Federal Transit Administration
Transit Asset Management Pilot Program
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

FTA Presentation, Global Mass Transit Conference, Washington DC, March 2013
“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

- Track
  - Ballasted Track
  - Embedded Track
  - Direct Fixation
  - Open Deck Timber
  - Special Track work
  - Curved Track
  - Tangent Track
  - Crossover
  - Double Crossover
  - Switch
Inventory Module - Simple Parent/Child Relationships
Detailed Inventory Information

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 Process
- Inventory
- Inspection Frequency
- Mobile Data Collection
- Process Efficiencies
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

Mobile Based Inspection Platform
Inspection Module Also Accessible By Map
UTA/Bentley Asset Management Model

- Maintenance
- Inspection Process
- Inventory

- Improved Safety
- Reduce Service Interruptions
- Extend Useful Life
- Improved Efficiencies
Maintenance Module

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

- Risk Evaluation
- Maintenance
- Inspection Process
- Inventory

- Customer Safety
- Impact on Service
- Asset Identification
- Maintenance Priority
Risk Areas for UTA
UTA/Bentley Asset Management Model

- Condition Rating
- Risk Evaluation
- Maintenance
- Inspection Process
- Inventory

- Inspected Assets Based on Performance
- Non Inspected Assets Based on Time
- Defined Condition Scale
<table>
<thead>
<tr>
<th>Condition Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Excellent- No visible defects.</td>
</tr>
<tr>
<td>9</td>
<td>Very Good- Only minor adjustment needed.</td>
</tr>
<tr>
<td>8</td>
<td>Good- Asset showing minimal signs of wear.</td>
</tr>
<tr>
<td>7</td>
<td>Satisfactory- Asset has past repair maintenance history.</td>
</tr>
<tr>
<td>6</td>
<td>Adequate- Asset has moderately deteriorated components.</td>
</tr>
<tr>
<td>5</td>
<td>State-of-Good Repair- Asset has reached the end of its useful life but still performs without limitations.</td>
</tr>
<tr>
<td>4</td>
<td>Marginal- Increasing number of deteriorated components and increasing maintenance needs.</td>
</tr>
<tr>
<td>3</td>
<td>Concern- Asset performs its function with limitations.</td>
</tr>
<tr>
<td>2</td>
<td>Poor- Asset is in need of repair or replacement.</td>
</tr>
<tr>
<td>1</td>
<td>Critical- Asset out of service.</td>
</tr>
</tbody>
</table>
UTA/Bentley Asset Management Model

- Deterioration Forecasting
  - Condition Rating
  - Risk Evaluation
  - Maintenance
  - Inspection Process
  - Inventory

- Curves Based on Data From TERM Lite
- Curves Adjust to Maintenance Activities
- Lead Time for Budgeting Activities
Deterioration Module

Base Curve
Deterioration Module

Modified condition rating and projection
Deterioration Module

- Provides automatic age-based condition rating assessment.
- Allows users to apply their own condition ratings.
- Allows users to apply useful life modifying activities to an asset.
- Accounts for changes in the budget projections.
- Accounts for both time and performance based condition assessments.

Shows modification, repair, and addition of recurring rehabilitation activities.
UTA/Bentley Asset Management Model

Budget Projections
- Deterioration Forecasting
- Condition Rating
- Risk Evaluation
- Maintenance
- Inspection Process
- Inventory

- Replacement Cost with Inflation
- Long Term Planning
- Executive Buy In
## Budget Component

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

- 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

Modified condition rating and projection
Circle of Asset Management

Transit Asset Management Cycle

- Inventory
- Inspection
- Deterioration
- Budget Projections
- Prioritization of Projects
- Project Development
- Construction
- Project Closeout
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

Capital
Maintenance
IT
Finance
Operations
Safety
Planning

Asset Management
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
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
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

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Bentley Systems
Utah Transit Authority
APTA SGR Working Group