Analysis, Modeling and Design for Traffic Incident Management Systems

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Project Objective
The major aim of this project is to develop mathematical models, perform analysis, develop simulations, and then apply those to assist decision support system for incident management in the Las Vegas area. In order to implement the system the project will get a handle on the local state of the art on Incident Management; will study alternate designs for incident management and then design a system that focuses on the details of field implementations and operations. This system will involve the collaboration with various agencies in Clark County such as RTC of Southern Nevada, Nevada DOT and Nevada Highway Patrol through FAST, and their consultant ITERIS. Additional collaboration will occur with local agency first responders and the private towing industry.

Project Orientation
Incident management

Project Abstract
The aim of incident management system is to minimize the total delay experienced by travelers and also to keep the whole operation safe. In order to achieve these two goals, the system should make optimal choices and use optimal designs. For the design of optimal solutions, appropriate mathematical models are needed for various tasks, and then mathematical techniques need to be developed. The mathematical models, their analysis and then optimal solutions can help in a decision support system framework for the overall incident management. Incidents result in reduction in the operational efficiency of the transportation network which lead to costly delays for the travelers, increased risk of secondary incidents, and also safety risks to the incident responders. Designing an effective incident management system requires the study of static (including geometric) and dynamic local characteristics of traffic, freeway and arterial traffic control architecture, and the structure of various organizations involved. Regional incident management requires the coordination of many agencies and technologies.

Project Task
a) Identify the ITS infrastructure availability for detecting the location of incidents and re-routing traffic
b) Evaluate public communications and education regarding incidents
c) Determine the availability of ITS elements for communicating to the public those locations where incident are more likely to occur
d) Obtain a system level mathematical model for the purposes of incident management; analyze the model; validate the model with data; develop a simulation model. Perform studies with this simulation model.

Project Milestones
Contacted local law enforcement agencies
Became a member of Nevada Traffic Incident Management (TIM) team
Initiated efforts to collect Computer Aided Dispatch (CAD) data from Nevada Highway Patrol
Framework for analyzing secondary incidents finalized
Total Budget
$193,619

Project Duration
Start Date : 2009-01-01
End Date : 2010-05-31

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Relationship to Other Project
It is related to

Technology Transfer Activities
Website is already developed to distribute information on the projects. Several journal papers are being prepared based on this study.

Potential Project Benefits
Due to rapid growth in recent years, the Las Vegas Area is now experiencing considerable congestion even outside the normal peak periods. An estimate of user costs for a one hour closure on I-15 in the peak direction during the afternoon peak hour is approximately $240,000. This estimated cost does not include the traffic that would be caught in the queue that would propagate nearly 10 miles. This project is expected to help understand the critical links in the incident management process, which would help the research team