



Federal Transit Administration Transit Asset Management Pilot Program



U T A



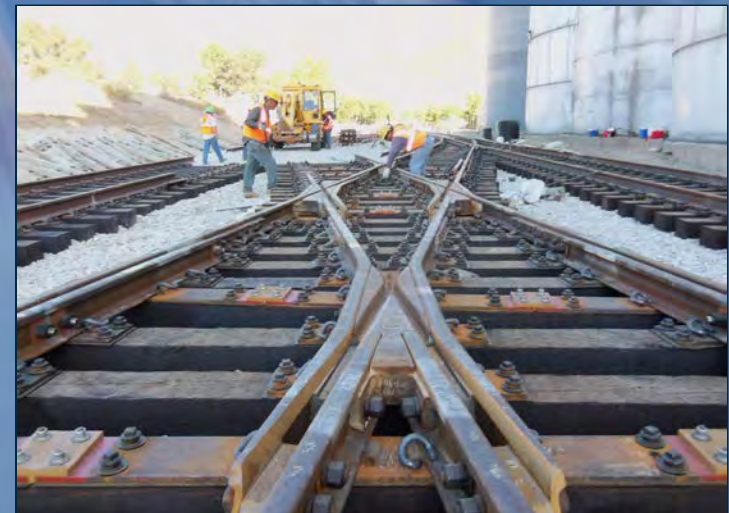
A Partnership Between Utah Transit Authority and Bentley/InspectTech

About UTA:

- Public Transit District
- Serves 2.2 million people in District
- Covers an Area - 130 miles by 20 miles
- Currently Employs - approx. 2000
- Operate 700 Buses, 400 Vans, 146 LRVs, and 60 Commuter Rail Vehicles

About Bentley/InspectTech:

- Bentley acquired InspectTech in 2012
- Global leader in software solutions for sustaining infrastructure
- 3000 Colleagues in 50 Countries
- Dedicated commitment to research and development of new software solutions



Strength of Partnering



- Bentley/InspectTech and Utah Transit Authority are recognized leaders in their respective areas. Together they provide the strongest team to develop a system that will meet the needs of regulatory agencies, transit systems and the public for today and into the future

- Provides an engineering based approach to an engineering problem
- Financial projections are a natural product of an effective Asset Management System



Evolution of Asset Management at UTA

- UTA recognized the need for an overall Asset Management System
- Reviewed available resources
- Recognized the need for outside assistance to develop a comprehensive system
- Identified that UTA used InspectTech to perform Asset Management on Structures
- Leveraged this relationship to begin development of comprehensive Asset Management System

Key Milestones

- Published in Federal Register November 19, 2010
- RFP submitted January 28, 2011
- Notice of Award In Federal Register August 4, 2011
- Notice to Proceed September 29, 2011
- UTA start date October 1, 2011
- Schedule and Plan submission October 15, 2011
- Interim Report January 10, 2012
- Preliminary Report April 12, 2012
- Final Report April 30, 2013

Completed on Time and Under Budget

MAP21 covers 5 Pillars for National TAM System

Define *state of good repair*, including objective measures of asset conditions

Establish an SGR performance measure -- each grantee must set an SGR performance target and report to FTA annually

Require TAM Plans for all recipients and sub-recipients

Report to the NTD data on asset inventories and condition assessments

Technical assistance from FTA

“Asset Management is the key to identifying problems before failures occur that can cause unplanned outages and disruptions in service. An effective Asset Management program will maintain a safe, efficient and reliable transit system for our customers and keep the public investment in a State of Good Repair.”



UTA/Bentley Asset Management Model



Inventory

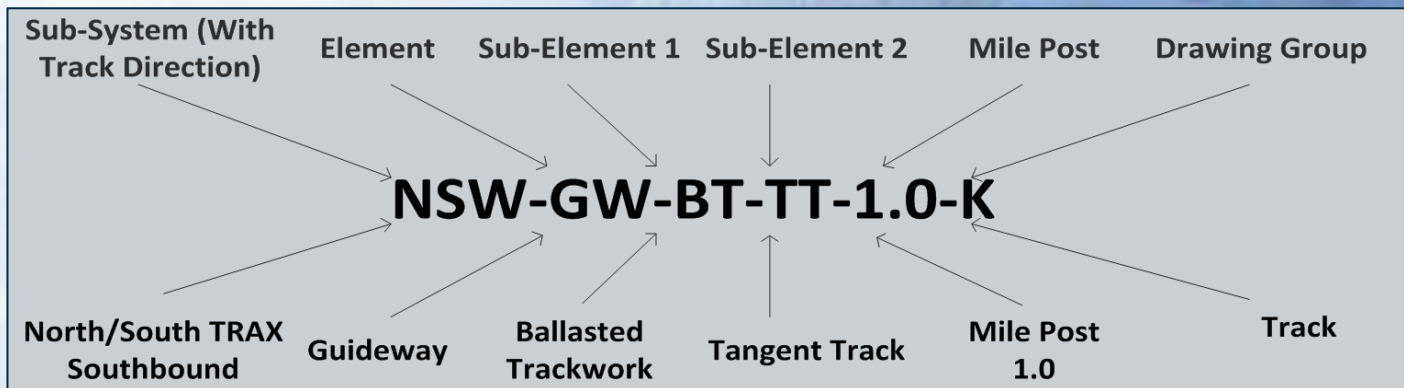
Developing an Asset Code

Granularity of Inventory

Keys to Developing an Asset Inventory

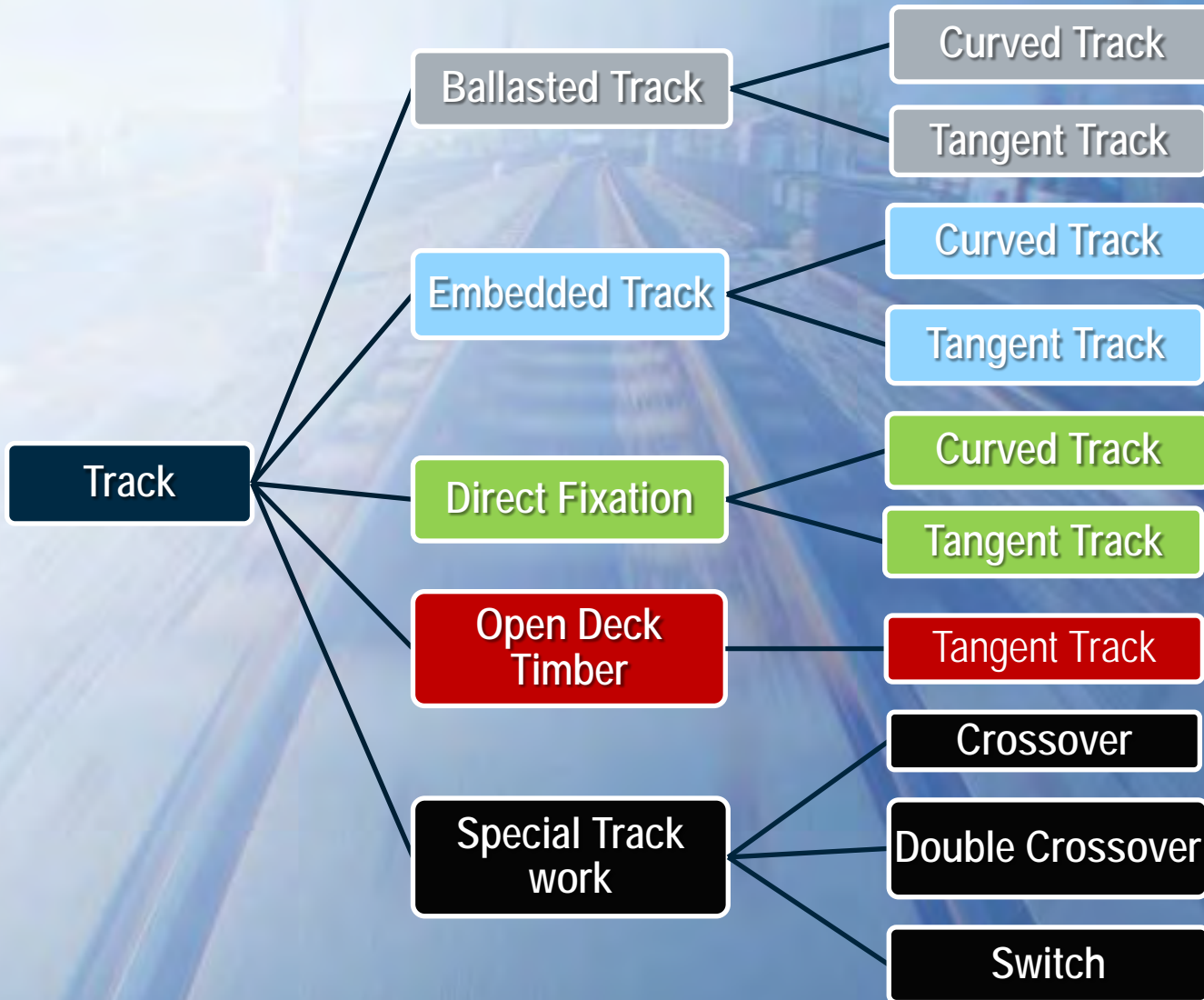
- Develop a strategy on what level of granularity assets will be inventoried
- Implement a unique asset code identifier
- Collect pertinent asset information
 - Location of asset: Physical, GPS, mile post etc...
 - Description of asset
 - System asset association
 - Quantity: Each, linear foot, etc...
 - Design life
 - Unit Cost
 - Replacement cost
 - Year procured: Age of the asset
 - Evaluate asset proximity to the agencies risk zones

Developing an Asset Code



- Each asset has been identified by a specific asset code. The unique code provides high level detail about the asset and its characteristics

Inventory Granularity




Inventory Module- Simple Parent/Child Relationships

File Edit View Favorites Tools Help

inspect²ech Main Collector Maintenance Manager Administration Help

Manage Inventory

 The asset information save completed successfully!

Filter Assets: No filter currently applied.

- All Assets
- [Create New Asset]
- + AIRPORT TRAX
- + Commuter Rail North
- Commuter Rail South
- [Create New Asset]
- + Guideway
- Train Control
 - [Create New Asset]
 - + Grade Crossing
 - + Interlocking
 - + Signal House
 - + Switch Machine
- + Components
- + Facilities
- + Garfield Line
- + INTERMODAL HUB EXTENSION
- + Jordan River Service Center
- + Lovendahl Yard
- + MID JORDAN TRAX
- + NORTH/SOUTH TRAX
- + UNIVERSITY TRAX
- + Warm Springs Yard
- + WEST VALLEY TRAX
- + Bridges

Edit Asset: Guideway

Asset Information

Asset Name:

Asset Code:

Parent Asset:

Asset Order:

Asset Type:

Default Report Type:

Default Child Report Type:

Asset Status:

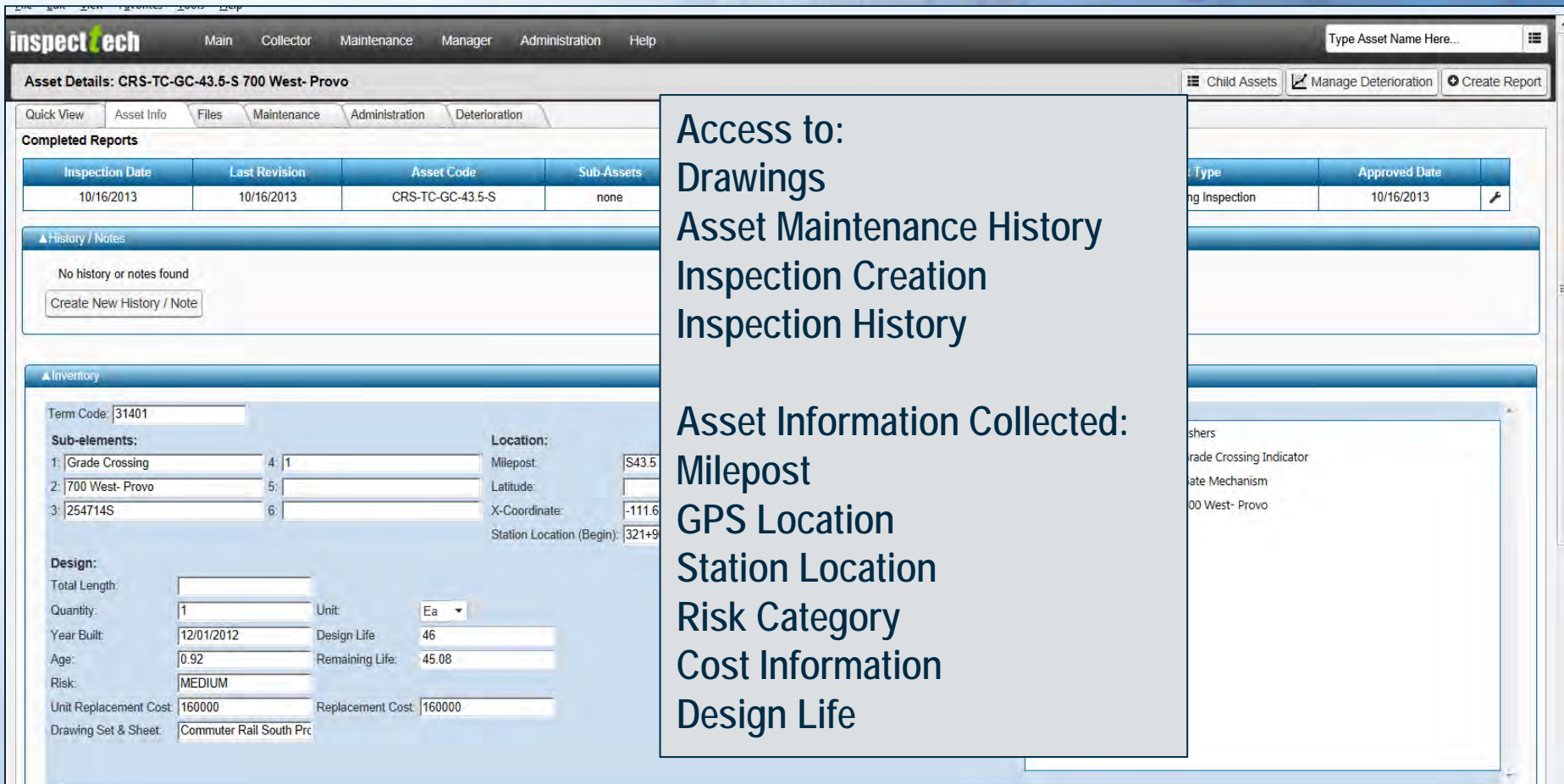
This asset can contain other assets

This asset is a component parent

Inspection Frequencies

Track	<input type="text" value="Weekly"/>
System	<input type="text"/>
Switch	<input type="text" value="30 day"/>
Mechanized Cross-tie	<input type="text"/>
Ultrasound	<input type="text"/>
Geometry Car	<input type="text"/>
Joint Bar	<input type="text"/>
Special	<input type="text"/>
Condition Rating	<input type="text"/>
Signal Inspection	<input type="text"/>

Detailed Inventory Information



inspect.tech Main Collector Maintenance Manager Administration Help

Asset Details: CRS-TC-GC-43.5-S 700 West- Provo

Child Assets Manage Deterioration Create Report

Quick View Asset Info Files Maintenance Administration Deterioration

Completed Reports

Inspection Date	Last Revision	Asset Code	Sub-Assets
10/16/2013	10/16/2013	CRS-TC-GC-43.5-S	none

▲ History / Notes

No history or notes found

Create New History / Note

▲ Inventory

Term Code: 31401

Sub-elements:

1: Grade Crossing	4: 1	Location:	Milepost: S43.5
2: 700 West- Provo	5:		Latitude:
3: 254714S	6:		X-Coordinate: -111.6
			Station Location (Begin): 321+9

Design:

Total Length:

Quantity: 1 Unit: Ea

Year Built: 12/01/2012 Design Life: 46

Age: 0.92 Remaining Life: 45.08

Risk: MEDIUM

Unit Replacement Cost: 160000 Replacement Cost: 160000

Drawing Set & Sheet: Commuter Rail South Prc

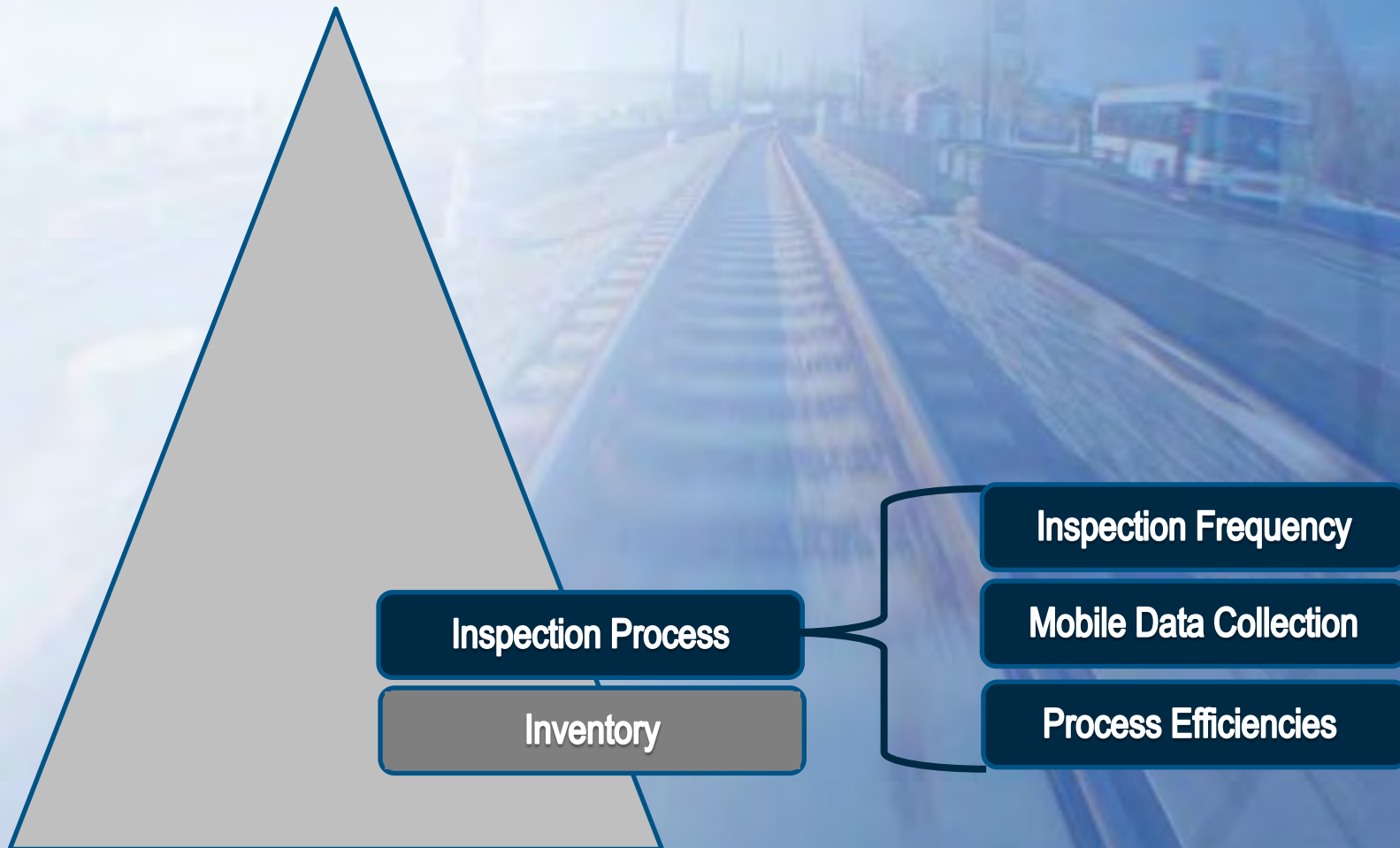
Access to:

- Drawings
- Asset Maintenance History
- Inspection Creation
- Inspection History

Asset Information Collected:

- Milepost
- GPS Location
- Station Location
- Risk Category
- Cost Information
- Design Life

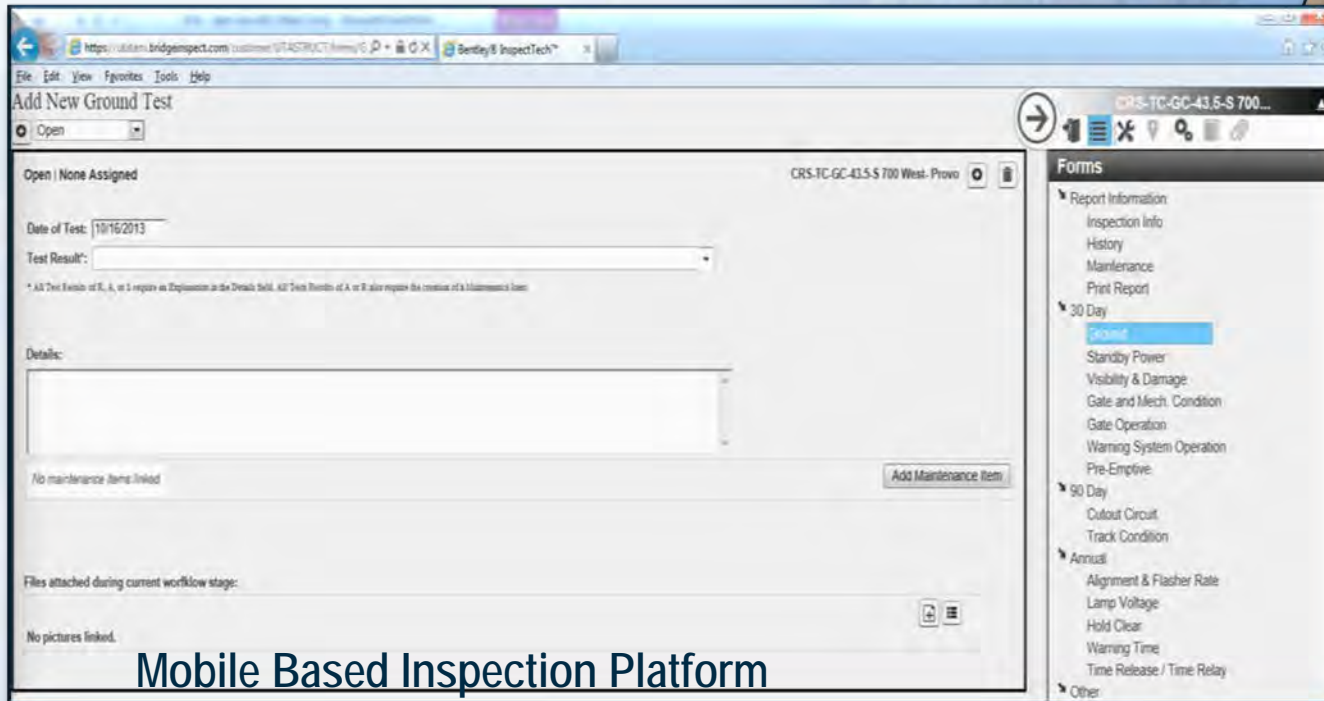
UTA/Bentley Asset Management Model



Inspection Module

- Inspection module allows users to customize the input process to match existing forms
- To reduce errors, the system uses dropdown and prepopulated menu options where applicable
- The web based software allows the inspectors to complete and submit their reports from the field
- The report approval process can be performed from the administrative office or in the field

Inspection Module- Adding Mobility While Streamlining the Process



The screenshot shows a web browser window with the URL <https://ulitem.bridginspect.com/customer/UTASTRUCT/Forms/G...> and the Bentley® InspectTech logo. The page title is "Add New Ground Test". The main content area includes a "Date of Test" field with the value "10/16/2013", a "Test Result" dropdown menu, and a "Details" section with a text area. A "Forms" sidebar on the right lists various inspection categories: Report Information, Inspection Info, History, Maintenance, Print Report, 30 Day (with "Ground" selected), Standby Power, Visibility & Damage, Gate and Mech. Condition, Gate Operation, Warning System Operation, Pre-Employee, 90 Day (with "Circuit" selected), Track Condition, Annual (with "Alignment & Flasher Rate" selected), Lamp Voltage, Hold Clear, Warning Time, Time Release / Time Relay, and Other. The bottom of the interface features a "Mobile Based Inspection Platform" label.



Inspection Module Also Accessible By Map

inspect^{tech}
Main Collector Maintenance Manager Administration Help

Type Asset Name Here... ☰

Main Map
Show Assets

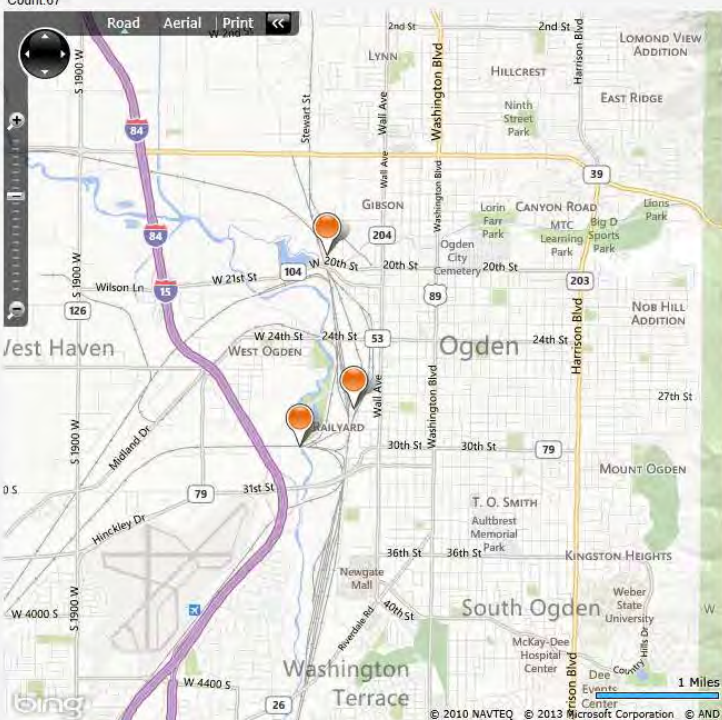
Show Assets in Bridges by [All Assets]

Type:

<input checked="" type="checkbox"/> Bridge	<input checked="" type="checkbox"/> Sound Berm	<input checked="" type="checkbox"/> Sub-System	<input checked="" type="checkbox"/> Signal House	<input checked="" type="checkbox"/> Grade Crossing	<input checked="" type="checkbox"/> Interlocking	<input checked="" type="checkbox"/> Switch Machine	<input checked="" type="checkbox"/> Traction Power Substation	<input checked="" type="checkbox"/> Milepost	<input checked="" type="checkbox"/> Overhead Catenary System
<input checked="" type="checkbox"/> 87A Vehicle	<input checked="" type="checkbox"/> Cab Car Vehicle	<input checked="" type="checkbox"/> Vehicles	<input checked="" type="checkbox"/> Counter Case	<input checked="" type="checkbox"/> Mine	<input checked="" type="checkbox"/> Guideway	<input checked="" type="checkbox"/> Guideway CP	<input checked="" type="checkbox"/> Guideway MP	<input checked="" type="checkbox"/> Guideway LP	<input checked="" type="checkbox"/> Guideway At Grade Ballast

Count: 67

Road Aerial Print ◀




© 2010 NAVTEQ © 2013 Microsoft Corporation © AND

Information Street View

Ogden Yard Bridge (FRA Brige)

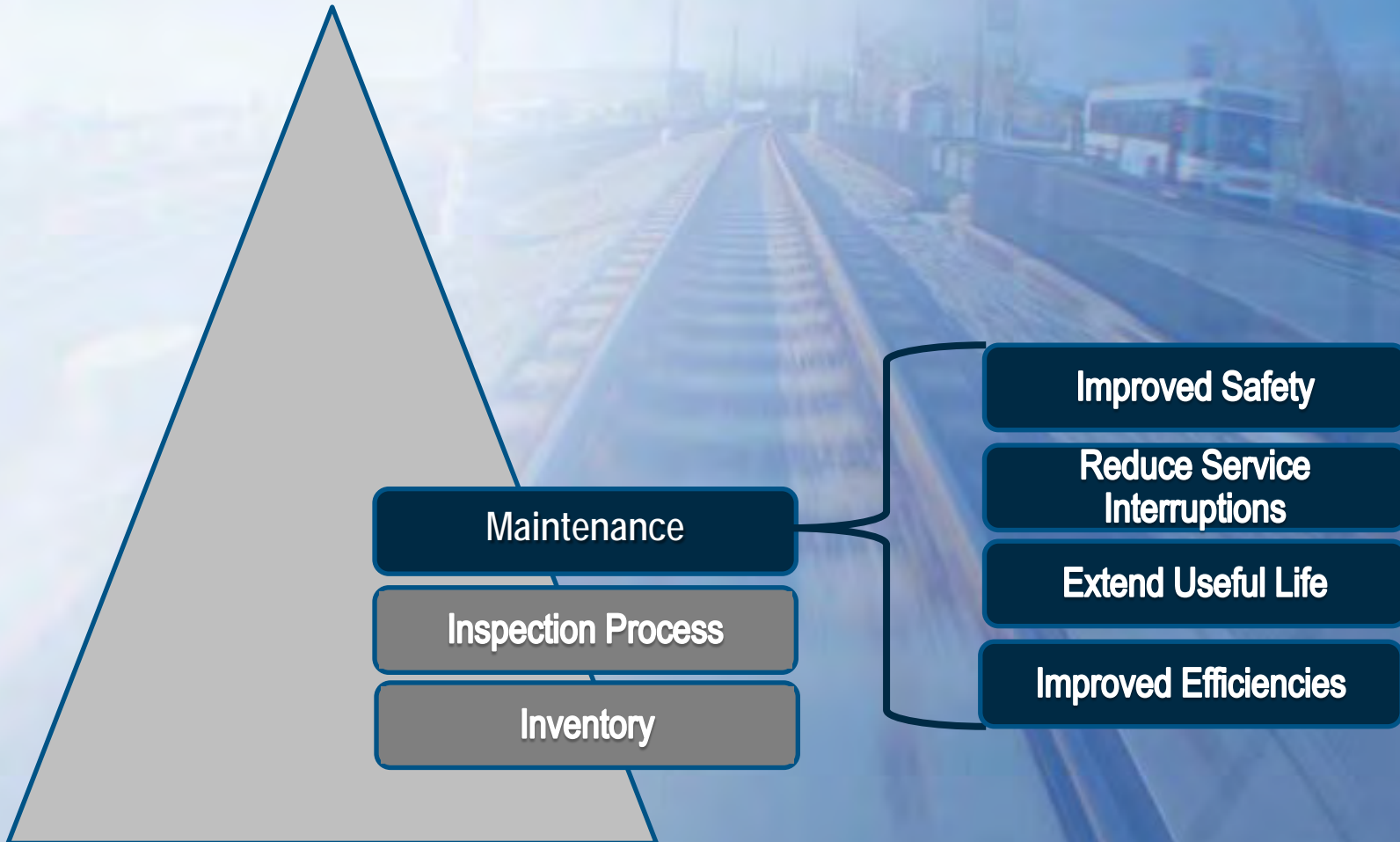
Parent Asset: FrontRunner North
 Asset Name: Ogden Yard Bridge (FRA Brige)
 Asset Code: CRN-ST-BR-ST-36.7-R
 Asset Type: Bridge



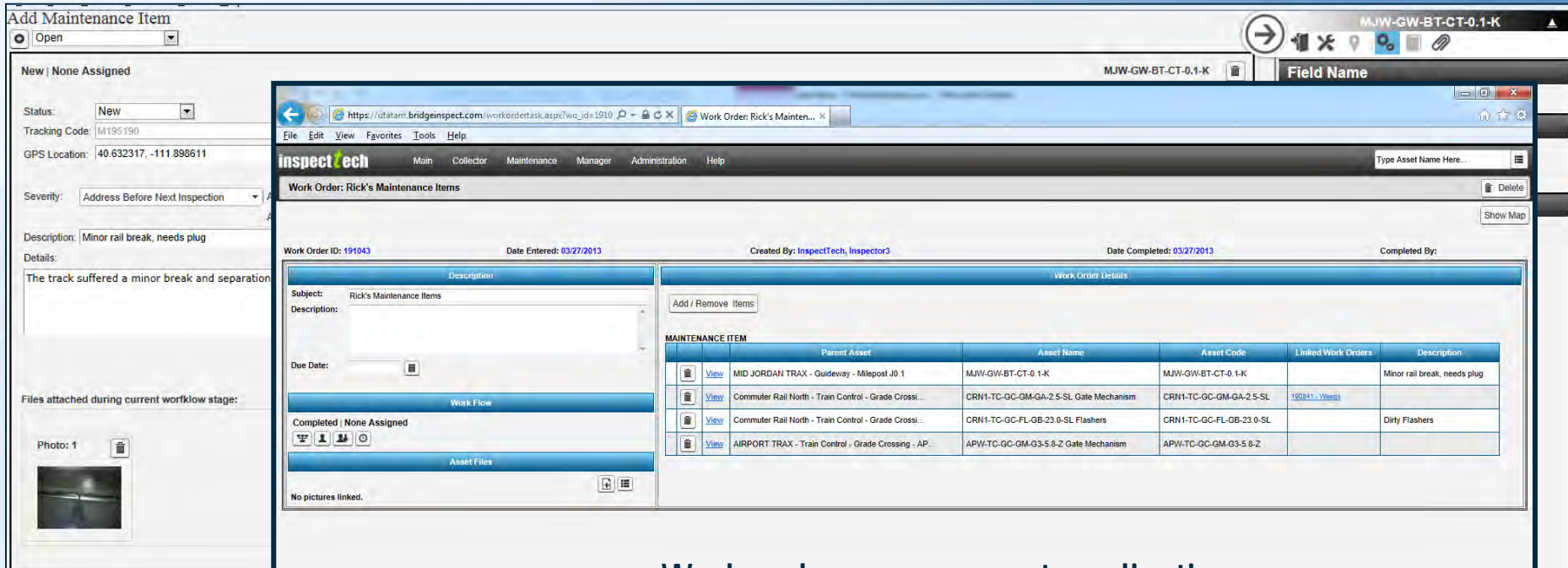
Go to [Bridge Detail Page](#)

Zoom Map to Bridge

UTA/Bentley Asset Management Model



Maintenance Module



Add Maintenance Item

Open

New | None Assigned

Status:

Tracking Code: M195190

GPS Location: 40.632317, -111.898611

Severity:

Description: Minor rail break, needs plug

Details: The track suffered a minor break and separation

Files attached during current workflow stage:

Photo: 1

Work Order: Rick's Maintenance Items

Work Order ID: 191043 | Date Entered: 03/27/2013 | Created By: InspectTech, Inspector3 | Date Completed: 03/27/2013 | Completed By:

Description		Work Order Details				
Subject	Description	Add / Remove Items				
MAINTENANCE ITEM						
	Parent Asset	Asset Name	Asset Code	Linked Work Orders	Description	
	MID JORDAN TRAX - Guideway - Milepost J0.1	MJW-GW-BT-CT-0.1-K	MJW-GW-BT-CT-0.1-K		Minor rail break, needs plug	
	Commuter Rail North - Train Control - Grade Crossi...	CRN1-TC-GC-GM-GA-2.5-SL Gate Mechanism	CRN1-TC-GC-GM-GA-2.5-SL	190941 - Wrecks		
	Commuter Rail North - Train Control - Grade Crossi...	CRN1-TC-GC-FL-GB-23.0-SL Flashers	CRN1-TC-GC-FL-GB-23.0-SL		Dirty Flashers	
	AIRPORT TRAX - Train Control - Grade Crossing - AP...	APIW-TC-GC-GM-G3-5.8-2 Gate Mechanism	APIW-TC-GC-GM-G3-5.8-2			

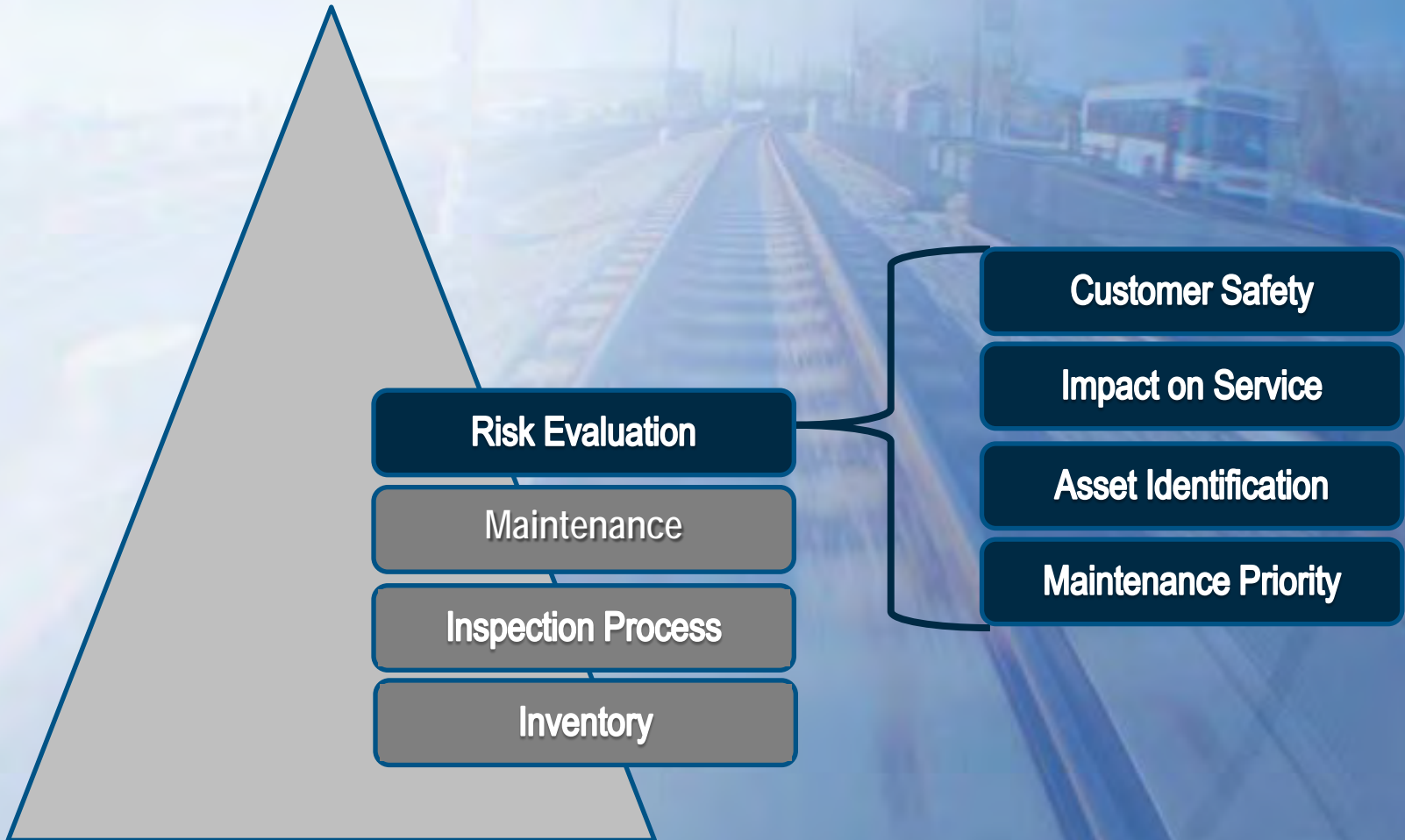
Completed | None Assigned

Asset Files

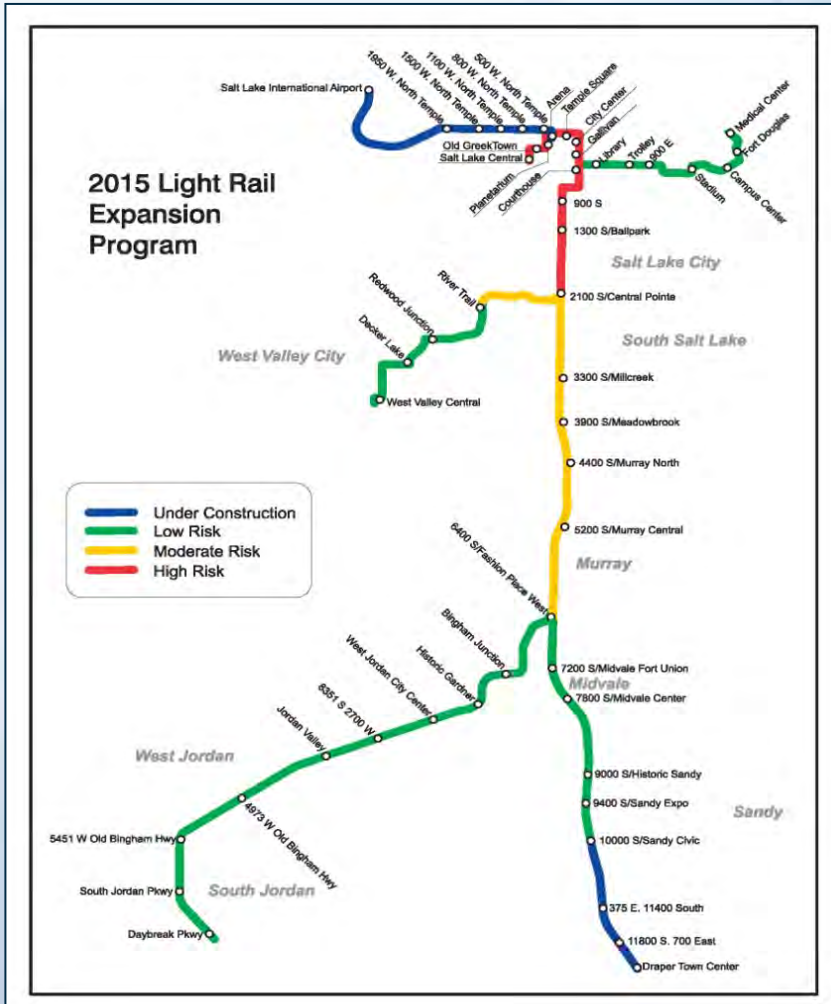
No pictures linked.

- Allows maintenance items to be captured during inspections or by other activities
- Allows GPS coordinates to be captured
- Allows pictures to be attached
- Work order management application
- Maintenance items can be grouped together in work orders and assigned to inspectors for resolution

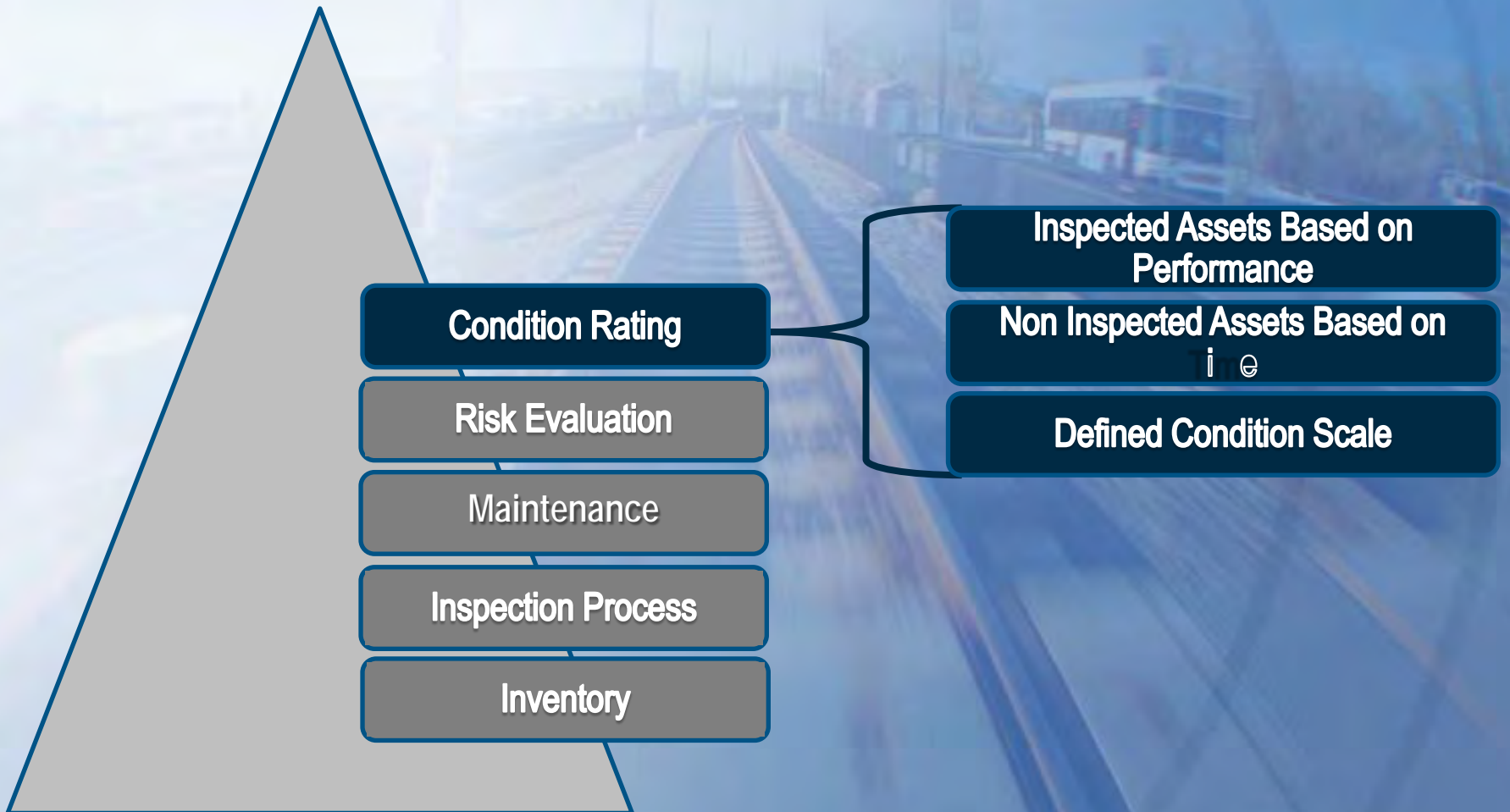
UTA/Bentley Asset Management Model



Risk Areas for UTA



UTA/Bentley Asset Management Model



Applying Condition Ratings

Asset in new condition



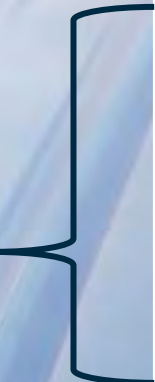
Planning for Replacement or Rehabilitation



UTA State of Good Repair Threshold

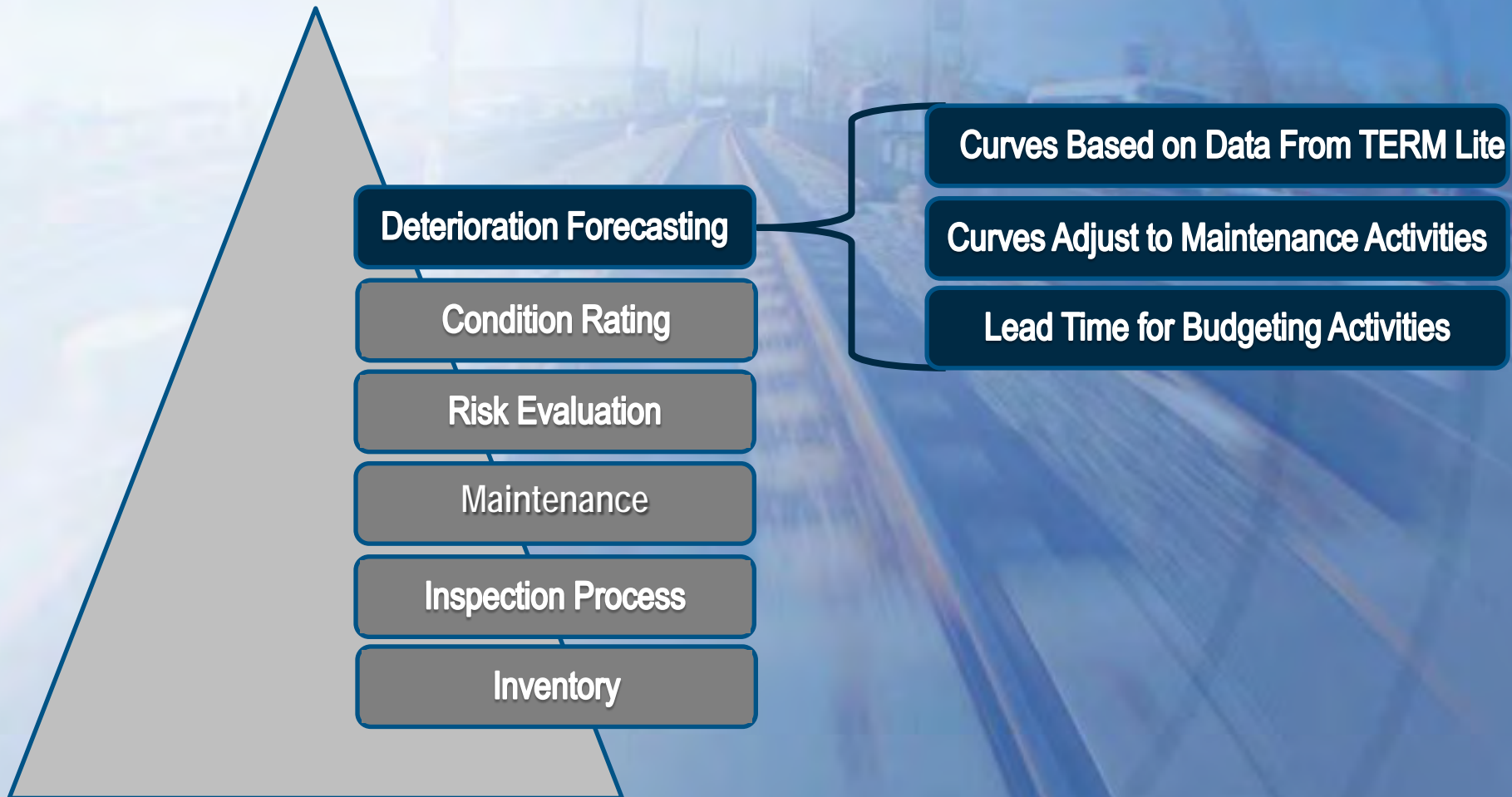


Out of a State of Good Repair

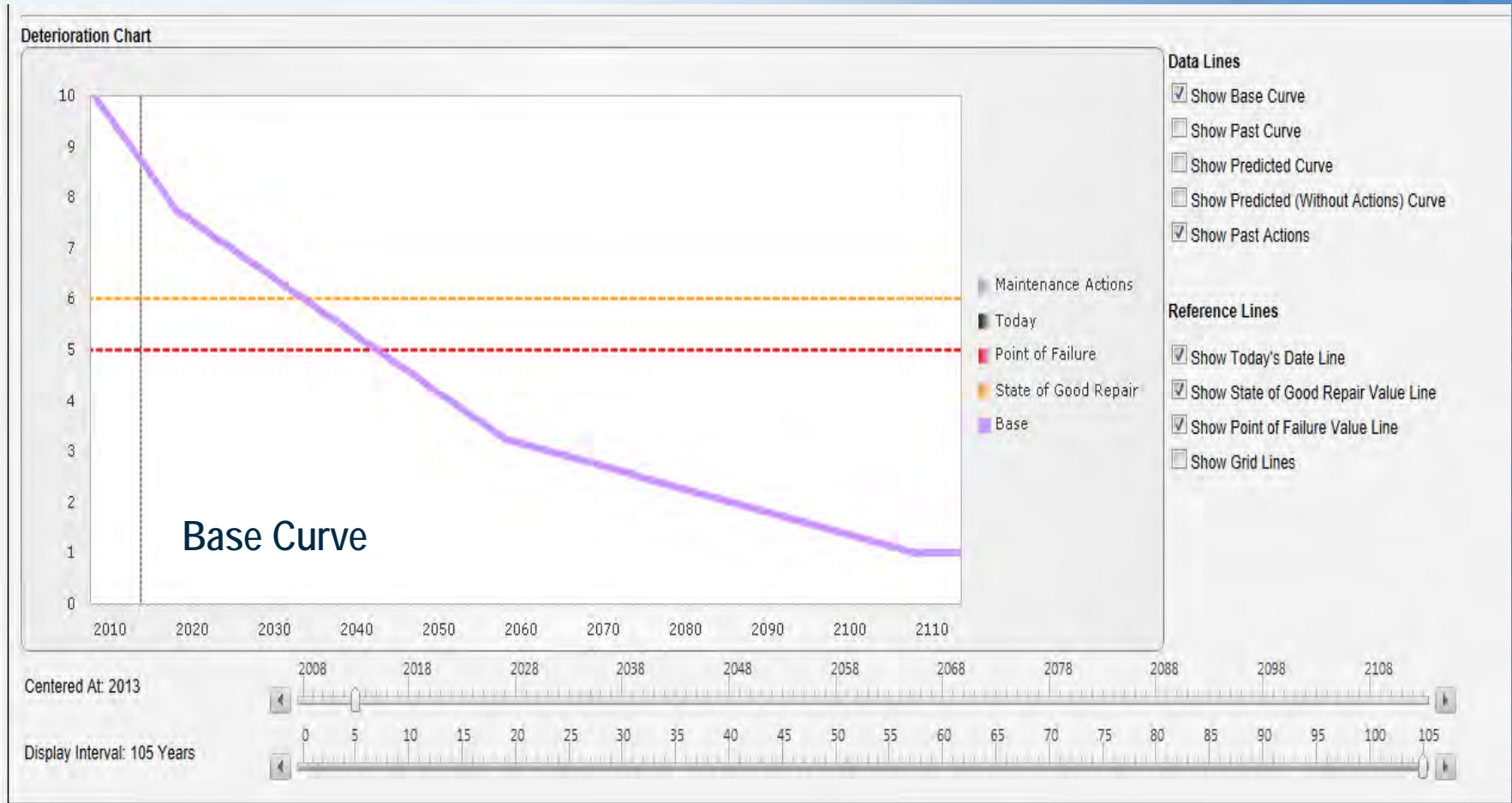


Condition Rating	Description
10	Excellent- No visible defects.
9	Very Good- Only minor adjustment needed.
8	Good- Asset showing minimal signs of wear.
7	Satisfactory- Asset has past repair maintenance history.
6	Adequate- Asset has moderately deteriorated components.
5	State-of-Good Repair- Asset has reached the end of its useful life but still performs without limitations.
4	Marginal- Increasing number of deteriorated components and increasing maintenance needs.
3	Concern- Asset performs its function with limitations.
2	Poor- Asset is in need of repair or replacement.
1	Critical- Asset out of service.

UTA/Bentley Asset Management Model

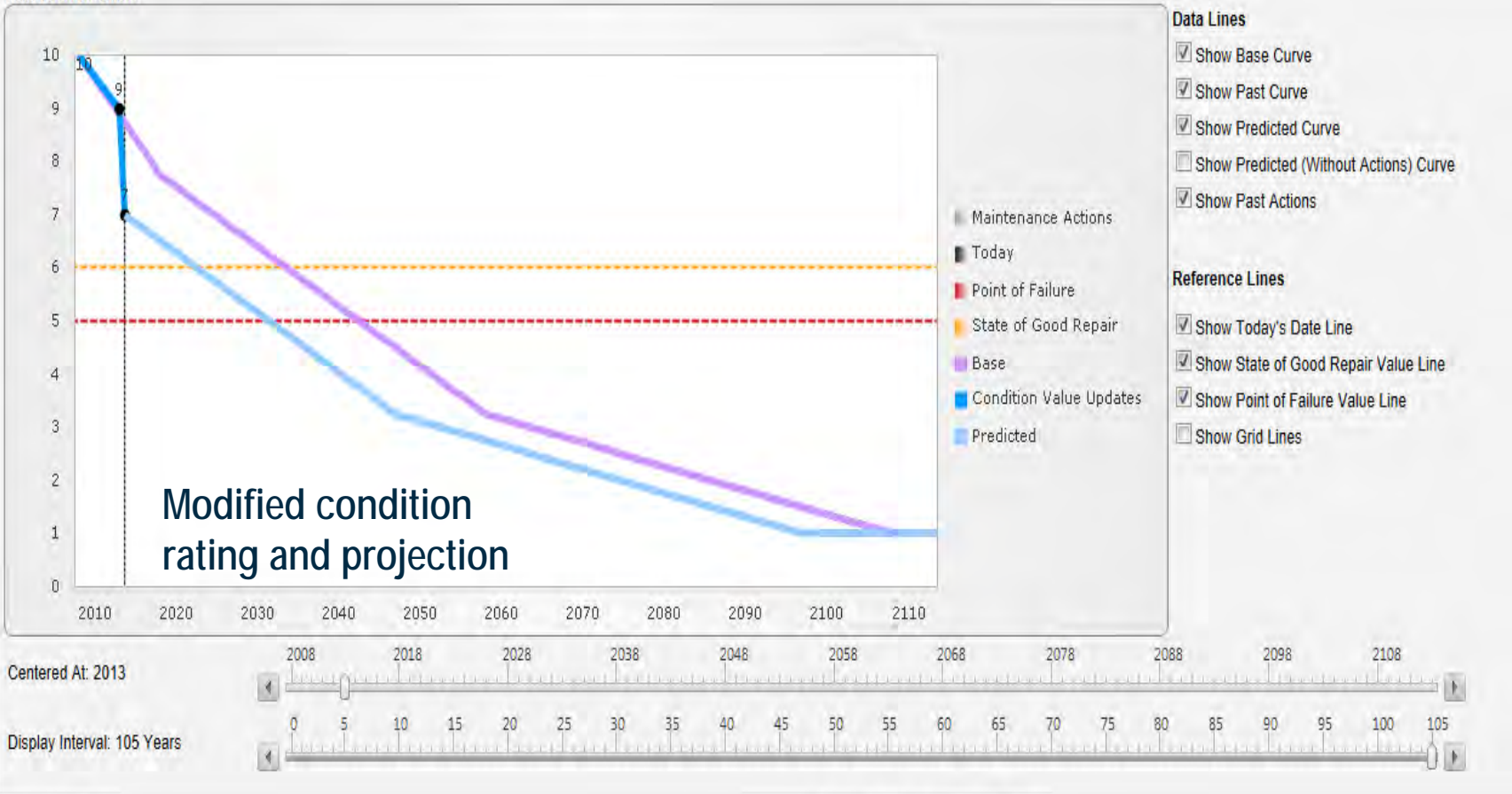


Deterioration Module



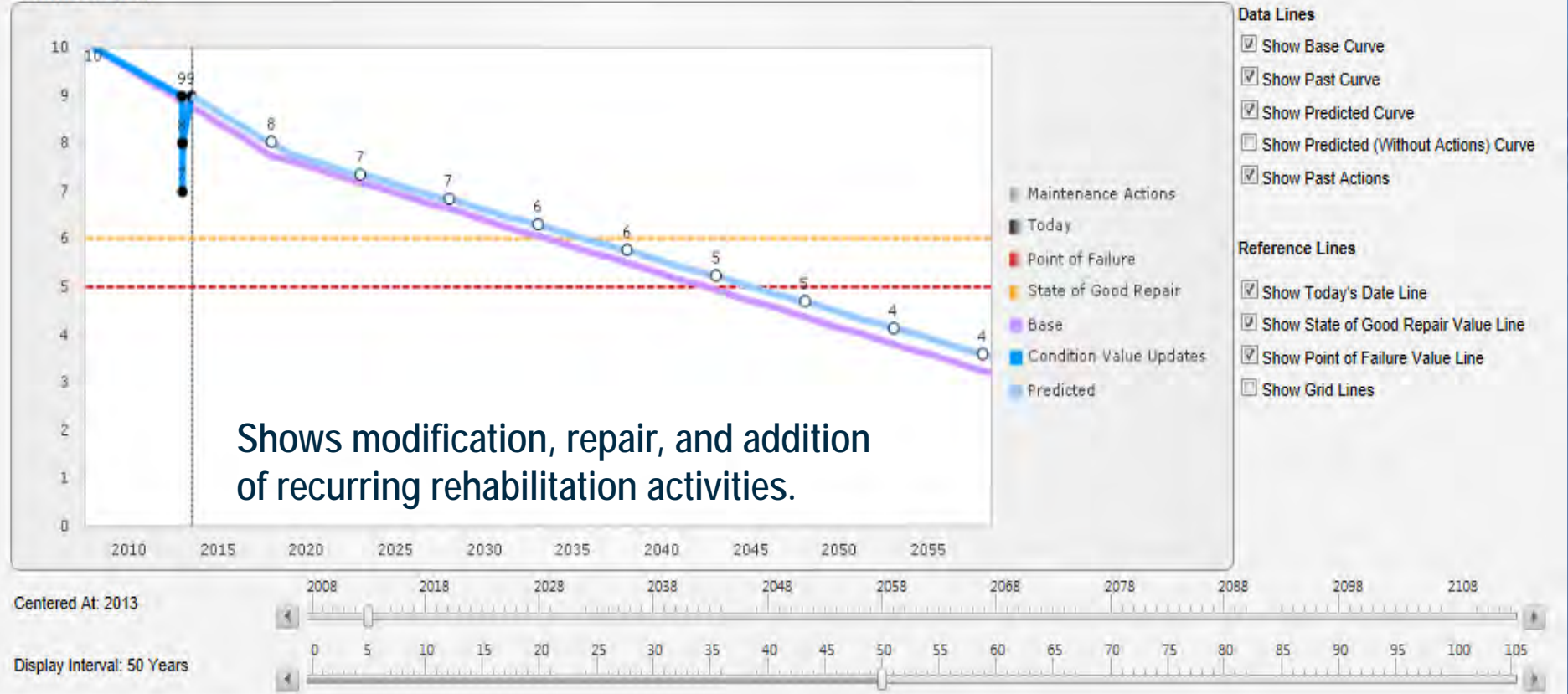
Deterioration Module

Deterioration Chart

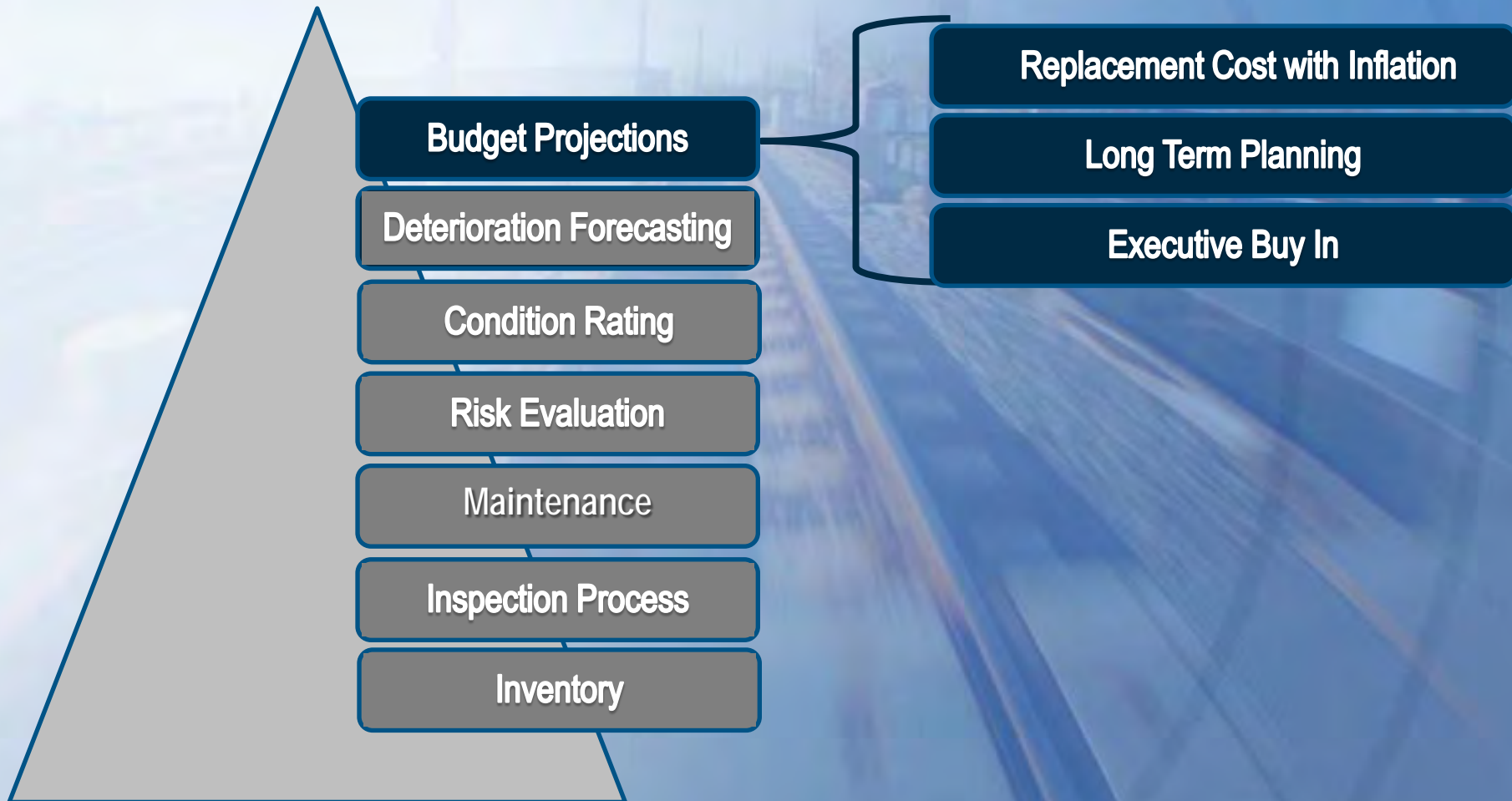


Deterioration Module

Deterioration Chart



UTA/Bentley Asset Management Model



Budget Component-

Parent Asset:

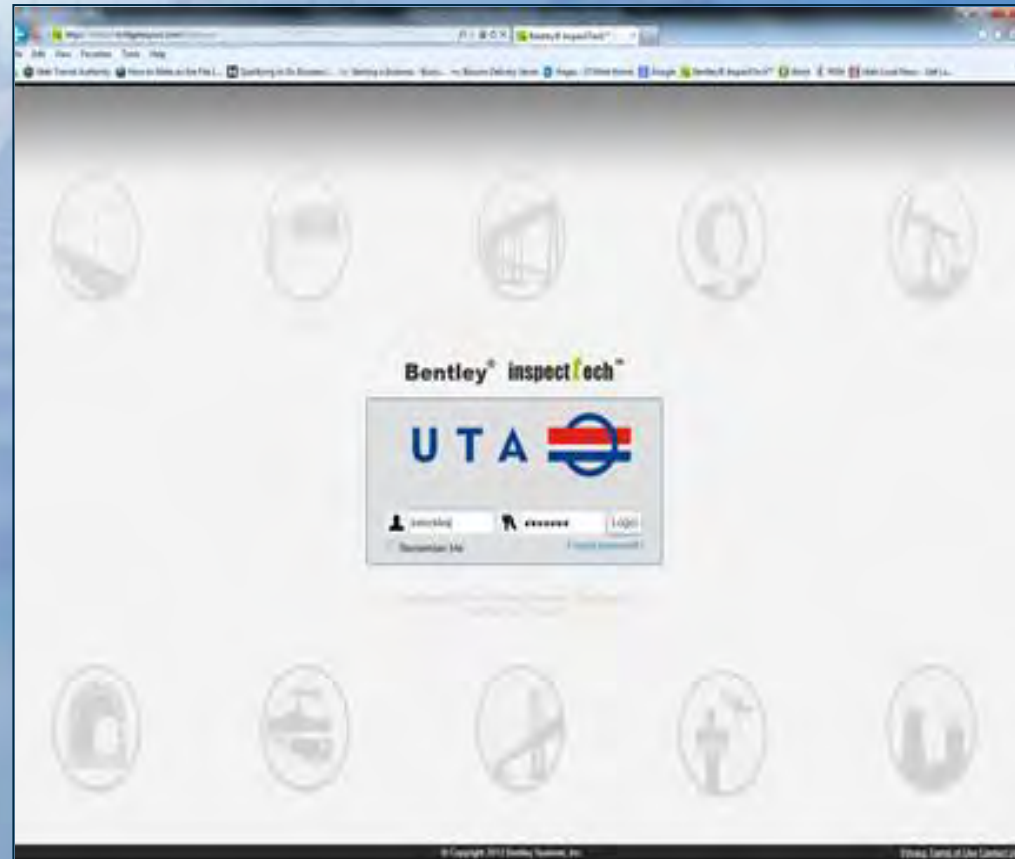
Output Type:

Report:

Report	Description	
State of Good Repair Backlog	Shows replacement cost for all assets that are no longer in a state of good repair.	run report
Budget Projection Forecast - Replacement Costs	30 year projection of replacement costs for assets that will reach their failure point.	run report
Budget Projection Report - Replacement Costs 0-10 Years	All Assets set to reach the failure point in the next 10 years.	run report
Budget Projection Report - Replacement Costs 11 - 20 Years	All Assets set to reach the failure point in the next 11 - 20 years.	run report
Budget Projection Report - Replacement Costs 21 - 30 Years	All Assets set to reach the failure point in the next 21 - 30 years.	run report
Budget Projection Forecast - All Costs	30 year projection of replacement & feasible action costs for assets that will reach their failure point.	run report
Budget Projection Report - All Costs 0 - 10 Years	10 year projection of replacement & feasible action costs for assets that will reach the failure point.	run report
Budget Projection Report - All Costs 11 - 20 Years	11 - 20 year projection of replacement & feasible action costs for assets that will reach the failure point.	run report
Budget Projection Report - All Costs 21 - 30 Years	21 - 30 year projection of replacement & feasible action costs for assets that will reach the failure point.	run report

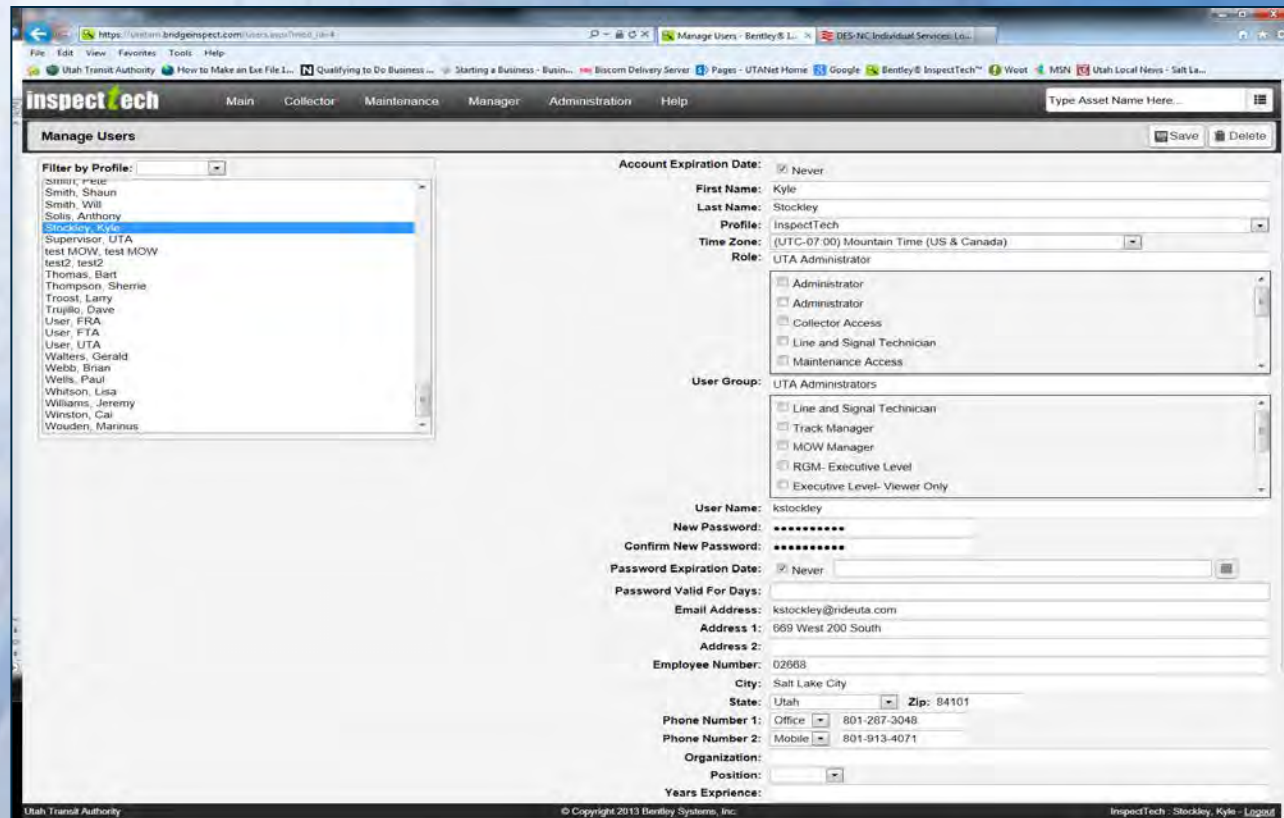
System Security

- Individual username and password for each employee
- Password must be complex with at least 8 characters. One must be uppercase and one must be a symbol



System Security

- Users can be assigned to workgroups
- System settings limit access to assets assigned



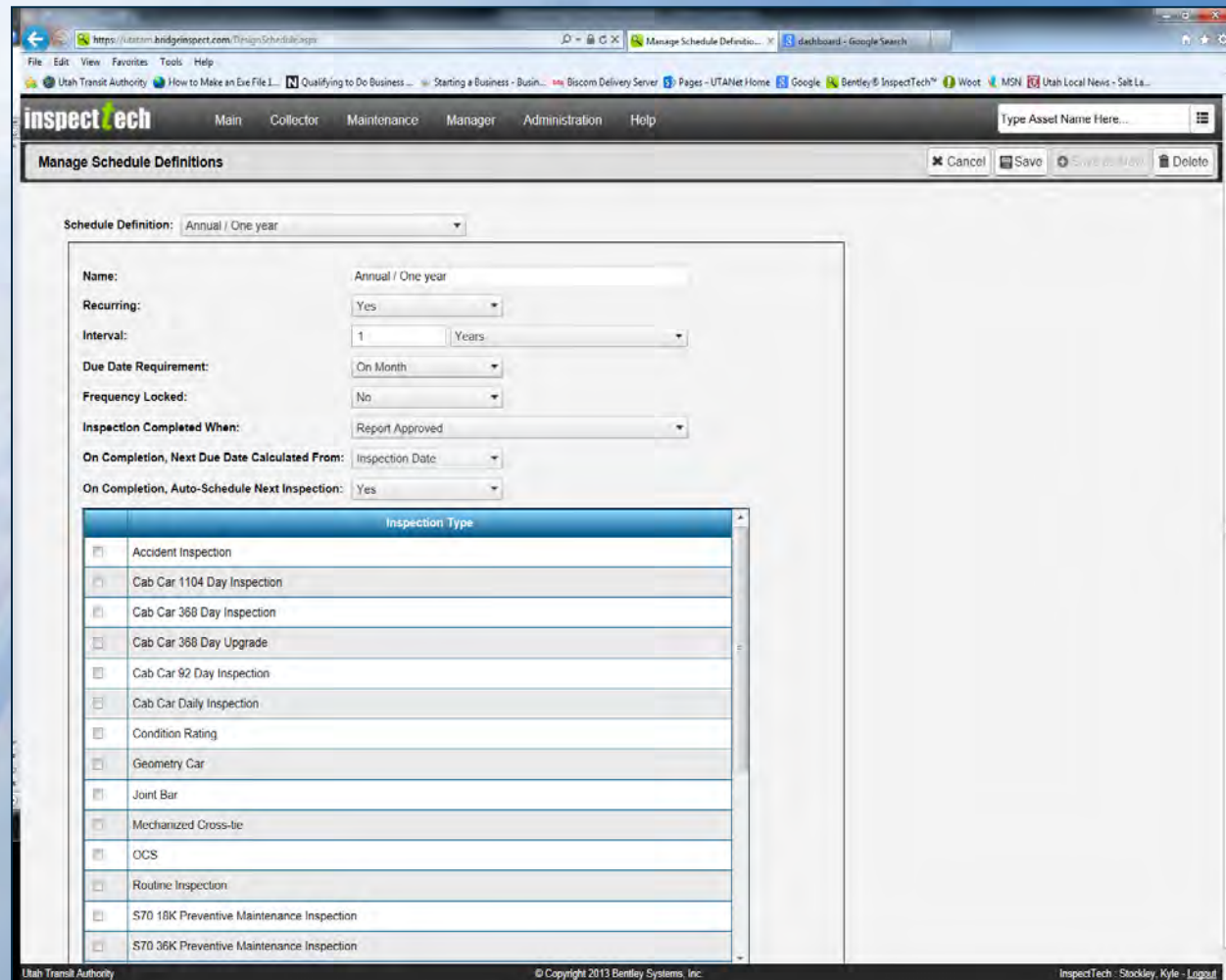
Dashboard and Widgets

- Offers transparency and control over the data associated within the system
- Each user can customize their view
- Direct link to the data and workflows



Scheduling Module

- Each inspection has a scheduling function
- Fully customizable for each type of inspection
- Reporting feature to track on time and overdue inspections



The screenshot shows the 'Manage Schedule Definitions' interface in the InspectTech application. The browser address bar shows the URL: <https://uatrain.bridginspect.com/ManageSchedule.aspx>. The application header includes the 'inspectTech' logo and navigation links: Main, Collector, Maintenance, Manager, Administration, Help. A search bar for 'Type Asset Name Here...' is also present.

The main content area is titled 'Manage Schedule Definitions' and includes a 'Schedule Definition: Annual / One year' dropdown menu. Below this is a form with the following fields:

- Name: Annual / One year
- Recurring: Yes
- Interval: 1 Years
- Due Date Requirement: On Month
- Frequency Locked: No
- Inspection Completed When: Report Approved
- On Completion, Next Due Date Calculated From: Inspection Date
- On Completion, Auto-Schedule Next Inspection: Yes

At the bottom of the form is a table titled 'Inspection Type' with a list of inspection types and checkboxes:

Inspection Type
<input type="checkbox"/> Accident Inspection
<input type="checkbox"/> Cab Car 1104 Day Inspection
<input type="checkbox"/> Cab Car 368 Day Inspection
<input type="checkbox"/> Cab Car 368 Day Upgrade
<input type="checkbox"/> Cab Car 92 Day Inspection
<input type="checkbox"/> Cab Car Daily Inspection
<input type="checkbox"/> Condition Rating
<input type="checkbox"/> Geometry Car
<input type="checkbox"/> Joint Bar
<input type="checkbox"/> Mechanized Cross-tie
<input type="checkbox"/> OCS
<input type="checkbox"/> Routine Inspection
<input type="checkbox"/> S70 18K Preventive Maintenance Inspection
<input type="checkbox"/> S70 36K Preventive Maintenance Inspection

At the bottom of the page, there is a footer with the text: 'Utah Transit Authority © Copyright 2013 Bentley Systems, Inc. InspectTech - Stockley, Kyle - Logout'

Condition Rating Module

The screenshot displays the 'inspect tech' software interface. The top navigation bar includes 'Main', 'Collector', 'Maintenance', 'Manager', 'Administration', and 'Help'. A search bar on the right contains the text 'Type Asset Name Here...'. Below the navigation bar, the asset name 'Jordan River Bridge (Eastbound) - MJW-ST-BR-CB-2.1-B (Bridge)' is displayed, with 'Back to Asset Detail' and 'Save' buttons. The main content area has two tabs: 'Asset Conditions' (selected) and 'Apply Actions'. The 'Asset Conditions' tab shows the following fields:

- Asset Condition Value: 10 (with a magnifying glass icon)
- Last Updated: 03/04/2014 11:13:24 AM
- Deterioration Group Type (DGT): TERM 10330, 10331, 10333 (dropdown menu)
- Date Built/Installed: 07/31/2011 (calendar icon)
- Manufacturer: (text input field)
- Quantity: (spinners)
- Material: (text input field)
- Replacement Cost: 28,404,064.91 (spinners)
- Deterioration Environment: 100 (spinners)

- Assets can be classified by the TERM time based or performance based condition rates
- Rehabilitation activities can be associated to extend useful life

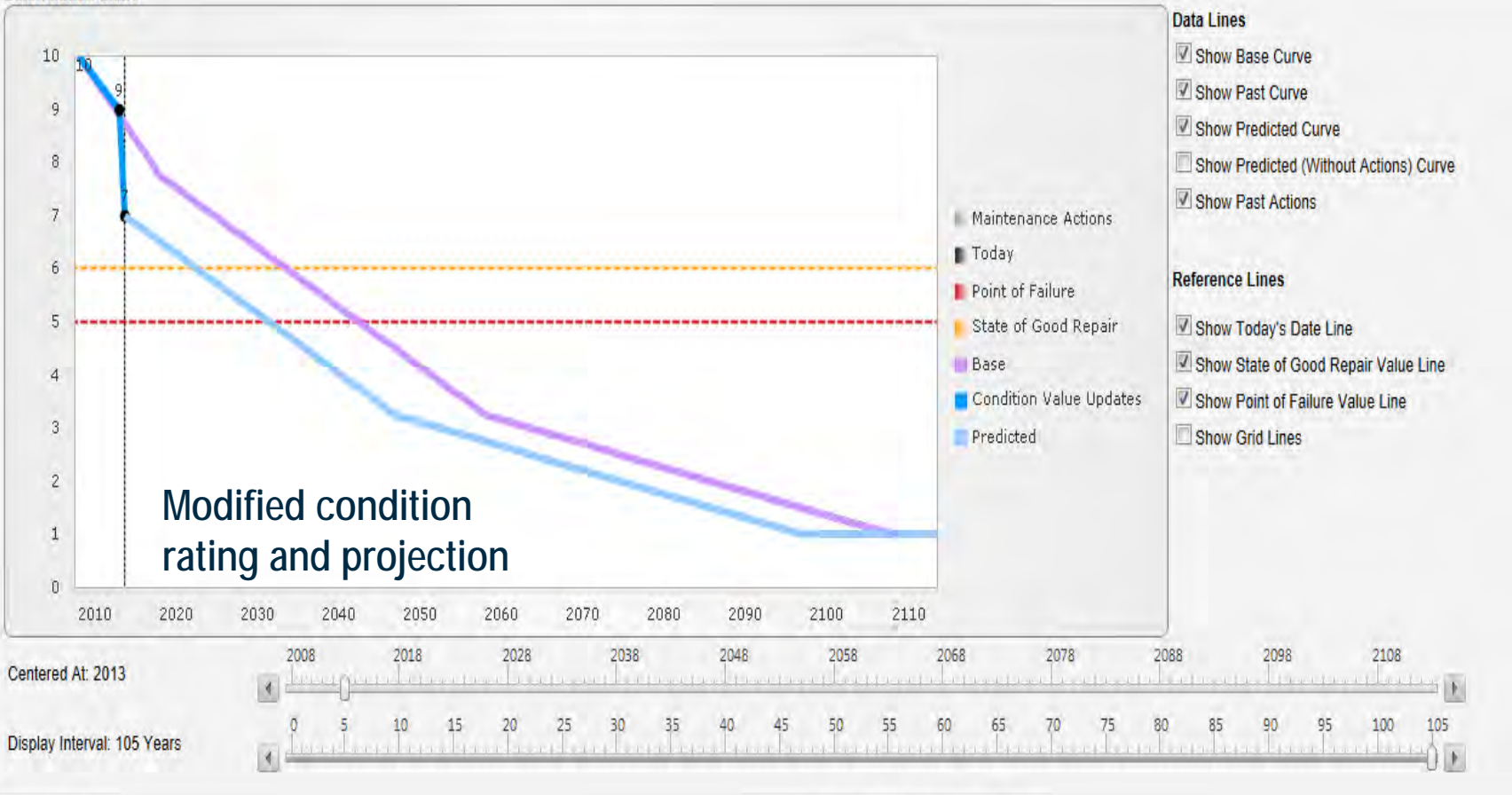
Deterioration Module

- Module accounts for time and performance based rates.
- System notification when assets approach the end of their useful life



Deterioration Module

Deterioration Chart



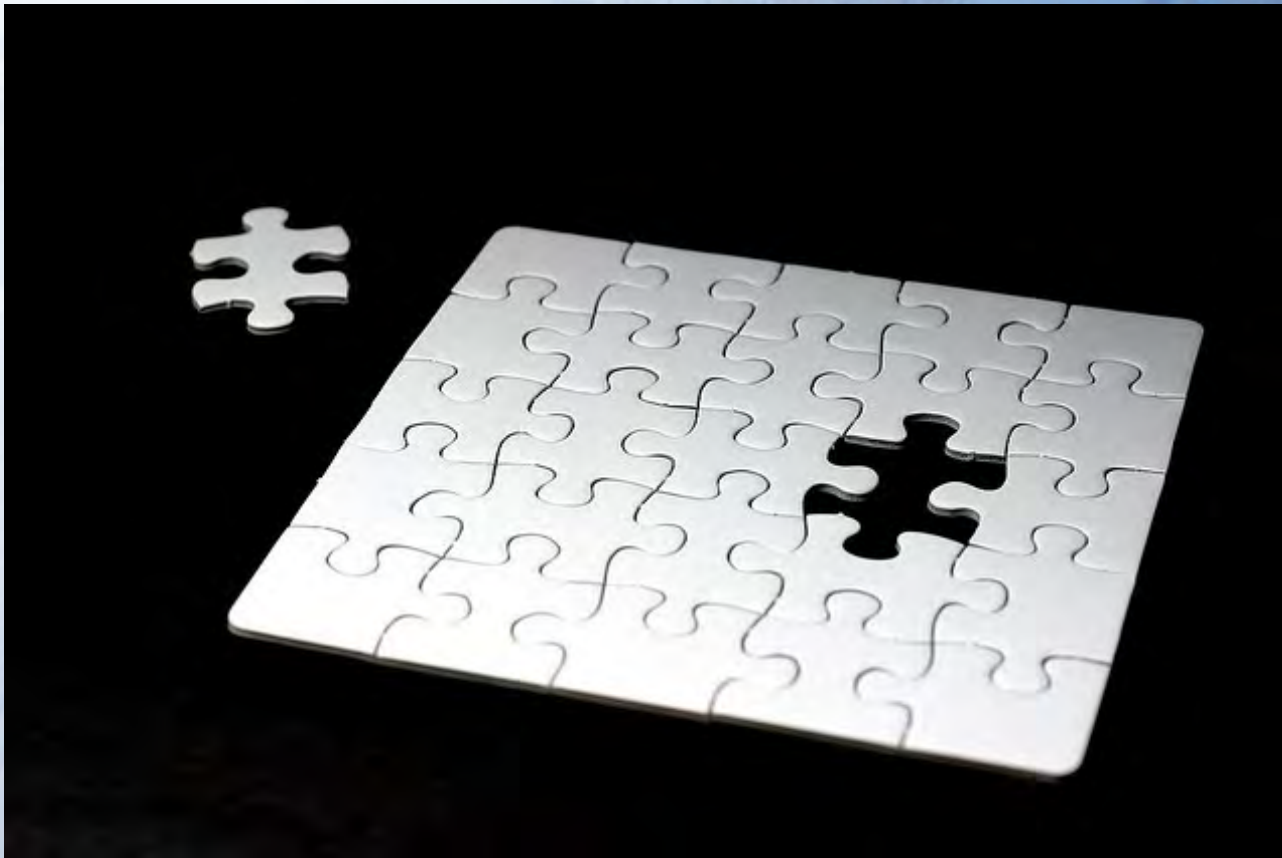
Circle of Asset Management



Benefits of the UTA/Bentley InspectTech System

- Inspections are available real time to supervisors and managers
- No lost data due to transfer from paper to electronic format
- Scheduling Module notifies when inspections are required
- Directly applies risk factors to condition of components
- Increased productivity and accuracy
- Provides input to create specific deterioration curves based on age and condition
- Eliminates asset condition guess work
- Provides real data input to create short and long range budgets for maintenance

How Does Asset Management Fit Into Your Organization?



Adjustment to Organization



Keys to Success

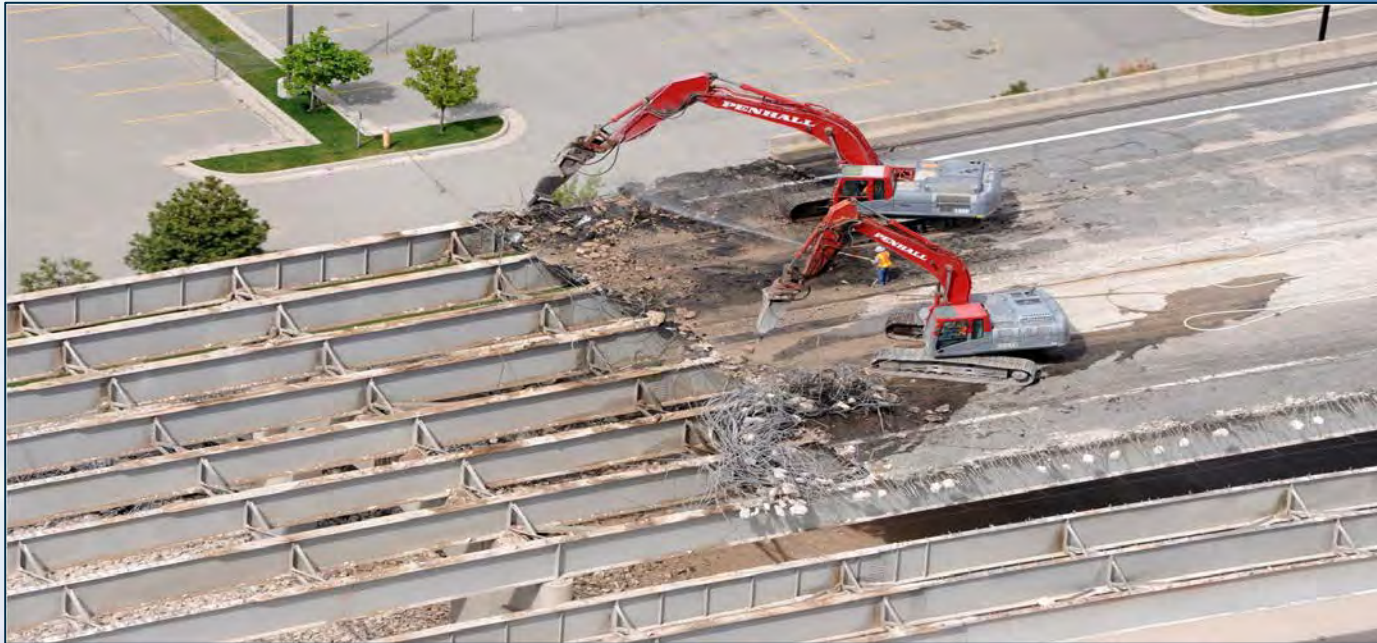
- Start with the end in mind
- Vision is easy, development is more difficult
- Acceptance at integration is key
- Must show end user the benefit to them personally for their job
- Identify a corporate champion early

Changing Mindset

- Transitioning from a construction and expansion mindset, to a maintain and maximize utilization mindset
- Abandoning the “fix it when it breaks” approach



Achieving Balance



An integrated and comprehensive asset management system will provide the basis to find the balance between expansion and maintaining a State of Good Repair

Steps to consider when developing an Asset Management Program

- Find and mentor an Executive Champion
- Develop an Asset Management Philosophy
- Identify existing resources
- Identify and involve internal customers
- Define key outputs to meet internal and external needs
- Overcome the internal fear associated with change

Opportunities and Recommendations

- Educate Executive Staff and Boards
- Foster open communication to ensure positive implementation
- Understand and plan for operational challenges
- Provide return-on-investment information
- It is less expensive to keep a customer than recruit a new one

Development of a comprehensive Asset Management System is a journey not a destination. Paul Edwards



Future steps on the Journey

- Refine scalability in price and function
- Develop direct data connection to National Transit Database (NTD) reporting requirements
- Complete lifecycle management module that ties to ERP financials
- Ongoing development to keep up with emerging technology
 - Smart phone apps
 - RFID
- Adapt data sharing for compatibility with other systems that agency may use

Acknowledgements

Federal Transit Administration

InspectTech Systems

Bentley Systems

Utah Transit Authority

APTA SGR Working Group



Questions?



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