

Florida Department of Transportation Research

Enhancement of the FDOT's Project Level and Network Level Bridge Management Analysis Tool

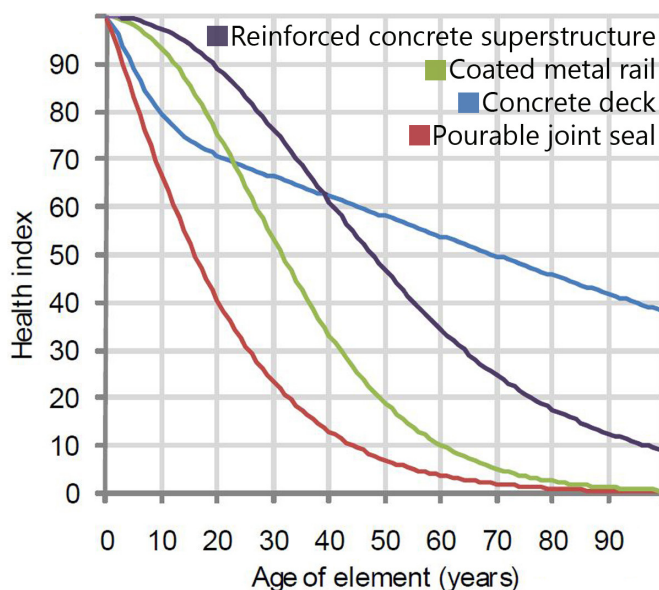
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FDOT is responsible for maintaining over 6500 bridges of all kinds throughout Florida. Bridges are inspected biennially and the degree of wear and potential need for repair are cataloged in a system specifying hundreds of possible actions, including postponing repairs. Planning decisions must seek to maintain bridges in optimal condition while avoiding both the costs of too frequent repairs and replacement costs due to neglect. The complexity of this planning for Florida's extensive network of bridges is managed with the help of the Pontis Bridge Management System, developed by the American Association of State Highway and Transportation Officials (AASHTO).

Over several years, the Florida Department of Transportation (FDOT) has been implementing Pontis to support network-level and project-level decision making in the headquarters and district offices. Pontis is an integral part of a Department-wide effort to improve the quality of asset management information provided to decision makers. With the success of these previous research efforts, FDOT further investigated several additional modeling issues that were not possible during earlier Pontis implementation work.

Researchers performed a sensitivity analysis on the Project Level Analysis Tool (PLAT) and Network Analysis Tool (NAT). These models were compared with the National Cooperative Highway Research Program (NCHRP) Report 590, which explored the criteria used for priority setting and resource allocation. The analysis suggested priority enhancements to PLAT/NAT, including improved deterioration and cost models and multi-objective optimization.

An improved version of the National Bridge Inventory (NBI) Translator was developed and implemented using two years of bridge inspection data from the Florida bridge inventory. A standalone computer program



Among several tasks accomplished in this study, researchers developed improved deterioration models, illustrated in this graph.

was developed, as well as a Microsoft Excel spreadsheet version of the Translator program written in Visual Basic for Applications (VBA), which was incorporated into the PLAT.

Researchers improved deterioration, action effectiveness, and cost models for Pontis and the PLAT. A new, simplified procedure was developed for estimating one-step Markovian models that produces usable results with significantly smaller sample sizes than traditional regression.

Models were developed for estimating user costs at bridge sites where no detour is considered. Several existing user cost models were reviewed in the study, including some traditional roadway-based models and the previous FDOT user cost model for bridges. New accident models were formulated based on Florida crash data at bridge sites for years 2003 through 2007, including binomial logistic regression, Poisson regression, and negative binomial regression models.