations, whereas actually they were from the enemy.

5. **Attributes of Propaganda**:

(i) It should be based on facts.

(ii) It should be such as the public opinion is likely to support it.

(iii) It must be congruent with national policy and objectives and the plans for their attainment.

(iv) It must rest on considered basic opinion and attitudes of its audience.

(v) it must always be combined with positive action and hence propaganda more often plays the auxiliary to action. It is never in the primary role.

(vi) It must be undertaken in terms of action responses desired from its targets.

(vii) It must be based on efficient organisation and should have central direction at the top executive level in Government.

6. **Civil Defence and Psychological Warfare**:

A well-planned programme of publicity and propaganda through Press, Radio and other means should be instituted at various levels by the Civil Defence Authorities along with other measures as follows:

(i) By counter-acting rumour by enemy through propaganda.

(ii) By carrying out C.D. Operations in an emergency with candour, sympathy and integrity.

(iii) By dissemination of correct and authentic in formation to the civilian population through mobile vans and information offices.

(iv) Muster help of local and influential leaders to tackle the panicky people.

(v) Help of the other reputed people of the area should also be taken who should address the masses on radio or appeal to the people through the Press and leaflets etc. For this the C.D. Controllers should make their own panel of broadcasters, speakers and writers etc.

7. **Technique of Rumour Mongering:**

Unless the spreading of rumour, is elaborately planned, it will not meet with any success whatsoever. Rumours are spread by some of the following methods.

(i) By putting about stories on radio containing some percentage of truth also in the same.

(ii) Rumours are spread by enemy agents who are specially employed for this.

(iii) This is not a method but inadvertently often the rumours spread through idle gossipers due to their careless talk.

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CHAPTER NO. 64

PANIC, ITS CAUSES CONSEQUENCES PREVENTION AND CONTROL CROWD BEHAVIOUR AND PSYCHOLOGICAL FIRST AID

1. **Object**:

The object of this lesson is to study the causes, consequences and prevention and control of panic in an emergency.

2. **What is Panic?**

Panic is characterised by the chaotic environment of sudden mass destruction and can create grossly magnified psychological and behaviour reactions in the survivors. Some of the reactions can exist before, during and after an air attack with the major reactions being fear and panic. The two are intimately connected with each other and difficult to separate. Fear can be the most crippling of emotions. The meaning. of events is lost. Victims will be incapable of any action and if there is one, it will generally be ineffectual or inappropriate because clear reasoning and judgment have been lost. Panic is often the product of fear. This occurs mainly during the warning or threat period before an air attack. This often results in immediate flight. This is very contagious and soon man becomes the primitive man united with the herd.

3. **Causes of Panic**:

Even though it has been described that the people will react in disaster situation as above, there are a few other causes which contribute to the said behaviour pattern of people in disaster.

(i) **Rumours:**

(ii) **Sense of insecurity**:

The feeling of insecurity is further reinforced due to the following:

(a) Lack of suitable and gainful employment.
(b) Lack of things essential to life e.g. food, clothing and shelter.
(c) Lack of adequate protective and preventive measures such as medical facilities, rescue, first aid etc.
(d) Breakdown of law and order.
(e) Breaking of family life and loss of relatives and friends etc.

(iii) **Perceptual Experience**: Perception of vast devastation and a large number of dead and dying people have a terrifying effect upon the people and may produce panic.

(iv) Lack of training.

(v) Element of surprise.

(vi) The harmful activity indulged in by anti-social elements such as black-marketeers and profiteers etc., who create an anxiety into the minds of the victims.

(vii) Lack of information about relatives and friends.

4. **Consequences of Panic**:

In the event of disasters, the real consequences of a mass panic may be absolutely absent but some of the consequences given below are bound to result which may be a great hindrance in the successful conduct of Relief Operations.

(i) **Crowd behaviour:** It is ruthless, irrational and wild behaviour of a number of people in which most of the people often exhibit harmful behaviour without even knowing as to why they are doing so.

(ii) Panicky masses may block certain roads and routes necessary for the movement of incoming relief services to the place of damage.

(iii) More casualties may result because of the un thoughtful behaviour of people who in their endeavour to move to safer places may actually land into more dangerous ones.

(iv) Panic may give ample opportunity to anti-social elements to disturb law and order.

(v) It may curb the activity of self-help on the part of a community which is very essential to fight the disastrous effect of calamity.

(vi) The impact of a disaster stimulates feeling of helplessness and intensified fear.

(vii) A widespread selfish behaviour on the part of the individual or groups of people in which regard for others, safety and comfort is completely lost sight of.

5**. Prevention of Panic:**

Prevention of panic amongst the victims of a disaster by providing Welfare Services to them is based on the achievements of certain basic objectives. The first of these is speed of service. The second objective in the prevention of panic is "help people to help themselves". Some more considerations to prevent panic are as follows:

(i) Re-establishment of family life with the help of Emergency Information Service.

(ii) Provision of Welfare Services such as feeding. clothing and housing.

(iii) Development of sense of security by associating people in pre-emergency period with the planning of relief measures.

(iv) Publicity and Propaganda: Adequate measures should be taken for publicity and propaganda amongst the victims during an emergency. Correct information should be available to the people in an emergency and the rumours should be counter-acted to avoid their spread and consequently the panic.

6. **Control Measures**:

(i) Publicise Relief arrangements.
(ii) Provide adequate food, water and other necessities of life to the victims of a disaster.
(iii) Curb anti-social elements by bringing them to book.

(iv) Reassure public frequently that everything possible is being done for them.
(v) Set example of devotion to duty (high morale of Relief Services can have a salutary effect on people).
(vi) Arrange for orderly evacuation wherever necessary.
(vii) Mobilise Relief Services and render relief and succour quickly.
(viii) Give psychological first-aid to the people suffering from panic and shock. Segregate such cases from others as far as practicable.

7. **Control of Crowd:**

It is very difficult to describe as to how a mass of people will behave in a crowd in case of an emergency. However, it is possible to outline certain general features of mass behaviour exhibited by a mass of people in a particular situation. Some of these are listed below:

(i) A marked tension and conflicts are present amongst the victims over the available amenities of life such as food, clothing and living accommodation.

(ii) An inevitable result is selfishness which rises further in the absence of effective control from within the crowd.

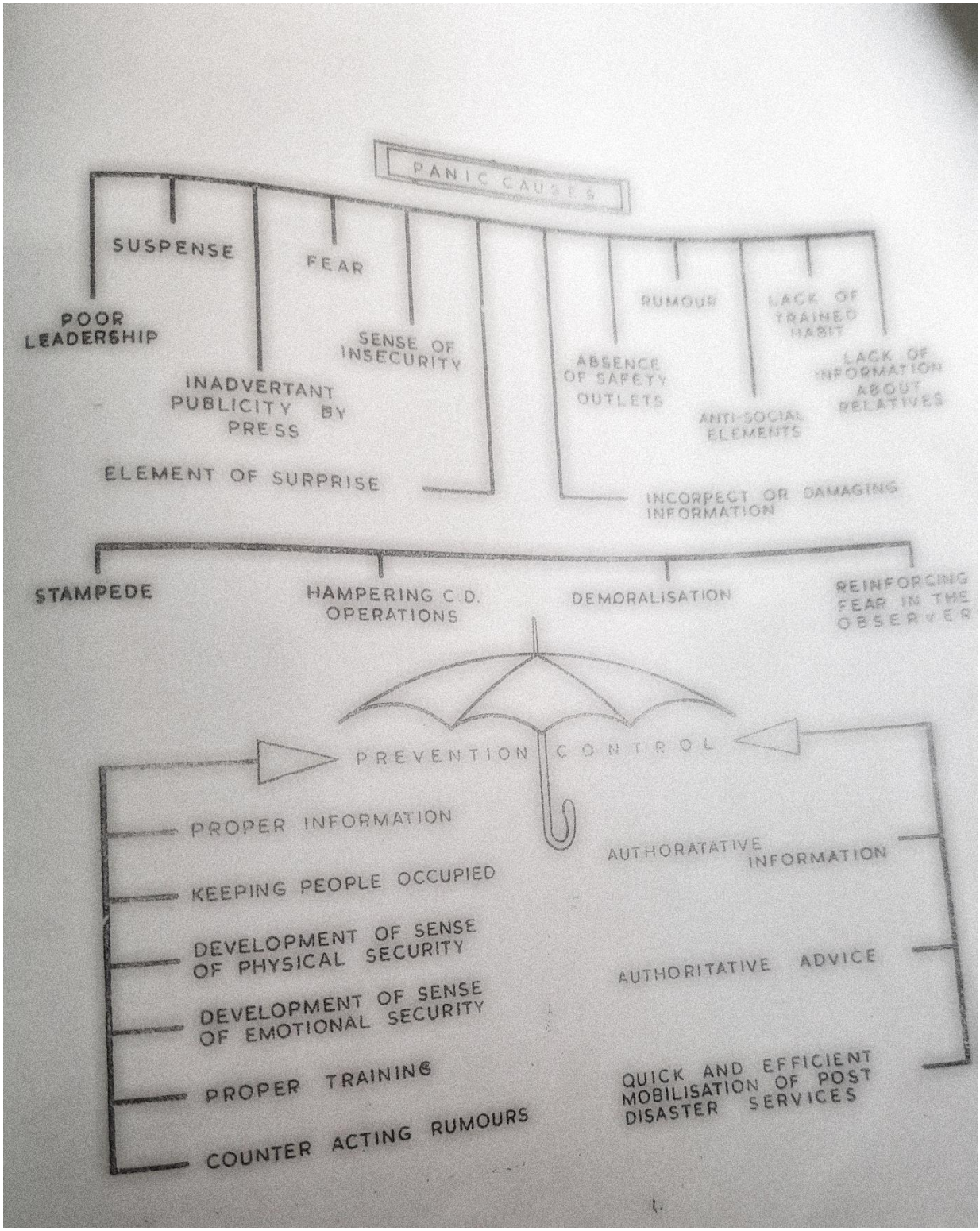
(iii) People may start pushing and shouting and snatch whatever they can for themselves with. out regard for others and all in a most dis orderly manner.

(iv) Everyone in the crowd is likely to feel that he was in an emergency and that he alone should be served right away.

8. Psychological First-Aid for the Victims in Disaster:

The effort of the Civil Defence Workers to reinstate confidence of the people under immense emotional shock is called the psychological first-aid. Some of the principles of the psychological first-aid are given below:

(i) Accept the victim's right to feel as he feels.
(ii) Let him know that you want to understand how he feels.
(iii) Do not overwhelm him with pity.
(iv) Do not criticise his feelings.
(v) Gain his confidence by trying to see the disaster as he does.
(vi) Give patient hearing to what he wants to ex press without abruptly interfering in it.
(vii) Accept the victim's limitations as handicaps as real without trying to minimise them.
(viii) Realise that he does not want to feel the way he does.
(ix) Help him to help himself by enabling him to use his own mental and physical resources. This will help him to regain emotional control of himself rapidly.
(x) Size up the victim's potentialities as accurately and as quickly as possible. Find out if he is greatly concerned about family and friends. Assure him to the extent you can, so that he may establish contact with them.


PANIC CAUSES
SUSPENSE
FEAR
POOR LEADERSHIP
INADVERTANT PUBLICITY BY PRESS
SENSE OF INSECURITY
ELEMENT OF SURPRISE
RUMOUR
LACK OF TRAINED HABIT
ABSENCE OF SAFETY OUTLETS
ANTI-SOCIAL ELEMENTS
LACK OF INFORMATION ABOUT RELATIVES
INCORPECT OR DAMAGING INFORMATION
STAMPEDE
HAMPERING C.D. OPERATIONS
DEMORALISATION
REINFORCING FEAR IN THE OBSERVER
PREVENTION
CONTROL
PROPER INFORMATION
KEEPING PEOPLE OCCUPIED
DEVELOPMENT OF SENSE OF PHYSICAL SECURITY
DEVELOPMENT OF SENSE OF EMOTIONAL SECURITY
PROPER TRAINING
COUNTER ACTING RUMOURS
AUTHORATATIVE INFORMATION
AUTHORITATIVE ADVICE
QUICK AND EFFICIENT MOBILISATION OF POST DISASTER SERVICES

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CHAPTER NO. 65

PROBLEMS OF EVACUATION

1. **Objects**:

Large scale movement of people from areas which are either affected or threatened by a disaster to safer areas, is termed "Evacuation of the population". This causes dislocation of normal life and a lot of sufferings and misery to the people affected. The evacuation of the population therefore, should be avoided at all costs. But under the threat of air raids or after an air raid, people may start aimless evacuation and if such an evacuation is not properly controlled, it will cause a lot of suffering. In the following paragraphs we will study this problem.

2. **Types of evacuation:**

Depending upon the time at which evacuation is affected, it could be categorised as "Pre-disaster" to "Post-disaster" evacuation. The Post-disaster evacuation creates many problems. After the impact of the disaster the disruption of means of communication and transport and panic will make orderly evacuation. impossible. It will be difficult to know the extent of dislocation, the number and place at which the evacuees have collected and the nature of their immediate needs etc. Once a population have made up their minds to leave the town, it is humanly impossible to persuade them to stay back. Therefore, the Civil Defence Authorities must be prepared in advance to deal with such evacuation. The evacuation in the pre-disaster period or even the post-disaster period, could be at the insistence of the Administrative Authorities concerned. Such evacuation is called Sponsored Evacuation and very well thought up plans for such evacuation could be prepared in advance. The categories of personnel to be evacuated and the number involved can be worked out, which will facilitate the proper evacuation. But the population of a town may not like to leave their homes. It is not proposed by the Government to resort to sponsored evacuation. However, it is possible that the evacuation may start spontaneously by the inhabitants of a particular locality due to fear or false rumours. Efforts to persuade people through local leaders may alley panic and may reduce the problems. but it is not possible to put any practical ban on such unsponsored evacuation. Such evacuation is not desirable, but it is essential that plans are made and measures adopted to turn this unsponsored evacuation in to an orderly movement of the people from a town. The following are some of the important points to be remembered in this connection.

3**. Problems of large-scale evacuation:**

The following difficulties will be faced in dealing with large scale evacuation.

(i) The evacuees may not know the places which could be safely and quickly reached and they may rush to places where no help can be sent to them for days, for lack of coordination.

(ii) The evacuees may use the routes which are open to danger or may be required for essential military etc. operation. The evacuees may Thus, even be stranded on the way resulting in administrative problems for the local authorities.

(iii) Lack of adequate transport facilities will result in panic, mass exodus on foot and other odd conveyances which will hamper the pace of, and arrangements for, proper evacuation.

(iv) In an emergency everybody is panicky and hence the tendency to leave the area first of all. Proper checks will therefore have to be maintained by the local authorities.

(v) A very large number of people may converge at one point and the congregation may be too large for case of handling, with every chance of panic breaking out. Therefore, there is the necessity of collecting the people from each locality at a specified point.

(vi) The evacuees may from unmanageable groups without proper guidance. Therefore, unless escorts and guides are provided, the movement may be delayed and the people may go to the wrong places.

(vii) **Traffic jams may result due to**:

(a) Indiscriminate use of roads by all sorts of slow- and fast-moving conveyances as well as those moving on foot.

(b) Narrow roads, blockage due to damage to roads, debris, breakdown of vehicles and river and railway crossings.

(c) Stray cattle and dead animals.

(viii) Activities of unsocial elements and hence the necessity of taking steps to prevent break-down of law and order.

(ix) Lack of essential facilities such as water, sanitation and hence the necessity of the provision of such facilities to all the evacuees.

(x) Due to rush of unsponsored evacuation, young children may be lost and the other members of the families may also be separated from each other and hence the necessity of organising information centres etc.

4. **Arrangements for movement:**

(i) **General Organisation**: Evacuation should be organised into parties which should have among themselves Leaders and Deputy Leaders appointed. Escorts for unattended children and women should be provided. The group leader and the escorts carry first aid kits, needles, water bottles, paper and pencils etc.

(ii) **Assembly Points:** Such points should be located near the railway stations and bus stations/stands. All the persons who want to leave the town should be directed to assemble there. From here the evacuees should be sent out in convenient batches by rail or other transport. Assembly Points are also intended to relieve congestion at the railway stations. As the evacuees are likely to stay here for some time before they can be cleared, arrangements for sanitation, re freshmen, feeding, water, first-aid, traffic control, maintenance of law and order etc, should be adequately made in order to be able to handle the anticipated rush.

(iii) **Other facilities**: Some evacuees may be in need of certain clothing which may have to be arranged. Care must be taken to see that children are not lost and in case of their having been lost, efforts must be made for their quick restoration to their parents. Arrangements for taking into custody any lost property and returning the same to the lawful owner will also have to be made. Evacuees should be instructed to label their belongings so that the owners can be traced quickly, if necessary formation Office should be located near the Assembly Points to give essential information and guidance to the evacuees. The Assembly Pointe should maintain constant liaison with the Reception Points etc., to inform them silently in advance of the anticipated number of evacuees being despatched.

5. **Arrangements for exodus by road:**

A few people may move by road in their own fast-moving vehicles. They should be told about the routes to be followed by them taking care to ensure that the routes earmarked for military and other essential traffic are kept free. There may be large number of people who may move in their slow-moving carts and unless they are made to take a route different from the rout earmarked for the fast-moving vehicles, they will create many traffic problems. There may be a large number of people who will leave the town on foot alone with their belongings and cattle. Unless they are diverted to special routes, they will block the normal route for the fast-moving vehicles. The following arrangements may have to be made for the movement by road and the traffic control.

(i) As far as possible the number and type of transport vehicles to be used in case of unsponsored evacuation should be worked out and wherever possible, earmarked in advance. The availability of the reserve stocks of petrol and lubricants for the vehicles should be ensured. The few vehicles available during the emergency will have to be used continuously throughout the day and night and therefore, reserve drivers for such vehicles should be earmarked in advance. In certain areas specialised Motor Units of Home Guards may have to be organised

(ii) Mobile Vehicle Repair Teams should be organised to provide repair facilities to the vehicles which may breakdown in the evacuation convoy.

(iii) Public should be advised to carry with them some of the essential things like food, water, blankets etc. Cyclists should be advised to carry pumps and puncture repair equipment.

(iv) Strict instructions should be issued not to damage crops en-route.

(v) Members of Home Guards/Police should ac company the convoys on motor cycles and may also be provided with loud-speakers to direct and control the traffic.

(vi) Earmark separate routes for the fast- and slow-moving traffic when possible. Trainee should be one way and in the absence of separate roads, separate lanes on the same road may be provided for each type of traffic.

(vii) Strict traffic control should be enforced by posting additional trained personnel along the route 2nd at possible bottle-neck.

(viii) To prevent traffic jams at level crossings, the Railway Authorities should be requested to cut down to the minimum the period for which the railway crossings are closed for traffic.

(ix) Transit camps en-route should be provided in case of long journeys. Facilities like space for rest, light refreshments, drinking water, in trines and urinals and medical care, should be organised at these places.

6. **Exodus by rail:**

In case of a very large-scale unsponsored evacuation, it will be necessary to make use of the railways in addition to the motor transport to evacuate the population. The local authorities should, therefore, have liaison with the local railway authorities to enable them to arrange for additional trains to be run to clear a large number of evacuees from the town concerned. Advance planning in this respect will have to be made. The following arrangements will help in the exodus by rail.

(i) Posting extra staff at railway stations including additional booking facilities

(ii) Provision of barricades and Home Guards/ Police to control and prevent the rush at the platforms. Admission of passengers to platforms should be limited to the number of persons a particular train can accommodate.

(iii) Preparation of time-table for special trains and allotment of seating accommodation to the evacuees at the Assembly Points

7. **Reception Points:**

In the reception areas evacuees may be pouring in from various channels of transport. They have to be properly received at these points by welfare units, who would listen to their difficulties sympathetically and arrange for tea and snacks and give them, psychological first-aid. Those who are sick are separated and sent to hospital. The evacuees are taken to dispersal
camps.

8. **Dispersal and Settlement camps:**

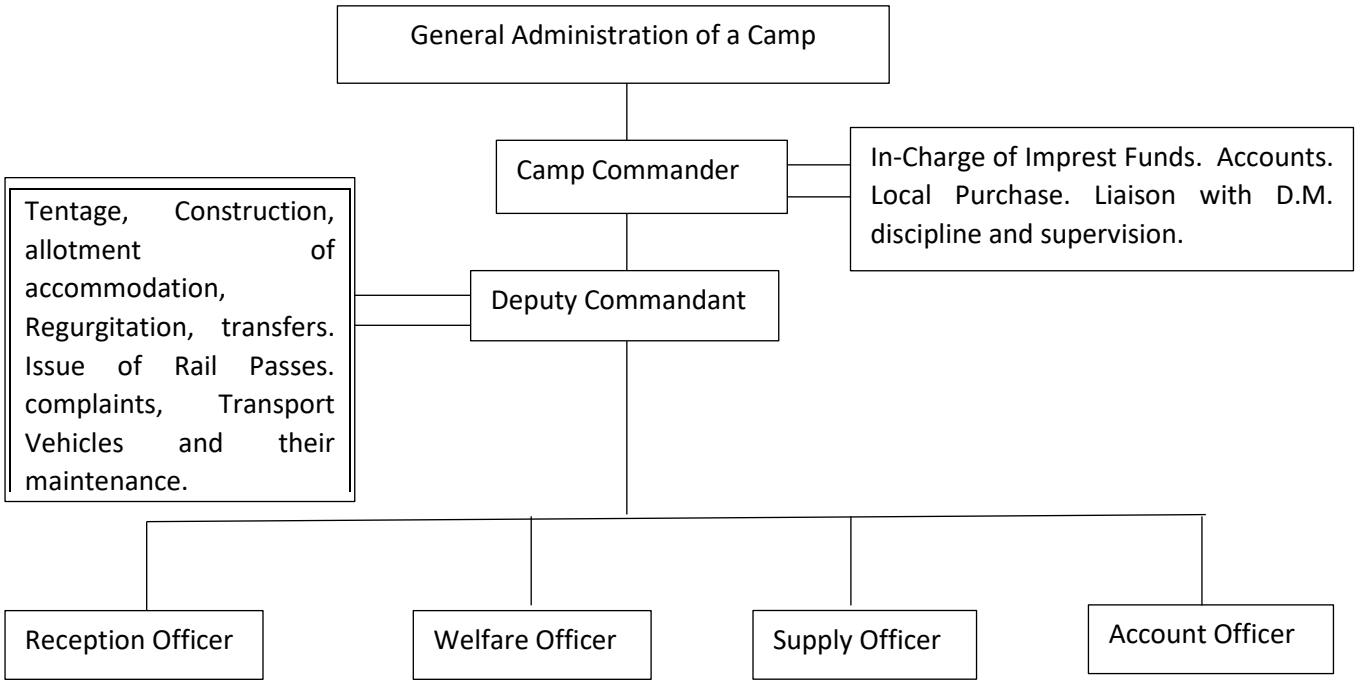
Dispersal Camp is located at a suitable distance from the reception points so that evacuees can quickly reach it. The evacuees are provided with shelter for a couple of days until they make their own arrangements with friends, relative or disperse to other areas. Here the families and friends get united. All facilities are provided to enable evacuees to find out their own accommodation. Those evacuees who are unable to go anywhere are shifted to Camps known as Settlement Camps. At the Settlement Camps facilities are provided for much longer stay These include education of children and vocational training for those who have lost the means of livelihood etc.

9**. Arrangements in a camp:**

(i) **Site:** Preferably use should be made of existing built up accommodation, alternatively tented accommodation should be arranged. There should be open level or gently sloping ground accessible by a road. Source of drinking water should be nearby. The camping site at a distance from the town be preferred to the one nearer to it. Adequate arrangements for roads, drainage, lighting etc. will be necessary in the area.

(ii) **Hygiene and Sanitation**: This requires special attention otherwise out-break of an epidemic may threaten the camp inmates. People have to be educated in how to use trench latrines and urinals properly. in reduction of garbage within tent lines. The sources of drinking water should be properly sterilized before consumption. Conservancy area to be properly marked on the leeward side of the camp and at a distance of at least 200 yards from living accommodation. Similarly, bathing places, water point for animals to be selected. The disposal of garbage within the camp lines and sanitation in kitchen should be supervised by trained volunteers.

(iii) **Administrative Staff**: The camp will be in charge of Camp Commandant, who will be assisted by Deputy Camp Commandant, Welfare Officer, Medical Officer, Accounts Officer. Supply Officer. etc. Since some of these officers will be handling rations, supplies etc., they should be preferably Government Officials. To do a lot of other functions like guarding the lines, protecting water points, supervising sanitation, helping in kitchens etc. voluntary help may be obtained from the inmates of camp. These volunteers should be selected by the Camp's Welfare Committee where the influential and reliable senior persons in the camp are represented.

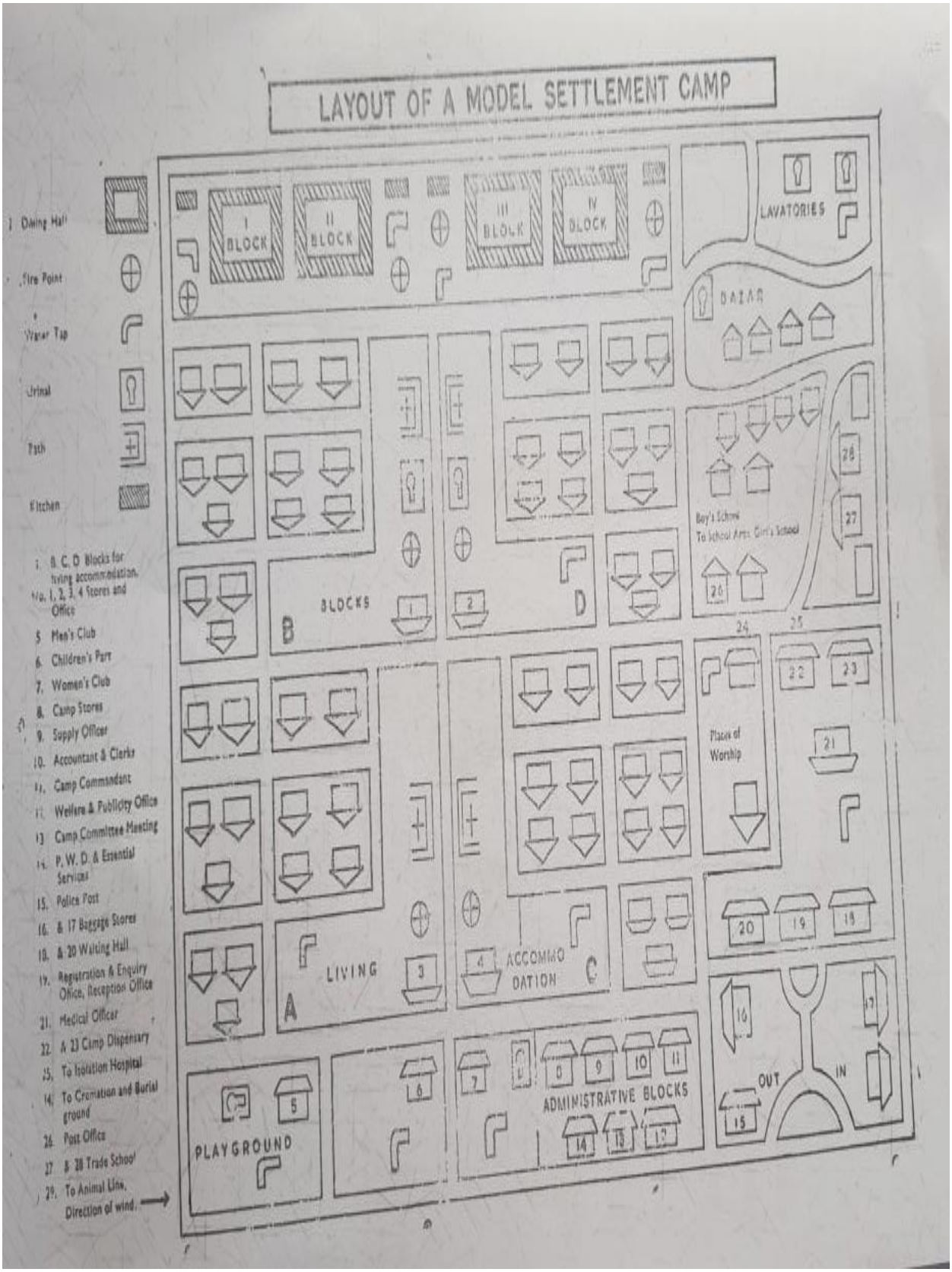


1. Reception at Railway Station.
2. Transport Arrangements.
3. Servicing meals on arrival.
4. Despatch of those leaving camps.

1. Sanitation.
2. Medical facilities.
3. Accommodation.
4. Feeding facilities.
5. Water.
6. Publicity and Information.
7. Police arrangement.
8. Emergency clothing etc.

1. Receipt of supplies.
2. Storage and care of supplies.
3. Census of issued ration card.
4. Store accounts.
5. Distribution of ration.

1. To Maintain all accounts.
2. To function under Camp Commandant.


LAYOUT OF A MODEL SETTLEMENT CAMP
Dining Hall
Fire Point
Water Tap
Urinal
Path
Kitchen
1. B. C. D Blocks for living accommodation. viz. 1, 2, 3, 4 Stores and Office
5. Men's Club
6. Children's Park
7. Women's Club
8. Camp Stores
9. Supply Officer
10. Accountant & Clerks
11. Camp Commandant
12. Welfare & Publicity Office
13. Camp Committee Meeting
14. P. W. D. & Essential Services
15. Police Post
16. & 17 Baggage Stores
18. & 20 Waiting Hall
19. Registration & Enquiry Office, Reception Office
21. Medical Officer
22. & 23 Camp Dispensary
25. To Isolation Hospital
24. To Cremation and Burial ground
26. Post Office
27. & 28 Trade School
29. To Animal Line. Direction of wind.
I BLOCK
II BLOCK
III BLOCK
IV BLOCK
LAVATORIES
BAZAR
Boy's School
To School Area
Girl's School
BLOCKS
B
D
A
LIVING
ACCOMMO DATION
C
Places of Worship
PLAYGROUND
ADMINISTRATIVE BLOCKS
OUT
IN

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CHAPTER NO. 66

TYPES OF TENTS, STRIKING, PITCHING AND PACKING OF TENTS

1. **Object**:

The housing of the victims of a disaster is normally to be done in vacant buildings, schools etc., but when these are not available or are not sufficient for the purpose, then a tented emergency camp may have to be set up. Some knowledge of tents, their types and capacities, space required for pitching and floor space available for use-is worth having by officers connected with E.R. work. This lecture-demonstration, will, therefore be of, immense value to all concerned with establishment of camps.

2**. Types of Tents**:

There are many types of tents in use. Information regarding the more common types is tabulated below:

Name of Tent	Pitching Space	Floor Space available	Accommodation for
1.P. Private	38'x36'	20' x 16'	16 to 20
180 Lbs/(82Kg)	(11.4Mx10.8M)	(6M x 4.8M)	8 to 12
	24'x21'	14' x14'	
(Double fly)	(7.2Mx3.6M)	(4.2Mx4.2M)	8 to 12
160Lbs/73Kg)	16'x 16'	14'x14'	
Double fly 112Lbs (51 Kg)	(4.8M + 4.8 M)	(4.2Mx4.2M)	6 to 8
	24' x25'	14'x8'	
80 Lbs/(37Kg) (Double	(7.2M x 4.5 M)	(4.2Mx 2.4M)	6 to 8
fly)	16'x 10'	7'x6'	
40 Lbs/(18 Kg)	10'x10'	7' x 6'	3 to 4
(Double fly)	(3M x 3M)	(2.1 M x 1.8 M)	
21 Lbs/(10 Kg) (Double	13'x8'	8' x 6 ½ '	3 to 4
fly)	(3.9M x 2.1M)	(2.4 M x 2 M)	
Latrine Tent	12'x 12'	3' x 3 '	
	(3.6M x 3.6M)	(0.9 M x 9.9 M)	

3. **Pitching of Tents:**

Tentage is an expensive item of equipment, particularly in its cost of maintenance and hence it is the duty of all concerned to see that no loss to the state is caused by neglecting in the following matters:

(i) **Selection of site:**

In deciding upon the site for the pitching of any tents, consideration should be paid when circumstances permit to:

(a) Natural drainage of the ground.

(b) Direction of the prevailing win.

(c) Nature and evenness of the ground.

(ii) **Method pitching:**

All tents should be pitched in the following manner: -

(a) Unpack the tent on a clean plot of ground beside the site selected for pitching.

(b) Stake out the pitching space. All wooden pegs for securing the ropes should be driven into the ground at an angle of 60 degrees outwards.

(c) Inspect all the poles to see that the rivets do not project or that nails and tacks have not been knocked into the bamboos.

(d) Lay out the tent flies, roll up all the ropes not used in the actual raising of the tent and raise the tent in the proper manner.

(e) See that the standing poles are vertical, the poles must neither be sunk into the ground nor raised upon bricks above the level of the ground.

(iii) **Care and maintenance of standing tents:**

(a) When the tents are pitched, outer file should not be allowed to touch the inner flies.

(b) Detachable flies should neither sag nor rest heavily against inner flies.

(c) Walls should be lifted and examined every day for white ants.

(d) Earth should not be banked up against the walls.

(e) Loose ends of the ropes should not be allowed to lie on the ground but should be tied back on to the ropes themselves.

(f) The components are only to be used for the purpose for which they are intended, any component not in actual use, should be collected raised off the ground and protected from damp.

(iv) **Cleaning:**

The method of cleaning tents is the same as for carpets, i.e. frequent brushing and shaking of the sur face. Dust, if allowed to settle may set up BLACK ROT in the fabric after the first soaking with rain or heavy dews.

(v) **Effect of moisture:**

Tents should never be struck and packed while wet or damp. When cotton gets wet it becomes an excellent breading place for "cellulose-destroying bacteria." Much loss to the state has occurred from time to time due to failure to observe the correct procedure in this respect.

(vi) Oil is an enemy of cotton, therefore, do not spray oily insecticides on the walls of the tents for any reasons.

4. **Striking and Packing:**

Want of care in striking tents is often the cause of considerable damage to them. The following instructions should be adhered to at all times: -

(i) Spread out on the ground near the tent to be struck all salutes and bags.

(ii) Remove walls, saibans, chicks, purdahs, cornered door poles, where such are separate from the fly.

(iii) Unfasten and roll up all ropes except the corner ropes. The ropes should be rolled up into a bundle and made fast close to the edge of the fly by taking a turn of the rope round the rolled bundle.

(iv) Draw all pins except the four corner pins and those at the feet of standing poles. Pack e pins away in the pin bags together with the mallets.

(v) When the tent is ready for lowering, sufficient men should be placed on each corner rope to ensure that the tent is lowered to the ground gently (one man for light tents and two for heavy tents). Cast off the corner ropes and lower the tent in the following manner.

(vi) The men on the side to which the tent is to fall should pull on the corner ropes till the tent menaces to fall, the men on the opposite side casing up their ropes, on the side the tent is falling, should let go their ropes so that the fly hangs vertically, while the men on the ropes on the opposite side keep strain on the ropes till the poles reaches the ground.

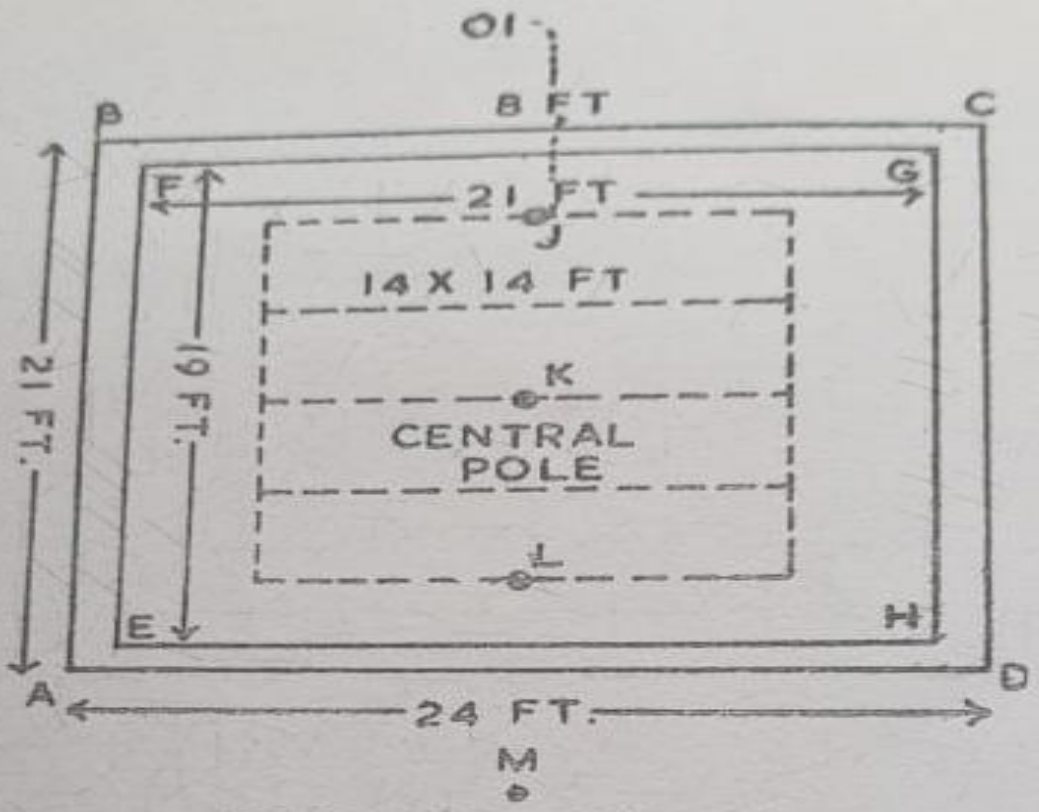
(vii) Remove the poles from the flies, take them apart and, if, carried in bags, pack them away. Draw the remaining pins and pack them in their bags and close up the pin bags.

(viii) Fold the fly or flies to the size that suits the salitah place on the top the purdahs or saibans and pin bags, poles, etc., where not carried separately. Dis tribute the ropes evenly except two corner ropes which should be left unrolled. Roll up the fly tightly and bind the corner ropes which have been left loose for this purpose.

(ix) Place the fly in salitah and lace up salitah. Where there are separate walls roll them up in pairs, insert them into their bags and secure the flap of the bag by means of the typing rope.

These general instructions apply to all descriptions of tents and should be closely followed as circumstances permit. The observance of these instructions will ensure the handling of tents in the manner best calculated to avoid damage and to maintain the tents in a serviceable condition.

SKETCH OF PITCHING AREA
OF TENT 180 LBS



PEG FOR GUY ROPE

A B = C D = 21 FT

B C = A D = 24 FT.

------ INTERRUPTED LINE INDICATES SPACE AVAILABLE FOR ACCOMODATION INSIDE THE TENT.

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CHAPTER NO. 67

NEED FOR LEADERSHIP-ATTRIBUTES OF LEADERSHIP, QUALITIES SELECTION AND TRAINING OF LEADERS

1. **Object**:

The object of this lesson is to study some of the details of leadership such as it attributes. qualities selection and training etc., as they are related to group dynamics in Emergency Relief."

2. **Introduction**:

In the confusion, consequent to an emergency the leadership plays an important and vital role in not only to keep the morale of the people high but also enable them to help themselves and face the danger boldly. It is the courageous and enlightened leader ship which will in the last analysis be responsible for efficient conduct of relief operations by the trained volunteers in Emergency Relief.

3. **Definition of Leadership:**

Leadership can best be described as a mixture of example, persuasion and compulsion. Each one of them being made use of by successful leaders as and when necessary. The leadership in a group means the democratic control of an individual who is superior to the larger number of members of the group. Leader ship is the motivating force for the group to channelize its collective activities through useful and constructive avenues.

4. **Types of Leadership:**

Of so complex a quality as leadership, it is difficult to generalise, but briefly the leaders may be grouped into following three main categories.

(i) **The Institutional Type**: Such leaders are often successful even in the absence of personal qualities. Such a leader is emphatic of rank, conservative in outlook, punctilious in matters of drill, discipline and stereotyped in his reactions.

(ii) **The Dominant Type**: This type assumes leadership by the virtue of his own personality and his innate force of character. The scope of such leadership is very limited.

(iii) **The Persuasive Type**: This type of leader maintains his position by virtue of his capacity to persuade and to convince his follower. This is the democratic type and the members of the group are driven by the force of example, courage, determination and initiative on the part of the leader. This type is most suitable for emergency relief work.

5. **Functions of the leader:**

Whatever be the type of leader, there are certain functions common to all, without the performance of which no type of leadership can ever venture to be successful. These functions are described below in brief.

(i) **Leader as Executive:** At the place of damage where the work of rescue, first-aid is going on, the leader has to see as to how best he can have it executed with proper guidance, use of skill and Thus, eniasm on the part of the members of the party.

(ii) **The Leader as Planner**: Again at the place of damage, before starting work the leader must plan the work of the group keeping in view the availability of manpower, equipment and the nature of job.

(iii) **The Leader as Policy Maker**: In certain matters of planning, training and recruitment in an area regarding E.R. the C.D./E.R. Officers determine details of policy in this connection so must as to achieve maximum efficiency in the work of relief operations.

(iv) **The Leader as Expert**: At the place of damage when faced with difficult problems of shoring, rescue, tunnelling or first-aid to serious casualties the leader must give sufficient proof of his expert knowledge in this respect.

(V) **The Leader as an Exemplar**: In difficult situations the leader keeps up the morale of the group members by personal example.

6. **Attributes of Leadership**:

There is no one list that can be drawn which would be a last word on the attributes of leadership. Some of these are given below:

(i) Integrity. Sincerity and Honesty.
(ii) Fairness, Impartiality.
(iii) Initiative, Courage, Self -confidence and decisiveness.
(iv) Knowledge and Experience.
(v) Thus, eniasm, Ability to arouse the same in others.
(vi) Curiosity, Observation, Open-mindedness.
(vii) Judgement.
(vii) Thoroughness.
(ix) Resourcefulness, Integrity, Originality.
(x) Sense of Humour.

7. **Leadership in Emergency Relief**:

In Emergency Relief the need of leadership will arise in the following three stages i.e. before, during and after an emergency.

(i) Leaders to enrol a large number of volunteer's stage, the leadership will be necessary for the following:

(a) Leaders for making people E.R. conscious.
(b) Leaders to enrol a large number of volunteers for E.R. Work.

(ii) **During an Emergency:** During an emergency the leadership will be necessary for the conduct of actual relief operations and in some of the following ways:

(a) Leadership for the various parties in E.R.
(b) Leadership to control the panicky crowds.
(c) Leadership to mobilise local help to reinforce the efforts of trained personnel of ER.

(iii) After an emergency the relief in main is provided through the Welfare Services of E.R. This can best be organised with efficiency only, if there is proper leadership.

8. **Selection of Lenders:**

Tests for leadership are numerous and varied. Also, it is not a property of relatively constant value possessed by an individual such as strength, physical endurance or expert knowledge of a subject. Thus, the best method to select leaders is to judge the actual performance of individuals while under training in E.R. work. Thus, the following may be observed to have a rough idea of the leadership qualities of person.

(i) What the man has done as a Leader.
(ii) What he is doing.
(iii) The past evidence of his actual leadership.
(iv) His performance in the interview: The method of interviewing is helpful in selecting the leaders which can be aided by preparing the rating card for which a person is interviewed. (Proforma of Rating Card for Leaders in Emergency Relief is attached). In the interview the person is asked certain questions to find out an evidence regarding his sincerity, general knowledge, appearance, manners etc. Since these leaders will also be required to impart training to their group members we may adjudge them on the rating scale in respect of such qualities as speech, conversational ability, voice, gaze etc.

9. **Training of Leaders:**

Leaders are not born. They are made. Hence there is ample scope for training of leadership. Thus, given the proper training in skills, it is not difficult to produce a large number of leaders required for the various E.R. Services. In order to realise the objectives of leadership training, experience shows it is necessary to include the following five elements in the same.

(i) A knowledge of the general characteristics of human nature as these are set forth in general and applied psychology.

(ii) Self-knowledge of one's own unique combinate of qualities with their varying degrees of strength and weakness.

(iii) A working grasp of the right attitude to possess m dealing with people.

(iv) An ability to apply all of his knowledge to the mobilising of energy and enthusiasm for the special objectives of the ER. Organisation.

(v) Deliberate efforts at broadening of the total personality in a cultural direction.

10. **Important Hints on Training Leaders:**

Having characterised the broad intent as well as the content of a leadership training, we shall now examine some of the methods which may be considered and the one's which can be adopted or made use of singly or in combination for leadership training. The following are some of these methods.

(i) **Experience in a leadership duration under some supervision**: This can best be provided to various deputy leaders and others of various rescue and F.A. Parties etc., by giving them a chance to be the leaders of their parties in the absence of the actual leaders.

(ii) **Progression from smaller to larger leadership situation**: In (i) above it has been said that the deputy leaders etc. may be given chances to be leaders in various situations. This should further lead to higher leaders for those whose place is taken by deputy leaders coming from below. For example, a leader of a First-aid Party may progressively become the group leader of various first-aid parties in a depot, if this policy of advancement for leaders is adopted. It may recognise to provide them as they grow and rise with some critical and constructive commentary on their labours.

(iii) **Training through Course of Practice and study**: This is the formal method of organising special courses of leadership for those who are select ed initially for this purpose.

(iv) **Organising Group meeting and Refresher Training**: No area of leadership today is exempted from rapid advances in knowledge and technique and one way to assure that such knowledge gets applied is to provide organised plans of "in service" or Re fresher Training. All this can best be achieved by organising frequently the group meeting under able t and expert leadership.

INTERVIEWR'S RATHING SCALE

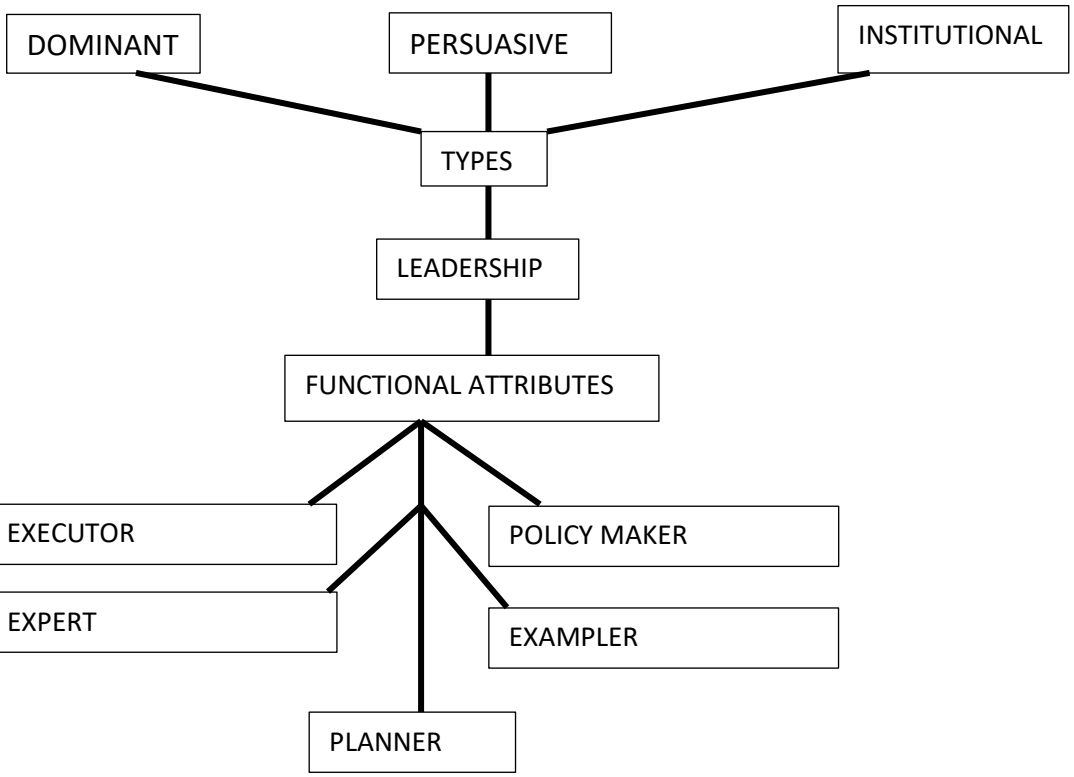
For selection of leader possessing the following qualities

NAME ……DATE……..

EXPERIENCE IN ER/FA Rescue work	Practically none	Some experience	Good experience	Long experience in same work	Expert
HEALTH Consider the work	Great stamina	Energetic	Normal	Below par	Sickly
APPERANCE	Handicapped	Need improvement	Neat and clean	above average	Excellent
SINCERITY	Very frank and open	Appears straight forward	Average	Doubtful	Deceptive
GENERAL KNOWLEDGE	Noticeably lacking	Only a few subjects	Adequate	Fairly broad interests	Informed in many fields
RESPONSIBILITY Manners, voice, gaze, bearing, etc.	Creates very pleasing impression	Likeable inspires confidence	Average	Too shy or too bold	Antagonising repulsive
SPEECH CONVERSATIONAL ABILITY	Bad manners poorly spoken	Unable to express well	Can make himself understood	Clear and concise	Effective use of good language and forceful.
ENTHUS, IASM	Contagious natural enthusiasm	Shows ready interest	Varies	Indifferent	Pessimistic
INITIATIVE AND SELF ASSEERTION	Lifeless	Easily discouraged	Average deter mention	Self-accretive	Usual initiative
CHARACTER	Inspiring	Commendable	Average	Doubtful	Should not be trusted
REASONING AND JUDGEMENT	Dull	Jumps at conclusion	Average	Thinks clearly	Very logical and capable

Length of interview Signature of Interviewer

Note: Many more qualities according to the needs of leadership in a particular field could be added and the rating scale prepare.


DOMINANT
PERSUASIVE
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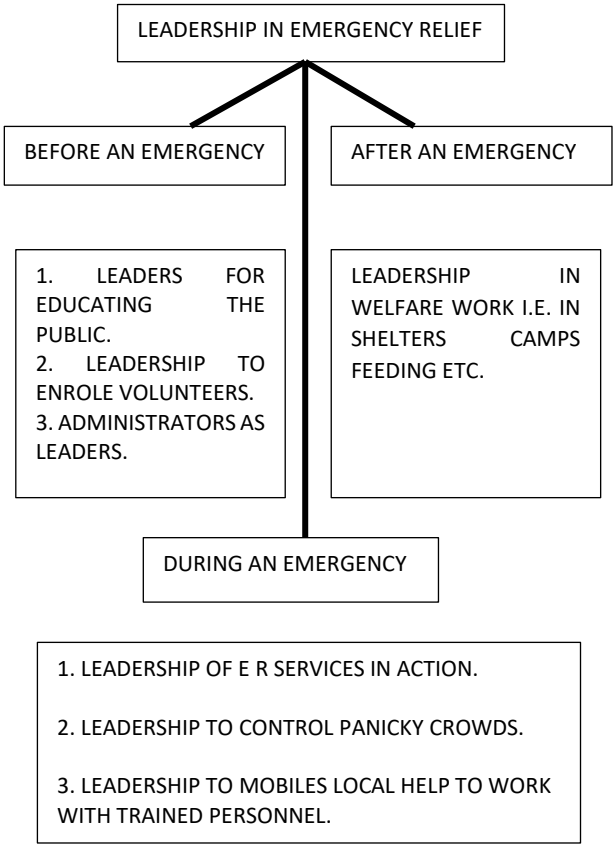
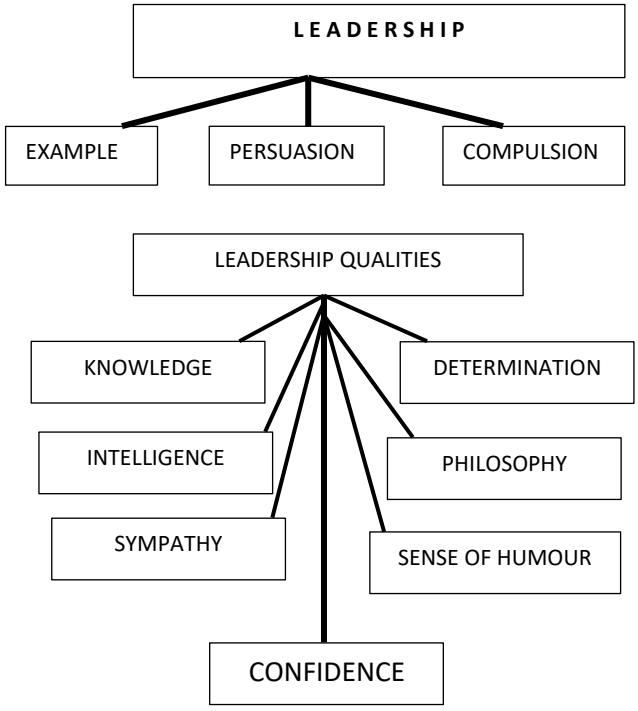
TYPES
LEADERSHIP
FUNCTIONAL ATTRIBUTES
EXECUTOR
POLICY MAKER
EXPERT
EXAMPLER
PLANNER


LEADERSHIP IN EMERGENCY RELIEF
BEFORE AN EMERGENCY
AFTER AN EMERGENCY
1. LEADERS FOR EDUCATING THE PUBLIC.
2. LEADERSHIP TO ENROLE VOLUNTEERS.
3. ADMINISTRATORS AS LEADERS.
LEADERSHIP IN WELFARE WORK I.E. IN SHELTERS CAMPS FEEDING ETC.
DURING AN EMERGENCY
1. LEADERSHIP OF E R SERVICES IN ACTION.
2. LEADERSHIP TO CONTROL PANICKY CROWDS.
3. LEADERSHIP TO MOBILES LOCAL HELP TO WORK WITH TRAINED PERSONNEL.


L E A D E R S H I P
EXAMPLE
PERSUASION
COMPULSION
LEADERSHIP QUALITIES
KNOWLEDGE
DETERMINATION
INTELLIGENCE
PHILOSOPHY
SYMPATHY
SENSE OF HUMOUR
CONFIDENCE

****

CHAPTER NO. 68

PROBLEMS OF MASS FEEDING, PROCUREMENT OF SUPPLIES, MAINTANCE OF RECORDS AND ACCOUNTS, REPORTS AND RETURNS SCALE OF RATIONS, PREPARATION AND COOKING OF MEALS DISTRIBUTION OF MEALS

1. **Object**:

The object of this lesson is to study the problems "of emergency feeding, maintenance of records and accounts and the methods of procurement of supplies etc.

2. **General Problems of emergency feeding**:

(i) In an emergency when a large number of people have to be served food at various places, it becomes absolutely necessary that the distribution is affected from a few centrally located places where the food is to be distributed in the cooked or uncooked form.

(ii) Transportation of food to the site of damage is another problem the details of which if not decided upon or visualised earlier, can present a stumbling block and a serious hindrance in the successful operations of emergency feeding.

(iii) Arrangements for cooking the food if not planned are likely to create serious problems.

(a) Places have to be earmarked for meal centres.
(b) Proper cooking facilities have to be provided.
(c) Utensils have to be arranged for.
(d) Cooks, supervisors etc. have to be arranged for. In case rations have to be issued in kind then well-staffed distribution centres are required to be set up at a very short notice.

(iv) Another problem for the organisers in emergency feeding is the special care that has to be taken of the children, the aged, the sick, expectant mothers etc., while issuing rations. There are perhaps different scales prescribed in different areas but they may have to be altered depending upon the availability of stock.

(v) It becomes a problem in civil emergency to differentiate between the deserving and non-deserving recipients. It, therefore, entails a system of issuing of ration cards, identity slips and meal tickets to the evacuees in cooperation with the authorities evacuating the people from the threatened area.

(vi) In a civil emergency when cooked food has to be provided for a large number of people, the requirements of staff and cooking utensils present a serious problem. It is, therefore, suggested that small self-contained family units for messing should be encouraged and this may be given preference over mass feeding.

(vii) A lot of wastage of food is likely to occur where no accounts of the food received and distributed are kept. This accounting procedure and maintenance of records should be agreed upon earlier at the planning stage.

(viii) In a Civil Emergency as a result of appeals for help and on the initiative of a few philanthropists, a large amount of cooked and uncooked food is likely to be made available for distribution amongst the sufferers. If proper and systematic arrangements are not made for their collection and distribution in time, it is feared that the food will either perish or will be misused.

3. **Advantages of issuing Dry Rations to Victims**:

It may be necessary in the initial stages in a civil emergency to distribute food to the victims in the cooked form to enable them to tide over the initial difficulty of getting food. But the issue of dry rations should be resorted to as soon as possible after a civil emergency for the following advantages.

(i) It saves labour of cooking the food.

(ii) It ensures economy in the use of utensils, for each individual family having saved one the other utensils can combine with the other families and Thus, small self-contained messing units are created.

(iii) As a result of (ii) sentiments regarding one's of caste etc. are not violated.

(iv) People can cook and eat their food according to their individual or group taste.

(v) In case of feeding, hours of eating are fixed and some people may not be able to make use of this facility if the time fixed is unsuitable. But when they cook in small units they can adjust the timings to suit their conveniences.

(vi) In mass cooking food is prepared for a fixed number of people. Even after the precautions all the required number of people may not turn up and Thus, there is danger of food being wasted.

(vii) When people cook in small units they get busy and there is an element of psychological first aid-in it.

4. **Procurement of Supplies:**

Procurement of essential and basic supplies like the rice, atta and other cereals for the civil emergency feeding authorities is the responsibility of the civil emergency supply service. These supplies by the Supply Service may be planned by deciding the procedure for their procurement from various sources such as the whole sale grain dealers in various man dies etc. or by requisitioning the stocks out of the grain depots owned by the State or the Central Government locale in the region of the State. Besides there such as vegetable milk fuel etc. It will be done by the Civil Emergency Feeding Authorities after actually a disaster has struck.

5. **Accruals and Records:**

The importance of maintaining proper records and accounts by the Civil Emergency Feeding Service is very important and hardly needs to be overemphasis ed here. The accounts of stocks purchased, issued and received at the various levels will have to be properly maintained. This will be necessary not only from the point of view of avoiding pilferage but it will also be helpful in running the whole service efficiently. Advance planning should include the development of an acceptable system of accounting and recording. Following are some of the suggested re cords which may be kept.

(i) **Stock Records**: The Stock Records will necessarily be maintained by the Headquarters section of the Supply Service and will be absolutely essential to be maintained by the various feeding units in the meal centres and temporary shelters etc. The records should be kept in respect of each main item showing from whom it has been received and to whom it has been issued and what balance is in hand. The Headquarters Section will have the responsibility to issue the stocks to the various depots and they must maintain the distribution records of the same. (The pro forma of the stock ledger and the distribution of the same is attached).

(ii) **Stock-Bin-Cards**: In the stores there will be various items stored in large quantities. Unless bin cards are maintained for each quantity separately it will not be possible to have the correct picture at any moment of the actual supply situation. Therefore, for each quantity for convenience the bin cards may be maintained as given in the attached proforma.

(iii) **Daily Receipt Issue Register**: The various meal centres and temporary shelters etc., where the feeding facilities are being organised may receive stocks from time to time and sometimes even daily. The issue of stocks by the feeding supervisor will have of course to be done daily to the person-in charge in the kitchen and it is, therefore, but natural that the records of this receipt and issue should be maintained for obvious reasons. (The suggested proforma for this is attached).

(iv) **Daily Meals Returns:** With a view to have a clear picture of the total number of meals prepared and issued at particular meals centres and to compare it with the total issues, it will be necessary to maintain the daily meals return. This will be very helpful in avoiding pilferage of food and will go a long way in keeping efficient records of prepared meals. (Suggested proforma is attached).

(v) **Specimen of a Meal Ticket**: With a view to distinguish between the deserving and non-deserving persons requiring feeding facilities and also to avoid duplicate issue of meals it is essential that as far as possible all victims are issued with the proper meal tickets. This will help in the food being distributed only to the deserving persons.

6. **Scale of Rations:**

The determination of scales of rations is very important. On this will depend the decision by the feeding authorities regarding the total quantities to be cooked and the quantities to be distributed to each individual or a family. The normal scales of rations prescribed are 16 ozs. of cereals for an adult and & ozs. for a child under 10 years of age. If at the planning stage the feeding authorities were to calculate the amount of food grains required in case of an emergency for the victims who will be requiring feeding facilities. it is possible that very large quantities of food may have to be procured if one were to adhere strictly to the scales of rations prescribed. The scales of rations to be provided to the victims will depend mostly on the demand and supply situation. In a civil emergency the primary aim

of the feeding authorities is to help in the initial stages to get some food or the other so that they can keep their body and soul together. No one in an emergency is expected to claim as a right that a particular scale of rations should be provided nor it will be possible at times to adhere to such strict scales. It will have to be reduced and cut down according to the conditions of demand and supplies. Thus, while planning or actually preparing or distributing food to the victims, a fairly large amount of flexibility will have to be introduced in so far as the scales of rations are concern ed. No hard and fast rule in this respect can either be prescribed nor adhered to with any certainty. However, a special mention may be made here to provide as far as possible fuller quantities and richer quality of food to priority categories of victims as indicated in the proceeding paragraphs. For calculating roughly, the quantities of food required the estimates should be based on the density of population and the economic standard of the people of a particular area.

7. **Preparation and distribution of meals**:

(i) **Accommodation at the place of cooking and its layout**: When a large number of different types of buildings are likely to be made use of for cooking and distribution of meals, it is not practicable to suggest a model layout, but all the premises should be used to the best of advantage. The shamianas or tents being made use of as dining halls must be properly laid out and enough space should be available for walking in between the lines of carpets etc. for. the serves and others. This is with a view to facilitate quick service of meals. Besides, in meal centres there should be a service counter, which may consist of. one or more tables aid end to end, at one end of the centre. The counter should be nearest to the users. Entrance and exists should be clearly marked and urinals etc. should be clearly signposted.

(ii) **Preparation for service of meals:**

(a) Care may be taken that the preparation of morning tea or breakfast the staff arrives sufficiently in time and at least two hours before the tea etc. is to be served. They will alight the fires and fill in water etc. required for preparing tea.

(b) Mid-day meals will normally be served between 1100 hours and 1400 hours. The preparation of vegetables is the task generally taking more time and wherever possible the assistance of volunteers should be encouraged for this as also for preparing chapatis etc.

(c) In an emergency meals centres are necessary. The people should collect their food at the counter and then go to dining hall. If using Pattals they will throw them at the proper places earmarked for the same. If using their own utensils, they may clean it themselves but again at a fixed place to avoid insanitary conditions prevailing.

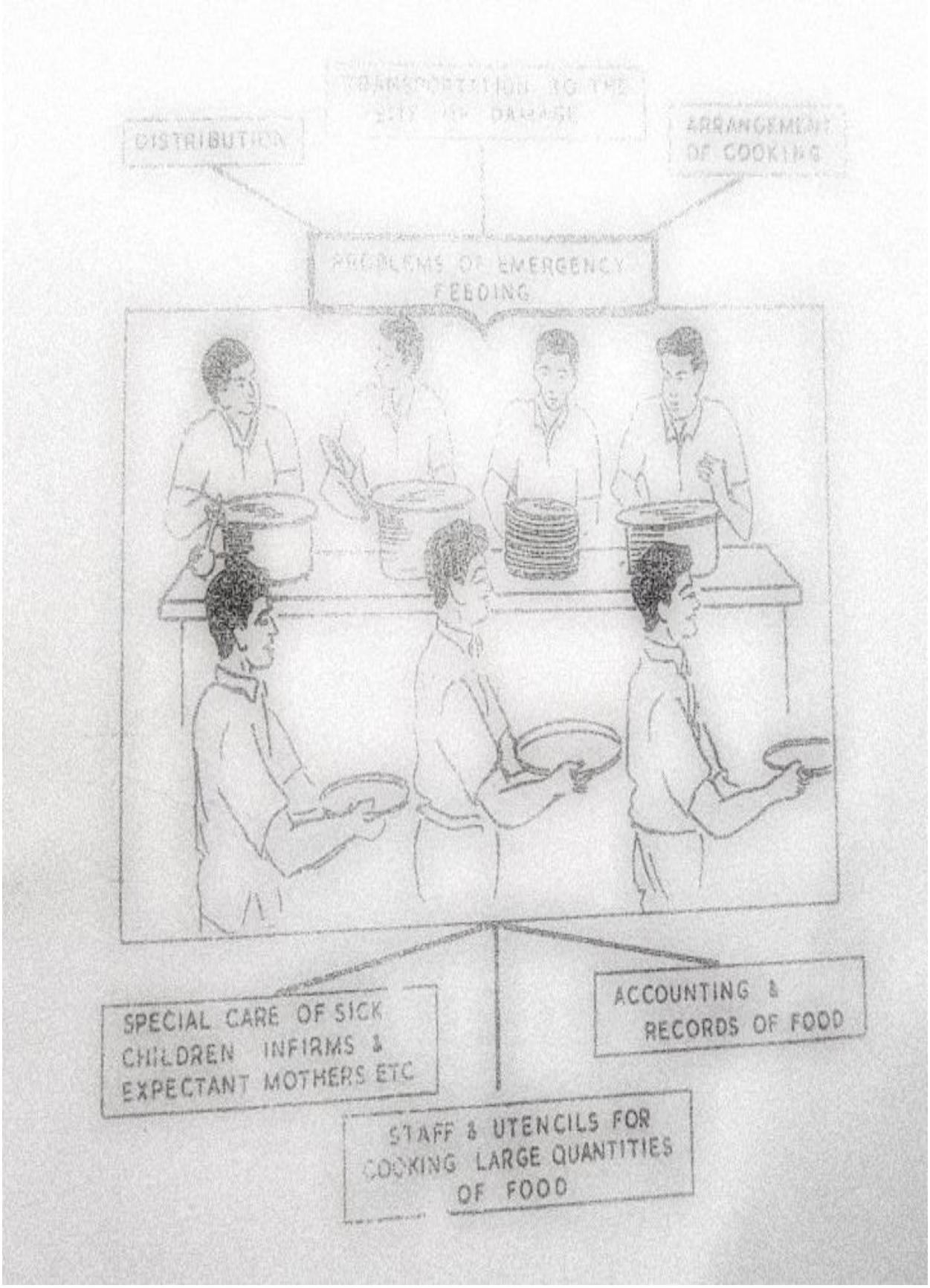
(iii) **Miscellaneous Hints:**

(a) In issuing and stocking of rations it may not always be possible to every time weigh a particular stock. It will therefore be useful to keep a note of how much usually a bag of sugar or flour weighs or how much weight of pulse or other cereal is contained in a particular container. This will facilitate quick accounting and issue of stocks.

(b) Check-up stocks of food, obtain additional supplies of fresh foods other than emergency stocks e.g. milk, vegetables etc.

(c) Clean regularly places so that they ready for use for the next preparation of meal at the centre.

(d) which need soaked over-night. Care should be taken to do this time wherever necessary.


DISTRIBUTION
ARRANGEMENT OF COOKING
PROBLEMS OF EMERGENCY FEEDING
SPECIAL CARE OF SICK CHILDREN INFIRMS & EXPECTANT MOTHERS ETC
ACCOUNTING & RECORDS OF FOOD
STAFF & UTENCILS FOR COOKING LARGE QUANTITIES OF FOOD

(To be Maintained by Meal Centre/Officer-in-charge Kitchen)

Morning Tea			Lunch			Dinner				Remarks
Prepared	Issued	Bal	P	L		Bal.	P.	L.	Bal	

NOTES :-

1. Nos. under P. (Prepared) should agree to issue entries in Daily Receipt/Issue Register.
2. Nos. and 1 (Issued) should tally with Meal Ticket collected.
3. In remarks Cols, mention disposal of balance and also explain when it is in excess of P.

STOCK BIN CARD

Receipt /Issue Voucher Number and date	Issue	Receipt	Balance	Remarks

Suggested Layout of Stock Records and Accounts Ledger

Decryption of articles……

Quantity planned to be mentioned at all times……..

Account Unit……..

(i.e. Nos. Kgs. Litres etc.)

Date	Receipt Voucher No. and date if any	Issue Voucher Number and date	From whom received or to whom issued	Receipt	Issue Balance	Remarks

DAILY RECEIPT /ISSUE REGISTER

(Separates for each type of Stores and for each Deport/Sub-Depot)

RECEIPTS ISSUES

Date	From whom	Voucher No. and date if any	Commodities					Date	To whom	Commodities				Remarks Signature Recipient
			Atta	Rice										

Daily Total Daily Total

Daily closing Balance to be C.F.

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CHAPTER NO. 69

PROBLEMS OF EMERGENCY LODGING

1.**Object**:

The object of this lesson is to study the problems of Emergency Lodging in the event of enemy attack on the civilian population in towns and cities.

2. **Introduction**:

As a result of enemy air-raids large areas might almost be completely devastated or rendered temporarily inaccessible or uninhabitable. While many persons and families belonging to such areas would be able to live with friends and relatives, many of them would still have to rely on the arrangements of housing made by the Welfare Services under the Civil De fence. In certain areas there may be a large number of unexploded bombs and people may have to be evacuated from them till such time as the un exploded bombs are disposed of. Accommodation for them will also have to be provided, though for a very short period. In case of saturated attack and complete devastation of certain areas or in case of evacuation from endangered areas people have to be moved out into the Settlement Campus set up at suit able places. In the following paragraphs we shall study the details of the accommodation provided for the victims of air-raids in different types of lodging as also the problems faced in respect of the same regarding planning and arrangements etc.

3. **Problems of Emergency Lodging:**

Housing a large number of people in itself presents a serious problem. If proper pre-planning is not done, it will result in a confusion during an emergency. Some of the problems of Emergency Lodging may result due to the following:

(i) If the buildings and other places for housing the people in an emergency are not earmarked beforehand it may result in delay for arranging lodging for the people which is likely to cause a lot of inconvenience to the victims. This will also create the problem of disturbing the normal life of a community by the haphazard requisitions.

(ii) At times the housing may have to be arranged by making use of tents. It should be therefore determined sufficiently in advance the method of procuring the same.

(iii) The lack of sanitary facilities in temporary lodging where a large number of people have to live under emergency conditions can result in serious health problems. Thus, arrangements for the stores, equipment for latrines, water storage, public health and sanitation in general and such other miscellaneous equipment for lodging may have to be thought and the procedure of their procurement in case of a disaster, ensured well in advance. Last though not the least important factor which will always have to be taken into consideration for successful planning will be that of trained manpower without which no emergency lodging or camp can run, no matter how collaborate other arrangements exist for the same.

4**. The duties of the Officer-in-Charge Welfare Ser vices Regarding Emergency Lodging:**

The Officer-in-Charge Welfare Services is responsible for the efficient working of emergency lodging services. It is obvious that such a service in which a large number of trained people to look after the victims during a disaster are required cannot be run efficiently by him alone unless he also closely associates not only the administrative authorities but also the non-official social welfare organisations and the voluntary statutory organisations like Home Guards etc. Thus, it may be advisable to have sub-committee who will consider the details regarding the planning and execution of the Emergency Lodging Services. In this representative of the local voluntary statutory organisations like Home Guards, managers or trustees of important community buildings, Dharam Shalas, managers and others may be included and their responsibility may be fixed as follows:

(i) Pre-disaster planning.

(ii) Operating lodgings after the disaster has struck.

(iii) Preparation of a written plan for emergency lodging considering the potential disaster hazards and the total need of the people in this regard. The need of the people will also be determined by the total population of the area and the general social and economic standard of the people residing there.

(iv) Surveying suitable buildings for emergency lodging and other buildings required by other Civil Defence Services. In this survey they collect information regarding the total accommodation and other facilities available at each of the buildings earmarked for emergency lodgings and on the basis of this a summary of the same is prepared giving the total available facilities, for emergency lodging.

(v) Surveying available sources of stores and supplies and equipment's such as cots for the sick, furniture for the office in a temporary lodging designed to house victims.

(vi) Initiating recruitment and training of volunteers for Civil Defence Lodging Service.

(vii) Directing overall emergency lodging operations during an air-raid.

(viii) Earmarking the sources from where the tents for temporary Settlement Camps will be arranged in the event of disaster. This also being their responsibilities i.e. organising temporary Settlement Camps.

5. **The Types of Emergency Lodgings**:

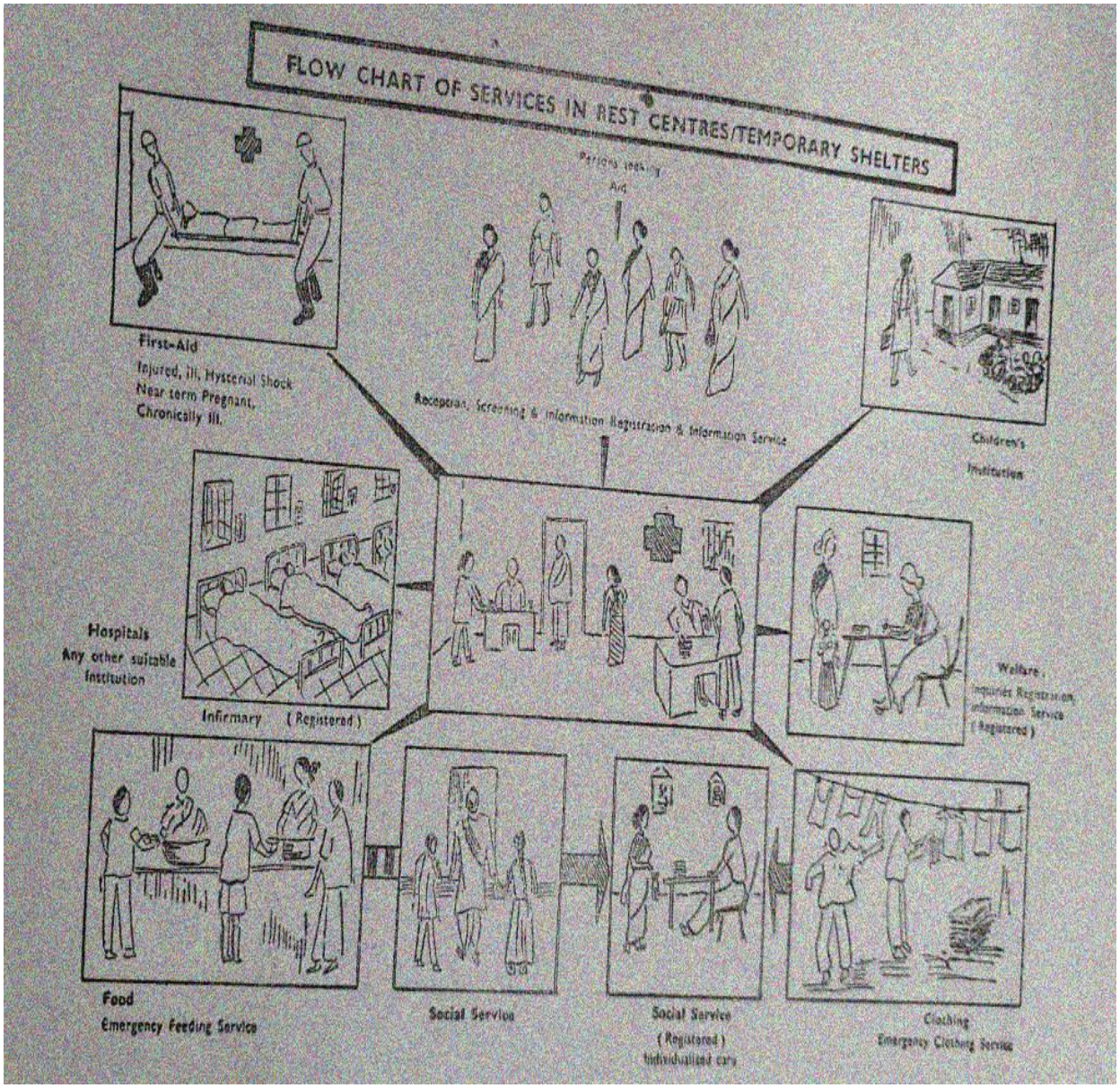
(i) **Rest Centre: Facilities** and Services which are of immediate importance and dire necessity are provided in the Rest Centres. The main object here is to house such people as may require accommodation for a week or so, for example, in case of evacuation rom areas infested with unexploded bombs. Here such facilities as accommodation large enough, amenities such as refreshments, first-aid, feeding, clothing etc. are provided. It may be that it will not be possible to provide all the said services in a full-fledged way. All the same even an organised effort to provide for a well-integrated, improvised service will be much appreciated by the people in distress. For this purpose, appropriate buildings for setting up of Rest Centres will be required. (See chart for flow of services in a rest centre).

(ii) **Individual Family Lodging:** Normally families are encouraged to arrange their own housing as far as possible after they have left the affected areas. Placing families with relatives and friends is preferable to mass housing e.g. people from affected areas may be housed with people in safer areas.

(iii) **Mass Lodgings**: It is normally the mass lodging that will have to be arranged in so far as the lodging needs of the people are concerned. These are further sub-divided as follows: (The various arrangements necessary in a temporary lodging arranged in a community building will be seen in a typical lay-out in a high school in the attached chart).

(a) Temporary Lodging: These are generally organised for housing the people when they are not too large in number or when they have to stay for a short duration of time after they have left the disaster area, e.g. they may be waiting for their houses being repaired. These lodgings are generally arranged in public, private buildings, religious places, large Dharma Shalas and other community halls and buildings etc. These lodging are further termed as primary or secondary lodgings, Primary are the ones which promise of having all the facilities, required in it. Secondary ones are those which lack in one or more of the necessary basic facilities for a temporary lodging, e.g. such lodging may be suitable only for housing the people. The other facilities like water. feeding etc. may not be available in them and may have to be arranged in some nearby or adjacent buildings.

(iv) **Tent Camps:** They are set up only when the lodging cannot be provided in the buildings etc. and the number of people is too large who require the facilities for lodging for a pretty long time. In such camps as the very name indicates the accommodation is provided by organising big tent camps i.e. the temporary settlement camps. These are set up only in exceptional cases.


FLOW CHART OF SERVICES IN REST CENTRES/TEMPORARY SHELTERS
First-Aid
Injured, Ill, Hysterial Shock
Near term Pregnant,
Chronically Ill.
Reception, Screening & Information Registration & Information Service
Children's
Institution
Hospitals
Any other suitable
institution
Infirmary (Registered)
Welfare,
(Registered)
Food
Emergency Feeding Service
Social Service
Social Service
(Registered)
individualised care
Clothing
Emergency Clothing Service

LAYOUT OF A TYPICAL TEMPORARY SHELTER IN A HIGH SCHOOL

R No. 1 Office/Accounts Etc.

R No. 2 Registration.

R No. 3 First Aid.

R No. 9 and 11 Kitchen

R No. 10 Provision Store

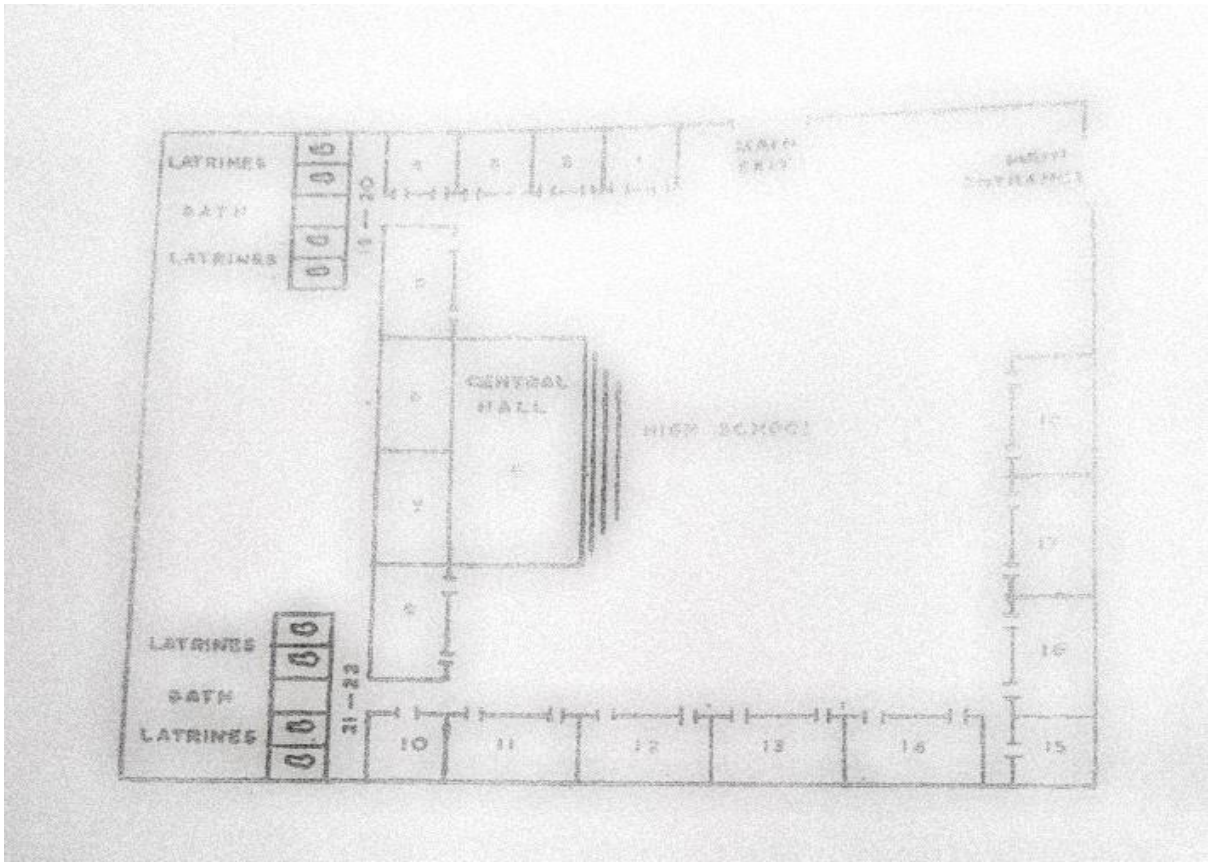
R No. 18 Publicity-Inquiry-information etc.

R No. 16 Recreation Room

R No. 8 (Hall) Feeding Centre

R No. 12,13,6,5,4,17,14 & 15 any Other Halt and Laboratory will also be used for Living Accommodation.

N.N The rest of the Accommodation available will be used as living place viz.



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CHAPTER NO. 70

REGISTRATION AND INQUIRY ORGANISATION

1.**Object**:

The object of this lesson is to study the Registration and Inquiry Organisation in Civil Defence.

2. **Introduction**:

Immediately after an area is struck by a heavy damage the normal life the people disturbed in many ways. Families and their members are rated from other. Relatives of affected people from outside areas also make frantic enquiries about the welfare whereabouts their near dear ones. Failure to timely, correct and authentic information about the missing friends and relatives' people at large will in undue anxiety the minds the people. To ward off un healthy state affairs, the information and publicity service the Civil Defence Welfare Services on visages organise the collection and dissemination reliable information through Registration Inquiry Organisation. This organisation will have the follow functions to perform.

(i) In miniature the function may be described compared with the any Inquiry Office engaged the work of disseminating information of general nature at any where people collect or they visit places of pilgrimage and other religious festivals. These Inquiry Offices known the have also helped. reuniting separated families. They specially do good work restoring lost children such crowds their parents. The Registration and Inquiry Organisation designed to perform similar function but on slightly bigger scale. main responsibility will be that establishing contact relatives and to assist reuniting families and answer inquiries regarding the safety and welfare of kith kin the victims of disaster area.

(ii) To collect and disseminate such authorised formation concerning relief Civil Emergency which general nature and the one affects people and other Civil Emergency Services which happen be organised for them during emergency.

3. **Organisation:**

This Service in local areas the administrative Like all other Services for this Services also there be a sub-committee. This sub-committee fully responsible matters concerned with general publicity information registration and inquiry organisation. organise registration and organisation in temporary shelters and camps and also cater to the organisation of other functions of this service in a civil emergency.

4. **Activities of the Service:**

The sub-committee of the publicity and information service of civil emergency will have to ensure that complete arrangements exist to start the registration and inquiry service at various shelters and camps. It will also see that the available information at various shelters and camps is coordinated by exchanging the same amongst them. Information received from other Civil Emergency Services will also have to be passed on to all the shelters and camps. It will therefore be necessary to carry out the activities of this Service at the following levels.

(i) **At forward Information Posts and Welfare Assembly Areas**: Here there will be need to depute some volunteers. They should be as far as possible, the local residents well conversant with the local people and also having up-to-date information about the activities of the Civil Defence Services. The names and numbers of such people will have to be decided before hand at the planning stage from amongst the Mohalla leaders and residents of the adjacent areas by the sub-committee on Publicity and Information. It will depute them in disaster areas as and when the need arises. These volunteers could be further useful in many ways to the Relief Coordinators also. In brief their functions will be as follows:

(a) To assist Relief Coordinator by getting people out of disaster area to Welfare Assembly Areas and provide such relevant information to the people here as may be necessary.

(b) To collect such information for Relief Coordinator as would be useful for deploying various Relief Services to effect better coordination.

(ii) **At Camps and Temporary Shelters**:

These are the places where people will be brought for Emergency shelter, food, clothing and other immediate needs. It is here that people will make enquiries about their lost and separated friends and relatives. They will also seek information regarding the various other facilities like feeding, clothing etc. With a view to meet these needs of the people it will be necessary that all such people who arrive at these places for shelter are registered. In order to provide this information, the following three units may be organised at any temporary shelter or camps.

(a) A Registration unit consisting of volunteers who will have to contact the people to register them in the proper forms which may be provided. They will register all the people arriving at such camps because only then it will be possible to answer the inquiries about the missing persons.

(b) A Welfare Inquiries Unit for filling the Registration Cards and compiling records for answering questions regarding the missing persons and separated families.

(c) A general information unit for answering general welfare services questions and directing people to the various services available within the camps or outside the place of sheltering.

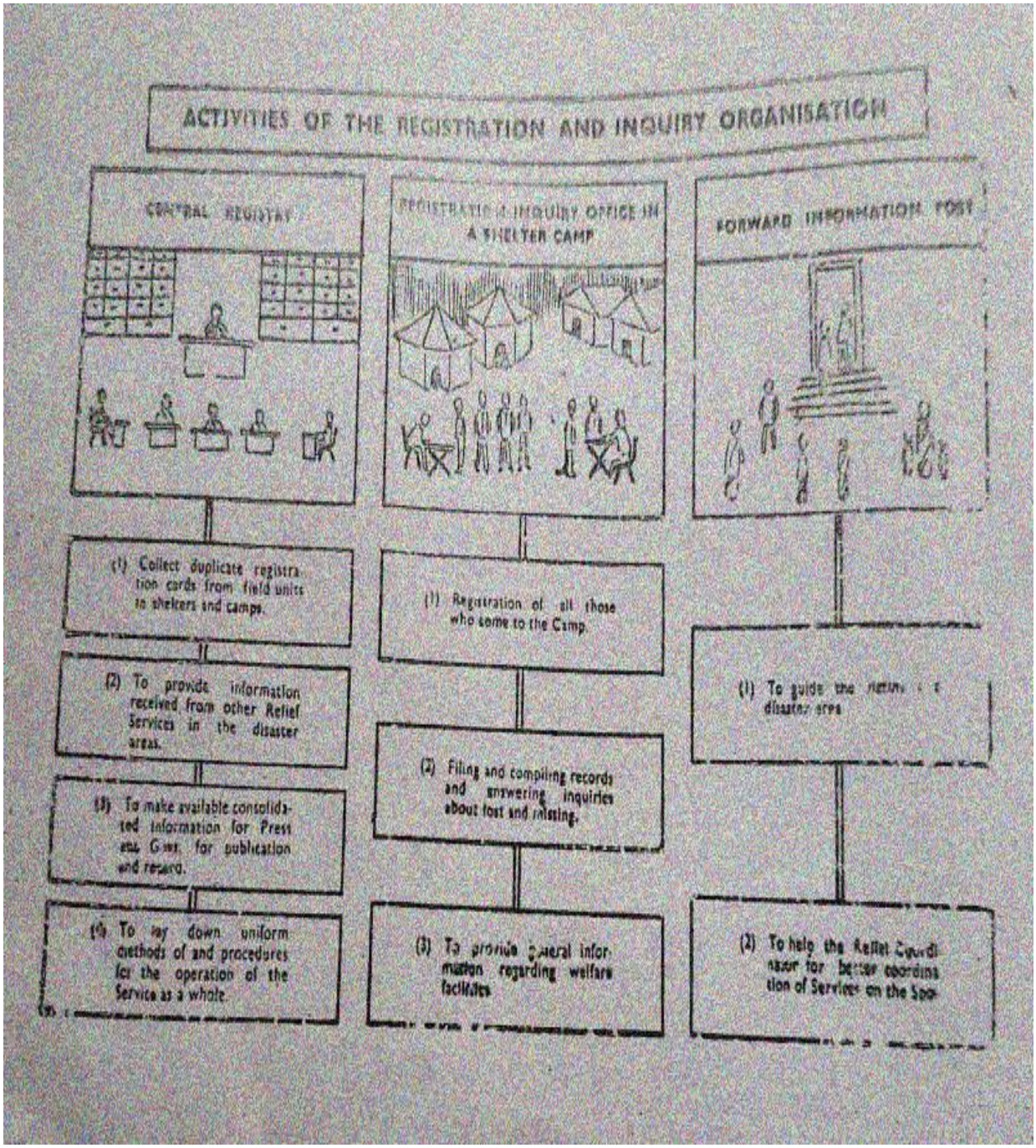
(iii) **The Central Registration and Inquiry Office:** Many temporary shelters and camps may have to be set up during a Civil Emergency and people will be registered at main places. Unless all these records are sent to one coordinating agency the inquiries cannot be answered full. The Central Registration Office will provide the Services as follows:

(a) Bring together at one place, duplicate registration, records maintained in temporary shelters and camps and make these records available to answer inquiries about the missing persons.

(b) The Central Registration Office will also be receiving information from various other Civil Defence Relief Services working in the affected areas. All information collected from such ser vices like the police, emergency hospitals and mortuary and burial grounds etc., will be necessary to be provided to the various temporary shelters and camps for being disseminated to the people in general. The work and organisation of registration and inquiry centres would remain incomplete unless information complete in all respect is available from other Civil De fence Services working in the field as mentioned above.

(c) To collect and disseminate general welfare information regarding various services to the people through temporary shelters and rest centres and to the press for publication if need be.

(d) The Central Office will also give assistance in the uniform methods and procedures to be ad opted for registration etc., and will prescribe forms to be used for the same. This will permit effective mutual aid and coordination amongst various temporary shelters and rest centres.


ACTIVITIES OF THE REGISTRATION AND INQUIRY ORGANISATION
CENTRAL REGISTRY
REGISTRATION & INQUIRY OFFICE IN A SHELTER CAMP
FORWARD INFORMATION POST
(1) Collect duplicate registration cards from field units in shelters and camps.
(2) To provide information received from other Relief Services in the disaster areas.
(3) To make available consolidated information for Press and Govt. for publication and record.
(4) To lay down uniform methods of and procedures for the operation of the Service as a whole.
(1) Registration of all those who come to the Camp.
(2) Filing and compiling records and answering inquiries about lost and missing.
(3) To provide general information regarding welfare facilities
(1) To guide the returnees to disaster area
(2) To help the Relief Coordinator for better coordination of Services on the Spot

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