PROBLEMS AND SOLUTIONS IN ESTABLISHING FREEWAY INCIDENT MANAGEMENT

C. L. Kurtzweg, Washington State Department of Transportation

Introduction

Freeway incidents, capacity-reducing events, take many forms. The most common are accidents, disabled vehicles, and material spills that occur randomly throughout the highway network. The less common incidents are planned lane closures for construction and maintenance activity. In the Seattle area major planned incidents are more difficult to manage than emergency situations.

In an emergency environment, incidents are handled in the Seattle area by mobilizing support from response groups. The Washington State Patrol is the lead agency for incident management on freeways. Necessary support is provided by the Department of Transportation, Local Fire Departments, medical service groups, towing companies, and local police agencies. Motorist information is provided by commercial radio and TV stations, which includes five traffic reporters in aircraft during peak traffic periods.

While no formal incident management team exists, emergency response procedures work well because of the availability of highly professional, competent and well-managed emergency response agencies. Communication channels and areas of responsibility are well established. Agencies react quickly and mobilize the equipment and skills necessary to get the job done.

For major planned incidents, the lead agency is the Department of Transportation. Traffic impacts are of longer duration, spreading over days rather than hours. Normal emergency communication channels do not apply. Instead, DOT engineering staff rather than normal emergency response staff are used.

The need for different procedures for major planned incidents became very apparent during the construction closure for I-5 resurfacing during the summer of 1984.

The primary needs were:

1) Maximizing capacity of available alternative traffic routes, some of which involved city arterials.

2) Maximizing potential modal shifts to high occupancy vehicles.

3) Providing a high level of information to motorists prior to and during major closures.

To meet these needs, different communication channels and interagency agreements proved necessary. Unique driver information techniques were also necessary.

The Project Area

Interstate 5 is the major commuter facility running north-south through Seattle. This section of I-5 is the most heavily traveled corridor in the state. Average weekday traffic (AWDT) through this section is 210,000 vehicles/day, with 94,000 vehicles/day using the northbound roadway. The Washington Department of Transportation resurfaced the northbound lanes of Interstate 5 on the Ship Canal Bridge and the Lakeview/Galer Viaduct in the City of Seattle.

The city of Seattle has a predominantly north-south geography bound by Puget Sound to the west and Lake Washington to the east. I-5 is one of five routes to cross Lake Washington Ship Canal. The Ship Canal connects Lake Washington with Puget Sound and divides the central and south portions of the city from North Seattle. Alternative routes crossing the Ship Canal include State Route 99, a six-lane principal arterial, a four city arterials. I-5 includes a separate reversible roadway which is an 8-mile-long facility that runs from Seattle's Central Business District to the north. This reversible roadway operates southbound during the morning and northbound during the evening.

Project Description

Construction of this section of I-5 was completed in 1965. High traffic volumes and the seasonal use of studded tires have reduced the original concrete thickness of the bridge deck slabs to the point where steel reinforcing bars were exposed. Use of salt to remove snow and ice from the roadway has also resulted in chloride intrusion into the bridge decks.

The Ship Canal Bridge and the Viaducts between Lakeview Boulevard and Denny Way were selected for resurfacing in 1984 and the southbound lanes scheduled for the summer of 1985.

The project had three construction phases. The first (deck repair) and the final cleanup phases were completed during night and weekend hours to minimize traffic impacts.

The second phase required 24-hour lane closures of half of the structure (2 lanes). This phase consisted of final preparatory work, placing latex-modified concrete, and allowing a minimum of 96 hours curing time. During phase two, two lanes were closed, reducing capacity of the roadway from 7,600 vehicles per hour to 3,000 vehicles per hour. This required 36,400 vehicles per day to be diverted to other routes. The total duration of this phase was 48 days.

Traffic Control Plan

The goal of the traffic control planning effort was to minimize adverse traffic impacts, maintain safety, and provide a condition for efficient construction operations. The availability of the reversible lanes and a strong transit/vanpool organization in Seattle were key tools in maintaining adequate commuter mobility through this region during the project.

The reversible lanes, which are below the mainline roadway across the Ship Canal Bridge, had sufficient capacity to divert substantial northbound traffic. The capacity of the reversible lanes across the Ship Canal was maximized by construction of a crossover from the reversible roadway to the northbound mainline roadway to avoid the bottleneck area.

The operation of the reversible lanes was also modified to better serve the northbound traffic. The section operated southbound between the hours of 5:30 a.m. and 9:30 a.m., and for the remaining hours, including weekends, operated northbound.

The change in access and operating hours accommodated up to 28,000 of the total diverted vehicles.

Diversion routes both parallel to I-5 and to alternative freeway access points are within the jurisdiction of the city of Seattle. Early in the planning coordination meeting, an agreement was developed to provide City of Seattle services to include:

Police Department personnel to ensure traffic control at selected on- and off-ramps and on heavily impacted city streets.

Coordinated detouring by the Seattle Engineering Department onto city streets and retiming of traffic signals on major arterials and certain off-ramps.

Provision of Office of Citizen Participation and Seattle Engineering Department by the informational support with news releases, attendance at community meetings, and referral of appropriate issues to DOT.

High Occupancy Vehicles (HOV) were the key to moving the most people possible through the construction area. To maximize the use of transit and carpools, one downtown on-ramp to northbound I-5 was restricted to HOV use. (A second ramp is normally reserved for HOV use only.)

A formal agreement was prepared with Metro transit, the regional transit agency for King County. This agreement provided extra bus service to the most severely impacted areas of the city, promotional pieces about the extra service during the resurfacing, extensive use of Commuter Pool's contacts in the business community and media, attendance at community meetings, and many staff hours of promotional planning.

Much of the traffic management success of the resurfacing project can be attributed to these coordination efforts. Not only were all agencies aware of and contributing to the mitigating traffic measures, but the information about the resurfacing project always included references to taking the bus, joining a carpool, and using alternate routes through the project area. Presentations to community groups were conducted by DOT staff, with representatives from Metro, Commuter Pool, and the City of Seattle. The presence of these agencies presented an organized, united appearance to the community at large.

Information to motorists included general information to encourage diversion and real-time information to identify incidents.

To inform motorists of construction activities, WSDOT installed five Highway Advisory Radio stations in the Seattle area. These low-powered radio stations gave motorists pertinent information, and encouraged use of alternate routes. They advised northbound traffic to divert to SR 99 and to the reversible lanes, and to use I-405 to divert northbound traffic around Seattle. Their effectiveness was reduced, however, due to equipment problems that resulted in poor signal quality in some areas.

WSDOT has an operational Surveillance, Control, and Driver Information system, known as the FLOW system, which operates in the I-5 section resurfaced. State traffic engineers monitored traffic and coordinated operations during the project through use of the system's closed-circuit television cameras and vehicle detectors.

The Seattle area has five "sky pilots" who give daily peak-period traffic reports for local radio stations. Radio communication to these airborne reporters permitted broadcasting of accurate, up-to-date information for guiding motorists over the best available route around the construction area.

This type of information is commonly provided for construction and maintenance activities. Because of the duration of the resurfacing project and the need for greater public information, additional temporary staff was hired to develop and execute a public information program.

Public Information Program

The objective of the Public Information Program was to inform the public of the resurfacing work on I-5. Three groups were identified to receive resurfacing information: a) drivers of I-5, particularly commuters from the Northend and Eastside; b) neighborhoods and businesses that experienced increases or decreases in traffic; and c) businesses and events whose customers were impacted by the anticipated congestion.

Three printed items were used during the project:

1. The primary piece was a general brochure that outlined the resurfacing work, answered general questions, and included maps of the project area and reversible lanes access, and gave information on expected traffic conditions. Also included were phone numbers to call for information about the resurfacing, bus routes (Metro), and carpool/vanpooling (Commuter Pool).

2. A poster giving the Resurfacing Hot Line Information Number to call for current information was displayed at work places, in libraries, community centers, grocery stores, etc.

3. A resurfacing letterhead was produced and used in a variety of ways, including news releases.

The Information Plan consisted of three stages, each having a media mix that would get special information to target groups.

Stage One:

A news conference was held and well-attended by TV, radio, and newspapers. The news conference was scheduled to coincide with a public hearing called by the Seattle Public Health Department. The Health Department was hearing testimony from the public on the noise variance requested by the Department of Transportation for the road preparation work to be done at night. As a result of the public hearing, the Department of Transportation received a noise variance.

Other information efforts included sending letters to all community groups in the impacted area explaining the resurfacing and offering to meet with them. Interviews with newspapers, radio, and TV stations were conducted.

Stage Two:

The next stage immediately preceded the beginning of the resurfacing work. At this time, information was distributed to all groups in the form of the general brochure with information relevant to specific neighborhoods. The operation of the Resurfacing Hot Line Information Number, publicized in all printed materials, began.

A special flyer was distributed to neighborhoods impacted by the noise of the night grinding work. News releases gave all media current information, with an emphasis on communicating with the air traffic reporters. Letters and brochures were sent to groups with a need for specific information: transportation services (trucking and taxi companies, delivery services), public office holders (mayor, congressmen, state senators), emergency services (police, fire department, ambulances), and day care centers throughout the resurfacing area. Commuter Pool's Employee Transportation Coordinators distributed information to people working in downtown Seattle and large companies in South Seattle. Articles about the resurfacing were published in local newsletters, including those produced by the Boeing Company, Automobile Association, and the University of Washington.

Stage Three:

The final stage was during the actual resurfacing period. The Department's objective was to have up-to-the-minute information available to anyone interested in having it.

In addition to the Highway Advisory Radio System, a Resurfacing Hot Line provided real-time information. Over the construction period more than 4,000 calls were received. Of these calls, only 61 were complaints; the remaining calls requested information.

Response to the resurfacing project was mixed. The media generally displayed a "necessary evil" attitude.

Of all the information requested the strongest response occurred before work began, and it was from neighborhoods adjoining the areas to be resurfaced; not in regard to traffic congestion, but instead on the noise anticipated to be caused by the night work.

Evaluation

The I-5 construction incident management program was a success. Average weekday traffic through the construction dropped by over 32,000 vehicles. Of this decrease almost 13,000 vehicles diverted to the reversible lanes and a similar number diverted to a major arterial parallel to I-5. The remaining 6,000 trips changed modes, diverted to other routes or were simply not made. No facility was overloaded by this diversion and few complaints were noted concerning intolerable travel time.

Project success was attributed to management techniques that brought together engineering, enforcement, and public information skills of affected jurisdictions. Without the agreements that led to direct involvement by the City and Metro, the smooth diversion of major volumes of traffic could not have taken place. The project would not have succeeded without the extensive public information that was provided.

The public information program not only provided motorists with route diversion information, but it also gave the traffic control plan "credibility." The direct involvement of the DOT and local agencies led to the public perception that everything possible was being done to mitigate the impacts of the project.

CASE STUDIES AND WORK SESSIONS

Three case studies were presented during the afternoon session of the Specialty Conference. Each case study was studied by two groups of about 10 people each for about 30 minutes. Each group was responsible for reviewing and discussing what actions could be taken to alleviate the potential traffic flow disruption caused by the incident.

Based upon the problem statement, their assumptions (if any), their experience, and the knowledge they gained from the morning sessions, the individual groups were asked to recommend the single action plan they thought would be the most responsive and appropriate for the incident problem described. The groups were asked to identify the traffic control plan and the related field equipment and support staff needed.

Subsequent to the 30-minute study periods, representatives for each group made 10-minute presentations on their problem and recommendations. The purpose of the case studies was not to develop the optimum or best implementation plan; but instead it was to provide the group participants with some insight about the value of having had well thought-out plans ready to implement.

Each of the case examples were for incidents that occurred on major interstate freeways with disruptions affecting peak travel periods. Two of the incidents involved spilled loads. One was a hydrochloric acid spill that occurred in a high-density area on a 12-lane freeway; the other was a spilled load resulting from the collapse and breakage of a tractor semitrailer carrying over 45,000 pounds of shredded paper on a 6-lane beltway-type freeway around a major urban area. The third incident involved an oversized load which struck an overhead pedestrian bridge, the impact of which moved the bridge deck from its pier support. This traffic disruption was on a major 8-lane urban freeway.

While none of these incidents had any associated fatalities or incidents, they all produced monumental traffic disruptions and delays. They also served well as case study examples, largely because each differed greatly in terms of the incident, environment, traffic and roadway conditions, and resources available.