And yet, it was deemed expedient by the author of this work, in the outset of the introduction of iron rail road bridges, to provide that 2,000 lbs. to the foot upon each pair of tracks, should not give a stress exceeding 10,000 lbs. to the square inch upon any part of the wrought iron work, not from a conviction that the material was unsafe under a stress of 15,000 lbs., but to provide against the possible contingency of its being sometimes exposed to greater stress than that produced by a dead weight of 2,000 lbs. to the linear foot.

XcII. The use of cast iron to sustain a tensile strain, should undoubtedly be avoided, as a general

To begin with an instance near at hand: the bridge from the island to the main shore on the Hudson River rail road at East Albany, has, in one of its stretches, trusses 48 feet long, in 8 panels. It is a double track bridge with three trusses, of which the middle one sustains one half of the two pairs of tracks, and of the loads passing over them.

The truss is composed of top and bottom chords, and thrust braces of timber, and vertical suspension bolts of wrought iron, in pairs; and it is at once obvious that \( \frac{3}{5} \) of the weight of the tracks and their loads (or, of the half bearing upon the centre truss), is concentrated on the two pairs of suspension rods located 6 feet from each end. [See diagram.]

The weight of middle truss, and other parts of the structure sustained by it, probably exceeds 16,000 lbs., of which \( \frac{3}{5} \), or 14,000 lbs. bear

![Fig. 25A.](image_url)

upon the endmost suspension bolts. Add 2,000 lbs. per foot for \( \frac{3}{5} \) of one pair of tracks, or rails, and it makes 50,000 lbs. upon the suspension bolts in question, with only one track loaded. These bolts are 4 in number, and 1\( \frac{1}{16} \)" in diameter; and, allowing \( \frac{1}{16} \)" to be cut away by screw thread, the aggregate net, available cross section of the four, is equal to 4.43 square inches; whence the tension, with only one track loaded, is 12,641 lbs. to the square inch, and 22,120 lbs. to the inch with both tracks loaded.

2. The bridge leading into the freight house of the Boston rail road, at East Albany, is a "Howe bridge," and acts upon the same principle as the one just spoken of. It is a double track bridge with two trusses, having 8 panels of 10\( \frac{1}{3} \)", and is a heavy covered bridge. Allowing 64 tons for weight of superstructure, or 56,000 lbs. for the portion sustained by the endmost bolts of each truss, and 2,000 lbs per foot upon one track, of which \( \frac{3}{5} \) at least, bears on one truss, giving