

Innovations in Freight Demand Modeling and Data

JULY 2013

Freight traffic has been growing faster than passenger traffic on the nation's highway network. This has exacerbated bottlenecks, not only near ports and intermodal facilities but throughout the network. Travel forecasts are beginning to show the effects on congestion of growing freight traffic on urban freeways, urban arterials, and some cross-country routes in rural areas. Understanding freight flows and being able to forecast freight demand are taking on increasing importance.

To improve the nation's ability to plan for increased freight-related traffic and to begin to address the growing issue of freight bottlenecks, the second Strategic Highway Research Program (SHRP 2) conducted a research project to assess the state of the practice of freight demand modeling and freight data as they relate to highway capacity planning and programming. This project, Freight Demand Modeling and Data Improvement Strategic Plan (Capacity Project C20), produced *Freight Demand Modeling and Data Improvement* (SHRP 2 Report S2-C20-RR-1), which documents the state of the practice for freight demand modeling; *Freight Demand Modeling and Data Improvement Strategic Plan* (SHRP 2 Report S2-C20-RW-2), which outlines seven strategic objectives that are designed to serve as the basis for future innovation in freight travel demand forecasting and data, and to guide both near- and long-term implementation; and a speaker's kit, which is intended to be a "starter" set of materials for use in presenting the freight modeling and data improvement strategic plan to a group of interested professionals. SHRP 2 Project C20 also hosted the 2010 Innovations in Freight Demand Modeling and Data Symposium, which was conducted as a means of discovering the sorts of innovation that were occurring internationally in terms of both freight demand modeling and freight data. Based on the success of this symposium, planning for a second innovation symposium is under way in SHRP 2 Project C43 (Second SHRP 2 Freight Modeling and Data Innovation). This project brief gives an overview of SHRP 2 projects C20 and C43.

Freight Demand Modeling and Data Improvement

The SHRP 2 Project C20 research initiative provides a strategic framework for continuous improvement and innovative breakthroughs in freight transportation forecasting, planning, and data. With more realistic and reliable freight demand models and data sources, public- and private-sector leaders will have the tools to make better-informed decisions related to transportation infrastructure, land use, economic development, and other policies fundamental to prosperity and quality of life. Relevant information includes the current movement of goods, modal mix and variations, shipping costs, time in transit, consumption rates, logistics chains, and other factors critical to the freight industry.



Freight Demand Modeling and Data Improvement (SHRP 2 Report S2-C20-RR-1) documents the state of the practice for freight demand modeling and the process used to develop a strategic plan aimed at improving it. The report explores fundamental changes in freight modeling and in data and data collection that could provide public- and private-sector decision makers with a clearer picture of the dynamics that affect their decisions. This report can be found at <http://www.trb.org/Main/Blurbs/167628.aspx> or by searching the report title at www.TRB.org.

Freight Demand Modeling and Data Improvement Strategic Plan

The *Freight Demand Modeling and Data Improvement Strategic Plan* (SHRP 2 Report S2-C20-RW-2) was developed through an inclusive process of public and private stakeholders from U.S. and international freight planning communities that culminated in the Innovations in Freight Demand Modeling and Data Symposium conducted in September 2010.

The Strategic Plan identified seven strategic objectives to encourage and support future innovation in freight travel demand forecasting and data and to guide both near- and long-term implementation. The objectives reflect the desired directions for enhanced freight planning, forecasting, and data analysis identified by the many stakeholders who participated in this project. The objectives aim to stimulate innovation through the approaches laid out in the Strategic Plan and will provide the basis for evaluating progress over time.

These are the seven strategic objectives:

1. Improve and expand the knowledge base for planners and decision makers;

2. Develop and refine forecasting and modeling practices that accurately reflect supply-chain management;
3. Develop and refine forecasting and modeling practices based on sound economic and demographic principles;
4. Develop standard freight data (such as Commodity Flow Survey, Freight Analysis Framework, and possible future variations of these tools) to smaller geographic scales;
5. Establish methods for maximizing the beneficial use of new freight analytic tools by state transportation agencies and metropolitan planning organizations in their planning and programming activities;
6. Improve the availability and visibility of data among agencies and between the public and private sectors; and
7. Develop new and enhanced visualization tools and techniques for freight planning and forecasting.

The sample research initiatives represent a near-term opportunity to advance research that addresses freight-related decision-making needs. These ideas for short-term research have been vetted by a range of stakeholders.

The future directions lay out an organizational approach to continue to identify freight modeling and data priority needs, spur innovative ideas, and foster breakthrough solutions for wide application. The Global Freight Research Consortium (GFRC) identified as part of this research effort is seen as an effective means for making continued analytic breakthroughs and targeting future supporting research.

The ultimate long-term goal for the research is to build on Strategic Objectives 2 and 3. This research is designed to lead to the development of a full network-based freight forecasting model that incorporates all modes of freight transport and accurately reflects the various factors related to the supply of freight infrastructure and services (Strategic Objective 2) and the underlying demand for these services (Strategic Objective 3). This model has the potential to effect a dramatic change in current freight planning and forecasting. It is a highly ambitious endeavor because of the complexity of freight transportation and the numerous elements that are necessary to achieve this long-term goal.

The other five strategic objectives are tied to this goal through the development of the applicable knowledge base needed to further the goal (Strategic Objective 1), the development and dissemination of data necessary to support it (Strategic Objectives 4 and 6), and the development of enhanced methods for disseminating information from

these analytic tools for public stakeholders (Strategic Objective 5) and decision makers (Strategic Objective 7).

The Strategic Plan is available at <http://www.trb.org/Main/Blurbs/167629.aspx> or by searching the full report title at www.TRB.org.

Speaker's Kit

SHRP 2 Project C20 developed a speaker's kit, which is intended to be a "starter" set of materials for use in presenting the freight modeling and data improvement strategic plan to a group of interested professionals. It includes a PowerPoint presentation and a brochure that highlight the process of why and how the strategic plan was developed and its key points. The brochure and presentation are available at <http://www.trb.org/Main/Blurbs/167629.aspx>.

2010 Innovations in Freight Modeling and Data Symposium: A Foundation for Moving Forward

The Innovations in Freight Modeling and Data Symposium held in September 2010 provided a solid foundation for future efforts. The symposium's success rested on several factors:

- The symposium provided a low-cost approach to generating a variety of research concepts;
- The competitive nature of the symposium generated numerous excellent ideas and promising research concepts;
- The symposium brought together academic, private-sector, and public-sector perspectives; and



Tetsuro Hyodo, Tokyo University of Marine Science and Technology, receives an award for his work on Modeling Truck Route Choice Behavior by Traffic Electronic Application Data. The award was presented at the 2010 Innovations in Freight Demand Modeling and Data Symposium by James Brock, chair of the symposium planning team.



- The symposium fostered a greater shared understanding of the issues and requirements for improved freight modeling and planning.

The focus and emphasis areas of future symposia will vary, but the principles of collaboration, competition, and communication represent significant building blocks for successful symposia.

This symposium featured 18 presentations selected to address the challenge of developing the next generation of freight demand models. It was characterized by a combination of modeling data and ideas presented by U.S. and international practitioners and academics, followed by open and direct dialogue and debate. It provided a strong foundation for moving forward because the symposium

- Generated ideas;
- Attracted international attention and participation;
- Resulted in the identification of several promising areas of research; and
- Provided a forum for public- and private-sector stakeholders, as well as university expertise.

Papers presented at the 2010 symposium are available at <http://www.trb.org/Main/Blurbs/167629.aspx>.

2013 Symposium: Innovations in Freight Modeling and Data: Integrating Supply-Chain Models and Data into Public-Sector Freight Demand Modeling

To build on the success of the 2010 symposium, SHRP 2 Project C43 (Second SHRP 2 Freight Modeling and Data Innovation) is planning a second symposium on innova-



tions in freight modeling and data. This symposium will provide a forum to explore how transportation planners, by focusing on freight flows, can benefit from using private-sector techniques to amplify existing freight demand forecasting models, data, and methods.

Through a public- and private-sector dialogue, the symposium will examine modeling approaches that are used in the private sector, particularly those that are appli-

cable to public-sector planners and modelers. The meeting seeks to have practitioners from both private industry and public agencies share and learn new knowledge and tools that can help public- and private-sector decision makers improve transportation infrastructure and operations, thereby driving economic growth for the nation.

In addition, one of the primary expected outcomes of the conference is to initiate an ongoing “Community of Practice” to further the science of freight demand modeling and forecasting and to enhance the dialogue between the public and private sectors. During the course of the symposium, participants will be asked to provide input and feedback to assist in identifying and advancing priority research topics for the future.

A call for papers has been issued, and short papers and abstracts are due by August 15, 2013. The symposium will be held October 21–22, 2013, at the Crowne Plaza Hotel—Washington Dulles International Airport, Herndon, Virginia.

More information about the 2013 symposium is available at <http://www.trb.org/Calendar/Blurbs/169110.aspx>.

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