

# Asset Management of Pavements: Managing for the Whole Life

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# Asset Management – This is how **we** do business:

- Manage our assets to minimize their whole life costs.
- Operate in a financially sustainable manner.
- Address risk.
- Provides a framework to improve performance on a long-term basis.

# Asset Management Plans and Managing Pavement Performance

- The Asset Management Plan should describe the DOTs strategy for managing their pavements for the long-term.
- The Asset Management Plan helps DOTs determine what performance is achievable based on current conditions and expected funding levels (that go to various program areas).
- The Asset Management Plan helps DOTs identify funding needs to meet realistic targets.

# Asset Management Basics: Five Core Questions

1. What is the current state of my assets?
2. What is my required level of service/performance?
3. Which assets are critical to sustained performance?
4. What are my best “Operations and Maintenance” and “Capital Improvement” investment strategies?
5. What is my best long-term funding strategy?



# ASSET MANAGEMENT and MAP-21 INFRASTRUCTURE CONDITION

- *Maintain the highway infrastructure asset system in a state of good repair.*

# What is asset management?

- Asset management is a strategic and systematic process of operating, maintaining, and improving physical assets, with a focus on engineering and economic analysis based upon quality information, to identify a structured sequence of maintenance, preservation, repair, rehabilitation, and replacement actions that will achieve and sustain a desired state of good repair over the lifecycle of the assets at minimum practicable cost. (23 U.S.C. 101(a)(2), MAP-21 § 1103)

# What requirements does MAP-21 have pertaining to asset management?

- Each State is required to develop a risk-based asset management plan for the National Highway System (NHS) to improve or preserve the condition of the assets and the performance of the system. (23 U.S.C. 119(e)(1), MAP-21 § 1106)

# Asset Management Plans

- National Highway Performance Program
- Developed using process certified by USDOT
- Recertified every 4 years



# What are the scope and content of a risk-based asset management plan?

- States must address pavements and bridges but are encouraged to include all infrastructure assets within the highway right-of-way in their risk-based asset management plan. (Also can include roads other than on the NHS.)
- Includes strategies that lead to a program of projects that would make progress toward achievement of the State targets for asset condition and performance of the NHS
- State DOTs should follow these investment strategies as they develop their STIP and undertake/implement these projects

# Highway Asset Management Plan

- Plan Contents
  - Pavement and bridge inventory and conditions on the NHS,
  - Objectives and measures,
  - Performance gap identification,
  - Lifecycle cost (Lifecycle planning – preservation strategies, managing for the whole life, etc.) and risk management analysis,
  - A financial plan, and
  - Investment strategies

# *National Performance Management Measures for Assessing Pavement Condition (490.307)*

Pavement Condition Measures	
Interstate System	Non-Interstate NHS System
Percentage of pavements in “Good” condition	Percentage of pavements in “Good” condition
Percentage of pavements in “Poor” condition	Percentage of pavements in “Poor” condition

# Pavement Condition Thresholds

	Good	Fair	Poor
IRI <i>(inches/mile)</i>	<95	95-170 95-220*	>170 >220*
Cracking <i>(%)</i>	<5	5-10	>10
Rutting <i>(inches)</i>	<0.20	0.20-0.40	>0.40
Faulting <i>(inches)</i>	<0.05	0.05-0.15	>0.15

\*Population >1M

# Life cycle cost analysis– Managing for the Whole Life

- DOT strategies of managing an asset from inception to disposal
- ... to identify a structured sequence of maintenance, preservation, repair, rehabilitation, and replacement actions that will achieve and sustain a desired state of good repair over the lifecycle of the assets at minimum practicable cost
- Explain the DOT's actions or strategies that prevent, delay or reduce deterioration to an asset, restore the function of the asset, keep the asset in good condition and extend the asset's life.
- Explain the DOT's strategies

# Risk Examples

- Funding
- Reputation
- Data and data quality
- Political changes
- Global conditions
- Leadership changes
- Storm severity – extreme weather
- Not undertaking timely preservation and maintenance
- Heavier loads
- Etc.

# Financial plan should include:

- Looking out a longer period of time of expected available funding and sources
- Knowledge of the costs of future work types
- Estimated cost of expected future work to implement investment strategies contained in the asset management plan
- Other (goes beyond the scope of this presentation)

# Management Systems

- USDOT will establish minimum standards for States to use in developing and operating:
  - Bridge management systems
  - Pavement management systems



# Management Systems

- 23 CFR 500.107 BMS An effective BMS should include, as a minimum, formal procedures for:
  - Collecting, processing, and updating data
  - Predicting deterioration
  - Identifying alternative actions
  - Predicting costs
  - Determining optimal policies
  - Performing short- and long-term budget forecasting; and
  - Recommending programs and schedules for implementation within policy and budget constraints

# Investment Strategies

- Developed based on the:
  - Objectives and measures,
  - Performance gap identification,
  - Lifecycle cost (Lifecycle planning – preservation strategies, managing for the whole life, etc.)
  - Risk management analysis,
  - Financial plan (considerations),
  - Management system analysis

# Highway Asset Management Plan

- States must have a plan developed consistent with the process by the 2<sup>nd</sup> fiscal year, otherwise federal share for NHPP will be reduced to 65%
- Process certification
  - USDOT 90 days review period to determine certification
  - States have 90 days to cure deficiencies if not certified
  - Recertification required every 4 years

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**What do we need to address in the Asset Management Plan with regard to managing pavement performance ?**

**Do we need to change the way we do business?**

# What should be taking place?

- Knowledge of the Asset Management requirements in MAP-21
- Organizational goals and objectives regarding asset management = self assessment and gap analysis
- **Listing of pavement and bridge assets and their condition**
- **Performance/condition targets for pavements and bridges**
- **Management systems – more than an inventory.**
- **Long-term investment strategies that address preservation (lifecycle strategies for sustaining infrastructure.)**
- Knowledge of risk management, beyond the project level.
- Participate in webinars, NHI training, other exchanges

# What is available

- MAP-21 states what must be included in a TAMP
- Templates and workplans for a DOT to work from in developing their TAMP are available from the TAMP development pilot project
- Draft TAMPs from 8 State DOTs are available (not certified)
- Webinars recorded including risk and financial plans
- Etc.

# **Transportation Asset Management Plans (TAMPs)**

TAMPs are developed for managing the organization's infrastructure so as to cost-effectively achieve the organization's strategic goals in the long-term.

# The most successful asset management programs:

- Have performance measures that guide investment decisions
- Adopt a ‘preservation first’ strategy for their investment priorities
- Moved away from a “worst first” investment strategy, and instead have adopted investment principles that are based on life cycle/whole life costing
- Had strong leadership support – “A Champion”



# Resources Are Available

- FHWA Office of Asset Management  
<http://www.fhwa.dot.gov/asset/index.cfm>
- NHI Transportation Asset Management Training Course
- AASHTO Asset Management Guide – A Focus on Implementation
- AASHTO Asset Management Subcommittee
- TRB Asset Management Committee
- Other