

Research Project Descriptions

UTC Project Information	
Project Title	Understanding Impact of Climate Change on Highway Hydraulic Design Procedures
University	The University of Texas at El Paso
Principal Investigator	PI: Vivek Tandon Co-PI: Vinod Kumar Co-PI:
PI Contact Information	[Vivek Tandon, vivek@utep.edu]
Funding Source(s) and Amounts Provided (by each agency or organization)	\$90,000 for 2 years– SPTC \$90,000 – SPO funds from research project TXDOT 0-6876
Total Project Cost	\$180,000
Agency ID or Contract Number	DTRT13-G-UTC36 OU Subaward #SPTC 14.1-96
Start and End Dates	11/1/2015 – 10/31/2017
Brief Description of Research Project	<p>PROBLEM: The consequences of climate change have the ability to create significant damage to the state’s existing transportation infrastructure on a scale that will grow over time. The potential consequences include: damage to highway pavements due to increased temperatures and more severe and frequent droughts; the inundation of roadways, bridges, and ferry infrastructure in low lying coastal areas, due to sea level rise; stronger storm surges along the coast and the subsequent damage to bridges and roadways; and the buckling of railroad tracks due to higher temperatures. Over the coming decades, state highway agencies risks the possibility of spending tens of billions of dollars of state funds to maintain or replace damaged infrastructure, due to climate change.</p> <p>Although influence of climate change on highway infrastructure needs to be evaluated, the complexity and interdependency of various factors makes aggregation of factors to predict impact of climate challenging. However, it is quite possible to predict the impact of individual factor such as precipitation. Changes in mean precipitation levels seem to have less impact on transportation than sea level rise. However, increase in the intensity and frequency of precipitation can impact roads such as slope instability, reduced bearing capacity due to saturation, etc. Similarly, the runoff resulting from increased precipitation could also lead to increased peak stream flow, which then would impact the sizing requirement for bridges and gutters.</p>

	<p>PROPOSED SOLUTION: To mitigate the impact of flooding, engineers are expected to modify highway hydraulic designs. However, incorporating the results of climate models will have very large cost implications for future infrastructure.</p> <p>Overestimating the magnitude of peak flows suggested by climate models can result in costly over sizing of drainage infrastructure, while underestimating may leave infrastructure vulnerable and their resultant flooding impacts on surrounding lands and structures inadequately addressed. Therefore, objectives of this study is to identify current resiliency of highway drainage infrastructure and to identify cost-effective adoption solution that extend service life despite not having been designed for climate change.</p>
<p>Describe Implementation of Research Outcomes (or why not implemented)</p> <p>Place Any Photos Here</p>	
<p>Impacts/Benefits of Implementation (actual, not anticipated)</p>	
<p>Web Links</p> <ul style="list-style-type: none"> • Reports • Project website 	<p>Will be provided under http://ctis.utep.edu/research/</p>