

THE RESURFACING OF OLD BRICK PAVEMENTS WITH SHEET ASPHALT AT COLUMBUS, OHIO.

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The resurfacing of old brick or block streets with asphalt is a subject that seems to be demanding the attention of municipal engineers thruout the country. We have a good many callers and receive numerous letters from other cities in regard to this type of pavement. Property owners and public officials in some cases are insistent upon this form of construction and it therefore behooves the city engineer to be ready to adopt this type of pavement, or be able to convince those interested that it is not the thing to do.

At Columbus, Ohio, there is being laid, on the average, about 150,000 sq. yds. of sheet asphalt a year. By far the largest per cent. of this yardage has been laid on new concrete foundation and on streets that have never been paved before. We have, however, a large number of old brick pavements that are worn out and some of these we have resurfaced over the brick.

It is not my intention either to promote or discourage the resurfacing of brick streets with asphalt, but merely to describe the method used at Columbus, Ohio, and point out some of the advantages and disadvantages of this kind of construction.

About thirty years ago the city of Columbus began to do a considerable amount of brick paving. Prior to that time cobble stone had been used on a number of streets.

Three of the old cobble stone pavements were resurfaced with asphalt about twenty-eight years ago and they are still being maintained. Two of them should have been resurfaced not later than the twentieth year, but the third (Bryden Road, Parsons avenue to Twenty-second street) is still in fair condition and with a reasonable amount of maintenance it can be kept in repair for several more years. Another old cobble stone pavement resurfaced fifteen years ago (Washington avenue, Broad street to Town street) is in excellent condition today. It has not had any repair and shows no signs of cracking or disintegration. The service which these



Sheet asphalt surfacing over old brick pavement on Sixth Street, Columbus, O., 1½-inch binder and 1½-inch top, 1912.

streets have given probably accounts for the fact that it was decided about four years ago to try resurfacing some of our old brick pavements.

These old brick pavements were laid on a gravel, a crushed stone or a creosoted plank and sand foundation. The brick were small size red brick and the joints were either tar or sand filled.

In 1912 three of these old streets having an area of about 14,000 sq. yds. were surfaced over with sheet asphalt. Since that time nine other similar streets have been given the same treatment and the total yardage has been increased to about 75,000 sq. yds.

One of the first questions to be considered in resurfacing brick with asphalt is that of surface drainage. All of our old streets were laid with a 6-inch gutter. After a 3-inch coat of binder and top has been put over the old brick, it therefore leaves a very shallow gutter. On streets having a lateral grade of 0.6 per cent. or over this is not so serious, but for grades less than 0.6 per cent. a 3-inch



Resurfacing old granite block pavement with asphalt on Twentieth Street, north of Mt. Vernon Street, Columbus, O., 1915.

gutter may not be deep enough to carry the water. On these streets one of two things can be done, viz:

The first method is to take up the old brick in the gutters for a width of 3 to 4 feet from the curb and lay a concrete base to such a grade that when the gutter is paved with new brick these brick will be high enough at the outer edge to form a shoulder for the edge of the asphalt and be 6 inches below the curb at the gutter line.

The second method is to take up the old brick for a distance of 3 to 4 feet from the curb, then concrete this space, leaving it low enough along the curb to lay asphalt and still maintain a desired depth of gutter. The outer edge of the concrete can be brought to the level of the old brick and an asphalt roadway can then be laid from curb to curb. This will increase the transverse grade or crown of the street near the curb, but not enough to be seriously objectionable.

Before any asphalt is laid on old brick it is essential that the

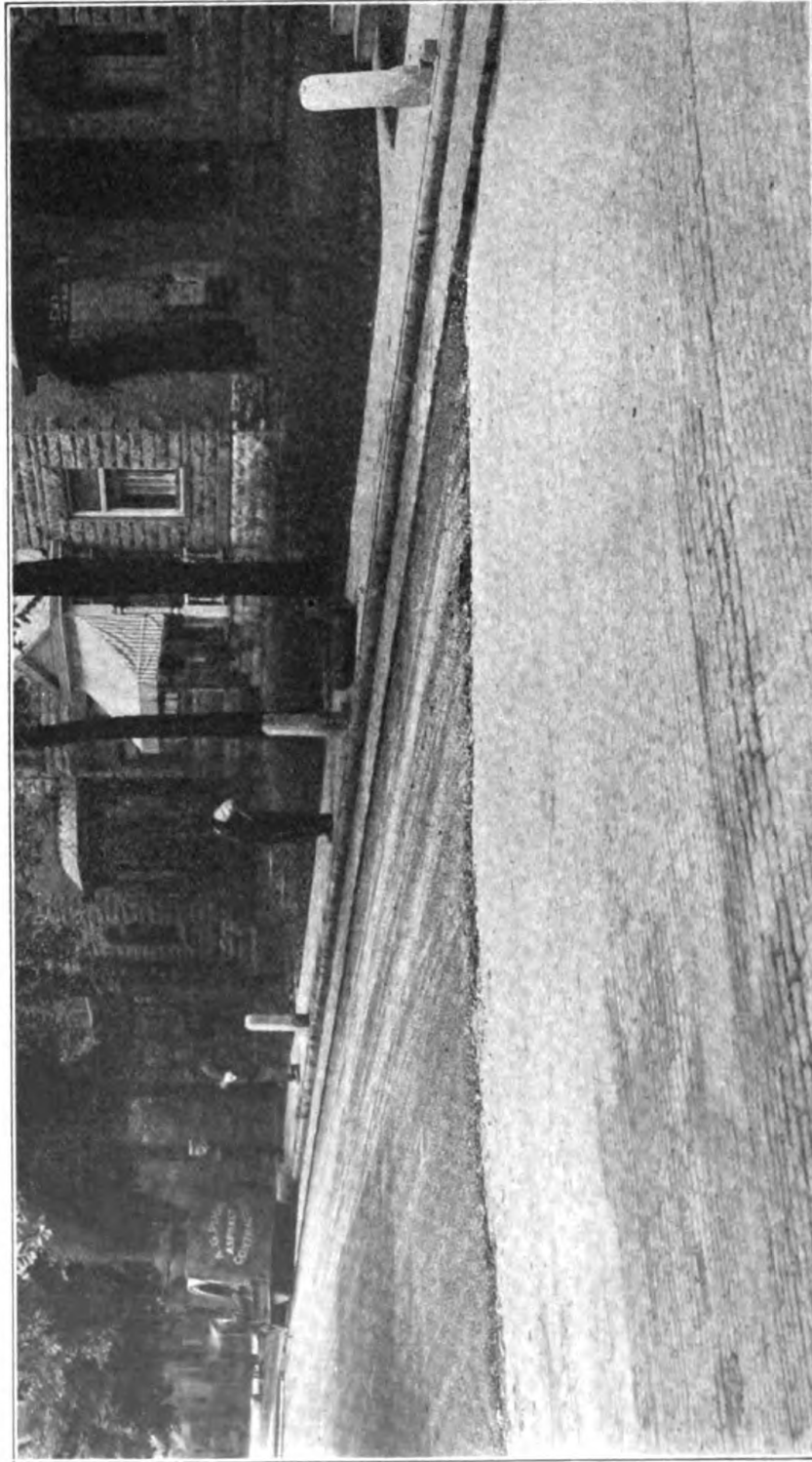
old brick pavement be cleaned and all of the dirt removed from the joints to a depth of at least $\frac{1}{2}$ inch. This is done most effectively by flushing with a fire hose. It can also be done by raking out the joints with sharp pointed picks, or hooks, and then sweeping. If flushed, it is necessary to give the street some time to dry out and for this reason the sweeping is preferable during the late fall months.

In case the old brick are worn thru at any point or are more than 3 inches below the general grade, these holes or depressions are cleaned out and concreted. At intersecting streets it is necessary to either go back of the property line a few feet and relay the brick, bringing them up enough to form a shoulder for the asphalt at the lot line, or to take up the brick in the wing and let the new asphalt pavement down enough to meet the existing pavement on the cross street.

A closed binder containing from 20 to 25 per cent. of material passing a 10-mesh sieve is preferable to a paint coat. A paint coat of asphalt must be cut back with naphtha in order to apply it and unless this naphtha entirely evaporates before the top is laid it is likely to work up thru the top and be detrimental to the pavement. The large variation in the thickness of the top, however, would be the greatest objection to the paint coat. The wide-tread roller, bearing on the different depths of top, will compress the thinnest portion the most and leave the deep spots only partially compressed. Trucks going over the pavement after it is completed will further compress the deep spots and form depressions in the pavement. The depressions thus formed will likely produce shoving and destroy the pavement.

We use $1\frac{1}{2}$ -inch top and $1\frac{1}{2}$ -inch binder on these streets. The $1\frac{1}{2}$ -inch binder is figured on the basis of 1 cu. yd., box measurement, laying 20 sq. yds. Whatever excess there is over this amount is paid for by the cu. yd. as extra binder.

Where the brick foundation is very irregular the binder is laid in two courses. The depressions are first filled and rolled and then the $1\frac{1}{2}$ -inch binder is laid. An examination of the under side of a slab of binder taken from a cut on a resurface job of this character showed the print of all the brick and also showed the binder driven in between the brick sufficiently to give a good bond.



Resurfacing old brick pavement with asphalt, using 1½-inch binder coat and 1½-inch wearing surface coat. New brick gutters with asphalt laid between them. Bryden Road, between Ohio and Miller Streets, Columbus, Ohio, 1916.

The average amount of binder required on all the streets that have been laid was .022 of a cu. yd. per sq. yd. of top. This at \$7.00 a cu. yd. would be an item of about 15 cents a sq. yd. for extra binder. This amount plus 5 cents a sq. yd. for cleaning deducted from the cost of excavation and new concrete, represents the saving that can be made on this kind of construction.

In our city with concrete figured at 70 cents a sq. yd. and excavation at 95 cents a cu. yd., this saving would amount to 75 cents a sq. yd. of finished pavement. This saving compounded annually at 4 per cent. would amount to \$1.35 a sq. yd. at the end of fifteen years, or enough to almost renew the pavement.

Another advantage of this form of construction lies in the fact that it is not necessary to have a street torn up nearly so long for repair and, if required, it need not be closed to traffic at all except on the day that asphalt is being laid on a certain portion of the street.

As a general proposition I would not advise attempting to surface over the old brick on a street having a car track. The only way that this can be done, if the brick are left in, is to raise the track, and this causes a bad condition with regard to the grade of the tracks at all intersecting car lines.

I did take up the brick in one block in Columbus and by using about 3 inches of binder and 2 inches of top surfaced over the old macadam foundation.

This was laid on a downtown street. The work was done by the city plant four years ago and the street is in very good condition to date. In that case it was quite an advantage to have the street torn up only a few days.

Three of the streets that were resurfaced four years ago are within four blocks of the center of the city. I cannot see but what they are in as good condition today as if they had been laid on a new concrete foundation. They are not cracked. They have not shodded and they have not had and do not need any repair. One of them took an extraordinary amount of traffic last year when the parallel streets on each side of it were in bad condition.

The nine streets resurfaced since 1912 carry a somewhat lighter



Resurfacing old brick pavement with asphalt, using binder coat and wearing surface coat. Asphalt laid from curb to curb. Gay Street, between High and Fifth Streets, Columbus, Ohio, 1912.

traffic than the 1912 streets and would all be classed as residence streets. They are all in good condition and have not had any repair.

We have not laid any surface using a paint coat instead of a binder, nor have we laid any asphaltic concrete. It would not require so great a depth of material to bring the street to grade if an asphaltic concrete were used, and consequently this construction would be less expensive.

In conclusion, I would say that wherever it is possible I would prefer to resurface over an old brick street from curb to curb if the longitudinal grade will permit. I find that less extra binder is required for this construction than where new brick gutters are laid.

In general, our brick streets resurfaced with sheet asphalt are satisfactory and the thing we are interested in now is how to get equally good results with less money.

BRICK STREETS RESURFACED WITH ASPHALT, COLUMBUS, OHIO.

Streets	Width	Completed	Thickness	Sq. Yds. Asphalt	Price Per Sq. Yd.	Extra Binder Per Sq. Yd. Top	Cost of Extra Binder Per Sq. Yd. Top	Total Cost Per Sq. Yd. Incl. Extra Binder
Gay St., High St. to 5th St.	46.5	11-1912	2" -1"	7218	\$0.92	\$0.043	\$0.05	\$0.97
Fifth St., Long to Broad St.	30	11-1912	1 1/2" -1 1/2"	2577	1.22	.005	.03	1.25
Sixth St., Broad to Town St.	30	11-1912	1 1/2" -1 1/2"	3979	1.25	.0127	.09	1.34
Willson Ave., Broad to Bryden.	30	7-1914	1 1/2" -1 1/2"	5037	1.37	.0313	.22	1.59
Monroe Ave., Broad to Oak.	30	9-1913	1 1/2" -1 1/2"	1274	1.40	.0301	.21	1.61
Grant Ave., Broad to Naghten.	32	9-1915	1 1/2" -1 1/2"	4793	1.36	.0261	.18	1.54
Eighteenth St., Long to Mt. Vernon.	30	8-1915	1 1/2" -1 1/2"	3264	1.35	.0207	.13	1.48
Twentieth St., Broad to P. C. C. & St. L.	30	8-1915	1 1/2" -1 1/2"	10716	1.36	.0366	.25	1.61
Bryden Rd., Ohio to Miller.	40	7-1915	1 1/2" -1 1/2"	10066	1.36	.0201	.13	1.49
Tenth Ave., High to Neil.	30	8-1915	1 1/2" -1 1/2"	7289	1.34	.0118	.08	1.42
Fifteenth Ave., High to Indianola.	30	8-1915	1 1/2" -1 1/2"	3943	1.36	.0154	.11	1.47
Dennison Ave., Buttles to Fifth.	30	1916	1 1/2" -1 1/2"	13720	1.39	.0371	.26	1.65
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