S.O.G Number: 600	Effective Date: October 1, 2010
Section: 604	
Subject: High Rise Operations	
By Order of the Fire Chief: Steven Paine	

Section 604 – High Rise Fires

Purpose:
To provide a Standard Operating Guideline (SOG) for response and operations at high-rise fires; Personnel must be thoroughly familiar with basic fire ground procedures since this SOG only covers occupancy-specific information and shall serve as a guideline.

Scope:
High-rises can be designed as residential, commercial, or mixed-use occupancies. Fires in these structures present great life safety hazards and logistical challenges as the need for resources can rapidly escalate in a working, high-rise fire complicated by the potential for both multiple victims' and multiple occupants' removal. The high-rise structures addressed in this SOP are buildings greater than 60'. These structures are generally a minimum of 6 stories tall and equipped with multiple fire protection and detection systems, Based on age of construction, the requirements for fire protection systems will vary.

Responsibility:

It is the responsibility of the Fire Chief, or designee, to review and update this procedure as needed. It is the responsibility of all Officers to ensure that this procedure is adhered to. All personnel are **responsible** for the basic knowledge and understanding of this procedure.

Basic Rules of Fire Attack

The following rules of fire attack should always be used in the interest of effective fire suppression and firefighter safety:

1. All units to report arrival to FireCom and IC. IC will then assign task. If no IC exists, First arriving unit officer to report initial size-up and establish IC, and will remain in command until relieved by arriving Incident commander.

2. In all cases where a structure or vehicle fire is attacked with a hose line, a second backup hose line Shall be available if needed.

3. Select the proper hose line size and stream that will most effectively suppress the fire. This should be the determination of the company officer.

4. All firefighters shall be removed from the interior of a structure before beginning an exterior defensive attack by 3 3second alert tones over the radio or 3 long blasts of engine airhorn.

Standard entry tactics

A. If entry is necessary and practical, it will be done by engine companies only, no engine company shall enter a structure with a full crew and adequate Protective personal Equipment and tools.

B. NO ENTRY will be made without the possession of a charged hose line. In case of a search and rescue operation, a RIT team should be standing by with a secondary hose line.

Personnel Hazards

Hazards at These Incidents Generally Involve:

- Need to operate in enclosed hallways with high heat and dense smoke.
- Boiling liquid expanding vapor explosion (BLEVE) of containers in a garage, storage room, or other unconventional areas. Liquefied petroleum gas (LPG) cylinder hazards.
- Partial collapse of structure in well-involved fires. Complete collapse is a rare occurrence.
- Fall through hazards created by weakened floors.
- Clandestine drug labs.
- Intentionally set hazards to prevent unwanted entry.
- Vacant or abandoned structures.
- Heavy dead loads on roof, heating, ventilation, and air conditioning (HVAC).
- Wind driven fires on upper floors.
- Trip or fall hazards.
- Alterations to structures leading to increased fire spread potential.

**Hazards identified to personnel must be transmitted over the radio and mitigation action taken. An example is posting a firefighter near a downed power line to prevent others from getting near.*

Hi-Rise Attack Procedures

- **APPARATUS ARRIVAL ORDER, PLACEMENT, TASKS, AND FUNCTIONS**

A. First Arriving Apparatus Considerations

The first arriving company must conduct a thorough size-up and transmit an initial radio report. The first arriving Company Officer shall establish command per the Incident Command System. Command presence should be known. At a minimum, the initial size-up should include the following:

- Command name identification - B12- E12
- Height and dimensions - Floors
- Type of construction – CBS – Wood Frames
- Occupancy type – Hi-rise
- Exterior Conditions: Smoke or flames showing – color of smoke – Light/moderate/ heavy
- Considered alarm if needed (i.e. Working Fire)

As example the first arriving size up should be:

" E12. arrival, I have a 15 story multifamily high rise building. I have heavy black smoke showing from the 15 floor. E12 will be assuming command and entering the structure for initial attack"

NOTE: ***An assignment will not be slowed to code 1 or downgraded until physical confirmation by LBTS VFD personnel of the situation and conditions present on the involved floor(s).***

Attention should be given to the following (if warranted):

- Command name identification
- Height and dimensions
- Type of construction
- Occupancy type
- Method of attack (offensive / defensive)
- PD for traffic and crowd control*
- Designation of a working fire*
- Call out of an investigator*
- Ensure RIT is assigned*
- Contact utility provider*
- Special call apparatus or striking additional alarms*
- It is essential that the first arriving unit(s) locates and define the fire problem and convey this information to responding units. The information relayed by the first arriving company(s) will determine, to a large extent, the success of the overall fire

operation. The first unit should take actions to:

- Secure entry gates, doors, etc., in the open position if there is not a full-time gate attendant. Any personnel hazard(s) must be identified and mitigated. This might require posting a firefighter at the hazard.
- Locate the fire alarm annunciator panel to determine the location of activated smoke/heat detectors, pull stations, etc. Whenever possible the system should be silenced to decrease noise levels and improve communications.
- Obtain as much information as possible from building personnel and present conditions to include:
- Determine the location and extent of the fire.
- Determine if evacuation procedures have been implemented.
- Determine the status of the elevators and recall them to the lobby.
- How to access the stairs serving the fire floor.
- Which elevator bank provides the safest access to the fire area.
- Recall all elevators and place the elevator cars to be used on "Firefighter Service".
- If available, obtain keys necessary to gain access to the fire floor/apartments from the knox box, security, maintenance personnel, etc.

B. Arriving Engine: (Attack)

- Report to IC.
- Stretch initial attack line of the appropriate size utilizing most appropriate method.
- Force entry as needed.
- Search en route to seat of fire
- If no other companies are on scene, remove victims if found. (Must maintain focus on fire attack as indicated above.)
- Extinguish all visible fire.
- Complete primary search and vent fire room as needed in coordination with other companies.
- Initiate or assist with searching for and extinguishment of fire extension

Responsibilities:

- ***Officer****:* Assess scene, gather additional information, give size up, take appropriate route to fire floor, confirm initial assignments, perform assignment as directed by IC, assist with forcible entry, back-up nozzle person as needed, search en route to fire, direct interior fire attack, vent fire room once all considerations have been addressed.
- ***Driver Engineer:*** Position apparatus with consideration of additional arriving companies (specifically not blocking FDC for third arriving engine and leaving room for aerial apparatus), don PPE, assemble assigned equipment.

- ***Firefighter:*** Assemble required equipment, proceed as directed by the Company Officer to the fire floor, perform assigned tasks as assigned by company officer. Stretch or assist with stretch of initial hose line to point of entry, assess for forcible entry / force entry with Officer as needed, ensure water to nozzle -correct pattern, air bled, and adequate pressure, advance hose line from entry position toward seat of fire as directed by Company Officer and apply water to fire compartment in appropriate fashion. Stand by to extinguish flare-ups and hidden fire as needed.

C. 2nd Arriving Engine: (Water Supply)

- Shall locate and secure a water supply to the building.
- The crew shall locate the building's sprinkler/standpipe.
- The entire crew shall remain together and in full turn out gear, they will layout one 5-inch supply line to the apparatus that will supply the building's sprinkler/standpipe system.
- The Driver/Engineer of the third arriving suppression apparatus should spot to supply the FDC. The apparatus should be spotted to allow the driver to supply the FDC with two 2 ½" lines. Any inability to supply the FDC, such as damaged female couplings, blocked access, etc., must be relayed to the IC and the attack hose team immediately; and actions should be taken to supply the system via a first floor or higher outlet(s) (some PRDs may eliminate this option).
- After securing the water supply to the building, the Officer and firefighter will proceed to the fire pump room and ensure that it is operating correctly. The Officer should also relay the residual pressure at the pump if it is running or static pressure if not running to the Driver/Engineer. The Driver/Engineer will remain with the engine to pump into the building appropriately based on pressures relayed from the Officer, fire floor, and fire flows.
- Once the Firefighter and Officer have completed the assignment in the pump room, they shall report to the IC for assignment.
- A possible assignment for these members could include elevator control, lobby control, forward staging officer, or aide to the IC, or work on upper floors.

Responsibilities:

- ***Officer***: Assure that the companies operating on the fire floor(s) have adequate water supply.
- ***Driver Engineer***: Position apparatus to establish a water supply form a suitable hydrant and then supply the building's FDC if not already completed. Remain with apparatus to supply building as needed based on direction from command.
- ***Firefighter:*** Assist with the establishment of a water supply from a suitable hydrant to the building's FDC. Proceed with assignment as directed by Company Officer.

D. **Arriving Ladder: (Ventilation / Searches / RIT)**

1. Position apparatus to fire building where access and use of the aerial device will be maximized if at all possible.

2. Establish Rapid Intervention Team (RIT) operations

3. Initiate aggressive ventilation of structure. Utilize all possible avenues of smoke and heat removal to improve interior conditions, visibility and facilitate fire location and attack. Adequate ventilation will greatly improve the tenability and operating conditions within a commercial occupancy. Ventilation shall include all swinging doors, overhead doors and vertical ventilation.

4. Driver Engineer shall set up aerial apparatus and position aerial ladder to the appropriate position based on conditions and / or direction from Company Officer or IC.

   a. Position ground ladders for access and egress if appropriate.

5. Initiate primary/secondary search as appropriate.

6. Upon completion of search, following knock down of visible fire, immediately check for fire extension and continue to do so until complete extinguishment is confirmed.

7. Initiate salvage and overhaul / property conservation efforts as soon as practical. Consider fire investigation needs when conducting overhaul and do what is prudent and necessary to confirm fire control while maintaining scene integrity when possible.

8. Perform additional assignments as directed by Incident Commander.

Tool Assignments:
Officer: Thermal Imager, Hand Light.
Driver Engineer: Apparatus, 6' Hook, Halligan, Hand Light
Firefighter: RIT KIT, K-12 (if needed)
Firefighter: Irons, Saw (if needed)

Responsibilities:
Officer: Direct Driver Engineer in positioning of apparatus; perform vent size up, along with the firefighter, Established RIT Operations and initiate ventilation and searches.

Driver Engineer: Position apparatus as directed by Officer, set up Aerial device, don PPE. Assist with assigned duties and tasks. Consider deployment of ground ladders for additional means of access / egress.

Firefighter: Establish and stage RIT operations

Firefighter: Force entry, ventilates, and search for fire extension along with the Officer. Once primary tasks are completed, assist with salvage and overhaul as directed by the Company Officer.

E. **Arriving Aerial: (Rear of Building/Special Call)**

1. The fourth arriving suppression should respond to the rear of the structure for the following:

   a. Perform a size-up of the rear of the structure and report to Command.

      i. Access problems.
      ii. Fire conditions.
      iii. Other information deemed relevant.

NOTE:
If the apparatus is unable to gain access to the rear of the structure, it is imperative that all possible forcible entry tools are taken with the crew (i.e., Irons, K-12,).

This will eliminate the need to return to the apparatus, which may cause a significant delay in accomplishing assigned tasks.

   b. Establish a water supply and supply the FDC, when applicable.

   c. Open up the rear to provide ventilation, secondary means of egress, and additional vantage point for fire attack.

      *** If fire attack is initiated, Officer must coordinate operations with command and other companies committed to interior operations in order to ensure operational safety.**

   d. Secure utilities, if not already completed.

   e. Ladder the structure for roof operations and:

      i. Determine the type of roof construction. It may be necessary to make an inspection (Kerf Cut) hole with the K-12.

      ii. Locate natural ventilation points.

      iii. Look for signs of fire underneath the roof, use of thermal imager may be helpful (i.e., sagging roof, bubbling tar, spongy deck, leaking smoke, heat signature indications, etc.)

iv. Determine dead loads such as HVAC units, heavy antennas, and standing water.

v. Determine if front façade is attached to the front wall or part of the cockloft. If a parapet wall exists, the facade is not continuous with the cockloft.

vi. In order to avoid fall through hazards, companies must use a tool to sound the roof in front of them as they walk on it. This is necessary even under light fire conditions.

***Companies assigned to the rear must request additional resources as necessary to carry out all critical functions at their location.**

Tool Assignments:
Officer: Thermal Imager, 6' Hook, Hand Light, Rope Bag (if needed)
Driver Engineer: Apparatus, 6' Hook, Halligan, Hand Light
Firefighter: Irons, Hand Light, K-12 (if needed)

Responsibilities:
Officer: Direct Company in completing priorities as listed above.

Driver Engineer: Position apparatus where it will not interfere with the Ladder Company or other, arriving, suppression apparatus. Don full PPE and remain with Company Officer to complete assigned tasks.

Firefighter: Assist Company with assignments as directed.

F. Support Unit/Utility Vehicle

1. Responsibilities

Support Unit/ Utility vehicle Shall respond and establish a rehab area in coordination with medical sector. If unavailable, contact fire communication and request mutual aid canteen unit.

G. **Arriving Medical Rescue:**

1. Position apparatus where it will not interfere with other arriving apparatus while maintaining ability to depart the scene for rapid transport if needed.

2. Provide medical assistance for any victims in need upon arrival.

3. If medical transport is required prior to the arrival of another Medical Rescue, provide the transportation as needed.

a. If no immediate need for medical treatment or transport exists, command should be contacted for orders. Preparations should be made for providing fire assistance.
b. Establishment of medical sector for firefighter rehab should be considered
c. Medical sector must request additional medical units to assist transport requirements.

***NOTE: upon declaration of a working fire and the filling out of the working fire assignment, a second rescue will be requested immediately and utilized for medical rehab duties and/or treatment as needed. Single rescue units will be assigned medical rehab. Additional rescues will be assigned as designated by command.**

H. Chief Officer Roles / Responsibilities

1st Due Battalion Chief – IC - Assume command upon conferring with initial arriving officer following size up of building and conditions. Makes assignments, requests additional resources as needed. (i.e. and alarms, notify fire chief and deputy chief)

Tools - Helmet, Coat, Hand Light if needed.

2nd Due BC - Incident Safety Officer - Conducts 360 of fire building if possible and reports pertinent info to command, May be assigned interior safety / operations sector depending upon building and fire conditions as determined by IC.

***Assumes role of RIT OIC in event of a RIT deployment.**

Tools - Full PPE w/ SCBA and Hand Light. Other hand tools as deemed appropriate.

Accountability / Medical Group - reports all pertinent info or alarms to IC. Also coordinates medical treatment and transports as needed. It is imperative that rehab be conducted and monitored at all applicable incidents.

Deputy Chief – Assist IC with command functions as needed. Once an incident escalates to a alarm or greater, Division Chief on duty shall assume command of incident. Initial IC (due BC) moves into the Operations position upon transfer of command to Division Chief.

***On duty Division Chief must maintain awareness and responsibility for all emergency activities and situations taking place within the Town of Lauderdale-By-The-Sea and ensure that adequate resources to respond to incidents are maintained.**

Tools - Helmet, Coat, Hand Light if needed.

Staff Chiefs – All Staff Chief Officers and other additional personnel responding to an incident shall report in to the command post for assignment upon arrival at the scene of an incident.

DETAILED COMPANY ASSIGNMENTS

I. First Arriving Engine Company

- If smoke is showing or confirmed, crew will bring the Hi-Rise pack with them to the staging floor, usually the floor below the fire floor.

- Placing the initial hose line into service to attack the fire is often the most important function of this company; controlling the fire typically saves more lives than any other action taken on the fire ground.
- Nothing should deter the first arriving suppression from placing the initial attack line into service, except an imminent rescue need. Even then, the suppression officer must determine whether or not extinguishing the fire is still the best course of action.
- If an imminent rescue is to be performed, the situation must be reported immediately via radio that the second arriving suppression unit can assume the task of placing the initial attack line in service.

J. Entry To The Building

- IC may be turned over to the next arriving Engine Company or Ladder Company prior to a Battalion Chief's arrival.
- Entry crew should attempt to make contact with security, building maintenance or management for assistance. This would include obtaining apartment keys, stairwell keys, fire service/elevator keys, and the lobby phone number for emergency use.
- Entry crew will locate and check anunciator panel to determine the fire floor. All relevant information will be passed on to IC before ascent to the floor below the fire.
- The entry crew Officer will be responsible for determining the best method of fire attack and suppression. The methods and uses of equipment may vary depending on location of the fire and conditions.

K. Upon Arrival On Fire Floor

- The entry crew Officer shall advise IC of conditions and will determine the method of fire attack. He will also determine the need and scope of evacuation.
- The entry crew Officer shall determine and designate the fire attack stairwell and the evacuation stairwell. This must be communicated to dispatch to advise incoming companies.
- The entry crew will place all required tools and equipment in service. IC will be advised of entry, conditions and progress during the operation.

l. Elevators

- The entry crew Officer will determine the uses of the elevator or stairwell. Crews may use the elevator in the fireman's service mode. All personnel in the elevator will be fully outfitted in personal protective equipment.

- When placing the elevator in the fireman's service mode it should always be checked to assure that it is working properly. This is done by going to the second floor and testing the fireman's service mode operation.
- When using the elevator, crews should only ascend three floors at a time stopping every three floors to check on conditions. This shall include shining a flashlight up into the elevator shaft to check for signs of fire or smoke. If these conditions exist, the stairwell should be used to continue on to the upper floors. Under no circumstances should the elevator be taken directly to the fire floor.

Reference Material

Hi-Rise Structure Systems & Construction Characteristics

Definitions

- Auto-Exposure -Means of fire travel from the apartment or floor of origin to the apartment or floor above. Fire venting out of a window directly exposes the apartment window above and fire spreads into that apartment by way of direct flame impingement, radiant, and/or convected heat.
- Bus Duct - Metal channel or raceway allowing wiring to run from one floor to another or from one meter room to another.
- Churning - Condition in a centrifugal pump where the impeller is spinning but no water is moving. This may result in overheating and damage to the pump.
- Compartmentation: - The subdividing of floor areas by fire resistive partitions or separations into smaller spaces or compartments. Unlike residential occupancies, non-compartmentalized commercial occupancies present the challenge of fire attack in large, open areas.
- Curtain Wall - A term used to describe a non-load bearing exterior wall of a building whose purpose is to keep out the weather and seal the building, these walls are usually made of glass, aluminum, or light weight, masonry panels attached to the structure through connections at the floors or columns of the building. These walls may create a vertical path for fire travel via the structural voids in between the curtain wall and the structure.
- Elevator Control Firefighter (ECF) -A firefighter from the initial attack team designated to remain in control of the elevator prior to the implementation of Lobby Control. The elevator must be operated in Firefighter's Service. The firefighter will also be equipped with a radio, irons, water extinguisher, and flashlight. Control of the elevator is maintained throughout the entire operation.
- Fire Department Connection (FDC) -Connection to a sprinkler, standpipe, or sprinkler/standpipe system used to supply and/or augment the municipal water supply or fire pump by a fire department pumper.

- Lobby Control - A unit established at a high-rise incident for logistical support of the operation. This position supervises personnel accountability, elevators, stairways, building systems, and evacuation.
- Neutral Pressure Plane (NPP) -Occurs in high-rises of sufficient height. Air naturally moves into the building below the NPP; above the NPP, air naturally moves out of the building; and at the NPP, there is neutrality in air movement. The NPP is affected by fire-generated heat currents, stack effect, temperature differentials, and wind speed.
- Plenum -A plenum is the space between the ceiling and the floor above that is used for heating ventilation and air conditioning (HVAC) air return. This space has the potential for fire spread in concealed spaces above the heads of unsuspecting personnel.
- Pressure Reducing Device (PRD) -These are devices attached to the standpipe outlets of some buildings to prevent outlet discharge pressures from exceeding 100 PSI. There are various types and designs. Some are easily removed or adjusted and some are neither.
- Lead Time -Is the time it takes a company to begin operations on the fire floor after arrival on scene. This time is also a factor for later arriving companies that are given assignments in support of the initial operation.
- Scrub Area -The entire area on the face of the structure that can be effectively reached by an aerial ladder without repositioning the apparatus. The aerial's turntable should be centered in the middle of the desired coverage area. For rear mount aerial apparatus, this area is usually maximized when backing into position.
- Smoke Proof Stair (a.k.a. Fire Tower) -A stairway separated from the building designed to prevent the spread of smoke into the stairway keeping it clear for evacuation.
- Smoke Stratification -The process where hot smoke begins to cool and lose its buoyancy during ascent within a structure. If this occurs, the smoke will collect on a floor or level beneath the top floor. This is more likely to occur with cool smoke and/or very tall buildings.
- Stack Effect -The natural vertical movement of air within a structure. It is affected by the air tightness of the building and the temperature gradient between the interior and exterior of the building. Positive stack effect is the movement of air upward and occurs when it is colder outside than it is inside. Negative stack effect is the movement of air downward and occurs when it is colder inside than it is outside.
- Staging - Location(s) for the standby of uncommitted apparatus, equipment, personnel, and other resources. In a high-rise incident, there will usually be a minimum of two staging areas: the exterior staging area and the subsequent. Interior staging area located two floors below the fire floor.
    - Ultra-High-Rise - Buildings greater than 40 stories

Overall Design (core construction vs. traditional construction)

- Core construction is when the building is designed with all the primary vertical structures (i.e., stairs, elevators, etc.) grouped together in the center of the building. Hallways service each side of the core. Exits are not remote from each other and can be simultaneously blocked by smoke and fire. Some core construction methods move the core from the center and are known as side core construction.
- Traditional construction provides elevators and stairs at separate locations on each floor. Stairs are generally located at the ends of each floor; and, depending on the overall length of the floors, there may be additional stairs in the center. Elevators are generally located in the center with service elevators and additional passenger elevators located elsewhere as needed.

Wall and Roof Construction

- Residential high-rise buildings in LBTS VFD response areas are generally of concrete construction to include exterior walls; interior walls are drywall with at least a 30-minute fire resistance rating, steel frame construction is very rare in South Florida. Commercial high-rise buildings are also of concrete structural construction. Commercial high-rise construction typically will have larger un-partitioned areas, which will allow rapid and unobstructed fire spread. Commercial building may also have "curtain" walls, which are non-load bearing lightweight material or glass panels attached to structural concrete columns.
- Generally roofs are constructed of concrete with a waterproof covering such as insulated panels, tar and gravel, etc.

Plenum

- A plenum is the space between the ceiling and the floor above that is used for heating ventilation and air conditioning (HVAC) air return, typically found above the public halls and large common areas in commercial buildings. Not every high-rise will be designed with them.

- Those buildings that do have these spaces utilize them for channeling return air for the HVAC, running plumbing and utility pipes and lines, sprinkler branch lines, and zone valves, etc.

- These spaces provide a ready means for horizontal fire and smoke spread as well as an accumulation area for highly flammable products of combustion.

Floor Construction Stacked Kitchens and Bathrooms

- Floor construction is pre-dominantly re-enforced concrete with post tension concrete and metal joist supported concrete used more sparingly. During fire involvement, reinforced concrete poses little concerns other than localized spalling. However, post-

tension and, of greater concern, concrete supported by metal decks on metal joists can present greater collapse hazards under severe fire conditions.

- Floor areas may be highly compartmentalized as in the case of structures used for apartments, hotels, etc, they may also be mostly undivided as in the case of an office building that creates cubicles using pre-fabricated, short height dividers in an otherwise wide-open floor space. The latter will allow fires to grow without the barriers created by Compartmentation and potentially to necessitate larger flows to extinguish.

- Kitchens and bathrooms are typically arranged so that plumbing pipes are in a straight column from floor to floor. Although the plumbing chases are supposed to be sealed, this arrangement allows for easy vertical fire and smoke spread.

Electrical Distribution, Meters, and Shutoff Locations

- Each apartment will have its own electrical meter. Meters are located in electrical meter rooms located on the ground floor, the basement, or on each individual floor in an isolated meter room. These meter rooms are generally stacked in-line over one another. Doors in hallways that lead to these electrical rooms generally are outward swinging doors into the hallway. Any crew that encounters a door that swings outward into the hallway in a high-rise building should suspect some sort of building utilities in the room behind the door.

HVAC Systems

- It is important to determine what affect the HVAC system is having on the fire. For this reason, a building engineer/maintenance person should be found to operate the system in a fashion that confines smoke fire spread and aids in ventilation. This person is extremely valuable and should remain with the Lobby Control Officer for the duration of the incident.

Basements and Internal Parking Garages

- Basements and/or lower level floors are common in hotel type occupancies. These floors generally contain much of the building's machinery rooms, maintenance shops, receiving departments, etc. In most cases, these floors are below grade at the front of the structure but are at grade level along one of the sides and/or rear.

- Floor layouts are generally unlike any of the floors occupied by residents and may contain materials and fire loads not otherwise found in the structure.

- New parking garages in high-rise buildings are generally required to be sprinkled and stand-piped. Older buildings may or may not have sprinklers/standpipes depending upon when they were built. Fire personnel must be prepared to hand lay long stretches of hose to reach vehicle fires to remote parts of the garage.
- Check for smoke and fire extension to enclosed portions of the building.

Stairwells

- ***Stairs are usually one of four types: return, scissor, wrap-around, and access. Unless open or smoke proof, all stairwells will serve as "chimneys" for heat and smoke.***
- Open stairs will vent smoke directly to the outside but will draw fire to their location once the doors are opened.
- Return stairs are the most common and are named so because they cause you to ascend/descend to a half-landing and "return" to continue the ascent/descent to the next floor. The doors leading out to the floors remain in the same position on each floor. Also, there may or may not be a well hole or shaft in the center of the stairs. When present, this well hole allows for vertical stretching of hose -requiring fewer lengths.
- Scissor stairs provide a straight run from one floor to another and only change direction at each floor. The door leading out to the floors alternates location on each floor as determined by the length of the "run". The similar door locations will be present on every other floor.
- Wrap-around stairs "wrap around" an elevator or open shaft. The open shaft will again allow a vertical hose stretch, while the elevator shaft will necessitate the use of 50' of hose per floor.
- Access stairs are not egress stairs. They are generally designed to serve one or two floors within the same space or occupancy inside the high-rise. and are not enclosed. These stairs provide for easy vertical fire extension.
- For the purposes of efficient occupant evacuation and coordinated fire attack, stairs must be designated as attack, ventilation, and evacuation stairs when possible, consideration should be given to positively pressurizing evacuation and attack stairs, opening the door leading onto the floor will contaminate an otherwise tenable staircase, the attack crew must be sure that no occupants are still entering or present in the staircase on the floors above, likewise, stairwells chosen to direct smoke must be free of occupants prior to doing so.
- Open and/or smoke proof stairs generally do not require this type of designation and coordination, the main issue with occupants evacuating through the same stairs utilized for attack is the trip hazard presented by the hose and potential delay in hose advancement as the attack team contends with the people exiting in the limited space provided in the stairwell.

Standpipe Systems

- Class 1 systems are designed for Fire Department (FD) use and larger hose streams. They contain 2 ½" outlets and no occupant use hose cabinets. The standpipe outlets will be located in the stairwells.
- Class 2 systems are designed for occupant use. They provide 1 ½" outlet with occupant use hose cabinets. These cabinets and their outlets are in the hallways. These outlets are not designed for FD use.
- Class 3 systems are designed for both occupant and FD use. Two basic designs require providing the 2 ½" outlets in the stairs in addition to the hose cabinets in the hallways or providing only the hallway hose cabinets equipped with a 2 ½"outlet reduced to 1 ½".
- Standpipes provide a rapid way to get water to the fire utilizing the buildings internal piping system, standpipes are supplied by domestic water sources and pumps; however, although it is critical that a suppression unit connect to the FDC with a suitable water supply, this company must assess the status of the building's fire pump prior to pumping the system. All standpipes should be supplied with two 2 ½" hose lines. In many cases, supplying the standpipe and pumping the appropriate pressure based on fire floor, number of hose lines, and GPM flow, will be ineffective if the fire pump has not been disabled. The engine company officer assigned water supply must determine whether the fire pump is providing the required water flow and if not then fire department apparatus shall pump the system and the fire pump will be shut down. If companies on the fire floor have sufficient fire flow, the water supply company will establish water to the engine from a suitable hydrant and charge both hose lines into the FDC and will stand by in case the fire pump fails at which point the system will be pumped.
- PRDs or pressure reducing devices are attached to standpipe outlets where it is necessary to regulate or reduce the operating pressure to a maximum outlet discharge pressure of 100 psi. PRDs vary in design and some are easily adjusted or removed, while others are not. PRDs are not a problem unless there is insufficient pressure in the standpipe system. When proper pressures cannot be generated, PRDs may further reduce available flow and hamper our abilities to generate effective fire streams.
- All new high-rise structures are sprinklered throughout. However, there are a significant number of high-rises that are not sprinklered. Many, but not all, older residential high-rise buildings in South Florida have been retrofitted with a partial sprinkler system that provides sprinkler coverage in corridors to protect egress. The remaining un-sprinklered, high-rise residences have until the year 2012 to become fully sprinklered as required by the Florida Building Code.
- Fire pumps are engineered to provide the required pressures to the upper-most floors as mandated by National Fire Protection Association (NFPA) standards. They are centrifugal pumps powered by electric or diesel motors. The proper operation of these pumps must be verified by personnel assigned to Water Supply, or as designated by the Incident Commander (IC).
- Multipurpose ABC fire extinguishers are provided for occupant use as mandated by NFPA standards. Fire personnel will not rely on their presence or usability.

***** These Standard Operations Procedures should be considered guidelines for use at specific emergencies. Different situations may dictate alteration of the procedures, however, the safety of personnel and the public shall remain the highest priority. *****