

MAINTENANCE OF SECONDARY TYPE ROADS

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Mr. Percy Hooker, State Superintendent of Highways of New Hampshire, makes the rather startling statement that the economic value of gravel and stone roads is such that they should constitute four-fifths of all the roads of a state. We who are charged with the maintenance of these unpaved roads are constantly being confronted with the demands for some kind of pavement.

It is interesting to watch the development of public sentiment along this line. I have in mind a recent addition of fifteen miles to the state system. When the road was taken over it was about everything a road should not be. The grade and alignment were almost impossible. The country through which it runs is poor and hilly. The condition in which we found the road was one which had existed for many years and one which those in charge were making no effort to improve. We started our drags and began applying metal and widening out the driving surface. The people along the road were highly elated with the results obtained. This went along until the summer season came on and the dust began to fly. Then the usual chorus of complaints started and a longing for the old order of things was expressed. This in turn gave way to requests for some kind of dustless top. I have noticed this cycle work on nearly all of our unpaved sections. In passing, I have also noticed that when a road is paved, people along this road long for the "good old days" when there was not so much traffic.

I have been asked to discuss the maintenance of stone roads and any ideas I may advance have grown out of the problems of maintaining approximately 800 miles of roads in the southeastern part of this state which have been assigned to me for upkeep. In nearly all of that section we are blessed with local stone along the roads which only needs quarrying and crushing to make very good maintenance metal. With such an abundance of stone the temptation always exists to quarry and crush anything that looks like stone. For instance, on one of our bituminous contracts in southern Indiana, on the day we finished, we accepted from our crushing contractor eighty-five cubic yards as being fit for road metal. The next day after we released this contractor, out of the same quarry and with the same quarry force over two hundred cubic yards were quarried and sold to the county. Years of lax specifications were responsible for acceptance and payment by the

county for over one hundred cubic yards of metal that was unfit for road maintenance. The eagerness to make the road dollar go far is responsible for much of this laxness. In the long run, of course, this is poor economy.

Here are a few suggestions to road men charged with the maintenance of stone roads who do not have access to a testing laboratory.

Qualities Essential in Road Stone

No testing laboratory is necessary to detect objectionable shale, soapstone, and sandstone. This can be done at the quarry by anyone having even a rudimentary acquaintance with limestone. Two qualities almost always spoken of in laboratory tests of stone are *hardness* and *toughness*. These may seem like confusing terms, yet one quality without the other makes poor road metal. Every road is constantly being subjected to a grinding action, either from the action of steel tired vehicles, or the rubbing action of one stone on another. In order to resist this grinding action the stone must possess the quality of *hardness*.

The surface is also subjected to pounding and impact action which tends to break up the metal into smaller pieces. In order to resist this action the stone must possess the quality of *toughness*. Remember the two destructive actions, grinding and breaking. A hard stone may be so brittle as to be almost useless and a tough stone so soft it will readily grind into dust.

Another thing to be looked for is the *cementing value* of the stone. A road that will not pack or that grinds up into dust is objectionable. If the proper hardness and toughness are secured, this cementing property will take care of itself. If you have a road that ravel or one excessively dusty, look for the cause in the quality of your road metal. No set rule can be laid down for this selection but experience and close study are necessary for results.

Placing and Manipulating Stone

After the proper material has been selected the next thing is to get it on the road. The earlier common practice, and I am sorry to say one that still exists, was to dump the whole load in one place. The next load was dumped the same way, usually leaving two or three feet between the end of one load and the beginning of the next. I think nothing need be said about the riding qualities of such a road. The metal should be uniformly and evenly scattered. If the base is strong enough remember you are only replacing the wearing surface by the addition of metal.

The stone should always be put on at the time of the year when it will readily incorporate with the surface. Recogni-

tion of this one fact alone will save many dollars in road metal. If put on at the proper time a larger aggregate can be used, resulting in a sturdier road. If the surface is not in the proper condition to receive a larger aggregate it will roll around on top and be very objectionable.

The principle of dragging and planing is so well known among all road men I am purposely omitting any further mention of it. *The best way to have a smooth stone road is to keep it smooth.* Once a stone road surface gets rough it is difficult to get it back in good condition. Great care should be taken that all stone surfaces go into the summer in a smooth condition. During the summer months a stone surface gets almost like concrete in hardness and a drag or maintainer can not have the smoothing action it would have on a gravel road. A stone surface is not so subject to "chatter bumps" as is a gravel road. This is one of its advantages.

While having many good qualities, the stone surface has some objectionable features. In summer the dust is very objectionable, both to the travelers' comfort and safety, and to the people living along the road. The farmer's crops, especially his forage crops, adjacent to the road are practically ruined if a rain does not immediately precede his harvest. The dust will penetrate into the houses and cause housekeepers much annoyance.

In conclusion, remember that stone can make an excellent road if properly selected, applied and manipulated. Have clearly in mind what you want when selecting your quarry, the condition of your road when applying the metal and forecast the season's demands when manipulating it. A stone road going into the summer as a smooth road is more likely to stay smooth. Finally if a road is smooth, as far as the traveling public is concerned, many other defects are readily forgiven.

REPORT OF NOBLE COUNTY HIGHWAY DEPARTMENT (1927)

By M. L. Latta,
Superintendent.

Types of Roads

Gravel	212.61 miles
Gravel and Concrete.....	12.17 miles
Concrete	26.64 miles
Brick	2.03 miles
Stone	6.02 miles
Total	259.47 miles