



Project Summary

Texas Department of Transportation

0-5862: Benefits of Wider Longitudinal Markings

Background

State departments of transportation (DOTs) are constantly investigating methods to improve safety along their respective roadway networks. As their roadway networks expand and become more complex, the costs associated with construction and maintenance grow as well. This means state DOTs must try to find every low-cost alternative for improving safety. One of the low-cost alternatives state agencies are examining is to install wider pavement markings to enhance roadway delineation, with the intent to reduce crashes. The standard longitudinal pavement marking width in Texas is 4 inches.

What the Researchers Did

The researchers conducted several different tasks over a two-year period when assessing the potential benefits of wider longitudinal pavement markings.

- Conducted a review of the applicable literature.
- Conducted a state usage survey.
- Discussed the findings from a recent safety study conducted by TTI on another project.
- Conducted a human factors evaluation of the impact of wider and brighter edge lines.

What They Found

The table on page 2 indicates findings from the project with regard to specific topic areas.

What This Means

Based on the research findings and their potential implications, the researchers recommend that TxDOT consider the use of wider edge line pavement markings for two-lane highways. The latest safety analyses support their positive effect on safety. In addition, the reduction in edge line encroachments and the slight shift by drivers toward the centerline are considered positive safety improvements. The eye-tracking data support the recommendation in that drivers appear to have more opportunity to focus on critical driving tasks when wider edge lines are used.

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Should TxDOT decide to use wider edge line pavement markings, the researchers also recommend that TxDOT consider following an experimental approach to their installation and conduct a before-after crash analysis, as the safety study findings were from states other than Texas and focused on two-lane highways. While a before-after crash analysis could be conducted across all roadway types, the researchers recommend that the farm-to-market system be included at a minimum. For example a TxDOT district, or a pair of districts, would install wider edge lines on their newly seal-coated highways, and other district(s) would install standard width edge lines markings along their newly seal-coated highways. After two years, Empirical Bayes statistical analyses could determine the safety impacts of the wider edge line pavement markings in Texas.

Topic	Finding	Implication
Wider Pavement Marking Usage	<ul style="list-style-type: none"> The majority of states are using and/or experimenting with wider markings, and this appears to be an increasing trend. 	This has little direct impact on Texas Department of Transportation (TxDOT) pavement marking practices, but it does suggest that there is support within the majority of states that the installation of wider pavement markings is an acceptable practice.
Safety Study	<ul style="list-style-type: none"> Crash data collected over approximately a six-year period from over 2,000 centerline miles of rural highway from two different states support the finding that crashes are reduced after the installation of wider edge line pavement markings. 	While the data were not collected in Texas, the researchers believe this finding at least supports the use of wider edge line pavement markings in field safety evaluations along rural two-lane highways in Texas.
Lateral Placement	<ul style="list-style-type: none"> As edge line marking width increased along lightly shifting tangents, vehicle lateral placement shifted away from the edge lines. As edge line marking brightness increased, vehicle lateral placement shifted away from the edge lines in the outside lane of horizontal curves. 	With respect to marking width, this finding would support the use of wider edge line markings along tangent segments with a high rate of run-off-road (ROR) crashes. As for marking brightness, brighter edge line markings along horizontal curves may reduce ROR crashes.
Encroachment	<ul style="list-style-type: none"> As edge line marking width increased along the inside lane of horizontal curves, the likelihood of edge line encroachment decreased by almost 60 percent. 	This finding supports the use of wider edge line pavement markings along horizontal curves since they may reduce ROR crashes.
Eye Glance*	<ul style="list-style-type: none"> Pavement marking brightness did not appear to impact eye-glance behavior. As edge line pavement marking width increased, LKG and NLKG durations increased, while the total percentage of NLKGs decreased. 	These findings suggest that wider edge line pavement markings provide a more comfortable driving environment for drivers and provide more time for drivers to focus on critical driving tasks, which could be used to support the use of wider edge line pavement markings along rural highways.

*Lane-keeping glance (LKG) and non-lane-keeping glance (NLKG).

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