0-6837-01: Assessment of Innovative and Automated Freight Systems and Development of Evaluation Tools—Phase II

Background

For Project 0-6837 Phase II, researchers investigated nine strategy/technology (S/T) areas that were recommended by the Texas Department of Transportation (TxDOT) at the end of Phase I of the project. Researchers used the National Cooperative Highway Research Program (NCHRP) 750: Volume 3 Systematic Technology Reconnaissance, Evaluation, and Adoption Methodology (STREAM)–based evaluation method and other appropriate methodologies to assess each S/T area. The nine areas selected were:

- Automated, zero-emission freight systems.
- Freight rail public-private partnerships.
- Natural gas, electric/hybrid, and other fueled freight vehicles.
- Truck-shipper matching systems.
- Port intelligent transportation systems (ITS).
- Separation of trucks from automobiles.
- Truck parking information systems.
- Freight village facility development.
- Border advanced freight traveler information.

What the Researchers Did

Phase II activities closely followed the NCHRP-recommended STREAM process in framing freight problems and improvement goals (frame), identifying the information needs (identify), conducting in-depth investigations (characterize), and performing analysis (compare).

Researchers initially framed Texas freight needs and goals based on the most current version of the Texas Freight Mobility Plan (TFMP) and the TxDOT Strategic Plan. Researchers identified the literature review findings, broad sources of information, databases, strategies and technologies assessed, and other remaining needs for each S/T area. Researchers

investigated the characteristics, costs, and implementation barriers for the nine innovative and automated freight S/T areas. Each S/T was also evaluated for implementation at locations on the Texas freight system and matched to specific needs identified in the TFMP.

Researchers completed an intensive and detailed analysis of each S/T area using STREAM-based techniques and examined the extensive applicability of STREAM as an evaluation tool.

What They Found

In some S/T areas, STREAM was not directly applicable, and alternative evaluation methods were applied. Researchers determined four specific S/T areas that TxDOT can currently or quickly implement:

- Port ITS.
- Separation of trucks from automobiles.
- Truck parking information systems.
- A border advanced information/cross-border vehicle inspection system.

Researchers then proposed prospective Phase III implementation projects at locations identified from stakeholder outreach and the TFMP where strategies and technologies could be tested.

The STREAM method provides a consistent framework for evaluation, works best as a decision-making aid between technology options to address a single issue, and allows tradeoff analyses between metrics. However, the STREAM process cannot as readily evaluate across multiple approaches to a problem—especially when detailed data or other numerical metrics are lacking or unavailable. Each of the four S/T areas selected resulted in one or more independent implementation projects to be employed in Phase III upon TxDOT approval. Project locations and final details will be finalized and incorporated into the Phase III work plan.

What This Means

The Phase II project expanded the understanding of the nine selected S/T areas using NCHRP-recommended STREAM process evaluation methods, informed the TxDOT project panel about how evaluated S/Ts could address TxDOT freight planning goals and objectives, and identified test concepts and applications that could address Texas freight system needs. Phase III is planned to implement projects related to the four S/Ts advanced by the panel during Phase II. Project information on other S/Ts (those not advanced by TxDOT at this time) are also included in the final report and its appendices.