*Data for Calculation.*

| | |
|---|---|
| Span | 47 feet. |
| Rise of arch | 5 " |
| Cross-section of all the arches in square inches, exclusive of castings | 72 " |
| Distance of centre of gravity from abutment | 12 " |
| Whole weight of bridge | 27,500 pounds. |
| Weight of bridge and load | 122,000 " |

As the arch sustains the whole of the weight, the calculation is extremely simple.

Let $P$ = pressure per square inch at crown.

Then $P \times 5 \times 72 = \frac{122000}{2} + 12$, or $P = 2033$ pounds per square inch, or only about one-thirtieth of the crushing force.

The greatest pressure upon any one post may be taken at 6 tons. The cross-section is 15 square inches. Pressure per square inch 800 pounds.

The projections of socket-boxes are 3 inches cylinder, the pressure on each is 3 tons = per square inch 630 pounds.

It is unnecessary to calculate the strain upon the counter-brace rods, they are evidently sufficient; and for the manner of making the calculations, sufficient illustrations have already been given. As a general rule in regard to counter-braces, it may be stated, that their dimensions may be assumed as constant, whatever may be the span; or rather, the counter-braces should bear a fixed proportion to the width of the panels, without reference to any of the other dimensions of the bridge, and, consequently, the counter-brace rods need not be larger or more numerous in proportion to the length in a bridge of large span than a shorter one.

The truth of this assertion will be evident from these considerations:—

The greatest possible strain upon any counter-brace has been shown to be less than the variable load upon one panel. The weight of the structure produces no strain whatever upon the counter-braces. The greatest variable load on railroad bridges