



These Digests are issued in the interest of providing an early awareness of the research results emanating from projects in the NCHRP. By making these results known as they are developed and prior to publication of the project report in the regular NCHRP series, it is hoped that the potential users of the research findings will be encouraged toward their early implementation in operating practices. Persons wanting to pursue the project subject matter in greater depth may obtain, on a loan basis, an uncorrected draft copy of the agency's report by request to: NCHRP Program Director, Transportation Research Board, 2101 Constitution Ave., N.W., Washington, D.C. 20418

## Freight Data Requirements for Statewide Transportation Systems Planning

*An NCHRP staff digest of the essential findings from the final report on NCHRP Project 8-17, conducted by Roger Creighton Associates, Delmar, New York. The Principal Investigator on the project was Frederick W. Memmott. The firm of R. L. Banks Associates served as a subcontractor.*

### THE PROBLEM AND ITS SOLUTION

Many state departments of transportation and other agencies are currently involved in planning highway, rail, air, pipeline, and water facilities needed to serve existing and future freight flows. Because this is a relatively new focus, the DOTs often are not familiar with the kinds of freight data needed for such planning. Furthermore, little is known about currently available data, especially their reliability, compatibility among different sources, temporal continuity, units of aggregation, and costs.

Because freight planning on a statewide basis is in the early development stage, there is a need to build a core of knowledge and understanding about goods transport, especially the identification of existing freight data source material upon which future transportation planning can be based. Also, there is a need to develop methods for assembling basic freight data. The purpose of this project was to determine what the data requirements are for statewide freight transportation planning and to prepare a manual describing how states can obtain primary and secondary data.

This project resulted in an extensive catalog of freight data sources for immediate use by state and regional planners. Procedures and techniques for obtaining primary and secondary data are described in clear and understandable language. They are directly usable; however, each state should assess its own particular planning requirements before initiating a data collection program. The specific techniques presented in the user manual were taken from previous planning studies and offer a

high probability of successful application by other agencies. The results of this project have direct application to current practice and will serve as a long-term reference during the development of a more comprehensive freight planning process.

## FINDINGS

Because of the immature state of the art of freight transportation planning, there is a great diversity of (a) problems and issues, (b) possible state roles in freight planning, and (c) geographic/jurisdictional levels at which problems occur. As a result, there is currently neither a consensus as to a formalized process by which different planning activities can be combined to produce a plan, nor, in fact, any agreement as to the content of a freight plan.

The research team found, through examining 74 major freight problems/issues:

- The greatest data need for all modes was for physical and operating data, especially information on facility location, operation characteristics, use, and capacity. This data need is especially important during the beginning phases of freight planning.
- There is a strong need for information on vehicle flow, plant condition, and capital and operating unit costs.
- Data supporting impact estimation are of moderate importance, especially data relating transportation system change to public health and safety. Of lesser importance is detailed information on the carriers themselves and the attributes of shippers and receivers.

Five types of planning activities and analysis techniques were examined to determine specific data requirements. Key findings from this examination include:

- Demand Forecasting. Due to the interdependency of freight or commodity flow and macroeconomic data in forecasting, freight demand forecasts can be no better than estimates of total economic growth and change. Trend extensions and simple correlations of traffic flow data with macroeconomic variables, which represent the current state of the art, must ultimately be replaced by more advanced techniques that take into account economic interdependencies, differential regional growth and specialization, and technological change.
- Mode Choice Analyses. The interdependency of data and theory, and the lack of consensus among professionals on both data and theory, indicate that much developmental work remains to be done before mode choice models can be readily applied by state planners to freight statewide transportation systems planning. Model development has been hampered by the scarcity of suitable traffic flow data containing transport level of service and/or commodity attributes.
- Network Analysis. Mechanical assignment methods must be developed further to simulate more realistic routings of freight traffic. The development of these more refined methods is directly related to improvements in traffic flow data availability.
- Economic Evaluation. Methods for developing cost, rate, transport time, and time reliability information must be further developed to support economic evaluation activities. Cost and rate data are so specialized, difficult to understand, and changeable over time as to effectively preclude direct state involvement with original data sets.
- Impact Estimation. Techniques for impact estimation, while originally developed primarily for application at the project level, can be adapted to use in systems planning to the extent that supporting traffic, operating, and physical data are available as well as information on ambient conditions necessary to determine air, noise, and water pollution impacts. More refined estimates of unit energy consumption and emissions productions are also needed to more closely simulate actual conditions.

Numerous data sources were identified for use in freight statewide transportation systems planning. However, these data are not all in the form or in the degree of detail needed for planning purposes. The final report for this project describes 77 principal data sources, 114 other sources, and 34 reference sources. The documentation of each principal data source includes the following items: (1) title, (2) mode, (3) type of data, (4) collected by (agency), (5) form (magnetic tape, hard copy, microfiche), (6) time period covered, (7) abstract/key words, (8) issued by (agency), (9) form of issued data, (10) price, (11) coverage, (12) relevant content of source file, (13) available summaries, (14) description of collection process, (15) significant exclusions of data, (16) future update or extension plans, (17) data availability/constraints on dissemination, and (18) evaluation/comments. The documentation of other data sources and references is in less detail, but still is sufficiently complete to give the user a clear idea of the contents of each source.

For each of 31 freight data categories, the researchers assessed both availability and quality. The frequency of use for statewide transportation systems planning was also considered to determine the criticality of deficiencies and unmet data needs. The most important unmet data needs include:

- Commodity flow and traffic flow data.
- Routing data.
- Rates/tariffs data.
- Transport level-of-service data.
- Unit cost data (capital and operating).

Strategies to reduce deficiencies and generally to improve the quality of data available to the states differ as a function of the data category and the criticality of the deficiency. Five basic strategies for improving the quality and quantity of available data were identified: (1) assembling similar data sets, (2) publishing and disseminating data, (3) establishing close working relationships with carriers, (4) expanding the sample rates of federal data sets, and (5) expanding the Census of Transportation.

For certain types of physical and operating data, states can best assemble the required data. Given the administrative and technical difficulties involved and the relatively high cost of new surveys, states are not advised to conduct their own primary surveys except in cases (such as a shipper's survey) where limited, specialized information is required that is not available from any other source. States should basically rely on existing secondary data for freight transportation systems planning purposes.

## APPLICATIONS

The final research report and user manual provide the following items for use by state and regional transportation planners:

1. A practical procedure for determining data needs.
2. A review of available techniques and a list of their data requirements.
3. An extensive catalog of available secondary data.
4. A description of the processes needed to assemble two types of new freight data most commonly required by the states.

The first two items provide a means to relate specific freight planning problems to available analysis techniques and data requirements. Guidance is also provided for states in which a more comprehensive freight planning process is being considered.

The catalog of freight data may be the most significant product of this research

and should prove to be of immediate use as well as constituting a long-term reference for state planners. The time and effort required to locate needed data should be greatly reduced through use of this catalog.

For data that are not available from secondary sources, the fourth item provides a guide to the assembly of primary data. The research work disclosed that the most common requirement for new data was for information on the shipment and receipt of freight. Second to this was the need for data on freight networks. For these two cases, directions are given on techniques for conducting the surveys needed to obtain the desired data.

The final report and user manual are now being edited for publication in the regular NCHRP report series. In the interim, loan copies of the agency draft are available as noted in the heading.

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National Research Council  
2101 Constitution Avenue, N.W.  
Washington, D.C. 20418