

Transportation Performance Management Webinar Series

The Intersection of Risk and Performance Management

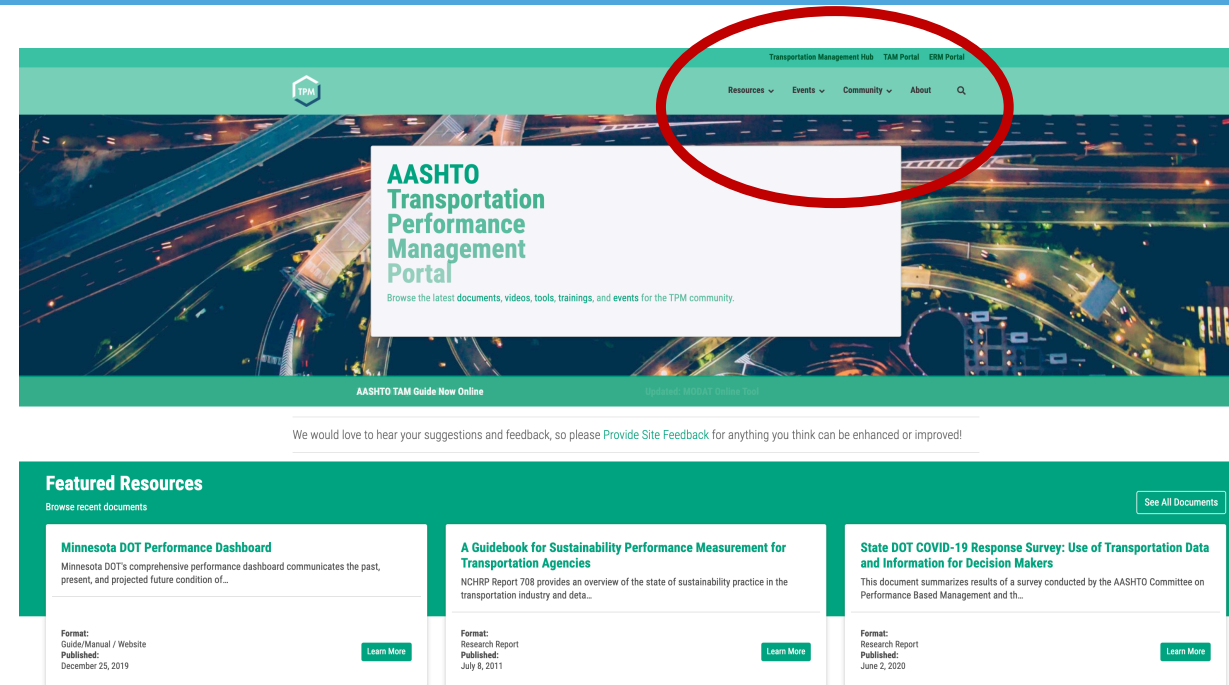
Sponsored by the TPM Pooled Fund
with Support from AASHTO CPBM Leadership and FHWA



March 17, 2021
TPM Webinar 5

Transportation Performance Management Webinar Series

- Our TPM webinar series is held every two months, on topics such as communications, system performance management, data sources, and many more to come!
- Today is the 5th webinar in our bi-monthly series
- We welcome ideas for future webinar topics and presentations
- Use the webinar Q&A panel during the webinar
 - Submit questions for today's presenters
 - Submit ideas for future webinar topics



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Welcome

The TPM Pooled Fund, the AASHTO Committee on Performance Based Management, and FHWA are pleased to sponsor this webinar series!

- Sharing knowledge is a critical component of advancing performance management practice



Webinar Agenda

- 2:00 Welcome and Introduction and TPM Pooled Fund Overview**
Christos Xenophontos (Rhode Island DOT), Matt Hardy (AASHTO)
- 2:10 FHWA's Approach to Enterprise Risk Management (ERM)**
Pete Stephanos (FHWA)
- 2:25 Risk Management Research**
Jean Wallace (Minnesota DOT) and Nathan Lee (Utah DOT)
- 2:45 Enterprise Risk Management Incorporating Long-Term Employee Health and Safety**
Paul Degges (Tennessee DOT)
- 3:05 Performance-Based Risk Management and Organizational Risk Strategies**
John Milton (Washington State DOT)
- 3:25 Q&A and Wrap Up**

Enterprise Risk Management

FHWA Implementation

*The Intersection of Risk and
Performance Management*

How is ERM being applied at FHWA?



What is it?

Making risk-based decisions at an “enterprise level” to most effectively and efficient carry out our programs to meet objectives.



How is it different?

We will better understand, as an Agency, when we should be involved and when we can step away in our program and project level actions.

What do we need to make it work?

Governance

making decisions at the corporate level

Objectives

knowing what we are striving to achieve

Operating Principles

knowing where we accept and avoid risks

Assessments

routinely evaluating our actions

Planning

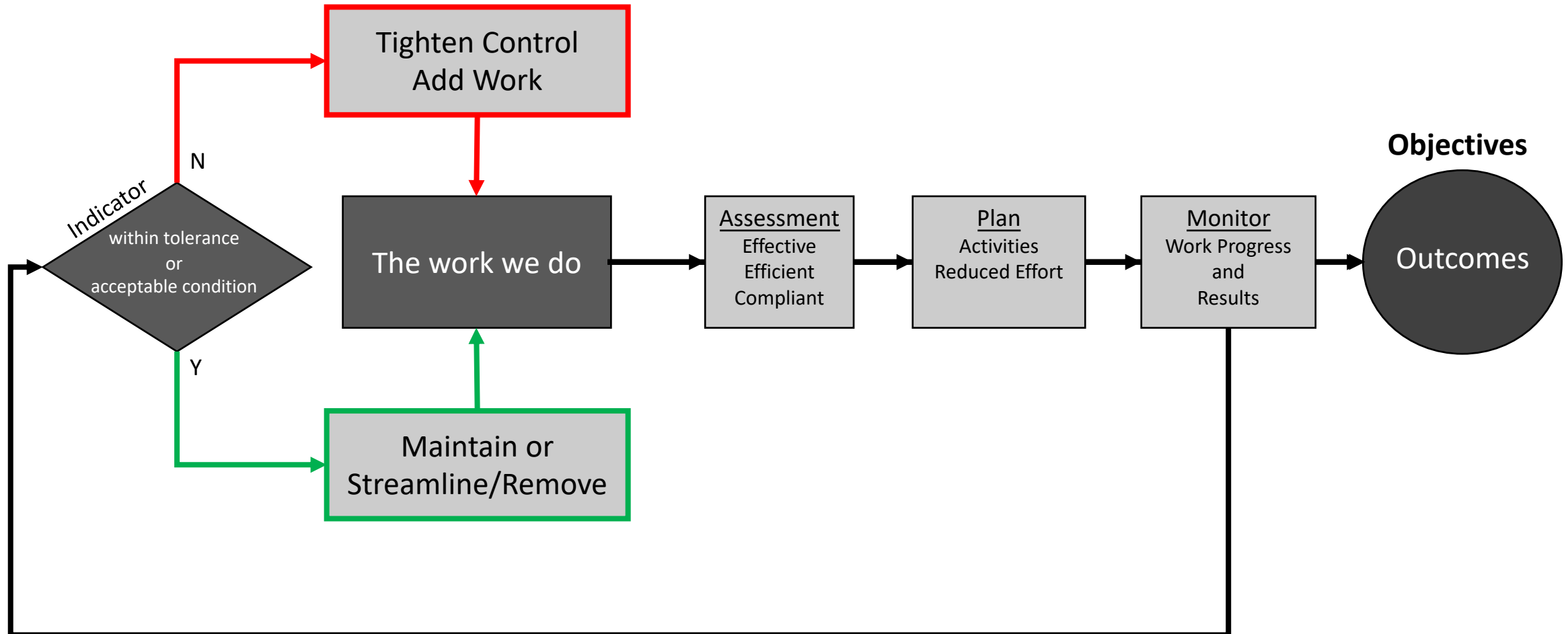
clearly communicating critical activities & reduced effort

Monitoring

tracking indicators against tolerances to assess progress

ERM in Practice

Operating Principles (*Where we **Avoid**/**Accept** risks*)



Managing Risk to Achieve Performance

- Assessing Opportunities and Threats
- Risk Responses:
 - The Federal Role
 - Potential for Impact
 - Strategic Direction
 - Readiness

Key Contacts

- Risk Management
 - Daniel Fodera
 - Daniel.Fodera@dot.gov
- Transportation Performance Management
 - Susanna Reck
 - Susanna.reck@dot.gov

Risk Management Research Overview

Jean Wallace, MnDOT, Chair, Subcommittee on Risk Management
Nathan Lee, UDOT, Vice Chair, Subcommittee on Risk Management



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What Do We Mean by Risk?

- “Risk is the positive or negative effects of uncertainty or variability upon agency objectives.”
- It includes:
 - Uncertainty
 - Variability
 - Treats
 - Opportunities



Research: Managing Risk at All Levels

- Risk management cascades to all levels of the organization
 - Enterprise
 - Program
 - Project
 - Activity



NCHRP International Scan on Enterprise Risk Management

NCHRP report on ERM completed in 2011

The US & DOT's are lagging - more than 60% of state DOT's did not have a formal ERM program; 40% never or rarely applied enterprise risk strategies

Most U.S. agencies that practice risk management apply it to construction projects but not to broader programs or to their enterprises as a whole.

International Scan in 2011 led to initial set of activities

Communication and Marketing

- Many TRB presentations
- Published paper
- CEO Roundtable at 2012 AASHTO Annual Meeting
 - Summary report
- NHI webinar (available online)
- NCHRP executive summary report, full report, bookmark, brochures

Research

- NCHRP Project 20-24 (74) Exec Strategies for RM
- NCHRP Project 8-36, Task 121 Successful ERM Implementation in State DOTs
- FHWA RM & AM series of five reports

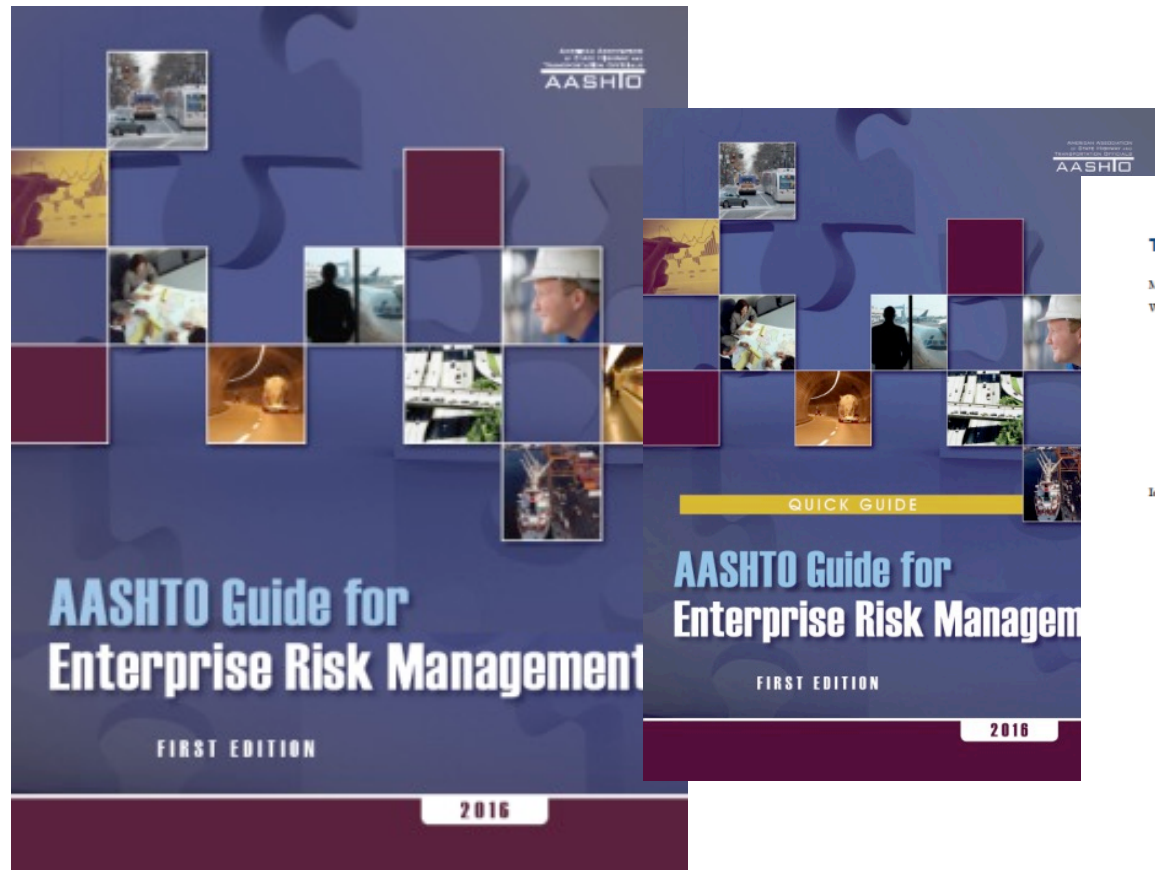
Training

- NHI ERM course

Governance

- Discussion on creation of AASHTO task force
- Discussion on TRB section creation

AASHTO Guide on ERM



AASHTO Guide for Enterprise Risk Management Quick Guide

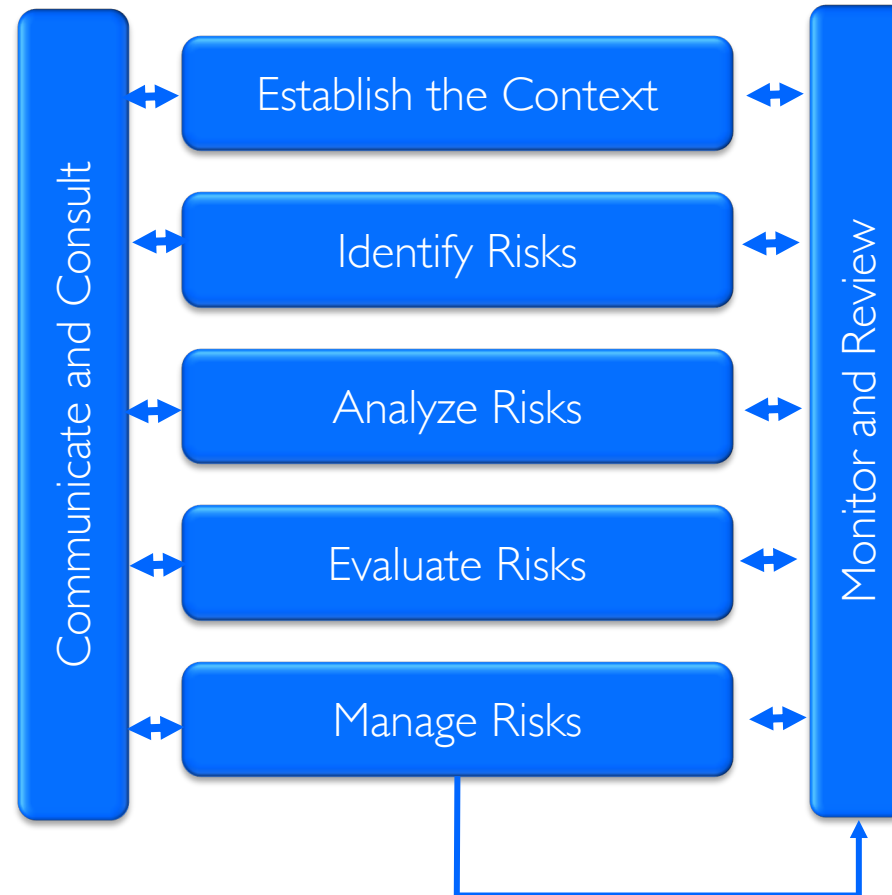
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AASHTO ERM Guide: Based on ISO

ISO Risk Process

- ISO is the international Organization of Standards
- Based on earlier Australian framework
- Adopted across Europe and U.S.
- Guide adopts ISO frameworks



AASHTO ERM Guide: Case Studies

Colorado Department of Transportation Asset Management Plan

The Colorado Department of Transportation (CDOT) addressed several risks to its asset in its 2013 *Risk-Based Asset Management Plan*.⁷¹ It followed recognized processes of identifying risks at the agency, programmatic, project, and asset levels. It convened a task force to identify, analyze, and evaluate risks to the department's assets. It developed a color-coded risk rating scale of measuring risks from negligible to catastrophic. It also evaluated the likelihood and consequences of the various risks identified by the task force through a workshop, as shown in Table 9-1.

It identified agency risks, such as lack of funds to meet asset targets, inability to meet MAP-21 targets on NHS segments under local control, revenue unpredictability, politics and change in department leadership, negative public perception that inhibits ability to garner revenue, not communicating, and getting buy-in within CDOT for asset management.

Risks identified at the program level include unfunded maintenance requirements, a large Interstate 70 project pulling funds from other projects, staff turnover and knowledge loss, data management, project delivery risks caused by organization or systematic issues, and construction cost variation.

At the project or asset level, significant risks were identified as changing climate, increased rainfall, and unstable geology in the mountainous state. Among the project or asset risks identified were flooding impacts, rock falls, landslides, culvert failures, and other issues. Additional risks were tunnel fires, intelligent transportation system traffic control failures, failure of aging small culverts, scope growth in projects, and project delays caused by environmental, right-of-way, or utility conflicts. Table 9-1 illustrates a CDOT risk register.

Table 9-1. Example Risk Register from the CDOT Asset Management Plan

		Consequence Score										Other Considerations				
Risk ID	Risk Priority	Likelihood	Safety	Reliability	Asset Damage	Other Financial Impact	Funding	Regulatory	Political	Reputation						
Agency Risks																
1a	11	Not having enough funds to meet targets due to inflation in construction costs					5	3	4	4	2	✓	✓	✓	✓	11
1d	4	Ability to meet MAP-21 targets for NHS segments under local control					5	3	2	3	2	✓	✓	✓	✓	15
		Revenue variations/uncertainties—inability to predict/project total funds available to CDOT					5	1	2	3	3	✓	✓	✓	✓	10.5
1d	9	Politics in general, combined with leadership changes in the Department					4	1	2	1	2	✓	✓	✓	✓	7.5
1e	9	Public perception of CDOT (negative)—resulting in an inability to garner new funds					2	2	4	3	2	✓	✓	✓	✓	6.5
		Not communicating to and getting buy-in at the appropriate levels in CDOT how the R&M AMP works					3	3	1	1	1	✓	✓	✓	✓	3.5
Program Risks																
2a	8	Unfunded maintenance requirements—e.g. regulator					5	3	3	2	3	✓	✓	✓	✓	15
2b	9	Will I-70 viaduct pull funding from other projects					4	2	3	3	2	✓	✓	✓	✓	12
2c	9	Retirement of key people, loss or turn-over of staff, resulting in loss of critical knowledge					4	3	2	2	3	✓	✓	✓	✓	11
2d	9	Data management (that impacts ability of CDOT to document accomplishments)					3	1	2	2	3	✓	✓	✓	✓	11
2f	9	Project delivery risks due to organizational or systemic issues, e.g. communications, etc.					3	2	1	1	4	✓	✓	✓	✓	7.2

71. Cambridge Systematics. CDOT's Risk-Based Asset Management Plan, Final Report. Colorado Department of Transportation, Denver, CO, 2013.

Minnesota Department of Transportation

The Minnesota Department of Transportation's *Transportation Asset Management Plan* notes the agency was deeply engaged with risk management for many years before the MAP-21 requirement.⁷² It identified asset management "undermanaged risks" that deserved additional attention to accomplish its asset management objectives.

It organized the risks into three levels. Priority one strategies for mitigating undermanaged risks include the following:

- Annually track, monitor, and identify road segments that have been in poor condition for more than five years and consistently consider them when programming
- Address the repairs needed on the existing South I-35W deep stormwater tunnel system
- Investigate the likelihood and impact of deep stormwater tunnel system failure
- Develop a thorough methodology for monitoring highway culvert performance
- Develop and adequately communicate construction specifications for overhead sign structures and high-mast light structures in a total asset management system (TAMS)

Priority two strategies include the following:

- Collect and evaluate performance data on ramps, auxiliary lanes, and frontage road pavements for the highway system in the Twin Cities metropolitan area
- Augment investment in bridge maintenance modules and develop related measures and tools for reporting and analysis
- Include highway culverts in TAMS
- Place pressure transducers in deep stormwater tunnels with capacity issues
- Incorporate the deep stormwater tunnel system in the bridge inventory
- Develop a policy requiring a five-year inspection frequency for overhead sign structures as well as related inspection training programs and forums

Priority three includes the following strategy:

- Repair and replace highway culverts in accordance with recommendations from TAMS once it is implemented

Georgia Department of Transportation

The Georgia Department of Transportation's 2013 *Transportation Asset Management Plan* includes numerous references to managing risks to assets.⁷³ It does not produce a risk register or quantified ranking of risks and their consequences, but it does integrate the concept of risk-based decision making throughout the document. It also includes an asset management process improvement action plan that calls for developing a robust risk management program. The plan discusses how risk elements are now inferred or implicit in

72. Minnesota Department of Transportation. Transportation Asset Management Plan, Draft. Minnesota Department of Transportation, St. Paul, MN, 2014.

73. Georgia Department of Transportation. 2014–2018 Transportation Asset Management Plan. Georgia Department of Transportation, Atlanta, GA, 2014.

AASHTO ERM Guide: Implementation

- NCHRP 20-44(2) :
<https://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4401>
- Established a Community of Practice
 - Folded into the AASHTO Subcommittee on Risk Management
- Identified three Pilot States to use the ERM Guide
- Held numerous webinars and workshops

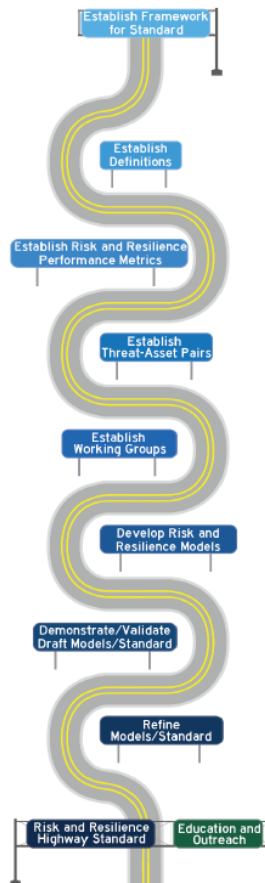


Ongoing NCHRP Risk-Related Projects

- Integrating Effective Transportation Performance, Risk and Asset Management (NCHRP 08-113)
- Development of a Risk Management Strategic Plan and Research Roadmap (NCHRP 20-123(04))
- Scoping Study to Develop the Basis for a High Standard to Conduct an All-Hazards Risk and Resilience Analysis (NCHRP 23-09)
- Guidance on Risks Related to Emerging and Disruptive Transportation Technologies



Please Join Us!



NCHRP 23-09

Scoping Study to Develop the Basis for a Highway Standard to Conduct an All-Hazards Risk and Resilience Analysis

On behalf of the Transportation Research Board, the AEM Team is helping to develop the basis for a Highway Standard by conducting an All-Hazards Risk and Resilience Analysis.

While transportation agencies often use all-hazards risk and resilience analyses to make decisions about enhancing system resilience at some level, the state of the practice varies widely.

The study will establish risk and resilience performance metrics, and include the following:

- Consistent terminology for transportation risk and resilience.
- A research roadmap to develop a framework for a quantitative analysis, with tools and applications guidance.
- Industry, academia and government outreach.

The primary audience for this research will include the AASHTO Committee on Transportation System Security and Resilience, the Subcommittees on Risk Management and Asset Management multiple TRB committees and public and private stakeholders from the transportation industry.

The NCHRP 23-09 Research team invites you to [register](#) for a free, informative, and valuable workshop on:

- Monday, March 22nd 1:00 – 4:00 PM ET
- Monday, April 12th 2:00 – 5:00 PM ET

Space is limited! Don't miss this opportunity to voice your thoughts, share your expertise, and learn.

For further project information [click here](#). For more details and information about getting involved, contact Maria Pena, Principal Investigator for NCHRP 23-09, at maria.pena@aemcorp.com.

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To register, contact: Maria.Pena@aemcorp.com

Proposed FY2022 NCHRP Projects

- B-03 Building Risk Management Momentum in Agencies
- A-04 Develop Methods to Allow Agencies to Incorporate Risk Assessment at the Project and Network Level



Conclusion

- PARTICIPATE in Subcommittee on Risk Management
 - Second Monday, even months from 1:00pm to 2:00pm EASTERN
 - Chair: Jean Wallace, Minnesota DOT
 - Vice Chair: Nathan Lee, Utah DOT
 - To join SRM, contact Matt Hardy, AASHTO: mhardy@ashto.org
- Engage with the upcoming NCHRP projects
 - VOTE (if you are from a State DOT)
 - Become a panel member
- USE the tools and guides currently available

AASHTO ERM Portal: <https://www.erm-portal.com/>

- AASHTO ERM Guide:
<https://store.transportation.org/Item/PublicationDetail?ID=2706>

Enterprise Risk Management Incorporating Long-Term Employee Health and Safety

Paul Degges
Tennessee DOT

The Intersection of Risk and Performance

A webinar presentation of AASHTO and
FHWA's Transportation Performance Management Pooled
Fund

John C. Milton, PhD, PE, RSP2I, PTOE
Director of Transportation Safety and
Systems Analysis (TSSA) Division
March 17, 2021

Roger Millar, Secretary of Transportation
Amy Scarton, Deputy Secretary of Transportation

Today's objectives



Discuss

- Performance-based risk management
- Organizational risk strategies

Highlight

- Long-term ERM practices incorporating employee health and safety

Share WSDOT's organizational risk strategies

- Evolution
- Current practices
- Lessons learned

Our perspective on performance and risk



Enterprise risk management complements performance and asset management, per AASHTO and NCHRP, above.

The process has evolved at WSDOT and is more inclusive and dynamic, as shown at right.



Performance and risk: two sides of the coin

WSDOT's **Gray Notebook** is the agency's quarterly performance journal. The June 2020 issue features an annual article on bridges. For years, the story focused on good performance (see dashboard from same issue, left) when the full picture gives a more accurate understanding of need (table from story on right).



79 STATEWIDE TRANSPORTATION POLICY GOALS DASHBOARD

Statewide policy goal/ WSDOT performance measure	Previous period	Current period	Goal	Goal met	Five-year trend (unless noted)	Desired trend
Safety						
Rate of traffic fatalities per 100 million vehicle miles traveled statewide ¹ (Annual measure: calendar years 2018 & 2019)	0.87	0.84	<1.00	✓		↓
Rate of recordable incidents for every 100 full-time WSDOT workers ² (Annual measure: calendar years 2018 & 2019)	5.0	4.7	<5.0	✓		↓
Preservation						
Percentage of state highway pavement in fair or better condition by vehicle miles traveled (Annual measure: calendar years 2017 & 2018)	91.8%	91.4%	≥ 90%	✓		↑
Percentage of state bridges in fair or better condition by bridge deck area (Annual measure: fiscal years 2019 & 2020)	92.9%	93.8%	≥ 90%	✓		↑
Mobility² (congestion relief)						
Highways: Vehicle Miles Traveled (VMT) on state highways (Annual measure: calendar years 2018 & 2019)	35.4 billion	35.4 billion	*	N/A		Not applicable
Highways: Average incident clearance times for all Incident Response program responses (Calendar quarterly measure: Q3 2019 & Q3 2020)	13.3 minutes	14.6 minutes	*	N/A		↓
Ferries: Percentage of trips departing on time ³ (Fiscal quarterly measure: year to year Q1 FY2020 & Q1 FY2021)	85.5%	80.3%	≥ 95%	—		↑
Rail: Amtrak Cascades on-time performance ⁴ (Annual measure: calendar years 2018 & 2019)	50%	58%	≥ 88%	—		↑

WSDOT expects an additional 81 bridges to need replacement or structural rehabilitation within the next 10 years
As of June 2020; Deck area in square feet

Bridge status	Number of bridges	Deck area
Contract work - Active	6	63,838
Replacement currently needed	12	104,464
Rehabilitation currently needed ¹	18	540,608
Border Bridges ²	1	102,700
Rehabilitation or replacement to be needed within 10 years	81	405,578
Total 10-year needs ³	117 ³	1.1 million ³

Data source: WSDOT Bridge and Structures Office.

¹ Includes one border bridge ² WSDOT funds 50% of preservation for 11 border bridges that cross state lines. ³ Does not include bridges with active contract work.

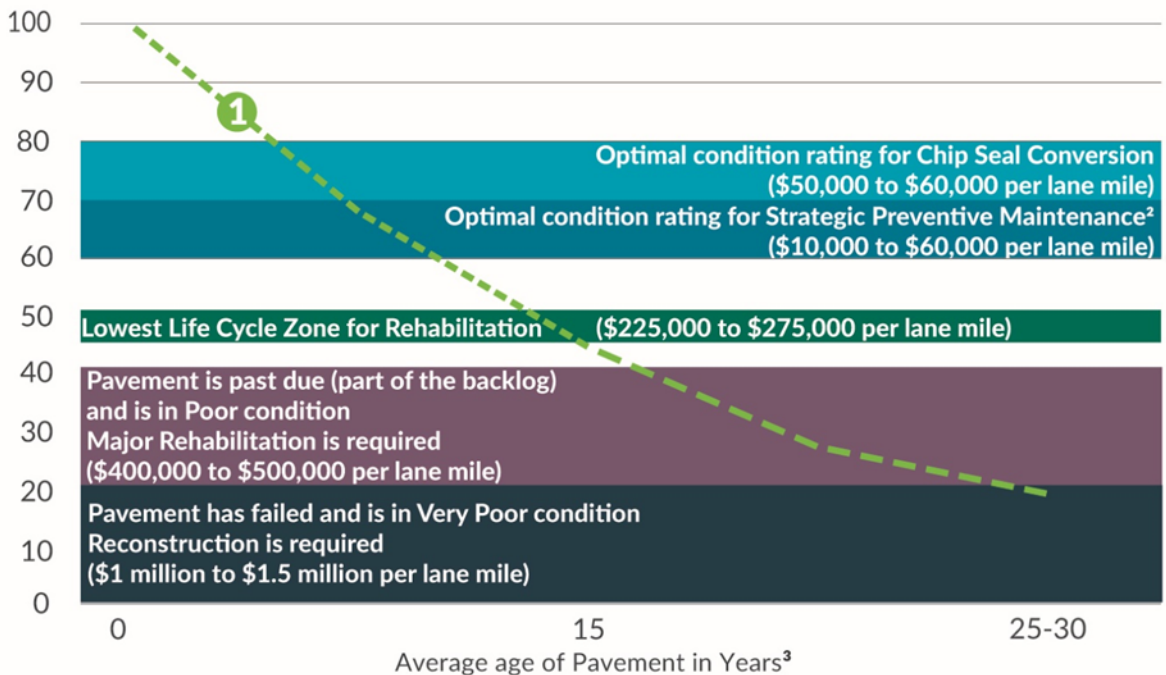
Current practices

Reconstructing failed asphalt pavement costs five times as much as rehabilitating asphalt pavement that is in the Lowest Life Cycle Zone

Asphalt pavements

Pavement
Condition
Index¹

1 Approximate condition rating of asphalt pavement without rehabilitation



Data source: WSDOT Pavement Office, WSDOT Capital Program Development and Management.

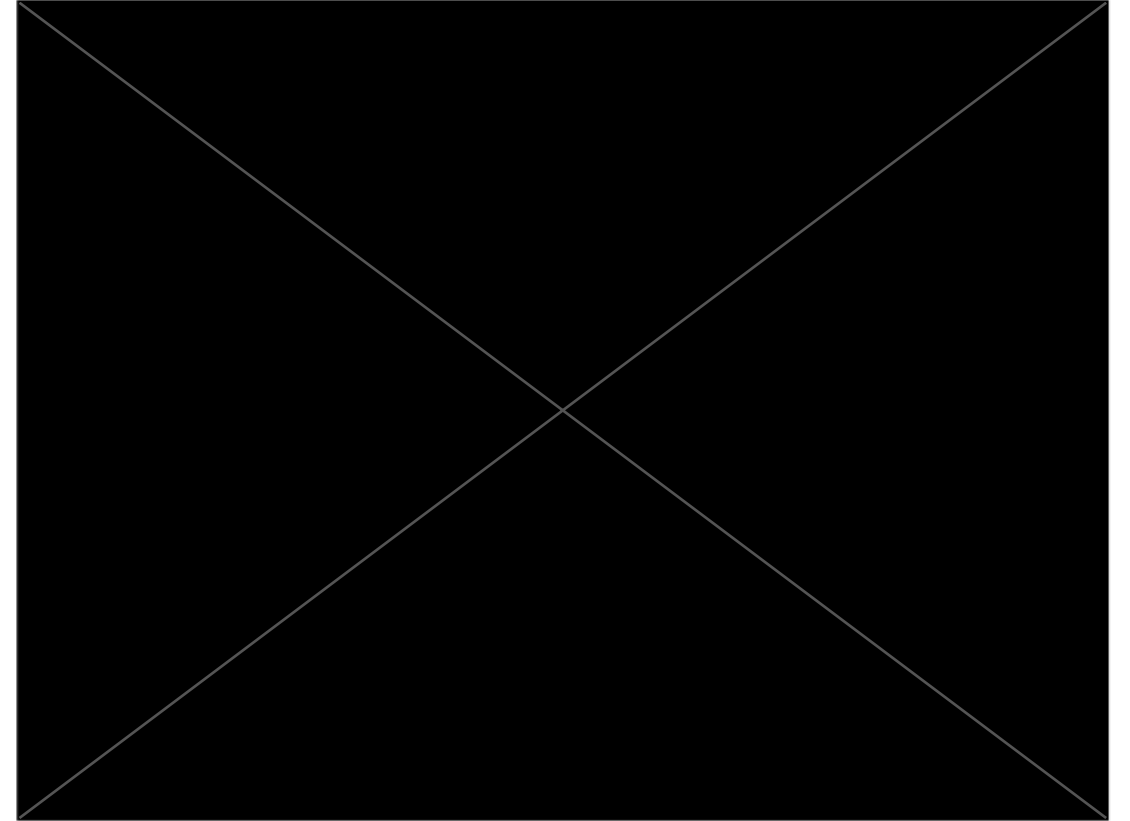
Notes: **1** A Pavement Condition Index between 80 and 100 is considered Very Good; 60-80 is Good, 40-60 is Fair, 20-40 is Poor and 0-20 is Very Poor. **2** Strategic Preventive Maintenance, also known as the “one-touch” policy, is the practice of extending pavement life by using capital budget funds to perform maintenance treatments at a strategic time. **3** A typical WSDOT asphalt pavement will have a condition rating of 45 when it is 15 years old.

Levels of risk aligned to pavement condition

Pavement Condition Indexes	Levels of Risk
100	Very Low
80	
80	Low
60	
60	Medium
40	
40	High
20	
20	Very High
0	

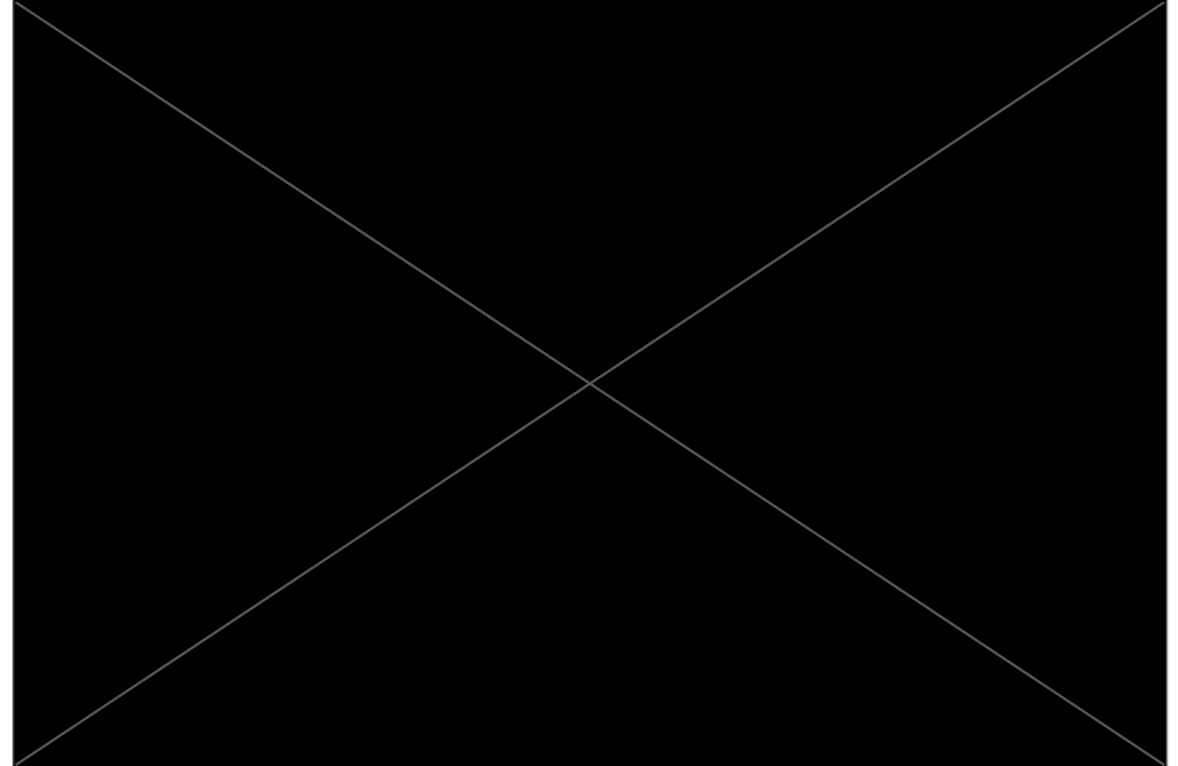
Performance and risk: past versus future

- Current good performance should not lead to agency complacency as future risks loom
- People were managing for today
- When performance and risk intersect, we must manage for the future



ERM for employee health and safety

- Long-standing practice at WSDOT
- People are assets
- Innovations help mitigate risk



Lessons learned

- Past versus future orientation
 - Performance is past tense
 - Risk is future tense
 - Need to consider both
- Performance reporting
 - Is not always a “good news” story
 - Can be misleading
- The right metrics:
 - Tell the full story
 - Incorporate a risk management perspective
 - Involve tradeoffs
 - Impact performance
 - Reveal a true picture of need



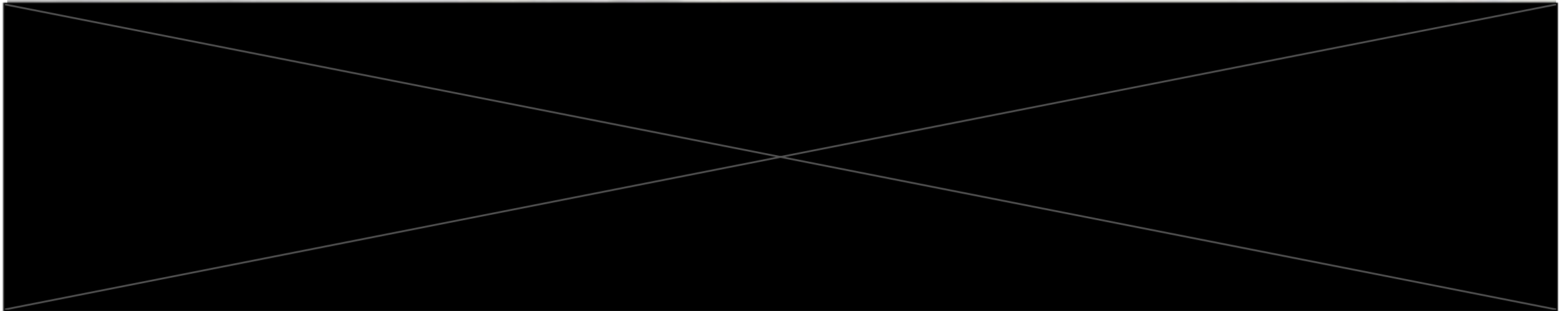
Lessons learned

- Evolve the way you do business
- Proactive Change Management is necessary for successful evolution
- Align research to risk
- Quality management and Lean practices improve the process
- Knowledge management provides continuity
- There is a direct relationship between how you manage your assets, risk and performance
- Strategic management provides context and direction



Conclusion

- Enterprise risk management is not a stand-alone process
- Each risk management strategy
 - involves tradeoffs
 - impacts on performance can be positive and negative
- Performance without risk is a “glide path to failure”



For more information

JOHN C. MILTON, PhD, PE, RSP2I, PTOE
Director, Transportation Safety and Systems Analysis (TSSA) Division
Washington State Department of Transportation
310 Maple Park Avenue SE
Olympia, WA 98504
MiltonJ@wsdot.wa.gov | (360) 704-6363

GUY ALSTON
Enterprise Risk Assessment Manager
AlstonG@wsdot.wa.gov | (360) 704-6338

Questions?

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Save the Dates!

A bimonthly webinar series, Wednesdays at 2:00 PM EST

MARK YOUR CALENDARS:

- May 19, 2021 2:00 PM Eastern Time
- July 21, 2021 2:00 PM Eastern Time

Please let us know about future topics of interest to you in 2021!

