

The Canadian Engineer

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Saving a Railway Bridge Built 63 Years Ago

Half-Inch Coating of Gunite Applied to Brick Work of Abutment and Eight Piers of Grand Trunk Railway Bridge at Weston, Ont.—Three Thousand Square Yards Shot in Six Weeks by Inexperienced Gang at Cost of Forty-Seven Cents a Yard

AT Weston, Ont., on the Toronto-Guelph line of the Grand Trunk Railway, there is a single-track bridge across the Humber River. This bridge was built in 1854 and its brick piers and abutments recently began to show signs of serious disintegration. One of the abutments was torn down about a year ago and rebuilt of reinforced concrete. The masonry department of the railway, desiring to avoid all unnecessary reconstruction at this time, decided to try the cement-gun as a means of repairing and strengthening the brickwork of the other abutment and of the piers and of preventing further disintegration. The work has just been successfully completed, and from all indications the life of the bridge has been greatly extended and reconstruction indefinitely postponed by filling all the holes (some of them from 18 ins. to 24 ins. deep) with gunite, as the product of the cement-gun is called, and covering the entire surface of all the piers and the abutment with one-half inch of the material.

The bridge has eight brick piers, built on granite substructure. The brick portion of each pier is about 60 ft. high, rectangular in horizontal cross-section, 7 ft. x 15 ft. at the top, 11 ft. x 18 ft. at the base.

One of the railroad's car compressor plants was assigned to the job, but the boiler was found to be in need of repair, so the plant was taken off the car, overhauled and set up alongside of and at the top of the concrete abutment. The plant, as used, consisted of an "Ajax" portable boiler, manufactured by A. B. Farquhar, of York, Pa., and a small compressor, built by the Chicago Pneumatic Tool Co., furnishing air at 50 lbs. pressure through two small riveted boiler plate receiving tanks. A 2-inch iron pipe line was laid roughly across the bridge and connected to the tanks as the air line. Water connection was

made with one of the town of Weston's services, and a 1-inch iron pipe was laid roughly across the bridge, with a cock at every pier.

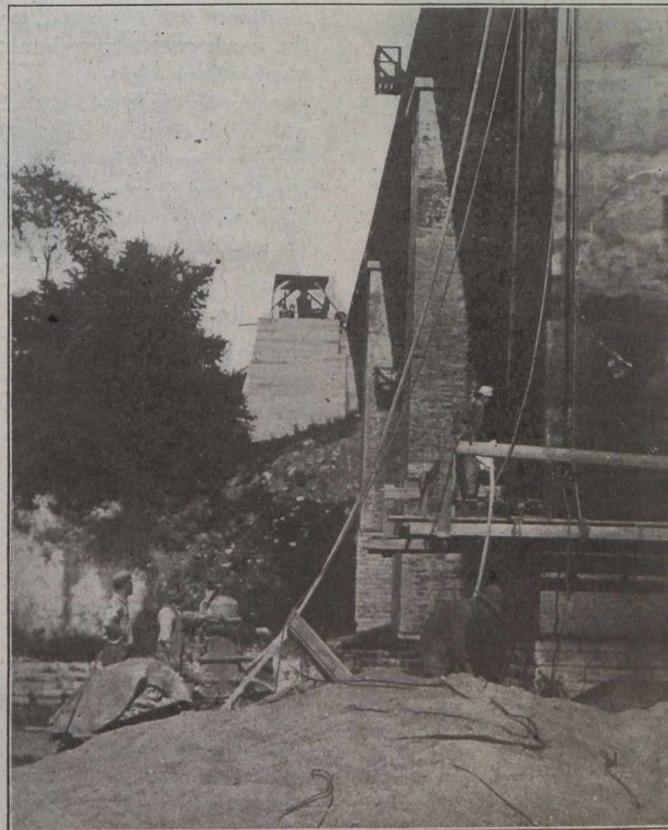
The cement-gun was placed on the river bank, as near as possible to the pier on which the work was started, and a 2-inch hose was dropped from the air line on the bridge to the gun, and a ½-inch hose from the water line on the bridge to the nozzle, the flow of water thus always being under control of the nozzleman, while the air pressure, governing the delivery of the mixed sand and cement, was under control of the gun operator, which is the usual arrangement in operating the cement-gun.

A mason's ordinary suspended platform was built around the pier, and raised and lowered by rope and tackle fastened to the girders and ties of the bridge. Only the nozzleman used this platform, starting at the top of the pier and covering all four sides from top to bottom, lowering the platform every five feet, thus covering each pier in twelve stages.

The gang consisted of five men, *viz.*, one nozzleman, one gun operator, one man in charge of compressor plant, and two men who alternated in their duties of screening sand and loading the gun with cement and sand. All sand was screened through ¼-inch mesh.

The work occupied six weeks, but toward the finish it took only two days to do a pier and one day to move

the apparatus to the next pier, while the earlier piers took three days to do. None of the men had ever before operated or even seen a cement-gun, and were green, unskilled hands, so that much time was lost in the beginning (a) through rearrangement of the compressor plant; (b) through not thoroughly understanding the gun and using too low air pressure; (c) through using too fine a sand; (d) and through the nozzleman's holding the nozzle at an



General View of the Work, Showing Concrete Abutment and Compressor Plant in Background, Two of the Eight Brick Piers Before Guniting, One Freshly Guniting Pier in Foreground, Cement-Gun, Air and Water Hose and Sand Screen