

Exception No. 1: The triangular openings formed by the riser, tread, and bottom element of a guardrail at the open side of a stair shall be of such size that a sphere 6 in. (15.2 cm) in diameter shall not pass through the triangular opening.

Exception No. 2: In detention and correctional occupancies, in industrial occupancies, and in storage occupancies, the clear distance between intermediate rails, measured at right angles to the rails, shall not exceed 21 in. (53.3 cm).

7.2.2.5 Enclosure and Protection of Stairs.

7.2.2.5.1 Enclosures. All inside stairs serving as an exit or exit component shall be enclosed in accordance with 7.1.3.2. All other inside stairs shall be protected in accordance with 8.2.5.

Subparagraph 7.2.2.5.1 emphasizes that enclosure protection for stairs depends on whether they serve within an exit or involve a vertical opening between floors. Stairs that are not used as exits but that involve vertical openings are not subject to the requirements of 7.1.3.2 but must be protected in accordance with 8.2.5. Many interior stairs serve as exits and are vertical openings. Therefore, they must meet the requirements of 7.1.3.2 for exits, and, as an element that creates vertical openings, they also must comply with 8.2.5. Compliance with 8.2.5 does not ensure compliance with 7.1.3.2. Stairs that are neither within an exit nor part of vertical openings, such as stairs to a platform or stage, or those running between two different floor levels on the same story, would not have to comply with either 7.1.3.2 or 8.2.5.

Exception: In existing buildings, where a two-story exit enclosure connects the story of exit discharge with an adjacent story, the exit shall be permitted to be enclosed only on the story of exit discharge, provided that not less than 50 percent of the number and capacity of exits on the story of exit discharge are independent of such enclosures.

The provisions of the exception to 7.2.2.5.1 recognize existing two-story stairs that, rather than being fully enclosed at both the top and bottom, are separated only from the level of exit discharge. Because such a stair is open to another floor, it might compromise the use of the stair enclosure for egress purposes by the occupants of the level of exit discharge. The Code requires that at least half of the egress for the level of exit discharge be independent of the stair enclosure. This requirement limits the effect of occupants who are forced to travel into an enclosure that is smoke-filled due to a fire on another floor that is

open to the stair. See Exhibit 7.40. The existing stair connecting the first and second floors, although separated from the first floor, is open to the second floor. This arrangement is permitted because a minimum of 50 percent of the first floor egress can be satisfied independently from use of the stair enclosure via the door that opens directly to the outside at grade level at the right of the figure.

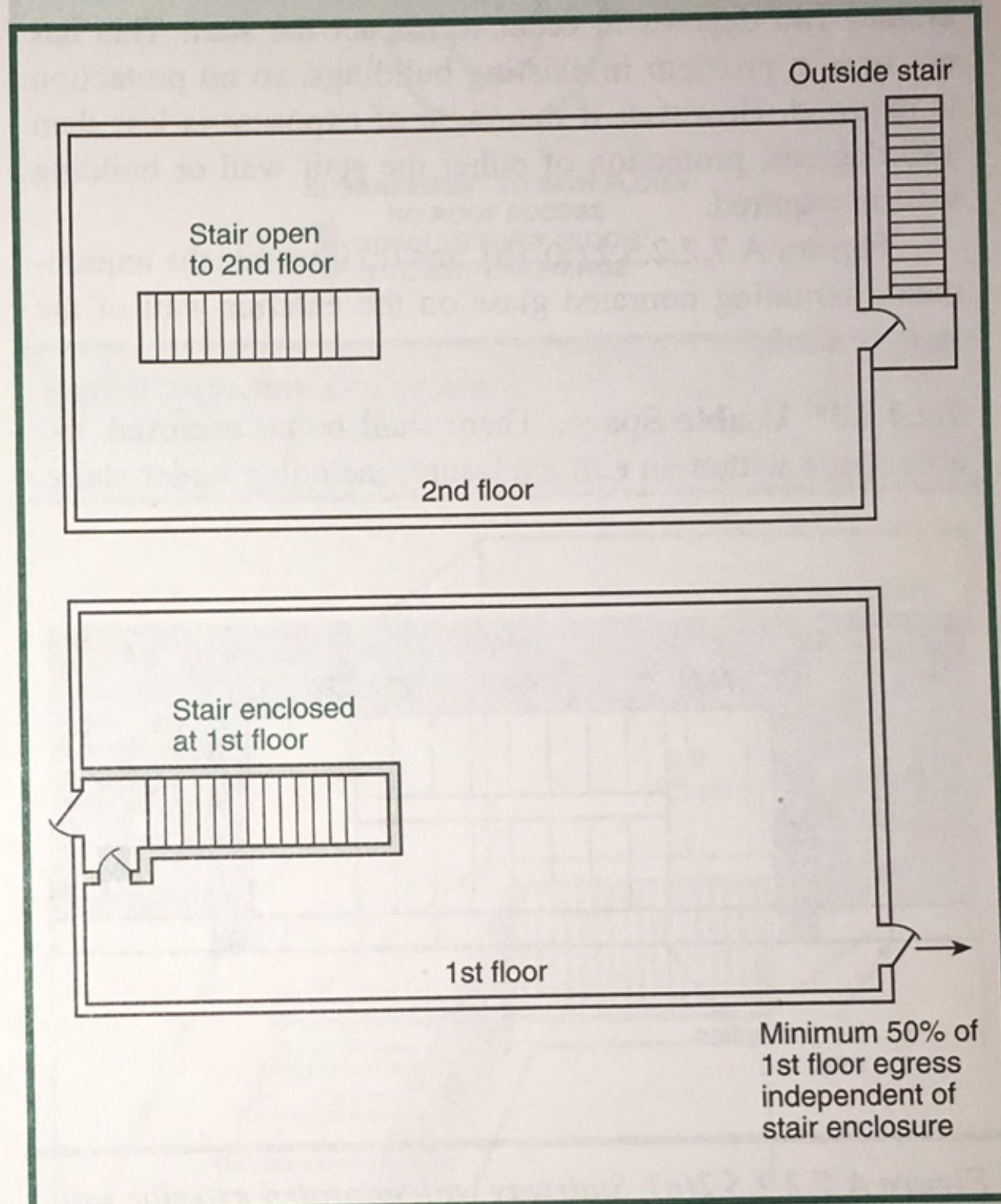


Exhibit 7.40 Partial enclosure of existing stair.

7.2.2.5.2* Exposures. Where nonrated walls or unprotected openings enclose the exterior of a stairway, other than an existing stairway, and the walls or openings are exposed by other parts of the building at an angle of less than 180 degrees, the building enclosure walls within 10 ft (3 m) horizontally of the nonrated wall or unprotected opening shall be constructed as required for stairway enclosures, including opening protectives. Construction shall extend vertically from the ground to a point 10 ft (3 m) above the topmost landing of the stairs or to the roofline, whichever is lower.

Exception: The fire resistance rating of the separation extending 10 ft (3 m) from the stairs shall not be required to exceed 1 hour where openings have not less than a ¾-hour fire protection rating.

Subparagraph 7.2.2.5.2 only applies where the stair is required to be enclosed either to create an exit or to protect a vertical opening.

A.7.2.2.5.2 The purpose of this provision is to protect the exterior wall of a stairway from fires in other portions of the building. If the exterior wall of the stair is flush with the building exterior wall, the fire would need to travel around 180 degrees in order to impact the stair. This has not been a problem in existing buildings, so no protection is required. However, if the angle of exposure is less than 180 degrees, protection of either the stair wall or building wall is required.

Figures A.7.2.2.5.2 (a), (b), and (c) illustrate the requirement, assuming nonrated glass on the exterior wall of the stair is used.

7.2.2.5.3* Usable Space. There shall be no enclosed, usable space within an exit enclosure, including under stairs,

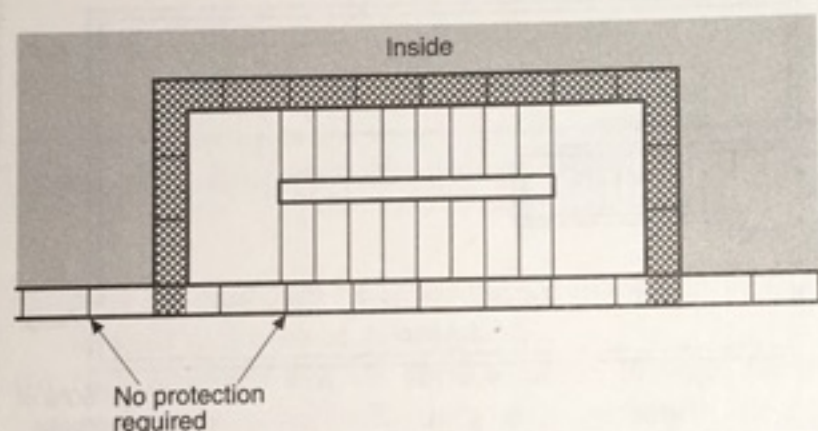


Figure A.7.2.2.5.2(a) Stairway with nonrated exterior wall in same plane as building exterior wall.

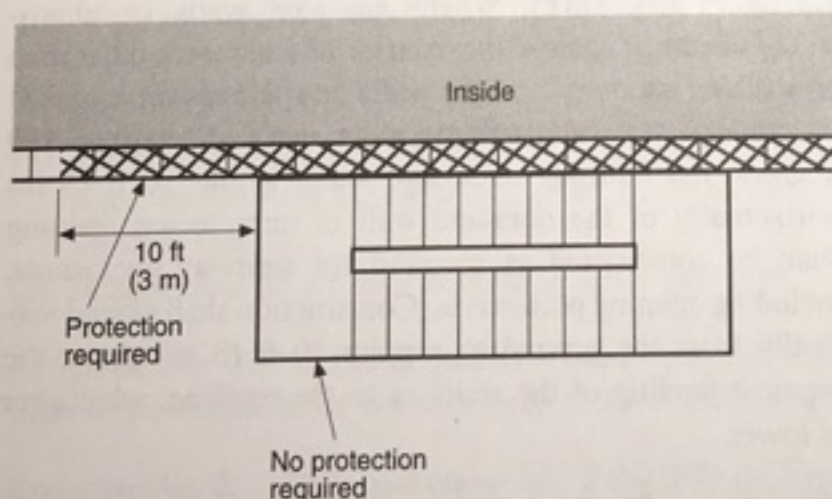


Figure A.7.2.2.5.2(b) Stairway with unprotected exterior perimeter protruding past building exterior wall.

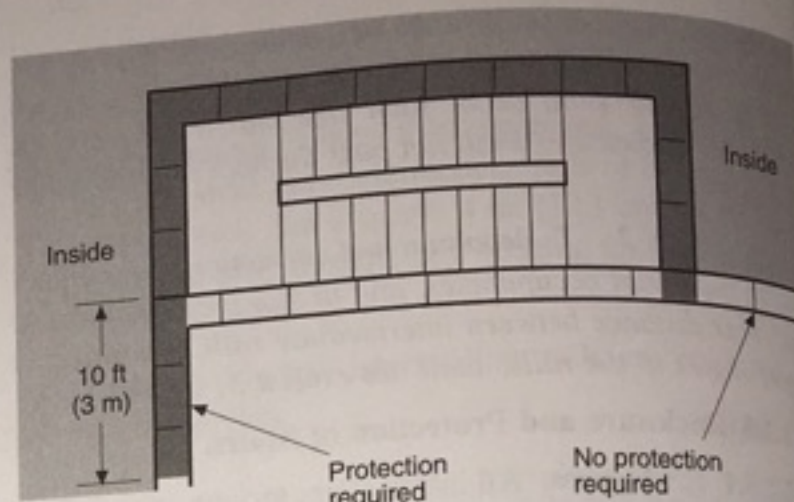


Figure A.7.2.2.5.2(c) Stairway with nonrated exterior wall exposed by adjacent exterior wall of building.

nor shall any open space within the enclosure be used for any purpose that has the potential to interfere with egress.

Exception: Enclosed, usable space shall be permitted under stairs, provided that the space is separated from the stair enclosure by the same fire resistance as the exit enclosure. Entrance to such enclosed usable space shall not be from within the stair enclosure. (See also 7.1.3.2.3.)

Subparagraph 7.2.2.5.3 states that, within an exit enclosure, no enclosed, usable space is permitted, nor is any open space permitted to be used for any purpose that could interfere with the use of the exit enclosure. An enclosed, usable space under a stair is permitted to be considered outside the exit enclosure if the walls and soffits of the enclosed space meet the same protection requirements as the stair enclosure, thereby separating the space from the exit enclosure. The door to the space is not permitted to open into the exit enclosure, per 7.1.3.2.1(d). See Exhibit 7.41.

A.7.2.2.5.3 An example of a use with the potential to interfere with egress is storage.

7.2.2.5.4* Stair Identification Signs. Stairs serving five or more stories shall be provided with signage within the enclosure at each floor landing. The signage shall indicate the story, the terminus of the top and bottom of the stair enclosure, and the identification of the stair enclosure. The signage also shall state the story of, and the direction to, exit discharge. The signage shall be inside the enclosure located approximately 5 ft (1.5 m) above the floor landing in a position that is readily visible when the door is in the open or closed position.

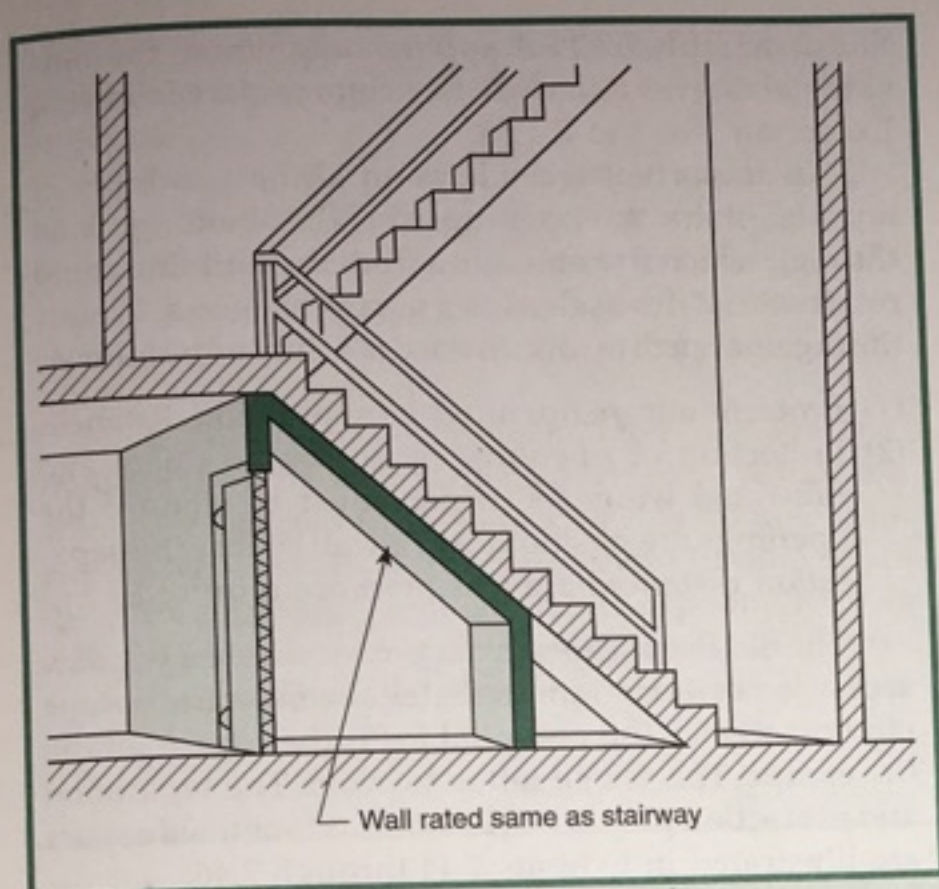


Exhibit 7.41 Enclosed, usable space under flight of stairs.

A.7.2.2.5.4 The intent of this provision is to provide vital egress information to the occupants of a building and to fire fighters. To reduce information overload to occupants during emergency egress, a sign indicating the floor level of and the direction to the exit discharge is permitted to be placed as a separate sign with another sign indicating the floor level, the terminus of the top and bottom of the stair enclosure, and the identification of the stair.

The provisions of 7.2.2.5.4 require the posting of important information at each floor landing in each stairwell if the stair serves five or more stories. The term *signage* is used to signify that the required information might appear on multiple signs mounted adjacent to each other. The information is for fire-fighting personnel and building occupants in an emergency. The information most helpful to fire fighters can be put on one sign, and the information most useful to occupants on another. See A.7.2.2.5.4.

The signage must identify the stair, indicate the floor level of the landing and where the stairwell terminates at the top and bottom, and identify and show the direction to the exit discharge. Exhibit 7.42 is an example of a single sign providing all the required information. Exhibit 7.43 illustrates the placement required to ensure that the sign is readily visible whether the door is in the open or closed position.

The indication of the direction to the level of exit

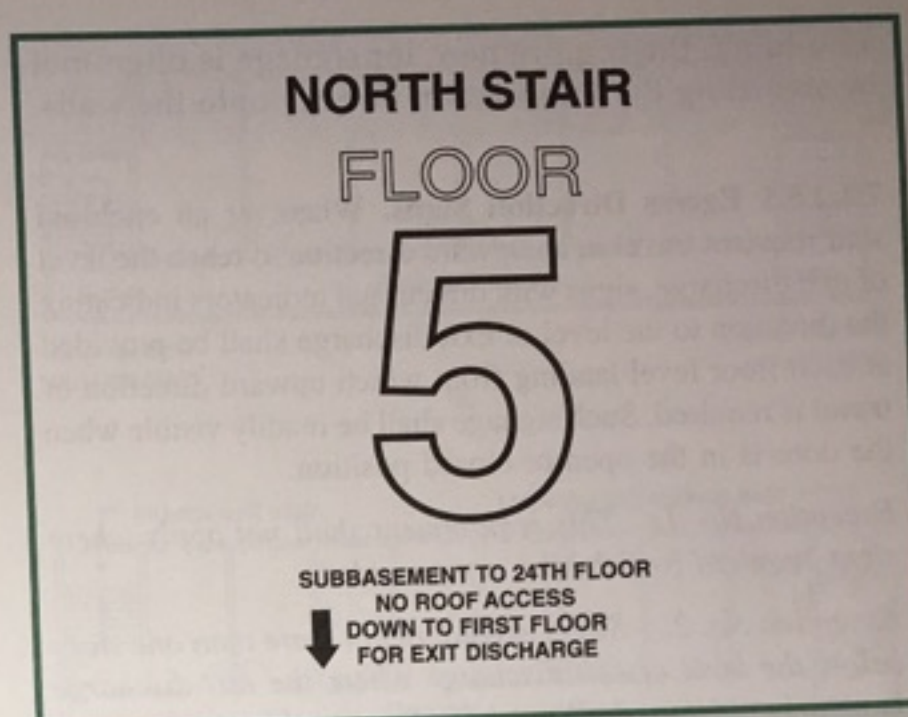


Exhibit 7.42 Stair sign details.

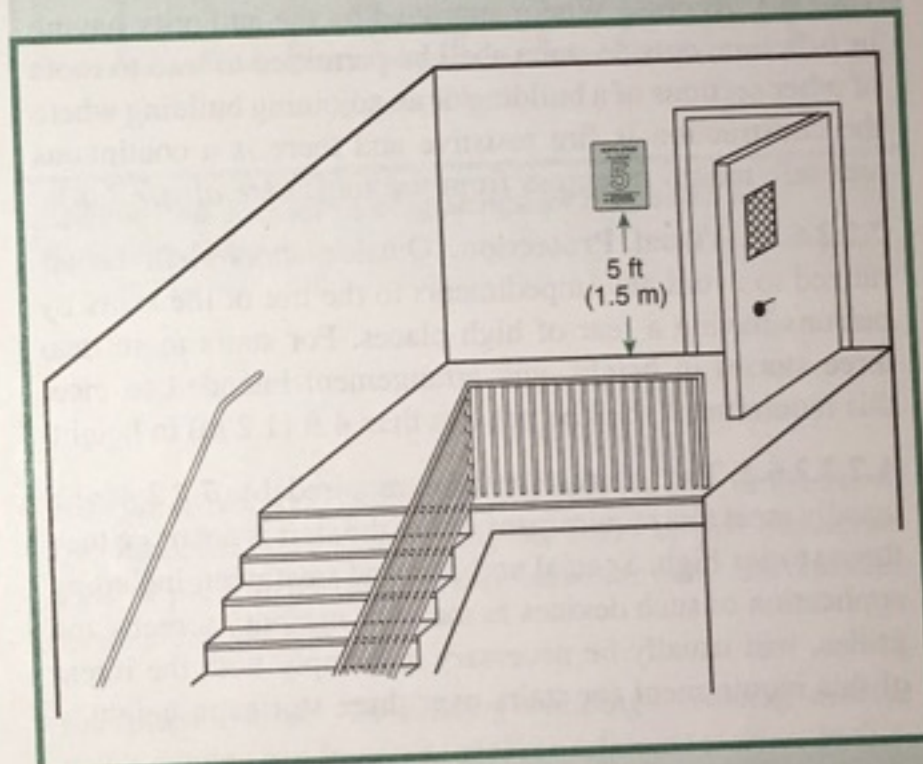


Exhibit 7.43 Stair sign placement.

discharge can be extremely useful to occupants of a building, especially if they are located below the level of exit discharge. The natural tendency of occupants is to attempt egress by traveling downward in a stair; this is counterproductive where the exit discharge is located on an upper level. Also, many buildings have multiple levels of entrance, which creates confusion with respect to travel direction in a given stair.

The requirements of 7.2.2.5.4 are not exempted for existing buildings, because it is feasible and cost effective to install signs providing the requested information. Because stair enclosures are usually not as aesthetically well finished as occupied portions of

a building, the requirement for signage is often met by stenciling the information directly onto the walls.

7.2.2.5.5 Egress Direction Signs. Wherever an enclosed stair requires travel in an upward direction to reach the level of exit discharge, signs with directional indicators indicating the direction to the level of exit discharge shall be provided at each floor level landing from which upward direction of travel is required. Such signage shall be readily visible when the door is in the open or closed position.

Exception No. 1: This requirement shall not apply where signs required by 7.2.2.5.4 are provided.

Exception No. 2: Stairs extending not more than one story below the level of exit discharge where the exit discharge is clearly obvious shall not be subject to this requirement.

7.2.2.6 Special Provisions for Outside Stairs.

7.2.2.6.1 Access. Where approved by the authority having jurisdiction, outside stairs shall be permitted to lead to roofs of other sections of a building or an adjoining building where the construction is fire resistive and there is a continuous and safe means of egress from the roof. (See also 7.7.6.)

7.2.2.6.2* Visual Protection. Outside stairs shall be arranged to avoid any impediments to the use of the stairs by persons having a fear of high places. For stairs more than three stories in height, any arrangement intended to meet this requirement shall be not less than 4 ft (1.2 m) in height.

A.7.2.2.6.2 The guards that are required by 7.2.2.4 will usually meet this requirement where the stair is not more than three stories high. Special architectural treatment, including application of such devices as metal or masonry screens and grilles, will usually be necessary to comply with the intent of this requirement for stairs over three stories in height.

Outside stairs frequently have an open side. Required rails and guards help to prevent falls but do nothing to shield the user's view of the vertical drop. For outside stairs on high buildings, the fear of height might interfere with the use of such stairs; therefore, 7.2.2.6.2 requires a 4-ft (122-cm) high visual barrier to be provided.

7.2.2.6.3 Separation and Protection of Outside Stairs. Outside stairs shall be separated from the interior of the building by walls with the fire resistance rating required for enclosed stairs with fixed or self-closing opening protectives. This construction shall extend vertically from the ground to a point 10 ft (3 m) above the topmost landing of the stairs or to the roofline, whichever is lower, and to a point not less than 10 ft (3 m) horizontally.

Subparagraph 7.2.2.6.3 applies only where the outside stair serves as an exit. See commentary following Exception No. 2 to 7.2.2.1.

An important consideration is the proximity of outside stairs to openings in the building wall through which fire emerging from the building could render the stairs useless as a means of egress. Protection against such an occurrence is achieved as follows:

- (1) Protection from openings by separation distances
- (2) Protection of openings by fire-rated doors and fire-rated windows, which must be done if the openings are positioned in a wall so that the separation distances are less than are required.

The old fire escape arrangement where a window access is positioned immediately below a fire escape landing creates the potential for fire exposure of the fire escape. This is a situation to avoid. The separation and protection provisions in 7.2.2.6.3 for outside stairs are illustrated in Exhibits 7.44 through 7.46.

In Exhibit 7.44, if openings are within 10 ft (3 m) of the outside stairs, they must be protected (see 7.2.2.6.3). However, the fire resistance ratings in

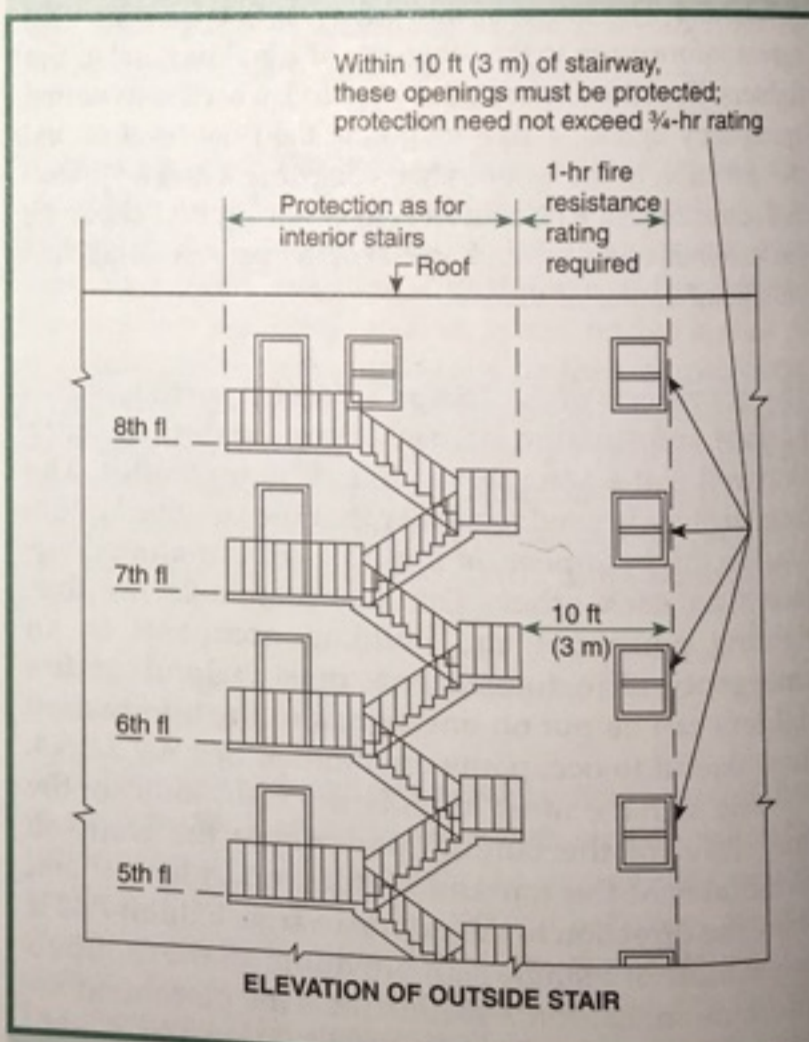


Exhibit 7.44 Protection of openings for outside stairs—Example 1.