Please read and send in as full a discussion as possible at earliest date.

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AN ASPHALT PLANT FOR WALKS AND CROSSINGS IN SMALL CITIES.

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In dealing with this subject, the writer proposes to describe an asphalt plant operated by the city of Kingston for the past twelve years.

This plant occupies a space of half an acre in one of the corporation yards, but at the same time, should much asphalt work be done in any district of the city far away from the said yard, the entire plant may be advantageously moved to a convenient place in that locality. A covered shed, 30 by 20 feet, serves as a protection to the plant proper, and the remaining space is used for storing the stock of asphalt, tar, and fuel, and for tarring the broken stone.

The plant consists of an asphalt boiler of 40 gallons capacity, a sand-heater with a surface of 100 square feet, and a mixing-board of about the same size. The sand-heater is simply a sheet-iron plate, half an inch thick, resting on four brick walls two feet high and one foot wide, enclosing an oven. The fuel is fed to the oven through a hole in one of the walls. The initial cost of the plant was $105.00.

In operating this plant the daily pay roll amounts to $12.74, and itemized is as follows:—

2 Labourers—Boiling Asphalt, heating sand, and mixing together, @ $1.50	$3.00
1 Labourer—Boiling Asphalt, heating sand, and mixing together, @ $1.57	1.57
1 Labourer—Preparing the foundation, @ $1.50	1.50
1 Labourer—Preparing the foundation, @ $1.35	1.35
1 Labourer—Laying and finishing the surface mixture, @ $1.57	1.57
1 Labourer—Laying and finishing the surface mixture, @ $1.50	1.50
1 Carter—Carting the mixture to the walk, @ $2.25	2.25
	$12.74

There is no charge made for superintendence, as the foreman of streets attends to that.

The cost of the various materials is as follows:—

Asphalt	1.57 cents per pound.
Sand	90.0 cents per cubic yard.
Cement	170.0 cents per 350-lb. barrel.
Gravel	75.0 cents per cubic yard.
Tar	1.0 cent per pound.

The daily output of the above force is about 300 square feet of finished crossing or walk.

The following statement shows in detail the cost of laying 5,000 square feet of asphalt crossings during the year 1905.

Material	Cost in cts. per sq. ft.	Labour	Cost in cts. per sq. ft.
Stone	0.267	Boiling Asphalt and heating sand	1.25
Asphalt	3.690	Carting	1.088
Cement	0.080	Laying and finishing surface	0.917
Fuel	0.110	Preparing foundation	1.020
Hardware	0.015		
Tarred Gravel	0.510		
	5.302		4.275

Total cost per sq. foot of crossing 9.577

It will be noticed that the charge for fuel is very small. That is due to the fact that the fuel is obtained from the old plank walks which were torn up when being replaced by new walks. The only charge, therefore, is that of cartage.

The cost of crossings is less than that of walks as the expense of preparing the foundation is a little more with the latter than with the former, and more tarred gravel is required in the case of the walks to give the surface mixture a firm base.

The manner of construction of the asphalt crossings is as follows:—

Surface Mixture.

(*a*) 270 pounds of Acme asphalt are heated to 300 degrees Fahrenheit and kept at that temperature for about two hours, being constantly stirred.

(*b*) 20 bushels of medium coarse sand, screened of all material 1-8 of an inch and over, are then heated to drive off the moisture.

(*c*) The asphalt and sand are then thoroughly mixed by hand on the mixing-board.

Laying on Macadam Roadways.

A furrow is picked up along the edge of the crossing so as to produce the desired camber and to prevent the wheels of vehicles from cutting into the asphalt. A load or two of tarred gravel in addition to this may be required along the length of the crossing.

The asphalt surface mixture is then laid on the foundation as prepared to a depth of two inches. It is then well tamped and pounded along the edges and thoroughly rolled with a heavy two-man roller. The surface of the roller and the pounder are first well oiled so as to prevent the mixture from adhering to them. A thin coating of cement is then sprinkled over the wearing surface and wetted down, about one pound of cement being required for every ten square feet of crossing.

Should the crossing required to be used on the same day or if the work is done in very hot weather, some limestone screenings spread over it and well wetted down will act as a protection.

Asphalt walks are constructed in a similar manner, with the exception of the foundation course. The ground is cleared of all loose material and graded to a firm even base, cinders well sprinkled and tamped being used to bring the walk to the required elevation. On the cinders is placed a 4-inch layer of tarred gravel. This course is then pounded to give a firm even bearing for the surface mixture, which is then laid as before.

On a heavily travelled street with the roadway abutting the walk, a concrete curb of the usual design is built in place along the outer edge of the walk. Wherever feasible, however, the usual custom is to arch the outside edge of the walk and tamp it well

into a small furrow. In this way an almost vertical face may be produced. Limestone screenings may then be placed along this edge for backing. A 1 by 10 inch form properly braced is placed along the inside edge of the walk before construction and is usually left there.

A method sometimes used for the outside face is a 2 by 10 inch form braced by means of 4-inch cedar posts placed every six feet on the walk side of the form and driven one foot into the ground. This is not to be recommended as the posts will eventually be heaved up by the action of the frost, thus destroying the wearing surface, and the form soon rots out.

The life of the asphalt crossings is found to vary from ten to twenty years. This together with such a low initial cost renders them vastly preferable to plank crossings and even to many of the more expensive crossings, such as those built of concrete, brick, or stone. For example there are several crossings built of asphalt in Kingston which have outlasted the surfaces of heavy concrete crossings of the same age and two to three times the initial cost. Another point in favor of asphalt for both crossings and walks is its elasticity, which when not too great is very desirable.

Several varieties of asphalt and constructions of the different varieties have been tried in this city, such as Trinadad Lake, Kiola, and Acme. The latter brand is at present used and the mixture as given is found to be simple and to produce good results.