

The purpose of this article is to describe briefly how the repairs were carried out, the broken 12-foot length of pipe being removed and a sound one substituted. Fortunately it was possible to undertake the repairs before the end of winter, while the water level in the river remained at its minimum, and the ice was in good condition.

Fig. 1 shows the location of the two submerged water pipe lines. Fig. 2 shows the trench dredged in the

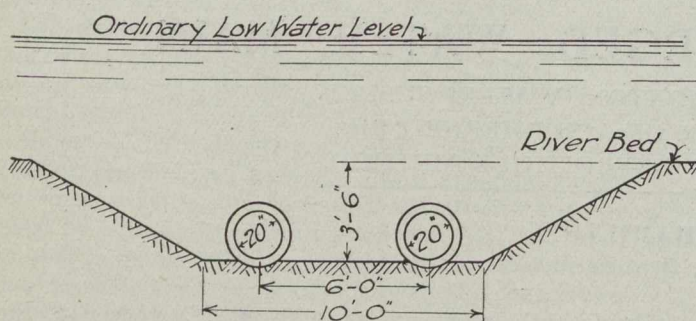


Fig. 2.—Trench Dredged in River Bed, for the Pipe Lines.

bed of the river with the two lines of 20-inch diameter cast iron pipes in position. Fig. 3 shows a cross-section of the cofferdam constructed around the broken pipe. Lock Joint steel sheet piling was used, the length of the dam being about 24 feet.

It would have been a comparatively simple matter to have secured a watertight cofferdam had it been possible to use this piling across the full width of both ends of the dam, but the position of the pipe prevented so simple a solution of the matter.

The material forming the river bed at the point in question consists of gravel mixed with a comparatively

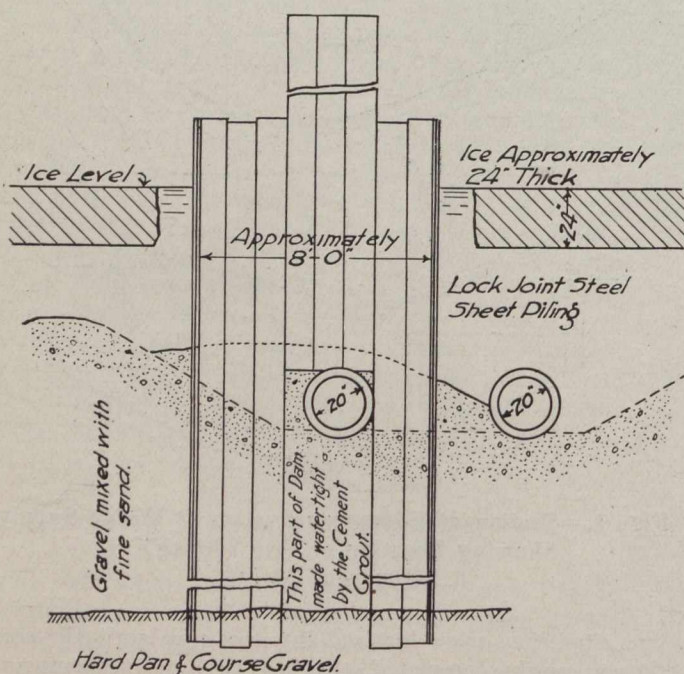


Fig. 3.—Sketch of Cofferdam Constructed Around the Section of Broken Pipe.

large proportion of fine sand, which overlies for a depth of several feet a firm stratum of coarse gravel and hardpan firmly cemented together, into which the sheet piling was driven.

Several attempts were made to complete the ends of the cofferdam above and below the pipe, but without

success, and much delay and expense might have been entailed had not the superintendent in charge of the work conceived the idea of forcing cement grout into the gravel and sand at these points by means of a hand pump—an idea which was put into operation with immediate and complete success. The cement was mixed in deep steel wheelbarrows, and reduced to the consistency of cream with water in which had been dissolved soda crystals, the latter being used to hasten the setting of the cement. The pump was operated by four laborers, and was found capable of exerting a pressure of 40 lbs. when previously tested with water against a pressure gauge.

The work of pumping the grout had to be carried out with the utmost despatch in order to prevent the pump from becoming choked, each batch of grout being handled quickly, and the pump thoroughly washed out after dealing with each batch. In all, twenty-two bags of cement were used, and within a period of 60 hours the cofferdam had been pumped dry.

The subsequent work of removing the broken pipe, and replacing it with a sound one was successfully and expeditiously performed.

The work of laying the double line of submerged mains, and the execution of the repairs above explained, were carried out under the direction of Mr. J. Ryan, superintendent of works for the city.

COST OF ROAD REPAIR AND MAINTENANCE, NIAGARA FALLS PARK.

IN our issue for October 1st, 1914, were given some road surfacing costs relating to work executed during 1913, in Queen Victoria Niagara Falls Park, under the direction of Mr. John H. Jackson, superintendent. The data related in particular to both heavy and light resurfacing of waterbound macadam roadways, and to carpet treatment with refined tar. Costs were also given for resurfacing a stretch of driveway with Rocmac.

The value of the figures is considerably enhanced by the recently issued report of 1914 operations. In the following data the costs have all been reduced to a square yard basis and the corresponding cost per mile is deduced for a stated width of surface.

Oiling Boulevard and Park Driveways.

Time—June and July.

Location—Between Park and Chippewa and south end of main driveway.

Average haul—.95 mile.

Surface treated—Length 8,265 ft. (1.56 miles), 19,240 square yards.

Labor.		Total.	Per sq. yd.
Loading and placing ½-in. stone	\$	270.00	1.40 cts.
Hauling ½-in. stone and oil		234.00	1.23
Rolling and heating		150.00	.77
	\$	654.00	3.40 cts.
Materials.			
½-in. stone, 260 tons	\$	358.00	1.86 cts.
Screenings, 83 tons			
Vulcan asphaltic oil			
(80%) 6,500 gals.		469.00	2.44
Demurrage, etc.			
Coal for heating and rolling, 9.05 tons		48.00	.25
	\$	875.00	4.55 cts.