

Request for Research Funding for FY 2024-2025			
Project Number (Research Center Use Only): SMO-25-03			
Requesting Office	State Materials Office	Priority	3 of 15
Proposed Title	Pavement Deflection Considerations for Improved Rehabilitation Strategies		
Justification	<p>The Department has been utilizing the Falling Weight Deflectometer (FWD) to determine the resilient modulus for pavement rehabilitation strategies for more than 20 years. Variation in embankment properties along the length of the roadway are accounted for during testing but best practices call for consideration of seasonal impacts due to variations of moisture throughout the design period. However, this is not practical due to the extensive laboratory testing that would be required. During the 20-year period of FWD testing, the resilient modulus has been measured multiple times during different seasons on many state roadways. Current practice uses the most current FWD tests for design purposes while past FWD data is not considered. This research would utilize the wealth of historical FWD data along with other factors such as geology and historical rainfall to determine if seasonal variation in the embankment resilient modulus can be appropriately characterized and incorporated into a more effective pavement design. The historical FWD data will also be reviewed to determine the appropriate frequency of testing, practical test lengths, and other testing protocols. Finally, deflection parameters commonly used to characterize pavement quality will be reviewed to determine those most beneficial for adoption in Florida design, forensic, and research practices. These parameters and their respective thresholds will be evaluated and revised if needed to be more reliably applicable to typical Florida pavements.</p> <p>The FWD is a critical tool that many transportation agencies use to determine pavement structural capacity. This research directly advances pavement resiliency by furthering the understanding of the impact of seasonal variations to pavement performance.</p>		
Impact	This research will provide more effective pavement rehabilitation designs that reliably consider seasonal variations of the embankment resilient modulus. A review of historical FWD data will also determine appropriate testing frequencies and other testing protocols which could be used to optimize the State Materials Office (SMO) response to District needs. If the research is not completed, the FWD testing protocols will remain unchanged which may result in pavement designs that do not accurately account for seasonal impacts.		
Affected Offices/ Districts	State Materials Office Pavement Design District Materials and Design Offices		
Existing Work	Extensive research has been conducted utilizing the FWD in pavement design practices and to monitor the impact of moisture on pavement response. Specific research relating historical FWD data to seasonal variation and how that variation impacts pavement design is limited, particularly related to specific Florida soil types. It is anticipated that existing research and historical Department data will be leveraged to optimize these practices for typical Florida pavements, soils, and pavement design practices.		
Keywords Used In Existing Work Search (Cannot leave blank)	Falling weight deflectometer Soil moisture Pavement design		
Related Contracts (Give contract numbers)	NA		
Funding Request	\$175,000	Anticipated Duration	18 months
Project Manager	Guangming Wang	Contracting Method	RFP to all registered vendors
Equipment	NA	Historical FWD data is available from the Department	
Urgency	3	This research will directly advance resilient pavement design practices.	

Implementability	1	If successful, this research will likely be straightforward to implement. It is anticipated that existing equipment will be utilized but new or improved analysis methods used in determining the embankment resilient modulus and other deflection-based parameters may be developed.
Project Benefits (Succinct, complete explanation) The primary benefit of this project is more resilient pavement designs due to improved characterizations of the embankment resilient modulus that consider seasonal variations. Further benefits include optimized testing resources through a better understanding of the changes in embankment support.		
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
○ Materials Enhancement	NA	NA
○ Financial Impact	\$ To be determined during research	Improved pavement design procedures will extend pavement life. Expected pavement life increase could be estimated during the research based on research findings.
○ Time Savings	To be determined during research	The research will provide testing frequency intervals required for soil types within Florida. It is anticipated that some regions will not need to be tested as regularly as others or that nearby tests could be extended to other areas. These findings can be used to optimize the testing resources at the SMO.
○ Lives Saved/Injuries Prevented	NA	NA
○ Other (Explain)	NA	NA

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