

Arkansas DOT Bridge Management System

Client
Arkansas DOT (AHTD)

Start Date
September, 2015

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Project Type
Bridge Management

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The Arkansas State Highway and Transportation Department (AHTD) procured the services of Deighton Associates Limited to implement a bridge management system capable of producing preservation, rehabilitation and replacement recommendations on the state’s network of bridges.

This project allowed for the implementation of the Bridge Management System (BMS) within dTIMS so that the pavement management system (PMS) and the BMS would reside in the same system to enable AHTD to move towards a more holistic approach to managing these important assets.

AHTD uses InspectTech software for managing bridge inventory and condition data, and wanted to integrate the data and models into a strategic level tool to assist in resource allocation decisions to achieve strategic targets such as funding levels and/or service levels.

The AHTD BMS was configured to analyze the network of bridges to recommend alternative preservation, rehabilitation, and replacement strategies based upon the following condition performance measures:

- Culvert Rating
- Deck Rating
- Substructure Rating
- Superstructure Rating
- Paint Element Condition
- Joint Element Conditions
- Bridge Condition Index

The following tasks were completed by Deighton as part of this project:

- Created Bridge Data View
- Created dTIMS Database
- Imported Bridge Data
- Conducted Analysis Parameter Workshop
- Developed Performance Models
- Established Treatment Types
- Established Treatment Triggers
- Added Economic Parameters
- Generated Strategies & Optimized Network
- Reviewed Recommended Program
- Training and documentation

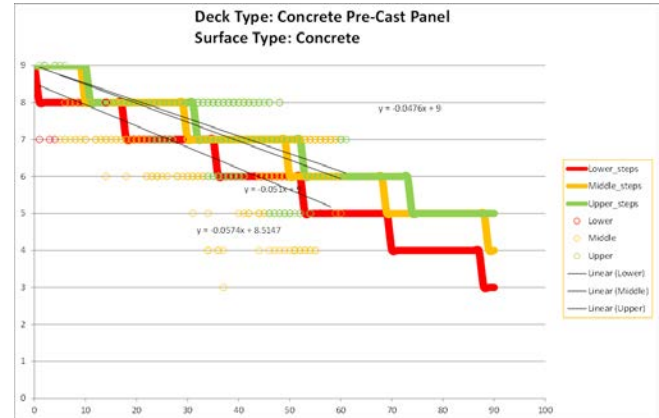


Figure 1: Example Deck Family 3 performance curve (Concrete Rep-cast with concrete surface).

Condition State	Median Years	Annual Deterioration	Transition Probabilities			
			1	2	3	4
Condition State 1	8	8.30	91.70	8.30		
Condition State 2	7	9.43		90.57	9.43	
Condition State 3	5	12.94			87.06	12.94
Condition State 4	n/a					100.00

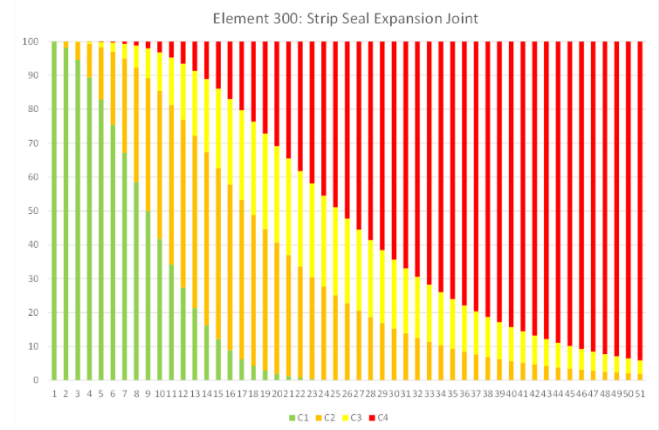


Figure 2: To predict the condition states into the future, Markov Transition Probability Matrices were used.

Trigger:	Deck Condition is ≥ 8 and Superstructure ≥ 7 and Substructure ≥ 7 and Deck surface is concrete.
Cost:	\$x.xx per square foot
Resets:	Deck Age reset – 10 years

Figure 3: The Deck Seal treatment shown above is used to apply a seal on a bare concrete deck when the condition of the deck and the condition of the structure is in excellent condition.