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FIRE PROTECTION HISTORY-PART 178: 1922 (DESIGN OCCUPANT LOADS-OFFICE BUILDINGS)

By Richard Schulte

The Report of Committee on Building Construction at the twenty-sixth Annual Meeting of the National Fire Protection Association held in 1922 included a discussion of the occupant load factor used to determine the design occupant load of office areas. The following is an excerpt of the transcript of the Discussion addressing this issue:

"***Discussion***

Prof. Woolson:

[TEXT OMITTED]

It is believed that safety to life has been adequately assured and that if such a building were under the protection of even a moderately efficient fire department a fire could be confined to the story in which it originated.

If these two things can be accomplished at moderate expense, it will be appreciated that an important step in the direction of advancing medium grade fire resistance in buildings has been taken. I move the adoption of this report as it stands.

I received a letter this morning from Mr. Clarence Heller, of San Francisco, respecting this report. I think I should read the criticisms which he offers and let the Association decide what it will do with them. On the subject of exits Mr. Heller writes:

"Exit requirements as given in this report are based on the number of occupants, but no mention is made as to how the number of occupants shall be determined. The number of persons in an office building is not under control as in a factory, and I think some method of determining the proper number of occupants for whom exits are to be provided should be given. Tentatively I would propose figuring 1 person per 150 square feet of gross area of upper floors."

Mr. Heller does not indicate how many floors he would call upper floors, in a 14 or 15 or 20 story office building. I would like to know what the Association would like to do in respect to this communication.

Mr. H. W. Forster (Philadelphia): Perhaps I might say a word on that point. The Safety to Life Committee of which I happen to be chairman and of which Mr. Heller is a particularly long standing, active and valuable member, is presenting tomorrow a preliminary report upon the subject of egress from office buildings, and as Mr. Heller writes, people in an office building are not under control as in a factory in which the number of persons may be limited in accordance with the stair capacity; hence some basis of square feet per person is essential. Our committee has suggested 100 square feet per person; perhaps the figure of 150 will ultimately be submitted and approved by this Association. I think the best thing to do would be to include here tentatively the 100 square foot rule which we are preliminarily bringing up tomorrow, understanding that this whole section on exits in office buildings, prepared by the Building Construction Committee, will have later to be modified if the Safety to Life Committee comes in next year with a well balanced code. I apprehend it is very desirable that Prof. Woolson's committee should have put in some of these exit essentials at this time, but I do think it would be well to put 100 square feet per person in the requirements at this stage because that is what our committee now has in mind.

Mr. Thayer: Would it be acceptable to insert in the proper place the number of persons to be determined by the formula laid down by the Committee on Safety to Life?

Mr. Forster: We have not yet formulated a set of regulations. We bring in a preliminary report this year; I am merely suggesting that you use our tentative figure of 100 in these formally approved specifications, subject to change next year if necessary.

Mr. Thayer: My thought is that if we merely refer to the regulations of your committee, our code will not require any reprinting and will follow your regulations as you may determine them from time to time.

Mr. Forster: I do not know what the Secretary would say about that, but I think we have here a complete code except off this one point upon which we have as yet no regulations. Let us put in today what we have in the way of preliminary thoughts and change it later when we have better thoughts,– if we do have better.

Mr. Thayer: "One person for each 100 square feet, or such figure as may be hereafter determined by the Committee on Safety to Life."

Mr. Forster: If you wish to adopt that practice, you might as well say "Tests for Portland cement as they are now or may be hereafter determined."

Mr. Thayer: That was just my thought.

Mr. Ralph. E. Richman: (Cincinnati): I would like to have a clearer understanding of this limitation of occupancy. Does it mean that inside the offices themselves the limitation shall be one person to every 100 square feet?

Mr. Forster: The Building Exits Code Committee has made actual counts of persons in buildings at different hours of the day, beginning at 8.30 and finishing at 6 (buildings in several cities, old and new, including those that were the last thing in construction), and we have thus gotten a sort of count which indicates a range of the number of persons per hundred square feet of gross area on all floors from the second floor up. We propose in establishing the number of stairways and the width of stairs in an office building supplying people from the second floor up, to take the gross floor area, divide it by 100 and then figure our stairs in accordance with a regular formula on that assumption. We do not say that office buildings may not have more persons than that, but we do say it is not feasible to control more people in emergency. We are finding out with a great deal of effort and expense how office buildings register under peak load conditions, and the Committee felt that this figure of 100 square feet was conservative. We may make it larger, but there is no restriction at all as to how many people may be in offices. We know that things average up; this office is full of clerks; that office is the general manager's and has an anteroom with a stenographer, etc.

Mr. Richman: I thought that in a great many office buildings there were far more than one person to every 100 square feet and felt it would be quite a hardship to impose such a limitation; but if it has been found that this is a very fair average figure, probably the observations of one merely passing through an office building would be entirely wrong. In some of these buildings, as you go through them, you see whole floors covered with desks that do not occupy more than 30 square feet.

Mr. Forster: We do not control the occupants, but in designing buildings or remodeling existing buildings, we say the stairs shall be based on that assumption. It is true there are some excessive occupancies (during the war, one banking building in New York averaged 30 square feet per person, including all private offices. That same banking building today is running around 100). There will be peak conditions, but we know that 100 square feet per person, if generally observed in the office buildings in this country, would give us far greater safety. There are few office buildings which meet that requirement today.

Mr. Derby: I might say that in a building in New York which probably has the largest occupancy of any building there, occupying a whole block, with 7,500 people, this rule proposed by Mr. Forster seems to fit the case and give us ample leeway."

The above excerpt provides the basis for the design occupant load factor utilized for office spaces today. As indicated above, the use of a factor of 100 SF per person was determined based upon an extensive study by the Building Exits Code Committee.

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Source: "*Proceedings of the Twenty-sixth Annual* [NFPA] *Meeting*", Atlantic City, New Jersey, 1922.