



Research Need Statement 536

Date:	July 23, 2018
Need Statement Champion:	Ken Johnson
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Idea Submitted by:	Ken Johnson
Idea Originated from:	Ideascale and TEO Pavement Marking Committee

Select Program:

MnDOT OR Local Road Research Board (LRRB)

Research OR Implementation

Need Statement Title:

Pavement Marking Patterns and Widths - Human Factors Study

Need Statement: Describe the problem or the opportunity. Include background and objective.

MnDOT currently uses the following as typical installations for pavement markings: 4" for normal width; 50' cycle (10' stripe, 40' gap) for broken line markings; and 15' cycle (3' stripe, 12' gap) for dotted line markings.

Some studies have shown benefits with a wider normal width marking - particularly with 6" edgelines on two-way, two-lane roads. Due to these studies, some states have gone to a wider 'normal width' pavement marking as a standard. There have also been requests for tighter spacing for broken line markings - to assist both drivers and autonomous vehicles.

The MUTCD has a requirement for broken lines to "consist of 10-foot line segments and 30-foot gaps, or dimensions in a similar ratio of line segments." Minnesota was able to add the 10' stripe, 40' gap broken line pattern into the Minnesota MUTCD and still keep substantial conformance with the Federal MUTCD - primarily to keep the 50' cycle. Other states have gone to a 12.5' stripe, 37.5' gap broken line pattern to keep with the 1:3 ratio, but have the 50' cycle. It has been theorized that a wider 'normal width' pavement marking and tighter spacing patterns would result in less eye fatigue for the driver - thus improving safety.

MnDOT Traffic Engineering Organization Pavement Marking Committee members feel that human factors analyses would assist with evaluating appropriate dimensions for pavement markings. This study should examine the following related to elements such as detection, eye fatigue, and other relevant human factors:

- the preferred 'normal width' on edgelines, centerlines, lane lines, etc



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- the preferred cycle patterns
- the effectiveness of contrast markings

Provide a summary of the potential benefits:

Improve safety and comfort for drivers – particularly elderly drivers

Improve operations of autonomous vehicles

How does this project build upon previous research (include title or reference to a completed research effort)?

Safety effects of wider edge lines on rural, two-lane highways, 2012, Park, et. al., found safety benefits of wider edge lines for rural applications.

This might build on some autonomous vehicle research with respect to pavement marking visibility.

Provide names to consider for a technical advisory panel:

Ken Johnson (MnDOT OTE), Ethan Peterson (MnDOT OTE), Brad Lechtenberg (MnDOT Maintenance), Sheila Johnson (MnDOT Metro Maintenance), Mike Kronzer (MnDOT CAV-X), Jim Miles (MnDOT D1 Traffic), Luke Johanneck (MnDOT D2 Traffic), Derek Leuer (MnDOT OTE), Shuo Wang (MnDOT Metro Traffic), Scott Poska (City of Minneapolis), Vic Lund (Saint Louis County), Joe Gustafson (Washington County)