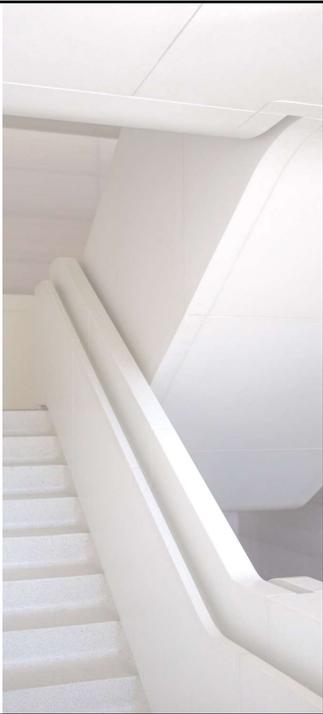




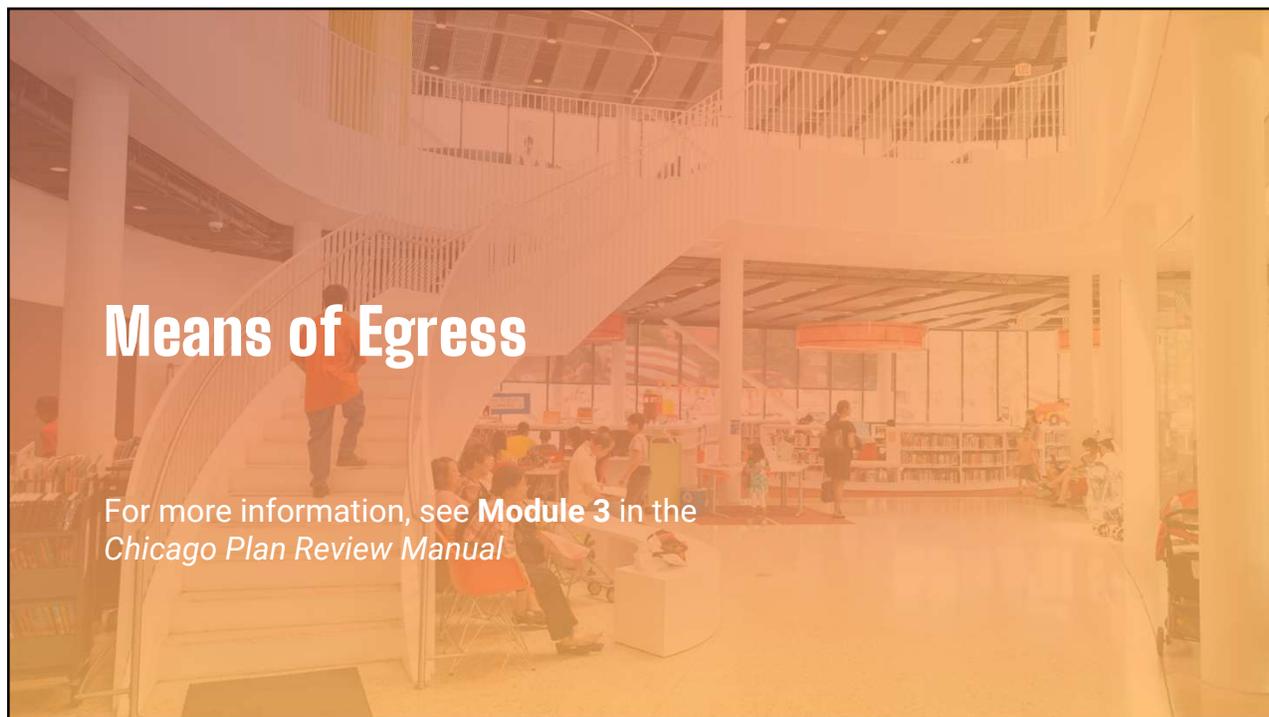
155

Morning Session 2

- ❶ Means of Egress
- ❷ Fire-resistance Rated Construction

A photograph of a modern, white staircase with a curved handrail. The staircase is set against a white wall and ceiling, creating a clean, minimalist aesthetic. The lighting is soft and even, highlighting the smooth surfaces of the stairs and handrail.

156



157

CODE BOOK



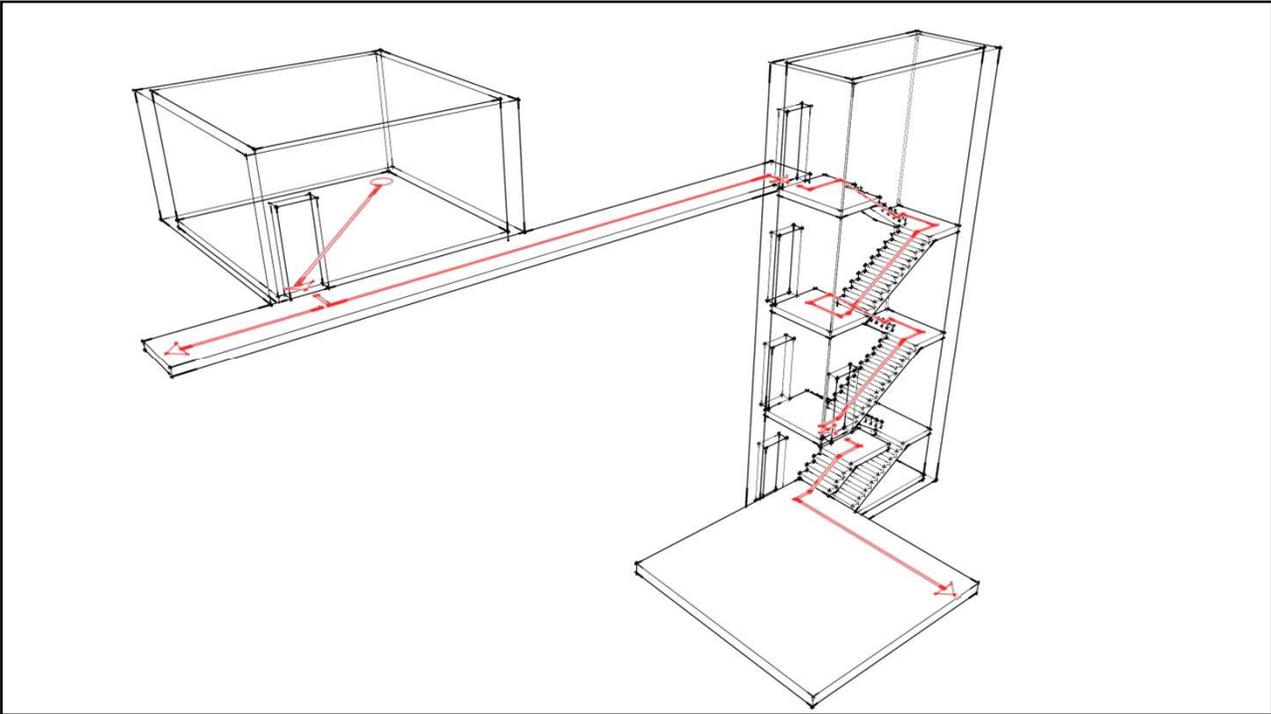
Means of Egress

MEANS OF EGRESS. A continuous and unobstructed path of vertical and horizontal egress travel from any *occupiable space* in a *building* or *structure* to a *public way*.

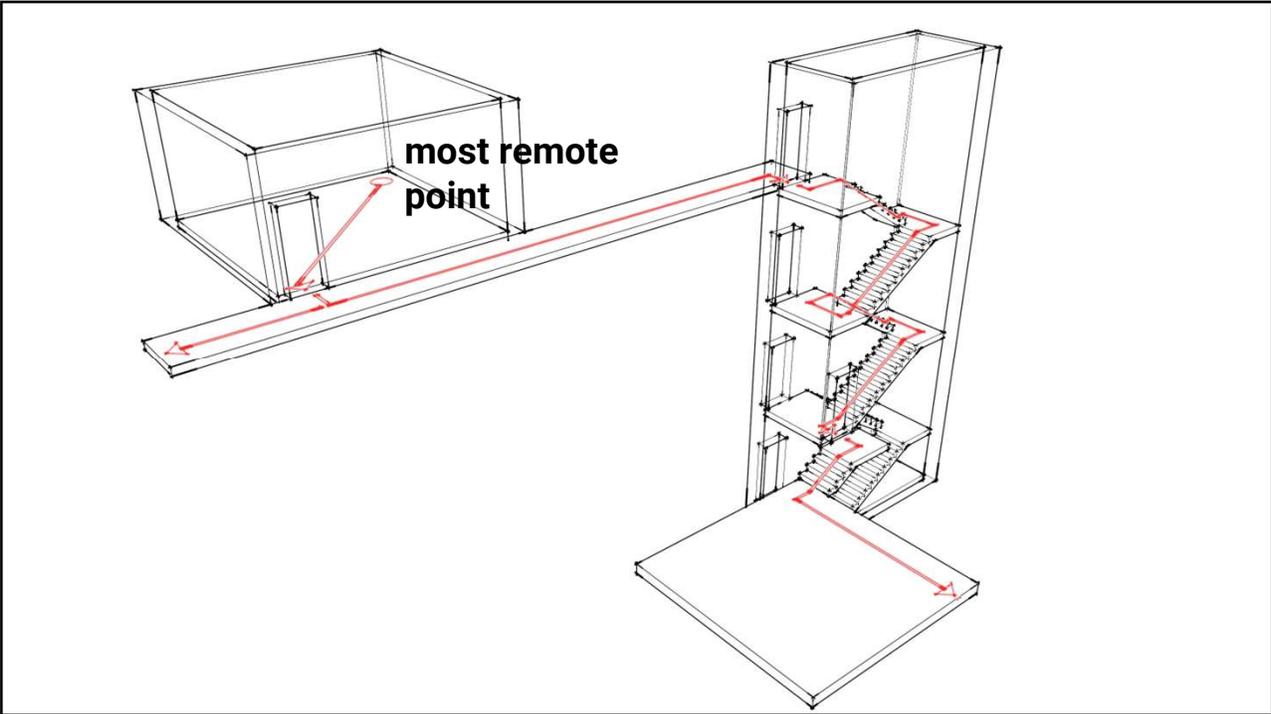
A means of egress consists of three separate and distinct parts:

- the *exit access*,
- the *exit*, and
- the *exit discharge*.

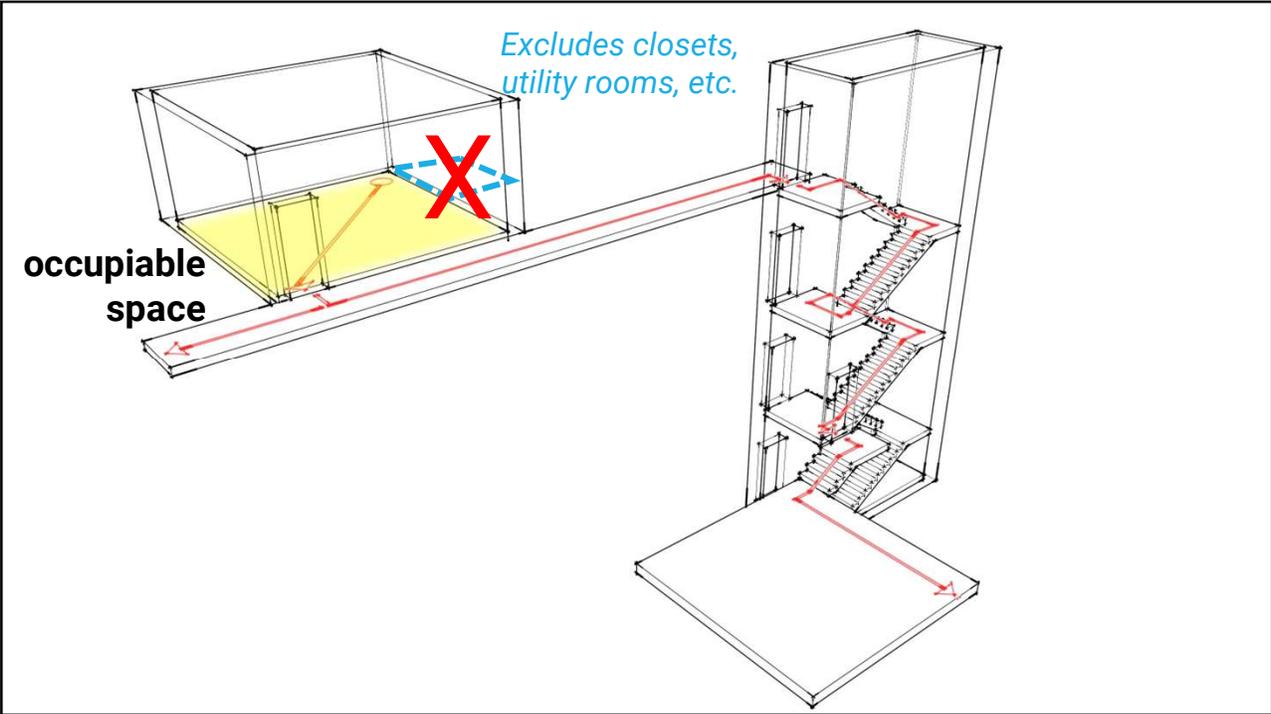
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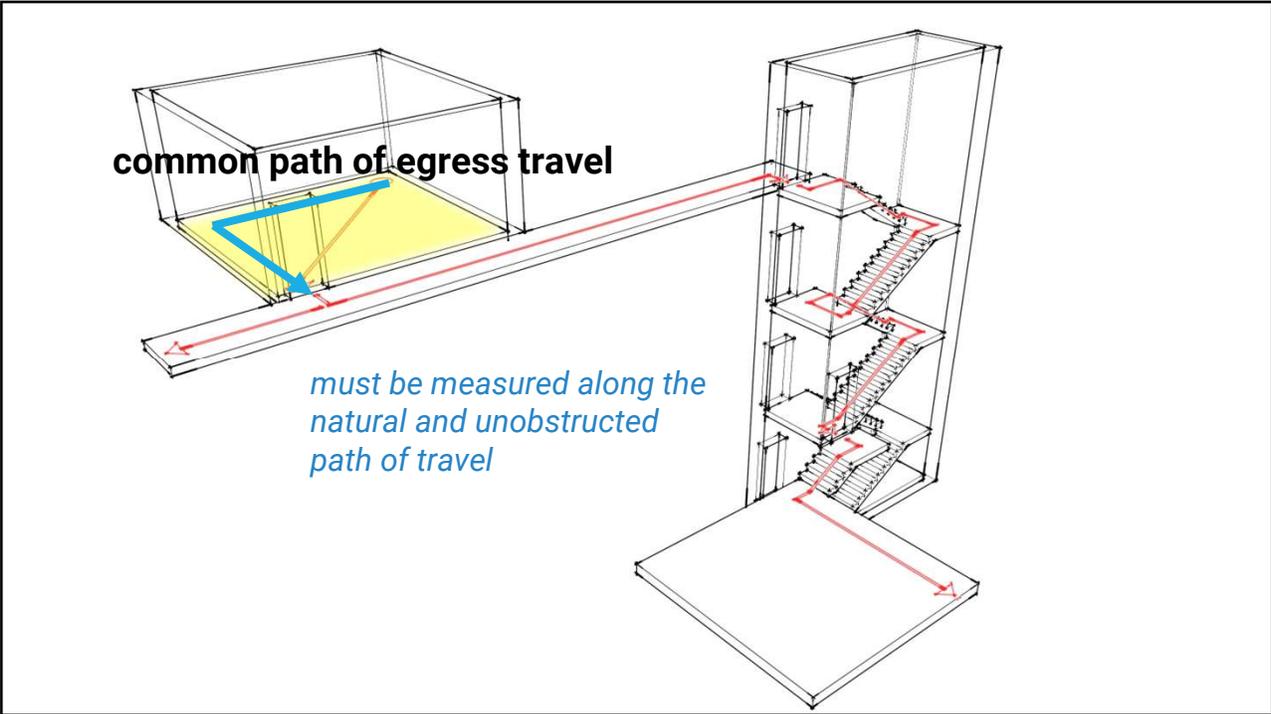
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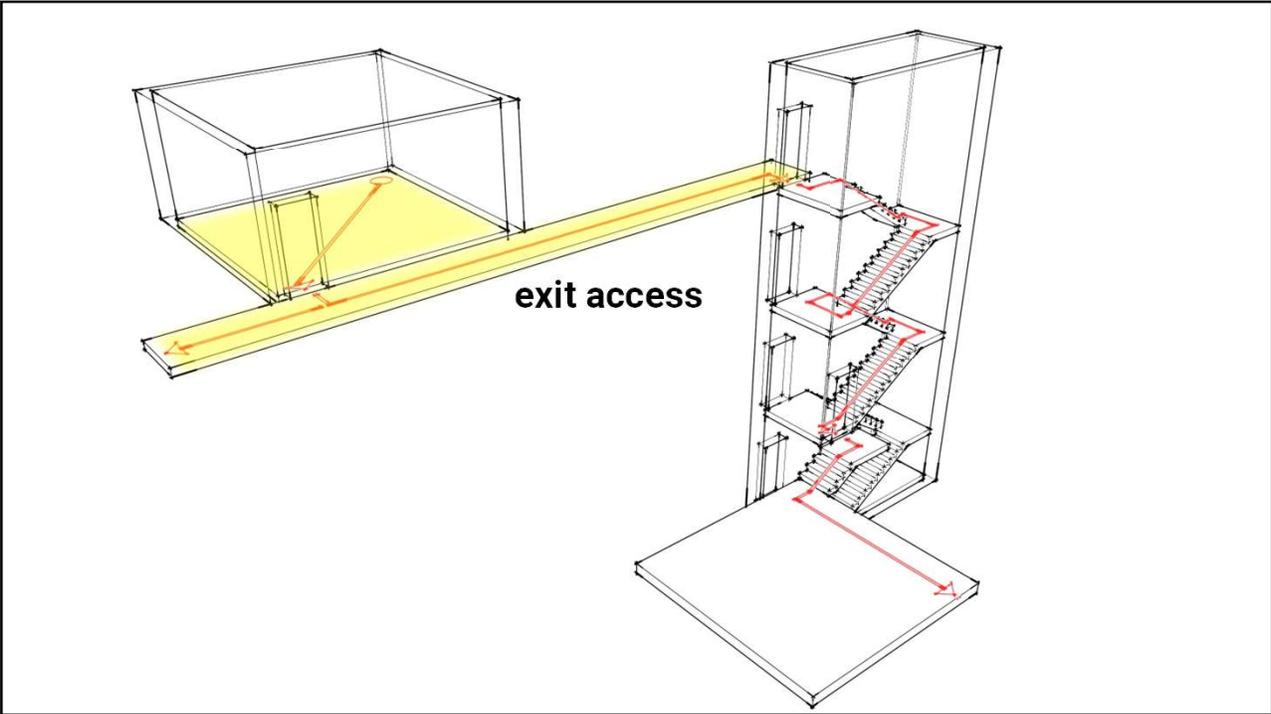
160



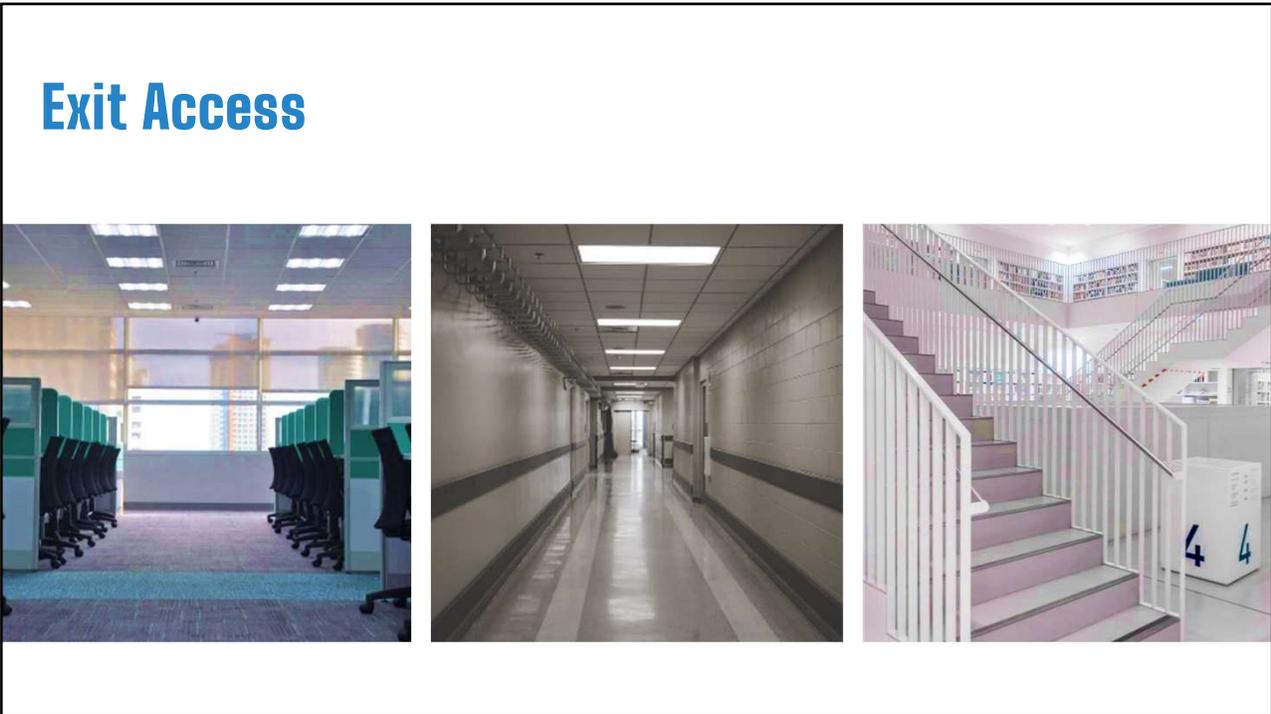
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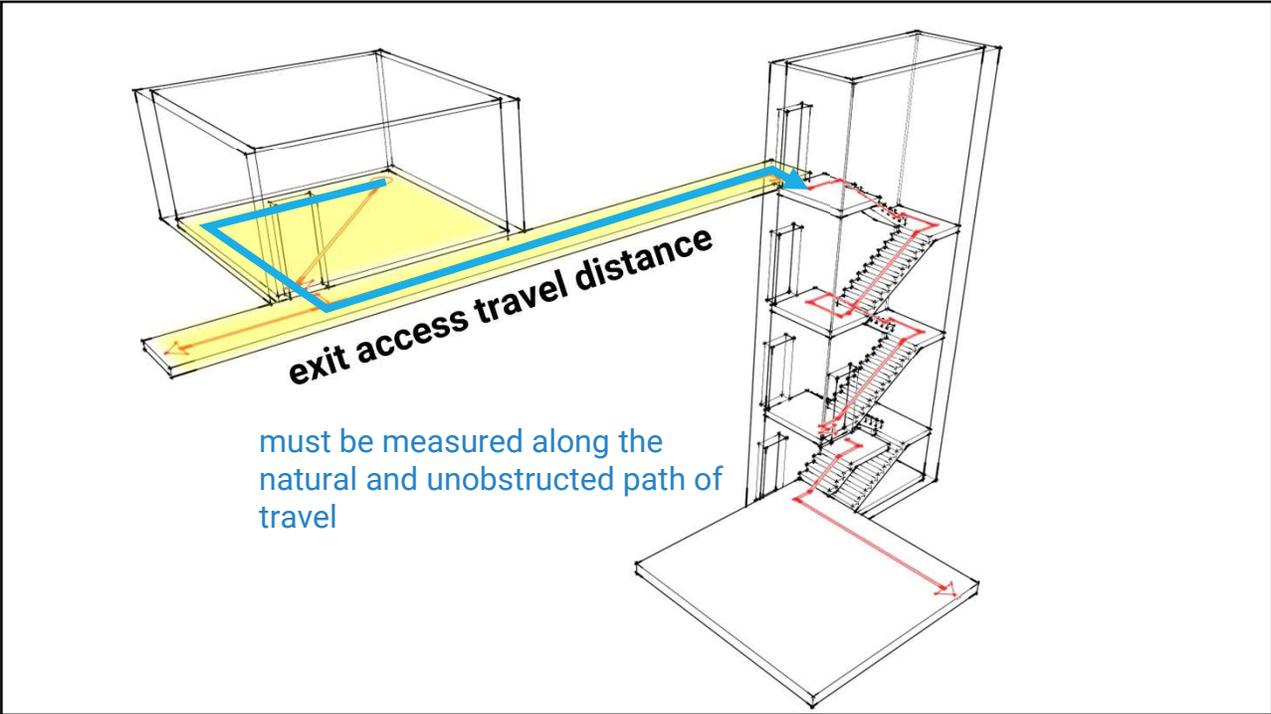
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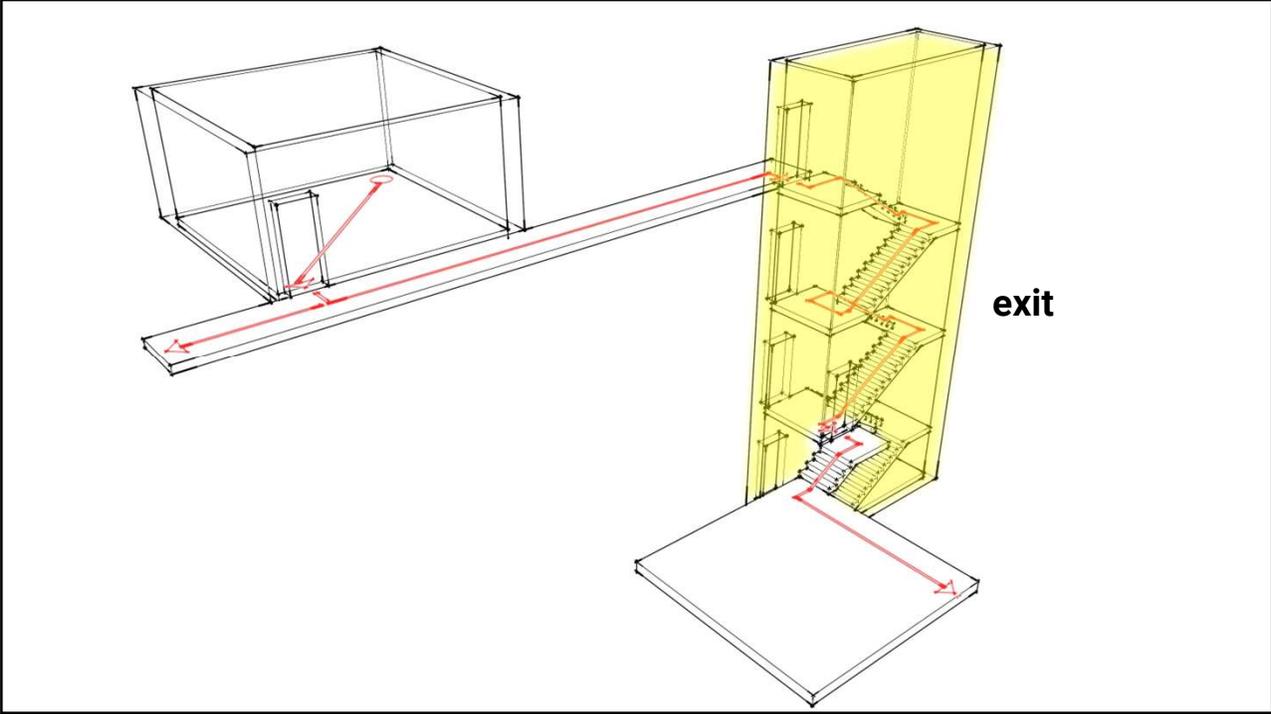
163



164

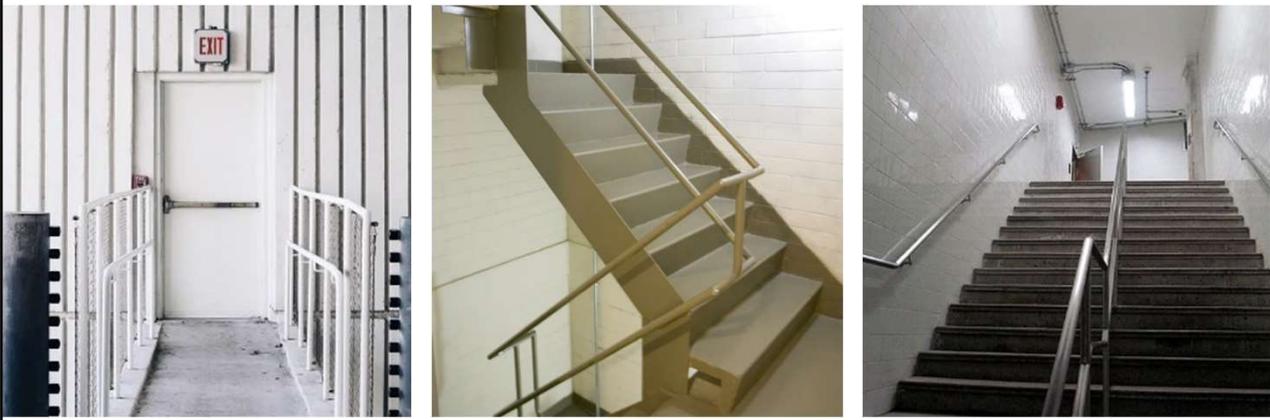


165

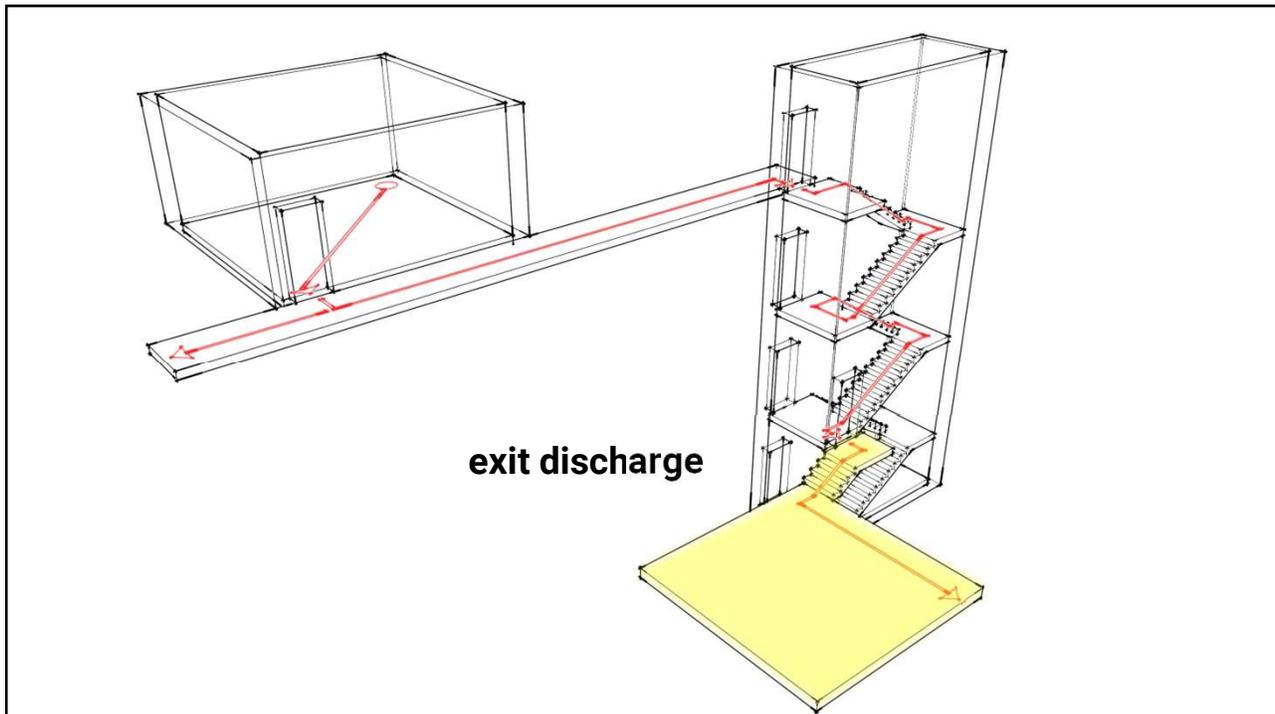


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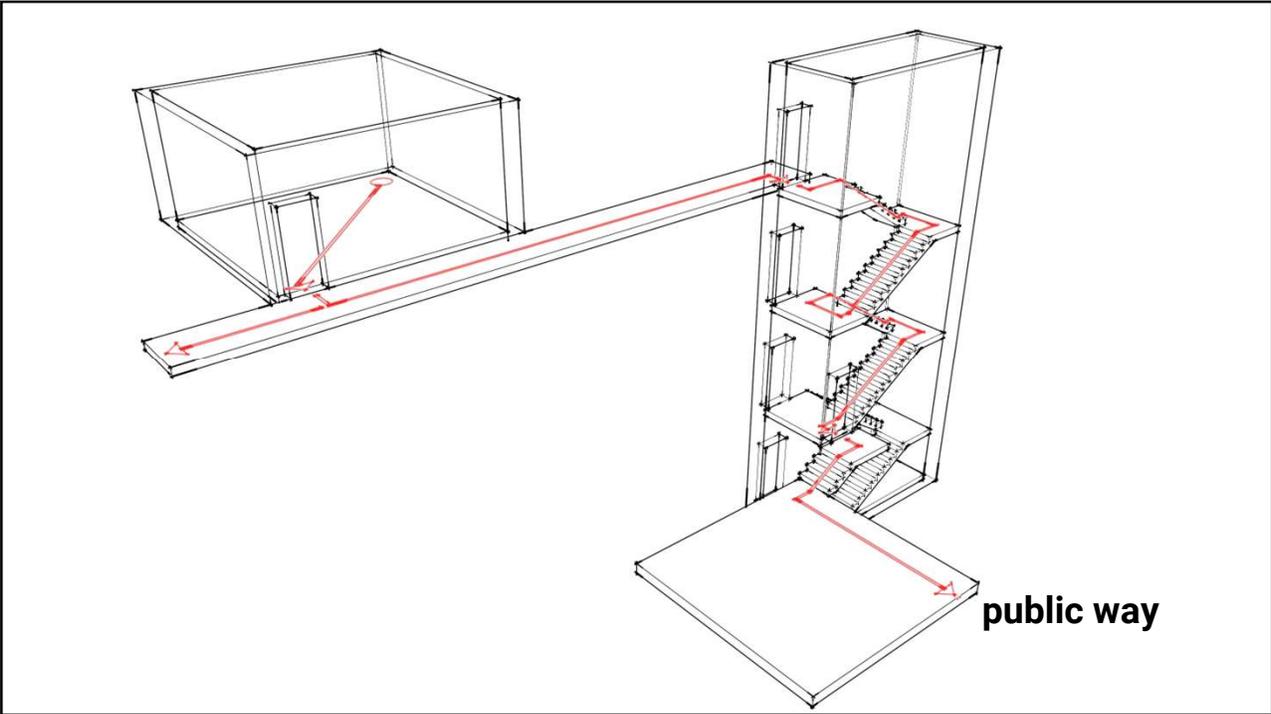
Exit



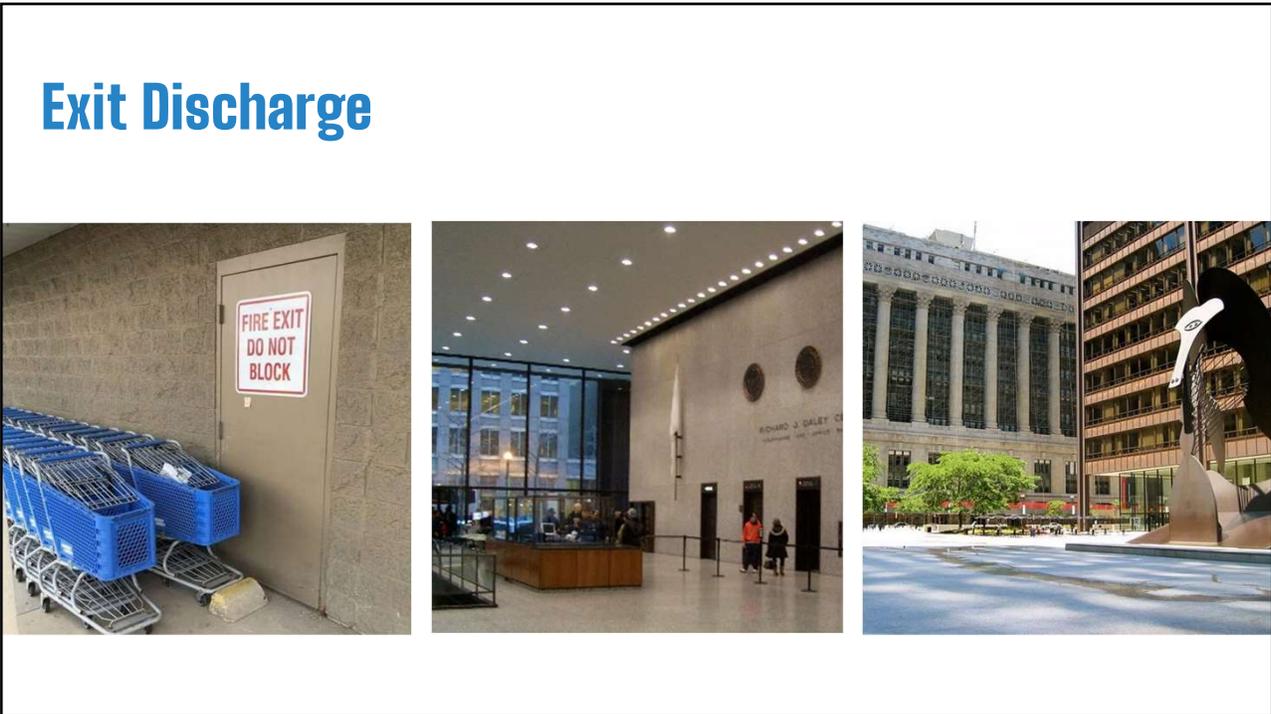
167



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FOR EXAMPLE



Exit Discharge – Daley Center

- At the Daley Center, the exit stairs discharge into the ground-level lobby. After exiting the building, occupants must cross the plaza (egress court) to reach a public way. Both the lobby and the plaza are exit discharge components.



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Determining Occupant Load

- Floor area factors in Table 1004.5
- Always safe to use gross floor area, but net floor area is allowed for some categories (see Sec. 203.5 for difference)
- Fixed seating (incl. benches, stools, booths) per Sec. 1004.6
- Include outdoor areas (limited exceptions)



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KEY CONCEPT



5 Steps to Determine Occupant Load

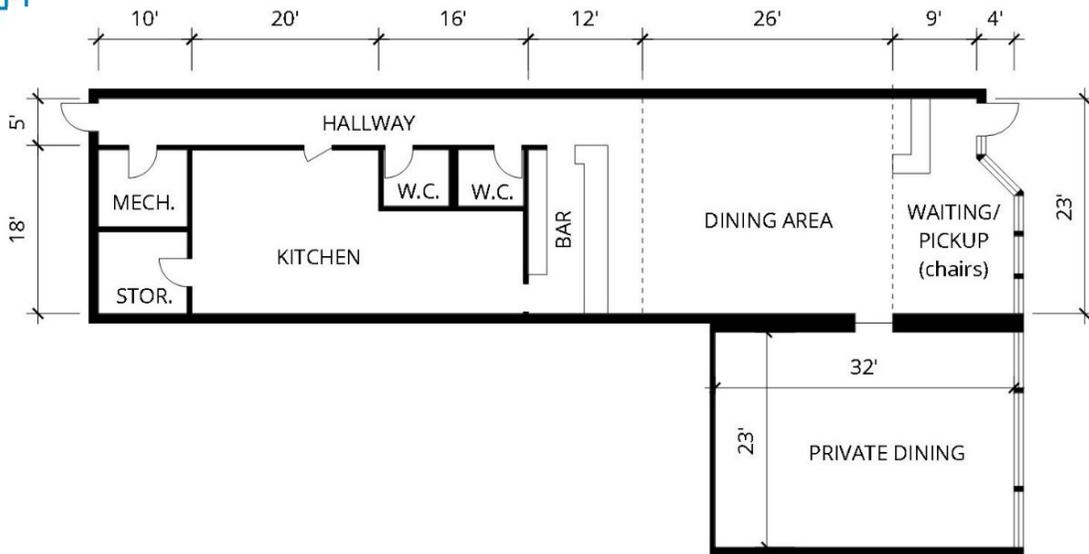
- ❶ Categorize the function for each area without fixed seating using closest category in Table 1004.5
- ❷ Identify the occupant load factor for each use/area. Note whether the factor is based on gross or net floor area.
- ❸ Calculate the design occupant load using factors for open floor areas and for fixed seating per Sec. 1004.6.
- ❹ Calculate combination loads at areas of convergence.
- ❺ Determine the design occupant load.

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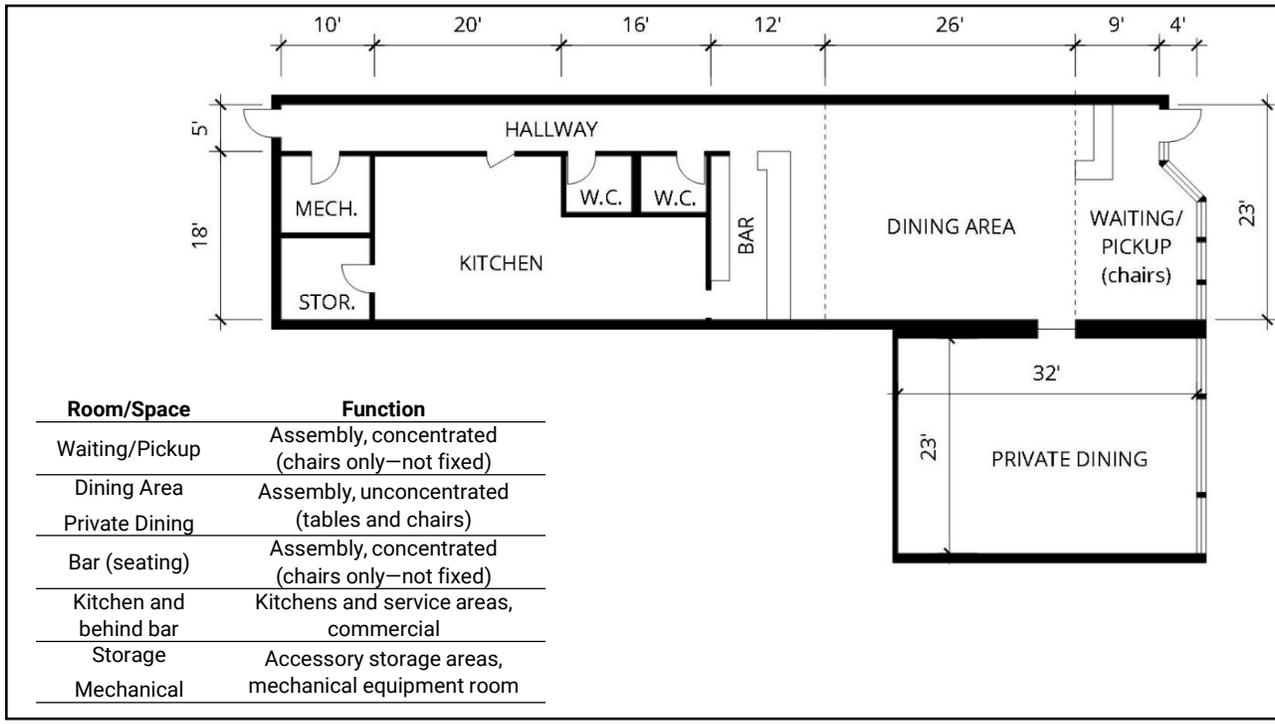
FOR EXAMPLE



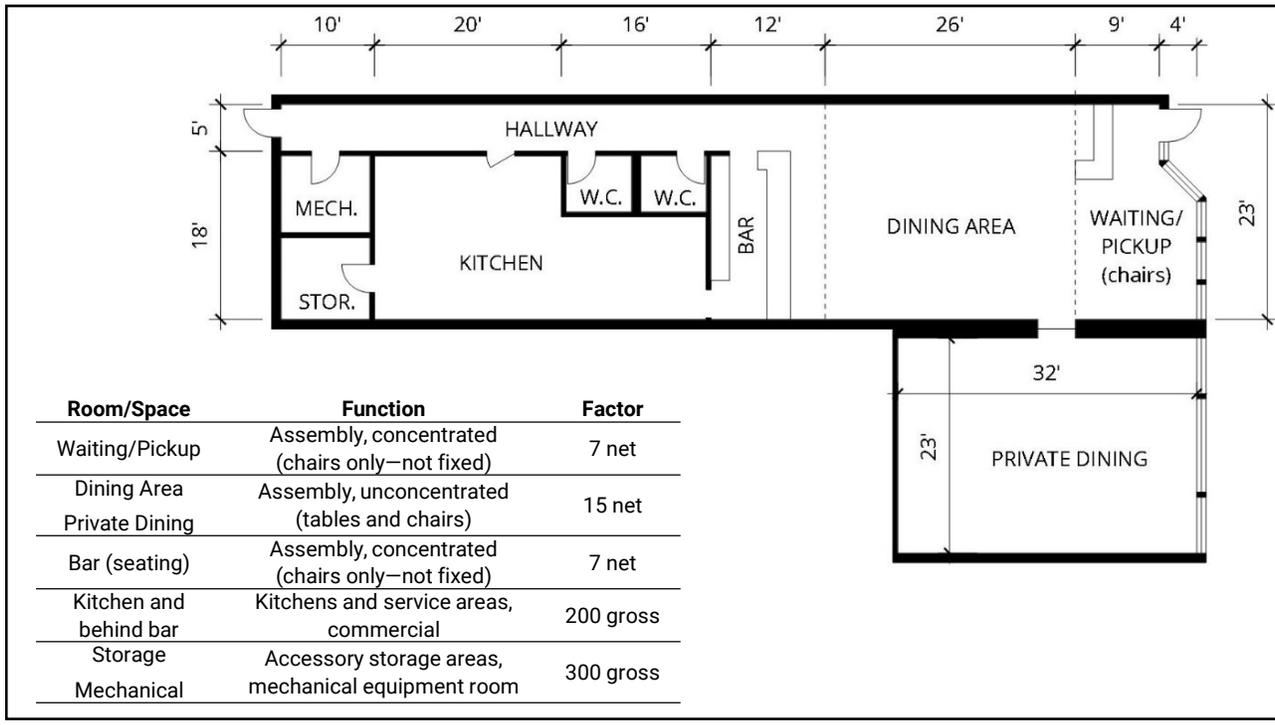
Restaurant Example (p. I-162)



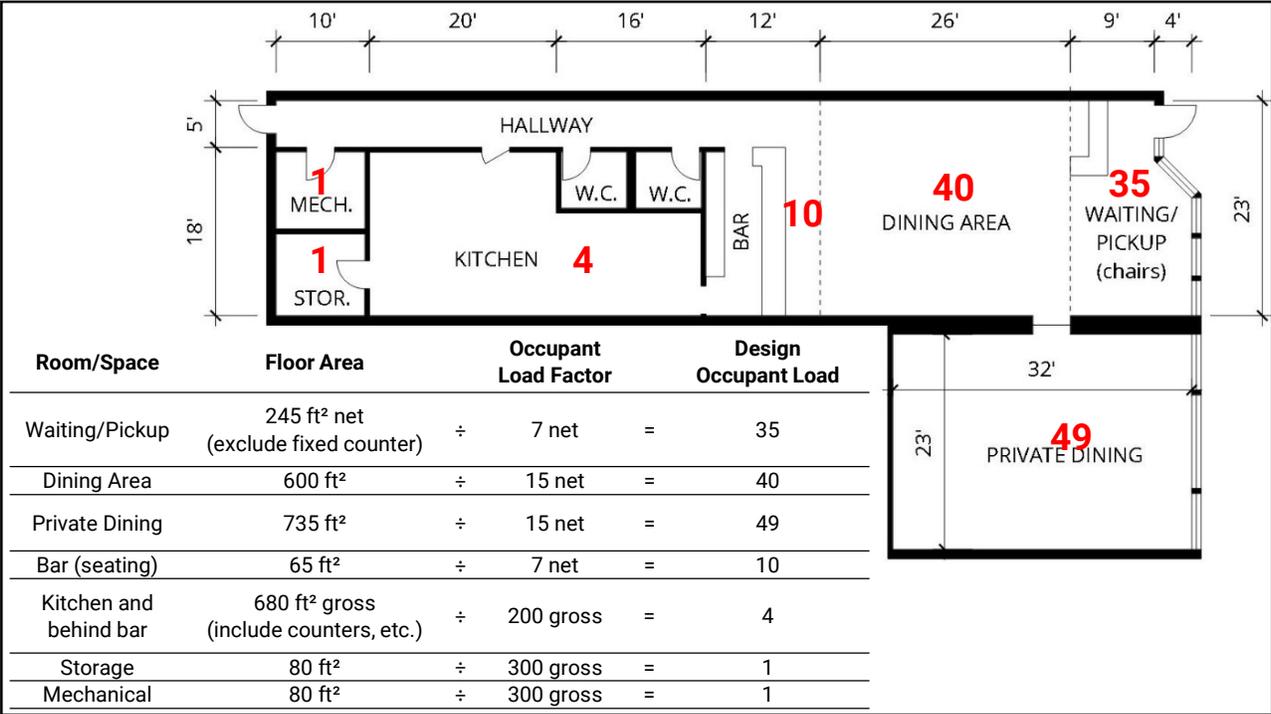
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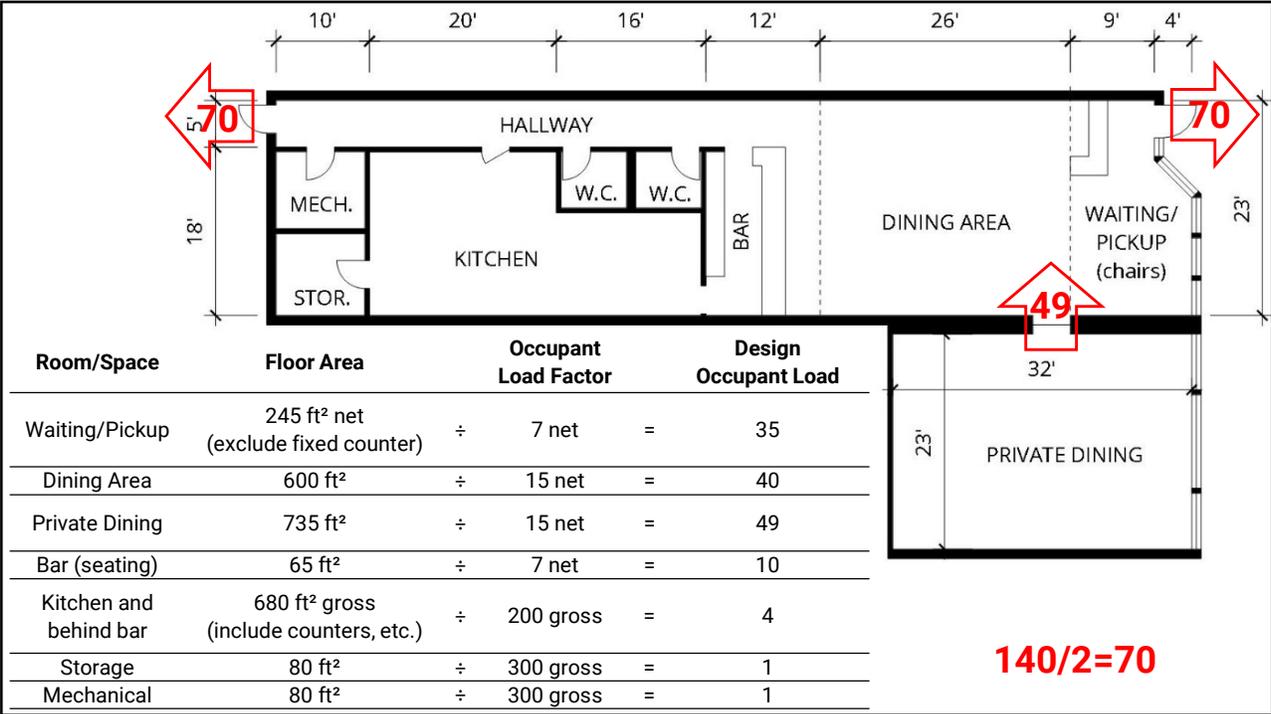
175



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Check Number and Location of Exits / Access to Exits

- Check number of exits (or access to exits) provided / required from each story and occupiable rooftop.
- If two exits are required from the story, check that each room/space on that story has the required number of exits, based on occupant load, and access to the number of exits required for the story.

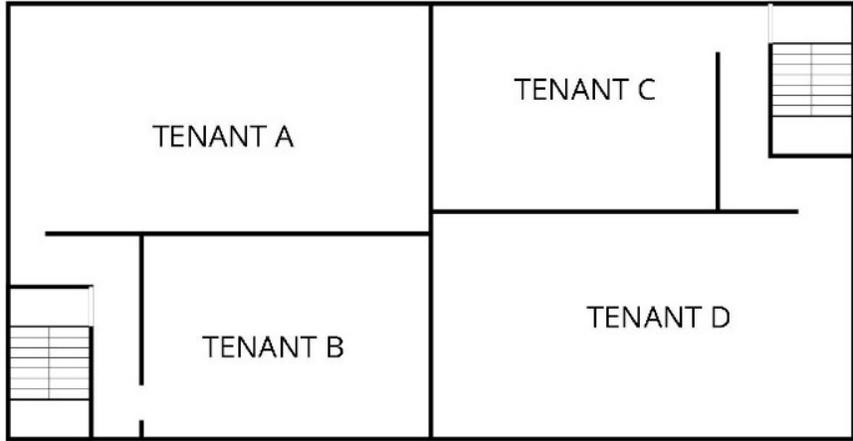


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FOR EXAMPLE



What not to do...



THIRD STORY ABOVE GRADE PLANE

180

Check Number and Location of Exits / Access to Exits (continued)

- Story with occupant load of 501 to 1,000 requires 3 exits or exit access stairways.
- Story with occupant load > 1,000 requires 4 exits or exit access stairways.
- Interlocking or scissor stairs are counted as one exit.
- Exit access stairways must connect to enclosed exits +/- 1 story in most occupancies.

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Check Number and Location of Exits / Access to Exits (continued)

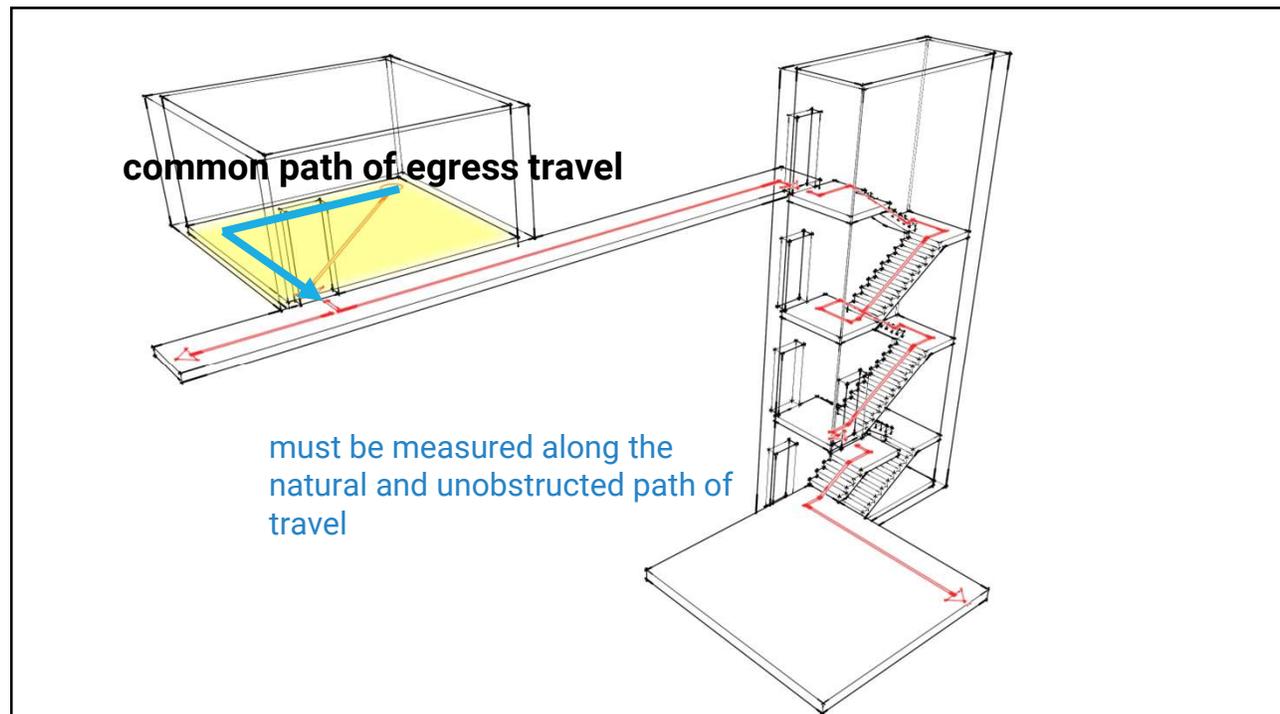
- Allowances for single exit from a story (residential) are in 1006.3.3 and are very similar to 13-160-050(c) through (o)
 - Chicago single-exit rules substituted for IBC/IRC requirements for egress windows (not required by CBC)
- Limited allowances for single exit from occupiable rooftops.
- Limited allowance for single exit from basement used for storage/mechanical up to 2,000 ft²
- One exit allowed from mech. penthouse because treated as part of story below

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Check Number and Location of Exits / Access to Exits (continued)

- Number of exits from room/space determined by three factors:
 - Floor area over 4,000 ft² requires 2 exits
 - Occupant load exceeds limit in Table 1006.2.1
 - Common path of egress travel exceeds limit in Table 1006.2.1
- 3 exits are required for room or space with OL > 500, 4 if OL > 1,000
(Section 1006.2.1.1 missing from first printing of CBC-printing error)
- 2 exits may be required based on use: boiler and equipment rooms, electrical equipment rooms, etc.

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**TABLE 1006.2.1
SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY**

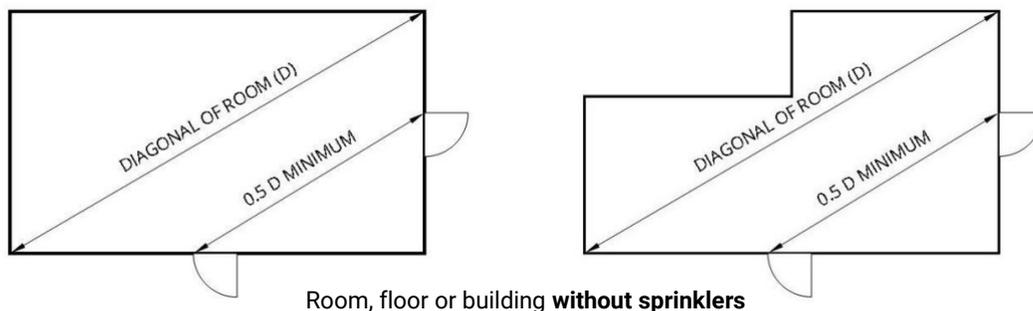
OCCUPANCY	MAXIMUM OCCUPANT LOAD OF SPACE	MAXIMUM COMMON PATH OF EGRESS TRAVEL DISTANCE (feet)	
		Without Sprinkler System (feet)	With Sprinkler System (feet)
A ^c , E	49	75	75 ^a
B, M	49	75	115 ^a
F	49	75	115 ^a
H-1, H-2, H-3	3	NP	25 ^b
H-4, H-5	10	NP	75 ^b
I-1, I-2 ^d , I-4	10	NP	75 ^a
I-3	10	NP	100 ^a
R-1	10 ^b	60	75 ^a
R-2	20 ^b	60	75 ^a
R-3 ^e , R-5 ^e	20 ^b	60	75 ^{a, g}
R-4 ^e	20	60	75 ^{a, g}
S ^f	29	75	115 ^a
U	49	75	75 ^a

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m².
NP = Not Permitted.

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Check Number and Location of Exits / Access to Exits (continued)

- When a room, space, or story is required to have 2 or more means of egress, they must be separated from each other.
 - Fully sprinklered building: 1/3 diagonal
 - Other buildings: 1/2 diagonal



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Check Number and Location of Exits / Access to Exits (continued)

Measurement Rules

- Separation distance to an exit or exit access doorway is measured to any point along the width of the doorway.
- Separation distance to an exit access stairway is measured to any point on the closest riser.
- Separation distance to an exit access ramp is measured to any point on the start of the ramp run.
- Where the path between the two exits for a story is a 1-hour fire-resistance-rated corridor, the separation distance may be measured along the shortest direct line of travel in the corridor.

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Check Number and Location of Exits / Access to Exits (continued)

Exceptions to Mathematical Separation

- *Old rule:* two means of egress must be remote from one another to minimize the change of both being blocked by smoke/fire.
 - Group R-5 occupancies
 - Within dwelling units or sleeping units
 - Group B or M tenant spaces separated from other spaces by 1-hour rated construction, with ACAR approval
- Fully sprinklered Group R-2, with dead ends not exceeding 20', may reduce separation to 15'

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Check Size and Capacity of Egress System

- Fractional inch/occupant factors replace units of exit width.
- Egress components also have minimum widths.

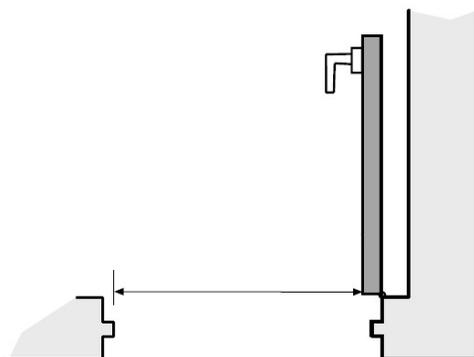
Capacity of Egress Components		
Component Type	NFPA 13 or 13R system throughout building	
	No	Yes ^a
Stairway	0.3 inch / occupant	0.2 inch / occupant
Indoor assembly seating aisles	See Section 1029.6.1	
Open air assembly seating aisles	See Section 1029.6.3	
Assembly aisle accessways	See Section 1029.13	
Other egress component (Doors, gates, etc.)	0.2 inch / occupant	0.15 inch / occupant

a. Use non-sprinklered factor for Group H and I-2 occupancies.

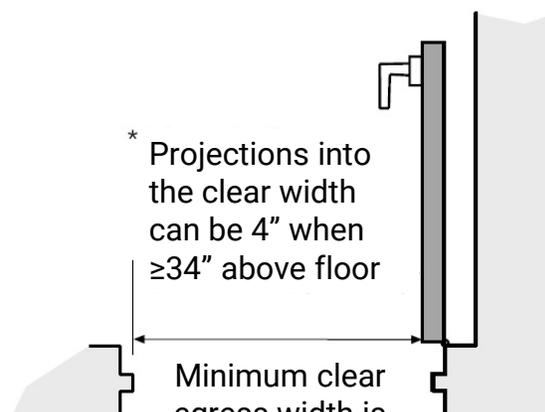


189

Check Size and Capacity of Egress System (continued)



Egress width at doors is measured as clear width (90° position)



* Projections into the clear width can be 4" when $\geq 34"$ above floor

Minimum clear egress width is 32"

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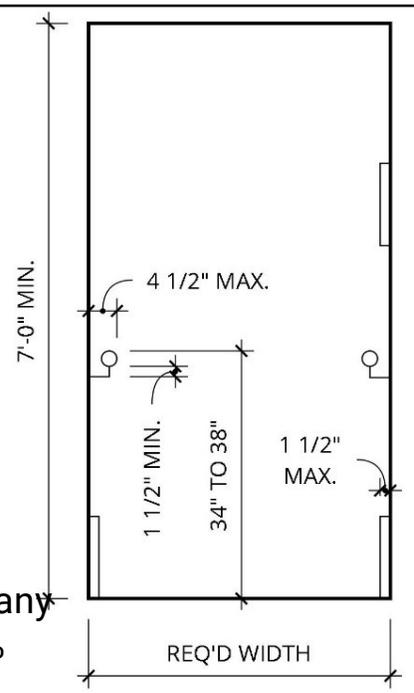
Check Size and Capacity of Egress System (continued)

Encroachment for Stairs, Ramps, Corridors:

- Handrails can project 4.5 inches
- Trim can project 1.5 inches
- Door hardware can project into corridors as allowed for doors

Distribution

- Where more than one exit or exit access is required, they must be sized so that the loss of any one does not reduce capacity by more than 50%

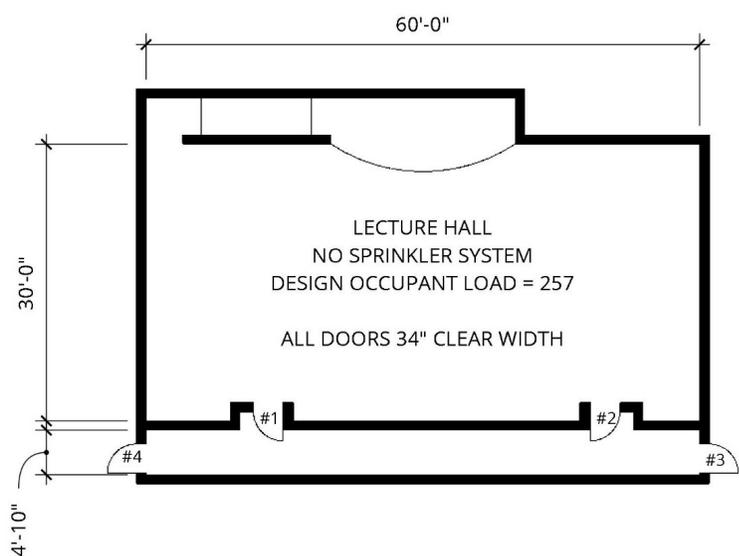


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FOR EXAMPLE



Exit Capacity Example (p. I-186)



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FOR EXAMPLE



Exit Capacity Example (continued)

1.	Determine the occupancy of the building or space.	<u>Group A-3</u>
2.	Determine the type of component(s) (stair, ramp, door, corridor, egress court).	<u>2 doors, 1 corridor</u>
3.	Determine whether the building is equipped with a sprinkler system in accordance with the applicable standard.	<u>No</u>
4.	Determine the design occupant load.	<u>257</u>

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FOR EXAMPLE



Exit Capacity Example (continued)

5. Compute the maximum capacity of the egress components.

a. Determine the clear width of each component.

Door #1 = 34"	Door #4 = 34"
Door #2 = 34"	Corridor = 58"
Door #3 = 34"	

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FOR EXAMPLE



Exit Capacity Example (continued)

- b. Determine whether the components are sized to accommodate the design occupant load.

- i. Determine the egress width per occupant for each component.

**0.2 in /
occupant**

Door #1 = 34"

Door #4 = 34"

Door #2 = 34"

Corridor = 58"

Door #3 = 34"

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FOR EXAMPLE



Exit Capacity Example (continued)

- ii. Divide the clear width(s) by the allowed egress width per occupant. Add the capacities of similar components together.

[Door #1 = 34" ÷ 0.2 = 170] +

[Door #2 = 34" ÷ 0.2 = 170] = 340

[Door #3 = 34" ÷ 0.2 = 170] +

[Door #4 = 34" ÷ 0.2 = 170] = 340

Corridor = 58" ÷ 0.2 = 290

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FOR EXAMPLE



Exit Capacity Example (continued)

- 6. Compare the design occupant load with the lowest maximum capacity of the egress component(s).

Design occupant load = 257 ≤ 340 (capacity of doors)

Design occupant load = 257 ≤ 290 (capacity of corridor)

- 7. Determine compliance.
Do egress components satisfy the design occupant load?

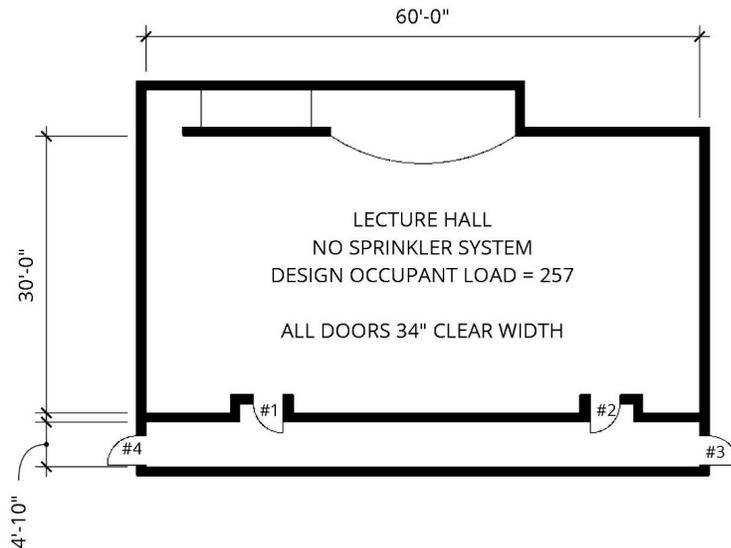
Yes

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FOR EXAMPLE



Exit Capacity Example (continued)



198

Check Exit Access Components

Exit access travel distance

- The distance from the most remote point of each room, area, or space to the entrance to the nearest exit.
- Measured along the natural, unobstructed path of horizontal and vertical egress travel.
- The length of exit access travel may not exceed the length specified in Table 1017.2.



199

Check Exit Access Components (continued)

**TABLE 1017.2
EXIT ACCESS TRAVEL DISTANCE^a**

OCCUPANCY	WITHOUT SPRINKLER SYSTEM (feet)	WITH SPRINKLER SYSTEM (feet)
A, E, F-1, M, R, S-1	200 ^c	250 ^b
I-1	Not Permitted	250 ^b
B	200	300 ^c
F-2, S-2, U	300	400 ^c
H-1	Not Permitted	75 ^d
H-2	Not Permitted	100 ^d
H-3	Not Permitted	150 ^d
H-4	Not Permitted	175 ^d
H-5	Not Permitted	200 ^c
I-2, I-3	Not Permitted	200 ^c
I-4	150	200 ^c

200

Check Exit Access Components (continued)

Egress through intervening spaces:

- Egress from a room or space to an exit may not pass through an adjoining room or space unless all the following conditions are met.
- Egress may not pass through a room that can be locked to prevent egress.
- Egress may not pass through a toilet room or bathroom.
- Egress from a sleeping area (bedroom) may not pass through another sleeping area (bedroom).
- Egress may not pass through a commercial kitchen, storage room, closet, or space used for similar purposes.
- Egress from a dwelling unit, sleeping unit, or tenant space may not pass through another dwelling unit, sleeping unit, or tenant space.

201

Check Exit Access Components (continued)

Exit access corridors:

- Required to have a fire-resistance rating in some occupancies (Table 1020.1)
- Minimum width varies by occupancy (Table 1020.2)
- Doors from occupiable spaces at any point in door swing may not reduce width to less than $\frac{3}{4}$ required width.
 - Does not apply to closet doors.
 - Does not apply within a dwelling unit.
- Dead end corridors limited by occupancy and sprinkler system
- Exit access corridors may not be used for air movement (with exceptions).

202

Check Exits and Exit Discharge Components

- Interior exit stairways (or ramps) provide a protected vertical path of egress travel, separated from other areas of the building by fire-resistance rated construction with limited openings and penetrations.
- Exit discharge is the portion between the enclosed exit and the public way.
 - Lobbies (where allowed)
 - Vestibules
 - Outdoors (on private property)



203

Exits and Exit Discharge Components (continued)

Interior Exit Enclosures

- Fire-resistance rated enclosure (fire barriers)
 - 1-hour if connecting 3 or fewer stories
 - 2-hour if connecting 4 or more stories
- Openings limited to those needed for access from normally-occupied spaces
 - No elevators, mechanical rooms, toilet rooms, utility access
- Penetrations into enclosure are prohibited, except as listed in Section 1023.5 and 1023.6

204

Exits and Exit Discharge Components (continued)

Exterior walls of exit enclosures

- Two options
 - Exterior wall is rated as required for exit enclosure and openings are limited
 - Adjoining exterior wall within 10 feet is 1-hour rated and openings have $\frac{3}{4}$ -hour protectives.

Doors

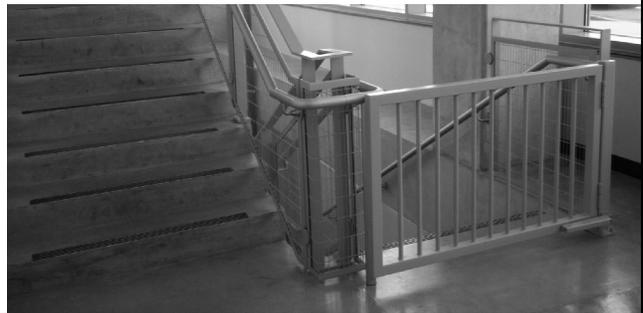
- Opening protectives required per Table 716.1(2)

205

Exits and Exit Discharge Components (continued)

Discharge identification

- The level of exit discharge must be clearly identified for users of the exit stairway/ramp.
- Directional exit signs should be used within stair at discharge level.
- If it continues below the level of exit discharge, a barrier should be provided.



206

Exits and Exit Discharge Components (continued)

Exit passageways (typ. horizontal transfer between two exit stairs)

- Construction, openings and penetrations limited similar to requirements for exit stair enclosures.

Horizontal exits

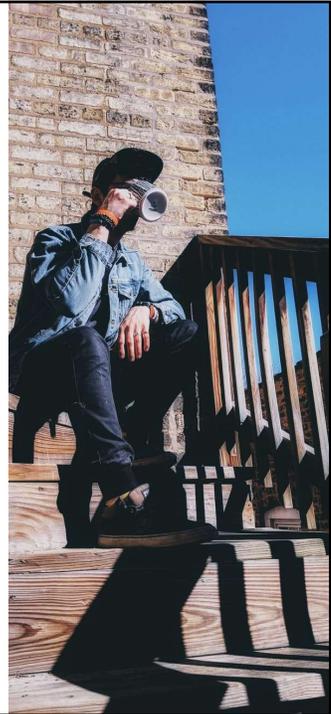
- Limited to 50% of required exit capacity.
- 2-hour fire-resistance rated construction.
- Continuous from wall to wall, and 2-hour floor/ceiling required if not vertically continuous.
- Refuge areas must be provided 3 ft²/occupant.

207

Exits and Exit Discharge Components (continued)

Exterior exit stairways and ramps

- Not allowed for Group I-2 or levels (stories or occupiable rooftops) more than 45 feet above grade at discharge of stair
- Limited to 50% of required exit capacity
- Protection and separation required
 - Exceptions for residential porches up to 4 stories



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Exits and Exit Discharge Components (continued)

Exit discharge

- Chicago allows 100% of exits to discharge through a lobby per Sec. 1028.1, Exception 4 (fully sprinklered building)
- In non-sprinklered building 50% of exits may pass through lobby if lobby level is sprinklered
- Discharge through vestibules
- Discharge directly to outside

209

Exits and Exit Discharge Components (continued)

Egress courts and exterior travel

- Minimum width and capacity must be maintained in outside areas.
- Minimum width of egress courts is 44" (except 36" for R-3, R-5)
- Walls within 10' of egress court must be fire-resistance rated and have opening protectives
- Egress should discharge to public way
 - Dispersal area allowed when access to public way not possible (rare)

210

Check General Egress Requirements

- Doors
 - Locks and latches
- Stairs
- Handrails
- Guards
- Exit signs
- Means of egress illumination
- Assembly



211

General Egress Requirements (continued)

Egress doors

- Minimum clear width: 32" (within non-accessible dwelling units, 28")
- Maximum width/leave: 48" nominal
- Minimum height: 80" (within dwelling unit 78")
- Must be pivoted or side-hinged (limited exceptions)
- Must swing in direction of travel where OL > 49
- Opening force for doors and gates, other than fire doors

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General Egress Requirements (continued)

Locks and latches

- Egress doors must be readily openable without key or special knowledge.
- Delayed egress locks allowed in Group B, F, I, M, R, S and U occupancies (limited allowances for Group A occupancies)
 - 15 sec. delay max
 - Must swing in direction of egress
 - Only one delayed lock on egress path
- Panic hardware required for Group A, E occupancies with OL > 49.

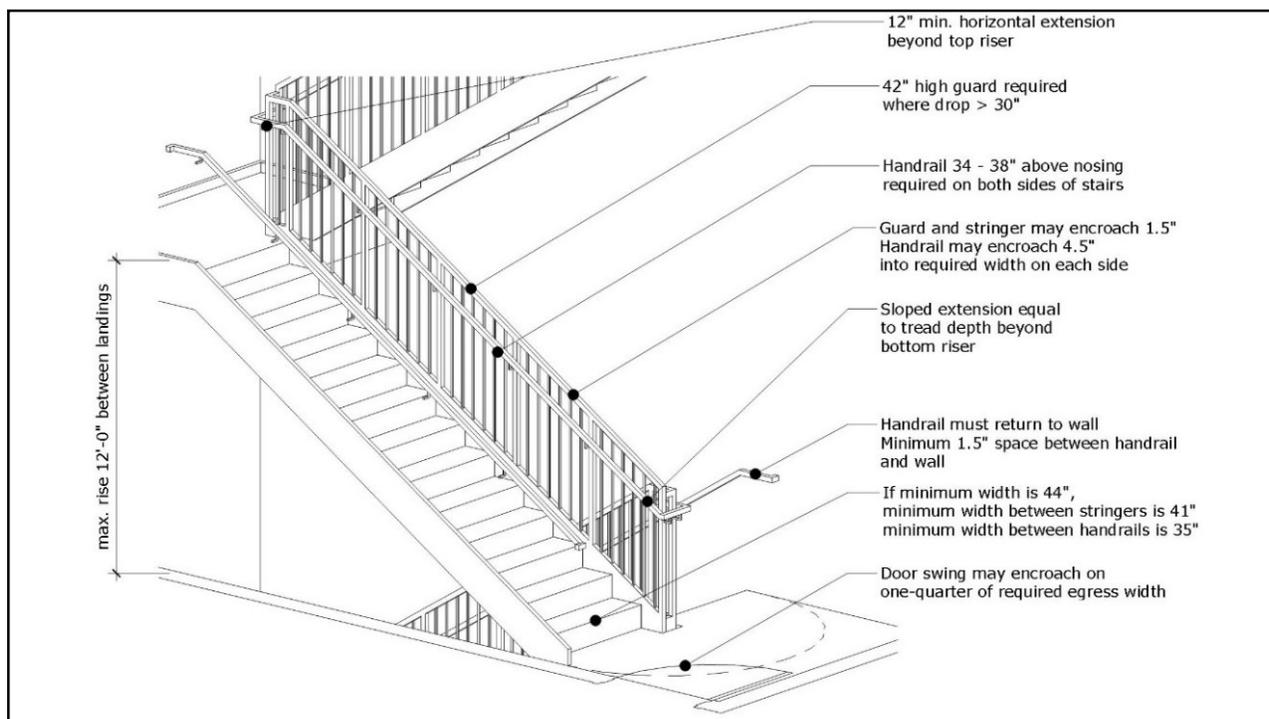
213

General Egress Requirements (continued)

Stairways

- 44" wide min. (36" if OL < 50)
- Measured in clear at narrowest point, excluding allowed projections
- Handrail required on both sides.
- Guard will be required at center of stairways under new code.
- Landings depth must equal width of stair, but max. 48"
- Minimum width will be measured with radius when path of egress turns

214



215

General Egress Requirements (continued)

Stairways

- Minimum headroom 7'-0"
- Maximum rise between landings: 12'-0" (all occupancies)
 - 12'-7" within dwelling units, Group R-5
- Door swinging into stairway, in any position, may not reduce clear width to less than $\frac{3}{4}$ required width

216

General Egress Requirements (continued)

Treads and risers

- Tread depth: 11" min.
- Riser height: 7" max.
- Solid risers required.
- Consult code for circular and spiral stairs.
- In Group R-5 and within dwelling units, stairs allowed to be steeper and use Chicago-style winders

217

General Egress Requirements (continued)

Handrails

- Handrails required on both sides of stairs
 - Limited exceptions
- Stairs wider than 60" require intermediate handrail
- Ramps with rise > 6" require handrails on both sides
- Handrails must meet dimensional requirements for graspability
 - Type II handrails allowed within dwelling units and Group R-5
- Handrails must be continuous and return to a wall or guard
- Handrail height: 34" to 38" above nosing

218

General Egress Requirements (continued)

Guards

- Required at open side of walking surfaces more than 30" above floor or grade within 36" horizontally
 - Surface that is 12" or less in depth, measured perpendicular to face of guard is not a walking surface, nor are planting beds or countertops at least 34" high. Benches are a walking surface.
- Common sense exceptions for loading platforms, transit platforms, stages, etc.
- 42" high, except 36" allowed in Group R-5 up to 3 stories above grade and within dwelling units.
- 4" sphere rule applies to guards up to 36" high

219

General Egress Requirements (continued)

Exit signs

- Remain as in pre-2019 Chicago Code
- "EXIT" and "STAIR" required.
- Must be illuminated, red lettering on translucent white background.
- Arrows required, no chevrons.
- Required in all rooms that require more than one exit or exit access.
- Must be readily visible and at least every 100' along corridor.

220

General Egress Requirements (continued)

Means of egress illumination

- Required for all portions of means of egress, including exit discharge (exterior)
- 1 fc at walking surface
- May be dimmed in Group A during exhibits or performances

Emergency lighting

- Rooms required to have 2 exits
- Corridors and exits
- Equipment rooms
- Public restrooms > 300 ft²

221

Fire-resistance Rated Construction

For more information, see **Module 4** in the
Chicago Plan Review Manual

222

KEY CONCEPT



Fire Safety Requirements

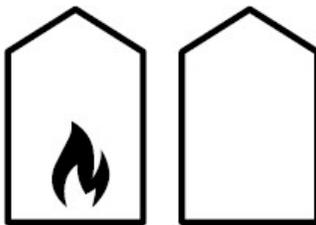
- Code includes interrelated strategies to protect people and property from fire and other hazards
 - Fire-resistance-rated and smoke resistant construction
 - Interior finishes
 - Fire protection and life safety systems
 - Means of egress
- Chapter 7 deals with “passive” fire resistance



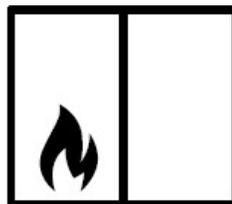
223

Fire Safety Requirements (continued)

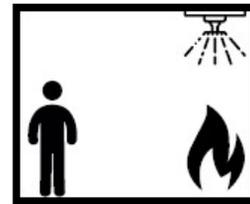
- Structural fire endurance
- Limit spread of fire from building to building
- Limit spread of fire and smoke from space to space



Prevent
Conflagration



Compartmentation



“Active” Systems

224

KEY CONCEPT



Fire-resistance Rated Construction

- Chapter 7 provides requirements for:
 - Structural members
 - Walls and partitions
 - Floors
 - Roofs
 - Opening protectives
 - Penetrations

Note: marking fire-resistance rated walls in accessible concealed spaces and equipment rooms required by Sec. 703.7.



225

KEY CONCEPT



Ratings

- **Fire-resistance rating** – Relative duration a building, element, component, or assembly is expected to maintain the ability to confine a fire, perform a given structural function, or both, as determined by testing data or calculations derived from testing data.
- **Fire protection rating** – Relative duration that an opening protective (window, door, fire shutter, etc.) is expected to maintain the ability to confine a fire, as determined by testing data.



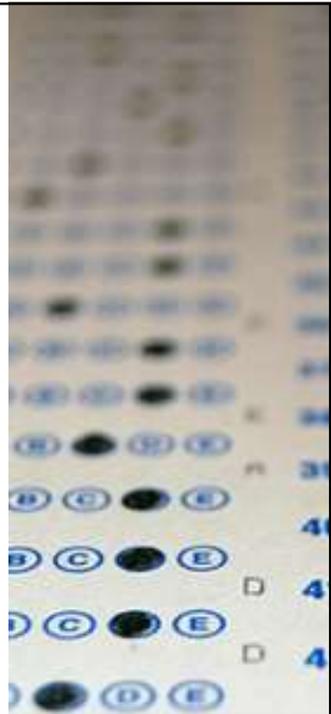
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KEY CONCEPT



Multiple Use Fire Assemblies

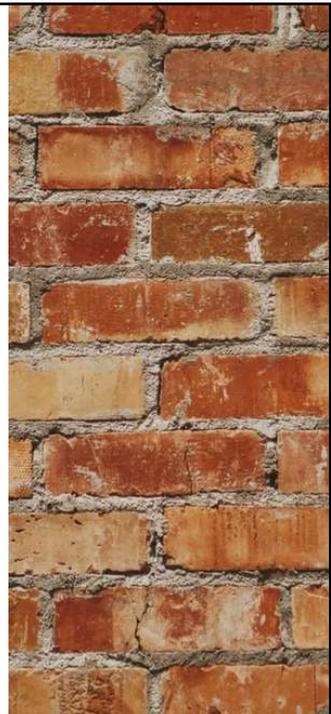
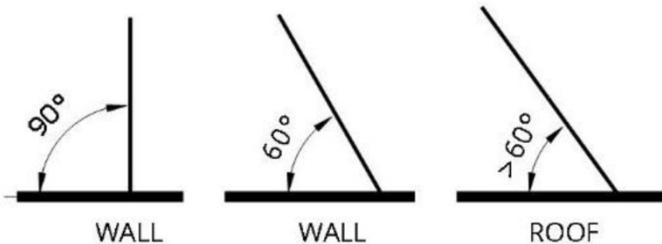
- Assemblies that serve multiple purposes must comply with all fire-resistive requirements that are applicable for each purpose. For example:
 - A wall may be a load-bearing wall (required to have a fire-resistance rating based on construction type) and must comply with Section 704.1.
 - An incidental use separation (required to have a fire-resistance rating by Section 509) must be a fire barrier and comply with Section 707.
 - A corridor wall (required to have a fire-resistance rating by Section 1020) must be a fire partition and comply with Section 708.



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Exterior Walls

- Exterior walls are required to be fire-resistance rated based on both construction type (if load bearing) and fire-separation distance.
- Exterior surfaces with a slope less than 60° from horizontal, such as windowsills and the top surface of parapets, must meet requirements for roofs.



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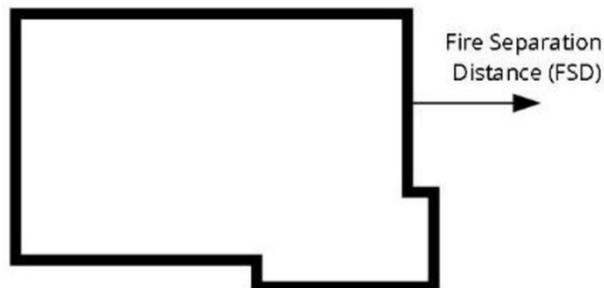
KEY CONCEPT



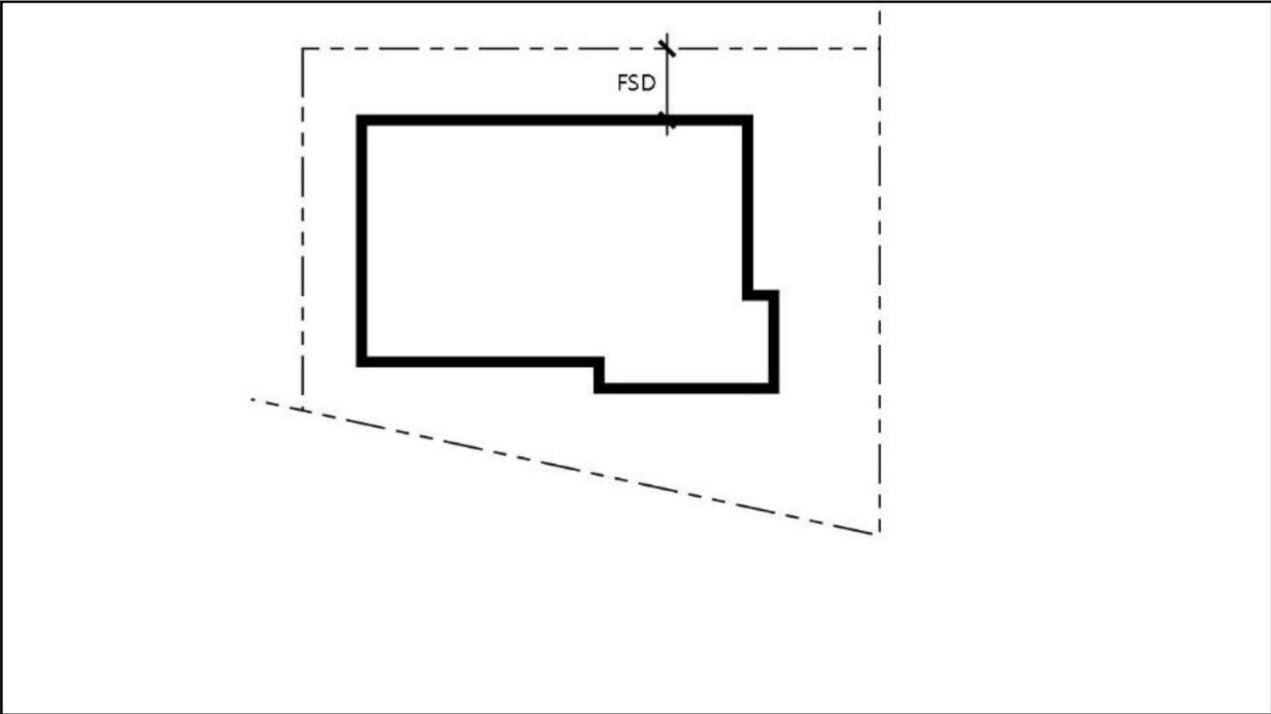
Fire Separation Distance

- The horizontal distance measured from the building face or element to one of the following:
 1. The closest *abutting property line*.
 2. The far boundary of a *public way* adjoining the *lot*.
 3. An imaginary line between two *buildings* on the same *lot*.The distance shall be measured at right angles from the face of a wall or edge of a building element.
- FSD is used to determine the required characteristics of exterior walls, openings in exterior walls, projections from exterior walls, and some features of occupiable rooftops.

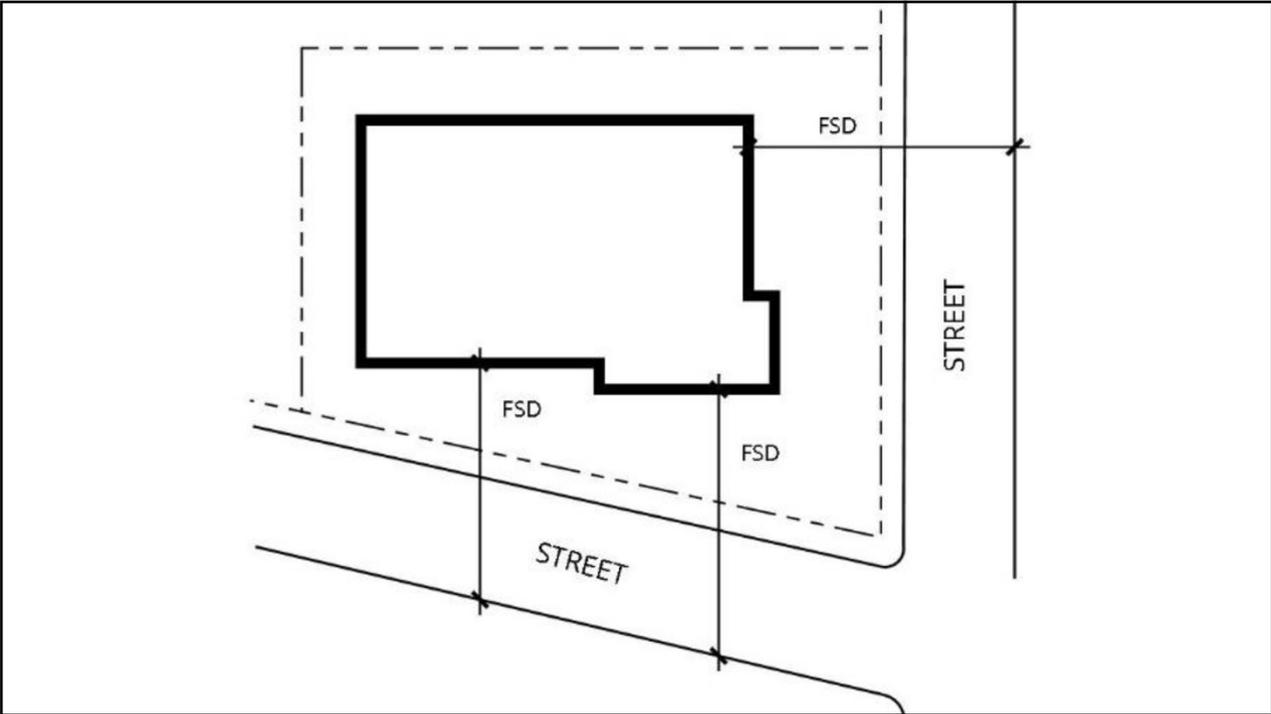
230



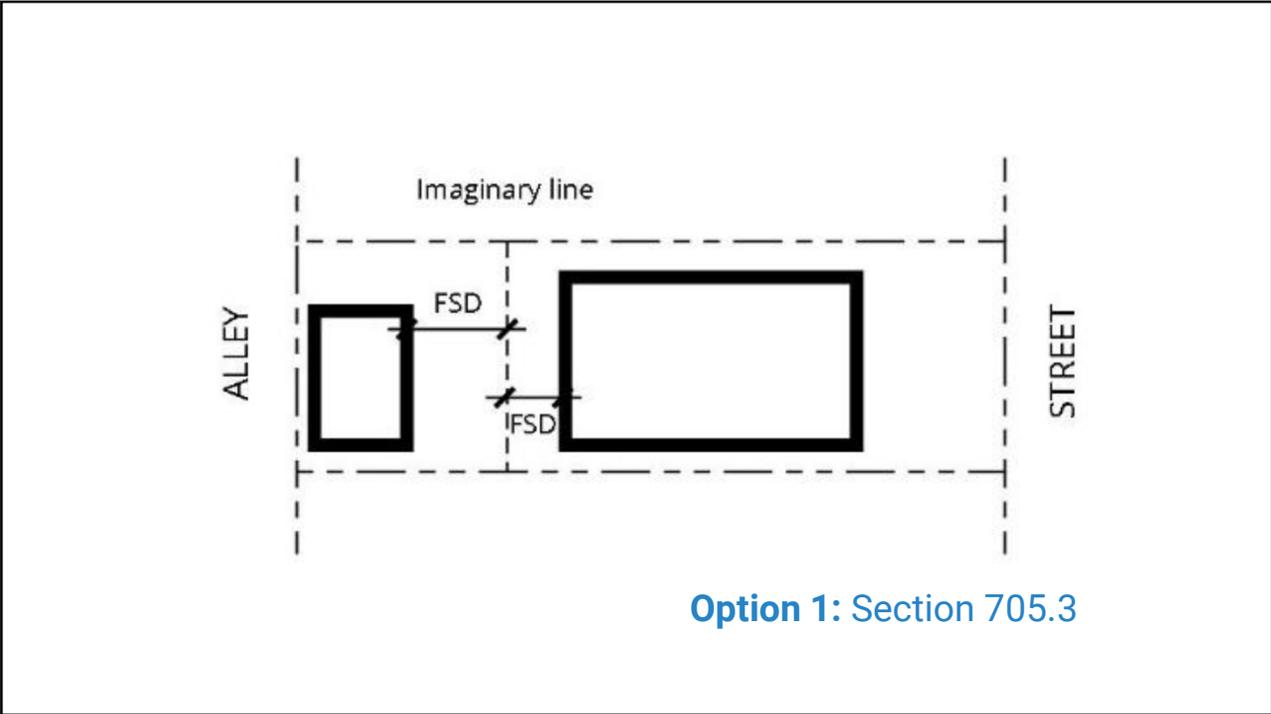
231



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Easements

- Legal right to use another’s land for a specified purpose, either temporarily or permanently
- Easements may be used for fire separation distance or to establish yards for natural light and ventilation
- Easements must be permanent, shown on survey, and verified through ACAR process



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Exterior Wall Requirements

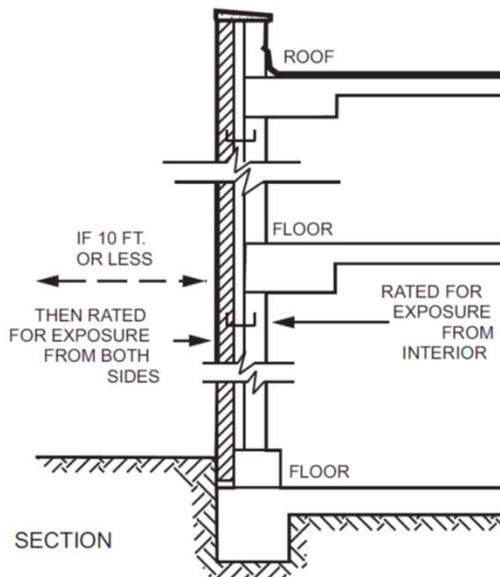
- Materials
- Fire-resistance Rating
- Opening Protectives
- Ducts and Air Transfer Openings
- Parapets
- Joints



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Exterior Wall Requirements (continued)

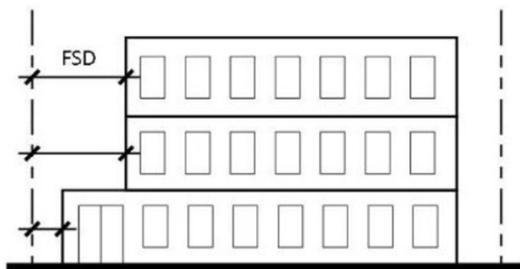
- Fire-resistance rating for nonbearing walls per Table 602 (fire separation distance)
- Fire-resistance rating for bearing walls—stricter of Table 601 (construction type) or 602 (fire separation distance)
- If $FSD \geq 10$ ft, fire-resistance rating required from interior only



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Exterior Wall Requirements (continued)

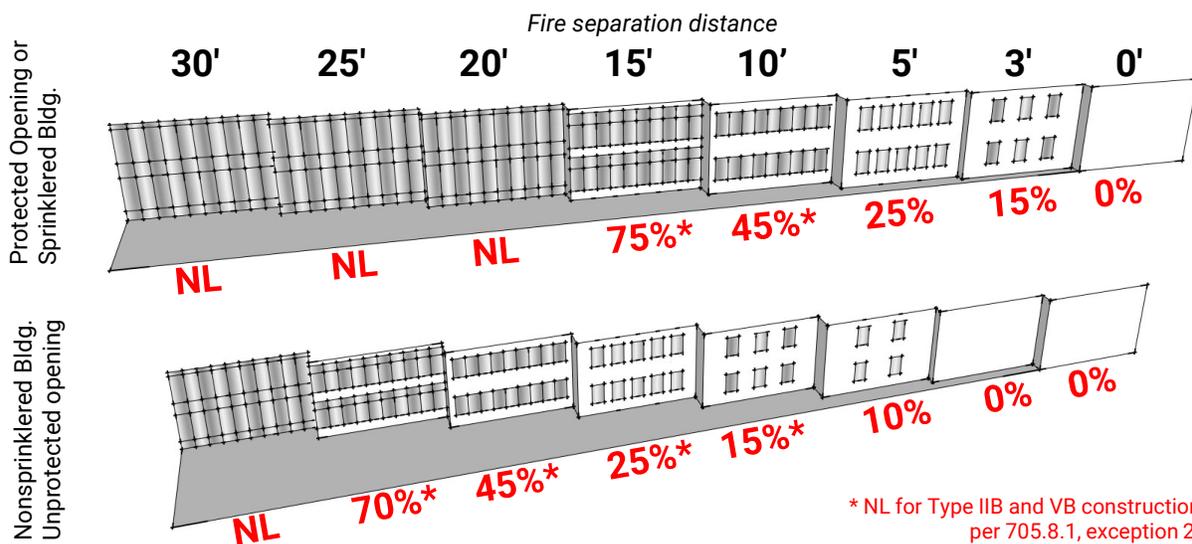
- Area of protected and unprotected openings per Tables 705.8(2) (residential buildings up to 4 stories) and 705.8(1) (all other buildings)
- Requirement is applied to each wall and each story.
- Where both protected and unprotected openings are used, sum of ratios of actual to allowable area must not exceed 1.



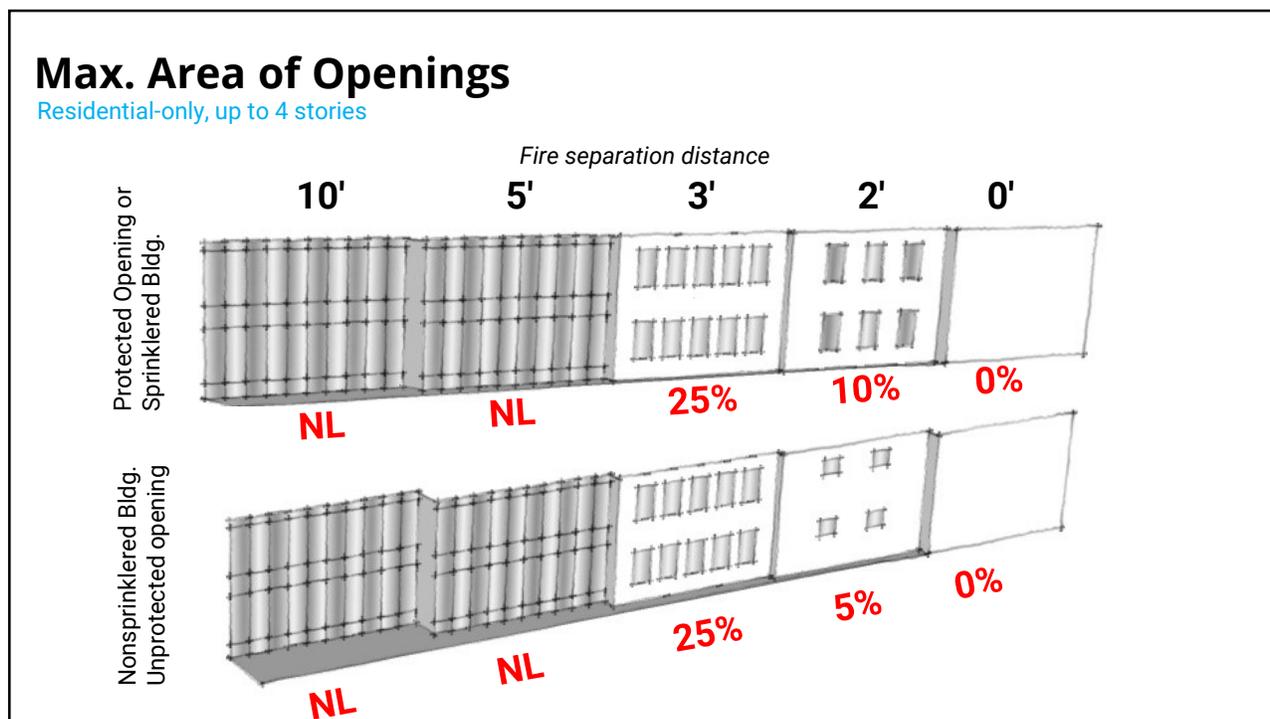
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Max. Area of Openings

NOTE: Different rules for residential buildings up to 4 stories



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Exterior Wall Requirements

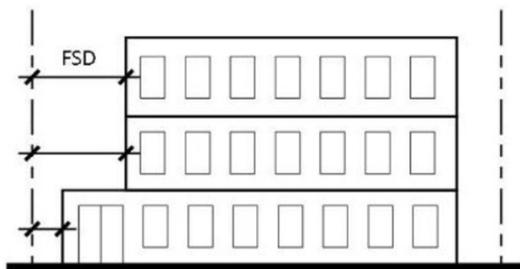
(continued)

- When ducts and air transfer openings penetrate an exterior wall, they must be protected, unless exception applies.
 - Exception for foundation vents, residential kitchen and clothes dryer exhaust.
- 30" parapets are required, unless exception applies.
 - 5 exceptions, including FSD, building type/area, and rated roof construction
- Materials used to protect joints (such as expansion joints) must have a fire-resistance rating, but area doesn't count toward area of openings.

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Exterior Wall Requirements (continued)

- Area of protected and unprotected openings per Tables 705.8(2) (residential buildings up to 4 stories) and 705.8(1) (all other buildings)
- Requirement is applied to each wall and each story.
- Where both protected and unprotected openings are used, sum of ratios of actual to allowable area must not exceed 1.



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Exterior Wall Activity (p. II-24)

- Determine the required fire-resistance rating for each wall of the fully-sprinklered single-story Type IIB department store shown:



	North	East	South	West
Fire separation distance				
Bearing wall				
Nonbearing wall				
Area of Openings				

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ACTIVITY

Exterior Wall Activity (answers)

- Determine the required fire-resistance rating for each wall of the fully-sprinklered single-story Type IIB department store shown:



	North	East	South	West
Fire separation distance	12 FT	8 FT	14 FT	65+ FT
Bearing wall	0/NC	1/NC	0/NC	0/NC
Nonbearing wall	0/NC	1/NC	0/NC	0/NC
Area of openings	UL	25%	UL	UL

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Exterior Wall Projections

- Chicago-specific definitions for “deck,” “porch,” and “exterior balcony”
- Also include: gutters/downspouts, bay windows, cornices
- Check separation distance (24” min.)
- Check materials
 - Table 705.2.1 for any construction type
 - Table 705.2.2 for Type III, IV or V construction
- Check % perimeter coverage



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FOR EXAMPLE



Exterior Wall Projections

**TABLE 705.2.1
PROJECTIONS FROM WALLS OF ANY TYPE OF CONSTRUCTION***

Type of Projection	MATERIAL TYPE	Fire Separation Distance (feet) ^b			
		0 to less than 3	3 to less than 5	5 to less than 10	10 or greater
Cornices, eave overhangs, bay windows, oriel windows and similar decorative projections on <i>buildings</i> not exceeding 40 feet in <i>building height</i>	U	No	Yes	Yes	Yes
	P	Yes	Yes	Yes	Yes
Cornices, eave overhangs, bay windows, oriel windows and similar decorative projections on <i>buildings</i> greater than 40 feet in <i>building height</i>	U	No	No	No	No
	P	No	No	No	Yes
	PNC	Yes	Yes	Yes	Yes
Gutters and downspouts on buildings not exceeding 40 feet in <i>building height</i>	U	No	Yes	Yes	Yes
	UNC	Yes	Yes	Yes	Yes
Gutters and downspouts on buildings greater than 40 feet in <i>building height</i>	U	No	No	No	No
	UNC	Yes	Yes	Yes	Yes
<i>Exterior balconies</i> , each not exceeding 100 square feet in area, on <i>buildings</i> not exceeding 55 feet in <i>building height</i>	U	No	Yes	Yes	Yes
	UNC	Yes	Yes	Yes	Yes
<i>Exterior balconies</i> , each not exceeding 100 square feet in area, on <i>buildings</i> greater than 55 feet in <i>building height</i>	U	No	No	No	No

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FOR EXAMPLE



Exterior Wall Projections

**TABLE 705.2.1
PROJECTIONS FROM WALLS OF ANY TYPE OF CONSTRUCTION***

Type of Projection	MATERIAL TYPE	Fire Separation Distance (feet) ^b			
		0 to less than 3	3 to less than 5	5 to less than 10	10 or greater
Cornices, eave overhangs, bay windows, oriel windows and similar decorative projections on <i>buildings</i> not exceeding 40 feet in <i>building height</i>	U	No	Yes	Yes	Yes
	P	Yes	Yes	Yes	Yes
Cornices, eave overhangs, bay windows, oriel windows and similar decorative projections on <i>buildings</i> greater than 40 feet in <i>building height</i>	U	No	No	No	No
	P	No	No	No	Yes
	PNC	Yes	Yes	Yes	Yes
Gutters and downspouts on buildings not exceeding 40 feet in <i>building height</i>	U	No	Yes	Yes	Yes
	UNC	Yes	Yes	Yes	Yes
Gutters and downspouts on buildings greater than 40 feet in <i>building height</i>	U	No	No	No	No
	UNC	Yes	Yes	Yes	Yes
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	UNC	Yes	Yes	Yes	Yes
<i>Exterior balconies</i> , each not exceeding 100 square feet in area, on <i>buildings</i> greater than 55 feet in <i>building height</i>	U	No	No	No	No

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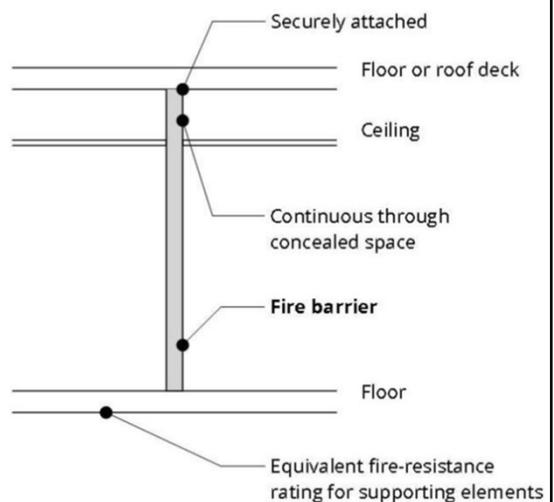
Fire Walls

- Fire walls divide a single structure into multiple buildings
- Protected openings in fire walls are limited
- Protected openings in fire walls on a property line (party walls) are extremely limited
- Combustible members framing into fire walls must be surrounded by 4" of noncombustible material
- CBC requires **4-hour rating**, but allows horizontal transfer with 4-hour supporting structure below

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Fire Barriers

- Fire barriers must begin at the floor and extend to the floor or roof deck above.
- Where there is a concealed space above a ceiling (including a ceiling that is part of a rated floor-ceiling assembly), the fire barrier must continue through the above-ceiling space.
- In combustible construction, fireblocking must be installed at every floor level if the fire barrier contains hollow vertical spaces.
- All construction supporting a fire barrier must have a fire-resistance rating at least equal to that required for the fire barrier.



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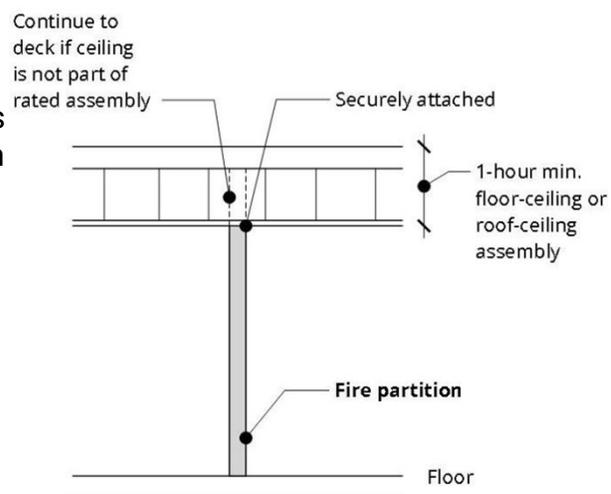
Fire Barriers (continued)

- Most fire-resistance-rated walls are required to be fire barriers:
 - Mixed-occupancy separations (Sec. 508.4)
 - Incidental use separations (Sec. 509)
 - Fire area separations (Ch. 9; Table 707.3.10)
 - Exit enclosures (Sec. 707.3.3, 1023.2)
- Hourly rating based on purpose.
- If multi-purpose, highest requirement.

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Fire Partitions

- Fire partitions may be used to separate apartments or guest rooms in an apartment building or hotel. Fire partitions may also be used to separate a corridor from adjacent areas of the building in some occupancies.
- Minimum 1-hour fire-resistance rated construction.
- Must extend from the floor assembly to either the floor or roof sheathing above or to a fire-resistance-rated floor/ceiling or roof/ceiling assembly.



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Smoke Barriers

- Smoke barriers are occasionally required by the code to resist the passage of smoke from one area to another. Smoke barriers will almost always also be required to have a 1-hour rating.
- In most cases, a smoke barrier is an enhanced form of fire barrier.
- Smoke barriers are required for:
 - Underground buildings (Sec. 405)
 - Group I-1, Condition 2
 - Groups I-2 and I-3
 - Ambulatory care facilities
 - Areas of refuge for accessible means of egress

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Structural Members and Bearing Walls

- Fire-resistance rating may be required for:
 - Primary structural frame
 - Bearing walls
 - Structural members supporting fire-resistance-rated horizontal assemblies
- Fire-resistance design for structural members and interior bearing walls (not required as part of another fire-resistance rated assembly) does not require opening, joint, or penetration protection.



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FOR EXAMPLE



Structural Members and Bearing Walls— Example

- Type IIA construction requires 1-hour horizontal assemblies for floors and roofs as well as for the primary structural frame and bearing walls.
- If a two-story Type IIA building includes a horizontal exit on the second story, and the fire barrier does not extend to the first story, a 2-hour fire-resistance-rated floor is required by Section 1026.2.
- The primary structural frame and/or bearing wall structure supporting this floor must also have a 2-hour fire-resistance rating per Section 704.1.

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Vertical Openings and Shaft Enclosures

- Vertical openings connecting 2 or more stories must be enclosed with fire-resistance rated construction or comply with one of the special provisions in Sec. 712.
- Shaft enclosures must have a 1-hour rating, or 2-hour rating if connecting more than 3 stories.



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Vertical Openings and Shaft Enclosures

- Vertical openings connecting 2 or more stories must be enclosed with fire-resistance rated construction or comply with one of the special provisions in Sec. 712.
- Shaft enclosures must have a 1-hour rating, or 2-hour rating if connecting more than 3 stories.
- 1-hour shaft allowed to enclose noncombustible pipes, conduit, or iron, steel or aluminum ducts with floor penetration up to 9 ft²/story, any number of stories

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Basement Construction

- Basements that exceed maximum areas must be subdivided with fire barriers into 40,000 ft² (80,000 ft² in fully-sprinklered building.)
- Basements with a floor level more than 60' below the lowest level of exit discharge must be subdivided into smoke compartments.
- In Type III or V buildings with 3 or more stories above grade, basement columns and bearing walls must be NC or HT.
- Buildings with multiple basements require Type IA construction below first story above grade.
- Floor construction over basements must have a min. 1-hour fire resistance rating (exception for R-5). (605.4)

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Floor Construction

- Rated floor/ceiling assemblies must meet the strictest rating required by:
 - Construction type
 - Occupancy separation
 - Fire area separation
 - Incidental use separation
- Exception for bottom membrane of floor/ceiling assembly over unusable space.
- All construction supporting floor/ceiling assembly must have same minimum rating.

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Roof Construction

- Roofs must have required fire-resistance rating.
 - No rating required for Type IIB, IIIB, or VB construction
 - Residential buildings ≤ 4 stories may be 30 min. ([Table 601, note h](#))
- Roofs must have required fire-resistance rating.
- Exception for top membrane of floor/ceiling assembly below unusable attic space.
- Roof assemblies must be continuous.
 - Skylights allowed. ([711.3.2](#))

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Penetration Protection

- Protection required when pipes, conduit, ducts, etc. penetrate a fire-resistance rated assembly.
- Different rules for horizontal and vertical assemblies.
- Different rules for membrane penetrations and through penetrations.
- Different rules for air transfer openings.
- Helpful chart on p. II-86 of *Manual*.
- **Penetrations of exit enclosures limited to essential openings!**

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KEY CONCEPT



- Exterior Walls
- Exterior Wall Projections
- Fire Walls
- Fire Barriers
- Fire Partitions
- Smoke Barriers
- Structural Members and Bearing Walls
- Vertical Openings and Shaft Enclosures
- Basement Construction
- Floor Construction
- Roof Construction
- Penetration Protection

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CODE BOOK



For More Information . . .

Chicago Building Code

- **705, Ch. 14** Exterior Walls
- **705.2** Exterior Wall Projections
- **706** Fire Walls
- **707** Fire Barriers
- **708** Fire Partitions
- **709** Smoke Barriers
- **704** Structural Members and Bearing Walls
- **712, 713** Vertical Openings and Shaft Enclosures
- **605, 711** Basement Construction
- **711** Floor Construction
- **711, Ch. 15** Roof Construction
- **714, 715, 717** Penetration Protection

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REFERENCE



For More Information . . .

Chicago Plan Review Manual

- **4.1** Exterior Walls (also **6.1**)
- **4.2** Exterior Wall Projections
- **4.3** Fire Walls
- **4.4** Fire Barriers
- **4.5** Fire Partitions
- **4.6** Smoke Barriers
- **4.7** Structural Members and Bearing Walls
- **4.8** Vertical Openings and Shaft Enclosures
- **4.9** Basement Construction
- **4.10** Floor Construction
- **4.11** Roof Construction (also **6.2**)
- **4.12** Penetration Protection

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