HIGHWAY BRIDGE OVER THE MIAMI RIVER AT ELIZABETHTOWN, OHIO.

The Longest Simple Truss Span Bridge in Existence.

H. C. Tyrrell.*

This bridge is remarkable in being the longest simple-truss bridge span in existence, and was designed by the writer. It has a span of 586 feet between centres of end pins and surpasses in length by 36 feet the longest other span, which is one in the bridge crossing the Ohio River at Cincinnati, known as the Cincinnati and Covington Railway and Highway bridge.

The width of roadway is 30 feet, and as the end posts are 30 inches wide, the distance between centres of trusses is 32 feet 6 inches, which is one-eighteenth of the span. The trusses are divided into 18 panels, 32 feet 6 inches long each, making square panels for the lateral system. The type of truss is the subdivided Pratt, with main panels 65 feet long. The truss depth varies from 80 feet at the centre to 40 feet at the first panel point. The curve of the top chord is a parabola, in straight sections of two panel lengths. Stiff laterals and sway bracing are used throughout. This is an essential feature of the design, and one upon which much of the stiffness of the bridge depends. Lateral and other light struts are built in box form, latticed on four sides. The first panels of the diagonals in the top lateral system are built in the same way. Each of the 33 feet 6 inch panels of the floor system are again subdivided by carrying an intermediate floor beam on two longitudinal beams, one at each side of the bridge. In addition to the benefit of economy in floor framing, the two side beams serve also as chords for the lower lateral system. The longitudinal and cross floor beams are of the same size, and the diagonal laterals are rigidly connected by plates, which fasten to the bottom flanges of both cross and longitudinal beams. The floor joists consist of 6-inch steel beams spaced 2 feet 6 inches apart, elevated on 9-inch corbels. On the steel joist is laid the 2½-inch oak flooring, spiked to six lines of 3-inch by 7-inch oak spiking pieces, with 60 d nails. The wheel guards are 6 by 6 inch oak, bevelled on the inner edge and elevated on 4-inch blocks spaced 2 feet apart for drainage. The bridge was given an initial camber of 3 feet at the centre. On each side of the roadway is a neat railing, made of four angles, latticed in box form. This railing lines up with the inner face of the web posts and fastens to them. The portal as shown on the writer's design is a heavy lattice framework, but it was changed in the shop to one plate construction, as shown in photograph, which does not harmonze with the other light framing. The two lines of heavy floor stringers, which act as wind truss chords, are rigidly attached by bottom bracket angles to the main truss posts. Such portions of the wind chord stresses as are not resisted by these longitudinal side beams, are transferred to the bottom chord eyebars, through these rigid connections.

The Elizabethtown Bridge, H. C. Tyrrell, Engineer.

The cross beams at the panel points are suspended by two rod hangers 1½ inches in diameter each, from the bottom chord pins, and at the same time are riveted to the bottom angles on the web posts. This gives a rigid floor beam connection and at the same time reduces the cost of erection. At one end of the bridge are sets of turned rollers and at both ends, the heavy side beams are connected to the shoe boxes, thereby transferring the wind stresses as directly as possible to the masonry. The vertical posts are spliced at the joints of the lateral struts. The minimum thickness of metal used is one quarter inch. The metal throughout is medium steel, conforming to the Manufacturers' standard specifications.

For the purpose of comparison, a table of other long span bridges is given, arranged in the order of their length:

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