

# **Surveys of Freight Shippers and Carriers: Lessons Learned**

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## **Abstract**

Oregon has given serious consideration to freight movement within its borders as demonstrated in a series of recent efforts. These efforts have made significant progress in developing an inventory of freight movement facilities and companies and in developing better freight planning tools and information databases. Recent interviews with freight shippers, receivers and carriers in the Portland area have produced valuable information for transportation planning. These interviews have significantly increased the understanding of the region's transportation planning agencies about how freight is moved in the region. The interviews have provided valuable information about the logistical process by which goods are shipped from origin to destination, how those logistical decisions are made, how congestion affects business costs and logistical decisions and where the existing transportation system could be improved to improve freight mobility. As part of a new effort to survey freight shippers and carriers statewide in Oregon to identify impediments to freight movement, the research team has reviewed the previous surveys in Oregon and thirty four survey efforts from other parts of the US and Australia. This paper provides a summary of what has been learned about freight logistics from all of these efforts but also summarizes what has been learned about surveying of freight shippers and carriers.

## **Background for Analysis of Freight Movement in Oregon**

Oregon has given serious consideration to freight movement within its borders as demonstrated in a series of recent efforts. These include:

- Development of the Oregon Intermodal Management System
- Development of a Statewide Freight Forecasting Model (and data collection to support the model development)
- Establishment of the Oregon Freight Advisory Committee
- Preparation of the Research Report *Freight Moves the Oregon Economy*
- Development of a Portland Area Freight Forecasting Model (and data collection to support the model development)
- ODOT Interviews with 62 Shippers and Carriers for the I-5 Trade Corridor Study
- Port of Portland Interviews with 13 Shippers and Carriers about Freight Mobility

These efforts have made significant progress in developing an inventory of freight movement facilities and companies. They have also identified a primary trucking network and assessed the current and potential future level of service on that network. This paper describes research performed in preparation for a statewide freight shipper and carrier survey to determine what the state's shippers and carriers perceive the most serious impediments to freight movement to be. This represents the next step for ODOT and the other transportation agencies in the state to improve their understanding of freight movement and the needs for improvement.

Prior to beginning the process of drafting a survey questionnaire for the Oregon Statewide Freight Shipper and Carrier Survey, the research team reviewed thirty-four other freight surveys that had been implemented. A summary of the surveys is presented in Table 1. A majority of the surveys were designed to gather truck trip information that could be used to develop a freight model or be used in other ways to reflect freight movements in urban transportation planning. Seventeen of the surveys also sought the respondent's opinions on where there were problems or impediments to freight movement.

### **Options and Tradeoffs**

The previous efforts reviewed revealed that there are a number of options for surveying firms about freight movements on the highway system. Each option generally has advantages but there are also tradeoffs in cost, quality of response, depth of response or response rate that must be considered. An approach that achieves the highest response rate may cost more or may result in less data being collected on each firm. Based on the review of prior work, the following list of options should be considered in designing a freight mobility survey.

1. **One Company Questionnaire versus Separate Company Questionnaires for Shippers and Carriers (and possibly other divisions)** – Are the practices of

- shippers sufficiently different from those of carriers to justify a separate survey questionnaire? Is other stratification necessary?
2. **Survey Transportation Managers Only versus Survey Managers and Drivers** – Who is the best person to complete the questionnaire? Who will be most knowledgeable about the logistical practices and needs of the company?
  3. **Direct Driver Contact versus Distribution to Drivers by Managers** – If the survey is to get information from drivers, what is the best way to get the questionnaire to the drivers?
  4. **Focus on Truck Movements Only versus focus on All Modes of Freight (Rail, Ship, and Air also)** – Can surveying focus on the truck movements only or does the information need to be multi-modal to be meaningful?
  5. **Explore problems through Open-Ended Questions versus Structured List of Possible Problems** – How structured can the survey be and still capture unusual or unanticipated practices?
  6. **Ask the respondent to Rank Problems versus List Problems Only** – When the survey seeks information about problems in the transportation network, is it important to get a relative ranking of problems?
  7. **Ask about problem and practices for Inbound and Outbound freight movements or Outbound Only** – Will surveying about outbound shipping capture all of the freight movement dynamics of interest (all shipments have an outbound and inbound dimension)?
  8. **Use a Written/Self-Completing Questionnaire versus Interviewing (by phone or in person)** – Will the surveying require the intervention of an interviewer to capture the details and intricacies of the freight movement patterns and concerns?
  9. **Use Cold Mailing of written questionnaire versus Pre-Arranged Participation** – If a self-completing questionnaire can be used, is some effort to pre-arrange participation required in advance in order to achieve a reasonable response rate?

## **Lessons Learned for Previous Freight Research in Oregon**

The recent surveys have also revealed much about interviewing private businesses involved in shipping, receiving and carrying goods. These lessons about surveying in the freight industry can be valuable to new efforts to gather freight movement information through surveys. The following are some of the most important lessons learned:

- **Freight movement logistics are complex** – There are many ways in which freight can be moved from origin to destination. The shipment size may change as shipments are broken down for distribution. The timing of shipments can also be changed to fit better within an overall logistics plan for a company. As a result, a survey instrument designed for freight analysis must have some flexibility to record all the necessary information about these complexities and be able to reflect unique practices in the freight movement logistics. There are very few “fixed” practices. It helps to have different forms for manufacturers, distributors and carriers, but companies also do not always fit exclusively into one of these categories.

- **Methods of shipping freight are changing rapidly.** – Since freight moving industries were deregulated and computerization allowed tighter inventory control, there have been dramatic changes in how freight is shipped. There is more less-than-truckload shipping and more use of parcel delivery services, there is more backhaul shipping and more inventory is maintained in trucks on the highway rather than in manufacturing plants, warehouses or stores just to name a few. If the statewide survey is to gather information about how freight is being shipped, the survey questionnaire must allow sufficient flexibility to pick up on the changes that are occurring.
- **It is not easy to get participation from private businesses** – While most businesses want to provide information that will improve freight mobility, profitable operation is almost always their top priority. As a result, it is often difficult to get adequate participation. Mail-out mail-back surveys have notoriously low response rates but getting cooperation in an in-person interview also takes considerable work. In recent efforts, many companies had to be called back repeatedly before agreeing to participate. While this is primarily an issue of survey method rather than content, it also has implications for how a survey questionnaire is designed. The questionnaire or survey guide should request information that the person or persons being surveyed from the company can answer fairly readily. It should also be obvious from the questions asked how the survey will be useful to improving freight mobility. Many companies considered how they handle their freight movement proprietary information and only want to discuss it if it is obvious that it will help improve freight mobility for them.
- **Limit the number of issues covered in the survey.** - Because of the complexity of freight movement logistics a survey should focus on a limited number of issues so that sufficient depth of understanding on those issues can be achieved. Some of the most valuable information from the Portland-area interviews came from the individual stories told by the respondents about how they perceive and deal with transportation problems.
- **Survey the right person.** – If a survey questionnaire seeks to gain too much or too many kinds of information, it is likely that more than one person within a company will have to help in answering the questions. Such a situation may result in a logistical nightmare arranging an in-person or telephone interview or increase the chance that a mail-out/mail-back survey will not be completed and returned. A transportation manager will generally know the most about decisions about how goods are shipped and received or how a carrier will get the goods from the origin to the destination. However, the transportation manager may not know how congestion impacts company costs or profitability. Such information may have to come from someone more directly involved in the financial accounting of the firm. The transportation manager may know much about how and when and by what route shipments are made but may not be as able to describe the location and nature of congestion, weather problems or other barriers to travel as a driver. Being able to

survey the right person will depend on maintaining a fairly narrow focus in the survey.

- **Explore the reasons why transportation bottlenecks are a problem and how they affect the business.** The Portland-area interviews found that within the metropolitan area shippers and carriers “scheduled around” many problems in the network. When congestion consistently restricted travel speeds or travel time reliability on a particular portion of roadway, shippers and carriers did all they could to avoid shipping across that segment during the times when it was congested. The recent surveys demonstrated that all roadway segments with peak-hour congestion from commuting did not necessarily cause problems for freight movement even if the routes carried a significant freight volume on a daily basis. It was only when the freight movements and congestion overlapped both spatially and temporally that a problem existed for the shippers and carriers. In the upcoming statewide survey, it will be important to ask not only about where the respondent perceives problems to exist on the highway network, but also the degree to which the company’s freight shipments are affected by the problem locations. It will be important to know during what hours of the day shipments are hindered, and how that affects company’s logistical decisions.
- **Nonrecurring congestion is a significant problem.** – Congestion caused by accidents, incidents or weather – was frequently mentioned as a major problem for shippers and carriers. The companies could not schedule around this unpredictable and irregular component of congestion. The statewide survey should include questions about nonrecurring congestion and explore ways of reducing its impact on freight movement.
- **Access to the major highways was as important as level of service on the major highways.** – Although level of service on the major highways in Portland was a significant concern to the companies interviewed in the Portland region, problems on the local access roads to the freeways and to the major freight terminals were also sources of significant concern. Many of the improvements that were suggested in the interviews related to signal timing, railroad grade crossings or improvements in turning radii. The statewide survey should solicit input about perceived problems on and off of the state’s major highway network.

**Table 1**  
**Summary of Prior Freight Survey Efforts**

<b>Survey Effort</b>	<b>Survey Contents</b>
Kentucky Transportation Cabinet Hall, Hill and Agent (TRR 1653)	Interviews conducted with 50 truck-trip generators to get adequacy ratings for intermodal routes.
Southeast Michigan COG (1998)	Registered-commercial –vehicle-based survey of travel activity.
Oregon Motor Carrier Transportation Branch (1998)	Mail-out survey to trucking companies asking how the MCTB was doing.
Sacramento Area Council of Governments (1996)	Mail-out/Mail-back survey of aggregate trucking activity by companies and a request for “Driver’s Daily Logs”.
Census of Transportation – Vehicle Inventory and Use Survey (1997)	Registered-commercial-vehicle-based survey. Collected data on vehicle characteristics, maintenance and aggregate data on use.
New York Metropolitan Transportation Council (1996)	Survey of truck terminals and warehouses designed to locate highway bottlenecks.
Saskatchewan/North Dakota	Survey of trucks operated over the border. Requested truck type, where registered, origin and destination, route and experience at border crossing.
Washington State Department of Transportation	Intercept truck-based survey. Requested company characteristics, truck characteristics, load characteristics, origin type, destination type, and route used.
San Francisco-Oakland Bay Bridge and Port of San Francisco Truck Traffic Surveys	Both surveys were very brief intercept interviews designed to get origin, destination, trip frequency, truck type, route, home base and truck ownership.
Caltrans – Alameda County Truck Intercept Survey and Count (1991)	Very brief survey to get origin, destination, place where garaged, type of goods carried and number of axles.
NYC Economic Development Corporation Cross Harbor Freight Movement MIS Shipper Interview Guide Cambridge Systematics	Lengthy interview guide to collect information on cross harbor truck movements in New York. Collected information on the business, commodity shipment characteristics (inbound, outbound and interplant), logistical costs for the business, shipment characteristics, shipment timing, factors affecting logistical decisions, suggestions for improvements.
NYC Economic Development Corporation, Cross Harbor Freight MIS Shipper/Distribution Center Recruiting Questionnaire	Interview is designed to determine whether the business is appropriate for the survey and whether the person contacted is appropriate to answer the questions. Other questions asked seek information about business type, commodities shipped, shipment patterns and routes, time of shipments, and time sensitivity of shipments.
Nationwide Truck Activity and	A variety of questions on truck use and company type.

Commodity Survey (1990)	
Chicago Area Transportation Study, Commercial Vehicle Survey (1986)	Registered-commercial-vehicle-based mail-out/mail-back trip diary survey.
Maricopa Association of Governments (Phoenix, AZ) Urban Truck Travel Survey	Registered-commercial-vehicle-based mail-out/mail-back trip diary survey.
New York – New Jersey Truck Commodity Survey (1987, 1991 and 1992)	Very brief interview survey at intercept points. Questions include number of axles, type of truck, commodity, loading (full, partial or empty), origin, destination, trailer characteristics, and route.
El Paso Commercial Truck Travel Survey (1994)	Registered-commercial-vehicle-based one-day trip diary.
North Carolina Triad Regional Transportation Study – Commercial Vehicle Travel Survey	Registered-commercial-vehicle-based one-day trip diary.
Houston-Galveston Area Council – Commercial Passenger Carrier Survey	Registered-commercial-vehicle-based one-day trip diary.
Ontario (Canada) Commercial Vehicle Survey	Intercept survey collecting information on the business, the vehicle, the freight being moved, the trip, the driver's trip, and the driver's characteristics.
Caltrans Rural Highway 94 Goods Movement Study Interview	Brief intercept interview includes number of occupants, vehicle type, cargo type, percent loaded, weight of load, origin, and destination.
Baltimore Metropolitan Council – Motor Carrier and Freight Movement Operational Characteristics ATA Foundation (1997)	Mail-out/mail-back survey sent to 470 companies and received 62 (13.1% response rate). Survey was designed to collect information on company characteristics, major routes of travel, pickup and delivery patterns, time of day of travel, origins and destinations, intermodal activities, impediments in freight flows, suggestions for infrastructure improvements.
New South Wales, Australia Assessment of Freight-Related Industry Needs, Perceptions and Expectations	Telephone interview requests information about the company, the goods shipped and received, the shipping patterns location of company facilities and detailed information about two problem areas. There are also opinion questions on a long list of proposals.
Chatham County (Savannah, Georgia) Intermodal Freight Study – Freight Movement Demand Survey	A detailed mail-out/mail-back survey of businesses designed to get information about the business, commodity flow by type (truck, rail, water and air), type of trucking services offered, flow patterns and timing, routes used in shipping, freight handling capacity, and future plans. The questionnaire also sought information about perceived problem areas and suggestions for solutions.

<p>Genesee Transportation Council – Survey of Motor Carriers in the Rochester Transportation Management Area. (1995)</p>	<p>This survey served as an inventory of motor carriers and a means of identifying where there are highway problems that affect carriers. The survey appears to be self-administering and was probably mail-out/mail-back.</p>
<p>San Francisco – Oakland Bay Area Metropolitan Transportation Commission – I-880 Truck Study (1999)</p>	<p>One survey was targeted at public sector staff asking what they thought the most significant trucking-related issue was facing their community. There was also a trucking company survey designed to get information about the company, their trucking operations and their perceptions of how well truck traffic is served in the I-880 corridor.</p>
<p>California – Survey of California Commercial Vehicle Operations Golob and Regan (1998)</p>	<p>This telephone survey of 1200 companies in California sought attitudinal information about the relative importance of different transportation problems. It also sought attitudes about possible solution strategies with a particular emphasis on information systems.</p>
<p>Central Massachusetts (Worcester) Regional Planning Commission ATA Foundation (1993)</p>	<p>This mail-out/mail-back survey focussed on identification of major impediments to truck traffic and possible solution strategies. The survey also sought information about the company, trucks owned or operated, frequent origins and destinations, time of truck movements, use of intermodal facilities and future needs and plans.</p>
<p>Southwestern Pennsylvania Regional Development Council (Pittsburgh, PA) – Questionnaire on Freight Transportation (1995)</p>	<p>This is a fairly short mail-out/mail-back survey designed to get information about where companies feel there are transportation problems that affect freight flows. The survey also sought information about the company’s use of intermodal services and how that use may be changing over time. The survey asks about common freight origins and destination and about total truck traffic but nothing about the company. The survey only got a 9% response with a telephone follow up.</p>
<p>Portland Metro and Port of Portland – Freight Logistics Interviews Cambridge Systematics (1998)</p>	<p>In-person interviews lasting roughly 45 minutes with 15 companies using or providing trucking services. The survey was designed to identify logistical trends and patterns in the trucking industry and how they vary by company type or size. The survey also asked about factors that affect logistics and about specific problem areas and solution options.</p>
<p>Port of Portland – Freight Movement Needs Survey</p>	<p>This in-person survey was designed to gather information about how freight transportation could be improved in the Portland region. The survey sought information about the business, how the business perceives freight mobility, where there were transportation system bottlenecks, and what</p>

	transportation problems cost the business.
Oregon Department of Transportation – Region 1 Freight Users/Shippers Logistics Interviews – I-5 Trade Corridor DKS Associates (1999)	This survey was a follow-on to the 1998 Metro/Port of Portland survey. It produced 61 in-depth interviews with manufacturers, distributors and carriers. The survey sought to get more information on trip rates, shipment size and type of trucking used. It also sought more information about the time sensitivity of shipments and how company costs are affected by travel time reliability.
NCHRP 2-17(4) – Measuring the Relationship Between Freight Transportation and Industry Productivity, Hickling Lewis Brod	For five major industries, this set of questions was designed to determine how transportation level of service impacts business costs. The questionnaires were designed to get information about the company, their logistical patterns, current distribution system productivity and costs, and potential changes in productivity and costs from transportation improvements.
Oregon’s Intermodal Management System CH2MHill et al (1997)	In-depth personal interviews with 72 companies including ship, rail and truck operators and manufacturers. The survey focussed on the key factors that affect freight mobility performance. The survey also asked for input on significant problem areas.