

**HIGH-RISE OFFICE BUILDINGS****CONTENTS**

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GLOSSARY

Access stairs	A stairway, usually open, serving a number of floors of a common tenant. Also known as convenience stairs.
Air diffusers	The air supply outlets of the heating, ventilation and air conditioning system (HVAC) into the conditioned space.
Attack stairway	A fire stair being used by the Fire Department to gain access to the fire area, where the door between the stairway and the fire area is being maintained in an open position.
Blind shaft elevators	Elevators serving the upper areas of a building in a shaft that is not equipped with hoistway doors on the lower floors.
Building evacuation supervisor	When the fire safety director is not present in a class "E" office building occupied by less than 100 people above or below the street floor or by less than 500 people in the entire building, an employee trained by the fire safety director will man the fire command station and execute the fire safety plan.
Churning	A condition in a centrifugal pump in which the impeller is rotating but no water is being discharged.
Core type building	A building in which the elevators, stairway and building support systems are grouped together in one area of the building. This area could be in the center of the building as in a center core building or on one of the sides of the building as in a side core building.
Compartmentation	The subdividing of floor areas by fire resistive separations into smaller spaces or compartments.
Curtain wall	A non-bearing wall, built between piers or columns for the enclosure of the structure, but not supported at each story.
Damper	A device to seal off or to control air flow in a HVAC system.
Diffusers	See air diffusers.
ECC	Engine Company Chauffeur. A Fire Department member trained and qualified to operate Fire Department pumps.
Elevator control panel	A visual display unit located in the lobby to indicate the status and location of all elevator cars and necessary controls for the operation of the cars.
Elevator door vane	The connection between the elevator car doors and the hoistway doors. It allows the elevator car doors to drive the hoistway doors.
Elevator machinery room	The area where the equipment is located that raises and lowers the elevator car. It can be at the top or bottom of the elevator shaft. In High-Rise buildings it is usually found at the top of the shaft.
Evacuation stairway	fire tower or a fire stairs that is remote from the fire area and used for the evacuation of the building occupants. A fire tower is the preferred evacuation stairs.
Fire dampers	A damper used to restrict the passage of heat.

Fire partition	A rated vertical unit or assembly of materials that separate one space from another within any story of a building.
Fire safety director	A designated employee holding a certificate of fitness from the Fire Department qualifying him to perform the duties as required.
Fire shutter, (reversible)	A fire damper that can be controlled from a remote location.
Fire tower	An enclosed stairway connected at each story by an outside balcony or fire proof vestibule vented to the outside.
Fusible link	A device designed to be actuated by an abnormal rise in temperature.
Hard wire communications	A system of communications in which wiring physically connects both lobby command post and other areas within the building. Viz.: Points of transmission and reception.
High-Rise communications kit	Handie-Talkie accessories designed to improve the performance of Fire Department Handie-Talkies when used within High-Rise buildings. (See AUC 179R addendum No. 2)
Key (1620)	An official Fire Department alarm box key.
Key (2642)	A standard key used by the elevator industry.
Locked door fail safe system	A system where the lock mechanism is controlled electrically from a remote location.
Mechanical control center	A location within a building where equipment is located for the monitoring of the building support systems. It has limited ability to control some of the building support systems. It may or may not be located on the same floor as the mechanical equipment rooms (MER).
Mixing dampers	Dampers in the HVAC system which control the mixing of the return air and outside air.
Plenum	An air compartment or chamber to which one or more ducts are connected and which form a part of an air distribution system. In High-Rise buildings the space between the suspended ceiling and the under side of the floor above is used as a plenum for the collection of the return air.
"Q" decking	A type of composite floor construction in which corrugated steel is used to support the concrete floor. (See Fig. 2-1)
Reversible fire shutters	See Fire Shutter (reversible).
Safety fire shutters	See Fire Shutter (reversible).
Safety edge	The leading edge of an elevator car door which causes the door to reverse its direction when it encounters an obstruction.
Set backs	The area formed when the floor area of a building is reduced thus requiring the exterior wall of a building to be recessed.
Scissor stairs	Two stairs constructed side by side in the core of a building in which their doors alternate the point of exit to opposite sides of the core.

Size-up	An estimate of the conditions and problems of a fire or emergency situation by the officer in command.
Sky lobby	An elevator terminal point on an upper floor of a building where passengers can change from one bank of elevators to another.
Smoke ejector	A fan used by the Fire Department to move smoke or air.
Sound powered phone system	A portable hardwire telephone system powered by voice sound.
Staging area	An area established on a floor below the operations post to provide logistical support to the operations post.
Search and evacuation post	A position established above the fire operations to control and coordinate all operations in that area.
Standpipe kit	A collection of tools used by an engine company to effectively operate a hose line from a standpipe system.
Thermostatic detector	A device to detect an increase in temperature.
Variation	Permission given by the Department of Buildings and/or Board of Standards and Appeal to construct a building in variation with the existing Building Code.

1. INTRODUCTION

1.1 PURPOSE

The purposes of this book are:

- 1.1.1 To describe High-Rise Class "E" office buildings. Over 800 of these structures can be found in New York City.
- 1.1.2 To point out the problems and features of such buildings with regard to fire.
- 1.1.3 To establish methods of operating at fires in such buildings, and recommend precautions that should be taken.

1.2 TYPES OF BUILDINGS

1.2.1 The types of buildings included in this book are:

- A. High-Rise Class "E" office buildings built before 1945.
- B. High-Rise Class "E" office buildings built between 1945 and 1 968.
- C. High-Rise Class "E" office buildings built after 1968.

Note: Many of these buildings are 200' x 400' in area with up to six stairways especially on the lower floors and with three or more stairways on the upper floors. However, others have only two stairshafts from lobby to roof with consequent reduction in our mobility and tactical flexibility.

Therefore, to permit an organized approach and deployment of our units this Bulletin is based upon a serious fire on the upper floors of a two-stairway office tower.

- 1. Because of the variation in construction techniques and the complexity of the High-Rise class "E" office buildings, the procedures outlined in this bulletin must be general in character and must differ substantially from the "Ladders 3" approach used at multiple dwelling fires.
- 2. In addition, the multitude of fire problems in these structures occupied with the human factor, i.e.; thousands of occupants on upper floors, severely limit the resources available on the first. alarm. As a result, new signals and response patterns will be introduced which demand all units operate in a controlled and coordinated manner.
- 3. As described in the operational Sections this article's aim is to establish critical priorities and assign chief officers and/or company units, not individual members or teams of members, to solve these problems.

2. DESCRIPTION OF HIGH-RISE CLASS "E" OFFICE BUILDINGS

2.1 GENERAL DESCRIPTION

- 2.1.1 100 feet or more in height.
- 2.1.2 Vary in area from 2,000 square feet to over 300,000 square feet.
- 2.1.3 Class 1 non-combustible.
- 2.1.4 Buildings shall be classified in the Class "E" occupancy group when they are primarily occupied for transacting business; for rendering professional services that may incidentally involve the storage of limited quantities of stocks of goods for office use or purposes. Buildings and spaces used for providing public and civic services shall also be classified in this group.

Examples are:

- A. Office spaces
- B. Showrooms
- C. Banks
- D. Telephone exchanges
- E. Civic administration
- F. Assembly occupancies such as restaurants, cafeterias, etc., also may be found in office buildings.

2.2 CLASS "E" HIGH-RISE OFFICE BUILDINGS BUILT BEFORE 1945

- 2.2.1 The construction techniques used in these buildings resulted in a "heavy-weight" building, usually weighing about 20 to 23 pounds per cubic foot.
- 2.2.3 Structural steel components were encased in concrete.
- 2.2.4 Exterior walls were of masonry construction.
- 2.2.5 Exterior walls were substantially tied to all floors.
- 2.2.6 Plenum type ceilings are generally not found in these buildings.
- 2.2.7 Normally steam heated.
- 2.2.8 Usually not centrally air conditioned.
- 2.2.9 Exterior windows were openable.
- 2.2.10 All buildings erected between 1938 and 1968 were required to have a fire tower. Some built prior to 1938 have fire towers.
- 2.2.11 Floors were constructed of reinforced concrete.
- 2.2.12 Core construction techniques were not used.

- 2.3 CLASS "E" HIGH-RISE BUILDINGS BUILT BETWEEN 1945 AND 1968.
 - 2.3.1 The construction techniques used resulted in a "medium-weight" building, usually weighing between 10 and 20 pounds per cubic foot.
 - 2.3.2 Fire towers were required in all of these buildings
 - 2.3.3 The characteristics of these buildings are a mix of the pre- 1945 buildings and the post 1968 buildings. These buildings were required to conform to the 1938 Building Code but because of the numerous variances granted they used many of the construction techniques of the post 1968 buildings.

- 2.4 CLASS "E" HIGH-RISE OFFICE BUILDINGS BUILT AFTER 1968
 - 2.4.1 The construction techniques used in these buildings resulted in a "lightweight" building, usually weighing about 8 to 10 pounds per cubic foot.
 - 2.4.2 They were constructed with a lack of compartmentation.
 - 2.4.3 The protection of the structural steel component is usually done by spraying on a fireproofing material.
 - 2.4.4 Exterior walls are curtain walls constructed of a combination of glass and metal.
 - 2.4.5 The method of securing the exterior curtain walls leaves a space of 6 to 12 inches which requires additional fire stopping.
 - 2.4.6 The ceiling plenums of these buildings are extensive and lack fire stopping. they are used to return the air to the air-conditioning system and for electrical, communications and other building support equipment.
 - 2.4.7 They are usually heated by the heating, ventilating, and air-conditioning system (HVAC).
 - 2.4.8 HVAC systems are usually multi-floor systems.
 - 2.4.9 Exterior windows are usually not openable.
 - 2.4.10 Fire towers are not required.
 - 2.4.11 Floors are light in weight usually consisting of lightweight concrete, "Q decking", etc. [See Fig. 2-1]
 - 2.4.12 Core construction techniques are used extensively.

3. DELETED

4. HEATING, VENTILATION, AND AIR CONDITIONING SYSTEM (HVAC)

4.1 INTRODUCTION

4.1.1 The strategic objectives of good HVAC management are to use the HVAC system to limit the spread of fire and to control the movement of smoke within the building. Also, this system provides the greatest assistance to Fire Department members who are being deployed to control the fire, and who are conducting the primary search for any trapped occupants.

4.1.2 To utilize the HVAC system to its full potential during a fire in a High-Rise office building, the officer in command of the fire must know how the system functions and have a strategic plan for its use.

4.2 DESCRIPTION OF HVAC SYSTEMS

4.2.1 The HVAC systems found in High-Rise office buildings fall into two general categories:

- A. Central air conditioning systems, in which the processing equipment supplies air to more than one floor.
- B. Non-central air conditioning systems that serve only the floor on which the processing equipment is located.

Note: Because central air conditioning systems are the most commonly found in High-Rise office buildings and create the most problems during a fire, the main emphasis of this section will be central air conditioning systems.

4.2.2 The HVAC system may be divided into three sub-systems:

- A. Processing equipment.
- B. Supply of processed air to the floors of the building.
- C. Return of the air from the floors to be reprocessed.

4.2.3 The processing of the air is usually done on the floors of the building where the mechanical equipment rooms (MER) are located.

4.2.4 The following equipment necessary for the processing of the air will be found on the MER floor: [see Fig. 4-1]

- A. Outside air supply dampers.
- B. Equipment for the filtering, heating, cooling and humidity control of the air.
- C. Supply air fans.
- D. Smoke and heat detectors.
- E. Duct work to the supply air shaft.
- F. Duct work from the return air shaft.
- G. Return air fans.
- H. Exhaust dampers.
- I. Mixing dampers.

- 4.2.5 The supply of processed air to the floors is accomplished by the following:
[see Fig. 4-2]
- A. Supply air shaft.
 - B. Fire dampers.
 - C. Supply air ducts.
 - D. Air diffusers.
- 4.2.6 The return of air from the floors to be reprocessed is accomplished by the following. [see Fig. 4-2]
- A. Return air inlets.
 - B. Return air plenums.
 - C. Fire dampers.
 - D. Smoke detectors.
 - E. Return air shaft.
- 4.2.7 In a typical centrally air conditioned High-Rise building the large volume of air required precludes the use of a single HVAC system. We will usually find a number of HVAC systems each supplying a group of floors. These groups are referred to as HVAC systems supply zones. [see Fig. 4-3]
- 4.2.8 The normal flow of air through an HVAC system is as follows:
- A. Through the processing equipment. [see Fig. 4-1]
 - 1. Air is returned from the building via the return air shaft (RAS) for reprocessing.
 - 2. A return air fan (RAF) is used to assist the movement of air in the return air shaft (RAS).
 - 3. Air from the return air fan then will flow through the mixing dampers.
 - 4. The air is then mixed with a percentage of outside air. The amount is dependent upon outside air temperature and humidity and is determined by the building engineers on duty or by a computer.
 - 5. The mixed air then is processed by flowing through filters, heating/cooling equipment and equipment to control its humidity.
 - 6. The supply air fan is used to assist the movement of air into the supply air shaft.
 - B. Through the supply system. [see Fig. 4-2]
 - 1. Air is distributed to the floors via the supply air shaft (SAS).
 - 2. Air from the supply air shaft is distributed on each floor by ducts. The ducts are found in the plenum.
 - 3. Fire dampers will be found in these ducts where the ducts meet the supply air shaft and wherever they pass through a rated fire partition.
 - 4. Air from the supply ducts is distributed to the occupied areas by air diffusers mounted in the hanging ceiling.

- C. Through the return system. [see Fig. 4-2]
 - 1. Air from the occupied areas flows through the return collectors into the plenums.
 - 2. The air flows through the plenums to the return air shaft. The return air in the plenums is not ducted.
 - 3. Fire dampers will be found where the air enters the return air shaft from the plenum on each floor and wherever the air flows through a rated fire partition.
 - 4. The air then is returned to the processing equipment via the return air shaft.

4.3 HVAC STRATEGIC OPERATING PLAN

- 4.3.1 Determine the status of all the HVAC systems in the building. Any systems that have not been automatically shut down shall be manually shut down. This shall include both the supply and return fans.

Note: In some systems, the smoke detectors only shut down the supply fans and allow the return air fans to remain operating. The return fans will have to be shut down manually.

- 4.3.2 Before any further action can be taken with the HVAC system, the fire floor must be accurately determined.

- 4.3.3 All the HVAC systems shall be placed in the non-circulating mode by:

- A. Opening all outside air supply dampers.
- B. Closing all mixing dampers.
- C. Opening all exhaust dampers. [see Fig. 4-1]

- 4.3.4 After the fire floor has been adequately determined, all HVAC zones that do not include the fire area shall have their supply fans activated. This will supply fresh outside air to these zones, pressurizing these zones and limiting the spread of smoke. It will also supply fresh outside air to any occupants on the floors in these zones.

- 4.3.6 **Warning!**
Whenever The HVAC Systems Are Reactivated, All Units Operating In The Building Shall Be Alerted To Report Any Adverse Effects.

4.4 OTHER CONSIDERATIONS

- 4.4.1 Automatic closure of the fire dampers is usually effected upon operation of an approved fusible link or other approved heat activated device located where they would be readily affected by an abnormal rise in temperature in the duct. Fusible links should have a temperature rating approximately 50 F above the maximum temperature that would normally be encountered with the system in operation or shut down.
- A. Once a fire damper has closed it must be manually opened before air can pass through the opening it is protecting.
- 4.4.2 Local Law No. 5 of 1973 requires an approved product of combustion ionization detecting device, or a combination of an approved smoke detecting device and an approved fixed temperature thermostatic device. These devices shall be located at the air return shaft at each floor in order to monitor each inlet to the return air shaft.
- A. Activation of any of the detectors installed in an HVAC system shall stop the air supply into and the air return from the affected floor. The air supply and the air return are stopped by the activation of an approved remote controlled reversible fire shutter or by automatically shutting down the air supply fans and the air return fans serving the floor where activated.
- B. The fans cannot be reactivated until the smoke detector has been cleared or the smoke detector relay has been electrically bypassed. This can be difficult and time consuming.
- 4.4.3 Temperature variations that occur in the periphery of the building, due to weather changes and movement of the sun, require supplementary treatment of the air. This is accomplished by the following: [see Fig. 4-4]
- A. Air supply may be from the main air supply shaft or from a separate periphery air supply shaft.
- B. The air supply is ducted through the plenum on the floor below to the periphery of the building.
- C. Flexible connectors are used between the ducts and the periphery air treatment equipment on the floor above.
1. Fire experience has shown that fire entering the plenum can extend from one floor to another when these flexible connectors fail.
- D. The air then is passed through the air treatment equipment to meet the demands of the periphery. Piping containing heated or chilled water is used to condition the air. The air then is discharged into the periphery of the building.
- E. The air is returned through the normal air return system.

- 4.4.4. The chief in charge must contact the building engineer and obtain the following information concerning the HVAC system:
- A. Location of the MER floors and the zones they supply.
 - B. Special HVAC zones in the building (Theaters, Restaurants, Computer Rooms, Stores, etc.).
 - C. Central control of the HVAC systems and their location.
 - D. Number of return air shafts and their location.
 - E. If return air shafts are common to more than one HVAC supply system.
 - F. If supply and return dampers on each floor are controllable from a central location.
 - G. If there is a periphery air supply system.
- 4.4.5 Due to variations found, chief officers must consult building engineers to become familiar with HVAC systems in their district.

5. HYDRAULICS

5.1 SUPPLYING HIGH-RISE STANDPIPE SYSTEM USING FIRE DEPARTMENT PUMPERS

5.1.1 CLASSIFICATION OF PUMPERS

- A. Conventional pumpers: Two-stage 1000 gpm or 2000 gpm pumpers.
- B. High-Pressure pumper: A pumper with a third stage capability. The third stage can supply 500 gpm at 700 psi.

5.1.2 To insure adequate water supply to the standpipe system:

- A. Supply the system with at least two pumpers.
- B. Supply at least two separate Siamese's.
- C. If only one Siamese is available, supply the first floor hose outlet with the second line.
- D. When a High-Pressure pumper is going to activate the 3rd stage, only one 3" special high pressure hose supply line may be stretched into a Siamese connection.
- E. To insure that water is being supplied to the standpipe system:
 - 1. When the pumper is equipped with flow meters, use a discharge gate to which a flow meter is connected.
 - 2. If the pumper is not equipped with flow meters, it must be monitored to prevent churning and overheating of the water in the pump.
 - 3. Chauffeurs supplying the standpipe system must coordinate their pumping pressure.
- F. If the building is equipped with a combination standpipe/sprinkler system (yellow Siamese caps), augmentation is required.

5.2 PUMP PRESSURES

- 5.2.1 To simplify computing pump pressure when supplying a standpipe system, a chart has been formulated. These calculations are based on nozzle pressure, friction loss of three lengths of 2-1/2" hose, head loss, system friction loss and friction loss of two lengths of 3-1/2" hose supplying the Siamese.

5.2.2 Chart.

RECOMMENDED PUMP PRESSURES

FIRE	FLOOR(S)	CONTROLLING NOZZLE		FOG NOZZLE	
Floors	1 - 10	150	psi	200	psi
Floors	11 - 20	200	psi	250	psi
Floors	21 - 30	250	psi	300	psi
Floors	31 - 40	300	psi	350	psi
Floors	41 - 50	350	psi	400	psi
Floors	51 - 60	400	psi	450	psi
Floors	61 - 70	450	psi	500	psi
Floors	71 - 80	500	psi	550	psi
Floors	81 - 90	550	psi	600	psi
Floors	91 - 100	600	psi	650	psi
Floors	101 - 110	650	psi	700	psi

5.2.3 If the height of the fire floor requires pressure in excess of 250 psi the officer in charge can order higher pressures at the pumper if the following precautions are followed:

- A. All civilian and Fire Department personnel are removed from a zone 50 feet on each side of the hose line supplying the siamese. 3" special high-pressure hose must be used.
- B. Warning tapes, stanchions or utility ropes are utilized to maintain this area clear.
- C. A Battalion Chief is designated to control this pumping operation.
- D. An audible alert be used to inform civilians and personnel on the scene. (Public address systems on apparatus may be utilized)
- E. Supply line to the siamese or standpipe outlet valve must be secured by utility rope to a substantial object.
- F. Only special high-pressure fittings may be used. They are painted white and are noticeably heavier than standard fittings.
- G. Maintain safety zones of at least 50' around a working pumper (high-pressure) in all directions.

- H. Supply lines must be connected to the pumper on the side opposite the control panel.
- I. Unused gated inlets and outlets must be closed and all caps secured to the pumper.
- J. Each pumper being utilized at pressures in excess of 250 psi must be controlled by the E.C.C., assisted by an E.C.C. from a non-operating pumper.(One man to operate pumper and one man to maintain radio communications)
- K. Command post to establish radio communications with all units involved in high-pressure pumping operation.
- L. During high-pressure pumping, members must not utilize stairways as staging or rest areas. Utilize minimum amount of personnel in stairways served by standpipes.
- M. The Chief in Command must designate a unit(s), to control and mark off safety zones.

Note: On the scene, the Safety Operating Battalion may be utilized to control this operation.

- 5.2.4 When the fire is above the 50th floor, or the building water supply is unsatisfactory, it may be necessary to use the third stage of the high-pressure pumper. Only the Chief in Charge of the fire may order this use. Chauffeurs of high pressure pumpers must ensure that tether security ropes are in place prior to activating the third (3rd) stage of the pump.

5.3 OPERATING PROCEDURES

- 5.3.1 Pump pressure must be increased slowly and floor outlet valves opened slowly to avoid pressure surges at the nozzle.
- 5.3.2 Member operating floor outlet valve must open it sufficiently to provide the required nozzle pressure as determined by the officer supervising the line.

5.4 MANUALLY OPERATED BUILDING FIRE PUMPS

5.4.1 Introduction

- A. The purpose of this section is to familiarize members with manually operated fire pumps.
- B. The 1968 Building code requires a manual fire pump to supplement the standpipe system in buildings over 300 feet high. The 1938 Building Code requires a manual fire pump in buildings over 250 high.
- C. Many times there are manual fire pumps in other than High-Rise buildings. The same guidelines should be used in all buildings where building fire pumps exist.

- D. It always has been the responsibility of building engineers to start the building fire pumps and this section in no way releases them from this assignment. We have found, however, that some engineers have been assigned to other duties when a fire starts. There is also the possibility that the building engineer might not be on duty at the time of the fire.

5.4.2 Pump room location.

- A. Follow signs or directions to the pump room which is normally located on the lowest floor (cellar or sub-cellar-cellar).
- B. Locate the pump and note the gauges on (C) inlet and (D) discharge lines. [see Figs. 5-1, 5-2 and 5-3]
- C. Locate the bypass valve (B) on the discharge side of the fire pump. The discharge side can be readily identified by examining the gauges. The discharge gauge is calibrated for higher pressures than the inlet gauge.
- D. The bypass valve should be in the closed position (stem in). Some engineers keep them open for test purposes, so they must be checked by the ECC assigned to operate the pumps. If they are found to be open, they should be closed by turning in a clockwise direction.
- E. Some systems are quite complex and the bypass valve is not readily discernible. If such a situation is present, it is permissible to start pump as ordered without checking bypass valve. Notify the engineer upon his arrival of this and any other actions taken. The efficiency of the pump will be affected if the bypass is open. A loss of 25 % can be expected in an 8" riser, and a loss of 45% can be expected in a 6" riser, with the bypass open.
- F. Locate the Fire Pump Control cabinet [see Figs. 5-4 and 5-5] in the vicinity of the pump and read the instruction plaque. (7)

5.4.3 Description of control cabinet.

- A. The control cabinet for a 750 gallon fire pump will be in the shape of a large cube. It varies from 6' x 6' x 6' to as large as 8' x 8' x 8' in the older models. The front of the cabinet will be the control panel. [see Figs. 5-4 and 5-5]

5.4.4 Four step procedure for starting of fire pumps, using the control panel.

OPERATION	LOCATION
A. Close knife switch (1) to on position. [Fig. 5-4 or 5-5]	1. On front panel (or) 2. Inside panel door
B. Close circuit breaker(s) (2) & power "on" light will glow.	1. On front panel (or) 2. Inside panel door
C. Push starting button (3) & pump "on" light will glow. [Fig. 5-4 or 5-5]	1. On front panel (or) 2. Inside panel door (or) 3. Adjacent to panel door
D. Move selector lever (4) to desired position increasing pump speed and thereby increasing pressure.	1. On front panel (or) 2. Inside panel door (or) 3. On outside cabinet on either side of front panel

5.4.5 The fire pumps should now be operating, if they have failed to start, the emergency power lever located at the panel shall be used. Push or pull to "on" position (5). [see Fig. 5-4 or 5-5]

5.4.6 Additional duties of the member assigned will include:

- A. Contact be maintained with fire command station, via
 - 1. Handie-talkies (or)
 - 2. Fire Command station phone located in pump room.
- B. Checking of the pressure gauge on the discharge side of the fire pump located near the riser. This is to insure that the pressures called for are being maintained. The following chart will help determine the proper setting of the speed selector lever. The building management is encouraged to provide just such a chart. The chart they supply should be located at the control panel and may vary slightly depending upon efficiency of the pump.

5.4.7 Recommended Pump Pressure

FIRE FLOORS	CONTROLLING NOZZLE	FOG NOZZLE
Floors 1 to 10	150 psi	200 psi
Floors 10 to 20	200 psi	250 psi
Floors 20 to 30	250 psi	300 psi
Floors 30 to 40	300 psi	350 psi
Floors 40 to 50	350 psi	400 psi

- 5.4.8 Building fire pump data.
- A. The engineers should be used if available but they may not have any knowledge of the pressures required to supply hose lines on upper floors. ECC shall be assigned to either assist the engineer, or to start and operate the building fire pumps.
 - B. Building fire pumps are usually located in the cellar or sub-cellar and fire lines connected to them should be painted red.
 - C. Pump capacity is usually 750 gpm Most High-Rise buildings have two pumps side by side which are connected in the parallel position.
 - D. The operation of these pumps is usually standard from building to building even though the physical layout may differ.
 - E. Some buildings have a combination standpipe/sprinkler system with the siamese connected to both systems. The same starting procedures will apply in these buildings. The usual arrangement for the fire pumps is that one will be automatic and one manual. The automatic fire pumps may be of smaller capacity. (250 gpm or 500 gpm).
 - F. When a building is equipped with two manual fire pumps, as is the case in most High-Rise buildings, each pump will have its own control panel. Both pumps shall be started and used.
 - G. Since fire pumps are connected in parallel position, it is necessary to have both pumps operating at or near the same pressures. Should one manual pump be operated at a pressure far in excess of the other, it could partially overcome the check valve making the second pump less efficient. A visual check should be made of the discharge gauges of both pumps. When both are operating correctly, the pressures should be equal or nearly so.
 - H. Where one gauge reading is considerably lower than the other, the pressure can be increased on the less efficient pump by moving the pump position lever to a higher position.
 - I. When the engineer of a building is present, this should be left to him to adjust since he will be familiar with the system's maintenance history and prior malfunctions.
 - J. Near each fire pump is a standpipe phone providing direct communication with the lobby command post.
 - K. When the command to shut down the building fire pumps is received, and the engineer in charge is not available, the pumps are deactivated by reversing the starting procedure.
 - 1. Return pump position lever to lowest speed.
 - 2. Push "off" button.
 - 3. Open circuit breakers.
 - 4. Open knife switch-(off position).
 - 5. Advise the lobby command post that the pumps have been deactivated.

5.5 OTHER CONSIDERATIONS

- 5.5.1 The building fire pumps shall be capable of delivering their rated capacity at a pressure of 50 psi at the highest floor hose outlet.
- 5.5.2 A relief valve is required at the fire pump limiting the pressure to 15 psi above that required to deliver its rated capacity at 50 psi to the highest floor outlet.
- 5.5.3 Because of the above restrictions, the building fire pump may not be capable of supplying adequate nozzle pressure to hose lines at the upper floors. The primary water supply to the standpipe system in many buildings is a gravity tank. In many instances, there will be inadequate head pressures supplied to the uppermost floor-hose outlets supplied by that gravity tank. For these reasons, the primary water supply for Firefighting in most operations shall be the Fire Department pumpers.
- 5.5.4 When the building fire pumps and Fire Department pumpers are being used to supply the standpipe system, both systems must be monitored to prevent overheating caused by churning.
- 5.5.5 The high pressures required to supply water to the upper floors of a High-Rise building limit the amount of water that a Fire Department pumper can supply. A good "rule of thumb" is to have a separate pumper supply the standpipe system for each hand line in operation.

6 OPERATIONS OF FIRST ALARM BATTALION CHIEF

6.1 STRATEGIC OPERATING PLAN

- 6.1.1 The following is a basic strategic operating plan for use at major High-Rise fires. (Listed in order of importance)
- A. Determine specific fire floor (if possible) or the floors on which smoke is reported from any information that is available to you in the building lobby.
 - 1. Frequently (especially during off business hours) specific fire floor information will not be available other than a report of smoke on numerous floors (e.g. 20th to 35th floors).
 - B. Verify fire floor. Sift information received from responsible occupant/building management personnel and/or first arriving ladder company.
 - 1. We must determine the fire floor location as rapidly as possible. All future actions hinge on this vital piece of information.
 - C. Simultaneously, or as soon as possible, begin the process of controlling evacuation.
 - 1. Occupants of numerous floors may have self-initiated evacuation causing almost a mob scene or near panic in stair shafts or building lobby.
 - 2. Due to large floor areas or maze like corridors, occupants on the fire floor may be unaware of the fire until it is too late to evacuate. Search of large areas will be required.
 - 3. Search and evacuation of the floor above the fire will also be required as soon as possible.
 - D. Gain control of the building systems.
 - 1. Elevators.
 - 2. HVAC.
 - 3. Communications.
 - 4. Fire pumps.
 - E. Confine and extinguish the fire.
 - 1. Experience indicates any serious fire will require a large commitment of units and equipment because of extensive logistic problems and a need for frequent relief of members.
 - F. Battalion Chief assignments and duties at High-Rise fires are pre-determined only for the Lobby and Operations Posts. Battalion Chief operations after these positions are covered shall be designated by the Incident Commander. The Search and Evacuation, Staging area, and Attack positions shall be assigned as conditions dictate. Section 6.5.4 defines fire situations where the services of "Attack Chief" shall be utilized.

6.2 PROCEDURES TO IMPLEMENT THE STRATEGIC OPERATING PLAN

- 6.2.1 For the first arriving battalion chief to achieve the above outlined strategic operating plan, the prime position is at the lobby command post. From this Post he will have control over all building systems through the fire safety director or his surrogate. He will receive first hand information about other problems that may develop on floors above the fire through the building communications networks. He will have liaison with the Police Department for control of the lobby and the streets in the vicinity of the fire building, Under the direct control of an alert and knowledgeable battalion chief, the lobby position is of prime importance. To provide continuity of operations, it is essential that the first arriving battalion chief remain at the lobby command post to assist the chief in charge of operations. He shall remain at the lobby command post until his services are no longer deemed necessary.
- 6.2.2 The first arriving battalion chief will be required to make an initial size up to determine the adequacy of the response and the need for additional response.
- A. A 10-76 signal shall be transmitted when a report of fire is confirmed. Any fire in a High-Rise office building which requires the stretching and operating of one hose line will necessitate the use of "All Hands."
 - B. A second alarm is warranted for any visible fire or smoke emanating through the exterior skin of the building or when a serious fire has been verified.
 - C. Because of the large number of occupants in High-Rise office buildings, even fires of a minor nature may require additional units to prevent unnecessary evacuation and panic.
- 6.2.3 The first arriving battalion chief shall establish liaison with the fire safety director if present, or his surrogate to determine the following:
- A. Has the fire floor definitely been determined?
 - B. What is the extent of the evacuation that has been implemented?
 - C. Have there been any reports of severe life hazards?
 - D. What is the status of the elevators and the HVAC system?
 - E. Are there any access stairs in the vicinity of the reported fire floor?
 - F. What communications have been established between the fire floor and the lobby command post?
 - G. What communications have been established between the lobby command post and the occupants of the building?

- 6.2.4 The battalion chief should arrange for the fire safety director or the evacuation supervisor to make an announcement over the PA system or the intercom system.
"This is your Fire Safety Director, Dr. John Doe. The New York City Fire Department has just arrived to extinguish a fire on the floor. As they obtain information, we will pass it along to you. If your assistance is required, I will make such an announcement. In the meantime, please remain calm at your place of employment."
 - 6.2.5 The fire safety director **MUST** be informed to remain in the lobby where his assistance will be available at any time.
 - 6.2.6 Obtain copies of the floor plan of the fire floor from the fire safety director.
 - 6.2.7 As soon as possible, the first arriving battalion chief shall start obtaining the additional information required by the High-Rise check list. [see Fig. 6-11]
- 6.3 TACTICAL PLAN
- 6.3.1 To achieve the basic strategic plan, the first arriving battalion chief shall use the following tactics:
 - A. Contact any units that are on the scene before his arrival, to ascertain their location, fire conditions, and the operations they have implemented. This information may be obtained from the Fire Department member who is manning the command post pending the arrival of the battalion chief.
 - B. Deleted
 - C. The placement of the 10-76 assignment shall be as follows:
 - 1. The first and second arriving engine companies shall be teamed to stretch and operate the first line.
 - 2. The third and fourth arriving engine companies shall be used to stretch and operate the second line.
 - 3. The first arriving ladder company shall be assigned to search and evacuate the fire floor.
 - 4. The second arriving ladder company shall be assigned to augment the search and evacuation of the fire floor.
 - 5. The third arriving ladder company shall be assigned to search and evacuate the floor above the fire.
 - 6. The fourth arriving ladder company shall be assigned similarly, to operate on the upper floors.
 - 7. The rescue company shall be used to perform special tasks as determined by the officer in command of the fire.
 - 8. The second arriving battalion chief shall be assigned to establish and operate the operations post. (See Section 6.5)

6.4 TACTICAL CONSIDERATIONS

- 6.4.1 A prime decision that the first arriving battalion chief must make is the placement of the first line. The following conditions must be considered:
- A. To select the stairway from which to operate the first line (attack stairway), evaluate information received from operating units as to the location of the fire in relation to the stairways and the standpipe system.
 - B. The number of stairways serving the fire floor.
 - C. The stair or stairways being used by the occupants of the building.
 - 1. A line shall not be operated from a stairway until it has been cleared of building occupants.
 - 2. A stairway shall be selected for evacuation of building occupants (evacuation stairway) preferably a fire tower if available.
 - 3. The specific fire floor and the floor above are initially all that are required to be evacuated. However, occupants of many other floors may self-initiate evacuation utilizing any or all stairways until instructed otherwise.
- 6.4.2 After the placement of the first line has been determined, the first arriving battalion chief then must consider the need for and the placement of the second line. The items to be considered in making this decision are:
- A. Information received from operating units.
 - B. Number of stairways available to the fire area.
 - C. Type of construction:
 - 1. center-core construction.
 - 2. side-core construction.
 - 3. non-core construction.
 - D. Location of the stairway with regard to the core.
 - E. Has the first line been stretched to the most advantageous position for attacking fire?
 - F. Has search and evacuation of the fire floor been completed.
- 6.4.3 Considering all the above items the placement of the second line may be used to:
- A. Reinforce the position of the first line.
 - B. Protect the position of the first line.
 - C. Protect the search and evacuation of the fire floor.
 - D. Contain and confine fire spread and/or prevent fire from wrapping around the core and endangering operation of the first line.

- 6.4.4 Is this fire within the reach of outside streams?
 - 6.4.5 Are there any set-backs in the vicinity of the fire floor, which may be used for:
 - A. Ventilation?
 - B. Attack on the fire?
 - C. Search and evacuation?
 - 6.4.6 Are there any horizontal exits to other buildings near the fire floor, which must be protected or may be used advantageously in the operation?
 - 6.4.7 The time of day must be considered as this will affect:
 - A. The occupancy load.
 - B. The status of the buildings systems.
 - C. The response time of the units.
 - 6.4.8 Ventilation by the removal of windows on the fire floor or other floors is not an initial consideration. It should be delayed until an evaluation can be made of its effect on air movement in the fire area and throughout the building. Before ventilation by the removal of windows is undertaken, safety precautions have to be taken in the area that will be affected by falling glass shards.
- 6.5 OPERATIONS POST
- 6.5.1 The second arriving battalion chief shall establish and man the operations post.
 - 6.5.2 Establishment of the operations post.
 - A. It shall be established on the first floor below the fire, where conditions permit.
 - B. The location of the operations post shall insure reliable communications with the operating units and the lobby command post.
 - C. The operations post shall be equipped with the following:
 - 1. High-Rise communications kit.
 - 2. Resuscitator.
 - 3. Masks for all personnel required for the operations of this post.
 - 4. Copy of the floor plan.
 - 5. Operations post log. [see Fig. 6-2]

- 6.5.3 The chief in charge of the operations post shall be responsible for:
- A. Control and coordination of the units operating on the fire floor and the floor above.
 - B. All communications between the operations post and the units operating within his sector.
 - C. All communications between the operations post and the lobby command post.
 - D. The implementation of the tactical procedures as received from the lobby command post.
 - E. Advising the lobby command post of conditions, problems and the need for additional units.
 - F. Consulting with the lobby command post as to additional tactical procedures required.
 - G. Communications with the staging area once it has been established.
 - H. Keeping in reserve an adequate number of units at the operations post for the orderly relief of unit operating on the fire floor and the floor above.
- 6.5.4 When conditions require, the third and fourth arriving battalion chief will operate under the direction of the chief in charge of the Operations Post. The Attack Chief shall direct unit attacks on the fire floor, and communicate progress reports to the Operations Post. Attack Chief and shall be assigned as conditions dictate.

7. COMMAND POST PROCEDURES

7.1 INTRODUCTION

7.1.1 Fires in High-Rise office buildings place unique demands upon the fire service. The large floor areas, the height of the buildings, the large number of occupants and the complex building support systems, all require that the fire service establish procedures to command, control and coordinate our operations at fires within these buildings.

7.2 COMMUNICATIONS

7.2.1 The command, control and coordination of fire department operations at fires in High-Rise office buildings require a well defined and structured communications network, composed of the following elements: [see Fig. 7-1]

- A. Equipment:
 - 1. Fire Department Handie-Talkies.
 - 2. High-Rise communications kits.
 - 3. Fire Department radio.
 - 4. Hard wire communication as follows:
 - a. Class "E" system.
 - b. Standpipe telephones.
 - c. In-house telephones.
 - d. Outside telephones.
 - e. Sound-powered phone systems.
 - 5. Building Handie-Talkie radio network.

Note: At the present time extensive experimentation is being conducted with a Cross Band Repeater Radio System (WNYF-1st Issue 1981) and Sound Powered Phone Systems which will substantially alter our High-Rise communication procedures.

- B. The lobby command post will be the center of all communications, and shall establish the following communications network:
 - 1. Department radio and hard wire with the Fire Department dispatcher.
 - 2. Handie-Talkie communications on the command channel with the operations post, staging areas and search and evacuation post. Hard wire communications also shall be established.
 - 3. The chief in charge of the lobby command post shall operate on the command channel. His aide shall operate on and monitor the primary tactical channel.
 - 4. Further information on Lobby Command Post is contained in Section 7.3.

- C. The chief-in-charge of the operations post shall establish the following communications network:
 - 1. Handie-Talkie communications on the primary tactical channel with the units under his command. When the operations post is established, units under its command shall not communicate with the lobby command post unless urgent.
 - 2. Handie-Talkie communications with the lobby command post on the command channel. Hard wire communications also shall be established.
 - 3. Handie-Talkie communication between the operations post and the staging area shall be conducted on the command channel.
 - 4. The chief-in-charge of the operations post shall operate on the primary tactical channel. His aide shall operate on the command channel.
 - 5. Further information on Operational Post is contained in Section 7.4.

- D. The chief in charge of the search and evacuation post (SAE) shall establish the following communications network:
 - 1. Handie-Talkie communication with the units under his command on the secondary tactical channel. When the SAE post is established, units under its command shall switch to secondary tactical channel and shall not communicate with the lobby command post unless urgent.
 - 2. Handie-Talkie communications with the lobby command post on the command channel. Hard wire communication also shall be established.
 - 3. The chief in charge of the search and evacuation post will operate on the secondary tactical channel. His aide will monitor and operate on the command channel.
 - 4. Further information on Search and Evacuation Post is contained in Section 7.5.

- E. The chief in charge of the Staging Area shall establish the following communications network:
 - 1. Handie-Talkie communications with the lobby command post and the operations post on the command channel. Hard wire communications also shall be established with the lobby command post.
 - 2. The chief in charge of the staging area shall operate on the command channel. His aide shall monitor the primary tactical channel.
 - 3. Further information on Staging Area is contained in Section 7.6.

- 7.2.2 In all communications directed to the lobby command post, the operations post, the search and evacuation post and the staging area, the post designation shall be used rather than the unit designation. Examples:
- A. "Operations post to lobby command post
 - B. "Ladder 8 to operations post."
 - C. "SAE post to lobby command post."
 - D. "Lobby command post to staging area."
- 7.2.3 High-Rise communications kits shall be utilized at lobby command post (2), operations post (1) and staging area (1). [see Figure 7-1]
- 7.3 LOBBY COMMAND POST
- 7.3.1 The early establishment of a lobby command post will enable the chief in charge to exert central control over:
- A. Evacuation.
 - B. Building systems.
 - C. The Fire Department units being deployed to locate, confine and extinguish the fire.
- 7.3.2 To assist the lobby command post, it may be necessary to establish areas of command as follows:
- A. Operations post.
 - B. Search and evacuation post.
 - C. Staging area.
- 7.3.3 Location and description of lobby command post.
- A. The lobby command post is established by the arriving units in an area in the building and manned by each succeeding officer in command. From this post operations conducted in the building by Fire Department units are coordinated and controlled. It shall afford the officer in command access to the following:
 - 1. The fire safety director.
 - 2. The fire safety plan.
 - 3. Floor plans.
 - 4. The class "E" communications system.
 - 5. Outside telephone lines.
 - 6. In-house telephone lines if available.
 - 7. Building, elevator and window keys.

- B. The lobby command post shall be established at a location that provides the following:
 - 1. Accessibility to incoming units.
 - 2. Control of the elevators.
 - 3. Control of the building fire command station.
 - 4. Facilities for communications with the following:
 - a. Dispatchers.
 - b. The fire pump room.
 - c. The HVAC control center.
 - d. The operations post, SAE post and the staging area.
 - e. The building occupants.

7.3.4 Manning of the lobby command post.

- A. The first arriving officer shall establish the lobby command post. In the event that he leaves the lobby command post before the arrival of a chief officer he shall designate a member to man the lobby command post, preferably the chauffeur of the first arriving ladder company. This member shall then note the units leaving the lobby command post and their destination.
- B. The first arriving battalion chief shall assume command of the lobby command post. When he is relieved by the deputy chief, he shall remain at the lobby command post to assist in its operation.

7.3.5 Operations of the lobby command post.

- A. The initial operations performed by the first arriving battalion chief are outlined in section 6. To continue the initial operation and to meet the demands of an expanding fire situation the following shall be necessary:
 - 1. Determine the need for additional evacuation and develop a plan for its implementation.
 - a. If necessary, establish a search and evacuation post (SAE).
 - 2. Complete the command post check list.
 - 3. Determine the need for additional assistance. (See Section 7.3.6)
 - 4. Implement a plan for the use of the HVAC system.
 - 5. Supply additional units as required to the operations post.
 - 6. Provide additional mask cylinders to the operations post.
 - 7. Account for elevators in all banks.
 - 8. Using the floor plan for the fire floor, plot the location of the fire, the stairway or stairways being used for the attack, the stairway or stairways being used for evacuation and the location of the elevators in relation to the fire.

9. Determine the safety of the service elevator for Fire Department use.
10. Provide fire department personnel to man and operate all elevators being used.
11. Determine the need for and if necessary, establish a staging area.
12. Establish a communications network as outlined in Section 7.2.

Note: The above twelve items will require time, a systematic approach and the assistance of one or more additional chief officers to assure each item is checked and updated as conditions change.

7.3.6 Deleted.

7.3.7 The chief in charge of the lobby command post has the responsibility of supplying logistical support to the operations post, SAE post and the staging area. This support shall consist of manpower and equipment. To accomplish this, he shall do the following:

- A. Supply sufficient units to the operations post to support the operations on the fire floor and the floor above.
- B. Supply sufficient units to the SAE post to support the operations on the floors above the fire. At least one unit for every five floors to be covered shall be supplied (use more units if necessary).
- C. Supply sufficient units to the staging area to enable it to meet the needs of the operations post. At least three engines and two ladder companies shall be at the staging area for immediate support of the operations post.
- D. Supply sufficient spare Scott cylinders to the staging area to support operations. A supply of at least 20 spare cylinders shall be maintained at the staging area.
- E. Engine companies reporting to the staging area shall bring with them the following equipment unless otherwise directed:
 1. A mask for each member.
 2. A standpipe kit and a nozzle.
 3. A length of hose per member.
 4. A spare Scott cylinder for each member.
- F. Ladder companies reporting to the staging area shall bring with them the following equipment, unless otherwise directed:
 1. A mask for each member.
 2. Two sets of forcible entry tools and six foot hooks.
 3. Search and utility ropes.
 4. A spare Scott cylinder for each member.

- G. The High-Rise Unit shall be used by the chief in charge of the lobby command post as a logistical support unit to supply the following:
 - 1. Spare Scott cylinders to the staging area or other areas of the building where required.
 - 2. Special tools and equipment to areas of the building as directed by the chief in charge.

- 7.3.8 A predesignated unit, that has been trained and equipped to operate as a command post company, shall be utilized to assist the chief in charge of the lobby command post. Its duties shall be as follows:
 - A. Maintain the command post log. [see Fig. 7-2]
 - B. Control the operations of all the elevators.
 - C. Insure the proper manning of all elevators.
 - D. Any other duties as deemed necessary by the chief in charge of the lobby command post.

- 7.3.9 Smoke movement in High-Rise buildings and measures to control or remove it are subjects of continuing research. Based on past fire experience and the behavior of normal air movements in tall buildings, a plan for the removal of smoke from the fire building may be developed. Ventilation of High-Rise office buildings shall be supervised and implemented by the chief in charge of the lobby command post. He shall attempt to control the movement of smoke within the building by the following means:
 - A. The use of the HVAC systems as outlined in Section 4.
 - B. The use of the Fire Department smoke ejectors (two 9,500 CFM fans) to supply air to the attack stairway three floors below the fire floor. With the doors closed at the top and bottom of the stairway, this will pressurize the stairway in the vicinity of the fire floor, decreasing the stack effect and limiting the spread of smoke throughout the building This will also decrease the effect of drawing the heat and smoke to the stairway causing the member making the attack to be in a high heat area.
 - C. The smoke ejectors may also be used with the doors open at the top and bottom of the stairway. This will increase the stack effect and assist in the removal of smoke via the stairway,.
 - D. Vertical ventilation is venting the top and bottom of vertical shafts to the outer air. Vertical ventilation is influenced by the stack effect as follows:
 - 1. Its effect becomes noticeable in buildings over 60 feet, and increases as the building's height increases.
 - 2. Its effect can be either positive or negative.
 - a. The positive stack effect is the upward movement of air in a vertical shaft.
 - b. The negative stack effect is the downward movement of air in a vertical shaft.
 - 3. Positive stack effect increases as the outside air temperature decreases in relation to the temperature inside the building.
 - 4. Negative stack effect may occur when the outside temperature is greater than the temperature inside the building. Its possibility is greatest when the outside air temperature is above 90 F.
 - 5. Its effect is intensified by the speed and direction of the wind.
 - 6. To obtain the greatest benefit from the stack effect, the doors at the top and bottom of the stairway must be opened when a stairway is used for smoke removal. The street floor near this stairway must also be vented to the outer air.

CAUTION: When using a stairway for smoke removal, an adverse condition could occur on the fire floor, causing heat and flames to be drawn toward the stairway being used. The drawing of heat and smoke toward stairways is especially evident whenever fire

- towers have been utilized. Due to this experience, fire towers are not recommended for use as fire attack stairs.
- E. Horizontal ventilation by the removal or opening of windows is begun, safety precautions shall be taken in the area that will be affected by failing glass shards.
 - 1. Horizontal ventilation should be the last consideration as its effects are least likely to be beneficial.
 - a. The stack effect of vertical shafts could cause the movement of air into the building and not allow the smoke to escape to the exterior.
- 7.3.10 The chief in charge of the lobby command post shall control street operations as follows:
- A. Establish communication with the police department superior officer on the scene to clear pedestrian and vehicular traffic on all sides of the fire building.
 - B. Establish exterior inspection by Fire Department personnel of all sides of the fire building to report the following:
 - 1. Fire and smoke conditions.
 - 2. Persons in distress.
 - 3. Any unusual conditions.
- 7.3.11 Other considerations of the chief in charge of the lobby command post shall include:
- A. The early response of the mask service unit.
 - B. The establishment of a suitable area within the building for the treatment of injured civilian and Fire Department personnel.
 - C. The response of emergency medical service and Fire Department ambulances.
- 7.4 OPERATIONS POST
- 7.4.1 The operations post is an area in the building established by the second arriving battalion chief. Its purpose is the control and coordination of all operations conducted on the fire floor and initially on the floors above.
- 7.4.2 The operations post shall be established at a location that provides:
- A. Proximity to the units operating on the fire floor usually the floor below the fire.
 - B. Hard wire communications to the lobby command post (Building internal phone system or NYFD Sound Powered Phone System).
 - C. Reliable Handie-Talkie communications with the units operating under his command.
 - D. Adequate space for units being held in reserve.
 - E. Accessibility to units reporting to the operations post.
- 7.4.3 The operations post shall be equipped with:
- A. At least two Handie-Talkies.
 - B. The High-Rise communications kit.
 - C. A resuscitator.
 - D. Masks for all members assigned to the operations post.
 - E. A copy of the floor plan.
 - F. The operations post log. [see Fig. 6-2]
- 7.4.4 The operations post shall be manned as follows:

- A. Prior to the arrival of the second battalion chief, the chief in charge of the lobby command post shall designate an officer of one of the first arriving units to coordinate the operations on the fire floor and the floor above.
- B. The second arriving battalion chief shall establish and command the operations post, assisted by his aide.
- C. The second arriving battalion chief shall remain in command until relieved by the special called deputy chief responding on the 10-76 signal.
- D. The deputy chief in charge of the operations post may establish sectors commanded by attack chiefs to coordinate and control units operating on the fire floor and the floor above.

- 7.4.5 The operations performed by the chief in charge of the operations post are outlined in Section 6.5. In addition, he shall:
- A. Insure that the attack stairway has been cleared of building occupants for at least five floors above the fire.
 - B. Insure that the evacuation stairway is maintained safe for any required evacuation and for use by Fire Department personnel.
 - C. Review the operations of the first arriving units to determine the need for changes in tactics or procedures.
 - D. Advise the lobby command post as to the need for and the placement of the second line in accordance with procedures as outlined in section 6.4.2 and 6.4.3.
 - E. Prior to the establishment of the staging area, advise the lobby command post of the need for:
 - 1. Additional units.
 - 2. An adequate supply of Scott cylinders.
 - 3. Any additional equipment that may be needed.
 - F. After the establishment of the staging area, obtain the items as listed in "E".
 - G. Advise the lobby command post of the need for additional evacuation of the floors above the fire.
- 7.5 SEARCH AND EVACUATION POST (SAE)
- 7.5.1 The SAE post is established within the building by the third or fourth arriving battalion chief. Its purpose is the control and coordination of all operations conducted above the fire operations (fire operations is defined as the fire floor and one floor above).
- 7.5.2 The criteria for the location of the SAE post shall be dependent on the following:
- A. Fire location and severity
 - B. Handie-Talkie effectiveness
 - C. If possible the SAE post shall be established on a floor which is not serviced by the same bank of elevators as the fire floor. [see Fig. 7-3]
Example:
 - 1. If the fire were on a floor serviced by the low rise bank of elevators the SAE post would be established on the 17th floor or at least five floors above the fire floor.
 - 2. If the fire were on a floor serviced by the intermediate bank of elevators the SAE post would be established on the 31st floor or at least five floors above the fire floor.
 - 3. When the fire is on a floor serviced by the High-Rise bank of elevators, the SAE post should be established five floors above the fire.

- 7.5.3 The SAE post shall be equipped as follows:
1. At least 2 Handie-Talkies.
 2. A resuscitator.
 3. Masks for all members assigned to the SAE post.
 4. A spare Scott cylinder for each member assigned to the SAE post.
 5. Floor diagram, Pad and Pen.
- 7.5.4 The SAE post shall normally be manned by the third or fourth arriving battalion chief and his aide.
- 7.5.5 The chief in charge of the SAE post shall be responsible for the following:
- A. The control and coordination of all units operating above the fire operations area.
 - B. Obtaining from the lobby command post sufficient units for the operations on the upper floors. All units assigned above the fire operations area shall bring with them a spare Scott cylinder.
 - C. Preventing unnecessary evacuation and avoiding panic.
 - D. Controlling necessary evacuation.
 1. By the use of the evacuation stairs.
 2. By the use of smoke-free blind shaft elevators manned by Fire Department personnel.
 - E. Preventing the use of the attack stairs for evacuation.
 - F. Ensuring that all floors above the fire operations area have been searched.
 - G. Establishing the required communications as outlined in Section 7.2.1 D.
 - H. Advising the lobby command post of conditions and problems encountered on the upper floors.
- 7.6 STAGING AREA
- 7.6.1 The staging area is established within the building by a battalion chief. Its purpose is to provide logistical support to the operations post.
- 7.6.2 The staging area shall be established at a location:
- A. Two floors below the operations post.
 - B. Where there is adequate space to hold units and equipment in reserve.
 - C. Where the units have ready access to the operations post.
 - D. That provides hard wire communications to the lobby command post.
 - E. That provides reliable Handie-Talkie communications between the staging area and the operations post and the lobby command post.
 - F. That is accessible to units reporting to it.

- 7.6.3 The staging area shall be equipped as follows:
- A. At least two Handie-Talkies.
 - B. The High-Rise communications kit.
 - C. Resuscitator.
 - D. Staging area log. [see Fig. 7-4]
- 7.6.4 The staging area shall be manned by a battalion chief and his aide.
- 7.6.5 The chief in charge of the staging area shall be responsible for the following:
- A. Control of all units being held in reserve and those units on R & R.
 - B. Obtaining from the lobby command post sufficient units to adequately meet the demands of the operations post. At least three engine and two ladder companies shall be maintained in reserve at the staging area.
 - C. Maintaining communications with the operations post on the command channel.
 - D. Maintaining at least 20 spare Scott cylinders.
 - E. Providing for the treatment and transportation of all injured members to the lobby command post.

7.7 FORWARD TRIAGE AREA

- 7.7.1 The Forward Triage Area (FTA) is established within the building by the Incident Commander.
- 7.7.2 Its purpose is to ensure the prompt response to fire victims and members.
- 7.7.3 The FTA shall be established in an environmentally safe location on a floor below the staging area. If conditions deteriorate on this floor, EMS personnel shall change locations. The IC shall be advised.
- 7.7.4 The IC shall determine, in consultation with the senior Bureau of EMS (BEMS) officer on scene, proper staffing levels of EMT's, Medics and EMS supervisors for the FTA.

8. CLASS "E" COMMUNICATION SYSTEMS

8.1 INTRODUCTION

Because of the large number of people working in office buildings, the large floor areas and the number of floors involved, a system to alert and direct the occupants in the event of a fire and to transmit an alarm to the Fire Department is required. To meet this need, Local Law No. 5 of 1973 provides for the installation of a Class "E" communications system in Class "E" office buildings.

8.2 DESCRIPTION

- 8.2.1 Class "E" communications systems shall consist of:
- A. The fire command station located in the lobby of the building near the elevator control panel.
 - B. Loudspeakers, operated from the fire command station, which are located on all floors, in all elevators and in all stairway enclosures.
 - C. Floor warden stations on each floor which provide two-way communications with the fire command station.
 - D. Manual fire alarm sending stations on each floor.

- E. Associated systems:
 - 1. Smoke detection systems.
 - 2. Sprinkler water flow alarms.
 - 3. Thermostatic alarms.
 - 4. Locked door fail safe system.

- 8.2.2 The fire command station shall include:
 - A. A hinged cover which permits the flashing "FIRE" signal to be seen. The hinged cover shall be provided with a lock and key.
 - B. An information display unit capable of monitoring the following systems in order of priority:
 - 1. Manual fire alarm.
 - 2. Smoke detectors.
 - 3. Sprinkler water flow alarms.
 - 4. Elevator lobby detectors.
 - 5. Fire alarm activation.
 - 6. Central office notification.
 - 7. Fan system on / Fan system off.
 - 8. Locked door fail safe system.
 - 9. Fire system trouble.
 - 10. Fire signal trouble.
 - 11. Tamper switch alarm.
 - 12. Power source indicator.
 - 13. Test/normal mode switch.
 - 14. Other information displays as desired.

 - C. Two-way communications between the fire command station and the following:
 - 1. Floor warden stations.
 - 2. Mechanical control center.
 - 3. Elevators.
 - 4. Air handling control rooms.
 - 5. Elevator machinery rooms.
 - D. A public address system to all floors, elevators and stairways either selectively or collectively.
 - E. The capability to transmit an alarm from the fire command post to the Fire Department via a central station.
 - F. While Local Law No. 5 mandates specific controls and items that must be displayed at the command station, it gives wide latitude to each manufacturer regarding the physical design and hardware that may be used. As a result, many different systems are utilized. This makes an intimate knowledge of each system difficult. Utilize building engineers or fire safety directors (if available) to assist in extracting all information possible from the equipment and an accurate input of Fire Department requirements as ordered by the chief in command of the fire.

- 8.2.3 A floor warden station shall be located on each floor between the required exits. It shall be provided with:
- A. A telephone type handset.
 - B. Capability to activate a visual and audible signal at the fire command station.
 - C. Two-way voice communications with the fire command station.
 - D. Provisions for making announcements over the loudspeaker system on the floor where it is located.
 - E. A handset, housing and door painted red and lettered "Fire Emergency-Open Door to Operate".
- 8.2.4 At least one manual fire alarm sending station shall be located in each path of escape in each story of a building. Additional stations shall be installed so that no point on any floor shall be more than 200 feet from the nearest station. The activation shall cause:
- A. Automatic transmission to the Fire Department via a central station.
 - B. A visual and audible signal at the fire command station, mechanical control center and the regularly assigned location of the fire safety director.
 - C. Sounding of the alarm on the fire floor and the floor above.
- 8.2.5 An approved combustion ionization detection device or a combination of an approved smoke detecting device and an approved fixed temperature thermostatic device shall be installed:
- A. At each elevator landing, the activation of this device shall:
 - 1. Recall the elevators.
 - 2. Sound the fire alarm signal on the fire floor and the floor above.
 - 3. Cause a fire alarm signal to be transmitted to the Fire Department via a central station.
 - 4. Cause a fire alarm signal to be sounded at the fire command station, the mechanical control center and the regularly assigned location of the fire safety director.
 - 5. Stop the air supply into and the return air from the floor where activated.
 - 6. Activate the air exhaust fans and dampers in the smoke shaft or the pressurizing fans in the stair enclosure.
 - 7. Unlock the doors on the locked fail safe system.
 - B. Within the HVAC system, the activation of this device shall accomplish all of the actions listed in 8.2.5A with the exception of recalling the elevators.
- 8.2.6 The activation of a sprinkler water flow alarm shall accomplish all of the actions as listed in Section 8.2.5A.
- 8.3 UTILIZATION OF THE CLASS "E" SYSTEM
- 8.3.1 The chief in charge of the command post will be able to obtain the following information from the fire command station:
- A. The location and time of activation of the:
 - 1. Manual pull stations.
 - 2. Smoke detecting devices.
 - 3. Thermostatic detecting devices.
 - 4. Sprinkler water flow alarms.
 - B. Status of the HVAC system.
 - C. Status of the elevators.

- 8.3.2 The communication features of the class "E" system can be used as follows:
- A. The public address system:
 - 1. To communicate with the building occupants.
 - 2. To control evacuation.
 - 3. To communicate with Fire Department personnel.

 - B. The warden telephone system:
 - 1. To communicate with the floor wardens.
 - 2. To establish hardwire communications with Fire Department personnel at the:
 - a. Operations Post.
 - b. SAE Post.
 - c. Staging area.
 - d. Other locations.

 - C. Two-way communications with:
 - 1. Elevators.
 - 2. Fire Pump room.
 - 3. Mechanical control center.
 - 4. Air handling control center.

9. LADDER COMPANY OPERATIONS

9.1 INTRODUCTION

9.1.1 Fires in High-Rise office buildings present unusual complex problems to the first arriving units. It is essential that the first alarm ladder companies define the fire problem and convey this information to the officer in charge and provide for the rescue and evacuation of occupants in affected areas. The information gathered by the first alarm ladder companies and relayed to the lobby command post will determine to a large extent the success of the overall fire operations.

9.2 LADDER COMPANY RESPONSIBILITIES

9.2.1 General goals of first alarm ladder companies.

- A. Gain control of elevators.
- B. Locate fire floor and determine the best access thereto.
- C. Ascertain the general area and extent of the fire on the floor.
- D. Provide the necessary search and evacuation of occupants on the fire floor.
- E. Conduct a preliminary search and examination of the floor above the fire.
- F. Initiate search and examination of the upper most floors of the building.
- G. Reconnaissance of the exterior of the building.

9.3 FIRST ARRIVING LADDER COMPANY

9.3.1 The first arriving ladder company shall:

- A. Obtain as much information as possible from the fire safety director or his surrogate as to:
 - 1. Location of the fire.
 - 2. Evacuation procedures that have been implemented.
 - 3. Status of elevators.
 - 4. Access stairs serving the fire floor.
- B. Prior to leaving the lobby:
 - 1. Determine the elevator bank that provides the safest access to the fire area and place the elevator cars to be used on "Firemen Service".
 - 2. Obtain floor plan of the fire area. If only one copy is available do not remove it from the fire command station.
 - 3. Obtain keys necessary to gain access to the fire floor.
 - 4. Insure that the lobby command post is manned by a fire department member.

5. Due to HVAC and the stack effect, smoke can permeate the entire zone (up to 25 floors) and cause confusion as to the specific fire floor. Numerous reports of fire or smoke may be received and even the original alarm may be from the incorrect floor. Always be prepared for the unexpected, especially when elevators are being utilized.
- C. Conduct a preliminary inspection of the exterior of the building by the chauffeur for:
 1. Persons in distress.
 2. Smoke or fire showing through the skin of the building.
 3. The need for any exterior operations.
- D. Proceed to a floor at least two floor below the fire floor using a "Firemen Service" elevator as outlined in section 3. A fireman equipped with a Handie-Talkie shall be assigned to remain with the elevator and to operate the elevator until relieved.
- E. Upon arrival at the floor below the fire. conduct the following operations and relay all information obtained to the lobby command post:
 1. Determine if the reported fire floor is the correct location and return the elevator to the lobby to transport the engine companies.
 2. Determine the heat and smoke condition on the fire floor.
 3. Determine the life hazard on the fire floor and initiate evacuation procedures where required.
 4. Determine the location of the fire on the floor and select a stairway with a standpipe that will provide the best attack on the fire.
 5. Conduct a primary search of the fire floor.
 6. Provide support to the advancing Engine Company by:
 - a. Removing obstructions.
 - b. Forcing entry.
 - c. Opening the ceiling to expose the plenum.

9.4 SECOND ARRIVING LADDER COMPANY

- 9.4.1 Due to the utilization of manpower from the 1st arriving Ladder Company for:
 - A. Examination of building exterior.
 - B. Elevator car operator.
 - C. Temporary Lobby Command Post supervisor, plus the large area that MUST be searched mandates that the second arriving Ladder Company assists in the search and evacuation of the fire floor.

- 9.4.2 The second arriving ladder company shall:
- A. Report to the lobby command post.
 - 1. Determine if the fire floor has been verified by the first arriving ladder company.
 - 2. Obtain an elevator car that provides the safest access to the fire area and place the car on "Firemen Service". If possible, the same elevator car used by the 1st arriving, ladder (manned by a H.T. radio equipped member of the 1st ladder company) should be utilized. If a different car must be utilized, a H.T. radio equipped member of the 2nd ladder shall be assigned to remain with the elevator and operate car until relieved.
 - 3. Upon arriving at the floor below the fire (or on the fire floor) obtain as much information as possible from the 1st arriving ladder company - areas searched, fire area location, occupants reported missing, etc.
 - 4. Coordinate the search operation of fire floor with first arriving ladder company.

9.5 THIRD ARRIVING LADDER COMPANY

9.5.1 The third arriving ladder company shall:

- A. Report to the lobby command post.
 - 1. Determine if the fire floor has been verified by either the 1st or 2nd arriving ladder company.
 - 2. Obtain an elevator that provides the safest access to the fire area and place the car on "Firemen Service".
 - 3. Proceed to a floor at least two floors below the fire floor, using a "Firemen Service" elevator as outlined in section 3.

Note: The 1st arriving and possibly the 2nd arriving ladder company will already have a H.T. radio equipped member operating one of the "Firemen Service" elevators. Use these cars if available rather than losing a member to operate another car. In ALL cases each elevator car used to transport Fire Dept. members a H.T. equipped member shall be assigned to operate the car. These cars shall then be returned promptly to the lobby to transport additional men or equipment.

- B. Upon arriving at the floor below the fire, obtain as much information as possible from the 1st or 2nd arriving ladder company OR by a rapid survey or reconnaissance of this floor and stairway serving it. Signs posted in elevator lobbies ("YOU ARE HERE" signs) can also be used for such familiarization. The Officer and member shall then:
 - 1. Determine the number of stairways serving the fire floor and the floor above.
 - 2. Proceed to the floor above the fire via a stairway other than the attack stairway.
 - 3. Determine which stairway is the best stairway to be used by the occupants for evacuation and advise the lobby command post.
 - 4. Examine the floor above the fire and report to the lobby command post the following:
 - a. The heat and smoke conditions.
 - b. The status of the evacuation.
 - c. Any extension of the fire.
 - d. Presence of Access Stairs - Down to Fire Floor or Upward to Floor Above.
 - 5. Examine all stairways for occupants and smoke condition.
 - 6. Remove all occupants from the attack stairway for a reasonable distance above the fire floor and prevent its use by the occupants.
 - 7. If difficulty is encountered in clearing the attack stairway of occupants, the officer shall advise the first arriving ladder company or the operations post to withhold the attack until the occupants have been safely removed.
 - 8. Conduct a primary search of the floor above the fire.
- C. When his operations are completed on the floor above the fire, report to the operations post either physically or via H. T Radio.
- D. Notification to Chief in Charge of Command Post or Operational Post of Missions NOT accomplished can be more important than assignments accomplished.

9.6 FOURTH ARRIVING LADDER COMPANY

9.6.1 The Fourth arriving ladder company shall:

- A. Report to the lobby command post.
 - 1. Each member shall be equipped with an extra Scott cylinder.
 - 2. Obtain an elevator that provides the safest access to the roof.
 - a. If the fire is on a floor that is not serviced by the High-Rise bank of elevators, the High-Rise bank will be used if it is in a blind shaft.
 - b. If the fire is on a floor that is serviced by the High-Rise bank of elevators, they shall proceed to a location below the fire floor and then use a stairway other than the attack stairway to proceed to the roof.
 - c. If the High-Rise bank of elevators is used, assign a member equipped with a Handie-Talkie to operate the "Firemen Service" elevator until relieved.
- B. Upon arrival at the roof area the officer shall:
 - 1. Report the following conditions to the lobby command Post.
 - a. Smoke and heat conditions in the area and in the stairways.
 - b. The presence of any building occupants.
 - c. All means available for roof ventilation, especially over stair ways and elevator shafts.
 - d. Any unusual conditions.
 - e. Fire or occupants at windows visible from roof.
 - C. Not undertake roof ventilation unless ordered by the Chief in Charge of the lobby command post.
 - D. Determine the identification of all stairways and elevator shafts so that when ordered, the correct ventilation can be carried out.
 - E. Conduct a primary search of the top five floors.
 - F. Remove any occupants to a safe area or assure the occupants what they are safe to remain where they are.
 - G. Remain in the roof area to monitor and report any changing condition until other wise ordered by the lobby command post.
 - H. A logical assignment after roof operations would be the terminal floor of elevator bank serving the fire floor.
 - I. Operate under the control of the lobby command post until the SAE post is established. They shall then operate under the command of the SAE post.

9.7 CARBON MONOXIDE METERS

- 9.7.1 All ladder companies equipped with Carbon Monoxide Meters, when responding to hi-rise fires after the Second Alarm assignment, shall report to the Lobby Command Post with their Meters.

10. ENGINE COMPANY OPERATIONS

10.1 INTRODUCTION

10.1.1 The many variables and complexities built into High-Rise office buildings may be compounded by both the fire location and the fire load within the tenant space on the floor.

10.1.2 Many fires will be within easy reach of hose streams operated from the immediate area of the stairway enclosure, but other fires may require both the combining of rolled up lengths and manpower of the first and second due units to advance the first hose line.

10.2 ENGINE COMPANY RESPONSIBILITIES

10.2.1 The general goals of the first alarm engine companies are:

- A. To stretch sufficient hose to reach the fire and be able to operate effectively during the initial stages of operation.
- B. Provide relief of the member operating the first hose lines.
- C. Supply the standpipe and sprinkler systems as per sec. 5.

10.3 FIRST ARRIVING ENGINE COMPANY

10.3.1 The first arriving engine company shall:

- A. If first to arrive, obtain as much information as possible from the fire safety director or his surrogate with regard to:
 - 1. Location of the fire.
 - 2. Evacuation procedure that have been implemented.
 - 3. Status of the elevators.
 - 4. Access stairs serving the fire floor.
- B. Remain at the lobby command post until the first ladder company has verified the fire location.
- C. Proceed to the upper floor via the elevator manned by the member of the first ladder company.
- D. With the assistance of the second arriving engine company, stretch a hose line from the standpipe outlet on the floor below the fire in the designated stairway.
- E. Operate the first hose line until relieved by the second arriving engine company.

10.4 SECOND ARRIVING ENGINE COMPANY

10.4.1 The second arriving engine company shall:

- A. Report to the officer in command of the lobby command post.
- B. Proceed to the location of the first engine company via a manned "Firemen Service" elevator.
- C. Assist the first arriving engine company in stretching sufficient hose to reach the fire.
- D. Provide Handie-Talkie communications between the standpipe outlet and the nozzle by having the officer of the second arriving engine company remain at the outlet until the hose line is operating at the correct nozzle pressure.
- E. Leave the fire area when the hose line has been stretched and is operating so as not to deplete their air supply.
- F. Coordinate with the officer in command of the first hose line so that the relief of members operating the line can be accomplished before their masks are expended.

10.5 THIRD AND FOURTH ARRIVING ENGINE COMPANIES

10.5.1 The third and fourth arriving engine companies shall:

- A. Report to the chief in charge of the lobby command post.
- B. Operate in a manner similar to the first and second engine companies to stretch the second hose line.
- C. Stretch and operate the second hose line as directed by the chief in charge of the operations post or the lobby command post. This hose line may be used to:
 - 1. Reinforce the position of the first line.
 - 2. Protect the position of the first line.
 - 3. Protect the search and evacuation of the fire floor.
 - 4. Contain and confine fire spread and/or prevent fire wrapping around the core and endangering operation of the first line.

10.6 GREATER ALARM ENGINE COMPANIES

10.6.1 Greater alarm engine companies shall report to the lobby command post for assignment to the operations post, SAE post or the staging area. Some of the duties they may be assigned to are:

- A. Relieve any of the first alarm units.
- B. Stretch additional hose line on the fire floor or the floors above.
- C. Assist in the search and evacuation of upper floors.
- D. Transport special tools and equipment to the staging area.

10.6.2 Units, without specific orders to the contrary shall bring masks, rolled up lengths and spare Scott cylinders to lobby area. If not required for their specific use, such equipment will be added to staging area supply for future use by units engaged in actual fire fighting operations.

BY ORDER OF THE FIRE COMMISSIONER AND THE CHIEF OF DEPARTMENT