TOLEDO FIRE & RESCUE DEPARTMENT

High Rise Fire Procedures Manual

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I. Mission Statements

- To safely accomplish the goal of getting a 2 ½" line flowing 250 GPM's of water for an hour minimum uninterrupted during a High Rise fire
- To support such an operation effectively and safely

II. High Rise Defined

For this manual, a High Rise Structure will be defined as "Any structure where all or even just portions of the building are beyond the reach of ground based firefighting equipment, specifically aerial ladders."

The concepts of this manual can also be applied to deep, low rise buildings; whereas they would apply toward depth of structure versus height in its application.

III. Command

The Command structure at high rise fires will follow the Incident Command System as explained in section C-57 of TFRD's Emergency Procedures Manual. Two Battalion Chiefs will be dispatched on a high rise regular alarm.

The first arriving Chief shall assume Command and become the Incident Commander from the exterior and set up a Command Post in an advantageous position. This Chief is ultimately responsible for the incident. The second chief shall join the interior crews and supervise the attack and the supporting base of operations.

IV. Responding to a Commercial Fire Alarm – High Rise (CFAHR)

When a detection alarm is received without a corroborating civilian 911 call an investigating response consisting of a single engine or engine company will be sent. It is easy to attend this situation lightly. There are enough LODD reports of firefighters who fall into this trap that should snap you out of this apathetic course of action. A high level of awareness and readiness must be maintained during this investigation.

Crews shall be in full gear, SCBA on standby, water can or dry chemical extinguisher, TIC and irons.

The arriving engine SHALL complete a 360 size up, give a condition report upon arrival and take Command. In many cases a 360 size up by the first arriving Engine may be impractical but they should get a visual of as much of the building as possible.

If Nothing Showing is observed exteriorly, the Officer and the crew will check the alarm panel and interview occupants to ascertain fire reality, severity and/or location as per Emergency Manual C5. They will also locate the Knox box and procure the elevator key and/or master key, if available. It may be in the Manager’s office or with the maintenance person.

- Do not simply look at the alarm that is displayed, scroll through the past alarms. Often the first alarm location is where the fire has started. The presence of multiple alarms going off may give you heads up to a working fire or at least identify the floors that have been affected by smoke so that you can avoid taking the elevator to that floor.
- Before deployment is made to investigate, double-check that information with the alarm panel.

Once control of the elevator has been established and cleared, firefighters shall ascend, leaving the driver back to monitor the alarm panel and continue gathering information. If the alarm is on the 5th floor or below, they shall take the stairs. If it is above the 5th floor, firefighters may use the elevator up to two floors below the suspected fire where they will walk up to the reported fire floor, taking note of floor layout, and checking for smoke. If there is no smoke on the fire floor, they will investigate further and take applicable action.

The safest method of ascending to the fire floor is to use a stair shaft that accesses the reported fire floor. Fire crews should pace themselves while ascending. On the way to the fire floor, the officer should check every several floors for floor layout, potential fire conditions and standpipe valves.

If smoke and/or fire are found and is beyond being contained by a fire extinguisher, dispatch shall be notified to send the balance of a High Rise Regular Alarm. The officer will then have the discretion, depending on the scope of the situation found, to request a High Rise 2nd Alarm. If a 2nd Alarm is called, these alarms should be separate to allow each wave to arrive naturally.

The crews will then Recon the best place to mount the attack at the most appropriate stairwell standpipe. It is industry standard to hook up to the standpipe on the floor below the fire. The stairwell landing where you hook up to the standpipe needs to be a safe and clear area. If conditions allow, such as no smoke, heat or flames threatening the standpipe landing then you may hook into the standpipe on the fire floor.

Take into consideration that once you advance the hose, the door will not be able to shut.

In the event of a true working fire, these crews must use common sense and experience to gain the best outcome as risk/reward possible for they will be on their own without high rise equipment for a short period.

As the balance of the High Rise Regular Alarm begins to arrive, Recon will pass Command to the 1st arriving rig giving them a report explaining the fire, their location, best standpipe stairwell and any other pertinent information such as injuries or evacuation needs. This incident should now be run in accordance with Regular High Rise Alarm Operations.

V. Clearing an Elevator for Use and Operational Recommendations

The use of elevator at a High Rise fire is surely the quickest means available to move to the upper floors of a High Rise structure. This does not mean that they are the safest means available; they can be a dangerous tool that must be dealt with in a cautious and respectful manner. Their hoist ways (shafts) can provide a means of extension for smoke and fire and therefore must be cleared before use.

- Firefighters should look up into the hoist way through the crack between the floor and elevator using a flashlight and thermal imager to verify that there is no smoke, fire or running water in the shaft.
- If there is smoke, fire or running water in the shaft, the elevator shall not be used.
- If the shaft is clear, it can be used.
- This inspection practice should continue at periodic stops along travel to destination. It also serves to test the function of the Fire Service Recall.

The intent of the following recommendations is to increase firefighter safety and probability for a successful outcome.

- If there is heavy fire seen from the exterior, firefighters should use the stairs.
- If the alarm panel indicates the smoke or fire is in elevator machine room, firefighters should use the stairs.
- All firefighters should be equipped with full PPE, SCBA, radios, extinguishers and irons for elevator travel.
- Do not overload the elevator. No more than six fully equipped firefighters should use an elevator car at once.
- Never take an elevator below grade during an underground fire operation.
- Never take an elevator directly to the fire floor. Always stop two floors below the reported fire floor. Walk the rest of the way.

- During an extended attack where elevator function is deemed safe, a firefighter with a portable radio will be assigned as an elevator operator per car in use.

A full discussion on the use of elevators under “Normal Conditions” and “Emergency Operations” is in Appendix 8 of this procedure.

VI. High Rise Regular Alarm Operations

Of all the adverse conditions and problems associated with High Rise firefighting, probably the worst is an initial absence of the staffing necessary to contain and extinguish the fire in a timely fashion. The demands placed on the first arriving companies can be overwhelming.

The next issue is the delay in getting to the fire floor. There is at times, up to twenty minutes, from time of arrival until efforts and equipment can be coordinated and manpower assembled. This “reflex time” is a proven factor at past fires.

There has never been a catastrophic full building collapse in a Type 1 structure due to organic fire conditions, while there is some internal partial collapse, it is a situation we can work within. The heartbreaking events of 9/11 have ushered us into a new age and line of High Rise thought. If a High Rise fire is due to a plane crash, bomb or terrorist event serious consideration must be given to limiting the operational time within the building, with a focus on defensive fire containment operations to affect the best possible evacuation scenario. Incident Commanders and fire officers must continually appraise the structural integrity of the building.

Also, air management must be well-thought-out. This is not a residential fire where there is quick egress to an exit and fresh air. In an open High Rise or large Commercial Box store you can very easily be extended deep into the incident. You cannot over-commit or work till the bell goes off. Look to your HUD, you need to start tracking back to base when it turns yellow. A good rule of thumb is 1/3 of a bottle in and 2/3 to get back. You need to use your judgment, erring on the side of personal safety, given the situation and your task when to head back safely.

This is THE classic High Risk / Low Frequency event. It cannot be treated like a house fire. There will be no “Fast Attack” mode. We will operate under Incident Command guidelines using either the Nothing Showing or the Command Mode.

The regular alarm for a High Rise Fire is:

- 5 Engine Companies
- 2 Trucks
- 2 Rescue Squads
- 2 Battalion Chiefs
- Safety 134
- Life Squad
- 1 BLS Eng. Co. as EMS sector Command Mode.

First Alarm Assignments – Nothing Showing Mode

When a detection alarm is received along with a corroborating civilian 911 call a High Rise Regular Alarm will be sent. First unit on scene SHALL give a 360 and a condition report upon arrival. In many cases a 360 size up by the first arriving Engine may be impossible or impractical and will require a collective effort. The first arriving Engine should get a visual of as much of the building as possible and utilize other responding rigs to complete the 360 as they arrive.

If they observe Nothing Showing, the Officer and his crew will enter the Building and determine the nature of the Incident following the guidelines laid out in Responding to a Commercial Fire Alarm - High Rise. This is a potentially dynamic situation, you will need to make adaptive decisions as the situation develops. Initially the first arriving Engine shall establish Command and will need to set up the incident with the following three priorities.

- **Assemble a Recon/Attack group:** Two to three crews shall be assembled and ascend together to where the alarm was initiated.
    - Crews shall be in full gear, SCBA on standby, water can or dry chemical extinguisher, TIC, irons, 2 ½” hose packs and high rise bag.
- **Secure Water:** The 1st arriving engine driver will remain behind and Recon the location of the FDC. The assigned engine will stage at the hydrant and work with the 1st driver to supply water if a fire is verified.
- **Lobby:** An engine shall be assigned to monitor the annunciator panel and set up for the Lobby function.
- The Chiefs will proceed to the building. First arriving Chief will assume Incident Command and set up a Command Post.
- All remaining uncommitted units will stage.

First Alarm Assignment – Command Mode

If first arriving units see any visible sign of fire during the collective 360 or civilians at the scene report a fire, the Command Mode shall be used.

- The first arriving unit shall establish Command with the following three priorities.
- Assemble a Recon/Attack group. Two to three crews shall be assembled and ascend together to where the alarm was initiated.
    - Crews shall be in full gear, SCBA on standby, water can or dry chemical extinguisher, TIC, irons, 2 ½” hose packs and high rise bag.

- **Water Supply:** The assigned engine will take a hydrant and hook-up and charge the Standpipe System with the first engine driver.
    - The standpipe FDC shall have priority over the sprinkler connection. If it is later scouted the sprinkler system needs a boost, it can be accounted for. Firefighters having water for the initial fire attack ASAP is necessary.
- **A Lobby sector**
- The 1st Chief on scene shall assume Incident Command and set up a Command Post.
- The 2nd Chief shall join the interior crews and supervise the attack and the supporting base of operations.
- **RIT:** An Engine or Engine Company with 4+ firefighters will be assigned RIT.
- **EMS Sector:** An Engine, preferably an Engine Company, will be assigned EMS.
- Trucks will stage in the Lobby unless fire or rescues are at a level allowing aerial ops.
    - Consideration should be given to using an aerial as a transitional attack platform while the interior crews work their way up to the fire and set up for their attack. Coordination would be at a premium here.
- All remaining crews will be a part of the Support Group and assigned as prioritized by Command.
    - These companies should proceed directly to the building with their gear and spare bottles and report to Lobby accountability to decrease transit time once assignment is made.

Group	Tasks
RECON / ATTACK 1 to 2 Engine Companies 1st Rescue Squad	Check panel for fire location. Take control of elevators. Check floor below fire floor for layout. Recon for most appropriate place to take standpipe. Fire attack.
WATER SUPPLY 1 Engine	Stage at hydrant. Take hydrant if needed. Connect to FDC
LOBBY CONTROL 1 Engine	Primary Accountability. Manage elevator use. Monitor / Silence Alarm Panel
TRUCKS 1st and 2nd Truck	**If incident above aerial reach** Supplement Support function **If incident within aerial reach** Consider exterior aerial use for rescue. Flying standpipe or transitional attack
RIT 1 Engine	Report to floor below fire floor. Check layout and egress

Group	Tasks
SUPPORT Remaining crews	Report to Command Post for assignment. Search Forcible entry Utility Evacuation
EMS Life Squad 1 Engine Company with Medic Unit EMS Supervisor 122	Report to three floors below fire floor Establish Triage / Treatment area Establish Rehab
COMMAND 2 Battalion Chiefs Safety Officer 134	First arriving Chief establishes Incident Command. Second arriving Chief establishes Operations Sector 134 establishes Safety Sector and fire floor accountability

Attack Group Operations

The Attack Group will ascend to two floors below the reported fire floor utilizing the safest and most efficient means. Upon arrival to two floors below the reported fire floor, the team should assess suitability for a Staging area. It should be clear of smoke and an area large enough for tools, equipment and personnel that will soon occupy it.

An officer and a small group of firefighters will form a Recon crew and ascend to the fire floor. The remainder of the Attack Group will prepare the initial attack line and await orders from the Recon officer.

If there is no smoke and the door is not hot on the reported fire floor, open it and search for the fire. Don’t be too hasty concluding that this is a false alarm if fire is not found on the fire floor. It could be possible that a fire on an adjacent floor has activated a detector on the reported floor or the system malfunctioned and has incorrectly reported the floor. Check the floor above and below the reported fire floor. If smoke and heat is encountered in the stairwell, it must be determined where it is entering the stairwell. It would be best if the attack stairwell has roof access for ventilation options.

- Once the fire floor has been identified, the Recon officer will formulate a plan of attack and brief the Attack group. Some things to consider:
    - Is building occupied? Commercial or Residential? Trusses?
    - Recon should determine as quickly as possible whether a full, partial, or no evacuation is necessary. Civilian injuries?
    - How has it affected building integrity? Is the building going to allow fire operations?
    - Does the situation warrant a 2nd High Rise Regular Alarm?
- The Recon officer will give a size up to Incident Command of fire and smoke conditions, the location of the attack stairwell, need of a 2nd Alarm, any evacuee issues and the location of the staging floor.

- The Attack group will hook up the attack line at the most appropriate location, charge the line and ensure proper standpipe pressure and flows are achieved prior to entering the fire floor.
    - Standpipes will be chosen by proximity to fire and the stairwell. The fire floor stairwell needs to be clear of smoke, heat and fire, when the door is opened, to hook to the standpipe, if not, connect on the floor below. The connection area needs to be a safe zone.
    - Standpipes not located in a stairwell should be avoided initially because in the event of changing fire conditions the hose would not lead back to egress.
        - These interior standpipes can be used for overhaul operations.
- To facilitate advancing the line; where feasible, flake lines up the stairs while it is being connected below.
    - Hose line must be stretched out. No piles of hose in the stairs or landing.
    - Stretch the hose using as much landing as possible, typically along the outside wall.
    - If possible, firefighters should be on each landing the hose is stretched across using their body weight as its being charged to help keep it from jarring out of place.
    - Test standpipe before connecting hose as you would a hydrant. Also, open standpipe slowly when filling the hose.
- One firefighter shall be assigned to monitor standpipe operating pressure and door control on the fire floor.
- The remaining personnel will operate and advance the attack line under the direction of the Recon officer.

Before advancing on the fire, you should take into consideration the possibility that occupants may be in the attack stairwell. Once you have opened the door and taken a line in with you, the stairwell door will not close and the stairwell might become filled with smoke. It may then be necessary to delay entry to the fire floor until the stairwell above is clear of people.

Lobby Sector

This sector is the gatekeeper of the High Rise firefighting process. It will start small and eventually grow into its own major operation with additional crews assigned as the extended attack evolves, especially if multiple fire attack bases are in operation. While monitoring the fire attack channel and using it when necessary, Lobby may ultimately require its own radio channel to coordinate with interior and exterior staging along with Command on matters of logistics.

They will need to complete multiple functions at once. This will be just as strenuous as the fire attack in its own way. The Attack Group will discuss with Lobby before ascension what they are going to do. It is imperative Lobby understands the plan.

Lobby will take charge of the fire detection panel. As the fire progresses it is a good idea to check back and see if it is registering any changes. Also, silence the alarm to improve communications.

Lobby will run the elevator banks. All elevator cars shall be recalled to the ground floor using firefighter elevator keys. Elevators shall be cleared for use on a consistent basis. Each car that will be used to ferry manpower or equipment will have an operator with knowledge on how to use it during fire operations, and have a radio and a dry chemical extinguisher. No elevator shall go above the interior staging floor. Elevator operators will assure all occupants have checked in with Lobby accountability before transporting them up into the building. Have a representative from the elevator company respond.

Lobby will coordinate arriving companies and have accountability for the entire structure. In order to document all who enter and all who leave, Lobby must control egress points. To do this they will require an Entry/Exit officer. It is understood this will be an impossible task at first, but as incident progresses, it must be accomplished. Firefighters need to be self-aware and check in and out and not skip this process. It is for their safety. While accountability will be a TFRD role, Entry/Exit control can be TPD. They will be assisting with any civilian evacuation.

Lobby will be civilian liaison. Building maintenance and managers know their building, its layout, public address system and civilian occupancy. They have master keys, floor plans and information to assist us. They understand their fire suppression systems and can help us understand if they are functioning properly. They can contact their outside entities such as HVAC operators or electricians if power outages affect fire protection systems.

Lobby will need to gain control of the buildings public address system if one exists to communicate with the civilians still in the building. We can use it to direct them to shelter in place depending on their location, or exit by designated evacuation stairwells from the building. If there is a phone system, it may be worth exploring to use with Interior Staging and EMS sectors so as to not tie up radio air.

Building staff radios might be necessary to incorporate into our communication line. If our radios have trouble transmitting and receiving, it may be because we do not have interior repeaters. Staff radios may be set up for communication within the building. Social media could come into play here. News channels may be researched online by trapped civilians and if we can get messages to them that way, it must be explored.

Finally, Lobby will also be the initial resource area. This will be the equipment staging area that needs to be transported up to support the fire attack. A Resource officer will be assigned to account for this and coordinate its transport up to interior staging. Attention must be given, if there are multiple fire attack bases, to assure proper logistical lines.

Depending upon the size and scope of the incident, a Chief officer must be considered for taking command of the Lobby operation.

The Forward Operating Base (FOB)

In the military, a FOB is used to support tactical operations without establishing full support facilities. The heart of a FOB is its staging area which, in our case, will support and supply an extended fire attack in the immediate fire area.

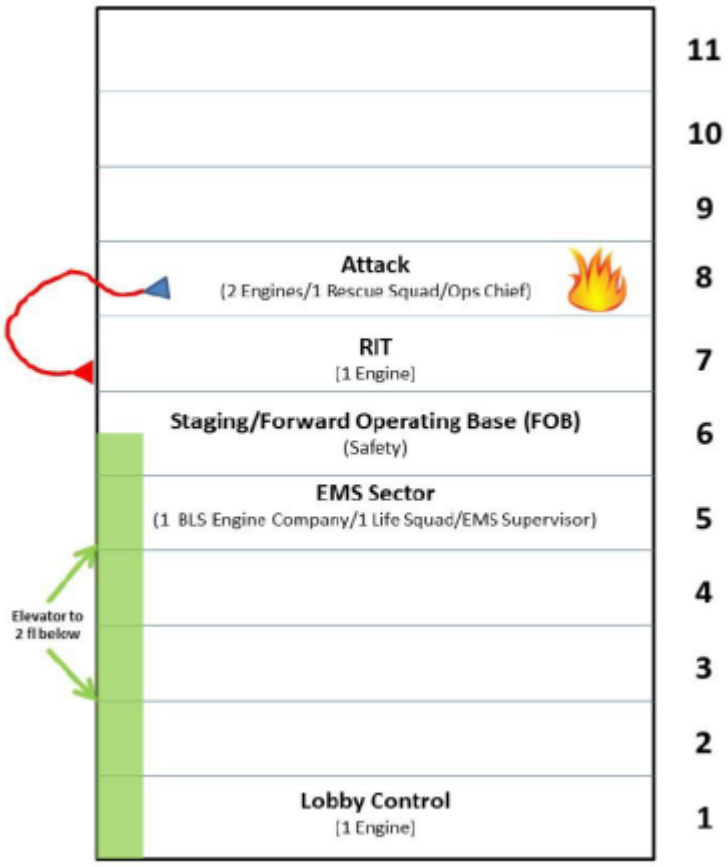
Once Recon has informed Incident Command the Attack Group has commenced the attack, the remaining arriving crews will populate the functions and the Forward Operating Base (FOB) as available and prioritized by the Incident Commander to fit the situation.

Look at the graph on the next page. From the top attack floor firefighters are operating on, down through the staged EMS sector is the totality of the FOB. Every new attack line in a differing stairwell shall have their own support FOB. It becomes imperative for Command, Control and Logistic reasons to easily distinguish between each FOB if there needs to be more than one attack area from different standpipes. If multiple FOB’s are required, each shall be given a unique name designation.

Care must be given when conducting simultaneous fire attacks from different stairwells because of the possibility of a situation where two attack lines oppose each other. These attacks must be well coordinated.

The 2nd arriving Chief will immediately report to the interior staging area after being briefed by Incident Command and will supervise the attack and oversee the FOB. If there are more than one FOBs there shall be a Chief FOB Commander overseeing each along, with their own Staging, RIT, EMS and Safety sectors in support of each separate attack area. And if the FOB gets too large for a proper span of control for FOB Command a Base Manager should be considered.

The Forward Operating Base (FOB) Graph



The concept of the FOB can be scaled to fit the incident. If the fire is on Division 3 of a 17-story high-rise ideally you would have RIT on Division 2, Staging on Division 1 and have EMS/REHAB advantageously staged outside. Or, if the building is more deep than tall such as the Avenue Apartments, in general, the attack, search and back up would be in the foremost positions with RIT a little further back and so on toward the front of the building. That is the basic structure of the support teams, you need to be able to adapt this concept to the physical environment you're presented as best you can.

Command Aide

Immediately upon the confirmation of an extended fire attack in a High Rise fire, NFPA 1710 codifies the use of Command Aides.

- Incident Command Aide; will assist the Incident Commander in the CP any way the IC deems necessary such as tracking crew and rig locations as they are assigned.
- FOB Command Aide; will report to the interior staging area and assist the FOB Commander with accountability and supply lists.

- FOB accountability shall include; all names, crews and availability for assignment in the staging area.
- Supply list shall include gear and equipment in the staging area.

The Chiefs can appoint them as they see fit by personnel available.

Safety Officer 134

A Safety Officer shall be assigned per FOB. They shall function as outlined in the Emergency Procedure Manual C-58 for Incident Safety Sector Officer. For a High Rise incident, they shall have some extra responsibilities.

- The Safety officer will ascend to the Staging floor utilizing the safest and most efficient means in full SCBA and turnout gear.
- The Safety officer shall track accountability on the fire floor.
- The Safety officer is responsible for ensuring that personnel are moved, controlled, and supported in a safe manner.
- They will use the CGM to monitor the air of the FOB and stairwell areas.
- Assure a safe corridor between FOB and Lobby.

Safety 134 can be where they see fit within their FOB and shall consult with FOB Command. Interior Safety Officers should have another firefighter accompanying them, so they are not alone in a fire environment and assist with accountability.

RIT Operations

RIT shall function as outlined in the Emergency Procedure Manual C-82.

- The first arriving RIT team will assemble their equipment and ascend to the staging floor utilizing the safest and most effective means.
- The RIT team shall stage one floor below the fire floor.
- A 360 survey may be extremely difficult to complete. Noting similarities and difference of floors and their layouts from the ascension would be prudent.
- Once in place the RIT officer shall discuss with Command and Safety any issues and firefighter

locations and scope out the fire floor as best as possible given the situation.

If additional RIT staffing is deemed necessary, any later arriving RIT team to supplement the initial RIT team, upon arrival, will be under the direction of the initial RIT officer.

EMS Sector

The EMS sector shall establish a Triage and Rehab area three floors below the fire. This sector will consist of one Life Squad, one Engine company and an EMS supervisor such as 122. Extra staffing to bolster this complement is to be considered by the FOB Commander based on the demands of the incident.

- EMS personnel will be dressed in their PPE and bring their SCBA's with them.
- Stair Chairs are recommended as are regular and scoop stretchers if elevators can be used and can accommodate the stretchers.
- FOB EMS will be in contact with Lobby to coordinate transport of patients from the FOB to Lobby and on to the staged transport area.

Fire crews that need Rehab shall report to the EMS floor. This function will be set up and run in accordance with Emergency Procedures Firefighter Rehabilitation C-85.

- Once a committed crew has worked through a bottle they, as a crew, shall report to the EMS level for rehab.
- Once cleared by rehab, they shall return to the staging area for reassignment.
- They shall do this for two bottles, where after their 2nd rehab, they shall be rotated outside the FOB to exterior staging for an extended break and resupply before reassignment.

Advancing the Fire Attack

The actual fire attack can begin once the line is charged and the effect of leaving the stairwell door open has been assessed. Keep the fire attack simple, apply firefighting basics to locate, confine and extinguish the fire while maintaining orientation.

The fundamental tactical objectives are the same whether you are fighting a fire in a High Rise Office or a High Rise Residential building.

- Forces should be directed towards protecting the hallways, corridors, stairs, elevators and other vertical openings while pressing the attack.

    - Protecting these will prohibit vertical spread and aid in evacuation efforts.
- Use the TIC to assess building features, fire and heat movement during the attack.
- All doors should be chocked as they are opened.
- A defensive posture can hold the fire line until a second line can be put into operation to support an offensive attack.
- Use the hose stream to displace ceiling tiles as you advance. This cools and allows for a visual of the plenum/cockloft.
- Proactively cool the upper areas, as high heat conditions are encountered during nozzle advancement, as well as direct the stream to the floor and side to side. This will allow for a sustained push, clear debris and reduce probability of flashover.

Any subsequent handlines stretched after the first may be positioned in a wide variety of locations depending on the needs and problems at a fire. At most operations, this second or Back-up line is positioned directly behind the first line in support of the Attack, following the path toward the seat of fire. The backup line is best attached and stretched from the floor below where the attack line was hooked up when the outcome of the fire is still uncertain. In a FOB, this will be the staging area floor. I.e. If the attack line was hooked up on the 14th floor, then the backup line will be hooked up on the 13th floor. By hooking up to the floor below the attack line, we have some degree of redundancy. The downside is this requires an additional length of hose. When the fire has a more definitive outcome one can hook up the second or more lines where circumstances dictate or allow.

Circumstances will dictate specifically where the second line should be placed. In a residential high rise with a common hallway the Back-up line should in most cases be directly behind the first attack line up to the point of entry. On the other hand, a commercial high-rise building might require something slightly different. Large open areas may require two lines to attack. If this is the case, they should be positioned in such a manner that each line could cover the other hose team if need be. With center core construction, each line may be sent in separate directions around the core, keeping in mind the potential for opposing streams when they wrap around and meet each other. Or, one line could create a static defensive position protecting the other hose crew while they roll up the fire around the core. Again, conditions will inform the tactics depending on the needs and problems of the fire.

It is imperative one or two floors above the fire floor are continually monitored for vertical fire spread and ensuring ventilation hatches in the stairwell are the way they should be.

Always keep the Incident Commander informed, especially when a sudden change of plan is needed. Concise, actionable Interior/Exterior communications will go a long way toward the interior and exterior crews helping each other coordinate the incident.

Do not develop tunnel vision. In some instances, it may be better to reposition attack lines to another stairwell. This could occur if the stairwell door is warped or expansion from the heat prohibits opening the door. Another instance would be if the main body of fire is near the point of entry or now beyond the reach of the attack line.

When it is necessary to reposition lines for an improved attack, go down a floor and cross to the other side and reconnect the lines. When the fire is beyond the control of initial attack methods, the following

options are available for consideration:

- Operate interior master stream appliance into the fire area from the stairwell on the fire floor.
- Flood the floor above the fire floor with hose lines operating from the stairwell. (This procedure is indirect at best and will be ineffective on hidden fire)

Support Group

The Support group is the next wave of firefighters to support the attack as shown in the Graph (Above). It is the balance of the 1st High Rise alarm that is not a part of the Recon/Attack Group, water supply or Lobby and the arriving 2nd Alarm.

Officers and their crews must be attentive to radio traffic and have situational awareness to assist the outcome of the incident. They shall report to Lobby with their gear and check in with the Accountability officer in preparation of assignment by the IC.

- If assigned to the FOB, the Support group shall ascend to the Staging floor utilizing the safest and most efficient means.
- Upon arrival, they shall check in with the FOB Command Aide for accountability purposes and then await assignment by FOB Command.

The FOB staging area should have fresh crews in place to be rotated with working crews. The objective of this is to maintain a constant application of water on the fire.

- A minimum of three Engine Companies and a Ladder support unit is recommended.
- No one should come to staging empty handed.
- A supply of SCBA bottles should be made available, enough to maintain the sustained attack and overhauling stage, or until the atmosphere is considered non-contaminated by FOB Safety.

Command can assign the Support Group to conduct:

- Search missions
- Evacuation
- Check Extension
- Forcible Entry
- Overhaul
- Whatever ‘The Job’ may call for

Use of Trucks shall be based upon incident need:

- If they may assist with rescue and life safety from the exterior with their aerials, that will be their first commitment.

- Consider use as a flying standpipe if there are interior standpipe problems.
- A coordinated transitional attack may be an option from the aerial while interior crews make their way to the fire floor.
- If there are no exterior operations for the trucks, the crews will join for staffing of the Support group.
- Ventilation, such as pressurizing stairwells, shall be considered.

The 2nd and following alarm complements shall implement Level II staging as described in Emergency Procedures Manual C-57. The Level II staging area shall be under the direction of a Staging Officer who shall report directly to the Incident Commander or Operations if an Operations section is established. All staged crews should be monitoring radio traffic and looking at Preplans if available on the MDT for incident familiarization purposes.

HVAC Systems

Through help of the building manager we must control the HVAC systems. We should leave this to the civilian entities who understand its operation. Ventilation systems can be a primary reason of fire and smoke spread if not handled correctly.

- We initially need to shut down the ventilation system. It is necessary to prevent the spread of smoke and causing intensification of the fire.
- Some ventilation systems are designed to remove smoke, most are not.
- We must work in conjunction with the building manager to determine if the HVAC system can be used for smoke removal on the floors above the fire and on the fire floor once it has been knocked down.
- Use of this in an attempt to assist the fire attack must be coordinated with the Building Manager, Lobby, the Incident Commander and FOB Command.

Ventilation

It is essential for the protection of occupants and a safer fire attack and search; that ventilation be accomplished. This must be in coordination with FOB Command and Incident Command. Premature ventilation may cause conditions on the fire floor to be detrimental to the attack forces.

In older Buildings, Ventilation can be accomplished by opening windows. This should be done on the windows on the leeward side (side the wind is not coming from) first and then the windows on the

windward (the side the wind is coming from) side. Any attempt at ventilation using windows should be tested one to two floors below to determine the effects of the wind.

In newer buildings, windows must be broken. If this is necessary, use an axe to glaze the window and then a pike pole to pull the glass into the building as much as possible. Prior to breaking the window, personnel and bystanders must be cleared from the area below. Coordinate this with Incident Command. Also, many newer commercial buildings have floor to ceiling windows. Caution must be used to mark off a broken vent window, so no one falls out in low visibility situations.

The initial attack stairwell must receive positive pressure ventilation; the Truck PPV can be used to pressurize a stairwell. It must be remembered that pressurized stairways do not remove smoke from the floors or hallways. It should be enough to negate the movement of heat and smoke into the stairwell. Ideally, evacuation stairwells should be pressurized as well.

If the stairwells are contaminated, a team can be assigned to the top floor and roof area. They are to open the hatch or roof door and the fan at the base of the stairwell activated. All other doors to the stairwell shall remain closed during this smoke removal period. The roof team will confirm when the stairwell is clear and then confirm when the door or hatch is closed. The stairwell will now become pressurized.

Structures taller than 15 stories should utilize an additional fan five floors below the fire area. The fan would be in the hall or occupancy with the force of air directed into the stairwell. This will enhance the pressure throughout the height of the stairwell.

Opening the door at roof level of an unpressured ventilated stairwell will increase the draft of that stair shaft. It will draw the fire, heat and smoke in the direction of that stairwell. When conditions are favorable, and authorization is given to vent in this manner, this top ventilation should improve conditions on the upper floors.

Salvage

Salvage operations are universal. In the event of a fire in a High Rise building, salvage operations will begin on the fire floor as practically as possible. The next area will be the floor below the fire floor. Water runoff from the fire floor can be removed down an unused stairwell or possibly down elevator shafts. Some restrooms in High Rise buildings have floor drains and/or you can break a toilet off at the floor and use its drain.

Tarps should be brought up to interior staging. Computers, personal items and sophisticated office equipment should be given priority in protection.

Extension / Overhaul

Common sense will be at a premium during this stage of the incident. It is also important that extensive overhaul not begin until an investigation is made to determine the cause of the fire. We will need to knock down the fire as best as possible and yet allow FIU an opportunity to do their job without completely tearing the place up. The following guidelines pertain to overhauling High Rise fires:

- Begin overhaul only after approval from Incident Command.
- Check concealed spaces for hot spots. Pay attention to the ceiling tiles and the plenum above. Suspended ceilings hide structural areas, utility chases and air handling systems. This presents areas where fire can spread undetected.
- Elevators will probably be safe to operate at this stage of the fire. It should be remembered that NO material that could rekindle be put in an elevator for transport outside.
- Any smoldering material shall be completely extinguished in the area where it lays.
- If the fire is knocked down, and the overhaul stage has begun, it is ok to hook up 1 ¾" line, provided it has a smooth bore tip, to assist in the overhaul.
- If the High Rise is a residential building, overhaul operations will be like those employed in a ranch house (only no tossing material out the window).

Communications

Communications will be problematic during a High Rise fire. In the event of an advanced fire, it may become necessary for Command to designate an officer to oversee Communications. It shall be the duty of the Communication Officer to find alternate methods of communication between on and off scene units.

- Radio traffic will need to be kept to a minimum, with brief actionable reports.
- Use face to face as often as practically possible, convey important accountability and tactical decisions on the air.
- In a large incident, Lobby will need its own channel.
- If the Incident Commander splits off the Operations function, they will need their own channel.
- Fire Communications can support Incident Command with larger base-station radios that are easily deployed. They could also call upon the county to access their emergency radio cache if portables are needed.
- Staffing the EOC should be a consideration dependent upon the size of the incident.

Appendix 1

Pre-planning, Drilling and Alarm Systems

The complexity of these potential incidents forces us to have preplanned premises to get ahead of the situation. Officers and crews should visit and examine the features of High Rise structures in their companies' district and a commitment to add High Rise evolutions to the rotation of drills.

- If a preplan is available for any High Rise in your first alarm district, you should become familiar with the sections that deal with standpipes, sprinkler connections, stairwell locations, mechanical equipment rooms, elevators, fire protection equipment and ventilation possibilities.

With alarm systems, members of the TFRD need to become aware of the difference between trouble signals and actual alarms of detection. The types of alarm detecting devices include, smoke, heat, water flow and manual pull alarms and each firefighter should have a working understanding of these concepts.

It should be incumbent upon officers and their crews, in a measure of crew cohesion and expert pride, to do this on their own as an exercise or after EMS runs and CFA's.

- High Rise training drills should be conducted regularly to allow firefighters and command officers the opportunity to become familiar with the High Rise firefighting operations. Drills should cover these important areas: incident command, firefighting and tactics including water supply, elevator operation, large area search, evacuation and management of occupants.
- This concept of preplanning should include other interesting structures or businesses or difficult or high life safety issue establishments. Check radio strength at different points of the building. Let Dispatch know for future premise history if it is poor.
- Be curious about your district.
- Interesting notes, such as how many 2.5" lines their standpipe can support, or cautions such as trusses can be referred to communications for MDT premise info inclusion.
- **These can be very dangerous operations. We need to train on them. The first time a firefighter does one of these evolutions should not be at an actual event.**

Appendix 2

High Rise Hose Pack and Bag

We will be using 50’ lengths of lightweight, kink resistant 2 ½” hose.

They will be stored in a flat load configuration with three straps to hold it in place.

It is suggested they are horseshoed over your SCBA for ascent to allow for a hands-free carry.

The High Rise hose bag will contain the following items:

- 2 ½” smoothbore nozzle with1 1/8” tip
- 45° elbow
- Inline pressure gauge.
- Lightweight wrench
- Spanners
- Door chocks

The above picture shows the hook up order on the standpipe. The inline pressure gauge goes on first. The ideal pressure we are looking for at the standpipe is 65psi. It will still work quite well at lower psi's, which is a reason we moved to 2 ½" hose with a smoothbore.

Next is the 45° elbow. It allows for a smoother turn from the standpipe to avoid a big kink in the line if the standpipe is pointed straight down. The hose then hooks on to that.

There will also be room for a small assortment of door stops, sprinkler wedges and Search marking materials.

Appendix 3

Stand Pipe Limitations

Courtesy Fire Engineering Most standpipe systems are designed for at least 500 gpm and often 750 gpm to 1,250 gpm. These volumes represent the number of hose lines that may be required to extinguish a fire in various occupancies. The largest flow designs apply to buildings that are not sprinkler protected, or where we can expect fire to quickly develop, especially in open-floor-plan office and professional occupancies. Residential occupancies generally have lower flow designs partly because of the compartmentalized design of the floors with fire resistance rated assemblies between units and the corridors. That is not meant, however, to diminish the need for reliable hose stream support when operating off a standpipe in a residential occupancy, particularly in older buildings that do not have sprinkler protection.

It can become impractical to attempt to deliver enough water through a single back-fed hose valve to support more than one operating hose lines. Such limitations severely limit crews' simultaneously performing main fire attack and advancing into exposure floors to cut off extension. It is unsafe to

commit crews to positions where they are connecting and advancing three or more hose lines into conditions where they are expected to encounter fire while giving only the standpipe enough water support to supply one or two of those hose lines at a time.

Departments that rely on a 2 1/2” wye for the attack and backup line deployment can run into certain problems. The wye is from a single supply line from a single outlet. If problems were encountered at this connection, say the pressure regulating system failed miserably to provide an adequate flow, both the attack and backup line would be in jeopardy. Also, what if the line supplying the wye burst and with it went all our water? These wyes are a tool in the toolbox and if the attack and back up lines are not run solely from the single 2 ½ wye, their use should not be limited. It may also be used later in the overhaul stage where you can attach a 1 ¾” wye on the 2 1/2” wye to support use of 1 ¾” hose with a smooth bore nozzle.

Preplanning standpipe flow and having the information on the MDT will be a necessity to understand our capabilities before the incident even begins.

Appendix 4

Building Design Features

Courtesy of Chief Jerry Tracy and Asst. Chief David McGrail

The most common framing systems used for High-Rise buildings utilize either concrete or structural steel as the basis for forming the building skeleton. Both types of construction use vertical interior and exterior columns to which the horizontal support, girders are attached. The girders span the horizontal distance between the columns and are used to support structural beams. These girders and beams will in turn support the floors. Although there is a difference in the materials used for the structural elements in a reinforced concrete or steel structural frame, they perform the same function of support.

Construction designs for High-Rise buildings are usually based on the concept that structural integrity of the building must be sufficiently maintained through any potential fire. In keeping with this concept, the principal components that comprise a High-Rise structural frame are required to have a high degree of fire resistiveness, but under prolonged exposure to sufficient heat, it is possible that failure of components could occur.

The building “Skin” is considered the exterior walls and windows. In the course of construction once the frame and floors of a structure are complete the skin is now mounted to protect the spaces from the elements and weather conditions. As the structure comes together it will now contain the products of combustion should a fire break out within the confines of its spaces.

The exterior walls of modern High-Rise buildings are usually lightweight, prefabricated walls. They are non-load bearing and referred to as curtain walls. A complete curtain wall consists of a panel with finished surfaces and a means of attaching it to the building frame. The most common method of

attaching curtain walls to the building is by bolting them to clips that are attached to the structural frame or floor slab. This space between wall and structure is an avenue for extension.

Generally, stairwells in High-Rise buildings are usually built into the core and may be supplemented with additional stairwells on the outer perimeter of the structure, based upon the requirement setting limits for a specific distance of travel to each exit. This will vary depending on the occupancy type of the building. Stairwells and exits in High-Rise buildings are not designed to handle the total occupant load simultaneously. Additionally, the number of useable stairwells may be reduced by heat, smoke or fire department operations. This is one of the main reasons that total evacuation of building occupants during a High-Rise fire can be impractical.

There are two basic types of stairs, the return-type and scissor-type stairs. Return-type stairs entry and exit is made from roughly the same location on each floor. While scissor-type stairs consist of two separate sets of stairs, which cross each other within a common shaft. In this type of stair arrangement, the stair access point for each set of stairs in the shaft is at opposite locations on adjacent floors. Some scissor type stair arrangements will only service alternate floors with each set of stairs in the same stair shaft.

Center core building design features office or living area surrounding a “core” containing stairwells, elevators and utilities. The fire can wrap around the corridor and behind crews on hose lines. This situation can also occur in large open areas around the core. If the potential for this exists, operate two lines; one to attack the fire and the other to prevent the fire from wrapping around the core.

Some High Rises in Toledo have an exterior curtain wall of glass and/or aluminum. In some cases, there is a gap between the main structural frame and the exterior curtain wall which can be a path for vertical fire spread. It is this and auto-exposure, or exterior lapping of fire to the floor above, are the main means of fire extension that should concern fire forces and be scouted for early and often.

Split bank elevators are elevators where separate shafts serve differing levels of the building. One Government Center has these. They have two banks of elevators. One services floors 3 through 13 and a separate bank services floors 14 through 22. The section from the ground floor to the 14th floor for that bank is called a blind hoist way. In these situations, for fires above the 16th floor, it would take some Recon to assure the safety of their use, but the bank that services floors 3-13 could be used to the 13th floor and then walk the rest of the way up to staging and the fire floor.

Appendix 5

Command Posts

There are two schools of thought to setting up a Command Post; in the lobby or an exterior location. Each have their pro's and con's but ultimately it is up to the IC to choose the spot best suited to the incident. Once the command post has been established, it shall be communicated to all responding companies.

Locating the command post in the lobby has advantages such as immediate access to security, management personnel, information and the Lobby function. Radio traffic will be minimized with this situation allowing the IC to concentrate communicating with FOB Command. This is best in a smaller incident. But if it is a larger incident with crowds of staged and working firefighters and evacuees, communication will be made difficult due to the noise and tumult, making an interior CP a much less beneficial choice. The lobby is also a poor choice when fire or products of combustion threaten the location.

Newer High Rise buildings are sometimes equipped with a Command Center, which is usually near the lobby. This is often the ideal CP location, as these centers often provide excellent communications, video feeds and the needed work space for command activities.

The exterior command post has its own advantages. One being able to monitor the exterior of the building allowing continual evaluation of the fire. Also, it facilitates interagency communications. It will be much easier to interact with them at a clearly marked exterior CP. If it's a big enough incident, we will most definitely be dealing with interagency entities so access to them must be accommodated. When choosing an exterior spot look for the most convenient, advantageous and safe location with at least two sides of the fire building in sight.

Lessons learned after the fall of the twin towers point to the fact that command post, in the event a High Rise fire is due to a plane, bomb or terrorist event, serious consideration must be given to staffing the EOC. Incident operations data should be managed and broadcast to command and control centers at remote locations so that information is secure and accessible by all personnel needing the information.

Also, command posts should be established outside the potential collapse footprint of any building which shows evidence of large multi-floor fires or has serious structural damage. A continual assessment of building stability and safety should be made in such emergencies to guide ongoing operations and enhance emergency responder safety.

To summarize, since an IC will have to perform many tasks and wear many hats initially, it might be best to start out in the lobby. If the incident remains smaller and manageable, the IC can probably remain there. But if the incident gets larger and more complex, especially with potential interagency involvement or serious structural damage, it is best to set up a command post on the exterior.

Appendix 6

Evacuation

Success in clearing a building in an emergency can be characterized in two quantities: the time people need to evacuate and the time available to them to do so. Depending on the time of day and if it's a commercial or residential High Rise, evacuation could be a simple task to a downright complex and challenging situation. As soon as possible we must begin the process of evaluating the needs for controlling evacuation.

If it is a large incident, numerous floors may have already begun self-evacuation. This may cause a mob scene or large crowds of excitable people. While the Attack Group assembles to ascend, they and Lobby should be trying to gather information about the fire and use the resident's knowledge of the building to direct the firefighters. The ascent may be difficult going against the human tide.

- Once Recon has decided upon an attack stairwell, it must be declared to the Incident Commander and be secured and maintained for both pressurization sake and ease of fire work. Ideally, this stairwell should have roof access for ventilation purposes.

Lobby should then use what they can, such as a PA system, to steer the evacuees to the remaining stairwells dedicated to evacuation.

- An Evacuation Stairwell Team may need to be dedicated to directly manage these stairwells and the occupants within them.
- When people are in the stairwells, it is important to keep them moving.

Any attempt to totally evacuate one of these buildings would severely and negatively affect fire suppression operations.

- The fire floor must be totally and systematically searched and evacuated as soon as possible.
- Next, search and evacuation of the two floors above the fire and then two floors below will also be required.
- We are clearing out the FOB work area and above it, in case of potential extension.
- These occupants should be moved below the EMS Sector.

For fires involving and contained to one room or floor, occupants in other than the two floors above the fire and FOB work area should shelter in place.

- If this is a large spreading fire in need of an extended attack, then those who have been sheltered in place will be evacuated as soon as the above higher priority evacuees are on their way out.
- It is understood these actions can only be accomplished as the resources of firefighter's available permit.

Once exited, occupants must not be allowed to just gather in the street around our fire operations. TPD

needs to be involved with this process.

- An evacuee staging area safely away from the incident needs to be figured out.
- Occupants should be monitored and directed by TPD.

Once occupants have assembled, begin to create a roster of these occupants to determine who has been accounted for. This roster should include their name, what floor they were on, and the time they arrived at the evacuation area.

Appendix 7

Search and Rescue

Extent, distance and logistic factors make Search one of the more difficult and complicated operations in a High Rise fire. Depending on the magnitude of the incident and occupant numbers it may be impossible to help all people everywhere. Search operations must be based upon a sound size up.

First, crews must identify who needs rescue and who doesn't. There will be those who are in critical situations who will need immediate rescue and those who are unaffected by the incident who would be safer to shelter in place. Overall, this operation dovetails with evacuation in its priority.

The following three tasks are the most important Search operations at a High Rise fire:

- The fire floor must be totally searched and evacuated as soon as possible.
- The attack stairwell up to the roof must be cleared. Some buildings have automatic locking doors and people may become stuck in the stairwell above the attack, which will be like a chimney flue to them.
- Next, search and evacuation of the two floors above the fire and then two floors below will also be required.
    - We are clearing out the FOB work area and above it, in case of fire extension.

Given the above general guideline of search areas, you must now prioritize as to which areas create the greatest danger to occupants. Immediate Search and Rescue will start with visual priority, what you see and can manage. Next, we must aggressively search the egress, such as door areas, landings, and hallways. Case studies of high rise fires repeatedly show that many people will call 911 claiming to be in dire straits. While these reports cannot be dismissed, crews on scene must correlate information gained from 911 calls with their observations and reports on the fire ground to ascertain who is in the greatest danger. Strong consideration should be given to areas where multiple calls are being made from.

Search crews will have to break the three essential Search tasks into manageable chunks, but at no time should a single crew be split up and sent to different floors. While clearing the FOB is essential to support

of successful fire-floor operations, potential victims beneath the fire floor are typically in minimal to no danger and should be able to self-evacuate with direction from fire crews. For this reason, the focus of search should be the fire floor and floor above. Unlike a house fire, the attack crew may not be able to “search as they go” while advancing towards the seat of a High Rise fire so it is imperative to assign a search crew to the fire floor.

Search, in any of its forms, must be based on a solid action plan that incorporates sectoring and accountability of all team members. Search teams need to have a backup rescue/removal crew in place. It must be decided, depending on the situation and goal, that if the searchers are to remove the victim or if it will be the job of the Back-up or RIT crew, especially in the case of a downed firefighter. Coordination with a hose line for protection is highly recommended. The use of the Thermal Imaging Camera (TIC) as a tool is necessary. These types of searches should never be done without one.

The Risk/Reward formula must be at the front of the Search teams mind. They must not get too far out ahead of any hose line. If they are searching a floor with limited visibility and no heat they can extend a little. It will depend on the task, debris, air management and actionable information as to how far they should go given each unique situation and task. Due to the grave circumstances that can result from High Rise Search and Rescue, stretching out more than 50 foot beyond the safety of a hose line or immediate egress is extremely risky and shall only be used in the direst and confirmable of life safety or RIT circumstances.

Residential Occupancy Search Deployments

Search in a residential occupancy will first focus on the affected living area. The apartments adjacent to, and above the fire apartment must be the second priority. It is recommended to have a crew(s) go down the right side of the hallway and another crew(s) go down the left side and clear rooms on their respective side of the hall. The oriented person remains by the door from the hallway.

We cannot think of these situations as we do in a Residential Type 5 constructed building. These large center hallway occupancies have many units off each side and require the team to be oriented. The officer shall use the TIC to remain oriented and direct crews to search individual apartments. In the event of an emergency, the oriented man can lead the evacuation with either the camera or orientation to the wall.

If smoke and fire get out into the hallway we will have no choice but to try and protect the affected occupants in place until IDLH conditions have subsided or until we can access these apartments and complete a search. All efforts should be made by search crews to isolate the fire room by closing the hallway door, this operation not only buys time for the search crew and potential victims, but will prevent a blowtorch effect from overtaking the search and/or attack teams.

Ultimately all areas of the affected fire floor will need to be searched. Forcible entry may be required. Having a master key before starting the search operation would be very helpful, but should not be counted on. Before forcing entry to the suspected fire apartment, it is imperative that crews force a door on the opposite side of the hallway so that if fire blows out the door and it cannot be shut, crews can evacuate to the relative safety of another apartment while awaiting rescue. Considering modern fire research and how flow paths can affect fire ground operations, doors should be only damaged as little as possible to open the door. If we want to maintain the ability to protect the occupants and our firefighters during search, we must be able to reclose the door behind us. It will only do so if as much integrity as possible is left in the door.

Consideration must also be given to mark already searched areas. It can be done with grease pens, paint stick markers, scene tape, an “X” in the door made with your axe, commercial door search markers or large crayons. Whatever is being used, crews should know going into the assignment what it is and have the ability to create the marks themselves.

Open Floor Plan or Large Commercial Structure Search

Search in a commercial structure, especially one with an open floor plan such as churches, gymnasiums, warehouses, big box stores or open office concepts in a high rise creates an exceptionally challenging scenario for fire operations. Crews will need to perform large area search operations off a hose line or using a search rope. Fire attack companies with their hose streams and crews pulling ceiling checking for extension will create debris piles, visibility and entanglement problems that crews must deal with. These searches are difficult at best and require effective team leadership, discipline and rope maintenance.

Before committing to this, you must ensure it is necessary. You must consider the viability of victims and the Risk/Reward formula. Use for RIT rescue makes sense, since firefighters have added protection from the environment it will buy time to make an effective rescue successfully. Try to incorporate PPV, if situation safely allows, into making the visibility and survivability greater.

There are two styles of Large Area Search; a rope assisted search, or a hose assisted search. Rope assisted search techniques are often employed more remote from the seat of the fire such as the floor above, on the opposite side of a warehouse or while working under the protection of a charged hose line. Hose assisted search procedures are often employed while operating in the fire area without the protecting of a separate attack line.

Rope Assisted Large Area Search:

- Personal webbing bundle and carabineers
- Utility Rope bag, two carabineers, on one end for anchor and other end for hooking to officer.
- Red rope throw bag
- TIC
- Flashlight for each firefighter and hand tools
- Hydra-Ram
- RIT pack

This is going to be a situation where you are going to have to do the best you can under the conditions you have. The Search team shall be at least 4 firefighters.

- The main rope is the utility rope and should be anchored to a point outside of the fire area or even outside the structure.
    - This rope can be anchored in the stairwell, to a railing, etc.
- One firefighter will be the “CONTROL FF” and serve as the oriented person. The CONTROL FF will remain between the search team and the exit to guide them out.
    - The CONTROL position will maintain some tension on the rope and will advance into the search area while maintaining contact with the rope as he begins to lose voice or visual contact with the search team.

        - A wide open or patterned search must be decided upon before committing to the search.

    - The Control FF should have a flashlight to serve as a beacon for returning firefighters. The “Henry Light” from TFRD RIT bag should be placed at the doorway for the same purpose.

    - The Control FF should also maintain control of the RIT bag.

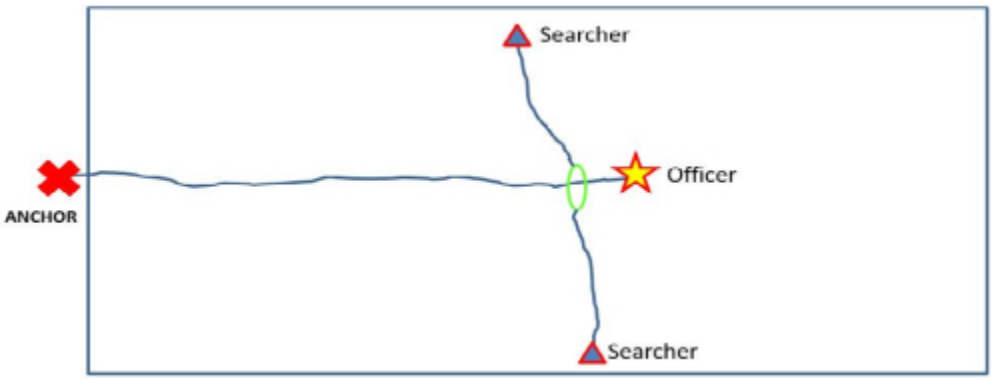
- The officer will click in with a carabineer to the end of the tether and have point, directing the searchers using the TIC. They will also carry the RIT bag.

    - Operate the TIC looking for room layout, holes in the floor, open stairwells or shafts, the seat of the fire or fire extension, keeping a PAR count, and looking for fire victims or a down firefighter.

    - Always allow all members of the Search crew to view the area being searched with the TIC prior to entry. A quick visual inspection of the room layout is all that is needed.

- The other two firefighters, using their webbing bundle, will click to the tether on one end and their SCBA on the other using carabineers. These searchers can be sent laterally away from the main tether to explore precise areas.

    - Both the left and right searcher shall clip to the tether with the same carabineer so that they are tied together at a single point on the reference rope, therefore they don’t pull the rope into a Z pattern and if an immediate withdraw is required, they are both at the same spot.



The RIT pack can be used for a victim but it is mainly for firefighters if there is an air problem.

Maneuvering the far anchor point (officer spot) will take a little skill and thus some practice. Since the webbing bundle only gets the searcher 20’ from the reference line, it is possible in a large/open area search, the far anchor point must move so the searchers can cover the entire area. This may require that the exit anchor point also move such that a grid pattern is performed rather than a sweep pattern. When there is furniture, office cubicles, support columns, debris, etc. this can be difficult too impossible to conduct quickly or completely.

Hose Assisted Large Area Search

The concept of working off a hose line is like working off a rope but with a few differences.

- There will be a dedicated firefighter on the nozzle whose sole responsibility is the nozzle and protecting the Search crew.
- The officer will be tethered several feet behind the nozzle team using webbing and carabiner. They are still the oriented person and not only directs the searchers but the nozzle firefighter using the TIC.
- The two searchers will use webbing bundles to remain secured to the hose line. These bundles can be connected to create longer lines. If these are unavailable utility rope can substitute.

Final Search

With High Rises, Low Rises and large Commercial structures, Search should have an added third phase. We are all familiar with the Primary Search, a quick and thorough as possible search during initial fire conditions, and the Secondary Search, a slower more deliberate search as fire conditions have improved. In these cases, a Final Search is needed. This Final Search is a redundancy that should be conducted as a Secondary Search after the incident is well in hand. It assures that absolutely no occupants have been left unaccounted for and a final confirmation of no hidden fire anywhere in the building.

Appendix 8

Elevators

Modern elevators are designed to operate in three different modes: Automatic, Independent Service and Fire Service. The TFRD SHALL NOT use elevators that are not equipped with Fire Service function or those that have not been captured by TFRD personnel during a potential fire incident.

Automatic Service is the normal operating mode of an elevator system. Crews that use elevators in Automatic Service at a fire incident not only have to compete with occupants, but place themselves at great risk.

- Elevators must respond to all floor calls in one direction, before reversing travel. This can put crews at or above the fire floor.
- The doors automatically open upon arrival and hold open a predetermined time.

Independent Service is designed for construction, maintenance crews and movers to allow a single operator to seize use of the elevator. While allowing for more control, it is not designed for fire service use because the doors open and stay that way upon arrival to desired floor.

Fire Service is designed is designed solely for us to provide us a degree of safety not obtainable by the other two service modes. Fire Service has two phases which firefighters MUST understand and implement

if they desire to capture and use the elevator safely and properly.

Phase 1 Fire Service is Recall. When elevators enter Phase 1 they bypass all floor calls and are immediately recalled to the lobby. Upon arrival at the lobby, the doors will open and power will automatically be shut off. There are two ways to attain this phase; Automatically or Manually.

- The buildings fire alarm system initiates Automatic Recall. When the alarm is activated, the elevators automatically recall to the lobby. If the alarm detects smoke in the elevator lobby, some systems have a Plan B where the elevator will recall usually to the next highest floor. Not all buildings have this feature, so crews shouldn't assume there isn't a fire if the elevators aren't recalled upon their arrival. Some buildings, such as One Government Center, where every elevator does not serve all floors, all elevators may not be recalled. If elevators are not automatically recalled during a CFA, crews must initiate Manual Recall.

Manual Recall is initiated by firefighters by placing the fire service key into the switch IN THE ELEVATOR LOBBY and turning it to the "ON" position. At this point, all elevators in that bank will recall.

- The fire service switch in the elevator lobby will be either a 2 or 3 position switch.
    - Two position switches are generally found with older elevators and will have an "ON" and "OFF" position.
    - Three position switches will have "ON," "OFF and "BYPASS" or "RESET" positions.

- When elevators are placed in “BYPASS” or “RESET,” it returns the elevator system to Automatic Service, despite any alarms that may still be activated.
    - This feature is designed to allow occupants to reenter the building after the fire is knocked down and crews are performing overhaul where residual smoke may still be found inside the structure.

It is imperative once elevators have been recalled during a High Rise fire to account for all of them and verify they are void of occupants.

Phase 2 Fire Service is Elevator Car Capture. To initiate Phase 2 Fire Service, the elevators MUST first be placed into Phase 1 Fire Service, either Automatically or Manually. It is good practice to turn the lobby switch to the “ON” position, even if the elevators have automatically recalled. Perform a shaft check before entering the chosen elevator car, in fact it is wise to check all shafts in the bank before use.

To fully place an elevator into Phase 2 Fire Service, the firefighter must enter the car and place the key into the fire service switch INSIDE THE CAR ELEVATOR. This witch may be either a 2 or 3 position switch.

- A two-position switch will have “ON” and “OFF” positions.
- A three-position switch will have “ON,” “OFF,” and “HOLD” positions.

To “capture” a car, the firefighter will turn the key to “ON.” At this point, the firefighter can request their desired floor, but they must hold the “DOOR CLOSE” button until the doors are completely closed before the ascent will begin.

Upon arrival at the requested floor, the elevator will stop but the doors will not open unless the operator

pushes AND HOLDS the “DOOR OPEN” button until the doors are completely open. The doors will not remain open until they are fully opened to ensure protection of crews if the elevator has stopped on a floor that has fire or smoke present.

- If fire service switch is a two-position switch, they can exit the car and begin their investigation.
- If the fire service switch has three positions, the crew should turn the key to “HOLD” and remove it. This ensures that no one else can take their elevator and it will be waiting with doors open upon their return.

To send the elevator car back to the recall lobby, crews should turn the fire service key to “OFF.” It is important to note that this function will only work properly if the doors are completely open and stay open.

- **CAUTION:** If the key is turned to the “OFF” position before the doors are completely open and crews exit, the elevator will be rendered inoperable and will require an elevator mechanic to put it back in service.

If at any time the “Fire Service,” “Maltese Cross” or “Fire Helmet” indicator light is flashing, you need to exit the elevator as expediently as possible. This is a warning that smoke, fire and/or water has been detected in the elevator hoist way or machine room and the elevator will very soon shut down.

Single Car Phase 2 Fire Service, where just one elevator in the bank is captured by TFRD crews might be advantageous at EMS runs. This would ensure timely response for the Medic Unit or to prevent waiting for an elevator when trying to transport the patient.

- To do this, crews must first manually recall elevators by inserting the key into the fire service LOBBY SWITCH and turning the key to the “ON” position.
- Once all the cars have been recalled, remove the key while the switch remains in the “ON” position.
- Choose the elevator that suits your needs, insert the key INSIDE THE ELEVATOR you chose and turn first to the “ON” position, then turn to “HOLD.”
- Remove the key, exit the car and insert the key back into the LOBBY SWITCH, turn the key to “RESET” and hold for 3 seconds then turn the key to the “OFF” position.

Remove the key from the LOBBY SWITCH. You have now returned all other elevators in the bank to Automatic Operation. Crews can enter the car that they have captured and re-insert the key INSIDE THE CAR, turn it to “ON.” It will now operate it as they would any car in Phase 2 Fire Service.

Yes, it sounds bizarrely complicated when you read it this way, but if you spend one quick session with an elevator working with it you will see it is easier than it reads.

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References:

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Averill, J. (2013). High Rise Fireground Field Experiments. National Institute of Standards and Technology. Bush, R. (1996). Operational Considerations for Highrise Firefighting. Emmitsburg: FEMA.

Coleman, J. High Rise Fire Procedures. TFRD

Hall, J. (2013). High Rise Building Fires. Quincy, MA: National Fire Protection Association.

McGrail, D. (2007). Firefighting Operations in High Rise and Standpipe-Equipped Buildings. Tulsa: PennWell.

Routley, J. G. (February 1991). Highrise Office Building Fire One Meridian Plaza. Philidelphia: FEMA.

Sexton, R. (2006). Incident Command at Highrise Operations. Washington DC: US Department of Homeland Security.

Smith, J. P. (2008). Strategic and Tactical Considerations on the Fireground, 2nd ed. Upper Saddle River: Pearson.

Sunder, S. (2005). Final Report on the World Trade Center Towers. US Government Printing Office. Washington DC.

Tracy, J. The High Rise Hand Book. FDNY

Various. (2002). NFPA 1710 Standard on Fire Department Deployment and Operations. National Fire Protection Association.
