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Inroads to Innovation

New Jersey's Technology Transfer Program

Courtesy of New Jersey DOT

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A camera-equipped unmanned aerial system, or drone, inspects a high-mast light in New Jersey. Capable of completing up to seven inspections per day compared with one or two using a traditional bucket truck, drones are among the innovations that the New Jersey Department of Transportation's Technology Transfer Program has promoted.

How can state departments of transportation (DOTs) advance innovation internally and within the broader transportation community? The New Jersey DOT Technology Transfer (T2) Program seeks to accomplish this—as its website[1] explains—by increasing the level of awareness of transportation-related issues, promoting an ongoing exchange of ideas, translating state-of-the-art trends and technology practices into implementable techniques, showcasing innovation, and disseminating research results. The goal: Encourage the development of cost-effective, practical solutions to real problems that affect the state's transportation systems and infrastructure. Such problems include durability and cost, mobility and accessibility, public health and safety, and resilience and environmental sustainability.

The T2 Program supports the work of the state DOT's Bureau of Research through technology transfer and other activities. These include soliciting research and innovation ideas, promoting New Jersey State Transportation Innovation Council (STIC) and FHWA Every Day Counts[2] initiatives to identify and deploy innovations, and identifying and matching knowledge-management needs with knowledge-sharing practices. The next sections outline these activities, including associated resources and where to find them.

Knowledge Bank

The New Jersey DOT T2 website is a repository for the work of the T2 Program, the New Jersey DOT Research Library, and the New Jersey STIC. Offerings range from research project final reports to progress reports on innovative initiatives underway, innovation

[1] Explore New Jersey DOT's Technology Transfer Program at https://www.njdottechtransfer.net/.

[2] Learn more about the Every Day Counts Program at https://www.fhwa.dot.gov/innovation/everydaycounts/.

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accomplishments, and links to training opportunities. Resources provided on this website include the following:

- New and noteworthy articles summarizing recently completed research and innovative initiatives (e.g., ultra-high-performance concrete bridge-deck overlays, sawcut vertical curbs, and the use of foamed glass aggregate for retaining walls and abutments), documenting Tech Talk webinars and other events, and disseminating reports and announcements from the U.S. Department of Transportation, FHWA, AASHTO, and other entities. In addition, Research Spotlight articles focus on transportation research recently completed or underway at New Jersey DOT.
- New Jersey STIC web pages highlighting the status of efforts to deploy new technologies and processes in transportation within New Jersey DOT and among agency partners. These web pages include summaries and collateral material from New Jersey STIC meetings, such as featured presentations on innovation topics. Some online meetings have used small group discussions and interactive polling to promote information exchange (e.g., to set goals and define implementation steps for priority FHWA Every Day Counts innovations or to identify notable accomplishments for future knowledge-sharing activities). Meeting recaps are posted on the T2 website and disseminated with other innovation news via email and newsletters to keep the New Jersey STIC membership updated between meetings.
- A New Jersey DOT Research Library section that provides links to a library guide; AASHTO standards; statistics; TRB research feeds; select Transportation Research International Documentation, or TRID, searches; the New Jersey State Library catalog; exam guides; and research databases.
- An online Knowledge Management Toolbox section that presents recognized model practices and case examples of knowledge capture and transfer. New Jersey DOT staff can refer to a suite of knowledge-sharing practices—such as inviting retiring employees to share lessons learned in a Last Lecture series—to address potential knowledge gaps and to make better use of knowledge in various mission-critical areas.

Courtesy of New Jersey DOT

Thomas Brennan, a professor of civil engineering at The College of New Jersey in Ewing Township, explains his research on work zone congestion management strategies during a lunchtime Tech Talk. These in-person and webinar presentations keep New Jersey DOT employees abreast of advances in areas from infrastructure repairs to winter road management.

Information-Sharing

The Tech Talks series presents lunchtime talks and other events to inform New Jersey DOT employees and others about recent agency-sponsored research and important technological innovations. These in-person or webinar events feature ongoing or recently completed research on topics that highlight emerging trends and promising innovations. Examples include the use of advanced reinforced concrete materials for transportation infrastructure, energy harvesting from bridge vibrations, winter weather road management, and automated traffic signal performance measures. The presentations and webinar recordings are shared on the T2 website, along with a summary description.

Tech Transfer News, a quarterly newsletter, is emailed to subscribers to inform them of tech talks and other events, share spotlight articles on research and innovation, and disseminate other news and announcements. The public can sign up to receive the newsletter.[3]

Through the online New Jersey Transportation Ideas portal, subject-matter experts and other transportation stakeholders share research and innovation ideas. Submitted ideas are reviewed by the Bureau of Research and either distributed to the New Jersey DOT Research Oversight Committee for possible project funding, shared with the Innovation Advisory Team for further consideration by the New Jersey STIC's core innovation area teams, or referred to state DOT or external partners for disposition.

Videos are used to showcase recent research and innovation deployments. For instance, they have been produced to raise awareness and encourage participation in New Jersey's Build a Better Mousetrap competition, which spotlights ingenious transportation implementations that improve safety and efficiency while reducing costs. An introductory video describes the competition and a series of

[3] Sign up for newsletter at https://www.njdottechtransfer.net/njdot-tech-transfer-news/.

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Courtesy of New Jersey DOT

A circular saw cuts a precise slice from the top of a concrete curb. This novel method—a Build a Better Mousetrap winner that was recognized by AASHTO's Innovative Initiative Program in 2022—lets New Jersey DOT quickly lower rather than replace existing curbs and was developed in response to a change in standards that limit the height of curbing at guardrails to two inches.

short clips recognizes past award winners, who explain the problem addressed and the benefits of their implemented solution. Research-to-implementation–themed videos feature select research projects funded through the New Jersey DOT's Bureau of Research and convey the benefits realized from taking research through to implementation activities. Examples include the following:

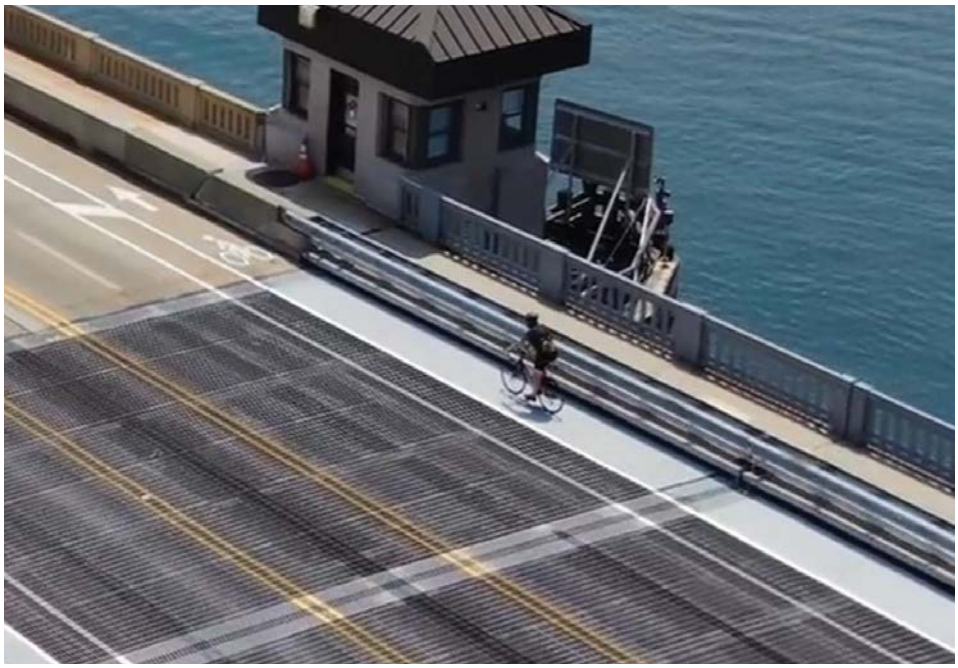
- Guidance on appropriate uses for reclaimed asphalt;
- Training for inspectors in the use of a scour evaluation model to prioritize repair work at bridges with foundations that are at greater risk of sediment transport and removal caused by swiftly moving water; and
- A demonstration project for using porous concrete on sidewalks, done in collaboration with a local public agency and a university research team.

Past innovation-oriented videos have explained the rationale for pursuing Every Day Counts–aligned initiatives in the areas of unmanned aerial systems and pavement preservation treatments and showcased New Jersey DOT accomplishments. The New Jersey DOT Technology Transfer YouTube channel[4] contains videos produced under the T2 Program, as well as others that are relevant to the research and innovation topics at the heart of the program and the New Jersey STIC. Videos documenting Build a Better Mousetrap competition winners, lunchtime Tech Talks, the annual state DOT research showcase, and STIC meetings—among other topics—are available for on-demand viewing.

Outreach Activities

Email marketing and social media are used to disseminate and target communications about T2 Program–related products, events, and research, along with innovation-related accomplishments to various audiences.

Several outreach and feedback approaches are used to inform technical assistance and training needs and to support future knowledge transfer and implementation activities. For example, an annual implementation status report seeks to identify the benefits, long-term effects, and next steps needed to achieve full-scale implementation of research projects. Efforts to capture the value of the research are informed by an online survey and phone interviews with the principal investigator, research customers, and the contracting agency's research project manager. Respondents are asked to consider the foreseeable benefits of implementing the research project's recommendations. They are also asked whether the research may have contributed to changes in policy, administrative



Courtesy of New Jersey DOT

Protected from the tire-trapping steel-grid deck by an innovative polymer mat, a cyclist pedals over the Shark River drawbridge between Belmar and Avon-by-the-Sea, New Jersey. A 2022 project to fix a mechanical malfunction and preserve the busy Route 71 span won state and national honors for such low-cost improvements as reducing traffic to two lanes and creating smooth—and safe—bike paths where none previously existed.

[4] Browse research-to-implementation and other videos at https://www.youtube.com/channel/UC-L3YfqzFHcuDw6aI7wDrJQ.

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Outreach, Feedback, and Quantitative Measures

New Jersey DOT's T2 Program uses multiple methods to identify knowledge needs, inform and prioritize research activities, train staff, and demonstrate the value of innovation. Sources include the following:

- **Priority topic interviews**—accomplishments, barriers, and training needs;
- **Online surveys**—noteworthy accomplishments, model practices, and critical knowledge, skills, and abilities needed;
- **Tech Talks**—participant feedback and number of attendees;
- **STIC**—number of meeting attendees, noteworthy innovations, and progress toward deployment goals;
- **New Jersey Build a Better Mousetrap Competition**—implemented innovations that improve safety, increase efficiency, and reduce costs in transportation;
- **Video technical assistance**—number of views, breadth of topics, and innovations and research results shared;
- **T2 Program website**—number of users, sessions, and page views, as well as top pages viewed;
- **Annual implementation report**—research benefits and implementation next steps;
- **New Jersey Transportation Ideas portal**—number and types of crowdsourced ideas and ideas shared with the state DOT's Research Oversight Committee and innovation advisory team; and
- ***Tech Transfer News***—number of subscribers, open rates, and top articles viewed.

and operational procedures, and standards and specifications, or may have led to further research phases, testing, or demonstration projects.

Online surveys are distributed periodically to further identify technology transfer and knowledge management needs, noteworthy accomplishments, and model practices being undertaken by New Jersey DOT and local public agencies. Key informant interviews are conducted with state DOT and other subject-matter experts and researchers to improve understanding of the research and innovative initiatives underway, as well as to share lessons learned, challenges encountered, and benefits.

Conclusion

Overall, the New Jersey DOT T2 Program draws upon several approaches to identify technology transfer needs and responsively implement a program of technical assistance, information exchange, and training opportunities for state DOT employees and other interested parties. Central to the effort is a continuing emphasis on valuing research that leads to implementation and building a supportive culture for innovation within the agency and among the state's transportation community.

"The New Jersey DOT Technology Transfer Program seeks to encourage the development of cost-effective, practical solutions to real problems that affect the state's transportation systems and infrastructure."

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