Guide for Optimal Replacement of Highway Operations Equipment

NCHRP Project 13-04

AASHTO Subcommittee on Maintenance Conference

Providence, RI
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Project Outputs

Guide

Excel-based Tool

Tool User Manual

Final Project Report
Life-Cycle Cost Analysis
Making Replacement Decisions is a Process

Data
- Collect data – a continuous process
- Perform rigorous data cleanup before inputting to LCCA

Analyze
- Customize replacement factors to agency operating environment
- Use LCCA to determine optimal life cycles

Decisions
- Fit to available replacement dollars
- Incorporate condition and mission criticality
- Determine replacement priorities
Replacement Factors

- Age
- Utilization
- Depreciation
- Maintenance and repair cost
- Fuel cost
- Downtime
- Obsolescence
- Replacement cost
- Purchase cost
- Cost of money
Depreciation

- This is not an accounting depreciation
- Based on actual salvage value of unit
- Average salvage values from DOT data
- Depreciation curves based on utilization
Overhead

- Mechanic hourly do not fully recognize overhead
- Overhead for warehouse, not chargeable mechanic time
  - True operating costs are understated
  - Tool has factor to include overhead
- Guide provides examples of how to calculate
Downtime

- Most DOTs are not tracking and recording downtime
  - Is a real and significant equipment cost
- Cost is manifested in highway maintenance and operations
  - Tool allows for hourly downtime cost
- Based on existing equipment rental rates
Tool Demonstration
Future Work

- Build tool in more robust software
- Begin tracking downtime
- Determine true mechanic hourly rate
- Need to commit resources
- Develop Training