Asset Management Overview

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Asset Value in Asset Management

- An Asset of $200,000 (House for Example)

- An Asset Value of $20 Billion (Modest Estimation of INDOT Highways)
  - New Construction – Added Value
  - Maintenance, Preservation & Rehab
  - Planning, Research & Development
Asset Value in Asset Management

• New Construction – Added Value
• 5% Maintenance, Preservation & Rehab
• 0.1% Planning, Research & Development
  (0.075%) (0.025%)

- An Asset of $ 200,000 (House Example)
  ($ 150/yr) ($ 50/yr)

INDOT Main Business Goal

Public Service/Customer Service

- Customer Pays:
  Federal Gas Tax at the Pump
  State Gas Tax at the Pump

- Customer Expects:
  High and/or Improving Level of Service
  (longer-lasting pavements with fewer delays)

Restaurant Example
  Paying the same for many years and
  expecting high and/or improving LOS
Asset Management - Definition

How to make limited budget dollars stretch and provide a network system that offers a high level of service?

• What is it?
  - A systematic process of maintaining, upgrading, and operating physical assets, such as highways and bridges, in a cost-effective way

• Combines
Asset Management Loop

1. Planning
2. Design
3. Construction
4. In-service Evaluation
5. Maintenance & Rehabilitation

Research and Development

Asset Management

Overlap for Success

Processes
People
Technology
Asset Management - Goal

Use short- and long-term decision making in the planning, budgeting, and operating functions so the assets stays at the highest condition level

Why is it needed with Highways?

During the last 30 years;
• roads mileage has marginally increased
• Average Daily Traffic has increased by 86%
• Average Daily Load has increased by 550%
Why is it needed with Highways?

- Show taxpayer and motoring public you are doing your function properly and investing wisely their tax dollars
- Good public agency business practice
- Proactively respond to the GASB
  GASB - “Government Accounting Standards Board”
  GASB Statement No. 34 issued June 10, 1999
GASB Statement No. 34 – Impact

- Report condition information about public infrastructure assets
- Report on the overall state of the agency’s financial health, not just individual “funds”
- Provide comprehensive information reflecting the cost of delivering services to the public
- Provide alternative methods for reporting the condition of infrastructure assets
GASB Rationale for Infrastructure Reporting

- Determine whether current-year revenues were sufficient to cover the cost of current-year services
- Assess the government agency’s financial position and condition
- Assess the service potential of assets and physical resources

Asset Management

Performance Targets  Network Level Planning (Strategic)

Preservation  Project Level Planning (Tactical)

Delivery
Asset Management - Items Needed

- Asset Inventory Data Base
- Condition assessment processes
- Asset valuation processes
- Performance prediction measures and trend indicators
- Cost estimates of options and resulting impacts
- Engineering/economic optimization tools

Asset Management

Classical Approach – Short Term

- Reactive Strategies
- Funds are Allocated without Direct Engineering Assessment
- Limited Review on Investment History
- Worst is First in Fixing
- Limited Investment on Good / Fair
Asset Management

New Rational Approach (Short & Long)

• Develop Long-Term Network Goals
• Develop Comprehensive Preservation and Maintenance Plans
• Proactively Manage Deterioration
• Commitment to Allocate Necessary Resources

Asset Management

New Approach (Short & Long)

• Look for network solutions not just individual project solutions
• Allow longer term planning to serve both local taxpayer and requirements
• Longer term network solutions require not only more durable assets but a “Mix of Fixes”
Key Asset Management System Components

- Pavement Management
- Maintenance & Preservation Management
- Bridge Management
- Safety Management
- Congestion Management
- Traffic Management
- Environmental Management

Key Asset Management Analysis Component

Life Cycle Cost Analysis (LCCA)

How it is done:

- Present Worth Analysis (PW)
- Equivalent Uniform Annual Cost Analysis (EUAC)
Life Cycle Cost Analysis

Present Worth Analysis:
Discounts all future costs (benefits) to the present

Equivalent Uniform Annual Cost:
Combines all present and future costs (benefits) into equal annual payments
Life Cycle Cost Analysis

Basic Factors:

- Economic Factors
  - Discount rate
  - Analysis Period
- Engineering Factors
  - Comparable sections
  - Rehabilitation selection
  - Agency Costs
  - User costs

Analysis Period:

- Normally equal for each alternative
  - Highways: 20-50 years
- Include at least one rehabilitation
  - Needed to capture the true economic benefit of each alternative
Life Cycle Cost Analysis

Agency Costs:

- Initial costs of pavement
- Maintenance and preservation costs
- Anticipated future rehabilitation costs
  - Engineering
  - Construction
  - Traffic Control
- Salvage (recycling value)

Life Cycle Cost Analysis

- Design equivalent pavement sections
- Establish strategies for analysis period
  - Estimate agency costs
  - Establish road user costs
  - Evaluate expenditure streams
- Analyze results
- Reevaluate strategies
Pavement Management Example

Strategy:

- Invest wisely to maximize the return (raise the level of service of the roadway system) through a program that balances long-term and short-term pavement strategies.

- Recognize the difference between project level and network level.

Pavement Management Example

Strategy:

- Pavement preservation, rehabilitation and reconstruction activities must be chosen so that the flow of dollars into the pavement system are maintained at the lowest, constant level possible, yet maintain the pavement in an acceptable condition.
Strategy:

- Always Consider **Network Impacts**
- Make the **Good-Fair-Poor Distribution** Drive the **Mix of Fixes**
- Use Iterative Process for Varied Mix of Fixes & Funding Levels

**Key issues:**

- Use Remaining Life Analysis
- Use Mix of Fixes
  - Dollars & the time frame till the next rehabilitation
- Network Impacts
- LCCA
Pavement Network Goal

• Preserve the pavement network to insure safety, mobility and serviceability, while optimizing all available resources
  – Pavements of Critical Concern: address 100%
  – Freeway: 95% Good or Fair by 200X
  – Non-Freeway NHS: 85% Good or Fair by 200X
  – Non- NHS: 85% Good or Fair by 200X

Pavement Treatments “Mix of fixes”

• Differentiate between Preservation, rehabilitation & Reconstruction
• Routine Maintenance & Preventive Maintenance
• Restoration (like CPR with PCCP)
• Resurfacing (overlays)
• Reconstruction
• Which is used depends on Good-Fair-Poor Distribution
Pavement Management Example

- Assess Current Business Practices
- Available Network Level Modeling Resources
- Modeling Information Needs
  - Deterioration Rates
  - Historic Costs Data
  - Network Impacts of Treatment Activities

Remaining Life

- Remaining Life, Years
- Percent of the Network, %
Remaining Life

Time frame before each segment of roadway needs repair

Pavement Treatment

Maintenance activities maintain serviceability

- High Benefit, Low User Impact
- Manages Deterioration Rates on “All” Structures
- Delays Category Drop on “All” Pavements
Pavement Treatment

Preservation

Preservation restores pavement integrity

- Manages Deterioration Rates on “Fair” Pavement
- Delays “Fair” From Becoming “Poor”
- Cost Effective Fixes - Touches More Pavements

Rehabilitation

Rehabilitation improves pavement condition

- Improves Condition Ratings
  - “Poor” to “Good”
  - “Poor” to “Fair”
  - “Fair” to “Good”
- Prioritizes Critical Concern Structures
Pavement Treatment

Reconstruction

Replaces pavements

• Address Other Pavement Needs
• Improves Condition Rating
  – “Poor” to “Good”
• Prioritizes Critical Concern Pavements

Remaining Life

Network Impact

Percent of Network

<2 3-7 8-12 13-17 18-22 23-27 28-32

Remaining Years
Network Impact

Average Skid Resistance (Friction number)
40 mph, Smooth Tire & Wet pavement

Asset (Pavement) Management Benefits

• Network
  – Systematic Approach to Network
  – Proactively Manages Deterioration Rates
  – Commitment to Do the Right Work at the Right Time on the Entire System
  – Ability to Meet Established Network Goals
Asset (Pavement) Management Benefits

• Organization
  – Increased Program Stability (Credibility)
  – Coordination with Other Programs
  – Organizational Commitment

• Customer
  – Reduced Impact to Motoring Public
  – Increased Program Stability (Confidence in agency)
  – Efficient Investment of Tax Dollars