

Applying Oil.—After the road has been prepared as heretofore described, the oil should be applied at the rate of one-fourth to one-half gallon per square yard of surface. If the road has never been oiled, or if more than a season has elapsed since a previous oiling, it will be found that about one-half gallon per square yard will be required. If the road or street has been oiled regularly, one-fourth to one-third gallon per square yard will usually be satisfactory. It is much better to apply a small amount of oil twice each season rather than to put on the full quantity in one application. When too much oil is applied, it is not only wasted, but is often very disagreeable to traffic.

After a road has been oiled for several years, one light application each year may be sufficient, or at least equal in results to two applications per year on a new oiled road.

The time for oiling will necessarily vary considerably, depending upon the season. Favorable times for applying the oil will be about April and September.

The uniform distribution of the material is one of the essential requirements for success. An ordinary street sprinkler or a home-made device attached to a threshing tank wagon or similar tank may be utilized for distributing the oil. An expert using such equipment can ordinarily get the required amount of oil on the road rather uniformly. Much better results, however, can be secured by the use of some specially designed apparatus made for the purpose, such as pressure distributor tank wagons.

There are a number of specially designed pressure distributing wagons on the market that vary in the price from \$400 to \$6,000. The horse-drawn distributors have a capacity of from 450 to 600 gallons and can be purchased at from \$400 to \$600. Such distributors are usually equipped with some form of heating device so that hot oil may be applied when required.

Some of the auto distributors hold 1,000 gallons and are equipped with oil heaters for heating the oil quickly; also, special oil pumps for filling the distributor and for spraying the oil upon the road in the desired quantities. Such trucks cost from \$5,000 to \$6,000 complete.

Shipping and Handling Oil.—Road oil is usually shipped in 8,000 or 10,000 gallon tank cars. Some companies are able to furnish 4,000 and 6,000 gallon tank cars, but such cars are very few and usually hard to get. The railroad tank cars are equipped with steam heating coils so the material may be heated in the tank by attaching a steam pipe or hose. Small quantities of oil may be purchased in molasses barrels, but when delivered in barrels there will be an additional cost of two to three cents per gallon. The tight barrels will ordinarily hold about 50 gallons. If the barrels are handled with care they can be sold at 50 to 65 cents each when empty. Heavy oil shipped in this manner is usually very difficult to remove from the barrels. In such cases the barrels are dumped into an open heating kettle and broken. After the oil is warm the staves and hoops may be removed by a large hoe or rake and used as kindling. The hot oil can be pumped from the heating kettles to the distributor and, while still hot, applied on the road.

Where there is no heating kettle on the job and there are but a few barrels of heavy oil to apply, they may be emptied direct into the distributing wagon by

first placing the barrels in a very warm room or close to a fire for several hours.

Where there is but a small quantity of oil desired, say, 3,000 or 4,000 gallons, it is usually cheaper and much more economically handled if shipped in a large tank car. Freight will have to be paid on a full tank car of 8,000 or 10,000 gallons, but this will ordinarily be compensated for by the saving in barrels and in the economy effected in handling the oil on the job.

Pumping Oil.—There are a number of special oil pumps on the market that can be purchased at from \$15 to \$30 that will readily pump hot or cold oil. The rotary pump is the one most commonly used. It may be driven by a gasoline engine or a steam engine, in case the latter is needed at the tank car for supplying steam heat. A 1½-inch or 2-inch rotary pump will fill a 600-gallon distributor in from ten to fifteen minutes.

The ordinary water tank pump may be used for pumping cold oil. A 2-inch suction tank pump will fill a 600-gallon tank in 30 to 40 minutes. Such pumps cannot be used for hot oil, as it will soon burn out the valves.

All of the above-named pumps work best attached to the bottom of the railroad tank car by means of a hose or pipe. However, it is well to eliminate hose connections as much as possible as some oils and tars eat them out very rapidly.

A 3-inch or 4-inch lift pump may be used to an advantage in pumping oils. Such pumps are set in the tank car at the top, and one man will readily pump a 600-gallon tank in 20 minutes. This kind of pump can be purchased for \$20 to \$25. It has many advantages, as there is no mechanical power needed nor any pipe or hose connections.

After the pump is connected at the bottom of the tank car and everything is ready to receive the oil, the cap on the dome of the car should be unscrewed and the discharge valve opened from the inside. This valve has a stem projecting up to the dome. It is well to have a cut-off valve in the hose or pipe connection at the bottom so the tank car valve may be left open during the day that oil is being used.

If there is an elevated siding or switch eight or ten feet high at the station, the tank can be spotted thereon and the oil allowed to flow by gravity into the distributing wagon from the tap in the bottom of the tank car.

Heating Oil.—Where oil must be heated before being applied, it is often convenient to spot the car on a spur near some steam plant, such as a mill, creamery, or electric light plant. Where such arrangements can be made, a ¾-inch or 1-inch steam pipe line may be connected from the plant to the tank car. If no steam plant is accessible, an ordinary steam tractor or roller can be connected with the tank car. Where a steam connection is made for supplying the heat, from 12 to 24 hours are required to bring the oil up to 150 to 175 degrees F., which is about the maximum temperature that can be reached with the steam heat. This temperature will permit the oil to be pumped readily. Its temperature may then be increased the desired amount in the distributor.

The steam connection with the tank car is made at one of the 2-inch pipes that projects beneath the tank; the other 2-inch pipe that projects should be supplied with a valve so the amount of steam passing through the coils may be regulated.