

Salvage and Overhaul

Chapter Overview

Direct contact with flame is not the only means by which property is damaged in a fire. In many fires, more property is ruined through contact with smoke or water than is burned. As a fire fighter, your mission is to protect life and property. This means one of your key responsibilities is preventing unnecessary damage to the contents of a structure, many of which are irreplaceable and of high sentimental value. Another critical responsibility is ensuring that the fire is completely extinguished. You will want to inspect behind walls, false ceilings, and other areas into which fires can creep, to ensure that there are no hidden pockets of smoldering embers or fire. Even a small amount of smoldering embers can rekindle into a full-blown fire. This can cause extensive additional damage. At the very least, a rekindle will require an embarrassing moment for the fire department as it is called again to extinguish the fire a second time.

After students complete this chapter and the related course work, they will understand the purposes and practices of salvage and overhaul within the context of overall fire suppression operations. Students will be able to demonstrate the correct use of salvage covers, ventilation, and other equipment in protecting property from the effects of smoke and water. They will also be able to demonstrate the correct use of hand tools in exposing and extinguishing smoldering or hidden pockets of fire.

NFPA Standards

NFPA 1001 Standard

Fire Fighter I

- 5.3.10** (A) *Requisite Knowledge*. Principles of fire streams; types, design, operation, nozzle pressure effects, and flow capabilities of nozzles; precautions to be followed when advancing hose lines to a fire; observable results that a fire stream has been properly applied; dangerous building conditions caused by a fire; principles of exposure protection; potential long-term consequences of exposure to products of combustion; physical states of matter in which fuels are found; common types of accidents or injuries and their causes; and the application of each size and type of attack line, the role of the backup team in fire attack situations, attack and control techniques for grade level and above and below grade levels, and exposing hidden fires.
- 5.3.13** Overhaul a fire scene, given personal protective equipment, attack line, hand tools, a flashlight, and an assignment, so that structural integrity is not compromised, all hidden fires are discovered, fire cause evidence is preserved, and the fire is extinguished.
- 5.3.13** (A) *Requisite Knowledge*. Types of fire attack lines and water application devices most effective for overhaul, water application methods for extinguishment that limit water damage, types of tools and methods used to expose hidden fire, dangers associated with overhaul, obvious signs of area of origin or signs of arson, and reasons for protection of fire scene.
- 5.3.13** (B) *Requisite Skills*. The ability to deploy and operate an attack line; remove flooring, ceiling, and wall components to expose void spaces without compromising structural integrity; apply water for maximum effectiveness; expose and extinguish hidden fires in walls, ceilings, and sub-floor spaces; recognize and preserve obvious signs of area of origin and arson; and evaluate for complete extinguishment.
- 5.3.14** Conserve property as a member of a team, given salvage tools and equipment and an assignment, so that the building and its contents are protected from further damage.
- 5.3.14** (A) *Requisite Knowledge*. The purpose of property conservation and its value to the public, methods used to protect property, types of and uses for salvage covers, operations at properties protected with automatic sprinklers, how to stop the flow of water from an automatic sprinkler head, identification of the main control valve on an automatic sprinkler

system, and forcible entry issues related to salvage.

- 5.3.14** (B) *Requisite Skills*. The ability to cluster furniture; deploy covering materials; roll and fold salvage covers for reuse; construct water chutes and catch-alls; remove water; cover building openings, including doors, windows, floor openings, and roof openings; separate, remove, and relocate charred material to a safe location while protecting the area of origin for cause determination; stop the flow of water from a sprinkler with sprinkler wedges or stoppers; and operate a main control valve on an automatic sprinkler system.
- 5.3.17** Illuminate the emergency scene, given fire service electrical equipment and an assignment, so that designated areas are illuminated and all equipment is operated within the manufacturer's listed safety precautions.
- 5.3.17** (A) *Requisite Knowledge*. Safety principles and practices, power supply capacity and limitations, and light deployment methods.
- 5.3.17** (B) *Requisite Skills*. The ability to operate department power supply and lighting equipment, deploy cords and connectors, reset ground-fault interrupter (GFI) devices, and locate lights for best effect.

Fire Fighter II

- 6.5.2** Maintain power plants, power tools, and lighting equipment, given tools and manufacturers' instructions, so that equipment is clean and maintained according to manufacturer and departmental guidelines, maintenance is recorded, and equipment is placed in a ready state or reported otherwise.
- 6.5.2** (A) *Requisite Knowledge*. Types of cleaning methods, correct use of cleaning solvents, manufacturer and departmental guidelines for maintaining equipment and its documentation, and problem-reporting practices.
- 6.5.2** (B) *Requisite Skills*. The ability to select correct tools; follow guidelines; complete recording and reporting procedures; and operate power plants, power tools, and lighting equipment.

Objectives and Resources

Knowledge Objectives

After studying this chapter, you will be able to:

- Describe the safety precautions that need to be considered when performing salvage.
- List the tools that are used for salvage.
- Describe how fire fighters can limit losses from smoke and heat.
- Describe the steps needed to protect building contents using a salvage cover.
- Describe some general steps that can be taken to limit water damage.
- Describe the steps needed to stop the flow of water from activated sprinkler heads.
- Describe overhaul.
- List the safety concerns that must be addressed to ensure safety for fire fighters performing overhaul.
- Describe how to preserve structural integrity during overhaul.
- List the tools that are used for overhaul.
- Describe the importance of adequate lighting at the fire scene and in the fire building.

Skills Objectives

After studying this chapter, you will be able to:

- Perform the one-fire fighter salvage cover fold.
- Perform the two-fire fighter salvage cover fold.
- Fold and roll a salvage cover.
- Perform a one-person salvage cover roll
- Perform a shoulder toss.
- Perform a balloon toss.
- Stop water from a sprinkler head a using sprinkler stop.
- Stop water from a sprinkler head using sprinkler wedges.
- Close and open main control valve (outside screw-and-yoke).
- Close and open main control valve (post-indicator).
- Construct a water chute.
- Construct a water catch-all.
- Open a ceiling to check for fire with a pike pole.

- Open an interior wall.
- Inspect and run a generator.

Support Materials

- Dry erase board and markers or chalkboard and chalk
- LCD projector, slide projector, or overhead projector, and projection screen
- PowerPoint® presentation, overhead transparencies, or slides
- Digital camera with downloading or projection capabilities
- Examples of sprinkler heads, sprinkler wedges, and sprinkler stops
- Salvage covers, pike poles, ventilation fans, and other hand tools and equipment needed for skill drills.

Enhancements

- Direct the students to visit the Internet at www.Fire-Fighter.jpup.com for online activities.
- Direct the students to relevant sections in the Student Workbook for application of the content introduced in this chapter.
- Direct the students to relevant sections in the Student Review Manual to prepare for examinations.
- Direct the students to the corresponding online Fire-Learn module to study the knowledge and critical thinking skills presented online.

Teaching Tips

- Salvage and overhaul are primarily manual skills. Limited theoretical knowledge is required, and most learning is accomplished through skill drills.
- It is difficult for fire fighter students to envision what takes place in interior firefighting activities and what to look for. If it is possible to videotape actual fire-fighting operations (perhaps through a department photographer), footage of salvage and overhaul efforts will give the student a much better understanding of what to look for and what to do.

Reading and Preparation

- Review all instructional materials, including *Fundamentals of Fire Fighter Skills*, Chapter 18, and all related presentation support materials.
- Review local firefighting protocols for Chapter 18.
- Gather several examples of sprinkler heads, sprinkler wedges, and commercial sprinkler stops to show students during the deactivating sprinklers lecture.

Presentation Overview

Total time: 410 minutes

Pre-Lecture

I. You Are the Fire Fighter	Small Group Activity/Discussion	5 minutes
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Notes

Lecture

I. Introduction	Lecture/Discussion	5 minutes
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Notes

II. Salvage	Lecture/Discussion	30 minutes
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III. Overhaul	Lecture/Discussion	30 minutes
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Notes

IV. Lighting	Lecture/Discussion	15 minutes
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Notes

V. Summary	Lecture/Discussion	5 minutes
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Notes

VI. Skill Drills	Demonstration/Group Activity	240 minutes
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- A. One-Fire Fighter Salvage Cover Fold (Skill Drill 18-1)
- B. Two-Fire Fighter Salvage Cover Fold (Skill Drill 18-2)
- C. Fold and Roll a Salvage Cover (Skill Drill 18-3)
- D. One-Person Salvage Cover Roll (Skill Drill 18-4)
- E. Shoulder Toss (Skill Drill 18-5)
- F. Balloon Toss (Skill Drill 18-6)
- G. Using a Sprinkler Stop (Skill Drill 18-7)
- H. Using Sprinkler Wedges (Skill Drill 18-8)
 - I. Close and Re-Open Main Control Valve (OS&Y) (Skill Drill 18-9)
 - J. Close and Open Main Control Valve (PIV) (Skill Drill 18-10)
- K. Construct a Water Chute (Skill Drill 18-11)
- L. Construct a Water Catch-All (Skill Drill 18-12)
- M. Pulling a Ceiling Using a Pike Pole (Skill Drill 18-13)
- N. Opening an Interior Wall (Skill Drill 18-14)
- O. Conduct a Weekly/Monthly Generator Test (Skill Drill 18-15)

Notes

Post-Lecture

I. Wrap-Up		
A. Fire Fighter in Action	Small Group Activity/Individual Activity/Discussion	20 minutes
B. Technology Resources (www.FireFighter.jpublish.com)	Small Group Activity/Discussion	20 minutes
II. Lesson Review	Discussion	15 minutes
III. Assignments	Lecture	5 minutes
IV. Chapter 18 Instructor Keyed Quiz	Individual Activity	20 minutes

Notes

Lesson Plan

Pre-Lecture

You Are the Fire Fighter



Time: 5 minutes



Small Group Activity/Discussion

Use this activity to motivate students to learn the knowledge and skills needed to perform salvage and overhaul correctly.

Purpose

To allow students an opportunity to explore the significance and concerns associated with salvage and overhaul.

Instructor Directions

1. Direct students to read the “You Are the Fire Fighter” scenario found in the beginning of Chapter 18.
2. You may assign students to a partner or a group. Direct them to review the discussion questions at the end of the scenario and prepare a response to each question. Facilitate a class dialogue centered on the discussion questions.
3. You may also assign this as an individual activity and ask students to turn in their comments on a separate piece of paper.

Lesson Plan

Lecture

SLIDE TEXT

LECTURE NOTES

I. Introduction



Time: 5 minutes



Slides: 1-6



Lecture/Discussion

Slides 1-4

Chapter Objectives

Slide 5

Introduction

(1 of 2)

- Fire fighter priorities are:
 - Saving lives
 - Controlling the fire
 - Protecting property
- Salvage and overhaul help to protect property.

A. After saving lives and controlling the fire, protecting property is the next highest priority of the fire fighter.

B. Salvage and overhaul operations help to protect property.

Slide 6

Introduction

(2 of 2)

- Salvage
 - Efforts to limit smoke, water, and physical damage to contents
- Overhaul
 - Efforts to identify and extinguish hidden pockets of fire and smoldering embers to prevent further progression or rekindles

C. Salvage includes any efforts to limit smoke, water, and physical damage to the contents of the fire structure.

D. Overhaul includes any efforts to identify hidden smoldering embers and pockets of fire in order to prevent further progression of the fire or rekindles.

II. Salvage

Time: 30 minutes



Slides: 7-21



Lecture/Discussion

Slide 7

Salvage

(1 of 3)

- Conducted to save property and reduce damage
- Aimed at limiting secondary losses from smoke and water damage

A. Salvage

1. Conducted to save property from a fire (and other conditions) and reduce damage
2. Aimed at limiting secondary losses from smoke and water

Slide 8

Salvage

(2 of 3)

- Salvage operations include:
 - Expelling smoke
 - Removing heat
 - Controlling water runoff
 - Removing water from the building
 - Securing a building after a fire
 - Covering broken windows and doors
 - Patching ventilation openings

3. Salvage operations include:
 - a. Expelling smoke
 - b. Removing heat
 - c. Controlling water runoff
 - d. Removing water from the building
 - e. Securing a building after a fire
 - f. Covering broken doors and windows
 - g. Patching ventilation openings

Slide 9

Salvage

(3 of 3)

- Protecting property is a responsibility of fire fighters.
 - Property can be irreplaceable and/or of high sentimental value (e.g. photos).
 - Contents may be more valuable than structure (e.g., artwork, computers, important files).

4. Protecting property is a responsibility of fire fighters.
 - a. Protection of property is the third priority after saving lives and controlling the fire.
 - b. Often property is irreplaceable and of high sentimental value.
 - c. Protecting property may be different for a commercial or industrial occupancy.
 - i. Occupants value items differently (e.g., business records, computers).
 - ii. Machinery may be more valuable than the finished products.

Slide 10**Safety Considerations: Salvage**

- Safety is a primary concern.
- Full PPE required, including SCBA
 - During firefighting
 - Until Safety Officer determines air in structure is safe to breathe
- Beware of possible structural collapse due to:
 - Lightweight trusses
 - Heavy objects
 - Extra water weight

Slide 11**Salvage Tools**

(1 of 2)

- Equipment used in salvage operations includes:
 - Salvage covers
 - Box cutters
 - Floor runners
 - Wet/dry vacuums
 - Squeegees

Slide 12**Salvage Tools**

(2 of 2)

- Submersible pumps and hose
- Sprinkler wedges and stops
- Ventilation fans
- Small hand tools

Slide 13**Limiting Smoke and Heat Damage**

- Keep smoke and heat out of uninvolved areas.
- Close doors after a room is searched.
- Perform rapid ventilation.
- Use salvage covers to protect contents.
- Use floor runners to protect carpets and hardwood floors.

Slide 14**Salvage Covers**

- Begin on floor below the fire.
- Move contents to center of room.
- Place pictures and small objects in drawers.
- Cover with salvage cover.
 - Shoulder toss
 - Balloon toss

B. Safety Considerations During Salvage Operations

1. Safety is a primary concern.
2. During firefighting and immediately afterwards, all personnel should be in full PPE, including SCBA.
3. Determination of when SCBA can be removed is made by the Safety Officer after atmospheric testing.
4. Beware of structural collapse due to:
 - a. Weakened structural components
 - b. Excess weight of water and building contents

C. Salvage Tools

1. Used to shield and cover building contents and remove smoke, water, and other damaging products
2. Salvage tools include:
 - a. Salvage covers
 - b. Box cutters
 - c. Floor runners
 - d. Wet/dry vacuums
 - e. Squeegees
 - f. Submersible pumps and hose
 - g. Sprinkler wedges and stops
 - h. Ventilation fans
 - i. Small hand tools

D. Limiting Smoke and Heat Damage

1. Keep heat and smoke out of areas that are not involved in the fire.
2. Close doors after a room is searched.
3. Rapid ventilation will often reduce smoke damage.
4. Use salvage covers to protect building contents.
 - a. Begin on the floor immediately below the fire.
 - b. Move contents to center of room.
 - c. Place pictures and small objects in drawers.
 - d. Cover with salvage cover.
 - e. Can be left behind to protect contents from drainage or the elements (remember to retrieve them when no longer needed)
 - f. Special folding and rolling techniques permit rapid deployment.
 - i. Folding and rolling salvage covers will be practiced in Skill Drills 18-1 through 18-4.
 - ii. Spreading a salvage cover will be practiced in Skill Drills 18-5 and 18-6.
5. Floor Runners
 - a. Protect carpets and hardwood floors from fire fighters' boots

Slide 15**Preventing Water Damage**

- Limit water application.
- Turn off nozzles when not in use.
- Deactivate sprinklers.
 - When IC declares fire under control
 - Using sprinkler wedges or stops
 - Using sprinkler control valves

Slide 16**Replacing Sprinkler Heads**

- Replacements are usually stored near main control valve.
- Replacement heads must be of same design, size, and temperature rating.
- System should be placed in service by a qualified professional.

Slide 17**Closing the Sprinkler Control Valve**

- Situations in which sprinkler control valve may need to be closed:
 - Recessed sprinkler heads
 - Too many heads activated for number of wedges or stops
 - Sprinkler heads cannot be plugged using wedges or stops.

Slide 18**Valve Closure Process**

- Use bolt cutters to remove control valve lock if key is unavailable.
 - Cut close to padlock so chain can be reused.
- Close zone valve if possible; otherwise close main sprinkler control valve.
- Open drain valve if one is present.

E. Preventing Water Damage

1. Best way to prevent water damage is to limit water application.
2. Deactivating Sprinklers
 - a. Shut down sprinklers as soon as IC declares fire under control.
 - b. Insert a sprinkler wedge or sprinkler stop to stop flow from sprinkler heads.
 - i. Using sprinkler stops and wedges will be practiced in Skill Drills 18-7 and 18-8.
 - c. Situations which will necessitate closure of sprinkler control valve:
 - i. Recessed sprinkler heads
 - ii. Too many heads activated for number of wedges or stops
 - iii. Sprinkler heads cannot be plugged using wedges or stops
3. Valve closure process:
 - a. Bring bolt cutters to remove control valve lock if key is unavailable.
 - i. Cut close to padlock so chain can be reused.
 - b. Close zone valve if possible; otherwise close main sprinkler control valve.
 - i. Outside stem and yoke (OS&Y) valve
 - ii. Post indicator valve (PIV)
 - c. Open drain valve if one is present.
 - d. Closing and re-opening the main control valve will be practiced in Skill Drill 18-9.
 - e. Closing and opening a post indicator valve will be practiced in Skill Drill 18-10.
 - f. Spare sprinkler heads are usually stored near main control valve.
 - i. Must be same design, size, and temperature rating
 - g. Only qualified professionals can place the system in service.

Slide 19**Removing Water**

(1 of 2)

- Channel to a drain or outside of building.
- Use pumps, wet/dry vacuums, or squeegees.
 - Pumps and vacuums can remove large amounts of water, but need power sources.
 - Gas-powered equipment must be located outside.
- Remove toilet to create a large drain.
- Create a “scupper”.
 - A floor-level hole in a wall to allow water to drain to the outside

Slide 20**Removing Water**

(2 of 2)

- Water Chute
 - Channels water to a drain or outside the structure
- Water Catch-All
 - A temporary “pond” that catches dripping water and holds it in place

Slide 21**Other Salvage Operations**

- Move contents to safe location within structure.
- Move contents outside structure.
- Place valuable items in the care of a law enforcement officer.
- Fire investigators may need to be consulted.

4. Removing Water

- a. Channel water to a drain or outside building.
- b. Water chutes—a chute constructed using a ladder and a salvage cover that channels water to a drain or the outside of the structure
 - i. Constructing a water chute will be practiced in Skill Drill 18-11.
- c. Water catch-alls—a temporary pond constructed using a salvage cover to hold dripping water in one location
 - i. Constructing a water catch-all will be practiced in Skill Drill 18-12.
- d. Use pumps, wet/dry vacuums, and squeegees.
 - i. Gas-powered equipment must be placed outside structure.
- e. Remove the toilet to create a large drain.
- f. Create opening at floor level in exterior wall (known as a “scupper”).

III. Overhaul

Time: 30 minutes



Slides: 22-35



Lecture/Discussion

Slide 22**Overhaul**

- Process of searching for and extinguishing hidden fire and embers
- Requires physically examining every potential void space
- A single pocket of embers can cause a rekindle.
- Fire not fully extinguished until overhaul is complete

A. Overhaul

1. Overhaul is the process of searching for and extinguishing pockets of fire that remain after a fire has been brought under control.
 - a. Identify and open any void spaces where fire might be burning undetected.
2. A single pocket of embers can cause a rekindle.
3. Fire is not considered fully extinguished until overhaul is complete.

Slide 23**Safety Considerations: Overhaul**

(1 of 2)

- Overhaul is strenuous work.
- Fire fighters may be fatigued and may overlook hazards.
 - IC should consider using a fresh crew for overhaul.
- Structural integrity may be compromised by fire.
- Limited visibility

Slide 24**Safety Considerations: Overhaul**

(2 of 2)

- Wet or icy surfaces
- Smoldering areas can burst into flames.
- Air may not be safe to breathe.
- Dangerous equipment used in close quarters
- Fire fighters should wear full PPE.
- Safety Officer should be present

Slide 25**Coordinating Overhaul with Fire Investigators**

- Ensure evidence is not lost or destroyed.
- Investigator should examine area before overhaul commences.
- Note burn patterns.
- Note whether appliances are plugged in or turned on.
- If anything suspicious is found, delay overhaul until investigator examines the scene.

B. Safety Considerations During Overhaul

1. Overhaul is strenuous work.
2. Fire fighters involved in suppression may be fatigued and may overlook hazards.
3. ICs should consider using fresh crews for overhaul.
4. Structural integrity could be compromised by fire.
 - a. Evaluate structural integrity before beginning overhaul.
 - b. Indicators of possible collapse include:
 - i. Lightweight or truss construction
 - ii. Walls that are cracked or out of alignment
 - iii. Sagging floors
 - iv. Heavy equipment on the roof (or higher floors)
 - v. Overhanging cornices or signs
 - vi. Accumulations of water
 - c. Use caution not to compromise structural integrity during overhaul.
5. Visibility is limited.
6. Surfaces can be wet or icy.
7. Smoldering areas can burst into flames.
 - a. Have a charged hose line ready at all times.
8. Air may not be safe to breathe.
9. Dangerous equipment is used in close quarters.
10. Fire fighters should wear full PPE.
11. Safety Officer should be present.
 - a. Safety Officer should confirm utilities are rendered safe before overhaul begins.

C. Coordinating Overhaul with Fire Investigators

1. Ensure important evidence is not lost or destroyed.
2. Ideally, the fire investigator should examine the area before overhaul commences.
3. Note burn patterns on walls and ceilings.
4. Note whether appliances were plugged in or turned on before moving them.
5. If anything suspicious is noted, delay overhaul until an investigator examines the scene.

Slide 26**Where to Overhaul**

(1 of 6)

- Look for avenues for fire to spread.
 - Utility shafts
 - Pipe chases
 - Doors or dampers that do not close tightly
 - Wiring or piping (for electrical fires)
 - Ventilation systems
- Look for voids created by remodeling.
 - False ceilings
 - False doors

Slide 27**Where to Overhaul**

(2 of 6)

- Wood-frame Construction
 - Many void spaces exist.
 - Open and check every wall, ceiling, and void space.

Slide 28**Where to Overhaul**

(3 of 6)

- Balloon-frame Construction
 - Fire can spread from basement to attic without showing on other floors.
 - Careful overhaul of every floor is required.

Slide 29**Where to Overhaul**

(4 of 6)

- Using Your Senses
 - Look
 - Smoke
 - Embers
 - Burnt areas
 - Discolorations
 - Peeling paint or cracked plaster

Slide 30**Where to Overhaul**

(5 of 6)

- Listen
 - Crackling sounds
 - Hissing sounds
- Feel
 - Heat (use back of hand)

D. Where to Overhaul

1. Overhaul must be thorough and extensive.
 - a. Make sure the fire is definitely out!
2. Overhaul depends on the building's construction and contents, and the size of the fire.
3. Look for openings that would allow fire to spread.
 - a. Utility shafts
 - b. Pipe chases
 - c. Doors and dampers that do not close tightly
4. Wood-frame construction
 - a. Many void spaces exist.
 - b. Every wall, ceiling, and potential void space needs to be opened and checked.
5. Balloon-frame construction
 - a. Fire can spread from basement to attic without showing on other floors.
 - b. These structures require careful, floor-by-floor overhaul.
6. Look for voids created by remodeling.
 - a. False ceilings
 - b. False roofs
7. Consider the cause and original location of the fire in determining where to overhaul.
 - a. Check areas around ventilation ducts and chimneys.
 - b. Check areas around wiring and piping in electrical fires.
8. Using Your Senses
 - a. Look for:
 - i. Smoke from cracks or around doors and windows
 - ii. Fresh or new smoke
 - iii. Red, glowing embers
 - iv. Burnt areas
 - v. Discolored material (especially walls)
 - vi. Peeling paint or cracked plaster
 - b. Listen for:
 - i. Crackling sounds
 - ii. Hissing sounds
 - c. Feel for:
 - i. Heat, using the back of the hand

Slide 31**Where to Overhaul**

(6 of 6)

- Thermal Imager
 - Displays minute differences in temperature
 - Can quickly identify areas that need to be opened

Slide 32**Overhaul Techniques**

- Charged hose line should be available to douse sudden flare-ups.
- Extinguish any fire or embers.
- Drop smoldering objects into bathtub or bucket of water.
- Remove smoldering contents to outside.
 - Far enough away to prevent damage
 - Do not block entrances or exits.
- Adjust techniques to meet situation.

Slide 33**Overhaul Tools**

(1 of 2)

- Pike poles
- Ceiling hooks
- Crowbars
- Halligan tools
- Axes
- Power tools
- Pitchforks
- Shovels
- Rubbish hooks
- Rakes
- Small hand lines

Slide 34**Overhaul Tools**

(2 of 2)

- Buckets, tubs, wheelbarrows, and carryalls are used to remove debris from a building.

Slide 35**Opening Walls and Ceilings**

- A six-foot pike pole is sufficient for most residential fires.
- Power saws and handsaw can be used to make cuts in walls and ceilings.
 - Pull wall section away by hand after cutting.

9. Thermal Imagers

- a. Produce images of even slight differences in temperature
- b. Can detect hot spots behind walls or ceilings
- c. Interpreting readings takes practice and training
- d. Can assist in location of hidden fires or heat, but does not replace thorough investigation by fire fighters

E. Overhaul Techniques

1. Charged hose line should be available to douse sudden flare-ups.
2. Extinguish small pockets of fire or smoldering materials using the least possible amount of water.
3. Drop smoldering objects into a bathtub or bucket filled with water.
4. Remove mattresses and other materials prone to smoldering and douse thoroughly outside.
 - a. Move far enough from structure to prevent damage if object rekindles.
 - b. Do not block entrances or exits.
5. Adjust techniques as situations dictate.
 - a. Enlarge a window opening to facilitate removal of debris.
6. Use a front-end loader to remove debris from large commercial structures.

F. Overhaul Tools

1. Overhaul tools are designed for cutting, prying, and pulling.
2. Tools include:
 - a. Pike poles/ceiling hooks
 - b. Crowbars/Halligan tools
 - c. Axes
 - d. Power tools
 - e. Pitchforks/shovels
 - f. Rubbish hooks/rakes
 - g. Small handlines
 - h. Buckets/tubs, wheelbarrows, and carryalls

G. Opening Walls and Ceilings

1. A six-foot pike pole is sufficient for most residential fires.
2. Work from farther away towards the door so exit is not blocked by debris.
3. Use pike pole or ceiling hook to penetrate wall or ceiling.
4. Pike poles, power saws, and handsaws can be used to open a hole in a wall.
5. Pulling down a ceiling with a pike pole will be practiced in Skill Drill 18-13.
6. Opening an interior wall will be practiced in Skill Drill 18-14.

IV. Lighting



Time: 15 minutes



Slides: 36-46



Lecture/Discussion

Slide 36

Lighting

- Many incidents occur at night.
- Most incidents require power to be shut off.
- Lighting required for safe and efficient operations
- Types of fire service lights
 - Spotlights: narrow concentrated beam of light
 - Floodlights: diffuse light over a wide area

Slide 37

Battery-Powered Lights

- Used to illuminate immediate work area
- Every crew member should have a high-powered hand light.
- Personal flashlight should be kept with fire fighters' PPE.

Slide 38

Electrical Generators

- Inverters usually not sufficient to power lights, tools, or ventilation fans
- Gas- or diesel-powered generators provide ample power.
 - Portable: up to 6 kW
 - Vehicle-mounted: can be >20kW

Slide 39

Safety Principles and Practice

(1 of 2)

- Lights and equipment use household current (110-volt AC).
- All equipment must be properly grounded.
 - Use a grounding rod, if provided.
 - Generators should be equipped with ground fault interrupters (GFIs).

Slide 40

Safety Principles and Practice

(2 of 2)

- Do not use equipment that is poorly insulated, worn, or undersized for load.
- Avoid areas of standing or flowing water.

A. Lighting

1. Many emergency incidents occur at night.
2. Most incidents require electricity to be disconnected for safety reasons.
3. Lighting is required to illuminate the scene and enable safe and efficient operations.
4. Types of lights:
 - a. Spotlights
 - i. Project a narrow concentrated beam of light
 - b. Floodlights
 - i. Project a diffuse light over a wide area

B. Battery-Powered Lights

1. Generally used by individual fire fighters to illuminate their immediate work area
2. Every crew member entering a building should have a high-powered hand light.
3. Personal flashlight should be kept with fire fighters' PPE.
 - a. Flashlights should be rugged and project a long beam.
 - b. Can be a lifesaver if your primary light source fails!

C. Electrical Generators

1. More powerful lights require a separate power source.
2. Inverters provide power from a vehicle's electrical system.
 - a. Usually insufficient to power scene lighting, power tools, or ventilation fans
3. Gas- or diesel-powered generators provide ample power for lights, tools, fans, etc.
 - a. Can be portable or permanently mounted on fire apparatus

D. Safety Principles and Practices

1. Lighting and power equipment used at a fire scene is usually 110-volt AC (same as household current).
2. All electrical equipment should be properly grounded.
3. Do not use equipment with electrical cords that are poorly insulated, that have cuts or defects, or that is undersized for load.
4. Generators should be equipped with ground fault interrupters (GFIs).
 - a. GFIs interrupt power to a device when a problem with the electrical ground is sensed.
 - b. Use a grounding device (such as a grounding rod), if provided.

Slide 41**Lighting Equipment**

(1 of 3)

- Portable lights
 - Used to illuminate the interior of the building or the fire scene

Slide 42**Lighting Equipment**

(2 of 3)

- Junction boxes
 - Serve as mobile power outlets
 - Are protected by waterproof covers
 - Are often equipped with small lights to make them easy to locate
- Connectors and plugs
 - Use a special connector that attaches with a slight clockwise twist.
 - Prevents accidental unplugging or use in standard household outlets

Slide 43**Lighting Equipment**

(3 of 3)

- Apparatus-mounted lights
 - Body-mounted flood and spotlights
 - Light towers

Slide 44**Lighting Methods**

(1 of 2)

- Light early, often, and safely.
- Exterior lighting
 - Fire fighters can see what they are doing, recognize hazards, and locate victims.
 - Makes scene visible to drivers
 - Provides some light inside structure

Slide 45**Lighting Methods**

(2 of 2)

- Interior lighting
 - Set up portable light at entry point to serve as a beacon for disoriented fire fighters.
 - Illuminate interior areas as needed.
 - Provide ample illumination to facilitate operations and increase safety.

E. Lighting Equipment

1. Portable lights can be used to illuminate the interior of the building or the fire scene.
2. Junction boxes
 - a. Serve as mobile power outlets
 - b. Are protected by waterproof covers
 - c. Are often equipped with small lights to make them easy to locate
3. Connectors and plugs
 - a. Fire service electrical equipment uses a special connector that attaches with a slight clockwise twist.
 - b. This prevents accidental unplugging and accidental use in standard household outlets.
4. Apparatus-mounted lights
 - a. Include floodlights and spotlights
 - b. Light towers can be raised and rotated by remote control.

F. Lighting Methods

1. Light early, light often, and light safely.
2. Exterior Lighting
 - a. Permits fire fighters to:
 - i. See what they are doing
 - ii. Recognize hazards
 - iii. Locate victims
 - b. Makes emergency scene more visible to drivers approaching the scene or maneuvering emergency vehicles
 - c. Provides some light to interior of building through doors and windows
 - d. Apparatus operators should turn on apparatus-mounted floodlights to illuminate the emergency scene.
3. Interior Lighting
 - a. Set up a portable light at the entry point to guide disoriented fire fighters to safety.
 - b. Illuminate interior areas as needed.
 - c. Provide ample illumination during salvage and overhaul to facilitate operations and increase safety.

Slide 46**Electrical Equipment Cleaning and Maintenance**

- Clean and maintain to ensure critical equipment works when needed.
- Test and run generators weekly or monthly.
- Examine equipment for cracked or broken covers or outlets.
- Examine power cords for fraying, heat or mechanical damage, etc.
- Refill generator fuel tanks.

G. Electrical Equipment Cleaning and Maintenance

1. Equipment must be cleaned and properly maintained to ensure it will work when needed.
2. Test and run generators weekly or monthly.
3. Examine equipment for cracked or broken covers or outlets.
4. Examine power cords for tears in the protective covering, fraying, heat or mechanical damage, or burns.
5. Inspect plugs for loose or bent prongs.
6. Inspect and run all power tools and equipment.
7. Refill generator fuel tanks.
8. Conducting a weekly/monthly generator test will be practiced in Skill Drill 18-15.

V. Summary

Time: 5 minutes



Slides: 47-49



Lecture/Discussion

Slide 47**Summary**

(1 of 3)

- Protection of property is a responsibility of the fire fighter.
- Salvage is the process used to protect property from the effects of smoke and water damage.
 - This includes expelling smoke, removing heat, and preventing water damage.
 - Salvage can begin while fire is being fought.

A. Salvage and overhaul are two major loss control operations conducted at every fire.**B. Salvage and overhaul are a lower priority than life safety.****C. The objective of salvage is to protect property and contents by expelling smoke, removing heat, and preventing water damage.****Slide 48****Summary**

(2 of 3)

- Overhaul is the process of checking for and extinguishing hidden pockets of fire and smoldering embers.
 - This requires a methodical and thorough examination of any place where fire or embers may be hidden.
 - Walls, ceilings, and void spaces must be opened and visually checked.

D. The objective of overhaul is to search for and extinguish any remaining pockets of fire after the main fire is under control.

1. All walls, ceilings, and void areas must be opened and checked for hidden fire or embers.

E. The fire officer will develop and direct the overhaul plan.**Slide 49****Summary**

(3 of 3)

- Salvage and overhaul are activities that still present dangers to the fire fighter.
- Wear PPE and SCBA to prevent injuries.
- Providing lighting is important to ensure fire fighters can work efficiently and safely.

F. Proper safety procedures, including appropriate PPE, must be followed during overhaul because of the hazardous environment and fire fighter fatigue.**G. Effective lighting is important during firefighting because it enables the safe, efficient performance of emergency scene operations.**

VI. Skill Drills



Time: 240 minutes



Slides: Chapter 18 Skill Drills PowerPoint® Presentation



Demonstration/Group Activity

Remember to maintain an adequate instructor to student ratio.

Purpose

Following instructor-facilitated demonstrations, this activity allows students to observe and demonstrate competency in firefighting skills associated with salvage and overhaul.

Materials Needed

1. Salvage covers
2. Sprinkler stops and wedges
3. OS&Y valve
4. PIV
5. Bolt cutters
6. Stepladders
7. Pike poles
8. Pick-head axes
9. Generator

Instructor Directions

1. Demonstrate each skill, placing emphasis on describing to the students any critical points or procedures.
2. On the basis of the specific skill, assign each student to a partner or team. Provide each partner/team with equipment or materials as needed.
3. Direct students to practice each skill. Closely monitor the practice sessions and provide constructive comments and redirecting.
4. As individual students achieve success, track their skills and conduct skill proficiency exams using the Skill Drill Evaluation Sheets that follow. Students failing the exam should be given redirection and an opportunity to practice before being retested.

Candidate: _____ Date: _____

ID#: _____

Skill Drill 18-1 One-Fire Fighter Salvage Cover Fold

Evaluator Instructions: The candidate shall be provided with a salvage cover, partner, broom, and gloves.

Task: One-fire fighter salvage cover fold.

Performance Outcome: The candidate shall demonstrate the ability to properly fold a salvage cover.

Candidate Directive: "Properly fold a salvage cover."

No.	Task Steps	First Test		Retest	
		P	F	P	F
1.	Spreads salvage cover flat on ground, faces partner.				
2.	Both fire fighters place one hand on outer edge of cover and other hand a quarter of the way in from edge.				
3.	Together, flips outside edge in 3" from middle.				
4.	Flips outside fold in to same point of cover, creating second fold. Repeats steps 2, 3, and 4 from opposite side of cover. Folded edges meet at middle of cover with fold 6" apart.				
5.	Folds two halves together.				
6.	Starts from middle of cover using a broom to brush air out.				
7.	Moves to narrow edge of salvage cover.				
8.	Folds narrow edge to 3" from middle of cover creating a fold at quarter point.				
9.	Flips outside fold of narrow edge into same point creating second fold. Folded edges meet at middle of cover with folds 6" apart.				
10.	Folds two halves together.				
Retest Approved By: _____		Retest Evaluator: _____			

Evaluator Comments: _____

Candidate Comments: _____

Evaluator

Date

Candidate

Date

Retest Evaluator

Date

Retest Candidate

Date

Candidate: _____ Date: _____

ID#: _____

Skill Drill 18-2 Two-Fire Fighter Salvage Cover Fold

Evaluator Instructions: The candidate shall be provided with a salvage cover, partner, broom, and gloves.

Task: Two-fire fighter salvage cover fold.

Performance Outcome: The candidate shall demonstrate the ability to properly fold a salvage cover with a partner.

Candidate Directive: "Properly fold a salvage cover with a partner."

No.	Task Steps	First Test		Retest	
		P	F	P	F
1.	Spreads salvage cover flat on ground, faces partner.				
2.	Both fire fighters place one hand on outer edge of cover and other hand a quarter of the way in from edge.				
3.	Flips outside edge in 3" from middle.				
4.	Flips outside fold in to same point of cover, creating second fold. Repeats steps 2, 3, and 4 from opposite side of cover. Folded edges meet at middle of cover with folds 6" apart.				
5.	Folds two halves together.				
6.	Starts from middle of cover using a broom to brush air out.				
7.	Moves to narrow edge of salvage cover.				
8.	Folds narrow edge to 3" from middle of cover creating a fold at quarter point.				
9.	Flips outside fold of narrow edge into same point creating second fold. Folded edges meet at middle of cover with folds 6" apart.				
10.	Folds two halves together.				
Retest Approved By:		Retest Evaluator:			

Evaluator Comments: _____ Candidate Comments: _____

Evaluator Date Candidate Date

Retest Evaluator Date Retest Candidate Date

Candidate: _____ Date: _____

ID#: _____

Skill Drill 18-3 Fold and Roll a Salvage Cover

Evaluator Instructions: The candidate shall be provided with a salvage cover, partner, broom, and gloves.

Task: Fold and roll salvage cover.

Performance Outcome: The candidate shall demonstrate the ability to properly fold and roll a salvage cover.

Candidate Directive: "Properly fold and roll a salvage cover."

No.	Task Steps	First Test		Retest	
		P	F	P	F
1.	Spreads salvage cover flat on ground, faces partner.				
2.	Both fire fighters place one hand on outer edge of cover and other hand a quarter of the way in from edge.				
3.	Flips outside edge in 3" from middle.				
4.	Flips outside fold in to same point of cover, creating second fold. Repeats steps 2, 3, and 4 from opposite side of cover. Folded edges meet at middle of cover with folds 6" apart.				
5.	Folds two halves together, folds should touch but not overlap.				
6.	Tightly rolls cover end to end.				
Retest Approved By: _____		Retest Evaluator: _____			

Evaluator Comments: _____

Candidate Comments: _____

Evaluator

Date

Candidate

Date

Retest Evaluator

Date

Retest Candidate

Date

Candidate: _____ Date: _____

ID#: _____

Skill Drill 18-4 One-Person Salvage Cover Roll

Evaluator Instructions: The candidate shall be provided with a rolled salvage cover and gloves.

Task: One-fire fighter salvage cover roll.

Performance Outcome: The candidate shall demonstrate the ability to properly unroll a salvage cover.

Candidate Directive: "Properly unroll a salvage cover."

No.	Task Steps	First Test		Retest	
		P	F	P	F
1.	Stands in front of object being covered.				
2.	Unrolls cover over end of object.				
3.	Continues unrolling cover until top of object is reached. Allows remainder of cover to unroll and settle at end of object.				
4.	Spreads cover, unfolding each side outward over object to the first fold.				
5.	Unfolds second fold on each side and drapes cover completely over object.				
6.	Tucks in all loose edges around object.				
Retest Approved By: _____		Retest Evaluator: _____			

Evaluator Comments: _____ Candidate Comments: _____

_____ Evaluator	_____ Date	_____ Candidate	_____ Date
_____ Retest Evaluator	_____ Date	_____ Retest Candidate	_____ Date

Candidate: _____ Date: _____

ID#: _____

Skill Drill 18-6 Balloon Toss

Evaluator Instructions: The candidate shall be provided with a folded salvage cover, a partner, and gloves.

Task: Balloon toss.

Performance Outcome: The candidate shall demonstrate the ability to properly balloon toss a salvage cover with a partner.

Candidate Directive: "Properly balloon toss a salvage cover with a partner."

No.	Task Steps	First Test		Retest	
		P	F	P	F
1.	Places cover on ground beside object.				
2.	Unfolds salvage cover along base of object. Each fire fighter grabs one edge and brings it to waist height.				
3.	Lifts cover quickly so it fills with air.				
4.	Moves quickly to other side of object, using air to support salvage cover.				
5.	Spreads entire salvage cover over object.				
Retest Approved By: _____		Retest Evaluator: _____			

Evaluator Comments: _____ Candidate Comments: _____

Evaluator

Date

Candidate

Date

Retest Evaluator

Date

Retest Candidate

Date

Candidate: _____ Date: _____

ID#: _____

Skill Drill 18-7 Using a Sprinkler Stop

Evaluator Instructions: The candidate shall be provided with full personal protective equipment, sprinkler stop, ladder, and activated sprinkler.

Task: Using a sprinkler stop.

Performance Outcome: The candidate shall demonstrate using a sprinkler stop to stop flow of water.

Candidate Directive: "Properly use a sprinkler stop to stop flow of water."

No.	Task Steps	First Test		Retest	
		P	F	P	F
1.	Has sprinkler stop in hand.				
2.	Places flat-coated part of sprinkler stop over sprinkler head orifice and between frame of sprinkler head.				
3.	Pushes lever to expand sprinkler stop until it snaps into position.				
Retest Approved By:			Retest Evaluator:		

Evaluator Comments: _____

Candidate Comments: _____

Evaluator

Date

Candidate

Date

Retest Evaluator

Date

Retest Candidate

Date

Candidate: _____ Date: _____

ID#: _____

Skill Drill 18-8 Using Sprinkler Wedges

Evaluator Instructions: The candidate shall be provided with full personal protective equipment, sprinkler wedges, ladder, and activated sprinkler.

Task: Using sprinkler wedges.

Performance Outcome: The candidate shall demonstrate using sprinkler wedges to stop flow of water.

Candidate Directive: "Properly use sprinkler wedges to stop flow of water."

No.	Task Steps	First Test		Retest	
		P	F	P	F
1.	Holds one wedge in each hand.				
2.	Inserts two wedges, one from each side, between discharge orifice and sprinkler head deflector.				
3.	Bumps wedges securely into place to stop water flow.				
Retest Approved By: _____			Retest Evaluator: _____		

Evaluator Comments: _____ Candidate Comments: _____

_____ Evaluator	_____ Date	_____ Candidate	_____ Date
_____ Retest Evaluator	_____ Date	_____ Retest Candidate	_____ Date

Candidate: _____ Date: _____

ID#: _____

Skill Drill 18-9 Close and Re-Open Main Control Valve (OS&Y)

Evaluator Instructions: The candidate shall be provided with OS&Y valve and bolt cutters.

Task: Close and re-open main control valve.

Performance Outcome: The candidate shall demonstrate how to close and re-open main control valve.

Candidate Directive: "Properly close and re-open main control valve."

No.	Task Steps	First Test		Retest	
		P	F	P	F
1.	Locates OS&Y valve on preincident plan. Stem of valve protrudes from valve handle in open position.				
2.	Identifies valve controlling sprinklers in fire area.				
3.	If valve is locked and key is unavailable, uses bolt cutters to cut padlock.				
4.	Turns valve handle clockwise to close valve.				
5.	Turns valve handle counterclockwise to open valve. Locks valve handle in open position.				

Retest Approved By: _____ Retest Evaluator: _____

Evaluator Comments: _____ Candidate Comments: _____

_____ Evaluator	_____ Date	_____ Candidate	_____ Date
_____ Retest Evaluator	_____ Date	_____ Retest Candidate	_____ Date

Candidate: _____ Date: _____

ID#: _____

Skill Drill 18-10 Close and Open Main Control Valve (PIV)

Evaluator Instructions: The candidate shall be provided with a post indicator valve (PIV) and bolt cutters.

Task: Close and open main control valve.

Performance Outcome: The candidate shall demonstrate how to close and open main control valve.

Candidate Directive: "Properly close and open main control valve."

No.	Task Steps	First Test		Retest	
		P	F	P	F
1.	Locates PIV.				
2.	Most PIVs will be locked in open position. If no key is available, uses bolt cutters to cut lock.				
3.	Removes handle from storage position on PIV and places on top of valve.				
4.	Turns valve stem in direction indicated on top to close valve. Keeps turning until visual indicator changes from "OPEN" to "SHUT."				
5.	To open PIV, turns valve in opposite direction until indicator changes back to "OPEN." Valve should then be locked in open position.				
Retest Approved By: _____		Retest Evaluator: _____			

Evaluator Comments: _____ Candidate Comments: _____

Evaluator	Date	Candidate	Date
Retest Evaluator	Date	Retest Candidate	Date

Candidate: _____ Date: _____

ID#: _____

Skill Drill 18-11 Construct a Water Chute

Evaluator Instructions: The candidate shall be provided with a salvage cover, two pike poles, and a step ladder.

Task: Construct a water chute.

Performance Outcome: The candidate shall demonstrate how to construct a water chute.

Candidate Directive: "Properly construct a water chute."

No.	Task Steps	First Test		Retest	
		P	F	P	F
1.	Fully opens large salvage cover on ground.				
2.	Rolls tightly from one edge to middle of salvage cover. If using pike poles, lays one pole on edge of salvage cover and rolls around handle.				
3.	Rolls opposite edge until edges are 1' to 3' apart.				
4.	Turns cover upside down.				
5.	Positions chute so it collects dripping water and channels towards drain.				
6.	Uses a stepladder or tall object to support chute made with pike poles.				

Retest Approved By: _____

Retest Evaluator: _____

Evaluator Comments: _____

Candidate Comments: _____

Evaluator

Date

Candidate

Date

Retest Evaluator

Date

Retest Candidate

Date

Candidate: _____ Date: _____

ID#: _____

Skill Drill 18-12 Construct a Water Catch-All

Evaluator Instructions: The candidate shall be provided with a salvage cover.

Task: Construct a water catch-all.

Performance Outcome: The candidate shall demonstrate how to construct a water catch all.

Candidate Directive: "Properly construct a water catch all."

No.	Task Steps	First Test		Retest	
		P	F	P	F
1.	Fully opens large salvage cover on ground.				
2.	Rolls two edges inward from opposite sides. Rolls approximately 3' on each side.				
3.	Folds each of four corners at a 90° angle. Starts each fold approximately 3' from edge.				
4.	Rolls remaining edges inward approximately 2'.				
5.	Lifts rolled edge over cover flaps, tucks under flaps to lock corners.				
Retest Approved By: _____			Retest Evaluator: _____		

Evaluator Comments: _____ Candidate Comments: _____

_____ Evaluator	_____ Date	_____ Candidate	_____ Date
_____ Retest Evaluator	_____ Date	_____ Retest Candidate	_____ Date

Candidate: _____ Date: _____

ID#: _____

Skill Drill 18-13 Pulling a Ceiling Using a Pike Pole					
Evaluator Instructions: The candidate shall be provided with a ceiling, full personal protective equipment, and a pike pole.					
Task: Pull a ceiling using a pike pole.					
Performance Outcome: The candidate shall demonstrate how to pull a ceiling using a pike pole.					
Candidate Directive: "Properly pull a ceiling using a pike pole."					
No.	Task Steps	First Test		Retest	
		P	F	P	F
1.	Selects appropriate size pike pole.				
2.	Determines area to be opened.				
3.	Positions self with back towards door so debris pulled does not block exit.				
4.	Uses strong upward-thrusting motion to penetrate ceiling with tip of pike pole. Faces hook side away from self.				
5.	Pulls down and away from body.				
6.	Pulls down section of ceiling until desired area is open. Pulls down insulation found in ceiling.				
Retest Approved By:			Retest Evaluator:		

Evaluator Comments: _____

Candidate Comments: _____

Evaluator

Date

Candidate

Date

Retest Evaluator

Date

Retest Candidate

Date

Candidate: _____ Date: _____

ID#: _____

Skill Drill 18-14 Opening an Interior Wall

Evaluator Instructions: The candidate shall be provided with a wall to be opened up, full personal protective equipment, and an axe.

Task: Open an interior wall.

Performance Outcome: The candidate shall demonstrate how to open an interior wall.

Candidate Directive: "Properly open an interior wall."

No.	Task Steps	First Test		Retest	
		P	F	P	F
1.	Uses axe blade to begin cutting near the top of the wall.				
2.	Cuts downward between wall studs.				
3.	Surveys the wall for electrical switches or receptacles.				
4.	After making two vertical cuts, uses pick end of axe to pull wall material away from studs and open the wall. Works from top to bottom.				
5.	If necessary, removes items such as baseboards or window and door trim.				
6.	Continues opening additional sections of wall until desired area is open.				
7.	Pulls out any insulation found behind the wall.				
Retest Approved By: _____		Retest Evaluator: _____			

Evaluator Comments: _____ Candidate Comments: _____

Evaluator

Date

Candidate

Date

Retest Evaluator

Date

Retest Candidate

Date



Candidate: _____ Date: _____

ID#: _____

Skill Drill 18-15 Conduct a Weekly/Monthly Generator Test

Evaluator Instructions: The candidate shall be provided with a generator to test.

Task: Conduct a weekly/monthly generator test.

Performance Outcome: The candidate shall demonstrate how to conduct a weekly/monthly generator test.

Candidate Directive: "Properly conduct a weekly/monthly generator test."

No.	Task Steps	First Test		Retest	
		P	F	P	F
1.	Removes generator from apparatus compartment (if required) or opens all doors and installs grounding rod (as needed).				
2.	Checks oil and fuel levels and starts generator.				
3.	Connects power cord or junction box to generator.				
4.	Connects a load (fan or lights) and listens as engine revs up to proper speed.				
5.	Checks voltage and amperage gauges to confirm efficient operation.				
6.	Runs generator under load for 15 to 30 minutes.				
7.	Turns off load and listens as generator slows down to idle speed.				
8.	Allows generator to idle for approximately 2 minutes.				
9.	Turns off generator.				
10.	Disconnects all power cords and junction boxes, and removes grounding rod (as needed).				
11.	Cleans all power cords and tools and replaces them in proper storage areas.				
12.	Allows generator to cool for 5 minutes.				
13.	Refills with fuel and oil as needed.				
14.	Returns generator to its compartment.				

Retest Approved By: _____ Retest Evaluator: _____

Evaluator Comments: _____ Candidate Comments: _____

Evaluator

Date

Candidate

Date

Retest Evaluator

Date

Retest Candidate

Date

Lesson Plan

Post-Lecture

I. Wrap-Up Activities



Time: 40 minutes



Small Group Activity/Individual Activity/Discussion

A. Fire Fighter in Action

This activity is designed to assist the student in gaining a further understanding of salvage and overhaul. The activity incorporates both critical thinking and the application of fire fighter knowledge.

Purpose

This activity allows students an opportunity to analyze a firefighting scenario and develop responses to critical thinking questions.

Instructor Directions

1. Direct students to read the “Fire Fighter in Action” scenario located in the Wrap-Up section at the end of Chapter 18.
2. Direct students to read and individually answer the quiz questions at the end of the scenario. Allow approximately 10 minutes for this part of the activity. Facilitate a class review and dialogue of the answers, allowing students to correct responses as needed. Use the quiz question answers noted below to assist in building this review. Allow approximately 10 minutes for this part of the activity.
3. You may also assign these as individual activities and ask students to turn in their comments on a separate piece of paper.

Answers to Multiple Choice Questions

1. Answer C: Salvage covers shield and cover building contents. Other tools remove smoke, water, and other products that can damage property. Examples of salvage tools include salvage covers (treated canvas or plastic), box cutters for cutting plastic, floor runners, wet/dry vacuums, squeegees, submersible pumps and hose, sprinkler shut-off kits, ventilation fans, power blowers, and small tool kits.
2. Answer B: Salvage efforts usually are aimed at preventing or limiting secondary losses that result from smoke and water damage, fire suppression efforts, and other causes. They must be performed promptly to preserve the building and protect the contents from avoidable damage. Salvage operations include expelling smoke, removing heat, controlling water runoff, removing water from the building, securing a building after a fire, covering broken windows and doors, and temporarily patching ventilation openings in the roof to protect the structure and its contents.
3. Answer A: The value of some items, such as photographs and family heirlooms, cannot be measured in dollars. These items are treasured by victims and are often irreplaceable.
4. Answer D: During firefighting operations and immediately afterward, fire fighters should wear a full set of protective clothing and equipment, including SCBA. After the fire is out, the area must be ventilated, and the atmosphere tested and determined to be safe by the safety officer before fire fighters can work without SCBA. Structural collapse is always a possibility during salvage operations because of fire damage to the building's structural components. Damage to the building's utility systems presents significant risks to fire fighters conducting salvage operations. Electrical services should always be shut off to eliminate the potential hazards of electrocution.

B. Technology Resources

This activity requires students to have access to the Internet. This may be accomplished through personal access, employer access, or through a local educational institution. Some community colleges, universities, or adult education centers may have classrooms with Internet capability that will allow for this activity to be completed in class. Check out local access points and encourage students to complete this activity as part of their ongoing reinforcement of firefighting knowledge and skills.

Purpose

To provide students an opportunity to reinforce chapter material through use of online Internet activities.

Instructor Directions

1. Use the Internet and go to www.FireFighter.jobpub.com. Follow the directions on the web site to access the exercises for Chapter 18.
2. Review the chapter activities and take note of desired or correct student responses.
3. As time allows, conduct an in-class review of the Internet activities and provide feedback to students as needed.
4. Be sure to check the web site before assigning these activities, as specific chapter-related activities may change from time to time.

II. Lesson Review

Time: 15 minutes



Lecture

Note: Facilitate the review of this lesson's major topics using the review questions as direct questions or overhead transparencies. Answers are found throughout this lesson plan.

- A. What is salvage, and why it is it important?
- B. What safety considerations are important to ensure fire fighter safety during salvage operations?
- C. What tools and equipment are used in salvage operations?
- D. What methods are available to eliminate water from a structure?
- E. What methods are available to eliminate smoke from a structure?
- F. How can the fire fighter control an open sprinkler?
- G. What is overhaul, and why it is it important?
- H. What safety considerations are important to ensure fire fighter safety during overhaul operations?
 - I. When can fire fighters remove SCBA during overhaul operations?
 - J. What tools and equipment are used in overhaul operations?
- K. What considerations are important for the preservation of evidence for fire investigators?
- L. Why is it necessary to provide artificial lighting on the fireground?
- M. What equipment is use to provide artificial lighting on the fireground?
- N. What special procedures must be used to keep lighting equipment clean and well serviced?

III. Assignments

Time: 5 minutes



Lecture

- A. Advise students to review materials for a quiz (determine date/time).
- B. Direct students to read the next chapter in *Fundamentals of Fire Fighter Skills* as listed in your syllabus (or reading assignment sheet) to prepare for the next class session.

IV. Instructor Keyed Quiz



Time: 20 minutes



Individual Activity

1. True or False: Salvage is the process of removing the contents of a structure after a fire has been extinguished.

Answer: b

- a. True
- b. False

2. When is the appropriate time to begin salvage operations?

Answer: c

- a. Immediately upon entering a fire structure
- b. Only when the IC directs salvage to begin
- c. As soon as possible after fire control and search and rescue have been initiated
- d. Only after the fire has been fully extinguished

3. Salvage efforts include:

Answer: a

- a. expelling smoke; controlling water runoff; moving property to the middle of the room and covering it with a salvage cover; covering windows and doors with plywood before leaving the scene.
- b. expelling smoke; controlling water runoff; shutting off utilities; and moving property to the middle of the room and covering it with a salvage cover.
- c. removing windows and cutting holes in the roof to remove smoke; limiting water application during firefighting; and shutting off utilities.
- d. checking void spaces for hidden smoldering embers and pockets of fire; removing any burning building contents and structural materials; and ensuring they are properly wetted down to prevent a rekindle.

4. When may fire fighters remove SCBA during salvage and overhaul operations?

Answer: b

- a. SCBA is not necessary during salvage and overhaul because these operations do not put the fire fighter in direct proximity to smoke and fire.
- b. Only after the work area has been ventilated and the atmosphere has been tested and determined to be safe by the Safety Officer
- c. When the work effort required is in excess of the capacity of SCBA to deliver breathable air
- d. Anytime the work area is sufficiently free of smoke to allow the fire fighter to see and breathe without difficulty

5. What are three methods to prevent damage to the contents of a fire structure?

Answer: c

- a. Use a fog stream to keep smoke particles from becoming aerosolized; move contents to centers of rooms and cover with salvage covers; and control sprinklers to prevent damage from excess water.
- b. Shut off water supply to sprinklers as soon as interior firefighting operations begin; move contents to centers of rooms and cover with salvage covers; and remove contents to outside the fire structure whenever possible.
- c. Ventilate the structure of excess smoke; move contents to centers of rooms and cover with salvage covers; and control excess water using water chutes and water catch-alls.
- d. Apply fire streams sparingly; shut off sprinklers as time allows; and control excess water using water chutes and water catch-alls.

6. True or False: Overhaul should be conducted concurrently with the initial fire attack whenever possible.

Answer: b

- a. True
- b. False

7. Overhaul can be considered complete when:

Answer: d

- a. the Safety Officer determines that overhaul has been adequately accomplished by inspecting all voids and places where it might be possible for fire and smoldering embers to be hidden.
- b. all visible fire and embers have been thoroughly wetted down or removed so no rekindle is possible.
- c. your company officer determines that overhaul has been adequately accomplished.
- d. the Incident Commander determines that overhaul has been adequately accomplished by inspecting all voids and places where it might be possible for fire and smoldering embers to be hidden.

8. Indicators of possible structural collapse during overhaul include:

Answer: c

- a. sagging floors, truss construction, hissing sounds from behind walls.
- b. sagging floors, lightweight construction, smoke seeping from cracks in walls.
- c. walls cracked or out of alignment, sagging floors, lightweight construction.
- d. smoke seeping from cracks in the walls, hissing sounds from behind walls, sagging floors.

9. A(n) _____ is useful for removing ceilings and walls to inspect for hidden fires and smoldering embers.

Answer: a

- a. pike pole
- b. axe
- c. Halligan tool
- d. sledgehammer

10. During the course of overhaul, you note a burn pattern on a wall that looks like a splash. What should you do?

Answer: d.

- a. Make a mental note of the pattern and location before proceeding further with overhaul.
- b. Carefully cut around the section of wall to preserve it for a fire investigator.
- c. Continue with overhaul, as such burn patterns are common in most fires.
- d. Stop all overhaul in the area until a fire investigator has examined the burn pattern.

11. The best way to determine where to overhaul is:

Answer: b

- a. Look for discoloration of walls that might indicate a fire burning behind them.
- b. Visually inspect by opening every wall or potential void where fire may have spread.
- c. Use a thermal imager to locate hidden hot spots.
- d. Listen for hissing sounds that might indicate a fire burning.

12. Fire fighters should wear SCBA during overhaul because:

Answer: a.

- a. smoldering embers could produce toxic or harmful by-products of combustion.
- b. opening a wall could cause a flare-up that might produce flames big enough for a fire fighter to breathe in.
- c. doing so is generally required by departmental SOPs and federal Occupational Safety and Health Administration rules.
- d. it is not necessary to wear SCBA during overhaul because the fire has already been brought under control.

13. What is the primary reason for providing exterior lighting on the fireground at night?

Answer: a

- a. To ensure that fire fighters can see hazards, have sufficient light to see what they are doing, and can identify and rescue victims
- b. To provide light inside the structure on fire
- c. To ensure that nearby drivers can see fire fighters and apparatus
- d. To provide a point of reference for disoriented fire fighters inside the structure

14. True or False: Fire service lighting equipment uses standard household current but different connectors.

Answer: a

- a. True
- b. False

15. Fire apparatus must be equipped with a(n) _____ in order to provide sufficient electrical power for emergency lighting.

Answer: d

- a. inductor
- b. power take-off (PTO)
- c. inverter
- d. generator

16. How often should generators be run in order to ensure that they function properly when needed?

Answer: b

- a. Daily
- b. Monthly
- c. Quarterly
- d. Yearly

Student Quiz

Name: _____

Date: _____

- _____ 1. **True or False: Salvage is the process of removing the contents of a structure after a fire has been extinguished.**
- True
 - False
- _____ 2. **When is the appropriate time to begin salvage operations?**
- Immediately upon entering a fire structure
 - Only when the IC directs salvage to begin
 - As soon as possible after fire control and search and rescue have been initiated
 - Only after the fire has been fully extinguished
- _____ 3. **Salvage efforts include:**
- expelling smoke; controlling water runoff; moving property to the middle of the room and covering it with a salvage cover; covering windows and doors with plywood before leaving the scene.
 - expelling smoke; controlling water runoff; shutting off utilities; and moving property to the middle of the room and covering it with a salvage cover.
 - removing windows and cutting holes in the roof to remove smoke; limiting water application during firefighting; and shutting off utilities.
 - checking void spaces for hidden smoldering embers and pockets of fire; removing any burning building contents and structural materials; and ensuring they are properly wetted down to prevent a rekindle.
- _____ 4. **When may fire fighters remove SCBA during salvage and overhaul operations?**
- SCBA is not necessary during salvage and overhaul because these operations do not put the fire fighter in direct proximity to smoke and fire.
 - Only after the work area has been ventilated and the atmosphere has been tested and determined to be safe by the Safety Officer
 - When the work effort required is in excess of the capacity of SCBA to deliver breathable air
 - Anytime the work area is sufficiently free of smoke to allow the fire fighter to see and breathe without difficulty
- _____ 5. **What are three methods to prevent damage to the contents of a fire structure ?**
- Use a fog stream to keep smoke particles from becoming aerosolized; move contents to centers of rooms and cover with salvage covers; and control sprinklers to prevent damage from excess water.
 - Shut off water supply to sprinklers as soon as interior firefighting operations begin; move contents to centers of rooms and cover with salvage covers; and remove contents to outside the fire structure whenever possible.
 - Ventilate the structure of excess smoke; move contents to centers of rooms and cover with salvage covers; and control excess water using water chutes and water catch-alls.
 - Apply fire streams sparingly; shut off sprinklers as time allows; and control excess water using water chutes and water catch-alls.
- _____ 6. **True or False: Overhaul should be conducted concurrently with the initial fire attack whenever possible.**
- True
 - False
- _____ 7. **Overhaul can be considered complete when:**
- the Safety Officer determines that overhaul has been adequately accomplished by inspecting all voids and places where it might be possible for fire and smoldering embers to be hidden.
 - all visible fire and embers have been thoroughly wetted down or removed so no rekindle is possible.
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