



NATIONAL COOPERATIVE FREIGHT RESEARCH PROGRAM

Current and Completed Projects

Winter 2010

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The National Cooperative Freight Research Program (NCFRP)

The freight transportation system in the United States is a complex, decentralized, and dynamic network of private and public entities, involving all modes of transportation—trucking, rail, waterways, air, and pipelines. Fueled by population growth and international trade, freight transportation demand, measured by ton mileage, is expected to grow by 50% in the next 20 years. Strategic operational and investment decisions by the private sector and governments at all levels will be necessary to maintain freight system performance, and will in turn require sound technical guidance based on research.

Congress recognized the need for more freight research and in 2005 enacted the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), which authorized the creation of NCFRP. It will carry out applied research with the objective of improving the efficiency, reliability, safety, and security of the nation's freight transportation system.

NCFRP is sponsored by the U.S. Department of Transportation's Research and Innovative Technology Administration (RITA) and managed by the National Academies through its Transportation Research Board (TRB), with program guidance provided by an Oversight Committee comprised of a representative cross section of freight stakeholders. The Oversight Committee developed a Strategic Plan (see page 9).

Current and Completed Projects

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NCFRP-01. Review and Analysis of Freight Transportation Markets and Relationships

Objective: Develop a freight primer that offers public-sector decision makers a deeper understanding of the importance of freight, the factors that drive private freight decisions, and the interaction of public policy with the public- and private-sector decision-making processes.

The primer will provide guidance and a discussion framework for public-sector decision makers so that they have an improved understanding of how public policies influence freight transportation markets and private freight decisions. The research will focus on current and future demand for freight transportation (in the context of global and national economic trends and advanced business logistics practices) and should serve as a foundation for future research.

Research Agency: Global Insight

Contract Amount: \$250,000

Status: Complete

NCFRP-02. Impacts of Public Policy on the Freight Transportation System

Objective: Identify intended and unintended impacts (either direct or indirect) of a broad array of public policies on the freight system, promoting a better understanding of these complex relationships and fostering appreciation for how public policies affect the freight transportation system.

Research Agency: ICF

Contract Amount: \$390,000

Status: Complete

NCFRP-03. Performance Measures for Freight Transportation

Objective: Identify measures to gauge the performance of the freight transportation system.

The measures should support investment, operations, and policy decisions by a range of stakeholders, both public and private, and reflect local, regional, national, and global perspectives. Areas of emphasis should include, but not be limited to, efficiency, effectiveness, capacity, safety, security, infrastructure condition, congestion, energy, and environment.



Research Agency: Gordon Proctor and Associates
Contract Amount: \$300,000
Status: In Publication

NCFRP-04: *Operational and Low-Cost Improvements to Freight Transportation System Performance*

Objectives:

- Develop a more standardized description of the dimensions of the freight system (e.g., elements of each mode and across modes, stakeholders, types of mobility constraints) that will help improve communication among freight-system decision makers and stakeholders and facilitate examination of freight-system mobility constraints and the operational practices or system enhancements used to address these constraints;
- Analyze explicitly the business practices and institutional factors that influence freight-system decision makers and stakeholders as they respond to freight-system mobility constraints and regulatory and other public policy initiatives;
- Develop a methodology that private- and public-sector decision makers can use to identify, categorize, and evaluate quickly implementable, low-cost capital, operational, and public policy actions that can enhance freight mobility by addressing system constraints; and
- Apply that methodology in a generic way to create a catalog of actions that may be most useful in addressing the nation's freight-system mobility constraints.

Research Agency: Battelle
Contract Amount: \$750,000
Status: Complete

NCFRP-05. *Framework and Tools for Estimating Benefits of Specific Freight Network Investment Needs*

Objective: Develop a comprehensive analytical framework and related tools for estimating public and private benefits to evaluate potential freight infrastructure investments (including investments in new, replacement, maintenance, and operational systems), as well as potential funding sources.

The framework should be based on a multidimensional matrix and related tools that can be used to guide the allocation of project costs among (a) private-sector freight transportation modes and shippers and (b) public-sector transportation interests such as Metropolitan Planning Organizations (MPOs), states, multi states, and freight transportation corridors.

Research Agency: Cambridge Systematics
Contract Amount: \$1,000,000
Status: Under Way (completion date, March 2011)

NCFRP-06. *Freight-Demand Modeling to Support Public-Sector Decision Making*

Objectives:

- Investigate, identify, and report on high-priority, high-payoff improvements in freight-demand models and other analysis tools; and
- Develop a guidebook to assist model developers in implementing these improvements.

This project will select one or more of the highest-priority, high-payoff recommendations and develop a comprehensive process to implement the improvements. The recommendations included in the guidebook will ultimately improve the usability of freight-demand models and other analysis tools for public-sector decision makers at a range of geographical levels. The guidebook will relate freight-demand models and other analysis tools to planning; engineering; construction; and use of infrastructure, finance, environmental mitigation, systems operation, and economic impact.

Research Agency: Cambridge Systematics
Contract Amount: \$500,000
Status: Complete



NCFRP-09. Institutional Arrangements in the Freight Transportation System

Objective: Describe successful and promising institutional arrangements for improving freight movement, now and in the future.

Research Agency: Cambridge Systematics

Contract Amount: \$270,000

Status: Complete

NCFRP-11. Current and Future Contributions to Freight Demand in North America

Objective: Describe and analyze important demographic, economic, environmental, and other factors that may contribute to the future quantity; geographic distribution; temporal distribution of tons, ton miles, vehicle miles or train miles; and the value of freight to be moved in and through North America.

The research will

- Identify the factors and estimate the direction and relative magnitude of the influence of each factor on freight demand;
- Identify whether the effects are international, national, regional, or local;
- Assess whether the factor and its effects on demand will continue in the near and long term; and
- Identify factors that should be monitored to detect major changes in trends in the demand for freight transportation, including supply interactions.

Research Agency: Halcrow

Contract Amount: \$375,000

Status: Under Way (completion date, March 2011)

NCFRP-12. Specifications for Freight Transportation Data Architecture

Objectives:

- Develop the specifications for the content and structure of freight data architecture;
- Identify the value and challenges of the potential architecture; and
- Specify institutional strategies to develop and maintain the architecture.

This architecture should serve the needs of public and private decision makers at the national, state, and local levels.

Research Agency: Texas Transportation Institute

Contract Amount: \$300,000

Status: Complete

NCFRP-14. Truck Drayage Practices

Objective: Develop a guidebook that will identify potential metrics for measuring drayage productivity and improvements that can be made by stakeholders to increase throughput, reduce air pollution, improve freight mobility, and increase truck driver productivity at marine container terminals nationwide.

Research Agency: Tioga Group

Contract Amount: \$390,000

Status: Complete (in publication)

NCFRP-15A. Understanding Urban Goods Movements

Objective: Develop a guidebook that will improve public decisions affecting urban commercial motor vehicle movements for goods delivery.

The guidebook will include a detailed background discussion of urban goods movement and teaching case studies. The guidebook and case studies will help decision makers understand the potential impacts of their decisions on urban goods movements among the following categories: transportation infrastructure and operations; land use and site design; and laws, regulations, and ordinances applicable to urban areas.

The research should recognize the dynamic nature of supply chains and focus on the urban pickup and delivery system for end-user consumer goods including, for example, food, fuel, retail goods, repair services, mail and package delivery, and waste collection.



Research Agency: Wilbur Smith Associates
Contract Amount: \$500,000
Status: Under Way (completion date, February 2011)

NCFRP-16. *Representing Freight in Air Quality and Greenhouse Gas Models*

Objective: Evaluate the current methods used to generate air emissions information from freight transportation activities and determine their suitability for purposes such as (a) health and climate risk assessments, (b) prioritization of emission reduction activities such as through state implementation plans (SIPs), and (c) public education.

The evaluations will include an identification of the state of the practice, gaps, and strengths and limitations of current emissions data estimates and methods. The research results should better inform the near-term needs of public and private stakeholders regarding the quality of these data and guide future research that links freight activities with emissions.

Research Agency: ICF
Contract Amount: \$200,000
Status: Complete

NCFRP-17. *North American Marine Highway Operations*

Objective: Produce a white paper that evaluates the potential for moving intermodal containers, containers on chassis, noncontainerized trailers, or rail cars on marine highways in North America.

The research will assess the conditions for feasibility, identify barriers (e.g., economic, technical, regulatory, and logistical), and propose solutions for barrier elimination.

Research Agency: Texas Transportation Institute
Contract Amount: \$100,000
Status: Complete

NCFRP-18. *Synthesis of International Freight Scans*

Objectives:

- Consolidate and summarize findings from reports on the three following international scans on freight transport, with particular emphasis on the recommendations for changes in practices in the United States:
 - Freight Transportation: The European Market—2002;
 - Freight Transportation: The Latin American Market—2003; and
 - Freight Mobility and Intermodal Connectivity in China—2007
- Recommend new research areas to inform the NCFRP Oversight Committee.

Research Agency: F. Gerald Rawling
Contract Amount: \$20,000
Status: Complete

NCFRP-19. *Truck Tolling: Understanding Trade-offs When Using or Avoiding Toll Facilities*

Objective: Identify the value that goods movement businesses seek from the transportation system and their willingness to pay for that value.

The proposed research will look across the spectrum of freight markets and their subsectors to address questions of who pays the tolls, how the tolls relate to other operating costs, whether these costs can be passed on to the customer, and who makes routing decisions. It is intended to be expansive with regard to freight markets, exploring not only those that move the goods, but the shipping community as well.

This project is jointly funded by NCHRP.

Research Agency: PB
Contract Amount: \$300,000
Status: Under Way (completion date, June 2011)

NCFRP-20. *Guidebook for Developing Subnational Commodity Flow Data*



Objective: Provide state DOTs and MPOs with guidance for compiling commodity flow data sets appropriate for subnational analysis.

This will include techniques for disaggregating national data sets; procedures and methodologies for conducting local commodity flow surveys; a compendium of commonly available public and private data sources for use in constructing subnational commodity flow data sets; and procedures for compiling local, state, or regional commodity flow databases from these various resources.

Research Agency: Cambridge Systematics

Contract Amount: \$500,000

Status: Under Way (completion date, March 2011)

NCFRP-22. *Applying Benefit–Cost Analysis to Freight Project Selection: Lessons from the Corps of Engineers*

Objective: Summarize past studies and testimonies on the effectiveness of benefit–cost analysis at the Corps of Engineers, supplemented by interviews with past and present Corps officials and stakeholders.

Research Agency: TBD

Contract Amount: \$50,000

Status: TBD

NCFRP-23. *Economic and Transportation Drivers for Siting Freight Intermodal and Warehouse Distribution Facilities*

Objective: Provide public-sector practitioners in both the transportation and economic development fields with an understanding of key transportation and economic-related factors and strategies that must be considered when building intermodal terminals and warehouse distribution facilities.

Research Agency: CWS Consulting

Contract Amount: \$250,000

Status: Under Way (completion date, February 2011)

NCFRP-24. *Preserving and Protecting Freight Infrastructure and Routes*

Objective: Provide state and local officials, land use planners, transportation consultants, architects and developers with a state-of-the-practice review of current activities in this area.

It will provide information on best practices, innovative zoning or other ordinances currently used, mitigation options, as well as a guidebook, which the aforementioned groups can utilize as they plan and develop facilities in proximity to freight, port, and rail operations.

Research Agency: Christensen Associates

Contract Amount: \$500,000

Status: Under Way (completion date, June 2011)

NCFRP-25. *Freight Trip Generation and Land Use*

Objective: Estimate the amount of freight activity generated or attracted by different types of land use for state and local planning studies.

The research would extend truck trip generation estimates and guidebooks developed by the Institute of Transportation Engineers and the Truck Trip Generation Guide in NCHRP Synthesis 20-05/Topic 31-09.

This project is jointly funded by NCHRP.

Research Agency: Rensselaer Polytechnic Institute

Contract Amount: \$250,000

Status: Under Way (completion date, April 2011)

NCFRP-26. *Freight Transportation Cost Data Elements*



Objective: Identify specific types of transportation cost data required by national, state, and local transportation and economic development agencies; assess different strategies for collecting those types of cost data; and propose a strategy for obtaining the needed data.

Research Agency: Rensselaer Polytechnic Institute

Contract Amount: \$300,000

Status: Under Way (completion date, September 2011)

NCFRP-27. *Promoting Environmental Goals in Freight Transportation Through Industry Benchmarking*

Objectives:

- Identify and evaluate methods currently used to estimate, monitor, and regulate freight emissions (building upon the work in NCFRP-16); and
- Examine benchmarking in the freight industry to promote environmental goals, opportunities to use benchmarking in the freight emissions context, and the possible benefits of benchmarking by mode for air quality impacts around major freight hubs.

Research Agency: ICF

Contract Amount: \$300,000

Status: Under Way (completion date, June 2011)

NCFRP-28. *Truck Idling Scoping Study*

Objective: Develop the scope, methods, and cost estimates for obtaining national and regional estimates of the time spent idling by trucks, categorized by type of truck and activity served.

Research Agency: Booz Allen Hamilton

Contract Amount: \$200,000

Status: Under Way (completion date, October 2011)

NCFRP-29. *New Dedicated Revenue Mechanisms for Freight Transportation Investment*

Objective: Analyze the functioning and implications of 11 proposed revenue mechanisms and describe in detail the requirements and mechanics to set up and operate each of them.

The proposed revenue mechanisms are (1) customs revenues for freight transportation purposes, (2) container fees, (3) bill of lading fees, (4) weight-based tax, (5) weight–distance tax, (6) freight transportation value tax, (7) annual highway user vehicle tax, (8) annual highway miles traveled fee, (9) sales tax on motor vehicles, (10) national vehicle safety inspection tag, and (11) carbon tax or cap-and-trade proceeds.

Research Agency: Tioga Group

Contract Amount: \$500,000

Status: Under Way (completion date, February 2011)

NCFRP-30. *Web-Based Screening Tool for Shared-Use Rail Corridors*

Objective: Provide funding to revise any existing railroad simulation software as a web-based, freely accessible tool able to estimate the incremental and service costs associated with adding or improving passenger rail service on freight rail lines.

Research Agency: Decision Tek

Contract Amount: \$500,000

Status: Under Way (completion date, July 2012)

NCFRP-31. *Guidebook for Sharing Freight Transportation Data*



Objective: Provide a general framework for agreements for public–private sharing of freight data to support planning and management decisions. The products will include samples and case studies of successful public–private freight data sharing arrangements, with identification and analysis of the safeguards included to protect all stakeholders and model data sharing agreements.

Research Agency: Cambridge Systematics

Contract Amount: \$250,000

Status: Under Way

NCFRP-32. *Impact of Smart Growth on Metropolitan Goods Movement*

Objectives:

- To improve upon the means by which planning agencies can measure the performance of (freight) transportation systems; and
- To use these improved measures to model (freight) transport systems more accurately.

Research Agency: Puget Sound Regional Council

Contract Amount: \$250,000

Status: Under Way (completion date, April 2012)

NCFRP-33. *Impact of Environmental Regulations on the Supply Chain*

Objective: To better understand the economic drivers and competition considerations of supply chain businesses with respect to current and future air quality and greenhouse gas emission regulations.

Research Agency: Halcrow

Contract Amount: \$400,000

Status: Under Way

NCFRP-34. *Alternative Technologies for Container Freight Movements*

Objective: Conduct an industry review of alternative technology to move ocean containers or truck trailers, including those such as magnetic levitation, the Texas Transportation Institute’s Universal Freight Shuttle, and future concepts still on the drawing board. The outcome would be an effective methodology to provide an unbiased evaluation of current and future technologies using proven benefit–cost analysis techniques.

Research Agency: Tioga

Contract Amount: \$300,000

Status: TBD

NCFRP-35. *The Great Lakes Region Impacts on the Intermodal Freight System*

Objective: Describe the current state of freight transportation in the Great Lakes region, the impediments that lead to inefficiencies, and practical steps that could raise intermodal freight performance in the region.

Research Agency: CPCS

Contract Amount: \$300,000

Status: Under Way (completion date, February 2012)



NATIONAL COOPERATIVE FREIGHT RESEARCH PROGRAM STRATEGIC PLAN

VISION

Relevant and credible information will be used by policy makers to make the nation's multimodal freight transportation system more efficient, reliable, safe, and secure.

MISSION

The National Cooperative Freight Research Program will conduct research and disseminate timely findings that will inform investment and operations decisions affecting the performance of the freight transportation system.

OBJECTIVES AND STRATEGIES

I. ANALYZE THE BUSINESS OF FREIGHT TRANSPORTATION

Trends in the global and national movement of freight and business logistics will likely place greater demands on the nation's freight transportation system. NCFRP research will provide better information and clearer insight into the market-driven factors that lead and respond to current and future freight demand.

- A. Describe the U.S. multimodal freight transportation system, highlighting the interactions among the modes and intermodal connections;
- B. Provide a deeper understanding of the factors that drive freight demand and the major trends that will shape future demand; and
- C. Describe the effects of the various public subsidies, incentives, taxes, and regulations that affect the freight transportation system.

II. DEVELOP RELIABLE DATA AND TOOLS FOR ANALYSIS OF FREIGHT TRANSPORTATION

Successful decision making is based on credible and reliable analysis, which itself depends on quality data. NCFRP research will identify improvements in collecting, analyzing, and using data and will develop tools for analyzing and managing the impacts (e.g., economic, safety, security, environmental, health, energy, community) of freight transportation decisions.

- A. Define performance measures that should be used to gauge the effectiveness and efficiency of the freight transportation system;
- B. Identify data sources and gaps for each performance measure;



- C. Recommend improvements in collection, analysis, and use of data on the performance of the freight transportation system;
- D. Improve freight-flow models for use in making decisions that affect the freight transportation system; and
- E. Develop methods for examining the community and environmental impacts of different freight strategies.

III. EXPLORE OPERATIONAL IMPROVEMENTS IN FREIGHT TRANSPORTATION

Enhancing system performance does not focus solely on providing new infrastructure but also includes operational strategies and more efficient management of existing capacity. NCFRP research will provide guidance on implementing promising operational and system management improvements.

- A. Describe operational practices and low-cost system enhancements that have been successful in maximizing the utility of the existing freight transportation infrastructure;
- B. Catalog ways in which those responsible for moving freight respond to constraints on the capacity of the freight system; and
- C. Examine the effect of pricing and other economic strategies in providing more efficient utilization of the transportation network.

IV. EVALUATE INVESTMENT DECISIONS FOR ADDING PHYSICAL CAPACITY TO THE FREIGHT TRANSPORTATION SYSTEM

Quantifying benefits, including return on investment, is an important input into decision making. NCFRP research will provide information and guidance on making sound decisions for adding capacity where investment makes economic sense.

- A. Evaluate how public sector decisions affect the performance of, and contribute to the return on investment in, the multimodal freight transportation system;
- B. Recommend analytical tools that transportation agencies can use to assess freight infrastructure investments and to facilitate comparisons among alternative improvements, including those in different modes; and
- C. Examine factors related to the success of innovative projects that enhance system productivity, such as truck-only lanes.



V. IDENTIFY WAYS TO STRENGTHEN THE INSTITUTIONAL FRAMEWORK FOR THE FREIGHT TRANSPORTATION SYSTEM

Institutional capacity is often a prerequisite for successful planning and implementation of freight-oriented strategies. NCFRP research will identify institutional barriers, organizational capacity issues and innovative solutions to freight transportation challenges. Of particular interest is the evolving concept of public–private partnerships that often does not conform to jurisdictional boundaries nor to the traditional dividing line between government and business.

- A. Describe successful institutional mechanisms for the current and future freight industry;
- B. Identify potential changes in existing institutions to address needs and opportunities for efficient freight transportation; and
- C. Examine and assess the advantages and disadvantages of evolving public–private partnership arrangements for providing transportation infrastructure, in particular as they foster improvements to the movement of freight.



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