



NATIONAL BRIDGE ELEMENT IMPLEMENTATION

Western Bridge Preservation Partnership Meeting
May 9th, 2012

Jeremy Shaffer, Ph.D.

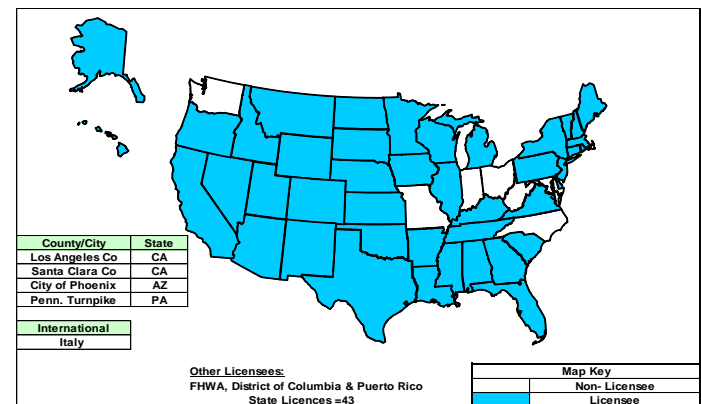
inspect^tech

What is Pontis?

- Powerful Bridge Management Analytical Software Tool
 - Organize the bridge inventory
 - Allow for entry and storage of inspection data
 - Develop a preservation policy
 - Simulating future bridge conditions
 - Developing a bridge program

Pontis Basics

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



Versions

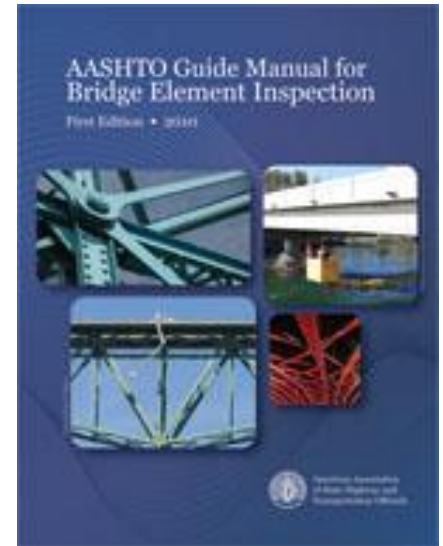
- Version 5.1.2
 - Microsoft .NET
 - Standalone (.NET) or Enterprise Web Based Application
 - NBEs/BMEs
 - Only Inspection software
 - Management depends on 5.2
 - Released March 2012
- Version 5.2
 - Microsoft .NET
 - Standalone (.NET) or Enterprise Web Based Application
 - NBEs/BMEs
 - Advanced Bridge Management Software

Why Change?

- Computer Technology Answer:
 - Have to stay up with technology to support user base
 - New Operating Systems (64 Bit)
 - New Database
 - New Programming Languages
 - New Protocols/Standards
 - Internet
- Better performance, enhanced capabilities, and more features.

Why Change?

- Element Answer:
 - In early 2011 AASHTO officially adopted the AASHTO Guide Manual for Bridge Element Inspection
 - New elements (CoRe -> NBE)
- Provides a foundation for improving bridge management
- Incorporate 15+ years of extensive user comments
- Simplify for usability and capability
- Better align with state DOT business practices



NBEs/BMEs

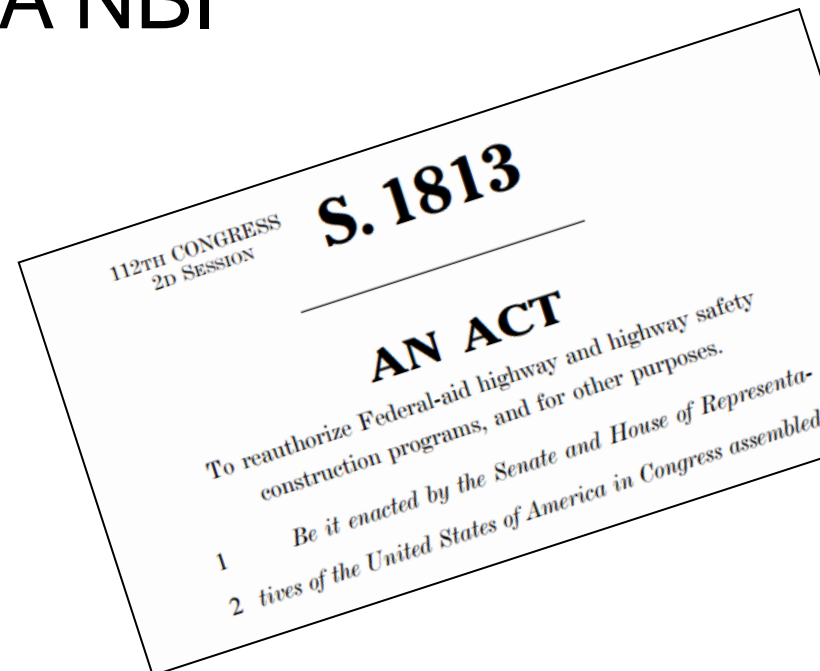
- National Bridge Elements (NBEs):
 - Form the core, fundamental parts of the bridge
 - Minimum that will be required to be reported to FHWA
 - Cover items such as Girders, Deck, Abutment
 - Can not be changed by an agency
- Bridge Management Elements (BMEs):
 - Used to help model other parts of the bridge
 - Cover items such as: joints, wearing surfaces
 - Agency may add, edit, delete BMEs
- Protective Systems and Defect Flags

NBEs/BMEs

- Parent/Child relationship established
 - All elements now have 4 condition states
 - Defect flags applied at the element level instead
 - Defect flag language included with the parent element description
 - Elements can be set to deteriorate or not
-
- Great flexibility and supports what is needed for the bridge management modeling

NBEs/BMEs

- Included in draft Highway Bills
 - Mandatory NHS Bridges
 - Study for NHS Bridges
- Foundation for new FHWA NBI
- Change is coming



Federal Requirements

BILLS-112s1813es.pdf - PDFlite

File View Go To Zoom Favorites Settings Help

Page: 109 / 1676 Find: element

8 boating, fishing, and other small vessels

9 that are less than 21 feet in length.

10 “(d) INVENTORY UPDATES AND REPORTS.—

11 “(1) IN GENERAL.—The Secretary shall—

12 “(A) annually revise the inventories au-

13 thorized by subsection (b); and

14 “(B) submit to the Committee on Trans-

15 portation and Infrastructure of the House of

16 Representatives and the Committee on Environ-

17 ment and Public Works of the Senate a report

18 on the inventories.

19 “(2) INSPECTION REPORT.—Not later than 1

20 year after the date of enactment of the MAP-21,

21 each State and appropriate Federal agency shall re-

22 port element level data to the Secretary, as each

23 bridge is inspected pursuant to this section, for all

24 highway bridges on the National Highway System.

The Basics of Pontis 5.1.2

- Pontis 5.1.2
 - Built off of the existing 5.X architecture (5.11/5.1.03)
 - Add support for new AASHTO National Bridge Elements
 - Assorted minor enhancements
 - “Features release”
- Goal: Allow for NBE/BME inspections to be done with Pontis and lay the foundation for 5.2 (management).

Graphical User Interface

Pontis5 Cassini Browser

File Sites Help

PONTIS BRIDGE MANAGEMENT SYSTEM

Welcome: **Pontis User**
Database: **Pontis512 SQL Server Sample DB**
Help ? Account LogOut

Menu

- ☒ Condition
- Appraisal
- Inventory
- Schedule
- Work
- Multimedia

Bridges Reports Admin Inspection Gateway

Bridge: **04 07598** Facility Carried (007): **JESSE OWENS PKWY** Inspection: **2004-12-15 (INRG)** Type: **Regular NBI** ☐ Metric ☒ English

Condition Ratings

Deck (058): **7 Good** Channel (061): **8 Protected**
Superstructure (059): **6 Satisfactory** Culvert (062): **N N/A (NBI)**
Substructure (060): **7 Good** Waterway (071): **8 Equal Desirable**

Unrepaired Spalls: (SF)

Validate
Calculate SR

Element Conditions

- All Structures - ☒ Quantity ☐ Percent ☒ Show Only Non-CoRe **Show Last CoRe Insp** **Add New Element** **Edit Element**

Elem	Str. Unit	Env	Description	Quantity	Units	Qty. 1	Qty. 2	Qty. 3	Qty. 4	Qty. 5
12	0 / Type = M (0)	Low (2)	Concrete Deck	400.000	sq.ft	100	200	100	0	
520			Deck/Slab Prot Sys	400.000	sq.ft	300	100	0	0	
104	0 / Type = M (0)	Low (2)	Prestress Box Girder	500.000	ft	350	100	50	0	
358			Concrete Cracking	20.000	ft	0	0	20	0	
215	0 / Type = M (0)	Low (2)	R/C Abutment	144.357	ft	114	20	10	0	
226	0 / Type = M (0)	Low (2)	P/S Conc Submrgd Pile	100.000	ft	70	30	0	0	
233	0 / Type = M (0)	Low (2)	P/S Conc Cap	30.000	ft	20	10	0	0	















Ready http://localhost:9000/default.aspx Port: 9000

New Feature – NBE/BME Elements

- Newly adopted bridge element standard that replaces CoRe elements for element level bridge inspections
- Fully supported in Pontis starting with version 5.1.2
- CoRe elements still visible in Pontis but all new inspections will be NBE/BME

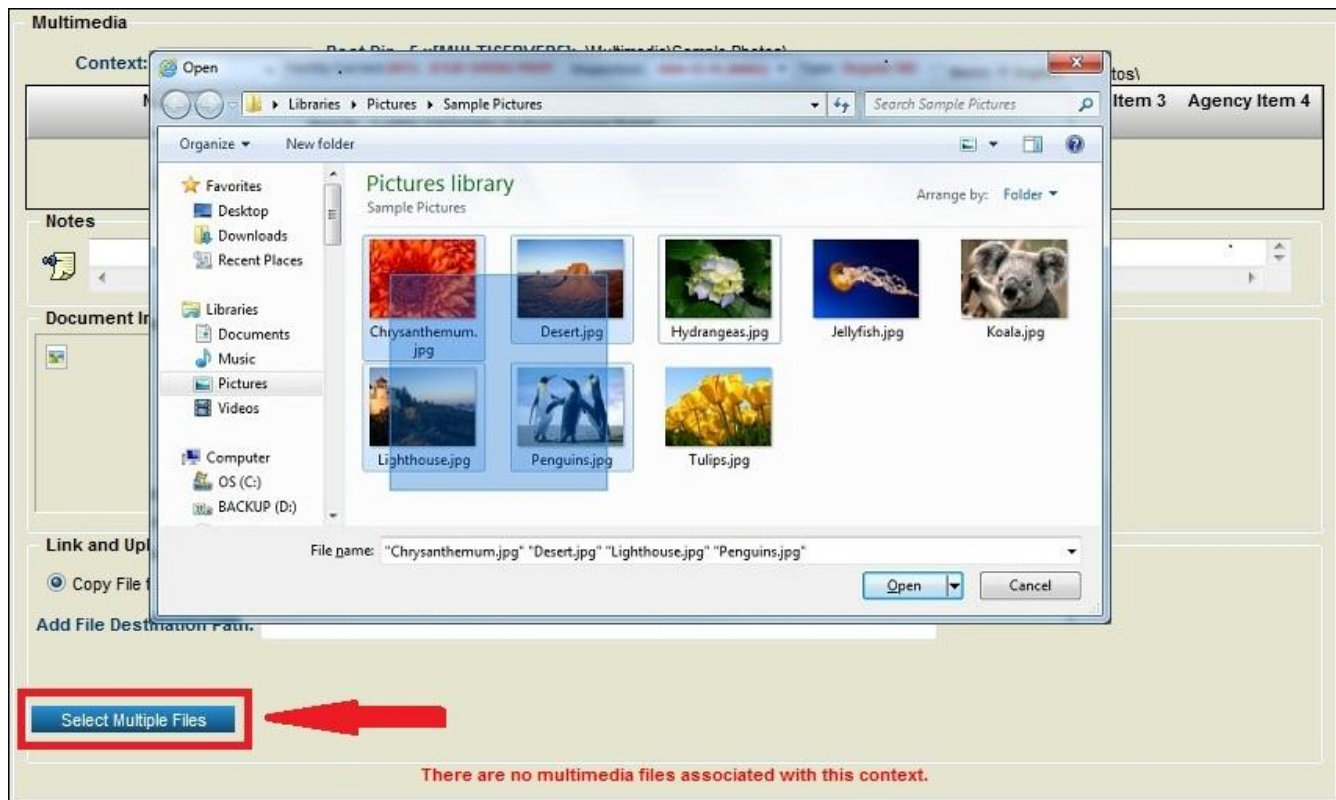
New Feature – Protective Systems

- Parent/child relationships
- Easily identifiable through icons

	Elem	Str. Unit	Env	Description	Quantity	Units	Qty. 1	Qty. 2	Qty. 3	Qty. 4	
		107	0 / Type = M (0)	Ben. (1)	Steel Open Girder / Beam	1640.420	ft	1640	0	0	0
		116	0 / Type = M (0)	Ben. (1)	R/C Stringer	1.000	ft	1	1	0	0
		358			Concrete Cracking	1.000	ft	1	0	0	0
		515			Steel Protective Coating	1.000	sq.ft	1	1	0	0
		202	0 / Type = M (0)	Low (2)	Steel Column	24.000	each	0	0	24	0
		241	0 / Type = M (0)	Low (2)	R/C Culvert	1.000	ft	1	0	0	0

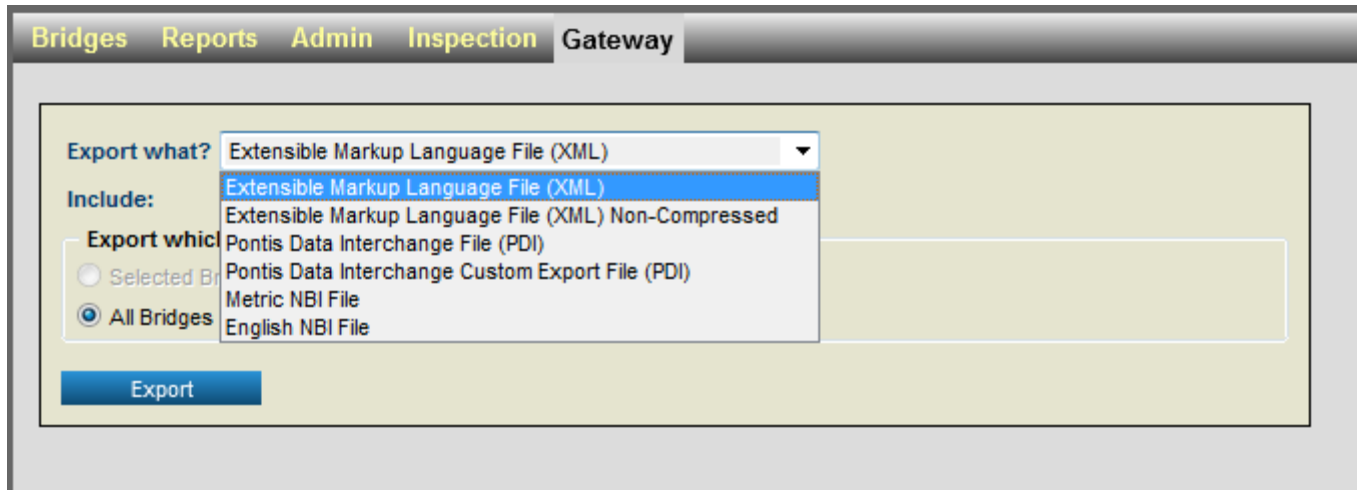
New Feature – Multi File Uploads

- Ability to upload multiple Files at once



New Feature – XML Export/Import

- XML is an industry standard format for saving and transferring data

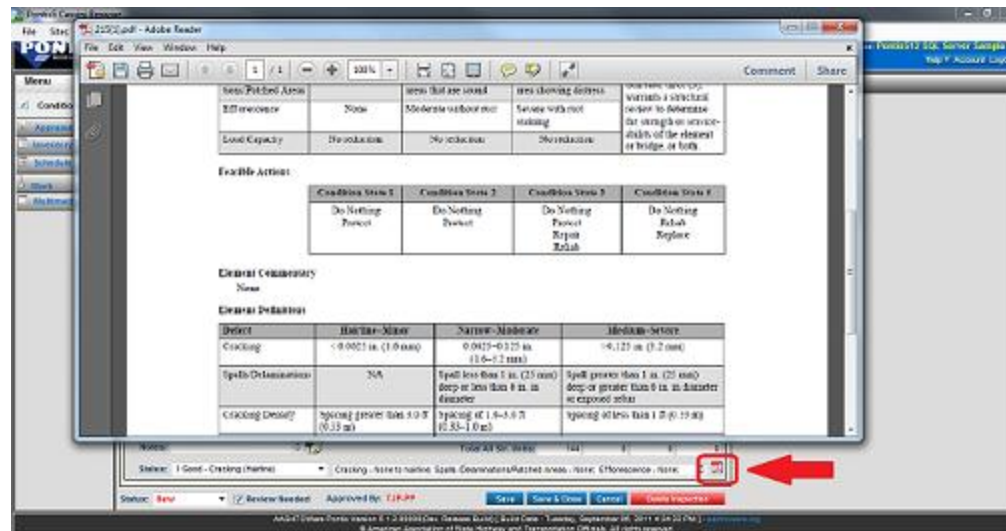


The screenshot shows the 'Bridges' software interface with a navigation bar at the top containing 'Bridges', 'Reports', 'Admin', 'Inspection', and 'Gateway'. The 'Inspection' tab is selected. Below the navigation bar, there is a form titled 'Export what?' with a dropdown menu set to 'Extensible Markup Language File (XML)'. Below this, there is a section labeled 'Include:' with a list of options: 'Extensible Markup Language File (XML)', 'Extensible Markup Language File (XML) Non-Compressed', 'Pontis Data Interchange File (PDI)', 'Pontis Data Interchange Custom Export File (PDI)', 'Metric NBI File', and 'English NBI File'. To the left of this list, there is a section labeled 'Export which' with two radio buttons: 'Selected Bridges' (unselected) and 'All Bridges' (selected). At the bottom of the form, there is a blue 'Export' button.

- PDI is still available option for exporting/importing data

New Features – User Requested Features

- Integrated Guide Manuals



- Easy access to past CoRe elements

Elem	Str. Unit	Env	Description	Quantity	Units	Qty. 1	Qty. 2	Qty. 3	Qty. 4	Qty. 5
241	0 / Type = M (0)	Low (2)	(CoRe) Concrete Culvert	647.999	(LF)	641	7	0	0	0
333	0 / Type = M (0)	Low (2)	(CoRe) Other Bridge Railing	157.999	(LF)	158	0	0	0	0
334	0 / Type = M (0)	Low (2)	(CoRe) Misc. Rail -.33 m sw	342.001	(LF)	342	0	0	0	0
515	0 / Type = M (0)	Low (2)	(CoRe) Custom R/C Wing Wall	354.326	(LF)	354	0	0	0	0

New Feature – On Demand Lists

- Performance improvement for agencies with large databases, from 70 sec load time to 7 sec load time
- Filter bridges as you type

Bridge: 04 08

04 08003

04 08508

04 08511

04 08529

04 08530

Facility Carried (007): JESSE OWENS PKWY Inspection: 2011-09-07 (TGBO) Type: Regular

Channel (061): 8 Protected

Culvert (062): N N/A (NBI)

Waterway (071): 8 Equal Desirable

Unrepaired Spalls: (SF)

Validate

Calculate SR

Element Conditions

- All Structures -

Quantity Percent

Show Last CoRe Insp Add New Element

Elem	Str. Unit	Env	Description	Quantity	Units	Qty. 1	Qty. 2	Qty. 3	Qty. 4
215	0 / Type = M (0)	Low (2)	R/C Abutment	144.357	ft	144	0	0	0

Pontis 5.1.2 Foundation for 5.2

- Lays element level foundation
- Starts technology updates
- New database tables and relationships started
- Starts agencies on a multi-year migration process

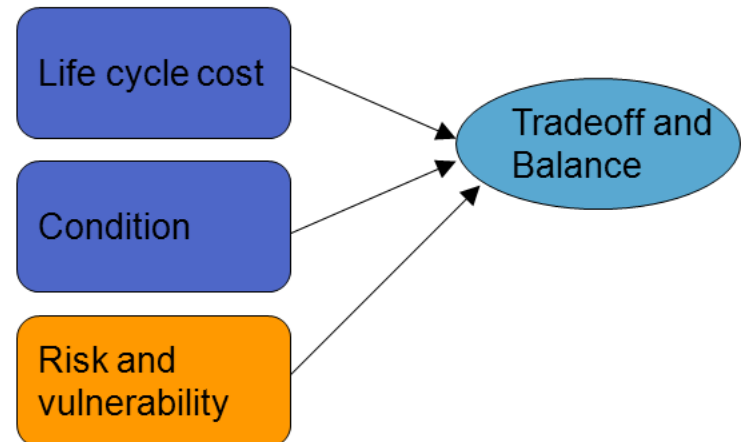
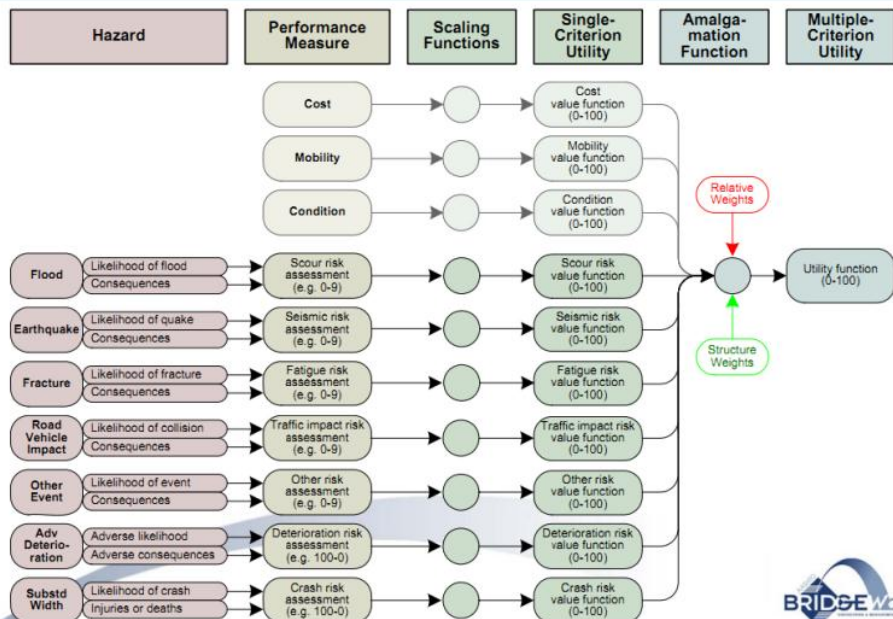


What is in Pontis 5.2?

- Builds off capabilities of existing Pontis versions
- Completely replaces and rewrites many previous modules
- Some significant areas:
 - Full incorporation of risks
 - Multi-objective analysis
 - Enhanced deterioration models
 - Life cycle cost analysis
 - Bridge level analysis
 - Project and Program Planning
 - Enhanced reporting
 - New data exchange

Multi-objective bridge modeling and prioritization framework

- Ability to evaluate and prioritize multiple objectives (current and future conditions, risks, and safety) simultaneously across all bridges.
- Better fit to agency workflow and business practices



Replacement of the project planning module

- Advanced analysis capabilities to for life cycle cost analysis, multi-objective comparisons and expected performance measures for the projects being created
- Performance measures for expected condition improvement, risk reduction, safety improvement and related economic evaluation

Work Candidates

Projects

Project List

Priority List

Optimization Data

Programs

Scenarios

Bridges

Inspection

Analysis

Reports

Admin

Project Filter:

Project Category

Project Characteristics

Project Name:

Project ID:

Bridge ID:

Project Status:

Review Status:

Assigned to Program:

Project Category:

Program Category:

Program:

Subset:

Years:

Project End Date:

Cost at Least (\$K):

IBC at Least:

Geographic Location

Within Distance:

Corridor:

Project:

Bridge Characteristics

Use Desktop Filter:

District:

Admin Area:

County:

Owner:

Custodian:

On/Off State System:

NHS Status:

Bridge Group:

Functional Class:

Advanced Criteria

Type:

Prog Treatment:

Account for Cost:

Account for Effect:

Freeze Category:

Freeze Year:

Coverage:

IBC Level:

Project:

Schedule:

Yes:

Yes:

Yes:

Yes:

Yes:

Full Bridge:

Green:

Proto:

Ignore:

No:

No:

No:

No:

Pat Bridge:

Yellow:

Complete:

Red:

Create Project

Go to Project:

Project Name	Project ID	Category	Program	Year	Treatment	Status	Cost (\$K)
→ Replace 123456	003-6543-8970	Replacement	→ HBRRP	→ 2012	Comp CPY	Proposed	30.5
→ Replace 123456	003-6543-8970	Replacement	→ State	→ 2012	Sched CE	Proposed	30.5
→ Replace 123456	003-6543-8970	Replacement	→ HBRRP	→ 2012	Camp C	Proposed	36.5
→ Replace 123456	003-6543-8970	Replacement	→ State	→ 2013	Ignore	Proposed	21.0
→ Replace 123456	003-6543-8970	Replacement	→ State	→ 2012	Comp CPY	Proposed	19.5
→ Replace 123456	003-6543-8970	Replacement	→ HBRRP	→ 2012	Camp CE	Proposed	30.5

1 Selected (\$36.5K)

Program Treatment:

Freeze:

Category:

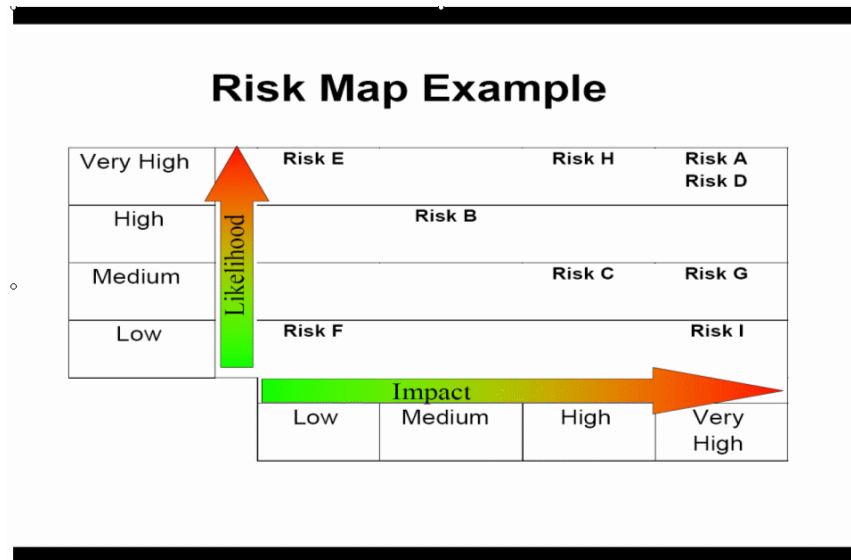
Program:

Year:

Set Treatment

Incorporation of risks definitions

- Ability to define bridge risks at the bridge level
- Support for user-defined risks to be considered
- Ability to define multiple risks for any bridge
- Consideration given based on the risk potential and consequences



Risk Assessments

Risk Assessment Interface

Navigation: Analysis | Reports | Gateway | Admin

Facility Carried: Jesse Owens Pkwy

Date	Status	Likelihood	Conseq	Impact	Value	Next
1/2/1/2005	Calculated	5	50	5	100	1/2/1/2015
5/12/2007	Verified	7	50	7	6	5/12/2010
12/2/2009	Verification Pending	5	50	4	6	12/2/2014
11/4/1999	Obsolete	5	50	7	7	11/4/2009

Assessments (3 Active) | Delete

Risk Assessment Value
Likelihood of hazard. Click one value in the table

	1	2	3	4	5	6	7	8	9	10
High	5	5	10	15	20	25	30	35	40	50
	4	8	12	16	20	24	28	32	36	40
	3	6	9	12	15	18	21	24	27	30
	2	4	6	8	10	12	14	16	18	20
Low	1	2	3	4	5	6	7	8	9	10

Consequence of hazard

Assessment Type: Scour
Assessment Date: 5/12/2009
Assessment Key/Date: 5/12/2009 (NNGR)
Workflow Status: Verified
Affected Deck Area (Sq. Ft): 8,000
Affected AADT: 26,000
Hazard Class: 3
Lots of scour here

Likelihood of Extreme Event: 7
Consequences to Structure: 50
Impact on Mission, Life & Property: 50
Assessment Final Value: 6
Next Assessment Date: 5/12/2009

Assessment Definitions

Navigation: Bridges | Inspection | Analysis | Reports | Gateway | Admin

Add New Assessment Definition

Assessment
Scour
Seismic
Fatigue
Impact
Other
Adv Deterioration
Deficient Width

7 Assessment Definitions | Duplicate | Delete

Candidate ID: Scour
Label: Risk from floods
Auto Generation: Not Automatic
Manual Generation: Manual
Checking: Requires Review
Interval (months): 12

Likelihood
Edit Allowed: Edit without Validation
Data Type: Integer
Maximum Value: 5
Minimum Value: 1

Consequence to Structure
Edit Allowed: Edit without Validation
Data Type: Integer
Maximum Value: 10
Minimum Value: 1

Impact on Mission, Life, and Property
Edit Allowed: Not Visible
Description: Not Visible
Maximum Value: 50
Minimum Value: 1

Final Risk Value
Edit Allowed: Edit without Validation
Description: Integer
Maximum Value: 50
Minimum Value: 1

Data Type: Integer

This is a risk assessment for scour, expressed on a 0-9 scale where 0 means the structure is already closed the structure, and 9 means the structure is on scour risk.

Improved cost estimating for bridge replacements

- Improved replacement recommendations coming from future years deterioration simulations to consider roadway level of service needs and current design standards in determining the proposed width, length and cost of the replacement bridge.
- Ability to “opt-out” historic bridges
- Better models for culvert cost estimates

Support for “corridor” based and geographically proximate project development

- Ability to define a collection of bridges (on a route, in an interchange, etc.) that will have their needs queried, evaluated and packaged as a group to take advantage of economies of scale.
- Improved project development process and cost savings for the agency

Bridge Groups

Context Filters

Bridge Filter 1
Context: Bridge
Load Filter
New Filter
Delete Filter
Share?

Table: Bridge
adminarea
atirload
atirmeth
atirload

bridge.atirload
between
10
and
32.4

bridge.district
Unknown
Not Applicable
District 1
District 2
District 3
District 4
District 5
District 6
District 7
District 8
District 9
District 10
Delete from filter?

Save Filter
Save Filter As
My New Filter

Network Corridor List

Corridor Filter
Custom
Bridge
Corridor
District
Add to Filter
Clear Filter
Delete Selected
Bridge Type - Prestressed
Apply Filter

Corridor Name: Interstates
Corridor Characteristics
Replace Template Set: 1-25 T-Rex Corridor
T-Rex Gothic Bridge Style
Widen Template Set: T-Rex Gothic Bridge Style
Automatic: ☒

Roadway Characteristics

Roadway-On: ☒
Kind of Highway: Interstate Highway
Level of Service: Mainline
Route(s): commo-separated list
Directional Suffix: North
Roadway Name: Interstate 25
Kilometer Post: 2.34 to 12.56
Average Daily Traffic: 100000 to 180000
Truck Percent: 12 to 20
Number of Lanes: 4 to 6
Functional Class: 11 - Urban Interstate
NHS Status: On NHS

Geographic Location

Within Distance: 10 miles of
Corridor: 1-25 T-Rex Corridor
Project: Central Valley Deck Repairs
Bridge: 09 5643E

Bridge Characteristics

Use Desktop Filter: ☒
District: Metro District
Admin Area: Forest Lawn
County: Calaveras
Owner: State Highway Agency
Custodian: State Highway Agency
On/Off State System: On NHS
NHS Status: On NHS
Bridge Group: My custom bridge group
Functional Class: 11 - Urban Interstate

Project Characteristics

Project Name: Central Valley Deck Repairs
Project ID: 003-6543-8907
Assigned to Program: Yes ☒
Project Category: Replacement
Program Category: Federal Bridge
Program: HBP
Subset: On-system Bridges
Years: 2012 to 2013

Who/How will Pontis 5.2 be Done?

- AASHTO BRIDGEWare Task Force
- AASHTO Staff
- Pontis Technical Review Team (TRT)
 - Assist in evaluating technologies and making detailed recommendations
- Pontis Users Group
- Contractor (InspectTech)
- Multiple groups/people working toward the same goal.

Solicitation

- States are asked to help support 5.2 development
- Significant advantages to participating states:
 - TRT participation
 - On-site training/assistance
 - Early knowledge and implementation
 - Staff expertise considerably increased

AASHTO BRIDGEWare

Pontis 5.2 Solicitation

Project Proposal & Business Case for Developing the Next
Generation of Pontis Bridge Management Software

Prepared by:
AASHTO Pontis® Task Force

This document has been prepared by the Pontis Task Force

February 2012



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When will Pontis 5.2 be available?

- Development on 5.2 has started!
- Phased releases
 - Version 5.2.1
 - Core program framework, risk assessments, integrated utility functions, network corridors
 - October 2012
 - Version 5.2.2
 - Implementation of new deterioration models and multi-objective analysis
 - Version 5.2.3
 - Integrated project and program planning
 - All administrative features

Completion and delivery of the final phase (5.2.3) is expected by January 2015.

Advantages of Pontis

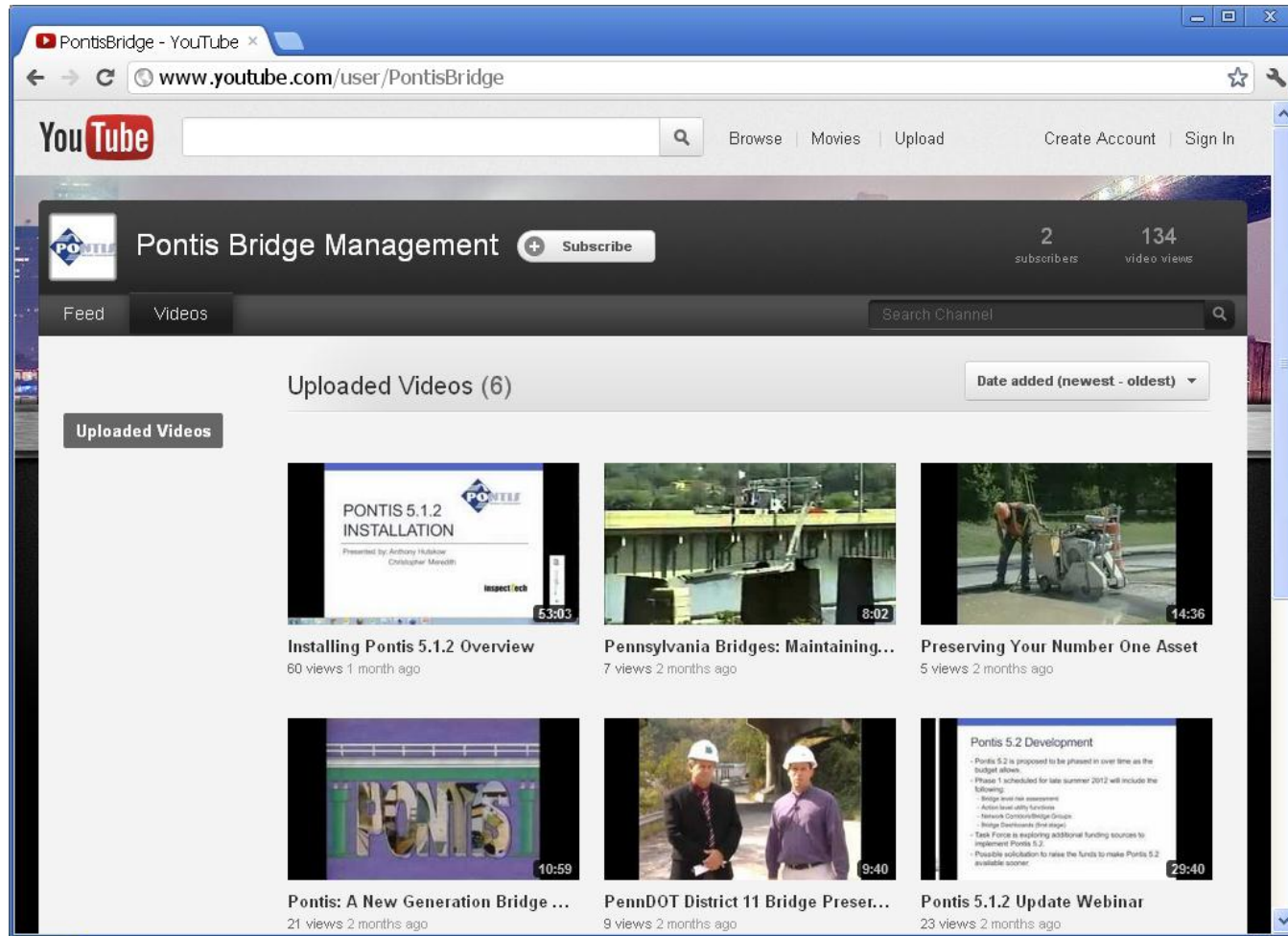
- Full support and maintenance provided by AASHTO.
- Enhancements and features are fully coordinated with AASHTO guidelines
- Incorporation of FHWA regulatory requirements.
- Development administered and overseen by a task force of State DOT representatives.
(Software created by DOTs for DOTs)

How do I stay updated?

Enhanced Communication Options:

- Webinars
- Email list
- Twitter/Facebook
- Pontis website (<http://pontis.inspecttech.com/>)
- Just Ask!

Webinar Series

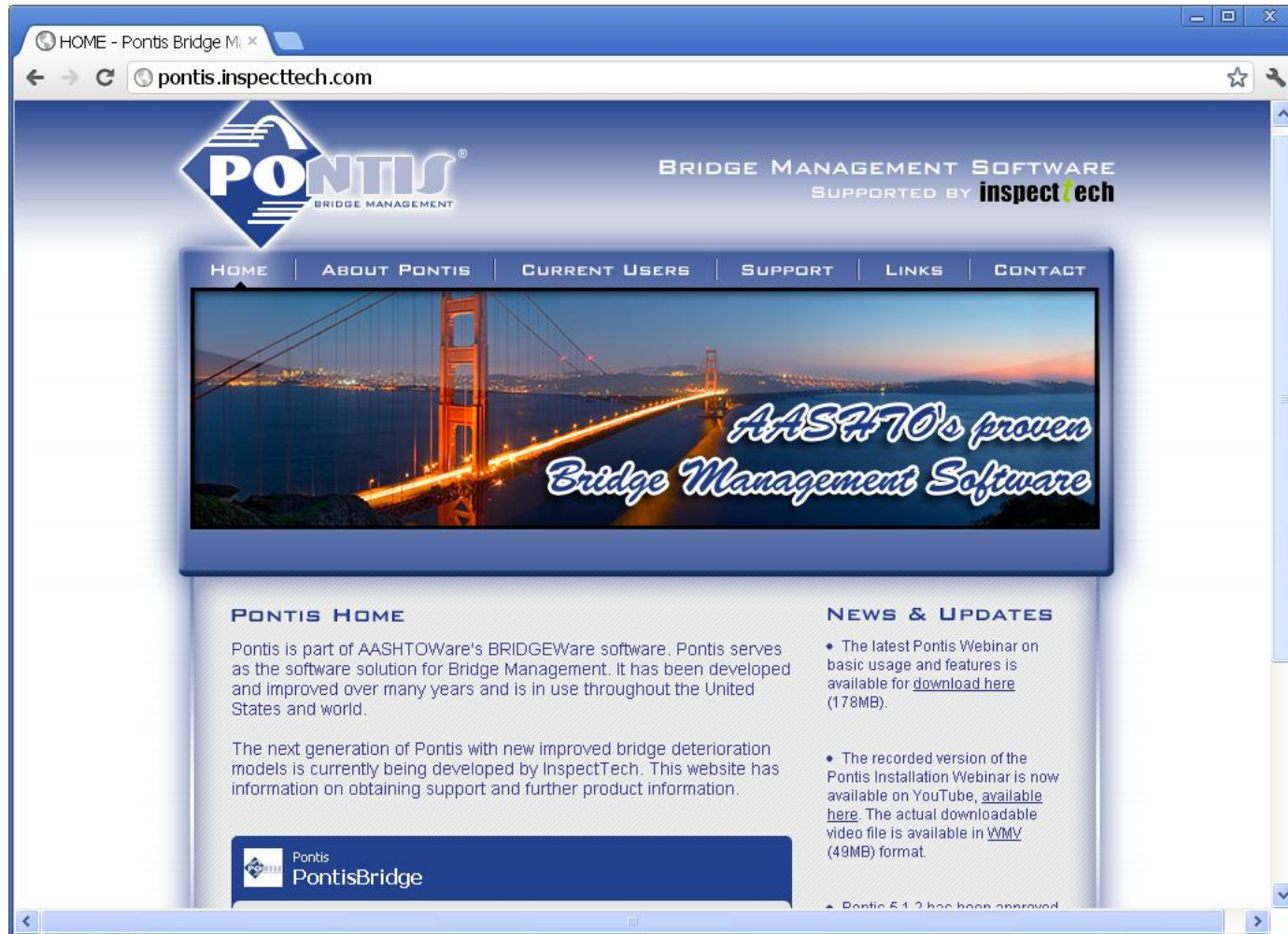


The screenshot displays the YouTube channel for PontisBridge Management. The channel has 2 subscribers and 134 video views. The 'Videos' tab is selected, showing a list of uploaded videos. The videos are as follows:

Video Title	Duration	Views	Time Ago
Installing Pontis 5.1.2 Overview	53:03	60 views	1 month ago
Pennsylvania Bridges: Maintaining...	8:02	7 views	2 months ago
Preserving Your Number One Asset	14:36	5 views	2 months ago
Pontis: A New Generation Bridge ...	10:59	21 views	2 months ago
PennDOT District 11 Bridge Preser...	9:40	9 views	2 months ago
Pontis 5.1.2 Update Webinar	29:40	23 views	2 months ago

<http://www.youtube.com/user/PontisBridge>

Webinar links on website:



<http://pontis.inspecttech.com/>

Next Webinar:

Advanced Inspection Module Training

- Using the Pontis built in customization features
 - Adding in your own custom reports to Pontis
 - Adding in custom developed screen/forms into Pontis
 - Tips for developing agency custom elements in Pontis
 - Changes to the administrative module in Pontis 5.1.2

Date: Wednesday May 16th

Time: 11:00 -Noon (EST)

To Register use link:

- <https://www4.gotomeeting.com/register/671193535>

QUESTIONS

<http://pontis.inspecttech.com/>

