Research Objectives

1. Advance the state-of-the-practice, leverage lessons learned, make specific and immediately useful for transit

2. Develop an asset management framework and business model that advances “best practice”

3. Address enterprise and asset class level activities:

   For each asset class, address: policy, strategy, business planning, capital planning & programming, O&M budgeting, long-range planning, scenario evaluation, inventory, condition inspection & performance monitoring, and lifecycle management

4. Provide tool to guide migration from current baseline to high-performance asset management organization
Research Addresses Transit Application

Transit Asset Management Manual

Industry Best Practices

Asset Management Guides

PAS55
(British Standards Institute for the optimized management of physical assets)

International Infrastructure Management Manual (New Zealand Asset Management Support)

AASHTO Transportation Asset Management Guide: Volume 2 – A Focus on Implementation

ISO 55001 asset management committee (International Org. for Standardization)

Other

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
Asset-Specific Information

• **Asset Class Description** - What assets are included in this group? How are they different from other asset classes?

• **Sub-assets** – What would the next one or two levels of sub-assets include (e.g., revenue and non-revenue vehicles with some examples)?

• **Performance metrics** – What metrics are used to measure reliability, availability, maintainability, safety, and customer satisfaction?

• **Lifecycle Management** - What affects asset condition (e.g., geography, groundwater intrusion, weather, vandalism, etc.)? What lifecycle activities should be undertaken for this asset class (e.g., refurbishing engines and seats, tie replacement, etc.)?

• **Condition Assessment & Performance Monitoring** – How often should assets be inspected? Can a sub-set (or sample) of the assets be inspected? How are they inspected (tools? visuals?) and how is condition measured? What does condition data tell us about performance (current and future)? What are common issues?

• **Industry Standards/Business Requirements** – What requirements, standards, and guidelines exist for this asset class (please differentiate)? Where can they be found?

• **Best practice examples**
Transit Asset Management Core Concepts

Customer-Centric Management

- Management approach that aligns performance with the customer experience to drive business success. This aligns enterprise management with customer-driven level of service metrics, such as on-time performance, convenience, vehicle cleanliness among others.

Enterprise Management

- Refers to corporate management processes, activities and decisions that occur at the highest level of an organization and apply across all departments and business or service lines.

Level of Service

- Defined service quality that the organization is expected to deliver and be measured against. Service levels usually relate to quality, quantity, reliability, responsiveness, sustainability, and cost. Applies at the enterprise (or corporate) level and for asset classes (e.g., rail vehicles and elevators).

Lifecycle Management

- The process of managing and maximizing the performance of an asset while minimizing its costs and risks throughout the course of its lifecycle.
Management Context

- Performance Management
- Asset Management
- Enterprise Risk Management
Transit Asset Management Framework

Enterprise Level

Strategy and Guidance
- Policy
- Strategy
- Business Planning

Cross-Asset Planning and Management
- Capital Planning & Programming
- O&M Budgeting
- Scenario Evaluation & Management

Asset Class Hierarchy
- Lifecycle Management

- Vehicles
- Facilities and Stations
- Trainway and Track Elements
- Systems

Data, Tools, and Procedures
- Asset inventory
- Condition assessment & performance monitoring
Asset Class Hierarchy

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

Facilities & Stations
- Rail Maintenance Facilities
- Bus Maintenance Facilities
- Private-Use Administrative Facilities
- Public-Use Administrative Facilities

Trainway & Track Elements
- Trainway (mainline)
- Trainway (yard)
- Trainway Support Structures/Facilities
- Trainway Ancillary Structures
- Trackwork

Systems
- Elevators, Escalators, and Moving Sidewalks
- Security Systems
- Traction Electrification Systems
- Signals & Communications
- Building & Facility Services (MEP)
Asset Management Business Processes

**Strategy & Guidance**
- **Policy**
  - Outlines the scope & principles of AM
  - Incorporates federal, state, local, industry, and agency AM goals and policies
- **Strategy**
  - Provides approach to addressing policy
  - Includes goals, objectives, and performance expectations of AM
- **Business Planning**
  - Provides approach to addressing strategy
  - Outlines AM roles & responsibilities, implementation approach, resources, & timeline

**Cross-Asset Planning & Management**
- **Capital Planning & Programming**
  - Optimizes how & when capital funds are expended
  - Incorporates agency goals and assets' lifecycle management plans
- **O&M Budgeting**
  - Considers trade-offs between capital investments and deferred maintenance
- **Scenario Evaluation & Management**
  - Informs decision-making through forecasting tools and reliable asset cost and condition data

**Asset Lifecycle Management**
- **Inventory**
  - Provides repository for all asset data in an agreed-upon asset hierarchy that supports the AM strategy
  - Requires established process for maintaining data
- **Condition Assessment & Performance Monitoring**
  - Outlines condition inspection and measurement approach for all asset classes
  - Provides the link between asset condition & performance
- **Asset Management Planning**
  - Development of asset class-specific lifecycle management plans that consider maintenance, rehabilitation, disposal, etc..
  - Ensure an asset’s performance is maximized throughout its life while minimizing costs and risks

**Enablers**
- Organization/Leadership
- AM Information Systems
- Contract & Supplier Management
- Communications
- Continuous Improvement
- Values & Culture
**Transit Asset Management - Implementation**

**Asset Management Maturity Level**

- **Level 1**
  - Asset Inventory
  - Condition Assessments

- **Level 2**
  - Policy & Strategy
  - LOS Objectives
  - Business Plan

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

- **Level 4**
  - Lifecycle Management Planning and Models
  - Lifecycle Costs/Performance Information

- **Level 5**
  - Scenario Evaluation and Management

**Key Phrases**

- "I know what I have"
- "I know where I want to be"
- "I know where I am against my level of service (LOS) objectives"
- "I can optimize across assets against a budget constraint."
- "I know how to optimally manage across the lifecycle"
Transit Asset Inventory Development & Integration
Project Start

• Asset/Maintenance Management Systems
  ▪ Oracle
    ➢ Asset Account’s and Financial Records
    ➢ Asset Condition Data not Captured
  ▪ Maximus M5
    ➢ Work Orders and Maintenance Records for Bus Fleet/Facilities & Railcars
  ▪ Excel Spreadsheets & Log Books
    ➢ Right-of-Way Maintenance Records
    ➢ Rail Facilities Records
  ▪ No Hierarchical Relationships Data
New System

• Integration of Management Information Systems
• Data No Longer Stored in Numerous Systems and Formats
• Asset Condition/Reporting to Support SGR in one System
• Asset Data Reflects Hierarchical Relationships & Condition
• Documentation of Processes
  ➢ Written Step-by-Step Procedures

• Total Asset Visibility
  ➢ Improved asset planning data
  ➢ Improved Lifecycle data
  ➢ Lower unexpected costs
  ➢ Improved budgeting forecast
Solutions & Lessons Learned

- Lessons Learned
  - Organizations must conduct a comprehensive inventory and photograph all critical assets
    - Develop data capture sheets to ensure consistency of data
    - Document Hierarchical Relationships of critical/capital assets
    - Ensure Hierarchical breakdown is reflected within the asset management system
    - Insure replacement and repair costs are captured within the asset management system
  - Solution/Tools
    - Use a tool such as SmartDraw to document and combine critical information into one document/system
      - Provide this data to populate new NTD database format
    - Metro’s Bus Life Cycle Cost Tool drastically reduces cost per-mile and road call breakdowns
      - Ensure predictable bus schedule maintenance operation and Bus replacement plan
  - Develop Step-by-Step Procedures
Industry-Integrated Standard Asset Inventory Structure Examples
Metro’s 29th Street Rail Maintenance Facility
Hierarchical relationships
Signal House Hierarchical Relationships Example
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