

Truck Company Operations Instructor Guide

Session Reference: 1-1

Topic: Checking for Extension, Overhaul and Forcible Entry

Level of Instruction:

Time Required: 2 Hours

Materials:

- Variety of Entry Tools
- Utility Rope

References:

- Truck Company Fireground Operations, Second Edition, Chapters 6, 7, and 13
- Essentials of Fire Fighting, Third Edition, Chapters 6, 10, and 13

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PREPARATION:

Motivation:

Objective (SPO): 1-1

The student will demonstrate a basic understanding of interior fire extension, fire spread, pre-fire inspection, size-up, overhaul, tools, and forcible entry through windows and doorways.

Overview:

Checking for Extension and Forcible Entry

- Interior fire extension
- Size-up
- Introduction to overhaul
- Checking for rekindle
- Tools
- Forcible entry through windows and doorways

Session 1-1 Checking for Extension, Overhaul and Forcible Entry

- SPO 1-1 The student will demonstrate a basic understanding of interior fire extension, fire spread, exterior exposures, pre-fire inspection, size-up, overhaul, tools, and forcible entry through windows and doorways.
- EO 1-1-1 Describe the interior building features which contribute to fire extension and the methods of checking for fire in them.
- EO 1-1-2 Describe the size up considerations related to fire extension.
- EO 1-1-3 Describe the concept of overhaul and the requirements for carrying it out.
- EO 1-1-4 Describe the indications and areas of rekindling and the importance of discovering and preserving possible evidence of arson.
- EO 1-1-5 Describe the general categories of tools used in forcible entry.
- EO 1-1-6 Describe obstacles to entry and various methods to accomplish forcible entry in various structural components.

I. Interior Fire Extension (1-1-1)

A. Fire in concealed spaces

1. If there is possibility of fire in space or shaft, it must be opened and inspected visually
 - a. Stream must be directed into shaft
 - b. Shaft must be ventilated
2. Either open shafts, walls, partitions, ceilings, floors, or whatever, or let fire destroy building completely
3. Every effort should be made to minimize damage to building and contents
4. Openings must be large enough for inspection, hose manipulation, ventilation, and to admit sufficient water to extinguish fire
5. Ventilation and search for fire in concealed space companion operations

B. Vertical fire spread

1. Fire travels vertically inside walls and partitions and through pipe shafts, dumbwaiters, air shafts, and similar pathways
 - a. Many one- and two-family dwellings contain shafts that carry water, gas and electric line or sewer system vent pipes
 - b. Newer dwellings and apartment houses have central heating vents
 - c. Vertical channels normally located toward rear of commercial buildings, stores, and shopping centers
 - d. In apartment buildings, they follow pattern of layouts and most often found near kitchens and bathrooms, each shaft serving several apartments
 - e. In some modern structures, shafts located in single central core

- f. Vent pipes and kitchen vents on roof good indicators of where shafts will be found
 - g. Vertical concealed spaces often created when interior of building is finished
2. Indications
- a. If there is working fire, fire fighters should assume that flames entered concealed space
 - b. Look for smoke and flames issuing from walls
 - c. Blistering, discoloration, or streaking of paint or other wall coverings indicate presence of fire or heat
 - d. Wall hot to touch
 - e. Detection of fire by smell
 - f. Fire may actually crack, hiss, and pop loudly
3. Checking walls
- a. Search for vertical spread should begin directly over fire on floor above fire floor
 - b. Baseboard area should be felt for heat and examined for black streaks on walls
 - c. If fire extending up within wall, line should be called for before opening wall
 - d. Wall showing any sign of fire must be opened to allow stream to be directed onto fire
 - e. Initial opening should be small and waist high
 - f. Wall opening should not be enlarged unless charged handline available

- g. Once line in position, opening should be enlarged until extent of fire determined and knocked down
 - h. When fire extends above opening, area above must be checked
4. Checking vertical shafts
- a. Check all rooms that could contain utility shafts or pipes
 - b. In apartments, kitchens usually locate one above the other
 - c. Built-in cabinets below kitchen sink usually constructed with enclosed space between floor and bottom shelf
 - d. Fire in space will travel to wall and higher stories
 - e. Fire entering space from below will travel horizontally through space
 - f. Exhaust ducts develop heavy internal coating of grease which, if ignited, burns with very hot flame that can heat duct
 - g. If fire involves grease duct, entire length should be checked
 - h. Ductwork for forced-air systems become matted with lint and dust which can ignite and quickly spread fire
 - i. Check air intake and outlet registers for smoke and walls around ductwork for heat
 - j. In some air conditioning systems, space between studs used as return ducts
 - k. Pipe shafts might be completely concealed within walls or located behind doors and louvers
 - l. Concealed shafts are hard to find

- m. When shafts found, they should be checked for signs of fire travel
 - n. When intense fire roaring up shaft, floor and ceiling must be checked where they abut shaft
 - o. If floor warm or ceiling shows signs of fire, area must be opened and stream directed in
5. Checking stairways
- a. Fire can start in spaces under stairways
 - b. Stairways and spaces under them must be checked if near fire
 - c. Stairs must be kept intact and eliminated as source of fire extension
6. Checking doors and windows
- a. Often space between door or window frame and adjacent studs
 - b. Fire will quickly extend up around the door or window
 - c. Areas around doors and windows should be carefully checked if in contact with fire or if fire has burned into doors and windows on floor below
- C. Horizontal fire spread
1. Although greatest tendency is fire to travel vertically, it also travels horizontally
- a. Fire spreads up to ceiling until blocked by ceiling and floor, then burns into ceiling and walls
 - b. If vertical and horizontal channels, fire will spread through both
 - c. Fire travels horizontally through spaces between ceilings and floors, over false or hanging ceilings, through cocklofts, through and along ductwork and utility

conduits, through conveyor tunnels, and through similar channels

- d. Fire can travel through concealed horizontal channels in walls, floors, and ceilings
 - e. Fire can move horizontally between attached buildings or occupancies through ducts, ceiling spaces, and walls
 - f. All horizontal channels must be checked for signs of extending fire
2. Indications
- a. Few external signs unless fire has reached and involved exterior walls
 - b. Inside, signs of horizontal fire spread are same as signs of vertical spread
 - c. Check floors and ceilings for smoke, fire, hot spots, blistering paint, black heat streaks, and sound and smell of fire
3. Checking ceilings
- a. When fire has control of an area, ceilings of adjoining units should be opened
 - b. Most ceilings easily opened with pike pole
 - c. If fire found, call for line, expose full extent of fire, and knock down
 - d. If possible, cover furniture and stock
 - e. High ceilings and thick materials may require going to floor above
 - f. Ceilings of tile are easy to open
 - g. Strong draft of fire can lift tiles off rails
 - h. Where ceiling tiles encountered, check adjoining areas for fire and smoke

- i. In older buildings, there may be more than one ceiling with fire not visible above lower ceiling
 - j. Hanging ceilings may be over sales area but not stock area
 - k. Light goods and empty cartons may be stored above hanging ceilings
4. Checking attached structures
- a. Cocklofts or attics of structures attached to fire structure must be checked for lateral fire spread
 - b. Where doubt, suspected areas should be checked through ceiling openings
 - c. Basements of structures attached to fire structure must be checked quickly
 - d. Party walls support joists for both buildings and often opening in wall where joists overlap
 - e. Large holes often made for plumbing or electric systems

II. Size-Up (1-1-2)

A. Fire building

- 1. If no signs of fire, building can be checked quickly to determine easiest way to force entry
- 2. When fire has gained headway and threatens escape paths or trapped victims, entry must be forced immediately without concern for damage
- 3. When finding smoldering fire, building must be ventilated before making entry
- 4. Once inside building, entry may have to be made to individual units
- 5. Might have to force doors for later fire fighting

B. Exposed buildings

1. For structures attached to fire building, crews should force entry into buildings on each side of fire building
2. May have to force entry into exposed structures taller than fire building
3. Object of forced entry into exposed buildings to provide access ahead of time
4. Check to be sure that access provided to all parts of building
5. Should not force entry into exposures when force not required
6. Always check entry door before forced since may not be locked

III. Introduction to Overhaul (1-1-3)

- A. Main purpose of overhaul to make certain no trace of fire remains to rekindle
- B. Second purpose is to leave structure in as safe a condition as possible
- C. Overhaul is toughest assignment
 1. Requires knowledge of fire travel and building construction
 2. Requires expertise in use of overhaul tools
 3. Requires stamina and muscle for prolonged periods of hard work
- D. Tired crews sometimes try to work too quickly and tend to take chances in effort to get job finished
- E. Overhaul begins after emergency over with no reason to rush or take chances
- F. Pre-Inspection
 1. Fire area must be checked thoroughly before sending people into building for overhaul

- a. Building might be strained or damaged by weight of water
 - b. Might be holes in floor or roof
 - c. Stairways might be hazardous
 - d. Portion of building might be unsafe to enter
 - e. Other dangerous conditions could exist
 - f. Bound to be accidents or injuries unless building is inspected and unsafe areas marked
2. Extent of pre-inspection and overhaul will depend on size of fire
 3. Purpose of inspection to make sure area is safe
 4. When damage at night fire has been extensive and entire area cannot be lighted, overhaul operation should be delayed until daylight
 5. Watch lines should be established to extinguish any fire that might rekindle

IV. Procedure for Checking for Rekindle (1-1-4)

A. Indications of rekindling

1. Look for flames, smoke, heat, stronger than normal odor, and areas obviously touched by flames
2. Look for vertical black streaks near baseboards and blistering and discoloration on walls
3. Concealed horizontal and vertical spaces should be checked
4. Portable lights great help in examining concealed spaces or areas that may have to be opened
5. Ceiling, floor, wall or shaft showing signs of fire damage should be checked further

6. If flames, embers, or smoke show when space opened, area should be wet down and further opened

B. Areas of possible rekindling

1. Walls and ceilings

- a. If in contact with fire and heat, must be opened and checked
- b. If partially opened during fire, open further to find full extent of fire
- c. Important to open ceiling space because any fire there will be guided to wall spaces and then up through building
- d. Ceiling spaces should be checked with extra care so damage will be minimized - protect building contents
- e. Check to see if sparks have been carried up interior walls or partitions

2. Above fire

- a. Remove baseboards for positive check for fire travel through walls and partitions
- b. Older walls more susceptible to hidden fire than newer walls
- c. Both sides of insulation must be checked
- d. When crews find that fire has penetrated ceiling space, must assume fire spread into floor above
- e. If part of floor must be removed, take it up until clean areas shows extent of fire
- f. In general, cutting during overhaul should be done with power saws

3. Shafts

- a. When crews suspect or find fire spread into vertical shafts, they must be opened and checked
 - b. Shaft openings might have to be enlarged to allow streams to be manipulated properly
 - c. Check top and bottom of shaft for fire and sparks
 - d. Shafts opened for venting or fire control must be thoroughly checked
 - e. Anything in contact with shafts must be thoroughly inspected
4. Cabinets and compartments - if cabinets have been subjected to fire or intense heat, they must be thoroughly checked
 5. Window and door facings
 - a. When fire has involved window or door facing, crews should remove facings and check concealed recesses
 - b. If extension found, walls or partitions must be opened to end fire travel
 - c. Wainscoting handled as door facing
 6. Basement areas
 - a. When fire directly involved basement or cellar, area must be checked completely
 - b. Even if not involved, check for fire that might have fallen from upper levels
 - c. Party walls must be examined carefully - both sides with special attention to point where joists overlap or abut
- C. Chemicals and other hazards
1. Fire fighters should know which chemicals and flammable liquids are kept in storage areas

2. Care must be exercised during firefighting operations for leaking flammables igniting
3. During overhaul, attention must be paid to labels on containers and to signs posted
4. Protective clothing (including SCBA) essential in overhaul

NOTE: Structural fire fighting protective clothing may not provide adequate protection from chemicals. When chemicals are discovered, there hazard must be determined before proceeding with overhaul.

D. Searching for the cause of fire

1. Important part of overhaul is discovery and preservation of evidence of arson
2. Fire fighters should be trained to look for signs of a deliberately set fire
3. Jumping into overhaul without checking for signs, evidence might accidentally be thrown out, buried, or washed away
4. When number of suspicious fires occurred in area, information should be sent to responding companies
5. Be especially alert for deliberately set fire and call investigators when anything unusual is discovered
6. Indications of deliberately set fire
 - a. Location, especially if started at bottom of stairwell or shaft
 - b. Multiple fires
 - c. Unusual odors
 - d. Undue wood charring
 - e. Uneven burning
 - f. Holes made in walls and floors

- g. Heating equipment not in proper condition
 - h. Empty accelerant containers
 - i. Residues of wax or paraffin
 - j. Opened or removed service doors or panels to shafts
 - k. Inoperative sprinkler systems, fire doors, and other protective devices
- E. Restoration and protection
- 1. Building
 - a. If vertical ventilation required, openings must be covered as much as possible
 - b. Holes can be covered with salvage covers or plastic sheets - ridge board needed for flat roofs
 - c. Roof drains must be cleared of debris
 - 2. Furnishings and stock
 - a. Items removed during firefighting operations should be returned to building if possible
 - b. Cover items which must remain outside
 - c. Security should be arranged for building and contents
 - d. Cover items returned to building that could be damaged by water

V. Tools (1-1-5)

- A. Forcible entry implies speed
- 1. Forcible entry operations should be carried out quickly as possible
 - 2. Forcible entry should create as little damage as possible

3. Both speed and minimal damage are achieved through proficiency with tools
4. Personal safety must be emphasized

B. Cutting tools

1. Tools most often used are axes, bolt cutters, power saws, and air and hydraulic cutters
2. Chisel end of halligan or kelly bar can be used for cutting
3. Cutting torches for special entry

C. Prying and forcing tools

1. Tools are halligan tool, claw tool, kelly too, pry axe, hux bar, and similar devices
2. Flathead axe often used
3. For heavy work, maul or hammerhead pick can be used
4. Hydraulic- and air-powered tools available in various sizes and types
5. Power tools should be used where heavy or barred doors common
6. Battering ram effective for breaking through heavy doors and walls

D. Lock pullers

1. Designed to remove cylinder locks
2. Driven onto locked cylinder and then pulled with halligan or similar tool

E. Hoisting Tools

1. Review basic knots used for hoisting small tools
 - a. Clove hitch

- b. Bowline
- c. Figure eight on a bight
- d. Figure eight reweave
- 2. Review basic tool tying
 - a. Axe
 - b. Pike pole
 - c. Haligan bar
 - d. Smoke ejector
 - e. Roof ladder

VI. Forcible Entry Through Windows and Doorways (1-1-6)

A. Windows

- 1. Double-hung windows
 - a. Window that allows simplest and quickest access to building
 - (1) Forced by prying up bottom section at center of window
 - (2) If top section made of small panes, pane nearest lock can be removed and window unlocked
 - b. If must be used for entry and cannot be forced quickly, it should be completed knocked out
 - (1) If at ground level, use axe or other appropriate tool
 - (2) Above ground situations may be not be discovered until window is reached
 - (3) Remove all splinters of glass before going through
 - c. Position ladders upwind from windows

- d. When time and/or fire does not permit use of tool, knock out window with ladder
 - e. Glass panes may be replaced with unbreakable plastic panes
 - (1) May be cut with power saw
 - (2) With other than steel frame, knock out entire window frame
 - (3) May have knock out panel which can be removed by striking corner with pick of axe
2. Casement windows
- a. Window hinged vertically with moving part of window attached to crank
 - (1) Window crank usually light
 - (2) Window lock located in middle or bottom of window
 - b. Best way to open window is break out pane of glass, reach in and unlock window, and force it open with pry tool
 - c. If heat not intense, remove second pane to operate crank
 - d. Many casement windows too narrow to allow entry
 - e. Narrow windows often located at sides of large glass picture window
3. Other windows
- a. Design of some windows prevents use for quick access
 - (1) Very heavy metal frames
 - (2) Wire within glass

(3) Horizontally hinged sections that swing out when window is opened

(4) Center swing-out sections surrounded by stationary glass

- b. Some windows simply too small to allow entry
- c. Large double-pane windows expensive to replace
- d. Storm windows or screens must be removed before built-in windows can be opened

B. Doorways

1. Pre-Fire Inspection

- a. The greater the company's knowledge of its territory, the more efficiently it will operate in forcing entry
 - (1) Which buildings locked up during part of day, and times locked
 - (2) Which buildings always open at street entrance, but could require forced entry into individual units
 - (3) Which buildings locked at street entrance and at inner lobby door
 - (4) Which buildings have doors that, when locked, can be easily forced open and which are difficult to force
 - (5) Which buildings can be entered from rear and sides, as well as from front
 - (6) Which buildings have private security forces that respond to alarm with keys
 - (7) Which buildings might present forcible entry problems as exposures if nearby or attached structure becomes involved in fire

- (8) Which is best way to enter problem buildings by force if that should be necessary
 - b. Results of inspections may be
 - (1) Carrying keys for building
 - (2) Pointing up need for special forcible entry tools
 - (3) Positioning tools so that most used ones easiest to reach
 - (4) Assigning front and rear coverage and exposure coverage
 - c. Pre-fire inspections should be continuing effort since most building owners constantly seeking to improve security
 - d. Crews should be aware of how best to enter those buildings with unusual or extremely difficult entry problems
2. Tempered-glass doors
- a. For all practical purposes tempered glass cannot be broken
 - b. Attack at lock or find some other means of entry
 - c. Locks usually cylinder type located at middle or both of door
 - d. Double tempered door locks located in middle
 - e. Use lock puller to remove lock
 - f. If lock puller not available, drive chisel end of pry bar between lock and frame or between two sections to force open
 - g. Alternative method is to drive bar into space above lock and then dive down to destroy locking pins

- h. For bottom locks, drive tool under door to displace keeper
 - i. Hydraulic tools can be used to force apart double doors or raise lock at bottom
 - j. Quickest way may be to force plate glass window near tempered glass door
 - k. If tempered glass door must be broken, strike at lower corner of door with pick end of axe
3. Heavy plate-glass doors
- a. Treat same as tempered-glass doors
 - b. Usually has bar across center or lower center of door
 - c. Better to remove or force lock or enter nearby plate glass window
4. Wood doors
- a. May or may not have cylinder locks
 - b. Usually has bolts that engage keepers at top or bottom of door or both
 - c. Double doors can be bolted to each other; pulling or forcing lock does not guarantee entry
 - d. May have center panels which can be broken out for entry or opening door
5. Metal doors
- a. Before attempting to force, checked for exposed locks or hinges
 - b. If lock can be seen, drive pry tool between door and frame and force open
 - c. If hinges exposed, pull hinge pins or drive tool between hinge and door facing

- d. Doors with neither lock nor hinges exposed cannot be forced with standard tools
 - e. Doors may be secured with a steel bar or fox lock
 - f. Door that cannot be forced can be cut open with power saw
 - g. Heavy steel door can be opened with battering ram
 - h. Door with fox lock practically impossible to force - look for alternative entry
 - i. If door with fox lock must be forced, use explosive charge
6. Roll-up doors
- a. Doors opening upward might be locked in several ways
 - b. Some, usually wood, locked with modified fox lock - open by knocking out panel and reaching in to rotate handle
 - c. Wooden door might be secured with pins from sides of door to track - door should be pried at bottom
 - d. Ring on door may be padlocked to ring set into floor - force with tool under door against ring
 - e. Wood doors can be cut with power saw or axe
 - f. Metal doors do not usually have built-in locks - can be padlocked to floor or locked into their rails
 - g. Manually operated doors often locked through raising chain
 - h. Motorized door rigidly connected to operating mechanism

- i. First step in forcing metal doors to pry it up at both sides
 - j. Force doors locked with pins or through chain by prying
 - k. If door must be opened, cut hole in door with power saw, torch, or explosive charge
7. Sliding doors
- a. Sliding glass with cylinder locks or some bolting arrangement holding at top and bottom
 - b. Bolts should be forced with available tools
 - c. If door particularly tough to force, drive pry tool between door and framing
 - d. Two doors locked to each other can also be opened by driving pry tool between doors
 - e. Avoid straining glass enough to break it
 - f. Break glass for entry only for immediate rescue or when glass already stained or damaged by heat or smoke
 - g. When bar or rod holds sliding section, glass will have to be broken

SUMMARY:

Review:

Checking for Extension and Forcible Entry

- Interior fire extension
- Size-up
- Introduction to overhaul
- Checking for rekindle
- Tools
- Forcible entry through windows and doorways

Remotivation:

Assignment:

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EVALUATION: