BRITISH COLUMBIA

GUIDELINES

Occupant Load

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Scope

This guideline explains the provisions for *occupant loads* in the BC Building Code and the BC Fire Code. There may be other external factors that affect *occupant loads* for a building or parts of a building, such as municipal bylaws and Liquor Control and Licensing Branch, these are not included within the scope of this document. These other factors may be more restrictive than the Building or Fire Code but they cannot permit a higher *occupant load* than the Fire Code.

The BC Building Code *occupant load* is based on the intended use as determined by the designer. The *occupant load* determined under the Fire Code is the maximum number of people permitted in a space under any condition.

Relationship between the Building and Fire Codes

The BC Building Code establishes a satisfactory standard of fire, life and health safety for the design and construction and alteration of buildings. The Fire Code establishes an acceptable standard for fire and life safety for buildings in use.

The two codes are intended to be complementary and coordinated documents which reduce the possibility of conflict in their respective contents. The BC Fire Code should not conflict with or supersede the requirements in the BC Building Code. *Occupant loads* determined under the two codes will likely be different since they are determined for different reasons. They should not be seen as conflicting.

Definitions

For the purposes of this guideline and to ensure that there is an understanding of the terms used in this document, the following definitions are provided. These italicized definitions are the same as those included in both the Building and Fire Codes.

> *Occupant load* means the number of persons for which a building or part thereof is designed.
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> *Means of egress* means a continuous path of travel provided for the escape of persons from any point in a building or contained open space to a separate building, an open public thoroughfare, or an exterior open space protected from fire exposure from the building and having access to an open public thoroughfare. *Means of egress* includes *exits* and *access to exit.*
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> *Exit* means that part of a *means of egress*, including doorways, which lead from the floor area it serves, to a separate building, an open public thoroughfare, or an exterior open space protected from fire exposure from the building and having access to an open thoroughfare.

Access to exit means that part of a *means of egress* within a floor area that provides access to an *exit* serving the floor area.

In summary, the *means of egress* is the path of travel from any point in the building to a safe space, protected from fire, which is usually the street. The *exit* is the actual door leading out of the building and could also be the door leading into the fire protected stair shaft or corridor. The *access to exit* is the path of travel within the floor area to an *exit.*

BC Building Code

One of the objectives of the Building Code is to assure an adequate level of health and safety for the number of people the building is designed to accommodate. The *occupant load* determines the capacity of the means of egress and other building features.

Table 3.1.16.1. of the Building Code provides area per person criteria to assist in determining the *occupant load* for various buildings or spaces within buildings. These suggested densities are intended to assist in the design of the *means of egress* and other *occupant load* dependent facilities in the building.

Clause 3.1.16.1.(1)(c) indicates the *occupant load* is the number of persons the area is designed for. However, it should not be less than that determined from the Table, unless it can be shown that the area will in fact be occupied by fewer persons. In other words, the Table is the default **minimum** *occupant load* for design purposes. However, due to potential variation in population densities in most of the categories listed, it is unrealistic to establish hard and fast rules for each category. Therefore, some reduction from the Table's values may be justified if it can be shown the area will be occupied for fewer persons. For instance, in a highly automated manufacturing operation the *occupant load* estimates might be relaxed from those calculated from the Table, provided there is reasonable assurance that the *occupant load* will not be exceeded in the future.

On the other hand, if a building is designed for an *occupant load* which exceeds the values determined from the Table, the higher values must be used. Table 3.1.16.1. is not intended to limit the number of occupants in an area, although it is sometimes used or applied this way. The values listed in Table 3.1.16.1. suggest a gross floor area for various uses, which includes the space occupied by fixtures, equipment, products and the like that are typical for the intended use of the space.

Where a building is designed with an *occupant load* which is different than determined using Table 3.1.16.1., Sentence 3.1.16.2.(2) requires a permanent sign to be posted indicating this *occupant load.*

There will be circumstances when it may not be appropriate to include all rooms in a building to determine the building's total design *occupant load.* This may be the case for an office building where washroom facilities are used only by occupants of the building. If the washroom was included in the count of the building's total occupant load, in effect you would be counting the same people twice.

BC Fire Code

Under Fire Code Article 2.7.1.3. there is a limit to the maximum number of persons permitted to enter a room. This limit is based on a density of not more than 0.4 sq m (4 sq ft) per person provided the available egress capacity is adequate. The density is based on the net floor space of the room which excludes areas occupied by structural components and fixtures, furnishings or equipment but does not exclude furniture used for seating. Therefore, the maximum permissible *occupant load* is to be calculated on the basis of the **lesser** of either 0.4 sq m (4 sq ft) of net floor space per occupant, or the *occupant load* for which egress is provided.

Maximum permissible *occupant load* cannot exceed the maximum number of persons that can safely be accommodated by the *means of egress* provided from a room. Actual use of a room or space may result in more people than the number determined by applying the *occupant load* factors of the Building Code. However, in no case should the maximum permissible *occupant load* be less than that determined by applying the BC Building Code.

Calculation of Exit and Egress Capacities

The width of a *means of egress* should be not less than:

- 1,100 mm (43 in) for corridors and passageways,
- 900 mm (35.5 in) for stairs and ramps,
- 800 mm (31.5 in) for suite doors, and
- 790 mm (31 in) for *exit* doorways.

[BCBC Sections 3.3 and 3.4]

Although these minimums may not be available in older buildings, the lesser dimensions will reduce the number of people that can be accommodated.

The capacity of the *means of egress* is calculated on the basis of:

- 6.1 mm (0.24 in) per person for doorways, corridors and passageways, and
- 8 mm (0.31 in) for stairs.

[BCBC Sentence 3.4.3.4.(1)]

The required capacity of an *access to exit* is based on the *occupant load* of the portion of the floor area served. The most restrictive part of a means of egress is ultimately the *occupant load's* controlling factor. For instance, the width of a corridor may not accommodate as many people as the egress doors or density of the room or rooms opening onto the corridor so the width of the corridor becomes the controlling factor

Door and Hardware Considerations

In addition to the width of the egress facilities the number of exit doors, direction of door swing and the type of hardware installed on a door can have an effect on its capacity. Examples are as follows;

1. A room or suite with only one egress door is limited to an *occupant load* not exceeding 60 persons. [BCBC 3.3.1.5.(1)(b)]

2. A door providing *access to exit* from a room with an *occupant load* of more than 60 persons must swing in the direction of travel to the *exit*. Therefore, a door that swings into the room limits the maximum permissible *occupant load* to 60 persons. [BCBC 3.3.1.10.(2)]

3. If a room used for an assembly occupancy has an *occupant load* of more than 100 persons then the doors must be equipped with door release hardware commonly know as "panic hardware." Doors without panic hardware limit the maximum permissible *occupant load* to 100 persons. [BCBC 3.3.2.6.(1) and 3.4.6.15.(2)]

4. A double leaf door that has one of the doors locked in place by manual flush bolts is considered to be a single leaf door for the purposes of exiting.

5. Egress doorways that are obstructed by locking devices or the placement of fixtures can reduce the maximum permissible *occupant load*.

Signs

Fire Code Sentence 2.7.1.4.(1) requires a sign to be posted in assembly occupancies where the *occupant load* exceeds 60 persons. This sign is intended to indicate the maximum permissible *occupant load* determined under Article 2.7.1.3.

The BC Fire Code requires the owner to carry out the provisions of the Fire Code so it is the owner's responsibility to post the required signs. However, as it is the responsibility of the local fire authority to enforce the Fire Code, it is recommended that the posting of the sign be done in consultation with the local fire authority.

In cases where the layout of an establishment periodically changes, it is recommended that the different layouts are documented as part of the fire safety plan, which is developed in cooperation with the local fire authority. This will help to ensure that the periodic change in layout is compliant with the requirements of the BC Fire Code.

Signage required by both the Building Code and the Fire Code shall be in a format as directed by the fire commissioner. Details of this format can be found at: http://www.pssg.gov.bc.ca/firecom/guidelines/index.htm.