HEIGHT, STORY. The vertical distance from top to top of two successive finished floor surfaces; and, for the topmost story, from the top of the floor finish to the top of the ceiling joists or, where there is not a ceiling, to the top of the roof rafters.

❖ This definition is needed for application of seismic provisions in Chapter 16. Specifically, the story height is required in the context of calculating story drift determination and P-delta effects in Section 1617.3, which refers the user to ASCE 7.

INDUSTRIAL EQUIPMENT PLATFORM. An unoccupied, elevated platform in an industrial occupancy used exclusively for mechanical systems or industrial process equipment, including the associated elevated walkways, stairs and ladders necessary to access the platform (see Section 505.5).

[illegible] made between industrial equipment platezzanines by way of definition. Industrial atforms, covered in Section 505.5, are unused exclusively for housing equipment access thereto, and are not subject to the for mezzanines. Their purpose could also ccess for maintenance, repair or modificated or very large equipment. Industrial atforms allow efficient use of high bay arling infrequently accessed equipment or verhead without the occupant load or inhazard to occupants in the room. Elevated iat do not meet this definition would be subject to the requirements for mezzanines.

MEZZANINE. An intermediate level or levels between the floor and ceiling of any story with an aggregate floor area of not more than one-third of the area of the room or space in which the level or levels are located (see Section 505).

❖ A common design feature in factories, warehouses and mercantile buildings is an intermediate loft, or platform, between the story levels of a building. This type of feature, or mezzanine, can be found in buildings of all occupancies. The code must deal with whether this intermediate level is another story of the building, and whether it can simply be treated as part of the story in which it is contained. The basic rule is that it must be less than one-third of the area of the floor below (of the room in which it is located) in order to be considered a mezzanine. Requirements for mezzanines are found in Section 505.

STORY. That portion of a building included between the upper surface of a floor and the upper surface of the floor or roof next above (also see "Basement" and "Mezzanine").

❖ All levels in a building that conform to this description are stories, including basements. For instance, Section 712.4.3.1 restricts penetrations that connect "more than three stories," which would include basements. Certain code provisions regarding number of stories, however, pertain only to stories above grade (for instance, the maximum height provisions of Table 503). A mezzanine is considered part of the story in which it is located.

SECTION 503
GENERAL HEIGHT AND AREA LIMITATIONS

503.1 General. The height and area for buildings of different construction types shall be governed by the intended use of the building and shall not exceed the limits in Table 503 except as modified hereafter. Each part of a building included within the exterior walls or the exterior walls and fire walls where provided shall be permitted to be a separate building.

❖ The provisions for governing the height and area of buildings on the basis of occupancy group classification and type of construction are established in this section. It also establishes Table 503 as the primary tool for determining the minimum type of construction. All buildings are subject to these limitations unless more specific code provisions for a building type provide for different height or area limitations. For instance, Section 507 allows certain buildings to be unlimited in area due to lack of exposure, low hazard level, construction type, the presence of fire safety systems or a combination of these characteristics. Given these specific provisions, Table 503 would not apply.

Table 601 is used with Table 503 to determine acceptable risk and fire safety levels for a building. Classification by occupancy, in accordance with the descriptions in Chapter 3, can be considered as establishing the level of "risk" associated with the use of a building. The various construction types, described in Chapter 6 and Table 601, can be thought of as various levels of safety in regard to fire resistance. Table 503 becomes a risk/safety matrix that sets a minimum level of safety (construction type) in accordance with the risk (the occupancy classification). The following is an example for the use of Table 503:

Example: Figure 503.1 shows a two-story factory building of Type IIB construction. Assuming the building is not sprinklered [fire areas < 12,000 square feet (1115 m^2)] and does not qualify for any area or height increases, what is the maximum allowable area per story and height of the building? Given the size of the building, is Type IIB construction adequate? What is the minimum required construction type?

Answer: From Table 503, the allowable area per story for an F-1 of Type IIB construction is 15,500 square feet (1440 m^2). Since the actual area is 120 × 150 = 18,000 square feet (1672 m^2), Type IIB construction is not acceptable. The minimum required type of construction is Type IV, Type IIIA or Type IIA, depending on the desired materials for construction. All of these construction types for an F-1 have allowable per-story areas greater than 18,000 square feet (1672 m^2) in accordance with Table 503. The actual height in feet and stories is also within the table limits for these construction types.

subsections contain additional restrictions for structures of a certain size or use.

SECTION 505
MEZZANINES

505.1 General. A mezzanine or mezzanines in compliance with this section shall be considered a portion of the floor below. Such mezzanines shall not contribute to either the building area or number of stories as regulated by Section 503.1. The area of the mezzanine shall be included in determining the fire area defined in Section 702. The clear height above and below the mezzanine floor construction shall not be less than 7 feet (2134 mm).

❖ Although mezzanines provide an additional or intermediate useable floor level in a building, they are not considered an additional story as long as they comply with the requirements of Section 505. Building height and area limitations are intended to offset the inherent fire hazard associated with specific occupancy groups and with materials and features of a specific construction type. Because of a mezzanine's restricted size and its required openness to the room or space below, a mezzanine does not contribute significantly to a building's inherent fire hazard; therefore, the area of a mezzanine is not considered when applying the provisions of Section 503.1 for building area limitations, and mezzanines are not considered in determining the height in stories of a building as regulated by Table 503. The occupant and fuel load of the mezzanine should be taken into consideration, however, when determining the necessity for fire protection systems. As such, the area of the mezzanine is to be included in the calculation of the size of the fire area for sprinkler thresholds (see the commentary for the definition of "Fire area" in Section 702.1).

This section does not include any requirements for the construction of a mezzanine or for fire-resistance ratings; therefore, the mezzanine is to be constructed of materials consistent with the construction type of the building. Required fire-resistance ratings are determined on the basis of Table 601 for the appropriate construction type.

Mezzanines are required to have a ceiling height of not less than 7 feet (2134 mm), and the ceiling height below the mezzanine must also be 7 feet (2134 mm). Even habitable rooms located in mezzanines may have a ceiling height of 7 feet (2134 mm), in accordance with Exception 4 in Section 1208.2.

505.2 Area limitation. The aggregate area of a mezzanine or mezzanines within a room shall not exceed one-third of the area of that room or space in which they are located. The enclosed portions of rooms shall not be included in a determination of the size of the room in which the mezzanine is located. In determining the allowable mezzanine area, the area of the mezzanine shall not be included in the area of the room.

Exception: The aggregate area of mezzanines in buildings and structures of Type I or II construction for special industrial occupancies in accordance with Section 503.1.2 shall not exceed two-thirds of the area of the room.

❖ So as not to contribute significantly to a building's inherent fire hazard, a mezzanine is restricted to a maximum of one-third of the area of the room with which it shares a common atmosphere. The area may consist of multiple mezzanines at the same or different floor levels, provided that the aggregate area does not exceed the one-third limitation. If the area limitation is exceeded, the provisions of this section do not apply and the level is considered a story.

In determining the allowable area of the mezzanine, the enclosed spaces of the room below are not to be included in calculating the room size. Although the mezzanine area is included in the calculation of fire area size, it is not included in the area of the room when computing the allowable mezzanine area. For example, a room contains 5,000 square feet (465 m^2), 500 of which are enclosed and not part of the common atmosphere with the mezzanine. A mezzanine may be provided in the room such that the area of the mezzanine is not more than 1,500 square feet (139 m^2). In accordance with Section 505.4, the space at the mezzanine level must be open, except that enclosed spaces are permitted for mezzanines in accordance with the exceptions to Section 505.4.

By definition, in special industrial occupancies (see commentary, Section 503.1.2), the inherent fire hazard is very low; therefore, mezzanines in such occupancies located in buildings of Type I or II construction are permitted to constitute up to two-thirds of the area of the room in which they are located, in accordance with the exception. The limitation on construction types further reduces the fire hazard associated with such occupancies.

Equipment platforms, as defined in Section 502.1, are not considered mezzanines (see Section 505.5 for requirements for industrial equipment platforms).

505.3 Egress. Each occupant of a mezzanine shall have access to at least two independent means of egress where the common path of egress travel exceeds the limitations of Section 1013.3. Where a stairway provides a means of exit access from a mezzanine, the maximum travel distance includes the distance traveled on the stairway measured in the plane of the tread nosing.

Exceptions:

1. A single means of egress shall be permitted in accordance with Section 1014.1.
2. Accessible means of egress shall be provided in accordance with Section 1007.

❖ A mezzanine can be likened to a single room when considering means of egress. As with rooms, if the occupant load of the mezzanine exceeds the limitations of Table 1014.1 for the specific use of the space, at least two independent means of egress must be provided for the mezzanine. For example, if a mezzanine containing office areas (Group B) has an occupant load exceeding

50, a second means of egress from the mezzanine is required. Additionally, if a mezzanine has one means of egress and it is by means of an open stair to the floor below, the travel distance from the most remote point on the mezzanine to the bottom of the stair may not exceed 75 feet (22 860 mm) in accordance with Section 1013.3 for common path of travel [see the exceptions to that section that allow 100 feet (30 480 mm) in some circumstances]. If the travel distance to the bottom of the stair exceeds the limits of Section 1013.3, then a second means of egress must be provided from the mezzanine.

Because mezzanines that comply with Section 505 are considered a portion of the floor below in accordance with Section 505.1, the stair leading from it is not considered an exit stairway and is not required to be a vertical exit enclosure.

This section does not require that an exit be provided directly from the mezzanine level (Exception 2 of Section 505.4, however, requires mezzanines that are not open to the room to have access to an exit directly from the mezzanine level, if two means of egress are provided). When two means of egress are required, however, they are to be located remote from each other in accordance with Section 1014.2, as for any other space, so that if one means of egress is blocked by fire or smoke, then the other will be presumed available.

When exits are not located on the same level as the mezzanine, the occupant load of the mezzanine is added to the room or space below and the required means of egress width for that room is determined accordingly (see Section 1005). For example, if a room (Group B) has an occupant load of 45 and a mezzanine (also Group B) has an occupant load of 15, the total occupant load for the space served is 60; therefore, the room must have two exit access doors in accordance with Table 1014.1. The mezzanine itself, however, needs only one means of egress.

The requirements for accessible means of egress are not in any way intended to be affected by these provisions, as clarified in Exception 2. The requirements for accessibility relate only to the requirements for the occupancy and use of the space as provided in Chapters 10 and 11 of the code.

505.4 Openness. A mezzanine shall be open and unobstructed to the room in which such mezzanine is located except for walls not more than 42 inches (1067 mm) high, columns and posts.

Exceptions:

1. Mezzanines or portions thereof are not required to be open to the room in which the mezzanines are located, provided that the occupant load of the aggregate area of the enclosed space does not exceed 10.
2. A mezzanine having two or more means of egress is not required to be open to the room in which the mezzanine is located, if at least one of the means of egress provides direct access to an exit from the mezzanine level.
3. Mezzanines or portions thereof are not required to be open to the room in which the mezzanines are located, provided that the aggregate floor area of the enclosed space does not exceed 10 percent of the mezzanine area.
4. In industrial facilities, mezzanines used for control equipment are permitted to be glazed on all sides.
5. In Group F occupancies of unlimited area, meeting the requirements of Section 507.2 or 507.3, mezzanines or portions thereof are not required to be open to the room in which the mezzanines are located, provided that an approved fire alarm system is installed throughout the entire building or structure and notification appliances are installed throughout the mezzanines in accordance with the provisions of NFPA 72. In addition, the fire alarm system shall be initiated by automatic sprinkler water flow.

❖ A mezzanine presents a unique fire threat to the occupant. If a mezzanine is closed off from the larger room, an undetected fire could develop such that it would jeopardize or eliminate the opportunity for occupant escape.

The exceptions address situations where the hazard is reduced. A low occupant load, typical of small mezzanines, would permit a mezzanine to be enclosed in accordance with Exception 1. Occupant load is calculated in accordance with Section 1004.1 for the use of the mezzanine space. Similarly, Exception 3 permits the enclosure of a limited portion of a mezzanine.

Exception 2 permits enclosure of the mezzanine based on the availability of an exit at the mezzanine level, and the mezzanine has at least two means of egress. The definition of "exit" is important for this exception. "Exit" is defined in Section 1002.1 as an element that is separated by fire-resistance-rated construction and opening protectives, and includes exterior doors; therefore, the mezzanine must be served by at least one vertical exit enclosure (Section 1019), a horizontal exit (Section 1021), an exit passageway (Section 1020), an exterior stair or ramp (Section 1022) or an exterior door discharging directly at grade. In addition, another means of egress is required, which may be an open stair to the room below.

Exceptions 4 and 5 address industrial facilities, where enclosure may be necessary for noise reduction or atmospheric control. The term "unlimited area" in Exception 5 refers to buildings that qualify as unlimited area buildings in accordance with Section 507.2 or 507.3, which requires the building to be sprinklered throughout. Although certain Group F occupancies could qualify as unlimited area buildings without sprinklers in accordance with Section 507.1, these buildings are n within the scope of this exception and need to meet t conditions of another exception in order to be enclos

505.5 Industrial equipment platforms. Industrial equi platforms in buildings shall not be considered as a portion of th floor below. Such equipment platforms shall not contribute to either the building area or the number of stories as regulated by Section 503.1. The area of the industrial equipment platform shall not be included in determining the fire area. Industrial

equipment platforms shall not be a part of any mezzanine, and such platforms and the walkways, stairs and ladders providing access to an equipment platform shall not serve as a part of the means of egress from the building.

❖ "Industrial equipment platform" is defined in Section 502.1 as an unoccupied, elevated platform in an industrial occupancy used exclusively for supporting mechanical systems or industrial process equipment and providing access to them. If an elevated platform does not meet all the conditions of this definition, then it must be considered either a mezzanine or another story.

Industrial equipment platforms are treated as part of the equipment they support (within the limitations of the subsections to this section), and do not contribute in any way to the area of the building, the number of stories, the area of any mezzanine or any fire area. If industrial equipment platforms are located in the same room as a mezzanine, however, the aggregate area of the platforms and mezzanines is limited by Section 505.5.1.

The definition of "Industrial equipment platform" includes the associated elevated walkways, stairs and ladders necessary to access the platform. Elements that serve an industrial equipment platform are not permitted to serve as a means of egress for occupants of the building unless they meet all the requirements for means of egress in Chapter 10. Because they are not used for means of egress, the elements used to access these platforms could be something other than a stair or ramp. For example, a permanent ladder could be used to access an industrial equipment platform. Since the code does not address ladder construction for this circumstance, other appropriate standards, such as OSHA standards, should be consulted for design.

Guards are required for elevated walking surfaces serving industrial equipment platforms in accordance with Section 1012.1 (see Section 505.5.3). Additionally, if a stair is used to access an equipment platform, it would be subject to all the dimensional requirements for stairs in accordance with Section 1009.1.

505.5.1 Area limitations. The aggregate area of all industrial equipment platforms within a room shall not exceed two-thirds of the area of the room in which they occur. Where an equipment platform is located in the same room as a mezzanine, the area of the mezzanine shall be determined by Section 505.2, and the combined aggregate area of the equipment platforms and mezzanines shall not exceed two-thirds of the room in which they occur.

❖ In determining the allowable area of an equipment platform, the enclosed spaces of the room below are not to be included in calculating the room size, and neither is the area of the equipment platform itself. Whereas the area of mezzanines is included in the calculation of fire area (see Section 505.1), the area of equipment platforms is not in accordance with Section 505.5. The area of mezzanines and equipment platforms, however, is summed when they are in the same room, and the aggregate area is limited to two-thirds of the area of the room. The total area of a mezzanine still cannot exceed one-third of the area of the room.

505.5.2 Fire suppression. Where located in a building that is required to be protected by an automatic sprinkler system, industrial equipment platforms shall be fully protected by sprinklers above and below the platform, where required by the standards referenced in Section 903.3.

❖ In buildings or spaces that are required to be protected with an automatic fire suppression system, fire suppression above and below the equipment platform is needed so the equipment platform will not obstruct sprinkler coverage or delay sprinkler activation if a fire develops below the platform. As stated in Section 903.3.1.1, sprinkler installation is to be in accordance with NFPA 13. This section should not be construed to require sprinkler protection for equipment platforms where such a system is not otherwise required.

505.5.3 Guards. Equipment platforms shall have guards where required by Section 1012.1.

❖ Guards are required for equipment platforms in the same manner that they are required at open walking surfaces in other parts of the building, and are subject to the same requirements for height, design load and configuration. Section 1012.3 contains an exception that allows spacing of guard balusters in Group F occupancies to only be close enough to prevent the passage of a 21-inch (533 mm) sphere.

SECTION 506
AREA MODIFICATIONS

506.1 General. The areas limited by Table 503 shall be permitted to be increased due to frontage (I_f) and automatic sprinkler system protection (I_s) in accordance with the following:

$$A_a = A_t + \left[\frac{A_t I_f}{100}\right] + \left[\frac{A_t I_s}{100}\right] \qquad \textbf{(Equation 5-1)}$$

where:

A_a = Allowable area per floor (square feet).

A_t = Tabular area per floor in accordance with Table 503 (square feet).

I_f = Area increase due to frontage (percent) as calculated in accordance with Section 506.2.

I_s = Area increase due to sprinkler protection (percent) as calculated in accordance with Section 506.3.

❖ Besides increasing the fire resistance (using a higher construction type) of the building structure, in general there are two circumstances that would decrease a building's fire hazard. These are: (1) isolating the building from other structures and (2) equipping it with a fire suppression system. Equation 5-1 takes these circum-

not to exceed 30 feet (9144 mm), which may represent a dead-end condition (see Figure 1013.4.2.1).

1013.5 Egress balconies. Balconies used for egress purposes shall conform to the same requirements as corridors for width, headroom, dead ends and projections. Exterior balconies shall be designed to minimize accumulation of snow or ice that impedes the means of egress.

Exception: Exterior balconies and concourses in outdoor stadiums shall be exempt from the design requirement to protect against the accumulation of snow or ice.

❖ This section regulates balconies that are used as an exit access and requires that they meet the same requirements as exit access corridors, except for the enclosure. Exterior exit access balconies must be kept free of snow and ice. Sheltering the exterior balcony can serve to minimize snow and ice accumulation but, in some areas, may not completely eliminate the need to remove the snow or ice by other means. If the exterior side of the balcony is also enclosed to prevent snow and ice accumulation, the balcony essentially creates the same conditions as an interior corridor and must be so protected.

The exception for protection of snow and ice accumulation for outdoor stadiums is based on the assumption that an adequate snow removal or maintenance policy exists for these facilities.

1013.5.1 Wall separation. Exterior egress balconies shall be separated from the interior of the building by walls and opening protectives as required for corridors.

Exception: Separation is not required where the exterior egress balcony is served by at least two stairs and a dead-end travel condition does not require travel past an unprotected opening to reach a stair.

❖ An exterior exit access balcony has a valuable attribute in that the products of combustion may be freely vented to the open air. In the event of a fire in an adjacent space, the products of combustion would not be expected to build up in the balcony area as would commonly occur in an interior corridor. However, there is still a concern for the egress of occupants who must use the balcony for exit access, and consequently, may have to pass the room or space where the fire is located. Therefore, an exterior exit access balcony is required to be separated from interior spaces by fire partitions, as is required for interior corridors. The other provisions of Section 1016 relative to dead ends and opening protectives also apply.

If there are no dead-end conditions that require travel past an unprotected opening and the balcony is provided with at least two stairways, then the wall separating the balcony from the interior spaces need not have a fire-resistance rating (see Figure 1013.5.1). Such an arrangement reduces the probability that occupants will need to pass the area with the fire to gain access to an exit.

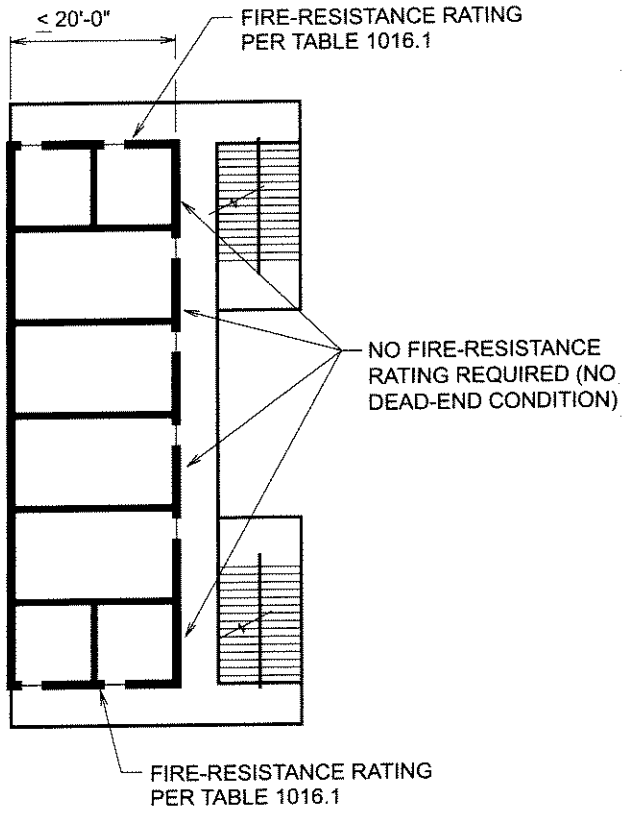

Figure 1013.5.1
EXIT ACCESS BALCONIES

1013.5.2 Openness. The long side of an egress balcony shall be at least 50 percent open, and the open area above the guards shall be so distributed as to minimize the accumulation of smoke or toxic gases.

❖ This section provides an opening requirement that is intended to preclude the rapid buildup of smoke and toxic gases. A minimum of one side of the exterior balcony is required to have a minimum open exterior area of 50 percent of the side area of the balcony. The side openings are to be fairly uniformly distributed along the length of the balcony.

SECTION 1014
EXIT AND EXIT ACCESS DOORWAYS

1014.1 Exit or exit access doorways required. Two exits or exit access doorways from any space shall be provided where one of the following conditions exists:

1. The occupant load of the space exceeds the values in Table 1014.1.

2. The common path of egress travel exceeds the limitations of Section 1013.3.
3. Where required by Sections 1014.3, 1014.4 and 1014.5.

Exception: Group I-2 occupancies shall comply with Section 1013.2.2.

❖ This section dictates the minimum number of paths of travel an occupant is to have available to avoid a fire incident in the occupied room or space. While providing multiple egress doorways from every room is unrealistic, a point does exist where alternative egress paths must be provided based on the number of occupants at risk, the distance any one occupant must travel to reach a doorway and the relative hazards associated with the occupancy of the space. Generally, the number of egress doorways required from any room or space coincides with the occupant load threshold criteria set forth for the minimum number of exits required in a building (see Section 1018.1). The limiting criteria in Table 1014.1 for rooms or spaces permitted to have a single exit access doorway are based on an empirical judgement of the associated risks.

If the occupants of a room are required to egress through another room, as permitted in Section 1013.2, the rooms are to be combined to determine if multiple doorways are required from the combined rooms. For example, if a suite of offices share a common reception area, the entire suite with the reception area must meet both the occupant load and the travel distance criteria.

It should be noted that where two doorways are required, the remoteness requirement of Section 1014.2 is applicable.

Item 2 sets the limits for a single means of egress based on travel distance. Where the common path of travel exceeds the limits in Section 1013.3, two egress paths are required for safe egress from the space.

Item 3 addresses when two means of egress may be required in boiler, incinerator and furnace rooms; refrigerator machinery rooms or refrigerated rooms and spaces.

Group I-2 occupancies are not addressed in Table 1014.1. The exception refers to Section 1013.2.2 for Group I-2 means of egress requirements.

TABLE 1014.1
SPACES WITH ONE MEANS OF EGRESS

OCCUPANCY	MAXIMUM OCCUPANT LOAD
A, B, E, F, M, U	50
H-1, H-2, H-3	3
H-4, H-5, I-1, I-3, I-4, R	10
S	30

❖ The table represents an empirical judgement of the risks associated with a single means of egress from a room or space based on the occupant load in the room, the travel distance to the exit access door and the inherent risks associated with the occupancy (such as occupant mobility, occupant familiarity with the building, occupant response and the fire growth rate).

Since the occupants of Groups I and R may be sleeping and, therefore, may not be able to detect a fire in its early stages without staff supervision or room detectors, the number of occupants in a single egress room or space is limited to 10.

Because of the potential for rapidly developing hazardous conditions, the single egress condition in Groups H-1, H-2 and H-3 is limited to a maximum of three persons. Because the materials contained in Groups H-4 and H-5 do not represent the same fire hazard potential as those found in Groups H-1, H-2 and H-3, the occupant load for spaces with one means of egress is increased.

Because of the reduced occupant density in Group S and the occupants' normal familiarity with the building, the single egress condition is permitted with an occupant load of 30.

1014.1.1 Three or more exits. Access to three or more exits shall be provided from a floor area where required by Section 1018.1.

❖ This section provides a reference to Section 1018.1 for conditions where three or more exits are required. The reference is provided in this section so that the requirements of Section 1018.1 will be obvious.

1014.2 Exit or exit access doorway arrangement. Required exits shall be located in a manner that makes their availability obvious. Exits shall be unobstructed at all times. Exit and exit access doorways shall be arranged in accordance with Sections 1014.2.1 and 1014.2.2.

❖ Exits need to be unobstructed and obvious at all times for the safety of occupants to evacuate the building in an emergency situation. This is consistent with the requirements in Section 1008.1 for exit or exit access doors to not be concealed by curtains, drapes, decorations or mirrors.

1014.2.1 Two exits or exit access doorways. Where two exits or exit access doorways are required from any portion of the exit access, the exit doors or exit access doorways shall be placed a distance apart equal to not less than one-half of the length of the maximum overall diagonal dimension of the building or area to be served measured in a straight line between exit doors or exit access doorways. Interlocking or scissor stairs shall be counted as one exit stairway.

Exceptions:

1. Where exit enclosures are provided as a portion of the required exit and are interconnected by a 1-hour fire-resistance-rated corridor conforming to the requirements of Section 1016, the required exit separation shall be measured along the shortest direct line of travel within the corridor.
2. Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, the separation distance of the exit doors or exit access doorways shall not be less than