



NCHRP 08-36 TASK 114

Transportation Asset Management for Ancillary Assets

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Overview

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- State-of-the-Practice
- Life Cycle Management Principles
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Project Approach

- Provide information to serve as a starting point to approach asset management for ancillary assets
 - Classification hierarchy for ancillary assets
 - Identification of how the life cycle management of ancillary assets can be incorporated into enterprise asset management systems
 - State-of-the-practice for asset management of a subset of ancillary assets
 - Recommended life cycle management business processes for the subset of ancillary assets

Project Tasks

Task 1: Project Kickoff

Meet with project panel



Task 2: Develop Classification Hierarchy for Ancillary Assets

Review prior NCHRP studies

Assess prior frameworks and develop standard hierarchy



Task 3: Document Ancillary Asset Lifecycle Management Practices

Select volunteer DOTs for surveys

Analyze state of practice



Task 4: Identify Best Practices

Use survey results, prior research, and the team's knowledge to identify best practices



Task 5: Final Report

Analyze results of survey

Compare best practices and state-of-the-practice

Identify linkages with asset management systems

Asset Classification Hierarchy

Asset Class	Asset Elements	Asset Sub-Elements (if Applicable)
Structures (not bridges or otherwise in the national bridge inventory)	Drainage Structures	
	Overhead Sign and Signal Structures	
	Retaining walls (Earth retaining structures)	
	Noise barriers	
	High Mast Light Poles	
Traffic Control & Management – Active Devices	Signals	Signals, beacons, flashers, ramp meters
	ITS Equipment	Cameras, variable message signs, detection devices/sensors, highway advisory radios
	Network Backbone	Hubs and nodes, fiber, cabinets, software

Asset Classification Hierarchy

Continued

Asset Class	Asset Elements	Asset Sub-Elements (if Applicable)
Traffic Control & Management – Passive Control Devices	Signs	Regulatory and warning signs Guide, service and attraction signs
	Barrier Systems	Guardrails, barrier walls, cable barriers, end treatments, impact attenuators
Drainage Systems and Environmental Mitigation Features	Drain Inlets and Outlets	Drains, drop inlets, catch basins, gutters
	Culverts (< 20 ft)/Pipes	
	Ditches	Paved and unpaved ditches
	Environmental Mitigation Features (Storm Water Retention Systems)	
	Other Drains	Slotted drains
Other Safety Features	Lighting	
Roadside Features	Sidewalks	
	Curbs	ADA ramps

Ancillary Assets Selected for Further Focus

- Culverts (<20 ft.)/Pipes
- Drainage Systems and Environmental Mitigation Features
 - Drain Inlets/Outlets; Ditches; Storm Water Retention Systems; Other Drains
- Overhead Sign and Signal Structures
- High Mast Light Poles
- ITS Equipment
 - Cameras; Variable Message Signs; Detection Sensors/Devices; Highway Advisory Radios
- Network Backbone
 - Hubs and Nodes; Fiber; Cabinets; Software
- Sidewalks and Curbs

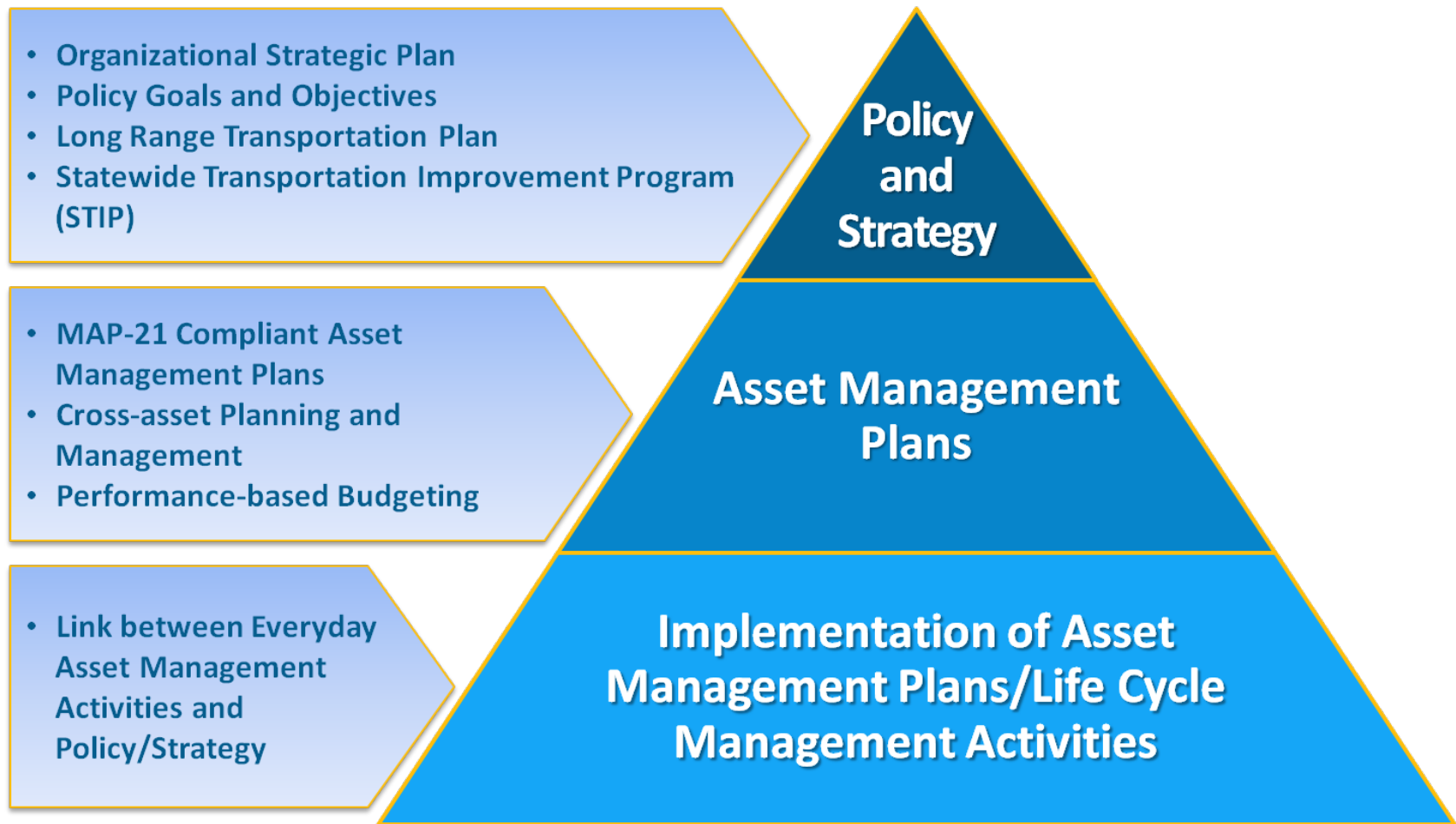
State-of-the-Practice

- Internationally-accepted standards for the management of physical infrastructure assets (ISO 55000 and PAS 55)
- Considerable body of knowledge related to the management of pavements and bridges in the U.S.
- Passage of MAP-21 resulted in new asset management requirements – primarily focused on pavement and bridge assets
- Much of the literature on ancillary asset management captures state-of-the-practice
- Generally no industry standards for the management of ancillary roadway assets

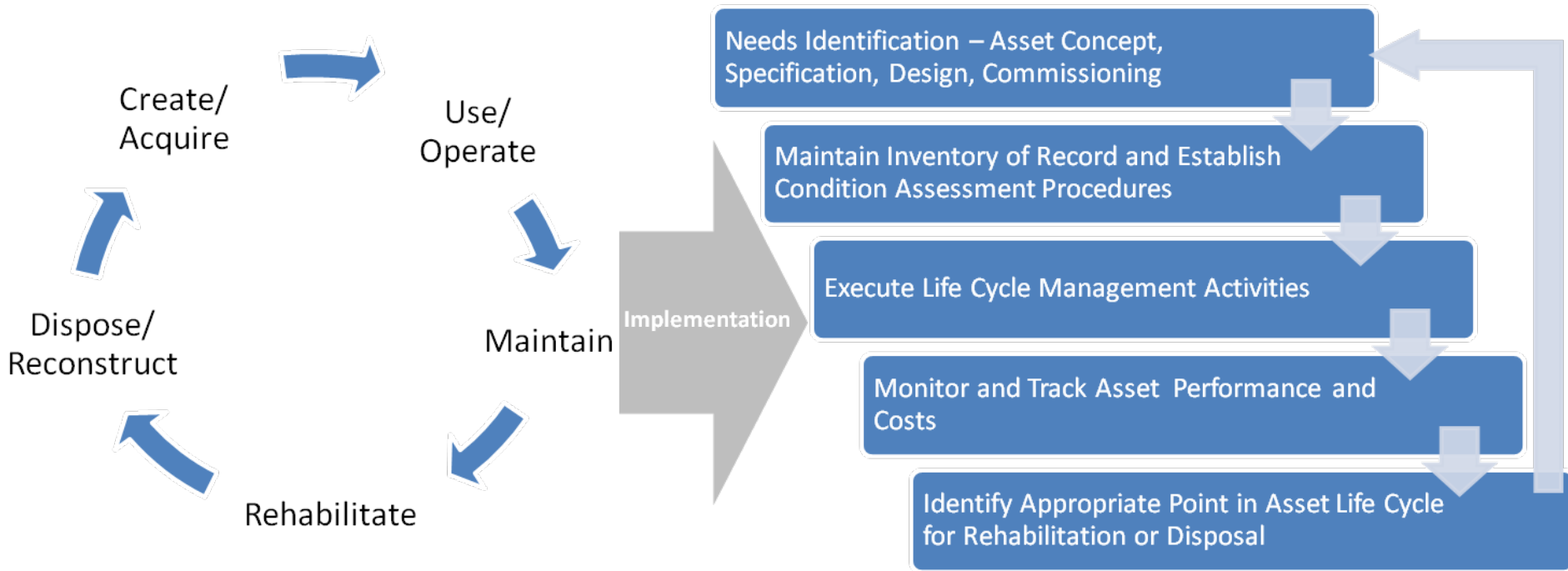
Life Cycle Management Principles

- Project team used the terminology and elements of asset management as outlined in PAS 55 and ISO 55000
- Management system (ISO 55000): a set of interrelated or interacting elements of an organization to establish policies and objectives, and processes to achieve those objectives
- Asset management information (PAS 55): meaningful data related to assets and asset management
- Asset management information system (PAS 55): a system for the storage, processing, and transmission of asset management information

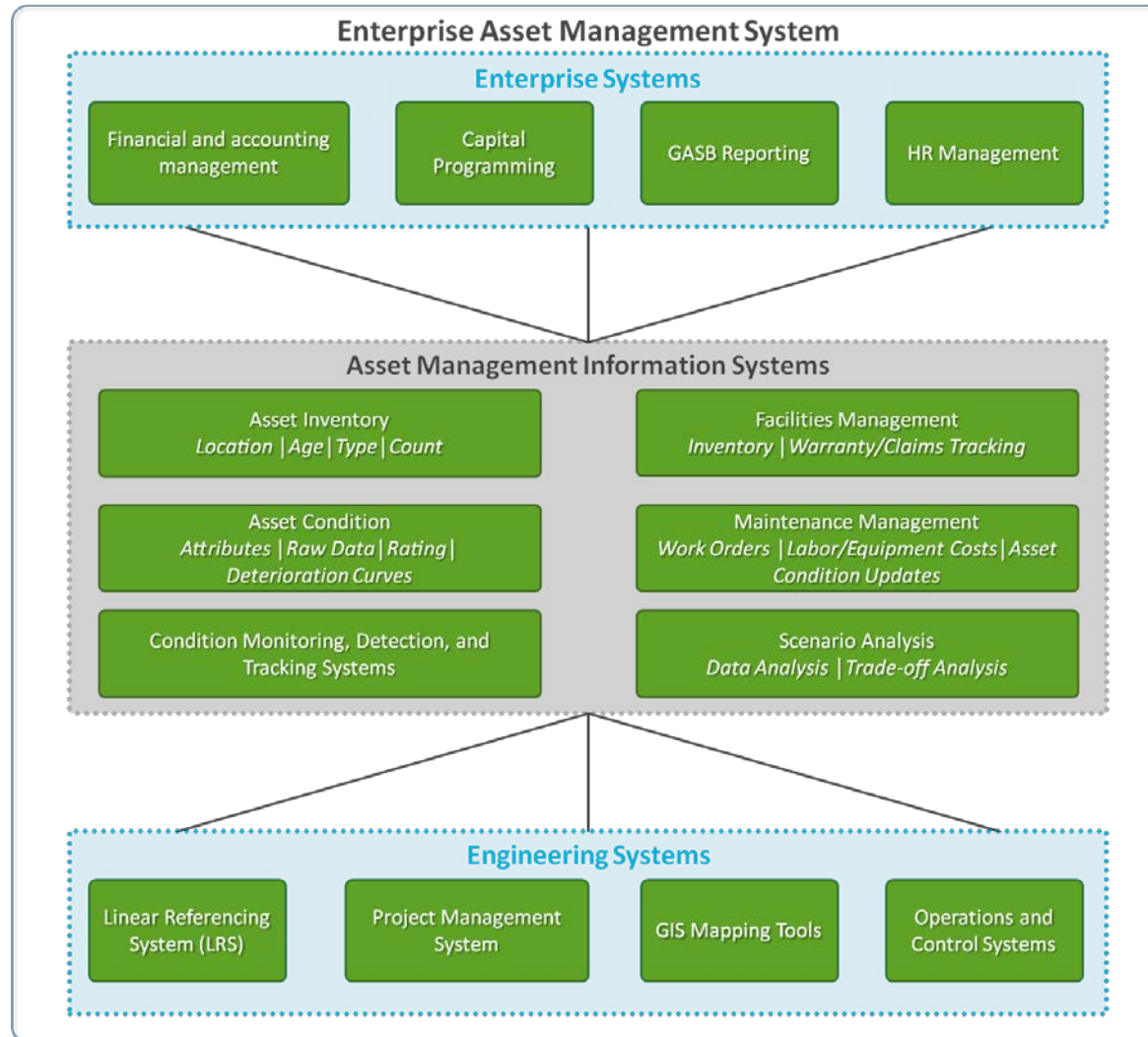
Key Elements for Asset Management



Asset Life Cycle Stages and Key Decision Points



Integrating Ancillary Assets into Enterprise Asset Management Systems



Template for Life Cycle Management Business Process Guidance

- *Enterprise-level*
 - Inventory
 - Interaction between Asset Classes
 - Relationship of Asset Class to Overall Safety, Mobility, and Asset Performance
- *Asset Specific-level*
 - Inspection and Condition Assessment
 - Level of Service/Performance Metrics
 - Lifecycle Management Plans and Practices
 - Asset Prioritization
 - Decision Support
- **Additional Sections**
 - Asset Element-specific Considerations
 - Additional References

Sample Template – High Mast Light Poles

- *Asset Element-specific Considerations*
 - Provide proven improvement to nighttime driving conditions
 - Height presents challenge for inspections
- *Enterprise-level*
 - Inventory
 - Recommended complete inventory with basic data items including location, condition, and age
 - Interaction between Asset Classes
 - Failure can result in closure of crucial links in the highway system
 - Relationship of Asset Class to Overall Safety, Mobility, and Asset Performance
 - Provide illumination that can improve safety

High Mast Light Pole Template

- *Asset Specific-level*
 - Inspection and Condition Assessment
 - Visual inspections with binoculars or telescopes
 - Remotely-operated inspection devices with video cameras
 - NDT techniques to inspect base plates and anchor rods
 - Inspect at least every 4 to 5 years – potentially greater frequency for anchor bolts which are known to loosen over time
 - Level of Service/Performance Metrics
 - Typically simple condition rating scale comparing current performance against originally intended function
 - Lifecycle Management Plans and Practices
 - Track maintenance activities and forecast future activities such as anchor bolt tightening, repair, or replacement
 - Account for need to replace lamps
 - Asset Prioritization
 - After high-wind weather events prioritize inspections
 - Prioritize inspections in areas with known nighttime safety issues
 - Decision Support
 - Track maintenance costs to inform future needs estimates
 - Estimate remaining service life based on installation date and age

High Mast Light Pole Template Continued

- *Additional References*

- Garlich, M.J. & Thorkildsen, E.T., 2005. Guidelines for the Installation, Inspection, Maintenance and Repair of Structural Supports for Highway Signs, Luminaries, and Traffic Signals, Washington, D.C.
- Sheth, P.N. & Montie, D., 2005. Integrated Light Maintenance and Inspection System for High-Mast Poles, Charlottesville, VA.
- Goyal, R., Dhonde, H.B. & Dawood, M., 2012. Fatigue Failure and Cracking in High Mast Poles, Houston, Texas.

Results and Next Steps

- Results of this research provide a foundation to develop TAMPs for a subset of ancillary assets
 - Final report available online:
[http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP08-36\(114\)_FR.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP08-36(114)_FR.pdf)
- We would like to take this further to develop generally accepted standards for the management of ancillary assets, particularly for:
 - Culverts
 - Drainage Systems and Environmental Mitigation Features
 - Network Backbone
 - Sidewalks and Curbs