RESEARCH ADMINISTRATION
Bureau of Field Services
Michigan Department of Transportation

Research Spotlight

MDOT's successful road delineation program will become even better

When the Wayne County Road Commission painted a centerline on River Road near Trenton, Michigan, in 1911, it was this country's first painted centerline. MDOT maintains its leadership in road delineation practices with annual restriping and delineation maintenance on 90 percent of its roadways. A recent review of road delineation practices in Michigan, across the upper Midwest and around the country confirmed the safety benefits of MDOT's current practices and identified opportunities for improvement.

Project Information

REPORT NAME: Evaluating Road Delineation Practices in Michigan

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TOTAL COST: $134,304

COST SHARING: 20% MDOT, 80% FHWA through the SPR, Part II, Program

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Problem

Effective roadway delineation helps motorists stay within driving lanes even in low-visibility weather. Each year, MDOT spends millions of dollars restriping roadway edge lines and lane lines, regrinding rumble strips and replacing road delineators (steel posts that have reflectors mounted on them and are generally spaced 400 feet apart). Although this annual road delineation program is effective, MDOT wanted to improve public safety outcomes through a review of other agencies' practices.

A leader in road delineation practices since the early 1900s, MDOT reviewed its delineation program to further improve public safety with cost-effective practices.

Research

MDOT worked with researchers from Opus International Consultants and Western Michigan University to evaluate the state of the practice in road delineation in cold-weather states and Canadian provinces. Researchers studied the literature on delineation practices, and with input from the study's research advisory panel, used the findings to construct a survey of delineation programs in areas outside

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"This study confirmed the value of our current delineation program and identified some potential improvements, such as increasing our use of polyurea pavement markings and potentially reevaluating the use of snowplowable raised pavement markers for some locations."

Mary Bramble, P.E.
Project Manager

Michigan. Investigators then identified opportunities for MDOT to improve both its management practices and the materials and devices used for road delineation.

The survey garnered responses from 20 states (including those surrounding Michigan) and two Canadian provinces. The respondents provided details on materials and methods, typical service lives, and cost estimates.

The investigators then gathered delineation guidance documents, identified and reviewed crash modification factors from their own research and from FHWA's Crash Modification Factors Clearinghouse, and conducted a statistical analysis of key practices that might benefit MDOT.

Results

Every agency contacted used post-mounted delineators, centerline rumble stripes and shoulder rumble stripes. The states neighboring Michigan all considered service life, average cost, durability and retroreflectivity (the ability of a material to reflect light back to its source) as critical to their pavement markings.

Based on their investigation, the researchers found that MDOT could enhance its current effective practices (which include use of rumble stripes, annual restriping, and replacement of damaged reflector-button posts with reflective-sheeting posts) in a number of ways. They recommended that MDOT consider six actions in particular:

- On four-lane roads with annual average daily traffic (AADT) of 20,000 or more vehicles, consider raised pavement markers that can withstand snowplowing. Snowplowable raised pavement markers are particularly beneficial for roadways with an AADT of 60,000 or higher.
- Expand the use of polyurea-based pavement marking material, which is thicker and more durable than waterborne pavement marking material. Polyurea pavement marking material may reduce nighttime crashes by 36 percent.
- Review lighting at freeway interchanges, and consider adding lighting at sites where more than one nighttime crash occurs every two years.
- Establish a regular replacement cycle for delineators (such as every seven years) and replace the reflective buttons with more durable and visible reflective sign sheeting.
- Update the process for recording delineation data (for example, by changing the formats used) to improve MDOT's inventory system.
- Update the Pavement Marking Selection Guidelines to include factors such as AADT and service life in comparisons between waterborne marking material and more durable materials.

Value

This research confirmed that MDOT's annual restriping and delineator replacement program does improve safety, and verified that the department should continue to use delineators with reflective sheeting when possible. Suggestions for inventory updating will help MDOT better manage cost and safety considerations, and allow for analysis of data to identify future safety improvements. MDOT plans to evaluate the potential for polyurea-based markings in higher-traffic applications, although such materials take longer to apply and cure than less durable pavement markings. The department also plans to explore the use of the newer raised pavement markers that can withstand snowplowing, as these devices are less expensive, lighter and potentially less likely to be dislodged by snowplows than previous models used by MDOT.

Research Administration

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