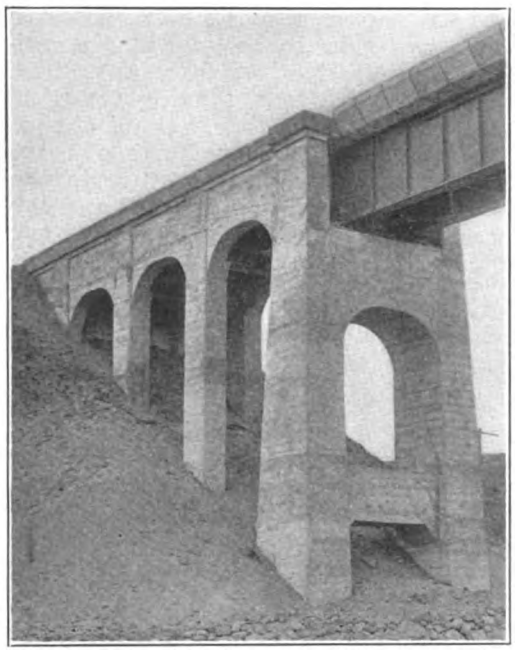


NORTHWEST ELEVATION OF EAST ABUTMENT

yd. of concrete and 103,000 lb. of reinforcement steel. A load of from 3½ to 4½ tons per square foot was allowed on its gravel foundation. The foundations of the other abutment were carried down to solid rock.

CONCRETING

Since the new structure was located on the same alignment as that of the timber trestle being replaced, it necessitated building the bridge under traffic. This was accomplished with very little interference with the old timber trestle. Only two posts in the second story of the timber trestle interfered with the longitudinal struts of the abutment, and these were shifted to a vertical position, giving the necessary clearance when the struts were cast.

The footings for the abutments were cast separately from the rest of the abutment masonry. The upper portion was cast in five stories of several sections each, with horizontal and vertical construction joints as indicated in the concreting diagram. The different sections were cast in the sequence of the numerals in the diagrams or in multiples of them, and the concrete was keyed at all joints with tennons formed by embedding 4-in. beveled blocks in the surface of the fresh concrete and removing them before the next section was concreted.

The viaduct was designed and constructed under the direction of the engineering department of the Chicago, Milwaukee & St. Paul Railway, of which C. F. Loweth is chief engineer and J. H. Prior engineer of design.

LOS ANGELES HARBOR WORK to the value of $847,786.95 was completed during the fiscal year ended June 30, 1914, according to the annual report of F. T. Woodman, head of the department of construction and maintenance. In the inner harbor 2920 ft. of creosoted-pile wharf have been completed, on which 1960 ft. of freight shed 100 ft. wide are being erected. In the outer harbor the reinforced-concrete wharf is finished. To date $2,752,630.79 has been spent, and $1,932,087.59 is yet available. The estimated value of contracts now in force and of work being done by force account is $1,211,970.

Operating Results of Harrisburg Filters for 1913

OPERATING results of the water filtration plant at Harrisburg, Pa., for the year 1913 are given in the recently published annual report of the Board of Water Commissioners, for whom James M. Caird served as consulting chemist and bacteriologist. The supply is taken from the Susquehanna River and passed through a settling basin and coagulating chamber and thence through mechanical filters to an uncovered reservoir. As the unfiltered water enters the settling basin calcium hypochlorite is added.

The turbidity ranged from 2 to 1600 parts per million; color, from 2 to 30 parts per million; alkalinity, from 2 to 109 parts per million, and bacteria, from 107 to 47,500 per cubic centimeter. All turbidity and color were removed in filtration and 99.94 per cent of the bacteria, leaving an average of but 3 bacteria in the filtered water for the entire year.

Four and nine-tenths parts of alkalinity were used by the application of 0.75 grains of sulphate of alumina, and sufficient CO_2 was always present in the water to decompose the 0.069 grains per gallon of hypochlorite that was applied to the raw water from the river. The hypochlorite, which is applied to the water in the intake well and sedimentation basin, reduced the bacteria 98.79 per cent in the treated water, an average of 62 bacteria per cubic centimeter when it goes on the filter.

The total number of gallons filtered was 3,160,891,600, of which 3,062,486,100 gal. were delivered to the pumping station, and 96,555,500 gal. or 3 per cent of the whole was used in washing filters.

CHEMICALS

The turbidity in the river averaged 55.7 parts per million, color 8.0 parts and the alkalinity 32.5 parts. The coagulant used an average of 4.9 parts of the alkalinity, leaving an average of 27.6 parts in the filtered water. Soda had to be used on 25 days during the year. The use of hypochlorite was continued all year and no trouble has developed from the high counts in the filtration.

The filters run an average of 17 hr. 32 min. between washings. In each wash averages of air for 4 min. and of water at a velocity equal to a vertical height of 0.9 ft. a minute for 5.6 min. were used. The time off for washing each filter averaged 18.6 min.

The operating expenses were $20,931.24, and were distributed as follows: Coagulant, $4,425.07; coal, $1,586.23; supplies, $1,715.32; materials and repairs, $2,687.97; oil and waste, $342.06; laboratory and chemist, $1,302.89, and salaries, $8,871.70. This makes the cost per million gallons $6.83; coagulant costing $1.45; coal, 52 cents; supplies, 56 cents; materials and repairs, 88 cents; oil and waste, 11 cents; laboratory and chemist, 42 cents, and salaries, $2.89.

Temporary Railway Bridge at Ellis, Ohio

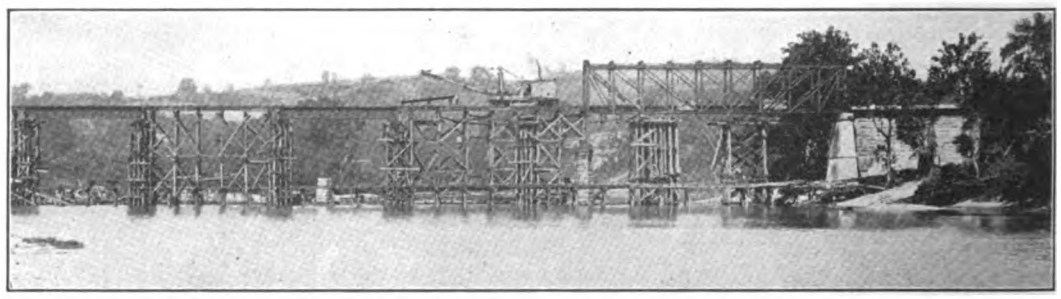
Trestle and Girder Spans for Temporary Service as Falsework and to Carry Traffic During Construction

THE reconstruction of the Pittsburgh, Cincinnati & St. Louis Railway bridge across the Muskingum River at Ellis, Ohio, is somewhat unusual on account of the fact that the work was done so as to maintain railroad traffic over a long structure at a considerable height above the river, support one end of an existing track span, provide clearance for the removal and rebuilding of the old piers, and furnish falsework for the erection of the new superstructure by means of a temporary structure.

Three of four 134-ft. through-truss spans were wrecked by flood in March, 1913, the superstructure falling to the bottom of the river alongside the piers. The fourth span remained in position in serviceable condition and is still in use, but the other spans, together with the approach at one end of the bridge, required to be rebuilt. Piles were driven and on them framed bents were erected by a derrick car to make falsework for the erection of the new superstructure and also to serve as a bridge carrying traffic until the permanent structure was erected. A low-level service track was installed on piles alongside the bridge and served for the distribution of materials and other construction purposes.

FALSEWORK CLEARANCE

As all three of the old river piers had to be rebuilt it was necessary that the falsework adjacent to them should have clearance for this purpose and several of the regular bents were therefore omitted at each pier and these spaces were spanned by plate girders supported on multiple bents of falsework braced to form towers between which the masonry construction was carried on. In order to support one end of the existing span and maintain it while the pier under it was replaced, a somewhat wider clearance was provided there and an 8-bent falsework tower with 48 vertical and inclined posts was built, and the third and fourth panel points from the ends of the trusses were wedged to bearing on it leaving the two end panels projecting as cantilevers beyond the tower. The tower also supported the plate girder spans carrying the traffic and the new steel work over the pier. The falsework and approach trestle were constructed by the Pittsburgh Construction Company.



DERRICK CAR ERECTING TEMPORARY RAILROAD BRIDGE AT ELLIS, OHIO