PHOENIX REGIONAL STANDARD OPERATING PROCEDURES	
Policy Name: **MID RISE OPERATIONS**	Policy Number: **M.P. 202.20**
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Related Policies: 201.01A, 202.04, 202.05, 202.05C, 202.12E	
Other Reference:	
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PURPOSE

The purpose of the procedure is to describe the unique operational considerations that mid-rise structures and occupancies pose for fire operations. These considerations are specific to these types of structures and differ from the more traditional apartment buildings/complexes as well as from high rise buildings. These considerations come in the form of construction materials and building practices, interior layout, fire protection systems, and building systems. These structures require specific operational attention for initial arriving companies in locating the fire, attacking the fire, and protecting and/or removing endangered occupants. These considerations present safety concerns that are specific to these buildings and challenge standard safety practices for other occupancy types.

Preplanning is critical for successful operations in these buildings. Because of the broad spectrum of construction practices, size, and configurations it is necessary to expect the unexpected.

As in any other structure, the ability of the Phoenix Fire Department to extinguish the fire as quickly as reasonably possible improves the conditions for any possible victims and the safety of the firefighters. All firefighting operations in mid-rise buildings should be built around this fact.

MID-RISE DEFINITION

For the purposes of Phoenix Regional Standard Operating Procedures, a mid-rise is defined as anything below 75' in height and greater than 3 stories. The City of Phoenix currently has residential and commercial mid-rise buildings in our city and in our neighboring communities. Mid-rise structures have different fire protection system standards than high-rise structures. The mid-rise fire protection standards in the fire code are dependent on construction features and elements hence is not the same across all mid-rise buildings.

MID-RISE SIZE UP AND FIREGROUND FACTORS

Preplanned information and a thorough size up are critical to early success for fires in mid-rise buildings. There are many unique critical factors for mid-rise structures that impact fire attack, rescue operations, and firefighter safety. Early recognition of the fireground factors and appropriate action to limit the fire growth and the impact to victims is fundamental. The size up should include all means of rescue and access from the most advantageous position. Fire conditions should be assessed for the best position of a fire attack. Size up should also include the recognition of structural involvement as early as possible with a pessimistic perspective.

Size-up in mid-rise structures should begin with the standard, fundamental size-up questions, and drive to the recognition of the unique challenges presented at each individual incident.
The critical factors for mid-rise include but aren't limited to:

- Life Safety
    - Residential mid-rise structures can have high density occupancy
    - Rapid evaluation of removing the fire from the victims or the victims from the fire is critical and should not delay an effective fire attack
    - Commercial mid-rise occupancies should be evaluated for the presence of life safety and managed as an action of opportunity and should not delay an effective fire attack
    - Rescues may be required from exterior positions dependent on the conditions and the ability of victims to escape
    - Many mid-rises have roof top common spaces that have the potential for high population density at any given time

- Fire and Smoke Conditions
    - Nothing showing means nothing
    - It is likely to have a serious fire with no external signs on arrival
    - Ventilation limited conditions are a significant possibility due to tightly sealed buildings
    - Recognition of building openings are critical in measuring the flow path potential
    - Wind driven conditions are a distinct possibility of floors above ground level
    - Determination of smoke and fire conditions in common hallways and stairwells is critical in determining the life safety impact and difficulty of a fire attack

- Access
    - Mid-rise structures do not typically have lobby level, centralized entrance that provides access to the entire structure
    - Mid-rise structures typically have multiple entrance points for different geographical areas of the building

- o Not all access points and stairwells will have standpipes or sprinkler control systems
- o Evaluate the presence of exterior access points from balconies via aerial apparatus
- o Floor access can come from multiple points
- o The fire code does not require the availability of keys or key fobs for all areas of the structure
- o The fire code requires keys be present for only these places:
  - Pools
  - Utility/Mechanical/Electrical rooms
  - Fire sprinkler riser room
  - Fire alarm control panel rooms
  - Stairwells
  - Roof access
  - Non-standard elevator keys

- Building Systems
  - o Mid-rise structures typically do not have a Fire Control Room as in high rise buildings
  - o A fire alarm panel is required in all new construction since 2002, and are typically located at the main entrance, in and around the building management offices
  - o Some older mid-rise buildings do not have a standard fire alarm panel
  - o There may be no fire alarm panels or displays in any exterior or remote entrance points to the building
  - o Mid-rise structures built since 2002 are required to be sprinklered
  - o The location and number of sprinkler heads is determined by the construction methods and features of the specific building
  - o Mid-rise buildings do not typically have fire pumps unless unique building or water issues are present
  - o Mid-rise buildings typically use city water pressure for the wet sprinkler systems and for the standpipe systems (when a combination system is present)
  - o Standpipes may not be present in every stairwell
  - o Standpipe supply connections may be at one specific location or decentralized depending on the footprint of the building
  - o Standpipe connections may be present in interior hallways due to the length of the hallway or the distance from the stairwell standpipe connections
  - o Some standpipe connections can be up to 200' apart depending on the sprinkler system in the building
  - o Fire department connections (FDC) and *interior* standpipe connections may have KNOX locking caps in place and require the "dog bone" keys for access

- Wet standpipe systems with city water pressure above ground level may have inadequate water volume and pressure to mount an effective fire attack
- Elevators in mid-rise buildings may not have centralized elevator monitoring in the lobby
- Elevators may not recall in all areas if alarm occurs in a specific location
- Mid-rise buildings typically do not have floor and stairwell pressurization or smoke evacuation systems
- Smoke detectors are typically found in residential units and at the elevator lobby(s)
- Automatic closing fire/smoke doors can be present in long hallways that are initiated by the fire alarm
- Each residential unit will typically have independent HVAC systems that are not tied to the building systems
- Commercial mid-rise buildings may have centralized HVAC systems with central monitoring and/or control
- Security systems are common and can have multi-layered approaches requiring keys or a key fob for access from the exterior and then onto individual floors and units
- Stairwells may not connect to all floors depending on the footprint of the building
- Roof access is required however not standard in location
- Gate arms and barricades leading to parking garages may be present and are sometimes added after final construction inspection

- Occupancy type
  - Residential mid-rise occupancies typically have an interior hallway layout with independent units on both sides of the hallways
  - Some residential mid-rises have multi story/level units
  - Residential units can be configured in many layouts with open floor plans
  - Commercial mid-rise occupancies have multiple configurations ranging from center hallway to open floor plans
  - Many mid-rise buildings have a combination of business on the lower level and residential on top
  - The lower level may not have interior communication/access to the upper levels

- Building construction
  - Mid-rise buildings have many different construction types
  - Modern residential mid-rise occupancies combine masonry and concrete in the lower level and wood framed construction in the upper levels
  - Wood framed mid-rise structures are combustible and the structural integrity will erode if the fire extends into the structure

- o Modern residential mid-rise occupancies can have multiple roof types depending on the construction methods
- o Residential mid-rise units can range in size from small (< 1,000 square feet) to very large (> 3,000 square feet)
- o Overall building size can have a large impact on operations as well as large number of occupants
- o Some buildings take up entire city blocks in size
- o Commercial mid-rise occupancies can have a more standard steel and lightweight concrete construction closely related to high rise construction
- o Modern mid-rise buildings are sealed tightly and resist exterior/interior air exchange to improve energy efficiency for cooling
- o Some mid-rise buildings have exterior opening window or doors however not all
- o Many mid-rise buildings have underground parking directly beneath the overall footprint of the building
- o Many mid-rise buildings have recreational spaces on the roof including pools, recreation rooms, and bars

- Resources
  - o Dependent on the smoke and fire conditions and the life safety potential, a rapid determination of the required resources is necessary
  - o Resources should be considered for external rescue and access
  - o It will be necessary to appropriately support the fire floor for fire attack and rescue, the floor above for rescue and fire extension, and the critical exposures for loss control
  - o Consideration should be given for staging resources close enough to the building and access points to decrease the in transit time and to not congest key tactical positions
  - o It is possible to develop an incident organization with significant complexities and the utilization of branches should be considered

STRATEGIC LEVEL CONSIDERATIONS

As in most fireground scenarios, the better the decision making and initial actions at mid-rise fires from the beginning, the more likely of the most positive outcome. Effective evaluation of the incident conditions and the ability to locate the fire as quickly as possible are foundational to effective operations. A pessimistic evaluation of the required resources to manage an effective fire attack and provide for the rescue or isolation of victims, on potentially multiple floors, is critical.

A focus on locating the fire as early as possible allows for the most effective identification of the critical tactical positions. Effective sectorization improves the span of control, supervision of

critical work, and command safety. Clear functional or positional sector assignments will improve the work outcomes and the safety of the firefighters working.

To execute the possibility of exterior rescues, apparatus placement becomes a critical consideration. The ability of aerial ladders, platforms, and ground ladders to access areas with rescue situations requires the consideration of the making those apparatus locations a priority. It will be necessary to provide access for multiple ladder companies to make simultaneous rescues when necessary, and search from exterior access points. These locations are also a consideration for access to initiate a fire attack if interior access is delayed.

Exterior aerial apparatus should also be considered for standpipe operations if an interior attack is delayed, or interior conditions won't allow safe operations with hose stretch distances and SCBA air consumption. In these instances, effective water supply, appropriate hose and nozzle selection is critical. The critical positions that must be considered include:

- *Exterior rescue*
  - Determine the location and means of removal
  - Determine the resources required for rescue
  - Coordination with interior fire attack or search teams
  - Coordination with secondary needs for treatment and transportation

- *Fire floor(s)*
  - Determine and monitor the fire attack stairwell
  - Determine and monitor evacuation stairwell based on conditions and access
  - Determine fire occupancy(s)
  - Determine structural involvement
  - Determine if the fire is in spaces between floors and attic/cockloft
  - Determine if wind driven conditions are present
  - Determine impacted exposures on fire floor
  - Recognize possibility of cold smoke situations with fires extinguished by the sprinkler systems prior to fire department arrival
  - Recognize possibility of stack effect conditions with smoke well below the fire impacting life safety and egress
  - Coordinate an effective fire attack with appropriate water volumes
  - Rescue profile and best actions (*protect in place or rescue*) determined by conditions
  - Establish and monitor effective water supply to fire floor
  - Determine the need for ventilation and smoke management
  - Establish and monitor safe refuge for fire attack and search companies
  - Determine resources needed to effectively complete the tactical objectives and facilitate effective air management

- *Floor(s) above*
  - Rescue profile and best actions determined by conditions
  - Determine fire extension
  - Determine structural involvement
  - Determine if wind driven conditions are present
  - Confirm and monitor evacuation stairwell based on conditions and access
  - Monitor effective water supply to floor(s) above
  - Establish and monitor safe refuge for companies working on floor(s) above
  - Determine resources needed to effectively complete the tactical objectives and facilitate effective air management
  - Large area, targeted search
    - Room by room or unit by unit search in areas that were exposed to smoke and heat
    - Fire control has been achieved and ventilation and checking for extension are in progress
    - Consider multiple crews in attack teams
    - Allow for sufficient time to complete
    - Should not be confused with a primary search to achieve an all clear
    - Should not be conducted with smoke and fire conditions present (IDLH) without hose lines or the use of SCBA's
  - Human factors
    - Occupants may not shelter in place
    - May attempt to exit the building floor via most familiar routes
  - Clearly identify attack and evacuation stairwells from each floor

The recognition of secondary tactical positions to support the initial fire attack and rescue efforts includes:
- Triage
- Extrication
- Treatment
- Transportation
- Ventilation
- Building systems
- Occupant Services

TACTICAL LEVEL CONSIDERATIONS
Effective tactical level (sector) management is the balance of decisive action to extinguish the fire, protect life safety, and effectively manage the safety and welfare of the operating crews. This includes clear plans to establish an effective fire attack with adequate water, remove and/or protect the victims, or support these actions from other positions. Sector management should include the following considerations:

- Development of a plan for exterior rescue with adequate resources that are capable of these functions
- Development of a plan to extinguish or support the extinguishment of the fire as quickly as possible
- Development of a plan to manage or support the rescue and/or protection in place
- Development of a plan for thorough fire extension investigation in all exposed areas
- Establishing and maintaining effective access
- Establish and maintain effective water supply
- Establish and maintain an area of safe refuge for fire companies
- Direct coordination with other Sector Officers
- Manage position and function of all units assigned to Sector
- Provide for 3 deep resource layers of working, on-deck, and recycling
- Accountability can be conducted via radio when required

Sector management must be done from a position outside of the smoke and fire conditions. Sector Officers attempting to operate in smoke and heat conditions are not able to effectively manage the work and communications when attempting to manage their own accountability and air consumption.

It is possible the building layout could require hose stretches of more than 150 feet. When this occurs a clear assessment of the required action and the position in the risk management plan is critical.

The simple expectation is that no fire company should operate on the interior of any structure, during firefighting operations, beyond their ability to retreat to an area of safe refuge prior to their low air alarm going off.

TASK LEVEL CONSIDERATIONS
Task level considerations for fires in mid-rise structures is built on sound decision making, fundamental task completion, and effective air management. They involve understanding the task level functions that are assigned and executing them within a plan or in coordination with other companies to achieve the tactical objectives.

Task level considerations should include:
- Size up and Decision Making
  - Assessing fire and smoke conditions and behavior
  - Assessing flow path conditions
  - Hoseline selection for reach and appropriate water volume
  - Assessing for the presence of wind driven conditions
  - Effective size up for most critical areas requiring search simultaneously with fire attack

- o Effective air management in coordination with crew members and Captain
  - o Effective management of access to safe refuge in the case of condition changes or low air levels
- Fundamental task completion
  - o Standpipe pumping operations and supporting the sprinkler systems with appropriate water supply
  - o Forceable entry
  - o Standpipe cap lock removal
  - o Standpipe connection and hose deployment for appropriately sized attack line and nozzle
  - o Targeted search in areas of greatest danger to victims
  - o Effective hose line advancement and management
  - o Effective hose stream management for cooling and extinguishment
  - o Horizontal, hydraulic ventilation
  - o Pressurization of stairwells with PPV fans
  - o Management for roof access hatches/bulkhead doors for ventilation or pressurization
- Air Management
  - o Utilize SCBA air when necessary
  - o Assess the effort required to complete tasks
  - o Plan for an exit of the contaminated hazard zone prior to low air alarm sounding
  - o Utilize standard fireground triggers to check air
  - o Plan for bottle change-out inside the building in an area of safe refuge
  - o Communicate air status with Captain at regular intervals that do not negatively impact the work

CRITICAL SAFETY CONSIDERATIONS

Mid-rise structures pose unique safety concerns for firefighters. They have unique features unlike high rise or more common apartment buildings. The greatest safety challenges include up to 6 stories of combustible building material, fire travel in void spaces, structural integrity under fire conditions, and interior layouts requiring hose stretches greater than 150 feet.

The absolute best action for potential victims and the safety of firefighters at any fire is to extinguish the fire as quickly as possible in its smallest state. Specifically, the best operation at a mid-rise fire is to extinguish the fire as quickly as possible to protect savable victims as well as decrease the likelihood of structural involvement and fire extension to other compartments. This requires effective size up to recognize when an aggressive, overwhelming fire attack is the best plan. It also requires recognition of when conditions are beyond the ability to control effectively by a standard interior fire attack.

When operating in an Offensive Strategy and conducting an interior fire attack and rescue operations, special consideration must be taken for structural integrity of floors surfaces and floor joists separating floors. Any fire involvement in these spaces can create localized failure and create opportunities for falls through the floor. The fire code requires sprinklers in the floor joist space when the joists/trusses are open web design. It does not require sprinklers in these spaces when the joists/trusses are solid (such as TJI joists). Areas with plumbing or air duct pass throughs is often opportunities for fire travel and weakening of the joist and structural members surrounding them. Floor integrity is often a concern in bathrooms and kitchens. It is difficult to know this information without preplanning and investigation.

When fire has spread into the structural members of a wood framed mid-rise building, this is a very dangerous situation. The loss of key structural members due to fire damage can significantly impact the overall structural stability of the entire building. Recognition of fire involving the structure should be reported to Command immediately. The Sector Officer and Command must determine if it safe and reasonable to continue in an Offensive Strategy. They must consider whether it is possible to write off portions of the structure or it requires writing off the entire building. A multi-story building with structural members burning is a dangerous situation.

Complex interior layouts with long interior hallways provide challenges for hose stretches of greater than 150 feet and effective air management. Standpipe outlet placement in stairwells and wall outlets in interior hallways are a necessary component to making a fire attack. When these are positioned in a manner that is greater than 150 feet from the fire occupancy/compartment, special consideration must be made for a fire attack and the ability to effectively manage adequate SCBA air while executing fire control and an all clear. Firefighters running out of air in contaminated atmosphere is *not an option*.

Fire radio communications may experience challenges in mid-rise buildings. This will depend on the location of crews working on the interior as well as the size and building construction methods present. This may require similar communication work arounds such as in high rise buildings including radio to radio relaying. Interior tactical positions may need to evaluate their location based on the communication abilities to manage the command system integrity. It is critical that all mid-rise fire operations always be conducted on hazard zone radio channels.