# MUNICIPAL DEPARTMENT

## CONSTRUCTION OF GRANITE BLOCK PAVEMENTS.*

This pavement may very properly be classed as a standard pavement for city streets, as it meets all the requirements of traffic, applies to any grade, and is without doubt the most durable pavement in use. It is a comparatively economical pavement. The only serious objections to its use are, taking all things into consideration, the fact that it is very noisy under traffic and its roughness tends to shorten the life of vehicles.

These objections are more or less compensated for by the better footing it gives to the horse in hauling heavy loads.

There are two methods of constructing this pavement, viz., as a first pavement, on unimproved or light traffic streets, it is generally laid with a sand base or bed, and joints of the same material; then on improved heavy traffic streets, or as a repaving, it is laid with concrete base and sand cushion or bed, the joints of gravel and bituminous paving composition or Portland cement grout.

It is absolutely necessary that the foundation or underlying material should be rendered uniformly firm and unyielding before beginning the work of construction. If the street has been sewered the matter of sub drainage is well provided for; if not, care should be exercised to secure good sub-drainage by other means. It may be that excavations have been made for pipes or for other purposes, and the openings may not have been solidly filled and compacted; it is therefore advisable before completing the forming of the sub-grade to require that a steam boiler weighing at least 12 tons be run over the whole surface several times until there is no yielding. This will reveal any soft places, and will compact those of shallow depth. If any appear to be of considerable depth it is well to slightly hollow or depress the surface over them, making openings with a bar, then flush with water, letting it flow until the voids below are thoroughly filled and solid. After it is allowed to dry out somewhat the roller should again be passed over this surface.

In the excavation for sub-grade it is sometimes provided that no plowing be done, but that seems to be an unnecessary provision where the rolling, above referred to, is required. If no rolling be done, then the plowing is objectionable for the reason that it will leave a sub-surface of uneven hardness.

The paving blocks should be hauled upon the work and piled on the sidewalk at least 2 feet back of the curb, for the length of one or more blocks, depending somewhat on the requirements of business, etc., leaving openings for access to buildings and being careful not to obstruct fire hydrants, mail boxes, etc. After these are delivered and before the final forming of the sub grade, the curbstones on either side of the roadway should be reset to the correct lines and grades, damaged stones to be replaced with perfect ones. The crosswalks at the intersecting and terminating streets should then be relaid on a sand bed and made to conform to the finished surface of pavement.

When the blue stone is reset as above, the sub grade should be brought to a true surface uniformly parallel with the proposed finished surface of the pavement, and where a sand base is used 10 inches below the same. Where a concrete base is laid the sub-grade should be 16 inches below the finished surface of pavement, allowing for 6 inches of concrete, 2 inches of sand and 8 inches for blocks.

Where concrete base or foundation is used the concrete should be composed of one part of Portland cement, three parts of clean, sharp sand, and six parts of broken stone, or sufficient to make up of the latter the proportion necessary to cause the voids to be filled and the mortar to flush to the surface when rammed.

The broken stone should be good, hard stone, equal to the good trap, granite or limestone. It must be free from dust and dirt and broken to such size that all will pass through a revolving circular screen having circular holes 2 inches in diameter and be retained by a screen having circular holes 1 inch in diameter.

In mixing the concrete without machinery it should be mixed on tight platforms of wood or metal (thin metal is to be preferred) about 12 feet square. Batches containing no more than one barrel of cement with the proper amounts of the other materials are preferable. Mix the sand and cements together dry and spread in a layer; over this distribute the broken stone after it has been thoroughly wetted, then turn the mass with shovel and mix thoroughly, adding gradually sufficient water to bring the whole mass to a proper consistency, so that when moved to its place and rammed, all voids will be filled and the mortar will be flush to the surface. Care should be taken that there is no more mortar than will just fill all voids. If the mixing is done by machinery proper proportions of materials must be secured and a mixture of uniform character and quality obtained. No delay should be tolerated in the mixing and moving into place of the concrete mixture, nor should concrete be used which has been mixed more than 15 minutes. While being put in place it should be carefully spread and rammed until well compacted and mortar flushes to the surface. In connecting with a batch partially set the face must be broken down and washed clean so that there will be perfect union between the new and old work. As to how much time should be allowed for the concrete to set, that will depend largely upon the kind of cement used and the temperature, but under ordinary conditions seven days should be sufficient. This, however, should be a matter of judgment.

(Continued next week.)

* A paper presented at the Milwaukee Convention of the American Society of Municipal Improvements by Mr. Josiah A. Briggs, Chief Engineer Department of Highways, Borough of the Bronx, New York City, and published in the Engineering Record.