



South Carolina
Department of Transportation



U.S. Department
of Transportation

**Federal Highway
Administration**

PROJECT SUMMARY

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South Carolina
Department of Transportation
1406 Shop Road
Columbia, SC 29201

Benefit Cost Analysis of Accelerated Incident Clearance

Overview

Highway incidents bring unexpected harm to both the traveling public and the community. Consequences from these incidents include traffic congestion, increased fuel consumption, and more air-polluting emissions. Moreover, a single incident can cause traffic delays that can result in equally devastating secondary incidents. By nature, incidents are unpredictable, caused by occurrences such as traffic crashes, adverse weather conditions, spills from trucks (possibly hazardous materials), and short-term unscheduled construction work. Therefore, minimizing the disruption these unusual events cause to the transportation system poses a formidable challenge to agencies responsible for assisting victims and returning traffic to normal flow.

Incident management addresses this type of non-recurrent congestion by shortening the duration of incidents to reduce their negative impacts on both highway travelers and the environment. Minimizing the time needed to return a highway to normal flow can greatly reduce delays and the occurrence of secondary incidents.

This study examined the current state of the incident management industry in the US by reviewing the available published literature, and by launching a nation-wide survey of multiple incident management agencies. The study also evaluated the specific impact of traffic incident management on both motorists and the environment on South Carolina freeways by using traffic simulation and benefit-cost analysis.

Analysis of Survey

An analysis of survey responses revealed that technologies such as traffic cameras, dispatched personnel, and freeway service patrols were the most successful in detecting and verifying incidents. Survey results also found that an efficient and comprehensive incident management program should have dump trucks, sweepers, air-cushioned recovery system, cranes and heavy-duty tow trucks available for clearing incidents. The respondents also emphasized the importance of institutional coordination, and effective communication methods to the public and to decision makers for a successful incident management program.

Impact Analysis

The researchers examined the effectiveness of using traffic sensors, traffic cameras, freeway service patrols, and a multiple-strategy approach. The measures of effectiveness for this simulation analysis included delay, fuel consumption, and emissions. All of the scenarios showed significant reductions in motorist delay, vehicle fuel consumption, and emissions.

Two special cases examined i) severe crashes that required route diversion and ii) minor incidents under the “Steer-it, Clear-it” law, which requires that drivers involved in such minor incidents move their vehicles from travel lanes. Although “Steer-it, Clear-it” provided smaller benefits per incident than other analyzed scenarios, the impact of this law was found to provide significant annual benefits if the SCDOT advertises it and drivers comply, because minor incidents occur much more frequently. Route diversion produced the greatest benefits per incident, because the incidents requiring this strategy are usually the most severe. However, route diversion also requires significant resources, such as dynamic message signs and personnel in the field on alternate routes for directing diverted traffic.

Benefit Cost Analysis

Benefit-cost analysis justified investment in incident management. Analysis results indicated that freeway service patrols produced \$11 of benefit for every dollar invested. Using traffic cameras to detect and verify incidents produced \$12 of benefit for each dollar invested. Using traffic sensors to detect incidents and traffic cameras to verify incidents produced \$7 for every dollar invested. While the multiple strategies scenario, representing a combination of above strategies and telephone calls by motorists reporting incidents, produced high benefits compared to the previous strategies, it only produced \$8 for each dollar invested due to required investment in several systems.

The benefit-cost analysis showed high returns for the “Steer-it Clear-it” and the route diversion scenarios. The “Steer-it Clear-it” scenario produced approximately \$22 for each dollar invested if all citizens were aware of and obeyed the law. While 100-percent compliance is unrealistic, these results justify investment in an aggressive statewide advertisement to increase motorist compliance. The route diversions evaluated produced approximately \$55 for every dollar invested. While route diversion options are not available at all possible crash locations, these results justify future investments in route diversion planning.

Products from This Study

The final report summarized the entire project with a section outlining an implementation strategy. In addition to the final report, this study also produced a brochure and a voice- embedded presentation, describing the benefits of an effective incident management program. These products are provided separately.

The South Carolina Department of Transportation
(SCDOT) commissioned the study that produced
these results from Clemson University

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