

It appears that the statement "that when failure occurs in spite of the careful observance of the other precautions, the only effective remedy is to bed the pipe in concrete or use stronger pipe" indicates the advisability of laying all large pipe in concrete or else using double strength pipe. In the absence of experimental data as to which of these alternations is the stronger construction, the concrete is to be preferred, since it lends itself to the making of tighter joints, particularly where cement joints are used or in wet trenches. All sewer pipe up to, and including 12" diameter, commonly conforms to the accepted specifications for double strength pipe.

Concrete for this purpose need not be expensive. During November and December of 1913, 47 cu. yds. of a 1-5 hand-mixed gravel concrete was laid under about equal lengths of 15" and 20" pipe for an actual cost, including excavation for same, of \$4.00 per cu. yd. Here the gravel cost \$1.07 per yd. and cement \$1.50 per barrel, delivered. Labor was 20 cents per hour. Very little foreman's time was included in the cost, since the work required practically no additional supervision. This cost does not include the removal of the excess material from the street, since in this case the earth was sold for the cost of removal. This figure would need to be increased in deep trenches where the cost of excavation was high or where the concrete could not be shovelled directly in place.

This sewer formed part of a storm sewer, the main outfall of which was 27" in diameter. On the outfall the cut was so shallow that it was feared a tile sewer would be broken under the weight of heavy rollers which it was expected to operate over the street preparatory to laying a pavement. Part of the sewer passing under railway tracks also required a stronger construction than tile. A concrete sewer 27" inside diam., 6" walls, with six 3/8" square bars placed longitudinally and spaced equidistant in the walls, was used as giving a stronger section. The structure was built of 1:4 gravel concrete and this section were made by bidders as being too small to build economically of concrete. The cost as tabulated below indicate that the concrete sewer was built considerably cheaper than a single strength tile sewer laid on concrete could have been. The entire section of the sewer was run at one pouring, leaving no joints except at the end of each day's run.

COST OF 27" CONCRETE SEWER.

Labor		Amount.	Unit Cost.
Item.			
Laborers, Exc. and backfill,	677 1/2 hours @ 20c.	\$ 135.50	0.472 per cu. yd.
Laborers, concreting,	510 " @ 20c.	102.00	1.46 " " "
Foreman, exc. and backfill,	58 1/2 " @ 40c.	23.40	0.081 " " "
Foreman, concreting,	40 " @ 40c.	19.40	0.28 " " "
	Total	\$280.30	\$ 0.72 per ft.
Materials.			
Gravel,	70 cu. yd. @ \$1.07	74.90	
Cement,	105 bbls. @ 1.50	157.50	
Forms,		64.85	
Miscellaneous supplies,		13.00	
	Total	\$310.25	\$ 0.82 per ft.
Total Labor and Material			1.52 per ft.

Results of hydrographic surveys conducted throughout the summer under the auspices of the naval service department, lead to the conclusion that first-class harbor facilities are to be found in James Bay in the vicinity of the mouth of the Nottaway River. Good shelter, ample room and a sufficient depth of water have been found and very little silt is in evidence to necessitate dredging. Soundings indicate plenty of water right out into the bay.

## THE FUNCTIONS OF THE ENGINEERING SOCIETY.\*

By L. K. Sherman,

President, Illinois Society of Engineers and Surveyors.

THE constitution of almost all engineering societies state that "the objects of the organization are the exchange of technical knowledge and experience and the advancement of the engineering profession." The benefits derived from the presentation of papers and the exchange of professional experience are of themselves ample reason for membership in the society, and incidentally they are large factors toward the professional advancement of engineering.

In my opinion, however, the time is now ripe when the engineering societies should enlarge their field of endeavor from the purely technical and literary functions to engage directly in efforts promoting the material status of the engineering profession and the individual members thereof.

I am not advocating this effort to promote the material status of engineers because of any alarming conditions. Engineering has advanced from a trade to a profession. Figures gathered by engineering societies, records of the graduates of technical schools and pay rolls of corporations show that the average annual income of the civil engineer to-day compares moderately well with similar statistics of the lawyer and doctor.

The field of the engineer has broadened, especially in lines of sanitation, highway construction and reclamation of lands. His position before the public is better recognized. Engineers are being placed as town managers, on public commissions, as investigators for financial corporations, and as constructors, instead of letting the work by contract.

It is, however, not our place merely to accept what the conditions of the times offer; it is our duty to take advantage of and to push those conditions which result in our rightful material welfare. This can be accomplished only through organization. This is the day of organization—individual effort fails. In business, consolidations alone survive. If engineers are to progress and to retain their rightful sphere they must do so through organization. The legal and medical professions are strongly organized to guard and advance their interests in legislation and in public relations. The architects of this State have an able organization, which legislated a certain kind of structural work out of our hands into theirs. Almost all lines of business have their lobbies. However much we may disagree with the methods of the building trades union we have to admire the efficiency of such organization. Some factors that have contributed toward the delinquency of engineers furthering their material welfare are their modesty, the fact that they are migratory animals, their false sense of dignity and too much conservatism. One of the unavoidable handicaps of the civil engineer arises from the very nature of his work. His work ends when the particular structure which he may be engaged on is completed. He then must seek other and often remote fields where new construction is to be started. These intervals between jobs are often of frequent occurrence. Thus the engineer is a migratory animal. I do not mean to underestimate the desirability of maintaining the dignity of engineering as a profession, but dignity should not interfere

\*Presidential address to the annual meeting of the society.