

Instructor Guide

Title: Tactical Approach to Chimney Fires

Time Required: 2 hours

Materials:

PowerPoint presentation
AV equipment

Requisite Knowledge:

- Firefighter I
- Basic knowledge of company SOPs

Requisite Skills:

- Firefighter I

References:

Avsec, Robert. "Taking the Fight out of a Chimney Fire." *FireRescue1 News*. FireRescue1, 18 Dec. 2013. Web. 4 Jan. 2015. Referenced from: <http://www.firerescue1.com/fire-products/training-products/suppression-equipment/articles/1636049-Taking-the-fight-out-of-a-chimney-fire/>.

Lee, Michael. "Tactical Approaches for Chimney Fires." *FireRescue1 News*. FireRescue1, 8 Oct. 2008. Web. 4 Jan. 2015. Referenced from: <http://www.firerescue1.com/fire-products/tools/articles/432037-Tactical-Approaches-for-Chimney-Fires/>.

Tactical Approach to Chimney Fires

Motivation:

Due to the seasonal nature of chimney use and lack of structured training on chimney fires in mainstream courses, many firefighters, especially firefighters with limited experience, find themselves ill-prepared to properly mitigate and manage incidents involving chimney fires. Training on how to properly handle a chimney fire can never come too early. Ensuring the proper extinguishment, utilization of salvage techniques, and prevention of fire spread can save a homeowner from further damage to their home in a chimney fire incident.

Student Performance Objective(s) (SPOs):

Given information from discussion, handouts, and reading materials, the student will be expected to describe the breakdown and anatomy of a chimney fire. The student will review causes of chimney fire inception, possible hazards associated with chimney fires and subsequent safety considerations, and methods of chimney fire extinguishment. The student will review the role of the fire ground personnel in mitigating a chimney fire incident.

Enabling Objectives (EOs):

- Describe the characteristics of a chimney fire
- Review the construction of fireplaces, wood pellet stoves, wood stoves, and wood stove inserts
- Describe how creosote build-up exacerbates the progression of chimney fires
- Identify damage within the confines of a fireplace, flue, and chimney and possible fire exposure to the structure
- Discuss the importance of critical thinking in initial response
- Review equipment necessary to mitigate a chimney fire
- Identify safety considerations at a chimney fire incident
- Discuss the ICS system and how it pertains to task breakdown of chimney fire fireground operations and maintaining accountability throughout operations
- Review salvage techniques throughout operations and proper overhaul after fire is under control

Overview:

- Characteristics of chimney fires
- Chimney anatomy and assemblies
- Causes and reasons for damaged chimneys
- ICS and fireground operations at chimney fire incidents
- Safety and accountability
- Extinguishment
- Salvage and overhaul

Lesson Plan

- I. Characteristics of chimney fires
 - A. Explosive burning
 - B. Noisy, low rumbles
 - C. Turbulent Smoke
 - D. Very high temperatures
 - E. Cracks in thimble and flue pipe
 - F. Smoke damage
 - G. Roof/attic damage
 - H. Chimney damage
- II. Chimney anatomy and assemblies
 - A. Fireplace
 1. Firebox
 2. Ash pit and ash pit cover
 3. Hearth
 4. Cleanout door
 5. Lintel
 6. Damper and damper casing
 7. Throat
 8. Smoke chamber
 9. Smoke shelf
 10. Flue and flue tile liners
 11. Roof line
 12. Crown and cap
 - B. Pellet Stove
 1. Burner
 2. Pellet hopper and pellet auger
 3. Exhaust
 4. Ash pit
 5. Air inlet and heated air outlet
 - C. Wood Burning Stove
 1. Stove and stove pipe
 2. Exhaust
 - D. Wood Burning Stove Insert
 1. Similar components as standard fireplace with an insert
 2. Stove and stove pipe
 3. Chimney flue liner
- III. Causes and reasons for damaged chimneys
 - A. Creosote
 1. Products of incomplete combustion that, when cooled, adhere to the inner lining of the chimney wall or flue
 2. Highly combustible

3. Can be black or brown in color and crusty/flaky or tarry/dripping in consistency
 4. Causes of creosote formation
 - a) Incomplete combustion
 - (1) Smoldering fires produce large amounts of creosote
 - (2) Failure to clean chimney regularly will result in creosote build-up
 - b) Cool surfaces
 - (1) Exterior chimneys are harder to keep warm
 - (2) If the fire is burning below 1100 degrees F, volatile gases escape and condense on relatively cooler surfaces
 - c) Wet wood or “green wood”
 - (1) Unseasoned softwoods form the most creosote
 - B. 2,000 degrees F will begin to break down masonry work
 - C. Crack in terracotta lining
 - D. Metal chimneys under high heat conditions can warp seams and crack welds
- IV. ICS and fireground operations at chimney fire incidents
- A. Response
 1. Chimney fire dispatched - but is it only a chimney fire?
 - a) Do not assume
 - b) Think possible house fire and respond for house fire with full assignment
 - c) Pull handline to front of house and charge to be ready to go
 - d) Officer or first arriving should do a complete walk around of house
 - B. Equipment necessary to combat chimney fires
 1. Chimney brush
 2. Tarps/runners, metal salvage bucket for salvage considerations
 3. Dry chemical
 - a) Extinguishers
 - b) “Chimney bombs” - dry chemical packs
 4. Small stove shovel
 5. Thermal imaging camera to assess for extension
 6. Mirror to view interior of chimney
 7. Positive pressure ventilation fan
 8. Heavy chain with metal cable
 - a) Outdated in some areas
 - C. Assignments
 1. Utilize ICS system to ensure structure and accountability
 - a) Incident Command (IC)
 - b) Safety Officer
 - c) Fire Attack Crew
 - (1) Consider floor runners to ensure proper salvage
 - (2) Open damper
 - (3) Use dry chem. up the chimney to subdue the fire
 - (4) Remove combustibles in metal salvage can
 - (5) Remove vent pipe if needed

- d) Roof/Chimney Crew
 - (1) Safety considerations
 - (a) Sound the roof to ensure roof integrity
 - (b) Utilize a roof ladder for safety in roof operations
 - (c) Ensure two means of egress
 - (d) Wear full PPE and SCBA
 - (2) Use “chimney bombs” (plastic bags with dry chem.) to put out the fire
 - (3) Check the integrity of the chimney
 - (4) Check for exposure to the roof
- e) Ventilation Crew
 - (1) Set up positive pressure ventilation (PPV) fan
 - (2) Create appropriate openings for movement of gaseous products of combustion
- f) Exposure Crew
 - (1) Check for extension along chimney area
 - (2) Check attic and second floor for extension
 - (a) Utilize TIC to assess for hot spots
 - (3) Pull back up handline
 - (4) Ensure egress for crews working interior
 - (a) Ladders
 - (5) Help with ventilation

V. Safety and accountability

- A. Full PPE and SCBA for everybody
- B. Use of aerial apparatus for better, safer accessibility
- C. Use TIC to check for hot spots and extension
- D. Crew integrity and accountability
 - 1. Regular PAR checks
 - 2. Work in teams of two or as a group, no freelancing
- E. Communicate!
 - 1. Communication consistent between all crews operating on the fireground
 - (a) Before use of dry. chem up the chimney stack, ensure personnel operating on the roof are aware
 - (b) Conversely, communicate to crew at firebox before dropping “chimney bombs” down the flue

VI. Extinguishment

- A. Extinguish and remove fuel from firebox
- B. Dry chem. in bags dropped down the chimney
 - 1. Dry chem. sealed in plastic bags (e.g. Ziplock)
 - 2. Drop sealed bags down flue toward draft stop
 - 3. Heat within the flue will melt bags to release dry chem. for fire extinguishment
- C. Dry chem. extinguisher from the base of the flue
 - 1. Coordinate opening of draft stop with release of dry chem. from extinguisher at base of flue

- a) Ensure proper coordination, as opening of the draft stop may initially accelerate the fire
 - 2. Expel dry chem. extinguisher up the flue
 - a) Heat will carry the dry chem. up the flue
 - b) Consider utilizing salvage tarps before beginning due to the potential for mess and damage
 - D. Utilize PPV to force dry chem. up the chimney and ensure ventilation
 - 1. Ensure all other openings in the structure are closed to ensure pressurization of fire room
 - 2. Use PPV fan to pressurize room
 - 3. Expel dry chem. extinguisher in coordination with ventilation with PPV fan
 - a) Consider use of a tarp to control the opening of the fireplace to limit the amount of ventilation going up the chimney so that dry chem. has time to extinguish the fire
 - E. Chimney chain
 - 1. Outdated
 - 2. Utilized to knock packed creosote and other products of combustion off the interior walls of the chimney and flue
- VII. Salvage and overhaul
- A. Salvage
 - 1. Consider salvage covers and floor runners to reduce damage to property
 - 2. Metal salvage can to collect debris from the chimney
 - B. Overhaul
 - 1. Utilize TIC to check for hot spots and extension
 - 2. Make sure fire is completely out to remove risk of rekindle
 - 3. Account for personnel
 - 4. Fireplace requires inspection before homeowner may continue use

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Summary:

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salvage techniques, and prevention of fire spread can save a homeowner from further damage to their home in a chimney fire incident.

Practical:

Our practical included a 40 gallon, metal barrel (a mock fireplace) lying on its side, with one end open, placed approximately 2' of the ground with bricks. On top of the barrel was a 2" hole. Protruding from the hole was a 6'long, 2" round, metal pipe (a mock chimney). The pipe was lined with one piece of paper on the inside of the pipe (to form mock creosote). We used excelsior as firewood and created a chimney fire. Utilizing the three methods of extinguishment, we were able to demonstrate putting out the fire by all 3 methods. Please use specific safety precautions and proper PPE when doing this practical. Addition materials needed: dry chemical extinguisher, dry chemical filled plastic bags, modified to be small enough to drop down 2" pipe, a small fan used for PPV and a small, noncombustible cover to go over opening of the barrel. An A-frame ladder will also need to be utilized to drop bombs down the pipe.