S.O.P. #: TACTICAL OPERATIONS MANUAL #10
SUBJECT: HIGH-RISE/ STANDPIPE EQUIPPED OPERATIONS
DIVISION: EMERGENCY OPERATIONS

High-rise / Standpipe Equipped Operations

I. Introduction

Effective fireground management at high-rise/sprinkler/standpipe equipped fire incidents requires an organized and controlled approach to problem solving and resource utilization. Organization and control are what Incident Command Systems are all about. Using an Incident Command System in high-rise firefighting requires that the following objectives be met:

- The Incident Command System must be incorporated into a department approved High-rise Operational Plan.
- It must address the unusual problems that are associated with fire control operations in high-rise buildings.
- Standard operational functions that are required at high-rise emergencies must be clearly defined and understood by all involved personnel.

The system that will be presented addresses the unique nature of high-rise firefighting and the unusual problems that are present. It stresses a clearly defined chain of command, reduces the overall problem into manageable segments and assigns specific responsibilities for critical parts of both fire control and support operations.

Officers who deviate from these guidelines to address specific incident needs when conditions or situations warrant must immediately notify the incident commander of their actions. The following priorities will guide decision making during the incident:

- Life Safety
- Incident Stabilization
- Property Conservation

When operating at high-rise/sprinkler/standpipe equipped fires, the following tactical goals apply:

Structural Fire Tactical Goals
S.L.I.C.E.R.S.

Sequential Actions: To take place in order
Size Up
Locate the Fire
Identify and Control Flow Path
Cool the Space from the Safest Location
Extinguish the Fire

Actions of Opportunity: May occur at any time
Rescue
Salvage

The Incident Commander (IC) should consider the potential for rescues at all times. Firefighters should always be prepared to remove trapped or endangered occupants. Often the best action the fire department can take is to immediately suppress the fire. The IC and fireground officers must make a rapid and informed choice on the priority and sequence of suppression activities vs. occupant removal. As life safety is the highest tactical priority, rescue shall always take precedence. The IC must determine the best course of action to ensure the best outcome for occupants based on the conditions at the time.

The incident commander must consider all critical factors including, but not limited to, building construction, age of structure, crew resources, sustainability of a water source, location of fire, probability of viable victims, and the extent of the fire when determining the appropriate type of fire attack.

Interior:	Interior fire attack with coordinated ventilation operations
Transitional:	Exterior knockdown transitioning to an interior attack with coordinated ventilation
Exterior:	Exterior fire attack operations

II. Definition

A. A high-rise building can be defined as a fire resistive, sprinkler/standpipe equipped building greater than 75’ in height requiring nearly all firefighting operations to be carried out from within. Their design and size will increase the reflex time of firefighters, presenting logistical challenges that may make any type of evacuation very difficult or impractical.

B. Officers should consider requesting a high-rise assignment on working incidents for other types of buildings that do not meet the basic definition of a high-rise but present logistical challenges in fire department operations. For example:

a. Large warehouses, malls, etc.
b. Multi-building, varied type construction
c. Podium construction
d. Donut (surrounds garage), U, H, T configuration
e. Mixed occupancy - usually wood frame (type V) over fire resistive (type I) vs residential
f. Wide-rise construction

PART 1
OPERATIONS

The following is a listing of Engine Company assignments to be utilized during a High-rise Incident and a brief description of the duties and responsibilities of each position.

A. 1st and 2nd Engine shall work together to accomplish the following:

a. Assume command, consider calling for additional resources, and develop an Incident Command Structure appropriate for the incident.

1. On incidents with a confirmed fire, or information of a probable fire, the BIR must include the assignments of the first 2 arriving apparatus. This will include.

2. Establishing exterior command and identify the location of the command post Assignment of the fire floor division supervisor.

b. Supply the Fire Department Connection (FDC) if feasible. The primary responsibility is to immediately support the sprinkler system.

c. Obtain building keys for the fire floor

d. Determine location of fire (visible, occupants, annunciator, and building personnel).

e. Check elevator status. Recall cars if they are not in the lobby.

f. Determine the best method of ascension - stairs or elevators. If using the elevator, refer to Tac 4.

g. Report to the floor below the fire (2 below if using the elevator) with standpipe equipment to deploy the initial attack line. All highrise packs will consist of 3 sections of 75' 2" hose with 2 ½" couplings, smoothbore nozzle and inline pressure gauge

h. On the floor below the fire, check the layout to determine the location of the fire as it relates to the stairwells. The standpipe equipped stairwell closest to the fire should be used for attack operations.

i. Inform all units of the identities of the ***attack stairwell*** and the ***evacuation stairwell*** (using the building's naming convention).

j. Evaluate fire floor conditions to determine ***Hallway or Stairwell*** stretch.

k. A firefighter shall connect and be assigned to the appropriate standpipe one floor below the fire floor and ensure that the in-line pressure gauge is in place on the standpipe outlet. The gauge shall be monitored throughout suppression efforts.

l. If performing a "stairwell stretch", clear the ***attack stairwell*** of occupants a minimum of three floors above the fire floor prior to advancing attack line into the hallway.

m. Transfer command and give updated information to first arriving chief. After the transfer of command, the initial incident command will reassigned as needed. (i.e. planning, safety, operations).

B. 2nd Engine

a. Crew members shall provide a coordinated effort to assist the first arriving engine in accomplishing the tasks in "Section A" above.

b. Supply second FDC or primary FDC if the first engine did not.

c. Report to the floor below the fire with standpipe equipment and appropriate tools in the ***attack stairwell*** and assist with the initial attack line.

d. The Officer in Charge (OIC) contacts command in preparation for either division assignment or transfer of command if 1st engine went into a Limited Command Mode.

C. 3rd Engine

a. Assume ***Lobby Control*** and perform the following:

- Gather remaining building keys
- Obtain invalid list from building representative
- Establish Level II accountability
- Control and man the elevator (Tac 4)
- Control heating ventilation air conditioning (HVAC) system
- Ensure main FDC/riser valves are open and fire pump is on
- Monitor annunciator panel and fire control room if equipped
- Building communications
- Rule out trash chute fire

b. Coordinate movement of resources between Lobby and Base
- Gathering spare self-contained breathing apparatus (SCBA) cylinders should be a priority.

c. Locate and control utilities for the fire apartment/area.
- Utilities may also be found on the fire floor. Coordination with the 1st arriving Truck is essential in securing utilities

d. Initiate positive pressure to the attack stairwell in coordination with attack operations.

D. 4th Engine

a. Assume Rapid Intervention Team (RIT)

b. Report to the floor below the fire with RIT equipment

c. Check layout of the apartment/ floor below the fire.

E. 5th Engine

a. Report to ***Base*** with standpipe equipment.

b. Hook up to standpipe outlet two floors below the fire floor (***Base*** level)

c. Place back-up line or second attack line in service.

F. 6th Engine

Primary duties

a. Command engine duties (See Tac 7)

b. Secondary duties if IC utilizes engine for operations

c. Establish ***Base*** two floors below the fire floor.

d. Bring standpipe equipment and spare SCBA bottles.

e. Assist the 5th engine with back-up line or second attack line.

f. Crew members should place themselves in doorways, corners and friction points.

The following is a listing of Truck/Squad Company assignments to be utilized during a High-rise Incident and a brief description of the duties and responsibilities of each position.

A. 1st Arriving Truck

a. Position truck for best access to the fire building.

b. Evaluate need to place aerial in service. For fires above the sixth floor aerial use may not be an option.

c. Consider taking elevator keys.

d. Check elevator status. Recall cars if they are not in the lobby.

e. Assist 1st arriving engine in determining the best method of ascension - stairs or elevators. If using elevator, refer to Tac 4.

f. Ascend to the floor below the fire (2 below if using elevator) and check the layout and to determine the location of the fire as it relates to the stairwells. The point of entry should be where the initial attack line was stretched (attack stairwell).

g. Identify fire apartment/ area and identify and create a firefighter refuge area (using the adjacent apartment)

h. Make entry to fire apartment/ area and ensure door control.

i. Perform primary search of fire apartment/ area

j. Locate and control utilities for the fire apartment/area.

1. Often utilities will not be found on the fire floor therefore coordination with the Lobby engine is essential in securing utilities

k. Identify need for shelter in place or localized evacuation.

l. Report findings to Division/Group Supervisor/Command

B. 2nd Truck

a. Position truck for best access to the fire building.

b. Consider taking elevator keys

c. Report to the floor above the fire.

d. Identify the apartment/ area above the fire.

e. Perform primary search of the apartment/ area above the fire and check for extension.

f. Locate and control utilities for the apartment/ area.

g. Identify need for shelter in place or localized evacuation.

h. Report findings to Division/Group Supervisor/Command

C. 1st Arriving Squad

a. Consider taking elevator keys

b. Monitor ***attack stairwell and evacuation stairwell*** for air quality.

c. Search for victims in ***attack stairwell and evacuation stairwell***

d. Direct occupants to stay in their rooms or direct them to a safe area.

e. Update command of their location and findings.

The following is a listing of EMS Supervisor and Medic unit Operations to be utilized in the High-rise Incident and a brief description of the duties and responsibilities of each position.

A. 1st Arriving EMS Supervisor

a. Report to Base

b. Establish medical group and rehab manager 2 floors below IDLH

B. 1st Arriving Medic unit

a. Report to Base with all medical gear

b. Assist with injured firefighters and victims

c. Assist in rehab of firefighters

C. 2nd arriving medic

a. Reports to medical via radio

b. Supports operations

PART 2

TACTICAL PRIORITIES/CONSIDERATIONS

I. Mitigate Fire

a. Apply SLICE-RS
b. Consider transitional attack.
c. Obtain access into an adjacent apartment for a area of refuge and to possibly gain layout
d. 2 in 2 out will be staged below the IDLH atmosphere.
e. Gauge wind conditions

II. Evacuation Plan

DECIDING HOW AND IF TO EVACUATE

In traditional fire resistive high-rise buildings, the construction itself is a major factor in the protection of life, and, except for the occupants of the unit involved, danger from the actual fire is remote. The modern mid/high-rise buildings and other sprinkler/standpipe equipped structures present unique challenges for suppression efforts as well as evacuation needs.

Experience has shown that in fire resistive structures, substantial benefit can be obtained by keeping the occupants in their unit with the door closed. This theory should not be assumed for other types of sprinkler/standpipe equipped buildings. If evacuation is required, then the Incident commander must determine, based on the operational plan, whether or not it should be a complete evacuation, or if the partial evacuation of endangered areas is sufficient. If practical, a partial evacuation may reduce panic and to reduce the number of persons requiring assistance and control.

Should a partial or full evacuation be required, efforts should begin in the immediate fire area and outward on the floor on fire, and then proceed to the 2 floors above the fire, followed by 2 floors below fire.

- Shelter in place - Protect in place
- Horizontal evacuation - full evacuation of the floor. If evacuating horizontally in a standard high-rise, this will be a full evacuation of the floor. For “wide-rise” type buildings, the horizontal evacuation may be contained between fire-rated divisions.
- Vertical evacuations - partial evacuation of the building. For example, the evacuations may be contained to several floors above and below the fire.

REGARDLESS whether complete or partial evacuation is required, it must be accomplished in coordination with dispatch and supervision if it is to be done safely and without panic. In order to accomplish these objectives, the following should apply to ALL evacuations:

A. Every effort should be made to have fire personnel stationed on each floor(s) to be evacuated. They will be able to reassure and direct occupants.

B. Make prompt provisions for invalids.

C. If possible, have occupants use stairways rather than elevators.

D. If elevators must be used, as for invalids, have EVERY elevator manned by a firefighter if possible. If manpower is critical, a police officer or competent building employee should be used.

E. If possible, direct occupants down stairs not blocked by hose or smoke.

F. Only use aerial ladders to remove people when absolutely necessary. (Last Resort).

G. Direct evacuees to safe areas out of the way of operations. During inclement weather, try to find protected space (lobby, garage, etc.).

H. Obtain police assistance to insure that no one reenters until authorized.

I. Obtain assistance from police and/or employees to check every unit to make sure that it is indeed vacant. Utilization of KNOX keys when available. Chalk can be used to mark an X on doors, indicating the room has been checked.

J. Consideration should be made by the operations section chief or command to add an evacuation group or branch to coordinate all evacuation strategies and tactics.

III. Resources

ALL DEPLOYED UNITS SHALL BRING APPROPRIATE RESOURCES INCLUDING BUT NOT LIMITED TO FORCIBLE ENTRY TOOLS, HIGH-RISE PACKS, AND SPARE BOTTLES

- Spare Bottles
- Second lines 2" Highrise packs with 2 ½" couplings
- Positive pressure fans (Consider Cordless fans for ease of deployment)
- Blitzfire Monitor Device
- Additional 2 ½" Hose
- Additional nozzles
- Additional Forcible Entry Tools
- Air monitoring meters

IV. Ventilation

SMOKE REMOVAL

If smoke has spread it is then necessary to promptly make every effort to remove it. In most situations this will require positive pressure ventilation through the involved area.

- Horizontal ventilation offers the advantage of removing the smoke with the necessity for moving it long distances. If the fire can be promptly extinguished, then smoke should be removed through the fire area, as additional damage is unlikely. Horizontal ventilation through areas not already involved should not be used except in extreme emergencies, as this will only add to the damage. Wind direction should be verified prior to beginning.

- Vertical ventilation will be required in many situations and caution must be applied to insure that this procedure does not add to the smoke problem. Vertical ventilation may be accomplished through an interior stairway or the elevator shaft. Stairwell scuttle hatches shall not be opened until absolutely deemed safe to do so.

- Fire Tower. If smoke is to be removed via an interior stairway then the stairways already blocked by hose lines should be used, if possible. Fire personnel should then be stationed to direct occupants to other means of egress and to keep upper level fire doors closed.

- Consider using the HVAC system.

CAUTION: Smoke removal devices should not be placed in operation until it is absolutely positive that they will not add to the spread of fire.

V. Communications

The efficient coordination of a fire, particularly in a high-rise building, requires frequent condition, action, needs (CAN) reports. This is the responsibility of both the initial Attack Officer and the Division/Battalion Chief.

A. MEANS OF COMMUNICATION**:** Several means are available to insure good communication, both on the fireground and between the fireground and Fire Dispatch.

a. Fireground Communications

i. Portable and Mobile Radios: Radios are the primary means of fireground communication. However, complete reliance on radios cannot always be expected as they may not function properly in large buildings.

ii. Fire Control Center**:** Many new buildings have a communication center designed into them for the sole purpose of Fire Department operations. The control center is usually in the proximity of the Lobby and has means to communicate with each floor through either an internal phone system or an intercom system.

b. Communications with Dispatch**:** Dispatchers cannot provide you with complete assistance unless they are kept advised of the situation. This not only means the initial reports, but frequent reports during operation.

B. COMMUNICATION RESPONSIBILITY: The responsibility for establishing immediate and effective Communications rests with the initially deployed tactical supervisor (Division or group) and Incident Commander.

a. Other Officers and Personnel: Under some circumstances, Officers of other companies may be able to provide additional information on the first report or during subsequent operations. On large buildings it is possible that the first company arriving would not see anything, whereas the company on another side could see fire or smoke. It is then the responsibility of other units to "correct" the On the Scene Report to provide additional information to Dispatch and inform the Initial Attack Officer.

b. Other personnel should not, except on orders of the INCIDENT COMMANDER, assume the responsibility for communications.

PART 3

Standpipe and Sprinkler System Operations: Water Supply

Note: Personnel should not interpret this section as a detailed presentation of standpipe and sprinkler systems. Additional reading and study are required to more effectively use these important tools of fire suppression.

A. Standpipe System Types

a. Dry System:

1. Dry standpipe systems are not supplied by a building's domestic water and, in order to operate properly, require water pumped from an outside source into the Fire Department Connection (FDC). Dry standpipe systems are commonly found in unheated structures such as parking garages but may also be found in older high-rise or commercial buildings.

2. When supplying a dry standpipe system, know that pressure cannot be generated in the system until the piping is completely filled with water. This may take several minutes from the time water is introduced into the system. Pump operators shall not delay in getting supply lines hooked up to the FDC and charged.

B. Wet System:

1. Wet standpipe systems are supplied by a building's domestic water system and normally filled with water. However, even though the system is considered "wet", in most instances it will not be able to provide adequate pressure to support initial fire attack. To obtain proper nozzle pressure and flow, water must be pumped into the system's FDC from an outside source. As with a dry standpipe system, the first arriving engine company shall obtain a reliable water supply and supply the building's FDC.

2. A building fire pump may or may not be present in a wet standpipe system. Even if present, the fire pump may not be able to supply the necessary pressure to mount an effective fire attack.

A. Procedure for Supplying Standpipe Systems:

1. Recent events strongly suggest that fires in large buildings, particularly high-rises, require greater fire flows than previously thought necessary. Therefore, provisions should be made initially for high volume water supply.

2. The first arriving engine shall obtain a water supply and position near the appropriate FDC, ideally within 150 feet of the connection.

3. It shall be the policy of this Department to connect two 3" supply lines directly to the FDC unless a specific LDH connection is present. For an FDC with two inlets, the first supply line shall be connected to the FDC and charged

quickly with tank water. Once the hydrant is charged and water supply obtained, the second supply line to the FDC can be added.

4. The engine supplying an FDC will be dedicated to that task alone. No additional attack or supply lines will be used from that engine.

5. The engine supplying the standpipe shall maintain a pump pressure between 180-200 psi. The maximum engine pressure shall not exceed 200 psi. The firefighter in control of the standpipe outlet pressure gauge will then be responsible for setting the pressure for the attack line.

B. Standpipe systems are prone to closed supply valves, inoperable fire pumps, debris, and pipe failures. Firefighters faced with standpipe water supply issues must act quickly and should consider the following options:

- "Supply the Outlet" – Connect a 3" supply line to the lowest standpipe outlet in the designated attack stairwell. This shall be accomplished by the Pump Operator of the 2nd or later arriving engine company and shall occur at all confirmed fires in standpipe equipped buildings. The supply line to the bottom standpipe outlet will not be charged unless directed by the Incident Commander.

- "Make Your Own Standpipe" – Stretch a 3" supply line with ball valve up the designated attack stairwell. Connect the pressure gauge and attack line, as you would with normal standpipe operations.

- "Flying Standpipe" – Use an aerial ladder, positioned to an appropriate window in a safe location, to supply the high-rise attack line. A ball valve, elbow, and pressure gauge shall be attached to the waterway so the pressure in the line may be controlled. Due to the aerial ladder's location, additional hose may be required to reach the fire apartment. A flying standpipe should be a last resort operation at a high-rise fire, as it ties down the aerial ladder and makes it unavailable for rescue, ventilation, master stream application, or other possible duties.

1. When operating at mid/high-rises incidents extreme care should be taken by pump operators supplying standpipes, due to the danger of falling glass and other objects from the fire building. This can result in injuries to members and damage to hose lines.

2. Companies operating (2)-stage fire pumps should use the stage of the pump that is most efficient for the engine pressure required.

II. Sprinkler Systems

A. Wet System:

1. Most sprinkler systems can be classified as “wet”, meaning they are supplied by the domestic water system.

2. Wet systems act to suppress a fire immediately after a sprinkler head is activated. However, most wet systems are designed based on a limited number of heads activated. If a fire continues to burn and additional heads are activated, the wet system may not be able to keep up with the required flow rate.

B. Dry System:

1. “Dry” sprinkler systems are usually located in buildings or areas that are subject to freezing temperatures (parking garages, large open attic spaces, warehouses, etc.). These systems may be completely dry or may be designed to become “wet” when a sprinkler head activates and purges air from the system.

C. Procedure for Supplying Sprinkler Systems

1. During a fire, both wet and dry sprinkler systems shall be supplemented by pumping water into the designated Fire Department Connection (FDC).

2. The third arriving engine shall obtain a water supply and position near the appropriate FDC, ideally within 150 feet of the connection.

3. It shall be the policy of this Department to connect two 3" supply lines directly to the FDC unless a specific LDH connection is present. The first supply line shall be connected to the FDC and charged quickly. If the demand for water is greater than one line can supply, the 2nd line shall be charged.

4. The engine supplying the sprinkler system shall maintain a pump pressure of 150 psi.

5. Companies operating (2)-stage fire pumps must pump a sprinkler system in VOLUME to meet flow requirements.

PART 4
Standpipe Operations: Attack Line Deployment

I. Overview

A. Pre-Planning – The importance of pre-planning standpipe equipped buildings cannot be over-emphasized. Pre-planning can assist first in companies with identifying type of building construction, floor layouts, length of hallways, location of stairways, elevators, fire protection system features, and other valuable information. Information gathered, coupled with routine practical training, will leave both officers and firefighters better prepared to fight fires in these types of buildings.

B. Fires in standpipe equipped buildings are high risk/low frequency, can present a significant challenge, are manpower intensive, and require a high level of coordination between all crews involved.

- Standpipe Equipment

C. Baltimore County's current high-rise hose/equipment consists of the following:

1. (3) 75' sections of 2-inch hose w/ 2-1/2" couplings
2. (1) Smooth bore nozzle with 1-1/8" integrated tip (265 gpm)
3. (1) 2-1/2" in-line pressure gauge
4. (1) 45^{o} elbow w/ 2-1/2" couplings
5. (1) Bag with other miscellaneous tools/adapters

D. A handful of units have also been outfitted with 2-1/2" hose packs and smoothbore nozzle with 1-1/4" tip (325 gpm).

E. Smooth bore nozzles are to be used for all lines connected to a standpipe system. Smooth bore nozzles provide greater stream reach, lower required nozzle pressure, and less nozzle reaction, but most importantly they can pass sediment and debris that is often found in standpipe systems. This debris can and will clog up a fog nozzle if present in the system. Fog nozzles SHALL NOT be used.

- Getting into Position

1. The first-arriving Engine Company will establish water supply, connect to the FDC, give BIR, check annunciator panel, obtain building keys and talk with a building representative, if available. The Officer of the first-arriving company has the option to maintain command or become the divisional Officer **(See Tactical #10)**.

2. The second-arriving Engine company crew will meet first in company and combine crews. The second-arriving Officer will either become the divisional Officer or Incident Commander, as determined by the first-arriving company Officer **(See Tactical #10)**.

3. To prevent an overextension of resources and to facilitate a smooth operation, **the first two engine companies shall be paired up to place a single attack line in service**.

4. Companies shall utilize the stairs if not properly trained in the elevator's Fireman's Service feature, if there is smoke present in the elevator shaft, or if the fire is located on or below the 5th Floor **(See Tactical #4)**.

5. The Officer ascending with the first crew shall designate the **Attack** and **Evacuation** stairwells. Determination of the **Attack** stairwell should be based on ensuring the high-rise hose line will reach all areas of the fire apartment.

6. When using the stairs to reach the fire floor, crew members should examine standpipe outlets for open valves as the ascent is made.

7. Initial crews shall verify the fire floor and, if possible, the apartment location on the fire floor by locating the same apartment on the floor below the fire. This will assist in determining/confirming the **Attack** stairwell.

8. Connection of the first attack line to the standpipe shall occur on the floor below the fire.

9. Attack Line Deployment

- The attack line shall be deployed using one of two methods: the "Hallway (Apartment) Stretch" or the "Stairwell Stretch." The Officer in charge of the initial attack line, after checking conditions on the fire floor, shall determine the most appropriate method of hose-line deployment. If the hallway or floor is relatively clear and **tenable**, the "Hallway Stretch" shall be utilized. If the hallway or floor is **untenable**, then a "Stairwell Stretch" shall be utilized.

- No matter which stretch is called for, firefighters must ensure that enough attack hose has been assembled to make the entire fire apartment or location. This does not mean just getting the nozzle to the door. Firefighters must have at least one working length staged outside the door to reach all areas inside the apartment. Choosing the correct Attack Stairwell is critical.

F. Hallway Stretch

1. The attack line is laid out and assembled on the floor below the fire. The line is then deployed as a dry line to the fire apartment door, making sure all kinks are removed.

2. Firefighters must ensure that enough attack hose has been assembled to make the entire fire apartment or location. This does not mean just getting the nozzle to the door. Firefighters must have at least one working length staged outside the door to reach all areas inside the apartment.
3. The attack line is charged, bled, and pressure set prior to entry.
4. The divisional Officer will assign one firefighter to the area of the stairway door at the fire floor. This firefighter will assist in advancing hose into the fire floor as needed. This firefighter will remain out of the IDLH area and will become the first member of the "Two-Out" team.

5. Consideration shall be given to forcing the door of an adjacent apartment as an emergency area of refuge prior to entering the fire apartment. A door on the same side of the hallway as the fire apartment and between the fire apartment and attack stairwell is ideal.

6. The "Hallway (Apartment) Stretch" is less manpower intensive than the "Stairwell Stretch" and shall be utilized whenever possible, as long as hallway conditions are tenable.

A. Stairwell Stretch

1. The attack line is laid out and assembled on the floor below the fire. The line is flaked out in the hallway of the floor below and advanced into and up the stairwell (no higher than one floor above the fire), making sure all kinks are removed.

2. Firefighters must ensure that enough attack hose has been assembled to make the entire fire apartment or location. This does not mean just getting the nozzle to the door.

3. The attack line is charged, bled, and pressure set. Advancement is then made with the charged attack line down the hallway to the fire apartment.

4. The divisional Officer will assign multiple firefighters to positions to assist in advancing the attack line from the stairwell and floor below the fire. At least one of these firefighters will remain out of the IDLH area and serve as the first member of the "Two-Out" team.

5. If performing a "Stairwell Stretch", clear the Attack stairwell of occupants a minimum of three floors above the fire floor prior to advancing attack line into the hallway.

6. Consideration shall be given to forcing the door of an adjacent apartment as an emergency area of refuge prior to entering the fire apartment. A door on the same side of the hallway as the fire apartment and between the fire apartment and attack stairwell is ideal.

7. The "Stairwell Stretch" is more manpower intensive than the "Hallway (Apartment) Stretch". Therefore, firefighters will need to work in unison to ensure the line is laid out and advanced in a smooth coordinated manner.

A. Connecting to the Standpipe Outlet

1. Connection of the first attack line to the standpipe shall occur on the floor below the fire.

2. Before connecting any device to a standpipe, the opening should be checked for foreign objects. Members may also find a Pressure Reducing Device, such as an orifice disc, that will reduce the effectiveness of hose streams unless they are removed. If such devices are found, the Incident Commander shall be notified immediately of their presence.

3. The 2-1/2" in-line pressure gauge will be connected to the standpipe outlet whenever the high-rise hose is deployed. The division Officer will assign a firefighter from the initial attack team (first two engine crews) the job of Standpipe Control. This firefighter will serve as a member of the "2-Out" team.

4. Once the attack line is stretched, the division Officer will call for the line to be charged. The Standpipe Control firefighter shall charge the standpipe by opening the valve completely.

A. Setting the Line Pressure

The issued 2" high-rise hose (blue) was field tested and the following noted:

- For a 1-1/8" tip (265 gpm), friction loss is 23 psi per 75' section.
- At 50 psi nozzle pressure and assuming a hook up on the floor below the fire, the standpipe outlet gauge shall be set at **100 psi** (50 psi + 23 psi + 23 psi + 5 psi) **for two sections** of 2" hose (**150 feet**).
- At 50 psi nozzle pressure and assuming a hook up on the floor below the fire, the standpipe outlet gauge shall be set at **125 psi** (50 psi + 23 psi + 23 psi + 23 psi + 5 psi) **for three sections** of 2" hose (**225 feet**).

The issued 2-1/2" high-rise hose should be flow tested by each company to determine exact friction loss characteristics. However, in general, pressures can be determined as follows:

- For a 1-1/4" tip (325 gpm), friction loss is 10 psi per 50' section.
- At 50 psi nozzle pressure and assuming a hook up on the floor below the fire, the standpipe outlet gauge shall be set at **85 psi** (50 psi + 10 psi +10 psi +10 psi + 5 psi) **for three sections** of 2-1/2" hose (**150 feet**).
- At 50 psi nozzle pressure and assuming a hook up on the floor below the fire, the standpipe outlet gauge shall be set at **95 psi** (50 psi + 10 psi +10 psi +10 psi + 10 psi + 5 psi) **for four sections** of 2-1/2" hose (**200 feet**).

*****IMPORTANT***** - the Standpipe Control firefighter cannot set the required in-line standpipe gauge pressure until the attack line nozzle is fully open and flowing water. Once the nozzle is flowing, the standpipe gauge pressure can be set by slowly closing the standpipe valve until the desired pressure is met.

1. Communication/coordination should take place between the Nozzle firefighter and Standpipe Control firefighter to make sure the attack line pressure is properly set.

Other Considerations

- Officers should keep in mind that a significant fire will require more than one attack line; additional lines may have to be stretched a greater distance. Provisions should be made to extend attack lines using larger diameter hose lines.
- The use of 2-1/2" hose lines having smooth bore nozzles with 1-¼"tips, and/or the use of master stream devices, may be necessary to suppress fires in high-rise buildings.
- In the event of a significant or wind-driven fire, where crews cannot confine and extinguish the fire using an interior attack, consideration shall be given to application of exterior streams. If such an order is given, it will not be carried out until the fire floor has been cleared of all personnel, the "all clear" given, and a Personnel Accountability Report (PAR) successfully conducted.

PART 5
GLOSSARY

Attack Stairwell
The standpipe equipped stairwell closest to the fire used for attack operations. The attack crew shall identify the attack stairwell and relay the location to Command.

Base
Variation from Firescope
The area where crews report prior to ascending to the fire floor, usually two (2) floors below the fire, near the attack stairwell but never in a stairwell. Crews reporting to base should always bring spare bottles, tools, etc. as this area is also used for equipment staging.

Doughnut construction
The "Doughnut", Texas Wrap or Transit Oriented Development (TOD) construction describes a residential building wrapped around a parking garage

Evacuation Stairwell
Designated stairwell, free from IDLH and accessible by civilians for evacuation.

FDC
The fire department connection is the point which fire departments can connect into a sprinkler, standpipe, or combination system to boost the water pressure in the system.

Hallway stretch
The hallway stretch, as the name applies, is specifically designed for a fire attack where the apartment or unit on fire has not compromised the hallway and is still compartmentalized allowing you to stretch a dry line to the fire unit

Occupant Evacuation types

A. Full Evacuation - Total removal of all occupants from the structure/floor due to life threatening concerns.

B. Partial Evacuation - The evacuation of occupants from specific locations within the structure, other occupants may be advised to protect in place.

C. Protect in Place - Non-evacuation of occupants during an incident.

Podium construction
One example of a multiple story hybrid construction that divides attached buildings vertically and horizontally through required fire rated dividers. Predominately wood frame (type V) over fire resistive (type I) which can be residential, mixed occupancy, or commercial. For further information please see www.woodworks.org

Reflex time
The span between unit arrival and mounting an effective attack

Reverse stack effect
Occurs on warmer days and the flow of air is in a downward mode. Smoke and by products of combustion may appear on floors below the fire floor. The movement of air is not a dramatic as the normal stack effect as the difference in temperature between the exterior and interior are not as great as in the winter months

Stack effect
Is the natural movement of air within a tightly sealed building due to the difference in temperature between the air on the interior and exterior of the structure. On a cold day, as the colder outside air flows into the lower levels of the building, it displaces warmer, lower density air which has a tendency to rise, causing an upward air current or stack action. As colder air is heated and expands, the density drops and air will rise to maintain the continuity of upward flow. This upward flow creates a pressure inside the shaft.

Staging – (Refer to Tac 6)

Variation from Firescope

The purpose of staging is to provide a standard system of resource placement prior to tactical assignments. Failure to utilize staging adds to the confusion on the incident scene. Lack of staging also results in units determining their own tactical assignments (freelancing).

- Level II staging is to be utilized by all responding units beyond the 1st Alarm assignment.

Stairwell Stretch

The stairwell stretch, as the name implies, is specifically designed for a fire attack that must be initiated from the safety of the stairwell, due primarily to the fact that the fire is no longer compartmentalized

Stratification

May occur in sealed buildings when the temperature of the smoke produced is not sufficient to cause it to rise all the way to the top of the building.

Suspended Ceilings

Firefighters advancing hose lines into areas with suspended ceiling assemblies should always check for fire in the plenum above. The hazard here is the possibility of the ceiling assembly dropping on the ceiling onto crews resulting in their being trapped in the maze of cross-tees, hanging wire and electrical cable.

Types of Construction

- Type I – Fire Resistive
- Type II – Noncombustible
- Type III – Ordinary
- Type IV – Heavy Timber
- Type V – Wood Frame

PART 6

HIGH-RISE IMS

I. INCIDENT COMMANDER

A. The officer responsible for the management of all incident operations

B. When the first arriving Chief Officer assumes this position, a command post shall be established and the location announced via radio. Dispatch should confirm this location.

C. Establishes the required organizational elements.

D. Plans the overall strategy for the control of the incident.

E. Establishes the minimum number of companies held in reserve at the Base and Staging areas. Informs the officers in charge of these functions of the minimums established.

F. All requests to Dispatch for additional companies and/or equipment are made through the IC.

G. Establishes that all appropriate records are kept.

H. Establish a Command Post: During working fires in high-rise buildings, it is essential that the INCIDENT COMMANDER promptly establish a central point of control and command. In order to accomplish this, the INCIDENT COMMANDER should, after determining that a working fire is evident, immediately establish a Command Post.

   a. Located at street level a recommended minimum of 200 feet from the involved structure.
   b. Operational location for the following personnel:
      i. Incident Commander
      ii. Planning Chief
      iii. Documentation Unit Leader.
      iv. Situation Status Unit Leader.
      v. Resource Status Unit Leader.
      vi. Information Officer.
      vii. Safety Officer.
      viii. Liaison Officer.

II. COMMAND STAFF

A. SAFETY
   a. Identifies hazardous situations associated with the incident.
   b. Advises incident personnel in matters affecting personnel safety.
   c. Investigates accidents that occur within the incident area.
   d. Consider Assistant Safety Officers (ASOs) to fire divisions and other tactical areas.

B. LIAISON
   a. Provides a point of contact for assisting/cooperating agencies.
   b. Identifies potential inter-agency problems.

C. PUBLIC INFORMATION
   a. Checks with the Incident Commander on any constraints on the release of information.
   b. Provides liaison between the media and incident personnel.
   c. Prepares press briefings.

III. OPERATIONS CHIEF (Second Arriving Division/Battalion Chief or their designee)

A. Reports directly to the Incident Commander.

B. Consults with the Incident Commander regarding the overall strategy and tactics to be employed.

C. Keeps the Incident Commander informed of the operational progress.

D. Establishes the Operations Section at the base above ground in proximity to the fire suppression/tactical areas within the structure.

E. Command of Division/Groups, RIT, Staging, and Air Operations.

a. DIVISION/GROUP COMMANDERS (Company Officers)
   i. Reports to the Operations Chief.
   ii. Supervises Geographical or Functional Divisions. For example: Division 14: Fire Suppression activities on the 14th floor (geographical).
      - Search and Rescue Group: Responsible for all search and rescue within the structure (functional).
      - Salvage Group: Responsible for salvage operations, regardless of the area or number of floors affected (functional).
      - Ventilation Group: Responsible for all smoke and heat removal (functional).
   iii. Coordinates and supervises the activities of the personnel assigned to the Division or Group.
   iv. Continually evaluates the conditions of the Division or Group and keeps the Operations Chief/Incident Commander informed.

b. RIT
   i. Reports to one floor below IDLH
   ii. Obtain layout of building and floors
   iii. Refer to Tac 18
   iv. Consider establishing RIT task force

c. Staging.
   i. That location where the ground level logistical functions are coordinated and administered.
   ii. Subordinate to the Incident Commander or Lobby Control initially and to the Logistics Section Chief as established.
   iii. Establishes proper parking configuration for all apparatus, a minimum of 200 feet from the involved structure.
   iv. Designates a marshaling area for equipment, prior to its delivery to Lobby Control or Staging.
   v. Clears areas around the building in anticipation of window breaking. Should be at least 200 feet away from involved building. (Obtains police assistance through the Command Post.)
   vi. Maintains the number of reserve companies at Staging as specified by the Incident Commander. Informs the Command Post any time the reserves are below the required minimum.

d. Air Operations
   i. Refer to Tac 7
   ii. Consider ATR
   iii. Consider mutual aid

IV. PLANNING CHIEF (3rd Arriving Division/Battalion Chief or their designee)

A. The Planning Chief reports to the Incident Commander.

B. The third arriving Division/Battalion Chief or designee assumes the Planning Chief's responsibilities.

C. Assists the Incident Commander in planning his overall strategy for containment of the incident.

D. Coordinates and supervises the activities for planning functions: Refer to Tac 7

V. LOGISTICS SECTION CHIEF (4th Arriving Division/Battalion Chief or their designee)

a. Reports directly to the Incident Commander.

b. Supervision of Staging Manager, Lobby Control, Stairwell Support, Communication, Water Supply, Air Supply.

c. Operational location varies depending on where functions under his supervision require assistance or have problems.

d. Responsible for the procurement of building's internal communications system.

VI. FUNCTIONS

a. Lobby Control – Third Engine: Will need to monitor both operational talkgroup as well as the logistical talkgroup as requests will be made through logistics. *Reporting to logistics will occur later in the incident - initially Lobby will report to IC*
   i. Subordinate to the Logistics Chief.
   ii. Coordinates movement of resources between Base and Staging.
   iii. Maintains and distributes building keys
   iv. Informs incoming companies of the availability of elevators or the stairway to utilize
   v. Responsible for the operation of elevators.
   vi. Responsible for control of the HVAC system.
   vii. Ensures annunciator panel and fire control room are monitored (if equipped)
   viii. Maintains necessary records.
   ix. Obtain invalid list from building representative
   x. Assure main FDC/riser valves are open and fire pump is turned on
   xi. Provides information and briefings to the Incident Command Post
b. Stairwell Support
   i. Subordinate to the Logistics Chief.
   ii. Transports equipment from the Lobby level to Base via stairway(s), shuttled two floors at a time.
   iii. Assigns members specific areas of responsibility. (Floor or floors)
   iv. Coordinated by the officer in command of Stairwell Support. (Company Officer.)
c. Communications Unit.
   i. Subordinate to the Logistics Section Chief.
   ii. Coordinates the acquisition of additional communication systems.
   iii. Coordinates overall operations of all communication systems at the incident.
d. Medical Unit Leader
   i. Reports to Logistics Section Chief
   ii. Establishes a medical unit at the staging location
   iii. Establishes responder Rehab Manager at required locations.

VII. Assigns and supervises the various division/group supervisors and the Base Officer.

e. BASE
   i. Reports to the Operations Section Chief and coordinates needs through the Logistics Section.
   ii. Establishes Base Area location for resources which are readily available for assignment.
   iii. Located at least two floors below incident floor.
   iv. Coordinates all activities in base area i.e. Air, Rehab, manpower, equipment, etc.
   v. Resources are to be assigned from Base at the request of the IC/Operations Section Chief.
   vi. Maintains personnel reserves as specified by the IC/Operations Section Chief. Any time the reserves fall below the minimum established by the Incident Commander, Staging shall be contacted for additional companies.
   vii. Maintains supplies of needed equipment.
   viii. Maintains necessary records.
   ix. Establishes level II accountability