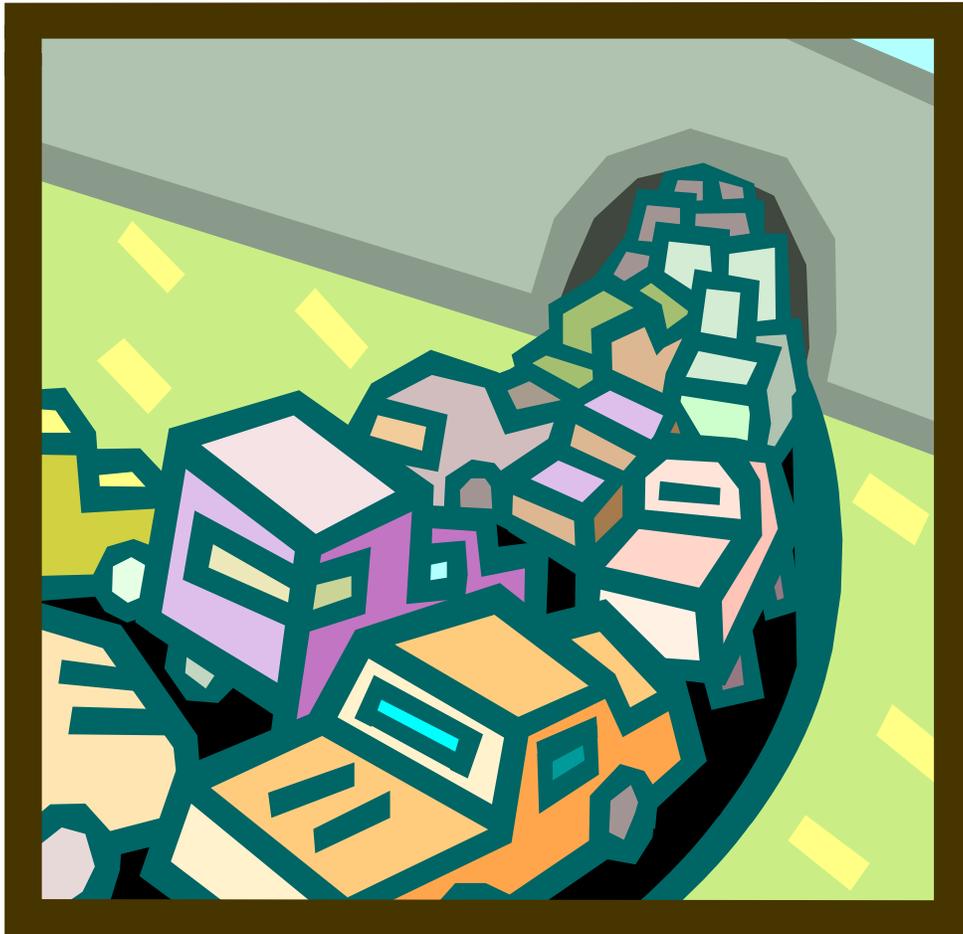


WORK ZONE MOBILITY AND SAFETY SELF ASSESSMENT

2009 NATIONAL REPORT



FEDERAL HIGHWAY ADMINISTRATION

OFFICE OF OPERATIONS

OCTOBER 2009 (FINAL)

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INTRODUCTION

To help States evaluate their work zone practices, and to help assess work zone practices nationally, the Federal Highway Administration (FHWA) developed the Work Zone Mobility and Safety Self Assessment (WZ SA) tool. The WZ SA tool consists of a set of 46 questions designed to assist those with work zone management responsibilities in assessing their programs, policies, and procedures against many of the good work zone practices in use today. The policies, strategies, processes, and tools identified in the WZ SA were gathered from the best practices currently in place in State departments of transportation (DOTs), metropolitan planning organizations, and local municipalities. Many of the items can be found in the *Work Zone Best Practices Guidebook* (available at <http://www.fhwa.dot.gov/workzones>).

The WZ SA helps FHWA Division Offices work with their State partners to:

- Assess their past work zone activities
- Identify actions and priority areas for improvement as appropriate for a given State
- Establish a baseline of their state of the practice and monitor changes over time
- Gain information that States can use as part of their inputs when they perform the process reviews that are required by the Work Zone Safety and Mobility Rule (http://www.ops.fhwa.dot.gov/wz/resources/final_rule.htm).

At the National level, the WZ SA serves several important roles. It:

- Helps raise the level of awareness of practices and strategies used in mitigating work zone congestion and crashes
- Facilitates communication and sharing of best practices among transportation professionals
- Provides an opportunity to benchmark progress in work zone management
- Helps FHWA identify work zone congestion and safety management strategies that need more investigation and evaluation
- Helps FHWA identify areas where there is a need for additional training and guidance
- Assists in identifying States that are on the “leading edge” in a particular area and may be well-suited to share their experiences through case studies, as part of scanning tours or workshops, or as peers in the WZ Peer-to-Peer Program (<http://www.ops.fhwa.dot.gov/wz/p2p/index.htm>).

OVERVIEW OF RESULTS

This section presents an overview of the combined results for the 51 Divisions/States that provided responses to the 2009 WZ SA. Results from the 2008 WZ SA are also included for comparative purposes. Table 1 shows the average ratings for each of the six sections in the WZ SA and compares the 2009 results with the 2008 average ratings.

Table 1. National Average Scores

Section	# of Questions	2008	2009	Change ¹	Percent Change
1. Leadership and Policy	10	9.2	9.6	0.4	4%
2. Project Planning and Programming	6	8.2	8.2	0.1	1%
3. Project Design	12	9.5	9.8	0.3	3%
4. Project Construction and Operation	9	9.9	10.2	0.3	3%
5. Communications and Education	5	11.5	11.8	0.3	2%
6. Program Evaluation	4	6.6	7.0	0.4	7%
Overall	46	9.4	9.7	0.3	3%

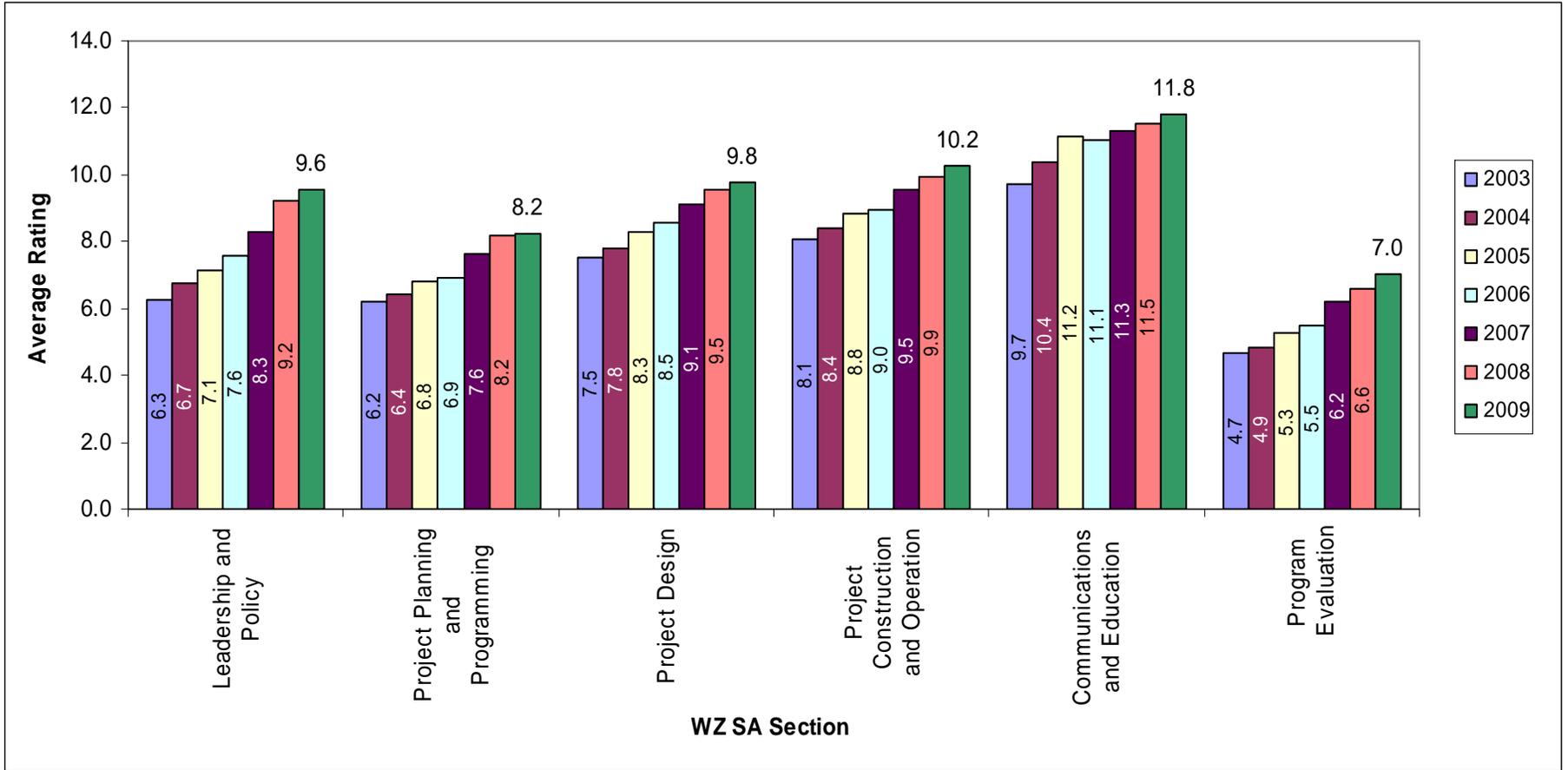
The data from Table 1 show that the highest average ratings were assigned to Section 5 (Communications and Education), followed by Section 4 (Project Construction and Operation) and Section 3 (Project Design). The lowest average rating was assigned to Section 6 (Program Evaluation). This is consistent with the results of the 2008 WZ SA and the trends from previous years.

Between 2008 and 2009, Section 6 (Program Evaluation) had the highest average rating increase (7%), followed by Section 1 (Leadership and Policy) with a 4% increase. The percentage increases are lower than those experienced from 2007 to 2008, which were between 4% and 11% for all sections except Section 5.

The National average ratings for all six sections have consistently increased since the inception of the WZ SA, with the level of increase varying from section to section as shown in Figure 1. This is the first year when the average score for every one of the six sections was at or above the implementation threshold of 7 – meaning that on average across the country, agencies are implementing the practices in all six sections of the assessment. As agencies have continued to strengthen and enhance their work zone practices, the average score has reached high levels on more questions and continued increases become more difficult. FHWA expects that going forward increases in overall scores will occur more gradually.

¹ Numbers in this table and other tables in this report may not calculate exactly due to rounding. Non-rounded values were used in these and other calculations throughout this report. E.g., For Section 2, the change from 2008 (8.17) to 2009 (8.23) is .06, which rounds to 0.1.

Figure 1. National Average Section Ratings by Year: 2003 to 2009



The questions showing the largest increases in score between 2008 and 2009 are:

- **4.4.9 Does the agency provide training to uniformed law enforcement personnel on work zone devices and layouts or ensure law enforcement personnel receive proper training elsewhere?** (17% increase)
 - Thirty-three (65%) of the responding agencies provide training to uniformed law enforcement or otherwise ensure they receive training, up from 52% in 2008. In 2009, the average rating crossed the implementation threshold of 7.
 - The continued increase in the number of agencies providing this training is likely a result of the expanded training requirement in the updated Work Zone Safety and Mobility Rule (the Rule), and the 23 CFR 630 Subpart K requirement for agencies to have a policy on the use of law enforcement.
 - This score may also have increased due to a wording change in the question that broadened the range of sources that might provide training to law enforcement personnel.

- **4.6.1 Does the agency collect data to track work zone congestion and delay performance in accordance with agency-established measures?** (13% increase)
 - Twenty-two (43%) of the responding agencies collect data to track work zone congestion and delay performance in accordance with agency-established measures.
 - While this question has had one of the lowest scores in the past two years it is also had one of the largest increases, indicating that agencies are increasingly moving towards using data to track work zone congestion and delay. This is likely due in part to the increased emphasis on the use of data and the addition of operational data in the updates to the Rule.
 - This question also may have increased as a result of the recent and current promotional activities underway at FHWA in the area of performance measurement.

- **4.6.2 Does the agency collect data to track work zone safety performance in accordance with agency-established measures?** (9% increase)
 - Thirty-three agencies are collecting data to track work zone safety performance.
 - The increase in score is a result of large increases in scores for three agencies.
 - A number of agencies are still struggling with data accuracy and determining causality, however, more agencies are beginning to collect data each year.
 - This question may have increased as a result of the recent and current promotional activities underway at FHWA in the area of performance measurement and the increased emphasis on the use of data in the updates to the Rule.

In addition to the question-specific reasons mentioned above, the change in score for any survey question may be due to a combination of reasons. These potential reasons include enhancements to State practices (perhaps based on the results of a previous

survey), FHWA's support to agencies in technical areas, enhanced processes for stakeholder input while filling out the surveys, added scrutiny of agency processes while filling out the survey, and changes in personnel filling out the survey. Question-specific factors for score changes to each question are listed in the section-by-section write-ups.

The following question was the highest rated question on the WZ SA in 2009, with an average rating of 13.2:

- **During type I, II, and III projects, does the agency use uniformed law enforcement?**
 - Ninety-six percent of the agencies (49 agencies) use uniformed law enforcement on projects.
 - This question has consistently had the highest overall rating of any question in the WZ SA, indicating that the use of law enforcement in work zones is a well-established and assessed practice in many agencies.

Four questions in the 2009 WZ SA showed a decrease from the 2008 results:

- **4.2.4 Does the agency's transportation planning process include a planning cost estimate review for work types I, II, and III that accounts for traffic management costs (e.g., incident management, public information campaigns, positive separation elements, uniformed law enforcement, and Intelligent Transportation Systems [ITS])?**
 - This question showed a 4% decrease from 8.4 in 2008 to 8.1 in 2009. This is the result of decreased scores in seven agencies. The number of agencies reaching the implementation threshold dropped from 34 agencies to 32 agencies.
 - The comments provided by each agency did not clearly identify trends as to why the score decreased.
- **4.1.10 Has the agency established Memoranda of Understanding (MOU) between utility suppliers to promote the proactive coordination of long-range transportation plans with long-range utility plans, with the goal of reducing project delays and minimizing the number of work zones on the highway?**
 - This question showed a 4% decrease from 6.0 in 2008 to 5.8 in 2009. It was the lowest rated question in the WZ SA in 2009. This is the result of decreased scores in seven agencies. The number of agencies reaching the implementation threshold remained constant at 20 agencies.
 - One agency noted that they had planned to establish an MOU but due to staff changes this was not completed. The comments provided by the other agencies did not clearly identify trends as to why the score decreased.
- **4.4.1 Is the letting schedule altered or optimized to reflect the available resources and capabilities of the construction industry?**
 - This question showed a small decrease (2%) from 9.5 in 2008 to 9.3 in 2009. This is the result of decreased scores in five agencies. The number of

agencies reaching the implementation threshold dropped from 42 agencies to 39 agencies.

- The comments provided by each agency did not clearly identify trends as to why the score decreased.
- **4.2.6 Does the agency’s transportation planning process engage planners as part of a multidisciplinary/multiagency team in the development of Transportation Management Plans involving major corridor improvements?**
 - This question showed a slight decrease (1%) from 8.7 in 2008 to 8.6 in 2009. This is the result of decreased scores in eight agencies. While a number of agencies scores decreased, the number of agencies reaching the implementation threshold actually increased from 36 agencies to 37 agencies.
 - The comments provided by each agency did not clearly identify trends as to why the score decreased.

Decreased scores for these questions were likely based on an enhanced evaluation that led stakeholders to conclude that a previous year rating was too high.

Most agencies reported an increase in their overall WZ SA score between 2008 and 2009. The average score increased for 41 of 51 agencies (80%), decreased for 9 of 51 agencies (18%), and remained the same for 1 of 51 agencies (2%). These percentages continue a similar trend from 2007 to 2008. Table 2 shows the changes in average agency scores from 2008 to 2009.

Table 2. Percent Change in Weighted Score by Agency

Score Change	Agencies	Percent of Agencies
Increased by more than 10%	5	10%
Increased 6% to 10%	9	17%
Increased 1% to 5%	27	53%
No Change	1	2%
Decreased by less than 5%	5	10%
Decreased by 5% or more	4	8%
Total	51	100%

One of the biggest changes between 2008 and 2009 is that more agencies are seeing an impact from the Rule, based on the responses to the supplemental questions. A majority of agencies have experienced some positive changes in their practices as a result of the Rule. Thirty-six agencies (71%) reported either a significant change (5 agencies) or some change (31 agencies) in enhanced consideration and management of work zone safety and mobility impacts, starting during planning and continuing through project completion. The number of agencies that thought it was too early to tell if the Rule has had an impact has dropped on all five of the supplemental questions, with most of those agencies now indicating that a positive change has occurred.

BACKGROUND AND PURPOSE

FHWA began the WZ SA in 2003 and conducts the assessment annually. In 2009, each FHWA Division Office was asked to re-examine and update the results of its 2008 WZ SA, working with transportation agency staff from its State partner. Each Division Office had the option of performing a simple update or a more in-depth reassessment. A simple update would focus on revising past scores to reflect current practices based on observations and an ongoing knowledge of work zone practices. For a more in-depth reassessment, the WZ SA is conducted as a group exercise and involves a structured discussion among stakeholders to develop consensus ratings for each of the questions.

While the WZ SA score provides a metric for measurement, the most important information is derived from the discussions conducted among the participants. The interchange among stakeholders provides an opportunity for an agency to identify specific areas for improvement and provides the basis for structuring approaches to improve work zone policies, programs, and practices.

The WZ SA is intended to help agencies identify areas of strength and areas for improvement and to then use that information to identify needs and gaps in practices that could benefit from additional focus. While a goal of the WZ SA is to identify opportunities for improvement, the “next step” is to identify techniques and actions that can fill those gaps to improve upon current work zone operations.

The WZ SA consists of six primary assessment areas and a set of five supplemental questions. The six primary areas are:

- Section 1: Leadership and Policy
- Section 2: Project Planning and Programming
- Section 3: Project Design
- Section 4: Project Construction and Operation
- Section 5: Communications and Education
- Section 6: Program Evaluation

Each assessment area contains a set of questions about a particular work zone related policy, strategy, process, or tool. For each question, respondents were asked to evaluate the extent to which a particular practice has been incorporated into an agency’s way of doing business. The questions in each section were rated according to the level of adoption phase, using a scale of 0 to 15 that is broken into a set of five progressive levels based on the quality improvement process model used by industry. A score of 7 or more on a question signifies that a State is implementing/executing the item in that question. Definitions for each of the rating levels are shown in Appendix A. Several questions in the WZ SA are based on the magnitude of impact that a project may have on a particular area. These project types (Types I through IV) are also described in Appendix A.

In order to assess how States' practices may have changed as a result of the Work Zone Safety and Mobility Rule (deadline for *implementation* was October 12, 2007), the following five supplemental questions were added in 2008 and revisited in 2009:

1. While planning and designing road projects, the agency is expanding planning beyond the project work zone itself to address corridor, network, and regional issues (e.g., alternate routes and/or modes, truck traffic, special events, etc.) - particularly when congestion is an issue.
2. The agency is seeing enhanced consideration and management of work zone safety and mobility impacts, starting during planning and continuing through project completion.
3. The agency is expanding work zone management beyond traffic safety and control to address mobility through the consideration and use of transportation operations and public information strategies.
4. As a result of its work zone policy, the agency is using a more consistent approach to planning, designing, and constructing road projects.
5. The agency has updated/changed training for its staff (designers, planners, construction staff, etc.) to address broader consideration of work zone impacts and management in the scheduling, design, and implementation of projects.

States were asked to select from one of the following five responses on how the Rule has changed their practices:

The Rule Has Caused Change:

- The agency has significantly experienced this as a result of the Rule.
- The agency has somewhat experienced this as a result of the Rule.

The Rule Has NOT Caused Change:

- This was already taking place prior to the Rule and has not changed since the Rule was implemented.
- This was not taking place prior to the Rule and is still not occurring.

Other:

- It is too early to tell if the Rule has caused this to occur (but I might know later).

DETAILED RESULTS

This section presents the results of the 2009 WZ SA at a more detailed level. The results represent a compilation of scores and comments submitted from 51 Divisions/States. For each section of the WZ SA, the information includes:

- An explanation of the intent of the section,
- National average ratings for each question in the section and comparative data from the 2008 WZ SA, and
- The questions asked in that section with a question-by-question discussion of the scores, including the percentage of agencies implementing the practice asked about in the question (meaning they rated themselves at 7 or higher) and a summary of comments included by respondents in the results they submitted.

The section on results of the 2009 WZ SA supplemental questions includes a question-by-question discussion of the scores, including how many agencies have experienced a change as a result of the Rule.

Many respondents provided comments for some questions. The respondents that provided comments offer helpful examples of some of the specific practices and efforts being done to make work zones work better.

Another rich source of examples is the FHWA Work Zone Program website at <http://www.fhwa.dot.gov/workzones>. The website contains work zone publications, studies, links, training information, technical resources, and best practices, as well as examples of what agencies are doing to support implementation of the Rule. A series of guides published by FHWA to assist transportation agencies in implementing the Rule (23 CFR 630 Subpart J) contains many good examples of State DOT practices in use and provides references to helpful informational resources.

Since 2007, the WZ SA has included linkages, as applicable by question, to the appropriate sections of the Work Zone Rule. As agencies worked to implement the Work Zone Rule by the October 12, 2007 deadline and since, these efforts have affected the ratings in a positive way.

Leadership and Policy

Agency leadership support should drive overall policy making for the agency. This support fosters an environment conducive to developing an effective work zone program. Project planning, design, and construction and maintenance activities should all incorporate consideration of work zone safety and mobility impacts and mitigation strategies. Agency management should facilitate and encourage a multidisciplinary approach to traffic management throughout all phases in the life of a project. Senior managers should be personally, visibly, and proactively involved in efforts to enhance the safety of motorists and workers in work zones and minimize work zone delays.

Goals provide high-level direction and establish expectations for agency staff. Clear and specific goal statements such as “Reduce congestion and delay in work zones by 10% in 5 years” establish a basis on which to develop strategies and actions. Use of performance measures helps to assess progress toward fulfillment of a goal. For example, to track progress toward reduction of work zone delays, an agency may gather information regarding the total vehicle hours of delay for a sample of work zones and track these values over time.

Figure 2 shows the average rating by question for 2008 and 2009 for the Leadership and Policy section. Table 3 shows the numeric ratings along with the percent change from 2008 to 2009 for each question.

Figure 2. Results for Leadership and Policy Section

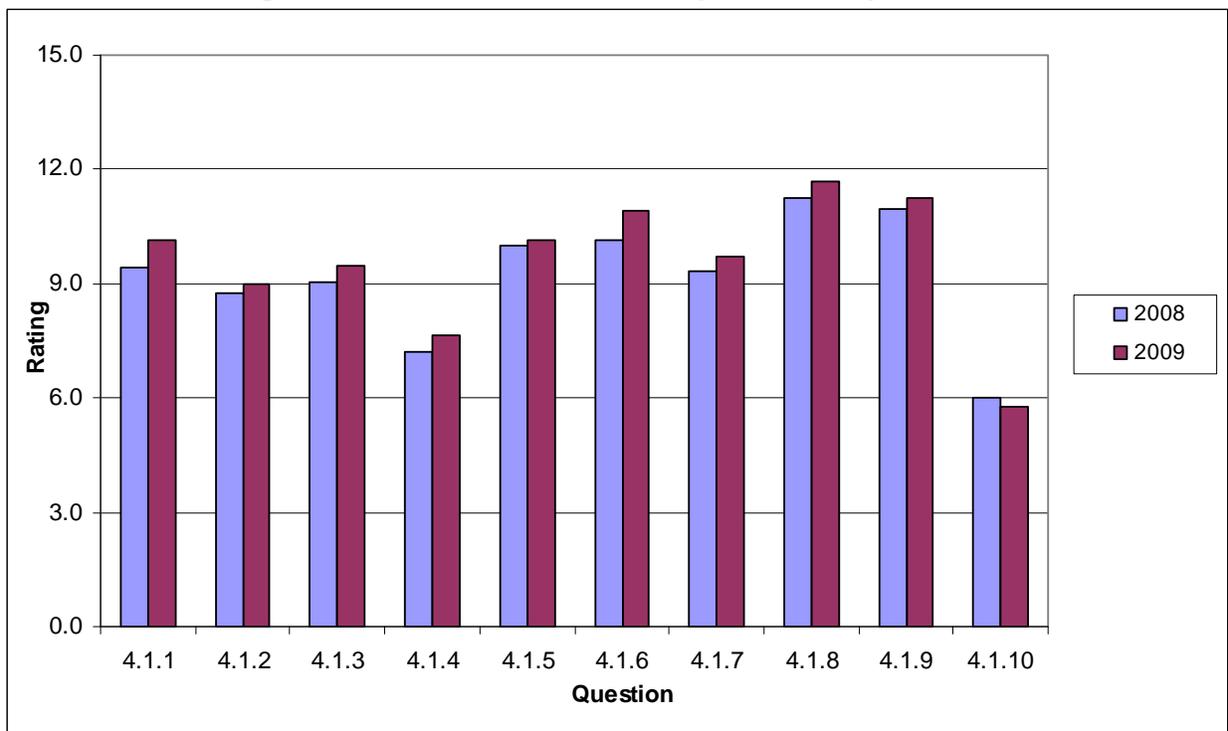


Table 3. Ratings for Leadership and Policy Section

Section	2008	2009	Change	Percent Change
4.1.1	9.4	10.2	0.8	8%
4.1.2	8.8	9.0	0.2	3%
4.1.3	9.0	9.5	0.5	5%
4.1.4	7.2	7.6	0.4	6%
4.1.5	10.0	10.1	0.2	2%
4.1.6	10.2	10.9	0.8	8%
4.1.7	9.3	9.7	0.4	4%
4.1.8	11.2	11.7	0.5	4%
4.1.9	10.9	11.3	0.3	3%
4.1.10	6.0	5.8	-0.2	-4%

The average ratings increased for most of the questions in this section. Questions 1 and 6 in this section saw the largest increases (8% each) from 2008 to 2009. Question 10 decreased slightly, and one agency noted that their 2008 score was too high and lowered it for 2009. All but question 10 had a national average score of 7.0 or greater, indicating that, on average, agencies are implementing the practices covered in this section.

4.1.1 Has the agency developed a process to determine whether a project is impact type I, II, III, or IV? Forty-six agencies (90%) have developed a process to determine the impact type of projects. The average score for this question had an 8% increase from 2008 to 2009. Several agencies cited use of a process to filter out significant projects without classifying all projects based on impact type I, II, III, or IV. One agency noted use of a checklist to classify projects using metrics such as project size, complexity, construction time, and anticipated traffic volume. The checklist results are then used to help practitioners understand the potential impacts at each stage of the project. Some agencies noted having fewer than four classification ratings but cited a similar process for separating projects based on their level of potential impact. One agency cited project cost as a key metric in determining whether it is significant (\$5 million and higher cost). Seven more agencies scored themselves as implementing a process (score ≥ 7) to determine project type in 2009 compared with 2008.

4.1.2 Has the agency established strategic goals specifically to reduce congestion and delays in work zones? Almost three-fourths (73%) of the responding agencies indicated that they have strategic goals to reduce work zone congestion and delays. Some agencies have goals, while some are in the process of developing strategic goals. Several agencies commented on performance measures in response to this question. One agency noted that they expect to develop performance measures prior to goal development, which may not be as effective since metrics should be tied to strategic goals. Another agency noted use of a permitted lane closure chart for freeway applications, focusing on minimizing delay and congestion without citing a specific goal. In a reference to performance measures, one agency noted using a threshold of 30 minutes of delay to determine when additional mitigation strategies are needed including modified windows within which to perform work.

4.1.3 Has the agency established strategic goals specifically to reduce crashes in work zones? Out of 51 reporting agencies, over three-fourths of them (76%) have strategic goals specifically to reduce crashes in work zones. Similar to question 4.1.2, several agencies cited specific performance measures considered in relation to a strategic goal. One agency noted a goal of reducing worker injury rates but had not established goals for motorist safety. Another agency noted use of contract specifications to improve safety, such as for portable changeable message signs, lettering on signs, and impact attenuator use. The same agency cited a goal to reduce work zone fatalities by 10% from 2004 to 2010. One agency cited a more general goal of reducing roadway crashes in work zones. Several agencies referred to their policy on work zone safety and mobility that addresses reducing crashes in work zones. Guidance on goal setting and performance measure development may be helpful to some agencies in the future.

4.1.4 Has the agency established measures (e.g., vehicle throughput or queue length) to track work zone congestion and delay? Over half (57%) of the agencies are implementing measures to track work zone congestion and delay. The average score for this item increased from 7.2 to 7.6 (6%) between 2008 and 2009. While a smaller percentage compared with previous years, the increase continues a trend from previous years. One agency develops measures for congestion and delay for individual projects. Another agency noted that they are reviewing available data sources to determine if performance measures can be established. The same agency cited public interest in displaying delay messages for work zones in the field. Another agency did not cite specific performance measures in use, but referenced a specific mitigation policy of moving warning signs upstream of queues. This policy may more directly relate to mitigating safety impacts of work zones. One agency noted use of performance measures such as delay, while the thresholds of what is considered reasonable are still under development.

4.1.5 Has the agency established measures (e.g., crash rates) to track work zone crashes? Forty-two agencies (82%) have established measures to track work zone crashes. The responses to this question indicate that the main focus is on improving reporting for work zone crashes compared with analysis or measurement of crash rates. For example, a few agencies noted the addition of a “location” parameter to crash reporting forms that assist with capturing the location of the crash (advance warning area, transition area, etc.). One agency noted that while work zone crashes are tracked, better analysis procedures are needed to generate results that can help with measuring performance. One agency cited the use of a tool to evaluate work zone crash data that was developed as part of Strategic Highway Safety Plan activities. Another agency focuses on analyzing fatal crashes to determine improvements, while another agency cited analysis of crash data based on issues that are discovered on a project by project basis.

4.1.6 Has the agency established a policy for the development of Transportation Management Plans to reduce work zone congestion and crashes? Forty-eight agencies (94%) are implementing a policy for the development of Transportation

Management Plans (TMPs) to reduce work zone congestion and crashes. Since TMPs are required for all Federal-aid highway projects, 100% of agencies should be implementing TMPs. Of the agencies that provided comments, a majority of them have a policy that includes development of TMPs for projects. Some agencies noted use of guidelines that structure the development of the TMP. One agency referred to their project cost threshold for significant projects, as TMPs are required for those projects. A few agencies are assessing their guidelines for TMPs and are providing training on the implementation of the guidelines and TMP development. One agency cited the use of demand management and other traffic operations strategies for an Interstate widening project. The 8% increase for this item is due to increased ratings from 21 agencies, and one agency crossed the implementation threshold (7 or higher) from 2008 to 2009.

4.1.7 Has the agency established work zone performance guidance that addresses maximum queue lengths, the number of open lanes, maximum traveler delay, etc.? Standards for work zone performance guidance have been established in 42 agencies (82%). Several agencies referred to use of a time period based permitted lane closure tool to display time periods to avoid due to the potential for unacceptable queues and delays. One agency noted that queuing and lane closure analysis is performed on a project level when incentive/disincentive contracts are used. Another agency sets a maximum queue length based on anticipated traffic volumes for project types I and II. The same agency cited temporary suspension of work activity as the primary result of unacceptable queues (4 miles or greater). Several agencies cited maximum delay as a primary metric used; 10 minutes, 12 minutes, and 30 minutes of delay are examples of maximum delay thresholds noted.

4.1.8 Has the agency established criteria to support the use of project execution strategies (e.g., night work, full closures) to reduce public exposure to work zones and reduce the duration of work zones? Forty-eight agencies (94%) have established criteria to support the use of project execution strategies. Several agencies noted use of strategies such as nighttime construction and full road closure, but did not mention specific criteria to support these decisions. One agency noted use of nighttime work routinely to avoid traffic impacts during daytime hours. Agencies may base their decision on use of such strategies on historical recurring and non-recurring congestion during peak daytime periods. One agency is collecting and analyzing data in order to establish project execution criteria and support decision-making. Some agencies cited the need for more formal guidelines on when to use such strategies.

4.1.9 Has the agency developed policies to support the use of innovative contracting strategies to reduce contract performance periods? Of 51 reporting agencies, 47 of them (92%) have developed policies to support the use of innovative contracting strategies to reduce contract performance periods. Adjusted for the number of reporting agencies in 2009, there was no change in the percentage of agencies that have reached the implementation threshold for use of innovative contracting strategies. Strategies used include A+B bidding, delayed start specifications, design-build and incentives/disincentives on major projects. One agency cited use of a new, emerging

strategy titled Construction Manager at Risk. This strategy provides an additional option to the low bid strategy and defines a maximum guaranteed price for delivering the project. CM at Risk is different from low bid contracting in that it provides for a cost plus fixed fee contract with a maximum cost for the customer. Another agency noted use of value engineering to reduce construction time.

4.1.10 Has the agency established Memoranda of Understanding (MOU) between utility suppliers to promote the proactive coordination of long-range transportation plans with long-range utility plans, with the goal of reducing project delays and minimizing the number of work zones on the highway? Only 20 agencies (39%) have established an MOU between utility suppliers to promote the proactive coordination of long range transportation plans with long-range utility plans. This continues to be the lowest rated question within this section of the WZ SA. While most agencies do not have a formal MOU, several agencies have agreements and cooperative understandings in place with utility suppliers. One agency noted that utility providers have begun partnering with the state DOT to share information on upcoming projects and work to schedule and coordinate maintenance work. One agency provides incentives for utility suppliers to include specifics on their work in the transportation agency's construction contracts.

Project Planning and Programming

While transportation planning and implementation processes differ significantly from State to State, they all focus on developing increased capacity and efficiency in the transportation system. They do this by developing long-range transportation plans (LRTPs), transportation improvement program plans (TIPs), unified planning work programs (UPWPs), and in some cases congestion management system (CMS) plans.

Transportation management and operations (M&O) processes are increasingly important to the planning professional. Metropolitan areas account for 83.5% of the nation's population² and 90% of its economic output³. They are centers for social as well as economic activity and are the hubs of the national transportation system. In addition, they are portals for people and freight moving between the United States and other countries. To meet the challenge of continued mobility, the planning community needs to take an active role in the development and implementation of transportation system M&O strategies.

The complexity of our transportation systems and the impact of congestion on our nation necessitate input from planners during the project development process in order to better assess and manage work zone impacts. The following are some example roles for planners:

- Using analytical traffic models to assess the system-wide impacts of specific project requirements.
- Evaluating programming estimates to ensure that the proper level of funding is included to mitigate traffic congestion and improve safety through work zones.
- Providing the critical “bridge” of knowledge between the planning world and the design world to reduce the impacts of work zones on the traveling public.

Figure 3 shows the average rating by question for 2008 and 2009 for the Project Planning and Programming section. Table 4 shows the numeric ratings along with the percent change in average rating from 2008 to 2009 for each question. The average ratings increased for half of the questions in this section. Question 5 remained the same and two questions showed a decline – question 4 decreased by 4% and question 6 decreased by 1%. The comments did not indicate why these decreases may have occurred. All the questions have scores at or above the implementation stage (score of 7 or higher), meaning on average agencies are implementing the practices addressed in this section.

² U.S. Census (<http://www.census.gov/Press-Release/www/releases/archives/population/011671.html>)

³ Bureau of Economic Analysis (http://www.bea.gov/newsreleases/regional/gdp_metro/2008/gdp_metro0908.htm)

Figure 3. Results for Project Planning and Programming Section

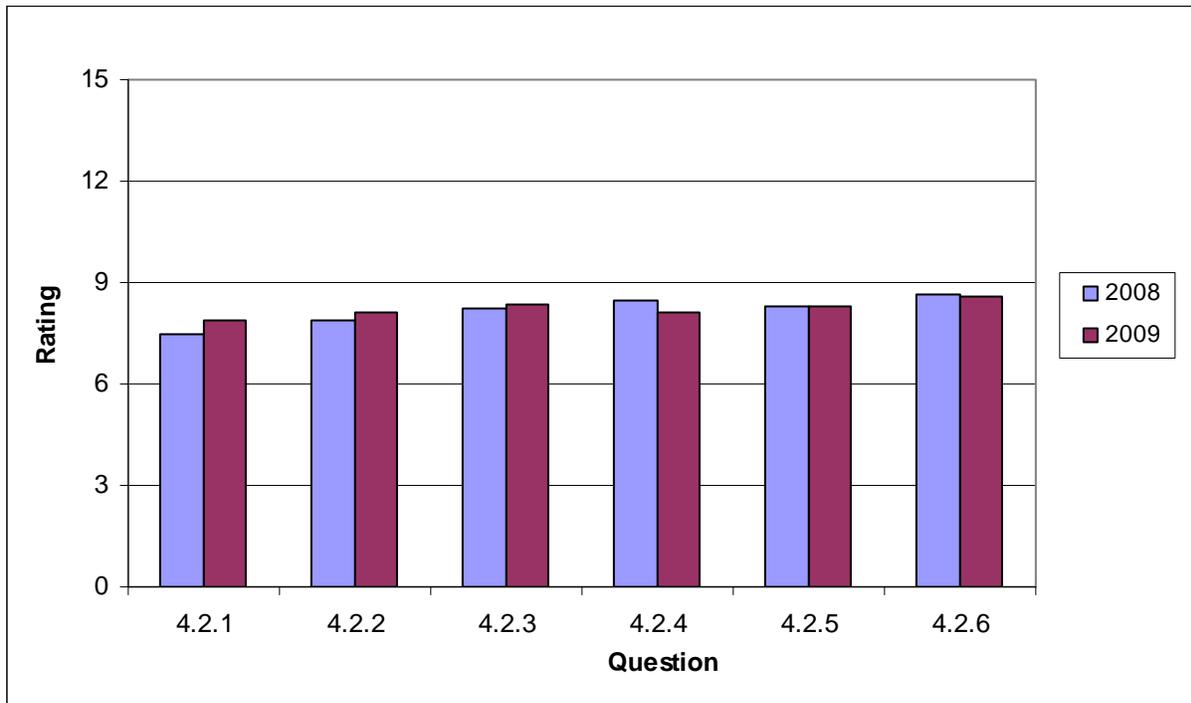


Table 4. Ratings for Project Planning and Programming Section

Section	2008	2009	Change	Percent Change
4.2.1	7.5	7.9	0.4	5%
4.2.2	7.9	8.1	0.2	3%
4.2.3	8.2	8.3	0.1	1%
4.2.4	8.4	8.1	-0.3	-4%
4.2.5	8.3	8.3	0.0	0%
4.2.6	8.7	8.6	-0.1	-1%

4.2.1 Does the agency’s planning process actively use analytical traffic modeling programs to determine the impact of future type I and II road construction and maintenance activities on network performance? Over two-thirds (69%) of the agencies actively use analytical traffic modeling programs to determine the impact of future type I and II project activities. The average rating for this question increased by 5% from 2008. One agency uses a performance measurement system to assess freeway performance and identify operational weaknesses. The system utilizes data from detectors and helps decision makers estimate the effects of operational improvements. Agencies cited use of a fairly broad range of proprietary software applications, including PeMS, HCS, QuickZone, Paramics, VISSIM, NETSIM, WZCAT, and Synchro, for modeling construction impacts. Several agencies noted that use of analytical tools was fairly common on more complex projects.

4.2.2 Does the agency’s planning process include developing alternative network options (e.g., frontage roads, increased capacity on parallel arterials, beltways, or strategically placed connectors) to maintain traffic volumes during future road construction and maintenance? Sixty-five percent (33) of the agencies

reported using tools to determine alternate network options for traffic volumes that could be delayed due to road construction. One agency uses a process to upgrade alternate routes when higher volumes are expected to use these routes during major construction on adjacent facilities. Another agency makes an effort to maintain appropriate capacity through the construction area.

4.2.3 Does the agency’s planning process manage the transportation improvement program to eliminate network congestion caused by poorly prioritized and uncoordinated execution of projects? Thirty-eight agencies (75%) indicated they make efforts during the planning process to manage the transportation improvement program to eliminate network congestion caused by poorly prioritized and uncoordinated execution of projects. One agency cited the use of a communications plan that allows districts to communicate information on upcoming projects on an annual basis. Several agencies referenced efforts to analyze local transportation improvement programs and statewide transportation improvement programs to determine potential conflicts with projects on major corridors.

4.2.4 Does the agency’s transportation planning process include a planning cost estimate review for work types I, II, and III that accounts for traffic management costs (e.g., incident management, public information campaigns, positive separation elements, uniformed law enforcement, and Intelligent Transportation Systems [ITS])? Thirty-two agencies (63%) have a process for estimating traffic management costs during the transportation planning process. The average rating for this question decreased by 4% from 2008. Some agencies use this practice on type I and II projects, but not on type III projects. One agency noted that their cost estimate reviews are performed during the project scoping phase and are generally one-half to one percent of the overall project cost. The same agency said that traffic control costs are also included in this estimate. Another agency noted that ITS costs are incorporated into the construction contract if higher delays are expected during construction.

4.2.5 Does the agency’s transportation planning process include the active involvement of planners during the project design stage to assist in the development of congestion mitigation strategies for type I and II projects? Planners assist in developing congestion mitigation strategies in 65% of reporting agencies. Agencies involve local planners (MPO representatives) in the process for State projects. Several agencies noted that planners are actively involved during the project design stage. One agency cited the need to involve statewide planning office representatives in project initiation (scoping).

4.2.6 Does the agency's transportation planning process engage planners as part of a multidisciplinary/multiagency team in the development of Transportation Management Plans involving major corridor improvements?

For 37 of the responding agencies (73%), the transportation planning process engages planners as a part of a team in the development of TMPs. Planners and designers often meet during the development of the TMP. Some agencies cited the use of multidisciplinary and multiagency teams to review TMPs. One agency noted that major corridor studies include a qualitative assessment of alternatives at the planning stage that supports the future development of TMPs at the design stage.

Project Design

Project designers, working in concert with other functional experts, should consider work zone maintenance of traffic issues early in the design process. Designers should examine the use of different project execution strategies that can accelerate construction, thereby reducing construction time and minimizing the exposure of travelers to work zones. In addition, designers should actively lead the preparation of Transportation Management Plans (TMPs) that will mitigate the impact of work zone activities.

Figure 4 shows the average rating by question for 2008 and 2009 for the Project Design section. Table 5 shows the numeric ratings along with the percent change in average rating from 2008 to 2009 for each question. The average ratings increased for all but one of the questions in this section. Question 9 increased in 2009, after a decrease from 2007 to 2008. Only question 10 remained the same from 2008. All the questions are at or beyond the implementation stage (score of 7 or higher), meaning on average agencies are implementing the practices addressed in this section. Many agencies are now in the assessment phase (score of 10-12).

Figure 4. Results for Project Design Section

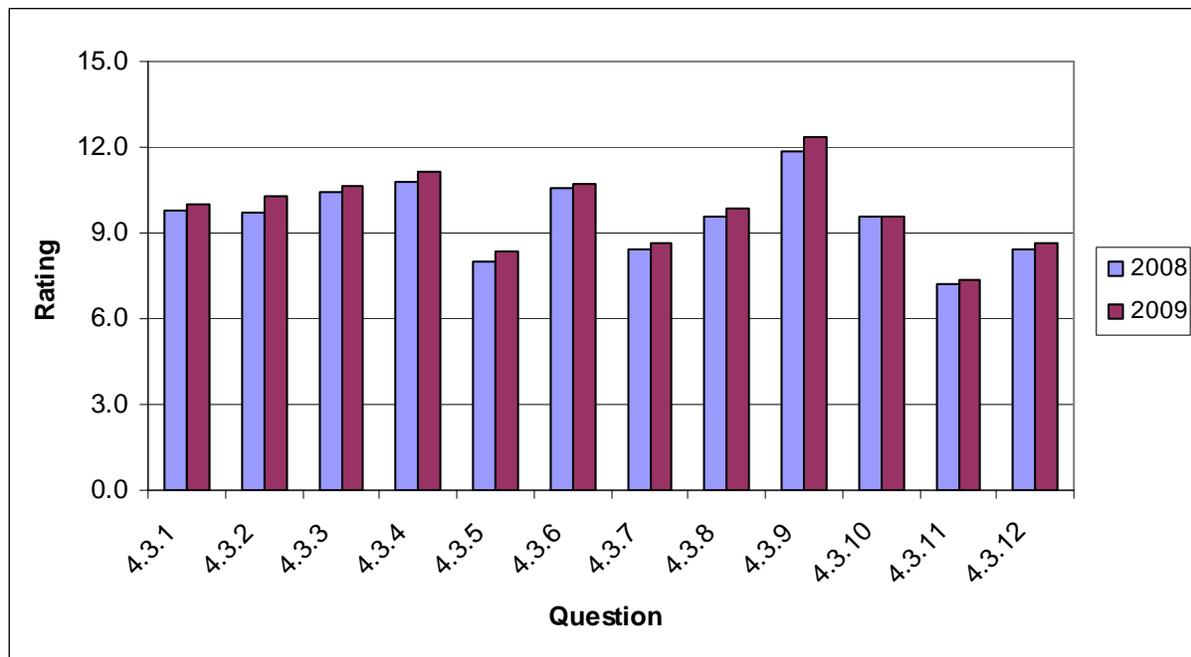


Table 5. Ratings for Project Design Section

Section	2008	2009	Change	Percent Change
4.3.1	9.8	10.0	0.2	2%
4.3.2	9.8	10.3	0.5	5%
4.3.3	10.4	10.7	0.3	3%
4.3.4	10.8	11.2	0.4	3%
4.3.5	8.0	8.3	0.4	4%
4.3.6	10.6	10.7	0.1	1%
4.3.7	8.4	8.6	0.2	2%
4.3.8	9.5	9.9	0.3	4%
4.3.9	11.9	12.4	0.5	4%
4.3.10	9.6	9.6	0	0%
4.3.11	7.2	7.4	0.2	3%
4.3.12	8.4	8.6	0.2	2%

4.3.1 Does the agency have a process to estimate road user costs and use them to evaluate and select project strategies (full closure, night work, traffic management alternatives, detours, etc.) for type I and II projects?

Forty-two agencies (82%) have a process to estimate road user costs. One agency cited use of the QUEWZ software to assist with the determination. The same agency noted that the results are combined with experience and historical knowledge to make decisions about the most appropriate strategies such as detours and nighttime construction. Some agencies noted that they have a process in place for estimating road user costs but either it is not used to determine types of project strategies or that some Districts choose not to use it (some use A+B bidding without a justification based on road user costs). One agency cited difficulties in comparing road user costs with other actual costs to justify decisions and investments based on benefits.

4.3.2 Does the agency develop a Transportation Management Plan that addresses all operational impacts focused on project congestion for type I and II projects?

Forty-eight agencies (94%) develop a TMP that addresses all operational impacts focused on project congestion for type I and II projects. The Rule requires TMPs and it was anticipated that all 51 responding agencies would have achieved the implementation level. In 2008, 46 agencies (88 percent) had reached the implementation level, with 48 of 51 agencies reporting having reached this threshold in 2009. One of the agencies that assigned a rating less than 7 (the implementation threshold) cited that components of the TMP are addressed for projects.

4.3.3 Does the agency use multidisciplinary teams consisting of agency staff to develop Transportation Management Plans for type I and II projects?

Forty-seven of the reporting agencies (92%) use multidisciplinary teams. These teams may consist of staff from planning, design, construction, operations, and other external stakeholders such as the public. In some cases, multidisciplinary teams are used primarily on high priority projects. One agency noted use of an approach that includes a variety of stakeholders including the public and elected officials. Another agency noted that construction and traffic engineering personnel have significant input into the process.

4.3.4 Does the agency perform constructability reviews that include project strategies to reduce congestion and traveler delays during construction and maintenance for type I and II projects? Out of the 51 responding agencies, 49 of them (96%) use constructability reviews on projects. This practice continues to have one of the highest implementation rates in the WZ SA. Agencies may only require constructability reviews for complex projects, or may decide to use them on a project-by-project basis. One agency performs constructability reviews after design, especially when incentive-based contracting is used. Another agency noted that constructability reviews are required on complex projects. One agency also noted that their Constructability Review Unit (CRU) performs reviews in-house on smaller projects and uses consultants for reviews on larger projects. An agency noted that reviews are focused on construction techniques to a larger extent than on traffic management issues.

4.3.5 Does the agency use independent contractors or contractor associations to provide construction process input to expedite project contract times for type I and II projects? Thirty-nine of the agencies (76%) use contractor associations to provide construction process input. One agency noted that this has been done on some projects, particularly design-build projects. Some agencies expressed concern over giving contractors advance knowledge of upcoming procurements and therefore do not use this process. One agency solicits input from the Associated General Contractors and a local university to improve the process.

4.3.6 Does the agency use scheduling techniques that are based on time and performance, such as the critical path method or parametric models, to determine contract performance times for type I and II projects? Forty-five agencies (88%) are using a technique to determine contract performance times for type I and II projects. Several agencies noted use of the critical path method during the construction phase to determine performance times. One agency cited use of several techniques, including a bar chart for lower cost projects (less than \$10 million), and the critical path method for larger projects valued at more than \$10 million. The scheduling requirements tend to increase as the cost of the project increases. One agency is planning to perform an assessment over two construction seasons to determine the effectiveness of project scheduling.

4.3.7 Does the agency have a process to evaluate the appropriate use of ITS technologies to minimize congestion in and around work zones for type I, II, and III projects? Thirty-nine of the agencies (76%) have a process to consider ITS technologies to minimize work zone congestion. Several agencies noted use of ITS, especially on significant projects. Agencies use stand-alone work zone ITS systems and also use existing, permanent ITS for monitoring and management. One agency noted efforts to increase use of dynamic merge systems to reduce rear-end collisions and aggressive driving. Another agency noted consideration of ITS during planning and design (when strategies are refined and readied for implementation).

4.3.8 Does the agency have a process to consider life-cycle costing when selecting materials that reduce the frequency and duration of work zones for type I, II, and III projects? Life-cycle costing is used by 41 agencies (80%) to reduce the frequency and duration of work zones. One agency cited the use of longer lasting pavements and striping on high volume roadways to reduce maintenance frequency. Another agency noted that life cycle cost analysis is used extensively in bridge and pavement design.

4.3.9 Does the agency have a process to assess projects for the use of positive separation devices for type I and II projects? Forty-nine agencies (96%) have a process to assess projects for the use of positive separation devices for type I and II projects. For example, an agency's positive separation process could include requiring the use of temporary concrete median barriers for major projects and on high speed facilities, and/or using shadow vehicles, moveable concrete barriers, and arrestor nets to provide positive protection. This question saw a 4% increase from 2008 after decreasing slightly on the previous WZ SA. Some agencies indicated that they set standards and specify that certain project types require positive separation devices. One agency has a checklist for use in determining when to use portable concrete barrier on projects. The score on this question is likely impacted by the Temporary Traffic Control Devices Rule (Subpart K) that was published by FHWA in December 2007 and had a compliance deadline of December 2008.

4.3.10 Does the agency anticipate and design projects to mitigate future congestion impacts of repair and maintenance for type I, II, and III projects? Forty-four agencies (86%) incorporate features into their project designs that accommodate the need for future repair and/or maintenance activities. One agency considers technology design and specifications, such as convenient access to permanent message boards and location of fiber optic lines to avoid the need for future lane closures. Another agency cited consideration such as wide shoulders for pull off areas and future maintenance work, and sign positioning that lessens future impacts during inspection and maintenance. Other examples include design of additional lanes and full depth shoulders.

4.3.11 When developing the Traffic Control Plan for a project, does the agency involve contractors in developing the Traffic Control Plan for type I and II projects? Contractors are involved with the development of traffic control plans in 31 agencies (61%). Often, contractors are used informally during constructability reviews or may be consulted during the design stage if needed. Additionally, agencies allow contractors to submit ideas for or revisions to the traffic control plan. One agency noted that, due to possible conflicts of interest in the bidding process, contractors are not consulted during the development of the plan for significant projects. However, their modifications/suggestions are considered during the construction phase. Often, subcontractors are hired to handle traffic control for the project, but plans are often developed during the design stages prior to involvement of the subcontractor (design-build projects are one exception).

4.3.12 When developing the Traffic Control Plan for a project, does the agency use computer modeling to assess Traffic Control Plan impacts on traffic flow characteristics such as speed, delay, and capacity for type I and II projects?

Thirty-eight of the 51 responding agencies (75%) implement computer modeling in the development of traffic control plans. Some agencies use this computer modeling on a project-by-project basis (potentially for larger projects when higher impacts are anticipated) or on occasion to evaluate the potential impacts. Agencies reported using software such as QuickZone, Corsim, Synchro, VISSIM, TREX, COSMIX, CA4PRS, and WZCAT for analyzing impacts. Several agencies noted use of data on demand relative to capacity to help determine allowable hours for lane closures.

Project Construction and Operation

A roadway construction or maintenance site can be a very complex orchestration of activities affecting the public in many ways. There are many pieces to the project delivery process and everyone has a critical role, but what the public mostly sees and experiences is the construction end of the process. The use of letting strategies, quality-based contractor selection, time-sensitive bidding, efficient operations, traffic management, aggressive contract management, and good public information, can help agencies improve the execution and public perception of transportation improvements.

Complaints from the traveling public often focus on the proper use and maintenance of traffic control devices such as cones, drums, signs, barricades, barriers, striping, and changeable message signs. Some common problems include signs that inform travelers of conditions that do not exist, striping that is misleading, changeable signs that show the wrong message, and cones and drums that are improperly spaced. These inconsistencies have an impact on agency credibility with the traveling public. Drivers develop work zone habits that are based on past observations. Agencies can require and provide incentives for work zone contractor personnel to be trained in the proper application and maintenance of traffic control devices in work zones.

Figure 5 shows the average rating by question for 2008 and 2009 for the Project Construction and Operation section. Table 6 shows the numeric ratings along with the percent change in average rating from 2008 to 2009 for each question. Overall, this section had the second highest average rating of the six sections. The average ratings increased for most of the questions in this section with question 2 remaining the same and question 1 decreasing by 2%. All the questions are at or beyond the implementation stage (score of 7 or higher), meaning on average agencies are implementing the practices addressed in this section.

The average score for question 9 saw a significant increase this year (17%) and crossed the implementation threshold for the first time. For this year, question 9 included a wording change that revised the question to include situations where the agency does not directly train law enforcement personnel but does require that law enforcement personnel receive proper work zone training elsewhere – clarifying that the focus of this question is on the training itself. The reworded question may have allowed agencies to improve their understanding of the intent of the question. The increase on this question continues the increase from previous years. Two other reasons for the continued major increase may be the earlier publication by FHWA of a work zone law enforcement course that can be used by DOTs to train law enforcement, and the Rule provision that specifies that DOTs require that personnel in work zone enforcement be adequately trained. Additionally, in 2008 FHWA began offering the FHWA-developed work zone law enforcement course through its Work Zone Safety Grant with The American Traffic Safety Services Association (ATSSA).

Figure 5. Results for Project Construction and Operation Section

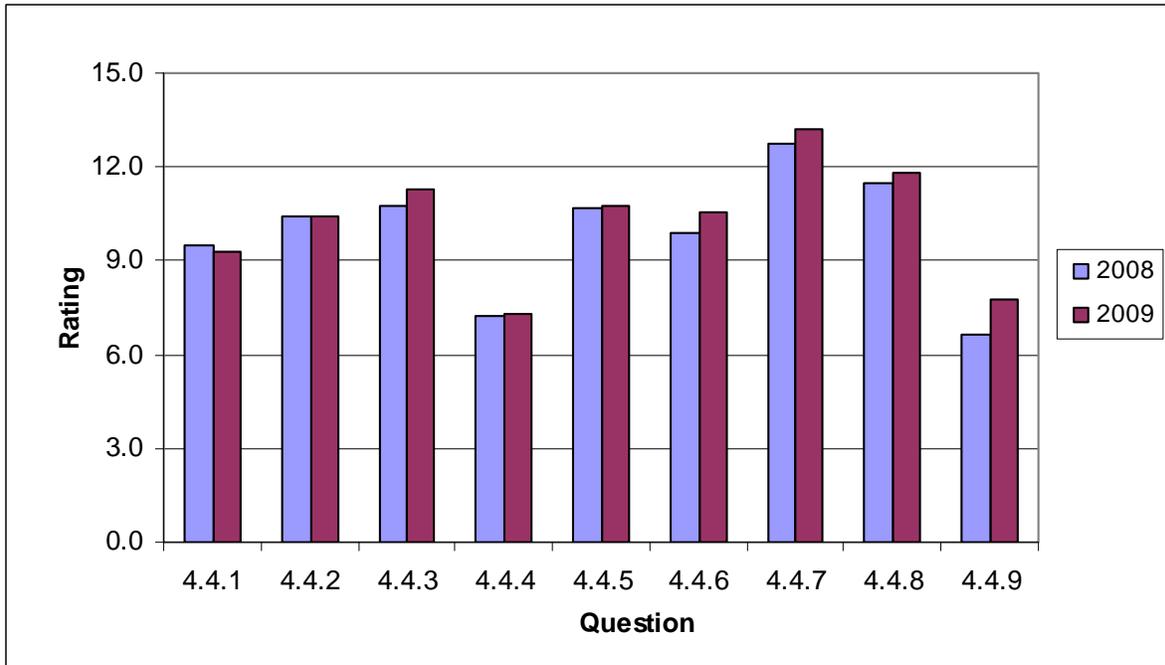


Table 6. Ratings for Project Construction and Operation Section

Section	2008	2009	Change	Percent Change
4.4.1	9.5	9.3	-0.2	-2%
4.4.2	10.3	10.4	0	0%
4.4.3	10.8	11.3	0.5	5%
4.4.4	7.2	7.3	0.1	1%
4.4.5	10.7	10.8	0.1	1%
4.4.6	9.9	10.5	0.6	6%
4.4.7	12.8	13.2	0.4	3%
4.4.8	11.5	11.8	0.3	3%
4.4.9	6.6	7.8	1.1	17%

4.4.1 Is the letting schedule altered or optimized to reflect the available resources and capabilities of the construction industry? Thirty-nine agencies (76%) alter or optimize their letting schedule based on contractor resources and capabilities. Letting schedules are often driven by fiscal process constraints. One agency stated that they will only let projects if they believe there will be adequate competition and adequate industry resources for completing the work. One agency noted that they let projects during the winter before a construction season so that contractors can plan accordingly. One agency performs an evaluation of industry capabilities and resources to determine an appropriate letting schedule.

4.4.2 Is the letting schedule altered or optimized to minimize disruptions to major traffic corridors? Ninety-two percent of the agencies (47 of 51 agencies) are minimizing disruptions on major traffic corridors by optimizing the letting schedule. Projects are reviewed to make sure that multiple projects do not adversely impact traffic along certain corridors. One agency noted that development of TMPs has helped the agency focus on processes and techniques such as altering letting schedules to avoid major impacts. Another agency noted that time constraints tied to availability of funding did not allow for alteration of letting schedules.

4.4.3 When bidding type I and II projects, does the agency include road user costs in establishing incentives or disincentives (e.g., I/D, A+B, or lane rental) to minimize road user delay caused by work zones? Ninety percent of the agencies (46 agencies) include road user costs in establishing incentives/disincentives (I/D) to minimize road user delay in work zones. Some examples of the strategies used by agencies include A+B bidding, lane rental, I/D, and the use of modeling to determine the effects of construction on traffic. One agency noted that disincentives used in nighttime construction contracts are calculated based on road user costs. Another agency cited use of a technique similar to lane rental to limit the length of time for closures and keep peak hour traffic impacts to a minimum. A few agencies said they include road user costs but do not have a formalized process for determining or setting such costs.

4.4.4 When bidding type I, II, and III projects, does the agency use performance-based selection to eliminate contractors who consistently demonstrate their inability to complete a quality job within the contract time? Thirty of the responding agencies (59%) use performance-based selection to eliminate contractors that regularly have difficulty completing quality jobs on-time, an increase of two agencies using this practice compared with the results from 2008. One agency noted that past performance is a criterion for selecting a contractor when using design-build or construction manager at risk methods. One agency has a rating system but it is not used to disqualify contractors or to assist with award decisions.

4.4.5 When bidding type I and II project contracts, does the agency use incident management services (e.g., wreckers, push vehicles, and service patrols)? Incident management services such as wreckers, courtesy patrols, and off-duty highway patrol officers are used by 46 agencies (90%). Several agencies noted use of incident management services for Type I and II projects, especially in major metropolitan areas. Due to the common presence of incident management services in cities, urban freeway work zones benefit from services that are provided on a routine basis without the work zone in place. Several agencies cited use of incident management services directly as part of a construction contract.

4.4.6 In bidding contracts, does the agency use flexible starting provisions after the Notice to Proceed is issued? More than three-fourths of responding agencies (82%) routinely use flexible starting provisions after the Notice to Proceed (NTP) is issued. One agency noted that contractors are allowed to specify the start date for a project, as long as it is completed within a specific time period. An example would be

completion prior to the end of a season for a paving project. Another agency noted that all projects have some flexibility between award and notice to proceed. The same agency said that the NTP is normally within 45 days of award, however the NTP may be extended in instances where a winter shutdown date occurs during or immediately after the 45 day window to have the contractor begin work after that winter shutdown period.

4.4.7 During type I, II, and III projects, does the agency use uniformed law enforcement? Ninety-six percent of the agencies (49 agencies) use uniformed law enforcement on projects. This question continues to have the highest overall rating of any question in the WZ SA, indicating that the use of law enforcement in work zones is a well-established and assessed practice in many agencies. Typical law enforcement roles include providing enhanced visibility during installation/removal of work zone traffic control; presence as a deterrent to speeding; and active enforcement. In some cases officers may also assist with traffic control. Some agencies use law enforcement personnel on a project-by-project basis. One agency determines when to use law enforcement personnel in work zones based on the facility type (mainly limited access highways). A few agencies noted that use of law enforcement personnel is a pay item in construction contracts. Additionally, automated speed enforcement is used in several states and may require an officer to be present.

4.4.8 Does the agency provide/require training of contractor staff on the proper layout and use of traffic control devices? Nearly all reporting agencies (90%) indicated that they provide and/or require training of contractor staff on proper use of traffic control devices. Several agencies cited focus on this area because of the provisions in the Rule. Additionally, some agencies cited use of training provided by ATSSA chapters and Local Technical Assistance Programs (LTAP). Another agency requires certification for flaggers, and is working on a requirement for traffic control supervisors. FHWA is sponsoring training courses through the Work Zone Safety Grants Program that provide many agencies with training at a substantially reduced cost. One agency requires personnel to be knowledgeable on proper setup of traffic control devices but does not require a specific type of training.

4.4.9 Does the agency provide training to uniformed law enforcement personnel on work zone devices and layouts or ensure law enforcement personnel receive proper training elsewhere? Thirty-three (65%) of the responding agencies provide training to uniformed law enforcement. Six more agencies have reached the implementation threshold for this question in 2009 compared with 2008. The average score for this question increase by 17% from 2008 to 2009. This increase represents the largest percentage increase for all questions in the WZ SA. Some agencies currently use the FHWA Work Zone law enforcement training course and have partnered with their FHWA Division Office to offer the course statewide. One agency used the FHWA course as a starting point and developed a state-specific version. Some agencies have dedicated law enforcement personnel for work zones and provide enhanced training for this group. Further implementation of the provisions within the Rule by agencies likely contributed to moving the average score above the implementation threshold (6.6 to 7.8) for the first time.

Communications and Education

To reduce public anxiety and frustration regarding work zones, it is important to sustain effective communications and outreach with the public about road construction and maintenance activity, and the potential impacts of the activities. This also increases the public's awareness of such activity. Lack of information is often cited as a key cause of frustration for the traveling public; therefore, the agency should identify and consider key issues from a public outreach and information perspective.

Figure 6 shows the average rating by question for 2008 and 2009 for the Communications and Education section. Table 7 shows the numeric ratings along with the percent change in average rating from 2008 to 2009 for each question. The average ratings increased for all of the questions in this section except question 5 which remained the same. The scores in this section have consistently been among the highest in the WZ SA and remain so this year. Many agencies are now in the assessment phase (scores of 10-12).

Figure 6. Results for Communications and Education Section

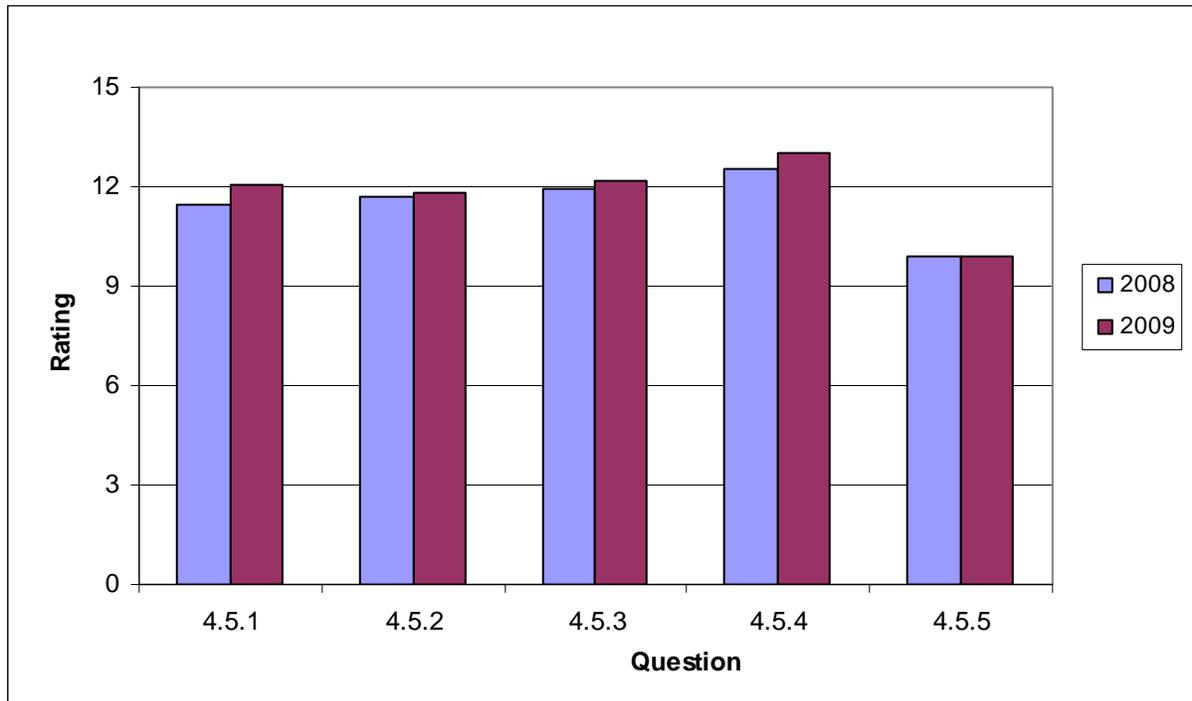


Table 7. Ratings for Communications and Education Section

Section	2008	2009	Change	Percent Change
4.5.1	11.4	12.1	0.6	5%
4.5.2	11.7	11.8	0.1	1%
4.5.3	11.9	12.2	0.2	2%
4.5.4	12.6	13.0	0.4	4%
4.5.5	9.9	9.9	0.0	0%

4.5.1 Does the agency maintain and update a work zone website providing timely and relevant traveler impact information for project types I, II, and III that allows travelers to effectively make travel plans? Forty-seven agencies (92%) implement a website to provide traveler impact information on projects to allow travelers to make more effective travel plans. One agency has a website that includes a traffic map and information on work zone activity statewide. The same agency also uses project websites to provide information for major projects. Some agencies update information on their websites on a daily basis, while others are designed to provide up to the minute traveler information for projects.

4.5.2 Does the agency sponsor National Work Zone Awareness week? Most agencies (86%) sponsor National Work Zone Awareness week. Some agencies have no formal campaign but still support the program while others have planned activities throughout the week. One agency hosts an annual memorial during National Work Zone Awareness Week in honor of workers who have died in work zones. Examples of other activities include holding press conferences, displaying the national memorial, and holding work zone safety awareness conferences.

4.5.3 Does the agency assume a proactive role in work zone educational efforts? Forty-eight agencies (94%) are developing educational materials to inform and educate the public on work zone safety. This question was the fourth highest scoring on the WZ SA. Most agencies that provided comments cited the use of educational efforts such as public service announcements and other marketing strategies including some use of social networking (e.g., Twitter). Some agencies have contracts with marketing firms and the radio industry to help promote work zone safety and reduce aggressive driving through work zones by providing safety tips, statistics, and general information on work zones.

4.5.4 During type I, II, and III project construction, does the agency use a public information plan that provides specific and timely project information to the traveling public through a variety of outreach techniques (e.g., agency website, newsletters, public meetings, radio, and other media outlets)? This practice is being implemented by all 51 reporting agencies, giving it the highest implementation rate in the WZ SA. All agencies use a public information plan to provide specific and timely project information to the traveling public through a variety of outreach techniques. Some of these techniques include publishing information on the agency's web site and providing information to media outlets. Other techniques include highway advisory radio messages, public relations managers, radio, TV, newspaper ads, telephone hotlines, and public information centers. This question remains the second highest scoring question on the WZ SA, indicating that the use of public information plans is widespread and is a well-established practice.

4.5.5 During type I, II, and III projects, does the agency use ITS technologies to collect and disseminate information to motorists and agency personnel on work zone conditions? Forty-one agencies (80%) use ITS technologies to collect and disseminate work zone information. This question had a decrease in the number of

agencies implementing this practice (4 fewer agencies in 2009 compared with 2008), while the average rating did not change from 2008 to 2009. Many agencies use more basic systems, including portable changeable message signs to give the traveling public specific and timely project information and Highway Advisory Radio (HAR). Of the agencies who use ITS, several noted that use is on a project by project basis depending on need. One agency noted that use of ITS is currently being expanded to projects in rural areas as well.

Program Evaluation

Evaluation is necessary to identify successes and analyze failures. Work zone performance monitoring and reporting at a nationwide level can increase the knowledge base on work zones and help lead to the development of better tools to help agencies better plan, design, and implement road construction and maintenance projects. At the local level, performance monitoring and reporting provides an agency with valuable information on the effectiveness of congestion mitigation strategies, contractor performance, and work zone safety.

Figure 7 shows the average rating by question for 2008 and 2009 for the Program Evaluation section. Table 8 shows the numeric ratings along with the percent change in average rating from 2008 to 2009 for each question. The average ratings increased for all questions in this section. Question 1 (collecting data to track congestion and delay) with a 13% increase from 2008 and question 2 (collecting data to track work zone safety performance) with a 9% increase had the second and third largest increases of all questions in the WZ SA. However, the questions in this section remain among the lowest rated questions in the WZ SA.

Figure 7. Results for Program Evaluation Section

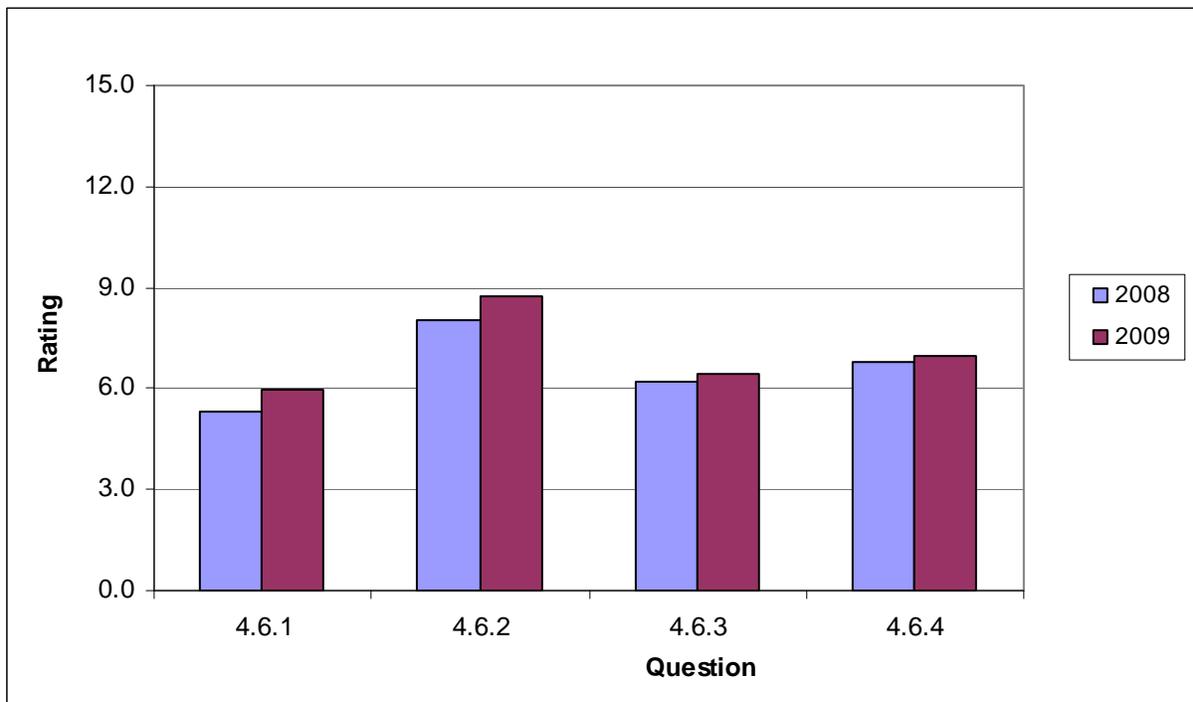


Table 8. Ratings for Program Evaluation Section

Section	2008	2009	Change	Percent Change
4.6.1	5.3	6.0	0.7	13%
4.6.2	8.1	8.7	0.7	9%
4.6.3	6.2	6.4	0.3	4%
4.6.4	6.8	7.0	0.2	3%

4.6.1 Does the agency collect data to track work zone congestion and delay performance in accordance with agency-established measures? (See Section 1, item 4.1.4) Less than half of responding agencies collect data to track work zone congestion and delay performance against agency measures. Although this question had the second lowest average score in the WZ SA, it had the second largest percent increase (13%) in the WZ SA and had the highest percent increase for this section. Thus it appears that more agencies are moving toward using data to track work zone congestion and delay. One agency stated that they have developed a policy and identified the need, but that performance measures still need to be established. Another agency noted that they will begin collecting congestion and delay information this year. One agency noted that they collect speed, volume, and occupancy data (the three common sources provided by wireless sensors), and they are determining how to use the data to calculate delay and queue length.

4.6.2 Does the agency collect data to track work zone safety performance in accordance with agency-established measures? (See Section 1, item 4.1.5) Thirty-three agencies (65%) are collecting data to track work zone safety performance. This question had a relatively large percentage increase (9%) over 2008. One agency noted that they plan to track work zone fatalities on a three year average statewide. Another agency cited a similar process, but noted that the data is not tied to performance measures due to some issues with accuracy and determining whether the fatality occurred within the work zone or downstream and outside the work zone. One agency collects work zone crash data and senior managers track the statistics. Several agencies noted that they need to establish measures for tracking purposes.

4.6.3 Does the agency conduct customer surveys to evaluate work zone traffic management practices and polices on a statewide/area-wide basis? Twenty-four agencies (47%) are using customer surveys to evaluate work zone performance. Agencies provide various opportunities for feedback on ways to improve work zones. Customer surveys are used in most cases. Customer surveys are often part of Context Sensitive Solutions practices in planning for and designing projects. One agency noted that the comments section of their website is available and used to solicit open public input on practices. Another agency is considering using customer satisfaction surveys as a tool to improve performance and to solicit input on programs and strategies. One agency asks the public to rate work zone practices on an “A to F” grading scale.

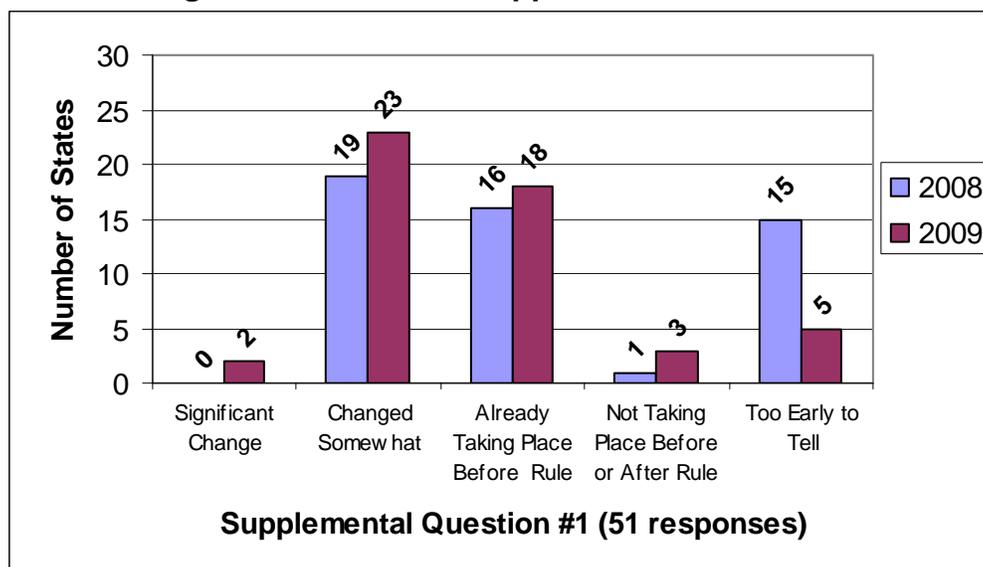
4.6.4 Does the agency develop strategies to improve work zone performance based on work zone performance data and customer surveys? Over half of agencies (59%) develop strategies to improve work zone performance based on work zone data and customer surveys. One agency is developing a process for collecting, tracking, and monitoring work zone site information along with responses to customer surveys in order to develop a set of performance measures. The same agency noted that additional research into performance measures for work zone strategies is needed. One agency noted an informal review process occurs, where a team visits project sites with known issues and, after discussion, provides recommendations to the project team.

SUPPLEMENTAL QUESTIONS: EFFECTS OF THE WORK ZONE SAFETY AND MOBILITY RULE

Overall agencies have experienced some changes in their practices as a result of the Rule. One of the biggest changes between 2008 and 2009 is that more agencies are seeing an impact from the Rule. The number of agencies that thought it was too early to tell if the Rule had an impact has dropped on all of the questions. Thirty-six agencies (71%) reported either a significant change (5 agencies) or some change (31 agencies) in enhanced consideration and management of work zone safety and mobility impacts, starting during planning and continuing through project completion. Agencies reported the least amount of change in training for staff (question 5). One agency did not complete the survey; therefore, percentages in the detailed discussion of the results are based upon the 51 agencies that completed the survey in 2009.

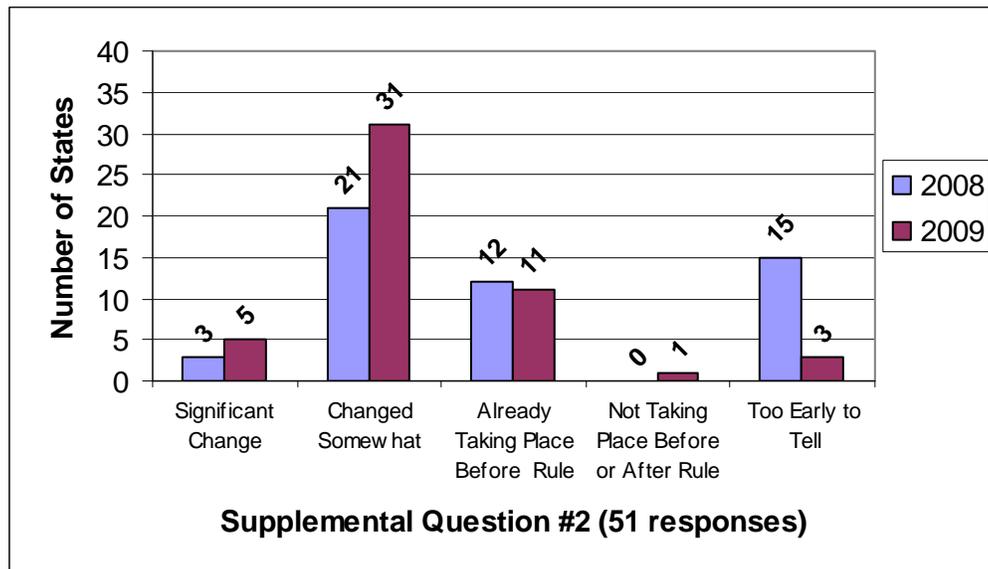
1. While planning and designing road projects, the agency is expanding planning beyond the project work zone itself to address corridor, network, and regional issues (e.g., alternate routes and/or modes, truck traffic, special events, etc.) - particularly when congestion is an issue. Twenty-three agencies (45%) responded that the Rule had caused this practice to change somewhat. Two agencies (4%) thought the Rule had caused a significant change in this area. Twenty-one agencies (41%) responded that it had not caused any change. Of those 21 agencies, three agencies responded that this was not taking place prior to the Rule and was still not occurring which was two more than in 2008. The remaining 18 agencies noted that this was already taking place prior to the Rule. Five agencies (10%) responded that it is too early to tell if the Rule had an impact on this area – this was down from 15 agencies (29%) last year which indicates that more agencies are seeing impacts from the Rule on their practices.

Figure 8. Results for Supplemental Question 1



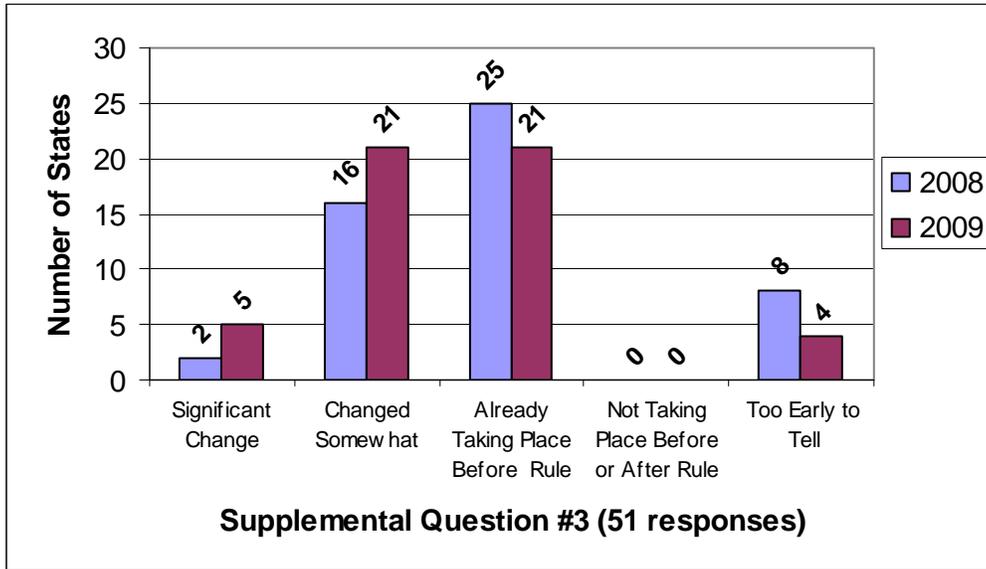
2. The agency is seeing enhanced consideration and management of work zone safety and mobility impacts, starting during planning and continuing through project completion. Thirty-six agencies (71%) responded that the Rule had caused change, with five of those agencies citing the Rule as causing a significant change in this area. Twelve agencies (24%) responded that the Rule had not caused a change, with 11 stating this was because this practice was already in place before the Rule. One agency noted this year that this was not in place before the Rule and is not taking place after the Rule. Three agencies (6%) responded that it is too early to tell if the Work Zone Rule had an impact on this area.

Figure 9. Results for Supplemental Question 2



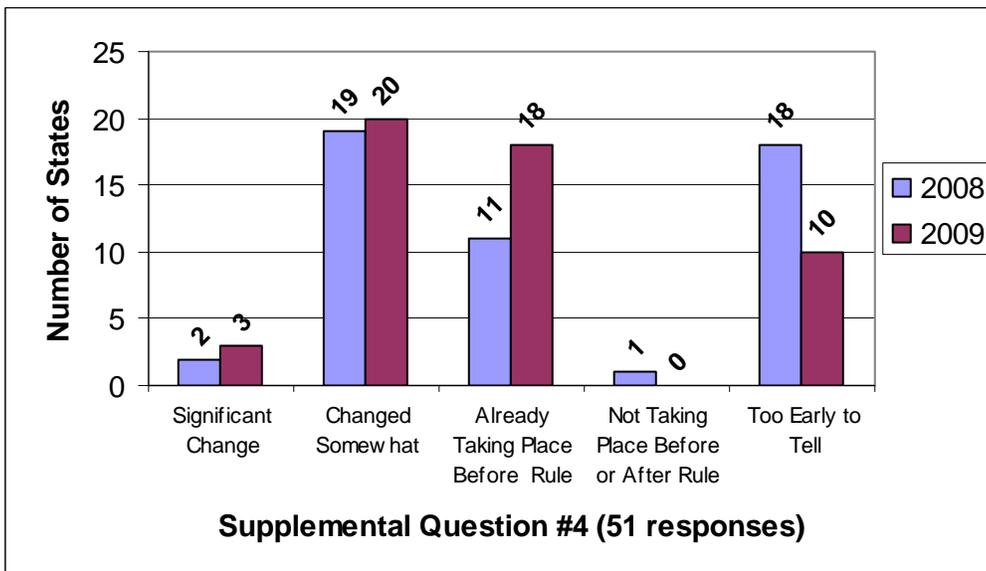
3. The agency is expanding work zone management beyond traffic safety and control to address mobility through the consideration and use of transportation operations and public information strategies. Twenty-six agencies (51%) responded that the Rule has caused change, with five of those agencies citing a significant change in this area. Twenty-one agencies (41%) cited that the Rule had not caused a change as this was already taking place before on this area. Four agencies (8%) noted that it was too early to tell if the Rule had an impact on expanding work zone management beyond traffic safety and control through the consideration and use of transportation operations and public information strategies.

Figure 10. Results for Supplemental Question 3



4. As a result of its work zone policy, the agency is using a more consistent approach to planning, designing, and constructing road projects. Twenty-three agencies (45%) noted that the Rule had caused a change with three of those agencies responding that the Rule had caused a significant change in this area. Eighteen agencies (35%) responded that the Rule had not caused a change in this area, all stating that the practice was already in place before the Rule. Ten agencies (20%) noted that it was still too early to tell if the Rule had an impact on this area.

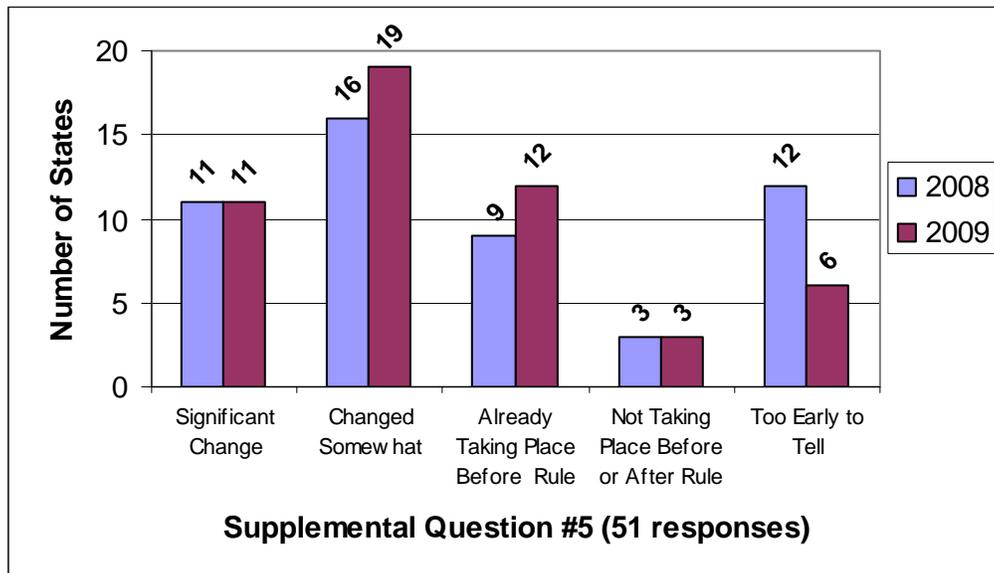
Figure 11. Results for Supplemental Question 4



5. The agency has updated/changed training for its staff (designers, planners, construction staff, etc.) to address broader consideration of work zone impacts and management in the scheduling, design, and implementation of projects.

Thirty agencies (59%) responded that the Rule has caused a change in this area, with 11 of those agencies citing a significant change. Fifteen agencies (29%) responded that the Rule had not caused a change, with 12 agencies stating that this was already taking place before the Rule and three stating that this was not in place before or after the Rule. Six agencies (12%) noted that it was still too early to tell if the Rule had an impact on training.

Figure 12. Results for Supplemental Question 5



CONCLUSION

The results of the 2009 WZ SA show continued progress Nationally toward implementation of the work zone best practices identified in the WZ SA. The 2009 WZ SA National average score of 9.7 represents a 3 percent increase over the 2008 National average. This increase was experienced across the country and is based on increases in 41 of 51 agencies (80%). This increase continues a steady trend over the seven years the WZ SA has been conducted.

The practices asked about in the WZ SA questions are consistent with the work zone management principles promoted by the Rule. This is particularly evident as this is the second WZ SA since the compliance date for the Rule. Additionally, FHWA continues to promote sound work zone management practices that can lead to reduced congestion and delay while improving safety in and around work zones. FHWA is particularly active in promoting practices through training, workshops, guideline development, and other research studies.

In addition to the quantitative results, this report shares specific examples cited by various agencies in written comments they submitted to support their numeric ratings. FHWA encourages agencies to consider implementing some of these good practices from other agencies to enhance their own practices. As a means of sharing these good examples further, FHWA will also review these examples for possible inclusion in the Work Zone Best Practices Guidebook or as part of Rule implementation case studies or website examples.

APPENDIX A: WZ SA SCORING AND PROJECT TYPES

Each assessment area contains a set of questions about a particular work zone related policy, strategy, process, or tool. For each question, respondents were asked to evaluate the extent to which a particular practice has been incorporated into an agency's way of doing business and select the most appropriate rating. Definitions for each of the rating levels are shown in Table A1.

Table A1: WZ SA Rating/Scoring Scale

Adoption Phase	Scoring Range	Description
Initiation	(0-3)	<ul style="list-style-type: none"> Does agency management acknowledge the need for a particular item? Has exploratory research taken place to assess the benefits of this item? Does management support further development of this item's requirements?
Development	(4-6)	<ul style="list-style-type: none"> Has the agency developed a plan or approach to address the item's requirements? Has the agency started to investigate the feasibility of implementation? Does the agency have standards and guidance to enable the item's implementation? Does the agency have the approvals necessary for implementation? Are resources in place to support the adoption of this item?
Execution	(7-9)	<ul style="list-style-type: none"> Is the agency implementing/carrying out the requirements of this item? Has the agency allocated financial or staff resources necessary for the item's execution? Have appropriate personnel been trained to execute the item's requirements? Has a process owner been established?
Assessment	(10-12)	<ul style="list-style-type: none"> Has the agency assessed how well this item reduces work zone congestion and crashes? Has the agency assessed the process for carrying out this item? Has the agency implemented appropriate changes to the requirements of this item based on performance assessments?
Integration	(13-15)	<ul style="list-style-type: none"> Has the agency integrated the requirements of this item into quality improvement processes? Are the requirements of this item integrated into agency culture? Are the requirements of this item included as part of the employee performance rating system?

Several questions in the WZ SA are based on the magnitude of impact that a project may have on a particular area. These project types (Types I through IV) are described in Table A2.

Table A2. Project Types Used in the WZ SA

Type	Characteristics	Examples
<i>Type I</i>	<ul style="list-style-type: none"> • Affects the traveling public at the metropolitan, regional, intrastate, and possibly interstate level • Very high level of public interest • Directly affects a very large number of travelers • Significant user cost impacts • Very long duration 	<ul style="list-style-type: none"> • Central Artery/Tunnel in Boston, Massachusetts • Woodrow Wilson Bridge in District of Columbia/Maryland/Virginia • Springfield Interchange “Mixing Bowl” in Springfield, Virginia • I-15 reconstruction in Salt Lake City, Utah
<i>Type II</i>	<ul style="list-style-type: none"> • Affects the traveling public predominantly at the metropolitan and regional level • Moderate to high level of public interest • Directly affects a moderate to high number of travelers • Moderate to high user cost impacts • Duration is moderate to long 	<ul style="list-style-type: none"> • Major corridor reconstruction • High-impact interchange improvements • Full closures on high-volume facilities • Major bridge repair • Repaving projects that require long term lane closures
<i>Type III</i>	<ul style="list-style-type: none"> • Affects the traveling public at the metropolitan or regional level • Low to moderate level of public interest • Directly affects a low to moderate level of travelers • Low to moderate user cost impacts • May include lane closures for a moderate duration 	<ul style="list-style-type: none"> • Repaving work on roadways and the National Highway System (NHS) with moderate Average Daily Traffic (ADT) • Minor bridge repair • Shoulder repair and construction • Minor interchange repairs
<i>Type IV</i>	<ul style="list-style-type: none"> • Affects the traveling public to a small degree • Low public interest and user cost impacts • Duration is short to moderate • Work zones are usually mobile and typically recurring 	<ul style="list-style-type: none"> • Certain low-impact striping work • Guardrail repair • Minor shoulder repair • Pothole patching • Very minor joint sealing • Minor bridge painting • Sign repair • Mowing

NOTE: These levels may not encompass all possible combinations or degrees of work zone categories. Some terms are general to allow flexibility in categorizing borderline project types.