TRANSIT ASSET MANAGEMENT MANUAL - OVERVIEW

State of Good Repair Roundtable
Philadelphia, PA
July 17, 2012
Presentation Topics

• Manual Overview
• Transit Asset Management in Context
• Transit Asset Management Framework
• Transit Asset Management Implementation
• Q&A
Manual Objectives

- Designed to increase the awareness and improve the practice of asset management in the US transit industry
- Provides a transit agency–specific application of asset management concepts, processes, and tools
- Supports an agency’s drive to increase the maturity of asset management practice
- Provides tools and resources for agency managers and practitioners across the country
Manual Organization

- Introduces key asset management concepts
- Presents an asset management framework and business model that define and communicate “best practice”
- Provides guidance that can be used to prepare and implement transit asset management plans
- Includes tools and case studies that can support asset management planning and implementation
Transit Asset Management Manual Chapters

1. Preface and Guide Introduction
   Provides reader with the purpose, structure, and sources of this document. Additionally, it helps the reader navigate to the sections most useful to them.

2. Introducing Transit Asset Management
   Provides reader with a framework and a “visual” of a highly-functioning asset management transit agency. Defines transit asset management and outlines expected benefits and outcomes.

3. Asset Management Framework Business Processes
   For each process outlined in the framework, this chapter provides: how to and best practice guidance, key implementation activities and challenges, and peer examples.

4. Asset Management Information Systems
   Describes the use of asset management information systems, and summarizes the implementation principles associated with these tools.

5. Asset Class-Specific Information
   For each major asset class, this chapter outlines lifecycle management considerations and “best practices.”

6. Implementation Guidance
   Provides guidance on planning for and implementing change that improves an agency’s asset management practices. It introduces key implementation concepts, provides an agency self-assessment for determining the agency’s maturity baseline, and outlines potential implementation paths for incorporating into the agency’s business plan.
Transit-Specific Asset Management Planning Application

- PAS55 (British Standards Institute)
- International Infrastructure Management Manual (New Zealand Asset Management Support)
- ISO 55001 asset management committee (International Org. for Standardization)
- AASHTO Transportation Asset Management Guide: Volume 2 – A Focus on Implementation

Industry Best Practices

Transit Application

- Business objectives: Reliability, safety, and customer satisfaction
- Systems: Assets are interconnected
- Level of service dependent on unique portfolio of asset classes and systems
- Stakeholders: Varying interests and knowledge
- Governance and related business requirements

Transit Asset Management Guidance

Asset Management Guides
Project Approach

1. Research Best Practices
   - Jun - May

2. Develop Best Practice Business Model
   - Jul - Nov

3. Develop Implementation Framework
   - Nov - May

4. Develop Guidance & Training
   - Apr - Jul

Partner agency collaboration

Obtain industry feedback
Transit Asset Management in Context
Transit Asset Management Defined

*Transit asset management is a strategic and systematic process through which an organization procures, operates, maintains, rehabilitates, and replaces transit assets to manage their performance, risks, and costs over their lifecycle to provide cost-effective, reliable, and safe service to current and future customers.*
Transit Asset Management – Managing Cost, Risk, and Performance across the Lifecycle

Asset Management

Cost

Risk

Time

Performance

Cost

Risk

Performance

Performance

Cost

Risk
Key Component of Agency Strategic Management

Performance Management

Asset Management

Risk Management
## Transit Asset Management Agency Benefits

<table>
<thead>
<tr>
<th>Transit Agency Business Benefits</th>
<th>Asset Management Approach</th>
</tr>
</thead>
</table>
| Improve customer service                | • Improves on-time performance and service operations, vehicle and facility cleanliness; reduces missed trips, slow orders, and station shutdowns  
                                           • Focuses investments around customer-driven goals and metrics                                                 |
| Improve productivity and reduce costs   | • Maintains assets more effectively, using condition-based approaches and using predictive and preventive maintenance strategies (where these can be employed) to reduce costs while improving service delivery |
| Optimized resource allocation           | • Better aligns spending with the agency’s goals and objectives to obtain the greatest return from limited funds  
                                           • Incorporates lifecycle cost, risk, and performance trade-offs into capital programming and operations & maintenance budgeting |
| Improved stakeholder communications     | • Provides stakeholders with more accurate and timely customer-driven performance indicators  
                                           • Provides tools to communicate forecasted performance metrics (including level of service) based on different levels of funding |
Transit Asset Management Framework Overview
Draft Transit Asset Management Framework

Enterprise Level

- Policy
- Strategy
- Business Planning

Cross-Asset Planning and Management

- Capital Planning and Programming
- O&M Budgeting
- Performance Modeling

Asset Class Level

- Lifecycle Management

Vehicles

- Rail Vehicles & Fixed Guideway Non-Revenue Vehicles
- Buses, Paratransit & Non-Revenue Vehicles

Facilities and Stations

- Rail Maintenance Facilities
- Bus Maintenance Facilities
- Service Facilities
- Public Facilities

Guideway Elements

- Track
- Bridges & Aerial Structures
- Tunnels, U Sections, & Cross Passages
- Ancillary

Systems

- Security
- Traction Electrification
- Signals
- Communications/ Monitoring/ SCADA
- Revenue Collection

Information Technology Systems

- Leadership and Accountability
- Training
- Communications

Enablers

- Values and Culture
- Project Management
- Continuous Improvement
Asset Management Framework Business Processes

**Asset Management Policy and Strategy**
- **Policy**
  - Confirms agency’s commitment to asset management and continual improvement
  - Provides top-down direction regarding expectations and mandatory requirements
- **Strategy**
  - Provides approach to addressing policy
  - Includes goals, objectives, and performance expectations of asset management
- **Business Planning**
  - Provides approach to addressing strategy
  - Outlines asset management roles and responsibilities, implementation approach, resources, & timeline

**Lifecycle Management**
- **Inventory**
  - Provides asset repository in a hierarchy that supports the asset management strategy
  - Requires data ownership and established data maintenance process
- **Condition Assessment and Performance Monitoring**
  - Outlines condition inspection and measurement approach for asset classes
  - Addresses risk and ensures assets can meet their performance requirements
- **Lifecycle Management Planning**
  - Specifies asset class-specific activities that consider costs, performance, risks of asset class throughout its lifecycle
  - Includes performance requirements, condition assessment approach, preventive maintenance activities, etc.

**Cross-Asset Planning and Management**
- **Capital Planning and Programming**
  - Optimizes how and when capital funds are expended based on consistent, reliable data
  - Reflects “top-down” guidance from agency leaders and “bottom-up” forecasted capital needs from agency staff
- **O&M Budgeting**
  - Optimizes how and when O&M funds are expended based on the agency’s level of service goals
  - Relies on performance-based decision-making reflecting input from the lifecycle management plans
- **Performance Modeling**
  - Applies analytical tools that use reliable condition and cost data to model asset performance under different investment scenarios

**Information Technology Systems**
- Leadership and Accountability
- Training
- Communications

**Enablers**
- Values and Culture
- Project Management
- Continuous Improvement

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**Cross-Asset Planning and Management**
- **Asset Management**
- **Policy and Strategy**
- **Lifecycle Management**
- **Strategy**
- **Business Planning**
- **Inventory**
- **Condition Assessment and Performance Monitoring**
- **Lifecycle Management Planning**
- **Capital Planning and Programming**
- **O&M Budgeting**
- **Performance Modeling**

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Asset Class Hierarchy

Vehicles
- Rail Vehicles & Fixed Guideway Non-Revenue Vehicles
- Buses, Paratransit & Non-Revenue Vehicles

Facilities & Stations
- Rail Maintenance Facilities
- Bus Maintenance Facilities
- Service Facilities
- Stations

Guideway Elements
- Track
- Bridges
- Tunnels
- Ancillary Structures

Systems
- Security
- Traction Electrification Systems
- Signals/Automatic Train Control
- Communications/Monitoring/SCADA
- Revenue Collection
Asset Class Example: Maintenance Facilities

- **Definition**: refers to the structures used for maintaining all revenue vehicles

- **Lifecycle Management Considerations**:
  - Design: Consider on-site circulation of work processes when designing facility to make work flow more efficient and reduce accidents
  - Preventative Maintenance: When possible, utilize a maintenance management system for tracking facility maintenance requirements and proper intervals
  - Capital Rehabilitation/Replacement: Replace all lighting and plumbing fixtures in building (likely at one time)
  - Disposal: Consider re-sale opportunities of equipment

- **Condition Assessment and Performance Monitoring**:
  - Monitor lumen output every 2 years to check for lighting levels
  - Monitor air changes per hour on a continuous basis
Asset Class Example: Maintenance Facilities (cont.)

• Sustainability Considerations

<table>
<thead>
<tr>
<th>Sustainability Considerations</th>
<th>Benefits</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renewable Energy</td>
<td>Cost savings, GHG</td>
<td>Renewable energy options with utility provider, independent power provider with proposed energy source (e.g., wind farm, concentrated solar, photovoltaic)</td>
</tr>
<tr>
<td>Healthy materials</td>
<td>Customer and employee healthy</td>
<td>No volatile organic compounds (VOC), formaldehydes, or other toxic materials</td>
</tr>
</tbody>
</table>

• Performance Metrics

<table>
<thead>
<tr>
<th>Asset Class</th>
<th>Condition/Structural Assessment Metrics</th>
<th>Performance Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus and Rail Facilities</td>
<td>• Energy efficiency, which can be measured by the billing costs of electricity, water, gas, and garbage.  • Effective facility management may be measured by the costs of maintenance and replacement of assets.</td>
<td>• Availability</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Safety (days without incident, # of workers comp claims)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Compliance with preventive facility maintenance program</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Employee satisfaction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• On-time performance (indirectly)</td>
</tr>
</tbody>
</table>
Transit Asset Management Implementation
Asset Management Maturity

**Level 1**
- Policy & Strategy
- Level of Service (LOS) Objectives
- Business Plan

**Level 2**
- Asset Inventory
- Condition Inspection

**Level 3**
- Condition Assessment
- Performance Assessment
- Risk Analysis

**Level 4**
- Capital Programming
- O&M Budgeting

**Level 5**
- Performance modeling
- Data-Driven Lifecycle Management Planning and Models

**“I know where I want to be”**

**“I know what I have”**

**“I know where I am against my objectives”**

**“I use asset lifecycle information in my budgeting processes.”**

**“I know how to optimally manage across the lifecycle”**
Implementation Activities

Prepare for Implementation
• Assess awareness
• Consider enablers
• Establish leadership and accountability

Assess Agency Maturity
• Determine baseline
• Communicate baseline
• Determine target

Develop Business Plan
• Develop business case
• Decide on implementation path
• Outline key activities
• Outline roles and responsibilities

Manage Implementation
• Develop communications strategy
• Develop information systems strategy
• Develop performance management strategy
Organization/Leadership Concept

**Top-Down Approach:**
Leadership provides strategic direction, sets expectations, empowers managers, and allocates resources.

**Bottom-Up Approach:**
Middle management and staff implement and improve upon the asset management initiative.
# Key Asset Management Roles

<table>
<thead>
<tr>
<th>Roles</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Board Members</td>
<td>Approves the asset management policies, strategy, and business plan&lt;br&gt;Provides overall accountability</td>
</tr>
<tr>
<td>GM/C.E.O.</td>
<td>Establishes the goals, policies, and level of service requirements for the organization&lt;br&gt;Dedicates appropriate resources&lt;br&gt;Provides leadership needed to drive change&lt;br&gt;Enforces strong accountability measures</td>
</tr>
<tr>
<td>Program Manager</td>
<td>Leads development and implementation of AM Business Plan&lt;br&gt;Leads AM Steering Committee&lt;br&gt;Communicates to internal and external stakeholders</td>
</tr>
<tr>
<td>Steering Committee</td>
<td>Responsible for developing and sharing AM best practices throughout organization</td>
</tr>
<tr>
<td>Asset Owners</td>
<td>Leads development and implementation of asset-specific lifecycle management plans</td>
</tr>
<tr>
<td>Department Heads</td>
<td>Ensures all line staff understand how their job supports AM strategy</td>
</tr>
<tr>
<td>Line Staff</td>
<td>As the key asset management business plan implementers, these individuals should conduct day-to-day responsibilities with an understanding of how they support the AM strategy</td>
</tr>
</tbody>
</table>
Asset Management and Information Technology

Enterprise Asset Management System

Enterprise Systems
- Financial and accounting management
- Capital programming
- GASB reporting
- HR management

Transit Asset Management System
- Asset inventory
  - Location | Age | Type | Count
- Asset condition
  - Attributes | Raw data | Rating | Deterioration/decay curves
- Condition monitoring, detection and tracking systems
  - Rail track reporting | Signal condition
- Facilities management
  - Inventory | Warranty, claims tracking
- Fleet management
  - Warranty, claims tracking | Incident management
- Maintenance management
  - Work orders | Labor/equipment costs | Asset condition updates
- Scenario analysis
  - Data analysis | Trade-off analysis
- Parts Management
  - Parts inventory | Usage trends

Engineering Systems
- Linear referencing system
- Project management system
- GIS mapping tools
- Operations and control systems
Transit Asset Management Maturity Agency
Self-Assessment Sample Output

100%
Information Systems

Continuous
Improvement

Organization and
Leadership

73%

33%

Project Management
93%

60%

47%

Skills and Training

Values and Culture

80%

Communications
## Implementation Path #1: Enterprise-Driven

### Enterprise-Driven Implementation Path

<table>
<thead>
<tr>
<th>Component</th>
<th>First 6 Months</th>
<th>6-12 Months</th>
<th>1-2 Years</th>
<th>3+ Years</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Policy &amp; Strategy</strong></td>
<td>Develop asset management policy &amp; strategy</td>
<td>Update asset management policy, strategy, and business plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lifecycle Management</strong></td>
<td>Identify critical assets and asset owners</td>
<td>Develop lifecycle management plans</td>
<td>Collect asset age and condition data</td>
<td>Develop processes for maintaining inventory data</td>
</tr>
<tr>
<td><strong>Cross-Asset Planning &amp; Management</strong></td>
<td>Develop updated prioritization processes based on SGR data</td>
<td>Incorporate lifecycle management plan data into budgeting process</td>
<td></td>
<td>Conduct scenario evaluation</td>
</tr>
<tr>
<td><strong>Information Systems</strong></td>
<td>Develop centralized inventory</td>
<td>Develop a performance modeling tool</td>
<td>Utilize maintenance management and other work management tools</td>
<td>Integrate all tools</td>
</tr>
<tr>
<td><strong>Enablers and Change Management</strong></td>
<td>lead two-way communications with stakeholders</td>
<td>Provide appropriate training to agency management and staff</td>
<td>Utilize condition monitoring, detection, and tracking systems</td>
<td>Encourage culture of accountability and continual improvement</td>
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# Implementation Path #2: Asset Class-Driven

<table>
<thead>
<tr>
<th>Asset Class-Driven Implementation Path</th>
<th>First 6 Months</th>
<th>6-12 Months</th>
<th>1-2 Years</th>
<th>3+ Years</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Policy &amp; Strategy</strong></td>
<td></td>
<td>Update asset class-specific policies</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lifecycle Management</strong></td>
<td>Identify 1-2 critical assets</td>
<td>Collect asset age and condition data</td>
<td>Replicate process for more asset classes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Develop lifecycle management plan for critical assets</td>
<td>Incorporate lifecycle management plan data into budgeting process</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cross-Asset Planning &amp; Management</strong></td>
<td></td>
<td>Develop and populate centralized inventory with critical asset data</td>
<td>Utilize maintenance management and other work management tools</td>
<td>Utilize condition monitoring, detection, and tracking systems</td>
</tr>
<tr>
<td><strong>Information Systems</strong></td>
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<tr>
<td><strong>Enablers and Change Management</strong></td>
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</table>
# Implementation Path #3: Capital-Driven

## Capital Planning and Programming-Driven Implementation Path

<table>
<thead>
<tr>
<th></th>
<th>First 6 Months</th>
<th>6-12 Months</th>
<th>1-2 Years</th>
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</thead>
<tbody>
<tr>
<td><strong>Policy &amp; Strategy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lifecycle Management</strong></td>
<td>Create high-level asset hierarchy for all assets</td>
<td>Collect asset age and condition data</td>
<td>Develop processes for maintaining inventory data</td>
<td></td>
</tr>
<tr>
<td><strong>Cross-Asset Planning &amp; Management</strong></td>
<td></td>
<td></td>
<td></td>
<td>Incorporate asset data into capital programming process</td>
</tr>
<tr>
<td><strong>Information Systems</strong></td>
<td>Develop centralized inventory</td>
<td>Develop a performance modeling tool</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Enablers and Change Management</strong></td>
<td>Lead two-way communications with stakeholders</td>
<td>Provide appropriate training to agency management and staff</td>
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U.S. Department of Transportation
Federal Transit Administration
Next Steps
Status and Next Steps

• Chapters 1 through 4 and Chapter 6 in draft final and ready to publish
• Chapter 5 – asset class specific undergoing further technical input will be complete and ready for review this month
• Prepare for training and roll out
Questions? Comments?

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