

Hydrodemolition Is Effective for Rehabilitating Bridge Decks



Image courtesy of GapVax

Hydrodemolition permits removal of bridge deck concrete more quickly and safely than traditional mechanical methods and can address both moderate and severe deck deterioration.

SCAN FOCUS

Several states are now using high-pressure water equipment to remove deteriorated concrete from bridge decks prior to replacement with new rigid materials. During the March 2018 Domestic Scan 18-01, the nine-member scan team examined firsthand the successful practices and lessons learned of 13 state Departments of Transportation (DOTs) with mature or growing hydrodemolition programs.

PERSON-TO-PERSON RESEARCH

Scan team members met with representatives of DOTs from across the country to gain a firsthand understanding of recent technologies, equipment and practices associated with the use of hydrodemolition. Discussions included design criteria, construction specifications, wastewater permitting, rebar protection, removal depths, replacement materials and overall costs.

Prior to the scan itself, the subject matter expert provided findings from previous research and current guidance on the topic. The team also reviewed information from hydrodemolition equipment manufacturers and contractors.

NEXT STEPS Put It into Practice

REVIEW STATE SPECS

The hydrodemolition specifications of several host states may serve as starting points for your agency.

GET CURRENT INFORMATION

Contact scan team members and host state representatives on page 2 and attend presentations on the scan at 2020 TRB and AASHTO meetings

READ MORE

Anticipated in early 2020, the full report of Scan 18-01 will detail use of hydrodemolition by 13 state DOTs.

SUGGEST FUTURE SCANS

What topic do you have for a NCHRP Domestic Scan?

See web.transportation.org/nchrp/20-68A.

PRELIMINARY FINDINGS

Agencies' experiences confirm that the hydrodemolition technique helps eliminate damage to rebar and sound concrete compared with the sole use of mechanical removal (jackhammer or other concrete busting equipment) and provides a superior bonding surface for the overlay. Moreover, demolition can be accomplished more rapidly and safely, benefiting workers and travelers, and noise and dust are greatly reduced.

Challenges to be addressed in the use of hydrodemolition may include local environmental restrictions, sourcing and disposing of water, decks with variable-depth beams, and bridges over live traffic or bodies of water.



Water used for hydrodemolition operations can be collected on-site, treated, and then recycled back into the system.

Image courtesy of Utah DOT

PUTTING IT TO WORK

Key considerations for successful implementation of hydrodemolition include:

1. A decision matrix on when to use the technique, as one state developed.
2. Use of test sections to calibrate equipment.
3. Determination of optimum removal depth for desired service life of rehabilitated deck.
4. Selection of appropriate overlay mix.
5. Sufficient curing time and knowledgeable inspection staff.

SHARING THE RESULTS

As part of their role on the scan team, members will present on their findings at upcoming bridge maintenance meetings and through industry associations and publications. Scan Chair Cheryl Hersh Simmons has provided a "Quick Take" video of scan outcomes at domesticscan.org/18-01.

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 Colorado DOT

SCAN TEAM

Cheryl Hersh Simmons, Chair, Utah DOT
 John Belcher, Michigan DOT
 Xiaohua Cheng, New Jersey DOT
 Zhengzheng Fu, Louisiana DOT
 Romeo Garcia, FHWA
 Paul Pilarski, Minnesota DOT
 Behrooz Rad, District DOT
 DeWayne Wilson, Washington State DOT

PEER EXCHANGE PARTICIPANTS

Idaho DOT	North Carolina DOT
Illinois DOT	Ohio DOT
Kentucky DOT	Pennsylvania DOT
Louisiana DOT	Utah DOT
Michigan DOT	Virginia DOT
Missouri DOT	Washington
Montana DOT	State DOT

SUBJECT MATTER EXPERT

Brent M. Phares | bphares@iastate.edu

NCHRP SENIOR PROGRAM OFFICER

Andrew Lemer | alemer@nas.edu

SCAN MANAGEMENT

Harry Capers | hcapers@arorapc.com

The National Academies of
 SCIENCES • ENGINEERING • MEDICINE

