



STRATEGIES FOR ALLEVIATING URBAN CONGESTION

PROBLEM STATEMENT

We are all familiar with the increasing traffic-congestion problem in Texas, and other areas of the nation. In fact, traffic is so severe in many areas that a general consensus has emerged — no *single* agency or mode will be able to successfully address the problem. An analysis conducted using Texas Transportation Institute's Roadway Congestion Index (RCI) indicated that even with a significant amount of future investment in roadway lane-miles, increasing travel demand in Texas' major urban areas will continue to cause congestion. Transportation agencies must pursue a wide range of actions if they are to prevent future increases in the urban congestion problem.

OBJECTIVES

The Texas Transportation Institute (TTI) conducted Study 1252, *An Assessment of Strategies for Alleviating Urban Congestion*, in cooperation with the Texas Department of Transportation (TxDOT) and the Federal Highway Administration (FHWA) to give transportation professionals a comprehensive assessment of strategies for alleviating urban traffic congestion. The study is intended to provide a clearer picture of the extent of the congestion problem in the largest Texas urban areas (Austin, Corpus Christi, Dallas, El Paso, Fort Worth, Houston, and San Antonio), including both historical quantifications and estimates of future urban area congestion and associated costs.

It is important to note that this study is not intended to replace or supersede plans that may have already been developed by different agencies. Rather, it is meant to develop quantitative planning tools that may be of use to the various agencies. By providing a macroscopic, areawide assessment of urban traffic congestion problems, it should help identify what impacts certain plans already scheduled for implementation might have on urban area congestion and provide insight to circumventing and alleviating possible problems. Major topics detailed in the study include:

- Extent of the congestion problem,
- Strategies available for alleviating urban congestion,
- Applications of strategies, and
- Relationship between level of expenditure and reduction in urban area congestion.

FINDINGS

Extent of Congestion Problem

Using historical data and the Roadway Congestion Index, estimates of congestion and associated costs were developed for the seven largest urban areas in Texas for the years 1975 to 1989. The level of congestion in all seven urban areas has increased significantly since 1975, with Houston and Dallas having surpassed the acceptable level. Estimates of future congestion levels and costs were also developed. The results of this analysis indicate that, in the future, even with a significant amount of investment in roadway lane-miles, the increasing travel demand in Texas' major urban areas will continue to increase congestion — unless state and local agencies pursue solutions to the urban congestion problem.

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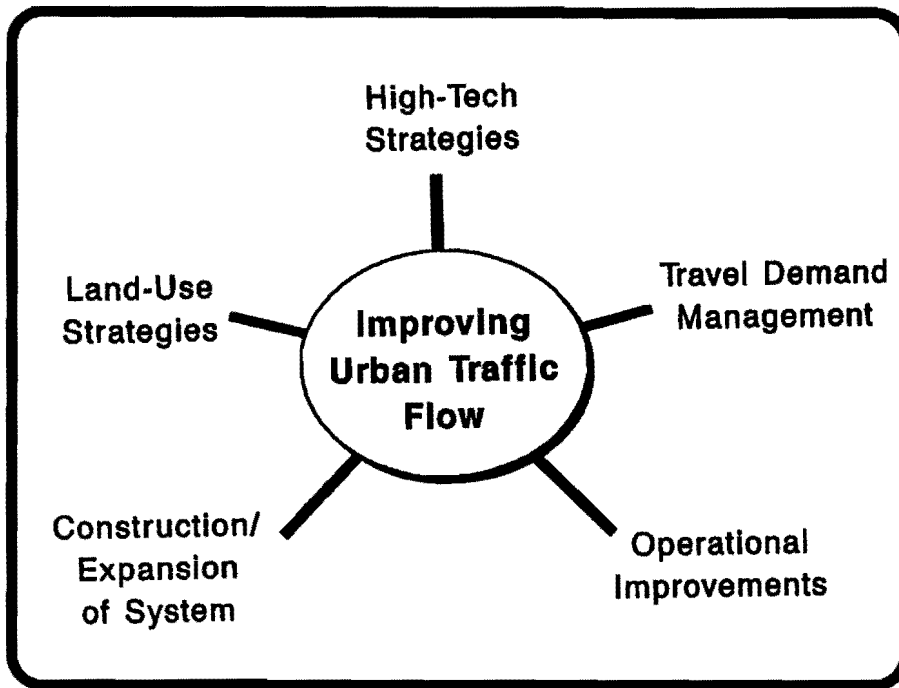
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Research Summary Report

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Five possible strategies represent the most promising techniques for improving urban traffic flow.

Strategies for Alleviating Urban Congestion

The strategies discussed represent the most promising techniques to alleviate traffic congestion both at present and in the foreseeable future. The costs and benefits of specific strategies are presented in the report. These strategies fall under one of the following five categories:

- 1) Construction/Expansion of System
- 2) Operational Improvements
- 3) Travel Demand Management
- 4) Land-use Strategies
- 5) High-tech Strategies

All of these strategies, while varying widely in terms of their cost, are those which appear to be most applicable on an area- or corridor-wide basis. General cost figures (low, medium, high, etc.) are provided where there is an absence of detailed cost data.

Application of Strategies

Researchers presented a more detailed assessment of the potential of three strategies for alleviating urban traffic congestion: high occupancy vehicle (HOV) lanes, surveillance, communication, and control (SC&C) system, and signal system improvements.

Since no one strategy will solve the

mobility problems we now face, investigators constructed matrices to illustrate which strategies can be applied most effectively in combination. The matrices should also serve to illustrate which strategies are not recommended for simultaneous application within the same corridor/subarea. The tables in this section reveal a wide variety of strategy packages that would work well together in addressing typical, urban area traffic congestion problems. The interactions between strategies developed in this study varied depending upon urban area size and existing level of congestion.

Relationships Between Expenditure and Reduction in Congestion

The final objective of this study was to identify general levels of expenditure required to bring about varying reductions in urban area congestion. Utilizing data identified in previous tasks of this research study, macroscopic assessments of the costs and reductions in congestion associated with the implementation of certain strategies were developed. Since signal system upgrades and SC&C systems are planned for eventual implementation in major Texas cit-

ies, these strategies were chosen for this particular analysis. To provide a comparison between areas of varying size and severity of congestion, Corpus Christi, Houston, and San Antonio were also chosen for this phase of the study. In the case of Houston, the cost and benefits associated with the existing high-occupancy vehicle lane system were also included in this analysis.

The results of these analyses show that while principal arterial signal upgrades and freeway SC&C systems will decrease congestion on the urban roadway system, the reduction in congestion will be overcome by only a few years of traffic growth.

CONCLUSIONS

The strategies for alleviating congestion identified in this study were assessed based on both independent and simultaneous application. Groups of strategies that appear to work well when applied simultaneously were identified. These assessments were made based on urban area size and severity of existing congestion and, where possible, were related directly to major Texas urban areas.

Future research could further test the status and validity of the different strategy packages, as well as update the cost-benefit issue for different Texas cities as they combat urban congestion through implementation and modification of these strategies.

—Prepared by Kelly West, Technical Writer/Editor, Texas Transportation Institute.

The information described in this summary is reported in detail in TTI Research Report 1252-1F, "An Assessment of Strategies for Alleviating Urban Congestion," Russell H. Henk, Christopher M. Poe, Timothy J. Lomax, November 1991. The contents of this summary do not necessarily reflect the official views or policies of the FHWA or TxDOT.