

**FIRE PROTECTION HISTORY-PART 267: 1918
(STAIR CONSTRUCTION DETAILS)**

By Richard Schulte

The twenty-second Annual Meeting of the National Fire Protection Association was held in Chicago in May 1918. Among the reports presented at this meeting was the Report of Committee on Safety to Life. A portion of this report addressed the details of the construction of stairs. The following is an excerpt of the Report addressing stairs:

“Stair Construction.

10. *All stairs, platforms, landings, balconies and stair hallways erected after (date of enactment of rules) shall be of sufficient strength to sustain safely a live load of not less than 100 lbs. per square foot for interior construction, and 150 lbs. per square foot for exterior construction, with a factor of safety of 4 in each case; and except in dwellings shall conform to all the requirements of Section 45 of the National Board Building Code as to hand rails, newels, landings, widths, exits and prohibition against winding treads. The space beneath any stairway built in whole or in part of combustible material shall be left entirely open or be completely enclosed without door or other opening.*

11. *Stairs in buildings erected after (date of enactment of rules) used as required means of exit shall be at least 44 inches wide between faces of walls, or 40 inches between face of wall and an open balustrade, or between two open balustrades. All such widths shall be clear of all obstructions except that hand rails attached to walls may project not more than 3½ inches within them. If newels project above tops of rails, a clear width of at least 44 inches shall be provided between the faces of the newel and the face of the wall or newel opposite. All stairs shall have walls or well secured balustrades or guards on both sides. A stairway of 7 feet or more in width shall be provided with a continuous intermediate hand rail substantially supported. All stairs shall have treads and risers of uniform width and height throughout each flight; the rise shall be not more than 7[-]¾inches, and the tread exclusive of the nosing not less than 9½ inches. Stairways exceeding 12 feet in height shall have an intermediate landing at least 3 feet in length. (Section 45, Article 4, of National Board Building Code.)*

Note.— A 7[-]3/4-inch rise and a 9½-inch tread produce a stair having an angle with the horizontal of approximately 37 degrees.

12. *Stairs in buildings erected prior to (date of enactment of rules) shall not be used as required means of exit unless they conform to the foregoing section, except that the width may be not less than 36 inches clear of obstructions of any kind other than hand rails. The minimum clear space between walls, balustrades, newels, and hand rails shall in no case be less than 32 inches. The pitch of stairs shall not exceed 45 degrees, and the treads, exclusive of nosings, shall be not less than 8 inches wide.*

13. *A 40-inch to 44-inch wide stair in buildings erected after (date of enactment of rules) and a 32-inch to 36-inch wide stair in buildings erected prior to (date of enactment of rules) shall constitute two units.*

14. *Stairways erected after (date of enactment of rules) used as required means of exit shall continue their full width for their entire length.*

15. *All stairways that serve as required means of exit and are accessible from two or more stories, and extend to one or more of the upper four stories shall be continued their full width to the roof, and shall lead by a direct line of travel to the first story, and open directly on the street, or to an open-air or fire-resistive passage leading to the street, or to a yard or court connected with the street. Such fire-resistive passage shall be not less than 7 feet in height.*

Note.— *This rule is made to prevent persons, thinking that they can escape to the roof, finding that the stairs lead only a portion of the way to that point. The New York State law contains a somewhat similar provision.*

16. *The continuity of all stairs which may be used for exit purposes shall be interrupted at street level by partitions or doors or other means which will make clear the direction of egress to the street. (Section 45, Article 8, of National Board Building Code.)*

17. *Every enclosed stairway shall be provided with an adequate system of lighting.*

18. *The stairs, landings, and balconies or platforms of smoke-proof towers, erected after (date of enactment of rules) shall be solid and completely enclosed, as required for interior stairways in Section 90, and shall extend from the sidewalk, court, or yard level to and above the roof to form a bulkhead. There shall be no openings in any wall separating the stairway from the building, but fixed or automatic fire-windows sufficient for lighting purposes are not objectionable in the exterior walls, provided they are not subject to fire exposure hazard from the same or nearby buildings. Access shall be provided to the stairway from every story of the building by outside balconies of steel or masonry, or by vestibules within the walls of the build-*

ing, but open on at least one side. Every such balcony or vestibule shall have an unobstructed width of at least 44 inches, and shall open upon an open space not less than 100 square feet in area. The balcony or vestibule shall be provided with a solid incombustible floor. Railings of steel or other approved incombustible material shall be provided not less than 4 feet high. Access to the balcony or vestibule from the building and to the stairways from the balcony or vestibule shall be by approved self-closing fire doors not less than 40 inches wide and 7 feet high, which shall swing in the direction of exit travel. The doors shall be provided with locks or latches, with visible fastenings requiring no keys to open them. A wired glass panel not exceeding 720 square inches shall be provided in the door opening into the stair shaft. The level of the balcony or vestibule floor shall be not more than 7[-]3/4 inches below the door sill of the building. Landings in such stairways shall be of a width that the doors in opening into the stairway shall not reduce the free passageway of the landing to a width less than the width of the stairway. (Section 45, Article 10b, of National Board Building Code.)

19. Smoke-proof towers erected prior to (date of enactment of rules) shall conform to the foregoing section, except that the unobstructed width of vestibules may be 36 inches, and fire doors may be 36 inches wide and 78 inches high.

20. Outside stairs on buildings erected after (date of enactment of rules) used as required means of exit shall comply with the specifications for Outside Stairs approved by the National Fire Protection Association.

21. Outside stairs (commonly called fire escapes) erected prior to (date of enactment of rules) used as required means of exit shall comply with the specifications for Outside Stairs on buildings erected after (date of enactment of rules), except that the following is permissible:

Note.—Figures refer to National Fire Protection Association standard specifications for Outside Stairs for Fire Exits, 1916 edition.

15. Protected Zone for Stairs.

a. For superimposed stairs: All wall openings, any part of which are within 5 feet as measured horizontally from each end of each flight of stairs, provided that any required means of exit outside of this protected zone shall have wall openings within 10 feet below it also protected.

b. For straight run stairs: Shall be as described in Section 15 a. on side away from direction of stair slope, shall include all wall openings below stairs for a distance of two stories, and, in addition, all wall openings any part of which are within 7 feet of stairs or platforms as measured vertically.

21. *Doors and casement windows to outside stairs shall have minimum width of 24 inches and minimum clear height of 72 inches.*

25. *Balconies and stairs shall be designed to carry a load of not less than 90 lbs. per square foot with a factor of safety of 4.*

28. *Balcony and stair enclosures and railings shall be of substantial design, and support at walls for such railings or enclosures shall be in manner specified above for tension members.*

29. *Size of Balconies. On straight run stairs the balconies shall be at least 3 feet long. The width of balcony, where stairs are in superimposed form, shall be at least 36 inches between inside of railings, and in straight run stairs shall be at least 18 inches inside of railings.*

30. *The minimum clear unobstructed width of any outside stair passageway, whether parallel to building or at right angles to it, shall be 14 inches.*

31. *Floors may be made of flat bars on edge or square bars on edge, supported to prevent turning, and with maximum separation between faces of adjoining members of 1 inch.*

32. *Enclosures shall be not less than 36 inches high.*

34. *Enclosures or railings shall be provided for floor openings for stairs, except at head of stairs, and such enclosures or railings shall be substantially constructed.*

36. *Floor openings for stairs shall be not less than 18 inches wide, and of sufficient length to provide for at least 7 feet head room, as measured vertically from the stair perpendicularly below the edge of opening.*

38. *The pitch of stationary and of swinging stairs (when down) shall not exceed 60 degrees.*

40. *Treads shall be not less than 6 inches wide, exclusive of nosings.*

41. *Treads may be constructed of flat bars on edge or square bars on edge, supported to prevent turning, and with maximum separation between faces of adjoining members of 1 inch.*

46. *Width of stairs between hand rails shall not be less than 18 inches.*

47. Railings shall be provided on both sides of stairs, and have height not less than 36 inches as measured vertically from center of stair treads.

49. b. If distance from lowest platform to ground exceeds 12 feet, an intermediate balcony not more than 12 feet from ground shall be provided, and shall have width not less than width of stairs and length not less than 2 feet.

51. c. Distance between rails of ladders to be not less than 12 inches.

e. Rungs of ladders to have diameter not less than 5/8 inch, or to be of square material not smaller than 5/8 inch on the side, and to be riveted in position.”

Note the similarity of the provisions for stair construction proposed in 1918 to the provisions for stair construction contained in building codes in use today.

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Source: “*Proceedings of the Twenty-Second Annual [NFPA] Meeting*”, Chicago, Illinois, 1918.

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