

# CHAPTER 3 CONSTRUCTION

## SECTION 301 GENERAL

**301.1 General.** The construction or installation of new bleachers, folding and telescopic seating, and grandstands and press boxes shall comply with the provisions of this chapter.

**301.2 Location on lot.** Outdoor installations shall be located at least 10 feet (3048 mm) from adjacent lot lines and from other buildings on the same lot unless the exterior walls and openings of the adjacent building are protected in accordance with the building code.

## SECTION 302 PERMITTED MATERIALS

**302.1 Combustibility and flame spread.** Bleachers, folding and telescopic seating, and grandstands shall be permitted to be constructed of combustible or noncombustible materials. Such installations within a building shall not be considered interior finish relative to the application of the building code.

**302.2 Durability.** Materials used in the construction of outdoor installations shall be weather resistant. Where wood is used, it shall be naturally durable or preservative-treated wood as defined in the building code or other approved material. Where ferrous metal is used, it shall be protected from corrosion. Fasteners shall consist of aluminum or other approved corrosion-resistant materials or shall be provided with approved corrosion-resistant coatings such as copper or zinc.

**302.3 Interior corrosive environment.** Installations located in interior corrosive environments, such as those located in conjunction with indoor pools, shall be corrosion resistant.

## SECTION 303 STRUCTURAL DESIGN

**303.1 Design.** The structural design shall be in accordance with the building code.

**303.2 Loads.** Bleachers, folding and telescopic seating, and grandstands shall be designed for a uniform live load of 100 pounds per square foot (psf) (4788 Pa). Press boxes shall be designed for a uniform live load of 50 psf (2394 Pa). The components of the installation shall be designed to support the loads listed in Table 303.2.

**303.3 Other loads.** Bleachers, folding and telescopic seating and grandstands, and press boxes and platforms attached to such installations, subject to wind, snow, seismic and other loads, shall be designed in accordance with the building code.

**303.4 Horizontal Sway Loads.** Bleachers, folding and telescopic seating, and grandstands shall be designed to resist lateral forces produced by the sudden and concerted motion of spectators.

**303.4.1 Sway Parallel to Seating.** A horizontal load of 24 pounds per linear foot shall be applied parallel to seating at the footboard level of each row of seating.

**303.4.2 Sway Perpendicular to Seating.** A horizontal load of 10 pounds per linear foot shall be applied perpendicular to seating at the footboard level of each row of seating.

**303.5 Load Combinations.** In addition to the load combinations required to be considered for design in accordance with the building code, the additional load combinations in Section 303.5.1 or in Section 303.5.2 shall be considered. Parallel and perpendicular sway loads need not be considered simultaneously. Also uniform, concentrated and infill loads need not be considered simultaneously.

**TABLE 303.2  
DESIGN LOADS**

| TIERED SEATING ELEMENT                  | LOAD TYPE | LOAD   |
|---|-----------|--|
| Seats (vertical)                        | L         | 120 pounds per linear foot.  |
| Treads                                  | L         | Stair treads and aisle stair treads shall be designed to resist a minimum concentrated load of 300 pounds on an area of 4 square inches.   |
| Handrails and guards, uniform load      | $R_r$     | Handrail assemblies and guards shall be designed to resist a load of 50 pounds per linear foot (pound per foot) applied in any direction at the top. The supporting elements shall transfer this load to the structure.  |
| Handrails and guards, concentrated load | $R_r$     | Handrail assemblies and guards shall be able to resist a single concentrated load of 200 pounds, applied in any direction at any direction along the top. Attachment devices and supporting elements shall transfer this load to the structure.  |
| Guards, infill components               | $R_r$     | Intermediate rails (all those except the handrail), balusters, and panel fillers (including flexible infill components) shall be designed to withstand a horizontally applied normal load of 50 pounds on an area equal to 1 square foot, including openings and space between rails. Application of the loads shall not allow guard openings greater than that permitted by Sections 408.2 and 503.2. |

For SI: 1 square inch = 645.46 mm<sup>2</sup>, 1 square foot = 0.0929 m<sup>2</sup>, 1 pound = 4.448 N, 1 pound per linear foot = 14.594 N/m.

**303.5.1 Load combinations using strength design or load and resistance factor design.** When using strength design or load and resistance factor the following additional load combination must be considered.

$$1.2D + 1.0L + 1.6Z \quad (\text{Equation 3-1})$$

$$1.2D + 1.2R_f \quad (\text{Equation 3-2})$$

**303.5.2 Load combinations using allowable stress design.** When using allowable stress design the following additional load combination must be considered.

$$D + 0.75L + 0.75Z \quad (\text{Equation 3-3})$$

$$D + 0.75R_f \quad (\text{Equation 3-4})$$

**303.5.3 Notations of terms in load combination equations.** The following notations shall, for the purpose of this chapter, have the meanings shown herein.

D = dead load as defined by the building code

L = live load as defined by Section 303.2

Z = horizontal sway loads as defined by Section 303.4.2 and Section 303.4.3

R<sub>f</sub> = guard or handrail loads as defined in Table 303.2

**303.6 Deflections.** Live load deflection of structural members shall be limited to 1/200 of the span.

**Exception:** Deflection of members in folding and telescopic seating shall not be limited.

**303.7 Foundations.** A foundation, designed to support all loads, shall be provided as required by the building code.

**Exception:** Outdoor installations that are directly supported on the ground that is adequate to support the superimposed loads.

### SECTION 304 INTERIOR INSTALLATIONS

**304.1 Interior installations.** Interior installations shall be supported on building facility floors. Folding or telescopic seating shall be supported on building facility floors specifically designed to accommodate both the live and dead loads associated with the movement of such installations.

### SECTION 305 SPACES BENEATH SEATS

**305.1 Spaces beneath seats.** Spaces beneath or adjacent to seating structures shall comply with the building code and fire code.

### SECTION 306 CLEAR HEIGHT

**306.1 Clear height.** The clear height of aisle accessways, aisles and portions of the means of egress system shall be a minimum of 80 inches (2032 mm).

### SECTION 307 ROOF HEIGHT

**307.1 Roof height.** A smoke-protected assembly seating area with a roof shall have the lowest portion of the roof deck not less than 15 feet (4572 mm) above the highest aisle or aisle accessway.

**Exception:** A roof canopy above an outdoor installation shall be permitted to be less than 15 feet (4572 mm) above the highest aisle or aisle accessway provided that there are no objects less than 80 inches (2032 mm) above the highest aisle or aisle accessway.

### SECTION 308 ELECTRICAL

**308.1 Electrical.** The electrical system shall comply with the electrical code.

### SECTION 309 FIRE PROTECTION

**309.1 Fire protection.** Fire protection systems shall be provided where required by the building code.

#### Exceptions:

1. An emergency voice/alarm system is not required for outdoor bleacher-type seating provided all of the following are met:
  - 1.1. The bleacher-type seating has an occupant load of less than 15,000;
  - 1.2. A public address system with standby power is provided;
  - 1.3. Enclosed spaces attached or immediately adjacent to the bleacher-type seating comprise, in the aggregate, 10% or less of the overall area of the bleacher-type seating or 1,000 square feet (92.9 square meters), whichever is less.
  - 1.4. Spaces under the bleacher-type seating shall be separated from the bleacher-type seating in accordance with Section 1028.1.1.1 of the International Building Code.
  - 1.5. All means of egress from the bleacher-type seating are open to the outside.
2. An emergency voice/alarm system is not required for outdoor bleacher-type seating with an occupant load of 300 or less.
3. An emergency voice/alarm system is not required for temporary outdoor bleacher-type seating providing all of the following are met:
  - 3.1. There are no enclosed spaces under or attached to the bleacher-type seating;
  - 3.2. The bleacher-type seating is erected for a period of less than 180 days;
  - 3.2. Evacuation of the bleacher-type seating is included in an approved fire safety plan.

**SECTION 310  
ACCESSIBILITY**

**310.1 Accessibility.** Tiered seating shall be accessible as required by the building code.

**SECTION 311  
OPEN SPACES BENEATH FOOTBOARDS AND  
SEATBOARDS**

**311.1 Open spaces at footboards and seatboards.** Where an opening between the seatboard and footboard is located more than 30 inches (762 mm) above the floor or ground below, the opening shall be closed with construction such that a 4-inch-diameter (102 mm) sphere cannot pass through.