

Welcome to the

2018 Annual Conference Educational Sessions

Session: Disaster Preparedness in the International Codes

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A green-tinted world map serves as the background for the slide. The map is centered on the Atlantic Ocean, showing the continents of North and South America on the left and Europe and Africa on the right. The map is overlaid with a dark green diagonal band that runs from the top-left to the bottom-right.

Disaster Preparedness in the International Codes

**Presenter: Kimberly Paarlberg, RA
International Code Council**

Agenda

- Planning strategies
- Types of disasters addressed in the I-Codes
- Emergency evacuation from a fire
 - Planning
 - Notification & Communication
 - Means of Egress (MOE)
 - Accessible Means of Egress (AMOE)
 - New Technology

National Planning System

The National Planning System consists of three levels of planning:

- **Strategic-level** plans address the execution of long-term or ongoing processes.
- **Operational-level** plans provide a description of roles and responsibilities, tasks, integration and actions required of a jurisdiction or its departments and agencies during incidents.
- **Tactical-level** plans focus on managing resources such as personnel and equipment that play a direct role in incident response.
- Planning is coordinated and integrated vertically – up and down levels of government and the community – and horizontally – across diverse functions, mission areas, organizations, and jurisdictions.
- <http://www.fema.gov/national-planning-system>

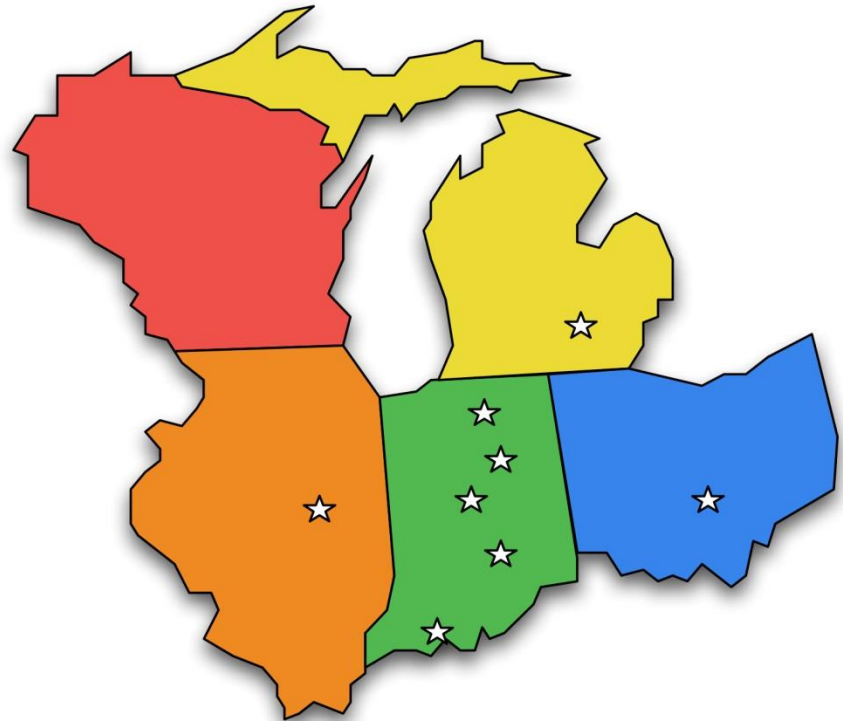
Planning for Disasters

- Pre-planning
 - During the event
 - Immediately following the event
 - Long term after the event



Considerations[☆]

- Region
- State
- County
- Community
- Neighborhood
- Family



Considerations

- Safety of the populations
- Vulnerable populations
 - Nursing homes/Assisted living facilities
 - Persons with disabilities/Elderly
 - Cultural communities
 - Lower economic communities
 - Children
- Animals – service, comfort, pets, livestock

Considerations

- Building resiliency
- Emergency services availability
- Road access
- Access to water

What are the International Codes?

- The **International Building Code (IBC)** is a model building code developed by the International Code Council (ICC).
- The ICC has a family of codes providing **minimum** requirements for public health and safety.
- It has been adopted throughout most of the United States at the state or local level as a **referenced** document. States do make **amendments**.
- Published every 3 years so that requirements stay current with industry advances.

2018 INTERNATIONAL CODES

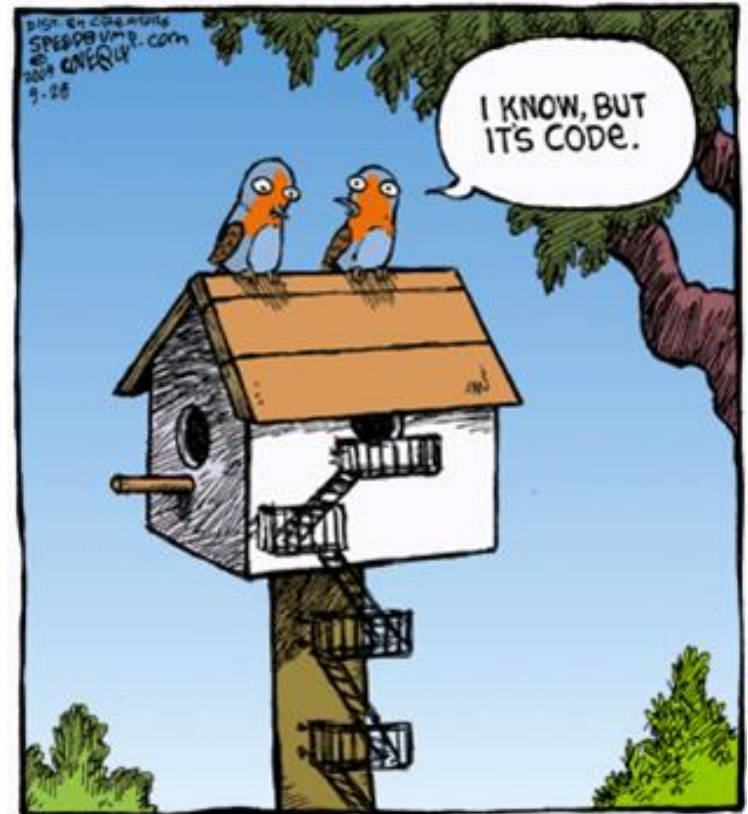


What are the International Codes?

- The IBC addresses construction and design or **new** buildings and **alterations**.
- The IFC code addresses the **operation** of a completed building.
- For example, the building code sets criteria for the **number, size and location** of exits in the design of a building while the fire code requires the exits of a completed building to not be blocked.
- The building code also deals with access for persons with disabilities – both in and out.

Enforcement

- The architect, contractor and building owner are required to comply with federal **and** state regulations.
- The building code official and fire official enforce **state/local** laws. These laws reference the IBC for minimum building requirements.
- The building code official does **not** enforce federal laws, including the ADA.
 - The 2010 ADA Standard for Accessible Design references the IBC for accessible means of egress.



Are you or your community prepared for this?



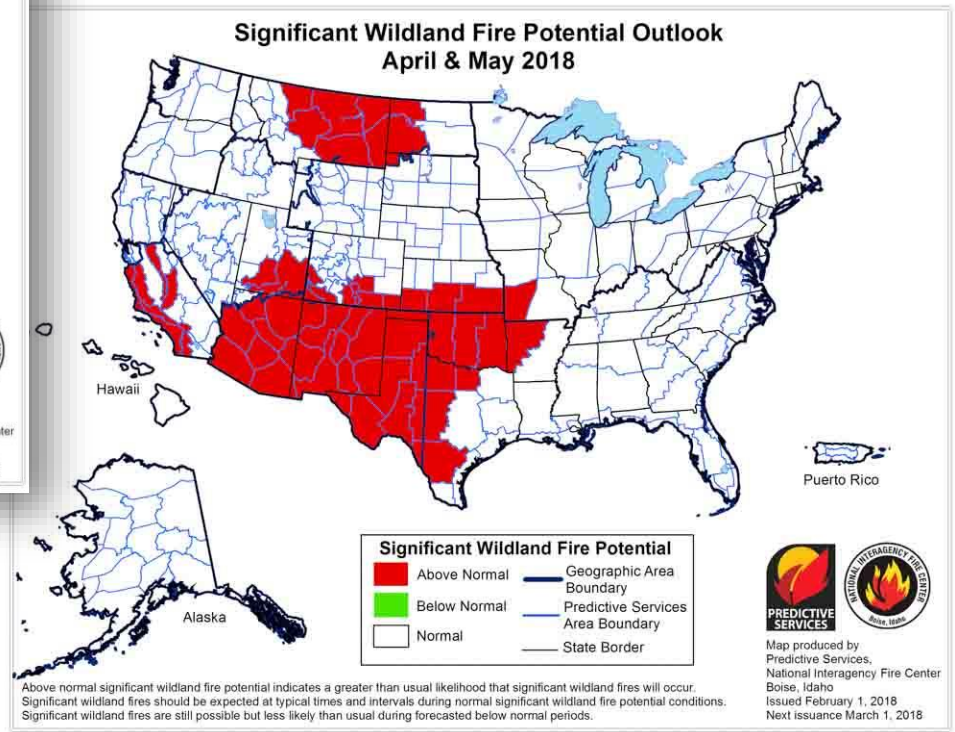
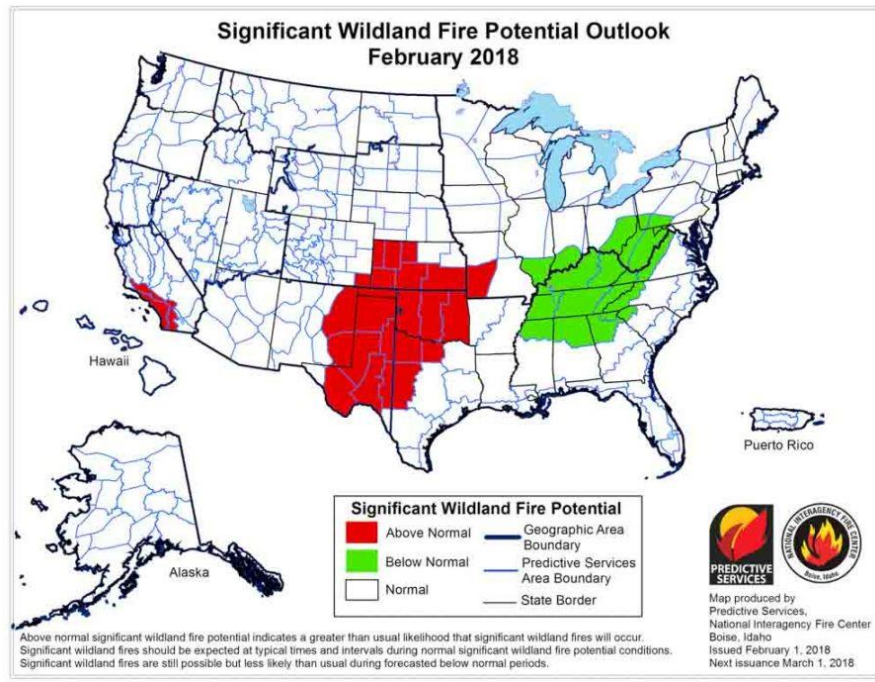
Types of hazards

- Earthquake
- Wildfires
- Severe weather
 - Snow/Ice
 - Flood/Storm Surge
 - Tornado/Hurricane/High Winds
- Fire

Wildfires

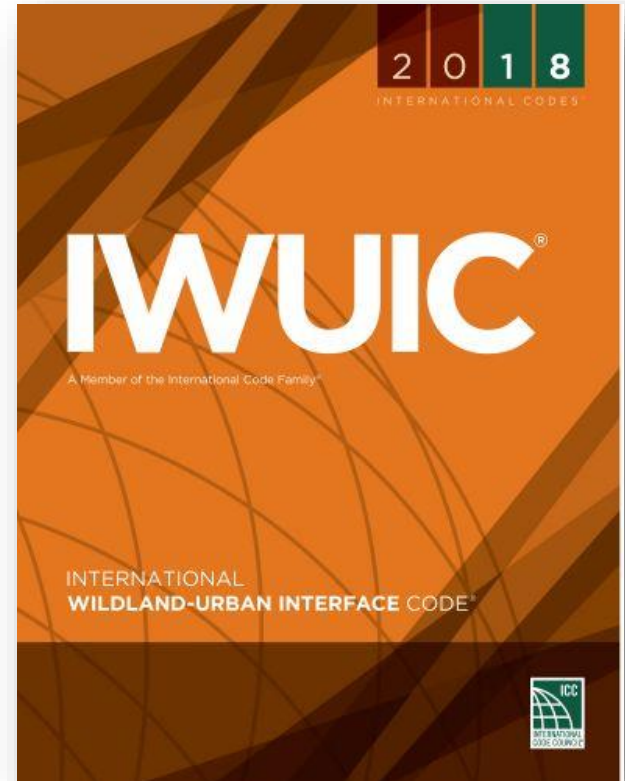


Wildfire Potential



In Wildfire Areas

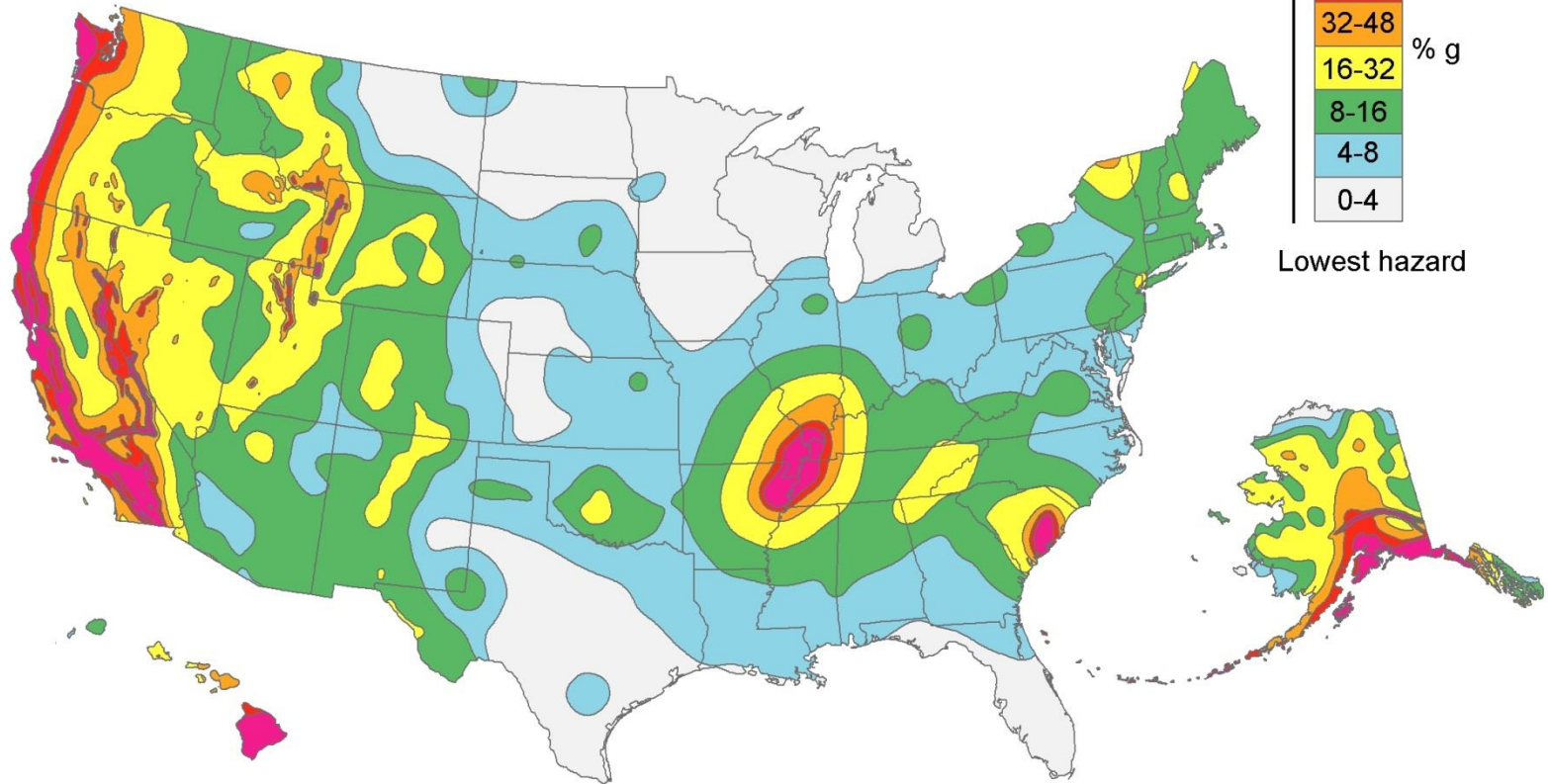
- ICC's *International Wildland-Urban Interface Code*® contains detailed requirements to minimize the hazards.
 - Fire service access; premises identification; access to water and equipment.



Earthquakes



Earthquakes



In Earthquake Areas



- The IBC contains requirements for earthquake design
 - Seismic resistance systems to improve building resistance to earthquakes
 - Reduce the risk of life loss or injury of occupants

In Earthquake Areas

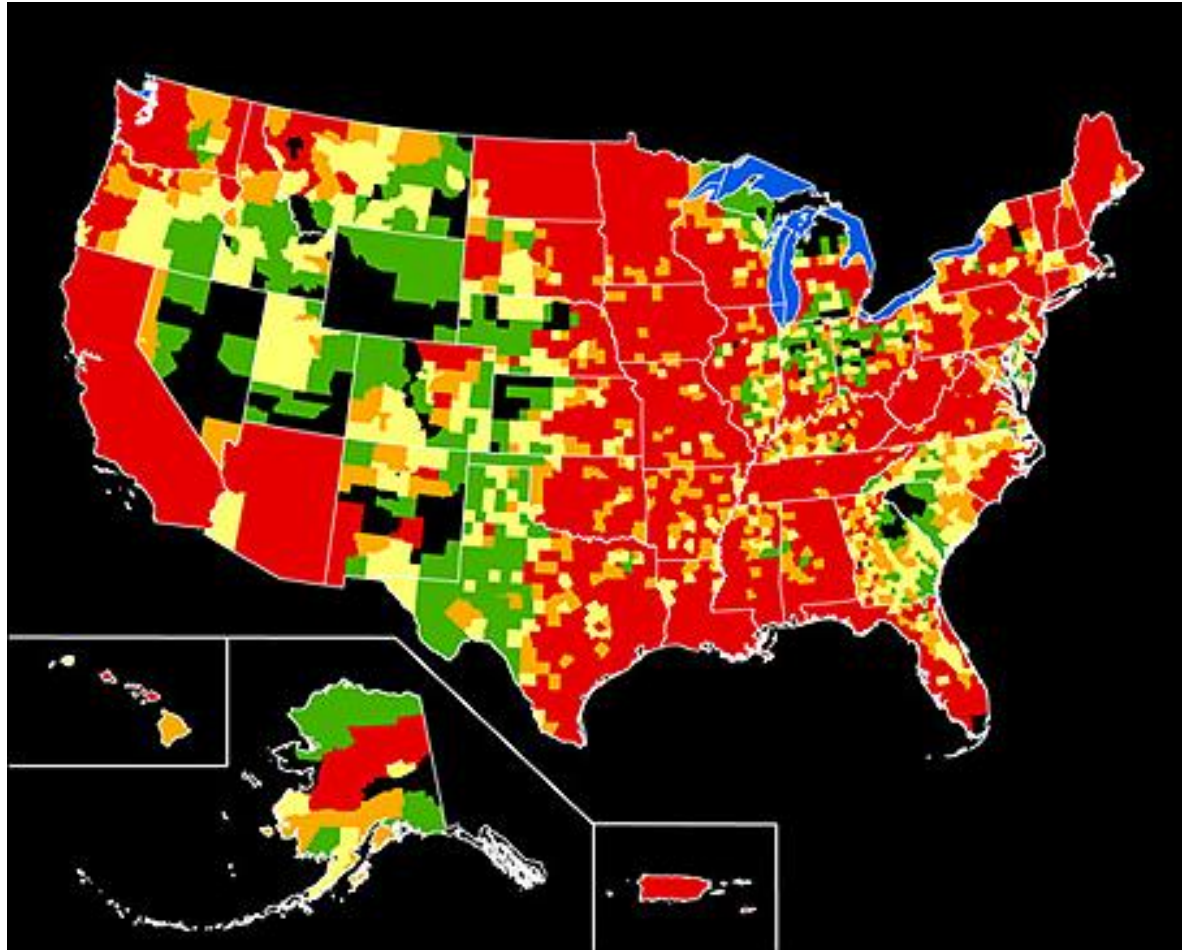
- Every new owned, leased or regulated federal building to compliance with the earthquake-resistant design provisions of the 2015 editions of the International Building Code (IBC) or the International Residential Code (IRC).



Floods/Storm Surge



Floods/Storm Surge

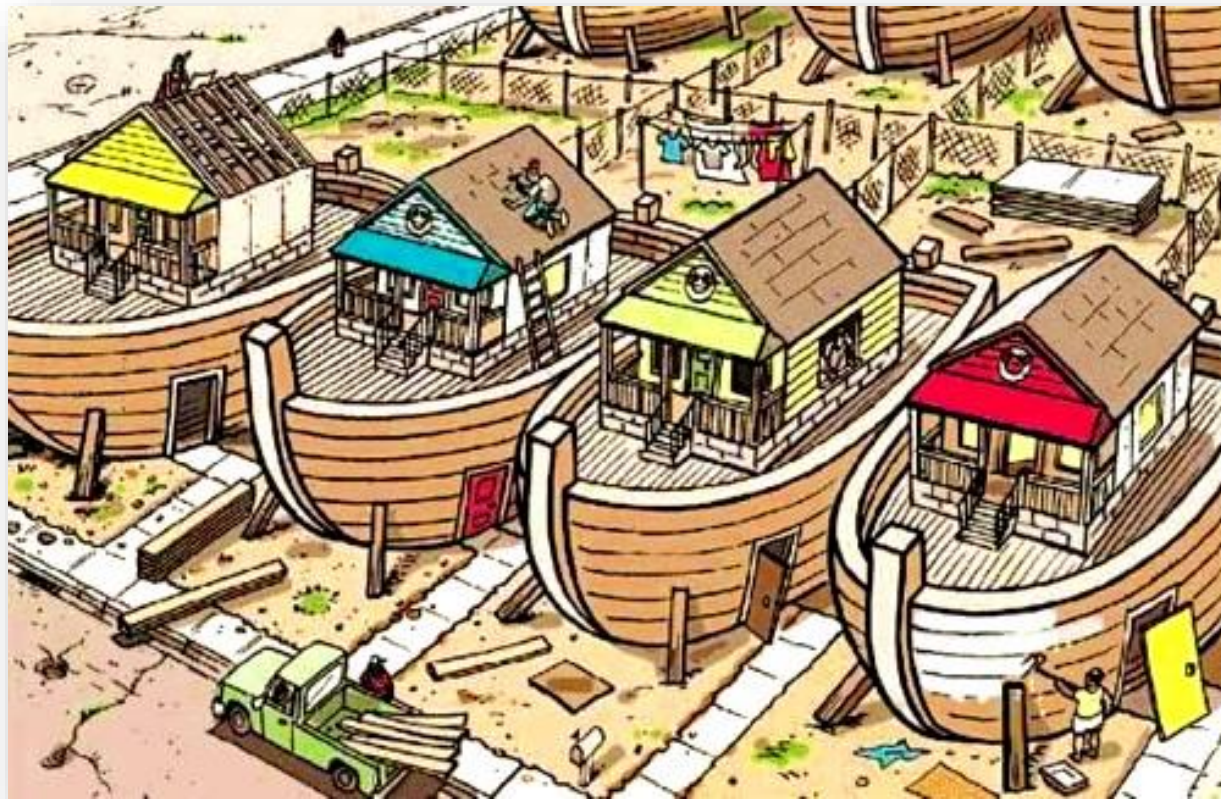


In Flood/Storm Surge Areas

- The IBC contains requirements for building in flood and coastal areas.
- This is in cooperation with FEMA and the NFIP.
- Wet/Dry floodproofing options



In Flood/Storm Surge Areas



In Flood/Storm Surge Areas



- Elevating residential above the base flood elevation (the elevation associated with the "100-year flood")
- Design floor elevation
- Freeboard

Tsunami



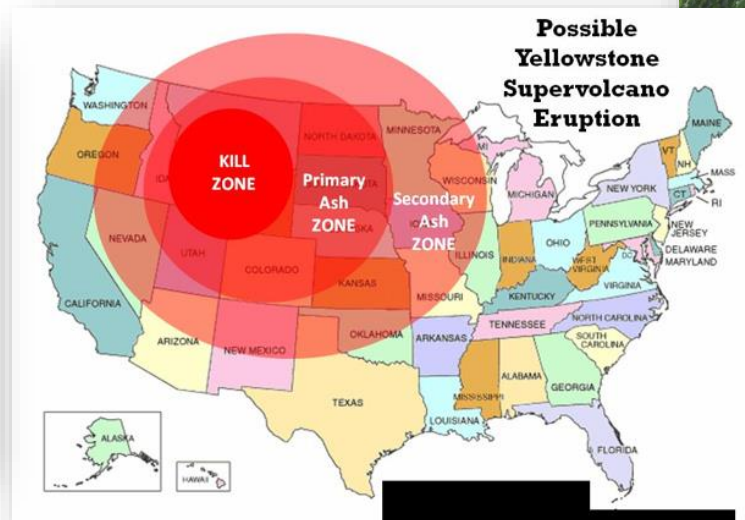
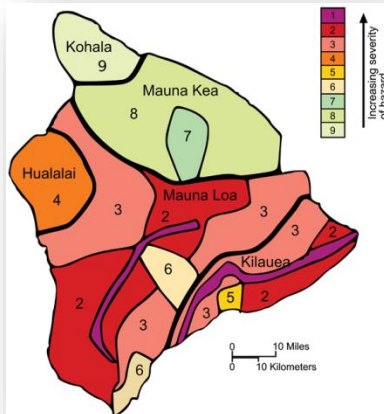
Appendix M Tsunami-Generated Flood Hazard.

- Addressing a tsunami risk for all types of construction in a tsunami hazard zone through building code requirements would typically not be cost effective, making tsunami-resistant construction impractical at an individual building level.
- The appendix does allow the adoption and enforcement of requirements for tsunami hazard zones that regulate the presence of high risk or high hazard structures.

Volcanoes



Not in the codes now.
Community planning similar to
tsunamis?



High winds



High Winds

- The IBC has requirements for high wind and weather protection.
- The requirements for high winds are not enough to protect your home or business from a tornado or hurricane.

Tornadoes and Hurricanes



Wind loads

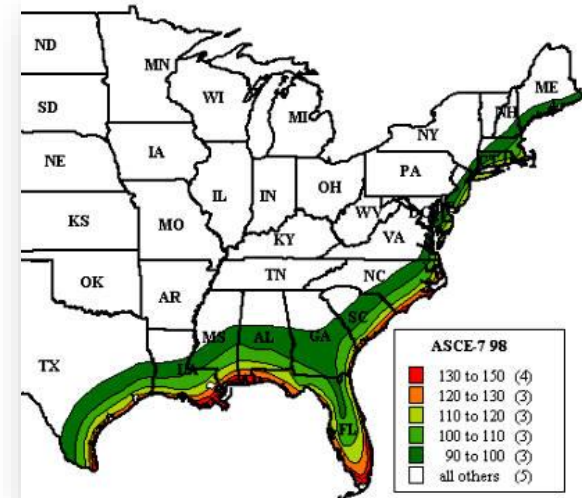
- Wind load contour maps

- Hurricanes ☯

- Atlantic coast and Gulf of Mexico
 - Hawaii, Puerto Rico, Guam and Virgin Islands

- Tornado ☁

- Mid-west and eastern states
 - Alaska, American Samoa, Guam, Hawaii, Puerto Rico, Virgin Islands



Types of shelters

- Shelters used for hurricanes



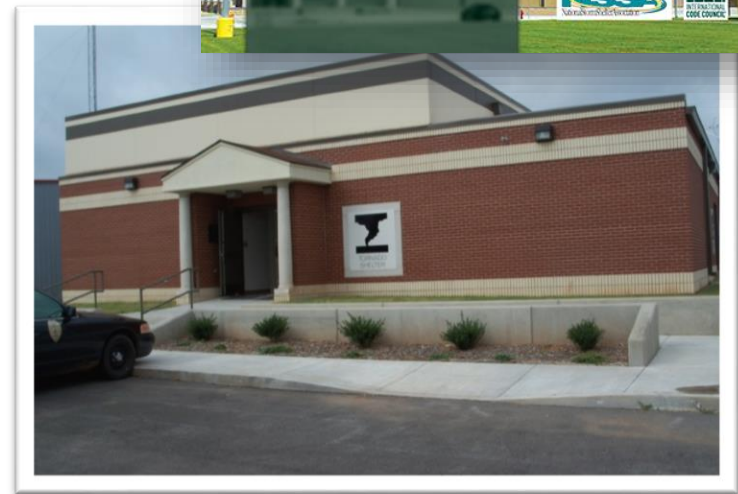
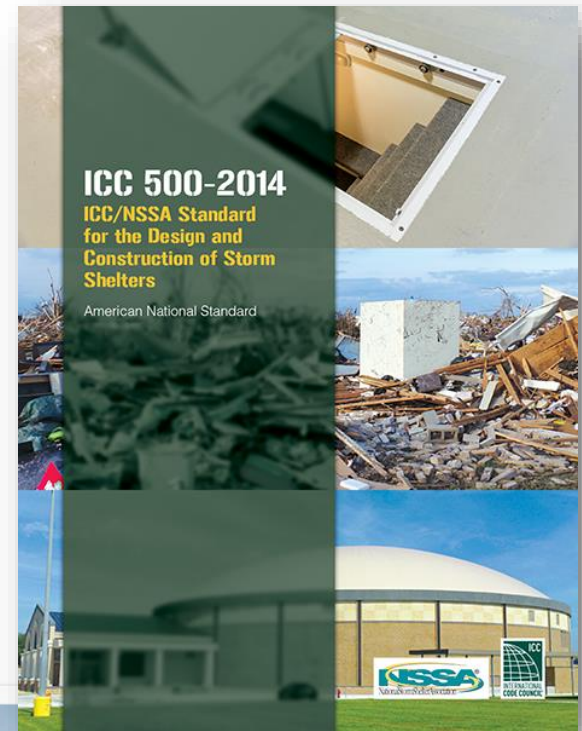
- Shelters used for tornadoes



- The primary difference in these two types is the expected duration of the storm.
 - Hurricane shelters – 24 hours
 - Tornado shelters – 2 hours

Types of shelters

- **Community shelters**
 - Any shelter that is not a residential shelter
- **Residential shelters**
 - Limited to 16 occupants maximum
 - Limited to a residence or small group of residences
- **ICC/NSSA 500** – Standard for the Design and Construction of Storm Shelters



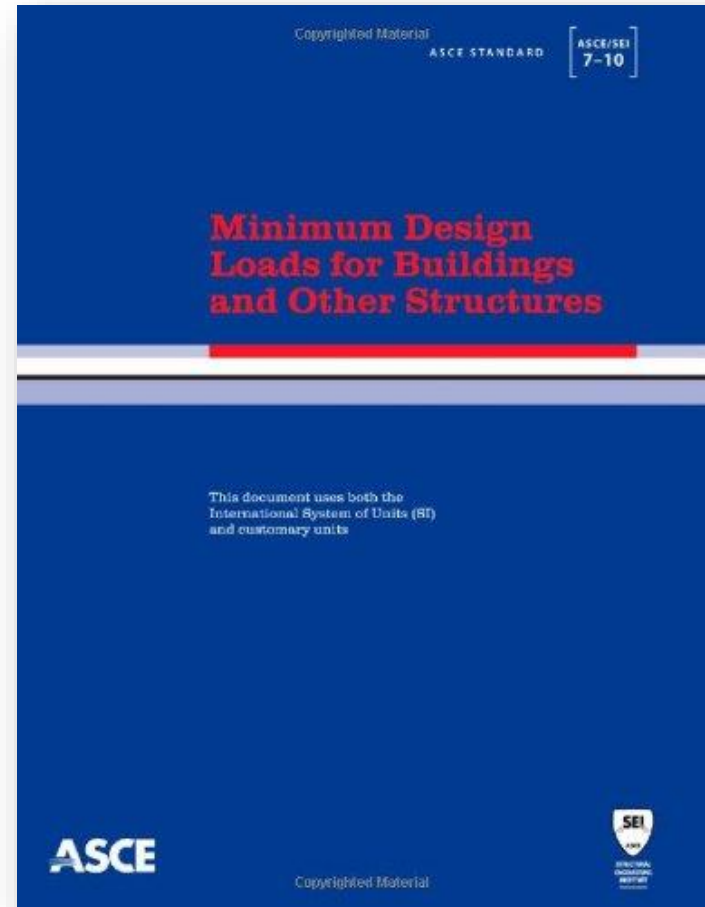
Essential Features

- Occupant density
- Number of doorways
- Emergency escape
- Ventilation
- Potable water and sanitation
- Emergency features
- Location
- Accessibility



Wind loads

- Modifications to ASCE 7 Method 2
 - Wind directional factor, K_d
 - Importance factor, I
 - Exposure category
 - Enclosure classification



Debris

- Research based on compact, rod and plate type missiles.
- Test methodology for testing walls, doors, shutters, and windows for impact from flying debris
- The debris missiles expected for tornadoes is considerably higher than hurricanes



Other structural issues

- Because fires often break out during or after a storm, the shelter must be protected by fire barriers and horizontal assemblies with a fire-resistance-rating of at least 2 hours.



Fires



Fire Protection

- The IBC contains requirements for:
- Fire rated construction, sprinklers, alarms and smoke detectors.
- Evacuations (Means of egress)

Means of egress

- Refers to the ability to exit the structure, primarily in the event of an emergency, such as a fire.
- A means of egress is broken into **three** parts: the path of travel to an exit, the exit itself, and the path to a safe area outside.

Means of egress

Requirements are based on:

- The **number of exits** required for a structure based on its intended **use** and the **number of people** who could be in the place at one time as well as their **relative locations**.
- **Special needs**, such as hospitals, nursing homes, and prisons where evacuating people may have special requirements.
- Possible **hazards** (such as in industries) where flammable or toxic chemicals will be in use.

Planning





Pre-Planning for Emergencies

- Fire evacuation plans
- Fire safety plans
- Lockdown plans
- Associated drills
- Worked out with the building owner/renter and the fire department
- Updated annually or when necessitated by changes
- Available for review





Pre-Planning for Emergencies

Required in:

- Assembly
- Churches over 2,000 occupants
- Educational
- College dormitories
- High Hazard
- Institutional
- Hotels
- Group homes



Pre-Planning for Emergencies

Required in:

- High-rise buildings
- Covered malls > 50,000 sq.ft.
- Mercantile & Factory (> 500 occupants on the 1st floor and basements or 2nd floor > 100 occupants)
- Underground buildings
- Assembly, Educational and Mercantile with atriums

A green-tinted world map serves as the background for the slide. The map is centered and shows the outlines of continents. Diagonal bands of varying shades of green cross the map from the top-left to the bottom-right.

Notification & Communication

Signage

- Evacuation plans at elevators
- Signage at any non-accessible exits



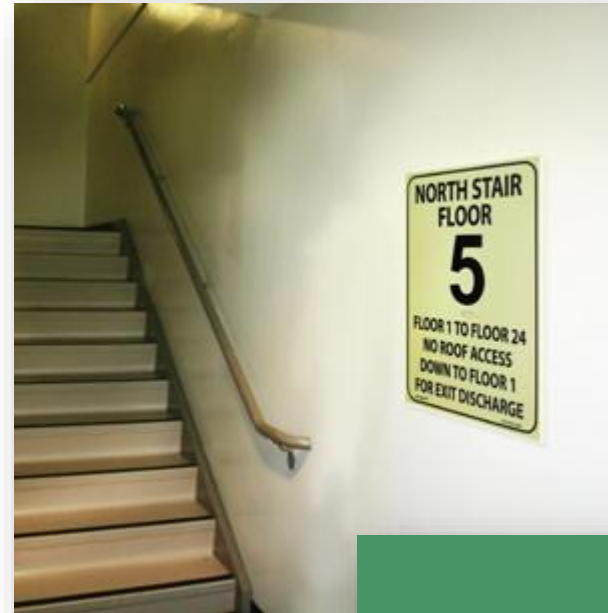
Signage

- Visual exit signs at stairway entrances
- Tactile exit signs at stairway entrances



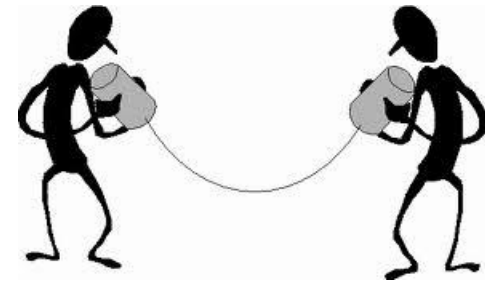
Signage

- Visual signage within the stairway
- Tactile signage indicating floor levels
- Tactile signage at the door leading to the exit discharge



Two-way Communication

- Within areas of refuge
- At elevator lobbies in sprinklered buildings (2009, 2012 and 2015 IBC)
- Variety of options
- Allow for communication and feedback between emergency responders and people who need assistance



Visible Alarms

- All public spaces.
- All common spaces.
- Group I-1 (assisted living) and R-1 (hotel) units per Table 907.9.1.3.
- Future expansion for:
 - Individual employee work areas.
 - Smoke alarms in Group R-2 (apartments) units.



Sprinkler automatic notification

- Activation of the sprinkler system automatically notifies the fire department
- Upon arrival the fire department can use the sprinkler panel to identify the floor where the fire is happening
- Standby power on the elevators allow for the fire department to move to the fire floor so they can offer assistance.



A green-tinted world map serves as the background for the top two-thirds of the slide. The map is centered on the Atlantic Ocean, showing the continents of North America, South America, Europe, and Africa. The colors range from a light green in the center to a darker green towards the edges. Diagonal lines in a slightly different shade of green cross the map from the top-left to the bottom-right.

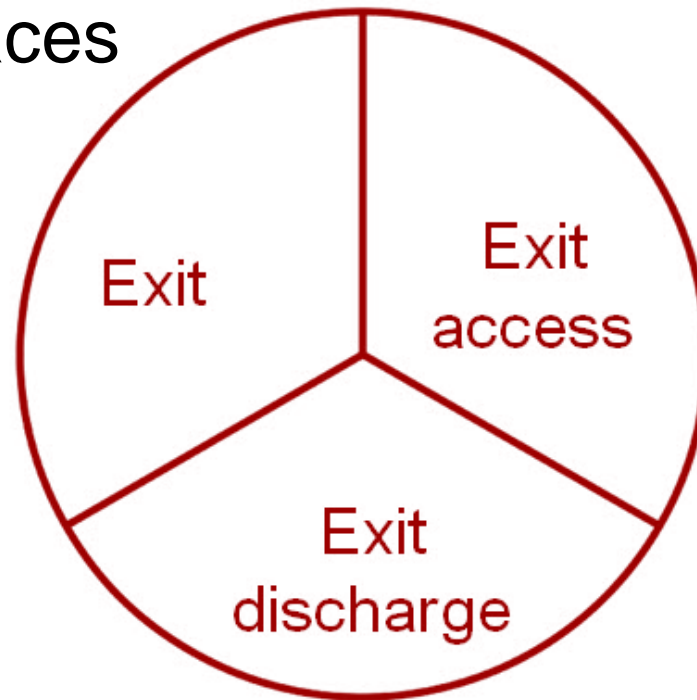
Means of Egress (MOE)

Means of Egress (MOE)

- A means of egress is
- an unobstructed path to leave buildings, structures, and spaces

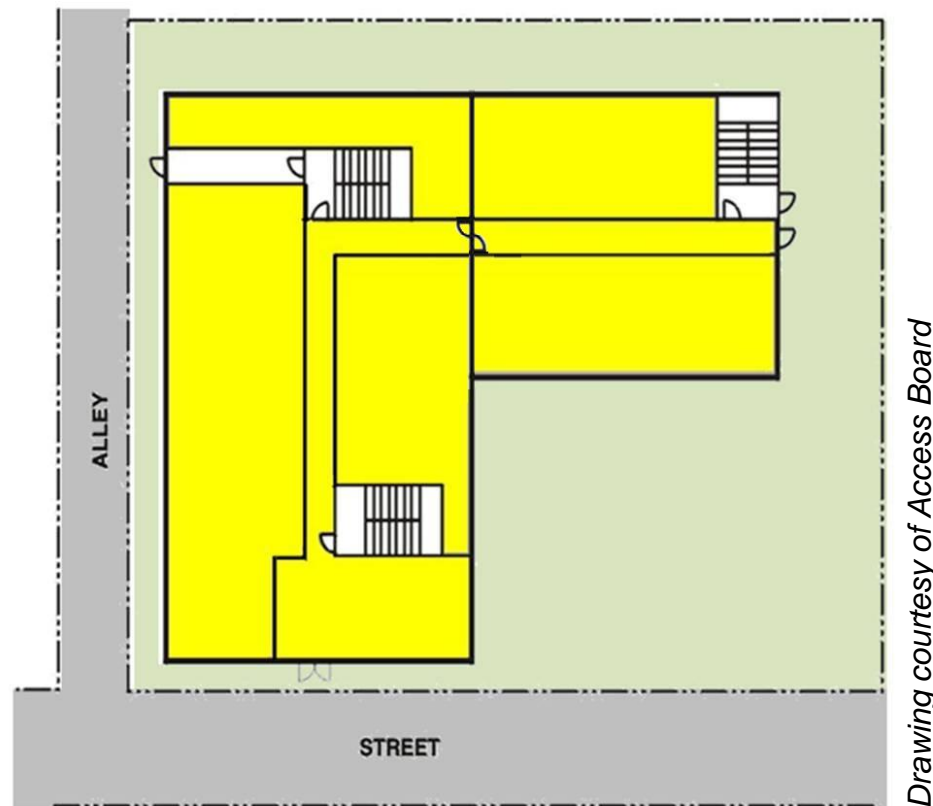
Comprised of:

- Exit Access
- Exits
- Exit Discharge



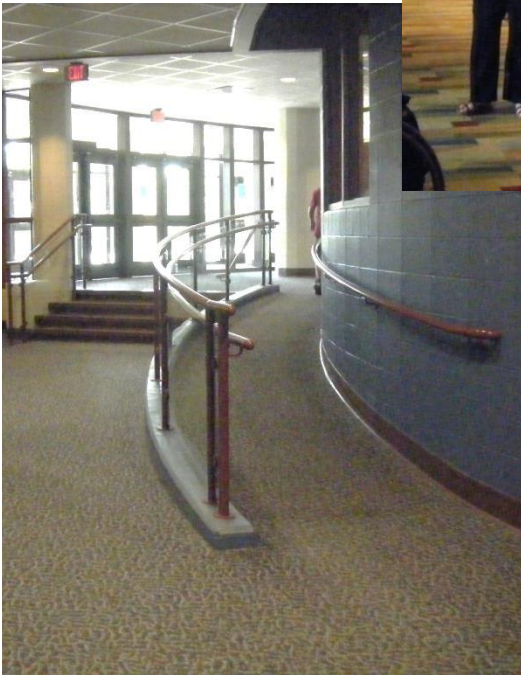
MOE: Exit Access

- The path from any location in a building to an exit



Accessible Exit Access

Ramps



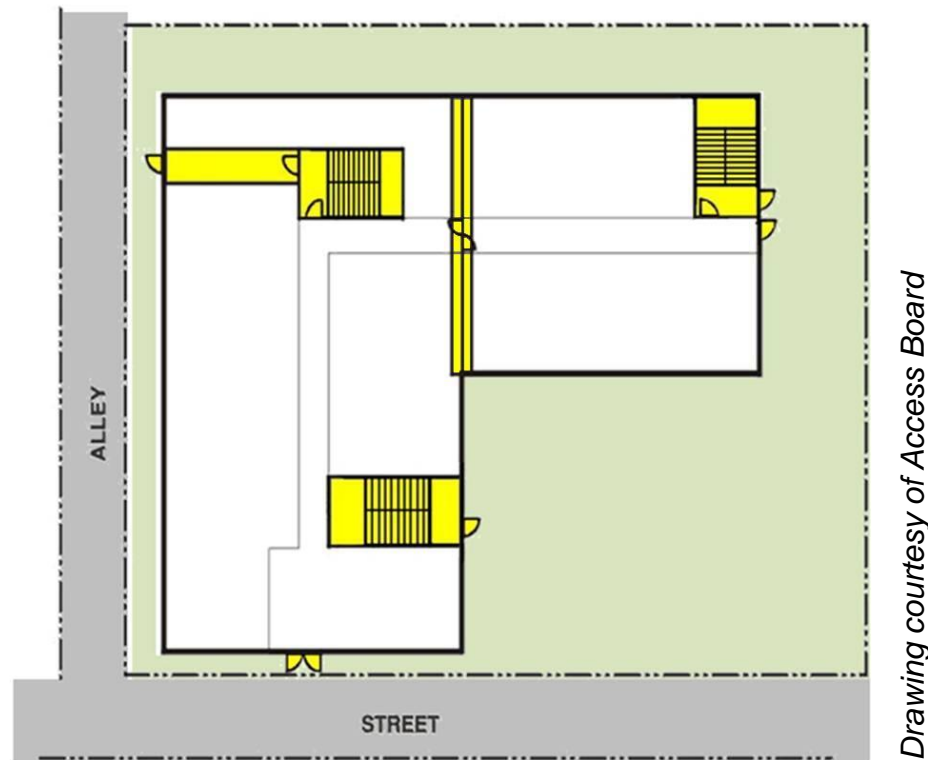
Horizontal
surfaces

Platform lifts with
standby power



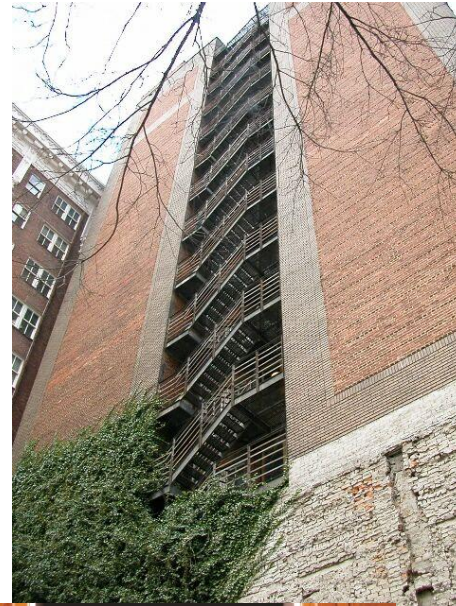
MOE: Exits

- Exits include doors to the outside, enclosed exit stairways, or horizontal exits



Accessible Exit

Exit Door



Exit Stairs



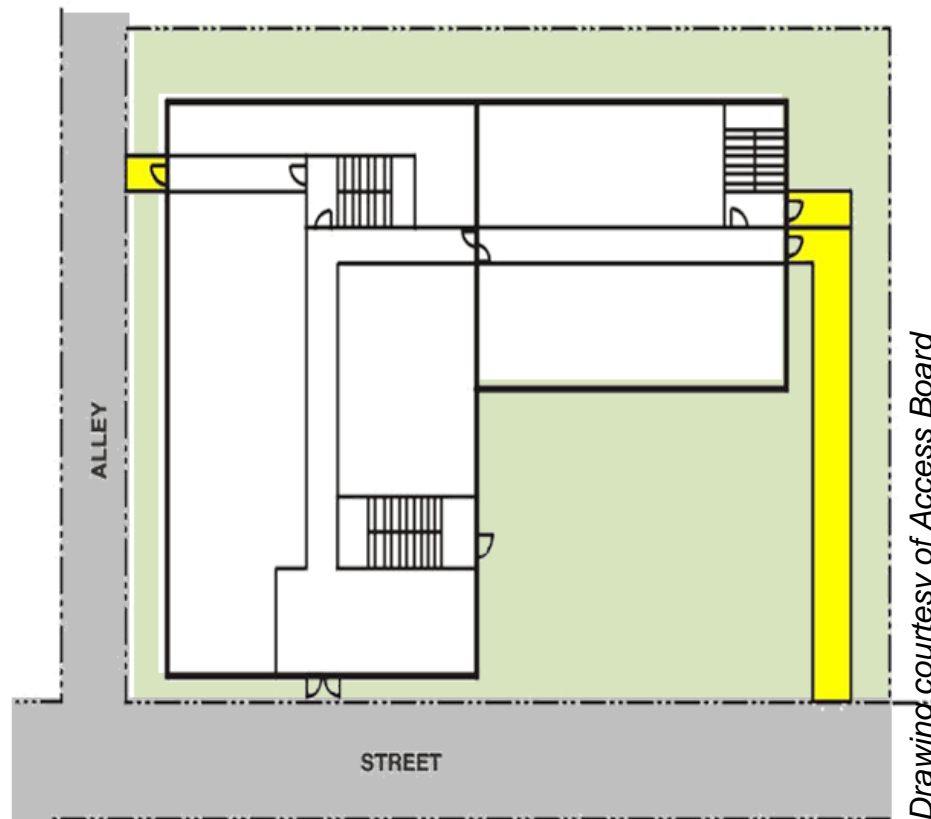
Horizontal Exit



Elevator with standby power

MOE: Exit Discharge

- The path from an exit to a public way (i.e., street or alley)



Accessible Exit Discharge



A green-tinted world map serves as the background for the slide. The map is centered on the Atlantic Ocean, with North and South America visible on the left and Europe and Africa on the right. The map is rendered in a light green color, contrasting with the darker green background.

Accessible Means of Egress

Accessible MOE

- An accessible means of egress is:
- A continuous and unobstructed accessible route of egress travel from any accessible point in a building or facility to a public way.



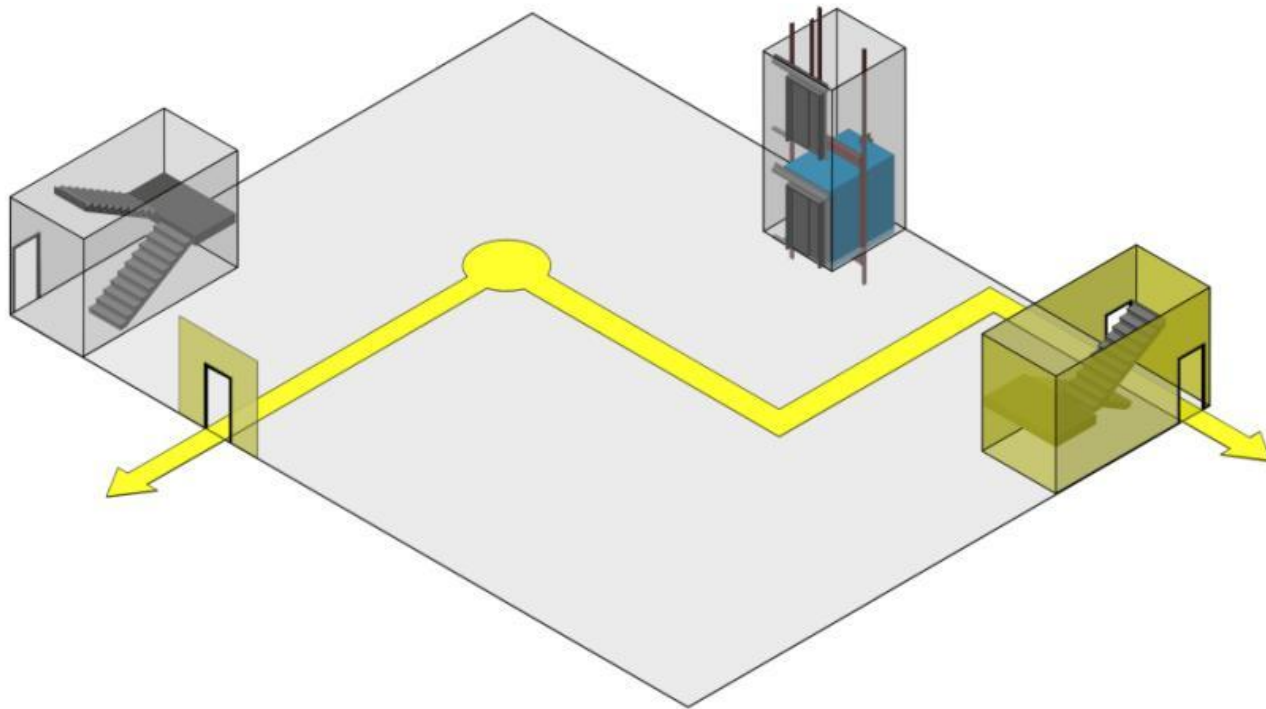
Accessible MOE

- Assisted rescue when necessary
- Defend in place (i.e., hospitals, jails)
- Assisted evacuation at stairways
- Assisted evacuation at elevators with standby power



MOE: Minimum Number

- IBC requires 2 or more MOE in most facilities with few exceptions

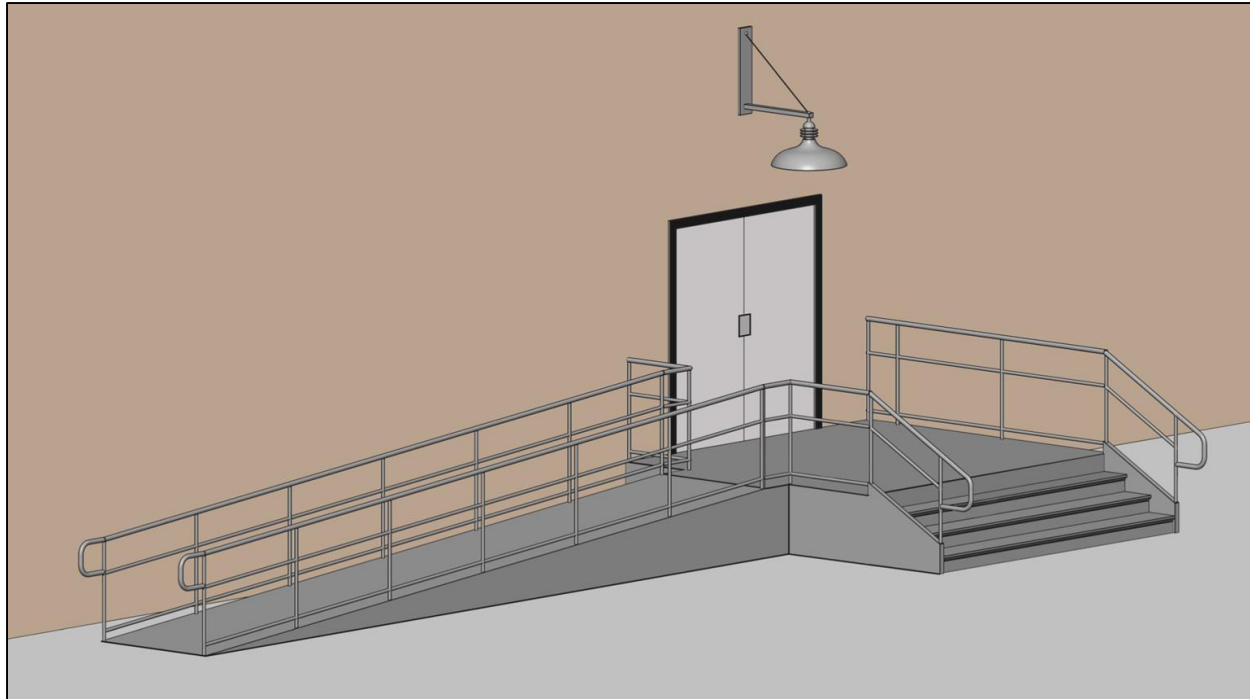


Drawing courtesy of Access Board



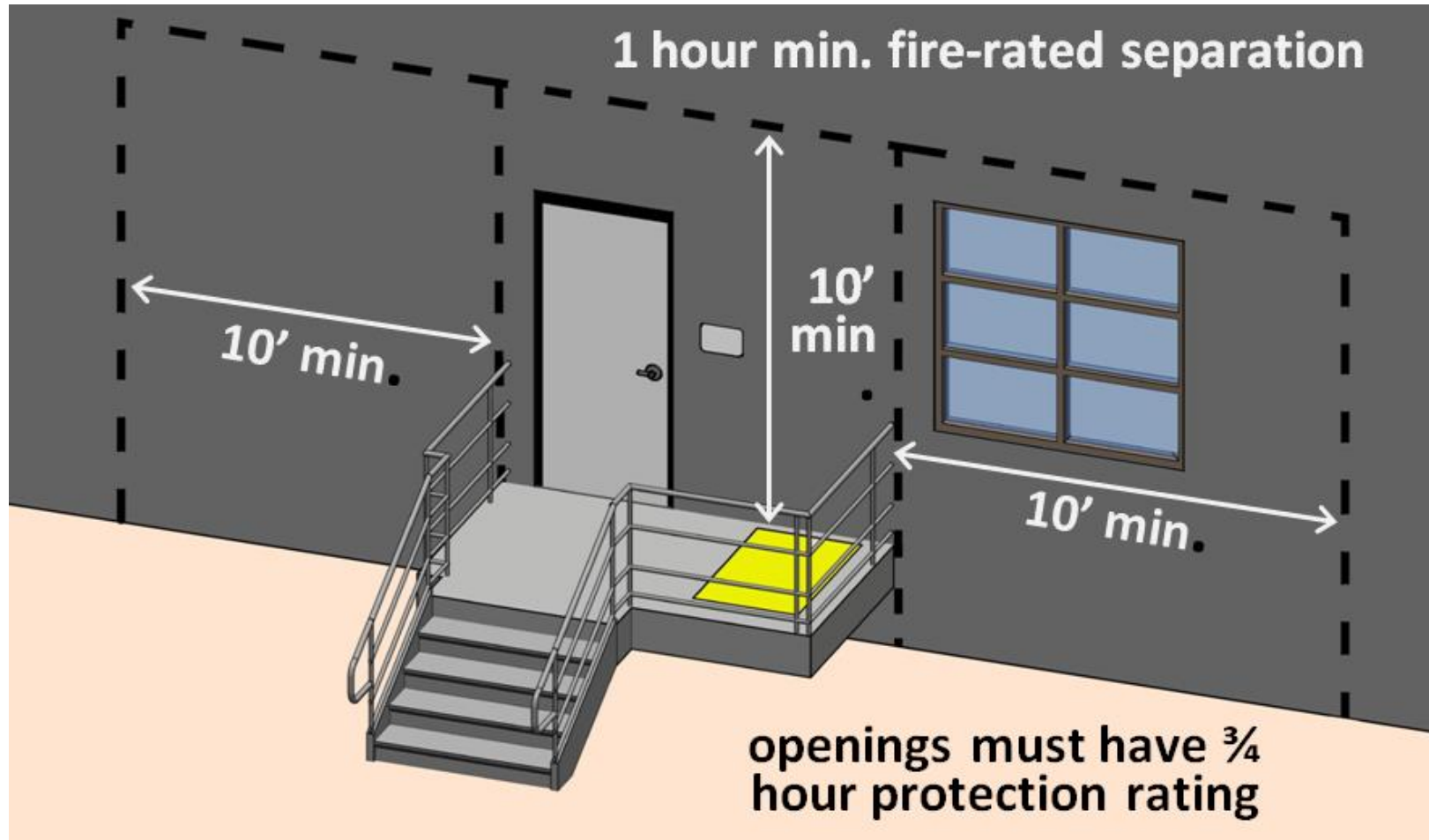
Exit Discharge

- Accessible route to a public way

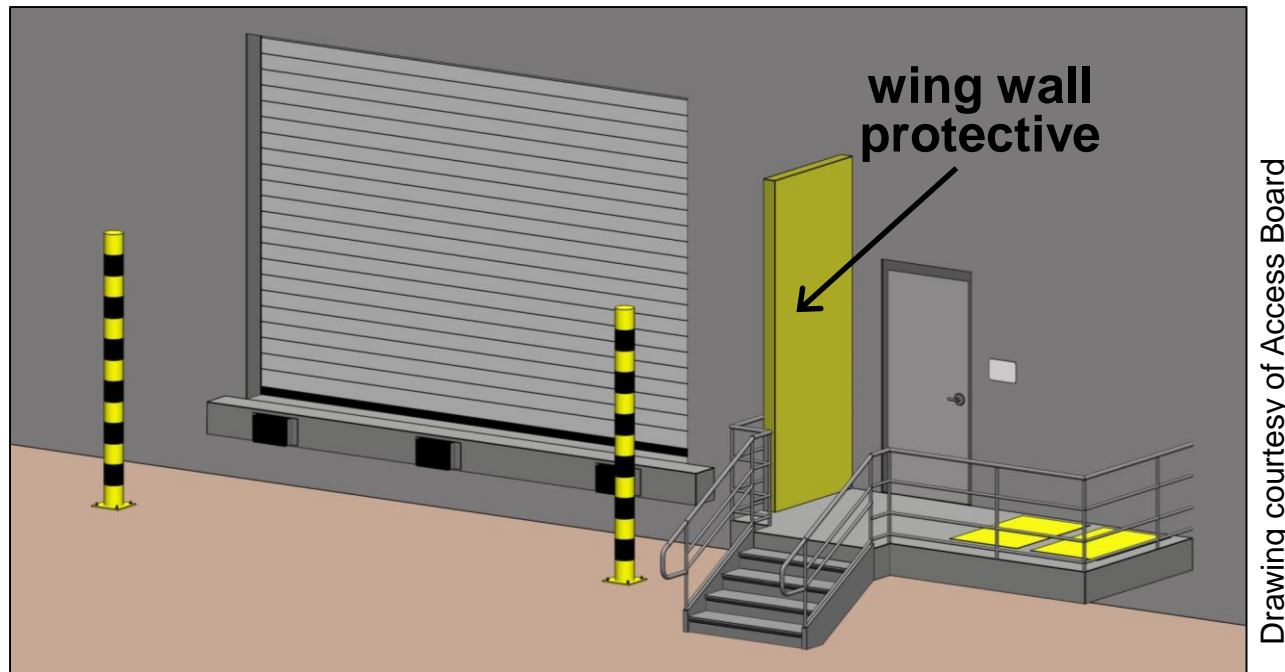


Drawing courtesy of Access Board

Exterior Area for Assisted Rescue



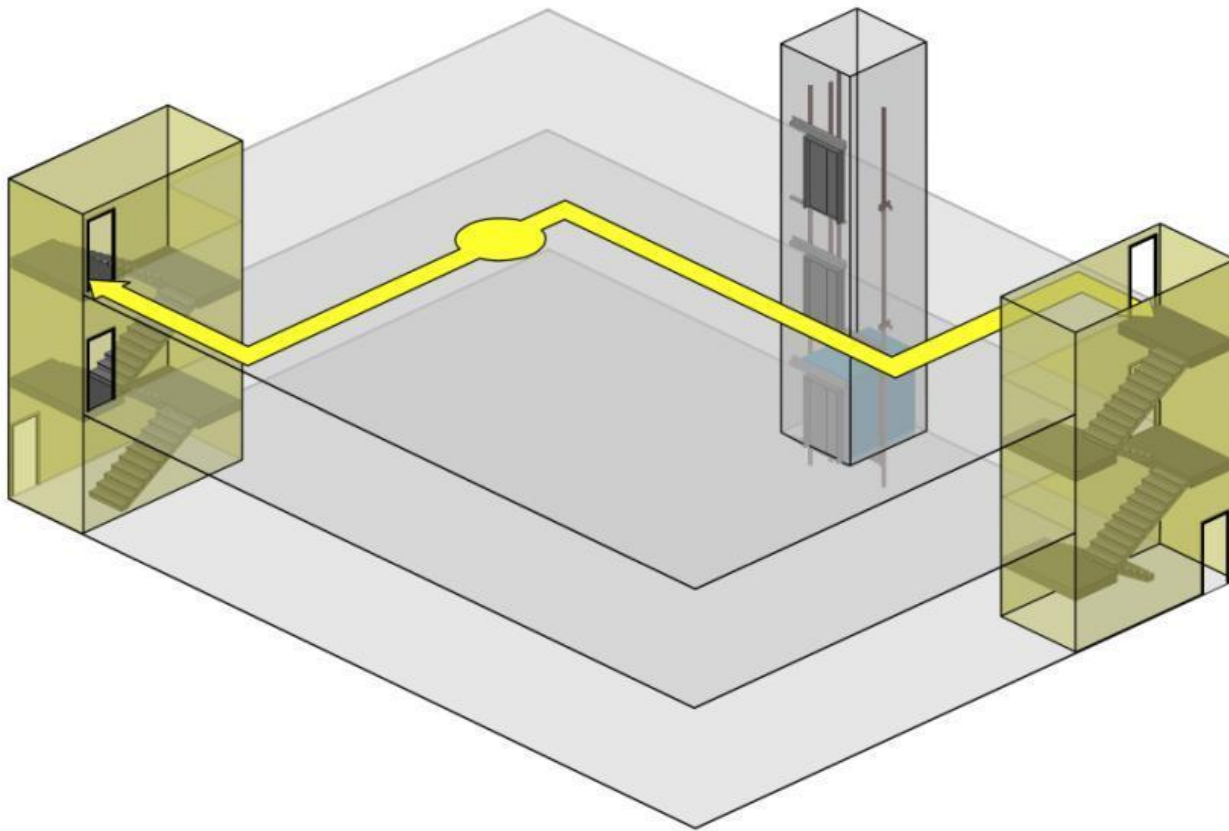
Exterior Area for Assisted Rescue



2012 IBC: New provision for alternative protection from opening on one side



Exit Access: Upper Floors

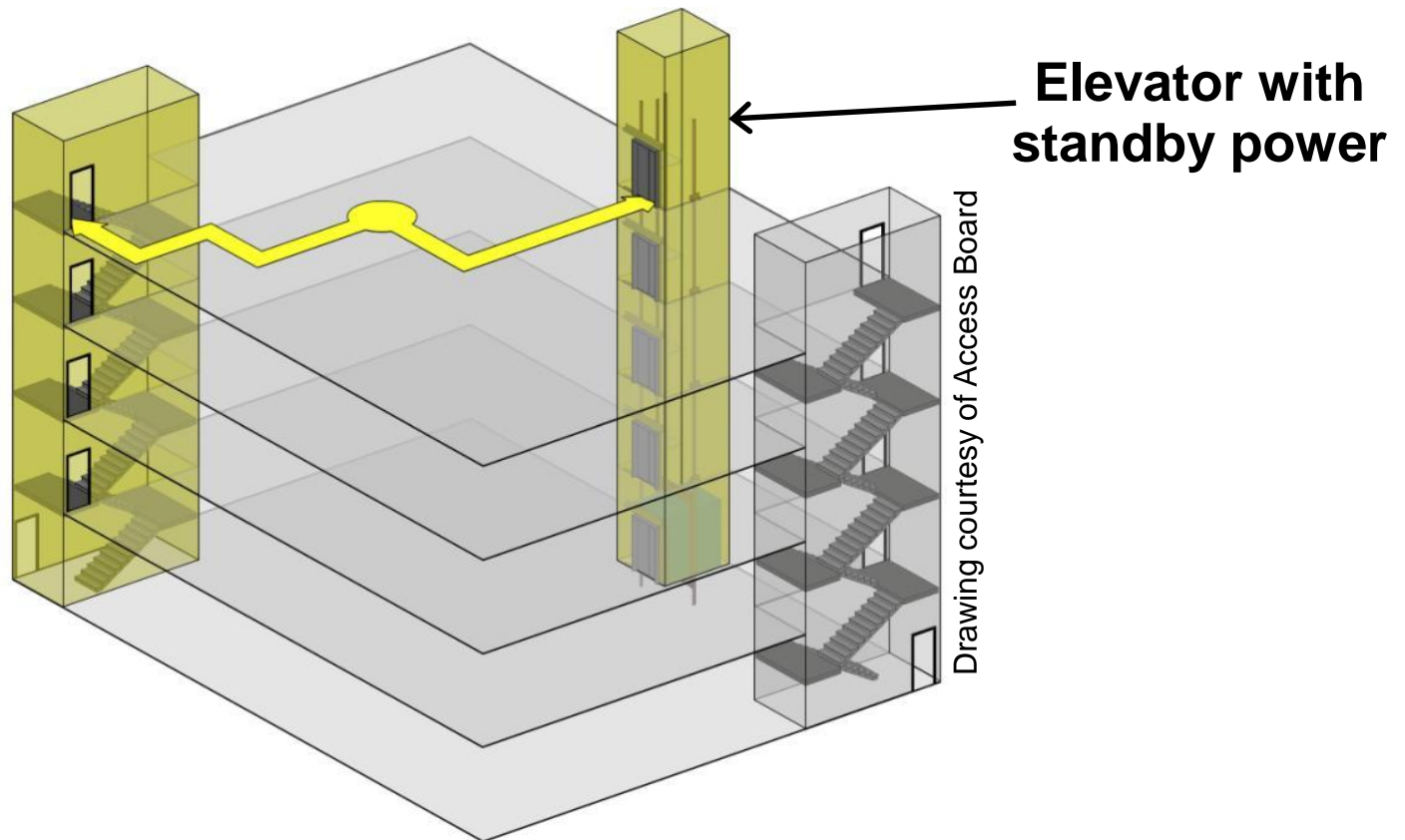


Drawing courtesy of Access Board



Elevator with Standby Power

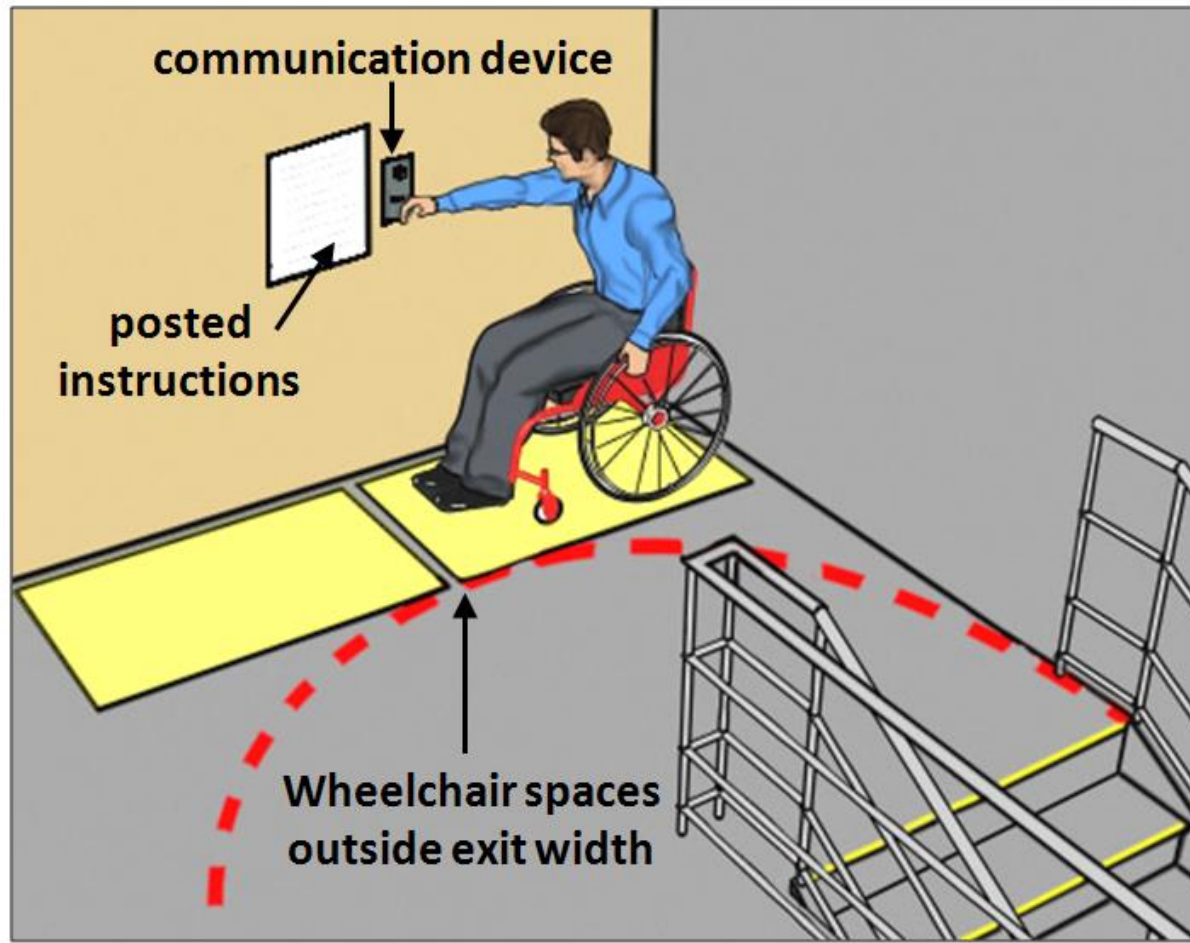
- Required in buildings 5 stories or higher



Areas of Refuge

- Required in non-sprinklered buildings on
- accessible route separated by a smoke barrier
- direct access to exit stairway, elevator with standby power
- 48" min. stairway width
- 30" x 48" space (1 for every 200 occupants) located outside general MOE path
- two-way communication system
- identification and instructional signage
- alternative: horizontal exit

Areas of Refuge



Drawing courtesy of Access Board

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2009 & 2012

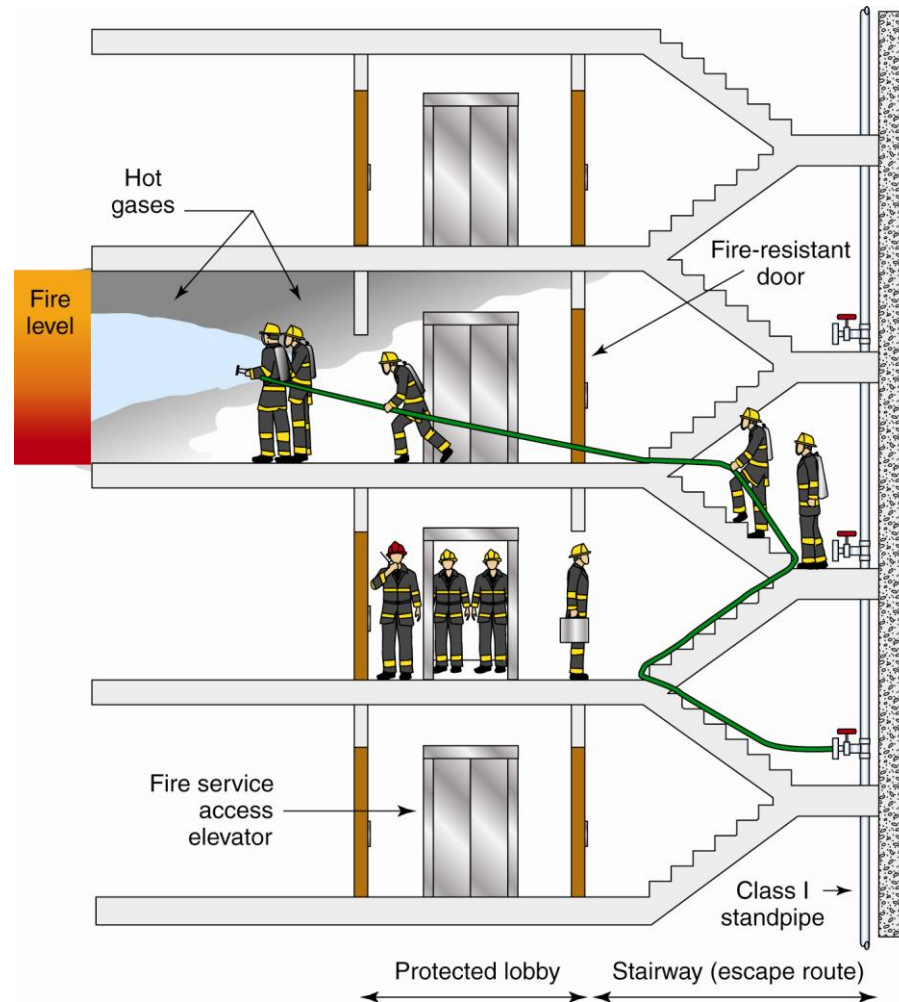
International Building Code

New Technology

Fire Service Access Elevators

- Required in buildings with floor >120 ft. above fire department vehicle access
- Must open into a fire service access elevator lobby and have direct access to an exit enclosure
- Numerous requirements: lobby protection, minimum lobby size, standby power, monitoring of elevator, protection of wiring, etc.

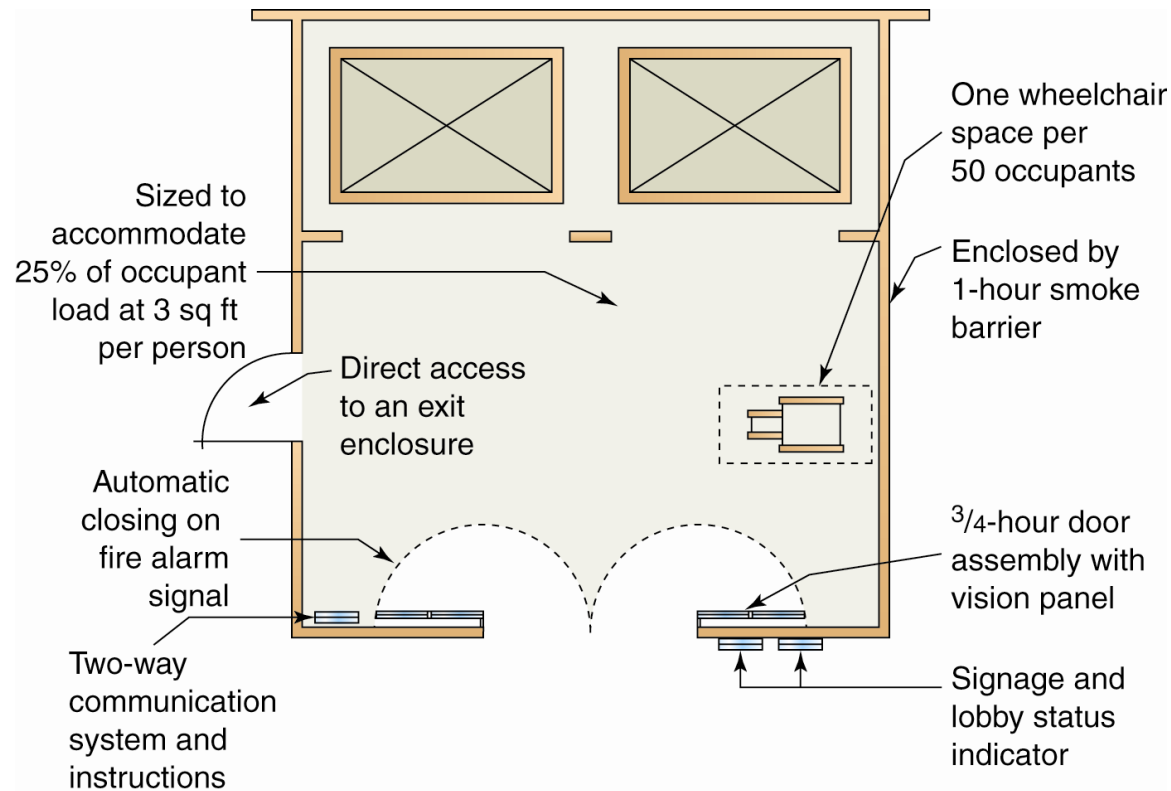
Fire Service Access Elevators



Occupant Evacuation Elevators

- Used for occupant self evacuation prior to emergency recall
- Must open into an elevator lobby and have direct access to an exit stairway
- Numerous requirements: lobby protection, minimum lobby size, elevator status indicators in lobby, standby power, monitoring of elevators, protection of wiring, etc.

Occupant Evacuation Elevators



Occupant Evacuation Elevator Lobby

Discussion Activity





Final Reflection

This slide will help the learner to reflect on the day and what they will take back to the job and apply.

- **What?** What happened and what was observed in the training?
- **So what?** What did you learn? What difference did this training make?
- **Now what?** How will you do things differently back on the job as a result of this training?

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