

## **Review and Enhancement of CHART Operations to Maximize the Benefit of Incident Response and Management**

### **Problem**

Although the contribution of the emergency response operations of Maryland's Coordinated Highway Action Response Team (CHART) has been well recognized by the general public, much remains to be done to effectively contend with increasingly congested traffic conditions and the accompanying incidents. In fact, to meet the expectation of policymakers and residents on minimizing the impact of non-recurrent congestion, CHART operations inevitably face the following challenges: How to increase its detection coverage and rate? Can the incident response time be further reduced? How can the incident clearance operations be performed more efficiently? How can the overall performance of CHART be maximized under the current resource constraints?

### **Objective**

The primary objective of this project was to develop some effective strategies to assist CHART staff in improving the efficiency of its operations and maximizing the resulting benefits under the existing resource constraints. Due to constraints on data, strategies focused on the following critical aspects:

- Understanding critical factors that contribute to an increase in incident response and clearance times;
- Allocating available highway patrol units based on the temporal and spatial distributions of incidents to minimize the potential incident response times; and
- Developing reliable models to predict the required duration of a detected incident and to identify critical contributing factors.

### **Description**

This project focused on identifying potential areas for CHART to enhance its incident management efficiency and to maximize the resulting benefits under existing resource constraints.

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Using the information from CHART and the Maryland Accident Analysis Reporting System (MAARS), this research identified critical factors affecting CHART's efficiency in incident response and clearance, and produced several reliable models to improve its performance.

This research also produced an optimal allocation model that will enable each operational center to best deploy available patrol vehicles along its responsible highway networks and to select the most beneficial fleet size under the resource constraints.

### **Results**

Using the information from CHART and MAARS, this research identified critical factors affecting CHART's efficiency in incident response and clearance and produced reliable models to improve its performance in incident traffic management. The optimal allocation model will enable each operational center to best deploy available patrol vehicles along its responsible highway networks and to select the most beneficial fleet size under the resource constraints. CHART can also apply the set of prediction models developed in this research to estimate the required clearance duration of a detected incident, thereby minimizing the resulting congestion within the impact boundaries via real-time traffic control strategies. Incorporating any of those developed models into current practice will enhance CHART's operational quality and significantly increase its effectiveness in minimizing non-recurrent congestion in this region.

However, despite the progress made in this research on improving incident response and clearance operations, much remains to be done to contend with the ever-increasing congestion in this region. As such, the report makes additional recommendations to improve incident data collection and recording as well as incident response and traffic management.

### **Report Information**

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