Bridge Management at New York State DOT

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AASHTO BRIDGEWare Task Force
NYS Highway Bridge Ownership

Numbers of Bridges

(17,406 Total)

Local (8587)  Other (1187)  State (7632)

Deck Area
(x 1,000 s.f.)
(136,420,000 Total)

Local (30,843)  Other (27,055)  State (78,622)
NYSDOT Bridge Management Organization

Centralized:
- Network Analysis, Goals
- Program Review / Oversight
- Funding Allocation
- Engineering Services

Decentralized:
- Ownership
- Maintenance
- Operations
- Program Development
- Regional Structures Management Teams
Bridge Management Goals

➤ Safety:
  • Eliminate poor conditions of critical components
  • Address failure vulnerabilities

➤ Preservation:
  • Reduce the overall number of deficient bridges
  • Maintain Interstate bridges in good condition
  • Maintain NHS bridges in at least fair condition

➤ Serviceability:
  • Reduce load restrictions
  • Eliminate highway bridge clearance restrictions
Performance Measures

NYS Condition Rating (CR)

- Single rating value for each bridge
- Weighted average of element inspection ratings
  - Uses up to 13 different element ratings
  - When multiple rated elements exist, the calculation utilizes lowest rated element
- If CR < 5.00, the bridge is considered “Deficient” according to NYSDOT
- CR is NYSDOT’s most widely used bridge condition performance indicator
What Do We Use?

Deterioration Modeling

Bridge Program Worksheet

BNAM-2008

Needs Tool
NYS BMS Tools - Commonalities

- Use NYS Inspection Ratings and Inventory Data
- Aggregate Data into Component, Span and Bridge Condition Indices
- Use NYS BMS Logic
- Use NYS Deterioration Models
- Provide “Network Level” analysis of bridge preservation and serviceability needs
NYS BMS Tools - Limitations

- Economic Optimization
- Need to “knit” together existing stand-alone tools
- Applications are more cumbersome to maintain and enhance as more functionalities are added
- Significant IT resources required to maintain and update applications
BRIDGEM Ware Product Suite And Bridge Life Cycle

- Bridge Alternatives
- Bridge Preservation & Management
- Bridge Design
- Bridge Load Rating
- Bridge Inspection

- Products Share a Common Database
- Products May Be Licensed Together or Separately
So Why Pontis?

- AASHTO BridgeWare nationally and internationally recognized “off shelf” BMS software

- A Software Tool For:
  - Recording Bridge Inventory and Inspection Data
  - Simulating Bridge Conditions
  - Generating Work Candidates
  - Developing an Optimal Preservation Plan
  - Developing a Bridge Program
NYSDOT’s Assessment of Pontis

Pontis benefits:

- Economic Optimization
  - Replacement vs. Major Rehab
- Enhance network analysis capabilities
- Enhance preservation program development capabilities
- Enhance element specific modeling capabilities
- Develop NBI and SR based forecasts
- System Support – Service Units
NYSDOT’s Assessment of Pontis

Pontis limitations:

➢ Pontis’ Least Long Term Cost optimization model is at times inconsistent with NYSDOT Condition focused BMS logic

➢ Lacks effective methodology to incorporate risk based criteria into models such as:
  • Scour and Seismic Vulnerabilities
NYSDOT’s Assessment of Pontis

Pontis ongoing activities:
- Continue to refine Preservation Models
- Continue to refine Cost Models
- Continue to refine model customization rules
- Continue to learn how input and parameters impact models and results
- Assess Pontis Post Processor and Optimizer used by VA, OK, HI
A Pontis Road Map to the Future

Where are we now?

- Pontis 4.x
  - Developed in 1995 (Version 3.0)
  - Last Development 2005 (Version 4.4)
  - Last Release 2009 (Version 4.5 – Maintenance and Bug Fixes)

- Pontis 5.1 Inspection Data Collection Module
  - September 2009 Release
A Pontis Road Map to the Future

Where Are We Going?

Pontis 5.2 Enhancements:

- Incorporate enhanced CoRe element definitions adopted by AASHTO in May 2010
- Incorporate multi-objective optimization (NCHRP-590)
- Prioritization occurs at need, project and network levels
- Reflect typical DOT project-centric business process and work flow
A Pontis Road Map to the Future

Where Are We Going?

- Pontis 5.2 Enhancements:
  - Trade-off and Balance
    - Life Cycle Cost
    - Condition
    - Risk and Vulnerability
  - Incorporate risk assessments including:
    - Likelihood and consequences of adverse risk events
    - Benefits of Risk Mitigation actions
A Pontis Road Map to the Future

Where Are We Going?

Pontis 5.2 Enhancements:

- Incorporate “Utility Function” – a unit less measure that allows combination of dissimilar benefits for:
  - Condition, Load Capacity, Vulnerability/Risk, Functional Needs, etc..

- Rich Graphical Interface allowing:
  - More interactivity with user
  - Better communication of model results and recommendations
BMS Next Steps

- Improve element cost estimating
  - Automate with link to TRANSPORT
- Modify element data collection
  - Facilitate conversion to PONTIS
  - Improved decision support for maintenance, repair, and programming
- Optimization

Questions?