Accelerating the Rate of Innovation Among State DOTs—Tracing Domestic Scan Impacts

Prepared for:

National Cooperative Highway Research Program
U.S. Domestic Scan Program

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Disclaimer

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Executive Summary

Background

The U.S. Domestic Scan program gives transportation agency professionals the opportunity to gain firsthand knowledge of best practices and policies and successful technologies that other states have implemented. Over a two-week period, a scan team of up to 10 state DOT and federal representatives, along with subject-matter experts and facilitators, visits a number of host agencies across the country identified as having expertise and advanced practices related to a specific transportation topic. The intensive exchange of information during each tour is followed by targeted technology transfer activities by the scan participants. The primary goal is to facilitate dissemination of best practices among transportation managers and practitioners nationwide and to accelerate their implementation.

Through NCHRP project 20-68, two domestic scan tours were conducted as a pilot effort in 2006. Based on their initial success, several additional scans were initiated, including eight launched in 2007 and 2008. Among those, six were completed by the end of 2009. These six scans covered a wide range of transportation topics, from planning and design to maintenance and the environment:

- Scan 07-01. Best Practices in Project Delivery Management
- Scan 07-02. Best Practices in Accelerated Construction Techniques
- Scan 07-03. Best Practices in Winter Maintenance
- Scan 07-05. Best Practices in Bridge Management Decision-Making
- Scan 08-01. Best Practices in Managing State Transportation Improvement Programs (STIPs), Transportation Improvement Programs (TIPs), and Metropolitan Transportation Plans in Response to Fiscal Constraints
- Scan 08-03. Best Practices in Addressing National Pollutant Discharge Elimination System (NPDES) and Other Water Quality Issues in Highway System Management

A final report documenting the activities, findings and recommendations from each of these scans is available online at http://domesticscan.org.

Measuring success

To measure how well the U.S. Domestic Scan program is meeting its stated goals, a parallel effort (funded through NCHRP project 20-68B(01), and the subject of this report) was undertaken to document the technology transfer and implementation activities resulting from each tour. This project sought to measure the first- and second-hand impacts of the first six scan tours in the U.S. Domestic Scan program. The project aimed to make observations and note trends among the scans; discover successes of and obstacles to the technology transfer and implementation efforts; and make recommendations for future scans to promote more effective implementation.

For each scan, consulting firm CTC & Associates used several methods to gather information on technology transfer and implementation activities:

- An online survey, conducted approximately six months following the completion of each scan, asking visiting team members to provide their thoughts on the value of the different components of the scan tour and to detail their technology transfer and implementation efforts to date.
- A webinar conducted around the same time among the visiting team members, which included a round-table dialogue on each scan and related follow-up efforts among participants.
- A telephone interview conducted approximately 12 months following the publication of each scan's final report, seeking final comments from scan participants on the value of the tour and their successes in implementing information learned on the tour.
- An online survey of "nonparticipants"—individuals who did not participate in a given scan but who were identified as having received information about it, either formally or informally. Nonparticipants were surveyed to help establish the reaching effects of the scan.

As a channel for sharing findings of the scans and the follow-up activities of scan participants, CTC & Associates also developed a website for the U.S. Domestic Scan program, http://domesticscan.org, as part of NCHRP project 20-68B.

Findings

For each scan, the information collected through these channels appears as a separate chapter of this report. Each chapter includes a summary overview and analysis followed by documentation of the surveys, webinar and interview results. The final chapter of the report describes ongoing efforts related to the U.S. Domestic Scan program website.

When the information gathered for all six scans is considered together, common trends and notable contrasts emerge related to technology transfer and implementation successes, obstacles, and opportunities. These are summarized below.

- **Scans were valuable to participants, to participants' own agencies, and to the nation.** Comments to this effect were made among virtually all scan participants who provided feedback. Similarly, many participants noted the value of the contacts made during the tour, both among other participants and among host state personnel.

  This finding is consistent with the results of the six-month participant survey. Participants were asked to "Please rank each of the following scan program outcomes in terms of its contribution to the overall value of this particular scan tour, where **1** is 'not important' and **5** is 'extremely important.' "

Aggregating 30 responses across all six scans yielded the following results:

Scan program outcome	Percentage of respondents rating either 4 or 5
Introduction to a new technology or practice	73%
Clearer understanding of a new technology or practice	90%
Identification of one or more individuals at a host state to call on as a future resource	90%
Identification of one or more scan participants to call on as a future resource	93%
Information with which to begin implementation of a technology or practice at your agency	80%
Information with which to continue implementation of a technology or practice at your agency	77%

Successful aspects, as well as challenges, of the individual scans are discussed in the points below and in Chapters 1 to 6 of this report.

- **The scans met timely needs.** Across the scans, participants' comments confirmed that the topics addressed were highly relevant. Selected examples follow:
    - "Transportation agencies are evolving very rapidly and doing whatever we can to deliver projects as quickly as possible without sacrificing safety, quality or performance." (Scan 07-02, Accelerated Construction)
    - "I thought the scan tour was both beneficial and timely, as more and more states are focusing on maintaining inventory rather than building new bridges in the current economic climate." (Scan 07-05, Bridge Management)
    - "This scan came at an opportune time for me. Seeing what others are doing changed my entire perspective on this topic and was a game-changer for me personally." (Scan 08-03, Addressing NPDES)
- **States implemented technologies learned on the scan tour.** The introductory sections of Chapters 1 to 6 of this report include numerous citations of implementation efforts. These typically involve transfer of practice from one state to another. A sample from each scan follows:
    - "As the federal government is moving toward electronic bidding for construction projects, I used information learned on the scan tour to help us move in that direction." (Scan 07-01, Project Delivery Management)
    - "[Our agency] has created an innovative contracting manual to assist decision-makers in appropriate project acceleration techniques." (Scan 07-02, Accelerated Construction.) This implementation activity was conducted by a nonparticipant; see the discussion of the scans' reach to nonparticipants later in this executive summary.
    - "Based on information brought back from the scan, our agency has piloted four different initiatives, acquired three different types of equipment, and are in the process of changing

three or four policies or procedures with regard to snow removal practices and material applications." (Scan 07-03, Winter Maintenance)

- "We enhanced our bridge performance measures as a result of this scan." (Scan 07-05, Bridge Management)
- "Our live STIP … is similar to the program the federal government piloted in New York. This tool automates the STIP development and communication process and allows our managers both to have daily access to data and to develop the annual report required by federal law." (08-01, STIPs and TIPs)
- "We are implementing a stormwater retrofit program that is using the asset management efforts from Maryland and North Carolina DOT." (08-03, Addressing NPDES)

- **Scans had an impact on federal policy and practices**. These additional examples illustrate how scans had an impact at the federal level.
  - A federal representative who participated in Scan 07-01 (Project Delivery Management) noted that "many of the recommendations and options in Every Day Counts (EDC), the national initiative to address accelerated project delivery, grew out of and were supported by the findings of this scan. What states could and were doing and what my peers considered best practices for project delivery had significant impact on EDC."

    Similarly, a participant of Scan 07-02 (Accelerated Construction) expects that the scan will support more widespread implementation of practices promoted by EDC, such as the use of prefabricated bridge elements and systems or the Construction Manager/General Contractor (CM/GC) alternative project delivery method.
  - In another example, a participant of Scan 08-03 (Addressing NPDES) stated, "An important aspect of this tour was the inclusion of EPA, the agency that regulates us, as a scan participant. I believe EPA's participation led to a separate transportation permitting section in the national stormwater regulations now in development, to be finalized in 2012."
- **Among these implementation successes, additional standout outcomes are noteworthy.**
  - Scan 08-03 (Addressing NPDES) led to the creation of a national working group on stormwater policy.
  - Scan 07-05 (Bridge Management) was the basis of a follow-up NCHRP research project to develop a handbook and software for maintenance and preservation of bridges.
  - Scan findings were incorporated into National Highway Institute courses for Scan 07-05 (Bridge Management) and Scan 08-03 (Addressing NPDES).
- **The success of implementation efforts depended in part on each individual scan and the nature of the scan topic.** For example, certain practices observed in Scan 07-01 (Project Delivery Management) could not be implemented in other states due to state legislative rules and limitations. By contrast, more technology-based scans, such as Scan 07-03 (Winter Maintenance), included practices that could be explored and tried more readily.

  This is not a strict rule, however. Scan 08-03 (Addressing NPDES) was concerned with regulatory and planning issues, yet the scan led to implementation efforts among participants of a number of the technologies and practices highlighted in the scan.

- **The scans revealed barriers to implementing new technologies and practices.** These included issues across a range of topics:
    - *Regulatory*. "We have Design-Build authority in Missouri, but do not have CMGC/CM at Risk authority. We are working with our industry partners and legislators to enable MoDOT to use this tool in the future." (Scan 07-01, Project Delivery Management.) In another example, "regulatory reasons" were behind a state's inability to implement New York's active treatment system (Scan 08-03, Addressing NPDES).
    - *Applicability of practices across agencies.* **"**Accelerated construction solutions and techniques are often specific to a particular problem, making it difficult to broadly implement such solutions to other projects that are significantly different in their details." (07-02, Accelerated Construction)
    - *Cost concerns.* "States don't want to do things that aren't required because of costs." (08-03, Addressing NPDES)
    - *External factors.* "Some of the implementation activities called for in the scan are in a holding pattern awaiting passage of the transportation reauthorization bill by Congress." (08-01, STIPs and TIPs)
- **Participants were supportive of the domestic scan process.** Some representative quotes highlight this viewpoint:
    - "[This scan tour] helped us take the step from state-of-the-art to state-of-the-practice. Seeing firsthand how other states have implemented these technologies enabled us to implement them ourselves." (Scan 07-03, Winter Maintenance)
    - "[Scans are] invaluable as programs. There is such a need for communication and so little time for it, and the scan tours really allow for this vital communication and the formation of critical partnerships." (Scan 07-05, Bridge Management)

  These comments are consistent with the participants' positive rating of the conduct of the scan, as recorded in the six-month participant surveys. Participants were asked to "Please rank each of the following scan program features in terms of its contribution to the overall value of this particular scan tour, where **1** is 'not important' and **5** is 'extremely important.' "

  Aggregating 30 responses across all six scans, respondents scored each of the five items consistently high.

Scan program feature	**Percentage of respondents rating either 4 or 5**
Preparatory materials and meetings in advance of the scan tour	97%
On-site visits to view the subject technology or practice	100%
Face-to-face technical exchange with host state personnel and other scan participants	100%
Final report of scan findings	100%
Post-scan consultation with host state personnel and other scan participants	75%

Responses indicate room for improvement in post-scan consultation with host state personnel and other scan participants. This is noted in the "recommendations" section below.

- **Host states also benefited from the scans.**
    - **"**The states on the scan, both participants and hosts, benefited tremendously from it." (Scan 07-03, Winter Maintenance)
    - "Valuable information is transferred both to and from the host state representatives and the scan participants." (Scan 07-05, Bridge Management)
- **A significant benefit of the scans included participants' learning from the lessons of others.**
    - "The scan went beyond just identifying effective practices and technology but explained how an organization put them in place, including the missteps and decision-making process along the way." (Scan 07-03, Winter Maintenance)
    - Scans may be a unique way to foster communication of unsuccessful efforts. "Technical literature rarely highlights the flaws of a strategy, even when it ultimately fails." (Scan 08-03, Addressing NPDES)
- **Across all six scans, technology transfer efforts were conducted broadly and with significant success.** Participants typically followed the planned efforts laid out in each scan's implementation plan (compiled by Arora and Associates; see Appendices A-F), and included a range of activities:
    - *At the national and international levels*. Presentations to AASHTO committees, TRB committees, industry and stakeholder conferences and seminars; webinars; and articles
    - *At the state and local levels.* Presentations to stakeholder groups, industry, and municipal, county and regional transportation authorities with responsibilities parallel to the state DOTs that participated in the scans
    - *Internally within DOTs.* Presentation to and conversations among executive staff, managers, technical staff, and regional offices
- **Among the technology transfer activities summarized in each chapter, noteworthy activities highlight the reach of the program:**
    - A university presentation highlighting the results of Scan 07-01 (Project Delivery Management) together with an International Scan Tour that addressed a similar topic
    - Papers in TRB's *Transportation Research Record* (07-05, Bridge Management) and articles in *Focus* and *Public Roads* (07-02, Accelerated Construction)
    - A webinar in the National Highway Institute's "NHI Innovations" series (07-02, Accelerated Construction)
    - A follow-up survey of attendees of an AASHTO subcommittee to gauge agreement and awareness nationally on NPDES issues (08-03, Addressing NPDES)
- **The scan had a reaching effect well beyond participants.** The effectiveness of information and technology transfer *among* participants is widely documented in participants' own implementation activities detailed in this report. The success of technology transfer *beyond* participants was also of interest to the project panel, and it was gauged through participants' reports of implementations at other agencies and through a survey of nonparticipants who heard about a scan through the scan team's technology transfer efforts.

Across the six scans, CTC & Associates sent a nonparticipant survey to a total of 1,150 people; the survey reached 1,053 names once invalid email addresses were subtracted. (This number includes a small percentage of people who received surveys on more than one scan.)

A total of 115 responses were received. Aggregating these responses, practitioners in 39 of the 50 states responded to the survey—one small measure of the scan program's reach to nonparticipants. Many respondents reported having heard about the scan findings through more than one avenue, with "TRB or AASHTO committee meeting" cited most often as an additional source (31 respondents).

A significant number of respondents took follow-up actions to make use of the scan results:

Follow-up action	**Number of respondents**
Obtained or read the scan report	40
Contacted a scan participant or host state	14
Made or initiated a change in practice at own agency	10
Discussed or recommended a change in practice at own agency	24
Shared information with a colleague	49

A number of respondents to the nonparticipant survey reported making significant changes as a result of the scan findings. A few examples follow:

- "We shared the findings with Utah LTAP and they changed their winter training to implement the findings." (Scan 07-03, Winter Maintenance)
- "Instructed project sponsors to make sure they use YOE figures in TIP entries. Added a O&M cost component to the TIP document to more clearly show fiscal constraint." (Scan 08-01, STIPs and TIPs)
- "Change of equipment used in snow removal." (Scan 07-03, Winter Maintenance)

Nonparticipants also engaged in notable technology transfer efforts to further disseminate the scan findings:

- An FHWA respondent built on the success of one scan: "We actually conducted a scan tour of New Hampshire, Maryland, and North Carolina to help Colorado DOT with their water quality issues." (Scan 08-03, NPDES)
- "Sent copy of report to 2011 National Winter Maintenance Peer Exchange attendees." (Scan 07-03, Winter Maintenance)
- "We held statewide meetings to discuss changes to SWPPP with all our people and contractor personnel and discussed the need to use BMPs to come into compliance." (Scan 08-03, NPDES)

Recommendations

Based on the findings among the individual scans, the following recommendations are drawn from comments and experiences of scan tour participants and responses to the nonparticipant survey. These suggestions could help enhance technology transfer and implementation efforts for future scans in the U.S. Domestic Scan program.

Recommendations for broader implementation

1. Keep promoting successes and translate them to actual cost savings or improvements. This type of information helps persuade upper management to invest in new implementations.
2. Although tracking institutional change associated with policy-based scans might be more difficult than tracking more traditional technological implementations, it is an important aspect of such scans and should be captured if possible.
3. Consider future scan tours to address the challenges states face due to budget constraints, lack of personnel, or lack of vision; explore why it takes so long for some DOTs to change their culture or practices.
4. Consider committing U.S. Domestic Scan program resources to additional implementation activities. This could entail making funds available for states who are early adopters of processes or technologies to travel to states interested in implementation.
5. Continue to carefully focus scan topics to foster implementation. For example, one participant suggested that the topic of accelerated construction techniques might have been too broad for a scan.

Recommendations for broader technology transfer

6. Develop a guide for future scan team members to use when planning and executing their technology transfer activities. The guide would draw from the successful strategies of these six scan teams. Guidance for future scan teams on conducting follow-up activities such as webinars could save time and money. The six scan teams took a variety of approaches to producing the webinars, and could share the lessons they learned. For example, the guide could:
    - Outline the pros and cons of working through existing webinar series, such as NHI or the Center for Transportation and the Environment, compared with having a scan member's agency host and facilitate webinars
    - Discuss the challenges and benefits of presenting one summary webinar or several webinars on scan subtopics
    - Highlight successful methods of publicizing the webinars and collecting attendees' email addresses for follow-up contact (such as distribution of the scan final report)
7. Consider additional channels for getting scan results and information to those who were not direct participants.
    - Distribution to the AASHTO Research Advisory Committee, and cooperation with the AASHTO Technology Implementation Group
    - Cooperation with LTAP programs, and expanded connection with developers of national training courses
    - Articles in trade magazines
    - Broader publicity for the U.S. Domestic Scan program website

- Email distribution of each scan's Executive Summary report to relevant committee rosters, listservs, pooled-fund project members, and other practitioner peer groups

8. Seek better participation from scan team members in tracking the results of technology transfer activities. (A participant noted: "I don't believe the follow-up activities of the scan have been sufficiently monitored. A listing of where presentations were made over the several years following the scan would be useful. AASHTO TIG does a good job of tracking this kind of follow-up presentation.")
    - Provide easier-to-use online tools on the U.S. Domestic Scan program website to allow scan participants to log their technology transfer efforts
9. Consider committing U.S. Domestic Scan program resources to additional technology transfer activities. Limited resources were cited as a barrier to additional technology transfer; several participants noted that scan activities such as webinars consume personnel and financial resources.
10. Seek ways to improve and expand post-scan consultation among host state personnel and other scan participants.

Scan best practices

Each of the introductory sections in Chapters 1 to 6 of this report lists "Scan Best Practices," which capture methods participants thought were effective in how the scans were designed and conducted. Among their comments were observations that might prove informative to facilitators designing and conducting future scans:

11. "Sending out consistent questions to destination states ahead of time resulted in answers that could be easily compared; this provided very usable data for those reading the project reports."
12. "It's critical to put people on the scan who have the ability to present and communicate with agencies outside the state DOTs after the tour. Representatives of local governments look to the states as cutting edge, so scan participants must be able to present what they found."
13. "We had a good mix of states—large and small, from the coasts and the Midwest—and federal representation. This diversity is important in a scan tour group."

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Best Practices in Project Delivery Management (Scan 07-01)

Transportation agencies' ongoing need to accelerate and improve project delivery motivated this first scan, conducted in 2009, focused on the following four areas identified as most critical by the participants:

- Project management
- Performance measures
- Contracting practices
- Community involvement

The findings of the scan are documented in the final scan report, available online at http://domesticscan.org/wp-content/uploads/2010/05/NCHRP-20-68A-Domestic-scan-07-01_Final-Scan-Report_Oct-2009.pdf.

Overview of technology transfer and implementation efforts

The following observations, conclusions and recommendations are based on information that CTC & Associates gathered during the six-month participant survey, the participant webinar, the 12-month participant interviews, and the 12-month nonparticipant survey. A complete record of findings through these channels follows later in this chapter.

Observations

- Among the first six scans conducted as part of NCHRP project 20-68A, this scan addressed the broadest topic, oriented to address the needs of high-level management and decision-makers. One participant noted that this was an appropriate project to kick off the Domestic Scan program. Whereas the subsequent scans drill down into more detailed topics, this first had the overarching theme of delivering transportation projects on time, on budget and in a consistent way.
- This scan had clear national implications, with state and federal participants alike noting how it dovetailed with the goals and efforts of the Every Day Counts initiative. One participant noted that "many of the recommendations and options in Every Day Counts, the national initiative to address accelerated project delivery, grew out of and were supported by the findings of this scan." Comments on EDC appeared in the participant and nonparticipant surveys as well as the participant webinar.

Highlights of effective technology transfer

- With 19 strategy categories, several of which included multiple efforts, this scan team's Implementation Plan (Appendix A) of technology transfer efforts was among the most comprehensive of the six scans. The plan included a six-webinar series, presentations to regional state DOT associations, and distribution of the scan report to LTAP centers. It also included

activities undertaken by most of the individual scan team members, such as giving presentations at AASHTO committee meetings and targeting key publications for articles about the scan.

- Participants cited topics they learned about during the scan and brought back to their home agencies, including Construction Manager/General Contracting (CM/GC) contracting and electronic bidding. Some participants called out the specific host agencies:
    - "Our agency learned a great deal from Missouri DOT in the area of alternate bidding."
    - "We learned a lot about project management from Washington State DOT and saw how it conducts training in an academy setting. We also learned about that DOT's engineering practices."
- Participants cited several instances where knowledge was passed along to others, including these noteworthy examples:
    - A scan participant made a presentation at a university setting based on information from this scan, together with findings from an International Scan Tour on a similar topic, to paint a picture of the worldwide state of the practice on this topic.
    - Several scan participants conducted six follow-up webinars on the topic over several weeks. Each webinar addressed a different aspect of the scan results and had 100 or more attendees from around the country. These were well received and yielded good feedback.
    - A scan participant used the information learned and contacts made on the tour to help FHWA develop and implement the Every Day Counts initiative.
- The 15 respondents to the nonparticipant survey represented at least 11 states, including two that were involved in the scan itself. Technology transfer activities among nonparticipants included discussions with management to recommend enhancing current best practices, follow-up contacts with scan team members, and conversations among colleagues within nonparticipants' agencies.

<u>Implementation successes</u>

- Three of six respondents to the six-month participant survey said that their participation in the scan facilitated the implementation of new practices or technologies at their agencies. Four of six respondents said that implementation was planned within the year.
- Nine respondents to the nonparticipant survey indicated that they made further inquiry into the findings of this scan, and eight took action to implement or disseminate one or more of the practices identified through the scan.
- Specific implementation activities resulting from or supported by this scan include at the state level:
    - Development of a project screening tool. "This effort was already ongoing, but the scan supplemented this effort."
    - Enhancement of state performance measures with well-defined metrics.
    - Expanded communication media used to share information with customers.
    - Assistance in state implementation of CM/GC projects.

  At the federal level:
    - Development of environmental processes and early planning and coordination for SHRP 2.
    - Assistance with federal budget requests, proposals and crafting of national policy.
    - "As the federal government is moving toward electronic bidding for construction projects, I used information learned on the scan tour to help us move in that direction."

  - Introduction of CM/GC contracting within Federal Lands.

Additional benefits of the scan

- The scan results served the needs of upper management. A participant reported that "our state secretary of transportation requested a synthesis of information among several states on best practices in project delivery, and the scan tour findings provided foundational information for this request."
- A participant stressed the value of this scan to FHWA and AASHTO as the agencies began to discuss Every Day Counts and how to accelerate program delivery.
- A participant noted that "it was good to make new contacts among state agencies and to get a baseline of our practices compared with what other agencies are doing."
- Regarding the program as a whole, one participant said that "the domestic scan program is an important part of identifying and advancing best practices and innovations nationally. The program accelerates transfer of key findings and best practices while establishing professional networks of subject matter experts."

Scan best practices

- A participant noted that "the planning, facilitation and execution of the scan were excellent. In particular, sending out consistent questions to destination states ahead of time resulted in answers that could be easily compared; this provided very usable data for those reading the project reports."

Barriers and opportunities for improvements

- Since this scan focused on practices in project management, the role of institutional change might be more important than for other scans. Tracking such change might be more difficult than tracking more traditional technological implementations.
- State legislation proved to be a barrier to implementation for multiple participants.
  - One noted that "our state legislation precludes us from trying some of the practices we saw in other states."
  - Another noted that "in our state we first evaluated the new practices that we could implement immediately versus those that required changes in legislation."
  - Missouri responded in the six-month survey: "We have Design-Build authority in Missouri, but do not have CMGC/CM at Risk authority. We are working with our industry partners and legislators to enable MoDOT to use this tool in the future."
- One participant noted that since large-scale follow-up webinars require a great deal of organizational work and technical expertise, it would be helpful if these were funded and organized as part of the scan process.

Scan details

Scan team members

- Jim McMinimee, Utah DOT (co-chair) (now retired)
- Shari Schaftlein, FHWA (co-chair)
- Sidonia S. Detmer, Virginia DOT
- Mark Lester, South Carolina DOT
- Gary Mroczka, Indiana DOT
- David Nichols, Missouri DOT
- Joyce N. Taylor, Maine DOT
- Alan Teikari, FHWA
- Connie Yew, FHWA
- Thomas R. Warne, Tom Warne and Associates, LLC (Subject Matter Expert)

Sites visited

- State transportation agencies in Arizona, Florida, Missouri, Utah, Virginia, and Washington
- City transportation agency in Phoenix

Scan dates
February 22 – March 3, 2009

Final report
December 2009, http://domesticscan.org/wp-content/uploads/2010/05/NCHRP-20-68A-Domestic-scan-07-01_Final-Scan-Report_Oct-2009.pdf

Six-month participant survey

CTC & Associates conducted an online survey of scan participants approximately six months following the completion of each scan. The scan included 10 team members, including two co-chairs and a subject matter expert (SME). One of the co-chairs (Jim McMinimee) has since retired. Of the 10 original members, seven responded to the survey.

The following text appeared at the start of the online survey.

> *Thank you for participating in this survey about your experience as a member of a Domestic Scan team. NCHRP has initiated this follow-up research to identify:*
>
> - *Progress toward implementation of technologies and practices identified in each scan's implementation plan*
> - *Benefits of the Domestic Scan Program to you, your agency, and industry as a whole*
> - *Completed or planned dissemination activities*
> - *Names of individuals (beyond participants) who have heard about scan findings*
>
> *Completion of this survey should require no more than 15 or 20 minutes.*
>
> *CTC & Associates will compile survey results in the next few weeks and then invite you and the other members of your scan tour to participate in a one-hour Web conference to discuss your responses. This will also be an opportunity for you to reconnect and share your successes and challenges in implementing technologies and practices discussed during the scan.*

This survey and Web conference will be followed by another in approximately six months to further trace the impacts of your participation in the scan tour. For more information, see NCHRP Project 20-68B(01), "Accelerating the Rate of Innovation Among State DOTs – Tracing Domestic Scan Impacts."

If you have any questions about the survey or other aspects of this research effort, please don't hesitate to contact me.

Final results of the survey follow.

Conduct of Scan. Please rank each of the following scan program features in terms of its contribution to the overall value of this particular scan tour, where 1 is "not important" and 5 is "extremely important." If it did not apply to your scan, please pick N/A (Not Applicable).

	Not Important 1	2	3	4	Extremely Important 5	N/A	Response Count
Preparatory materials and meetings in advance of the scan tour	0	0	0	2	5	0	7
On-site visits to view the subject technology or practice	0	0	0	3	4	0	7
Face-to-face technical exchange with host state personnel and other scan participants	0	0	0	0	7	0	7
Final report of scan findings	0	0	0	0	7	0	7
Post-scan consultation with host state personnel and other scan participants	0	0	1	3	3	0	7

Scan Outcomes. Please rank each of the following scan program outcomes in terms of its contribution to the overall value of this particular scan tour, where 1 is "not important" and 5 is "extremely important."

	Not Important 1	2	3	4	Extremely Important 5	Response Count
Introduction to a new technology or practice	0	0	1	3	3	7
Clearer understanding of a new technology or practice	0	0	0	5	2	7
Identification of one or more individuals at a host state to call on as a future resource	0	0	1	2	4	7
Identification of one or more scan participants to call on as a future resource	0	0	1	2	4	7
Information with which to *begin* implementation of a technology or practice at your agency	0	0	0	5	2	7
Information with which to continue implementation of a technology or practice at your agency	0	0	0	5	2	7

General comments regarding the overall value and benefits of the NCHRP Domestic Scan Program:

- Many times it was the cultural change within the organization that led to the big changes.
- The domestic scan program is an important part of identifying and advancing best practices and innovations nationally. The program accelerates transfer of key findings and best practices while establishing professional networks of SMEs.
- For being one of the first domestic scan trips, I have to say it was well organized and the subject matter expert was extremely helpful. Well done.
- The program is valuable to help spread the word about the best practices, and about helping to identify leaders and innovators. It was valuable to FHWA and AASHTO as they began to discuss Every Day Counts, and how to accelerate program delivery.

Did your participation in the scan facilitate the implementation of any new practices or technologies?

Yes	No
3	3

Completed Implementations

- Development of a project screening tool. This effort was already on-going but the scan supplemented this effort
- The scan confirmed the value of well defined metrics, and Virginia is adding to its performance measures to further assist in the program delivery and promote transparency and accountability.
- Expanded communication media used to share information with customers.
- My role changed, and my participation in the industry has become at a national level. I am currently helping FHWA implement a program to spread the innovative contracting - both design build and CM/GC - through the EDC program.
- Helping Colorado, and Ministry of Ontario implement first projects in CM/GC

Are any implementations planned within the next year?

Yes	No
4	2

Planned Implementations (within the next year):

- I will use the information gathered in the scan to help my future clients with their project delivery activities.
- Strengthening risk management.
- Accelerating consultant procurement process.
- We have Design-Build authority in Missouri, but do not have CMGC/CM at Risk authority. We are working with our industry partners and legislators to enable MoDOT to use this tool in the future.
- Performance criteria in EDC suggest that more states will implement DB and CM/GC

Number of respondents who attempted an implementation without success
None

Number of contacts provided regarding current or planned implementation activities
4

Number of contacts outside the agency provided
None

Dissemination Activities (from three respondents):

- Organization - FHWA AASHTO, NCHRP
  Event - Project Delivery Webinar Series
  Date - 9/1/2009
  Title/Subject - Overview of Scan Results
  Used Scan PowerPoint? (Yes/No) – Yes
- Organization - FHWA AASHTO, NCHRP
  Event - Project Delivery Webinar Series
  Date - 9/24/2009
  Title/Subject - Community Involvement
  Used Scan PowerPoint? (Yes/No) – Yes

- Organization – Mn/DOT
  Event - Peer Review
  Date - 10/4/2009
  Title/Subject - Best Practices in Project Delivery Management, NCHRP 20-68A, Scan 07-01
  Used Scan PowerPoint? (Yes/No) – Yes
- Organization - FHWA hosted a series of webinars to present scan results
  Event - Webinar series--presented an overview and by focus areas
  Date - 8/25/09 (practice run); 9/1/09 (overview); 9/8/09 (project management); 9/15/09 (contracting practices); 9/22/09 (performance measures); 9/24/09 (community involvement)
  Title/Subject - Best Practices in Project Delivery Management
  Used Scan PowerPoint? (Yes/No) – Yes
- Organization - Transportation Research Board
  Event - 2010 TRB Annual Meeting
  Date - January 2010
  Title/Subject - Best Practices in Project Delivery -- Performance Measures
  Used Scan PowerPoint? (Yes/No) – Yes
- Organization - University of Virginia
  Event - Graduate Students Forum
  Date - April 2010
  Title/Subject - Performance Management
  Used Scan PowerPoint? (Yes/No) – Yes
- Organization - Vermont Agency of Transportation
  Event - Performance Contracting Workshop
  Date - July 2010
  Title/Subject - Best Practices in Performance Management
  Used Scan PowerPoint? (Yes/No) – Yes
- Article “Efficient, Expeditious, and Effective: Best Practices in Project Delivery Management” was published in Jan/Feb 2010 FOCUS journal. - Report was disseminated to LTAP Centers in March 2010. - Report was posted on TRB Performance Measurement Committee Google site/FHWA Exchange in Jan 2010 and on AASHTO Standing Committee on Performance Management website in March 2010.
- Organization - AASHTO SCOH
  Event - spring meeting
  Date - spring 2009
  Used Scan PowerPoint? (Yes/No) - Yes

Six-month participant webinar

Several scan tour participants and NCHRP project panel members took part in a webinar approximately six months following the conclusion of the scan. The purpose of the webinar was to discuss the initial findings of the scan, to review technology and implementation efforts to date and to plan follow-up activities. Details on the webinar follow.

Date
Wednesday, October 6, 2010

Attendees

Facilitators

- Dylan Casey, CTC & Associates LLC
- Patrick Casey, CTC & Associates, LLC

Scan Team Members

- Jim McMinimee, Utah DOT (co-chair) (now retired)
- Shari Schaftlein, FHWA (co-chair)
- Sidonia S. Detmer, Virginia DOT
- Mark Lester, South Carolina DOT
- Connie Yew, FHWA

Panel Members

- Harold "Skip" Paul, Director LTRC (chair)
- Rick Kreider, Kansas DOT
- Marsha Fiol, Virginia DOT
- Keith Platte, AASHTO
- Nancy Chinlund, CALTRANS

Guest

- Lori Rosenkopf, Wharton School at the University of Pennsylvania

Media

- Slides: http://domesticscan.org/wp-content/uploads/Scan07-01Webinar.pdf
- Webinar Recording: http://www.domesticscan.org/videos/Project_Management_Domestic_Scan_Webinar.mp4

Summary

Draft survey results were provided to scan team members prior to the webinar. Following introductions and a review of the results, each team member discussed some of their implementation efforts and their view of the impact of the scan. All of them praised the scan process and work done on the scan, finding it important to both their own specific work and to their profession.

Shari Schaftlein noted that this scan was, in many ways, a "management level" scan involving people in positions to influence overall management that would lead to implementation of particular technologies/practices. She commented that there is an opportunity to reference scan materials in "all the technical assistance we do" in the form of resource lists, Q & A, and other outreach.

Jim McMinimee has recently left his position at Utah DOT, but pointed out plans that were in the works to implement some of the environmental management practices that they saw in Florida during the scan. He suggested contacting Rebecca Stromness Chief Environmental Engineer at UDOT to see how the project is going.

Connie Yew pointed to the webinars that she and Shari Schaftlein organized and conducted after the scan as being particularly successful avenues for dissemination of the scan results. They conducted six webinars over several weeks, each on a different aspect of the scan results. Each webinar had 100+ attendees from around the country. She thought they went very well and received good feedback on them; however, they required a great deal of organizational work that was unfunded and technical expertise that

was hard to come by. She suggested that such webinars might be funded and organized as part of the scan process in general.

Sidonia Detmer considered the scan "a fantastic opportunity" and came away with "more information than we can implement within our DOT." She is looking to leverage both technology and consultants to better effect, especially with an eye to saving money. "There's no better time to implement these best practices." She also noted that Virginia is aggressively sharing information from the scan within the DOT and with its various partners.

Following the comments from the scan team members, the Panel members each made some comments, leading off with Skip Paul. They clarified some of the panel's interest in the scans, particularly their interest in how the scan as an effort is working to get new technologies into practice. Skip Paul noted that it is clear that the scan is good for the participants and the host sites, but the Panel is very interested in how the knowledge from the scan spreads and what can be done to facilitate such spreading: "How many states not on the team got engaged and tried to use some of this information?"

Nancy Chinlund asked about quotes from the survey regarding the role of institutional change in obtaining successful implementation of technologies and practices. She thought that since this particular scan focused on practices in project management, the role of institutional change might be more important than with most scans and that tracking such change might be more difficult than tracking more traditional technological implementations.

Several panel members commented that they were relatively new to the panel and were using the webinar as another opportunity to get a sense of the scans and the review effort.

12-month participant interviews

CTC & Associates conducted a brief interview with participants approximately one year following the publication of the scan report. Most of the interviews were conducted by telephone, with a few respondents submitting answers via email instead.

Among the nine highway agency scan participants contacted, seven participated in the interview. Responses to each of three questions are summarized and compiled below.

1. How have you implemented changes to your agency's policies, practices or technologies based on what you learned from participating in this scan tour?

- I retired from the Utah Department of Transportation in January of 2010, so I had a limited time to implement things that I learned from the domestic scan tour at UDOT. Since leaving UDOT, I have taken a job as a consultant helping states implement new technologies. I have used the knowledge that I gained while on the tour to help states understand best practices in project management. I have helped FHWA with two efforts to implement changes to program and project delivery. Specifically, I've helped FHWA with accelerated bridge construction, design build, and CM/GC contracting. My current job as SHRP 2 coordinator puts me in regular contact with the states. Frequently I lean on my experiences in the domestic scan tour to help states understand state of the art and state of the practice with regard to project delivery. I very regularly use, and I help states use, the contacts that I made while on the tour.

- Many of the recommendations and options in Every Day Counts, the national initiative to address accelerated project delivery, grew out of and were supported by the findings of this scan. What states could and were doing and what my peers considered best practices for project delivery had significant impact on EDC.
- Research I have been involved with since this scan tour built on the results of the scan, such as SHRP 2 work on environmental processes and early planning and coordination recommendations. Collaborative decision-making tools and visioning are other examples.
- We receive requests from the office of our secretary and from congress as options and pathways are considered for reauthorization, and we have provided facts, policy and program ideas building on accelerated project delivery, some of which were developed in the scan and promoted around the country.
- This provided some of the first opportunities for discussions of new contracting issues among different states and agencies.
- Our agency learned a great deal from Missouri DOT in the area of alternate bidding. This allowed us to open the umbrella in this area, not just for pavement types but also contract components, timeframe and packaging.
- We learned a lot about project management from Washington State DOT and saw how it conducts training in an academy setting. We also learned about WSDOTs engineering practices.
- Our state legislation precludes us from trying some of the practices we saw in other states.
- FHWA's primary role is to transfer knowledge, technology, applications and lessons learned to other states and others who may benefit from it. From a policy perspective, information gained from this program has helped with federal budget requests, proposals and crafting of national policy.
- The Office of Federal Lands Highway hasn't done electronic bidding in the past. As the federal government is moving toward electronic bidding for construction projects, I used information learned on the scan tour to help us move in that direction.
- We have initiated the use of CM/GC contracting within Federal Lands as well.
- We have implemented some of these practices already, and we continue to work with state legislators with a goal of using additional ones.

2. *(For State DOT representatives)* Have you shared information you learned or contacts you made during the scan tour with other people in your agency, in your state, or beyond, and if so, how have they put that information to use?

(or)

***2. (For Federal agency representatives)* Have you shared information you learned or contacts you made during the scan tour with other people in your agency, in other agencies, or beyond, and if so, how have they put that information to use?**

- Yes I have shared the information within my state and beyond. I do not have a way to measure or a way to support my observations, but I believe that the information has proven to be very useful, and is getting much attention in the transportation industry. The best example that I can give you is FHWA's Every Day Counts initiative. I used the information and contacts that I made while on the tour to help FHWA present and implement the Every Day Counts initiative.

- AASHTO initially started a project delivery task force after our tour and conducted a survey on this topic. Its findings were consistent with the tour's findings.
- Our state secretary of transportation requested a synthesis of information among several states on best practices in project delivery, and the scan tour findings provided foundational information for this request.
- I made a presentation on this topic at a conference in our state attended by 2,000 transportation officials and professionals. I also presented the findings to the AASHTO Subcommittee on Design.
- We conducted smaller group sessions and meetings with regional partners within our own agency.
- The follow-up webinar provided a mechanism to share this information with the wide transportation community, across all the states and at the federal level as well.
- The scan tour findings were presented at conferences and meetings, including the TRB meeting.
- At a nearby university I presented this information, together with findings from an International Scan Tour, to paint a picture of the worldwide state of the practice on this topic.
- I have shared this information within our agency. Other federal agencies are also learning about the new techniques we're using. It's a learning process for them with this type of activity.
- We have shared information learned from this tour with individuals outside of our agency and state, including practitioners, graduate students, and industry partners.
- People in our agency, including subject matter experts, have made follow-up contacts with individuals in the agencies we visited on the scan tour. We have communicated with other scan tour participant agencies as well. For example, we shared information on our project manager training program with another scan tour participant state.
- We have not conducted follow-up work with other states with whom we have shared the details of our practices to see if they adopted any of these practices.

3. How would you characterize the overall value of this scan tour? What comments would you like to share for the summary report on this project?

- I believe the tour was extremely valuable. Many of the participants are very active in spreading new ideas both within their states and within the broader national community. The relationships were an important outgrowth of the tour. The reports and presentations that we implemented afterward helped and continue to help the industry. The value of the program is very high in my estimation.
- This was a great project to serve as a kickoff for the Domestic Scan program. The subsequent scans drill down into more detailed topics, but this first one has the overarching theme of how do we deliver projects on time, on budget and in a consistent way, and it provides a context for focusing on performance with reauthorization in mind.
- The scan tour is an outstanding method for gathering and synthesizing data on this topic to allow non-participants to quickly gain information they need to change their business. Transferring that knowledge still remains something of a challenge, since reading reports still requires time and effort.

- Planning, facilitation and execution of the scan were excellent. Sending out consistent questions to destination states ahead of time resulted in answers that could be easily compared. This provided very usable data for those reading the project reports.
- From a performance measures perspective, the scan tour helps foster understanding of why some states are successful, highlighting the mechanisms and best practices states are using. I know of plans for the exchange of tools and systems among scan tour participants, but I am not aware if these were taken to completion.
- It was good to make new contacts among state agencies and to get a baseline of our practices compared with what other agencies are doing. Good information, good contacts and good possibilities for making changes.
- I think the experience was outstanding for the tour participants, including those from the visiting teams as well as the host states. The impact continues to be felt throughout the country and beyond the DOTs. We have even seen changes in the private sector as a result of this tour.
- We should have been conducting domestic scans like these a long time ago, since there are so many wonderful things being done around the country, and this is an excellent opportunity to share that information quickly and gain real ground in this area.

Nonparticipant survey

To gather more information about the reach of the scan tour findings, CTC & Associates conducted a seven-question online survey of nonparticipants—individuals who did not participate in the scan but who were identified as having received information about it.

Survey Methodology

The scan team identified 19 categories of technology transfer strategies as part of the scan's Implementation Plan (see Appendix A, compiled by scan consultant Arora and Associates). Several of these activities involved presenting the scan findings to groups of specific individuals, such as attendees at committee meetings.

In an effort to trace the paths through which information about the scan findings spread beyond the initial scan participants, CTC & Associates reviewed the information available about which of the planned technology transfer activities had been completed and confirmed these details through an online search. We identified the activities for which attendees' names were most likely to have been compiled, and we contacted the organizers of those activities.

We were able to obtain attendance lists for two of these activities. We culled the lists for those attendees who represented state DOTs and FHWA divisions, and through online searching we compiled email addresses for these two groups. We sent surveys to state DOT and FHWA staff who heard about the scan results through:

- A presentation at the July 2009 meeting of the AASHTO Subcommittee on Design (survey sent to 81 attendees)
- A series of six webinars led by several scan team members (survey sent to 116 people who attended at least one webinar)

Scan team members and respondents to the nonparticipant survey provided three additional names of DOT staff who had been involved in an implementation of scan technology or whom they had spoken to about the scan findings. Surveys were sent to these three individuals as well.

In all, CTC & Associates sent the nonparticipant survey to 200 people; subtracting invalid email addresses, the survey reached 176 recipients. Recipients received the following email, modified as appropriate to indicate the venue of the scan presentation they attended:

> *Hello,*
>
> *The National Cooperative Highway Research Program is conducting research to evaluate how the innovative technologies and practices identified through its Domestic Scan Program (http://domesticscan.org) are being used by transportation practitioners beyond the initial scan participants. The findings of the 2009 scan tour on Project Delivery Management were presented in a series of FHWA webinars in August and September 2009, which you attended, and we would appreciate a few minutes of your time to complete a brief survey (7 questions) on your use of the scan findings.*
>
> ***You may receive an invitation to complete a survey about more than one scan topic. Please feel free to respond to only one of these.***
>
> *This survey is an important opportunity to document the real, tangible benefits and value of the practitioner-to-practitioner information exchanges facilitated by the Domestic Scan Program. The goal of the program is to accelerate the spread of leading-edge, proven technologies and practices to DOTs across the country, thereby helping all agencies provide safer, longer-lasting, more cost-effective transportation facilities to their taxpayers. This survey is an effort to trace these impacts.*
>
> *The survey is available at http://www.surveymonkey.com/s/7K33HQQ. If possible, please complete the survey by Friday, August 12.*
>
> *If you have any questions about this NCHRP research effort, please feel free to contact me at the phone number or email below. You can also contact TRB Senior Program Officer Andrew Lemer at ALemer@nas.edu or (202) 334-3972.*
>
> *Thank you for your time and your participation.*

The survey itself also included the following introductory text:

> *The National Cooperative Highway Research Program sponsors a Domestic Scan Program (NCHRP Project 20-68A) to facilitate technology transfer among state DOTs. NCHRP is conducting research to evaluate how the technologies and practices identified through the Domestic Scan Program are being used by transportation practitioners beyond the scan participants. This survey is part of that effort to capture how those who have heard about the scan findings are using that information at their agencies.*
>
> *This survey is an important opportunity to document the real, tangible benefits and value of the practitioner-to-practitioner information exchanges facilitated by the Domestic Scan Program. The goal of the program is to accelerate the spread of leading-edge, proven technologies and practices to DOTs across the country, thereby helping all agencies provide safer, longer-lasting,*

more cost-effective transportation facilities to their taxpayers. This survey is an effort to trace these impacts.

You can review a summary of the results of the Project Delivery Management scan at this link: Executive Summary

Thank you for taking the time to complete the survey.

Responses

A total of 15 people responded to the surveys:

- 5 attendees of the AASHTO SCOD meeting
- 10 webinar attendees

The respondents represented agencies across the country:

- 10 respondents were from 10 different state DOTs, including 2 states that were involved in the scan
- 5 respondents were from FHWA; 2 of these specified regional divisions of the agency

In all, practitioners from 11 states responded to the survey, including 2 states that were involved in the scan.

The 15 responses are compiled below.

1. Do you recall hearing a presentation at the July 2009 meeting of the AASHTO Subcommittee on Design (held in Indianapolis) about the innovative practices identified by the 2009 domestic scan on Project Delivery Management?

or

Do you recall viewing one or more FHWA webinars in August and September 2009 about the innovative practices identified by the 2009 domestic scan on Project Delivery Management?

Yes	No	Not sure
8	4	3

2. Did you hear about the findings of the Project Delivery Management scan tour from other sources as well?

Yes (see below)	No
5	10

Conferences and meetings				
TRB or AASHTO meeting or committee meeting	Another national or regional conference	State DOT workshop	State DOT internal meeting	Other (please describe)
4	0	1	2	0

Other sources				
Webinar	Article in a publication	Conversation or email with a scan participant	Conversation or email with a colleague	Other source (please specify)
0	0	1	0	1
Responses to "Other source": • Email in my in-box.				

3. Did you make any further inquiry into any of the findings of the scan on Project Delivery Management?

Yes (see below)	**No**
6	9

Follow-up actions			
Obtained or read the scan report	Contacted a scan participant	Contacted someone from one of the states visited in the scan	Other (please specify)
9	0	0	1
Responses to "Other": • Partial read and distributed to staff			

4. Did you take action to implement or disseminate one or more of the practices identified through the scan?

Yes (see below)	**No**	**[No response]**
5	8	2

Follow-up actions			
Made or initiated a change in practice at my agency	Discussed or recommended a change in practice at my agency	Shared information with a colleague	Other (please specify)
1	2	8	0
Specific practices implemented or disseminated • Project Mgmt System used by Utah DOT • CMGC/CMAR option for my state. Follow up item covered in FHWA EDC initiative.			

5. If you used information from the scan tour to make or recommend a change to your agency's practices, please describe.

Open-ended responses (1 respondent):
- n/a

6. If you indicated in Question 3, 4 or 5 that you contacted or talked to others about the scan tour results, please list their names and agencies.

Open-ended responses (5 respondents):
- I will discuss the results with my boss as part of a conversation about recommending a plan for enhancement of current best practices.
- n/a
- I talked to [scan team member] Dave Nichols and my direct reports.
- Information was shared with NHDOT
- NDOT - Amir Soltani

7. Please use this space to provide any additional comments about your use of the findings of the Project Delivery Management scan tour.

Open-ended responses (3 respondents):
- Good practice to keep the information fresh and new. Thank you.
- n/a
- In 2009 I was still on a training program and wasn't in a position to implement or take much action on what I learned. However, I find the scans- both domestic and international- to be interesting and to provide helpful information.

2

Best Practices in Accelerated Construction Techniques (Scan 07-02)

This scan, conducted in early 2009, focused on identifying operational and management best practices for accelerated construction and delivery of transportation projects. Major areas addressed during this scan include:

- Accelerated construction for emergency situations and planned projects
- Prefrabricated components for bridge construction
- Activity sequencing for pavement construction
- Construction plan evaluation tools
- Contracting strategies and business models

The findings of the scan are documented in the final scan report, available online at http://domesticscan.org/wp-content/uploads/2010/05/NCHRP20-68A-Domestic-scan-07-02_Final-Scan-Report_Nov-2009.pdf.

Overview of technology transfer and implementation efforts

The following observations, conclusions and recommendations are based on information that CTC & Associates gathered during the six-month participant survey, the participant webinar, the 12-month participant interviews, and the 12-month nonparticipant survey. A complete record of findings through these channels follows later in this chapter.

Observations

- Like scan 07-01 on project delivery management, this scan too had significant national relevance: "Shortening Project Delivery" is one of the targeted areas of FHWA's Every Day Counts initiative. One participant expects that this scan will support more widespread implementation of practices promoted by EDC, such as the use of prefabricated bridge elements and systems or the CM/GC alternative project delivery method.
- Tying the scan to other national efforts, a scan team member noted that "the scan confirmed/validated the methods, technologies, and ideas from past years, particularly those that came out of the 33 Accelerated Construction Technology Transfer workshops sponsored by AASHTO."
- One respondent to the nonparticipant survey linked the scan to a topic addressed in the second Strategic Highway Research Program (SHRP 2), noting that Project R02 of the initiative "will provide additional tools and information in this area." This project focuses on geotechnical solutions, including rapid embankment construction.

Highlights of effective technology transfer

- The 18 respondents to the nonparticipant survey were from 16 different states (15 state DOTs and one turnpike authority), including 2 states that were involved in the scan itself. Technology transfer activities among nonparticipants included discussions with management to recommend enhancing current best practices, follow-up contacts with scan team members and host agencies, and conversations among colleagues within nonparticipants' agencies.
- This scan team's Implementation Plan (Appendix B) of technology transfer efforts spanned a wide range of activities. These included:
    - Presentations at meetings and conferences: Scan participants gave presentations to the AASHTO Standing Committee on Highways, the AASHTO Subcommittee on Construction, two TRB committees, the American Road & Transportation Builders Association, and others. The scan team targeted regional meetings as well, presenting to the Southeastern Association of State Highway and Transportation Officials and during the annual Transportation Short Course sponsored by Texas DOT and the Texas Transportation Institute, with additional presentations planned.
    - A webinar in the National Highway Institute's "NHI Innovations" series
    - Articles in *Focus* and *Public Roads*
    - A flyer about the scan results, created by a scan team member and distributed at national and regional conferences and meetings.

  In addition, a scan team member traveled to Chile in October and November 2010 following an earthquake there; he provided education about accelerated construction as part of a joint effort of the U.S. State Department and the Chilean Fulbright program.

Implementation successes

- One of the respondents to the six-month participant survey said that participation in the scan facilitated planned implementation of new practices or technologies within the year.
- Nineteen of the 22 respondents to the nonparticipant survey indicated that they had taken action to implement or disseminate one or more of the practices identified through the scan.
    - One respondent noted that his agency "has created an innovative contracting manual to assist decision-makers in appropriate project acceleration techniques."
    - Another respondent said he "pushed for better schedule specification to align with the detail required by ACT."
    - Respondents listed numerous other examples of scan findings that they had implemented or disseminated, addressing a wide range of topics: technologies (intelligent compaction, precast bridge elements), contracting strategies (design-build, CM/GC, CM at Risk), and specific practices (rapid decision-making, clearly defining responsibilities).
- One scan participant said that practices in Utah affirmed some things already known at his agency and planted strategies for new things to try.
- Another participant could not cite specific implementation results based on information learned during the tour, but stated instead: "For us it was more about gaining general knowledge and background which we will be able to tap into on an as-needed basis."
- At the federal level, FHWA's Office of Infrastructure is launching two new programs related to the scan tour study, as a scan participant explained:
    - "We are starting an initiative called Intelligent Construction Systems and Technology to develop a strategic roadmap across all disciplines of highway engineering and to identify

the developing or underutilized technologies to advance or accelerate construction. ICST was influenced by the findings of this scan tour.

- "Also related to the scan is our Construction Program Baseline Review program, which is collecting information from states on best construction processes. We'll develop regional peer exchanges based on the findings."

Additional benefits of the scan

- A participant said that this scan tour "helped build the body of thinking that points us toward doing what we do faster, whether it's public-private partnerships or design-build."
- Two participant noted the timeliness and relevance of this scan tour:
  - "Transportation agencies are evolving very rapidly and doing whatever we can to deliver project as quickly as possible without sacrificing safety, quality or performance."
  - The tour was "highly relevant to new research that another panel is now addressing on emergency management contracts."
- Regarding the program as a whole:
  - One participants said he is a "strong advocate for the scan program and scan approach. There's no better way to spend such money."
  - Another said, "Transportation scan tours have received bad press recently and been called a 'boondoggle,' but this was really the farthest thing from that. Participation required a great deal of hard work. I learned a lot and built valuable relationships with people I previously didn't know."

Barriers and opportunities for improvements

- Participants noted barriers inherent to the topic of this scan:
  - "It's tough because the need is sporadic right now," one said, noting that accelerated construction is frequently driven by disasters, not by dependable, everyday construction.
  - Another noted that accelerated construction solutions and techniques are often specific to a particular problem, making it difficult to broadly implement such solutions to other projects that are significantly different in their details.
  - It was also suggested that the topic of accelerated construction techniques may possibly have been too broad for a scan.
- It was suggested that a greater effort could be made to get scan results and information to those who were not direct participants. The AASHTO subcommittee structure was suggested as a good model for sharing this information.
- It was asked whether the scan panel or the Domestic Scan program could provide more assistance in fostering implementation.

Scan details

Scan team members

- Brian Blanchard, Florida DOT (co-chair)
- Thomas Bohuslav, Texas DOT (co-chair) (now retired)
- Christopher J. Schneider, FHWA (co-chair)
- Richard H. Sheffield, Mississippi DOT
- Steven D. DeWitt, North Carolina Turnpike Authority
- George Raymond, Oklahoma DOT
- Stuart Anderson, Texas A&M University (Subject Matter Expert)
- Cliff J. Schexnayder, Arizona State University (Subject Matter Expert)

Sites visited

- Jacksonville and Pensacola, Florida
- Birmingham and Montgomery, Alabama
- Houston, Texas
- Salt Lake City, Utah
- Sacramento and Oakland, California

Scan dates
March 1-7 and March 22-29, 2009

Final report
December 2009, http://domesticscan.org/wp-content/uploads/2010/05/NCHRP20-68A-Domestic-scan-07-02_Final-Scan-Report_Nov-2009.pdf.

Six-month participant survey

CTC & Associates conducted an online survey of scan participants approximately six months following the completion of each scan. The scan included eight team members, including three co-chairs and two subject matter experts (SMEs). At the time of the survey, one of the co-chairs (Thomas Bohuslav) had retired. Of the eight original members, two responded to the survey.

The following text appeared at the start of the online survey.

> *Thank you for participating in this survey about your experience as a member of a Domestic Scan team. NCHRP has initiated this follow-up research to identify:*
>
> - *Progress toward implementation of technologies and practices identified in each scan's implementation plan*
> - *Benefits of the Domestic Scan Program to you, your agency, and industry as a whole*
> - *Completed or planned dissemination activities*
> - *Names of individuals (beyond participants) who have heard about scan findings*
>
> *Completion of this survey should require no more than 15 or 20 minutes.*
>
> *CTC & Associates will compile survey results in the next few weeks and then invite you and the other members of your scan tour to participate in a one-hour Web conference to discuss your responses.*

This will also be an opportunity for you to reconnect and share your successes and challenges in implementing technologies and practices discussed during the scan.

This survey and Web conference will be followed by another in approximately six months to further trace the impacts of your participation in the scan tour. For more information, see NCHRP Project 20-68B(01), "Accelerating the Rate of Innovation Among State DOTs – Tracing Domestic Scan Impacts."

If you have any questions about the survey or other aspects of this research effort, please don't hesitate to contact me.

Final results of the survey follow.

Conduct of Scan. Please rank each of the following scan program features in terms of its contribution to the overall value of this particular scan tour, where 1 is "not important" and 5 is "extremely important." If it did not apply to your scan, please pick N/A (Not Applicable).

	Not Important 1	2	3	4	Extremely Important 5	N/A	Response Count
Preparatory materials and meetings in advance of the scan tour	0	0	0	2	0	0	2
On-site visits to view the subject technology or practice	0	0	0	1	1	0	2
Face-to-face technical exchange with host state personnel and other scan participants	0	0	0	0	2	0	2
Final report of scan findings	0	0	0	0	2	0	2
Post-scan consultation with host state personnel and other scan participants	0	0	1	1	0	0	2

Scan Outcomes. Please rank each of the following scan program outcomes in terms of its contribution to the overall value of this particular scan tour, where 1 is "not important" and 5 is "extremely important."

	Not Important 1	2	3	4	Extremely Important 5	Response Count
Introduction to a new technology or practice	0	0	1	1	0	2
Clearer understanding of a new technology or practice	0	0	2	0	0	2
Identification of one or more individuals at a host state to call on as a future resource	0	0	0	2	0	2
Identification of one or more scan participants to call on as a future resource	0	0	0	2	0	2
Information with which to *begin* implementation of a technology or practice at your agency	0	0	2	0	0	2
Information with which to continue implementation of a technology or practice at your agency	0	0	0	2	0	2

General comments regarding the overall value and benefits of the NCHRP Domestic Scan Program:

- I believe the host state's take pride in getting to showcase their success stories and receive this type of national recognition; just a fringe benefit to the scan program I think.

Did your participation in the scan facilitate the implementation of any new practices or technologies?

Yes	No
0	2

Completed Implementations
None

Are any implementations planned within the next year?

Yes	No
1	1

Planned Implementations (within the next year):

- "Construction Manager / General Contractor" (CM/GC) alternative project delivery method. Adopted and prominently used by Utah DOT, look for more widely spread use among US state DOTs. An FHWA EDC initiative.
- Prefabricated Bridge Elements and Systems (PBES). Anticipate more widely spread application of standardized bridge elements by US state DOTs to shorten highway project delivery. An FHWA EDC initiative.

Number of respondents who attempted an implementation without success
None

Number of contacts provided regarding current or planned implementation activities
None

Number of contacts outside the agency provided
None

Dissemination Activities (from one respondent):

- Organization - WASHTO
  Event –Annual WASHTO Meeting
  Date - 7/13/2010
  Title/Subject –2009 Domestic Scan of Accelerated Construction Practices
  Used Scan PowerPoint? (Yes/No) – Yes

Six-month participant webinar

Several scan tour participants and NCHRP project panel members took part in a webinar approximately six months following the conclusion of the scan. The purpose of the webinar was to discuss the initial findings of the scan, to review technology and implementation efforts to date and to plan follow-up activities. Details on the webinar follow.

Date
Friday, January 21, 2011

Attendees
Facilitators

- Dylan Casey, CTC & Associates LLC
- Patrick Casey, CTC & Associates, LLC

Scan Team Members

- Christopher J. Schneider, FHWA (co-chair)
- Steven D. DeWitt, North Carolina Turnpike Authority

Panel Members

- Harold "Skip" Paul, Director LTRC (chair)
- Rick Kreider, Kansas DOT
- Glenn Roberts, New Hampshire DOT
- Mark Van Port Vleet, Michigan DOT

- Andrew Lemer, TRB

Guests
- Lori Rosenkopf, Wharton School at the University of Pennsylvania
- Batia Wiesenfeld
- Nicole Rosenkranz

Media
- Slides: http://domesticscan.org/wp-content/uploads/Scan07-02Webinar.pdf

Summary
Draft survey results were provided to scan team members prior to the webinar. Following introductions and a review of the results, each team member discussed some of their implementation efforts and their view of the impact of the scan.

Chris Schneider led off the discussion saying that while he was a co-chair, he was as senior within FHWA as his state counterpart within the DOT which affected his ability to push forward on implementation projects from the scan. It was the first scan he'd been involved in and he called it "very fulfilling." He noted that it was "tough work, long days and long meetings" and that he'd "learned a lot personally from very knowledgeable construction people." He found that the scan confirmed/validated the methods, technologies, and ideas from past years, particularly those that came out of the accelerated construction technology transfer exchanges sponsored by AASHTO. (These comprised approximately 34 workshops over the previous seven years.) The implementation plan included a number of presentations which were made, but many others were done as well. He also noted articles in *Focus* and *Public Roads* and a number of flyers that were created as a result of the scan.

In his comments, Steve Dewitt said he was a long-time scan veteran (two Domestic Scans, one past International Scan and one upcoming). He cited stand-out benefits of the scans as the detailed, long-lasting report and inciting participants to innovate and pass-along innovations. "Scans become pieces of research that stand the test of time." He pointed to UDOTs "culture of innovation" as being a particularly valuable stop, saying the visit "affirmed some things known and planted strategies for new things to try." He saw the output of the scans not in terms of particular, traceable implementations, but rather through a more osmotic pressure toward incorporating new knowledge gathered during the scan.

Questions from panel members and other participants followed the general comments from the two scan participants.

Rick Kreider noted the importance of precast concrete to many of the accelerated construction techniques and wondered whether the pre-cast industry had stepped-up to fill the opportunity, particularly in locations where accelerated construction may be more prevalent. Steve affirmed that there is such a desire within the industry, but considered it a chicken and egg problem. "It's tough because the need is sporadic right now," noting that accelerated construction is frequently driven by disasters, not by dependable, everyday construction.

Andy Lemer inquired how the participants explain the broader value of the scans to home departments, funding agencies, or others. "It's clearly a terrific experience for those on the scan and report is good, but what do think two years out? How long did the value of the scan last?" Steve compared the experience to engineering school where the specifics of what's learned in class isn't what is leveraged directly out on the job. Rather the techniques, context, and methods learned are brought to bear on problems and

solutions that differ in their details. He also noted that this scan in particular focuses on unique circumstances and projects. “We’re not going to accelerate every project.” The scan provides access to understanding and thinking about particular technologies, but also to ways of thinking about a whole class of problems and techniques. “To me it’s not a great challenge to justify these things.”

Andy asked further about the modes of dissemination – “Do you spread the word about these things because of who you are or something from the scan?” Steve replied that it’s “a bit of both,” noting that he gives many talks as part of his work, but also frequently points to scan results as particular examples.

Glenn Roberts asked several questions focusing on *how* scan results are implemented, pointing to two general facets of implementation in the scans: 1) team members return to their DOTs and transfer the learned technology internally and 2) the team/scan program in general disseminates the lessons learned and technologies beyond the team itself to other audiences. He inquired about how much of the implementation plan has been executed, whether there were obstacles to implementation, and whether the scan team members were able to disseminate the scan results beyond the immediate team members. Steve said that there are always opportunities to disseminate the scan results, citing an upcoming conference of international construction management. “We will talk about things just as we are now that are very relevant. The process continues.” Chris noted that the scan fits nicely with the current “Every Day Counts” initiative through FHWA, where accelerating construction would be part of shortening construction in general.

Mark Van Port Fleet asked about the ways in which the message is promulgated beyond the scan team members. He suggested that some things could be done through the Technology Implementation Group (TIG) that aren’t done now and that the Domestic Scan Program as a whole might do well to make more efforts to broadcast scan results and reports. Noting that there is an audience of people that hear about the scan results from their participation in various federal and state programs at large, he thought that more effort could be made to get information to those that are not direct participants. Possibly the AASHTO sub-committee structure may be a better model for sharing this information. He said that results disseminated primarily via fifteen minute PowerPoint presentations may not be enough to get the information to stick, suggesting a workshop environment or the FHWA peer exchange program as better avenues to promote dissemination and implementation.

Skip Paul, as panel chair, looked to see success and show value in the program. He wondered how much emphasis was placed on implementation in the process of the scan and how the program as a whole might be improved. Could the panel/program provide more assistance in fostering implementation? Was this particular topic possibly too broad and may that have inhibited efforts toward broad-based implementation/dissemination? He also wondered whether the scan team members had seen the website and whether it could be used fruitfully between team members. Chris said that the team discussed implementation plans frequently and took them seriously. The consensus at time was that there weren’t any specific projects to implement per se, possibly some research projects. The focus of the implementation plans was dissemination of the findings. He noted that the TRB web-page for the scans can be difficult to get to and obtain information; he likes the new Web pages. Steve responded by discussing one successful and another unsuccessful post-implementation attempt. A good example of a successful post-scan implementation: following the construction management international scan six years ago, there was a partially funded federal highway initiative aimed at fostering implementation that provided seed money to allow DOTs to reach out to private industry. This capitalized on the passion and enthusiasm of the group itself. He pointed to an upcoming meeting construction management (occurring every two years) that was born out of the implantation efforts from that scan and the dollars put in following the scan. “It’s taken on a life of its own.” A good example of an unsuccessful post-scan

implementation: following the public/private partnership scan there were one or two meetings (three years ago) of some people, but nothing since. He noted that the topic was and remains very important and timely, however, the implementation effort "just evaporated." He cited the lessons for successful implementation as: gather a good group of people, keep them together, and provide funding for them to do their work. He further commented that for successful implementation, the results of a scan need to find a home, possibly an AASHTO subcommittee or something else the states are involved in. He thinks this scan topic could find such a home, but not sure that it has.

Skip wondered about low participation in the survey. Steve didn't think much should be read into it. "Everyone is swamped."

Lori Rosenkopf asked whether people come to scan members to ask for advice or information based upon their scan participation. Steve said yes, but he's not certain that it's due to the reports; more likely it's due to presentations and follow-up questions. Chris said he'd turned a number of people onto the scan from questions and calls he gets as project manager for accelerated construction for FHWA.

Steve closed by saying that he's a strong advocate for the scan program and scan approach. "There's no better way to spend such money."

12-month participant interviews

CTC & Associates conducted a brief telephone interview with participants approximately one year following the publication of the scan report.

Among the six highway agency scan participants contacted, four participated in the interview. Responses to each of three questions are summarized and compiled below.

1. How have you implemented changes to your agency's policies, practices or technologies based on what you learned from participating in this scan tour?

- In the Office of Infrastructure we are launching two new programs related to the scan tour study. We are starting an initiative called Intelligent Construction Systems and Technology to develop a strategic roadmap across all disciplines of highway engineering and to identify the developing or underutilized technologies to advance or accelerate construction. ICST was influenced by the findings of this scan tour. Also related to the scan is our Construction Program Baseline Review program, which is collecting information from states on best construction processes. We'll develop regional peer exchanges based on the findings.
- More generally, this scan is related to the Every Day Counts program's focus on accelerating constructing while maintaining quality and safety.
- It's hard to attribute a specific change back to the scan tour, but our department has been progressive for a long time on this topic and we continue to be progressive. The scan tour has helped build the body of thinking that points us toward doing what we do faster, whether it's public-private partnerships or design-build. It's a piece of the puzzle.
- We did not specifically implement any changes based on what we learned during the tour. For us it was more about gaining general knowledge and background which we will be able to tap into on an as-needed basis.

2. ***(For State DOT representatives)*** **Have you shared information you learned or contacts you made during the scan tour with other people in your agency, in your state, or beyond, and if so, how have they put that information to use?**

(or)

2. (For Federal agency representatives) **Have you shared information you learned or contacts you made during the scan tour with other people in your agency, in other agencies, or beyond, and if so, how have they put that information to use?**

- I gave a presentation on the results of the scan to the AASHTO Standing Committee on Highways, and a colleague of mine gave a presentation at SASHTO.
- There has been significant sharing of information on the results of this scan. Quite a few presentations were given at conferences and workshops on the scan findings. Articles have been written about it as well.
- We have shared this report within FHWA as well as among state and industry partners.
- We have shared information and discussed the scans in a variety of settings. I can't cite a specific example.
- We shared the scan tour report, the experiences and our contacts with others, but I'm not aware of specific implementation activities.

3. How would you characterize the overall value of this scan tour? What comments would you like to share for the summary report on this project?

- The results of the scan tour validated the recommendations that came out of the 33 Accelerated Construction Technology Transfer workshops conducted between 2002 and 2008 by AASHTO and FHWA.
- This was my first experience with a scan tour, and I thought it had value. Transportation scan tours have received bad press recently and been called a boondoggle, but this was really the farthest thing from that. Participation required a great deal of hard work. I learned a lot and built valuable relationships with people I previously didn't know.
- The scan was timely and relevant. Transportation agencies are evolving very rapidly and doing whatever we can to deliver project as quickly as possible without sacrificing safety, quality or performance. The report captures many of the good lessons we learned or reaffirmed through the tour.
- The scan tour was very valuable. It was good to learn how other states are acting upon these kinds of issues. We had a very knowledgeable group with a great background, and I was glad to be a part of it.
- This scan tour proved highly relevant to new research that another panel is now addressing on emergency management contracts. I was able to assist that effort by reaching out to states that I had knowledge of through my experience in the scan tour.

Nonparticipant survey

To gather more information about the reach of the scan tour findings, CTC & Associates conducted a seven-question online survey of nonparticipants—individuals who did not participate in the scan but who were identified as having received information about it.

Survey Methodology

The 07-02 scan team completed a broad range of technology transfer activities as part of the scan's Implementation Plan (see Appendix B, compiled by scan consultant Arora and Associates). They included a webinar; articles and papers in a variety of publications; and presentations at committee meetings and national and regional conferences. Several of these activities involved presenting the scan findings to groups of specific individuals, such as attendees at committee meetings.

In an effort to trace the paths through which information about the scan findings spread beyond the initial scan participants, CTC & Associates reviewed the information available about which of the planned technology transfer activities had been completed and confirmed these details through an online search. We identified the activities for which attendees' names were most likely to have been compiled, and we contacted the organizers of those activities.

We were able to obtain attendance lists for three of these activities. We culled the lists for those attendees who represented state DOTs and FHWA divisions, and through online searching we compiled email addresses for these two groups. We sent surveys to state DOT and FHWA staff who heard about the scan results through:

- A presentation at the August 2009 meeting of the AASHTO Subcommittee on Construction (survey sent to 96 attendees)
- A presentation at the October 2009 meeting of the AASHTO Standing Committee on Highways (survey sent to 54 attendees)
- A January 2010 meeting of the TRB Committee on Construction Management (survey sent to four attendees)

In all, CTC & Associates sent the nonparticipant survey to 154 people; subtracting invalid email addresses, the survey reached 147 recipients. Recipients received the following email, modified as appropriate to indicate the venue of the scan presentation they attended:

> *Hello,*
>
> *The National Cooperative Highway Research Program is conducting research to evaluate how the innovative technologies and practices identified through its Domestic Scan Program (http://domesticscan.org) are being used by transportation practitioners beyond the initial scan participants. The findings of the 2009 scan tour on Accelerated Construction Techniques were presented at the August 2009 meeting of the AASHTO Subcommittee on Construction (held in Chicago), which you attended, and we would appreciate a few minutes of your time to complete a brief survey (7 questions) on your use of the scan findings.*
>
> ***You may receive an invitation to complete a survey about more than one scan topic. Please feel free to respond to only one of these.***
>
> *This survey is an important opportunity to document the real, tangible benefits and value of the practitioner-to-practitioner information exchanges facilitated by the Domestic Scan Program. The goal of the program is to accelerate the spread of leading-edge, proven technologies and practices to DOTs across the country, thereby helping all agencies provide safer, longer-lasting, more cost-effective transportation facilities to their taxpayers. This survey is an effort to trace these impacts.*

The survey is available at http://www.surveymonkey.com/s/KLPRVYQ. If possible, please complete the survey by Monday, August 15.

If you have any questions about this NCHRP research effort, please feel free to contact me at the phone number or email below. You can also contact TRB Senior Program Officer Andrew Lemer at ALemer@nas.edu or (202) 334-3972.

Thank you for your time and your participation.

The survey itself also included the following introductory text:

The National Cooperative Highway Research Program sponsors a Domestic Scan Program (NCHRP Project 20-68A) to facilitate technology transfer among state DOTs. NCHRP is conducting research to evaluate how the technologies and practices identified through the Domestic Scan Program are being used by transportation practitioners beyond the scan participants. This survey is part of that effort to capture how those who have heard about the scan findings are using that information at their agencies.

This survey is an important opportunity to document the real, tangible benefits and value of the practitioner-to-practitioner information exchanges facilitated by the Domestic Scan Program. The goal of the program is to accelerate the spread of leading-edge, proven technologies and practices to DOTs across the country, thereby helping all agencies provide safer, longer-lasting, more cost-effective transportation facilities to their taxpayers. This survey is an effort to trace these impacts.

You can review a summary of the results of the Accelerated Construction Techniques scan at this link: Executive Summary

Thank you for taking the time to complete the survey.

Responses

A total of 21 people who were not involved in the scan responded to the surveys:

- 11 attendees of the AASHTO SOC meeting
- 8 attendees of the AASHTO SCOH meeting
- 2 attendees of the TRB Construction Management Committee meeting

The respondents represented agencies across the country:

- 18 respondents were from 16 different states (15 state DOTs and one turnpike authority), including 2 states that were involved in the scan
- 3 respondents were from FHWA

Two responses to the nonparticipant survey were received from scan tour participants or members of the scan project panel; these responses have been removed from the survey results presented here.

The 21 survey responses are compiled below.

1. Do you recall hearing a presentation at the August 2009 annual meeting of the AASHTO Subcommittee on Construction (held in Chicago) about the innovative technologies and practices identified by the 2009 domestic scan on Accelerated Construction Techniques?

or

Do you recall hearing a presentation at the October 2009 business meeting of the AASHTO Standing Committee on Highways (in Palm Desert, CA) about the innovative technologies and practices identified by the 2009 domestic scan on Accelerated Construction Techniques?

or

Do you recall hearing a presentation at the January 2010 meeting of the TRB Construction Management Committee about the innovative technologies and practices identified by the 2009 domestic scan on Accelerated Construction Techniques?

Yes	No	Not sure
17	3	1

2. Did you hear about the findings of the Accelerated Construction Techniques scan tour from other sources as well?

Yes (see below)	No
12	9

Conferences and meetings				
TRB or AASHTO meeting or committee meeting	Another national or regional conference	State DOT workshop	State DOT internal meeting	Other (please describe)
10	4	1	1	0

Other sources				
Webinar	Article in a publication	Conversation or email with a scan participant	Conversation or email with a colleague	Other source (please specify)
1	5	4	7	0

3. Did you make any further inquiry into any of the findings of the scan on Accelerated Construction Techniques?

Yes (see below)	No
4	17

Follow-up actions			
Obtained or read the scan report	Contacted a scan participant	Contacted someone from one of the states visited in the scan	Other (please specify)
3	3	2	1
Responses to "Other": • Read some articles in magazines on the topic			

4. Did you take action to implement or disseminate one or more of the practices identified through the scan?

Yes (see below)	**No**
15	6

Follow-up actions			
Made or initiated a change in practice at my agency	Discussed or recommended a change in practice at my agency	Shared information with a colleague	Other (please specify)
1	7	15	0
Specific technologies or practices implemented or disseminated (8 respondents): • Clearly defining the responsibilities/authority of all project personnel. Clearly define the "chain of command" to all involved parties. • —Rapid decision making process —Preconstruction activities accounted for in schedules • Precast Bridge Elements, use of SPMT's, Total closure. White paper on D/B for budget cycle. WisDOT utilizes A+B, lane rentals, I/D's. We do not have legislation for the use of D/B, CMAR. • DB • Accelerated embankment construction including intelligent compaction, EPS geofoam and column supported embankments • DB, CM-GC, CM @ Risk • Accelerated Bridge Construction, Design Build • Contract provisions / procedure for emergency projects			

5. If you used information from the scan tour to make or recommend a change to your agency's practices, please describe.

Open-ended responses (8 respondents):

- We already utilize many of the items mentioned to expedite construction as we are a tolled facility.
- Pushed for better schedule specification to align with the detail required by ACT.
- Discussed findings in general, do not recall specifics
- SPMT, Design-Build
- In our last legislation for a new highway bill we have authority to do one DB project in one of 2 counties within Kansas (Johnson or Wyandotte).
- We discussed the use of partnering
- DB, CM-GC, CM @ Risk
- MDOT has created an innovative contracting manual to assist decision-makers in appropriate project acceleration techniques

6. If you indicated in Question 3, 4 or 5 that you contacted or talked to others about the scan tour results, please list their names and agencies.

Open-ended responses (10 respondents):

- Gordon Johnson, Director of Engineering
- Project Manager here at VTrans.
- I vaguely remember briefly discussing with the SCDOT Director of Construction (now retired), but I don't remember any specifics and if any info was used to implement new practices.
- UDOT, ODOT
- FHWA, Illinois DOT, Missouri DOT
- NA
- Chris Schneider – FHWA
- Internal personnel
- Jim McMinimee of Utah DOT (at the time)
- Chris Schneider, FHWA

7. Please use this space to provide any additional comments about your use of the findings of the Project Delivery Management scan tour.

Open-ended responses (3 respondents):

- I was not aware of the scan tour or the report though I have been trying to implement some of the technologies and methods. I will be reading the report for information for more insight.
- SHRP 2 project R02 will provide additional tools and information in this area.
- Thought it was informative

3

Best Practices in Winter Maintenance (Scan 07-03)

This scan, conducted in early 2009, addressed a wide range of technologies and practices in the area of winter maintenance. Major areas addressed during this scan include:

- Maintenance decision support systems
- Automatic vehicle location systems
- Equipment-related technologies and facilities
- Training and development
- Management issues
- Integration of weather, traffic and maintenance operations

The findings of the scan are documented in the final scan report, available online at http://domesticscan.org/wp-content/uploads/2010/05/NCHRP-20-68A-Domestic-scan-07-03_Final-Scan-Report_Oct-2009.pdf.

Overview of technology transfer and implementation efforts

The following observations, conclusions and recommendations are based on information that CTC & Associates gathered during the six-month participant survey, the participant webinar, the 12-month participant interviews, and the 12-month nonparticipant survey. A complete record of findings through these channels follows later in this chapter.

Observations

- The high degree of implementation resulting from this scan is noteworthy. Collected from the various participant response channels (webinars, surveys, interviews) is an extensive list of completed and planned implementations that were credited to this scan.

  In light of the main topics of this scan (see the bullet points above), it appears that the implementation efforts tended to be in the areas of winter maintenance technologies, facilities and systems far more than in the areas of training, development and management tools. Specific implementation efforts are noted in the "Implementation successes" section of this overview.
- The high value of the scan in supporting implementation efforts was a repeated theme among participants.
  - One scan team participant noted that this scan tour "helped us take the step from state-of-the-art to state-of-the-practice. Seeing firsthand how other states have implemented these technologies enabled us to implement them ourselves."
  - Another explained that the scan went beyond just identifying effective practices and technology but explained how an organization put them in place, including the missteps and decision-making process along the way.

Highlights of effective technology transfer

- Scan participants made presentations at national and international venues, including:
  - The International Winter Road Congress in Quebec
  - TRB and AASHTO committee meetings
  - The APWA national congress, the National Winter Maintenance Peer Exchange, and pooled fund committee meetings

  The scan's Implementation Plan (Appendix C) details the events targeted for these presentations, which were the focus of this scan team's technology transfer efforts. Scan participants also hosted a webinar, made presentations at regional or state-specific meetings, and launched a Facebook page for the scan.
- Among technology transfer efforts at the state and local levels:
  - One participant noted, "I have shared this information within my agency statewide as well as with local municipalities, townships and the state turnpike. Our state holds several local workshops for winter best practices, and I had the opportunity to give a firsthand account of the scan tour and its outcomes."
  - A scan team member noted that the APWA national congress was also a "good forum to get information to county and city maintenance departments"
  - Several participants made presentations to DOT staff, district engineers, and leadership teams
- One participant highlighted good person-to-person technology transfer: "Several times I have been able to get help and advice for winter maintenance practices from Nevada, Pennsylvania, Virginia, and Minnesota because of contact the scan provided from other scan members."
- A scan participant was interviewed for a *Better Roads* magazine article that "generated lots of interest in the technologies" especially the route-by-route iPod technology.
- One participant noted that the scan results had been "injected … into the LTAP education and training programs," and a respondent to the nonparticipant survey reported, "We shared findings with Utah LTAP and they changed their winter training to implement findings."
- The 18 respondents to the nonparticipant survey were from 16 different states, including 4 states that were involved in the scan itself. One nonparticipant reported distributing the scan's final report to the attendees of the 2011 National Winter Maintenance Peer Exchange. Other technology transfer activities among nonparticipants included discussions with management to recommend enhancing current best practices, follow-up contacts with scan team members and host agencies, and conversations among colleagues within nonparticipants' agencies.

Implementation successes

- The best practices addressed in this scan have been widely implemented by scan team members. Among their comments:
  - "We began using what was learned from the scan and we had the ability to push this information out to our districts."
  - "Our agency has made quite a few changes regarding winter maintenance based on the tour. We saw that several of the lead states we visited have winter maintenance performance measurement programs, and we have since implemented one ourselves"
  - "Based on information brought back from the scan, our agency has piloted four different initiatives, acquired three different types of equipment, and are in process of changing

three or four policies or procedures with regard to snow removal practices and material applications."

- Among the four respondents to the six-month participant survey, three said that participation in the scan facilitated implementation of new practices or technologies, both completed and planned within the year.
- Completed implementations by scan participants included
  - GPS/AVL programs
  - Use of weather services
  - MDSS pilot implementation
  - Flexible plow blades
  - Double walled brine tanks
  - Tow plow; one participant notes, "We have moved forward in acquiring two tow plows for our agency"
  - V-box truck slide in unit for pre-wetting and salt spreading
  - Joma rubber mounted carbide cutting edges for snow plow
  - Budget recommendations for field research programs seen in other states
- Some participants reported implementation successes in terms of how the scan reinforced activities already ongoing within the agencies, such as expanded tow plow opportunities and existing procedures for winter snow and ice control
- Planned implementations among scan participants included
  - MDSS
  - Expanded pre-wetting program
  - Consideration of the use of wing plows
  - Additional or new brine manufacturing facilities
  - Calcium chloride brine solution for anti-icing
  - Beet juice, ice bite/brine solution for pre-wetting/anti-icing
- Completed implementations reported by respondents to the nonparticipant survey included
  - AVL/GPS system (created in-house)
  - Tow plows
  - Joma plow blades
  - Increased use of anti-icing liquids
  - Use of salt slurry
  - Change in snow removal equipment
  - State-of-the-art salt brine facility
- Nonparticipants also reported evaluating MDSS and RWIS but not implementing them.

<u>Additional benefits of the scan</u>

- One participant expanded on the implementation successes: "Broadly we were able to take the information, personal contacts, and examples of best practices and bring those back to our agency and put them into place. I don't think this would have happened as quickly without the scan or without my being on the scan. Being on the scan, seeing people use the technology and talking to them helped us put these into practices."

- Another thought that the scan tour's efforts on sharing states' experiences with the tow plow helped turn that into an AASHTO Technology Implementation Group focus technology. "In general, a lot of this technology started to take off on a national level after participants started sharing and publishing the results of the tour."
- The following comment was made about this scan but is generally applicable to the scan program: "I see a dual benefit of the scan. For the participants, it provides information and training to help make a direct impact on their own agencies' practices. At a national level, it helps establish and publicize best practices for these technologies."

Scan best practices

- A scan participant said, "It's critical to put people on the scan who have the ability to present and communicate with agencies outside the state DOTs after the tour. Representatives of local governments look to the states as cutting edge, so scan participants must be able to present what they found."
- Another noted, "The subject matter expert brought great enthusiasm to the project and helped draw out good discussion."
- A participant commented on the benefit of the scan in building relationships between the scan members, stating that "It was more than just getting information." He said he felt that the members of the scan "really clicked" and worked together particularly well. To him, this underlined the importance of giving thought to the make-up of the scan teams.

Barriers and opportunities for improvements

- A comment was made on institutional resistance, and how much of it centered on chief engineers not being comfortable with the proposed technologies and how they are to be implemented. It was suggested that it would help states if there was an implementation plan template for each specific technology to facilitate the implementation itself. "It's tough to take the next step" of getting the technologies implemented.
    - One respondent to the nonparticipant survey commented: "Great report. Need to keep promoting these successes and translate them to actual cost savings or improvements in LOS so field maintenance can do a more effective job of convincing their top management to invest in winter maintenance."
    - Another nonparticipant suggested that a future scan tour could address the challenges states face due to budget constraints, lack of personnel, and "lack of vision." He suggested that the scan explore why it takes so long for a DOT to change its culture and practices: "Maybe ask difficult questions of those that did change—what roadblocks they faced, lessons learned."
- A participant noted: "I don't believe the follow-up activities of the scan have been sufficiently monitored. A listing of where presentations were made over the in several years following the scan would be useful. AASHTO TIG does a good job of tracking this kind of follow-up presentation."
- A panel member suggested that getting the scan results into the hands of AASHTO RAC (Research Advisory Committee) members would be an effective way of "getting the word out."
- The broad scope of the scan was a concern for one participant: "It would have been helpful if the scan had identified ten key findings rather than presenting so much material in such a lengthy and

overwhelming fashion. For a manager with limited time to review a report, being able to focus on the top ten recommendations or the ten most exciting technologies would be much more useful.

Another agreed and suggested "working toward a 'champions approach' to foster implementation by designating specific people for specific implementation tasks."

Scan details

Scan team members

- Benjamin McKeever, USDOT (scan co-chair)
- William Hoffman, Nevada DOT (scan co-chair)
- Steven Lund, Minnesota DOT
- Terry Nye, Pennsylvania DOT
- Dave Ray, Ohio DOT
- Michael Schwartz, Virginia DOT
- Rodney Pletan (Subject Matter Expert)

Sites visited

- State transportation agencies in Minnesota, Colorado, Utah, Indiana, and Virginia
- Local transportation agency in Cites of Denver, Fort Collins, and Grand Junction; the E-740 Public Highway Authority; Eisenhower/Johnson Memorial Tunnels and Hanging Lake Tunnel Operations Centers

Scan dates
March 25 – April 7, 2009

Final report
December 2009, http://domesticscan.org/wp-content/uploads/2010/05/NCHRP-20-68A-Domestic-scan-07-03_Final-Scan-Report_Oct-2009.pdf.

Six-month participant survey

CTC & Associates conducted an online survey of scan participants approximately six months following the completion of each scan. The scan included seven team members, including two co-chairs and a subject matter expert (SME). Of the seven original members, five responded to the survey.

The following text appeared at the start of the online survey.

Thank you for participating in this survey about your experience as a member of a Domestic Scan team. NCHRP has initiated this follow-up research to identify:

- *Progress toward implementation of technologies and practices identified in each scan's implementation plan*
- *Benefits of the Domestic Scan Program to you, your agency, and industry as a whole*
- *Completed or planned dissemination activities*
- *Names of individuals (beyond participants) who have heard about scan findings*

Completion of this survey should require no more than 15 or 20 minutes.

CTC & Associates will compile survey results in the next few weeks and then invite you and the other members of your scan tour to participate in a one-hour Web conference to discuss your responses. This will also be an opportunity for you to reconnect and share your successes and challenges in implementing technologies and practices discussed during the scan.

This survey and Web conference will be followed by another in approximately six months to further trace the impacts of your participation in the scan tour. For more information, see NCHRP Project 20-68B(01), "Accelerating the Rate of Innovation Among State DOTs – Tracing Domestic Scan Impacts."

If you have any questions about the survey or other aspects of this research effort, please don't hesitate to contact me.

Final results of the survey follow.

Conduct of Scan. Please rank each of the following scan program features in terms of its contribution to the overall value of this particular scan tour, where 1 is "not important" and 5 is "extremely important." If it did not apply to your scan, please pick N/A (Not Applicable).

	Not Important 1	2	3	4	Extremely Important 5	N/A	Response Count
Preparatory materials and meetings in advance of the scan tour	0	0	0	1	3	1	5
On-site visits to view the subject technology or practice	0	0	0	0	5	0	5
Face-to-face technical exchange with host state personnel and other scan participants	0	0	0	1	4	0	5
Final report of scan findings	0	0	0	1	4	0	5
Post-scan consultation with host state personnel and other scan participants	0	0	0	0	3	2	5

Scan Outcomes. Please rank each of the following scan program outcomes in terms of its contribution to the overall value of this particular scan tour, where 1 is "not important" and 5 is "extremely important."

	Not Important 1	2	3	4	Extremely Important 5	Response Count
Introduction to a new technology or practice	0	0	0	1	4	5
Clearer understanding of a new technology or practice	0	0	0	0	5	5
Identification of one or more individuals at a host state to call on as a future resource	0	0	1	1	3	5
Identification of one or more scan participants to call on as a future resource	0	0	0	2	3	5
Information with which to *begin* implementation of a technology or practice at your agency	0	0	0	1	4	5
Information with which to continue implementation of a technology or practice at your agency	0	0	1	1	3	5

General comments regarding the overall value and benefits of the NCHRP Domestic Scan Program:

- In Ohio we began using what was learned from the scan and we had the ability to push this information out to our districts. Also, several times I have been able to get help and advice for winter maintenance practices from Nevada, Pa., Va., or Minnesota because of contact the scan provided from other scan members.
- Identifying effective practice/technology but providing "how [an] organization got there" and the missteps/decision-making process is very helpful for sharing agencies.

Did your participation in the scan facilitate the implementation of any new practices or technologies?

Yes	No
3	1

Completed Implementations

- Started a GPS/AVL pilot program in Ohio for our snowplow fleet.
- Use of weather services - sharing information - better prepared
- MDSS pilot implementation for this winter for PennDOT. Savings TBD
- Reinforces some activities that were ongoing including: explore expanded tow plow opportunities, continue with deployment of maintenance decision support system, and increase use of flexible plow blades
- Made budget recommendations in Ohio for field research programs as we saw in other states.
- Double walled Brine Tank vs. Containment Facility. $5K savings in one facility
- Started to evaluate the tow plow in Ohio that we saw in other states.
- V box Truck Slide in Unit for pre-wetting and salt spreading. Savings/Efficiency TBD
- The Scan reinforced procedures for winter snow and ice control that we were already doing in Ohio by demonstrating in several other states that they were also successful.
- Automated Vehicle Locator. Savings/Efficiency TBD
- Joma Rubber mounted carbide cutting edges for snow plow. Savings $1100/trk/year

Are any implementations planned within the next year?

Yes	No
3	1

Planned Implementations (within the next year):

- Yes [as noted in the current implementations].
- Use of MDSS
- Expanded pre-wetting program
- Consideration of the use of wing plows
- Additional/New Brine Manufacturing Facilities
- Calcium Chloride Brine Solution anti icing
- Beet Juice, Ice Bite/Brine solution for pre-wetting/anti-icing

Number of respondents who attempted an implementation without success
None

Number of contacts provided regarding current or planned implementation activities
5

Number of contacts outside the agency provided
1

Dissemination Activities (from three respondents):

- Organization – APWA
  Event – National Congress
  Date – Sept. 2009
  Title/Subject - Innovative Winter Maintenance Practices of High Performing Agencies
  Used Scan PowerPoint? (Yes/No) – Yes
- Organization – PA Dept of Transportation
  Event – Expanded Staff Meeting
  Date – 11/01/2009
  Title/Subject - Winter Scan
  Used Scan PowerPoint? (Yes/No) – Yes, Portions of the PowerPoint
- Organization – internal Department presentations
  Event – District Engineers
  Date – spring/summer 2009
  Title/Subject - general overview
  Used Scan PowerPoint? (Yes/No) – Yes
- Organization – Ohio Department of Transportation District Leadership Event – Monthly meeting
  Date – 2009
  Title/Subject - Results of the winter scan tour
  Used Scan PowerPoint? (Yes/No) – No but used report
- Organization – N/E Ohio Snow and Ice Technologies, Solon, OH
  Event – Winter Symposium
  Date – 05/13/2010
  Title/Subject - Winter Services in PA/Winter Scan
  Used Scan PowerPoint? (Yes/No) – Yes, portions of the PowerPoint
- Organization – internal Department presentations
  Event – District Maintenance Engineer
  Date – Spring/summer 2009
  Title/Subject - General overview
  Used Scan PowerPoint? (Yes/No) – Yes
- Organization – PIARC
  Event – International Winter Road Congress, Quebec
  Date – 02/01/2010
  Title/Subject - Scan overview
  Used Scan PowerPoint? (Yes/No) – Yes

Six-month participant webinar

Several scan tour participants and NCHRP project panel members took part in a webinar approximately six months following the conclusion of the scan. The purpose of the webinar was to discuss the initial findings of the scan, to review technology and implementation efforts to date and to plan follow-up activities. Details on the webinar follow.

Date
Wednesday, November 17, 2010

Attendees

Facilitators

- Dylan Casey, CTC & Associates LLC
- Patrick Casey, CTC & Associates, LLC

Scan Team Members

- Bill Hoffman, Nevada DOT, scan co-chair
- Terry Nye, Pennsylvania DOT
- Dave Ray, Ohio DOT
- Michael Schwartz, Virginia DOT
- Rodney Pletan, SME

Panel Members

- Skip Paul, Director LTRC (panel chair)
- Andy Lemer, TRB
- Rick Kreider, Kansas DOT
- Amy Schutzbach, Illinois DOT

Media

- Slides: http://domesticscan.org/wp-content/uploads/Scan07-03Webinar.pdf

Summary

Draft survey results were provided to scan team members prior to the webinar. Following introductions and a review of the results, each team member discussed some of their implementation efforts and their view of the impact of the scan. All of them praised the scan process and work done on the scan, finding it important to both their own specific work and to their profession.

Bill Hoffman commented that the states on the scan, both participants and hosts, benefited tremendously from it. In his own implementation/dissemination efforts, he was interviewed for a *Better Roads* article that "generated lots of interest in the technologies" especially the route-by-route iPod technology. Additionally, Nevada DOT had "injected scan results into the LTAP education and training programs" since the completion of the scan. Bill initiated a discussion regarding the challenges of implementing the results of the scan upon returning home, saying that it was one thing to spread the word regarding the scan technologies and another to get them implemented in an agency. He "hit a ceiling in [his] implementation activities" due to institutional resistance, much of it centered on chief engineers not being comfortable with the proposed technologies and how they would be implemented. He said that it would help states if there was an implementation plan template for each specific technology to facilitate the implementation itself. "It's tough to take the next step" of getting the technologies implemented.

Terry Nye said that he'd been able to implement eight or nine of the technologies from the scan, but also echoed Bill Hoffman's observation of institutional resistance to changing technologies and practices. He suggested working toward a "champions approach" to foster implementation by designating specific people for specific implementation tasks. He commented that "the lessons learned were huge" and that the condensing of information that occurs during the scan "saves lots of money, development, and [on-the-job] learning."

Mike Schwartz commented that implementation discussions were ongoing regionally (mid-Atlantic area) and that last year's challenging snows had prompted many discussions, including a five-state conference on winter maintenance.

Dave Ray agreed with all that had been said, but wanted to emphasize the benefits of the scan in building relationships between the scan members. "It was more than just getting information." He felt that the members of the scan "really clicked" and worked together particularly well. To him, this underlined the importance of giving thought to the make-up of the scan teams. [Note: Due to some technical difficulties, Dave Ray was only able to hear the conversation during the webinar, but could not fully participate. His comments were obtained in a follow-up phone conversation.]

Rodney Pletan (SME for the scan) attended the webinar "primarily to listen," but also noted that he'd used some of the scan material to educate himself.

Following the comments from the scan team members, the Panel members each made some comments, leading off with Skip Paul. They clarified some of the panel's interest in the scans, particularly their interest in how the scan as an effort is working to get new technologies into practice. Skip Paul noted that it is clear that the scan is good for the participants and the host sites, but the Panel is very interested in how the knowledge from the scan spreads and what can be done to facilitate such spreading: "How many states *not* on the team got engaged and tried to use some of this information?" He also inquired about any future plans for dissemination at other programs or meetings. Bill Hoffman replied that he didn't know about any particular plans, but that many of the technologies from the scan have been wrapped up in a recent AASHTO Technology Implementation Group project.

Amy Schutzbach suggested that getting the scan results into the hands of AASHTO RAC (Research Advisory Committee) members would be an effective way of "getting the word out."

Andy Lemer commented that the Domestic Scan is part of a general effort "to get research out there," moving results from researchers into the hands of transportation agencies where they can be put to use making safer, more efficient, and less expensive transportation systems.

12-month participant interviews

CTC & Associates conducted a brief telephone interview with participants approximately one year following the publication of the scan report.

Among the six highway agency scan participants contacted, five participated in the interview. Responses to each of three questions are summarized and compiled below.

1. How have you implemented changes to your agency's policies, practices or technologies based on what you learned from participating in this scan tour?

- Our agency has made quite a few changes regarding winter maintenance based on the tour. We saw that several of the lead states we visited have winter maintenance performance measurement programs, and we have since implemented one ourselves.
- On the tour we saw the benefits of the tow plow among the host states. We have moved forward in acquiring two tow plows for our agency.

- The scan tour helped us take the step from state-of-the-art to state-of-the-practice. Seeing firsthand how other states have implemented these technologies enabled us to implement them ourselves.
- No, we found that we were already working with all of the initiatives identified in the scan.
- Based on information brought back from the scan, our agency has piloted four different initiatives, acquired three different types of equipment, and are in process of changing three or four policies or procedures with regard to snow removal practices and material applications.
- Broadly we were able to take the information, personal contacts, and examples of best practices and bring those back to our agency and put them into place. I don't think this would have happened as quickly without the scan or without my being on the scan. Being on the scan, seeing people use the technology and talking to them helped us put these into practices.
- Specific examples of implementation facilitated by the tour include: GPS/AVL for snow plow trucks, management practices, winter strategies for customer service, the tow plow, and field research budgeting techniques for effective winter maintenance.
- Our department has made some changes based on the findings of the tour.

2. *(For State DOT representatives)* Have you shared information you learned or contacts you made during the scan tour with other people in your agency, in your state, or beyond, and if so, how have they put that information to use?

(or)

***2. (For Federal agency representatives)* Have you shared information you learned or contacts you made during the scan tour with other people in your agency, in other agencies, or beyond, and if so, how have they put that information to use?**

- I made a number of presentations on the technology from tour, both within our DOT and nationally to such groups as APWA, AASHTO and WASHTO.
- I believe this scan tour's efforts on sharing states' experiences with the tow plow helped turn that into an AASHTO Technology Implementation Group focus technology. In general, a lot of this technology started to take off on a national level after participants started sharing and publishing the results of the tour.
- I made multiple presentations internally within our department. Multiple presentations of the scan were made nationally.
- Presentations were made on this scan at TRB and the AASHTO Subcommittee on Maintenance in the first year after the scan.
- I have shared this information within my agency statewide as well as with local municipalities, townships and the state turnpike.
- We presented the results of the scan tour at the American Public Works Congress. It was a good forum to get information to county and city maintenance departments.
- Our state holds several local workshops for winter best practices, and I had the opportunity to give a firsthand account of the scan tour and its outcomes.

- It's critical to put people on the scan who have the ability to present and communicate with agencies outside the state DOTs after the tour. Representatives of local governments look to the states as cutting edge, so scan participants must be able to present what they found.
- I don't know of specific implementations by others based on the presentations we gave.
- Some of the information I learned on the tour was relayed to other individuals, but I don't know how it may have been used.

3. How would you characterize the overall value of this scan tour? What comments would you like to share for the summary report on this project?

- I see a dual benefit of the scan. For the participants, it provides information and training to help make a direct impact on their own agencies' practices. At a national level, it helps establish and publicize best practices for these technologies.
- The subject matter expert brought great enthusiasm to the project and helped draw out good discussion.
- I don't believe the follow-up activities of the scan have been sufficiently monitored. A listing of where presentations were made over the in several years following the scan would be useful. AASHTO TIG does a good job of tracking this kind of follow-up presentation.
- It would have been helpful if the scan had identified ten key findings rather than presenting so much material in such a lengthy and overwhelming fashion. For a manager with limited time to review a report, being able to focus on the top ten recommendations or the ten most exciting technologies would be much more useful.
- Visits with local agencies were interesting but their strategies were not highly relevant for state agencies.
- As private operators, toll agencies we visited were unable to present cost data, which made their operation harder to asses.
- This was a high value both for me and my organization. The timing of the scan tour was very good for my agency and for government agencies in general. We knew technology was out there, and pulling it together in a scan showed what was available and afforded opportunities to try new practices and equipment.
- I would recommend conducting a winter maintenance scan tour on a regular basis every three-to-five years. Given the constantly evolving technology, costs and environmental concerns, a periodic scan on this topic would help keep our industry grounded.
- The overall success was fantastic from the standpoint of knowledge shared, both within and beyond of the agencies of the tour participants.
- A domestic scan made sense in light of the international scans that had been done elsewhere, like Europe and Japan. It turns out there was a lot to learn looking at our own country.
- There is value in the domestic scans. We need to continue to hold and promote these scans.
- I was pleased with the outcome of this tour and the report. The group worked well together, and it was a valuable fact-finding experience for those involved regarding practices in use elsewhere.

Nonparticipant survey

To gather more information about the reach of the scan tour findings, CTC & Associates conducted a seven-question online survey of nonparticipants—individuals who did not participate in the scan but who were identified as having received information about it.

Survey Methodology

Members of the 07-03 scan team made numerous presentations of the scan findings as part of the scan's Implementation Plan of technology transfer activities (see Appendix C, compiled by scan consultant Arora and Associates). They included a webinar as well as presentations at committee meetings and international, national and regional conferences.

In an effort to trace the paths through which information about the scan findings spread beyond the initial scan participants, CTC & Associates reviewed the information available about which of the planned technology transfer activities had been completed and confirmed these details through an online search. We identified the activities for which attendees' names were most likely to have been compiled, and we contacted the organizers of those activities.

We were able to obtain an attendance list for one of these activities: the August 2009 National Winter Maintenance Peer Exchange. We culled the list for those attendees who represented state DOTs and FHWA divisions, and sent surveys to staff from those agencies. The survey was sent to 69 attendees.

Scan team members and respondents to the nonparticipant survey provided five additional names of DOT staff who had been involved in an implementation of scan technology or whom they had spoken to about the scan findings. Surveys were sent to these five individuals as well.

In all, CTC & Associates sent the nonparticipant survey to 74 people; subtracting invalid email addresses, the survey reached 66 recipients. Recipients received the following email, modified as appropriate for the five recipients who were referred to us by others:

> *Hello,*
>
> *The National Cooperative Highway Research Program is conducting research to evaluate how the innovative technologies and practices identified through its Domestic Scan Program (http://domesticscan.org) are being used by transportation practitioners beyond the initial scan participants. The findings of the 2009 scan tour on Winter Maintenance were presented at the August 2009 National Winter Maintenance Peer Exchange, which you attended, and we would appreciate a few minutes of your time to complete a brief survey (7 questions) on your use of the scan findings.*
>
> *This survey is an important opportunity to document the real, tangible benefits and value of the practitioner-to-practitioner information exchanges facilitated by the Domestic Scan Program. The goal of the program is to accelerate the spread of leading-edge, proven technologies and practices to DOTs across the country, thereby helping all agencies provide safer, longer-lasting, more cost-effective transportation facilities to their taxpayers. This survey is an effort to trace these impacts.*
>
> *The survey is available at http://www.surveymonkey.com/s/9W5ZHXB. If possible, please complete the survey by Wednesday, August 10.*

If you have any questions about this NCHRP research effort, please feel free to contact me at the phone number or email below. You can also contact TRB Senior Program Officer Andrew Lemer at ALemer@nas.edu or (202) 334-3972.

Thank you for your time and your participation.

The survey itself also included the following introductory text:

The National Cooperative Highway Research Program sponsors a Domestic Scan Program (NCHRP Project 20-68A) to facilitate technology transfer among state DOTs. NCHRP is conducting research to evaluate how the technologies and practices identified through the Domestic Scan Program are being used by transportation practitioners beyond the scan participants. This survey is part of that effort to capture how those who have heard about the scan findings are using that information at their agencies.

This survey is an important opportunity to document the real, tangible benefits and value of the practitioner-to-practitioner information exchanges facilitated by the Domestic Scan Program. The goal of the program is to accelerate the spread of leading-edge, proven technologies and practices to DOTs across the country, thereby helping all agencies provide safer, longer-lasting, more cost-effective transportation facilities to their taxpayers. This survey is an effort to trace these impacts.

You can review a summary of the results of the Winter Maintenance scan at this link: Executive Summary

Thank you for taking the time to complete the survey.

Responses

A total of 19 people responded to the surveys:

- 16 attendees of the National Winter Maintenance Peer Exchange
- 3 people who were referred by scan team members or survey respondents

The respondents represented agencies across the country:

- 18 respondents were from 16 different state DOTs, including 4 states that were involved in the scan
- 1 respondent was from AASHTO

The 19 survey responses are compiled below.

1. Do you recall hearing a presentation at the August 2009 National Winter Maintenance Peer Exchange about the innovative technologies and practices identified by the 2009 domestic scan on Winter Maintenance?

Note: This question was not asked of the respondents who were referred to us by scan team members or by other survey respondents.

Yes	No
16	0

2. Did you hear about the findings of the Winter Maintenance scan tour from other sources as well?

Yes (see below)	No
12	4

Conferences and meetings				
TRB or AASHTO meeting or committee meeting	Another national or regional conference	State DOT workshop	State DOT internal meeting	Other (please describe)
6	6	0	4	8

Responses to "Other (please describe)" (8 responses):

- I checked [#2] above as yes but it should be "probably, I don't remember"
- National Peer Exchange hosted by AASHTO
- Aurora meeting
- Email on snow and ice list-serve
- 2010 APWA North American Snow Conference
- Via Email
- Clear Roads
- Sorry the tour was just completed before the 2009 PEER Exchange and a formal report was not available. That was forthcoming out of SICOP and the information transfer seemed to be limited.

Other sources				
Webinar	Article in a publication	Conversation or email with a scan participant	Conversation or email with a colleague	Other source (please specify)
0	2	5	6	0

3. Did you make any further inquiry into any of the findings of the Winter Maintenance scan?

Yes (see below)	No	No response
7	11	1

Follow-up actions			
Obtained or read the scan report	Contacted a scan participant	Contacted someone from one of the states visited in the scan	Other (please specify)
9	6	3	0

4. Did you take action to implement or disseminate one or more of the practices identified through the scan?

Yes (see below)	No
11	8

Follow-up actions			
Made or initiated a change in practice at my agency	Discussed or recommended a change in practice at my agency	Shared information with a colleague	Other (please specify)
4	3	11	2
Responses to "Other": • Sent copy of report to 2011 National Winter Maintenance Peer Exchange attendees • Still reviewing document			
Specific technologies or practices implemented or disseminated (7 respondents): • Scan results were [shared with] my coworkers to see if there was anything they wanted to investigate further • —Tow Plow Innovation invented by a MoDOT employee and shared with other DOTs. —Joma Snow Blades are being used by some superintendents. • Increased use in anti-icing liquids and MDSS/RWIS evaluation. • AVL/GPS System created in house for our fleet. • Disseminated all of them listed in the "Summary of Initial Findings" • The addition of state of the art salt brine facility added another tool to the toolbox • tow-plows			

5. If you used information from the scan tour to make or recommend a change to your agency's practices, please describe.

Open-ended responses (5 respondents):

- We opted not to use MDSS. However, we liked components of it.
- Looked to integrate RWIS info into weather forecast.
- Change of equipment used in snow removal
- To be determined
- Tow Plow; Salt Slurry

6. If you indicated in Question 3, 4 or 5 that you contacted or talked to others about the scan tour results, please list their names and agencies.

Open-ended responses (8 respondents):

- —Jim Dowd, Iowa DOT
  —Dennis Burkheimer, Iowa DOT (now retired)
- Tim Jackson, MoDOT
- Bill Hoffman, Nevada DOT
- Too many to list here. AASHTO WMTSP member, members of the TRB AHD065 Winter Maintenance Committee meeting in Washington, D.C., members of the boards of Aurora and Clear Roads
- —Peter Carttar, KDOT
  —Ron Hall, KDOT
- The rest of the New England states. Joe Baker, RIDOT; Chuck Drda, Connecticut DOT; and the usuals—NH, Maine and VT, etc.
- Jim Foster, Elko Airport
- Charity Goodheart, PennDOT; Allen Willams, VDOT; Tim, MoDOT; Monty, WSDOT

7. Please use this space to provide any additional comments about your use of the findings of the Winter Maintenance scan tour.

Open-ended responses (4 respondents):

- We are using some of the technologies and/or practices mentioned in the scan tour, but we were doing them already and did not make any changes based on the results of the scan tour.
- Great report. Need to keep promoting these successes and translate them to actual cost savings or improvements in LOS so field maintenance can do a more effective job of convincing their top management to invest in winter maintenance.
- Next tour might look at some of the challenges that other states are facing due to budget restraints, lack of personnel, lack of vision. Why does it take so long for a DOT to change culture, practices? Maybe ask difficult questions of those that did change—what roadblocks they faced, lessons learned.
- We shared findings with Utah LTAP and they changed their winter training to implement findings.

4

Best Practices in Bridge Management Decision-Making (Scan 07-05)

This scan, conducted in mid-2009, focused on practices among transportation agencies to identify, prioritize, and execute programs to manage highway bridges. The major findings of the scan were grouped into three areas:

- The bridge management process
- Preventive maintenance
- Agency support

The findings of the scan are documented in the final scan report, available online at http://domesticscan.org/wp-content/uploads/NCHRP20-68A_07-05.pdf.

Overview of technology transfer and implementation efforts

The following observations, conclusions, and recommendations are based on information that CTC & Associates gathered during the six-month participant survey, the participant webinar, the 12-month participant interviews, and the 12-month nonparticipant survey. A complete record of findings through these channels follows later in this chapter.

Observations

- This scan resulted in a highly significant and successful outcome: a follow-up NCHRP research project. Proposed by AASHTO's Subcommittee on Bridges and Structures and selected for funding by the Standing Committee on Research, the $850,000 study will develop a handbook and software for maintenance and preservation of bridges.

  The scan results were credited among participants as an impetus for the approval of this project. Driving factors included:

  - *Timeliness*. This is an important topic among DOTs facing funding issues; preserving and extending life of current bridge inventory has become a priority.
  - *Awareness.* The presentation of the scan findings at conferences, online, and to directly to AASHTO's Subcommittee on Bridges and Structures aided in the approval process.
  - *Relevance.* FHWA has only unofficial guidelines regarding management and preventative maintenance decision-making for bridges. National guidance from NCHRP will help address questions about federal funding approval from one state to the next.

- This scan also points to the value using a variety of methods to gather information on technology transfer and implementation efforts among participants. For this scan, the low participation in the six-month survey and webinar did not initially suggest much implementation activity. However, the 12-month interviews among participants uncovered a range of implementation activities that illustrated the value of the scan to participants and their agencies. These are detailed in the "Implementation successes" section of this overview.

Highlights of effective technology transfer

- Participants noted a number of successful external channels for disseminating information about this scan:
    - Many presentations about the scan findings were given at maintenance conferences around the nation, at AASHTO committee meetings, and at the TRB annual meeting.
    - In addition to the presentations, two webinars were conducted, which received wide distribution and attendance. For each webinar, the presenters included three scan participants: one visiting team member and two host state representatives.
    - One scan participant co-authored a *Transportation Research Record* journal paper on the scan. An article was also published in *Roads and Bridges* magazine.
    - A scan participant reported providing input on maintenance recommendations and other procedures to the National Highway Institute classes on bridge maintenance and management.

  More information about these activities is available in this scan's Implementation Plan of technology transfer efforts (see Appendix D).
- Internal communication among participants' own agencies are described in the following comments:
    - "We passed this information along to our agency's preservation and maintenance area, as well as ownership groups and local groups outside our agency."
    - "We distributed the report and I made presentations to our agency's bridge leadership team and to upper management."
    - "I shared what I learned on the tour and what appeared to be best practices among our inspection staff."
- One participated noted: "We have gotten a lot of questions back on this topic, from FHWA all the way down to local agencies. I think discussions on this topic are ongoing in a lot of agencies."
- The 10 respondents to the nonparticipant survey were from 8 different states, including 3 states that were involved in the scan itself. Technology transfer activities among nonparticipants included discussions with management to recommend enhancing current best practices, follow-up contacts with scan team members and host agencies, and conversations among colleagues within nonparticipants' agencies.
- One respondent to the nonparticipant survey reported that his agency, a state DOT, had invited a representative from the local FHWA division to give further guidance to DOT staff. He noted that this was a positive experience.

Implementation successes

- Though not revealed through the six-month survey or webinar, follow-up communication among scan participants reveal significant implementation of best practices addressed in this scan, as noted in these comments:
    - "We took ideas from how other agencies are tracking performance measures and indicators—for all assets, not just bridges—and are developing those into our department's policies and investment strategies."
    - "We started working with FHWA to develop a preventive maintenance program for bridges. We learned about others in the scan who were already participating in this federal program."
    - "We enhanced our bridge performance measure as a result of this scan. We learned on the scan that other states weren't necessarily just using the national measures but had developed their own, and we followed suit."
    - "We adjusted how we analyze, select and allocate money for major bridge maintenance efforts."
    - "We were in the process of implementing a new bridge management system at the time of the scan tour, and we incorporated some of what we learned on maintenance tracking and other recommendations from the other states into that system."
    - "We developed a GIS mapping application of functionally obsolete bridges drawing from what we learned in the scan."
    - "We are working on making decisions regarding performance management, including reporting of condition assessments."
    - "We made three major program changes as a result of the scan tour."
- One respondent to the nonparticipant survey reported that his agency is in the process of implementing elemental inspection.

Additional benefits of the scan

- One participant addressed the overall value of the domestic and international scan tours, saying that they are "invaluable as programs. There is such a need for communication and so little time for it, and the scan tours really allow for this vital communication and the formation of critical partnerships."
- Another participant described how the scan tour creates unique communication channels among transportation professionals, "putting half a dozen people who are dealing with a topic in their day-to-day work in touch with a similar number in other state agencies that are doing the same thing. There is no other way to get that one-on-one communication."

  He spoke about being able to "pick up on things due to the presence of other experts in joint conversation…; this can't be done in any other mode."
- It was noted how valuable information is transferred both to and from the host state representatives and the scan participants.

Barriers and opportunities for improvements

- A discussion during the six-month webinar addressed how to get better participation from scan team members in tracking the results of the scan. Such tracking appeared to be lacking for this scan in particular, despite efforts to have participants document their work.
- In light of the low participation in six-month survey and webinar, a webinar participant asked if there were opportunities for sharing the technologies for this particular scan.

Scan details

Scan team members

- Peter Weykamp, New York State DOT (scan co-chair)
- Tod Kimball, FHWA Vermont Division (scan co-chair)
- Bruce V. Johnson, Oregon DOT
- Keith Ramsey, Texas DOT
- Arthur D'Andrea, Louisiana DOTD
- Scot Becker, Wisconsin DOT
- George Hearn, University of Colorado at Boulder (Subject Matter Expert)

Sites visited

- State transportation agencies in Washington, Michigan, Ohio, Virginia, Florida, Delaware, California
- County transportation agencies in El Dorado/Placer County, California
- Turnpike Authority in Florida

Scan dates
May 25 – June 6, 2009

Final report
July 2010, http://domesticscan.org/wp-content/uploads/NCHRP20-68A_07-05.pdf.

Six-month participant survey

CTC & Associates conducted an online survey of scan participants approximately six months following the completion of each scan. The scan included six team members, including two co-chairs and a subject matter expert (SME). Of the six original members, two responded to the survey.

The following text appeared at the start of the online survey.

> *Thank you for participating in this survey about your experience as a member of a Domestic Scan team. NCHRP has initiated this follow-up research to identify:*
>
> - *Progress toward implementation of technologies and practices identified in each scan's implementation plan*
> - *Benefits of the Domestic Scan Program to you, your agency, and industry as a whole*
> - *Completed or planned dissemination activities*
> - *Names of individuals (beyond participants) who have heard about scan findings*
>
> *Completion of this survey should require no more than 15 or 20 minutes.*

CTC & Associates will compile survey results in the next few weeks and then invite you and the other members of your scan tour to participate in a one-hour Web conference to discuss your responses. This will also be an opportunity for you to reconnect and share your successes and challenges in implementing technologies and practices discussed during the scan.

This survey and Web conference will be followed by another in approximately six months to further trace the impacts of your participation in the scan tour. For more information, see NCHRP Project 20-68B(01), "Accelerating the Rate of Innovation Among State DOTs – Tracing Domestic Scan Impacts."

If you have any questions about the survey or other aspects of this research effort, please don't hesitate to contact me.

Final results of the survey follow.

Conduct of Scan. Please rank each of the following scan program features in terms of its contribution to the overall value of this particular scan tour, where 1 is "not important" and 5 is "extremely important." If it did not apply to your scan, please pick N/A (Not Applicable).

	Not Important 1	2	3	4	Extremely Important 5	N/A	Response Count
Preparatory materials and meetings in advance of the scan tour	0	0	1	1	0	0	2
On-site visits to view the subject technology or practice	0	0	0	2	0	0	2
Face-to-face technical exchange with host state personnel and other scan participants	0	0	0	1	1	0	2
Final report of scan findings	0	0	0	2	0	0	2
Post-scan consultation with host state personnel and other scan participants	0	1	1	0	0	0	2

Scan Outcomes. Please rank each of the following scan program outcomes in terms of its contribution to the overall value of this particular scan tour, where 1 is "not important" and 5 is "extremely important."

	Not Important 1	2	3	4	Extremely Important 5	Response Count
Introduction to a new technology or practice	0	0	1	1	0	2
Clearer understanding of a new technology or practice	0	0	0	2	0	2
Identification of one or more individuals at a host state to call on as a future resource	0	0	0	2	0	2
Identification of one or more scan participants to call on as a future resource	0	0	0	2	0	2
Information with which to *begin* implementation of a technology or practice at your agency	0	0	2	0	0	2
Information with which to continue implementation of a technology or practice at your agency	0	0	2	0	0	2

General comments regarding the overall value and benefits of the NCHRP Domestic Scan Program:
No comments

Did your participation in the scan facilitate the implementation of any new practices or technologies?

Yes	No
1	1

Completed Implementations

- Working on performance measures – will be long-term implementation..

Are any implementations planned within the next year?

Yes	No
0	1

Planned Implementations (within the next year):
None

Number of respondents who attempted an implementation without success
None

Number of contacts provided regarding current or planned implementation activities
None

Number of contacts outside the agency provided
1— AASHTO BridgeWare

Dissemination Activities (from one respondent):

- Organization – WisDOT
  Event – Maintenance Meeting

Six-month participant webinar

A scan tour participant and NCHRP project panel members took part in a webinar approximately six months following the conclusion of the scan. The purpose of the webinar was to discuss the initial findings of the scan, to review technology and implementation efforts to date and to plan follow-up activities. Details on the webinar follow.

Date
Monday, March 14, 2011

Attendees
Facilitators

- Dylan Casey, CTC & Associates LLC
- Patrick Casey, CTC & Associates, LLC

Scan Team Members

- Bruce Johnson, Oregon DOT

Panel Members

- Rick Kreider, Kansas DOT
- Mark Van Port Fleet, Michigan DOT
- Andrew Lemer, TRB

Guests

- Lorie Rosenkopf
- Batia Wiesenfeld
- Sebastian (graduate student)

Media

- Slides: http://domesticscan.org/wp-content/uploads/Scan07-05Webinar.pdf

Summary
Draft survey results were provided to scan team members prior to the webinar. Following introductions and a review of the results, the attending team member discussed some of his implementation efforts and his view of the impact of the scan. Following his comments, he fielded questions from several panel members and guests.

Bruce Johnson said that the final 20 recommendations that formed the implementation plan for the scan were grouped together and overseen by individual scan team members. His particular responsibility was in submitting proposals for research. They've had one big success in the funding of a full NCHRP study at $850,000. The study proposal was submitted by AASHTO's Subcommittee on Bridges and Structures and selected for funding by the Standing Committee on Research. They now have a panel, a RFP, and are in the process of hiring a consultant.

The study is a direct follow-up to the scan work, focusing on developing a handbook that distills the best information gathered during the scan (and elsewhere) pertaining to decision-making practices regarding maintenance and preservation of bridges, and developing a software tool to aid in such decision-making processes. The goal is to generate both general strategy tools that maximize efficiencies in programs overall, and spreadsheet tools. The latter was done, for example, in Michigan regarding bridge decks. In the research project, they hope to produce a whole suite of tools each geared toward a bridge element.

Bruce thought that there were at least two reasons the project was approved: 1) It is an important topic for DOTs where funding issues mean preserving/extending life of current inventory has become a priority. 2) Many presentations regarding the scan have been given at maintenance conferences around country and at the TRB Annual Meeting, influencing members of SCOBS and SCOR and helped move the project proposal forward. (Bruce noted that the scan follow-up survey did not reflect the number of presentations that have been made regarding scan findings.)

With George Hearn, he also put together a presentation for the TRB Annual Meeting with an accompanying paper which was accepted for publication in one of the Transportation Research Records. The paper reviews the scan and scan results and goals for implementation.

Rick Kreider asked whether there are FHWA guidelines/best-practices regarding management and preventative maintenance decision-making. Bruce said there are none that are part of official federal policy, though there was a mechanism in the most recent highway bill for getting money to states for such projects that depended upon their having a systematic process for making preventative maintenance decisions. A variety of states have such processes in place, with some receiving approval for funding and others not, though the submitted plans appear to be very similar. Bruce and others have asked FHWA for the criteria they're using for approval of a systematic decision-making process, and it appears that that guidelines have been drafted but not yet officially issued.

Rick also asked how the scan final report was distributed, particularly whether it was sent out through the various bridge email lists. Bruce said that the final report publication was mentioned in the TRB E-Newsletter, but he didn't think that there was a separate mass email notification. There were many presentations made at several meetings and two webinars were conducted. The webinars had a very wide distribution and large attendance, presenting the scan, the results, and the implementation plan. The webinars were organized through TRB by Harry Capers of Arora and Associates and included presentations from scan team members and from state participants. They were generally very successful.

Andy Lemer asked how we can get more participation from scan team members in tracking the results of the scan, noting the low response to the survey and attendance at the webinar. Bruce said that this kind of tracking has been particularly difficult with this scan, saying that Melissa Jiang with Arora has tried valiantly to keep the implementation reporting up, but has not had very much success in getting participants to document the work they've been doing.

Following a general question regarding what the scan did well and didn't do well, Bruce commented that conferences, SCOBS annual meetings, and similar meetings also spread knowledge, but that the scans do what nothing else does: put half a dozen people who are dealing the a topic in their day-to-day work in touch with a similar number in other state agencies that are doing the same thing. "There is no other way to get that one-on-one communication." "You pick up on things due to the presence of other experts" in joint conversation and "this can't be done in any other mode." In addition to the final report, participants collect many things that aren't necessarily envisioned before embarking on the scan. He cited the example of the Ohio training program. Originally, the team thought that training regarding preservation and maintenance was one of the major failures of DOTs, but found that there are whole training programs, with Ohio being a great example.

Lorie Rosenkopf asked about how the scan allows people to get to know those they didn't know before. "Did you know these people on the scan or were they new relationships?" Bruce replied that they were primarily new relationships. He knew Peter Weykamp well from AASHTO, but not the others. (He noted that he still learned many new things from Pete.) He received a wider view and appreciation of what states were doing, both from scan team members and the states visited. To his knowledge, Pete didn't know any of the others, save George Hearn, whom several of the team members knew. He thought that his experience was true of the other participants.

Batia Wiesenfeld asked whether there is something about this particular scan or the sub-community on bridge maintenance such that there are other mechanisms for sharing particular technologies, noting the de-emphasis of information sharing in the (albeit meager) survey results. Bruce cautioned that the results of the survey, being such a small sample, are likely not indicative of the general view. He thinks that there's actually not much opportunity for sharing information between individuals and that implementation of the scan information is extremely important in disseminating the technological information itself.

12-month participant interviews

CTC & Associates conducted a brief telephone interview with participants approximately one year following the publication of the scan report. Most of the interviews were conducted by telephone, with one respondent submitting answers via email instead.

Among the six highway agency scan participants contacted, four participated in the interview. Responses to each of three questions are summarized and compiled below.

1. How have you implemented changes to your agency's policies, practices or technologies based on what you learned from participating in this scan tour?

- We took ideas from how other agencies are tracking performance measures and indicators—for all assets, not just bridges—and are developing those into our department's policies and investment strategies.

- We started working with FHWA to develop a preventive maintenance program for bridges. We learned about others in the scan who were already participating in this federal program.
- We enhanced our bridge performance measure as a result of this scan. We learned on the scan that other states weren't necessarily just using the national measures but had developed their own, and we followed suit.
- We adjusted how we analyze, select and allocate money for major bridge maintenance efforts.
- We were in the process of implementing a new bridge management system at the time of the scan tour, and we incorporated some of what we learned on maintenance tracking and other recommendations from the other states into that system.
- We developed a GIS mapping application of functionally obsolete bridges drawing from what we learned in the scan.
- We are working on making decisions regarding performance management, including reporting of condition assessments.

2. *(For State DOT representatives)* Have you shared information you learned or contacts you made during the scan tour with other people in your agency, in your state, or beyond, and if so, how have they put that information to use?

(or)

***2. (For Federal agency representatives)* Have you shared information you learned or contacts you made during the scan tour with other people in your agency, in other agencies, or beyond, and if so, how have they put that information to use?**

- Across our agency, we are seeing a more in-depth approach to tracking decision making. We passed this information along to our agency's preservation and maintenance area, as well as ownership groups and local groups outside our agency.
- We have gotten a lot of questions back on this topic, from FHWA all the way down to local agencies. I think discussions on this topic are ongoing in a lot of agencies.
- We distributed the report and I made presentations to our agency's bridge leadership team and to upper management. That helped in gaining their support of our changes to our bridge performance measure.
- I made presentations on this scan to the AASHTO SCOBS.
- I don't know how others may have used this information.
- We conducted two national webinars. For each webinar, the presenters included three scan participants: one visiting team member and two host state representatives.
- I shared what I learned on the tour and what appeared to be best practices among our inspection staff.
- I also provided input on maintenance recommendations and other procedures to the NHI bridge maintenance class and bridge management class.

3. How would you characterize the overall value of this scan tour? What comments would you like to share for the summary report on this project?

- This scan tour was valuable and helped identify and document the agencies with the best practices.
- In general, the domestic and international scan tours are invaluable as programs. There is such a need for communication and so little time for it, and the scan tours really allow for this vital communication and the formation of critical partnerships.
- The scan provided very valuable information, from the host states as well as the other panel members.
- I'm glad I was able to participate.
- We made three major program changes as a result of the scan tour.
- I thought the scan tour was both beneficial and timely, as more and more states are focusing on maintaining inventory rather than building new bridges in the current economic climate. We picked up very good information from other states and developed a good joint plan as presented in the scan tour report.
- The scan is very useful, and participation provides great value.

Nonparticipant survey

To gather more information about the reach of the scan tour findings, CTC & Associates conducted a seven-question online survey of nonparticipants—individuals who did not participate in the scan but who were identified as having received information about it.

Survey Methodology

The 07-05 scan team completed a broad range of technology transfer activities as part of the scan's Implementation Plan of technology transfer efforts (see Appendix D, compiled by scan consultant Arora and Associates). They included two webinars; articles and papers in a variety of publications; and presentations at committee meetings and national and regional conferences. Several of these activities involved presenting the scan findings to groups of specific individuals, such as attendees at committee meetings.

In an effort to trace the paths through which information about the scan findings spread beyond the initial scan participants, CTC & Associates reviewed the information available about which of the planned technology transfer activities had been completed and confirmed these details through an online search. We identified the activities for which attendees' names were most likely to have been compiled, and we contacted the organizers of those activities.

We were able to obtain attendance lists for two of these activities. We culled the lists for those attendees who represented state DOTs and FHWA divisions, and we compiled email addresses for these two groups. We sent surveys to state DOT and FHWA staff who heard about the scan results through:

- A presentation at the July 2009 meeting of the AASHTO Subcommittee on Bridges and Structures (survey sent to 150 attendees)
- A presentation at the January 2010 meeting of the TRB Structures Maintenance Committee (survey sent to 21 attendees)

In all, CTC & Associates sent the nonparticipant survey to 171 people; subtracting invalid email addresses, the survey reached 150 recipients. Recipients received the following email, modified as appropriate to indicate the venue of the scan presentation they attended:

> *Hello,*
>
> *The National Cooperative Highway Research Program is conducting research to evaluate how the innovative technologies and practices identified through its Domestic Scan Program (http://domesticscan.org) are being used by transportation practitioners beyond the initial scan participants. The findings of the 2009 scan tour on Bridge Management Decision-Making were presented at the January 2010 meeting of the TRB Committee on Structures Maintenance, which you attended, and we would appreciate a few minutes of your time to complete a brief survey (7 questions) on your use of the scan findings.*
>
> *This survey is an important opportunity to document the real, tangible benefits and value of the practitioner-to-practitioner information exchanges facilitated by the Domestic Scan Program. The goal of the program is to accelerate the spread of leading-edge, proven technologies and practices to DOTs across the country, thereby helping all agencies provide safer, longer-lasting, more cost-effective transportation facilities to their taxpayers. This survey is an effort to trace these impacts.*
>
> *The survey is available at http://www.surveymonkey.com/s/PCLKVNL. If possible, please complete the survey by Friday, August 5.*
>
> *If you have any questions about this NCHRP research effort, please feel free to contact me at the phone number or email below. You can also contact TRB Senior Program Officer Andrew Lemer at ALemer@nas.edu or (202) 334-3972.*
>
> *Thank you for your time and your participation.*

The survey itself also included the following introductory text:

> *The National Cooperative Highway Research Program sponsors a Domestic Scan Program (NCHRP Project 20-68A) to facilitate technology transfer among state DOTs. NCHRP is conducting research to evaluate how the technologies and practices identified through the Domestic Scan Program are being used by transportation practitioners beyond the scan participants. This survey is part of that effort to capture how those who have heard about the scan findings are using that information at their agencies.*
>
> *This survey is an important opportunity to document the real, tangible benefits and value of the practitioner-to-practitioner information exchanges facilitated by the Domestic Scan Program. The goal of the program is to accelerate the spread of leading-edge, proven technologies and practices to DOTs across the country, thereby helping all agencies provide safer, longer-lasting, more cost-effective transportation facilities to their taxpayers. This survey is an effort to trace these impacts.*

You can review a summary of the results of the Bridge Management Decision Making scan at this link: Executive Summary

Thank you for taking the time to complete the survey.

Responses

A total of 10 people who were not involved in the scan responded to the surveys:

- 9 attendees of the AASHTO SCOBS meeting
- 1 attendee of the TRB Structures Maintenance Committee meeting

The respondents represented agencies across the country:

- 8 respondents were from 8 different states, including 3 states that were involved in the scan
- 2 respondents were from FHWA

Two responses to the nonparticipant survey were received from participants in the scan tour; these responses have been removed from the survey results presented here.

The 10 survey responses are compiled below.

1. Do you recall hearing a presentation at the July 2009 meeting of the AASHTO Subcommittee on Bridges and Structures (held in New Orleans) about the innovative technologies and practices identified by the 2009 domestic scan on Bridge Management Decision-Making?

or

Do you recall hearing a presentation at the January 2010 meeting of the TRB Structures Maintenance Committee about the innovative technologies and practices identified by the 2009 domestic scan on Bridge Management Decision-Making?

Yes	No	Not sure
8	1	1

2. Did you hear about the findings of the Bridge Management Decision-Making scan tour from other sources as well?

Yes (see below)	No
4	6

Conferences and meetings				
TRB or AASHTO meeting or committee meeting	Another national or regional conference	State DOT workshop	State DOT internal meeting	Other (please describe)
3	1	0	0	0

Other sources				
Webinar	Article in a publication	Conversation or email with a scan participant	Conversation or email with a colleague	Other source (please specify)
0	1	3	1	0

3. Did you make any further inquiry into any of the findings of the scan on Bridge Management Decision-Making?

Yes (see below)	**No**
2	8

Follow-up actions			
Obtained or read the scan report	Contacted a scan participant	Contacted someone from one of the states visited in the scan	Other (please specify)
4	0	0	0

4. Did you take action to implement or disseminate one or more of the practices identified through the scan?

Yes (see below)	**No**
1	9

Follow-up actions			
Made or initiated a change in practice at my agency	Discussed or recommended a change in practice at my agency	Shared information with a colleague	Other (please specify)
1	1	2	0
Specific technologies or practices implemented or disseminated: • [No responses were received to this question]			

5. If you used information from the scan tour to make or recommend a change to the technologies and practices in use at your agency, please describe.

Open-ended responses (2 respondents):

- Recent changes to the Division structure have allowed the creation of a Bridge Maintenance and Bridge Management Program Area. The director will be informed of the scan tour information.

- --Elemental inspection (in progress)
  --Funding
  --Upper management support

6. If you indicated in Question 3, 4 or 5 that you contacted or talked to others about the scan tour results, please list their names and agencies.

Open-ended responses (3 respondents):
- Internal Staff
- Pete Weykamp – NYSDOT; Wade Casey, Tod Kimball – FHWA
- Pete Weykamp, NYSDOT; Mike Johnson, Caltrans

7. Please use this space to provide any additional comments about your use of the findings of the Bridge Management Decision-Making scan tour.

Open-ended responses (2 respondents):
- [Repeated response; same answer given to Question 5] Recent changes to the Division structure have allowed the creation of a Bridge Maintenance and Bridge Management Program Area. The director will be informed of the scan tour information.
- We have invited Anwar Ahmed from FHWA to our state for further guidance. He did and was very positive.

5

Best Practices in Managing STIPs, TIPs, and Metropolitan Transportation Plans in Response to Fiscal Constraints (Scan 08-01)

This scan, conducted in mid-2009, focused best practices among state DOTs and metropolitan planning organizations (MPOs) to comply with fiscal constraint requirements related to Transportation Improvement Programs (TIPs), state TIPs (STIPs), and metropolitan transportation plans.

The findings of the scan are documented in the final scan report, available online at http://domesticscan.org/wp-content/uploads/2010/05/NCHRP20-68A_08-01-Final-Report.pdf.

Overview of technology transfer and implementation efforts

The following observations, conclusions, and recommendations are based on information that CTC & Associates gathered during the six-month participant survey, the participant webinar, the 12-month participant interviews, and the 12-month nonparticipant survey. A complete record of findings through these channels follows later in this chapter.

Observations

- As discussed during the six-month webinar, this scan focused on planning practices rather than on hard technology. One participant noted that this sort of scan and the resulting distillation of knowledge is just as important as technology-oriented scans.
- The number of stakeholders involved played a role in this scan as well. A participant said that "having so many distinct stakeholders [state DOTs, regulatory partners, etc.] makes face-to-face dealings all the more important and productive."
- A repeated theme among participants was that this scan served not just to identify best practices, but to highlight important issues:
    - Several participants noted how the scan brought to light the common misapplication of STIPs and TIPs. They were originally intended to serve as planning guides, but they had effectively turned into budgeting tools. One participant stated a wish to see "more of a planning document and less of an accounting document."

      The anticipated reauthorization of a federal highway aid bill may play a role in this issue. One participant said, "We will see if the scan has any influence on the reauthorization of the next bill. We will try to influence the outcome to [include] less accounting and annual budgeting and more planning and broad direction and incentives."

- A participant said the scan "illustrated that 'one size does not fit all' " and that a given best practice is not necessarily right for every state or situation. Along similar lines, another participant said, "The conversations were very productive and led to a broad understanding of the (tremendous) variation between the states regarding planning activities and demands."

Highlights of effective technology transfer

- A scan participant who is a member of the AASHTO Standing Committee on Planning (SCOP) reported wide communication of the scan results to secondary audiences: "I have shared the scan findings with [SCOP]. A number of the DOTs on SCOP have either made use of specific recommendations from this scan or at a minimum have made information available to their leadership or staff to help them understand how other metropolitan planning organizations, states, and the federal government are doing business."
- Participants reported a number of successful technology transfer efforts for this scan.
  - The scan team hosted a two-hour webinar on the scan findings that was attended by more than 450 people, including representatives of state DOTs, regional and metropolitan planning organizations, FHWA, FTA, and other agencies. A question-and-answer period allowed attendees to interact directly with the scan participants. A scan participant also made brief presentations on the scan findings to two TRB committees.
  - One participant said that his agency conducts "a 'Let's Talk Planning' webinar with our field offices once a quarter. We spent part of one webinar to share what we learned on the scan with attendees from federal offices. We also presented scan findings to two TRB committees in January 2010."

  Among other internal, local and regional technology transfer efforts:

  - "We shared a lot with NPOs and FHWA locally, and we continue to bring up the findings in peer exchanges within the state."
  - "I have had several opportunities to pass on the observations from the domestic scan, both internally and externally."
  - "I shared what I learned from this scan, particularly about our state's progressive approach."

  More information about the scan team's planned and completed technology transfer efforts is available in this scan's Implementation Plan (see Appendix E).
- The 37 respondents to the nonparticipant survey were from 22 different states, including 5 states that were involved in the scan itself. Technology transfer activities among nonparticipants included discussions with management to recommend enhancing current best practices, follow-up contacts with scan team members and host agencies, and conversations among colleagues within nonparticipants' agencies.
  - One respondent from the national Association of Metropolitan Planning Organizations reported sharing scan findings with AMPO members.
  - Another respondent described her efforts: "I have printed out and distributed the executive summary to my supervisor and co-workers. I have made a note about this program and will continue to review the website for additional references and resources."

- A third respondent used the scan findings to initiate a dialogue within his agency, discussing "how our procedures compare with those outlined in the webinar."

Implementation successes

- Two of four respondents to the six-month participant survey said that their participation in the scan facilitated the implementation of new practices or technologies at their agencies. One respondent provided details, commenting on his agency's live STIP software development ongoing over the next few years.

  The scan team member provided further details during the 12-month participant interview: "Our live STIP … is similar to the program the federal government piloted in New York. This tool automates the STIP development and communication process and allows our managers both to have daily access to data and to develop the annual report required by federal law."

- One participant's agency took steps based on the scan findings about inconsistent treatment of fiscal constraint in different FHWA field offices: "We have since kicked off a process review team to visit three or four offices each year to share best practices. We also put out some revised federal fiscal restraint guidance, which was in part an outcome of the scan."

- Another participant noted that this scan initiated greater dialog between local FHWA offices and state DOTs: "We have initiated regular peer to peer meetings with neighboring states (held 3 or more times a year) to exchange information on how to best handle similar issues."

- A participant commented on the timeliness of the scan, given economic conditions, and the resulting implementation steps: "This scan helped us take a look at how we list and use items in our STIPs. There has been a tendency to over-program in the past, but we need to change that in light of the current economy and changes in prices."

- Thirteen respondents to the nonparticipant survey reported taking steps to implement or disseminate the scan findings. Several detailed the specific changes they made or initiated:
  - "Instructed project sponsors to make sure they use YOE figures in TIP entries. Added a O&M cost component to the TIP document to more clearly show fiscal constraint."
  - "Updated fiscal constraint practices. Will try to consider findings in making our documentation better."
  - "Updating TIP amendment process. Developed methodology for plan, require revenue documentation for TIP (not just letter)."
  - Use of "consistent revenue and cost methodologies, coordination w/ feds on [administrative modification] vs. amendment."
  - "Have been recommending that we spend resources on improving project development so that we have a better understanding of the project scope prior to funding it."

- Respondents to the nonparticipant survey also reported broader effects of their exposure to the scan findings:
  - "An example is encouraging others in my agency to think of metro plans as both a resource for our own planning activities and an opportunity to influence (through participation) decisions that might be made by others that will affect our operations and investments."

  - A respondent from an MPO said the scan findings had sparked "discussion of the opportunity and need to get the DOT on board with making changes before we can make changes."
  - "Used the information in a general way to think about how my agency's practices could change, but to date, no substantive changes have been made as a result. I did appreciate [hearing] alternate perspectives and different ways to articulate what the TIPs, STIPs and metro plans are about."

Additional benefits of the scan

- Several participants highlighted the value of this scan:
  - It showed "both scan members and scan sites … how the implementation of regulations had varied across MPOs."
  - "The scan was particularly valuable in highlighting changes that needed to occur at the national level and how states are required to respond to fiscal constraint."
  - "This was the first domestic scan I participated in, and it was professionally rewarding."
- One respondent to the nonparticipant survey praised the scan findings as "very useful information and a good resource for the planning community." Another said the scan confirmed his agency's current practices: "Found that we are doing a fairly good job in our state."
- Several participants offered support for the scan program in general:
  - "This work provides a foundation for networks for people to find and share best practices and creates a network of experts around a topic. In the long term, activities like this scan will allow those networks to continue to improve business practices and products that help us deliver transportation in the United States."
  - "I encourage people to participate in a scan if they have an opportunity."
  - "I recommend the continuation of the scan program."

Scan best practices

- A participant emphasized the effectiveness of the peer-to-peer and face-to-face nature of the scans, saying it was far and away the preferred mode of communication.
- Another highlighted the benefits of scans compared with traditional presentations: "Typical half-hour presentations given at national meetings often only highlight practices that are working well. The challenges and problem areas only come to light when you spend a day or longer with a state and discuss processes and policies more extensively and can hold involved discussions on what's working and what isn't."
- Scan participants were very effective at publicizing the two-hour webinar they hosted to disseminate the scan's findings; it drew over 450 attendees from a wide range of agencies across the country.

Barriers and opportunities for improvements

- It was noted that some of the implementation activities called for in the scan are in a holding pattern awaiting passage of the transportation reauthorization bill by Congress; future conversations will occur as the reauthorization process continues.
- One participant noted that "the challenges of publicizing the results of this scan are similar to the challenges of publicizing a national transportation planning vision. The states are trying to understand this new vision individually and, in particular, get away from planning as primarily an exercise in accounting."
- Participants suggested additional technology transfer channels:
    - Other ways to disseminate the results of the scan to a broad audience could include "an article in a trade magazine, especially since the research results seem both broadly applicable and readily available for dissemination."
    - The results of the scan "could be circulated within the AASHTO Standing Committee on Planning along with the affiliated subcommittees and MPOs."
- Limited resources were cited as a barrier to additional technology transfer: Carrying out "scan activities like webinars and such consumes personnel and financial resources, which should be considered when evaluating the scan overall."
- Despite appearing on the attendance list for the scan webinar, some respondents to the nonparticipant survey said they did not remember viewing it. One commented: "Although I did not use the findings, I would have liked to be made aware of them. I believe these domestic scans are very useful, but with all the info we get, the findings may have been 'lost.' Perhaps we need a more focused plan for getting this info to managers."
- Two webinar attendees offered feedback about the level of detail presented, though it was not clear whether the comments referred to the scan itself or to the webinar format:
    - "Would have loved additional detail on methodologies for both revenue and cost estimates. That can be in the next scan..."
    - "The information presented was very basic. Most MPOs should already be doing this."

Scan details

Scan team members

- Timothy A. Henkel, Minnesota DOT (scan co-chair)
- Harlan Miller, FHWA (scan co-chair)
- Jeanne Stevens, Tennessee DOT
- Ben Orsbon, South Dakota DOT
- Tracy Larkin-Thomason, Nevada DOT
- W. David Lee, Florida DOT
- Thomas W. Clash (Subject Matter Expert)

Sites visited

State transportation agencies in New York, Vermont, Kansas, Missouri, Colorado, Texas, Washington

Scan dates
May 31 – June 6, 2009, June 14 – June 20, 2009

Final report
April 2010, http://domesticscan.org/wp-content/uploads/2010/05/NCHRP20-68A_08-01-Final-Report.pdf.

Six-month participant survey

CTC & Associates conducted an online survey of scan participants approximately six months following the completion of each scan. The scan included seven team members, including two co-chairs and a subject matter expert (SME). Of the seven original members, five responded to the survey.

The following text appeared at the start of the online survey.

> *Thank you for participating in this survey about your experience as a member of a Domestic Scan team. NCHRP has initiated this follow-up research to identify:*
>
> - *Progress toward implementation of technologies and practices identified in each scan's implementation plan*
> - *Benefits of the Domestic Scan Program to you, your agency, and industry as a whole*
> - *Completed or planned dissemination activities*
> - *Names of individuals (beyond participants) who have heard about scan findings*
>
> *Completion of this survey should require no more than 15 or 20 minutes.*
>
> *CTC & Associates will compile survey results in the next few weeks and then invite you and the other members of your scan tour to participate in a one-hour Web conference to discuss your responses. This will also be an opportunity for you to reconnect and share your successes and challenges in implementing technologies and practices discussed during the scan.*
>
> *This survey and Web conference will be followed by another in approximately six months to further trace the impacts of your participation in the scan tour. For more information, see NCHRP Project 20-68B(01), "Accelerating the Rate of Innovation Among State DOTs – Tracing Domestic Scan Impacts."*
>
> *If you have any questions about the survey or other aspects of this research effort, please don't hesitate to contact me.*

Final results of the survey follow.

Conduct of Scan. Please rank each of the following scan program features in terms of its contribution to the overall value of this particular scan tour, where 1 is "not important" and 5 is "extremely important." If it did not apply to your scan, please pick N/A (Not Applicable).

	Not Important 1	2	3	4	Extremely Important 5	N/A	Response Count
Preparatory materials and meetings in advance of the scan tour	0	0	0	3	2	0	5
On-site visits to view the subject technology or practice	0	0	0	0	3	2	5
Face-to-face technical exchange with host state personnel and other scan participants	0	0	0	0	5	0	5
Final report of scan findings	0	0	0	0	5	0	5
Post-scan consultation with host state personnel and other scan participants	0	0	0	0	3	2	5

Scan Outcomes. Please rank each of the following scan program outcomes in terms of its contribution to the overall value of this particular scan tour, where 1 is "not important" and 5 is "extremely important."

	Not Important 1	2	3	4	Extremely Important 5	Response Count
Introduction to a new technology or practice	0	0	4	0	1	5
Clearer understanding of a new technology or practice	0	0	0	4	1	5
Identification of one or more individuals at a host state to call on as a future resource	0	1	0	3	1	5
Identification of one or more scan participants to call on as a future resource	0	0	0	3	2	5

(continued)

(continued)						
	Not Important 1	**2**	**3**	**4**	**Extremely Important 5**	**Response Count**
Information with which to *begin* implementation of a technology or practice at your agency	0	0	1	3	1	5
Information with which to continue implementation of a technology or practice at your agency	0	0	2	2	1	5

General comments regarding the overall value and benefits of the NCHRP Domestic Scan Program:

- The Domestic Scan Program is a great value to the participants, in particular the scan team.
- The scan identified both best practices and the issues associated [with the] topics. It illustrated that "one size does not fit all", that while there were identified best practices, it may not be the best practice for your state.

Did your participation in the scan facilitate the implementation of any new practices or technologies?

Yes	**No**
2	2

Completed Implementations

- Live STIP software development
- We will see if the scan has any influence on the reauthorization of the next bill. We will try to influence the outcome to [have] less accounting and annual budgeting and more planning and broad direction and incentives.
- Not so much implementation as it initiated greater dialog between FHWA (local) and state. Also have initiated regular peer to peer meetings with neighboring states (held 3+ times a year) to exchange information on how to best handle similar issues.

Are any implementations planned within the next year?

Yes	**No**
1	2

Planned Implementations (within the next year):

- Live STIP will be developed over the next 1-2 years
- Whenever reauthorization begins.

Number of respondents who attempted an implementation without success
None

Number of contacts provided regarding current or planned implementation activities
1

Number of contacts outside the agency provided
1

Dissemination Activities (from one respondent):

- Organization – AASHTO
  Event – Webinar
  Date – 02/10/2010
  Title/Subject – Same as Scan
  Used Scan PowerPoint? (Yes/No) – Yes
- Organization – Mn/DOT
  Event – Commissioner's Staff
  Date – 01/01/2010
  Title/Subject – Managing STIPS, TIPS, and Metropolitan Transportation Plans in Response to Fiscal Constraints Management
  Used Scan PowerPoint? (Yes/No) – Yes

Six-month participant webinar

Several scan tour participants and NCHRP project panel members took part in a webinar approximately six months following the conclusion of the scan. The purpose of the webinar was to discuss the initial findings of the scan, to review technology and implementation efforts to date and to plan follow-up activities. Details on the webinar follow.

Date
Friday, December 3, 2010

Attendees
Facilitators

- Dylan Casey, CTC & Associates LLC
- Patrick Casey, CTC & Associates, LLC

Scan Team Members

- Tim Henkel, Minnesota DOT, scan co-chair
- Jeanne Stevens, Tennessee DOT
- Ben Orsbon, South Dakota DOT

Panel Members

- Shane Brown, Washington State University
- Rick Kreider, Kansas DOT
- Andrew Lemer, TRB

Media

- Slides: http://domesticscan.org/wp-content/uploads/Scan08-01Webinar.pdf

Summary

Draft survey results were provided to scan team and panel members, prior to the webinar. Following introductions and a review of the results, each team member discussed some of their implementation efforts and their view of the impact of the scan. The scan team members all thought that the scan was successful in capturing, understanding, and documenting successful, innovative technologies and practices.

Tim Henkel said that the survey fairly represented the outcome of the scan. He noted that it was a planning/procedure and practices scan and not oriented toward hard-tech. He emphasized that this sort of scan and distillation of knowledge is "just as important" as tech-oriented scans. Regarding MPO involvement, the panel needs to recognize that the planning world has many stakeholders, e.g., state DOTs, regulatory partners. Having so many distinct stakeholders makes face-to-face dealings all the more important and productive. Overall, the scan worked extremely well. It was easy to accommodate the size and scale of participation. The conversations were very productive and led to a broad understanding of the (tremendous) variation between the states regarding planning activities and demands. Mr. Henkel further emphasized that the face-to-face contact afforded by the scans is particularly important in an era of growing regulation because there is often great emotion that comes along with the implementation of these regulations. The "human part is an important part" of discussions and is impossible without face-to-face discussion. He noted that many of the implementation activities called for in the scan are in a holding pattern awaiting passage of the transportation reauthorization bill by Congress; future conversations will occur as the reauthorization process continues.

Ben Orsbon echoed Tim Henkel's comments. He pointed out the value to all participants, both scan members and scan sites, of seeing how the implementation of regulations had varied across MPOs. The scan evaluated the utility of fiscal constraint and examined how it was implemented in planning policy. "The key is not to interpret planning under fiscal constraint as an accounting exercise. Fiscal constraint is a constraint on planning vision."

Jeanne Stevens emphasized the importance of making contacts and their use as resources in the future. She underlined the effectiveness of the peer-to-peer and face-to-face nature of the scans, saying it was far and away the preferred mode of communication. "Seeing the expressions and body language of colleagues is particularly important when discussing controversial or sensitive topics." Regarding implementation plans, she said that the biggest challenge was that reauthorization hasn't happened yet.

Panel member Rick Kreider suggested that there may be other ways to disseminate the results of the scan to a broad audience, possibly an article in a trade magazine, especially since the research results seem both broadly applicable and readily available for dissemination.

Andy Lemer, the project coordinator for NCHRP, asked how the results of the scan influence how people conduct business. Tim Henkel responded that they had used webinars to publicize the scan results and that they'd had connections from over 200 locations on the last one. He noted that the challenges of publicizing the results of this scan are similar to the challenges of publicizing a national transportation planning vision. The states are trying to understand this new vision individually and, in particular, get away from planning as primarily an exercise in accounting. Ben Orsbon added that the results of the scan could well be circulated within the AASHTO standing committee on planning along with the affiliated sub-committees and MPOs. "They all need to know about the scan report and its findings." Regarding

dissemination, Tim noted a problem of ensuring resource availability for dissemination and implementation of scan results. In particular, post scan activities like webinars and such consume personnel and financial resources which should be considered when evaluating the scan overall.

12-month participant interviews

CTC & Associates conducted a brief telephone interview with participants approximately one year following the publication of the scan report.

Among the six highway agency scan participants contacted, five participated in the interview. Responses to each of three questions are summarized and compiled below.

1. How have you implemented changes to your agency's policies, practices or technologies based on what you learned from participating in this scan tour?

- We made significant changes in our agency to implement some of the technology found throughout the United States. The most practical example is our Live State Transportation Improvement Program, which is similar to the program the federal government piloted in New York. This tool automates the STIP development and communication process and allows our managers both to have daily access to data and to develop the annual report required by federal law.
- One of the things that came out of the scan was a finding of some inconsistency about how fiscal constraint was being addressed in different FHWA field offices. We have since kicked off a process review team to visit three or four offices each year to share best practices. We also put out some revised federal fiscal restraint guidance, which was in part an outcome of the scan.
- I believe our state is one of the leaders in the area of fiscal constraint. We haven't changed our practices based on the scan tour findings because we were already very progressive in fiscal constraint requirements.
- We are looking to make this more of a planning document and less of an accounting document, and we have been working with FHWA.
- This scan helped us take a look at how we list and use items in our STIPs. There has been a tendency to over-program in the past, but we need to change that in light of the current economy and changes in prices.
- We utilized the contacts we made on the scan tour quite a bit.
- I can't think of a specific change we made as a result of my participation on the scan.

2. *(For State DOT representatives)* Have you shared information you learned or contacts you made during the scan tour with other people in your agency, in your state, or beyond, and if so, how have they put that information to use?

(or)

***2. (For Federal agency representatives)* Have you shared information you learned or contacts you made during the scan tour with other people in your agency, in other agencies, or beyond, and if so, how have they put that information to use?**

- I am vice chair of AASHTO SCOP and have shared the scan findings with that committee. A number of the DOTs on SCOP have either made use of specific recommendations from this scan or at a minimum have made information available to their leadership or staff to help them understand how other metropolitan planning organizations, states, and the federal government are doing business.
- We conduct a "Let's Talk Planning" webinar with our field offices once a quarter. We spent part of one webinar to share what we learned on the scan with attendees from federal offices. We also presented scan findings to two TRB committees in January 2010
- I shared what I learned from this scan, particularly about our state's progressive approach.
- We shared a lot with NPOs and FHWA locally, and we continue to bring up the findings in peer exchanges within the state.
- Our assistant secretary attended a meeting of AASHTO SCOP to address fiscal constraint, and he presented the findings from the tour.
- I have had several opportunities to pass on the observations from the domestic scan, both internally and externally.

3. How would you characterize the overall value of this scan tour? What comments would you like to share for the summary report on this project?

- I highly value scans and the product this scan provided. I value the opportunity I had to be a participant in this scan and to play a leadership role.
- This work provides a foundation for networks for people to find and share best practices and creates a network of experts around a topic. In the long term, activities like this scan will allow those networks to continue to improve business practices and products that help us deliver transportation in the United States.
- Team members learned a lot about the state of the practice across the country, since most members didn't have a lot of exposure to one another's practice ahead of time. We also learned some good and bad examples and shared them with representative of the host states. There was good two-way conversation among visiting team members and host states.
- The scan was particularly valuable in highlighting changes that needed to occur at the national level and how states are required to respond to fiscal constraint.
- A major finding of the scan is how fiscal constraint has in many instances overwhelmed the planning process and become an accounting document, which is was never intended to be, rather than a planning document.
- There was high value in determining where there were similarities in practice and where it became apparent that one-size-does-not-fit-all. Learning how each state operates, and identifying the characteristics of decision-makers and reporting systems from state to state, helped explain why processes were successful in specific instances.
- The typical half-hour presentations given at national meetings often only highlight practices that are working well. The challenges and problems areas only come light when you spend a day or longer with a state and discuss processes and policies more extensively and can hold involved discussions on what's working and what isn't.

- This was the first domestic scan I participated in, and it was professionally rewarding.
- I encourage people to participate in a scan if they have an opportunity.
- I recommend the continuation of the scan program.
- I think the program did a good job of capturing and communicating what we learned through the report, webinar and outreach efforts.

Nonparticipant survey

To gather more information about the reach of the scan tour findings, CTC & Associates conducted a seven-question online survey of nonparticipants—individuals who did not participate in the scan but who were identified as having received information about it.

Survey Methodology

As described in the scan team's Implementation Plan of technology transfer activities (see Appendix E, compiled by scan consultant Arora and Associates), the scan team hosted a February 2010 webinar to share the scan's findings, and a scan participant made brief presentations at two TRB committee meetings.

In an effort to trace the paths through which information about the scan findings spread beyond the initial scan participants, CTC & Associates reviewed the information available about which of the planned technology transfer activities had been completed and confirmed these details through an online search. We contacted the organizers of these activities.

We were able to obtain an attendance list for one activity—the February 2010 webinar on the scan findings, which drew more than 450 attendees. We culled the list for those attendees who represented state DOTs, FHWA divisions, the Federal Transit Administration, and regional and metropolitan planning organizations, and sent surveys to those individuals. The survey was sent to 431 attendees.

Scan team members and respondents to the nonparticipant survey provided three additional names of DOT staff who had been involved in an implementation of scan technology or whom they had spoken to about the scan findings. Surveys were sent to these three individuals as well.

In all, CTC & Associates sent the nonparticipant survey to 434 people; subtracting invalid email addresses, the survey reached 405 recipients. Recipients received the following email:

> *Hello,*
>
> *The National Cooperative Highway Research Program is conducting research to evaluate how the innovative technologies and practices identified through its Domestic Scan Program (http://domesticscan.org) are being used by transportation practitioners beyond the initial scan participants. The findings of the 2009 scan tour on Managing STIPs, TIPS, and Metropolitan Transportation Plans in Response to Fiscal Constraints were presented in a February 2010 webinar, which you attended, and we would appreciate a few minutes of your time to complete a brief survey (7 questions) on your use of the scan findings.*
>
> ***You may receive an invitation to complete a survey about more than one scan topic. Please feel free to respond to only one of these.***

This survey is an important opportunity to document the real, tangible benefits and value of the practitioner-to-practitioner information exchanges facilitated by the Domestic Scan Program. The goal of the program is to accelerate the spread of leading-edge, proven technologies and practices to DOTs across the country, thereby helping all agencies provide safer, longer-lasting, more cost-effective transportation facilities to their taxpayers. This survey is an effort to trace these impacts.

The survey is available at http://www.surveymonkey.com/s/7KVKQ8H. If possible, please complete the survey by Tuesday, August 16.

If you have any questions about this NCHRP research effort, please feel free to contact me at the phone number or email below. You can also contact TRB Senior Program Officer Andrew Lemer at ALemer@nas.edu or (202) 334-3972.

Thank you for your time and your participation.

The survey itself also included the following introductory text:

The National Cooperative Highway Research Program sponsors a Domestic Scan Program (NCHRP Project 20-68A) to facilitate technology transfer among state DOTs. NCHRP is conducting research to evaluate how the technologies and practices identified through the Domestic Scan Program are being used by transportation practitioners beyond the scan participants. This survey is part of that effort to capture how those who have heard about the scan findings are using that information at their agencies.

This survey is an important opportunity to document the real, tangible benefits and value of the practitioner-to-practitioner information exchanges facilitated by the Domestic Scan Program. The goal of the program is to accelerate the spread of leading-edge, proven technologies and practices to DOTs across the country, thereby helping all agencies provide safer, longer-lasting, more cost-effective transportation facilities to their taxpayers. This survey is an effort to trace these impacts.

You can review a summary of the results of the scan on Managing STIPs, TIPs, and Metropolitan Transportation Plans in Response to Fiscal Constraints at this link: Executive Summary

Thank you for taking the time to complete the survey.

Responses

A total of 37 people who were not involved in the scan responded to the surveys. All were attendees of the February 2010 webinar. The respondents represented agencies and organizations across the country:

- 31 respondents were from 22 different states, including 5 states that were involved in the scan
- 15 respondents were from state DOTs
- 15 respondents were from regional or metropolitan planning organizations, councils of local governments, or related organizations
- 5 respondents were from FHWA, including 2 from the agency's regional divisions
- 2 respondents were from FTA

Two responses to the nonparticipant survey were received from individuals who had participated in the scan, either as part of the visiting scan team or at a host site; these responses have been removed from the survey results presented here.

The 37 survey responses are compiled below.

1. Do you recall viewing a webinar in February 2010 about the innovative practices identified by the 2009 domestic scan on Managing STIPs, TIPs, and Metropolitan Transportation Plans in Response to Fiscal Constraints?

Yes	No	Not sure
18	11	8

2. Did you hear about the findings of the scan tour from other sources as well?

Yes (see below)	No
9	28

Conferences and meetings				
TRB or AASHTO meeting or committee meeting	Another national or regional conference	State DOT workshop	State DOT internal meeting	Other (please describe)
5	1	0	1	2
Responses to "Other" (2 respondents): • MPO Counsel meetings • AMPO Annual Conference				

Other sources				
Other webinar	Article in a publication	Conversation or email with a scan participant	Conversation or email with a colleague	Other source (please specify)
0	1	1	4	0

3. Did you make any further inquiry into any of the findings of this scan?

Yes (see below)	No	No response
9	27	1

Follow-up actions			
Obtained or read the scan report	Contacted a scan participant	Contacted someone from one of the states visited in the scan	Other (please specify)
13	2	0	0

4. Did you take action to implement or disseminate one or more of the practices identified through the scan?

Yes (see below)	**No**	**No response**
10	26	1

Follow-up actions			
Made or initiated a change in practice at my agency	Discussed or recommended a change in practice at my agency	Shared information with a colleague	Other (please specify)
1	8	10	1

Other (1 respondent):

- Shared with AMPO members

Specific practices implemented or disseminated (5 respondents):

- Used the information in a general way to think about how my agency's practices could change, but to date, no substantive changes have been made as a result. I did appreciate [hearing] alternate perspectives and different ways to articulate what the TIPs, STIPs and metro plans are about.
- Instructed project sponsors to make sure they use YOE figures in TIP entries. Added a O&M cost component to the TIP document to more clearly show fiscal constraint.
- Discussed how our procedures compare with those outlined in webinar.
- Consistent revenue and cost methodologies, coordination w/ feds on admin mod vs. amendment
- Updated fiscal constraint practices. Will try to consider findings in making our documentation better.

5. If you used information from the scan tour to make or recommend a change to your agency's practices, please describe.

Open-ended responses (5 respondents):

- An example is encouraging others in my agency to think of metro plans as both a resource for our own planning activities and an opportunity to influence (through participation) decisions that might be made by others that will affect our operations and investments.
- Made no changes as of yet.
- Discussion of the opportunity and need to get the DOT on board with making changes before we can make changes
- Have been recommending that we spend resources on improving project development so that we have a better understanding of the project scope prior to funding it.
- Updating TIP amendment process. Developed methodology for plan, require revenue documentation for TIP (not just letter).

6. If you indicated in Question 3, 4 or 5 that you contacted or talked to others about the scan tour results, please list their names and agencies.

Open-ended responses (5 respondents):

- Declined
- Chad Edwards, NCTCOG
- Scott Omer, ADOT
- Florida and Kansas
- Multiple MPOs (AMPO's members)

7. Please use this space to provide any additional comments about your use of the findings of the scan tour on Managing STIPs, TIPs, and Metropolitan Transportation Plans in Response to Fiscal Constraints.

Open-ended responses (8 respondents):

- Although I did not use the findings, I would have liked to be made aware of them. I believe these domestic scans are very useful, but with all the info we get, the findings may have been "lost." Perhaps we need a more focused plan for getting this info to managers.
- Now that I'm aware of this document, I will download it and review the recommendations.
- I apologize for not being of much assistance. I have printed out and distributed the executive summary to my supervisor and co-workers. I have made a note about this program and will continue to review the website for additional references and resources.
- I do not recall viewing this webcast. However, it is possible that I/we did and I/we have no record of it.
- Found that we are doing a fairly good job in our state.
- The information presented was very basic. Most MPOs should already be doing this.
- Would have loved additional detail on methodologies for both revenue and cost estimates. That can be in the next scan...
- Very useful information and a good resource for the planning community.

6

Best Practices in Addressing NPDES and Other Water Quality Issues in Highway System Management (Scan 08-03)

This scan, conducted in mid-2009, focused on highway agencies' need for compliance with the National Pollution Discharge Elimination System (NPDES) and other water quality management issues. Successful implementation and compliance with NPDES permits requires good transfer of information and accountability through multiple phases of project delivery, whereas noncompliance can impact project design, engineering, and construction schedules and increase construction time and costs.

The scan focused on the following four topics:

- Total Maximum Daily Load (TMDL) implementation
- Traditional and innovative best management practices (BMPs)
- DOT practices and procedures
- Regulatory issues

The findings of the scan are documented in the final scan report, available online at http://domesticscan.org/wp-content/uploads/2010/05/NCHRP20-68A_08-03-Final-Report.pdf.

Overview of technology transfer and implementation efforts

The following observations, conclusions, and recommendations are based on information that CTC & Associates gathered during the six-month participant survey, the participant webinar, the 12-month participant interviews, and the 12-month nonparticipant survey. A complete record of findings through these channels follows later in this chapter.

Observations

- Among the six scans addressed in this report, this one was most focused on regulatory concerns. The value of establishing good dialogue and understanding between highway agencies and local, state, and federal natural resource agencies was repeatedly stressed by participants.
- Among other results of this scan, two noteworthy outcomes with national implications are noted here:
    - *This scan had an impact on national stormwater policy.* One participant stated: "An important aspect of this tour was the inclusion of EPA, the agency that regulates us, as a scan participant. I believe EPA's participation led to a separate transportation permitting section in the national stormwater regulations now in development, to be finalized in 2012."

  - *This scan led to a national working group on stormwater*. One participant reported: "The Stormwater Management Community of Practice, under the AASHTO Center for Environmental Excellence, grew out of this scan and two nationwide stormwater conferences, one in 2008 and a second in 2010. This need for a working group of stakeholders and practitioners was highlighted in the scan final report."

- Discussions during the six-month webinar focused on the challenges to implementing new technologies and practices regarding water quality, with participants noting that the main barriers are cost and required institutional and cultural changes. Despite this, the six-month survey and 12-month interviews revealed significant implementation efforts resulting from this scan.

Highlights of effective technology transfer

- The scan team engaged in an extensive array of technology transfer activities at the national level. Scan team members:
  - Authored a technical paper based on the scan report that was presented at the TRB Annual Meeting.
  - Made presentations on the scan findings at TRB and AASHTO committee meetings, at least 10 national conferences, and several EPA and FHWA meetings and teleconferences.
  - Presented a webinar.
  - Shared scan findings within their own agencies at events such as brown-bag lunches.

  Additional details on many of these activities are available in the scan team's Implementation Plan (see Appendix F).

- As a follow-up to a presentation made to the AASHTO Subcommittee on Construction, one scan team member noted: "We are planning on surveying the AASHTO SOC meeting attendees to gauge agreement and awareness nationally on NPDES issues."

- Participants noted the value of good information transfer and improved dialogue, both among states as well as between highway agencies and regulators:
  - "I have spread information out to our regions and other offices involved with transportation issues. I know that some are working on revising their own documentation and guidance, and they have followed up with me based on information I provided."
  - "This scan helped regulators appreciate how our department is attempting to manage our properties, and will help them evaluate how well we are complying with their regulations."
  - "Regular coordination and communication with local and federal regulators was an important aspect of improving the working relationship. Options such as funding staff positions at the regulatory agency improved the resources available for stormwater programs."
  - "We shared information from the tour extensively, particularly through our bureaus of design and maintenance. We shared information locally, with our state districts, and with agencies like U.S. Fish and Wildlife, FHWA, the U.S. Army Corps of Engineers, and the EPA."

- It was also noted that the findings "have worked their way into current NCHRP research, including one project addressing nitrogen total maximum daily load and another addressing construction best management practices. Both are focusing on needs identified on the scan tour."
- The 14 respondents to the nonparticipant survey were from 12 different states, none of which were involved in the scan. One described how his agency shared the scan findings: "We held statewide meetings to discuss changes to SWPPP with all our people and contractor personnel and discussed the need to use BMPs to come into compliance."
    - Other technology transfer activities among nonparticipants included discussions with management to recommend enhancing current best practices, follow-up contacts with scan team members and host agencies, and conversations among colleagues within nonparticipants' agencies.

Implementation successes

- Five of nine respondents to the six-month participant survey said that their participation in the scan facilitated the implementation of new practices or technologies at their agencies.
- Participants commented on the overall value of this scan for DOTs in terms of implementation:
    - "DOTs are partnering with universities and regulatory agencies on implementing applied studies on various technologies in the field. Research programs can improve program delivery."
    - The scan findings assist state DOTs with "stormwater program assessment," "assessment of requirements for NPDES planning," and development of training courses.
- Participants noted the value of the scan in helping address regulatory concerns. One noted: "We used the information very heavily in providing mandatory responses to EPA's questions as it continues to update the national stormwater regulation." Another said that the scan was "good timing, since FHWA is currently revising some of its regulations."
- Several participants described specific implementation activities at their agencies:
    - "We are implementing a stormwater retrofit program that is using the asset management efforts from Maryland and North Carolina DOT."
    - "North Carolina's use of polyacrylamide for soil stabilization and turbidity stabilization control has had a sizable impact on large construction projects in our state."
    - "We updated our department's design policies to incorporate practices observed in New York, Florida, and Texas."
    - "We created a training and demonstration facility within our university system to educate contractors, designers, and construction personnel on the proper use of best management practices similar to those we saw in Florida and Texas."
    - "We developed a construction erosion sediment control field guide for construction inspection similar to those in use in several of the DOTs visited."

  One participant commented: "We found that short-term items related to construction are easier to implement. When the time comes to address longer-term items like Municipal Separate Storm Sewer Systems, we'll be drawing from information we learned on that topic."
- Participants also noted planned implementation activities:
    - Development of a stormwater management plan that integrates Clean Water Act Section 404 and 402 requirements.

  - Exploration of evaluation of NPDES compliance for construction projects that include incentives and disincentives.
  - Update of National Highway Institute course 142054, "Design and Implementation of Erosion and Sediment Control," with information from the scan.
- One participant noted the successful secondary use of scan information by nonparticipants: "I have recommended that some states also visit the scan host states, and four of them have done so. Some are looking to implement some of the policies that the host states shared."

  Another noted a secondary use of this information as well: "Making this information available to local agencies, such as soil and water conversation districts, helped them implement similar programs at their level."
- One respondent to the nonparticipant survey, an FHWA staff member, built on the scan tour's success: "We actually conducted a scan tour of New Hampshire, Maryland, and North Carolina to help Colorado DOT with their water quality issues."
- Other respondents to the nonparticipant survey listed specific technologies and practices that they had implemented or disseminated:
  - "Invested in BMPs for maintenance activities."
  - "Moved stormwater practices into early in the project delivery process."
  - "Reiterated the need for our Bureau of Operations to update their policy manual to include temporary BMPs when conducting maintenance on roadsides."
- Participants also mentioned promising research highlighted in the scan that may prove valuable in the future:
  - Use of outside vendors to maintain and build stormwater structures for erosion control.
  - Permeable friction course overlays to reduce pollutant discharge from freeways and highways.
  - Batch detention to "dramatically improve the performance of dry detention basins."
  - Slope stabilization
  - Embankment vegetation
  - Flocculent systems

<u>Additional benefits of the scan</u>

- Scan participants found the tour to be extremely valuable. They discussed important lessons learned:
  - "Most important is our understanding of resources available so as not to repeat the same costly mistakes as those on the cutting edge of implementing practices. Technical literature rarely highlights the flaws of a strategy, even when it ultimately fails. Face-to-face meetings allow those of us who follow to avoid their costly learning curve."
  - "Just because an agency may do something differently, it doesn't make it wrong. The tour demonstrated the value of keeping an open mind."
- Several participants shared additional details on what made the scan successful:
  - "The overall value of this scan was very high, particularly given the complexity of this topic and the programs involved. It was very valuable to learn what kind of management and organization is required to meet the regulators' expectations."

  - "Partnering between highway agencies and regulators helps build credibility of the DOT compliance programs. Good and ongoing communication helps make expectations more reasonable—stakeholders understand each other's positions better and can develop workable solutions."
  - "The scan tour was excellent. It did a good job of showing how other states do things, which is particularly useful for other states that may not be as advanced in this area. It also provides more contacts for all involved."
  - "The whole scan program is extremely valuable. I was disappointed by the news coverage. It's a time-consuming and work-intensive two weeks, with a lot of effort required to get to all these good discussions. I think the program was money well spent."
- Participants stressed the timeliness of this tour:
  - "This scan came at an opportune time for me. Seeing what others are doing changed my entire perspective on this topic and was a game-changer for me personally."
  - "NPDES is a high priority for a number of states as it relates to construction, since they recognize the ramifications from water resource agencies—both state and federal—if their practices are not meeting requirements."
- One respondent to the nonparticipant survey commented: "I appreciate the national perspective that the scan provides."

<u>Scan best practices</u>

- One participant commented on the makeup of the scan team: "We had a good mix of states—large and small, from the coasts and the Midwest—and federal representation. This diversity is important in a scan tour group."
- Another suggested that the scan tour should serve as a model for other agencies: "There needs to be greater sharing of this type for all highway agencies."
- The technology transfer activities completed by the scan team were among the most extensive of the six scans studied in this report, including presentations at 10 or more national conferences.

<u>Barriers and opportunities for improvements</u>

- One participant stated that this scan did not include post-scan consultation with host state personnel and other scan participants.
- Two respondents to the six-month survey indicated that implementation efforts were unsuccessful due to institutional resistance. This was also mentioned during the six-month webinar, where cost and institutional resistance were noted as the main barriers to implementation. A participant suggested that "it might be worthwhile for future scans to consider how to tailor the scan results to address these institutional/cultural issues."
- One participant stated that "regulatory reasons" were behind his state's inability to implement New York's active treatment system.

Scan details

Scan team members

- Scott McGowen, California DOT (scan co-chair)
- Brian Smith, FHWA (scan co-chair)
- Vincent W. Davis, Delaware DOT
- Frances Brindle, Oregon DOT
- Matthew S. Lauffer, North Carolina DOT
- Mark Hemmerlein, New Hampshire DOT
- Patricia A. Cazenas, FHWA
- Jeff Lewis, FHWA
- Tom Ripka, Illinois DOT
- Rachel Herbert, U.S. EPA
- Scott Taylor (Subject Matter Expert)

Sites visited

State transportation agencies in New York, Maryland, North Carolina, Texas, Florida, Washington, D.C.

Scan dates
July 21-24, 2009

Final report
April 2010, http://domesticscan.org/wp-content/uploads/2010/05/NCHRP20-68A_08-03-Final-Report.pdf.

Six-month participant survey

CTC & Associates conducted an online survey of scan participants approximately six months following the completion of each scan. The scan included 11 team members, including two co-chairs and a subject matter expert (SME). Of the 11 original members, nine responded to the survey.

The following text appeared at the start of the online survey.

> *Thank you for participating in this survey about your experience as a member of a Domestic Scan team. NCHRP has initiated this follow-up research to identify:*
>
> - *Progress toward implementation of technologies and practices identified in each scan's implementation plan*
> - *Benefits of the Domestic Scan Program to you, your agency, and industry as a whole*
> - *Completed or planned dissemination activities*
> - *Names of individuals (beyond participants) who have heard about scan findings*
>
> *Completion of this survey should require no more than 15 or 20 minutes.*
>
> *CTC & Associates will compile survey results in the next few weeks and then invite you and the other members of your scan tour to participate in a one-hour Web conference to discuss your responses. This will also be an opportunity for you to reconnect and share your successes and challenges in implementing technologies and practices discussed during the scan.*

This survey and Web conference will be followed by another in approximately six months to further trace the impacts of your participation in the scan tour. For more information, see NCHRP Project 20-68B(01), "Accelerating the Rate of Innovation Among State DOTs – Tracing Domestic Scan Impacts."

If you have any questions about the survey or other aspects of this research effort, please don't hesitate to contact me.

Final results of the survey follow.

Conduct of Scan. Please rank each of the following scan program features in terms of its contribution to the overall value of this particular scan tour, where 1 is "not important" and 5 is "extremely important." If it did not apply to your scan, please pick N/A (Not Applicable).

	Not Important 1	2	3	4	Extremely Important 5	N/A	Response Count
Preparatory materials and meetings in advance of the scan tour	0	0	0	2	7	0	9
On-site visits to view the subject technology or practice	0	0	0	1	8	0	9
Face-to-face technical exchange with host state personnel and other scan participants	0	0	0	0	9	0	9
Final report of scan findings	0	0	0	3	6	0	9
Post-scan consultation with host state personnel and other scan participants	0	0	2	2	3	2	9

Scan Outcomes. Please rank each of the following scan program outcomes in terms of its contribution to the overall value of this particular scan tour, where 1 is "not important" and 5 is "extremely important."

	Not Important 1	2	3	4	Extremely Important 5	Response Count
Introduction to a new technology or practice	0	0	1	1	7	9
Clearer understanding of a new technology or practice	0	0	1	4	2	9

(continued)

(continued)						
	Not Important 1	**2**	**3**	**4**	**Extremely Important 5**	**Response Count**
Identification of one or more individuals at a host state to call on as a future resource	0	0	0	2	7	9
Identification of one or more scan participants to call on as a future resource	0	0	1	1	7	9
Information with which to *begin* implementation of a technology or practice at your agency	0	1	0	3	5	9
Information with which to continue implementation of a technology or practice at your agency	0	0	2	3	4	9

General comments regarding the overall value and benefits of the NCHRP Domestic Scan Program:

- The scan program provided an excellent forum with which to exchange information, ideas, and to meet other people who are in the same job situation.
- Research into stormwater practices is being carried out at several institutions around the country. Distribution of the findings seems slow and inefficient. DOTs are continuously developing programs that could be of benefit to other DOTs, again dissemination of the information is slow. Scan acts as a vehicle to efficiently distribute information.
- I think the mission of the NCHRP Domestic Scan Program is extremely important. For our particular scan, many DOTs have said how valuable identifying unique or innovative techniques and aspects of stormwater programs has been to them.
- Most important is our understanding of resources available so as not to repeat the same costly mistakes as those on the cutting edge of implementing practices. Technical literature rarely highlights the flaws of a strategy, even when it ultimately fails. Face-to-face meetings allow those of us who follow to avoid their costly learning curve.
- I don't think this scan included post-scan consultation with host state personnel and other scan participants; however, host state did review the scan report.
- Extremely valuable experience. It changed the way we do business at NHDOT
- Identified contacts and provided additional networking opportunities to learn and exchange ideas and state of the practice knowledge in the area of stormwater management, maintenance, construction and design.

Did your participation in the scan facilitate the implementation of any new practices or technologies?

Yes	No
5	4

Completed Implementations

- Other than 'getting the word out' on the Scan results. The Scan implementation plan has been well executed, with papers presented at five conferences by year's end.
- While I do not work at a DOT, this experience has enabled me to explain to headquarters and regional EPA stormwater staff and managers the various issues and solutions that DOTs have developed to implement their stormwater programs.
- We are implementing a storm water retrofit program that is using the asset management efforts from Maryland and N. Carolina DOT.
- Presentations at National Practitioners' Conference
- Flocculents - Better ESC.
- DOTs partnering with Universities and regulatory agencies on implementing applied studies on various technologies in the field. Research programs can improve program delivery.
- Assistance with State DOT stormwater program assessment
- NPDES Planning - Better assessment of requirements
- Agency maintenance and operations tracking programs that help to improve water quality. The ability to ensure performance of stormwater measures through effective tracking. Helps to identify which measures are working and providing the greatest benefit for the money expended.
- Assistance with State's training course
- Regular coordination and communication with local and federal regulators was an important aspect to improve the working relationship. Options such as funding staff positions at the regulatory agency improved the resources available for stormwater programs.

Are any implementations planned within the next year?

Yes	No
2	4

Planned Implementations (within the next year):

- Passive PAM application - NCSU is working on this technology and it will have important implications for complying with Construction NPDES permit requirements in the future.
- Assistance with State DOT stormwater program assessment
- Adding flocculent systems to projects
- The Green Streets and Highway Conference, November 14-17. We will be doing a presentation on the Scan.
- University of Texas is working on the water quality benefits of permeable friction course overlays. This technology could have very important benefits for reducing pollutant discharge from freeways and highways. The technology is easily retrofit and affordable.

- Development of a stormwater management plan for the Oregon DOT that integrates CWA Section 404 and 402 requirements.
- Presentations at conferences
- Update information to National Highway Institute course 142054 Design and Implementation of Erosion and Sediment Control
- University of Texas is working on 'batch' detention. This technology is easily retrofit and affordable, and dramatically improves the performance of dry detention basins.
- Exploration of evaluation of NPDES compliance for construction projects that includes incentives and disincentives.
- State training workshops
- University of Florida continues to be a leader, along with University of New Hampshire, in the assessment and research into previous pavement, this will be an important technology in the future for DOTs
- Assistance with National Highway Institute training course revisions

Number of respondents who attempted an implementation without success
2, citing institutional resistance

Number of contacts provided regarding current or planned implementation activities
13

Number of contacts outside the agency provided
4

Dissemination Activities (from eight respondents):

- Organization – DelDOT
  Event – "Brown Bag" meeting
  Date – 10/01/2009
  Title/Subject – Lessons learned from the scan tour
  Used Scan PowerPoint? (Yes/No) – Yes
- Organization – TRB
  Event – Annual Conference
  Date – 01/01/2010
  Title/Subject – Scan Implementation
  Used Scan Powerpoint? (Yes/No) Yes
- Organization – Center for Transportation and the Environment (CTE) at North Carolina State University, in cooperation with the Federal Highway Administration
  Event – Webcast
  Date – 03/25/2010
  Title/Subject – Best Practices in Addressing NPDES stem and Other Water Quality Issues in Highway System Management
  Used Scan PowerPoint? (Yes/No) – Yes

- Organization – AASHTO
  Event – National Environmental Practitioners Meeting
  Date – 11/18/2010
  Title/Subject – NPDES Domestic Scan Results
  Used Scan PowerPoint? (Yes/No) – Yes
- Organization – Federal Highway Administration
  Event – Resource Agency Meeting
  Date – 09/01/2009
  Title/Subject – Erosion & Sediment Control Advances
  Used Scan PowerPoint? (Yes/No) – Yes
- Organization – TRB
  Event – mid-year meeting
  Date - 06/01/2010
  Title/Subject – Domestic Scan Tour Best Practices in Addressing NPDES
  Used Scan PowerPoint? (Yes/No) – Yes
- Organization – TRB
  Event – Construction Sub-Committee
  Date – 08/01/2010
  Title/Subject – Domestic Scan
  Used Scan PowerPoint? (Yes/No) – Yes
- Organization – TRB/Committee on Hydraulics, Hydrology and Water Quality
  Event – Mid-year meetings
  Date – 12/2010 and 8/2010
  Title/Subject – FHWA updates which included information on the Scan Tour
  Used Scan PowerPoint? (Yes/No) – No
- Organization – Stormcon
  Event – Annual Conference
  Date – 08/01/2010
  Scan Implementation
  Used Scan PowerPoint? (Yes/No) – Yes
- Organization – Transportation Research Board (TRB)
  Event – Transportation Research Board (TRB) Environment and Energy Research Conference
  Date – 06/08/2010
  Title/Subject – Best Practices in Addressing NPDES stem and Other Water Quality Issues in Highway System Management
  Used Scan PowerPoint? (Yes/No) – Yes
- Organization – AASHTO
  Event – National DOT Stormwater Practitioners' Conference
  Date – 04/01/2010
  Title/Subject – Domestic Scan Tour Best Practices in Addressing NPDES
  Used Scan PowerPoint? (Yes/No) – Yes

- Organization – AASHTO
  Event – Water Quality Meeting (Denver)
  Date – 06/01/2010
  Title/Subject – Domestic Scan
  Used Scan PowerPoint? (Yes/No) – Yes
- Organization – FHWA
  Event – 2010 National Hydraulics Engineering Conference
  Date - 8/31-9/3/2010
  Title/Subject – Best Practices in Addressing Water Issues in Highway System Management
  Used Scan PowerPoint? (Yes/No) – Yes
- Organization – AASHTO
  Event – National Hydraulics Engineers Conference
  Date – 08/01/2010
  Title/Subject – Scan Implementation
  Used Scan PowerPoint? (Yes/No) – Yes
- Organization – USEPA
  Event – Teleconference with the EPA Regions
  Date – 08/11/2010
  Title/Subject – Stormwater SCAN Tour Overview
  Used Scan PowerPoint? (Yes/No) – No
- Organization – FHWA
  Event – Office meeting
  Date – 07/01/2010
  Title/Subject – Domestic Scan Tour Best Practices in Addressing NPDES
  Used Scan PowerPoint? (Yes/No) – Yes
- Organization – ASCE/FHWA/EPA/AASHTO
  Event – Green Streets and Highways Conference
  Date – November 14-17, 2010
  Title/Subject – Best Practices in Addressing NPDES and Other Water Quality Issues in Highway System Management
  Used Scan PowerPoint? (Yes/No) – Yes
- Organization – ASCE
  Event –Transportation and Development Institute Conference
  Date – 11/01/2010
  Title/Subject – Scan Implementation
  Used Scan PowerPoint? (Yes/No) – Yes
- Organization – USEPA
  Event – Teleconference with EPA Transportation Peer Exchange Members
  Date – 10/27/2010
  Title/Subject – Stormwater SCAN Tour Overview
  Used Scan PowerPoint? (Yes/No) – No

- Organization – AASHTO
  Event – AASHTO Annual Stormwater Practitioners Conference
  Date – 4/27/10
  Title/Subject – Best Practices in Addressing NPDES stem and Other Water Quality Issues in Highway System Management
  Used Scan PowerPoint? (Yes/No) – Yes
- Provided information, including report to a variety of individuals and contacts from Scan to [members of my agency]

Six-month participant webinar

Several scan tour participants and NCHRP project panel members took part in a webinar approximately six months following the conclusion of the scan. The purpose of the webinar was to discuss the initial findings of the scan, to review technology and implementation efforts to date and to plan follow-up activities. Details on the webinar follow.

Date
Wednesday, November 19, 2010

Attendees
Facilitators
- Dylan Casey, CTC & Associates LLC
- Patrick Casey, CTC & Associates, LLC

Scan Team Members
- Brian Smith, FHWA (scan co-chair)
- Vince Davis, Delaware DOT
- Jeff Lewis, FHWA
- Rachel Herbert, EPA
- Scott Taylor, SME

Panel Members
- Skip Paul, Director LTRC (panel chair)
- Shane Brown, Washington State University
- Rick Kreider, Kansas DOT

Media
- Slides: http://domesticscan.org/wp-content/uploads/Scan08-03Webinar.pdf

Summary
Draft survey results were provided to scan team members prior to the webinar. Following introductions and a review of the results, each team member discussed some of their implementation efforts and their view of the impact of the scan. The scan team members all thought that the scan was successful in capturing, understanding, and documenting successful innovative technologies and practices.

In general, the conversation centered around Brian Smith's initial observation that there were many challenges to implementing new technologies and practices regarding water quality. The two dominant factors are cost and institutional/cultural changes required. He noted that this is a nationwide problem.

Vince Davis commented that "states don't want to do things that aren't required" because of costs. Also, he noted that institutional communication between and within agencies is a "huge key" to successfully implementing these technologies. "Everyone needs to work well together."

Jeff Lewis concurred that "people are touchy about trying new things due to fiscal constraints."

Rachel Herbert echoed Brian's comments about institutional issues and cited the lack of upper management support for these innovations as being a frequent stumbling block for implementation. She also said that it can be difficult working with permitting authorities regarding new technologies due to their own unfamiliarity with them. "It requires a trust factor."

Panel member Rick Kreider suggested that it might be worthwhile for future scans to consider how to tailor the scan results to address these institutional/cultural issues.

Following the comments from the scan team members, Skip Paul clarified some of the Panel's interest in the scans, particularly their interest in how the scan as an effort is working to get new technologies into practice. He noted that the Panel is very interested in how the knowledge from the scan spreads and what can be done to facilitate such spreading: "How many states not on the team got engaged and tried to use some of this information?" He also asked specifically whether any scan team members had visited the new website, used the blog, or had any suggestions for other material that could be usefully included on the site.

Brian Smith said he'd briefly visited the website. In terms of spreading the results of the scan, he'd had many "good discussions regarding the scan" at a number of meetings, citing the state practitioners in Colorado as a good example. He also noted that he's helping facilitate a visit with North Carolina and Maryland regarding scan-related technologies and that West Virginia had made a request that they help them assess their own current program.

12-month participant interviews

CTC & Associates conducted a brief telephone interview with participants approximately one year following the publication of the scan report.

Among the 10 highway agency scan participants contacted, eight participated in the interview. Responses to each of three questions are summarized and compiled below.

1. How have you implemented changes to your agency's policies, practices or technologies based on what you learned from participating in this scan tour?

- On several occasions while brainstorming issues with staff, I have brought up a practice used by a given DOT that we could use, in part or as a whole, or look into further. Subsequently we have built pieces of those into our business practices.
- I have recommended that some states also visit the scan host states, and four of them have done so. Some are looking to implement some of the policies that the host states shared.
- We considered some of the practices we learned about, but I can't say that we changed anything.

- The scan was extremely valuable not only for participants on the team but the agencies visited. It helped with networking contacts.
- An important aspect of this tour was the inclusion of EPA, the agency that regulates us, as a scan participant. I believe EPA's participation led to a separate transportation permitting section in the national stormwater regulations now in development, to be finalized in 2012.
- Our state was both a scan participant and a host state. During the visit to our state, we had our regulators available, and they were able to better clarify how we were regulated.
- We used the information very heavily in providing mandatory responses to EPA's questions as it continues to update the national stormwater regulation.
- This scan had a sizable impact on our DOT.
- North Carolina's use of polyacrylamide for soil stabilization and turbidity stabilization control has had a sizable impact on large construction projects in our state.
- The scan helped us understand New York's active treatment system; this ultimately didn't work in our state for regulatory reasons.
- Washington D.C.'s stormwater activities were interesting, but ultimately not directly applicable to us, since we're more involved in rural areas and D.C. is primarily metropolitan.
- We may want to consider Maryland's practice of using outside vendors to maintain and build stormwater structures for erosion control.
- Slope stabilization in North Carolina, Texas, and Florida was interesting, and these tools proved useful for us to bring to the table in discussions with our own state regulators.
- We found that short-term items related to construction are easier to implement. When the time comes to address longer-term items like Municipal Separate Storm Sewer Systems, we'll be drawing from information we learned on that topic. I believe that information was more immediately useful to the national representatives on the scan tour.
- I don't think we have implemented any findings at this time, but there have been a number of discussions among state and federal personnel about this topic.
- We were interested in the research at one host state on embankment vegetation and how it removes a significant portion of pollution from stormwater. If vegetation can really be as effective as described, then this study suggests the possibility of reducing existing stormwater treatment requirements for highways. This will be something we want to look into more closely.
- I have been incorporating the scan findings into our outreach and training activities. This is good timing, since FHWA is currently revising some of its regulations.
- Following the scan tour, we updated our department's design policies to incorporate practices observed in New York, Florida, and Texas.
- We also created a training and demonstration facility within our university system to educate contractors, designers, and construction personnel on the proper use of best management practices similar to those we saw in Florida and Texas. We developed a construction erosion sediment control field guide for construction inspection similar to those in use in several of the DOTs visited.

- We also utilized contacts with the other states visited when evaluating potential issues in our DOT's stormwater program.
- The Stormwater Management Community of Practice, under the AASHTO Center for Environmental Excellence, grew out of this scan and two nationwide stormwater conferences, one in 2008 and a second in 2010. This need for a working group of stakeholders and practitioners was highlighted in the scan final report.

2. *(For State DOT representatives)* Have you shared information you learned or contacts you made during the scan tour with other people in your agency, in your state, or beyond, and if so, how have they put that information to use?

(or)

***2. (For Federal agency representatives)* Have you shared information you learned or contacts you made during the scan tour with other people in your agency, in other agencies, or beyond, and if so, how have they put that information to use?**

- I have referred my staff to contacts I made during the scan when issues come up in my state. The networking aspect of the scan is very valuable and helpful. I have also shared information on our practices with regulators and with our state's stormwater association.
- We shared the information we learned on policy and practice aspects of this tour with other states.
- Working with another state, we co-authored/co-sponsored a report on this project.
- We have maintained contact with the host states and continued networking with them. We will use them as a resource in the future.
- We shared information we learned, and I believe some of the people we spoke with followed up with the presenters from the host states.
- We believe the communication and networking, particularly with FHWA, was very valuable. For example, we learned what unique funding mechanisms might be able to us for stormwater management.
- Two scan team members made a presentation in 2010 at the TRB conference to TRB committee AFB-60 on Hydrology, Hydraulics, and Water Quality. Another member presented the results at the 2010 stormwater conference in Denver.
- I think the scan findings have worked their way into current NCHRP research, including one project addressing nitrogen total maximum daily load and another addressing construction best management practices. Both are focusing on needs identified on the scan tour.
- The FHWA Resource Center has kept this issue on the front-burner for a lot of people.
- The AASHTO Subcommittee on Construction brought in a scan member to present to committee members.
- We are planning on surveying the AASHTO Subcommittee on Construction meeting attendees to gauge agreement and awareness nationally on NPDES issues.
- I have spread information out to our regions and other offices involved with transportation issues. I know that some are working on revising their own documentation and guidance, and they have followed up with me based on information I provided.

- We shared information from the tour extensively, particularly through our bureaus of design and maintenance. We shared information locally, with our state districts, and with agencies like U.S. Fish and Wildlife, FHWA, the U.S. Army Corps of Engineers, and the EPA.
- Making this information available to local agencies, such as soil and water conversation districts, helped them implement similar programs at their level.
- This scan helped regulators appreciate how our department is attempting to manage our properties, and will help them evaluate how well we are complying with their regulations.

3. How would you characterize the overall value of this scan tour? What comments would you like to share for the summary report on this project?

- Overall the scan was very important, and the timing was key. As stormwater regulations are changing, getting more prescriptive while state DOTs try to capture these practices in a unique linear environment, the scan assisted us in sharing what works, what is helpful, and who we can call on for questions. More importantly, this team has made it easy to formulate a national small group of practitioners to discuss ongoing challenges.
- The overall value of this scan was very high, particularly given the complexity of this topic and the programs involved. It was very valuable to learn what kind of management and organization is required to meet the regulators' expectations.
- Partnering between highway agencies and regulators helps build credibility of the DOT compliance programs. Good and ongoing communication helps make expectations more reasonable—stakeholders understand each other's positions better and can develop workable solutions. It's much better to address many of the issues involved at an institutional level rather than on a project-by-project basis.
- The scan tour was excellent. It did a good job of showing how other states do things, which is particularly useful for other states that may not be as advanced in this area. It also provides more contacts for all involved.
- Another lesson of the tour is that just because an agency may do something differently, it doesn't make it wrong. The tour demonstrated the value of keeping an open mind.
- The whole scan program is extremely valuable. I was disappointed by the news coverage. It's a time-consuming and work-intensive two weeks, with a lot of effort required to get to all these good discussions. I think the program was money well spent.
- We had a good mix of states—large and small, from the coasts and the Midwest—and federal representation. This diversity is important in a scan tour group.
- This scan came at an opportune time for me. Seeing what others are doing changed my entire perspective on this topic and was a game-changer for me personally.
- For those of us on the scan, having an opportunity to work intensively and talk with others and among ourselves helped us to developed a robust strategy for moving forward in addressing stormwater issues. That's reflected in the ongoing NCHRP studies.
- This was a valuable scan. NPDES is a high priority for a number of states as it relates to construction, since they recognize the ramifications from water resource agencies—both state and federal—if their practices are not meeting requirements.

- The exchange made possible through the scan tour and the subsequent report helped define a good sampling of practices and may lead to more consistency about how stormwater is handled among states.
- Supporting and disseminating information on what DOTs are doing to meet their water quality requirement is very valuable. I have heard this comment too from other DOTs who weren't on the tour.
- The process of the scan tour was helpful and allowed people to interact one-on-one and share experiences on what worked and what didn't from state to state.
- The overall value of this scan tour for our agency was huge. As advocacy for stormwater enforcement grew in our state, we had examples to go to about what could be done to improve our compliance.
- The scan eliminated the wastefulness associated with trying methods that proved consistently unsuccessful elsewhere.
- There needs to be greater sharing of this type for all highway agencies. There is nothing like face-to-face communication and going out to see what works and what doesn't.

Nonparticipant survey

To gather more information about the reach of the scan tour findings, CTC & Associates conducted a seven-question online survey of nonparticipants—individuals who did not participate in the scan but who were identified as having received information about it.

Survey Methodology

The scan team completed a broad range of technology transfer activities as part of the scan's Implementation Plan (see Appendix F, compiled by scan consultant Arora and Associates). These efforts included presentations at TRB and AASHTO committee meetings and at least 10 national conferences, a webinar, and meetings such as brown-bag lunches at participants' agencies. Several of these activities involved presenting the scan findings to groups of specific individuals, such as attendees at committee meetings.

In an effort to trace the paths through which information about the scan findings spread beyond the initial scan participants, CTC & Associates reviewed the information available about which of the planned technology transfer activities had been completed and confirmed these details through an online search. We identified the activities for which attendees' names were most likely to have been compiled, and we contacted the organizers of those activities.

We were able to obtain an attendance list for one of these activities—a presentation at an August 2010 meeting of the AASHTO Subcommittee on Construction. We culled the list for those attendees who represented state DOTs and FHWA divisions, and sent surveys to staff from those agencies. The survey was sent to 110 attendees.

Scan team members and respondents to the nonparticipant survey provided seven additional names of people who had been involved in an implementation of scan technology or whom they had spoken to about the scan findings. Surveys were sent to these seven individuals as well.

In all, CTC & Associates sent the nonparticipant survey to 117 people; subtracting invalid email addresses, the survey reached 109 recipients. Recipients received the following email:

Hello,

The National Cooperative Highway Research Program is conducting research to evaluate how the innovative technologies and practices identified through its Domestic Scan Program (http://domesticscan.org) are being used by transportation practitioners beyond the initial scan participants. The findings of the 2009 scan tour on Addressing NPDES and Other Water Quality Issues in Highway System Management were presented at the August 2010 meeting of the AASHTO Subcommittee on Construction, which you attended, and we would appreciate a few minutes of your time to complete a brief survey (7 questions) on your use of the scan findings.

You may receive an invitation to complete a survey about more than one scan topic. Please feel free to respond to only one of these.

This survey is an important opportunity to document the real, tangible benefits and value of the practitioner-to-practitioner information exchanges facilitated by the Domestic Scan Program. The goal of the program is to accelerate the spread of leading-edge, proven technologies and practices to DOTs across the country, thereby helping all agencies provide safer, longer-lasting, more cost-effective transportation facilities to their taxpayers. This survey is an effort to trace these impacts.

The survey is available at http://www.surveymonkey.com/s/NWQDF85. If possible, please complete the survey by Friday, August 12.

If you have any questions about this NCHRP research effort, please feel free to contact me at the phone number or email below. You can also contact TRB Senior Program Officer Andrew Lemer at ALemer@nas.edu or (202) 334-3972.

Thank you for your time and your participation.

The survey itself also included the following introductory text:

The National Cooperative Highway Research Program sponsors a Domestic Scan Program (NCHRP Project 20-68A) to facilitate technology transfer among state DOTs. NCHRP is conducting research to evaluate how the technologies and practices identified through the Domestic Scan Program are being used by transportation practitioners beyond the scan participants. This survey is part of that effort to capture how those who have heard about the scan findings are using that information at their agencies.

This survey is an important opportunity to document the real, tangible benefits and value of the practitioner-to-practitioner information exchanges facilitated by the Domestic Scan Program. The goal of the program is to accelerate the spread of leading-edge, proven technologies and practices to DOTs across the country, thereby helping all agencies provide safer, longer-lasting, more cost-effective transportation facilities to their taxpayers. This survey is an effort to trace these impacts.

You can review a summary of the results of the scan on Addressing NPDES and Other Water Quality Issues at this link: Executive Summary

Thank you for taking the time to complete the survey.

Responses

A total of 14 people who were not involved in the scan responded to the surveys. The respondents represented agencies across the country:

- 13 respondents were from 12 different states, none of which were involved in the scan
- 2 respondents were from FHWA, including one from a state division

One response to the nonparticipant survey was received from a scan participant; this response has been removed from the survey results presented here.

The 14 survey responses are compiled below.

1. Do you recall hearing a presentation at the August 2010 meeting of the AASHTO Subcommittee on Construction about the innovative technologies and practices identified by the 2009 domestic scan on NPDES?
Note: This question was not asked of the respondents who were referred to us by scan team members or by other survey respondents.

Yes	No	Not sure
8	2	2

2. Did you hear about the findings of the scan tour on NPDES from other sources as well?

Yes (see below)	No
3	9

Conferences and meetings				
TRB or AASHTO meeting or committee meeting	Another national or regional conference	State DOT workshop	State DOT internal meeting	Other (please describe)
3	0	0	1	1
Responses to "Other": • Our Operations Environmental Engineer				

Other sources				
Webinar	Article in a publication	Conversation or email with a scan participant	Conversation or email with a colleague	Other source (please specify)
0	0	1	0	0

3. Did you make any further inquiry into any of the findings of the scan on NPDES?

Yes (see below)	No
2	12

Follow-up actions			
Obtained or read the scan report	Contacted a scan participant	Contacted someone from one of the states visited in the scan	Other (please specify)
2	1	1	1

Responses to "Other":

- Read the executive report that came with the e-mail for this survey.

4. Did you take action to implement or disseminate one or more of the technologies or practices identified through the scan?

Yes (see below)	No
7	7

Follow-up actions			
Made or initiated a change in practice at my agency	Discussed or recommended a change in practice at my agency	Shared information with a colleague	Other (please specify)
2	3	3	3

Responses to "Other":

- My DOT counterpart was at AASHTO SOC 2010
- We actually conducted a scan tour of New Hampshire, Maryland, and North Carolina to help Colorado DOT with their water quality issues.
- Discussed with our Operations Environmental Engineer, who coordinates with our Regions and others to determine needed actions.

Specific technologies or practices implemented or disseminated (3 respondents):

- We held statewide meetings to discuss changes to SWPPP with all our people and contractor personnel and discussed the need to use BMPs to come into compliance.
- Invest in BMPs for maintenance activities.
- Moving stormwater practices into early in the project delivery process.

5. If you used information from the scan tour to make or recommend a change to the technologies and practices in use at your agency, please describe.

Open-ended responses (1 respondent):

- Reiterated the need for our Bureau of Operations to update their policy manual to include temporary BMPs when conducting maintenance on roadsides.

6. If you indicated in Question 3, 4 or 5 that you contacted or talked to others about the scan tour results, please list their names and agencies.

Open-ended responses (2 respondents):

- Kristin Schuster, Operations Environmental Engineer, Michigan Department of Transportation
- Tom Ripka (Illinois DOT)

7. Please use this space to provide any additional comments about your use of the findings of the scan tour.

Open-ended responses (1 respondent):

- I appreciate the national perspective that the scan provides.

7

Domestic Scan Program Website

In addition to tracking the reach and implementation successes of six scans in the U.S. Domestic Scan program, another part of the NCHRP project 20-68B was development of the program's website. CTC & Associates developed the program's site, http://domesticscan.org, which launched in August 2010. A screen shot of the website's home page, current as of October 2011, is shown in Figure 7.1.

Figure 7.1. The U.S. Domestic Scan program website.

The site was designed to serve multiple purposes:

- To provide overview information on the U.S. Domestic Scan program.
- To provide summary information on all scans conducted through the U.S. Domestic Scan program, whether completed, in-progress, or planned.
- For completed scan, to provide a page with collateral documentation of interest to scan team members, stakeholders, and the public.
    - For a given scan, this typically includes information on the scan itself (prospectus, final report, executive summary, and final presentation) as well as documentation related to the follow-up technology transfer and dissemination activities described in this report (the participant webinar presentation and the memorandum on the webinar and participant survey)
- To provide a forum for discussion of follow-up technology transfer and implementation activities through a participant blog page. This would serve two purposes:
    - To capture the extent of technology transfer activities spelled out in each scan's implementation plan.

      To capture scan benefits to nonparticipants—individuals who did not participate in the scan but learned about it through various communications channels.

Site use and statistics

A report on Web activity for the U.S. Domestic Scan program website is presented as Appendix G to this report. A summary of site activity between mid-August 2010 and late September 2011 follows:

- The site had 915 visitors with a total of 3,304 page views.
- Beyond the home page, the most accessed pages were the participant blog and the scan home pages for Scans 07-01 (Project Delivery Management) and 07-02 (Accelerated Construction).
- Among files accessed by visitors, the Final Scan Report Executive Summary and Final Scan Report for each scan were consistently the most accessed downloads.
- By far, the United States was the greatest source of visitors (881 visits). Brazil was a distant second (27 visits).

Although the website has been online since August 2010, it was not widely publicized for nearly a year. The site was announced broadly to members of AASHTO's Research Advisory Council at that organization's July 2011 meetings. This accounts for the marked increase in website traffic in July 2011, as shown in Appendix G and Figure 7.2 below.

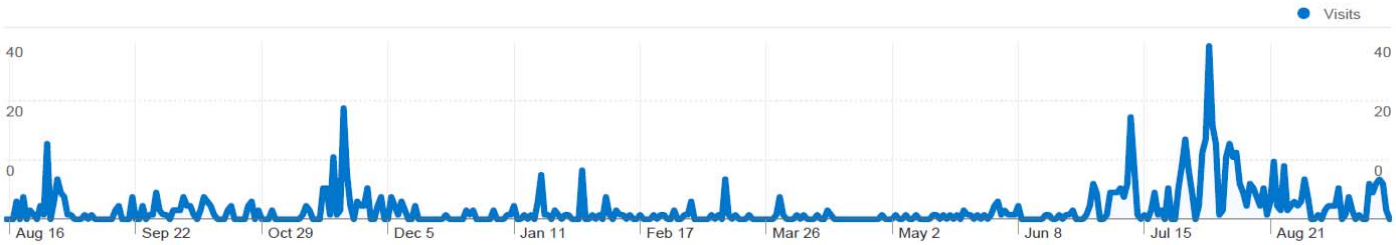


Figure 7.2. Visitors to domesticscan.org, Aug 15, 2010 to Sep 25, 2011.

Suggested improvements

There are a number of opportunities to enhance the value of the U.S. Domestic Scan program website to address two shortcomings:

1. To date, the participant blog has not been used effectively.
2. The website has a relatively small number of visitors.

As the U.S. Domestic Scan program moves forward, the following enhancements to the website are proposed:

- Replace the general "participant blog" with a more specific reporting feature to allow scan participants to log their technology transfer efforts and other practitioners to comment upon implementation of scan technologies and practices. Improved reporting would help document these activities and generate a valuable database of nonparticipants to later survey.
- Given the inherent value of the U.S. Domestic Scan program website as a technology transfer tool unto itself, explore ways to enhance the audience of the U.S. Domestic Scan program website:
    - Make announcements to transportation and research stakeholders, such as AASHTO FHWA, TRB, and private-sector contractors and consultants among others.
    - Work with NCHRP to link the U.S. Domestic Scan program website (http://domesticscan.org) from the program page on TRB's website (http://144.171.11.40/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=1570).
    - Optimize search engines to provide better results when users are seeking this site.
- As the number of completed scans grows, make menu and site structure changes as appropriate to make the results of recently conducted scans more accessible.

Future website hosting and maintenance

NCHRP has amended contract 20-68B(01) whereby CTC & Associates will perform a review of the next 12 scan tours and continue to host and maintain the U.S. Domestic Scan program website through March 2013. As part of this extended work CTC & Associates will work with Arora and Associates to add information to the site regarding the next 12 scans. CTC & Associates will also update the maps of host states and team member home states to reflect the ongoing reach of the scan tours.

Appendix A
Compiled by Arora and Associates

Domestic Scan 07-01 Best Practices in Project Delivery Management Implementation Plan

Updated 12-01-10

Strategy	Activities	Who	Target Dates	Status
#1-Articles in magazines and professional journals. A traditional means for sharing information in the transportation industry is through the monthly periodicals that are widely read by professionals.	Examples publications: • Public Roads • Better Roads • Governing	Connie Yew, Alan Teikari, Sheri Schaftlein	Feb 2010	Article "Efficient, Expeditious, and Effective: Best Practices in Project Delivery Management" was published in Jan/Feb 2010 FOCUS journal. http://www.fhwa.dot.gov/publications/focus/10jan/index.cfm
#2-AASHTO web site content AASHTO's web site is a popular and effective tool for distributing information to state DOTs and other public and private sector groups and individuals. Posting one or more summaries of the scan to the AASHTO web site will help with sharing this information.		Jim McMinimee	March 2010	Report was posted on AASHTO Standing Committee on Performance Management website in March 2010
#3-Publish in TR News TR News is published by the Transportation Research Board six times a year. Each issue contains relevant information about current and emerging subjects in the transportation industry. The format for an article in TR News is conducive to a comprehensive look at the findings of Best Practices of this scan		Joyce Taylor Sid Detmer	TBD	
#4-Publish in Research Digest The Research Digest is published by the Transportation Research Board and offers a more succinct format for sharing the findings of this scan team. Typically, an issue of the Research Digest is subject specific and would lend itself well to these Best Practices.		Joyce Taylor Sid Detmer	TBD	

Strategy	Activities	Who	Target Dates	Status
#5-AASHTO presentations Many of AASHTO's standing committees and subcommittees are established to cover the precise topic areas of this scan. As such, members of these bodies should be exposed to the findings and Best Practices identified by the team.	Subcommittee on Construction	Dave Nichols	TBD	Will try to get on agenda for 2010 meeting
	Standing Committee on Highways (SCOH)	Jim McMinimee		Gave report to the spring SCOH, Bedford Springs, Pa, 2009
	Standing Committee on the Environment (SCOE)	Shari Schaftlein	TBD	2009 meeting is canceled
	Subcommittee on Design (SCOD)	Gary Mroczka	July 19-23, 2009, Indianapolis, IN	Presented on July 22
	Board of Directors	Jim McMinimee		Didn't get on agenda
	Standing Committee on Performance Management	Joyce Taylor		2009 meeting is canceled
	Leadership Forum	Jim McMinimee		Missed 2009 year's deadline. Will try to get on agenda in 2010 meeting.

Strategy	Activities	Who	Target Dates	Status
#6-Regional meeting presentations for state DOTs State DOTs meet at least annually in a regional format to share information and address issues that reflect some of their unique geographic needs. The scan team feels that these regional meetings offer valuable opportunities to share information.	Northeast Association of State Transportation Officials (NASTO)	Joyce Taylor	TBD	Missed 2009 year's deadline. Will try to get on agenda in 2010 meeting.
	Southeast Association of State Highway and Transportation Officials (SASHTO)	Mark Lester	TBD	
	Mississippi Valley Conference	Dave Nichols	TBD	Will try to get on agenda in 2010 meeting.
	Western Association of State Highway and Transportation Officials (WASHTO)	Jim McMinimee	TBD	Will try to get on agenda in 2010 meeting.
#7-FHWA website and other information exchange opportunities The Federal Highway Administration works hard to share information with the transportation industry through its website and other avenues. As one of the agency sponsors for the scan it is logical that FHWA will assist with the dissemination of Best Practices in project delivery management.		Alan Teikari Connie Yew Shari Schaftlein	Jan 2010 April 2010	Report was posted on TRB Performance Measurement Google site/FHWA Exchange in Jan 2010. FHWA will be sharing highlights of the scan at a seminar for graduate students at University of Virginia in April 2010

Strategy	Activities	Who	Target Dates	Status
#8-Webinars Webinars have become a very popular medium to communicate critical information to a large audience at one time. The scan team believes that using webinars will assist in getting this information out to a large audience who may not be able to attend the other meetings and venues listed in this chapter. It is envisioned that the webinars may be specific to one focus area rather than trying to address all of the Best Practices described in this report.	Aug 25 (2:00-4:00 pm Eastern time) - Practice Run: All Measures Moderator: Joyce and Connie	Connie Yew Gary Mroczka	Aug 25, 2009 2:00-4:00 pm Eastern time	Completed All presentation materials of 5 sessions (including 2 successfully recorded sessions) are posted in the Webinar room at: http://fhwa.na3.acrobat.com/bestpractices500/
	Sept 1 (1:30-3:00 pm Eastern time) – Overview Moderator: Jim and Shari		Sept 1, 2009 1:30-3:00 pm Eastern time	Completed All presentation materials of 5 sessions (including 2 successfully recorded sessions) are posted in the Webinar room at: http://fhwa.na3.acrobat.com/bestpractices500/
	Sept 8 (1:30-3:00 pm Eastern time) - Project Management Moderator: Mark and Alan		Sept 8, 2009 1:30-3:00 pm Eastern time	Completed All presentation materials of 5 sessions (including 2 successfully recorded sessions) are posted in the Webinar room at: http://fhwa.na3.acrobat.com/bestpractices500/ Recording: http://fhwa.na3.acrobat.com/p97437178/
	Sept 15 (1:30-3:00 pm Eastern time) – Contracting Practices Moderator: Dave and Jim		Sept 15,2009 1:30-3:00 pm Eastern time	Completed All presentation materials of 5 sessions (including 2 successfully recorded sessions) are posted in the Webinar room at: http://fhwa.na3.acrobat.com/bestpractices500/ Partial Recording w/o intro: http://fhwa.na3.acrobat.com/p27796940/
	Sept 22 (1:30-3:00 pm Eastern time) - Performance Measures Moderator: Joyce and Connie		Sept 22, 2009 1:30-3:00 pm Eastern time	Completed All presentation materials of 5 sessions (including 2 successfully recorded sessions) are posted in the Webinar room at: http://fhwa.na3.acrobat.com/bestpractices500/
	Sept 24 (1:30-3:00 pm Eastern time) - Community Involvement Moderator: Gary and Sid		Sept 24, 2009 1:30-3:00 pm Eastern time	Completed All presentation materials of 5 sessions (including 2 successfully recorded sessions) are posted in the Webinar room at: http://fhwa.na3.acrobat.com/bestpractices500/

Strategy	Activities	Who	Target Dates	Status
#9-TRB Committee presentations Numerous opportunities exist to present the findings and Best Practices of this scan to the many committee meetings and sessions sponsored by the Transportation Research Board (TRB). These opportunities may occur at either the Annual Meeting in Washington, DC held each year in January or at the summer meetings of the various entities of TRB.	Performance Measurement (PM)	Connie Yew	July 20, 2009	TRB PM Committee members were invited and participated in the Sept 2009 Webinar series.
	Management and Productivity (MP)	Connie Yew	July 20, 2009	TRB MP Committee members were invited and participated in the Sept 2009 Webinar series.
	Project Delivery	Tom Warne Arun Shirole	TBD	
	Construction Management	Tom Warne Arun Shirole	TBD	
	Environmental	Shari Schaftlein	TBD	Get into the minute
	2010 TRB Annual Conference2010 TRB Annual Conference **Event Title:** Best Practices in Project Delivery: Results of AASHTO Domestic Scan on Project Delivery	Jim McMinimee Connie Yew Dave Nichols Shari Schaftlein	1/13/10 8:00am – 9:45am	Project Management McMinimee, Jim Performance Measures Yew, Connie Contracting Practices Nichols, David Community Involvement Schaftlein, Shari M.
#10-Share results using contemporary media The team recognizes that potential users of the Best Practices identified during this scan will be more readily reached through contemporary media such as YouTube, Facebook, Twitter or a Blog. The team will endeavor to move contents from this report and the review of these agencies to members of the industry through a sampling of these tools.	Such as YouTube, Facebook, Twitter or a Blog	Shari Schaftlein Sid Detmer	TBD	
#11-Incorporate Best Practice information into reauthorization initiatives. The current transportation authorizing legislation (SAFETEA-LU) expires on September 30, 2009. Efforts are now underway to create and pass a replacement bill in Congress. This opportunity typically only comes once every five or six years so the team felt it would be appropriate to bring to those involved information relating to these Best Practices in project delivery management. This will be done through a variety of agency and association initiatives.		Dave Nichols, Jim McMinimee, Connie Yew	2010	Report has been shared with individuals in FHWA Office of Infrastructure who are responsible for drafting the legislation.

Strategy	Activities	Who	Target Dates	Status
#12-Presentations at association meetings. Key associations in the transportation industry will want information from this scan to be shared with their members at-large. National meetings represent rich venues for doing this.	The American Road & Transportation Builders Association (ARTBA)	Dave Nichols Arun Shirole		
	AASHTO/ACEC Task Force	Dave Nichols Arun Shirole		
	National *Association* of County Engineers (NACE)	Arun Shirole		
	The Associated General Contractors of America (AGC)	Dave Nichols		Annual meeting
#13-Federal Lands Strategic Planning meeting presentation. An opportunity exists for this information to be incorporated into the strategic planning process associated with the Federal Lands Division of the Federal Highway Administration		Alan Teikari	July 20-24, 2009	Presented during the meeting
#14-Provide a knowledge transfer session (Webinar) to the scan agencies. The agencies visited by the scan team were generous in presenting information and practices. Some common Best Practices were observed among them while others were unique to single states. The team believes a webinar for these agencies would allow for sharing the contents of this report.		Connie Yew Jim McMinimee Shari Schaftlein	Aug 25, 2009	The practice run held on Aug 25, 2009 (2:00-4:00 pm EST) would fulfill this activity. All scan states were invited to share their unique practices during this Webinar session
#15-Share Best Practices with SHRP 2. The Transportation Research Board (TRB) has a major research initiative underway focused on innovation in transportation. Research efforts are divided into four areas: Safety, Renewal, Reliability, and Capacity. The team will share the results of this scan with appropriate leaders of the SHRP II initiative.		Jim McMinimee Shari Schaftlein	TBD	
#16-Sharing Best Practices with LTAPs. The Local Transportation Assistance Program (LTAP) is focused on disseminating information to all levels of government and practitioners who may not be operating in the same organizations as the state DOTs. The success of LTAP is without question and this network provides a powerful opportunity for the Best Practices observed in this scan to be shared with a large segment of the industry		Connie Yew	March 2010	Report has been disseminated to LTAP Centers in March 2010.

Strategy	Activities	Who	Target Dates	Status
#17-Share innovations through AASHTO's TIG. AASHTO's Technology Implementation Group (TIG) was established to assess and advance innovations in transportation technologies and practices. The Best Practices identified in this scan will be shared with the TIG as a means to further its distribution through the AASHTO organization and its affiliates. The team felt Florida's ETDM, Utah's ePM and Washington's MAP Team reflect just some of the findings that would be appropriate for the TIG to consider.		Jim McMinimee	TBD	Haven't got positive responses. Will ask webinar audience whether this is preferable.

Strategy	Activities	Who	Target Dates	Status
#18-Package the Best Practice findings onto a CD for distribution. The nature of the transportation industry requires a more aggressive means for distribution of the team's findings. In order to facilitate the team has proposed preparing a CD with the information gathered during this scan for ease of distribution to a wide audience who can then adopt innovations as appropriate.		Shari Schaftlein Jim McMinimee Tom Warne	TBD	Holding. Will ask webinar audience whether this is preferable.
#19-Coordinate findings with the March SCOR meeting. AASHTO's Standing Committee on Research (SCOR) determines how millions of dollars in pooled research funds are spent to benefit the transportation industry at-large. Many of the findings are relevant to the discussions held and decisions made at this meeting.		Shari Schaftlein	TBD	

Appendix B
Compiled by Arora and Associates

Domestic Scan 07-02 Best Practices in Accelerated Construction Techniques
Implementation Plan

Updated 12-4-10

Activity	Who	Target Dates	Status
Summary Report (50 Page Maximum)	Stu Anderson, Cliff Schexnayder (Chris Schneider for funding)	When Final Draft Report is ready August 31, 2009	**Completed**.
Flyer (based on the executive summary)	Chris Schneider	Draft ready for comment by July 22, 2009; Final ready for AASHTO Subcommittee on Construction Meeting	**Completed**. Flyers were distributed at the AASHTO SOC meeting in Chicago, Aug 4, 2009
Webinar: SR500: NHI Innovations - Best Practices in Accelerated Construction Techniques	Chris Schneider and Cliff Schexnayder	8/18/2009 2:30 PM - 4:00 PM EST	**Completed** Target Audience: Highway Transportation Industry https://admin.na3.acrobat.com/_a55098539/p37023793/
Focus Article	Chris Schneider and Cliff Schexnayder	Working with Lisa Pope Editor, FOCUS August 2009	**Completed** Article published in FHWA's FOCUS magazine, August 2009 issue. http://www.tfhrc.gov/focus/aug09/01.htm
Public Roads	Chris Schneider	Scheduled for the Jan/Feb 2010 issue of Public Roads.	**Completed** Short Article (in "Along the Road" Department) published in FHWA's Public Roads periodical, January / February 2010 issue. http://www.tfhrc.gov/pubrds/10janfeb/alongroad.htm

Activity	Who	Date/Location	Status
Encourage the Research Steering Committee of SOC to continue the effort of collecting case study information on accelerated construction projects from its membership	Whole team		
AASHTO Subcommittee on Construction (SOC)	Stu Anderson, Cliff Schexnayder	August 4, 2009 Chicago	**Completed.** Presented by Stu and Cliff (Chris Schneider provided Flyers)
Southeastern Association of State Highway and Transportation Officials (SASHTO)	Richard Sheffield	28 Aug.-2 Sept. 2009 Biloxi, MS	**Completed** .Presented by Richard Sheffield, September 1, 2009 (Chris Schneider provided Flyers)
American Road & Transportation Builders Association (ARTBA)	Steven D. DeWitt	6-9 Oct. 2009 Charleston, S.C.	**Completed**
TxDOT and TTI Annual Transportation Short Course	Thomas R. Bohuslav	Oct 14, 2009 College Station, TX	**Completed**
AASHTO Standing Committee on Highways (SCOH)	Brian A. Blanchard	October 22 – 27, 2009 Palm Desert, CA	**Completed**. Presented on October 24, 2009 to the chief engineers
Associated General Contractors (AGC) of America, Highway & Transportation Div.	Steven D. DeWitt Brian Deery, AGC	Spring 2010	
Transportation Research Board, Annual Meeting	Stu Anderson Steven D. DeWitt	10-14 Jan. 2010 Washington, DC	**Completed.** Stu Anderson did a short presentation during the Project Delivery Methods Committee (AFH15) meeting on Jan 11, 2010 and during the Construction Management Committee meeting.

Activity	Who	Date/Location	Status
Paper "Strategies for Planned Project Acceleration," submitted to the Construction Journal of the American Society of Civil Engineers.	Stu Anderson, Cliff Schexnayder	Submitted August 2009 Paper Resubmitted August 2010	Received some comments from editors. The paper will be resubmitted in August 2010 Paper Accepted for Publication in ASCE Journal of Construction Engineering and Management. Likely published in late 2011.
Paper "Accelerated Construction – Emergency" submitted to the 2010 Construction Research Congress of the Construction Institute of the American Society of Civil Engineers	Stu Anderson, Cliff Schexnayder	Submitted September 2009	Completed. The paper was published in the Congress Proceedings, Volume 2, pages 837 to 848
Emergency Accelerated Construction at the ASCE Construction Research Congress 2010	Stu Anderson, Cliff Schexnayder	Banff, Alberta, Canada May 9,2010	**Completed.** Presented by Stu and Cliff on May 9, 2010.
2010 Western Association of State Highway and Transportation Officials (WASHTO) Meeting	Chris Schneider	July 13, 2010 Bismarck, ND	Scheduled. 30-minute presentation on Scan findings and conclusions
Paper "Program Approach to Project Acceleration" submitted for publication and presentation at the Second International Conference on Transportation Construction Management (TCM-2), Orlando, Florida, February 2011.	Stu Anderson, Cliff Schexnayder	Submitted November 2010	Approved for publication in TCM-2 proceedings and presentation at conference.

Activity	Who	Date/Location	Status
U.S. State Department - Chilean Fulbright Program Senior Specialists sponsored activates	Cliff Schexnayder	Oct. 10 to Nov. 30, 2010	**Completed.**
Ministerio de Obras Publicas, Chile	Cliff Schexnayder	Oct. 15, 2010, Santiago, Chile	**Completed**. Presentation on the Accelerated Construction report to Hernán de Solminihac Tampier, Minister of Public Works – Chile Report copies provided by Srinivasan, Nanda, NCHRP staff.

Activity	Who	Date/Location	Status
Ministerio de Obras Públicas, Chile	Cliff Schexnayder	Oct. 15, 2010, Ministerio office Santiago, Chile	**Completed**. Meeting with to discuss accelerated construction with Alberto ABalo Donoso, Direccion General; Eduardo Delpiano Antillo, Assesor Gabinete DGOP; and Bernardo Cifuentes Morales, Ingeniero Agrónomo; Ministerio de Obras Públicas, Chile
Ministerio de Obras Ministerio de Obras Públicas, Chile, Chile	Cliff Schexnayder	Oct. 28, 2010 – damage to roads and bridges in the Santiago area Oct. 29, 2010 – damage to Route 5 (Panamerican Highway) from Santiago south and roads to the coast in the area of the tsunami.	**Completed.** Inspection of damage from the Feb. 2010 "Maule" earthquake and efforts to accelerate construction.
Ministerio de Obras Ministerio de Obras Públicas, Chile, Chile	Cliff Schexnayder	Nov. 28, 2010 – damage to roads and bridges in the Concepción area. Major bridges across the Bio Bio River: Juan Pablo II and Llacolén Bridge – used Acrow bridge system as in Florida.	**Completed.** Inspection of damage from the Feb. 2010 "Maule" earthquake and efforts to accelerate construction.

Activity	Who	Date/Location	Status
Cámara Chilena de la Construcción (Chilean Chamber of Construction, similar to the AGC in the US).	Cliff Schexnayder	Nov. 15, 2010, Santiago, Chile	**Completed.** Presentation on accelerated construction at a luncheon meeting of the Chamber (≈ 140 people)
University civil engineering class on accelerated construction	Cliff Schexnayder	Nov. 18, 2010, Pontificia Universidad Católica de Chile, Santiago, Chile.	**Completed.** Presentation on accelerated construction to senior civil engineering class.
Cámara Chilena de la Construcción (Chilean Chamber of Construction, similar to the AGC in the US).	Cliff Schexnayder	Nov. 25, 2010, Santiago, Chile	**Completed.** Seminar (3 hr) on accelerated construction (≈ 120 people)
Ministerio de Obras Ministerio de Obras Públicas, Chile, Chile	Cliff Schexnayder	Nov. 25, 2010, Santiago, Chile	**Completed.** Presentation (3 hr) to senior staff engineers on accelerated construction (26 people)
Master's class; Cámara Chilena de la Construcción (Chilean Chamber of Construction, similar to the AGC in the US). It jointly conducts a masters program with Universidad Católica de Chile.	Cliff Schexnayder	Nov. 26, 2010, Santiago, Chile	**Completed.** Class (3 hr) to engineers on accelerated construction (28 students)

Appendix C
Compiled by Arora and Associates

NCHRP 20-68A Domestic Scan 07-03
Best Practices in Winter Maintenance

Implementation Plan

Updated 7-7-10

More specifically, there are several known regularly scheduled venues where findings of this project can be disseminated as oral presentations. Included, but not limited to, are the following:

- Short Term
  - Presentations at scheduled conferences (mostly scheduled at least annually)
    - PIARC World Road Association Winter Road Congress (scheduled 2010 Quebec City)
    - TRB Annual Meeting
    - TRB Winter Maintenance Committee
    - TRB Committee on Surface Transportation Weather
    - TRB Snow & Ice Symposium (scheduled 2012)
    - AASHTO Subcommittee of Maintenance
    - PNS Pacific Northwest Snowfighters
    - APWA American Public Works (Winter Maintenance Committee)
    - NACE National Association of County Engineers
    - AASHTO Eastern Snow Expo
    - APWA National Congress (September 2009, Columbus, OH)
  - Presentations to Pooled Fund organizations
    - SICOP Winter Maintenance Technical Service Program (WMTSP)
    - Clear Roads
    - Aurora
    - Annual Clarus and MDSS Stakeholder Meeting
    - PNS
  - Other meetings
    - National Winter Maintenance Peer Exchange
    - MDSS Showcase
    - Indiana DOT Winter Snow Conference (Statewide Presentations Given in 3 Regions, Sept. 2009)
  - Webinar - Washington DOT (Nov. 2009)

- Medium Term
  - Identify potential projects with Pooled Fun organizations
  - Coordinate activities with Lee Smithson, SICOP Coordinator
  - Promote more MDSS-type Showcases
  - Establish a "Winter Maintenance Best Practices" web site to post final report and presentations, plus allow addition of new best practices as they are identified (There is currently a Facebook Page with brief descriptions, photos and links under "/Winter Scan")
- Longer Term
  - Assist in developing Problem Statements for NCHRP
  - Identify funding source for covering travel and other expenses for the above activities
    - NCHRP 20-68A,
    - One or more already-in-place Pooled Funds
    - FHWA

Strategy	Activity	Who	Target Dates	Status
SHORT TERM: Presentations at scheduled conferences	PIARC World Road Association Winter Road Congress	Steven Lund	February 8-11, 2010. Quebec City, Canada	Completed. Presentation on Feb 11, 2010
	TRB Annual Meeting			
	TRB Winter Maintenance Committee			
	TRB Committee on Surface Transportation Weather			
	TRB Snow & Ice Symposium		Scheduled 2012	
	AASHTO Subcommittee of Maintenance		2010	
	PNS Pacific Northwest Snowfighters			
	APWA American Public Works (Winter Maintenance Committee)			
	NACE National Association of County Engineers			
	AASHTO Eastern Snow Expo			
	APWA National Congress	Diana Clonch and Dave Ray	September 2009, Columbus, Ohio	Completed
	APWA National Congress 2010 North American Snow Conference	William Hoffman	Apr 18 - 21, 2010 Omaha, Nebraska	Completed. Presented on Apr 20
SHORT TERM: Presentations to Pooled Fund organizations	SICOP Winter Maintenance Technical Service Program (WMTSP)			
	Clear Roads			
	Aurora			
	Annual Clarus and MDSS Stakeholder Meeting (Charlotte, NC)	Ben McKeever	Sept 16, 2009	Completed
	PNS			
SHORT TERM: Other meetings	National Winter Maintenance Peer Exchange	William Hoffman	August, 2009	Completed
	MDSS Showcase			
	Indiana DOT Winter Snow Conference	William Hoffman	Sept 23, 2009	Statewide Presentations Given in 3 Regions
SHORT TERM: Webinar	Webinar - Domestic Scanning Tour for Best Practices in Winter Maintenance	Whole Team	Thursday 11/12/2009 1:30pm-3:00pm Eastern time	Completed. Presented to interested parties

Strategy	Activity	Who	Target Dates	Status
Medium Term	Identify potential projects with Pooled Fun organizations			
	Coordinate activities with Lee Smithson, SICOP Coordinator			
	Promote more MDSS-type Showcases			
	Establish a "Winter Maintenance Best Practices" web site to post final report and presentations, plus allow addition of new best practices as they are identified	Team		Established a Facebook Page with brief descriptions, photos and links under "/Winter Scan"

Appendix D
Compiled by Arora and Associates

Activity	Action Steps	Owners of Activity	Resources	Prioritization	Rational	Progress Report Date	Completion Date
Investigate and recommend an FHWA Demo Project of Best Practices in Bridge Management Technologies and Computer Applications.	Written proposal for FHWA - forward to Ian Freidland and Wade Casey and Tom Everett	Pete Weykamp	Use state people, scan team members and FHWA people to travel to different states to present the demo	1			
Repository of home grown repair techniques for skills training (TSP2 or TCC web page?).	Work with TSP2 Bridge Specialist to set up Web Application on TSP2 website. Encourage States tgo send in examples.	Pete Weykamp	TSP2 staff, Use the Oregon (Bruce Johnson) example. Set up structure within TSP2 webpage. Work within site to set up repository.	1			
FHWA HQ issue national approval guidelines for acceptable systematic process for bridge preventive maintenance activities.	Prepare a letter requesting the quidelines be issued on behalf of SCOBS or the Scan Team	Tod Kimball, Scott Becker and Arthur D'Andrea	Take a resolution on behalf of all states to FHWA or write the letter. Requesting national guidelines.	1			
Present recommendations to the Pontis Task Force for changes to the software: a. Option to include all needs in any project identified for a specific bridge b. Link recommended actions to corresponding core elements when applicable c. Include inspector recommended actions in prioritized needs	Prepare written recommendation for consideration of Task Force and present it at the Task Force meeting	Scot Becker	Let us know when.	1			
Recommend an NCHRP Synthesis Study on methods of cost-effective maintenance contracting.	Prepare the research proposal for submittal to Mal Kerley	Bruce Johnson		1		Spring 2010	
Recommend changes to the NHI Bridge Maintenance and Bridge Rehabilitation courses to include findings from the scan. Encourage cross training of maintenance and inspection technicians. (Wade Casey - coordinator)	Prepare written proposal for submittal to course technical coordinator, Wade Casey	Keith Ramsey		1		11/17/2009 - Have been in contact with Wade Casey about incorporating findings from scan tour into NHI Bridge Maintenance and Bridge Rehabilitation courses. Wade reported that maintenance course is going to be reworked as soon as funds are available. I have received training materials and am reviewing to see where findings and recommednations from the scan tour can be included. Based upon my review a written proposal will be generated to identify applicable domestic scan tour findings for consideration in the course revision.	
Recommend changes to the NHI 2-week Bridge Inspection Course on making repair recommendations. (Gary Moss - Course coordinator)	Prepare written proposal for submittal to course technical coordinator, Gary Moss	Keith Ramsey		1		11/17/2009 - Have been in contact with Gary Moss about incorporating findings from scan tour into the two week NHI Bridge Inspection course. Gary reported a contract had just been let to upgrade the course. I am working to review the existing training materials to determine the best locations for inserting some of the findings from the scan tour. Based upon my review a written proposal will be generated to identify applicable domestic scan tour findings for consideration in the course revision.	
Prepare draft PPT on summary and findings from the Scan. Present PPT at July SCOBS and SCOM general meetings.	Done	Bruce present at SCOBS, Pete present at SCOM		1			Done July 2009
Publish applications / spreadsheets / programs for identification, prioritization, and monitoring maintenance recommendations.	Determine which ones to post - get permission from the owner state, send them to AASHTO with the Final report	Scott Becker		1			
Include links to recommended applications in final report for scan.	George leave placeholder in the report for the links - publish	George Hearn		1			
Publish a paper that describes examples of determining optimum level of maintenance and to justify adequate expenditures and publish successful state Federal-aid Preventive Maintenance Programs in preventative maintenance based on improved overall system performance.				2			
Recommend an NCHRP Synthesis on Optimal Performance Measures for Bridge Preventive Maintenance, including use of simple Red-Yellow-Green indicators.	Prepare the research proposal for submittal to Mal Kerley	Bruce Johnson		1		Spring 2010	Done February 2010

Activity	Action Steps	Owners of Activity	Resources	Prioritization	Rational	Progress Report Date	Completion Date
Prepare Public Roads (Road and Bridges, Bridge Design and Engineering, New York Bridge Maintenance Newsletter) article on a summary and findings of the Scan.	Send in a concept	Tod Kimball, Scott Becker and Arthur D'Andrea		1		Road and Bridges article submitted. Published in May 2010 issue.	Done May 2010
Submit to various bridge conferences to present a summary and findings on the Scan; IBC, NBC, NWBMC, IABSE and TRB.	Consider using Scan Implementation funding for travel to TRB and IBC.	TRB – George Hearn, NWBMC – Bruce Johnson, Midwest Br Maint Workshop – Keith Ramsey, IBC	contact harry	1		Bruce Johnson gave a short presentation during TRB Structures Maintenance Committee (AHD30) committee meeting on Jan 11, 2010.	
Recommend an NCHRP Synthesis on best practices for identification, prioritization, and monitoring of bridge management techniques, decision making, and actions.	Prepare the research proposal for submittal to Mal Kerley and Carlos	Bruce Johnson and Pete Weykamp		1		Spring 2010	Done February 2010
Prepare a communication plan (web sites, FHWA, webinars, articles, TRB, AASHTO committees and task forces) to increase exchange of information on identification, prioritization, and monitoring of bridge management techniques, decisions and actions, including support for exchanging information between TSP2 Regional Groups.			Artur - draft a plan	2		Bridges 2010 presentation Raleigh North Carolina. February 22-24: Diagnostic Analysis: Establishing Health Monitoring Metrics For Forecasting Better Future Bridge Conditions And Funding Scenarios. This session will present successful bridge deficiency metrics that provide insight into the functional obsolescence, structural adequacy, safety and costs associated with bridge maintenance to facilitate the ability for forecasting future bridge condition and funding scenarios. More so, it will explore the unexpected in an analysis of bridge reconstruction further to Hurricane Katrina. Diagnostic system process and analysis Exploring findings, results and challenges in overcoming these deficiencies Analysis of dealing with unexpected, emergency funding and reconstruction for long term sustainability	
Recommend FHWA increase emphasis or requirements for maintenance of Federal-aid projects, including preventive maintenance to achieve planned service life.	Prepare letter to Wade and Tom	Pete Weykamp		1			
Encourage dissemination and use of the new NCHRP Report on Deck Overlays and Preservation Methods.		Arthur D'Andrea		2			
Recommend FHWA Office of Asset Management host a webinar to describe the summary and findings of the Scan and have 3 states highlight their best practices.	Webinar Part I is completed. Webinar Part II is completed	Tod Kimball and Pete Weykamp		1		Part I was completed on Nov 19, 2009 Part II was completed on Dec 17, 2009 (90 sites connected, 140 participants)	Part I was completed on Nov 19, 2009; Part II was completed on Dec 17, 2009
Recommend a special set-aside of NCHRP funding dedicated to bridge maintenance and preservation issues, based on the TSP Roadmap and TSP2 Strategic Plan.	Drop			2			

Appendix E
Compiled by Arora and Associates

NCHRP 20-68A, Domestic Scan 08-01

BEST PRACTICES IN MANAGING STIPS, TIPS, AND METROPOLITAN TRANSPORTATION PLANS IN RESPONSE TO FISCAL CONSTRAINTS

Planned Implementation Activities

The scan team's approach to implementation of its findings and recommendations will be designed to inform AASHTO, TRB, state DOTs, and MPOs of the "best practices" that were identified in the study, including the major recommendations for effective ways to comply with current federal requirements.

In addition, through outreach to AASHTO's Standing Committee on Planning (SCOP), the team intends to provide its recommendations, especially those that may entail statutory and regulatory changes, so that they may be used to help shape transportation reauthorizing legislation due in late 2009. Various forms of communication will be considered, including:

- Presentations to SCOP and perhaps AASHTO's Executive Committee, TRB and the Association of Metropolitan Planning Organizations (AMPO);
- Presentations to FHWA and FTA;
- Webinars for state DOT and MPO participants.

Update 2-18-10

Activity	Who	Target Dates	Status
Presentations to SCOP			
Presentations to AASHTO's Executive Committee			
Presentations to TRB 2010 Annual Meeting	Harlan Miler	Jan 10-14, 2010	Harlan Miler briefly introduced the domestic scan results in Transportation Programming, Planning, and Systems Evaluation Committee (ADA50) meeting on Jan 11, 2010 and in Metropolitan Policy, Planning, and Processes Committee (ADA20) meeting on Jan 12, 2010
Presentations to the Association of Metropolitan Planning Organizations (AMPO)			
Presentations to FHWA			
Presentations to FTA			
Webinars for state DOT and MPO participants –Practice Webinar	Whole team	Dec 16, 2009 3:00pm - 5:00pm Eastern Time	Completed

Activity	Who	Target Dates	Status
Webinars for state DOT and MPO participants –Practice Webinar	Whole team	Feb 9, 2010 1:00pm - 3:00pm Eastern Time	Completed
Webinars for state DOT and MPO participants –Practice Webinar	Whole Team	Feb 10, 2010 2:00pm- 4:00pm Eastern Time	Completed. The webinar was recorded and posted on: http://www.statewideplanning.org/news.php?id=25

Domestic scan 08-03 Best Practices in Addressing NPDES and Other Water Quality Issues in Highway System Management

Planned Implementation Activities

V. 12-1-10

Implementation Strategy

The Team is committed to implementing the findings of this Scan. The national dialogue on DOT stormwater programs remains one of the most important issues today. Many important programs, strategies and BMPs were identified in the Scan that would be of benefit if implemented at other DOTs. The Team plans to initiate implementation activities such as the following immediately upon completion of the Scan Report:

- Publication of articles in journals and other industry related publications such as *ASCE Magazine*, *Stormwater Solutions* and *APWA Reporter* (published by the American Public Works Association).

- Presentations at AASHTO committees, TRB sessions, ASCE, and other conferences.

- Use of the project PowerPoint® developed for the scan trip for in-house DOT presentations and presentation to local transportation organizations by the Scan Team members.

- Integration of the team's findings into other association and industry groups, such as the AASHTO Center for Excellence.

- Outreach with the assistance of the FHWA and U.S. EPA.

The above are general options the Team will use as opportunities arise to disseminate the study information. Specific activities that will be completed, along with target dates are provided in the following section.

Implementation Activities

The Scan Team has developed a roster of specific implementation activities to publicize the information from the Scan. The activities, a description and a target completion date listed in chronological order are:

- Technical Paper Presentation at the Transportation Research Board (TRB) Annual Meeting. The Scan Summary Report was edited to a technical paper and has

been accepted for the TRB Annual Meeting as an oral presentation. The TRB is one of six major divisions of the National Research Council— a private, nonprofit institution that is the principal operating agency of the National Academies in providing services to the government, the public, and the scientific and engineering communities.
Target date: January, 2010**.**
Lead: Scott Taylor
Status: Completed. Scott Taylor presented the scan results on Jan 11, 2010 during session "Low-Impact Development: Benefits, Limitations, and Research Needs"

- Webcast through the Center for Transportation and the Environment (CTE) National Broadcast Series at North Carolina State University, in cooperation with the Federal Highway Administration. CTE is available to assist in the production of a webcast dedicated to the Scan.
  Target date: March 25, 2010.
  Lead: Matt Lauffer, Patricia Cazenas
  Status: Completed March 25, 2010. The presentation was recorded and can be viewed at http://itre.ncsu.edu/CTE/TechTransfer?Teleconferences/Archive.asp.

- AASHTO Annual Stormwater Conference. AASHTO sponsored the first Stormwater conference in June 2008 in San Diego, CA. The conference convenes stormwater practitioners from each of the DOTs nationally in a forum designed to improve performance of DOT NPDES programs. The Scan Team recommends that the 2010 Stormwater Conference (with support from FHWA) tentatively scheduled for April, 2010 focus on the findings of this Scan and the further development and implementation of the findings.
  Target date: April, 27, 28 and 29th, 2010.
  Lead: Scott McGowen, Matt Lauffer, Patricia Cazenas
  Status: Completed. The scan results were presented to the participants.

- Transportation Research Board (TRB) Environment and Energy Research Conference. The conference brings together more than a dozen TRB Energy and Environmental committees meeting jointly with the AASHTO Standing Committee on the Environment and serves as a platform to develop better transportation solutions through the integration of diverse environmental (human and natural) and transportation perspectives.
  Target date: June 8, 2010.
  Lead: Scott McGowen, Brian Smith, Rachel Herbert
  Status: Completed. The scan results were presented to the participants.

- Develop a National Cooperative Highway Research Program (NCHRP) Proposal. The NCHRP conducts research relative to highway planning, design, construction, operation, and maintenance nationwide. The NCHRP program is operated by the

Target date: July 2010.
Lead: Mark Hemmerlein
Status:

- Technical Paper Presentation at the National Hydraulics Engineering Conference. The 2010 National Hydraulics Engineering Conference (NHEC) will be held near historic Park City, Utah, at the Canyons Resort Grand Summit Hotel from Tuesday, August 31 through Friday, September 3, 2010. The conference is being sponsored by the FHWA, Utah Department of Transportation and AASHTO.
  Target date: August 31, September 1st and 2nd, 2010.
  Lead: Scott Taylor, Patricia Cazenas
  Status: Completed. Scott Taylor and Patricia Cazenas presented the paper during the "Water Quality" track on Wednesday, September 1st.

- Technical Paper Presentation at StormCon. StormCon is a national conference targeted to stormwater quality practitioners. An abstract has been submitted for the 2010 conference to be held in San Antonio Texas.
  Target date: August 1st, 2nd, 3rd, 4th and 5th, 2010.
  Lead: Scott Taylor and Scott McGowen
  Status: Completed. Scott Taylor presented the paper on Wednesday, August 4th.

- Technical Paper Presentation at ASCE T&DI Conference. The Transportation and Development Institute Green Streets and Highways Conference, Denver Colorado. This conference responds to the rapidly growing interest and activity in sustainable transportation by sharing information on leading-edge environmental stewardship and sustainability principles and practices. Join us to explore many of the most important new concepts in the field—including context sensitive solutions, sustainability for transportation projects, and the complete street approach to development—practical applications, and case studies.
  Target Date: November 14 – 17, 2010
  Lead: Scott Taylor and Pat Cazenas
  Status: Completed. Scott Taylor and Patricia Cazenas presented the Paper in Track D on Monday, November 15th.

- Updates to existing National Highway Institute (NHI) Training Courses. The NHI is an organization within the Federal Highway Administration. The NHI helps improve the performance of the transportation industry through training. The

Design and Implementation of Erosion and Sediment Control –NHI Course #142054 This NHI course was developed as a joint effort between FHWA and the EPA Office of Water, this course provides education and training on planning, design, implementation, enforcement, inspection and maintenance strategies to control erosion and sediment on highway construction projects, as well as to ensure that regulatory issues are addressed accurately and uniformly. This course will be updated to reflect the new Construction and Development Industry Effluent Guidelines and reflect information and technologies gathered from the recent stormwater scan tour.

Water Quality Management of Highway Runoff –NHI Course #142047 This NHI course was developed with EPA Office of Water and provides an overview of the basic water quality parameters and processes, along with the requirements and guidance on best management practices the transportation community can use in mitigating highway runoff impacts and protecting water quality. This course shares approaches and technologies for the water quality management of highway runoff, including the effective maintenance, inspection and evaluation of Best Management Practices (BMPs). This course will also be updated to reflect information and new technology gained from the stormwater scan tour.
Target date: October, 2010.
Lead: Patricia Cazenas, Rachel Herbert
Status: Erosion and Sediment Control course update is scheduled to begin in August 2010.

Plan/Process for Implementation

The implementation activities are a good tool disseminating the information developed from the Scan, the plan for implementation describes specific mechanisms for applying the Team's recommendations in DOT operations. The Team recognizes that the recommendations developed from the Scan will be implemented adaptively, but each recommendation should be pursued to realize the full benefit of the resources invested in the Scan program.

Transportation Separate Storm Sewer System (TS4) Permit. Investigate the feasibility and benefit of developing a model permit for transportation agencies. A model permit could be used by the states to help focus DOT NPDES programs on areas that will have the most beneficial environmental impact, and de-emphasize the elements of traditional MS4 NPDES programs that are not as beneficial for a transportation agency. The Spring 2010 AASHTO Stormwater conference is the appropriate forum to initiate

discussion on this topic. Breakout sessions and speakers from the FHWA, EPA, DOTs and private industry can help frame the discussion. Alternatively, the AASHTO Standing Committee on the Environment (SCOE) or the Standing Committee on Research (SCOR) could develop a panel to investigate this topic. The Scan Chairs will lead this effort.

National Guidance on TMDL Application for DOTs. DOTs cross most watersheds in a state, and the runoff from highways includes many of the constituents that are contributing to impairment of our nations waters. As a result, DOTs are named as stakeholders and assigned a waste load allocation for TMDLs. However, DOTs are not a source for some pollutants and DOT resources should not be expended participating in a TMDL process for which they have only a de minimis contribution. The implementation plan for this recommendation is identical to that suggested for the TS4 Model Permit.

The Watershed Approach. A watershed approach that allows credit trading would reduce costs for DOTs and bring environmental improvement more rapidly. Investigation is recommended into credit trading or stormwater banking options that allow DOTs to focus on those constituents with available cost-effective controls, and purchase or trade credits for pollutants that are comparatively costly for the DOT to mitigate. The Federal Highway Administration and the U.S. Geological Survey are cooperating on a national project to evaluate the existing highway stormwater runoff model and update the model using new information and software. This work will incorporate the existing model in a new software platform, provide information on the probability distributions of: precipitation characteristics, highway-runoff-volumes, highway-runoff concentrations, upstream flow, upstream receiving-water concentrations, and structural best management practice performance. This information is used to estimate the probability of concentration and loads in receiving waters downstream of the highway outfall and it will estimate the probability of the outfall exceeding water quality standards. The model is in preparation. Information on this project can be found at: http://ma.water.usgs.gov/fhwa/, along with the 1990 FHWA Pollutant Loadings Model for Highway Stormwater Runoff.

Environmental Stewardship. Environmental stewardship must be made part of the transportation agency culture. The Scan team has made specific recommendations to integrate stewardship into an organization. The implementation plan for this recommendation is through the AASHTO Stormwater Conference to be held in the spring, 2010.

Technology Deployment activities (not funded yet):
FHWA Technology Deployment funding has been requested by State DOT personnel to participate in a peer exchange with two of the scan host DOTs, NCDOT and MDSHA, in order to obtain information that could lead to programs and development of performance measures that will benefit compliance efforts concerning water quality regulations. If funded 2 DOT representatives (one from DOT's Environmental branch, and one from DOT Engineering) will visit and explore in more detail programs that can help in their water quality program efforts. A comprehensive report

will be prepared by the visiting DOT representatives for FHWA and the state regulatory agency for decision making purposes based on the findings and applicability. Performance measures will be developed for DOT Executive management approval.

Other Recommendations

The Scan Team developed supporting recommendations supporting the primary recommendations which may be implemented independently.

- **De-centralize program responsibility**. The purpose of de-centralizing NPDES program responsibility is to increase 'ownership' throughout the agency. This concept will be highlighted in the technical presentations describing the Scan and also through the AASHTO Stormwater conference. The Scan SME will lead this effort.

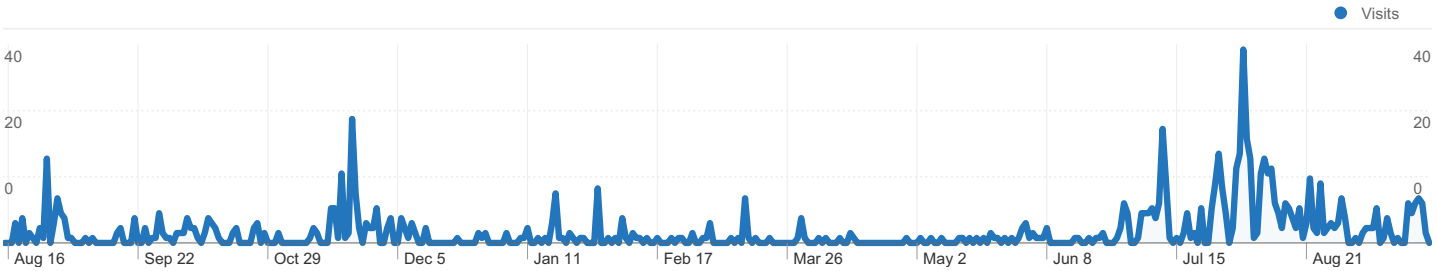
- **Pooled fund studies**. The use of pooled fund studies to assess pressing areas of stormwater research will allow DOTs to leverage resources and reduce the duplication of research. The NCHRP is an example of this type of approach, but there remains an opportunity for further consolidation. The Scan Chairs will lead this effort.

- **Collect accurate cost data**. DOTs need accurate stormwater program cost data to effectively discuss program changes. This initiative will be put forward at the AASHTO Stormwater conference in April 2010. The Scan SME will lead this effort. There are efforts to establish performance measures for stormwater management, the Scan Team recommends that cost data and maintenance information data be collected along with the implementation of performance measures at DOTs.

- **Source control research**. DOTs should fund additional research into source control strategies as the most effective and least costly approach to surface water improvement. Future NCHRP studies in this area are recommended. The FHWA representatives on the Scan will lead this effort.

domesticscan.org
Dashboard

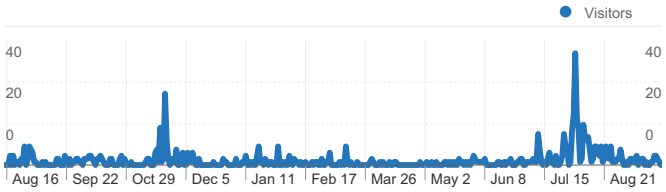
Aug 15, 2010 - Sep 25, 2011
Comparing to: Site



Site Usage

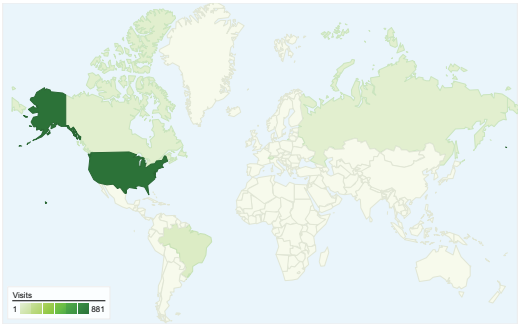
915 Visits	50.05% Bounce Rate
3,304 Pageviews	00:03:54 Avg. Time on Site
3.61 Pages/Visit	31.80% % New Visits

Visitors Overview

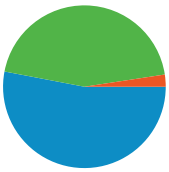


Visitors
310

Map Overlay



Traffic Sources Overview



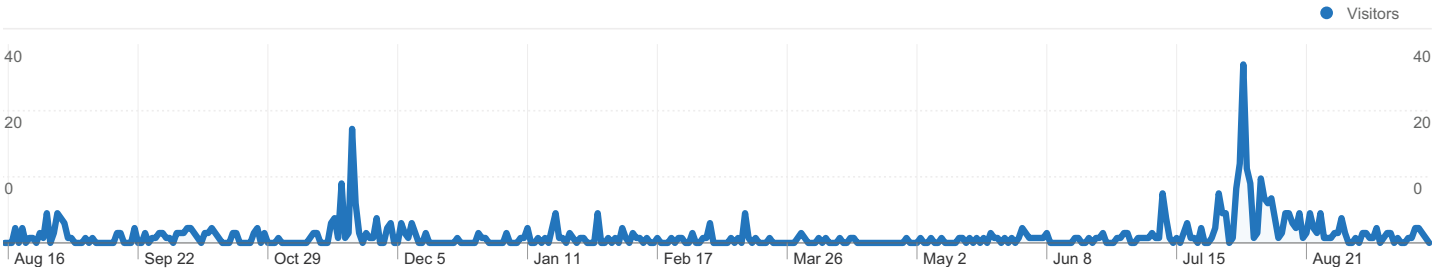
- Direct Traffic
  485.00 (53.01%)
- Referring Sites
  408.00 (44.59%)
- Search Engines
  22.00 (2.40%)

Content Overview

Pages	Pageviews	% Pageviews
/	1,285	38.89%
/blog	295	8.93%
/scans/07-01-project-delivery-	285	8.63%
/scans/07-02-accelerated-	177	5.36%
/scans/07-03-winter-	138	4.18%

Visitors Overview

Aug 15, 2010 - Sep 25, 2011
Comparing to: Site



310 people visited this site

915 Visits

310 Absolute Unique Visitors

3,304 Pageviews

3.61 Average Pageviews

00:03:54 Time on Site

50.05% Bounce Rate

31.80% New Visits

Technical Profile

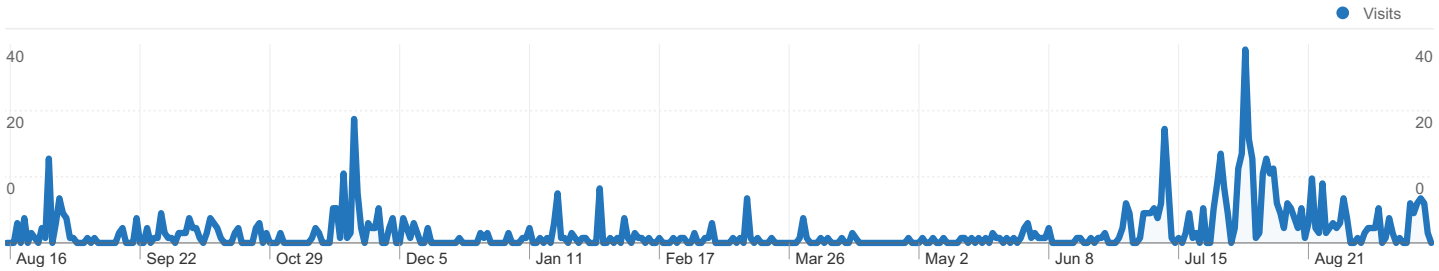
Browser	Visits	% visits
Internet Explorer	351	38.36%
Safari	249	27.21%
Firefox	248	27.10%
Chrome	58	6.34%
Mozilla Compatible Agent	4	0.44%

domesticscan.org

Traffic Sources Overview

Aug 15, 2010 - Sep 25, 2011

Comparing to: Site

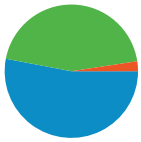


All traffic sources sent a total of 915 visits

53.01% Direct Traffic

44.59% Referring Sites

2.40% Search Engines



Direct Traffic
485.00 (53.01%)

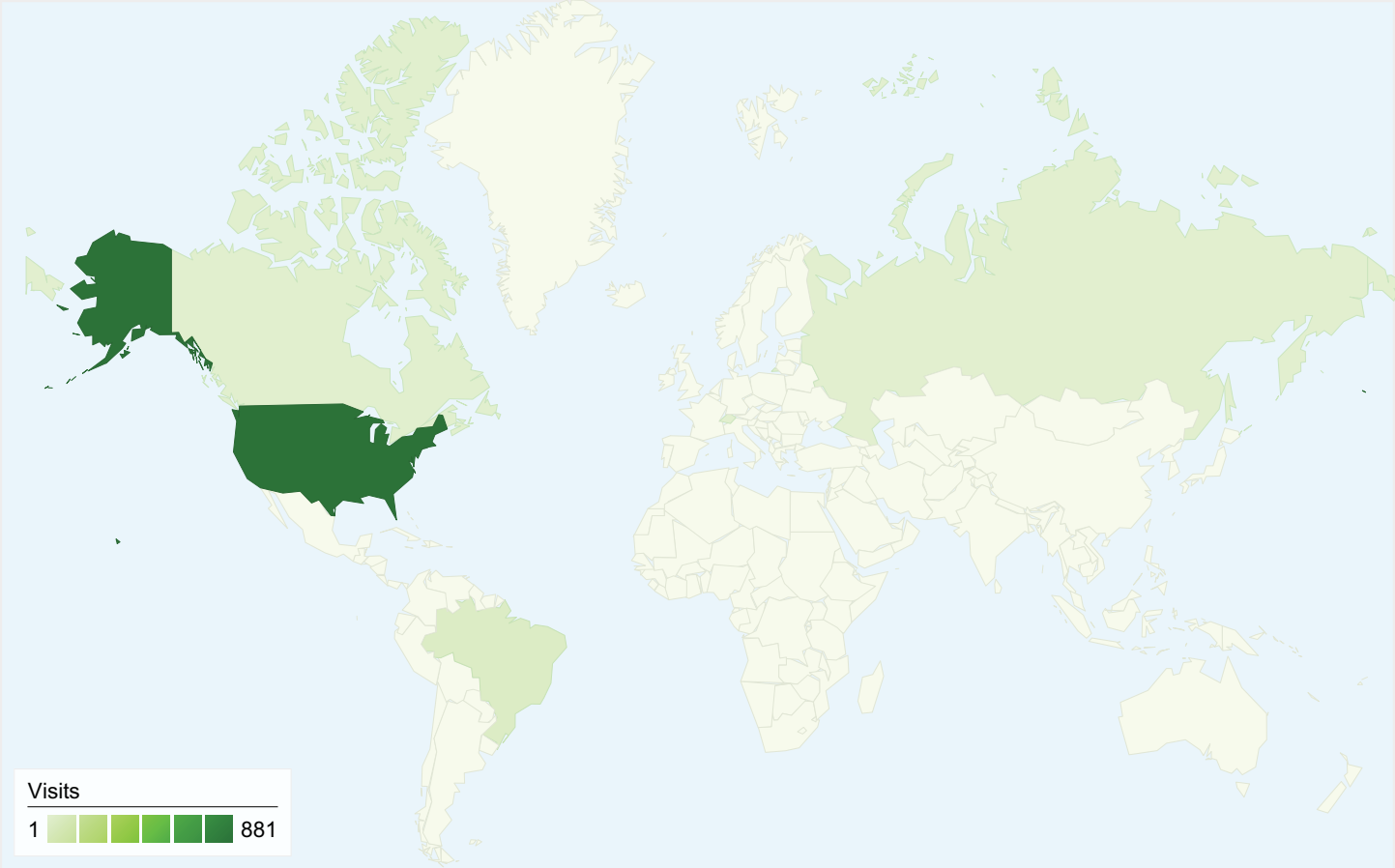
Referring Sites
408.00 (44.59%)

Search Engines
22.00 (2.40%)

Top Traffic Sources

Sources	Visits	% visits
(direct) ((none))	485	53.01%
surveymonkey.com (referral)	381	41.64%
google (organic)	22	2.40%
bit.ly/forexmarket (referral)	5	0.55%
www.br4.in/ForexMarket	5	0.55%

Keywords	Visits	% visits
domesticscan.org	18	81.82%
www.domesticscan.com	3	13.64%
www.domesticscan	1	4.55%



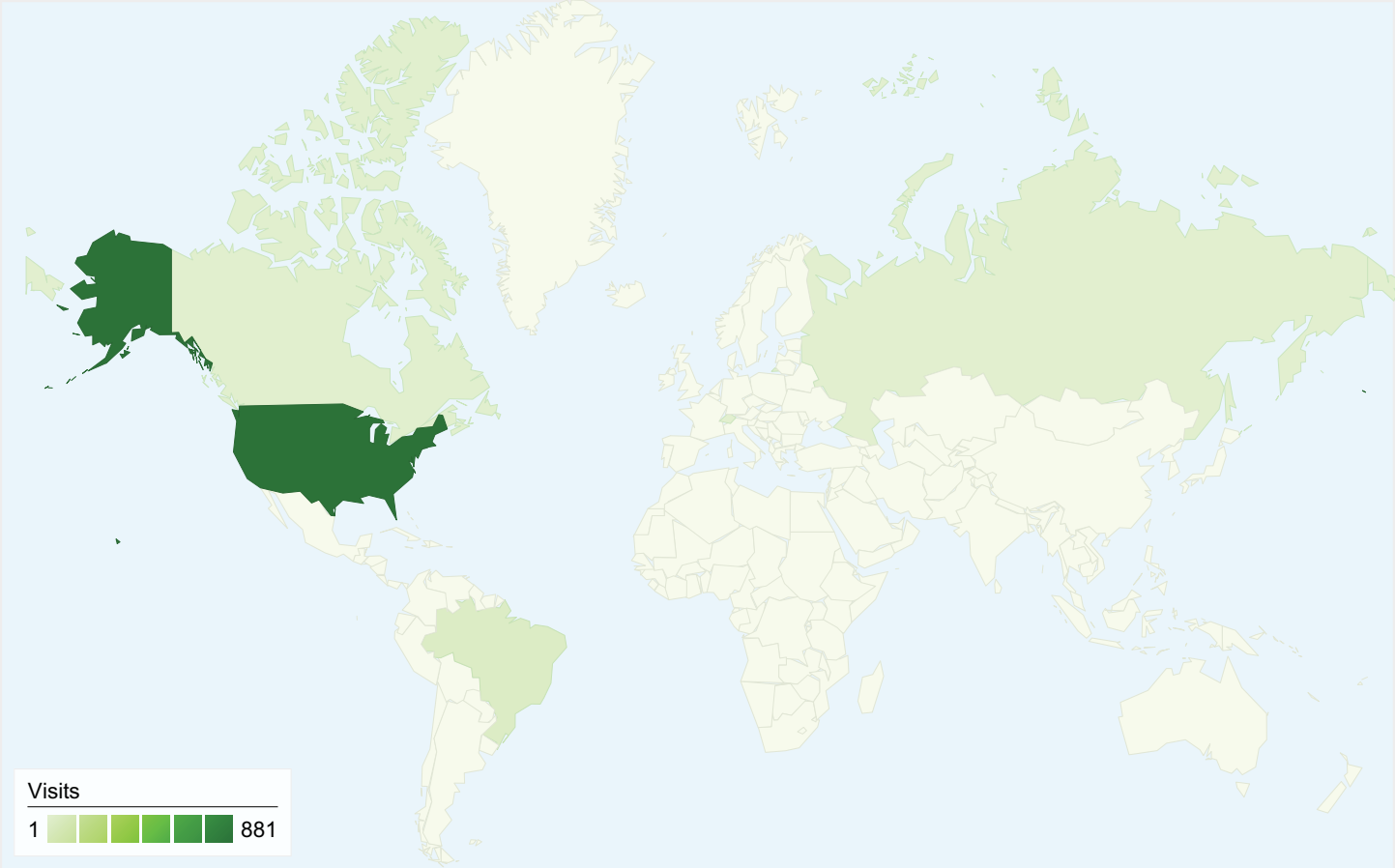
915 visits came from 5 countries/territories

Site Usage

Visits	Pages/Visit	Avg. Time on Site	% New Visits	Bounce Rate
915 % of Site Total: 100.00%	3.61 Site Avg: 3.61 (0.00%)	00:03:54 Site Avg: 00:03:54 (0.00%)	31.80% Site Avg: 31.80% (0.00%)	50.05% Site Avg: 50.05% (0.00%)

Country/Territory	Visits	Pages/Visit	Avg. Time on Site	% New Visits	Bounce Rate
United States	881	3.69	00:04:02	32.69%	49.49%
Brazil	27	1.26	> 00:00:00	0.00%	74.07%
Canada	5	2.00	00:02:31	20.00%	20.00%
Switzerland	1	4.00	00:02:29	100.00%	0.00%
Russia	1	1.00	00:00:00	100.00%	100.00%

1 - 5 of 5



915 visits came from 5 countries/territories

Site Usage

Visits	Pages/Visit	Avg. Time on Site	% New Visits	Bounce Rate
915 % of Site Total: 100.00%	3.61 Site Avg: 3.61 (0.00%)	00:03:54 Site Avg: 00:03:54 (0.00%)	31.80% Site Avg: 31.80% (0.00%)	50.05% Site Avg: 50.05% (0.00%)

Country/Territory	Visits	Pages/Visit	Avg. Time on Site	% New Visits	Bounce Rate
United States	881	3.69	00:04:02	32.69%	49.49%
Brazil	27	1.26	> 00:00:00	0.00%	74.07%
Canada	5	2.00	00:02:31	20.00%	20.00%
Switzerland	1	4.00	00:02:29	100.00%	0.00%
Russia	1	1.00	00:00:00	100.00%	100.00%

1 - 5 of 5