WisDOT Asset Management

Theme X’ Investment Strategy Overview
(Performance-Based Practical Design)

For

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This is how we do business:
- Preserve our assets and minimize their whole life cost
- Operate in a financially sustainable manner
- Provide a framework to improve performance on a long-term basis

Theme X’ Investment Strategy Meets These Objectives
Performance-Based Practical Design

Issue
State Departments of Transportation (DOT) are increasingly challenged with addressing their system performance, mobility, and safety needs in the current era of financial limitations.

Summary
The Federal Highway Administration (FHWA) conducted an in-depth review of the Practical Design concept, including interviewing a number of States about their practices.

Though the name, definition, and approach of Practical Design vary from State to State, most States with a Practical Design program emphasize a renewed focus on scoping projects to stay within the core purpose and need. By exercising a greater level of discipline, agencies may eliminate nonessential project design elements resulting in lower cost and improved value. This approach enables States to deliver a greater number of projects than otherwise possible under their previous project development approaches. By implementing Practical Design, States realized cost savings by utilizing flexibility that exists in current design guidance and regulations.

A concern is that agencies may overemphasize short-term cost savings without a clear understanding of how such decisions could impact other objectives (such as safety and operational performance, context sensitivity, life-cycle costs, long-range corridor goals, livability, and sustainability).

To address this concern, agencies can make more informed decisions by evolving towards a Performance-Based Practical Design (PBPD) approach grounded in a performance management framework. PBPD can be articulated as modifying a traditional design approach to a "design up" approach where transportation decision makers exercise engineering judgment to build up the improvements from existing conditions to meet both project and system objectives. PBPD uses appropriate performance-analysis tools, considers both short and long term project and system goals while addressing project purpose and need.
Data-Driven Decisions
- Preserve assets and minimize lifecycle cost
- Operate in a financially sustainable manner
- Provide a framework to improve performance on a long-term basis

System Preservation Focus
- A practical design approach to maintain service
  - Strategies that provide the best system-wide service at the lowest cost
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A Practical Design Approach to System Preservation

(continued)

- Data-Driven Decisions
- System Preservation Focus

- Replace-In-Kind
  - Practical design approach to reconstruction
    - Can current and future needs be met by reconstructing within existing footprint?
    - Safety is primary driver for expanding footprint
    - Lower R.O.W and environmental study costs means more $ for pavement and bridge improvements
Transportation Challenge...
A Solution Alternative...

Asset Management!
Investment Theme Research & Development Guides Asset Management Methodology
The Latest Testing Reveals…

...How We Deal With The Following Issues Will Have A Large Impact On Future System Conditions:

- Pavement Preservation
- Pavement Replacement
- Safety
- Downshift For Lower Function Highways
Theme X’ Has a Safety Emphasis...

Programmatic Safety BCA to Determine Level of Safety Improvement For Planning Purposes...
Theme X’ Has a Pavement Preservation Emphasis...

Typical Pavement Condition Life Cycle

- EXCELLENT
- VERY GOOD
- GOOD
- FAIR
- POOR
- VERY POOR
- FAILED

40% Drop in Quality

Cost For Renovation Here

~ 75% of life

40% Drop in Quality

~ 12% of life

Will Cost 4 to 5 times more here
Preventive Maintenance Is Also “Preservation”

Preventive Maintenance provides life extension to “good” condition pavements having little or no structural deficiencies as part of a planned strategy to minimize life cycle cost by preventing or retarding deterioration that would necessitate more comprehensive and costly improvements.

Service Life Extension (SLE) = Maintenance Activity

MSL = Minimum Service Level*

*MSLs used for calculating SLE of Preventive Maintenance candidates are 70 for Backbone and 65 for Arterials and Collectors. To be eligible for Improvement funding as a Federal Preventive Maintenance project, treatments must provide SLE >=4 years.

Expected Future Performance

Condition Increase Due To Maintenance

Good to Excellent Condition

Condition (PCI)

Time (years)

10
20
30
40
100
90
80
70
60
50
40
30
20
10
Why Emphasize Preservation ???

An Example From FHWA and the National Center For Pavement Preservation...

Sample Agency Network = 4356 lane-miles

- If no improvements are made for 1 year, then remaining life years for each road segment will decrease by 1 year.
- Without improvements, Sample Agency loses 4356 lane-mile-life years per year.
- Improving more than 4356 lane-mile-life years per year, improves the network.
- Improving less than 4356 lane-mile-life years per year lessens the normal network decline, but does not maintain current conditions.
Why Emphasize Preservation???
An Example From FHWA and the National Center For Pavement Preservation

Sample Agency Budget $37M – Annual Project Mix Example #1

- With respect to maintaining system conditions, Project Mix #1 is deficient by 1654 lane-mile-life years.
Why Emphasize Preservation ???

An Example From FHWA and the National Center For Pavement Preservation

Sample Agency Budget $37M – Annual Project Mix Example #2

- Reconstruction and Rehabilitation projects are reduced to free-up ~$6M for less costly pavement preservation improvements. (-345 ln-mi-yrs)

- $6M invested in right place and right time preservation treatments yields an additional 1999 ln-mi-life years. (5.8X reduction above)

- Project Mix #2 maintains current conditions!
Standard Approach For Identifying Viable Improvement Alternatives...

- **Service Life Extension (SLE)**
  - SLE = 3 Years
  - Crack Repair & Patching
  - Patch and Structural Overlay: SLE = 12 Years

- Expected Future Performance
“Theme X’ Downshift” Approach...

Service Life Extension (SLE) = 7 Years

Expected Future Performance

Crack Repair & Patching

Accepting a Lower Level of Service on Degraded Pavements

Increases The Viability of Low Cost Treatment Alternatives

Frees up Funding to Use Elsewhere, Obtaining More System Benefit Per $
WisDOT is:

- Making data-driven decisions to achieve the best overall system health given existing funding constraints – this means better long-term conditions and a lower backlog of unmet needs

- The approach involves a strategic combination of best value and low cost fixes that promote enhanced system health:
  
  - Place a higher priority on funding timely rehabilitation projects, cost-effective pavement preservation activities, viable lower cost improvement projects, and select reconstruction projects in order to add more system life for the given investment level.

  - Strategically defer some more costly improvement alternatives to the extent practicable to add more system life by investing elsewhere and adding more system life per investment dollar.
Measuring Impact...
Resulting Pavement Conditions...

(Data Only for Illustrative Purposes)

Pavements “Fair And Above”

Pavements “Poor Or Worse”

-35%
Unmet Highway Need Backlog...
(Data Only for Illustrative Purposes)

Backlog Miles In 10-years

Cost To Fix Backlog

-47%

-24%
Resulting Highway Life-Years Added...
(Data Only for Illustrative Purposes)

Life Mile Years Added

Traditional  Theme X'

+68%
THANK YOU!

Questions?