

CEMENT JOINTS FOR CAST IRON MAINS.

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also several thousand feet of 8-in. cast-iron pipe have been laid in fine beach sand; all are giving perfect satisfaction. An 8-in. cast-iron main with cement joints was laid in filled ground (the soil being clay) with only 6 ins. of covering above the pipe when the line was put in service; the fill was then completed to 18 ins. above the top of the pipe, and was rolled with a 14-ton steam road roller, without causing the slightest seepage in any of the joints. The rolling was done preparatory to paving the street in which the pipe was laid. This was a very severe test of the merits of the cement joint. At the time this rolling was done, had any seepage developed, it would have been readily detected, as the whole line was within 3 ft. of the edge of the fill. The fill was completed to a width of 80 ft., 3 months later, leaving the pipe 12 ft. from the centre of the street.

In several instances a cast-iron main laid with cement joints has settled 3 ins., or probably more, in loose or filled ground, without developing any leakage. In fact, there is only one case that the writer can recall where the cement joint was not satisfactory. This was in a 6-in. cast-iron main on a dock, about 3 ft. from a railroad track. Many joints in this pipe have developed seepage, and some have small pin leaks, but the leakage is not considered serious enough to warrant closing down the line for re-construction. This failure may be due to faulty construction, as the pipe was laid when the making of cement joints was in its infancy. However, the main is situated so that it cannot be entirely covered.

Removing Cement-Jointed Pipes.—Fig. 5 shows a completed joint. The cement joint can be taken apart in a very simple and economical way. The pipe is uncovered about one-half, or a little below the centre. At the joint where the original bell-hole was dug, the trench is usually made wider on the sides (but not deeper under the pipe), in order to permit the caulker to work at the joint. The upper half of the joint is cleaned out with a cape-chisel; then, with tripod and blocks, the free end of the pipe is raised until the lower half of the joint breaks free from the bell. The pipe seldom has to be pulled out of the bell, as it nearly always works itself out as the free end is lowered. If portions of the cement stick to the bell, end of the pipe, or fail to be entirely crushed in the bell, it is a very simple matter to clean out the bell with a cape-chisel, or knock the cement from the spigot with a hammer.

On occasions, after a joint has been cemented tight in the line, it is necessary to cut it out entirely (such as for laying a valve on its side; turning a tee or Y in another direction; adjusting a tee to conform to or meet a grade; avoiding a sewer connection or any other unforeseen obstacle). Table 1 has been compiled from records of the actual time spent in doing such work.

Table 1.—Time Required for One Man to Dig Out a Complete Cement Joint, Without Removing the Fitting or Gates from the Line.

Size.	Time.
4 inches	18 minutes
6 "	22 "
8 "	26 "
10 "	30 "
12 "	38 "
14 "	48 "
16 "	60 "

Table 2.—Data Relative to Cement Joints.

Size of pipe, in inches.	Rings of jute per joint.	Jute per joint, in pounds (approximate).	No. of joints per 94-lb. sack of cement.*	No. of joints per 8-hour day (one caulker).
4	2	0.14	24	50
6	2	0.19	18	42
8	2	0.24	14	34
10	3	0.43	11	28
12	3	0.51	8	24
14	3	0.58	7	20
16	3	0.66	6	17
18	3	0.73	5	14
20	3	0.80	4	11
24	3	0.95	3	7

*Including the 20 per cent. of cement wasted or left over.

The writer has never cut out a joint on a main of greater diameter than 16 ins. It is fair to assume that to cut out the upper half of a joint, for the purpose of removing a pipe, would take only one-half the time indicated in Table 1.

At Long Beach unit costs have been kept on all construction, covering nearly the entire 60 miles of cast-iron water mains. Table 2 has been carefully compiled from these unit costs, and presents data concerning cement joints.

GOOD RESULTS OF ONTARIO GOVERNMENT RY.

The total mileage of the Temiskaming and Northern Ontario Railway in operation at the end of 1916 was 454 miles, according to the fifteenth annual report of the road. The total operating revenue was \$2,138,121, as compared with \$1,550,403 in the previous year, and the operating expenses were \$1,594,177 in 1916, as against \$1,356,049 in 1915. The net operating revenue, therefore, was \$543,944 in 1916, as against \$194,353 in 1915. Total earnings were: \$528,705 in 1916, \$210,538 in 1915. The payroll totalled \$1,127,885, as compared with \$953,209 in 1915, and \$216,119 in 1905, the year in which the road commenced operation.

Other figures are: Revenue per mile of road, 1916, \$6,508; 1915, \$4,719. Expenditure, per mile, 1916, \$4,852; 1915, \$4,128—a betterment in net revenue in 1916 of \$1,064 per mile operated over that of 1915. During 1916 the commission spent \$463,604 on equipment and improvements, as against \$112,000 in 1915.

SASKATCHEWAN BRANCH, CAN. SOC. C.E.

At a meeting of the Saskatchewan Branch of the Canadian Society of Civil Engineers held at the Assiniboia Club, Regina, on May 10th, the following officers were elected for the year: Chairman, L. A. Thornton, Regina; vice-chairman, G. D. Mackie, Moose Jaw; secretary, J. N. de Stein, Regina; executive, H. S. Carpenter, E. G. W. Montgomery, Regina; A. H. Dion, Moose Jaw; C. J. Yorath and Prof. A. R. Greig, Saskatoon.

It was decided to hold a public meeting at Regina on May 25th, when railway problems will be discussed, and a similar gathering will be held in Moose Jaw some time in August.

The Dominion Government has spent \$17,790,587.74 on the construction of the Hudson Bay Railway and the Port Nelson terminals.