WISCONSIN HEALTHCARE ENGINEERING ASSOCIATION

Dedicated to Excellence in Healthcare Engineering

"Lunch & Learn" 2014 Webinar Series

Oct, 2014

LSC Chapter 7

Presented by:
Bill Lauzon, PE
Lauzon Life Safety Consulting, LLC

262-945-4567
Lauzon.lsc@gmail.com
Web: Lauzon-LSC.com

WISCONSIN HEALTHCARE ENGINEERING ASSOCIATION

Dedicated to Excellence in Healthcare Engineering

- Wis Professional Engineer
- Experienced Facility Director
- Experienced AHJ
- WHEA Code Committee
- WHEA Education Committee

Presented by:
Bill Lauzon, PE
Lauzon Life Safety Consulting, LLC

262-945-4567
Lauzon.LSC@gmail.com

Web: Lauzon-LSC.com

WISCONSIN HEALTHCARE ENGINEERING ASSOCIATION

Dedicated to Excellence in Healthcare Engineering

Hosted by Lakeview Specialty Hospital

with

Heather Lauzon Werner

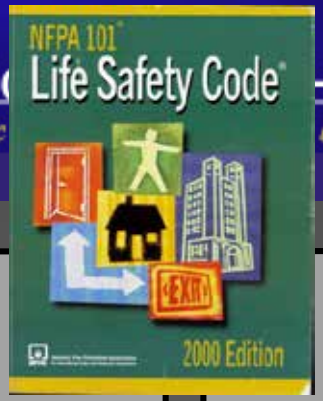
Director of the Environment of Care

LAKEVIEW

Waterford, Wi

WISC HCARE ENGINEERING ASSOCIATION

Dedic llence in Healthcare Engineering



Jan, 2014
LSC Overview

Feb, 2014
Health Care Occupancy

Mar, 2014
Other Occupancies

May, 2014
Fire & Smoke Doors

June, 2014
2012 LSC

July, 2014
Fire Stopping

Sept, 2014
LSC Chapter 8 "Features of Fire Protection"

Oct, 2014
LSC Chapter 7
"Means of Egress"

Nov, 2014 "Ventilation"

Dec, 2014 "Fire Alarm"

LSC Chapter 7 "Means of Egress" (MoE)

- 7.1 General
- 7.2 MoE Components
- 7.3 MoE Capacity
- 7.4 Number of MoE
- 7.5 Arrangement of MoE
- 7.6 Travel Distance
- 7.7 Discharge from Exits
- 7.8 Illumination of MoE
- 7.9 Emergency Lighting
- 7.10 Marking of MoE
- 7.11 High Hazard Contents
- 7.12 Mechanical Equip Rms

LSC Chapter 7 "Means of Egress" (MoE)

7.1 General

7.2 MoE

7.3 MoE

7.4 Numb

7.5 Arran

7.6 Travel Distance

7.7 Discharge from Exits

MoE

nting

E

ontents

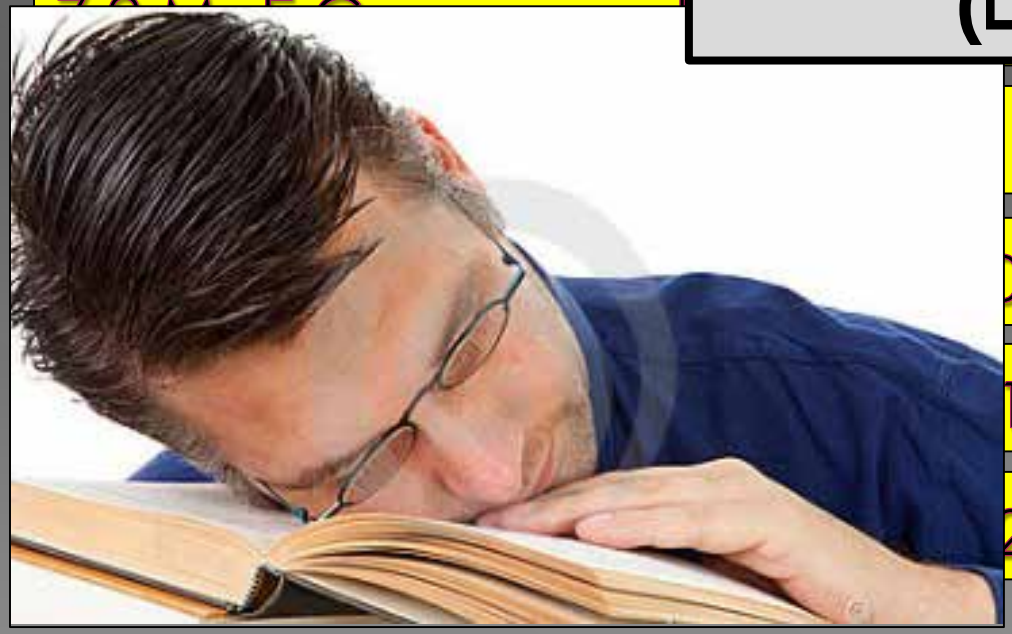
7.12 Mechanical Equip Rms

Chap 7 = 26 pages
Chap 8 = 6 pages
Chap 18 = 10 pages
Chap 19 = 10 pages

LSC Chap

7.1 General

Easy to fall sleep when you read codes
(Long & Detailed)



Emergency Lighting

) Marking of MoE

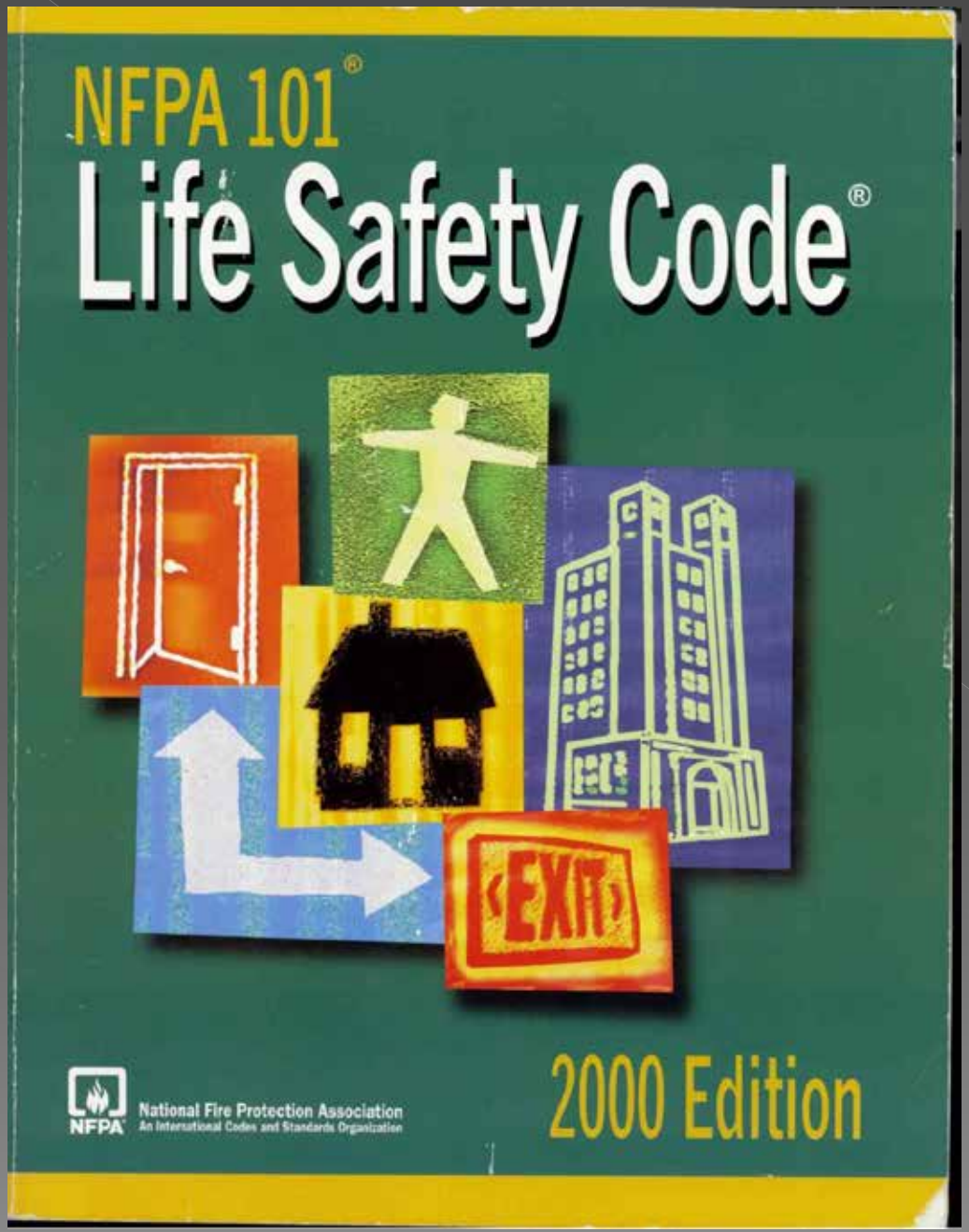
1 High Hazard Contents

2 Mechanical Equip Rms

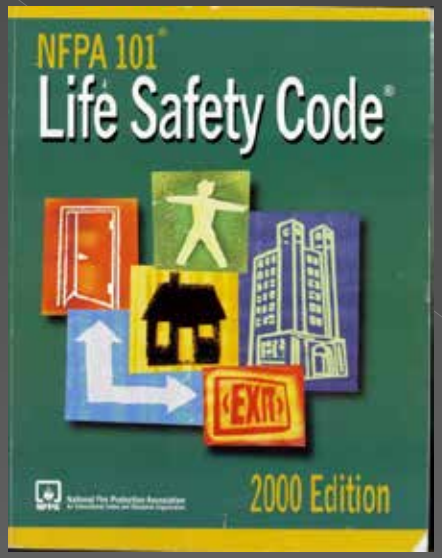
"Lunch & Learn"
2014 Webinar Series

Presented by:
Bill Lauzon, PE
Life Safety
LC
7
ail.com
on-LSC.com

Oct, 2014
LSC
Chapter



3 General Items about NFPA 101



"HOW-TO" NOT "WHEN-TO"

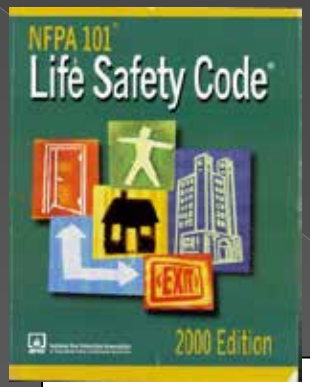
#1

LSC Chapter 7

"Means of Egress"

"WHEN-TO"

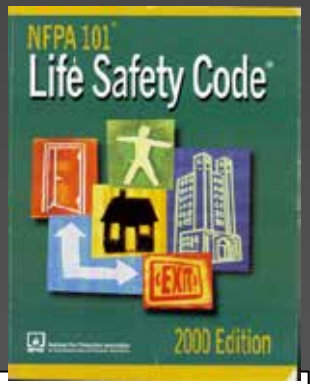
is specified in the Occupancy Chapters



#2

4.4.2.2 - Specific Occupancy Requirements GOVERN **OVER** the General Requirements

In other words,
Chapters 18/19
OVER-RULE Chapters 7-8-9-10



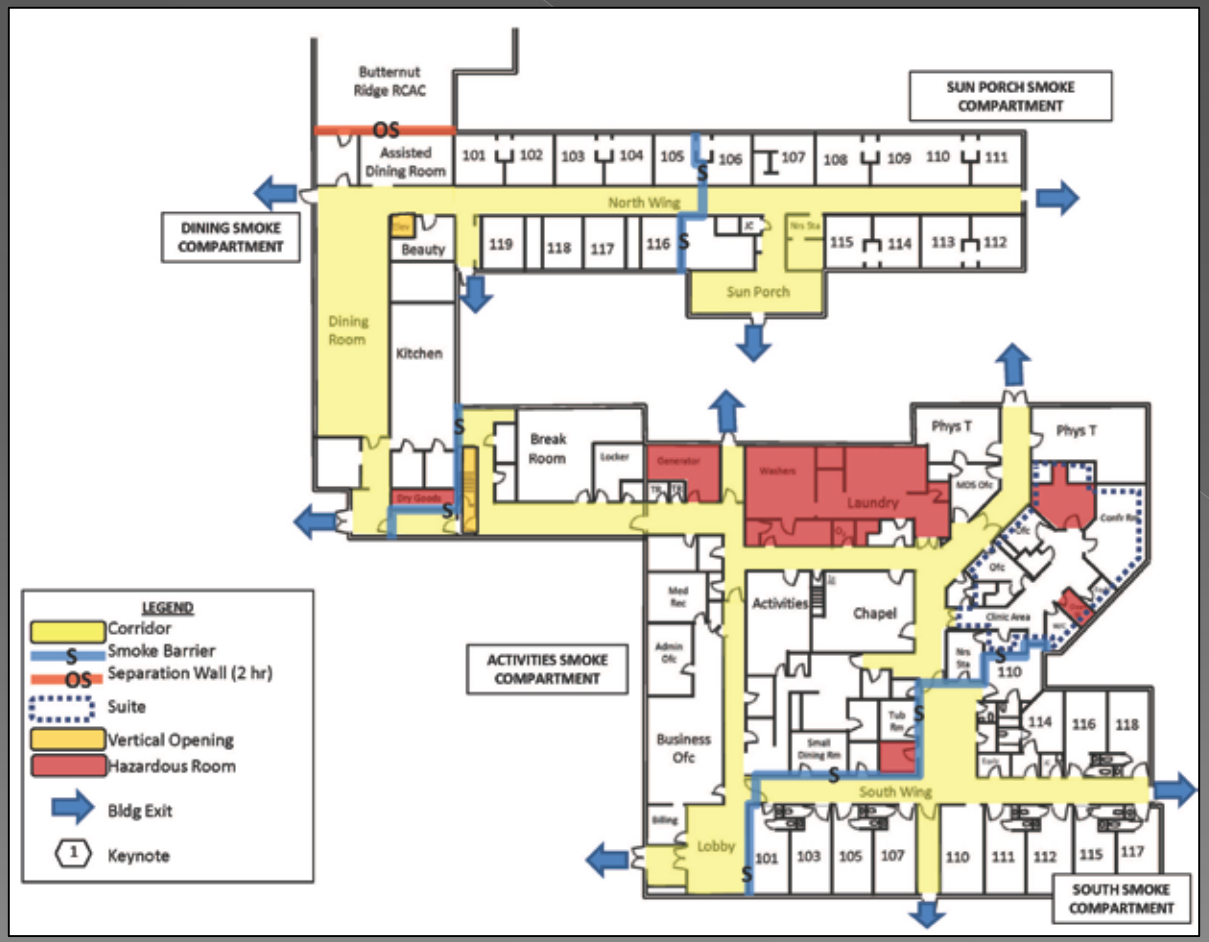
1st Read the OCCUPANCY Chapter

Then

Go to the GENERAL Chapter (WHEN directed)

Life Safety Plans

#3



LSP should display all the "Means of Egress"

NOT code required

- Accurate
- Room ID
- Carry-round size
- Colorize
- Keynote Explanations
- Good Legend

LSC Chapter 7 "Means of Egress" (MoE)

7.1 General

7.2 MoE Components

7.3 MoE Capacity

7.4 Number of MoE

7.5 Arrangement of MoE

7.6 Travel Distance

7.7 Discharge from Exits

7.8 Illumination of MoE

7.9 Emergency Lighting

7.10 Marking of MoE

7.11 High Hazard Contents

7.12 Mechanical Equip Rms

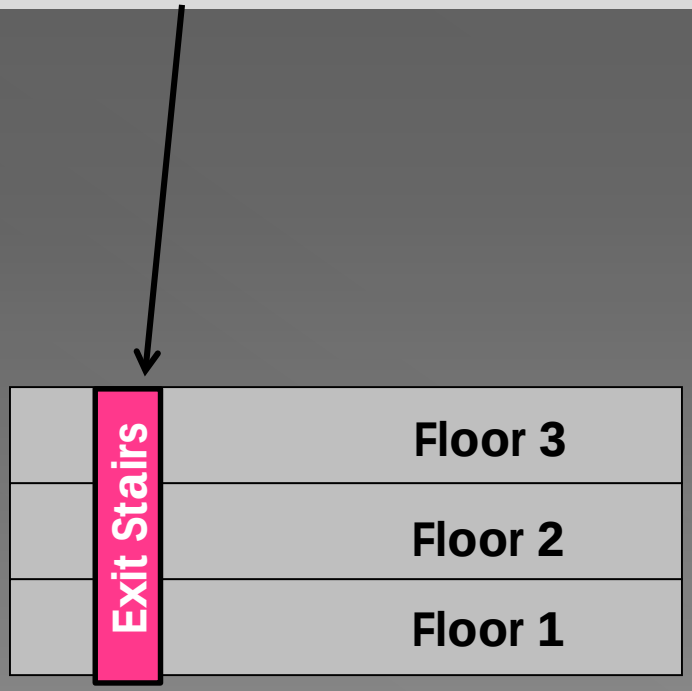
LSC Chapter 7 "Means of Egress" (MoE)

7.1 General

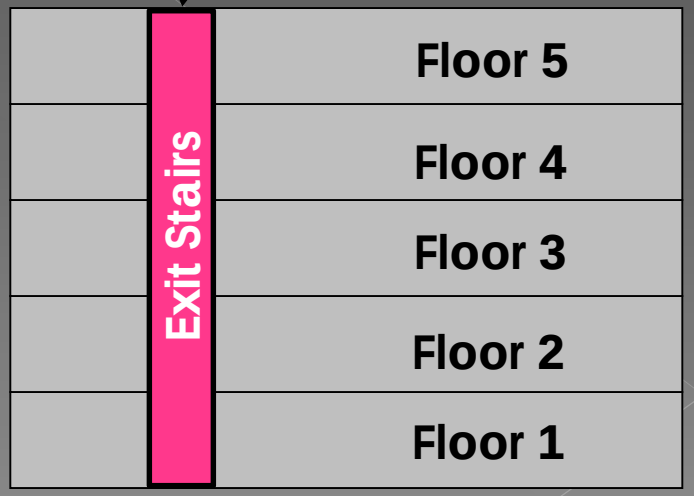
7.1.3.2-Exit Separation

7.1.3.2.1-Exit Enclosure – Wall Ratings

(a) 1 hr, if 3 story or less



(b) 2 hrs, if 4 story or more



LSC Chapter 7 "Means of Egress" (MoE)

7.1 General

7.1.3.2-Exit Separation

7.1.3.2.1(c) -Exit Enclosure – Door Closers

LSC Chapter 7 "Means of Egress" (MoE)

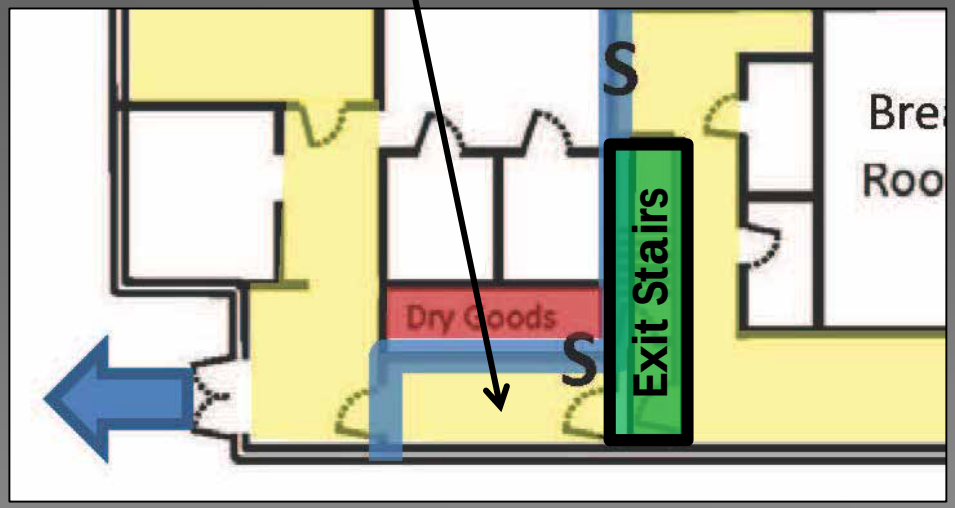
7.1 General

7.1.3.2-Exit Separation

7.1.3.2.1(d) -Exit Enclosure – Openings

LIMITED TO:

- Corridors
- Normally Occupied Spaces



- Okay: Offices
- NOT: Mech Rms, Storage Rms

LSC Chapter 7 "Means of Egress" (MoE)

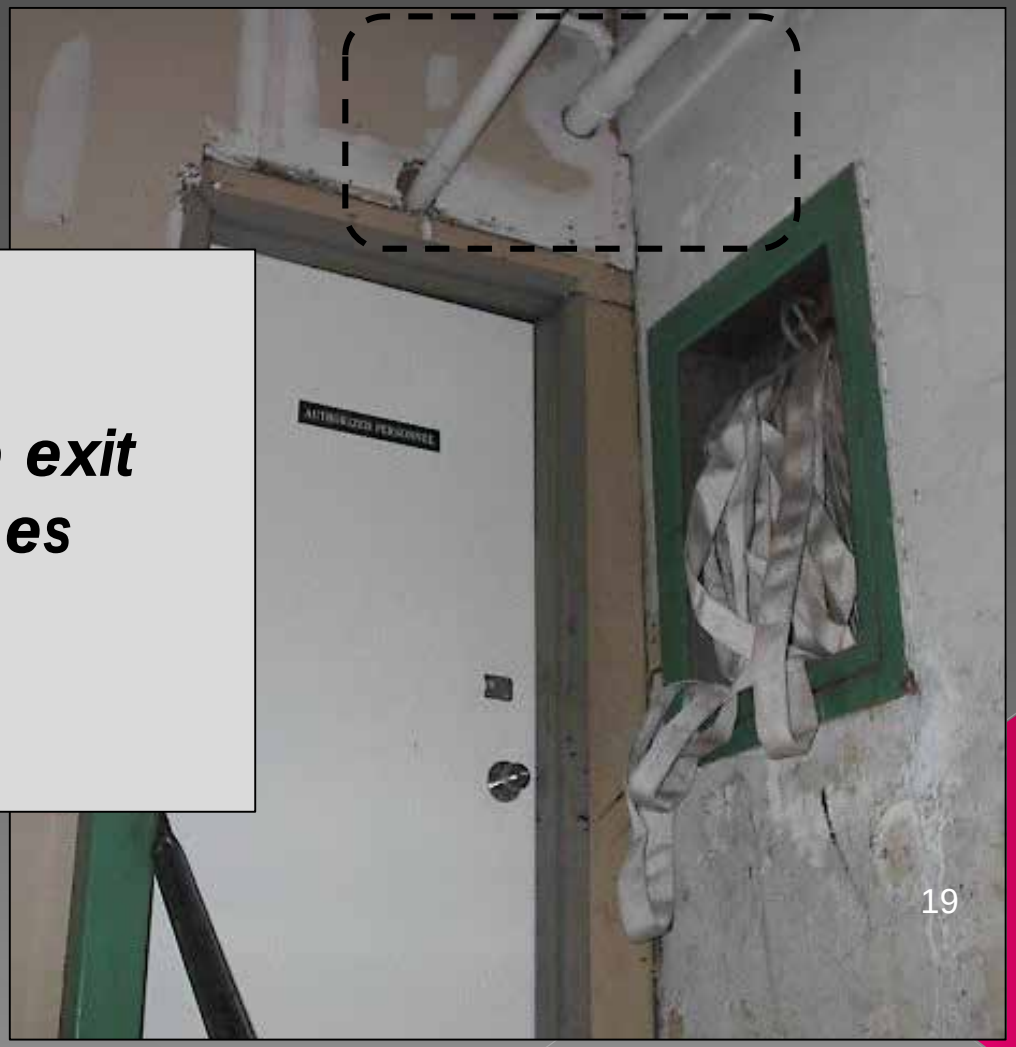
7.1 General

7.1.3.2-Exit Separation

7.1.3.2.1(e) -Exit Enclosure – Penetrations

PROHIBITED
(except for):

- ***Utilities that serve the exit***
- ***Sprinklers & Standpipes***
- ***Fire Alarm (in metal conduits)***
- ***Existing penetrations***



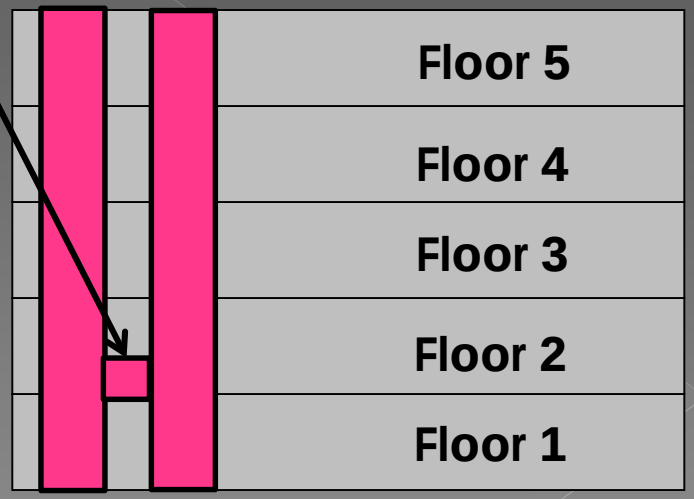
LSC Chapter 7 "Means of Egress" (MoE)

7.1 General

7.1.3.2-Exit Separation

7.1.3.2.1(f) -Exit Enclosure – Adjacent exits

Openings/penetrations prohibited between adjacent exit enclosures

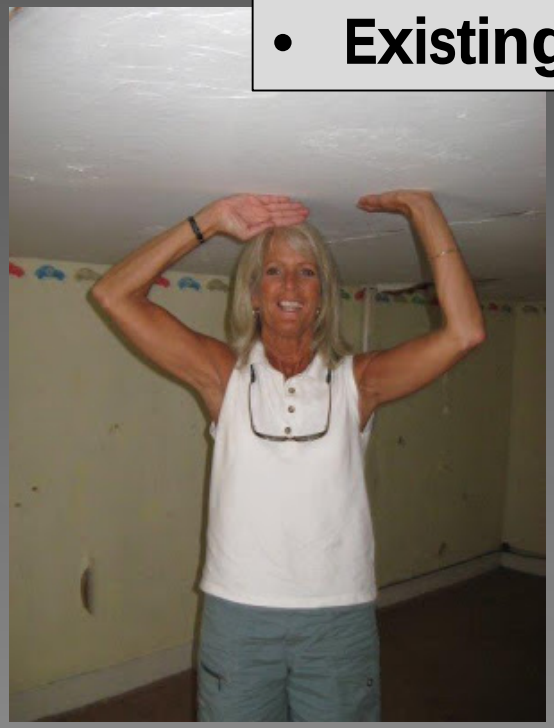


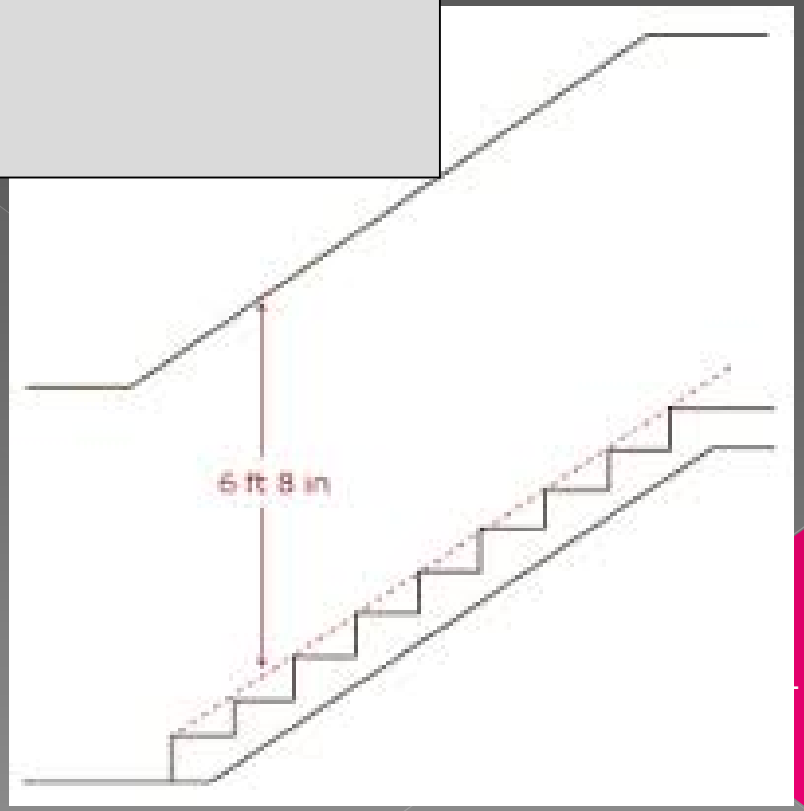
LSC Chapter 7 "Means of Egress" (MoE)

7.1 General

7.1.5-Headroom

- Min 7'-6" for min 2/3 of the area
- Projections to 6'-8"
- Stairs min 6'-8"
- Existing: min 7'-0"





LSC Chapter 7 "Means of Egress" (MoE)

7.1 General

7.1.6-Walking Surfaces

- Abrupt changes max 1/4 inch
- 1/4 – 1/2 inch must have 30° bevel
- >1/2 inch must be ramped
- Cross slope max 1/48
- Must be uniformly slip resistant

LSC Chapter 7 "Means of Egress" (MoE)

7.1 General

7.1.6-Walking Surfaces

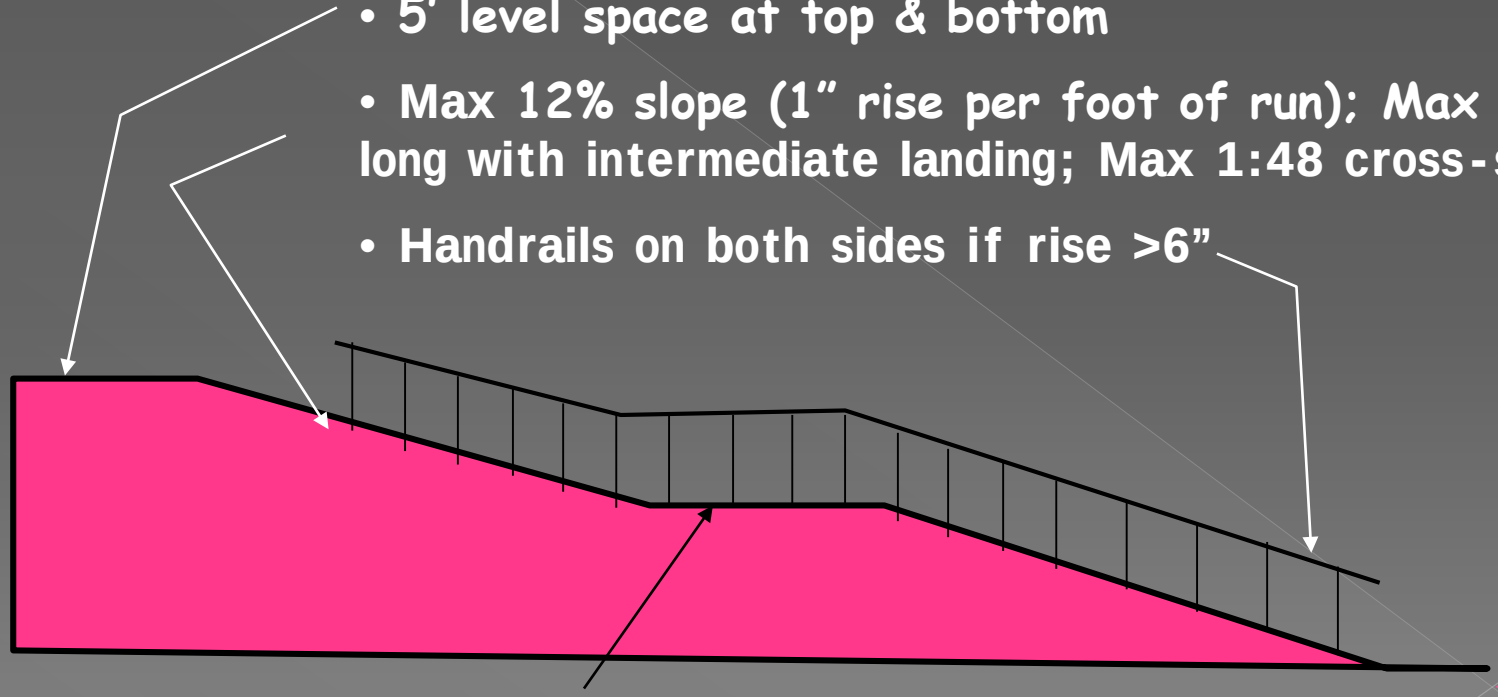
LSC Chapter 7 "Means of Egress" (MoE)

7.1 General

7.1.7-Change in Level

Changes in elevations of an exit must be via a compliant stair or ramp

- 5' level space at top & bottom
- Max 12% slope (1" rise per foot of run); Max 30' long with intermediate landing; Max 1:48 cross-slope
- Handrails on both sides if rise >6"



- Min Intermediate Landing 5' long if multiple slopes
- Min 44" wide or as required for location

LSC Chapter 7 "Means of Egress" (MoE)

7.1 General

7.1.10-MoE Reliability

- **MoE must be <u>continuously</u> maintained free of all obstructions or impediments to full instant use in case of fire or other emergency**
- **No furnishings, decorations or other objects shall obstruct exits or their visibility**

LSC Chapter 7 "Means of Egress" (MoE)

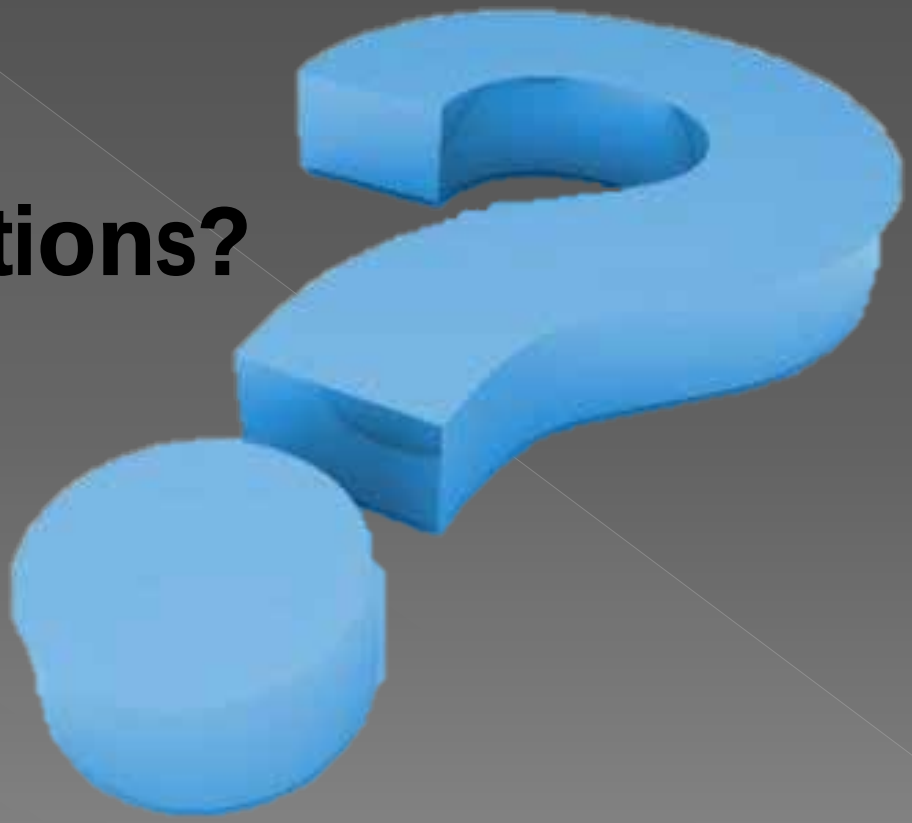
7.1 General

7.1.10-MoE Reliability

- **Mirrors shall not be placed on exit door or adjacent to any exit path if they might confuse the direction of egress**

7.1 General

Any Questions?



LSC Chapter 7 "Means of Egress" (MoE)

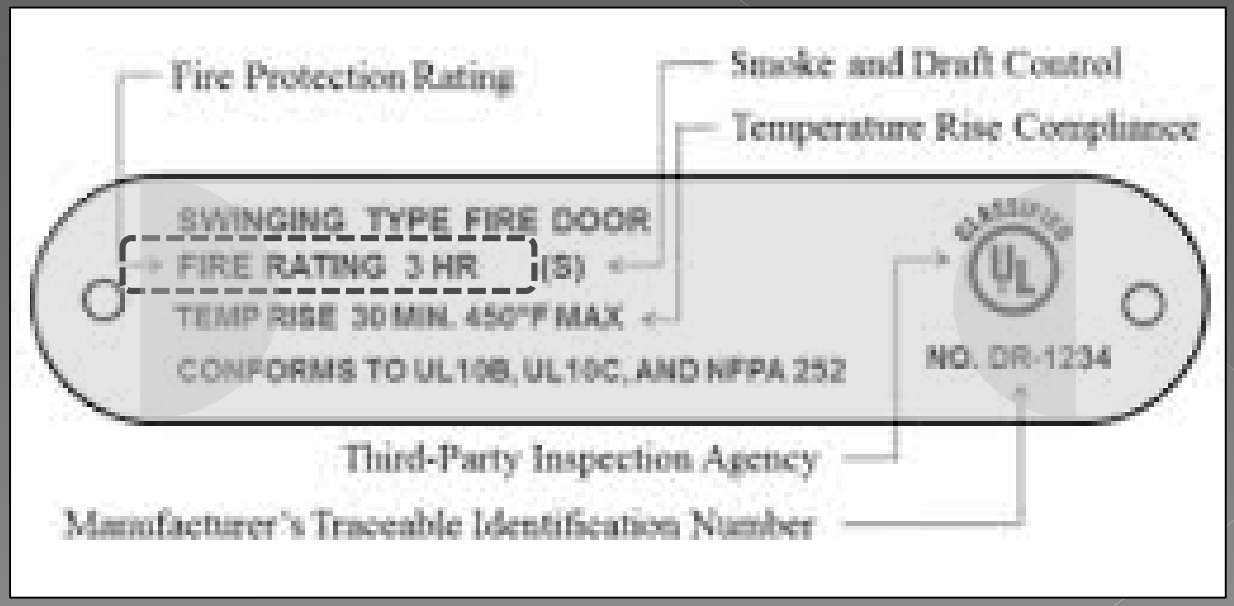
7.1 General	7.7 Discharge from Exits
7.2 MoE Components	ation of MoE
7.3 MoE Capacity	7.9 Emergency Lighting
7.4 Number of MoE	7.10 Marking of MoE
7.5 Arrangement of MoE	7.11 High Hazard Contents
7.6 Travel Distance	7.12 Mechanical Equip Rms

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.1-Doors

RATING

- **Nothing in Chapter 7 defines the ratings of doors … that is done in the Occupancy Chapters & Chapter 8**

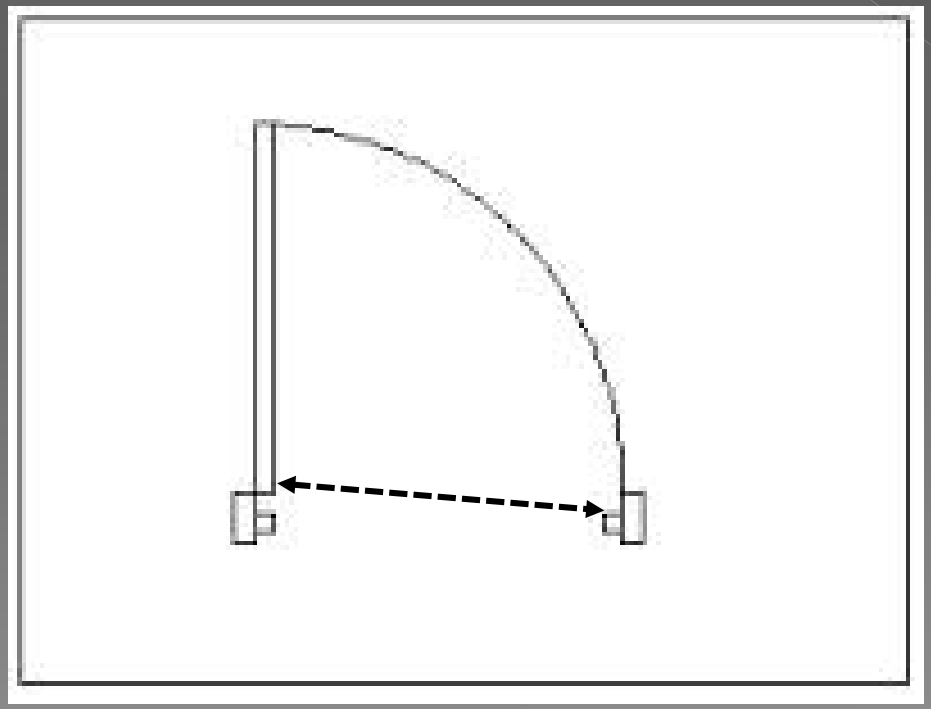


LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.1-Doors

.2 WIDTH

- **Egress capacity is determined by the available clear width when the door is 90° open**



- **Width is measured from the stop on the frame to the face of the door**

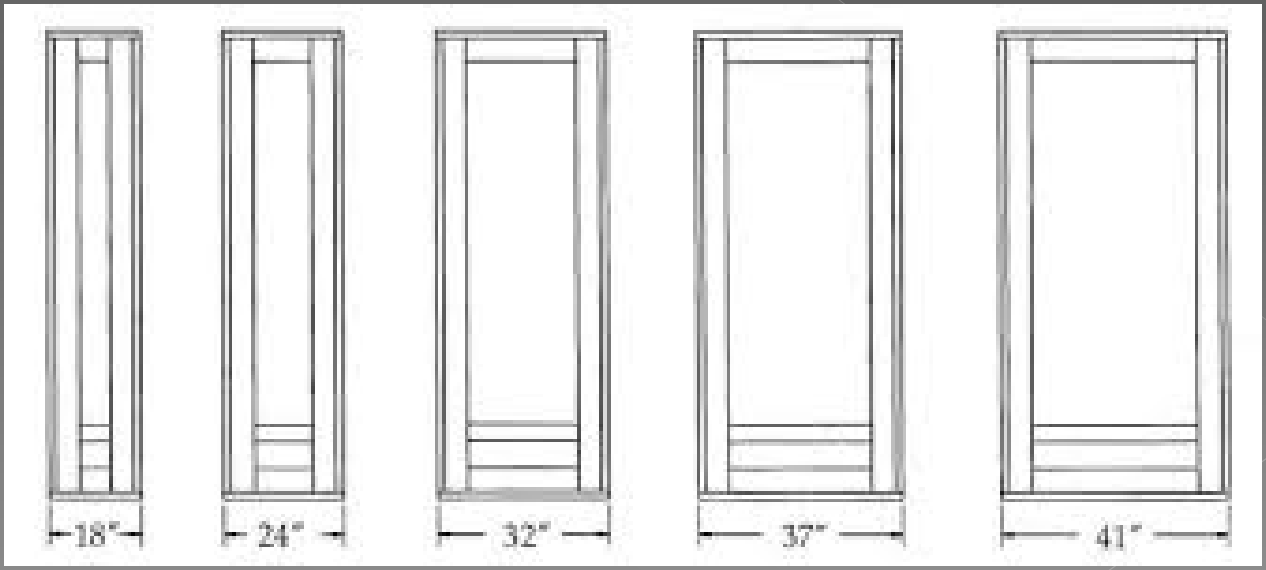
LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.1-Doors

- **Min width of leaf = 32"**

Exceptions:

- Ø ***Min per Occupancy Chapter***
- Ø ***Min 24" in rms < 70 SF***
- Ø ***Min 28" in existing***
- Ø ***Revolving doors***



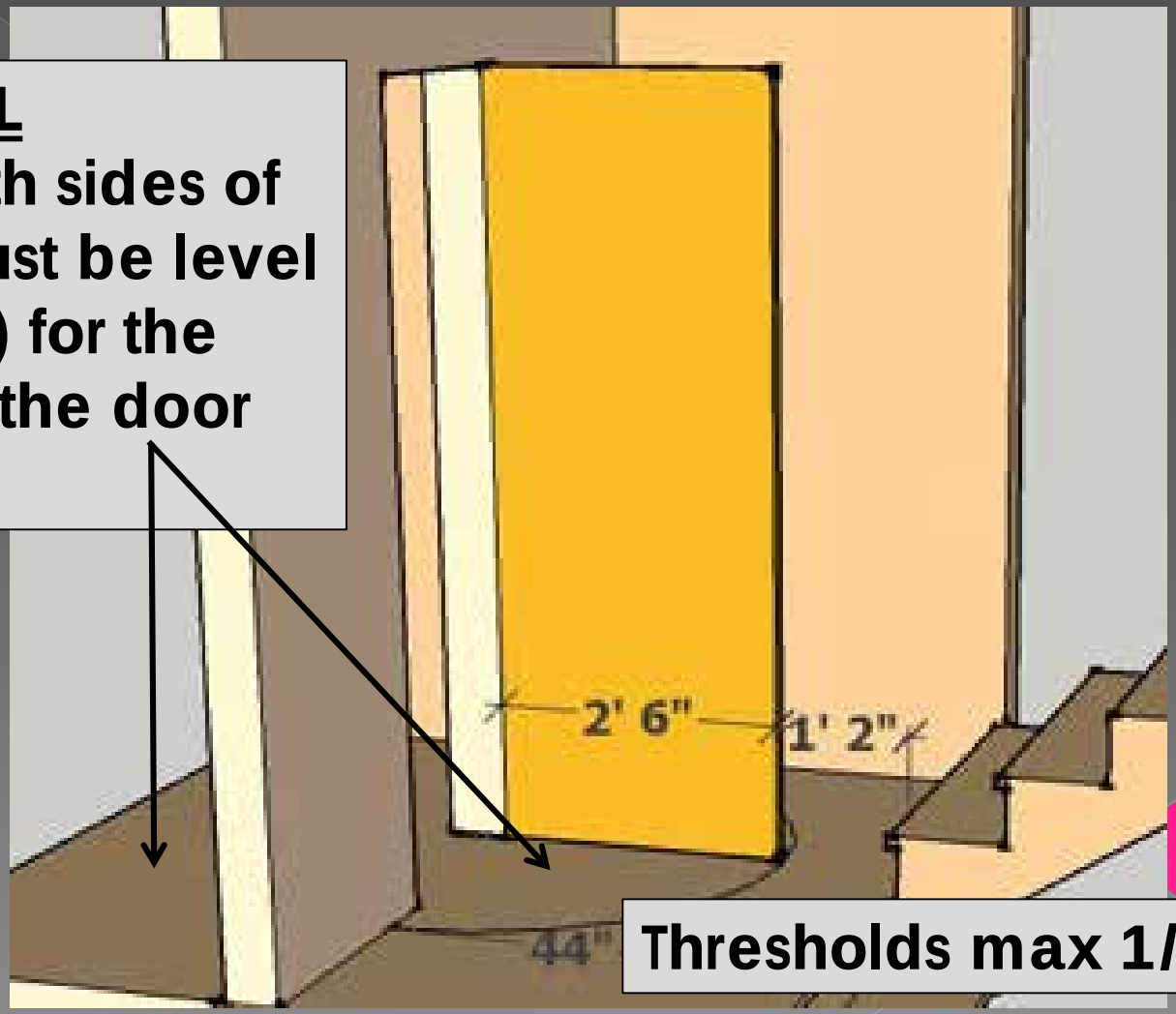
LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components

7.2.1-Doors

.3 FLOOR LEVEL

- **Floor on both sides of the door must be level (within 1/2") for the distance of the door leaf**



Thresholds max 1/2"

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.1-Doors

.4 SWING: Any door in a MoE must be side-hinged or pivot-swing

Exceptions:

- ***Sliding, if locked open when bldg is open to the public***
- ***Sliding, if per 7.2.1.14***
- ***Sliding, if <=10 occupants in garages, business, storage with low/ordinary hazards***
- ***Revolving doors***
- ***Existing fusible link-operated sliding or vertical rolling fire doors***

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.1-Doors

.4 DIRECTION OF SWING

Must swing in direction of egress,

IF the space has:

- **50 or more occupants**
- **High hazard contents**

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.1-Doors

.4 OUTSWINGING DOORS

- **Must leave at least HALF of the required egress width at any point of its swing**
- **Must project into required width no more than 7" when fully open**

2 Rules

Exception:

Ø Existing stairwells only need to satisfy the 7" rule

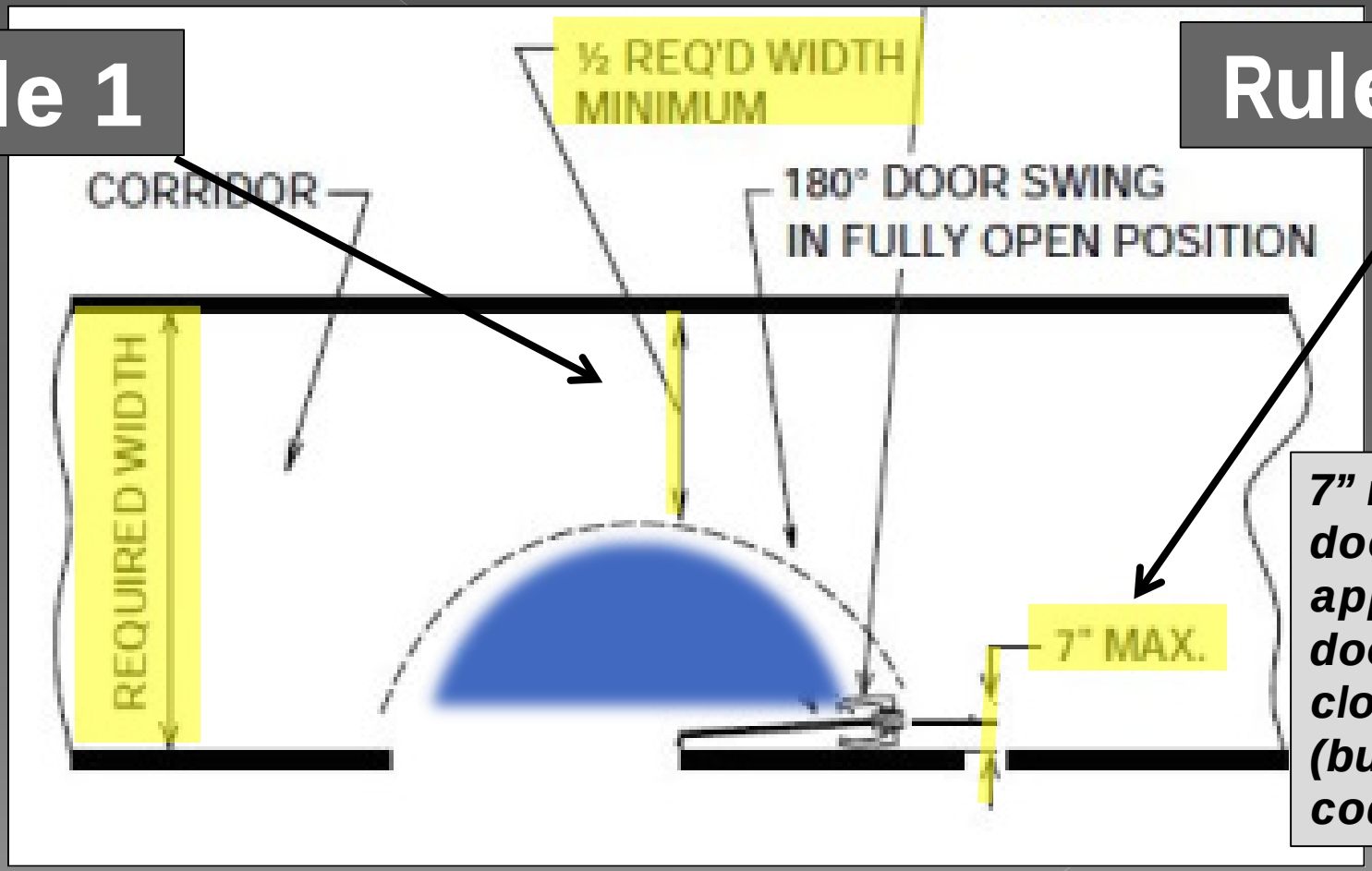
LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.1-Doors

.4 OUTSWINGING DOORS

Rule 1

Rule 2



7" rule does not apply if door has closer (but not in code)

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.1-Doors

.4 FORCE TO OPEN

Max forces:

- **15 lbf - To release the latch**
- **30 lbf – To set the door in motion**
- **15 lbf – To fully open the door**
- **5 lbf – To set in motion & full open doors without closers**

Exceptions:

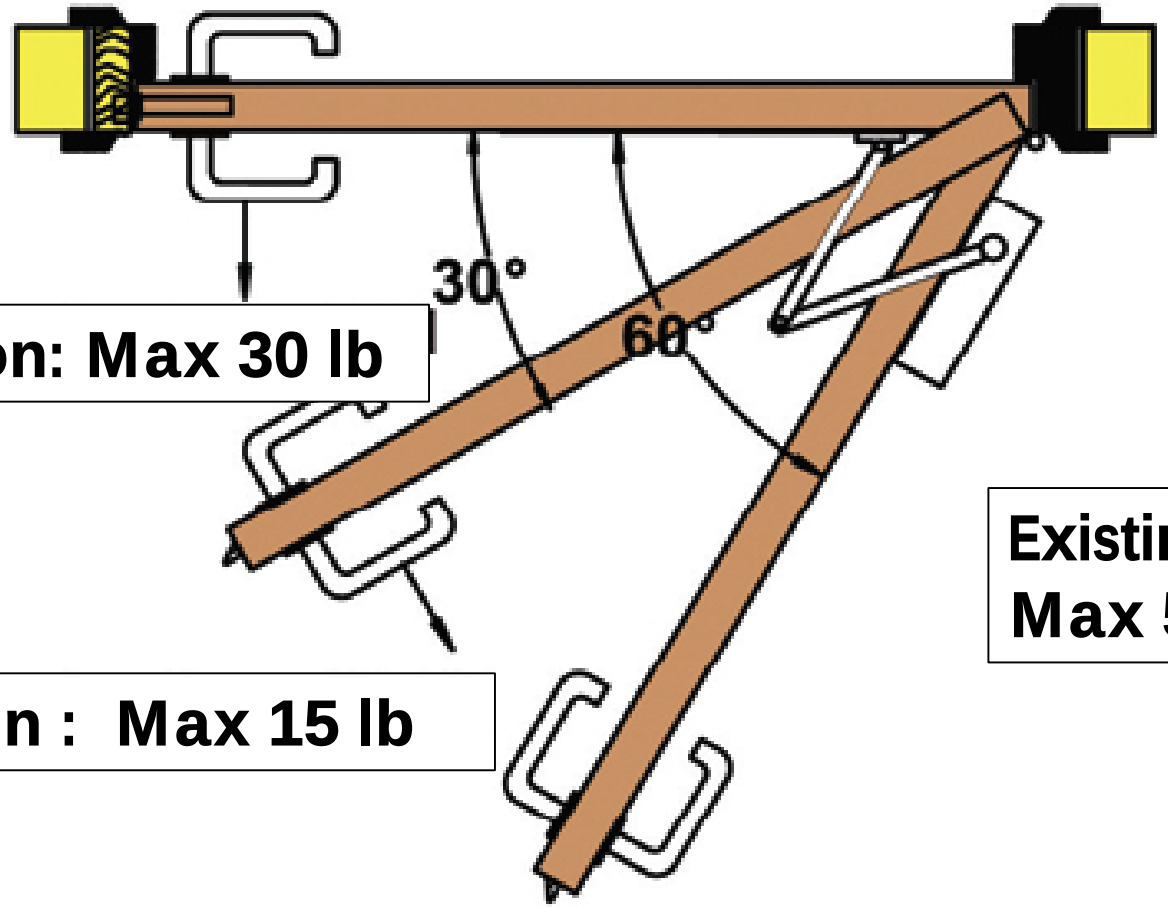
- Ø ***50 lbf in existing buildings***
- Ø ***50 lbf to set powered doors in motion***

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.1-Doors

.4 FORCE TO OPEN

Retract **Latch: Max 15 lb**



Start **Motion: Max 30 lb**

Existing: Max 50 lb

Complete **Open : Max 15 lb**

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.1-Doors

.5 LOCKS & LATCHING

- **Doors shall be opened readily from the egress side when the building is occupied**

Exceptions:

- ***Per Occupancy chapters***
- ***Exterior doors can be key locked if okay by occup chapter, signed, & key is available to any occupant***

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.1-Doors

.5 LOCKS & LATCHING

- **Locks shall not require the use of a key, tool, special knowledge or effort to operate**

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.1-Doors

.5 LATCH RELEASE

- **Latch operation must be OBVIOUS & readily operated under all lighting conditions**

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.1-Doors

.5 LATCH RELEASE

- **Release mechanism located 34"to 48" above the floor**

Beware of deadbolts converted to spring latches

34"-48"

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.1-Doors

.5 LATCH RELEASE

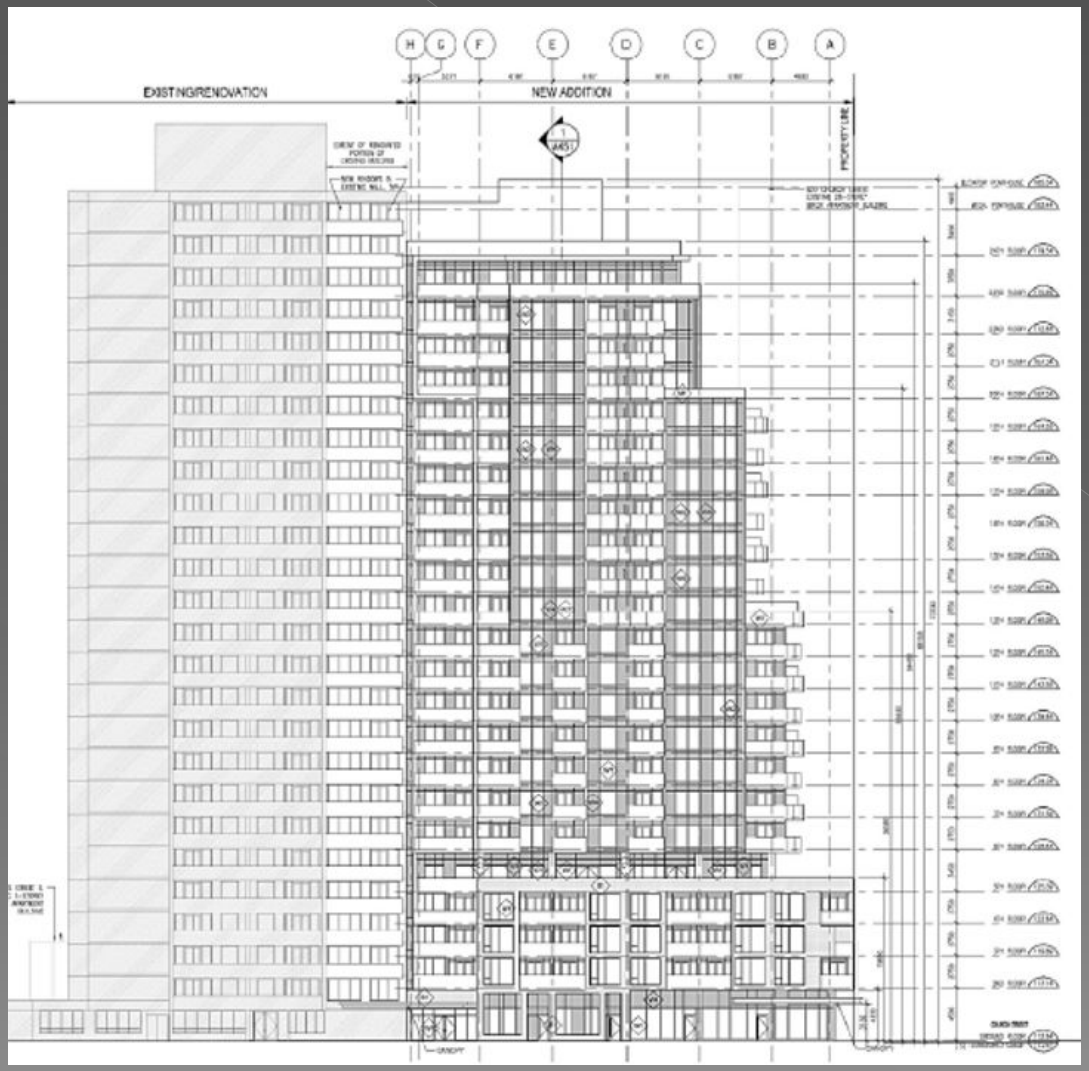
- **Latch can not have more than one releasing operation**

"One Hand-One Motion"

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components

7.2.1-Doors



.5 STAIR LOCKING

Stairs for >4 stories shall allow re-entry to the building or have auto unlock via the fire alarm sys

Exceptions:

- ***Per Occupancy chapters***
- ***Can lock re-entry if satisfy 5 conditions***

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.1-Doors

.5 ROOF DOORS

Door must be either kept locked or shall allow re-entry from the roof

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.1-Doors

.5 PAIRS OF DOORS

- **Each leaf must have its own releasing device**

Exception:

- ***Inactive leaf does not need a release device IF it has an auto flush bolt and no surface mounted hardware***

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.1-Doors

.6 DELAY-EGRESS LOCKS

Okay, IF

- **Permitted by Occupancy Chapter**
- **Hardware is listed**
- **Room has low/ordinary haz contents**
- **Building is fully sprinkled or fully smoke detected**

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.1-Doors

.6 DELAY-EGRESS LOCKS

Operation:

- Doors unlock on operation of the sprinkler system or max 2 smoke detectors
- Doors unlock on loss of power
- Doors release within 15 sec (max 30 sec if okay by AHJ) of pushing the release device (with max 15 lbf for max 3 sec)
- Initiation of release process activates an audible signal at the door
- Relocking by manual means only

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.1-Doors

.6 DELAY-EGRESS LOCKS

Operation:

- **Readily visible sign with 1" letters of the precise message in code**

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.1-Doors

.6 ACCESS-CONTROLLED LOCKS

Okay, IF

- **Permitted by Occupancy Chapter**
- **Unlocks with loss of power or operation of the sprinkler or fire alarm sys**

ENTRANCE – NOT EXIT

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.1-Doors

.6 ACCESS-CONTROLLED LOCKS

Okay, IF

- **Auto unlocks with motion sensor on egress side**

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.1-Doors

.6 ACCESS-CONTROLLED LOCKS

Permitted, IF

- **Manual release device located 40-48" above the floor & within 5' of door; readily accessible & signed that reads "Push to Exit"; device will directly interrupt power to lock independent of access control electronics & remain unlocked for not less than 30 sec**

Max 5'

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.1-Doors

.7 PANIC HARDWARE (if required)

- Activation bar extends at least half the width of the door, at 34"-48" high (existing >30")
- Activates with max 15 lbf
- Only approved fire exit hardware shall be used on fire doors
- Shall not have any means to prevent the release of the latch ("Dogging")

Note: only required at high hazard areas (including elec switchgear), daycare, assembly & education occupancies if > 100 occupants

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.1-Doors

.8 SELF-CLOSING DEVICES

Doors required to be kept closed shall not be secured open at any time and shall have a self-closing or auto-closing device

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.1-Doors

.8 SELF-CLOSING DEVICES

If permitted by occupancy, doors required to be closed can have:

- **Hold-open device & closer**
- **Can be instantly released manually**
- **Auto release on loss of power**

- **Auto release via approved smoke detection**
- **In a stair, all doors release on smoke detection**

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.1-Doors

.9 POWERED DOORS

Doors must open/close manually upon loss of power

- **Max 50 lbf to open**
- **Sign: "In Emergency, Push to Open"**

If doors are required be self-closing/latching:

- **New doors must close within 30 sec**
- **Must self-close/latch on activation of approved smoke detectors**

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.1-Doors

.10 REVOLVING DOORS

- Must be able to collapse into a book-fold position with 36"width
- Must be min 10' from bottom or top of stairs
- Max revolving speed per chart
- Swinging door within 10'

If in MoE, can be max 50% of required egress capacity

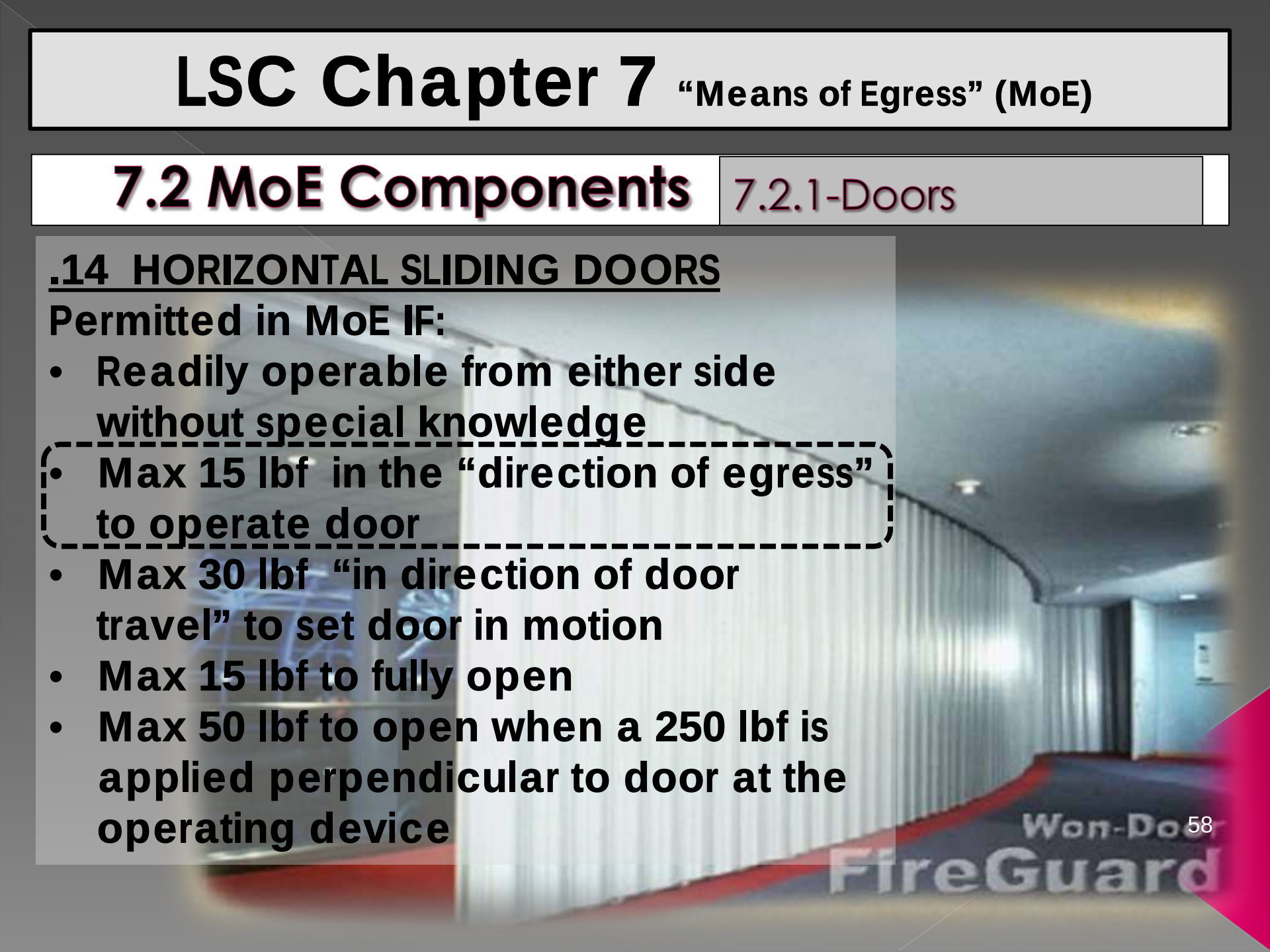
LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.1-Doors

.14 HORIZONTAL SLIDING DOORS

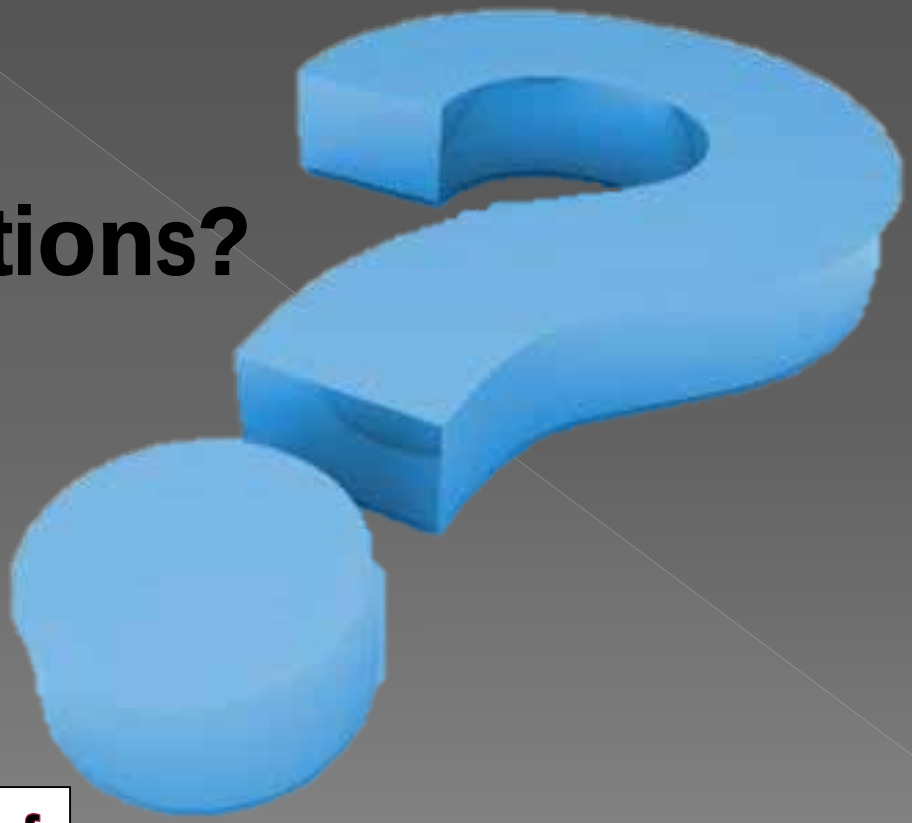
Permitted in MoE IF:

- **Readily operable from either side without special knowledge**
- **Max 15 lbf in the "direction of egress" to operate door**
- **Max 30 lbf "in direction of door travel" to set door in motion**
- **Max 15 lbf to fully open**
- **Max 50 lbf to open when a 250 lbf is applied perpendicular to door at the operating device**



7.2 MoE Components

Doors



Any Questions?

Completed 6-1/2 of 26 pages in Chap 7

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.2-Stairs

STAIR DETAILS:

- Construction
- Landings
- Tread/Landing Surfaces
- Riser Ht
- Tread Depth
- Uniformity

GUARDS & HANDRAILS

ENCLOSURE OF STAIRS

- Ratings per 7.1 (or occup chapter)
- Exterior walls, doors & windows of either the stairs OR building must be 1-hr rated if within 10' & at <180° angle

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.2-Stairs

Stairwell Tables (composite)

Feature	NEW	EXISTING-A	EXISTING-B
Min Width	44"	44"/36"*	44"/36"*
Max Riser	7"	7 ½"	8"
Min Riser	4"	None	none
Min Tread	11"	10"	9"
Min Headrm	6'-8"	6'-8"	6'-8"
Max Landing Ht	12'	12'	12'
* If total occupant load of all stores < 50			

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.2-Stairs

USABLE SPACES:

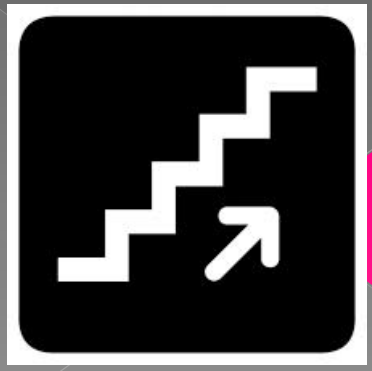
Prohibited within stairs

STAIR ID SIGN:

Signage within stairs that serve 5 or more stories to gives story, stair ID, direction of discharge; located 5' hi; visible when door open/closed

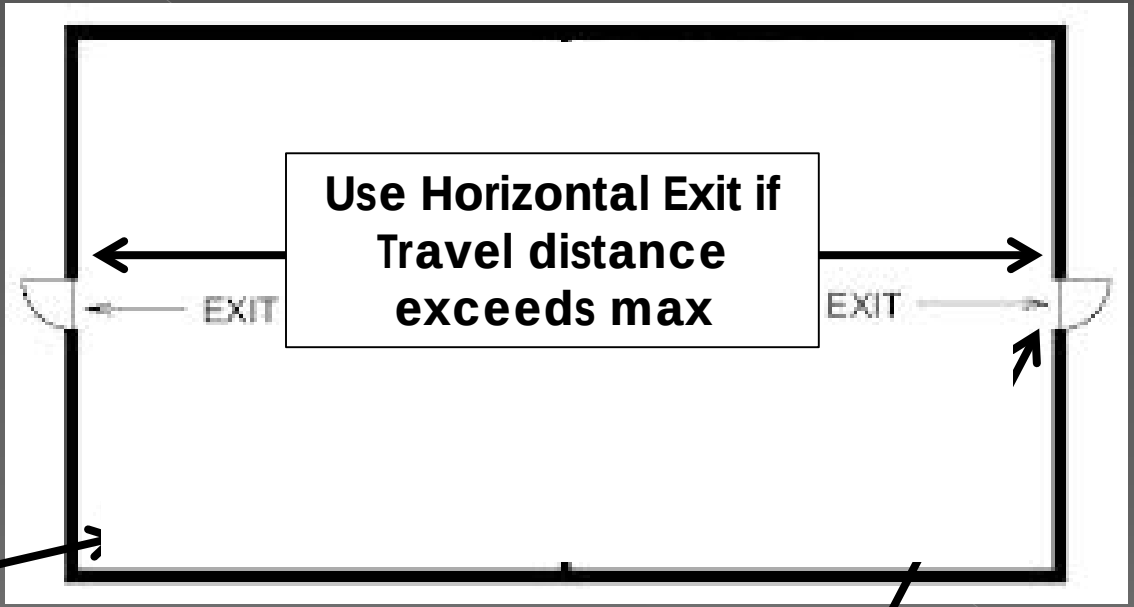
EGRESS DIRECTIONAL SIGNS

If egress is upward must have sign



LSC Chapter 7 "Means of Egress" (MoE)

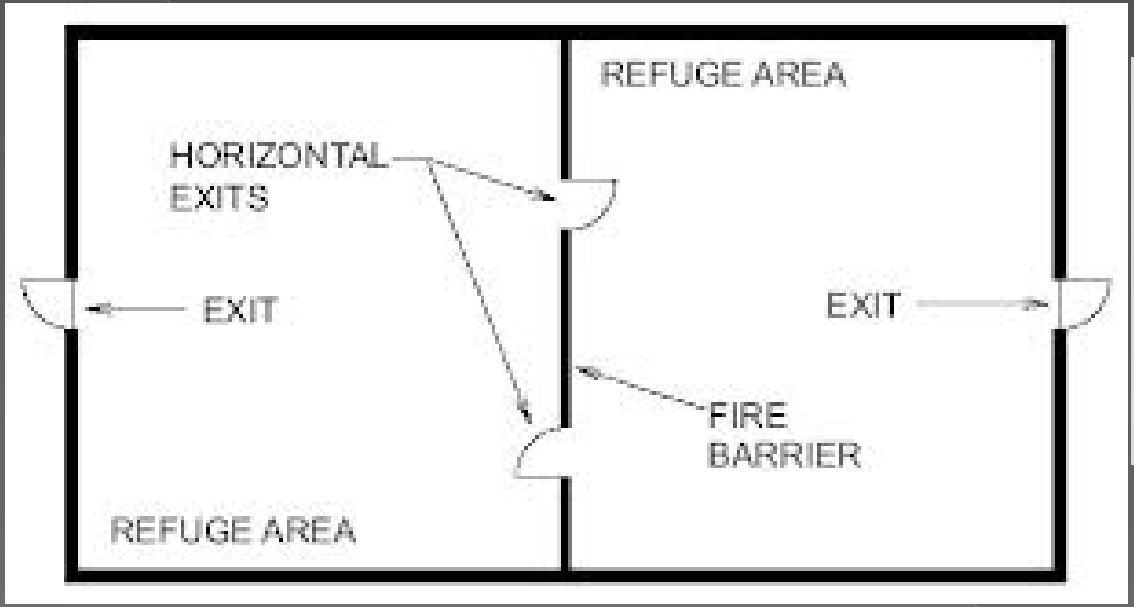
7.2 MoE Components | 7.2.4-Horizontal Exits



- Each side must have paths to a means of egress leading to the outside of the building
- Each side must be large enough to hold all occupants of both floor areas (min 3 SF/person)

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.4-Horizontal Exits



Can serve as a substitute for 50% of the total exit requirements

- **Fire barrier walls must be 2-hr rated & doors 90 min w/closer & latching**

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.5-Ramps

RAMP DETAILS:

- **Construction**
- **Landings**
- **Drop-Offs**

Ramp Tables (composite)

Feature	NEW	EXISTING-A	EXISTING-B
Min Width	44"	44"	30"
Max Slope	1 in 12	1 in 10	1 in 8
Max Rise of Single Run	30"	none	none
Max Landing Ht	12'	12'	12'

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.5-Ramps

GUARDS & HANDRAILS

ENCLOSURE OF RAMPS

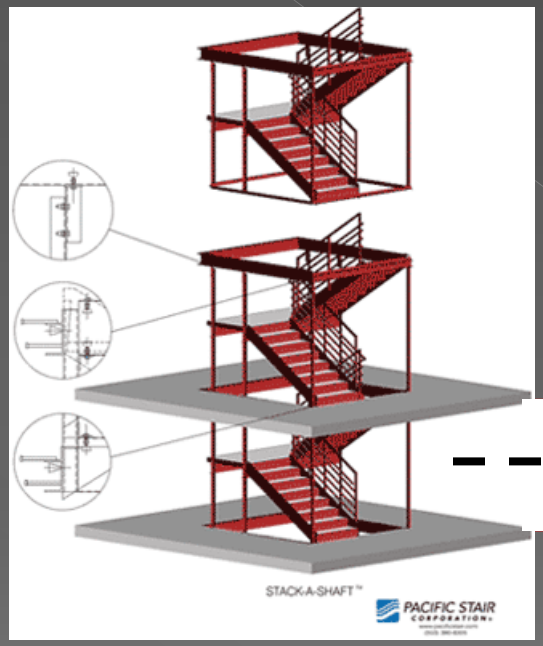
- Ratings per 7.1 (or occup chapter)

EXTERIOR RAMPS

- Visual protection for those with a fear of high places
- Designed to minimize water accumulation on surfaces

LSC Chapter 7 "Means of Egress" (MoE)

7.2 MoE Components | 7.2.6-Exit Passageways



Outside

ENCLOSURE

- **Ratings per 7.1 (or occup chapter) the same as stairwells**

LSC Chapter 7 "Means of Egress" (MoE)

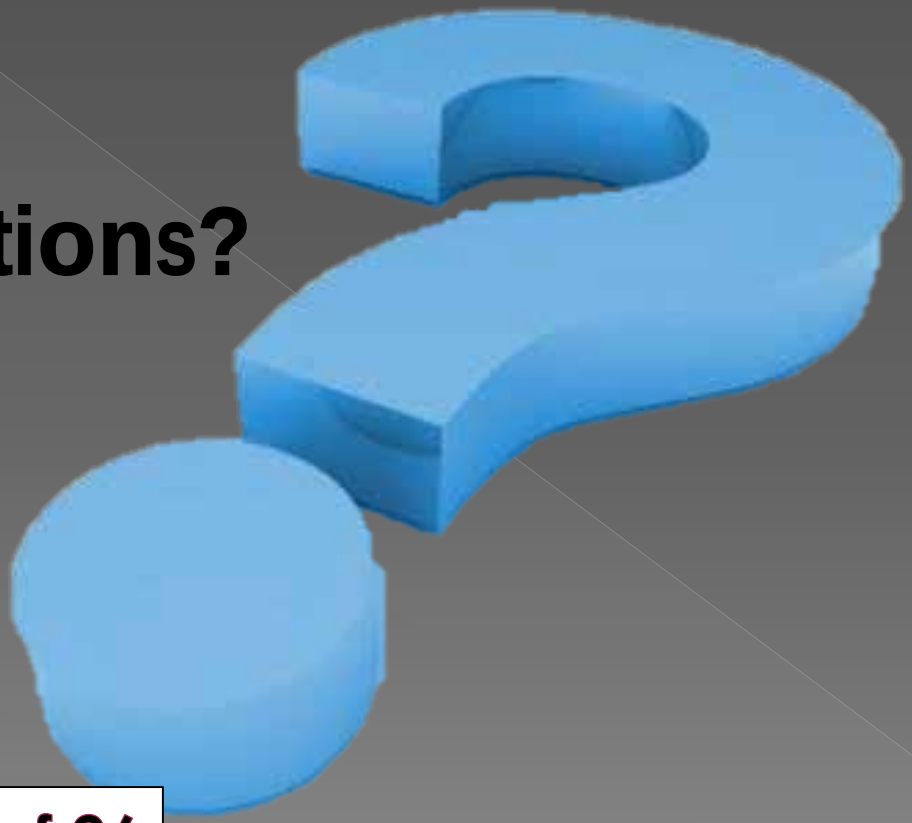
7.2 MoE Components

NOT COVERING:

- 7.2.7-Escalators & Moving Walks
- 7.2.8-Fire Escape Stairs
- 7.2.9-Fire Escape Ladders
- 7.2.10-Slide Escapes
- 7.2.11-Alternating Tread Devices
- 7.2.12-Areas of Refuge
- 7.2.13-Elevators (as an exit)

7.2 MoE Components

Any Questions?



This completes 18 of 26 pages in Chap 7

(70%)

LSC Chapter 7 "Means of Egress" (MoE)

7.1 General

7.2 MoE Components

7.3 MoE Capacity

7.4 Number of MoE

7.5 Arrangement of MoE

7.6 Travel Distance

7.7 Discharge from Exits

7.8 Illumination of MoE

Emergency Lighting

7.10 Marking of MoE

7.11 High Hazard Contents

7.12 Mechanical Equip Rms

LSC Chapter 7 "Means of Egress" (MoE)

7.3 MoE Capacity

7.3.1-Occupant Load

Mathematical calculation of required width of egress, based on sizes of spaces

1. Determine Occupant Load (from Tables 7.3.1)

LSC Chapter 7 "Means of Egress" (MoE)

7.3 MoE Capacity

7.3.1-Occupant Load

1. Determine Occupant Load (from Tables)

Use	SF/person
Inpatient Treatment	240
Sleeping Dept	120
Business	100
Assembly, w/o fixed seats	7-15
Kitchen	100

Example: (small upper floor with a single inpatient unit)

5,700 SF Bed space: 5700 sf/240 =

300 SF Staff Offices: 300 sf/100 =

TOTAL OCCUPANTS =

LSC Chapter 7 "Means of Egress" (MoE)

7.3 MoE Capacity

7.3.1-Occupant Load

1. **Determine Occupant Load (from Tables)**
2. **Determine Capacity of Egress (7.3.3)**

<u>Example</u>: (small upper floor with a single inpatient unit)

Floor has 2 stairwells, with 41.5" clear width doors & 44" wide steps

LSC Chapter 7 "Means of Egress" (MoE)

7.3 MoE Capacity

7.3.1-Occupant Load

1. **Determine Occupant Load (from Tables)**
2. **Determine Capacity of Egress (7.3.3)**

Location	Stairwell Inches per Person	Level & Ramp Inches per Person
Health Care-sprinkled	.3	.2
Health Car non-sprinkled	.6	.5

Example: **Stairwell step capacity : 44"/.3 =**
Stairwell door capacity: 41.5"/.2=

Steps are the limiting factor, so 146 x 2 stairwells =
292 person exit capacity

LSC Chapter 7 "Means of Egress" (MoE)

7.3 MoE Capacity

7.3.1-Occupant Load

1. Determine Occupant Load (from Tables)
2. Determine Capacity of Egress (7.3.3)
3. Compare Load to Capacity

Example:

TOTAL OCCUPANT LOAD = 26.8 persons

TOTAL CAPACITY = 292 persons

CAPACITY > LOAD

So, Capacity of Exits is satisfactory !

LSC Chapter 7 "Means of Egress" (MoE)

7.3 MoE Capacity | 7.3.4-Minimum Width

Capacity shall not be less than:

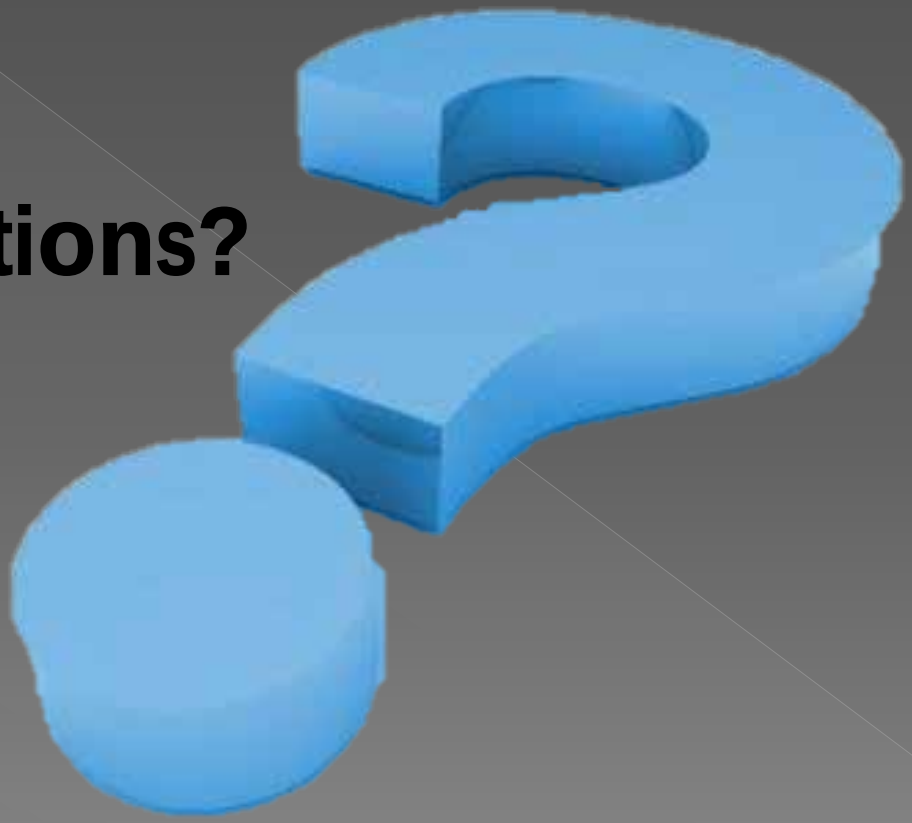
1. **Calculated Load**
2. **Min widths required by Occupancy Chapter**
3. **No less than 36"**

Exceptions:

1. ***18" below 38" aff / 28" above at furniture & movable partitions that serve < 6 persons & length more than 50'***
2. ***Doors compliant with 7.2.1.2***
3. ***28" in existing buildings***
4. ***Aisles in Assembly occupancies***
5. ***Industrial occupancies***

7.3 – MoE Capacity

Any Questions?



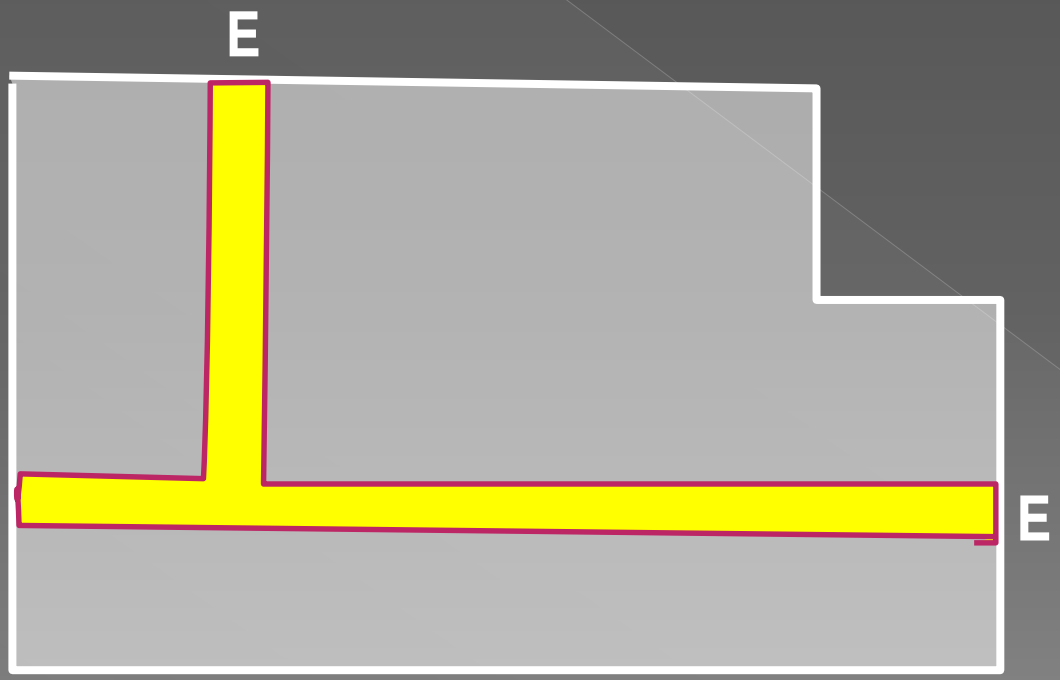
LSC Chapter 7 "Means of Egress" (MoE)

7.1 General	7.7 Discharge from Exits
7.2 MoE Components	7.8 Illumination of MoE
7.3 MoE Capacity	7.9 Emergency Lighting
7.4 Number of MoE	Marking of MoE
7.5 Arrangement of MoE	7.11 High Hazard Contents
7.6 Travel Distance	7.12 Mechanical Equip Rms

LSC Chapter 7 "Means of Egress" (MoE)

7.4 Number of MoE

Min 2 exits per story, mezzanine, balcony

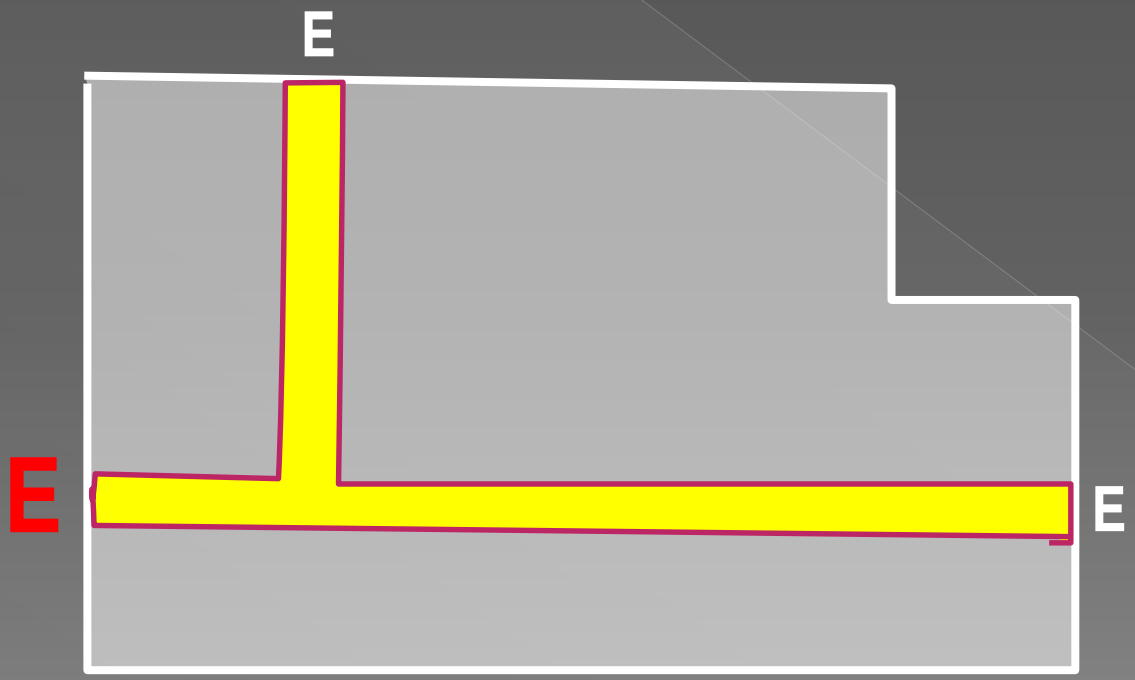


If 500 or fewer occupants per story

LSC Chapter 7 "Means of Egress" (MoE)

7.4 Number of MoE

Min 3 exits if >500, but < 1000 occupants

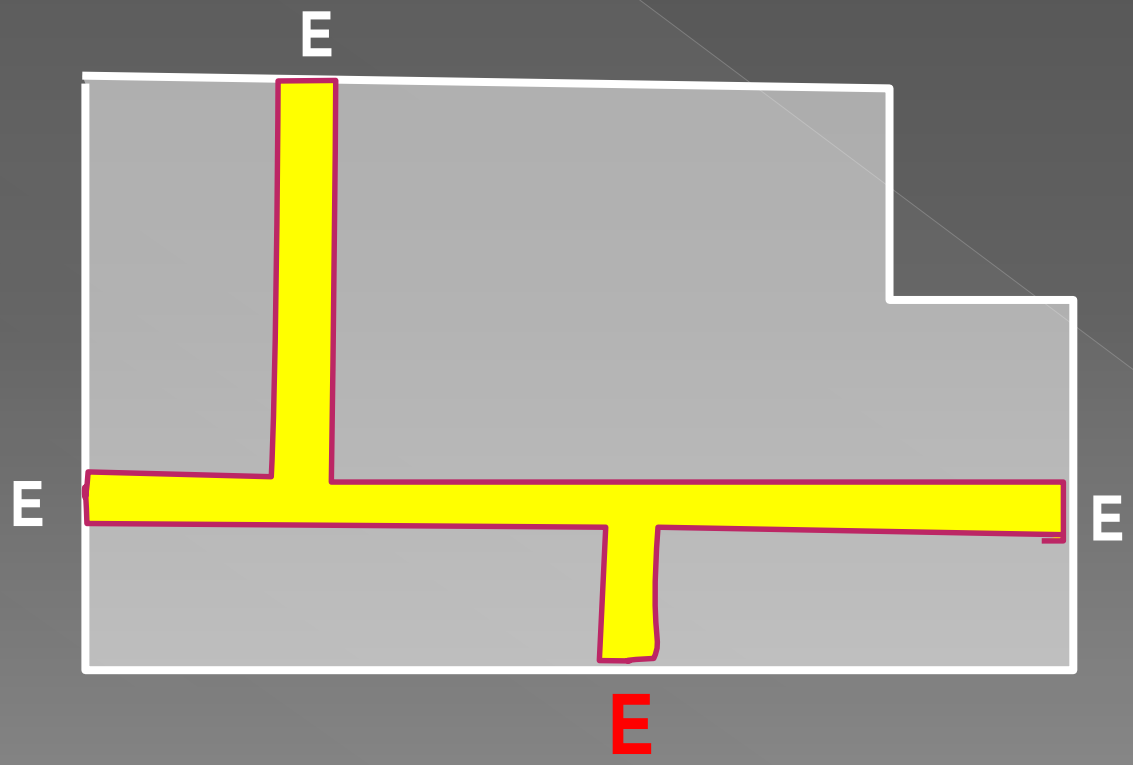


If 501 to 999 occupants per story

LSC Chapter 7 "Means of Egress" (MoE)

7.4 Number of MoE

Min 4 exits if >1000 occupants



If 1001 or more occupants per story

LSC Chapter 7 "Means of Egress" (MoE)

7.1 General

7.2 MoE Components

7.3 MoE Capacity

7.4 Number of MoE

7.5 Arrangement of MoE

7.6 Travel Distance

7.7 Discharge from Exits

7.8 Illumination of MoE

7.9 Emergency Lighting

7.10 Marking of MoE

zard Contents

7.12 Mechanical Equip Rms

LSC Chapter 7 "Means of Egress" (MoE)

7.5 Arrangement of MoE | 7.5.1-General

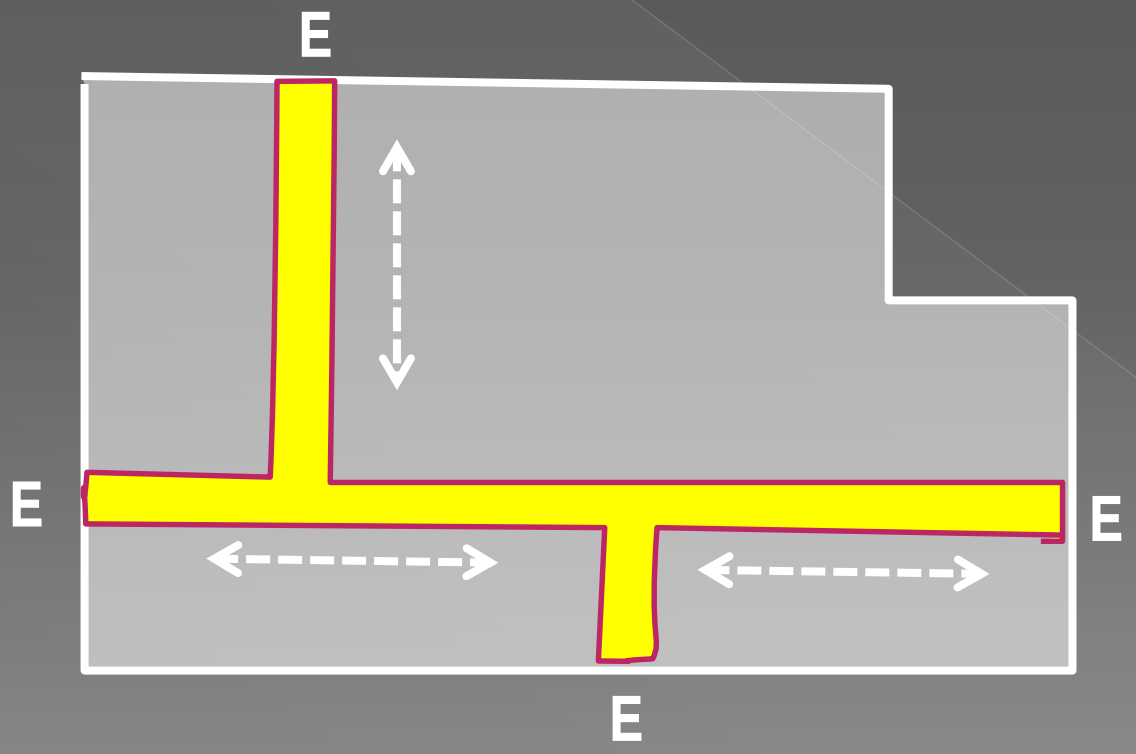
Exits must be readily accessible at all times

DO NOT LOCK EGRESS !

LSC Chapter 7 "Means of Egress" (MoE)

7.5 Arrangement of MoE | 7.5.1-General

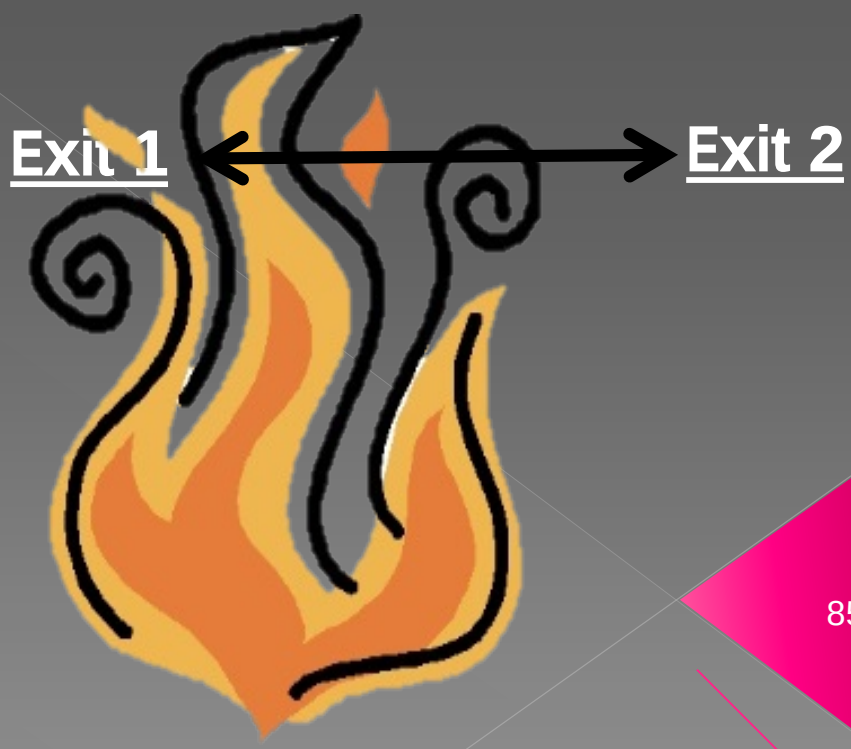
Corridors must have access to not less than 2 exits without passing through any intervening rooms



LSC Chapter 7 "Means of Egress" (MoE)

7.5 Arrangement of MoE | 7.5.1-General

Exits must be REMOTELY located



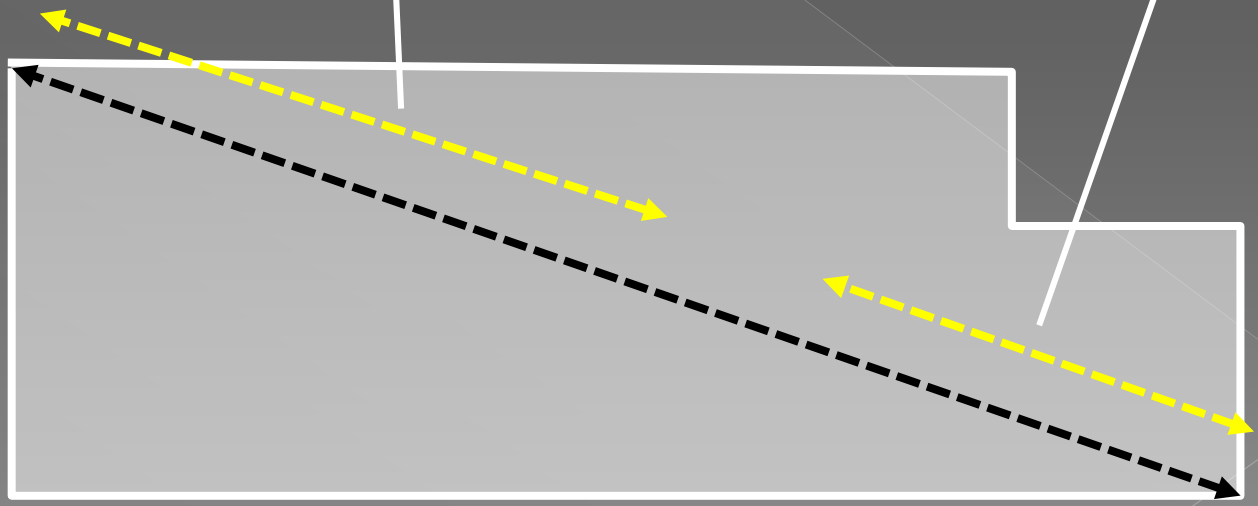
LSC Chapter 7 "Means of Egress" (MoE)

7.5 Arrangement of MoE | 7.5.1-General

Exits must be REMOTELY located

<u>If Un-Sprinkled:</u>
Separated > 1/2 Diagonal Distance

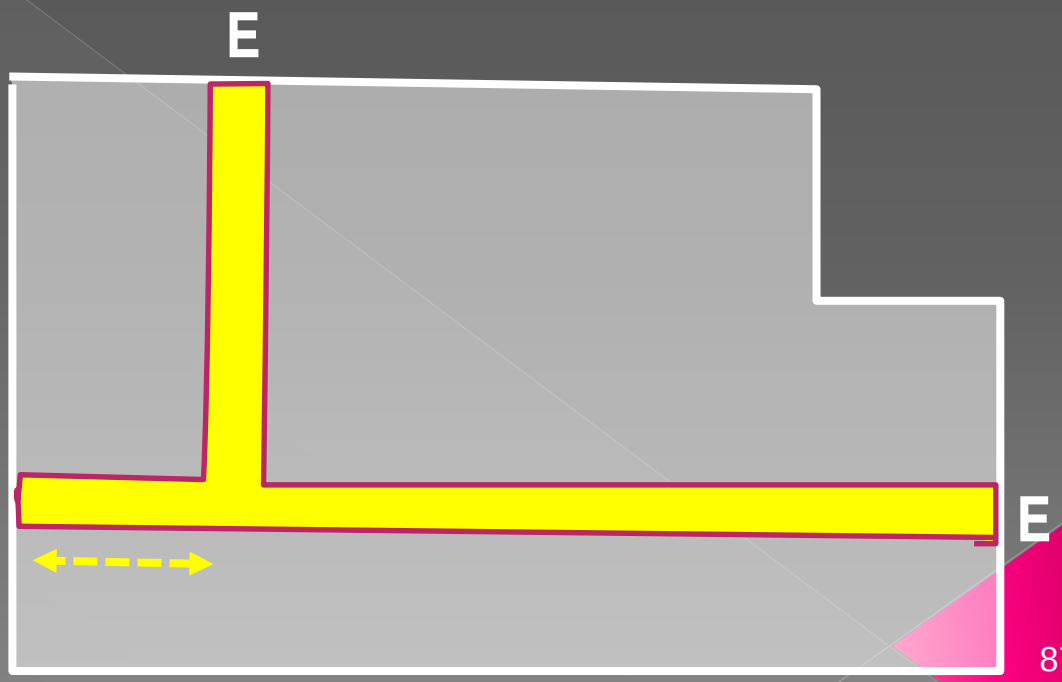
<u>If Sprinkled:</u>
Separated > 1/3 Diagonal Distance



LSC Chapter 7 "Means of Egress" (MoE)

7.5 Arrangement of MoE | 7.5.1-General

Corridors cannot be dead-ended, unless permitted by the occupancy chapter



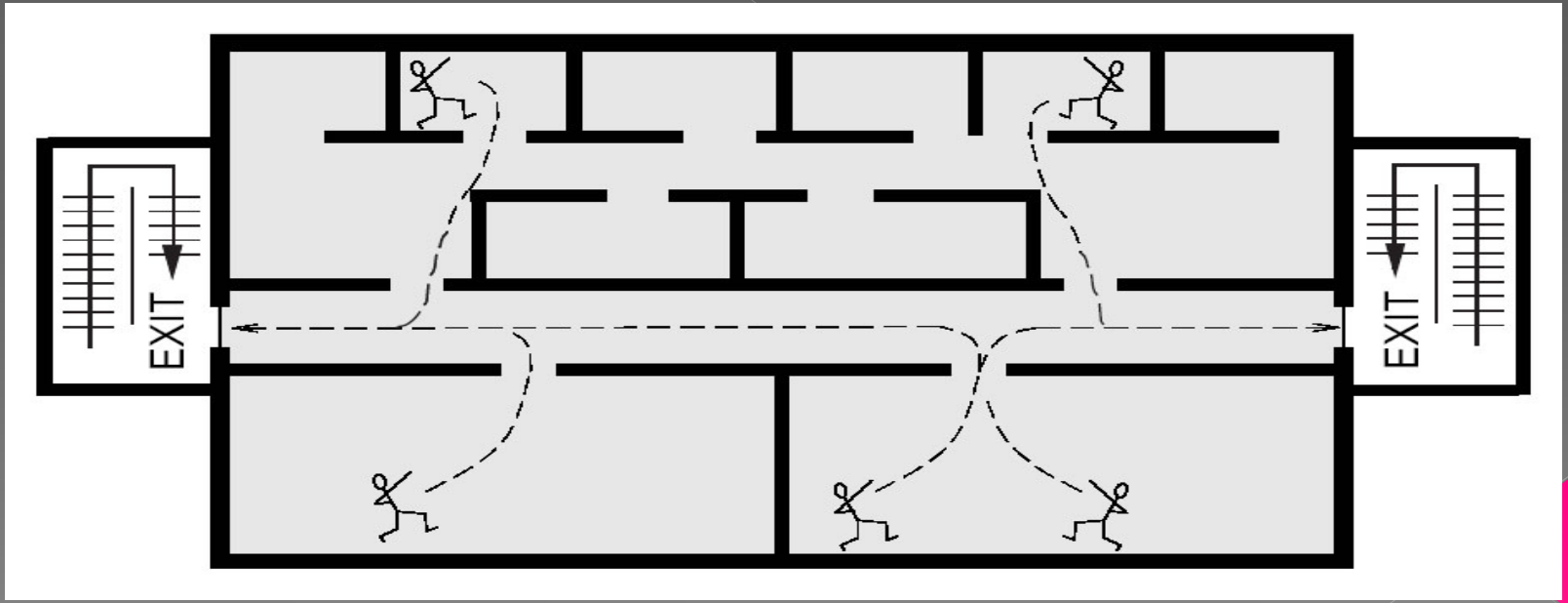
New Health Care:
Dead-End max 30'
(IBC max 20')

Existing Health Care:
Unlimited, unless AHJ thinks it can be fixed ("impractical & unfeasible")

LSC Chapter 7 "Means of Egress" (MoE)

7.5 Arrangement of MoE | 7.5.2-Impediments

Cannot exit through Kitchen, Storerooms, Restrooms, Closets, Bedrooms, or rooms subject to locking (unless permitted by occupancy)



LSC Chapter 7 "Means of Egress" (MoE)

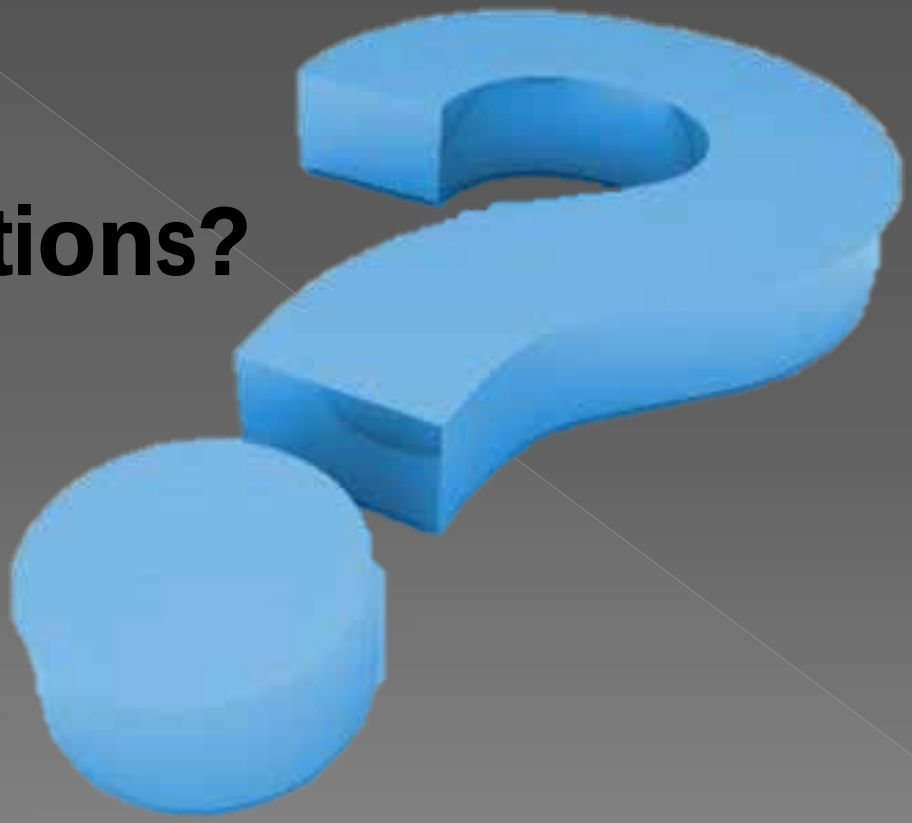
7.5 Arrangement of MoE | 7.5.2-Impediments

Exit Access & Exit Doors must be <u>CLEARLY RECOGNIZABLE</u>

- **No drapes to hide**
- **No mirrors on door, or nearby**
- **No confusing decorations (even w/exit signs)**

7.5 –Arrangement of MoE

Any Questions?



LSC Chapter 7 "Means of Egress" (MoE)

7.1 General

7.2 MoE Components

7.3 MoE Capacity

7.4 Number of MoE

7.5 Arrangement of MoE

7.6 Travel Distance

7.7 Discharge from Exits

7.8 Illumination of MoE

7.9 Emergency Lighting

7.10 Marking of MoE

7.11 High Hazard Contents

Mechanical Equip Rms

LSC Chapter 7 "Means of Egress" (MoE)

7.6 Travel Distance

Travel Distance is measured:

- **On the floor**
- **Centerline of normal travel path**
- **Start from most remote point**
- **Curve around corners/obstructions (1' clearance)**
- **End at center of the destination door**

LSC Chapter 7 "Means of Egress" (MoE)

7.6 Travel Distance

Travel Distance to at least one exit shall not exceed the limits established by the occupancy chapter

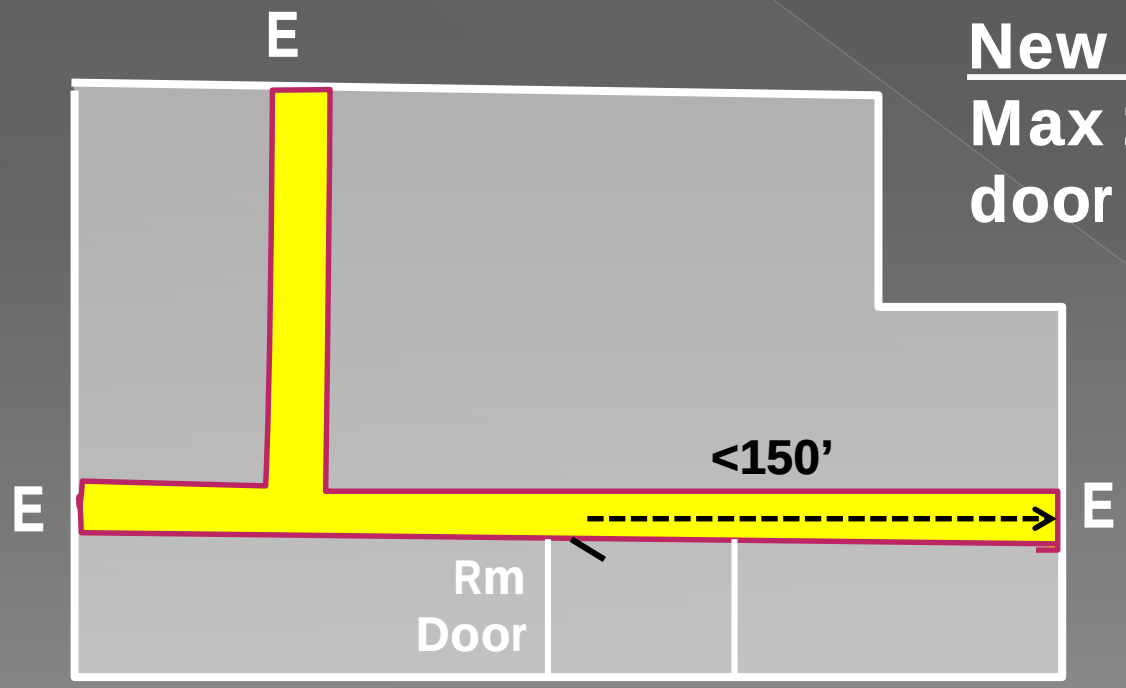
Let's GO TO:

Health Care: 18/19.2.6
To determine limits

LSC Chapter 7 "Means of Egress" (MoE)

7.6 Travel Distance – Corridor To Exit

Travel Distance to at least ONE EXIT shall not exceed the limits established by the occupancy chapter



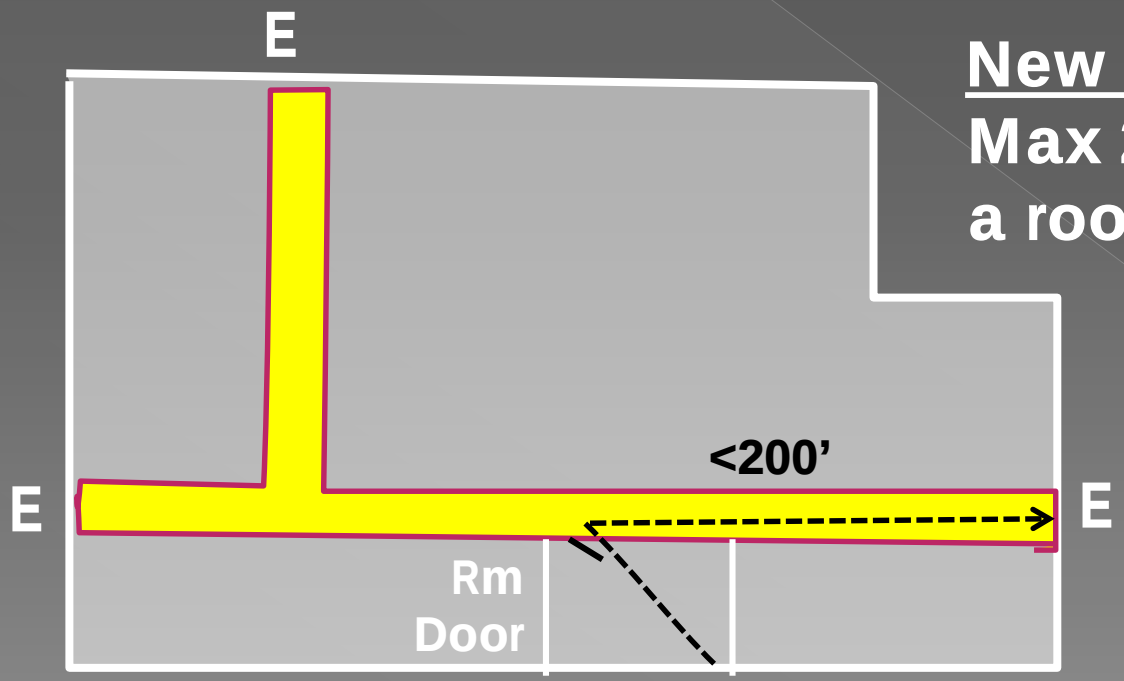
<u>New Health Care</u>: 18.2.6 – Max 150' from exit access door to exit

<u>Existing</u>: Same as New, except 50' less if not sprinkled

LSC Chapter 7 "Means of Egress" (MoE)

7.6 Travel Distance – Room to Exit

Travel Distance to at least one exit shall not exceed the limits established by the occupancy chapter



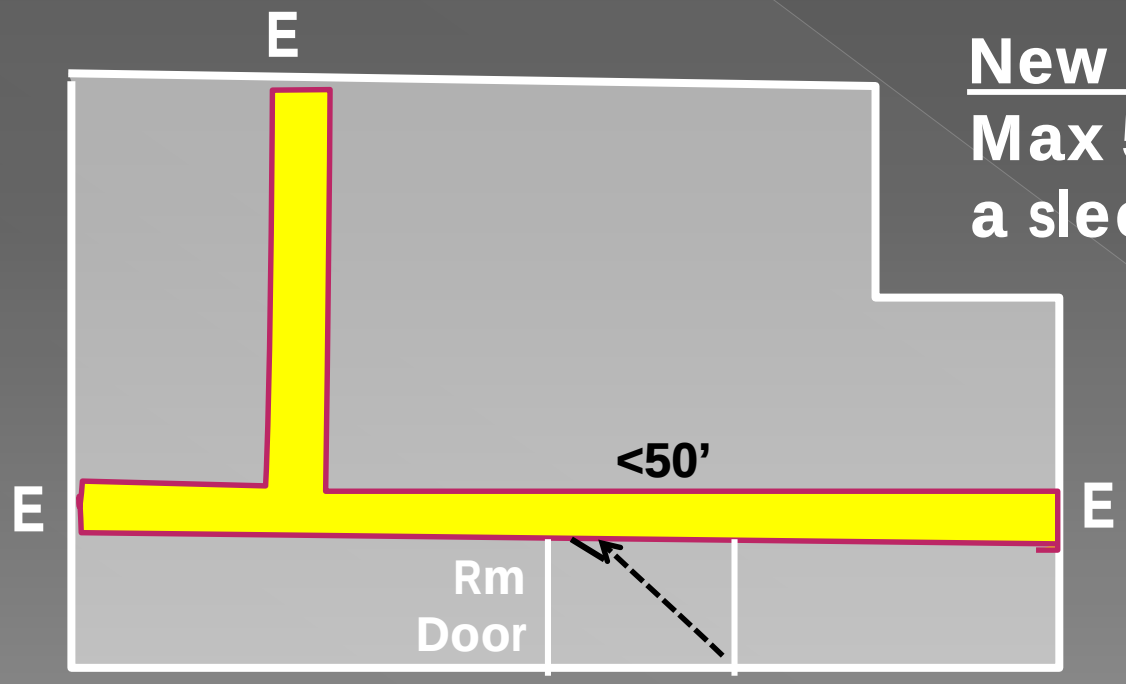
<u>New Health Care</u>: 18.2.6 – Max 200' from any point in a room to exit

<u>Existing Health Care</u>: Same as New, except 50' less if not sprinkled

LSC Chapter 7 "Means of Egress" (MoE)

7.6 Travel Distance – Room to Corridor

Travel Distance to at least one exit shall not exceed the limits established by the occupancy chapter



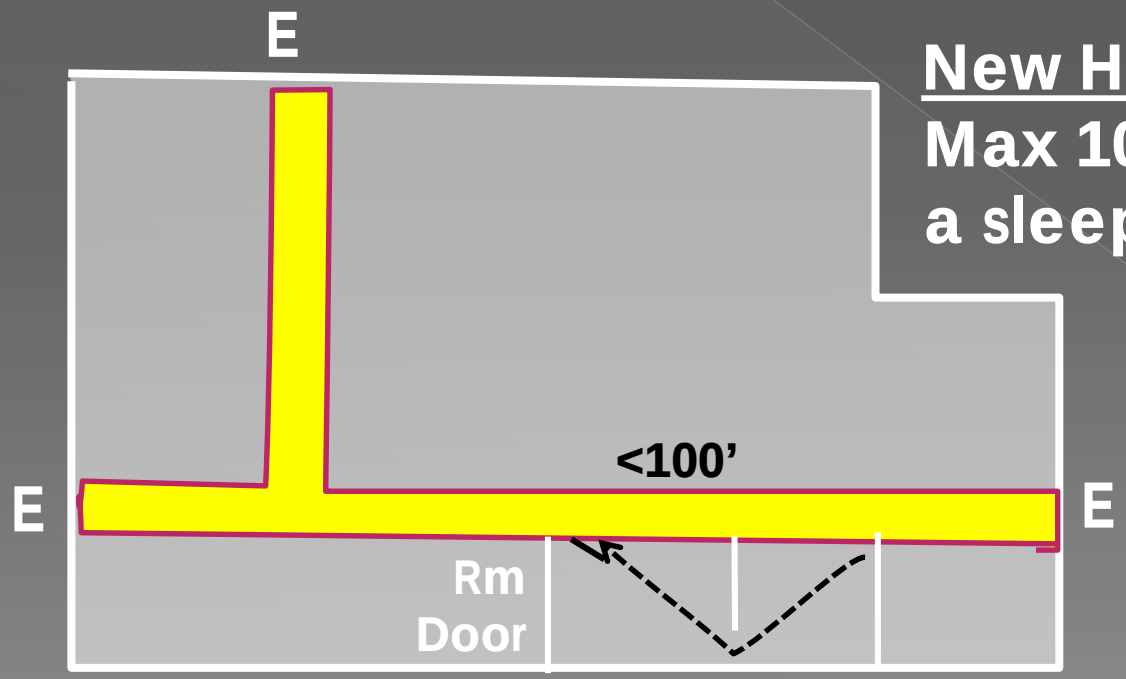
<u>New Health Care</u>: 18.2.6 – Max 50' from any point in a sleep room to exit

<u>Existing</u> : Same as New

LSC Chapter 7 "Means of Egress" (MoE)

7.6 Travel Distance – Suite to Corridor

Travel Distance to at least one exit shall not exceed the limits established by the occupancy chapter

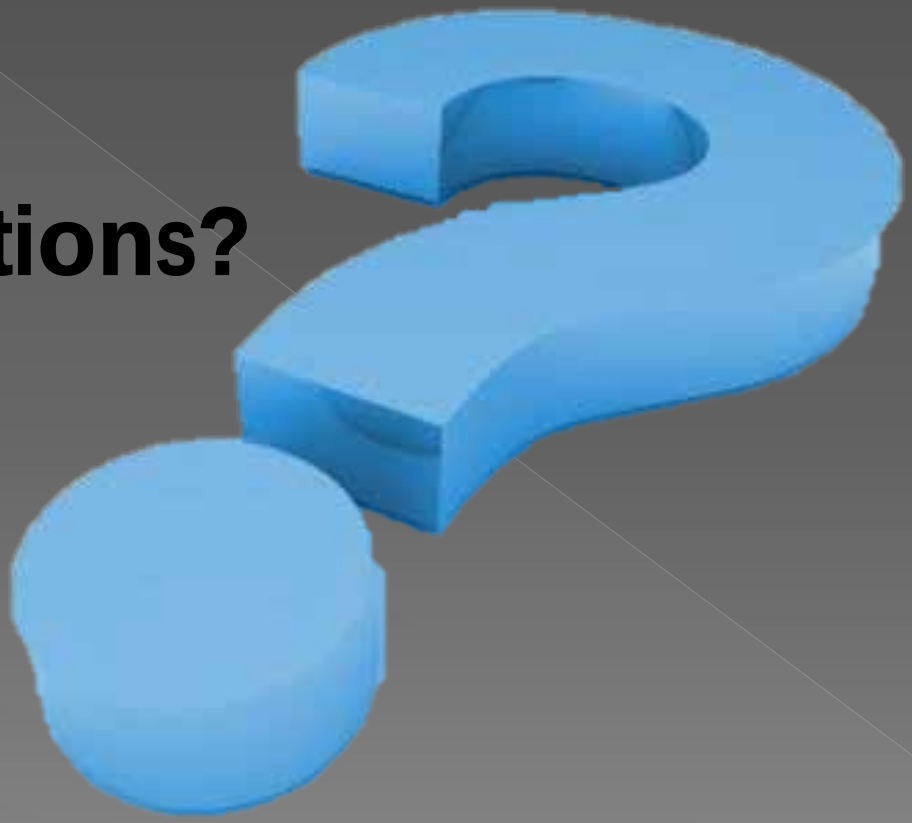


<u>New Health Care</u>: 18.2.6 – Max 100' from any point in a sleep suite to exit access

<u>Existing</u> : Same as New,

7.6 Travel Distance

Any Questions?



LSC Chapter 7 "Means of Egress" (MoE)

7.1 General

7.7 Discharge from Exits

7.2 MoE Components

7.8 Illumination of MoE

7.3 MoE Capacity

7.9 Emergency Lighting

7.4 Number of MoE

7.10 Marking of MoE

7.5 Arrangement of MoE

7.11 High Hazard Contents

7.6 Travel Distance

7.12 Mechanical Equip Rms

LSC Chapter 7 "Means of Egress" (MoE)

7.7 Discharge from Exits

7.7.1-General

Exits shall terminate directly at a <u>public way</u>

<u>Public way:</u> Parcel of land open to the outside & available for public use, at least 10' wide & high

LSC Chapter 7 "Means of Egress" (MoE)

7.7 Discharge from Exits

7.7.1-General

Exits shall terminate directly at a <u>public way</u>

<u>Safe Distance</u>: Not given in code, but 50' is generally accepted

LSC Chapter 7 "Means of Egress" (MoE)

7.7 Discharge from Exits

7.7.1-General

Exits shall terminate directly at a <u>public way</u>




<u>Maintainable</u>: CMS requires a hardened path that is usable in all weather conditions

LSC Chapter 7 "Means of Egress" (MoE)

7.7 Discharge from Exits

7.7.2-Interior

7.7.2 - Interior Exit Discharge

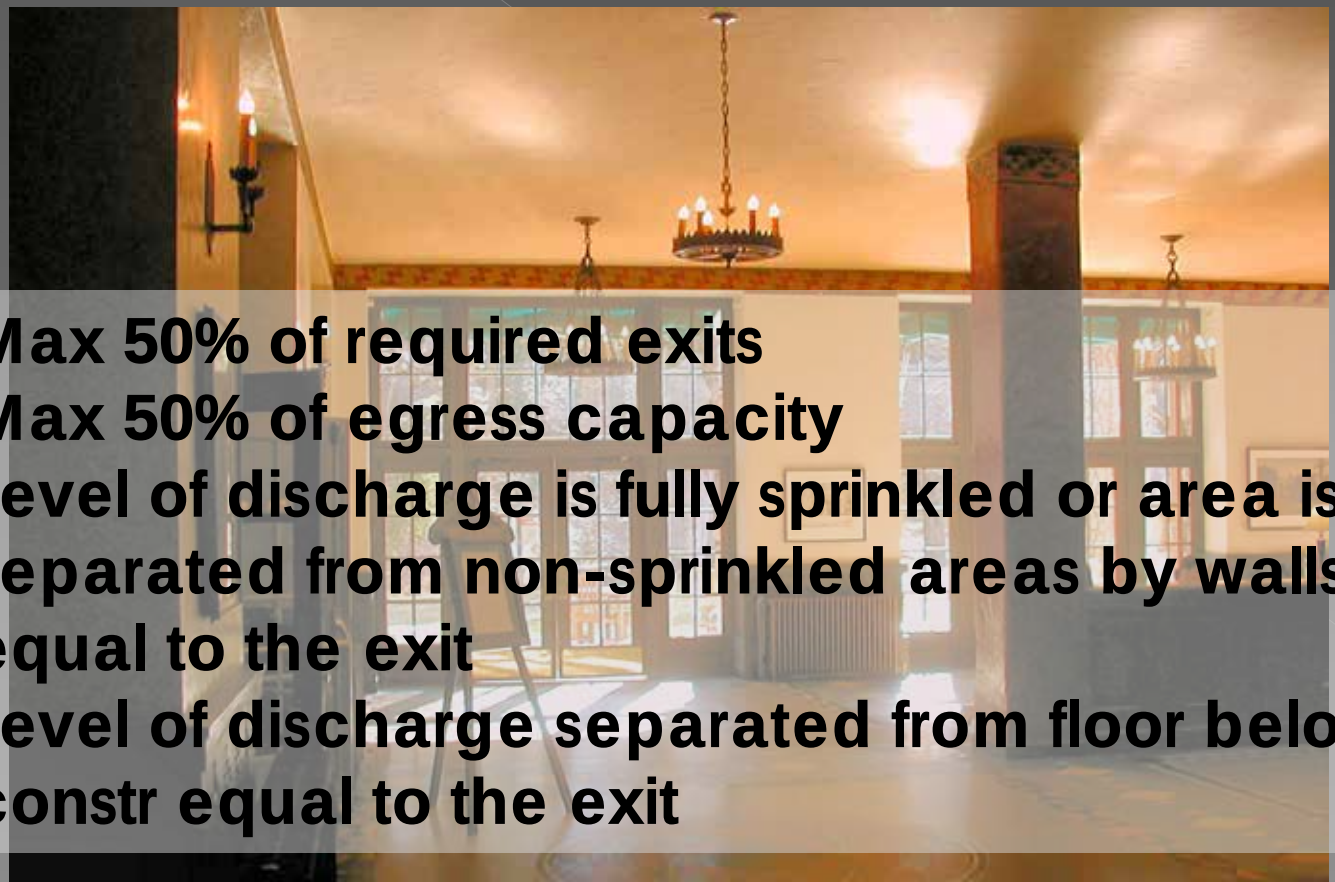
Can discharge through an area on the level of discharge, provided:

LSC Chapter 7 "Means of Egress" (MoE)

7.7 Discharge from Exits

7.7.2-Interior

7.7.2 - Interior Exit Discharge



1. Max 50% of required exits
2. Max 50% of egress capacity
3. Level of discharge is fully sprinkled or area is separated from non-sprinkled areas by walls equal to the exit
4. Level of discharge separated from floor below by constr equal to the exit

LSC Chapter 7 "Means of Egress" (MoE)

7.7 Discharge from Exits

7.7.2-Interior

7.7.2 - Interior Exit Discharge

5. Lead to a free & <u>unobstructed</u> path to the exterior
6. Path is <u>readily visible</u> & <u>identifiable</u> from the exit

LSC Chapter 7 "Means of Egress" (MoE)

7.7 Discharge from Exits

7.7.3-Interruption

7.7.3 – Interruption of Travel

Stairs that continue more than ½ story beyond the level of discharge shall be interrupted by partitions, or doors or other effective means

LSC Chapter 7 "Means of Egress" (MoE)

7.7 Discharge from Exits | 7.7.6-Roof

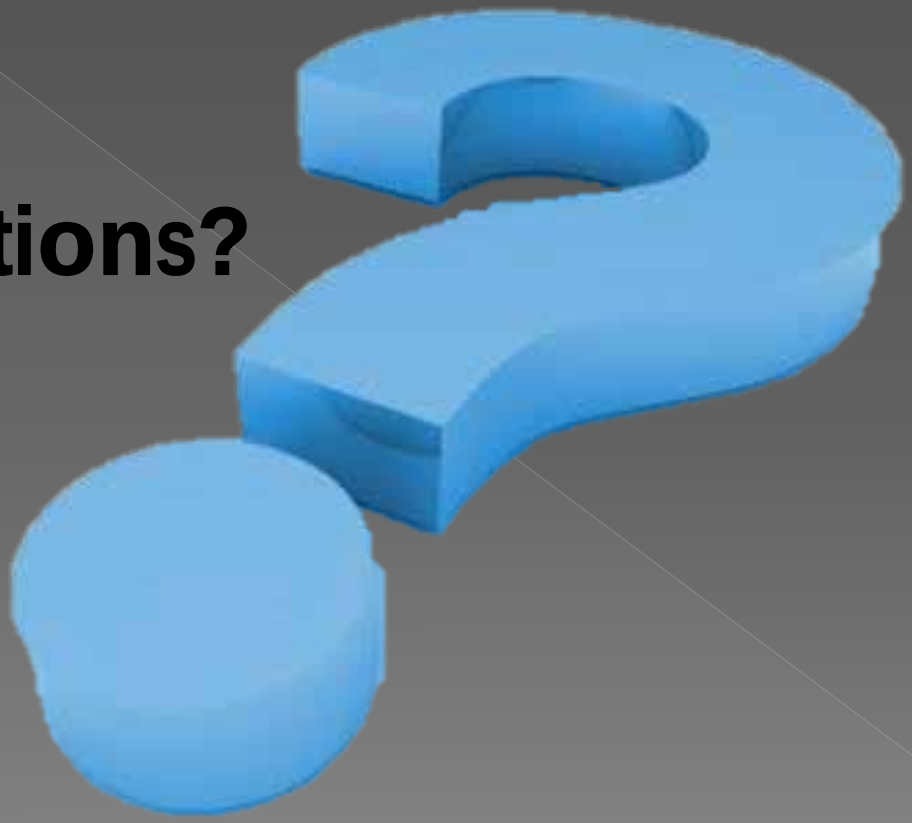
7.7.6 – Roof Exits

Exit can discharge to a roof if:

1. AHJ approves
2. Roof has FRR of the exit enclosure
3. There is a safe & continuous means of egress from the roof

7.7 Discharge from Exits

Any Questions?



LSC Chapter 7 "Means of Egress" (MoE)

7.1 General

7.2 MoE Compone

7.3 MoE Capacity

7.4 Number of MoE

7.5 Arrangement of MoE

7.6 Travel Distance

7.7 Discharge from Exits

7.8 Illumination of MoE

7.9 Emergency Lighting

7.10 Marking of MoE

7.11 High Hazard Contents

7.12 Mechanical Equip Rms

LSC Chapter 7 "Means of Egress" (MoE)

7.8 Illumination of MoE

7.8.1-General

- Powered from a reliable source (Normal power)
- Continuously ON when building occupied

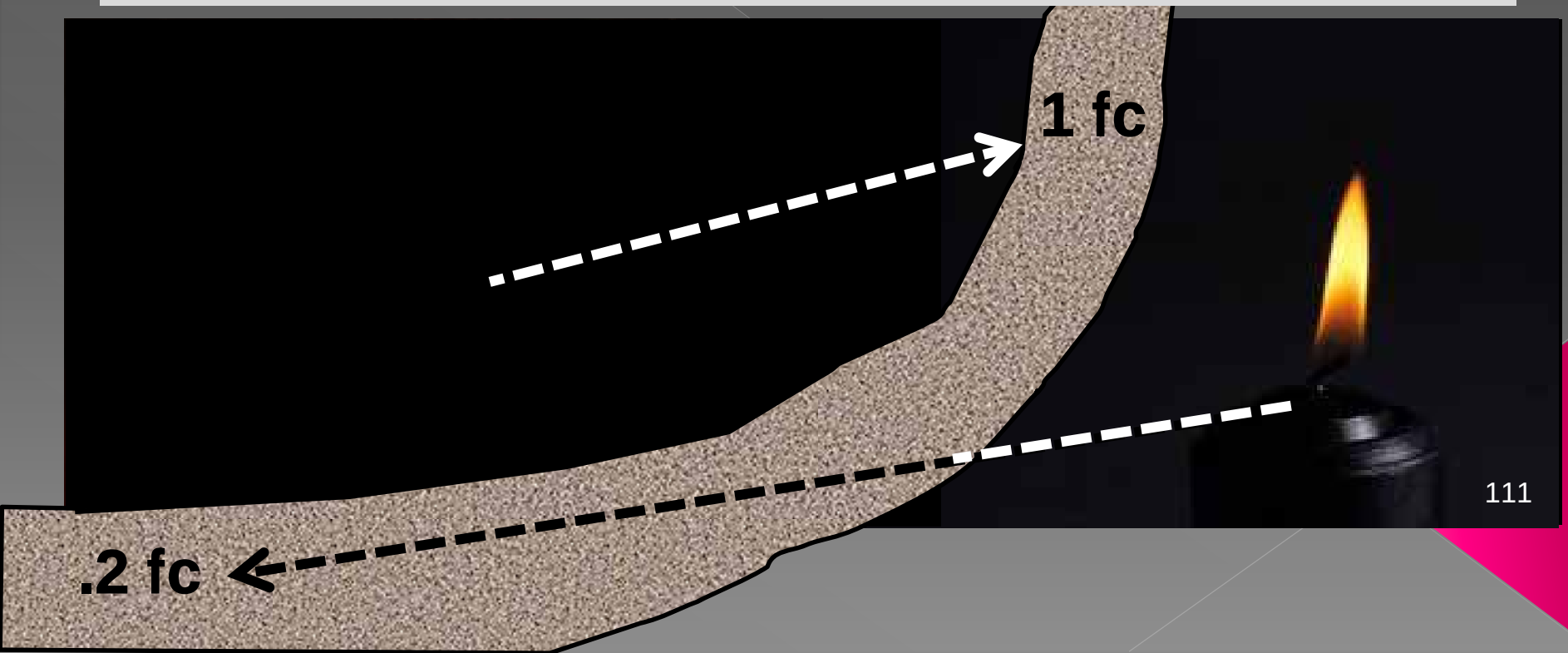
(Motion-sensor controls acceptable if fail-safe & min 15 min on-cycle)

LSC Chapter 7 "Means of Egress" (MoE)

7.8 Illumination of MoE

7.8.1-General

- Min 1 foot-candle (fc) of light
- Redundant lamps so .2 fc is provided if any single lighting unit fails



LSC Chapter 7 "Means of Egress" (MoE)

7.9 Emergency Lighting | 7.9.1-General

- When required by occupancy
- Max 10 second delay during switch over of sources

LSC Chapter 7 "Means of Egress" (MoE)

7.9 Emergency Lighting | 7.9.2-Performance

- Min 90 min service duration
- Min average 1 fc (min .1 fc) at start of outage
- Min average .6 fc (min .06 fc) after 90 min
- 40-1 illumination uniformity
- Lighting automatically starts on any lighting interruption

LSC Chapter 7 "Means of Egress" (MoE)

7.9 Emergency Lighting | 7.9.2-Performance

If generators used, must be installed, tested & maintained per NFPA 110

If batteries used, must be rechargeable, per NFPA 70

System must be capable of repeated automatic operation, without manual intervention

LSC Chapter 7 "Means of Egress" (MoE)

7.9 Emergency Lighting | 7.9.3-Testing

Emergency lighting equipment must be tested

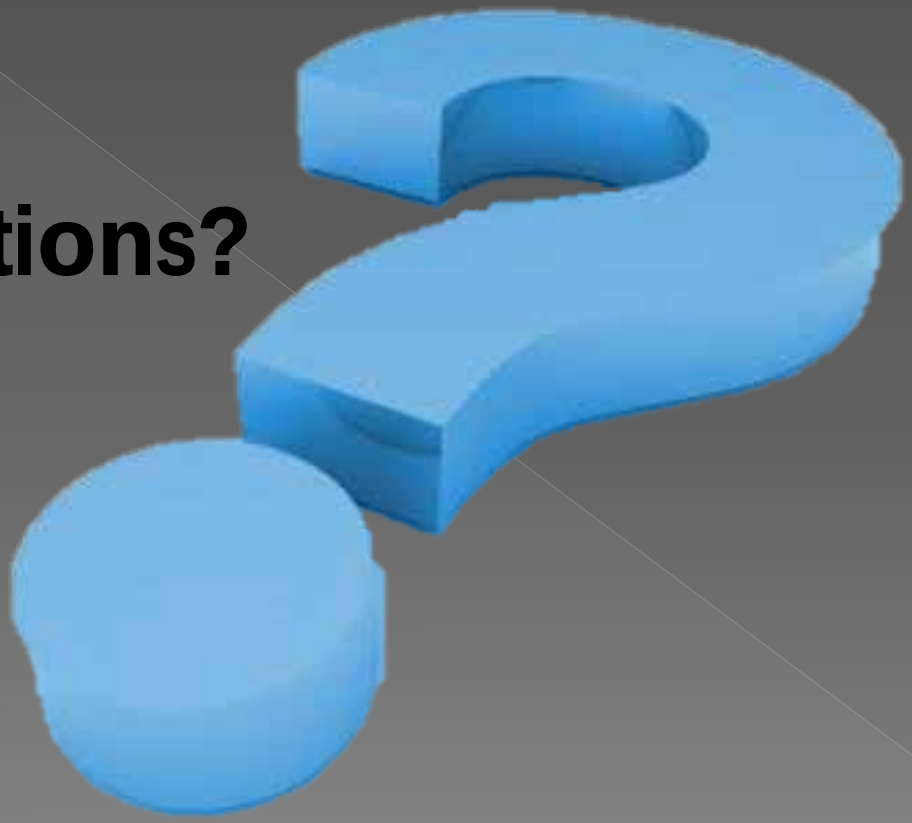
- **at 30-day intervals**
- **For 30 seconds**

Exception: Self-testing battery lights okay if device has a failure indicator & facility performs a 30 day visual inspection

Emergency lighting equipment must be tested annually for 90 minutes

7.8 & .9 Illumination

Any Questions?



LSC Chapter 7 "Means of Egress" (MoE)

7.1 General

7.2 MoE Components

7.3 MoE Capacity

7.4 Number of MoE

7.5 Arrangement of MoE

7.6 Travel Distance

7.7 Discharge from Exits

7.8 Illumination of MoE

7.9 Emergency Lighting

7.10 Marking of MoE

7.11 High Hazard Contents

7.12 Mechanical Equip Rms

LSC Chapter 7 "Means of Egress" (MoE)

7.10 Marking of MoE

7.10.1-General

EXITS shall be marked by a sign that is readily visible from any direction of exit access

A tactile "Exit" door sign at every exit stairwell, 60" aff

Exception: Existing buildings

LSC Chapter 7 "Means of Egress" (MoE)

7.10 Marking of MoE

7.10.1-General

EXIT ACCESS shall be marked where ever the way to an exit is not readily apparent to the occupants

Keep in mind the AHJ determines "readily apparent"

DHS, the local building inspector & local fire department (all are AHJ's) can have differing opinions. You must comply with the most restrictive.

LSC Chapter 7 "Means of Egress" (MoE)

7.10 Marking of MoE

7.10.1-General

Max 100' to a sign (200' between signs)

LSC Chapter 7 "Means of Egress" (MoE)

7.10 Marking of MoE

7.10.1-General

SIGNS shall be

- **readily visible**
- **provide contrast with decorations, finishes & other signs**
- **Nothing shall impair visibility**

LSC Chapter 7 "Means of Egress" (MoE)

7.10 Marking of MoE

7.10.2-Directional Signs

SIGNS shall have a DIRECTION indicator when ever the direction of travel is not apparent

LSC Chapter 7 "Means of Egress" (MoE)

7.10 Marking of MoE

7.10.2-Directional Signs

The DIRECTION indicator shall be located at the end of the sign for the direction indicated.

- **Chevron-shape**
- **Min 3/8" from any letter**
- **Visible from 40'**

Exception: Existing approved signs

LSC Chapter 7 "Means of Egress" (MoE)

7.10 Marking of MoE | 7.10.6-Externally Lite

NEW EXTERNALLY ILLUMINATED SIGNS

- Min 6" high letters
- Min ¾" wide stroke
- Min 2" width of letters ("I" min 3/8")
- Min 5 foot-candles at the surface
- Min contrast ratio .5

Exception: Existing approved signs

LSC Chapter 7 "Means of Egress" (MoE)

7.10 Marking of MoE

7.10.7-Internally Lite

NEW INTERNALLY ILLUMINATED SIGNS

- Min 4" high letters
- Listed per UL 924

NEW PHOTOLUMINESCENT SIGNS

- Face continuously illuminated when occupied
- Install & operate per product marking

Exception: Existing approved signs

LSC Chapter 7 "Means of Egress" (MoE)

7.10 Marking of MoE | 7.10.8-Special Signs

NO EXIT SIGNS

Install where ever a pathway may be mistaken for an exit (in the opinion of the AHJ)

- **Word NO min 2" high**
- **Word EXIT 1" high (half the size as NO)**
- **Exit located below NO**

Exception: Existing approved signs

LSC Chapter 7 "Means of Egress" (MoE)

7.10 Marking of MoE | 7.10.8-Special Signs

NO EXIT SIGNS

Installed After Mar 2003

Exception: Existing approved signs

LSC Chapter 7 "Means of Egress" (MoE)

7.10 Marking of MoE

7.10.9-Testing

VISUAL INSPECTION:

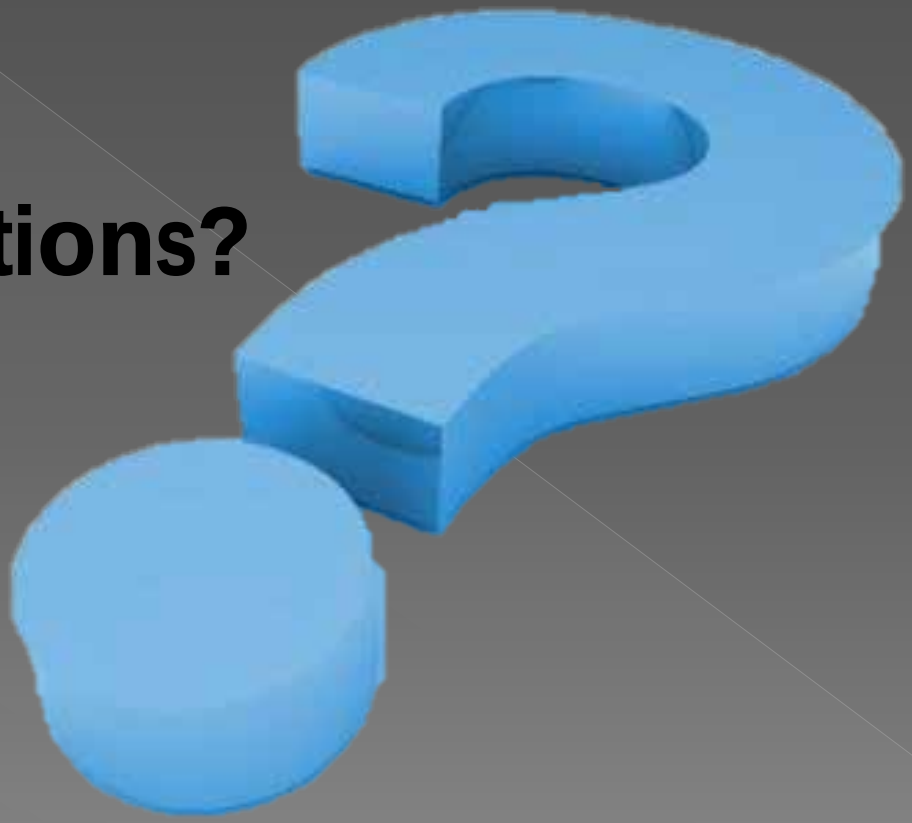
- **Inspect for operation**
- **Max interval of 30 days**
  (Note: CMS has no tolerance for exceeding this interval; TJC does)

TESTING:

- **Test battery lights per emergency lighting requirements of 7.9.3 (30 day/annual)**

7.10 Marking of MoE

Any Questions?



LSC Chapter 7 "Means of Egress" (MoE)

7.1 General

7.2 MoE Components

7.3 MoE Capacity

7.4 Number of MoE

7.5 Arrangemer

7.6 Travel Distance

7.7 Discharge from Exits

7.8 Illumination of MoE

7.9 Emergency Lighting

7.10 Marking of MoE

7.11 High Hazard Contents

7.12 Mechanical Equip Rms

LSC Chapter 7 "Means of Egress" (MoE)

7.11 High Hazard Contents

HIGH HAZARD: (6.2.2.4)

likely to burn with extreme rapidity or explosions

- Max 75 travel distance to exit
- Egress capacity factor increase
  - .7 inch/person for stairs
  - .4 inch/person for level
- Min 2 paths if
  - > 200 SF or
  - > 3 persons or
  - > 25' travel distance
- If less than above one exit is okay, but no dead-ends
- If >5 occupants must have panic hardware

LSC Chapter 7 "Means of Egress" (MoE)

7.1 General

7.2 MoE Components

7.3 MoE Capacity

7.4 Number of MoE

7.5 Arrangement of MoE

7.6 Travel Dist

7.7 Discharge from Exits

7.8 Illumination of MoE

7.9 Emergency Lighting

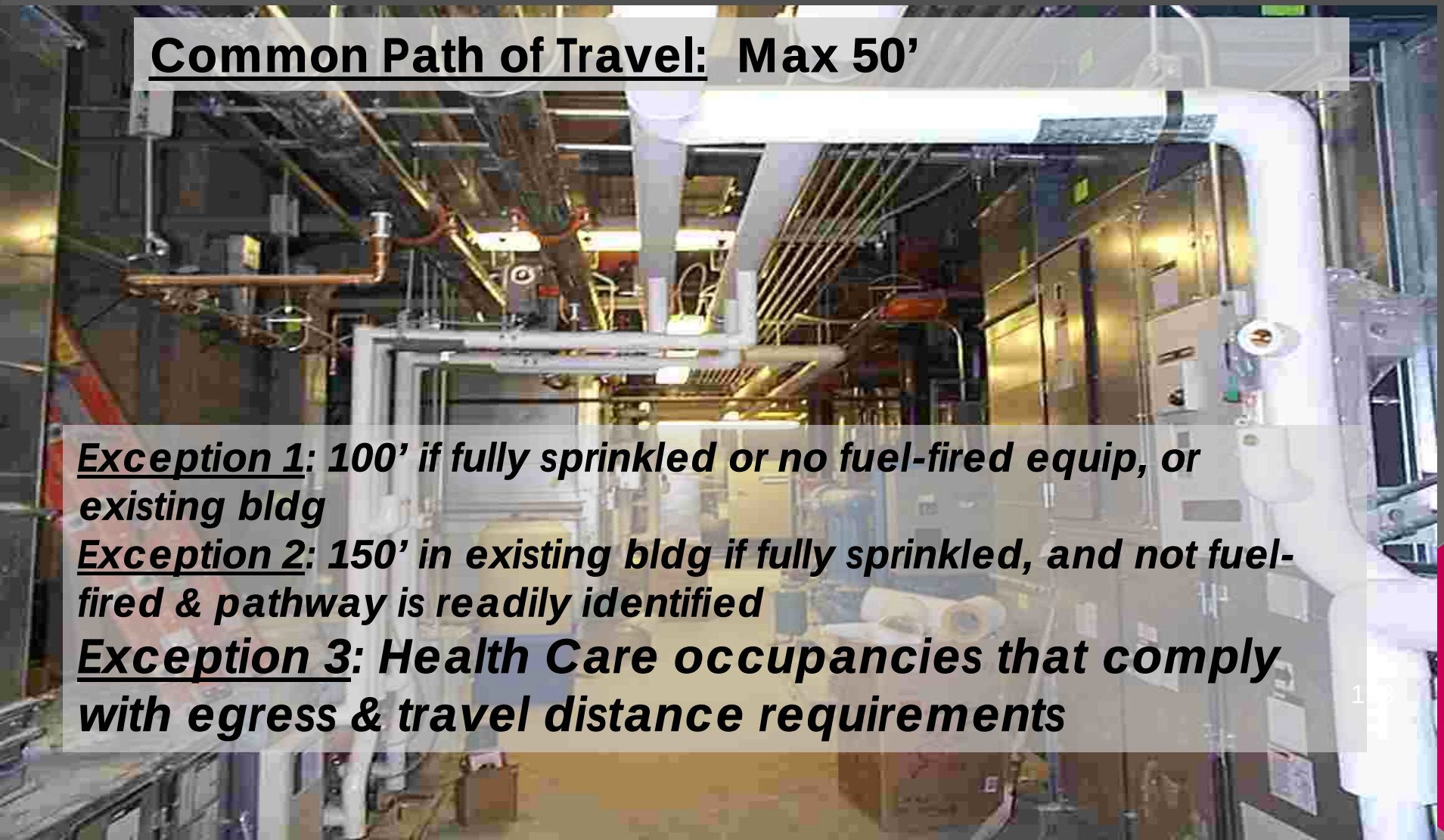
7.10 Marking of MoE

7.11 High Hazard Contents

7.12 Mechanical Equip Rms

LSC Chapter 7 "Means of Egress" (MoE)

7.12 Mechanical Equipment Rooms



Common Path of Travel: Max 50'

***Exception 1**: 100' if fully sprinkled or no fuel-fired equip, or existing bldg*

***Exception 2**: 150' in existing bldg if fully sprinkled, and not fuel-fired & pathway is readily identified*

***Exception 3**: Health Care occupancies that comply with egress & travel distance requirements*

LSC Chapter 7 "Means of Egress" (MoE)

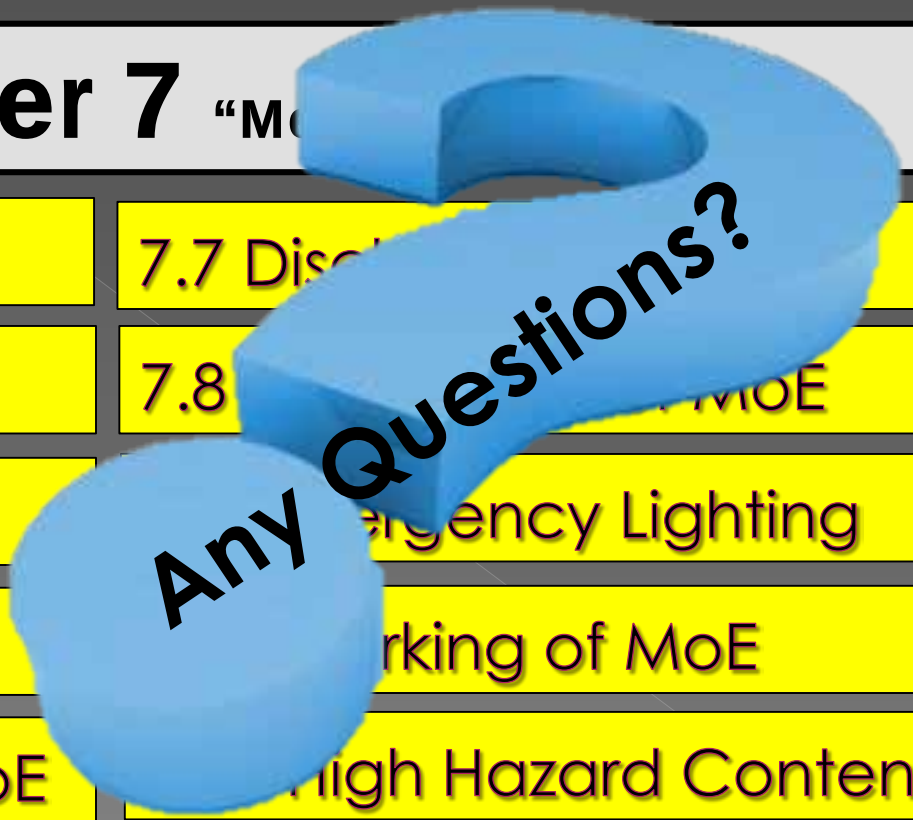
7.12 Mechanical Equipment Rooms

Single means of egress:

- **Story used exclusively for mechanical equip, furnaces or boilers if travel distance to an exit is less than above Common Path of Travel distances (100' in existing building)**

LSC Chapter 7 "M

- 7.1 General
- 7.2 MoE Components
- 7.3 MoE Capacity
- 7.4 Number of MoE
- 7.5 Arrangement of MoE
- 7.6 Travel Distance
- 7.7 Dis
- 7.8 MoE
- ergency Lighting
- rking of MoE
- High Hazard Contents
- 7.12 Mechanical Equip Rms



WISCONSIN HEALTHCARE ENGINEERING ASSOCIATION

Dedicated to Excellence in Healthcare Engineering

"Lunch & Learn" 2014 Webinar Series

Oct, 2014

LSC Chapter 7

Presented by:
Bill Lauzon, PE
Lauzon Life Safety Consulting, LLC

262-945-4567
Lauzon.lsc@gmail.com
Web: Lauzon-LSC.com