

# *Firefighters' Emergency Operation & Elevator Shutdown*

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# *Topics*

- Firefighters' Operation
  - *Phase I*
  - *Phase II*
- Firefighters' Operation & Elevator Shutdown
  - *NFPA 72, NFPA 13, & ASME A17.1*

# *Firefighters' Emergency Operation*

- Required in some form from 1976.
- Now required on all elevators with a travel of more than 6'8".
- Phase I recall operation.
- Phase II in-car operation.
- Fire alarm initiating device's installed at each landing, machine rooms, and hoistways

# *Phase I Emergency Recall Operation*

- A three-position key-operated switch provided only at the designated level for each single elevator or for each group of elevators.
  - Additional two position switch is permitted only at the building fire control station.
- Labeled "FIRE RECALL" and its positions marked "RESET," "OFF," and "ON" (in that order), with the "OFF" position as the center position.

# *Phase I Emergency Recall Operation*

- Designated level: the main floor or other floor level that best serves the needs of emergency personnel for firefighting or rescue purposes identified by the building code or fire authority.

# *Phase I Emergency Recall Operation*

- Phase I Operation may be initiated by a fire alarm initiating device (FAID) in elevator lobbies, machine room or top of the hoistway when required, or by manual operation of the three-position key switch located at the designated level.

# *Phase I Recall*

- To initiate Phase I Recall;
  - The three-position key switch when turned to the “ON” position will place all the elevators that serve that lobby into Phase I and return them to the designated level.
  - The same operation should take place if a FAID in one of the aforementioned locations also activates.

## FIREFIGHTER'S OPERATION



PHASE  
I

TO RECALL ELEVATORS

INSERT FIRE KEY AND TURN TO 'ON'

## FIREFIGHTER'S OPERATION



PHASE  
II

TO OPERATE CAR

INSERT FIRE KEY AND TURN TO 'ON'

PRESS DESIRED FLOOR BUTTON

TO CANCEL FLOOR SELECTION

PRESS 'CALL CANCEL' BUTTON

TO CLOSE DOOR

PRESS AND HOLD 'DOOR CLOSE' BUTTON

TO OPEN DOOR

PRESS AND HOLD 'DOOR OPEN' BUTTON

TO HOLD CAR AT FLOOR

WITH DOORS OPEN, TURN KEY TO 'HOLD'

TO RETURN CAR TO RECALL FLOOR

WITH DOOR OPEN, TURN KEY TO 'OFF'

# *Phase I Recall*

- When Phase I is initiated;
  - All cars traveling away from the designated level will stop at or before the next available landing and reverse direction without opening their doors.
  - All cars standing at a floor will immediately close their doors and return to the recall floor.

# *Phase I Recall*

- When Phase I is initiated;
  - Door reopening devices smoke or flame sensitive also become inoperative. Door reopening devices not sensitive to smoke or flame (e.g., mechanically actuated devices) are permitted to remain operative.

# *Phase I Recall*

- When Phase I is initiated;
- An illuminated visual and audible signal system is activated to alert the passengers that the car is returning nonstop to the designated level.

## *Phase I Recall*

- When Phase I is initiated under the current code, the fire hat is required to flash intermittently when the *FAID* in the machine room or hoistway is activate.

## *Phase I Recall*

- To remove the car from Phase I, you must return the car to the designated landing, then with the doors open turn the designated level three-position switch to the "BYPASS" or "RESET" position.

## *Phase II In-Car Operation*

- A three-position ("OFF," "HOLD," and "ON," in that order) key-operated switch labeled "FIRE OPERATION" is provided in an operating panel in each car.
- The switch is rotated clockwise from "OFF" to "HOLD" to "ON."

## *Phase II In-Car Operation*

- Phase II operation becomes effective only when Phase I Emergency Recall Operation is in effect and the car has been returned to the recall level.

## *Phase II In-Car Operation*

- When the "FIRE OPERATION" (Phase II) switch is in the "ON" position the elevator is operable only by a person in the car.
  - It is recommended that a firefighter equipped with a portable radio be assigned a position as elevator operator.

## *Phase II In-Car Operation*

- The car should not respond to landing calls.
- Door open and close buttons are provided for power operated doors. The door open and close buttons should be labeled "OPEN" and "CLOSE."

## *Phase II In-Car Operation*

- The opening of power-operated doors is controlled by continuous-pressure on the door open button.
  - If the button is released prior to the doors reaching the normal open position, the doors should close automatically.

## *Phase II In-Car Operation*

- Open power-operated doors shall be closed only by continuous pressure on the door close button.
  - If the button is released prior to the doors reaching the fully closed position, doors should automatically reopen,

## *Phase II In-Car Operation*

- Every car should be provided with a button marked "CALL CANCEL," located in the same car operating panel as the Phase II key switch.
- When activated, all registered calls should be canceled and a traveling car should stop at or before the next available landing.

## *Phase II In-Car Operation*

- Floor selection buttons should be provided in the car to permit travel to all landings served by the car, and they should be operative at all times.
- Means to prevent the operation of the floor selection buttons or door-operating buttons should be rendered inoperative.

# *Phase II In-Car Operation*

- The sequence of operation cont.
  - Turn the designated level Phase I switch to “ON.”
  - Turn the Phase II in-car key switch to “ON.”
  - With power doors, press and hold the “DOOR CLOSE” button until the doors are fully closed.

## *Phase II In-Car Operation*

- The sequence of operation cont.
- Press the button for the floor desired (at least 2 floors below the fire floor). Make several intermediate stops before the fire floor and check the hoistway for the presence of smoke.

## *Phase II In-Car Operation*

- Sequence of operation cont.
- Check around the car door openings for heat prior to the operation of the "DOOR OPEN" button.

# *Phase II In-Car Operation*

- Sequence of operation cont.
  - Upon arrival at the desired floor, with power doors, press and hold the “DOOR OPEN” button until the doors are fully opened. If there is fire or smoke present, just release the button before the doors fully open and the doors should close automatically.

## *Phase II In-Car Operation*

- Sequence of operation cont.
- A change in the key position is recognized by the elevator system only when the elevator is stopped at a floor and the doors are fully opened.

# *Phase II In-Car Operation*

- Sequence of operation cont.
- When the car is at a landing, with the doors open, and the Phase II switch is in the "HOLD" position, the car should remain at the landing with the doors open. The door close buttons should be inoperative, and car calls should not be registered.

# *Phase II In-Car Operation*

- Sequence of operation cont.
  - When the car is at a landing other than the designated level, with the doors in the fully open position, and the Phase II switch is turned to the "OFF" position, the doors should close. Door open buttons should remain operative.
  - The car should return to the designated level.

# *Phase II In-Car Operation*

- Sequence of operation cont.
  - It is important to remember that once Phase I has initiated, the car can only be operated by placing it on Phase II and then it can only be operated by the firefighter in the car. It is recommended that a firefighter equipped with a portable radio be assigned a position as elevator car operator.

# ***Elevator Recall & NFPA 72***

# *NFPA 72*

- **Detector.** A device suitable for connection to a circuit that has a sensor that responds to a physical stimulus such as heat or smoke.

# *NFPA 72*

- Automatic Fire Detector. A device designed to detect the presence of a fire signature and to initiate action. For the purpose of this Code, automatic fire detectors are classified as follows: Automatic Fire Extinguishing or Suppression System Operation Detector, Fire–Gas Detector, **Heat Detector**, Other Fire Detectors, Radiant Energy–Sensing Fire Detector, **Smoke Detector**.

# *NFPA 72*

- **Air Sampling–Type Detector.** A detector that consists of a piping or tubing distribution network that runs from the detector to the area(s) to be protected. An aspiration fan in the detector housing draws air from the protected area back to the detector through air sampling ports, piping, or tubing. At the detector, the air is analyzed for fire products.

# *NFPA 72*

- 4.4.1.4.1 - A dedicated branch circuit shall supply primary power.
- 4.4.1.4.2.1 - The dedicated branch circuit(s) and connections shall be mechanically protected.

# *NFPA 72*

- 4.4.1.4.2.2 - Circuit disconnecting means shall have a **red** marking, shall be accessible only to authorized personnel, and shall be identified as "FIRE ALARM CIRCUIT."

# *NFPA 72*

- 4.4.1.4.2.3 - The location of the circuit disconnecting means shall be permanently identified at the fire alarm control unit.

# *NFPA 72*

- 4.4.5 - In areas that are not continuously occupied, automatic smoke detection shall be provided at the location of each fire alarm control unit(s) to provide notification of fire at that location.

# *NFPA 72*

- 4.5.1.2 - Before requesting final approval of the installation, the installing contractor shall furnish a written statement stating that the system has been installed in accordance with approved plans and tested in accordance with the manufacturer's specifications and the appropriate NFPA requirements.

# *NFPA 72*

- 5.6.2.1.1 - Heat-sensing fire detectors of the fixed-temperature or rate-compensated, spot-type shall be classified as to the temperature of operation and marked with a color code in accordance with Table 5.6.2.1.1.

# *NFPA 72*

- 5.6.3.1 - Unless otherwise modified by 5.6.3.1.1 or 5.6.3.1.2, spot-type heat-sensing fire detectors shall be located on the ceiling not less than 100 mm (4 in.) from the sidewall or on the sidewalls between 100 mm and 300 mm (4 in. and 12 in.) from the ceiling.

# *NFPA 72*

- 5.7.1.8 - Unless specifically designed and listed for the expected conditions, smoke detectors shall not be installed if any of the following ambient conditions exist:
  - (1) Temperature below 0°C (32°F)
  - (2) Temperature above 38°C (100°F)
  - (3) Relative humidity above 93 percent
  - (4) Air velocity greater than 1.5 m/sec (300 ft/min)

# *NFPA 72*

- 5.7.1.11 - Detectors shall not be installed until after the construction cleanup of all trades is complete and final.

# *NFPA 72*

- 5.7.3.2.1 - Spot-type smoke detectors shall be located on the ceiling not less than 100 mm (4 in.) from a sidewall to the near edge or, if on a sidewall, between 100 mm and 300 mm (4 in. and 12 in.) down from the ceiling to the top of the detector.

# *NFPA 72*

- 6.8.1.1 - Actuation Time. Actuation of alarm notification appliances or emergency voice communications, fire safety functions, and annunciation at the protected premises shall occur within 10 seconds after the activation of an initiating device.

# *NFPA 72*

- 6.15.2.2 - A listed relay or other listed appliance connected to the fire alarm system used to initiate control of protected premises fire safety functions shall be located within 1 m (3 ft) of the controlled circuit or appliance.

# *NFPA 72*

- 6.15.2.4 - The installation wiring between the fire alarm control unit and the relay or other appliance shall be monitored for integrity.

# *NFPA 72*

- 6.15.2.8 - The operation of all fire safety functions shall be verified by an operational test at the time of system acceptance.

# *NFPA 72*

- 6.15.3.1 - System-type smoke detectors or other automatic fire detection as permitted by 6.15.3.7 located in elevator lobbies, elevator hoistways, and elevator machine rooms including machine space, control room, and control space used to initiate fire fighters' service recall shall be connected to the building fire alarm system.

# *NFPA 72*

- 6.15.3.3 - Unless otherwise required by the authority having jurisdiction, only the elevator lobby, elevator hoistway, and the elevator machine room smoke detectors or other automatic fire detection as permitted by 6.15.3.7 shall be used to recall elevators for fire fighters' service.

# *NFPA 72*

- 6.15.3.6 - Smoke detectors shall not be installed in unsprinklered elevator hoistways unless they are installed to activate the elevator hoistway smoke relief equipment.
  - *IBC 3004.3 Of the total required vent area, not less than one-third shall be of the permanently open type unless all vents activate upon detection of smoke from any of the **elevator lobby smoke detectors**.*

# *NFPA 72*

- 6.15.3.7 - If ambient conditions prohibit installation of automatic smoke detection, other automatic fire detection shall be permitted.

# *NFPA 72*

- 6.15.3.9 - Actuation from elevator hoistway and elevator machine room smoke detectors shall cause separate and distinct visible annunciation at the control unit and required annunciators to alert fire fighters and other emergency personnel that the elevators are no longer safe to use.

# *NFPA 72*

- 6.15.3.10 - For each group of elevators within a building, a minimum of three separate elevator control circuits shall be terminated at the designated elevator controller within the group's elevator machine room(s).

# *NFPA 72*

- (1) - The smoke detector located in the designated elevator recall lobby shall actuate the first elevator control circuit. In addition, if the elevator is equipped with front and rear doors, or if the elevator machine room is located at the designated level, the required smoke detectors shall actuate the first elevator control circuit. The smoke detectors in both lobbies at the designated level shall actuate the first elevator control circuit.

# *NFPA 72*

- (2) - The smoke detectors in the remaining elevator lobbies shall actuate the second elevator control circuit.
- (3) - The smoke detectors in elevator hoistways and the elevator machine room(s) shall actuate a third elevator control circuit.

# *Maintenance*

- A17.1 - 8.6.10.1 - All elevators provided with firefighters' emergency operation shall be subjected monthly to Phase I recall by use of the key switch, and a minimum of one-floor operation on Phase II. Deficiencies shall be corrected.

# *Maintenance*

- A17.1 - 8.6.10.1 - A record of findings shall be available to elevator personnel and the authority having jurisdiction.

# *Keys*

- An additional set of keys for Emergency Operation\* and an elevator machine room access keys\*\* for use by the fire department, police department, or other authorized personnel shall be kept in a metal box mounted in a conspicuous location.
  - \*effective 1976
  - \*\*effective 1998

# *Keys*

- The emergency key box should be located adjacent to the main elevator entrances at the designated floor or other approved location. The box shall have a lock - type cover, which can be opened by the fire department, police department, or other authorized personnel.

# *Keys*

- The key switches required Emergency Standby Power and Firefighters' Emergency Operation for all elevators in a building shall be operable by the same key. There shall be a key for each switch provided in the Emergency Key Box.

■ *Effective 1983*

# *Identification of Equipment*

- A17.1 2.29.1 - In buildings with more than one elevator, each elevator in the building shall be assigned a unique alphabetical or numerical identification, a minimum of 50 mm (2 in.) in height unless otherwise specified.

# *Identification of Equipment*

- The identification shall be painted on, engraved, or securely attached to;
  - (a) the driving machine;
  - (b) MG set;
  - (c) controller;
  - (d) selector;
  - (e) governor;
  - (f) main line disconnect switch;
  - (g) the crosshead, or where there is no crosshead, the car frame, such that it is visible from the top of the car;

# *Identification of Equipment*

- The identification shall be painted on, engraved, or securely attached to;
  - *(h)* the car operating panel, minimum of 13 mm (0.5 in.) in height; and
  - *(i)* adjacent to or on every elevator entrance at the designated level, minimum of 75 mm (3 in.) in height

# *Elevator Shutdown*

# *NFPA 72*

- A17.1 2.8.2.3.4 - “means shall be provided to automatically disconnect the main line power supply to the affected elevator upon or prior to the application of water from sprinklers located in the machine room or in the hoistway more than 600 mm (24 in.) above the pit floor.”

# *NFPA 72*

- 6.15.4.1 - Where heat detectors are used to shut down elevator power prior to sprinkler operation, the detector shall have both a lower temperature rating and a higher sensitivity as compared to the sprinkler.

# *NFPA 72*

- 6.15.4.2 - If heat detectors are used to shut down elevator power prior to sprinkler operation, they shall be placed within 610 mm (2 ft) of each sprinkler head and be installed in accordance with the requirements of Chapter 5.

# *NFPA 72*

- 6.15.4.4 - Control circuits to shut down elevator power shall be monitored for presence of operating voltage. Loss of voltage to the control circuit for the disconnecting means shall cause a supervisory signal to be indicated at the control unit and required remote annunciators.

# ***Sprinklers - NFPA 13***

# ***NFPA 13***

- 8.14.5.1 - Sidewall spray sprinklers shall be installed at the bottom of each elevator hoistway not more than 2 ft (0.61 m) above the floor of the pit.

# *NFPA 13*

- 8.14.5.2 - The sprinkler required at the bottom of the elevator hoistway by 8.14.5.1 shall not be required for enclosed, noncombustible elevator shafts that do not contain combustible hydraulic fluids.

# *NFPA 13*

- 8.14.5.3 - Automatic sprinklers in elevator machine rooms or at the tops of hoistways shall be of ordinary- or intermediate-temperature rating.

# *NFPA 13*

- 8.14.5.4 - Upright or pendent spray sprinklers shall be installed at the top of elevator hoistways.

# *NFPA 13*

- 8.14.5.5 - The sprinkler required at the top of the elevator hoistway by 8.14.5.4 shall not be required where the hoistway for passenger elevators is noncombustible and the car enclosure materials meet the requirements of ASME A17.1, Safety Code for Elevators and Escalators.

# ***NFPA 13***

- ASME A17.1, Safety Code for Elevators and Escalators, allows the sprinklers within 2 ft (0.65 m) of the bottom of the pit to be exempted from the special arrangements of inhibiting waterflow until elevator recall has occurred.

# *NFPA 13*

- A.8.14.5.3 ASME A17.1, Safety Code for Elevators and Escalators, requires the shutdown of power to the elevator upon or prior to the application of water in elevator machine rooms or hoistways. This shutdown can be accomplished by a detection system with sufficient sensitivity that operates prior to the activation of the sprinklers.

# *NFPA 13*

- As an alternative, the system can be arranged using devices or sprinklers capable of effecting power shutdown immediately upon sprinkler activation, such as a waterflow switch without a time delay. This alternative arrangement is intended to interrupt power before significant sprinkler discharge.

*Emergency or Standby  
Power System*

# ***A17.1***

- 2.27.2.3 - An illuminated signal marked "ELEVATOR EMERGENCY POWER" shall be provided in the elevator lobby at the designated level to indicate that the normal power supply has failed and the emergency or standby power is in effect.

# ***A17.1***

- 2.27.2.4 - Where the emergency or standby power system is not capable of operating all elevators simultaneously, requirements of 2.27.2.4.1 through 2.27.2.4.5 shall be conformed to.

# ***A17.1***

- 2.27.2.4.1 - A selector switch(es) marked "ELEVATOR EMERGENCY POWER" in red lettering a minimum of 5 mm (0.25 in.) in height, which is key-operated or under a locked cover (see 2.27.8), shall be provided to permit the selection of the elevator(s) to operate on the emergency or standby power system.

## ***A17.1***

- 2.27.2.4.2 - The selector switch(es) positions shall be marked to correspond with the elevator identification number (see 2.29) and a position marked "AUTO."

## ***A17.1***

- 2.27.2.4.3 - The selector switch(es) shall be located at the designated level in view of all elevator entrances, or if located elsewhere means shall be provided adjacent to the selector switch(es) to indicate that the elevator is at the designated level with the doors in the normally open position.

# *Building Codes*

# *IBC*

- 3002.3 - An approved pictorial sign of a standardized design shall be posted adjacent to each elevator call station on all floors instructing occupants to use the exit stairways and not to use the elevators in case of fire.

## *Comm 62*

- 62.3001(4) - At least one existing elevator shall be provided with firefighters' emergency operation complying with Comm 18 when an existing building or structure that is greater than 60 feet in height is changed to include a Group R-1 or R-2 occupancy.

# *IBC*

- 3002.3 - The sign shall read: IN FIRE EMERGENCY, DO NOT USE ELEVATOR. USE EXIT STAIRS. The emergency sign shall not be required for elevators that are part of an accessible means of egress complying with Section 1003.2.13.3.

## *Comm 62*

- 62.3002 - In buildings four stories in height or more, and, regardless of the number of stories, in all outpatient clinics specified in IBC section 304.1 and in all nursing homes and hospitals as specified in IBC section 308.3. at least one elevator shall be provided for fire department emergency access to all floors.

## *Comm 62*

- 62.3002 – The elevator car shall be of such a size and arrangement to accommodate a 24–inch by 76–inch ambulance stretcher in the horizontal, open position.

## *Comm 62*

- 62.3002 – The elevator shall be identified by the international symbol for emergency medical services, which is the star of life. The symbol shall not be less than 3 inches high and shall be placed inside on both sides of the hoistway doorframe.

# *IBC*

- 3004.1 - Hoistways of elevators and dumbwaiters penetrating more than three stories shall be provided with a means for venting smoke and hot gases to the outer air in case of fire.

# *IBC*

- 3004.1 - Of the total required vent area, not less than one-third shall be of the permanently open type unless all vents activate upon detection of smoke from any of the elevator lobby smoke detectors.

**Thank You**