

Good Road Building

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each other, and not kept apart by the binding material, therefore only such quantity should be used as will fill up the small irregularities made by reason of the irregularity of the stone. Each course should be thoroughly rolled to get the material as compact as possible, but before this is completed the shoulders should be made up of earth on each side, about three or four feet wide. These may be covered with gravel, they should be dressed off to the side ditches and the whole surface rolled and made uniform, in order that the water may pass off freely to the ditches. The shoulders, in addition to affording a surface for the occasional passage of wheels, serve to retain the broken stones within the limits of the proposed macadam roadway.

Maintenance

It is said that the maintenance of a macadam road should begin on the day that the road is completed. In a sense this remark is not far from the truth. Usually, and more especially if the road has been properly constructed, very little need be done to the macadam surface for a year or two; but the ditches should be kept free from silt, weeds and any rubbish which tend to stop the flow of water in them. Culverts should be kept open and in such shape that the water will have free access through them. The ditches at the outlet of these should be capable of taking away the water quickly, and thus be prevented from becoming dammed up, to the injury of the road.

The above remarks apply in an equal manner to other types of roads. Wheel tracks very soon form on a newly gravelled surface, particularly if left to be consolidated by traffic. These tracks are formed to a certain extent by some of the gravel being forced outward. They should receive constant attention until they become well consolidated, by having them refilled, by raking the material back into them and adding fresh material where needed. If this is neglected, the wheel ways, which should be the strongest part of the road, soon become the weakest.

Loose stones should never be allowed to lie around on the surface of a road; they should be at once picked up and piled along the side of the road allowance or hauled away. Besides the discomfort occasioned by vehicles jolting over them, they are a menace to horses stumbling and injuring themselves. The vehicles and the road suffer alike from the effects of the heavy loads passing over them, or being thrown sideways off them; no small number of ruts have been started from this cause. When ruts and depressions in the road appear, they should be at once attended to by being filled up with the same material as the surface. If this is earth, they should be filled with earth; if gravel, they should be filled with gravel; and if stone, they should be filled with broken stone. If a soft material is used on a hard road, the hole will quickly reappear; and if a harder ma-

terial is used than the road is made of, it will cause two holes to be made instead of one by the wheels of wagons dropping on to the softer material.

The maintenance of a road is just as important as the construction, for many agencies, such as rain, snow, drought, wagon traffic, steel-shod hoofs, narrow tires, which combine powerful forces that tend to flatten, cut up and destroy roads, that, unless some systematic effort is made to counteract them, the results will be heavy expenditure for repairs, and improper and unserviceable condition of the roads for the greater part of the time.

Here, again, is where the value and importance of a road superintendent shows itself. With constant inspection, he would be able to detect and have repaired at once, at a minimum cost, any break or irregularity that might appear on the surface of the road, which would result in the road being kept at a higher standard of efficiency at all times and its condition improving rather than deteriorating. More especially in the early spring and fall times should attention be given to such inspection and repairs. In the early spring, before the water begins to flow in the ditches, the ends of culverts should be cleared of any snow and ice that may have accumulated there in the winter, and in the early fall the road should be made as smooth as possible, so as to have them freeze in this condition, so that, when the snow begins to melt in the spring, the water will not be permitted to lie in ruts and depressions on the surface, but be shed into the ditches as soon as it appears.

It is the neglecting to attend to the many small details in connection with the improvement and the maintenance of the road that necessitates the large expenditure of money for repairs. When this duty devolves from one councillor to another, it is almost sure to be neglected. It should not be expected that these men will place their own private business interest in a subordinate position to the carrying on and looking after of a work that is entirely public in its character. The responsibility for the execution of the work should rest upon the shoulders of some one person, paid as a public servant and directly responsible to the municipal council.

Road Machinery

In order to secure the greatest results from the money expended, and obtain the most durable work, it is necessary that modern machinery and tools be used in the construction of roads. Among the other more common tools should be found sledge scrapers, wheel scrapers, a roller and water wagon, in the road plant of every municipality.

The use of a road roller is strongly recommended. It produces a great saving in the amount of material required, and when a road is completed it is at once in the best condition for traffic. It is not only the road covering that requires the rolling, but also the surface upon which this covering is placed. Especially is this true for macadam roads. In throwing the broken stones on an undrained and unrolled earth surface, it is necessary to build them massive; but no matter how massive they may be made, they will have no cohesive strength; they will never be impervious to the mud from below or the rain from above, and will always be unsatisfactory.

Wheel scrapers are necessary in handling material when it has to be moved over fifty feet. Very often roads are graded over small rises in the ground for want of wheel scrapers to move the material from such points to the low places. This is a sad mistake, as these ridges should be cut down and the hollows filled up. One great advantage to be gained from this, besides doing away with unsightly piteches in the road surface, is that the depth of open drainage ditches on the sides of the road are very much lessened without diminishing their drainage capacity, rendering the road more secure to the travelling public.

It is incredible, when we see the vast improvements and developments going on around us in other lines of work, that so little has been done to handle this great work, the greatest that any municipal government has to deal with, with improved, modern, up-to-date methods.

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