Occupant Evacuation Elevators
An Outline
for
STL SFPE
September 21, 2020

Code Consultants, Inc.
Experts  Responsive  Solutions
Overview

Primary Reason for Occupant Evacuation Elevators

- 3rd stair required in buildings over 420 feet
- 3rd stair eliminated if Occupant Evacuation Elevators used
- Egress calculated using only two stairs

Codes Involved

- International Building Code
- ASME A17.1 Safety Code for Elevators and Escalators
- NFPA 72 – Fire Alarm and Signaling Code
Choosing the Elevators Options

- 2015 IBC
  - All passenger elevators for “general” public use*

- 2018 IBC
  - Number of cars for total evacuation in 1 hour (or)
  - Number of cars for evacuating highest 5 floors in 15 minutes
Signage

IN CASE OF FIRE
DO NOT USE ELEVATORS

IN CASE OF FIRE
USE ELEVATOR
OR STAIRS
Elevator Priority

➢ 1\textsuperscript{st} - Seismic Events
➢ 2\textsuperscript{nd} - Elevator Recall
➢ 3\textsuperscript{rd} - Occupant Evacuation Operation (OEO)
Operational Overview

Initial Evacuation Zone (Block)
- Floor of Alarm
- Two Floors Above
- Two Floors Below

Subsequent Alarms
- Adds to Evacuation zone (contiguous)
- Adds two floors to zone on opposite side of alarm

Manual Evacuation Buttons in the FCC
- Same as Subsequent Alarms (or)
- Floor by Floor
<table>
<thead>
<tr>
<th>Scenario #4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoke Alarm Elevator Lobby Level 18 Mid-High Bank Lobby - Evacuate Floor</td>
</tr>
<tr>
<td>Special Message directing to Low Bank</td>
</tr>
<tr>
<td>Evacuation Message for L20, L19, L17, L16</td>
</tr>
<tr>
<td>High and Mid Banks Execute Recall</td>
</tr>
<tr>
<td>Lower Bank Executes OEO</td>
</tr>
<tr>
<td>Elevator Not Available Message to other floor's lobby in OEO</td>
</tr>
<tr>
<td>Elevator Not Available Message to other floor's lobby in High and Mid</td>
</tr>
<tr>
<td>Bank in Recall ?</td>
</tr>
<tr>
<td>Shared Lobby Between High Bank and Mid Bank</td>
</tr>
<tr>
<td>Evacuation Block</td>
</tr>
</tbody>
</table>

| 18—Do not Use Elevator*                                                   |
| 19—Do not Use Elevator                                                    |
| 18—Use Elevator                                                          |
| 17—Use Elevator                                                          |
| 16—Use Elevator                                                          |
| 15—Elevator Not Available                                                 |
| 14—Elevator Not Available                                                 |

34—Elevator Not Available
33—Elevator Not Available
32—Elevator Not Available
31—Elevator Not Available
30—Elevator Not Available
29—Elevator Not Available
28—Elevator Not Available
27—Elevator Not Available
26—Elevator Not Available
25—Elevator Not Available
24—Elevator Not Available
23—Elevator Not Available
22—Elevator Not Available
21—Elevator Not Available
20—Do Not Use Elevator
19—Do not Use Elevator

LOW BANK

18—Do not Use Elevator*
Operational Overview

Lobby Smoke Detection
- Elevator Recall
- Evacuation zone – Use stairs only (throughout floor)
- Non-Evacuation Floors – Elevator not available (throughout floor)*

Other Detection Devices on Floor
- Activation of Occupant Evacuation Operation (OEO)
- Evacuation zone – Use stairs or elevators (throughout floor)
- Non-Evacuation Floors – Elevator not available (throughout floor)*
Operational Overview
Fire Command Center

➢ Graphic Panel in Fire Command Center
➢ Manual buttons to increase Evacuation zone
➢ Lights to indicate
  ➢ Floors in alarm
  ➢ Floors automatically in Evacuation zone
  ➢ Floors manually in Evacuation zone
  ➢ Lobby temperature range
  ➢ Lobby smoke detector status
➢ Recall and OEO status
➢ Building-wide evacuation switch
MANUAL OCCUPANT EVACUATION OPERATING INSTRUCTIONS

1. To enable manual operation of Occupant Evacuation Elevators, turn the "MANUAL OPERATION" key switch to the "ENABLED" position.
2. Once enabled, select the individual floors to be manually commanded by pressing the "MANUAL CALL" switch for the respective floor(s).
3. To evacuate the entire building, rotate the "TOTAL BUILDING EVACUATION" switch to the "ON" position.
4. Confirmation of switch activation is provided by the respective switch status LED.
5. Switches may be restored without resetting the system or adversely affecting the automatic alarm evacuation system.

555 108th Avenue NE - Bellevue, Washington
<table>
<thead>
<tr>
<th>FLOOR</th>
<th>MANUAL EVAC</th>
<th>AUTO ALARM FLOOR</th>
<th>AUTO EVAC FLOOR</th>
<th>OEO STATUS</th>
<th>GO</th>
<th>INOP</th>
<th>OEO LOW - RISE LOBBY SAFETY STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
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</tbody>
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LOW-RISE OEE BANK

- OEO MODE ACTIVE
- OEO MODE FAULT
- EMERGENCY RECALL ACTIVE
- OUT OF SERVICE
- SEISMIC SAFETY ACTIVATION
- VENTILATION POWER FAULT

G1
Interface Between Elevators and Fire Alarm

Fire Alarm to Elevators

➢ Group Recall (Automatic)
➢ OEO Alarm Floor
➢ OEO Evacuation Floor

Elevators to Fire Alarm

➢ Seismic Event
➢ Group Recall (Manual Method)
➢ OEO Confirmations
➢ Out of Service
Elevators and Fire Alarm Messages

Fire Alarm
- Audible Messages on Floors
- Strobe Lights on Floors (Alert?)
- Audible Message In Lobbies*
- Voice Paging to Cars

Elevators
- Visual Messages in Lobby
- Automatic Audible and Visual Messages in Cars
- ADA Messaging at Call Stations
Relative Code Issues

- Lobbies have direct access to exit stairway
- Lobby Size must accommodate 25% of floor occupant load plus wheelchair spaces
- Two-Way Communication Systems
- Manual Elevator Recall on a car by car basis in addition to groups
- Lobby Status Indicators
OCCUPANT EVACUATION MODE
DO NOT ENTER ELEVATOR
Relative Code Issues

- Sprinklers not allowed in hoistways or machine rooms
- Shunt trip not allowed
- Water Protection for Shafts (Same as FSAEs)
- 2-hour hoistway with level 2 soft body impact classification
- Lobby hour 1-hour smoke enclosure
- 45-minutes doors with smoke and draft control
- Vision panels in doors
- Automatic Door Closing*
Features

➢ Elevators on Emergency Generators
➢ Group Recall on Elevator Panel
➢ Level 2 survivability on critical wiring
➢ Elevator Monitoring
  ➢ Floor location of cars
  ➢ Direction of travel
  ➢ Power Status
  ➢ Recall Status of each car