

Request for Research Funding for FY 2023-2024

SPR Subpart B Project: (Research Center use only): SMO-24-11

Requesting Office	SMO	Priority	11 of 12
Proposed Title	Slip and Creep of High-Performance Bridge Coatings		
Justification	<p>[Short] To validate the slip critical performance of the Department’s High-Performance Bridge Coating System and examine the performance of novel coating systems under consideration for FDOT approval.</p> <p>[Long] FDOT follows the AASHTO standard for analyzing the performance of slip-critical bolted connections with painted steel surfaces. The test is called the Slip coefficient test. In 2014, FHWA performed an initial studying of high performance bridge coatings systems to ensure they met the AASHTO slip coefficient requirement for slip-critical bolted connections.</p> <p>Additionally, FDOT continues to lead the country in advancements in coatings technology, and internal testing has identified a new coating that may be eligible for slip-critical connections. The product is a coating applied by thermal spray wire metalizing and is not specific to a coatings manufacturer, so no slip critical test data exists. FHWA performed the first round of testing in 2014 but did not include this specific type of metalizing. Advancements in aluminum metalizing came after 2014 and require test validation that they also meet the design criteria. The AASHTO LRFD Bridge Construction Specification discusses some allowances for lower grades of surface preparation for slip critical connections, but the reference material for that decision remains to be discovered. To be thorough, the Department should perform its due diligence in verifying that the slip-critical connections required by FDOT Specification meet the AASHTO requirement. This would apply to all painted steel bridge connections.</p> <p>Research is needed to determine the slip coefficient of the approved FDOT high-performance bridge coating systems being applied per the FDOT Specifications. The same research is needed to identify the slip coefficient of an all-aluminum metalizing system that FHWA did not previously test. The slip coefficient will be compared to the AASHTO requirement for slip-critical connection compliance.</p>		
Impact	<p>Validating the long-term performance of coated steel bolted connections is a necessary endeavor. The research has two goals [1] to identify if the lower surface preparation standard allowed by AASHTO LRFD and specified by the FDOT Specification does actually meet the intended slip critical connection requirement; [2] to verify if the performance of aluminum metalizing can meet the intended slip critical connection requirement. If they both pass, the Department will have sound research to validate the decision to continue allowing lowered surface preparation. If the current FDOT standard fails to pass, the Department will need to update Specification 460 to require a higher level of surface preparation (SSPC SP-5). If the aluminum metalizing fails to pass, the Department will publish its metalizing Specification with an inorganic zinc-rich primer that has known performance when cleaned to SP-5.</p>		
Affected Offices	Construction; Design; Maintenance; Materials		
Existing Work	FHWA-HRT-14-083 Slip and Creep of Thermal Coatings		
Keywords Used In Existing Work Search (Cannot leave blank)	Coating; Slip Critical, Faying Surfaces, Metalizing, Metallizing, Class B, Steel Connections,		
Related Contracts (Give contract numbers)	NA		
Funding Request	\$100,000	Anticipated Duration	12 months
Project Manager	Tim McCullough	Contracting Method	RFP to all registered vendors
Equipment	NA	NA	

Urgency	2	This project may provide FDOT with an immediate need to update its 460 Specification, which would impact all future bridges.
Implementability	2	If the FHWA research results are validated on coatings prepared to SP-10, FDOT will not need to make a change to 460. If it fails, FDOT will need to make an immediate change to 460. If the research confirms aluminum metalizing is satisfactory, SMO will update the DEV specification for metalizing and move to publish in the Standard Specification book.
Project Benefits		
This project will verify the faying surface used in steel bolted connections and specified by the Department are meeting their designed performance criteria and intended durability.		
Project Benefits (Select all that apply and explain)	Quantifiable Benefits (units, dollars, etc...if applicable)	Methodology or Data Sources Used to Determine Quantifiable Benefits. If not applicable, please give justification of project benefits
<input type="radio"/> Materials Enhancement	NA	
<input type="radio"/> Materials Savings	NA	If the surface preparation of the steel connections is validated, there should be a no cost impact to the Department. If the surface preparation needs to be increased to achieve the Departments expectations, future maintenance issues will be averted on this topic.
<input type="radio"/> Time Savings	NA	
<input type="radio"/> Lives Saved/Injuries Prevented	NA	Ensuring the steel bridge bolted connections meet their intended design and durability expectation should be a safety consideration for its residents, visitors, and businesses. The goal is to provide a safer transportation system.
<input type="radio"/> Other (Explain)	NA	

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