1910 General Industry
Exit Routes

Lesson Objectives

Understand history of egress & special considerations

Recognize benefits of an emergency action plan

Identify elements of fire protection plan

Identify conditions under which evacuation actions may be necessary in an emergency situation

Identify conditions under which shelter-in-place may be necessary in an emergency situation

Lesson Objectives

Identify characteristics of an effective emergency escape route

Recognize the five types of fire extinguishers, including the types of fires they can extinguish

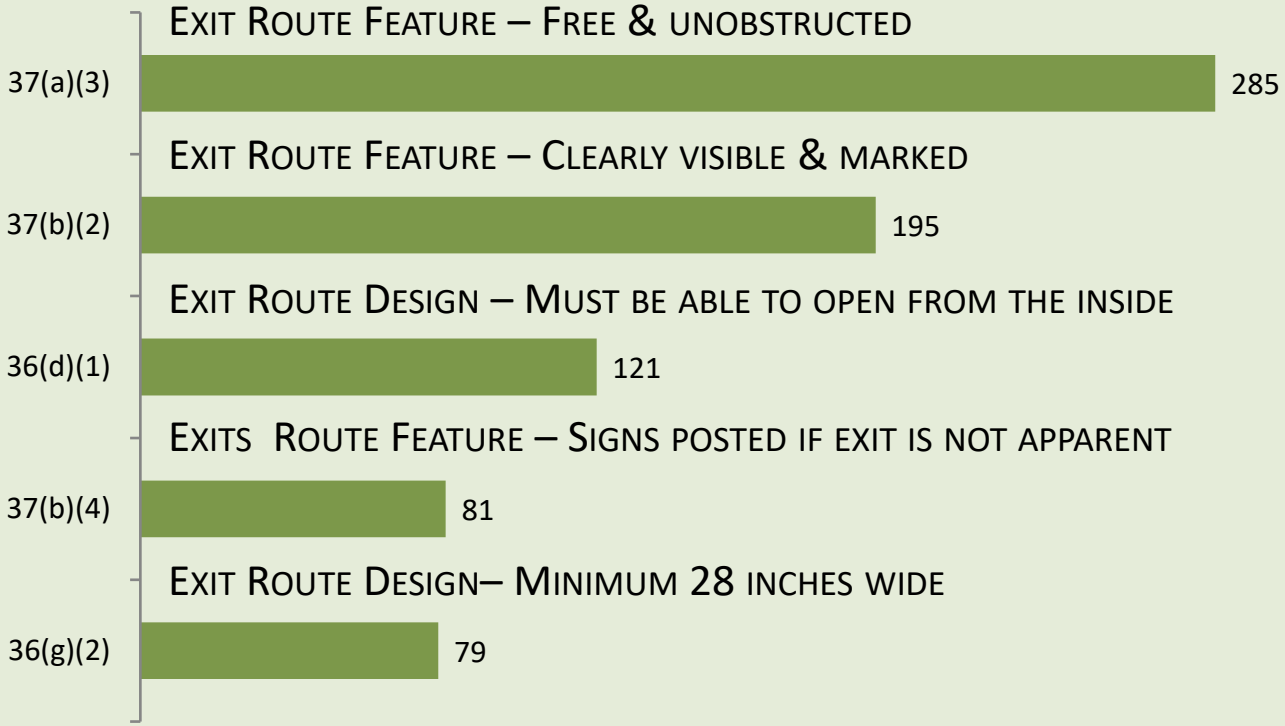
Review requirements for proper maintenance of portable fire extinguishers

EGRESS

1: A place or means of going out : EXIT

2: The action or right of going or coming out

MEANS OF EGRESS [1910.33 – .39]

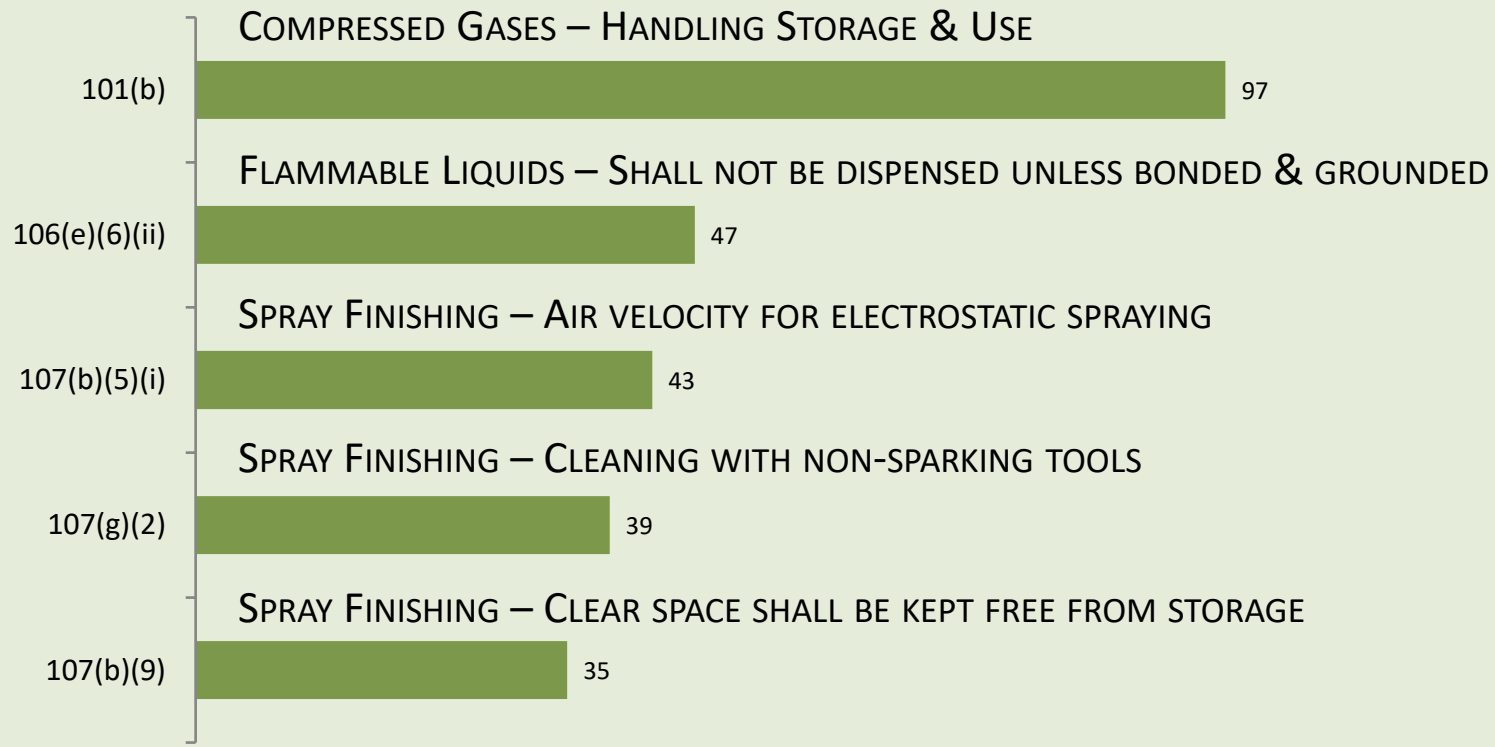


29 CFR 1910.

NUMBER OF SERIOUS VIOLATIONS – FY 2017

SUBPART E

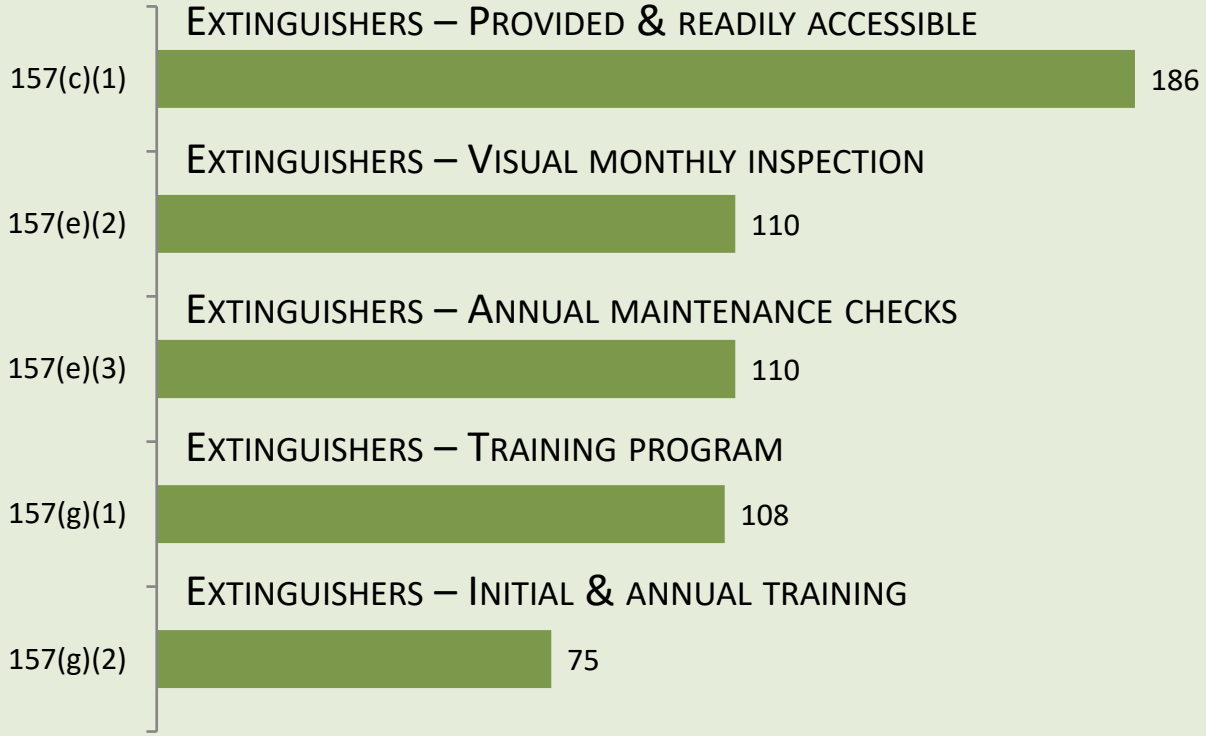
Hazardous Materials [1910.101 – .126]



29 CFR 1910.

Number of Serious Violations – FY 2017

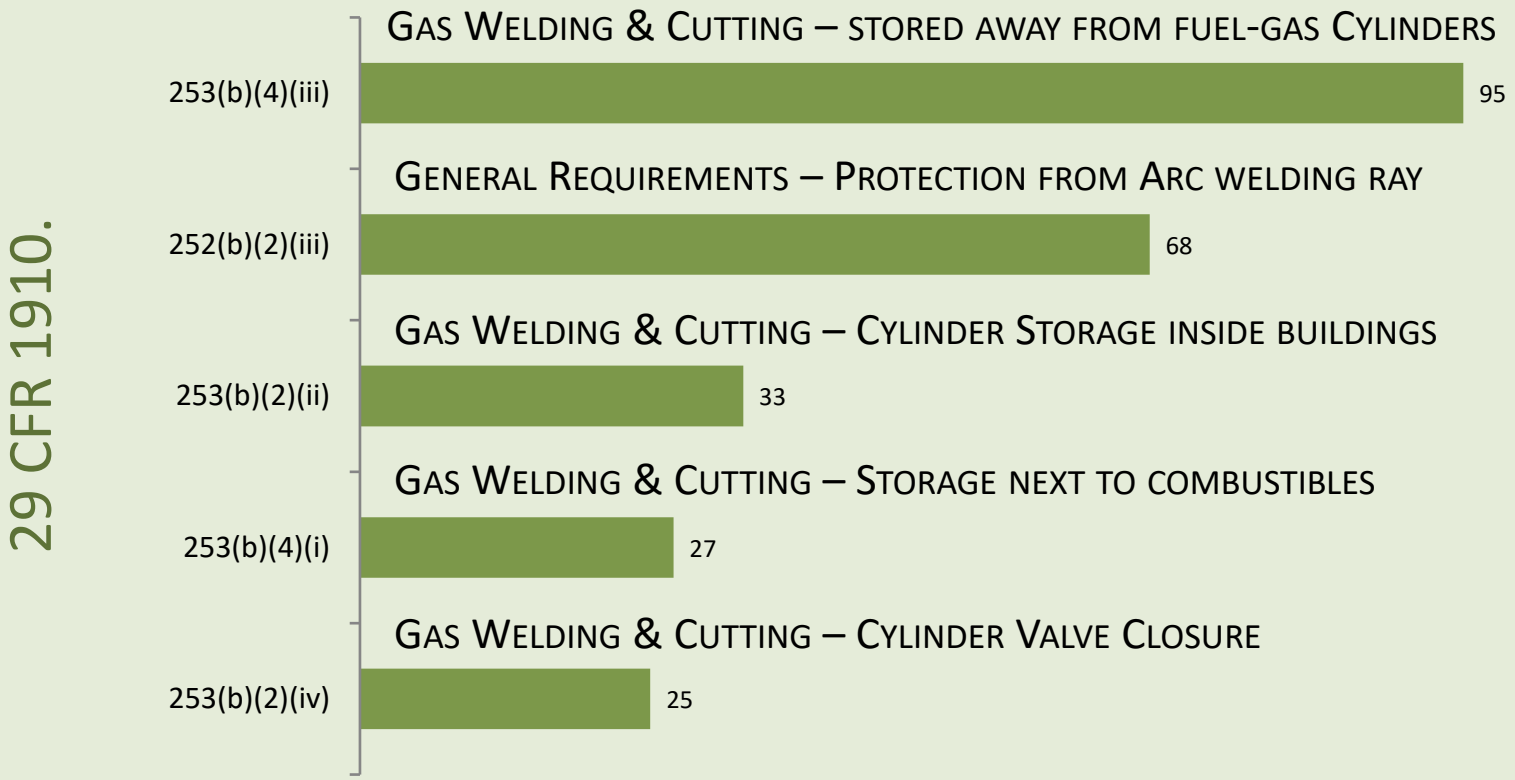
Fire Protection [1910.155 – .165]



29 CFR 1910.

Number of Serious Violations – FY 2017

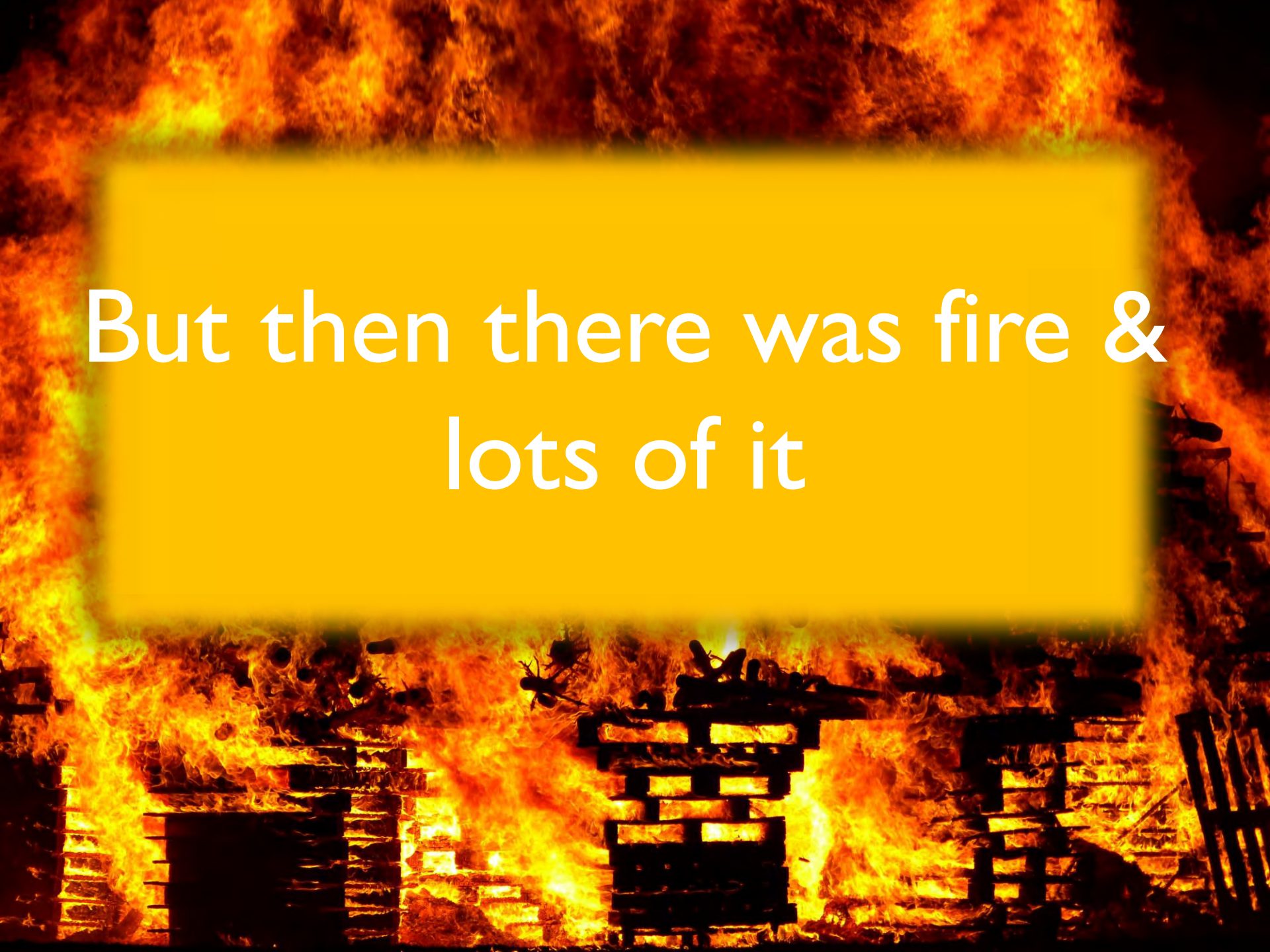
Welding, Cutting, & Brazing [1910.251 – .255]



Number of Serious Violations – FY 2017

Background:

Before 1973, elevators were used as evacuation means

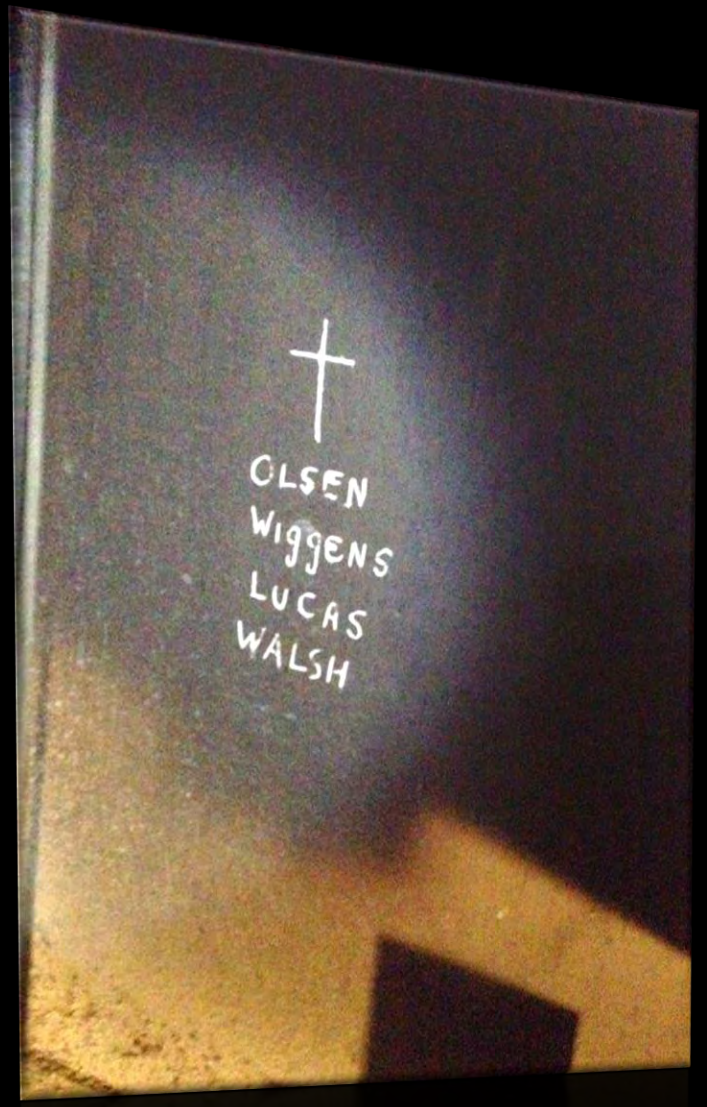

But then there was fire &
lots of it

Fire Affects EVERYONE

From 1900 to 2018, there were

28,000 fatalities

due to building fires


OLSEN
WIGGENS
LUCAS
WALSH

Fire Affects EVERYONE

April 11th 1973: Fire in a hoistway at the Sears Tower kills 4 Elevator Constructors

Larry Lucas, Local 2

April 11, 1973

Len Olson, Local 2

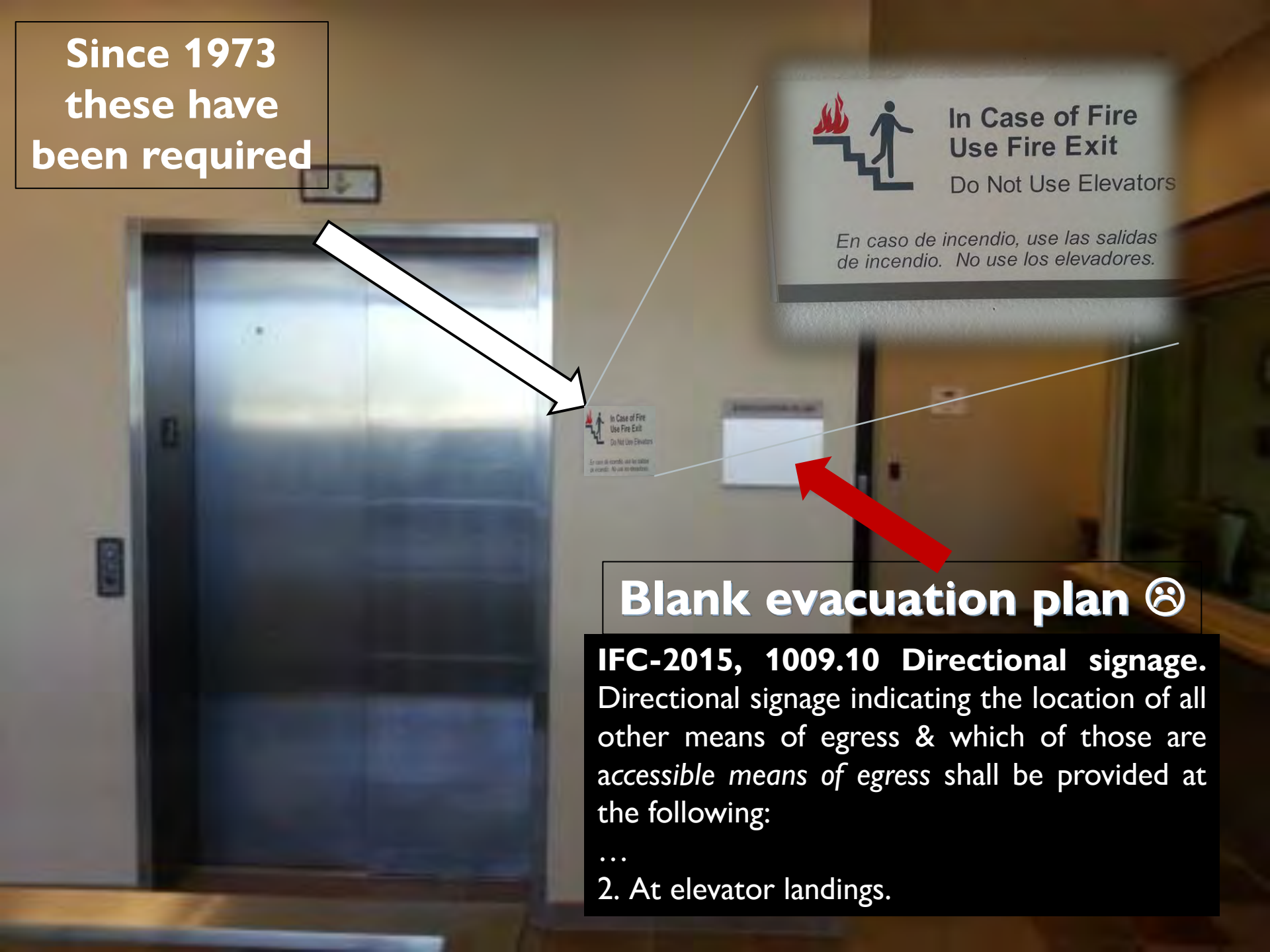
April 11, 1973

Bill Walsh, Local 2

April 11, 1973

Robert Wiggins, Local 2

April 11, 1973


Since 1973 these have been required
In Case of Fire
Use Fire Exit
Do Not Use Elevators
En caso de incendio, use las salidas de incendio. No use los elevadores.
Blank evacuation plan ☹
IFC-2015, 1009.10 Directional signage. Directional signage indicating the location of all other means of egress & which of those are *accessible means of egress* shall be provided at the following:
…
2. At elevator landings.

Background:

September 11th, 2001

3,000 people were evacuated in 16 minutes from Tower 2

14,000-19,000 people were in the towers at the time of the attack

Evacuees enter cabins through specially configured exit windows on handicapped-accessible ramps.

A hydraulic-winch mechanism deploys and transports a ver-

Elevators

- Just an elevator
- Multiple standards

FSAE

- ***F**ire **S**ervice **A**ccess **E**levators (FSAE).*
- In buildings with an occupied floor more than 120 feet (36 576 mm) above the lowest level of fire department vehicle access **F**ire **S**ervice **A**ccess **E**levators may be required
- IBC, IFC etc.
- Not in A17.1…yet

OEO

- ***O**ccupant **E**vacuation **O**peration Elevators (OEO)*
- For buildings other than Group R-2 that are more than 420’ in building height, one additional interior exit stair is needed
- Or go OEO
- R-2 is one type of IBC residential building
- IBC, IFC, A17.1 etc.


Have you considered your exit strategy?


Executive Manual
ThyssenKrupp Elevator


FCC
REGISTRA
NO.1032
EAST

What else causes us to exit & egress?

Hazardous Substances

Natural Disasters

Public Safety Threats

Knowledge Check

What year were elevators no longer recommended as part of a safe exit strategy?

a. 1945
b. 1962
c. 2011
d. 1973

Answer:

d. 1973

29 CFR 1910 Subpart E Exit Routes & Emergency Planning

Coverage & definitions

Compliance with alternate exit route codes

Design & construction requirements for exit routes

Maintenance, safeguards, & operational features for exit routes

Emergency action plans

Fire prevention plans

Appendix

1910.33

Evacuation Maps Show:

- Exits: to, thru, & away
- At least two ways out
  - Primary exit
  - Secondary exit
- Assembly area
- Location on the map
- Additional information – location of fire extinguishers

Exit Routes & Emergency Planning - Definitions

1910.34

- Electroluminescent
- Exit route
- Exit access
- Exit
- Exit discharge
- High-hazard area
- Occupant load
- Refuge area
- Self-luminous


RATH
AREA OF
REFUGE


EXIT
FIRE
EXIT STAIRS
AREA OF REFUGE
FIRE ALARM


AREA OF REFUGE
PUSH FOR HELP
EMERGENCY PHONE
PULL TO OPEN

Other Codes

1910.35

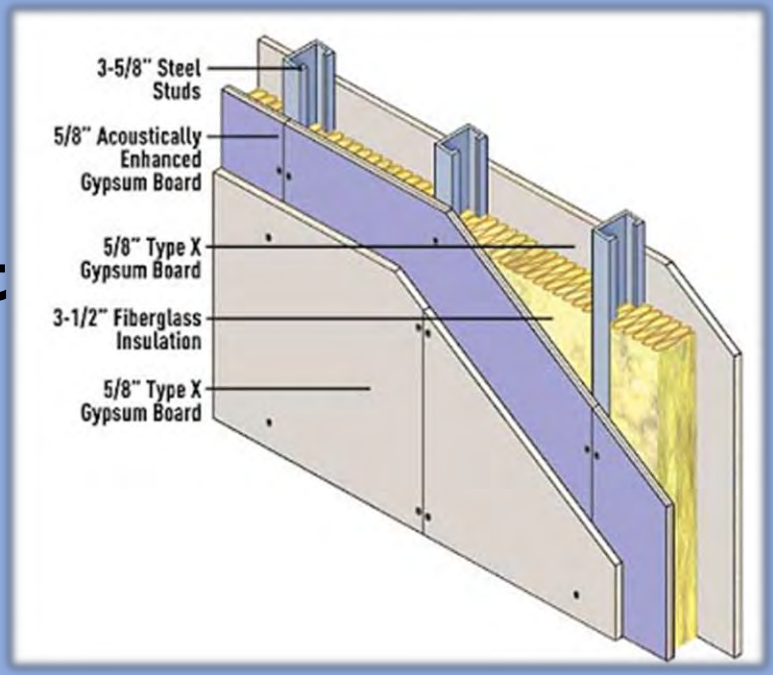
Other Codes


IBC
2015
INTERNATIONAL CODES
INTERNATIONAL
Building Code®
A Member of the International
Code Family®
INTERNATIONAL
CODE COUNCIL

Basic Requirements

Permanent

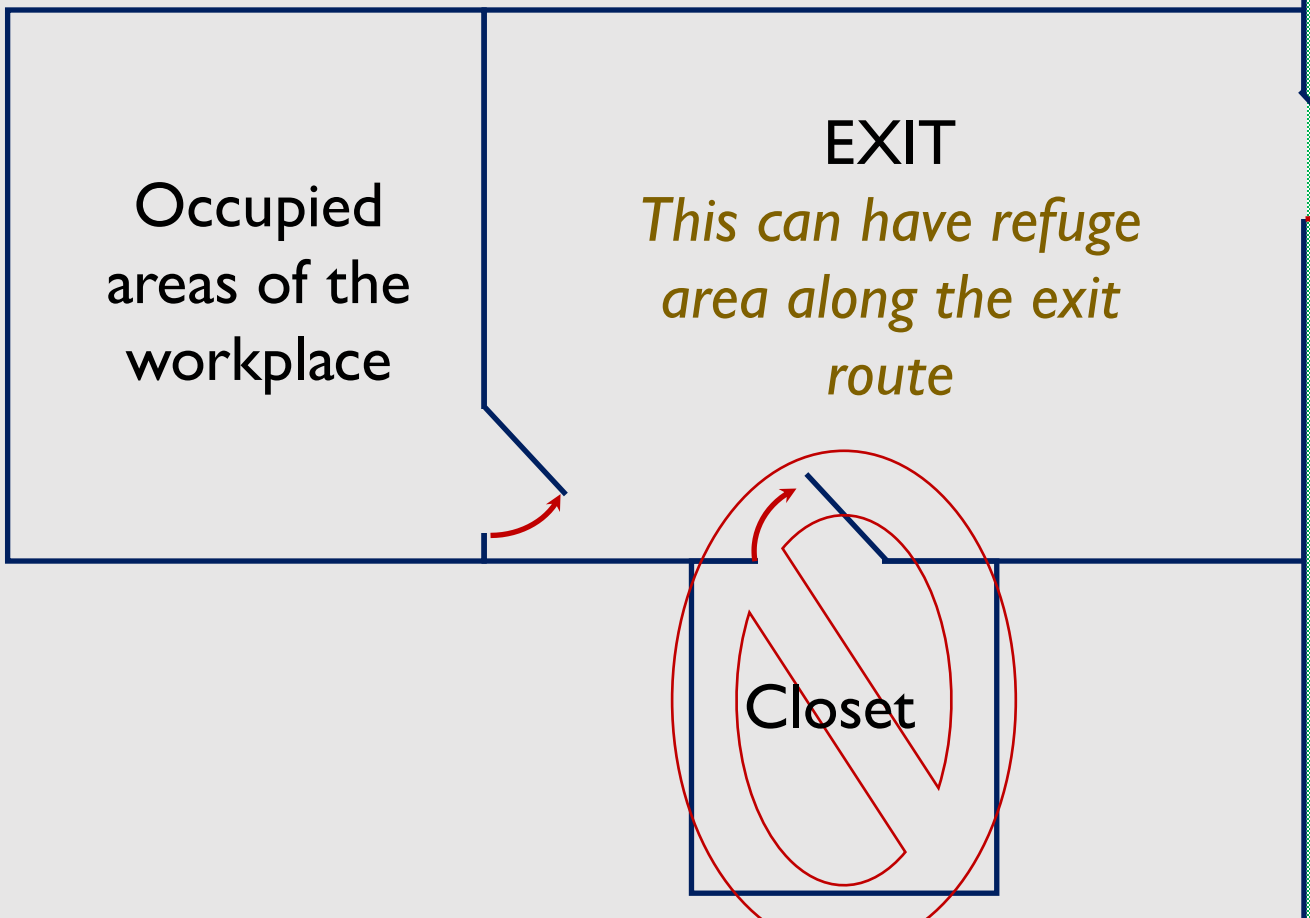
Fire Resistant



1910.36

Basic Requirements

Only those openings necessary to allow access to the exit are allowed



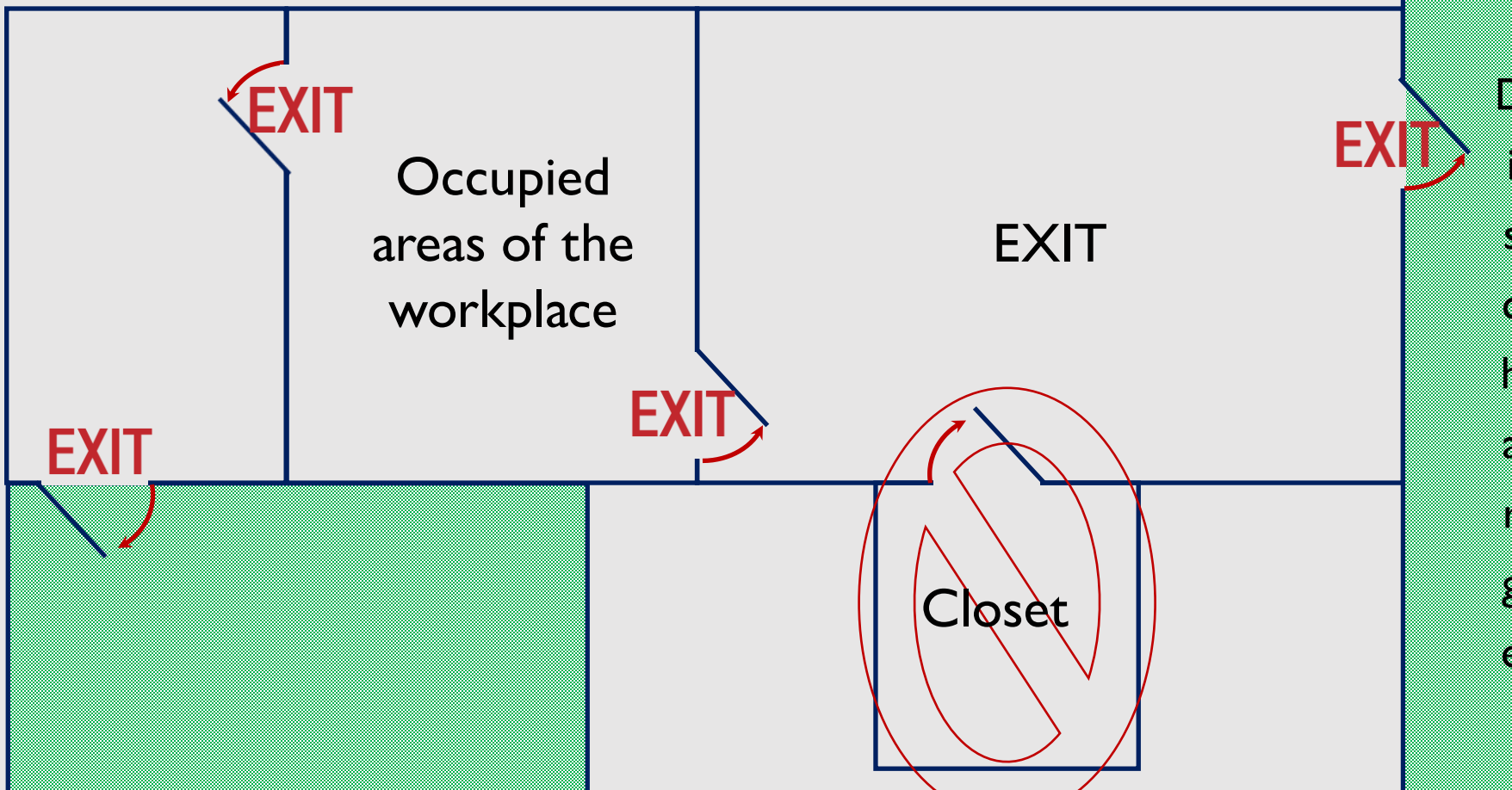
1910.36

Basic Requirements

1910.36

At least 2 exits with an exception

Doors swing out

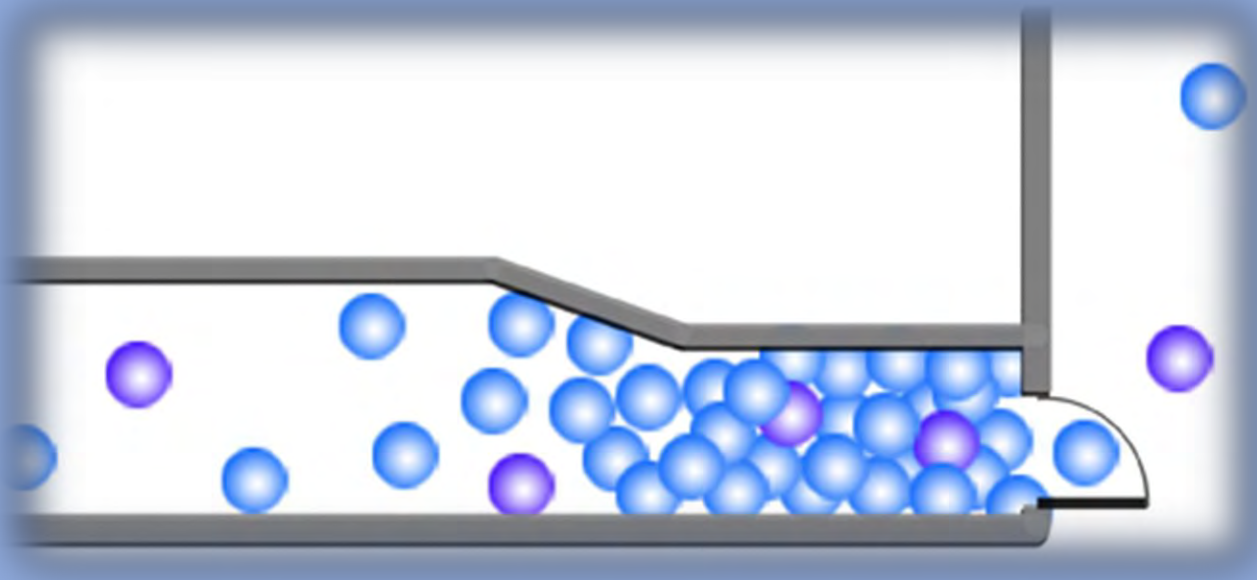


- Guiding traffic
- No keys, tools, special knowledge requirements allowed
- Panic bars are allowed
- Free of devices
- Alarm restricting emergency use of the exit route if they fail

1910.36

Capacity

2003 Station nightclub fire, West Warwick, RI, killed 100



No bottlenecks

Exit route = 7’ 6” high

Ceiling projections ≥ 6’ 8” high

Exit access ≥ 28” wide

1910.36

If there is only one exit access leading to an exit or exit discharge, then width of the exit & exit discharge must = width of access

Width accommodates occupant load of each floor served by the exit route

Projecting object can’t reduce width of exit route to less than minimum

Outdoor Exit Route is Permitted

Must have guardrails to protect unenclosed sides if a fall hazard exists

Must be covered if snow or ice is likely to accumulate along the route, unless the employer can demonstrate that any snow or ice accumulation will be removed before it presents a slipping hazard

1910.36

Outdoor Routes

Must be reasonably straight & have smooth, solid, substantially level walkways

Must not have a dead-end that is longer than 20’

1910.36

Exit routes must be:

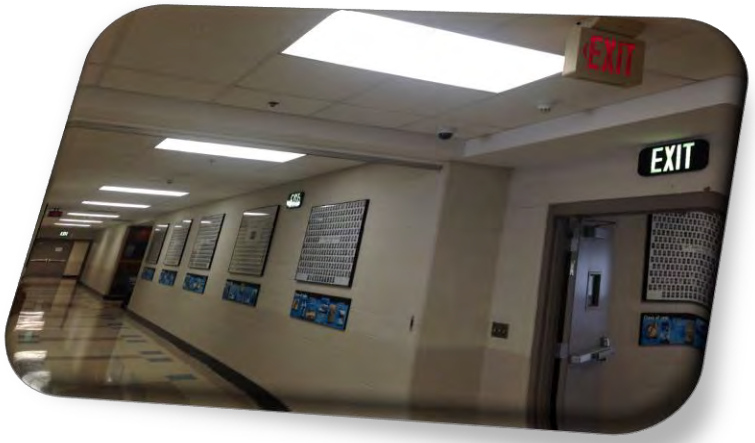
- Free of explosive or highly flammable furnishing[illegible]ions
- Arranged so that employees will not have to travel toward an unprotected high hazard area
- Unobstructed & not used as storage areas
- Not locked, dead ended, or in unlevel areas
- Safeguarded against emergencies

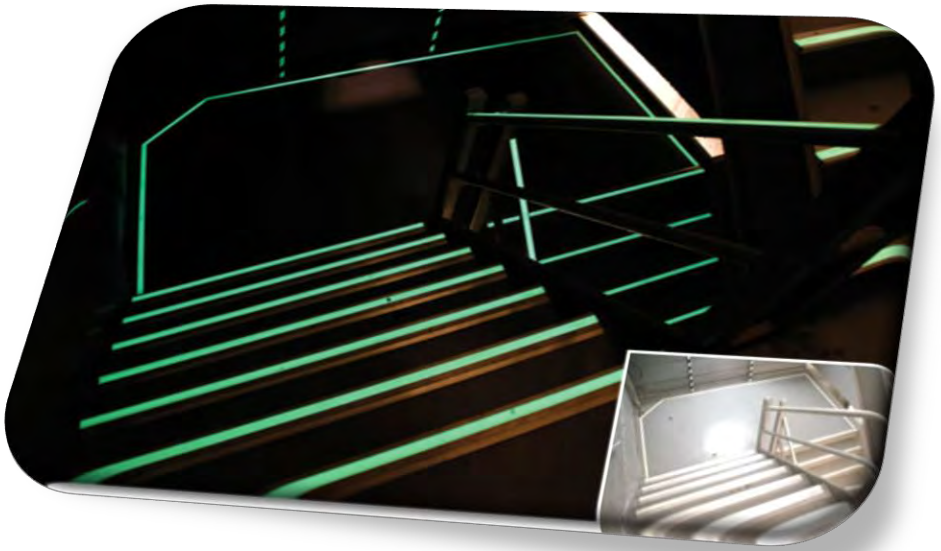
1910.37

Lighting & Marking

1910.37

- Visible & clearly marked "exit."
- Free of decorations/signs that obscure the exit route door





1910.37

Direction must be apparent & line of sight

EXIT

Letters 6” high

≥ 0.75” w

Non-exits must be indicated

Lighting 5  or self-luminous or electroluminescent

1910.37

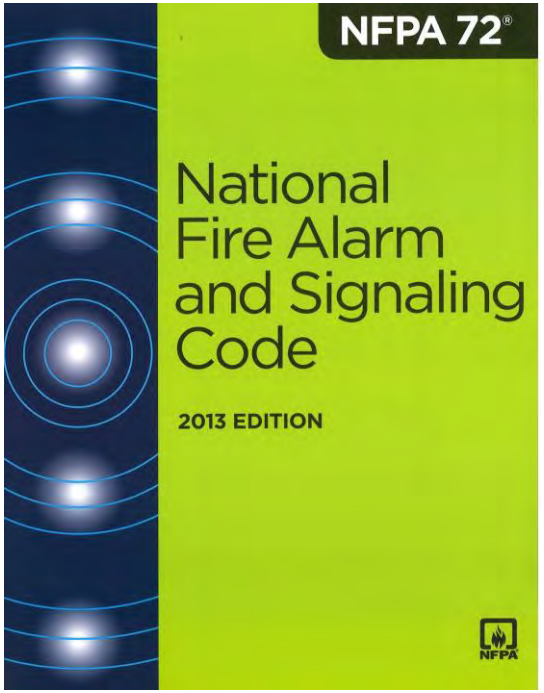
Flammable Hazards

Construction

Alteration

Maintenance, Safeguards & Operational Features

Alarms



Emergency Action Plans

EAPs facilitate & organize actions taken during an emergency 1910.38

Application

Employer has to have one if needed

Written & oral emergency action plans

Has to be written unless ≤ 10 employees

Emergency Action Plans

1910.38

Minimum Elements:

- Reporting procedures
- Evacuation procedures
- Critical plant operating procedures
- Accountability procedures
- Rescue & medical procedures
- Resource contact procedure

Emergency Action Plans

1910.38

Employee alarm system

- Must have & maintain an employee alarm system
- Must be a distinctive signal for each purpose
- Must comply with the Alarm regulations in 29 CFR 1910

Training

- Must have employees to coordinate & assist

Review of emergency action plan

- Must review with each employee:
- When its developed
- When the employee is initially assigned to a job
- When the employee's responsibilities change
- When the plan is changed

Emergency Action Plans

1910.38

Benefits of an Emergency Action Plan:

- Provides a Standard Operating Procedure (SOP) that facilitates & organizes employer & employee actions during workplace emergencies
- Proper planning may reduce/mitigate/eliminate injuries
- Proactive effort may result in less structural damage
- Reduces confusion during an emergency & improve well being in the workplace during non-emergency scenarios

Subpart E Appendix

1910.39

This appendix serves as a nonmandatory guideline to assist employers in complying with the appropriate requirements of subpart E.

1. Emergency action plan elements
2. Emergency evacuation
3. Emergency action plan training
4. Fire prevention housekeeping
5. Maintenance of equipment under fire prevention plan

Knowledge Check

Benefits of an Emergency Action Plan include:

a. Proper planning may reduce, mitigate &/or eliminate injuries
b. Proactive planning & effort may result in less structural damage
c. Employers can pass the liability associated to emergencies onto employees once the employees are trained.
d. a & b.

Answer:

d. a & b

Knowledge Check

Which of the following statements is TRUE regarding Emergency Action Plans (EAPs)?

a. EAPs need to be written down only if requested by employees
b. EAPs facilitate & organize actions taken during an emergency
c. EAPs have no effect on the number or severity of injuries during & emergency
d. EAPs increase confusion due to the number of documents required

Answer:

b. EAPs facilitate & organize actions taken during an emergency

Knowledge Check

When should the employer review the Emergency Action Plan with the employee?

a. When the plan is developed or the employee is assigned initially to a job
b. When the employee's responsibilities under the plan change
c. When the plan is changed
d. All of the above

Answer:

d. All of the above

Considerations for Evacuation

Factors affecting response to emergencies:

- Type/extent of emergency
- Location of emergency
- Type of building in which workplace is located
- Shutting down critical operations

Considerations for Evacuation

Fire emergencies:

Fight or Flee?

- Options for evacuation
  1. Total evacuation
  2. Designated employees authorized to fight fire; all others evacuate
  3. All employees authorized to fight fire
  4. Extinguishers provided but not intended for employee use

Considerations for Evacuation

Fire emergencies:

Fight or Flee?

- Performing a risk assessment
  - Is the fire too big?
  - Is the air safe to breathe?
  - Is the environment too hot or smoky?
  - Is there a safe evacuation path?
  - Who is competent to determine this?

Considerations for Evacuation

Evacuation maps show:

- Exits: **to, thru, & away**
- At least two ways out
  - Primary exit
  - Secondary exit
- Assembly area
- Location on the map
- Additional information – Location of fire extinguishers

Considerations for Evacuation

Evacuation actions:

- Alerting employees to evacuate
  - Alarm
  - Enunciator panel/speaker
- Accounting for who has exited
  - How is that accomplished
- Keeping employees informed
  - All clear, re-enter, or remain at assembly point
  - Clear to leave workplace

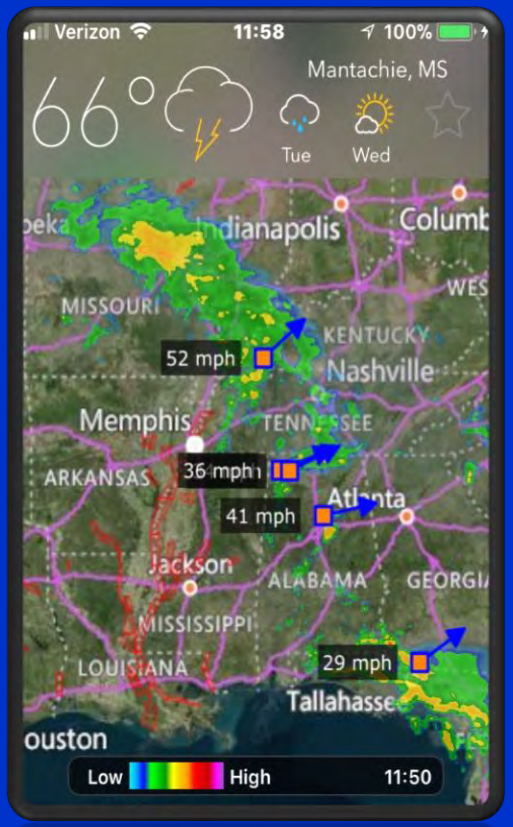
SOP!

SOP!

SOP!

Considerations for Shelter-in-Place

- Nuclear, Biological, Chemical
- Severe weather
- What else?



Considerations for Shelter-in-Place

Shelter-in-place:

- Taking refuge in interior room(s) with no/few windows
- Local authorities may provide training, exercises, alerts, support via local news & phone carriers
- **OSHA** provided guidance for this & many other areas

Shelter in Place

Fire Prevention Plans

Application

Employer has to have one if needed

Written & oral fire prevention plans

Has to be written unless ≤ 10 employees

1910.39

Fire Prevention Plans

1910.39

Minimum Elements:

- Fire hazard procedures
- Flammable & combustible waste procedures
- Maintenance procedures
- Maintenance contact procedures
- Fuel source hazard control contact procedure

Fire Prevention Plans

Employee information:

- Must inform employees upon initial assignment to a job
- Must review w/employee fire hazards they are expose to
- Must review w/ employee fire prevention plan necessary for self-protection

1910.39

Fire Prevention Plans

Chemical Reaction

Spontaneous combustion toooo!

1910.39

Fire Prevention Plans

Ignition sources

Smoking

Lightning

Open flames

Hot work

Hot surfaces

Static electricity

Electrical &
mechanical sparks

Oxidizers

1910.39

Fire Prevention Plans

If you, *the employee*, are

- Working with combustible or flammable gases
- Working with combustible or flammable materials
- Working with combustible or flammable liquids
- Working with combustible or flammable fibers
- Working with combustible or flammable dust

…or creating any of the ignition sources as mentioned previously, you are working where a Fire Protection Plan is required.

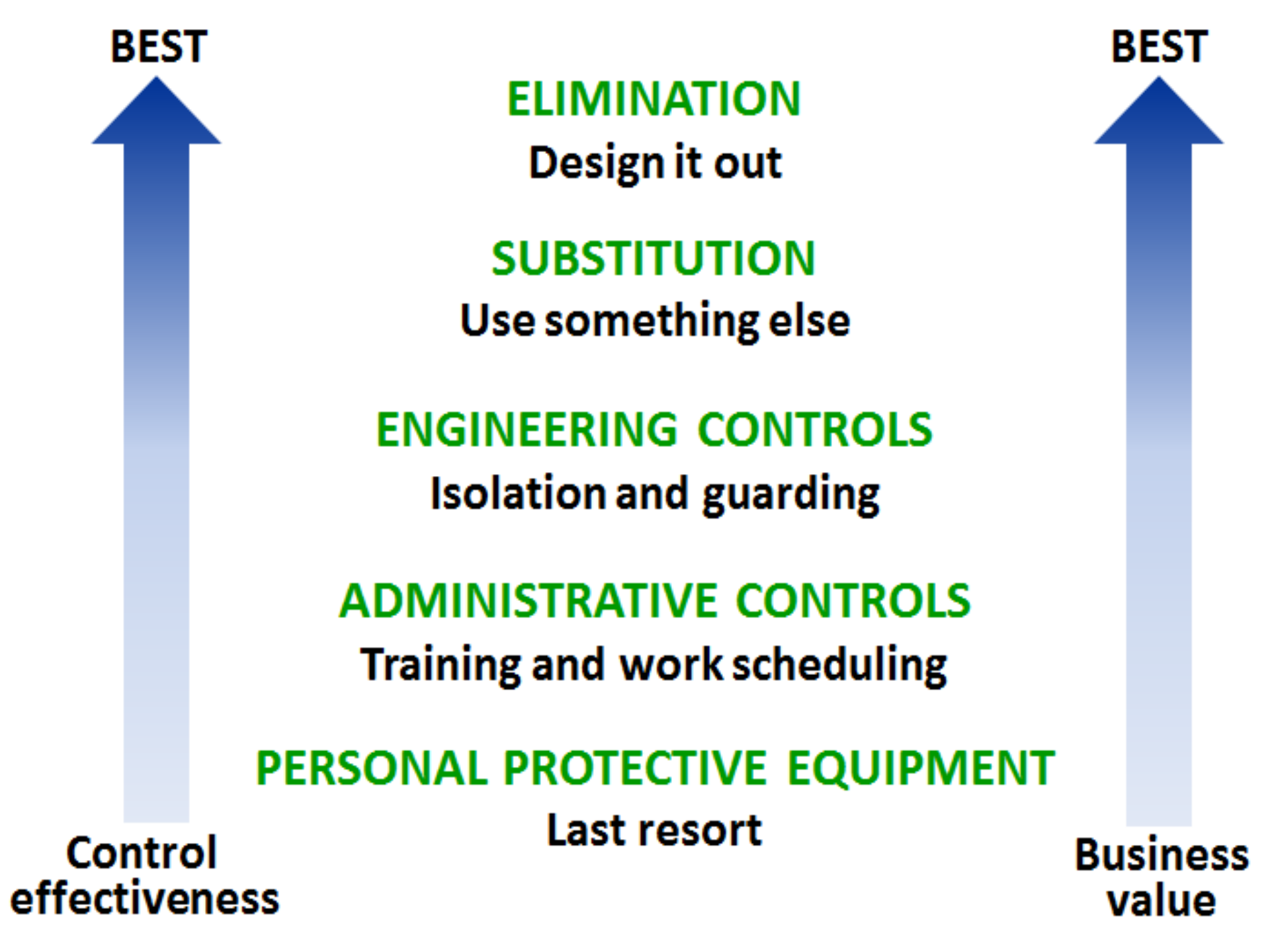
1910.39

Fire Prevention Plans

S.D.S.

- **Handling of flammable hazards**
  - Only use approved containers for storage
  - Practice good housekeeping
  - Keep containers closed when not in use
  - Store away from exits or passageways
  - Keep away from ignition sources

1910.39


BEST
BEST
ELIMINATION
Design it out
SUBSTITUTION
Use something else
ENGINEERING CONTROLS
Isolation and guarding
ADMINISTRATIVE CONTROLS
Training and work scheduling
PERSONAL PROTECTIVE EQUIPMENT
Last resort
Control effectiveness
Business value

Anticipate the Danger

Recognize the Signs

Evaluate the Workplace

Control the Hazards

Knowledge Check

Fire Prevention Plan (FPP) requirements include all of the following, except that ___.

a. it must be a written document that is kept in the workplace
b. it must be made available to employees for review
c. the employer must review with each employee the parts of the FPP necessary for self-protection
d. FPPs can be communicated orally if there are more than 10 employees

Answer:

d. FPPs can be communicated orally if there are more than 10 employees

Knowledge Check

Which of the following elements are required in order for a fire to occur?

a. Sufficient oxygen, fuel, ignition source, & chemical reaction
b. Sufficient fuel, carbon dioxide, heat, & chemical reaction
c. Combustible materials, spark, heat, & mechanical reaction
d. Smoke, heat, flames, & light reaction

Answer:

a. Sufficient oxygen, fuel, ignition source, & chemical reaction

Fire Protection

General Industry requirements apply for fire brigades, all portable or fixed fire suppression equipment, fire detection systems, & fire or employee alarm systems.

This applies to all employments except for maritime, construction, & agriculture

Subpart L

Fire Protection

OSHA's 29 CFR 1910 Subpart L will address:

- Fire brigades
- Portable fire extinguishers
- Standpipe & hose systems
- Automatic sprinkler systems
- General requirements for fixed extinguishing systems
- Dry chemical fixed extinguishing systems
- Gaseous agent fixed extinguishing systems
- Water spray & foam fixed extinguishing systems
- Fire detection systems
- Employee alarm systems
- An appendix addressing all of the above

Extinguishing Fires

Subpart L

Portable fire extinguisher training & education

- Required for employees authorized to use fire extinguishers
- Required initial employment/assignment instruction & hands on
- Required annual instruction & hands on
- Hazards of incipient stage fire fighting
- Basics of fire extinguisher use
- Instruction & hands-on practice

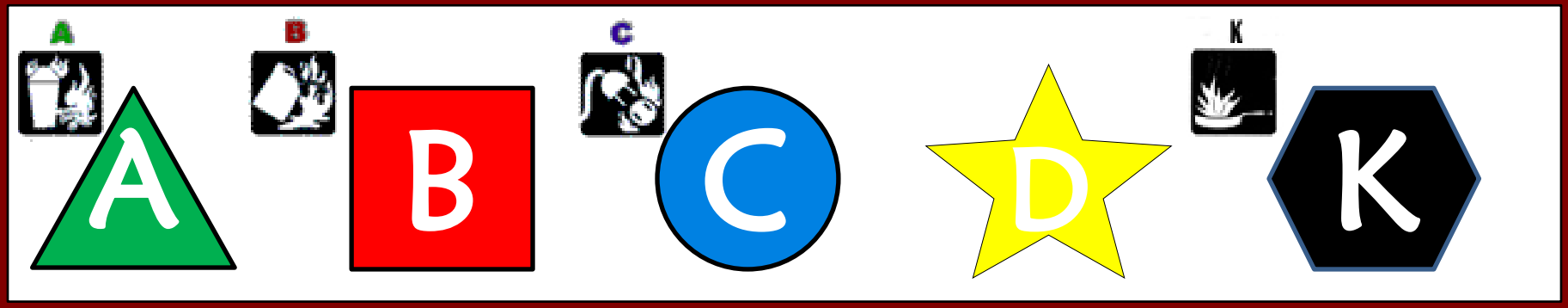
Source: OSHA

Extinguishing Fires

Subpart L

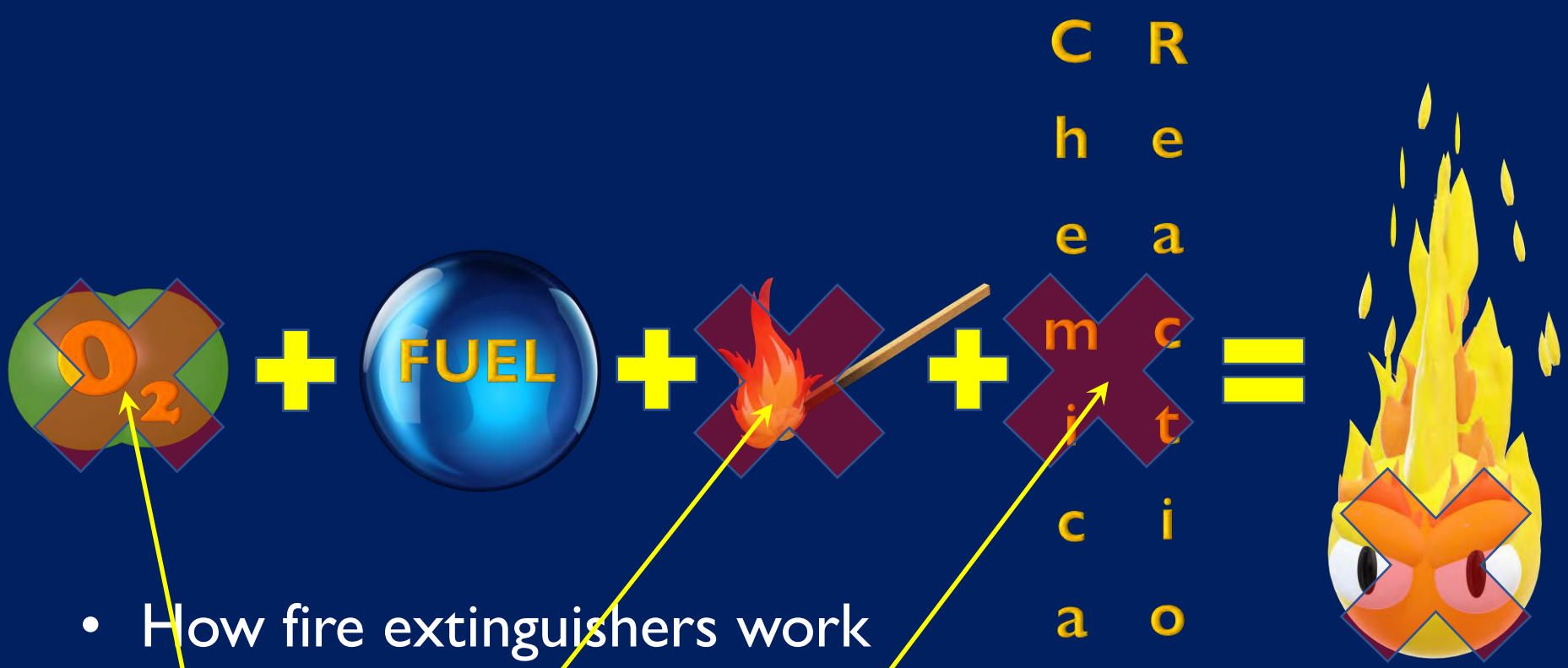
Classes of fires:

- Class A – Ordinary combustibles
- Class B – Flammable liquids & gases
- Class C – Energized electrical equipment
- Class D – Combustible metals
- Class K – Cooking oils & greases



Source: OTIEC

Fire Prevention Plans



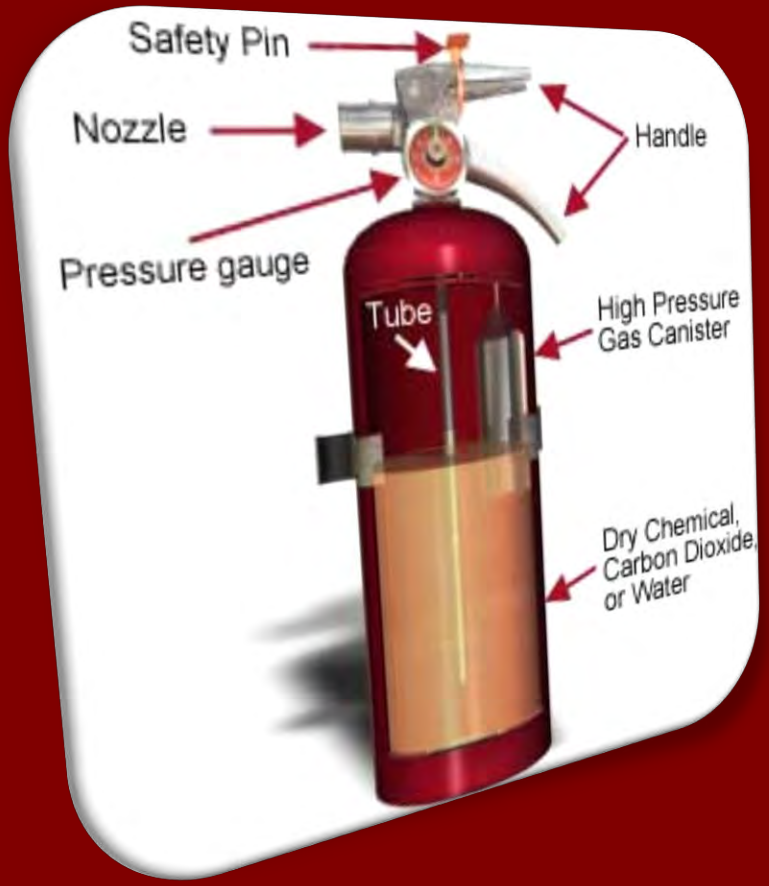
- How fire extinguishers work
  - Remove heat
  - Displace/remove oxygen
  - Stop chemical reaction

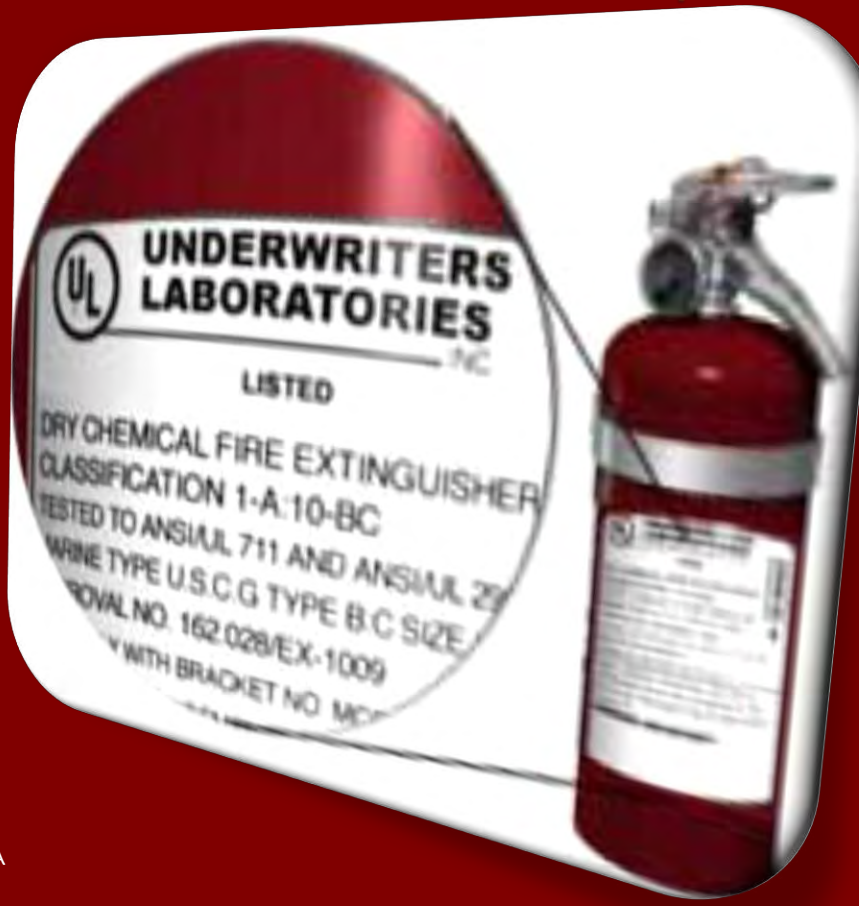
Subpart L

Extinguishing Fires

Subpart L

Parts of a fire extinguisher & labels





Source of graphics: OSHA

Extinguishing Fires

Types of extinguishers:

- Water
- Carbon Dioxide
- Dry Chemical

Source: OSHA

Subpart L

Extinguishing Fires

- Water or air-pressurized water (APW) extinguishers
  - Designed for **Class A fires only**
  - Large silver container, 2 to 3 ft. tall, weighing about 25 lbs. when full
  - Filled 2/3 with ordinary water, then pressurized with air
  - Detergents may be added
  - Cool the surface to remove the heat
  - Never use to extinguish flammable liquid fires or electrical fires

Source of graphics: OSHA

Extinguishing Fires

- Carbon Dioxide (CO_2) extinguishers
  - Designed for **Class B & <u>Class C fires only</u>**
  - Red cylinders, ranging from 5 to 100 lbs. or larger, with a hard horn & no pressure gauge
  - Filled with Carbon Dioxide (CO_2), under extreme pressure
  - Displace oxygen; dry ice pieces also have cooling effect
  - <u>Never use in confined space without respiratory protection</u>

Source of graphics: OSHA

Subpart L

Extinguishing Fires

- Dry Chemical extinguishers (Multi-purpose)
  - May be used on **Class A, Class B, &/or Class C fires** (check label)
  - Red cylinders, ranging in size from 5 to 20 lbs.
  - Fire-retardant powder is the extinguishing agent & is propelled by a compressed, non-flammable gas
  - Separates fuel from oxygen; powder also interrupts chemical reaction

Source of graphics: OSHA

Subpart L

Extinguishing Fires

- Class K – dry & wet chemical extinguishers
  - Designed for Class K **kitchen fires**
  - Only intended to be used after activation of built-in hood suppression system
  - Filled with electrically conductive extinguishing agents; use only after electrical power to appliance has been shut off
  - Potassium bicarbonate may be used in dry types; wet chemical extinguishers spray a fine mist

Source of graphics: OSHA

Subpart L

Extinguishing Fires

Using a fire extinguisher:

- Steps to follow
  1. Sound alarm; call fire department
  2. Identify safe evacuation path
  3. Select appropriate fire extinguisher
  4. Discharge extinguisher using P.A.S.S. technique
  5. Back away once extinguished
  6. Evacuate immediately if necessary
     - Extinguisher empty & fire is not out
     - Fire progresses beyond incipient stage

Extinguishing Fires

- P.A.S.S. technique
  - **Pull** the pin
  - **Aim** at base of fire
  - **Squeeze** handle
  - **Sweep** side-to-side at base of fire until fire appears out

Watch area for re-ignition & repeat steps 2 – 4;

When in doubt,
EVACUATE IMMEDIATELY!

Source: OSHA

Subpart L

Maintenance of Extinguisher

Elements of inspection:

- Inspect bottle, handle, hose, & gauge for proper working order
- Inspection tag
  - Month & year put in service must be current (annual)
  - Monthly visual inspections completed (monthly)
  - Extinguisher product still free-flowing inside bottle (turn upside down &/or shake)

Knowledge Check

Only those employees who have received training on the use of a fire extinguisher can be authorized to use a fire extinguisher during a workplace fire.

a. True
b. False

Answer:
a. True

Knowledge Check

Trash fires involving paper & wood products are __ fires.

a. Class A
b. Class B
c. Class C
d. Class D

Answer:
a. Class A

Knowledge Check

Which fire extinguisher is appropriate for use on a fire involving gasoline in a confined space when no respiratory protection is available?

a. Water (APW) extinguisher
b. Carbon dioxide extinguisher
c. Dry chemical extinguisher
d. Class K dry-type extinguisher

Answer:

c. Dry chemical extinguisher

Knowledge Check

The P.A.S.S. technique for using a fire extinguisher means ___.

a. Position, aim, sweep, slowly
b. Pull, aim, squeeze, sweep
c. Point, away, side-to-side
d. Pin, approach, start, stop

Answer:

b. Pull, aim, squeeze, sweep

Knowledge Check

At minimum, how often must maintenance checks be performed on portable fire extinguishers?

a. Once a month
b. Once a year
c. Once every two years
d. Once every five years

Answer:
b. Once a year

Through the Alliance between OSHA's 10 Regional Offices and the Elevator Contractors of America (ECA), Elevator Industry Work Preservation Fund (EIWPF), International Union of Elevator Constructors (IUEC), National Association of Elevator Contractors (NAEC), National Elevator Industry Educational Program (NEIEP), and National Elevator Industry Inc. (NEII), collectively known as The Elevator Industry Safety Partners, developed this Exit Routes Industry Specific Training for informational purposes only. It does not necessarily reflect the official views of OSHA or the U.S. Department of Labor. May 2021

Under the Occupational Safety and Health Act, employers are responsible (http://www.osha.gov/as/opa/worker/employer-responsibility.html) for providing a safe and healthy workplace and workers have rights (https://www.osha.gov/workers). OSHA can help answer questions or concerns from employers and workers. OSHA's On-Site Consultation Program (https://www.osha.gov/consultation) offers free and confidential advice to small and medium-sized businesses, with priority given to high-hazard worksites. For more information, contact your regional or area OSHA office (https://www.osha.gov/contactus/bystate), call 1-800-321-OSHA (6742), or visit https://www.osha.gov/.

Questions?