

COLLAPSED STRUCTURE SEARCH AND RESCUE (CSSR)

LESSON 7 — OVERVIEW

Tools, Equipment and Accessories

Duration	Lecture: 02 Periods	Practical: 34 Periods	Total: 36 Periods
Main Points	• Definition of tools, equipment and accessories (TEA) • Classification of TEAs according to their use • Classification of TEAs according to their power source • Steps to follow before, during and after use of TEAs • Guidelines to follow during use of TEAs		
Suggested Preparation	• Thoroughly study reference material (RM-07) • Based on lesson objectives, highlight the reference material on related subjects. • Fill in the blanks in the participant's manual to guide you in helping participants with needed information. • Have on hand any experiences, stories or comments related to this lesson. • Have the practical exercise stations prepared before the lesson. • Meet with all assistant instructors prior to the class for station assignments and to clarify any doubts. • Have assistant instructors present for the lecture portions. • Any material needed for the practical exercise should be prepared a day in advance.		
Evaluation System	• Written test the next day • Demonstration of the use of tools, equipment and accessories at four practical stations at the end of the lecture		
Materials and Resources Needed	• PowerPoint presentation (10) • Multi-media projector • Projector screen • Handouts (1) • Post-Test (1) • Exercise guides (5) • Clipboards (5) • Radios (Instructor) • PPE • Level 24" • Tape measure • Framing square • Lumber pencil • Generators (4) • Come-along (1) • Rotary rescue saw: - metal blades (2) - concrete blades (2)	• Chain saw (2) • Circular saw electric (1) • Reciprocating saw (1): - (4) wood blades - (4) metal blades • Hydraulic jack: - 10-ton (1) - 20-ton (1) • Light accessories with (stations) extension cords • Hammer drill (1) • Drill (1) ½" bit • Wood (2) Metal (2) Tarp per stations • Chipping Hammer • Fire Extinguisher	Other Materials • Module for working walls • Concrete slabs • Wood 10 cm x 10 cm x 3 meters (8) • Wood 10 cm x 10 cm x 3 meters (4) • Tin sheeting number 28 or 24, 1 meter x 0.5 meter (4) • Rebar ½" between 40 centimetres to 1 meter • Plywood sheeting 1,2 meters x 2,4 meters x1, 25 cm (4)
Importance of This Lesson	To familiarize the participant with the tools, equipment or accessories available in a CSSR cache, and how to properly use and maintain them in a safe manner. It is imperative that the rescuer be familiar with the operation and safe usage of the tools, accessories and equipment in order to accomplish the required tasks.		

LESSON

07

TOOLS, EQUIPMENT AND ACCESSORIES

Lecture: 02 Periods, Practical: 34 Periods

Total : 36 Periods

LESSON OBJECTIVES

Upon completing this lesson, you should be able to:

1. Define tools, equipment and accessories (TEA).
2. List four categories of TEA according to their use.
3. List five power sources for equipment and tools.
4. List the general steps for use and maintenance of tools and equipment (before, during and after their use).
5. Demonstrate in four practical exercises the correct use of TEA.

Instructor Activity

► PPT 7-1 to PPT 7-3

Introduce yourself and your assistant.

Present the lesson topic, explain the relevance of the lesson to the course, state the duration, and describe scheduled activities and method of evaluation.

Present lesson objectives. Ask a participant to read them aloud from the workbook.

Ensure that the objectives are clear to all participants.

Comment on the importance of knowing the proper operation and handling of tools, equipment and accessories used in CSSR, as well as maintenance and other guidelines for use.

1

Definitions

1.1. Tools

A tool is a device that is used to perform or facilitate manual or mechanical work, using only the strength of the operator.

Examples: Tin Snips, adjustable wrench and sledge hammer

Figure 1 ▼
Brick hammer and adjustable wrench



Instructor Activity

► PPT 7-4

Ask a participant to read the definition of tool from the workbook.

Ask for some additional examples of tools besides what is in the workbook.

1

Definitions (Cont.)**1.2 Equipment**

A piece of **equipment** is a machine or device that performs a physical task, whose operation depends on an external power source in order to increase work capacity.

Examples:

Circular saw, hammer drill and rotary rescue saw

Figure 2 ▼

Chainsaw and rotary hammer drill

**1.3 Accessories**

An **accessory** is a component that supplements or completes a tool or piece of equipment, and which increases the operator's ability to perform a task.

Examples: tool belt, drill bits, rotary saw, blade, extension cord

Figure 3 ▼

Carpenter's apron and chipping hammer bit

**Instructor Activity**▶ **PPT 7-5**

Ask a participant to read the definition of equipment. Ask for additional examples.

Prepare examples that will differentiate tools from equipment (for example, a hammer, and a chainsaw).

Promote a discussion regarding the characteristics and capabilities of the tools and equipment used by the participants in their rescue activities. Also ask them to contribute their experiences with maintenance and getting maximum productivity from the TEA they have used.

▶ **PPT 7-6**

Ask a participant to read the definition of accessory from the workbook.

Ask for some additional examples of accessories besides what is in the workbook.

Stress the importance of everyone using the same name or word to describe TEA throughout the course.

Develop a strategy that will allow you to shift from the discussion on TEA to working on how they are classified according to use.

2

Classifying Tools, Equipment and Accessories According to their use

21 Search TEA

Search tools, equipment and accessories are used in **searching** for potentially trapped victims and locating them in collapsed structures. They can be used individually or in conjunction with each other.

22 Rescue TEA

Rescue tools, equipment and accessories are those used to **penetrate** a structure and gain access to a victim in a CSSR operation (Figure 4).

Figure 4 ▼

Rotary rescue saw (K-12) and reciprocating saw



23 Operations Support Equipment and Accessories

This category includes all items and devices used to **aid** in conducting a CSSR operation and which **support** rescue activities (Figure 5).

Figure 5 ▼

Generator and hand-held two-way radios



Instructor Activity

► PPT 7-7

Ask a participant to read the definition on the transparency.

Starting with TEA for search, explain that these are used to detect and locate victims trapped in a collapsed structure as seen in Lesson 5.

With TEA for rescue, these are used to penetrate and cut materials when locating and removing trapped victims.

Promote a group discussion on what types of TEA the participants would use to penetrate any given structure.

► Discuss operations support equipment and accessories and explain the significance of operations support in a CSSR operation. See RM 7-3 and 7-4.

To reinforce this point mention communications, ventilation, power generation, etc. and how these activities support a CSSR operation.

Discuss the HO 7-1 for additional information

As a follow-up, elaborate on the subject of equipment that is used to break, cut, and otherwise penetrate, explaining that many of the tools are also used for these same purposes as well as for measuring, hammering, separating, lifting, etc.

24 Personal Protective Equipment

Personal protective equipment (PPE) is required in order to **prevent injury** while working on a CSSR operation. Some basic PPE items are shown below:

Figure 6 ▼

PPE items: work gloves, eye protection and safety helmet



Ear Plug



Dust Mask



Elbow Pad



Knee Pad

Instructor Activity

- Discuss PPE and relate it to Lesson 5 on safety. Make special reference to unsafe actions and unsafe conditions.

Use RM 7-4 as your guide.

Generate a group discussion on what parts of the rescuer's body require protection during a CSSR operation.



Hard Toe boot

3

Classifying Tools and Equipment According to Power Source

3.1 Electrically-powered

Electric tools and equipment are used to cut, penetrate and break materials.

Examples: circular saws, hammer drills.

Figure 7 ▶
Electric drill
and circular saw



3.2. Pneumatic (Air-Powered)

Pneumatic tools and equipment use pressurised air to cut, hammer and lift. They can be powered by a motor-driven compressor or pressurised air cylinders.

Examples: pneumatic cutters, breaker hammer and air bag

Figure 8 ▶
Pneumatic (air) chisel



▶ Begin this section by asking the group questions such as, “What are some other ways we can classify TEA?”

▶ **PPT 7-8**
Ask a participant to read the transparency aloud.

Explain classification of tools and equipment by power source, such as electric, air-powered, hydraulic, etc.

Explain the difference between pneumatic and electrically-powered tools and equipment.

Give several examples for each type of power source. Use RM 7-4 as a guide.

3.3 Internal Combustion

These tools use fuel-burning, 2-cycle or 4-cycle motors. These are most commonly cutting tools.

Examples: chainsaw, rotary rescue saw.

Figure 9 ►
Generator



3.4 Hydraulic

These tools use the same principle as pneumatic tools, using pressurised hydraulic fluids instead of air.

Figure 10 ►
Hydraulic
bottle jacks



3.5. Other Types

Some tools do not fall into any of the four categories mentioned above.

Examples of these include the acetylene torch, come-along, and winch.

Figure 11 ►
Hoist
(come-along)



Instructor Activity

- Explain and discuss internal combustion equipment. Discuss main characteristics, uses/functions, and where they can and cannot be used.

Can internal combustion equipment be used in closed spaces?

- Explain and discuss hydraulic equipment. Discuss main characteristics, uses/functions, and where they can and cannot be used.

Can hydraulic equipment be used underwater or in a horizontal position?

Allow time for questions and comments. Make any clarifications as needed. Remember to record in the File questions that need to be answered later.

- Discuss the come-along and other types of equipment. This category includes all equipment whose characteristics, mechanisms or power source do not easily fit into the previously mentioned categories, such as some mechanical devices, manually-operated, gas-powered (such as the acetylene torch), etc.

Ask participants for additional suggestions.

Classifying Tools, Equipment and Accessories

ACCORDING TO USE	
Search	Examples: Thermal Imaging Search Camera Acoustic/Vibration Devices
Rescue	Examples: Chipping Hammer Chain Saw Drills Chisels
Operational Support	Examples: Cable Extension Cord Power Strips Bulbs Adapters
ACCORDING TO POWER SOURCE	
Electrical	Examples: Circular Saw Hammer Drill
Air Powered	Examples: Pneumatic Cutters Breaker Hammer Air Bag
Internal Combustion	Examples: Chain Saw Rotary Rescue Saw
Hydraulic	Examples: Jack Hydraulic Cutter and Spreader
Other	Examples: Acetylene Torch Come-along Winch

Instructor Activity

► Use the table shown to review the classifications of TEA.

Instruct participants to fill in the table with the examples presented in discussion.

4

General Steps for Use and Maintenance

There are seven general steps you should follow when using any tool or piece of equipment in a CSSR operation. These steps are in addition to the specific instructions for each particular tool or piece of equipment.

Before

1. Put on all required PPE.
2. Verify availability of fuel and power sources.
3. Verify proper operation of tool.
4. Check required accessories for each tool or piece of equipment.
5. Follow all safety rule
(course rules and manufacturer's rules).

During

6. Use proper technique when using a tool or piece of equipment.

After

7. Follow proper cleaning and maintenance procedures for each tool or piece of equipment.

4.1 Tips for Using Equipment

Follow these important guidelines when using various pieces of equipment:

- Always use the proper bit or blade for the material to be penetrated and make sure that it is firmly installed in the equipment before operating.

- Do not operate a drill until it is in contact with the material to be penetrated.

Instructor Activity**► PPT 7-9 to 7-10**

Point out that a member of a CSSR squad, not only must know the characteristics of the TEA, but also the steps for their proper care and maintenance. This includes care before, during and after use.

Ask participants to suggest ideas for the general steps.

Remind participants that it is also extremely important for TEA to be in order, so they can be easily found and accounted for. Use the phrase:

“Every tool in its place, and a place for every tool.”

Complete the general steps and answer any questions the participants may have.

See RM 7-5 to 7-7.

► Present equipment tips and generate a discussion among the group.

Present ideas and tips based on your own experience and ask participants to contribute from theirs as well.

4

General Steps for Use and Maintenance (Cont.)

- Conversely, when operating a rotary saw, bring it up to full speed **before** making contact with the material to be penetrated.

- When drilling, do not stop the drill while the bit is inside the material – doing so may cause the bit to jam in the material. Likewise, do not allow the blade of a rotary saw to come to a stop while cutting material – remove it fully first.

- If a drill bit becomes jammed in the material and you are unable to remove it with normal drill action, **do not** use the whole drill as a lever on the bit – remove the drill from the bit and try to loosen it with hand tools.

4.2 Equipment Monitoring Form

The Equipment Monitoring Form on the following page is as a sample for tracking all activity and usage for a piece of equipment. The Maintenance Log and Use Log portions can be broken out onto separate pages, as those portions can become lengthy. Because the form records maintenance, it is essential from the safety standpoint.

Instructor Activity

- Explain how to use the form to keep track of maintenance, amount of use, warranty information, and other important information.

EQUIPMENT MONITORING FORM

Description:			
Model:		Brand:	
Serial #:		ID Tag:	
Cost:		Date of Purchase:	
Repair Company:		Warranty Expiration Date:	
Additional Specifications:			
Accessories:			
MAINTENANCE LOG			
Date	Description of Work Performed	Technician	Labour Warranty Expiration Date
USE LOG			
Date	Amount of Time Used	Operator	Comments

EQUIPMENT MONITORING FORM

(FORM TO BE USED IN THE PRACTICAL EXERCISES)

Description:			
Model:		Brand:	
Serial #:		ID Tag:	
Cost:		Date of Purchase:	
Repair Company:		Warranty Expiration Date:	
Additional Specifications:			
Accessories:			
USE LOG			
Date	Amount of Time Used	Operator	Comments

Instructor Activity

- ▶ Practical exercise
- ▶ Review EG for Safety Briefing.
- ▶ Ask participants to complete the Lesson
- ▶ Evaluation form.
- ▶ **REVIEW**
Review lesson objectives and other main points.

Ensure that lesson objectives have been met.
- ▶ **EVALUATION**
Remind participants to study the RM in preparation for Post-Test.
- ▶ **CLOSING**
Collect Lesson Evaluation forms from everyone.

Thank class for their participation and announce the next lesson.

POST-TEST | LESSON 7

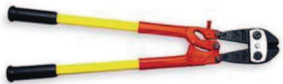
Tools, Equipment and Accessories

1. Below you will find three definitions for tools, equipment and accessories. Match the correct definition for each term by writing the correct answer in the space provided: (T) for tools, (E) for equipment and (A) for accessories.

- (T) A device that is used to perform or facilitate manual or mechanical work, using only the strength of the operator.
- (E) A machine or device that performs a physical task, whose operation depends on an outside power source in order to increase work capacity.
- (A) A component that supplements or completes a tool or piece of equipment, and which increases the operator's ability to perform a task.

2. Identify each item pictured below and on the following page, using the name it has been given in this course. In addition, identify it as a tool, piece of equipment, or accessory, by writing 'T,' 'E' or 'A' in the "T/E/A" column.

	Name	T/E/A
	<u>Chain saw</u>	<u> E </u>
	<u>Framing square</u>	<u> T </u>
	<u>Bucket</u>	<u> A </u>

	Name	T/E/A
	<u>Bolt cutter</u>	<u>T</u>
	<u>Adjustable wrench</u>	<u>T</u>
	<u>Chipping hammer</u>	<u>E</u>
	<u>Wood circular saw</u>	<u>E</u>
	<u>Gas container</u>	<u>A</u>

3. List and describe the steps you should take before starting the item pictured below.



1. Put on required PPE.
2. Verify availability of fuel and power sources.
3. Verify proper operation of tool.
4. Check required accessories.
5. Follow all safety rules.

LESSON 7

— PPT's

7-1



7-2

OBJECTIVES

Upon completing this lesson, you will be able to:

- 1 Define tools, equipment and accessories (TEA).
- 2 List four categories of TEA according to their use.
- 3 List five power sources for equipment and tools.

7-3

OBJECTIVES

Upon completing this lesson, you will be able to:

- 4 List the general steps for use and maintenance of tools and equipment (before, during and after their use).
- 5 Demonstrate in four practical exercises the correct use of TEA.

7-4

TOOL



A device that is used to perform or facilitate manual or mechanical work, using only the strength of the operator.

7-5

EQUIPMENT



A machine or device that performs a physical task, whose operation depends on an outside power source in order to increase work capacity.

7-6

ACCESSORY



A component that supplements or completes a tool or piece of equipment, and which increases the operator's ability to perform a task.

LESSON 7

— PPT's

7-7

CLASSIFYING TEA BY USE



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PPT 7-7

7-8

CLASSIFYING TEA BY POWER SOURCE

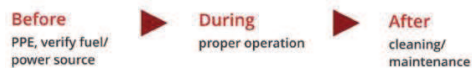


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PPT 7-8

7-9

USE AND MAINTENANCE



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PPT 7-9

7-10

BEFORE USING POWER TOOLS, READ MANUFACTURER'S INSTRUCTIONS



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PPT 7-10