

Our method of getting rid of potholes after oiling is much the same as that used in preparing the street for the oil in the first instance. We scarify just deep enough to go below the bottom of the holes, then pulverize the surface with a light farm harrow. Next we plane off the surface from the center to the sides, to make a smooth, even bed. The black, pulverized material is then pulled in and spread evenly over the entire street. We follow this with a light drag. The action of traffic will completely compact this blanket in a very short time. The hot rays of the sun, and action of capillary attraction, will almost always bring plenty of oil to the surface to keep down the dust.

After this re-working, with the oil slowly coming back to the surface and bonding with the surface materials, the tendency to form breaks and holes is much less than when first applied. Sometimes, however, it is necessary to repeat this maintenance process later in the season. But usually two such operations will carry any of our streets through the summer and fall months.

We generally meet with some objections, when scarifying and planing off the surface, from those who are primarily interested in the dust laying merits of the oil. However, when the process is completed and the street, in addition to being dustless, presents a smooth, easy surface for traffic, these objections are forgotten.

SURFACE TREATED GRAVEL ROADS

By W. O. Jones,
Wayne County Highway Superintendent.

Before embarking on our program in Wayne County, we studied the surface treated gravel problem very thoroughly. We visited the State of Wisconsin and spent considerable time going over the surface treated roads in the county in which the state capital is located. We read up on everything which we could find of recent publication on this subject and then basing our judgment on what we had seen and read, coupled with the knowledge gleaned from our previous experience, we launched our program.

Don'ts

Later on in this paper we are going to discuss what we considered the best practice when we applied our last bituminous material last fall but before we pass on to that, we will mention some don'ts which may serve as conclusions.

1. Don't apply a large amount of gravel a short time before you expect to surface treat your road. Deep, loose gravel will tend to cause pushing and shoving.

2. Don't apply too much bituminous material. Some of the advocates of surface treated gravel claim that an excess of bituminous materials produces pushing and shoving.

We all know that bituminous material which runs off the road is wasted and we know that a road which is too "fat," bleeds and will be picked up by steel tired traffic. Our own experience shows that an excess of gravel will cause pushing and shoving but we have not been convinced that an excess of bituminous material is an aid to pushing and shoving. We have noted a tendency towards the application of too small an amount of bituminous material. This will cause raveling. We believe that excessive patching, which may be required when the road ravel, will be more expensive than using greater amounts of bituminous materials originally.

3. Don't do extensive ditching just ahead of your surface treating. The dropping of soil cannot be avoided and this will necessitate the application of patches on the surface later.

4. Don't treat a road which does not have good drainage.

5. Don't treat a road which does not have a good base.

6. Don't treat a narrow road. The traffic will eat in from the outside if passing vehicles are continually forced to get the outside wheels off the surface treatment.

7. Don't get in a hurry! The little details are very important in this work.

Procedure

Before surface treatment, a road should be traveled at least two or three months after it has either been ditched or heavily regraded. All improvements should be made before the road is surface treated but not immediately before.

Let us take a concrete example. We will suppose that the county commissioners at their March meeting determine to surface treat a certain road. The county highway superintendent would immediately view the road and ascertain if minor improvements were needed. Then gravel might be applied very lightly in low places and in washouts. Any wet spots which have a tendency to be rough should be honed very lightly with a road grader two or three times. Washes in the berm should be repaired, being careful not to get soil or sod on the main part of the road.

The dragging should continue as usual with a possible exception that more care should be exercised in preventing excessive crown and in seeing that all curves are properly elevated and widened. Excessive gravel should not be applied at any point but small loads of gravel could very well be applied where most needed if it were thoroughly scattered.

By this method the road would gradually be improved and probably during the latter part of April or the first part of May would be ready for a surface treatment.

When it is necessary to use the grader to roll back the sod along the berm this should be done soon after the decision to surface-treat the road has been made. Care should be taken in turning not to drag soil and mud on to the metal of the road.

The last thing to be done before applying the bituminous material is to see that the road is dragged several times with a heavy drag so that it becomes smooth and level with a mulch of loose material over the entire surface. This dragging will also spread out any freshly dumped aggregate.

First Application of Bituminous Material:

About one-third of a gallon of tar per square yard is applied at a pressure of approximately forty pounds to the square inch. We have found it very economical from an operating standpoint to apply two distributor loads of tar along one side covering one-half the road, or nine feet of an eighteen foot road. This reduces the number of turns which are required for the grading equipment and also permits traffic to continue without getting into the fresh tar.

Second Operation:

With a medium sized grader hooked behind a large dump truck we scraped all the tar and gravel which we could get loose from the road and placed it in a windrow in the middle of the treated half of the road. We started just as soon as the second distributor load of tar had been applied and went as far as the end of the second distributor load of tar. We then turned the blade of the grader and made a return trip moving the windrow into the middle of the road.

Third Operation:

One third of a gallon of tar was then applied to the surface which had been scraped clean and allowed to set for about one hour.

Fourth Operation:

After the tar had set approximately one hour we floated the material in the wind row back uniformly over the half of the road from which it had been removed. This requires a good grader man, but after a little practice it can be accomplished so as to leave no shiny or sloppy places and without dragging any excess gravel back onto the berm. The windrow was generally about two to two and one-half feet wide and approximately nine to twelve inches high.

After this fourth operation the road is not sloppy and traffic going at a medium speed experiences no difficulty in travel-

ing over it. So we immediately change to the other half of the road and work it in the same way.

We found that these four operations would normally keep the distributor fairly busy when heating the tar to 150° Fahrenheit. It would also keep the grader and drag busy as there was always some clean-up work behind, after the second or third day. During the first two or three days of a surface treating program, the truck and grader were generally needed to help shape the road ahead of the distributor.

Fifth Operation:

After the first four operations had been completed on both sides of the road for some distance and a careful inspection of the road surface showed that everything was working out nicely, the third application of tar was made using about one third of a gallon per square yard. During this operation, it was found better to apply one distributor load on the right side and then one on the left so as to leave the sides even when quitting for the night and not get one side too far ahead of the covering material. This application made the road very sloppy and we believe it is best to hold the traffic off the road while this coat is being applied.

Sixth Operation, Covering Road:

After the third application of tar, the entire surface of the road was covered very evenly with gravel dumped from the rear end of a one-ton truck at the rate of fifty to sixty cubic yards per mile. If the application is not made evenly, it is well to have the man in charge of the dumping scatter the gravel which falls in piles with a shovel.

After a considerable length of the road has been graveled, preferably on a hot afternoon, a straight drag should be pulled over the road one or two times to get the top covering more evenly distributed.

Seventh Operation, Rolling:

The use of a roller is considered questionable because a roller is generally an expensive piece of equipment to operate. There is no doubt but that the roller does considerable good, but often the additional benefits to be derived from rolling do not justify the added expense. Our experience has shown that the roller is of greatest value in rolling down the berms so there will be an immediate run-off of water and little puddles will not remain along the side of the road just inside the grass line. The roller also greatly aids in forcing the gravel into the tar treatment so that the traffic will not dislodge it before it becomes an integral part of the road. The more traffic on the road the less need there is for a roller especially if the traffic is distributed well over the road. We used a roller on the roads which we treated last fall.

Re-Treatments:

The road is now ready for traffic and, if the tar has been applied very evenly, it should not require any patching the first season and very little patching the first part of the second season. It will probably require a light treatment over the entire surface during the later part of the second season in order to hold it over the second winter.

Bituminous Material:

For our work in Wayne county, we used Tarvia B which is very similar to the Indiana State Highway Specifications for Tar TC.

The gravel which we used was bank-run or washed river gravel from which we had screened the boulders. During 1925 we used stone chips for our second treatment. The use of stone as compared to gravel should be decided in each case according to the conditions existing in the particular locality.

SURFACE TREATMENT OF GRAVEL AND STONE ROADS

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Prior to the year 1926, a few small sections of state road had been surface treated with tar and known as surface treated gravel and stone roads. Early in 1926, it was decided to surface treat about 12.6 miles of a gravel road lying between Lebanon and Frankfort now known as State Road No. 39.

This particular job will be described, not because it is an ideal piece of work but because a recital of all the errors and defects together with the commendable features may be helpful to those contemplating similar work.

Our old roadbed was about 20 to 22 feet wide which proved hardly enough to accommodate a treated surface of 20 feet and leave sufficient shoulder to hold the metal base. We obtained, however, in most places the additional width of right-of-way needed to permit us to go forward with our shoulder work in a satisfactory manner.

About February 15th, we began to look forward to getting our gravel base in condition to receive the tar in the spring. We patched the places which showed signs of weakness and at the same time eliminated the waves which had been in the surface for some time. Before we had progressed very far along this line, the spring thaw set in after which we found ourselves up against a real job in handling twelve miles of road, a half of which had broken through. Although we had