

Plan Review
for Mixed Use Design

Also known as
"Building With MUD"

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Instructor #728

Class Approved for
3 Hours Plan Review

Approval #CP-21-00108

Course Objectives

- To identify when buildings have Mixed Occupancies.
- To learn the different options for mixed occupancies.
- To identify the requirements of other parts of the code on the Mixed Occupancy buildings.
- To learn the application of the Mixed Occupancy options on a multi-story building.

What is Mixed Use?

- **SECTION 302.1** STRUCTURES WITH MULTIPLE OCCUPANCIES OR USES SHALL COMPLY WITH SECTION 508.

What is Mixed Use?

- **508.1 GENERAL.** WHERE A BUILDING CONTAINS MORE THAN ONE OCCUPANCY GROUP, THE BUILDING OR PORTION THEREOF SHALL COMPLY WITH THE APPLICABLE PROVISIONS OF SECTION 508.2, 508.3 OR 508.4, OR A COMBINATION OF THESE SECTIONS.

What are the Options?

- Separate Buildings
- Section 508.2 – Accessory Occupancies
- Section 508.3 – Nonseparated Occupancies
- Section 508.4 – Separated Occupancies
- Section 509. – Incidental Uses
- Section 414.2 -- Control Areas
- Combination of the above

Who's option is it?

- The Building Official?
- The Building Owner?
- The Plan Reviewer?
- The Fire Official?
- The AHJ?

- The Designer chooses the option used.

Occupancy Classifications

■ A – Assembly	■ M – Mercantile
■ B – Business	■ R – Residential
■ E – Education	■ S – Storage
■ F – Factory	■ U – Utility and Miscellaneous
■ H – High-hazard	
■ I – Institutional	

Separate Buildings

- Occupancies are in separate buildings divided by fire walls of the required fire resistance rating or by a separation distance and/or fire resistant exterior walls.
- Table 706.4 (fire wall ratings)
- Table 602 (exterior walls)
 - Imaginary property line for buildings on the same lot.

Table 706.4

**TABLE 706.4
FIRE WALL FIRE-RESISTANCE RATINGS**

GROUP	FIRE-RESISTANCE RATING (hours)
A, B, E, H-4, I, R-1, R-2, U	3 ^a
F-1, H-3 ^b , H-5, M, S-1	3
H-1, H-2	4 ^b
F-2, S-2, R-3, R-4	2

- a. In Type II or V construction, walls shall be permitted to have a 2-hour fire-resistance rating.
 b. For Group H-1, H-2 or H-3 buildings, also see Sections 415.4 and 415.5.

Table 602

**TABLE 602
FIRE-RESISTANCE RATING REQUIREMENTS FOR EXTERIOR WALLS BASED ON FIRE SEPARATION DISTANCE^{a, b, c}**

FIRE SEPARATION DISTANCE = X (feet)	TYPE OF CONSTRUCTION	OCCUPANCY GROUP ^d	OCCUPANCY GROUP F-1, M, S-1 ^e	OCCUPANCY GROUP A, B, E, F-2, I, R, S-2, U ^f
X < 5 ^g	All	3	2	1
5 ≤ X < 10	IA	3	2	1
	Others	2	1	1
10 ≤ X < 30	IA, IB	2	1	1 ^f
	IIB, VB	1	0	0
	Others	1	1	1 ^f
X ≥ 30	All	0	0	0

- For SI: 1 foot = 304.8 mm.
 a. Load-bearing exterior walls shall also comply with the fire-resistance rating requirements of Table 601.
 b. See Section 706.1.1 for party walls.
 c. Open parking garages complying with Section 406 shall not be required to have a fire-resistance rating.
 d. The fire-resistance rating of an exterior wall is determined based upon the fire separation distance of the exterior wall and the story in which the wall is located.
 e. For special requirements for Group H occupancies, see Section 415.6.
 f. For special requirements for Group S aircraft hangars, see Section 412.4.1.
 g. Where Table 705.8 permits nonbearing exterior walls with unlimited area of unprotected openings, the required fire-resistance rating for the exterior walls is 0 hours.
 h. For a building containing only a Group U occupancy private garage or carport, the exterior wall shall not be required to have a fire-resistance rating where the fire separation distance is 5 feet (1523 mm) or greater.

Accessory Occupancies

- Ancillary to the main use.
- Not more than 10% of the main use.
- Not more than permitted by Table 506.2 for a non-sprinklered building.
 - Exception for Small Assembly Uses (< 750 sq. ft)
 - Exception for Assembly Areas to Use Group E.
 - Exception to Religious educational and small assembly uses.
- No Separation required.

Nonseparated Occupancies

- Classify each portion of the building according to use.
- Type of construction based upon most restrictive.
- Apply other provisions of the code based upon the use of the individual space.
- High rise and fire protection requirements apply throughout.
- No fire separations required.
- Design for the worst case.

Separated Occupancies

- Classify each portion separately by use.
- Separate by vertical fire barriers and horizontal assemblies.
- Rating of separations based upon Table 508.4
- Height of each floor must comply with limits of 503.1

“Nonseparated Separated” Occupancies

- Some of the uses do not require fire ratings in order to be considered separated.
- Look at the “groupings” of uses in Table 508.4.
- Look where “N” appears in the table.

Table 508.4

**TABLE 508.4
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)**

OCCUPANCY	A, E		I-1 ^a , I-3, I-4		I-2		R ^a		F-2, S-2 ^b , U		B, F-1, M, S-1		H-1		H-2		H-3, H-4		H-5	
	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS
A, E	N	N	1	2	2	NP	1	2	N	1	1	2	NP	NP	3	4	2	3	2	NP
I-1 ^a , I-3, I-4	---	---	N	N	2	NP	1	NP	1	2	1	2	NP	NP	3	NP	2	NP	2	NP
I-2	---	---	---	---	N	N	2	NP	2	NP	2	NP	NP	NP	3	NP	2	NP	2	NP
R ^a	---	---	---	---	---	---	N	N	1 ^c	2 ^c	1	2	NP	NP	3	NP	2	NP	2	NP
F-2, S-2 ^b , U	---	---	---	---	---	---	---	---	N	N	1	2	NP	NP	3	4	2	3	2	NP
B, F-1, M, S-1	---	---	---	---	---	---	---	---	---	---	N	N	NP	NP	2	3	1	2	1	NP
H-1	---	---	---	---	---	---	---	---	---	---	N	NP	NP	NP	NP	NP	NP	NP	NP	NP
H-2	---	---	---	---	---	---	---	---	---	---	---	---	N	NP	1	NP	1	NP	1	NP
H-3, H-4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1 ^d	NP	1	NP	1
H-5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N	NP

S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
 NS = Buildings not equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
 N = No separation requirement.
 NP = Not permitted.
 a. See Section 420.
 b. The required separation from areas used only for private or pleasure vehicles shall be reduced by 1 hour but to not less than 1 hour.
 c. See Section 406.3.4.
 d. Separation is not required between occupancies of the same classification.

Incidental Uses

- Incidental to the main occupancy.
- Not really a different occupancy.
- Table 508.2.5 establishes separation requirements, if any.
 - Required separations are provided by a fire barrier or horizontal assembly.
 - If automatic fire extinguishing system is used the use must be enclosed to prevent the passage of smoke.

Table 509

ROOM OR AREA	SEPARATION AND/OR PROTECTION
Furnace room where any piece of equipment is over 400,000 Btu per hour input	1 hour or provide automatic sprinkler system
Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower	1 hour or provide automatic sprinkler system
Refrigerant machinery room	1 hour or provide automatic sprinkler system
Hydrogen fuel gas rooms, not classified as Group H	1 hour in Group B, F, M, S and U occupancies; 2 hours in Group A, E, I and R occupancies
Incinerator rooms	2 hours and provide automatic sprinkler system
Paint shops, not classified as Group H, located in occupancies other than Group F	2 hours, or 1 hour and provide automatic sprinkler system
In Group E occupancies, laboratories and vocational shops not classified as Group H	1 hour or provide automatic sprinkler system
In Group I-2 occupancies, laboratories not classified as Group H	1 hour and provide automatic sprinkler system
In ambulatory care facilities, laboratories not classified as Group H	1 hour or provide automatic sprinkler system
Laundry rooms over 100 square feet	1 hour or provide automatic sprinkler system
In Group I-2, laundry rooms over 100 square feet	1 hour
Group I-3 cells and Group I-2 patient rooms equipped with padded surfaces	1 hour
In Group I-2, physical plant maintenance shops	1 hour
In ambulatory care facilities or Group I-2 occupancies, waste and linen collection rooms with containers that have an aggregate volume of 10 cubic feet or greater	1 hour
In other than ambulatory care facilities and Group I-2 occupancies, waste and linen collection rooms over 100 square feet	1 hour or provide automatic sprinkler system
In ambulatory care facilities or Group I-2 occupancies, storage rooms greater than 100 square feet	1 hour
Stationary storage battery systems having a liquid electrolyte capacity of more than 50 gallons for flooded lead-acid, nickel cadmium or VRLA, or more than 1,000 pounds for lithium ion and lithium metal polymer used for facility standby power, emergency power or uninterruptible power supplies	1 hour in Group B, F, M, S and U occupancies; 2 hours in Group A, E, I and R occupancies

For SI: 1 square foot = 0.0929 m²; 1 pound per square inch (psi) = 6.895 kPa; 1 British thermal unit (Btu) per hour = 0.293 watt;
 1 horsepower = 746 watt; 1 cubic foot = 0.0283 m³.

Control Areas

- By use of control areas, high hazard uses can exist in mixed use buildings.
- Control area walls are different than separation of incidental use areas.
- The High Hazard Use is classified the same as the adjacent use.

Control Areas Table 414.2.2

[F] TABLE 414.2.2
DESIGN AND NUMBER OF CONTROL AREAS

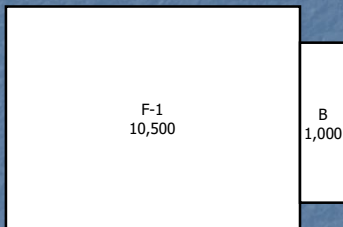
FLOOR LEVEL	PERCENTAGE OF THE MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA ^a	NUMBER OF CONTROL AREAS PER FLOOR	FIRE-RESISTANCE RATING FOR FIRE BARRIERS IN HOURS ^b
Above grade plane	Higher than 9	5	1
	7-9	5	2
	6	12.5	2
	5	12.5	2
	4	12.5	2
	3	50	2
Below grade plane	2	75	3
	1	100	4
	Lower than 2	Not Allowed	Not Allowed

a. Percentages shall be of the maximum allowable quantity per control area shown in Tables 307.1(1) and 307.1(2), with all increases allowed in the notes to those tables.
 b. Separation shall include fire barriers and horizontal assemblies as necessary to provide separation from other portions of the building.

A Combination of Options

- Can use separated occupancies for one portion of a building.
- Can use non-separated occupancies for another portion of the building.
- Can use accessory occupancies where applicable.
- May still have incidental occupancies.
- Can have Control Areas.

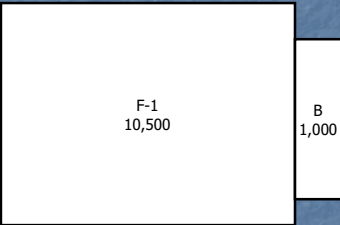
The Factory Question



Accessory Occupancy?

- Is It accessory to the main use?
- Is it less than 10% of the main use?
- Is it less than the allowable area in Table 506.2? (Without increases)

The Factory Question

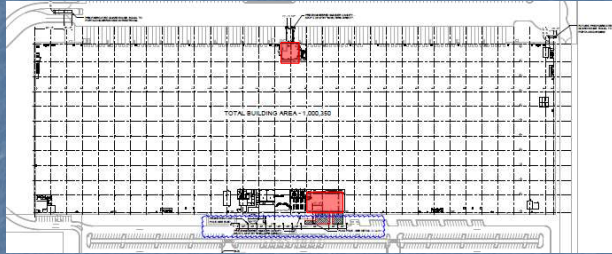


F-1
10,500

B
1,000

It is an Accessory Occupancy
No Separation is Required

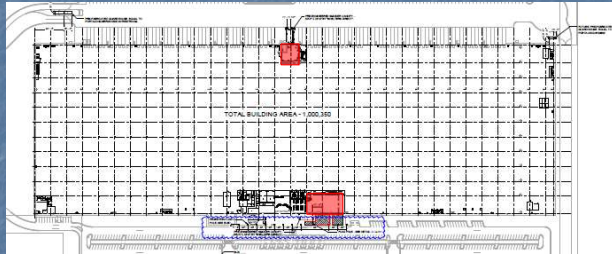
The Factory Question (2)



TOTAL BUILDING AREA = 1,000,350

Is it an Accessory Occupancy

The Factory Question (2)



TOTAL BUILDING AREA = 1,000,350

S-1 Occupancy 1,000,350 s.f.
A-2 Occupancy 13,358 s.f.

Accessory Occupancy?

- Is It accessory to the main use?
- Is it less than 10% of the main use?
- Is it less than the allowable area in Table 506.2? (Without increases)

Accessory Occupancy?

- **508.2.3 Allowable building area.**
Aggregate accessory occupancies shall not occupy more than 10 percent of the floor area of the story in which they are located and shall not exceed the tabular values for nonsprinklered buildings in Table 506.2 for each such accessory occupancy.

The Factory Question (2)

TABLE 506.2*
ALLOWABLE AREA FACTOR (A₁ = NS, S1, S13R, or SM, as applicable) IN SQUARE FEET

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION									
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V		
		A	B	A	B	A	B	HT	A	B	
A-1	NS	UL	UL	15,500	8,500	14,000	8,500	15,000	11,500	5,500	
	S1	UL	UL	62,000	34,000	56,000	34,000	60,000	46,000	22,000	
	SM	UL	UL	46,500	25,500	42,000	25,500	45,000	34,500	16,500	
A-2	NS	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000	
	S1	UL	UL	62,000	38,000	56,000	38,000	60,000	46,000	24,000	
	SM	UL	UL	46,500	28,500	42,000	28,500	45,000	34,500	18,000	
A-3	NS	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000	
	S1	UL	UL	62,000	38,000	56,000	38,000	60,000	46,000	24,000	
	SM	UL	UL	46,500	28,500	42,000	28,500	45,000	34,500	18,000	
A-4	NS	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000	
	S1	UL	UL	62,000	38,000	56,000	38,000	60,000	46,000	24,000	
	SM	UL	UL	46,500	28,500	42,000	28,500	45,000	34,500	18,000	

S-1 Occupancy 1,000,350 s.f.
A-2 Occupancy 13,358 s.f.

The Factory Question (2)

13,358 s.f. of A-2 (or A-3) Occupancy is too big to be an accessory occupancy to any use

Could we just make it an unlimited area building?

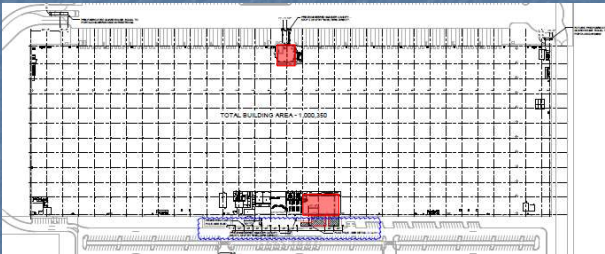
The Factory Question (2)

UNLIMITED AREA BUILDING

507.4.1 Mixed occupancy buildings with Groups A-1 and A-2. Group A-1 and A-2 occupancies of other than Type V construction shall be permitted within mixed occupancy buildings of unlimited area complying with Section 507.4, provided all of the following criteria are met:

1. Group A-1 and A-2 occupancies are separated from other occupancies as required for separated occupancies in Section 508.4.4 with no reduction allowed in the *fire-resistance rating* of the separation based upon the installation of an *automatic sprinkler system*.

The Factory Question (2)

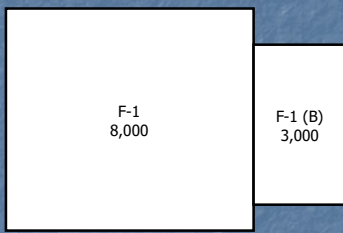


S-1, A-3 Occupancy
1,000,350 s.f. Unlimited Area Building

Nonseparated Occupancy?

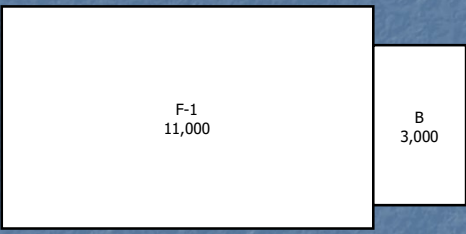
- Classify each portion of the building according to use.
- Type of construction based upon most restrictive.
- Apply other provisions based upon the use of the individual space.
- High rise and fire protection requirements apply throughout.
- No fire separations required.

The Factory Question (3)



No Separation is Required

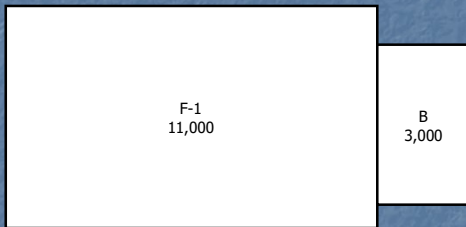
The Factory Question (4)



Nonseparated Occupancy?

- Classify each portion of the building according to use.
- Type of construction based upon most restrictive.
- Apply other provisions based upon the use of the individual space.
- High rise and fire protection requirements apply throughout.
- No fire separations required.

The Factory Question (4)



No separation required for mixed uses but sprinklers needed because of fire area size and Section 903.2.4.

The Factory Question (4)

903.2.4 Group F-1. An automatic sprinkler system shall be provided throughout all buildings containing a Group F-1 occupancy where one of the following conditions exists:

1. A Group F-1 fire area exceeds 12,000 square feet

The Factory Question (4)

■ **FIRE AREA.** The aggregate floor area enclosed and bounded by *fire walls*, *fire barriers*, *exterior walls* or *horizontal assemblies* of a building.

Table 508.4

TABLE 508.4
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)

OCCUPANCY	A, E		I-1, I-3, I-4		I-2		R*		F-2, S-2 ^a , U		B, F-1, M, S-1		H-1		H-2		H-3, H-4		H-5		
	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	
A, E	N	N	1	2	2	NP	1	2	N	1	1	2	NP	NP	3	4	2	3	2	2	NP
I-1, I-3, I-4	—	—	N	N	2	NP	1	NP	1	2	1	2	NP	NP	3	NP	2	NP	2	NP	
I-2	—	—	—	—	N	N	2	NP	2	NP	2	NP	NP	NP	3	NP	2	NP	2	NP	
R*	—	—	—	—	—	—	N	N	1 ^b	2 ^c	1	2	NP	NP	3	NP	2	NP	2	NP	
F-2, S-2 ^a , U	—	—	—	—	—	—	—	—	N	N	1	2	NP	NP	3	4	2	3	2	NP	
B, F-1, M, S-1	—	—	—	—	—	—	—	—	N	N	NP	NP	2	3	1	2	1	NP	NP		
H-1	—	—	—	—	—	—	—	—	—	—	N	NP	NP	NP	NP	NP	NP	NP	NP		
H-2	—	—	—	—	—	—	—	—	—	—	—	—	N	NP	1	NP	1	NP	NP		
H-3, H-4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1 ^d	NP	1	NP	NP		
H-5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	N	NP		

S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
 NS = Buildings not equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
 N = No separation requirement.
 NP = Not permitted.
 a. See Section 420.
 b. The required separation from areas used only for private or pleasure vehicles shall be reduced by 1 hour but to not less than 1 hour.
 c. See Section 406.3.4.
 d. Separation is not required between occupancies of the same classification.

The Factory Question (4)

■ **901.7 Fire areas.** Where buildings, or portions thereof, are divided into *fire areas* so as not to exceed the limits established for requiring a *fire protection system* in accordance with this chapter, such *fire areas* shall be separated by *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both, having a *fire-resistance rating* of not less than that determined in accordance with Section 707.3.10.

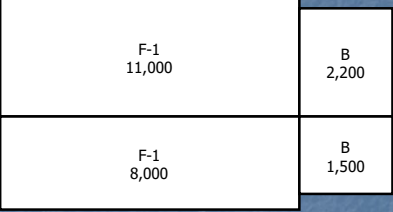
The Factory Question (4)

Use Table 707.3.10 (not Table 508.4) to separate fire areas.

**TABLE 707.3.10
FIRE-RESISTANCE RATING REQUIREMENTS FOR FIRE BARRIER ASSEMBLIES OR HORIZONTAL ASSEMBLIES BETWEEN FIRE AREAS**

OCCUPANCY GROUP	FIRE-RESISTANCE RATING (hours)
H-1, H-2	4
F-1, H-3, S-1	3
A, B, E, F-2, H-4, H-5, I, M, R, S-2	2
U	1

The Factory Question (5)

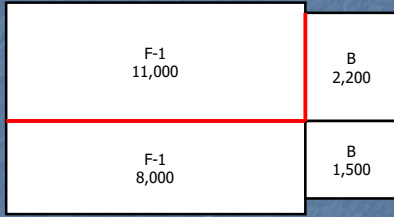


The Factory Question (5)

**TABLE 707.3.10
FIRE-RESISTANCE RATING REQUIREMENTS FOR FIRE BARRIER ASSEMBLIES OR HORIZONTAL ASSEMBLIES BETWEEN FIRE AREAS**

OCCUPANCY GROUP	FIRE-RESISTANCE RATING (hours)
H-1, H-2	4
F-1, H-3, S-1	3
A, B, E, F-2, H-4, H-5, I, M, R, S-2	2
U	1

The Factory Question (5)

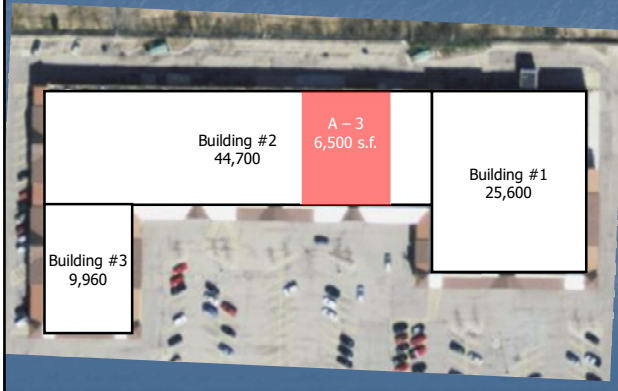


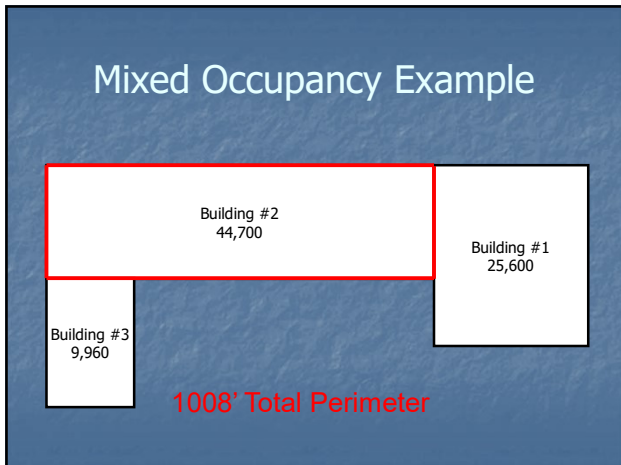
— Three hour fire barrier

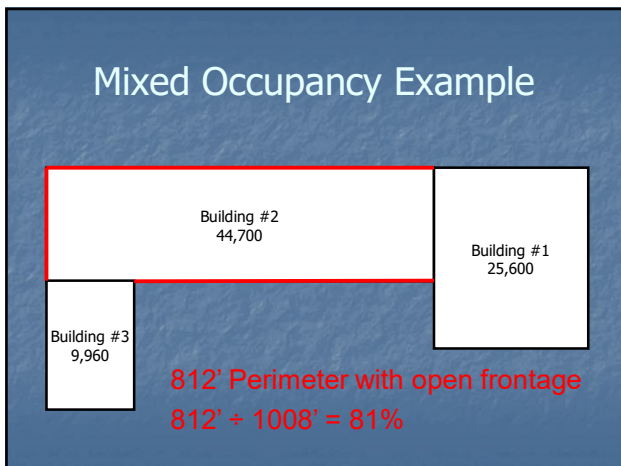
Mixed Occupancy Example



Mixed Occupancy Example

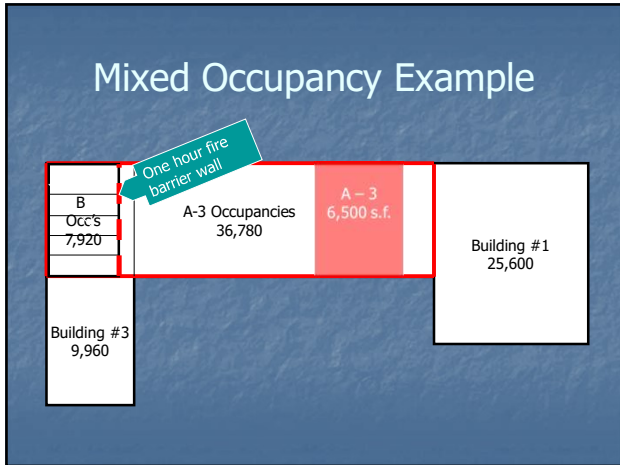






Mixed Occupancy Example

- It is not accessory to the other uses in the center.
- Allowable area for A-3 from table 506.2 is 9,500 square feet.
- $9,500 + (3) 9,500 + (.81-.25) 9,500 = 43,320$
- $44,700 > 43,320$
- The building is too big for nonseparated occupancies.



Mixed Occupancy Example

- In each *story*, the *building area* shall be such that the sum of the ratios of the actual *building area* of each separated occupancy divided by the allowable *building area* of each separated occupancy shall not exceed 1.

Doing the math

Actual A-3	+	Actual B	+	
Allowable A-3		Allowable B		< or = 1

Type IIB Construction				
36,780		7,920		
43,320	+	103,730	+	0.9254

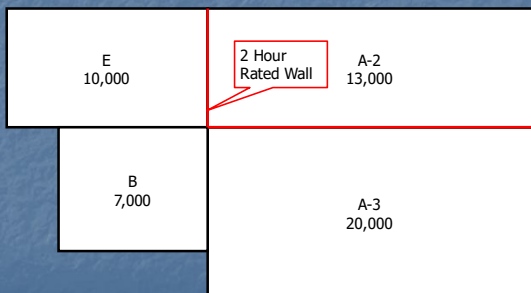
Non-Separated, Separated Occupancies

- Try Non-Separated Mixed Occupancy
 - A-2 Occupancy Will Control
 - Tabular Area = 9,500 Square Feet
 - Max Area = 9,500 x 4.75 = 45,125 sf
 - 50,000 > 45,125
 - Won't work

Non-Separated, Separated Occupancies

- Try Unlimited Area Building
 - One Story = Yes
 - Open Yard on All Sides = Yes
 - Sprinklered = Yes
 - A-2 Occupancy = No Section 507.3
 - Must be Separated per Section 507.3.1
 - No reduction for sprinklers
 - 2 hours per Table 508.4

Non-Separated, Separated Occupancies As an Unlimited Area Building



Non-Separated, Separated Occupancies

- Try Separated Occupancies
 - Separate each Occupancy
 - Check the Ratio

Actual A-2	Actual A-3	Actual B	Actual E	
Allow able A-2 +	Allow able A-3 +	Allow able B +	Allow able E	< or = 1
13,000	20,000	7,000	10,000	
45,125 +	45,125 +	109,250 +	68,875	0.9406

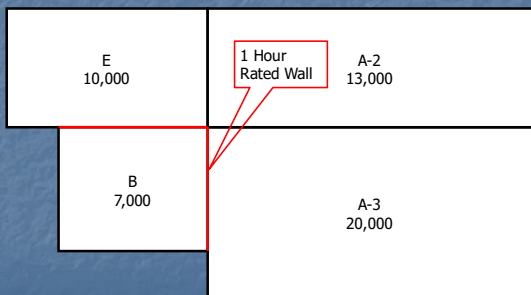
Table 508.4

**TABLE 508.4
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)**

OCCUPANCY	A, E		I-1, I-2, I-4		I-2		R ^a		F-2, S-2 ^b , U		B, F-1, M, S-1		H-1		H-2		H-3, H-4		H-5		
	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	
A, E	N	N	1	2	2	NP	1	2	N	1	1	2	NP	NP	3	4	2	3	2	NP	
L-1 ^c , I-3, L-4	—	—	N	N	2	NP	1	NP	1	2	1	2	NP	NP	3	NP	2	NP	2	NP	
I-2	—	—	—	—	N	2	NP	2	NP	2	NP	NP	NP	3	NP	2	NP	2	NP		
R ^a	—	—	—	—	—	—	N	N	1 ^c	2 ^c	1	2	NP	NP	3	NP	2	NP	2	NP	
F-2, S-2 ^b , U	—	—	—	—	—	—	—	—	N	N	1	2	NP	NP	2	3	1	2	3	2	NP
B, F-1, M, S-1	—	—	—	—	—	—	—	—	—	N	N	NP	NP	2	3	1	2	1	NP		
H-1	—	—	—	—	—	—	—	—	—	—	N	NP	NP	NP	NP	NP	NP	NP	NP		
H-2	—	—	—	—	—	—	—	—	—	—	—	N	NP	1	NP	1	NP	1	NP		
H-3, H-4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1 ^d	NP	1	NP	1	NP	
H-5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	N	NP	—	NP	

S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
 NS = Buildings not equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
 N = No separation requirement.
 NP = Not permitted.
 a. See Section 420.
 b. The required separation from areas used only for private or pleasure vehicles shall be reduced by 1 hour but to not less than 1 hour.
 c. See Section 406.3.4.
 d. Separation is not required between occupancies of the same classification.

Non-Separated, Separated Occupancies



Non-Separated, Separated Occupancies

- Separating the B Occupancy
 - Check the Ratio
 - Same as before

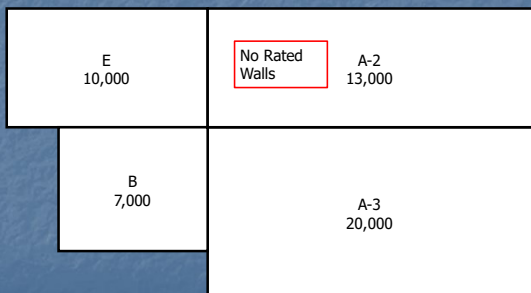
Actual A-2	Actual A-3	Actual B	Actual E	
Allowable A-2 +	Allowable A-3 +	Allowable B +	Allowable E	< or = 1
13,000	20,000	7,000	10,000	
45,125	+ 45,125	+ 109,250	+ 68,875	0.9406

Non-Separated, Separated Occupancies

- Try Non-Separated Occupancies
 - Combine B and E
 - Check the Ratio

Actual A-2	Actual A-3	Actual E	
Allowable A-2 +	Allowable A-3 +	Allowable E	< or = 1
13,000	20,000	17,000	
45,125	+ 45,125	+ 68,875	0.9761

Non-Separated, Separated Occupancies



Mixed Use Design Options

- That is why you let the designer decide!

Restaurant on Top

B 4,000	A-2 6,000
B 10,000	
B 10,000	
B 10,000	

What type of Construction is required?

Restaurant on Top

508.4.3 Allowable height. Each separated occupancy shall comply with the *building height* limitations based on the type of construction of the building in accordance with Section 503.1.

As a separated or nonseparated mixed occupancy the construction type would need to be 2A or 3A in order to allow a 4 Story A-2 Occupancy building.

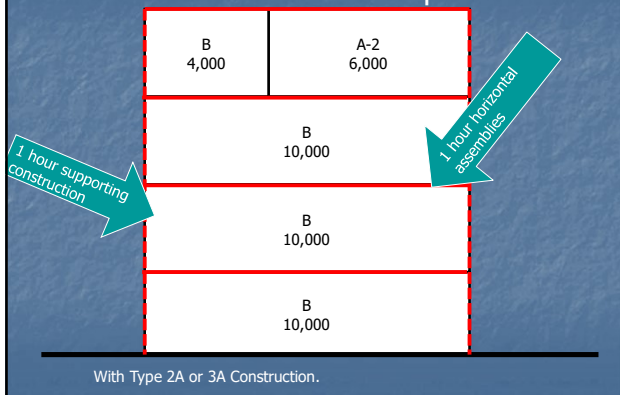
What type of Construction is required?

Table 504.4

TABLE 504.4.1
ALLOWABLE NUMBER OF STORES ABOVE GRADE PLANE

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION									
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V		
		A	B	A	B	A	B	HT	A	B	
A-1	NS	U/L	5	3	2	3	2	3	2	1	
	S	U/L	6	4	3	4	3	4	3	2	
A-2	NS	U/L	11	3	2	3	2	3	2	1	
	S	U/L	12	4	3	4	3	4	3	2	
A-3	NS	U/L	11	3	2	3	2	3	2	1	
	S	U/L	12	4	3	4	3	4	3	2	
A-4	NS	U/L	11	3	2	3	2	3	2	1	
	S	U/L	12	4	3	4	3	4	3	2	
A-5	NS	U/L	U/L	U/L	U/L	U/L	U/L	U/L	U/L	U/L	
	S	U/L	U/L	U/L	U/L	U/L	U/L	U/L	U/L	U/L	
B	NS	U/L	11	5	3	5	3	5	3	2	
	S	U/L	12	6	4	6	4	6	4	3	
E	NS	U/L	5	3	2	3	2	3	1	1	
	S	U/L	6	4	3	4	3	4	2	2	
F-1	NS	U/L	11	4	2	3	2	4	2	1	
	S	U/L	12	5	3	4	3	5	3	2	

Restaurant on Top



Restaurant on Bottom

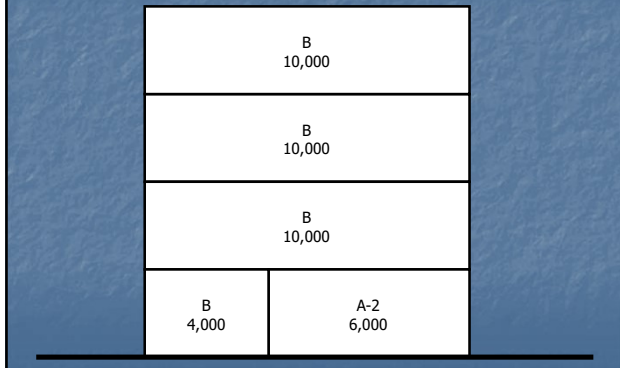


Table 504.4

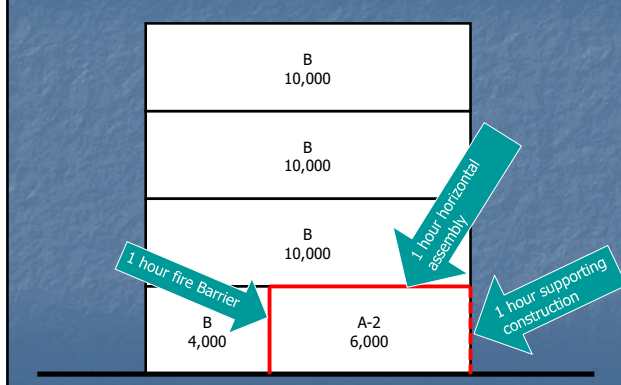
OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TABLE 504.4 ^a ALLOWABLE NUMBER OF STORES ABOVE GRADE PLANE																		
		TYPE OF CONSTRUCTION																		
		TYPE I		TYPE II		TYPE III		TYPE IV		TYPE V		TYPE I		TYPE II		TYPE III		TYPE IV		TYPE V
A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	
A-1	NS	UL	5	3	2	3	2	3	2	3	2	1	1	1	1	1	1	1	1	1
	S	UL	6	4	3	4	3	4	3	4	3	2	2	2	2	2	2	2	2	2
<u>A-2</u>	NS	UL	11	3	2	3	2	3	2	3	2	1	1	1	1	1	1	1	1	1
	S	UL	12	4	3	4	3	4	3	4	3	2	2	2	2	2	2	2	2	2
A-3	NS	UL	11	3	2	3	2	3	2	3	2	1	1	1	1	1	1	1	1	1
	S	UL	12	4	3	4	3	4	3	4	3	2	2	2	2	2	2	2	2	2
A-4	NS	UL	11	3	2	3	2	3	2	3	2	1	1	1	1	1	1	1	1	1
	S	UL	12	4	3	4	3	4	3	4	3	2	2	2	2	2	2	2	2	2
A-5	NS	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	S	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
<u>B</u>	NS	UL	11	5	3	5	3	5	3	5	3	2	2	2	2	2	2	2	2	2
	S	UL	12	6	4	6	4	6	4	6	4	3	3	3	3	3	3	3	3	3
E	NS	UL	5	3	2	3	2	3	2	3	2	1	1	1	1	1	1	1	1	1
	S	UL	6	4	3	4	3	4	3	4	3	2	2	2	2	2	2	2	2	2
F-1	NS	UL	11	4	2	3	2	4	2	4	2	1	1	1	1	1	1	1	1	1
	S	UL	12	5	3	4	3	5	3	5	3	2	2	2	2	2	2	2	2	2

Restaurant on Bottom

OCCUPANCY	TABLE 508.4 REQUIRED SEPARATION OF OCCUPANCIES (HOURS)																
	A, E	I ¹ , I-2, I-4	I-2	R ¹	F-2, S-2 ¹ , U	<u>B, F-1, M, S-1</u>	H-1	H-2	H-3, H-4	H-5	S	NS	S	NS	S	NS	
<u>A, E</u>	N	N	1	2	2	NP	1	2	2	NP	3	4	2	3	2	NP	
L-1 ¹ , I-3, I-4	—	N	N	2	NP	1	NP	1	2	2	NP	3	NP	2	NP	2	NP
I-2	—	—	—	—	—	N	N	2	NP	2	NP	NP	NP	2	NP	2	NP
R ¹	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
F-2, S-2 ¹ , U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
B, F-1, M, S-1	—	—	—	—	—	—	N	N	NP	NP	2	3	1	2	1	NP	
H-1	—	—	—	—	—	—	—	—	N	NP	NP	NP	NP	NP	NP	NP	
H-2	—	—	—	—	—	—	—	—	—	N	NP	1	NP	1	NP	NP	
H-3, H-4	—	—	—	—	—	—	—	—	—	—	—	—	—	1 ¹	NP	1	NP
H-5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	N	NP	

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Restaurant on Bottom



Four or more story building

- Four story hotel
- Type VA construction
- Sprinklered
- Fully Accessible Perimeter

Four or more story building

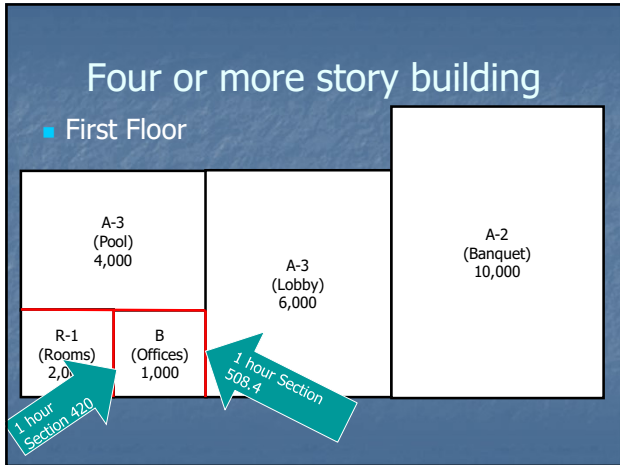
- First Floor

A-3 (Pool) 4,000		A-3 (Lobby) 6,000	A-2 (Banquet) 10,000
R-1 (Rooms) 2,000	B (Offices) 1,000		

Four or more story building

- Upper Floors

R-1 (Rooms) 20,000



Four or more story building

- Check first floor

Actual A-2	Actual A-3	Actual B	Actual R-1	
Allow able A-2	+ Allow able A-3	+ Allow able B	+ Allow able R-1	< or = 1
10,000	10,000	1,000	2,000	
43,125	+ 43,125	+ 67,150	+ 45,000	0.5231

Separated Occupancies (con't)

- 506.2.4 Mixed-occupancy, multistory buildings.** For buildings with more than three stories above grade plane, the total building area shall be such that the aggregate sum of the ratios of the actual area of each story divided by the allowable area of such stories shall not exceed three.

Four or more story building

- Check Building

Actual A-2	Actual A-3	Actual B	Actual R-1				
Allowable A-2	Allowable A-3	Allowable B	Allowable R-1	< or = 3			
10,000	10,000	1,000	62,000				
43,125	+	43,125	+	67,150	+	45,000	1.8563

Questions?

Thank You!

And Have Fun Playing in the MUD
