


Project Bulletin 4160-17B

Project 0-4160: Operating Freeways with Managed Lanes

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Incident Management for Managed Lanes



Much has been documented regarding traffic incident management for general purpose lanes on controlled-access highways. Incident management for general purpose lanes and for managed lanes share many of the same goals; consequently, many of the techniques, policies, and procedures are the same for facilities of both categories.

In the context of this research, “managed lanes” can include any type of lane that maintains free-flow travel speeds on designated lanes or facilities by providing managed access to participating groups of vehicles. Examples could include any or various combinations of the following:

- express lanes,
- HOV lanes,
- HOT lanes,
- exclusive lanes,
- bus lanes, and
- lane restrictions.

Among the various principles for incident management for general purpose facilities,

perhaps the most important is the development, and maintenance, of relationships between key individuals from each of the involved agencies. While it may not be uncommon for the heads of agencies (e.g., local and state law enforcement, local and state transportation departments, transit agency, etc.) to meet periodically during the normal course of events, this type of interaction cannot take the place of familiarity and healthy working relationships among operations staff members from these and other critical agencies.

In addition to working relationships, another characteristic of successful incident management programs is the use of various types of agreements, including mutual-aid agreements, hold-harmless agreements, wreckage clearance policies, etc.

These and various other elements of incident management programs are common to successfully minimizing non-recurring

congestion due to freeway incidents in general purpose lanes. These elements are also common to incident management programs for managed lane facilities.

In addition to these incident management elements, the unique features of various types of managed lanes introduce additional aspects to incident management.

What We Did . . .

The purpose of this task was to identify incident management policies and procedures that are critical to facilities with managed lanes and provide agencies with recommendations on best practices. To gather information from managed lanes operators and other interested parties from around the nation, the research team developed an incident management survey and disseminated it online.

The task team assembled an advisory committee of personnel from TxDOT, HCTRA, METRO, NTTA,

and DART. The committee provided input on the development of the survey instrument and commentary on the findings from the survey recipients' responses.

In addition to conducting a thorough literature review, the research team conducted an incident management survey that was distributed to an on-line national audience, including individuals who serve on incident management committees and task forces in numerous locales and with multiple professional associations. This group includes representatives from state and local departments of transportation, state and local law enforcement, fire and emergency medical services departments, transit agencies, towing firms, and other entities involved in incident management.

The survey was structured such that the respondent could provide input for each type of managed lane, including express lanes, high-occupancy vehicle lanes, toll lanes, high-occupancy toll lanes, truck lanes, truck-restricted lanes, transit lanes, and other. The survey included the following sections:

- general information on managed lanes facilities;
- incident management for managed lanes;
- emergency vehicle use of managed lanes for incidents in general purpose (GP) lanes;
- GP incident diversion into managed lanes;
- questions for agencies without plans for diverting GP traffic into managed lanes during GP incidents; and
- final comments.

The receipt of the survey results was followed by some limited telephone interviews from selected incident response team members for clarification of their responses to survey questions which required narratives.

What We Found . . .

Many incident management tools for general-purpose lanes apply to incidents in managed lanes as well. Among these are the use of intelligent transportation system (ITS) incident detection and verification technologies; the use of dynamic message signs, highway advisory radio, and other means of motorist communication; team building and relationships among multiple agency personnel; etc.

However, a number of these tools have different impacts for facilities with managed lanes. They include:

- impact on managed lanes of public notification of incidents,
- incident responder access path to the incident scene,
- impact of adjacent roadway incidents to managed lane operations,
- general-purpose traffic diversion into managed lanes,
- pre-positioned response crews,
- blocking a managed lane to create a safe work area, and
- mutual aid agreements between managed lane agencies and general-purpose lane agencies.

The Researchers Recommend . . .

Then following subsections describe the impacts of the aforementioned incident management tools on facilities with managed lanes in operation.

Multi-Agency Cooperation

Where the make-up of the incident response team for the managed lanes is different from that of the nearby general purpose lanes, the potential for poor incident management is heightened. As an example, where an incident on, or immediately upstream of, the ramp to the managed lanes is within the purview of an incident response

team that does not have jurisdiction over the managed lanes themselves, the operational efficiency of the managed lanes can suffer, yet the incident response team that is handling the incident may have no accountability to the agency operating the managed lanes. This scenario has financial implications for managed lanes where revenues are generated, e.g., HOT and toll lanes.

Conversely, where an incident in the managed lanes impedes access to the general purpose lanes or frontage road, and the incident response teams differ for the two types of lanes, there is potential for the operations of the general purpose lanes to suffer by the actions of a team that has no accountability for traffic operations in those lanes.

Ideally, the incident response team roles (e.g., policy, fire, emergency medical services, traffic operations, etc.) for the managed lanes team are filled by the same agencies as those for the general purpose lanes; although because different agencies can have different goals, this is not always the case. In these circumstances, the negative potentials within these scenarios can be mitigated through multi-agency cooperation. Such cooperation can include mutual aid agreements, hold-harmless agreements, quick clearance policies, abandoned vehicle policies, post-incident briefings, shared information, etc.

Public Notification of An Incident

Sometimes public notification of the clearance of the incident does not happen as rapidly as the notification of the onset of the incident. This delay or omission is likely due to a presumption that the clearance notification is less critical. However, the likelihood that a motorist will choose to use the

managed lanes can be significantly reduced as the website and media report that the managed lanes are congested due to an incident in those lanes. Continued reporting of this message after the incident has been cleared reduces the usage of the managed lanes. In cases where the managed lanes are toll or HOT lanes, the erroneous continuation of an incident report, after it has cleared, can unnecessarily create adverse impacts on revenues. This result is in addition to the congestion implications of managed lane-eligible motorists electing to forego the managed lane option and choosing to join the congested general purpose lanes.

It is recommended that communications to the public regarding the clearance of an incident in the managed lanes be delivered quickly, just as with messages regarding the beginning of the incident. As with incident management for non-managed lanes, incident management for managed lanes should include coordinating statements to the media through a designated incident response team member, e.g., state department of transportation public information officer. In addition, this designated public information officer should provide regular briefings to other incident response team agencies.

Pre-Positioned Response Vehicles

Many incident response teams on non-managed lane facilities use contracted towing companies to clear wreckage from the scene where involved vehicles have become inoperable. The expense of pre-positioning tow trucks at strategically selected locations throughout the corridor is deemed prohibitive.

However, this expense may be worth considering for managed lane

facilities that generate revenue. Depending on the specific financial details of a managed lane facility, it may be that the cost of pre-positioning tow trucks, or other response vehicles, is offset by the more rapid response to an incident. If the incident is cleared more quickly and the incident-induced congestion is thereby minimized, then potential toll-paying motorists may choose to use the HOT or toll lane more often. The consideration of deploying pre-positioned tow trucks is an issue of travel time reliability and the resultant beneficial impact on toll revenues.

Creation of A Safe Work Area

When incident response teams arrive at a scene where a one-lane incident is sufficiently severe, it may require that a second lane be closed to create a safe work area in which the team can maneuver. Where this situation occurs on a facility that includes a non-barrier-separated managed lane, e.g., a concurrent flow HOV lane, and the one-lane incident occurs in the general purpose lane immediately adjacent to the managed lane, a question arises regarding which lane should serve as the second closed lane for the incident response team.

If the managed lane is closed (see Figure 1) to create the safe work area, then the managed lane traffic must merge to the right, into the general purpose lanes. This channelization temporarily eliminates the benefits of the managed lane, and it may involve the merging of traffic from a lane operating at higher speeds into lanes operating at lower speeds. The

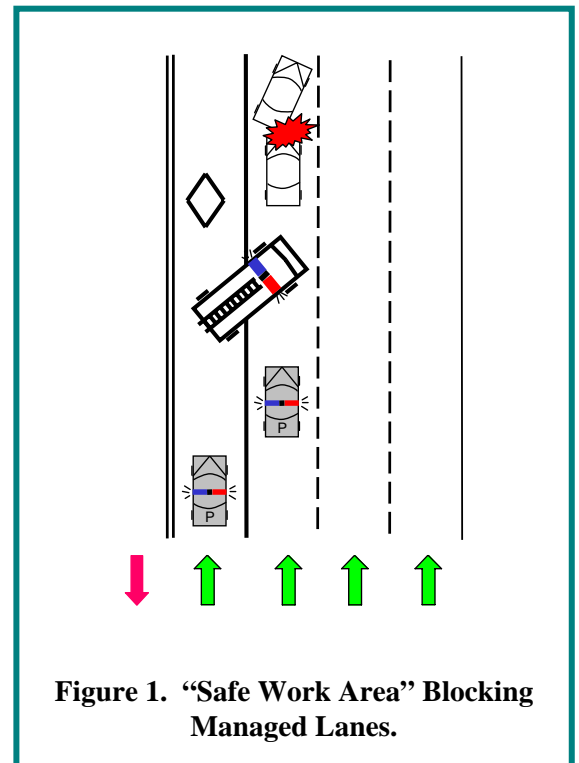


Figure 1. “Safe Work Area” Blocking Managed Lanes.

result offers the possibility of secondary collisions.

The alternative is to keep the managed lane open and close the lane to the right of the incident lane. This channelization results in the “safe area” being a temporary island with moving traffic on both the right and left sides of the incident scene. Incident response teams report that the island concept should be avoided, for the safety of everyone involved at the scene.

Response Vehicle Access

Where managed lanes are separated from general purpose lanes by a barrier, access to an incident, when congestion levels are high and speeds are slow, can be achieved via traveling on the shoulders. Where the best route to an incident scene is via the lanes on the opposite side of the barrier from the incident, emergency response vehicles can benefit by the use of emergency access points in the barrier.

Discussions with incident response team personnel argue against directing response vehicles

to travel in a contraflow direction in a managed lane even when it is one-lane, barrier-separated, and the lane is completely blocked. Opposition to response vehicle contraflow is based on the high cost (head-on secondary collision) of making an error in reporting that the lane downstream of the incident is clear for a “wrong way” approach. The time required to achieve a sufficient level of certainty may be too great for the contraflow approach to be worthwhile as a time saver. Consequently, unless the managed lane downstream of the complete blockage is absolutely devoid of other moving vehicles it is recommended that incident response vehicles access the incident scene without traveling in a contraflow direction. The exception to this recommendation is the completely blocked, one-lane, barrier-separated facility that has excellent coverage by CCTV cameras and is actively monitored by traffic management center personnel. In this case, emergency vehicle contraflow access to an incident scene may be accomplished with a sufficient level of safety to the responders.

Diversion to Managed Lanes

The first recommendation regarding the diversion plan is that it be developed by all the relevant parties, including all the agencies on the incident response team. Typically this team should include the state department of transportation, state law enforcement, transit authority, incident response team, fire department, hazardous materials team, freeway service patrols, emergency medical services, local government traffic engineering, towing companies, medical examiner, the designated agency’s public information office, etc.

The diversion plan should provide for the elimination, or curtailment, of the usual managed lane user eligibility criteria during incidents in the general purpose lanes. These eligibility criteria include vehicle type restrictions, occupancy restrictions, and toll payments.

It is recommended that the diversion plan be deployed if an incident has blocked, or will block, traffic for a specified duration, e.g., 10, 15, or 30 minutes. One managed lane facility operator reported that since they introduced a 10-minute minimum threshold, the managed lane users have issued fewer complaints regarding sharing the lane with general purpose traffic. Agencies report that once the general purpose traffic is allowed to divert into the managed

lanes, it is very difficult to “turn it off.” Consequently, the specific threshold should be selected based on facility experience. It may be necessary to select the minimum duration such that the frequency of diversion plan deployment is not so often as to motivate managed lane motorists away from regularly using it.

Where the managed lane’s physical features and communications infrastructure can support it, it is recommended that the diversion of general purpose traffic into the managed lane cease prior to its reaching an unacceptable congestion level.

For More Details . . .

Related Report:

Report 4160-17, *Incident Management on Managed Lanes*.

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