



# Research Need Statement 533

<b>Date:</b>	<b>7/23/2018</b>
<b>Need Statement Champion:</b>	<b>Tom Peters</b>
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<b>Idea Submitted by:</b>	<b>Dr. Stephen J. Druschel</b>
<b>Idea Originated from:</b>	<b>Previous Research by Dr. Stephen J. Druschel</b>

**Select Program:**

MnDOT    OR     Local Road Research Board (LRRB)

Research    OR     Implementation

**Need Statement Title:**

Hot Shots for Cold Climes – Evaluating Treatment of The Hardest Icy Spots

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

Roadway deicing and snow removal is a balance between achieving a winter driving “level of service” and cost. However, costs are not only money but labor, equipment and environmental impact. If only we could put out a sign saying “Cost Savings Ahead – Reduce Speed”. However, public safety and perhaps bad driving demand a certain level of expense. Recent optimizations in deicer application by weather conditions have helped reduce costs and improve environmental impacts, and these optimizations have become the standard in winter roadway maintenance.

However, every roadway has trouble spots: wind blow, shading, cold air capture, refreeze or perhaps just awkward cross slopes on curves. When icy conditions develop on these trouble spots, state patrol shouts for more salt as vehicles are sliding sideways and crashes multiplying, and people may be getting hurt. In times like these, the consideration of environmental protection can be neglected, and much good work of deicer optimization can be negated.

This study should evaluate items including, but not limited to:

1. The reduction in levels of service caused by these trouble spots;
2. The frequency of occurrence;
3. The winter maintenance response, particularly the additional deicer resources, targeted to the trouble spots; and,



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4. The calculated adjustment in environmental protection caused by this response.

This study should leverage Automatic Vehicle Location (AVL) and Maintenance Decision Support System (MDSS), records of MnDOT deicer applications, augmented by on-site photographic records and weather data measurement, for both trouble spots and ordinary roadway stretches. Results from this study can be used to quantify speed reduction or road closure decisions, and will provide strength for discussions about roadway salting and environmental damage.

### **Provide a summary of the potential benefits:**

Some of the potential benefits of this study are: gain a better understanding of where continued troubled spots are on the roadway, what weather conditions typically cause each trouble spot and how often they occur. This will help maintenance managers and crews better plan for a quicker response, provide signage, post speed reduction, or close roads in a much more efficient and site specific manner which should provide the traveling public with more awareness and allow them to make more informed decisions about their travel plans. Another benefit should be the identification of ways to mitigate these trouble spots when at all possible and/or ways to maintain these trouble spots in the most efficient and environmentally friendly way, all without sacrificing safety for the traveling public.

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

This project will build upon previous research Dr. Stephen Druschel has performed for MnDOT on the effectiveness of salt, salt brine and alternative chemicals. This will take some of his work and allow it to be utilized to help address the more specific problem of trouble spots along a roadway.

### **Provide names to consider for a technical advisory panel:**

Daniel Gullickson, Tracy Olson, Jakin Koll, Joseph Huneke, Jeffery Jansen, Danny Flatgard, District Maintenance Supervisors (tbd)