

**FIRE SCENE OPERATIONS**

4. FIRE SCENE OPERATIONS**4.1 FIREFIGHTING OBJECTIVES**

4.1.1 The objectives of firefighting are to protect life and property by performing rescues, and by locating, confining and extinguishing fires.

4.1.2 Strategy and tactics defined:

STRATEGY - The general plan or course of action decided upon by the IC in order to achieve firefighting objectives.

TACTICS - The operations or actions required to carry out the strategy selected by the IC.

Most fire operations employ an *offensive strategy* which emphasizes the rapid stretching of hoselines for an aggressive interior attack on the seat of the fire. Engine company *tactics* at most structure fires are to stretch a hoseline via the primary means of egress (main entrance to the building), connect to a hydrant and attack the fire.

A *defensive strategy* may be employed, initially, at large or expanding fire operations where protection of exposures or containment of the fire is critical. Emphasis is placed on developing large water flows. Tactics compatible with these conditions might include positioning the apparatus for use of a LCS, such as the deck pipe, stretching a 2 1/2 inch hoseline for exposure protection or dropping 3 1/2 inch hose to supply an incoming Tower Ladder.

4.1.3 Selection and implementation of any strategic plan and its supporting tactics is dependent upon an accurate and ongoing *size-up* of the fire situation. Size-up starts with the receipt of the alarm and continues until the fire is under control. The size-up process may be carried out many times and by many different individuals during the course of a fire. The responsibility for size-up initially lies with the first officer on the scene, however all engine company members must make a personal size-up of the fire situation. As higher ranking officers arrive, the responsibility for size-up is passed up the chain of command.

4.1.4 An accurate and complete size-up must include consideration of the following *strategic factors*. They are:

- A. Time of day
 - sleeping occupants at night
 - rush hour traffic delays in response
 - limited visibility at night

- B. Life
 - residential vs. commercial building
 - occupied vs. vacant
 - transient vs. permanent residents
 - ambulatory vs. non-ambulatory occupants
- C. Area
 - large volume of fire
 - long stretches
- D. Height
 - elevator operations
 - standpipe stretches
 - long stretches
- E. Construction
 - frame buildings
 - Truss roof and floor beams
 - fire resistive
 - Old Law Tenements
- F. Occupancy
 - Public Assembly
 - Health Care Facilities
 - Hazardous Materials
 - Fuel Loading
- G. Location and extent of fire
 - cellar, sub cellars
 - cockloft
 - dumbwaiter
- H. Water supply
 - hydrant spacing
 - hydrant serviceability
- I. Street conditions
 - construction
 - elevated roadways and railways
 - overhead wires
- J. Auxiliary appliances
 - standpipe systems
 - sprinkler systems
- K. Weather
 - wind direction and velocity
 - freezing conditions
 - heat stress

- L. Apparatus and equipment
 - Large caliber streams (LCS)
 - Large Diameter Hose (LDH)
 - foam equipment

- M. Exposures
 - six sides of the fire

4.2 PROTECTION OF LIFE

4.2.1 The protection of life is the primary consideration at any fireground operation. Engine companies are often confronted with life saving operations upon arrival. Life saving operations are placed ahead of firefighting when sufficient firefighters are not available to do both, as is the case when no ladder company is on the scene. Judgment is a key factor when confronted with this situation. The best life saving measure may be a prompt attack on the fire which, if allowed to spread, would trap occupants. A life hazard, visible upon arrival, must be addressed.

However, immediate rescue attempts by the first arriving engine company without simultaneously stretching and positioning a hoseline should be attempted only in **extreme** situations.

4.2.2 Factors impacting on the decision to attempt an immediate rescue include:

- *The provisions of AUC 329 are complied with.*
- Occupants endangered by being in the immediate vicinity of the fire.
- Number of persons trapped.
- Occupants threatening to jump.
- Means of egress cutoff by fire.
- Ability to reach occupants with portable ladders.
- Anticipated arrival time of the first due ladder company.
- Staffing level of the engine company--four or five firefighters.

4.2.3 Actions that the officer of the first arriving engine company can implement to protect endangered occupants include:

- Position a hoseline between the fire and the endangered occupants.
- Ventilate to draw fire, heat, and smoke away from the endangered occupants.
- Give verbal instructions and assurances to the occupants.
- Close doors to limit the spread of smoke.
- Ensure that incoming units are informed of the location of endangered occupants.

- 4.2.4 Depending on staffing, one member may be released from the stretch and proceed to the roof to provide vertical ventilation over the stairs. This action may reduce panic by relieving the smoke condition in the stairway. Proper tools must be brought to the roof and access to the roof of the fire building shall be made in accordance with established Department guidelines for the roof position.

4.3 LOCATING THE FIRE

- 4.3.1 Before any fire attack can be initiated, the exact location of the fire must be determined. This is the first stage of the fire suppression effort.

- Refer to response printout and/or department radio for reported particulars, i.e. floor or apartment number.
- Upon arrival, an exterior survey of the building should be conducted for visible flames, smoke, smoke blackened windows, occupants in distress, fire escapes being utilized by fleeing occupants, etc.
- Solicit information from occupants exiting via the interior stairs.
- Listen to handie talkie radio traffic from ladder company personnel.

- 4.3.2 Often the odor given off by burning materials, even if there is no visible smoke, may indicate what is burning and perhaps indicate where the fire might be located:

- Wood and paint odor - apartment.
- Food on the stove - apartment.
- Fuel oil odor - boiler room or basement.
- Rubbish odor - public hallway/stairway, compactor room, shafts.
- Electrical odor - overhead lights in hallways.

- 4.3.3 While enroute to the reported fire location look out hallway windows or up stairwells for indications of fire or smoke.

- 4.3.4 If a particular apartment is suspected to be the fire location, but the door is locked and there are no visible indications of a fire, try jostling the door. Smoke might puff out around the door casing.

- 4.3.5 When the exact location of the fire has been determined it must be conveyed to the other units operating on the scene. ***The most direct route to the fire area must be relayed to the members stretching the initial hoseline.***

4.4 CONFINING/CONTROLLING THE FIRE

- 4.4.1 Confining and controlling a fire is the second stage of the fire suppression effort and includes those actions taken to prevent the fire from extending beyond the area already involved. This is generally the immediate concern, and fulfills the role of placing a hoseline between the fire and the majority of the building occupants.

- 4.4.2 Confinement of the fire must take into consideration the intensity of the fire as well as the known or anticipated direction of fire spread. Be aware that the fire may be extending via pipe recess, voids, concealed spaces, etc.

- 4.4.3 Depending on the type of building and the fire location, the first line stretched and operated may be committed to confining any fire extension while a subsequent hoseline is utilized to extinguish the main body of fire.

Example: Fire in the cellar of an Old Law Tenement (OLT), the first line is stretched into the first floor to protect the interior stairs and the second line is stretched into the cellar to extinguish the fire. (FFP-MD's Sec 4.2.1)

- 4.4.4 In some situations the closing of a door or window may play a vital role in confining the fire while hoselines are being stretched to the location.

4.5 EXTINGUISHING THE FIRE

- 4.5.1 Extinguishment is the third stage in the fire suppression effort.

- 4.5.2 Initial extinguishment includes "knock down" of visible flames and readily apparent burning and smoldering material debris. Final extinguishment means that any fire uncovered by "opening up" and overhauling procedures has been extinguished.

4.6 STAGES OF FIRE GROWTH

- 4.6.1 In order to safely extinguish a fire, firefighters should be familiar with the basic concepts of fire, how fire develops and significant events which can occur during a fire. Fire growth in a room can be divided into three distinct stages: the growth stage (incipient), the fully developed stage (free-burning), and the decay stage (smoldering).

4.6.2 Growth Stage (incipient)

During the growth stage a fire increases in size from small flames to full fire that involves the entire room. It may take several seconds to several hours for this to occur. Fire Growth is dependent on:

- Combustible content (fuel load).
- Oxygen supply (ventilation openings).
- Size of room.
- Insulation of room.

During the growth stage, flammable gases released by the burning material collect at the ceiling level and mix with oxygen. The heated gases are pushed under pressure from the fire area into uninvolved areas. When this mixture ignites flashes of flame can be seen in this layer of smoke. This condition is known as *rollover*. *Rollover* should serve as a warning that the fire area may *flashover*. As the fire progresses through the growth stage and into the fully developed stage the potential for flashover exists. Flashover is defined as *the sudden involvement of a room or area in flames from floor to ceiling caused by thermal radiation feedback*. Radiation feedback from the ceiling and walls heats the smoke and gases given off by the burning materials and the combustible contents of the room. When the contents have been heated to their ignition temperature, sudden and simultaneous ignition of the area can occur.

4.6.3 Fully Developed Stage (free-burning)

In the fully developed stage the entire room and contents are involved in fire. If no efforts were made to extinguish the fire, the fire would continue to burn until the available fuel and/or oxygen in the room or area was consumed. Because of limited ventilation, *most structure fires are air regulated, not fuel regulated*. This means that fires will move into the decay stage due to insufficient oxygen. Outside fires are fuel regulated. How long and to what extent an outside fire burns is controlled by the amount of fuel available, not oxygen.

4.6.4 Decay Stage (smoldering)

As available oxygen is consumed, the fire moves into the decay stage. Although some oxygen remains in the fire area, visible flames have started to diminish, and the fire continues to smolder. High heat and smoke conditions remain and the potential for a backdraft is present. A *backdraft* is a smoke explosion which can occur when additional oxygen is introduced into a smoldering fire and the heated gases enter their flammable range and ignite with explosive force. Firefighters must realize that a backdraft produces violent shock waves which can shatter windows, blow down firefighters and collapse walls.

Warning signs of a possible backdraft include:

- Heavy dense smoke with no visible flame in a tightly closed occupancy.
- Black smoke pushing out around closed doors or window frames.
- Glass stained with smoke condensation and pulsating from the pressure of the fire.
- Reversal of air movement pulling smoke back into a building through a doorway.