

most effective mode of so doing. But while thus reducing the subject to simplicity, it is of the utmost importance to keep constantly in mind that any saving that the one system may present over the other is actually limited to a portion, or per centage, of a subordinate part of the total amount of the material employed.

In the case now under consideration, namely, that of the Victoria tubes, the total weight of the material between the bearings is 252 tons, which weight is disposed of in the following manner:—

Top of tube	76 tons	
Bottom of ditto	92 tons	
		168 tons
Sides of ditto		84 tons
Total	252 tons.	

Assuming that the strain per square inch in the top and bottom is the same for every kind of beam—say four tons of compression in the top, and five tons of tension in the bottom—the only saving that can by any possibility be made to take place being confined to the sides, must be a saving in that portion of its weight, which is only about 34 per cent. of the whole. How, therefore, can 70 per cent. of saving be realised as has been stated out of the total weight, when the question resolves itself into a difference of opinion on a portion which is only 34 per cent. of such weight?

I am tempted to reiterate here much that was said by several experienced engineers on the subject, during the discussions already alluded to at the Institution of Civil Engineers, but the argument adduced on that occasion could only be rendered thoroughly intelligible by the assistance of diagrams of some complexity, and I think sufficient has been said to demonstrate that no saving *of importance* can be made in the construction of the roadway of the Victoria Bridge, as it is now designed, by the substitution of any other description of girder. Yet, lest this should be considered mere assertion, permit me to adduce one or two examples, where the close-sided tubular system and the open-sided system may be fairly brought into comparison with each other in actual practice.

The most remarkable parallel case which occurs to me is the comparison of the Victoria tubes, under consideration, with a triangular or "Warren" bridge, which has been erected by Mr. Joseph Cubitt over a branch of the river Trent, near Newark, on the Great Northern Railway.

The spans are very similar, and so are the depths. In calling your attention to the comparison, you must bear in mind that all possible skill and science were brought to bear upon every portion of the details of the Newark Dyke Bridge, in order to reduce the total weight and cost to a minimum.

The comparison stands thus:—

Victoria Bridge, as being erected.

Span, 212 feet. Weight, including bearings, 275 tons, for a length of 257 feet.