Elevators & Firefighters' Operation

CHELAN, WA

OCTOBER 23, 2018

About me…

47 years in the elevator industry

Teaching for many years:

NEIEP (industry education program)

Code (since 1994)

Educational Director for NAESA for 6-years

Former Chief Elevator Inspector (Oregon)

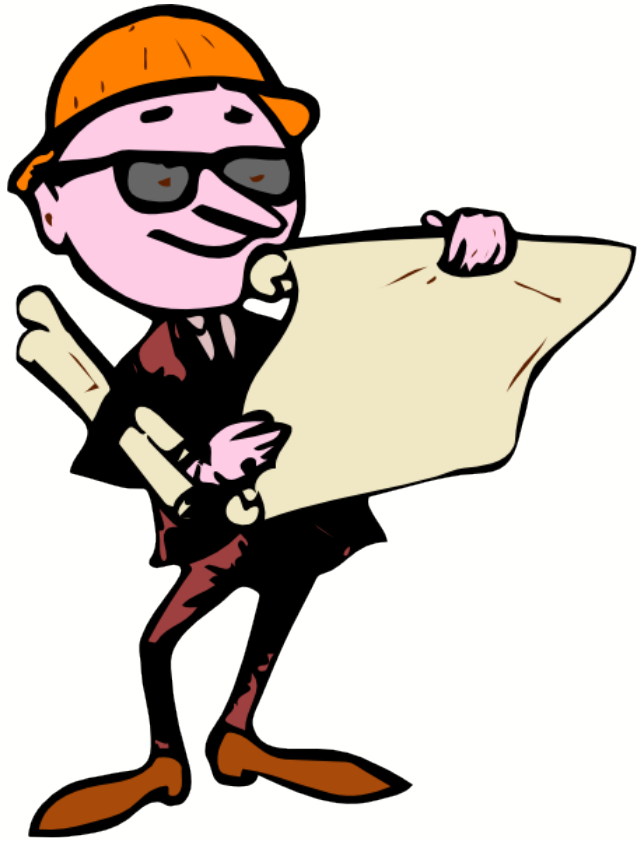
Currently: State of Washington, Labor & Industries, Technical Training Specialist

Overview

- Some of what L&I does!
- A brief history!
- What is FEO?
- Who picks the designated and alternate recall floors?
- What about the “keys” to operate fire service operation!
- NFPA 13 (Sprinklers) & 72 (FAIDS & Shunt-trip)
- Hoistway Ratings

ASME

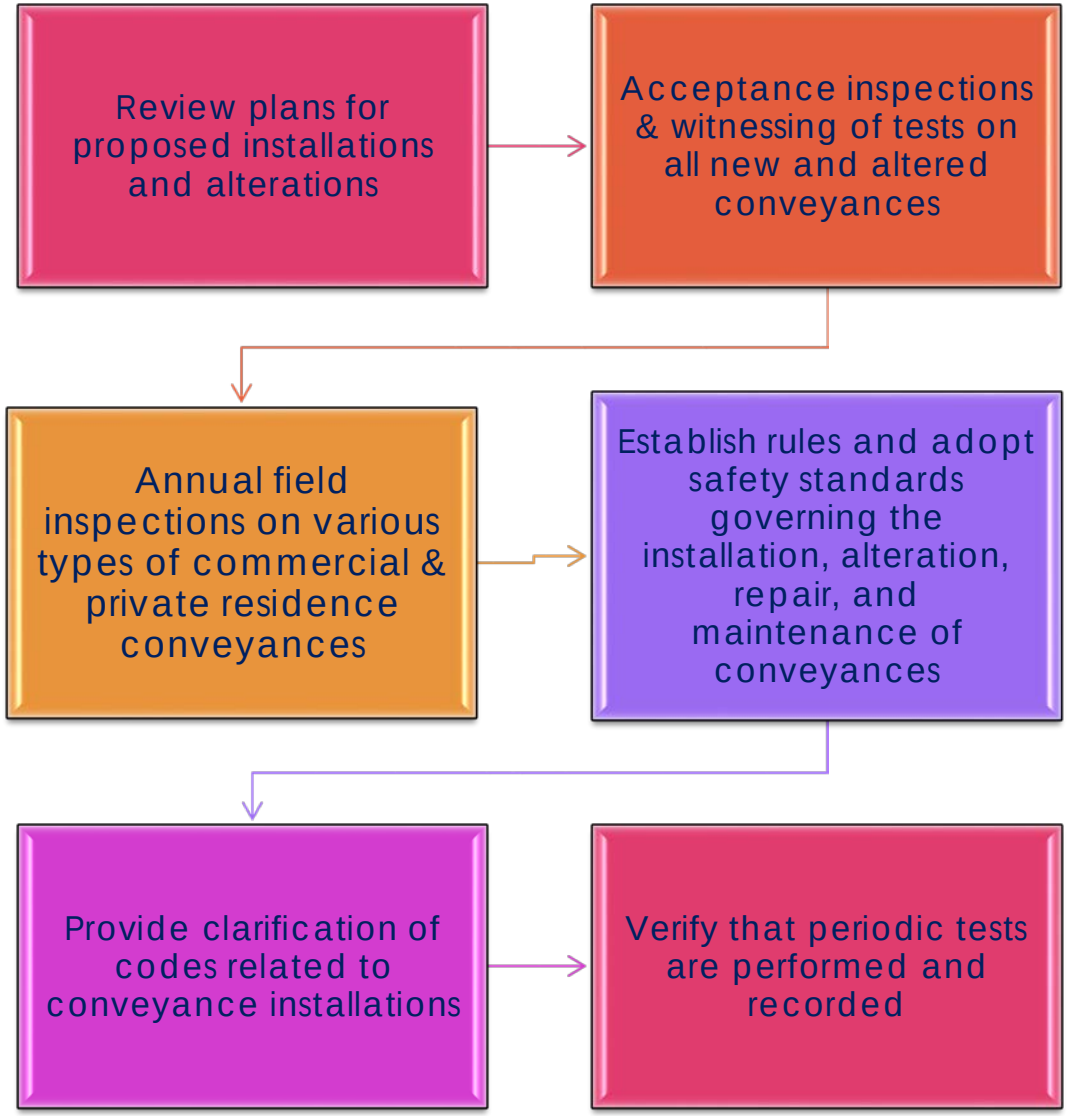
SETTING THE STANDARD



What does L&I do?

A MULTITUDE OF TASKS

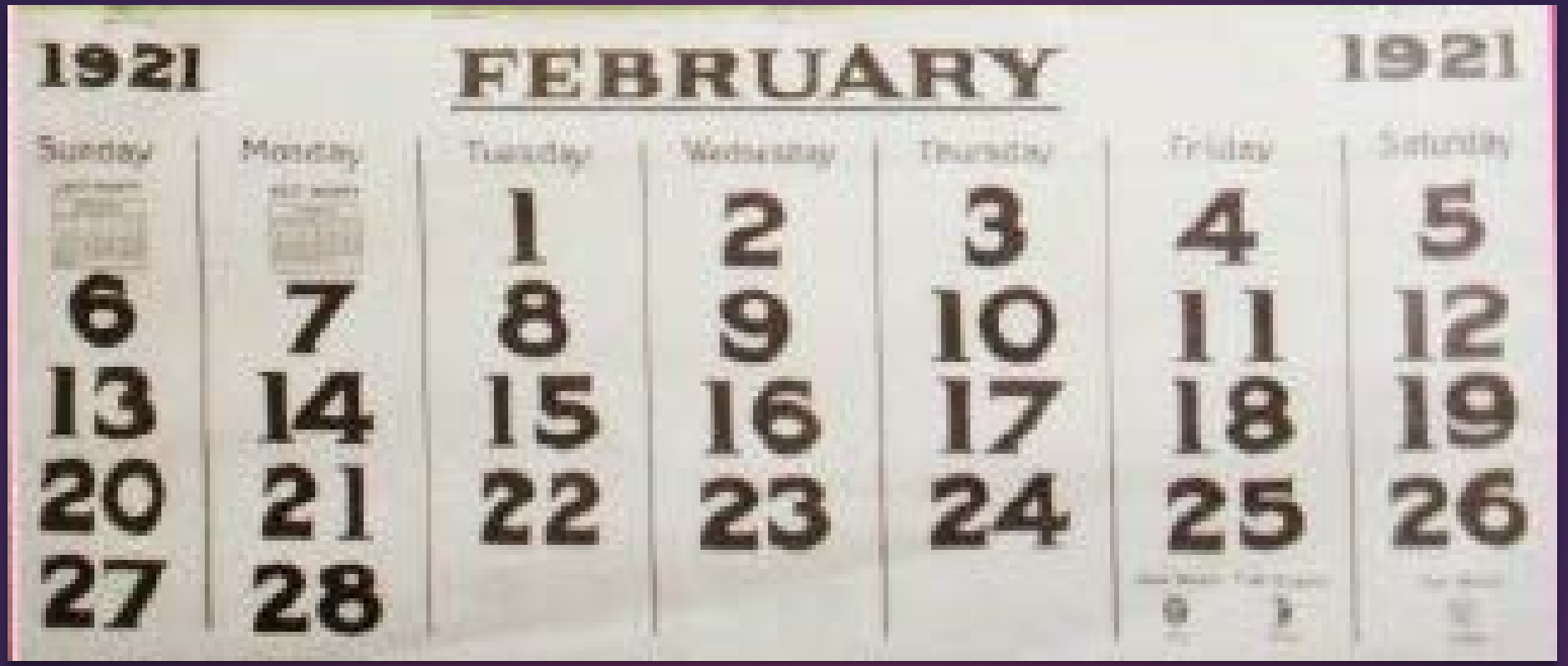
Some of the highlights...



And…

PROVIDE ELEVATOR CODE EDUCATION FOR INDUSTRY, BUILDING OWNERS, & RELATED DISCIPLINES!

History of FEO



The ASME Elevator Code A17.1

BEEN AROUND SINCE ABOUT JANUARY 1921!

ASME A17.1, 1973b – 1978 Editions

FEO is born!

A meager beginning…

About 16 requirements.

Editions & Addenda Updates

Total : 140+ changes over 45 years

- 1973b (debut)
- 1976g (1)
- 1978 (0)
- 1981 (14)
- 1983b (2)
- 1984 (7)
- 1985a (4)
- 1987 (2)
- 1989b (22)
- 1990 (1)
- 1992b (3)
- 1993 (0)
- 1994a (4)
- 1995b (4)
- 1996 (0)
- 1997a (5)
- 2000 (18)
- 2004 (2)
- 2005a (5)
- 2005s (1)
- 2007 (13)
- 2008a (6)
- 2009b (5)
- 2010 (1)
- 2013 (12)
- 2016 (9)

The 7 Versions of FEO

There are about 7 basic versions of FEO since 1973 thru the 1999b addenda

Nothing to tell firefighters which version is provided on the equipment

Thus, it gets confusing at time

FEO Exemption

Firefighters' Emergency Operation shall apply to all automatic elevators except where the hoistway or a portion thereof is not required to be fire-resistive construction (see 2.1.1.1), the rise does not exceed 2 000 mm (80 in.), and the hoistway does not penetrate a floor.

NOTE (2.27.3): When the structure (building, etc.) is located in a flood hazard area, the alternate and designated levels (see 8.12.1) should be above the base flood elevation.

What codes apply?

IT TAKES SEVERAL CODES TO INSTALL AN ELEVATOR

Applicable Standards

IBC

NFPA 70

NFPA 13

NFPA 72

ASME A17.1/CSA B44

ASME A17.6

To name a few…

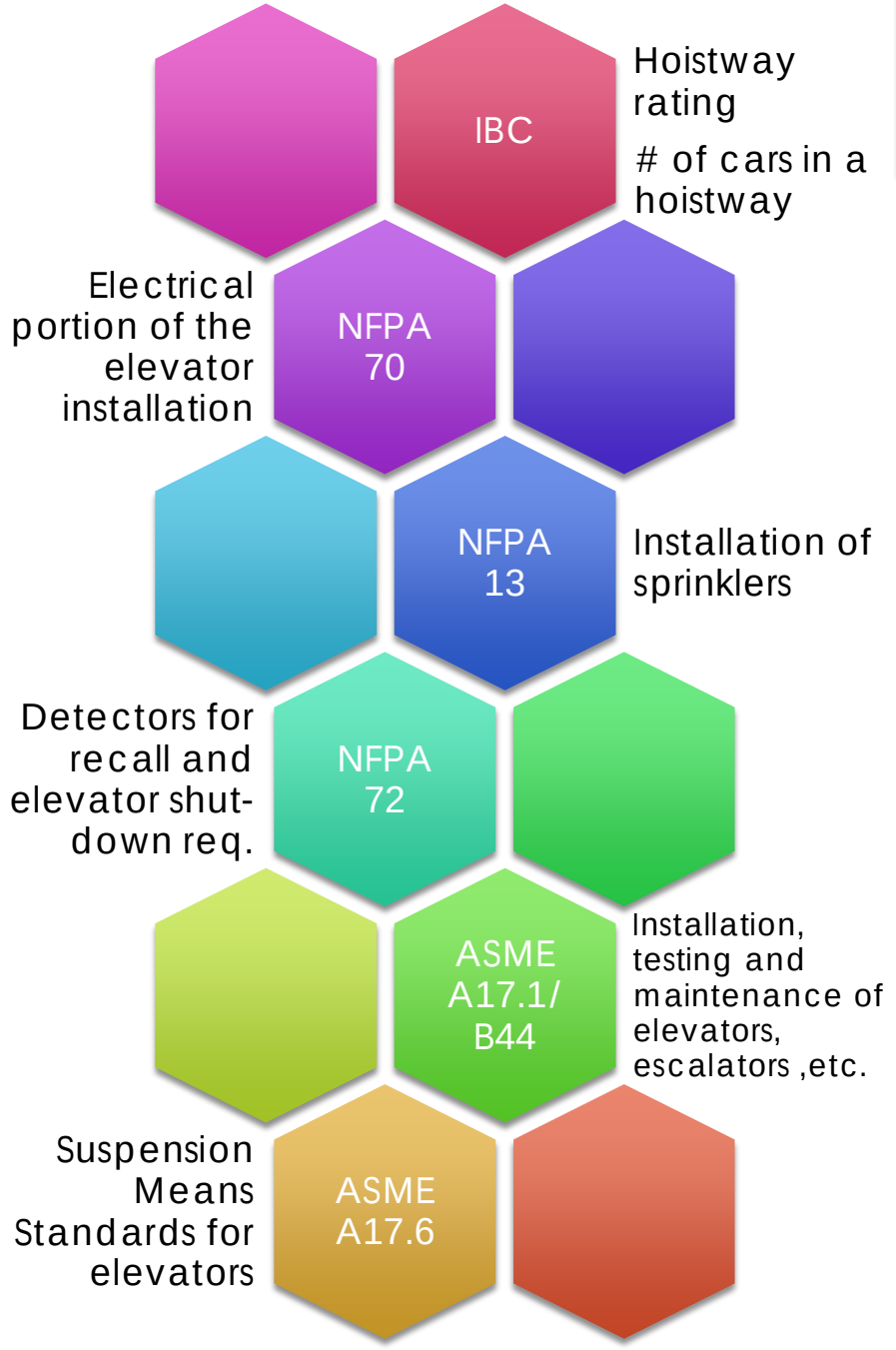
Applicable Standards

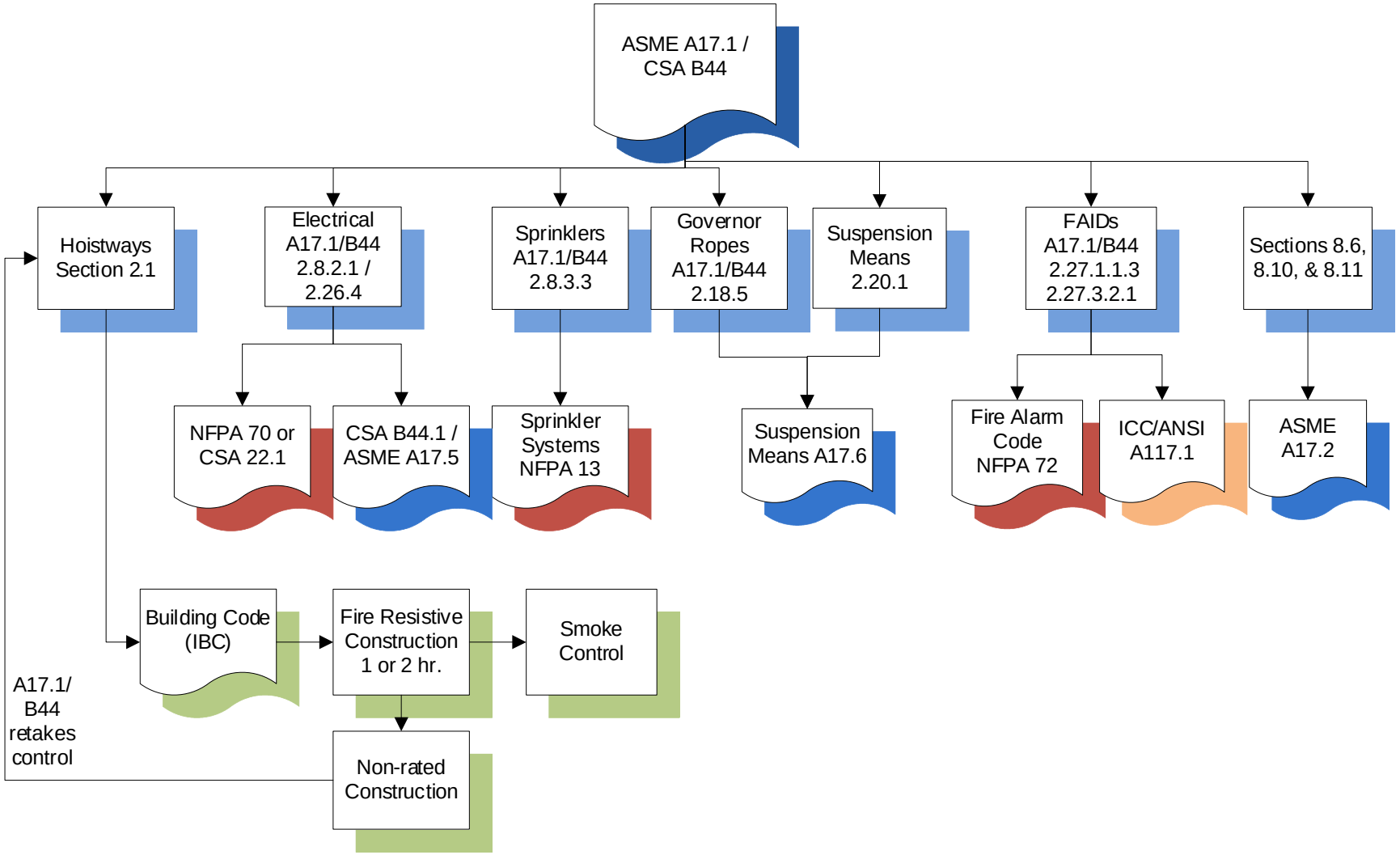
NFPA 13

NFPA 72

ASME A17.1/CSA B44

What do these codes cover?





Recognizing FEO

2000 & later editions

Optional 2-position switch in FCC

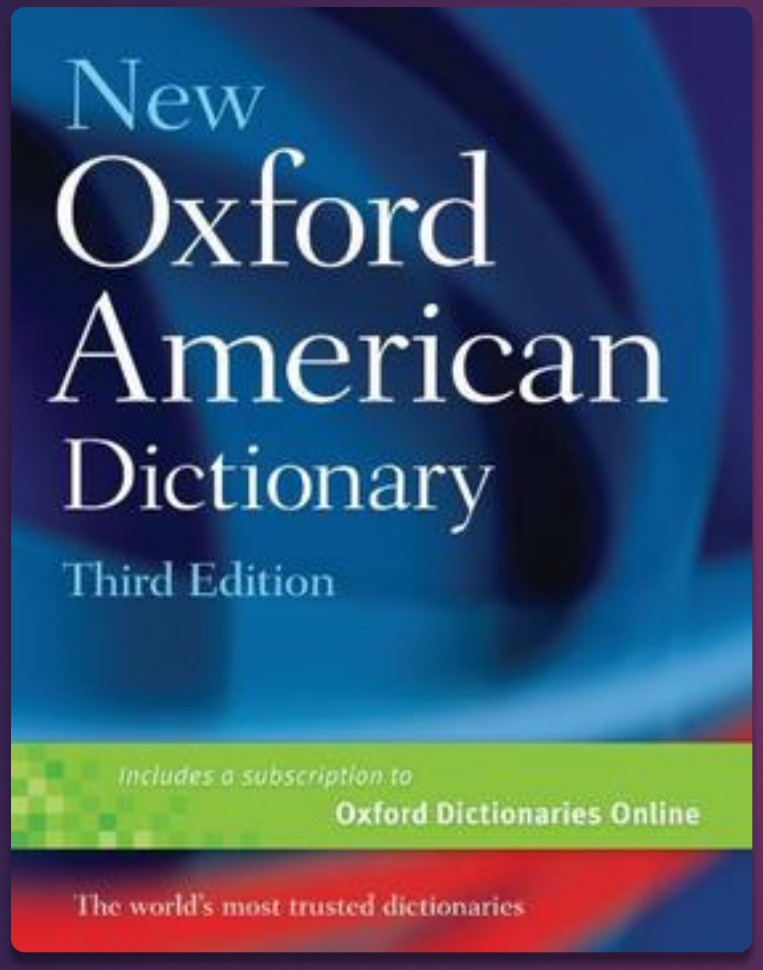
"Bypass" "Off" "On"
Pre-2000 edition

What is FEO?

FIREFIGHTERS' EMERGENCY OPERATION

PHASE I – ELEVATOR RECALL OPERATION

PHASE II – FIREFIGHTERS' IN-CAR OPERATION



Definitons

THE HEART OF ANY CODE!

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.

Alternate level

A FLOOR LEVEL IDENTIFIED BY THE BUILDING CODE OR FIRE AUTHORITY, OTHER THAN THE DESIGNATED LEVEL.

Recall level

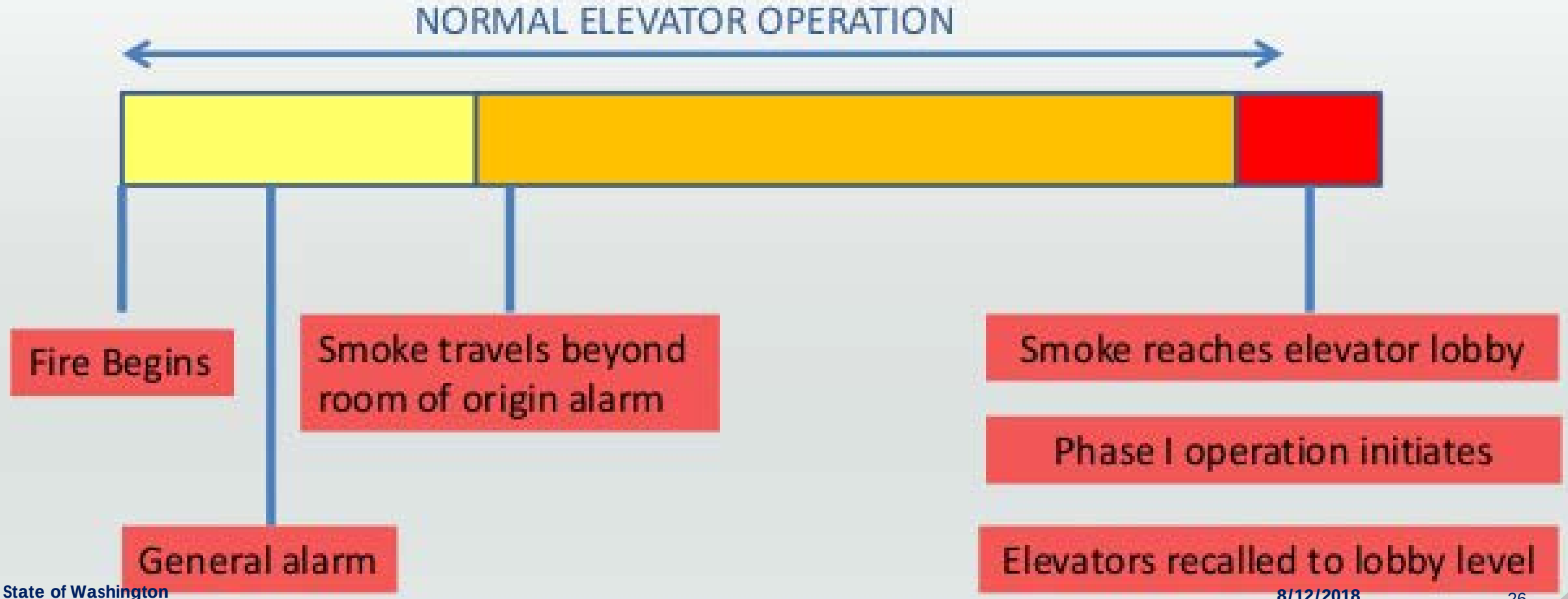
- the designated or alternate level that cars are returned to when Phase I Emergency Recall Operation is activated.

FEO?

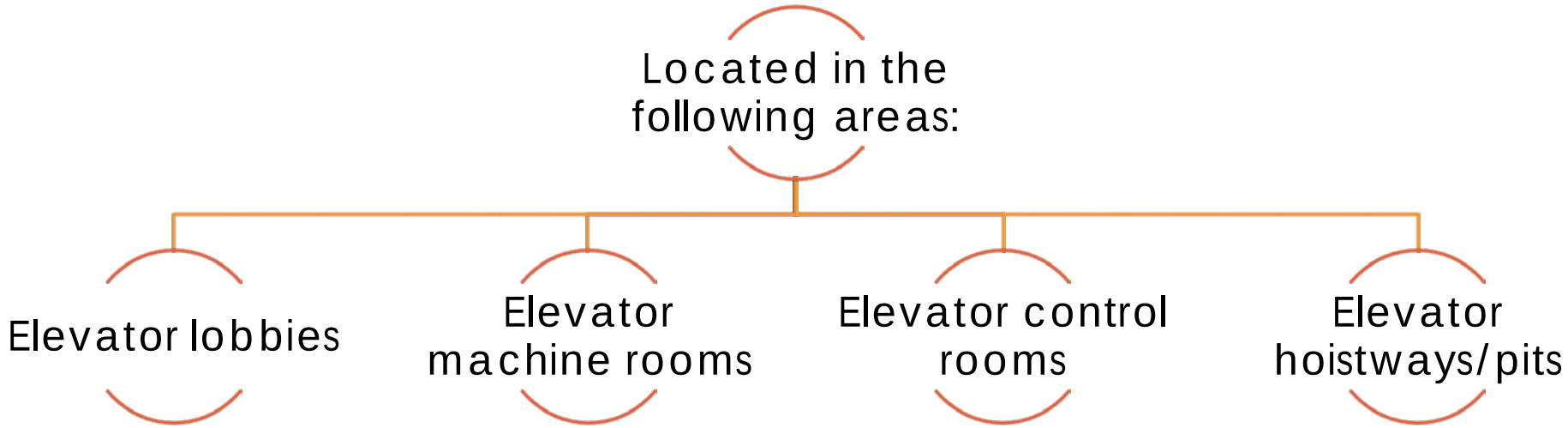
- Basically there are two parts:
  - 1. Firefighters' Emergency Recall (Phase I)
  - 2. Firefighters' In-Car Operation (Phase II)

3-Detector locations and recall requirements

PHASE I- EMERGENCY RECALL OPERATION



Elevator code & NFPA 72 requires detectors to be…



Phase I Emergency Recall Operation

Elevator(s) responds to the first detector activated; *or*

The 3-position Phase I keyed switch located at the "designated level"

Elevator recalls to the designated level; unless

The designated level detector is activated;

Then the car moves to the alternate level

Car can be pulled to the designated level via the 3-position keyed switch

Recall operation via detector...

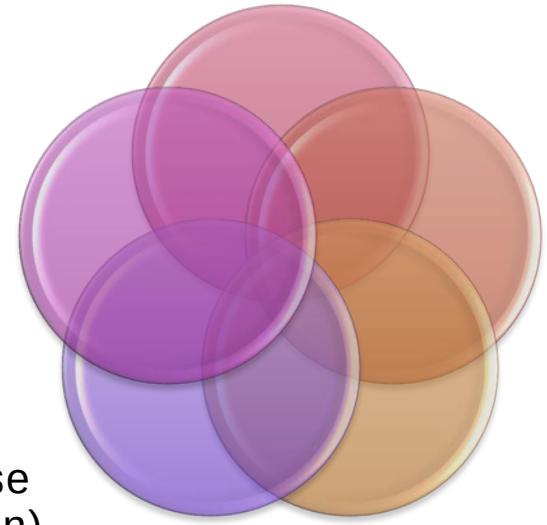
1. Elevator reacts to the first detector activated only!

2. Audible signal sounds

3. Fire hat in car and hall illuminates

4. Doors close slowly (if open)

5. Elevator proceeds to designated or alternate level



Recall operation via the keyed switch…

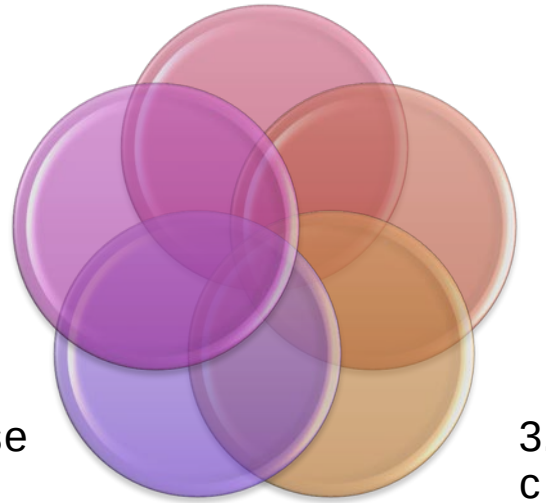
1. Elevator reacts to the first detector activated only!

2. Audible signal sounds

3. Fire hat in car and hall illuminates

4. Doors close slowly (if open)

5. Elevator proceeds to designated level



The 7 Versions of FEO?
So how do you know which is which?

There are 7 versions of FEO since 1973 thru the 1999b addenda

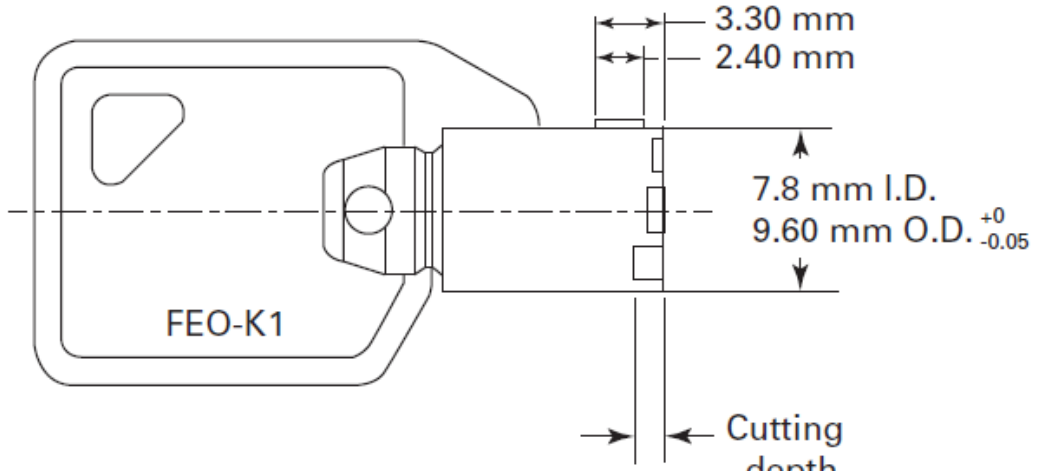
Nothing to tell firefighters which version is which

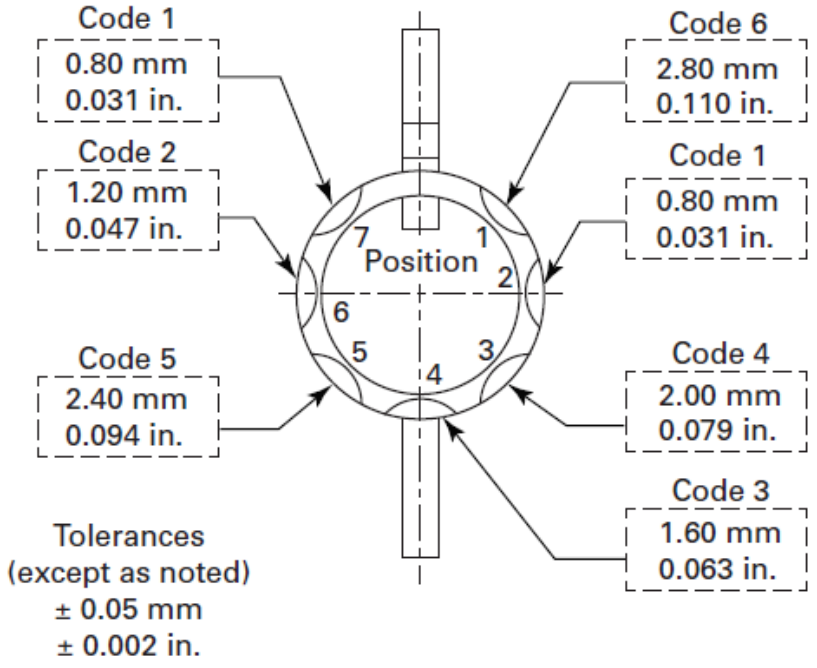
Thus, it can get confusing at time

Two ways to activate Phase I...

3-position keyed switch at the designated level

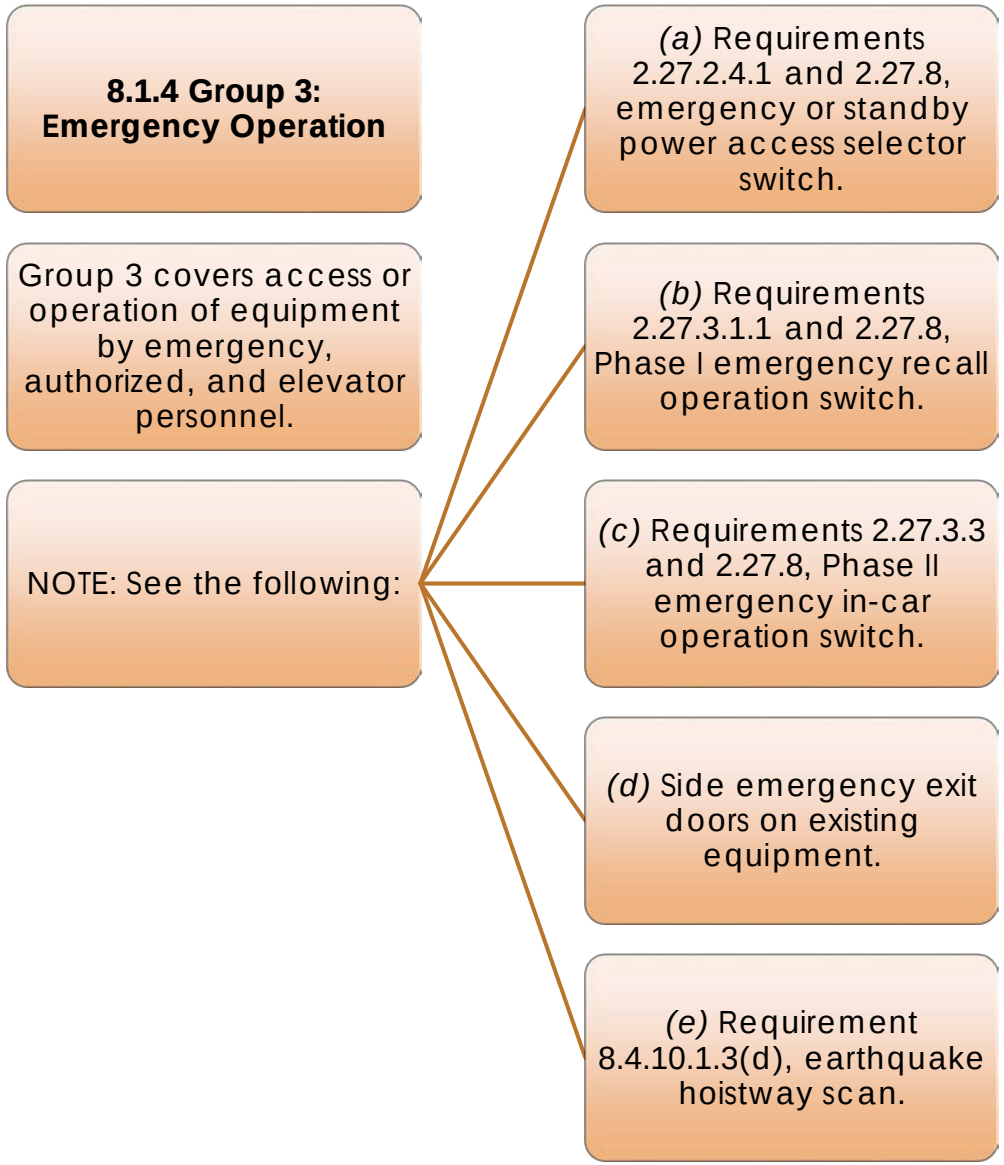
Detectors in elevator lobbies, machine/control rooms, hoistways





The standardized keyed switch!

ASME A17.1/CSA B44, Section 8.1 Security



ASME A17.1/CSA B44, Section 8.1 Security

- **8.1.2 Group 1: Restricted**
- Group 1 covers access or operation of equipment restricted to elevator personnel, except as noted.
- *(i)* Requirement 2.11.1.2(h), emergency access doors. (Shall also be made available to emergency personnel during an emergency.)
- *(j)* Requirement 2.12.6.2.4, hoistway door unlocking device. (Shall also be made available to emergency personnel during an emergency.)

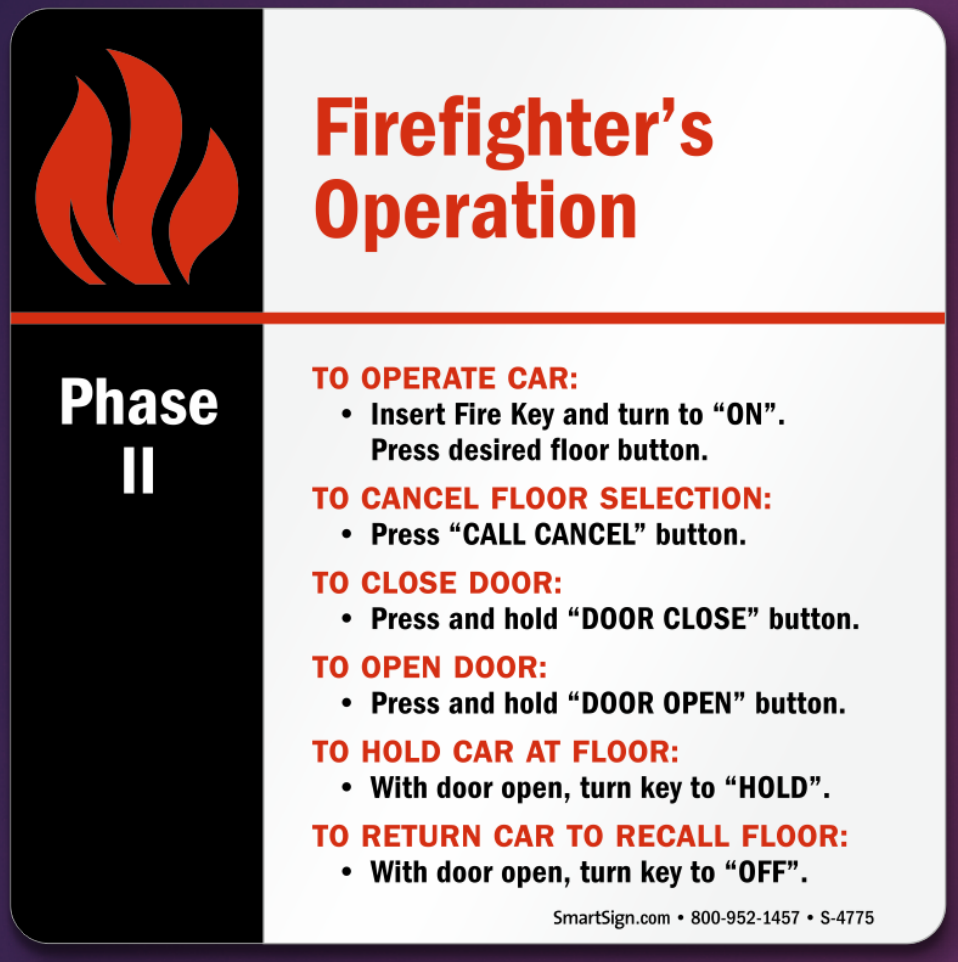
Item (j)

Flashing hat… (in car only)

When does it flash intermittently?

- 2004 and later codes; when activated by a detector in a machine/control room or hoistway

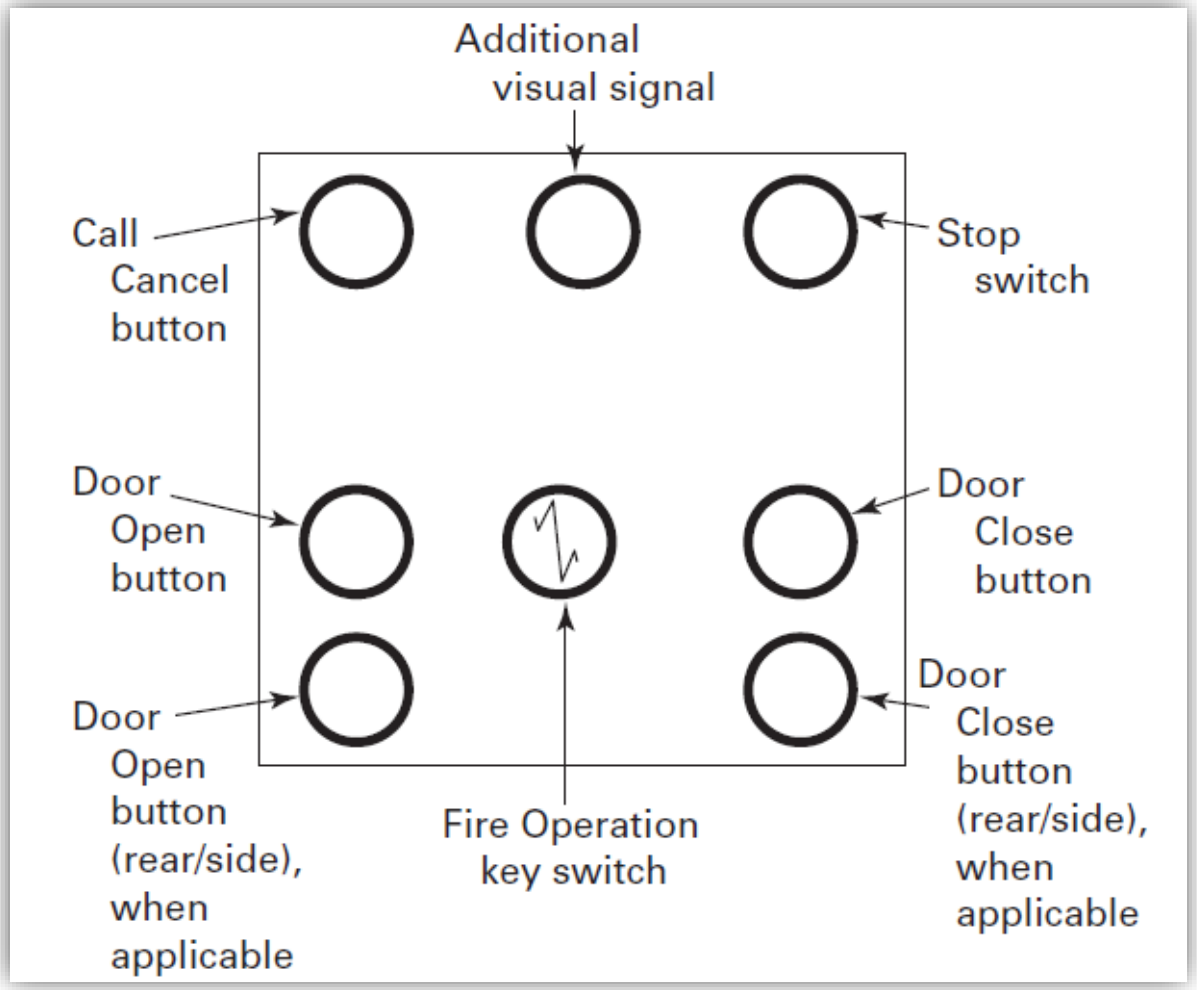
Basic shapes:



Phase II Firefighters' In-car Operation

Generic F/O Panel Layout

Required as of the 2004 edition of A17.1



2004 & later editions

Pre-2004 edition

FIRE OPERATION

When  Flashes, Exit Elevator

To Operate Car	Insert Fire Key and Turn to "ON" Press Desired Button.
To Cancel Floor Selection	Press "CALL CANCEL" Button.
To Close Power Operated Door	Press and Hold "DOOR CLOSE" Button.
To Hold Car at Floor	Press and Hold "DOOR OPEN" Button.
To Automatically Send Car to Recall Floor	Turn Key to "OFF"

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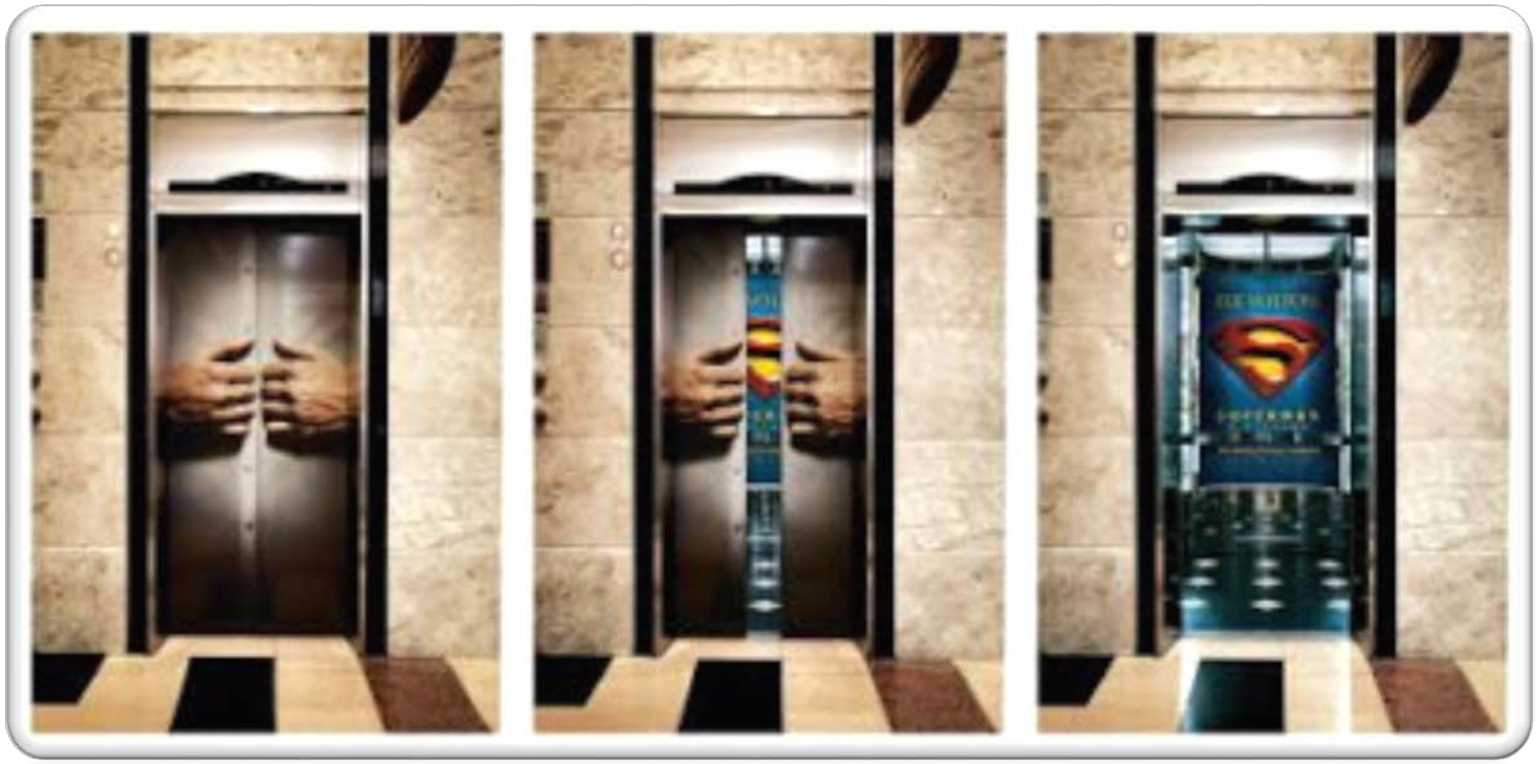
To Reset Phase II Operation

- **2.27.3.3.5** Elevators shall be removed from Phase II Emergency In-Car Operation only when the "FIRE OPERATION" switch is in the "OFF" position and the car is at the designated level and the doors are in the normal open position.

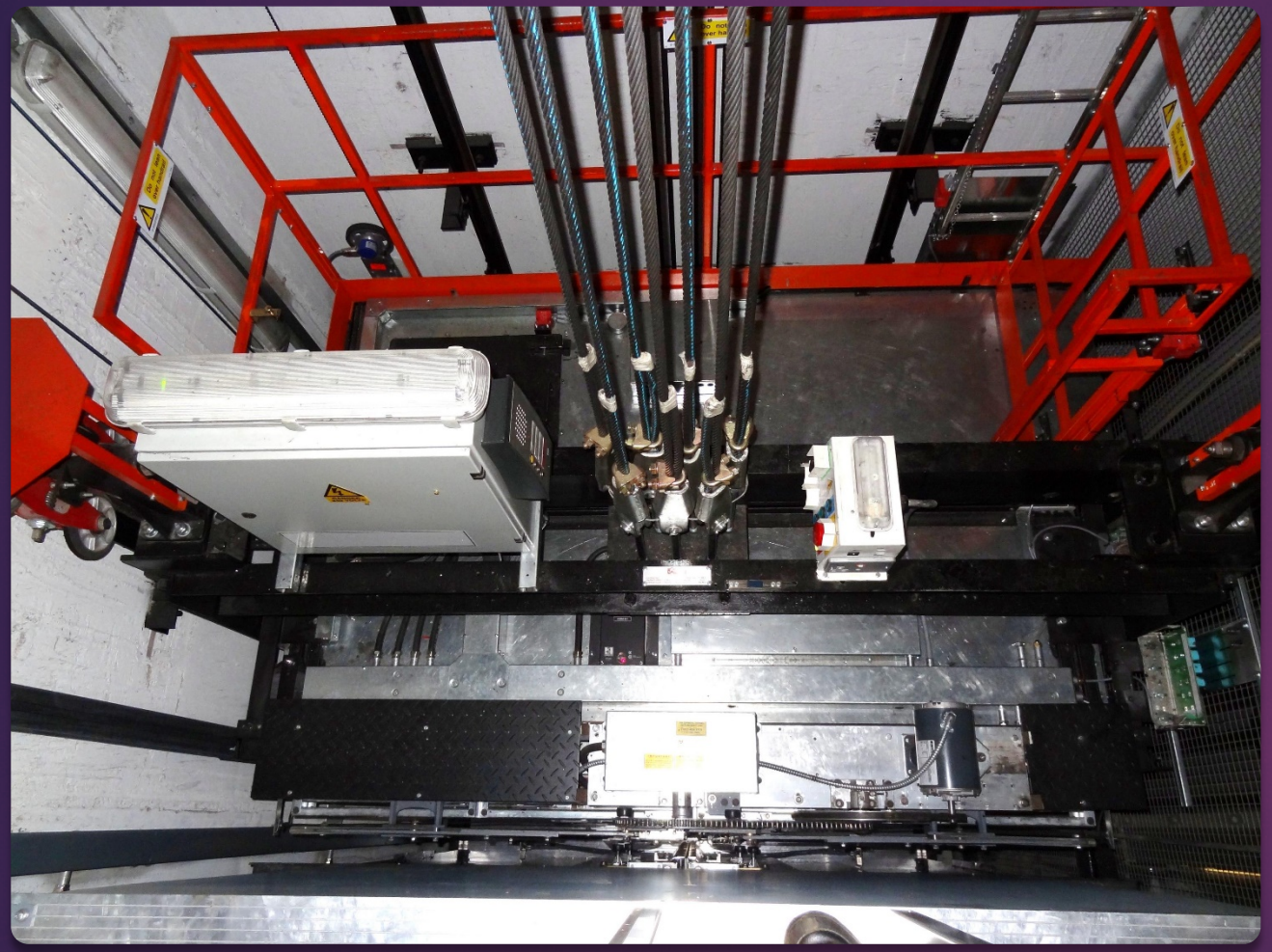


Sprinklers & Shunt-trip Device

WHEN ARE SHUNT TRIP DEVICES REQUIRED

Why Do We Need Shunt-Trip Devices?

- The short answer....
- Because the industry cannot guarantee how the elevator would operate with water pouring on it!



Hoistway – Car Top Equipment

Essentially…

If any sprinkler located in equipment rooms, hoistways, or near elevator equipment, might cause an unsafe operation of the elevator…

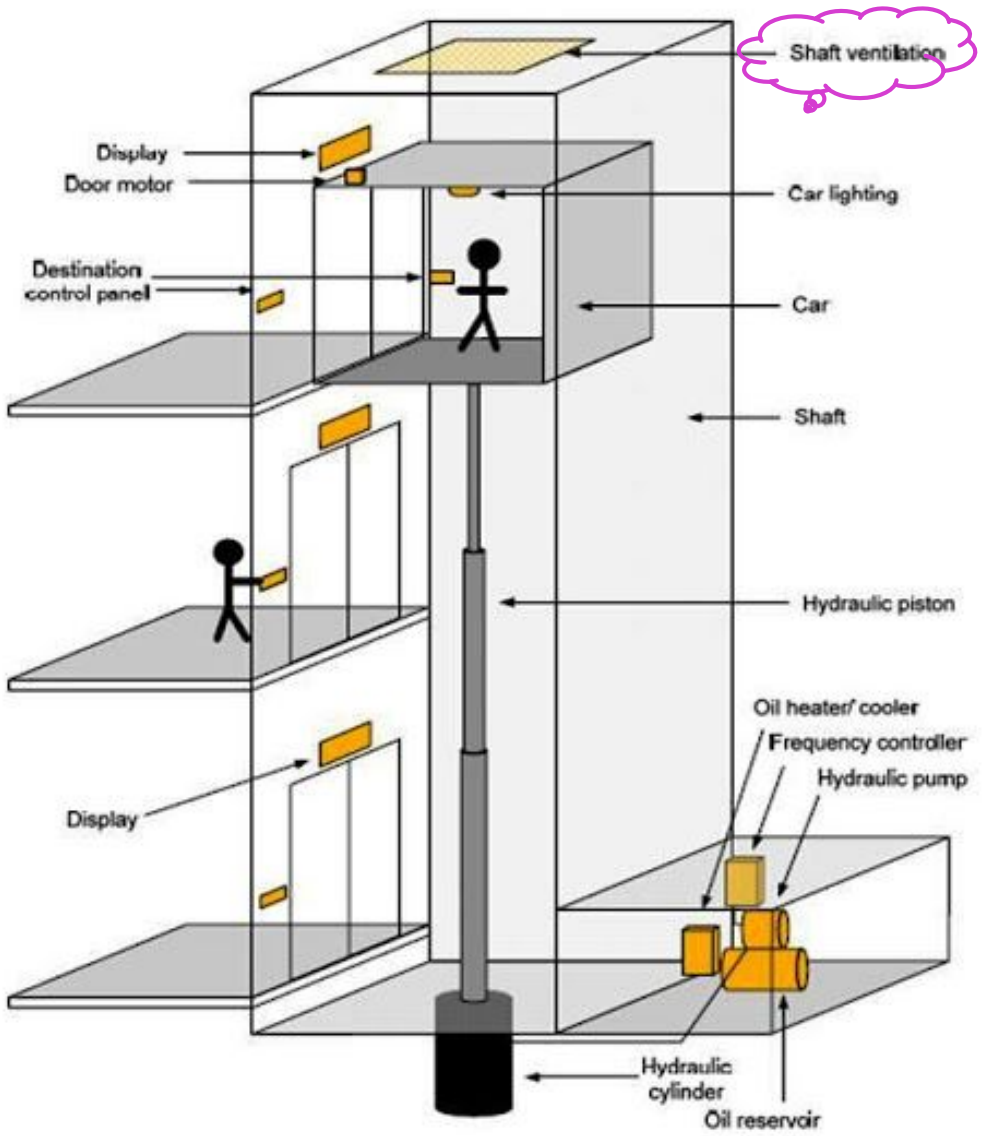
A shunt-trip device is required!

Fire Service Access Elevators & OEO

Sprinklers not allowed in elevator equipment rooms/spaces.

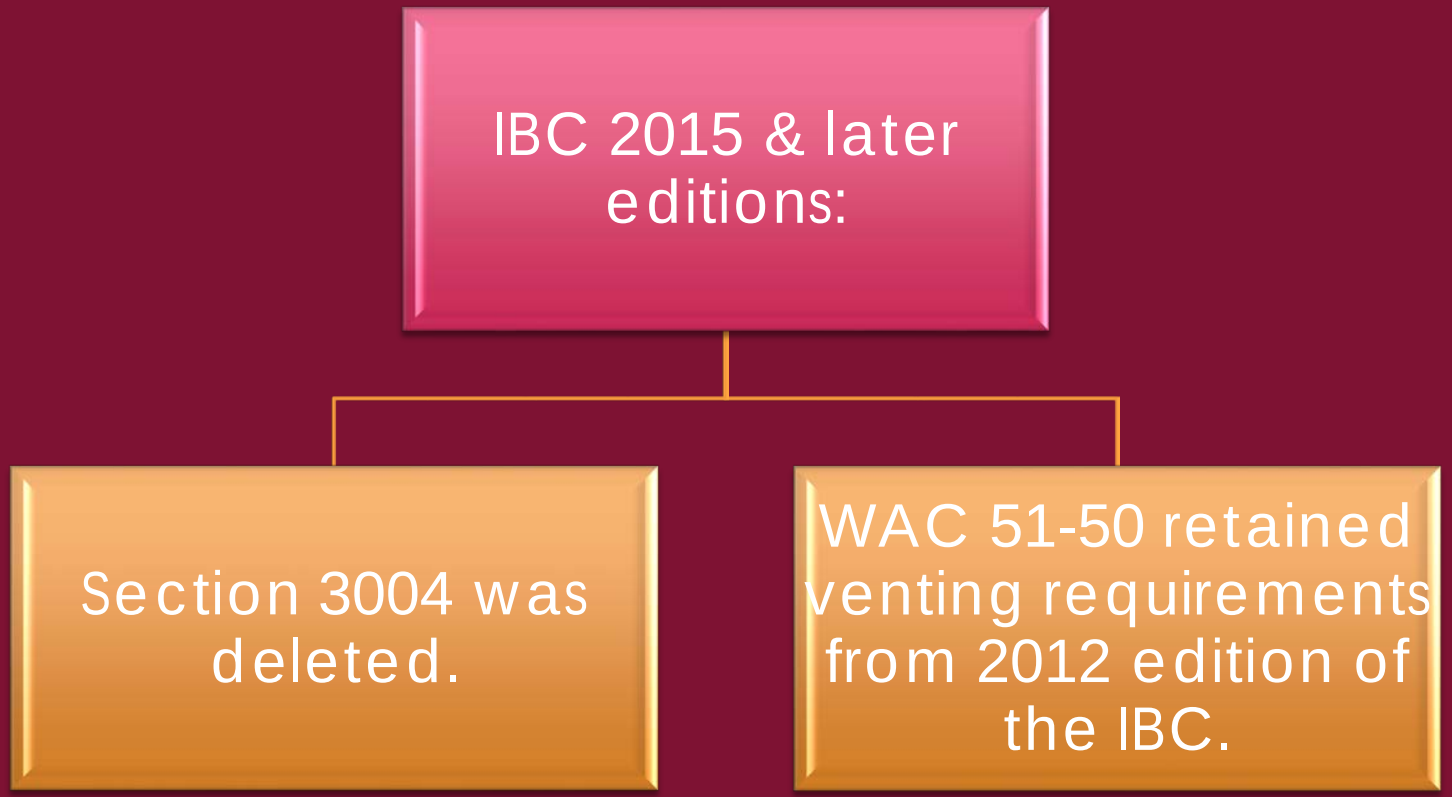
=

Thus, no shunt-trip required.



Hoistways & Venting

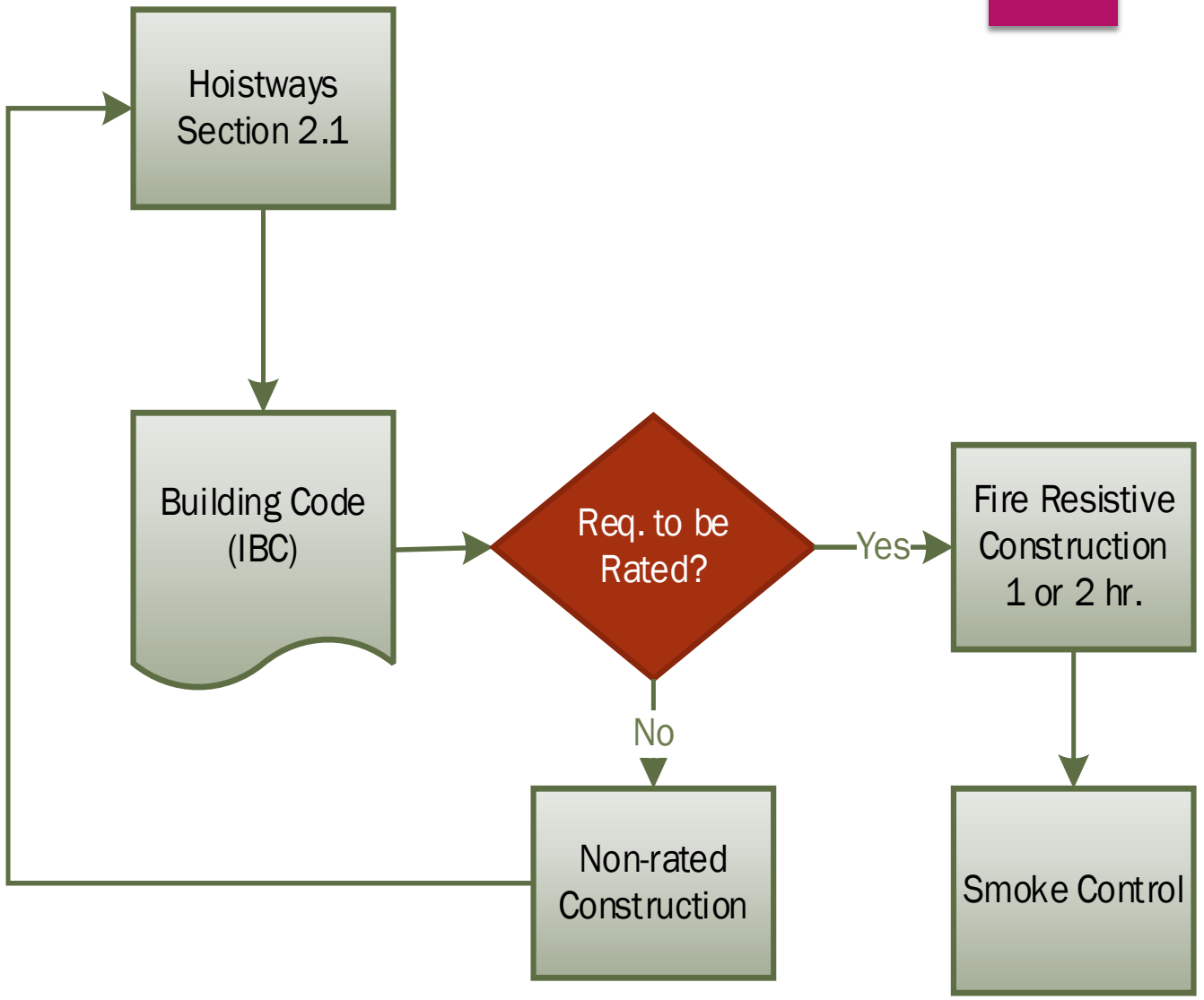
Venting is a function of the building code...



Other smoke control methods...

Hoistway Rating

- Function of the building code
- Normally 1 or 2 hour rating
- Non-rated; falls back under the elevator code



Section 3007 Fire Service Access Elevators

- IBC Sets criterion for when these are required:
- **403.6.1 Fire service access elevator.** In buildings with an occupied floor more than 120 feet (36 576 mm) above the lowest level of fire department vehicle access, not fewer than two fire service access elevators, or all elevators, whichever is less, shall be provided in accordance with Section 3007. Each fire service access elevator shall have a capacity of not less than 3,500 pounds (1588 kg) and shall comply with Section 3002.4.

Sprinklers

3007.2 Automatic sprinkler system. The building shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, except as otherwise permitted by Section 903.3.1.1.1 and as prohibited by Section 3007.2.1.

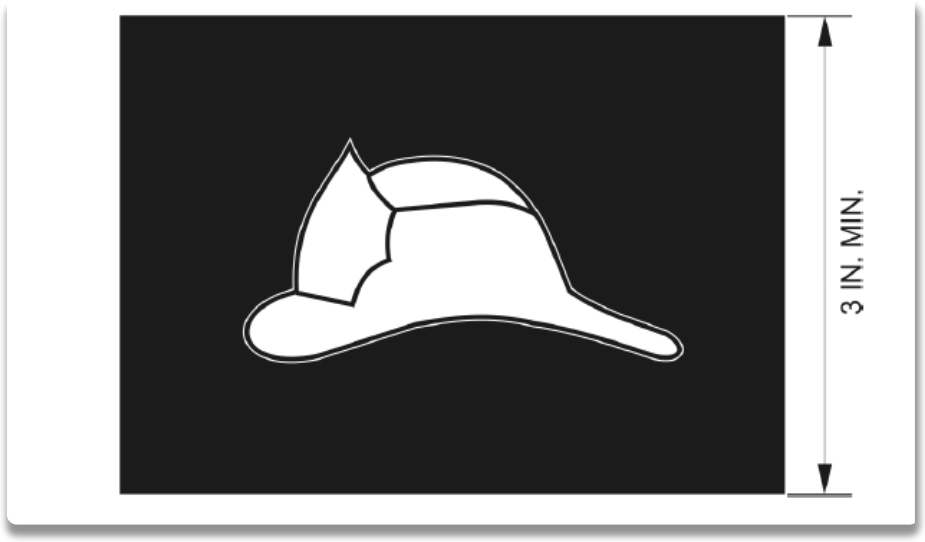
3007.2.1 Prohibited locations. Automatic sprinklers shall not be installed in machine rooms, elevator machinery spaces, control rooms, control spaces and elevator hoistways of fire service access elevators.

3007.2.2 Sprinkler system monitoring. The sprinkler system shall have a sprinkler control valve supervisory switch and water-flow-initiating device provided for each floor that is monitored by the building's *fire alarm system.*

FSAE requirements continued…

- **3007.3 Water protection.** Water from the operation of an automatic sprinkler system outside the enclosed lobby shall be prevented from infiltrating into the hoistway enclosure in accordance with an approved method.
- **3007.4 Shunt trip.** Means for elevator shutdown in accordance with Section 3005.5 shall not be installed on elevator systems used for fire service access elevators.

Other FSAE requirements…



Special hoistway enclosures

Hoistway lighting

Special lobby requirements

- 1 hour rating minimum
- Direct access to an exit stairway
- ¾ hour lobby access door(s)
- Size = 150 ft^2 (14m^2)
- Special identifying symbol

Section 3008 Occupant Evacuation Elevators

OCCUPANT EVACUATION OPERATION

When is OEE Required? It's Not!

OEE: New 2018 Requirements

3008.1.1 Number of occupant evacuation elevators.

The number of elevators available for occupant evacuation shall be determined based on an egress analysis that addresses one of the following scenarios:

1. Full-building evacuation where the analysis demonstrates that the number of elevators provided for evacuation results in an evacuation time less than 1 hour.

2. Evacuation of the five consecutive floors with the highest cumulative occupant load where the analysis demonstrates that the number of elevators provided for evacuation results in an evacuation time less than 15 minutes.

Some other stuff...

- Prevention of water entering hoistway
- No sprinklers, thus no shunt-trip devices
- Enclosed lobbies
- Size = 3 ft^2 (0.28m^2) per person or 25% of occupant load at floor
- Monitoring of elevators at the FCC
- Communication between FCC and evac-floors
- OEO terminates if FEO is activated

Summary

WHAT HAVE WE COVERED?

The basics...

- Labor & Industries duties and responsibilities
- Brief history of FEO
- Recognizing FEO Elevators
- Phase I & II Basic Operation
- Recall Detectors (FAIDs)
- Sprinklers & Shunt-trip Device
- Hoistway Venting & Rating
- Fire Service Access Elevators
- Occupancy Evacuation Elevators

More in depth discussions can be made available..

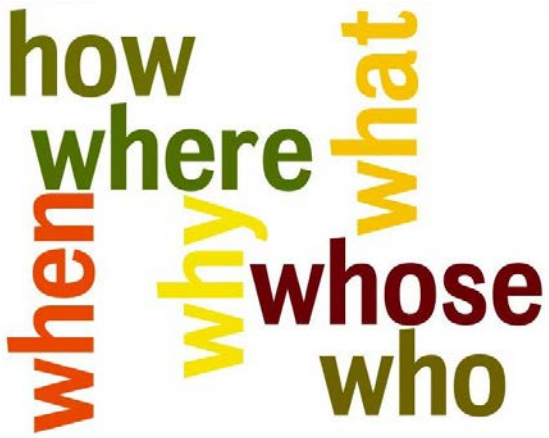
- More Details of FEO
- Details of the relationship between NFPA 72, NFPA 13, & A17.1/B44
- Details of OEO as defined by A17.1/B44 & other related standards

RESOURCES:

ASME A17.1/CSA B44-2016
NFPA 13 – 2016
NFPA 72 – 2016
IBC 2015-2018
WAC 51-50

Contact Information: 800-705-1411

Technical Training Specialist	• Jim Runyan (360) - 918-4246 runj235@lni.wa.gov
Chief Elevator Inspector:	• Dotty Stanlaske: (360)-902-6465 sdot235@lni.wa.gov
Operations Manager:	• Wayne Molesworth: (509)-850-6942 molw235@lni.wa.gov
Technical Specialists:	• Candace Lau: (425)-290-5251 lauc235@lni.wa.gov • Leon Caril: (206)-835-1097 cleo235@lni.wa.gov



Thank you!