AASHTOWare
Bridge Management
Contest and Prizes

• Contest and prizes at the end!
Pontis Basics

- Development started in the early 1990s under FHWA guidance
- Result of many millions invested by states and FHWA
- Part of AASHTOWARE – BRIDGEWare software
- Licensed by more than 40 states
- Supports AASHTO element level inspection and management
Overview of Pontis 5.2

- AASHTOWare Product being developed under contract by Bentley
- Next generation of Bridge Management
- New Web interface/architecture
- National Bridge Elements
- Licensed by over 40 state DOTs
  - Also utilized by local and international agencies
Pontis — AASHTOWare Bridge Management

• Pontis 5.2 is funded by a voluntary $5M pool from more than 20 state DOTs, under DOT guidance and expertise

• Tools that are easier to use and understand:
  – Planning
  – Deterioration
  – Risk
  – Multi-objective analysis
  – Lifecycle costs
  – Project models
  – Dashboards
  – Corridor planning
Advantages of Pontis as a BMS

• Full support and maintenance provided by AASHTO
• Developed over the past 20 years through extensive research and user feedback
• Enhancements and features are fully coordinated with AASHTO guidelines (including element revisions)
• Incorporation of FHWA regulatory requirements
• Software created by DOTs for DOTs
  – Development administered and overseen by task force of state DOT representatives.
Basic Approach of BrM 5.2

• Utilize extensive research and lessons learned over past 20 years
  • Continue to evaluate best approach and layout
  • Give Task Force recommendations
  • Technical Review Team (TRT) Expert Panel of State Representatives

• Develop the trunk of 5.2 and outward functionality at each level

• Multiple-phased implementation
Full Support of MAP-21 Requirements

Bridge Management System that is:

• Risk Based
• Data Driven
• Supports Performance Measures
• Supports National Bridge and Tunnel Elements
Pontis 5.2 Phases

• Development on 5.2 moving forward rapidly

• Phased releases
  – Version 5.2.1 (Fall 2013)
    • Core program framework, risk assessments, integrated utility functions, network corridors
    • Support for new AASHTO element revisions
  – Version 5.2.2 (mid 2014)
    • Implementation of new deterioration models and multi-objective analysis
  – Version 5.2.3 (early 2015)
    • Integrated project and program planning
    • All administrative features
Pontis 5.2.1

- Actively being developed
- Three Main Parts
  - Bridge Groups - 5.2.1(a)  ✔ Done
  - Risk Assessments – 5.2.1(b)  ✔ Done
  - Utility Functions – 5.2.1(c)  In Progress

Incorporation of user requests:
- Addressing tickets and incorporating as we go
- New features – advanced filters/Excel output
Bridge Groups

- Easy to use, new Web interface
- Network Corridors or user-defined groups of bridges
- Ability to group bridges based on a variety of factors
  - Simple creation list of common fields
  - Advanced fields
- Ability to group bridges allows for easier management and planning
Incorporation of Risk Assessments
- Creation of new database data structures
- Interface for creation of new Risk Assessments
- Directly supports MAP-21
Risk Assessment Types

- Ability to have user-defined risk assessment types
- Support for agency-specified scales and formulas
- No limit to the number of assets created
Work Accomplishments/Requests

- Work Requests/Accomplishments
  - Allow for setting Agency priority, cost, assignment and whether work is programmed
- Interface for external work accomplishments
- Better able to integrate with maintenance management systems
Improved Decision Making Tools

Better Tradeoff Analysis

- Mobility
- Life cycle cost
- Condition
- Risk and vulnerability

Tradeoff and Balance

New functionality:
- Balance multiple objectives
- More control of results
- More transparency

Eventual added consideration:
- Risk
- Time-sensitive deterioration
- Indirect cost

Better fit for agency workflow and business processes
Implementing Utility Functions

• Create a multi-objective framework that can be used to show the value (utility) of an action for a bridge

• Utility will also be shown for each sub-area
  – Mobility
  – Lifecycle cost
  – Condition
  – Risk items

• Work candidates are evaluated for how they contribute to mobility, lifecycle cost, condition and risk weightings
Multi-Objective Analysis Framework

- The model will score each work candidate identified.
Utility Function Admin Page

- Easily able to graphically create and edit utility functions
- No “black box” mystery of how things work
Utility Rating View

- When rating calculated on an individual bridge the user can see exactly how it was calculated.
- Each component of the formula, its weight, and its score that it contributed are shown.
Phase II (5.2.2)

- New and easy to use Deterioration Models
- Complete Bridge Analysis Module
  - Bridge Analysis Dashboard
  - Work Candidate Dashboard
  - Replacement Bridge/Culvert page
- Completion of Multi-Objective Analysis
Bridge Analysis Dashboard

- All bridge information shown in one place
- Ability to see the effect of work candidates / actions on the condition of the bridge
- Shows current and future effects with deterioration model integration
**Improved Deterioration Models**

- Allow for evaluating future condition at the detail and summary level
- Implement new deterioration model logic
  - Weibull approach to include time factor
- Easy to construct/new elicitation process
- Utilize NBE elements
  - Protective systems
  - Defect flags
- Allow for multi-path deterioration
Phase III (5.2.3)

- Completion of full programming module
- Scenario Creation
- Results Browsing/Dashboards
- Additional administration features
Network Level Planning

- Ability to see full effects of all actions across the network
- See current status, target goals, and projected conditions for a variety of key performance metrics

This graph compares the performance of the inventory subsets. If any are underperforming, you can increase their share of the budget to bring them up. Target performance is set on the Tradeoff Analysis Dashboard.

This graph shows the maximum achievable utility at any given budget level, given the project list and utility weights developed elsewhere in the system. Since the program is optimized, it will always be at one point along this frontier, indicated by the triangle.
New Features…. (available now or 5.2.1)

- Advanced filters
- Excel outputs
- Improved interface
  - Less clicks
  - Latest web controls
- Performance/speed improvements
- Hosting/SaaS option
- Coordination with optional Bentley InspectTech modules
Planned Bentley Add-Ons And Services

• AASHTO / Bentley Agreement supports new add-ons in coordination with Task Force

• Able to purchase via new Hosting/Add-On Service Units in new AASHTO Catalog

• Examples of expanded capabilities:
  – Hosting/SaaS
  – Mobile applications
  – 3D interactive inspection models
  – Others as determined by AASHTO Task Force/Bentley
Hosting / SaaS Solutions

• Bentley able to provide reliable and secure hosting environment for Pontis solutions
• Bentley applies all patches and updates needed to Pontis
• Storage, processing and servers tuned for Pontis maximum performance
• Can result in significant cost savings to DOT and performance/satisfaction improvement
Mobile App Version for Pontis Field Usage

Advanced mobility for users of Pontis: InspectTech Collector Mobile

• Sleek, graphical interface
• Capture photos, video, and audio
• FHWA Calculations based on NBI and other codes
• Rapid pinpointing of assets using mapping/GPS
• Cloud service synchronization with SaaS solution
• Full synch with Pontis database
Complex Structure Add-On

• Solution designed to support large assets
• Turns thousands of pages into useful information
• Data can be viewed and linked on interactive 3D model accessible via the Web
• Information directly linked to individual elements
• Interactive dashboards and powerful visuals help to quickly identify problems and needs
3D Models (InspectTech 3D add-on)

- Web-based or field based
- Roll-up individual components on large bridge to element summaries
Conclusion

• Pontis 5.2 (AASHTOWare Bridge Management 5.2) is rapidly being developed

• BrM will be an easier to use and more powerful tool defining new standard of Bridge Management

• Version 5.1.3 with Migrator Support available now

• Pontis 5.2 will be released in three main phases

• Offered as SaaS solution that provides an anywhere, anytime secure one-stop location for all data

• New AASHTO / Bentley agreement provides greater coordination and new optional features for Pontis users