MARYLAND DEPARTMENT OF TRANSPORTATION

STATE HIGHWAY ADMINISTRATION

RESEARCH SUMMARY

DEVELOPMENT OF A TRAFFIC MANAGEMENT DECISION SUPPORT TOOL (DST) FOR FREEWAY INCIDENT TRAFFIC MANAGEMENT PLAN DEVELOPMENT

Phase-2: An Enhanced DST-I-95, including I-495, I-695, I-70, US 29

WHAT WAS THE NEED?

It is well recognized that traffic incidents can result in roadway capacity reduction, reliability degradation, and significant delays for commuters. Over the past several decades, many U.S. highway agencies have established Traffic Incident Management (TIM) programs that, in some cases, have a TIM system to help mitigate such impacts and restore normal traffic conditions. Such a system can effectively reduce the incident duration of detected incidents, and in turn, reduce impacts on traffic and safety. To do so, a TIM system first needs a reliable and robust model to predict the required duration for incident clearance operations and to assess its time-varying traffic impact, because such information is essential for determining the proper control strategies and the responsive traffic management tasks.

WHAT WAS THE GOAL?

The goal of this project is to provide a reliable Decision Support Tool (DST) for MDOT SHA to effectively respond and manage traffic incidents. The core tasks of this study include: (1) extending the **i**ncident **d**uration **p**rediction **m**odel (IDPM) for I-95 to I-495, I-695, I-70, and US 29; and (2) develop a transferability assessment methodology that can serve as the tool for transferring well-established prediction rules in the existing IDPM to other highways that do not have sufficient incident records for model calibration.

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WHAT DID THE RESEARCH TEAM DO?

This study produced reliable IDPMs for four heavily congested highways with uniquely complex traffic and incident patterns. Since these four completed systems, along with IDPM-I-95, have collectively covered two beltways (e.g., I-695), typical commuting freeways (I-95), and a major expressway (US 29), it is expected that those empirically calibrated prediction rules embedded in such IDPMs can serve as the basis for design of a generalized IDPM for all other highways. The two innovative **T**ransferability **A**ssessment **M**ethod (TAMs) developed in this study also offer a set of cost-effective tools for responsible highway agencies to cope with the data quality and deficiency issues that often hinder the progress of IDPM development for highways with either inadequate or not properly recorded incident data.

WHAT WAS THE OUTCOME?

The IDPMs and software developed in this project have been evaluated to yield the prediction accuracy of 80-85%. The decision support system with all existing IDPMs is ready for use by MDOT SHA's incident response team to predict a detected incident's clearance time and estimate the resulting traffic impacts.

HOW WILL MDOT SHA USE THE RESULTS?

The MDOT SHA recently enhanced its in-house developed Advanced Transportation Management System (ATMS) to include an estimated incident severity score. The severity score is calculated based on the evolving incident information collected by traffic management center operators in real time and will help them to allocate resources when responding to incidents. The incident duration cannot be reliably estimated across the statewide roadway network, so it is not included in the calculation. The IDPM models developed in this phase will be further developed into a generalized IDPM in the phase III project (on-going), which is not dependent on roadway class. The MDOT SHA will then look to incorporate the models into the ATMS severity score and support efficient TIM operations (plans, identification, response, clearance, etc.). The aim is to incorporate the models developed within this research into the CHART ATMS to automate incident duration calculation.

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