

UTC Project Information	
Project Title	MPC-625 – Effect of Deicing Agents and Environmental Conditions on Performance of Asphalt Pavements in Cold Regions
University	South Dakota State University
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Funding Source(s) and Amounts Provided (by each agency or organization)	USDOT, Office of the Assistant Secretary for Research and Technology \$48,870 South Dakota State University \$49,027
Total Project Cost	\$97,897
Agency ID or Contract Number	69A3551747108
Start and End Dates	February 19, 2020 to July 31, 2024
Brief Description of Research Project	<p>Winter maintenance plays a vital role in keeping the highway system safe and functional during the winter season. Deicing, among different practices, is central to every winter maintenance effort. Deicing is defined as application of chemicals in order to facilitate breaking up the ice and snow pack and melting glare/black ice. While sodium chloride is widely used as a deicing agent, other chemicals, namely calcium chloride, magnesium chloride, potassium chloride, and acetates are also being used for the ice removal, depending on their effectiveness in different temperature ranges. Deicing chemicals lower the freezing point and therefore, keep the precipitated water in the pavement in liquid form at freezing temperature. This, in turn, subjects the pavement to freeze-thaw cycles even during the frigid temperatures. This mechanism is reported to accelerate moisture-induced damage and pothole formation, deteriorate asphalt pavements' durability and may negatively affect its structural integrity. Although there are growing concerns over the negative effects of deicers on asphalt mixes, limited research has been conducted to address these concerns. Based on aforementioned need, this study is being proposed to investigate the effects of commonly-used deicing agents on durability and performance of asphalt mixes exposed to those chemicals and freeze-thaw cycles. The outcomes of this study will help the transportation agencies and highway authorities to gain a clearer understanding of any possible negative effects of using deicers on pavement performance. This will help with decision-making process in selecting the type of deicing agents to minimize damage to asphalt pavement structure.</p>

<p>Describe Implementation of Research Outcomes (or why not implemented)</p> <p>Place Any Photos Here</p>	<p>The outcomes of this study will help transportation agencies and highway authorities understand the adverse effects of deicers on pavement performance. This will help with the decision-making process of selecting the type of deicing agents to minimize any damage to asphalt pavement structures in cold climates.</p>
<p>Impacts/Benefits of Implementation (actual, not anticipated)</p>	<p>Many deicing chemicals may have a deteriorating effect on asphalt pavements' durability. This study, after implementation, will provide the pavement engineers and decision-makers in DOTs with laboratory data that shows the extent of any negative effect of using deicing agents on pavement performance and durability. This will help minimize the undesirable effects of deicing agents and F-T cycles on pavements' longevity by selecting a winter maintenance plan that suits the condition of the local asphalt pavements. Therefore, the economic impacts of the proposed study are expected to be significant by any measure.</p>
<p>Web Links</p> <ul style="list-style-type: none"> • Reports • Project Website 	<ul style="list-style-type: none"> • MPC Final Report – Effect of Deicing Agents and Environmental Conditions on Performance of Asphalt Pavements in Cold Regions