SHRP2 C20: Freight Demand Modeling and Data Improvement Strategic Plan

presented to

Florida Model Task Force

presented by

Patrick R. Anater

Gannett Fleming

March 6, 2012

Freight Demand Modeling and Data Improvement Strategic Plan

SHRP2 C-20

October 2011

TRB — TRANSPORTATION RESEARCH BOARD

SHRP 2

SHRP2 C20: Technical Expert Task Group

Chair
Susie Lahsene
Sr. Manager, Transp. and Land Use Policy
Port of Portland

Members
John Fuller
Department of Economics and Geography
University of Iowa

James Gosnell
West Coast Corridor Coalition

Robert James
Principal Transportation Planner
SAIR/Port Authority of New York and New Jersey

Rebecca Knudson
Senior Transportation Analyst
Oregon Department of Transportation

Phillip Mescher
Team Leader, Forecasting and Modeling
Iowa Department of Transportation

Randy Mullet
Government Relations and Public Affairs
Con-way, Inc.

Rolf Schmitt
Team Leader, Freight Analysis Team
Federal Highway Administration

Spencer Stevens
Community Planner, Office of Planning
Federal Highway Administration

SHRP2/TRB Staff
Neil F. Hawks
Director, SHRP2

David Plazak
Senior Program Officer, SHRP2

Tom Palmerlee
Associate Division Director, Technical Activities,
Transportation Research Board

Purpose

- **Understanding freight flows and forecasting them is critical to determining the need for future transportation capacity.**

- **However, analytical tools and methods used to forecast freight demand are inadequate.**

- **The overall objective of SHRP2 C-20 is to "*foster fresh ideas and new approaches to designing and implementing freight demand modeling*" through the development of research initiatives to address decision-making needs.**

Strategic Objectives

Seven strategic objectives serve as the basis for future innovation in freight travel demand forecasting and data.

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

2. Develop and refine forecasting/modeling practices that reflect the "real world" of supply chain management.

3. Develop and refine forecasting/modeling practices based on sound economic and demographic principles.

4. Develop standard freight data to smaller geographic scales.

Strategic Objectives

5. **Establish methods for maximizing the beneficial use of new freight analytical tools by state DOTs 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.**

7. **Develop new and enhanced visualization tools and techniques for freight planning and forecasting.**

Current State of the Practice

- **Current Modeling Shortcomings:**

  - **Multiple freight transport modes not captured**

  - **Do not address the factors that drive freight movements, differing peaking characteristics, or international trends and economic considerations**

  - **Variations among transportation patterns by commodity types**

  - **Difficulty obtaining proprietary data from private sources**

  - **Do not capture time sensitivity of mode choice**

  - **Difficulty quantifying local deliveries (i.e., "touring") in metropolitan areas**

  - **Identification and quantification of complex relationships between land use and freight generation/attraction**
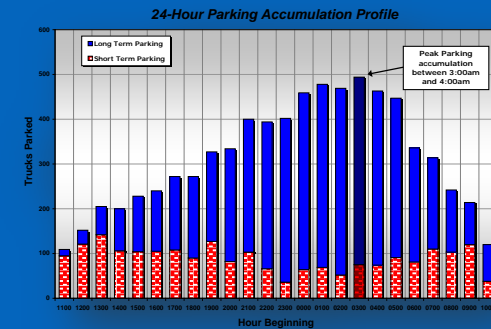
Current State of the Practice

- **Current Data Shortcomings:**
  - Availability
  - Frequency of updates
  - Cost of collecting data to close gaps
  - Accuracy and suitability for planning and modeling at specific geographic levels
  - Potential errors aggregating or disaggregating data for geographic scaling
  - Relating freight data to model networks

Research Initiatives to Address Needs

- Determine the freight and logistics knowledge and skill requirements for transportation decision-makers, and professional and technical personnel

- Develop the associated learning systems to address knowledge and skill deficits

- Establish techniques and standard practices to validate freight forecasts

- Establish modeling approaches for "behavior-based" freight movement

Research Initiatives (continued)

- Develop methods that predict mode shift and highway capacity implications of various "what-if" scenarios

- Develop a range of freight forecasting methods/tools that address decision-making needs at all levels (national, regional, state, MPO, municipal)

- Develop robust tools for freight cost-benefit analysis that go beyond financial to the full range of benefits, costs, and externalities.

- Establish analytical approaches that describe how elements of freight transportation impact the overall system

Research Initiatives (continued)

- Determine how economic, demographic, and other factors drive freight patterns and characteristics.

- Document economic and demographic changes related to freight choices.

- Develop freight data resources for application at sub-regional levels.

- Establish, pool, and standardize a portfolio of core freight data sources

Research Initiatives (continued)

- Develop procedures for applying freight forecasting to the design of transportation infrastructure

- Advance research to effectively integrate logistics practices (private sector) with transportation policy, planning, and programming (public sector)

- Develop visualization tools for freight planning and modeling

Roadmap Organizing Concept

- Global Freight Research Consortium

  - Purpose: To promote a body of research through funding agencies and other stakeholders for improved freight performance and decision making

  - Participation: Voluntary and will include those that have a stake in achieving roadmap strategic objectives—public domestic agencies, modal and other associations, universities, and the transportation research entities of other countries.

  - Responsibilities: Enable, fund, and promote research, supported through public organizations (national and international) with assistance from private freight-oriented organizations.

Roadmap Elements

- Freight Modeling and Data Innovation Symposium

  - A good <u>foundation</u> is to build upon the successful Freight Modeling and Data Symposium held in September 2010.

  - Small size to facilitate discussion. ~50 in attendance and ~15 presentations to address the challenge of developing the next generation of freight demand models and data.

  - Jury panel of experts in the field to judge presentations.

  - A monetary award to winner of competition.

  - An on-going dialogue to incorporate innovations into modeling and data practices.

Roadmap Elements

1. Define Issues Ripe for Research Innovation
    - Establish the initial set of problems or research issues demanding attention.
    - Publish and widely distribute a call for ideas.
    - Communicate the submission format approach standards and the incentives or awards being made available.

2. Provide Recognition and Incentives to Spur Breakthroughs
    - Establish initial sources for a call for innovative ideas.
    - Establish a basis for contributions for funding awards, prizes, and related activities.
    - As funding for awards increases, establish multiple categories and multiple award winners.

Roadmap Elements

3. Conduct Regular Innovation Forums
   - Hold an annual forum for presentations and selecting the most promising ideas.
   - Publish a report from each forum that would be used to frame the freight modeling and data research agenda

4. Promote Technology Transfer from Other Disciplines
   - Consider solutions to modeling needs from other fields that can be transferable or adaptable to freight transportation.
   - Promote regularly to various utilities and other sectors.

Roadmap Elements

5. Promote an International Focus
    - Draw on global research and promote the participation from all relevant freight sectors and academic institutions worldwide

6. Recognize the Application of Completed Research
    - Periodically draw attention to the impacts and benefits of completed freight modeling and data research as it has been applied.
    - Promote broader implementation of successful freight analytical approaches.

Conclusion

- By the end of this decade, a vision for improved freight modeling and data will be characterized as follows:

  - Robust freight forecasting tools have been developed and is the standard for public sector freight transportation planning.

  - These tools and data are dynamic in terms of linking with other key variables such as development and land use, and in terms of application to local scale, corridors, or regions.

Conclusion

- The challenges associated with the data necessary to support new planning tools have been addressed through bringing together the varied resources of public and private sectors.

- The knowledge and skills of DOT and MPO staff have been methodically enhanced to complement the development of better tools and data.

- Decision-makers recognize that transportation investments are being informed by an understanding of the implications, benefits, and trade-offs relative to freight.

FLORIDA MODEL TASK FORCE

Contact information:

Patrick R. Anater
Gannett Fleming, Inc.
1121 Situs Ct., #170
Raleigh NC 27606

Phone: (919)859-4880
E-mail: panater@gfnet.com