

## Travel Distance

By Ronald L. Geren, AIA, CSI, CCS, CCCA, SCIP

If you ask most people to define “travel distance,” they would probably respond with something along the line of, “How far I have go on I my next business or vacation trip.” But in building code parlance, travel distance has a completely different meaning.

Although not specifically defined in the *International Building Code (IBC)*, travel distance is described in Section 1016.1 (2009 IBC) as

*the maximum length of exit access travel, measured from the most remote point within a story along the natural and unobstructed path of egress travel to an exterior exit door at the level of exit discharge, an entrance to a vertical exit enclosure, an exit passageway, a horizontal exit, an exterior exit stairway or an exterior exit ramp, [which] shall not exceed the distances given in Table 1016.1.*

In essence, it is the total distance an occupant must cover to reach an exit as defined by the IBC (See Figure 1). The concern with travel distance is to ensure that occupants can reach an exterior door or protected exit enclosure without having to take an extremely long path to get there, thus reducing the occupants’ exposure to a potential hazard.

$$\text{Travel Distance} = A + B + C$$

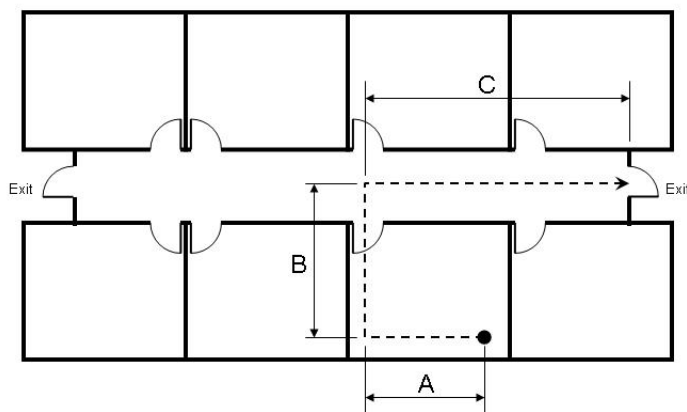


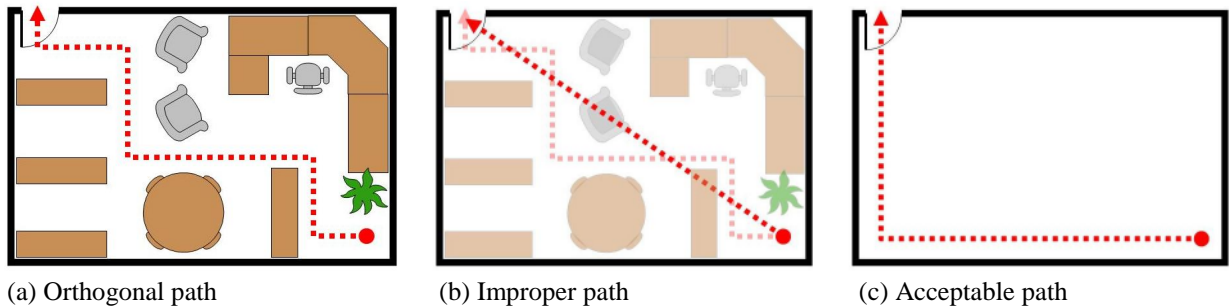
Figure 1 - Determining travel distance.

Table 1016.1 provides the limitations on travel distance based on occupancy and the installation of a sprinkler system. For most nonsprinklered occupancy groups, this distance is 200 feet. With a sprinkler system installed, this distance increases to 250 feet, but for B occupancies, it increases to 300 feet. Nonsprinklered Groups F-2, S-2, and U are limited to 300 feet (400 feet when sprinklered). Group I and H occupancies have various travel distances listed, but are limited to only sprinklered buildings, since these occupancies are required to be sprinklered per Section 903.2.

### Measuring Travel Distance

The measurement of travel distance within a space, as the IBC description indicates, must follow a path that would ordinarily be followed. In most cases, a space will be filled with furniture, fixtures, and equipment (FF&E) that would typically require an orthogonal path of travel through the space to reach the exit or exit access doorway (See Figure 2a). However, using a direct path to the doorway would not provide a realistic path (See Figure 2b)—only in a very few situations would such a path be acceptable.

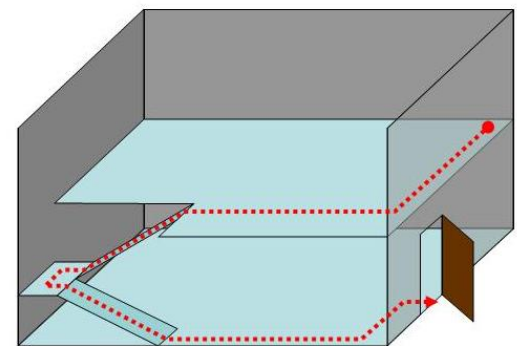
There is no codified method for determining travel distance, but the simplest approach is to start at the farthest point and follow the perimeter of the space until an exit or exit access doorway is reached using the shortest route possible (See Figure 2c). However, it is not necessary to take the measurement right at the wall. Since an occupant will follow a path that allows some clearance from objects such as walls, measuring the path at a reasonable distance from the wall is acceptable. The IBC does not prescribe a distance, but NFPA 101, *Life Safety Code*, establishes a 12-inch clearance, which may be used as a guide.



**Figure 2** - Determining the egress path for measuring travel distance.

Although this method is imprecise, it delineates a path having a distance comparable to one that weaves through FF&E. It is understandable that the FF&E layout could create a path that is shorter or longer than the method described above, but since the layout of a space is unknown and can vary throughout a building’s life, the method described above is generally accepted by building departments.

As the description states, travel distance is limited to “within a story.” However, two exceptions permit the travel distance to be measured along unenclosed stairways and ramps that connect two stories for occupancies other than Groups H and I. When unenclosed stairways or ramps are used, the travel distance measurement must include the path of travel along these egress components until an exit is reached (See Figure 3). For stairways, the measurement is taken parallel to the slope made by the stair tread nosings and not parallel to the treads (See Figure 4).

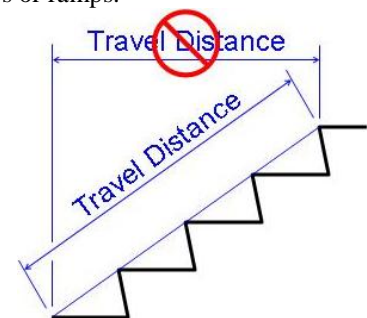


**Figure 3** - Travel distance along unenclosed stairs or ramps.

**Special Conditions**

Up to this point, the discussion on travel distance has focused on the general requirements. However, there are special conditions that are found under footnote “a” of Table 1016.1 that may restrict or extend the travel distances listed in the Table.

Covered mall buildings have special circumstances unique to that building type. Therefore, the general requirements for travel distance within them are modified in Section 402.4.4. Within tenant spaces, the travel distance is limited to 200 feet from any point to an exit or the entrance to the mall.



**Figure 4** - Measurement of travel distance along stairs is parallel to the stair slope.

Additionally, another 200 feet is permitted from any point within the mall to an exit. Therefore, a Group M mall building can have a travel distance up to 400 feet compared to the 250 feet allowed by Table 1016.1 (The distance for a sprinklered building is used since covered mall buildings are required to be sprinklered per Section 402.9).

Other special conditions provided in the Table’s footnotes include atriums, assembly seating, Groups I-2 and I-3, refrigerated rooms and spaces, refrigeration equipment rooms, temporary structures, pedestrian walkways, and buildings with one exit. Of that list, the following are commonly encountered:

- For atriums, if the required means of egress is through an atrium, only 200 feet of the permitted travel distance can be within the atrium.
- For assembly seating, the travel distance is limited to 200 feet (250 feet in sprinklered buildings) and must be measured along the aisles and aisle accessways to an exit. An aisle accessway is the path within the rows of seating that lead to the main aisles. For open-air seating, the travel distance is 400 feet, and in buildings of Types I or II construction, the travel distance is unlimited.
- For buildings that are eligible to have one exit, the travel distance is limited based on the occupancy group, occupant load, and the story height. The travel distances prescribed vary in length, but all are significantly less than the distances permitted in Table 1016.1.
- For refrigeration equipment rooms, an exterior exit access doorway is required to be within 150 feet of all portions of the room.

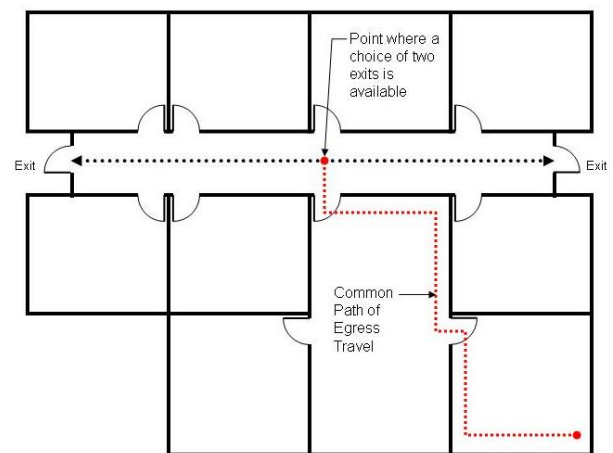
Another provision in Section 1016.2 for exterior egress balconies allows an extension up to 100 feet to the travel distances permitted in Table 1016.1. This provision can apply to any occupancy group when the last portion of the exit access leading to an exit occurs on an exterior egress balcony. Therefore the travel distance to the beginning of the exterior egress balcony can be no longer than the distance indicated in Table 1016.1, and the travel distance on the balcony to an exit can be no longer than 100 feet.

### Common Path of Egress Travel

An article on travel distance would not be complete without mentioning the “common path of egress travel.” The common path of egress travel, or CPET, is defined in the IBC as:

*That portion of exit access which the occupants are required to traverse before two separate and distinct paths of egress travel to two exits are available. Paths that merge are common paths of travel. Common paths of egress travel shall be included within the permitted travel distance.*

In other words, when occupants are restricted to one path before they have a choice of going in two directions to reach separate exits, that one path is the CPET (See Figure 5). In all occupancies, except for Groups H-1, H-2, H-3, and I-3, the CPET is limited to 75 feet. For Groups H-1, H-2, and H-3 occupancies, it is limited to 25 feet, and for Group I-3 it is limited to 100 feet.



**Figure 3 - Identifying the common path of egress travel**

There are two exceptions that allow the CPET to be extended. One exception allows the CPET to be 100 feet in Groups B, F, and S if the buildings are sprinklered throughout. The second exception allows the CPET to be 100 feet in tenant spaces of Groups B, S, and U when the occupant load is 30 or less.

As stated in the last part of the definition, the CPET is included within the permitted travel distance and is measured using the same principles. For example, a nonsprinklered Group B building is allowed 100 feet of travel distance per Table 1016.1. Within that distance, 75 feet is permitted to be a common path of egress travel.

### **The Positive Side of Travel Distance**

Establishing the maximum distance that occupants must traverse before reaching an exit is essential to an effective building code, even though the distances may seem a little restrictive from a design viewpoint. On the positive side, the limitations are only applicable to one of the available exits; if other exits are provided, they may be at distances greater than the permitted travel distance.

Furthermore, since measuring travel distance is not rocket science, measuring to the nearest inch is unnecessary—rounding to the nearest foot is acceptable. Also, if you are over the maximum by a short distance (5 feet or less, depending on the permitted travel distance), you may be able to eliminate the excess distance by making reasonable minor adjustments to the path's location.

As the saying goes, “All roads lead to Rome,” which essentially means, “Different paths can take you to the same place.” When it comes to means of egress, the “same place” is the building exterior. But, unlike the roads to Rome, you don't want the trip to be a long one when danger is present, so restrictions on travel distance must be established.

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*About the Author: Ronald L. Geren, AIA, CSI, CCS, CCCA, SCIP, is an ICC Certified Building Plans Examiner, and is the principal of RLGA Technical Services located in Scottsdale, Arizona, which provides specifications and code consulting services to architects, engineers, owners, and product manufacturers. A 1984 graduate of the University of Arizona, Ron has over 24 years of experience with military, public, and private agencies.*