REPORT OF COMMITTEE ON MAINTENANCE

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TREATMENT OF ICY PAVEMENTS

B C Tiney, *Project Chairman*

SYNOPSIS

The reduction of hazards caused by slippery roadways is one of the important problems demanding the attention of Maintenance Engineers at the present time and it is most essential that a solution be found. The formation of ice on the pavement surface constitutes one of the worst and most difficult conditions to combat The Maintenance Committee has made a study of the methods being used and the results obtained for the treatment of icy pavements, so that proper traction may be obtained The report presents suggestions as to satisfactory methods in use at the present time

The hazard caused by slippery roadways is one of the important problems demanding the attention of Maintenance Engineers at the present time When it is realized that the lives of the public are endangered it becomes most essential to find a solution to this problem at once. The formation of ice on the pavement surface offers one of the worst and most difficult conditions to combat

Materials such as coarse sand or cinders, thoroughly embedded in the ice so as not to be easily blown off the surface by wind or thrown off by vehicles, have been found to be the most useful in securing satisfactory traction Cinders have proven to be probably the best, but due to the difficulty of obtaining them coarse sands or similar materials are often substituted.

In embedding the material it is necessary to have a partial thawing of the ice. Calcium chloride has been found to be a practicable agent for melting the ice so that the coarse sand or cinders will be embedded properly, thereby providing traction

The committee has corresponded with various engineers interested in this problem and has studied their methods and the results obtained It is believed that the following suggestions offer practicable methods for treatment of icy pavement surfaces.

MATERIALS

Cinders are preferable although coarse sand is more often used since it is more generally available

PREPARATION

Storage piles of materials should be placed at convenient locations, particularly near grades or curves where traction will be most needed Sufficient calcium chloride should be spread over the surface of the material to prevent freezing—from twenty-five to fifty pounds per cubic yard

APPLICATION

At time of application the material should be treated with fifty pounds of flake calcium chloride per cubic yard. Distribution may be made by hand from trucks, but this method is slow and the results uneven The use of sand spreaders is recommended where a considerable amount of surface is to be covered The treated material should be spread at the rate of 1½ to 2 pounds per square yards of pavement surface.

There has been considerable question as to whether or not the use of calcium chloride for this purpose causes scaling of the concrete surface A study of cases where scaling has occurred indicated that the trouble was not due primarily to the action of calcium chloride but rather to the resulting thawing and freezing of the surface due to the absorption of the solution formed

Removal of the ice from the pavement surface by the direct application of calcium chloride is not recommended for general practice However, where this is deemed necessary the resulting slush should be removed from the surface of the pavement

There is definite information that traffic passing over an accumulation of fine material may cause considerable erosion of the concrete surface It is therefore important that an excess of sand or cinders be not applied; and that in any case the abrasive be removed from the pavement if it collects at the bottom of grades or other locations Surface disintegration is, of course, accelerated when concrete surfaces are subjected to abrasion from tire chains, etc , particularly from heavy truck traffic

The following outline of study is contemplated by the committee

I Investigation of possibilities of pretreatment of concrete slabs with bitumen, or other materials, to guard against scaling of these slabs when calcium chloride is used for thawing ice. The factors in this phase of the investigation will be color, cost, and effectiveness

II Investigation of methods and materials to be used in rendering icy pavements non-skid. This investigation will involve the use of sand, gravel and cinders, their grading, and use mixed with chemicals designed to thaw the ice and embed the aggregate The investigation will cover the type of equipment most suitable for spreading these

materials, the stockpiling of the aggregates, and the treatment with chemicals to prevent freezing in the stockpiles.

III Laboratory work to develop certain phases of the above investigation

FILLERS AND BEDDING COURSES FOR BRICK PAVEMENTS

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SYNOPSIS

Brick pavements laid in 1923 on a bedding of sand mixed with tar have been investigated and found to be in good condition Tests of the bedding course reveal some unexplained loss of bitumen Experiments have been conducted with coatings of glycerine and whitewash to prevent adhesion of the filler to the brick surface Asphalt emulsions have been studied for use as filler and in bedding courses Recent experience in construction of brick pavements on a sand mastic cushion in Illinois indicates that more than 4 per cent of bitumen is needed in the cushion

BEDDING COURSES

It has been known for many years that most of the ills to which brick pavements are subject are due to faulty foundations and bedding courses Cracks will form in a concrete foundation These will spread and let the sand cushion run through unless it is bound with some material that will hold it in place With this thought in mind a cushion of sand and cement was tried, and it has been used to some extent throughout the country It never has been thoroughly satisfactory because it makes a rigid layer on which the brick are bedded Hence it is more or less like an anvil and traffic is the hammer

The idea of mixing tar and sand together and laying the mix as a bedding course was first tried out with a wood block pavement in Syracuse, New York, in 1920 The pavement laid there at that time is in excellent condition today, and the engineer in charge states that the cushion has been 100 per cent efficient A mastic cushion was tried at Matoon, Illinois, 1923-24 Here brick pavements were laid over a cushion consisting of clean sand mixed with a light refined tar in the proportion of 96 per cent sand and 4 per cent tar by weight An examination of the pavements in 1931 showed them to be in excellent condition, although no maintenance had been given them during the past seven years Samples of the cushion were removed from the pavements, and these were examined and analyzed at the Materials Testing Laboratory of the University of Illinois. The following results were noted