

Separated occupancies

When a building contains multiple uses, the designer can choose to separate the occupancies from each other by construction having a fire-resistance rating. When the designer chooses this option, the building is considered to be a *separated occupancy building*. The hourly ratings of the fire separation are based on the requirements of IBC Table 508.4. This table gives credit for the installation of a fire sprinkler system by reducing the required fire ratings of the separation by 1 hour. For example, if the shopping center in the preceding example was provided with fire sprinklers, it would be required to have a 1-hour fire-resistance rated separation between the two assembly occupancies (A-2 and A-3) and the other three occupancies (B, M and S-1). However, a separation would not be required between the B, M and S-1 occupancies (Figure 6-2). When a separation is required in Table 508.4, it must be constructed as fire barriers (Section 707) and/or horizontal assemblies (Section 711).

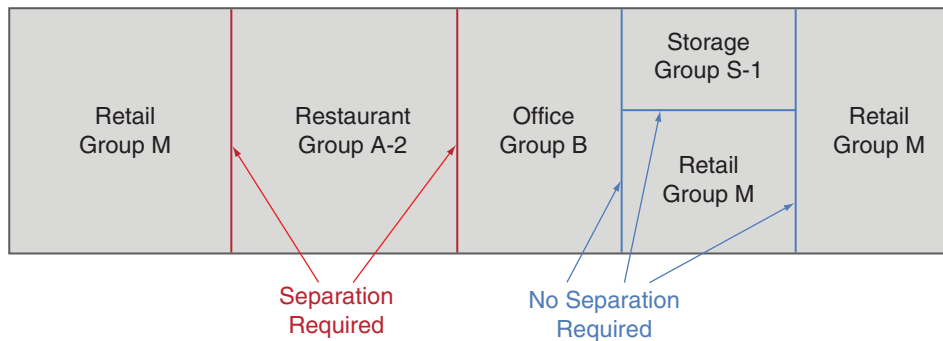
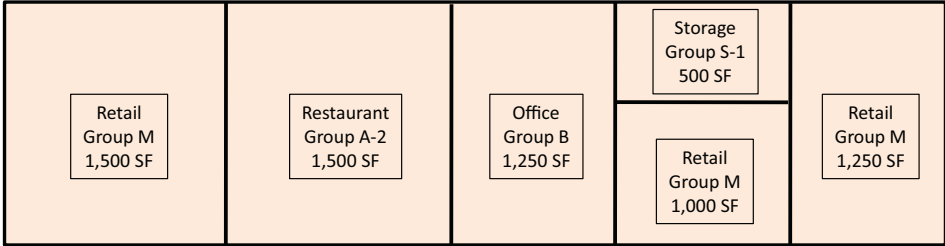


FIGURE 6-2 A separated occupancy building

When a building is designed as a separated occupancy, the allowable building area discussed in Chapter 5 must be expanded to address the multiple occupancies. The IBC requires that a calculation be done to confirm that the percentages of each of the different occupancies added together do not exceed 100 percent. A ratio calculation is done by dividing the actual area of each occupancy by the allowable area of each occupancy. All of the ratios or percentages are added together for each story and are not permitted to exceed 1, or 100 percent (Figure 6-3). This calculation is done for each individual story in the building. As long as none of the floor's ratios exceed 1 for a single-, two-, or three-story structure, the building is deemed to comply with the height and area requirements. To determine the maximum area of the building that is four or more stories in height, the ratios of all of the stories are added together. The total of all of these ratios cannot exceed 3. **[Ref. 508.4]**



Separated Occupancy Building

Given:

- Above mixed occupancy building
- One Story
- Type VB Construction
- No Fire Sprinklers
- No Frontage Increase
- Allowable Areas
 - Group A-2 = 6,000 SF
 - Group B = 9,000 SF
 - Group M = 9,000 SF
 - Group S-1 = 9,000 SF

Evaluate Allowable Area:

- Ratio Calculation
- Group A-2 $1,500/6,000 = 0.25$
- Group B $1,250/9,000 = 0.14$
- Group M $3,750/9,000 = 0.42$
- Group S-2 $500/9,000 = \underline{0.05}$
- Total Ratio 0.86

FIGURE 6-3 Separated occupancy area calculation