



9B20 Ver. 2/1/2020

Based on the 2020 BCNYS and 2020 FCNYS

APPENDIX

Student Exercises and Supplemental Material

Fire Safe Design

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Appendix

Occupancy Classification Exercise

Using Chapter 3 of the Building Code list the appropriate occupancy designation

What is the Occupancy?

- Cell phone tower _____
- Hotel (transient) _____
- Movie theater _____
- Elementary school _____
- Mental hospital _____
- College basketball arena _____
- Building department offices _____
- Clothing store _____
- Explosives manufacturing plant _____
- Café seating 65 people _____
- Infant day care center with 15 children _____
- Masonry block manufacturing plant _____

Appendix

Occupancy Classification Exercise

Using Chapter 3 of the Building Code list the appropriate occupancy designation

Motor Vehicle Related Occupancies

What is the Occupancy?

Public parking garage _____

Automobile showroom _____

Repair garage _____

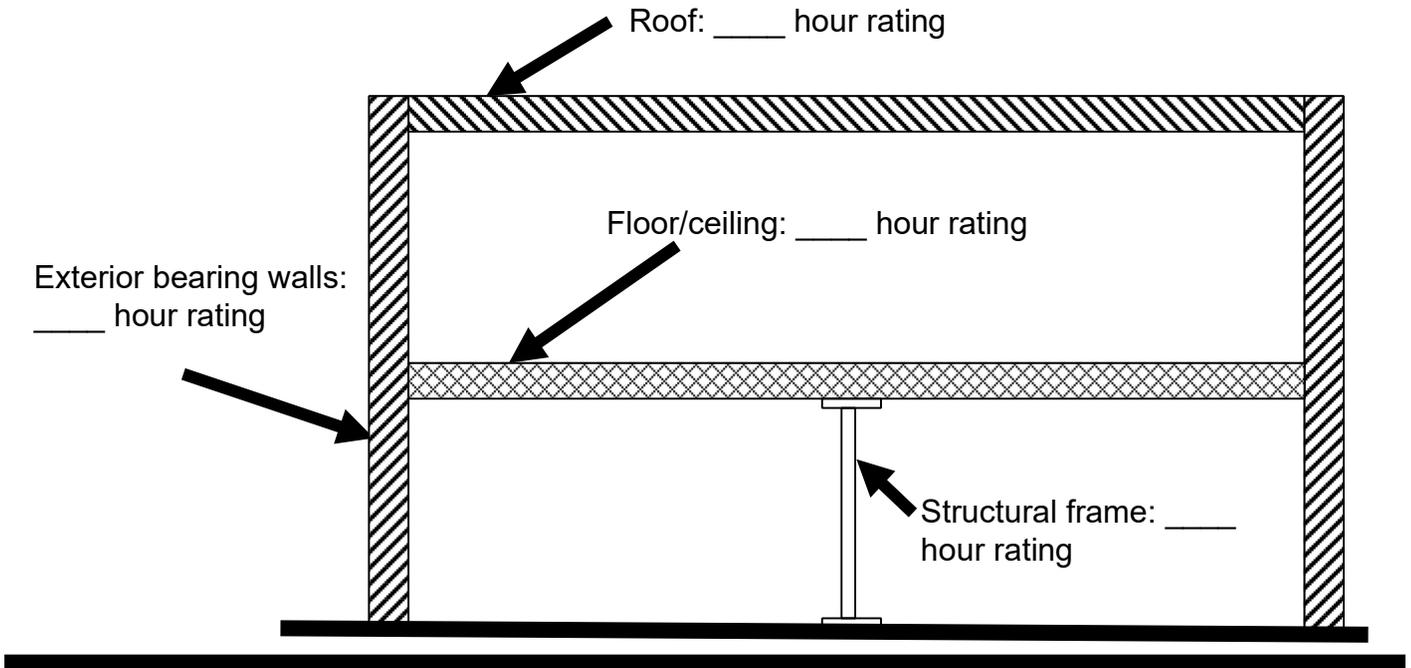
Car factory _____

Motor fuel dispensing station _____

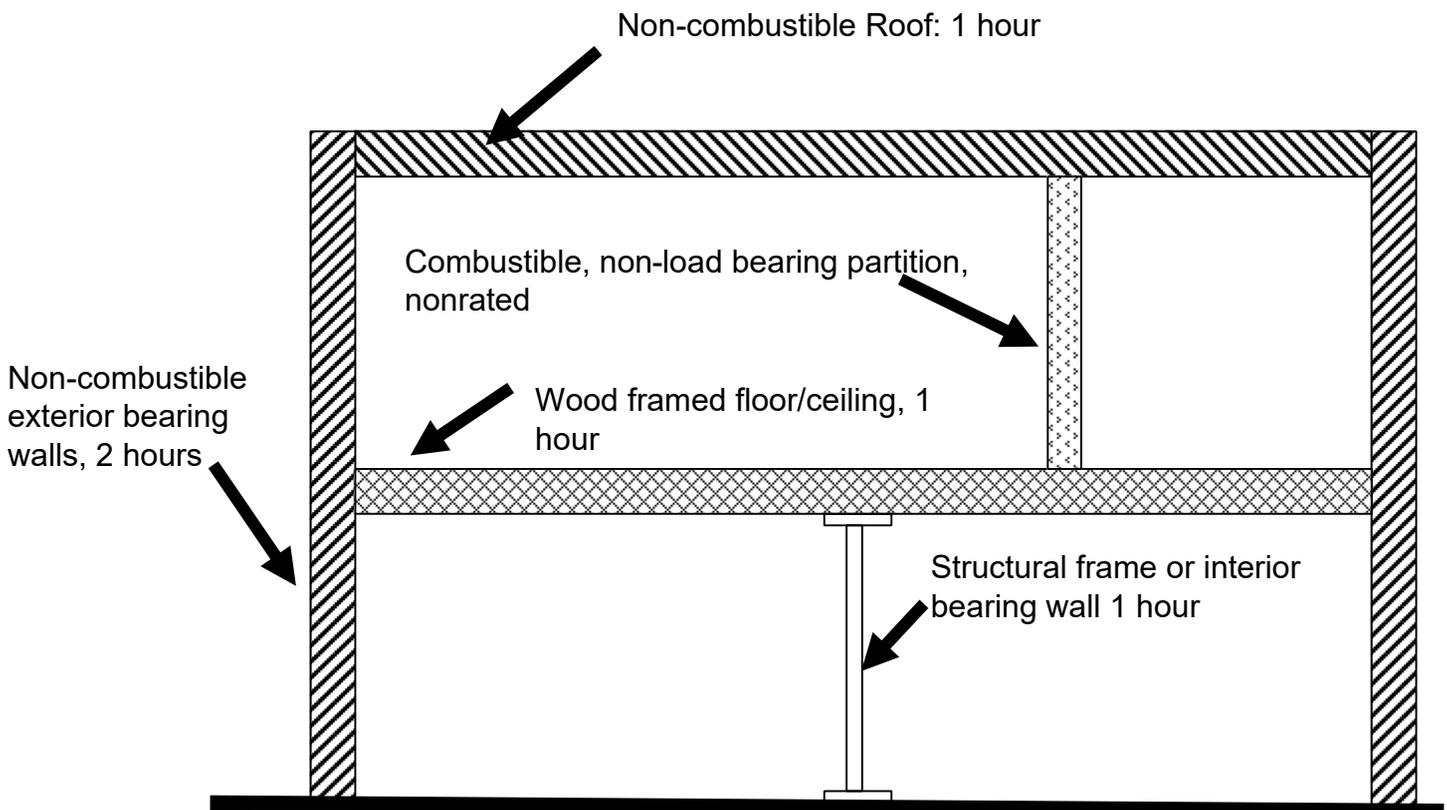
Appendix

Type of Construction Exercise

Exercise #1. This building is proposed to be Type II-B, Non-combustible. What are the minimum fire-resistive ratings for the building elements?



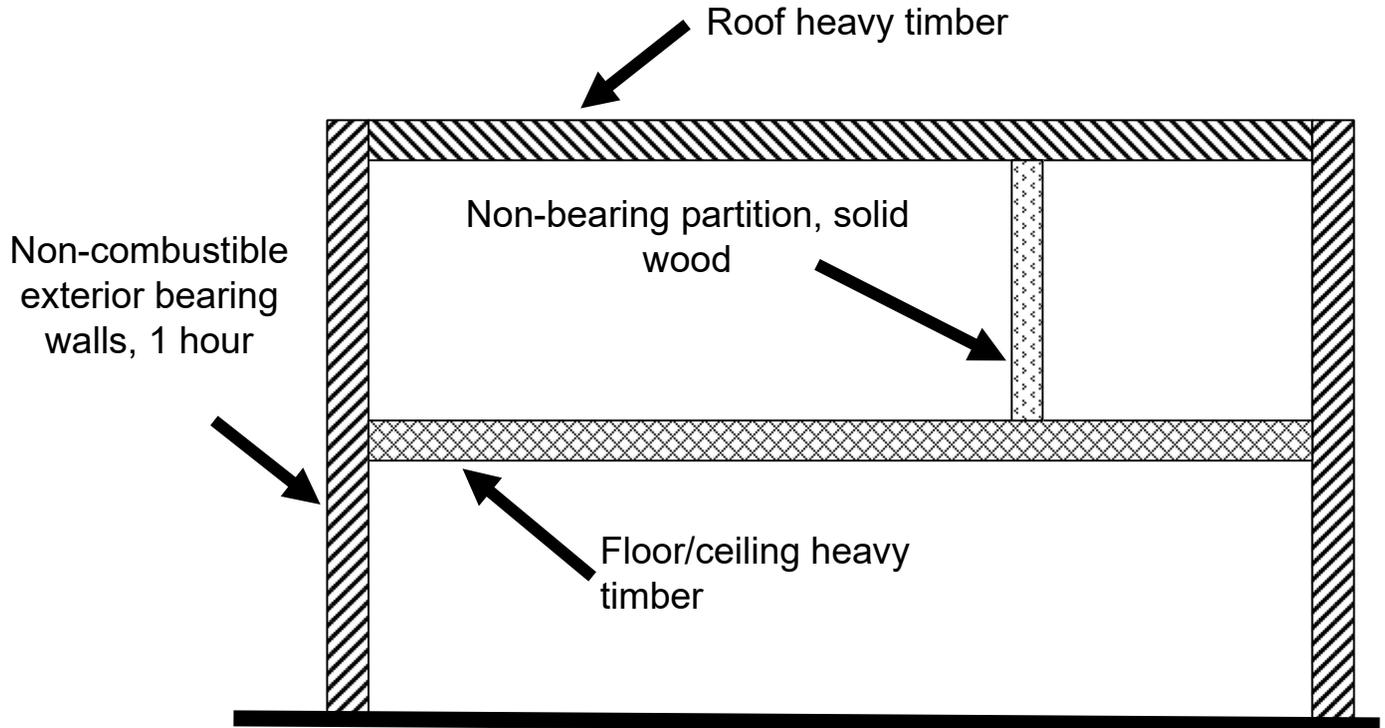
Exercise #2. Does this building satisfy Type III-A Construction requirements?



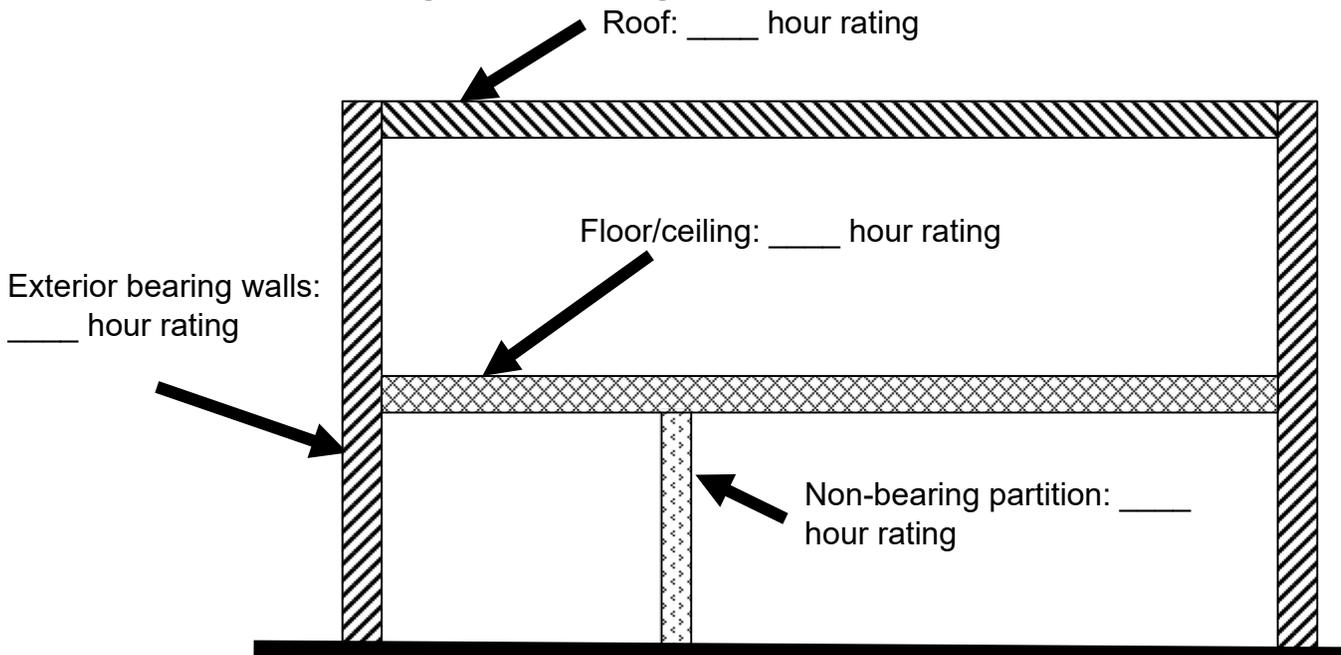
Appendix

Type of Construction Exercise

Exercise #3. Does this building satisfy Type IV Construction requirements?



Exercise #4. This building is proposed to be Type I-A, Non-combustible. What are the minimum fire-resistive ratings for the building elements?



Appendix

Building Story, Height and Area Exercise Using Tables 504.3 Height in Feet, 504.4 Height in Stories, and 506.2 Allowable Area Factor.

Occupancy Group	Type of Construction	Height in Feet	Height in Stories	Other details	Allowable Area
Department store	Noncombustible elements, no additional fire resistance			Sprinklered	2 Story
Sleepy Time Motel transient	Masonry exterior walls, 2 hour rated, and unrated wood frame interior			Nonsprinklered	1 Story
Bob's Bar and Grill	Log Cabin			Sprinklered	2 Story
Veterinary Hospital	Wood frame, no fire resistance rating			Nonsprinkler	3 Story <i>Appendix - 6</i>

Exercise 1:

M Occupancy of Type IIIB construction
Three stories - Fully Sprinklered

Is this correct? Do these Two numbers verify?

$$A_a = A_t + (NS \times I_f)$$


$$A_a = 37,500 + (18,500 \times I_f)$$

Exercise 2:

B Occupancy of Type VB construction
Four stories - Fully Sprinklered

Is this correct? Do these Two numbers verify?

$$A_a = A_t + (NS \times I_f)$$


$$A_a = 27,500 + (9,000 \times I_f)$$

Exercise 3:

R-2 Occupancy of Type VB construction
two stories - NFPA 13-R Sprinkler

Is this correct? Do these Two numbers verify?

$$A_a = A_t + (NS \times I_f)$$



$$A_a = 7,000 + (7,000 \times I_f)$$

Exercise 4:

E Occupancy of Type IIB construction
One story - partially Sprinklered

Is this correct? Do these Two numbers verify?

$$A_a = A_t + (NS \times I_f)$$



$$A_a = 58,000 + (14,500 \times I_f)$$

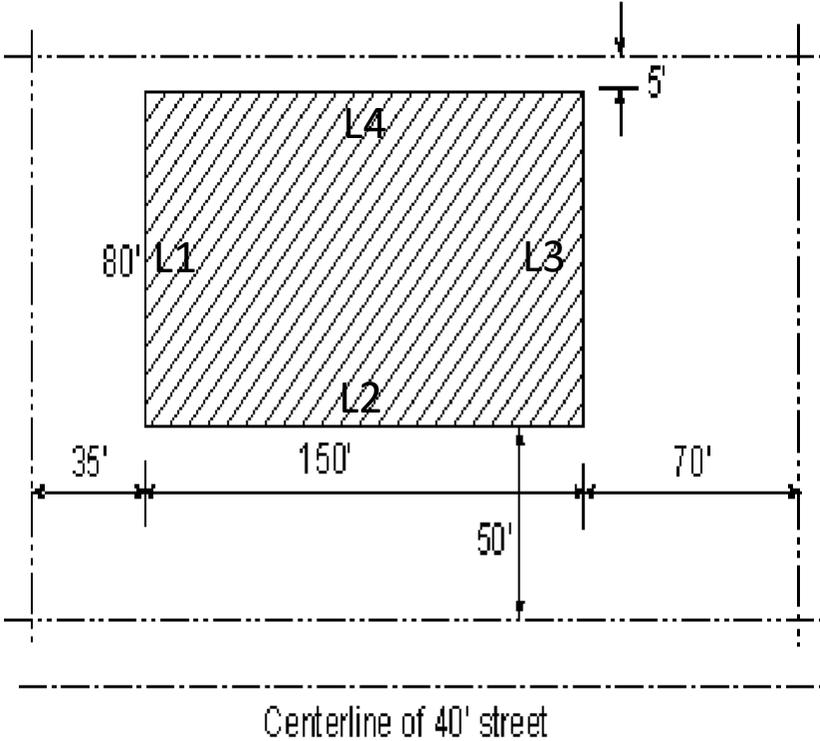
Exercise 5:

Is this correct? Do these Two numbers verify?

$$I_f = \left[\frac{F}{P} - 0.25 \right] \times \frac{W}{30}$$

↓

$$I_f = \frac{395}{480} - 0.25 \times \frac{W}{30}$$



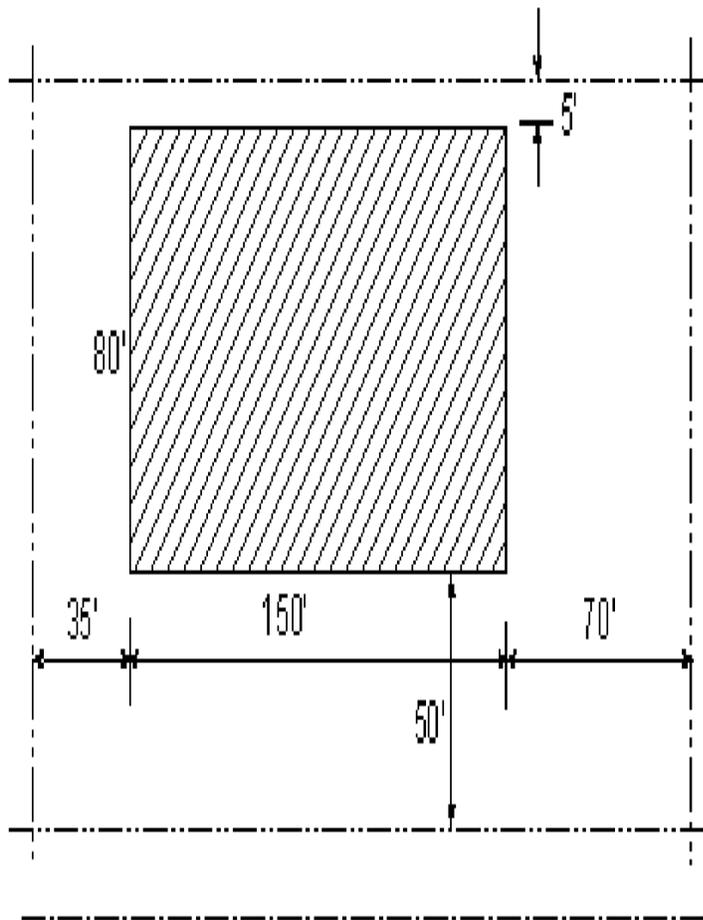
Exercise 6:

Does this verify? Compare all the Numbers?

$$W = \frac{(L_1 \times W_1) + (L_2 \times W_2) + (L_3 \times W_3)}{F}$$



$$W = \frac{(80 \times 30) + (150 \times 30) + (80 \times 30)}{80 + 150 + 80}$$



Centerline of 40' street

Appendix

Exercise - Uses and Separations:

Proposed: Type II-B Construction, No Sprinkler

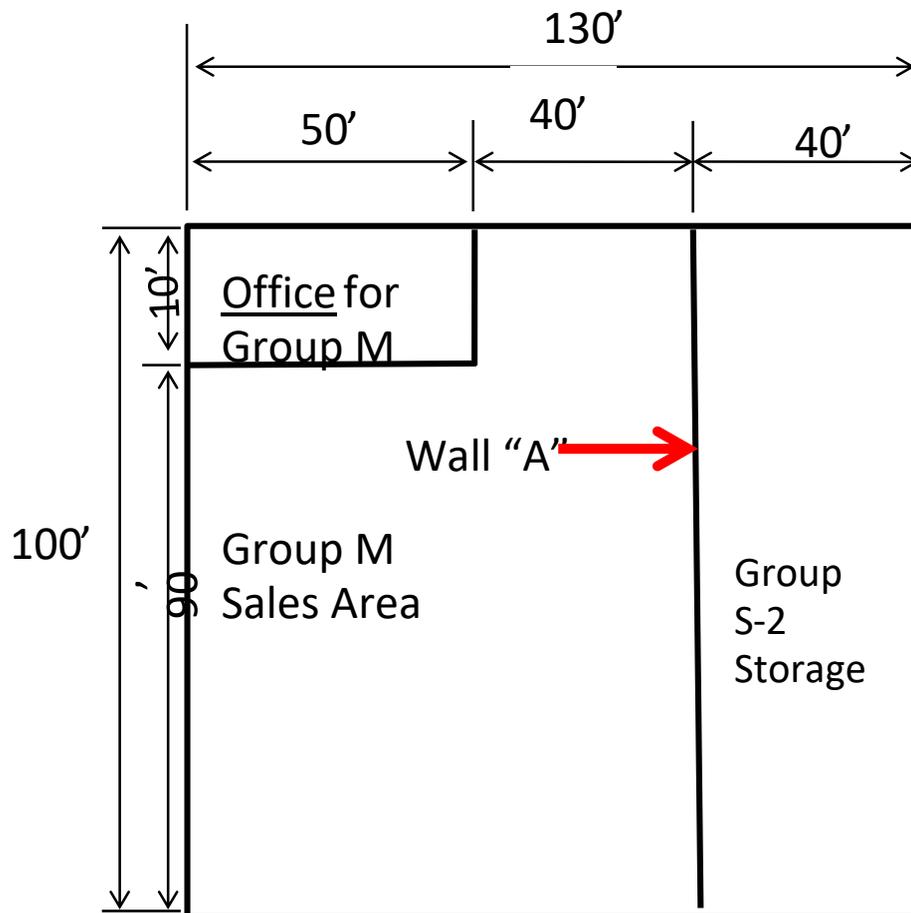
First step: is to calculate the sizes of each separate use.

Second step: is to determine which use(s) qualifies as an "Accessory" Use (Section 508.2)?

Third step: is to determine which uses are considered a mixed use.

Fourth step: is to determine which type of separation is required between the mixed use(s). The choices are:

- Non rated wall
- Fire Partition
- Fire Barrier



Answer questions on next page using this diagram

Exercise - Uses and Separations

Answer questions using diagram on previous page.

Question (1) Can Wall "A" be non-rated?

Question (2) IF the proposal is a SEPARATED MIXED USE can the wall be a Fire Partition?

Question (3) IF the proposal is a SEPARATED MIXED USE can the wall be a Fire Barrier?

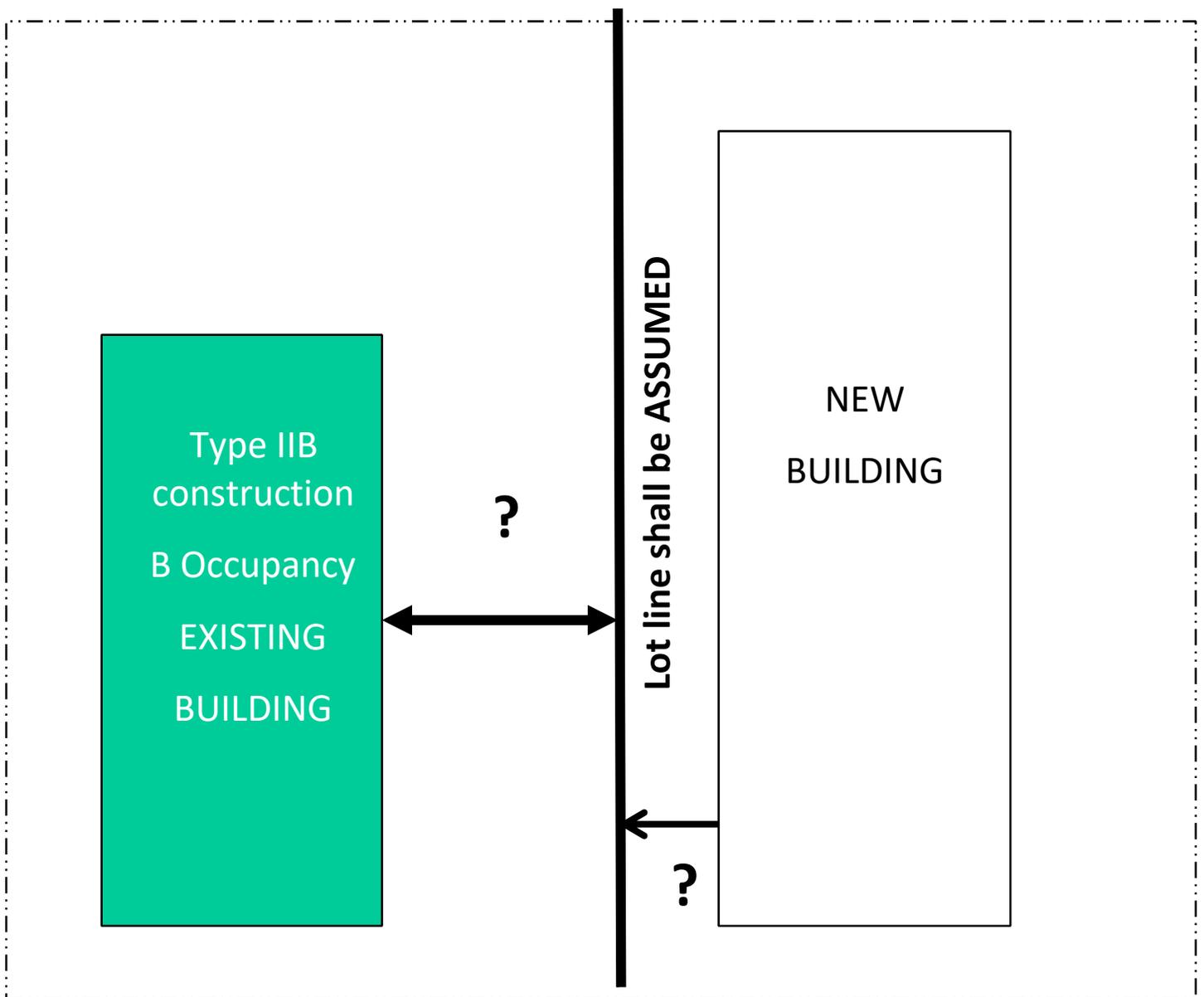
Appendix

Fire Separation Distance

705.3 Buildings on the Same Lot

Using table 602 determine the following:

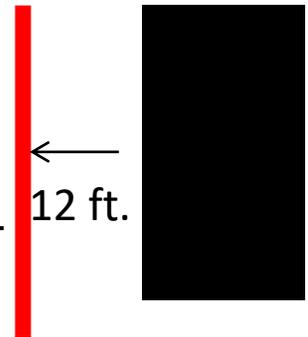
- 1) Distance from the EXISTING building to the imaginary line
- 2) Distance from the NEW building to the imaginary line.



Appendix

Allowable Area of Opening Exercise

- Exterior wall 12' from interior property line
- Protected/unprotected openings as shown
- Determine if the areas of unprotected openings are permitted



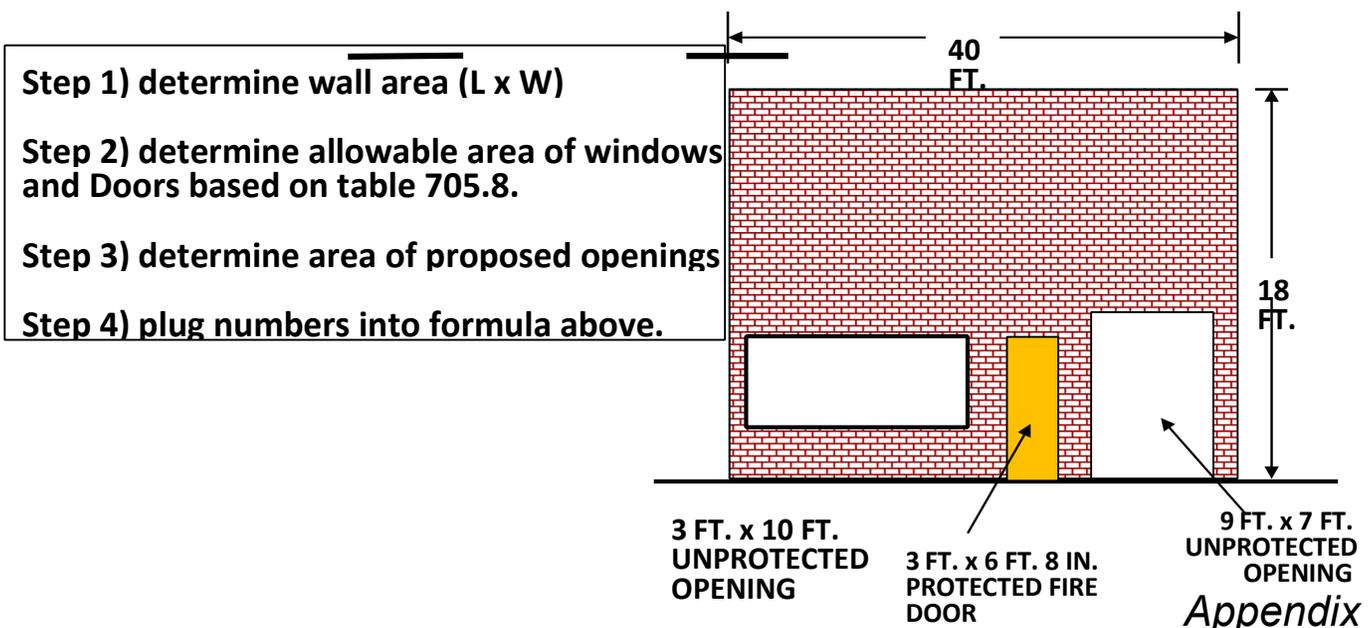
A_p = proposed protected openings

a_p = allowable protected openings base on the table

A_u = proposed un-protected openings

a_u = allowable un-protected openings base on the table

$$\frac{A_p}{a_p} + \frac{A_u}{a_u} < 1$$



Appendix

Fire-resistance Rated Assemblies

1. Find at least 10 situations where the Code requires a FIRE BARRIER.

- 1) _____
- 2) _____
- 3) _____
- 4) _____
- 5) _____
- 6) _____
- 7) _____
- 8) _____
- 9) _____
- 10) _____

2. What are the non-sprinklered and sprinklered hourly values between Groups H-3 and I-3 in a Type III-A building, per Table 508.4?

- A) _____
- B) _____

3. What are the non-sprinklered and sprinklered hourly values between fire areas within Group M in a Type V-B building, per Table 508.4?

- A) _____
- B) _____

Appendix

Sprinkler Systems: Where Required. Please list answers in the space provided

For the following examples, indicate that a sprinkler is required or not required for new construction. Indicate where the sprinklers must be installed and cite the appropriate code section.

1. Single story, office building, 30,000 SF in area.

Occupancy classification: _____
Required or Not-required: _____
Where in the building: _____
Code citation: _____

2. A restaurant occupies the third story of an office building.

Occupancy classification: _____
Required or Not-required: _____
Where in the building: _____
Code citation: _____

3. A single story motel.

Occupancy classification: _____
Required or Not-required: _____
Where in the building: _____
Code citation: _____

4. A Woodworking Factory, 10,000 SF at grade.

Occupancy classification: _____ Required or Not-
required: _____
Where in the building: _____
Code citation: _____

5. A semi-conductor manufacturing facility using HPM (Hazardous production materials).

Occupancy classification: _____
Required or Not-required: _____
Where in the building: _____
Code citation: _____

6. A four story department store.

Occupancy classification: _____
Required or Not-required: _____
Where in the building: _____
Code citation: _____

Appendix

Extra Credit: A 10 story office building design for 100 people on each story.

Occupancy classification: _____

Required or Not-required: _____

Where in the building: _____

Code citation: _____

Standpipe System: Where Required

If this Agency Building was constructed today, would a Standpipe system be required?

If so, what are the important details? Please list in the space below.

Alarm and Detection: Where Required

In a GROUP F occupancy:

- When is a system required? _____
- What type of system is required? _____

In a GROUP R-1 Occupancy:

- When is a system required? _____
- What type of system is required? _____

In a GROUP R-2 Occupancy – Student Housing

- When is a system required? _____
- What type of system is required? _____
- Where is it required? _____

Appendix

Student Research

Fire Apparatus Access Road (FAAR)

Using 503, find the specifications for:

Minimum width

Vertical clearance

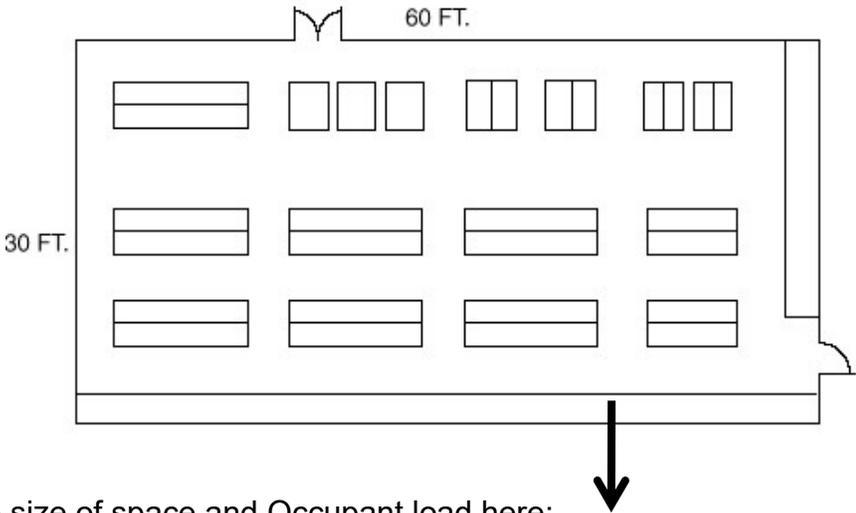
Surface characteristics

Turning radius

Dead ends

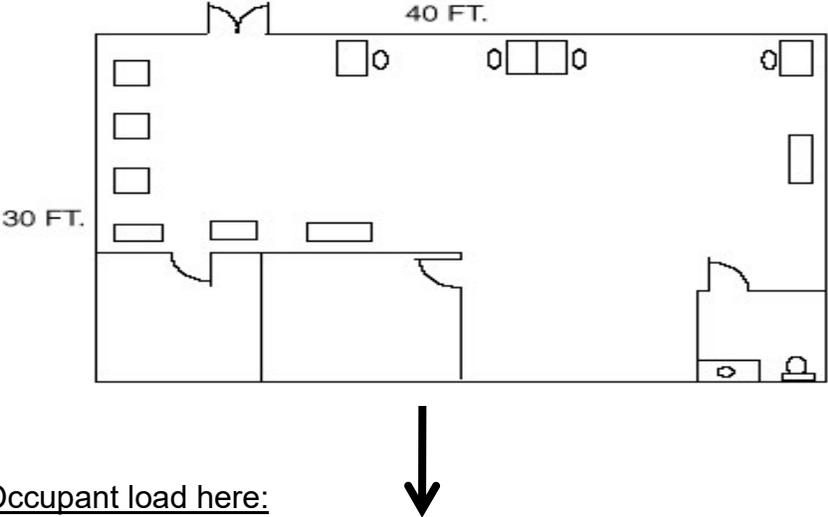
Appendix

Egress: Design Occupant Load Retail sales/mercantile



Calculate size of space and Occupant load here:

Office occupancy



Calculate size of space and Occupant load here:

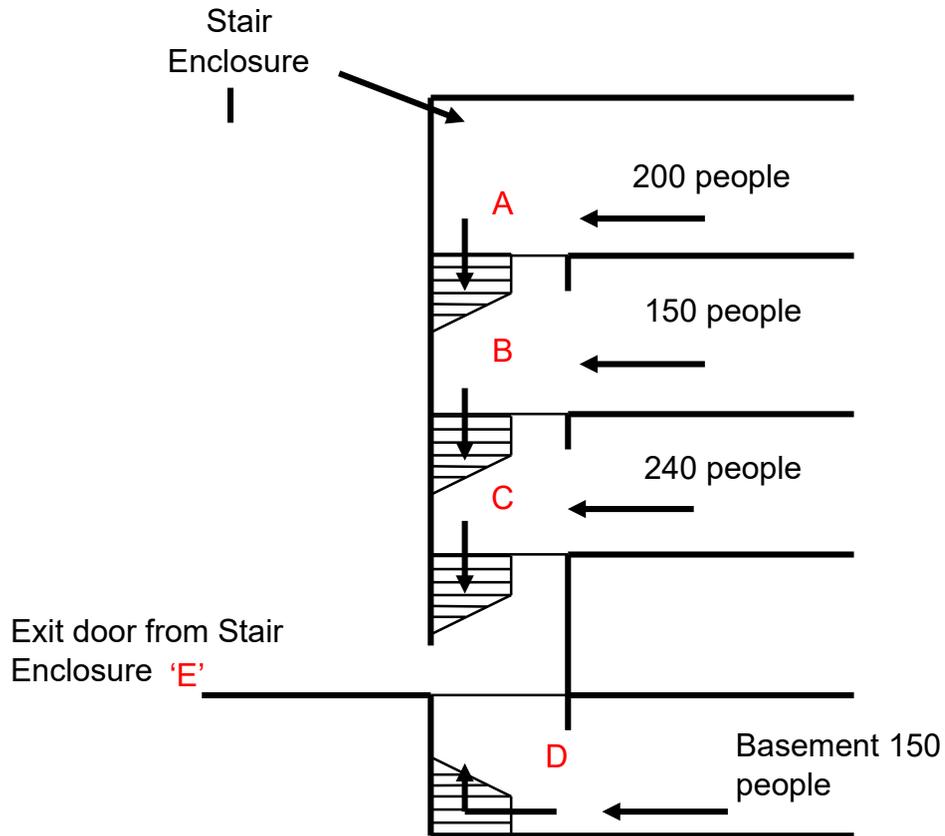
Appendix

Egress: Multiple Levels and Convergence

GIVEN:

- 4 Story, Non-sprinklered Office Building
- Occupants from each level into 44" stair enclosure as indicated
- First floor has independent exit without entering stair enclosure

Complete the information on the Table below



Exit Element	Occupant Load Served	Required Width
Stair at 'A'		
Stair at 'B'		
Stair at 'C'		
Stair at 'D'		
Door at 'E'		

Appendix

Find and list the Requirements for Ramps

- Maximum Slope
- Maximum Rise
- Minimum Width
- Minimum Headroom
- Minimum Dimensions for Landings

Where are Exit Signs required?

- ALL doors shown are required access or exit doors.
- Indicate on the drawing below where the exit signs should be placed.

