

Request for Research Funding for FY 2021-2022

Requesting Office	District 1 Construction	Priority	4 of 10 (projects may not have the same ranking – no ties)
Proposed Title	State of the Practice Synthesis on Wet-nighttime Visibility of Concrete Pavement Markings		
Justification	<p>Pavement marking systems have traditionally provided adequate delineation under dry nighttime conditions but often fail under wet-nighttime conditions. Many pavement marking systems have been developed to provide improved delineation during wet-night conditions but information on their performance and efficacy is lacking. This synthesis will document the state of the practice which will provide Department engineers effective and durable concrete pavement marking options during wet-nighttime driving conditions. This research will also assess the implication of these improved marking systems on Advanced Driver Assistance Systems and automated vehicles to ensure FDOT is adequately prepared for future needs. Research focus areas include but are not limited to material selection, performance evaluation, retro-reflectivity testing/measurement, durability, installation and life cycle cost, restriping, and removal. Information will be gathered through literature review, survey of DOT's, and interviews with selected agencies. This synthesis will be critical in the Departments development of effective guidelines and recommendations for effective wet-nighttime contrast pavement markings.</p>		
Impact	<p>This synthesis will identify potential improvements in pavement marking material/system selection, installation, performance testing and evaluation, and specifications. If the research work is not conducted, Florida drivers will continue to face the challenges presented by poor pavement marking visibility during nighttime and rainy driving conditions. These conditions are even more challenging for the growing Florida elderly population.</p>		
Affected Offices	Design, Construction, Maintenance, Safety, Specifications, Materials		
Existing Work	<p>RIP</p> <ul style="list-style-type: none"> • Crash Modification Factors (CMFs) for Contrast Pavement Markings on Light-Colored Pavement • Synthesis of Information Related to Highway Practices. Topic 51-03. Temporary Pavement Markings Placement and Removal Practices in Work Zones • Wet Reflective Pavement Markings Evaluation • Maintenance and Restriping Strategies for Pavement Markings in Louisiana <p>TRID</p> <ul style="list-style-type: none"> • Optimization of Pavement Marking Performance • Centerline Contrast Striping and the Addition of High Visibility Striping Material for Added Conspicuity in Nighttime and Wet Driving Conditions • Solar Delineator Trial Project • A Pavement Marking Selection Guide for the Illinois Department of Transportation • Evaluating Pavement Markings on Portland Cement Concrete (PCC) and Various Asphalt Surfaces: Results of Year 1, 2, 3, and 4 Data Collection • Evaluation of Pavement Markings <p>TRB</p> <ul style="list-style-type: none"> • NCHRP Synthesis 306, Long-Term Pavement Marking Practices: A synthesis of Highway Practices • Centerline Contrast Striping and the Addition of High-Visibility Striping Material for Added Conspicuity in Nighttime and Wet Driving Conditions • Towards A Wet-Night Visibility Requirement for Roadmarkings 		

	<ul style="list-style-type: none"> Nighttime Visibility and Retro-reflectance of Pavement Markings in Dry, Wet, and Rainy Conditions Service Life of Durable Pavement Markings <p>OTHER</p> <ul style="list-style-type: none"> Florida Wet Weather Demonstration Project – BD191 (TTI, 2009) High Performance Traffic Markings In Wet Weather – BD544-35 (USF, 2007) Evaluation of Wet-Weather and Contrast Pavement Marking Applications – FHWA/TX-06/0-5008-1(TTI, 2005) The Wet Night Visibility of Pavement Markings. Publication VTRC 04-CR (VTRC, 2004) 		
Keywords Used in Existing Work Search (Cannot leave blank)	Pavement markings; Retro-reflectivity; retroreflectometer; contrast marking; paint; thermoplastic; reflective pavement marking; glass beads; guidelines; durability; luminance; illuminance; wet-reflective pavement marking; rumble strips; visibility; failure; installation; service life; contrast marking; Advanced Driver Assistance Systems; automated vehicles.		
Related Contracts (Give contract numbers)			
Funding Request	Estimated cost \$60 K	Anticipated Duration 12 months	Estimated length of time to complete work 12 to 18 months
Project Manager	Proposed technical manager to oversee research Abdenour Nazef	Contracting Method	Anticipated procurement method (e.g., supplement to existing project, RFP to all registered vendors, direct contract with university) RFP
Urgency	Score 1-5 1= highest most immediate need 2	The mission of the Department is to provide a safe transportation system. Providing roadway delineation with adequate visible pavement markings is a critical component to ensure the safety of the traveling public. Nighttime driving during rainy events and reduced visibility present very challenging conditions and potential safety hazards to drivers. It is critical and imperative to seek the implementation of pavement marking systems, methods and procedures which could potentially provide effective and durable delineation of concrete pavements during wet-nighttime driving conditions	
Implementability	Score 1-5 1=greatest likelihood of and proximity to implementing results 2	Establishing an experimental evaluation with a period of performance monitoring under actual or controlled traffic and environmental conditions may be required to validate improved marking systems identified in this synthesis.	
Project Benefits (Succinct, complete explanation)			

The result from this project may help identify effective and proven systems, including technologies, materials, practices, standards, and procedures that can potentially improve Florida's concrete pavements markings and thus improve the safety of the traveling public

<p>Project Benefits (Select all that apply and explain)</p>	<p>Quantifiable Benefits (units, dollars, etc....if applicable)</p> <p>Wet and dry distance (ft)</p> <p>\$/mile/Yr*</p> <p>(*Years of service)</p>	<p>Methodology or Data Sources Used to Determine Quantifiable Benefits. If not applicable, please give justification of project benefits</p> <p>Longer Wet and Dry Detection Distance</p> <p>Lower Cost</p>
<p><input type="radio"/> Materials Enhancement</p>	<p>% preserved reflectivity over time</p>	<p>Enhanced durability</p>
<p><input type="radio"/> Materials Savings</p>	<p>B/C</p>	<p>Better life cycle cost</p>
<p><input type="radio"/> Time Savings</p>	<p>Months/years</p>	<p>Longer restriping cycle</p>
<p><input type="radio"/> Lives Saved/Injuries Prevented</p>	<p>Accidents/mile</p>	<p>Potential crash reduction</p>
<p><input type="radio"/> Other (Explain)</p>	<p>(mcd/lx/m²)/\$</p>	<p>Higher visibility per dollar spent</p>

*Comments should explain and support urgency, financial benefit, and implementability scores