

# **HIGH PERFORMANCE TRAFFIC MARKINGS IN WET WEATHER**

## **PROBLEM STATEMENT**

Traffic markings are one of the most important traffic control and safety devices. The basic requirement for traffic marking is that it must be visible. During clear daylight hours, the visibility of traffic markings usually presents little problem. During night driving in rainy conditions, however, the accumulated water on the road surface will reduce the light reflected back to drivers' eyes. Thus, it will result in a greatly reduced visibility performance of traffic marking.

During the past two decades, many techniques have been implemented to improve the visibility performance of traffic markings under wet-night conditions. These techniques include, but are not limited to: raised pavement markers, larger glass beads, inverted profile or structured markings and wet-weather traffic strips, etc. Several manufacturers claim that their products are "all-weather pavement markings" and have high levels of visibility under wet-night conditions. So far it is not clear whether these markings and techniques can provide adequate performance in Florida. In order to ensure markings can provide adequate safety to the traveling public in Florida, traffic marking performance on wet pavement surfaces should be tested and evaluated under Florida environmental conditions.

## **OBJECTIVES**

The purpose of this research is to perform a preliminary study which will establish a basis for future larger scale evaluation of traffic markings on wet pavement surfaces. The specific objectives include setting testing parameters and developing a testing plan for the future larger scale test of wet weather pavement markings.

## **FINDINGS AND CONCLUSIONS**

To achieve the research objective, an extensive literature review has been undertaken to review testing procedures and evaluation guidelines used in past similar projects. It was found that there are no widely accepted guidelines that have specified the minimum retroreflectivity level of traffic markings under wet weather conditions. In addition, previous studies have only focused on the visibility performance of new traffic markings under wet-night conditions. There is little in-use wet marking performance data for traffic markings.

The authors of this report recommend that a follow-up project should be conducted to investigate the wet-night visibility of traffic markings in Florida. The research team have selected the testing parameters and developed a testing procedure for the proposed test. The selected testing variables include detection distance, retroreflectivity, and service life of different traffic markings. A testing plan was developed to test the selected testing parameters of various pavement marking systems

under different rainy conditions. In addition, several wet-weather pavement marking systems were also selected for the future larger scale test. These products were found by previous studies to have good visibility performance during wet-weather conditions.

The research team of this study also summarized methodologies used by previous studies to simulate rainy conditions. There are basically two different methods for the simulation of rainy conditions, including the ASTM methods and the rain tunnel methods. By following ASTM E 2176 and E 2177, it is possible to simulate rainy conditions. The rain tunnel method requires building an enclosed space to simulate wet weather environments. The most crucial parameter is the maximum rate of rainfall that a material is able to overcome and maintain retroreflectance. This performance characteristic can be compared to real life Florida weather events. For this purpose, 20 years of Florida rainfall data was acquired from the National Climatic Data Center. Statistical analysis was conducted based on the collected rainfall data. Based on the rainfall data analysis results, the research team determined three different rainfall rates that the rain tunnel should be able to simulate: 0.3 in./hr, 0.65 in./hr and 1.2 in./hr.

## **BENEFITS**

Traffic markings are very important for safety operations of traffic. If traffic marking performance is reduced during the wet weather, it might cause safety problems to traveling public, and traffic operation efficiency may also be reduced.

This study could be considered a preliminary study for a future research to evaluate the performance of various traffic markings under wet weather conditions in Florida. By reviewing previous studies in related areas and analyzing Florida rainfall data acquired from the National Climatic Data Center, the research team selected the testing parameters and developed a testing plan for the future test. The research results established a good basis for future larger scale test and have the potential for the development of guidelines to improve traffic marking performance under wet weather conditions.

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