NCHRP 20-44(28)

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

DISSEMINATION STRATEGIES FOR FIVE RESEARCH PROJECTS

Prepared for:

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

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The information contained in this report was prepared as part of NCHRP Project 20-44(28), National Cooperative Highway Research Program.

Disclaimer

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

NCHRP 20-44(28) Task 2 Deliverable—Dissemination Strategies for Five Research Projects

Prepared for

National Cooperative Highway Research Program

Prepared by

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

January 25, 2022

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1. SUMMARY

AASHTO Region 3 state department of transportation (DOT) research programs are well known nationally for their tireless pursuit of innovation within their own transportation departments as well as regionally. The region is also well known for its collaborative and cooperative approach to transportation research, sharing project results as well as the successful processes, materials, and products that are discovered.

This NCHRP 20-44 implementation project represents a next step by the nine AASHTO Region 3 states to coordinate efforts. To develop guidance for effectively sharing research results, participant states have selected five recently completed projects. For each project, a customized menu of dissemination activities offers options that agencies can use to effectively share the project's results with other states across the region.

2. INTRODUCTION AND CONSIDERATIONS

This memo is the Task 2 deliverable for NCHRP Project 20-44(28): Development of a Technology Transfer Plan for State Departments of Transportation Research Programs. It represents a dissemination strategy for the following five projects:

- **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
- **Development of an Intelligent Snowplow Truck That Integrates Telematics Technology, Roadway Sensors and Connected Vehicles**, conducted by Indiana DOT
- **Highway Safety Manual Training**, conducted by Missouri DOT
- **Streamlining Implementation of Sustainable Channel Maintenance Practices**, conducted by Ohio DOT

As outlined in Task 1, each of the five dissemination strategies exemplifies how a state agency might raise awareness of the research findings among its own employees, partners, and peer states. In developing the strategy for each project, special consideration has been 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.

Tools

This publication suggests a range of dissemination strategies. To facilitate implementation of these strategies, a number of possibly useful digitals tools are listed here. Note that the authors have found these particular tools helpful on past projects, but this list does not constitute a recommendation or endorsement. Rather, it is intended to serve as a starting point for users who wish to take first steps in these areas.

- **Image publishing:** Flickr, Google Photos, Instagram
- **News campaigns and mailing list delivery:** Constant Contact, GovDelivery, Mailchimp
- **Social media:** Facebook, LinkedIn, Twitter
- **Surveys:** Constant Contact, Google Surveys, Survey Monkey
- **Web meetings and webinars:** Teams, GoToMeeting/GoToWebinar, Webex, Zoom
- **Website and blog publishing:** Squarespace, Wix, Wordpress
- **Video editing:** Adobe Premiere Pro, Final Cut, iMovie
- **Video publishing:** Vimeo, YouTube

3. COMMERCIAL PRODUCTION OF NON-PROPRIETARY ULTRA HIGH PERFORMANCE CONCRETE

Research project title: **Commercial Production of Non-Proprietary Ultra High Performance Concrete**

Conducted by: **Michigan DOT (MDOT)**

Research topical areas: Bridges and structures, construction, design, materials, pavements

Research product types: New/updated technology, specifications

Summary of research and outcomes

Per MDOT, "[u]ltra-high performance concrete (UHPC) is very strong and extremely durable; it can last decades longer than regular concrete, which itself performs well for many decades. MDOT currently acquires UHPC from a manufacturer that closely guards its components and mixing process, keeping the concrete too expensive and impractical for many bridge uses. A previous MDOT study developed a generic Michigan UHPC mixture (MI-UHPC), but it mixed poorly in the field. To fully implement MI-UHPC, researchers developed a new procedure for successfully mixing UHPC in the field, where it will provide outstanding performance for the lifetime of a bridge."

The final report was published December 2018 and may be found at https://www.michigan.gov/documents/mdot/SPR-1670-2019_644044_7.pdf.

MDOT staff noted when suggesting this project as the topic of a dissemination strategy: "Following the specifications developed, any DOT can mix this highly durable concrete in the field. This UHPC saves hundreds of dollars per cubic yard over the proprietary mixture. The technology has been successfully transferred to a county road commission and could easily transfer to any DOT nationwide or internationally."

Anticipated implementation and tech transfer framework

MDOT reported the expected ease of implementing the research results and conducting technology transfer.

- Expected ease to implement research results: Typical
- Expected ease to transfer this technology from one agency to another: Easier than typical
- Expected time frame to implement research results: Medium term (6-18 months)
- Anticipated cost to implement research results: $100,000 - $250,000

Unique dissemination needs

While some dissemination goals are common across all research projects, the following factors specific to this project inform the dissemination strategy outlined in this chapter:

- UHPC has a particularly high national interest. It is gaining significant attention at the federal level as an Every Day Counts (EDC) 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.

Dissemination strategy

The following strategy has been tailored specifically for MDOT and its technology transfer efforts related to this project. This includes completed activities and proposed complementary activities.

Completed activities

MDOT has already undertaken several dissemination efforts related to this effort. Many of these are efforts that are conducted for all MDOT research projects as coordinated by MDOT's research office. In addition, some of these products were developed and delivered by the project's investigator team.

These completed activities tend to be targeted to practitioners and staff in Michigan, though some are also suitable for public consumption.

1. Two-page technical summary brief.
    - Audience: Lawmakers, local agencies, research partners, industry, and the public.
    - Cost to MDOT: $1,500 - $2,500.
    - Estimated time to produce: 25-35 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

2. Video and summary article, created by the project's researchers.
    - Audience: Lawmakers, local agencies, research partners, industry, and the public.
    - Cost to MDOT: None.
    - Agency tools and resources required: None.

3. Announcement through MDOT's subscription email list.
    - Audience: Public.
    - Cost to MDOT: Minimal.
    - Estimated time to produce: 1-2 hours.
    - Agency tools and resources required: GovDelivery account and in-house communications team or external contractors.

4. Write-up in MDOT's weekly newsletter, the Monday Memo.
    - Audience: MDOT staff.
    - Cost to MDOT: Minimal.
    - Estimated time to produce: 1-2 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

5. Conference materials. Included as part of an annual bridge conference run by Michigan Technological University.
    - Audience: Industry experts.
    - Cost to MDOT: Minimal.
    - Estimated time to produce: 5-10 hours.
    - Agency tools and resources required: Staff time.

6. Meetings. Presented by the principal investigator at MDOT's monthly bridge committee update.
    - Audience: Industry experts and specialized agency staff
    - Cost to MDOT: Minimal.
    - Estimated time to produce: 1-2 hours.
    - Agency tools and resources required: None.

Proposed complementary activities

The additional activities proposed here expand the reach of the findings to a public audience within Michigan as well as a national network of peers and practitioners.

7. Social media.
    - Core message: Use MDOT's Facebook, Twitter, YouTube, and Instagram channels to share the most compelling research outcomes for general audiences.
    - Audience: Public.
    - Cost to MDOT: Minimal.
    - Estimated time to produce: 1-2 hours per channel.
    - Agency tools and resources required: In-house communications team or external contractors.

8. Press releases.
    - Core message: Tout MDOT's commitment to innovation and saving taxpayer money.
    - Audience: Regional and statewide TV, print, and radio news outlets.
    - Cost to MDOT: Minimal.
    - Estimated time to produce: 3-5 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

9. Video.
    - Core message: Highlight the visually interesting aspects of this research to create a short, 3-5-minute storytelling tool for publication on YouTube or other promotional efforts.
    - Audience: Lawmakers, local agencies, research partners, industry, and the public.
    - Cost to MDOT: $2,500 - $3,500.
    - Estimated time to produce: 40-50 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

10. Paper for Transportation Research Board (TRB) Annual Meeting.
    - Core message: Share the technical details and opportunities for cost-savings with peer agencies and others familiar with the topic.
    - Details: Must be 7,500 words or fewer. Deadline to submit is August 1 of the previous year.
    - Audience: Transportation professionals and industry experts.
    - Cost to MDOT: Varies.
    - Estimated time to produce: 15-30 hours.
    - Agency tools and resources required: Staff or researcher time.

11. Article in industry magazines or journals.
    - Core message: Showcase the research and opportunities for cost-savings in a 700- to 900-word article for publication in Roads & Bridges, APWA Reporter, Concrete Construction, or similar industry publications.
    - Audience: Transportation professionals and industry experts.
    - Cost to MDOT: Varies.
    - Estimated time to produce: 15-25 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

12. News item.
    - Core message: Share the research highlights in a 150- to 200-word write-up for targeted regional and national organizations like the Mid America Association of State Transportation Officials, Michigan Local Technical Assistance Program and American Society of Highway Engineers.
    - Audience: Transportation professionals and industry experts.
    - Cost to MDOT: Minimal.
    - Estimated time to produce: 1.5 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

13. Podcast.
    - Core message: Share the research outcomes and high-level environmental benefits through the Talking Michigan Transportation podcast.
    - Audience: Public.
    - Cost to MDOT: Minimal.
    - Estimated time to produce: 1-2 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

As this project is of significant national interest, the following activities have been identified to coordinate with the Every Day Counts (EDC) initiative and other federal efforts:

14. Newsletter article.
    - Core message: Submit a brief 150-word article and images to the EDCNews weekly newsletter. Highlight the potential cost savings agencies could realize as a result of this innovation. Send to Jeffrey Zaharewicz, senior advisor, at Jeffrey.Zaharewicz@dot.gov.
    - Audience: Transportation professionals, trade and research groups, academia, the private sector, and public.
    - Cost to MDOT: Minimal.
    - Estimated time to produce: 1-2 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

15. Trade publication article.
    - Core message: Provide additional detail about the opportunities and challenges UHPC offers in Innovator, a bi-monthly publication produced by the FHWA Center for Accelerating Innovation. Send query email to Jeffrey A. Zaharewicz, senior advisor, at Jeffrey.Zaharewicz@dot.gov.
    - Audience: Transportation professionals, trade and research groups, academia, the private sector, and public.
    - Cost to MDOT: Minimal.
    - Estimated time to produce: 3-4 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

Other national outreach

Contact the following representatives and organizations to share project details and results with transportation-related groups for possible news items or inclusion on meeting and conference agendas:

Carmen E.L. Swanwick, Chair
Cswanwick@utah.gov
AASHTO Committee on Bridges and Structures
https://bridges.transportation.org/

Moe Jamshidi, Chair
Moe.Jamshidi@nebraska.gov
AASHTO Committee on Materials and Pavements
https://materials.transportation.org/

Mina Saremi, Sr. ABC-UTC Conference Coordinator
msare001@fiu.edu
Accelerated Bridge Construction Conference
https://abc-utc.fiu.edu/conference/

Benhamin Graybeal, Lead Study Contact
Benjamin.graybeal@dot.gov

Structural Behavior of Ultra-High Performance Concrete Pooled Fund (TPF-5(468))
https://www.pooledfund.org/Details/Study/695

4. HOLDING STRATEGIES FOR LOW VOLUME STATE ROUTES: PHASE I & PHASE II

Research project title: **Holding Strategies for Low Volume State Routes: Phase I & Phase II**

Conducted by: **Iowa DOT**

Research topical areas: Construction, maintenance, materials, pavements

Research product types: Guidance and training, new/updated practice, new/updated policy

Summary of research and outcomes

Per Iowa DOT: Phase I: "The objective of this research was to evaluate the six-year performance of various holding strategies and their cost-effectiveness. Treatments included combinations of thin hot-mix asphalt (HMA) overlays, in-place recycling technologies such as cold in-place recycling (CIR) and full-depth reclamation (FDR), and thin surface treatments."

https://ideas.iowadot.gov/subdomain/ideas-main/end/node/3215?qmzn=iKFrYf (Idea Page), http://publications.iowa.gov/35058/2/holding_strategies_for_low-vol_state_routes_phase_I_w_cvr.pdf (Final Report)

Phase II: "This second phase study focused on surface treatments and was intended to treat highly distressed composite pavements that have asphalt overlays on portland cement concrete (PCC) pavements. Based on the evaluation of the test sections and follow-up surveys, recommendations were given regarding the selection of the most advantageous strategy for the conditions of the studied pavement."

https://ideas.iowadot.gov/subdomain/ideas-main/end/node/3276?qmzn=iKFrYf (Idea Page), http://publications.iowa.gov/35239/1/TR-735_Holding%20Strategies%20for%20Low-Volume%20State%20Routes%20-%20Phase%20II%20Final%20Report.pdf (Final Report)

Anticipated implementation and tech transfer framework

Iowa DOT reported the expected ease of implementing the research results and conducting technology transfer.

- Expected ease to implement research results: Typical
- Expected ease to transfer this technology from one agency to another: Typical
- Expected time frame to implement research results: Long term (>18 months)
- Anticipated cost to implement research results: $25,000 - $100,000

Unique dissemination needs

While some dissemination goals are common across all research projects, the following factors specific to this project inform the dissemination strategy outlined in this chapter:

- 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 II 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).

Dissemination strategy

The following strategy has been tailored specifically for Iowa DOT and its technology transfer efforts related to this project. This includes completed activities and proposed complementary activities.

Completed activities

Below are the strategies that Iowa DOT and the project investigators have already undertaken for each phase of this project.

Phase I:

1. Two-page tech transfer summary.
    - Audience: Lawmakers, local agencies, research partners, industry, and the public.
    - Cost to Iowa DOT: $1,500 - $2,500.
    - Estimated time to produce: 25-35 hours.
    - Agency tools and resources required: None, produced by project investigators.

Phase II:

2. Two-page tech transfer summary.
    - Audience: Lawmakers, local agencies, research partners, industry, and the public.
    - Cost to Iowa DOT: $1,500 - $2,500.
    - Estimated time to produce: 25-35 hours.
    - Agency tools and resources required: None, produced by project investigators.

Phases I and II:

3. Conference materials. Presented to the Iowa County Engineers Convention around 2013.
    - Audience: Regional experts.
    - Cost to Iowa DOT: Minimal.
    - Estimated time required to prepare and present: 5-10 hours.
    - Agency tools and resources required: None, presented by project investigators.

4. Meetings. Presented at the TRB 2015 Low Volume Roads conference in Pittsburgh.
    - Audience: Industry experts and specialized agency staff

- Cost to Iowa DOT: Minimal.
- Estimated time to prepare and present: 3-5 hours.
- Agency tools and resources required: None.

5. Published in the January 1, 2015, edition of the Transportation Research Record (Vol. 2474, Issue 1.)
    - Audience: Transportation professionals and industry experts.
    - Cost to Iowa DOT: Minimal.
    - Estimated time to produce: 15-25 hours.
    - Agency tools and resources required: None, produced by project investigators.

Proposed complementary activities

The additional activities proposed here expand the reach of the findings to a public audience within Iowa as well as a national network of peers and practitioners.

6. Webinar.
    - Core message: Record a presentation to add to the virtual library of the Iowa Local Assistance Program (LTAP).
    - Audience: Local transportation officials.
    - Cost to Iowa DOT: Minimal.
    - Estimated time to produce: 3-5 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

7. Social media.
    - Core message: Use Iowa DOT's Facebook, Twitter, YouTube, and Instagram channels to share the most compelling research outcomes for general audiences.
    - Audience: Public.
    - Cost to Iowa DOT: Minimal.
    - Estimated time to produce: 1-2 hours per channel.
    - Agency tools and resources required: In-house communications team or external contractors.

8. Press releases.
    - Core message: Tout Iowa DOT's commitment to innovation and saving taxpayer money.
    - Audience: Regional and statewide TV, print, and radio news outlets.
    - Cost to Iowa DOT: Minimal.
    - Estimated time to produce: 3-5 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

9. Video.
    - Core message: Provide visual documentation of the findings of this project through a short, 3-5-minute storytelling tool for publication on YouTube or other promotional efforts.
    - Audience: Lawmakers, local agencies, research partners, industry, and the public.
    - Cost to Iowa DOT: $2,500 - $3,500.
    - Estimated time to produce: 40-50 hours.

- Agency tools and resources required: In-house communications team or external contractors.

10. Article in industry magazines or journals.
    - Core message: Showcase the research and opportunities for cost-savings in a 700- to 900-word article for publication in Roads & Bridges, APWA Reporter, or similar industry publications.
    - Audience: Transportation professionals and industry experts.
    - Cost to Iowa DOT: Varies.
    - Estimated time to produce: 15-25 hours.
    - Agency tools and resources required: In-house communications team or external contractors.
11. News item.
    - Core message: Share the research highlights in a 150- to 200-word write-up for targeted organizations like the Mid America Association of State Transportation Officials (MAASTO) and No Boundaries pooled fund.
    - Audience: Transportation professionals and industry experts.
    - Cost to Iowa DOT: Minimal.
    - Estimated time to produce: 1.5 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

Other national and international outreach

Contact the following representatives and organizations to share project details and results with transportation-related groups for possible news items or inclusion on meeting and conference agendas:

National

Alma Mujkanovic, President
amujkanovic@dot.ga.gov
AASHTO Committee on Performance-Based Management
https://cpbm.transportation.org/

Keith Knapp, Communications Workgroup Member (Iowa's liaison)
kknapp@iastate.edu
National Local & Tribal Technical Assistance Program Association
https://nltapa.org/

Todd Kinney, Chair (and County Engineer of Clinton County, IA)
tkinney@clintoncounty-ia.gov
National Association of County Engineers
https://www.countyengineers.org/

Laura Fay, Chair
laura.fay1@montana.edu
TRB Standing Committee on Low-Volume Roads
https://www.mytrb.org/OnlineDirectory/Committee/Details/5210

International

TRB International Conference on Low-Volume Roads
July 23-26, 2021 – Cedar Rapids, IA
https://trb.secure-platform.com/a/page/lowvolumeroads

5. DEVELOPMENT OF AN INTELLIGENT SNOWPLOW TRUCK THAT INTEGRATES TELEMATICS TECHNOLOGY, ROADWAY SENSORS AND CONNECTED VEHICLES

Research project title: **Development of an Intelligent Snowplow Truck That Integrates Telematics Technology, Roadway Sensors and Connected Vehicles**

Conducted by: **Indiana DOT (INDOT)**

Research topical areas: Intelligent technologies, winter maintenance

Research product types: New/updated technology

Summary of research and outcomes

Per INDOT: "The objective of this project was to identify and develop tools INDOT could provide its operators to effectively perform winter operation deicing activities. This project examined application methods and data to provide analytics and make data-driven decisions for statewide deployment and operations.

"Discovery of calibration metrics partnered with fleetwide telematics enabled the development of analytic dashboards that allowed real-time evaluations and adjustments to be made during winter operation activities. These tools will allow the agency to better treat and enhance safety for road users. The advancement of a functioning automated brine applicator provided insight towards development of a functioning intelligent snowplow."

The final report is expected to be published in January 2022.

Anticipated implementation and tech transfer framework

INDOT reported the expected ease of difficulty of implementing the research results and conducting technology transfer.

- Expected ease to implement research results: More difficult than typical
- Expected ease to transfer this technology from one agency to another: Typical
- Expected time frame to implement research results: Medium term (6-18 months)
- Anticipated cost to implement research results: $250,000 - $1 million

Unique dissemination needs

- 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.

Dissemination strategy

The following strategy has been tailored specifically for INDOT and its technology transfer efforts related to this project. This includes completed activities and proposed complementary activities.

Completed activities

Below are the strategies that INDOT and the project investigators have already undertaken for this project.

1. Videos.
    - A series of pre-recorded videos to serve as reference materials for training and demonstration purposes.
    - Audience: Local transportation officials and equipment operators.
    - Cost to INDOT: Minimal.
    - Estimated time to produce each video: 2-3 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

2. Paper for Journal of Transportation Technologies.
    - A summary of the capabilities of real-time dashboards to help agencies monitor and allocate resources effectively.
    - Audience: Transportation professionals and industry experts.
    - Cost to INDOT: Varies.
    - Estimated time to produce: 15-30 hours.
    - Agency tools and resources required: Staff and researcher time.

3. Presentations.
    - Frequent project summaries and discussions provided at meetings of targeted professional organizations.
    - Audience: 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.
    - Cost to INDOT: Minimal.
    - Estimated time to attend and present at each meeting: 2-3 hours.
    - Agency tools and resources required: Staff time.

Proposed complementary activities

The additional activities proposed here expand the reach of the findings to a public audience within Indiana as well as a national network of peers and practitioners.

4. Webinar.
    - Core message: Use the workshop course deliverable to pre-record a presentation that can be added to the virtual library of the Indiana Local Technical Assistance Program or provided as part of online educational materials as needed.
    - Audience: Local transportation officials.
    - Cost to INDOT: Minimal.
    - Estimated time to produce: 3-5 hours.

- Agency tools and resources required: In-house communications team or external contractors.

5. Workshops.
    - Core message: Attend and present the research and results in-person at conferences and conventions, such as the North American Snow Conference and International Conference on Connected Vehicles and Expo.
    - Audience: Regional, national, and international transportation officials.
    - Cost to INDOT: Minimal.
    - Estimated time to produce: 3-5 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

6. Social media.
    - Core message: Use INDOT's Facebook, Twitter, YouTube, and Instagram channels to share the outcomes of the research and safety benefits for general audiences.
    - Audience: Public.
    - Cost to INDOT: Minimal.
    - Estimated time to produce: 1-2 hours per channel.
    - Agency tools and resources required: In-house communications team or external contractors.

7. Press releases.
    - Core message: Share INDOT's commitment to innovation and safety.
    - Audience: Regional and statewide TV, print, and radio news outlets.
    - Cost to INDOT: Minimal.
    - Estimated time to produce: 3-5 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

8. Videos.
    - Core message: Highlight the research process, results, and benefits in a 3-5-minute video for publication on YouTube.
    - Audience: Lawmakers, local agencies, research partners, industry, and the public.
    - Cost to INDOT: $2,500 - $3,500.
    - Estimated time to produce: 40-50 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

9. Paper for TRB Annual Meeting.
    - Core message: Share the technical details and dissemination opportunities of the project.
    - Details: Must be 7,500 words or fewer. Deadline to submit is August 1 of the previous year.
    - Audience: Transportation professionals and industry experts.
    - Cost to INDOT: Varies.
    - Estimated time to produce: 15-30 hours.
    - Agency tools and resources required: Staff or researcher time.

10. Article in industry magazines or journals.
    - Core message: Showcase the research and opportunities for increasing safety in an article for publication in Journal of Intelligent Transportation Systems, APWA Reporter, or similar industry publications.
    - Audience: Transportation professionals and industry experts.
    - Cost to INDOT: Varies.
    - Estimated time to produce: 15-25 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

11. Trade publication article.
    - Core message: Provide additional detail about the opportunities that intelligent snowplows can offer in Innovator, a bi-monthly publication produced by the FHWA Center for Accelerating Innovation. Send query email to Jeffrey A. Zaharewicz, senior advisor, at Jeffrey.Zaharewicz@dot.gov.
    - Audience: Transportation professionals, trade and research groups, academia, the private sector, and public.
    - Cost to INDOT: Minimal.
    - Estimated time to produce: 3-4 hours (assumes FHWA sources authorship of the article).
    - Agency tools and resources required: In-house communications team or external contractors.

12. News item.
    - Core message: Share the research highlights in a 150- to 200-word write-up for targeted organizations like the Clear Roads pooled fund, Aurora pooled fund, SICOP, Maintenance Decision Support System Pooled Fund, and the ENTERPRISE pooled fund.
    - Audience: Winter maintenance and transportation professionals, industry experts.
    - Cost to INDOT: Minimal.
    - Estimated time to produce: 1.5 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

Other national and international outreach

Contact the following representatives and organizations to share project details and results with transportation-related groups for possible news items or inclusion on meeting and conference agendas:

National

Nat Beuse, Chair
info@itsa.org
Standing Committee on Automated Vehicles, ITS America
https://itsa.org/s/automated-vehicles/

ITS America 2021 Annual Meeting
December 7-10, 2021 – Charlotte, NC
https://itsa.org/event/its-america-2021-annual-meeting-charlotte/

Scott Marler, Chair
Scott.marler@iowadot.us
AASHTO Committee on Transportation System Operations
https://systemoperations.transportation.org/

Michael Fontaine, Lead Study Contact
Michael.Fontaine@VDOT.Virginia.gov
Connected Vehicle Pooled Fund (TPF-5(389))
https://www.pooledfund.org/Details/Study/642

International

Jaime McAuley, Event Director
jmcauley@reedexpo.org
ITS World Congress
September 18-22, 2022 – Los Angeles, CA
https://www.itsamericaevents.com/world-congress/en-us.html

6. HIGHWAY SAFETY MANUAL TRAINING

Research project title: **Highway Safety Manual Training**

Conducted by: **Missouri DOT (MoDOT)**

Research topical areas: Safety, traffic operations

Research product types: Guidance and training

Summary of research and outcomes

Per MoDOT: "The publication of the Highway Safety Manual (2010) and the Supplement (2014) have standardized data-driven safety methodology and developed associated user-friendly tools such as spreadsheets and ISATe (Enhanced Interchange Safety Analysis Toolbox). The demand for knowledge and experience in data-driven safety analysis has been increasing.

"This report documents a project to produce data-driven safety training for MoDOT trainers. The project developed two training deliverables."

https://spexternal.modot.mo.gov/sites/cm/CORDT/cmr20-008_sum.pdf (Summary Report), https://spexternal.modot.mo.gov/sites/cm/CORDT/cmr20-008.pdf (Final Report)

Anticipated implementation and tech transfer framework

MoDOT reported the expected ease of difficulty of implementing the research results and conducting technology transfer.

- Expected ease to implement research results: Typical
- Expected ease to transfer this technology from one agency to another: Typical
- Expected time frame to implement research results: Medium-term (6-18 months)
- Anticipated cost to implement research results: $25,000 - $100,000

Unique dissemination needs

- 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.

Dissemination strategy

The following strategy has been tailored specifically for MoDOT and its technology transfer efforts related to this project. This includes completed activities and proposed complementary activities.

Completed activities

Below are the strategies that MoDOT and the project investigators have already undertaken for this project.

1. Flexible training materials.
    - A 15-minute video, presenting an overview of data-driven safety suitable for staff at various levels and with or without formal safety training.
    - A workshop course, covering the fundamentals of data-driven safety and sample applications.
    - Audience: MoDOT trainers, safety staff, and engineers.
    - Cost to MoDOT: Produced as part of research deliverables.
    - Estimated time to produce: Minimal.
    - Agency tools and resources required: None; produced by researchers.

Proposed complementary activities

The additional activities proposed here expand the reach of the findings to a public audience within Missouri as well as a national network of peers and practitioners.

2. Webinar.
    - Core message: Use the workshop course deliverable to pre-record a presentation that offers Missouri-specific highway safety data and examples and can be added to the virtual library of the Missouri LTAP or provided as part of online educational materials as needed.
    - Audience: Local transportation officials.
    - Cost to MoDOT: Minimal.
    - Estimated time to produce: 3-5 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

3. Workshops.
    - Core message: Attend and present the research and results in-person at conferences and conventions, such as the annual Missouri Highway Safety and Traffic Conference and the annual meeting of the Governors Highway Safety Association.
    - Audience: State, local, and national transportation officials.
    - Cost to MoDOT: Minimal.
    - Estimated time to produce: 3-5 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

4. Social media.
    - Core message: Use MoDOT's Facebook, Twitter, YouTube, and Instagram channels to share the outcomes of the research and safety benefits for general audiences.
    - Audience: Public.
    - Cost to MoDOT: Minimal.
    - Estimated time to produce: 1-2 hours per channel.
    - Agency tools and resources required: In-house communications team or external contractors.

5. Press releases.
    - Core message: Share MoDOT's commitment to innovation and safety.
    - Audience: Regional and statewide TV, print, and radio news outlets.
    - Cost to MoDOT: Minimal.
    - Estimated time to produce: 3-5 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

6. Videos.
    - Share the video produced as part of the project's deliverables with the Missouri Local Assistance Program (LTAP) for their virtual library.
    - Audience: Local transportation officials.
    - Cost to MoDOT: Minimal.
    - Estimated time to produce: Minimal.
    - Agency tools and resources required: In-house research or communications team.
    - Core message: Develop a new, 3-5-minute video that highlights the need for research and the visually interesting aspects of this for publication on YouTube or other promotional efforts.
    - Audience: Lawmakers, local agencies, research partners, industry, and the public.
    - Cost to MoDOT: $2,500 - $3,500.
    - Estimated time to produce: 40-50 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

7. Paper for TRB Annual Meeting.
    - Core message: Share the technical details and dissemination opportunities of the project.
    - Details: Must be 7,500 words or fewer. Deadline to submit is August 1 of the previous year.
    - Audience: Transportation professionals and industry experts.
    - Cost to MoDOT: Varies.
    - Estimated time to produce: 15-30 hours.
    - Agency tools and resources required: Staff or researcher time.

8. Article in industry magazines or journals.
    - Core message: Showcase the research and opportunities for increasing safety in a 700- to 900-word article for publication in Journal of Transportation Safety & Security, APWA Reporter, or similar industry publications.
    - Audience: Transportation professionals and industry experts.

- Cost to MoDOT: Varies.
- Estimated time to produce: 15-25 hours.
- Agency tools and resources required: In-house communications team or external contractors.

9. Trade publication article.
    - Core message: Provide additional detail about the opportunities offered by the new Highway Safety Manual training in Innovator, a bi-monthly publication produced by the FHWA Center for Accelerating Innovation. Send query email to Jeffrey A. Zaharewicz, senior advisor, at Jeffrey.Zaharewicz@dot.gov.
    - Audience: Transportation professionals, trade and research groups, academia, the private sector, and public.
    - Cost to MoDOT: Minimal.
    - Estimated time to produce: 3-4 hours.
    - Agency tools and resources required: In-house communications team or external contractors.
10. News item.
    - Core message: Share the research highlights in a 150- to 200-word write-up for targeted organizations like the Mid America Association of State Transportation Officials and No Boundaries pooled fund.
    - Audience: Transportation professionals and industry experts.
    - Cost to MoDOT: Minimal.
    - Estimated time to produce: 1.5 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

Other national outreach

As the Highway Safety Manual is a major national product that all states reference and rely upon, the representatives and national organizations listed below may be able to assist MoDOT with its dissemination efforts or with developing its products for a national audience:

info@highwaysafetymanual.org
AASHTO Highway Safety Manual
http://www.highwaysafetymanual.org

NHICustomerService@dot.gov
National Highway Institute
https://www.nhi.fhwa.dot.gov/

Glenn Page, TC3 Program Manager
gpage@aashto.org
AASHTO's TC3 (Transportation Curriculum Coordination Council)
https://tc3.transportation.org/training-resources/courses/

Jerry Roche, Lead Study Contact
Jerry.Roche@dot.gov
Highway Safety Manual Implementation Pooled Fund Study (TPF-5(255))
https://www.pooledfund.org/Details/Study/484

Stephen Read, Technical Publications Subcommittee
Stephen.Read@VDOT.Virginia.gov
AASHTO Committee on Safety
https://safety.transportation.org/

Karen Dixon, Co-Chair
k-dixon@tamu.edu
TRB Standing Committee on Safety Performance and Analysis
https://www.mytrb.org/OnlineDirectory/Committee/Details/5174

7. STREAMLINING IMPLEMENTATION OF SUSTAINABLE CHANNEL MAINTENANCE PRACTICES

Research project title: **Streamlining Implementation of Sustainable Channel Maintenance Practices**

Conducted by: **Ohio DOT (ODOT)**

Research topical areas: Bridges and structures, environmental, maintenance

Research product types: Guidance and training, new/updated practice

Summary of research and outcomes

This project is the second part of a multistage project on channel maintenance practices. The first part, Alternative Stream Channel Maintenance at Bridge Crossings, was published in 2017. Per ODOT: "Preliminary monitoring and modeling results suggest that natural channel design-based maintenance practices can be sustainable alternatives to current practices for stream restoration."

https://cdm16007.contentdm.oclc.org/digital/collection/p267401ccp2/id/14622 (Report and Fact Sheet), https://rosap.ntl.bts.gov/view/dot/31893 (Downloadable Report).

This initial project pointed ODOT to undertake follow-up implementation activities. "Additional implementation and monitoring are needed to assess performance across a range of conditions and explore the limits of the approach. Seven pilot projects were implemented in three counties. Two single-arm vanes, three culvert-weirs, a low-weir, and bankfull partition were implemented and used as case-studies to identify permitting requirements. Two-dimensional hydraulics models of six pilot projects were developed to simulate as-designed, premaintenance, and post-maintenance conditions across a range of flow rates. All projects were documented with photos and video to develop multi-media educational materials and facilitate technology transfer to other Districts."

https://cdm16007.contentdm.oclc.org/digital/collection/p267401ccp2/id/17922 (Report and Fact Sheet), https://rosap.ntl.bts.gov/view/dot/53560 (Downloadable Report)

The same principal investigator conducted both the original research project and the follow-up implementation project.

Anticipated implementation and tech transfer framework

ODOT reported the expected ease of implementing the research results and conducting technology transfer.

- Expected ease to implement research results: Typical
- Expected ease to transfer this technology from one agency to another: Easier than typical
- Expected time frame to implement research results: Short term (<6 months)
- Anticipated cost to implement research results: $25,000 - $100,000

Unique dissemination needs

- 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.

Dissemination strategy

The following strategy has been tailored specifically for ODOT and its technology transfer efforts related to this project. This includes completed activities—including those related to the initial project that preceded this implementation effort—and proposed complementary activities.

Completed activities

The steps below were previously taken by ODOT and the project investigators for the original research project that preceded this implementation effort.

1. Investigators gave a detailed presentation on the research results that was recorded and published on YouTube.
2. Several articles were written and published in early 2017:
    - Article in April 2017 *Transcript*, ODOT's newsletter, titled "Go with the Flow" by Pieter Wykoff.
    - Article in May/June 2017 *TR News* titled "Stream Channel Maintenance at Bridge Crossings in Ohio: Collaborative Approach Leads to Innovation and Implementation" by Jill Martindale.
    - Article in Spring 2017 *Ingenium*, EMH&T's magazine, titled "Alternative Stream Channel Maintenance at Bridges: Research Leads to Innovative Solutions."

The following strategy was undertaken by ODOT and the project investigators for the follow-up implementation project.

3. Implementation strategy example videos.
    - A series of three short videos highlight localized sedimentation problems and mitigation efforts.
        - Twin Box Culvert Weir – Geauga, Ohio
        - Twin Box Culvert Weir – Noble, Ohio
        - Culvert Partition – Geauga, Ohio
    - Audience: Ohio's state and local maintenance engineers.
    - Cost to ODOT: Produced as part of research deliverables.

- Estimated time to produce: Minimal.
- Agency tools and resources required: None; produced by researchers.

Proposed complementary activities

The additional activities proposed here expand the reach of the findings to a public audience within Ohio as well as a national network of peers and practitioners.

4. Webinar.
    - Core message: How to determine which project meets criteria for non-notifying permits or could be permitted under the ODOT Regional General Permit. Record a presentation to add to the virtual library of the Ohio Local Assistance Program (LTAP).
    - Audience: Local transportation officials.
    - Cost to ODOT: Minimal.
    - Estimated time to produce: 3-5 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

5. Podcast.
    - Core message: Share the research outcomes and high-level environmental benefits through the Transcript Radio monthly podcast.
    - Audience: Public.
    - Cost to ODOT: Minimal.
    - Estimated time to produce: 3-5 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

6. Workshop.
    - Core message: Attend and present the research and results at the Annual Conference of the Ohio Township Association (OTA). The OTA will post a call for workshop topics and speakers in the fall of 2021.
    - Audience: Regional transportation officials.
    - Cost to ODOT: Minimal.
    - Estimated time to produce: 3-5 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

7. Social media.
    - Core message: Use ODOT's Facebook, Twitter, YouTube, and Instagram channels to share the outcomes of the research and environmental benefits for general audiences.
    - Audience: Public.
    - Cost to ODOT: Minimal.
    - Estimated time to produce: 1-2 hours per channel.
    - Agency tools and resources required: In-house communications team or external contractors.

8. Press releases.
    - Core message: Share ODOT's commitment to innovation and environmentalism.
    - Audience: Regional and statewide TV, print, and radio news outlets.

- Cost to ODOT: Minimal.
- Estimated time to produce: 3-5 hours.
- Agency tools and resources required: In-house communications team or external contractors.

9. Explanatory video.
    - Core message: Provide visual documentation of the findings of this project through a short, 3-5-minute storytelling tool for publication on YouTube or other promotional efforts.
    - Audience: Lawmakers, local agencies, research partners, industry, and the public.
    - Cost to ODOT: $2,500 - $3,500.
    - Estimated time to produce: 40-50 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

10. Paper for TRB Annual Meeting.
    - Core message: Share the technical details and opportunities for channel maintenance with others familiar with the topic.
    - Details: Must be 7,500 words or fewer. Deadline to submit is August 1 of the previous year.
    - Audience: Transportation professionals and industry experts.
    - Cost to ODOT: Varies.
    - Estimated time to produce: 15-30 hours.
    - Agency tools and resources required: Staff or researcher time.

11. Article in industry magazines or journals.
    - Core message: Showcase the research and opportunities for sustainable channel maintenance practices in a 700- to 900-word article for publication in Stormwater, APWA Reporter, or similar industry publications.
    - Audience: Transportation professionals and industry experts.
    - Cost to ODOT: Varies.
    - Estimated time to produce: 15-25 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

12. News item.
    - Core message: Share the research highlights in a 150- to 200-word write-up for targeted organizations like AASHTO's Center for Environmental Excellence or the U.S. Geological Survey (USGS).
    - Audience: Maintenance and environmental professionals.
    - Cost to ODOT: Minimal.
    - Estimated time to produce: 1.5 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

13. Featured case study.
    - Core message: Provide greater detail about the challenges and solutions involved in this project as 1,000- to 1,500-word case study for AASHTO's Center for Environmental Excellence.
    - Audience: Maintenance and environmental professionals.
    - Cost to ODOT: Varies.
    - Estimated time to produce: 10-15 hours.
    - Agency tools and resources required: In-house communications team or external contractors.

Other national outreach

Contact the following representatives and organizations to share project details and results with transportation-related groups for possible news items or inclusion on meeting and conference agendas:

Jeffrey Syar, Chair
Jeffrey.Syar@dot.ohio.gov
AASHTO Committee on Design's Technical Committee on Hydrology and Hydraulics
https://design.transportation.org/technical-committees/hydrology-and-hydraulics/

Michael Perez
Map0032@auburn.edu
TRB Standing Committee on Hydrology, Hydraulics, and Stormwater
https://www.mytrb.org/OnlineDirectory/Committee/Details/5181

Marisa Lubeck, Public Affairs Specialist
mlubeck@usgs.gov
USGS
https://www.usgs.gov/