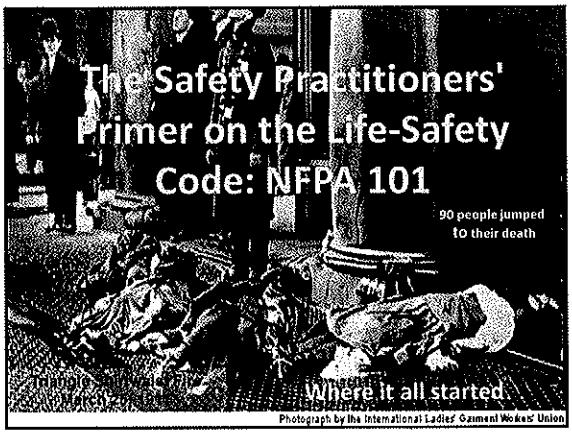
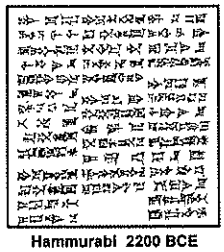


THE ENEMY - Fire is:

- **Fire is HOT! - Heat is more threatening than flames.**
  - A fire's heat alone can kill. Room temperatures in a fire can be 100 degrees at floor level and rise to 600 degrees at eye level. Inhaling this super hot air will scorch your lungs. You then drown
- **Fire is DARK! - Fire isn't bright, it's pitch black.**
  - Fire starts bright, but quickly produces black smoke and complete darkness.
- **Fire is FAST! - There is little time!**
  - In less than 30 seconds a small flame can get completely out of control and turn into a major fire.
- **Fire is DEADLY! - Smoke & toxic gases kill more people than flames do.**

The First Life Safety Code

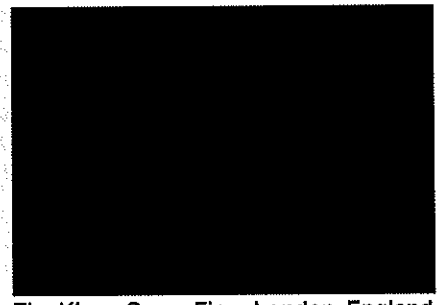


Hammurabi 2200 BCE

If a builder builds a house for a man and does not make its construction firm and the house collapses and causes the death of the owner of the house – that builder shall be put to death.

If it destroys property – he shall restore whatever it destroyed and because he did not make it firm, he shall rebuild it at his own expense

Human Reactions to Fire



The Kings Cross Fire - London, England

9 Famous Fires
You should know about!

Historical

1.	**Iroquois Theatre fire** Dec. 30, 1903, Chicago, IL:	605 Dead
2.	**Triangle Shirtwaist Factory**, NYC; March 25, 1911:	146 Dead
3.	**Coconut Grove Night Club**, Boston, MA, Nov.18,1942:	492 Dead
4.	**Circus Fire**, July 6, 1944, Hartford, CT	169 Dead
5.	**Our Lady of the Angels**, Chicago, IL Dec. 1, 1958	95 Dead

Recent

6.	**Beverly Hills Supper Club**, May 28, 1977, Kentucky	65 Dead
7.	**Haunted Castle; 6 Flags Great Adventure**; May 11, 1984	8 Dead
8.	**Imperial Food Products;**, Hamlet, NC; Sept.3,1991	25 Dead
9.	**The Station Nightclub**; Feb. 20, 2003, W Warwick, RI	100 Dead

Triangle Fire
Causes/Lessons Learned

- Factory foremen had locked the exit doors to keep workers from taking breaks & stealing scraps of fabric.
- No fire alarm system
- No Sprinkler protection system
- Doors only opened inward & were blocked by the stampede of workers struggling to escape 8th & 9th floors
- NYFD had cited the Asch building (Triangle) for lack of adequate fire escapes a week before the fire.
  - (During fire the escape collapsed)
- The ladders of the city's fire engines could not reach high enough (6th floor) to save the employees.
- Public outrage led New York Gov. John Alden Dix to create the ***Factory Investigating Commission***, with broad subpoena powers and teams of investigators.

Why Have Safety Standards ?

- Almost every standard exists because someone **died** for want of that **safeguard.**
- Most do not see how lack of safeguards can cause an accident until one happens.
- Safety standards of any type are **not** negotiable.
- Standards are consensus documents; trade-off's are already incorporated. No further compromise should be allowed.

A. A. Ahern, NASA

HISTORY OF THE LIFE SAFETY CODE

The NFPA Safety to Life Committee was formed in 1913, and NFPA's Building Exits Code (later named the *Life Safety Code®*) was one of the first codes to address these protection and evacuation issues in 1927.

- It has been reviewed, revised and updated every 3 years since

Intended Goals of the Code's Requirements:

1. To provide for adequate safety without dependence on any single safeguard
2. To ensure that construction is sufficient to provide structural integrity during a fire while occupants seek safe refuge within the building or egress to the building exterior
3. To provide an appropriate degree of life safety considering the size, shape, and nature of the occupancy
4. To ensure that the egress paths are clear, unobstructed, and unlocked
5. To ensure that the exits and egress routes are clearly marked to provide the necessary cues and avoid confusion

Intended Goals of the Code's Requirements:

6. To provide adequate lighting
7. To ensure prompt occupant response by providing warning of fire
8. To provide for back-up or redundant egress arrangements
9. To ensure suitable enclosure of vertical openings
10. To allow for design criteria that exceed the scope of the *Code*.

What is the AHJ?

Authority Having Jurisdiction

- An organization, office or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation or a procedure."
  - On any one project, there may be many different AHJs: the owner, architect, engineer, building official, fire official, insurance company, etc. Identifying the many AHJs on a project is important because each may impose different requirements..

Life Safety Code Organization

Part	Chapters	Content
1	1 Through 7	Core or Fundamental Information
2	8 Through 29	Occupancy
3	30	Special Structures & Hi-rise Buildings
4	31	Operating Features
5	32	Mandatory Referenced Publications
6	Appendices A & B	Useful Additional Information

Content of the Key Chapters

- ***Definitions. Chapter 3*** provides definitions of terms commonly used in the Code. For example, the term shall indicates a mandatory requirement, while the term should indicates a recommended practice.
- ***Classification of Occupancy & Hazard of Contents. Chapter 4*** introduces some basic terminology in the classification of occupancies and contents hazards. An ability to properly classify occupancies and hazards is essential to correct application of the Code.

Content of the Key Chapters

- ***Means of Egress. Chapter 5*** establishes minimum requirements for the means of egress for application to all occupancy classifications. It specifically covers the components, number, size, arrangement, lighting, and identification of means of egress.
- ***Features of Fire Protection. Chapter 6*** establishes basic requirements for features of fire protection, which include construction, compartmentation through use of fire barriers, protection of vertical openings, subdivision of building space through use of smoke barriers, protection from hazards, and interior finish.

Content of the Chapters

- ***Occupancy Chapters.*** All of the chapters dealing with the individual occupancy types (Chapters 8-29) follow the same general pattern.
  - They address the topics of occupant load, types of exits, capacity of exits, number of exits, etc.
  - Many of the specifications for different occupancies are the same, but many variations also exist.

Content of the Chapters

- ***Special Structures & High Rise Buildings. Chapter 30*** apply to occupancies regulated by Chapters 8-29 that are in special structures or high-rise buildings. This section of the Code deals with *types of buildings* rather than types of occupancies.
- ***Operating Features. Chapter 31*** complement the features mandated by the earlier chapters of the *Code*. These complete the package of requirements that ensure a minimum, acceptable level of safety to life. This chapter focuses on how individuals (e.g., occupants, owners, maintenance personnel,) can augment the fixed, active life safety systems and other passive building features required by the Code.

Definition: Means of Egress

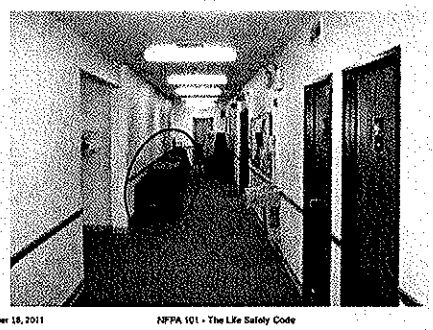
A continuous unobstructed path from any point in a building to a public way

- 3 parts
  - The way of exit access
  - The exit
  - The way of exit discharge
- Area of Refuge Concept

Exit Access Corridors & Exit Doors

- Exit access & exit doors shall be arranged & designed to be clearly recognizable.
- Means of egress shall be continuously maintained free of all obstructions or Impediments at all times.

Paths to Exits Must Not be Blocked



Exit Capacity

- Exit capacity is the number of occupants that the exit path can safely and efficiently handle.
- The code establishes minimum widths for exit components such as doors and stairs,
- Exit components must be sized to accommodate the design occupant load as determined by the codes through established occupant load factors (square feet per person) based on the proposed use of a space.

Occupant Load Factors

- Table 7.3.1.2 of the Life Safety Code identifies the occupant load factors to be used as part of the way the space is used, rather than on its occupancy classification.

Assembly Use

Concentrated use, without fixed seating	7 ft²/ person
Less concentrated use, without fixed seating	15 ft²/ person
Bench-type seating:	1 person/18 linear inches
Fixed seating :	Number of fixed seats

Egress Specifics

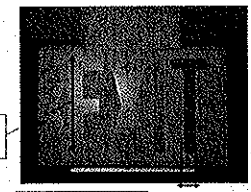
Stairs in the WTC were only designed to be 24" in 1968

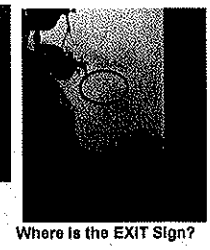
- Width of egress depends on elevation and angle of egress - minimum 30"
- Doors swinging into a means of egress must not restrict the egress width
- Door must swing with exit travel
- Egress must be able to accommodate the occupant load

Telltale Indicators

Things That You Should Look at during your Surveys that Indicate Potential Life Safety Code Discrepancies

Exit Signs





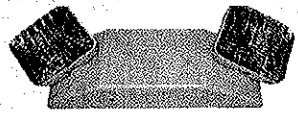
6 inches or more

3/4 inch minimum width

Where is the EXIT Sign?

Every exit sign shall have the word "Exit" in plainly legible letters not less than 6 inches high, with the principal strokes of letters not less than three-fourths-inch wide.

Emergency Lighting.

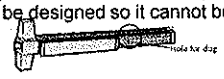


- An emergency system must provide illumination automatically in less than 10 seconds when normal lighting is interrupted
- Emergency illumination must be provided for a minimum of 1.5 hours when the normal lighting fails.
- Emergency lighting must provide illumination of not less than one foot-candle measured at floor level.
- A functional test shall be conducted on every emergency light at 30-day intervals for not less than 30 seconds

Panic Devices or Fire Devices?

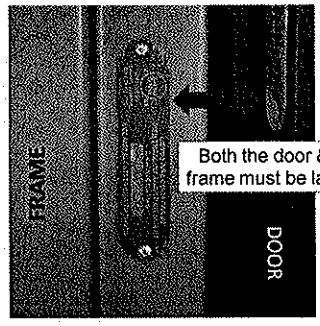
There is a distinct difference between panic and fire devices, which carry a fire label. Latching devices or locks on fire doors must be self latching.

- Because this requires that it be constantly latched, a fire exit device must be designed so it cannot be dogged

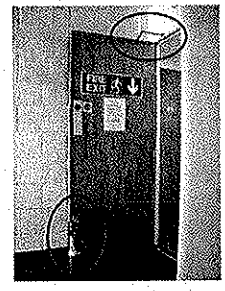


  - Dogging is the mechanical or electrical retraction of a latch bolt to provide push/pull operation during heavy traffic periods, to reduce wear on the mechanical parts
- When using fire exit hardware, codes require that the fire door bear a label stating the door is "For Fire Exit Hardware

Fire Door Labeling



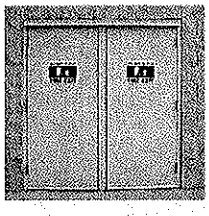
Fire doors must be kept CLOSED



- Doors are part of compartmentalization
- Open doors allow free passage of smoke & hot gasses
- **Do you recognize a concern here?**

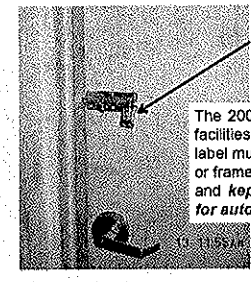
No latching mechanism

NEW Requirement: Annual Fire Door Inspection



- **MEANS OF EGRESS: ANNUAL INSPECTION OF DOORS** NFPA 101®, 2009 Edition, has added the new Section 7.2.1.15 Inspection of Door Openings, which requires door assemblies for which the door leaf is required to swing in the direction of egress travel to be inspected and tested not less than annually.

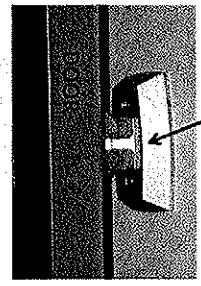
Exit Doors Must Open When Needed



Padlock on barrel bolt

The 2007 edition of the NFPA 80 mandates facilities use only labeled fire doors, and a label must be affixed permanently to the door or frame. Doors must be operable at all times and ***kept closed and latched or arranged for automatic closing***

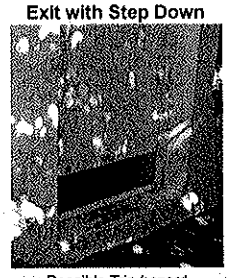
Approved Method to Hold Open a Fire Door



Magnetic hold open – released Upon Activation of fire alarm or sprinkler system

Exit Egress Concerns

Exit with Step Down



Possible Trip hazard

Egress with Pad

Code Compliant-Essentially Level

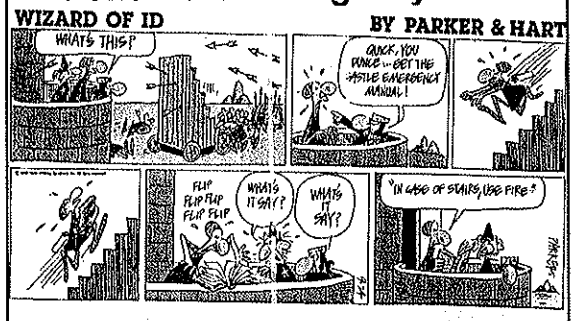
LSC (NFPA 101) & OSHA

The OSHA regulation, originally based on the **1970** edition of the *Life Safety Code*, is limited in scope in that it applies only to the workplace environment. Primarily means of Egress

OSHA also provides requirements beyond those listed in the building codes, such as **Emergency Action & Fire Prevention plans.**

Because of its close ties to the *Life Safety Code, OSHA* states that compliance with NFPA 101, 2000 edition, will be deemed in compliance with applicable portions of the OSHA regulation.

Always Follow the Emergency Plan



Recommended Reading

1. **Triangle: The Fire That Changed America**
   - By: David von Drehle
2. **Tinder Box: The Iroquois Theatre Disaster 1903**
   - By: Anthony P. Hatch
3. **Fire in the Grove: The Cocoanut Grove Tragedy and Its Aftermath**
   - John C. Esposito
4. **The Circus Fire: A True Story of an American Tragedy**
   - by Stewart O'Nan
5. **To Sleep with the Angels: The Story of a Fire**
   - David Cowan

My Action Plan! What do I do with what I've Learned

1. Become more observant of what goes on around me?
2. Review and then share the handout?
3. Read at least one of the recommended books?
4. Study chapters 3, 4 and 5 of the Life safety Code?
5. _____
6. _____