

MUNICIPAL DEPARTMENT

COSTS OF PIPELAYING.*

The following memoranda were obtained by the writer during the summer of 1893.

CASE I.—Pay of laborers, 15 cents per hour; pipe handlers, 16 cents to 17½ cents; foreman 20 cents to 25 cents. In a paved street. Paving, cedar blocks on plank and sand. Backfilling all pounded in layers when loose not more than 4 inches thick. Material, mostly clay; a few feet of sandy loam. Depth of trench 4 to 5½ feet. Size of pipe 24 inches, laid on 4x4-inch blocks. Specials about every 300 feet. Length of line 2,500 feet. Total of connections: 12"=56'; 10"=14'; 8"=27'; 6"=89'; 4"=.21'. Estimated=2,550 feet of 24-inch pipe.

Estimated earth excavated, 2,709.4 cubic yards.

Cost per foot: Digging, 27.25 cents; pipelaying, 24.80 cents; bell holes, 15 cents; shovelling in, 17.9 cents; pounding, 79.27 cents; loading earth, 8.95 cents; teaming earth, 6.36 cents; total, \$1.7953.

Cost per cubic yard: Digging, 25.62 cents; shovelling in, 16.84; pounding, 74.61 cents.

Surplus earth was hauled at 17 cents per load of 1.4 cubic yards loose.

CASE II.—In an unpaved street. Backfilling for 1,356 feet done by laying tiles, two lines, one of 4-inch at bottom of trench and one of 3-inch at half the depth, both connected to sewers, and filling in layers 12 to 20 inches thick, each thoroughly slushed from above before next was put on to within 6 inches of top. Top 6 inches thoroughly pounded after bottom had dried at least 24 hours.

The remaining 790 feet filled as above. Material as above.

Total length of 24-inch pipe, 2,032 feet. Total of connections: 12-inch=19 feet; 8"=32'; 6"=99'; 4"=21'. Estimated=2,100 feet of 24-inch pipe.

Estimated earth excavated, 1,963.4. Total length of trench dug and filled, 2,200 feet.

Other data as in Case I.

Cost per foot: Digging, 33.3 cents; pipelaying, 18.2 cents; bell holes, 12.8 cents; shovelling in, wet, 19.1 cents; pounding, wet, 10.7 cents, dry, 46.4 cents; tile, hose work, etc.,† wet, 7.4 cents, dry, 2.1 cents; loading earth, wet, 4.6 cents, dry, 4.4 cents; teaming earth, wet, 5.5 cents, dry, 3.8 cents; total, wet, \$1.117, dry, \$1.401.

Cost per cubic yard excavated: Digging, 37.3 cents, shovelling in, wet, 21.6 cents, dry, 19.9 cents; pounding, wet, 12.1 cents, dry, 48.1 cents; tile, hose work, etc., wet, 8.4 cents, dry, 2.1 cents.

Surplus earth was hauled at 17 cents per load of 1.4 cubic yards loose. Or considering the filling alone the cost per foot for wet work was 47¾ cents, and for pounding work was 75¾ cents.

As to the results of the backfilling experiment other than the reduced cost, it was found that the filling in the wet way required two or three days longer than in the dry way. So far as the condition of the trench and roadway were concerned in an unpaved street, the filling was rounded up about 4 inches above the grade of the rest of the street both in the wet and the dry work, and this has been sufficient to provide for the settlement in both cases. The dry work shows itself somewhat more smooth than the wet, but hardly sufficiently so to be noticeable in driving over the ground.

CASE IV.—Pay of laborers as previously. In paved streets, mainly cedar on sand. Material, clay. Backfilling as in Case I. Lime composed of 24"=17'; 16"=4,121'; 12"=1,615'. Connections, 12"=10'; 10"=25'; 6"=179'; 4"=195'. Estimated=6,241 feet 12x15-inch pipe.

Cost per foot: Digging, 20.60 cents; pipelaying, 20.89 cents; bell holes, 9.54 cents; shovelling in, 12.28 cents; pounding, 28.96 cents; loading earth, 3.58 cents; teaming, 6.35 cents; total \$1.0318.

Cost per cubic yard: Digging, 37.36 cents; shovelling in, 22.26 cents; pounding, 54.34 cents.

Estimated excavation, 3,441 cubic yards. Surplus earth hauled at 40 cents per load.

CASE V.—Pay of laborers as above. In unpaved streets, backfilling, wet, as in Case II. Material, clay. Pipe, laid on blocks. Other data as previously. Size of pipe 10 inches. Connections, 4"=98'; 3"=4'; Estimated=8,969 feet of 10-inch pipe. Estimated excavation, 4,508 cubic yards. Earth pounded on top and for street crossings, 1,376 cubic yards.

Cost per foot: Digging, 24.16 cents; pipelaying, 9.39 cents; bell holes, 0.98 cent; shovelling in, 13.60 cents; pounding, 13.22 cents; tile,* hose work, etc., 2 cents; loading, 0.52 cent; teaming, 0.46 cent; total, 64.33 cents.

Cost per cubic yard: Digging, 48.07 cents; shovelling in, 27.06 cents; pounding, 86.18 cents.

Surplus earth hauled at 17 cents per load.

On this work great pains were taken with the grading of the tile, one row being at the bottom and another half-way up, and all were connected to sewers. As a result, from the time the work was completed the ditch has been the best part of the street, and especially so in muddy seasons.

In the above memoranda there are developed some relations between earth in the ground and earth in wagon boxes.

In Case I., of 24-inch pipe, the pipe volume was about 110 cubic yards, but the quantity of earth hauled away from the trench by wagon load measurement was about 1,300 cubic yards, or 2,709 cubic yards, swelled 1,190 cubic yards in

handling, amounting to about 44 per cent.

In Case II., of 24-inch pipe, the pipe volume in slush work was about 55 cubic yards, and there was hauled about 611 cubic yards of surplus. For the pounded work the pipe volume was about 28 cubic yards, and the surplus about 252 cubic yards. Or the amount of the swelling in former instance was 556 cubic yards in 1,200, or about 44½ per cent., and in the latter it was 224 cubic yards in 763, or about 30 per cent.

In Case IV., of 16-inch and 12-inch pipe, the pipe volumes were about 355 cubic yards and the surplus was about 1,030. The swelling, therefore, was 675 cubic yards in 3,441 cubic yards, or about 20 per cent.

CASE VI.—Laborers paid \$1.25 for eight hours. In a paved street. All backfilling pounded. Connections every 300 feet. Size of pipe 12 inches. Length of line 1,048 feet. Depth 5 feet.

Cost per foot: Digging, 18.6 cents; laying, 25.7 cents; filling 45 cents; hauling surplus earth, 1.4 cents; total, 90.7 cents.

CASE VII.—Same as above except length=2,475 feet.

Cost per foot: Digging, 13.4 cents; laying 16.2 cents; filling, 39 cents; hauling surplus earth, 1.1 cents; total, 69.73 cents.

CASE VIII.—Same as above, except size=10 inches, and length=2,592 feet.

Cost per foot: Digging, 19.20 cents; laying, 12.18 cents; filling 39.49 cents; hauling surplus earth, 1.01 cents; total, 71.88 cents.

CASE IX.—Same as above, except size=8 inches, and length=2,049 feet.

Cost per foot: Digging, 14.42 cents; laying, 6.78 cents; filling 36.32 cents; hauling surplus earth, —; total, 57.46 cents.

In all the foregoing each connection made was with a line already in service, and therefore involving a more or less complicated shut-off. Besides this, in almost every case, there was a pre-existing pipe which had to be removed. In Cases I. to V. inclusive, a record of the cost of this labor was kept and deducted, but in the remaining cases no account was taken of it either way.

PERSONAL.

Mr. Thomas Huston, who for thirty-three years has held the position of town clerk of Whitby, Ont., died on the 20th inst.

Mr. A. W. Campbell, C. E., of St. Thomas, has received from the Ontario government the appointment of inspector in roadmaking. He will be attached to the Department of Agriculture, with headquarters at the Parliament Buildings, Toronto, where he may be consulted by the municipal authorities and others as to the proper methods of road construction and maintenance. Mr. Campbell has made a special study of roadmaking, and in his present capacity will without doubt prove to be a very efficient and valuable public official.

* G. S. W., '88, in The Technician.

† Tile, etc., includes cost of tiling.

* Item "Tile" includes cost of tile itself.