

Traffic Incident Management Planning: The Case for Mainstreaming

**TRAFFIC INCIDENT
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POWERFUL TOOL FOR
MEETING PUBLIC DEMAND
FOR SYSTEM RELIABILITY
AND SAFETY. IT IS
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IN MARCH 2002, THE AMERICAN Association of State Highway and Transportation Officials (AASHTO), the Intelligent Transportation Society of America and the Federal Highway Administration (FHWA) co-sponsored the National Conference on Traffic Incident Management in Irvine, CA, USA. More than 100 professionals met to discuss concerns about managing incidents on U.S. highways.

The conference focused on identifying key concerns in technical, operational and institutional areas of traffic incident management and developing recommendations for national priorities to address these issues. One of the top recommendations was to integrate traffic incident management needs into highway planning and design.

In the United States, incidents on highways—ranging from flat tires to fatal multi-car accidents—account for as much as 60 percent of congestion-related delay in urban areas and up to 100 percent of delay in rural areas. Traffic incident management programs are designed to return travel lanes to traffic as quickly as possible, significantly improving safety and reducing the exposure of victims, responders and other motorists to secondary incidents or crashes. With this level of return, it is incumbent on transportation system operators to develop comprehensive programs as an integral part of the system planning process and the design and construction of transportation projects.

Effective traffic incident management requires a comprehensive, integrated planning process that involves all potentially affected stakeholders, including traffic engineers, highway maintenance personnel, law enforcement officers, fire and emergency medical responders, towing and recovery operators and a range of other professionals—from federal, state and local agencies as

well as private sector, volunteer and contract agencies—who play a role in incidents and emergencies on the roadway. Representatives from all of these agencies must work together to define common goals, roles, responsibilities and strategies for improving institutional, technical and operational aspects of traffic incident management.

There are two approaches to developing and implementing effective traffic incident management. The first is to identify incident management as a planning priority and develop programs and plans for the existing system. The second approach is to incorporate incident management as a key component of any construction or reconstruction project. The inclusion of a comprehensive program in construction projects supports safety goals for the long term while mitigating traffic congestion during construction.

THE PLANNING PROCESS

A traffic incident management program is a pre-planned, coordinated approach that addresses several key components or phases of traffic incident management, including:

- Incident detection and verification;
- Incident response;
- Motorist information dissemination;
- Incident site management; and
- Incident clearance.

Effective traffic incident management planning follows these standard steps:

Mission. The mission driving an effective traffic incident management program defines the purpose of the effort. One example of a mission might be to create a safe and reliable transportation system.

Goals. Goals are the desired effects of an effort. They provide ways of defining the mission in terms of specific achievements. A common goal of traffic incident management is to reduce delay and congestion caused by traffic incidents on freeways.

Objectives. Discernible outcomes help define opportunities for system improve-

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ment and specific results to be attained. An example of a result might be a 50-percent reduction in average detection clearance time for minor traffic incidents.

Performance Measures. In evaluating how well various alternatives or approaches meet program objectives, performance measures must be developed. Performance measures are most clearly applied in terms of quantifying an objective, but they can be measured in less quantitative ways, such as responder observation or public feedback. A performance measure for detection clearance time could be the monitoring detection clearance time in minutes.

Problems. An integral part of any effective planning process is the determination of problems that limit the ability to meet stated goals and objectives. For example, not meeting detection clearance objectives may be a result of the inability to remove stalled vehicles from freeway shoulders during peak periods.

Needs. The process of defining goals and objectives and identifying existing problems or limitations helps determine program needs in terms of what is lacking. Following the example above, the fact that tow trucks are not readily available on freeways during peak periods may be a contributing factor that could be addressed through resources.

Strategies. Strategies are specific approaches to an outcome or objective. If reduced delay is the goal, one strategic approach might be to provide for quick-response clearance equipment during peak periods.

Alternative Tactics. The development of a traffic incident management program should consider numerous tactical alternatives that address specific objectives and deliver results. In the case of a quick-clearance strategy, a number of alternative tactics could be considered, including towing contracts, public agency "relocation" tow trucks and drop sites, expanded peak period squad patrols with push bumpers, or contracted roving motorist assistance towing patrols.

Program Implementation. Through each step of the process, a combination of tactics and time frames is developed for implementation. This generally includes operational, procedural and technical alternatives combined in a

comprehensive system to support the program mission, goals and objectives.

Program Evaluation. An essential component of any good plan is evaluation. Does the program work? Evaluation applies the performance measures to the program through a scheduled review process. This can be achieved by incorporating adopted tactics into an annualized evaluation program, collecting before-and-after data on specific objectives and building performance monitoring into service contracts.

MULTI-DISCIPLINARY APPROACH

Successful traffic incident management programs depend on strong inter-agency involvement and commitment. To meet the safety and mobility needs of all affected parties, traffic incidents require a high level of collaboration and coordination. All agencies responding to incidents must be involved in program planning to ensure that the program meets their needs and will be implemented in a coordinated partnership.

To maximize the efficiency and reliability of new highways or other transportation facilities, traffic incident management should be an integral component of planning and design. To identify design and infrastructure components that support a comprehensive traffic incident management program, non-traditional partners such as emergency planners and responders must be involved in the planning process. This provides an opportunity to mainstream management applications into project development.

OPPORTUNITIES FOR MAINSTREAMING

Mainstreaming traffic incident management planning requires acknowledgment that incident management is a core function of effective system management and operations. Mainstreaming can take a variety of forms and should be considered when initiating any project that could benefit from reduced delay and improved safety.

Statewide Planning

Statewide planning processes generally are well defined and can incorporate a variety of transportation modes as well as capital and operational considerations.

Long-range state transportation plans can include performance measures and objectives related to traffic incident management. For example, a state transportation plan can reinforce system reliability performance goals with objectives such as:

- All incidents on the state's "backbone" highway network will be cleared in 90 minutes.
- Travel-time variability in work zones attributable to traffic incidents will remain below 20 percent by the year 2020.

For meaningful programmatic acceptance of traffic incident management as a policy priority, state transportation plans must consider the system performance implications of conventional highway improvements alongside traffic operations strategies. The political significance of state transportation agencies is manifest in their inputs to state transportation policy and their role in the administration of federal transportation programs and resources.

States that consider traffic incident management at the level of the state transportation plan also can establish more coherent and efficient organizational provisions. For example, state traffic incident management committees can be established and supported. These committees can promote appropriately scaled regional and corridor programs and can interface and coordinate with other state-level entities such as state emergency management organizations, homeland security agencies and public safety communications committees. Finally, state committees can accelerate the extension of transportation operations planning and program development into multi-state transportation operations programs such as the Gary-Chicago-Milwaukee Corridor and the High Plains Coalition.

Regional Planning

Regional plans focus on large geographic areas that share common characteristics of land use, travel patterns, topography, transportation systems, or other key features. Regional planning often crosses numerous jurisdictional and agency boundaries and requires coordination of various planning goals. It also is migrating from an exclusive emphasis on highway infrastructure deployment and renewal toward a more balanced

and integrated approach that emphasizes multi-modal infrastructure solutions as well as sustained commitment to ongoing operations and maintenance of the surface transportation system.

Regional planning commissions (RPC) and metropolitan planning organizations (MPO) offer a basic inter-organizational entity for sustaining vital operational relationships. These regional relationships between transportation and public safety organizations and between public and private sectors can serve as the cornerstone of effective transportation operations. They can provide the impetus to develop and the means to fully utilize regionally integrated communications technologies for transportation operations. Regional, corridor and statewide intelligent transportation systems (ITS) architectures can support RPCs and MPOs in planning these technologies.

Ideally, RPCs and MPOs sponsor or organizationally incorporate regional traffic incident management programs and associated program administration activities. The resultant planning and program development process links regional transportation planning, regional traffic incident management program facilitation, regional ITS architecture development and administration and the development and management of the local transportation improvement program. A notable model for this role is the Mid-Ohio Regional Planning Commission in Columbus, OH, USA.

A fundamental and essential enhancement to RPCs and MPOs is required to accommodate this emerging role—the aggressive inclusion of public safety and emergency service agencies as peer participants at the regional planning table.

Local Planning and Agency-Level Planning

Local plans focus on specific areas, often under the jurisdiction of a single agency. In addition, specific agencies maintain internal corporate strategic plans, business plans and program plans. Planning at this most basic level can reflect traffic incident management as a priority. For example, a state transportation agency can identify travel reliability and transportation security as core emphasis areas. A set of organizational strategic plans and business

plans can correlate these emphasis areas to performance measures, customer satisfaction, intra-organizational structure and resource modeling and allocation.

Emerging agency-level plans include those that specifically support transportation management centers (TMC) and systems. Agencies need to support established regional ITS architecture concepts, which delineate operational and maintenance responsibilities for ITS infrastructure. Configuration management plans enable the sustained coordination of changes in information technology by tracking and documenting software, hardware and communications infrastructure modifications. Individual TMCs can adopt operations and maintenance plans to guide day-to-day staffing and functions of the center and associated systems.

Each of these TMC-related plans offers the opportunity to open TMC functions and systems to support the multi-disciplinary objectives of traffic incident management. This is particularly critical in the context of public safety communications system interoperability. For example, a regional ITS architecture concept of operations could incorporate limited public safety voice-communications elements. TMC maintenance and configuration management plans could accommodate a portion of the ongoing support necessary for inter-agency radio system patches. These same plans could enable longer-term upgrading of regional wireless communications infrastructure to seamlessly support public safety and transportation voice and data interoperability.

Special events offer another localized opportunity to plan for traffic incident management. Major sporting events, fairs and concerts can precipitate collaboration between adjacent and affected jurisdictions. This collaboration, which often comes with a sense of urgency, can serve as a cornerstone for lasting inter-agency relationships that provide the framework for continued planning for transportation operations and associated traffic incident management elements.

Capital Projects

Further opportunities to mainstream traffic incident management are encoun-

tered as projects are deployed within state, regional and specific program plans. For example, highway improvement projects on high-volume or economically significant interstate highway corridors can include traffic incident management activities as part of traffic impact mitigation measures. Service patrols, intensified electronic traffic surveillance and temporary interagency communications infrastructure can enhance the ability of responding and operating agencies to detect and clear traffic incidents during construction. It may be cost effective to continue some of these features after construction is complete.

Highway improvement projects also may include permanent features within the roadway infrastructure to support safer and quicker traffic incident management. Permanent crash investigation sites can be built to accommodate and protect law enforcement officers or stranded motorists. Roadway shoulders can be designed to accommodate emergency access for crash and disaster response. Enforcement and turnaround accommodations can be introduced consistently or improved based upon input from public safety experts. Communications conduit, cabling and towers can be included selectively and cost-effectively with the deployment of surveillance cameras and traffic detectors.

Corridor Operations Plans

Corridor and area operations plans provide a planning mechanism for traffic incident management and traffic operations. In general, the corridor operations planning process consists of the following steps:

- A region, state, or multi-state area develops a high-level strategic statement of the transportation system's purposes. The role and relative significance of inter-jurisdictional coordination and traffic management system integration are distinguished. For example, a region may recognize the function of its freeway system to support intercity traffic and commerce while providing access to local special events and tourism destinations. Coordination between freeway and arterial operations is critical to these highway

functions and coordination almost certainly would require inter-jurisdictional integration.

- The area's transportation network then can be divided logically into sectors or corridors to focus and localize inter-jurisdictional relationships.
- For each corridor or sub-regional area, geographic, political, economic and community features that are relevant to transportation operations can be identified. For example, a corridor may contain a major shopping center that is partially surrounded by residential neighborhoods and adjacent to a freeway that is routinely congested by commuter traffic.
- For each corridor or sub-regional area, a limited set of typical scenarios can be identified. From the example above, a scenario might be a Saturday morning in December when the shopping center attracts a large volume of holiday shoppers.
- Each scenario within a corridor illustrates what traffic management strategies and associated tactics can be effective. For example, a freeway traffic incident may require a strategy that detours traffic from the freeway to a downstream entrance ramp. Tactics that support this strategy may include pre-positioned traffic barricades and static signs that can be deployed readily by police or highway maintenance personnel. Tactics also may include traffic-responsive signal systems and settings along parallel arterial highway routes.

The aggregation of strategies and tactics derived through this process constitutes the core of a corridor or area operations plan. These plans can trickle down into features within highway improvement projects, or the plans can bubble up into traffic operations components or layers of regional and state transportation plans.

MOVING FORWARD

There are several current developments at the national level that will support more universal, consistent and mainstreamed planning for traffic incident management.

- The AASHTO Standing Committee on Highways has expanded its Subcommittee on Advanced Transportation Systems into a Subcommittee on System Operations and Management. One of the working groups focuses on traffic incident management, emergency response, work zones and weather safety. This Traffic Incident Management Working Group is in an ideal position to support and pursue recommendations of the AASHTO Traffic Incident Management Conference conducted in March 2002.
- The U.S. Department of Transportation's ITS Public Safety Advisory Group continues to lead the dialogue on ITS aspects of traffic incident management. The Public Safety Forum recently was formed to support the group. It will provide a flexible working environment to expand and advance the agenda for the group.
- The National Public Safety Telecommunications Council (NPSTC) has formed the National Task Force on Interoperability (NTFI). NPSTC is a formal collaboration between the public safety and transportation communities. NTFI is producing a national action document to promote planning for public safety communications system interoperability. NTFI supports sustained partnerships between transportation and public safety communities at regional and state levels.
- The Transportation Research Board's (TRB) Future Strategic Highway Research Program (F-SHRP) Reliability Panel is one of four panels setting the agenda for transportation research and technology transfer for the next decade. The panel emphasizes research needs for the successful implementation of regional traffic incident management programs. The emerging research agenda includes proposed projects to address on-scene and technological and institutional aspects of traffic incident management practices and programs.
- The ITE Traffic Incident Management (TIM) Committee of the ITS

Council is actively involved in shaping the dialogue and direction of traffic incident management planning. The TIM Committee and the TRB Freeway Operations Committee co-sponsor an annual, one-day traffic incident management workshop in conjunction with the TRB Annual Meeting.

- The FHWA Office of Operations is working to foster better regional transportation operations collaboration and coordination. A new report introduces formal collaborative activity for transportation managers and public safety officials from cities, counties and states within a metropolitan region. The document is available online at www.ops.fhwa.dot.gov.

Clarity on the principles of traffic incident management planning and coordinated national support offer dramatic new synergies for improved transportation system reliability, safety and security. ■



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