

REPORT ON DISTRIBUTED LOAD TEST ON 66-INCH CAST IRON PIPE.

It was thought advisable to make a load test on one of the cast iron pipes to be used in the syphon under the Don River, Toronto, in connection with the High Level Interceptor. The pipe tested weighed 9,038 lbs., measured 8 feet in length and 66 inches in inside diameter, and was made of 1.5-inch thickness of metal. This pipe being the last of the line, had a 3-inch flange in place of the bell of the standard pipe. The report of this test and the cuts are abstracted from the Report of the City Engineer of Toronto for 1910.



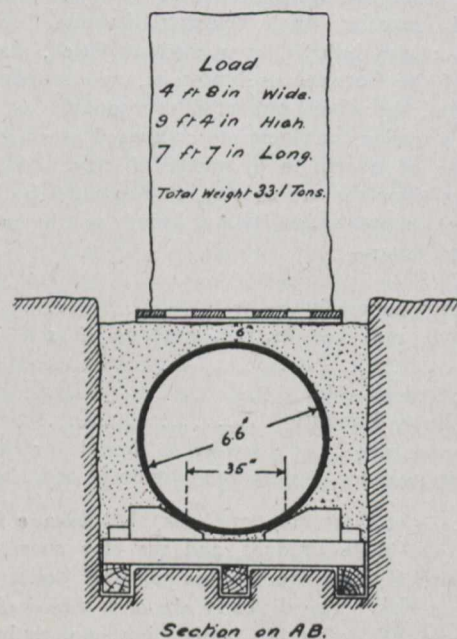
Testing Cast Iron Pipe.

A pit was excavated measuring 8 ft. \times 11 ft. and 8 ft. deep. In this were laid three sills 10 in. \times 10 in. \times 11 ft. and on them two caps 8 \times 10 \times 8 ft., spaced four feet apart, centre to centre, and placed so as to lie 2 feet from each end of the pipe, this construction being similar to that adopted in the actual work on the syphon. On each cap two bearing blocks were fastened supporting the pipe at two points 35 inches apart horizontally. The pipe was lowered into place by jacking on the ends of a 10 in. \times 10 in. timber placed through the pipe. The spigot end was placed tight against the end of the pit, and a bulkhead built around the flange end, so that when the back filling was completed access could be had to the inside of the pipe. The filling used was composed of the clayey sand being excavated from the river bed, was thoroughly wetted and tamped, and brought up to a height of 6 inches above the top of the pipe. On top of this a skeleton platform of 2-inch boards was laid to form a foundation for the pig iron, which material was to be used for the load.

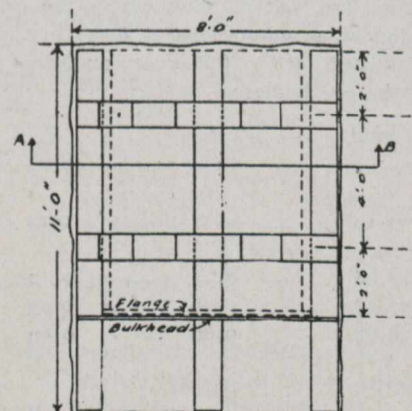
The pile of iron was commenced on a base measuring 7 ft. 7 ins. by 4 ft. 8 ins. Two tiers, 4.1 tons, were laid before the gauges were set. These were three in number, two being used to measure contraction on the vertical diameter at the flange and spigot ends, and the third to measure expansion on the horizontal diameter midway between them. They were of simple construction; an oak rod $\frac{3}{4}$ -in. square fitted with a metal bearing point at the bottom and having fixed at the top a rule inset in which was a graduated metal slide on which readings could readily be made to 1-64 of an inch. Depressions were made with a centre punch into which the gauges were set. The load was increased by increments of one ton (50 pigs approximately), and at each increment the gauges were read. The total load applied was 33.1 tons, and took approximately two days to place.

As may be seen by the accompanying tables and curves, the deformation occurred uniformly to the extent of approximately 1-64 of an inch per ton at the spigot end, one-half as much at the flange end, and one-half the difference midway between. The curves, plotted as they are to magnify any change in the rate of deformation, are practically straight lines. That for the spigot end, at which place only was the deformation for each reading appreciable, is the most uniform, the only inequality occurring where the load ceased to be applied continuously.

It had been the original intention to take readings as the load was decreased, but circumstances would not permit of this. Two readings were, however, obtained, one being made just after the load had been removed, and the other after the filling had been removed. The former showed that the pipe had returned from a total deflection of 25-64 of an inch at the spigot end to within 6-64 of an inch of its original diameter, and from a total deflection of 13-64 of an inch at the flange end to within 3-64 of an inch of its original diameter. The latter showed the pipe in its initial shape.



Section on AB.



Plan of Timber Foundation

Outline of Pipe shown in Dotted Lines.

Method of Supporting and Loading 66-in. Cast Iron Pipe.

When the platform under the pig iron was taken up, it was noticed that very little settlement had taken place, showing that the load had been practically a uniformly distributed one.