

MUNICIPAL DEPARTMENT

HIGHWAY DEPARTMENT RULES.

The street commissioner of Medford, Mass., has formulated for the guidance of foremen, teamsters and road men in his department the following regulations:

1. Never allow a hollow, a rut, or a puddle on a street, but fill it at once with stone that has passed through the $\frac{1}{2}$ -inch screen. Never use stone larger than 2 inches for this work. Some judgment must be exercised regarding the size of stone.

2. Never put clean stones on a hard dry road without first picking it up. Rake out all irregularities and place the stone on only one stone deep, adding a second layer after the first has worn in so as to prove insufficient.

3. Always have a rake close at hand in patching; it is one of the most useful tools in the plant.

4. Do not spread large patches of stone across the entire street unless you use the roller. Fill the horse tracks first, and be careful not to fill above the level of the street.

5. Never shoot stones into the road and crack them, for a good surface can never result from so doing.

6. Remove all large stones, blocks of wood, paper, tin cans, glass bottles, pieces of boards with nails in them, dead animals, wire hoops, boots, shoes, and other obstructions that may be thrown into the street, as soon as discovered or on being notified of such, as by so doing you may prevent accidents and lawsuits. The attention of teamsters is especially called to this article.

7. In repairing a road never use stone that will not pass through the 2-inch screen, and for patching and slight repairs use a still smaller size.

8. Use 1-inch screenings from the stone crusher for binding newly laid stone together. Street sweepings, horse droppings, sods, and other rubbish used for this purpose, will ruin the best road ever built.

9. Rounded or water-worn stones should never be used for repairs, especially on steep gradients, for they will never bind.

10. Never allow dust or mud to lie on the surface of the road, for these double the cost of maintenance. Dust becomes mud at the first shower, and mud forms a wet blanket which keeps the road in a filthy condition for weeks, instead of allowing it to dry in a few hours.

11. Have all sweepings and scrapings promptly scraped into heaps and carted off.

12. The middle of the street should always be higher than the sides, so that the water may run into the gutters.

13. Look after the streets in wet weather; filling all hollows or ruts that hold water.

14. When the coatings of stone have worn in, go over the road, rake all the loose stones in heaps, and cart them to the crusher when going there for stone. Loose stones are a source of danger and annoyance, and should receive careful attention.

15. Never allow the grating bars of any culvert, catch-basin, or manhole to be placed parallel with the street, but place them crosswise; also, see that no grating, manhole or catch-basin curbing, water-gate, or gas shut-off projects above the surface of the street.

16. Keep all overhanging trees and hedges cut back to line of street. Report to the street commissioner, as soon as discovered, any damage that may be done to or defects in grade posts, fences, mile-stones, bridges, sidewalks or streets.

17. The proper time for the bulk of road patching is the fall and early winter. The exact time for beginning will depend on weather, subsoil, and the nature of the material used. It is well to have this work done before the first of the year so that the stone will be partially worked in before winter, when they are most needed. Stones laid in winter seldom bind thoroughly, and those laid in spring rarely bind at all.

18. Never allow catch-basins, manholes, culverts, or gutters to become clogged in any manner. Keep them clear the year round.

19. Remember that the commissioner is always willing to give advice, and that it is your duty to consult him when you are in any difficulty. The eyes of the taxpayers are upon you, and the public requires smooth, clean streets.

20. Carelessness or negligence on the part of employees means an increased expense to taxpayers, and may render the city liable to an action at law.

CONCRETE.

At a recent meeting of the Association of Birmingham Students of the Institution of Civil Engineers, Mr. Robert Godfrey, A.M.I.C.E., in the chair, a paper on "Concrete" was read by Mr. J. H. Webb. Before dealing with the main subject of the paper a few remarks were made on cement and a criticism of the wet and dry processes of manufacture was made. The author was of opinion that the dry process was the best, but, taking into consideration the cost, it depended entirely on local circumstances. The value of the cement as a matrix depends on (1) the chemical constitution of the chalk and clay, (2) the proportion used of each, (3) the time taken to calcine and the temperature at which it was done, (4) the degree of fineness to which the clinker is ground. The clay, being the cheaper material, is generally used to too great an extent. Referring to the usual tests, it was remarked that the weight test was very delusive, as the same cement might be made to weigh from 110 lb. to 130 lb. per bushel, according to how it was packed; and in the tensile stress a difference of 30 per cent. may be obtained by different men making the briquettes. The specific gravity test is altogether the most satisfactory for weight, and a much

more reliable result as to the stress would be obtained if the cement were mixed with sand in the same proportion as it is to be used on the work. Several formulæ are given for ascertaining the proportion of sand to be mixed with the aggregate, but none can be reliable, as the quality of the materials varies so much. To obtain a really good concrete no pains should be spared to get an aggregate of suitable proportions, and to see that it is perfectly clean and mixed in the specified manner. It is now usually specified "all gravel and sand to be washed before use," and the sooner this is universally adopted the better for the concrete. Unless the aggregate is clean the concrete, instead of improving with age, will greatly deteriorate. Mr. Webb does not see that there are any real objections to a concrete foot-path, as lime concrete will expand, and a small margin may be left at each side of the path to accommodate this, and cement concrete, if good, does not contract sufficiently to spoil the works. This cracking, which is the general objection raised, might be overcome by having a good firm foundation and by the use of good materials.

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