

The Federal Role in Freight Transportation Data

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Summary

This paper explores the role of the federal government in collecting and disseminating data on commodity flows and related freight activity. Several strategies for nationwide collection of data on local conditions are highlighted, considerations in the selection of a desired strategy are identified, and steps toward developing a consensus on the appropriate federal role and strategy are suggested. Comments should be directed to Rolf Schmitt at 202-366-9258 or <Rolf.Schmitt@fhwa.dot.gov>.

Introduction

The federal government has collected nationwide data on commodity flows and related freight transportation activity for over 40 years. The Commodity Flow Surveys of 1993, 1997, and 2002 were preceded by the smaller Commodity Transportation Surveys of 1963 through 1977 and an unpublished edition in 1983. The Rail Waybill, Waterborne Commerce Statistics, and the Vehicle Inventory and Use Survey are as old or older. These freight data programs were designed to meet national needs, and generally do not provide geographic detail below states in publicly available products.

A recent study by the Transportation Research Board (TRB) called for a national freight data program to support project planning and design. [1] The study did not explore the role of the federal government or other public and private entities in providing such locally detailed data nationwide.

The federal government has clear mandates to provide data on freight movements, but a consensus on the types of data, geographic detail, and strategies for obtaining the data has not been developed. This paper is intended as a first step in the discussion of issues and strategies for meeting local freight data needs with a national program.

The Federal Perspective

The federal government has had an interest in freight transportation issues at least since 1808, when Secretary of the Treasury Albert Gallatin sent a report to the Senate on potential federal-state-private partnerships to finance canals and roads. [2] Four decades later, Congressman Abraham Lincoln spoke eloquently of the need for federal investments in domestic transportation. He articulated a set of statistics, including “the surplus, that which is produce in one place to be consumed in another; the capacity of each locality for producing a greater surplus; the natural means of transportation, and their susceptibility for improvement; the hindrances, delays, and losses of life and

property during transportation, and the causes of each” to “save us from doing what we do in the wrong places” and went on to say:

“These statistics might be equally accessible, as they would be equally useful, to both the nation and the States. In this way, and by these means, let the nation take hold of the larger works, and the States the smaller ones; and thus working in a meeting direction, discreetly, but steadily and firmly, what is made unequal in one place may be equalized in another, extravagance avoided, and the whole country put on that career of prosperity, which shall correspond with the extent of territory, its natural resources, and the intelligence and enterprise of its people.” [3]

Lincoln’s view was echoed in federal legislation during the 1990s, which directed the Bureau of Transportation Statistics of the U.S. Department of Transportation to provide “information on the volumes and patterns of movement of goods, including local, interregional, and international movement, by all modes of transportation and intermodal combinations, and by relevant classification” (49 USC 111 (d)(3)(A)) and to make sure that its “data relating to the performance of the transportation systems of the United States” are “relevant to the States and metropolitan planning organizations.” (49 USC 111 (c)(2))

The federal interest in freight transportation and freight data reflects the interstate nature of commodity flows. Economic activity and the commodity movements generated by that activity typically extend well beyond the boundaries-and thus monitoring capabilities-of states and localities. Even trucking, considered primarily a form of short distance transportation, is heavily interstate when measured in ton miles. Shipments originating or destined out of state or just passing through account for a majority of ton miles moved by truck in all but two states. [4] Through-movements alone account for a majority of ton miles by truck in 21 states.

While the federal government is the only public entity with a geographic domain large enough to capture interstate freight movements nationwide, it does not necessarily have the interest or resources to track the significant variations in freight activity among individual localities. Current freight data programs monitor large scale shifts in commodity flows among regions. Locally significant, small scale shifts are not necessarily a federal concern and are much harder to measure accurately in a national data program.

The Local Perspective

The demand for data on local commodity flows and related freight activity is clearly spreading, but the data elements of interest and desired level of geographic detail are not necessarily uniform across states and localities. Until recently, the demand was limited primarily to a few major cities with ports or other international gateways. Interest in local commodity flow data has spread as more communities make plans for public investments in freight facilities to support the local economy, and as more agencies wonder how to accommodate predicted growth in freight traffic on increasingly

congested highways and railroads. However, economic development and freight transportation issues in large metropolitan areas are very different from rural areas, and may require different types of data.

The recommendation for a national data program to support project planning and design requires collection of data on commodity flows within and among counties. There are:

- 3,141 counties and county-equivalent jurisdictions;
- approximately 25,000 places identified by the Census Bureau;
- approximately 33,000 geographic zip codes identified by the Postal Service; and
- approximately 65,000 census tracts identified by the Census Bureau, which are similar to traffic analysis zones used in metropolitan planning.

Just for flows among counties, the required size of data collection programs to provide the geographic detail is enormous. A matrix of county-to-county flows by 20 types of commodities and 5 modes of transportation has 987 million cells. While a large number of those cells should be empty, the statistical requirements of reliably estimating even a small fraction of that matrix exceeds what can be reasonably measured by nationwide surveys and current reporting systems. The Commodity Flow Survey requires observations of over 10 million shipments just to estimate reliably flows among only 106 multi-county regions.

Passenger flow data are available at the census tract level in many cities where metropolitan planning organizations have conducted local household surveys and expanded the results with urban travel demand models, occasionally updating the estimated flows with decennial census data and local traffic counts. A similar tradition of local data collection does not exist for freight, and the state of the art in modeling freight flows is far behind the half-century evolution of urban travel demand models.

Is the federal role to provide freight data for small areas, provide standards and requirements for freight data, stimulate data collection in freight data similar to urban travel data, or something else?

Strategies for Nationwide Collection of Small Area Data

There are at least six strategies for creating a national set of data on flows among counties or smaller geographic areas:

1. National Census. Nationwide demographic and housing data for small areas are collected from a complete census of households every 10 years at a cost in the billions of dollars. Travel to work, historically asked of a large percentage of respondents to the decennial census, is now measured through a massive, continuous survey that adds up to a national census over time. A complete census of business

establishments for revenue, payroll, and basic production data is conducted every five years at a cost in the hundreds of millions of dollars.

2. **Nationally Required Local Data Collection.** State and local governments are often required to collect data on local conditions as a prerequisite for federal grants, or to meet public health and safety needs. The Highway Performance Monitoring System is an example of this strategy; states are required to collect data elements determined by the Federal Highway Administration as a prerequisite for receiving federal grants for highway construction and preservation.
3. **National Architecture for Local Data Collection.** Rather than mandate local data collection, the federal government can set standards to guide local data collection whenever it occurs. The National Intelligent Transportation Systems Architecture and the National Spatial Data Infrastructure are examples of national standards to support the exchange and integration of locally collected data into a national picture.
4. **National/Regional Control Totals Guiding Local Collection.** Many national and regional statistics are used by state and local governments as a context for local data collection. This is the planned approach for improvement of the Freight Analysis Framework, in which flows among states and major metropolitan areas can be used as sample frames for local freight studies.
5. **Commercial Sources.** While many commercial vendors repackage or supplement public data, a few vendors have created nationwide data sets through relationships with private companies. For example, Dunn and Bradstreet provides place-specific data on company characteristics as a by-product of credit ratings, the Journal of Commerce tracks individual imports and exports through its PIERS system, and Reebie Associates estimates county-to-county commodity flows through a data exchange with major intercity transportation carriers.
6. **Best Practice Guidelines.** This is the current practice in urban travel monitoring. Each state and metropolitan planning organization collects data its own way, sometimes building on patterns from the decennial census. Standardization is encouraged through clearinghouse activities to promote best practice.

Considerations

The effectiveness of each strategy for developing small area data depends on: costs to the government and to respondents; funded versus unfunded mandates; data needs; national consistency versus targeting to local conditions and issues; transparency, accountability, and confidentiality; new data collection technology; and stimulating local freight knowledge and data user diversity.

With respect to costs:

- How much does each strategy cost the public sector?

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- How much does each strategy cost the federal government?
- How much does each strategy cost the respondent in reporting burden?

With respect to funded versus unfunded mandates:

- Are costs to the government absorbed by a federal program, are they an eligible expense for a mandatory program, are they an eligible expense for voluntary program, or are they an unfunded reporting requirement?
- Can incentives be used as effectively as mandates?

Are data to support national policy and nationally significant projects the same as data to support local planning and local projects in terms of geographic specificity; geographic reach; industry and commodity detail; and relationships to economic development, land use, and other issues related to transportation?

How does the strategy balance data that are nationally consistent with data targeted to local conditions and issues?

- How different is the freight transportation environment among major ports and other international gateways?
- How does the freight transportation environment vary from international gateways to domestic hubs of freight activity, central cities, and rural areas?
- Can these environments be measured by a standard set of variables?

With respect to transparency, accountability, and confidentiality:

- How much transparency of data and collection methods is essential for credible policy, apportionments, system planning, project design, and regulation in an increasingly litigious society?
- Do transparency requirements change for public or private sectors between estimating the present and forecasting the future?
- Who should be accountable for data quality?
- Can confidentiality be maintained in the face of transparency and national security requirements?

With respect to potential benefits and pitfalls of new data collection technology:

- Intelligent Transportation Systems, Global Positioning Systems, Radio Frequency Identification Device tags, and other remote sensing of vehicles and cargo are becoming affordable and more widespread. Are we finally (again) on the cusp of

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promised improvements in data coverage, detail, and quality with inexpensive, unobtrusive, and accurate technology?

- How do we deal with increasing fragmentation, narrowness, and unknown quality of new data sources?
- How do we encourage serendipity while trying to mitigate spurious data?
- How does new technology change the balance of transparency, accountability, and confidentiality?
- How do national security interests affect the ability of new technology to deliver its promise to the public?
- Does new technology force new public and private relationships or exacerbate old issues?

With respect to stimulating local freight knowledge and to diversity of data users:

- If we cannot meet all local planning needs with national data, how do we keep overextended national data from becoming a substitute for local knowledge?
- How do we support the democratization of freight data and understanding of its proper use among local agencies, “mom and pop” consultants, academic researchers, public interest groups, small shippers and carriers, and interested citizens?

The desired strategy or combination of strategies ultimately depends on whether local decisionmaking needs are best met with a complete, detailed picture of local freight activity provided by the federal government, or with a federally provided context of how the locality fits with the national (and increasingly global) world of freight and a locally provided understanding of local freight activity .

Next Steps

The evolution of a national freight data program would benefit from a more complete and rigorous evaluation of strategies for small-area data collection; discussion of how technology and security may change the strengths and weaknesses of each strategy; development of an explicit understanding of federal, state, local, and private sector freight data needs and data collection abilities; and development of a consensus on appropriate roles. This paper is a starting point for the discussions needed to move towards an effective national freight data program to serve national and local needs.

References

[1] Transportation Research Board, *A Concept for a National Freight Data Program*, Special Report 276 (2003)

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[2] U.S. Secretary of the Treasury, Report on Roads and Canals, *American State Papers, Miscellaneous*, 1: 724-741 (April 4, 1808)

[3] Internal Improvements, Speech of Mr. A. Lincoln of Illinois in the House of Representatives, June 28, 1848, *Cong. Globe*, 30th Cong., 1st Sess. 709-711 (1848)

[4] U.S. Department of Transportation. Letter of the Director, Bureau of Transportation Statistics, to Senator Daniel Patrick Moynihan concerning domestic movements of international trade by truck (September, 1997).