

<b>UTC Project Information</b>	
Project Title	MPC-664 – Electrospun Recycled Polyethylene Terephthalate Microfibers as an Asphalt Binder Modifier
University	South Dakota State University
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Funding Source(s) and Amounts Provided (by each agency or organization)	<p>USDOT, Office of the Assistant Secretary for Research and Technology \$157,879.85</p> <p>South Dakota State University – \$125,287.39 South Dakota Local Transportation Assistance Program – \$33,351.00</p>
Total Project Cost	\$316,518.24
Agency ID or Contract Number	69A3551747108
Start and End Dates	August 25, 2021 to July 31, 2024
Brief Description of Research Project	<p>More than 8.8 billion Polyethylene Terephthalate (PET) bottles end up in landfills, annually. High elasticity, stable polymer backbone, and hydrophobicity make PET a strong candidate for being recycled in asphalt mixes. In absence of an effective method for recycling PET in asphalt, this study seeks to address environmental concerns related to PET waste and overcome technical challenges of recycling PET in asphalt mixes while improving their mechanical properties. Therefore, PET microfibers will be produced in the laboratory from waste plastic by using electrospinning technique. Different amounts of Electrospun PET Microfiber (EPM) will be incorporated in asphalt binders and their effect on the rheological, mechanical, and adhesion properties of asphalt binders will be studied. Additionally, effects of using EPM-modified asphalt binders in mixes on their cracking, elastic modulus, rutting, and stripping properties will be evaluated. Finally, feasibility of using resonant frequency test, as a quick and non-destructive technique, for indirect measurement of elasticity and crack detection in EPM-modified</p>

	<p>asphalt mixes will be studied. This study is expected to introduce a novel approach for recycling waste PET in asphalt mixes which in turn addresses an important environmental challenge while improving the sustainability and performance of asphalt pavements and ground transportation system.</p>
<p>Describe Implementation of Research Outcomes (or why not implemented)</p> <p>Place Any Photos Here</p>	<p>The laboratory test results strongly suggest the high potential for implementing the technology developed in this study. Before full implementation of the study's findings, a field test section should be constructed to assess field performance of the proposed material which will pave the road for implementing the findings in construction.</p>
<p>Impacts/Benefits of Implementation (actual, not anticipated)</p>	<p>The study's findings are expected to promote using EPM from waste PET as a binder modifier to improve asphalt binders' mechanical properties. This will reduce landfilled PET plastic and the need for expensive petroleum-based polymers, offering a hopeful outlook for the future of ground transportation systems. The findings of this study showed that EPM-modified asphalt binders had better resistance to cracking and rutting compared to pavements without any EPM in their composition. As a result, this will reduce the need for polymer-modified asphalt binders and extend pavement life, leading to lower construction and maintenance costs, a potential cost-saving measure.</p>
<p>Web Links</p> <ul style="list-style-type: none"> <li>• Reports</li> <li>• Project Website</li> </ul>	<ul style="list-style-type: none"> <li>• MPC Final Report – <a href="#">Electrospun Recycled Polyethylene Terephthalate Microfibers as an Asphalt Binder Modifier</a></li> </ul>