



Fire Chiefs' Association of Broward County

Standard Operating Guidelines

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I. Purpose/Intent:

The purpose of this document is to enhance the effectiveness of life safety and fire suppression operations at high-rise structures in Broward County, Florida. Fire incidents in high-rise buildings present several challenges and hazards to firefighters, as well as building occupants. Specifically, increased reflex time to a remote fire, the possibility of a large number of victims, the use of standpipes, along with a required knowledge of and ability to control building systems necessitate an organized effort, along with considerable resources and personnel to mitigate these incidents.

This document consists of a standard SOG, tactical worksheets (FOGs), terminology, and an appendix, where additional information can be found on best practices and common hazards associated with high-rise fire suppression operations.

II. Definition:

For the purpose of firefighting operations, a high-rise structure is defined in this document as a building fifty (50) feet or more in height. The building may be a residential, commercial, or mixed-use property.

III. Scope:

This SOG and reference document is intended to be used by all Fire Rescue agencies within Broward County to increase safety and effectiveness of fire suppression activities at high-rise fires. It is a comprehensive document for any agency in Broward County. For 2nd alarm (or greater) high rise fire incidents, it serves as a compilation of best practices for mutual aid requests for agencies with established high rise procedures

IV. Overall Objectives:

- Establish strategic and tactical benchmarks to mitigate fire incidents in high-rise buildings, which will increase life safety for firefighters and building occupants.
- Define terminology and tactics commonly employed in high-rise fire incidents.
- Increase base knowledge of building systems, such as standpipes, fire sprinklers, elevators, HVAC, fire alarm systems and their role in high-rise firefighting operations.
- Describe indications of high-hazard fire and smoke behavior events that may be encountered at high-rise incidents and present several tactics to contain and mitigate them.

V. Primary Operational Objectives:

Life Safety should always be the primary objective, followed by incident mitigation and property conservation. However, due to the remote location of the fire and high potential of life loss, prioritizing the initial attack line, controlling the stairwells, and securing a water supply may have the most positive impact on life safety. Sections I, II, and III describe how to accomplish these benchmarks.

A. Initial Response/Early Arriving Units

1. The first arriving unit officer is responsible for size-up, locating the fire alarm panel, assessing the approximate location of the fire and hazards to any occupants, as well as securing an elevator for Fire Department use.
2. The initial arriving unit officer/crew must decide whether the incident warrants an investigation or quick-fire attack mode. One crewmember (preferably a Driver Engineer) **MUST** be designated as the Elevator Control Firefighter (ECF). (*see Appendix 3 for info on ECF*)
3. The officer should establish command, and transmit their findings gathered from the initial size-up, alarm panel, and building representatives and/or occupants to incoming units and advise whether they are in investigation or fire attack mode.
 - a. **Investigation Mode:** If the initial officer determines the situation requires more information, they may opt to recon the fire floor using full PPE, forcible entry tools, and at minimum an extinguisher. Consider bringing high-rise kits and hose and staging them in the stairwell if incoming units may be delayed.
The officer should transmit over the radio that they are investigating the situation, so incoming units can gather and deliver the high-rise kit and any other equipment needed to upper floors while the initial crew ascends immediately to investigate.
 - b. **Fire Attack Mode:** If the initial officer determines a quick-fire attack is warranted, they should gather the equipment listed below (D), and team up with firefighters from a second arriving unit to maximize efficiency and comply with the OSHA 2 in/2 out Rule. Consideration should be given to passing Command when the initial arriving officer(s) will be engaged in fire suppression.
A minimum of 4 firefighters for each attack line desired are needed (5 or 6 FF's preferred) on the attack team for efficient hose line management, as well as complying with the OSHA "2 In/2 Out" Rule.
Upon confirmation of any working fire at a high-rise building, a **Second Alarm** should be called immediately over dispatch.
**When additional firefighters arrive to the fire area, their efforts should be concentrated on establishing a working primary hose line before initiating a back-up line.
4. A high-rise kit, high rise hose bundles (2 or 2.5 inch is preferred), conventional forcible entry tools, a multipurpose fire extinguisher, and a Hydraulic Forcible Entry Tool (HFT) should be brought into the lobby on the main egress floor to expedite deployment when the fire attack team ascends.
5. If the lowest floor reporting fire or smoke is above seven (7) stories, use the elevators with caution as listed below (F). If reports of smoke or fire are below the seventh floor, personnel should use the stairs.

6. Elevators that have returned to the main egress floor (Phase I) should be checked along with the elevator shaft for the presence of water and smoke. If these conditions are present, that elevator bank should not be used. If the shaft is clear, put into Fire Department Use (Phase II) mode by the ECF.

If the elevator is usable, it should be taken to two (2) floors below the fire floor. Doing this will decrease the chance that firefighters will be transported directly into an IDLH environment, as well as give firefighters a chance to check the layout of the halls and apartments in the building. The ECF should be in full PPE, and be equipped with a radio, forcible entry tools, and a fire extinguisher.

The ECF should stay in the elevator car to ensure the elevator doors do not close, leaving firefighters on that floor and return the car to the main egress floor.

***When in Phase II mode, elevator doors remain closed when a floor is reached. Therefore, if an ECF needs to exit to assist firefighters in an emergency, the elevator should be put back into Phase I so the elevator doors will open when the car returns to the main egress floor, allowing other firefighters to use the elevator. (see Appendix 3 for more info on elevator use, Phase I and Phase II)*

7. Once the fire attack crew reaches the floor below the fire in the attack stairwell, the most appropriate standpipe must be located and flushed. Next, the hose from the high-rise bundles should be connected to the 2.5-inch standpipe outlet, and then coupled together on the floor below the fire prior to deployment.

***Doing this will ensure that the fire attack crews will have an operational hose line in service before they enter an IDLH, or if fire and smoke conditions change rapidly. The Officer(s) conducting the initial fire attack should verify that the standpipe has been flushed, is operational, and the attack hose is fully connected and ready to use before initiating fire attack or entering an IDLH.*

8. In order to achieve the maximum useable fire flow from the standpipe, gated wyes and/or water thieves should not be connected to a standpipe or used in high-rise hose deployments. Ideally, additional hose lines should be supplied by standpipe riser outlets on another floor, or another riser altogether if it is practical to do so.
9. Consideration should be given to utilizing the option of connecting a gate valve and a water pressure/flow meter after connecting the first 50 feet of hose to the standpipe outlet. This option can give firefighters the advantage of placing the flow meter and the gate valve in a protected stairwell on or near the fire floor.

This gives firefighters a way to monitor water pressure as well as the ability to control water flow with the gate valve without having to travel up and down the stairway or leave a firefighter on the floor below at the standpipe.

10. The officer from the second arriving unit should begin the initial duties of the Lobby Control Officer, described in the next section.

VI. Lobby Control and Stairwell Management

- A. The second arriving officer should assume the initial functions of the Lobby Control Officer as follows: *(see Appendix 2 Lobby Control)*

*** In circumstances where the second arriving officer may be better utilized on the fire floor with the first crew, consider having the second arriving officer make the decision to do so, and having the next arriving officer/Chief assume Lobby Control duties.*

1. Begin Accountability
 2. Designate and transmit over the radio evacuation and fire attack stairwells.
 3. Control the Fire Alarm Panel. Before considering silencing the alarm, use the PA system to inform occupants regarding evacuation and/or protect in place details.
 4. Make contact with a building representative when possible. Maintenance personnel are preferred. They may have the best knowledge of the HVAC system and other building features, occupied residences, and special needs occupants. They may also have additional keys not found in the Knox Box.
 5. Maintenance personnel may also be of assistance locating meter rooms, natural gas lines, and Emergency Power Shunts. *(see section XIV. for Utilities)*
 6. Verify the operation and details of the fire pump, standpipe and sprinkler systems. Command should be notified immediately if the standpipe incorporates the use of pressure reducing valves (PRV's), since a specific pressure (often higher than 175 psi) must be pumped to the FDC, regardless of whether it is provided by the house fire pump or by fire department pumps. *(See Appendix 1 for more information on standpipes, fire pumps, PRD's and PRV's)*
- B. Maintaining Stairwells
1. Designation of an attack stairwell(s) and evacuation stairwell(s) must be done as early in the incident as possible. This can be accomplished by the Lobby Control Officer and/or IC communicating with interior crews to assess smoke conditions and the location/extent of the fire. *(see section II)*
 2. Consider the need to pressurize stairwells to maintain tenable conditions for evacuation and fire attack. This may be accomplished by HVAC systems or positive pressure fans.
 3. Electric and/or battery powered fans should be used, but CO monitoring should still be employed whenever possible.

VII. Water Supply

Note: *Establishing a water supply to back up an "in-house" fire pump is a high priority, but consideration should be given to temporarily dedicating extra personnel to establish a working attack line before concentrating on a water supply in buildings with an engineered Class I or Class III standpipe system with a functioning fire pump.*

- A. The second arriving Driver Engineer should establish a water supply from a hydrant and supply the appropriate FDC. Hydrants should be located in close proximity of the FDC. The FDC should be supplied by two (2) 2.5 or 3-inch hose lines. Depending on the position of the initial arriving engine, it may be advantageous for the second arriving DE to utilize the initial engine to supply the FDC.
- B. Some standpipe systems require very high operating pressures (especially when equipped with PRV's) in excess of 300 PSI. The pump operating pressure should be identified above the FDC. Supplying and maintaining these pressures will require tandem pumping or the use of 4 way valve device.
- C. It is important for Driver Engineers to recognize whether they are actually moving water, or if they are only pumping to the check valve on the discharge side of the buildings fire pump. This can be verified by temporarily closing the discharges supplying the FDC, then opening them again. If the discharge gauges do not drop then spike back up, they are most likely only pumping to the check valve in the standpipe system. Another discharge should be cracked open to move enough water to keep the engines fire pump cool.

Consideration should be given to protecting the hose lines from falling glass and debris, as well as securing the hose lines by tying them off.

- D. ***The Third arriving Driver Engineer may have to initiate water supply actions if the 2nd arriving Driver Engineer was assigned to assist crews with establishing the initial attack line.*

The remainder of the third arriving crew may then be assigned as an Aide to Command and/or Lobby Control. If the third arriving unit is not needed for these functions, they can be assigned by Command to assist in evacuation, or incident priorities listed in Section IV below.

VIII. Later Arriving Units

The fourth, fifth, and sixth arriving units should check in with Command, who will prioritize what efforts should be directed towards Search, RIT, Staging, Ventilation and Rehab based on conditions and progress of the initial arriving crews. These functions are detailed in the sections below.

Also address functions of arriving Chiefs, who may be assigned as Division Officers assigned to specific floors, Functional Groups, or Safety Officers.

IX. RIC (Initially designate 3-6 Personnel) IRIC Vs. RIC

- A. Establishing a full RIC Group beyond the "2 in/2 out back-up firefighters or the Initial RIC should be a high priority for Command at high rise fires.
- B. RIC should be located in an area with clean air, but close to active suppression and search areas.
- C. Consideration should be given to use regional assets such as TRT/Special Ops teams for RIC. These teams will have a 6 -8 person response, and usually train on the discipline together.
- D. Multiple RIC crews may be necessary due to fire ops on multiple floors and/or large areas.

X. Search and Rescue (Initially Designate 3 to 6 firefighters per team)

- A. Searching for victims should be conducted as soon as possible using these general priorities: The immediate fire area, fire floor, floor above the fire, the top floor, followed by all floors and stairwells.
- B. If a large number of victims are present, they should be rescued by these priorities: The most severely threatened, the largest number of victims, then all other victims.
- C. Consideration should be given to splitting up search group personnel to search even and odd floors to cover multiple floors efficiently. Any functional group (Vent, Search, RIC, etc.) that is moving from floor to floor should check in with a Division Officer when they are operating on a floor.

XI. Ventilation (Initially designate 4 – 8 Personnel)

- A. Due to the challenges of high-rise building design, it is imperative that any ventilation efforts should be coordinated with the fire attack team(s) and verified by Command.
- B. Whenever manpower permits, all floors should be checked for smoke and possible victims. By design, some HVAC Systems may circulate smoke to remote floors. If this condition is present, consider shutting down the HVAC or portions of it if possible. (*refer to sec II A. 4 for information*)
- C. Ventilation efforts that will negatively affect smoke conditions in the designated evacuation stairwell should be avoided. Positive pressure may be maintained with the use of electric or battery-operated vent fans.

XII. Staging (Initially Designate 1 Unit)

- A. Staging should be located two (2) floors below the fire if possible. Staging and firefighter rehab areas should be actively monitored for the presence of CO, and air quality should be maintained with positive pressure fans or HVAC systems whenever possible.
- B. A secondary staging area should be identified early and used if the primary staging area untenable for any reason.

XIII. Rehab and Medical (Initially Designate 1 unit)

- A. Firefighter Rehab and a Medical treatment area should be established two (2) floors below the lowest floor affected by fire **or** smoke.
- B. Consider establishing Rehab and Medical areas close to the staging area. Doing so will aid in personnel accountability and CO monitoring.

XIV. Supply Air Bottles / Tools (Initially Designate 4 – 6 Personnel)

- A. Crews will use their air supply rapidly. It is imperative that additional filled air bottles are staged near firefighters working in an IDLH and rehab to replace used cylinders.
- B. Additionally, efforts to replenish used air bottles and transporting them to staging should begin as early in the incident as possible. Reverse stack effect, fire attack, and HVAC systems may all contribute to smoke conditions that require firefighters to wear SCBA/PPE in stairwells and areas remote from the fire floor.

- C. Air trucks should be called to the scene early if they are not on the run card so they can be in place when crews start depleting air bottles.
- D. Air bottles and any other additional equipment needed for fire operations and Rehab need to be staged on upper floors. Consideration should be given to using runners who travel up and down 3 or 4 flights to expedite the process. Runners can shed some PPE as necessary, but they should keep it in the stairwell, so they can don it if conditions change.

XV. Communications

- A. High-Rise incidents pose several communication challenges, both from the number of simultaneous functions that need to take place, and the number personnel that must communicate to complete them.
- B. Radio discipline must be practiced and designating Division Officers (geographically based) for all non-emergency radio communications should be considered. For larger incidents, functional Groups consisting of 3 or more crews may also be employed.
- C. High Rise Structures also create radio frequency interference, especially in higher frequency ranges (such as 800 MHz). Mobile repeaters, and the Broward County Communications Mobile Unit or other portable resources may improve transmission and receiving capabilities in the building.
- D. Simplex (AM) radio waves are less susceptible to the types of radio frequency interference encountered in high-rise structures and should be considered for back up and/or emergency communications. For these reasons, the simplex channel should always be monitored by RIT crews and Command.

XVI. Aerials / Truck Company Operations (2 – 4 Personnel)

- A. Aerials should be positioned close to the building in an area that will maximize scrub area for elevated rescue.
- B. Before elevating an aerial ladder, personnel should confer with the IC to verify how the aerial ladder-pipe should be positioned; either for rescue or elevated master stream.
- C. Aerial personnel should consider any bridge load limits, obstructions, and the best route and approach to the setup area. If a unit must back up in reverse to the area, spotters should always be used.

XVII. BASE (Level 2 Staging) (Staging Officer/Aide)

- A. Due to the large number of personnel and resources needed at high rise incidents, staging vehicles in the immediate area may become unattainable. When considering a Base Staging Area, evaluate the desired size of the area, the ease of access to and from the area, and the safety of personnel: traffic, sun and heat exposure, possible smoke drift, walking distance, and communication barriers.
- B. Base Staging should be assigned to an Officer, preferably a Chief Officer, and given an aide if possible to document, track, and forecast resource needs, as well as back-filling units upon deployment. (Base Staging Officer)

- C. Communications over the radio should be initiated by the Base Staging Officer. Large incidents may require Base staging to have an assigned tac-channel, along with the ability to communicate with (interior) staging, command, and dispatch.

XVIII. Securing Utilities / Utility Considerations

- A. Securing electrical power and gas utilities in a high-rise incident may present some significant challenges to Fire Operations. Any electrical power in the fire area, the same area on the floor above, and areas located where the fire can rapidly spread to should immediately be considered for isolation.
- B. Most high-rise buildings have an electrical meter room on each floor that can be used to secure utilities in areas as needed, while minimizing the need to shut down power to large areas of the building.
- C. Fire Personnel must recognize that securing utilities in other areas must be tempered against the benefits of having illuminated exit signs, lighting for stairwells, as well as residences and/or other areas away from the immediate fire area used for protect-in-place occupants.
- D. Fire personnel need to recognize that many high-rise buildings in south Florida have an automatic emergency back-up generator for the elevator, egress paths and discharges, and/or basic functions of the building. These generators may need to be shunted if fire threatens these areas or electrical power in the areas present a life safety hazard.
- E. Natural Gas/LPG utilities should also be appropriately secured. Any areas where gas utilities are shut off will need to be checked for leaks and any pilots restored after the incident. If fire conditions are affecting (or may affect) an area where gas piping is present, gas utilities should also be isolated.
- F. Fire conditions in a meter room can be life threatening. If the electrical meter room itself is on fire, crews should not attempt to enter or extinguish it before contacting FPL.