

NCHRP 08-113

Integrating Effective Transportation Performance, Risk, and Asset Management Practices



Technical Memorandum

NCHRP 08-113 Implementation Plan and Additional Research Priorities

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Introduction

This document identifies recommendations of needs and priorities for additional related research following the conclusion of NCHRP 08-113. It will identify:

- Actionable findings and recommendations of the research
- Opportunities to implement the guidance
- The need and priority for specific additional research concepts
- Immediate next steps to broadcast guidance study results following NCHRP 08-113 research efforts

This document recognizes planned and ongoing NCHRP efforts. It will also identify research opportunities that may be pursued by NCHRP, AASHTO, and State Planning and Research (SPR) grants, pooled fund studies, University Transportation Centers, and other state-level research programs.

Actionable Findings and Recommendations

In order for additional research to be useful for transportation agencies, it should speak to actionable findings and recommendations. NCHRP 08-113 found that integrating performance, risk, and asset management is an innovative approach to streamline systematic efficiencies and mitigate operational risks created from data, process, and staffing silos within an agency. The research made actionable recommendations on each of **five key focus areas**:

- *Approaches to Integration* | Develop business practices, standard operating procedures, and cyclical schedules for capital investment, resource allocation, life cycle management, operations and maintenance, and other key functions that integrate performance, risk, and asset management. Seek out opportunities to pool funds to develop these approaches or to embrace regional and national research on the subject.
- *Data and Software Needs* | Ensure that data and software are governed, digitized, and documented consistently. Develop bridge, pavement, and other asset management software systems and models that account for uncertainty, vulnerability, and resilience.
- *Personnel and Skills* | Establish and implement a list of core essential skills, both technical and non-technical, that high-functioning staff should possess. Support cross-functional interactions, including less-formal opportunities such as coffee chats. Build a central hub for performance, risk, and asset management activities through text/voice/video chat and file sharing.
- *Policy and Agency Structure* | Identify or establish who is responsible for both implementing an overall implemented vision and for individual actions and tasks. Ensure that these people feel supported, collaborative, and empowered.
- *Resource Needs* | Assess the agencies financial capabilities, understanding management area integration as a long-term investment. Continuously evaluate the outcomes of integration efforts, gaining insights on the financial and other impacts over time, and relating this back to similar evaluations of previous management practices.

Opportunities to Implement the Guidance

As noted by members of the research panel, the research will likely be most helpful to agencies if it is incorporated into existing business processes, specifically those that are cyclical and foundational for planning and investments. These may include:

- A periodic capital investment plan, work program, ten-year plan, etc.
- Development of the annual State Transportation Improvement Plan (STIP) in partnership with metropolitan planning organizations.
- Development of a Transportation Asset Management Plan (TAMP) required by FHWA – currently DOTs are required to submit a new TAMP in 2022, 2026, 2030, etc.
- A periodic long-range transportation plan (LRTP) required by FHWA every 4 years.
- A periodic or live-updated performance scorecard or dashboard.
- Development of periodic business or management plan that impact agency vision and goals as well as organization of department or agency management structure

Additional foundational documents and periodic planning efforts may exist in agencies, regions, and states.

Need and Priority for Additional Research Concepts

Research that builds on NCHRP 08-113 speaks to both the actionable findings of this project and an agencies' most effective implementation opportunities. Consequently, these concepts are framed using both the implementation opportunities and the focus areas. Instead of a typical priority system, the concepts are assigned to four categories:

- **Time Sensitive** | These concepts may be useful for the 2022 TAMP round and as such may need to be initiated/completed in 2021 or early in 2022.
- **Direct Follow-Up for NCHRP 08-113** | These concepts build directly from the findings of this research and have similar approaches and lines of inquiry.
- **High-Value Assistance** | These concepts were suggested or inspired by participants in 08-113 workshops as well as the project panel and could bring significant benefits to agencies in the areas discussed in this work.
- **Ongoing Efforts** | These concepts build upon prior or current research efforts that relate to the areas discussed in this work.

The concepts and their need/priority are listed on the proceeding pages.

Opportunity	Focus Area	Concept	Need	Priority
TAMP Development	Approaches to Integration	Develop clear guidance and best practices for Risk Management in the 2022 TAMP round.	These concepts would assist DOTs in developing more robust TAMPs that fully execute risk management practices. In addition, there are time-sensitive if they are to be implemented during the 2022 TAMP process.	Time-Sensitive
TAMP Development	Approaches to Integration	Develop clear guidance and best practices for communicating and visualizing performance uncertainty in the 2022 TAMP round.		Time-Sensitive
General	Approaches to Integration Policy and Agency Structure	Develop guidance for chartering and maintaining cross-functional task forces for management area integration at transportation agencies, including tips for facilitation, outreach, and championing.	This concept addresses the expressed priorities of agencies that participated in NCHRP 08-113 workshops.	Direct Follow-up to NCHRP 08-113
Capital Investment	Approaches to Integration Resource Requirements	Develop guidance for cross-functional investment planning as an interpersonal process, crossing silos and evolving legacy approaches for program sizing and project selection through collaboration.	Panel members expressed enthusiasm for implementing in capital planning.	Direct Follow-up to NCHRP 08-113
Capital Investment	Policy and Agency Structure	Explore how uncertainty can be applied to performance-based project scoring and ranking approaches.	These concepts dovetail with those presented in NCHRP 20-123(04). Establishing risk management skills can be a predicate to better data and technical approaches.	Direct Follow-up to NCHRP 08-113
Maintenance/ Preservation	Approaches to Integration	Explore how uncertainty can be implemented in maintenance management approaches for scheduling, resource availability and consumption, benefits of preservation etc.		Direct Follow-up to NCHRP 08-113
L RTP Development	Approaches to Integration	Develop guidance for risk and uncertainty in LRTPs, including scenario planning, return-on-investment, economics, asset condition, traffic volume, etc.	This concept helps to realize the value add for 08-113 in agencies for whom and LRTP (or other long-range plan) is the core of cyclical planning.	Direct Follow-up to NCHRP 08-113
General	Data and Software Tools	Develop and maintain a database of asset management software tools and purchasable datasets with metadata and technical details for use in the development of consistent, detailed documentation across agencies.	Most transportation agencies could use a leg up in system/data documentation, and the technical details of systems are consistent across adopters in most cases. This is particularly helpful for smaller agencies.	High Value Assistance
Maintenance/ Preservation	Data and Software Tools	Explore how uncertainty can be implemented in maintenance management systems.	Maintenance management systems measure productivity and costs of repeated tasks where statistical analysis can be applied.	High Value Assistance

Opportunity	Focus Area	Concept	Need	Priority
Maintenance/ Preservation	Data and Software Tools	Develop guidance for the collection and digitization of historic hard-copy records for work history and asset condition.	Many agencies have backlogs of old hard-copy diaries, reports, etc. that may contain insights on productivity of work, life cycle costs, and the condition and history of assets that still exist on the network.	High Value Assistance
Performance Reporting	Data and Software Tools	Develop an open-source code base for online performance dashboarding that can be picked up, customized, and applied across agencies.	Attractive, user-friendly dashboards have tremendous benefits for agency credibility and public image with effort that is relatively small and can be performed for many agencies at once.	High Value Assistance
Performance Reporting	Data and Software Tools	Continue to explore new technological avenues for system performance data collection, including location-based services, unmanned aerial vehicles, etc.	Agencies participating in NCHRP 08-113 workshops cited performance data (delay, reliability) as a key growth area in coming years.	High Value Assistance
General	Data and Software Tools	Develop guidance for use of collaboration tools and hubs at agencies to coordinate performance, risk, and asset management activities.	Tools such as Microsoft Teams and 365, G Suite, Dropbox, Zoom, etc. are being rapidly rolled-out during COVID-19. The NCHRP 08-113 workshops showed the promise of these platforms as well as the benefit that could come from guidance and advice for taking best advantage of them.	Ongoing Efforts
Capital Investment	Data and Software Tools	Continue to develop user-friendly performance-based project ranking and investment selection tools, following the lead of NCHRP Report 806 among many others.	Agencies across the country have begun to invest in cross-asset resource allocation and project selection platforms. The next frontier may be simplicity and effectiveness of the user-interface, as well as broadening the performance and data basis for the tools.	Ongoing Efforts
Capital Investment	Personnel and Skills	Explore how uncertainty can be incorporated into project proposal development, drawing on best practices for risk management and return-on-investment already in use in states.	Project development is one area where many DOTs already implement elements of risk management.	Ongoing Efforts

Immediate Next Steps

The research team recommends three tracks of next steps: development of research strategic plans and research roadmaps; research to support agencies in enhancing cyclical planning (including TAMPs); and direct follow-up projects that build on elements of this research:

- *Development of research strategic plans and research roadmaps* | The research team is already engaged in NCHRP 20-123(04) to develop a research strategic plan and research roadmap for Risk Management. NCHRP 20-123(01) is performing the same process for Asset Management. NCHRP may wish to consider similar planning efforts for Performance Management or for Integrated Management. Improvements in Performance Management strategy, development and use of tools and data visualization was a common interest heard during research on NCHRP 08-113 and collaborated efforts on all three management functions could reinforce and build upon 08-113 efforts and conclusions.
- *Research to support agencies in enhancing cyclical planning* | The research panel impressed on the research team that the value for agencies implementing the guidance will likely be found in core cyclical planning processes. These may include TAMP development, capital planning, maintenance/preservation work planning, and LRTP development, among others. With every DOT required to certify a TAMP update in 2022, supporting research along the lines of the suggestions on page 3 could bring significant short-term benefits to DOTs and to FHWA.
- *Direct follow-up projects to NCHRP 08-113* | While all of the concepts outlined in this document build upon NCHRP 08-113 in some way, direct follow-ups maintain the same framing and explorative nature of this project in drilling down further on some of its themes. They are also linked to the prior point on enhancing cyclical planning, as the concepts about this on page 3 include support for integrating the findings of NCHRP 08-113 into capital planning and LRTP development.

At a high-level, any of the concepts in this document would be an excellent next step for NCHRP and other researchers to take in helping agencies implement and realize the value of this research.