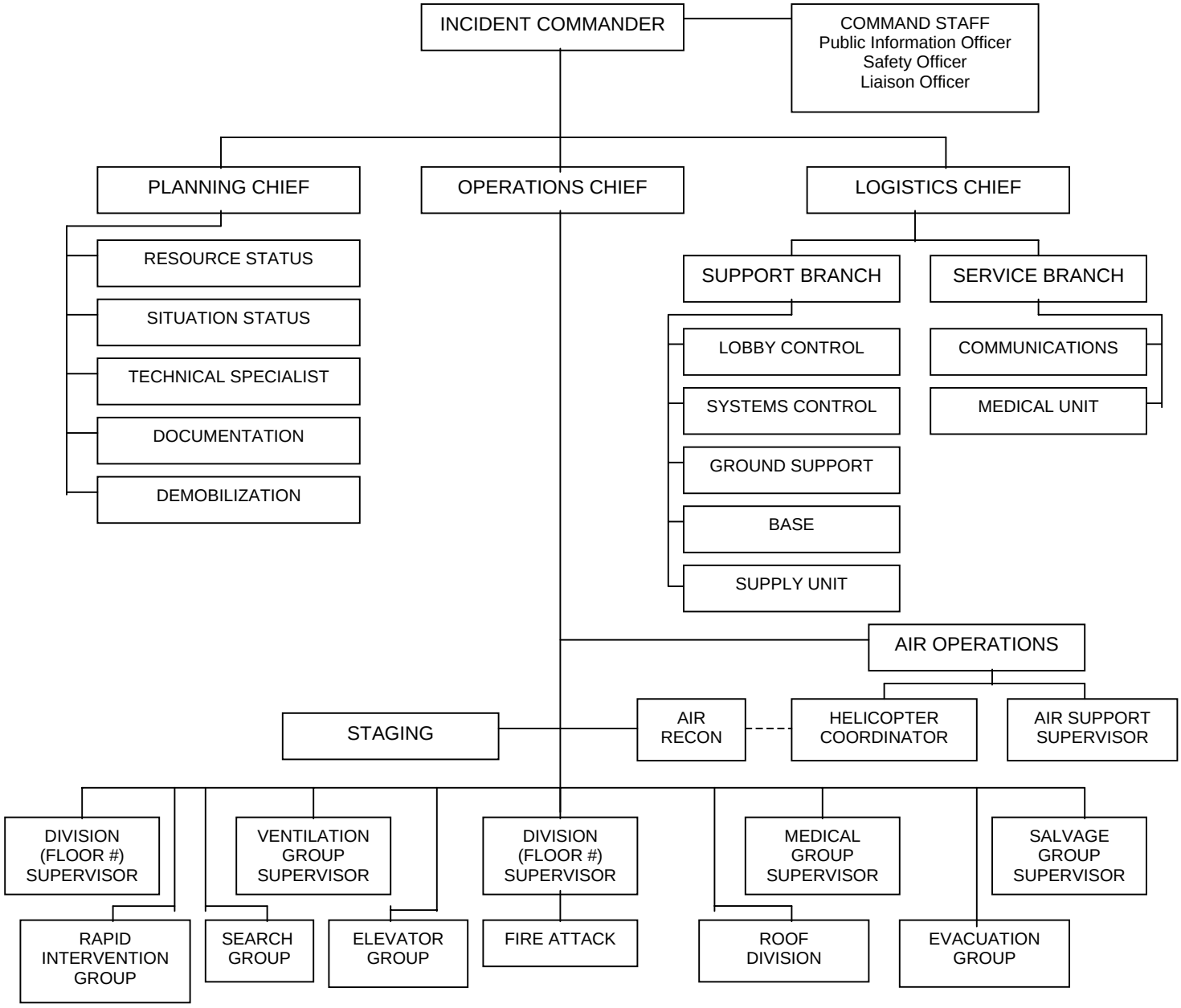
CHAPTER 1

HIGH RISE INCIDENT COMMAND SYSTEM

This chapter gives a brief overview of the High Rise Incident Command System. More detailed information for each of the components will be offered in Chapter 3, Specific Operations.

ORGANIZATION



INCIDENT COMMANDER

The Incident Commander is responsible for the management of all incident operations.

The Incident Commander plans and directs the overall strategy for control of the incident and establishes the organizational elements necessary to deal with the incident.

The Incident Commander may assign a Deputy Incident Commander to assist. During the initial phase of an escalating high rise incident, after the arrival and transition of command to the first arriving Assistant Chief, the first Battalion Chief may be used to assist in this capacity to assist the Incident Commander with the management on various command and tactical radio channels.

The Incident Commander approves the ordering and release of resources and directs and coordinates staff activities.

COMMAND STAFF

Safety Officer

The Safety Officer reports to the Incident Commander and is responsible for the recon and assessment of hazardous or unsafe situations such as fire behavior changes to assure personnel safety. The Safety Officer will correct unsafe acts through the regular line of authority, except that emergency authority may be exercised to stop or prevent unsafe acts when immediate action is required. The Incident Commander shall be immediately notified by the Safety Officer if any changes impact accountability or tactical operations. To accomplish this, the Safety Officer maintains awareness of active and developing situations and advises the Incident Commander and incident personnel accordingly. This officer investigates injuries/accidents to identify causes. Until a Safety Officer is assigned, the Incident Commander has the responsibility for monitoring incident safety.

Assistant Safety Officers may be assigned as required and will report directly to the Incident Safety Officer. The number of personnel needed to perform the functions of the Safety Officer will depend on the complexity of the incident, the size of the building and size of the incident organization. A single Safety Officer will likely be unable to oversee all areas and perform the duties adequately. Assistant Safety Officers carry the same authority to change unsafe conditions at an incident as the Incident Safety Officer.

Public Information Officer

The Public Information Officer provides liaison between the media and the Incident Commander, consults with the Incident Commander regarding any constraints on the release of information and prepares press briefings.

Liaison Officer

The Liaison Officer provides a point of contact for assisting/cooperating agencies and identifies current or potential inter-agency needs.

Note: Safety Officer, Public Information Officer, and Liaison Officer can have Assistants.

PLANNING SECTION CHIEF

The Planning Section Chief reports to the Incident Commander.

The Planning Section Chief assists the Incident Commander in planning the overall strategy for containment of the incident. The Plans Chief supervises and coordinates the activities of the Situation Status Unit (SIT/STAT), the Resource Status Unit (RE/STAT), the Documentation Unit, Technical Specialists, and the Demobilization Unit Leader.

Situation/Status

The Situation Status Unit creates and maintains a display of current situation status and maintains a record of command personnel.

Resource/Status

The Resource Status Unit creates and maintains a current roster of the companies assigned to the incident of their status. As the Incident Commander is responsible for overall personnel accountability for an incident, this unit shall initiate an accountability and inventory worksheet (F-666) at the very beginning of company deployment and shall maintain that system through completion of the incident.

Documentation Unit

The Documentation Unit shall be activated for major fires or unusual incidents to provide a comprehensive, chronological record of incident activities.

Technical Specialists

Large-scale incidents may require the assignment of Technical Specialists to augment the Planning Chief's staff. These individuals would have specific technical areas of responsibility and may be LAFD members, e.g., Fire Prevention Inspector, or specialists not associated with the Department such as building engineers and building management personnel.

Demobilization Unit Leader

The Demobilization Unit Leader within the Planning Section is responsible for the preparation of the Demobilization Plan which includes cause determination and overhaul, and assisting the Incident Commander in ensuring that an orderly, safe, and cost effective movement of personnel and equipment is accomplished in de-escalating the incident. In addition, the Unit Leader may be assigned the responsibility for re-entry of occupants to retrieve necessary personal items, i.e., medicine, clothing, and family pets, etc.

NOTE: When interacting with a Law Enforcement agency, the National Incident Management System (NIMS) allows the Planning/Intelligence position to be Established in four areas: Command Staff Officer; Section Chief under the Incident Commander; Branch Director under Operations; or a Unit/Technical Specialist under the Planning Section Chief.

OPERATIONS SECTION CHIEF

When implemented, the Operations Section Chief manages all tactical operations involving primary fire suppression, search, rescue, and Emergency Medical Services (EMS) operations. This officer reports to and consults with the Incident Commander regarding the overall strategy and tactics to be employed. The Operations Section Chief assigns and supervises Fire Attack, Staging, Division Supervisors, Group Supervisors, Rapid Intervention, and Air Operations. The Operations Chief normally operates at the Command Post.

Fire Attack Team

The first company on scene shall be the Fire Attack Team. The responsibility of this team is to enter the building, determine a safe means of ascent, and locate the emergency. Once they have found the emergency, the officer MUST COMMUNICATE THE LOCATION, NATURE AND EXTENT OF THE PROBLEM TO THE INCIDENT COMMANDER. This company is also responsible to check two floors below the fire floor for the suitability for Staging. If there is an actual fire, the Fire Attack Team can then initiate fire attack. In this situation the officer now becomes a Division Supervisor and

remains in charge of the floor until relieved. The Officer should provide the Incident Commander with progressive reports on their location and fire conditions.

The Division is identified by the floor number on which that company is operating. If the company attacks the fire on the 12th floor, that officer would be designated Division 12 until relieved.

Rapid Intervention Company

A company or companies designated to standby in a state of readiness to perform a rescue effort of Department members. This Officer reports to the Incident Commander/ Operations or a Rapid Intervention Group Supervisor when implemented.

In high rise incidents the Rapid Intervention Company(s) is normally assembled and deployed from Staging. This will allow these companies to be deployed in a timely manner.

Rapid Intervention Group Supervisor

This Group Supervisor is a functional position with the responsibility for supervising one or more Rapid Intervention Company(s) assigned to standby for or perform the rescue of firefighters.

Search Group Supervisor

This Group Supervisor is a functional position with the responsibility for supervising companies involved in the search and rescue, and the evacuation of building occupants to the ground level.

Evacuation Group Supervisor

This Group Supervisor is a functional position with the responsibility of the control and safety of building occupants from the ground level to an assembly level outside of the building. This officer, through consultation with the Incident Commander (or Operations Section Chief, if implemented), and the Search Group Supervisor will implement evacuation plans and control building occupants based on the conditions on each floor and the strategic objectives of the incident.

Branch Director

That organizational level having functional or geographic responsibility for major parts of incident operations. The Branch level is organizationally between Section and Division/ Group in the Operations Section, and between Section and Units in the Logistics Section. Branches are identified by the use of roman numerals or by functional name, i.e., Medical, etc. Based on the need or complexity of the incident, the Incident

Commander/Operations Chief can implement a "Branch Director", to more effectively manage the incident. Incident Commanders should not prematurely form Branches.

Division Supervisor

The Division Supervisor reports to the Incident Commander/Operations Chief and is responsible for fire suppression and rescue activities within a geographic area, usually a specific floor. (Division 15, Division 16, or Roof Division, etc.)

Group Supervisor

A Group Supervisor reports to the Incident Commander/Operations Chief and is responsible for the performance of a specific function, and is not limited to a geographic area. Typical functional assignments would be Ventilation Group, Salvage Group, Rapid Intervention Group, Search Group, Elevator Group, Medical Group, or Evacuation Group.

Staging Manager

The Staging Area Manager reports to the Incident Commander/Operations Chief. Staging is normally located two floors below the fire. This Officer maintains supplies of equipment and a reserve force at a level specified by the Incident Commander. A medical treatment/rehabilitation area shall normally be established in Staging to provide medical treatment/rehab care for incident personnel.

Resources are dispatched from Staging at the direction of the Incident Commander/ Operations Chief. Anytime reserves fall below the specified level, additional resources are requested by the Staging Area Manager through the Incident Commander/Operations Chief to Logistics/Base. Necessary supplies and equipment are requested directly from Logistics/Base.

It has proven effective to have Staging monitor two radio channels. One channel is assigned as a Logistical channel to order equipment and supplies and the second channel is a Tactical or Command channel to the Incident Commander/Operations for additional resources.

Air Operations Branch Director

The Air Operations Branch Director reports to the Incident Commander/Operations Chief and supervises and coordinates air operations as directed. The Air Operations Director is normally located on the ground in the area of the helispot.

Helicopter Coordinator

The Helicopter Coordinator is responsible for coordinating all helicopter tactical operations at the incident. The Helicopter Coordinator is normally airborne and will be either the Chief Pilot or the Senior Pilot at the incident.

Air Support Group Supervisor

When extended helicopter operations are anticipated a Helicopter Support Unit will be established, and normally staffed by Helitac Personnel. The Air Support Group Supervisor will establish and maintain the helispot and coordinate overall support functions for the helicopters. This officer will report to the Air Operations Branch Director.

Air Reconnaissance

The Air Reconnaissance (Recon) Officer reports to the Incident Commander/Operations Chief. The position is normally assigned to a Chief Officer to provide the incident command with a continuous and accurate assessment of fire activity which is provided by airborne observation.

Airborne Engine Companies

Several companies have been designated and trained as Airborne Engine Companies. They are normally dispatched on all fires in High Rise Buildings. During their response, Airborne Engine Companies are designed to the Helicopter Coordinator (Helco), or the Air Operations Branch Director. Upon approval of the Incident Commander or Operations Section Chief they may be deployed on the roof of the involved High Rise Building. Once deployed, the Airborne Engine shall contact the Incident Commander for an assignment and will no longer report to Helco.

LOGISTICS SECTION CHIEF

The Logistics Section Chief reports to the Incident Commander. The Logistics Section Chief supervises and coordinates the activities of Lobby Control, Systems Control, Base, Ground Support, Supply Unit, Communications Unit, and Medical Unit. Requests from Staging for equipment and supplies will go through the Logistics Section Chief to Base or Ground Support.

The Logistics Section Chief must also ensure that incident communications are adequate and functioning properly.

The operational location of this officer will normally be near the Command Post.

Lobby Control

The Lobby Control Officer reports to the Logistics Section Chief. This Officer is primarily responsible for notifying the Incident Commander of the number of floors in the building and that the elevators have been recalled, maintaining personnel/company accountability for all building entry and exits, accessing information from the fire control room, controlling vertical access of personnel to known safe routes, operating elevators (when determined to be safe), controlling the air handling system, pressurizing the stairwells, and coordinating the movement of supplies between Base and Staging.

Note: The location and position of the elevators will dictate whether an Elevator Group is established by the Incident Commander. The Elevator Group's responsibility is to locate and search for unaccounted elevators which may contain building occupants.

Systems Control Unit

If needed, a Systems Control Unit can be implemented to assist Lobby Control with monitoring and maintaining the buildings built-in fire control, life safety, environmental control, communications and elevator systems. (Systems Control Unit functions may be performed in the initial stages of an incident or in simple high rise buildings by Lobby Control.) The Systems Control Officer reports to the Logistics Section Chief. The unit may respond directly to requests from the Operations Section Chief in the manual operation of the various built-in systems. If implemented, the Systems Control Unit Officer must establish and maintain close liaison with building/facility engineering staff, utility company representative(s), and other appropriate technical specialists.

The number of personnel needed to perform the Systems Control Unit functions will depend on the complexity and number of built-in systems, the duration of the incident, the availability of specialists, and the performance of the systems.

Ground Support Group (formally Stairwell Support)

The Ground Support Group is responsible for providing transportation for personnel, equipment, and supplies; providing refilling of SCBA cylinders and maintenance of SCBAs; provide fueling, service and maintenance of vehicles and portable power equipment and tools; and implementing the ground level traffic/movement plan at the incident including marking safe access routes and zones and coordinates the transport of equipment via the stairwells. The Ground Support Group Supervisor reports to the Support Branch Director (if established) or the Logistics Section Chief.

If an auxiliary water supply is required, the Ground Support Group Supervisor will coordinate and supervise this function.

Base

Base may be established by available Engineer(s) from the first alarm assignment. In a working incident they will be augmented by an additional company(s). The member responsible for Base reports initially to the Incident Commander and then to the Logistics Chief or Support Branch Director when that position is implemented.

Base shall be established a minimum of 200 feet away from the incident structure. It is the point where the primary logistical functions are coordinated and administered. The Base Area Manager designates a marshaling area for equipment being delivered to Lobby Control or Ground Support Group.

The Base Area Manager maintains a reserve resource level as determined by the Incident Commander. Additional resources necessary to maintain that level are requested through Logistics to the Incident Commander.

Communications Unit

The Officer in charge of the Communications Unit reports to the Logistics Section Chief or the Service Branch Director (if implemented) and ensures that an effective communications system is maintained between the Incident Commander and incident personnel. This includes portable radios, spare batteries, cellular phones, and the building's sound powered system.

This Officer will also coordinate communication needs with outside agencies.

Medical Unit

The Medical Unit is primarily responsible for the development of the Medial Emergency Plan, for providing medial aid and transportation for injured and ill incident personnel, for providing rehabilitation services for incident personnel, and for the preparation of reports and records. The Medical Unit may assist the Incident Commander or Operations in supplying medical care and transportation to civilian casualties, but this is normally limited to situations where civilian casualties are few or not anticipated. The Medical Unit reports to the Logistics Section Chief or the Service Branch Director (if established).

CHAPTER 2

PRIORITY DEPLOYMENT OF FIRST ALARM ASSIGNMENT

The difference between a successful emergency operation which is brought to an early conclusion and one that becomes a protracted effort, often heavily taxing a department's resources, depends greatly on actions taken by first arriving companies. Our experience has shown that initial actions at a high rise emergency must fall into a priority order if the operation is to progress smoothly to a successful conclusion.

The normal first alarm assignment for a reported fire in a high rise structure is five fire companies, an airborne engine company component (task force), a basic life support (BLS) ambulance, an advanced life support ambulance (ALS), an emergency medical services battalion captain, and a battalion chief. The five fire companies will consist of two truck companies and three engine companies. These companies may arrive in task force or light force configuration. In addition, a squad company will respond on the first alarm assignment to incidents in specific first-in districts.

All personnel operating at a high rise incident should have a heightened level of situational awareness due to the ancillary equipment and building systems that are contained within these structures. Pre-incident planning and fire prevention inspections are the key to understanding and locating this equipment. In addition to normal fire protection equipment, other ancillary equipment and utilities, including communication equipment, microwave towers, solar power panels, UPS battery back-up systems, building redundant power supplies, and fuel cell power supplies to name a few, can jeopardize safety to firefighters operating at these incidents.

Accountability/Discipline

The Incident Commander shall be responsible for the overall personnel accountability at an emergency incident. The Incident Commander shall initiate an accountability and inventory worksheet (F-666) at the very beginning of operations and shall maintain that system throughout the incident. Subordinate officers, such as Division or Group Supervisors, shall be responsible for the accountability of resources and personnel assigned to their area of responsibility. They shall maintain an ongoing awareness of the location and condition of companies assigned to their command. All members shall be responsible to follow personnel accountability system procedures.

First-In Company

The Officer gives a radio size-up, assumes the initial responsibility of the Incident Commander and leads the company as the Fire Attack Team into the building. Once the first-in company officer commits to a tactical objective (i.e., fire attack) and other resources arrive on scene, command of the incident should be "passed" to another on-

scene officer or transitioned to a higher-ranking officer. The primary responsibility of this Team is to locate and identify the emergency and determine its scope.

In a high rise incident, a minimum of a four-member initial fire attack team shall ascend to the reported floor. As the team ascends to the fire floor, progressive reports as to the location and conditions should be provided to the Incident Commander. This Fire Attack Team should check conditions two floors below the reported fire floor as to ascertain if it is suitable for Staging. This information should also be transmitted to the Incident Commander. Two members of this team shall be used as fire attack while the remaining two members standby in the stairwell. In this situation, the company officer could remain in the stairwell with another standby member while two members advance a hose line into the fire floor or the company officer could be part of the two member fire attack team while the other members remain in the safe atmosphere. The Incident Commander shall provide back up for the initial fire attack team as soon as possible through the use of additional fire attack teams or companies assigned to Staging.

Second-In Company

This company establishes Lobby Control and the Officer becomes the Incident Commander. This is a critical assignment. Lobby Control has a significant responsibility for occupant and personnel safety because they are responsible for controlling the elevators, vertical access routes, and responsible for initially activating the building's communication systems. Lobby Control also controls the air handling system, the initial pressurization of stairwells, and coordinates logistical support between Base and Staging. In a working incident, this responsibility will probably require the assignment of an additional company. If the incident warrants, a Systems Control Unit can be implemented to operate, support, or augment building system controls, life safety, environmental controls, communications, and elevator systems once additional companies arrive on scene.

Supplying water to the building standpipe system will be the responsibility of the first arriving 200 Series Engineer, except when the first arriving and second arriving companies are single engine companies. In this case, the Engineer of the second arriving company has the responsibility for water supply.

Additional Companies

Staging should be established utilizing a company from the first alarm assignment consistent with strategic considerations and priorities. Staging personnel must ascend by a safe route and set up Staging, normally two floors below the fire. Staging is the assembly point where a reserve of personnel and equipment are maintained awaiting assignment within the building.

Base may be established by available engineers from the first alarm assignment, or by a greater alarm company. Once Base has been established, it will be augmented at the direction of the Incident Commander.

The basic requirements of the Incident Command System have been met with the establishment of Fire Attack, Lobby Control, Staging and Base. Any additional resources will be assigned by the Incident Commander to supplement the system and implement incident strategy.

As incidents expand beyond the first alarm assignment, the Incident Commander shall ensure the assignment or designate a Rapid Intervention component to stand by. There may be a need for more than one Rapid Intervention Company based on the size and complexity of the incident. In high rise fire incidents, a Rapid Intervention Company/Companies shall be located in, or proximity to, Staging. This will allow for a Rapid Intervention Company to be deployed in an expedient manner.

PRIORITY ASSIGNMENT OF COMMAND OFFICERS

In a routine high rise incident, company priorities of assignment can be implemented as described above. A command officer (Battalion Chief) arrives, relieves a subordinate officer as the Incident Commander, implements strategic objectives, and deploys resources to control the incident.

In a major high rise incident involving greater alarm companies it is necessary to build and augment the basic system established by the first alarm assignment. As more resources are committed to the incident, command level responsibilities must be assigned on a priority basis to ensure a smooth and effective expansion of the incident.

Based on incident determined priorities, consideration for assignment of Chief Officers:

- The first arriving Battalion Chief assumes the duties of Incident Commander.

- The second arriving Battalion Chief may be assigned as a Division Supervisor on the fire floor.

- The first arriving Assistant Chief will relieve the Incident Commander (first arriving Battalion Chief who should remain at the Command Post) and be utilized at the discretion of the Incident Commander (i.e., Deputy Incident Commander, Plans Chief, Operations Chief, etc.).

- The next arriving Battalion Chief may be assigned as the Search Group Supervisor, depending on the needs of the incident.

- The next arriving Battalion Chief may be assigned as the Logistics Section Chief.

- The next arriving Battalion Chief may be assigned as the Division Supervisor on the floor above the fire.

- The next arriving Battalion Chief may be assigned as the Safety Officer to provide an assessment of hazardous or unsafe situations and assure personnel safety.

Note: Incident development may dictate a different prioritization of assignment(s). Consider the need for a Battalion Chief as a Rapid Intervention Group Supervisor when more than one Rapid Intervention Company is assigned and an additional Battalion Chief has not been included as part of the RIC component.

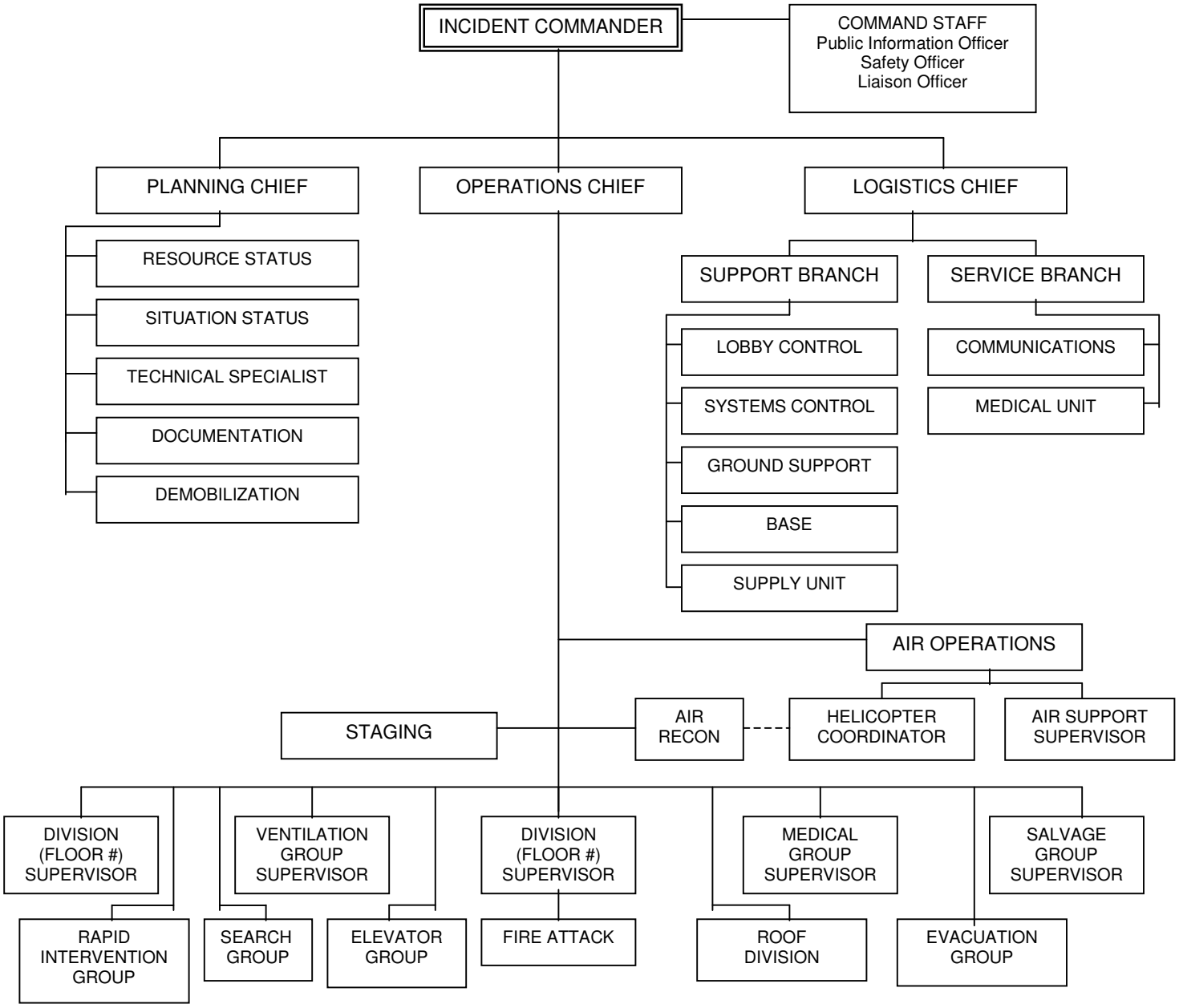
Additional Chief Officers may be assigned as needed by the Incident Commander/ Operations Chief. Depending on the needs of the incident, consideration should be given to the formation of an Evacuation Group, Salvage Group, Roof Division, Ventilation Group, Staging Officer, etc.

CHAPTER 3

SPECIFIC OPERATIONS

This chapter will discuss the responsibilities of personnel assigned to implement various elements of the Incident Command System at a high rise emergency. In addition to the description of these responsibilities, some of the considerations that impact on the decisions of these individuals will be noted.

INCIDENT COMMANDER



RESPONSIBILITIES - INCIDENT COMMANDER

Management of Total Incident Operations

Including inside and outside the building and the entire surrounding area.

Establish Command Organization

As the incident expands, the organization must expand in order to effectively manage the incident.

1. For investigations or minor incidents, implementation of the command organization might be limited to a Battalion Chief, a member tracking resource status at the Command Post, a Fire Attack Team, and Lobby Control.

    - For major incidents, the total organization would normally be implemented.

Develop Preliminary Strategy

1. Determine the scope of the problem.

    - Where is the emergency located, where is it going?
    - In there an immediate life hazard?
    - Is there a need to control evacuation?
    - Does the Building Inventory Plan or private Building Plan (e.g., Massey Plans) indicate any unusual features that will assist or complicate operational or logistical planning?
    - Will a Medical Group be required?
    - Will an Elevator Group be required?
    - Will a Search Group be required?

2. Remember, the lead-time necessary to get personnel and equipment in position at their assignment is the single greatest difference between controlling an incident in a high rise structure as opposed to an incident at ground level. The Incident Commander MUST plan ahead.

    At an actual working fire on the 21st floor of a high rise building, 36 minutes elapsed from receipt of the alarm until water was applied to the fire. This was a well fought fire and this is considered a normal time frame for a high rise incident.

Determine Level of Resources Needed to Implement Strategy

Some important considerations are:

1. Operations

    - Number of companies required on fire floor/floors. Plan for early relief (10 to 15 minutes) for fire control personnel.

    - Evacuation. (Consider use of building security personnel, floor wardens, and the use of building communication systems to assist the Evacuation Group.)

    - Search. (Consider the use of airborne companies to initiate search on upper floors.)

    - Ventilation

    - Dewatering

    - Salvage

    - Medical

    - Designated Rapid Intervention Company/Companies

2. Logistics

    - Number of companies needed to staff Lobby, Base, Ground Support, Communications, etc.

    - All requests for additional resources for the incident shall be made through the Incident Commander.

    - Utilize Building Engineer if available.

3. Outside Agencies

    - Will the services of Police, Utility Companies, etc., be needed?

4. Command Officers

    - Number of chief officers needed to staff the organization.

Direct Activities

1. Command Post Personnel

- Planning Section (Re/Stat, Sit/Stat, Technical Specialists, Documentation, Demobilization)

- Command Staff (Public Information, Safety, Liaison)

2. Operations

   - Inform as to strategy, resources and overall responsibility.

3. Logistics

   - Inform as to strategy, resources and overall responsibility.

4. Perimeter Control

   - The Incident Commander must assign the responsibility for establishing and maintaining control of the safety zone around the incident building. Considerations should include the structural integrity of the building and evacuation considerations. This responsibility may be delegated to the LAPD.

ESTABLISH LOCATIONS

Command Post

1. A safe distance from the building; minimum 200 feet.

2. Consider the location as it relates to observation of the involved structure and control of resources entering the structure.

3. Announce the Command Post location to OCD.

Base

1. A safe distance from the building (at least 200 feet) and not in proximity to the command post.

2. Consider the location as it relates to a safe corridor for personnel approaching and entering the building.

3. Announce the location of "Base" to OCD and direct that all companies report to that location. In some situations it may be helpful to specify an approach route to "Base" thus avoiding companies responding directly past the building, or through the incident operations area.

Staging

1. Consider input from the fire attack team who will have made an initial assessment of the staging area.

2. When the location for "Staging" is determined, normally two floors below the fire, announce its location over the fireground tactical channel.

Air Operations Helispot

1. At least one-half mile from involved building.

2. Consider large, open area where noise, rotor down wash, traffic congestion and crowd control problems will be minimal. Be alert to obstructions; trees, fences, power lines, etc.

3. Normally, helicopters should remain a minimum of 500 feet from the involved building while in flight and away from the Command Post.

STRATEGY

1. Consult with the Operations, Plans, Logistics and Command Staff Chiefs.

    - Evaluate effectiveness of preliminary strategy.

    - Modify preliminary strategy as necessary to develop overall strategy.

2. The Incident Commander must evaluate overall strategy on a continuing basis throughout the duration of the incident. Conditions will definitely change and these changes will impact strategic planning.

3. Investigation/demobilization

    - Determine fire cause.

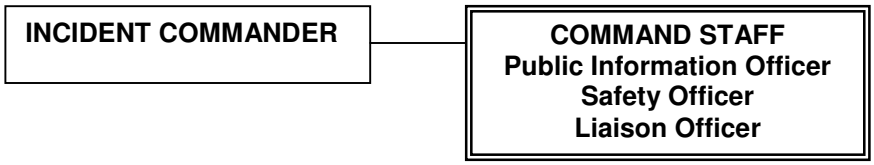
    - Use Arson Section Investigators

    - Develop and implement an overhaul plan.

    - Develop and implement a demobilization plan.

    - Develop safe re-entry procedures for occupants to retrieve necessary personal items or reoccupy parts of the building.

COMMAND STAFF



RESPONSIBILITIES

Manage command staff functions of Safety, Liaison and Information. These officers report to the Incident Commander.

1. The Incident Commander assigns the Safety Officer.

   - The Safety Officer will "recon" the incident and assess, identify, and report hazardous conditions, unsafe activities or fire behavior to the Incident Commander.

   - The Safety Officer will correct unsafe acts through the regular line of authority, except that emergency authority may be exercised to stop or prevent unsafe acts when immediate action is required.

   - The Incident Commander shall be immediately notified by the Safety Officer if any changes impact accountability or tactics.

   - The Safety Officer investigates accidents occurring in the incident area and submits follow-up reports.

   The need, size, complexity, or duration of an incident can necessitate the need for Assistant Safety Officers. Incidents such as a high-rise fire may require additional assistance. In these cases, The Incident Safety Officer should request for the Incident Commander the need to establish Assistant Safety Officers under the direction of the Incident Safety Officer. Assistant Safety Officers can be assigned to handle scene monitoring, action planning, risk management, interior safety at a high rise incident, or serve as relief for the Safety Officer during extended incidents.

2. The Incident Commander designates a Liaison Officer*.

   - The Liaison Officer is the point of contact for assisting agency representatives.

   - The Liaison Officer will assess and monitor active and potential agency involvement, ensure an adequate communications capability is established and that the logistical needs of the assisting agencies are met.

3. The Incident Commander designates the Public Information Officer*.

- The Public Information Officer will be advised of any constraints on the method or content of news releases pertaining to the incident.

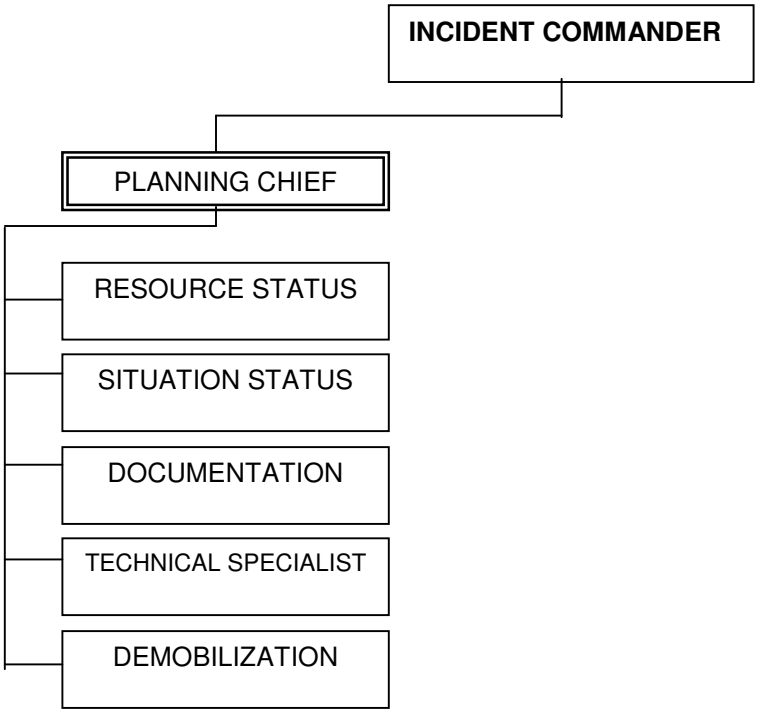
- The Public Information Officer will coordinate dissemination of information to the news media, including interviews with incident personnel. This activity is normally performed by a Department Public Information Officer (P.I.O.)

- Large incidents may require more than one Public Information Officer.

*At the direction of the Incident Commander these officers will establish work areas accessible to, but removed from, the Command Post in order to minimize congestion in the Command Post area.

Note: Safety Officer, Public Information Officer, and Liaison Officer can have Assistants.

PLANNING SECTION CHIEF



RESPONSIBILITIES

1. After consultation with the Incident Commander, develops plans to support the Incident Commander's strategy, from initial implementation through demobilization. Reports to the Incident Commander.

   - Supervises and coordinates the activities of the Resource Status Unit. This Unit, normally staffed by an assigned member, works closely with the Situation Status Unit to ensure that the status of resources committed to the incident are accurately recorded. Resource assignments should be recorded on the incident tactical worksheet's (F-666) resource status log.

   - Supervises and coordinates the activities of the Situation Status Unit. This Unit, normally staffed by an assigned member, maintains a diagram of the incident depicting the concerned structure, pertinent structure components, the fire location, size and the current situation.

     To assure accountability, the tactical worksheet (F-666) diagram should identify where specific companies are assigned, the location of divisional boundaries, the names of command officers, and a list of resources in reserve in base and staging.

   - For major fires or unusual incidents, a Documentation Unit shall be activated to provide a comprehensive, chronological documentation regarding the incident.

     Documentation is necessary for administrative needs, provides accurate information for post-incident analysis, and is used during cost recovery.

   - Supervises and coordinates the activities of technical specialists.

   - As necessary, activates a Water Resource Specialist to assess overall water supply and recommend solutions for existing or potential water supply problems.

2. Control Resources, Maintain Records.

   - All resources requested for the incident shall be approved by the Incident Commander and ordered through the Resource Status Unit.

   - To assure accountability of companies, records shall be maintained of ALL resources requested and/or assigned to the incident.

LOCATION

The Planning Section Chief manages the Command Post under the direction of the Incident Commander. This Chief assigns working locations to Command Post personnel.

INVESTIGATION

Coordinate with the Arson Section in determining cause.

OVERHAUL

Consult with the Incident Commander to determine overhaul responsibility and method.

1. Extent of Department involvement.
2. Building management responsibility.

DEMOBILIZATION

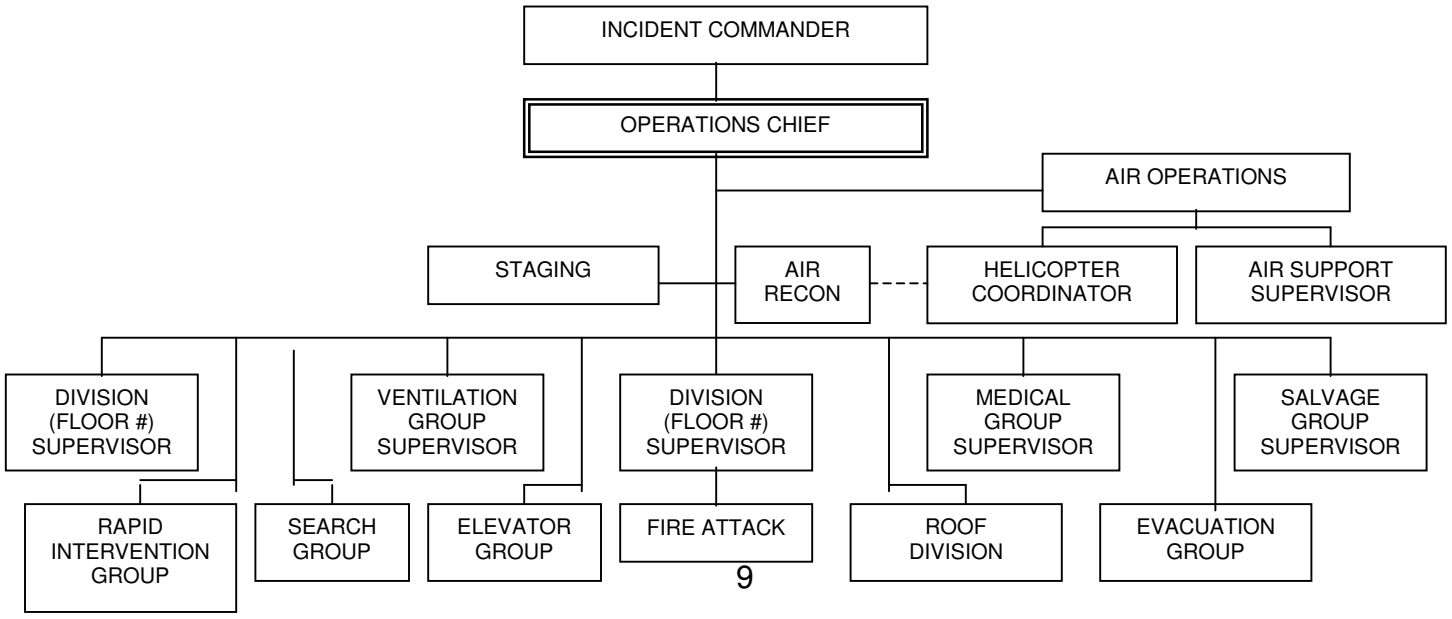
Consult with Incident Commander to develop overall plan for de-escalation of the Incident.

All resources released from the incident shall be released by the Incident Commander through the RESOURCE/STATUS Unit.

When Incident Command is transferred to another officer, overhaul and demobilization plans shall be clearly understood.

This Unit Leader may be assigned the responsibility for re-entry of occupants to retrieve necessary personal items.

OPERATIONS SECTION CHIEF



RESPONSIBILITIES - OPERATIONS

Manage all tactical operations and maintains accountability of resources. Reports to the Incident Commander. Responsibilities includes the supervision of:

1. Fire Attack
2. Staging
3. Search/Rescue
4. Rapid Intervention
5. Air Operations
6. Medical
7. Evacuation
8. Ventilation
9. Salvage
10. Overhaul

COMMAND LOCATION

The Operations Section Chief will normally be located at the command post to manage the tactical operations and maintain accountability of assigned companies. If the Operations Section Chief leaves the command post for any reason, the responsibility for accountability of resources still remains with that member. For example, if poor radio communications is a problem at an incident, the movement of the command post to a better location, use of a radio relay, or a telephone/ cellular phone may be better options than the Operations Chief leaving the command post to assure company accountability.

STRATEGY AND TACTICS

Consult with the Incident Commander regarding broad overall strategy and implement the tactics necessary to achieve the incident objectives.

1. Determine resource commitment, including relief, needed to accomplish necessary tasks, e.g.
    - Fire Attack
    - Staging

- Search
- Rescue
- Evacuation
- Rapid Intervention
- Ventilation
- Medical
- Salvage
    - Protect elevator shafts, elevator mechanical rooms from water.
- Overhaul
- Air Operations

2. Communicate strategy and tactical assignments to subordinate officers.
    - Direct activities and maintain accountability of subordinates.
    - When conditions dictate, provide tactical direction to subordinates.
    - Keep subordinates informed of changing conditions, fire behavior, spread, lapping, etc.
3. Communicate with Logistics Officer.
    - Establish reliable means of communication: telephone, building sound powered phone system, radio tactical channel, building communication (public address) systems, building radios, messengers, etc.
    - The logistics function supports the overall incident. The Incident Commander/Operations Chief must anticipate needs for personnel and equipment with sufficient lead time to permit Logistics to deliver the needed resources to the area of need in a timely manner.
    - A separate tactical channel should be assigned to Logistics to allow for communication between Base, Lobby, and Stairwell Support. This channel would also allow Staging to communicate with Logistics to request equipment and supplies.
4. The Operations Section Chief shall assure the accountability of companies and personnel is maintained.

DIVISION/GROUP SUPERVISORS

RESPONSIBILITIES

Division Supervisors manage a specific Division under the Incident Commander/ Operations Chief. A Division is a specific GEOGRAPHIC area, usually one floor in a high rise incident.

Group Supervisors manage a specific FUNCTION under the Incident Commander/ Operations Chief. This function may not be confined to a specific geographic area, e.g., the Ventilation Group, Elevator Group, Search Group, Rescue Group, or Salvage Group, and may be working on several floors simultaneously, or a Medical Group could be operating both inside and outside of a building.

Division and Group Supervisors shall be responsible for the accountability of companies and personnel assigned to their area of responsibility.

COMMAND LOCATION

Division and Group Supervisors will normally be located in proximity to their area of responsibility.

1. Good communications capability is essential.

    - Radio tactical channels, building sound powered phone system, telephone, or messengers.

2. The Incident Commander/Operations Chief and subordinate officers should be informed of the Division/Group Supervisor's location.

STRATEGY AND TACTICS

Consult with the Incident Commander/Operations Chief

1. Overall Strategy

2. Specific Responsibility

3. Resources Previously Committed and Tasks Assigned

4. Status of Additional Resources Ordered

Communicate Strategy and Assignments to Subordinate Officers

1. Direct Activities of Subordinates

2. Provide Tactical Direction to Subordinates

3. Establish Communication Methods

4. Keep Subordinates Informed of Changing Conditions

Organization

1. Company officers must keep their personnel together and under their control. Company effectiveness and personnel safety will be greatly enhanced by adherence to this fundamental rule.

2. Tasks should be assigned on a company basis, and be specific as to the area and limits of responsibility.

    - Who To Report To
    - Where To Report
    - When To Report

3. When tasks exceed the capability of a single company, several companies may be assigned under the command of a specific officer, with clearly defined responsibilities.

4. Division/Group Supervisors must maintain current status of resources assigned to their Command indicating status and area of responsibility. This is essential in maintaining accountability of their resources.

5. Division/Group Supervisors must coordinate the activities of their Division/Group with those of related Divisions/Groups.

FIRE ATTACK

RESPONSIBILITIES

The first company on the scene, by the use of a safe route, shall proceed to the area where the emergency exists, assess the scope of the emergency, communicate this information to the Incident Commander, and take measures to mitigate the emergency.

Once the first-in company officer commits to a tactical objective (i.e., fire attack) and other resources arrive on scene, command of the incident should be “passed” to another on-scene officer or transitioned to a higher-ranking officer.

A minimum four-member initial fire attack team shall ascend to the reported floor. Two members of this team shall be used as fire attack and the remaining two members shall standby in the stairwell. Upon the arrival of additional company(s) the standby members may be deployed and committed as necessary.

ACTIONS

Upon arrival, give size-up and order additional resources if indicated.

Proceed to Lobby taking ALL company personnel, with appropriate equipment and the high rise operational packet.

1. Obtain information from security/building management.

    - What is the nature of the emergency?
    - Where is the emergency located?
    - Is there an alarm system annunciator panel in the building?
    - Are stairwell locking mechanisms "unlocked" with alarm activation?
    - Is the building equipped with a Fire Control Room for emergency use?
    - What is the lobby phone number?
    - How many people are in the building at this time? (habitational vs. office building).
    - Type of stairs? (return or scissor)

2. Obtain items from lock box, if provided.

    - Retain one copy of the building inventory sheet and ONE SET OF KEYS. Remaining contents of lock box are to be used by the Lobby Control Officer.

3. Captain determines the means of ascent. If a stairwell is utilized, the Captain relays stairwell identification to incoming companies. The company then begins their ascent.

    As the Fire Attack Team ascends, the officer should periodically report conditions in the building to the Incident Commander for information purposes and to assure adequate communications are maintained.

    Elevators, equipped with Phases I and II Emergency Service, may be used for access to upper floors under certain conditions. When elevators are utilized, strict

adherence shall be followed to Department procedures and guidelines when elevators are used in a highrise building under investigation or during fire fighting operations. The Incident Commander has the ultimate responsibility to authorize (or discontinue) the use of elevators. The decision to use an elevator as a means of ascent is a critical decision the company officer will make. Under fire conditions, elevators may malfunction due to the exposure of fire, heat, smoke or water. It is imperative that the company officer has the knowledge, training, and familiarization with operating elevators in the Emergency Service (Phase II) mode in order to understand the differences from normal operations. Since various makes, models and age of elevators operate differently and may not be identical, officers should become familiar through training including pre-incident planning of specific elevators in high-rise occupancies within the respective response districts, with their controls and how to properly operate.

Specific operational procedures for elevator use will be discussed in Chapter 5, “Fire Extinguishment” and Chapter 7, “Elevators.”

4. Fire Attack Team informs the Incident Commander begins ascent and shall take the following equipment.

   - Breathing Apparatus
   - Portable Radios
   - Rotary Saw of Forcible Entry Tools
   - Thermal Imaging (Infrared) Camera
   - High Rise Hose Packs

   When feasible, the following additional equipment should be taken.

   - Portable Spotlight
   - Extra Air Bottles
   - Portable Extinguisher (mandatory if elevators are used)

5. The Fire Attack Officer shall evaluate the two floors below the reported fire floor for its use as a staging area and communicate this information to the Incident Commander. In addition, this officer should determine the floor plan of the building. Floor layout signs in elevator lobbies can assist with determining the floor plan.

   If elevators are utilized as a means of ascent, they shall not be taken to a location closer than two floors below the reported fire floor or two floors below the lowest

indicated alarm floor location. In this situation, the Fire Attack Team will exit the elevator two floors below the reported incident floor and proceed to an appropriate stairwell. The Officer shall notify the Incident Commander of the stairwell identification being utilized for continuing aloft and conditions found.

6. The Fire Attack Team shall then locate the emergency, check for vertical extension and give a size-up. If it is a fire:

    - What is burning?
    - Are occupants endangered?
    - What is the potential for vertical extension; interior and exterior?
    - What is the potential for horizontal extension?
    - What is the best route for resources going to Staging? What is the best route for resources going from Staging to the fire floor and above? (Is this consistent with the identification of the fire attack and evacuation stairwell?)

7. This officer now assumes the role of Division (floor number) and attacks the fire. Two members of this team shall be used as fire attack and the remaining two members shall standby, outside of the I.D.L.H. atmosphere. Upon the arrival of additional company(s) the standby members may be deployed and committed as necessary.

    - If they cannot extinguish the fire, the Fire Attack Team must endeavor to protect the vertical openings and contain the fire until assistance arrives. If unable to effect a direct and sustainable attack, consider exposure protection and assisting with search and/or evacuation.
    - The Division Supervisor must keep the Incident Commander informed as to progress and conditions in the fire area.
    - Division Supervisors should attempt to maintain a sustained fire attack. They should maintain sufficient companies in the stairwell or close proximity to facilitate a rotation of companies on the fire floor. Division Supervisors should not have to wait for relief companies from staging. The Division Supervisor must project and request enough companies from staging to facilitate this rotation.

STAGING

RESPONSIBILITIES

The Staging Area Manager verifies the location of Staging with the Incident Commander.

1. Plan layout of Staging area.

2. Manage all Staging activities.

    - Control of reserve and rehab personnel, in separate areas.

    - Maintain separate stockpile of reserve and expended equipment.

    - Medical treatment station/Rehabilitation area for incident personnel.

    - Maintain complete, accurate record of resource status to assure accountability.

    - When available, the Staging Officer should procure a building sound powered phone from Lobby.

The Staging Area Manager is subordinate to the Incident Commander/Operations Chief.

LOCATION

The Staging Area Manager will be located in or adjacent to the Staging area to facilitate effective control of its activities.

Resources should arrive at Staging via a common route. Staging personnel should be positioned to meet, check in, and direct them to the appropriate area. All stairwell access to staging must be controlled to prevent companies from bypassing staging.

TACTICS

Consult with the Incident Commander or the Operations Chief (when implemented) to determine resource levels to be maintained in Staging.

As resources are dispatched from Staging, the Staging Area Manager will order additional resources through the Incident Commander/Operations Chief. Equipment and supplies will be ordered through the Logistics Officer to Base, preferably on a separate tactical radio channel.

Communications

When feasible, use an additional radio tactical channel to access the logistics system. This will improve communications and effectiveness overall. Consider:

- Separate Tactical Frequency (if a radio channel has not been assigned, request one through the Incident Commander or the Logistics Section Chief, if established);
- Building Sound Powered Phone System;
- Building Telephone System;
- Messengers;
- Spare Batteries for Portable Radios.

An effective communications link must be maintained with the Incident Commander/Operations Chief. Staging will normally be located two floors below the fire, unless it is unsuitable, e.g., two floors below the fire will be a noisy cramped machinery area, while the third floor below the fire may be vacant. (Note: Some buildings do not have a 13th floor.)

If the Incident Commander/Operations Chief does not specify equipment, develop an equipment inventory and order from Logistics/Base. When ordering equipment, specify quantities.

1. Equipment to consider:
   - Air Bottles
   - Hose with Fittings
   - Breathing Apparatus
   - Smoke Ejectors
   - Forcible Entry Tools
   - Salvage Equipment
   - Pike Poles
   - Ladders

- Resuscitators
- Medical Supplies
- Drinking Water or Fluids for rehabilitation of firefighters
- Spare Radio Batteries

Maintain a record of equipment ordered, time ordered and delivery time to minimize duplication of equipment orders.

2. Separate equipment and store like equipment together, e.g., full bottles, empty bottles and breathing apparatus should be stored apart from each other.

   Make signs and tape to wall to identify different areas.

3. It is imperative that officers maintain control of their companies when assigned to rehabilitation or reserve areas.

4. Breathing apparatus will be a critical need in a working high rise fire. Provide an adequate area to function as an air cylinder exchange station. Use reserve companies to perform tasks in Staging, e.g., changing air bottles, separating arriving equipment, etc.

5. Designate specific personnel to maintain records, e.g., time and identification of companies arriving at Staging; assignment, time and identification of companies when they leave Staging.

6. Rapid Intervention Company(s) are assigned to Incident Commander/Operations but are to standby in Staging. This designated company(s) shall be suited up in a state of readiness.

RAPID INTERVENTION OPERATIONS

Rapid Intervention Company operations at a high rise incident will include special challenges in regards to personnel, equipment, travel time, preparation, readiness, and rescue procedures.

The Rapid Intervention Company at a high-rise should involve a Light Force, Engine, or Squad and an ALS resource at a minimum. There may be a need for more than one Rapid Intervention Company based on the size and complexity of the incident. Resources assigned to Rapid Intervention will initially report to the Incident Commander/Operations Chief. As the incident escalates, the Incident Commander should expand to a task force for standby and immediate deployment, if needed, in Staging. When more than one company is assigned to rapid intervention operations, a Battalion Commander should be assigned as the Rapid Intervention Group Supervisor.

The Rapid Intervention Group Supervisor will be responsible for the overall firefighter rescue operation. This officer shall coordinate rescue operations throughout the incident area and monitor appropriate radio communication channels.

Staging or the floor below the fire may be an appropriate location for Rapid Intervention Company(s) to locate as this will facilitate a rapid deployment to an emergency and will assist the Rapid Intervention Company(s) in locating and identifying which companies occupy the floors and stairwells. It is imperative that resource and situation status for assigned companies be accurately maintained and documented for quick reference. Consider the assignment of a Rapid Intervention Company(s) per stairwell. Also adequate reserve company(s) should be maintained in Staging in case of deployment.

One of the challenges facing the assigned Rapid Intervention Company during a high rise fire will be the selection and delivery of the necessary equipment to the identified area of operation. Considerations should be given to a minimal amount of equipment to begin operations. As additional companies are assigned to the "Rapid Intervention Group" additional equipment can be requested, and delivered to Staging.

1. Special equipment considerations include:

- Rapid Intervention Company (RIC) SCBA Kit

  The RIC SCBA Kit will be assigned to all Truck Companies, Hazardous Material Squads and US&R apparatus. These kits include:

  a. Nylon bag with sling and carrying handles.
  b. 45 minute or 60 minute air cylinder.
  c. First stage pressure reducer with 20 feet of intermediate pressure hose.
  d. Second stage regulator.
  e. Facepiece
  f. 150 feet drop bag line
  g. Flashlight with integrated holder

- Thermal Imaging (Infrared) Camera

- Extra one-hour SCBA air bottles (maintained in a separate location from equipment cache in Staging.)

- Rambar, Hayward or Haligan tool

- Porter wire cutters

- Portable spotlights

- Drop bags

- Chalk

- E.M.S. Equipment (including collapsible flat, stair chair, backboards, and gurney if feasible.)

SEARCH

Any successful fire suppression operation includes a concurrent search component to ensure the accountability and safety of building occupants. The establishment of a Search Group ensures and provides for a primary and secondary search for building occupants is conducted and completed. Simultaneous to fire suppression efforts, primary searches should be initiated and a systematic approach to searching all areas compromised by smoke should be immediately addressed. The Search Group should work in concert with the Evacuation Group (if or when established).

The Search Group Supervisor works closely with the Evacuation Group Supervisor and manages all building occupants located above the ground floor of the involved building. Searches shall be conducted on a priority basis beginning with the fire floor and all areas above the fire. Search efforts can be extremely laborious and personnel intensive due to the area required to be covered. Even though the incident might dictate the relocation of occupants from the immediate area surrounding the fire floor to safe refuge areas, all areas above the fire floor and subsequently all areas of the building shall be searched. This includes all hallways and stairways. Attention should be given to continually monitoring stairwells, particularly the fire attack stairwell above the fire floor. Conditions in the evacuation stairwell should also be continuously monitored. Unless absolutely necessary, the stairwell door to the fire floor should not be opened into the evacuation stairwell when building occupants are present. The only exception is when it necessitates a civilian and/or firefighter rescue.

The Search Group Supervisor reports to the Incident Commander or Operations Section Chief (if implemented).

RESPONSIBILITIES

1. Ensure that primary and secondary searches are properly conducted, paying particular attention to stairwells.

2. Control and Coordination of resources assigned to the Search Group.

3. Determine appropriate areas of safe refuge, if appropriate. Continually monitor safe refuge areas for carbon monoxide.

4. Assess and report smoke conditions on upper floors, the potential number of occupants, and additional resources needed to complete primary and secondary searches of the building.

5. Remove occupants out of the fire attack stairwell to the evacuation stairwell or to an identified safe refuge area.

6. Coordinate with the Evacuation Group on the potential number of occupants requiring relocation or evacuation and the stair or stairways to be utilized.

EVACUATION

Evacuation of a building, in conjunction with fire suppression activities, will be a crucial and time-critical task. Evacuation should be based on the risk to the occupants. Unnecessary evacuation may hinder firefighting operations. Occupants of numerous floors may have self-initiated the evacuation process based on the buildings alarm system. This spontaneous evacuation may result in confusion, panic, and overcrowded conditions in the building's stairwells and the lobby area negatively impacting fire attack efforts.

Traditionally, occupant evacuation of the fire floor and the two floors above and below has been sufficient. However, following the events of New York's World Trade Center, firefighters may find self-evacuation more common. Occupants directed to a safe refuge area can be relocated on a priority basis should the need arise. Thereafter, evacuation priorities are determined on specific needs of the incident and conditions within the building. The Evacuation Group Supervisor works closely with the Search Group Supervisor and manages all building occupants from the ground floor to the assembly area outside of the involved building.

The Evacuation Group Supervisor reports to the Incident Commander or Operations Section Chief (if implemented).

RESPONSIBILITIES

1. Management and control of all evacuation activities from the ground floor to an assembly area.

2. Determine the need for additional evacuation and develop a plan for implementation.

3. Determine the stair or stairways to be used by the occupants for evacuation.

4. Coordinate with Lobby or Systems Control in the use of the building communication system.

5. Establish a police liaison.

Once occupants have been evacuated, either through self-evacuation or directed by fire service personnel, Police Department assistance should be requested to assist in directing evacuees to a safe location, at a minimum 200 feet from the affected structure.

AIR OPERATIONS BRANCH DIRECTOR

RESPONSIBILITIES

1. Manage all helicopter activities.

2. The Air Operations Branch Director reports to the Incident Commander/Operations Chief.

LOCATIONS

The helispot location should be located at least one-half mile from the incident site. This will result in minimum impact on incident operations from the noise and rotor down wash from the aircraft.

Normally, helicopters should remain at least 500 feet from the involved building while in flight. Air Operations should be accessible to the helispot but protected from the noise/ rotor down wash to the extent feasible.

STRATEGY

1. Consult with the Incident Commander/Operations Chief about planned or potential helicopter missions.

   Develop a plan identifying the resources needed for the expected duration of the incident. Consider:

   - Specialized aircraft, night sun, Infra-red (F.L.I.R.), hoist, or air ambulance.
   - Helicopter tender apparatus, lights, fuel, etc.
   - Helitac personnel.
   - Relief pilots.

2. Depending on the time of year, availability, and most importantly if conditions warrant, consider the use of the Erickson Skycrane, equipped with the water cannon. The Incident Commander must utilize this option with extreme caution and with consideration to occupants and firefighting resources within the building.

TACTICS

1. Order resources through the Incident Commander/Operations Chief.

2. Announce helispot location to OCD and the Incident Commander.

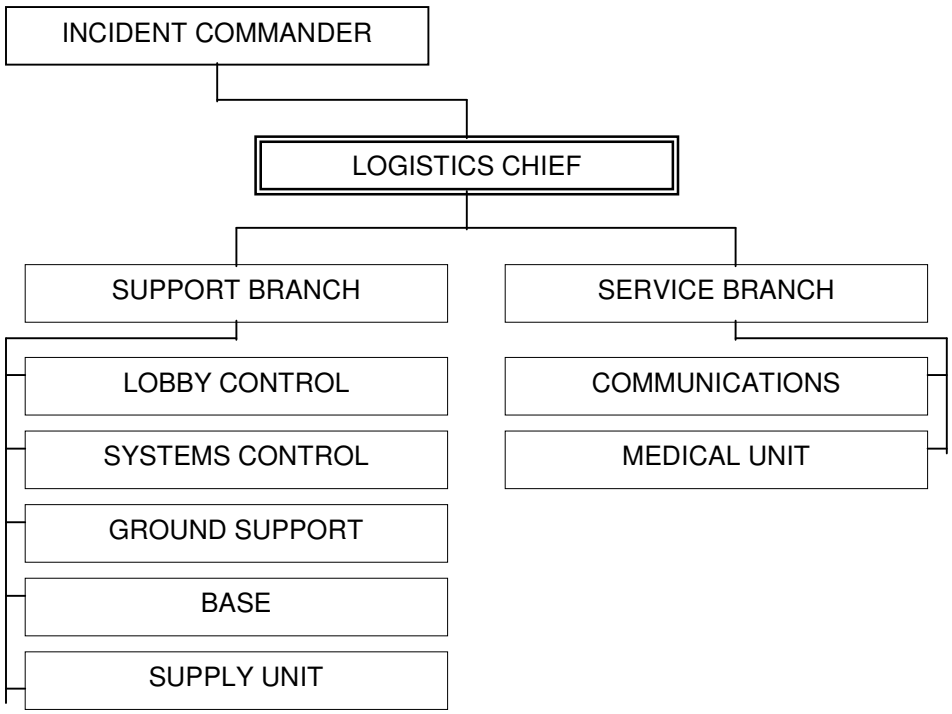
3. Organize resources to support helicopter operations.

4. Roof operations.

    - Airborne Engine Company personnel may be deployed to the roof. Personnel deployed to the roof needs to be coordinated and approved by the Incident Commander.

5. Use F.L.I.R. to assist in identifying occupants above the fire and for fire extension.

LOGISTICS SECTION CHIEF



RESPONSIBILITIES

Manage the logistics function to provide resources necessary for the control of the incident. The system will consist of some, or all, of the following components.

1. Base

2. Lobby Control
3. Systems Control
4. Communications
5. Ground Support
6. Supply Unit
7. Medical Unit
    a. Rehabilitation

COMMAND LOCATION

The Logistics Section Chief is a critical element in the Incident Command System. This officer will typically be set up in the vicinity of the Command Post and monitors the various components of the system beginning at Base and following up at Lobby Control to ensure that adequate equipment and resources reach Staging.

Subordinate officers will normally be located with their personnel in, or adjacent to, their area of responsibility.

STRATEGY AND TACTICS

1. Consult with the Incident Commander regarding overall incident strategy.
2. Determine level of resources necessary for:
    - Operations Tactical Activities
    - Logistics System Activities
    - Reserves
    - Relief
3. Develop plan for implementing the Logistics system.
4. Communicate incident strategy, Logistics system plan, and assignments to subordinate officers.
5. Coordinate with the Incident Commander and the Operations Section Chief to ensure proper Logistics system performance.

COMMUNICATIONS

Effective communications are critical to Logistics system communications. This will improve communications and effectiveness overall. Consider:

1. A separate Tactical Frequency is needed for Logistics
2. Building Sound Powered Telephone System
3. Building Telephone System
4. Messengers
5. The buildings public address system can provide one-way communication
6. Building radio system
7. Spare Batteries for Portable Radios

Assess incident communication problems, implement solutions.

BASE

RESPONSIBILITIES

1. The Base Area Manager shall verify the location of Base with the Incident Commander (normally located 200 feet from the incident building).
2. Manage all operations at Base. The Base Officer reports to the Support Branch Director, Logistics Chief or to the Incident Commander if Logistics position has not been established.
3. Consult through Logistics to the Incident Commander to determine resource levels to be maintained at Base and what priority equipment is to be moved to Lobby Control. Additional resources are to be ordered through the Incident Commander. Normally, two companies should be kept at Base for each company held in staging.
4. Deliver equipment from Base to Lobby Control or Stairwell Support. Use Ground Support Unit personnel or companies en route to Staging to assist in the movement of priority equipment to Lobby. An important consideration is to provide drinking fluids for the rehabilitation of personnel at Staging to prevent dehydration of fire attack members.
5. Direct companies from Base to Lobby Control.

6. When a water supply is established via the stairwell, Base shall provide a supply line to the entrance to the stairwell.

COMMAND LOCATION

The Base Officer should be situated to control resources as they arrive at Base.

Arriving companies must be checked in and given specific instructions as to where and how to park apparatus. Company officers shall keep their personnel together at their apparatus while awaiting assignment.

The Base Officer is responsible for establishing and maintaining a security perimeter around Base and a safe corridor from Base to the entry point of the building.

APPARATUS

Apparatus Parking Area

1. Block streets as necessary, use DOT/LAPD to relieve LAFD personnel.

2. Control apparatus parking. Park diagonally so apparatus can be moved independently.

3. Base personnel are responsible for apparatus security.

EQUIPMENT

The equipment pool should be located in a secure area.

1. Consider a traffic flow that will facilitate unloading of equipment and transportation to Lobby Control.

2. Equipment should be transported on a priority basis.

3. Movement of equipment should be coordinated with Lobby Control.

PERSONNEL

Companies in Base shall be kept together at their apparatus under the control of their officer.

Companies may be utilized to accomplish necessary tasks at Base.

RECORDS

Specific personnel shall be assigned to maintain records of activities at Base. Companies and equipment shall be checked in and out by time and assignment to which they are committed.

LOBBY CONTROL

The second in company at a high rise incident is responsible for establishing Lobby Control and the Officer becomes the Incident Commander (until relieved by a higher ranking officer). Lobby Control has a significant responsibility for personnel safety because they control elevators and vertical access routes.

RESPONSIBILITIES

1. Manage Lobby Control Activities
    - Elevators - Recall and Location
        - Verify all elevators are accounted for and returned to lobby
        - Provide operators for elevators
    - Stairwell Access
    - Building Engineer Contact
    - Activate the building communication system
    - Air Handling System
    - Monitor Fire Control Room or Station
    - Ensure fire pumps are operating properly (until the establishment of the Systems Control Unit.)
    - Priority movement of personnel and equipment between Base and Staging.
    - Initial Pressurization of Stair Shafts
    - Request additional resources to assist with Lobby Control
2. Inform the Incident Commander of the number of floors within the building and whether the elevators have been recalled.
3. Reports to the Logistics Section Chief or the Incident Commander if Logistics has not been established.
4. Verify water supply is established into standpipe system.

LOCATION

The Lobby Control Officer will be located in, or adjacent to, the lobby area.

TACTICS

Control Fire Department personnel and civilians:

1. Entering the building.

2. Exiting the building; ensure both civilian and Fire Department traffic exits through a safe corridor and moves directly away from the building a minimum of 200 feet (use LAPD to control civilians evacuated from the building).

3. On older high rise buildings (pre-1960) that have fire escape balconies, the Incident Commander needs to inform Lobby and Staging regarding companies sent into the building by fire escapes that bypass Lobby control.

   NOTE: Companies utilizing exterior means of ascent still need to check in with Staging.

4. Ascending to upper floors.

   - Designate a stairwell for Fire Department use.

   - When the elevators are determined safe, the Lobby Control Officer shall designate specific elevators to be used and assign Fire Department operators.

5. Initial pressurization of stair shafts. The assurance of a smoke free environment within the building stairways will assist in providing a tenable environment for occupants exiting the building and firefighters ascending or operating within the stair shafts. Lobby Control shall verify that built-in stairwell pressurization features are activated in order to maintain positive pressure within the stairwell. If the building is not equipped with pressurized stair shafts, utilize smoke ejectors to pressurize the stairwells. All access stairwells should be pressurized.

Obtain fire alarm information from annunciator panel or fire control room. Access lock box for building inventory plan, elevator and stairwell keys, etc.

Activate the buildings communication system. Lobby Control will have the initial responsibility to evaluate and support the buildings public address system. Initial communications should attempt to control evacuation efforts and not direct occupants to evacuate until conditions are known.

Establish equipment stockpiling areas proximate to their anticipated route of ascent. Use companies en route to Staging or request additional assistance through the Incident Commander to assist in the movement of priority equipment.

Designate personnel to maintain records; checking personnel and equipment in and out by time and destination.

Coordinate with Staging and Base to determine the priority of movement of personnel and equipment.

MEANS OF ASCENT

Stairwells

Stairwells shall be used for the initial ascent until the elevators can be verified by LAFD personnel as safe for our use. (See requirements for specific operational procedures for elevator use in Chapter 5, "Fire Extinguishment" and Chapter 7, "Elevators.")

1. Designate stairwells for specific use. It may be desirable to designate specific stairwells for Fire Department personnel use (ground to roof access) and a secondary stairwell for movement of equipment or possible civilian evacuation.

2. Locate stairwell ground floor openings and open only as necessary. Post personnel to control entry and direct civilians exiting the building (consider using LAPD personnel for this purpose).

Elevators

1. Elevators are the most effective means of transporting personnel and equipment aloft in high rise buildings. However, improper use of elevators in a fire situation can expose personnel to serious risk. Elevators SHALL NOT be used until it can be determined that the shaft is not threatened or contaminated with fire, smoke or water.

2. Lobby Control shall recall all elevators to the lobby, using the emergency service control (Phase I), and secure them at that location. Specific attention should be provided to those elevators not recalled by smoke detectors. Lobby Control shall notify the Incident Commander of the elevator status and any elevators that are not accounted for and their location.

3. The judgment whether or not the elevators are safe for personnel will rely heavily on conditions found and reports from the Fire Attack Officer. Under specific circumstances, elevators equipped with Phases I and II Emergency Service may be used for access to upper floors under certain conditions. When elevators are utilized, strict adherence shall be followed to Department procedures and guidelines when used as a means of ascent in a highrise building under investigation or during fire fighting operations.

4. Attempt to verify that elevator equipment rooms are free from fire, water and smoke residue.

SYSTEMS CONTROL

If needed, a Systems Control Unit can be implemented to relieve Lobby Control of the responsibilities associated with monitoring and maintaining the buildings built-in fire control, life safety, HVAC systems, communications and elevator systems.

RESPONSIBILITIES

1. Operate, support or augment building systems as required.
   - Identify type of built-in systems and monitor their current performance.
2. Assess current situation and request needed personnel and resources.
   - Examine building layout, system display/control panels.
   - Obtain briefing from currently assigned personnel and on-scene building/ facility management and engineering staff.
   - Obtain system layout/operation documents from building inventory, private pre-fire plans, or management representatives.
3. Request response of, and make contact with, building engineer, utility representatives, elevator service personnel, appropriate fire prevention personnel, etc. In a major incident, anticipate the failure of important systems by the following actions:
   - Request necessary technical specialists/assistance.
   - Assign personnel with communications capability to technical specialists assigned to problem systems.
   - Communicate and plan with Logistics Chief regarding solutions to systems failures so that plans and resource needs can be prepared.
4. Assign personnel to monitor and operate system display/control panels.
5. Evaluate the status and operation of the fire and domestic water pumps and water supply.
   - Support or repair system as required. The Systems Control Unit monitors and supports the water supply after the meter.

- Protect fire pumps from flooding and power loss.

- Investigate and remedy any failure of automatic fire suppression systems, and conditions of inadequate water pressure or volume within the building.

6. Evaluate and operate, as required (in conjunction with the Building Engineer), the heating, ventilation and air conditioning systems (HVAC) and the smoke removal and stairwell protection systems. (Operation or deactivation of these systems must be closely coordinated with the Operations Section to minimize smoke and fire spread and protect occupants and fire personnel.)

7. Evaluate, support and control, as needed, the building electrical system and emergency power. Building engineers and utility company personnel should be requested early in the incident to control, and restore power as required. Protect ground level and basement electrical rooms from flooding.

8. Evaluate and support, as needed, the buildings public address, telephone, emergency phone and other building communications systems.

LOCATION

The Systems Control Officer will be located in, or adjacent to, the buildings fire control room/area.

COMMUNICATIONS

RESPONSIBILITIES

1. The Communications Unit Leader shall manage on-site Communication Activities.

   - Building Communications System

   - 800 MHz Radio Cache (Replacement Radios and Spare Batteries)

   - Sound Powered Systems

   - Telephones and Cellular Phones

2. Inform Logistics Section Chief regarding the status of communications in building.

3. Create an effective Communications System between the Incident Commander and Incident personnel.

4. Reports to the Logistics Section Chief or the Incident Commander if Logistics has not been established.

LOCATION

The Unit Leader in charge of Communications will be located to facilitate communications needs.

TACTICS

Control and Implement the Communications System utilized by Fire Department personnel.

1. 800 MHz Radios (Replacement Radios and Batteries)

2. Telephones and Cellular Phones

3. Sound Powered Systems

4. Building Communications Systems

GROUND SUPPORT UNIT

RESPONSIBILITIES

1. Transport equipment via a stairwell, on a priority basis, from ground level to the Staging floor.

2. When equipment is delivered to the roof by helicopter, transport equipment via the stairwell to the Staging floor.

3. If an auxiliary water supply is required, the Officer in charge of the Ground Support Unit will coordinate and supervise this effort. Request Base to provide a supply line to the entrance of the stairwell.

4. Reports to the Support Branch Director, Logistics Section Chief or Incident Commander if Logistics position has not been established.

STRATEGY AND TACTICS

1. Consult with the Logistics Section Chief and the Lobby Control Officer to determine which stairwell is to be used.

2. Determine the number of personnel necessary to accomplish the task. Consider one member per two floors and one officer per four or five members.

- Officers must remain mobile to supervise the operation. Ground support is very demanding work and the officers must ensure a smooth flow of equipment at a pace that can be sustained. Officers must monitor their personnel closely for signs of undue fatigue or distress.

- If it is to be an extended operation, arrange for timely relief and rehabilitation. Consider assigning two-member teams alternating with one carrying and one resting.

3. Ground Support or Base will deliver equipment to the stairwell entrance at ground level.

4. Assign Floors

   - Normally one member per two floors, e.g., one member picks equipment up at ground floor entrance to stairwell and carries it to the third floor landing. Member then returns to ground floor for another load. Member at third floor carries the equipment to the fifth floor landing then returns to the third floor for another load. This process continues until the equipment is delivered to the Staging floor hallway. Moving the equipment beyond that point is the responsibility of the Staging Officer.

   - If the route involves unusual problems, long hallways, etc., supervising officers shall adjust assignments.

5. Equipment

   - Ground Support personnel shall have their personal safety equipment, turnouts, helmets, breathing apparatus, and spotlights available to them in the stairwell. In addition, officers will have their portable radios and building sound powered phones.

MEDICAL UNIT LEADER

The Medical Unit Leader is primarily responsible for the development of the medical emergency plan, for providing medical aid and transportation for injured and ill incident personnel, for providing rehabilitation services for incident personnel, and for the preparation of reports and records. The Medical Unit Leader reports to the Service Branch Director (if established) or the Logistics Section Chief. The Medical Unit may assist the Incident Commander/Operations in supplying medical care and transportation to civilian casualties, but this is normally limited to situations where civilian casualties are few or not anticipated.

RESPONSIBILITIES

1. Identify the location of fire operations, Staging Area, Base, and approved usable stairwells. Determine which, if any, elevators are approved for use.

2. Assess current situation and request necessary resources.

   - Evaluate current fire conditions and building layout with reference to injury potential and medical evacuation limitations.

   - Identify number of personnel needed to staff medical aid stations in Staging.

   - Determine number of rescue ambulances needed to standby.

3. Establish aid stations, arrange equipment, transportation and assign personnel.

4. Assign personnel and equipment to rehabilitation locations as directed or required. Designate and staff a medical treatment/rehabilitation area in Staging.

5. Coordinate plans and activities with the Operations Section Medical Branch or Group.

CHAPTER 4

SEARCH/EVACUATION

Over the last few years several disastrous fires have occurred in high rise buildings. These fires, some of which have occurred in relatively new and ostensibly state-of-the-art buildings, have resulted in a large loss of human life. Whether accidental in nature or the result of a terrorist act, occupants of high rise occupancies must be carefully managed during a fire situation. Life hazard to occupants will vary greatly with the type of occupancy as well as the location and extent of the fire. Evacuation of a building can prove to be a monumental and complex task requiring the commitment of a large amount of resources. Gaining control of stairwells during a spontaneous evacuation may require a considerable amount of time, personnel, and may negatively impact access by fire attack teams to the fire location.

It should go without saying that the Incident Commander at a high rise incident is faced with more complex operational priorities such as life safety, extinguishment, and property conservation than those in smaller structures. Considerations including occupant safety, personnel safety, personnel accountability, fire confinement, and evacuation are all of paramount importance. Evacuation of a high rise, or the management of building occupants during a spontaneous evacuation, can be one of the top priorities in effectively managing and controlling a high rise emergency.

Evacuation of a high rise can be one of the biggest challenges facing the fire service today in controlling a high rise fire emergency. We must be prepared to control panic and safely manage the evacuation of occupants from high rise occupancies.

This Chapter will provide an orientation into the pertinent codes, policies and procedures that contribute to effective management of building occupants during a high rise fire emergency.

High Rise Occupancy Type

High rise buildings designed for human occupancy are of two basic types, either residential or commercial. Residential high rise buildings may be hotels, apartment houses, condominiums, hospitals or care facilities. These occupancies are generally characterized by center hall corridors, numerous interior compartments, and 24-hour occupancy.

Commercial high rise buildings are characterized by center core construction, circuit corridors around the core, and relatively larger, more open spaces. Human population density is usually greater in commercial buildings than residential buildings, with the greatest concentrations during business hours.

Building Features and Systems

For our purposes, a high rise building is defined as a building which is over 75' in height, measured from ground level access to the floor level of the highest floor intended for occupant use.

High rise buildings in the City of Los Angeles have a number of design features which will assist us in protecting and, when necessary, evacuating occupants of these buildings.

Buildings Constructed Since 1974

Buildings constructed since 1974 that are over 75' in height will have the following features and systems:

1. These buildings are completely sprinklered.

2. Class III Combination Standpipe System -- This is a combined standpipe/sprinkler system, with an on-site water supply and pump. The outlets on this system are all 2-1/2 inch and required to have an 1-1/2 inch reducer.

3. At least two approved means of egress from each floor.

4. Local Fire Warning System -- When the fire warning system is actuated, either manually, by smoke detectors or water flow switches, the floor of origin and in some buildings, adjacent floors go into "alarm mode". Alarm mode will sound a localized alarm, annunciate in the fire control room, and shut down the heating, ventilation, and air conditioning (HVAC) system on the floor of actuation and, in some buildings, adjacent floors. Alarm mode will also pressurize the stairwells and unlock all stairwell doors that are controlled magnetically from the fire control room. If the smoke detector in the elevator vestibule is actuated, the elevators on that bank will be recalled to the ground floor.

5. Building Communication System -- This public address system will permit the Fire Department to communicate with occupants in any public area of the building. This is a one-way communication system, building occupants cannot use it to communicate with the Fire Department.

6. Building Control Station -- This station will be in a room housing the fire alarm annunciator panel, the building communication system controls, an elevator status panel, and the smoke handling controls.

7. Fire Department Lock Box -- This lock box will have keys to operate automatic elevators in "fire emergency service," the fire alarm system, and to gain access to floors from the stairwells. In addition, Building Inventory Plans are included in some buildings.

8. Standby and Emergency Power Systems.

9. An emergency helicopter landing pad on the roof.

10. Stairwell numbering system.

Buildings Constructed Before 1974

Depending on the period when they were constructed, high rise buildings will have varying design features and systems. At a minimum, all high rise buildings currently occupied in the City of Los Angeles will have these features.

1. At least two approved exits from each floor.

2. Enclosed stairwells, except in a few very old high rise buildings.

3. Some type of smoke control. This may be openable windows, tempered glass breakout panels on at least two sides, or a modified HVAC system capable of exhausting smoke outside the building without spreading it onto additional floors.

4. Floor level numbering signs at each floor in each stairwell. These signs identify the floor level, stair number, floors served by the stairs, and whether the stairs provide roof access.

5. Some type of standpipe system.

   High rise buildings constructed before 1960 will have a Class I Dry Standpipe (2 1/2"), with water supplied by Fire Department pumpers, and a Class II Standpipe (1 1/2") supplied from the domestic water system.

   Buildings constructed between 1960 and 1974 that exceed 150' in height will have Class III Combination (Wet) Standpipe System with 1 1/2" and 2 1/2" outlets. An on-site fire pump maintains a working pressure in the system. Buildings built in this period that are less than 150' will have the same systems as pre-1960 buildings.

6. A Building Communication System (if the building is 150' or more in height). This public address system will permit the Fire Department to communicate with occupants in any public area of the building. This is a one-way communication system.

Occupant Training Programs

The Department's Fire and Safety Education Unit administers a program, required under Title 19 of the California Administrative Code, whereby occupants of all high rise buildings

in the City are trained in emergency pre-fire planning and evacuation procedures. Under this program, building management is responsible for establishing, implementing and maintaining an emergency pre-fire plan that includes the following:

1. Assignment of a responsible person as Fire Safety Director.

2. Annual instruction of all high rise building occupants on procedures to be followed in the event of fire, earthquake or other emergency.

3. Appointment of floor wardens who shall oversee the evacuation team and occupant instruction. The floor wardens shall ensure safe and complete evacuation or relocation within the building of occupants during actual emergencies or drills.

4. Posting of emergency exit plans and evacuation procedures in each quadrant of each floor, elevator lobby, dwelling unit, hotel guest room, and office area.

5. A minimum of one fire drill annually, which may be conducted on individual floors. (Hotels are exempt from the training and drill requirements for guests. This training is required for all hotel employees.) Total building evacuation is not necessary. All drills must be properly documented.

6. The Fire Safety Director shall maintain a current list of physically challenged individuals located in the building, needing assistance in relocating to a safe refuge area or with evacuating the building.

Experience has demonstrated that evacuation is more effectively managed if the occupants have been trained in evacuation procedures. Unfortunately, building occupants often become complacent with fire warning alarms and do not always follow evacuation procedures resulting in the delay of exiting and ultimately becoming trapped.

Fire attack and evacuation remain the two highest priorities during high rise operations. While an aggressive fire attack has proven to be the most effective strategy in the majority of high rise fires, managing occupant evacuation requires that the first arriving officers, and the subsequent Incident Commanders, make a continuous assessment of the risks posed to occupants who are still inside the building. Depending on the situation encountered, a strategic change from an offensive attack on the seat of the fire to defensive tactics, such as protecting stairwells, evacuating occupants, and/or managing evacuees might be necessary.

<u>Danger to Building Occupants in High Rise Fires</u>

In the event of a high rise fire, the danger to building occupants could develop from three sources. First, there is the possibility that occupants could be directly exposed to the actual fire. Direct exposure to the fire is most likely to occur to tenants in residential high rise buildings through careless activities, e.g., smoker fires, etc. These fires are generally confined to the unit of origin. Direct exposure to fire could also result from a fast spreading

fire sweeping through a public area of a high rise building. High rise buildings in the City are designed with two-hour fire resistance between floors and around vertical openings. This effectively compartmentalizes each floor and reduces the likelihood of vertical fire spread. The usefulness of this concept has been proven in actual high rise fire incidents.

The second threat to building occupants is the possibility that a panic could result from the knowledge or belief that a fire is in progress in the building. Occasionally, individuals will react to a high rise fire situation in an irrational manner and may show some degree of panic. The best defense against this situation is public education. People who have been trained to do the right thing are much less susceptible to panic or irrational actions under stress.

The third and by far the gravest threat to building occupants in high rise fires is exposure to smoke and the products of combustion. Building design features such as compartmentalization, pressurized stairwells and elevator vestibules are intended to minimize smoke travel within the building. However, these efforts may not be entirely successful. Smoke may be transmitted through the air handling systems of older buildings lacking automatic shutdown devices. Smoke will also communicate through elevator shafts, stairwells, utility alleys or almost any vertical or horizontal opening. Smoke could also escape the building and be carried back in at other levels by exterior air currents.

The greater the volume of fire, the greater the amount of smoke likely to be generated. Larger fires will also generate higher temperatures and greater pressures to spread the smoke.

Search of Building Occupants in High Rise Fires

Fire Attack

Experience has shown that the most effective means of saving lives and facilitating rescue in a high rise fire emergency is an aggressive attack on the fire. The best way to protect high rise occupants from smoke and fire is to control the fire rapidly, which is best achieved through the properly operating fire protection systems. Unfortunately, many existing buildings (specifically residential high rise occupancies) do not offer this type of protection, resulting in a delay in fire suppression efforts and significant evacuation problems. A quick, aggressive attack combined with proper ventilation offers the best means of containing the products of combustion and the spread of fire, and thereby affords building occupants the greatest degree of protection. Containment of the fire and controlling the products of combustion will allow time for relocating, and where necessary, evacuating building occupants.

Every effort should be made to confine the fire and products of combustion within the minimum number of building compartments. Simply closing doors between the fire and the uninvolved areas will help confine smoke travel and fire spread.

Access for the Fire Attack Team will be via a stairwell. Where possible, separate stairwells should be utilized for emergency personnel access and occupant evacuation. In reality, this may be impossible and impractical. Depending on conditions on the fire floor, there is the possibility of smoke entering the stairwell through the door held open by the fire attack hose line. The fire attack may have to be delayed until control of the stairwell used for fire attack has been established above the fire floor in order to ensure exiting occupants will not be exposed to the products of combustion.

When the relocation of occupants to a place of safe refuge within the building is necessary, or to a safe assembly area outside the building, it should be carefully coordinated. One stairwell should be dedicated to occupant traffic, under Fire Department control, and one stairwell should be dedicated exclusively for Fire Department operations. This effort can be coordinated and controlled through the use of the building communication system in those buildings so equipped.

In the event of a working fire, all access stairwells should be pressurized with Fire Department blowers.

Searching the Building

When a working fire in a high rise building occurs, the whole building must be searched to ensure all building occupants are accounted for. People may be found in high rise buildings at any time of the day or night, and on weekends as well. In one of the Fire Department's first high rise fires, a restaurant on the top floor was well involved with fire. Long after the fire was extinguished, a custodian cleaning offices was discovered several floors below the fire. He had been working throughout the course of the fire and was unaware there had been a fire in the building.

Searching a large, high rise building will be a time consuming process and could require a lot of personnel. The search should be conducted on a priority basis, beginning in the immediate area of the fire and then advancing to the area above the fire that may have been exposed, and concluding with the balance of the building above and below the fire.

This operation will be conducted under the direction of the Search Group Supervisor. Search teams must be provided keys to access individual floors from the stairwell. Individual room keys should be provided if possible.

Strict control and documentation of the search will be necessary to ensure that each room on each floor is searched and duplication of effort is kept to a minimum. Each elevator car must be located, inspected, and verified empty. The Search Group Supervisor or Elevator Group Supervisor, if implemented, will check with the Lobby Control Officer or Systems Group Leader to determine the status and location of all elevator cars. Elevator cars located above the fire must be verified empty because of the significant danger to occupants who may be in the cars.

Our standard operating guideline will require the use of chalk to indicate the progress of the search, the current location and identity of the searchers, and to prevent duplication of effort. As a search company enters a floor, a large, single, diagonal chalk line and the company designation shall be made on the entry door. When the office suite, or dwelling unit has been searched, a second diagonal line is placed on the door making a large "X". The door is left closed to minimize smoke and fire spread. When all rooms on the floor have been searched and marked, the company shall complete the "X" along with their company identification on the stairwell door of the floor just searched and move on to the next floor.

Relocation of Building Occupants to a Place of Safe Refuge

Some high rise buildings in Los Angeles house more than 5,000 people during peak time periods. A planned evacuation of these populations for even a working high rise fire is difficult. Attempting to totally evacuate one of these buildings will impact fire suppression operations, as well as our ability to move those occupants to a place of safety that are actually threatened by the fire. However, responding personnel should be prepared for a spontaneous evacuation of building occupants and adjust operational objectives as the incident priorities dictate.

An alternative is to relocate the minimum number of occupants to areas of safe refuge within the building. For a working fire, relocate occupants from the fire floor and at least two floors above and two floors below the fire to a safe location, preferable below the fire, to facilitate our operations. In most situations we can provide for occupant safety and Fire Department access by clearing five floors. If further relocation or evacuation is necessary, it must be controlled and implemented by the Fire Department and coordinated with the existing building evacuation plan. On rare occasions, the intensity of the fire may dictate that occupants of additional floors above the fire be relocated.

First arriving officers and ultimately the Incident Commander must determine as quickly as possible, whether a complete, partial, or no evacuation is necessary. This information needs to be communicated to building occupants by using the building's public address system or other means. This task is usually initially assigned to Lobby Control and might require the assignment of additional resources to assist specifically with evacuation. O.C.D. must be notified of evacuation status and objectives.

Building Emergency Plans, required for commercial high rise occupancies, require that an updated list be maintained indicating the name, location, and type of assistance needed for each physically challenged individual within the building. "Physically challenged" can be defined as "anyone who without the assistance of another person would have difficulty evacuating or relocating to a safe location either inside or outside the building, or slow down evacuation of other occupants within the building". The Incident Commander, Operations Section Chief, or the Search Group Supervisor, should identify and consider the prioritization of these individuals and assign personnel to assist in, or ensure, the relocation or evacuation of these occupants. The location of these physically challenged individuals may be communicated to the Command Post by the Building Emergency Plan, the buildings Floor Warden, or communication through telephone reports to O.C.D.

Evacuation Underway Prior to Fire Department Arrival

Our success in controlling the fire and protecting the occupants will depend on our ability to control the stairwells.

If an evacuation is underway upon our arrival, we must attempt to gain control of it. The Incident Commander will determine which stairwell is the most suitable for fire attack and concentrate resources to control that stairwell. This stairwell shall be designated the fire attack stairwell and should have roof access. The remaining stairwell(s) will be designated the evacuation stairwell(s). Multiple stairwells can be differentiated by using the stairwell number.

Beginning at the second floor, firefighters must make their way to each landing and attempt to control existing occupants. If firefighters cannot move in the stairwell due to the press of occupants evacuating the building, the Incident Commander shall be notified of the delay. The Incident Commander may utilize an Airborne Engine Company deployed to the roof. Working down from the roof this company may be able to gain control of the stairwell more quickly than units from the ground. Depending on the circumstances, this company may also be used for fire attack. Tactical considerations for this operation will be discussed in Chapter 12.

When firefighters are able to move in the stairwell, the occupants three or more floors below the fire should be managed until occupants above the fire can be evacuated. Occupants on floors three or more floors above the fire should also be managed and assisted in evacuation. Occupants on the fire floor will likely have already evacuated the fire floor. Occupants of the two floors above and below the fire should be assisted to the remaining stairwell which shall be designated as the evacuation stairwell.

Once firefighters assigned to gain control of the fire attack stairwell have managed the flow of occupants into the stairwell at a specific floor, they must remain on that floor, at the stairwell door to prevent occupants re-entering the stairwell. Company officers shall rotate among the floors controlled by their personnel, monitoring the situation on each floor and reassuring the occupants. It is critically important to the peace of mind of the occupants, and our ability to control them, that these members maintain a presence and project confidence and professionalism.

Gaining control of stairwells in a spontaneous evacuation situation may require a considerable amount of time and personnel. Elevators may present an alternative. If Fire Department personnel can ascertain that the elevator lobbies and shaft are not threatened by the fire, the elevators shall be switched to "firefighter service" and employed to transport Fire Department personnel and equipment. Refer to Chapter 7.

Communications Between the Fire Department and Building Occupants

Gaining control of an evacuation and providing information and direction to building occupants will be greatly simplified in those buildings which are equipped with a public

address system. These systems are usually controlled from the fire control room. These systems can be switched to speak to all floors simultaneously or to selected floors.

The member assigned the responsibility for communications with the building occupants must be carefully chosen. This individual must be steady, mature, and project confidence. Consider repeating instructions in appropriate languages other than English. The designated Fire Department member will communicate with the building occupants on a periodic basis. The following scenario describes how this system might be used in an actual high rise fire in a 30-story building.

To all floors:

"Your attention please. This is not a drill. This is Firefighter Smith of the Los Angeles Fire Department. There is a fire on the 17th Floor. The Fire Department is here. Please remain in your present location, until the evacuation routes are secured for your safety. You are in no danger."

To Floors 17, 18 and 19:

"This is Firefighter Smith again. At this time we want you to relocate to the 14th Floor. Floor wardens are to implement the floor evacuation plan using the Number One Stairwell. The Fire Department is operating the Number Two Stairwell. Take your personal items with you and walk to the stairwell now. I repeat, you are to go down the Number One Stairwell to the 14th Floor."

Ideally, members of the Search Group will be situated in the evacuation stairwell to direct the occupants onto the 14th Floor. It may be necessary to relocate these occupants before Fire Department personnel can be deployed in the stairwell. In this situation, you may want to advise building occupants that firefighters are on the way to assist them.

To Floors 15 and 16, after the relocation described above has been accomplished:

"This is Firefighter Smith again. At this time we want you to relocate to the 13th Floor. Floor wardens are to implement the floor evacuation plan using the Number One Stairwell. The Fire Department is operating in the Number Two Stairwell. Take your personal items with you and walk to the stairwell now. You are in no danger. I repeat, you are to go down the Number One Stairwell to the 13th Floor."

To Floors 20 through 30:

"This is Firefighter Smith again. We are making good progress on the fire on the 17th Floor and expect to have it under control shortly. Do not be alarmed if you detect a faint smoke odor on your floor, this is normal in this situation, especially near the stairwell. If you have visible smoke on your floor, close the doors between it and any occupied area and report it to your floor warden. Floor wardens are to call 911 and report any unusual conditions to the Fire Dispatcher. Remain where you are, the Fire Department is using the stairwells to fight the fire."

Here again, it may be helpful to advise the building occupants that firefighters are on their way to their location to assist them.

Dispatchers receiving calls from building occupants on the 911 lines will note the time, location of the caller, conditions reported, number of occupants at that location, and the call back number. This information shall be relayed to the Incident Commander, then to the Search or Evacuation Group supervisor, depending on the incident. If Fire Department personnel will be delayed in reaching these people, OCD shall make every effort to stay on the line so that the Search Group Supervisor will set up a telephone link whereby concerned occupants can be periodically contacted and building occupants can be kept informed of the situation.

Incident Commanders may also establish a separate communication link to OCD for the management of 9-1-1 callers through the assignment of a Communications Technical Specialist assigned to the Command Post. During high rise fires in other jurisdictions, several callers were told the Fire Department is on scene and that they should not be concerned, to stay in place, and the call was terminated. Unfortunately, those same individuals entered a stairwell, were unable to return to a floor, and met their death. The Incident Commander, or the individual assigned as the Communication Technical Specialist , shall ensure these telephone contacts are reconciled by the Search or Evacuation Group Supervisor.

To all floors:

"This is Firefighter Smith again. The fire on the 17th Floor is contained at this time. It is going to take some time to clear the smoke from the building. You are to stay where you are until we can clear the smoke and begin an orderly evacuation. When the time comes you will leave the building by traveling down the stairwell. The helicopters you may have seen are delivering Fire Department personnel and equipment to the roof. We will not be evacuating people by helicopter. The air conditioning system was shut down to limit the spread of smoke through the building. We are working to isolate the 17th Floor and get the air conditioning system working again."

Handling Evacuees

When people are in the stairwells it is important to keep traffic moving smoothly. People in the stairwell may not be able to hear directions given over the public address system. The Search/Evacuation Group's function will be to provide simple directions to people in the stairwell and to keep bottlenecks from forming.

Relocating occupants will be most effective when Fire Department personnel are available in the evacuation stairwell to direct them onto the appropriate floor.

Evacuating occupants from the building requires some planning. You can expect that once occupants reach the terminus at ground level, they will stop to look around and talk

to other individuals. This will result in a logjam at this point that will soon extend back into the stairwell and restrict the movement of those still attempting to exit the building.

To prevent the logjam and to reduce the risk of occupant injury from falling glass, a corridor should be established to lead occupants to an assembly area away from the building. This corridor, and the assembly area, may be defined with fire line tape or rope.

Use Fire Department personnel and police officers if they are available to keep people moving all the way to the assembly area.

When occupants reach the assembly area, use the floor wardens to make a roster of people under their supervision. The roster should show the names of all those evacuated, the floor, office/room they evacuated, and the time they arrived at the assembly area. This information will be especially important for those occupants who vacated the fire floor and the two floors above it. Once they have logged in, assuming they have no medical or other problems related to the incident, they may leave the assembly area. Be sure they understand they are not to return to the building. The decision whether or not to remain at the scene is between the people evacuated and their employers or building management. Advise them that we will provide periodic briefings at the assembly area as the incident progresses.

Los Angeles Police Department personnel should be given the assembly area responsibility.

Protecting the occupants of a high rise building in the event of a working fire will be a complex and challenging responsibility. Evacuation of these potentially large numbers of people will require a significant commitment of resources and time. Your ability to meet this challenge will be enhanced by your understanding of the procedures set forth in this manual.

CHAPTER 5

FIRE EXTINGUISHMENT

Effective high-rise firefighting is one of the greatest challenges you will face as a firefighter. The problems you routinely face in fire suppression operations will be compounded in a high-rise structure. These buildings may well exceed 50 floors in height and contain their own environment, sealed off from the outside atmosphere.

Despite the peculiarities of high-rise construction, basic firefighting principles apply. While methods must be slightly adapted to a high-rise fire, basic strategy and tactics are consistent with all fires. The objective of the fire suppression efforts will be to locate, confine, and extinguish the fire.

Pre-Planning

Our preparation to extinguish a high-rise fire begins long before the alarm sounds. We start developing standard operating guidelines to identify specific responsibilities of each company member. For example, on an engine company a member will be assigned to take the hydrant while another member would take the nozzle. In order to be safe and effective in combating a high-rise fire, company members must understand the Los Angeles Fire Department's High-Rise policy in addition to their company's standard operating guidelines.

Pre-Planning also involves a working knowledge of the specific buildings in our respective districts. Depending on when they were constructed, high-rise buildings will have different built-in fire protection systems and features that make each building unique. Knowledge of these systems is essential to our effectiveness in fighting a fire in a specific high-rise building. What we learn from our on-site inspections can be augmented and reinforced through study of the Los Angeles Fire Code and Department manuals. All members must have a basic understanding of high-rise building design, elevator operation including use under emergency firefighter service, the stairwell numbering system, fire control rooms, and how to access and enter stairwells from ground level.

Physical conditioning is also part of pre-planning for a high-rise fire. Firefighting is tough, demanding work. Fighting a working fire in a sealed high-rise building is probably the most difficult kind of fire you will encounter. The Department's Wellness Program helps maintain the most important element of our plan, you. Often in a high-rise fire, it is necessary to carry all of our firefighting equipment up many floors. Optimum physical conditioning is required to enable firefighters the ability to get the job done with sufficient stamina left over to provide the margin of safety to contend with the unexpected.

We should not forget the tools that we use to achieve our objectives. Pre-planning involves a thorough knowledge of our equipment and the ability to use it effectively.

The preliminary portion of our planning is concluded with a study of past fires. The lessons learned from these fires can often be applied to the successful attack and extinguishment of a high-rise fire, and saving lives and property.

En Route

Your plan becomes operational when the alarm sounds. Begin with an initial evaluation of the information you receive with the alarm. If it is a building for which a Building Inventory Plan has been developed, you will want to refer to it en route. Some of your considerations may be:

- The time of day, day of the week, and type of occupancy will indicate whether an office building will be nearly empty of employees or a residential high-rise might be occupied by people sleeping. Is an occupant evacuation underway? The history of the building may indicate special problems or hazards.

- As you approach the building, is fire showing? What is the size of the building and approximate number of floors? Is it a new high-rise building with many fire protection systems, retro-fitted, or a older residential high-rise without certain fire protection systems?

On Scene

On of the first decisions when arriving on scene will be apparatus placement. Pre-planning makes this decision easier. A pre-determined location to gain access or meet security personnel can make the initial fire attack and extinguishment easier. But if there is fire showing above your pre-planned location, presenting the possibility of falling glass or other hazards, it may be necessary to spot apparatus in another safe location. These important factors must be included in your initial size up.

Once the radio size up has been made and apparatus has been safely positioned, the fire attack team can initiate tactical operations. Resources immediately available to the first-in officer will determine the number of firefighters and equipment that will comprise the initial Fire Attack Team. When a single engine company is first-in, the Fire Attack Team will consist of all four engine company members. If a fire suppression certified rescue ambulance arrives with the engine company, the extra personnel may be included in the attack team or directed to perform another critical function.

Department policy requires the Fire Attack Team take with them their breathing apparatus, portable radio(s), forcible entry tools, high-rise hose packs, pigtail, thermal imaging camera, and a fire extinguisher if an elevator is used. When feasible, the Fire Attack Team should also take a portable spotlight and extra air bottles. At the discretion of the company officer, additional equipment, i.e., a ladder, rotary saw, 2-1/2 inch hose,

may be added to the complement. Any added equipment would be supplementary to the required minimum listed above.

Training and experience at actual high-rise incidents and/or knowledge of specific problems within your district will help you determine whether or not your company could benefit from some sort of the specialty equipment that has been developed, such as the air bottle carriers constructed of old hose and short sections of drop-bag line or webbing. It will also help determine if you should take a ladder aloft with your Fire Attack Team and if so, which ladder is best suited to your needs. You may find that the 12-foot extension ladder fits into more elevator cars in your district that the 14-foot extension does, or that the narrow width of the 14-foot ladder is necessary to gain access to certain areas of a specific building.

Pre-planning and training will make assembling the Fire Attack Team run smoothly. Specific jobs and duties can be pre-assigned, reducing confusion and saving time at the scene.

Entering the Building

Entering the building may seem routine during normal business hours or when security personnel are there to meet you after hours. In other circumstances, building entry can be greatly facilitated by the presence of an exterior Fire Department lock box.

Some office buildings are locked and do not have security personnel available after business hours, so forcible entry may be required. Choose the method that will cause the least damage. Sometimes two claw tools can be used to pry double doors apart. The rotary saw might be used to cut the deadbolt that locks the double doors together.

Often these entry doors are deadbolted directly into the concrete floor. Depending on the fit of the door and other circumstances, you may be able to cut these deadbolts with the rotary saw. Do not limit your consideration to the front doors, look for other means of entry.

An aerial ladder could perhaps be used to access the building above ground level. But this option is seldom used due to unopenable windows and deep building setbacks. In a working fire, we will need access to the building stairwell at ground level, as it is the only practical means of moving personnel and equipment necessary to meet our objectives.

When our efforts to gain access through forcible entry of the doors are unsuccessful, the next best option will probably be to break glass. The entrance doors are very expensive and should not be broken except as a last resort. The large glass panels often found next to the doors are much less expensive and are a better choice, provided they are big enough to meet our needs. Remember, however, that in a situation where fire is showing the first priority is gaining effective access.

In the Lobby

Once inside the lobby, gather information from all available resources.

Does the building have a fire control room? A review of your Building Inventory Plan while you were responding will get you off on the right foot.

Check the annunciator panel. What floor or floors indicate a problem? What type of alarm has been actuated? Was it a manual pull station, smoke detector, heat detector, or water flow? Is there more than one device activated or a combination? The problem could be a special extinguishing system in a computer room. Some annunciator panels graphically display the general floor plan of the building and the location of the device that has been actuated in addition to the type of alarm.

If building maintenance or security personnel are present, do they have someone on the reported fire floor reporting a system malfunction? Have they investigated the floor above and below the indicated fire floor? Are security cameras available to assist in determining conditions on the floors, stairways, or elevator lobbies when problems are indicated?

Further information can be gathered from other sources in the lobby. The elevators should be checked to determine which floors are served by split banks. Have the elevators been recalled and are all cars accounted for? Is the elevator serving the reported fire floor in Phase I, "recall?" This may indicate a fire on the reported floor.

The building directory may give you a clue to the type of occupancies on the reported fire floor, the floor above the fire, and the staging floor.

The Fire Code requires an interior lock box for Fire Department use. This is usually found at the building's lobby security post or in the fire control room. From the lock box, obtain one set of building keys and a copy of the building inventory prior to the proceeding aloft. These keys should enable you to control the elevators and unlock the ground level entrance and all floors served by the stairwell. Does the occupancy have a private building plan or emergency plan available? These plans have proven to assist responding personnel with determining floor layouts, building hazards, stairwell and elevator locations, electrical rooms, sprinkler systems, and other building features.

Obtain a telephone number for either the fire control room or the lobby.

A safe route of ascent must next be determined.

Going Aloft

Once you have gathered information from available sources and determined the proper stairwell or elevator, notify incoming companies of the route you have chosen for your ascent. Command shall be "passed" to the next arriving company or transitioned to a

higher ranking officer if on scene. Any other pertinent information that you have discovered should also be relayed to incoming companies.

The officer in charge of the Fire Attack Team sets the stairwell climbing pace. As necessary, stop and take short rests. You must conserve your strength and ensure that all members of the Fire Attack Team are not too exhausted to effectively attack the fire when you reach it. Attack teams have, on occasion, had to climb over 20 floors to reach the fire.

Stairwells have proven to be the safest and most reliable route to the fire floor for the Fire Attack Team. However, you must have a working knowledge of stairwells in order to use them effectively and safely.

All floors of a high-rise building may not be served by every stairwell. The stairwell numbering sign inside the stairwell indicates which floors will be available to you and if it exits the roof. Scissor-type stairwells, for example, may only service alternate floors, skipping every other floor or exit at the opposite end of the building.

You may also encounter stairwells where the shaft terminates and it is necessary to exit a stairwell and cross over to another stairwell to reach the upper floors. In choosing a fire attack stairwell, select a stairwell that has ground to roof access whenever possible. However, the selection of the attack stairwell should be a tactical decision based on several factors. Considerations include the location of the fire in relationship to the stairs, stairway pressurization features, what stairways are being used by occupants for evacuation, and the safest access to the fire to name a few. Some buildings are equipped with stairwell pressurization systems which provides positive pressure within the stairshaft. This greatly reduces heat, smoke, and products of combustion from entering the stairshaft when a stairwell door to the fire floor is opened. If, however, the building is not equipped with one of these systems or it is not working adequately, the positioning of smoke ejectors at the ground level entrance to the stairs will assist in providing positive pressure within the stairwell. If necessary an additional smoke ejector may be placed at an advantageous location within the stairwell. Water pressure driven blowers have proven very beneficial at high-rise fires. They do not emit carbon monoxide and supply fresh air to the stairwell.

Sometimes, just finding the stairwell entrance can be difficult. Some building architects hide stairwell exit doors. The outside of the ground level stairwell door will often be covered with the same material as the building's exterior, effectively camouflaging it. The doors can usually be distinguished from other types of doors by their double-door width and key cylinder lock. In addition to the key lock, some doors are held closed by a magnetic device requiring 25-pound pressure to overcome it. If the key unlocks the door, but it resists opening, give it a hard pull.

Access to upper floors by firefighters via stairwells in high-rise buildings offers numerous challenges to firefighting personnel. Firefighters in personal protective equipment, breathing apparatus, high-rise hose packs, and forcible entry equipment require approximately one-minute per floor to ascend stairs. If any significant distance

from building access to the fire floor, the fire attack team may be likely to need some rehabilitation before fire suppression operations can begin.

Elevators equipped with Emergency Service, remote or separated from the fire location, and operating properly, may be utilized to access upper floors under certain conditions.

If the fire is reported to be on or below the sixth (6th) floor, the stairwell shall be used and firefighters will walk to reach the fire floor. If elevators are to be considered for use, certain parameters, procedures, and guidelines must be strictly adhered to in order to increase firefighter safety. While elevators function fairly similarly, the familiarization of elevators in your first-in district is imperative for safe and efficient operations during emergency conditions.

If elevators are to be used, all elevators must be accounted for, recalled (Phase I operation), and equipped with Phase II Emergency Service. Under no circumstances should an elevator not equipped with Emergency Service or a freight elevator be utilized until it is determined safe by fire department personnel on the desired floor(s) of operation and their use approved by the Incident Commander.

Elevators shall not be taken to, or above, the reported fire floor. If used as a means of ascent, elevators should not be taken closer than two floors below the reported fire floor or two floors below the lowest alarm activated floor location.

Prior to entering the elevator, all personnel shall determine the location of the stairwells in relationship to the elevator. Additionally, at the first and any subsequent safety stops, the location of the stairwells in relationship to the elevators should be determined.

No more than six (6) personnel with equipment is permitted in any elevator. This will prevent exceeding the weight capacity of the elevator.

Often the fire cannot be seen from outside the building. A continuous size up must be provided to keep the Incident Commander and responding companies informed of your progress. The officer in charge of the Fire Attack Team should give an assessment of conditions found in the stairwell every four or five floors and, if elevators are used, during the precautionary stops every five floors. When conditions warrant, the Fire Attack Team utilizing a stairwell should open floor access doors to check conditions on intervening floors. The continuous size up given from the stairwell can simply be a report of heat and/or smoke conditions for a given floor while climbing towards the reported fire floor. The continuous size up will also confirms that radio communications are being maintained.

SPECIFIC OPERATIONAL PROCEDURES FOR ELEVATOR USE UNDER EMERGENCY CONDITIONS IS DISCUSSED IN CHAPTER 7, “ELEVATORS.”

Check for Staging

Two floors below the reported fire floor, the attack team should assess that floor's suitability for Staging. It should be clear of smoke and heat and large enough to accommodate tools, equipment, and the firefighters that may soon occupy it.

Additionally, the building's general floor plan should be checked by looking at one of the occupant evacuation plan signs. You can see what the floor layout is, as well as the size and direction of corridors. Note the location of the elevators and whether the elevator lobby is separated by lobby doors. If a determination can be made that it would be safe for additional personnel to use the elevators, dependent on the conditions found and the procedures established for the safe use of elevators, notify the Incident Commander.

After you have assessed the floor, inform the Incident Commander via radio, whether it is suitable for Staging and proceed to the reported fire floor. Check each intervening floor for fire.

Fire Floor

When you reach the reported fire floor, if there is no smoke in the stairwell and the door is not hot, open it and search the floor for fire. Do not be hasty in concluding it is a false alarm if fire is not found on the reported floor. It could be that a fire on an adjacent floor has activated the detectors on the floor you are investigating, or a system malfunction has incorrectly reported the involved floor. Check the floors above and below the reported fire floor.

If you encounter smoke and heat in the stairwell, you must determine where it is entering the stairwell. Breathing apparatus may have to be used at this time. If an IDLH atmosphere is encountered, two members shall remain outside of the IDLH atmosphere until other resources arrive on scene. Once you have identified the fire floor, before opening the stairwell door, you must check the floor above and report your findings to the Incident Commander. The check of the floor above can assist in determining vertical extension, potential hazards, and vertical openings such as tenant stairs.

When the door is hot to the touch, or if a fire is suspected, connect and charge a hose line. Conditions may dictate whether you connect the line on the fire floor, the floor below the fire floor, or above the fire floor. It is very dangerous to open a door in a high-rise, as in any structure, that is separating you from fire without a charged hose line for protection. It may be necessary to consider the use of an alternative stairwell to initiate the fire attack.

Before attacking the fire and opening the stairwell door to the fire floor, you should take into consideration the possibility that occupants may be in the stairwell above the fire floor. Once you have opened the door and taken a hose line onto the fire floor, the

stairwell door will not close and the stairwell may become contaminated with smoke and other fire gases, making it unsuitable for use for building occupants and evacuees. It may be necessary to delay entry onto the fire floor until the stairwell above the fire floor is clear of people. The fire attack stairwell should be monitored throughout the incident to ensure that occupants have not entered the stairwell and exposed themselves to heat, smoke, and the products of combustion.

Advancing Lines

Your decision as to where and how you connect your lines will depend on the specific circumstances you encounter. If and when conditions permit, it may be viable to connect your lines to the standpipe outlet on the fire floor landing. This will make pulling hose easier and increase the effective reach of the line. However, consider the location of the standpipe outlet in relationship to the stairwell door. The exposure of heat and smoke when the stairwell door is opened may dictate that the connection be made to the standpipe outlet on the floor below the fire.

To facilitate advancing lines, where feasible, flake the line up the stairs while it is being connected below. When preparing to advance two lines simultaneously, flake one up the stairs and the other down the stairs to minimize the chance of them becoming entangled. When you are preparing lines of different sizes, flake the large line up the stairs and the smaller one down the stairs to make it easier to move the loaded lines.

Water supply in a high-rise fire is crucial to safe, effective operations. Consider the water supply from a single standpipe outlet before connecting more than one line to an outlet. Standpipe pressure in a high-rise building is controlled by three means: pressure regulating devices, pressure restricting devices, or orifice plates. They work on very different principles. The pressure regulating devices control pressure, and assuming they are functioning properly, the volume of a give outlet can increase to supply more than one line, as long as the g.p.m. does not exceed the set limit which is normally 300 g.p.m. Pressure restricting devices work by restricting to flow by how far the valve can be opened, thereby reducing the flow and the p.s.i. The orifice plate controls pressure by restricting volume and is limited to its design requirements for supplying 200 g.p.m.

When augmenting your high-rise hose packs, be sure to use shut-off butts with removable tips so lines can be easily extended. If a gated wye is part of your hose lay, it must be attended or strapped open to prevent inadvertent closure. Lines connected to orifice plates require that the orifice plate be removed and a member remain at the outlet. If an orifice plate cannot be removed, lines should not be completely shut off at the nozzle. A complete shut off may raise the pressure in the line to the much higher static pressure of the system and could rupture the hose.

Do not over extend yourself or your team. You will have a limited number of air bottles, and relief may be some time in getting to you. The first line in a working high-rise fire may not be sufficient to extinguish the fire. When you are confronted with this situation, work to contain the fire until sufficient resources can be deployed to put the fire out.

The basic tactical objectives are the same whether you are fighting a fire in a high-rise office building or a high-rise residential building. The Fire Attack Team should direct their efforts toward protecting hallways and corridors, stairs and elevators, and other vertical openings. If the fire has overtaken any of these areas, it may be necessary to use large or multiple handlines to mount an effective attack. It is far better to start out with your largest capacity handline and reduce it than to begin with too small a line and be chased off the fire floor.

Do not develop "tunnel vision." In some instances, it may become necessary to reposition your attack lines to another stairwell. This could occur if the stairwell door is stuck closed due to warping or expansion from heat and unopenable even with forcible entry tools. This may also be necessary if the main body of the fire is at your first point of attack, preventing you from attacking the fire from the uninvolved area to the involved.

When it is necessary to reposition your lines for a more effective attack, go down a floor, cross to the other side, and reconnect your lines. Always keep the Incident Commander informed of your actions. Be cognizant of occupants that may be in the stairwell above you. Your continuous size up does not end once you leave the stairwell.

When the fire is located, determine what is burning. Most often the fuel for the fire will be ordinary combustibles and interior furnishings. However, it could involve flammable liquids.

Interior Building Design Features

High-rise firefighting can be complicated by the building's design and construction materials.

Center core building design features can include office areas or living areas, which surround a "core" containing stairwells, elevators, and utilities. In firefighting, the fire can "wrap around" in the corridor and suddenly be behind the firefighters operating the hose line. This phenomenon can also occur in a situation where large open areas exist around the core. If the fire attack officer determines that a "wrap around" potential exists, it can be prevented by coordinating two hose lines. One line to attack the fire (offensive), and one line to prevent the fire from wrapping around the core (defensive). The two lines must be carefully coordinated so as to develop a situation of opposing lines.

Fire attack can also be hampered by fire above suspended ceilings, flashover, and backdraft. Each member on the fire floor must be alert for these conditions and communicate with other companies operating on the fire floor.

In high-rise buildings, the area above the ceiling usually serves as the return air plenum for the HVAC systems. This area presents a hidden space, above the level of the sprinkler system effectiveness, where fire can spread undetected. As your firefighting operations progress, check the plenum area frequently to ensure the fire does not travel

overhead and possibly come down behind you, cutting off your escape route. To make this check, simply remove a ceiling tile or panel with a pike pole or similar tool and take a look. A hose stream directed at the ceiling is another method of removing these tiles.

Suspended ceilings in high-rise buildings often fall to the floor when exposed to fire. At best, creating an obstacle to firefighter mobility, and at worst, possibly injuring or entangling members engaged in firefighting.

Some high-rise buildings in Los Angeles, such as the Arco Towers and the First Interstate Tower, have floors interconnected by a separate open stairwell. Because these are vertical openings, they must have two-hour protection. This is accomplished by rolling steel fire doors that drop and enclose the stairwell. It is extremely dangerous to use these stairwells during a fire as the doors may close at any time. This risk can be mitigated through pre-incident planning. As mentioned earlier, if time and conditions permit, check the building directory in the lobby. If one business occupies two or more consecutive floors, on of which is the reported fire floor, you should be alert for the possibility of an additional stairwell and path of fire travel.

High-rise buildings have very high electrical energy requirements and will often have electrical substations in the building. These are very high voltage, high amperage systems and electrocution is possible if water is indiscriminately applied to one of these building substations.

Flashover

Petrochemical synthetics are extensively used in furnishings high-rise buildings. This wide use of plastics for everything from computers, synthetic plants, carpets, furniture and draperies to polyvinyl chloride (PVC) wallpaper make for a very volatile atmosphere in a fire situation. The potential for a flashover is present in any high-rise fire situation.

The stage for flashover is set when the heat of the fire liberates flammable gases from these synthetics. As the temperature of these gases increases, it reaches the flashover point, which may be as low as 700 degrees Fahrenheit. This can result in a sudden and violent propagation of flame through these accumulated gases. The indicators of a flashover could be a freely burning fire, an accumulation of heat and/or smoke in the upper part of the room, an increase in the density of smoke which may or may not reach the point of banking down, and fire flickering in the ceiling smoke.

Remember, these are only indicators. They may not all be present, and you may not be forced down to the floor by the heat necessary to cause a flashover. As in all firefighting, you must remain alert to the fire conditions throughout the operation. Knowledge and constant vigilance are your best protections.

Backdraft

Backdraft is also a potential hazard of high-rise firefighting. When the HVAC system is shut down in a sealed high-rise building, whether by actuation of a fire protection

system or by firefighters, the fire floor atmosphere may become oxygen deficient, creating the conditions for a potential backdraft.

Signs of a potential backdraft include fire confined within a structure or compartment. Smoke forced through cracks and other small openings which may alternate with moments of air being drawn in through these same openings. The smoke may be thick and dark or it could be brown or grayish yellow in color. Doors and windows may be hot to the touch.
A classic backdraft symptom might occur as you opened a stairwell door to the fire floor. If air is drawn in, you had better close it quickly and remain in the stairwell until ventilation of the involved floor has been accomplished.

One means of ventilating a floor or compartment of a high-rise building to eliminate a backdraft condition is to break the windows and horizontally ventilate the fire floor. If conditions warrant, this may be accomplished by working above the fire. You can work from this location to break the fire floor windows.

Extreme caution must be exercised when performing horizontal ventilation in a high-rise fire due to the effects from winds causing greater fire intensity and growth under these wind driven conditions. Opening doors or windows can increase the growth of the fire and allow it to spread beyond the room of origin. The introduction and presence of an external wind can create significant and rapid increases in the heat production of a fire. Many wind driven fire incidents have resulted in firefighter fatalities and injuries.

If horizontal ventilation is being contemplated or the potential exists for window failure, charged hose lines must be positioned protecting horizontal openings including means of egress, stairwells, and hallways. Consider venting the leeward side of the building when the need exists. However, be prepared for changing wind directions. Ventilation procedures for high-rise fires are covered in greater depth in Chapter 6.

The Fire Attack Team has now located the fire, determined what is burning, and where it is going. The fire attack officer has notified the Incident Commander of this situation and whether or not elevators may be considered for use.

When the Fire Attack Team is relieved, all company personnel must stay together and report to Staging for rehabilitation and reassignment. Maintaining company integrity is essential to the effectiveness of the company and the safety of company members.

This chapter is not inclusive of all the problems you may encounter during the challenge of a high-rise fire. The unique problems they present can, however, be overcome by pre-planning, and a coordinated and aggressive attack using basic firefighting tactics.

CHAPTER 6

VENTILATION

The migration of smoke and toxic combustion products throughout a high-rise building may often present a greater hazard to life and fire fighting efforts than the spread of the fire itself. Smoke patterns within a high-rise building are usually characterized by the movement of air from lower to upper floors by way of vertical shafts, poke-through construction, HVAC systems, etc. During a fire, the ability of air to travel through a high-rise building frequently results in the spread of smoke and toxic gases to areas far removed from the actual fire. This may cause vertical and horizontal escape routes to become impassable and fire suppression efforts to be hampered. Due to the height of high-rise buildings, smoke movement "characteristics", such as stratification of smoke on one or several floors, present unique and varied ventilation problems. A downward draft, or "reverse stack effect," becomes more pronounced when outside temperatures are higher. If lobby or stairwell doors are unnecessarily left opened to expedite the evacuation of occupants or the ingress of firefighters, smoke migration will have a negative effect on fire department operations below the fire floor. A well-planned approach to ventilation with specific plans for the effective use of personnel and equipment is essential. Additionally, when ventilation operations are necessary, a clear understanding of the parameters (building and air movement characteristics) imposed by high-rise buildings are necessary.

BUILDING CHARACTERISTICS

The following characteristics are common to high-rise building, can affect the travel of fire and contaminate within a building, and assist or hamper ventilation operations.

Stairshafts and Elevators

Stairshafts and elevators may be located in a central core (known as a center core building), or can be randomly located within a building. These vertical passageways provide excellent channels for the travel of fire and smoke, and are also utilized by occupants and Fire Department personnel to exit or access the interior floors. Elevators and stairshafts may be constructed as follows:

Elevators

- Elevators may service all floors of a building (service elevator). These elevator shafts run the entire height of a building.

- Elevators may service only selected floors of a building (P-4 through 1, or banked elevators, i.e., 1-15 and 15-30, etc.).

Stairshafts

- Stairshafts may service all floors of a building.
- Stairshafts may service odd or even floors of a building (scissor stairways).
- Stairshafts may service selected floors of a building (P-4 through 1).
- Stairshafts may or may not terminate onto the roof.
- Stairshafts in high-rise buildings constructed after 1974 are required to employ a shairshaft ventilation system. Pressurization fans, that function when the sprinkler or smoke detector systems are activated, are required to provide a uniform air velocity within each enclosed stairshaft. The fans must provide not less than 50 cubic feet per minute while maintaining a positive pressure of not over 25 lbs. on interior doors. The air is then vented to the exterior of the building. The positive pressure developed in the stairshaft is designed to prevent smoke from entering the stairwell from the fire floor.

Heating, Ventilation and Air Conditioning (HVAC) Systems

HVAC systems can form natural channels for the distribution of smoke within a building. These systems can be operated by manual or automatic systems.

Unsealed Openings

Depending on various factors such as the type of construction and various unsealed openings between the floors of a high-rise building (plenums, elevator shafts, curtain walls, pipe and electrical alleys), a high-rise building will “leak internally” (movement of air, smoke, etc.) between the floors and into stairshafts.

Sealed Buildings

Most high-rise buildings can be classified as “sealed buildings” (external glass panels are not openable). The internal environment in these buildings (temperature, humidity, etc.) is controlled by the HVAC systems. These HVAC systems are capable of retaining smoke, heat, and fire gases until they are manually ventilated to the outside environment.

AIR MOVEMENT CHARACTERISTICS

Air movement within a high-rise building can assist or hamper ventilation operations. Therefore, an understanding of basic air movement characteristics is essential in formulating effective ventilation operations. Smoke movement within a high-rise building can be affected by the following characteristics:

Construction

As previously mentioned, high-rise buildings will “leak” between floors and from floors into stairshafts. Smoke can travel between floors due to different types of construction such as unsealed openings, spaces or cracks between floors, and “poke through” construction (openings utilized for pipes, elevators shafts, electrical alleys, etc.). Additionally the pressure generated by a fire (up to three times atmospheric pressure) will force smoke through these openings and may contaminate other floors or stairshafts within the building.

Mushrooming and Stratification

The formation of stratified smoke and fire gases on floors below the top of a multi-story building is enhanced in high-rise buildings due to their height and open vertical passageways (such as stairshafts).

Stratification of smoke and fire gases occurs as heat and smoke travel vertically within a building. These products of combustion will rise through any available vertical opening, cooling as they rise, until the temperature is equal to the temperature of the surrounding air. When stabilization of the temperature occurs, smoke and fire gases will form layers or clouds within the building (Figure No. 1). This stratification of smoke and fire gases generally serve as a “lid” for other products of combustion which will tend to bank down below the stratified smoke and horizontally spread to other portions of the building. This process is common in vertical stairshafts.

Mushrooming is a condition caused by smoke and fire gases that cannot vertically escape a building. Smoke and fire gases will rise to the highest level possible and then begin to bank down and fill all available spaces (Figure No. 2). Mushrooming smoke and fire gases can contaminate the upper floors, or contaminate the floors below stratified smoke in the stairshaft. Smoke may bank down below the fire floor. In stairshafts, this may occur all the way down to the entrance level.

Doors

Open passageways created by doors that have been opened or inadvertently “left open” will allow fire and smoke to travel horizontally and/or vertically to additional areas within a building. It is essential that the status of doors that may effect the travel of smoke from a contaminated area be monitored. Stairshaft doors must receive special consideration. Doors to stairshaft enclosures that are left open will allow smoke and heat to be drawn into stairshafts, creating an exposure problem to personnel and building occupants in the stairshafts and/or upper levels of a building.

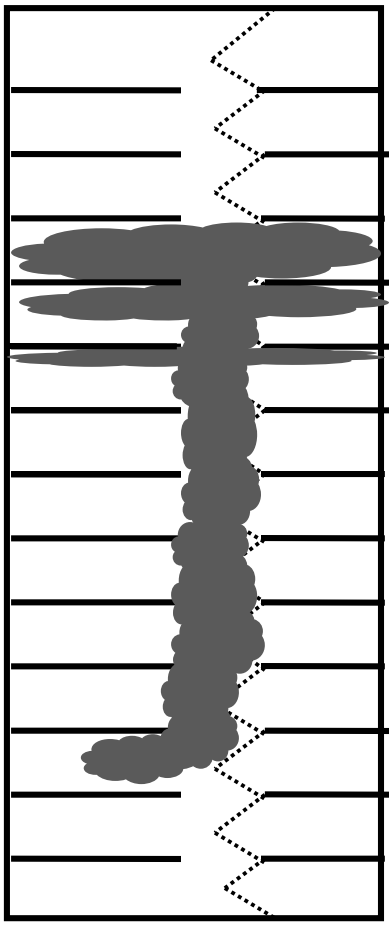


Figure #1

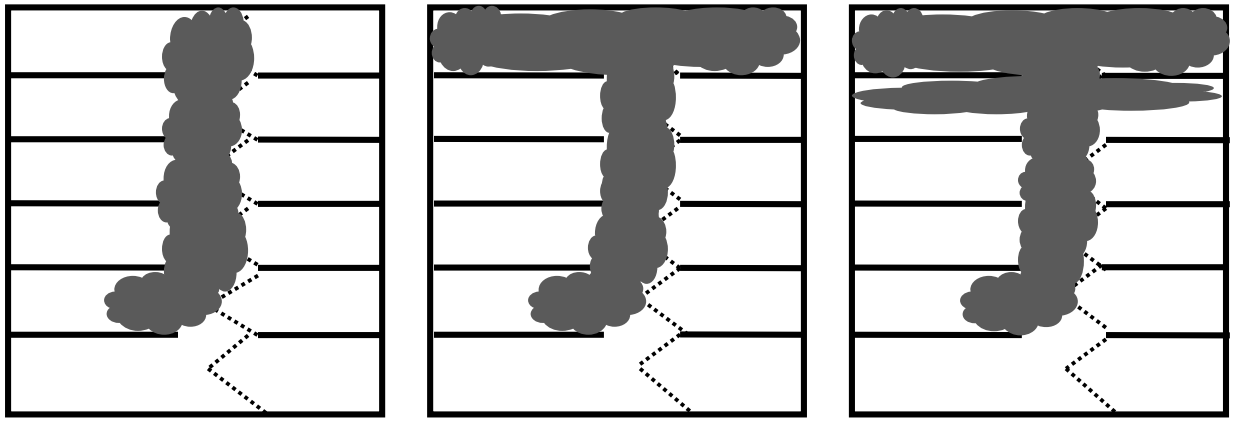


Figure # 2

Windows

Openings created by windows that have been broken, removed, or opened will allow fire and/or smoke to travel horizontally through the interior of a building. Additionally, outside wind conditions blowing into a building can result in fire, heat, and smoke to travel to other areas within the building resulting in devastating effects for firefighting personnel and occupants. Exterior panels or windows that are not openable may, under closely supervised and coordinated efforts, need to be removed or broken to create ventilation openings to the exterior of a high-rise building. In buildings where windows have failed or have been prematurely opened and wind is blowing into a building, the resulting increase of oxygen to the fire may cause the fire room to become pressurized by the wind. This type of fire (wind-driven) has the potential to blowtorch through the fire room and into hallways and stairshafts if access doors have been left opened.

In the City of Los Angeles, windows in exterior walls that can be used for the removal of heat and smoke are required as follows:

- Pre-1960 – Openable windows

- Post –1960 – Tempered glass on at least two sides of the building.
  (At corners, and at 50-foot intervals or less.)

- Post-1974 – Tempered glass on four sides of the building.
  (At corners, and at 50-foot intervals or less.)

  Tempered glass windows are identified by 3-inch luminous or reflective decals in a lower corner which indicate they are “For Fire Department Use.”

  NOTE: Openable windows or mechanical smoke removal systems may be substituted for tempered glass.

- Post-1996 – Requirement of Smoke Control Systems (Uniform Building Code) in high rise buildings has eliminated the requirement of the installation of tempered glass.

Prior to breaking windows, radio notification shall be made indicating the need and intention to break glass and the specific side of the building. This will assure that personnel working at ground level are cognizant of falling glass and personnel working inside the building can anticipate and prepare for what may occur if wind conditions are present.

HVAC Systems

HVAC systems are utilized to control the internal environment of high-rise buildings. Many HVAC systems incorporate remote controlled dampers at the supply and return

ducts on each floor. These dampers can be closed to prevent heat loss during periods when the building is unoccupied (energy conservation), and can be opened to supply "conditioned" air to floors within the building as necessary.

HVAC systems can cause the spread of smoke through the building. However, an HVAC system can also assist in the removal of smoke by utilizing the building system to selectively supply and/or exhaust air from areas or floors within a building. Unfortunately, there are many variations of HVAC systems found in high rise occupancies. Unless the HVAC system is contributing to the spread of fire or smoke throughout the building, it should be left in the on (operating) position. Systems may be manually or automatically activated by smoke detectors. Some systems may use a combination of manual or automatic activation. Unless personnel are thoroughly familiar with a HVAC system encountered at an incident, the HVAC system should be left on unless it is detrimental to fire suppression operations or resulting in the migration of smoke throughout the building. Leaving the system in the on position will enable the effective and timely utilization of a particular system and/or prevent the accidental spread of heat, smoke, and other contaminates.

Stairshafts

Stairshafts provide natural channels for the flow of smoke and fire within a high-rise building. When openings are created (open doors) at the top and bottom of stairshafts, a natural upward flow of air will quickly develop. This natural upward flow of air can also be utilized to assist in the removal of smoke within the stairshaft or building.

For ventilation purposes, stairshafts can be placed in two categories:

1. Stairshafts that open to the interior only of a building and provide roof access (Figure No. 3).

The natural movement of air is almost always upward. Warm air normally rises and cool air descends. HVAC systems cause a natural upward draft to occur through elevator shafts, stairwells, and other vertical openings as warm air rises. The movement of air, either upward or downward, is enhanced and subjected to temperature differences between inside and outside temperatures. However, the natural air flow within building stairshafts is virtually static in buildings up to 25 stories. Buildings over 25 stories will naturally flow minimal amounts of air in an upward direction.

Therefore, when required, ventilation efforts directed at removing contaminants in these stairshafts must be augmented by mechanical means other than utilizing natural air flow only.

2. Stairshafts that open to the exterior of a building and provide roof access (Figure No. 4).

Again, tests have indicated that regardless of the atmospheric temperature or humidity, any natural movement of air is almost always upward. However, natural air flow within these stairshafts can be significant.

Natural vertical air currents of three to six mph, that flow upward in stairshafts, can be created by simply opening a door at the bottom and roof levels of a stairshaft. These air currents can be effectively utilized to remove contaminants that have collected or are entering a stairshaft from a fire within a building. If utilizing a stairshaft as an avenue to remove contaminants, personnel must ensure that occupants are not in the stairwell or the stairwell is not being utilized for evacuation purposes.

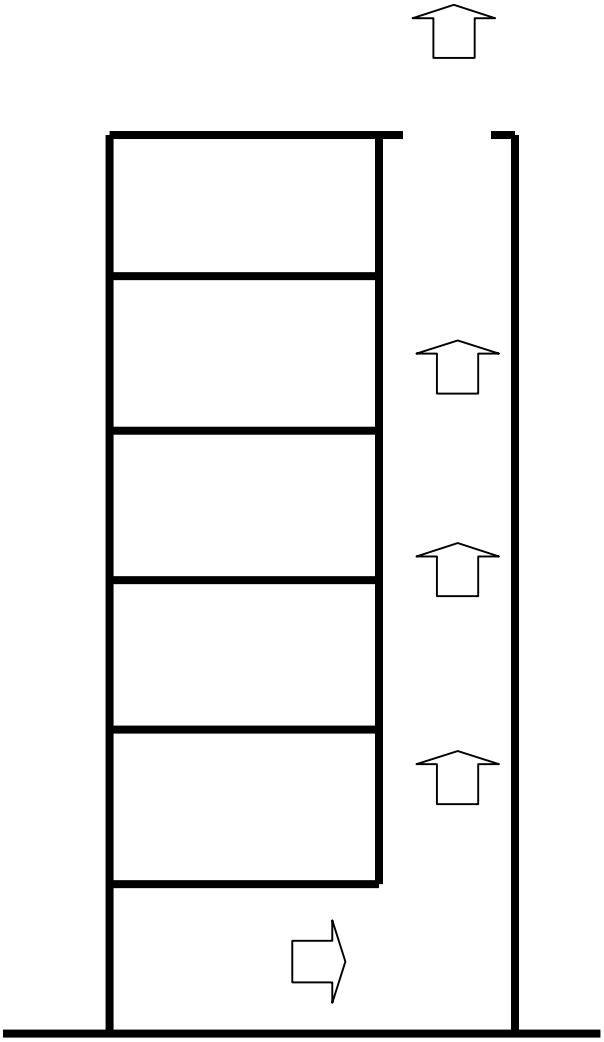


Figure #3

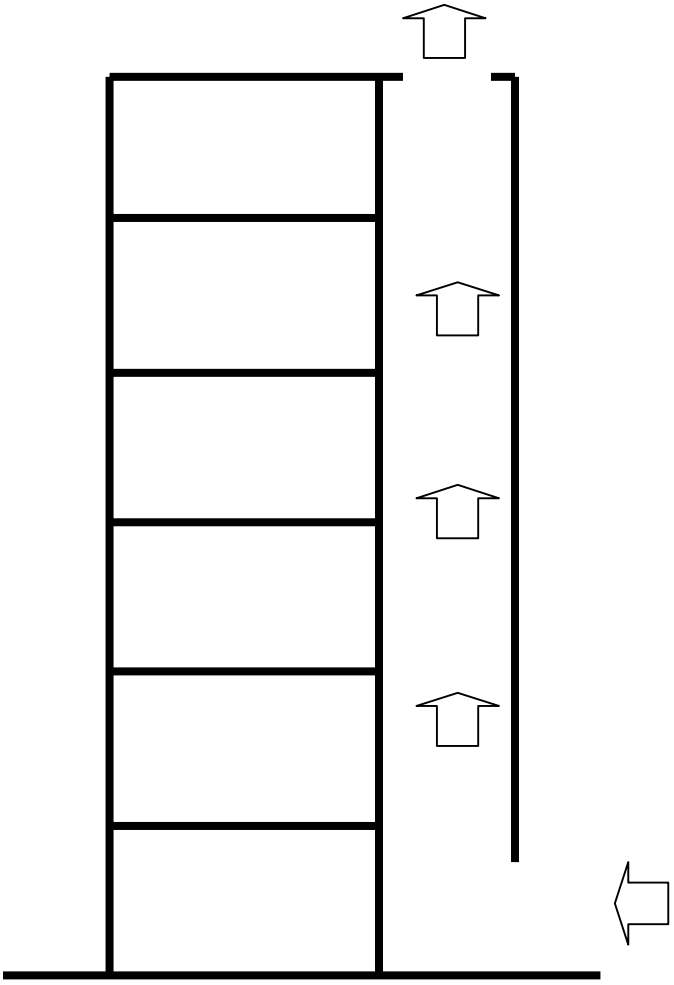


Figure #4

Additionally, the natural vertical air flow in a stairshaft can be created or maintained by the following:

- Stairshaft Pressurization Fans

  By activating these fans within the stairshaft an upward flow of air will occur. Stairshaft pressurization fans are normally capable of providing adequate air flow for ventilation operations; however, excessive opening of stairshaft doors will diminish effectiveness and result in the air to be driven to the openings.

- Positive Pressure

  Positive pressure created by Fire Department blowers can effectively create or augment the natural flow of air in a stairshaft and result in the discharge of contaminants within a stairshaft by pressurizing the ground level entrance opening to the stairshaft and removing the contaminants through the smoke control dampers (if present) at the top of the stairshaft and/or opening the roof level door. Positive pressure can also be used to augment stairshaft pressurization fans for increased air flow and efficiency.

  Consider the use of Water Turbine Driven Positive Pressure Ventilators, strategically located throughout the Department, if augmentation of the stairshaft is required. Water turbine blowers produce significantly less noise and will provide more than twice the cubic feet of air per minute that a like-sized gasoline powered blower. Water turbine blowers can be requested through O.C.D.

Emergency Smoke Control System

High-rise buildings constructed after 1974 are required to employ an emergency smoke control system that is comprised of the following components:

1. Pressurized Stairshaft

2. Mechanical Smoke Removal System

3. Tempered Glass or Openable Windows

OPERATIONAL GUIDELINES

Is there a fire or are there contaminants from a fire within the building? If so, what is the specific location and extent of the problem?

Remember that most high-rise buildings are “sealed” buildings and are capable of containing extensive fire and smoke with “nothing showing” on the outside of the

building. If there is a fire or contaminants in the building, Lobby Control and/or the Systems Control Unit, if implemented, shall be responsible for the following:

Building Control Room

If the building is equipped with a building control room, or fire control station, the location of the station should be determined. When the room or station has been located, check the status of the following:

1. Smoke indicators for potential location and extension of fire.

2. Designated "FIRE DEPARTMENT" elevators for potential access to and from the fire WHEN the safety of the elevators has been verified and Department policy on elevator use can be strictly adhered to.

3. Building HVAC system – If sufficient expertise is not available, and the system is functioning properly, leave the HVAC system on. If the HVAC system is having a detrimental effect on fire suppression operations or causing the spread of contaminants throughout the building, the system may be shut off. This will limit the potential extension of fire and/or contaminants and may be used for potential ventilation of contaminants.

4. Building stairshaft pressurization fans – Activation (manual or automatic) will supply positive pressure to stairshaft(s) and assist in keeping the stairshaft clear of contaminants. Primary emphasis shall be places on the stairshafts used for evacuation of occupants and/or access by Fire Department personnel.

Stairshafts

Determine the location of all stairshafts within the building, the configuration of the stairshafts, the status of the stairshafts (are they clear, charged with smoke, being used for evacuation, etc.), and the stairshafts that could be used for ventilation operations, if necessary. Emphasis should be placed on determining the stairshafts that open to the roof of the building. These stairshafts can be easily cleared of contaminants, facilitating the use of the stairshaft for evacuation, access, or ventilation operations.

Ventilation Considerations

Lobby Control shall be responsible for ensuring that stairshafts are pressurized. Primary emphasis shall be placed on the stairshaft utilized by the Fire Attack Team or stairshaft used to access Staging. Positive pressure ventilation utilized correctly can increase the effectiveness of firefighting personnel and the survivability of occupants in high-rise buildings.

1. Positive Pressure

When the preceding factors have been analyzed and a fire or significant contaminants from a fire have been verified within a high-rise building, positive pressure can be utilized at the discretion of the Incident Commander. In a high-rise building it is possible to increase the pressure of a stairwell to prevent the infiltration of smoke if blowers are positioned properly. When configured properly, positive pressure ventilation fans can meet or exceed fixed smoke control systems. Proper configuration requires the consideration of a range of variables including fan size, set back, angle, fan position inside or outside the building, and number and alignment of multiple fans.

Full-scale experiments in a 30-story office building demonstrated that in order to maximize the capability of Positive Pressure Ventilation fans, the following guidelines should be followed:

- Regardless of the size, portable blowers should be placed 4 feet to 6 feet back from the doorway and angled back at least 5 degrees. This maximizes the flow through the fan shroud and air entrainment around the fan shroud as it reaches the door.

- Placing fans in a V-shape is more effective than placing them is series (See Figure #5)

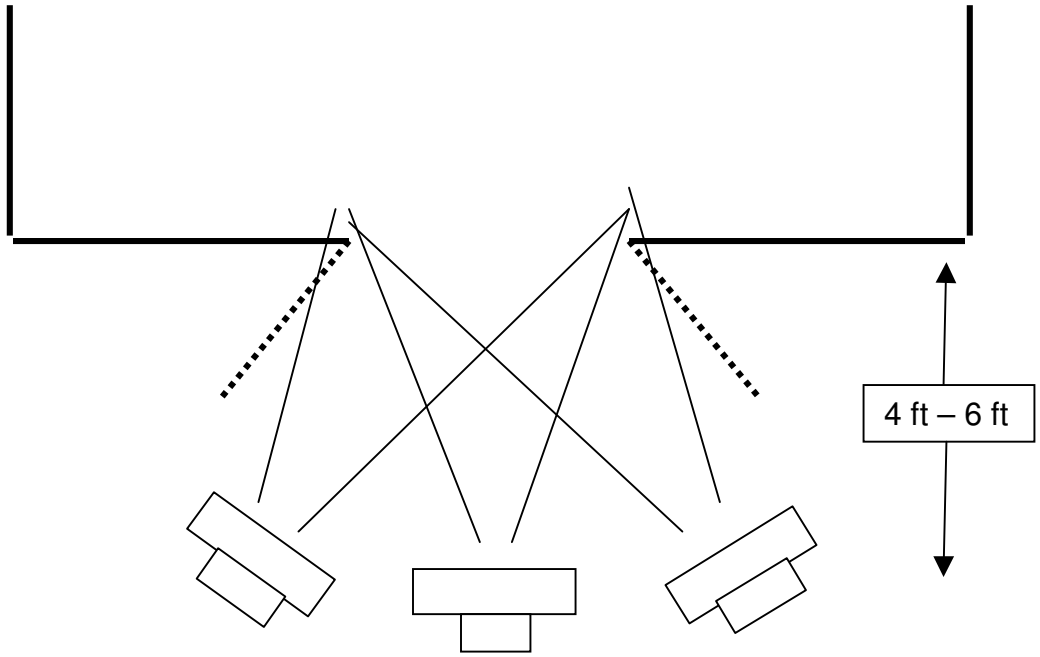


Figure #5

- When attempting to pressurize a tall stairwell, portable fans at the base of the stairwell or at a ground level entrance alone will not be effective.

  Placing portable fans inside the building below the fire floor is a way to generate pressure differentials to increase the effectiveness of positive pressure in tall buildings. Blowers can be loud which may have an impact of fire ground communication. Portable gasoline powered blowers also generate carbon monoxide but the amount has to be compared to that of the hazard created by the fire in the building.

- Portable blowers used inside the building, when possible, should be set back and angled just as if they were positioned at an outside doorway.

NOTE: The following operations may require personnel on the roof and ground for proper coordination.

2. Vertical Ventilation

   By opening the bottom door to a stairshaft and placing blowers to pressurize the door openings on each floor and stairshaft, the following can be accomplished:

   - Evacuate contaminants within the stairshaft.

     This operation will require an opening (door, etc.) at the top of the stairshaft to exhaust the stairshaft contaminants to the exterior of the building (Figure No. 4). Stairshaft pressurization fans may be utilized “with or without” blowers for this operation (Figure No. 6). Prior to opening a roof stairshaft exit, communication and coordination should be established with personnel operating on the fire floor and in the stairshaft to assure safety of the firefighters operating within these areas.

   - Keep contaminants from entering the stairshaft from fire involved floors.

     This operation is most effective with no openings at the top of the stairshaft. When air is flowing upward through and pressurizing a stairshaft, contaminants will have difficulty accumulating within the stairshaft.

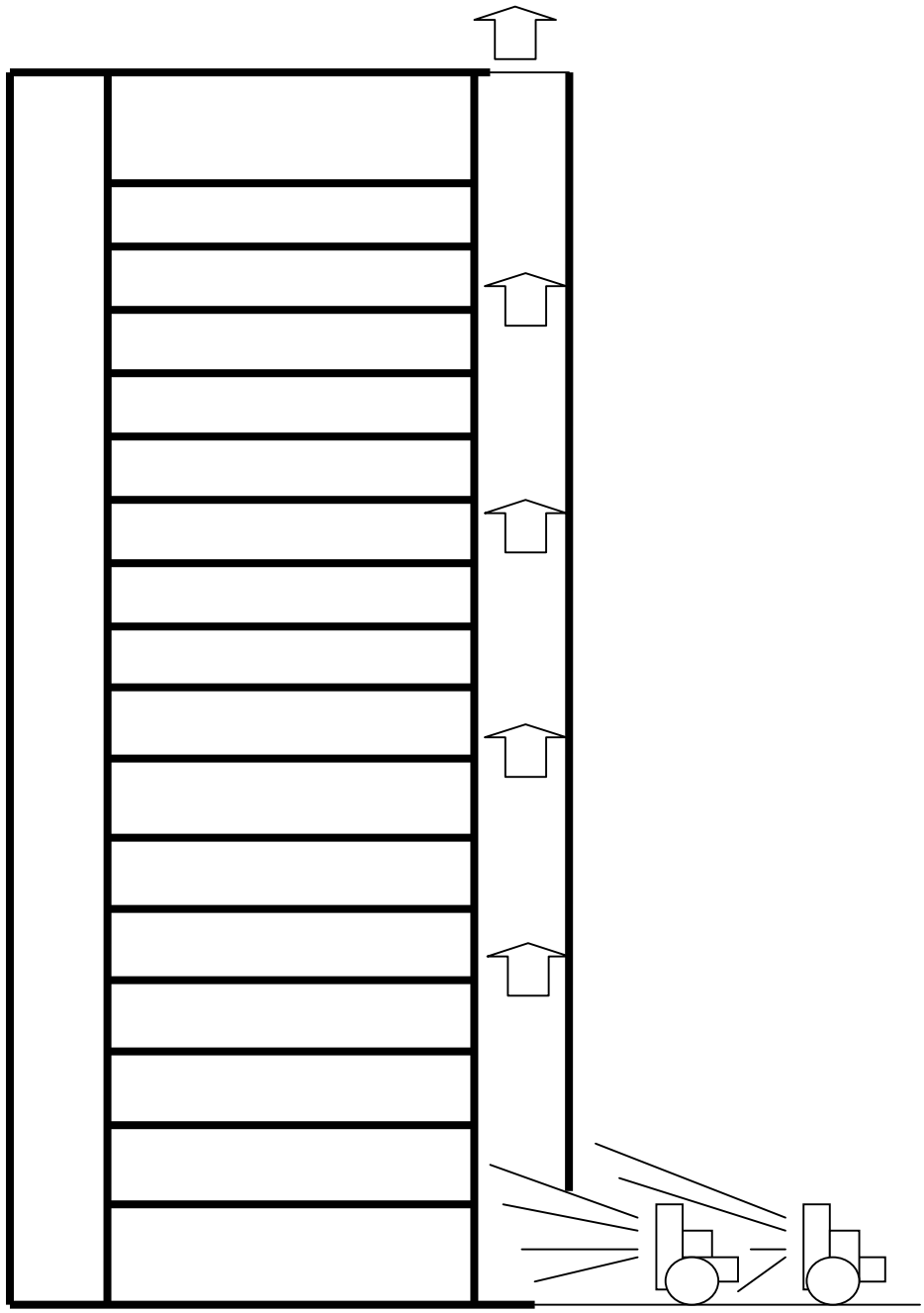


Figure #6

3. Cross Ventilation

Cross ventilation of a contaminated floor in a high-rise building can be effectively accomplished by utilizing blowers or a combination of blowers and stairshaft pressurization fans to pressurize a stairshaft and then directing the flow of pressurized air across the floor to be ventilated as follows:

- <u>To windows on the contaminated floor that have been opened/broken by personnel of a fire (Figure No. 7)</u>

  If windows must opened/broken for ventilation purposes, utilize the windows on the leeward side of the building, if possible. Hose lines must be in place for protection and to prevent fire lapping.

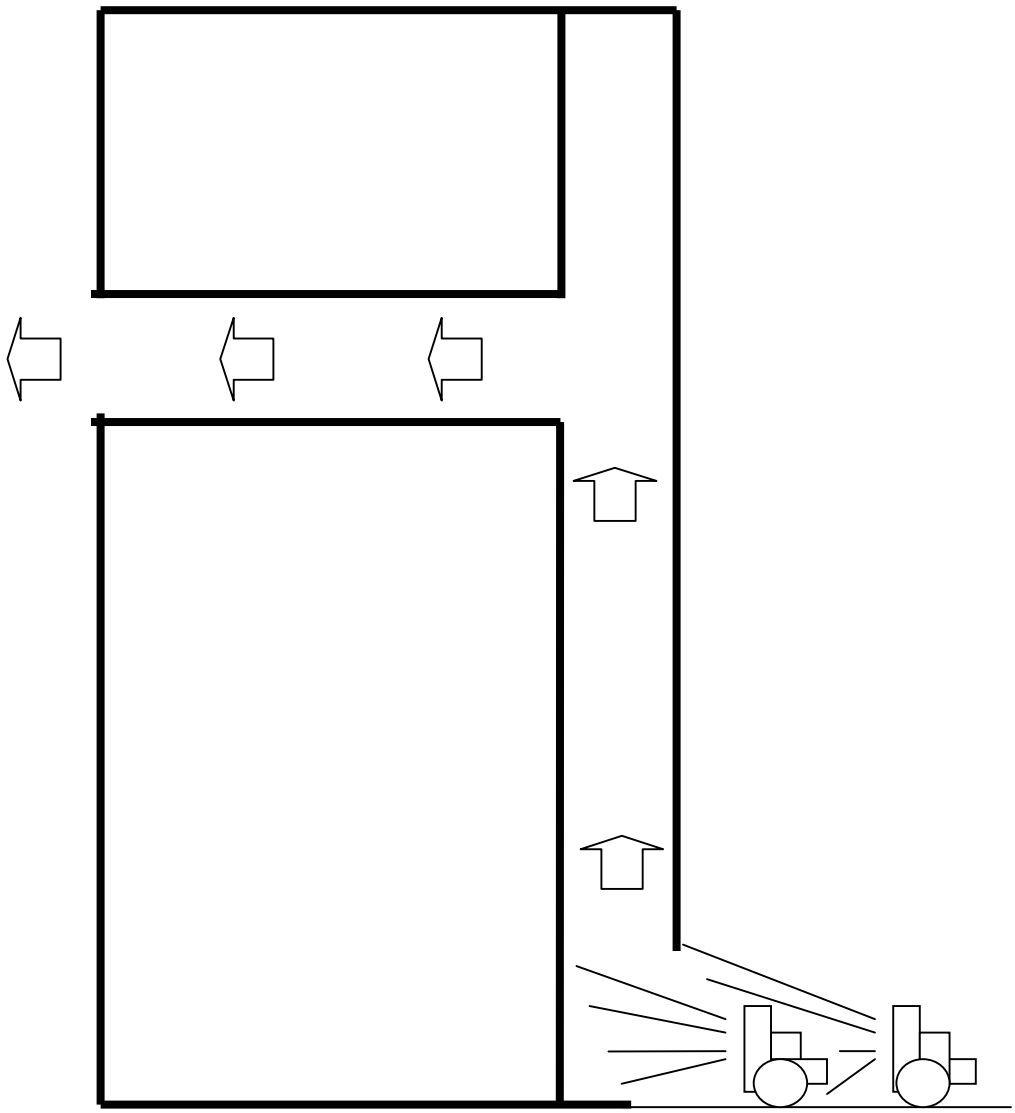


Figure #7

- <u>To an opposing stairshaft that opens to the roof of the building (Figure No. 8).</u>

  The exhausting contaminants from the effected area will be vertically exhausted from the opposing unpressurized stairshaft with the roof access door opened.

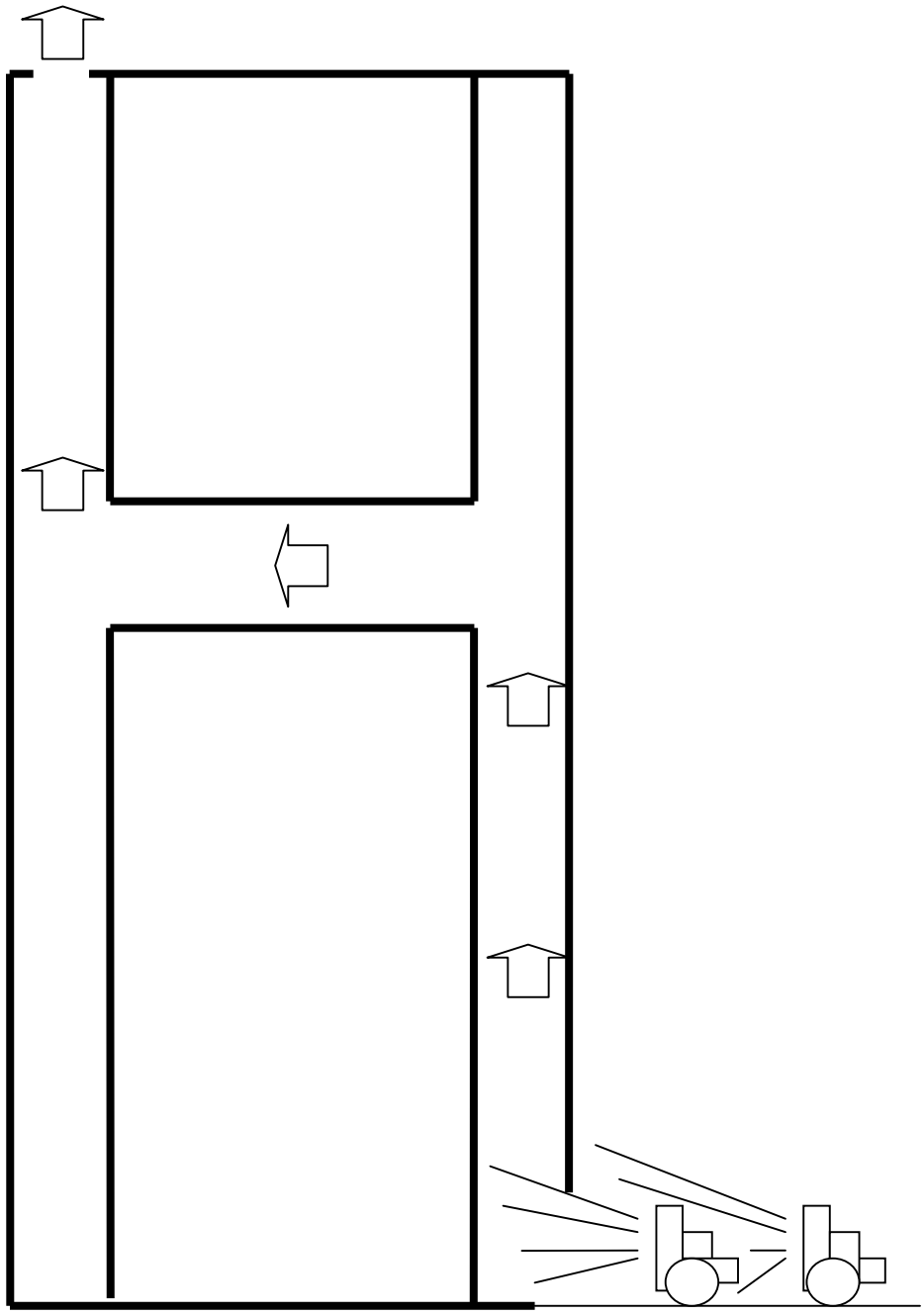


Figure #8

The preceding cross ventilation operations are effective up to 25 floors in a high-rise building. If it is necessary to cross ventilate floors above the 25th floor, it may be necessary to utilize an additional blower in the pressurized stairshaft to supply additional pressurized air to the floor to be ventilated (Figure #9). Ventilation efforts may be impacted due to interior walls, partitions, tenant stairs, open hallways, etc. Additional pressurized air may be necessary due to the leakage (through vents, unsealed openings, etc.) in stairshafts over 25 floors high.

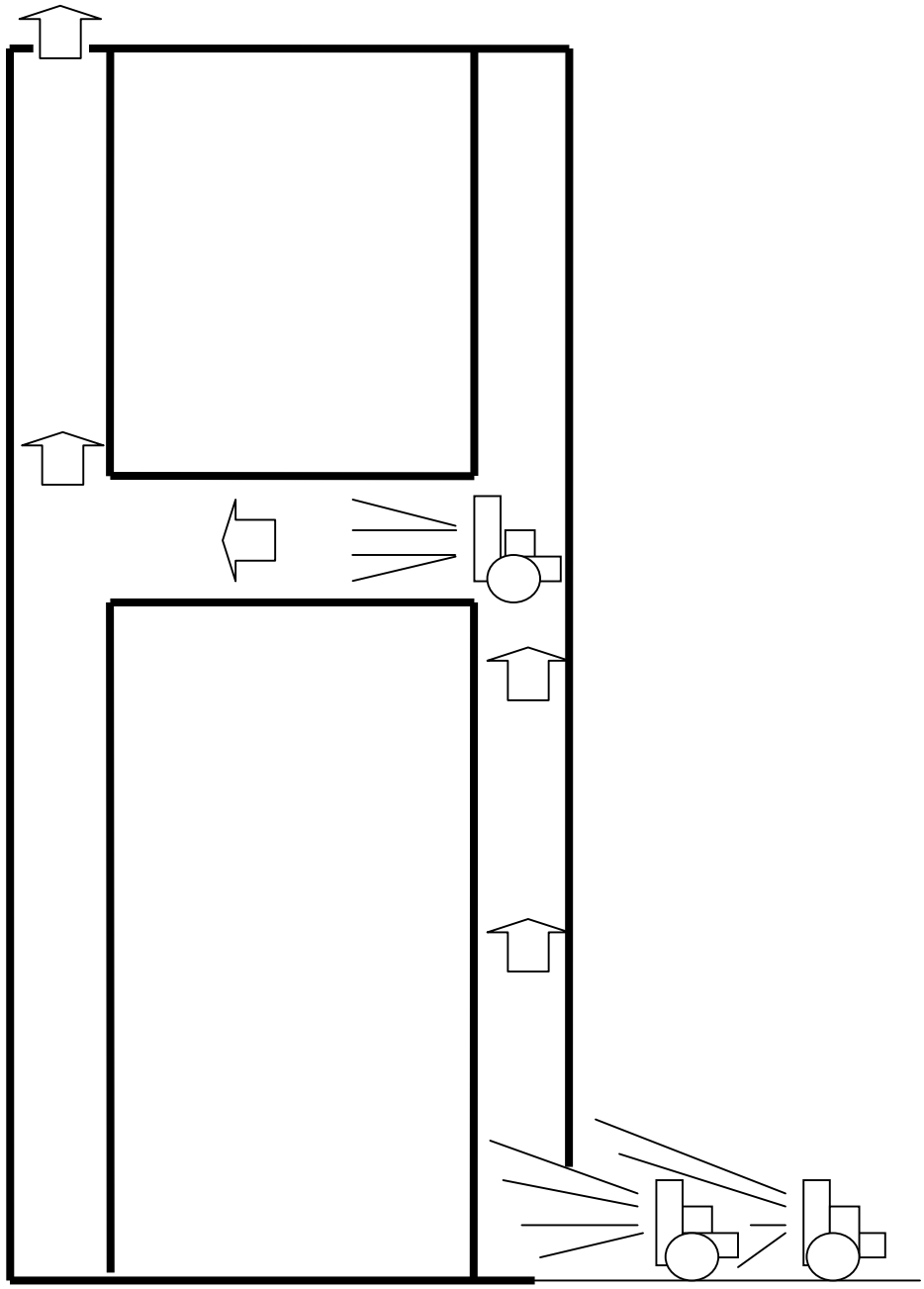


Figure #9

CHAPTER 7

ELEVATORS

This chapter defines components and provides operational guidelines for the use of elevators in high-rise buildings. Emphasis is placed on emergency operations under fire conditions.

Although elevators are necessary for moving large numbers of people throughout the building under normal circumstances, experience has proven that the operation of elevators under fire conditions can be erratic and dangerous. Elevators are subjected to malfunction from the effects of heat, smoke, and water on drive machinery and/or control equipment. When elevators are used during high rise incidents, caution and strict adherence to Department procedures relative to the safe operations of elevators are imperative.

Effective use of elevators during emergency operations is dependent upon the knowledge of the specifics as well as hazards associated with elevator use under fire conditions. Title 24 of the California Administrative Code provides requirements for the operation of elevators under fire and emergency conditions. The Code requires a building to have:

1. Designated Level – The floor that elevators will respond to upon recall. It may be the main floor or any other level that best serves the needs of emergency personnel for firefighting or rescue purposes. This floor will contain the "Emergency Service Switch" needed to recall the elevators and will be referred to as "Lobby" for the remainder of this chapter.

   NOTE: Alternative designated floors may be required, due to smoke detector placement and/or split banks of elevators.

2. Smoke Detectors – There shall be a smoke detector installed adjacent to the elevators at each landing, usually in a vestibule on each floor except the Lobby. Generally, elevators serving the landing or vestibule where a smoke detector is actuated are the only cars automatically recalled. Elevators in other banks continue to operate until smoke reaches their sensors of the lobby "Emergency Service" switch is operated (turned to "ON" position).

3. Elevator Emergency Service – Recall or Recall/Override capability.

   Phase I, "Recall Phase" – Elevators recalled will respond non-stop to the lobby and ignore all other call button requests. Automatic elevators having a total travel of more than 50 feet (or more than 25 feet, if new after October 6, 1975) may be recalled to the lobby by sensing devices (smoke detectors) or by a three-position key operated "Emergency Service" switch in the lobby.

AUTOMATIC ELEVATORS

RECALL PHASE (Phase I)

Recall by Smoke Detectors
and/or
Emergency Service Switch

EXISTING:
Travel distance exceeds 50 feet.

SINCE: 10-6-75:
Travel distance exceeds 25 feet.

>50’

>50’

>25’

OVER-RIDE PHASE (Phase 2)

Recall by
Smoke Detectors
and/or
Emergency Service Switch
Can be placed in emergency use by firefighters.

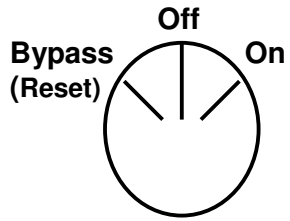
Travel above grade level is 70’ or more.

70’

SPLIT BANKS

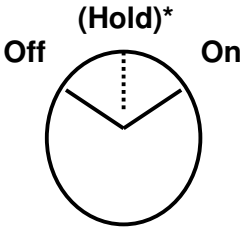
EMERGENCY SERVICE SWITCH

One per Elevator Bank Located in Lobby Level (key non-removable in bypass position)



With smoke detectors

IN-CAR SWITCH



(*If equipped)

NOTE: A minimum of one switch per bank is required. In the event a Building Control Station is required and is on the same floor in the area of the elevator banks, the "Emergency Service" switch may be located in the station. If the station is remote, it may have a second "Emergency Service" switch, but it must be labeled and identified in the same manner as the lobby "Emergency Service" switch.

Phase II, "Override Phase" – Recalled elevators will respond as per Phase I, but in addition can be places in emergency use by firefighters. All automatic elevators having a travel of 70 feet or more above the lowest grade level may be recalled to the lobby by smoke detectors or by a three-position key operated "Emergency Service" switch in the lobby.

A three-position (On-Off-Hold) "Emergency Service" switch is provided in each car. The in-car switches are operative when the lobby "Emergency Service" switch is in the "ON" position. Turning both switches to the "ON" position operates the "Override Phase."

ELEVATOR OPERATION CONSIDERATION

Elevators equipped with "Emergency Service", and operating properly, may be utilized under certain conditions with strict adherence to operational procedures. If any of these procedures cannot be adhered to, stairwells shall be utilized for going aloft.

Elevator ascent during investigations or firefighting operations shall only be used when the reported location is above the sixth (6^{th}) floor. Firefighters who climb stairs, as opposed to utilizing elevators, will arrive faster to locations at or below the 6^{th} floor, as the procedures required for safe elevator use may delay the expedient arrival to the reported fire floor.

Elevators shall not be taken directly to, or above the fire floor. If used as a means of ascent, elevators should not be taken closer than two floors below the reported fire floor or two floors below the lowest indicated alarm floor location.

Elevators shall never be taken below grade until deemed safe for use by Fire Department personnel through making a visual assessment of conditions that might affect elevator use.

All elevators or groups of elevators not automatically recalled to the lobby area shall be recalled by the use of the "Emergency Service" switch. Even if automatically recalled, the Lobby elevator recall switch shall be activated. If elevators are used for going aloft, all elevators must be accounted for and equipped with Phase II Emergency Firefighter Service. Under no circumstances should an elevator not equipped with Emergency Firefighter Service or a freight elevator be utilized until it is determined safe by fire department personnel on the desired floor(s) of operation and their use approved by the Incident Commander.

If the building is equipped with split bank elevators, do not use an elevator that services the fire floor if a lower bank of elevators reaches within five (5) floors of the fire floor.

Elevators that travel through a “blind shaft” should be avoided whenever possible. A “blind shaft” allows expedited elevator access to upper floors by excluding access at intermediate floor locations. An elevator that malfunctions or stops within the blind shaft can present a difficult and time consuming forcible exit rescue concerns, particularly when the blind shaft becomes exposed to smoke or products of combustion.

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Before utilizing an elevator, the elevator shaft shall be observed to determine the presence of smoke, fire, or water. Directing a flashlight or thermal-imaging camera up between the elevator car and the shaft wall can determine the presence of smoke, fire, or water in the elevator shaft. The elevator hatch door, if readily accessible, can also be utilized for this inspection. If the presence of any amount of smoke, fire, or water is detected, the use of the elevator for ascent shall be discontinued. All members shall immediately exit the elevator and proceed to an appropriate stairwell. The Lobby Control Officer, if assigned, and the Incident Commander shall be apprised of this situation. This procedure of checking for the presence of smoke, fire, or water shall also be performed during precautionary stops.

All members, including the member assigned as the elevator operator, utilizing the elevator as a means of ascent shall be equipped with full personal protective equipment; breathing apparatus; portable radio; sound power phone, forcible entry tool, and the appropriate equipment for fire suppression operations or assigned task. Prior to going aloft, all members shall have donned their Self Contained Breathing Apparatus (SCBA) facepiece and be prepared to connect the regulator if an IDLH (Immediately Dangerous to Life or Health) is encountered. A dry chemical extinguisher shall remain in the elevator car with elevator operator.

The Fire Attack Team shall consist of a minimum of four members. When an engine company is first fire suppression resource at a high-rise fire, personnel from an additional resource must be on-scene and one member will be assigned and designated as the elevator operator before the elevator is used to go aloft. This additional member can be from an additional company or from a fire suppression certified rescue ambulance. The elevator operator must be trained and familiar with Emergency Firefighter Service (Phase I and II) operations. If a Light Force is first on scene and assumes the role of fire attack, one member may be assigned to operate the elevator and four members can assume to role of the Fire Attack Team and go aloft. IF THE FIRST ARRIVING PESONNEL ARE NOT TRAINED OR NOT FAMILIAR WITH EMERGENCY SERVICE OPERATIONS, DO NOT USE THE ELEVATORS AS A MEANS FOR GOING ALOFT. IF ANY DOUBT EXISTS, USE THE STAIRS. The elevator operator will be assigned and report to the Lobby Control Officer and remain in control of the elevator until relieved or reassigned. The elevator operator shall be equipped with full personal protective equipment; breathing apparatus, portable radio, sound powered phone, forcible entry tool(s), e.g., pickheaded axe, hayward, hooligan, and a portable dry chemical fire extinguisher, which will remain in the elevator car. It is

It is imperative that members assigned as elevator operator(s) remain in the elevator car and either maintain constant pressure on the "DOOR OPEN" button or activate the "HOLD" feature, if the elevator is so equipped, as the elevator doors may close. Once the elevator doors close while operating in Phase II with not personnel inside the elevator, the elevator may be lost for the duration of the incident without professional intervention.

Members using an elevator for ascent should also determine the location of the stairwells in relationship to the elevator. This should be accomplished at the first, and subsequent precautionary stops by observing the buildings emergency exit plan located at each elevator lobby landing. These stairway verification checks should be done above the building lobby level due to the fact that stairs leading to the exterior of the building may be connected by a hallway thus providing misleading information as to where the stairwells actually are in relationship to the ground level exits.

No more than six (6) personnel, with required equipment, shall be permitted in any one elevator at a time during Phase II operations. This will prevent exceeding the weight capacity of the elevator and allow for maneuverability should the need for forcible exit is required.

Personnel utilizing the elevator for ascent shall make precautionary stops every five (5) floors in order to test and confirm that the elevator is properly operating in the Phase II mode. These precautionary stops will ensure that:

- The elevator stops at the desired floor(s),
- The elevator doors remain closed when the elevator stops,
- The elevator doors open only when the door open button is activated,
- The elevator doors close when the door open button is released, and
- The elevator is performing in Phase II operations as designed.

These precautionary stops shall be conducted even if the bank of elevators being used for ascent does not service the fire floor. If for any reason, the elevator does not perform as designed in Phase II operations, or acts erratically, elevator operations shall be immediately stopped and the Fire Attack Team and the Elevator Operator proceed to an appropriate stairwell. The Lobby Control Officer and the Incident Commander shall be apprised of this situation.

ELEVATOR OPERATION – EMERGENCY SERVICE PHASE I

The lobby level "Emergency Service" switch is normally in the "OFF" (automatic) position. It operates in the following manner.

- When the lobby "Emergency Service" switch is turned to the "ON" (emergency) position, all elevators in the bank controlled by the switch will be recalled to the lobby floor and remain there with their doors open. The lobby "Emergency Service" switch shall be turned to "ON" even if the cars have already been returned to the lobby floor in response to the activation of a smoke detector. After the key is turned to the "ON" position, remove the key from the switch. The cars are then no longer subject to calls from other sources.

- The photo-electric beams and other non-mechanical door retraction safety devices are deactivated.

- If the car is at a landing at the time the Recall Phase is activated, the car will start moving to the lobby as soon as the door closes.

- The "bypass" position is used during an incident to place the elevators in operation on a temporary basis when the entire building has been deemed safe for normal use, but there is still enough residual smoke to actuate the detector or the detectors are malfunctioning. The key is not removable when the switch is in the "bypass" position.

- Lobby "Emergency Service" switches, marked with "RESET," "OFF," and "ON" operate in the same manner except that there is no means to bypass the alarm system when a fire protection device cannot be reset.

PHASE II

The lobby level "Emergency Service" switch is normally in the "OFF" (automatic) position. It operates in the following manner:

- When the lobby "Emergency Service" switch is turned to the "ON" (emergency) position, all elevators on the bank controlled by the switch will be recalled to the lobby floor and remain there until their doors open. The lobby "Emergency Service" switch position shall be turned to "ON" position even if the cars have already been returned to the lobby floor in response to the activation of a smoke detector. After the key is turned to the "ON" position, remove the key from the switch. The cars are then no longer subject to calls from other sources.

- Use the key to place the in-car switch in the "ON" position; the car will be openable only by a person in the elevator. The car will not respond to a call from any other source.

- When operating elevators in "Emergency Service" mode, the automatic door open feature and photo-electric device are rendered inoperable. The destination is selected by actuating a floor button in the normal manner.

Opening of the power operated doors is controlled by continuous pressure on the "Door Open" button. If the button is released prior to the doors reaching the fully opened position, the doors will automatically re-close. The only exception is that the doors may automatically open upon return to the lobby.

Open doors are closed by continuous pressure on the "Door Closed" button, if provided. If a "Door Close" button is not provided, continuous pressure on the desired floor button will serve to close the doors. If either of these buttons are released before the doors reach the fully closed position, the doors will automatically reopen.

- If multiple floor buttons have been actuated, the car will stop at the first of the selected floors that it reaches. At that time all other selections will be cancelled. The car doors will remain closed.

  NOTE: Elevators installed after October 15, 1985 must have a separate "Call Cancel" button for use by emergency personnel.

- The "bypass" position is used to place the elevator in operation on a temporary basis when the entire building has been deemed safe for normal use, but there is still enough residual smoke to actuate the detectors or the detectors are malfunctioning. <u>The key is not removable when the switch is in the "bypass" position.</u>

NOTE: In either Phase I or II, the elevator car(s) may be equipped with an "Independent Service" mode (with or without photo-electric devices). <u>Do not use this feature for fire related emergencies.</u> This mode is used by employees or service personnel for routine, nonemergency operation. Elevators installed since 1986 are required to be recalled to the lobby. Until determined safe by LAFD personnel, elevators equipped <u>without</u> the Fire Service mode shall not be utilized.

"Independent Service" may be operated by key (not compatible with in-car fire service switch) or toggle switch. Usually the controls are found behind a locked panel on the control panel inside the elevator car. Keys are available from building personnel.

While the elevator is operating in the "Independent Service" mode, the photo-electric hold open device is rendered inoperative, but the automatic door open feature will continue to function. While the cars are being used in the "Independent Service" mode, they are not subject to recall by either the sensing device or the key operated switches. Under emergency conditions, depressing the "Door Close" button will cause the doors to close, but only after they have reached the fully opened position. However, if elevators are in recall phase, returning the elevator car to automatic operation for "Independent Service" will place the car in the recall phase.

LIFE-SAVING EMERGENCY MEASURES

In either Phase I, "Recall" or Phase II, "Override" modes, if for any reason an emergency occurs while you are in the elevator car and the sensing devices do not work, the following procedures may be used:

- Automatic Mode (without photo-electric devices) – Depress the "Door Close" button to cause the doors to close, but only after they have reached their fully opened position.

- Automatic Mode (with photo-electric devices) – It is possible that the smoke may be of sufficient density to block the photo beam and cause the door to remain open. The photo-electric device can be rendered inoperable by depressing the switch marked: "TO BE USED IN CASE OF FIRE ONLY". This action will cause the doors to close.

- The "Emergency Stop" switch is operative during the time the car is in the Automatic Mode, and upon activation will immediately stop the car. In most elevators, operation of this switch will cancel any previous floor selections. The use of the "Emergency Stop" swithch should be used as a last resort , as the activation may cause the elevator to come to a hard stop. Newer elevators may not have a "stop button" but may require a separate elevator key.

  NOTE: THESE PROCEDURES ARE NOT TO BE USED DURING OUR NORMAL EMERGENCY OPERATIONS.

USE OF ELEVATORS DURING EMERGENCIES

- Restrict the use of elevators by both building occupants and firefighting personnel until the safety of the elevators is determined. Elevators equipped with "Emergency Service," and operating properly, may be utilized under certain conditions with strict adherence to operational procedures.

- Obtain a key for the "Emergency Service" switch from the required building lock box or from building personnel.

- Recall all elevators or groups of elevators not automatically recalled to the lobby area by use of the "Emergency Service" switch in the lobby area. Locate the "Emergency Service" switch. Insert the key into the "Emergency Service" switch and turn it to the "ON" position. This will recall the elevator car(s) directly to the lobby level area and hold the car(s) at that location with the doors open. Leave the switch in the "ON" position and remove the key. This will eliminate the possibility of use by other than Fire Department personnel and SHALL be done in all cases, regardless of whether fire department personnel plan to use the elevators.

If an elevator was installed under Phase II provisions, insert the key into in-car "Emergency Service" switch and turn to "ON" position. In addition, check to determine if the car is in "Independent Service". If so, remove from "Independent Service" before using in "Emergency Service" mode.

- At every high-rise incident, the use of elevators shall be delayed until Fire Department personnel determine they are safe to use (See requirements under Elevator Operation Consideration). Only then will elevators be considered for the movement of personnel. Information received from the Fire Attack Team regarding the safety of elevators and actual floor conditions (two floors below the fire or lowest actuated alarm device) should also be relayed to the Incident Commander, who will determine the continuation of the use of elevators.

  NOTE: The determination to use the elevator is ultimately the responsibility of Fire Department personnel. Information from the Fire Attack Team, Lobby Control or Systems Control, if implemented, can be utilized in assisting in the determination for the safe use of elevators.

- All personnel from the initial Fire Attack Team traveling in elevator cars must be equipped with appropriate personal protective equipment, SCBA, and equipment described on Page 4 of this chapter. Breathing apparatus should be ready for immediate connection.

  If even the slightest amount of smoke or water is visible in the hoistway, the elevator shall not be used. At all times the elevator is in motion, firefighting personnel should be prepared to take immediate action that will cause the doors to close if the car responds to a floor where smoke conditions are present. This action will be dictated by the elevator control equipment and the Phase II operating mode. If for any reason the elevator doors cannot be closed, personnel shall immediately proceed to the closest, appropriate stairwell.

- Any time elevators are utilized by Fire Department personnel during emergency operations, a Fire Department member shall be designated to control the car operation. The operator will report to and maintain communications with Lobby Control. In addition, if phone jacks are available in cars, sound-powered telephones should be placed in operation.

CONCLUSION

All members must have a working knowledge of elevators and a thorough knowledge of elevator operation in order to function safely during high-rise operations. Training and practice are essential for members to learn how to properly handle elevators under fire conditions. Members shall familiarize themselves with the operation of individual elevator systems within their response areas during pre-incident planning and routine fire prevention activities.

CHAPTER 8

WATER SYSTEMS

This chapter covers high-rise water systems and their components. The water system in a high-rise structure is the most important fire protection system provided to protect the structure and its occupants. Water systems have evolved over the years and the type of system found in a building depends upon its age, height and the building codes in effect when it was constructed. It is important to point out that there are slight variations in some systems due to differing interpretations of building code requirements. There are three basic types of systems, depending upon the year of construction; those constructed prior to 1960, those constructed between 1960 and 1974, and those constructed after 1974.

STANDPIPE SYSTEMS

A Standpipe System is a wet or dry system of piping, valves, outlets, and related equipment designed to provide water at specified pressures and installed exclusively for firefighting. There are four types of standpipe systems: Class I (Dry) Standpipes, Class II (Wet) Standpipes, Class III - Combination, and Combined.

Pre-1960

Prior to 1960, there was a height limit on buildings of 150', or approximately 13 stories. This height limit was mainly due to the threat of earthquakes.

Firefighting water systems in pre-1960 buildings consisted of Dry Standpipes, Interior Wet Standpipes, and sprinklered basements. (See Figure 1)

CLASS I (DRY) STANDPIPE SYSTEMS

Dry Standpipe Systems are found in older (Pre-1960) high-rise buildings four or more stories in height; in buildings built from 1960 to 1974, four or more stories in height and not exceeding 150'; and in buildings built after 1974, four or more stories in height and not exceeding 150'. They consist of vertical risers, with appropriate inlet and outlet connections, installed primarily for Fire Department use. The vertical risers are not cross connected.

Dry Standpipe Risers

Dry Standpipe Risers are, depending on building height, 4" to 6" diameter pipe and must flow 500 g.p.m. per riser. They will have two to four 2-1/2" inlets at the Fire Department Connection (FDC), depending on building height and if the standpipes are interconnected.

The total water supply for the Dry Standpipe Systems must be delivered by the Fire Department pumps through the inlet connections. Pressure in the system is controlled by

HIGH RISE WATER SYSTEMS

PRE - 1960

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MAXIMUM HEIGHT 150 FT.

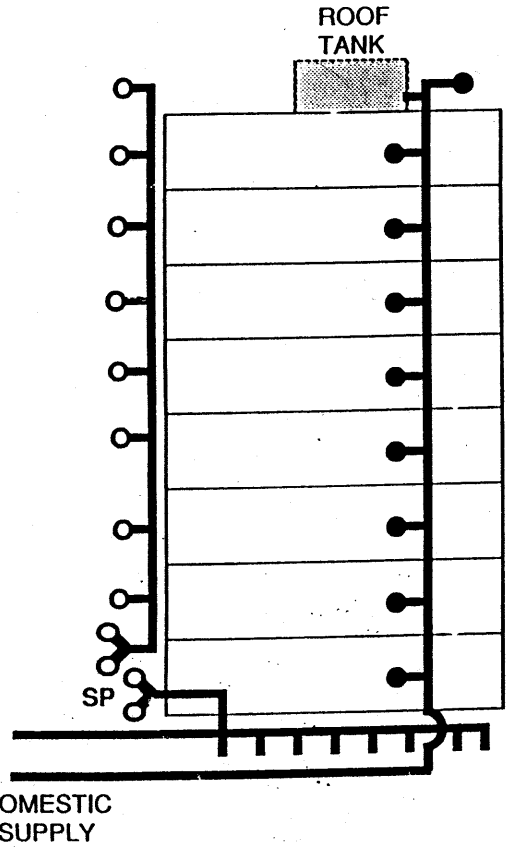


FIG. 1 8-1a

3 OR MORE STORIES

CLASS II WET STANDPIPE - (1 1/2" with hose and nozzle). Supplied by domestic system. May have roof tank, generally gravity but may be pressurized.

4 OR MORE STORIES

CLASS I DRY STANDPIPE - 500 gpm minimum. On exterior of building (fire escape), may be in stairwell. Sufficient risers to cover any portion of building with 30' stream from 100' of hose.

OUTLETS - 2 1/2" Globe Valve.

INLETS - 2 - 2 1/2" for 4 to 5 stories.
4 - 2 1/2" for 6 or more stories.

FIRE PUMPS - None
Pressure controlled by LAFD Engine(s).

ON SITE WATER SUPPLY - None.

SPRINKLERS - Required in basement if used for storage. Supplied by domestic system with F.D. connection to augment supply.

5/01

the Fire Department pumping apparatus and is based on the friction loss in the standpipe system and hose lines, back pressure (head) to the fire floor, and the required nozzle pressures. Since Dry Standpipes are not equipped with pressure control devices, it is important that the pressure delivered to these systems by Fire Department operators be proper to provide safe, effective hose streams.

Dry Standpipe Outlets

When Dry Standpipes are installed, outlets are provided at every floor level and roof landing of required enclosed stairways, fire escapes and smoke towers, except the first floor. Outlets are located based on the requirement that every point within the structure must be reachable by a 30' stream of water from a nozzle attached to 100' of hose.

In buildings built prior to 1960, the outlets of the Dry and the Wet Standpipe Systems are straightway gate valves or globe valves.

CLASS II (WET) STANDPIPE SYSTEMS

Wet Standpipe Systems are required in buildings three or more stories in height (four or more stories after 1983), and are directly connected to a water supply and equipped with 1-1/2" outlets, with hose and nozzle. These are primarily for use by building occupants. Depending on the age and height of the building, water is supplied to the Wet Standpipe System from one of the following sources:

1. Domestic Water System

2. Gravity Feed or Pressurized Tanks and Domestic Water System

Wet Standpipe Risers

In buildings constructed prior to 1960, Wet Standpipe Risers are 1-1/2" or 2-1/2", depending on the height of the building and year of construction. There are no inlets for the Fire Department to pump into these systems. These risers are supplied off the City mains.

The flow requirements for Wet Standpipes at the roof outlets are:

Prior to 1948	- 8 p.s.i. flowing 20 g.p.m.
1948 to 1959	- 12 p.s.i. flowing 35 g.p.m.
1960 to 1970	- 15 p.s.i. flowing 35 g.p.m.
1970 to present	- 30 p.s.i. flowing 35 g.p.m.

1960 to 1974

In 1960, height restrictions were removed from buildings constructed in the City of Los Angeles. At the present time, there is no maximum height. Changes in these water systems were necessary due to height, center core construction, and sealed buildings. After 1960, standpipes were required in the stairshafts. If the height of the

building exceeded 150′, standpipes were charged with water and fire pumps were required in the building to provide pressure at the outlets.

The Code changes in 1960 were broken down into the requirements for buildings that did not exceed 150' in height, and those buildings that exceeded 150' in height (High-Rise). The building that did not exceed 150' in height, and built after 1960, had the same requirements as those built prior to 1960. The exception was that the Dry Standpipes were required to be in the stairshafts rather than on the exterior of the building.

Buildings built after 1960 that exceeded 150' in height (High-Rise) are required to have Combination Standpipe Systems. (See Figure 2)

CLASS III (COMBINATION) STANDPIPE SYSTEMS

Combination Standpipe Systems are directly connected to a water supply and equipped with both 1-1/2" outlets (2-1/2” outlet with a 1-1/2” reducer), with hose and nozzle attached, for use by the building occupants; and 2-1/2" outlets for use by the Fire Department. The 2-1/2" system may have 100' of single-jacketed, unlined 2-1/2" hose with a 1" tip attached to 2-1/2" outlets on each floor above the 5th floor.

Two separate sources of water supply are required. The primary water supply is through connections to the city water mains. This supply is most often connected directly to the building fire pump or, in the case of some larger buildings, to internal tanks which supply the fire pumps. Fire Department inlet connections to Combination Standpipe Systems are required, and are considered as a secondary source of water.

As the water is supplied from the domestic system (street mains), two back flow (clapper) valves are required to keep the firefighting water from flowing back into and contaminating the domestic water system. Outside Stem and Yoke (OS&Y) valves will be found on each side of the back flow valves so that maintenance work can be done on the valves.

The water then flows into the building's fire pumps, which are usually found on the bottom level of a building. OS&Y valves will also be found on each side of the fire pumps for maintenance purposes. To keep the water from flowing back down the standpipe when the fire pump is shut off, a check valve is placed in the piping on the pressure side of the fire pump, just ahead of the OS&Y valve.

Jockey pumps are normally installed to make up minor leakage rates in system pressure. They prevent the fire pump from continually starting and stopping due to minor fluctuations in the system pressure.

Combination Standpipe Risers

Combination Standpipe Risers are 6" and must flow 1000 g.p.m. per riser. They will have four inlets at the FDC (250 g.p.m. per inlet) or if three or more standpipe risers, six inlets. A flow of 300 g.p.m. is required at each 2-1/2" outlet.

After the water leaves the fire pump, the piping will split to supply the standpipe in each stairshaft. The standpipes located in each stairshaft will have an OS&Y at the base of the

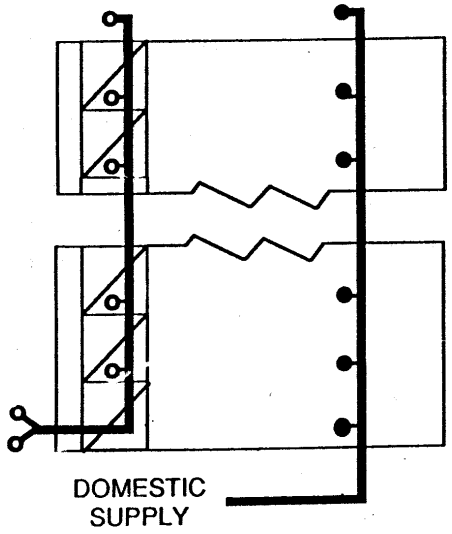
HIGH RISE WATER SYSTEMS
1960 TO 1974

LAFD
July 1991

BUILDINGS UNDER 150 FEET

CLASS I DRY STANDPIPE SYSTEM
In stairshaft. Refer to pre - 1960 system.

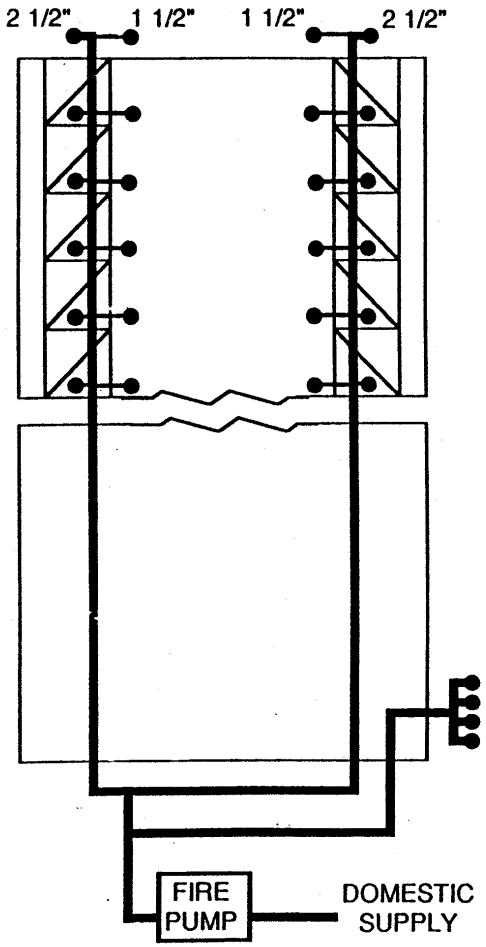
CLASS II WET STANDPIPE SYSTEM
Refer to pre - 1960 system.



8-3a

FIG. 2

BUILDINGS OVER 150 FEET



CLASS III COMBINATION STAND-PIPE SYSTEM

OUTLETS - 2 1/2" in stairshaft with Orifice Plates. Some have 100' of 2 1/2" hose with 1" tip, 5th floor and above. May have PRV's.

INLETS - 4-2 1/2"s, supply 1000gpm.

FIRE PUMPS - Diesel or electric, emergency electrical back-up not required. Jockey pump to maintain static pressure.

ON-SITE WATER SUPPLY - Not required.

SPRINKLERS - Only required in basement. Supplied by domestic supply with F.D. connection to augment supply.

CLASS II WET STANDPIPE SYSTEM (1 1/2" with hose and nozzle) - Supplied off of Combination Standpipe utilizing Orifice Plates to control pressure (flow).

5/01

riser. If one riser were to break, the OS&Y valve can be shut off for that riser and water will still be available from the riser in the other stairshaft. In some buildings risers may also be cross-connected at the top. These will have OS&Y valves at the top of the riser as well as at the base of the riser to allow the entire riser to be shut off and isolated.

A means must be provided for the Fire Department to pump into the building standpipe system in case of fire pump failure, or water supply disruptions to the fire pump. Fire Department inlets (referred to in Codes as Fire Department Connections or FDC's) are provided which allow the Fire Department to pump into the system on the discharge side of the fire pump. This is downstream of the OS&Y valve. To keep the water from flowing back out of the Fire Department inlets, there is a check valve between the inlets and the riser.

Test valves are required to provide a way of testing the fire pump(s). Test valve piping comes off the riser on the discharge side of the fire pump and goes to the exterior of the building. An OS&Y valve in the piping is provided so that unauthorized opening of the test valves will not flow water. The OS&Y valve, which is normally closed, is opened during fire pump tests. The test valve piping may be piped back into the on-site water supply, if applicable, instead of going to test valves on the exterior. This eliminates flowing large quantities of water into the street and saves the cost and waste of the water.

The same standpipes are utilized for supplying the 1-1/2" Wet Standpipe System.

This system, installed in buildings exceeding 150' in height and built between 1960 and 1974, is a Combination Standpipe System.

Buildings that do not exceed 150', built between 1960 and 1974, had the same requirements as those that do not exceed 150' built prior to 1960, i.e., Dry Standpipes (except they are in the stairshafts), Wet Standpipes off the domestic system, and sprinklered basements.

Combination Standpipe Outlets

The standpipe outlets in buildings built between 1960 and 1974, that do not exceed 150' (Dry Standpipe System), are gate or globe valves. On buildings exceeding 150' (Combination Standpipe System) the 2-1/2 " and 1-1/2" outlets have globe valves with orifice plates (See Figure 3). The 2-1/2" outlets must flow a minimum of 300 g.p.m. Because building fire pumps must produce pressures that are sufficient to supply required flows to the top floors, provisions must be made to reduce outlet pressures on lower floors. As an example, the riser pressure at the second floor of a 62-story building is 445 p.s.i. If the residual pressure at the 2-1/2" outlet exceeds 135 p.s.i., an approved device must be provided to reduce the nozzle pressure to 45 p.s.i. The system utilized in these buildings is orifice plates on the outlets. Orifice plates are a heavy gauge metal washer-like device which restricts the flow by restricting the size of the opening, thereby reducing the pressure when flowing. They are calibrated to supply 200 g.p.m. at 45 p.s.i. through 100' of 2-1/2" hose with a 1" tip. When not flowing calibrated g.p.m., the pressure increases equal to the riser pressure, i.e., 455 p.s.i.

ORIFICE PLATE SYSTEM

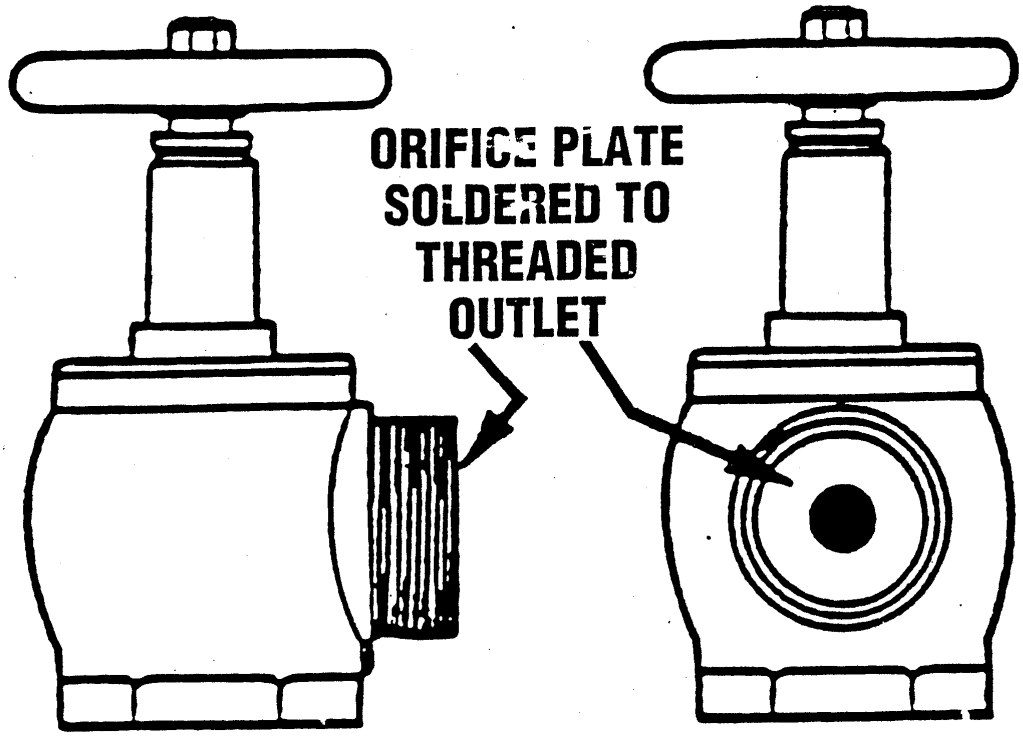


FIG. 3

Orifice plates are required to be securely installed in a fixed position. They are most often soldered to the outlet barrel or held in place by an adapter fitting. In some older buildings, however, the orifice plates are inserted between the outlet valve barrel or drip fitting and the attached hose coupling of the single jacket hose.

The obvious disadvantage of the orifice plate method of regulating outlet pressure is that it has no effect on static pressure. If the flow of water is shut off at the nozzle, the full static pressure of the standpipe will fill the hose, possibly rupturing the hose, especially if it is kinked.

During firefighting operations when using standpipes where orifice plates have been removed, it may be necessary to leave a member by the valve to manually regulate or shut off the water flow.

At the 5th floor level and above, some 2-1/2" outlets were equipped with 100' of 2-1/2" unlined, linen hose and a 1" straight stream tip, hung in an approved hose cabinet. The cabinet had to be locked and have a glass panel and marked "Fire Department Use Only." There are no provisions for testing this hose and therefore it is not reliable for Fire Department use. All building supplied hose should be replaced with fire department hose and fittings prior to starting firefighting operations.

1-1/2" Wet Standpipe System

As noted above, the same standpipes are used for supplying the 2-1/2" and 1-1/2" outlets. The 1-1/2" outlets have 100' of 1-1/2" hose with a straight tip, in a cabinet for occupant use.

On Wet Standpipe Systems, if the static pressure on the 1-1/2" outlets exceeds 70 p.s.i., a pressure reducing valve must be installed to reduce the nozzle pressure to 50 p.s.i. To produce 50 p.s.i. nozzle pressure, through 100' of 1-1/2" hose flowing 52 g.p.m., requires 68.5 p.s.i. at the outlet.

1974 to Present

In 1974, there was a major change in the requirements for firefighting water systems in high-rise buildings. The 150' requirement for high-rise buildings was reduced to buildings over 75' in height. The current definition of a high-rise building is any building over 75' in height, measured to the floor of the top floor level designed for occupant use, from the lowest level of Fire Department access. (See Figure 4 and 5)

COMBINED SPRINKLER-STANDPIPE SYSTEMS

Buildings built after 1974, exceeding 150' in height, will have a Combined Sprinkler-Standpipe System which is directly connected to a water supply and is equipped with 2-1/2" outlets for use by the Fire Department. One and one-half inch (1-1/2") outlets are not required in a combined system. The standpipe also supplies water to the sprinkler system. It will have Fire Department inlet connections, an on-site water supply, and a fire pump which supplies water and pressure to the standpipes. The on-site water supply and the fire pump are usually located at the bottom level of the building.

In 1974, the major change in the Building Code required buildings over 75' to be fully sprinklered. The supply for the sprinklers is the riser(s) in the stairshafts. The Code still requires buildings exceeding 150' in height to have Combination Standpipe Systems, and those that do not exceed 150' are only required to have Dry Standpipe Systems (in the stairshafts). Adding the requirement to fully sprinklered buildings over 75' in height onto these two requirements, results in three different configurations (depending on building height) of water systems in buildings built after 1974.

Combined Sprinkler Standpipes

Since 1974, buildings that exceed 150' are fully sprinklered and use combination (wet) standpipes to supply the sprinklers. Combined Sprinkler Standpipe System Risers are required to flow 1000 g.p.m. per riser and have four inlets (250 g.p.m. per inlet), or if three or more risers, six inlets are required.

Standpipe risers and outlets will be found in required stairshafts at each floor level, and occasionally may be found in other portions of the building as well. Combined Sprinkler-Standpipe systems are engineered to deliver specific amounts of water to the sprinklers in the building. For economic reasons (to use smaller piping), the water supply for each floor may come from a Looped System (except 1983 to 1988), that is, the water for a given sprinkler head is delivered from two or more risers. For this reason, the sprinkler shut-off valve at each riser will have to be closed in order to isolate and drain the sprinkler on a particular floor. Signs at each riser should indicate which additional valves need to be closed and the location of the drain valve.

The exception to the "Looping" of the sprinkler systems between 1983 and 1988 was due to the City adopting the Uniform Building Code in 1983. It did not require two separate points of connection for sprinklers. The City and the Fire Department prefer two points of connection (looped) because it makes the system more reliable and less susceptible to failure or isolation. The Code was changed in 1988 to require two points of connection. You will find buildings built between 1983 and 1988 that are not looped, and the sprinklers are supplied by only one riser.

Combined Standpipe Outlets

Another requirement resulted from the Fire Department's dissatisfaction with the performance of the orifice plates and the unlined 2-1/2" hose in the hose cabinets. These systems did not perform effectively in fire situations. The solution was pressure reducing valves on the 2-1/2" outlets. The trade off was eliminating the requirement for the installation of 2-1/2" hose attached to the standpipe outlets.

In buildings built after 1974 exceeding 75', a Pressure Reducing Valve (PRV) System is utilized to reduce standpipe pressure to working pressure. The term PRV is a general term used when referring to the complete system, i.e., a system of pressure reducing valves. The purpose of the system is to maintain a safe flow of pressure to firefighting handlines and sprinklers. The term PRD, Pressure Regulating Device or Pressure Restricting Device should be used when referring to the mechanism that reduces the pressure.

Pressure Regulating Devices are required to be used on any standpipe outlet where the static pressure exceeds 150 p.s.i. With Pressure Regulating Devices, the pressure control mechanism is built into the supply side of the valve and is preset according to the static pressure of the riser at that outlet (See Figure 6). The upper floors with pressures below 150 p.s.i. at the outlet may use orifice plates to restrict the flow.

For the Pressure Regulating Devices to operate properly and provide the proper pressure and flow, the designed static pressure of the riser must be provided, either by the building fire pump(s), or if they fail, by Fire Department engines pumping the system pressure into the system. Firefighting personnel cannot change the settings of Pressure Regulating Devices.

Pre-set pressures on Pressure Regulating Devices are required to provide 80 to 125 p.s.i. flowing 300 g.p.m. By policy, Fire Department inspectors are having the Pressure Regulating Device set at 100 p.s.i. at 300 g.p.m. Tests have shown pressure will vary only slightly whether using one or two lines off of the outlet. The Pressure Regulating Device adjusts pressure automatically, providing a constant nozzle pressure and providing a safety feature on wyed lines not found with the orifice plate system.

It is important to note that for Pressure Regulating Devices to operate properly and to provide rated flow, the valve must be fully opened.

Wet Standpipe Systems

In buildings that are sprinklered (over 75' in height), the Wet Standpipe System outlets, with hose, are not required, provided that there are 2-1/2" to 1-1/2" reducers with cap and chain on the 2-1/2" outlets.

Buildings 75' to 150', 1974 to Present

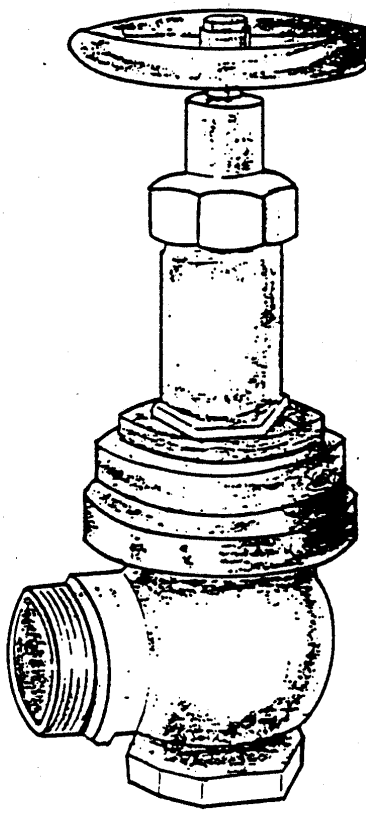
Buildings over 75' that do not exceed 150' in height are fully sprinklered and utilize the Dry Standpipe Systems to supply the sprinklers.

In these buildings that have a constant water supply for the sprinkler system in what may be considered Dry Standpipes, the water supply may only be adequate for the sprinkler system demand. These systems require a fire pump and the on-site water supply to augment the water system, and these systems MAY NOT provide an effective hose stream for the 2-1/2" outlets. Where more than one standpipe is provided, the standpipes shall be interconnected at the bottom.

Two and one-half inch (2-1/2") outlets may have orifice plates or Pressure Restricting Valves to regulate flow and pressure. (See Figure 7)

Pressure Restricting Devices are found when static pressures are between 135 and 150 p.s.i. Pressure Restricting Devices work by restricting the flow, hence reducing the p.s.i. The Pressure Restricting Device is mechanical and limits how far the valve can be opened, thereby reducing the flow and the p.s.i.

PRESSURE REDUCING VALVE



PRESSURE REGULATING DEVICE

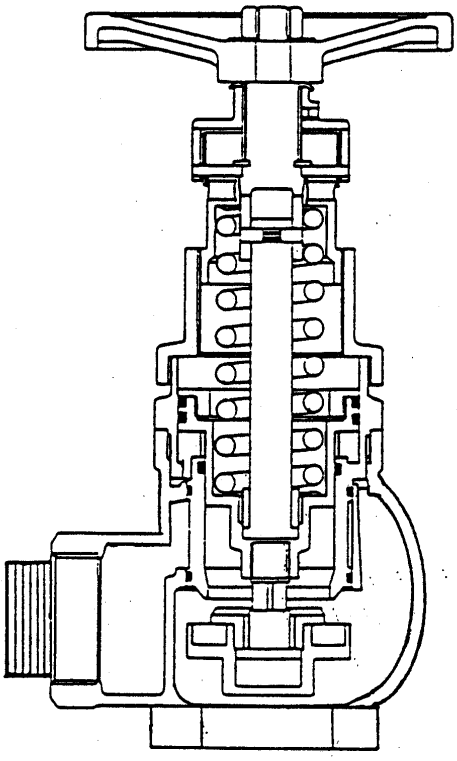


FIG. 6

PRESSURE RESTRICTING DEVICE

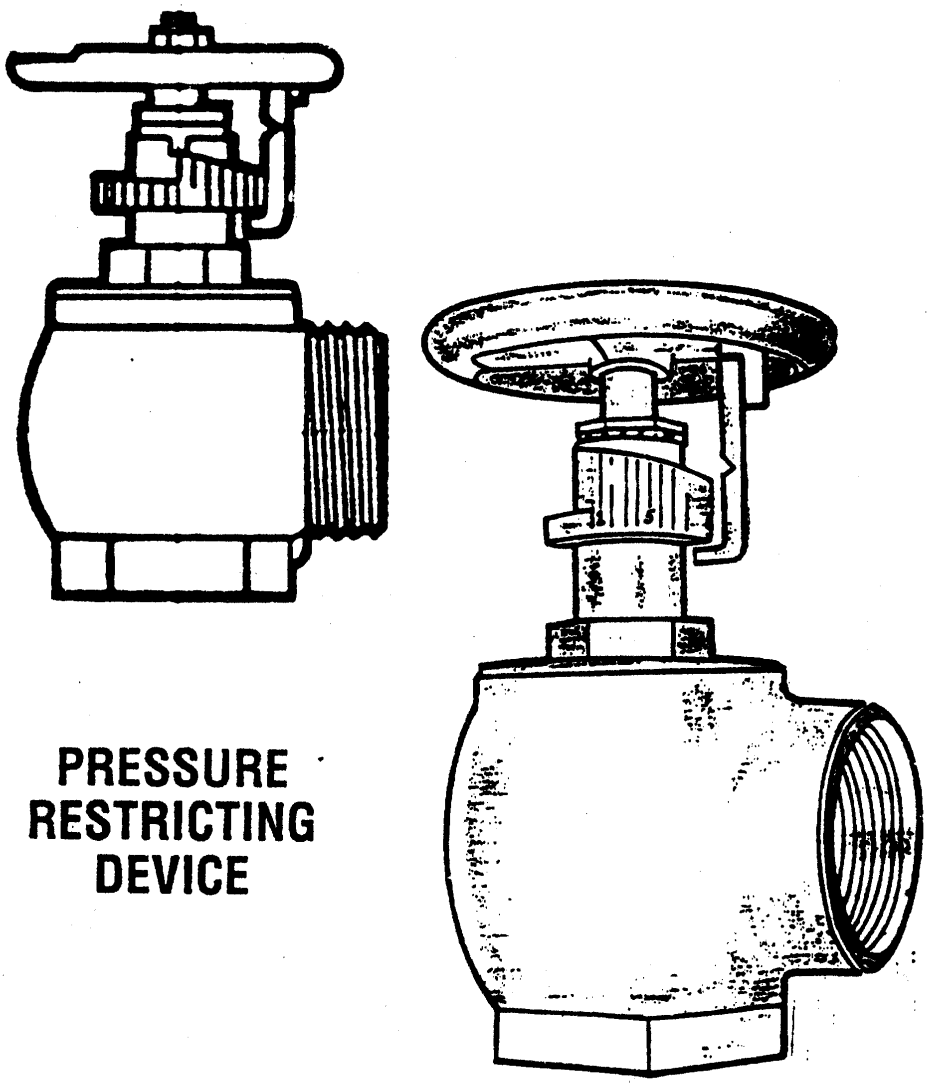


FIG. 7

During firefighting operations these valves may be adjusted by removing the restricting mechanism. After you have removed the restricting mechanism, it will be necessary to leave a member by the valve to manually regulate flow and pressure. In order to effectively adjust these valves during emergencies, members must familiarize themselves with the different brands of valves.

On-Site Water Supply

Beginning in 1974, new high-rise buildings in Los Angeles were required to have an on-site water supply (tank) to supplement the main water supply system. This on-site water supply acts as a safety valve for a building in the event of an earthquake or other disaster where the water supply to the building is interrupted.

For sprinklered buildings, over 75' but not exceeding 150' in height, the on-site water supply must supply the calculated sprinkler fire flow requirements of the most demanding rectangular area of the building for 30 minutes, plus an additional 100 g.p.m. for the total standpipe.

An example of this is the new California Medical Center, a 10-story hospital which has an on-site water supply of 4,500 gallons.

For buildings exceeding 150' but not over 275', the hydraulic calculations for on-site water supplies are calculated on the standpipe demand and the sprinkler demand is ignored. The standpipe requirements are 500 g.p.m. for the first riser plus 250 g.p.m. for each additional riser, for 30 minutes.

For buildings exceeding 275', the minimum amount of water in the on-site water tank is 45,000 gallons. This increases as the area and or hazards of the building increase and can be up to a maximum of 105,000 gallons in a larger high-rise. The on-site water supplies for high-rise buildings will almost always be found at the bottom of the building.

The Code requires these on-site water supplies to be maintained automatically and requires two methods to fill the tank. One is a minimum 2" diameter pipe adequate to fill the tank in not more than 12 hours from the main water supply system, or after 1983 a 6" pipe to fill it in 8 hours. The other method is unspecified. Normally, there is a pipe that comes off the piping between the Fire Department inlets and the standpipe. This allows water pumped into the inlets to be used to fill the tank, except there is a valve in this pipe between the Fire Department inlets and the tank and it is normally closed.

Buildings Less Than 75', 1974 To Present

Buildings that do not exceed 75', built after 1974, have the same requirements as those not exceeding 150' built from 1960 to 1974, i.e., Dry Standpipes in the stairshafts, Wet Standpipes off the domestic system, and sprinklered basements.

These are the descriptions of the types of systems, by age groups, and/or by height, that normally will be found in the City of Los Angeles.

Fire Department Connection Signs

FDC's are required to have a sign DRY STANDPIPE, COMBINATION STANDPIPE, OR AUTO-SPRINKLER and STANDPIPE, and if interconnected the word ALL.

Buildings Under Construction

During the construction of a building and until the permanent fire extinguishment system has been installed and is in service, fire protection shall be provided as follows. Every building six or more stories in height shall be provided with not less than one standpipe for use during construction. Such standpipe shall be installed when the progress of construction is not more than 50' in height above grade. Such standpipe shall be provided with a 2-1/2" outlet on each floor adjacent to usable stairs. Such standpipe system shall be extended as construction progresses to within one floor of the highest point of construction having secure decking or flooring.

Where construction height requires installation of a Combination Standpipe (exceeds 150' in height), fire pumps and water main connections shall be provided to serve the standpipe. This includes temporary inlets, normally 2 to 2-1/2". Up to 150' in height this system will be a Dry Standpipe. Once the standpipe exceeds 150', a temporary manually started fire pump shall be installed. There are no pressure control devices required on the outlets. This condition will exist until the building is completed and the permanent fire pump(s) and the PRV's are installed on each outlet.

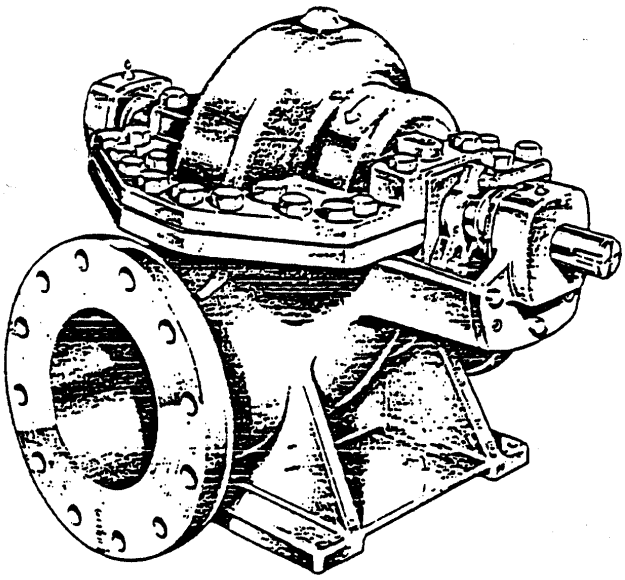
Fire Pumps

Fire pumps are required in buildings that have Combination or Combined Standpipe Systems. They provide a constant supply of water at the proper pressure to the standpipes.

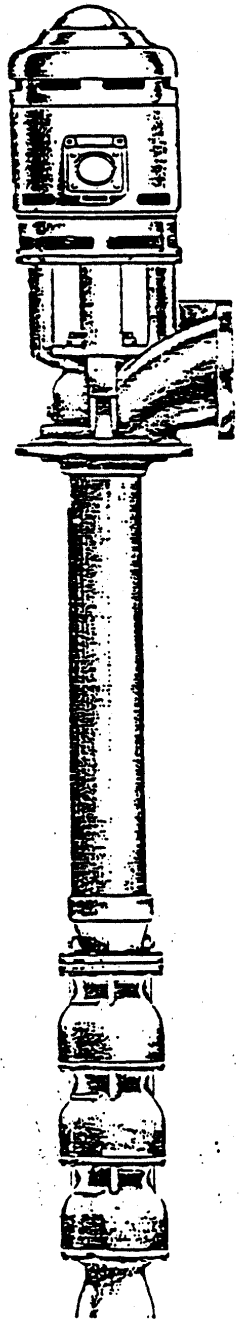
The primary water supply is from city water mains, which feed directly to the building fire pump, or from internal tanks (on-site water supply), which supplies the fire pump. FDC's to a Combination or Combined Sprinkler-Standpipe System are required, and may be considered a second source. The FDC's are plumbed into the discharge side of the fire pump. Shut-off valves are not permitted between the FDC's and their connections to the standpipe system. A required check valve in this piping will prevent the fire pump pressure from reaching the FDC's. The FDC's are located at the base of the building and may be grouped with test outlet valves. In some newer buildings the test valves are in a different location (sometimes in the pump room). The purpose of the test valves is to permit a periodic test of the building fire pump which is required to pump 150% of its rated capacity. The test valves can be identified by their male threads. FDC's will always have female threads.

Types of Fire Pumps

1. Horizontal Pump - A centrifugal pump with the shaft normally in a horizontal position. (See Figure 8)



HORIZONTAL FIRE PUMP
FIG. #8



VERTICAL FIRE PUMP
FIG. #9

2. Vertical Shaft Turbine Pump - A centrifugal pump with one or more impellers discharging into one or more bowls with a vertical eductor or column pipe used to connect the bowls to the discharge head. They are particularly suitable for fire pump service when the water source is located below ground and where it would be difficult to install any other type of pump below the minimum water level. (See Figure 9)

3. Pressure Maintenance Pumps (Jockey or make-up pumps) - These type of pumps are used to maintain a uniform, relatively high pressure on the fire protection system. A jockey pump should be sized to make up the allowable hourly leakage rate within 10 minutes, or 1 g.p.m., whichever is larger. A centrifugal-type pressure maintenance pump is preferable. A check valve should be installed in the discharge pipe. The jockey pump should be set to operate at a pressure of 5 to 10 p.s.i. higher than the main pumps starting pressure; which means that the fire pumps starting pressure should be at least 5 p.s.i. less than the jockey pumps starting pressure. The fire pump should not be used as a pressure maintenance pump.

Fire Pumps - Required Fittings

1. Automatic Air Release Valve - To automatically release air from the pump.

2. Circulation Relief Valve - Located between the pump and the pump discharge check valve, to operate if the pressure exceeds the pressure for which the system components are rated. Water being discharged from the relief valve has to be readily visible or easily detectable by the pump operator.

3. Pressure Gages - (1) A pressure gauge shall be connected near the discharge casting, and (2) a compound pressure and vacuum gauge shall be connected to the suction pipe near the pump. (A compound pressure and vacuum gauge is not required on a Vertical Shaft pump).

4. Metering Device - A water measuring device shall be provided to test the pump. Fire pump installation must have the ability to test the pump and the suction supply at the maximum flow available from the fire pump. It shall be capable of water flow of not less than 150% of rated pump capacity.

Types of Driving Motors

Fire pumps can be either powered by an electric motor or by a diesel engine. Prior to 1974, generally there was only one fire pump and it was electrical. Since 1974, buildings over 275' are required to have three fire pumps, one electric and two diesel.

Electric Motor

Power shall be supplied to the electric motor by one or more of the following sources:

1. Utility Service

2. Single Power Station

3. Emergency Generator

It should be noted that Emergency Power was not required in buildings built between 1960 and 1974. Some have voluntarily installed emergency power so that if power is lost to the building, the fire protection systems, including the fire pumps, will still be operational.

Diesel Engine Drive

1. Instrumentation and Controls

   - Governors

     Diesel engines must be provided with a governor capable of regulating the engine speed within a range of 10% between the shutoff and maximum load condition of the pump.

   - Overspeed Shutdown Device

     Engines shall be provided with an overspeed shutdown device. It shall shut down the engine at a speed approximately 20% above rated engine speed and must be manually reset after overspeed shutdown.

   - Tachometer

   - Oil pressure Gauge

   - Temperature Gauge

   All the above instrumentation shall be placed on a panel and secured to the engine at a suitable point.

2. Batteries

   Each engine shall be provided with two storage battery units. Each battery unit shall have the capacity to maintain cranking speed throughout a six-minute cycle.

   Example: 15 seconds of cranking and 15 seconds rest in 12 consecutive cycles.

3. Fuel Supply U.B.C. Sec. 1807 I-1

   There must be a separate fuel line and a separate fuel supply tank (day tank) for each engine. There shall be a minimum 8-hour (new high-rise post 1974) and 4-hour (existing high-rise -1960 through 1974) supply of fuel.

Engine Drive Controllers

The basic function of a fire pump controller is to start the engine automatically upon a drop in pressure in the riser, or allow manual starting in case of a problem with the automatic system. (See Figure 10 for Engine Driven Fire Pump Controller.) The controller provides automatic cycled cranking and alarm protection for various engine failures when running. All controllers shall be marked "FIRE PUMP CONTROLLER." Where multiple pumps are provided, serving different areas or portions of the building, an appropriate sign shall be conspicuously attached to each controller indicating the area, zone, and portion of the system served by the pump or pump controller. The controller should be located as close as practical to the engine it controls and always within sight of the engine. A complete set of instructions covering the operation of the controller shall be provided and conspicuously mounted on the controller.

The controller will start the engine when there is a drop in the water line pressure. This is done by a mercoid pressure switch, which is independently adjusted to a high (stop) and low (start) setting. The policy in Los Angeles for the STOP pressure is set 10 p.s.i. below system pressure and the START pressure is set 50 p.s.i. below the system pressure. As water is flowed from a hose line or a sprinkler(s) operating, the pressure in the system will drop until it gets down to the START setting. Once it drops to this setting, the fire pump will automatically start, bringing the pressure up to the system pressure. As the pressure increases and goes by the STOP setting the Controller will shut off the fire pump, except there is a run-out timer to keep the pump from constantly starting and stopping. The run-out timer is normally set for seven to ten minutes for electric driven fire pumps and 30 minutes for diesel driven pumps. These run-out timers can be set manually.

1. Four-Position Selector Switch

   The four-position selector switch is labeled "TEST, AUTO, OFF & MANUAL."

   - Test

     This momentarily drops the water pressure, closing the pressure (mercoid) switch, thus starting the engine.

   - Auto

     Puts the controller in the standby mode. All the automatic functions are ready for operation.

   - Manual

     All automatic functions of the controller are bypassed when the engine is started with the manual push buttons. There are two manual start push buttons for manually cranking the engine from either set of batteries. In the event of low battery condition, both switches may be depressed simultaneously, increasing the battery potential to the starter. All engine alarms are operative in the manual mode.

FIRE PUMP CONTROLLER

FOR ENGINE DRIVEN FIRE PUMPS

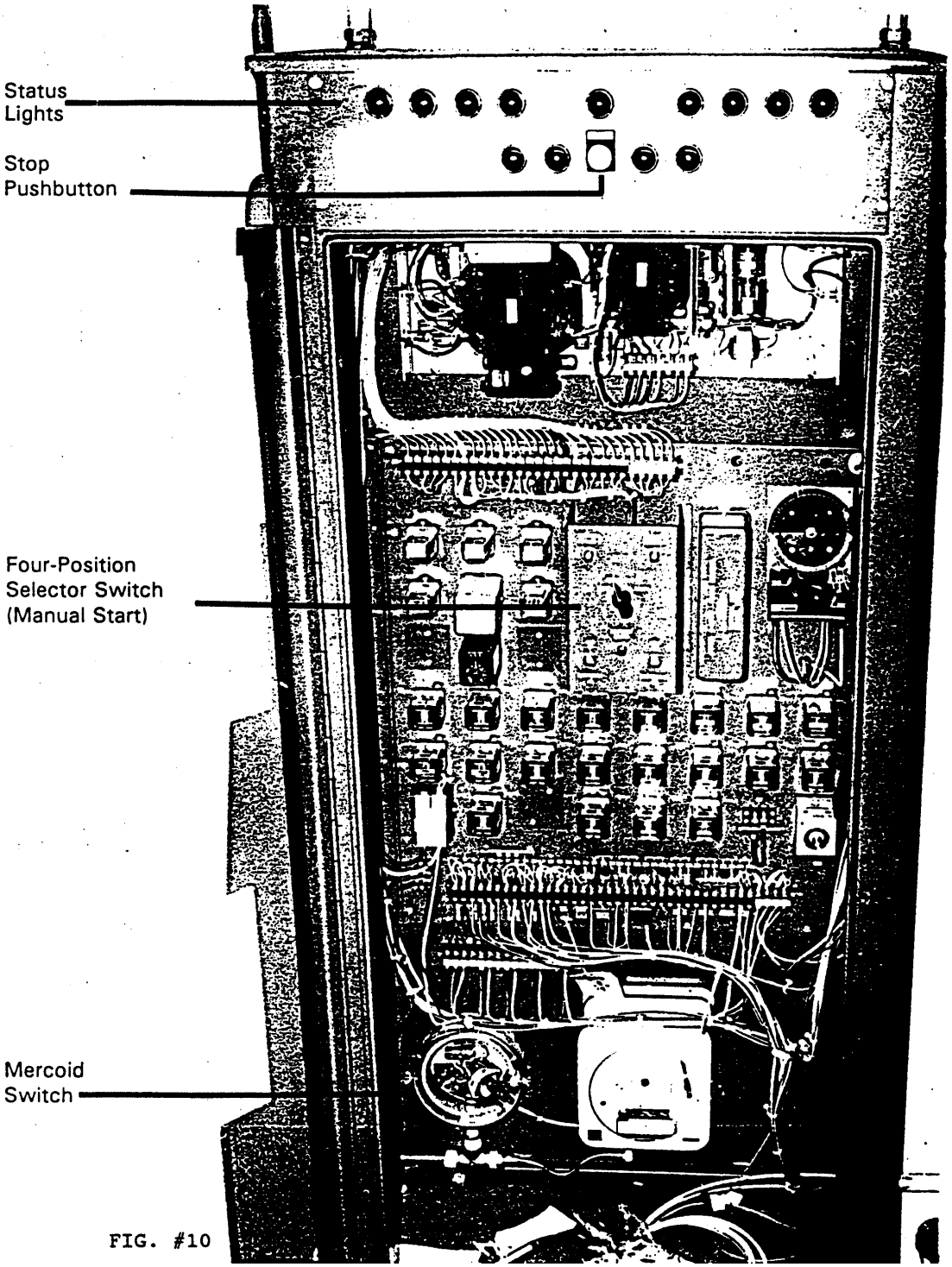


FIG. #10

- Off

  Turns the controller off. In this position the fire pumps will not start.

2. Manual Stop Push Button

   Mounted on the outside of the controller. It bypasses the selector switch allowing the manual shutdown of the engine. If the demand that caused the engine to start has returned to normal (mercoid pressure switch, and run-out timer), the controller will automatically reset for standby mode, if not, the engine will start up again. The way to correct this is to turn the four-position selector switch to the "OFF" position while pushing the manual stop button.

3. Failure Alarm on the Controller

   There are circuits to provide local lights and alarm on the controller for the following:

   - Overcrank Lamp

     If the engine fails to start at the end of the six crank attempts (six 15-second crank periods separated by five 15-second rest periods) the overcrank lamp will be lit and the audible alarm will sound.

   - Low Oil Pressure

     This is an alarm only.

   - High-Water Temperature

     This is an alarm only.

   - Overspeed

     This is an alarm and will also shut down the engine. Overspeed is the only problem that will automatically shut down the engine.

   - Loss of Battery Charger Output

     The loss of 115 volts results in the loss of charger output.

4. Status Lights

   There are three green lights on the controller that indicate battery power is available from battery one and battery two.

   The third lamp indicates that the control is in "AUTO" position.

5. Sequential Starting

   The controller for each multiple pump unit shall incorporate a sequential timing device to prevent any combination of engines from starting simultaneously. If water requirements call for more than one pumping unit to operate, the units shall start at intervals of five to ten seconds. If the pressure in the system stays at the START pressure setting of the mercoid pressure switch for four to six seconds the second pump will start, if the pressure stays there for six to eight seconds the third pump will start. Failure of a leading engine to start will not prevent the subsequent engine from starting.

Electric Motor Fire Pump Controllers

An electric fire pump controller (See Figure 11) will include a single handle for operating both the isolating switch and circuit breaker in the proper sequence. It will also include a starting contactor, a built-in pressure switch for automatic starting, manual start and stop push buttons, and a Power Available pilot light to indicate that primary and control power are available. An emergency start lever will close the starting contactor independent of the automatic control circuits.

Automatic Transfer Switch

This switch provides for the operation of electric fire pump motors from an alternate source of power when the normal source fails. The switch is interlocked electrically and mechanically to prevent both services from feeding the load at the same time.

The transfer switch is capable of manual operation. When the voltage of any phase falls below the preset level, the transfer switch will automatically transfer to the alternate source. This unit has two pilot lights, one for normal position and one for emergency. It provides a visual indication of switch position. A test switch is also provided which simulates loss of normal power so that the transfer switch operation can be checked without interrupting normal service to the fire pump controller.

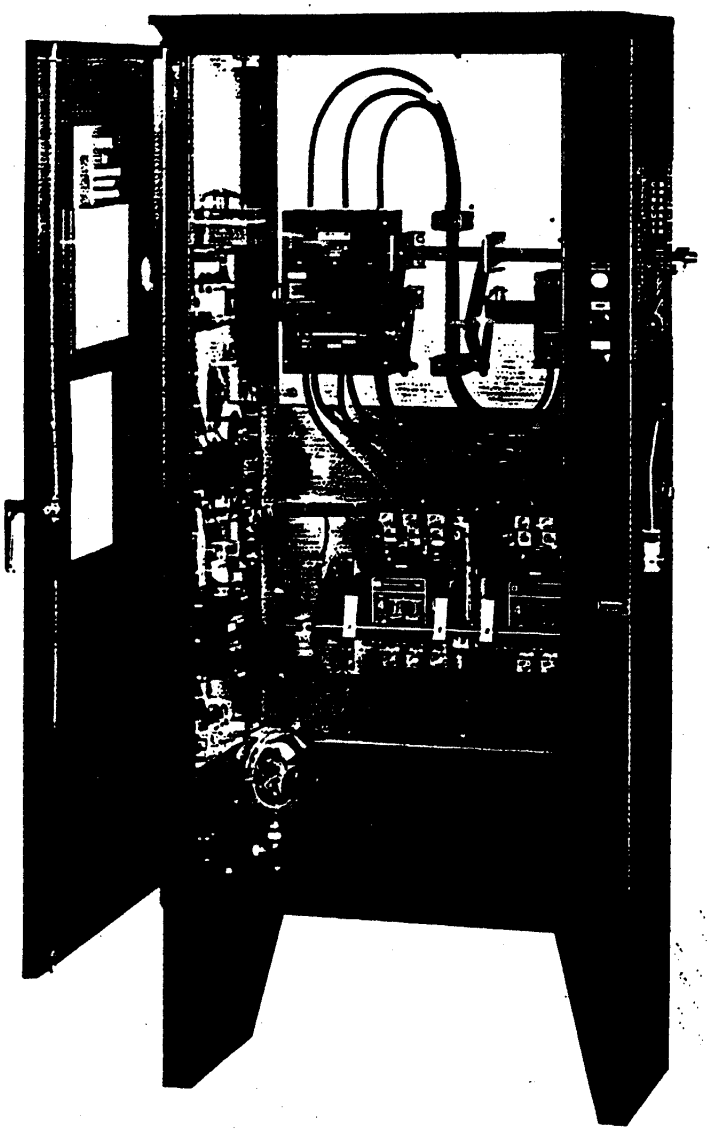
Remote Alarm Panel

The National Fire Protection Association requires that when the pump room is not constantly attended, an audible or visual alarm, powered by a reliable source, be provided at a point of constant attendance. (See Figure 12).

Acceptance Test

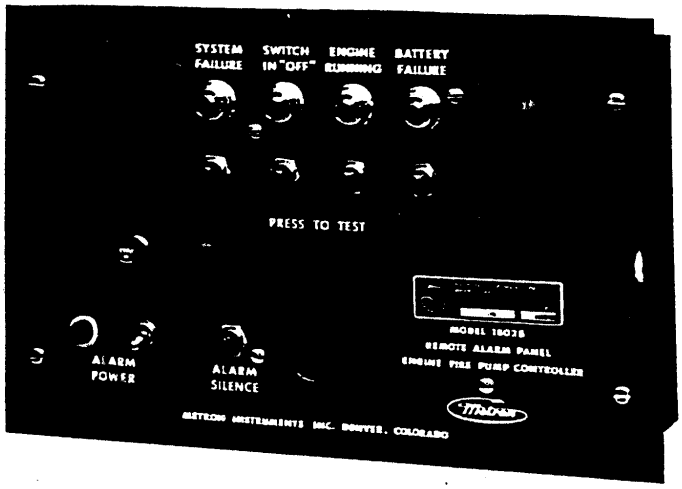
Fire pump controllers shall perform not less than 10 automatic and 10 manual operations during the acceptance test and shall be operated for a period of at least five minutes at full speed during each of the tests. The automatic operation sequence of the controllers shall start the pump from all provided starting features.

FIRE PUMP CONTROLLER
FOR ELECTRIC MOTOR DRIVEN
FIRE PUMPS



REMOTE ALARM PANELS

FOR ENGINE DRIVEN
FIRE PUMP CONTROLLERS



FOR ELECTRIC MOTOR DRIVEN
FIRE PUMP CONTROLLERS

FIG. #12

Annual Fire Pump Test

An annual test of the fire pump assembly (pump, driver, and controller) shall be performed to determine its ability to continue to attain satisfactory performance at peak loads. Fire pumps are required to pump 150% of rated capacity and at a pressure of not less than 65% of its rated pressure for a minimum of 15 minutes.

Vane Type Water Flow Switch

Vane type water flow switches are used on wet sprinkler systems to detect water flow. In high-rise structures they will be found in the stairshafts where the sprinkler pipe comes off the standpipe. The minimum flow rate for alarm is 4 to 10 g.p.m. (equal to one sprinkler head) and operates in 20 to 60 seconds.

Flow adjustment is controlled by the small coil springs that hold the vane in the normal position against the direction of the water flow. These units have an adjustable pneumatic retard to prevent false alarms due to water surge. The retard is adjustable from 0 to approximately 90 seconds. The water flow switch can be wired as an open or closed circuit. It has two switches, one that can be used to operate a central station, proprietary, or remote station transmitter, while the other contact is used to operate a local bell or annunciator panel.

Valve Tamper Switches

Tamper switches are placed on valves in the firefighting water systems of buildings to prevent unauthorized closing. The switch will activate within two turns when the valve is operated from full open towards the closed position. Removing the tamper switch cover will also cause the switch to operate. The tamper switches are wired electrically to the alarm panel and will transmit a trouble signal when activated. The signal may also be transmitted to an alarm company.

You will also find tamper switches that utilize a cable looped through the valve handle and the ends of the cable inserted into an alarm box. If the valve is closed the cable is pulled out of the alarm box, activating a trouble signal.

Retrofit Program

The Commercial High-Rise Sprinkler Retrofit Program was created in 1988 to amend the Los Angeles Building Code (Amending Ordinance 163836). Its purpose is directed toward the upgrading of fire and life safety systems in "existing" nonresidential high-rise buildings. The term "existing" high-rise refers to structures over 75' in height constructed prior to July 1974. These occupancies are office, industrial, or commercial type buildings.

The amending ordinance requires upgrades such as buildings must be fully sprinklered and have a firefighting water system to at least one stairwell. Water to this system may be provided directly from the city mains, or from an on-site water supply augmented by the city main. Also, the building must have an electric fire pump to maintain adequate pressure within the sprinkler system in the event that a sprinkler is activated.

NOTE: The sprinkler and firefighting water system must be looped together making it a "COMBINED" type system. Also, the fire pumps are required to maintain adequate pressures in the sprinkler system and will still be able to maintain correct pressure once a firefighting line is opened. The Los Angeles Fire Department's method for hooking up to FDC's to supplement system pressure is outlined in Training Bulletin No. 64 of the Manual of Operation, Book 23.

There are 356 buildings in the City of Los Angeles that were affected by this 1988 Ordinance. Approximately 40 of the 356 building owners were granted a variance from this Ordinance due to various unique conditions that existed in their respective buildings. An example of a building that might be granted a variance is a building already sprinklered at the time the Ordinance was enacted. In these buildings, the sprinkler and standpipe systems might not be looped together.

Selected buildings which are to remain vacant above the first floor may be exempt from Ordinance compliance and could be given extensions of up to 11 years from the date of citation to comply.

With 356 of these existing high-rise buildings spread throughout the City, there is a great likelihood that Department members will encounter an emergency in one of these buildings. For obvious reasons, it is important to know what type of water system firefighters will be dealing with throughout the entire process of the buildings' retrofit program.

The types of buildings that firefighters will find can be placed into two categories:

1. Buildings that have Completed Their Retrofit Program

2. Buildings in the Process of Completing Their Retrofit Program

In completely retrofitted high-rise buildings, as in new high-rise buildings (built after July 1974), you will encounter different types of PRV's. There are two types of PRV's that firefighters will commonly come in contact with:

1. Pressure **Regulating** Devices

2. Pressure **Restricting** Devices

NOTE: Orifice Plates may also be used.

It is important to be able to identify each of the Devices. Pressure Regulating Devices are mechanisms encased in LARGE cast metal housings. (See Figure 6) Mechanical Pressure Restricting Devices will be smaller than the Pressure Regulating Devices. Mechanical Pressure Restricting Devices will have calibrating mechanism as an internal part of the unit, or have one attached to it. (See Figure 7) Orifice Plates will be found in normal gate valves (globe valves or angle valves). (See Figure 3)

Members encountering incidents in buildings in the process of the retro-fit program will be faced with greater challenges. Members may find makeshift water systems, one or more

floors of a building completely taken out of service while the system is being worked on, temporary connections, and other things different than a normal fire protection system.

The High-Rise Unit of the Fire Prevention Bureau has required contractors working on systems to assist the Fire Department by complying with the following:

- Place signs within the building stating that the building is in the process of being retro-fitted.

- Limit the duration of time a portion of a fire protection system can be taken out of service (between four to six hours) and require that O.C.D. and the first-in Battalion Commander be notified of the temporary condition.

- Post signs at any connection that has been taken out of service, and the proper parts to fix the system must be on scene close enough to the system to allow the system to be put back into service in a short amount of time.

- Attach a temporary connection to enable the Fire Department to bypass the portion of the system disabled and still pump to the other parts of the system.

At times, requirements are violated. The situation encountered will be much different. Members must have knowledge of buildings in their district to compensate for inadequate or unexpected application of these Codes. Recently, in a building undergoing retro-fit, firefighters encountered only one very well hidden sign describing the process. Also, floors were out of service without temporary connections and notifications were not made. Additionally, there was storage in the stairwell that would have hindered firefighting operations.

To ensure safe and effective firefighting operations, it is paramount that fire stations which have "existing" high-rise buildings within their districts identify these buildings, develop a pre-incident plan for them, and share this information with the companies of the first alarm assignment. Remember, due to the fact that most of these buildings were granted up to 11 years to complete their retro-fit, firefighters will be dealing with these buildings for a long time to come.

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CHAPTER 9

SALVAGE OPERATIONS

As defined by the dictionary, salvage is property saved from destruction in a calamity (as a wreck or fire). Applied to the Fire Service, salvage operations are utilized to save structures and their contents from loss or damage from the uncontrolled presence of the following:

- Smoke, heat, water, and other elements that are the result of fire suppression efforts.
- Water from activated sprinklers, leaking water pipes, etc.

Although the loss to a structure and its contents from a broken water pipe is a direct result from a single factor (water), the total loss due to a structure fire is a result of two factors:

- Direct Loss: Direct loss is damage caused by fire, heat, and the products of combustion.
- Indirect Loss: Indirect loss is damage caused by the fire suppression operations used to control and extinguish a fire.

Salvage operations should be an integral part of fire suppression operations. When a salvage problem exists, the Incident Commander should consider assigning an officer as Salvage Group Supervisor, early on in the incident. The goal in fire suppression operations is to keep the loss to a minimum and get the occupants back in business as soon as possible. Therefore, the earlier salvage operations are started the greater the chance of minimizing the indirect loss.

Damage to a structure and its contents are usually caused by heat, smoke, and water. Heat and smoke are normally handled by ventilation procedures. The main focus in salvage operations is the control of water and keeping it out of elevator shafts, machinery rooms, and electrical rooms.

<u>Size-Up</u>

Effective salvage operations begin with an accurate size-up and a timely operational plan. The process of determining appropriate priorities is simplified with a basic knowledge of the following information:

- Sprinkler Systems
- Construction Methods
- Location of Computer Rooms
- Location of Elevator Shafts and Equipment Rooms
- Location of Electrical Rooms/Vaults
- Vertical Shafts

Pre-Incident Planning

Pre-Incident planning and routine fire prevention inspections offer an excellent opportunity to:

- Develop a familiarity with the building.
- Evaluate the following factors:

  A. Sprinkler Systems
  B. Watertight Floors
  C. Computer Rooms
  D. Elevator Shafts and Equipment Rooms
  E. Electrical Rooms/Vaults
  F. Vertical Shafts

Origin

Locating the seat of the fire or source of water flow will initially indicate what portion of the structure is involved, where the fire/water is going, and any additional hazards.

Salvage operations should begin where the greatest loss is expected. Generally, this is the floor of origin or the floor directly below. Priorities should be quickly established based on location, value, susceptibility to damage, and the type of occupancy involved.

Habitational Occupancies

In this type of occupancy, items of the most value are normally personal and household items, such as:

- Expensive Appliances
- Furniture
- Clothing
- Irreplaceable Art and Personal Pictures
- Miscellaneous

Commercial/Industrial Occupancies

- Business Records
- Machinery and Finished Product
- Unfinished Stock and Raw Materials
- Computers
- Miscellaneous

Office Buildings

- Computers
- Business Records
- Filing Cabinets

- Business Machines
- Miscellaneous

Water Removal

Knowledge of high-rise water systems is very important. In order to minimize damage, it is necessary to control the source and accumulation of water in a timely manner. If water is allowed to accumulate, the weight of water can overload a fire weakened structure to the point of collapse. Consider the weight of water a hose line can add to a structure.

1. A 2"-line at 200 g.p.m. adds 1,670 pounds per minute.

2. A 2-1/2"-line at 325 g.p.m. adds nearly 2,800 pounds per minute.

Although some of this water is turned to steam or drains from the structure, a significant portion can be absorbed by the building and its contents.

Removing water from a structure can be accomplished by eliminating the source and dewatering.

NOTE: Early consideration should be given to identifying if the water supply for each floor may come from a "looped system" and the water for a given sprinkler head may be supplied from two or more risers. For this reason, the sprinkler shut-off valve at each riser will have to be closed in order to isolate and drain the sprinkler on a particular floor.

Depending on the incident and source of the water, it is often advisable for the company officer to assign personnel to investigate alternate methods to shut off the flow of water. This process will result in a minimal amount of time to eliminate the flow of water and provide alternate methods if the primary method is not successful.

Vertical Shafts

Before channeling water into a vertical shaft, consider the following items:

1. Water running into an elevator shaft will most likely put the elevator out of service when it may be needed to carry firefighters and equipment to upper floors. Water runoff can cause an electrical hazard to firefighters.

2. Electrical vaults and elevator machinery rooms must be protected.

3. Water may run down the inside portion of exterior walls onto the floors below.

4. The terminus of the shafts, usually the basement or lower floors, may have to be pumped out.

Channeling

Based on the type of occupancy and incident, it is often advantageous to channel water into a stairwell. This is the best method for large quantities of water. This method is only limited by available resources and initiative. The salvage problem may be as simple as setting up window drains utilizing salvage covers or plastic, depending on area involved and quantity of water.

Determining the origin of the problem, amount of water present, and the anticipated flow will provide the basic parameters to formulate a salvage plan. These factors will also indicate the size of a salvage operation and resources required to abate the problem.

Effective salvage operations are dependent on a combination of pre-planned and timely operations. It is necessary to ensure adequate training and leadership to formulate and coordinate a basic plan that includes flexibility, initiative, and appropriate use of resources.

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CHAPTER 10

BUILT-IN SYSTEMS

This chapter covers items and situations that should be considered by individuals assigned the task of operating the Fire Control Room (or in some buildings called the Building Control Station) at a high-rise incident.

The Fire Control Room in a high-rise building can be a tremendous resource in the hands of a knowledgeable operator. Information can be relayed to the Incident Commander and utilized to plan the strategy necessary to abate the emergency. It is important to point out that the layout and operation of these rooms vary greatly from simple annunciator panels to complex computer controlled systems, and not every high-rise building has all of the systems discussed in this chapter.

The information included in this chapter should not be construed as everything that is known on the subject of Fire Control Rooms but rather, a list of guidelines and considerations to be used and prioritized as indicated by the needs of the specific incident.

The best way to become familiar with the Fire Control Rooms in your district is through training and pre-incident planning. During a pre-incident plan and following an emergency incident, a review may be of assistance in covering all aspects of the fire control room.

One of the most important things to remember is to find someone from the building that is familiar with the Fire Control Room. This may be the Building Engineer or possibly security personnel. Members should refer to the Building Inventory to help determine how the Fire Control Room can be utilized to abate the emergency.

You must determine what information is vital to the control of the emergency and what actions in the Fire Control Room should be taken to help abate the emergency, i.e., during the early stages of a fire, you would be more concerned with the activation of smoke detectors and recall of elevators than the status of the sound powered telephone system. If tenants are having difficulty evacuating the building because of smoke in the stairwells, perhaps the priority should be pressurization of the stairwells. Decisions on actions taken in the Fire Control Room will normally be made by the Incident Commander, Lobby Control, or Systems Control.

Discussed below are things that should be considered in your routine while on a

pre-incident plan and during an emergency incident when making decisions involving monitoring and actions taken in the Fire Control Room. Items listed below are not in any specific priority.

<u>Location of Fire Control Room and Access</u>

The location of the Fire Control Room is normally (but not always) on the lobby level and can be found pictured on the Building Inventory. The keys are usually kept in the Fire

Department lock box or at the security desk and an additional lock box is located in the Fire Control Room. This lock box will contain additional elevator and master keys for Fire Department use. During pre-incident planning, ensure that the keys fit the Fire Control Room by opening the room with the key that you will use during a fire. It is a good practice to test all of the keys that Department members may use during an incident. Do not let security open the doors using their keys. Sometimes these locks are changed and the keys found in the lock box will not fit them.

During an incident, locate the keys mentioned above and provide them to Lobby Control, Systems Control or issue them to resources at the direction of Lobby Control. A good practice is to write the Lobby and Fire Control Room telephone numbers on a copy of the Building Inventory (there should be six unplasticized copies of the Building Inventory sheet in the lock box). If possible, give one copy of the Building Inventory to the initial Fire Attack Team along with one stairwell or master key.

General Familiarization

Some buildings have contracted with outside vendors who prepare "disaster plans." These plans are actually very detailed building inventories that can be of value to the Fire Department. Most buildings that have these plans will keep a copy in the Fire Control Room for our use. It is usually a loose-leaf binder labeled emergency plan, disaster plan, or something similar. The building engineer may have an additional copy in his office.

Once inside, use the priorities designated by the Incident Commander, Lobby Control Supervisor or Systems Control Supervisor to gather information and control HVAC systems in the Fire Control Room. Once the critical actions have been taken and the data has been obtained and passed to the Incident Commander, you should familiarize yourself with all the other aspects of the systems provided. If you should discover that the building has a disaster plan like the one mentioned above, notify your supervisor and get the book to the Incident Commander.

Smoke/Heat Detection System

This system may be a separate, simple to complex annunciator panel or a printout/display, or both. Familiarize yourself with the information provided and how to interpret what you see. Some systems have separate zones that divide each floor. Determine if the system provides a permanent or temporary record of the time of activation of individual detectors. This could be an electronic display, printout, or stored in the computer memory.

Do not assume there is only one annunciator panel, some buildings have more than one, each serving a different area of the building. You must learn how to reset the alarms from the Fire Control Room so you will be able to do so when instructed to by the Incident Commander.

During an incident, some operators will momentarily turn off the lights in the Fire Control Room when they first take control. This dark room will accentuate any lights on the annunciator and help locate the ones that have activated.

In a system that has a simple annunciator panel, a good practice is to mark the activated detectors and the time with a china marker, pencil, or tape when you first view the annunciator panel. This provides you with a time record of the incident as it pertains to the activation of detectors. Pass this information on to Lobby Control. You should note any additional detectors that activate in the course of the fire and note the time of their activation. Pass this information on to Lobby Control. In the early stages of a high-rise fire, any information on the location of the fire and its direction of travel will be of great importance to the Incident Commander.

Water Flow Detection System

This system may be a separate annunciator panel or a printout/display, or both. Familiarize yourself with the information provided and how to interpret what you see. Some of these systems break floors into separate zones similar to the smoke and heat detector systems.

During an incident, determine if the tamper annunciators have been activated, indicating a system has been shut down. These tamper annunciators will usually tell you that a sectionalizing or main water valve controlling a sprinkler system has been shut down fully or partially. This information could be important to the Fire Attack Team or the Incident Commander.

Review Chapter 8 - Water Systems

Elevator Status

Determine if the building has split bank elevators and what floors the lower banks service. Find the location of the elevator equipment room for the lower banks. Make sure you know how to read the elevator status annunciator. Some use a digital readout while others use separate lights for each floor. Determine which elevators are powered by the standby generator. These elevators are usually the last ones to return. Some systems allow you to switch standby power to a different car. If this feature is available, determine how it is done. Refer to the elevator instruction card located in the lock box. Find out how to recall all or a single bank of elevators to the lobby or designated floor. Determine to what floor each bank is recalled. Some buildings will recall some elevators to the lobby and others to a different floor. Find out where and why. It may give a clue to a safer approach to the building at a level other than lobby.

Review Chapter 7 - Elevators

Air Handling System

Normally, during a fire, the air handling system will be completely shut down to prevent the travel of smoke to uninvolved floors. If the Fire Control Room has an air handling system annunciator, report its status to Lobby Control. Any switching of the air handling controls should be done cautiously and under the direction of the Incident Commander. Changing the direction of air flow could have a significant effect on personnel on the fire floor. Normally, we will not operate air handling controls (except for complete shut down) unless we are very familiar with the specific building or the Building Engineer is on the scene.

Review Chapter 6 - Ventilation

Stairway Pressurization System

Ensure that the stairwell pressurization systems are operating; if not, advise Lobby Control Officer and be guided by his instructions.

Review Chapter 6 - Ventilation

Stairshaft Doors Unlocking Controls

During a fire, determine if the stairshaft doors are unlocked; if not, unlock them and report this action to your supervisor. Some systems will re-lock the stairshaft doors if the alarm system is reset. If this is the case, there may be an override to keep the doors unlocked.

Fire Pump and Water Supply Status Indicators

These indicators may disclose information about the amount of water in the water tank, fire pump pressure, etc. Pertinent information should be passed on to Lobby Control. In a computerized system, this information may be displayed on a printout or monitor screen.

Review Chapter 8 - Water Systems

Standby and Emergency System Status

Indicators in the Fire Control Room may disclose the amount of fuel left in the tank and whether the emergency or standby generator is operating. Some systems indicate voltage, RPM, engine temperature, etc. Familiarize yourself with these indicators. Sometimes these control panels will allow you to switch power to specific elevator cars. If this is the case, advise Lobby Control of this ability.

Fire Department Communication System

Find the sound powered telephone handsets (six removable and one permanently attached in the Fire Control Room). Telephone jacks may be found in each elevator car, all elevator vestibules and elevator lobby, every enclosed exit stairway at each level, and each exit location where a stairshaft exits to a public way. Their location depends on the building's age and codes in effect at the time. During an incident, this system is used to augment Fire Department communications. You should provide handsets as needed. Once activated, the handset should be continuously monitored. You should also monitor the tactical channel on your portable radio.

Building Communication System

Many of the public address systems are similar. They usually provide a series of buttons (one for each floor), a button for all floors, and a microphone to address the selected floors. They provide public address communication to elevator cars, elevator vestibules,

corridors, stairways, rooms with an occupancy load of 50 or more, and every dwelling unit in a hotel or apartment. Familiarize yourself with the system and ensure that you can communicate a verbal message to any or all floors of the building with evacuation or status update information.

During a fire, some of the more sophisticated systems will automatically make a preprogrammed announcement to specific areas of the building, e.g., "please remain calm and stay in your room with the door closed" or "proceed to your predetermined safe area on the 14th floor". These messages will continue to be transmitted to the affected floors and will be audible in the Fire Control Room when Fire Department resources arrive. Advise the Lobby Control Officer or the Systems Control Officer of any message that is transmitted to tenants in the building.

As a spokesperson for the Department and probably the only link tenants will have with the outside, your voice must be calm and in control. Signs of indecision, uncertainty or excitement could cause panic. It is usually desirable to have the same person (preferably bilingual) make all the announcements. This tends to give the impression that they are in it together. Honesty and trust should be cultivated in this relationship. Listed below are some messages that might be transmitted over the Building Communication System:

"You may start smelling smoke on your floor, remain calm and remain in your room, we have fire companies on your floor." "Please proceed down to the 10th floor using the number 2 stairway, it is located at the south end of the building, you will be directed to a safe area by firefighters on that floor."

(Refer to Chapter 4, Communications Between Fire Department and Building Occupants)

Some buildings provide a sophisticated video and audio monitoring system that can provide two-way audio communications to various parts of the building. This system could be used to determine if there is activity in the stairways and smoke conditions in the hallways and stairways.

Flammable/Toxic Gas Detection System

Some buildings are providing flammable gas or toxic gas detection systems when the buildings store or utilize flammable or toxic substances. Some of them have methane detectors. Some hospitals utilize gases for the autoclaves and have detectors specifically designed for these substances. Determine if the building has a system of this type and what it detects. Also, determine where the hazardous substance is stored.

Public Telephone

Determine the location of the public telephone. Sometimes night security personnel lock up these telephones to discourage their use. Locate the key and access the telephone. During a fire, call OCD and give the dispatcher the telephone number of the Fire Control Room. Also, give this information to the Incident Commander, Fire Attack, and Lobby Control. Determine if the telephone is a pay telephone and that you have adequate change to make calls. OCD's direct line is (213) 485-6180 but in an emergency, public telephones will dial 9-1-1 without depositing any money.

Other Fire Protection Equipment and Controls

Some buildings are controlled by a central computer. These systems will usually have a monitor screen or printer that displays the status or activation of any of the heat, smoke, water flow or other systems. The more sophisticated systems display exactly what was activated, e.g., "smoke detector 14th floor north east section 1226 hours." Other systems will use a code to identify the area affected, i.e., "SD zone 1409." Fire detection systems that utilize a code system must either display a chart or book that gives the definitions of the codes displayed on the printout or monitor screen. Familiarize yourself with these codes and ensure that you understand how to translate them into useful information. Some systems will automatically do a system diagnostic at set intervals (usually one-hour intervals). These systems can be of great value in determining the area of origin and where the fire is going because they keep a record of the time an individual detector was activated. The information could tell a skilled operator that there is smoke in one area of a floor but not another area of the same floor. This could indicate that there is a fire door separating the two areas and suggest that a particular stairwell would be a better choice for Fire Attack to use.

Some computerized systems that use security "key cards" will provide a record of who is on what floor and when they entered the floor. This information can usually be accessed by a security supervisor or the Building Engineer. Share this information with the Incident Commander.

BIBLIOGRAPHY

The following references were used in preparation of this chapter:

L.A. Fire Code, Division 118, New High-Rise Buildings.

Training Bulletin 18, Automatic Elevators.

Training Bulletin 62, 2”-High-Rise Hose Systems.

Manual of Operation, Volume 6.

CHAPTER 11

RADIO COMMUNICATIONS

Introduction

In order for any incident to run smoothly, an effective communication system must be established. This is especially true of those incidents involving high rise occupancies. The system developed must allow the Incident Commander (IC) to direct and coordinate the activities of those assigned and allow for personnel accountability. Likewise, the system must allow resources to communicate their needs back to the Incident Commander so that appropriate action can be taken.

This chapter addresses many of the issues associated with the communications needs at high rise incidents, including radio discipline. It offers considerations and suggestions for establishing an effective communications system within the Incident Command System.

Radio Discipline

When utilizing a department radio at any incident, stop and think about what is going to be said before attempting to transmit a radio message. Ask yourself, is the message really necessary or can it be relayed face-to-face?

To be effective, radio messages should be concise, brief, and use accepted terminology. Messages should be task oriented and specific, thereby eliminating any options or confusion for the receiver of the message (e.g., "LF-2 from IC, you are to take charge of fire attack on the 21st floor. You will be known as Division 21"). When giving orders, they should be well organized and systematic, reflecting a plan of action. Messages should be directed to a company/assignment, not normally to an individual. When receiving an order, a brief restatement of the order is a better acknowledgement than simply utilizing the term "roger" (e.g., "IC from LF-2, Fire Attack--Division 21").

Members should use common language and standard firefighting terms when talking on the radio. Avoid "trick" phases or words which may tend to confuse others not familiar with those terms. Before transmitting, make sure that no one else is talking so that other messages are not accidentally "stepped on." This will eliminate having to repeat messages. It will also reduce confusion and wasted radio air time.

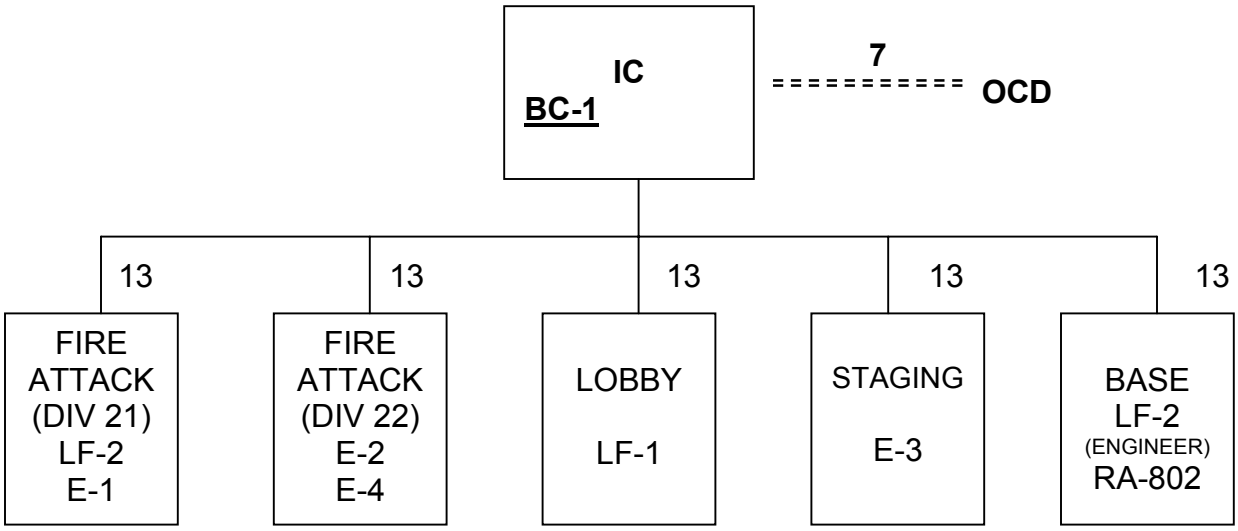
Communications For An Initial Assignment To A High Rise Fire

The initial assignment to a reported high rise fire will be dispatched on an O.C.D. channel and be given a fire ground tactical channel. Upon arrival, the Incident Commander will give a size-up and, if needed, request additional resources on the

O.C.D. channel. All communications between the Incident Commander and the assigned fire companies will be on the fire ground tactical channel. Based on the following radio channel assignments OCD--7, and Fire Ground--13, the radio communications for a first alarm assignment as indicated below would be as follows:

Initial Assignment

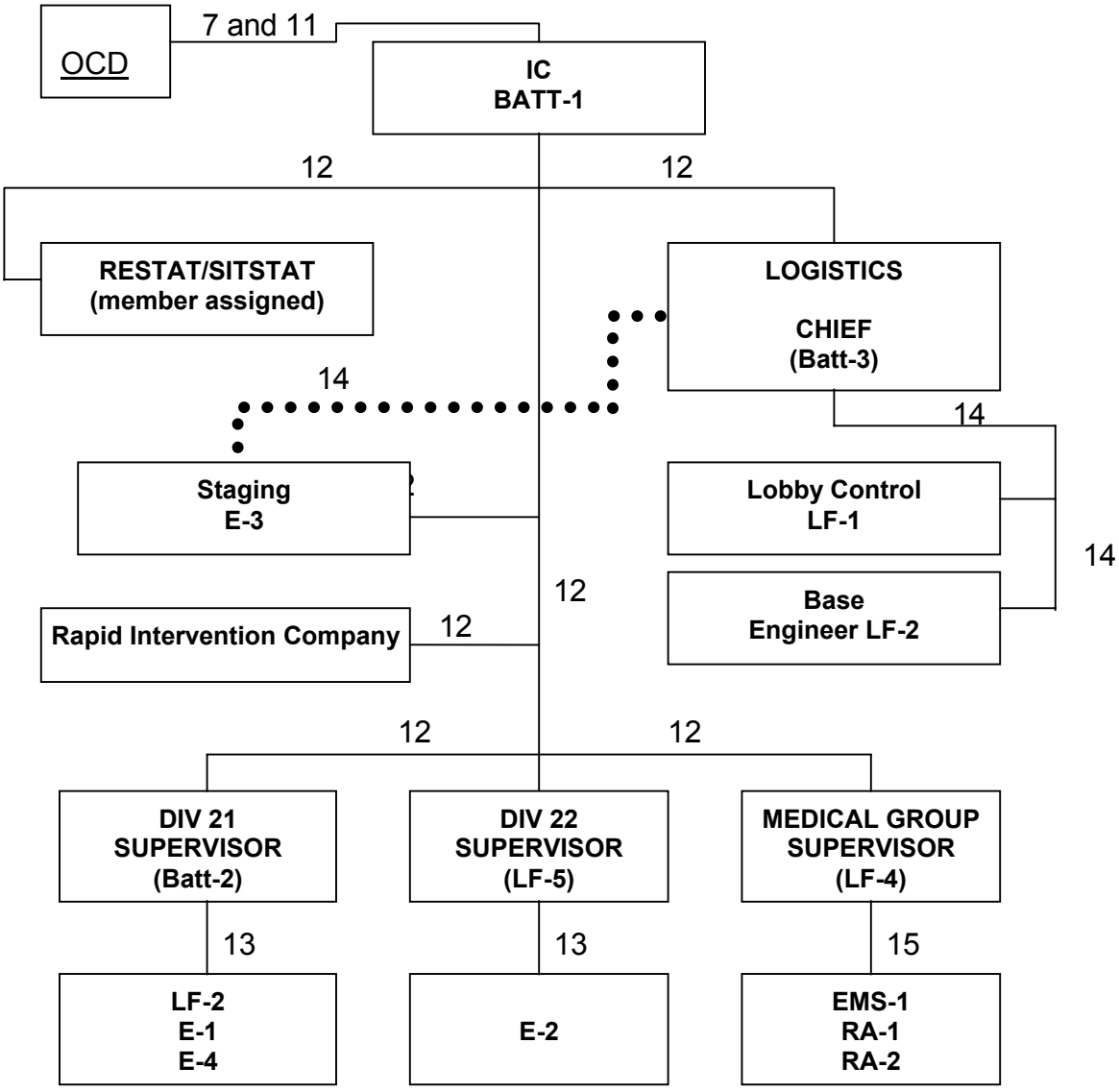
BC-1
TF-1
TF-2
E-3
E-4
RA-802



Radio Communications For A Greater Alarm Assignment (Or Larger) High Rise Fire

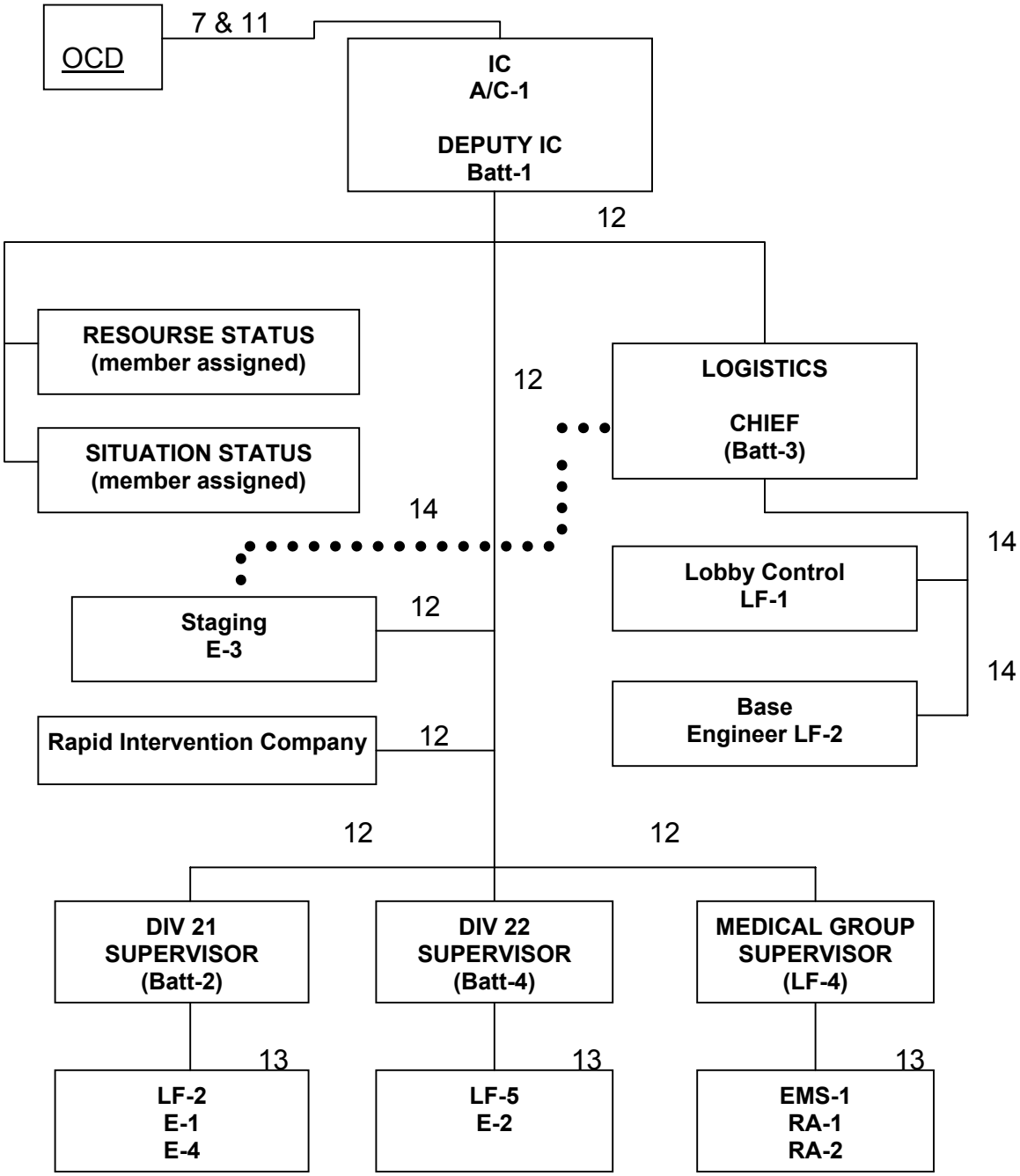
As a high rise fire extends beyond the initial assignment, communications between the Incident Commander and the companies assigned become strained unless additional fire ground tactical channels are utilized. Experience has shown that the use of additional channels for logistical/support functions and an incident command channel will improve communication between the various elements within the Incident Command System. Based on the magnitude of the incident and the number of companies assigned, the Incident Commander should consider the use of additional fire ground tactical channels. The following diagram illustrates how additional tactical channels may be utilized within the Incident Command System at an escalating incident. These diagrams are based on the following radio channel assignments:

OCD - 7 FIRE GROUND TACS - 13 AND 15
COMMAND CHANNEL - 11
INCIDENT COMMAND CHANNEL - 12 LOGISITICS - 14



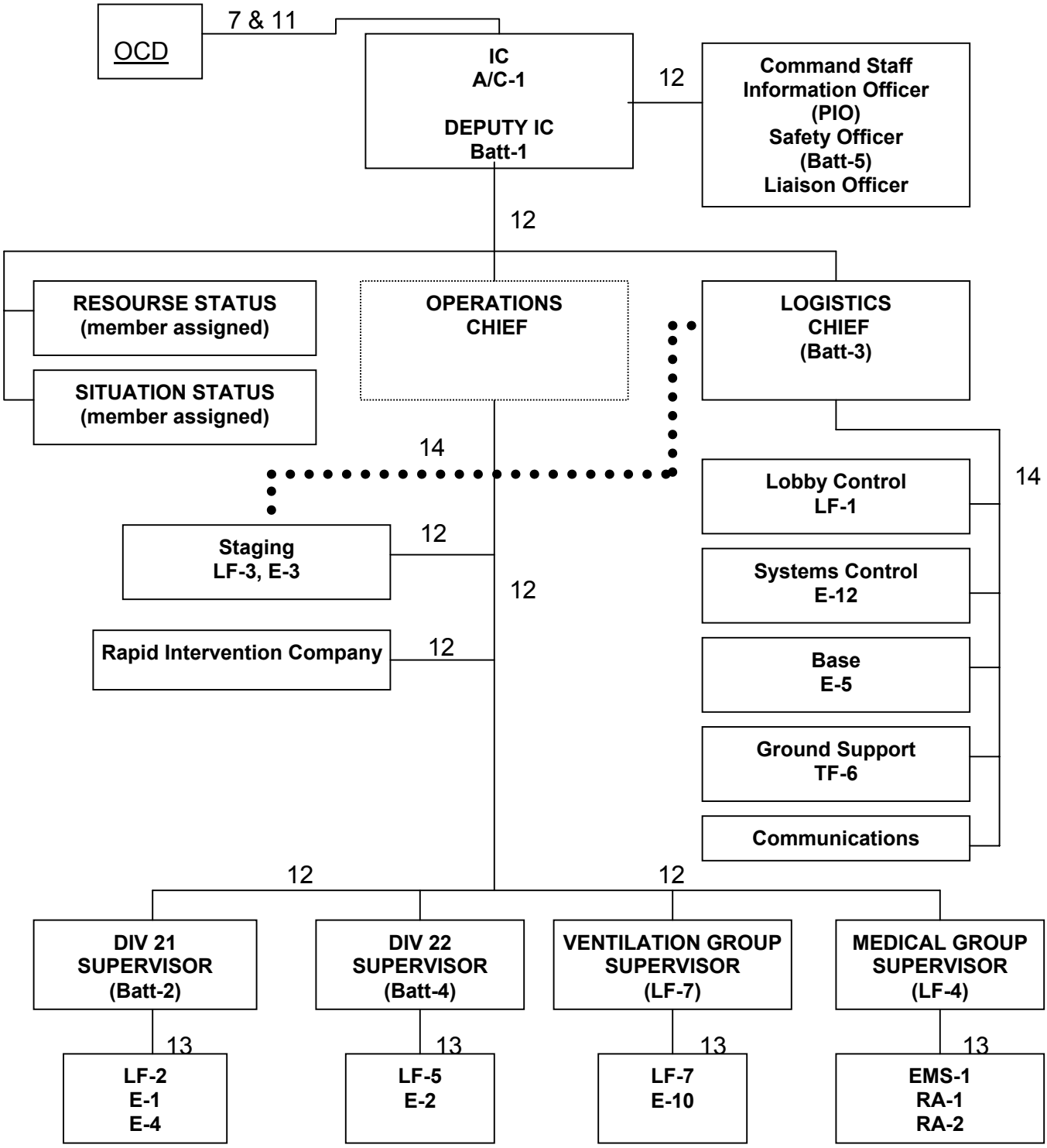
Implementation of the various components of the Incident Command System are incident driven. The Incident Commander determines and implements these components based on the needs of the incident. Under the following scenario, the Incident Commander may have a Deputy. The Deputy Incident Commander may act in place or relief of the Incident Commander. During the initial phase of this scenario, Battalion 1 will become the Deputy Incident Commander and assist A/C-1 with incident management on the various command and tactical radio channels.

DIAGRAM 2



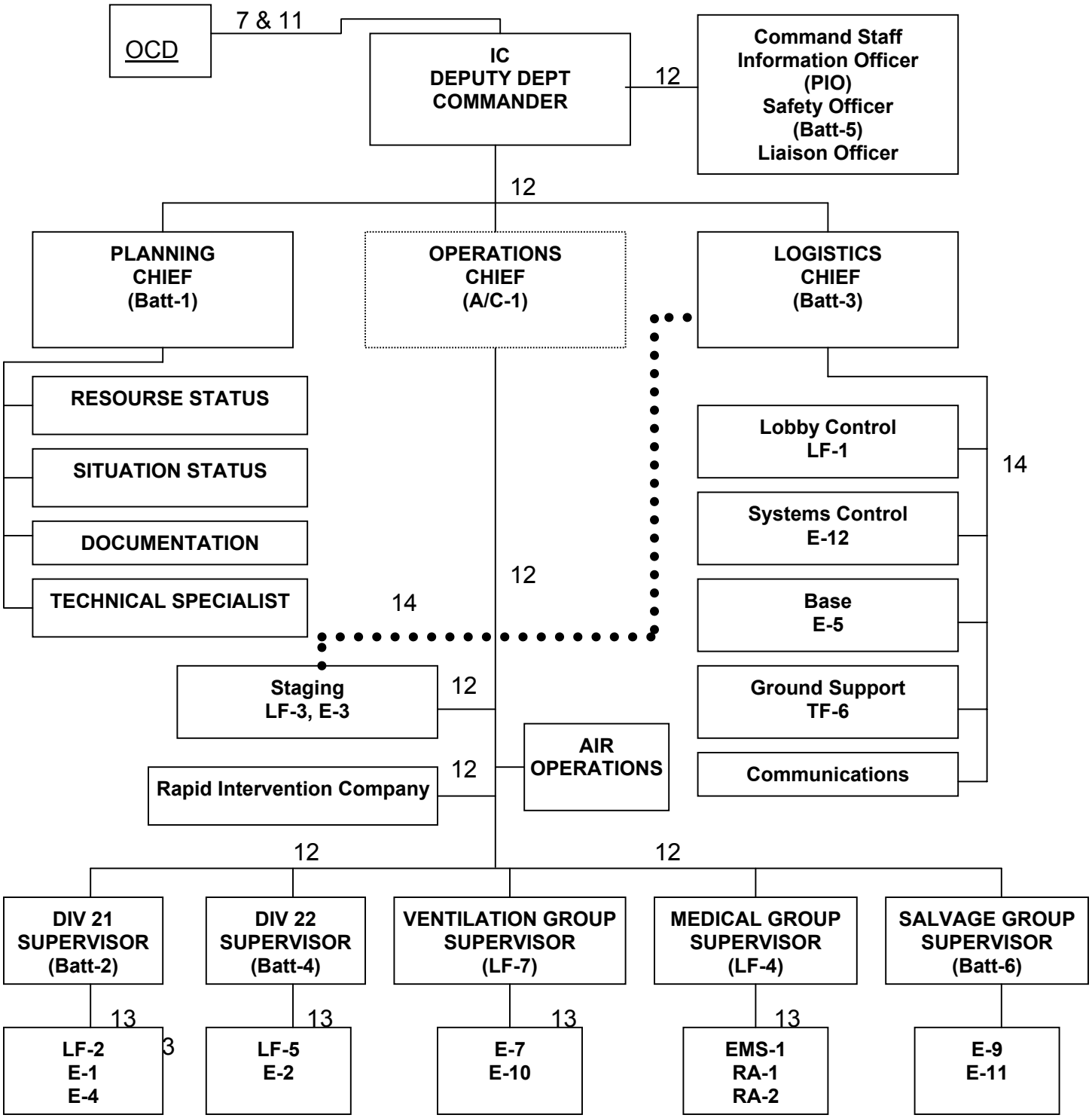
In the following scenario, the position of Operations Chief was not implemented due to Battalion 1 remaining Deputy Incident Commander.

DIAGRAM 3



Under this scenario when the Deputy Department Commander (DDC) assumes command, the DDC becomes the Incident Commander. A/C-1 becomes the Operations Chief and Battalion 1 becomes the Planning Chief.

DIAGRAM 4



Definitions

OCD CHANNEL -- To be utilized by the Incident Commander to give size-ups, request additional resources, or transmit additional information to OCD. (Normally Channels 7, 8, or 9)

COMMAND -- CHANNEL To be used by the Incident Commander, Department Staff, and OCD. (Normally Channel 11)

INCIDENT -- COMMAND CHANNEL To be utilized by the following assignments (regardless of rank—normally B/C or Captain) IC, General Staff, Command Staff, Operations, Division Supervisors, Group Supervisors, Staging (for personnel requests from IC/Operations). This channel is normally not utilized until a second alarm assignment has arrived on scene. Members assigned to an Incident Command Channel are to monitor both the Incident Command Channel and their assigned tactical channel.

LOGISTICS -- TAC CHANNEL To be utilized by the following assignments (regardless of rank—normally B/C or Captain): Logistics Chief, Lobby, Base, Ground Support, and Communications. Staging will monitor two radio channels--the Command Channel for deployment of resources with the IC/Operations and the Logistics Channel to order equipment.

TACTICAL -- CHANNEL To be utilized by the first arriving companies to talk with the Incident Commander. Companies are to remain on this channel unless told by the Incident Commander or Operations to utilize another tactical channel for their fire ground activities.

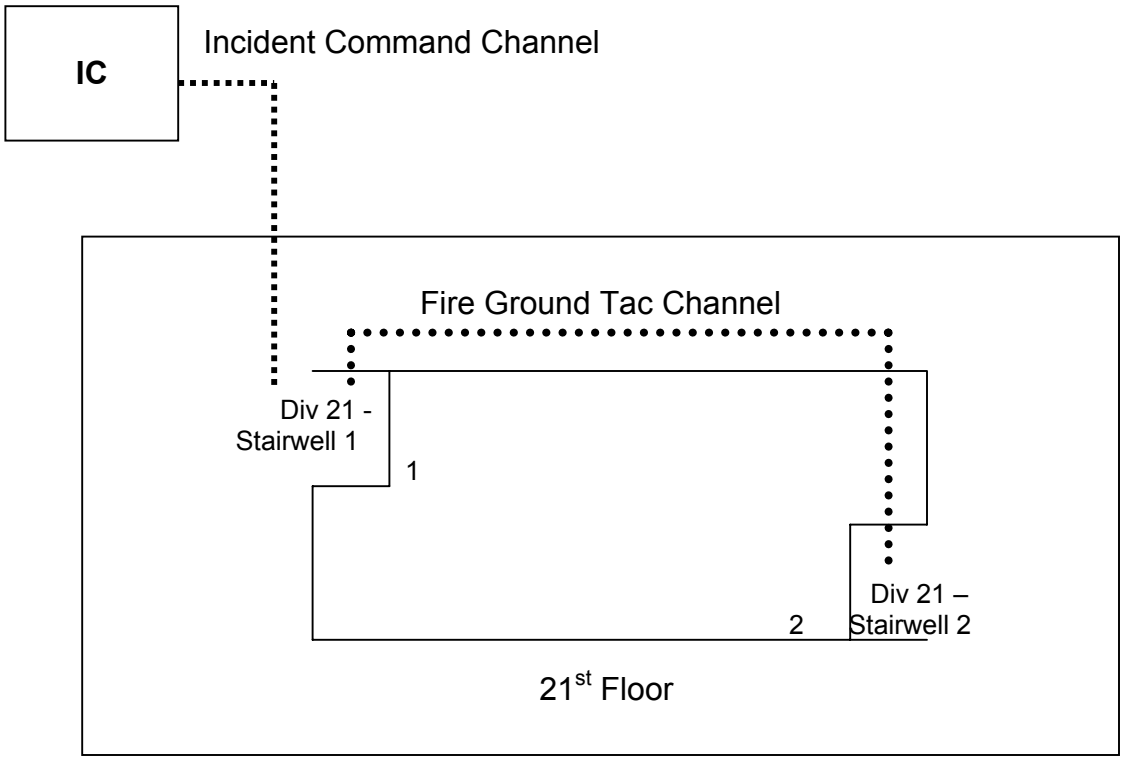
EMERGENCY -- TRAFFIC To be utilized by any member who encounters a life- threatening condition. Member is either to activate their emergency trigger button on their 800 MHz radio or make a declaration on their tactical channel of “Emergency Traffic” and the nature of the emergency. All other companies are to restrict their communications until the "Emergency Traffic" situation can be addressed. The Incident Commander should consider having the affected member(s) go to Channel 6 if they are on another tactical channel. If this is not possible, have them remain on the original tactical channel. All other companies will restrict their transmissions to information pertinent to the emergency traffic or critical to the management of the incident. Rescue Group Supervisor/ RIC's should initiate the action plan assigned by the I/C and monitor Tactical Channel 6 and their designated tactical channel.

Communication Problem Areas

If communications cannot be maintained between the fire attack companies/Division Supervisors and the Incident Commander due to the location of the incident or when working below grade (e.g., basements and sub-basement areas), consideration should be given to utilizing the 800 MHz radio system in the direct mode. Other options that should be considered in this situation include establishing a relay officer, utilizing messengers, or the use of the building's sound powered telephone systems. A Department cellular telephone or building telephone should also be considered when communications difficulties arise.

Communications When Operating Out of More Than One Stairwell

When necessary to operate out of more than one stairwell on a fire floor, the Division Supervisor assigned to that floor will utilize the allocated fire ground tactical channel to communicate with the companies under their command. Individual companies operating out of separate stairwells will be identified by the company identification number (e.g., LF-11, Engine 6, etc.). Consideration should be given to assigning one officer/company to supervise the secondary stairwell(s). These officers/companies will be identified by the Division and stairwell number (e.g., Division 21--Stairwell 2, Division 21--Stairwell 3, etc.). Their function is to coordinate the placement, accountability, and safety of companies operating out of the secondary stairwell(s) with the Division supervisor.



Accountability

Due to the necessity of Division and Group Supervisors having to monitor more than one radio channel (e.g., incident command and a fire ground tactical channel) and their responsibility for being accountable for the members assigned, consideration should be given for the utilization of a Department member to assist with radio communications and company accountability. If these positions are not assigned to a Chief Officer, they will normally be assigned to a Task Force Commander. The Task Force Commander should utilize a member from the Light Force to assist with this function. The remainder of the company will operate utilizing an Acting Captain and two or three members.

Use of Multiple Channels

As a high rise incident escalates, consideration should be given to utilize separate tactical channels for Logistics, Medical Group, Divisions, etc. If utilized, the Supervisor in charge of these functions will communicate with the IC/Operations on the incident command channel and with their assigned companies on the assigned fire ground tactical channel.

If the need arises to utilize multiple channels in excess of what OCD can provide, consideration should be given to request the use of the Mutual Aid Frequencies 19-24. Members are reminded that if these channels are utilized, they can only be used in the direct mode and cannot be monitored or recorded by OCD.

Conclusion

As past high rise incidents have shown, the need for an effective communications plan is crucial. This plan must allow the Incident Commander to effectively direct and coordinate the activities of the companies assigned and provide for personnel accountability. In order to effectively manage large high rise incidents, officers should preplan their high rise buildings for potential communications problems and establish a communication plan as needed. In addition, company members should be aware of the different communications systems available in high rise buildings and be proficient in their use.

The effectiveness of the resources assigned to a high rise incident are only as good as the communications between the officers assigned and the Incident Commander.

CHAPTER 12

AIR OPERATIONS

Helicopters serve many useful purposes during high-rise firefighting operations. They can be deployed for EVACUATION, OBSERVATION, DEPLOYMENT OF PERSONNEL AND EQUIPMENT and many other functions. This chapter will cover the role of helicopter operations during a high-rise fire.

DISPATCH

Upon the declaration of a working high-rise fire, the Incident Commander should confirm the need for helicopters with O.C.D. and ensure that appropriate resources are dispatched.

Helicopters may serve many functions at a high-rise fire. Large helicopters can respond as hoist/rescue ships or air ambulances. In addition, if necessary, large helicopters can be staffed with fire personnel who can be flown to or lowered onto the roof of a high-rise building to be utilized as needed.

Small helicopters are normally used for aerial observation and/or Air Operations command and control functions.

The Incident Commander at a high-rise fire may request the use of Department helicopters and helicopter support equipment at anytime. When helicopters or helicopter support is requested, the Incident Commander must state the intended need(s) (e.g., personnel transportation, hoist rescue, observation, air ambulance, night sun), so that the appropriate resources will be dispatched.

Information which should be included in the request to O.C.D.:

1. Number of helicopters needed

2. Specific request for specialized equipment, resources, or personnel

3. Intended helicopter mission

4. Location of helispot as required

The Incident Commander should consider response time in the decision to request air support. It is important to make this request in a timely manner. The following minimum helicopter response times from the Van Nuys Airport may serve as guidelines in requesting helicopter assistance.

Downtown Area:	10-12 minutes
San Fernando Valley:	5-7 minutes

West Los Angeles Area: 10 minutes

Harbor Area: 20 minutes

Additional time may be required to land specialized equipment and personnel.

AIR RECONNAISSANCE

The reconnaissance aircraft plays a multitude of roles. On a large high-rise fire, it can be as simple as patrolling downwind for embers or as complex as directing the aerial efforts of several agencies, i.e., fire, police, news media. The pilot of this aircraft, the Helicopter Coordinator, reports to the IC/Operations and directs the efforts of all aircraft to comply with needed requests.

An Air Reconnaissance Officer, when assigned, will normally be on board this aircraft to provide information to the IC/Operations. Observations from an aerial point of view allows the Air Reconnaissance Officer to provide the IC/Operations with a more complete picture of the fire. This information has proven to be beneficial in areas such as size up, fire extension, exposures, resource deployment, etc.

The pilot of this aircraft must locate and coordinate landing sites for evacuation, refueling operations, designated area for equipment, and possible redeployment of personnel and apparatus. The Bell Jet Ranger is normally used for the observation role because of its smaller size, reduced noise and rotor downwash.

Normally, helicopters should remain approximately 500' from the involved building while in flight. The helispot location should be located at least one-half mile from the incident site.

DEPLOYING PERSONNEL AND EQUIPMENT

Any fire suppression company or rescue ambulance crew may be assigned to operate from, or be transported by, Department helicopters. The needs of the incident will be the determining factor of what type of companies or personnel are requested by the Incident Commander. The personnel can be airlifted to the roof or to a medical care area.

Typical uses:

1. Search
2. Rescue
3. Roof Evacuation
4. Check for Fire Extension
5. Medical Group

6. Roof Division (open penthouse door, stair shaft, ventilation, etc.)

7. Fire Attack

Standard High-rise Equipment:

2" Hose Pack with Pig Tail

Axe - Claw Tool - Haligan

Breathing Apparatus and Spare Bottles
(Consider 60-minute Bottles)

Rotary Saw and Blades

Medical Equipment:

Starter Kit and Drugs	Resuscitator
Scope and Defibrillator	Backboard/Flat Stretcher

EVACUATION

If air evacuation of people from a high-rise fire is necessary, one of two basic methods can be used. If the people are assembled on the roof where helicopters can land, they will be loaded directly into the helicopter for transportation to a helispot area. If they are stranded on individual balconies or other areas where the helicopter cannot land, a hoist rescue may be necessary.

Rooftop Rescues

When evacuating people from a high-rise roof top, crowd control is a must. If available, firefighter/paramedics and helitac personnel should be included to assist with the evacuation. Firefighter/paramedics should triage and treat any injuries, while the helitac personnel act as liaison with the pilot to assure a safe loading operation.

Prior to loading evacuees off the top of a high-rise that does not have a helispot, it may be necessary to hoist Fire Department personnel to the roof in order to clear obstructions such as antennas, satellite dishes, etc. This will be done at the discretion of the pilot.

The pilot is in total charge of the helicopter's safety and therefore must have the final say in whether or not a particular evacuation method will be attempted. Like all emergency operations, each one is unique, so input from any member involved should be considered. After a plan has been formulated, keep the pilot apprised of any changes that may affect the plan. When possible, this should be done through the helitac member.

The location that receives evacuees should also have helitac, firefighters, and paramedics assigned. They will perform off-loading, crowd control, and medical assistance duties.

Members assigned to this operation shall be guided by the helitac personnel; they are always in radio contact with the pilot and know if any changes have been made.

Hoist Rescue

A hoist may be used when the people to be rescued are trapped on a balcony or on a roof without a landing area. Hoist rescues are limited to 250' or approximately 20 stories below the roof. In some situations hoist rescues may be blocked by smoke coming from lower floors.

When hoist extraction is utilized, two helitac members will usually be lowered to the scene for control and hookup of the victim(s). Normally, a civilian will not be brought up on the hoist alone; they are normally coupled with one of the helitac members.

If Department members find trapped civilian(s) on the roof of a high-rise during a rescue operation, be guided by and assist the helitac members with crowd control. This operation obviously takes time, so members may have to work hard at keeping people from panicking while waiting their turn. It is important to reassure the victim(s). Department members will be hoisted out last unless they are committed to other emergency duties.

If an operation expands to a point where additional helicopters are needed, agencies other than the L.A.F.D. may be requested to help. *ALL* aircraft will be under the control of the L.A.F.D. Helicopter Coordinator on scene.

Requests for a helicopter at a high-rise fire shall be directed to the IC/Operations.

SAFETY

Safety has always been the most important factor when working around helicopters. Remember to follow these steps when loading, embarking, disembarking, and departing from the landing area.

Loading:

1. When waiting to load and/or board a Department helicopter, personnel shall form a single line at least 50' from the aircraft, toward the front side, in full view of the pilot at all times.

2. Before approaching an operating helicopter, secure eye contact with the pilot for his approval or obtain approval from helitac personnel and be guided by their instructions.

3. Personnel will be directed to approach and load aboard the helicopter on one or both sides by the pilot or helitac member.

4. Tail Rotor - Approach and/or leave helicopters from the front, in full view of the pilot. Stay away from the tail rotor. Never approach from or circle the rear of a helicopter. The tail rotor is nearly invisible when rotating, especially at night.

5. Keep your head low until out of rotor arc.

6. Tools/Equipment - Personnel shall carry long-handled tools and equipment horizontally when approaching or leaving helicopters. All loose items shall be secured. This function is normally performed by helitac personnel.

Embarking:

1. Enter cockpit head and shoulders first.

2. Secure safety restraint system.

3. Hold loose items (maps, papers, etc.) securely.

4. Wear radio headset, if provided, so that communication with the pilot and helitac personnel may be maintained.

Disembarking:

1. Do not release safety restraint system or start to disembark the helicopter until after the aircraft has come to a full stop landing or the pilot has given authorization to disembark.

2. Remove and stow radio headsets.

3. Assist helitac personnel with unloading of equipment or litter patients.

Departing from Helicopter Area:

1. Always depart toward the front of the helicopter in full view of the pilot. Do not move to the rear of the main passenger compartment.

2. Walk in a slightly stooped over position to safe location at least 50‘ away, not in line with intended helicopter flight departure path. Always carry equipment horizontal to the ground.

   Operational circumstances may require that departed personnel remain at this location, in a squatting position, facing the helicopter, with goggles and chin straps in place and equipment protected from rotor wash, until the helicopter has departed.

3. Follow the instructions of the pilot and helitac personnel.

CONSIDERATIONS

1. Air Operations should be on a separate radio channel so as not to interfere with fire ground communications.

Information such as potential jumpers on the back side of a building, additional fires, or other unusual events need to be relayed to the IC/Operations in a timely manner. Conversely, the IC/Operations may need the helicopter to recon and verify a report of something in an area not visible from the ground. Busy fire ground channels make this impossible.

2. Air Operations should not be prematurely demobilized.

3. Helicopters should not fly closer to a high-rise building than necessary to accomplish their required task.

4. The IC/Operations should consider assigning a Chief Officer as Air Recon early into the incident. This can assist the IC/Operations in determining the fire progress in areas not visible to ground companies. In addition, Air Recon can coordinate directing companies to downwind fires.

CHAPTER 13

BUILDING DESIGN AND FIRE PROTECTION SYSTEMS

Introduction

Building design, fire protection systems, and construction practices have changed significantly during the past century. One hundred years ago, structural steel was unknown and reinforced concrete was a material which had not yet been used for structural framing applications.

Design professions have also advanced significantly during the past century. Architecture has changed markedly, and techniques of analysis and design are available to engineers today that were unknown a century, or even a generation ago. Building design has become a very complex process, integrating many skills, products, and technologies into its system.

Fire protection engineering has taken strides in its professional development, similar to those taken in other parts of the building industry. At the turn of the century, conflagrations were a common occurrence in cities. However, increased knowledge of fire behavior and building design enabled buildings to be constructed so that a fire could be confined to the building of origin, rather than the block of origin or larger areas. Today's building design is an attempt to confine a fire to the room of origin or to an even smaller area.

The conscious integrated design for building fire safety must be achieved as a part of the architectural design process, if it is to be effective and economical. All members of the traditional building design team should include, as an integral part of their work, design for emergency fire conditions. The earlier in the design process that fire safety objectives are established, and engineering design decisions are made, the more effective and economical the final results will be.

The Fire Service must recognize and identify those areas in which building designers create unnecessary hazards; then steps must be taken to ensure that appropriate safeguards are incorporated to facilitate the rescue of occupants and control of any fire.

It is further recognized that some building designers are content, as are their clients, to meet the minimum safety standards of the local building code. Often, both assume incorrectly that the codes provide completely adequate measures, rather than the minimum. In other instances, building owners and occupants see fire as something that will never happen to them. They will tolerate the risk because fire safety measures can be costly, or adequately balance the risk by the provisions of a fire insurance policy. These attitudes require fire departments to compensate accordingly and take appropriate precautions. Fire Officers must make critical decisions relating to fire safety; they must clearly identify the specific needs of the occupancy with regard to the functions of the building. Fire Officers must consciously ask pertinent questions and ascertain conditions that are incorporated into a building. Such questions must center around decisions relating to the following three areas:

1. Life Safety

2. Property Protection

3. Continuation of Operations

With the advent of the modern high-rise building, the Fire Service is presented with a new set of problems it has never faced before. The Fire Service is asked to provide life safety and fire control capabilities for fires in aboveground areas which are extremely difficult to reach, difficult to communicate from, and operate in environments which can be intolerable. The potential for life and property loss is tremendous.

Solving these problems requires an understanding of the unique situations that can be encountered during emergency operations in high-rise structures. Since these problems are, to a great degree, directly related to the design and construction features of

high-rise buildings, solutions must also be based on a familiarization with these same features and awareness of their effect on fire control efforts.

Life Safety

Adequate life safety design for a building is often related only to complying with the requirements of local building regulations. This may or may not provide sufficient occupant protection, depending on the particular building function and occupant activities.

Alerting occupants to the existence of a fire is only one part of the people protection design. A performance objective that could be used is to realize that an occupant should have sufficient prior knowledge of the existence of a fire before the escape route is blocked. In order to accomplish this, the designer must either ensure that the fire and its products of combustion will be slow enough to provide the time, or ensure that provisions are incorporated into the building to achieve that objective.

Escape is, of course, only one alternative to life safety. Life safety design for a building is difficult. It involves more than a provision for emergency egress. It requires knowledge of who will be using the building and what they will be doing most of the time. Consideration must be given to communication, the protection of escape routes, and temporary areas of safe refuge for a period of time reasonable for the building occupants to reach safety.

Property Protection

The identification of specific items of property which have a high monetary or other value must be made in order to protect them adequately in case of fire. In some cases, specially protected areas are needed. In other cases, a duplicate set of vital records stored in another location may be adequate.

Continuation of Operations

Maintaining operational continuity after a fire is the third major design concern. The owner must identify the amount of "downtime" that can be tolerated before revenues begin to be seriously affected. Often, certain functions or locations are more essential to the

continued operation of the building than are others. The designer must recognize those areas that are particularly sensitive to the vital operations of the business, so that adequate protection is provided for that area of the building. Often, these areas need special fire protection attention which is not required throughout the entire building.

Definitions

A "High-rise Building" is defined as a building which is over 75‘ in height measured from ground level access to the floor level of the highest floor intended for occupant use, NOT to the actual height of the building. Most eight-story buildings are high-rise by definition, although some six- and seven-story buildings will fall into the high-rise category.

According to the State Fire Marshal's Office, there are approximately 1,700 high-rise buildings in the State of California; of these, Los Angeles has approximately 745. Most of the high-rise buildings in Los Angeles consist of commercial occupancies. About 20 to 25 percent are habitational, such as hotels, apartment buildings, and condos.

High-rise buildings are divided into two groups: "Existing High-Rise" and "New High-Rise." The date of construction determines which group, and the required fire protection systems and equipment a building will have.

Existing High-Rise Buildings are ones which were constructed prior to July 1974. Approximately 520 of the high-rise buildings in Los Angeles are in this category. For convenience, existing high-rise buildings may be divided into two sub-groups: those constructed prior to 1960 and those constructed between 1960 and 1974.

A New high-rise building is one, which was constructed after July 1974. Approximately 225 of the high-rise buildings in Los Angeles are new high-rises.

History of Existing High-Rise Construction, 1900 to 1960

As already mentioned, existing high-rise buildings can conveniently be subdivided into two categories: those Constructed Before 1960 and those Constructed After 1960. Prior to 1957, all buildings in Los Angeles were limited to 150’ in height for earthquake safety. Several years passed after the repeal of this limitation before taller buildings were constructed, so it is safe to state that most pre-1960, high-rise buildings are a maximum of 13 stories. The Los Angeles City Hall, with 27 stories, and the USC-LA County General Hospital, with 19 stories, are exceptions to this rule.

All high-rise buildings, then and today, are of Type I Construction, that is, noncombustible construction throughout. The pre-1960 high-rises were generally constructed with a reinforced concrete exterior as opposed to the steel beam construction seen commonly today. Buildings erected before the 1960's usually had open stairways and exterior fire escape assemblies. A "High-Rise Retrofit Program" was initiated by the LAFD and the state in 1976 to bring these buildings into conformance with newer building codes.

Fire protection equipment in pre-1960, high-rise buildings was initially limited to systems not interconnected:

1. Dry (Class I) standpipes supplied by Fire Department pumpers, if needed.

2. Wet (Class II) standpipes with fire hose. The water for these is supplied by the domestic system. These are intended for occupant use.

3. Automatic fire sprinklers in basements.

Most high-rise buildings constructed prior to 1960 have openable windows, so ventilation during firefighting operations usually presents no special problems. Fire alarm systems, emergency power and lighting systems, and building communication systems were NOT REQUIRED in any of these buildings at the time of construction.

History of Existing High-Rise Construction, Post-1960

By the end of 1957, more stringent earthquake standards had been adopted by the City; the 150' restriction was repealed and building codes imposed no limit on the height of Type I buildings.

Like the earlier existing high-rise buildings, the post-1960 group are also of Type I (fire resistive) construction. Type I (fire resistive) construction is that type of construction in which the structural members, including walls, columns, beams, floors and roofs are of noncombustible or limited combustible materials, and are required to have varying fire-resistive rating depending on their usage. The Type I building is designed to withstand the most severe fire to be expected within the building for two or more hours without structural failure. However, instead of reinforced concrete, they were generally built with Steel Beams Coated With a Fire Retardant Material commonly known as Mono-Kote. Floors and roof are of concrete slab or steel decking covered with concrete. The only combustible materials allowed are the interior partition walls and office furnishing. The height and floor areas are unlimited.

By the 1960's, the codes required "COMPARTMENTATION," that is, subdivision of buildings into "fire areas." This was accomplished by providing two-hour, fire-resistive separations between floor levels and around vertical shafts. These separations establish a "compartment" to control fire extension. Fire doors and other fire protection assemblies are installed to protect penetrations through these separations.

Most high-rise buildings of this era are of the "Central Core" type. The elevators and stairshafts are in the center of the building, surrounded by a corridor and the outer tenant areas.

Buildings exceeding 150' in height after 1960 were required to install Combination (Class III) standpipe systems. These provide a 1-1/2" hose for occupant use, and 2-1/2" outlets for Fire Department use. Depending on the time of installation, some 2-1/2" outlets are equipped with 2-1/2"
hoses, however, many are not so equipped. A fire pump on the premises maintains a working pressure within the system.

With a Class III standpipe system, the most common method of controlling working pressure at the various floor levels is with the installation of ORIFICE PLATES. This

washer-like device is installed at an outlet to restrict the size of the opening and thereby control the volume. This arrangement effectively lowers nozzle pressure when water is flowing; however, if the firefighting line is shut down, the increased static pressure at the nozzle may make it impossible to reopen.

A second system is the installation of PRESSURE REDUCING VALVES (P.R.V.'s) at the outlets. Such P.R.V.'s are engineered to maintain a set pressure at varying floors. Another system used in some buildings is a "Zone PRV" which controls the flow pressure for standpipe systems.

Other buildings constructed during this era, which are less than 150', may have utilized Class III standpipe systems, but most often only the Class I and II systems were installed. As in high-rise buildings constructed before 1960, automatic fire sprinkler systems continued to be required only in basements.

At least two approved means of egress (exit stairshafts) were required. Sometimes scissor stairs were installed to better utilize these shafts.

Smoke-Free Exitways and Firefighter Access

Smoke Towers on the periphery of some high-rise buildings were constructed to provide "smoke-free" exiting and access. The term "smoke tower" causes much confusion. Such exitways are not intended for smoke removal and cannot be used for such; a better term would be "smoke-proof enclosure." In a smoke tower, you travel through a vestibule where smoke can escape to the outside atmosphere as you move between the building and the stairshaft.

The "mechanically ventilated smoke-proof enclosure" is a two-hour rated shaft with positive pressure which can go from the lowest level to the roof and can be controlled by the Fire Department. As in the pre-1960 buildings, the alarm systems, emergency power and lighting systems, and building communication systems were not required.

New High-Rise Buildings

1. High-rise buildings constructed since July, 1974 have more elaborate and complex fire protection systems and features than the existing high-rise buildings already discussed.

2. All new high-rise buildings (post 1974) are fully equipped with automatic fire sprinklers supplied by the same risers as the 2-1/2" wet outlets provided for Fire Department use. This type of system is known as a combined standpipe system, as opposed to the Class III (combination) system formerly used in existing high-rise buildings. Risers and outlets will be found in stairshafts at each floor level and on the roof. Occasionally, they may also be found in other portions of the building. Combined standpipe systems are engineered to deliver specific amounts of water to the sprinklers and standpipes in the building. In some buildings under 275', and all buildings exceeding 275', a looped standpipe system is required.

3. An on-site water supply and a fire pump supplies water and pressure to the combined standpipe risers. Usually the water reservoir and fire pump will be located at the bottom level of the building.

4. As stated before, at least two approved means of egress are required from each floor. In new high-rise buildings, this is accomplished with enclosed stairshafts. The stairshafts and other vertical shafts must be of two-hour construction as are floor separations. Horizontal exit corridors are required to be illuminated at all times.

5. Each new high-rise is required to maintain a one-hour rated Fire Control Room previously known as the building control station, in an approved location (usually the ground floor). This room houses the fire warning system annunciation panel, smoke control panel, fire pump status panel, and emergency generator status panel. A Fire Department lock box will be located be in the Fire Control Room. A lock box may also be located just inside the entrance to the building or at a security desk.

   The Fire Control Room shall be Supervised at all times by either an on-site responsible person, or by a Central Station Signaling System, such as ADT, API, etc. A telephone capable of accessing unrestricted outside lines must be located in the room.

6. Every new high-rise will be protected by a local fire warning system, which is initiated by manual and/or automatic devices. Manual pull stations are located on each floor adjacent to stairshafts and other locations. Area detectors are located in and adjacent to one-hour elevator vestibules, HVAC ducts, and selected equipment rooms. Waterflow switches are located on each floor adjacent to each shut-off valve. Actuation of any of these devices will place the floor of actuation, and sometimes adjacent floors, in "Alarm Mode." A localized alarm will sound and there will be annunciation in the Fire Control Room. If the Fire Control Room is not staffed continuously, it is also required to be monitored by a central station. The alarm mode will shut down the air handling system on the floor of actuation and possible adjacent floors, or turn on smoke evacuation systems in affected areas. The alarm mode will activate the powerful fans which pressurize the stairshafts. The alarm mode will unlock all electric locks on stairshaft doors which are normally locked from the stairshaft side, and will also unlock elevator lobby doors which have electric locks. The alarm mode will also close all doors if they are normally held open by magnetic devices. Finally, if the smoke sensor located within the elevator vestibule is actuated, the elevators in the bank will be recalled to the designated floor (Lobby) or alternate designated floor.

7. All new high-rise buildings must have an emergency smoke control system, a system capable of exhausting smoke directly to the exterior of the building, or perimeter windows must be openable or have breakable tempered glass in each corner and every 50 linear feet, or a combination of the above.

   HVAC systems designed for smoke removal may also be used, providing they exhaust a minimum of six air changes per hour, and exhaust to the exterior of the building without recirculating to the other sections of the building. Smoke control systems shall be provided for all below grade levels. Controls for all smoke control

and stairshaft systems must be located in the Fire Control Room. All stairshafts must be pressurized to maintain a positive air pressure at any time the building goes into an alarm mode.

8. A Building Communication System must be installed in each new high-rise building. This is a one-way communication system capable of transmitting voice messages to all normally occupied areas of the building. The controls for the one-way communication system are located in the Fire Control Room.

9. A Fire Department Communication System must be installed in each new high-rise building. This system consists of sound-powered telephones and jacks for Fire Department use. The jacks are installed in the Fire Control Room and at every floor level in each stairshaft, including the roof and street level, interior, and exterior. They must also be installed in every elevator car, elevator machine room, elevator lobby, outside the fire pump room, emergency generator room, and at every stairwell exiting to a public way. At least six telephone handsets are required to be on the premises for firefighter use. These will be located in the Fire Control Room.

10. Every new high-rise building must have Emergency and Standby Power Systems. As firefighters, it is important to understand that emergency and standby power systems are supplied by the same power source (emergency generator) and may be in operation at the time of our arrival. These systems operate the fire life safety systems within a new high-rise building if normal power is lost.

    The fire life safety system includes exit lighting, fire pumps, elevators, fire alarm system, smoke control, voice communication systems, etc. This is provided by an on-site generator which automatically provides electrical power in the event of failure of normal power sources. This power must be available for at least eight hours at full demand.

11. Most new high-rise buildings have an Emergency Helicopter Landing Facility on the roof. The number inside the 50' by 50' pad identifies the load capacity of the pad in thousands of pounds. For example, a number 10 indicates 10,000 pounds. There is also an adjacent 1-1/2" exterior standpipe outlet for fire protection or with 1 or 2 Class Helispot (H) standpipe outlets.

12. All high-rise buildings are required to develop emergency procedures which include evacuation manuals, a fire warden system, drills, etc. These procedures should be written in a manual and made available to all occupants.

In July 1974, stringent state codes required new high-rise buildings to install more elaborate systems and equipment. At the same time, it was also recognized that existing high-rise buildings desperately needed upgrading. Implementation of the state mandated High-Rise Retrofit Program began in late 1976. The changes have significantly increased occupant safety and upgraded firefighting capabilities in existing high-rise buildings.

The Basic Provisions of the state mandated Retrofit Program for existing buildings include:

1. Construction of Stair Enclosures and Floor Separations was accepted as the method to provide compartmentation. This also assured a better means of egress.

2. At least two approved means of egress were required to be provided from each floor level. At least one was to be an enclosed, one-hour stairshaft; the other could be an existing fire escape if no other stairway was available. Exterior fire escapes which were accepted as approved means of egress were required to be certified structurally sound by a Structural Engineer. Also, such fire escapes were required to have wired glass or equivalent protection for the windows on all landings and within 5' on either side of the landing. Thus, IF windows are closed, there would be some protection for persons passing a fire floor.

3. A manually operated Fire Alarm System utilizing manual pull stations located adjacent to stairs was required. This system must annunciate in the lobby or other approved location. This location became, by definition, the "Building Control Station," now referred to as a Fire Control Room.

4. Additional fire detecting devices were required:

   - A smoke detector in each lobby serving automatic elevators which would recall the elevators.

   - Smoke detectors in excessively long, dead-end corridors in a few of the older buildings.

5. A Smoke Control System to remove smoke and heat had to be provided. Older buildings with openable windows needed nothing more. The post-1960, sealed, high-rise buildings normally had breakable Tempered Glass around the perimeter of the building every 50 linear feet, mechanical ventilation could be provided by modifying their HVAC system.

6. Two types of communication systems were required in selected high-rise buildings. A Building Communication System was required in the public areas of buildings over 150' in height. This system is a one-way communication system to contact building occupants. A Fire Department Communication System (sound-powered telephones) was required in existing high-rise buildings which failed a radio test conducted by the Los Angeles City Fire Department. This system provides outlet jacks in each stairshaft at each floor level, roof exits, stairwell exits, and the building control station. The building is required to provide a minimum of six telephone handsets for the system.

7. Effective emergency power was NOT REQUIRED by the state mandated Retrofit Program. Also, electrically operated fire pumps and elevators did not have to be provided with a back-up system during power loss.

8. Elevators. In a separate state mandated retrofit program, automatic elevators were required to be equipped with Fire Emergency Service. Refer to Chapter 7 regarding the use of automatic elevators in fire emergency service mode.

9. Another requirement of the state mandated High-Rise Retrofit Program was the so-called "Software" provision. This requires every high-rise building to provide "Evacuation Maps" of their building on each floor level at various approved locations. Emergency manuals must be provided for occupants, a building warden and floor wardens must be appointed, and drills held for all occupants.

10. Approximately 30 of the older existing high-rise buildings chose to not comply with the requirements of the High-Rise Retrofit Program, primarily because of the problem of providing two approved means of egress. These buildings were vacated and sealed.

Retrofit Sprinkler Program (1988)

As a result of the First Interstate Bank Building Fire in May 1988, a Retrofit Sprinkler Ordinance was passed in August of 1988 requiring installation of fire sprinklers in all existing high-rise office buildings. This ordinance effects 356 high-rise buildings in the City of Los Angeles (Reference: LA City Building Code, Section 8604 F).

In addition to requiring the installation of fire sprinklers, the ordinance requires the following:

1. Provision of one-hour rated elevator lobby vestibules.

2. Addition of emergency power generating systems.

3. Provision of a 20 square foot, manually-operated ventilation opening in stairshafts that access the top floor and does not penetrate the roof.

4. Provide a 3” drain in buildings which are equipped with Pressure Reducing Valves (P.R.V.'s). This provides a means to flow test P.R.V.'s and return the water back into the tank without running hose lines up the entire stairshaft.

Characteristics Common to All High-Rise Buildings

1. Each high-rise building is required to have a Fire Department Lock Box.

2. All high-rise buildings have some degree of COMPARTMENTATION. This includes enclosed stairshafts, except in a few very old high-rise buildings.

3. All high-rise buildings have a minimum of Two Approved Means of Egress From Each Floor.

4. All high-rise buildings have some type of Standpipe for Fire Department Use.

- These may be CLASS I, II, III, or a combination thereof in existing high-rise buildings less than 150' in height.

- CLASS III standpipes are found in existing high-rise buildings exceeding 150' in height built between 1960 and 1974.

- Combined Standpipes are found in new high-rise buildings built since 1974.

5. All high-rise buildings have Automatic Elevators equipped with emergency service, except those few with only manually-operated cars.

6. All high-rise buildings have some type of Smoke Control, such as:

   - Openable windows, or;

   - In sealed buildings, breakable tempered glass windows on the perimeter of the building every 50 linear feet with 20 square foot opening.

   - These are supposed to be identified by 2" minimum luminous or reflective Decals in a lower corner which indicates they are "tempered glass," or;

   - Automatic Smoke Removal System, or;

   - A combination of the above.

7. All high-rise buildings have Floor Level Numbering Signs at each floor in each stairshaft. These signs indicate the floor level, the stair number, the floors served by the stair, and whether the stair has roof access.

8. Every high-rise is required to maintain an occupant evacuation program with evacuation manuals, building and floor wardens, and annual evacuation drills. These drills may be done floor by floor. For the entire building, it is required that all occupants have an annual exercise.

Special Extinguishing Systems (particularly Halon 1301 total flooding system)

1. Many special extinguishing systems will be found in high-rise buildings; CO_2 deluge systems, hood systems for kitchens, and Halon 1301 systems. The last is of greatest concern to firefighters.

2. Halon 1301 total flooding systems are usually used to protect computers and other high-value equipment.

   - Halon 1301 is a halogenated hydrocarbon gas which interrupts the normal process of combustion, thereby effectively extinguishing fires in hidden areas.

   - A halon total flooding system will rapidly dump compressed halon gas into a sealed room upon either automatic or manual activation.

    - Five percent or more of the volume of the room will then be composed of halon gas.

    - This is adequate to extinguish most fires.

- The long-term effect of halon on humans is unknown, although industry claims that it is completely nontoxic.

- Halon will decompose into toxic gases, principally phosgene, if permitted to heat to approximately 900 degrees Fahrenheit.

    - If personnel must enter a Halon 1301 atmosphere for investigation of the alarm, use breathing apparatus throughout the investigation.

    - Make every effort to contain the halon within the sealed room so far as possible to maintain a concentration significant enough to extinguish the fire.

- If personnel determine for sure that the halon has been accidentally dumped before entering the room, it is best not to enter the room, and begin the exhaust process immediately.

- A halon exhaust switch is provided outside these rooms.

The exact building features and functional systems that are found in a particular high-rise building will generally be determined by the age of the building and the various code requirements that were in effect at the time it was built. Because all high-rise buildings are not the same, and because familiarity with construction features and functional building systems is so vitally important to the decisions and actions that are taken during high-rise fire control operations, the need for effective pre-incident planning cannot be emphasized enough.

CHAPTER 14

DEMOBILIZATION/OVERHAUL/RE-ENTRY

Introduction

After a high-rise fire has been knocked down and the building searched, the demobilization, overhaul, and re-entry phases of the incident can become a bigger challenge than the actual fire. In order to effectively handle these phases of the incident, an organized demobilization plan must be developed. Lost jobs, business interruptions, lost revenues and displaced persons will have a major impact upon the community and create hardships for those involved.

After a knockdown has been declared, the primary goals for an Incident Commander are:

- Develop Cause Determination
- Develop a Demobilization Plan
- Develop an Overhaul Plan
- Develop a Re-entry/Re-housing Plan

All of these goals can be accomplished through the continued use of the Incident Command System.

Cause Determination

The primary responsibility for cause determination rests with the Incident Commander. Due to the magnitude of most high-rise fires and the associated dollar loss, this function is normally performed, as per Department policy, by an A-Unit. It is the responsibility of the Incident Commander to preserve and guard the fire scene and evidence until the building or portions of the building are released for overhaul by the Arson Investigators.

Demobilization

It is the Incident Commander's responsibility to release resources as soon as possible and turn the building back to the owner/responsible party. In order to do so, the Incident Commander should consider holding a Plans Meeting with key members to discuss demobilization plans. The Incident Commander along with the Operations (when implemented), Logistics, and Planning Chiefs need to discuss how to diffuse the incident in controlled stages. Considerations should include staffing for the overhaul,

re-entry, and security. At this time, the Incident Commander should determine the number of resources needed to handle these functions. One important issue to remember is that all responders, especially first-in companies, may have been subject to extreme working

conditions. The Incident Commander should consider using fresh or unused companies for extensive overhaul and re-housing of tenants.
It is imperative that the Incident Command System continues to function during demobilization.

Overhaul

The overhauling process is determined through an orderly examination of the fire building and its contents to ensure that the fire is completely out. The Incident Commander shall determine cause, extent of the fire, materials involved, and the structural stability of the building.

The first priority for the Incident Commander is to ensure the building is structurally safe for firefighters. Incident Commanders should consider conferring with structural engineers, representatives from Building and Safety, and Department staff regarding structural stability. A plan needs to be established for an organized overhaul procedure. The building must also be thoroughly ventilated so that firefighters can work in comfort. Additionally, hose lines must be charged and in place to extinguish any remaining fire and guard against any flare-ups or unknown extension.

The Incident Commander will determine if overhaul should be done while wearing

Self-Contained Breathing Apparatus (SCBA). Conditions could be present such as toxic gases or carbon monoxide caused by the products that are involved in the fire. If a change of air cannot be achieved through the use of positive pressure ventilation or if the air quality is determined to be unsafe when monitored by C/O meters, overhaul may have to be done while wearing SCBA's. The use of dust masks should be a consideration whenever airborne particles are present.

Another concern for the Incident Commander would be if asbestos are present in the fire area. The use of SCBA's would have to be worn and exposed firefighters would have to go through decontamination if exposed to airborne particles of asbestos.

The Incident Commander will determine where the overhaul will begin and give direction as to the extent of the overhaul operations. When starting to overhaul in a room that contains considerable stock or materials, it may be necessary to provide a clear space in which to work. Salvageable articles must be separated from burned materials and placed in a safe location. If overhauling above ground, it is imperative that the floor below be checked for salvage needs to prevent further water damage.

Depending on the location of the fire, it might be unrealistic to carry out burned objects to street level. It is best to move burned objects to the center of the room and provide for thorough extinguishment. Officers should take time to observe conditions on the overhaul floors during this process. Time taken during the overhaul stage will reduce excessive water damage and ensure complete fire extinguishment.

If structural integrity of an area, floor or other area is in doubt, a fire watch should be considered and firefighters should not be allowed to enter the area. The Department of Building and Safety may be contacted to assist in this determination.

The Incident Commander should consider turning the overhaul responsibilities to the owner of the building when the following conditions are met: 1) The fire is completely

extinguished and there is no possibility of rekindle; 2) no additional fire related damage to the building can occur; 3) safety of civilian overhaul personnel can be assured; 4) security of the premises is in place; and 5) building or overhaul areas are released by Arson.

Re-Entry/Re-Housing

During re-housing of occupants, it is important that Fire Department personnel establish criteria for people to enter the building. This will be best accomplished by conducting a Plans Meeting with the general staff, command staff, and building management personnel. The Fire Department, in conjunction with input from the building management, should determine who will be allowed to re-enter the building; when and for how long they will be allowed to re-enter; who will provide tenant escorts; and what access routes will be utilized for the building occupants.

For incidents requiring large-scale evacuation of a building, the Re-Entry/Re-Housing Unit Leader position should be established. This position reports to the Evacuation Group Supervisor (if established) or the Incident Commander. The officer in charge of a Re-Entry/Re-Housing Unit shall formulate plans and coordinate with other units in the Evacuation Group and involved agencies regarding the safe re-entry of evacuated areas and re-housing of evacuees. The Evacuation Group officer shall coordinate the release of pertinent information to the evacuees under the direction of the Incident Commander.

Responsibilities:

1. Provide information regarding the incident as follows:

    - Communicate with incident personnel to gather appropriate re-entry/re-housing information.

    - Brief Community Liaison Officer/PIO's assigned to the Evacuation Group (Shelter, Incident Commander, etc.)

    - Communicate information to evacuees under the direction of the Incident Commander.

2. Establish Re-entry Plan.

    - Confirm safety of structure or evacuation area based on information from responsible agencies (Building and Safety, Utilities Companies, Fire Department Incident Commander, Los Angeles County Health Department, etc.)

    - Determine if re-entry will be of a temporary or permanent nature.

    - Formulate a plan for a safe/orderly re-entry.

        - Determine need for portable lights.

        - Determine the safety of persons re-entering structure/evacuation area.

- Ensure that appropriate safety equipment is provided to persons re-entering as needed (e.g., flashlights, boots, helmets, etc.) The Supply and Maintenance Division is capable of providing these supplies.

- If temporary, determine duration of re-entry.

- Provide supervision/guides for persons temporarily re-entering structure/ evacuation area.

- Consider using other elements of Evacuation Group ICS to ensure orderly and coordinated re-entry.

- Confer with building management regarding the re-entry plan for their concurrence.

3. Establish Re-housing Plan

   - Coordinate with all elements of Evacuation Group ICS in order to carry out an orderly activation of the re-housing plan.

   - Ensure that adequate resources are maintained in order to provide a safe and coordinated demobilization.

4. Update the Incident Commander relative to:

   - Number of Evacuees

   - Confirm Safety of structure/evacuation area.

   - Re-entry/re-housing plans.

5. Maintain records regarding:

   - All Media Contacts

   - All Mayor/Council Contacts

   - Document Re-entry/Re-housing Plan

   - Occupants Allowed to Re-enter/Re-house

   - Maintain Accurate Records of Activities Chronologically

   - Use Evacuation Records to Assist Re-entry/Re-housing

Once the Fire Department has released the incident, the security of property must be left with the owner, responsible party, or police/security.

Fire protection devices should be reset if possible, sprinkler systems restored and elevators operational. Field officers should consider utilizing the expertise of the Fire Prevention Bureau staff when restoring fire life safety systems in these types of occupancies. If building management/Department personnel are unable to restore the fire protection equipment, a fire watch notice shall be issued and a fire watch established.

Conclusion

The information provided in this chapter is not intended to address all possible scenarios that could occur during the demobilization, overhaul, and re-entry phases of an incident. It is intended to serve as a guide to assist officers with these functions.

As previously stated, the demobilization, overhaul, and re-entry phases of an incident can prove to be a larger challenge and have far more impact than the actual fire itself. It is imperative the Incident Commander have a well thought out and orderly plan so that these phases can be accomplished with the least amount of impact upon the building management and tenants.

Bibliography

Training Bulletin 57, Evacuation Guidelines Manual of Operation, 2/1-63.01-40.

CHAPTER 15

LESSONS LEARNED

The Los Angeles Fire Department has responded to numerous high-rise fires. This chapter will discuss "Lessons Learned" at some of those fires and Department-wide training exercises.

Some of the fires include Bunker Hill Towers, First Interstate Bank Building, Union Bank Tower Building, Department of Health Services Building and the Metropolitan Transit Authority Headquarters. The post-incident analyses of these fires and Department wide training exercises present opportunities for all members to prepare themselves for the enormous challenges these types of fires bring. A review of these incidents has given us a number of lessons learned.

STRATEGY AND TACTICS

Initial Actions

Generally speaking, a high-rise fire will call for a tremendous amount of resources. As with any large incident, it is essential that sufficient resources be called for as soon as possible. Making OCD aware of the extent of the incident assists them in preparing for move-ups and continued coverage of the City. Having sufficient resources available will assist the Incident Commander in handling the tactical operations within the High-Rise Incident Command System.

In order to apprise incoming companies, proper identification of the "Type" of high-rise building is important. This will enable the Incident Commander to properly allocate first-in companies to appropriate tasks. For instance, at a pre-1960 type high-rise building, auxiliary water supply needs to be an early consideration. A second water supply should be established due to the unreliability of standpipe operations during the retrofit process. Hose must be laid to all Fire Department Connections (F.D.C.'s) to ensure the loading of all water systems.

When the first arriving resource gives the initial exterior high-rise size-up, the location of the fire should be given as an "approximate" floor. As Fire Attack Teams go aloft, they must communicate to the Incident Commander which stairwell they are using and its location for incoming companies. When interior operations begin, the fire floor should be designated consistent with the interior stairwell/elevator floor numbering system. This enables fire companies, which will be accessing the fire from the interior stairwells and low bank elevators, a point of reference from an interior location.

On ascent the Fire Attack Team should check the lower floors for floor plan layout, designate a floor suitable for Staging, check for the standpipe valve type in case fire floor visibility is poor, report the location and extent of the fire, and the resources needed to the Incident Commander.

The first arriving Task Force Commander (unless the first arriving Task Force Commander is a single company, i.e., Light Force) should remain on their apparatus and manage the incident until properly relieved by a Chief Officer. Personnel and company accountability is extremely important, especially when companies may be accessing the building via different stairwells, exterior fire escapes or exterior windows in older style high-rise buildings. It is imperative that all companies check in with Lobby and Staging prior to proceeding to the fire floor(s). Whenever a company uses alternate means to access a high-rise, the Incident Commander shall be apprised to assure notification to Staging and Lobby control. Lobby can maintain its control over the building by having sufficient resources to cover any entrance used by Fire Department personnel. As an incident escalates, consider using a full Task Force for Staging and Lobby and assigning a Chief Officer to manage it. This will ensure control of access to the building and the fire floor.

Resources need to be deployed on the floor(s) above the fire as soon as possible in order to prevent fire extension to the upper floors. Attack the fire when you have an offensive advantage while containing the fire on the floors where a defensive position is dictated. Companies above the fire floor should preplan their handline placement, decide which stairshaft they are going to use, and if more than one stairshaft is used, the Division Supervisor will assign an officer to be in command of the fire attack in the second stairshaft. They should familiarize themselves with the floor layout and ascertain potential problems before they occur.

When attacking a pre-1960 high-rise or an existing high-rise, several other considerations should be addressed.

Establishing/Advancing Hose Lines

- In a major fire a minimum of two charged lines are mandatory.

- When extending lines into a fire floor, consider using the "Wet Line/Dry Line" method. A line is connected to the stairwell standpipe outlet, loaded and then advanced onto the fire floor until fully extended. A second line is put in place and loaded. Another section of dry hose is advanced to the nozzle of the first line and flaked out, connected, loaded, while applying water on the fire from the second line. Strap the shutoff butt in the open position. This method can be repeated on each line while advancing both firefighting lines.

- Have a coordinated attack on a fire. Consider using three-person teams, with relief teams waiting in the stairwell conserving their air. When the first team exhausts their air, return to the stairwell and the second team will take their place. A ten-member Task Force can provide three rotating teams, ensuring a fire attack without interruption.

Equipment

- Forcible entry tools should be taken aloft by the first Fire Attack Team, specifically the rotary saw. It has become a practice in many downtown older high-rises, particularly in the garment and jewelry mart buildings, to use security bars on fire escape and interior door accesses. Rotary saws may be needed for entry.

- Needed equipment, fire hose, and SCBA bottles, etc., should be expedited from Base through Lobby directly to Staging. This will prevent the unnecessary stockpiling of equipment in Lobby.

- Additional companies directed to Staging should bring priority equipment from Base/Lobby, i.e., SCBA bottles, high-rise hose, etc.

Ventilation

- Needs to be addressed early in the incident.

- Horizontal ventilation, concurrent with fire attack, will greatly facilitate fire containment and extinguishment. Backup companies to fire attack can be utilized to initiate horizontal ventilation on the fire floor.

- The assignment of companies a minimum of two floors above the fire, along with horizontal ventilation will prevent extension as well as prevent the fire from lapping to additional floors. If possible, get approval from the Incident Commander prior to breaking glass, and notify the Incident Commander of the location of the operation. When windows are broken out, consider placing an object such as a desk in front of the opening for the safety of members.

- Early arriving companies should bring in their complement of "blowers" as part of their equipment to ensure that pressurization of the stairwells has been accomplished.

- Pressurize all access stairwells used, regardless of whether the stairwell is auto-pressurized or not.

- Open the penthouse doors, except on stairwells being used for occupant egress.

Elevators

- Initial companies should not take the elevator keys aloft during their investigation.

- During pre-incident inspections, ensure all elevator and building keys are present, marked, and work.

Firefighter Safety

- During an "Emergency Traffic" situation, if a firefighter becomes trapped, the member should push their emergency trigger on their portable radio. This will switch their radio to Channel 6 and OCD will be notified. In addition, they should attempt to activate their PASS device. The Incident Commander shall utilize an RIC, request a tactical channel for the rescue company, and have the RIC monitor Channel 6 and the tactical channel. Fire attack should not be neglected or many more members will be in jeopardy.

- When accessing the fire building and windows are being broken out overhead, consider using another entrance away from falling glass.

- Ensure that you have the Lobby phone number when you go aloft.

- Always work in teams and leave in teams.

- Maintain an awareness of escape routes.

- Back out when your low air warning activates.

USE OF THE INCIDENT COMMANDER SYSTEM

Standard high-rise tactical deployment of the first alarm assignment should be followed whenever possible, i.e., Fire Attack, Lobby, Staging, and Base. Give immediate consideration to the floor above the fire and backup company for fire attack. However, the Incident Command System (ICS) should not drive the incident, the incident drives the ICS, i.e., do not fill out the ICS at the expense of tactically covering the fire.

Lobby

- Lobby needs to announce its location.

- Initially, assign a member to monitor the Fire Control Room (Building Control Station). As needed, a Systems Control Unit can be implemented to monitor the building fire control, life safety, environmental control, communications and elevator systems.

- When making the primary assessment of the elevators, observe which elevator(s) or elevator bank(s) have automatically recalled and which have not. This will give an indication of where the smoke is in relation to the elevator shaft and possibly the location of the fire. When recalling the elevators, make sure they all return to the lobby or their designated recall floor. Account for the freight elevator which may be on independent service. Inform the Incident Commander regarding elevator status and the number of floors in the building based on the highest floor served by the elevator. All elevators must be accounted for in the building. If you are not sure where an elevator is, then its considered unaccounted for.

- One company will not be sufficient to staff Lobby, especially on a working fire. Order sufficient resources to manage Lobby effectively.

- Prioritize the movement of equipment ordered by Staging.

- Use fire line tape to direct the movement of companies to the appropriate stairshaft or elevator.

Staging

- Consider using a full Task Force in Staging. The demands placed upon Staging at a working fire are so great that they will quickly overload the personnel of an Engine Company or Light Force.

- Any extensive high-rise fire will need the supervision and management support of additional Chief Officers.

- Officers should get a "master key," a copy of the Building Inventory, Lobby telephone number and sound powered handsets (one for each stairwell) if available. The more logistical functions that can be kept off the tactical channels the better.

- Staging should operate with two radio channels. One channel for the deployment of companies based on direction from Incident Commander/Operations. The second tactical channel should be utilized to request equipment from Logistics.

- Using a floor below Staging for firefighter rehabilitation will reduce congestion and confusion.

- Companies in rehabilitation at Staging, that will not be returning for additional fire fighting duties, can be used in other support functions such as Evacuation, Staging management, Search, and Rescue, etc.

- Deploy paramedic resources in Staging to establish a first care area as close to the operations areas as practical. Extended medical treatment areas can be established adjacent to but separate from Base.

- Drinking fluids need to be brought to Staging as soon as possible for rehab of firefighters.

Ground Support

- Ground Support (stairwell support) needs to be implemented early in the incident, if elevators can't be utilized, in order to move necessary equipment (air bottles, etc.) from Lobby to Staging.

- Consideration should be given to providing periodic relief for members assigned to Ground Support.

- Assign a company to provide backup lighting in the stairwell for any extended operation where there is no emergency lighting.

Base

- There should be only one Base per incident.

- Resources dispatched to Base should not communicate with the Incident Commander when approaching the incident. When this occurs, it distracts from the overall

management of the incident at the command post and delays the deployment of resources.

- Once the location of Base is established, select a safe route of approach for incoming companies, and a safe route for access to Lobby.

- Consider marking a clear path from Base to Lobby using drop line or fire line tape.
- The Incident Commander should announce the location of Base on the Tactical Channel and request OCD to announce the same on subsequent dispatches.

- Control of Base should be at both ends in order to provide directions to the companies reporting to Base, as well as direction for companies en route to an assignment.

- Companies in Base awaiting assignment can be utilized to help carry priority equipment to Lobby.

Logistics

- Setup Logistics in proximity to the Command Post.

- Use face-to-face communications with Incident Commander/Operations whenever possible.

- Coordinate the movement of resources based on the direction of the Incident/Operations.

- Coordinate equipment requests and movement from Base, Lobby, and Staging.

- Utilize a separate tactical channel to handle equipment requests from Staging.

- When needed, establish Stairwell Support.

- If the incident is going to be prolonged, request additional radio batteries and a charger.

Command Post

- Keep this location away from Base and sufficiently removed from the building (at least 200'), in a safe location. Consider a position which affords Command Post personnel a good view of the incident without interfering with tactical operations. A view of two sides of the building, one being the fire side, is preferred.

- Isolate the Command Post with fire line tape.

WATER SYSTEMS

Because of retrofit variances (buildings have a variety of water systems in various states of compliance), a thorough knowledge of alternate methods of supplying water above ground

is essential. Only by pre-incident planning your first-in high-rises, can proper identification of the status of the water systems in these buildings be accomplished.

Dry Standpipe Systems (Found in buildings built prior to 1960 and buildings 75' to 50' built from 1960 to 1974.)

- When attaching hose lines to dry standpipe outlets, use the gated wye alone if the outlet is in a stairwell. If the outlet is exterior, adjacent to the fire escape, use the pigtail with the gated wye. Strap the wye and hose so the 1-1/2" outlets are pointing in or at the window.
- Use more than just the building dry standpipe system to deliver water to the fire floors. Dry standpipe systems are not always reliable.

- Drop bagging 1-3/4" hose is a fast, effective way to get a working hose line in buildings with these types of systems. Furthermore, it allows you the luxury of being able to extend with your 2" high-rise hose packs (friction loss is negligible). Downtown companies who regularly drill with this method have effectively drop bagged 10 stories.

- Drop bagging 2-1/2" hose to use as an auxiliary standpipe provides you with the capacity of placing two effective hose lines in place when used with a gated wye.

- Consider using an aerial ladder and ladderpipe hose to place an auxiliary standpipe close to a fire escape. If the ladder does not reach the fire floor, consider extending your standpipe with 2-1/2" hose or high-rise hose packs.

- An often overlooked method of bringing water to the fire floor at any high-rise building is the running of a supply line up the interior stairwell. The number of floors you will be supplying, and how many hose lines you are using will dictate the size of the supply line you use.

- Develop a plan to implement the stairwell supply line and communicate the methodology to your command. Part of the plan is to determine how many sections of hose will be needed, and what and how many fittings. Don't forget that some high-rises have hallways separating stairshafts on intermediate floors. Consider using a runner to calculate hose requirements.

- On a large-scale incident, a 3-1/2" supply line should be used. Consider using two 3-1/2" supply lines gated down to one at the stairwell entrance. Placement of gated wye's every two or three floors will help if there is a broken line. Lay out additional hose along the lay to replace broken lines.

- Be careful not to block stairwell doorways with the hose. Consider laying the hose "wide" on the midway stair landings, and "tight," with the hose strapped to the railing, on the landings with doors. Another method is to lay the hose straight up between the stair railings. This method uses the least amount of hose, but requires good strapping to avoid slipping once the line is loaded, and creates a lot of stress on the couplings. Make sure the hose line isn't pinched off between the railing when the line is loaded.

Combination Standpipe Systems (Normally found in buildings built between 1960 and 1974 that are over 150' in height. Commonly has 2-1/2" wet outlets for fire department use located in cabinets. This system has orifice plates engineered to reduce the flow of water, which in turn lowers pressure. Removal of the orifice plate is necessary to provide an effective fire fighting line(s).

- Keep a firefighter at the valve whenever you remove the orifice plate for safety, and open the outlet slowly 1-1/2 turns. (You can adjust the outlet as needed).

- If orifice plates are located in the elbow (not at the outlet), remove the elbow if possible.

Combined Standpipe Systems (Found in buildings built since 1974 that are over 75' in height. They can have Pressure Regulating Devices for when the pressure at the outlet exceeds 150 p.s.i., they may have orifice plates when the system pressure falls below 150 p.s.i. Pressure Regulating Devices regulate pressure and currently limits the GPM to 300.)

- Connect the gated wye directly to the outlet and open the Pressure Regulating Device fully. Failure to open it fully will result in reduced flow.

Pressure Restricting Devices (Pressure Restricting Devices, which can look like a Pressure Regulating Device, are devices that work just like an orifice plate, they regulate GPM. They are usually found on floors of buildings where the system pressure exceeds 100 p.s.i., but not over 150 p.s.i.)

- When you have hooked up to a Pressure Restricting Device and the flow at the nozzle is insufficient, break the tang or pin which is preventing you from opening the valve fully. Open the valve enough to get an effective fire fighting stream, and keep a firefighter at the valve for safety.

Retrofit Buildings

- Pre-incident plan your retrofit buildings to keep abreast of the status of the water systems.

- If you have an incident at one of these buildings, "expect the unexpected" and remain flexible.

ADDENDUM

INCIDENT COMMANDER

I. RESPONSIBILITIES

- A. MANAGE TOTAL INCIDENT OPERATIONS
- B. ESTABLISH COMMAND ORGANIZATION
- C. DEVELOP STRATEGY
- D. DETERMINE ADEQUACY OF RESOURCES
- E. DIRECT ACTIVITIES
  1. COMMAND POST PERSONNEL
     a. PLANS (RE/STAT, SIT/STAT [RESPONSIBLE FOR ACCOUNTABILITY OF ASSIGNED COMPANY LOCATIONS], TECHNICAL SPECIALISTS, DOCUMENTATION, DEMOBILIZATION.)
     b. COMMAND STAFF (INFORMATION, SAFETY, LIAISON)
  2. OPERATIONS
  3. LOGISTICS
  4. PERIMETER CONTROL

II. LOCATIONS

- A. COMMAND POST
- B. BASE, "DISPATCH ALL COMPANIES TO THIS LOCATION"
- C. STAGING
- D. AIR OPERATIONS

III. STRATEGY

- A. CONSULT WITH OPERATIONS, PLANS, LOGISTICS AND COMMAND STAFF
- B. INVESTIGATION/DEMOBILIZATION
  1. DETERMINE FIRE CAUSE
  2. OVERHAUL
  3. DEMOBILIZATION

OPERATIONS

I. RESPONSIBILITIES

A. MANAGE ALL SUPPRESSION, RESCUE, AND EMS OPERATIONS:

1. FIRE ATTACK
2. STAGING
3. EVACUATION
4. SEARCH
5. RESCUE
6. RAPID INTERVENTION
7. AIR OPERATIONS
8. MEDICAL
9. VENTILATION
10. SALVAGE
11. OVERHAUL

II. LOCATION

A. OPERATIONS CHIEF--NORMALLY LOCATED AT THE COMMAND POST WITH THE Incident Commander (IC)

B. LOCATION MUST PROVIDE EFFECTIVE COMMUNICATIONS

III. STRATEGY AND TACTICS

A. CONSULT WITH IC

B. DETERMINE RESOURCE NEEDS (INCLUDING RELIEF)

1. FIRE ATTACK
2. STAGING
3. EVACUATION
4. SEARCH
5. RESCUE
6. RAPID INTERVENTION COMPANY
7. AIR OPERATIONS
8. MEDICAL
9. VENTILATION
10. SALVAGE
11. OVERHAUL

C. COMMUNICATE STRATEGY AND TACTICS TO SUBORDINATE OFFICERS

D. COMMUNICATE WITH LOGISTICS OFFICER

1. COMMUNICATIONS METHODS

2. PRESENT AND FUTURE NEEDS:

a. COMPANIES
b. RELIEF/RESERVES
c. EQUIPMENT

FIRE ATTACK

I. RESPONSIBILITIES

A. FIRST COMPANY ON SCENE TO FIRE FLOOR

1. DETERMINE SAFE ROUTE
2. ASSESS SCOPE OF THE EMERGENCY
3. INFORM THE IC
4. ATTACK THE FIRE

B. FIRST 200 SERIES ENGINE IS RESPONSIBLE FOR WATER SUPPLY (EXCEPT WHEN THE FIRST AND SECOND COMPANIES ARE TRIPLES, THEN THE ENGINEER OF THE SECOND-IN COMPANY IS RESPONSIBLE FOR WATER SUPPLY)

II. ACTIONS

A. INITIAL SIZE-UP, ORDERS ADDITIONAL COMPANIES IF INDICATED

B. COMPANY PROCEEDS TO LOBBY WITH ALL PERSONNEL AND EQUIPMENT

1. INFORMATION NEEDED:

a. NATURE AND LOCATION OF EMERGENCY
b. LOCATION OF ANNUNCIATOR PANEL OR CONTROL ROOM
c. LOBBY TELEPHONE NUMBER
d. LOCK BOX KEYS AND BUILDING INVENTORY PLAN (ONE SET)

2. CAPTAIN DETERMINES SAFE ROUTE AND INFORMS INCOMING COMPANIES, GIVES CONTINUOUS SIZE-UP DURING ASCENT

NOTE: ELEVATORS SHALL NOT BE USED UNTIL DETERMINED SAFE BY LAFD PERSONNEL.

3. EQUIPMENT TO BE TAKEN ALOFT

a. BREATHING APPARATUS
b. PORTABLE RADIOS
c. ROTARY SAW OR FORCIBLE ENTRY TOOLS
d. HOSE PACKS

ADDITIONAL EQUIPMENT IF FEASIBLE

e. PORTABLE SPOTLIGHT
f. EXTRA AIR BOTTLES
g. PORTABLE EXTINGUISHER (MANDATORY IF ELEVATORS ARE USED)

4. EVALUATE STAGING AREA AND INFORM IC.

5. FIRE FLOOR, SIZE-UP OF PROBLEM TO IC.

6. FIRE ATTACK NOW BECOMES DIVISION (FLOOR NO.), CONTINUOUS SIZE-UP AS NEEDED.

STAGING

I. RESPONSIBILITIES

A. VERIFY LOCATION OF STAGING WITH IC.

B. PLAN LAYOUT OF STAGING AREA.

C. MANAGE ALL STAGING AREA ACTIVITIES.

1. CONTROL OF RESERVE AND REHAB PERSONNEL, IN SEPARATE AREAS.
2. MAINTAIN SEPARATE STOCKPILES OF RESERVE AND EXPENDED EQUIPMENT.
3. MEDICAL TREATMENT AREA FOR LAFD PERSONNEL.
4. MAINTAIN COMPLETE, ACCURATE RECORD OF RESOURCE STATUS.

D. REPORTS TO THE IC/OPERATIONS CHIEF

II. LOCATIONS

A. THE STAGING OFFICER WILL BE LOCATED IN THE STAGING AREA.

B. STAGING PERSONNEL MUST CONTROL STAIRWELL ACCESS TO STAGING TO PREVENT COMPANIES BYPASSING STAGING AND TO PROPERLY ROUTE ARRIVING RESOURCES.

III. TACTICS

A. CONSULT WITH I.C./OPERATIONS CHIEF TO DETERMINE MINIMUM STAFFING RESERVE.

1. AS RESOURCES ARE DISPATCHED FROM STAGING ADDITIONAL RESOURCES ARE ORDERED THROUGH THE IC/OPERATIONS CHIEF.

B. COMMUNICATIONS

1. WHEN FEASIBLE, USE AN ALTERNATIVE TACTICAL CHANNEL TO ACCESS LOGISTICS, CONSIDER:

a. SEPARATE TACTICAL CHANNEL

b. BUILDING SOUND POWERED TELEPHONE SYSTEM

c. BUILDING TELEPHONE SYSTEM

d. MESSENGERS

2. AN EFFECTIVE COMMUNICATIONS LINK MUST BE MAINTAINED WITH THE I.C./OPERATIONS CHIEF.

C. STAGING IS NORMALLY LOCATED TWO FLOORS BELOW THE FIRE.

D. DEVELOP AN EQUIPMENT INVENTORY AND ORDER SPECIFIC QUANTITIES FROM BASE, CONSIDER:

1. AIR BOTTLES
2. HOSE WITH FITTINGS
3. BREATHING APPARATUS
4. SMOKE EJECTORS
5. FORCIBLE ENTRY TOOLS
6. SALVAGE EQUIPMENT
7. PIKE POLES
8. LADDERS
9. MEDICAL SUPPLIES/RESUSCITATOR
10. DRINKING WATER OR FLUIDS FOR RE-HAB OF FIREFIGHTERS
11. SPARE RADIO BATTERIES

    a. MAINTAIN A RECORD OF EQUIPMENT ORDERED, TIME ORDERED AND TIME DELIVERED.

    b. SEPARATE EQUIPMENT AND STORE LIKE EQUIPMENT TOGETHER, IDENTIFY STORAGE AREAS WITH SIGNS TAPED TO WALL

AIR OPERATIONS

I. RESPONSIBILITIES

A. MANAGE ALL HELICOPTER ACTIVITIES

B. REPORTS TO THE IC/OPERATIONS CHIEF

II. LOCATIONS

A. HELISPOT, AT LEAST 1/2 MILE FROM FIRE BUILDING, NOISE/WIND

B. AIR OPERATIONS ACCESSIBLE TO HELISPOT BUT REMOVED

III. STRATEGY & TACTICS

A. CONSULT WITH IC/OPERATIONS CHIEF AS TO PLANNED, POTENTIAL HELICOPTER MISSIONS

B. ASSESS RESOURCE NEEDS:

1. NIGHT SUN, HOIST, AIR AMBULANCE
2. HELICOPTER TENDER (LIGHTS, FUEL ETC.)
3. HELITAC PERSONNEL
4. RELIEF PILOTS

C. ORDER RESOURCES THROUGH THE IC/OPERATIONS CHIEF

D. ANNOUNCE HELISPOT LOCATION TO OCD AND IC

E. ORGANIZE RESOURCES TO SUPPORT HELICOPTER OPERATIONS

F. ROOF OPERATIONS

1. USE HELITAC PERSONNEL

2. PERSONNEL MAY BE DEPLOYED TO THE ROOF BY LANDING A HELICOPTER WITH A FIRE/RESCUE/SEARCH COMPANY

LOGISTICS

I. RESPONSIBILITIES

A. MANAGE LOGISTICS ACTIVITIES

1. BASE
2. LOBBY
3. SYSTEMS CONTROL
4. GROUND SUPPORT
5. COMMUNICATIONS
6. SUPPLIES
7. REHABILITATION
8. MEDICAL (INCIDENT PERSONNEL)

B. REPORTS TO THE IC

II. LOCATION

A. NORMALLY IN THE VICINITY OF THE COMMAND POST

III. TACTICS

A. CONSULT WITH IC

B. DETERMINE RESOURCE LEVEL FOR:

1. OPERATIONS ACTIVITIES
2. LOGISTICS ACTIVITIES
3. RESERVES

C. DEVELOP PLAN FOR LOGISTICS SYSTEM

D. COMMUNICATE PLAN AND ASSIGNMENTS TO SUBORDINATE OFFICERS

E. COORDINATE WITH THE IC AND THE OPERATIONS SECTION CHIEF

IV. COMMUNICATIONS

A. MAINTAIN EFFECTIVE COMMUNICATIONS

1. SEPARATE TACTICAL CHANNEL
2. BUILDING SOUND POWERED TELEPHONE SYSTEM
3. BUILDING TELEPHONES
4. MESSENGERS

B. ASSESS AND CORRECT COMMUNICATIONS PROBLEMS

LOBBY CONTROL UNIT

I. RESPONSIBILITIES

A. MANAGE LOBBY ACTIVITIES

1. ELEVATORS
2. STAIRWELL ACCESS
3. CONTACT BUILDING ENGINEER
4. AIR HANDLING SYSTEM
5. MONITOR FIRE CONTROL ROOM OR STATION
6. PRIORITY MOVEMENT OF PERSONNEL AND EQUIPMENT, BASE
7. INITIATE PRESSURIZATION OF STAIRWELLS

B. NOTIFY THE IC OF ELEVATOR STATUS AND NUMBER OF FLOORS WITHIN THE BUILDING

C. MANAGE BASE UNTIL OFFICER ASSIGNED

D. REPORTS TO THE IC IF LOGISTICS NOT ESTABLISHED

II. LOCATION

A. IN OR ADJACENT TO LOBBY

III. TACTICS

A. CONTROL OF LAFD PERSONNEL AND CIVILIANS

1. ENTERING OR EXITING BUILDING THROUGH SAFE CORRIDOR
2. REMOVE CIVILIANS A MINIMUM OF 200‘ FROM BUILDING
3. ASCENDING TO UPPER FLOORS VIA STAIRWELL AND/OR ELEVATORS WHEN DETERMINED SAFE

B. OBTAIN FIRE ALARM AND LOCK BOX INFORMATION AND KEYS

1. CONTROL THE ISSUING OF KEYS TO LAFD PERSONNEL

C. IF ACTUAL FIRE, SHUT DOWN AIR HANDLING SYSTEM (CONSIDER THE USE OF THE HVAC SYSTEM IN POST-1974 BUILDINGS FOR SMOKE REMOVAL)

D. ESTABLISH EQUIPMENT POOL

E. MAINTAIN RECORDS

F. COORDINATE WITH STAGING AND BASE

G. OBTAIN AND DISTRIBUTE BUILDING SOUND POWERED TELEPHONES

IV. MEANS OF ASCENT

A. STAIRWELLS, INITIAL ASCENT

1. DESIGNATE STAIRWELLS FOR SPECIFIC USE
2. LOCATE STAIRWELL GROUND FLOOR OPENINGS
3. POST PERSONNEL TO CONTROL

B. ELEVATORS

1. RECALL ALL ELEVATORS TO LOBBY
2. NOT USED UNTIL DETERMINED SAFE BY LAFD PERSONNEL

SYSTEMS CONTROL UNIT

I. RESPONSIBILITIES

A. OPERATE, SUPPORT OR AUGMENT BUILDING SYSTEMS AS REQUIRED

1. IDENTIFY TYPE OF BUILT-IN SYSTEMS AND MONITOR THEIR CURRENT PERFORMANCE

B. ASSESS CURRENT SITUATION AND REQUEST NEEDED PERSONNEL AND RESOURCES

1. EXAMINE BUILDING LAYOUT, SYSTEM DISPLAY/CONTROL PANELS.

2. OBTAIN BRIEFING FROM CURRENTLY ASSIGNED PERSONNEL AND ON- SCENE BUILDING/FACILITY MANAGEMENT AND ENGINEERING STAFF.

3. OBTAIN SYSTEM LAYOUT/OPERATION DOCUMENTS FROM BUILDING INVENTORY OR BUILDING MANAGEMENT REPRESENTATIVES.

A. REQUEST RESPONSE OF, AND MAKE CONTACT WITH BUILDING ENGINEER, UTILITY REPRESENTATIVES, ELEVATOR SERVICE PERSONNEL, ETC. ANTICIPATE THE FAILURE OF CRITICAL SYSTEMS BY THE FOLLOWING ACTIONS:

1. REQUEST NECESSARY TECHNICAL SPECIALISTS/ASSISTANCE.

2. COMMUNICATE AND PLAN WITH LOGISTICS CHIEF REGARDING SOLUTIONS TO SYSTEM FAILURES.

3. PREPARE CONTINGENCY PLANS AND RESOURCE NEEDS IN CASE OF SYSTEM FAILURES. ASSIGN PERSONNEL TO MONITOR AND OPERATE SYSTEM DISPLAY/CONTROL PANELS

E. EVALUATE THE STATUS AND OPERATION OF THE FIRE AND DOMESTIC WATER PUMPS AND WATER SUPPLY.

1. SUPPORT OR REPAIR SYSTEM AS REQUIRED.

2. PROTECT FIRE PUMPS FROM FLOODING AND POWER LOSS.

3. INVESTIGATE AND REMEDY ANY FAILURE OF AUTOMATIC FIRE SUPPRESSION SYSTEMS, AND CONDITIONS OF INADEQUATE WATER PRESSURE OR VOLUME WITHIN THE BUILDING.

F. EVALUATE AND OPERATE, AS REQUIRED, THE HEATING, VENTILATION AND AIR CONDITIONING SYSTEMS (HVAC) AND THE SMOKE REMOVAL AND STAIRWELL PROTECTIONS SYSTEMS. (MUST BE COORDINATED WITH OPERATIONS)

G. EVALUATE, SUPPORT AND CONTROL, AS NEEDED, THE BUILDING ELECTRICAL SYSTEM AND EMERGENCY POWER.

H. EVALUATE AND SUPPORT, AS NEEDED, THE BUILDINGS PUBLIC ADDRESS, TELEPHONE, EMERGENCY PHONE AND OTHER BUILDING COMMUNICATIONS SYSTEMS

II. LOCATION

A. IN OR ADJACENT TO THE BUILDING FIRE CONTROL ROOM/AREA

III. TACTICS

THE NUMBER OF PERSONNEL NEEDED TO PERFORM THE SYSTEMS CONTROL UNIT FUNCTIONS WILL DEPEND ON THE COMPLEXITY AND NUMBER OF BUILT-IN SYSTEMS, THE DURATION OF THE INCIDENT, THE AVAILABILITY OF SPECIALISTS, AND THE PERFORMANCE OF THE SYSTEMS

BASE

I. RESPONSIBILITIES

A. VERIFY BASE LOCATION WITH IC (NORMALLY 200‘ FROM STRUCTURE)

B. MANAGE ALL OPERATIONS AT BASE, REPORTS TO IC UNTIL LOGISTICS CHIEF ASSIGNED

C. CONSULT WITH IC OR LOGISTICS TO DETERMINE RESOURCE LEVELS, NORMALLY TWO COMPANIES SHOULD BE KEPT AT BASE FOR EACH COMPANY HELD IN STAGING

D. DELIVER EQUIPMENT FROM BASE TO LOBBY

E. DIRECT COMPANIES FROM BASE TO LOBBY

F. WHEN DIRECTED, PROVIDE A WATER SUPPLY TO THE ENTRANCE OF THE STAIRWELL FOR USE BY GROUND SUPPORT

II. LOCATION

A. BASE OFFICER LOCATED TO CONTROL ARRIVING RESOURCES

1. CONTROL ALL COMPANIES, IN AND OUT

2. ESTABLISH SECURITY PERIMETER AROUND BASE AND SAFE CORRIDOR TO LOBBY

B. APPARATUS

1. BLOCK STREETS AND CONTROL TRAFFIC

2. CONTROL APPARATUS PARKING, DIAGONALLY

3. USE LAPD/DOT FOR TRAFFIC CONTROL, IF POSSIBLE

III. EQUIPMENT

A. LOCATED IN SECURE AREA

1. CONSIDER FLOW OF EQUIPMENT FROM BASE TO LOBBY

2. TRANSPORT EQUIPMENT FROM BASE TO LOBBY, BY PRIORITY

3. COORDINATE WITH LOBBY CONTROL

IV. PERSONNEL

A. COMPANIES SHALL REMAIN INTACT AT THEIR APPARATUS

B. USE COMPANIES FOR TASKS AT BASE

V. RECORDS

A. ASSIGN SPECIFIC PERSONNEL TO MAINTAIN RECORDS FOR ACCOUNTABILITY OF COMPANIES

GROUND SUPPORT UNIT

I. RESPONSIBILITIES

A. CONTROL AND TRANSPORT PERSONNEL, EQUIPMENT, AND APPARATUS AT THE INCIDENT

B. TRANSPORT EQUIPMENT VIA STAIRWELL, BY PRIORITY, GROUND LEVEL TO STAGING

C. PROVIDE SCBA AIR CYLINDER FILING AND TRANSPORT

D. IF HELICOPTERS ARE USED, TRANSPORT EQUIPMENT FROM ROOF TO STAGING

E. IF AUXILIARY WATER SUPPLY REQUIRED, COORDINATE AND SUPERVISE

F. REPORTS TO LOGISTICS, OR IC IF LOGISTICS NOT ESTABLISHED

II. STRATEGY AND TACTICS

A. ASSESS SITUATION AND REQUEST NEEDED RESOURCES AND PERSONNEL.

B. ESTABLISH COMMUNICATIONS AND COORDINATE OPERATIONS WITH:

1. STAGING AREA MANAGER
2 BASE MANAGER
3. LOBBY CONTROL UNIT LEADER

C. ASSIGN THE FOLLOWING FUNCTIONS (IF NEEDED):

1. STAIRWELL SUPPORT (TRANSPORT OF EQUIPMENT AND SUPPLIES WITHIN THE BUILDING)
2. GROUND TRANSPORT (MOVEMENT OF PERSONNEL, EQUIPMENT AND APPARATUS AT GROUND LEVEL)

3. APPARATUS AND EQUIPMENT SUPPORT (FUEL, SERVICE AND REPAIR OF INCIDENT EQUIPMENT AND APPARATUS)

4. SCBA AIR SUPPLY SUPPORT (PROVIDE FOR THE EXCHANGE AND FILLING OF EMPTY AIR CYLINDERS)

D. DETERMINE FROM LOGISTICS OR LOBBY WHICH STAIRWELL TO USE AND DESIGNATED ELEVATORS

E. DETERMINE NUMBER OF PERSONNEL REQUIRED

1. STAIRWELL SUPPORT
   a….. ONE MEMBER PER TWO FLOORS
   b. ONE OFFICER PER FOUR OR FIVE MEMBERS
   c. CONSIDER RELIEF IF EXTENDED OPERATION

2. ASSIGN FLOORS

   a. GROUND LEVEL TO FLOOR 3
   b. FLOOR 3 TO FLOOR 5
   c. ETC. UP TO STAGING
   d. PLACE EQUIPMENT IN HALLWAY AT STAGING
   e. OFFICER-MAKE ADJUSTMENTS, LONG HALLWAYS, ETC.

3. EQUIPMENT

   a. STAIRWELL SUPPORT PERSONNEL SHALL HAVE:

      1 . PERSONAL SAFETY EQUIPMENT
      2. BREATHING APPARATUS
      3. SPOTLIGHTS
      4. PORTABLE RADIOS
      5… BUILDING SOUND POWERED TELEPHONES

F. IDENTIFY AND POST GROUND AND BUILDING SAFE MOVEMENT ROUTES, AND ESTABLISH SAFE REFUGE AREAS FOR UNIT PERSONNEL

G. LOCATE, ORGANIZE AND OPERATE SCBA AIR CYLINDER REFILL OPERATION

H. MAINTAIN ADEQUATE AMOUNTS OF MAINTENANCE AND REPLENISH SUPPLIES

I. IMPLEMENT AN AUXILIARY WATER SUPPLY AS DIRECTED BY THE INCIDENT COMMMANDER IF BUILDING SUPPLY FAILS

COMMUNICATIONS

I. RESPONSIBILITIES

A. MANAGE ON-SITE COMMUNICATION ACTIVITIES

1. BUILDING COMMUNICATIONS SYSTEM

2. 800 MHz RADIOS CACHE
(REPLACEMENT RADIOS AND SPARE BATTERIES)

3. SOUND POWERED SYSTEMS

4. TELEPHONES AND CELLULAR TELEPHONES

B. INFORM LOGISTICS SECTION CHIEF REGARDING THE STATUS OF COMMUNICATIONS IN BUILDING

C. CREATE AN EFFECTIVE COMMUNICATIONS SYSTEM BETWEEN THE IC AND INCIDENT PERSONNEL

D. REPORTS TO THE LOGISTICS SECTION CHIEF OR THE IC IF LOGISTICS HAS NOT BEEN ESTABLISHED

II. LOCATION

A. THE OFFICER IN CHARGE OF COMMUNICATIONS WILL BE LOCATED TO FACILITATE COMMUNICATIONS NEEDS

III. TACTICS

A. CONTROL AND IMPLEMENT THE COMMUNICATIONS SYSTEM UTILIZED BY FIRE DEPARTMENT PERSONNEL

1. 800 MHz RADIOS
REPLACEMENT RADIOS AND BATTERIES

2. TELEPHONES AND CELLULAR TELEPHONES

3. SOUND POWERED SYSTEMS

4. BUILDING COMMUNICATIONS SYSTEMS

MEDICAL UNIT LEADER

I. RESPONSIBILITIES

A. DEVELOP THE INCIDENT MEDICAL EMERGENCY PLAN

B. PROVIDE FIRST AID TO INCIDENT PERSONNEL IN STAGING AND ADVANCE LIFE SUPPORT CARE AT GROUND LEVEL LOCATION

C. PROVIDE MEDICAL EVACUATION AND TRANSPORT FOR INCIDENT PERSONNEL

NOTE: THE MEDICAL UNIT MAY ALSO ASSIST OPERATIONS IN PROVIDING LIMITED MEDICAL CARE TO CIVILIAN CASUALTIES AT THE INCIDENT.

A. PROVIDING REHABILITATION SERVICES FOR INCIDENT PERSONNEL

II. STRATEGY AND TACTICS

A. OBTAIN BRIEFING AND COMMUNICATIONS (TACTICAL) CHANNEL FROM INCIDENT COMMANDER OR LOGISTICS SECTION CHIEF

B. ASSESS SITUATION AND REQUEST NEEDED RESOURCES AND PERSONNEL

C. ESTABLISH COMMUNICATIONS AND COORDINATE OPERATIONS WITH:

1. AREA MANAGER
2. BASE MANAGER
3. SAFETY OFFICER

D. ESTABLISH AND STAFF INCIDENT MEDICAL AID STATIONS WITH EMS PERSONNEL AVAILABLE IN STAGING, ARRANGE EMERGENCY TRANSPORT UNITS AND EQUIPMENT, AND ASSIGN NECESSARY PERSONNEL.

E. ASSIGN PERSONNEL AND EQUIPMENT TO REHABILITATION LOCATIONS AS DIRECTED OR REQUIRED

ELEVATOR USE CHECKLIST

- Use of an elevator always requires more than 4 people.
- Use of an elevator always limited to a maximum load of 6 people (with PPE's and equipment).
- SCBA facepiece must be in position when elevator is in use.
- Never go higher than 2 floors below the fire or 2 floors below the lowest floor where a fire protection device is activated.

Fire or alarm reported above the 6th floor?	Yes (Go to next Question) No – **USE STAIRS**
Elevator equipped with Phase II Emergency Service?	Yes (Go to next Question) No - **DO NOT USE ELEVATOR**
Elevator shaft has smoke or water in it?	No (Go to next Question) Yes **DO NOT USE ELEVATOR**
All Elevators accounted for on Phase I Recall?	Yes (Go to next Question) No **DO NOT USE ELEVATOR**
Fire Hat Indicator blinking? (Smoke/Heat detector activation in machinery room)	No (Go to next Question) Yes **DO NOT USE ELEVATOR**
Split bank elevator shaft?	Yes (Go to next Question) No (Consider elevator for use)
Elevator shaft remote/isolated from fire? (Different wing/fire protected elevator lobby)	Yes (Go to next Question) No **DO NOT USE ELEVATOR**
Trained operator available?	Yes (Go to next Question) No **DO NOT USE ELEVATOR**
Does the elevator function properly?	Yes (Consider elevator for use) No **DO NOT USE ELEVATOR**

- (Elevator Stops at Desired Floor)
- (Elevator Doors Remain Closed when Elevator Stops)
- (Elevator Doors Open when the Door Open Button is Activated)
- (Elevator Doors Close when the Door Open Button is Released)
- (Elevator is Performing Phase II Operations as Designed)

DO NOT OVERLOAD THE ELEVATOR

ELEVATOR OPERATION CHECKLIST

- Activate Phase I by Elevator Lobby key switch by turning switch to “ON” and recall elevators to the Lobby or Recall location.
- Remove key from Elevator Lobby key switch and leave switch in the “ON” position.
- Insert key into Firefighter Service switch in elevator car. Turn key to “ON” position.
- Check elevator shaft for smoke, water, or fire.
- Press and hold the “DOOR CLOSE” button until elevator doors completely close.
- Press the “DOOR OPEN” button until the doors begin opening. Release the button and the doors should immediately close.
- Press the “DOOR OPEN” until the elevator doors fully open.
- Enter several floors (below the reported fire floor) by pushing floor indicator buttons. The floor buttons should light up, but the elevator doors should not close. (Elevators without a “DOOR CLOSE” button will proceed to the first chosen floor if the floor button is held in a depressed position. Touch buttons briefly or use the door open button to keep doors open with elevator remaining stationary.)
- Press the “RESET” or “CALL CANCEL” button to clear the elevator control panel. Repeat this process to ensure the call cancel feature is operating correctly.
- Press the desired floor button (2 floors below the fire floor or 2 floors below the lowest fire alarm activation) and a minimum of two additional floors between the Lobby and the desired floor.
- At the first “precautionary stop”, check elevator shaft for water, smoke or fire and ensure that the elevator:
  - Stops at the desired floor;
  - Doors remain closed when the elevator stops;
  - Doors open when the door open button is activated; and
  - Doors close when the door open button is released.
- Determine location of stairwells in proximity to elevator lobby.
- With elevator doors fully opened, turn the Firefighter Service switch to the “HOLD” position (if exists) and test this feature by pushing a floor button. The elevator should not accept any additional floor call inputs.
- While in the “HOLD” position (if exists), attempt to close the elevator doors by pushing the “Door Closed” button. The elevator doors should remain open.
- If elevator shaft is clear of smoke, water, or fire and all checks perform as designed, turn the Firefighter Service switch back to the “ON” position and continue to the next precautionary stop.
- At the next precautionary stop, check the elevator shaft for water, smoke or fire. It is not necessary to repeat the control panel checks.

IF AT ANY TIME SMOKE, WATER, OR FIRE IS DETECTED IN THE ELEVATOR SHAFT; THE ELEVATOR ACTS ERRATICALLY; OR DOES NOT FUNCTION AS DESIGNED; THE ELEVATOR SHALL BE ABANDONED BY ALL MEMBERS AND CONTINUE ALOFT VIA THE STAIRS.