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

MEMORANDUM

Project findings from Scan 08-04
Best Practices in Work Zone Assessment, Data Collection, and Performance Evaluation

Prepared for:

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

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Disclaimer

Table of Contents

Best Practices in Work Zone Assessment, Data Collection, and Performance Evaluation (Scan 08-04)

The purpose of the scan was to investigate best practices in work zone assessment, data collection and performance measurement and to learn how these practices are being used to ensure safety and minimize congestion in work zones. The scan team targeted these topics:

- How do agencies assess work zones safety, congestion and operational performance?
- How do agencies collect and use data to make improvements in work zone performance and management?
- What processes, methods, and tools do agencies use to assess impacts during various stages of project development?

The findings of the scan are documented in the final scan report, available online at http://www.domesticscan.org/wp-content/uploads/NCHRP20-68A_08-04.pdf.

Overview of technology transfer and implementation efforts

The following observations, conclusions and recommendations are based on information that CTC & Associates gathered during participant interviews, a participant webinar, and a nonparticipant survey. A complete description of findings associated with each of these collections methods follows later in this chapter.

Observations

- A repeated theme among the comments of scan participants was that the scan helped define the state of the practice and the scope of work zone data, assessment and evaluation issues, including those that are being addressed as well as those that remain a challenge:
    - "I think it was very valuable for both finding out what states and a toll authority are doing in the subject area of the scan and for confirming that this is still an area in need of more development in practice."
    - "The scan tour was great in helping us better understand the state-of-the-practice. It allowed us to focus in on the lead practitioners to better understand and capture their approaches and practices and share this information with others."
    - "This scan helped address the question of how to get the best value out of work zone data. That has been a question that many states have struggled with, and it was helpful to see what states were and weren't doing and where the greatest needs are."
- This scan made use of videoconferencing and webinars at hub locations around the country, and several host states participated remotely via webinar. Scan team members and project panelists later addressed some of the challenges presented by webinar discussions.
    - A scan participant noted: "In-person meetings and demonstrations seemed much more effective than information presented in the webinar format. Communication was more effective in the in-person setting." A panelist noted further that time is often lost at the start of Web conferences setting up connections.

  - One participant stated that the U.S. Domestic Scan program should exercise caution in considering any switch to completely virtual meetings.
  - Nevertheless, one participant who shared these concerns about webinars also said that he has kept in contact with and sought further information from state representatives who only participated via webinar.
- The impact of this scan on nonparticipants follows a pattern similar to what has been seen with other scans: More nonparticipants indicated that they sought more information about the scan or discussed it with others compared with the number who reported planned or actual implementation efforts. Project panelists and scan team members agreed that type of falloff is to be expected from relatively low commitment follow-up activities (seeking more information about a scan) to high commitment activities (implementation of findings).
- When scan participants were asked to rate the importance of four aspects of the scan on a scale of 1 (not important) to 5 (extremely important), the average rating of each of these was near an average value of **4.5**.
  - Introduction to (or clearer understanding of) a new technology or practice: **4.4**
  - Identification of one or more individuals, either at host state or on the scan team, to call on as a future resource: **4.8**
  - Information with which to *begin* implementation of a technology or practice at your agency: **4.5**
  - Information with which to *continue* implementation of a technology or practice at your agency: **4.3**

<u>Highlights of effective technology transfer</u>

- The scan fostered dialogue at participants' own agencies:
  - "I have shared this information numerous times. Reports are posted on our agency's website in several places."
  - "I shared the highlights of the tour with our team of district work zone traffic managers."
  - "Information learned on this scan was presented to our state's traffic engineers group. That group's meetings also include representatives from ITS, department of transportation development, and maintenance."
- A participant described how the dialogue extended to nearby states as well:
  - "We shared some of the data with a neighboring state to link work zone systems between two major metropolitan areas. We see significant user benefit in this type of data sharing—including travel time and delay—which we started earlier this year."
- The scan team also shared these findings with national and regional audiences (more information on these appear in the "Participant interviews" section of this chapter and in the scan team's implementation plan, Appendix A, provided by Arora and Associates):
  - An email distribution to the AASHTO Subcommittee on Traffic Engineering and its Work Zones Technical Team
  - Conference presentations (2011 TRB meeting, 2010 AASHTO SCOTE meeting, Ohio ATSSA Chapter Meeting)
  - A webinar as part of the National Highway Institute's Innovation webinar series

- The 19 respondents to the nonparticipant survey, representing 16 state agencies and FHWA, described the reach of technology transfer to secondary audiences.
    - The most common way that nonparticipants learned about this scan was through a conversation or email with a scan participant or host state member.
    - Follow-up activities among nonparticipants included reading the scan report (9 respondents), visiting the website www.domesticscan.org (5 respondents), and contacting a scan participant (2 respondents).
    - Detailed findings from the nonparticipant survey are presented later in the "Nonparticipant survey" section of this chapter.

Implementation successes

- Scan participants cited topics they learned about during the scan and brought back to their home agencies:
    - Project review processes: "Based in part on what we saw with highly developed and organized systems like those in Ohio and Michigan, we created our own traffic control committee to ensure that all projects are reviewed on a systematic and regular basis. Being able to point to how other states do this helped augment the final-rule process in our state."
    - Enforcement prioritization: One participant's agency had been pursuing ways to prioritize enforcing on its work zone areas, and Indiana's presentation on its algorithm for this purpose proved particularly helpful.
    - Smart work zone technology and control devices. "We are starting to implement some of the things we saw. We recently approved the iCone [sensor-equipped traffic barrel] in our state and ran several tests. We are looking into using it further once the device is able to count vehicles across multiple lanes… I saw many technologies on the tour that I think we will take a serious look at implementing here at our agencies."
    - Costing and valuation: "We did notice that our state's user cost values appear to be out of line with other states' values. We are looking into revising our figures, possibly through a research project to address this issue."
- Two federal representatives on the scan team described how the scan had an impact on the federal level:
    - One successful implementation activity was the submission of the research problem statement "Evaluation of the Effectiveness of Contract Incentives for Improving Work Zone Traffic Impacts and Performance," which was selected for funding by the Smart Work Zone Deployment Initiative pooled fund.
    - Some effect of this scan has been seen more generally at FHWA. It was observed that work zone funding proposals and problem statements that the agency receives have been more commonly referencing the issues addressed in this scan.
- Among nonparticipants, four surveyed respondents reported proposed implementation based in part on the scan findings:
    - One state's efforts includes "collection of crash and speed data for the development of performance measures to assist the DOT in applying effective traffic management strategies during construction."
    - Another is working with a university partner in "developing work zone performance measures and will be using the information in the scan report to assist [them.]"

- In addition, four nonparticipants surveyed reported in-progress implementation efforts:
    - One agency has "set work zone safety goal as part of statewide strategic highway safety plan. [It is] collecting additional field data at freeway work zones on lane capacity and traffic diversion[, and] using Bluetooth technology to collect data. Intend to collect additional sampling/monitoring of predicted and actual work zone delays."
    - Another state is standardizing its lane closure database and "developing PeMS [Highway Performance Measurement System] training to district traffic managers for real time data evaluation."

Additional benefits of the scan

- Participants commented on the importance of direct, one-on-one knowledge transfer through the scan process:
    - "It was valuable to me to know what other states are doing. It can be difficult to scan other website to find out what they're doing. To learn about processes, hear information firsthand and get feedback is extremely valuable."
    - "Participating on the tour did keep us informed of what other agencies are doing. We can now go into projects with a larger toolbox and understanding of what other states are doing."
- Scan team members detailed how they made individual contacts and built their professional network with practitioner experts:
    - "It is very helpful to have a personal contact in other states to discuss specific topics that we might want to explore further. For example, I know who to contact in Ohio to discuss queue length treatment or in Indiana to discuss that state's use of Bluetooth technology for work zone ITS."
    - "I have three times the number of personal contacts than I did in the past, and these are people working directly in the same area as me."
    - "Our organization will greatly benefit from my participation on this scan and accessing information that doesn't often show up on other DOT's websites or in paper scans. Being able to contact people directly is a much faster was of getting the information I need as well."

Scan best practices

- A participant commented that the scope of the scan was well defined and appropriate: "Our effort was focused well, allowing us to connect with DOTs on the 'bleeding edge' of practice."

Barriers and opportunities for improvements

- Participants cited different reasons for their inability to implement findings:
    - "Our state was ahead of the curve in many areas that the scan tour was looking at, so I don't think we made any policy or practice changes."
    - "We don't directly implement the practices at FHWA headquarters."
- There were some concerns about the discussion formats. Questions about the effectiveness of webinars for the purpose of open discussion are summarized in the "Observations" section above and addressed in more detail in the "Participant webinar" summary below. In addition, it was

noted that an auditorium-style presentation to a large audience at one locale had limited effectiveness for dialogue and discussion.

- A scan participant asked whether scan facilitators have and share guidance on effective host state practices. A project panelist suggested that it might be appropriate for the panel and past scan participants to review any such materials to help make the visits more meaningful.
- A significant challenge is keeping participants focused on implementation and outreach activities after the scan. A participant observed that this appears not to be a role of the scan coordinators, who are closely involved in scan activities before and during the tour but not afterward. More ongoing support in the short term after a scan might lead to a more robust outreach effort to push implementation.
    - During the post-scan webinar, the participants and panel discussed successful follow-up efforts as well as those efforts that might have been pursued had there been dedicated funding (a video and an article are two examples).

Scan details

Scan team members

- J. Stuart Bourne, North Carolina DOT, Scan Co-Chair
- Chung Eng, FHWA, Scan Co-Chair
- Diana Gomez, Caltrans
- David L. Holstein, Ohio DOT
- Ronald D. Lipps, Maryland SHA
- Denise L. Markow, New Hampshire DOT
- K.C. Matthews, Colorado DOT
- Tracy A. Scriba, FHWA
- Reynaldo Stargell, Ohio DOT
- Brian Zimmerman, Michigan DOT
- Gerald L. Ullman, Texas Transportation Institute, Subject Matter Expert

Sites visited

Hub states

- California DOT
- Maryland DOT
- Michigan DOT
- New Jersey DOT
- Ohio DOT

Invited to hub state or webinar

- Florida DOT
- Illinois Tollway
- Indiana DOT
- Missouri DOT
- New Hampshire DOT
- New York State DOT
- Oregon DOT
- Pennsylvania DOT
- Washington State DOT
- Wisconsin DOT

Scan dates

Conducted March 7-13 and March 21-28, 2010

Final report

October 2010, http://www.domesticscan.org/wp-content/uploads/NCHRP20-68A_08-04.pdf

Participant interviews

CTC & Associates conducted interviews with participants shortly after the publication of the scan report. Interviews were conducted either by telephone or via email based on the each respondent's preference.

Two of the 10 highway agency scan participants have retired since the time of the scan. Among the remaining eight, five participated in the interviews. Responses to each of four questions are summarized and compiled below.

As appropriate, this information has been supplemented with information provided in the scan team's implementation plan (Appendix A).

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? What implementation activities do you have planned?

- I don't believe we've made any changes as a direct result of the tour. Participating on the tour did keep us informed of what other agencies are doing. We can now go into projects with a larger toolbox and understanding of what other states are doing.
- We did notice that our state's user cost values appear to be out of line with other states' values. We are looking into revising our figures, possibly through a research project to address this issue.
- We don't directly implement the practices at FHWA headquarters.
- This question is more appropriate for the state DOT participants. The scan did influence the focus and scope of several research projects that FHWA initiated since the scan.
- My focus in my agency and on the scan has been work zone ITS. There are four components of implementation activities that we have done in our state:
    - We have developed standard guidelines, including a smart work zone ITS toolbox.
    - We have developed and conducted targeted training for our design and construction staff on work zone ITS.
    - We have looked at the different types of data types we can capture—primarily travel time and delay data—and how such sensor data can be used to better compute delay and work zone travel times.
    - We have looked at how we can start to do quarterly reporting in work zones that have ITS.
- Based in part on what we saw with highly developed and organized systems like those in Ohio and Michigan, we created our own traffic control committee to ensure that all projects are reviewed on a systematic and regular basis. Being able to point to how other states do this helped augment the final-rule process in our state.
- Our state was ahead of the curve in many areas that the scan tour was looking at, so I don't think we made any policy or practice changes.
- With respect to technology, we are starting to implement some of the things we saw. For example, smart work zone technology and control devices. We recently approved the iCone [sensor-equipped traffic barrel] in our state and ran several tests. We are looking into using it further once the device is able to count vehicles across multiple lanes.

2. We will be surveying "secondary" audiences to assess the reach of the scan program beyond the participants themselves. Have you shared information you learned or contacts you made during the scan tour with others—either in your agency or beyond? Can you provide contact information or meeting names and dates?

- September 2010 webinar presented as part of the National Highway Institute's Innovation webinar series (https://connectdot.connectsolutions.com/n134083201009/).
- January 2011 TRB workshop (http://pressamp.trb.org/conferenceinteractiveprogram/EventDetails.aspx?ID=20226)
- I shared the highlights of the tour with our team of district work zone traffic managers.
- We presented this to vendors and contractors at the Ohio ATSSA Chapter Meeting.
- I have shared this information numerous times. Reports are posted on our agency's website in several places.
- I have communicated with the points of contact for some other FHWA projects. For example, I am using the findings from one of the subquestions of the scan in a Web discussion on transportation management plans.
- We shared some of the data with a neighboring state to link work zone systems between two major metropolitan areas. We see significant user benefit in this type of data sharing—including travel time and delay—which we started earlier this year.
- Information learned on this scan was presented to our state's traffic engineers group. That group's meetings also include representatives from ITS, department of transportation development, and maintenance.

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?

- It was valuable to me to know what other states are doing. It can be difficult to scan other states' websites to find out what they're doing. To learn about processes, hear information firsthand and get feedback is extremely valuable.
- In-person meetings and demonstrations seemed much more effective than information presented in the webinar format. Communication was more effective in the in-person setting.
- Overall the scan was beneficial.
- I think it was very valuable for both finding out what states and a toll authority are doing in the subject area of the scan and for confirming that this is still an area in need of more development in practice.
- The scan tour was great in helping us better understand the state-of-the-practice. It allowed us to focus in on the lead practitioners to better understand and capture their approaches and practices and share this information with others.
- This scan helped address the question of how to get the best value out of work zone data. That has been a question that many states have struggled with, and it was helpful to see what states were and weren't doing and where the greatest needs are.

- As a way of characterizing delay, the scan homed in on the parameter of "delay per vehicle per traveler per mile" to capture delay at the driver level.
- The overall value of the scan is tremendous.
- It is very helpful to have a personal contact in other states to discuss specific topics that we might want to explore further. For example, I know who to contact in Ohio to discuss queue length treatment or in Indiana to discuss that state's use of Bluetooth technology for work zone ITS.
- I have three times the number of personal contacts than I did in the past, and these are people working directly in the same area as me.
- Our effort was focused well, allowing us to connect with DOTs on the "bleeding edge" of practice.
- I thought the tour was excellent. I saw many technologies on the tour that I think we will take a serious look at implementing here at our agencies.
- Our organization will greatly benefit from my participation on this scan and accessing information that doesn't often show up on other DOT's websites or in paper scans. Being able to contact people directly is a much faster was of getting the information I need as well.

4. Please rate the following outcomes in terms of their contribution to the value of this scan tour, where 1 is "not important "and 5 is "extremely important."

	Not Important 1	**2**	**3**	**4**	**Extremely Important 5**	**Average**
Introduction to (or clearer understanding of) a new technology or practice				3	2	**4.4**
Identification of one or more individuals, either at host state or on the scan team, to call on as a future resource				1	4	**4.8**
Information with which to *begin* implementation of a technology or practice at your agency				2	2	**4.5**
Information with which to *continue* implementation of a technology or practice at your agency			1	1	2	**4.3**

Participant webinar

Available scan tour participants and NCHRP project panel members took part in a webinar following the participant interviews. 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

April 25, 2012

Attendees

Facilitators

- Patrick Casey, CTC & Associates, LLC
- Brian Hirt, CTC & Associates LLC

Scan Team Members

- Chung Eng, FHWA, Scan Co-Chair
- Denise L. Markow, New Hampshire DOT
- Tracy A. Scriba, FHWA
- Reynaldo Stargell, Ohio DOT

Panel Members

- Marsha Fiol, Virginia DOT
- Rick Kreider, Kansas DOT
- Glenn Roberts, New Hampshire DOT
- Amy Schutzbach, Illinois DOT

Presentation

- http://domesticscan.org/wp-content/uploads/Scan08-04Webinar.pdf

Discussion of Nonparticipant Survey Results

During discussion of the nonparticipant survey results, scan participant Tracy Scriba inquired about the process of how the nonparticipant survey distribution list was created. Facilitator Brian Hirt explained how the list was compiled with scan participants' assistance from available event attendance records and material distribution lists. Scriba noted that the responses to question "How did you hear about the scan?" will necessarily be a function of which subset of nonparticipants was actually surveyed.

Scan participant and co-chair Chung asked how the survey data compared with other scans. Hirt said that the responses followed a pattern similar to other scans, with significant numbers of respondents indicating they sought more information about the scan or discussed it with others, but relatively fewer reporting planned or actual implementation efforts.

Open Discussion Summary

Scan participant Reynaldo Stargell said that he found it beneficial to visit DOT staff in person and discuss the issues face-to-face. He said he learned several things that he brought back to his own agency that were implemented into existing processes. Stargell said he found some of the scan webinars less effective than

face-to-face meetings. Nevertheless, he has kept in contact with and sought further information from state representatives who only participated via webinar.

Eng said that videoconferencing tools allowed the scan to reach a broader group than it could have otherwise. He acknowledged the drawbacks as well, including the lack of opportunities to have informal, one-on-one discussions after presentations. He also noted that time was often lost at the start of web conferences setting up connections. He said he doesn't see this replacing face-to-face visits, but instead supplementing them. Scriba seconded Eng's observation, saying that the U.S. Domestic Scan program should exercise caution in considering any switch to completely virtual meetings. She said that the depth of information exchange and participant attention are both much better when people participate in person.

Eng also noted variability in how host states prepared for the scan, with some facilitating the exchanges better than others. The group discussed one auditorium-style presentation to a large audience that had limited effectiveness for dialogue and discussion. Panelist Marsha Fiol said that holding such a presentation for multiple audiences—the scan team as well as others—seemed like it would be a significant distraction. Eng asked whether scan facilitators have and share guidance on effective host state practices. Panelist Amy Schutzbach suggested that perhaps it would be appropriate for the panel and past scan participants to review any such materials to help make the visits more meaningful.

Scriba discussed post-scan challenges, most notably how to keep participants focused on implementation and outreach activities after the scan. She said that providing support in this area appears not to be a role of the scan coordinators, who are closely involved in scan activities before and during the tour but not afterward. More ongoing support in the short term after a scan might lead to a more robust outreach effort to push implementation. Despite this challenge, though, she said the team's TRB session was a success story with very good participation from scan team and host state participants. She noted that these workshop presentations included pairings of participants and host state representatives to address a series of topics.

Panelist Rick Kreider asked the team whether during the process they had any "aha moments" that brought ideas of solutions to light. Stargell said that Ohio has been pursuing ways to prioritize enforcing on its work zone areas, and Indiana's presentation on its algorithm for this purpose was an "aha moment" for him. Kreider commented on the value of these kinds of individual success stories.

Panelist Glenn Roberts asked whether the team's implementation plan was available on the website. Hirt noted that there is a members-only location on the website for implementation plans; it could be made available to the public if desired by the scan team and panel.

Roberts noted that the panel has been considering dedicating additional funding toward implementation. He asked if information dissemination efforts possibly could have been improved if additional funding had been available.

- Eng said that the group "did what it could" with funding available, including the development of a brochure and facilitation of a webinar.
- Stargell recalled that at the end of the scan, the team discussed a number of communication options, but several were dismissed due to funding limitations.
- Scriba noted that the team's final implementation plan included a number of in-state presentations and a limited number of national efforts: a TRB workshop, a national webinar, and

> Pennsylvania's transportation engineering conference. A proposed video was dismissed as too expensive. A planned article was not pursued due to lack of available time among team members.

Scriba noted that one successful implementation activity was the submission of the research problem statement "Evaluation of the Effectiveness of Contract Incentives for Improving Work Zone Traffic Impacts and Performance," which was selected for funding by the Smart Work Zone Deployment Initiative pooled fund.

Eng said that he has seen some effect of this scan at FHWA, with more of the work zone funding proposals and problem statements that the agency receives referencing the issues addressed in this scan. The scan findings have helped forward the dialogue in this area.

Nonparticipant survey

To gather more information about the reach of the scan tour findings and to trace the paths through which information about the scan findings spread beyond the initial participants, CTC & Associates conducted an online survey of nonparticipants—individuals who did not participate in the scan but who were identified as having received information about it.

Based on participant interviews and input as well as the implementation plan for this scan compiled by Arora and Associates, we identified the activities—meetings, presentations and report distributions—through which the scan likely reached secondary audiences. We contacted the organizers of those activities and searched the Web to obtain attendee lists and distribution rosters. From these lists we surveyed representatives of state DOTs, other highway agencies, and federal agencies, totaling 108 names from the following two lists:

- A distribution to the AASHTO Subcommittee on Traffic Engineering and its technical team on Work Zones
- Participants in the September 2010 NHI webinar

Scan team members provided nine additional names of colleagues with whom they spoke about the scan findings.

The results of the nonparticipant survey (question 6, "If you talked to colleagues or peers about the scan tour results, we would appreciate it if you could share their names and agencies.") 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 two individuals as well.

In all, CTC & Associates sent the nonparticipant survey to 120 individuals. 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 U.S. Domestic Scan Program (http://domesticscan.org) are being used by transportation practitioners beyond the initial scan participants.*
>
> *You were identified as having received information about **Scan 08-04: Work Zone Assessment, Data Collection and Performance Measurements**. We would appreciate a few minutes of your time to complete a brief survey (7 questions) on your use of the scan findings. Your responses will help NCHRP evaluate the reach of this scan and the overall value of the U.S. Domestic Scan Program.*
>
> *The survey is available at http://www.surveymonkey.com/s/ZMYN29W.*
>
> *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 the U.S. Domestic Scan Program to facilitate technology transfer among state DOTs. As part of the program, CTC & Associates is conducting this survey on behalf of NCHRP to evaluate how the technologies and practices identified through the scans are being used by transportation practitioners beyond the scan participants.*
>
> *You were identified as having received information about* ***Scan 08-04: Work Zone Assessment, Data Collection and Performance Measurements*** *(see the project Web page or final scan report [PDF]). Your feedback about how you learned about this scan—and how the scan findings are being used at your agency—will be of great value to NCHRP and the transportation community.*
>
> ***Thank you*** *for taking the time to complete this short seven-question survey.*

Responses

A total of 19 people responded to the survey, a 16 percent response rate. These responses are compiled below.

1. (Required) Please provide your name and organization. This information will not be published.

18 of the 19 survey respondents represented state DOTs, and one represented FHWA.

Among state respondents, accounting for multiple responses from the same agency, respondents represented a total of 16 different agencies.

- Two of these agencies were the same as those agencies represented in the Scan Team membership.
- Seven of these agencies were the same as those who participated as scan host states. Host states include "hub states" as well as states invited to participate by webinar or to attend meetings at hub states.

2. HOW YOU LEARNED ABOUT THIS SCAN. The scan findings were disseminated and presented through a number of channels. How did you learn about the scan results? (Check all that apply.)

	Number responding	Percent responding
Conversation or email with a colleague at my organization	3	16%
Conversation or email with a scan participant or host state member	5	26%
Received final scan report from an email distribution	4	21%
TRB Annual Meeting	1	5%
AASHTO SCOTE meeting (June 2010, Chicago)	4	21%
NHI webinar (September 2010)	1	5%
Another national or regional conference (please describe in the "Other" box below)	2	11%
Journal paper or trade publication article	0	0%
I don't remember learning about this scan tour prior to this survey	4	21%
Other (open-ended) • Assisted host state member to present California's practices. • This was some time ago. We did not have the resources to get involved. • INDOT participated in the scan webinar, providing information on our queue analysis and queue data collection methods. • WSDOT participated in the scan. • National Work Zone Safety Clearinghouse. • The scan was mentioned during the Web conference on Work Zone Transportation Management Plan Changes During Construction. • Our department participated. • My director informed me that NJ was participating in the work zone safety scan. • Asked another in this office if he was aware of the scan. He wasn't either.	9	47%

3. SOUGHT MORE INFORMATION. If you sought more information about the findings of the scan tour, please indicate how. (Check all that apply.)

	Number responding	Percent responding
Obtained or read the scan report	9	47%
Visited the website domesticscan.org	5	26%
Contacted a scan participant	2	11%
Contacted someone from one of the states visited in the scan	1	5%
Other	0	0%
Specific technologies or practices discussed (open-ended) • Examination of the sensor data reliability from NHDOT Smart Work Zone data review study • What stood out in my mind was 1) the need to collect crash data specific to work zones beyond what the current NJTR-1 crash report collects, and 2) the need for quicker data collection.		

4. SHARED INFORMATION WITH OTHERS. If you shared information about one or more of the technologies or practices identified through the scan, please describe how. (Check all that apply.)

	Number responding	Percent responding
Shared information with a colleague at my organization	11	58%
Shared information with other stakeholders in my state	5	26%
Recommended a change in practice at my organization	2	11%
Other	0	0%

Specific technologies or practices discussed (open-ended)

- Set work zone safety goal as part of statewide strategic highway safety plan. Collecting additional field data at freeway work zones on lane capacity and traffic diversion. Using Bluetooth technology to collect data. Intend to collect additional sampling/monitoring of predicted and actual work zone delays.
- We are in the process of establishing work zone performance measures now.
- Referenced the data reliability/accuracy from side-fire radar traffic detectors.
- 1. Discussed about piloting an additional appendix to the NJTR-1 for work zone crashes. 2. Discussed modifying NJTR-1 crash report to include additional fields of data associated with work zones.

5. IMPLEMENTED SCAN FINDINGS. If you used information from the scan tour to make or recommend a change to your agency's practices, please indicate how.

	Number responding	Percent responding
Proposed implementation	4	21%
Planned implementation	0	0%
In-progress implementation	4	21%
Completed implementation	0	0%

Please provide details on the implementation (open-ended)

- See response to question 4 ("Set work zone safety goal as part of statewide strategic highway safety plan….")
- Standardizing Lane Closure database, developing PeMS [Highway Performance Measurement System] training to district traffic managers for real time data evaluation.
- Working with University of Virginia in developing work zone performance measures and will be using the information in the scan report to assist us.
- Collection of crash and speed data for the development of performance measures to assist the DOT in applying effective traffic management strategies during construction.
- As indicated by the scan, our department is involved in the work zone scan methods.
- FHWA does not have the ability to implement changes—just influence the partner agencies to see the benefits and make changes.
- No progress has been made as of yet.

6. CONTACTS. If you talked to colleagues or peers about the scan tour results, we would appreciate it if you could share their names and agencies. This information will not be published.

A total of three names were provided. Each of these individuals was later sent this nonparticipant survey.

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

	Number responding	Percent responding
Open-ended response	3	16%
• I assisted my supervisor, Diana Gomez (a scan member), to present California's practices in May 2010. However, with other workload and absence from the job for three months due to health in 2011, I did not read the final results or consciously begin to develop a plan. Thank you for this survey as it raised the flag again. I realize we are developing some items to assist in work zone assessment, but more is needed and I hope to establish goals and objectives for Work Zone Safety and Mobility. • None at this time • As the person responsible for evaluation of work zone impacts for all projects that are administered by this state, I sought information on ways that others may have undertaken that effort.		

Appendix A
Compiled by Arora and Associates

Domestic Scan 08-04 Implementation Strategy

The scan team identified 7 potential dissemination avenues for the results of this scan. These avenues are listed below.

- Presentation of scan findings at relevant conferences and meetings
- Publication of summary article(s) regarding the scan findings in pertinent journals and trade publications
- Development and presentation of webinars
- Development of research problem statements and inserting them as appropriate into the funding cycles of various r
- Development of a summary brochure that can help "market" the scan report and its findings to agencies
- Development of demonstration workshops highlighting innovative practices and technologies identified through th
- Development of a marketing video that would raise the awareness of the scan report and its findings amongst agen

Scan Findings Presentations

As of 10/18/10 Coordinator: Tracy Scriba and Denise Markow

Venue	Date	Location	Team Member Presenting	Status	Audience
National Events					
AASHTO SSOM Meeting	May 2-5, 2010	Houston	Tracy	Done	State Ops folks, Consultants, FHWA
AASHTO SCOTE	June 27-30, 2010	Chicago	KC	Done - presented to WZ task force with subsequent discussion, and to whole SCOTE. Summary report distributed to overall SCOTE chair and SCOTE WZ task force chair	State Traffic folks, Consultants, FHWA
AASHTO Construction					
AASHTO Design					
AASHTO Maintenance					
ITE		Vancouver, BC			
ARTBA					
IMSA					
AGC					
I-95 Corridor Coalition					
AGC					
TRB 1/2 Day Workshop	Jan 23, 2011	Washington, DC	Multiple team members plus a couple of States we scanned	Done. Agenda developed by Jerry, Tracy, Denise	Researchers, Consultants, State DOTs
Regional Events					
NC/SC ATSSA Chapter			Stuart	Tentative	
Southeast Regional ITE Meeting			Stuart	Tentative	
Transportation Engineering & Safety Conference	December	Penn State Univ	Reynaldo	Scheduled - will cover what Ohio shared with the team during the scan	
State Events					
Virginia ATSSA Chapter			Stuart	Tentative	
NCSITE			Stuart	Tentative	Private Engineering Firms, Municipalities, NCDOT staff
CA ATSSA Meetings			Diana	Tentative	
Ohio ATSSA Chapter Meeting	June		Dave/Reynaldo	Tentative	
Internal Meetings					
NHDOT Quarterly TCC Meeting	April		Denise	Done	
District WZ Traffic Managers meeting	May		Dave/Reynaldo	Planned	
NC Traffic Safety and Mobility Division	May/June		Stuart	Planned	
NC Chief Engineer's Staff Meeting	June		Stuart	Planned	

Scan Articles

As of 5/6/10 Coordinator: . Gerald Ullman and Diana Gomez

Publications	Article Title	Date	Resources	Task Lead	Status	Note
ITE Journal						
Roads						
Bridges						
FHWA Focus						
Public Roads						
TRB Transportation News						

Scan Webinars

As of 10/18/10

Coordinator: Chung Eng and K.C. Mathews

Webinar Title	Date	Resources	Task Lead	Status	Note
Best Practices in Work Zone Assessment, Data Collection, and Performance Measurement	Sept 16 2:30–4pm Eastern	FHWA webconferencing system	Chung	Done	Webinar invitation provided to overall SCOTE chair and SCOTE WZ task force chair Recording of webinar is available at http://fhwa.na3.acrobat.com/n134083201009/

Problem Statements

As of 10/18/10 Coordinator: Gerald Ullman and Stuart Bourne

Topic	Date	Funding Sources	Task Lead	Status	Note
Evaluation of the Effectiveness of Contract Incentives for Improving WZ Traffic Impacts and Performance	9/28/2010	Smart WZ Deployment Initiative Pooled Fund	Tracy	Submitted	Submitted for consideration for 2011 research projects; may not get selected.

Summary Brochure

As of 11/29/10 Coordinator: Stuart Bourne and Chung Eng

Date	Funding Sources	Task Lead	Status	Note
11/22/2010		Stuart Bourne and Chung Eng	The draft brochure is being reviewed by the scan team	

Workshop

As of 5/6/10 Coordinator: Chung Eng and Diana Gomez

Topic	Date	Location	Task Lead	Status	Note

Summary Brochure

As of 5/6/10 Coordinator: Brian Zimmerman and Denise Markow

Date	Funding Sources	Task Lead	Status	Note