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Traffic Marking Reflectivity Study
(Final Report)

REFERENCE: Work Plan 90-R-5

HISTORY:

On June 5, 1990, a test site for studying reflectivity of traffic markings over time was prepared. Transverse stripes of standard traffic paint and three types of preformed pavement marking tape were installed across the west bound lane of US Route 302 near the Materials and Research Division lab in Berlin. These test stripes were monitored periodically over a one year period ending May 13, 1991.

BACKGROUND NOTES:

Retroreflectivity is a measure of the amount of light a surface reflects back from a light source. In this study, a Mirolux 12 Reflectometer was used. This apparatus models the reflection angles of a car's headlights off the pavement and back to the driver. Visibility is not limited to reflectivity; color, contrast and stripe size also play significant roles in the driver's ability to distinguish traffic markings from the pavement surface.

STATUS:

The four stripes installed on June 5, 1990 tested the performance of: Vermont's standard white traffic paint, 3M Stamark series 5730, 350 and 380. On the day of installation, nine sets of retroreflectivity readings were taken to determine the immediate impact of traffic on the markings. Vehicle counts were taken up to 2000 vehicles. After the June 5 readings, the vehicle count used was the directional adjusted average daily traffic based on the automatic traffic counter (Station W006), located at the test site.

A baseline retroreflectivity of 66 millicandellas was established by finding the average reading for well worn asphalt pavement. Test stripe reflectivity reported is the average of five adjacent readings spanning the left wheel path of the west bound traffic lane. A graphical summary of data is included on page three of this report.

During the first week, the readings fluctuated significantly. The three tapes showed a general increase in retroreflectivity. This may have been caused by wear of the top surface exposing the embedded glass beads. Traffic paint reflectivity decreased slightly over the same period.

All of the test stripes showed a steady decrease in retroreflectivity over the following four months. During this time, retroreflectivity readings at the edge of the roadway were higher than those taken in the wheel path. After the first snowfall and subsequent sanding and plowing operations, all retroreflectivity readings plummeted. The glass beads embedded in the stripes were most likely scraped off by the plows.

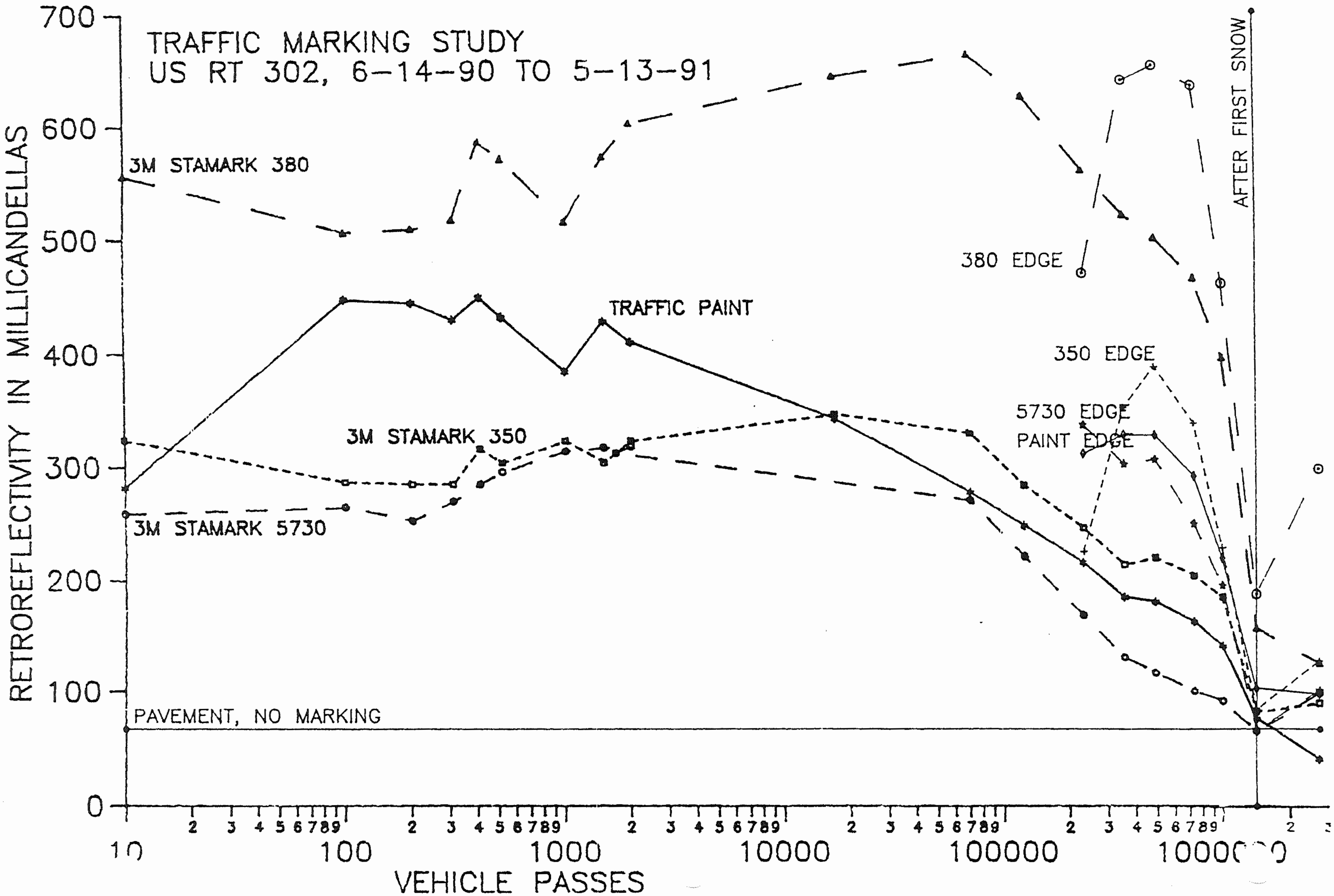
Readings taken on May 13, 1991 show the edge readings increasing for the tapes, while readings in the wheel path leveled off. The edge readings for paint leveled off, but the readings in the wheel path fell below the retroreflectivity of bare pavement. All of the test stripes were worn but still easily visible.

DISCUSSION:

Standard traffic paint has an annual cost of less than $0.03/linear foot. The tapes have an initial cost ranging from $0.85 to $1.50/linear foot. The annual cost depends upon service life, usually 3.5 to 4 years, and can vary from $0.21 to $0.38/linear foot.

Similar patterns of retroreflectivity readings can be seen for all the test stripes. The 3M Stamark 380 read significantly higher than the other three markings, which stayed closely grouped over the duration of the study. However, none of the markings performed well following winter road maintenance. Although the 3M Stamark 350 and 380 tapes outperformed traffic paint in this study, the increased performance even with a service life of 4 to 5 years does not justify the increased cost (7 to 10 times the annual cost of paint). For this reason, it does not appear that preformed traffic markings can be cost effective in areas where heavy snow and plowing is expected.

Distribution A,B,C,D,E,F,G



TRAFFIC MARKING STUDY
US RT 302, 6-14-90 TO 5-13-91
RETROREFLECTIVITY IN MILLICANDELLAS
VEHICLE PASSES
3M STAMARK 380
TRAFFIC PAINT
3M STAMARK 350
3M STAMARK 5730
380 EDGE
350 EDGE
5730 EDGE
PAINT EDGE
AFTER FIRST SNOW
PAVEMENT, NO MARKING
0
100
200
300
400
500
600
700
10
100
1000
10000
100000