

MICHIGAN
STATE HIGHWAY DEPARTMENT
Charles M. Ziegler
State Highway Commissioner

LIQUID CHLORIDE APPLICATION STUDY

By

E. A. Finney

Research Project 47 G-37

Research Laboratory
Testing and Research Division
Report No. 102
September 17, 1947



MICHIGAN
STATE HIGHWAY DEPARTMENT
LANSING 13

HARRY T. WARD 213
CHIEF DEPUTY COMMISSIONER

HARRY C. COONS
DEPUTY COMMISSIONER,
CHIEF ENGINEER

CHARLES M. ZIEGLER
STATE HIGHWAY COMMISSIONER

September 17, 1947

No. 3 Olds Hall
Michigan State College
East Lansing, Michigan

TO: Mr. W. W. McLaughlin
Testing and Research Engineer

SUBJECT: Liquid Chloride Application Studies
Research Project 47 G-37, Report P-102

In compliance with the request of B. R. Downey, Maintenance Engineer, a study is in progress concerning the application of liquid chloride to gravel surfaces as a dust palliative. It was brought to the attention of Mr. Downey by members of the maintenance organization that in certain cases the liquid chloride remained on the surface for a considerable period of time and was spattered to the roadside by traffic. This is a progress report covering findings in the field and offers suggestive changes in operation methods which might eliminate to a certain extent the trouble now experienced in applying liquid chloride.

On August 21, 1947, C. C. Rhodes, R. Thurm and L. L. Peterson observed roads M-79 and M-100 near Charlotte, Michigan. These roads had just received applications of liquid chloride dust palliative. It was learned at the maintenance garage that the roads had been sprinkled with water by a truck immediately preceding the liquid chloride distribution truck. It was noticed that the roads were thoroughly wet and pools of liquid scattered over the road surface. These pools persisted for several hours after application, causing traffic to spatter the liquid chloride to the roadsides where it was ineffective for dust control. These pools seemed to be caused by three factors; the extreme compaction of the road surface making penetration of the liquid into the road surface difficult, liquid chloride being applied too soon after the application of water, and the high concentration of the liquid chloride solution used.

On August 25, 1947, R. Thurm and L. L. Peterson observed the application of liquid chloride to highway M-43 west of Lake Odessa, Michigan. This material was applied to the dry road without any initial pretreatment with water. It was noticed that the liquid chloride solution collected in small globules on the surface of the road and wet the road only with great difficulty. These globules were also spattered and rolled to the roadside by traffic. This same globule effect can also be noticed on any dusty surface with plain water.

Experience has shown that a dilute solution will soak into the road surface more readily than a concentrated one. However, this would require more material per unit area to obtain the same chloride concentration as with the more concentrated solution, and there is some doubt as to whether the compacted road surface could absorb this additional liquid rapidly enough to eliminate the pool effect previously mentioned.

One possible method of reducing both the globule and pool difficulties would be thorough sprinkling beforehand with water. However, enough time should be allowed for the water to be absorbed by the road, leaving a damp surface with no pools rather than a wet one before applying the liquid chloride. This should greatly reduce both of the above-mentioned effects. It is suggested that the above procedure be incorporated in the manual of "Standard Procedure for Highway Maintenance", section 2.02.01. This section already specifies sprinkling before applying flake chloride. When using liquid chloride, however, the time allowed for the water to work in before applying the liquid chloride is important. Further, it is suggested that perhaps some kind of a drag behind the liquid chloride distributing truck might be beneficial in breaking up the globule effect and dispersing the liquid chloride solution over the road surface. This method will be tried out on future applications. Further studies on this subject are in progress.



E. A. Finney
Assistant Testing and Research
Engineer in charge of Research

EAF:lc