Request for Research Funding for FY 2022-2023			
SPR Subpart B Project: OOM-23-01			
Requesting Office	Office of Maintenance	**Priority**	1 of 2
Proposed Title	Enhancement of AASHTOWare Bridge Management for Florida's Bridge Inspection and Asset Management		
Justification	To satisfy bridge owner needs and MAP-21 requirements, AASHTO in 2013 approved a new bridge element inspection manual, which was updated in 2015 as the AASHTO Manual for Bridge Element Inspection. The Department started in 2014 to implement the AASHTOWare Bridge Management System or BrM to support network-level and project-level decision making in the headquarters and district offices. BrM has helped the Department's effort to improve the quality of asset management information provided to decision makers. The credibility and usefulness of this information is also essential for satisfaction of the requirements of the Government Accounting Standards Board Statement 34 (GASB 34) regarding the reporting of capital assets, and the Federal MAP-21 requirements for performance management and development of asset management plans. The risk-based Transportation Asset Management Plan (TAMP), also a federal requirement, outlines the processes that the Department uses to improve or preserve the condition and performance of the National Highway System (NHS) pavement and bridge assets. The plan includes asset inventory, consideration of financial planning and investment strategies, as well as life cycle cost and risk management analyses. BrM provides the primary input for the highway bridge data necessary to develop the TAMP. In research conducted for the Department between 2014 and 2016, some initial models and methodologies were developed to aid its implementation of BrM. Since this research, two cycles of bridge element inspection data have been collected, in accordance with the new BrM requirements and using the revised FDOT Field Guide. The Department now wishes to engage the assistance of experts in bridge management to help it further with the implementation and enhancement of the AASHTOWare Bridge Management software (BrM). It is now necessary to re-calibrate the core BrM models and tools, including the element deterioration models, risk models, cost models, life cycle planning, and the translator model, to be consistent with the data gathered since 2015 under the new AASHTO Manual. This will ensure accurate condition and cost forecasts, and performance targets, for Transportation Asset Management Plans and capital budgets in the decade ahead.		
Impact	This proposed research will enable the Department to satisfy its Departmental and federal requirements on multiple fronts. Based on the requirements of MAP-21, FHWA has mandated a national adoption of a portion of the AASHTO Manual for Bridge Element Inspection, known as the National Bridge Elements. The enhanced BrM will aid in reporting and making decisions based on the bridge element inspection data. Development of the Department's capital budget, Statewide Transportation Improvement Plan, and the Transportation Asset Management Plan (TAMP) will be greatly enhanced using an improved BrM, with its updated models, for more accurate forecasting of future costs and conditions. The Department will also be able to perform its bridge management activities, both at the state and district levels, including the application of an improved BrM for life cycle planning and analyses, including those of its big bridges.		
Affected Offices	Office of Maintenance, District Maintenance Offices		
Existing Work	Given the current federal requirements justifying this research, and that the bridges in Florida are unique based on their environment and risk exposure, no existing research is available that had addressed the needs narrated above. A search on the Transportation Research International Documentation (TRID) (https://trid.trb.org/Results) and the Research in Progress (RIP) (https://rip.trb.org/) online databases, for pertinent research, identified no existing work that duplicates the proposed research need, but four studies that are somewhat related. These studies do not have the same research objectives as the proposed research for the Department but may offer applicable ideas and methodologies. The studies are listed below. 1. Synthesis of Information Related to Highway Practices. Topic 52-02. Using Bridge Element Data in Asset Management Decision Making. Sponsor: National Cooperative Highway Research Program (NCHRP), Transportation Research Board Record URL: http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4978 2. Developing Deterioration Curves for Bridge Elements. Sponsor: Illinois Department of Transportation.		

	3. Bridge Element Deterioration for Midwest States. Development of bridge element deterioration models for 12 states in the upper Midwest. This pooled-fund study focuses on bridge decks and therefore addresses only a small fraction of elements needed in Florida, under very different climate and operating conditions. However, the methodology is relevant, and could be partially adapted for the proposed work. Study is underway, expected completion in late-2022. Sponsored by FHWA and led by Wisconsin DOT. https://www.pooledfund.org/Details/Study/655 The NCHRP synthesis study is a small-scale summary, which is very general, and the Illinois study focuses on Illinois bridges which are different from Florida bridges, but the study may be useful as a literature review, depending on the findings.		
Keywords Used In Existing Work Search **(Cannot leave blank)**	BrM Research.		
Related Contracts (Give contract numbers)	None.		
Funding Request	$250,000	**Anticipated Duration**	24 months.
Project Manager	Felix Padilla, P.E. Office of Maintenance felix.padilla@dot.state.fl.us	**Contracting Method**	Direct contract with University: John O. Sobanjo (PI) Florida State University jsobanjo@fsu.edu
Equipment	NA	All of the work will be analytical, so it will be done through software we already licensed as well as using spreadsheets.	
Urgency	1	Overall bridge inspection and management are extremely important in Florida for timely maintenance and safety of bridges on the state roadway network. The proposed research will enhance the ongoing effort by Florida and also meet the nationwide requests by the FHWA on bridge management.	
Implementability	1	The Office of Maintenance has already developed procedures and documentation for bridge inspectors, to enable a successful transition to the BrM implementation. The Office of Information Services has also performed the various tasks necessary to install, test, and implement AASHTO's BrM software. No other implementation requirements are anticipated. The proposed efforts are being implemented by researchers already very experienced with existing models and there is also data already available at the FDOT.	

Project Benefits (Succinct, complete explanation)

Efficient element inspections and timely actions on the roadway bridges will save considerable money down the line on expensive repairs and replacement projects. More importantly, excessive user costs are eliminated that could accrue from accidents, delays and other inconveniences on the bridges.

Specifically, the proposed research will aid the Department in satisfying various federal requirements: implementation of the AASHTO bridge element inspection; establishment of the risk-based Transportation Asset Management Plan (TAMP); and preparation for the forthcoming changes on the national level, in terms of the Specifications for the National Bridge Inventory (SNBI), and the National Bridge Inspection Standards (NBIS).

The proposed work encompasses a set of necessary tasks that each state DOT needs to accomplish to calibrate the BrM planning models to each state's unique climate, operating conditions, maintenance capabilities, and cost structure. This ensures accurate forecasting of conditions and costs, and consistent prioritization of safety and mobility needs within the bridge program.

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**
o Materials Enhancement		
o Materials Savings		
o Time Savings	Improved accuracy and reduction in times required of bridge engineers to perform analyses related to bridge management.	The BrM is a tool for bridge engineers and managers to develop and apply bridge element deterioration curves, optimization models, etc., for more accurate decision making.
o Lives Saved/Injuries Prevented	Reduction and elimination of user costs associated with accidents on bridges.	The BrM aids in the efficient inspection of bridge elements and making timely decisions on bridges, to reduce accident risk on bridges.
o Other (Explain)		

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