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FIRE PROTECTION HISTORY-PART 71: 1917 (21ST ANNUAL NFPA MEETING/REPORT OF THE COMMITTEE ON SAFETY TO LIFE)

By Richard Schulte

The 21st annual meeting of the National Fire Protection Association (NFPA) was held in Washington, DC in early May, 1917. Among the technical committee reports discussed at this meeting was the report of the Committee on Safety to Life. The following is an excerpt of the Committee's report which addresses building egress times:

"***Report of Committee on Safety to Life.***

Emptying Time.

For the purpose of a tabulation of this character, it is necessary to establish an emptying time speed such as that of persons passing out of the front door of the building. In the opinion of this committee, based on information available to it, it is felt that this speed could safety be assumed to be 45 persons per minute per unit of stair width past a given point.

If the number of persons on each floor is just large enough comfortably to fill the stairs and halls, and if the method of emptying the building is first to get all person into the stairs and halls, and then simultaneously to start marching them out of the building, the emptying time in seconds will be equal to the number of persons per unit of stair width located above the first floor multiplied by 60/45 or 4/3, plus a time allowance necessary to get the people from their working places on the floor into the halls and onto the stairs. This allowance has been made 30 seconds in all cases. To bring this out clearly, the tabulation shows two figures under emptying time in seconds. The one, the time to empty the building after the persons reach and fill the stairs and stair enclosures and the other the total emptying time, 30 seconds higher in each instance.

The forgoing is on the assumption that the persons on the first floor will have separate exits or will move out without interfering with those coming down from above.

This 45 per minute rate of travel past a given point is belied to be conservative for buildings up to seven stories in height as shown in tabulation. For higher buildings, there will undoubtedly a slowing up of travel, making it necessary to cut down the per floor allowance per unit of stair width, except, of course, that it is never necessary to cut down this allowance below the safe capacity of the stairs and stair enclosures, if these have adequate fire-resisting power.

In making up the table, the emptying time limits have been approximately set at 3 minutes in high inflammability buildings, 4 minutes in moderate inflammability ones, and 5 minutes in low inflammability ones, in each case allowances as great as this applying only to the best types of building construction.

Line 72 in tabulation shows maximum emptying times in the three classes of occupancy of 182, 238 and 302 seconds respectively."

Although building codes now utilize egress capacity factors which utilize factors based upon the number of occupants per inch of egress component width, in the early days of building codes, egress capacity was based upon units of egress width provided. A unit of egress width was defined as 22 inches.

A factor of 45 people per unit of egress width per minute for egress stairs would be the equivalent of 135 people per unit of egress width in a period of three minutes.

Today, the Life Safety Code utilizes an egress capacity factor of 0.3 inches per person for stairs. Hence, a stair width of 22 inches (one unit of egress stair width) would provide egress capacity for 73 occupants.

It should be noted that, in 1917, the Committee on Safety to Life considered an evacuation time between 3.5 (3 minutes, plus 30 seconds for travel to the stair) and 5.5 minutes (5 minutes, plus 30 seconds for travel to the stair) to be acceptable, depending upon the construction type of the building.

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