APPLICATION OF RESULTS.

Calculations) at 30 cubic feet per foot lineal, as this is about an average of the Howe bridges, on the Pennsylvania Railroad. The greatest load that can ever be thrown upon a railroad bridge, would consist of several locomotives, of the first class, attached together—as is sometimes done in clearing off snow in winter.

The heaviest locomotives in use weigh about 23 tons, and their length is 23 feet. Consequently, 1 ton per foot for the load, and \( \frac{1}{2} \) ton per foot for the weight of the structure, may be assumed as a safe average for the maximum load, where the span does not exceed 200 feet. One and a-half tons per foot lineal, will, therefore, be assumed as the extreme load—in the following calculations.

The greatest safe strain per square inch for wood, will be considered as 1,000 pounds, and for iron, as 10,000 pounds.

To determine the strain upon the chords.

The strain upon the upper chords, is one of compression; it is greatest in the middle of the bridge, and diminishes towards the ends. The maximum strain in the middle, is equal to that force which, if applied horizontally, would sustain one-half the bridge, if the other half were supposed to be removed. To obtain it, multiply half the weight of the bridge by the distance of the centre of gravity from the abutment (which is always very nearly one-fourth the span), and divide the product by the height of the truss, as measured from the middle of one chord to the middle point of the other.

Let \( H \) represent the horizontal strain in the centre

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S = \text{span of the bridge} \\
\ h = \text{height of truss, from middle points of chords} \\
W = \text{weight of the whole span}
\]

Then \( H = \frac{W}{2} \times \frac{S}{4} \times \frac{1}{h} = \frac{SW}{8h} \).

Example.

If the span of a bridge be 160 feet, and the height of truss 17 feet, what should be the cross-section of the upper chord in the centre?