U.S. Department of Transportation
Federal Highway Administration

Office of Operations

21st Century Operations Using 21st Century Technologies

BEST PRACTICES IN TRAFFIC INCIDENT MANAGEMENT

EXECUTIVE SUMMARY

SEPTEMBER 2010

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Traffic incident management (TIM) is a planned and coordinated program to detect and remove incidents and restore traffic capacity as safely and as quickly as possible. Over time, various tools and strategies have been developed and implemented in an effort to improve overall TIM efforts. The nature and extent of tools and strategies in use are highly variable across the Nation, reflecting different priorities, congestion effects, levels of program maturity, and investment. As a direct result, the reported effectiveness of individual or combined strategies is inconsistent.

To achieve a higher level of effectiveness in U.S. TIM efforts and to accelerate the implementation process, the objectives of this investigation were to review and assess various TIM policies, procedures, and technologies to identify current "best practices" in the United States, and seek a synergistic partnership with the National Traffic Incident Management Coalition (NTIMC) to support both the identification of best practices in the United States and the implementation of these practices by State, regional, and local TIM partners.

Information to support this investigation was obtained through a review of published and electronic information sources and input from TIM practitioners representing law enforcement, fire and rescue, emergency medical services, transportation, and towing and recovery agencies in Arizona, California, Florida, Maryland, Michigan, Nevada, New Jersey, New York, Ohio, Pennsylvania, Tennessee, Texas, Utah, and Washington. Task-specific and cross-cutting challenges commonly encountered by TIM responders in the performance of their duties, and novel or effective strategies for overcoming these challenges (i.e., best practices), were considered. Task-specific challenges may include obtaining accurate information from motorists, accessing the scene, and condemning a spilled load. Cross-cutting challenges may include interagency coordination and communication, technology procurement and deployment, and performance measurement. The reported tools and strategies for improving TIM range from sophisticated, high-technology strategies to simple, procedural strategies.

Best Practice TIM Tools and Strategies

Task-specific tools and strategies generally reported to be most effective in enhancing TIM efforts include the following:

- Detection and verification:
    - Field verification by on-site responders and closed-circuit television (CCTV) cameras to support confirmation of incident occurrence and enhance the assessment of incident needs and the subsequent dispatch of appropriate personnel and resources to the scene.
    - Frequent or enhanced roadway reference markers and enhanced 9-1-1/automated positioning systems to support accurate identification of incident location by motorists or response personnel.
    - In rural areas, motorist aid call boxes and automated collision notification systems (ACNS) to speed detection.
- Traveler information:
    - 5-1-1 systems, traveler information websites, and media partnerships to enhance the provision of traveler information to motorists who are primarily off-site in an effort to reduce traffic demand at the incident scene.

  - Dynamic message signs (DMSs) and associated standardized DMS message sets and use protocol to enhance the provision of traveler information to motorists who are approaching the incident scene, including the consistency with which traveler information is presented.

- Response:

  - Personnel and equipment resource lists and the Towing and Recovery Association of America's (TRAA's) *Vehicle Identification Guide* to support the dispatch of appropriate resources to the incident scene.
  - Instant tow dispatch procedures and towing and recovery zone-based contracts to speed response to the incident scene by towing and recovery personnel through expedited dispatch and reduced travel distances.
  - Enhanced computer-aided dispatch (E-CAD), dual or optimized dispatch procedures, and motorcycle patrols to speed response to the incident scene by public safety personnel through reduced travel distances and increased maneuverability in congested conditions.
  - Equipment staging areas and pre-positioned equipment to enhance availability of and reduce wait time for specialty equipment that may be slow to mobilize and to improve access to and speed deployment of supporting equipment, such as traffic control devices.

- Scene management and traffic control:

  - The Incident Command System (ICS) to reduce confusion over on-scene authority and provide a unified command structure for decision making.
  - Response vehicle parking plans to enhance on-scene maneuverability.
  - High-visibility safety apparel and vehicle markings, on-scene emergency lighting procedures, and safe, quick clearance *Move Over* laws that require motorists approaching an incident to reduce speed and/or change lanes to enhance responder safety at the scene.
  - Effective traffic control through on-site traffic management teams and end-of-queue advance warning systems to provide advance warning of a downstream incident or associated congestion and subsequently reduce the occurrence of secondary incidents.
  - Alternate route plans to effectively reduce excess delay.

- Quick clearance and recovery:

  - Abandoned vehicle legislation/policy to expedite the clearance of abandoned vehicles from the roadway right-of-way and minimize the risk for abandoned-vehicle-involved secondary incidents.
  - Safe, quick clearance *Driver Removal* laws, service patrols, vehicle-mounted push bumpers, and incident investigation sites to speed the clearance of minor incidents by either the involved motorists or response personnel.
  - Safe, quick clearance *Authority Removal* laws, quick clearance/open roads policy, non-cargo vehicle fluid discharge policy, fatality certification/removal policy, and quick clearance using fire apparatus to speed the clearance of major incidents through the provision of common clearance goals, the authority to take appropriate action, and protection against liability for those actions.
  - Expedited crash investigation to speed the clearance of major incidents involving a fatality or other suspicious circumstances requiring additional information gathering at the incident scene.

- Towing and recovery quick clearance incentives to speed the clearance of major incidents through the provision of financial rewards and or penalties tied to performance for participating towing and recovery agencies.
- Major incident response teams to speed the clearance of major incidents through a high level of familiarity among the various team members and their authority to mobilize the necessary personnel and equipment to respond.

These tools and strategies, including their functional area of primary impact and select implementation locations, are summarized in table 1.

Table 1. Task-specific strategies and select implementation locations.

TASK-SPECIFIC STRATEGIES	Detection/Verification	Traveler Information	Response	Scene Management/ Traffic Control	Quick Clearance/ Recovery	EXAMPLE APPLICATIONS
Field Verification by On-Site Responders	●					NY (Hudson Valley Region)
Closed-Circuit Television Cameras	●					76+ U.S. Metropolitan Areas, MD
Frequent/Enhanced Roadway Reference Markers	●					FL, NJ/PA (Delaware Valley Region), OH, TN
Enhanced 9-1-1/ Automated Positioning Systems	●					TX (San Antonio)
Motorist Aid Call Boxes	●					27+ U.S. Metropolitan Areas, GA
Automated Collision Notification Systems	●					16+ U.S. Metropolitan Areas, NY (Erie Co.)
5-1-1 Systems		●				33+ States
Traveler Information Websites		●				39+ States
Media Partnerships		●				53+ U.S. Metropolitan Areas
Dynamic Message Signs		●				81+ U.S. Metropolitan Areas, CA (Stockton)
Standardized DMS Message Sets/ Use Protocol		●				73+ U.S. Metropolitan Areas, TX (Austin, San Antonio)
Personnel/Equipment Resource Lists			●			75+ U.S. Metropolitan Areas
Towing and Recovery *Vehicle Identification Guide*			●			NJ/PA (Delaware Valley Region), TX (Austin)
Instant Tow Dispatch Procedures			●			WA (Seattle)
Towing and Recovery Zone-Based Contracts			●			TX (Houston)
Enhanced Computer-Aided Dispatch			●			43+ Agencies in U.S. Metropolitan Areas, CA (Los Angeles), NM (Albuquerque), TN (Sequatchie Co.)
Dual/Optimized Dispatch Procedures			●			NJ
Motorcycle Patrols			●			All or Nearly U.S. Metropolitan Areas
Equipment Staging Areas/ Pre-positioned Equipment			●			TN, WI
Incident Command System				●		58+ U.S. Metropolitan Areas, WA
Response Vehicle Parking Plans				●		AZ (Phoenix), CO (Lakewood), IA, MI (Farmington), TX (Lancaster)

Table 1. Task-specific strategies and select implementation locations (continued).

TASK-SPECIFIC STRATEGIES	Detection/Verification	Traveler Information	Response	Scene Management/ Traffic Control	Quick Clearance/ Recovery	EXAMPLE APPLICATIONS
High-Visibility Safety Apparel/ Vehicle Markings				●		CO (Eagle)
On-Scene Emergency Lighting Procedures				●		TX (Austin, San Antonio)
Safe, Quick Clearance Laws—*Move Over*				●		47 States, including CA, FL, GA, IN, TN
Effective Traffic Control Through On-Site Traffic Management Teams				●		CA (Stockton), FL (Southeast), NJ
End-of-Queue Advance Warning Systems				●		CA (Bishop, Los Angeles, Redding, Stockton), NJ (Camden), TN (Chattanooga), UT (Salt Lake City)
Alternate Route Plans				●		62+ U.S. Metropolitan Areas, CA (Anaheim), FL (Northeast), ME/NH, NJ/PA (Delaware Valley Region), WI
Abandoned Vehicle Legislation/Policy					●	21+ U.S. Metropolitan Areas, IN, NC
Safe, Quick Clearance Laws—*Driver Removal*					●	~25 States, including FL, GA, MD, NC, OH, SC, TN, TX, VA, WI
Service Patrols					●	130+ U.S. Metropolitan Areas, AZ (Phoenix), CA, FL, GA (Atlanta), IN, MD, MN, NM (Albuquerque), OR, TN, UT (Salt Lake City)
Vehicle-Mounted Push Bumpers					●	CA (Redding, Stockton), MD (Baltimore), NJ/PA (Delaware Valley Region), OH (Cincinnati), TN (Chattanooga), TX (Austin), UT (Salt Lake City)
Incident Investigation Sites					●	16+ U.S. Metropolitan Areas, TX (Houston)
Safe, Quick Clearance Laws—*Authority Removal*					●	AZ, CA, CO, FL, GA, IL, IN, KY, MO, NM, NC, OH, OR, SC, TN, TX, VA, WA
Quick Clearance/Open Roads Policy					●	35+ U.S. Metropolitan Areas, CA, FL, GA, ID, IN, LA, MD, NV, NH, TN, UT, WA, WI
Non-cargo Vehicle Fluid Discharge Policy					●	FL, MN
Fatality Certification/Removal Policy					●	PA, TN, TX (Austin), WA
Expedited Crash Investigation					●	93+ U.S. Metropolitan Areas, FL, IN, TX (North Central Region), UT
Quick Clearance Using Fire Apparatus					●	TX (Austin)
Towing and Recovery Quick Clearance Incentives					●	FL, GA, WA
Major Incident Response Teams					●	DE, FL, IL (Chicago), LA, MD, NJ, OH (Cincinnati, Columbus), NY, TX (Dallas Co.), WA

Tools and strategies generally reported to be most effective in addressing cross-cutting TIM challenges include the following:

- Agency relations:
    - Routine, periodic "TIM team" meetings to encourage ongoing dialogue among TIM responders, increasing awareness of priorities and roles.
    - Joint agency/jurisdictional protocols and traffic/emergency management centers to formalize agency relations and respective roles in TIM and to demonstrate commitment through common resource/facility investments.
- Training:
    - National TIM training and information clearinghouses/communities of practice to support information dissemination and exchange among various response agencies involved in TIM regarding national best practices.
    - Local multidisciplinary TIM training and associated tabletop exercises/scenarios and after-action reviews/debriefings to encourage joint and effective training among responders and improved TIM operations at the local level.
    - Multidisciplinary TIM response plan/operating procedures to formalize recommended actions in support of future TIM training efforts, enhanced TIM responder competency, and consistent TIM operations.
    - TIM personnel certifications/training requirements to support enhanced TIM responder competency and consistent TIM operations.
- Communications:
    - Common mutual-aid frequency/channel, alternative communications devices, wireless information networks, and an associated standardized communications terminology/protocol to enhance en-route and on-scene communications among responders from different agencies.
    - Mobile unified communications vehicle to enhance en-route/on-scene communications among responders from different agencies for major incidents and emergencies.
- Technology:
    - Expedited standards development process and standards requirements for State procurement to facilitate/encourage the use of standards and subsequently enhance system and component interoperability and minimize life-cycle costs of investments.
- Performance measurement:
    - National performance measurement guidance to lend consistency and consensus to TIM performance metrics at the State and program levels.
    - Annual TIM self-assessment to support identification of TIM strengths and weaknesses and subsequent activities and initiatives to encourage continued TIM improvements at the national, State, and program levels.
    - Strong funding and performance link to ensure that TIM program effectiveness can be demonstrated and adequate attention is given in project funding prioritization.
    - Multi-agency data exchange protocol to enhance data sharing and accessibility in support of TIM performance measurement activities.

- Program resources and funding:
    - Dedicated, ongoing funding, guidelines for Federal/State funding sources, metropolitan planning organization partnerships, and an associated TIM strategic plan to ensure ongoing access to program resources and funding.
    - Efficient/effective TIM resource management to encourage optimum use of existing resources.
    - Executive outreach materials/events to ensure that the effectiveness of TIM programs is adequately demonstrated to decision makers and that TIM programs subsequently receive adequate attention in prioritization of projects for funding.

These tools and strategies, including their institutional area of primary impact and select implementation locations, are summarized in table 2.

Table 2. Cross-cutting strategies and select implementation locations.

CROSS-CUTTING STRATEGIES	Agency Relations	Training	Communications	Technology	Performance Measurement	Program Resources/ Funding	EXAMPLE APPLICATIONS
Routine, Periodic "TIM Team" Meetings	●						GA (Atlanta), MI (Detroit), NJ/PA (Delaware Valley Region), TX (Austin), WA, WI
Joint Agency/Jurisdictional Protocols	●						FL (Southeast), WA
Joint Traffic/Emergency Management Center	●						FL, GA (Atlanta), IL (Chicago), NY (Hudson Valley Region, New York), RI, TX (Austin), UT (Salt Lake City)
National TIM Training		●					National Highway Institute (NHI), Department of Homeland Security (DHS) (National Incident Management System (NIMS)), Consortium for ITS Training and Education (CITE), *Traffic Incident Management Systems*
Information Clearinghouses/ Communities of Practice		●					NTIMC, ResponderSafety.com, I-95 Quick Clearance Toolkit, International Association of Chiefs of Police (IACP) Technology Clearinghouse, International Association of Fire Chiefs (IAFC) Vehicle Safety Resources, FL (Southwest), GA, IN, NV, NJ/PA (Delaware Valley Region), NY, WA, WI
Local Multidisciplinary TIM Training		●					AZ, FL, GA, IN, MD, MI, NC, NJ, NY, OR, TX (Dallas, Ft. Worth), VA, WA, WI
Tabletop Exercises/Scenarios		●					NJ/PA (Delaware Valley Region), MD
After-Action Reviews/Debriefings		●					FL, ME/NH, GA, NV, NJ/PA (Delaware Valley Region), TX (Austin), WI

Table 2. Cross-cutting strategies and select implementation locations (continued).

CROSS-CUTTING STRATEGIES	Agency Relations	Training	Communications	Technology	Performance Measurement	Program Resources/ Funding	EXAMPLE APPLICATIONS
Multidisciplinary TIM Response Plan/Operating Procedures		●					AZ, CT, ME/NH, MA, MN, NJ/PA (Delaware Valley Region), NY, NC, OH, TX (Austin, San Antonio), WI
TIM Personnel Certifications/Training Requirements		●					TRAA, GA, NJ/PA (Delaware Valley Region), NY (Hudson Valley Region), VA
Common Mutual-Aid Frequency/Channel			●				ME/NH
Alternative Communications Devices			●				WI
Wireless Information Networks			●				AR, DC/MD/VA, IL, MA (Westford), MS
Mobile Unified Communications Vehicle			●				IL (Chicago), OR (Tillamook Co.)
Standardized Communications Terminology/Protocol			●				75+ U.S. Metropolitan Areas (Resource Lists), 58+ U.S. Metropolitan Areas (ICS), Institute of Electrical and Electronics Engineers, Inc. (IEEE)/Global Justice XML Data Model (GJXDM)
Expedited Standards Development Process				●			Law Enforcement Information Technology Standards Council (Computer-Aided Dispatch (CAD) Systems)
Standards Requirements for State Procurement				●			Federal Highway Administration (FHWA)(Intelligent Transportation Systems (ITS))
National Performance Measurement Guidance					●		TIM Focus State Initiative (FSI), TIM Performance Measurement Knowledge Management System/Listserv
Annual TIM Self-Assessment					●		75+ U.S. Metropolitan Areas
Strong Funding and Performance Link					●		MD, WA
Multi-agency Data Exchange Protocol					●		CA (San Diego), CO (El Paso/Teller Co.), NV (Clark Co.), TX (Ft. Worth), UT, WA
Dedicated, Ongoing Funding						●	CA, MD, NJ/PA (Delaware Valley Region)
Guidelines for Federal/State Funding Sources						●	FI (Orlando), WI
Metropolitan Planning Organization Partnerships						●	FL, NJ/PA (Delaware Valley Region), TN (Chattanooga), TX (Austin)
TIM Strategic Plan						●	FL, GA (Atlanta), KY, TN, TX (Austin)
Efficient/Effective TIM Resource Management						●	MD (Baltimore)
Executive Outreach Materials/Events						●	GA (Atlanta), National Volunteer Fire Council (NVFC) Cost Savings Calculators

Implementation

When considering the myriad of task-specific and cross-cutting tools and strategies identified in this document, note that in some cases, select TIM tools and strategies must operate concurrently to fully realize the benefits to operations (e.g., DMSs and standardized DMS message sets/use protocol). In addition, this investigation did not consider cost in relation to effectiveness. Low- or no-cost tools or strategies with moderate reported or observed effectiveness may prove to be better implementation options than higher-cost strategies with the same or potentially higher benefits. Consequently, additional information gathering is recommended prior to implementation.

The complete *Best Practices in Traffic Incident Management* document, available for download from the FHWA's Office of Operation's Publications website (http://ops.fhwa.dot.gov/eto_tim_pse/publications/index.htm) supports additional information gathering. At a local, regional, or State level, TIM administrative or operations personnel considering implementation of a particular tool or strategy can refer to the appropriate references for published findings cited in this document or contact TIM practitioners participating in this investigation directly by telephone or email to obtain more information.

At a national level, NTIMC, working in close cooperation with FHWA, provides a unique forum for disseminating the information presented here directly through its website and through participation in various outreach activities and events. Stated goals of NTIMC include promoting and supporting the successful development and conduct of local, regional, and statewide TIM programs through peer networking, mentoring, and knowledge exchange among public safety and transportation professionals, and providing leadership in the development of multidisciplinary best practices, guides, standards, and performance measures in support of sound TIM activities.

As evidenced by the wide range of observed and reported effectiveness for singular TIM tools and strategies among the various participating locales, longer-term efforts of NTIMC, again working in close cooperation with FHWA, should focus on standardizing practices to consistently maximize the effectiveness of TIM efforts. In many cases, this may require additional research to identify the local conditions related to the nature and extent of operation, maintenance, marketing, etc. that have a significant impact on the perceived or measured success of specific TIM efforts. More consistent implementation of TIM tools and strategies will enhance not only the cost-effectiveness of program operation but also its sustainability over time.

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September 2010

Publication FHWA-HOP-10-050x