**National Cooperative Highway Research Program**

 **August 2021**

**Supplemental Announcement of NCHRP Projects**

The National Cooperative Highway Research Program (NCHRP) is supported on a continuing basis by funds from participating member states of the American Association of State Highway and Transportation Officials (AASHTO), with the full cooperation and support of the Federal Highway Administration, U.S. Department of Transportation. The NCHRP is administered by the Transportation Research Board (TRB) of the National Academies of Sciences, Engineering, and Medicine. The NCHRP is an applied contract research program that provides practical and timely solutions to problems facing highway and transportation practitioners and administrators.

The main program is announced in May of each year. Additional projects may be identified throughout the year, however, and this supplemental announcement covers four such projects that NCHRP is now soliciting panel nominations for.

**Nominations of others and self-nominations for panel members should be submitted online from the TRB website by October 1, 2021, at the MyTRB portal at this link:** [**Online Panel Nominations**](https://volunteer.mytrb.org/Panel/AvailableProjects)

You will be asked to login to MyTRB.  If you do not already have an account, you will be asked to quickly create one using your email and a password. To ensure proper consideration of nominations, please provide all of the information requested. A current resume is necessary to determine relevant knowledge and experience.

Communication to determine an individual's interest and availability in serving will be made from this office only after we have matched available expertise (e.g., knowledge and experience as presented in the resume) with that required by the nature of the project.

**List of Projects**

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| **Project Number** | **Title** |
| 20-24(141) | The Art of Decision Making |
| 20-44(41) | Deploying Transportation Resilience Practices in State DOTs: Implementation |
| 20-102(20) | Workforce Capability Strategies for State and Local Agencies |
| 23-27 | Strategies to Strengthen Data Driven Decision Making |

**20-24(141)**

***The Art of Decision Making***

Allocation: $300,000

NCHRP Staff: Ann Hartell

Decisions are guided by processes and influenced by organizational culture, biases, reason, emotion, experience and memories, benefits and costs, and context. Decisions are also affected the type of decision (emergent activity or established practice), degree of collaboration required, role clarity, the urgency, completeness and quality of data, and availability of resources.

State DOTs make many decisions in many different contexts. As our work becomes more multimodal and multidisciplinary, the complexity of decision making is increasing. As we seek to provide equity, we need to review our decision-making practices for systemic bias. New practices are often evaluated using decision models designed for operational activities. We are also at the precipice of using more automation, machine learning, and artificial intelligence and need to understand the types of decisions that are best suited for these practices.

The goal of this project is to identify factors and frameworks that support different types of decisions, common pitfalls in decision-making, and strategies for successful and sustainable decisions. It is anticipated that this may include systems thinking, common cognitive biases, decision roles, and practices such as recognition-primed decision making, the Cynefin model, and more.

The objective of this project is to identify and review decision-making models for their potential to improve the fit with the type of decision being made and the desired outcomes. This includes supporting decision quality, reducing rework, supporting transparency and equity, promoting sustainable outcomes, and providing timely support for changes in business strategies. Tasks are anticipated to include:

1. Collecting and reviewing the decision-making models and frameworks and summarizing common elements and strengthens and intended uses of the models.

2. Surveying state DOTs for models and frameworks currently in use and the context and experience of using them.

3. Analyzing the results and developing recommendations for

a. The types and complexity of decisions made

b. Decision models used and the context of their use

c. Role models used

d. Equity and potential biases

e. Comparison to state of the practice decision models and frameworks

4. Prepare a guidebook of these decision models and frameworks and the relative strengthens and weaknesses for common uses in state departments of transportation.

State DOTs are seeking to improve diversity, equity, and inclusion. Reviewing current decision making practices and evaluating the potential for systemic bias is a critical step for improvement. In addition, the complexity of decision making has increased but decision models to fit the more multidisciplinary and emergent decisions are still in development. This project will provide useful information for assessing current practices and provide resources to quickly determine a decision model for the types of decisions being make.

**20-44(41)**

***Deploying Transportation Resilience Practices in State DOTs: Implementation***

Allocation: $180,000

NCHRP Staff: Stephan Parker

NCHRP Project 20-117 has been completed and the final report and guidebook have been published. The current guidebook is approximately 200 pages long with many tables and linkages to other parts of the assessment process.  Upgrading the guidebook to a downloadable application would greatly enhance its usefulness.

The implementation plan in the 20-117 final report says (in part):

“The Resilience Guidebook and Self-Assessment Tool is designed to provide transportation officials with a capability to identify and implement actions and strategies to enhance their agency’s resilience-related capabilities. As such, it provides an approach to overcome some of the implementation challenges noted earlier. However, efforts still need to be made to discuss the availability of the tool, provide an exposure to how it can be used, and overview the types of strategies that could be considered by transportation officials. Such efforts could be undertaken by numerous organizations, including AASHTO, TRB, FHWA, the Association of Metropolitan Planning Organizations (AMPO), and the National Association of Regional Councils (NARC).”

A major product of the NCHRP 20-117 is a self-assessment guidebook on incorporating resilience concepts into state DOT activities and decision-making. The guidebook covers all major functional units in a DOT and leads to the identification of strategies for enhancing its resilience efforts. Specific implementation activities include:

* Pilot workshops (4): The workshops will focus on a guidebook tool that will be developed prior to holding the workshops (the cost of making the guidebook user friendly and as a downloadable program has been allocated across the four workshops).  The workshop would cover the basic concepts underlying the guidebook and will allow different DOT staff to use the program to assess their current resilience status and to identify DOT strategies. The tool would be sent to the DOT prior to the workshop. We would get a commitment from the DOT to have relevant staff use the tool for the functional area they are responsible for. During the workshop, we would work through the results for each functional area and determine action steps to enhance resilience for that area. At the end of the first part of the workshop, the participants as a group will be asked to assess the usefulness and value of the tool. At the end of the workshop, a meeting will be held with the top executives of the agency to go over the strategies that were identified by their staff. The result would be recommended state DOT-wide resilience enhancement program. Note that the pilot states were selected for their diversity in resilience challenges as well as geographic diversity.
* Development of an implementation document describing the experiences of the four pilot studies. This document would be formatted to be easily understood, highlighting the benefits of using of the guidebook (and downloadable program). The benefits as described by the pilot state DOTs would be highlighted: Presentations would be made to the CTSSR and others as directed by the Committee.

NCHRP is looking for nominees from participating agencies that will agree to host workshops for piloting the Resilience Guidebook (estimated state DOT host staff hours: 15 to 20 per workshop).

The proposed activities will facilitate research implementation in several ways. First, it will make the guidebook more easily used and comprehensible to DOT staff. Second, it will show how the guidebook can be used in a real DOT environment and the benefits of doing so. Third, the final document will be used to market the guidebook and downloadable program to other DOTs and transportation agencies in other levels of government. As noted above, this final document will highlight the benefits of the guidebook as defined by the pilot DOT officials.

The pilot workshops will each have an evaluation report prepared with input from the host state. Overall, the success of the overall effort will be measured by the number of downloads of the guidebook program. This will provide a direct measure of interest. In addition, presentations will be made to AASHTO committees and at AASHTO meetings as desired by the CTSSR to disseminate the results of the pilot studies and implement the marketing strategy. These efforts will be reported to NCHRP as part of the implementation strategy.

**20-102(20)**

***Workforce Capability Strategies for State and Local Agencies***

Allocation: $300,000

NCHRP Staff: Jennifer L. Weeks

The transportation industry is rapidly expanding, and new technologies are creating connective networks that are merging the physical and digital worlds of transportation. The pace at which these technologies are evolving is creating workforce challenges for the transportation industry as new skills are quickly becoming essential to deploy, operate, and maintain these technologies. The transportation industry requires new and modified training opportunities to effectively acquire these advanced skillsets.

New technologies, such as connected vehicles, connected infrastructure, smart cities, and automated vehicles, are changing the landscape of the physical and digital worlds of transportation and redefining necessary skillsets to achieve successful deployment. These changing workforce needs for state and local agencies must be researched. Key research objectives include:

* Understanding the array of training opportunities/resources currently available to state and local agencies,
* Understanding the areas of incoming technologies that state and local agency personnel feel most comfortable/uncomfortable with,
* Determining the new/anticipated skillsets that will be required of state and local agency personnel and which will require the most training,
* Determining gaps between currently available training resources and necessary new skillsets,
* Understanding the most impactful method of delivery/resource format for the needed new training materials, and
* Understanding how to best evaluate the effectiveness, employee satisfaction, and return on investment of suggested workforce development strategies.

Outputs of this research will inform state and local agencies on how to best prepare their personnel for successful connected and automated vehicle (CAV) deployments. Research results will determine the current training landscape, anticipated skillsets/training needs, training gaps, and strategies for successful training delivery/evaluation. Enhancing the focus on newfound/anticipated training needs and achievement strategies will promote a universal understanding of CAV concepts throughout state and local agencies while effectively guiding personnel to successful CAV deployments.

NOTES

The study should build upon National Operations Center of Excellence work, TCRP J-05/Task 18-03, NCHRP 20-07/408, TCRP J-11/Task 34, and other efforts, including the U.S. Department of Transportation’s new project titled “Impact of Automated Vehicle Technologies on Workforce.” New disciplines and skills should be identified and consideration should be given to the likely V2I communications technologies.

**23-27**

***Strategies to Strengthen Data Driven Decision Making***

Allocation: $300,000

NCHRP Staff: Ann Hartell

State DOTs are seeking to derive more decisions from data, improve real time performance management, and integrate advancements in data science. While data analytics, automation and machine learning are increasing, current data architectures are fragmented and costly, adding complexity and delay for information system development and management. This makes it difficult to maintain alignment with business needs. Business and enterprise architectures are used by some state departments of transportation as well as many other public and private organizations. Examples of these architectures include the Zachman Framework for Enterprise Architectures, The Open Group Architecture Framework (TOGAF), and the Federal Enterprise Architecture (FEA).

The goal of this project is to identify business architectures that support and optimize faster decisions, data relevance and usability across the organization, and current business needs and responsive to evolving needs.

The objective of this project is to explore business and enterprise architectures for their potential to improve the alignment of data with business needs and provide timely support for changes in business strategies. Tasks are anticipated to include:

1. Collecting and reviewing the business and enterprise architectures and summarizing common elements and strengthens and intended uses of the models.

2. Surveying state DOTs for uses of these architectures and/or the elements of the architectures.

3. Analyzing the results and developing recommendations for architectures that optimize nimble data strategies.

4. Prepare a guidebook of these architectures and the relative strengthens and weaknesses for common uses in state departments of transportation.

There is rapid evolution of data science and analytics in the transportation sector, and it is anticipated that this will continue at an accelerated pace. Therefore, it is timely to identify strategies that can optimize and streamline data architectures to promote more responsive integration of these new approaches.