Chapter 5
Incident Management Evaluation Program

5.1 Introduction
An important activity within the TIME Program is to consistently assess and evaluate the Program’s effectiveness. The purpose of the evaluation is to measure and document both quantitative and qualitative values of the Program elements Measures of Effectiveness (MOEs) such as efficiency, cost, public perception, and inter-jurisdiction cooperation/coordination. This requires the development of a structured evaluation plan to be prepared and carried out by an independent evaluator or Evaluation Team. The TIME Program Evaluation Team consists of researchers from the University of Wisconsin – Madison and Marquette University with direction and support provided by the WisDOT and TIME Program consultant team.

Several key measures have been identified at the national level for ITS program evaluation consistency. These measures pertain to travel time/delay, crashes, fatalities, throughput, cost, and customer satisfaction, in addition to emissions reduction and fuel savings. Added to these are MOEs that relate specifically to the incident management process and the TIME Program goals and objectives. These MOEs include the time to detect, verify, respond to, and clear freeway incidents. The success of the TIME Program will also be determined by the extent that multiple jurisdictions and agencies work together.

5.2 Phase I Evaluation Results
Phase I included the evaluation of the following test plans:

- Test Plan 1: Enhanced Freeway Patrols and Gateway Patrols
- Test Plan 2: Crash Investigation Sites
- Test Plan 3: Transverse Pavement Markings
- Test Plan 4: Enhanced Reference Signs
- Test Plan 5: Computer Aided Dispatch (CAD)/ Emergency Respondent
- Test Plan 6: User Acceptance
Results of the Phase I Evaluation, are provided in subsequent sections of this chapter.

### 5.2.1 Enhanced Freeway/Gateway Patrols

The WisDOT implemented two motorist assistance programs to better serve the motoring public traveling along portions of the I-94 corridor. The “Gateway Patrol” program serves the Racine and Kenosha County freeway system and the “Enhanced Freeway Patrol” program serves the Milwaukee County freeway system.

Almost three-quarters of the motorists traveling the Racine-Kenosha I-94 corridor who received assistance from Gateway Patrol Program tow trucks were stranded for a time not exceeding 10 minutes. Average time spent providing service was 15 minutes, ranging from a low of 5 minutes to report an abandoned vehicle to a high of 36 minutes when towing from a crash scene was required. A 14% decrease in the number of secondary collisions associated with a downstream collision was measured in the period following program implementation. The program was very well received by the motoring public as expressed in written comments received by the WisDOT. The most common comments were about fast and courteous service, however, most responding motorists were not aware of the program before they were assisted.

The Enhanced Freeway Patrol program allowed a higher level of enforcement along the East-West corridor (a 29% increase in traffic stops was observed along the “East-West” corridor). An 8% decrease in the number of secondary collisions associated with downstream incidents was measured in the period following program implementation. Service to disabled vehicles was shortened by 1 minute on average (from 14 minutes to 13 minutes) and dispatches to crashes were shortened by 3 minutes on average (from 31 minutes to 28 minutes).

### 5.2.2 Crash Investigation Sites

**Safety Benefits**

The evaluation has been conducted on three existing crash investigation sites (CIS) in Racine and Kenosha counties. The crash data in 1997 is used as the “before” condition.
Note that construction occurred on the I-94 corridor from April 27, 1998, to October 22, 1998. The crash data from June 20, 1998, (official opening date of CIS) to December 31, 1998, is used as the “after” condition with construction and the crash data from October 22, 1998, to December 31, 1998, is used as the “after” condition without construction. In general, the secondary crash rate was reduced from 8.24% in 1997 to 5.15% in 1998. For the same periods from June 20 to December 31, the secondary crash rate was reduced from 4.92% in 1997 to 4.76% in 1998. Noticeably, after October 22, 1998 (when the construction ends), no secondary crashes were found. In conclusion, the implementation of Crash Investigation Sites is fairly successful and beneficial for reducing the chance of secondary crashes.

**User's Perception**

Based on the questionnaires returned from motorists, it is concluded that the users' perception of the CIS is positive and encouraging. Most of the CIS users agreed with the safety improvement benefits for performing their activities at CIS instead of being on the freeway shoulder.

1. In general, 24% of drivers reported that the CIS signs are quite useful for guiding them to the CIS sites. Note that another 57% of users who returned the forms were escorted to the site and didn't provide answers.
2. Regarding the provided space and location, 99% of users agreed and felt satisfied with the current design. However, one comment from users is that the site is too far from the town.
3. About 51% of users used the phone when it was available. Some motorists reported that they did not use the phone because they did not have change.
4. Considering the lighting condition, 46% of users reported that it is quite ample for them to perform operation. Note that another 54% of users who returned the forms were escorted to the site during daytime and didn't provide answers.
Agencies' Perception

From the agencies' perspectives, the implementation of the CIS program is quite successful and worked satisfactorily with the goals and objective of the TIME program. The benefits of the CIS perceived by the sheriffs and state patrol can be summarized as follows.

1. Reducing incident clearance time. This program will work very effectively with the gateway.
2. Reducing the chance of secondary incident.
3. Facilitating the operation.
4. Enhancing safety for the responding personnel. All officers are clearly realizing this advantage.

One useful comment from agencies upon the success of the CIS program is to inform the public about the function of the CIS. From the officers' observation and the lessons learned from other deployments of incident management programs, this step is the most crucial activity to maximize the advantages of the CIS.

5.2.3 Transverse Pavement Markings

Transverse pavement markings were placed on the westbound lanes of I-94 during Phase II of the repaving construction in 1999. The study was on a 3-mile stretch from Oakwood Road to Puetz Road. The transverse pavement markings did have an effect on further reducing speeds in construction zones. The changes in speed were recorded for all four scenarios: before construction, during construction without the transverse pavement markings, during construction with the transverse pavement markings, and after construction. As shown in the histogram, most vehicles have a 0-5 mph decrease in speed before construction. Once construction begins and no transverse pavement markings are in place, most vehicles have a 10-15 mph speed reduction. With the transverse markings in place, most vehicles have a 10-20 mph speed reduction. After construction, most vehicles again have a 0-5 mph speed reduction. The traffic flow on the roadway changes for different times of the day. This traffic flow had an effect on the
speeds experienced on the roadway, but had minor impact on the speed changes experienced by vehicles.

**Figure 5.1**

**Frequency of Speed Change**

![Chart showing frequency of speed change](image)

5.2.4 Enhanced Reference Signs

The data collection is still in progress. A short survey questionnaire will be developed and distributed to 911 operators, dispatchers, and sergeants at the Milwaukee County Sheriff’s Department. The questionnaire will be used to determine:

- The current level of usage of the Enhanced Reference Signs and mile markers by drivers in reporting incidents.
- Whether drivers experience difficulty in describing the location of incidents to operators.
- Any institutional issues that may limit the effectiveness and usage of Enhanced Reference Signs. For example, one issue that has been mentioned is the requirement by the state that cross-streets be used to identify the location of incidents in accident reports.
Sergeant Tom Smith has agreed to distribute and collect the surveys. It was determined from discussions with the Milwaukee County Sheriff’s Department that it is not feasible to review tapes of 911 calls.

5.2.5 Computer Aided Dispatch (CAD)/ Emergency Respondent
The Milwaukee County Dispatch system is very outdated and needs to be upgraded. The many advantages of a CAD system definitely outweigh the disadvantages of having such a system. Implementing a CAD system that is tailored for use by law enforcement agencies or upgrading to faster computers could reduce many of the disadvantages of CAD.

5.2.6 User Acceptance
The purpose of this study was to evaluate the user’s perception of the effectiveness and benefits of the TIME Program. To accomplish this, a survey questionnaire was developed and mailed to a random sample of 1,000 drivers in seven Southeastern Wisconsin counties during November 1999. The survey was composed of 42 questions designed to determine the public’s awareness and perceptions of TIME in general and each component of the program in particular. Over 40% of those who received the survey completed and returned it. These survey responses were then used to determine the answers to the following key questions:

- Is the public aware of Crash Investigation Sites?
  The majority of users (72%) stated that they had heard of Crash Investigation Sites and 34% indicated that they had a high level of familiarity with them. Yet when asked where they would go if involved in a minor accident, only 7% responded that they would use a crash investigation site. In fact, while the majority would move their vehicles off the freeway, either to the shoulder of the freeway (60%) or to a safe well-lit area (11%), a sizable proportion (21%) would stay put. Of these users, 86% stated that they would do so because “they wanted the police to see the accident as it is”. The low-level use of the crash investigation sites appears to be due in part to a lack of understanding or familiarity with the sites. After reading a description of the
sites, a majority (68%) stated that they would be willing to use a crash investigation site if they were involved in a minor accident in the future.

- **Is the public aware of 911 cellular service?**
  Exactly half of the survey respondents own a cellular phone, and 25% have used it to report an accident or breakdown that they have seen accidents on the freeway. However, of those who do report accidents, 81% stated that they do so for less than 25% of the time. The most common reason users gave for not reporting an accident or breakdown was that they would assume that someone else already had.

- **Is the public aware of road marking systems?**
  When asked to rank several options in terms of how likely would be to use them to report an accident or breakdown to a 911 operator, 36% selected mile markers as their first choice. Users in Kenosha, Racine, and Walworth counties were the most likely to use mile markers, with slightly more than half of the users in each of these counties selecting them as the option they would most likely use. However, the great majority of users did not know how long they could legally leave their cars on the freeway. Seventy five percent of users stated that they did not know the time limit and the responses of those who claimed they did know ranged from 0 to 72 hours with an average of 15 hours.

- **Is the public aware of expanded motorist information?**
  A large proportion of users was aware of the existence of traffic information sources. In particular, users were very familiar with changeable message signs (86.8%), commercial radio (81%), local newspapers (79%), and commercial television (75%) as sources of travel information. Drivers were less likely however to use some of these sources. Only 7% stated that they use travel advisory radio, even though 25% were aware of it as a potential information source, and only 9% indicated that they used the Internet. Changeable message sign and commercial radio were the sources that the largest number of drivers (78% and 81%, respectively) stated they used. However, drivers indicated that they were using information about traffic congestion...
to adjust their traffic plans. Fifty four percent reported that they adjusted the time at which they left to travel and 59% stated that they have adjusted their travel route within the past month. Almost all of the users (92%) also indicated that they considered the availability of information about traffic congestion and incidents to be important, with 62% indicating that it was very important. The majority of users also felt that the traffic information they were currently receiving was timely (61%) and accurate (70%).

• **What is the public’s general perception of the TIME program?**
  The great majority of the drivers (90%) indicated that they had never heard of the TIME Program. However, after reading a description of the program, their responses to TIME were overwhelmingly positive. Seventy one percent of the users considered it to be a "good to very good" use of money, 74% agreed that it would improve freeway safety and speed up the clearing of accidents, and 77% indicated that they believed it would improve the response times of emergency vehicles.

• **What is the public’s perception of Southeastern Wisconsin’s freeway services?**
  Based on users' statements, the average time that it would take for emergency assistance to arrive was 32 minutes, while the average time that they felt it should take was 17 minutes. In addition, although 18% of users felt that the time for emergency assistance to arrive had decreased during the past year, the majority (57%) felt that it had stayed the same and 24% felt it had increased. Drivers also indicated that they were increasingly frustrated by their driving experience in general. Forty seven percent stated that the time they were delayed due to other people's accidents had increased during the past year and that their driving experience had worsened. A sizable proportion (12%) however, did indicate that their driving experience had improved and their delay had been reduced.

• **What is the public’s perception of the freeway patrol?**
  Most users felt that putting more police on the road during rush hour would improve freeway safety (60%), speed up the clearing of accidents (73%), and reduce the
number of accidents (50%). They did not feel positive, however, about the effects of more police on speeding the flow of traffic (27%) or on saving driving time (34%).

Based on these responses, it has been recommended that outreach and branding efforts be continued and strengthened. Users indicated that they were frustrated and unhappy with driving conditions in Southeastern Wisconsin. Users were also largely unfamiliar with the TIME Program. Yet, the large number of drivers who took the time to fill out the survey, as well as their largely positive response to the information they were given about the TIME programs, indicates that they have not crossed the threshold to being apathetic or antagonistic. They are still interested in and open to the efforts of the Wisconsin Department of Transportation, law enforcement, and other TIME participants to improve conditions.

5.3 Relationship of Evaluation Results to the TIME Program Goals, Objectives, and Potential Benefits

Another important aspect of the TIME Program Evaluation is to measure how well the results of the individual test plans support the goals and objectives of the TIME Program. This is necessary to determine if the TIME solutions are accomplishing their intended purposes in an effective manner. Table 5.1 uses a rating of high (H), medium (M), or low (L) to describe the level of support each Phase I test plan provides for the Program goals and objectives. A high level of support means that the test plan satisfies the goal/objective whereas a low level of support means that the test plan did not meet all of the expectations set by the goal/objective.
Table 5.1  
Relationship of Evaluation Results to the 
TIME Program Goals, Objectives, and Potential Benefits

<table>
<thead>
<tr>
<th>TIME Program Goals</th>
<th>Elements Evaluated</th>
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<tbody>
<tr>
<td>1. Improve and Enhance Freeway Incident Management</td>
<td>H</td>
</tr>
<tr>
<td>2. Improve Freeway Safety</td>
<td>M</td>
</tr>
<tr>
<td>3. Enhance the Quality and Efficiency of Freeway Travel</td>
<td>M</td>
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* Support of Goals / Objectives: H = High, M = Medium, L = Low