

Innovations in concrete bridge deck design and construction



Image courtesy of Texas DOT

Texas DOT uses bedding strips to support precast concrete panels placed over girders.

SCAN FOCUS

Steel is a common reinforcement material for concrete bridge decks, but exposure to moisture and chemical deicers can result in corrosion that lowers the performance and service life of the bridge and adds significant costs in maintenance and repairs. A range of alternative materials and innovative design and construction practices have been found to solve many of the challenges traditionally associated with steel-reinforced concrete bridge decks. To learn what strategies are used across the United States, Domestic Scan 22-01 sought to identify states' best practices and strategies for reducing the need for preservation activities, saving money and extending the service lives of their concrete bridge decks.

PERSON-TO-PERSON RESEARCH

The team invited 13 state and local transportation agencies to participate in a virtual workshop in early 2023 and share their recent successes in building concrete decks using innovative materials and methods. The scan team members then synthesized their findings and developed a list of recommendations and implementation strategies to help other agencies deploy these solutions successfully in their own states.

NEXT STEPS Put It into Practice

EXPLORE NEW IDEAS

The strategies that have worked well for other public and private organizations may suit your agency's needs as well.

GET INVOLVED

Help problem-solve with AASHTO's Committee on Bridges and Structure at transportation.org/bridges.

READ MORE

The full Scan 22-01 report will be available soon at domesticscan.org/22-01.

SUGGEST FUTURE SCANS

What topic do you have for an NCHRP Domestic Scan? See domesticscan.org/.

PRELIMINARY FINDINGS

The scan team learned that materials, such as ultra high performance concrete (UHPC) and practices like rebar placement and minimal finishing can have a big impact on the quality of a concrete bridge deck. These and other innovations can minimize cracking in concrete, though practices vary greatly among states and over time as knowledgeable staff leave the workforce. As quality of construction is key, workforce training to increase skill and knowledge management strategies to track success and increase continuity can be smart investments.



Image courtesy of Utah DOT

Utah DOT has found that using UHPC for full-depth precast concrete deck joints results in performance that is similar to joint post-tensioning.

PUTTING IT TO WORK

The team developed a number of recommendations to help states put innovative strategies into practice. Some of these include:

- Document project details and track the benefits, costs and lessons learned from innovative efforts.
- Invest in training and certifications for bridge and construction engineers, inspectors, contractors and field staff.
- Prioritize improving concrete quality over corrosion-resistant reinforcement.
- Support research to refine methods and data for better deterioration models.

SHARING THE RESULTS

As part of their role on the scan team, members have presented their findings at a variety of state, local and national gatherings of transportation professionals. The information will also be shared at upcoming events.

ABOUT THE PROGRAM: The NCHRP U.S. Domestic Scan Program (NCHRP Project 20-68, domesticscan.org) recognizes the value of firsthand sharing of new technologies and practices. Launched in 2006, the program typically sponsors two or three scans per year, putting state and federal DOT practitioners who need solutions in touch with innovative peers around the country, speeding the transfer of technology and know-how. During the intense experience of the scan (typically one to two weeks), participants see how a new technology or practice works in the real world. They also develop close professional relationships that remain readily available to them years later.

SCAN PARTICIPANTS



Image courtesy of Texas DOT

SCAN TEAM

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