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# **Federal Highway Administration Focus States Initiative: Traffic Incident Management Performance Measures Final Report**

**Submitted to:  
United States Department of Transportation  
Federal Highway Administration  
Office of Transportation Operations**



**U.S. Department of Transportation  
Federal Highway Administration**

**December 2009**

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<b>1. Report No.</b> FHWA-HOP-10-010	<b>2. Government Accession No.</b>	<b>3. Recipient's Catalog No.</b>	
<b>4. Title and Subtitle</b> Federal Highway Administration Focus States Initiative: Traffic Incident Management Performance Measures Final Report		<b>5. Report Date</b> December 2009	
		<b>6. Performing Organization Code</b>	
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		<b>11. Contract or Grant No.</b> DTFH61-06-D-00005	
<b>12. Sponsoring Agency Name and Address</b> United States Department of Transportation Federal Highway Administration 1200 New Jersey Avenue Washington, DC 20590		<b>13. Type of Report and Period Covered</b> Final Report	
		<b>14. Sponsoring Agency Code</b> HOIT-1	
<b>15. Supplementary Notes</b> Mr. David Helman (COTM) Mr. Barry Zimmerman (COTR)			
<b>16. Abstract</b> The Traffic Incident Management Performance Measures Focus States Initiative (TIM PM FSI) involves 11 States that have defined three traffic incident performance measures (PM) and conducted field tests of two of these measures. The following measures were defined in December 2005 and field tested for 18 months: <ol style="list-style-type: none"> <li>1. Reduce "roadway clearance" time (defined as the time between awareness of an incident and restoration of lanes to full operational status)</li> <li>2. Reduce "incident clearance" time (defined as the time between awareness of an incident and removal of all evidence of the incident, including debris or remaining assets, from shoulders).</li> </ol> A third measure was defined at the final project work shop in October 2007 but has not yet been field tested: <ol style="list-style-type: none"> <li>3. Reduce the number of secondary incidents—specifically unplanned incidents for which a response or intervention is taken, where a collision occurs either a) within the incident scene or b) within the queue (which could include opposite direction) resulting from the original incident.</li> </ol> The FSI represents the first effort by multiple States to measure TIM performance using common performance metrics. The results of the FSI demonstrated that TIM performance measurement is institutionally and technically viable. The participating States also demonstrated that integrating and coordinating TIM operations between multiple agencies can be done seamlessly. The final products of the FSI are an outreach plan and outreach products that can be used by States to promote TIM PM and integrated TIM programs.			
<b>Key Words</b> Traffic Incident Management, Performance Measurement, Integrated Traffic Incident Management Programs, Secondary Incidents		<b>18. Distribution Statement</b> No restrictions.	
<b>19. Security Classif. (of this report)</b> Unclassified	<b>20. Security Classif. (of this page)</b> Unclassified	<b>21.No of Pages</b> 29	<b>22. Price</b> N/A

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## List of Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
ARTBA	American Road & Transportation Builders Association
CAD TMC	Computer-Aided Dispatch Traffic Management Center
CMP	Congestion Management Process
DOT	Department of Transportation
FAQs	Frequently Asked Questions
FHWA	Federal Highway Administration
FSI	Focus States Initiative
GPS	Global Positioning Satellite
IACP	International Association of Chiefs of Police
MOU	Memorandum of Understanding
NTIMC	National Traffic Incident Management Coalition
NUG	National Unified Goal
PM	Performance Measures
RFP	Request for Proposal
SOW	Statement of Work
SSOM	Subcommittee on Systems and Operation Management Committee
TIM PM FSI	Traffic Incident Management Performance Measures Focus States Initiative
TRB	Transportation Research Board
TIM SA	Traffic Incident Management Self Assessments
WSDOT	Washington Department of Transportation
WSP	Washington State Police

## 1. Introduction

This report presents the results of the Federal Highway Administration's (FHWA) Office of Operations-sponsored Focus States Initiative (FSI) designed to advance the state-of-the-practice for traffic incident management (TIM) performance measurement. Through this effort, 11 Focus States<sup>1</sup> identified several national-level TIM program objectives and related performance measures. During the process, the States successfully overcame institutional, operational, and technical barriers and defined three multi-agency, measurable TIM objectives and methods of measuring performance toward those objectives. All 11 Focus States committed to build on the momentum generated by the TIM FSI and to continue to work together to advance program-level performance measurement in their States as well as nationwide.

Table 1 summarizes the three national-level TIM program objectives and their supporting performance measures agreed to by the participating States.

**Table 1. TIM FSI Candidate National Program-Level Performance Measures**

TIM Program Objective	Related Performance Measure
<p><b>1. Reduce “roadway clearance” time</b> defined as the time between awareness of an incident and restoration of lanes to full operational status).</p>	<p>Time between first recordable awareness of incident by a responsible agency and first confirmation that all lanes are available for traffic flow.</p>
<p><b>2. Reduce “incident clearance” time</b> (defined as the time between awareness of an incident and removal of all evidence of the incident, including debris or remaining assets, from shoulders).</p>	<p>Time between first recordable awareness of incident by a responsible agency and time at which the last responder has left the scene.</p>
<p><b>3. (NEWEST) Reduce the number of secondary incidents</b>—specifically unplanned incidents for which a response or intervention is taken, where a collision occurs either a) within the incident scene or b) within the queue (which could include opposite direction) resulting from the original incident.</p>	<p>Number of unplanned incidents beginning with the time of detection of the primary incident where a collision occurs either a) within the incident scene or b) within the queue, including the opposite direction, resulting from the original incident.</p>

The results of the Initiative clearly demonstrate that:

- All States can use the same performance measure to analyze their respective programs.
- States are able to collect and analyze the data needed to support TIM performance measurement using a common performance metric. However, the methods of data collection vary significantly between States.
- States are able to compare TIM performance measurement using common metrics.

<sup>1</sup>The 11 States that participated in the FSI include: California, Connecticut, Florida, Georgia, Maryland, North Carolina, New York, Texas, Utah, Washington, and Wisconsin. As the FSI effort proceeded, other States expressed interest in the outcomes of this initiative, with one State asking to observe the TIM FSI's final conference held in Milwaukee in October 2007.

During the course of the Initiative, the 11 States worked with representatives from State Departments of Transportation (DOTs), law enforcement agencies and the FHWA. Collectively, they achieved the following:

- The group conducted an 18-month field test using the “incident clearance” and “roadway clearance” performance measures. Five States (*Florida, Georgia, Maryland, Wisconsin, and Washington*) identified data sources, collected and analyzed data to measure TIM performance.
- All 11 FSI States established inter-agency programs to support TIM. By late 2007, only two States (*Texas and Utah*) were not yet measuring TIM performance.
- Four States (*California, Connecticut, New York, and North Carolina*) committed to implementing TIM performance measurements as part of a comprehensive TIM program. Their TIM programs include establishing inter-agency agreements; identifying data requirements and data sources; and developing data exchange interfaces. These activities required substantial planning, and in several instances, the acquisition of technical assistance to modify legacy systems and interfaces. While these States may not be measuring TIM performance metrics yet, they have initiated planning to enable performance measurement as part of an integrated TIM program. Table 2 demonstrates the Focus States’ TIM Performance Measurement activities through the notations “under development” and “in progress.”<sup>2</sup>
- The group developed a preliminary definition of secondary incidents and the third performance measure—“reduce secondary incidents”—at the final project workshop.<sup>3</sup>

*Secondary Incidents are unplanned incidents (starting at the time of detection) for which a response or intervention is taken, where a collision occurs either a) within the incident scene or b) within the queue (which could include the opposite direction) resulting from the original incident.*

Through this initiative, the 11 Focus States overcame common institutional, operational, and technical barriers that define multi-agency, measurable TIM objectives and measured performance toward those objectives, as shown in Table 2.<sup>4</sup> Examples of TIM performance data collected by States are included in the PowerPoint presentation described in appendix A to this Final Report, which is provided under a separate cover.

During the process, other States expressed interest in the outcomes of this initiative. One State (*Missouri*) participated as an observer in the TIM Focus State Initiative final conference held in Milwaukee in October 2007 to learn more. All 11 Focus States concluded the process by expressing their desire to build on the TIM FSI momentum and to continue the work together to advance program-level performance measurement in their States, as well as nationwide.

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<sup>2</sup> Note: “CAD TMC” in the third column refers to Computer-Aided Dispatch Traffic Management Center.

<sup>3</sup> At the time of the final workshop, held in Milwaukee, Wisconsin, in October 2007, this third performance measure had not been tested through the FSI.

<sup>4</sup> The FSI implementation summary was developed during the final project workshop.



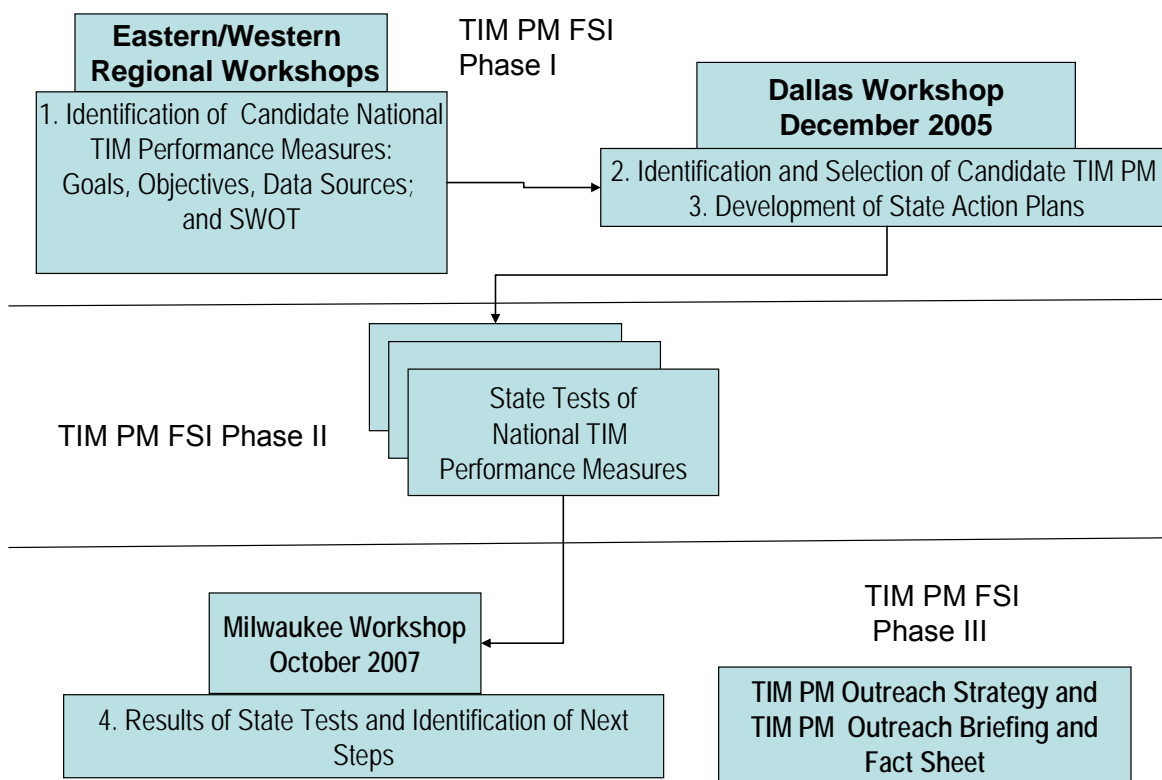
**Table 2. TIM PM FSI Implementation Summary**

State	Developing Interagency TIM Program	Interagency Data Exchange (CAD TMC)	Reduce Roadway Clearance Time	Reduce Incident Clearance Time	Results Used to Improve TIM Operations
California	Y	Under Development	In Progress	In Progress	Planned
Connecticut	Y	Under Development	In Progress	In Progress	Planned
Florida	Y	Y	Y	Y	Tracking average incident duration in Districts 4 and 6 and on Florida Turnpike.
Georgia	Y	N	Y	Y	PM used to determine if targets for major incident clearance—90 minutes and incident response—8 minutes are achieved.
Maryland	Y	N	Y	Y	Annual assessment data is used to identify high crash corridors, plan resource allocation, and identify trends in TIM.
New York	Y	Under Development	In Progress	In Progress	Planned
North Carolina	Y	Under Development	In Progress	In Progress	Planned
Texas	Y (Local Events)	N	N	N	N
Utah	Y	Limited	N	N	N
Washington	Y	Limited	Y	Y	In progress for incidents involving joint response with Washington Department of Transportation (WSDOT) and Washington State Police (WSP).
Wisconsin	Y	Y	Y	N	Currently tracking average response times.

## 2. Focus States Initiative Overview

The TIM PM FSI task comprised in three phases:

- Phase I brought the 11 States together to identify the candidate performance measures, to select measures for testing, and to develop an Action Plan for conducting the test.
- Phase II consisted of an 18-month performance measurement test where each State implemented its Action Plan.
- Phase III involved a final workshop where States discussed their implementation results and identified next steps for continuing the development of performance measurement, in particular, identifying opportunities for FHWA to continue providing support for TIM performance measurement.



**Figure 1. TIM PM FSI Implementation Overview.**

For Phase I, FHWA divided the 11 States into two groups. This enabled transportation and law enforcement representatives from each State to meet. FHWA conducted two concurrent regional workshops, one held in McLean, Virginia, and the second in Sacramento, California, in September 2005. FHWA viewed the participation of law enforcement agencies as critical, since they play the lead role in traffic incident operations and respond to many more incidents than State DOTs. The State law enforcement agencies possess a vast collection of incident data that is valuable in the development of any developing coordinated regional TIM program. For these

reasons, law enforcement participation in the development of TIM performance measures is critical to the success of TIM program performance improvements.

FHWA sponsored these workshops to gain input and support from State DOT representatives, law enforcement practitioners, and FHWA Division and Resource Center representatives to collaboratively define a core set of program-level TIM PMs. Table 3 summarizes the list of overall candidate objectives and proposed performance measures defined at the two regional workshops.

**Table 3. Candidate Program-Level TIM Objectives and Performance Measures**

Candidate Objective	Proposed Performance Measure(s)
<p><b>1. Reduce incident notification time</b> (defined as the time between the first agency's awareness of an incident, and the time to notify needed response agencies).</p>	<p>a. The time between the first agency's awareness of an incident, and the time to notify needed response agencies.</p>
<p><b>2. Reduce roadway clearance time</b> (defined as the time between awareness of an incident and restoration of lanes to full operational status).</p>	<p>a. Time between first recordable awareness (detection/ notification/ verification) of incident by a responsible agency and first confirmation that all lanes are available for traffic flow.</p>
<p><b>3. Reduce incident clearance time</b> (defined as the time between awareness of an incident and removal of all evidence of the incident, including debris or remaining assets, from shoulders).</p>	<p>a. Time between first recordable awareness (detection/ notification/verification) of incident by a responsible agency and time at which all evidence of incident is removed (including debris cleared from the shoulder).</p> <p>b. Time between first recordable awareness and time at which the last responder has left the scene.</p>
<p><b>4. Reduce "recovery" time</b> (defined as between awareness of an incident and restoration of impacted roadway/ roadways to "normal" conditions).</p>	<p>a. Time between awareness of an incident and restoration of impacted roadway/roadways to "normal" conditions. (NOTE: Participants noted that "normal" conditions could be difficult to define.)</p>
<p><b>5. Reduce time for needed responders to arrive on-scene after notification.</b></p>	<p>a. Time between notification and arrival of first qualified response person to arrive on incident scene.</p>
<p><b>6. Reduce number of secondary incidents and severity of primary and secondary incidents.</b></p>	<p>a. # of total incidents (regardless of primary or secondary) and severity of primary incidents (National Highway Transportation Safety Administration [NHTSA] classification).</p> <p>b. # of secondary of incidents and severity (NHTSA classification).</p> <p>c. # fatalities.</p>

Candidate Objective	Proposed Performance Measure(s)
<p><b>7. Develop and ensure familiarity with regional, multi-disciplinary TIM goals and objectives and supporting procedures by all stakeholders.</b></p>	<ul style="list-style-type: none"> <li>a. Existence/availability of program-level plan for implementing traffic control devices and/or procedures.</li> <li>b. Existence of/participation in multi-agency/jurisdictional training programs on the effective use of traffic control/staging devices and procedures.</li> <li>c. % of workforce trained on National Incident Management System as well as local/ regional/ "program-level" procedures.</li> <li>d. % of agencies with active, up-to-date Memoranda of Understanding (MOUs) for program-level TIM.</li> <li>e. # of certified courses taken.</li> <li>f. # of attendees at various courses.</li> </ul>
<p><b>8. Improve communication between responders and managers regarding the status of an incident throughout the incident.</b></p>	<ul style="list-style-type: none"> <li>a. # or % of agencies with a need to communicate, who are able to communicate (sharing information or communications systems) within an incident.</li> </ul>
<p><b>9. Provide timely, accurate, and useful traveler information to the motoring public on regular basis during incident.</b></p>	<ul style="list-style-type: none"> <li>a. Comparison of information provided at any given time to what information could have been provided.</li> <li>b. Customer perceptions on usefulness of information provided.</li> <li>c. Time of updates to various sources.</li> <li>d. # of minutes it takes to disseminate informational updates to the public (after something changes regarding incident status).</li> <li>e. # of sources of information to the public.</li> <li>f. # of system miles that are covered/density of coverage by traveler information systems (seek to increase these).</li> </ul>
<p><b>10. Regularly evaluate and use customer (road user) feedback to improve TIM program assets and practices.</b></p>	<ul style="list-style-type: none"> <li>a. % incidents managed in accordance with program-level procedures.</li> <li>b. % of incidents for which multi-agency reviews occur.</li> <li>c. Perceived effectiveness (by involved stakeholders) of use of traffic control devices to achieve incident management goals developed for each incident.</li> <li>d. Correlation of use of program-level traffic control devices by incident type.</li> <li>e. # of instances of sending the needed equipment (presumes that needed quantities and types of equipment are defined) for the incident.</li> <li>f. Frequency of dissemination of multi-agency/program-level and customer feedback back to partners.</li> <li>g. Measures of customer feedback: <ul style="list-style-type: none"> <li>• # Web site feedback.</li> <li>• # of surveys conducted/focus groups.</li> <li>• # of complaint logs.</li> <li>• # of service patrol comment cards.</li> <li>• # of 1-800 feedback system calls.</li> <li>• # of sources of information to the public (# of media/government outlets providing information).</li> <li>• # of 511 calls.</li> </ul> </li> </ul>

After the concurrent workshops, participants from all 11 States met in Dallas in December 2005 to develop consensus on performance objectives and identify a few good measures that they could use in their States. All 11 States developed an Action Plan to pursue TIM performance measurement in their States by identifying how to conduct the test of the two measures.<sup>5</sup> Table 4 identifies the two program-level performance measures selected for testing by the States.

**Table 4. Candidate TIM Performance Measures Based on Candidate Objectives**

Candidate Objectives	Proposed Performance Measures
<ul style="list-style-type: none"> <li>• <b>Reduce roadway clearance time</b> (defined as the time between awareness of an incident and restoration of lanes to full operational status).</li> </ul>	<ul style="list-style-type: none"> <li>• Time between first recordable awareness of incident by a responsible agency and first confirmation that all lanes are available for traffic flow.</li> </ul>
<ul style="list-style-type: none"> <li>• <b>Reduce incident clearance time (defined as the time between awareness of an incident and removal of all evidence of the incident, including debris or remaining assets, from shoulders).</b></li> </ul>	<ul style="list-style-type: none"> <li>• Time between first recordable awareness of incident by a responsible agency and time at which the last responder has left the scene.</li> </ul>

Following the Dallas workshop, the participating States then agreed to test the selected performance measures over an 18-month period during Phase II. In Phase III, FHWA hosted a final task workshop in Milwaukee. There, the States reported on progress made in implementing the two performance measurements during. The workshop objectives included:

1. A presentation of States' status reports on the implementation of State Action Plans.
2. Discussions of lessons learned—institutional, technical integration, and data exchange—and how States were or were not able to resolve issues they encountered.
3. Development of outreach strategies, including materials needed to support the development of TIM programs and TIM performance measurements.
4. An initial discussion on a common definition of secondary incidents.
5. The identification of areas where FHWA could assist with the adoption of TIM performance measurements.

To address the first workshop objective, each State presented an update on their progress in implementing its State Action Plan. Following the progress updates, FHWA facilitated discussions to gain participant input and experience to support the remaining workshop objectives. The results from the workshop were submitted to FHWA in December 2007.<sup>6</sup>

During the final Phase III workshop in Milwaukee, FHWA asked participants to work on developing a common definition for secondary incidents. Participants opened the discussion with a general understanding that secondary incidents are crashes or other incidents resulting

<sup>5</sup>A majority (85 percent) of the participants at the Action Plan Development Workshop attended either the East or West Coast Regional Workshop.

<sup>6</sup>"Focus States Initiative Traffic Incident Management Performance Measures Milwaukee Workshop Report," (December 2007), developed by Science Applications International Corporation (SAIC), in association with American Transportation Research Institute (ATRI) for the Federal Highway Administration.

from immediate factors associated with a previous incident. The participants noted that the definition is subjective.

Discussing a secondary incidents definition and data collection methods for this metric, participants identified the following issues for consideration:

- **Secondary incidents resulting from rear-end crashes.** A common type of secondary incident involves rear-end crashes caused by unexpected slowing as a result of a primary incident. However, participants noted that rear-end crashes result from two factors: capacity and an existing incident. In identifying secondary incidents, participants stated that capacity crashes should be filtered out so as not to overstate the number of secondary incidents.
- **Secondary incidents resulting from an unplanned incident/event occurring during recurring congestion.** Participants noted that recurring congestion is considered a planned incident/event and that incidents that occur during such an incident/event should not be considered as secondary incidents. Secondary incidents should be incidents occurring as a result of an unplanned incident/event that result in a non-recurring queue.
- **Need to establish a time or distance parameter used in defining secondary incidents.** Participants discussed the need to establish a time or distance parameter to use in defining secondary incidents. One State indicated that secondary incidents are defined as incidents that occur within 2 miles and/or 2 hours of a primary incident. The State also indicated that incidents occurring within one-half mile and/or one-half hour of primary crash in the opposite direction are also considered secondary.
- **Need to provide training to incident responders to preclude subjective determination in properly identifying secondary incidents associated with non-recurring congestion.** Secondary incidents often are based on the investigating officer's determination that the incident is a secondary incident. This can be subjective and participants stated that training would be required for officers (and other incident responders) on how to properly determine that a crash or incident is in fact secondary, and is associated with non-recurring congestion.
- **Need to establish criteria to define a secondary incident as any incident that would not have occurred given the lack of a primary incident.** One discriminator identified by participants in defining secondary incidents was to establish criteria that a secondary incident is any incident that most likely would not have happened given the lack of the primary incident. However, participants cautioned that defining an incident as secondary can create huge liability issues for responders. For example, if responders had properly handled a primary incident, the secondary incident would not have occurred; therefore, the secondary incident is the direct responsibility of the responders.

The participants agreed that the following statement represented a good start to developing a common definition for secondary incidents. However, the participants did not reach consensus on this definition:

*Unplanned incidents (starting at the time of detection) for which a response or intervention is taken, where a collision occurs either a) within the incident scene or b) within the queue (which could include the opposite direction) resulting from the original incidents.*

Participants used the results of the facilitated discussion to establish the third performance measure related to secondary incidents, as presented in Table 5.

**Table 5. Candidate for Third TIM Performance Measures Based on Candidate Objectives**

TIM Program Objective	Related Performance Measure
<p><b>3. (NEWEST) Reduce the number of secondary incidents</b>—specifically unplanned incidents for which a response or intervention is taken, where a collision occurs either a) within the incident scene or b) within the queue (which could include opposite direction) resulting from the original incident.</p>	<p>Number of unplanned incidents beginning with the time of detection of the primary incident where a collision occurs either a) within the incident scene or b) within the queue, including the opposite direction, resulting from the original incident.</p>

Phase III of the TIM performance measurements FSI also addressed development of an outreach strategy and outreach materials for use by States interested in establishing TIM PM. The Statement of Work (SOW) produced by the Focus States identified and defined three deliverables in support of outreach efforts promoting TIM performance measures: 1) What message or messages should be delivered; 2) key issues that needed to be addressed; and 3) what supporting documentation should be highlighted in the materials.

### 3. Focus States Initiative – Lessons Learned

#### *Institutional Issues and Challenges*

The participating States identified the most common institutional issue as gaining acceptance to measure performance from both executive decision makers and other agencies involved with TIM responsibilities. The following identify reasons for the difficulty in obtaining executive acceptance:

- The development of an integrated TIM program and program-level TIM PM often requires “thinking outside of the box”:
  - Agencies have specific charges and responsibilities and may not view the collection of data needed for TIM PM as a priority when responding to an incident.
  - Agencies view TIM PM as being the responsibility of another agency. One State cited an example where emergency responders indicated that collecting data and measuring performance was the responsibility of the State’s DOT.
- Decision makers may have limited resources available for program activities and need to be convinced that investing resources in TIM PM is worthwhile.

The participating States also identified other significant issues involved obtaining executive acceptance for data exchange:

- Exchanging data with other agencies may be a new practice for an agency and managers need to be convinced that this is beneficial to their agency.
- What data is exchanged, who has access to the data, and how the data is used also may be of concern. This is particularly true with respect to data that may be needed for criminal investigations that arise from an incident.
- Data exchange often involves legacy system modifications. Again, the key issue is convincing managers to invest resources.

Fortunately, the participants identified a number of strategies that they have used in their own States to address the above-cited issues. Successful strategies, all of which emphasize developing cooperative relationships with other agencies, include the following:

- **Establishing working relationships with all agencies involved.** Several States have established working groups that meet on a regular basis to discuss TIM operations and policies as a means to identify areas for improvement and exchange information and lessons learned.
- **Developing a Memorandum of Understanding (MOU) between agencies that defines roles, responsibilities, and establishes a defined working relationship.** An



MOU can be an effective tool for addressing data exchange issues by stating what data will be exchanged and how the data will be used.

- **Developing outreach materials that document the benefits of TIM PM.** These can incorporate results from other States or within the State, but the key is to show how performance measurement can be a benefit, i.e., improving response operations and responder safety, obtaining additional budget funds, and so forth.
- **Establishing a cost-sharing agreement was identified by several States as critical to success.** Placing responsibility on a single agency to obtain the funding needed for legacy system modifications was identified as problematic, whereas cost-sharing served the benefit of reducing a particular agency's resource requirements. States indicated that leveraging other funding sources and resources also was a critical success factor, such as demonstrating how a particular legacy system modification needed to support TIM PM also would support other program activities helped obtain acceptance and support from management.

### ***Technical Integration and Data Exchange***

States identified the following solutions they used in to successfully address the most common technical integration and data exchange challenges:

- **Establish agreements between law enforcement and DOTs to preclude compromising sensitive data.** Ensuring that law enforcement data provided to DOTs did not include any sensitive data that if made public would compromise a criminal investigation. A number of States indicated that to address this issue they had established agreements to specifically define data elements to be provided. These States also had established system filters that allowed the exchange of these agreed to data elements.
- **Establish technical committees to develop common data dictionaries.** Many agencies within a State do not have compatible data dictionaries and collect the same information in different formats. States indicated that to address this issue, States would establish technical committees to help develop common data dictionaries or translators that would enable different systems to identify and match information.
- **Establish a common time stamp and common geographic coordinates necessary for data exchange and reporting functions.** A common time stamp and common geographic coordinates necessary to identify an incident's location also were identified as key issues for data exchange. For example, an enforcement agency may time stamp the closing of an incident as when the last enforcement vehicle departs the scene, while DOT or other responders may still be onsite. States indicated that establishing a common time stamp that establishes common incident start and close time stamps and the sharing of this information between agencies as critical to properly measuring incident duration. The same issue was identified with the use of geographic coordinates:

if agencies use different geographic coordinates to identify an incident location, some type of system modification that translates these into a common set of coordinates is needed to enable agencies to properly identify the location of the same incident.

- **Identify and agree to a defined standard or group of standards for data exchange.** The States cited that identifying and agreeing to a particular standard or group of standards was identified as critical for ensuring interoperability. States indicated that multiple systems using multiple standards (IEEE 1512, APCO 36, NLETS, and so forth) created problems in enabling the exchange of data between systems. As part of this discussion, participants stated that developing a common ITS architecture was very helpful in identifying standards to be used by different agencies.
- **Identify and agree upon method of integrating text, video, and audio formats for data exchange.** Integrating multiple types of data exchange via text, video, audio also was identified as important. This helps with identifying the appropriate response strategy; providing information on 511 or Web-based traveler information systems; notifying the media; and improving overall incident management in addition to enabling TIM PM. States indicated that this also helped convince managers to support the allocation of funds and resources needed for legacy system modifications.
- **Identify and agree upon consistent data collection practices within and between agencies.** A significant issue facing States is that of inconsistent data collection practices both within and between agencies. Solutions identified included:
  - Minimizing human interface through use of automated data entry where possible, i.e., Global Positioning Satellite (GPS) systems, time-stamped data entry, and so forth.
  - Single-point data entry that is based on a user-friendly interface (for example, pull-down menus, single sheet, and so forth).
  - Pushing crash data from law enforcement to DOT and identify an agency (for example, DOT) responsible for time-stamping closure of incident.
  - Prioritizing the need for a “lane-clear” time stamp among law enforcement responders.
  - Training at all levels (practitioner, mid-level and executive) and among all partners organizations (DOT, law enforcement, etc.) on data-collection techniques to ensure common practices.
  - Identification and standardization by each State on which organization collects time-stamp data.

## 4. TIM Performance Measurement – Next Steps

During the final session, the group identified the next steps for nationwide adoption of TIM performance metrics.

### ***Capitalize on Demonstrated TIM PM FSI Successes***

The TIM FSI successfully demonstrated the viability of performance measurement. The initiative unexpectedly resulted in the development of a peer exchange network. The FSI peers shared innovative approaches to TIM performance measurement, data exchange and systems integration, and institutional models to promote multi-agency information exchange. A majority of the participating States continue to move ahead with implementing integrated TIM programs that involve inter-agency data exchange and performance measurement.

All of the participating States indicated the importance of continuing the information exchange, a key component of the TIM PM FSI. Responding to recommendations from the Focus States, FHWA developed an online Knowledge Management System to promote a national-level dialogue and knowledge exchange on TIM performance measurements. It is accessible at the FHWA ETO website, specifically [http://ops.fhwa.dot.gov/eto\\_tim\\_pse](http://ops.fhwa.dot.gov/eto_tim_pse). The TIM Performance Measurements Knowledge Management System constitutes only one of many tools that may be used to continue to promote TIM performance measurements.

### ***TIM Outreach Strategy Plan***

Produced by the TIM Focus States, the TIM Outreach Strategy Plan encompasses a five-year scope. The goals are designed to help FHWA Division Offices move key decision-makers in State transportation and law enforcement agencies from “awareness” through “comprehension,” “conviction,” “desire,” and finally “action” to learn more about and implement TIM performance measurement and to adopt and implement the three proposed performance metrics outlined in this document.<sup>7</sup>

Performance measurement successes in other domains and its growing importance in FHWA initiatives suggest that there is an emerging market for information. States seek best practices and technical assistance in how to conduct multi-agency, multi-jurisdictional performance measurements given available resources. Examples of FHWA initiatives that emphasize performance measurement include:

- Congestion Management Process (CMP), including management and operations into the planning process,
- Integrated Corridor Management,
- Several Safety initiatives, and
- National Unified Goal (NUG) for Traffic Incident Management,

Other indicators include the importance of Performance Measurement to the National Traffic Incident Management Coalition’s (NTIMC) work; the level of engagement by States in the TIM FSI; and the expression interest by other States (such as Missouri) during the FSI process.

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<sup>7</sup>Note that all timeframes are approximate. The primary impetus for moving from one phase of the marketing effort to the next will be the accomplishment of the previous phase’s goals.

The FSI study team recommends that FHWA support the implementation of the outreach activities. Table 6 outlines a number of cost-efficient, yet highly effective means of providing outreach to participating States. Further, the message delivered through each medium can be tailored to meet the needs of a specific audience.<sup>8</sup>

**Table 6. Recommended Outreach Activities**

Outreach Product/Tool	Description
<b>Conferences and Events</b>	<p>Conferences and events represent one of the most effective outreach opportunities for continuing to advance the State of the practice in any area. Practitioners value in-person meetings as well as virtual opportunities for peer exchange (see Webinars). This was one of the most frequently referenced suggestions by FSI participants when asked how FHWA could continue to advance program-level TIM PM:</p> <p><i>“Bringing everyone together. Having these kinds of conferences/workshops. This needs to be something that goes on over years. Building a bench. We need to bring new people to these meetings to keep the flow going. Maybe once per year/ maybe meet on a regional basis annually and national basis every 5 years.”</i></p> <p>Conferences also provide effective forums for distributing hardcopy outreach materials (fact sheets, trading cards); interacting with stakeholders in person (word of mouth marketing); and giving presentations on program-level TIM PM.</p>
<b>Structured Regional or Topic-Based Workshops</b>	<p>Assuming a sufficient level of interest, FHWA could sponsor targeted regional or topic-based workshops on program-level TIM PM and invite one or more focus State(s) to participate as subject matter experts/peers. The FHWA peer exchange model could be used (see Office of Freight peer exchange model). For topic-based workshops, role plays, and other experiential learning techniques could be blended with more traditional peer exchange/knowledge exchange techniques to help prepare participants to be successful in their regions or home environments.</p>
<b>Personal contact with representatives from target States and agencies.</b>	<p>While outreach products can help to raise awareness and generate interest in performance contracting and in FHWA’s Implementation Framework, <b>the most effective way to influence States to consider program-level TIM PM is through direct personal contact between FHWA and the target States.</b> The outreach products can help to prepare FHWA and its representatives to communicate effectively with States about program-level TIM PM. Conferences/ events offer opportunities to do this, but phone calls and emails can be effective.</p>
<b>*Fact Sheet</b>	<p>The TIM FSI developed an executive fact sheet (see appendix B) that introduces the need for program-level TIM PM, how it can benefit agencies and the public, and where States can learn more. Division offices can distribute this to State partners, and bring this to all events/forums where they are attending or presenting on TIM.</p>
<b>*PowerPoint Presentation</b>	<p>The TIM FSI also developed an executive-level presentation for use by State and local transportation or law enforcement officials in building support for program-level TIM PM. Division offices can distribute this to State partners, and bring this to all events/forums where they are attending or presenting on TIM. This presentation is available on the FHWA TIM Website, and can be readily tailored if desired, to a particular audience by removing unrelated slides.</p>

<sup>8</sup>Those outreach products marked with \* were developed through the TIM PM FSI are available to support outreach activities.

<b>Outreach Product/Tool</b>	<b>Description</b>
<b>Webinar and Podcasts</b>	<p>Webinars represent another popular electronic means for disseminating information to a large number of people and can be podcasted along with closed captioning. One Webinar was held for general TIM stakeholder audiences near the end of the TIM FSI to introduce the FSI. FHWA can consider holding additional Webinars periodically, such as:</p> <ul style="list-style-type: none"> <li>• Introduce all Division Offices to program-level TIM PM and the FSI outreach strategy.</li> <li>• Conduct in-depth learning/skill development in a core area of program-level TIM PM (institutional development/partnership building, technical development, operational implementation).</li> <li>• Bring TIM stakeholders interested in TIM PM together to exchange lessons-learned, practices, and tips.</li> <li>• Announce the program-level TIM PM Knowledge Management System to stimulate interest and help regain momentum.</li> </ul> <p>Webinars offer a structured, interactive forum in which stakeholders can ask questions. Webinars can be scheduled quarterly or biannually to maintain a general awareness and account for staff turnover in agencies (a key barrier to implementing program-level TIM PM cited by TIM FSI participants).</p> <p>The Webinars also can be held as needed to address specific topics of interest, or to offer educational opportunities to provide stakeholders with regular opportunities to learn more about performance contracting for construction and how this approach can be helpful to them.</p> <p>Questions asked during the Web conferences can serve to help FHWA to gather additional information for creating Frequently Asked Questions (FAQs) lists.</p>
<b>Website, Knowledge Management System, and FAQs</b>	<p>The FHWA or other national sponsor Website (NTIMC) should function as the reliable source for the latest information on program-level TIM PM. (Note that passive mechanisms such as the Website alone are not effective means for marketing. Target audiences must be made aware of the Website, motivated to visit it, and must find the information they are seeking when they visit.)</p> <p>Create pointers from all related Websites to a Web page that is dedicated to introducing program-level TIM PM; how it can benefit stakeholders; FAQs; introducing the Knowledge Management System; and include the experiences of the TIM FSI.</p> <p>FHWA is developing a Knowledge Management System to allow the focus States and others interested in TIM performance measurement to continue to share information, experiences, and resources such as data exchange standards and architectures with each other. This system will be comprised of a managed email list to allow folks to tap into the collective knowledge across the country with TIM PM, as well as an online Knowledgebase for conveniently sharing documents and other downloadable products.</p>
<b>Press or News Release</b>	<p>A brief news release may be used for significant updates or developments in the area of TIM PMs. News releases can be distributed to, and available from the Website, to be carried by external media.</p>
<b>Magazine/Journal/Web Articles</b>	<p>A core article could be developed for a key target publication (i.e., Public Roads) introducing program-level TIM PM, the TIM FSI experience, how program-level TIM PM can benefit partner agencies, to promote the forthcoming Knowledge Management System, and explain how and where readers can learn more.</p>

Outreach Product/Tool	Description
<b>Headlines on/links from other related/partner sites</b>	Request that partners' sites (NTIMC, Office of Operations, law enforcement/EMS associations, AASHTO, etc.) carry a headline for a period of 1-3 weeks introducing FHWA's program-level TIM Knowledge Management System. Suggested group websites include: <ul style="list-style-type: none"> <li>• American Associate of State Highway and Transportation Officials (AASHTO) General</li> <li>• American Road &amp; Transportation Builders Association (ARTBA)</li> <li>• Transportation Research Board's (TRB) Subcommittee on Systems and Operation Management (SSOM) Committee</li> <li>• International Association of Chiefs of Police (IACP)</li> <li>• I-95 Corridor Coalition, and others as defined</li> </ul>
<b>Trading Cards</b>	Develop a business card or baseball style card that emphasizes the message in a catchy way such as "TIM is a Team Sport," and motivates practitioners to consider program-level TIM PM. Cards could feature "most valuable players," and feature individuals or teams across the country who are leading in program-level TIM performance measurement, showing that it can be done.
<b>Managed Email List</b>	The program-level TIM performance measurement Knowledge Management System <b>LISTSERV</b> will serve as a primary means of information exchange and promotion for the forthcoming Knowledgebase. Transportation stakeholders regularly report preferring managed email lists (like a <b>LISTSERV</b> ) as an efficient means of receiving quick updates on a topic of interest that they may optionally choose to pursue further if desired. Emails sent to the managed email list will include informational headlines and Website addresses to short articles or new articles in the program-level TIM performance measurement Knowledgebase that stakeholders can pursue further at their leisure.
<b>Workshop Report (Can be posted to Knowledgebase)</b>	The workshop reports give more detailed information on how the Focus States got started in their data collection and analysis and the lessons learned. A contact list of TIM PM focus States participants is available so that you can contact them directly for more information.
<b>Self Assessments</b>	FHWA's annual TIM Self-Assessment is another useful tool for identifying TIM performance measures and tracking those measures on a yearly basis.

Research shows that people need to be exposed to a message seven times in three different formats for the information to make an impression. This means that to effectively raise awareness about TIM performance measurements and to motivate people to take action and learn more, outreach efforts should be "layered" to ensure that target audiences receive the message multiple times. Examples of layered outreach would include using an event-driven approach and announcing the event through several channels such as:

- A press release.
- Targeted article.
- Web site postings.
- Presentations at conferences/events.
- Distributing collateral such as trading cards or fact sheets at events.
- A webinar.

A number of newsworthy, cost-efficient TIM Performance measurement-related events lend themselves to outreach:

- Completion and release of the TIM PM FSI final report.
- Launch of the program-level TIM PM Knowledge Management System.
- Promotion of major advances in TIM PM by States that are worthy of national attention.
- New resource updates or functionality upgrades to the TIM PM Knowledge Management System.

Through sharing the FSI's results and promoting expanded involvement of all interested States through the Knowledge Management System, FHWA's efforts will benefit all States and provide a forum where they can exchange successes in overcoming these challenges. The results and findings of this initiative will help States to identify areas where improvements in incident response capabilities can improve highway safety for both the traveling public and the responder community. As an added benefit, this study addresses a significant gap in existing resources and tools available for improving TIM performance. FHWA hopes that this report will aid States in reducing congestion, safeguarding the motoring public and responders, and contributing toward the National Unified Goal (NUG) for Traffic Incident Management through measuring TIM performance.

A supplementary PowerPoint presentation developed through this initiative follows as Appendix A, "Traffic Incident Management Performance Measurement The Focus States Initiative: On the Road to Success."

## **Appendix A: Traffic Incident Management Performance Measurement Presentation**

The referenced Traffic Incident Management Performance Measurement PowerPoint presentation, titled “The Focus States Initiative: On the Road to Success” supplements this Final Report and the 2-page outreach fact sheet in appendix B.

The presentation details the benefits of program-level TIM performance measurement, with the goal of helping various State transportation professionals determine how they can capitalize on the results and utilize them in their respective States.

Specific topics include:

- Various TIM stakeholders.
- What are the five benefits of effective TIM?
- Samples of data collection and evaluation results from the three sample States.
- Challenges and lessons learned.
- How other States can gain support in getting started in tracking and evaluating identified performance measures.



## **APPENDIX B: TIM PERFORMANCE MEASUREMENT OUTREACH FACT SHEET**

The following two pages present an executive-level outreach fact sheet, titled “Traffic Incident Management (TIM) Performance Measurement On the Road to Success.” States may use this fact sheet, which complements the PowerPoint presentation in appendix A, to build support among colleagues, managers, and partner agencies for program-level TIM performance measurement.

# Traffic Incident Management (TIM) Performance Measurement On the Road to Success

Law enforcement, fire and rescue, emergency medical services, and transportation agencies involved in traffic incident management (TIM) share a common goal—restoring the roadways as safely and quickly as possible. They know that every minute of incident delay multiplies traffic queues by a factor of four and increases the risk to responders' and drivers' lives.

TIM teams across the country are recognizing that improvements in individual agency TIM operations are helpful, but that to make a real impact responders must work together to assess, identify and act on opportunities for improvement. In short, TIM has become a team sport. TIM teams across the country are increasingly interested in jointly measuring performance as a team to win more resources for TIM.

The biggest barriers to jointly measuring performance of multiagency TIM operations include different definitions for common measures such as "incident clearance time," institutional concerns over data sharing, and incompatible data systems. FHWA's TIM Performance Measurement Focus State Initiative, however, has shown that all of these hurdles can be overcome.

## FHWA's Traffic Incident Management Program-Level Performance Measurement Focus State Initiative

FHWA launched a focus state initiative in 2005 to develop and test consensus-based, multi-agency, or "program-level" performance measures for TIM. TIM leaders from transportation and law enforcement organizations in 11 states reached consensus on three program-level TIM objectives and associated performance measures for their TIM teams:

TIM Program Objectives	Related Performance Measures
Reduce "Roadway" Clearance Time	Time between first recordable awareness of incident by a responsible agency and first confirmation that all lanes are available for traffic flow.
Reduce "Incident" Clearance Time	Time between first recordable awareness of incident by a responsible agency and time at which the last responder has left the scene.
Reduce the Number of Secondary Crashes	Number of unplanned crashes beginning with the time of detection of the primary incident where a collision occurs either a) within the incident scene or b) within the queue, including the opposite direction, resulting from the original incident.

Consensus-based, Program-level TIM Performance Measures Developed by Focus States

TIM teams across the country are beginning to explore measuring team or "program-level" TIM performance as the only means to improve multi-agency team response. TIM stakeholders share a common goal to safely restore the roadways as quickly as possible because this equates to lives saved:

- Every minute of incident delay multiplies traffic queues by a factor of four, and increases the risk for secondary crashes
- The likelihood of a secondary crash increases by 2.8% for each minute the primary incident continues to be a hazard
- Faster response time has a well-documented relationship to the increased likelihood of crash survival
- Responder lives remain at risk every minute they are on the incident scene



## Traffic Incident Management (TIM) Performance Measurement



### Focus State TIM Performance Measurement Accomplishments

- Achieved landmark agreement on common definitions for three core TIM performance measures.
- Demonstrated that multi-agency data collection and fusion to improve TIM can be accomplished.
- Demonstrated that by working together to measure TIM performance, transportation and law enforcement agencies were able to overcome institutional data sharing hurdles and improved their ability to quantify TIM benefits.
- Helped agencies more effectively build support for their TIM program and win additional funding for TIM technical and resource needs by showing quantified TIM benefits.

### Getting Started with TIM Performance Measurement

Getting started measuring program-level TIM has never been easier. The experiences and resources of the 11 focus states and others in the TIM community are soon a mouse-click away with the TIM Performance Measurement Knowledge Management System, coming this spring:

- **Subscribe to the TIM Performance Measurement email list** to conveniently access the experiences and expertise of the focus states and your peers across the country for your questions. Send an email to [ETO@dot.gov](mailto:ETO@dot.gov) to subscribe.
- **Plan to bookmark and visit the TIM Performance Measurement Knowledgebase** to download helpful resources including sample MOUs, CAD-TMC integration strategies and requirements documents that have worked for others, as well as presentations, studies and reports that can help you build support in your region with TIM performance measurement. Search by keyword or browse by performance measure, conference/event (for presentations you've seen) or document type to find what you're looking for.

### Steps to Success

- Recruit agency champions for program-level TIM Performance Measurement.
- Develop a plan, including a plan to exchange needed data between agencies.
- Test the performance measures with available data, manually at first if necessary.
- Identify and plan for any needed system modifications to support data sharing.
- Modify your plan as needed.
- Track your progress on the Road to Success!

### TIM Performance Measures 11 Focus States:

- California
- Connecticut
- Florida
- Georgia
- Maryland
- New York
- North Carolina
- Texas
- Utah
- Washington
- Wisconsin

### Want to Know More?

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<http://ops.fhwa.dot.gov/incidentmgmt/index.htm>





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**Publication #: FHWA-HOP-10-010**

**December 2009**