



Project Summary

Texas Department of Transportation

0-5292: Using Operations-Oriented Performance Measures to Support Freeway Management Systems

Background

Performance measurement is the monitoring, assessment, and reporting of progress toward goals. It is a systematic process involving not only the selection of a particular measure, but the selection of goals, objectives, and performance targets. (See Figure 1.)

While performance measurement has been applied to transportation in the planning area for some time, its use in real-time applications has been extremely limited. This project examined a wide range of performance measures for real-time application in the areas of operations and emissions. It created a prototype system for implementing and testing real-time performance measurement.

What the Researchers Did

The research performed within the scope of this project provided a groundwork feasibility test for using performance measures in real-time. Results of Year 1 efforts indicated that the areas of operations and emissions were not using a real-time performance measurement process.

Research Performed by:

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Project Completed:

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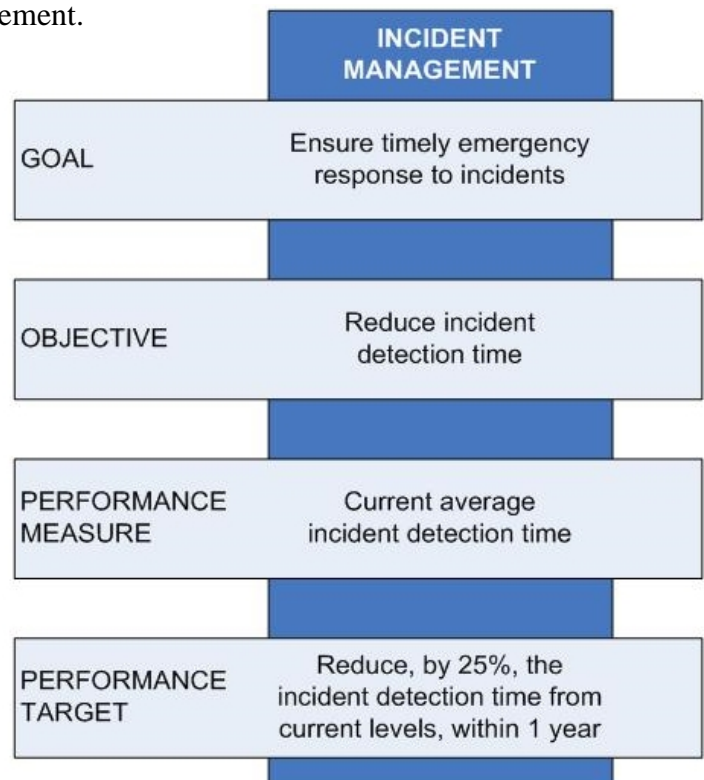


Figure 1. Performance Measurement Process.

Further examination concluded that the operations area was a viable avenue to continue development of a real-time performance monitoring capability. The emissions area was not found to be viable for development of a real-time, narrowly focused monitoring architecture.

In Year 2, a prototype real-time performance monitoring system was developed. The development of this prototype system encompassed the creation of a system architecture, assessment of potential measures, simulation based testing of real-time measures, assessment of results and future viability, prototype interfaces and data storage capabilities, and a concept of operations to guide future development or implementation.

What They Found

The prototype interfaces (operator displays) emphasize several points. The use of the performance measures in real-time can provide an understanding of roadway conditions and serve as a baseline to visually communicate that information to operators on both a temporal and spatial basis. The candidate measures came from the recommendations for planning performance measures by the National Transportation Operations Coalition (NTOC). One measure in particular, ‘Extent of Congestion-Spatial,’ showed particular promise for use in real-time applications.

While the initial results are promising, modifications to the NTOC methodologies would be necessary for some measures, such as a straight comparison of speed or travel time. Without a comparison baseline, the normal volatility in these parameters would render them inadequate for identifying abnormal conditions. Additional efforts are necessary to determine the sensitivity of the measures to variations in traffic levels, changes in the ratio value used, etc. Additionally, a determination of the sensitivity of the travel time ratio performance measure should be made if the target travel time values change by time of day, as determined by an operator. An example of the operator interface developed for displaying the extent of congestion measure is shown in Figure 2.



Figure 2. Example Strip Chart Output from Real-Time Performance Measurement System.

What This Means

The results of the research hold promise for supplementing the current systems and aiding operators in detection of an incident, determination of the location, extent of the incident’s effect, and timeframe of the incident’s effects.

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