RECONSTRUCTION OF THE BALTIMORE & OHIO BRIDGE OVER THE SUSQUEHANNA RIVER.

BY DAY ALLEN WILLEY.

The great development which has taken place during the past decade in the freight and passenger business of the leading railroads has made it incumbent upon them to undertake works of reconstruction and enlargement often upon a truly enormous scale. It has been no unusual occurrence, of late years, for a leading trunk road to spend from fifteen to thirty million dollars merely upon the improvement of its existing roadbed and structures. This work includes the relocation of the lines for the purpose of reducing grades and cutting out curvature; the rebuilding of roadbed structures; and the entire reconstruction of bridges. This last work, particularly where broad and deep rivers are spanned, is very costly, and especially so in cases where the existing bridge makes provision for only a single track, since then it becomes necessary, not merely to build a bridge of greater weight and strength to accommodate heavier locomotives and rolling stock, but the tracks have to be at least doubled, with a corresponding increase in the labor and materials entering into the new bridge.

The accompanying illustrations represent the reconstruction of one of the longest and most important railroad bridges in the country—the crossing of the Susquehanna River by the Baltimore & Ohio Railroad. The river, at this point, calls for a bridge of about 7,000 feet total length, which, indeed, is the length of the old single-track bridge measured from abutment to abutment. In the center of the river is an island or shoal known as Watkins Island, which is dry throughout the greater part of the year, but is usually submerged during periods of high water. The channels on each side of Watkins Island are spanned by truss bridges. The west channel structure is a through truss, and that on the east channel a deck truss. The approaches and that portion of the crossing which extends across Watkins Island are carried upon steel bents resting on masonry pedestals, the superstructure consisting of plate girders of a span of 30 feet. The crossing of the easterly channel is spanned by a deck truss in which the tracks are carried above the upper chord. That portion of the river between the westerly channel and the westerly abutment in the old bridge is spanned by four long deck trusses.

In the reconstruction of the bridge it was decided to discard the old structure altogether, and build an entirely new bridge throughout the whole length of the crossing. The magnitude of this work will be appreciated when we state that in the whole 7,000 feet of bridgework there will be no less than 20,000 tons of steel. The difficulty of the work is increased by the fact that not only is the bridge to be made of more than double the capacity, providing for two tracks in place of one, and enabling these tracks to carry loads far in excess of those for which the old bridge was designed, but this 20,000 tons of steel must be assembled, hoisted into place, and riveted together, without any interference with the heavy traffic which passes daily over this road.

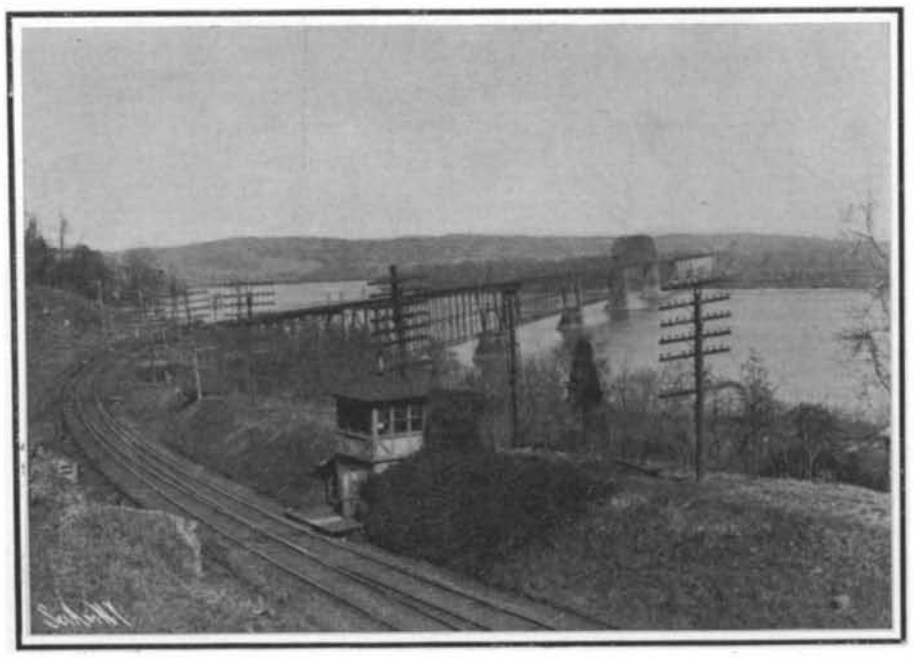
In the reconstruction of the plate girder viaduct portion of the bridge on Watkins Island and in the approaches it was decided to substitute concrete piers for the old steel trestle work and to greatly enlarge the spans, using 90-foot girders in place of the old girders of 30 feet span. In doing this work new concrete piers were built beneath every third span, their location falling, therefore, clear of the existing steel bents. The top of the piers falls considerably short of the base of the old girders, the increased clearance being necessary to accommodate the greater depth of the 90-foot plate girders of the new structure.

Of course, the most important and difficult part of the work is the reconstruction of the through steel trusses 520 feet in length across the deep water channel. The falsework for carrying these trusses during construction consists of temporary timber piers, resting on piling driven into the bed of the channel, and spanned by four lines of deep plate girders. The great span over the westward navigable channel will have a clear length between end pins of 520 feet, and another span of the same length will be thrown across the east channel between Watkins Island and the east approach. The truss over the western channel will be a deck truss, that is to say, the tracks will be laid through the truss at the level of the lower chords. The truss over the easterly channel will be a deck truss with the tracks laid upon a floor system resting upon the upper floors. The distance between the westerly piers of the westerly channel truss and the west approach will be spanned by four deck trusses, each 480 feet in length. There will be a clear height of navigation of 90 feet between the under side of the westerly channel span and the water.

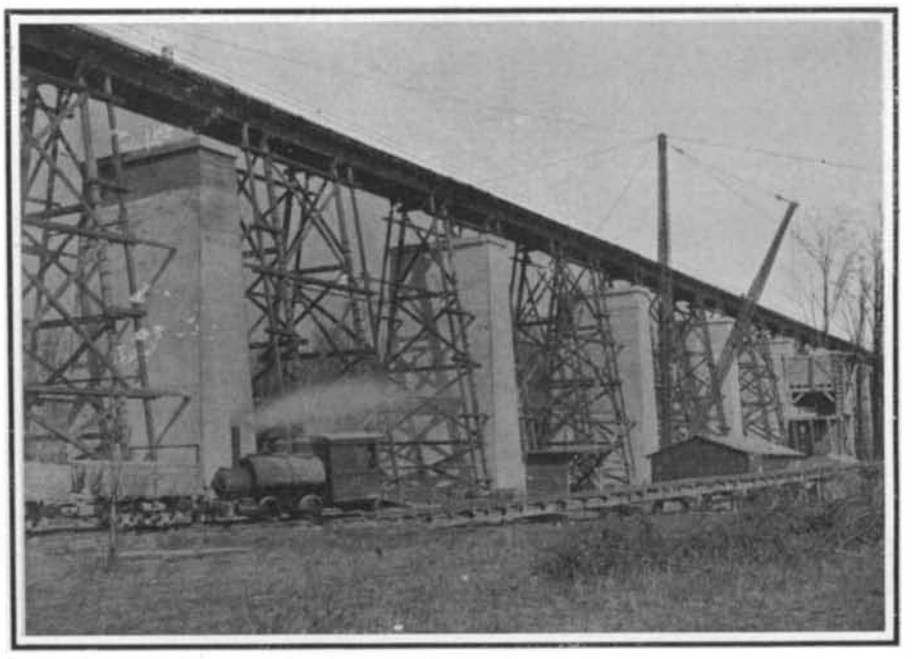
Ordinarily, the depth of water in the west channel ranges from 20 to 25 feet, while the depth in the east channel reaches, in some places, 55 feet. These depths, however, are liable to be increased in the flood season by from 20 to 25 feet. In some parts of the crossing it has been necessary to go down a distance of 80 feet to reach the rock bed; while in the east channel the rock is over 100 feet below the surface of the water when the river is at flood.

Fully three years must pass before the bridge is ready for service. When it is completed it will rank as one of the notable bridges of the world.

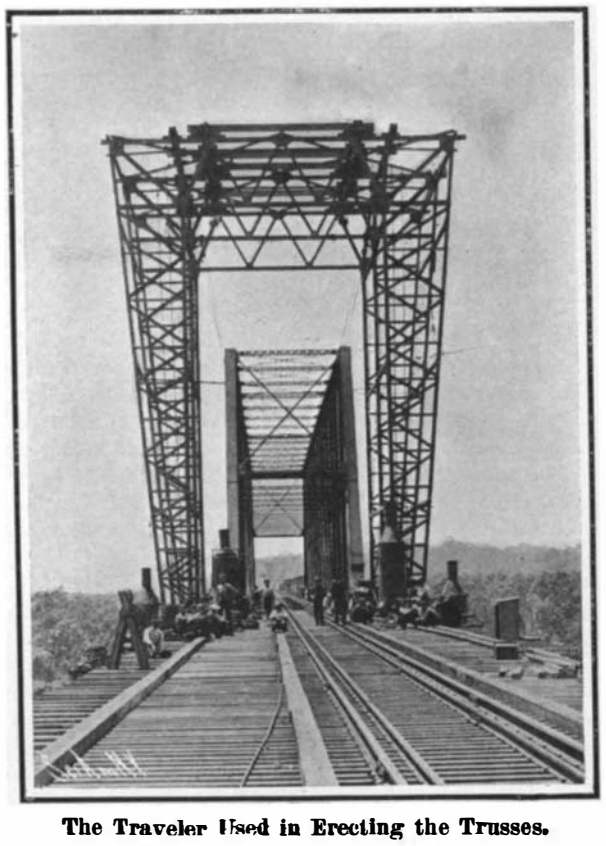
The Susquehanna Bridge is one of a series which is being erected as part of the reconstruction of portions of the Baltimore & Ohio system, and in this work are included several stone arch bridges which are notable for their massive proportions, ranking in this respect with some of the famous masonry bridges of Europe. The conception and carrying out of the new bridge is due to Mr. D. D. Carothers, chief engineer of the Baltimore & Ohio system. Mr. A. M. Kinsman, bridge engineer of the road, is in charge, with Mr. J. T. Wilson as supervisor.



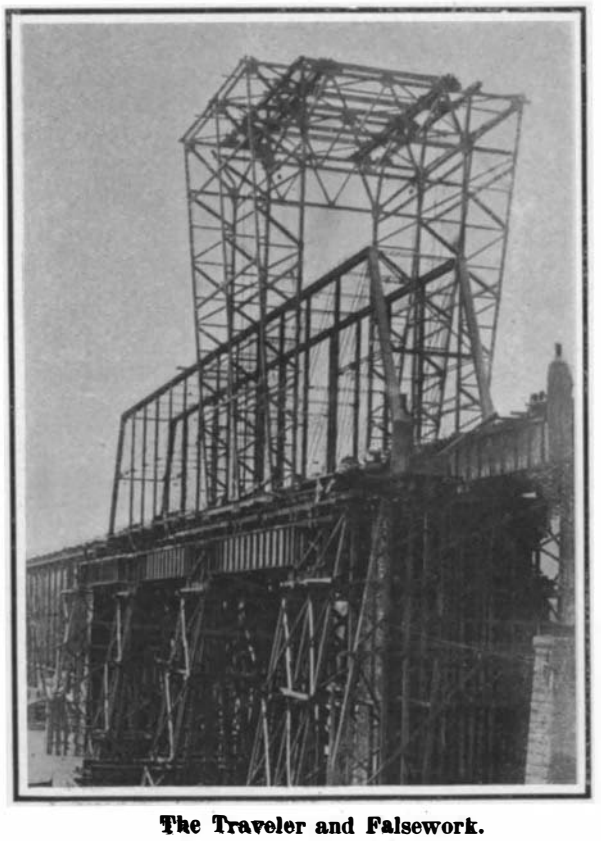
General View of the Bridge.



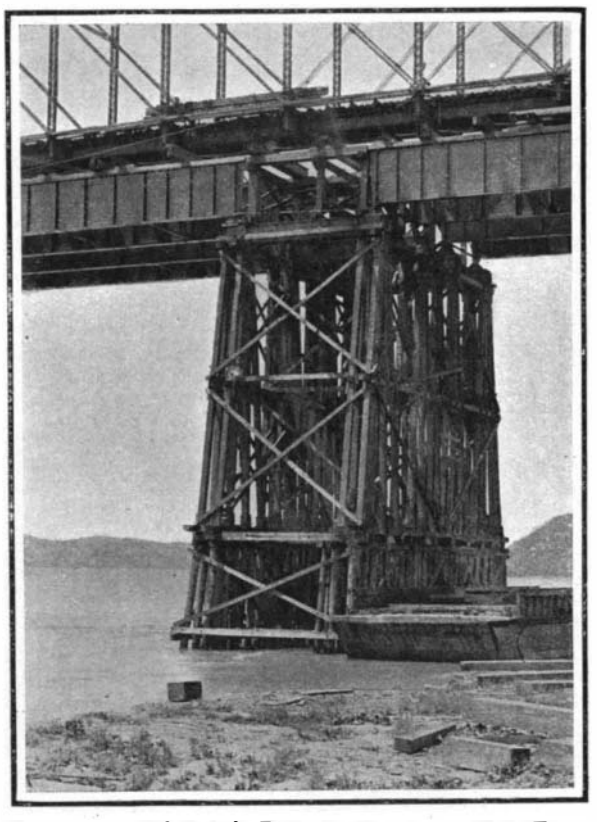
View Showing Old Bridge and New Concrete Piers.



The Traveler Used in Erecting the Trusses.



The Traveler and Falsework.



Temporary Falsework Pier Supporting Ends of Two Plate Girders.

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