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## **Integration of Detector Data, Archive Information, and Simulation for Reliable Estimation of Travel Time During Non-recurrent Congestion – An Application for the I-270 Corridor**

### **Problem**

Due to the ever-increasing travel demand on major commuting corridors and the uncertainty of potential traffic conditions, most highway agencies in recent years have faced mounting pressures to provide travel time information, especially during non-recurrent congestion. However, it is quite difficult for responsible highway agencies to project traffic conditions unless the commuting corridor has been deployed with extensive surveillance sensors.

### **Objectives**

The primary objective of this study is to develop an intelligent simulation-based system that can effectively integrate detector data, archive information and simulation results in providing a best estimate of travel times and delays to both control center operators and commuters during traffic congestion.

### **Description**

The proposed Integrated Traffic Information Simulation (ITIS) system consists of the following two principal components: a database module that efficiently integrates information from previous incident management reports and various available on-line as well as off-line data; and a simulation-based module to perform a robust estimation of the time-varying travel times and delays during both recurrent and non-recurrent congestion.

Based on the information available in the I-270/MD 355 simulator, the proposed ITIS system was developed along the following two lines: (1) extending the simulation data set to a generalized traffic information database with an intelligent interface to facilitate its applications, and (2) expanding the simulation functions and its output for traffic management during both recurrent and non-recurrent congestion.

### **Results**

This research report presents the developed Integrated Traffic Information and Simulation System (ITIS), including a detailed description of its principal components and their interrelations, the main functions embedded in each technical module, and key algorithms employed to verify users needs and to perform the required estimation. The proposed ITIS system offers an effective tool for MSHA engineers/planners to take full advantage of information available from on-line detectors, archive data, and simulation results in estimating travel times during non-recurrent and recurrent congestion patterns.

In developing the ITIS system, the research team has recognized that despite the lack of extensive sensor coverage on most freeways, there are a variety of data collected by different MSHA departments and stored with different computer software. Such information, if properly integrated, shall be sufficient for most planning and operational analyses performed by MSHA staff. The intelligent database embedded in the developed ITIS is designed for such needs.

### **Report Information**

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