

DUST PREVENTION BY USE OF OIL.

THE following notes, abstracted from a bulletin on Dust Prevention, issued by the Ohio Highway Department relate to the proper method of applying oil to road surfaces. It is first pointed out that the method of application and the amount of oil that should be applied must depend upon the kind of oil used, the condition of the surface of the road on which it is to be used, and other local conditions. The light oils should be applied more frequently and in smaller quantities than the heavy oils. The crude or the refined oil may be applied either cold or hot, according to its quality. Most crude oils, and some refined oils, have been applied cold; but it is necessary to heat the heavier oils before they are applied.

The oil is shipped either in barrels containing from about 30 to 50 gals. each, or in steel tank cars containing from 6,000 to 10,000 gals. each. If a heavy oil is used, it is necessary that the car tank be equipped with steam coils in order to heat the oil, that it may be drawn or pumped from the tank.

When the material is shipped in barrels it is customary to heat it on the roadside in heating kettles holding from 4 to 10 bbls., from which it is applied to the road surface by the use of hand pouring pots of about 4 gals. capacity. It is important that these pots be provided with spouts that will spread the oil in such a way as to produce an even distribution, as in this lies the secret of the success of its application. The ordinary water sprinkling spout with the holes punched larger with an 8 d. or 20 d. wire nail, depending upon the grade of material being used, will usually give very satisfactory results.

When the oil is shipped in tank cars, it is usually applied to the road from tank wagons, holding from 400 to 800 gals. Tank wagons used for this purpose may be classified under two heads: (1) Gravity tanks, which allow the oil to flow by gravity through a perforated pipe, which sprinkles the oil onto the road; (2) Pressure tanks, which spray the oil under pressure onto the road through perforated pipes, or a series of nozzles, or a single large hose and nozzle. The pressure is produced either by steam or compressed air in the tank itself, or by pressure in the distributing pipes only, induced by some form of pump.

When the oil is applied to the road surface in the form of a fine spray, which can be done with the pressure tank wagon, a more even distribution and better penetration is secured. The pressure tank wagon is particularly valuable when it is desired to use a very light application of oil. By the use of such a wagon, so light an application as $\frac{1}{8}$ gal. per square yard can be evenly spread, while about $\frac{1}{3}$ gal. per square yard is as small a quantity as can be uniformly distributed with a gravity tank. The use of the pressure tank has an additional advantage; when the oil under pressure comes into contact with the stone with some force, it blows the dust from the surface, and thus by cleaning the stone secures a better adhesion of the oil. This is very beneficial with the heavier asphaltic oils where it is absolutely essential that the surface of the large stones be exposed and clean in order to insure a good bond. However, if the oils are not too heavy, and the road is gone over several times with the gravity tank and a very light application given each time, a very even distribution can be secured and fairly good results obtained. The tank wagon is sometimes provided with a heating arrangement either in the form of a fire box underneath, or in the form of steam coils to be

attached to the roller boiler. With such an equipped tank, the heavier grades of materials may be applied.

In general, it is better to give the middle of the road a heavier application than the sides. This is especially true in the case of the lighter oils and emulsions, and calcium chloride solution, owing to the tendency of these materials to being carried to the sides of the road by gravitation and running water. While in the case of the lighter oils, no cover is necessary after the oil is applied, yet better results are usually secured by covering the oil with a layer of coarse sand. When the heavier oils that require heating are used, it is essential that they be covered with either screenings or coarse sand. Stone, slag or gravel screenings are best suited for this purpose. The screenings should be dry and clean and free from dust, and of a fairly hard material. A size that will pass a $\frac{1}{2}$ -in. circular mesh and be retained on a $\frac{1}{4}$ -in. mesh is usually very satisfactory. A size that will pass a $\frac{3}{4}$ -in. screen and even a 1-in. screen is sometimes used with perfect satisfaction. The heavier the grade of oil that is being used, the coarser the screenings may be. If the surface is afterwards rolled, larger screenings can be used than where traffic alone compacts them. Unless a heavy oil that stiffens quickly upon exposure to the air is being used, it is best to allow the oil from 5 to 36 hours' time to be absorbed by the road surface before applying the screenings. It often happens, however, that the road cannot be closed to traffic so long, in which case the screenings are put on immediately after the oil is applied, with very good results. If the oil stands in little pools on the surface after it is applied, it should be gone over with hand brooms and the puddles of oil broomed evenly over the surface before the screenings are spread. This will aid in producing a more uniform surface, and uniformity of surface is not only one of the essentials in building a road, but it is also one of the essentials in maintaining a road.

Dust prevention is so closely associated with road preservation that the two should usually be considered together, for any method of preserving surface will invariably reduce the dust. It might be well to state, however, that such surface treatments of oil do not constitute the building of a road. At its best, it constitutes merely a maintenance proposition. It is a false notion to hold that an old wornout, rough road surface can be made good by the application of a little oil. In order to maintain a good surface, it is essential that the surface be put in a good condition previous to the application of the oil. Therefore, unless it is merely intended to temporarily allay the dust, the holes and ruts should be eliminated from the surface before any oil is applied. The depressions in the road should be cleaned of all dirt and foreign material, the edges cut vertical and the bottoms loosened by picking. The depressions should then be filled with stone, slag or gravel of the same quality and size as the remainder of the road surface, and this material thoroughly compacted by hand ramming or rolling.

Poor results in the use of oil treatments frequently come from the fact that the surface had not been previously cleaned in a proper manner. The practice of some small villages of putting oil on a road surface already covered with several inches of dust and filth, cannot be too severely condemned. When such practice is followed, the street, after every rain, will be covered with a black, oily mud, which may be as objectionable as the dust itself. Before the lighter oils, such as are put on cold, are applied, the surface should be comparatively free of all loose dust and foreign material. Before the