EVALUATION OF SNOWPLOWABLE RAISED PAVEMENT MARKERS

Final Report
for Iowa DOT
Project HR-558

Federal Highway Administration
Project IA-93-02

November 1995

Project Development Division

Iowa Department
of Transportation

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Jaime Reyes
Safety Review Engineer
515-239-1077

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DISCLAIMER

ABSTRACT

In 1992, the Iowa DOT installed 6200 snowplowable Raised Pavement Markers (RPM) in six areas around the state. They were evaluated at six-month intervals until the replacement of the reflective lenses in 1995. During this time, the RPM performed well.

The Iowa Department of Transportation uses de-icers and sand during the winter to control snow and ice on the pavement. The sand and the chemicals reduced the reflectivity of the reflectors. With minimum or no maintenance the visibility of the RPM is low. Although the RPM appear to present a problem during snow plowing, they are an excellent device for lane delineation at night in adverse weather.

INTRODUCTION

Lane delineation during adverse weather is a problem, especially at night. Some raised marking devices have been tried for lane delineation, but they did not withstand the snowplows during snow removal operations. Painted pavement markings are not visible during rainy conditions.

The RPM in this study were installed as an addition to the regular pavement markings, not as a substitute for them. They were installed at several locations in the state to test their placement under different types of pavement and maintenance conditions.

OBJECTIVE

The objective was to evaluate the RPM for durability as well as field evaluation by visual observation to determine the brightness of lane delineation.

PROJECT LOCATION

The contractor was Alphonso Construction Company from Denison, Iowa. The six geographic locations are shown on Figure 1, the number installed were as follows:

1.	Woodbury County, I-29 in Sioux City	212
2.	Pottawattamie County, I-29 in Council Bluffs	781
3.	Polk County, I-235 in Des Moines	2975
4.	Polk County, US 6 (Euclid Avenue) in Des Moines	271
5.	Webster County, on Co. Rd. P50 over US 520	170
6.	Linn County, I-380 in Cedar Rapids	1788

CONSTRUCTION

Most of the units were installed in the 1992 construction season, the rest in 1993. The installation was performed according to the specifications and with excellent field inspection. We only lost one unit due to faulty installation. The installation procedure was as follows:

1. The groove was cut in one single step with a plunge saw. The groove matched the bottom contour of the casting.
2. The groove was dried and cleaned with compressed air.
3. The epoxy mix was poured into the clean groove to the level indicated by the manufacturer.
4. The metal casting, clean and free of any material which could have impaired bonding, was placed into the groove with the four leveling lugs resting on the pavement and with the leading tips below the surface of the adjacent pavement.
5. The epoxy was allowed to dry before opening the road to traffic.

COST

The total cost of the project was $281,905.09. This cost is relatively high for this type of work. The reason being that it was the first of its kind in Iowa and the contractor needed to acquire expensive installation equipment. It is expected that the installation cost will be lower as we continue to install more units.

PERFORMANCE

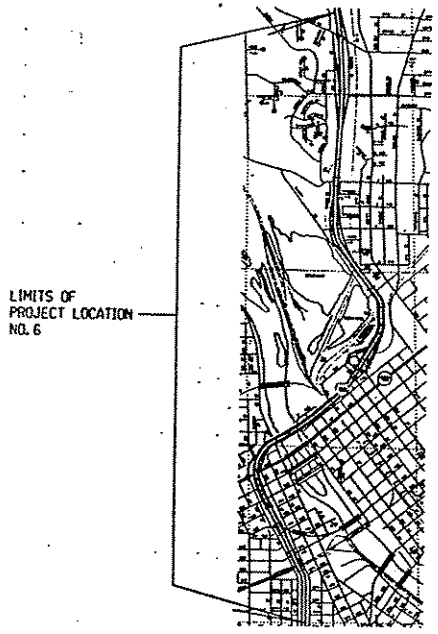
The main problem we experienced was the loss of reflectivity due to dirt on the surface of the lenses, especially on dry, cold days during the winter. This time of the year we use de-icing chemicals which, combined with dirt, dry and remain on the surface of the lenses impairing their reflectivity. We tried washing them once, a treatment which lasted only until the next snow and ice treatment.

After the third winter of use, it was found that while the RPM on locations with low traffic showed excellent durability, the opposite was true on high traffic areas. In locations such as the freeway, with 100,000 ADT, the surface of the reflective lenses was badly damaged due to the abrasive effect of the sand used to control icing on the road. Many of them had cracked as the tires pushed the sand on the lenses. The reflectors in Cedar Rapids and Des Moines were replaced In the summer of 1995. We will monitor the performance of the new lenses.

CONCLUSIONS

The RPM are an excellent delineation device for night driving. They outperform any other device or pavement marking in bad weather conditions because they stand out above the pavement surface during rain and snow. The only drawback is that in snow locations they get dirty and lose a great percentage of reflectivity. Nevertheless, even when dirty, the RPM can be seen well enough to provide effective lane guidance.

FIGURE 1
Project Location



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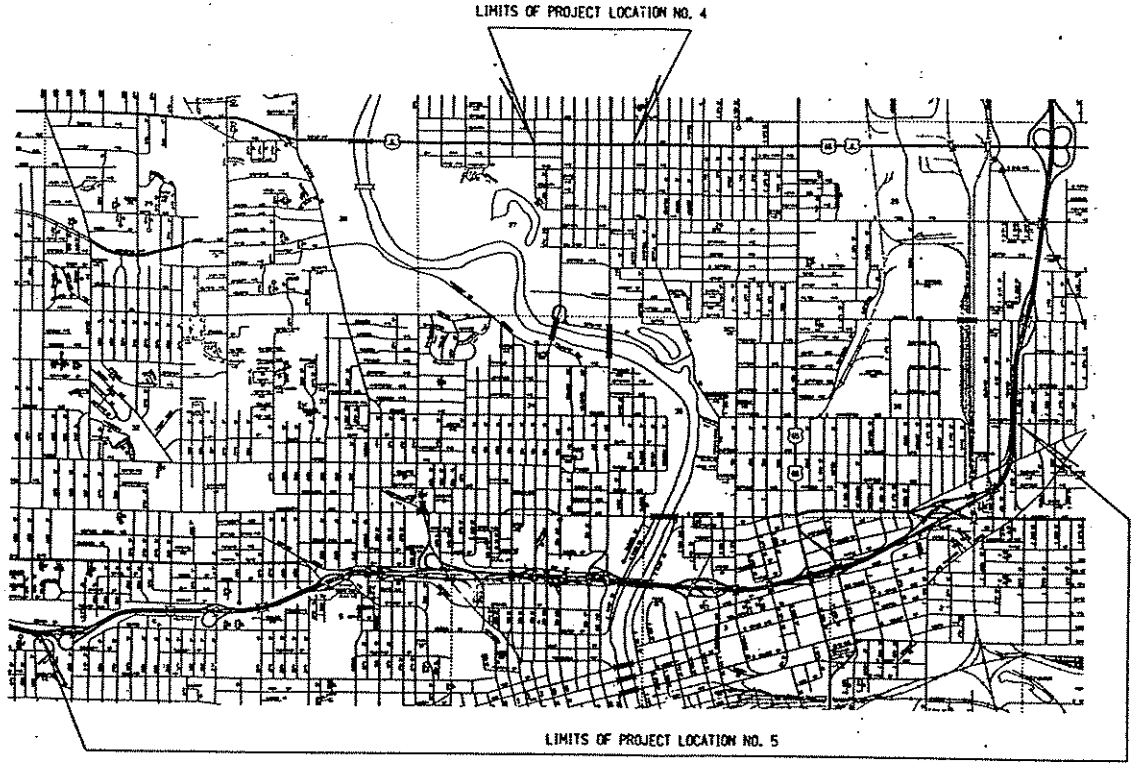

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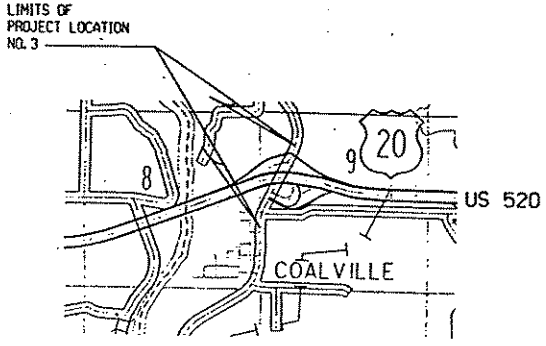

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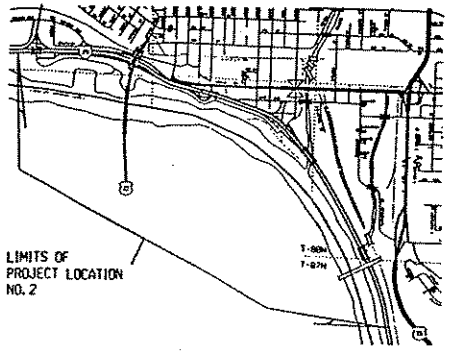
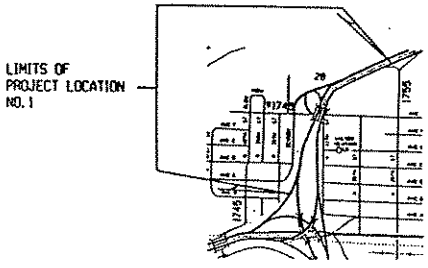


CITY OF SIOUX CITY



CITY OF COUNCIL BLUFFS

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