in SI:

$$R_1 = \begin{cases} 1 & \text{for } A_T \leq 18.58 \text{ m}^2 \\ 1.2 - 0.011A_t & \text{for } 18.58 \text{ m}^2 < A_T < 55.74 \text{ m}^2 \\ 0.6 & \text{for } A_T \geq 55.74 \text{ m}^2 \end{cases}$$

where A_T = tributary area in ft^2 (m^2) supported by the member and

$$R_2 = \begin{cases} 1 & \text{for } F \leq 4 \\ 1.2 - 0.05F & \text{for } 4 < F < 12 \\ 0.6 & \text{for } F \geq 12 \end{cases}$$

where, for a pitched roof, F = number of inches of rise per foot (in SI: $F = 0.12 \times$ slope, with slope expressed in percentage points) and, for an arch or dome, F = rise-to-span ratio multiplied by 32.

4.8.3 Special Purpose Roofs

Roofs that have an occupancy function, such as roof gardens, assembly purposes, or other special purposes are permitted to have their uniformly distributed live load reduced in accordance with the requirements of Section 4.7.

4.9 CRANE LOADS

4.9.1 General

The crane live load shall be the rated capacity of the crane. Design loads for the runway beams, including connections and support brackets, of moving bridge cranes and monorail cranes shall include the maximum wheel loads of the crane and the vertical impact, lateral, and longitudinal forces induced by the moving crane.

4.9.2 Maximum Wheel Load

The maximum wheel loads shall be the wheel loads produced by the weight of the bridge, as applicable, plus the sum of the rated capacity and the weight of the trolley with the trolley positioned on its runway at the location where the resulting load effect is maximum.

4.9.3 Vertical Impact Force

The maximum wheel loads of the crane shall be increased by the percentages shown in the following text to determine the induced vertical impact or vibration force:

Monorail cranes (powered)	25
Cab-operated or remotely operated bridge cranes (powered)	25
Pendant-operated bridge cranes (powered)	10
Bridge cranes or monorail cranes with hand-geared bridge, trolley, and hoist	0

4.9.4 Lateral Force

The lateral force on crane runway beams with electrically powered trolleys shall be calculated as 20 percent of the sum of the rated capacity of the crane and the weight of the hoist and trolley. The lateral force shall be assumed to act horizontally at the traction surface of a runway beam, in either direction perpendicular to the beam, and shall be distributed with due regard to the lateral stiffness of the runway beam and supporting structure.

4.9.5 Longitudinal Force

The longitudinal force on crane runway beams, except for bridge cranes with hand-geared bridges, shall be calculated as 10 percent of the maximum wheel loads of the crane. The longitudinal force shall be assumed to act horizontally at the traction surface of a runway beam in either direction parallel to the beam.

4.10 CONSENSUS STANDARDS AND OTHER REFERENCED DOCUMENTS

This section lists the consensus standards and other documents that are adopted by reference within this chapter:

AASHTO
American Association of State Highway and
 Transportation Officials
444 North Capitol Street, NW, Suite 249
Washington, DC 20001

Sections 4.4.3, Table 4-1

AASHTO LRFD Bridge Design Specifications, 4th
 edition, 2007, with 2008 Interim Revisions
Sections 4.5.3, Table 4-1

ASME
American Society of Mechanical Engineers
Three Park Avenue
New York, NY 10016-5900

ASME A17.1
Section 4.6.2
American National Standard Safety Code for
 Elevators and Escalators, 2007.