

In our day-to-day lives, most of us never notice how code requirements are implemented in public buildings. The value of codes is quickly realized, however, when a calamity such as a power outage, a fire, or an armed robbery occurs and causes panic. The number of people, the size of the building, the combustibility of the construction, the illumination and signage of the exits, and the ease of travel all suddenly matter.

Public buildings and their decks are regulated by the International Building Code (IBC) rather than the more familiar International Residential Code (IRC). This article covers

some of the provisions that limit commercial deck design, but it obviously can't explain all the requirements of the IBC. If you primarily build residential decks, it's a good idea to employ a registered design professional when doing commercial work, whether or not it's required by your local building department. The code can be baffling; plus, you probably don't want to own the liability for a design failure of, say, a deck on a popular restaurant.

Means of Egress

A priority in commercial deck design is making sure people can exit a building, particularly

Commercial Decks Play by Different Rules

by Glenn Mathewson

**Occupancy, exit, and fire-protection considerations
limit material choices and complicate the game**

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in an emergency. Chapter 10 of the 2006 IBC defines “means of egress” as “a continuous and unobstructed path of vertical and horizontal egress travel from any occupied portion of a building or structure to a public way. A means of egress consists of three separate and distinct parts: the exit access, the exit and the exit discharge.” When a deck is added to a structure, the existing means of egress must not be compromised.

Every place in a building or on a structure outside a building is considered part of the means of egress (**Figure 1**), including enclosed areas such as decks and exterior exit stairways or ramps, where flames, airborne debris, or collapsing structures can still threaten occupants’ safety and their ability to reach a public way. Travel can’t be inhibited by security fences, gates, trip hazards, or excessively uneven or sloping surfaces.

Another limitation is found in IBC section 1003.4, which generically states: “Walking surfaces of the means of egress shall have a slip-resistant surface and be securely attached.” While it’s obvious you don’t want people slipping on a deck, and you certainly don’t want the decking to move under their feet, there is no test standard or accepted criteria referenced by the IBC for determining whether a surface is slip-resistant. And stairways and approaches to stairways on the exterior of a building — in addition to being slip-resistant — must also be designed so that water won’t accumulate on the walking surface (IBC 1009.5.2).

Elevation Changes

It’s common at private residences to see decks with multiple levels separated by just one or two steps. Though that’s a nice way to distinguish different areas of a deck for backyard entertaining, it might not be allowed on a public deck.



Figure 1. Even small public decks such as this view platform must have at least one accessible egress path.

Generally, if the elevation change is less than 12 inches, you can’t put in steps — you must slope the surface so it’s accessible to people with disabilities (**Figure 2, page 3**).

There is an exception to that rule. While all paths are part of a means of egress, only some are required to be accessible. When just one exit is required, it must be accessible, and when two are required, both must be accessible. However, when three or more exits are required, no more than two have to be accessible. So, when the elevation change is not part of an accessible means of egress, a change in elevation of less than 12 inches can be made by either one or two risers (7 inches, maximum) and a tread (13 inches, minimum), as long as no point of the normal path of egress travel is farther than 30 inches from a handrail. But unless you have the help of a design professional, avoid small elevation changes.

Elevation changes at doorways are also regulated by the IBC. In regions where it snows, many homeowners prefer a step down from the exit door to the deck to keep snow from piling against the door. You can’t do that in

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commercial applications. The floor surfaces on both sides of a public doorway must be at the same elevation, no more than $\frac{1}{2}$ inch below the door threshold (IBC 1008.1.4). Thresholds of sliding glass doors in the living and sleeping areas of apartments and hotels are an exception and can be as much as $\frac{3}{4}$ inch above the floor.

Lighting

As a rule, all components of the means of egress must be illuminated (IBC 1006) to at least 1 foot-candle at the walking surface, as measured by a light meter at night. If you don't have a light meter, don't worry: Chances are pretty good your inspector won't have one either; nor is the inspection likely to be at night. A logical approach is best: Make sure the deck is significantly illuminated. In some instances, the lighting may be required to be connected to an emergency electrical backup system.

Type of Construction

The IBC categorizes construction into five types according to the combustibility of the building material and the fire-resistivity of the assemblies. All except type IV (heavy timber) have A and B subtypes, with A requiring more fire-resistivity in the building assemblies than B. The maximum allowable height and area of

a building are primarily determined by the type of construction. The more fire-resistant the building type, the larger and higher the structure is allowed to be.

In types I and II, both A and B, almost all the building components must be noncombustible. However, decks, porches, and exterior stairways not functioning as required exits can be constructed of fire-retardant-treated wood; and their handrails and guard components can be made of untreated wood. Neither exception allows the use of plastics or plastic-wood composites, but those could be approved by the local authority as an alternative for untreated-wood handrails and guards.

In types III, IV, and V, decks and exterior stairways can be built from combustible materials, yet the assembly may still be required to be fire-resistive. You would probably need to consult a design professional for the details of such construction.

Some site conditions, such as open yards around the building for fire-vehicle access, or a fire-sprinkler system, may allow for increases to the height and area of the building. These are important to identify because the design for any addition or modification to an existing building must take into account how its original height and area were determined. A large

Subtle Elevation Change

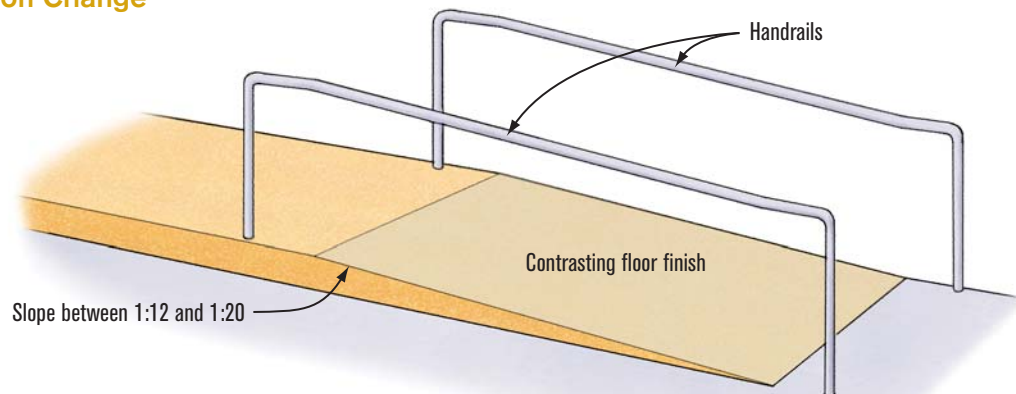


Figure 2. On public decks, elevation changes often must be made with a slope — between 1:12 and 1:20 — rather than steps. Small changes are difficult to see, so when the elevation change is 6 inches or less, the sloped surface must be distinguished with a contrasting floor finish or handrails must be installed.

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deck built on the back of a church, for example, may not be allowed to encroach into an open yard that was intended for fire access in the original design.

In all types of construction, the aggregate length of a deck along a building's exterior can't exceed 50 percent of the building's perimeter for each floor level. However, the presence of fire sprinklers at the deck can allow for exceptions to the maximum total length and fire-

resistance requirements (IBC 1406.3). These are aspects of the code for which you definitely need the help of a design professional.

Occupancy Type and Occupant Load

After construction type, the next criteria to consider are the occupancy type, or intended use; and the occupant load, or maximum number of people that may legally occupy the building. The occupancy of a building has a dramatic effect on its design and construction and is a starting point for almost all the design provisions of the IBC — particularly the number of required exits.

Most deck construction occurs at Assembly (A), Mercantile (M), Business (B), and Residential (R) occupancies. Once the occupancy type has been properly identified, the current and new occupant loads must be considered. Occupant load is based on the “anticipated function of the space” and the amount of area thereby required for each person. IBC table 1004.1.1, titled “maximum floor area allowances per occupant,” provides 38 different functions that a designer or plan reviewer will use to categorize building spaces.

In the case of a deck addition, the size and function of the spaces in the existing building and on the new deck combine to dictate the building's total occupant load (**Figure 3**). Each individual space must also be considered separately, as the required number of exits from each space is dictated by the occupant load of that space; and further, any accessory space that exits through another primary space must have its occupant load added to the load of the primary space it exits through. It is these final occupant loads, based on how the occupants travel to a public way, that determine how many exits are required.

Not only does the number of required exits vary based on the occupant load and occupancy type, but so does the total width of the exits (IBC 1005). When more than one exit is required from a space, the total width of the required exits must be properly distributed among all the exit openings, and the locations of the exits must be spaced according to provisions in the code (**Figure 4, page 5**). Each arrangement requires a specific evaluation and

Occupant Loads and Egress

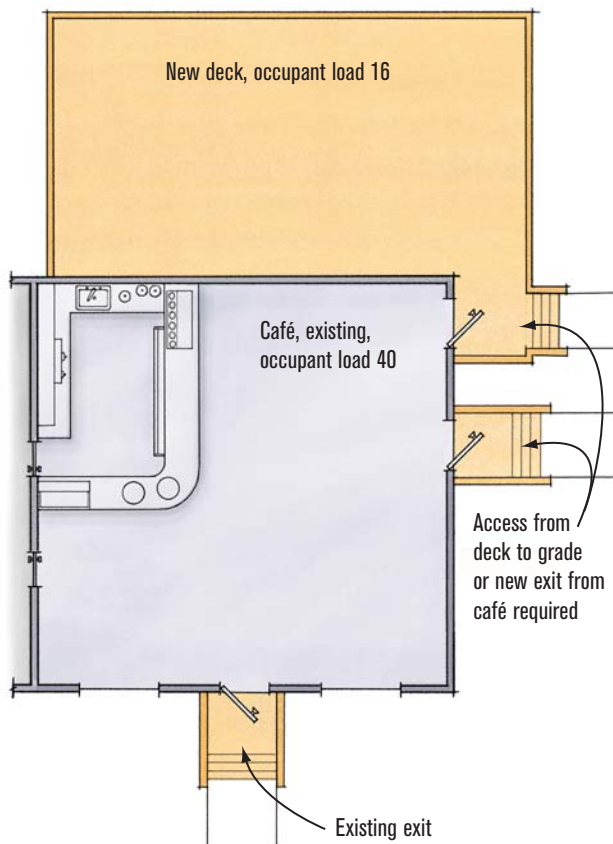


Figure 3. A new deck (above) is high above grade and surrounded by guards. If egress for the deck's 16 occupants were only through the café, the occupant load of the café would be increased to 56 (40 + 16). Spaces with a load of 50 or more usually require two exits, so a second exit door from the café would have to be added. However, if egress from the deck were provided directly to grade, the deck occupants wouldn't need to exit through the café and the additional door wouldn't be necessary.

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Distance Between Exits

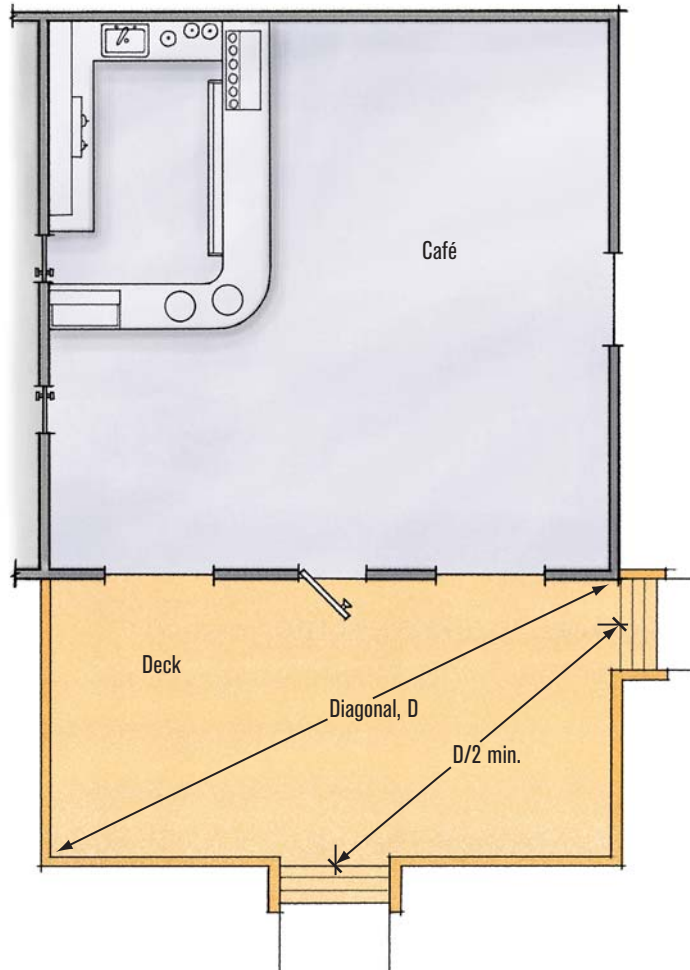


Figure 4. When two exits are required, they cannot be closer to each other — as measured in a straight line from the center of one to the center of the other — than half of the overall maximum diagonal distance across the area in question.

Figure 5. When public decks have an occupant load of more than 50 and serve as a means of egress, illuminated exit signs may be required.



could result in dramatically different requirements. It's all about how people must move through the spaces.

Related to occupant load is the design live load. In commercial structures, the 40 psf live load typically required for residential structures is no longer the rule. The live load that a structure is required to resist varies and is based on similar criteria as the occupant load (Table 1607.1). For example, a restaurant deck without fixed seats must be designed to resist 100 psf, while a deck serving an office must resist 50 psf.

Occupant Load of 50 or More

As shown in the illustration on page 4, the creation of a deck sometimes requires the addition of an exit. That prompts even more requirements. A space requiring two exits, for instance, must have illuminated exit signs above both exits (Figure 5). In the example at left, where the deck itself requires two exits, exit signs would need to be provided at the exits from the deck, but not from inside the café. However, an exception in the IBC does allow the building official to approve the omission of exit signs when the exits are “obviously and clearly identifiable as exits.” Of course, this is specific to an individual project.

When a door serves a space with an occupant load of 50 or more, the door must swing in the direction of egress travel. In the example shown on page 54, if the back deck were larger (750 square feet) and had access only through the café, the door would have to swing in.

The presence of an automatic fire-sprinkler system in an existing building can affect how codes apply to a deck addition, potentially allowing greater design flexibility in the new project. However, the presence of an existing fire-sprinkler system may also require newly

constructed spaces, even decks, to be included within the protecting boundaries of the system. The details of this requirement are outside the scope of this article, but you should know that designing a deck on a building with fire sprinklers requires additional considerations. ❖

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