such cases the maximum positive bending moment in each individual span is taken as eight-tenths of that which would be produced in the same span resting freely on two supports, and the negative bending moment over intermediate supports is taken as ten-twelfths of the maximum positive bending moment in an adjacent span.

For beams and slabs the straight-line formula has been used, based on the following assumptions:

(*a*) All tensile stresses are considered to be resisted entirely by the steel reinforcing.

(*b*) There are no initial stresses in the beams.

(*c*) All shearing strain is cared for and there is no slipping between concrete and steel.

(*d*) The modulus of elasticity of concrete in compression is constant up to the limit of the allowable working stress.

(*e*) A section, plane before bending, remains plane after bending; that is, the stress on any fibre is directly proportional to its distance from the neutral axis.

Diagonal tension existing simultaneously with the maximum bending moment is considered as provided for by the concrete without web reinforcement, when the quotient of the vertical shear and the area between the centre of steel and centre of compression in the concrete does not exceed 50 lbs. per square inch.

Punching is assumed to be resisted by an area of concrete equal to the perimeter of the area of contact multiplied by the effective depth of the slab, and shall be considered as provided for by the concrete alone when the shear on this area does not exceed 100 lbs. per square inch.

The following are assumed working stresses in pounds per square inch:—

Tension in steel reinforcement	15,000
Compression in extreme fibres in bending	500
Modulus of elasticity of concrete	1,500,000
Modulus of elasticity of steel	30,000,000
Compression on 1:2:4 concrete under bearing plates and pad stones	400
Compression on 1:2½:5 concrete in body of pier	350
Compression on 1:3:5 concrete in caissons	300
Bond between deformed bars and concrete	100

The following assumptions are among those governing the structural steel designing:—

The steelwork is arranged to provide for the future traffic on the lower level, the clearance being 17 ft. 3 in. in height and 14 ft. 6 in. in width for each of two tracks. The top corners are bevelled 3 ft. 9 in. to a side, and the base has a width of 11 ft. 6 in. at rail level. Clearance is also provided for installation of two 42-in. water mains.

For purposes of dead load stress computation the weights of the different substances are assumed as follows:—

Concrete (plain or reinforced)	150 lbs. per cu ft.
Steel, as ordinarily listed per lin. ft.	
Broken stone ballast	100 lbs. per cu. ft.
Timber ties	54 lbs. per cu. ft.
4-inch wood block paving and ½-inch sand cushion	25 lbs. per sq. ft.
Rammed sand or gravel	125 lbs. per cu. ft.
Loose sand and earth	100 lbs. per cu. ft.

The floor system and posts are designed to carry on each upper deck track two 50-ton electric cars, producing live loads of 25,000 lbs. per axle (4 per car), the spacing in feet being 5 ft. 6 in.: 20 ft.: 5 ft. 6 in.:: 13 ft.:: 5 ft. 6 in.: 20 ft.: 5 ft. 6 in.

The arches and foundations are designed for a uniform load of 1,600 pounds per lineal foot of electric railway track.

The floor system and posts are designed for greatest roadway stresses produced by either of the following:—

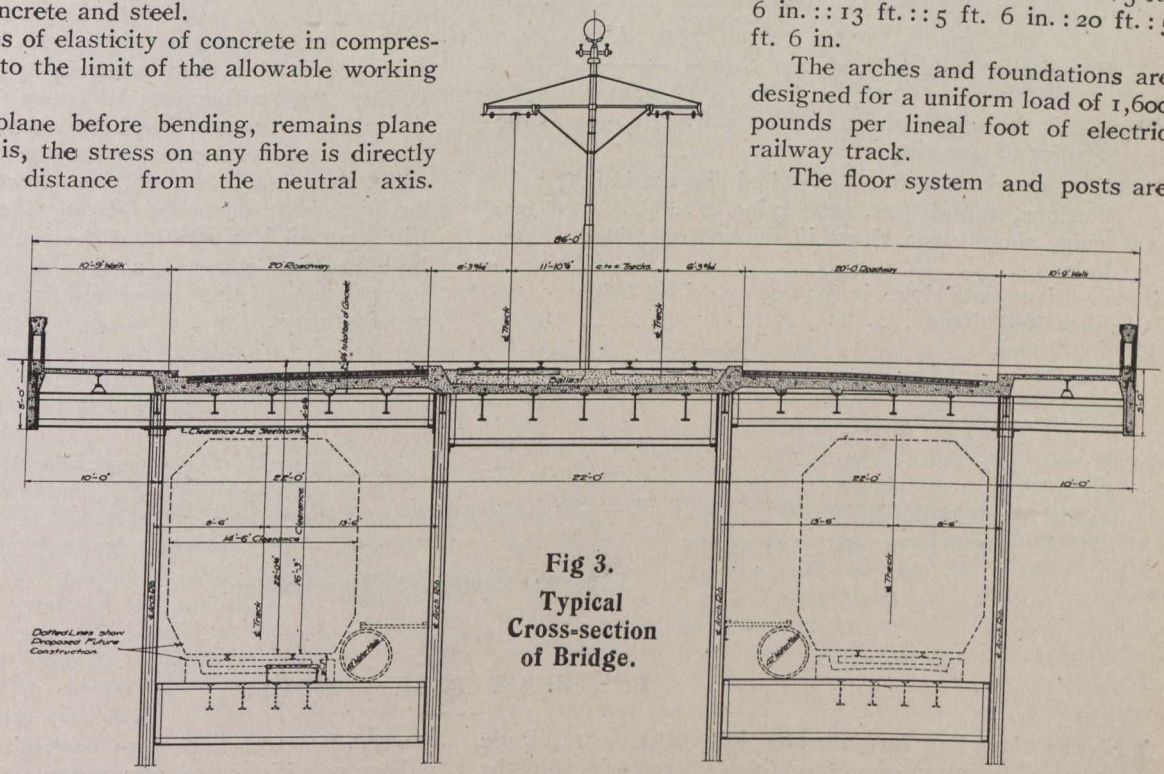

Fig 3. Typical Cross-section of Bridge.

(1) A uniform load of 135 lbs. per square foot on the area remaining after deducting a strip 22 ft. wide for tracks.

(2) A 20-ton truck producing loads of 12,000 and 28,000 lbs. on front and rear axles respectively, axles being spaced 12 ft. apart and wheels 5 ft. c. to c.

The arches and foundations are designed for a uniform load of 80 pounds per square foot for spans of 200 feet or over, and $80 + \frac{200-S}{5}$ pounds per square foot for spans under 200 feet. (S = span in feet.)

The slab, stringers, and posts for the sidewalk are designed for a uniform load of 100 pounds per square foot and the arches and foundations for a uniform load of 80 pounds per square foot.

The bridge is designed for a wind pressure of 50 pounds per square foot on the unloaded structure. For the upper deck the wind pressure is assumed to act on a vertical surface, ten feet in height from bottom of stringers upward. For the lower deck it is assumed to act on a vertical surface four feet in height taken twice.

For the truss members and posts it is assumed to act on twice the exposed area of one rib.