

# MUNICIPAL DEPARTMENT

## CONCRETE SIDEWALKS.

Although more or less has been said on this subject in previous numbers, it may not do any harm to reiterate some of the points which are of importance in this class of concrete work, and also, perhaps, to add a little new material to the subject.

The point is naturally raised by people in general as to the wear of concrete walks, and the question is often asked, "Why do these walks crack?" "Why do they go to pieces?" The answer is simple. Because the price for having them put down properly is not paid, or, if what is reasonable for a first-class pavement is paid, because the man who does the work is negligent, or ignorant, or does not furnish proper materials. Given the proper materials, it is an easy matter to construct a concrete walk, within reasonable cost, which will outwear any known paving material.

In New York there are a great number of very poor pavements. The competition is sharp, prices are low, and the work must be done within the contract price. People pay large sums for their walks, but they often get the work done by the general contractors or second parties who have their commissions to make, with the result that the work is carried out by the lowest bidder, and the consequences are discouraging.

Again, the fault lies with the architect, or the engineer, or the landscape gardener, who is ignorant of a proper specification for such walks, does not know that one grade of cement is better than another for color and strength, does not insist on proper drainage and foundation, and is ignorant of the use of dryers and other means taken to avoid labor and lessen the expense. There are many people who are ready to pay even more than the ordinary rates, if they could be assured of getting the value of their money, but, unfortunately, they are not assured, under ordinary circumstances.

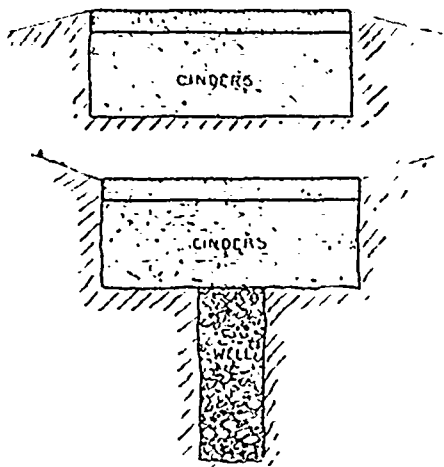
In all ordinary work, on the ground, the following is good practise and will insure success:—

1. Do not lay walks on newly made ground. Allow a year at least for settlement.
2. Excavate 18 to 20 ins. and fill the trench or excavation with (1) clean locomotive or mill cinders; (2) broken brick, pottery, and other porous material; (3) broken stone or gravel. In making the excavation, provide all the means possible for preventing water accumulating in the trench, for it will freeze and heave the walk, to a certainty.

The figures given below show the method of draining which is most satisfactory. Where the slope of the land is such that the water does not naturally flow away from the walk, wells should be

dug at intervals of perhaps 20 ft., and filled with broken stone or porous material of any kind, these wells being 3 to 4 ft. deep, sufficient to go beneath the frozen surface, and permit water to drain away into the earth.

A few bars of three-sixteenths in. square twisted iron or steel rods (Ransome), imbedded about 12 ins. apart, as near the



surface of the walk as possible, will be found to furnish additional security from cracking by frost or settlement.

3. Mix the coarse concrete in the proportion of one part cement to four or five parts of coarse sand or fine gravel and four or five parts of clean 2 in. stone or screened gravel. Mix thoroughly and use a first-class cement of imported or American Portland. Wet to the consistency of a stiff dough. Put this concrete in place and tamp down thoroughly to a uniform thickness of  $3\frac{1}{4}$  ins. While this is being done have the top concrete mixed, using the same cement as in the bottom. To cheapen work it is the practise to use one cement for the bottom and another for the top, but this can seldom be done successfully on account of the difference of time in the setting of the two brands.

Thus most of the cheaper cements are quick setting and the dearer ones are slow setting—in fact, this is the rough index to the grade of a cement. If a quick-setting cement is used for the coarse stuff of the bottom and a slow-setting cement is used for the fine material of the top, the result is that the bottom concrete is hard before the top sets at all, and this prevents a strong adhesion of this top layer to the bottom. Again, if the same grade of cement is used throughout, it is very important that the coarse concrete is not allowed to set before the top is put on; otherwise there is failure in the adhesion of the two layers. Presently the walk sounds "hollow" as one walks over it, and after a time the top layer begins to crack and break up. It is almost invariably the case whenever the coarse material is allowed to set before the top is put on, and great care should be taken to prevent workmen from putting in more coarse concrete than can be readily finished in a day's work. In straight-away work a first-class finisher and helper with five men ought to finish up 500 sq. ft. a day.

In the mixture for the top use one part cement to two parts of coarse sand or "wheat" stone, the latter preferred. Beach sand of coarse variety, if free from

salt, makes good topping, and good clean pit sand, free from loam or dirt, will be satisfactory, but best of all is "wheat" stone of granite or other hard stone.

In the Western States granite "wheat" is almost universally used in the pavement work, and the words "granolithic" and "granitoid" are names adopted to denote this class of work, although at present "granolithic" denotes the concrete pavement, without reference to the materials of which it is made. Mr. P. M. Bruner was one of the first, if not the first, to use the names "granolithic" and "granitoid," and if all who have adopted these names would also adopt his method and materials we should not hear so much about poor concrete paving.

The topping should not be mixed with too much water. It is the tendency among workmen to use an excess of water, as it saves labor. The practise is to spread the soft material and allow the water to rise to the top, and then use dry cement and sand to absorb the excess of water. The custom is a bad one, for too much water drowns and injures the cement. The "dryer" is sifted on and is then trowelled into the soft material below. The surface thus made is not a hard one and wears away easily. This practise is common in "rolled" work, and the softness of the surface is seen in the rapidity with which the roller marking wears away. The best surface is made by mixing the concrete to a stiff dough and trowelling it on in two or more layers. This will insure a very hard surface, upon which a roller will make little impression, and years of travel will show little wear.

On the matter of coloring there is little to be said. A good quality of lampblack gives the best results in blues and slates. Reds and yellows are not wholly satisfactory, as they do not hold their brilliancy for any length of time. They are suitable, however, for some classes of work where vividness of color is not essential. In using lampblack a good deal depends on the sand, as some kinds take much more than others to get the same depth of color. Sea sand takes as much again as pit sand, for instance, varying for a moderate blue from 1 lb. to 3 lbs. of lampblack per barrel of cement.

Do not attempt to lay concrete pavements in frosty weather out of doors, for the best of care will barely protect them. There is not much danger of injuring the concrete itself, but a thin film of cement and water may freeze on the surface, and eventually this will peel off and ruin the appearance of the walk. Concrete should be thoroughly dried out before being exposed to severe cold; but, again, the injury will depend largely on the quality of cement used.

As far as the writer's experience goes, the best cement for paving is the "Germania" brand, for it makes a very white surface, very uniform and fine in appearance. It is one of the strongest and most reliable of the German cements, and is particularly adapted to pavement work. Dyckerhoff, Alsens, Star Stettin, Hilton, Brooks, Shroobridge, White Bros., and other brands of German and English Portlands have been largely used, and some American brands are finding a market among the paving men.

When a concrete walk is properly and conscientiously constructed there is no better paving material known. It is unfortunate that competition has driven a lot of inferior work into the market, for it is these poor walks that give a hurtful name to concrete in general, but as the material becomes better understood and its use becomes more extended perhaps the requirements for better work will be insisted on, and then we may look for better results.—Ross F. Tucker, in The Brickbuilder.