Project Summary Reports (PSRs)

No need to submit your PSR with extensive formatting—CTR’s Production Department will lay out the final publication in InDesign after receiving approval to publish from RTI. Just submit your PSR as a Word document, with an average of 800 words.

A graphic is not required, but may be included if it will most effectively convey the information. Text will then need to be shortened to make space for the graphic.

Note: The Technical Report Documentation Page ("DOT" page) is not required when submitting a PSR.

Below is a checklist for your use in preparing the submittal.

**1. Begin the document by providing the following information:**

Project Summary Report [#-####-S]—include project prefix (Ex. "0-1234-S")

Project [#-####]: [project title]

Research Supervisor: [name & phone number]

Research Team: [the names of research team members who should be credited in the PSR]

Project Termination Date: [date]

**2. In the body of the PSR, include these four headings and accompanying text:**

**Background** - a brief description on the purpose and scope of the project and why the research was important.

**What the Researchers Did** - a brief summary of project activities, and problems encountered, if any.

**What They Found** - a summary of the research findings and what conclusions can be drawn from them, and whether or not the findings were as anticipated. This would be a good spot to include any Value of Research (VoR) material, if your project contract requires its inclusion.

**What This Means** - suggestions from the research team for putting project findings to use.

**Project Summary Report 0-6898-S**

**Project 0-6898:** Estimating Freight Value Moved on TxDOT-Maintained Roadways for Investment Decision-Making

**Research Supervisor:** Dr. C. Michael Walton, P.E., Phone: (512) 471-1414

**Research Team:** Nan Jiang, Rydell Walthall, Kevin Savage, Pavle Bujanovic

**Project Termination Date**: August 31, 2017

## Background

In recent years, state transportation agencies have been encouraged to incorporate freight into their statewide transportation planning program. Despite recognizing the need for improved freight planning, most states have limited planning tools to address goods movements and are lagging behind the freight industry in terms of technological and logistical advances. Though there has been advancement in freight planning modeling towards a supply chain and logistics based approach, lack of adequate freight data is a hindrance to developing behavioral models.

Traditional infrastructure investment decisions are usually made based on the condition of the infrastructure and the traffic volume without considering the value of commodities moved on the infrastructure. However, freight values have a more direct effect on the wider economy than simple volume measurements, and thus are an important metric to consider when making investment decisions. Developing a methodology to estimate the value of freight moved on TxDOT-maintained roadways help TxDOT prioritize infrastructure improvement projects.

## What the Researchers Did

After an extensive literature review on commodity flow estimation methods, the team decided to pursue a commodity-specific modeling approach using commodity-specific data sources that are tied more closely to each commodity’s unique attributes. The researchers then applied this methodology to a list of commodities selected based on weight/value of the commodities’ movements within Texas and their importance to the Texas economy.

For each selected commodity, the research team studied its supply chain and the available data sources for estimating production and consumption as well as determining typical types of trucks used for transportation. The research team then developed methods to estimate county-to-county flows of the selected commodities.

The research team converted the estimated county-to-county flow matrices into truck trip and value matrices based on an assessment of the unit value for each commodity and the typical type of truck used for transporting the commodity. The researchers then assigned estimated county-to-county truck trips and value to the Texas primary and secondary freight networks.

Lastly, the research team incorporated commodity seasonal variations and the impacts of congestion in the modeling process by estimating the peak and off-peak movement times of commodities and by using afternoon peak travel-time generated by the Statewide Analysis Model (SAM) to perform user-equilibrium based traffic assignment.

## What They Found

The researchers found that a commodity-based approach can use commodity-specific data to develop a flow estimation methodology that is tailored for that commodity and therefore provides opportunity to perform detailed analysis of that commodity’s movement along its supply chain. However, this commodity-specific approach requires detailed study of each commodity and can be both time- and resource-consuming if it is applied to all commodities. Therefore, this approach is more suitable for studying key commodities or for a specific commodity targeted for further study. More studies need to be performed to develop a methodology that can be used to estimate the total value of all commodities moved on the roadway at a more spatially disaggregated level than exiting databases provide.

The researchers have identified some key Texas corridors for transporting those commodities studied in this project. As mentioned earlier, the commodities studied are important to the state economy and the key corridors identified may therefore merit higher priority for improvement. The researchers have also explored ways of incorporating freight value into the infrastructure improvement project selection process.

The researchers also found that commodities with significant seasonal variation can cause high truck volume during peak seasonal periods and those trucks’ impact on infrastructure can be underestimated if only annual estimations are used.

## What This Means

This research provides an insight into the opportunities and challenges of pursuing a commodity-specific approach to estimate the value of commodities moved on the Texas roadway system. This study approach sought to understand the complexities of the interactions between the key stakeholders in freight distribution. It is especially applicable for detailed logistic chain-based study of a small set of target commodities.

The “Guidebook for Estimating the Value of Freight for Texas Highways” developed in this project provides a tool to guide the process of estimating the value of commodities that are of interest to TxDOT. Another product of this project, the GIS database, provides a clear picture of the movements and value of several key commodities on Texas freight network.

Based on this study, the research team recommends that commodity values to be considered in the investment decision-making process so that those roadways carrying high values of freight can receive commensurate funding for improvements. It is also recommended that peak seasonal periods and daily truck volume during those periods should be identified so that the impact of those commodities’ movements on infrastructure can be more accurately evaluated.