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## LAS VEGAS FIRE & RESCUE

### FIRE PROTECTION ENGINEERING DIVISION

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## Elevator Recall configurations

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### General:

There are many different configurations that we may be exposed to in the field. This document is intended to cover only the basics of the most commonly observed configurations of elevator recall. The items within this document were sent to the State Elevator Inspection Supervisor for input and clarification.

\*It is always advised to refer to the appropriate code/standard as this is just a brief and does not contain all text within the prescriptive code.

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### Elevator Recall Configurations

#### Overview:

Elevator recall and specifically the shunt function has long been somewhat confusing as it is a mix of a few different codes and standards.

Primarily the codes are:

- ASME A17.1b Elevator code
- NFPA 72 Fire alarm Code
- NFPA 13 Fire Sprinkler code

All three documents have some information related to elevator recall, but not one is all encompassing covering all of the requirements. There are some varying building conditions that will require different recall, shunt conditions. This document is intended to cover the baseline for recall/shunt functionality.

#### General:

- Initially NFPA 72 which typically would be the best reference is coordinated with the ASME document as NFPA indicates that not recall is required unit the elevator travels more than 24 feet. The ASME standard took the distance requirement away in 1992, and requires that all elevators shall have recall.
- When a fire alarm system installed within the building, these functions can and should be integrated into said system in accordance with NFPA 72.

- If no required fire alarm system is installed within the building, the use of a Dedicated Function Fire Alarm (per NFPA 72) panel is installed to facilitate this function. Panel shall be marked as “ELEVATOR CONTROL ONLY), no alarm notification is required or shall be connected to the system, and no central station monitoring required.
- *(The use of Smoke detectors in outdoor conditions is not recommended as they are prone to false or nuisance alarms)*
- In high rise locations there will be additional required items however the general concepts are the same regarding the configurations to require recall or shunt.

### **Building Condition # 1**

In a multi-story building requiring recall in accordance with State of Nevada or NFPA 72 **not equipped** with fire sprinklers that incorporate outside open air lobbies/landings, utilizing hydraulic lift equipment located within a separate mechanical room. (Not in hoist way).

#### **Requirements:**

**Recall Type** – Phase I recall to pre-determined floor(s) other than floor of alarm activation.

#### **Initiating device locations:**

Heat detection initiating devices located on lobby/landings and a smoke/heat detector (if equipped) is located within the machine room housing the elevator equipment.

#### **Functions:**

If initiating device activates on 1<sup>st</sup> floor lobby/landing - Cars to 2<sup>nd</sup> or alternate level

If initiating device activates on 2<sup>nd</sup> or above floor lobby/landing - Cars to 1<sup>st</sup> or primary level

If initiating device activates in Machine room - Cars to nearest or primary level.

### **Building Condition # 2**

In a multi-story building requiring recall in accordance with State of Nevada or NFPA 72 **equipped with** fire sprinklers throughout the building including the hoist way and elevator machine room that incorporate outside lobbies/landings, utilizing hydraulic lift equipment located in a separate mechanical room. (Not in hoist way)

**Recall type-** Phase I recall to pre-determined floor(s) other than floor of alarm activation and shunt.

#### **Initiating Device Locations:**

Heat detector Initiating devices located on lobbies/landings, hoist way and a smoke/heat detector located within the machine room housing the elevator equipment.

#### **Functions:**

Initiating device activates on 1<sup>st</sup> floor lobby/landing - Cars to 2<sup>nd</sup> or alternate level

Initiating device activates on 2<sup>nd</sup> floor lobby/landing - Cars to 1<sup>st</sup> or primary level

Initiating device activates within hoist way or machine room – Cars to nearest level and shunt elevator equipment prior to sprinkler activation.

*\*(Heat detector devices shall be within 24" of each sprinkler head in Hoist way per NFPA 72 Section 21.4)*

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### **Building Condition # 3**

In a multi-story building requiring recall in accordance with State of Nevada or NFPA 72, **equipped with** fire sprinklers **not in the hoist way or machine room**, no fire alarm system installed, incorporate outside lobbies/landings, utilizing hydraulic lift equipment located in a separate mechanical room. (Not in hoist way)

**Recall Type- Phase I.** Recall to pre-determined alternate floor of alarm activation.

#### **Initiating Device Locations:**

Heat detector initiating devices located on lobby/landings, smoke/heat detector located within the machine room housing the elevator equipment.

If initiating device activates on 1<sup>st</sup> floor lobby/landing - Cars to 2<sup>nd</sup> or alternate level

If initiating device activates on 2<sup>nd</sup> or above floor lobby/landing - Cars to 1<sup>st</sup> or primary level

If initiating device activates in Machine room - Cars to nearest or primary level.

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#### **Definitions:**

**Phase I Recall:** Operation is activated by either a special key or automatic smoke or heat detection devices to remove the elevators from service so that building occupants do not use the elevators during a fire and become trapped. Typically signals from the first floor would send the cars to an alternate and alarms on the 2<sup>nd</sup> or other floors will send the cars to the ground floor

**Phase II Recall** is an override designed for firefighters after phase I has been activated. Under Phase II, firefighters can use a special key switch to operate the elevator, provided that the hoist way is clear of fire and the elevator has electricity.

**Elevator Shunt:** Is a control function that utilizes automatic smoke/heat detection designed to operate at a lower temperature than the installed fire sprinkler head(s) within the hoist way or machine room. The shunt condition will move the cars to the nearest floor or designated recall floor, open the doors and power down the equipment prior to the sprinkler activation.

#### **Note:**

The intent with the smoke or heat within the hoist way/machine room is when the space protected by fire sprinklers is that it is inevitable that if the sprinkler head were to discharge into the elevator hoist way or machine room during operation, it is likely that the elevator would operate unpredictably due to water on the control devices or electronics that control the elevators.

#### **Shunt Trip Delay Sequence:**

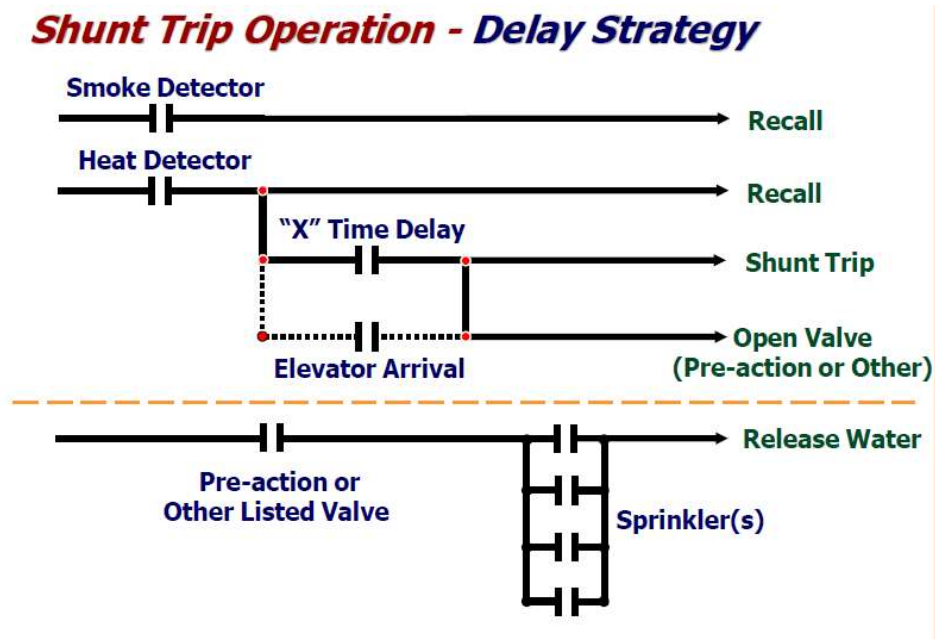
1. Upon device activation, the elevator shunt trip delay circuit<sup>1</sup> is activated and will allow the cars to move to the nearest floor or pre-determined primary recall floor level, open the doors and remove the elevators from operation not allowing any further use until the issue has been

resolved and the shunt trip has been reset by an authorized person. All occurring prior to the fire sprinkler activating.

2. General items related to Shunt configuration
  - a. If heat detectors are used to initiate shunt the heat detectors shall be of a lower temperature rating and higher sensitivity compared to the fire sprinkler. If used the placement shall be within 2 ft of each sprinkler head.
  - b. Pressure or waterflow switches with time delay are not permitted.

*\* A shunt action does not or is not designed to impact the elevator car lighting or required communications within the car.*

<sup>1</sup> General schematic of Shunt trip delay methodology



NFPA 72 A.21.4.2 is also a great resource on how the recall delay is intended to operate.

**A.21.4.2** Upon activation of the heat detector used for elevator power shutdown, there can be a delay in the activation of the power shunt. When such a delay is used, it is recommended that the delay should be approximately the time that it takes the elevator car(s) to travel from the top of the Hoistway to the lowest recall level. The purpose of the delay of the shunt trip is to increase the potential for the elevators to complete their travel to the recall level. It is important to be aware that the requirements of A17.1/B44, *safety Code for Elevators and Escalators*, relative to sprinkler water release and power shutdown would still apply.

| Scenario(1)  | AS Pit(2) | AS Top of Hoistway | AS EMR | AS Control Panel Space | Shunt Pit (3) | Shunt Top of Hoistway (3) | Shunt EMR (3) | Shunt Control Panel Space(3) | Recall Pit (4) | Recall Top of hoistway (5) | Recall EMR (5) | Recall Control Panel Space(5) |
|--|-----------|--------------------|--------|------------------------|---------------|---------------------------|---------------|------------------------------|----------------|----------------------------|----------------|-------------------------------|
| Passenger, Traction w/EMR  | N         | N                  | N      | NA                     | N             | N                         | N             | NA                           | N              | N                          | Y              | NA                            |
| Passenger, traction with internal motor, separate control panel space              | N         | N                  | NA     | N                      | N             | N                         | NA            | N                            | N              | Y                          | NA             | Y                             |
| Passenger, traction, internal motor and control panel                              | N         | N                  | NA     | NA                     | N             | N                         | NA            | NA                           | N              | Y                          | NA             | NA                            |
|  |           |                    |        |                        |               |                           |               |                              |                |                            |                |                               |
| Passenger, Hydraulic w/EMR   | Y         | N                  | Y      | NA                     | N             | N                         | Y             | NA                           | Y              | N                          | Y              | NA                            |
| Passenger, Hydraulic, hydraulic tank inside hoistway, separate control panel space | Y         | N                  | NA     | N                      | N             | N                         | NA            | N                            | Y              | N                          | NA             | Y                             |
| Passenger, Hydraulic, tank and control panel inside hoistway                       | Y         | N                  | NA     | NA                     | Y             | N                         | NA            | NA                           | Y              | Y                          | NA             | NA                            |
|  |           |                    |        |                        |               |                           |               |                              |                |                            |                |                               |
| LULA, Traction   | N         | N                  | N      | N                      | N             | N                         | N             | N                            | N              | N                          | N              | N                             |
| LULA, Hydraulic  | Y         | N                  | Y      | N                      | N             | N                         | Y             | N                            | N              | N                          | N              | N                             |
|  |           |                    |        |                        |               |                           |               |                              |                |                            |                |                               |
| Freight, traction, w/EMR   | N         | Y                  | N      | NA                     | N             | Y                         | N             | NA                           | N              | Y                          | Y              | NA                            |
| Freight, traction, machine inside with control space                               | N         | Y                  | NA     | N                      | N             | Y                         | NA            | N                            | N              | Y                          | NA             | Y                             |
| Freight, hydraulic, w/EMR  | Y         | Y                  | Y      | NA                     | N             | Y                         | Y             | NA                           | Y              | Y                          | Y              | NA                            |
| Freight, hydraulic, hydraulic tank inside hoistway, separate control panel space   | Y         | Y                  | NA     | Y                      | N             | Y                         | NA            | Y                            | Y              | Y                          | NA             | Y                             |
| Freight, Hydraulic, tank and control panel inside hoistway                         | Y         | Y                  | NA     | Y                      | Y             | Y                         | NA            | Y                            | Y              | Y                          | NA             | Y                             |