

## Pavement Marking Management Systems

### Description:

This research project, along with a previous project, studied some operational factors for pavement markings and developed a Pavement Marking Management System (PMMS). This PMMS provides an automated system not only to inventory pavement markings but also to manage them. The issues involved in the management of markings include quality control, quality assurance, system automation, development of life cycle curves and prioritize re-stripping and collection of data. These issues are directly related to many of the operational factors involved in the project. The operational factors included paint thickness, type of beads, type of material and quality control of application. Initial work only was done on these operational factors.

A major component of a management system is a measure for quality/durability. Retroreflectivity was used since FHWA is working on establishing minimum levels. This information was collected with a mobile reflectometer. Retroreflectivity readings can be taken at normal driving speeds. This allows for readings to be taken quickly, accurately and provides one common source of information to enhance quality assurance. By gathering a history of retroreflectivity readings, life expectancy curves can be generated to project when markings should be re-stripped according to a set minimum retroreflectivity. The database of retroreflectivity readings on different types of pavement markings with different type of materials can also be maintained in PMMS. MoDOT has made minimum improvements to in-house pavement markings with waterborne paint since 1990. The ultimate goal of this project was to improve MoDOT's pavement markings.

### Advantages/Disadvantages:

A Pavement Marking Management System provides an automated method to manage pavement markings and not just inventory them. It provides a location and methodology to collect a large amount of information regarding numerous factors that could affect the quality of pavement markings. The PMMS software will require some modification and refinement to fit the needs of the user.

### Research Development and Technology

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The collection of this information requires commitment from the personnel on the striping train and supervisors to collect the information and input it into the software.

Retroreflectivity readings from a mobile retroreflectometer are needed since they are used as the primary factor in determination of the quality and durability of the markings. Readings are a critical component for the PMMS.

### **Costs:**

We were not able to determine costs at this stage. The actual cost to use PMMS is minimal. In order to provide information to determine the quality and durability of pavement markings, retroreflectivity readings are required. The collection of these readings will be the primary additional cost for PMMS.

Other costs associated with the operational factors from the research project will depend on actual changes made in operations.

### **Conclusions:**

Numerous conclusions were generated from the study:

1. MoDOT needs to change emphasis on in-house pavement markings from quantity to quality.
2. Statewide technical assistance, training and verification of consistent processes are needed for better quality control.
3. If waterborne pavement markings are applied appropriately, some roads do not need to be re-stripped every year.
4. Application rates of 15 mils wet thickness of paint with 8 pounds of Type 1 beads per gallon should be increased to 17 mils wet thickness of paint with 10 pounds of Type L beads (some districts) per gallon. Additional research is needed on application rates to determine which rates are appropriate for optimum durability and retroreflectivity with consideration being given to the area of the state where the stripe is located.
5. New pavement surfaces should receive a heavier one-time application of material or be striped twice in a season. Standard application

rates should be based on the porosity of the surface.

6. MoDOT needs to do further testing to obtain accurate information on the best combination of beads and paint thickness to yield the best markings for retroreflectivity and durability.
7. MoDOT should change from waterborne paint using 2<sup>nd</sup> generation resins to waterborne paint using 4<sup>th</sup> generation resins.
8. Retroreflectivity readings taken by a Laserlux retroreflectometer are needed on in-house markings of a sufficient size sample for quality assurance.
9. Funding needs to be set up for readings to be taken with a Laserlux mobile retroreflectometer.
10. Retroreflectivity readings from MiroLux 30, LTL 2000 and the Laserlux do not directly correlate with each other and should not be compared to each other.
11. In-house pavement markings outperformed contractor applied markings in District 7.
12. The commitment needs to be made and a program implemented that ensures durable markings are maintained as durables and not just forgotten about and striped over with waterborne paint.

### **For more information, please contact**

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