

Integration of the Incident Command System (ICS) Protocol for Effective Coordination of Multi-Agency Response to Traffic Incidents

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In 2014, there were 13,528 incidents on the Interstates in South Carolina. Of these, 90 were fatal, 2,489 involved injuries, and 10,949 were property damage only. The State Highway Emergency Program (SHEP) responds to roughly 60,000 incidents per year on Interstates near major urban areas in South Carolina. These incidents involve vehicles that are on fire, have medical emergencies, have crashed, or have mobility issues (e.g., engine failure or tire problems). Daily incidents on South Carolina roadways cause delay and threaten our quality of life, safety, and mobility.

In recent years, there has been an increased focus on Traffic Incident Management (TIM) and incorporation of the Incident Command System (ICS) to reduce traffic congestion on the nation's Interstates. In fact, studies show that for every minute a freeway lane is blocked due to an incident, there is a corresponding time of four minutes of travel delay (NTIMC, 2006). According to a study published in the ITS Journal, it was estimated that the likelihood of a secondary crash increases by 2.8% for every minute that the primary incident remains a hazard (FHWA, 2009). Further, severe congestion also leads to: increased response time by police, fire, and emergency medical services; lost time and a reduction in productivity; increased cost of goods and services; increased fuel consumption and vehicle maintenance costs; reduced air quality and other adverse environmental impacts; and, a negative public image for agencies involved in incident management activities.

Between 2012 and 2013, there were 129 fatal incidents recorded on SC Interstates. Roughly half of the fatal incident recovery times (dispatch of response to incident cleared) were in excess of six hours, with maximum recovery times well over 12 hours. The median recovery time for injury incidents is under two hours, with maximum recovery times approaching five hours. These clearance and recovery times are significantly higher than those in other states. States which have implemented enhanced ICS and TIM procedures are consistently achieving major incident clearance times of one and a half hours or less.

Resolving highway incidents, and responding to emergencies with clear and unified objectives, involves multi-stakeholder agency emergency response and may include personnel from the state department of transportation, highway patrol and/or other law enforcement agencies, fire services, emergency medical services, towing, coroner, and hazardous-spill cleanup services. Efficiencies resulting from adoption of coordinated multi-agency response through ICS can reduce the impact of non-recurrent traffic congestion caused by traffic incidents on major roadways. This project investigated the effectiveness of multi-stakeholder agency coordinated ICS strategies for managing traffic incidents by considering their potential impacts in reducing incident duration.

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After analyzing the current state-of-practice in South Carolina, and national best practices, the potential areas for improvement in incident response were identified. The TIM areas most in need of improvement were response and clearance strategies, with major gaps noted in towing, coroner, HAZMAT, and crash investigation procedures. The summary of these recommendations for these four areas are as follows:

- Towing - In South Carolina, towing operations are conducted on a rotation dispatch system. The dispatched company has 45 minutes to arrive at the scene of the accident and is paid by the hour to clear incident vehicles. Under the current system, there is no motivation for the towing companies to get the job done quickly, because the longer they work the crash scene the more money they earn. In 2008, Georgia implemented the Towing and Recovery Incentive Program (TRIP) which compensates certified, inspected, heavy-duty recovery companies to expedite clearance at major incident scenes. Over the seven years that the program has been in operation, there have been 515 TRIP activations and clearance times have dropped from 216 minutes to under 40 minutes (38 min in 2014). An independent evaluation of the program in 2011 indicated a cost savings per incident of \$456,396 (or 71% savings). Based on a median fatal incident recovery time of 355 minutes in South Carolina, and a 66% improvement in incident duration from implementation of a TRIP program, an estimated 234 minutes could be saved for a single fatal incident.
- Hazmat – Delays in HAZMAT response and clean-up may occur when DHEC resources are requested unnecessarily to incident sites which are notification-only events. The cause of this may most often be attributed to an overestimation of the amount of fuel spilled by on-scene response personnel. Accurately identifying when a HAZMAT team response is needed will result in faster clearance times for incidents. A statewide policy would provide consistency and formal protocols for evaluating fuel spills, as well as hazardous material cargo spills. By explicitly defining and developing standard statewide operating procedures and interactive spill training, hazardous material spills could be handled more quickly and efficiently by the resource personnel closest to the incident. Though HAZMAT response is not frequently needed, cargo spills containing hazardous materials entail some of the lengthiest incident responses.
- Coroner – Under South Carolina legislation, incident responders are not allowed to disturb a victim's body in any way (i.e., moving the body or the vehicle containing the body) until a formal investigation and authorization has been completed by a coroner, deputy coroner, medical examiner, or deputy medical examiner. Significant delays and increased congestion are likely outcomes due to the response time of

the coroner. Additionally, there are typically a limited number of qualified individuals that may investigate and authorize the removal of deceased individual from a traffic incident scene. Texas, Tennessee, and Louisiana have implemented traffic fatality certification laws to address the removal of the deceased from incident scenes where the location obstructs or presents a hazard to adjacent traffic flow. These laws are a combination of quick clearance (i.e., allowing temporary removal of the deceased from the highway and/or certification of the incident fatality by someone other than the coroner, such as EMS and qualified Fire personnel) and hold harmless acts.

- Crash Investigation – In South Carolina, the Multidisciplinary Accident Investigation Team (MAIT) conducts in-depth investigations of traffic incidents involving complex circumstances (e.g., fatalities and felony cases). MAIT investigations are associated with having the longest incident time duration as much of the investigation is likely conducted in the field at the time of the incident. With the implementation of new technologies (e.g., 3D laser scanning and drone cameras), crash scene measurements may be completed in a fraction of the current time and have an added benefit of collecting a significant amount of additional data. Reductions in data collection time noted in the literature range from 50% to 90% when these technologies are used. Further, these technologies don't require personnel to enter hazardous areas of the scene, nor do they require traffic operations to be suspended during use.

Based on the analysis of implementing these strategies in other states, South Carolina should expect shorter incident duration times, reduced costs and increased efficiency for each stakeholder agency, and more effective cooperation with local responders. The motoring public should experience fewer secondary collisions, reduced congestion times, and lower vehicular operating costs. Additionally, there will be less fuel wasted and fewer emissions from idling vehicles due to reduced incident times. An intangible result should be of a more favorable opinion by the public of the agencies involved in incident management activities. A benefit-cost analysis was conducted to evaluate the effectiveness of ICS strategies; benefits were determined by comparing the simulation outputs between existing and enhanced TIM scenarios. The results show that implementing TIM strategies should provide a range of returns from \$15 to \$168 for every dollar invested. The return on investment accrues from savings in terms of travel time, fuel, and emissions

For full report: <http://www.scdot.sc.gov/wp-content/uploads/2017/05/SPR-699-FHWA-SC-17-07.pdf>
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