Florida Department of Transportation Research

Enhancement of AASHTOWare Bridge Management for Florida's Bridge Inspection and Asset Management

March 2026

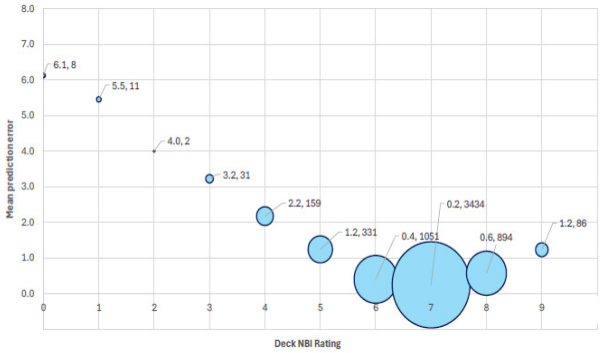
Project Number
BED30-977-10

Project Manager
Felix Padilla, P.E
Structures Design Office

Principal Investigator
John O. Sobanjo
Florida State University

Background

The Florida Department of Transportation (FDOT) is in a strong position to modernize how it manages its bridge assets by updating its AASHTOWare Bridge Management (BrM) software, a comprehensive system designed to help agencies track inspections, forecast needs, optimize maintenance, and support federal reporting more effectively. BrM brings powerful capabilities for life-cycle cost analysis, deterioration forecasting, risk-based prioritization, and visualization that can help FDOT stretch its budget further and extend the life of Florida's bridges while improving safety and reliability.



In this image showing the mean prediction errors at each Deck National Bridge Inventory (NBI) rating, it can be observed that the best accuracy for bridge deck NBI condition ratings was at the rating of 7.

However, to fully realize these benefits and ensure the software reflects the real performance and conditions of Florida's bridges, the core analytical models and tools need to be recalibrated using the latest inspection data, so the system can provide truly tailored, data-driven insights that support confident decision-making.

Research Objectives

The primary objective of the research was to help FDOT successfully implement and optimize the AASHTOWare BrM software by recalibrating its essential analytical models—such as deterioration, risk, cost, and data translation tools—so the software can more accurately forecast bridge performance, support decision-making, and satisfy federal requirements.

Project Activities

To achieve this, the Florida State University research team first updated the deterioration models that BrM uses to forecast how bridge elements degrade over time, using statistical analysis of element inspection data, expert judgement, and condition transition probabilities. A subtask refined the environmental classification scheme for elements, though limitations in available data meant only recommendations were developed. The study then enhanced risk models by incorporating Florida-specific hazards (e.g., hurricanes, flood, scour, overheight collisions) to estimate likelihoods of occurrence, expected costs, risk utilities, and priorities for mitigation.

Next, the research developed an improved NBI Translator tool to convert FDOT's detailed element inspection data into the Federal Highway Administration's National Bridge Inventory format using multiple modeling approaches including regression and machine learning.

Lastly, the project developed new cost-estimating models for bridge maintenance, repair, and rehabilitation, using historical maintenance database records and construction bid data, and presented a method for estimating costs based on typical crew and material productivity.

Project Conclusions and Benefits

The research provided FDOT with updated deterioration forecasting parameters, transition probabilities, and tools to populate BrM with more accurate performance models, increasing confidence in future condition predictions and budget planning. The risk modeling task identified key hazards affecting Florida bridges and produced utility values that help prioritize which structures may need mitigation activities most urgently. The newly developed NBI Translator improved data translation from FDOT's element-level data to national reporting standards, enhancing consistency and accuracy in federal reporting.

The new cost-estimating methodologies enable more reliable planning of maintenance and rehabilitation budgets using available state data. Together, these outcomes support FDOT's effective adoption and use of BrM to manage bridge assets more accurately, cost-effectively, and in compliance with federal requirements.

For more information, please see fdot.gov/research.