

be. It is hoped that this review of what can be done, and what is being done by some agencies, will help illustrate the role of incident detection and response in operating urban freeways.

## INCIDENT MANAGEMENT

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Every day, the flow of traffic on our freeways and streets is slowed as the result of incidents -- everything from vehicle stalls, flat tires, spilled loads, accidents, major events with large crowds, to maintenance/construction activities. And every day, the resulting congestion and additional accidents are costing the travelling public millions of dollars. During one calendar year in the Los Angeles region, there were 220 incidents which caused major blockages of freeway lanes. Delays and secondary accidents are costing Los Angeles freeway drivers a staggering \$60 million each year. Clearly, it is a problem that demands attention.

Yet, in many areas, little or nothing is being done to deal with the problem. In fact, there seems to be an attitude that this is just one of those things that must be accepted and about which little can be done. Such is not the case -- plenty can be done.

Further analysis of delays caused by accidents or other lane blockages in Los Angeles revealed the critical nature of the time required to remove the obstruction and restore full roadway capacity. During off-peak hours, each additional minute taken to correct the problem will extend the duration of congestion by four or five minutes. In peak periods, this factor often soars to fifty to one, or more.

Clearly, then, any program to deal with the problem should focus on cutting this total time -- the time to detect that a problem has occurred, the time to move forces into the field to deal with the problem, the time to make decisions and implement diversion routes, the time to clear obstructions and restore capacity, the time to make necessary repairs to the roadway, the time to dissipate congestion and return traffic flows to normal.

It is essential that advanced planning for incident management take place. Detour plans need to be developed, teams need to be organized, equipment assembled, and procedures established. These all need to be in place in order to respond quickly and effectively.

Virtually every segment of the freeway and street system should be closely analyzed to determine how traffic will be diverted, and to which surface streets it will be detoured. Working together, the State and local enforcement and traffic engineering agencies need to examine such things as diversion routings, signal timing, manually controlling intersections, and parking restrictions, and to develop a plan to handle detoured traffic. As a part of this planning phase, it is essential that involved agencies "buy in" to the plan, and commit to implementing their portion of the overall plan when the need arises. Periodically, these plans need to be reviewed and updated as street patterns and traffic conditions change over time.

An incident management program cannot be truly successful unless there is a cooperative, coordinated attitude on the part of each of the agencies involved. The working relationship between the traffic engineering, the maintenance, and the enforcement organizations is particularly critical. All have a legitimate responsibility and authority at an accident scene; all have resources to help correct the situation and get traffic flowing normally again. Local agencies need to be included, too -- detoured traffic will frequently be operating on city streets. A host of other authorities will also be involved; fire departments, tow truck services, ambulance services, etc. The key is to get together before an emergency and to plan how each agency can coordinate its necessary work with that of the other members of the team, all working toward a common goal. And keep in mind that, from a traffic flow point of view, the goal is to get things back to normal as quickly as possible.

Invariably, with this kind of informal multi-disciplinary team, the question will come up: "Who's in charge?" In Los Angeles, our answer is that no one agency is in charge; consensus decisions are made by the team. This may fly in the face of some organizational theorists, but in the real world, it works well.

The California Department of Transportation's incident response teams in Los Angeles are comprised of about two dozen volunteers, all with a traffic engineering background and all of whom have other regularly assigned duties in the Traffic Operations functions. Teams operate similar to a volunteer fire department -- members take equipment (vehicles, sign trucks, signs, flares) home with them, are on call 24 hours a day, and go into action whenever an incident will block two or more freeway lanes for two or more hours. Team personnel, along with police, maintenance, and other emergency personnel meet at the incident site and actively manage the situations. An on-site command post is set up. Clearing the wreckage, repairing damaged facilities, detouring traffic, and keeping the public informed of the situation are carried out in a coordinated manner.

The primary responsibility of the Caltrans' traffic engineer team member is to expedite the safe and orderly movement of traffic through and around the incident. As a first step, he will take a lead role in determining the alternate routes to use; he then carries much of the responsibility to implement the selected detour plan. Appropriate barricading must be placed, changeable message signs (both truck-mounted and stationary) need to be activated to divert traffic, signs need to be placed along the detour to reassure motorists, intersection controls must be implemented. Traffic conditions then need to be continuously monitored, and appropriate adjustments in the plan need to be made.

In Los Angeles, the Caltrans/Highway Patrol traffic operation center becomes a key tool in managing traffic at the incident. Traffic conditions on the freeway system are monitored and relayed to the team, changeable message signs to support the incident management plan are activated, traffic advisories are sent to radio stations for broadcast, and helicopter surveillance of the incident site can be initiated.

An effective program to manage incidents is going to cost some money; personnel costs, training costs, equipment costs. But you can expect that the resulting savings in delays and in related secondary accidents will far exceed those costs. Based on over ten years' experience in the Los Angeles district, Caltrans has seen a five or six to one benefit/cost ratio. Last year, Caltrans' field operations for responding to major incidents cost about \$115,000; of that

amount, over \$72,000 has been recovered from those parties which caused the accidents. During the same period, savings to the public resulting from reduced delays totalled over half a million dollars. The resultant benefit/cost ratio was about twelve to one.

The same kind of incident management can be effectively used at "planned" incidents -- major events attracting large crowds, recurring spot congestion locations, construction/maintenance activities. Use of many of the same techniques and procedures (teams, alternate route plans, diversion, etc.) can produce significant reduction in delays which result from these events.

Incidents on the freeway system cannot be eliminated -- neither can the delays associated with those incidents. Delays and secondary accidents due to congestion can be markedly reduced, however, using well thought-out, proven incident management techniques. That is exactly what is happening in Los Angeles -- and it is paying off.

## TRAFFIC MANAGEMENT TEAMS

This presentation, the text of a booklet by D. Ray Derr, "Traffic Management Teams in Texas", is available from: State Department of Highways and Public Transportation, Safety and Maintenance Operations Division, 11th and Brazos, Austin, Texas 78701

### Introduction

The first Traffic Management Team in Texas was officially formed in 1975. By 1980, there were five teams and there are currently twelve operating in the state. These teams cover the seven largest metropolitan areas and the nine largest cities as well as other smaller areas. The rapid spread of the team concept and the wide acceptance among the large cities in Texas lead us to believe that it is a very beneficial organization.

The team brings together professionals from the various traffic-related agencies in the area and helps them to work together to solve the area's traffic problems. Essential to the team's successful operation is the communication, coordination and cooperation which can be realized through working side by side on the team.

### What Does a Traffic Management Team Do?

A Traffic Management Team improves the overall traffic operation and safety in an urban area's corridors by coordinating the activities of the principal operational agencies in the area (Figure 1).

### What Is A Corridor?

A corridor is a system of roadways which interact and serve as alternate routes to each other. Corridors can consist of two or more parallel streets or a freeway with parallel streets. All cities have several different corridors serving different origins and destinations which intertwine and change in size depending on the time of day and day of the week. Any change made to the capacity of one element of the corridor affects the others by