

# NCHRP 20-44(28)

## DEVELOPMENT OF A TECHNOLOGY TRANSFER PLAN FOR STATE DEPARTMENTS OF TRANSPORTATION RESEARCH PROGRAMS

### FINAL REPORT

*Prepared for:*

National Cooperative Highway Research Program,  
Transportation Research Board  
of  
The National Academies of Sciences, Engineering, and Medicine

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- Vicky Fout, Ohio Department of Transportation
- Jennifer Harper, Missouri Department of Transportation
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The project was managed by Sid Mohan, NCHRP Senior Program Officer.

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## Summary

The nine Midwestern states that comprise Region 3 of the American Association of State Highway and Transportation Officials (AASHTO) share many of the same challenges. They have geographical similarities, four-season climates, a mix of large cities and small towns, and a central position at the crossroads of American passenger and freight transportation.

Region 3 state department of transportation (DOT) research programs are well known nationally for their aggressive pursuit of innovation within their own transportation departments as well as regionally. Recently, Region 3 research programs forged a cooperative approach to hosting their periodic peer exchanges required by the Federal Highway Administration (FHWA).

There is extensive guidance in published literature for dissemination and implementation of transportation research results, not only from NCHRP and TRB but also from the U.S. DOT, the AASHTO Research Advisory Committee and many other organizations. Making use of such guidance, however, can be challenging: technology transfer options can be overwhelming, and effective dissemination requires understanding the recipient audience, the message and the desired outcome.

This NCHRP 20-44 implementation project represents a next step by the nine states to coordinate their efforts, particularly related to the widespread sharing of innovative processes, materials and products resulting from their research projects. While some of each state's research focuses on challenges unique to that state, most of the states' research is of potential interest across the entire region. Effective strategies for communicating promising research results will be useful to all of the states in the region.

This report summarizes the activities performed as part of NCHRP Project 20-44(28): Development of a Technology Transfer Plan for State Departments of Transportation Research Programs. It represents the investigator's final deliverable in fulfillment of Task 7 of the project. This report is organized by task, numbered 1 through 6, focusing on the need, outcome, deliverable and benefit for each task. Resources, links and appendices associated with each task represent key products from this project.

## Task 1. Project Scoping with Region 3 Technical Advisory Committee

Even given the many common regional needs of the AASHTO Region 3 states, each member has a unique perspective and set of priorities. The main activities in this first task were to help the project panel identify priorities, plan project deliverables and determine which research projects to work with in Task 2.

Each of the project panelists nominated two of their state's projects for consideration. An online survey was developed and invited voters from Region 3 member states to rank the selection criteria. The five projects that received the highest aggregate scores are diverse in topical areas and product times, and present a variety of dissemination challenges and opportunities:

### **Commercial Production of Non-Proprietary Ultra High Performance Concrete**

*Conducted by Michigan DOT*

- UHPC has a particularly **high national interest**. It is gaining significant attention at the federal level as an **Every Day Counts initiative**, so dissemination and tech transfer of results has to be done in that context and should dovetail with federal efforts.

- The impact and value include a strong **cost-savings component**; this can be a focus of dissemination and help drive technology transfer.

### **Holding Strategies for Low Volume State Routes: Phase I & Phase II**

*Conducted by Iowa DOT*

- This project will help show how to conduct tech transfer for a multi-phase project: how to disseminate in-progress results at the end of a non-final phase, and how to encapsulate core previous-phase findings during tech transfer at the end of the project.
- The asset management component of this project involves policy and decision-making components; these can present tech transfer challenges.
- Some of the differences in pavement distress and treatment types are technical and nuanced. These require careful framing for successful dissemination and technology transfer, particularly to different audiences.
- Phase 2 notes the importance of development of guidance for use on district and local levels. This involves tech transfer tailored to users in smaller areas, both within agencies (districts, subdistricts) and beyond (counties, municipalities).

### **Development of an Intelligent Snowplow Truck That Integrates Telematics Technology, Roadway Sensors and Connected Vehicles**

*Conducted by Indiana DOT*

- This was the most **future facing** project among those submitted, dependent on the successful application of new technologies. Disseminating results about aspirational future products—such as a functioning intelligent snowplow—requires balancing high potential benefit with realistic expectations.
- Tech transfer must be done in the **larger landscape of intelligent transportation and connected vehicles**. There is a lot of interest in these topics, but also a lot of competing information.
- The submitter identified this as **“more difficult than typical” to implement**; as such, it is worth including among the five projects.

### **Highway Safety Manual Training**

*Conducted by Missouri DOT*

- This project interfaces with a **major national document** (the Highway Safety Manual) that all states use. Any dissemination or tech transfer efforts will have to **work in concert with existing tools** developed at the state and national levels.
- Communicating about safety presents specific challenges: expressing that an agency is working to improve safety **without stating or suggesting that the current system is inherently unsafe** is critical.
- The project deliverables are themselves **dissemination (training) tools** requiring unique dissemination and tech transfer strategies.

### **Streamlining Implementation of Sustainable Channel Maintenance Practices**

*Conducted by Ohio DOT*

- This is an **implementation project**, which requires a different approach for dissemination and technology transfer.
- The research involves interfacing with **complex state and federal requirements** on environmental standards.

- It is anticipated that **some portions of the findings will be extensible to other states**, and some portions may not.
- This is a **follow-up study to a previous research project**; those findings must be rolled into the dissemination and tech transfer efforts for this one.

The complete survey results, as well as the plan for Tasks 2 through 7, are detailed in [Appendix A](#).

## Task 2. Dissemination Strategies for Five Projects

With the five highest-ranking projects identified, the investigators began developing a customized menu of dissemination activities to effectively raise awareness of the research findings among the agency's employees, partners, and peer states.

To accomplish this, each project's final deliverables were reviewed to understand the need, objective, methodology, results, target users and hoped-for benefits. Representatives from each project were also consulted to learn about current dissemination efforts and existing communications channels within each agency that could be leveraged. In addition, special consideration was given to:

- Understanding the project's goals and objectives, current dissemination efforts, and the agency's existing communication channels to develop a strategy that is customized to the specific project and agency. To this end, the NCHRP Project 20-44(28) investigators communicated with each of these agencies and research project investigators when possible.
- Proposing a menu of tailored activities, which could include articles, technical briefs, videos, social media posts, and more.
- Identifying the audience, core message and desired technology transfer outcome, as well as the resources required for successful dissemination.
- Identifying regional, national, and international opportunities for broad dissemination and building communities of practice.

The resulting dissemination strategies are unique to each project; these strategies include specific activities and the tools and resources that an agency would likely need to complete them.

The dissemination strategies for each of the five projects can be found on the [NCHRP Project 20-44\(28\) web page](#).

## Task 3. Videos and How-To Guide

To demonstrate the power of video as a storytelling tool and maximize the potential of this medium, the project panel selected four of the projects identified in Task 1 to develop into brief, 3- to 5-minute videos. The projects selected include:

- **Commercial Production of Non-Proprietary Ultra High Performance Concrete**, conducted by Michigan DOT
- **Holding Strategies for Low Volume State Routes: Phase I & Phase II**, conducted by Iowa DOT
- **Highway Safety Manual Training**, conducted by Missouri DOT
- **Streamlining Implementation of Sustainable Channel Maintenance Practices**, conducted by Ohio DOT

The investigators worked closely with each project's agency champions and research team, conducting on-camera interviews with key project stakeholders and collecting supplementary imagery from

research in the field and in the laboratory. A storyboard was developed to show how audio from the interviews and additional narration would be combined with visual elements to create a cohesive story. Finally, the individual pieces were edited and produced to create a final video that documents the research story.

Images of each video's title page follow. Links to the videos may be found on the [NCHRP Project 20-44\(28\) web page](#).

### Michigan DOT: Making Ultra High-Performance Concrete Affordable for All



### Iowa DOT: Extending the Life of Iowa's Low-Volume State Roads





## Missouri DOT: Applying State-Specific Safety Data to Roadway Designs



## Ohio DOT: Streamlining Ohio's Sustainable Channel Maintenance Practices



In addition to these four video briefs, a step-by-step guide was developed to help transportation agencies create similarly compelling videos in the future. It details a low-cost approach to creating videos that has proven effective with multiple state departments of transportation (DOTs). The suggested approach requires some experience in video recording, video editing and voice-over recording, which are skills that often may be found within an agency or which may be outsourced.

The **How-To Guide for Creating Project-Focused Videos** can be found on the [NCHRP Project 20-44\(28\) web page](#).

## Task 4. Technology Transfer Webinars

Representatives from all nine AASHTO Region 3 states voted on which of the four videos created as part of project Task 3 they wished to see further developed into webinars. Voters were asked to consider topics based on their broad national appeal, their potential for attracting and engaging a large audience, and the transferability of the research results. Michigan DOT's **Commercial Production of Non-Proprietary Ultra High Performance Concrete** and Ohio DOT's **Streamlining Implementation of Sustainable Channel Maintenance Practices** received the highest votes and were selected.

Both webinars featured presentations from key project stakeholders representing the sponsoring agency and research team. The consultant team prepared draft webinar content that examined the details of the research and the technology transfer tools and practices that were used—or could be used—to further disseminate project results. Representatives from the research teams and agency technical experts provided revisions to the draft research-related content prepared by the consultants.

One month before the scheduled webinars, the consultant team provided the NCHRP project panel with a notice describing the webinars and offering calendar links with login information for both sessions. Panel members and other Region 3 member states shared this notice through agency newsletters and internal mailing lists, and alerted other contacts likely to be interested in the webinar topics. The project panel chair also distributed the webinar notice through the AASHTO Research Advisory Committee mailing list, which reaches the research programs of all 50 states and the District of Columbia.

The webinars were both conducted in late March 2023 using the Zoom meeting platform. Recordings of both webinars can be found on the [NCHRP Project 20-44\(28\) web page](#):

- **Making Ultra-High Performance Concrete Affordable for All: Research Results and Opportunities for Tech Transfer**
- **Streamlining Ohio's Sustainable Channel Maintenance Practices: Research Results and Opportunities for Tech Transfer**

The presentation slides that were used during the webinars can be found in [Appendix B](#) of this report as well.

## Task 5. Technology Transfer Workshops

Representatives from all nine AASHTO Region 3 states voted on which of the two webinars created as part of project Task 4 to feature as part of a collaborative workshop on technology transfer. Voters were asked to consider each project's appeal, potential for implementation and the transferability of the research results. Michigan DOT's **Commercial Production of Non-Proprietary Ultra High Performance Concrete** was selected after receiving the most votes.

While other tasks in this project focused on disseminating research, the workshop developed for Task 5 aimed to help states adapt and apply the strategies and best practices developed through the previous tasks according to their own particular needs and resources. The Region 3 states chose a six-hour virtual workshop, held over two days, to address the UHPC research projects in depth and all of the states' plans for technology transfer.

A second workshop was originally planned with the aim of communicating project results to the national research community. It was later decided that an effective alternative approach would be multiple

presentations at the joint in-person TRB and AASHTO research meetings in July 2023. One of these featured a portion of the UHPC workshop detailed in this section, and another summarized project findings and lessons learned from this project as a whole. The consultant team was assisted in the second presentation by three of the Region 3 panelists, who each spoke to their experience with adapting their agency's research for a different dissemination strategy:

- Videos – Jennifer Harper, Missouri DOT
- Webinars – Vicky Fout, Ohio DOT
- Workshops – Michael Townley, Michigan DOT

A summary report on the UHPC technology transfer workshops, the follow-up national presentations, and all presentation materials used during these events are available in [Appendix C](#) of this report.

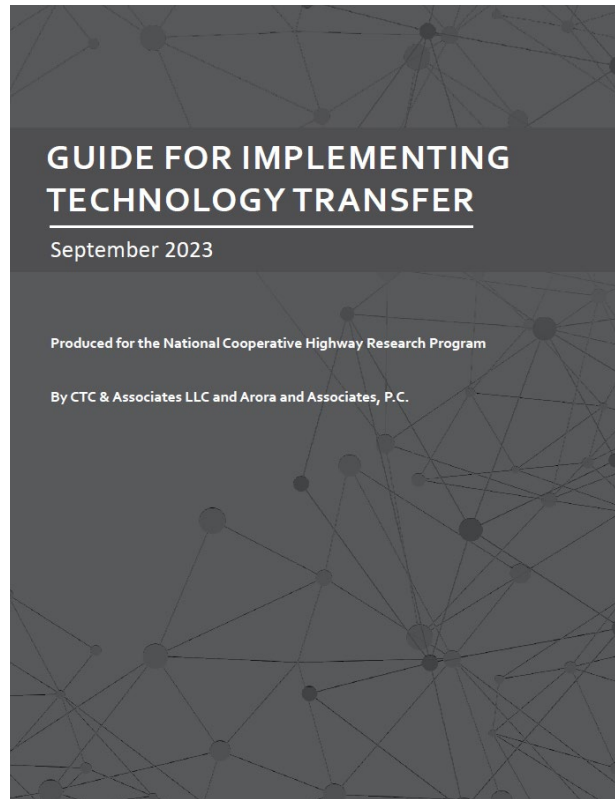
## Task 6. Guide for Implementing Technology Transfer

Finally, the NCHRP project culminated in a user-friendly resource developed to document the most impactful and cost-effective peer-to-peer technology transfer opportunities and serve as step-by-step guidance for maximizing each strategy.

The guide draws from key findings and elements in Tasks 2-5, unifying and packaging them in a cohesive, easy-to-use format. These include:

- Presentation and discussion of a menu of dissemination strategies and required resources along with five sample dissemination strategies for a range of research projects.
- A how-to guide for creating research video briefs along with two sample videos, as developed in Task 3.
- Tips for developing a webinar on research results for various audiences.
- Presentation materials, poll results and a summary of the questions and comments received during the webinar presented in Task 4.
- Summaries of each of the technology transfer workshops, focusing on each state's plan for expanded dissemination efforts.

Each section of the guide highlights the "regional approach" to technology transfer, detailing how regional states' common concerns and parallel efforts can be leveraged to enhance technology transfer. Each section also links to additional resources to support the technology transfer activities describes, as well as best practices in the form of do's and don'ts.



The guide may be found on the [NCHRP Project 20-44\(28\) web page](#).

**Appendix A. Project Work Plan**

# **Development of a Technology Transfer Plan for State Departments of Transportation Research Programs**

**NCHRP 20-44(28) Task 1 Deliverable—Task Memo**

Prepared for

**National Cooperative Highway Research Program**

Prepared by

**CTC & Associates LLC and Arora and Associates, P.C.**

March 15, 2021

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## 1. SUMMARY

This memo is the project planning and scoping document for [NCHRP Project 20-44\(28\)](#): Development of a Technology Transfer Plan for State Departments of Transportation Research Programs. It represents the investigator’s final deliverable in fulfillment of Task 1 of the project.

Project participants are:

- Transportation Research Board — Sid Mohan
- Project Panelists
  - Iowa DOT — Brian Worrel (panel chair)
  - Michigan DOT — Mary Hoffmeyer
  - Minnesota DOT — Hafiz Munir (Region 3 chair)
  - Ohio DOT — Vicky Fout
  - Wisconsin DOT — Ethan Severson
- AASHTO Region 3 Committee Members
- Investigators
  - CTC & Associates — Brian Hirt, Chris Kline
  - Arora and Associates — Harry Capers, Melissa Jiang

## 2. PROJECT KICKOFF

The investigator team met with Sid Mohan and the project panelists on January 11. On this web meeting, the investigators provided an overview of the tasks, deliverables, schedule and budget to inform development of the Task 1 priorities and planning deliverable and prepare for identifying possible projects to work with in Task 2 (dissemination strategies for five projects).

Based on panel feedback, the following revision to the project schedule was developed:

**NCHRP Project 20-44(28): Project Schedule**  
Draft revision January 2021

Task		2020				2021								2022														
No.	Task Name (Task Deliverable ▲)	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N
1	Project Scoping with Region 3 TAC (Priority and planning document)				■	■	■	■																				
2	Dissemination Strategies for Five Projects (Draft and final strategies document)							▲	■	■	■	■	■	■	■	■	■											
3	Two Videos with How-To Guide (Video 1, Video 2, How-To Guide)																											
4	Technology Transfer Webinars (2 webinars with materials and recording)																											
5	Targeted Technology Workshops (Workshop 1, Workshop 2, AASHTO RAC Workshop)																											
6	Guide for Implementing Technology Transfer (Draft guide, final guide, webinar)																											
7	Project Report (Draft and final report)																											

Key components of Tasks 1 through 7 were detailed and discussed during the kickoff meeting.



## Task 1: Project Priorities and Planning Document

The main activities of Task 1 were to:

- Meet with the project panel to discuss, define and document specific needs, priorities and direction for each of the project tasks.
- Develop and define a process for eliciting Region 3 priorities for research project nomination and selection for Task 2.

The next section of this task memo details the scope of Tasks 2 through 7 as currently understood. Following this, the remainder of this task memo documents completed Task 1 activities and outcomes.

### 3. SUMMARY OF TASKS 2 THROUGH 7

#### Task 2: Dissemination Strategies for Five Projects

- Complete selection process and identify five projects for inclusion in dissemination strategies document
- Develop tailored dissemination strategies to promote the wide use of findings from five recently completed research projects
- Fit to specific research projects and agencies:
  - Review final deliverables to understand the need, objective, methodology, results, target users and hoped-for benefits
  - Learn about current dissemination efforts
  - Leverage existing communication channels within the agencies
- Propose a menu of tailored strategies, including possibly:
  - Blurbs in employee newsletter
  - Constant Contact notices to target audiences
  - Two-page research briefs
  - Topic-specific summaries of groups of research projects
  - Video briefs
  - Presentations at relevant local, regional and national meetings
  - Internal, regional webinars and national webinars
  - Articles in industry journals
  - Regional conferences
- Other considerations:
  - Identification of audience, core message and the desired technology transfer outcome
  - Expanded dissemination to lawmakers, local agencies, research partners, industry and the public
  - Alternative delivery options (virtual presentations, peer exchanges and workshops)
  - Resources needed (personnel costs, equipment, software/licenses, travel/meetings)
- Results will feed into Task 6, Guide for Implementing Technology Transfer.

### Task 3: Two Videos with How-To Guide

- Two 5-minute videos combining easy-to-follow visuals with compelling dialogue and narration on the value and potential application of a research product
- Selection criteria and considerations:
  - Suggest one technical topic, one policy/planning topic
  - Anticipated primary audiences (practitioners, managers and executives at state DOTs and other agencies) and secondary audiences (decision-makers and lawmakers; members of the public)
- Development and production:
  - Interview the state DOT project manager on camera to learn about the need, results and benefits as well as key considerations for implementation
  - Collect all available project-related still images and video footage
  - Write a shot-by-shot script for the video, pairing video (still images, field video, interview video, and on-screen text and graphics) with audio (narration text, comments from the interview subject, and audio from field video) with estimated durations for each shot
  - Panel will review draft script and draft video
- How-to guide for creating similar technology transfer videos will address:
  - Selecting a project to feature
  - Identifying key messages
  - Working with project staff to capture project highlights
  - Selection of meaningful video and audio
  - Best practice do's and don'ts
- The videos and how-to guide will feed into Task 6, Guide for Implementing Technology Transfer.

### Task 4: Technology Transfer Webinars

- Support the development and delivery of two 90-minute webinars:
  - A webinar for each of the two research projects featured in the Task 3 videos
  - Work with the original research teams for the technologies selected
- Process:
  - Help develop presentation materials that communicate the important aspects of the research project
  - Assist with communicating the technology transfer opportunities associated with each project:
    - Identification of practical tools from the research
    - Putting the findings to work (including stakeholder identification and engagement)
    - Communicating the results and benefits to maximum effect
  - Tailor the presentation components of each webinar with examples aimed at the target audiences: state DOT research staff, other state DOT employees from selected business areas, principal investigators and local agency representatives
- Create all materials and serve as webinar moderator or presenters as appropriate:
  - Original researchers associated with these projects will play a cooperative role in the technical development and delivery of the webinars.

- Likely one or more Region 3 state research customers will also be involved to discuss technology transfer progress, successes and challenges associated with the research results.
- The webinar presentations, live poll results and recordings will feed into Task 6, Guide for Implementing Technology Transfer.

## Task 5: Technology Transfer Workshops

- Conduct a technology transfer workshop for each of the two research projects identified in Tasks 3 and 4:
  - Opportunity to meet virtually with each state's research team to discuss in depth both immediate and longer-term strategies for technology transfer
  - Focus on helping the research director and staff apply the dissemination strategies and tools developed through the previous tasks to the unique environment of each state
- Participants:
  - Include relevant counterparts (customers, practitioners and researchers) from other agencies
  - Technology transfer specialists from both CTC and Arora:
    - A subject matter expert from Arora with experience in the discipline of the research may provide technical insights on the dissemination challenges encountered in deploying research recommendations.
    - The university or consultant principal investigators responsible for the research efforts under discussion will also be expected to attend and participate.
- Format:
  - Six hours over two days
  - Agenda:
    - Program review
    - Selection of dissemination priorities
    - Formation of a process to implement and measure these
    - Ways to improve collaboration
- Third, shorter (two-hour) workshop to be presented at 2022 AASHTO RAC meeting
- A summary of the workshops and discussions and state-specific plans to expand dissemination efforts will feed into Task 6, Guide for Implementing Technology Transfer.

## Task 6: Guide for Implementing Technology Transfer

- Guide for Region 3 states and others to reference as they move forward in expanding their research dissemination efforts:
  - User-friendly
  - Not more than 50 pages
  - Draw and unify key findings from Tasks 2-5
  - Draw from prior experience with research communication and technology transfer
- Companion webinar:
  - 90 minutes
  - Highlight strategies and tools from the guide
  - Feature examples aimed at target audience
  - Conduct live polling to learn about strategies and opportunities
  - Set aside time for Q-and-A

## Task 7: Project Report

- Briefly document:
  - Project need and approach
  - Members of the project panel
  - Timeline of the effort
  - Logistical details
  - Project deliverables
  - Recommended next steps
- Deliverables from all previous tasks will represent the core knowledge gained from this research effort
  - Include in the project report as appendices or links

## 4. DEVELOPING SELECTION CRITERIA WITH AASHTO REGION 3

The project panel suggested making use of the monthly AASHTO Region 3 conference calls as a means to communicate project progress and soliciting research project nomination and selection criteria for the dissemination strategies document (Task 2).

### Reintroduction of Region 3 Members to the Project

The investigators provided Brian Worrel with a PowerPoint presentation to brief the Region 3 committee on the project and prepare them for next steps.

Brian Worrel shared Region 3 feedback with the investigators shortly after the February 2 meeting of the Region 3 committee. Comments and clarifications are already incorporated into the Summary of Tasks 2 through 7 above and into the Region 3 survey, as described below.

### Region 3 Survey

A previously agreed upon strategy for selecting projects to include in Task 2 was for each Region 3 state to nominate two projects for consideration, and then for the project panel, working with the investigators, to select five to include.

The investigators developed an online survey to help Region 3 members prioritize criteria for initial project nomination and subsequent final selection. Incorporating comments from the panel and TRB, the investigators finalized the survey.

The survey requested participant contact information and responses to the following two ranking questions:

1. **Criteria that each state can use for nominating its own research projects.** Please rank the relative importance of each of the following characteristics. (1 = Most Important)
  - High potential interest and applicability at our agency
  - Likelihood of successful deployment and acceptance by our agency staff
  - High potential interest and applicability across AASHTO RAC Region 3
  - High potential interest and applicability nationally

- Award-winning research project
- Small/reasonable budget required to undertake implementation
- Anticipated interest/willingness of the external research team to participate in Project 20-44(28) tasks
- Anticipated interest/willingness of internal champions and customers to participate in Project 20-44(28) tasks

(If you wish to note additional **project nomination criteria** beyond those listed above, please use the space provided.)

2. **Criteria that Region 3 can use for selecting the final five projects for the compendium.** Please rank the relative importance of each of the following characteristics. (1 = Most Important)
- Projects together address a range of research areas
  - Projects together address a range of research types (specs, develop/test new technology, policy/compliance, etc.)
  - Projects together address a range of ease/difficulty of implementation and technology transfer
  - Projects together reflect a range of budgets to undertake implementation
  - Projects together reflect a range of implementation time frames (immediate, medium-term, long-term)

(If you wish to note additional **final selection criteria** beyond those listed above, please use the space provided.)

## Survey Results

The survey invited multiple submissions from each Region 3 member state DOT. In total, 13 responses were received from eight of the nine Region 3 states. Complete survey results with aggregate rankings follow:

### 1. Criteria that each state can use for nominating its own research projects.

Criterion	Rank	Mean	Var.
High potential interest and applicability at our agency	1	2.6	2.8
High potential interest and applicability across AASHTO RAC Region 3	2	2.9	3.1
Likelihood of successful deployment and acceptance by our agency staff	3	3.7	2.6
Anticipated interest/willingness of internal champions and customers to participate in Project 20-44(28) tasks	4	4.1	5.7
Anticipated interest/willingness of the external research team to participate in Project 20-44(28) tasks	5	4.9	5.4
Small/reasonable budget required to undertake implementation	6	5.2	3.0
High potential interest and applicability nationally	7	5.9	3.9
Award-winning research project	8	6.6	3.8

## 2. Criteria that Region 3 can use for selecting the final five projects for the compendium.

Criterion	Rank	Mean	Var.
Projects together address a range of research areas	1	2.2	2.4
Projects together address a range of ease/difficulty of implementation and technology transfer	1	2.2	1.4
Projects together address a range of research types (specs, develop/test new technology, policy/compliance, etc.)	3	2.7	2.4
Projects together reflect a range of implementation time frames (immediate, medium-term, long-term)	4	3.8	0.5
Projects together reflect a range of budgets to undertake implementation	5	4.0	1.0

*Free response: 1. Projects that have proven benefits; 2. Majority of Region 3 States able to implement; 3. Results can be communicated clearly and marketable for surface transportation interest*

### Discussion

The investigators presented the survey results at the March 2, 2021, meeting of Region 3 members, along with the following initial observations:

- There are potentially competing priorities embedded in the responses: An individual project should have a high “likelihood of successful deployment and acceptance by our agency staff,” but the final five projects selected should represent “projects [that] together address a range of ease/difficulty of implementation and technology transfer.”

The likelihood of implementation and the ease/difficulty of implementation may be related to each other, but these are not the same thing. For example, implementation of research results that address a high-priority issue may be very likely to succeed, with the understanding that such implementation may take significant time and effort.

- Budget requirements for implementation are generally not a priority for project nomination or selection.

The following additional comments were addressed at the meeting:

- Despite its top ranking as a selection criterion for the final five projects, diversity of project types may not strictly be necessary. For example, multiple projects addressing pavements (bridges, safety, etc.) might be acceptable if they are the most useful to the group.

An added dimension to this observation is that multiple projects might approach a similar topic but in different ways. Research to validate pavement performance might be very different in nature from research to update pavement specifications.

It is important to note that selection of the final five projects will be done with input and oversight from the project panel and Region 3 members.

- The project panel restated the expectation that for any selected project, the agency’s subject matter experts should be engaged at some minimum level to help lay out the recommended project need and background.

The project submission form will note that the involvement of the agency subject matter expert and the principal investigator are going to be important to fulfilling the requirements of this project.

## 5. NEXT STEPS

The investigator team will develop the online submission form to collect two project nominations from each Region 3 state to be considered for inclusion in the Task 2 dissemination strategies document. The form will include the nomination priorities and guidance outlined in this memo. This step is already in progress.

Selection of five projects and subsequent development of the dissemination strategies document will proceed as Task 2, outlined in the Summary of Tasks 2 through 7 section of this memo.

The investigator team will continue to work under the close guidance and oversight of TRB and the NCHRP Project 20-44(28) project panel.

The project remains on budget and on schedule.

**Appendix B. Technology Transfer Webinars**



# **Development of a Technology Transfer Plan for State Departments of Transportation Research Programs**

**NCHRP 20-44(28) Task 4 Deliverable—Technology Transfer Webinars**

Prepared for

**National Cooperative Highway Research Program**

Prepared by

**CTC & Associates LLC**

April 17, 2023

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## 1. SUMMARY

Webinars have been used effectively for years in the transportation research community to reach large, geographically dispersed audiences. To demonstrate the opportunities, considerations and processes involved with successfully tailoring a research project for this interactive format, as well as the need and findings of the research itself, the [NCHRP Project 20-44\(28\)](#) project panel selected two of the research projects that had previously been selected for videos in Task 3 and developed these into two 90-minute webinar presentations conducted in late March 2023.

## 2. TOPIC SELECTION PROCESS

Representatives from all nine AASHTO Region 3 states voted on which of the four videos created as part of project Task 3 they wished to see further developed into webinars. Voters were asked to consider topics based on their broad national appeal, their potential for attracting and engaging a large audience, and the transferability of the research results. Michigan DOT's **Commercial Production of Non-Proprietary Ultra High Performance Concrete** and Ohio DOT's **Streamlining Implementation of Sustainable Channel Maintenance Practices** received the highest votes and were selected.

## 3. WEBINAR PREPARATION AND DISSEMINATION

Both webinars featured presentations from key project stakeholders representing the sponsoring agency and research team. The consultant team prepared draft webinar content that examined the details of the research and the technology transfer tools and practices that were used—or could be used—to further disseminate project results. Representatives from the research teams and agency technical experts provided revisions to the draft research-related content prepared by the consultants.

One month before the scheduled webinars, the consultant team provided the NCHRP project panel with a notice describing the webinars and offering calendar links with login information for both sessions. Panel members and other Region 3 member states shared this notice through agency newsletters and internal mailing lists, and alerted other contacts likely to be interested in the webinar topics. The project panel chair also distributed the webinar notice through the AASHTO Research Advisory Committee mailing list, which reaches the research programs of all 50 states and the District of Columbia.

The webinars were conducted in late March 2023 using the Zoom meeting platform. Details of each webinar follow.

### **Making Ultra High Performance Concrete Affordable for All: Research Results and Opportunities for Tech Transfer**

Presented on March 27, 2023, from 11:30 a.m. to 1 p.m. (ET)

#### **Summary**

The webinar addressed why Michigan DOT sought a non-proprietary formulation of ultra high performance concrete and the steps that the project's research team took to create it. A county engineer who has already used the material successfully in several projects shared his practical advice

for working with this UHPC formula. Following the project-specific presentations, an overview of the different strategies used to disseminate the research was provided.

### Presenters

- **Michael Townley**, Engineer of Research, Michigan DOT
- **Steve Kahl**, Engineer, Structures Construction Section, Michigan DOT
- **Sherif El-Tawil**, Professor, Civil and Environmental Engineering, University of Michigan
- **Mike Clark**, County Engineer, St. Clair County Road Commission
- **Brian Hirt**, Principal and CEO, CTC & Associates LLC

### Attendees

The webinar was attended by 67 individuals representing a variety of organizations and interests, including state and local transportation agencies, academia, and industry. A Mentimeter poll conducted at the conclusion of the presentations asked attendees to self-identify their affiliation and familiarity with UHPC. These questions, and the attendees' responses, are included below:

- What type of organization do you represent? (36 respondents)
  - Michigan DOT (6)
  - Another state DOT (17)
  - Another government agency (federal, county, local, other) (5)
  - Regional or national organization (1)
  - Academia (3)
  - Industry (3)
- Prior to today, what was your familiarity/experience with UHPC? (Select all that apply) (36 respondents)
  - Limited knowledge (20)
  - Knowledgeable (7)
  - I have hands-on experience (5)
  - My agency uses UHPC in a limited capacity (12)
  - My agency uses UHPC in a broad capacity (3)

### Discussion

Attendees were invited to write their questions in the chat box during the speakers' presentations, and many were answered in the chat box before the webinar concluded. A designated opportunity for Q&A was also provided at the end of the webinar for additional questions and clarification of responses entered in the chat box. Questions for the presenters, which have been lightly edited for clarity, included:

- When using UHPC for steel beam-end repair, how does the bond between the steel and UHPC perform overtime?
- How hard was it to "shot blast" the finished UHPC? Do you think grinding and not using UHPC will work faster?
- Can UHPC be used in hot weather or extreme hot weather conditions? Would steel fibers expansions cause any problems or affect the strength of the UHPC?
- Why the epoxy overlay? and, how the preparation of the epoxy overlay was achieved?

- By how much does using fiber reinforcement (steel fiber) improve the strength performance of UHPC?
- When you have a chance, could you mention which brand/model of high shear pan mixer you use (in lab)?
- Will a PDH certificate be available for this webinar?
- Any concerns of friction resistance?

## Resources

The recorded webinar, including details of the question-and-answer session, may be found on the [NCHRP Project 20-44\(28\) web page](#).

## Streamlining Ohio’s Sustainable Channel Maintenance Practices: Research Results and Opportunities for Tech Transfer

Presented on March 29, 2023, from 1 to 2:30 p.m. (ET)

### Summary

A representative from Ohio DOT and the research team explained the need for sustainable channel maintenance practices and shared before-and-after images and videos of Ohio waterways where these practices have been implemented. Following these presentations, a detailed list of dissemination strategies was shared to showcase the potential avenues for technology transfer.

### Presenters

- Jon Witter, Associate Professor, Ohio State University
- Matt Perlik, Assistant Environmental Administrator, Ohio DOT
- Brian Hirt, Principal and CEO, CTC & Associates LLC

### Attendees

The webinar was attended by 38 individuals from Ohio and other state and local transportation agencies, academia, and industry.

A Mentimeter poll conducted at the conclusion of the presentations asked attendees to self-identify their affiliation and familiarity with channel maintenance practices. These questions, and the attendees’ responses, are included below:

- What type of organization do you represent? (23 respondents)
  - Ohio DOT (4)
  - Another state DOT (10)
  - Another government agency (federal, county, local, other) (2)
  - Regional or national organization (0)
  - Academia (1)
  - Industry (6)

- Prior to today, what was your familiarity/experience with the channel maintenance practices described today? (Select all that apply) (23 respondents)
  - Limited knowledge (16)
  - Knowledgeable (4)
  - I have hands-on experience (5)
  - My agency uses UHPC in a limited capacity (2)
  - My agency uses UHPC in a broad capacity (2)

## **Discussion**

Attendees were invited to write their questions in the chat box during the speakers' presentation. A designated opportunity for Q&A was also provided at the end of the webinar. Questions for the presenters, which have been lightly edited for clarity, included:

- Did you run into issues with regulatory floodplains (FEMA) performing any of the in-stream work?
- Were there challenges related to AOP [aquatic organism passage] in permitting? Seems like only the double vane would be an issue. Was it because that was meant to be temporary?

## **Resources**

The recorded webinar, including details of the question-and-answer session, may be found on the [NCHRP Project 20-44\(28\) web page](#).

**Appendix C. Technology Transfer Workshop**

# **Development of a Technology Transfer Plan for State Departments of Transportation Research Programs**

**NCHRP 20-44(28) Task 5 Deliverable—Technology Transfer Workshops**

Prepared for

**National Cooperative Highway Research Program**

Prepared by

**CTC & Associates LLC**

September 15, 2023



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## 1. SUMMARY

A workshop typically takes place over several hours or even across multiple days, providing a one-of-a-kind forum for participants to explore and discuss topics of interest in greater depth than other formats. Best suited to a small group, a workshop also encourages engagement and the freedom to share without the usual time constraints. To showcase the benefits of the workshop format and how it can effectively support tech transfer, and to share the background and results of the research itself, the [NCHRP 20-44\(28\)](#) project panel selected one of the research projects that had previously been selected for a webinar in Task 4 and developed a six-hour virtual workshop that was held over two days in June 2023. In addition to this standard-format workshop, a second presentation highlighting each task in the broader NCHRP 20-44(28) project, as well as findings and best practices, was shared with the national research community in July 2023.

## 2. TOPIC SELECTION PROCESS

Representatives from all nine AASHTO Region 3 states voted on which of the two webinars created as part of project Task 4 to feature as part of a collaborative workshop on technology transfer. Voters were asked to consider each project's appeal, potential for implementation and the transferability of the research results. Michigan DOT's **Commercial Production of Non-Proprietary Ultra High Performance Concrete** was selected after receiving the most votes.

## 3. WORKSHOP PREPARATION AND DISSEMINATION

While other tasks in this project focused on disseminating research, the workshops developed for Task 5 aimed to help states adapt and apply the strategies and best practices developed through the previous tasks according to their own particular needs and resources.

The first workshop was wide-ranging, with representatives from Michigan DOT providing an overview of the agency's research program and highlights of its UHPC research project and completed dissemination activities. Participants from other state DOTs were invited to share details of their own research programs, and roundtable discussions provided an opportunity for everyone to discuss challenges and potential solutions.

A month prior to the scheduled workshop, the NCHRP project panel with a draft agenda and login information for the virtual event. This information and an invitation to attend was shared by the panel with members of the national AASHTO RAC, which includes DOT research managers from all 50 states.

The first workshop was held over two days in June 2023 using the Zoom meeting platform. Details of the event and each day's agenda are included below.

## **Workshop 1**

### **Summary**

The consultant team worked closely with the NCHRP project panel and Michigan DOT to develop an agenda that included informative presentations and opportunities for whole-group discussion. Each day's sessions and speakers are listed below.

#### **Day 1 - June 12, 2023**

##### **Implementation Planning and Best Practices: Approaches for Creating and Executing an Effective Implementation Plan for UHPC**

Welcome, Introductions and Focus for Today

*Brian Hirt, CTC & Associates*

NCHRP Project 20-44(28) Review

*Brian Hirt, CTC & Associates*

Program Review: Overview of Michigan DOT's Research Program

*Michael Townley, Michigan DOT*

Roundtable Responses from Other Region 3 States

*All (moderated)*

Summary of MDOT's Non-Proprietary UHPC Research

*Steve Kahl, Michigan DOT; Sherif El-Tawil, University of Michigan; Dewayne Rogers, Clare County*

Roundtable Responses from Other Region 3 States

*All (moderated)*

Implementation Planning Strategies

*Harry Capers, Arora and Associates; Brian Hirt, CTC & Associates*

Recap of the Day, Preparing for Day 2

*Brian Hirt, CTC & Associates*

#### **Day 2 - June 13, 2023**

##### **Facilitating Technology Transfer: Helping UHPC Spread Across and Beyond a State DOT**

Welcome, Introductions and Focus for Today

*Brian Hirt, CTC & Associates*

"Technology Transfer"

*Brian Hirt, CTC & Associates*

MDOT's Perspective on Tech Transfer

*Michael Townley, Michigan DOT*

Dissemination to Support and Promote Tech Transfer: Priorities, Tools and Strategies

*Katie Johnson, CTC & Associates*

Roundtable Responses from All Region 3 States

*All (moderated)*

Leveraging National Interest in the Research Topic

*Harry Capers, Arora and Associates; Brian Hirt, CTC & Associates*

Workshop Takeaways

*Brian Hirt, CTC & Associates*

## **Attendees**

The two-day workshop was attended by 22 individuals representing a variety of organizations and interests, including state and local transportation agencies, academia, and industry. The names and affiliations of the attendees are included below:

- **Kansas DOT** - J.R. Zamora, Brandon Broxterman
- **Illinois DOT** - James Krstulovich
- **Indiana DOT** - Tommy Nantung
- **Iowa DOT** - Linda Su
- **Michigan DOT** - Michael Townley, Dean Kanitz, Mary Hoffmeyer, Steve Kahl, Michelle Weber-Currie, Melissa Donoso, May Red
- **Minnesota DOT** – Hafiz Munir
- **Missouri DOT** - Brent Schulte
- **Wisconsin DOT** - Evelyn Bromberg, Carter Angelo
- **Clare County (MI) Road Commission** - Dewayne Rogers
- **University of Illinois** - Bayezid Baten (student)
- **University of Michigan** - Sherif El-Tawil
- **Arora and Associates** - Harry Capers
- **CTC & Associates** – Brian Hirt, Katie Johnson

## **Discussion**

With ample time on the agenda for roundtable discussions after each presentation, attendees were free to ask questions of each other and compare and contrast their own research programs with the information presented.

At various times throughout the workshop the Mentimeter polling tool was used to identify differences and similarities among participants' research programs and gauge the group's interest on key topics.

## **Resources**

A benefit of the virtual format was the ability to record; links to each session are available on the [NCHRP Project 20-44\(28\) web page](#). Time locations are shown for subtopics on both days.

## Day 1 - Implementation Planning and Best Practices: Approaches for Creating and Executing an Effective Implementation Plan for UHPC

- Welcome and introduction (0:00)
- NCHRP 20-44(28) Project overview (10:54)
- Overview of Michigan DOT's Research Program (30:15)
- Roundtable Discussion (1:17:00)
- Summary of MDOT's Non-Proprietary UHPC Research (1:28:15)
- Roundtable Discussion (2:23:15)
- Implementation Planning Strategies (2:40:05)

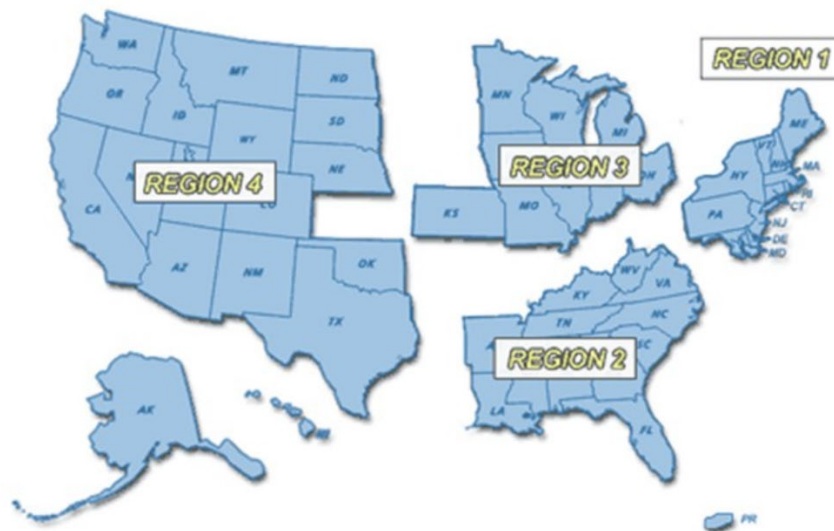
## Day 2 - Facilitating Technology Transfer: Helping UHPC Spread Across and Beyond a State DOT

- Welcome, Introductions and Focus for Today (0:00)
- "Technology Transfer" (43:47)
- MDOT's Perspective on Tech Transfer (49:30)
- Dissemination to Support and Promote Tech Transfer: Priorities, Tools and Strategies (1:27:38)
- Roundtable Discussion (1:50:52)
- Leveraging National Interest in the Research Topic (2:17:12)
- Workshop Takeaways (2:30:33)

## Workshop 2

### Summary

A second workshop was originally planned with the aim of communicating project results to the national research community. It was later decided that an effective alternative approach would be multiple presentations at the joint in-person TRB and AASHTO research meetings in July 2023 to encourage tech transfer from the Region 3 states to those in Regions 1, 2 and 4.



The onsite presentations featured a portion of the UHPC workshop detailed in this section, and another summarized project findings and lessons learned from this project as a whole.

The consultant team was assisted in the second presentation by three of the Region 3 panelists, who each spoke to their experience with adapting their agency's research for a different dissemination strategy:

- Videos – Jennifer Harper, Missouri DOT
- Webinars – Vicky Fout, Ohio DOT
- Workshops – Michael Townley, Michigan DOT

### **AASHTO RAC Annual Meeting, July 23-28, 2023**

#### **Attendees**

The audience consisted of dozens of peer research managers from state transportation agencies across the country, as well as representatives from national organizations like AASHTO, TRB and FHWA.

#### **Discussion**

The project panelists took turns sharing their takeaways, and attendees asked thoughtful questions that exemplified the overwhelming interest in the topic of tech transfer among all AASHTO regions.

Project panelists from the Region 3 states shared these insights and recommendations during the course of the presentation.

- **Dissemination Strategies**
  - It can take extra effort to find niche groups that would be interested in a particular research project, but since those groups are often the ones that would benefit the most, this time and effort may be a wise investment.
- **Videos**
  - Consider that project investigators can have varying levels of skill and comfort in front of the camera.
- **Webinars**
  - As presentation slides are shared between presenters and internally for agency review and approval, their file size can exceed some agencies' systems. Plan ahead by setting up a temporary file-sharing server to make transferring easier.
- **Workshops**
  - When publishing a single video recordings that is long or takes place over multiple days, add chapters or time markers to help others more easily locate the sessions that they are most interested in.

- Participating in a webinar or workshop can take time and effort for presenters who are volunteering their time. Consider preparing draft presentation materials as a starting point to lessen the burden of preparing for these activities.

## **Resources**

Presentation materials for the TRB committee presentation are the same as the slides that appear in the video above, “Dissemination to Support and Promote Tech Transfer: Priorities, Tools and Strategies.”

The presentation made to the AASHTO Research Advisory Committee was not recorded, but slides follow here.



NCHRP Project 20-44(28)

Development of a  
Technology Transfer Plan  
for State DOT Research  
Programs

**Brian Hirt**  
CTC & Associates



# Background

- ❑ AASHTO Region 3 states share many of the same challenges (geographical similarities, four-season climates, mix of large cities and small towns).
- ❑ Region 3 states are well known nationally for an aggressive pursuit of innovation.
- ❑ The region's research programs have a history of working collaboratively; periodic peer exchanges are just one example.



Mid America Association of State Highway and  
Transportation Officials (AASHTO Region 3)  
Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota,  
Missouri, Ohio, Wisconsin

# NCHRP 20-44(28)

- ❑ NCHRP Project 20-44(28) Development of a Technology Transfer Plan for State Departments of Transportation Research Programs
- ❑ December 2020 to September 2023
- ❑ Tasks
  1. Project Scoping with Region 3 Technical Advisory Committee
  2. Dissemination Strategies for Five Projects
  3. Four Videos with How-To Guide
  4. Technology Transfer Webinars
  5. Technology Transfer Workshops
  6. Guide for Implementing Technology Transfer
  7. Project Report

# Team

## □ Project Panelists

- Iowa DOT – Brian Worrel (panel chair)
- Michigan DOT – Mary Hoffmeyer
- Minnesota DOT – Hafiz Munir
- Missouri DOT – Jennifer Harper
- Ohio DOT – Vicky Fout
- Wisconsin DOT – Ethan Severson

## □ Transportation Research Board – Sid Mohan

## □ Investigators

- CTC & Associates – Brian Hirt (PI), Chris Kline, Katie Johnson
- Arora and Associates – Harry Capers (co-PI), Melissa Jiang

# Three Key Ideas...

## 1. “Technology Transfer”

*Technology transfer is the process of communication that results in putting research findings or new information into practice.*

### □ Two parts...

- **Communication/dissemination** component—getting knowledge from “point A” to “point B”
- **Implementation** component—putting that knowledge to work in the form of a new technology, practice or policy.

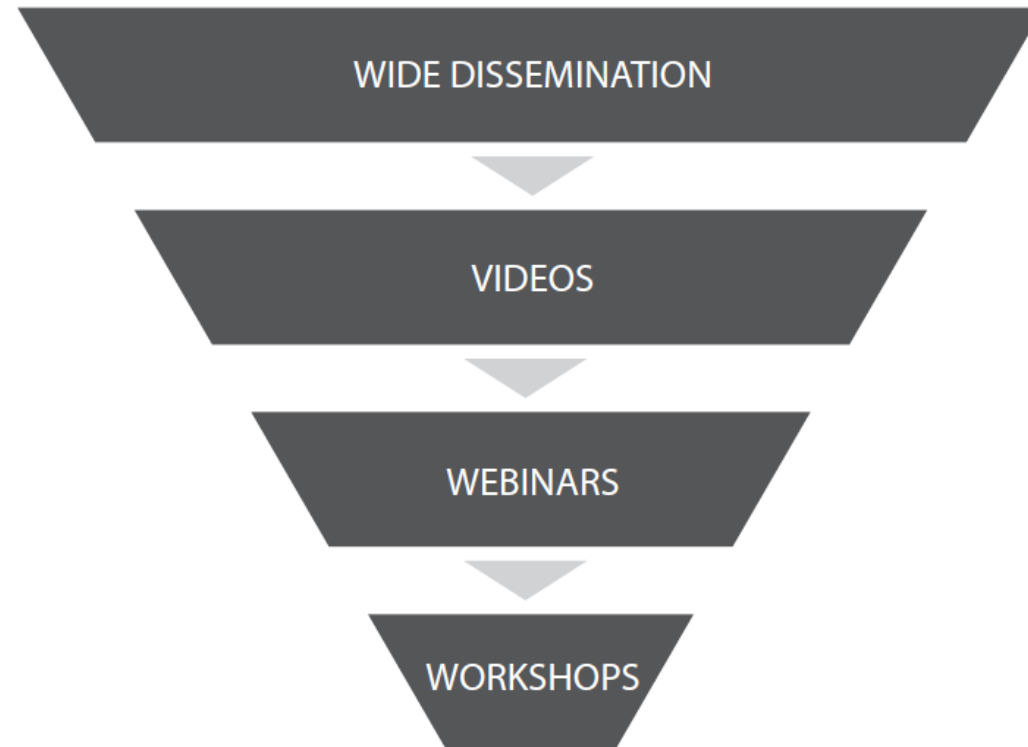
### □ Both parts of this definition are necessary, and neither suffices without the other.

# Three Key Ideas...

2. This NCHRP project engaged in parallel tracks of:
  - **Conducting** activities that support tech transfer
  - **Documenting/creating guidance** to help states carry out these activities in the future

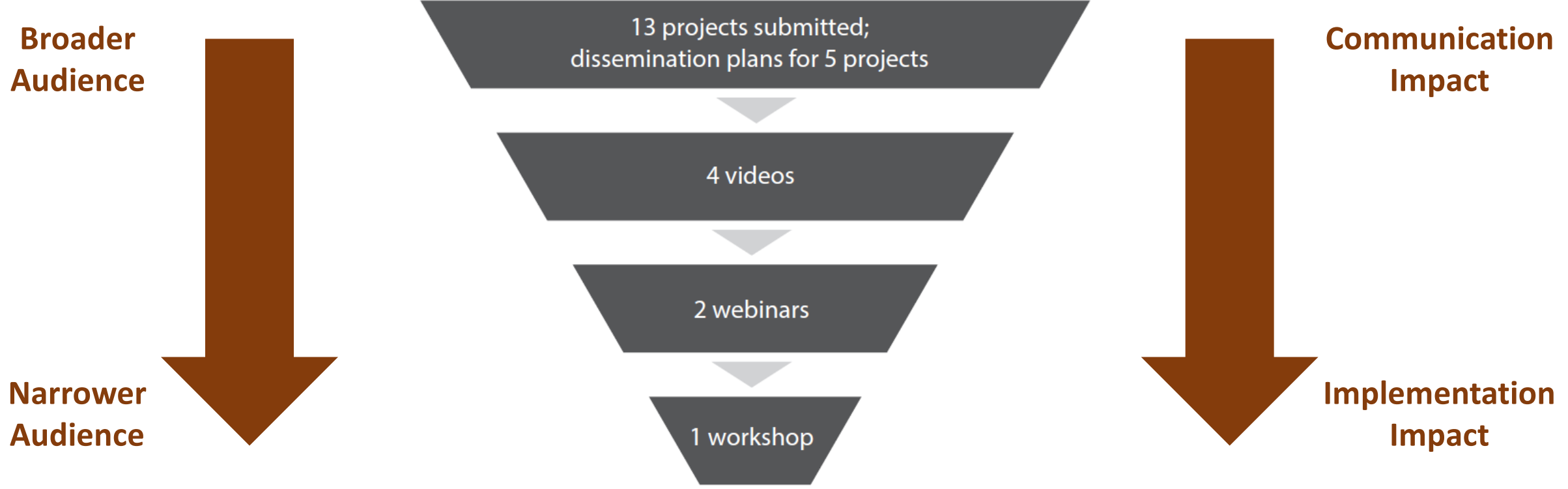
# Three Key Ideas...

## 3. A “funnel” from wide to narrow



# Three Key Ideas...

## 3. A “funnel” from wide to narrow



# Tasks and Deliverables, More Specifically

**Task 1:** Project **priorities and planning document**.

**Task 2:** **Dissemination strategies** to promote research results, with detailed dissemination proposals for five completed research projects of different types, chosen by the states.

**Task 3:** Four **dissemination videos** on selected research projects, along with guidelines for developing other videos.

**Task 4:** Two interactive **webinars** illustrating the effective communication of the results of research projects, aimed at research staff, other state DOT employees, contractors and local agencies.

**Task 5:** One **workshop** on selected projects to help Region 3 participants with implementation and technology transfer, and an additional **AASHTO RAC workshop** targeted more generally to all state DOTs.

**Task 6:** Drawing from deliverables and knowledge gained in Tasks 2 through 5, a **guide for implementing technology transfer** for any state to employ similar dissemination strategies and technology transfer programs.

**Task 7:** Development of a brief **project report** documenting the activities and results of this project.



# Starting at the End...

## Task 6: Guide for Implementing Technology Transfer

- Capstone deliverable that provides overview content and practical guidance related to each part of this project
- Draft is under review by the project panel; expect completion by mid-September

### GUIDE FOR IMPLEMENTING TECHNOLOGY TRANSFER

September 2023

Produced for the National Cooperative Highway Research Program

By CTC & Associates LLC and Arora and Associates, P.C.

**DRAFT**

# The Guide

Comprised of four sections, with thoughts today from Region 3 state representatives

1. Developing a Dissemination Strategy
2. Creating Project-Focused Videos  
*Jen Harper, Missouri*
3. Creating a Webinar  
*Vicky Fout, Ohio*
4. Creating a Workshop  
*Michael Townley, Michigan*

“The Regional Approach” highlights throughout

## GUIDE FOR IMPLEMENTING TECHNOLOGY TRANSFER

September 2023

Produced for the National Cooperative Highway Research Program

By CTC & Associates LLC and Arora and Associates, P.C.

**DRAFT**

# Section 1: Dissemination Strategies

- ❑ **Goals**
  - Inform decision-making
  - Plan for long- and short-term opportunities
  - Maximize limited resources
- ❑ **Considerations**
  - Target audience, required resources, internal and external partners, project timeline
- ❑ **How-to guidance**
  - Sample dissemination strategies, estimates of time and expense needed to produce and links to online resources to learn more

## SECTION 1: DEVELOPING A DISSEMINATION STRATEGY

### GETTING STARTED

It's never too early to start thinking about dissemination. To make the most of every opportunity, discussions of how and where research will eventually be shared should be included as part of the project scoping process and other pre-project activities. These preliminary discussions should consider:

- **Impacts.** Which groups within the agency will be affected by the research and results?
- **Audience.** Who will be interested in learning about the project?
- **Relevance.** Why is the research important? Does it save time or money, improve safety, advance the state of practice, or accomplish something else?
- **Appeal.** Does the research coincide with other state or federal initiatives? If so, are there federal resources or opportunities that can be leveraged?
- **Resources.** What are the materials, costs and staff time that an agency has available and would need to complete each dissemination strategy?
- **Partners.** How can the investigating team or other external stakeholders support dissemination efforts?
- **Products.** What are the anticipated deliverables?
- **Timeline.** What are the significant milestones of this project and anticipated timeframe to implement research results? Are there opportunities for promotion in the interim?

By considering dissemination early on in the planning process, agency staff will have greater flexibility when it comes to making impactful and cost-effective decisions. If a presentation at a conference, workshop or other event is selected, keep in mind that travel logistics, as well as an event's specific submission criteria and deadlines, can require significant planning and preparation in advance.

### IDENTIFYING OPTIONS

Just as every project is unique, no two dissemination plans will —or even should— be exactly the same. To help agencies identify and select the activities that will best suit their needs and resources, a menu of tried-and-tested activities is listed below.

#### Lower-investment strategies (1-2 hours to produce)

The activities identified below can likely be completed by a single agency staff person using tools and platforms the agency already has in place.

- Summary or post in internal agency newsletter
- Email announcement to external stakeholders
- Press release
- Social media post

# Section 1: Dissemination Strategies

## 5 examples

- **Commercial Production of Non-Proprietary Ultra High Performance Concrete** by the Michigan Department of Transportation
- **Holding Strategies for Low Volume State Routes: Phase I & Phase II** by the Iowa Department of Transportation
- **Development of an Intelligent Snowplow Truck that Integrates Telematics Technology, Roadway Sensors and Connected Vehicles** by the Indiana Department of Transportation
- **Highway Safety Manual Training** by the Missouri Department of Transportation
- **Streamlining Implementation of Sustainable Channel Maintenance Practices** by the Ohio Department of Transportation

## SAMPLE RESEARCH PROJECT #3

### Development of an Intelligent Snowplow Truck that Integrates Telematics Technology, Roadway Sensors and Connected Vehicles

Conducted by Indiana DOT (INDOT)

**Project summary:** This research identified and developed tools INDOT could provide its snowplow operators to effectively perform winter operation de-icing activities.

**Impacts:** Intelligent technologies, winter maintenance.

**Audience:** Tech transfer must be done in the larger landscape of intelligent transportation and connected vehicles.

**Relevance:** Disseminating results about aspirational future products—such as a functioning intelligent snowplow—requires balancing high potential benefit with realistic expectations.

**Appeal:** Safety, technology, maintenance.

**Resources:** Anticipated cost to implement research results: \$250,000 - \$1,000,000.

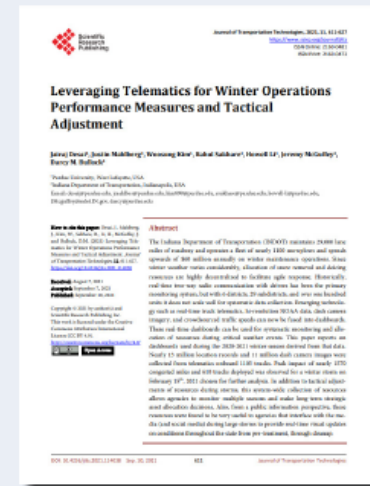
**Partners:** The Joint Transportation Research Program is a partnership between INDOT, Purdue University and other stakeholders.

**Products:** New/updated technology.

**Timeline:** Expected time frame to implement research results: 6-18 months.

#### Select Dissemination Activities

Activity	Target Audience	Estimated Cost to INDOT	To Be Completed By	Location of Deliverable
Training videos/materials	Local transportation officials and equipment operators	None	Project investigator	University <a href="#">website</a>
Conference presentations	Winter maintenance professionals and members of the American Public Works Association, AASHTO, Snow and Ice Pooled Fund Cooperative Program (SICOP), TRB, FHWA, and Roads & Bridges	Minimal	Agency staff, project investigator	
Technical journal article	Transportation professionals and industry experts	None	Project investigator	<a href="#">Journal of Transportation Technologies</a> , Vol. 11, No. 4



# Section 2: Videos

## SECTION 2: CREATING PROJECT-FOCUSED VIDEOS

### BENEFITS OF THIS STRATEGY

Video can be a powerful storytelling tool, allowing viewers an inside look at a topic while making difficult-to-visualize concepts immediately clear. Videos featuring transportation research projects can give agencies the opportunity to share the value and potential application of research results in a highly engaging manner.

### IN THIS SECTION

The following pages detail a low-cost production approach that has proven effective with multiple state DOTs. This approach requires some experience in video recording, video editing and voice-over recording; these are skills that often may be found within an agency or which may be outsourced. Technical guidance (for example, how to use video recording or editing software) is beyond the scope of this guide.

Other approaches to creating videos are possible as well, but incorporating high production-value features—such as animations and field interviews—would raise the cost considerably. The process described here, once established by a transportation agency, might require a total of 50 to 75 hours of staff and consultant time per video.

### THE REGIONAL APPROACH


For this NCHRP 20-44 implementation project, the Region 3 states selected to develop videos for four of the five completed projects. The video created by Michigan DOT for its Commercial Production of Non-Proprietary Ultra High Performance Concrete project is used throughout this guide as an illustration of the points covered.

### STAGES OF VIDEO PRODUCTION

There are four main stages of video production:

1. **Planning and pre-production** includes all of the selection, planning and coordination efforts needed to develop the necessary components of the video.
2. **Production** involves creating the on-camera interviews, compiling collateral video footage and still images, and creating a storyboard needed to create the video.
3. **Editing and post-production** involves assembling the various audio and visual materials to create and finalize the video.
4. **Publishing** is the final stage, where the produced video is shared with internal and external audiences.

Script for NCHRP research dissemination video on Missouri's Highway Safety Manual  
August 5, 2022

Shot #	Video	Audio	Shot Length	Running Length
1	<p>Title Card:</p> <p>Missouri DOT logo and design background</p> <p><b>Applying State-Specific Safety Data to Roadway Designs</b></p> <p>Faded background image: Highway.png</p> 	<p>Background <a href="#">music</a></p> <p>(fade to background, but still audible during narration)</p>	0:05	0:05
2	<ul style="list-style-type: none"> <li>• AASHTO Safety Manual (0:23 – 0:32)</li> <li>• Shoulders (0:27 – 0:32)</li> <li>• Shoulders (0:51 – 0:59)</li> <li>• Recruitment (1:22 – 1:30)</li> <li>• Roundabout.mp4 (0:27 – 0:32)</li> <li>• Bikes (0:40 – 0:45)</li> </ul>	<p>Narrator: First published in 2010, the federal government's Highway Safety Manual, or HSM, helps engineers across the country apply scientific data to compare certain roadway characteristics – like the number of lanes and the width of the road's shoulders – to better understand their effects the frequency and severity of crashes.</p> <p>The information and digital tools can help designers, maintenance workers and others make decisions that improve safety for all road users.</p> <p>The federal government also provides training materials and tools to help stakeholders understand the data that's needed,</p>	0:36	0:41



# Section 2: Videos

## □ 4 examples

**Michigan DOT - Making Ultra High-Performance Concrete Affordable for All**

<https://vimeo.com/759961779/831c34a7e6>

**Iowa DOT - Extending the Life of Iowa's Low-Volume State Roads**

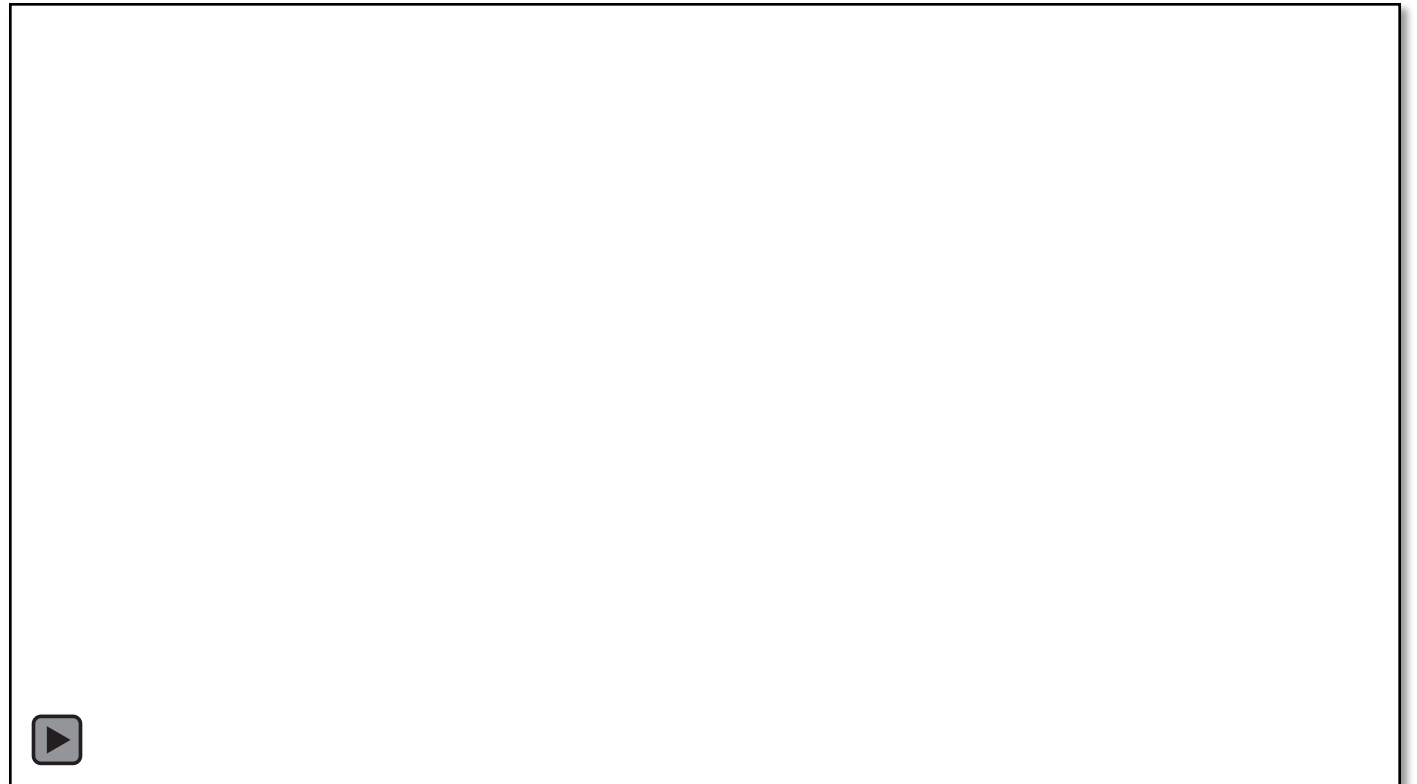
<https://vimeo.com/759959176/833ce0f4e1>

**Missouri DOT - Applying State-Specific Safety Data to Roadway Designs**

<https://vimeo.com/753095966/d7ec121fb0>

**Ohio DOT - Streamlining Ohio's Sustainable Channel Maintenance Practices**

<https://vimeo.com/763749049/c0e1c2b421>



## Section 2: Videos

- ❑ Thoughts from Jen Harper (Missouri DOT)
  - What was MoDOT's experience with creating the video? Was it particularly easy or difficult?
  - Have you found the video to be valuable to the agency?
  - How does the video complement other tools and dissemination strategies developed for this research?
  - How has or will the video be used?
  - Do you plan to follow this model to create videos on other MoDOT research topics?

# Section 3: Webinars

- ❑ **Considerations**
  - Target audience, resource needs
- ❑ **Planning**
  - Logistics; tips for hosting a live, pre-recorded or hybrid event; timeline for developing and approving presentations, links to additional resources
- ❑ **Production**
  - Tips for hosting an educational and informative event

## SECTION 3: CREATING A WEBINAR

### BENEFITS OF THIS STRATEGY

Webinars offer a unique opportunity for large, geographically dispersed audiences to hear from the experts themselves. A recorded webinar can also serve as a useful training tool, giving agencies a resource to teach staff without incurring additional expense. A webinar can be conducted in real time, pre-recorded or both, and each option offers distinct benefits. Careful consideration will help in developing a webinar that meets the agency's needs.

### PRELIMINARY CONSIDERATIONS

A successful webinar will require significant planning, preparation and collaboration among the project's stakeholders. Depending on the topic, number of presenters and format, a single webinar can take several months to develop and promote.

Regardless of how the webinar is conducted, one or more practice sessions will increase confidence and ensure everyone is familiar with the technology, their role and general expectations. Additional considerations for each type of program are outlined below.

#### Presenting Live

A webinar in real-time allows attendees to ask questions and receive immediate answers, which can ensure the material is well received and understood. However, a live webinar will also need to adhere to strict start and end times to accommodate attendees' and presenters' schedules. Remember to still record so that the information can continue to educate and disseminate after the program is over.

Resources for this approach include:

- A digital meeting platform such as Zoom or similar technology
- High-speed internet connection
- At least one presenter with a prepared presentation
- A host or facilitator to introduce the presenter(s) and monitor incoming questions
- A co-host or technical expert who can provide assistance in case of issues
- An account on YouTube or similar platform to store the finished webinar

#### Pre-recording Presentations

A webinar that has been pre-recorded provides greater convenience and flexibility than one that's held live. With the option to record and re-record their presentations in advance, presenters may be more comfortable and produce a more conversational finished product. When pre-recorded, the length of the webinar is also less important, giving presenters more flexibility to explain the research at their own pace. Finally, a pre-recorded webinar allows attendees to view and re-watch presentations when it's most convenient for them.



# Section 3: Webinars

## □ 2 examples

- Making Ultra High Performance Concrete Affordable for All: Research Results and Opportunities for Tech Transfer
- Streamlining Ohio's Sustainable Channel Maintenance Practices: Research Results and Opportunities for Tech Transfer →

## □ Thoughts from Vicky Fout (Ohio DOT)

- What was ODOT's experience with creating the webinar? Was it particularly easy or difficult?
- Have you found the webinar to be valuable to the agency?
- How does the webinar complement other tools and dissemination strategies that have been developed for this research?
- How has or will the recording be used?
- Do you plan to follow this model to create webinars on other research topics?

## SAMPLE WEBINAR #1

### Streamlining Ohio's Sustainable Channel Maintenance Practices: Research Results and Opportunities for Tech Transfer

Presented on March 29, 2023, from 1 to 2:30 p.m. (ET)

#### Summary

A representative from Ohio DOT and the research team explained the need for sustainable channel maintenance practices and shared before-and-after images and videos of Ohio waterways where these practices have been implemented. Following these presentations, a detailed list of dissemination strategies was shared to showcase the potential avenues for technology transfer.

#### Logistics

90-minute live webinar on Zoom.

#### Presenters

- Jon Witter, Associate Professor, Ohio State University
- Matt Perlik, Assistant Environmental Administrator, Ohio DOT

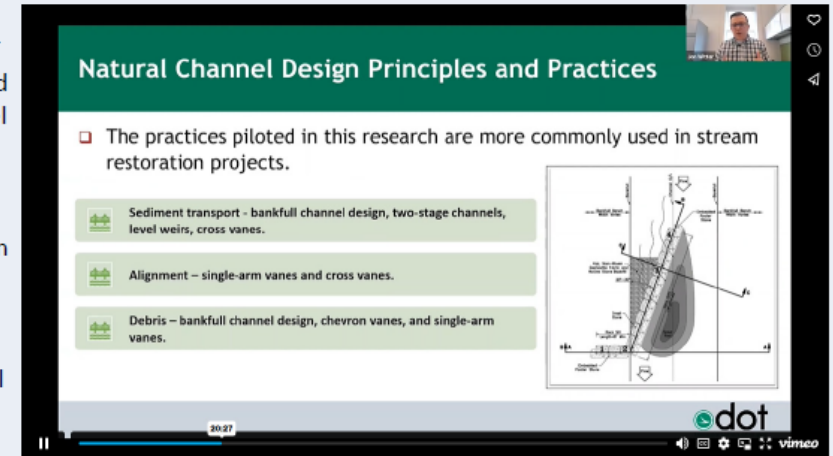
#### External Facilitator

#### Attendees

The webinar was attended by 38 individuals from Ohio and other state and local transportation agencies, academia, and industry.

#### Resources

The recorded webinar, including details of the question-and-answer session, may be found at <https://vimeo.com/813311740>. Presentation slides will be available in the final report for this project.



# Section 4: Workshops

- ❑ **Considerations**
  - Target audience, resource needs
  - Thoughts for hosting the workshop in-person or virtually
- ❑ **Planning**
  - Logistics, agenda development, links to learn more
- ❑ **Delivery**
  - Tips for hosting a successful event

## SECTION 4: CREATING A WORKSHOP

### BENEFITS OF THIS STRATEGY

While webinars provide a forum for a speaker to present and engage with a group, a workshop gives a small group of participants a more intimate and substantial opportunity to interact and discuss a topic of interest in greater depth. Whether held virtually or in person, a workshop's longer duration allows participants to get to know each other better so they can more comfortably learn and share their perspectives. It also allows sufficient time for technically complex questions (and answers) that may help attendees get past barriers to implementation. In-person workshops further allow for technical demonstrations and hands-on learning if appropriate for the topic. A workshop can be recorded, though this may influence participants' willingness to share freely.

### THE REGIONAL APPROACH

The Region 3 states chose a six-hour virtual workshop, held over two days, to discuss one of the previously completed projects and the state's plans for expanded dissemination efforts. The project that was chosen was Michigan DOT's Commercial Production of Non-Proprietary Ultra High Performance Concrete, or UHPC. A second workshop will be held in-person during the AASHTO RAC Annual Meeting in 2023.

It is noteworthy that other workshop participants have taken or are considering taking different steps in the area of UHPC. Being located in the same part of the country, these other states may be working with the same contractors and suppliers as Michigan and can benefit from learning about Michigan's specific obstacles and how the state overcame them.

### WORKSHOP PREPARATION

#### Determine the Logistics

Once a topic has been selected for a workshop, the host agency should consider the following questions.

- Will the workshop be held in person or virtually?
- If it will be virtual, what platform should be used to host the workshop?
- If it will be held in-person, where will it take place? Will refreshments be needed? Will access to laboratory or field equipment be needed?
- Who should be invited, and how can they be reached?
- Who will help to facilitate discussions so that all attendees are heard and engaged?

#### In-Person Versus Virtual

Both in-person and virtual workshops have their benefits. In-person workshops:

- Are often better at keeping attendees engaged and focused
- Allow for important side-discussions and conversation between sessions
- Present opportunities for technical visits and hands-on information exchange

# Section 4: Workshops

## □ Example

- Making Ultra High Performance Concrete Affordable for All

## □ Thoughts from Michael Townley (Michigan DOT)

- What was MDOT's experience with creating the workshop? Was it particularly easy or difficult?
- Have you found the workshop to be valuable to the agency?
- How does the workshop complement other tools and dissemination strategies developed for this research?
- How has or will the workshop recording be used?
- Do you plan to follow this model to create workshops on other MDOT research topics?

### SAMPLE WORKSHOP

#### Making Ultra High Performance Concrete Affordable for All

Presented on June 12 -13, 2023,  
from 10 a.m. to 1 p.m. (ET)

##### Summary

Drawing from MDOT's experiences with the non-proprietary UHPC project, attendees discussed the resources that agency research programs need to be successful, the challenges and opportunities of different dissemination strategies, and their own experiences with technology transfer.

##### Logistics

Two three-hour sessions over two days on Zoom.

##### Presenters

- Michael Townley, Engineer of Research, Michigan DOT
- Sherif El-Tawil, Professor, Civil and Environmental Engineering, University of Michigan
- DeWayne Rogers, Clare County Road Commission

##### External Facilitator

##### Attendees

The webinar was attended by representatives from 7 state DOTs, two universities and members of industry.

##### Resources

The recorded workshop, including details of the question-and-answer sessions and round-tables, may be found at <https://vimeo.com/836935925/> (Day 1) and <https://vimeo.com/836940208/> (Day 2). Presentation slides will be available in the final report for this project.



# Final Thoughts

## This project...

- ❑ Aimed to develop best practices, and in the process also developed *replicable* practices.
- ❑ Involved Region 3 states so they know what's doable. The next time will be a breeze.
- ❑ Emphasized intentionality. When aims are known, the decisions become easy.
- ❑ Others from Region 3 members...?

## Next Steps

- ❑ Finalize guide
- ❑ Publish guide and recordings
- ❑ Final report - project overview and takeaways

**Thank you!**