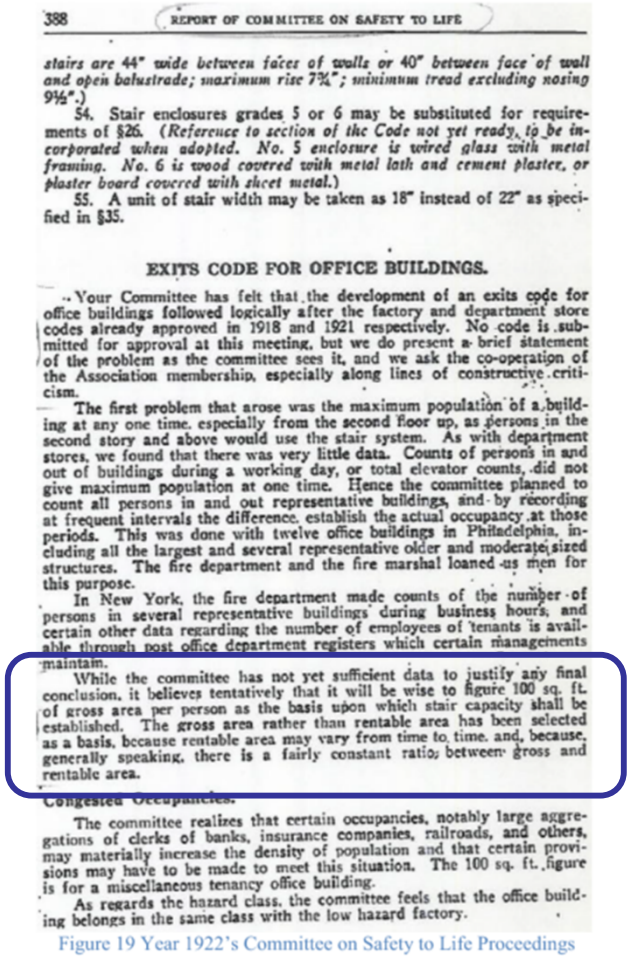
Office Use Occupant Load Factors

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COFFMAN ENGINEERS

History



388 REPORT OF COMMITTEE ON SAFETY TO LIFE

stairs are 44" wide between faces of walls or 40" between face of wall and open balustrade; maximum rise 7¾"; minimum tread excluding nosing 9½".)

54. Stair enclosures grades 5 or 6 may be substituted for requirements of §26. *(Reference to section of the Code not yet ready, to be incorporated when adopted. No. 5 enclosure is wired glass with metal framing. No. 6 is wood covered with metal lath and cement plaster, or plaster board covered with sheet metal.)*

55. A unit of stair width may be taken as 18" instead of 22" as specified in §35.

EXITS CODE FOR OFFICE BUILDINGS.

Your Committee has felt that the development of an exits code for office buildings followed logically after the factory and department store codes already approved in 1918 and 1921 respectively. No code is submitted for approval at this meeting, but we do present a brief statement of the problem as the committee sees it, and we ask the co-operation of the Association membership, especially along lines of constructive criticism.

The first problem that arose was the maximum population of a building at any one time, especially from the second floor up, as persons in the second story and above would use the stair system. As with department stores, we found that there was very little data. Counts of persons in and out of buildings during a working day, or total elevator counts, did not give maximum population at one time. Hence the committee planned to count all persons in and out representative buildings, and by recording at frequent intervals the difference, establish the actual occupancy at those periods. This was done with twelve office buildings in Philadelphia, including all the largest and several representative older and moderate sized structures. The fire department and the fire marshal loaned us men for this purpose.

In New York, the fire department made counts of the number of persons in several representative buildings during business hours, and certain other data regarding the number of employees of tenants is available through post office department registers which certain managements maintain.

While the committee has not yet sufficient data to justify any final conclusion, it believes tentatively that it will be wise to figure 100 sq. ft. of gross area per person as the basis upon which stair capacity shall be established. The gross area rather than rentable area has been selected as a basis, because rentable area may vary from time to time, and, because, generally speaking, there is a fairly constant ratio between gross and rentable area.

Congested Occupancies.

The committee realizes that certain occupancies, notably large aggregations of clerks of banks, insurance companies, railroads, and others, may materially increase the density of population and that certain provisions may have to be made to meet this situation. The 100 sq. ft. figure is for a miscellaneous tenancy office building.

As regards the hazard class, the committee feels that the office building belongs in the same class with the low hazard factory.

Figure 19 Year 1922's Committee on Safety to Life Proceedings

"While the committee has not yet sufficient data to justify any final conclusion, it believes tentatively that it will be wise to figure 100 sq. ft. of gross area per person as the basis upon which stair capacity shall be established"

- 1922 Committee on Safety to Life Proceedings

Code Change

2016 CBC

TABLE 1004.1.2
MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Accessory storage areas, mechanical equipment room	300 gross
Agricultural building	300 gross
Aircraft hangars	500 gross
Airport terminal Baggage claim Baggage handling Concourse Waiting areas	 20 gross 300 gross 100 gross 15 gross
Assembly Gaming floors (keno, slots, etc.) Exhibit Gallery and Museum	 11 gross 30 net
Assembly with fixed seats	See Section 1004.4
Assembly without fixed seats Concentrated (chairs only-not fixed) Standing space Unconcentrated (tables and chairs)	 7 net 5 net 15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas	100 gross

2019 CBC & Beyond

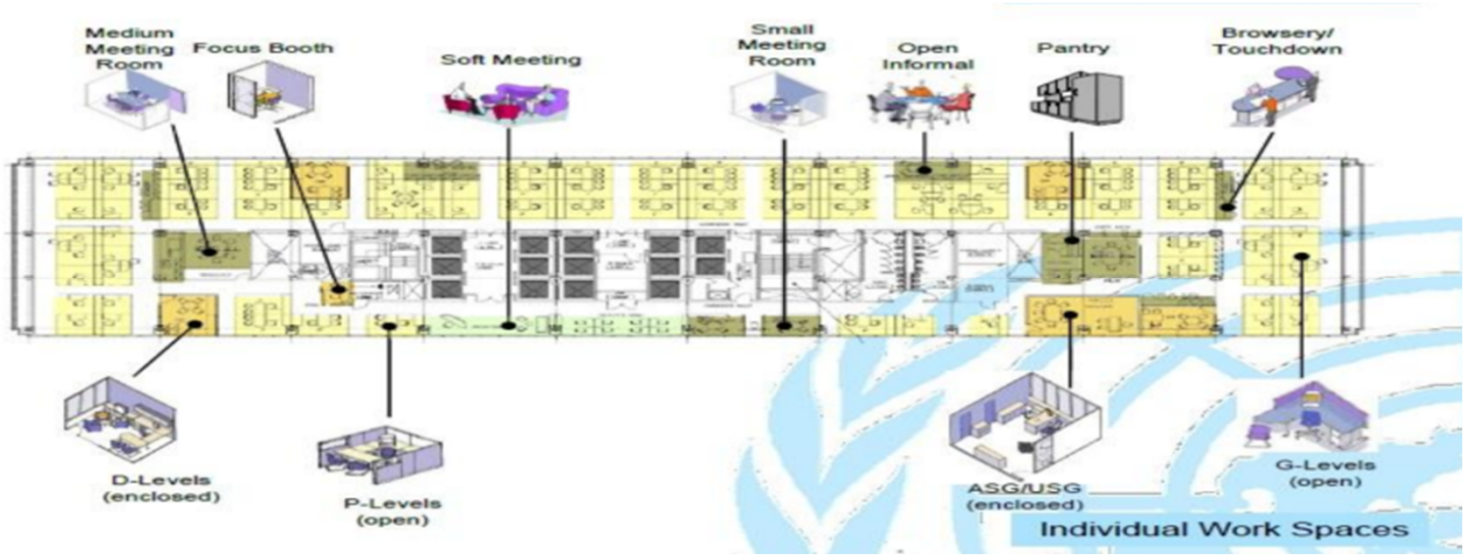
TABLE 1004.5
MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Accessory storage areas, mechanical equipment room	300 gross
Agricultural building	300 gross
Aircraft hangars	500 gross
Airport terminal Baggage claim Baggage handling Concourse Waiting areas	 20 gross 300 gross 100 gross 15 gross
Assembly Gaming floors (keno, slots, etc.) Exhibit gallery and museum	 11 gross 30 net
Assembly with fixed seats	See Section 1004.6
Assembly without fixed seats Concentrated (chairs only—not fixed) Standing space Unconcentrated (tables and chairs)	 7 net 5 net 15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas Concentrated business use areas	150 gross See Section 1004.8

1004.8 Concentrated business use areas. The occupant load factor for concentrated business use shall be applied to telephone call centers, trading floors, electronic data processing centers and similar business use areas with a higher density of occupants than would normally be expected in a typical business occupancy environment. Where approved by the building official, the occupant load for concentrated business use areas shall be the actual occupant load, but not less than one occupant per 50 square feet (4.65 m^2) of gross occupiable floor space.

Where did it come from?

“Studies conducted between 1966 and 1992 have indicated that occupant load factors in business occupancies ranged from 150 to 278 square feet per occupant. A more recent project to study the appropriateness of the 100-square-feet-per-occupant factor was undertaken by the NFPA Fire Protection Research Foundation. The study was conducted by WPI undergraduate students. The recommendations of this study also supported an increase to the occupant load factor in business occupancies. Based on this information, it was deemed appropriate that the factor be increased to 150 square feet per occupant.” - 2018 CBC Significant Code Changes



Research Quotes

"The purpose of looking at office furniture in respect to occupancy load is simply that if a manufacturer is making a 24" x 36" cubical, there are likely businesses that are currently use them and therefore have only a $6ft^2$ of desk space for each worker. While in some types businesses, this may be counterbalanced with a larger amenity areas for employees (i.e. breakrooms, lounges, group meeting rooms, etc.) this may not be true for all businesses with high density seating arrangements and therefore strongly must be taken into consideration."

"The types of offices included in this category are: call centers, mail rooms, printer area, copy machines, spaces mainly designed for low ranked personnel who can easily be substituted."

Muha, T. (2012). Evaluating Occupant Load Factors for Business Operations, WPI.



Research Recommendation

14. Recommendation

Our recommendation is that the value of the occupant load factor for general business use spaces should be increased to 150ft^2/person, and that a new category of concentrated business use be introduced with an occupant load factor or 100 ft^2/person as summarized in Table 17. It is noted however that smaller occupant load factors might be more appropriate for concentrated business use areas depending upon the size of work space anticipated, i.e. workstations as small as of 25ft^2/person are available.

Category of office space	Occupant Load Factor (ft^2/person)
General office space	150
High density spaces (e.g. call centers)	100

Table 17 Summary of recommendation

Muha, T. (2012). Evaluating Occupant Load Factors for Business Operations, WPI.

Code Guidance

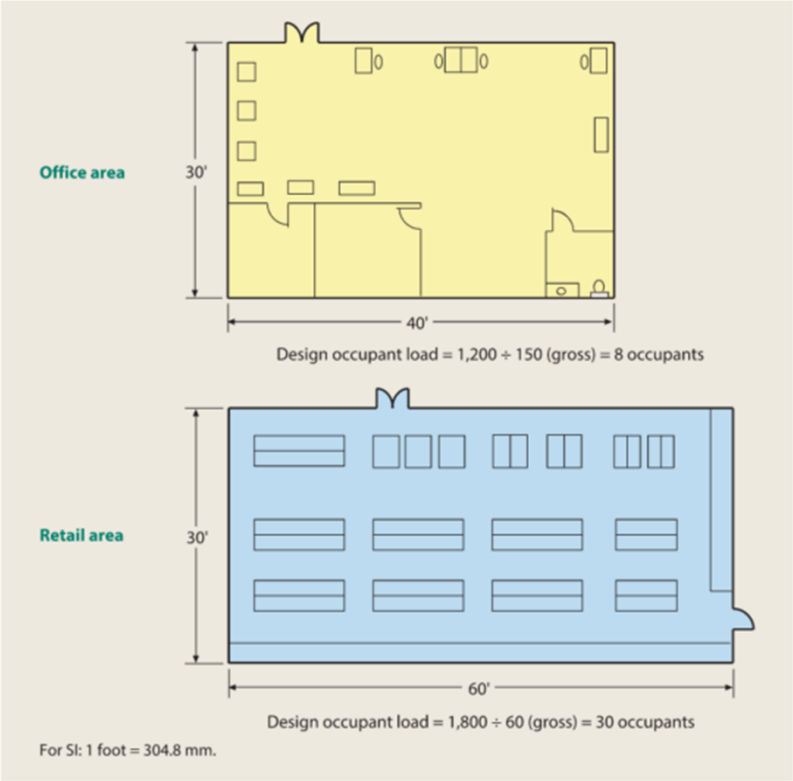


Figure 1004-5 **Design occupant load examples.**

"For example, when the code prescribes an occupant load factor of 150 gross for business use, it is not saying that each person in an office must be provided with at least 150 square feet of working space. Rather, it is saying that, for egress purposes, at least one person must be assumed to be present for each 150 square feet of floor area in the business use."

IBC Illustrated Handbook

SF Variance from Model Code

SF DBI

SF DBI enforces this requirement by applying a 1:50 ratio, or the actual workstation count, in the specific areas where concentrated workstations are located. For the remainder of the floor, a 1:150 ratio is applied, excluding large conference rooms and common employee assembly areas.

IBC

“For example, when the code prescribes an occupant load factor of 150 gross for business use, it is not saying that each person in an office must be provided with at least 150 square feet of working space. Rather, it is saying that, for egress purposes, at least one person must be assumed to be present for each 150 square feet of floor area in the business use.”

Request

Problem

TI projects, even without desking reconfigurations, are being flagged as noncompliant, triggering restroom recalculation and redesign.

Request

Confirm acceptance of a 1:150 gross OLF for office use.
If SF's OLF deviates from model code, initiate a code amendment process.



