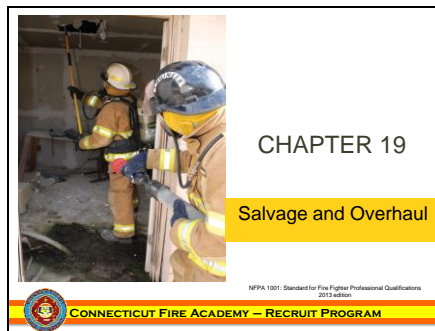




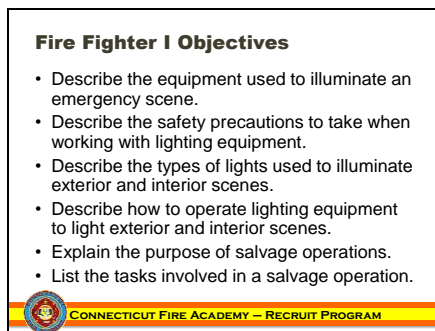
Slide 1



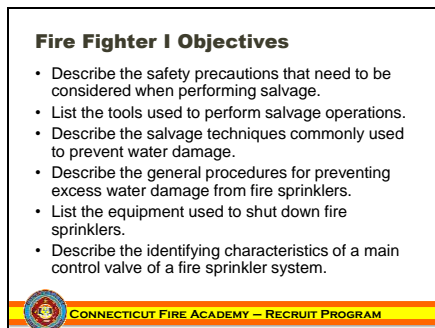
Slide 2



Slide 3



Slide 4






Slide 5

**Fire Fighter I Objectives**


- Describe the general procedures and equipment used to remove excess water from a structure.
- Describe the general procedures and equipment used to limit smoke and heat damage.
- Describe how to maintain salvage covers.
- Explain when fire investigators should become involved in salvage operations.
- Describe the purpose of overhaul operations.
- List the concerns that must be addressed to ensure the safety of fire fighters who are performing overhaul.

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Slide 6

**Fire Fighter I Objectives**


- Describe how to coordinate overhaul operations with fire investigators.
- List the indicators of possible structural collapse.
- Explain how to preserve structural integrity during overhaul.
- Describe how to coordinate overhaul operations with fire investigators.
- Explain how fire fighters determine overhaul locations.
- List the tools that are used for overhaul operations.
- Describe the general techniques used in overhaul operations.

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Slide 7

**Fire Fighter II Objectives** FFII

- Describe the types of generators used to power lighting equipment.
- Describe how generators operate.
- Describe how to clean and maintain lighting equipment.
- Describe how to maintain generators.


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Slide 8

**Introduction**

- Salvage protects property and belongings from damage.
- Overhaul ensures that a fire is completely extinguished.
- Salvage and overhaul are usually conducted in close coordination with each other.
- Fire fighters must attempt to preserve evidence related to the cause of the fire.
- Fire fighters must be able to see where they are going, what they are doing, and whether any potential hazards are present.

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

Salvage efforts protect property and belongings from damage, particularly from the effects of smoke and water.

Overhaul ensures that a fire is completely extinguished by finding and exposing any smoldering or hidden pockets of fire in an area that has been burned.

Salvage and overhaul are usually conducted in close coordination with each other and have a lower priority than conducting search and rescue operations or controlling the fire.


Throughout salvage and overhaul, fire fighters must attempt to preserve evidence related to the cause of the fire.

Fire fighters performing salvage and overhaul must be able to see where they are going, what they are doing, and whether any potential hazards are present.

Slide 9

**Salvage**

- 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


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Slide 10

**Salvage**

- Conducted to save property and reduce damage
- Aimed at limiting secondary losses from smoke and water damage
- Protecting property is a responsibility of fire fighters.
  - Property can be irreplaceable and/or of high sentimental value (eg, photos).
  - Contents may be more valuable than structure (eg, computers, important files).



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**Salvage**

Conducted to save property from a fire and reduce damage

Aimed at limiting secondary losses from smoke and water damage

Salvage operations include:

Expelling smoke

Removing heat

Controlling water runoff

Removing water from the building

Securing a building after a fire

Covering broken doors and windows

Patching ventilation openings

Protecting property is a responsibility of fire fighters.

Often property is irreplaceable and of high sentimental value.

Protecting property may be different for a commercial or industrial occupancy.


Occupants value items differently (eg, business records, computers).

Machinery may be more valuable than the finished products.

Slide 11

**Safety Considerations During Salvage**

- Full PPE required, including self-contained breathing apparatus
- Beware of possible structural collapse
  - Weakened structural components
  - Extra water weight
  - Heavy objects



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**Safety considerations during salvage operations**

Safety is a primary concern.

During firefighting and immediately afterward, all personnel should be in full PPE, including self-contained breathing apparatus (SCBA).

Determination of when SCBA can be removed is made by the safety officer after atmospheric testing.

Beware of structural collapse due to:

Weakened structural components

Excess weight of water and building contents

Gas and electrical services should always be shut off to eliminate risk of electrocution or explosion.



Slide 12

**Salvage Tools**

- Salvage covers
- Box cutters
- Floor runners
- Wet/dry vacuums
- Squeegees



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**Salvage Tools**

Used to shield and cover building contents and remove smoke, water, and other damaging products

Salvage tools include:

Salvage covers: treated canvas or plastic

Box cutters

Floor runners


Wet/dry vacuums

Squeegees

Slide 13

**Salvage Tools**

- Submersible pumps and hose
- Sprinkler shut-off kit
- Ventilation fans
- Small tool kit



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**Salvage Tools**

Submersible pumps and hose

Sprinkler shut-off kit

Ventilation fans, power blowers


Small tool kit

Pike poles to construct water chutes

Slide 14

**Preventing Water Damage**

- Limit application.
- Deactivate sprinklers when fire is under control
- Use sprinkler wedges, stops, or control valves.



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**Best way to prevent water damage is to limit water application.**

**Deactivating Sprinklers**

Shut down sprinklers as soon as incident commander (IC) declares fire under control.

Insert a sprinkler wedge or sprinkler stop to stop flow from sprinkler heads.

Some sprinkler stops are manufactured with a fusible link so they can shut off a sprinkler head and return that sprinkler head to temporary service

Using sprinkler stops and wedges will be practiced in Skill Drills 19-3 and 19-4.

Situations that will necessitate closure of sprinkler control valve:

Recessed sprinkler heads

Too many heads activated for number of wedges or stops

The main control valve for a sprinkler system is usually an outside stem and yoke (OS&Y) valve or a post indicator valve (PIV).

An OS&Y is usually found in a building's

Revision: 030514



mechanical room.

A PIV is located outside the building or on the exterior wall.

Some sprinkler systems also have zone valves controlling flow of water to different areas.

Closing a zone valve stops flow to the sprinklers in that zone only.

Sprinkler control valves should always be locked in the open position.

The steps to close and reopen a main control valve will be practiced in Skill Drills 19-5 and 19-6.

Slide 15

**Replacing Sprinkler Heads**

- Replacement heads must be of same design, size, and temperature rating.
- The valve must be closed and the system drained.



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Before a sprinkler system can be restored to normal operation, the sprinkler heads that have been activated must be replaced.




An activated sprinkler head must be replaced with another head of the same design, size, and temperature rating.

The valve must be closed and the system drained.

Slide 16

**Removing Water**

- 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



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### Removing Water

Channel water to a drain or outside building. Create an opening at floor level in an exterior wall from which water can drain.

Water chute: A chute constructed using a ladder and a salvage cover that channels water to a drain or the outside the structure

Constructing a water chute will be practiced in Skill Drill 19-7.

Water catch-all: A temporary pond constructed using a salvage cover to hold dripping water in one location



Constructing a water catch-all will be practiced in Skill Drill 19-8.



Slide 17

**Removing Water**

- Water vacuum
  - Small or large
  - Can use wet/dry shop vacuum
- Drainage pumps
  - Electric or gas powered
- Channel to a drain or outside of building.
- Create an opening at floor-level in an exterior wall to allow water to drain to the outside.



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### Removing Water

#### Water vacuum

Available as small-capacity backpack and as larger, wheeled unit

Wet/dry shop vacuums can be used as alternative.

#### Drainage pumps

Remove water that has accumulated in basements or below ground level



Electric submersible pumps can be lowered into the water.

Gas-powered pumps must remain outside because they emit carbon monoxide

Slide 18

**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.



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### Limiting smoke and heat damage

Keep heat and smoke out of areas that are not involved in the fire.

Close doors after a room is searched.

Rapid ventilation will often reduce smoke damage.

### Salvage Covers



Large square or rectangular sheets of heavy canvas or plastic material

Use salvage covers to protect building contents.

Slide 19

**Salvage Covers**

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



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### Salvage Covers

Begin on the floor immediately below the fire.

Move contents to center of room.

Place pictures and small objects in drawers.

Cover with salvage cover.

Can be left behind to protect contents from drainage or the elements (remember to retrieve them when no longer needed)

Special folding and rolling techniques permit rapid deployment.

Folding and rolling salvage covers will be practiced during practical skill training.


Spreading a salvage cover will be practiced during practical skill training.



Slide 20

**Salvage Cover Maintenance**

- Must be adequately maintained to preserve shelf life
- Clean with a scrub brush and clean water.
- Dry canvas covers before returning them to service.
- After drying, inspect salvage covers for tears and holes.



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**Salvage Cover Maintenance**

Must be adequately maintained to preserve shelf life

Easily maintained by cleaning with a scrub brush and clean water



Canvas covers must be properly dried before returning to service.

After drying, salvage covers should be inspected for tears and holes.

Slide 21

**Floor Runners**

- Protect carpets and hardwood floors from the following:
  - Water
  - Debris
  - Fire fighters' boots
  - Firefighting equipment



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**Floor Runners**

Protect carpets and hardwood floors from water, debris, fire fighters' boots, and firefighting equipment.

Slide 22

**Other Salvage Operations**

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



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**Other Salvage Operations**

Move contents to a safe location within the structure.

Move contents outside the structure.

Protect contents from damage caused by firefighting operations or weather.

Place valuable items in the care of a law enforcement officer if property owner is not present.

Fire investigators may need to be consulted.







Slide 23

**Overhaul**

- Process of searching for and extinguishing hidden fire and embers
- A single pocket of embers can cause a rekindle.
- Fire not fully extinguished until overhaul is complete



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### Overhaul

Overhaul is the process of searching for and extinguishing pockets of fire that remain after a fire has been brought under control.

A single pocket of embers can cause a rekindle. Fire is not considered fully extinguished until overhaul is complete.

#### Process

Identify and open any void spaces where fire might be burning undetected.

Open the walls and ceiling to expose any burned areas.



Materials that are still burning must be soaked with water or removed from the building.

Overhaul is also required for nonstructure fires, including those in automobiles, bulk piles, vegetation, and garbage.

Slide 24

**Overhaul**

- Process
  - Identify and open any void spaces.
  - Expose any burned areas.
  - Materials that are still burning must be soaked with water or removed from the building.
- Overhaul is also required for non-structure fires.



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Slide 25

**Safety Considerations: Overhaul**

- Fire fighters may be fatigued.
  - Consider using a fresh crew for overhaul.
  - Provide adequate breaks for rehabilitation.
- Structural integrity may be compromised.
- Visibility may be limited.



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### Safety Considerations During Overhaul

Overhaul is strenuous work.

Fire fighters involved in suppression may be fatigued and may overlook hazards.

ICs should consider using fresh crews for overhaul.


Provide adequate breaks for rehabilitation




Slide 26

**Safety Considerations: Overhaul**

- 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 must wear full PPE.
- Safety officer should be present.



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### **Safety Considerations During Overhaul**

Surfaces can be wet or icy.

Smoldering areas can burst into flames.

Air may not be safe to breathe.

Dangerous equipment is used in close quarters.

A charged hose line must always be ready in case of flare-ups or explosions.


Fire fighters must wear full PPE.


Safety officer should be present to note hazards and ensure safe operations.

Slide 27

**Safety Considerations: Overhaul**

- Look for indicators of possible collapse.
- Do not compromise the structural integrity of the building.
- IC may call for hydraulic overhaul or a fire watch.



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### **Safety Considerations During Overhaul**

Structural integrity could be compromised by fire.

Evaluate structural integrity before beginning overhaul.

Visibility is limited.

Company officers should supervise operations, look for hazards, and make sure crew members work carefully.

Look for indicators of possible structural collapse:

Lightweight and/or truss construction

Cracked walls, out-of-alignment walls, sagging floors

Heavy mechanical equipment on the roof

Overhanging cornices or heavy signs

Accumulations of water

Do not compromise the structural integrity of the building.

IC may call for a “hydraulic overhaul” in which large-caliber hose streams are used to completely extinguish a fire from the exterior.

Condemned or abandoned buildings that will be torn down are not places to risk the health of a fire fighter



If a complete overhaul cannot be conducted, IC may establish a fire watch.



Slide 28

**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/on.
- If anything suspicious is found, delay overhaul.



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**Coordinating overhaul with fire investigators**

Ensure important evidence is not lost or destroyed.

Ideally, the fire investigator should examine the area before overhaul begins.

Note burn patterns on walls and ceilings.

Note whether appliances were plugged in or



turned on before moving them.

If anything suspicious is noted, delay overhaul until an investigator examines the scene.

Slide 29

**Where to Overhaul**

- Fire-resistive construction
  - Utility shafts
  - Pipe chases
  - Doors or dampers that did not close tightly
- Wood-frame and ordinary construction
  - Open every wall, ceiling, and potential void space.



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**Where to Overhaul**

Overhaul must be thorough and extensive.

Make sure the fire is definitely out.

Overhaul depends on the building's construction, its contents, and the size of the fire.

Fire-resistive construction

Can help contain a fire

Look for openings that would allow the fire to spread

Utility shafts

Pipe chases

Doors and dampers that did not close tightly


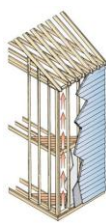
Wood-frame and ordinary construction

Many void spaces exist.

Slide 30

**Where to Overhaul**

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



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**Balloon-frame construction**

Fire can spread from basement to attic without showing on other floors.

These structures require careful, floor-by-floor overhaul.

Look for voids created by remodeling.

False ceilings

False roofs

Every wall, ceiling, and potential void space needs to be opened and checked.

Consider the cause and original location of the fire in determining where to overhaul.

Check areas around ventilation ducts and chimneys.


Check areas around wiring and piping in electrical fires.




Slide 31

**Where to Overhaul**

- Look for:
  - Smoke
  - Embers
  - Burned areas
  - Discolorations
- Listen for:
  - Crackling sounds
  - Hissing sounds
- Feel for:
  - Heat (use back of hand)
- Peeling paint or cracked plaster
- Look for voids created by remodeling.
  - False ceilings
  - False doors



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Using your senses

Look for:

Smoke from cracks or around doors and windows

Fresh or new smoke

Red, glowing embers

Burned areas

Discolored material

Peeling paint or cracked plaster

Listen for:

Crackling sounds

Hissing sounds


Feel for:


Heat, using the back of the hand (if safe to remove glove)

Slide 32

**Thermal Imaging**

- Displays minute differences in temperature
- Can quickly identify areas that need to be opened
- Cannot rule out concealed fire



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### **Thermal imaging**

Produces images of even slight differences in temperature

Can detect hot spots behind walls or ceilings

Interpreting readings takes practice and training

Can assist in location of hidden fires or heat but does not replace thorough investigation by fire fighters


Hot spots behind padding and carpeting may not show up on the thermal imager

Cannot rule out the possibility of a concealed fire

Slide 33

**Overhaul Techniques**

- Charged hose line should be available to douse sudden flare-ups.
- Extinguish any fire or embers.
- Drop smoldering objects into water.
- Remove smoldering contents to outside.
- Adjust techniques to meet situation.

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### **Overhaul Techniques**

Charged hose line should be available to douse sudden flare-ups.

Extinguish small pockets of fire or smoldering materials using the least possible amount of water.

Drop smoldering objects into a bathtub or bucket filled with water.

Remove mattresses and other materials prone to smoldering and douse thoroughly outside.

Move far enough from structure to prevent damage if object rekindles.

Do not block entrances or exits.

Adjust techniques as situations dictate.

Enlarge a window opening to facilitate removal of debris.


Use a front-end loader to remove debris from large commercial structures.



Slide 34

**Overhaul Tools**

- Pike poles
- Ceiling hooks
- Crowbars
- Halligan tools
- Axes
- Power tools
- Pitchforks
- Shovels
- Rubbish hooks
- Rakes
- Thermal imaging cameras
- Hose lines

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### Overhaul Tools

Overhaul tools are designed for cutting, prying, and pulling.

Tools include:

Pike poles and ceiling hooks

Crowbars and Halligan-type tools

Axes

Power tools

Pitchforks and shovels

Rubbish hooks and rakes

Thermal imaging cameras


A 1½" or 1¾" hose line is usually sufficient to extinguish hot spots.


Follow your department's standard operating procedures when choosing a hose line during overhaul.

Slide 35

**Overhaul Tools**

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

  
Courtesy of Cascade Fire Equipment Company

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### Overhaul Tools

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

Slide 36

**Opening Walls and Ceilings**

- A 6-ft pike pole is sufficient for most residential fires.
- Pike poles, power saws, and handsaws can be used to open a hole in a wall.
  - Pull wall section away by hand after cutting.

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### Opening walls and ceilings

A 6-ft pike pole is sufficient for most residential fires.

Work from farther away toward the door so the exit is not blocked by debris.

Use pike pole or ceiling hook to penetrate wall or ceiling.


Pike poles, power saws, and handsaws can be used to open a hole in a wall.



Slide 37

Summary

- Salvage and overhaul limit and reduce property losses from a fire.
- Lighting is required to illuminate the scene.
- Spotlights and floodlights are used.
- Electrical equipment must be grounded.
- Lights can be portable or mounted on apparatus.




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Slide 38

Summary

- Electricity for lighting equipment is supplied by a generator, inverter, or a building's electrical system.
- Portable electronic equipment should be cleaned and maintained.
- Salvage efforts prevent or limit secondary losses from smoke and water.




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Slide 39

Summary

- Safety is the primary concern during salvage operations.
- To prevent water damage, limit the amount of water used.
- Sprinklers can be shut down by using sprinkler wedges or stops or shutting off the main control valve.




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Slide 40

Summary

- Water can be removed using a salvage pump, water chute, water catch-all, water vacuum, or drainage pump.
- Salvage techniques limit smoke and heat damage.
- Overhaul searches for and extinguishes any pockets of fire remaining.




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Slide 41

Summary

- Injuries can occur during overhaul.
- Charged hose lines must always be ready for use during overhaul operations to suppress flare-ups and explosions.
- Evaluate the structural condition of a building before beginning overhaul.
- During overhaul, do not compromise the structural integrity of the building.




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Slide 42

Summary

- The area of overhaul depends on building construction, contents, and size of the fire.
- Fire fighters should use their senses to determine where overhaul is needed.



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The Connecticut Fire Academy  
Recruit Firefighter Program  
**Presentation Instructor Notes**

**Unit 8.1.2**  
**Chapter 19**  
**Salvage & Overhaul**

Slide 43

