



WISCONSIN HEALTHCARE ENGINEERING ASSOCIATION
Dedicated to Excellence in Healthcare Engineering

“Lunch & Learn” 2014 Webinar Series

Sept, 2014 LSC Chapter 8

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

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

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Hosted by Riley Construction

Gold WHEA Sponsor

Ben Kossow, *Vice President*
Tammy Ames, *Senior Project Manager*

RILEY
CONSTRUCTION

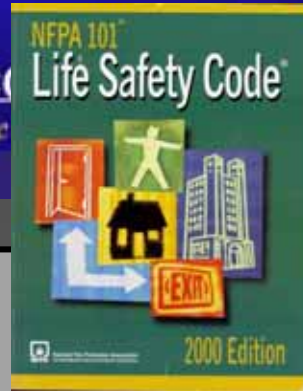
Milwaukee ▪ Kenosha ▪ Chicago

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your job easier™





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HEALTHCARE ENGINEERING ASSOCIATION
Dedicated to Excellence in Healthcare Engineering

Jan, 2014

LSC Overview

July, 2014

Fire Stopping

Feb, 2014

Health Care Occupancy

Sept, 2014

LSC Chapter 8

"Features of Fire Protection"

Mar, 2014

Other Occupancies

May, 2014

Fire & Smoke Doors

Oct, 2014

LSC Chapter 7

"Means of Egress"

June, 2014

2012 LSC



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LSC Chapter 8 “Features of Fire Protection”

8.2 Construction & Compartmentalization

8.2.1-Construction

8.2.2-Compartments

8.2.3-Fire Barriers

8.2.4-Smoke Partitions

8.2.5-Vertical Openings

8.2.6-Mezzanines

8.2.7-Concealed Spaces

8.3 Smoke Barriers

8.4 Hazard Protection



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LSC Chapter 8 “Features of Fire Protection”

8.2 Construction & Compartmentation

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8.2.2-Compartmentments

8.2.3-Fire Barriers

8.2.4-Smoke Partitions

8.2.5-Vertical Penetrations

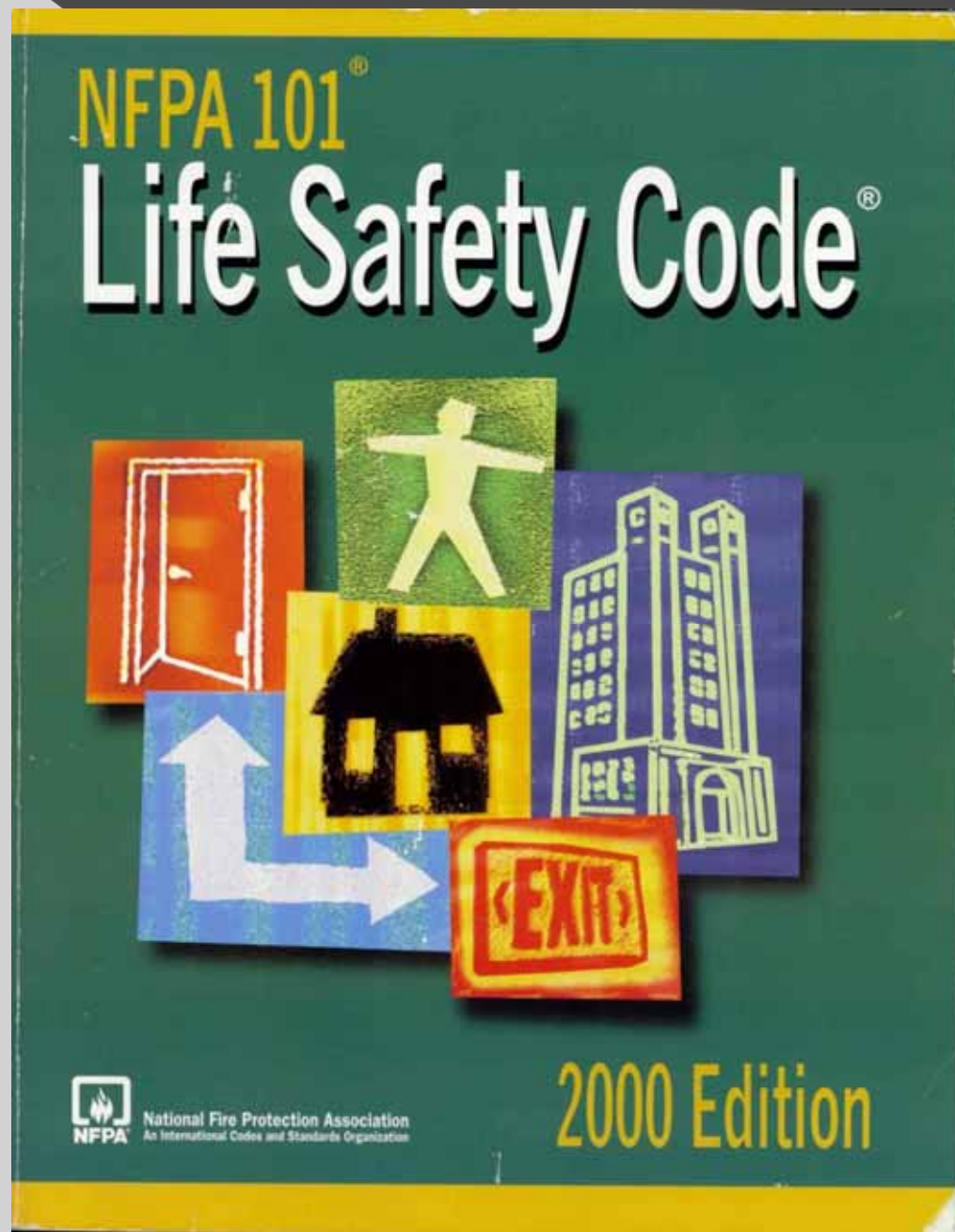
8.2.6-Mezzanines

8.2.7-Unfinished Spaces

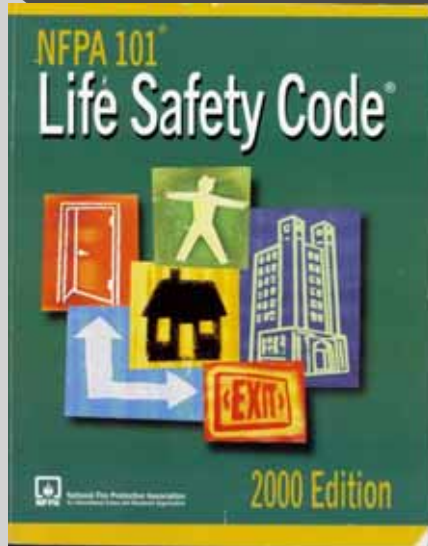
**Ask ANY
time during
presentation**

8.3 Smoke Barriers

8.4 Hazard Protection



3 General Items about NFPA 101



“HOW-to”
NOT
“WHEN-to”

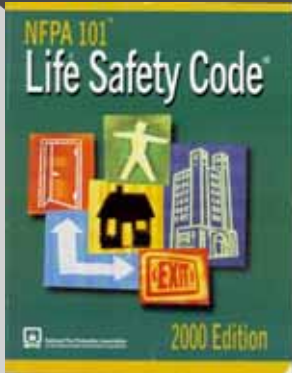
#1

LSC

Chapter 8

“Features of Fire Protection”

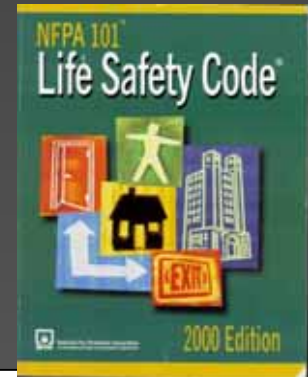
(**“WHEN-TO”** is specified in the Occupancy Chapters)



#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)**



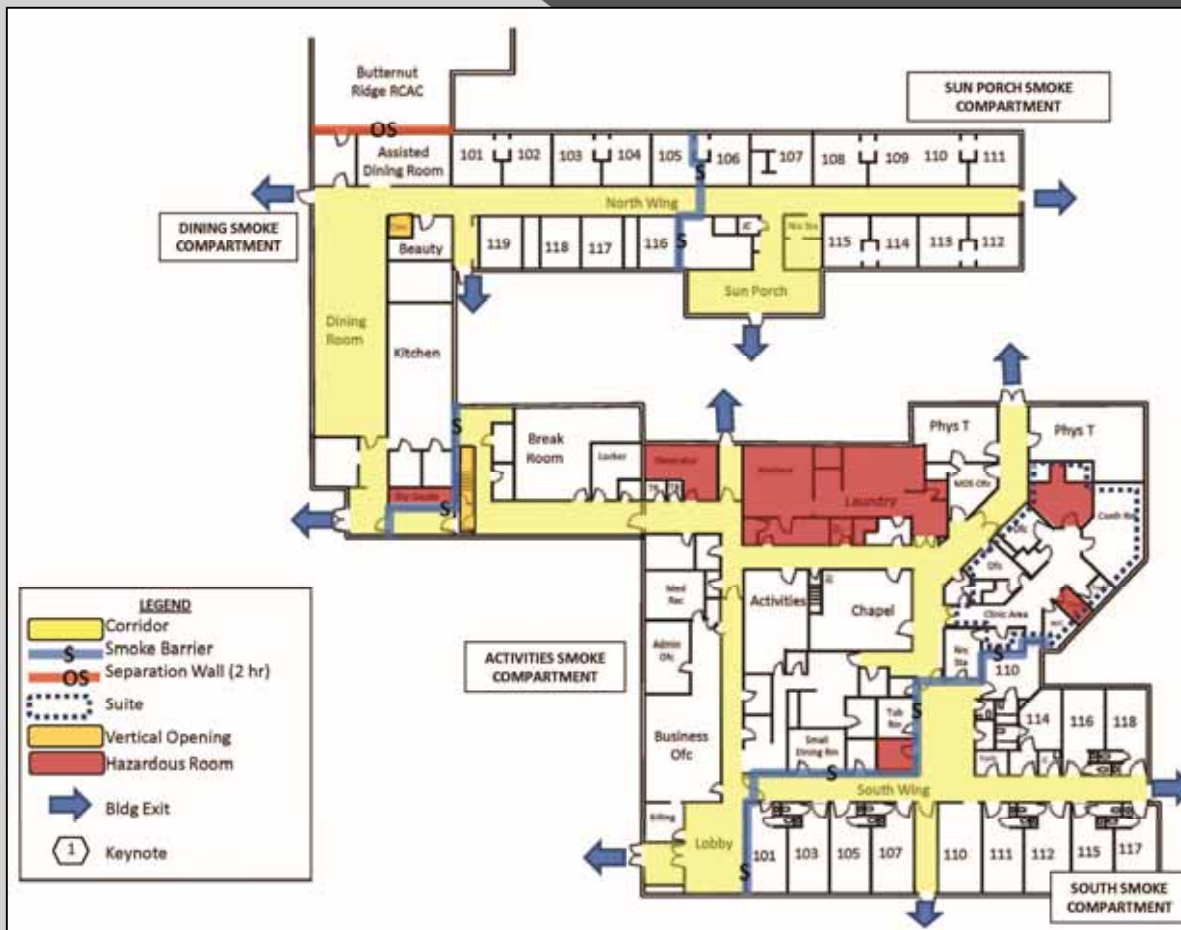
Life Safety Plans

#3

LSP should display
all the “Features
of Fire Protection”

**NOT code
required**

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



Life Safety Plans

- Good Legend

INSPECTION LIFE SAFETY PLAN

LIFE SAFETY LEGEND	
NON-RATED WALL	
	CORRIDOR (yellow fill)
	SUITE BOUNDARY (blue dashed line)
RATED WALLS & DOORS	
	VERTICAL OPENING (green fill)
	HAZARDOUS ROOM (red/pink fill)
	SMOKE BARRIER (blue line, w/SB)
	OCCUPANCY SEPARATION (green line, w/OS)
	BUILDING SEPARATION (green line, w/BS)
	HORIZONTAL EXIT (green line)
TRAVEL DISTANCE ROUTES:	
	SUITE TRAVEL DISTANCE (black dash)
	SMOKE TRAVEL DISTANCE (black dash-dot)
	EXIT TRAVEL DISTANCE (black dash-dot-dot)
	COMMON PATH OF TRAVEL DIST.
NOTE: Each of the above lines are shown individually. If a wall has multiple functions, each function is shown separately, beside each	

LIFE SAFETY CODE REQUIREMENTS

WALL REQUIREMENTS	DOOR REQUIREMENTS
NON-RATED WALL	NON-RATED DOOR: ALL DOORS NOT REQUIRED; DOOR MUST CLOSE WITH A SLIGHT PUSH OR PULL
ALL YRS: RESIST PASSAGE OF SMOKE VIA (A) FULL HEIGHT OR (B) WALLS UP TO CORRIDOR CEILING + SMOKE-TIGHT CEILING	ALL YRS: RESIST PASSAGE OF SMOKE WITH FRAME STOPS; SPRING-LOADED POSITIVE LATCHES; NO GRILLS (EXCEPT IN TOILETS, ETC); 1" UNDERCUT
SAME AS CORRIDOR WALLS	SAME AS CORRIDOR WALLS
RATED WALLS:	RATED DOOR & FRAME: ALL: CLOSER; 3/4" UNDERCUT; POS LATCH; HOLD-OPEN ONLY W/ELCT-MAG+SMK DET
>2003: 1-HR RATED IF BLDG IS <4 STORIES; 2-HR IF 4 OR MORE <2003: 1-HR RATED FOR ALL STORIES	>2003: 60 MIN RATED IF BLDG IS <4 STORIES; 90 MIN IF 4 OR MORE <2003: 45 MIN RATED FOR ALL STORIES
>2003: 1-HR RATED; STORE RMS >=100 SF; SMOKE-TIGHT IF 50-99 SF <2003: (A) 1-HR RATED OR (B) SMOKE-TIGHT	>2003: 45 MIN RATED <2003: (A) 45 MIN RATED OR (B) SMOKE-TIGHT + CLOSER
>2003: 1-HR RATED-FULL HEIGHT <2003: 30 MIN RATED-FULL HEIGHT	>2003: 20 MIN LABEL <2003: (A) 20 MIN RATED OR (B) MIN 1-3/4" THICK SOLID WOOD CORE
ALL YRS: 2-HR RATING-FULL HEIGHT	ALL YRS: 90 MIN RATING
ALL YRS: 2-HR RATING-FULL HEIGHT	ALL YRS: 90 MIN RATING
ALL YRS: 2-HR RATING-FULL HEIGHT	ALL YRS: 90 MIN RATING
TRAVEL DISTANCES:	
ALL YRS: 100' THRU 1 OR 2 RMS; 50' THRU 2 ROOMS	
ALL YRS: 200' TO AN UNLOCKED DOOR IN THE ADJ SMOKE COMPARTMENT	
ALL YRS: 150' FROM ANY CORRIDOR DOOR TO AN EXIT, WHICH MEANS THAT EXITS MUST BE LESS THAN 300' APART	
NOT APPLICABLE IN HEALTH CARE BUSINESS OCCUPANCIES: 100'	
SHOWN ARE THE REQUIREMENTS IN HEALTHCARE OCCUPANCIES THAT ARE SPRINKLED; ALWAYS CONSULT THE ACTUAL CODE FOR FULL REQUIREMENTS	



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LSC Chapter 8 “Features of Fire Protection”

8.2 Construction & Compartmentalization

8.2.1-Construction

8.2.2-Compartments

8.2.3-Fire Barriers

8.2.4-Smoke Partitions

8.2.5-Vertical Openings

8.2.6-Mezzanines

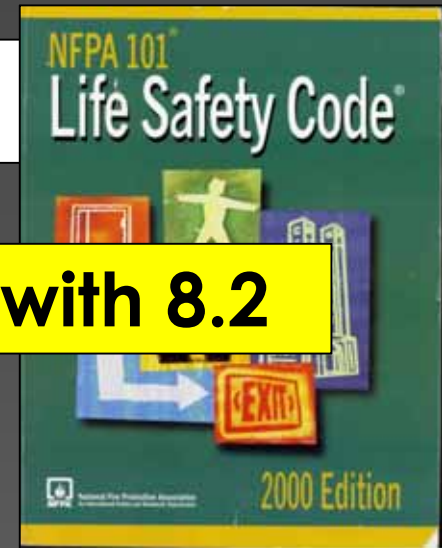
8.2.7-Concealed Spaces

8.3 Smoke Barriers

8.4 Hazard Protection

8.2 Construction

18/19.1.6.2 – Requires compliance with 8.2



NFPA:

Different Construction Types require:

1. 2 Hr Vertically Aligned Fire Barrier

8.2 Construction

DIFFERENT



IBC:

Different Construction Types require:

2 or 3 Hr Vertically Aligned Fire WALL

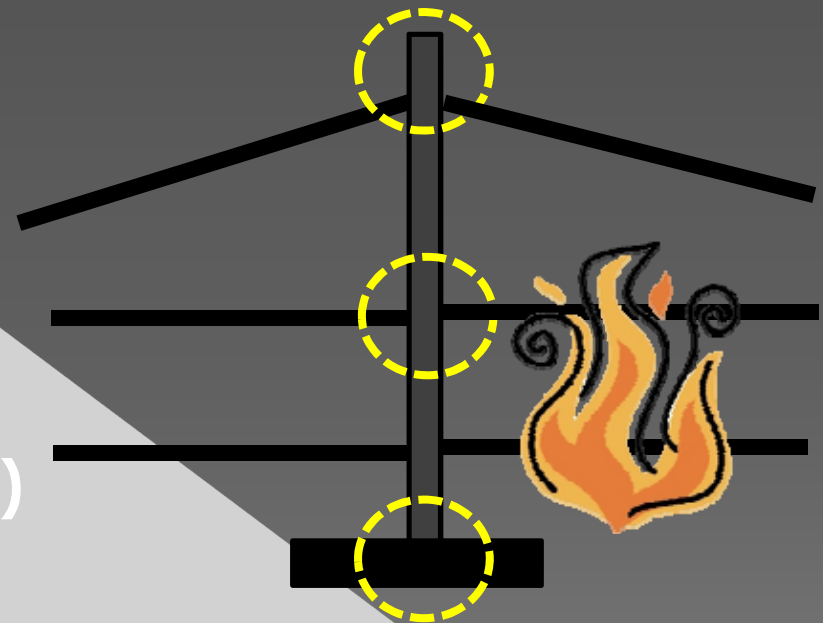
503.1 – Each portion of a building separated by fire walls...shall be considered a separate building

Table 503 on Allowable Bldg Heights & Areas **are** applied to each individually

8.2 Construction

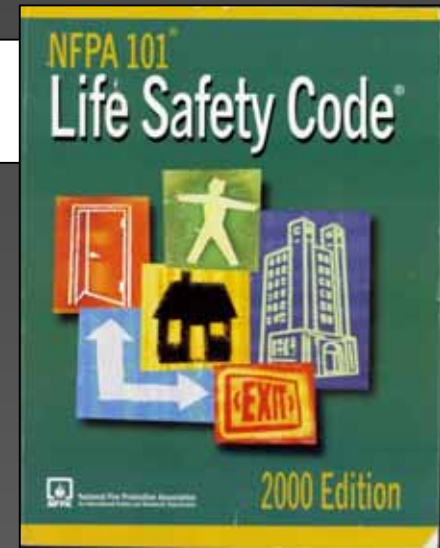
Fire WALL versus Fire BARRIER

Fire WALL: used by IBC (International Building Code). Applies to all commercial buildings;
(**Structural Design** & Fire Rating)



Fire BARRIER: used by NFPA & IBC. Applies to all commercial buildings & jurisdictions that adopted the LSC (**No Structural Design**; only Fire Rating)

8.2 Construction



NFPA:

Different Construction Types require:

1. 2 Hr Vertically Aligned Fire Barrier
(per NFPA 221, Chapter 3)

2. (or) Least Constr Type applies

A photograph of a large, multi-story building engulfed in flames at night. A prominent fire tower on the roof is also on fire, with bright orange and yellow flames and sparks rising into the dark sky. The building's windows are visible, some glowing from the fire inside. Streetlights are visible in the foreground, and the overall scene is one of a major fire incident.

CONSTRUCTION TYPES

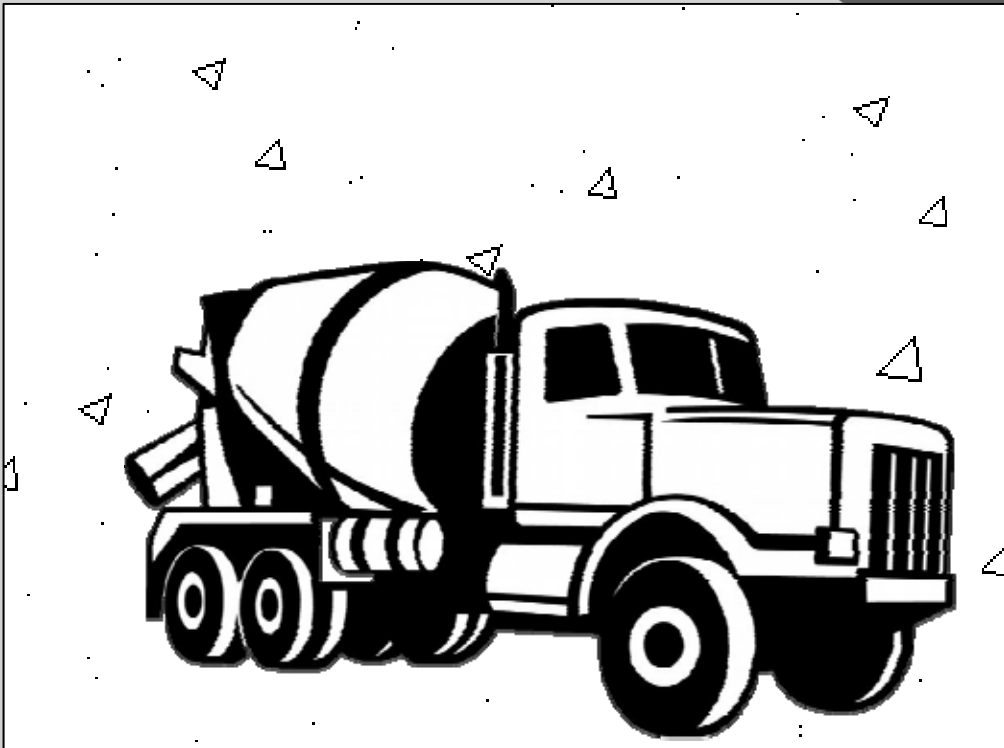
- **Combustibility**
- **Fire Protection**

CONSTRUCTION TYPES

Non-Combustible Construction (I & II)

Concrete

Steel



CONSTRUCTION TYPES

Combustible Construction (III, IV, V)

Wood & Masonry or Steel (III)

Heavy Timber (IV)

Wood (V)



Protected vs. Un-Protected

PROTECTED

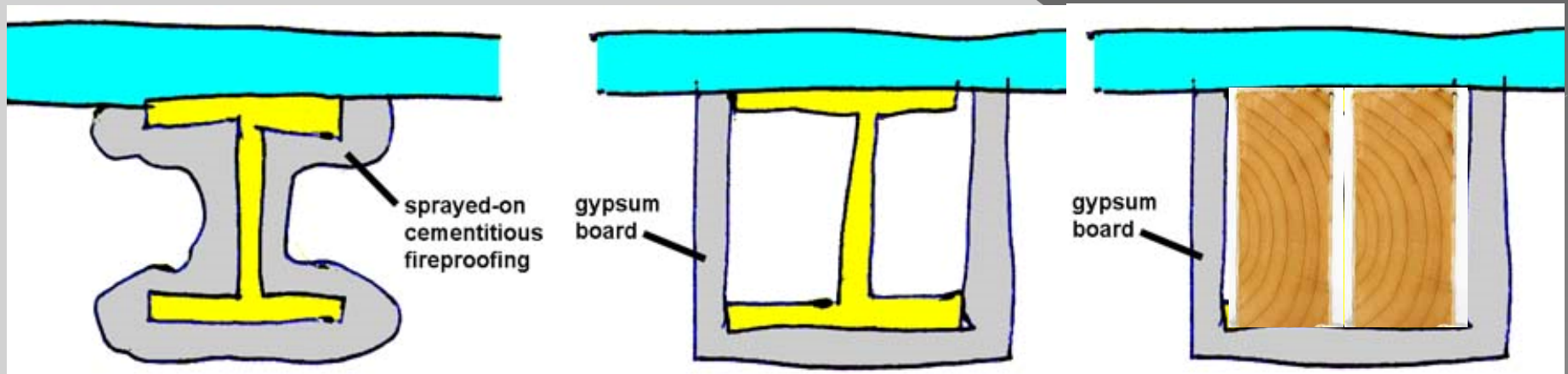
(111) = Protected

(211) = Protected

(222) = Protected

(332) = Protected

(443) = Protected



Protected vs. Un-Protected

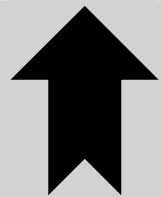
UN-PROTECTED

Bare/Exposed
Structural Members
(non-concrete)

(000) = Un-Protected

(200) = Un-Protected

(2HH)= Un-Protected



**“0” hrs of Fire
Resistance**



HEALTH CARE CONSTRUCTION TYPE

Table 18.1.6.2 Construction Type Limitations

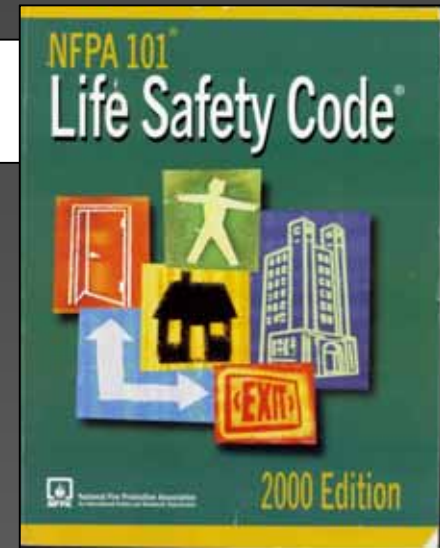
Construction Type	Stories			
	1	2	3	4 or More
I(443)	X	X	X	X
I(332)	X	X	X	X
II(222)	X	X	X	X
II(111)	X	X	X	NP
II(000)	X	NP	NP	NP
III(211)	X	NP	NP	NP
III(200)	NP	NP	NP	NP
IV(2HH)	X	NP	NP	NP
V(111)	X	NP	NP	NP
V(000)	NP	NP	NP	NP

X: Permitted type of construction.

NP: Not permitted.

NEW
construction

8.2 Construction



NFPA:

Different Construction Types require:

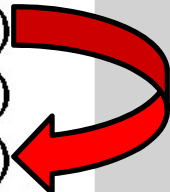
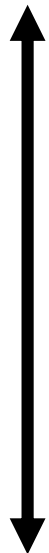
1. 2 Hr Vertically Aligned Fire Barrier
2. (or) Least Constr Type applies

HEALTH CARE CONSTRUCTION TYPE

Table 18.1.6.2

Construction Type
I(443)
I(332)
II(222)
II(111)
II(000)
III(211)
III(200)
IV(2HH)
V(111)
V(000)

Construction Type Hierarchy
“lowest” unseparated type
applies to whole building



HEALTH CARE CONSTRUCTION TYPE

Table 18.1.6.2 Construction Type Limitations

Construction Type	Stories			
	1	2	3	4 or More
I(443)	X	X	X	X
I(332)	X	X	X	X
II(222)	X	X	X	X
II(111)	X	X	X	NP
II(000)	X	NP	NP	NP
III(211)	X	NP	NP	NP
III(200)	NP	NP	NP	NP
IV(2HH)	X	NP	NP	NP
V(111)	X	NP	NP	NP
V(000)	NP	NP	NP	NP

X: Permitted type of construction.

NP: Not permitted.

NEW
construction

HEALTH CARE CONSTRUCTION TYPE

Table 18.1.6.2

NFPA

I(443)
I(332)
II(222)
II(111)
II(000)
III(211)
III(200)
IV(2HH)
V(111)
V(000)

Per
NFPA 220

IBC

IA
IA
IB
IIA
IIB
IIIA
IIIB
IV
VA
VB

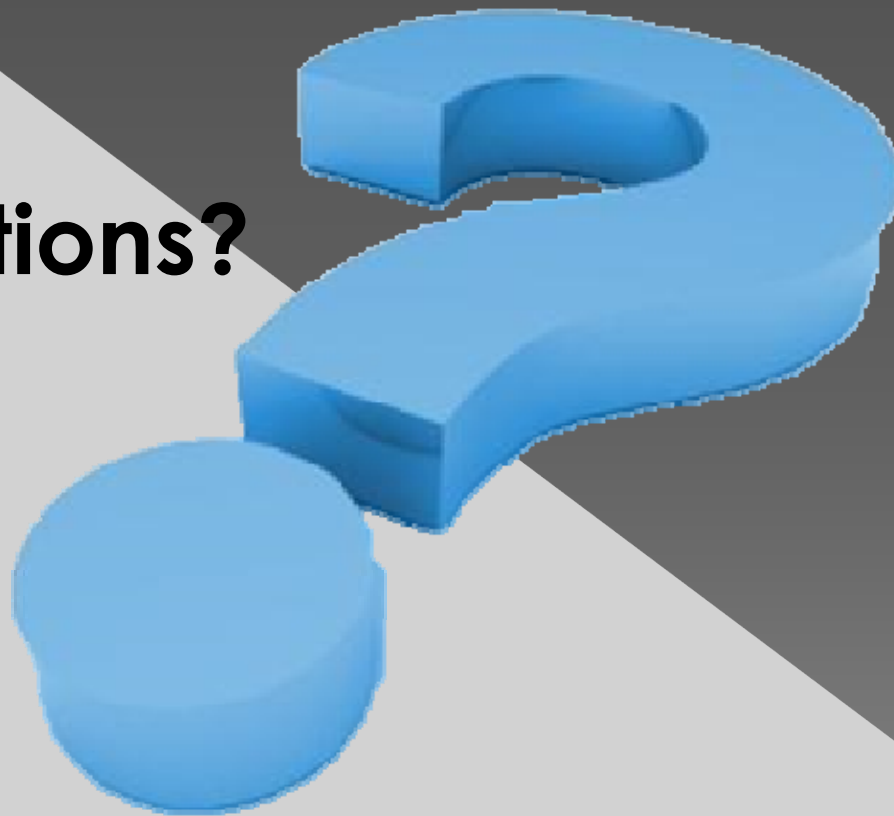
Per
IBC 602



**Can be
Confusing**
(Always describe using
both code methods)

8.2 Construction

Any Questions?





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LSC Chapter 8 “Features of Fire Protection”

8.2 Construction & Compartmentalization

8.2.1-Construction

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8.3 Smoke Barriers

8.4 Hazard Protection

8.2.2 Compartmentalization

Consists of :

- Floors & Openings (stairs, shafts)
- Walls & Openings (doors/windows)

The Occupancy Chapters define
“WHEN-TO” & “WHAT LEVEL” of
Compartmentalization

8.2.2 Compartmentalization

18/19.2.2 – Requires compliance with 8.2.2

Health care
occupancies are built
with a combination of
“boxes” or
compartments ...
whose job is to slow
down the spread of
fire & smoke

Floor 5
Floor 4
Floor 3
Floor 2
Floor 1

8.2.2 Compartmentalization

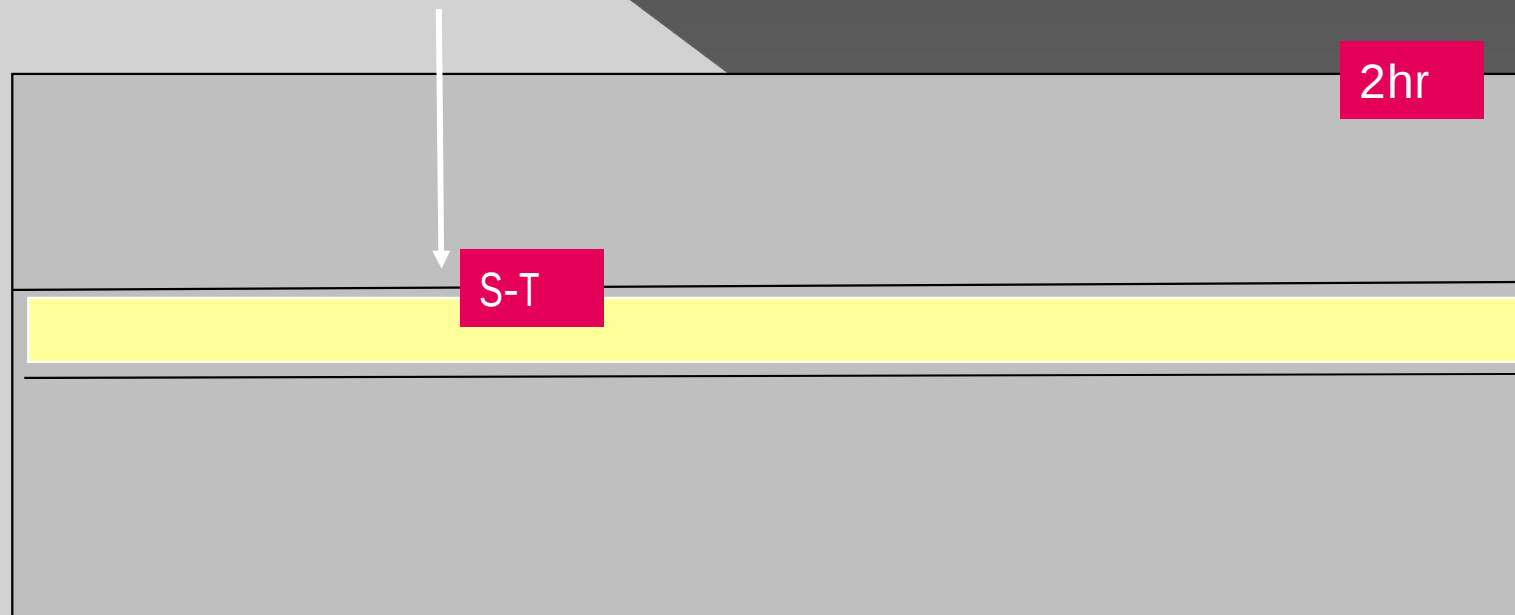
Floor 5
Floor 4
Floor 3
Floor 2
Floor 1

**Each Floor has a
Fire Resistance Rating
&
is a Smoke
Compartment**

8.2.2 Compartmentalization

(4 or more stories, sprinkled)

Corridors are separated from rooms by
“smoke-tight” walls & ceilings

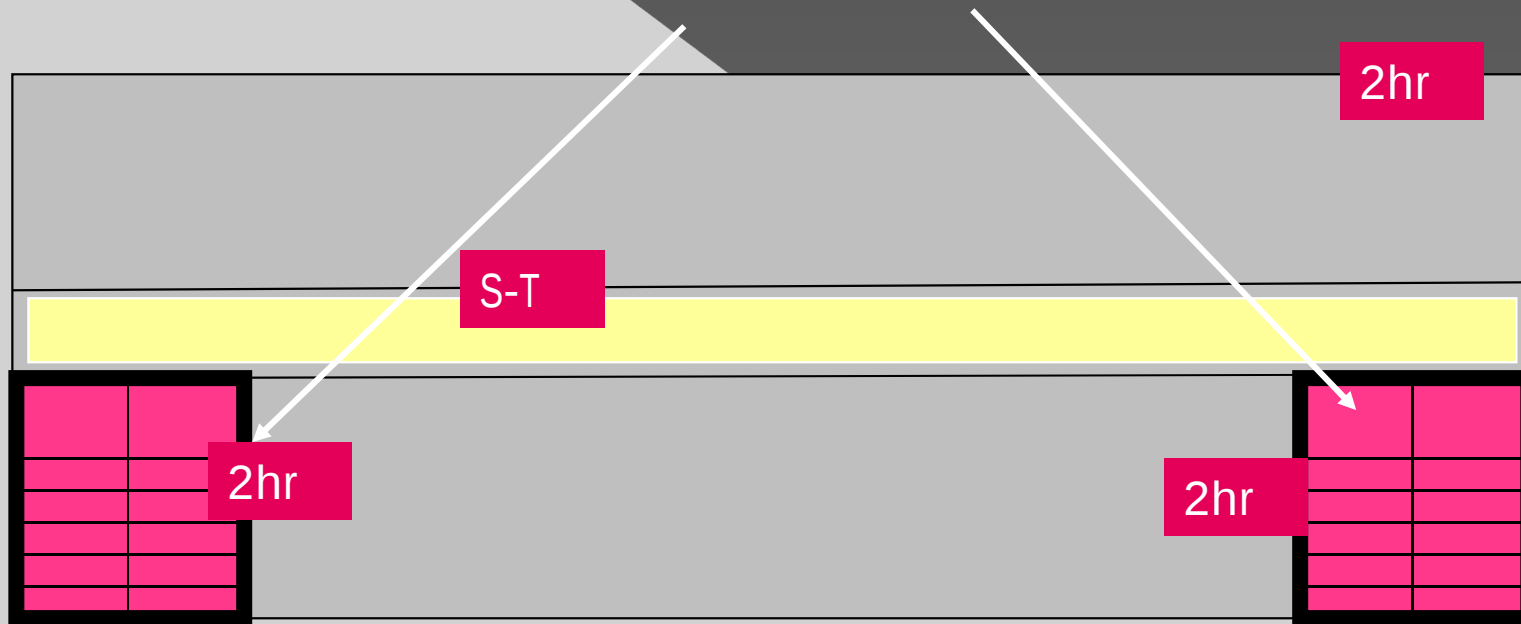


EACH HEALTH CARE FLOOR

8.2.2 Compartmentalization

(4 or more stories, sprinkled)

Stairwells are surrounded by walls with
2-hour fire resistive ratings

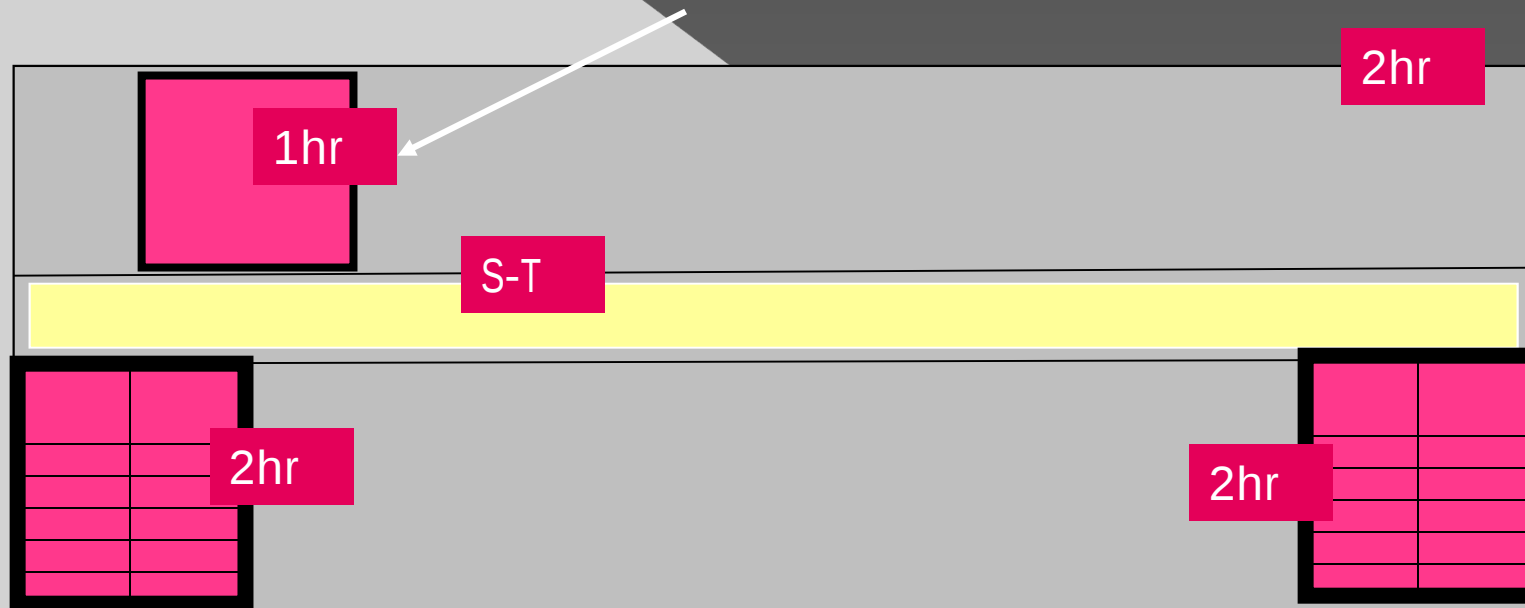


EACH HEALTH CARE FLOOR

8.2.2 Compartmentalization

(4 or more stories, sprinkled)

Rooms with significant combustibles are surrounded by walls with 1-hour fire resistive ratings

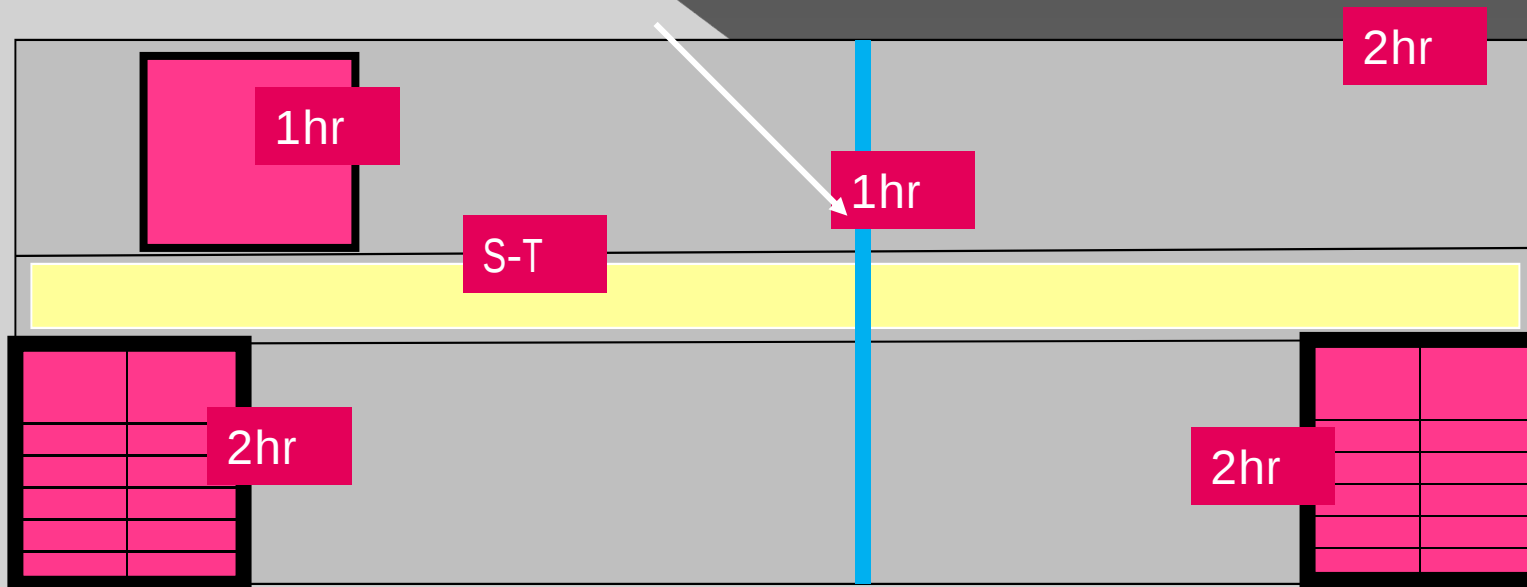


EACH HEALTH CARE FLOOR

8.2.2 Compartmentalization

(4 or more stories, sprinkled)

Each Floor is divided by Smoke Barrier Walls into compartments which have walls with 1-hour fire resistive ratings

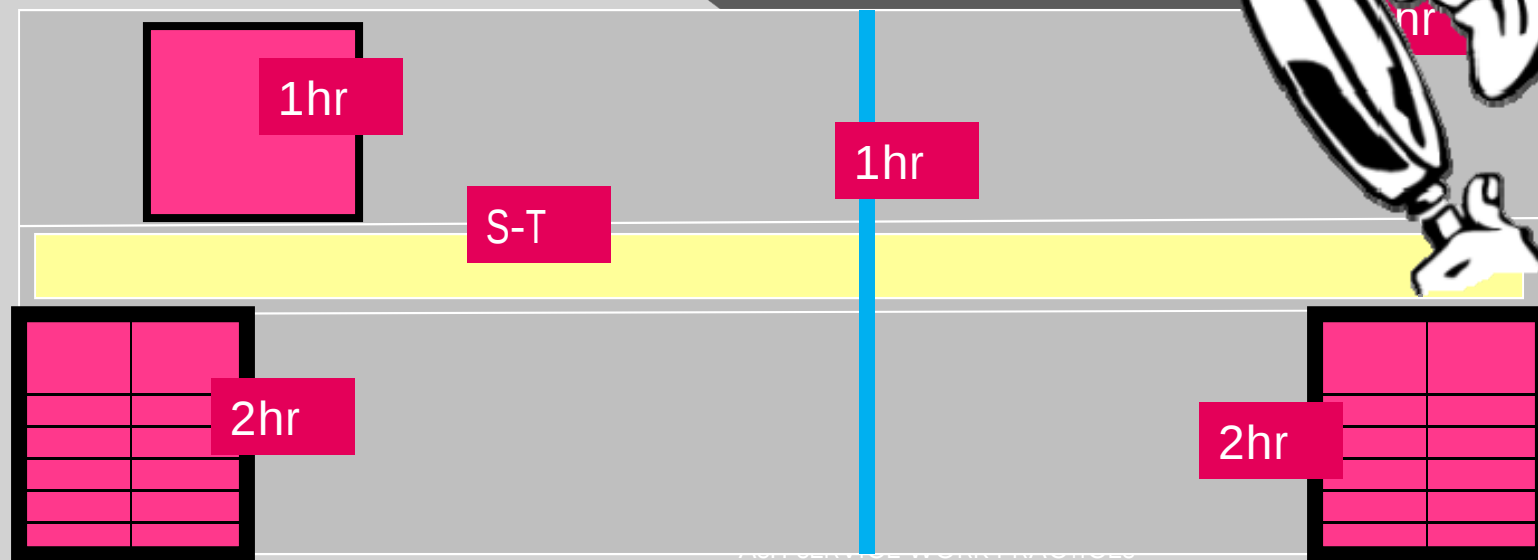


EACH HEALTH CARE FLOOR

8.2.2 Compartmentalization

(4 or more stories, sprinkled)

Health Care is the 2nd most inspected type of occupancy





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LSC Chapter 8 “Features of Fire Protection”

8.2 Construction & Compartmentalization

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8.2.5-Vertical Openings

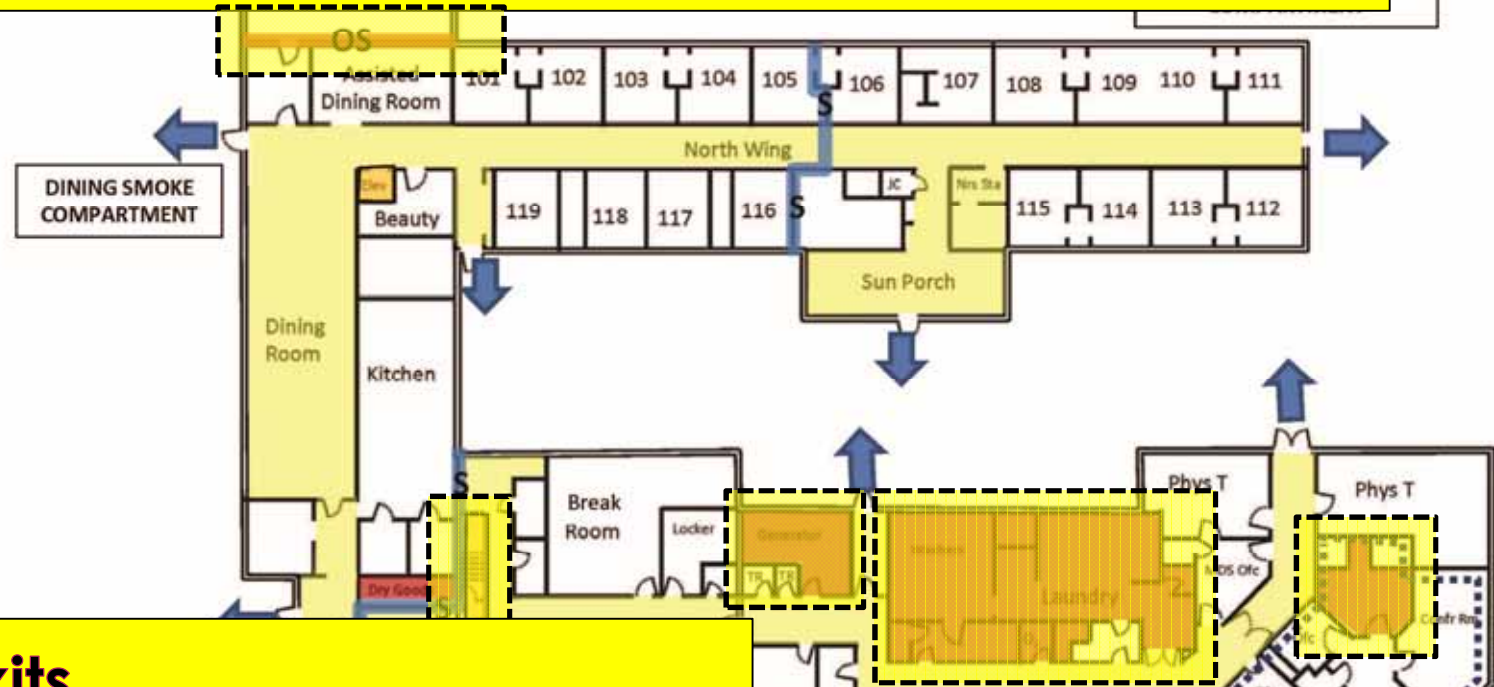
8.2.6-Mezzanines

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8.3 Smoke Barriers

8.4 Hazard Protection

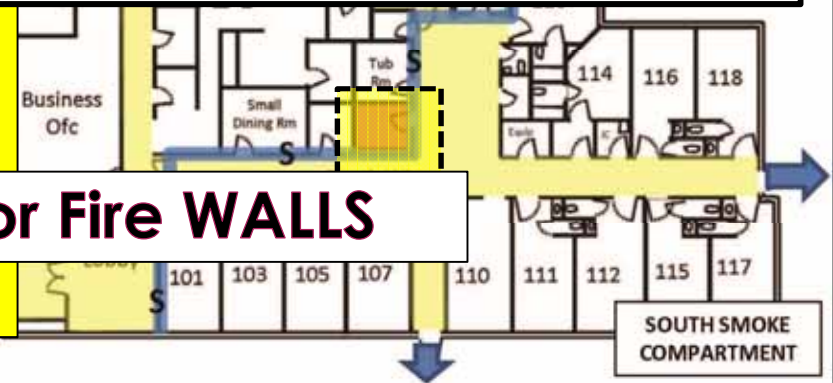
Fire Barriers Are Used At:



- Exits
- Stairs
- Shafts
- Occupancy Separations
- Horizontal Exits
- Building Separations
- Hazardous enclosures

COLORIZE to show the FUNCTION
(which determines the code requirements)

←or Fire WALLS



8.3 Compartmentalization

8.2.3 - “Fire Barriers”

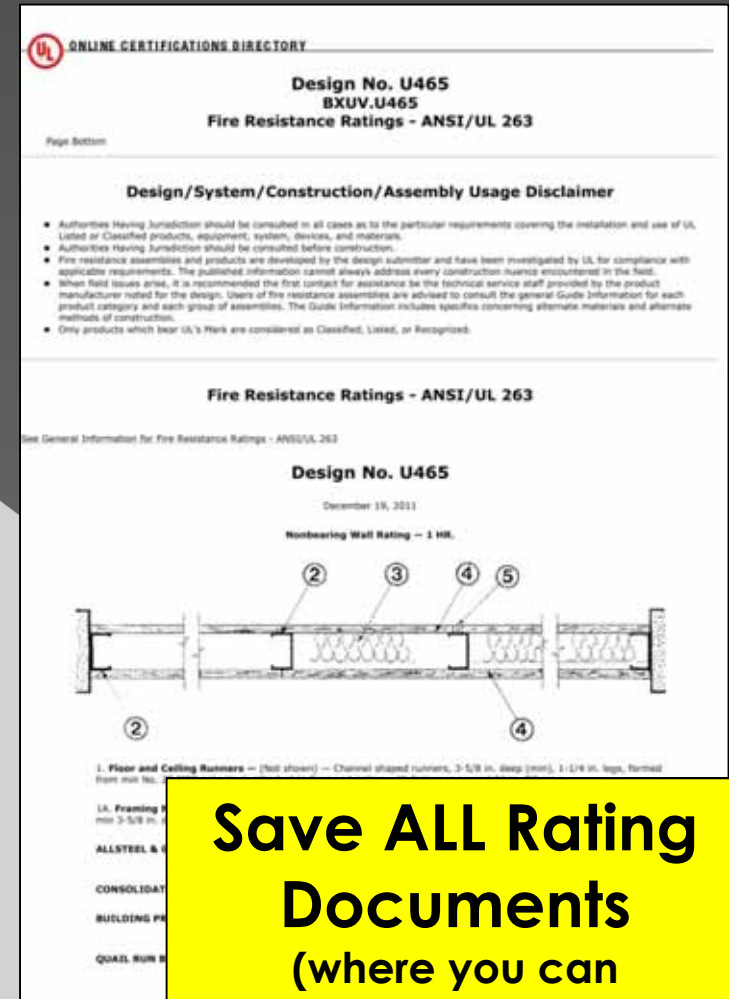
Design must satisfy tests of NFPA 251

- Floor-Ceiling Assemblies
- Wall Assemblies

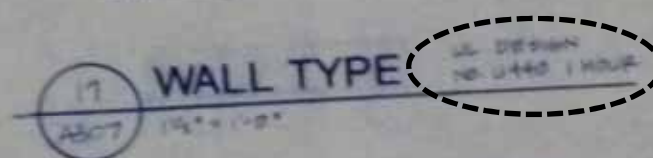
(IBC uses ASTM E119 or UL 263)

Typical Test Agencies:

- UL & ULC
- FM
- Intertek



Save ALL Rating Documents
(where you can immediately find them)



- 17A SAME AS ABOVE w/ (1) LAYER OF 1/2" MOISTURE RESISTANT GYPSUM BOARD ON INS. SIDE
- 17B SAME AS 17A w/ 3/4" FIBERGLASS BATT INSULATION

Save ALL Rating Documents
(where you can immediately find them)

8.2 Compartmentalization

8.2.3.2.1 - “Fire Doors”

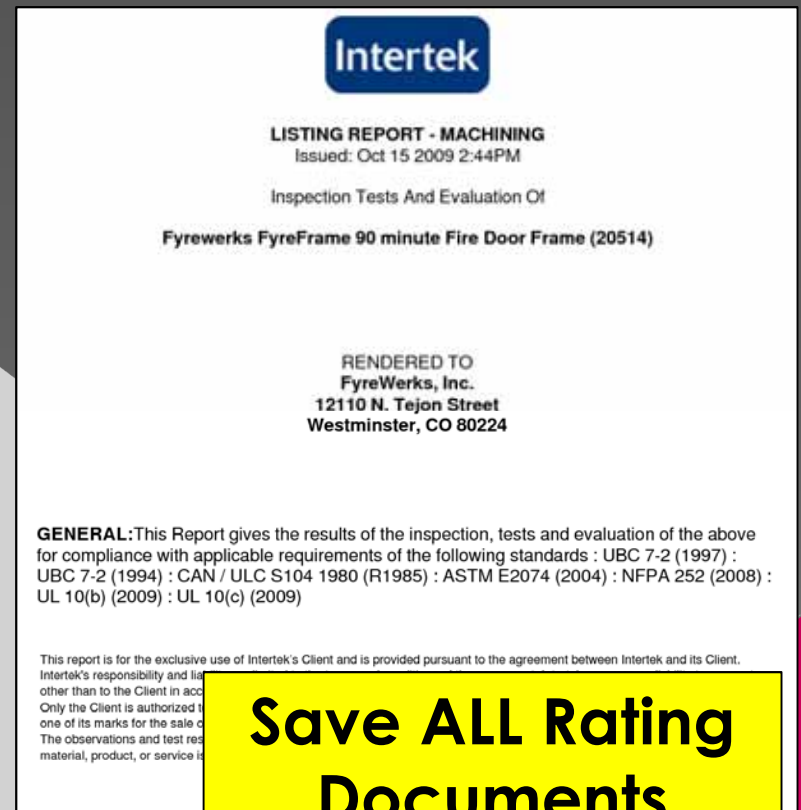
Design must satisfy
tests of NFPA 252

- Door/Frame Assemblies

Install per NFPA 80

Must Self-Close

(IBC uses various test stds)



The image shows a document titled "Intertek LISTING REPORT - MACHINING". It is dated "Issued: Oct 15 2009 2:44PM" and describes "Inspection Tests And Evaluation Of Fyrewerks FyreFrame 90 minute Fire Door Frame (20514)". The report is "RENDERED TO FyreWerks, Inc." at "12110 N. Tejon Street Westminster, CO 80224". A "GENERAL" section states the report gives results for compliance with standards: UBC 7-2 (1997), UBC 7-2 (1994), CAN / ULC S104 1980 (R1985), ASTM E2074 (2004), NFPA 252 (2008), and UL 10(b) (2009) / UL 10(c) (2009). A disclaimer at the bottom states the report is for exclusive use of Intertek's Client.

Intertek

LISTING REPORT - MACHINING
Issued: Oct 15 2009 2:44PM

Inspection Tests And Evaluation Of
Fyrewerks FyreFrame 90 minute Fire Door Frame (20514)

RENDERED TO
FyreWerks, Inc.
12110 N. Tejon Street
Westminster, CO 80224

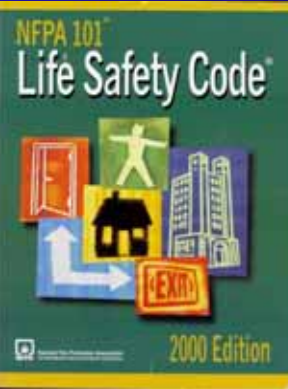
GENERAL:This Report gives the results of the inspection, tests and evaluation of the above for compliance with applicable requirements of the following standards : UBC 7-2 (1997) : UBC 7-2 (1994) : CAN / ULC S104 1980 (R1985) : ASTM E2074 (2004) : NFPA 252 (2008) : UL 10(b) (2009) : UL 10(c) (2009)

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Save ALL Rating Documents
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2012 LSC

8.2 Compartmentalization

8.2.3.2.1 - “Fire Doors”

MOST violated LS “Rule”:

**NEVER MODIFY* a
listed door or frame**



- * Without documented approval of the door/frame manufacturer

MOST violated LS “Rule”:

**NEVER MODIFY* a
listed door or frame**



8.2 Compartmentalization

8.2.3.2.2 - “Fire Window”

Design must satisfy tests of NFPA 257

- Use in ≤ 1 hr wall
- Install per NFPA 80
- Max 25% of wall area
- Wired Glass (max sizes: 100si/1296si)



Can use any size
fire-rated glass



8.2 Compartmentalization

8.2.3.2.3 - “Door Ratings”

Openings must “restrict the movement of smoke”

Fire Ratings:

- 2 hr wall → 1-1/2 hr
- 1 hr wall → 1 hr (vertical openings)
 - 3/4 hr (other)
 - Smoke Barrier = 20 min
- 1/2 hr wall → 20 min



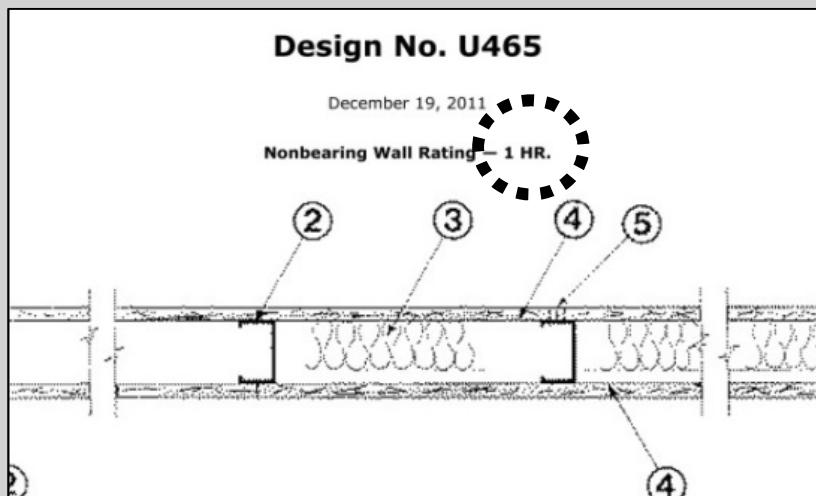
8.2 Compartmentalization

8.2.3.2.3 - “Ratings”

Tidbit to know:

Doors are usually rated LESS than the wall they are in

Wall



Door



?



BECAUSE

Combustible materials are not placed in door opening
So, the code permits fire doors to be
“de-rated” about a ½ hr.

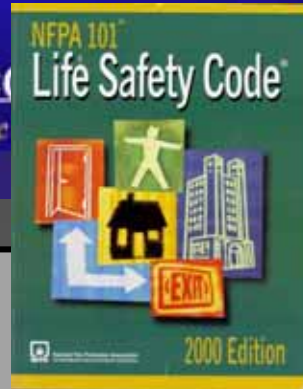
8.2 Compartmentalization

8.2.3.2.4 - “Penetrations”

- Ducts: follow 9.2.1 (fire stop/damper)
- Construction Joints
- Other: must seal with
 - Material w/wall rating
 - Approved device



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Sept, 2014

LSC Chapter 8

“Features of Fire Protection”



**FAIL: 1/8" thick
in a 2-hr Wall**

**Large Amount of Fire Stop Sealant
INVITES investigation**

Fire Stop Labels Can be Filled Out INCORRECTLY !

HILTI
Fire Rated Assembly / Assemblée Vitrifiée

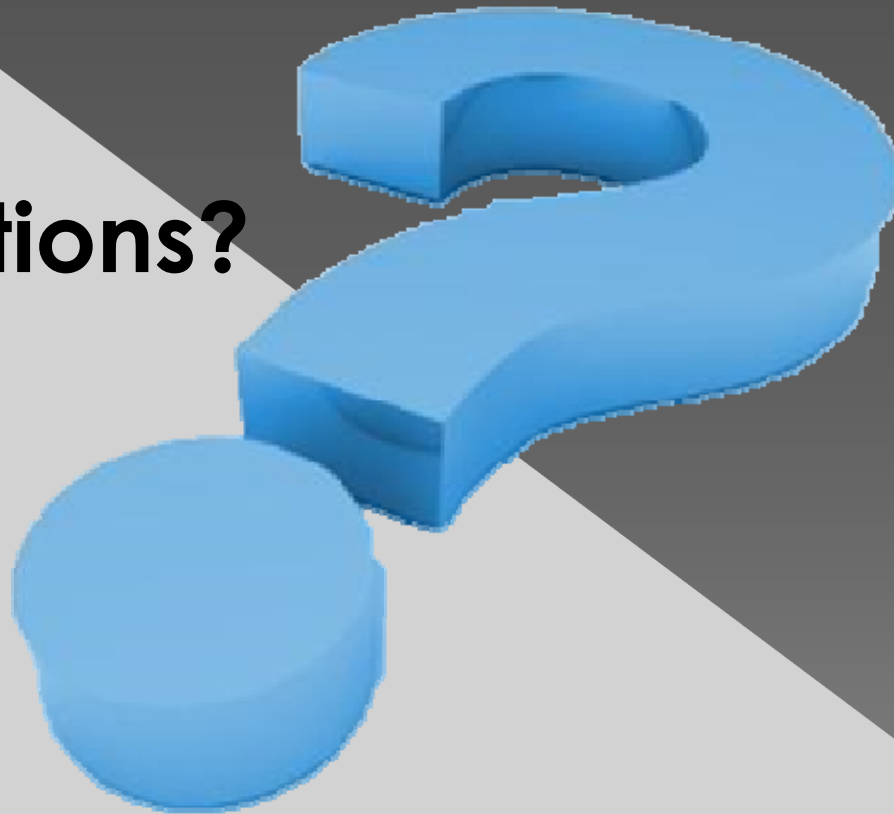
Product: <u>CAJ 149</u>	Location:
Manufacturer: <u>HILTI</u>	Date:
Inspector:	Inspector:

WRONG:

CAJ is for concrete walls & floors

8.2.3 – Fire Barriers

Any Questions?





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LSC Chapter 8 “Features of Fire Protection”

8.2 Construction & Compartmentalization

8.2.1-Construction

8.2.2-Compartments

8.2.3-Fire Barriers

8.2.4-Smoke Partitions

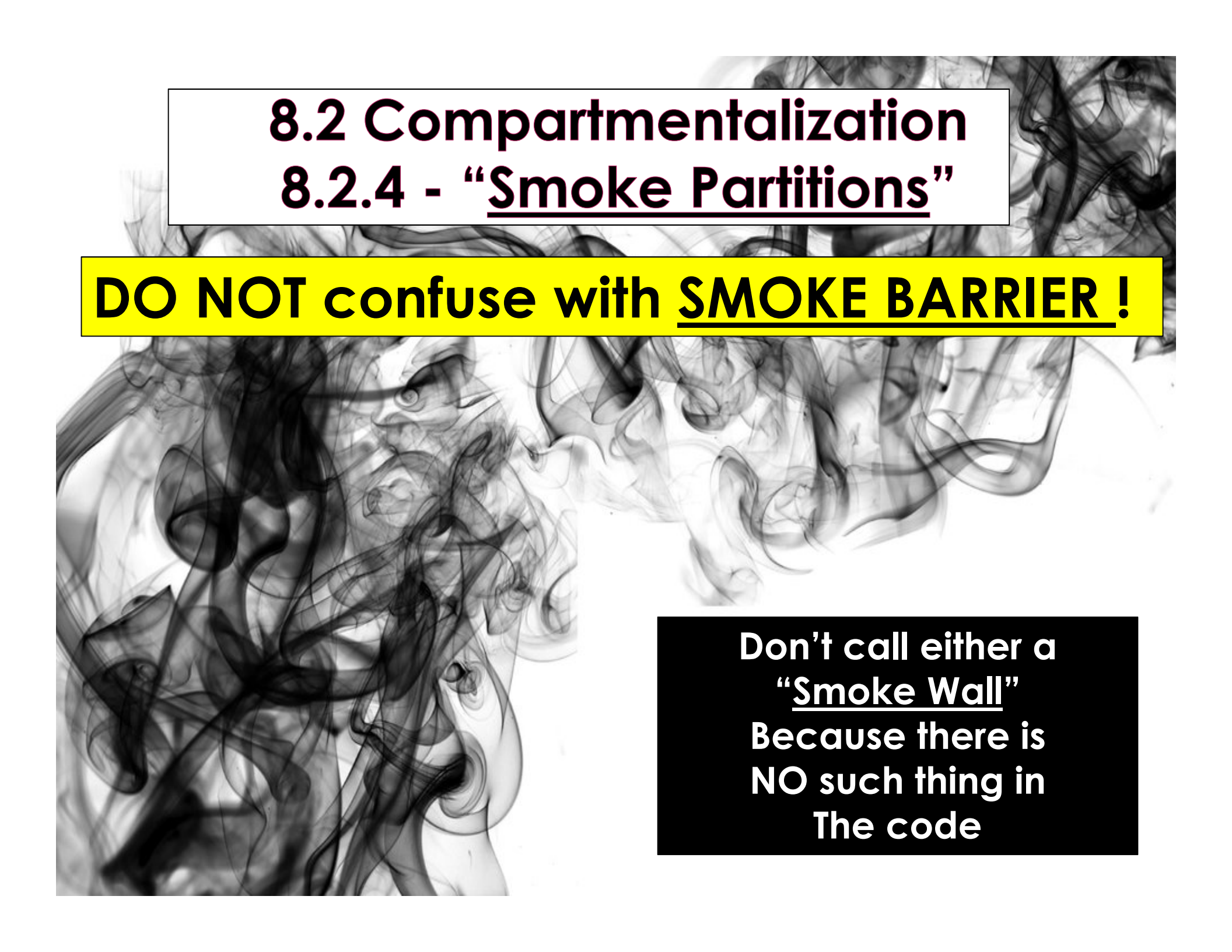
8.2.5-Vertical Openings

8.2.6-Mezzanines

8.2.7-Concealed Spaces

8.3 Smoke Barriers

8.4 Hazard Protection

The background of the slide is a black and white photograph of smoke. The smoke is thick and billowing, with many swirling eddies and tendrils. It fills the entire frame, creating a sense of movement and chaos. The lighting is dramatic, with some areas of the smoke appearing very dark and others catching the light, highlighting its wispy texture.

8.2 Compartmentalization

8.2.4 - “Smoke Partitions”

DO NOT confuse with SMOKE BARRIER !

Don't call either a
“Smoke Wall”
Because there is
NO such thing in
The code

8.2 Compartmentalization

8.2.4 - “Smoke Partitions”

- Called “Corridors” in Health Care
- Limit the “Transfer of Smoke”
- Constructed floor to deck above
(may stop at suspended ceiling if it's continuous, has sealed joint, no ceiling plenum)

**Compliance with 8.2.4 is NOT
referenced anywhere
in Chapter 18 or 19**

8.2 Compartmentalization

8.2.4 - “Smoke Partitions”

- Doors: No louvers, Clearances per NFPA 80, self-closing (if required by occupancy)
- Penetrations:
 - Same rating as wall or
 - Sealed with approved device
 - Ducts: Dampers w/Detectors



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8.3 Smoke Barriers

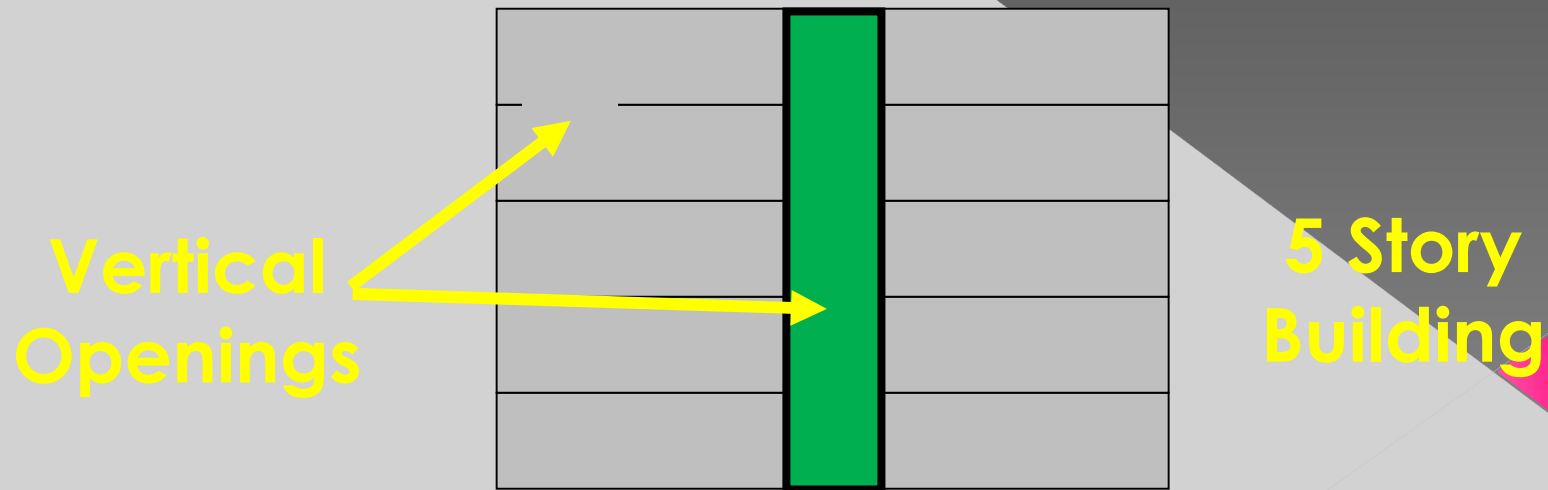
8.4 Hazard Protection

8.2 Compartmentalization

8.2.5 - “Vertical Openings”

18/19.3.1 – Requires compliance with 8.2.5

Any “hole” through a floor is a
VERTICAL OPENING



8.2 Compartmentalization

8.2.5 - “Vertical Openings”

Typical Vertical Openings

- Stairs
- Elevators
- Dumbwaiters
- “Atriums”
- Ventilation Shafts
- Pipe Shafts

8.2 Compartmentalization

8.2.5 - “Vertical Openings”

General Rules:

8.2.5.2 – All Openings through floors shall be ENCLOSED with Fire Barrier Walls !

Not applicable to code-designed escalators, expansion joints, pneumatic tubes, mail chutes

**EVERY Floor is
a SMOKE BARRIER**

(Impact on Elevator Lobby Doors)

8.2 Compartmentalization

8.2.5 - “Vertical Openings”

General Rule:

8.2.5.4 – Fire Barrier Wall Ratings

- **2 hr – Connecting 4 or more stories**
- **1 hr – Connecting 3 or less stories**
- **~~1/2 hr~~ – Existing Enclosures in Existing Bldgs**

[Note: 19.3.1.1 requires 1 hr enclosure]

8.2 Compartmentalization

8.2.5 - “Vertical Openings”

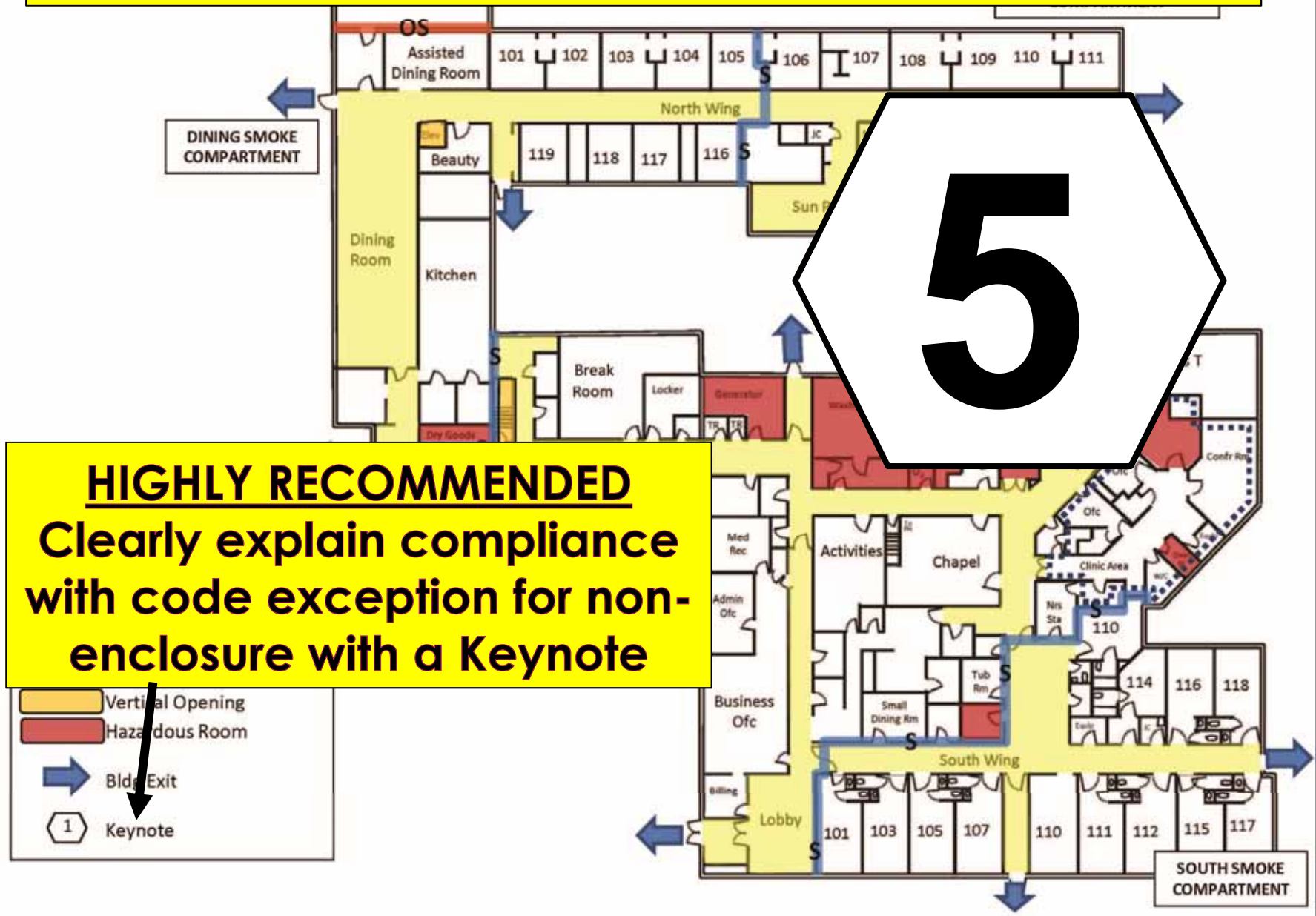


Most Inspectors
HATE UN-ENCLOSED
Vertical Openings

Because the LSP typically does not explain
how they meet one of the exceptions to the
enclosure requirement

& the building owner usually can't explain

Unenclosed Vertical Openings:



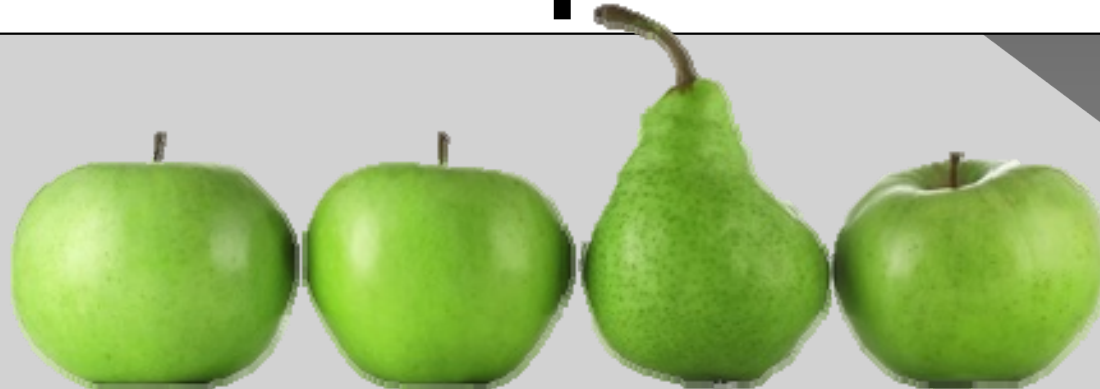
8.2 Compartmentalization

8.2.5 - “Vertical Openings”

General Rule:

8.2.5.2 – All Openings through floors shall be ENCLOSED with Fire Barrier Walls !

4 Exceptions



8.2 Compartmentalization

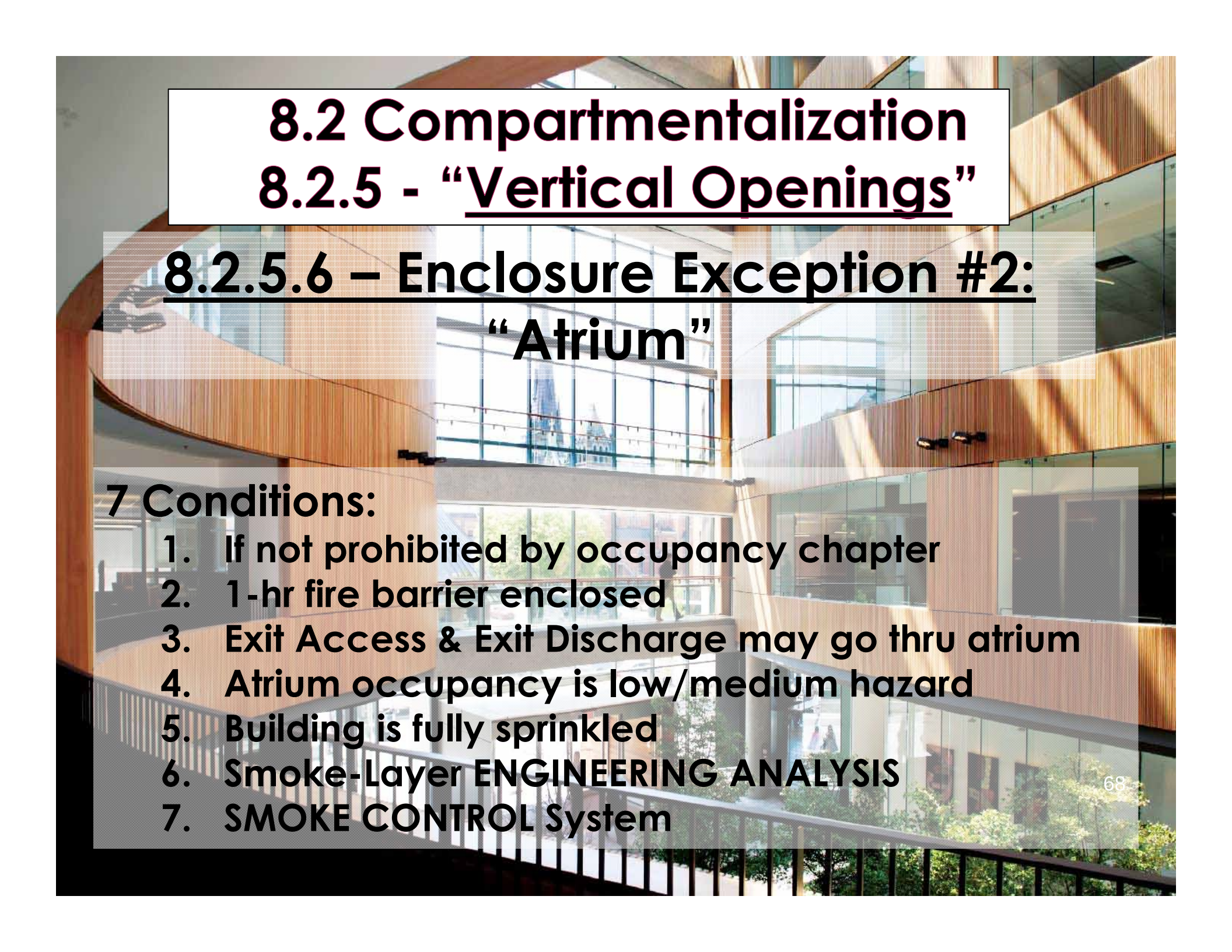
8.2.5 - “Vertical Openings”

8.2.5.5 – Enclosure Exception #1: **“Mini-Atrium”**

[Not permitted in Health Care per 18/19.3.1.1]

9 Conditions:

1. If permitted by Occupancy chapter
2. Max 3 stories
3. Lowest or next is a street floor
4. Communicating space is open
5. Communicating space enclosed by 1-hr fire barrier
6. Communicating space ordinary hazard or fully sprinkled
7. Egress capacity for all floors that are open
8. Access to an exit at every level
9. Outside of communicating space has an exit without using the communicating space



8.2 Compartmentalization

8.2.5 - “Vertical Openings”

8.2.5.6 – Enclosure Exception #2: **“Atrium”**

7 Conditions:

- 1. If not prohibited by occupancy chapter**
- 2. 1-hr fire barrier enclosed**
- 3. Exit Access & Exit Discharge may go thru atrium**
- 4. Atrium occupancy is low/medium hazard**
- 5. Building is fully sprinkled**
- 6. Smoke-Layer ENGINEERING ANALYSIS**
- 7. SMOKE CONTROL System**

The background image shows a modern building interior with a large, multi-level staircase. The staircase has glass railings and is illuminated by warm, recessed lighting. The ceiling is made of horizontal wooden slats, and there are large white columns supporting the structure. The overall atmosphere is bright and contemporary.

8.2 Compartmentalization

8.2.5 - “Vertical Openings”

8.2.5.7 – Enclosure Exception #3: **“Tall-Room”**

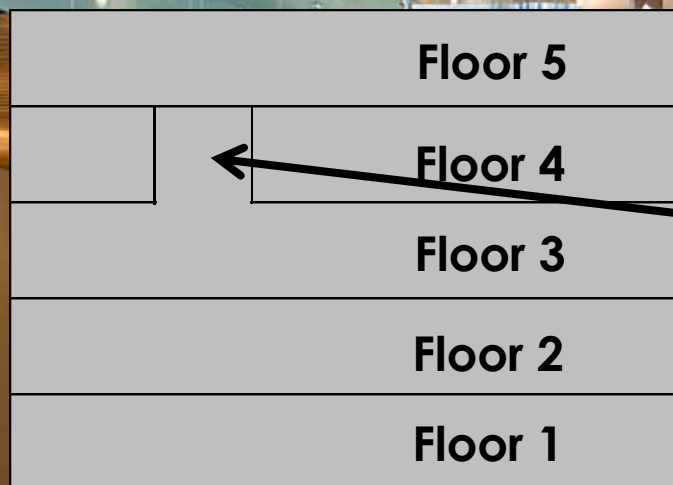
4 Conditions:

- 1. Max 2 stories**
- 2. Not an exit enclosure**
- 3. Pierce only one floor**
- 4. Separated from rest of bldg by fire barriers with same rating as the floor**

8.2 Compartmentalization

8.2.5 - “Vertical Openings”

8.2.5.7 – Enclosure Exception #3: “Tall-Room”



“Floor” wraps
up/down to form a
tall space



8.2 Compartmentalization

8.2.5 - “Vertical Openings”

8.2.5.8 – Enclosure Exception #4: **“Non-Concealed Space”**

6 Conditions:

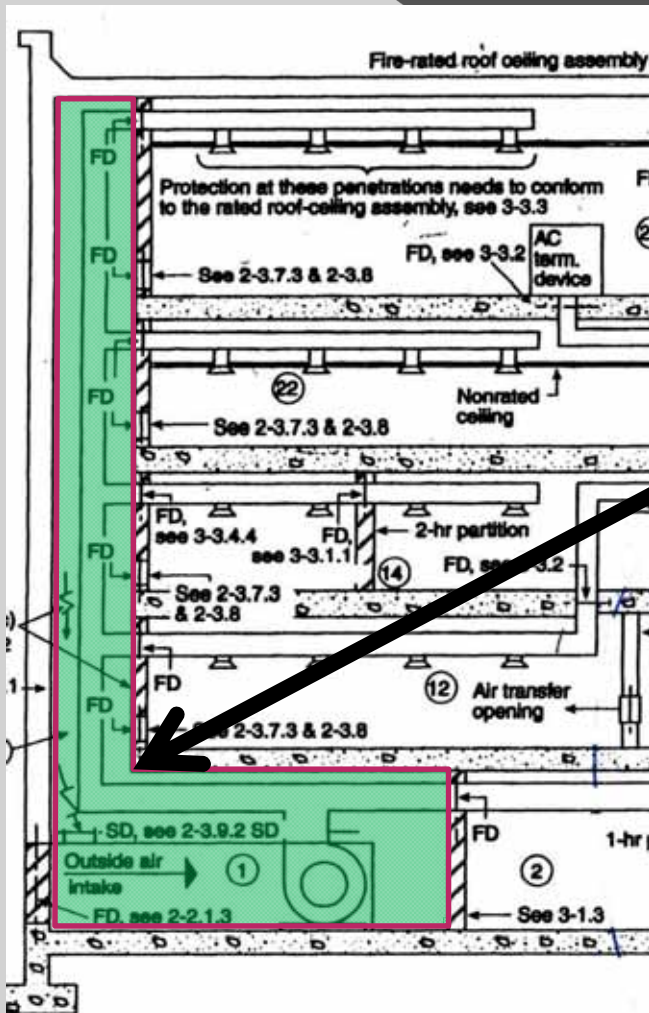
- 1. If permitted by occupancy chapter**
- 2. Not enclosed within the building**
- 3. Max 2 stories**
- 4. SEPARATED from rest of bldg by fire barrier**
- 5. SEPARATED from corridors**
- 6. CANNOT EGRESS through the opening**

8.2 Compartmentalization

8.2.5 - “Vertical Openings”

8.2.5.3 - SHAFTS

Rooms open to a shaft at top/bottom of a shaft (i.e. no damper or closure) shall be enclosed as a shaft



8.2 Compartmentalization

8.2.5 - “Vertical Openings”

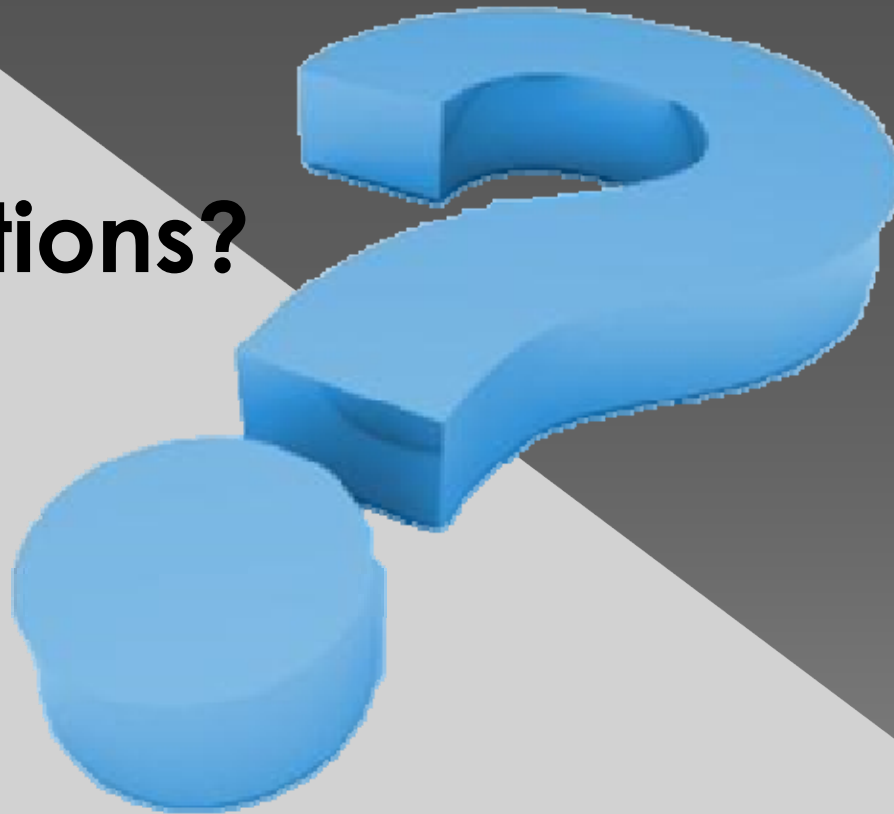
8.2.5.9 – ELEVATOR HOIST WAY



3 or fewer
elevator cars
can be in the
SAME hoist way
enclosure

8.2.5 – Vertical Openings

Any Questions?





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8.2 Construction & Compartmentalization

8.2.1-Construction

8.2.2-Compartments

8.2.3-Fire Barriers

8.2.4-Smoke Partitions

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8.2.6-Mezzanines

8.2.7-Concealed Spaces

8.3 Smoke Barriers

8.4 Hazard Protection

8.2 Compartmentalization

8.2.6 - “Mezzanines”

Compliance with 8.2.6 is NOT referenced anywhere in Chapter 18 or 19

Definition:

“An intermediate level between the floor and the ceiling of any room or space” (3.3.126)

Max size: $\frac{1}{3}$ the open area of the room

No Limit on the number of Mezzanines

Openness: Entire mezzanine must be open and visible from the room if >10 occupants



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8.3 Smoke Barriers

8.4 Hazard Protection

8.2 Compartmentalization

8.2.7 - “Concealed Spaces”

Compliance with 8.2.7 is NOT referenced anywhere in Chapter 18 or 19

In NEW Type III, IV, or V Construction with any material > Class A flame spread openings must be fire stopped or draft stopped

In EXISTING Construction openings must be fire stopped or draft stopped



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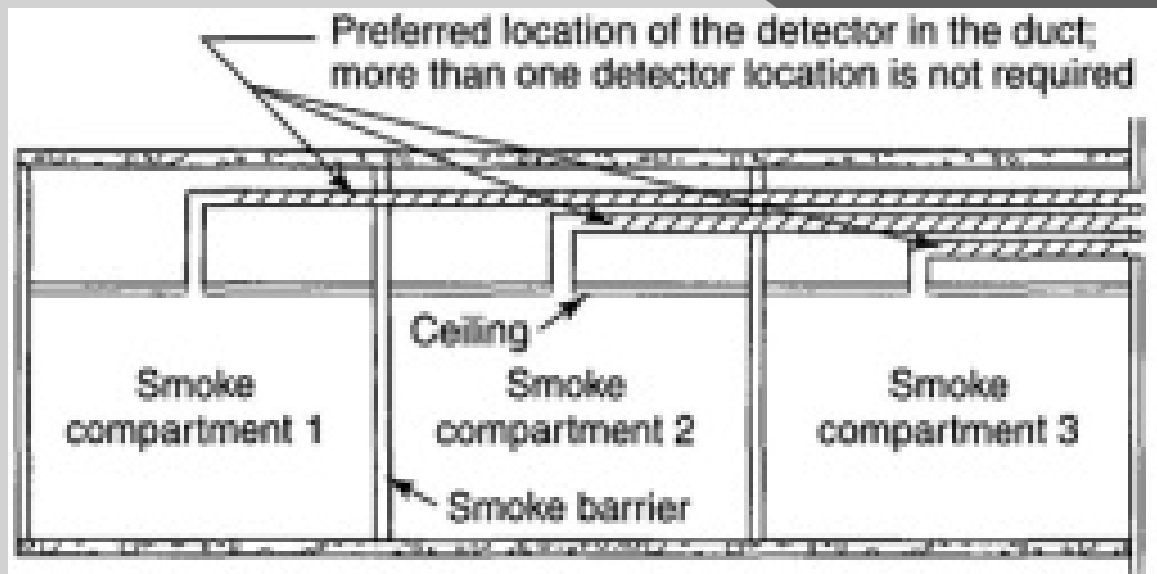
8.3 Smoke Barriers

8.4 Hazard Protection

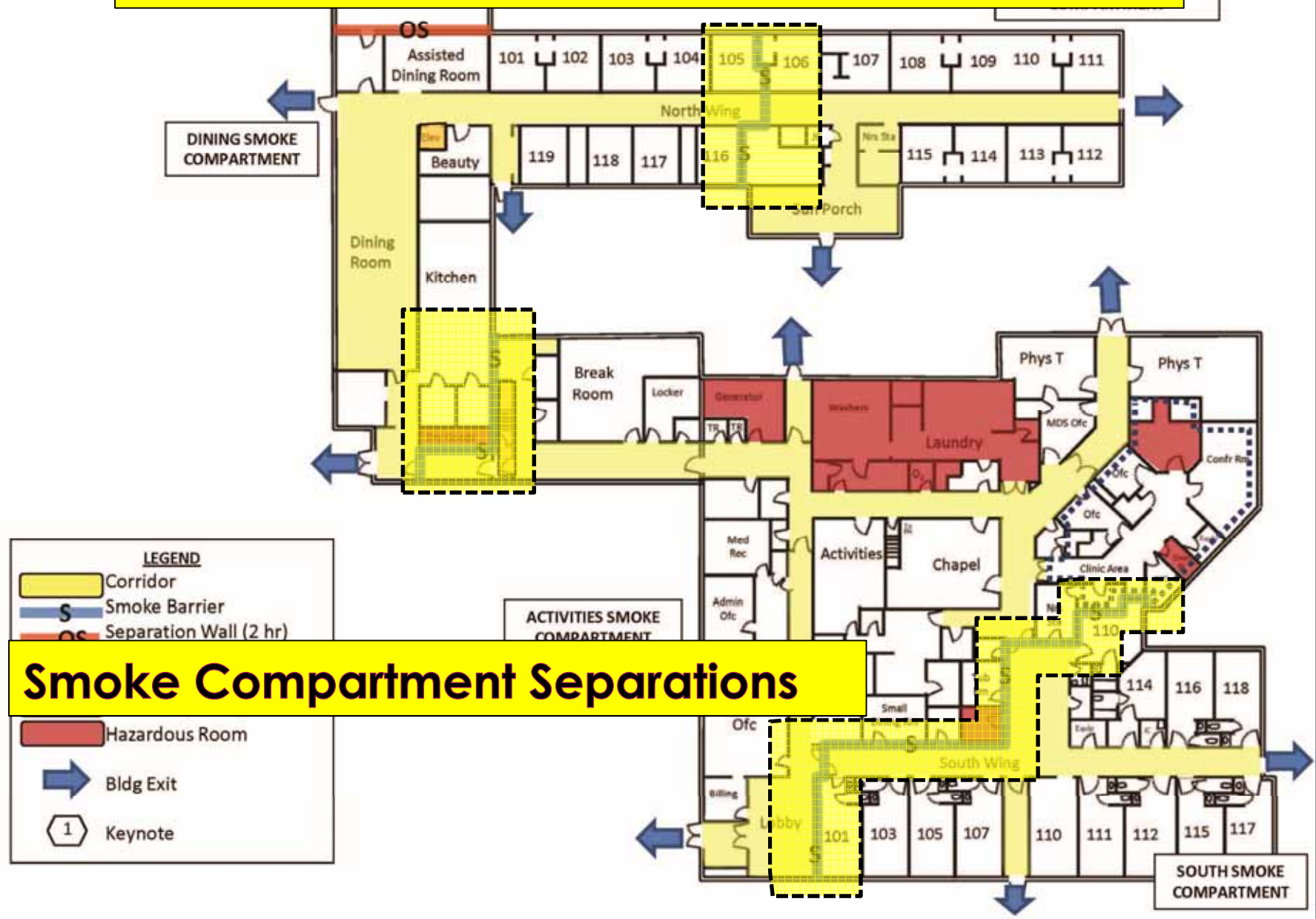
8.3 Smoke Barriers

18/19.3.7.3 – Requires compliance with 8.3

18/19.3.7 – Defines the location & size of Smoke Compartments, wall ratings & other details



Smoke Barriers Are Used At:



8.3 Smoke Barriers

8.3.2 - “Continuous”

Wall/Floor must be Continuous

- From outside wall to outside wall, or
- From floor to floor, or
- From smoke barrier to smoke barrier
- Through all concealed spaces, other than interstitial spaces with floors with same rating as the smoke barrier

8.3 Smoke Barriers

8.3.4 - “Doors”

8.3.4.1 – Minimum Clearance Necessary

- No undercuts, louvers, grills

8.3.4.2 – Door Rating

- Min 20 min rating

8.3.4.3 – Door Operation

- Self-closing or automatic-closing



**Same as in Health Care 18/19,
which has added requirements**

8.3 Smoke Barriers

8.3.5 - “Smoke Dampers”

8.3.5.1 – Required Locations

- Each air transfer location
- Each duct penetration

Exceptions:

- 1. Engineered Smoke Control System**
- 2. AHU controlled to prevent recirculation of exhaust/return in a fire emergency**
- 3. AHU serves only one smoke compartment**
- 4. Floor penetrations**



[Same requirements as in Health Care 18/19]

Doesn't include the exception for NOT having Smoke Dampers if fully ducted & sprinkled

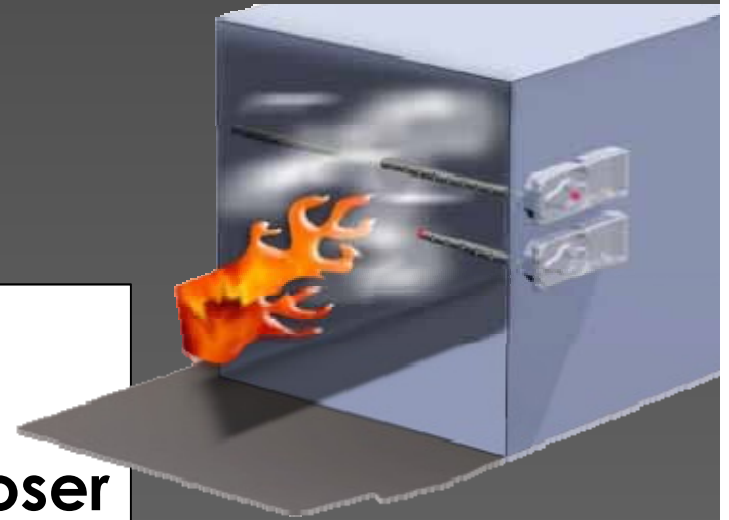
8.3 Smoke Barriers

8.3.5 - “Smoke Dampers”

8.3.5.2 – Duct Dampers close on detection of smoke per NFPA 72

Exceptions:

- 1. Duct detector not needed if detector built into the door closer**
- 2. Existing detectors exempt from NFPA 72**



8.3.5.3 – Transfer Dampers close on detection of smoke per NFPA 72

8.3 Smoke Barriers

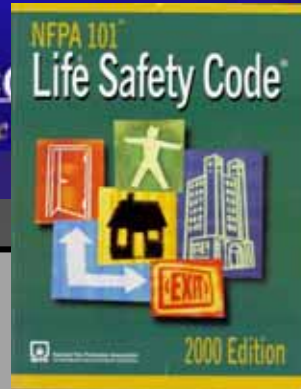
8.3.6 - “Penetrations”

Penetrations & junctions with rated & smoke barrier walls must seal with

- **Material w/same smoke resistance as barrier, or**
- **Construction Joints**
- **Approved device**



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HEALTHCARE ENGINEERING ASSOCIATION
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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

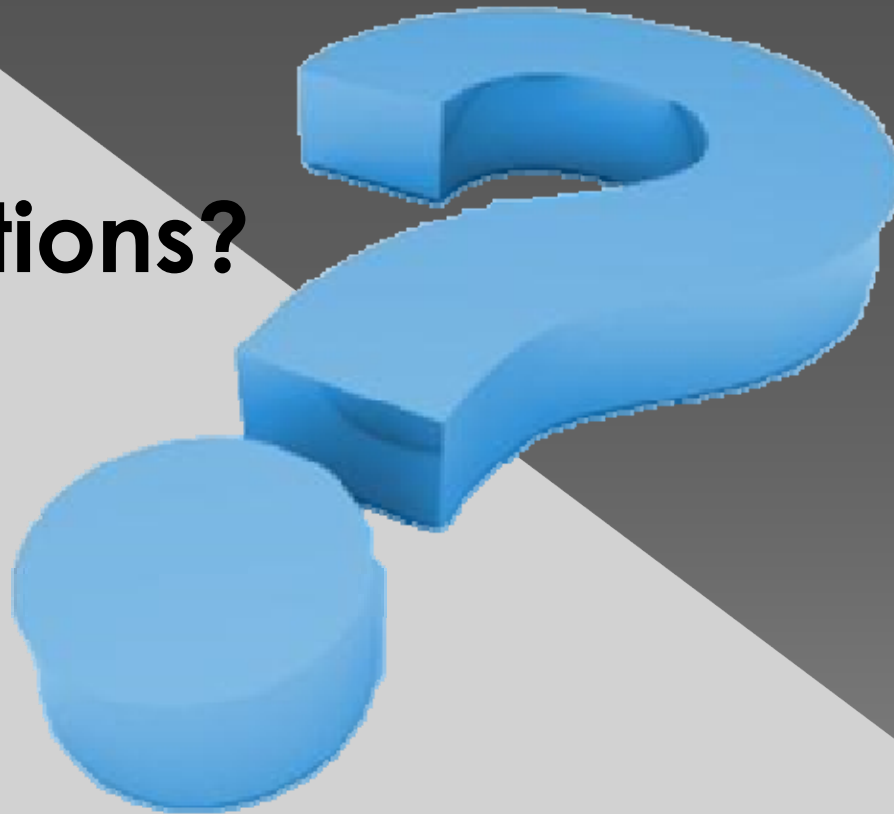
Sept, 2014

LSC Chapter 8

“Features of Fire Protection”

8.3 Smoke Barriers

Any Questions?





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LSC Chapter 8 “Features of Fire Protection”

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8.4 Hazard Protection

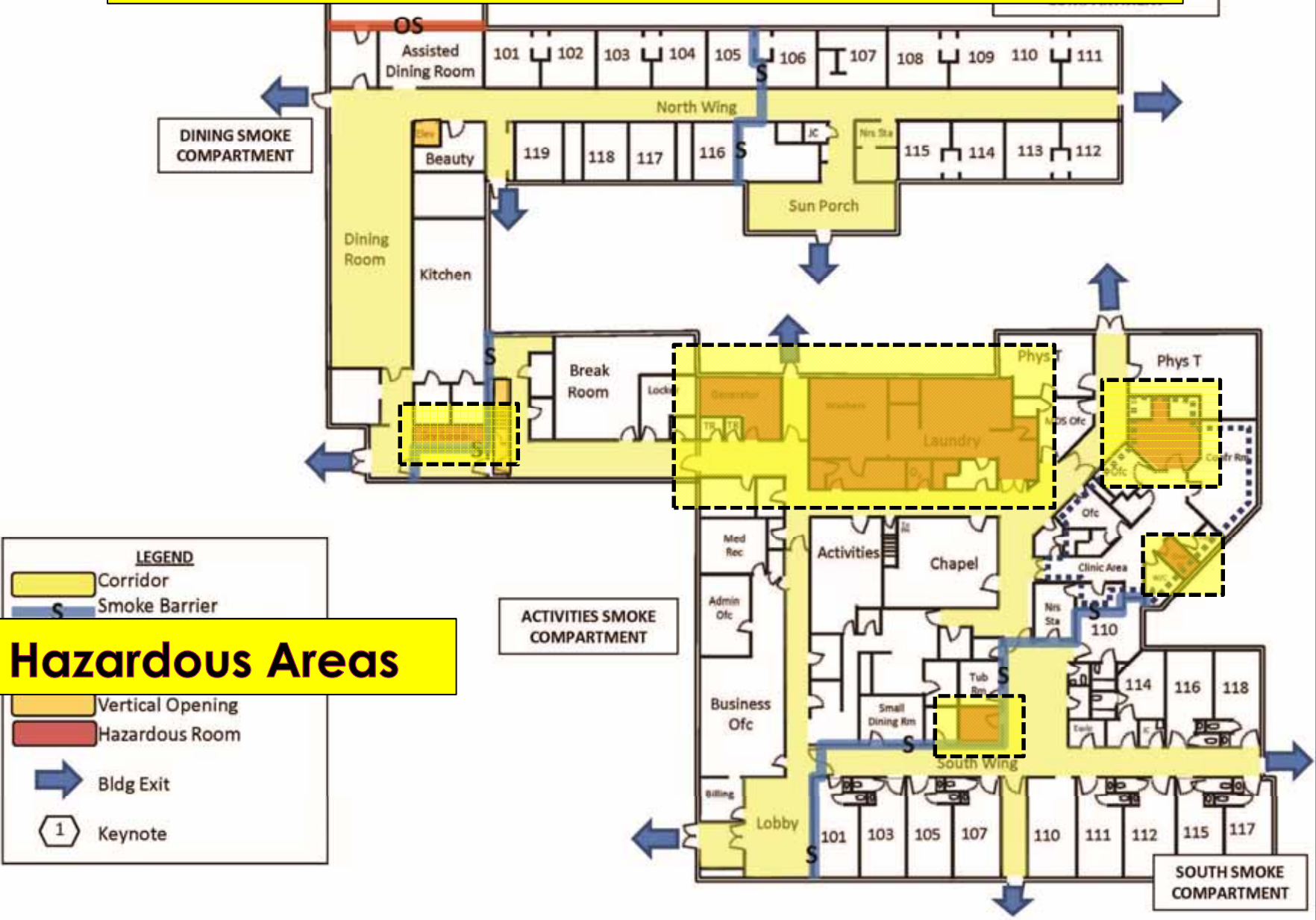
8.4 Hazard Protection

18/19.3.2.1 – Requires compliance with 8.4

18/19.3.1 – Defines the location & size of hazardous areas, wall ratings & other details



Hazardous Area Used At:



HEALTH CARE HAZARDOUS AREAS

HAZARDOUS STORAGE AREAS

	<u>0-50 SF</u>	<u>51-99 SF</u>	<u>100 SF & over</u>
NEW	No Requirements	Smoke Tight	1-Hr Rated Enclosure
EXISTING	No Requirements	Sprinkler & Smoke-Tight <u>OR</u> 1-Hr Rated Enclosure	

LSP should show which requirement the room intends to comply with

8.4 Hazard Protection

8.4.1 - “Greater Than Normal”

**Hazardous is anything
“Greater Than Normal”
in the occupancy**

(In the Opinion of the AHJ)

**In health care, CMS considers “normal” to be
the amount of combustibles found in a
typical patient/resident room**

8.4 Hazard Protection

8.4.1 - “Greater Than Normal”

Hazards “Greater Than Normal” in occupancy

- 1-hr fire barrier, ~~or~~ New: “and”
- Sprinkle space
- If HIGH hazard, must sprinkle & enclose with 1-hr fire barrier
- If NEW (with rated walls), must sprinkle & treat walls as a ~~smoke partition~~ New: “fire barrier”

Examples of 4.4.2.2: Specific Occupancy Requirements Govern over the General Requirement

8.4 Hazard Protection

8.4.3 - “Flammables”

Storage & handling per:

- NFPA 30 – Flammable & Combustible Liquids
- NFPA 54 – National Fuel Gas Code
- NFPA 58 – Liquefied Petroleum Code



8.4 Hazard Protection

8.4.3 - “Flammables”

NFPA 30 – Flammable & Combustible Liquids Standard

- Max Size of Container: (depends on Class of Liq & type of container) 1 pt to 1g in glass; 1g to 5g in metal; 2g to 5g in safety can
- Max 60 Gallons of Class I,II in a Storage Cabinet
- Max 120 Gallons Total in a Storage Cabinet
- Max of 3 Flammable Liq Cabinets within any 2-hr rated fire area

Note: a 10 DAY SUPPLY of liquids used for building maintenance, painting, etc.. are permitted to be stored temporarily in closed containers OUTSIDE of Flammable Liquids Cabinets.(NFPA 30-98, 4-5.1.4)

Flammable & Combustible Liquids

<u>Class</u>	<u>Flash Point</u>	<u>Boiling Point</u>
IA Flam Liq	<73	<100
IB Flam Liq	<73	>100
IC Flam Liq	73-100	
II Comb Liq	100-140	
IIIA Comb Liq	140-200	
IIIB Comb Liq	>200	(All Temps in °F)

8.4 Hazard Protection

8.4.4 - “Laboratories”



Comply with:

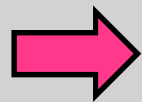
- **NFPA 45 – Laboratories Using Chemicals**
- **If in Health Care & Medical Offices, NFPA 99**

8.4 Hazard Protection

8.4.4 - “Laboratories”

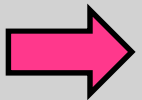
Ordinary hazard Lab has less than: (SOM, Append I, K31, Interpretive Guidelines]

- 10 gal flammable liq in use outside flam liq cabinet (NFPA 30-98, 4-5.5.3)
- 25 gal flam liq in safety cans outside of flam liq cabinet (NFPA 30-98, 4-5.5.4)
- 60 gal combustible liq outside flam liq cabinet (NFPA 30-98, 4-5.5.5)
- 60 gal in a flammable liquids cabinet.



Follow **NFPA 101** – **Hazardous Room Requirements** (18/19.3.2.1 & .2) – 1 hr enclosure walls or sprinkle & smoke-tight

Severe hazard Lab exceeds the above limits, a lab that uses enough combustibles that would sustain a fire that would breach a 1-hr wall.



Follow **NFPA 99** – **Health Care Laboratory Standards** (Chapter 10) – 1 hr enclosure walls

Follow **NFPA 45** – **General Laboratory Standards** (Chapter 3-Construction)



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8.4 Hazard Protection



NEXT MONTH

WISCONSIN HEALTHCARE ENGINEERING ASSOCIATION
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“Lunch & Learn” 2014 Webinar Series

Oct, 2014
LSC
Chapter 7

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



100



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8.2.7-Protected Spaces

8.3 Smoke Barriers

8.4 Hazard Protection

