**REGION II**
**UNIVERSITY TRANSPORTATION RESEARCH CENTER**

# Final Report

## FEASIBILITY STUDY FOR FREIGHT DATA COLLECTION

**Final Report to the**
**New York Metropolitan Transportation Council**
**Rensselaer Polytechnic Institute**


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**16. Abstract**

The New York City (NYC) metropolitan region is home to close to 20 million residents, more than 600,000 business establishments, more than 1.3 million registered trucks, and more than 8.8 million employees. Every year, more than 80 million trucks cross the toll facilities administered by the various transportation agencies (New York Metropolitan Transportation Council, 2004). This traffic translates into a total amount of cargo of about 200 million tons. The bulk of these goods accounts for 79% of the region's goods while the national average is 44%. As freight transportation is becoming more critical to the region, NYMTC has recognized the need to take proactive steps to enhance the overall efficiency of the freight transportation system, as a way to enhance the region and the Nation's competitiveness.

To consider freight issues systematically and quantitatively, effective and efficient freight data collection plays a crucial role, especially for (a) improvement strategies evaluation for freight mobility, (b) system performance forecasting, (c) mitigating the impacts of truck traffic, (d) determining the impacts on air quality, and (e) improving the safety and security performance of the road network. This project proposes to establish an efficient and cost-effective freight data collection framework for NYMTC to address data needs in freight modeling.

In order to quantify freight issues through modeling, the data itself—and how efficiently it is collected—is critical, especially for: (1) improvement strategies evaluation for freight mobility; (2) system performance forecasting; (3) mitigating the impacts of truck traffic; (4) determining the impacts on air quality; and (5) improving the safety and security performance of the road network. The main objective of this project was to establish an efficient and cost-effective freight data collection framework, which was developed through a number of major components, including but not limited to: identification of freight data needs and existing relevant data sources, definition of the data collection framework and estimation of data collection costs, and estimation of total deliveries by ZIP code.

The report contains information on the development of the data collection framework. Chapter 3 identifies the data needs for different modeling techniques, as well as the possible sources for the data. Chapter 4 outlines the data collection procedures, ranging from surveys and interviews to freight volume counts. Chapter 5 highlights data expectations and challenges, while developing the data collection framework. Chapter 6 covers the costs associated with data collection strategies. An introduction to freight modeling can be found in Appendix A. Appendix B is a comprehensive review of relevant publications.
There is also a supplemental report that covers the following project components: (1) results from the estimation of trip generation models; (2) analysis of ZIP code employment data; (3) estimation of total deliveries by ZIP code; and (4) geolocation of large traffic generators.

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# 1. INTRODUCTION

The New York City (NYC) metropolitan region is home to close to 20 million residents, more than 600,000 business establishments, more than 1.3 million registered trucks, and over 8.8 million employees. Every year, more than 80 million trucks cross the toll facilities administered by the various transportation agencies (New York Metropolitan Transportation Council, 2008). The region is one of the largest and densest in the world with an average of 17,600 persons per square mile. The complexity of moving goods and passengers is compounded by the severe congestion, the existence of significant physical constraints, and the fact that the area is home to the largest concentration of transportation facilities in the world, including three airports, dozens of container terminals, intermodal yards, and more than 11,000 miles of highways.

A huge amount of freight is being transported. The cargoes with origin or destination in the NYC region amount to close to 200 million tons (Holguín-Veras and Thorson, 2000). The bulk of these goods arrive/depart from terminals in New Jersey, and then are transported to New York by trucks that move 79% of the region's goods while the national average is 44% (Holguín-Veras and Thorson, 2000). If through movements are taken into account, the total tonnage moved to, through or out of the region is 475 million tons (New York City Economic Development Corporation, 1998). Although air cargo represents only 0.26% of the regional goods movement, it is very important to the economy because these cargoes are time-sensitive cargoes with high opportunity costs that require efficient trucking connections at trip ends.

A more detailed picture is provided by the last comprehensive freight origin-destination surveys that took place in the NYC metropolitan area, which were conducted in 1963 and 1964 (Wood and Leighton, 1969; Wood, 1970) by the Tri-State Transportation Commission. These surveys collected detailed data about both internal and external flows passing through an external cordon. At the time, the region under study had over 8,000 square miles, a population of about 18.5 million, a per capita income of $3,600, and a total employment of about 8 million (Wood, 1970).

The data show that in the average work day of 1963, there were a total of about 13.374 million auto trips, 2.8 million truck trips, and 1.2 million taxi trips in the Tri-State cordon area. Trucks accounted for 11% of all vehicle miles (Wood, 1970). In terms of tons, internally registered trucks transported—in the average work day—a total of 0.763 million tons of freight with a total annual volume of 191 million tons. This translates into an average truck trip generation rate of 0.35 truck-trips/employee-day, and 0.095 tons/employee-day. Interestingly enough, these rates are consistent with the estimates produced by the authors using recent data.

There are several sources that provide estimates of the exorbitant cost involved in moving goods in NYC. Federal Express claims that it costs 30% more to deliver in NYC than other comparable locations

(New York Metropolitan Transportation Council, 1998). A focus group of business representatives reported that moving a shipment from the container terminals in New Jersey to Manhattan, a straight line distance of 1.5 miles, costs as much as sending a shipment from Connecticut to Ohio—that is a difference of 500 miles! (New York City Economic Development Corporation, 1998). Recognizing the importance of incorporating freight transportation into the planning process, the New York Metropolitan Transportation Council (NYMTC) has undertaken a number of steps aimed at ensuring proper consideration of freight issues, including producing a Regional Freight Plan to support the transportation planning process (New York Metropolitan Transportation Council, 2000).

NYMTC's interest in freight transportation is part of a global trend toward a more systematic and quantitative consideration of freight issues. In recent years, transportation professionals throughout the country have increasingly recognized the need to take proactive steps to enhance the overall efficiency of the freight transportation system, as a way to enhance the Nation's competitiveness. Probably, the most recent and notable example of this trend is the creation of the National Cooperative Freight Research Program, which is the first funding program exclusively dedicated to support freight transportation research.

In order to quantify freight issues through modeling, the data itself—and how efficiently it is collected—is critical, especially for: (1) improvement strategies evaluation for freight mobility; (2) system performance forecasting; (3) mitigating the impacts of truck traffic; (4) determining the impacts on air quality; and (5) improving the safety and security performance of the road network. The main objective of this project was to establish an efficient and cost-effective freight data collection framework, which was developed through a number of major components, including but not limited to: identification of freight data needs and existing relevant data sources, definition of the data collection framework and estimation of data collection costs, and estimation of total deliveries by ZIP code.

The report contains information on the development of the data collection framework. Chapter 3 identifies the data needs for different modeling techniques, as well as the possible sources for the data. Chapter 4 outlines the data collection procedures, ranging from surveys and interviews to freight volume counts. Chapter 5 highlights data expectations and challenges, while developing the data collection framework. Chapter 6 covers the costs associated with data collection strategies. An introduction to freight modeling can be found in Appendix A. Appendix B is a comprehensive review of relevant publications. There is also a supplemental report that covers the following project components: (1) results from the estimation of trip generation models; (2) analysis of ZIP code employment data; (3) estimation of total deliveries by ZIP code; and (4) geolocation of large traffic generators.

# 2. IDENTIFICATION OF DATA NEEDS AND SOURCES

The first half of this chapter focuses on the identification of freight modeling techniques and their respective data needs by using a classification system based on the focus, principle, and flow unit. To simplify the information, data categories are outlined to address desired outcomes and necessary inputs. Based on the modeling techniques and categories developed, a summary of the data requirements is presented for both calibration and forecasting methods. The remainder of the chapter highlights the current sources available for obtaining the required data. The data sources are compared against the categories using a usefulness rating to help identify which of the sources may be most pertinent overall.

## *2.1. Data needs*

In order to simplify the exposition, the team decided to identify data needs using a classification of alternative modeling approaches (see Table 1). As shown, the classification is based on:

- Modeling focus, which could be trip interchanges linking an origin to a destination; or tours, i.e., a sequence of delivery stops.
- Flow unit, which could be commodity flows, cargo value, vehicle trips, or a combination.
- Modeling principle, which refers to the alternative techniques that could be used for freight demand modeling.

Table 1 shows the model classification produced by the team. It is important to mention that the table is by no means comprehensive, nor it is intended to be. There are two main reasons why this is the case. First, a much finer detail could be provided in terms of modeling technique/principle as the ones listed only represent the main types. Second, the table does not consider the endless combinations of possibilities that a modeler could choose to use in a given modeling context.

When analyzing the process of model development and trying to assess data requirements, care must be taken to understand that the requirement must take into consideration the fundamental structure of the model, the empirical foundation of the model, the computational algorithms and data structures that perform the computations, and the process to analyze the modeling results. In general, the data or information required to address these issues fall under two main categories: (1) data for model calibration, and (2) data to make forecasts.

For the sake of brevity and conciseness the team decided to identify the key data categories that are typically needed to develop, calibrate, and do forecasting of freight demand. As in the previous discussion, these definitions are by no means comprehensive as, depending on the model details, other data may be needed. Table 2 shows the main groups. Brief descriptions are also provided.

**Table 1: Modeling techniques classification**

| Modeling focus | Flow unit | Modeling technique/principle |
|---|---|---|
| Trip interchange models | Commodity based | Commodity generation: regression models, trip rates, cross classification analyses (simple, multiple) |
| | | Distribution: spatial interaction, opportunity, variants |
| | | Input-Output: single region, multi-regional, inter-regional |
| | | Freight mode choice: ad-hoc procedures, without shipment size, with shipment size (endogenous, exogenous) |
| | | Empty trip: econometric, simplified trip chain |
| | Joint commodity flow and vehicle-trip based | Spatial price equilibrium: trip based, tour based |
| | Vehicle-trip based | Trip generation: regression models, trip rates, cross classification analyses (simple, multiple) |
| | | Distribution models: spatial interaction, opportunity, etc. |
| Tour based models | Vehicle-trip based | Micro-simulation: logistic based, with/without behavioral models |
| | Joint commodity flow and vehicle-trip based | Micro-simulation-hybrid: with modeling of commodity flows and routing of vehicles |
| | | Spatial price equilibrium: tour based, static, dynamic |
| Both (trip or tour) | Both (commodity flow and/or vehicle-trip) | Freight origin-destination synthesis models: with and without empty trips, structured and unstructured approaches, and their variants |

**Table 2: Data categories**

| Data class | Items |
|---|---|
| Information/insight into logistical pattern of flows | |
| Freight generation data (amount of commodities, vehicle trips, deliveries) | Production |
| | Consumption |
| Delivery tours | Sequence of stops |
| | Location of deliveries |
| | Commodity, vehicle-trip OD flows |
| | Empty trips |
| Economic characteristics of participating agents | Shippers, warehouses, forwarders |
| | Carriers |
| | Receivers |
| Spatial distribution / Location of participating agents | Shippers, warehouses, forwarders |
| | Carriers |
| | Receivers |
| Network characteristics | Travel times, costs |
| | Use restrictions |
| | Capacity |
| | Traffic volumes |
| Special choice processes | Mode choice |
| | Delivery time |
| | Mode attributes |
| Other economic data | Production functions |
| | Demand functions |
| | Input-Output technical coefficients |

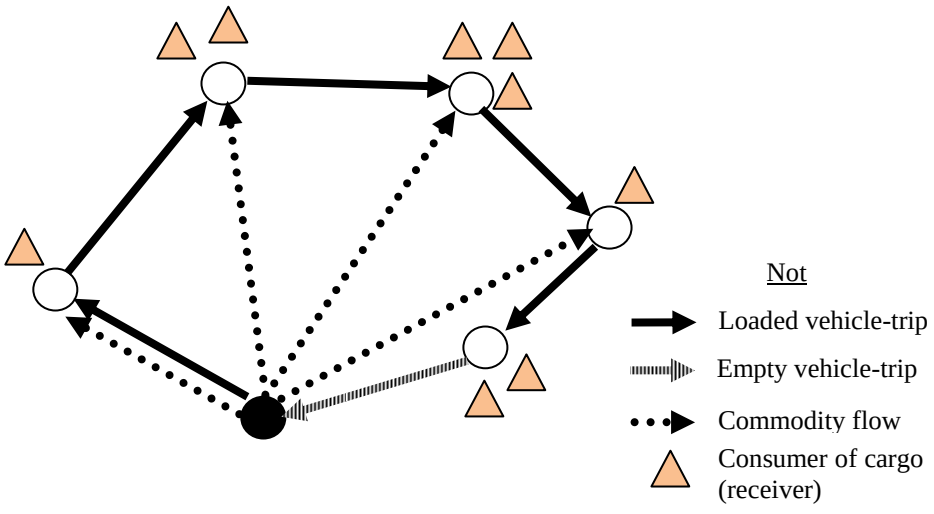
### 2.1.1. Information/insight into logistical patterns of flows

Developing a good freight demand model requires a basic understanding of the functioning of the system being modeled. Such qualitative knowledge is a basic requirement for model development and data collection. The reason is that a modeler who possesses a good idea about how the freight system operates in the study area has a better chance of designing an efficient data collection process and developing a good model than a modeler who does not. Due to its importance, the team decided to include this as a need, though the information is more qualitative than quantitative.

### 2.1.2. Freight generation data

Freight generation refers to the study of *production* and *consumption* of freight. It focuses on the analyses and quantification of the transactions between a producer of cargo (the economic agent that produces/ships the freight) and the next consumer (the economic agent that processes/transforms, stores, or consumes the cargo). It is important to mention that there are multiple ways to define and measure freight, many economic agents involved in the generation of freight, and many factors that influence the amount of freight that is generated, and how it is transported and processed. The multiplicity of metrics to define and measure freight also adds complexity as freight could be measured according to: (1) the amount of cargo transported, (2) the vehicle trips produced, (3) the value of the cargo, and (4) the number of deliveries made. Depending on the modeling technique the corresponding production and consumption data must be used. A schematic of the relationship between these units is shown in Figure 1.

**Figure 1: Vehicle trips, commodity flows, and delivery tours**




### 2.1.3. Delivery tours

This category refers to the information required to characterize delivery tours. It includes information about the *sequence* and *location* of the different nodes visited by the delivery vehicles, as well as amount of cargo (or deliveries) picked up or delivered. The sequence is important to determine the different

routes the vehicles or fleets of vehicles use, the delivery locations allow for spatial identification of characteristics that may affect the route choice. These data provide insight about the pattern of deliveries. In addition to the sequence and location of the nodes, data must be gathered about the commodity origin-destination (*OD) flows* along the tour. Data must also be collected about the *empty vehicle trips*, specifically used for empty trip models. These empty trip models complement commodity based models because the empty trips cannot be directly estimated from the commodity flows.

It is important to mention that data about OD flows of commodities and vehicle-trips (both loaded and empty) are a subset of the delivery tour data. In essence, the traditional OD matrices widely used in freight transportation planning are nothing more than a decomposition of the delivery tours into a sequence of disjoint trips.

#### 2.1.4. Economic characteristics and spatial distribution/ location of agents

Most modeling techniques require the use of data to characterize the behavior of the agents involved in freight demand. Depending on the complexity of the model, data must be collected for a minimum of two agents (producers and consumers of cargo), to a maximum of six (producers, carriers, freight forwarders, warehouses/distribution centers, entry/exit locations such as ports and airports, and receivers). It is important then to have data about business size, number of employees, number and type of trucks, frequency of deliveries, shipment size, inventory policies, hours of operations, sales, industry segment, type of operations, spatial location and distribution, and spatial distribution of their respective suppliers and consumers, among others. These characteristics directly and indirectly influence both commodity and vehicle trip flows to, between, and from each of them.

#### 2.1.5. Network characteristics

All freight models will require a complete specification of network characteristics, which are required to be able to model the manner in which the freight flows are going to use the transportation system. To a great extent, these data are similar to what is required by passenger demand models. It includes travel times, costs, and other out-of-pocket expenses, such as tolls. It is also important to have information about *use restrictions* since they impact the way freight vehicles travel in the network. In the same manner, capacity constraints and link-performance functions can be used to estimate how travel times, and cost, change with congestion levels. Traffic counts are also needed for calibration of the model, and in the case of origin-destination synthesis models, to estimate OD matrices from secondary data. This unique breed of models could significantly reduce data collection needs. The issue of link-performance functions—that are the ones intended to represent the impact of traffic on travel times—is particularly challenging because of the lack of formulations capable of capturing car-truck interactions.

### 2.1.6. Special choice processes

In addition to the models described above, it is likely that an additional set of models aimed at studying specific processes are needed. Examples include: freight mode choice, decision concerning delivery times (which determines the response of the freight industry to congestion pricing), among others. These special choice processes are routinely studied with the assistance of models that complement the basic functions described above. In other cases, some of these "special choice processes," like freight mode choice, are built into the main model. In any case, these models typically require behavioral data (stated or revealed preference data) and the use of econometric techniques, such as discrete choice modeling, that are not typically part of the standard set of tools used for freight demand analyses.

### 2.1.7. Other economic data

These types of data are intended to characterize specific aspects of freight demand not covered by the previous categories. These include, for instance, *production* (supply) and *demand* functions of commodities in each region, which is information needed by spatial price equilibrium models, and technical coefficients of Input-Output (IO) models. Input-Output models are a family of modeling approaches that characterize the relationships between economic sectors as a function of the amounts of inputs, in economic terms, required to produce a given output. These models require the unit flows from the different sectors of production, measured with respect to the output, referred to as *technical coefficients*, which are also called direct requirements because they measure the proportion of inputs that are directly required form other sectors. In addition to these technical coefficients, other requirements such as the "final demands" and the inter-regional trade flow coefficients that measure the amount of commodities transported from region to region are needed.

Table 3 presents the summary of the data requirements of the alternative modeling approaches, taking into consideration the data categories previously discussed. The letters C and F are used to denote Calibration and Forecast. It is important to note that some modeling techniques are part of a modeling framework, where an input sometimes is the output of previous steps that in themselves could be one of the other modeling approaches.

**Table 3: Data needs for alternative modeling approaches**

| Aspect: | | Commodity generation models | Distribution models | Input-Output models | Freight mode choice | Empty trip models | Spatial price equilibrium models | Trip generation models | Distribution models | Micro-simulation models | Micro-simulation-hybrid models | Spatial price equilibrium models | Freight origin-destination models |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Information/insight into logistical pattern of flows** | | | C | C | | | C | | C | C | C | C | |
| **Freight generation data** | Production | C | | C, F | | | | C | | C, F | C | C | C, F (?) |
| | Consumption | C | | C, F | | | | C | | C, F | C | C | C, F (?) |
| **Delivery tours** | Sequence | | | | | | | | | C, F | | C, F | |
| | Location | | | | | | | | | C, F | | C, F | |
| | OD flows | | C, F | C, F | | C, F | | | C, F | C, F | C, F | C, F | |
| | Empty flows | | | | | C | | | | | | | |
| **Economic characteristics of participating agents** | Shippers | C, F | | | | | | C, F | | C, F | C, F | C, F | |
| | Carriers | C, F | | | | | | C, F | | C, F | C, F | C, F | |
| | Receivers | C, F | | | | | | C, F | | C, F | C, F | C, F | |
| **Spatial distribution / Location of participating agents** | Shippers | C, F | | | | | | | | C, F | C, F | C, F | |
| | Carriers | C, F | | | | | | | | C, F | C, F | C, F | |
| | Receivers | C, F | | | | | | | | C, F | C, F | C, F | |
| **Network characteristics** | Travel times and costs | | C, F | C, F | | C, F | | | C, F | C, F | C, F | C, F | C, F |
| | Use restrictions | | C, F | C, F | | C, F | | | C, F | C, F | C, F | C, F | C, F |
| | Capacity | | C, F | C, F | | C, F | | | C, F | C, F | C, F | C, F | C, F |
| | Traffic volumes | | | | | | | | | | | | C |
| **Special choice processes** | Mode choice | | | | C | | | | | N.A. | | | |
| | Delivery time | | | | | | | | | N.A. | | | |
| | Mode attributes | | | | C, F | | | | | N.A. | | | |
| **Other economic data** | Production functions | | | | | | C, F | | | | | | |
| | Demand functions | | | | | | C, F | | | | | | |
| | IO tech. coeffs. | | | C, F | | | | | | | | | |

### *2.2. Data sources*

After outlining the different modeling approaches and categorizing them based on data requirements, the team identified the key data sources. For this identification process, the team used as the starting point, the NYMTC report on freight demand modeling, commissioned by NYMTC in 2000 (Holguín-Veras et al., 2001), that contains a comprehensive assessment of the modeling alternatives available at the time. Initially, an update of the relevant data sources from this report was performed, emphasizing the ones that offer the largest benefit to freight demand modeling activities. The updates, where available, are presented in the form of notes for the original data sources in Appendix C. This is done to avoid confusion since some sources may have been subject to a name change or were discontinued. In addition to updates for the original sources, the last section of the Appendix C presents a quick description of new data sources or reference material and tools. In general, these tools are offered by the different governmental agencies, such as the Bureau of Economic Analysis, the Bureau of Transportation Statistics and the Federal Highway Administration, among others.

In order to provide a quick reference tool, to identify the type of information the different data sources could offer, the team produced a table comparing each data source to the data categories presented in Table 2. In addition, the comparison Table 4 organizes the different data sources according to their usefulness. The *usefulness*-ranking category is extracted from the original 2001 NYMTC report. The classification used is: very useful (VU), useful (U), marginal (M) and specialized (S).

When conducting the comparison between the data sources and the data categories, the team identified that different data sources may provide information about the different categories at different levels of detail. Five levels of detail were selected as appropriate for comparison purposes. These levels of detail are:

- Excellent level of detail
- Good level of detail
- Some level of detail
- Low level of detail
- Only general information

**Table 4: Data sources**

■ Excellent level of detail
◘ Good level of detail
▣ Some level of detail
⊡ Low level of detail
☐ Only general information

| Compendium of Freight Data Sources | Freight generation data | | Delivery tours | | | | Economic characteristics of participating agents | | | Spatial distribution / Location of participating agents | | | Network | | | | Special choice processes | | | Other economic data | | | Usefulness | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Production | Consumption | Sequence | Location | OD flows | Empty flows | Shippers | Carriers | Receivers | Shippers | Carriers | Receivers | Travel times, costs | Use restrictions | Capacity | Traffic volumes | Mode choice | Delivery time | Mode attributes | Production functions | Demand functions | IO tech. coeffs. | | |
| County Business Patterns | | | | | | | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | | | | | | | | | | | VU | Information from 1998-2007 |
| ZIP Code Business Patterns | | | | | | | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | | | | | | | | | | | VU | Also includes employment information |
| Regional Economic Information System (REIS) | | | | | | | | | | | | | | | | | | | | | | ◘ | VU | Intercounty flows. Employment by one-d |
| Highway Performance Monitoring System (HPMS) Database | | | | | | | | | | | | | | ⊡ | ⊡ | | | | | | | | VU | |
| Vehicle Inventory and Use Survey (VIUS) | | | | | | | | | | | | | | | | | | | | | | | VU | |
| Current Employment Statistics Publication | | | | | | | ☐ | ☐ | ☐ | | | | | | | | | | | | | | U,S | Data available 1997-May 2008. Employ |
| BEA Regional Projections to 2045; County Projections also | | | | | | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | | | | | | | | | | | U | Includes historical data and projections |
| Commodity Flow Survey: 2002 | | | | | ◘ | | ▣ | ▣ | ▣ | ▣ | ▣ | ▣ | | | | | | | | | | | U | |
| Motor Carrier Management Information System | | | | | | | ⊡ | ⊡ | ⊡ | ⊡ | ⊡ | ⊡ | | | | | | | | | | | U | |
| 1992 Census of Transportation, Communications and Utilities Geographic Area Series Summary ( | | | | | | | ☐ | ☐ | ☐ | | | | | | | | | | | | | | U | Includes Employment. NAICS 40-49. |
| Annual Motor Carrier Reports | | | | | | | | ☐ | | | ☐ | | | | | | | | | | | | U | Emp. info for Class I and Class II for hir |
| Annual Registration Filings | | | | | | | | ☐ | | | ☐ | | | | | | | | | | | | U | Includes Employment |
| Commercial Drivers Licenses | | | | | | | | ☐ | | | ☐ | | | | | | | | | | | | U | |
| Monthly Traffic Volume Trends | | | | | | | | | | | | | ☐ | | | ◘ | | | | | | | U | |
| National Commodity Flow Network | | | | | | | | | | | | | ☐ | | ◘ | | | | | | | | U | |
| National Highway Planning Network (NHPN) | | | | | | | | | | | | | ⊡ | | ◘ | | | | | | | | U | |
| Truck Weight Study Data Database | | | | | | | | | | | | | | | | ⊡ | | | | | | | U | |
| Current Population Survey | | | | | | | | | | | | | | | | | | | | | | | U | |

■ Excellent level of detail
□ Good level of detail ⧈
Some level of detail ⊡
Low level of detail □ Only
general information

| Compendium of Freight Data Sources | Freight generation data: Production | Freight generation data: Consumption | Delivery tours: Sequence | Delivery tours: Location | Delivery tours: OD flows | Delivery tours: Empty flows | Economic characteristics of participating agents: Shippers | Economic characteristics of participating agents: Carriers | Economic characteristics of participating agents: Receivers | Spatial distribution / Location of participating agents: Shippers | Spatial distribution / Location of participating agents: Carriers | Spatial distribution / Location of participating agents: Receivers | Network: Travel times, costs | Network: Use restrictions | Network: Capacity | Network: Traffic volumes | Special choice processes: Mode choice | Special choice processes: Delivery time | Special choice processes: Mode attributes | Other economic data: Production functions | Other economic data: Demand functions | Other economic data: IO tech. coeffs. | Usefulness | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| National Transportation Statistics (NTS) | | | | | | | | | | | | | | | | | | | | | | | U | |
| Motor Freight Transportation and Warehousing Survey | | | | | | | □ | □ | □ | □ | □ | □ | | | | | | | | | | | M | |
| Nationwide Truck Activity Survey (NTACS) | | | | | | | □ | □ | □ | □ | □ | □ | | | | | | | | | | | M | |
| Payroll Reports | | | | | | | ⊡ | ⊡ | ⊡ | ⊡ | ⊡ | ⊡ | | | | | | | | | | | M | |
| 1997 Economic Census - Transportation and Warehousing - Geographic Area Series Publication | | | | | | | □ | □ | □ | □ | □ | □ | | | | | | | | | | | M | Businesses in NAICS sector 48-49. Emp |
| Occupational Compensation Surveys Publication | | | | | | | ⊡ | ⊡ | ⊡ | | | | | | | | | | | | | | M | |
| Occupational Employment Statistics Publication | | | | | | | ⊡ | ⊡ | ⊡ | | | | | | | | | | | | | | M | |
| Occupational Employment Statistics | | | | | | | ⊡ | ⊡ | ⊡ | | | | | | | | | | | | | | M | |
| Occupational Outlook Handbook | | | | | | | □ | □ | □ | | | | | | | | | | | | | | M | |
| Employment and Wages | | | | | | | □ | □ | □ | | | | | | | | | | | | | | M | |
| Annual Survey of Manufactures Publication | | | | | | | ⊡ | | | ⊡ | | | | | | | | | | | | | M | |
| 2002 Benchmark Input-Output Accounts of the USA | | | | | | | | | | | | | | | | | | | | | | □ | M | |
| Vehicle Classification and Vehicle Miles Travelled (VCVMT) Database | | | | | | | | | | | | | | | | ⊡ | | | | | | | M | |
| Employment and Earnings | | | | | | | | | | | | | | | | | | | | | | | M | |
| | | | | | | | | | | | | | | | | | | | | | | | | |
| a: AIR | | | | | | | | | | | | | | | | | | | | | | | | |
| FAA Statistical Handbook of Aviation Publication | | | | | | | | ⧈ | | | ⧈ | | | | | | | | | | | | S | |
| Aviation Data and Analysis System (ADAS) | | | | | | | | | | | | | | | □ | | | | | | | | S | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Airport Activity Statistics of Certificated Route Air Carriers Publication | | | | | | | | ☐ | | | ☐ | | | | ☐ | | | | | | | | U | |
| Terminal Area Forecast | | | | | | | | ☐ | | | ☐ | | | | | | | | | | | | M | |
| | | | | | | | | | | | | | | | | | | | | | | | | |
| b: PIPELINE | | | | | | | | | | | | | | | | | | | | | | | | |
| Capacity and Service on the Interstate Natural Gas Pipeline System Publication | | | | | | | | ⊡ | | | ⊡ | | | | ◘ | | | | | | | | S | Only for Natural Gas |
| Statistics of Interstate Natural Gas Pipeline Companies | | | | | | | ⊡ | | ⊡ | ⊡ | | ⊡ | | | | | | | | | | | S | |
| | | | | | | | | | | | | | | | | | | | | | | | | |
| c: RAIL | | | | | | | | | | | | | | | | | | | | | | | | |
| Carload Waybill Sample | | | | | ▣ | | | ⊡ | | | ⊡ | | | | | ⊡ | ⊡ | | ☐ | | | | S | Aggregated at the 5-digit STCC level |
| FRA National Planning Network | | | | | | | | | | | | | | | ⊡ | | | | ⊡ | | | | S | |
| Grade Crossing Inventory System (GCIS) | | | | | | | | | | | | | | | | ▣ | | | | | | | U,S | |
| | | | | | | | | | | | | | | | | | | | | | | | | |
| d: WATER | | | | | | | | | | | | | | | | | | | | | | | | |
| Exposure Data Base (EDB) | | | | | | | | ☐ | ☐ | | ☐ | ☐ | | | ⊡ | | | | ⊡ | | | | S | |
| U.S. Waterborne Exports and Outbound Intransit Shipments | | | | | | | ▣ | ⊡ | | ⊡ | ⊡ | | | | | | | | ☐ | | | | S | |
| U.S. Waterborne General Imports and Inbound Intransit Shipments | | | | | | | | ⊡ | ⊡ | | ⊡ | ⊡ | | | | | | | ☐ | | | | S | |
| Waterborne Commerce of the United States, Parts 1 thru 5 Publication | | | | | ▣ | | | ⊡ | | | ☐ | | | | | ⊡ | | | ▣ | | | | S | |
| Maritime Statistical Information System | | | | | ⊡ | | | ☐ | | | ☐ | | | | | | | | ⊡ | | | | S | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| American Intermodal Equipment Inventory | | | | | | | | ⊡ | | | ⊡ | | | | | | | | | | | | S | |
| Analysis of Ports for National Defense | | | | | | | | | ⊡ | | | ⊡ | | | | | | | | | | | S | |
| Estimated Waterborne Commerce Statistics Publication | | | | | ▣ | | | | | | | | | | | | | | | | | | S | |
| Origin and Destination of Waterborne Commerce of the United States, Public Domain Data | | | | | ◘ | | | | | | | | | | | | | | | | | | S | |
| Waterborne Transportation Lines of the United States | | | | | | | | ⊡ | | | ⊡ | | | | | | | | ⊡ | | | | U,S | |
| Port Facilities Inventory | | | | | | | | | ⊡ | | | ⊡ | | | | | | | | | | | U,S | |
| Port Series, 1921-Present | | | | | | | | | ⊡ | | | ⊡ | | | | | | | | | | | U,S | |
| Tonnage for Selected United States Ports | | | | | | | | | ⊡ | | | ⊡ | | | | | | | | | | | U,S | |
| | | | | | | | | | | | | | | | | | | | | | | | | |
| e: MULTIMODAL AND OTHER | | | | | | | | | | | | | | | | | | | | | | | | |
| U.S. Trade with Puerto Rico and U.S. Possessions Publication | | | | | ◘ | | ☐ | ☐ | | ☐ | ☐ | | | | | | ☐ | | ☐ | | | | S | |
| Economic Census | | | | | | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | | | | | | | | | | | S | |
| Data Bank: U.S. Exports of Domestic and Foreign Merchandise | | | | | ◘ | | ☐ | ☐ | | ☐ | ☐ | | | | | | | | ☐ | | | | S | |
| Data Bank: U.S. General Imports and Imports for Consumption | | | | | ◘ | | | ☐ | ☐ | | ☐ | ☐ | | | | | | | | | | | S | |
| Coal Supply and Transportation Model (CSTM) Model | | | ◘ | | ◘ | | | ⊡ | | | | | | | | | | | ⊡ | | | | S | |
| Employee Occupational Database | | | | | | | ☐ | ☐ | ☐ | | | | | | | | | | | | | | S | |
| Industry Productivity and Technology Studies Publication | | | | | | | ☐ | ☐ | ☐ | | | | | | | | | | | | | | S | |
| Occupational Employment Database | | | | | | | ☐ | ☐ | ☐ | | | | | | | | | | | | | | S | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Coal Distribution Data | | | | | ◘ | | | ⊡ | | | | | | | | | | | ☐ | | | | S | |
| Operating Permits | | | | | | | | ◘ | | | ◘ | | | | | | | | | | | | S | |
| Quarterly Financial & Operating Reports | | | | | | | | ☐ | | | ☐ | | | | | | | | | | | | S | |
| Surface Transborder Commodity Data | | | | | ◘ | | | | | | | | | | | | | | ☐ | | | | S | |
| Worldwide Household Goods Information System for Transportation (WHIST) | | | | | | | | | | | | | | | | | | | | | | | S | |
| Occupational Employment in Federal Government | | | | | | | | | | | | | | | | | | | | | | | S | |
| Fresh Fruit & Vegetable Shipments | | | | | ◘ | | | ⊡ | | | ⊡ | | | | | | | | ☐ | | | | U,S | |
| Transportation Energy Data Book, Edition 14 Publication | | | | | | | | | | | | | | | | | | | | | | | U,S | |
| A compendium of selected regional transportation, and demographic statistics (NYMTC) | | | | | | | | | | | | | | | | | | | | | | | U | |
| Hazardous Materials Registration Program Database | | | | | | | ☐ | ☐ | | ☐ | ☐ | | | | | | | | | | | | M | |
| Quarterly & Annual Financial Reports | | | | | | | | ☐ | | | ☐ | | | | | | | | | | | | M | |
| U.S. County-level Freight-movement Data by Commodity Group and Mode of Transportati | | | | | ◘ | | | ☐ | | ☐ | | | | | | ⊡ | | | | | | | VU | |
| | | | | | | | | | | | | | | | | | | | | | | | | |
| f: COMMERCIAL AND REGIONAL DATA | | | | | | | | | | | | | | | | | | | | | | | | |
| InfoUSA | | | | | | | | | | ⊡ | ⊡ | ⊡ | ⊡ | ⊡ | ⊡ | | | | | | | | S | Commercial |
| Dun & Bradstreet | | | | | | | | | | ⊡ | ⊡ | ⊡ | ⊡ | ⊡ | ⊡ | | | | | | | | U | Commercial |
| GPS data | | | ◘ | ◘ | | | | | | ☐ | | ☐ | ☐ | | | | | | | | | | U | Commercial. Inferred |
| Truck Toll Volumes (NY Metropolitan) | | | | | | | | | | | | | | | | ◘ | | | | | | | U | Regional |
| Seven NY Metropolitan agencies truck toll data | | | | | | | | | | | | | | | | ◘ | | | | | | | U | Regional |

Although the available data sources are expected to provide minimal support to NYMTC's freight demand modeling efforts, only six deemed very useful, and as seen in Table 4, not even these could provide all data needed. The data sources categorized as very useful are:

- ZIP Code / County Business Patterns
- U.S. County Level Freight Movement Data
- Regional Economic Information System (REIS)
- Highway Performance Monitoring System (HPMS)
- Vehicle Inventory and Use Survey (VIUS) (discontinued)
- U.S. County-level Freight-movement Data by Commodity Group and Mode of Transportation

In the following chapters there are reviews of different data collection procedures and the development of a data collection framework for a freight demand model for the NYMTC region. The framework will identify which data sources to use and for what purpose, and in addition will recommend a data collection procedure most appropriate for the specific data needs.

# 3. REVIEW OF DATA COLLECTION PROCEDURES

In order to supplement the data sources currently available, as identified in Chapter 3, it is often necessary to collect subsequent data. This chapter describes the key findings from a comprehensive review of freight data collection approaches. The review takes into account that freight data have been collected by targeting either shippers, carriers, or receivers, reflecting the fact that transportation demand data could be collected either at the origin, en-route, or at the destination. There are significant trade-offs among these alternative approaches that will be discussed in this chapter. The following sections provide a comprehensive review of alternative freight data collection procedures. However, a brief introduction is provided to highlight the challenges of conducting freight transportation surveys and the different means of collecting data.

Freight transportation surveys present very different and major challenges not faced by passenger surveys. Ironically, the bulk of research that has focused on addressing the methodological issues of travel surveys has mainly focused on passenger travel. Some of the key issues involved in freight transportation that affect the possible type of surveys to be implemented are: (1) multiplicity of metrics to define and measure freight; (2) multiplicity of factors determine freight generation, freight trip generation, distribution and the other factors that determine demand; (3) multiplicity of economic agents involved; and (4) agents that only have a partial view of the freight system.

The first issue is related to the complexity of measuring freight. As it is widely known, there are a huge number of vehicle types, tens of thousands of different commodities that are transported, and multiple ways to measure then (e.g., tons, ton-miles, vehicle-trips, cargo value). All these aspects complicate tremendously the development of freight surveys. A second issue relates to the huge complexity of the dynamics that determine freight demand patterns. The immediate consequence of this is to increase the complexity of the questions in freight surveys. The third issue is related to the decision making structure. In freight transportation there are multiple decision makers interacting dynamically and deciding on behalf of hundreds, thousands, and even millions of shipments; understanding the actors and decision makers is of great importance because if the freight movement process is understood before a survey effort is undertaken, the survey questions will correspond with respondents' roles in the process. The final issue is associated with the fact that each agent involved in freight transportation only has a partial view of the process; therefore, a given survey could only collect the data that are available to the particular respondent.

Table 5 presents a summary of the partial views the different agents have of the freight system, making it clear that data may need to be collected from all agents to fulfill the objectives of the survey.

The implication is that, in order to achieve a system view, one must assemble it from different pieces. Considering these issues, it seems clear that a comprehensive approach to collect freight data is the best and to fully describe what happens in the system a combination of methods may be required.

**Table 5: Partial views of the freight system**

| Freight generation: | Shippers / Producers | Carriers | Distribution centers / Warehouses | Consumers of cargo (receivers) | Transportation agencies |
|---|---|---|---|---|---|
| Amount of cargo | Yes (1) | Yes (1) | Yes (1) | Yes (2) | No |
| Number of loaded vehicle-trips | Yes (1) | Yes (1) | Yes (1) | Not always | At key links (no distinction between loaded and empty) |
| Number of empty vehicle-trips | No | Yes (1) | No | No | |
| Number, frequency, of deliveries | Yes (1) | Yes (1) | Yes (1) | Yes (2) | No |
| Commodity type | Yes (1) | Not always | Yes (1) | Yes (2) | Only at some ports of entry |
| Shipment size | Yes (1) | Yes (1) | Yes (1) | Yes (2) | No |
| Cargo value | Yes (1) | Not always | Not always | Yes (2) | Only at some ports of entry |
| Land use patterns | Yes (1) | Yes (1) | Yes (1) | Yes (1) | All |

Notes: (1): Only of the cargo that they handle. (2): For all the cargo they receive.

In general, the different types of data collection techniques or surveys could be grouped depending on how the sampling frame is defined (i.e., on the basis of the establishments at the origin or the destination of the shipment, the truck traffic, cargo tour). This translates into data collection procedures that focus on the origin or destination of the cargo, or en-route as in a truck intercept survey, or along the chain of the shipment. Table 6 presents the different units or sampling frames for the data collection procedures. This table also indicates which type of data could be gathered.

Following the selection of the sampling target, different survey techniques can be implemented. Examples of these techniques include personal interviewing—which could be on-site, by telephone, or mail—and could also be technology assisted i.e. CAPI (Computer Assisted Personal Interviewing), CATI (Computer Assisted Telephone Interviewing). Other techniques examples are the license plate surveys, multimode surveys, or those under Intelligent Transportation System (ITS) technologies, such as vehicle and shipment tracking (Meyburg and Rahman, 2003). The following sections describe different methodologies depending on their sampling frame.

**Table 6: Sampling frame of different data collection procedures**

■ Excellent level of detail
◘ Good level of detail
▣ Some level of detail
⊡ Low level of detail
□ Only general information

| Unit/ Sampling Frame | | Freight generation data | | Delivery tours | | | | Economic characteristics of participating agents | | | Spatial distribution / Location of participating agents | | | Network | | | | Special choice processes | | | Other economic data | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Production | Consumption | Sequence | Location | OD flows | Empty flows | Shippers | Carriers | Receivers | Shippers | Carriers | Receivers | Travel times, costs | Use restrictions | Capacity | Traffic volumes | Mode choice | Delivery time | Mode attributes | Production functions | Demand functions | IO tech. coeffs. |
| Establishment | Shipper | ■ | | | | ◘ | | ■ | ▣ | ▣ | ■ | ▣ | ▣ | | | | | □ | | ⊡ | | | |
| | Carrier | | | ■ | ■ | ■ | ■ | ⊡ | ■ | ⊡ | ◘ | ■ | ◘ | ▣ | □ | | | | ▣ | ▣ | | | |
| | Receiver | | ■ | | | ◘ | | ▣ | ▣ | ■ | ▣ | ▣ | ■ | | | | | ▣ | | ⊡ | | | |
| Trip intercepts | | ⊡ | ⊡ | ⊡ | ⊡ | ◘ | ▣ | ⊡ | ▣ | ⊡ | ⊡ | ▣ | ⊡ | ▣ | ⊡ | ⊡ | | | ⊡ | ⊡ | | | |
| Vehicle | | | | ■ | ■ | ■ | ■ | ⊡ | ■ | ⊡ | ◘ | ■ | ◘ | ▣ | □ | | | | ▣ | | | | |
| Tour | | | | ■ | ■ | ■ | ■ | ⊡ | ■ | ⊡ | ◘ | ■ | ◘ | ▣ | □ | | | | ▣ | | | | |

### *3.1. Establishment based surveys*

In this type of survey, establishments engaged in freight activity at either end of the transaction (i.e. shippers, carriers, receivers, etc.) are the main focus. These data collection methods involve surveying owners, operators, or fleet managers of key establishments, which may include manufacturing facilities, warehouses, retail distribution centers, truck terminals, and trans-loading facilities. These surveys can be used to collect comprehensive information about economic, land use, and modal freight activity characteristics of the facilities. Specifics on shipper, carrier and receiver based surveys are explained in following sections. Some of the applications of this data include trip generation, truck trip-chaining analysis, payload factors, time-of-day analysis to understand variations in trucking activity, and analysis of the types of facilities used by trucks generated by a facility for different commodity groups (Beagan et al., 2007).

The classic methods of conducting establishment surveys include telephone interviews, mail-out/mail-back surveys, and combined telephone and mail surveys. Each of these methods has advantages and limitations. Generally, mail surveys are relatively easy to implement compared to telephone or combined telephone and mail surveys. The investment costs and personnel requirements of mail surveys are typically also the lowest. However, some of the limitations are the low response rates and the inability to clarify responses to specific questions. On the other hand, telephone surveys have relatively higher

response rates; however, these may be less effective in getting comprehensive trucking activity information. Also, telephone interviews require the availability of accurate data on telephone numbers and interviewees, and compiling this data can be time consuming and costly. Combined telephone and mail surveys have high response rates and improve the ability to clarify and explain questions. However, these surveys have usually the highest cost of implementation (Jessup et al., 2004; Beagan et al., 2007).

### 3.1.1. Shipper based surveys

In these approaches, the data are collected by interviewing the economic agents that ship out the cargoes either by self-administered questionnaires or staff-assisted surveys. The archetypical example of a shipper based survey is the Commodity Flow Survey (U.S. Department of Transportation and U.S. Department of Commerce, 2004). Other examples are the Annual Survey of Manufacturers, along with Current Industrial Reports (CIR) by the Census Bureau. These provide measures of total sales, market share, quantity and cost of materials consumed, production hours and transportation modes, and location information. Approximately 55,000 of 370,000 sites are included in the survey process. Reports generated include a series by industry, by location of manufacturers, and geographic area statistics (Anderson, 1994).

The strength of shipper based surveys is their ability to capture data about the characteristics of the cargo, that only the shipper readily knows (e.g., cargo type, shipment size). The key weakness is associated with the fact that shippers may not know much about how the cargo is actually transported to the destinations and, for that reason, data about routes, intermediaries processing/transfer points, etc. may be of questionable validity. However, there are instances in which the shipper survey is complemented with tracking of a sample of shipments along the supply chain.

### 3.1.2. Receiver based surveys

As the name implies, these surveys target the receivers of the shipments. These surveys are very useful for developing freight demand generation models as it is straightforward to develop statistical models relating the amount of freight attracted and produced as a function of the characteristics of the establishment. In spite of this, receiver based surveys are not widely used as the primary data collection mechanism for modeling purposes. One of the likely reasons is that the vast majority of receivers are completely unaware of the transportation related aspects of the operation. For that reason, they cannot provide crucial information needed for modeling purposes (e.g., trip chains, truck origin-destinations). On the plus column, since the receivers know the characteristics of the cargoes they provide excellent data about the goods they receive.

### 3.1.3. Carrier based surveys

This type of surveys is the most widely used approach to collect freight data. Probably, the key reason is the relative ease to define the target population, i.e., freight trucks that could be sampled using vehicle registration, and collect the corresponding sample. Examples of this type of survey are the Freight Movement Survey (FMS) and the Highway Carrier Attitude Survey (Jessup et al., 2004), two surveys conducted by the Arizona Department of Transportation which produced information on commodities shipped, carrier type, tonnage, origins and destinations, routes used, and issues and concerns. Twenty-one hundred carriers were surveyed, with a total response of approximately 25%, requiring three mailings, select telephone follow-ups and in person meetings (Anderson, 1994).

In terms of advantages and disadvantages, carrier based surveys tend to collect fairly good data about travel patterns (e.g., truck origin-destinations, routes, time of travel) because these are the data that the drivers know quite well. The key weakness, however, is that some drivers do not know the details of the shipments they are delivering. For that reason, the quality of the cargo related data may be in question.

#### 3.1.3.1. Vehicle registration based samples

In this case, the sample is obtained from vehicle registration files. For this type of survey, the survey team contacts the owners of the sample of vehicles, and requests them to provide detailed travel information for the vehicle (Cambridge Systematics, 1996). Examples of this includes: the 2000 Denver Regional Council of Government (Denver Regional Council of Governments and Parsons Transportation Group Inc., 2001), and the 1963 internal freight origin-destination survey in NYC (Wood, 1970). A major strength of this approach is that registered vehicle data can usually be obtained from the local Department of Motor Vehicles (DMV) at little cost. The major weakness is that vehicle registration lists do not typically match the commercial vehicle population in urban areas since many trucks not registered in the areas will be garaged and operated within the area, and conversely many commercial vehicles registered in the area will typically operate elsewhere (Cambridge Systematics, 1996). The initial step is to contact the businesses to obtain approval for the survey participation. Typically, the survey mail-out instrument requests establishment, vehicle, and travel behavior data (trip diary forms) for a single-travel day. Data retrieval is usually conducted either by mail-back (self-administered questionnaire) or telephone contact (Computer Assisted Telephone Interview–CATI). Both designs have been used for surveys of this type, with the higher response rate associated with the telephone interviews (Cambridge Systematics, 1996).

Registration based surveys tend to collect more information as the participants are provided with travel diaries, or other forms of questionnaires, to fill during the sampled day. In order to foster

participation, financial incentives, e.g., cash awards, are often used to incite drivers to provide the information needed for modeling.

### *3.2. Trip intercept based surveys*

This type of survey focus on truck/vehicle trips, instead of pre-selecting establishments involved in freight activities. Truck intercept surveys (i.e. roadside interviews) tend to be relatively short to minimize the traffic disruptions they produce. For that reason, data are collected for the current trip (the one being intercepted) with complementary question aimed at assessing the length of the trip chain, and other pertinent information. Some of the key strengths of performing roadside intercept surveys for gathering truck travel information are: (1) that they offer the best statistical control and reliability, since sample is from known traffic population; (2) they have high response rates compared to mail or telephone surveys, due to direct one-on-one interview with the driver; (3) surveys at external stations provide a good statistical representation of trucks entering, exiting, and passing through the study area; (4) they have low investment costs (compared to productivity), if managed and administered properly (Beagan et al., 2007).

The key weaknesses, however, are that: (1) there are only a limited number of locations where intercept surveys may be implemented in a region, which can lead to sampling bias in the truck travel characteristics determined from the survey; (2) there is potential disruption of traffic, especially when surveys are conducted by roadside pull-offs; (3) they can only capture truck traffic characteristics of trucks passing through survey sites; (4) they are not particularly effective for collecting information on internal-internal truck traffic characteristics because of the limitations in the number of sites, and the complexities in distribution patterns of internal-internal trips (Beagan et al., 2007); (5) they are not able to collect information on delivery tours.

#### 3.2.1.Roadside interviews

Roadside interviews refer to the case where a sample of the trucks passing by a set of screen lines are stopped–usually by the police–and asked to participate in the survey. This is the approach used in NYC in 1964 to conduct the external cordon survey (Wood and Leighton, 1969), and the Port Authority of New York and New Jersey's Truck Surveys (Strauss-Wleder et al., 1989). The key data attributes that can be collected through roadside interviews include OD locations (state, city, ZIP code), routing patterns, type of commodity, vehicle and cargo weight, shipper and receiver information (business name, contact, type of facility, etc.), trucking company information (business name, contact, type of carrier, etc.), and type of truck (number of axles and number of units) (Beagan et al., 2007). The locations for conducting roadside intercept surveys depend on the OD truck travel patterns that are being analyzed.

### *3.3. Cordon survey*

Cordon surveys collect travel pattern information including origins and destinations at the perimeter of a region. External cordon surveys are designed to obtain information on trips that cross the external boundary of a study area. These include: (1) external-external trips, which begin and end outside the study area but travel through it; (2) internal-external trips, which begin inside the study area but end outside; and (3) external-internal trips, which originate outside the study area but end within it. External cordons are the external highway gateways that are used by trucks to enter and exit. Commercial vehicles crossing the cordon line are the basic sampling unit, for which the following travel data are usually collected: OD locations (state, city, ZIP code), routing patterns, type of commodity, vehicle and cargo weight, shipper and receiver information (business name, contact, type of facility, etc.), trucking company information (business name, contact, type of carrier – truckload, LTL, or private, etc.), and type of truck (number of axles and number of units). Data collected from external cordon surveys are useful for freight modeling and planning applications such as: the development of OD freight flow matrices, commodity tonnage distribution to truck classes, and empty and through truck factors (Beagan et al., 2007).

External cordon surveys are usually conducted using one of these three methods: (1) roadside interviews, (2) roadside postcard survey distribution to be mailed back, or (3) license plate recording/matching with a survey mailed out to be returned (Miller et al., 1993). The roadside interview has been described in the previous section. The postcard survey consists of stopping commercial vehicles at the survey station and handing out a postcard to be mailed back after completion by the respondent. This procedure is somewhat less likely to disrupt traffic than conducting interviews is, and it requires fewer field personnel. However, the response rate is usually lower, which could result in significant non-response bias. The third method—the license plate recording and survey mail-out—involves recording license plate numbers as vehicles pass, matching plate numbers against registry files to determine the address, and mailing a survey form to be returned by mail. The license plates can be recorded by using pencil and notepad, audiotape recorder, laptop or portable computer, or film or video camera. The major advantage of the license plate method is that it does not disrupt traffic. The disadvantages, however, are that the lag between time of observation and the receipt of the survey by the respondent may lead to low response rates (and significant non-response bias) and high recollection errors. Adverse publicity may be generated because of errors in license plate recording or address matching and the subsequent mailing of surveys to the wrong place. Even if errors are kept to a minimum, the public may perceive it as an invasion of privacy (Miller et al., 1993).

An example of the external cordon survey is the Goods Movement External Truck Survey, in 1964, which provided data on freight moving into, out of, and through the cordon area defined in the Tri-

State Region (Wood and Leighton, 1969). This survey was conducted as a roadside interview with truckers stopped at points where the sampled highways intersect the cordon line.

### *3.4. Vehicle based surveys*

These surveys have individual vehicles as the sampling unit. They try to collect information regarding the vehicles' freight specific operations. Following, the descriptions of travel diary surveys and surveys assisted by Global Positioning Systems (GPS) are presented.

#### 3.4.1. Travel diary surveys

Travel diary surveys are useful for understanding internal-internal truck trips in an urban area. This data collection method involves selecting a representative sample of trucks operating in the region and obtaining travel diaries from truck drivers for pre-selected time duration (usually 24 hours). The drivers must manually complete forms where they are asked to record information on the truck trip regarding: origin, destination, trip mileage, routing, travel time, trip time of day, commodity-hauled, shipment size, truck type, land use, activity at trip end, type of carrier operation, etc (Beagan et al., 2007). Travel diary surveys can be complemented by the use of Global Positioning System (GPS) receivers which will be discussed further on in this report.

Some of the key freight forecasting and planning applications of the data collected from travel diaries are trip chaining, trip generation, and trip routing (Beagan et al., 2007). Some of the key limitations associated with these surveys include: (1) the sampling process can be difficult; (2) the use of vehicle registration samples can produce biased results in the case where there is a significant fraction of trucking activity from trucks that are not registered in the region; (3) the low response rates; and (4) in the case of GPS use these surveys are relatively more expensive to implement (Beagan et al., 2007).

#### 3.4.2. Surveys and freight data collection assisted by Global Positioning Systems (GPS)

These surveys make use of Global Positioning Systems (GPS) to track the routing patterns of trucks while they travel in the study area. Wemuth et al. (2003) discuss the advantages of employing computers (laptops, palmtops, mobile phones, and GPS receivers) to assist observation and interviews as a mean of data collection, and improve the quality of the results. "Computer-assisted observation allows spatial and temporal movement data to be collected… without direct involvement of the respondents… GPS allows automatic real-time data collection to be made with different degrees of positioning accuracy… spatial and temporal information is characterized by a higher validity" (Wemuth et al., 2003).

It should be noted, however, that GPS devices tend to have a limited role in data collection for modeling purposes, as they cannot provide the data collected by traditional surveys (e.g., commodity type,

shipment size, trip purpose). The maximum utility of GPS-based data collection is realized when combined with other data sources and methods of data collection. For example, origin, destination and routing information received from GPS receivers can be used to validate and improve the information provided by truck drivers in manually completed travel diaries. Also, combining GPS truck trip information with GIS (Geographic Information System) land use data can yield useful information on truck activity characteristics at trip ends (Beagan et al., 2007). For that reason, most GPS devices are likely to remain for the foreseeable future as useful complements to the more traditional freight demand data collection procedures.

Most recently in the industry, there are two approaches in GPS assisted freight data collection services. One approach is to buy a database of trucks for which the cost is usually $1 per truck per month. The main disadvantage of this approach is that the database may not be representative of the region, since the actual content of the sample is unknown. The other approach is to hire a company that puts together a sample for the study. These companies enlist a variety of commercial carriers and pay the participating fleets to contribute anonymous GPS data. The GPS data are then consolidated and shared with participating companies and third parties. Each commercial carrier gives the data collection company the right to monitor their GPS activity compiling movement histories for each truck. For most of the monitored trucks, the make and model of the trucks, as well as the primary cargo a particular company hauls, may also be collected. The delivery tours can be accurately deduced for those trucks due to the equipped GPS units, but how much cargo was loaded or unloaded at each stop is not available. The costs of these services range from $10,000 to $20,000 per month depending on the study area. The main disadvantage of this approach is the difficulty in putting together a representative sample of the region, i.e., a sample of significant size that considers all significant industry sectors and company sizes. Also, the commercial carriers that are recruited are mainly those that can afford to install GPS-based monitoring systems in their trucks. However, there are numerous small-size trucking companies, many with only one or a few trucks, especially in the NYMTC region, that would not be considered in the sample.

### *3.5. Tour based surveys*

As the name implies, these surveys focus on data collection along the supply chain. This stands in contrast with establishment surveys that focus on the business at the ends of the supply chain. Although, they are traditionally associated with carrier surveys, the emergence of longitudinal surveys that track shipments along the supply chain suggest that it is best to broaden the scope of this important class of freight surveys.

### 3.5.1.Longitudinal surveys

Longitudinal surveys are those in which individual shipments are tracked long a supply chain. There are not many instances of this type of survey, as the few examples are the ones conducted in France. Two national shipper surveys were carried out in France in 1988 and then in 2004 in which shippers were interviewed about their production constraints and transportation practices. These surveys also aimed to provide a comprehensive description of supply chains based on the door-to-door tracking of each shipment from the shipper to the final receiver. Guilbault and Gouvernal (2010) analyzed the data collected by these two surveys in France and presented some findings which highlight the major structural and logistical changes observed over the period of 1988-2004. The 1988 survey covered 1,742 firms and 5,118 shipments were observed and tracked and the 2004 survey covered 2,953 shippers and 10,462 shipments (Guilbault and Gouvernal, 2010).

The success of the 1988 French survey was one of the reasons to use this approach for the European 1999 MYSTIC (Methodological Framework for Modeling European Passenger and Freight Transport) survey. There, a shipper survey was held in France and in the Netherlands (Rizet et al., 2003). These surveys incorporate three major components (Rizet et al., 2003; Guilbault and Gouvernal, 2010):

- The tracing of a selection of shipments from their departure from the plant up to their arrival to the consignee or receiver; and
- The description of the main organizational features of the shippers' plants influencing transportation characteristics (shipment size, mode choice, etc).
- The use of the shipment as a transportation measurement unit in addition to the conventional units of tons or ton kilometers.

The surveys were structured in three levels, each one including one or several types of questionnaire forms: (1) the establishment level, (2) the shipment level, and (3) the physical or organizational transportation chain level. At the first level, the "pre-interview" and "establishment" questionnaires apply to the economic and logistical characteristics of the plant. The main information is gathered through face-to-face interviews and refers to the activity of the plant, its production and delivery constraints, the links with its trading partners, and logistical points, such as availability of own fleet, storage policy, accessibility of different transportation infrastructure, and computerized information systems recording the transportation movements (Rizet et al., 2003).

The next step, the "shipment questionnaire," which is also done face-to-face, deals with the description of randomly selected recent shipments. The questions in the survey address the physical and economic characteristics of the shipments: commodity type, value, weight, appearance and conditions of departure, the destination, nature of the customer, time of departure and configuration of the order, and the exchange commercial terms.

The third level of the survey, where the reconstitution of organizational and physical chains takes place, the operator and journey-leg questionnaires are filled out through telephone interviews. For each operator involved in the transportation or in its organization, an “operator” form describes the economic characteristics of this operator, the services provided, and the subcontracting relationships. Also, the receiver is asked about the conditions of arrival of the shipment, and the price paid for the part of the transportation of which he was in charge. The leg questionnaires are filled out by the operators who took part in the goods movement. The questions refer to the origin, destination, and transportation time of each leg, transit time on intermediate platforms, services provided, mode of transport and type of vehicle, and type of service (Rizet et al., 2003). The procedure to identify the different operators involved in the transportation of the shipment is one of the key points of the survey. According to this procedure, each interviewed person is asked for the modalities of his intervention and for the addresses of the operators he contacted to organize the next step, to produce a complete reconstitution of the chain (Rizet et al., 2003).

The strength about the shipper survey with tracking is that, in fact, it tracks shipments along the successive steps of the transportation chain, up to the final destination, which gives the opportunity to analyze the organizational characteristics of the chain, the split of responsibilities between the operators in the organization, as well as the relationship between them. This type of economic information is definitely of major relevance for transportation policy (Rizet et al., 2003). The main weakness is that these surveys are expensive and the budget may be an important element in their success or failure. Also, it requires a very specific survey design because it is necessary to survey the successive operators of the transportation chain (Rizet et al., 2003).

### *3.6. Freight volumes data collection techniques*

The survey based data collection methods discussed above can reveal fundamental characteristics of freight traffic such as trip purposes, and OD information. Therefore, they are the main focus of this study. Under certain conditions, however, freight volumes on roadways are also needed, e.g., to assess the impact of freight volume on traffic congestion. The data collection method for freight volume is mainly performed via Automatic Vehicle Classifier (AVC), or manual counting. Manual counting involves a trained observer collecting vehicle classification counts at a location based on direct observation of vehicles. It is generally used for short durations of count data collection (for example, peak hour), and in cases where available resources do not justify the use of automated counting equipment. Manual counting can also be done using videography, which involves collecting vehicle classification counts using video tape recorders and tallying them manually by observing vehicles on the video. A primary advantage of videography is the ability to stop time and review data, if necessary (Beagan et al., 2007). AVC is usually based on techniques such as Weight-In-Motion (WIM), consisting of loop detectors, video cameras, or

other types of detectors to automatically classify vehicles and collect freight volume (Sharma et al., 1998). WIM can detect all thirteen FHWA vehicle classes (U.S. Department of Transportation, 1997). The full installation of WIM, however, may be expensive and is only deployed at limited locations. The other AVC methods include: pneumatic tubes, loop detectors (or other types of magnetic detectors), and video cameras. Placed across travel lanes for automatic recording of vehicles, pneumatic tubes can record count data for 24-hour periods or more, and are easily portable. However, the classification accuracy degrades where there is simultaneous crossing of multiple vehicles, such as on high-volume, high-occupancy road segments. Loop detectors involve embedding one or more loops of wire in the pavement, which are very useful under all weather conditions, and are mainly used as permanent recorders at locations where counts are required for a longer time duration (Beagan et al., 2007). Sun and Ritchie (2000) and Oh (2003) show that loop data can be used for vehicle classification by detecting vehicle lengths.

Coifman and Ergueta (2003) suggested the use of the median vehicle on-time instead of the mean and found that the results are less sensitive to outliers. More recently, Coifman and Kim (2009) proposed to use vehicle actuation data to estimate the length of individual vehicles, with improved classification performances. However, as Coifman and Kim (2009) reported, the classification performance "degrades during congestion" due to the difficulty of estimating speeds under congestion. Avery et al. (2004) developed methods to detect vehicle lengths based on video images. They reported satisfactory classification performances (over 90% accuracy in average) using un-calibrated images. Classification methods based on video cameras however are subject to errors due to shadows, blockage of large vehicles, clement weathers, and camera angles. Calibration may also be required in certain cases (Lai et al., 2001).

Table 7 summarizes existing AVC techniques, the classification data they can collect, and their pros and cons. In summary, existing AVC methods (1) heavily rely on fixed location sensing and detection techniques; (2) the data collection locations are restricted by existing traffic monitoring and data collection systems, and cannot be applied to wide areas (Avery et al., 2004); (3) as different AVC techniques can collect different types of classification data (e.g., number of axles, vehicle lengths, FHWA-defined 13 vehicle classes), there is a potential for error when converting counts from one classification system to the other (Beagan et al., 2007).

Some of the key limitations of vehicle classification counts are presented for each method of traffic volume data collection. In manual counts, there is a high personnel and training requirement, but there is still the potential for human error, especially under heavy traffic conditions. It is also not a good approach for counting vehicles during the nighttime period, as visibility can cause problems in effective counting of vehicles by vehicle classes. As for video surveillance based counts, they are associated with high equipment costs, especially for larger geographic coverage areas. Weather can have a serious impact

on video counts, due to the potential for equipment failure or reduced visibility. As for AVC counts, there is a potential for equipment failure and they are relatively more expensive compared to manual counting methods, especially for a larger geographic coverage area. Also, AVC can count vehicles only based on a particular classification system (e.g., number of axles), and consequently, there is a potential for error when converting counts between classification systems (Beagan et al., 2007).

**Table 7: Comparison of existing vehicle classification techniques**

| Technology | Types of vehicle classification data | | | Pros and Cons | |
|---|---|---|---|---|---|
| | FHWA 13 vehicle classes | Number of axles | Vehicle length | Advantages | Disadvantages |
| **Manual Observation / videography** | x | x | x | Can obtain detailed classification results | Time and resource consuming; can only be applied to short time window and limited area |
| **Pneumatic tubes** | | x | | Inexpensive; automatic classification and continuous data collection; portable | Can only detect number of axles; large errors for high-volume, high speed road segments |
| **Video camera** | | | x | Continuous data collection; automatic classification | Can only detect vehicle length; subject to errors due to shadow, blockage, clement weather, and camera angle |
| **Loop detectors / other magnetic sensors / off pavement sensors** | | | x | Continuous data collection; automatic classification | Can only detect vehicle lengths; Performance degrades under congestion |
| **WIM** | x | x | x | Continuous data collection; automatic classification | Full installation is expensive; limited locations |

### *3.7. Conclusions*

As shall be obvious to the reader by now, each approach has advantages and disadvantages and, for that reason, it is doubtful that a single approach may be the absolute best way to do freight data collection. As typical of situations like this one, the best approach will be the combination of data collection procedures that best fits the needs and constraints of the participating agencies. A comprehensive assessment of the pros and cons of the alternative data collection mechanisms available to NYMTC has been presented in this chapter, and the next chapter will focus on defining the best ways to combine them as part of the data collection framework.

# 4. DEFINITION OF DATA COLLECTION FRAMEWORK

This section describes the process used to develop the overall framework that would guide NYMTC's data collection process in pursuit of the development of a freight demand model. This chapter builds upon the information presented in Chapter 3, where the data needs and sources for different modeling techniques are identified. The definition of a data collection framework that meets NYMTC's needs and expectations must satisfy a set of distinct requirements, in terms of expectations from the data collected, and the efficiency and cost-effectiveness of the data collection process itself. The key criteria are described below.

## *4.1. Expectations from the data collected*

The data collected must:

- Quantitatively describe the functioning of the segments of the urban freight system of interest to NYMTC.
- Capture the socio-economic attributes that characterize the agents involved in freight activity and that influence the various freight processes (e.g., generation, consumption, transformation, distribution, storage, mode choice, time of delivery).
- Be able to be forecasted as part of NYMTC's forecasting procedures.
- To the extent possible, be flexible enough to support multiple uses.
- Be as accurate as needed for modeling purposes.
- Be able to support the various stages of the modeling process: development, calibration, validation, and application/forecast.

## *4.2. Efficiency considerations*

The data collection process must be efficient and cost-effective in terms of:

- Its ability to collect the data needed at the lowest cost possible (which includes time, direct expenditures, disturbances to traffic and other stakeholders, etc.).
- Respondent's burden.

## *4.3. Challenges and impediments*

In addition, the data collection framework has to contend with the following impediments:

- There are a multitude of agents that participate in freight activity that tend to have a partial view of the system and are unable to provide system level data.
- Reaching/finding the proper decision maker, i.e., the one that could provide the data, is typically a challenge.

- Some companies may shy away from sharing data that they consider commercially sensitive. However, the experience of the team suggests that if properly motivated, most companies would try to cooperate as long as their financial interest is protected.

### *4.4. Identification of data gaps*

The data needs for alternative approaches and the current sources for these data are outlined in Chapter 3; however, there are major data gaps that are not covered by the data available, which are shown in Table 8. The fundamental implication of Table 8 is that most of the data needed for the development of a freight demand model must be collected from scratch, using techniques described in Chapter 4. However, since almost all freight demand modeling exercises entail one form or another of data or freight demand synthesis, i.e., the estimation of data or freight demand from secondary sources, it is important to discuss the potential role of synthesis techniques. This is the subject of the next section.

**Table 8: Summary of key data gaps**

| | | |
|---|---|---|
| **Freight generation data** | Production | No sources were identified that could provide information about Production and Consumption[1, 2] |
| | Consumption | |
| **Delivery tours** | Sequence | Only GPS data from private vendors can provide good data |
| | Location | Low level of detail about locations |
| | OD flows | Some sources identified but no complete information |
| | Empty flows | No sources identified |
| **Economic characteristics of participating agents** | Shippers | Some sources identified that can provide this type of information, but no complete depiction. The data have no extra information about other categories |
| | Carriers | |
| | Receivers | |
| **Spatial distribution / Location of participating agents** | Shippers | Some sources identified that can provide this type of information, but no complete depiction. The data have no extra information about other categories |
| | Carriers | |
| | Receivers | |
| **Network characteristics** | Travel times and costs | Only a low level of detail about these categories was identified from different sources |
| | Use restrictions | |
| | Capacity | |
| | Traffic volumes | |
| **Special choice processes** | Mode choice | No information about mode choice |
| | Delivery time | Low level of detail about delivery times |
| | Mode attributes | Some level of detail about mode attributes |
| **Other economic data** | Production functions | No sources identified |
| | Demand functions | No sources identified |
| | IO tech. coeffs. | Good level of detail specifically from REIS and 2002 Benchmark I-O Accounts of the USA |

[1] ITE Trip Generation Manual contains trip rates but does not contain information about the cargo attracted or produced

[2] The Commodity Flow Survey microdata could provide information about production and consumption though it would need to be processed and access to the data is restricted

### *4.5. Role of data / freight demand synthesis*

It is important to discuss at this stage the potential role of freight demand synthesis, i.e., the process by which data/freight demand is inferred or estimated from indirect sources. The reason is that in most freight demand modeling efforts there is almost always a component of freight demand synthesis that serves the purpose of filling gaps in the data collected. Such synthesis processes typically play a key role in supporting the modeling process because, more often than not, freight modelers do not have access to all the data needed/wanted. Research has shown that, for instance, the estimation of freight OD matrices could be reasonably achieved using secondary sources such as traffic counts (Tamin and Willumsen, 1988; Gedeon et al., 1993; Tavasszy et al., 1994; Nozick et al., 1996; List et al., 2002; Rios et al., 2002; Al-Battaineh and Kaysi, 2005; Holguín-Veras and Patil, 2007; 2008). In fact, the truck OD matrix in NYMTC's Best Practice Model (BPM) is the result of such process (List et al., 2002).

There is a wide range of possibilities that differ in the extent of the synthesis that is conducted. At one end of the spectrum, a modeler could undertake freight demand modeling with a minimal amount of data, which requires the use of a significant number of assumptions and consequently the use of synthesis techniques. In this context, synthesis techniques could indeed reduce data collection costs, though at the expense of weakening the behavioral considerations captured by the resulting demand model. This happens because most synthesis techniques require the use of simplifying behavioral assumptions. Obviously, the further the assumed behavior is with respect to the actual one, the lower the chances of the resulting model to produce a good representation of reality. Moreover, even when sound behavioral assumptions are used, the heterogeneity of the freight industry degrades the performance of the models. In essence, there is a price to pay for using freight demand synthesis. The fundamental question is whether or not this price is compensated by the reduction in data collection costs.

At the other end, a modeler could undertake a massive amount of data collection that covers all modeling needs and necessitates a minimal number of assumptions and almost no freight demand synthesis. This leads to a situation in which, the more resources spent in data collection, the lower the data error and the better the foundation for the modeling effort. However, data collection costs could become astronomical.

In between, there is a myriad of possibilities that represent different combinations of data error vs. data collection costs, or freight demand synthesis vs. actual data. Most freight demand models are found in between the end positions discussed above. The best approach is the one that best represents the preference of the agency that is sponsoring the modeling effort. As a result, NYMTC staff should ponder what is the balance of data error and data cost that is most appropriate for its region. In most cases, the decision boils down to what amount of data collection could be afforded, given the budget constraint.

In order to deal with this complexity, it is assumed that NYMTC's intent is to collect all the data needed to support the freight demand modeling process, without needing to use freight demand synthesis procedures. As a result, the data collection framework is structured under the assumption that comprehensive data are sought, which represents the gold standard.

### *4.6. Data Collection Framework*

This chapter describes the approach suggested by the team to collect data concerning the different categories identified in Chapter 3. The different subsections summarize the objectives of each data categories, define the target population and the data to be collected, sample size and data collection approach suggested, as well as the output that would be produced with the data.

Standard Industrial Codes (SICs) were used to code the data. The SICs were grouped into eleven different categories according to their sector descriptions. Eight of these categories were selected as being related to freight: agriculture, forestry, and fisheries; mineral industries; construction industries; manufacturing; transportation, communication, and utilities; wholesale trade; retail trade; and food. The freight related SICs are shown with their respective groups for those categories having five observations or more per SIC or per group.

**Table 9: SIC groups corresponding to freight and non-freight related industries**

| Type | Group | Sector | SIC |
|---|---|---|---|
| FREIGHT | 1 | Agriculture, forestry, and fisheries | 1,2,7,8,9 |
| | 2 | Mineral Industries | 10,12,13,14 |
| | 3 | Construction Industries | 15,16,17 |
| | 4 | Manufacturing | 21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39 |
| | 5 | Transportation, Communication, and Utilities | 40,41,42,43,44,45,46,47,48,49 |
| | 6 | Wholesale Trade | 50,51 |
| | 7 | Retail Trade | 52,53,55,56,57,59 |
| | 8 | Food | 20,54,58 |
| NON-FREIGHT | 9 | Finance, Insurance, and Real Estate | 60,61,62,63,64,65,67 |
| | 10 | Service Industries | 70,72,73,74,75,76,78,79,80,81,82,83,84,86,87,88,89 |
| | 11 | Public Adminstration | 90,91,92,93,94,95,96,97,98,99 |

#### 4.6.1. Freight generation data about production and consumption patterns

As indicated in previous tasks (see Table 3)**,** data about production-consumption patterns are needed to characterize the processes by which freight is produced and consumed. *Production* is understood to be the generation of freight coming out of a given establishment; while *consumption* refers to the freight being received by the establishment.

Objective: To collect data that could support the development of models that express freight production and consumption as a function of the economic characteristics of either individual establishments, or zones.

Target population: Primary: Businesses in freight related economic sectors (see Table 9). Secondary: Businesses in non-freight related economic sectors (see Table 9) that may need or produce freight in a sporadic fashion.

Data to be collected: Company attributes (e.g., number of employees, sales, industry sector, line of business); frequency of deliveries, amount of cargo received, commodities most frequently received/shipped, time of deliveries, among others. Some of these data could be purchased from data aggregators (e.g., Dun and Bradstreet, InfoUSA), but may not be as accurate as the aggregators believe.

Sample size suggested: 250, 100 or 50 completed surveys for each of freight related industry sectors for the wide range of business sizes (see Table 9); and 50, 25 or 10 completed surveys for each of non-freight related industry sectors for the wide range of business sizes (see Table 9). The main reason to collect the latter data is to quantify the amount of deliveries (some of them related to service activities) that non-freight related sectors generate. Special emphasis must be placed on Large Traffic Generators.

Data collection approach: Computer aided telephone interviews.

Output: A data set with estimates of number of deliveries, amount of cargo (tons), by commodity type, and company attributes.

#### 4.6.2.Delivery tour data

These data describe the geographic patterns of the pickups and deliveries made in the area. They are very important because they determine the patterns of freight traffic in the various corridors in the area. It is recommended that the delivery tour data collection be decomposed into two surveys: an internal survey to be applied in the NYMTC region and key New Jersey counties that generate significant freight to the NYMTC region; and, an external cordon survey to obtain, which would be described in the next section. This section will present the framework for the internal survey for the delivery tour data.

Objective: To provide the foundation for the development of mathematical models to describe the geographic patterns of commodity flows, vehicle-trips, the corresponding sequences of stops and pickup and delivery actions.

Target population: Private and common carriers in the NYMTC region and key New Jersey counties. Note: It is important to include private carriers, i.e., companies that transport only the cargo for a parent or related company, as they transport a significant, yet undetermined, amount of freight in urban

areas. However, in order to maximize the chances of finding companies that use their own trucks to meet their transportation needs, it may be advisable to sample companies that are larger than a minimum size, e.g., five employees.

Data to be collected: Company characteristics (number of drivers and trucks, number of tours made to the NYMTC region, annual sales), tonnage transported, commodity types, vehicle-trips, tours, sequence of delivery stops visited per tour, amounts delivered and picked up, and time of travel. Some of these data could be purchased from data aggregators (e.g., Dun and Bradstreet, InfoUSA).

Sample size suggested: 1-3% of registrations for truck / commercial vehicle registrations.

Data collection approach: Travel diaries complemented with Global Positioning System (GPS) data loggers.

Output: Data set containing an expanded sample of tonnage transported, tours, vehicle trips, that could be used to produce origin-destination matrices.

#### 4.6.3. Cordon survey

Objective: To obtain travel patterns of internal-external, external-internal, and external-external trips.

Target population: Freight traffic entering the study area within the sampling period

Data to be collected: Company characteristics (number of drivers and trucks, number of tours made to the NYMTC region, annual sales), tonnage transported, commodity types, vehicle-trips, tours, sequence of delivery stops visited per tour, amounts delivered and picked up, and time of travel. Some of these data could be purchased from data aggregators (e.g., Dun and Bradstreet, InfoUSA).

Sample size suggested: 1-5% of trucks crossing the cordon line survey sites.

Data collection approach: Roadside interviews for certain locations and postcard surveys to be mailed back or answered through the internet to be handed out at toll booths. These surveys should usually be done for a minimum of three days to pick the day that best represents the travel patterns.

Output: Data set containing an expanded sample of tonnage transported, tours, and vehicle trips, that could be used to produce origin-destination matrices.

#### 4.6.4. Spatial distribution of the economic agents involved in freight

Objective: To describe the geographic patterns of location of the various agents involved in the freight system. It includes, in addition to carriers, shippers, receivers, warehouses and distribution centers, and all other businesses involved in freight.

Target population: Primary: Businesses in freight related economic sectors (Table 9). Secondary: Businesses in non-freight related economic sectors (Table 9) that may need or produce freight in a sporadic fashion.

Data to be collected: Company attributes (e.g., number of employees, sales, industry sector, line of business).

Sample size suggested: 30-40% of records. Publicly available data (e.g., ZIP Code Business Patterns) provide a significant amount of the data needed. Data aggregators (e.g., Dun and Bradstreet, InfoUSA) could provide the rest. The low cost to collect this information allows for the sample size suggested.

Data collection approach: Direct purchase of a sample from data aggregators.

Output: A data set containing geo-referenced locations of establishments involved in freight activity, together with company descriptors.

#### 4.6.5. Large traffic generators (LTGs)

Objective: To describe the freight production-consumption patterns, and the corresponding generation of freight trips at LTGs.

Target population: Primary: Businesses in freight related economic sectors, (Table 9). Secondary: Businesses in non-freight related economic sectors (Table 9) that may need or produce freight in a sporadic fashion.

LTGs could be defined in a number of different ways, which lead to different sub-populations. The first one is the group of large buildings that house scores of establishments, e.g., Empire State. Although the individual establishments generate relatively small amounts of freight, taken together the building generate significant freight traffic. Some of these buildings are easily identifiable because they have their own ZIP code, e.g., Empire State; while others do not, e.g., Grand Central Terminal, Hunts Point terminal. The second group is comprised of large establishments (businesses) that because of their size generate significant amounts of freight. Since different thresholds could be used to define these LTGs (e.g., larger than 250 employees, 500 employees, 1000 employees), it is important to gain insight into their generation patterns before the actual data collection, to be able to decide what threshold to use.

In the case of "Large Buildings," it is likely that the freight generation patterns could be elicit from the data collected about production and consumption patterns. After all, these patterns are not expected to be different than others in the city. However, data must be collected about the relationship between deliveries and truck-trips as in these buildings it is likely that carriers could make a significant number of deliveries with one truck trip.

In the case of "Large Establishments," it is important to oversample this group to capture their freight production-consumption and the corresponding truck-trip generation patterns. Oversampling is advised because—since there is a relatively small number of these establishments, and they produce significant amounts of freight and truck-trips—they may not adequately represented in a random survey.

Data to be collected: Company attributes (e.g., number of employees, sales, industry sector, line of business); frequency of deliveries, amount of cargo received, commodities most frequently received/shipped, time of deliveries, among others. Some of these data could be purchased from data aggregators (e.g., Dun and Bradstreet, InfoUSA), but may not be as accurate as the aggregators believe.

Sample size suggested:

- Large Establishments: 25-50% (particularly in freight related sectors)
- Large Buildings: Convenience sample of 25-50% buildings to estimate ratio of deliveries to truck-trips.

Data collection approach:

- Large Establishments: CATI based on random sampling of potential participants.
- Large Buildings: Manual counts and interviews at the receiving stations.

Output: A data set with estimates of number of deliveries, number of truck-trips produced, amount of cargo (tons), by commodity type, and company attributes.

#### 4.6.6.Network data

Objective: To provide the information needed to characterize the transportation network upon which the freight flows take place, and the data needed for calibration purposes.

Target population: Not applicable.

Data to be collected: The NYMTC's Best Practice Model (BPM) provides a basic network that is bound to provide the starting point. The BPM network would have to be expanded and reviewed to ensure

it contains all relevant freight only links. In terms of traffic data, classified traffic counts at screenlines would be needed; together with traffic data from permanent tolling and counting stations.

Sample size suggested: One week automated traffic counts, complemented with one day classified traffic counts at key locations (50-100 locations).

Data collection approach: Direct traffic measurements at key locations/screenlines.

Output: Database containing traffic counts by counting station and screenline.

#### 4.6.7. Special purpose models: vehicle/mode choice, delivery time

Objective: To collect the data needed for the estimation of models that are intended to answer and help support the study of specific policy questions (e.g., how to increase rail use, how to increase deliveries at night).

Target population: It would depend on the specific choice process to be modeled. Special attention must be paid to identify and reach the proper decision maker.

Data to be collected: Although the details would depend on the specific policy question to be answered and/or studied, in the case of behavioral models, the data required typically include company characteristics and stated preference (SP) and revealed preference (RP) data.

Sample size suggested: 200 to 400 observations with SP/RP scenarios. In cases, where it is expected that the behavior of the agents to be interviewed depends on location, data pooling could be considered which could reduce the recommended number of observations.

Data collection approach: CATI based on random sampling of potential participants.

Output: A data set containing company characteristics and the SP/RP data needed for behavioral modeling.

#### 4.6.8. Other economic data

Objective: These data are intended to provide quantitative estimates of economic sub-models embedded in some of the alternative freight demand models based on first economic principles (e.g., spatial price equilibriums, Input-Output).

Target population: It depends on the model structure. For instance, spatial price equilibrium models require data about demand and supply functions which indicate that consumers and suppliers would be the target population. Input-Output models do not require collecting data from users as the technical coefficients are obtained from national accounting techniques.

Data to be collected: It depends on the model structure. In the case of supply and demand functions, a profile of quantity demanded and supplied versus price would be needed for the various industry segments.

Sample size suggested: These data are notoriously difficult to collect, which is a significant constraint. For that reason, collecting 10-20 observations for each industry segment should be considered an accomplishment.

Data collection approach: In-Depth-Interviews.

Output: Supply-demand versus price schedule.

# 5. ESTIMATION OF DATA COLLECTION COSTS

This chapter outlines the costs associated with data collection techniques and strategies. This builds upon the work in: Chapter 4, where the data collection procedures are discussed; Chapter 5, where the data collection framework for the NYMTC region is developed; and the supplemental report, where the characteristics of the freight traffic in the NYMTC area were studied.

## *5.1. Review of previous survey costs*

In Jessup et al. (2004) a review of early urban truck travel studies was conducted and seven major urban truck travel studies were discussed: (1) Chicago Area Transportation Study (CATS), 1970 and 1986; (2) Ontario, Canada 1978, 1983 and 1988; (3) Phoenix, 1991; (4) Alameda County, California, 1991; (5) New York-New Jersey, 1974-1994; (6) El Paso, Texas, 1994; and (7) Houston-Galveston, Texas, 1994. Four other surveys have been added to this review of survey costs, one conducted in France and three others conducted by the research team led by Jose Holguín-Veras: (1) France, 1988 and 2004 National shipper surveys; (2) Evaluation Study of the Port Authority of New York and New Jersey Time of Day Pricing, 2001; and (3) New York State Department of Transportation Off-Hour Delivery Study, 2006. Table 10 presents information about each study on the survey methods employed, sample sources, number of completed surveys, response rates, data applications, and survey costs. This information gives an idea of the cost per survey depending on the data collection method employed, i.e., mail-out/mail-back, telephone interview and CATI (Computer-Assisted Telephone Interviewing), combined mailout-mailback and telephone interviews, face to face interview and CAPI (Computer-Assisted Personal Interviewing), and roadside interviews.

## *5.2. Estimation of data collection costs*

Based on the literature review conducted, the reviews of Beagan et al. (2007), as well as Jose Holguín-Veras' experience conducting surveys, the data collection framework costs were estimated. Table 11 summarizes the unit costs described in Beagan et al. (2007) of vehicle classification counts, roadside interviews, establishment surveys and travel diaries. It should be noted that the mail-out/mail-back survey cost, the telephone survey costs, as well as the cost of the combination of both (more than $250) are higher than what is usually estimated for these types of surveys. As it can be seen in Table 10, previous studies conducted in the 1980s, 1990s and more recently in 2006 show that these costs could be much lower ($100-$150).

## Table 10: Unit costs from previous studies

| Survey Location | Survey Year | Description of Study | Survey Method | Sample Source | Approx. No. Completed Surveys | Response Rate | Data Applications | Total Survey Cost | $ / Survey |
|---|---|---|---|---|---|---|---|---|---|
| Chicago | 1986 | Chicago Area Transportation Study (CATS) Commercial Vehicle Survey | Mailout-Mailback | DMV | 3,506 | 25.3% | Truck travel model development. Corridor/Route analysis. Effects of toll on trucks. Truck speed simulation model. Truck activity mapping. | $200,000 | $57 |
| Ontario | 1988 | The Ontario Ministry of Transportation conducts roadside surveys every five years | Roadside Interview | Roadside Interview[1] | 19,225 | 96.5% | Time series comparison. Evaluate and design road geometrics. Pavement management planning. Truck accident analysis. Dangerous goods regulation and enforcement analysis. Driver education program. | NA | NA |
| Phoenix | 1991 | Conducted by Cambridge Systematics sponsored and funded by the Arizona DOT and closely modeled after the 1986 Chicago CATS survey | Combined Telephone-Mailout-Mailback | DMV | 720 | 30.0% | Truck travel model development. | $90,000 [2] | $125 |
| N.Y. & N.J. | 1991 | Conducted by the Port Authority of New York & New Jersey | Roadside Interview | Toll Plaza | 4,500 | NA | Evaluate dedicated rout/corridor proposal. Traffic management for highway reconstruction. Time-series freight analysis. Freight economics analysis. | NA | NA |
| Alameda County, CA | 1991 | Barton Aschman Associates, Inc. conducted the study for the Alameda County-San Francisco Bay Area Caltrans District 4 | Combined Telephone-Mailout-Mailback & | DMV, Port of Oakland | 2,200 | 79.0% | I-880 corridor analysis. Create truck travel submodel for corridor analysis. Generate 24-hour and PM peak volumes by axle. | $285,000 [3] | NA |
| | | | Roadside Interview | Roadside Interview | over 8,000 | NA | | | |
| N.Y. & N.J. | 1992-94 | Conducted by the Port Authority of New York & New Jersey | Roadside Interview | Roadside Interview | 14,671 | 37.8%[4] | NA | $312,000 [5] | $21 |

Source: Lau, Samuel W. "Truck Travel Surveys: A review of the Literature and State-of-the-Art." Metropolitan Transportation Commission, 1995.

[1] Sample taken at roadside intercept surveys.

[2] Cost include data collection, data coding, and model development.

[3] The cost included sample design, survey design, data collection, coding, data reporting, and model development. Approximately, $5,000 was also included in the total cost for conduction vehicle classification counts at 11 locations along I-80 and I-880.

[4] This was a sampling rate. No response rate was given.

[5] This was a multi-agency effort, with partnership from the New Jersey Department of Transportation (NJDOT), the New York Metropolitan Transportation Council (NYMTC), and the Port Authority of New York and New Jersey. The survey was conducted at 18 locations with 3 interviews per toll plaza for 24 hours.

| Survey Location | Survey Year | Description of Study | Survey Method | Sample Source | Approx. No. Completed Surveys | Response Rate | Data Applications | Total Survey Cost | $ / Survey |
|---|---|---|---|---|---|---|---|---|---|
| El Paso | 1994 | Developed by the city of El Paso, Texas Metropolitan Planning Organization, in association with the Texas DOT | Telephone Interview | TVICS[1] | 188 | 42.6% | Truck travel model development. Part of regional travel study. Truck emissions analysis. | $65,000 [2] | $345 [3] |
| Houston-Galveston | 1994 | Wilbur Smith Associates conducted the survey for the Houston-Galveston Area Council | Combined Telephone-Mailout-Mailback | DMV | 900 | 35%-40% | Truck travel model development. | $150,000 | $167 |
| France | 1988 and 2004 | National shipper surveys (ECHO survey) | Establishment: Mailout-Mailback and Face-to-Face Interview (CAPI) | SIRET complete database of firms held by the INSEE[4] | 1988: 1,742 firms and 5,118 shipments (4,983 transportation chains fully reconstructed). 2004: 2,953 shippers and 10,462 shipments (9,742 transportation chains) | NA | Analysis of the transportation chains. Analysis of the relationship between transportation and the industrial production system and its logistical determinants. | 1988: 3 million Francs. 2004: 1 million Euros | NA |
| | | | Shipment: Face-to-Face Interview | Census of the last 20 shipments dispatched by all modes | | | | | |
| | | | Operator and leg: Telephone Interview | Sample of the shipments | | | | | |
| N.Y. & N.J. | 2001 | Evaluation Study of the Port Authority of New York & New Jersey Time of Day Pricing | CATI | D&B | 1,000 | 20% | Behavioral modeling | $78,000 | $90 (15 min/ survey) |
| N.Y. & N.J. | 2006 | New York State Department of Transportation Off-Hour Delivery Study | CATI | D&B | 343 (Brooklyn phase) | 31% | Behavioral modeling | $42,800 | $125 |
| | | | | | 360 (Manhattan phase) | 60% | Behavioral modeling | $35,000 | $97 |

[1] Sample drawn from the Texas Vehicle Information and Computer Services, Inc. (TVICS) database.

[2] Cost included sample design, survey design, data collection, coding, reporting, survey analysis, and model development.

[3] The higher cost was due to a high number of incomplete surveys.

[4] All enterprises registered in France obtain a SIRET number at the time of registration with the National Institute of Statistics and Economic Studies (INSEE).

### 5.2.1. Delivery tours data collection sampling and costs

The data collection framework proposed indicates that the delivery tour data collection is decomposed into two surveys: an internal survey and an external cordon survey. The internal survey is recommended for all NYMTC and key New Jersey counties; and the external cordon survey to capture the travel patterns of internal-external, external-internal and external-external trips of freight traffic entering the study area within the sampling period. The external cordon survey would be conducted in tunnels, bridges, and major interstate highways where commercial vehicles enter the region (see Figure 2). The main advantages are that it is more efficient due to reduced need to sample outside the NYMTC region, and it could be coordinated in conjunction with the New Jersey Turnpike Authority (NJTPA) and the Port Authority of New York and New Jersey (PANYNJ) and increase cost efficiency. The disadvantage is that two survey efforts have to be organized instead of one.

The analyses indicate that the delivery tour data collection is the main cost component. The main question is how many trucks/commercial vehicles that routinely travel to the study area are registered in each county of New York, New Jersey, Pennsylvania and to a less extent Connecticut, which according to studies from the PANYNJ and from Reebie Associates data are important freight generators that affect the region. Previous research indicates that the geographic distribution of the population is correlated with the distribution of trucks, particularly in suburban areas. Since the team could not obtain the real geographic distribution of freight vehicles in the areas of interest, it was estimated with the geographic distribution of the population. The overall process to estimate the geographic distribution of vehicles consisted of using OD data to identify where to sample. Data from PANYNJ and NYMTC were available to the team for this purpose.

**Figure 2: Access points to the NYMTC region (highways, bridges and tunnels)**

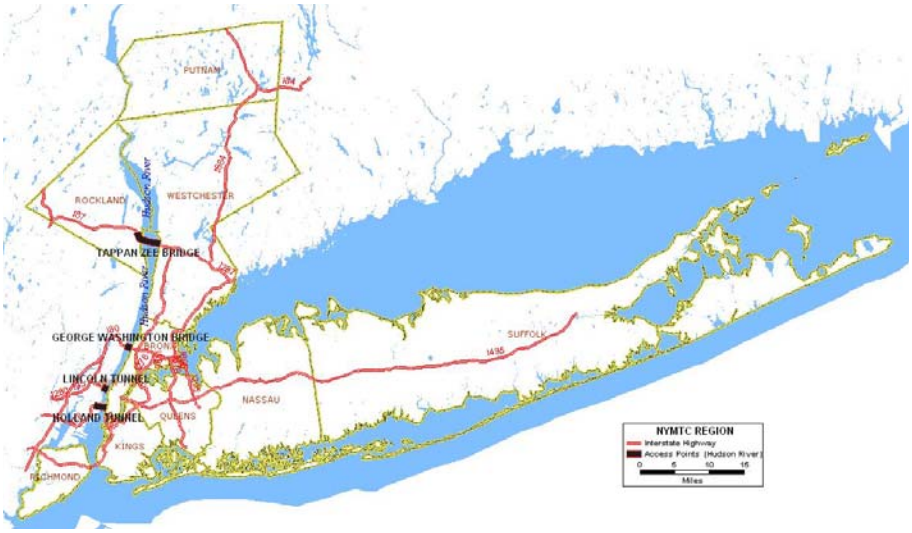
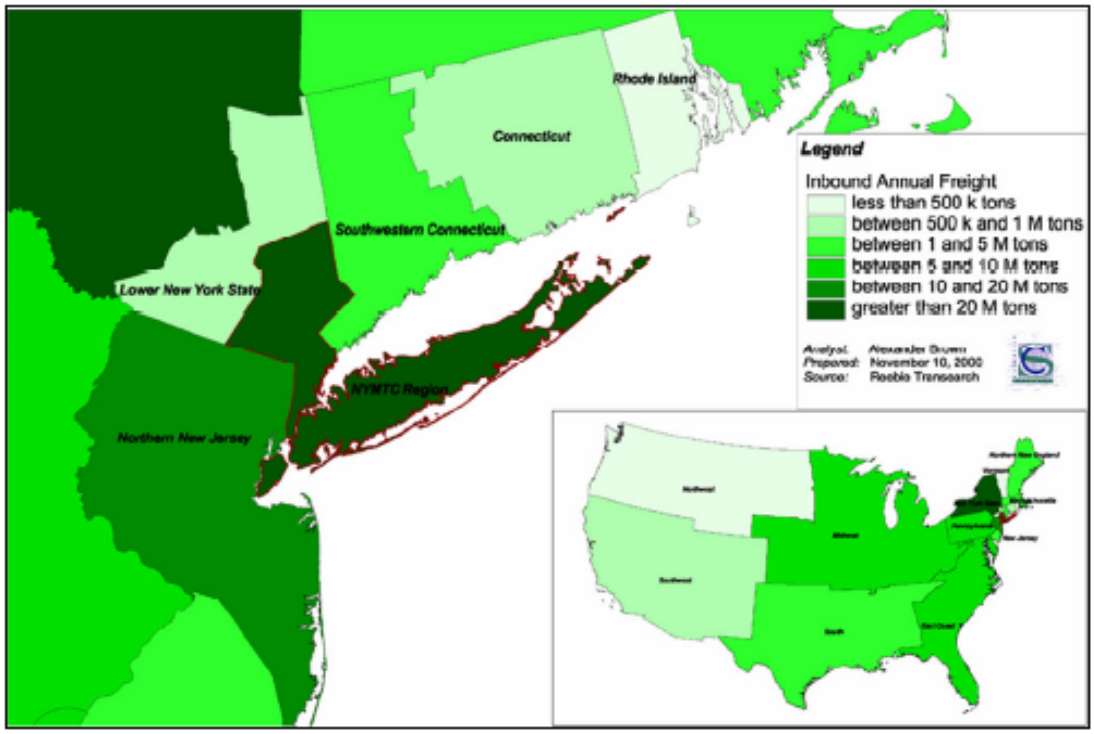


**Table 11: Unit costs collected from Beagan, et al (2007)**

| Data Collection Method | Cost Description | Type | Average Cost | Comments |
|---|---|---|---|---|
| **Vehicle Classification Counts** | Unit cost (per site) for conducting 24-hour vehicle classification counts. | Manual Counting | $650 | To reduce costs it should be considered availability of count data from existing counting programs (ex: DOTs) |
| | | Video Counting | $500 | |
| | | Automated Counting | NA | |
| **Roadside Intercept Surveys** | Unit cost (per site) for conducting 24-hour intercept survey | Roadside Interviews | $5,000 | Actual costs of data collection can vary significantly based on the characteristics of the sites, the quantity and quality of data collected, and the data collection firm employed for conducting the surveys. |
| **Establishment Surveys** | Cost per survey | Mail-Out/Mail-Back | $100 (10% response rate) | NA |
| | | Telephone Survey | $250 (20% response rate) | |
| | | Combined Telephone and Mail | Expected to be higher than telephone surveys | |
| **Travel Diary Surveys** | Cost per survey | Not assisted by GPS | NA | Cost is a major implementation issue only in the case of GPS-based travel diaries, owing to the high equipment costs associated with GPS receivers, and the costs of installation on trucks. However, limited data are available on the costs of conducting GPS-based travel diary surveys because of the relatively fewer applications of this survey methodology. |
| | | GPS assisted | NA | |

**Figure 3: Annual tons of freight arriving in the NYMTC region by origin**




Source: Reebie Associates.

**Figure 4: Top origins from the PANYNJ 2000 Truck Survey**

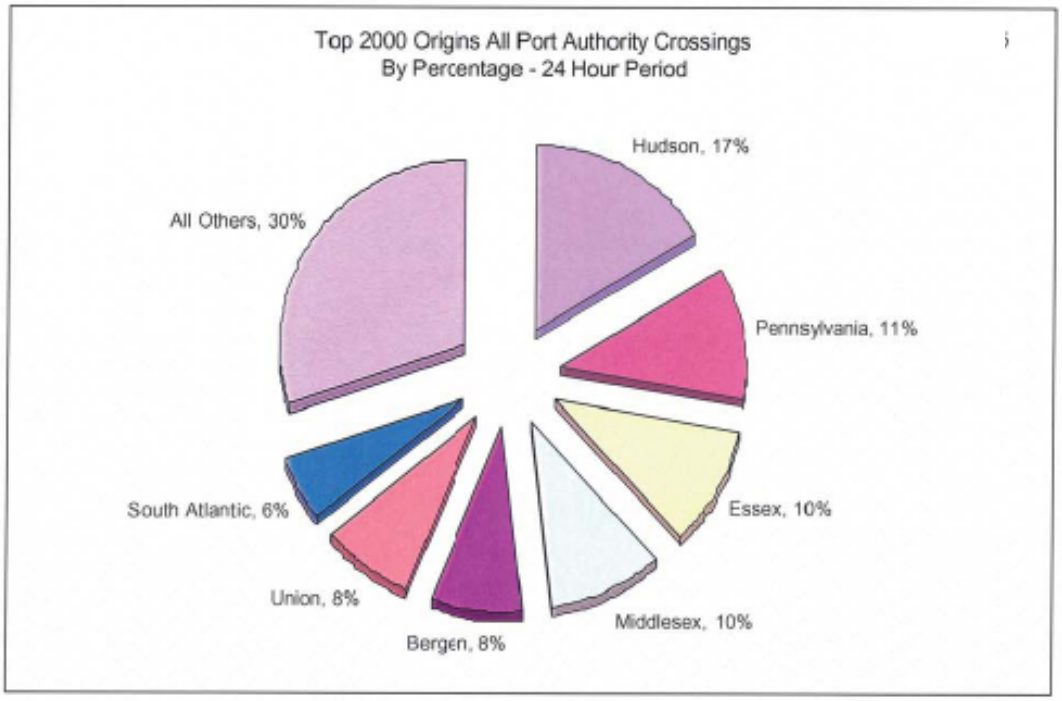
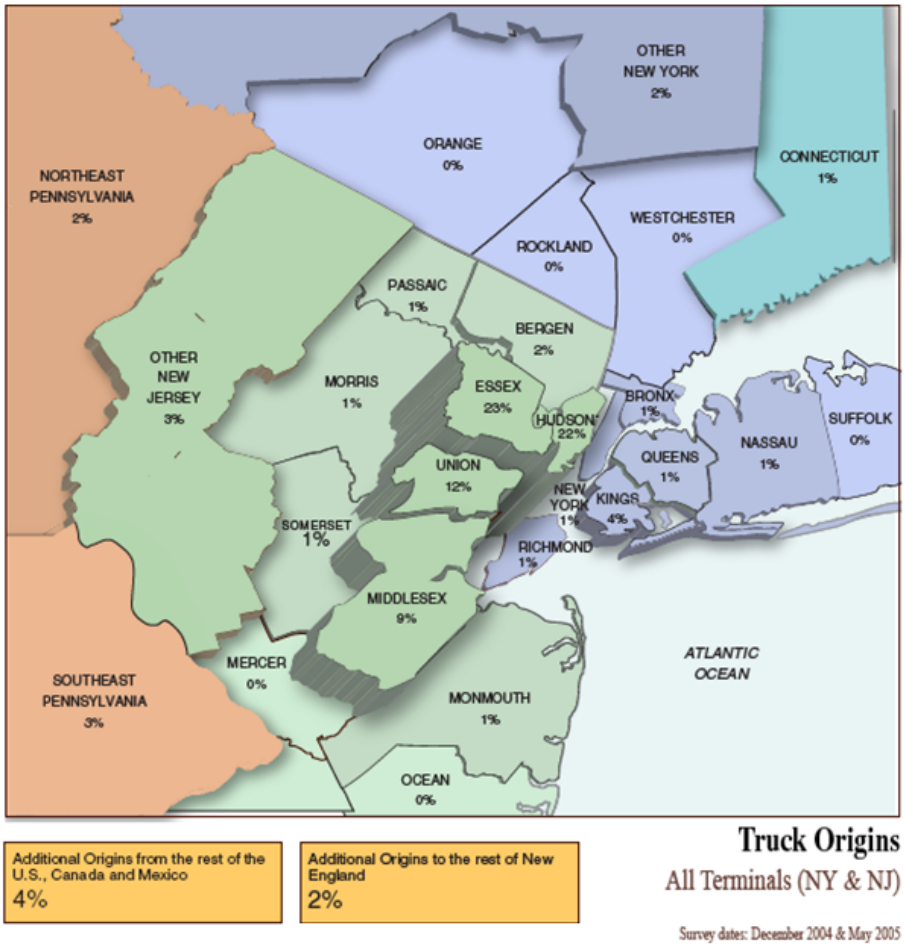


**Figure 5: Truck origins from the PANYNJ Marine Container Terminal Truck OD Survey**




Figures 4-6 show the top truck origins of the NYMTC region and PANYNJ crossings. In general, the major truck origins responsible for freight production to the NYMTC region are: the NYMTC region, New York State, Northern New Jersey, Pennsylvania, and to less extent Southwest Connecticut. A sample of the counties located in the major freight production origins was taken using a 50-150 mile radius around the NYMTC region. The percentages of the county population with respect to the total state population were computed, and these percentages were used to estimate the percentage of trucks registered in the counties. Table 12 shows the estimated distribution of trucks for the selected counties under the 100-mile radius. The total trucks per state were taken from the 2002 Vehicle Inventory and Use Survey (VIUS). Table 13 shows the proposed sample for the delivery tours data collection. It should be noted that the actual geographic distribution of trucks/commercial vehicles is still unknown.

**Table 12: Distribution of trucks in 100-mile radius**

| County | Population | % Pop | Trucks | County | Population | % Pop | Trucks |
|---|---|---|---|---|---|---|---|
| Fairfield CT | 882,567 | 25.9% | 206,598 | Rensselaer NY | 152,538 | 0.8% | 28,356 |
| New Haven CT | 824,008 | 24.2% | 192,890 | Washington NY | 61,042 | 0.3% | 11,347 |
| Litchfield CT | 182,193 | 5.3% | 42,649 | Broome NY | 200,536 | 1.1% | 37,278 |
| Sussex NJ | 144,166 | 1.7% | 36,362 | Chenango NY | 51,401 | 0.3% | 9,555 |
| Bergen NJ | 884,118 | 10.5% | 222,996 | Susquehanna PA | 42,238 | 0.3% | 10,623 |
| Hudson NJ | 608,975 | 7.2% | 153,598 | Berks PA | 373,638 | 3.0% | 93,970 |
| Essex NJ | 793,633 | 9.4% | 200,173 | Wyoming PA | 28,080 | 0.2% | 7,062 |
| Passaic NJ | 489,049 | 5.8% | 123,350 | Luzerne PA | 319,250 | 2.6% | 80,292 |
| Warren NJ | 102,437 | 1.2% | 25,837 | Lehigh PA | 312,090 | 2.5% | 78,491 |
| Hunterdon NJ | 121,989 | 1.4% | 30,769 | Carbon PA | 58,802 | 0.5% | 14,789 |
| Monmouth NJ | 615,301 | 7.3% | 155,194 | Schuylkill PA | 150,336 | 1.2% | 37,810 |
| Ocean NJ | 510,916 | 6.1% | 128,865 | Monroe PA | 138,687 | 1.1% | 34,880 |
| Somerset NJ | 297,490 | 3.5% | 75,034 | Wayne PA | 47,722 | 0.4% | 12,002 |
| Union NJ | 522,541 | 6.2% | 131,797 | Lackawanna PA | 213,295 | 1.7% | 53,644 |
| Mercer NJ | 350,761 | 4.2% | 88,470 | Philadelphia PA | 1,517,550 | 12.4% | 381,666 |
| Morris NJ | 470,212 | 5.6% | 118,599 | Pike PA | 46,302 | 0.4% | 11,645 |
| Middlesex NJ | 750,162 | 8.9% | 189,209 | Delaware PA | 550,864 | 4.5% | 138,543 |
| Delaware NY | 48,055 | 0.3% | 8,933 | Montgomery PA | 750,097 | 6.1% | 188,650 |
| Ulster NY | 177,749 | 0.9% | 33,042 | Bucks PA | 597,635 | 4.9% | 150,306 |
| Greene NY | 48,195 | 0.3% | 8,959 | Northampton PA | 267,066 | 2.2% | 67,167 |
| Columbia NY | 63,094 | 0.3% | 11,729 | Lebanon PA | 120,327 | 1.0% | 30,262 |
| Otsego NY | 61,676 | 0.3% | 11,465 | Lancaster PA | 470,658 | 3.8% | 118,371 |
| Schoharie NY | 31,582 | 0.2% | 5,871 | Chester PA | 433,501 | 3.5% | 109,026 |
| Sullivan NY | 73,966 | 0.4% | 13,750 | Bradford PA | 62,761 | 0.5% | 15,784 |
| Montgomery NY | 49,708 | 0.3% | 9,240 | York PA | 381,751 | 3.1% | 96,011 |
| Saratoga NY | 200,635 | 1.1% | 37,297 | Dauphin PA | 251,798 | 2.1% | 63,328 |
| Albany NY | 294,565 | 1.6% | 54,758 | Columbia PA | 64,151 | 0.5% | 16,134 |
| Schenectady NY | 146,555 | 0.8% | 27,244 | | | | |

**Table 13: Delivery tours sample**

| | Total Trucks | Trucks (100 miles) | Trucks (150 miles) | Counties selected | 3% | 2% | 1% |
|---|---|---|---|---|---|---|---|
| **NYMTC** | 296,025 | 296,025 | 296,025 | 296,025 | 8,881 | 5,921 | 2,960 |
| **NY** | 3,527,600 | 424,360 | 673,563 | External cordon | | | |
| **NJ** | 2,122,300 | 2,122,300 | 2,122,300 | 897,773 | 26,933 | 17,955 | 8,978 |
| **PA** | 3,088,700 | 1,810,456 | 1,992,736 | External cordon | | | |
| **CT** | 797,200 | 797,200 | 797,200 | External cordon | | | |
| **Total** | 9,535,800 | 5,450,342 | 5,881,825 | 1,193,798 | 35,814 | 23,876 | 11,938 |

### 5.2.2. Data collection costs

Table 14 presents the unit cost for the data collection framework developed for the NYMTC region. The tables show for each data category, the corresponding sample size, data collection approach, the number of completed surveys, and the estimated unit cost. For each aspect there are different cases or options that can be applied to collect the corresponding data. The unit costs that were estimated for the

different data collection methods are: for Computer Assisted Telephone Interviewing (CATI) $80-$100 per survey; travel diaries with GPS data loggers $150 per survey, and $100 per survey for travel diaries without GPS; roadside interviews $10,000 per site for 24 hours; direct purchase of establishment data from data aggregators $0.35 per record; traffic counts $2,500 per location for a week; in depth interviews $100 per interview; direct purchase of GPS data from data aggregators $10,000-$20,000 per sample or $1 per truck (both with data of one month).

The different alternatives proposed range from the more comprehensive to the less comprehensive data collection framework, and respectively ranging from the more costly to the less costly. Table 15 shows these alternatives for each data category and its advantages and limitations with the corresponding total data collection costs. For the NYMTC region, the estimated total costs of the freight generation data about production and consumption patterns range from $1.32 million to $265 thousand; Delivery tours data collection range from $5.37 million to $20 thousand; External cordon survey data collection range from $240 thousand to $80 thousand; Spatial distribution of participating agents ranges from $50 thousand to no costs at all; LTGs for large establishments ranges from $70 thousand to $3 thousand; LTGs for large buildings goes from $13 thousand to $4 thousand; Network characteristics range from $250 thousand to $125 thousand; Special choice processes from $50 thousand to $25 thousand; and, Other economic data from $100 thousand to $50 thousand. In essence, all data collection alternatives for all aspects to be collected have advantages and disadvantages, and it is up to the agencies to decide on which to select, depending on the objectives of the study and the budget constraints.

**Table 14: Data collection unit costs**

| Aspect: | Sample Size | Data collection approach | Total Quantity | No. of Observations | Unit Cost |
|---|---|---|---|---|---|
| **Freight generation data about production and consumption patterns** | 250, 100 or 50 completed surveys for each of freight related industry sectors for the wide range of business sizes; and, 50, 25 or 10 completed surveys for each of non-freight related industry sectors for the wide range of business sizes. (86 SICS: 52 freight related and 34 non-freight related) | Computer aided telephone interviews (CATI) | Case 1: 250 completed surveys for each freight SIC (25 per county); and 50 completed surveys for each non-freight SIC (5 per county) | 14,700 | $80-$100 (30% response rate) |
| | | | Case 2: 100 completed surveys for each freight SIC (10 per county); and 25 completed surveys for each non-freight SIC (dispersed through the region) | 6,050 | |
| | | | Case 3: 50 completed surveys for each freight SIC (5 per county); and 10 completed surveys for each non-freight SIC (dispersed through the region) | 2,940 | |
| **Delivery tours** | 3%, 2% or 1% of registrations for truck / commercial vehicle registrations (From 2002 VIUS: over 9.5 million commercial vehicles registered in NY, NJ, CT and PA) | Travel diaries complemented with Global Positioning System (GPS) data loggers for one week. | Case 1: 3% of commercial vehicle registrations | 35,814 | $100 without GPS assistance $150 with GPS data loggers |
| | | | Case 2: 2% of commercial vehicle registrations | 23,876 | |
| | | | Case 3: 1% of commercial vehicle registrations | 11,983 | |
| | | Direct purchase of a sample from GPS data aggregators | Case 4: Direct purchase of 1-month sample | N/A | $20,000/sample or $1/truck |
| **Cordon survey** | 1-5% of trucks crossing the cordon line survey sites | Roadside interviews for certain locations and postcard surveys | Case 1: 1 day of data collection | 3% for 1 day | $10,000 per site for 24 hours |
| | | | Case 2: 2 days of data collection | 3% for 2 days | |
| | | | Case 3: 3 days of data collection | 3% for 3 days | |
| **Spatial distribution / Location of participating agents** | 30-40% of Records. Publicly available data (e.g., ZIP Code Business Patterns) provide a significant amount of the data needed. Data aggregators (e.g., Dun and Bradstreet, InfoUSA) could provide the rest. Total freight related establishments in the NYMTC region 171,309 and non-freight related 182,339 establishments | Direct purchase of a sample from data aggregators. | Case 1: 40% of records. Freight: 68,524 records. Non-Freight: 72,936 records | 68,524 | $0.35 (D&B) |
| | | | Case 2: 30% of records. Freight: 51,393 records. Non-Freight: 54,702 records (30%) | 51,393 | $0.35 (D&B) |
| | | | Case 3: ZIP code Business Patterns Data | ALL | FREE |

| Aspect: | Sample Size | Data collection approach | Total Quantity | | No. of Observations | Unit Cost |
|---|---|---|---|---|---|---|
| **Large Traffic Generators (LTGs)** | Large Establishments: 25-50% (particularly in freight related sectors). Total large establishments of 250-499 empl: 559 freight estab; 500-999 empl: 162 freight estab; and 1000+ empl: 72 freight estab | Large Establishments: CATI based on random sampling of potential participants | 50% | 250+ empl: 793 freight estab | 397 | $150-$200 (70% response rate) |
| | | | | 500+ empl: 234 freight estab | 117 | |
| | | | | 1000+ empl: 72 freight estab | 36 | |
| | | | 25% | 250+ empl: 793 freight estab | 199 | |
| | | | | 500+ empl: 162 freight estab | 59 | |
| | | | | 1000+ empl: 72 freight estab | 18 | |
| | Large Buildings: 25-50% of buildings to estimate ratio of deliveries to truck-trips (assuming there are 90-150 large buildings) | Large Buildings: Manual counts and interviews at the receiving stations | 50% | 150 buildings | 75 | |
| | | | | 90 buildings | 45 | |
| | | | 25% | 150 buildings | 38 | |
| | | | | 90 buildings | 23 | |
| **Network characteristics** | One week automated traffic counts, complemented with one day classified traffic counts at key locations. | Direct traffic measurements at key locations/screenlines | 50 to 100 locations | | 75 | $2,500 per location |
| **Special choice processes** | 200 to 400 observations with SP/RP scenarios. In cases, where it is expected that the behavior of the agents to be interviewed depends on location, data pooling could be considered which could reduce the recommended number of observations | CATI based on random sampling of potential participants | 400 observations per choice process | | 400 | $100-$150 (30% response rate) |
| | | | 300 observations per choice process | | 300 | |
| | | | 200 observations per choice process | | 200 | |
| **Other economic data** | These data are notoriously difficult to collect, which is a significant constraint. For that reason, collecting 10-20 observations for each industry segment should be considered an accomplishment | In-Depth-Interviews | 780 observations (52 freight industry segments) | | 780 | $100 per interview |

**Table 15: Analysis of total data collection costs**

| Aspect | Unit cost | Alternatives | | | | |
|---|---|---|---|---|---|---|
| **Freight generation data about production and consumption patterns** | **$90** | Case 1: 250 completed surveys for each freight SIC (25 per county); and 50 completed surveys for each non-freight SIC (5 per county) | Case 2: 100 completed surveys for each freight SIC (10 per county); and 25 completed surveys for each non-freight SIC (dispersed through the region) | Case 3: 50 completed surveys for each freight SIC (5 per county); and 10 completed surveys for each non-freight SIC (dispersed through the region) | | Case 7: No data collection, use generation rates from the literature |
| | | Sample: 13,000 surveys for freight and 1,700 for non-freight businesses | Sample: 5,200 surveys for freight and 850 for non-freight businesses | Sample: 2,600 surveys for freight and 340 for non-freight businesses | | |
| | | Advantages: Support models by SIC and county, pooled if desired | Advantages: Support SIC pooled models with county parameters | Advantages: Support SIC models only | | Advantages: Small investment |
| | | Limitations: None | Limitations: Lose the ability to have county specific models by SIC | Limitations: Lose the ability to consider county specific models | | Limitations: No connection to local conditions |
| | | Total Cost: $1,323,000 | Total Cost: $544,500 | Total Cost: $264,600 | | Total Cost: $0 |
| **Delivery tours, pickups/ deliveries, commodities transported, trip purposes** | **For cases 1-3** | Case 1: 3% of commercial vehicle registrations | Case 2: 2% of commercial vehicle registrations | Case 3: 1% of commercial vehicle registrations | Case 4: Direct purchase of sample from GPS data aggregators | Case 7: No data collection. O-D Synthesis |
| | **$150** | Sample: 35,814 | Sample: 23,876 | Sample: 11,938 | Sample: Whatever is available from the data aggregators | |
| | **For case 4:** | Advantages: Data likely to meet modeling needs. Meets the standard of OD surveys. | Advantages: Data not as solid as for 3%, though quite appropriate for modeling. Lower cost. | Advantages: Data appropriate for modeling. Gaps may surface. Lowest cost | Advantages: Lowest cost | Advantages: Small investment |
| | **$10,000-$20,000/ month for 2-3 years** | Limitations: None | Limitations: Small industry segments may not be adequately covered. | Limitations: Some data gaps may be evident. | Limitations: Potentially large bias in data. Potential lack of coverage on small companies and some industry sectors not prone to use GPS. No data regarding trip determinance. | Limitations: Weak/No connection to the underlying factors that determine freight demand |
| | | Total Cost: ######## | Total Cost: $3,581,400 | Total Cost: ######## | Total Cost: $120,000- | Total Cost: $0 |

**MORE COMPREHENSIVE** LESS COMPREHENSIVE

| Aspect | Unit cost | Alternatives | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Cordon Survey** | **$10,000** | Case 1: 3 days of data collection | | Case 2: 2 days of data collection | | Case 3: 1 day of data collection | | Case 7: No data collection |
| | | Sample: 8-10 survey sites in the cordon line around the region | | Sample: 8-10 survey sites in the cordon line around the region | | Sample: 8-10 survey sites in the cordon line around the region | | |
| | | Advantages: Data likely to meet modeling needs. Meets the standard of OD surveys. There will be backup data if there are collection problems. | | Advantages: Data not as solid as for 3 days though appropriate for modeling. Lower cost. | | Advantages: Relatively low cost. | | Advantages: No investment required |
| | | Limitations: None | | Limitations: In case of problems the amount of backup data is minimal. | | Limitations: No backup data. No way to verify data soundness. | | Limitations: No data about I-E, E-I, E-E trips |
| | | Total Cost: $240,000 | | Total Cost: $160,000.00 | | Total Cost: $80,000 | | $0 |
| **Spatial distribution / Location of participating agents** | **$0.35** | Case 1: 40% of records | | Case 2: 30% of records | | Case 3: ZIP code Business Patterns | | |
| | | Sample: 68,524 freight records; 72,936 non-freight records | | Sample: 51,393 freight records; 54,702 non-freight records | | Sample: ALL | | |
| | | Advantages: Accurate geolocation. Could be expanded to control totals. | | Advantages: Accurate geolocation. Could be expanded to control totals. | | Advantages: Cost. Comprehensive data that contains summaries of all observations. | | |
| | | Limitations: Data provided by aggregators may have errors. | | Limitations: Data provided by aggregators may have errors. | | Limitations: Data located at Zip code level. Unable to geolocate precisely. | | |
| | | Total Cost: $49,511 | | Total Cost: $37,133 | | Total Cost: FREE | | |
| **LTGs (Large establish-ments)** | **$175** | Case 1: 50% of estab with 250+ employees | Case 2: 25% of estab with 250+ employees | Case 3: 50% of estab with 500+ employees | Case 4: 25% of estab with 500+ employees | Case 5: 50% of estab with 1000+ employees | Case 6: 25% of estab with 1000+ employees | Case 7: No data collection |
| | | Sample: 397 freight | Sample: 198 freight establishments | Sample: 117 freight establishments | Sample: 59 freight establishments | Sample: 36 freight establishments | Sample: 18 freight establishments | |
| | | Advantages: Cover the key groups | Advantages: Lower cost | Advantages: Lower cost | Advantages: Lower cost | Advantages: Lower cost | Advantages: Lower cost | Advantages: No investment required |
| | | Limitations: None | Limitations: Some groups not covered | Limitations: Gap in coverage (250-499) | Limitations: Gap in coverage (250-499) | Limitations: Gap in coverage (250-999) | Limitations: Gap in coverage (250-999) | Limitations: No data about LTGs |
| | | Total Cost: $69,475 | Total Cost: $34,825 | Total Cost: $20,475 | Total Cost: $10,325 | Total Cost: $6,300 | Total Cost: $3,150 | Total Cost: $0 |

**MORE COMPREHENSIVE** **LESS COMPREHENSIVE**

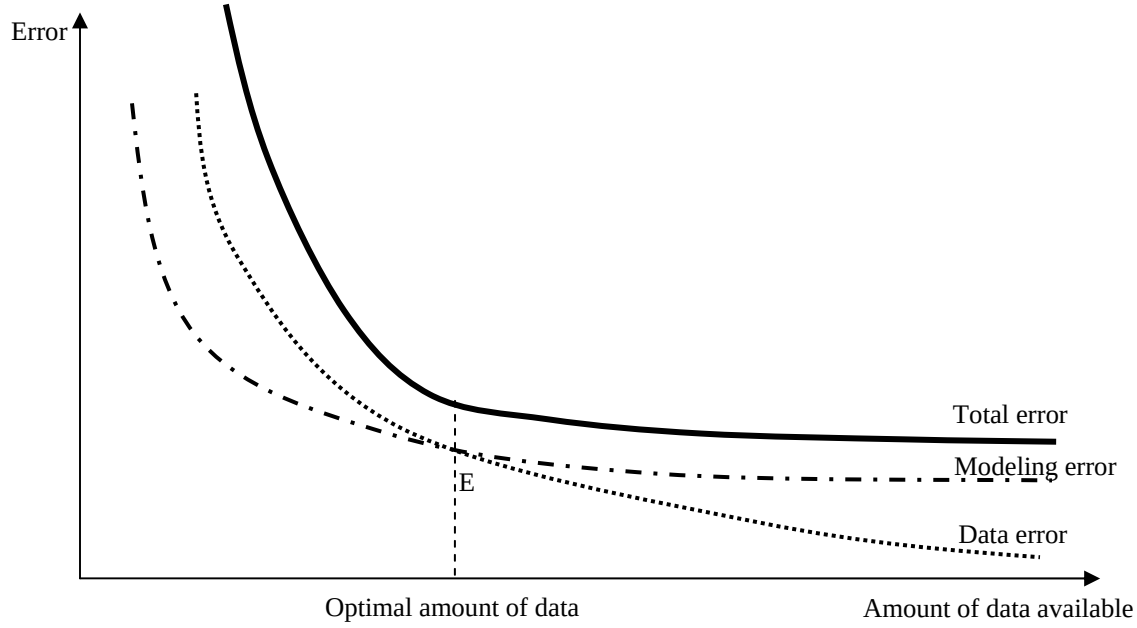
| Aspect | Unit cost | Alternatives | | | | |
|---|---|---|---|---|---|---|
| **LTGs (Large buildings)** | **$175** | Case 1: 50% of 150 buildings | Case 2: 50% of 90 buildings | Case 3: 25% of 150 buildings | Case 4: 25% of 90 buildings | Case 7: No data collection |
| | | Sample: 75 buildings | Sample: 45 buildings | Sample: 38 buildings | Sample: 23 buildings | |
| | | Advantages: Data will satisfy most modeling needs | Advantages: Lower cost | Advantages: Lower cost | Advantages: Lower cost | Advantages: No investment required |
| | | Limitations: None | Limitations: No data for buildings without own ZIP | Limitations: Some data gaps could arise | Limitations: No data for buildings without own ZIP | Limitations: No data about LTGs |
| | | Total Cost: $13,125 | Total $7,875 | Total Cost: $6,650 | Total Cost: $4,025 | Total Cost: $0 |
| **Network charac-teristics** | **$2,500** | Case 1: 100 locations | Case 2: 75 locations | Case 3: 50 locations | | Case 7: No data collection. |
| | | Advantages: Complete coverage | Advantages: Lower cost | Advantages: Lower cost | | Advantages: No investment required |
| | | Limitations: None | Limitations: Reduced coverage | Limitations: Reduced coverage | | Limitations: No traffic data |
| | | Total Cost: ####### | Total ####### | Total Cost: ####### | | Total Cost: $0 |
| **Special choice processes** | **$125** | Case 1: 400 observations per choice process | Case 2: 300 observations per choice process | Case 3: 200 observations per choice process | | Case 7: No data collection |
| | | Advantages: Data will satisfy most modeling needs. | Advantages: Data appropriate for modeling. | Advantages: Data appropriate for modeling. | | Advantages: No investment required |
| | | Limitations: None. | Limitations: Validation data set will be small. | Limitations: Require careful design. Validation data not possible. | | Limitations: No data to do these analyses |
| | | Total Cost: $50,000 | Total $37,500 | Total Cost: $25,000 | | Total Cost: $0 |
| **Other economic data** | **$100** | Case 1: 20 observations for each freight related industry segment | Case 2: 15 observations for each freight related industry segment | Case 3: 10 observations for each freight related industry segment | | Case 7: No data collection |
| | | Sample: 1,040 observations | Sample: 780 observations | Sample: 520 observations | | |
| | | Advantages: Solid data collected | Advantages: Data acceptable | Advantages: Lower cost | | Advantages: No investment required |
| | | Limitations: None | Limitations: Data reliability | Limitations: Data quality borderline | | Limitations: No data to do these analyses |
| | | Total Cost: $104,000 | Total Cost: $78,000 | Total Cost: $52,000 | | Total Cost: $0 |

**MORE COMPREHENSIVE** **LESS COMPREHENSIVE**

### *5.3. Data collection alternatives*

As discussed throughout the report, there is a combinatorial number of potential data collection alternatives that differ in the extent to which additional data are collected, and that freight demand modeling is used to synthesize (infer) the missing elements. It is also important to stress that the different data collection alternatives have vastly different implications in terms of quality of the modeling effort that they could support. At one end of the spectrum, while not collecting any freight data would definitely minimize data collection costs, it would lead to large (and of unknown magnitude) errors during the modeling process. At the other end, conducting an extremely comprehensive data collection effort may not necessarily improve the quality of the modeling effort, because the models have a limited ability to replicate the system under study. These tradeoffs could be illustrated with the assistance of Figure 6.

**Figure 6: Conceptual representation of modeling and data errors**




The figure highlights a number of fundamental principles of great importance to the decision of how much data to collect. The first insight is that it is wise to avoid situations at the far left of the point at which modeling and data errors intercept (point E). As illustrated in the figure, in a region of data deprivation both modeling and data errors are likely to be very large. Conversely, the situation illustrated at the far right of point E is not good either. If such a situation is reached, i.e., the data error is much lower than the modeling error, it means that probably too much data have been collected, as opposed to model development. The optimal situation is one in which the data error is about equal to the modeling error, i.e., the data match the needs of the model. Another important consideration is that collecting data

that, though not needed at the moment, would support future model research and development could be a very wise decision. This could be a crucial component of a model improvement strategy.

Table 16 presents a summary of the set of data collection alternatives described in the previous section. In order to assist NYMTC to identify the most appropriate alternatives, the team put together the most meaningful combinations, ranking them in increasing order of data collection cost. These are shown in Table 17. The estimates indicate a wide variance of costs, ranging from modeling exercises that require no purchase of data, to comprehensive data collection efforts that may cost in excess of $7 million. Since these figures do not include items such as indirect costs, fringe benefits, and data analysis costs, the actual costs would be higher. It is also important to highlight that, when designing the alternatives to include in the table, the team adopted a modular approach. The fundamental advantage of such decision is that it is straightforward to decide on an expansion plan involving a staggered investment in research, model development, and data collection. This, in turn, makes it easier for the agencies to deal with financial and technical constraints. As part of such a strategy, for instance, NYMTC and the partner agencies may decide to make an initial investment on model development and data collection, that could be subsequently improved and enhanced as additional data collection and model development phases are completed. In this context, the subsequent stages of research and development would progressively address weaknesses and limitations of the initial work.

As shown in Table 17, all of the alternatives at the low end of costs entail heavy use of origin-destination synthesis (ODS) techniques (matrix estimation techniques). These models (Tamin and Willumsen, 1988; Gedeon et al., 1993; List and Turnquist, 1994; Tavasszy et al., 1994; Nozick et al., 1996; List et al., 2002; Rios et al., 2002; Al-Battaineh and Kaysi, 2005; Holguín-Veras and Patil, 2007; 2008) entail the use of numerical algorithms to estimate the origin-destination matrices that best match the observed traffic counts. The truck origin-destination matrix embedded in NYMTC's Best Practice Model was estimated using these techniques. Since then, much progress has been made in this area, which suggests that using modern ODS techniques would significantly improve modeling capabilities.

**Table 16: Summary of data collection alternatives**

| Aspect | Unit cost | Alternatives | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Freight generation data about production and consumption patterns** | **$90** | Case 1: 250 completed surveys for each freight SIC (25 per county); and 50 completed surveys for each non-freight SIC (5 per county)<br>Total Cost: $1,323,000 | | | | Case 2: 100 completed surveys for each freight SIC (10 per county); and 25 completed surveys for each non-freight SIC (dispersed through the region)<br>Total Cost: $544,500 | | | | Case 3: 50 completed surveys for each freight SIC (5 per county); and 10 completed surveys for each non-freight SIC (dispersed through the region)<br>Total Cost: $264,600 | | | Case 7: No data collection, Use Generation Rates<br>Total Cost: $0 |
| **Delivery tours, pickups/ deliveries, commodities transported, trip purposes** | **For cases 1-3 = $150**<br>**4 $20,000 sample / month** | Case 1: 3% of commercial vehicle registrations<br>Total Cost: $5,372,100 | | | | Case 2: 2% of commercial vehicle registrations<br>Total Cost: $3,581,400 | | | | Case 3: 1% of commercial vehicle registrations<br>Total Cost: $1,790,700 | | | Case 4: Purchase of 1-month data from GPS data aggregators<br>Total Cost: $20,000 | | Case 7: No data collection. O-D Synthesis<br>Total Cost: $0 |
| **Cordon Survey** | **$10,000** | Case 1: 3 days of data collection<br>Total Cost: $240,000 | | | | Case 2: 2 days of data collection<br>Total Cost: $160,000 | | | | Case 3: 1 day of data collection<br>Total Cost: $80,000 | | | | | Case 7: No data<br>Total Cost: $0 |
| **Spatial distribution / Location of participating agents** | **$0.35** | Case 1: 40% of records<br>Total Cost: $49,511 | | | | Case 2: 30% of records<br>Total Cost: $37,133 | | | | Case 3: ZIP code Business Patterns Data<br>Total Cost: FREE | | | | | |
| **LTGs (Large establish-ments)** | **$175** | Case 1: 50% of estab w/ 250+ employees<br>Total Cost: $69,475 | | Case 2: 25% of estab w/ 250+ employees<br>Total Cost: $34,825 | | Case 3: 50% of estab w/ 500+ employees<br>Total Cost: $20,475 | | Case 4: 25% of estab w/ 500+ employees<br>Total Cost: $10,325 | | Case 5: 50% of estab w/ 1000+ employees<br>Total Cost: $6,300 | | Case 6: 25% of estab w/ 1000+ employees<br>Total Cost: $3,150 | | | Case 7: No data collection<br>Total Cost: $0 |
| **LTGs (Large buildings)** | **$175** | Case 1: 50% of 150 buildings<br>Total Cost: $13,125 | | | | Case 2: 50% of 90 buildings<br>Total Cost: $7,875 | | | | Case 3: 25% of 150 buildings<br>Total Cost: $6,650 | | | Case 4: 25% of 90 buildings<br>Total Cost: $4,025 | | Case 7: No data collection<br>Total Cost: $0 |
| **Network charac-teristics** | **$2,500** | Case 1: 100 locations<br>Total Cost: $250,000 | | | | Case 2: 75 locations<br>Total Cost: $187,500 | | | | Case 3: 50 locations<br>Total Cost: $125,000 | | | | | Case 7: No data collection. Use existing<br>Total Cost: $0 |
| **Special choice processes** | **$125** | Case 1: 400 observations per choice process<br>Total Cost: $50,000 | | | | Case 2: 300 observations per choice process<br>Total Cost: $37,500 | | | | Case 3: 200 observations per choice process<br>Total Cost: $25,000 | | | | | Case 7: No data collection<br>Total Cost: $0 |
| **Other economic data** | **$100** | Case 1: 20 observations for each freight related industry segment<br>Total Cost: $104,000 | | | | Case 2: 15 observations for each freight related industry segment<br>Total Cost: $78,000 | | | | Case 3: 10 observations for each freight related industry segment<br>Total Cost: $52,000 | | | | | Case 7: No data collection<br>Total Cost: $0 |

**Table 17: Combinations of data collection strategies**

| | Scenario 1: ODS with existing data | Scenario 2: Only GPS | Scenario 3: ODS plus network data | Scenario 4: ODS plus network, GPS data | Scenario 5: ODS and cordon data | Scenario 6: ODS plus network, GPS, generation data | Scenario 7: ODS plus network, cordon, GPS, generation | Scenario 8: ODS, GPS, good generation, good data | Scenario 9: ODS, GPS, better generation good data | Scenario 10 : ODS, GPS, best generation good data |
|---|---|---|---|---|---|---|---|---|---|---|
| **Freight generation data about production and consumption patterns** | Case 7: No data collection, Use Generation Rates | Case 7: No data collection, Use Generation Rates | Case 7: No data collection, Use Generation Rates | Case 7: No data collection, Use Generation Rates | Case 7: No data collection, Use Generation Rates | Case 3: 50 surveys for each freight SIC; 10 for each non-freight | Case 3: 50 surveys for each freight SIC; 10 for each non-freight | Case 3: 50 surveys for each freight SIC; 10 for each non-freight | Case 2: 100 surveys for each freight SIC ; 25 for each non-freight | Case 1: 250 surveys for each freight SIC ; 50 for each non-freight |
| **Delivery tours, pickups/ deliveries, commodities transported, trip purposes** | Case 7: No data collection. O-D Synthesis | Case 4: Purchase of 1-month data | Case 7: No data collection. O-D Synthesis | Case 4: Purchase of 1-month data | Case 7: No data collection. O-D Synthesis | Case 4: Purchase of 1-month data | Case 4: Purchase of 1-month data | Case 4: Purchase of 1-month data | Case 4: Purchase of 1-month data | Case 4: Purchase of 1-month data |
| **Cordon Survey** | Case 7: No data collection | Case 7: No data collection | Case 7: No data collection | Case 7: No data collection | Case 1: 3 days of data collection | Case 7: No data collection | Case 1: 3 days of data collection | Case 3: 1 day of data collection | Case 3: 1 day of data collection | Case 3: 1 day of data collection |
| **Spatial distribution / Location of part. agents** | Case 3: ZIP code Business Patterns Data | Case 3: ZIP code Business Patterns Data | Case 3: ZIP code Business Patterns Data | Case 3: ZIP code Business Patterns Data | Case 3: ZIP code Business Patterns Data | Case 3: ZIP code Business Patterns Data | Case 3: ZIP code Business Patterns Data | Case 3: ZIP code Business Patterns Data | Case 3: ZIP code Business Patterns Data | Case 3: ZIP code Business Patterns Data |
| **LTGs (Large establish-ments)** | Case 7: No data collection | Case 7: No data collection | Case 7: No data collection | Case 7: No data collection | Case 6: 25% of estab w/ 1000+ employees | Case 6: 25% of estab w/ 1000+ employees | Case 6: 25% of estab w/ 1000+ employees | Case 1: 50% of estab w/ 250+ employees | Case 1: 50% of estab w/ 250+ employees | Case 1: 50% of estab w/ 250+ employees |
| **LTGs (Large buildings)** | Case 7: No data collection | Case 7: No data collection | Case 7: No data collection | Case 7: No data collection | Case 4: 25% of 90 buildings | Case 4: 25% of 90 buildings | Case 4: 25% of 90 buildings | Case 1: 50% of 150 buildings | Case 1: 50% of 150 buildings | Case 1: 50% of 150 buildings |
| **Network charac-teristics** | Case 7: No data collection. Use existing data | Case 7: No data collection. Use existing data | Case 3: 50 locations | Case 3: 50 locations | Case 3: 50 locations | Case 3: 50 locations | Case 3: 50 locations | Case 1: 100 locations | Case 1: 100 locations | Case 1: 100 locations |
| **Special choice processes** | Case 7: No data collection | Case 7: No data collection | Case 7: No data collection | Case 7: No data collection | Case 3: 200 obs. per choice | Case 7: No data collection | Case 7: No data collection | Case 1: 400 obs. per choice | Case 1: 400 obs. per choice | Case 2: 300 obs. per choice |
| **Other economic data** | Case 7: No data collection | Case 7: No data collection | Case 7: No data collection | Case 7: No data collection | Case 7: No data collection | Case 7: No data collection | Case 7: No data collection | Case 1: 20 obs. for each freight SIC | Case 1: 20 obs. for each freight SIC | Case 1: 20 obs. for each freight SIC |
| | **$ -** | **$ 120,000** | **$ 125,000** | **$ 245,000** | **$ 397,175** | **$ 516,775** | **$ 756,775** | **$ 951,200** | **$ 1,231,100** | **$ 1,997,100** |

| | Scenario 11: Delivery tours and basic data | Scenario 12: Good delivery tours, good generation, and basic data | Scenario 13: Good delivery tours, better generation, and basic data | Scenario 14: Good delivery tours, good generation, and best data | Scenario 15: Good delivery tours, better generation, and best data | Scenario 16: Good delivery tours, best generation, and better data | Scenario 17: Good delivery tours, best generation, and best data | Scenario 18 : Better delivery tours, good generation, and best data | Scenario 19: Better delivery tours, better generation, and best data | Scenario 20: Better delivery tours, best generation, and best data |
|---|---|---|---|---|---|---|---|---|---|---|
| **Freight generation data about production and consumption patterns** | Case 7: No data collection, Use Generation Rates | Case 3: 50 surveys for each freight SIC; 10 for each non-freight | Case 2: 100 surveys for each freight SIC ; 25 for each non-freight | Case 3: 50 surveys for each freight SIC; 10 for each non-freight | Case 2: 100 surveys for each freight SIC ; 25 for each non-freight | Case 1: 250 surveys for each freight SIC ; 50 for each non-freight | Case 1: 250 surveys for each freight SIC ; 50 for each non-freight | Case 3: 50 surveys for each freight SIC; 10 for each non-freight | Case 2: 100 surveys for each freight SIC ; 25 for each non-freight | Case 1: 250 surveys for each freight SIC ; 50 for each non-freight |
| **Delivery tours, pickups/ deliveries, commodities transported, trip purposes** | Case 3: 1% of commercial vehicle registrations | Case 3: 1% of commercial vehicle registrations | Case 3: 1% of commercial vehicle registrations | Case 3: 1% of commercial vehicle registrations | Case 3: 1% of commercial vehicle registrations | Case 3: 1% of commercial vehicle registrations | Case 3: 1% of commercial vehicle registrations | Case 2: 2% of commercial vehicle registrations | Case 2: 2% of commercial vehicle registrations | Case 2: 2% of commercial vehicle registrations |
| **Cordon Survey** | Case 3: 1 day of data collection | Case 3: 1 day of data collection | Case 3: 1 day of data collection | Case 1: 3 days of data collection | Case 1: 3 days of data collection | Case 3: 1 day of data collection | Case 1: 3 days of data collection | Case 1: 3 days of data collection | Case 1: 3 days of data collection | Case 1: 3 days of data collection |
| **Spatial distribution / Location of part. agents** | Case 3: ZIP code Business Patterns Data | Case 3: ZIP code Business Patterns Data | Case 3: ZIP code Business Patterns Data | Case 1: 40% of records | Case 1: 40% of records | Case 3: ZIP code Business Patterns Data | Case 1: 40% of records | Case 1: 40% of records | Case 1: 40% of records | Case 1: 40% of records |
| **LTGs (Large establish-ments)** | Case 3: 50% of estab w/ 500+ employees | Case 3: 50% of estab w/ 500+ employees | Case 3: 50% of estab w/ 500+ employees | Case 1: 50% of estab w/ 250+ employees | Case 1: 50% of estab w/ 250+ employees | Case 3: 50% of estab w/ 500+ employees | Case 1: 50% of estab w/ 250+ employees | Case 1: 50% of estab w/ 250+ employees | Case 1: 50% of estab w/ 250+ employees | Case 1: 50% of estab w/ 250+ employees |
| **LTGs (Large buildings)** | Case 2: 50% of 90 buildings | Case 2: 50% of 90 buildings | Case 2: 50% of 90 buildings | Case 1: 50% of 150 buildings | Case 1: 50% of 150 buildings | Case 2: 50% of 90 buildings | Case 1: 50% of 150 buildings | Case 1: 50% of 150 buildings | Case 1: 50% of 150 buildings | Case 1: 50% of 150 buildings |
| **Network charac-teristics** | Case 3: 50 locations | Case 3: 50 locations | Case 3: 50 locations | Case 1: 100 locations | Case 1: 100 locations | Case 3: 50 locations | Case 1: 100 locations | Case 1: 100 locations | Case 1: 100 locations | Case 1: 100 locations |
| **Special choice processes** | Case 2: 300 obs. per choice | Case 2: 300 obs. per choice | Case 2: 300 obs. per choice | Case 1: 400 obs. per choice | Case 1: 400 obs. per choice | Case 2: 300 obs. per choice | Case 1: 400 obs. per choice | Case 1: 400 obs. per choice | Case 1: 400 obs. per choice | Case 1: 400 obs. per choice |
| **Other economic data** | Case 7: No data collection | Case 7: No data collection | Case 3: 10 obs. for each freight SIC | Case 1: 20 obs. for each freight SIC | Case 1: 20 obs. for each freight SIC | Case 2: 15 obs. for each freight SIC | Case 1: 20 obs. for each freight SIC | Case 1: 20 obs. for each freight SIC | Case 1: 20 obs. for each freight SIC | Case 1: 20 obs. for each freight SIC |
| | **$ 2,061,550** | **$ 2,326,150** | **$ 2,658,050** | **$ 2,831,411** | **$ 3,111,311** | **$ 3,462,550** | **$ 3,889,811** | **$ 4,622,111** | **$ 4,902,011** | **$ 5,680,511** |

| | Scenario 21: Best delivery tours, good generation, and best data | Scenario 22: Best delivery tours, better generation, and best data | Scenario 23: Best delivery tours, best generation, and best data |
|---|---|---|---|
| **Freight generation data about production and consumption patterns** | Case 3: 50 surveys for each freight SIC; 10 for each non-freight | Case 2: 100 surveys for each freight SIC ; 25 for each non-freight | Case 1: 250 surveys for each freight SIC ; 50 for each non-freight |
| **Delivery tours, pickups/ deliveries, commodities transported, trip purposes** | Case 1: 3% of commercial vehicle registrations | Case 1: 3% of commercial vehicle registrations | Case 1: 3% of commercial vehicle registrations |
| **Cordon Survey** | Case 1: 3 days of data collection | Case 1: 3 days of data collection | Case 1: 3 days of data collection |
| **Spatial distribution / Location of part. agents** | Case 1: 40% of records | Case 1: 40% of records | Case 1: 40% of records |
| **LTGs (Large establish-ments)** | Case 1: 50% of estab w/ 250+ employees | Case 1: 50% of estab w/ 250+ employees | Case 1: 50% of estab w/ 250+ employees |
| **LTGs (Large buildings)** | Case 1: 50% of 150 buildings | Case 1: 50% of 150 buildings | Case 1: 50% of 150 buildings |
| **Network charac-teristics** | Case 1: 100 locations | Case 1: 100 locations | Case 1: 100 locations |
| **Special choice processes** | Case 1: 400 obs. per choice | Case 1: 400 obs. per choice | Case 1: 400 obs. per choice |
| **Other economic data** | Case 1: 20 obs. for each freight SIC | Case 1: 20 obs. for each freight SIC | Case 1: 20 obs. for each freight SIC |
| | **$ 6,412,811** | **$ 6,692,711** | **$ 7,471,211** |

The estimates also indicate that collecting additional data, particularly about delivery tours and the determinants of freight demand, becomes increasingly expensive. As shown in Table 17, when collecting data about freight generation and tour data, the costs range from $2 million to more than $7.4 million. On the other hand, these data provide a thorough understanding of freight activity in the NYMTC region. Taking into account that the last comprehensive freight origin-destination survey was conducted in 1963, it may be a good idea to undertake such data collection project if permitted by the ever present financial constraints.

As typical of these situations, the most appropriate alternative depends on the objectives the freight demand model is intended to fulfill, and the technical and financial constraints at the participating agencies. In this context, NYMTC and partner agencies would be well advised to clarify to the fullest extent possible what is expected from the model, how much funds could be allocated to both model development and data collection, and whether or not a staggered research and development is desired. A clear consensus on these critical issues will lead to an expedient decision on the best way to proceed forward with the development of the regional freight demand model the NYMTC region needs.

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# APPENDIX A: REVIEW OF FREIGHT DEMAND MODELING

When talking about transport modeling, it is important first to define transportation. With this in mind, transportation will be understood as the: *movement of people, goods and information*. After this general idea, additional dimensions come to play, such as: when is the movement taking place, from which place, to where is it going to be moved, how is it going to be moved, what is going to be moved, what is required for the movement, where is being moved, what type of choices are there for the movement, who is making the decision, etc. All these factors can give the reader an idea of the complexity of the transportation process.

As a consequence, trying to produce accurate and efficient models for the transportation process can be a major task. In general this process have been approached or divided from two perspectives, passenger transport and freight transport. Initial works in freight modeling tried to adapt the passenger models, but many significant differences between people and goods movement clearly suggested that freight transportation characteristics should be further analyzed. According to Friedrich et al. (2003), Ogden (1992), Ortúzar and Willumsen (2001), and Holguín-Veras (2000) some of these differences include:

- Freight is entirely passive and therefore may require specific infrastructure for loading and unloading
- Many freight vehicles are specifically designed for a particular type of goods
- The items being transported range from an urgent simple parcel to non-urgent bulk shipments of thousands of tones
- There are several market actors that influence the travel itinerary of freight items
- A supply network for freight consists not only of nodes and links but also of terminal nodes (freight hubs, logistic centers, shunting yards, warehouses) with specific characteristics concerning capacity and transfer delay time.
- Service frequency and transport costs for shipments are often undefined until a potential sender makes an enquiry.

In addition, when considering the different actors such as the shipper, the freight forwarder, the carrier, the driver and the consignee, and the complex interactions among them, it can be seen that modeling the decision process in freight transport is more complicated compared to passenger transport, where the unit of decision is only the individual traveler. Another factor that makes passenger transport easier to model is the fact that for passenger demand the use of a combination of numerous individual decisions makes it relatively easier when estimating the parameters of choice models.

A derivation of the previous statement for which passenger demand can be considered as only treating one dimension of demand, results in another difference with freight transport. Freight transport is multidimensional; there are factors such as truck weight, truck volume, number of vehicle trips and

transportation value, among others, that must be considered when estimating demand modeling, and which in turn adds to its analytical complexity.

When taking into consideration the network, it is also important to understand that in road freight transport, for example, the vehicles frequently do not take the direct routes between origin and destination but are routed through hubs. There is also the presence of chain trips; moreover, there are choices not only between modes but also between vehicles of different size and different tours. In some cases passenger travel also includes trips chains, but an average passenger only makes 1.2 stops/trip, while freight transport include very long trip chains averaging 5.6 stops per trip (Holguín-Veras and Patil, 2005).

As discussed in Lahsene et al. (2008) and Holguín-Veras and Thorson (Holguín-Veras and Thorson, 2003b), changes in the global economy (globalization) have resulted in a growth in international freight movement. Perceptions about environmental issues and their relationships with freight transportation activities have put increased pressure in the transportation systems. These have resulted in the fact that freight has emerged as a major issue in public and private transportation agencies. The different transportation systems are running at capacity, and the resulting congestion has become an important variable in the cost of doing businesses and in economic development.

When considering critical decisions about investments in increased capacity or evaluation of control policies, the different agencies must account for different ranges of planning purposes, but in general costly infrastructure investments require long term planning and for this, long term forecast of future demands and needs must be accounted for. It is important then, to develop accurate models that could help forecast these future needs. As mentioned before, current freight models are typically based on methods developed for passenger travel demand forecasting, and this represents a requirement for improvements in both the state of the practice and the state of the art in modeling freight demand.

Many authors, including Pendyala and Shankar (2000) and D'Este (2000), agree that the four-step transport modeling structure derived for passenger transport can be adapted and modified for freight transport, where in each of the steps freight considerations may highly differ from the passenger framework. Considerations about the number and diversity of the decision makers in freight, the type of commodity and the data required, among other, must be taken.

According to Jong et al. (2004), the four steps in the context of a freight transport model are:

- Production and attraction. Determine the amount goods to be transported from the various origin zones to the destination zones (marginals of the OD matrix). Could be expressed in tones of goods, or for intermediary stages could be monetary units (trade flows).
- Distribution. Goods transport between origin and destinations (cells of the OD matrix).
- Modal split. Allocation of the commodity flows to nodes.
- Assignment. Flows converted into vehicle-units, they can be assigned to networks.

When looking at the definitions previously discussed, and considering, for example, the fact that any freight distribution can include several stops in the trips, it can clearly be seen that calculating the OD matrix cells cannot be done directly, since the truck trip from a point *i* to a point *j* may not represent the actual commodity flow, or even further, in real life this truck trip could be an empty trip. Some other examples can show that care must be taken when trying to develop models for each of the steps involved in this demand modeling framework.

Due to the different considerations previously discussed and others not covered in this document, freight transportation demand has resulted in two major modeling platforms: commodity based and vehicle-trip based. The commodity based approaches model the commodity type, typically by size and weight, while the vehicle-trip based techniques model vehicle trips. Both of these platforms have in common: trip generation, trip distribution, and traffic assignment. Extracted from Holguín-Veras and Thorson (2000), Figure 7 and Figure 8 show these platforms. These techniques can focus on either individual trips or tours, or for the case of commodity based models on multiple processing points.

**Figure 7: Model components of trip-based approaches**

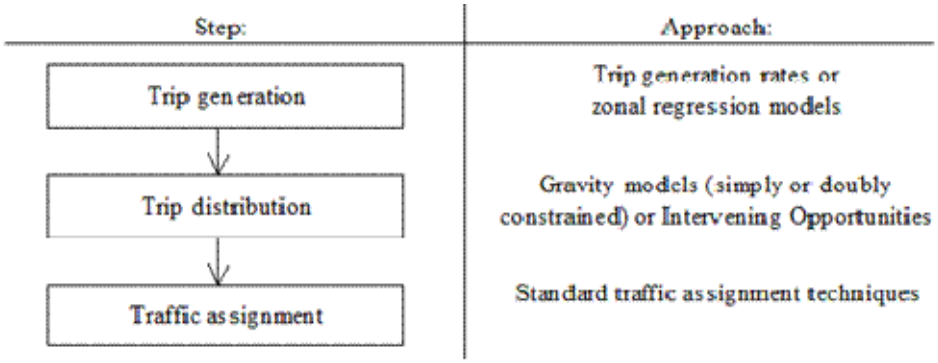
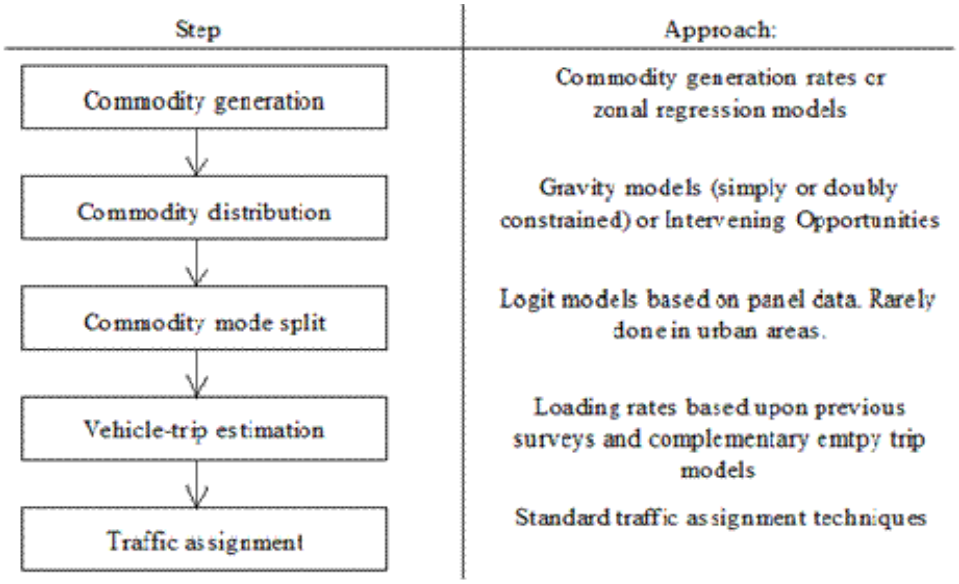



**Figure 8: Model components of commodity-based approaches**




According to Holguín-Veras (2000), there exists a dilemma in what to use, commodity-based or trip-based models. Practitioners, researches, or those in charge of freight demand modeling should focus in the short term on developing, for instance, better empty trip models with enhanced depictions of commercial vehicle trip chains (2003a); or developing models to represent the commercial vehicle choice process (Holguín-Veras, 2002); and in the long term, they should focus on developing comprehensive frameworks in which both commodity flows and routing decisions are modeled for an entire area. The advantages and disadvantages of trip-based and commodity-based modeling approaches are discussed in detail in Holguín-Veras and Thorson (2000) and are briefly summarized in Table 18.

**Table 18: Advantages and disadvantages of commodity-based and trip-based models**

| | Commodity-based models | Trip-based models |
|---|---|---|
| **Advantages** | Better able to capture behavioral/economic mechanisms | Calibration data (i.e., traffic counts) readily available and easy to collect |
| | Follow the real-life process | |
| | Able to model multimodal systems | |
| **Disadvantages** | Require commodity data for calibration | How do you model multimodal systems? |
| | Empty trips? | Inter-vehicle competition already took place |
| | | Cannot take into account the characteristics of the cargoes |

In general, urban freight operations differ from freight operations over states, regions, or nations. For the urban case, freight movement is performed almost completely by road, since other modes have shown to be inefficient in these areas (Ogden, 1992). Urban deliveries are composed of short-distance movements and multiple stops made on one tour, which normally starts and ends at the warehouse.

Initially, the study of these movements was overlooked by transportation planners, for example, in the United States in the late 1950s, study efforts identified truck trips as minor elements (Chatterjee, 1996). This changed during the 1970s when researchers, transportation planners, and government agencies identified that previous studies had almost completely neglected urban goods movement. From this point, the level of knowledge about urban freight movements, their costs, problems and opportunities in the United States, Canada and Britain, started to improve since a series of studies and research projects were conducted. Among these studies: the review of Canadian freight research in the 1970s by Wood (1979), Wood et al. (1982), and Kearney AT (1975); the research projects of urban goods movement funded by the U.S. government: Kearney AT (1975) and Kearney AT (1976); and a number of freight studies in specific urban areas in Britain: Corcoran and Christie (1978).

Following, a review of the literature of the different modeling approaches that could be issued as components in the diagrams shown in Figure 7 and Figure 8 is presented. It is important to mention that Holguín-Veras et al. (2001) contains a comprehensive assessment of the modeling alternatives available at the time. Their work includes a brief description of the different models and a preliminary assessment of: (1) data requirements, (2) staff requirements; (3) computing power required; (4) adequacy to NYMTC's conditions; (5) practicality; and (6) conceptual validity. That report is being updated with new relevant publications and methodologies as part of this project, and is provided in Appendix C.

### *A.1. Trip generation/commodity generation models*

It has been discussed that both frameworks have in common: trip generation, distribution, and assignment. For trip-based models, Jack Faucett Associates (1991) describes an approach in which truck trips are generated directly using information such as land use, and trip data from trip diaries and shipper behavior. Commonly using a form of gravity models calibrated with trip length frequency distributions obtained from trip diaries, the trips rates calculated are then distributed. Another type of trip-based model is the one developed by Cambridge Systematics Inc. (1996) named the Quick Response Freight Manual (QRPM). This model firstly obtains data on economic activity for the traffic analysis zones, then it applies trip generation rates to estimate the number of commercial vehicle trips for each zone. The next step is to estimate commercial vehicle volumes at external stations, and with these the commercial trips between zones and the mode share for each trip are estimated. The model then loads the OD trip to the network, and finally it compares the control vehicle miles traveled (VMT) with the estimated VMT. This model was applied by Marker and Goulis (1998) in a truck flow survey study intended to investigate the impacts of different degrees of geographic resolution on traffic assignment.

Other models used, for production and attraction, that have been applied in practice include: trend and time series models; system dynamic models; zonal trip rate models; and input-output and related models. In Garrido (2000), time series data have been used to develop models that range from simple growth factor models to complex auto-regressive moving average models. In system dynamics models, the changes in the transported quantities over time and feedbacks to/from the economy, land use, and the environment are modeled explicitly. Zonal trip rates for production and attraction are usually derived from classifying cross-sectional data on transport volumes to/from each zone; examples include the QRPM, the Guidebook on Statewide Travel Forecasting (Federal Highway Agency, 1999), and Bastida and Holguín-Veras (2009).

Input-output models are basically macro-economic models that start from input-output tables. These tables describe, in monetary units, what each sector of the economy delivers to the other sectors, also including the final demand by consumers, import and export.

In general, in the area of trip generation subject, the study by Brogan (1980) in which a comparison of the effectiveness of different stratification strategies on improving trip end-generation models, indicated that stratification by land use is the most effective in improving the statistical significance of the models. In a different stratification scheme, using vehicle type, Middleton et al. (1987) studied trip generation characteristics for special-use truck traffic in Texas. Special-use truck traffic is the traffic associated with the processing and transporting of timber, grain, beef cattle, cotton, produce, sand and gravel, and limestone. The impact of each special-use activity center was assessed in terms of trip generation. They collected data for trip-generation rates, trip length, and vehicle type. With traffic counts and based on vehicle type stratification, Tadi and Balbach (1994) estimated trip-generation rates for nonresidential land uses in a city in California.

Using counts and information about containers, Wegmann et al. (1995) produced trip generation rates for some container ports in the United States. For the port of Houston, Guha and Walton (1993) produced estimates of trip generation rates. Other trip generation studies at container terminals include Holguín-Veras et al. (2002), Al-Deek et al. (2000), and Al-Deek (2001)—these last two works implemented regression analysis and neural networks, respectively, to develop the trip generation models.

Going away from the terminal cluster, another application was developed by Kawamura et al. (2005) who developed models of truck trip generation at the disaggregate level that incorporated strategic supply chain decisions made by individual businesses. Among their findings, they concluded that the commonly used store floor space or the numbers of employees are poor predictors of truck trip generation at retail stores.

Using linear regression models and modeling techniques, Novak et al. (2007) tried to predict freight generation at the national level within the U.S. They provide insight into different variable transformation techniques, evaluate the use of spatial regression variables, and apply a spatial regression modeling methodology to correct for spatial autocorrelation. They conclude that the spatial regression model is the preferred specification for freight generation at the national level.

Maruyama and Harata (2005) developed three types of combined network equilibrium models which incorporate trip chains. The models include: (1) a combined trip distribution and assignment model for tours with one stop; (2) a combined modal split and assignment model for tours with one stop; and (3) a combined trip distribution and assignment model for tours with any number of stops.

In terms of the commodity generation, recent publications include the work of Waliszewski et al. (2004), in which the amount of commodities generated at each zone is estimated using growth rates that are commodity-type specific, with the assumption that the land use characteristics do not change much through time. Other recent publications were previously mentioned in the IO model section.

Extracted from Jong et al. (2004), Table 19 presents a summary of the advantages and disadvantages of different models used for freight transport production and attraction.

**Table 19: Summary of freight transport production and attraction models**

| Type of Model | Advantages | Disadvantages |
|---|---|---|
| Time Series | Limited data requirements (but for many years) | Little insight into causality, and limited scope for policy effects |
| System Dynamics | Limited data requirements<br>Can give land use interactions<br>External and policy effects variables can be included | No statistical tests on parameter values |
| Trip Rates | Limited data requirements (zonal data) | Little insight into causality, and limited scope for policy effects |
| Input-Output | Link to economy<br>Can give land use interactions<br>Policy effects if elastic coefficients | Need input-output table, preferably multi-regional<br>Restrictive assumptions if fixed coefficients<br>Need conversion from values to tonnes<br>Need to identify import and export trade flows |

### *A.2. Distribution Models*

The objective of these models is to estimate freight traffic between origin and destination. Since there is a significant distinction between origin/destination and production/consumption relation, estimating this traffic is really complex. The objective is then to capture the production/consumption

relations, but it is important to keep in mind that tours and long trip chains, and the consolidation of cargo, could complicate the relational inferences, and void the assumptions that trips are made as functions of the OD variables. The models for distribution include gravity models, intervening opportunity models, and direct demand models. The reader is referred to Ortúzar and Willumsen (2001) for a description of gravity models. Applications of gravity models to trip-based modeling include Swan Wooster (1979), Southworth (1981), Ogden (1977), and Meyburg (1976). Button and Pearman (1981) describes British work in the 1970s. A more recent formulation is presented in Cambridge Systematics Inc. (1996).

Intervening opportunity models, first formulated by Stouffer (Stouffer, 1940), owe its current formulation to Schneider (Schneider, 1959). This model is based on the fundamental assumption that the probability of selecting a destination is a function of the probability of not selecting one of the prior destinations to the trip. If the destinations are organized and numbered in ascending values of the trip impedance, the probability of selecting the $m^{th}$ destination away from origin *i*, depends on the probability of not being satisfied by the first, the second… up to the $(m-1)^{th}$ destination.

Typical distribution models are zone based. In order to avoid the problems of spatial aggregation, there has been research for producing estimates of commodity generation at the industrial level, and even at the production unit and plant level. For example, the work developed by Wisetjindawat and Sano (2003) is a firm based modeling structure. This procedure is composed of two stages a commodity generation and a commodity distribution.

Extracted from Jong et al. (2004), Table 20 presents a summary of the advantages and disadvantages of different models used for freight transport distribution.

**Table 20: Summary of freight transport distribution models**

| Type of Model | Advantages | Disadvantages |
|---|---|---|
| Gravity | Limited data requirements<br>Some policy effects through transport cost function | Limited scope for including explanatory factors and policy effects<br>Limited number of calibration parameters |
| Input-Output | Link to economy<br>Can give land use interactions<br>Policy effects if elastic coefficients | Need input-output table, preferably multi-regional<br>Restrictive assumptions if fixed coefficients<br>Need conversion from values to tonnes |

### *A.3. Input Output Models*

These models refer to a family of analytical formulations that represent the inter-linkages among economic sectors as a function of the amount of inputs, in economic terms, required to produce a given output. They represent a systematic analytical depiction of inter-sectorial flows. The basic formulation is

due to Leontief (1936). IO models have two types of structures; there are single-regional and multiregional models. Single-region IO models limit their applicability to macroscopic analysis to the regional or national level, while multiregional models are applied to systems which could be divided into *n* sub-regions, and then it includes *n* regional IO tables for each sub-region, and also uses a system wide IO table to control the total flows among all regions (Kanafani, 1983). In recent years, an increasing number of applications have tried to use the principles of these inter-sectorial flows resulting from Input-output models for freight transportation modeling.

In Sorratini and Smith (2000), Jack Faucett Associates (1999) an IO table is used to estimate the total amounts of commodities being attracted by a given zone, as a function of the anticipated levels of economic activity. Guiliano et al. (2007) present a method for estimating intra-metropolitan freight flows on a highway network. They use a local-area input/output model, and combine its information with available import/export commodity flow data from secondary sources, to estimate detailed commodity flow matrices. IO models require a great deal of data on regional economic activity and interregional flows, which have often oriented their implementation to large scale systems to the international, national, or regional level. For the urban areas, Fischer et al. (2000) use the IMPLAN IO models to determine the percentage of inbound commodity that goes to the final consumer, and also the use of each commodity by industry sector in southern California. Using IO data with employment and population information, Al-Battaineh and Kaysi (2005) estimated commodity production and attraction at the zone level. They also used the genetic global search method to calibrate the OD matrix.

Truck flows for the state of Wisconsin have been estimated by Sorratini (2000) by using the commodity flows from the 1993 Commodity Flow Survey (CFS) and IO coefficients. Using the employment data at the country level, production and attraction rates in tons for heavy truck mode are derived for 28 economic sectors. Using average tons-per-vehicle load, the annual tons for the county level were converted to daily truck trips, these trips were assigned to the network using the four-step modeling process, and the results were compared to real counts. Since not all truck trips were included, it was found that the production and attraction values were underestimated.

Hewings et al. (2002) formulates and analyzes a model of interregional commodity flows, incorporating regional input-output relationships, and the corresponding transportation network flows. Other interregional versions of IO models allow for estimation of freight traffic generation and attractions, as well as the flows between regions and the mode share (Zhao and Kockelman, 2004).

Integrating the traditional four-step model into one single process, Ham et al. (2005) develops an interregional multimodal commodity shipment model with the associated transportation network flows. This model is developed by combining a multiregional economic/IO relationship in the commodity

shipment model, with a multimodal transportation flow network model. It allows for predicting the monetary values of commodity shipments and also the flow share on the transportation network by industry sector and mode.

### *A.4. Freight mode choice*

Although truck has been assumed by the majority of modeling techniques as the preferred mode choice, it is important to understand how this selection process is performed. Researchers have tried to understand who decides on vehicle and mode. The literature is concentrated in three different groups that consider: (1) that carriers make decision without input (shipment size) from shippers; (2) that carriers make decision with input (shipment size) from shippers; and (3) that shippers and carriers cooperate. Holguín-Veras (2002) developed a discrete-continuous model for freight mode choice and hypothesized that the shipper—after experimenting with various types of shipment sizes and receiving feedback from the carriers—decides the final shipment size, which in turn determines the mode choice. Economic experiments conducted at Rensselaer Polytechnic Institute demonstrated that, regardless of who led the experiments (shipper or carriers), the shipment sizes and modes selected were the same; all experiments converged to the results corresponding to the perfect cooperation case, where shipper and carrier cooperate (Holguín-Veras et al., 2009).

Initial works include McFadden et al. (1986), who developed a theoretical formulation for a joint model of shipment size and mode choice under the assumption that the choice of shipment size is determined by inventory decisions. Chiang et al. (1980) developed disaggregate models in which the mode choice decision is embedded in a larger inventory-theoretic and logistic framework, for the location of supplier, shipment size, and mode choice. Abdelwahab and Sargious (1991) developed a binary probit formulation that treats the shipment size-mode choice problem as a joint decision process.

In terms of disaggregate freight models which deal with mode choice only, examples include: Winston (Winston, 1981) who developed a probit model for the choice between road and rail transport by commodity group in the U.S.; Jiang et al. (1999) who used a nested logit model on the French 1988 shippers survey; Nuzzolo and Russo (Nuzzolo and Russo, 1995) who developed the mode choice model for the Italian national model; Fosgerau (Fosgerau, 1996)who developed a mode choice on revealed and stated preference; and De Jong et al. (2001) with a mode choice model on revealed and stated preference data for the north of France, developed for the French Ministry of Transport. Norojono and Young (2003) develop a disaggregate mode choice model focusing on the choice between rail and road in Java, Indonesia.

Sivakumar and Bhat (Sivakumar and Bhat, 2002) propose a fractional split model for the commodity-flow distribution, estimating the fraction of commodity consumed at each destination zone that originates from alternate production zones.

Extracted from Jong et al. (2004), Table 21 presents a summary of the advantages and disadvantages of different models used for freight transport modal split. Some of the models are presented in this document; the reader is referred to the authors' work for more information.

**Table 21: Summary of freight transport modal split models**

| Type of Model | Advantages | Disadvantages |
|---|---|---|
| Elasticity-based | Very limited data requirements<br>Fast in application | Elasticities may not be transferable<br>Only impact of single measures, no synergies |
| Aggregate mode split | Limited data requirements | Weak theoretical basis<br>Little insight into causality<br>Limited scope for policy effects |
| Neoclassical | Limited data requirements<br>Theoretical basis | Little insight into causality, and limited scope for policy effects |
| Direct demand | Limited data requirements | Hard to integrate in four-steps model |
| Disaggregate mode split | Theoretical basis<br>Potential to include many causal variables and policy measures | Need disaggregate data (shipper or commodity survey and/or SP) |
| Micro-simulation approach | Many behavioral choices<br>Included links to theory | Either large data requirements or many assumptions on distributions |
| Multi-model network | Limited data requirements<br>Theoretical basis<br>Can include elastic demand and policies affecting generalized transport cost | Little insight into causality<br>Mostly done with fixed demand |

### *A.5. Empty trip models*

The first historical approach to estimate or include empty trips is referred to as *naïve proportionality model* by Hautzinger (1984). This approach implements empirically determined constants to account for empty trips from the total number of trips, differentiating from loaded and empty trips. The next approach, by accounting for empty trips as a different and distinct commodity, tried to calibrate trip distribution models to represent empty trip flows (Tamin and Willumsen, 1988; Fernandez et al., 2003).

In Holguín-Veras and Thorson (2003b), the authors discuss implications of modeling commercial vehicle empty trips; they also present a theoretical derivation for parameter estimation, and insight is given into the order of magnitude of estimation errors due to the improper modeling of commercial vehicle empty trips. In addition, Holguín-Veras and Thorson (2003a) present a mathematical formulation for the flow of empty commercial vehicles, these flows are depicted as a function of a given commodity flow matrix. Their model is based on the concept of order of a trip chain, and provides a statistical link

between the first order and higher order trip chains. This paper also provides empirical evidence of the importance of modeling empty trips. In Holguín-Veras et al. (2005), the authors provide a comprehensive discussion of the theoretical developments pertaining to commercial vehicle empty trip models, the corresponding estimation procedure, empirical evidence, and practical implications. This work also provides formulations for estimating the probability of zero order trip chains; further, the paper discusses the empirical support for the fundamental assumptions used in almost all empty trip models. This zero order trip chain probability for trip chain models is discussed in Holguín-Veras et al. (2008).

### *A.6. Freight origin-destination models*

Freight OD data are some of the most important data a planner could have. OD matrices are a fundamental input to analytical transportation planning and, for that reason, a significant amount of effort, time, and money are spent on their estimation. In order to estimate OD matrices, two main approaches can be distinguished: (1) direct sample estimation techniques, and (2) OD estimation from secondary data sources, referred such as OD synthesis.

The first approaches present some limitations, such as double counting the number of trips (Kuwahara and Sullivan, 1987), introducing bias in the parameters of random utility models (Ben-Akiva et al., 1985) and others (Willumsen, 1978; Ortúzar and Willumsen, 2001). For OD synthesis, Willumsen (1978) has analyzed principles such as entropy maximization, information minimization, or maximum likelihood to estimate OD matrices from traffic counts.

Rios et al. (2002) considered the impact of the type of information inputs on the quality of the estimation. Their work analyzed the impact of using origin and destination totals, partial and aggregate OD entries, and link counts. By using an optimization model, combining the entropy maximization formulation and a weighted sum of squares of the differences between the observations and estimates, the authors found that link count information was very useful, followed by aggregate OD entries and the origin and destination totals.

According to Holguín-Veras and Patil (2007), who formulate an integrated OD synthesis model that is based on a commodity-based model for estimation of loaded trips, complemented by an empty trip model to properly take into account empty trips, freight OD syntheses have received little attention from researchers and transportation professionals. Holguín-Veras and Patil (2008) expand Holguín-Veras and Patil (2007) and develop an OD synthesis model for multiple commodities. This model significantly improves the estimation quality with respect to previous formulations.

Among the references, Tamin and Willumsen (1992) developed a formulation to obtain the parameters of a gravity opportunity model, with the limitation that it requires link volumes and total tons

produced and attracted at each zone. Gedeon et al. (1993) tried to obtain multi-commodity flows in multidimensional networks.

A commercial trip forecasting model for the Baltimore Metropolitan Council (BMC) was developed by Allen and Agnello (Allen and Agnello, 2004). Commercial vehicle counts are synthesized at the locations where count data exists. It is a backward process where trip tables are developed from count data.

Formulating the OD problem as a large-scale linear programming problem, List and Turnquist (1994) developed a formulation to estimate OD matrices. Their work was later expanded by Nozick et al. (1996). Other references related to OD synthesis include Tavasszy et al. (1994), and Al-Battaineh and Kaysi (2005). In their work, Al-Battaineh and Kaysi (2005) use input-output data with employment and population data to estimate the zonal level of commodity attraction and production, and the genetic algorithm global search method to calibrate the OD matrix. This model is also flexible in terms of the type of data used in estimating the OD matrix.

### *A.7. Micro-simulation and hybrid models*

According to Holguín-Veras (2000), there exists a dilemma in what to use, commodity-based or trip-based models. Practitioners, researches, or any one in charge of freight demand modeling, should in the short term focus on developing, for instance, better empty trip models with enhances depictions of commercial vehicle trip chains (Holguín-Veras and Thorson, 2003a); develop models to represent the commercial vehicle choice process Holguín-Veras (2002); and in the long term, they should focus on developing comprehensive frameworks in which both commodity flows and routing decisions are modeled for an entire area. The following techniques fall under this later statement. They could be understood under three main areas: (1) commodity-based tour models; (2) vehicle-trip-based tour models; and (3) activity-based tour models.

### *A.8. Commodity-based tour models*

These types of models refer to the relations between commodity flows and the vehicle flows, taking into consideration trip chains or tours. In the goods delivery process, two different flows are occurring, first a commodity flow, and the second is the flow of vehicles in the network. In the area of research focusing on freight demand modeling taking into consideration these two types of flows and implementing tour-based approaches, the works of Wisetjindawat et al. (2007) estimated the delivery routes associated with the transport of the commodity flows using a heuristic tour construction procedure.

Based on the commodity flows in Tokyo, Raothanachonkun et al. (2007) estimates OD matrices for light and heavy trucks. Taking into consideration rounds and trip chains for the truck movements, loaded and empty trips are estimated. Considering the commodity OD with the most attractive zones, adjacent zones, and the average payload, the trip chains are modeled. Another example of this type of modeling technique is developed by Donnelly (2007). Using the 1997 Commodity Flow Survey to derive the commodity flow OD matrix, the author proposes a hybrid micro-simulation model of freight flows. This approach discretises each shipment from each OD pair, in order to assign truck loads. These small shipments are assigned though a Monte Carlo simulation process to shipper-receiver pairs. The optimal solution is reached by selecting the minimum distance traveled tour solving a traveling salesman problem.

A commodity-based freight tour model is developed by Boerkamps and Binsbergen (1999). This model, called GoodTrip, takes into consideration logistics chains, and all aspects of the urban goods distribution including economics, logistics, traffic and effects. The commodity flows are estimated based on the consumer demand, and simulation is used to determine vehicle tours. As noted by Wang and Holguín-Veras (2008), a variety of principles and theories have also been applied to solve this problem, profit maximization behavior (Thorson, 2005; Thorson and Holguín-Veras, 2008).

### *A.9. Vehicle-trip-based tour models*

Vehicle trips differ depending mainly on their type of purpose, which leads to different travel patterns. This, in turn, leads to the need for improved models that can handle commercial vehicle tours with different purposes. In Calgary, Canada, for example, a system of modeling commercial movements has been developed. In Stefan et al. (2005) and Hunt and Stefan (2007), the authors use Monte Carlo simulation techniques to construct tours. These tours are selected from a list of tours generated, taking into consideration the traffic zone, the tour purpose, vehicle type, next stop purpose, next stop location, and next stop duration sequentially. The simulation was then based on taking into consideration logit models estimated from a survey of commercial movements.

### *A.10. Activity-based tour models*

These types of methodologies were originated to estimate passenger travel demand and have been adapted to the case of urban commercial vehicle flows. The fundamental statement for these models is to estimate travel as a derived demand from the need to conduct activities distributed in space. Initial publications related to this type of methodologies include Bhat et al. (2003) and Misra et al. (2003). In general, this approach uses a micro-simulation-based framework, including discrete choice models for the selection of activities. A drawback is the need for a data collection procedure to provide revealed travel diaries. Gliebe et al. (2007) developed an activity-based Disaggregate Commercial Model (DCM). With

this approach the authors are able to model intra-urban commercial vehicle movements. This is done by combining a micro-simulation, which focuses on the generation of activity patterns using a dynamic discrete choice model formulation.

### *A.11. Spatial price equilibrium models*

Among other modeling approaches that were not included in the original report, there are spatial price equilibrium (SPE) models, which are based on the SPE principles (Samuelson, 1952; Takayama and Judge, 1964; Takayama and Judge, 1970). These models focus on the interactions between producers, consumers, and shippers. According to Barker (1985), the underlying principle can be stated as the following: "if there is a flow of commodity from a supply market to a demand market, it is because the price of this commodity in the supply market plus the transportation costs from the supply market to the demand market is the lowest among all competitors; otherwise there will be no flow." Based on these principles an integrated model in which the four-step processes are performed simultaneously was developed by Harker and Friesz (1986). The effect of spatial price competition is incorporated into freight demand by Inaba and Wallace (1989), where spatial price competition determines what would be the shipper's market area and their shipment size and profit level.

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# APPENDIX B: RELEVANT PUBLICATIONS

This appendix presents a description of relevant publications on the subjects of freight issues and data in the New York Metropolitan Transportation Council (NYMTC) region.

### *B.1. New York State Rail Plan: Strategies for a New Age. New York State Department of Transportation (2009).*

This report describes goals, objectives, and strategies to improve and expand rail freight and passenger service in New York State. It also outlines the opportunities and challenges due to the new system and describes trends in usage, available funding programs, rail safety issues, and a description of rail's benefits to the economy and environment. As the report points out, railroads can move a ton of freight an average of 436 miles with each gallon of fuel. In terms of passenger, rail uses 20 percent less energy per passenger mile traveled than automobiles and 17 percent less than airline travel.

In the long run, the plan presents New York State's rail infrastructure needs over the next 20 years and outlines recommended rail passenger and freight infrastructure investments for the future.

### *B.2. Mid-Atlantic Truck Operations Study. I-95 Corridor Coalition (2009).*

The objective of the Mid-Atlantic Truck Operations (MATOps) study is to identify and analyze major highway bottlenecks causing delay to trucks traveling on the Mid-Atlantic region's highway system and develop a consensus-based approach for reducing those delays and their economic costs.

The work undertaken in the MATOps study identifies 29 truck bottlenecks in the region, estimates the truck-hours of delay at each, and then develops detailed delay estimates for the five worst truck bottlenecks in each state. The study also describes the Mid-Atlantic economy, estimates the value and tonnage of the commodities caught in the truck bottlenecks, maps the commodity flows against truck freight bottlenecks and identifies "bottleneck strings" along the region's trade corridors. It reports the Mid-Atlantic Truck Operations Study ES-2 I-95 Corridor Coalition's current bottleneck reduction strategies and recommends actions that the Coalition and its member agencies can pursue as the next steps in reducing truck bottleneck delays. In Phase II, the study will further analyze the operational, physical, and institutional issues impacting the identified bottlenecks, and will identify strategies to mitigate these bottlenecks.

### *B.3. Multi-State Truck Stop Inventory and Assessment Study. Tri-State Regional Summary of Truck Stop and Rest Area Activities. New York Metropolitan Transportation Council (2009).*

This report produced by the New York Metropolitan Transportation Council provides a summary of truck parking studies conducted in the Tri-State Region in recent years, specifically those conducted by: (1) the Connecticut Department of Transportation; (2) the North Jersey Transportation Planning Authority; and (3) the New York Metropolitan Transportation Council. The report provides a description of the objectives, approach, conclusions, recommendation, and implementation of each of the case studies.

In addition, the report discusses recommendations of the NYMTC Truck Stop Study. Recommendations are provided in terms of locations for expansion or new facilities, outreach and education, innovative technologies, opportunities to increase efficient use of current capacity, and recommended policy positions to advocate or look out for when the next Federal transportation bill is drafted after the 2009 bill expired. The report also presents courses of action for NYMTC members in order to advance the cause of improving truck parking conditions and highway safety, and a description of future and current studies.

The report also presents the results of Task 2 of the study that refers to the Truck Stop Facility Inventory. The report provides the inventory of facilities, with a summary of the amenities of each facility, locations, parking utilization, facility capacity and utilization. A description of the results of the driver interview cordon survey is presented, with summaries of the results for each of the questions. An analysis of the forecasted demand for the different corridors is also presented, with information about the estimated flows. The report ends with a summary of the findings for the NYMTC region in terms of parking and rest facilities.

### *B.4. Drayage Truck Characterization Survey at the Port Authority and the Global Marine Terminals. The Port Authority of New York and New Jersey (2008).*

This report presents results of the survey of drayage trucks at the five Port Authority of New York and New Jersey maintained marine container terminals and one privately owned marine container terminal, conducted by the Starcrest Consulting Group Consulting Group, LLC (Starcrest) and Hatch Mott MacDonald (HMM) in September 2008. The terminals that were surveyed were: Port Newark Container Terminal (PNCT) at Port Newark, Maher Terminal at the Elizabeth Port Authority Marine Terminal (EPAMT), APM Terminal at EPAMT, New York Container Terminal at Howland Hook Marine Terminal, American Stevedoring, Inc (ASI) secondary barge depot at Port Newark, and Global Marine Terminal (a privately owned terminal).

The purpose of the survey was to collect information on the age and activity characteristics of drayage trucks. The information derived from the survey results includes the model year distribution of the fleet of trucks serving the Port Authority terminals, including the relative differences in model year between owner-operated and employee-operated trucks, and an estimate of the total number of trucks in various model year groups.

The survey responses were analyzed for important characteristics of the trucks and their activity related to operations associated with Port Authority container terminals. The number of trucks in each model year group was estimated using reported frequency of visits to Port Authority terminals and the estimated total number truck visits per week.

***B.5. Trip Generation Manual, 8th Edition. Institute of Transportation Engineers, ITE (2008).***

This manual contains a comprehensive compilation of estimated freight trip generation (FTG) rates for a broad range of land use types. Another publication, the ITE Trip Generation Handbook, 2nd Edition, provides guidelines on how the rates (for all vehicle types) may be used for a given trip generation study.

***B.6. Truck Toll Volumes 1998-2007. New York Metropolitan Transportation Council (2001-2008).***

These reports available since 1999, and having the last report for the year 2007, present statistical data of quarterly listed truck traffic over the region's toll bridges and barriers. They also monitor the changes and growth in travel of commercial freight vehicles which move through the region's toll facilities. The data sources include: Metropolitan Transportation Authority – Bridges and Tunnels, the Port Authority of New York and New Jersey, New York State Thruway Authority, New York State Bridge Authority, New Jersey Turnpike Authority (Garden State Parkway), New Jersey Turnpike Authority, and Nassau County Bridge Authority.

The reports include information such as: annual truck toll volumes at river crossings, annual commercial vehicle registrations, and detailed (monthly information about the truck toll volumes in the New York/ New Jersey Region), among others.

***B.7. Truck Route Management and Community Impact Reduction Study. New York City Department of Transportation, NYCDOT (2007).***

This document discusses the Truck Route Management and Community Impact Reduction Study undertaken by the New York City Department of Transportation (NYCDOT) led by the engineering firm Edwards and Kelcey Engineers, Inc. This study seeks to coordinate engineering, education, information, and enforcement efforts to mitigate the negative impacts relating to truck traffic, as well as improve the

overall truck management framework that exists in New York City. It intends to allow relevant stakeholders the opportunity to highlight how truck traffic affects their communities, quality of life, and daily operations. The broad set of goals are: to ensure that trucks do not inappropriately utilize residential streets; improve the quality of life for residents and workers in New York City; reduce traffic congestion; increase logistics options that will benefit businesses, transportation providers, and consumers; and improve the economic competitiveness of New York City by enhancing the attractiveness of industrial sites at major distribution points in the City.

Information was gathered to evaluate the viability of the existing Truck Route Network from existing and new sources of data. The various sources of information utilized include: truck vehicles counts and classifications, vehicle volume to capacity ratios, accident statistics, truck summonses, existing zoning and land use data, and truck trip forecasts by Traffic Analysis Zone. The analysis focused on problem areas made know by the NYCDOT staff, the study's Technical Advisory Committee and the general public. A list of 71 truck generator sites was compiled from the input received by the stakeholders (public, trucking and business communities) and the NYCDOT, and this list was reduced to ten sites based on several criteria developed by Edwards and Kelcey.

Detailed findings and recommendations developed from this study are presented in this document in five technical memorandums. The Traffic Policies and Regulations Memorandum presents an overview of the City's current policies, regulations and enforcement strategies as they relate to current and future goods movement needs in the City  and provides a series o recommendations to meet those needs. The Truck Routing Analysis Memorandum contains an assessment of localized issues and truck routing concerns on an individual borough basis. The Truck Signage Program Memorandum contains a comprehensive assessment of the City's truck sign program and recommended improvements for signage. The Education Program Memorandum provides a comprehensive program if initiatives to develop a self-enforcing truck route program. The Public Involvement Memorandum is a compilation of all outreach initiatives with the stakeholders.

### *B.8. Port Authority Marine Container Terminals Truck Origin Destination Survey 2005. The Port Authority of New York and New Jersey (2006).*

This report presents the results from the survey conducted by the Port Authority of New York and New Jersey to seven container terminals; five in Port Newark and Elizabeth Port Authority Marine Terminal, one in Jersey City, and one in Staten Island, New York (Howland Hook). The surveys were conducted during December 2004 in New York and during May in New Jersey. The surveys were conducted in the inbound direction only; however, the survey included questions related to both the

inbound and outbound movements in order to avoid the need for a second interview at the outbound gates. Trucks were interviewed when in queue at the gates.

Results presented include: the number of daily truck movements at the container terminals; commodities (imported, exported); truck origin-destinations by geographical areas for all container terminals surveyed; origin-destinations by facility type; access routes to and from the ports; vehicle characteristics; type of equipment used; load status; trip frequencies; inbound trip times; movement types; time spent at terminal; and vehicle ownership.

### *B.9. Freight System Performance Assessment Study: Final Current and Future Conditions Report. New Jersey Transportation Planning Authority, NJTPA(2005).*

The study presents an assessment of the current and future system performance of the freight network in the northern New Jersey region. It includes the collection and refinement of freight data from a variety of sources to contribute to the updating of NJTPA's Regional Transportation Plan. Particular focus was placed on identifying: problems and opportunities associated with the region's freight infrastructure and operations, ideas about how things are changing, and the kinds of threats and opportunities that will emerge in the future.

This document presents a briefing about why freight is important, an overview of Regional Freight movement in the NJTPA region, and a 2025 and 2030 freight forecast for each component of the freight transportation system. Also, the document presents the freight transportation system performance in terms of trucking, rail, marine system, air cargo, and warehouse and distribution centers. Finally, it presents the interregional and institutional factors, freight issues, needs, and strategies and critical path action items for the NJTPA region.

### *B.10. Regional Freight Plan. New York Metropolitan Transportation Council , NYMTC (2004).*

This document discusses the NYMTC Regional Freight Plan Project led by the engineering firm Cambridge Systematics. The purpose of the NYMTC Regional Freight Plan Project is to develop a roadmap for the improvement of freight transportation in the NYMTC region. The goals of the plan are to improve: the transportation of freight by removing burdensome government regulations and restrictions; the physical infrastructure of the transportation system for freight-related transportation among shipping and receiving points, and major terminals and ports; to improve the reliability and overall movements of freight in the region by encouraging expedient and cooperative multimodal shipment of freight; and, to improve the freight system’s strategic redundancy.

The plan presents a wide range of strategies and action that include capital projects, operational improvements, and policy changes. The strategies are multimodal, targeting highway, rail, and marine transportation, and can be implemented in the short term (one to three years), mid term (three to ten years), or long term (more than ten years). These strategies were identified through the following process.

First, a public forum was held to solicit a list of improvements. Next, NYMTC's member agencies generated a working list of candidate freight strategies and actions to test, and the actions were separated into short-term, mid-term and long-term solutions. Projects were evaluated considering impacts on transportation, the environment, economy, connectivity, communities, institutional and physical feasibility, and the use of new technologies. Some of the recommendations in the plan call for short-term actions around which a general consensus already existed. In the case of the most capital-intensive projects, it is recommended that agency owners continue the planning process. NYMTC has used this planning process to develop a consensus on the problems facing the region and the goals and objectives of a regional freight program.

### *B.11. 2000 Truck Survey Summary and Analysis. The Port Authority of New York and New Jersey, PANYNJ (2002).*

This report presents a summary and analysis of the 2000 Truck Survey that was conducted by the Port Authority of New York and New Jersey on the six vehicular crossings linking the states of New York and New Jersey, during October, November, and December of 2000, prior to the Port Authority's bridge and tunnel toll increase on March 25, 2001. The data were collected by interviewing truck drivers in the toll directions with reverse trip questions, for the return trip. These links include: the George Washington Bridge (GWB), the Lincoln Tunnel, the Holland Tunnel, and the Staten Island Bridges (SIB) (the Outerbridge Crossing, Bayonne Bridge, and Goethals Bridge). The analysis shows that the Port Authority bridges and tunnels carry about 353,200 vehicles each day in the toll direction of which 31,200, or nearly 9%, are trucks or tractor trailers.

The report presents results for the number of trucks using Port Authority's facilities; origins, destinations, and origin-and-destination pairs; summary of type of commodities carried; estimates for empty trucks; reverse trips; and other information related to specific destinations such as airports, terminals and other facilities. The results are presented for the total set of facilities, and also for each separate facility.

### *B.12. Cross-Harbor Freight Movement Study: Draft Environmental Impact Statement DEIS. New York City Economic Development Corporation, NYCEDC (2002).*

The Cross Harbor Freight Movement Project is a joint Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), and New York City Economic Development Corporation (NYCEDC) effort to examine the way freight is transported in the New York metropolitan region area. The study effort began in 1998 when NYCEDC commissioned a Major Investment Study (MIS) to identify and evaluate strategies for improving freight movement throughout the entire region's rail freight network. At the conclusion of the MIS in 2000, four alternatives were identified for further analysis. In 2001, NYCEDC, in cooperation with FHWA and FRA, began work on a Draft Environmental Impact Statement (DEIS) to further examine these initial alternatives.

The goals of the Cross Harbor Freight Movement DEIS are based on the five primary goals of the EIS that respond to the needs identified in the previous MIS. The goals are designed to improve the economic strength, environmental health, and security of the New York/Northern New Jersey metropolitan region. The preferred alternative according to these goals was a rail freight tunnel between Brooklyn and New Jersey. The proposed tunnel would connect two freight lines, the Greenville Branch on the Jersey City side of the harbor, and the Bay Ridge Branch on the Brooklyn and Queens side.

### *B.13. Review of Technologies Used in Freight Transportation. New York Metropolitan Transportation Council. (2002).*

As stated by the authors, the objective of the report is to survey and identify the most significant existing and emerging technologies, which affect or could affect the future of freight transportation in the NYMTC. Since the purpose of the report is to provide information about the different technologies, it is limited to a general discussion and no technical details are provided. Firstly, the report discusses developments in communications and wireless technologies, describing communications systems and wireless technologies, and implementations such as video detection systems, ITS-Fiber Optics, bar-coding and label technology, border crossing technologies, management technologies, and ITS applications to response to terrorism attacks. After this general description is presented, the document describes technologies used in the trucking, marine, rail and air freight industries.

### *B.14. General Patterns of Freight Movements in the NYMTC Region. Holguín-Veras J. and E. Thorson. (2002).*

In 2000, NYMTC commissioned this study to identify the main characteristics of freight movements in the area. The report was based on analysis performed to data from the Transearch database, a proprietary database updated and maintained by Reebie Associates.

The report provides a general overview of the overall freight patterns and also provides specific details. The analyses are performed taking into consideration 41 markets, which represent individual counties in the NYMTC region, groups of counties in the immediate vicinity of NYMTC, individual states, and groups of states. In order to provide a commodity flow analysis, the authors implemented the Standard Classification of Transported Goods (SCTG) code system at the two-digit level.

The analysis focuses on characterizing the commodity flows into, through, and out of the different markets, with this, a general idea about the amounts of freight that are delivered to and from each market to the other markets in the study. In addition, the authors provide a description about the overall modal distribution for these flows, identifying that 78.77% of all the cargo delivered to the NYMTC region is done by truck. Further analysis was performed in terms of identifying the nature of these cargos broken down by commodity groups and origin/destination. The analysis also produced two different sets of OD matrices with different levels of geographic aggregation. Specific attention was given to the study of the modal shares for origin and destination matrices by modes for all commodities. This report helps to understand the commodity flows throughout the region.

### *B.15. Truck Trip Generation Data. Synthesis Report 298. National Cooperative Highway Research Program (2001).*

This report identifies available data sources and data collection techniques, and assesses the current state of the practice in truck trip generation. In addition, the report discusses key considerations in the development of truck trip generation data needs, which include uses of truck trip generation data, trip purpose, estimation techniques, and data collection. Two types of trip generation models are presented: commodity-based models (14 models) and vehicle-based models (12 models). Furthermore, the report reviews a set of projects related to freight trip generation with emphasis on truck trip generation data and survey methods. The report also discusses three major methods of estimating truck trip generation data (simple rates, linear regression models, and commodity flow models) and seven approaches for collecting data for truck trip generation (trip diaries, classification counts, published commodity flow data, collected commodity flow data, shipper/carrier/special generator surveys, intercept surveys, and published rates).

### *B.16. Truck Terminals and Warehouses Survey Results in the New York Metropolitan Region. New York Metropolitan Transportation Council. (2001).*

The objective of this report is to provide an inventory of the existing trucking and storage facilities in the New York Metropolitan Transportation Council Region, and to indentify the highway and other access bottlenecks to truck movements, adequate storage place, and commodity flows. The report is a continuation of the truck terminal and warehouse survey results published by NYMTC in 1996. The

results are based on a survey with responses from New York, Nassau, Putnam, Rockland, Suffolk, and Westchester counties. The report does not include information for facilities in northern New Jersey or southwestern Connecticut, since these areas are address by a study conducted by the Port Authority of New York and New Jersey.

The survey responses allowed identifying issues affecting truck freight in the New York Metropolitan Area. A discussion about the importance of truck freight industry for the region and the country is presented, and detailed information about truck and commodity movements in, through and from the area is described. Trucking and warehousing trends in the region are also presented, and a description of the challenges faced by the industry such as concerns about safety, congestion, pollution, and highway deterioration, among others.

The results presented include a description of truck terminals and warehouse centers in the New York Metropolitan area, with a discussion about the commodities transported and stored, and conclusions are drawn from the survey responses about the industrial patterns in the region. The report also presents a description of the survey participants, and analysis of the responses, describing the major problems indicated in the survey, in terms of congestion, access/infrastructure, safety and enforcement, road operation, technology, internal problems, and others. The report also includes recommendations to be analyzed by the appropriate public agencies regarding issues of great concern to the trucking industry.

### *B.17. Annual Update to the Freight Facilities and System Inventory Report. New York Metropolitan Transportation Council. (2001).*

This document contains an update to different sections of the inventory report "Freight Facilities and System Inventory in the New York Metropolitan Region" issued in 2000. It mainly contains updated contact information, and updates in parameters for ongoing projects at that time.

### *B.18. Freight Facilities and System Inventory in the New York Metropolitan Region. New York Metropolitan Transportation Council. (2000).*

This report, produced by NYMTC staff, is an inventory for major freight facilities and systems active in the NYMTC region. It updates an inventory report issued by NYMTC in 1995. The purpose of the report is to describe the current condition of major freight transportation facilities and systems. The major elements of the inventory include: rail carload and intermodal (rail/highway) transportation; trucking; air (domestic/international); and water transportation (domestic/international). The report is based on a freight inventory survey that was conducted during 1999 and 2000.

In terms of air freight, the report provides an overview of worldwide transport operations, discussing the air cargo industry in the U.S., and in the New York metropolitan region. It provides a description of the technologies used and the critical issues concerning air freight. The report goes into detail about airport classifications, the major freight-handling airports in the metropolitan region, and major regulations affecting the air transport industry. In the same way, the report explains the marine industry, from a global perspective to details about the New York metropolitan region port, its future trends, description of NYC terminals, other terminals and surrounding facilities.

The railroad industry is analyzed in terms of technologies used, a description of the advantages of intermodalism, and the industry overview in the NYC metropolitan region. A rail facility inventory is provided for the region. For the trucking industry, an analysis of the issues that affect it is presented; this is followed by a review of the characteristics of this industry in the New York metropolitan region, a description of some truck terminals in the region, the major regulations affecting this industry, and a discussion about the future outlook of the trucking industry.

### *B.19. Freight Movement Issues in the Region: First Steps toward Implementing Solutions. New York Metropolitan Transportation Council (1998 )*

This document presents a briefing from a forum conducted in 1998 by the New York Metropolitan Transportation Council, which focused on short-term implementation activities and long-term regional planning, for freight activities in the region. The main objectives were to examine issues with short-term focus, the implementation of potential solutions, and how to build freight into the planning process and provide a long-term focus for comprehensive freight planning for the region. The forum treated the elements that affect freight movement activities; these elements include: the economy, agency coordination, and public and stakeholder inputs. Also, freight movements must be examined using a system and multimodal approach.

The main discussion of the forum was about: the critical issues in good movements faced by the region, how to encourage multimodal activities, the effects of changes in the region demographics in the movement of goods, what types of opportunities are there for partnerships between the public and private sector, and the topic of urban congestion and its impact into urban freight activities. After the panel members discussed the previous topics, a set of group discussions were held. The main topics of these discussions treated the areas of maintaining economic viability, employing technology and intelligent transportation systems (ITS), improving infrastructure, and enhancing multimodal opportunities. In addition, during the forum, the discussions focused on how to improve metro freight transportation.

### *B.20. Freight Synthesis. Literature Review. Department of City Planning City of New York. (1999)*

The purpose of the Freight Synthesis study is to review regional goods movement reports in order to formulate some recommendations for enhancing goods movement in New York City. In addition, it is intended to provide information on the region's assets, current economic condition, and freight facilities, infrastructure, and industry trends. This is a reference document summarizing and outlining the major points of conducted assessments. The report analyses focus on three sections: (1) waterborne freight; (2) rail/intermodal freight; and (3) truck freight. As part of the study, key issues, trends, and opportunities are identified in terms of goods movements for NYC and its metropolitan area.

When dealing with truck freight, the analyses indicate that a great portion of incoming truck trips that move freight passing through the bridges and tunnels of New York, have destinations on Long Island and in New England. A discussion about restriction faced by the trucking industry is presented. The documents reviewed and analyzed are reports and documents published by the Port Authority of New York and New Jersey, New York Department of City Planning, NYSDOT, and other agencies.

### *B.21. Compendium of Freight Information. New York Metropolitan Transportation Council. (1997).*

This document presents a collection of freight data for the New York metropolitan and surrounding regions. In addition, it provides information about the region's freight facilities and activities. The document discusses the different concerns faced by the freight intermodal transportation industry. The document also presents a list of publications related to freight issues.

Using information from various sources—such as NYMTC's freight telephone survey to facilities' operators, American Trucking Association's publications, the Port Authority of New York and New Jersey, the U.S. Bureau of Census, and Reebie Associates—the report provides technical information about freight facilities for air, truck, marine and rail in the New York metropolitan region. In addition, this report provides shipment characteristics by mode of transportation for the National Transportation Analysis Region (NTAR), New York State, New Jersey, Connecticut, and the United States. The report discusses data about major commodity flows by mode for these states and the U.S.

### *B.22. The Truck Commodity Survey in the New York-New Jersey Metropolitan Area. Strauss-Wieder, A., K. Kang and M. Yokei (1989).*

This document discusses the truck commodity survey conducted by the Port Authority of New York and New Jersey. The purpose of the survey was to understand truck traffic at its six bridges and tunnels, and to try and develop strategies to help ease congestion at peak periods, to understand the role of the truck in the economy of the region, and to evaluate impacts of proposed actions and policies. The

report describes the region that was defined for the survey and future analyses. For the survey, nearly 15,000 truck drivers were interviewed during 1984 and 1985.

The survey identified key characteristics of eastbound truck traffic related types of origin and destination, and the relationship between the truck traffic and the different warehouses and distribution centers located west of the Hudson River; an important find was to understand that freight movement is a derived demand which reflects the needs and time constraints of area businesses. The results also discuss the commodity flows in the area, its origin and destination, and a discussion about the evolution of these flows throughout the day is provided. The results also help to identify the characteristics of the shipments, the percentage of fully and partially loaded trips, and also the amount of empty trips, which was about 20%. In this document, an example of the truck commodity survey is presented.

### *B.23. Freight Monitoring. Tri-State Regional Planning Commission. (1970-1978).*

A series of reports were produced by the Tri-State Regional Planning Commission in order to provide understanding about freight movements in the region. The reports focuses on: analyzing freight moved by direction and mode throughout the region, and comparing these with the national freight movements; freight movement per capita by direction, and the costs of these movements; an overview of trans-shipment of freight in the region; a description of container ports with information about their number, size, and types of activities; and other information regarding waterborne freight. The objective was to measure the change in the region's freight volumes and characteristics, in order to assess the progress of the region freight goals.

### *B.24. A model to describe truck trip ends in the Tri-State region. Tri-State Regional Planning Commission. (1977).*

This report presents a model capable of forecasting the dispersal of truck activity to the various counties and square mile areas in the tri-state region. This model was based on data obtained from the 1963 truck-taxi survey, registrations by the various states, federal highway statistics, census data, and traffic counts for the region. This report, although outdated, presents information about the last truck survey conducted in the U.S. In addition, it shows the pattern of increase in the trucking registrations in the region. This report also presents information about truck trips in New York City, with a value of 9.91 trips per truck. A discussion about the relationship of truck trips and residential and nonresidential floor areas is also presented, providing truck trips estimates depending on this variable.

### *B.25. Measuring Urban Freight in the Tri-State Region. Wood R. (1970).*

This paper presents a summary of the research performed by the author in terms of the nature and volume of urban-freight in the tri-state region, making emphasis on internal freight. The main aspects covered by the author are the process of data acquisition, findings and results from their analysis, and a discussion of urban freight trends in the region. The paper presents results and information about the amount of freight transported in the region by freight, with the trucking industry presenting overwhelming results. In terms of data acquisition, the author discusses the 1963 truck-taxi survey and the results that could be drawn from this type of survey, and the way the survey should be designed. In terms of the findings, the author discusses the internal trucking industry, describing truck trip and delivery patterns, and types of trucks utilized and their freight transporting share. The amounts of different types of commodities transported by internal truck are also discussed, in addition to results on the industry shares that transport the commodities. In a lesser degree, internal waterborne, rail, and pipeline traffics are discussed. In the last section of the document, the author expresses his opinions about the probable course of development of urban freight demand and strategies for meeting them.

### *B.26. Truck Freight in the Tri-State Region. Wood R. and R. Leighton (1969).*

This paper presents results of the surveys conducted by the Tri-State Transportation Committee about the region's internal truck freight in 1963 and a roadside truck survey covering the movement of truck freight into, through, and out of the region conducted in 1964. The authors also discuss the characteristics of these types of surveys, and remark that for an origin-destination survey for truck freight, the different trip types and pickup and delivery patterns must be taken into account. The authors also discuss the need to understand the differences between trip origin and destination and freight origin and destinations. Although these surveys provided great insight about freight in the region, the complete picture was not provided since, for example, the roadside survey just obtained information on the origins and destinations of trucks crossing a line, but no information was obtained about the freight flow.The authors present some results from the survey such as the distribution of freight carried by the different industries, and the shipment and truck characteristics, for local and intercity trips. It is important to mention that the authors provide a discussion of the impact of small consignments and small trucks in the congestion of downtown areas. Other results presented include: origin and destination of daily flows (tons), the commodities transported and their relationship to the trip length, and commodity flows between the region counties.

### *B.27. Truck Freight in the Tri-State Region: Volume I. Tri-State Transportation Commission. (1968).*

This report presents a description of the truck freight system in the area, making emphasis to the volume of freight transported into, within, through, and out of the region. The report is based on two surveys, conducted within and at the periphery of the Tri-State Cordon Area: (1) the truck-taxi survey (1963), which gave insight about the internal truck freight; and (2) the Goods Movement External Truck Survey (1964), which provided data on freight moving into, through, and out of the area. The analyses presented make a distinction between consumer-oriented and business-oriented products, which is important due to the characteristics of the region. Results presented refer to types of commodities transportation in the region. A section includes a description of the characteristics of the industries that carry this freight, and characteristics of the truck fleet serving the region, and the transportation patterns for different urban and regional areas. Analyses are presented about the relationships between the commodities transported and the distance moved. In addition, the report presents a description of the load characteristics of intercity truck freight by class of truck. Another section of this report discusses the interaction between the region and the outside world, describing the commodity freight flows, understanding the origin and destinations of these flows. A review of the industry trends in the area is also presented. This report, although outdated, is a great source of information about the region's truck freight characteristics since is based on the last truck surveys conducted.

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# APPENDIX C: UPDATE OF NYMTC REPORT ON FREIGHT MODELING

**Quick Update of NYMTC Report: An Assessment of Methodological Alternatives for a Regional Freight Model in the NYMTC Region**

**Appendix II: Compendium of Freight Data Sources.**

**(Holguín-Veras et al., 2001)**

The objective of this appendix is to present an update of Appendix II: Compendium of Freight Data Sources of the NYMTC report: An Assessment of Methodological Alternatives for a Regional Freight Model in the NYMTC Region (Holguín-Veras et al., 2001) . The updates, where available, are presented in the form of notes for the original Data Sources presented in the 2001 report. This is done to avoid confusion since some sources may have been subject to a name change or were discontinued. In addition to updates for the original sources, the last section of this document presents a quick description of new data sources or reference material and tools.

Note: The links provided to the different sources were last accessed as of November 2009.

## 1982 Benchmark Input-Output Accounts of the United States Publication

| **MODE**: Demographics, Flows, etc., Multi-mode | **GEOGRAPHY**: National | **USEFULNESS**: Marginal | USE WITH MANUAL: Growth factor |
|---|---|---|---|

**SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES

**TITLE**: 1982 Benchmark Input-Output Accounts of the United States Publication

**Abstract**: This publication shows the distribution of transportation service output (including rail, truck, water, air, pipeline, and other transportation services) to using industries and final purchasers. Among the using industries are transportation industries defined by mode. The commodities used as inputs by these transportation industries are also identified. These accounts also provide detailed information on the consumption of specified commodities. The input-output workfile that is available for benchmark years includes information for over 8,000 commodities.

**Source of Data**: Department of Commerce/Bureau of Economic Analysis.

**Attributes**:

| | |
|---|---|
| **Geographic Coverage of Data**: National | **Time span of Data Source**: 1982 |
| **First Developed**: 1958 | **Update Frequency**: Every 5 Years |
| **Media**: Tape, Disk, Hardcopy | **Sponsoring Organization**: Department of Commerce, Bureau of Economic Analysis, Interindustry Economic Division |

**Availability**: Tape, Disk: DOC/Bureau of Economic Analysis, Interindustry Economics Division, BE-51, Washington, DC 20230; telephone, (202)606-5585. Price varies by table requested., Printed Source: Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402; telephone, (202)783-3238. Price, $19.

**Contact for Additional Information**:
Ann Lawson
Chief, DOC/Bureau of Economic Analysis, Interindustry Economics Division
(202) 606-5584

**Notes:**

The latest version of the document is:

U.S. Benchmark Input-Output Accounts, 2002, October 2007

Can be accessed at:

http://www.bea.gov/scb/pdf/2007/10%20October/1007_benchmark_io.pdf

It provides the estimates for both the summary (that is, at the I-O two-digit level) and the detailed (I-O six-digit level) industries and commodities in one publication. It also provides information on the uses of I-O accounts and on the methods underlying them.

Information about 1992 Benchamark I-O Accounts of the U.S. can be accessed at:
http://www.bea.gov/scb/account_articles/national/io1992/maintext.htm

## 1987 Census of Transportation Geographic Area Series (TC87-A-1) Publication

| | | | |
|---|---|---|---|
| **MODE**: Demographics, Flows, etc. | **GEOGRAPHY**: National, state, metropolitan | **USEFULNESS**: Marginal | USE WITH MANUAL: Establish sampling base for survey |

**SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES

**TITLE**: 1987 Census of Transportation Geographic Area Series (TC87-A-1) Publication

**Abstract**: Presents data for establishments with payroll from selected transportation for the United States, each state, District of Columbia, and selected metropolitan statistical areas (MSA's). Presents general statistics on number of establishments, revenue, payroll, and employment by varied transportation classifications. Data are also provided on revenue and employees per establishment, and on revenue and payroll per employee. Comparative statistics showing percent changes in revenue and payroll between 1982 and 1987 are also shown for some kind-of-business classifications.

**Source of Data**: 1987 Economic Census; 1987 Census of Transportation (transportation companies).

**Attributes**:

| | |
|---|---|
| **Geographic Coverage of Data**: National, Stratified by State, Selected Metropolitan Statistical Areas | **Time span of Data Source**: January 1, 1987 - December 31, 1987 |
| **First Developed**: 1991 | **Update Frequency**: Every Five Years |
| **Media**: Tape, Hardcopy | **Significant Features and/or Limitations**: Covers selected transportation industries as defined in Division E of the Standard Industrial Classification (SIC) Manual. Includes all establishments with one or more paid employees primarily engaged in these classifications: SIC 42, motor freight, transportation and warehousing; SIC 44, water transportation; and SIC 47, transportation services. Excludes firms without paid employees, governmental establishments, and auxiliary establishments. |
| **Sponsoring Organization**: Department of Commerce, Bureau of the Census, Business Division | **Availability**: Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402; telephone, (202)783-3238 |

**Contact for Additional Information**: Dennis Shoemaker
Chief

| |
|---|
| DOC/Bureau of the Census, Utilities Census Branch (301)763-2662 |

**Notes:**

1997 Economic Census - Transportation And Warehousing

Domestic establishments providing transportation of passengers and cargo, warehousing and storage for goods, scenic and sightseeing transportation, and support activities related to modes of transportation. These are businesses classified in NAICS sector 48-49. Excluded from this sector are establishments primarily engaged in providing travel agent services that support transportation and other establishments, such as hotels, businesses, and government agencies (NAICS 56); rental and leasing of transportation equipment without operators (NAICS 532); and rental and leasing of mini-warehouses and self-storage facilities (NAICS 531). In 1997, over 178 thousand employer establishments accounted for over 318 billion of revenue in NAICS sector 48-49.

**Content**

Basic data obtained for all reporting units include kind of business, geographic location, revenue, annual and first quarter payroll, and number of employees for pay period including March 12. Establishments receiving a census form provide additional data on revenue by source and other industry-specific measures such as purchased transportation expenses and revenue by class of customer.

**Frequency**

This expanded census began for 1992, and will continue every 5 years for years ending in "2" and "7." From 1962 through 1987, transportation statistics were published in a census of transportation. Data collection begins at the end of December of the census year and responses are due about 8 weeks later. Data are requested for activities taking place during the census calendar year.

**Methods**

A mail-out/mail-back data collection for all establishments of multiunit companies and most single-establishment employers; administrative records data for some small employers.

Single establishment employer firms classified in Truck Transportation (NAICS 484) and Couriers and Messengers (NAICS 492) receive a census form if they have annualized payrolls above a size cutoff. Employer establishments in NAICS 484 or NAICS 492 that are below the size cutoff are sampled using a stratified sample with strata based on kind of business and geography. Basic data for small employers not selected in this sample are obtained from Federal administrative records. For this sector, estimates of revenue by source and other industry-specific data are based partly on small employer sample results.

**Products**

Geographic Area Series consist of 52 PDF (portable document format) reports, one for the U.S., each state, and the District of Columbia. Reports tabulate data for establishments with payroll by kind of business for the U.S., states, and metropolitan areas.

Subject Series reports will consist of 4 reports: Establishment and Firm Size, Sources of Revenue, Miscellaneous Subjects, and a Summary Report.

**Uses**

The Bureau of Economic Analysis uses the data to benchmark national income and product accounts and input-output tables. The Bureau of Labor Statistics uses the data for statistical research and benchmarking employment by industry. The Census Bureau uses the data in sampling and benchmarking activities in annual surveys on transportation. The Department of Transportation uses the data for statistical research. Trucking associations use the data for economic research.

Documents for the following publications can be accessed at:

Geographic Areas.

http://www.census.gov/prod/www/abs/trans-wh.html

Sources of Revenue:

http://www.census.gov/prod/ec97/97t48-ls.pdf

Establishment and Firm size

http://www.census.gov/prod/ec97/97t48-sz.pdf

Miscellaneous Subjects

http://www.census.gov/prod/ec97/97t48-sb.pdf

Summary.

http://www.census.gov/prod/ec97/97t48-sm.pdf

**1992 Census of Transportation, Communications and Utilities Geographic Area Series Summary (UC92-A-1)**

| **MODE**: Demographics, Flows, etc. | **GEOGRAPHY**: National, state, metropolitan | **USEFULNESS**: Useful | USE WITH MANUAL: Base year statistics |
|---|---|---|---|
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: 1992 Census of Transportation, Communications and Utilities Geographic Area Series Summary (UC92-A-1); other series also available: Series Establishment and Firm Size (Including Legal Form of Organization) (UC92-S-1) and Miscellaneous Subjects (UC92-S-2) Publication | | | |
| **Abstract**: Presents data for establishments with payroll in transportation, communications, and utilities industries as defined in Division E of the 1987 Standard Industrial Classification (SIC) Manual, except for SIC Major Group 43, U.S. Postal Service. Presents general statistics on number of establishments, revenue, payroll, and employment. Data are also provided on revenue and employees per establishment, and on revenue and payroll per employee. Comparative statistics showing percent changes in revenue and payroll between 1987 and 1992 area also shown for some kind-of-business classifications. | | | |
| **Source of Data**: 1992 Economic Census; 1992 Census of Transportation, Communications, and Utilities {transportation companies). | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: National, Stratified by State, Consolidated Metropolitan Statistical Areas, Primary Metropolitan Statistical Areas, Selected Metropolitan Statistical Areas | | **Time span of Data Source**: January 1, 1992-December 31, 1992 | |
| **First Developed**: In Progress | | **Update Frequency**: Every Five Years | |
| **Last update**: 1989 | | **Media**: CD-ROM, Hardcopy | |
| Significant Features and/or Limitations: Includes all establishments with one or more paid employees engaged in these classifications: SIC 41, local and suburban transit and interurban highway passenger transportation; SIC 42, motor freight transportation and warehousing; SIC 44, water, transportation; SIC 45, transportation by air; SIC 46, pipeline, except natural gas; SIC 47, transportation services; SIC 48, communications; SIC 49, electric, gas, and sanitary services. Also includes SIC 40, railroad transportation reported to the, Association of American Railroads; they were not in the 1992 Census of Transportation, Communications, and Utilities universe. Likewise, data reported to DOT's RSPA/Office of Airline Statistics were included in the tabulations for SIC 45, but were excluded from the universe. Excludes firms without paid employees and governmental organizations. Excludes auxiliaries for all industries except firms in SIC's 46 (pipeline, except natural | | | |

| | |
|---|---|
| gas); 481 and 482 (telephone, telegraph and other message | |
| **Sponsoring Organization**: Department of Commerce, Bureau of the Census, Business Division | **Availability**: Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402; telephone, (202) 512-1800. Publication not available until February 1995. |
| **Contact for Additional Information**: Dennis Shoemaker<br>Chief<br>DOC/Bureau of the Census, Utilities Census Branch<br>(301) 457-2786<br>Fax (301) 457-4576 | |

**Notes:**

This specific document is the latest available. It can be accessed at:
http://www.census.gov/prod/1/trans/uc92-a-1.pdf

## Annual Motor Carrier Reports

| **MODE**: | **GEOGRAPHY**: | **USEFULNESS**: | USE WITH MANUAL: |
|---|---|---|---|
| Demographics, Flows, etc., highway | National, state | Useful | Establish sampling base for survey |
| **SOURCE**: FOR-HIRE TRUCKING INDUSTRY SIZE STUDY | | | |
| **TITLE**: Annual Motor Carrier Reports | | | |
| **CONTENT**: Employment and leased-employee information for Class I and Class II for hire motor carriers (this group represents a small percent of total for-hire carriers). | | | |
| **METHODOLOGY**: For-hire motor carriers file for interstate operating authority with the ICC. Class I and Class II carriers (annual revenues greater than $3 million) also submit a Motor Carrier Annual Report (Form M). An employment census (including the number of leased owner-operators) is included in Form M. | | | |

**Notes:**

RITA. Research and Innovative Technology Administration

Bureau of Transportation Statistics

Motor Carrier Operators: Annual Report

http://www.transtats.bts.gov/TableInfo.asp?Table_ID=775&DB_Short_Name=Motor Carrier Operators&Info_Only=1

The collection of for-hire trucking company financial and operating statistics (F&OS) data is a mandatory program (regulations: 49 CFR 1420) managed by the Bureau of Transportation Statistics (BTS) Office of Motor Carrier Information (OMCI). For-hire contract and common motor carriers of property and household goods which have gross annual operating revenue of $3 million or more are required to file 8-page annual reports (Form M), while carriers with revenues of $10 million or more must also file four 2-page quarterly reports (Form QFR) each year.

The data you see on the ITDB are 1999 Form M data for 2,172 for-hire trucking companies. The F&OS data on the ITDB can be downloaded by row (trucking company), groups of rows (e.g., segment of the industry), or as a whole, with each column of data representing F&OS characteristics of the trucking companies - - taken from the line items and schedules on the 1999 Form Ms (annual reports). Please consult the OMCI/BTS web site (www.bts.gov/mcs) for more information and copies of Form M and Form QFR.

Last available data: 2003

Important notes:

Users should exercise care when analyzing the for-hire trucking company '99 Form M (annual report) data: 1. The city and state shown here indicate the headquarters location or the domicile of the carrier. They do not necessarily indicate the region within which the carrier's vehicles operate. Users should not designate the state shown here on a map as the geographic scope of the carrier's operations nor should they, for example, use the square miles or population of the state shown here as a denominator for any of the potential numerator data provided. 2. The revenue commodity group identification reflects the predominant, but perhaps not the entire operation (e.g., a "General Freight Truckload" carrier may also handle substantial "Specialty Freight," "Container"). 3. All data elements are not annual (e.g., some data are reported on the Form M for "close of year," "beginning of year," "actual full year," and as averages for a year of data. 4. ACCT 305 (Shipments or loads) is a line item, which can have different meanings for different operations, and is usually dependent on the method of billing. (For example, the number of "shipments" for one carrier may not be directly comparable with the number of "loads" [reported on a "manifest"] of another carrier, whose "loads" may include several of what some carriers define as "shipments.")

Data Provider Agency The Federal Motor Carrier Safety Administration
Data Provider Office Motor Carrier Financial and Operating Statistics (F&OS) Program
BTS Contact TranStats Customer Support
Phone: (800) 853-1351 (800) 853-1351
Email:answers@bts.gov

## Annual Registration Filings

| **MODE**: | **GEOGRAPHY**: | **USEFULNESS**: | USE WITH MANUAL: |
|---|---|---|---|
| Highway | National, state | Useful | Establish sampling base for survey |
| **SOURCE**: FOR-HIRE TRUCKING INDUSTRY SIZE STUDY | | | |
| **TITLE**: Annual Registration Filings | | | |
| **CONTENT**: Varies significantly from state to state. The data include: Size of motor carrier Measured by equipment used, employees, and/or estimate revenue. | | | |
| **Type of operation**: Service, for-hire, private, construction, agriculture, off-highway. | | | |
| **Commodity hauled**: Broad classifications usually, no greater detail than 2-digit SIC level. | | | |
| **Area of operation**: Range of operation carrier. | | | |

**Notes:**

Registration filings could be accessed where available at each state department of motor vehicle office.

## BEA Regional Projections to 2040; County Projections also available Publication

| | | | |
|---|---|---|---|
| **MODE**: Demographics, Flows, etc. | **GEOGRAPHY**: National, state, metropolitan, other | **USEFULNESS**: Very useful | USE WITH MANUAL: Growth factor, base year statistics, forecast statistics |

**SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES

**TITLE**: BEA Regional Projections to 2040; County Projections also available Publication

**Abstract**: This document illustrates estimates for 1973, 1979, 1983, 1988, and projections for 1995, 2000, 2005, 2010, 2020, and 2040 for total persons income, population, per capita personal income, and employment and earnings by industry for the U.S., BEA regions, states, metropolitan statistical areas, and BEA economic area. Volume 1 contains data on states, Volume 2 contains data on MSAs, and Volume 3 contains data on BEA Economic Areas.

**Source of Data**: Department of Commerce/Bureau of Economic Analysis.

**Attributes**:

| | |
|---|---|
| **Geographic Coverage of Data**: U.S., States, MSAs, BEA Economic Areas | **Time span of Data Source**: 1973-2040 |
| **First Developed**: 1964 | **Update Frequency**: Every 5 Years |

**Sponsoring Organization**: Department of Commerce, Bureau of Economic Analysis, Regional Economic Analysis Division

**Availability**:

Volume 1 - National Technical Information Service, Springfield, VA 22161; telephone, (301)487-4650. Price, $27; order number PB90-264532.

Volumes 2 and 3 - Superintendent of Documents, U.S. Government Printing Office, Washington, DC, 20590; telephone,, (202)783-3238. Price, $17/Volume 2 order number 003-010-00211-5; $10/Volume 3, order number 003-010-00212-3.

Disks: DOC/Bureau of Economic Analysis, Regional Economics Analysis Division, Washington, DC 20230; telephone, (202) 523-0959. Prices vary.

County Level: DOC/Bureau of Economic Analysis, Regional Economic Analysis Division, BE-61, Washington, DC 20230; telephone, (202) 523-0959. Price, $260 (13 disks). Data also available for user-selected states at $20/disk.

| | |
|---|---|
| **Contact for Additional Information**: Duane Hackman Data Manager DOC/Bureau of Economic Analysis | **Contact for Additional Information**: George Downey Chief DOC/Bureau of Economic Analysis, Projects Branch |

| | |
|---|---|
| (202)606-9218 | (202)606-5341 |

**Notes:**

Updated for projections to 2045

This three volume series contains economic projections for the U.S., States, Metropolitan Statistical Areas (MSA's), and BEA economic areas. Projections cover gross state product (GSP) by industry (available for States only), employment and earnings by industry, population, and total personal income, for the years 1998, 2000, 2005, 2010, 2015, 2025, and 2045. Historical data consistent with the projections are also available for the years 1977 - 1992 for GSP, and 1969 -1993 for all other data

Description can be found at:
http://www.ctre.iastate.edu/Research/bts_wb/cd-rom/employment/bea.htm

How to access

Volume 1, States is available for $13 from the Superintendent of Documents, U.S. Government Printing Office, Washington DC 20402. Orders should specify GPO Stock Number 003-010-00256-5. State projections are also available for $40 on two 3-1/2 inch, high-density diskettes. Contact the Regional Economic Analysis Division at (202) 606-5341 (202) 606-5341 to order diskettes. State projections are also available electronically on the Economic Bulletin Board (EBB) and on the Internet from the Commerce Department's STAT-USA. For prices and other information about these services, call (202) 482-1986 (202) 482-1986 . Volume 2, Metropolitan Statistical Areas, and Volume 3, Economic Areas will be available in the Spring of 1996.

## Commercial Drivers Licenses

| **MODE**: | **GEOGRAPHY**: | **USEFULNESS**: | USE WITH |
|---|---|---|---|
| Demographics, Flows, etc. | National, state | Useful | MANUAL: Growth factor |

**SOURCE**: FOR-HIRE TRUCKING INDUSTRY SIZE STUDY

**TITLE**: Commercial Drivers Licenses

**CONTENT**: Number of Commercial Drivers Licenses issued. These data are updated continuously.

**METHODOLOGY**: A Commercial Drivers License (CDL) is required for all commercial drivers whose vehicle falls into one of the following categories:

- gross weight of more than 26,000 pounds, including a towed unit over 10,000 pounds;
- designed to haul more than 15 passengers, including the driver;
- requires placards under the Hazardous Materials Regulations.

**Notes:**

Information about Driver Licensing can be accessed from the U.S. Department of Transportation and the Federal Highway Administration from the "Highway Statistics 2003" at:

http://www.fhwa.dot.gov/policy/ohim/hs03/dl.htm

## Commodity Flow Survey: 1993

| | | | |
|---|---|---|---|
| **MODE**: Demographics, Flows, etc., Multi-mode | **GEOGRAPHY**: National, state | **USEFULNESS**: Useful | USE WITH MANUAL: Growth factor, base year statistics |

**SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES

**TITLE**: Commodity Flow Survey: 1993

**Abstract**: The Commodity Flow Survey (CFS) is designed to provide data on the flow of goods and materials by mode of transport. The CFS is a continuation of statistics collected in the Commodity Transportation Survey from 1963 through 1977, and includes major improvements in methodology, sample size and scope. A sample of 200,000 domestic establishments randomly selected from a universe of about 900,000 establishments engaged in mining, manufacturing, wholesale, auxiliary establishments (warehouses) of multi-establishment companies, and some selected activities in retail and service was used. Each selected establishment will report a sample of approximately 30 outboard shipments for a two week period in each of the four calendar quarters of 1993. This will produce a total sample of about 20 million shipments. For each sampled shipment, zip code of origin and destination, 5-digit Standard Transportation Commodity Classification (STCC) code, weight, value, and modes of transport, will be provided. Check box information on whether the shipment was containerized, a hazardous material, or an export will also be obtained.

**Source of Data**: A sample of manufacturing wholesale establishments will complete questionnaire.

**Attributes**:

| | |
|---|---|
| **Geographic Coverage of Data**: National, Stratified by State | **Time span of Data Source**: 1993 |
| **First Developed**: 1993 | **Update Frequency**: Every Five Years |
| **Number of Records**: ~20 Million (Estimated) | **File Size**: TBD |
| **File Format**: TBD | **Media**: 9-track Tape, CD-ROM, Hardcopy |

**Significant Features and/or Limitations**: The 1993 CFS will differ from previous surveys in greatly expanded coverage of intermodalism. Earlier surveys reported only the principal mode. The 1993 survey will report all modes used for the shipment (for-hire truck, private truck, rail, inland water, deep sea water, pipeline, air, parcel delivery or U.S. Postal Service, other mode, unknown). Route distance for each mode for each shipment will be imputed from a Mode-Distance Table developed by Oak Ridge National Laboratory. Distance, in turn, will be, used to compute ton-mileage by mode of transport.

| | |
|---|---|
| **Corresponding Printed Source**: | **Sponsoring Organization**: Department of Transportation, |

| | |
|---|---|
| Commodity Flow Survey, 1993 | Bureau of Transportation Statistics, Department of Commerce, Bureau of the Census |
| Performing Organization: Department of Commerce, Bureau of the Census, Oak Ridge National Laboratory | **Availability**: Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402; telephone, (202) 783-3238. Data not available until late 1995. |
| **Contact for Additional Information**: John Fowler DOC/ Bureau of the Census, Business Division (301)763-6087 | |

**Notes:**

Latest available is:

2002 Commodity Flow Survey

Measures the movement of goods by major type of commodities shipped and means of transportation. The report covers establishments in mining, manufacturing and wholesale trade, and in some kinds of retail and service industries. The survey also covers some auxiliary establishments (such as warehouse) of multiunit and retail companies. The report provides data on shipment characteristics, such as value, tons, ton-miles, and average miles, each cross-classified by other topics including commodity, shipment weight, and means of transportation. The report also provides origin and destination data

Reports can be accessed at:

http://www.census.gov/prod/www/abs/02cf-pdf.html

Database Tables can be accessed at:

http://www.transtats.bts.gov/Tables.asp?DB_ID=510&DB_Name=Commodity%20Flow%20Survey%20%28CFS%29&DB_Short_Name=CFS

## County Business Patterns

| | | | |
|---|---|---|---|
| **MODE**: Demographics, flows, etc. | **GEOGRAPHY**: National, state, county | **USEFULNESS**: Very useful | USE WITH MANUAL: Growth factor, base year statistics |

**SOURCE**: FOR-HIRE TRUCKING INDUSTRY SIZE STUDY

**TITLE**: County Business Patterns

**CONTENT**: The County Business Patterns (CBP) is an annual series of state and national publications presenting county-level data on number of establishments, total employment, and payroll on an establishment basis, with economic activity classification reflecting the principal activity at each individual locations. The data are derived from a universe of employees covered by Federal Insurance Contributions Act (FICA).

Data in the CBP represent the following types of employment covered by FICA:

* all covered wage and salary employment of private nonfarm employers and of nonprofit organizations;
* all employment of religious organizations covered under the elective provisions of FICA.

Data for employees of establishments totally exempt from FICA are excluded. These include the following types of employment: self-employed, government, domestic service, agricultural, foreign, and railroad employment jointly covered by Social Security and railroad retirement programs.

For activities such as construction, transportation, electric and gas, establishments are represented by those relatively permanent main or branch offices, terminals, stations, etc. Hence, the individual sites or systems of such dispersed activities (e.g., worksites) are not ordinarily considered to be establishments.

Note: Data for industries with less than 100 employees in a given county are not shown in the printed reports, but are included on the CD-ROM and computer tape.

County Business Patterns Addendum:

| | |
|---|---|
| **Source of Data**: Department of Commerce/Bureau of Economic Analysis | **Attributes**: **Geographic Coverage of Data**: US, states and counties, to zip code level by special request |
| **Update Frequency**: annual | **Sponsoring Organization**: Department of Commerce, Bureau of Economic Analysis |
| **Availability**: Printed reports, tape, diskette, microfiche, CD-ROM | **Entire US**: Superintendent of Documents, PO Box 371954, Pittsburgh, PA 15250-7954, ph. 202-512-1800, fax (202) 512-2250. Price $245, stock number 803-049-00000-9. |
| **Individual States**: (county level) | **Internet**: To county level by 4-digit SIC code - total |

| | |
|---|---|
| Prices vary from $2.50 to $15.00. Contact above for order information. | employment, not by employment by size. Sample//http://www.census.gov/> |
| **Special request**: Total establishments and establishments by employment size class by 4-digit SIC code by zip code. Minimum charge $300; total US $1000 | |
| Contact for additional information: Carol Comisarow, Statistician DOC - Economics Planning and Coordination Division Phone: 301-457-2580 | Also contact: Customer Services Branch Data Users Services Division Bureau of the Census Washington, DC 20233 Phone: 301-457-4100 <http://www.census.gov/> |

**Notes:**

Information and tables can be accessed at:

http://www.census.gov/econ/cbp/index.html

The information is available from 1998 to 2007.

## Current Employment Statistics Publication

| | | | |
|---|---|---|---|
| **MODE**: Demographics, Flows, etc. | **GEOGRAPHY**: National, metropolitan | **USEFULNESS**: Useful, specialized | USE WITH MANUAL: Base year statistics |
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: Current Employment Statistics Publication | | | |
| **Abstract**: This publication provides monthly employment data collected from payroll records of business establishments. Statistics on employment, hours, and earnings are published for industry groups in the transportation sector, with these data classified using the Standard Industrial Classification (SIC). Publication detail includes all 2-digit SIC detail (railroad transportation, local and interurban passenger transit, trucking and warehousing, water transportation, transportation by air, pipelines, transportation services) and selected 3- and 4-digit detail. | | | |
| **Source of Data**: Monthly payroll records from a sample of business establishments. Employment data for Class I Railroads are provided by the ICC. Data collected via mail, computer automated telephone interviewing, and touchtone data entry. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: National | | **Time span of Data Source**: Current Year | |
| **Update Frequency**: Monthly | | **Sponsoring Organization**: Department of Labor, Bureau of Labor Statistics | |
| **Availability**: DOL/Inquiries and Correspondence Branch, Office of Publications, Bureau of Labor Statistics, Washington, DC 20212; telephone, (202)606-5902 | | | |
| **Contact for Additional Information**: Lois Plunkert Data Manager BLS/Division of Monthly Industry Employment Statistics (202) 606-6527 | | | |

**Notes:**

A database containing Employment and Wages from Occupational Employment Statistics (OES) Survey can be accessed at:

http://www.bls.gov/oes/data.htm

The different files are available at:

http://www.bls.gov/oes/oes_dl.htm

They are available from 1997 to May 2008

### Current Population Survey

| **MODE**: Demographics, Flows, etc. | **GEOGRAPHY**: National | **USEFULNESS**: Useful | USE WITH MANUAL: Base year statistics, forecast statistics |
|---|---|---|---|
| **SOURCE**: FOR-HIRE TRUCKING INDUSTRY SIZE STUDY | | | |
| **TITLE**: Current Population Survey | | | |
| **CONTENT**: The Bureau of Census conducts the survey each month for the Bureau of Labor Statistics and provides comprehensive data on the employed and unemployed, including such characteristics as age, sex, occupation, hours worked and industry. | | | |
| **METHODOLOGY**: Data based on household interviews are obtained from the Current Population Survey (CPS), a sample survey of the population 16 years of age and over.<br><br>CPS employment data are estimated from a sample survey of about 60,000 households and 115,000 persons selected to represent the entire civilian noninstitutional population. The CPS estimates are designed to measure overall employment, unemployment, and those not in the labor force. The survey data are weighted to derive national estimates. | | | |

**Notes:**

A Joint effort between the Bureau of Labor Statistics and the Census Bureau

The Current Population Survey (CPS) is a monthly survey of about 50,000 households conducted by the Bureau of the Census for the Bureau of Labor Statistics.

The CPS is the primary source of information on the labor force characteristics of the U.S. population. The sample is scientifically selected to represent the civilian noninstitutional population. Respondents are interviewed to obtain information about the employment status of each member of the household 15 years of age and older. However, published data focus on those ages 16 and over. The sample provides estimates for the nation as a whole and serves as part of model-based estimates for individual states and other geographic areas.

Estimates obtained from the CPS include employment, unemployment, earnings, hours of work, and other indicators. They are available by a variety of demographic characteristics including age, sex, race, marital status, and educational attainment. They are also available by occupation, industry, and class of worker. Supplemental questions to produce estimates on a variety of topics including school enrollment, income, previous work experience, health, employee benefits, and work schedules are also often added to the regular CPS questionnaire.

Data can be accessed from:

http://www.bls.census.gov/ferretftp.htm

## Employment and Earnings

| **MODE**: | **GEOGRAPHY**: | **USEFULNESS**: | USE WITH |
|---|---|---|---|
| Demographics, Flows, etc. | National, state | Marginal | MANUAL: Base year statistics |

**SOURCE**: FOR-HIRE TRUCKING INDUSTRY SIZE STUDY

**TITLE**: Employment and Earnings

**CONTENT**: The Employment and Earnings database contains information on industry employment, by state, and nationwide occupational employment. This data is published monthly.

**METHODOLOGY**: According to the BLS, Employment and Earnings (E&E) statistics are compiled from two places: household interviews and employer results.

Data based on household interviews are obtained from the Current Population Survey (CPS), a sample survey of the population 16 years of age and over. The Bureau of Census conducts the survey each month for the BLS and provides comprehensive data on the employed and unemployed, including such characteristics as occupation, hours and industry.

Data based on establishment records are compiled each month from questionnaires sent by the Bureau of Labor Statistics, in cooperation with state employment agencies. The Current Employment Statistics (CES) survey provides industry information on non-farm wage and salary employment, hours, and average weekly earnings. State agencies mail the questionnaires, then collect and compile data and make employment estimates at the state level. National employment estimates are then made by the BLS. The Employment and Earnings publication is prepared in the Office of Employment and Unemployment Statistics in collaboration with the Office of Publications and Special Studies.

AVAILABILITY: Data are available in printed publications and on computer files.

**Notes:**

United Stated Department of Labor

Bureau of Labor Statistics

Office of Publications and Special Studies

Employment and Earning Online

Publications can be accessed at:

http://www.bls.gov/opub/ee/home.htm

Data can be accessed at:

http://www.bls.gov/data/

## Employment and Wages

| **MODE**: | **GEOGRAPHY**: | **USEFULNESS**: | USE WITH MANUAL: |
|---|---|---|---|
| Demographics, Flows, etc. | National, state | Marginal | Base year statistics |

**SOURCE**: FOR-HIRE TRUCKING INDUSTRY SIZE STUDY

**TITLE**: Employment and Wages

**CONTENT**: The Employment and Wages database contains information on employment, wages and establishments, by industry, by state. The data represent the count of employment and wages for workers covered by State unemployment insurance programs (UI) and Federal civilian workers covered by the Unemployment Compensation for Federal Employees (UCFE) program.

The BLS aggregates the data to national levels, by State and by industry -- private sector data are shown at the 4-digit SIC level. Employment and Wages data are available quarterly.

**AVAILABILITY**: The Office of Employment and Unemployment Statistics at the BLS in Washington, D.C. maintains the database of employment and wages data. The BLS data can be copied onto diskettes using compression software. The BLS may have their employment and wages data available on CD-ROM and also on the **Internet** -- where databases can be downloaded via modem.

**Notes:**

Quarterly Census of Employment and Wages Publications can be accessed at:
http://www.bls.gov/cew/

Data can be accessed at:
http://www.bls.gov/data/

## Highway Performance Monitoring System (HPMS) Database

| **MODE**: | **GEOGRAPHY**: | **USEFULNESS**: | USE WITH |
|---|---|---|---|
| Highway | National, state, metropolitan, facility- airport, marine port, etc. | Very useful | MANUAL: Network related |

**SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES

**TITLE**: Highway Performance Monitoring System (HPMS) Database

**Abstract**: This system includes universe data consisting of a small amount of information for all public road mileage in each state. Additional information on physical characteristics, condition, use, and performance for sample roadway sections within the state are included in the sample data. Sample data are statistically valid for each arterial and collect or functional system for rural, small urban, and urbanized areas. Areawide data, consisting of accident data, system length and travel by functional system, and travel activity by vehicle type are also reported in summary form. Accident data contains summary statistics on fatal and non-fatal injury accidents.

**Source of Data**: State inventory, sampling, and surveys are conducted by State Highway Agencies.

**Attributes**:

| | |
|---|---|
| **Geographic Coverage of Data**: National, Puerto Rico, Limited Data from U.S. Territories | **Time span of Data Source**: 1978, 1980-1992 |
| **First Developed**: 1978 | **Update Frequency**: Annual |
| **Last update**: 1992 | **Number of Records**: ~3.3 Million Universe/Year including 116,000 Sample Section Records/Year |
| **File Size**: ~568MB | **File Format**: ASCII, EBCDIC, LOTUS (areawide) |
| **Media**: 9-track Tape, Disk, Hardcopy | Significant Features and/or Limitations: Sample data only for collector through interstate functional systems. |
| Corresponding Printed Source: Highway Statistics (not inclusive of all data) | **Sponsoring Organization**: Department of Transportation, Federal Highway Administration, Office of Highway Information Management |

**Availability**: DOT/FHWA, Office of Highway Information Management, HPM-20, 400 7th Street, SW, Washington, DC 20590; telephone (202) 366-0175. Price $30-$150 and up for non-government agencies; price varies depending upon amount and coverage desired.

**Contact for Additional Information**:

| | | | |
|---|---|---|---|
| Don DOT/FHWA, (202)366-0175 | Kestyn, | Transportation | Specialist HPM-20 |

**Notes:**

Information about the Highway Performance Monitoring System can be accessed at:
http://www.fhwa.dot.gov/policy/ohpi/hpms/

Publications can be found at:
http://www.fhwa.dot.gov/policy/ohpi/hpms/hpmspubs.cfm

## Monthly Traffic Volume Trends

| | | | |
|---|---|---|---|
| **MODE**: Highway | **GEOGRAPHY**: National, state | **USEFULNESS**: Useful | USE WITH MANUAL: VMT related |
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: Monthly Traffic Volume Trends | | | |
| **Abstract**: This data base contains information on vehicle miles of travel (VMT) generated by the Highway Performance Monitoring System. VMT is expanded from the previous year to give a current year estimate based on the change in traffic volumes at approximately 4,500 locations across the nation. The VMT estimates are generated by functional highway system within each state and the aggregate for national totals. A computer data base for the VMT has been created on the DOT central computers beginning with 1970. A new, expanded data base is generated on the current micro computer system beginning with 1991 VM2 (Traffic Volume Trends Report) data. | | | |
| **Source of Data**: State Highway Agencies provide FHWA with traffic counts from automatic traffic data recorders buried in roadway surfaces. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: National | | **Time span of Data Source**: 1970-present | |
| **First Developed**: 1935 | | **Update Frequency**: Monthly | |
| **Number of Records**: Varies | | **File Size**: Varies | |
| **File Format**: dBASE | | **Media**: Disk, Hardcopy | |
| **Significant Features and/or Limitations**: Sample limited by statistic sampling and finances available. A computer data base for the VMT has been created on the DOT central computers beginning with 1970. A new, expanded data base is generated on the current micro computer system beginning with 1991 VM2 data. | | **Corresponding Printed Source**: Traffic Volume Trends | |
| **Sponsoring Organization**: Department of Transportation, Federal Highway Administration, Office of Highway Information Management | | **Availability**: DOT/FHWA, Office of Highway Information Management, HPM-30, 400 7th Street, SW, Washington, DC 20590; telephone (202)366-5055. Price, monthly report is free; annual cost for monthly data base is $240. | |
| **Contact for Additional Information**: | | | |

| | | | | |
|---|---|---|---|---|
| Kenneth | H. | Welty, | Highway | Engineer |
| DOT/FHWA, | | | | HPM-30 |
| (202)366-5055 | | | | |

**Notes:**

The information related to Traffic Volume trends can be accessed and downloaded from:
http://www.fhwa.dot.gov/ohim/tvtw/tvtpage.cfm

The latest information available correspond to August 2009
http://www.fhwa.dot.gov/ohim/tvtw/tvtpage.cfm

Contact
**Steven Jessberger**
Office of Highway Policy Information
202-366-5052
202-366-5052

## Motor Carrier Census

| | | | |
|---|---|---|---|
| **MODE**: Highway | **GEOGRAPHY**: Other | **USEFULNESS**: Useful | USE WITH MANUAL: Establish sampling base for survey |
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: Motor Carrier Census | | | |
| **Abstract**: This system includes the name and address, type and size of operation, commodities transported and other characteristics of the operation of approximately 300,000 motor carriers (truck and bus) and shippers subject to the Federal Motor Carrier Safety Regulations or Federal Hazardous Materials Regulations. | | | |
| **Source of Data**: Interstate motor carriers are required to submit an identification form, Form MCS-150, to FHWA which results in the carrier being registered in the data base system and being issued a USDOT number. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: U.S., Canadian, and Mexican Carriers Operating in U.S. | | **Time span of Data Source**: Current | |
| **First Developed**: 1979 | | **Update Frequency**: Continual | |
| **Number of Records**: ~300,000 | | **File Size**: Varies | |
| **File Format**: EBCDIC | | **Media**: 9-track Tape, 6250 bpi/1600 bpi | |
| **Significant Features and/or Limitations**: On-line data base that is directly accessible by all Office of Motor Carrier Headquarters and field personnel. Changes to the data can be made at any time, generally after contact with the motor carrier, i.e., a safety or compliance review, roadside, inspection, etc. | | **Sponsoring Organization**: Department of Transportation, Federal Highway Administration, Office of Motor Carriers | |
| **Availability**: The Scientex Corporation, OMC Data Dissemination Program, P.O. Box 13028, Arlington, VA 22219. Price, $275/6250 bpi tape; $375/1600 bpi tape. | | | |
| **Contact for Additional Information**: Linda Giles<br>Data Manager<br>DOT/FHWA, HIA-10<br>(202)366-2971 | | | |

**Notes:**

Motor Carrier Management Information System information can be accessed at:
http://mcmiscatalog.fmcsa.dot.gov/beta/Catalogs&Documentation/documentation/census/mcmis_doc.asp

The information in the MCMIS Census file represents data that is reported to the Federal Motor Carrier Safety Administration through the requirements of State and Federal programs. This file is dynamic and is constantly being updated to keep up with the changes in the motor carrier industry. Therefore, the information on a copy of this file is only valid as of the date the copy is generated. The Census file will be provided in a Tilde delineated format text file. Also, any copy of this file will contain only those entities with a status of "active" as defined above.

A copy of the MCMIS Census File, available as a CD-ROM, can be obtained by contacting the following government contractor:

*COmputing TechnologieS, Inc.*
MCMIS Data Dissemination Program
P.O. Box 3248
Merrifield, VA 22116-3248
703-280-4001
703-280-4001

Federal Relay Service Number for TTY is 1-800-877-8339 1-800-877-8339

## Motor Freight Transportation and Warehousing Survey

| **MODE**: Highway | **GEOGRAPHY**: National | **USEFULNESS**: Marginal | USE WITH MANUAL: Establish sampling base for survey |
|---|---|---|---|

**SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES

**TITLE**: Motor Freight Transportation and Warehousing Survey

**Abstract**: This data base reflects information obtained from firms furnishing local and long-distance trucking, and courier services, except by air; public warehousing and storage including farm product warehousing, refrigerated, general, and special warehousing and storage. Excluded are private motor carriers and independent owner-operators. The data items consist of total operating revenue, and total operating expenses that include annual payroll and employee benefits. Information collected from trucking firms also includes commodities carried, end-of-year inventory of revenue generating equipment, and type of carrier.

**Source of Data**: Data are collected from employer businesses on a national level.

**Attributes**:

| | |
|---|---|
| **Geographic Coverage of Data**: National | **Time span of Data Source**: 1984-1991 |
| **First Developed**: 1984 | **Update Frequency**: Annual |
| **Last update**: 05/93 | **Number of Records**: 2,345 |
| **File Size**: Not Available | **File Format**: Not Available |
| **Media**: CENDATA, Hardcopy | Corresponding Printed Source: Motor Freight Transportation and Warehousing Survey |
| **Sponsoring Organization**: Department of Commerce, Bureau of the Census, Business Division | **Availability**: DOC/Bureau of the Census, Business Division, Washington, DC 20233; telephone, (301) 763-3990. Price, $2.50. |

**Contact for Additional Information**:
Christine Tucker
Project Manager
DOC/Bureau of the Census, Business Division
(301)763-3990

**Notes:**

The report for the 1995 Motor Freight Transportation and Warehousing Survey can be accessed at: http://www.census.gov/prod/3/97pubs/bt95.pdf

The U.S. Census Bureau also offers the 2002 Economic Census – Transportation and Warehousing. Files can be accessed at: http://www.census.gov/prod/www/abs/trans-a.html

### National Commodity Flow Network

| | | | |
|---|---|---|---|
| **MODE**: Demographics, Flows, etc., Multi-mode | **GEOGRAPHY**: National, state, metropolitan, facility- airport, marine port, etc. | **USEFULNESS**: Useful | USE WITH MANUAL: Network related |
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: National Commodity Flow Network | | | |
| **Abstract**: This data base includes information on highway, railroad, waterway, aviation, and pipeline networks with intermodal connections for use in calculating distances for the Commodity Flow Survey. Emphasis has been placed on topological accuracy rather than planimetric accuracy for use in network analysis such as minimum path calculations. | | | |
| **Source of Data**: Public domain maps, digital line graphs from the U.S. Geological Survey. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: National | | **Time span of Data Source**: 1993 | |
| **First Developed**: 1993 | | **Update Frequency**: Annual | |
| **Last update**: 1993 | | **Number of Records**: TBD | |
| **File Size**: TBD | | **File Format**: ASCII | |
| **Media**: CD-ROM | | Significant Features and/or Limitations: These networks are based on 1:2,000,000 maps and are generally accurate to 1,000 meters. | |
| **Sponsoring Organization**: Department of Transportation, Bureau of Transp. Statistics | | **Performing Organization**: DOT/Research and Special Programs Administration, Volpe National Transportation Systems Center (RSPA/Volpe Center), Service Assessment Division, Oak Ridge National Laboratory | |
| **Availability**: DOT/Bureau of Transportation Statistics, 400 7th Street, SW, Room 2104, Washington, DC 20590; telephone (202)366-3282; fax (202)366-3640 | | | |
| **Contact for Additional Information**: Staff, DOT/Bureau of | **Contact for Additional Information**: Bruce Spear DOT/RSPA/Volpe Center, DTS-49 | **Contact for Additional Information**: Mike Bronzini Oak Ridge National Laboratory (615)574-8267 | |

| | | |
|---|---|---|
| Transportation Statistics (202)366-3282 | (617)494-2192 | |

**Notes:**

No updated information could be found.

## National Highway Planning Network (NHPN)

| | | | |
|---|---|---|---|
| **MODE**: Highway | **GEOGRAPHY**: National, state, metropolitan, County, Facility-airport, marine port, etc. | **USEFULNESS**: Useful | USE WITH MANUAL: Network related |
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: National Highway Planning Network (NHPN) | | | |
| **Abstract**: The NHPN is a data base of the major highways in the U.S. It is a foundation for analytic studies of highway performance, vehicle routing and scheduling problems, and mapping purposes. The network is based on the U.S. Geological Survey's 1:2,000,000 digital line graphs (DLG's). The DLG's have been enhanced through addition of transportation attributes such as number of lanes, degree of access control, median type, and FHWA's functional classification codes. Other enhancements include the digitation of some additional links and the correction of topological errors to create a true analytic network. | | | |
| **Source of Data**: U.S. Geological Survey's digital line graphs and the States. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: National | | **Time span of Data Source**: Real-Time | |
| **First Developed**: 1985 | | **Update Frequency**: Continual | |
| **Number of Records**: ~35,000 | | **File Size**: ~16 MB | |
| **File Format**: ASCII | | **Media**: Disk, Hardcopy, CD-ROM | |
| **Significant Features and/or Limitations**: 1:2,000,000 accuracy insufficient for some types of analyses. This data base has been expanded upon by the Department of Defense, Military Traffic Management Command, Transportation Engineering Agency. See National Highway Planning Network Strategic, Highway Corridor Network (STRANET) and Connectors located in the MTMC profiles section. | | **Corresponding Printed Source**: Description of the National Highway Planning Network | |
| **Sponsoring Organization**: Department of Transportation, Federal Highway Administration, Highway Needs and Investment Branch | | **Performing Organization**: Oak Ridge National Laboratory | |
| **Availability**: Disk, Printed Source: DOT/FHWA, Highway Needs and Investment Branch, HPP-22, 400 7th Street, SW, Washington, DC 20590; telephone (202)366-9223. No charge for data, however, six high density floppy disks must be provided by the customer. | | | |

| CD-ROM: Transportation Data Sampler - DOT/Bureau of Transportation Statistics, 400 7th Street, SW, Room 2104, Washington, DC 20590; telephone, (202)366-3282; fax (202)366-3640 | |
|---|---|
| **Contact for Additional Information**: Stephen M. Lewis, Data Manager FHWA, HPP-22 (202)366-9223 | **Contact for Additional Information**: Bruce Patterson, Data Manager Oakridge National Laboratory (615)574-4419 |

**Notes:**

This dataset has been updated. The new version NHPN v2005.08 is now available for all 50 States, the District of Columbia and Puerto Rico. These files are in zipped Shapefile format.

The different files can be accessed at:
http://www.fhwa.dot.gov/planning/nhpn/

Contact
Mark Sarmiento, mark.sarmiento@dor.gov
202-366-4828

## National Transportation Statistics (NTS)

| | | | |
|---|---|---|---|
| **MODE**: Highway, Multi-Mode | **GEOGRAPHY**: National, state, metropolitan, County, | **USEFULNESS**: Useful | USE WITH MANUAL: Network related |
| **SOURCE**: US DOT BTS | | | |
| **TITLE**: National Transportation Statistics (NTS) | | | |

**Abstract**: The Highway Performance Monitoring System (HPMS) is the source of road mileage data and is considered reliable. The Federal Highway Administration (FHWA) of the U.S. Department of Transportation (USDOT) collects and reviews state-reported HPMS data for completeness, consistency, and adherence to specifications. Some inaccuracy may arise from variations across states in their adherence to federal guidelines in the Traffic Monitoring Guide and the Highway Performance Monitoring System Field Manual for the Continuing Analytical and Statistical Database.

Beginning with the 1997 issue of Highway Statistics, FHWA instituted a new method for creating mileage-based tables derived from the HPMS. Previously, adjustments to tables developed from sample data were made using area-wide mileage information provided by states. These adjustments are now being made using universe totals from the HPMS dataset. In addition, FHWA has discontinued the process of spreading rounding and other differences across table cells. Thus, users may note minor differences in table-to-table totals. FHWA considers mileage totals from table HM-20, "Public Road Length, Miles by Functional System" to be the controlling totals should a single value be required

| | |
|---|---|
| **Source of Data**: Bureau of Transportation Statistics, National Transportation Statistics 99 | |
| **Attributes**: | |
| **Geographic Coverage of Data**: National | **Time span of Data Source**: |
| **First Developed**: | **Update Frequency**: |
| **Number of Records** | **File Size**: 2031 KB |
| **File Format**: PDF files | **Media**: Internet |
| **Significant Features and/or Limitations**: Reliability may be diminished for comparisons with pre-1980 data, which were collected via different methods and special national studies. For instance, pre-1980 mileage data included some nonpublic roadways (95,000 miles in 1979) while post-1980 data reports only "public road" mileage (roads or streets governed and maintained by a public authority and open to public travel). | **Corresponding Printed Source**: *The National Transportation Statistics 1999 (NTS)* tables are available in two formats. (HTML or Excel) You may also download all of the tables in a chapter as a single Acrobat PDF file. |

| | |
|---|---|
| | |
| **Sponsoring Organization**: Department of Transportation | **Performing Organization**: DOT BTS |
| **Availability**: | |
| **Contact for Additional Information**: http://www.bts.gov/ntda/nts/NTS99/ch1index.html | **Contact for Additional Information**: |

**Notes:**

*National Transportation Statistics* presents statistics on the U.S. transportation system, including its physical components, safety record, economic performance, the human and natural environment, and national security. This is a large online document comprising more than 260 data tables plus data source and accuracy statements, glossary and a list of acronyms and initialisms.

The different files can be accessed at:
http://www.bts.gov/publications/national_transportation_statistics/

## Nationwide Truck Activity Survey (NTACS)

| **MODE**: Highway | **GEOGRAPHY**: National, state | **USEFULNESS**: Marginal | USE WITH MANUAL: Base year statistics |
|---|---|---|---|

**SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES

**TITLE**: Nationwide Truck Activity Survey (NTACS)

**Abstract**: The NTACS is a follow-on to the 1987 Truck Inventory and Use Survey (TIUS) designed to collect detailed information on travel characteristics of commercial motor vehicles. The survey provides detailed annual and daily activity for a probability sample of trucks responding to the TIUS. The data were collected for days selected at random over a 12-month period ending in October 1990. Among the truck, shipment, and location characteristics, the NTACS identifies shipments carried by the truck that were picked up or delivered to another mode. In addition, the survey provides information on temporal, geographic and other characteristics of truck use that are not collected in the TIUS.

**Source of Data**: Survey of a sample of all trucks reported carrying commodities over long distances in the 1987 TIUS, approximately half of the trucks that were reported as carrying commodities locally in the 1987 TIUS and a small portion of the remaining, 1987 TIUS respondents.

**Attributes**:

| | |
|---|---|
| **Geographic Coverage of Data**: National, Regional | **Time span of Data Source**: 1989-1990 |
| **First Developed**: 1990 | **Update Frequency**: TBD |
| **Last update**: 1990 | **Number of Records**: 22,044 |
| **File Size**: 180 tracks, ASCII, 510 Tracks SAS | **File Format**: ASCII, SAS |
| **Media**: 9-track Tape, 6250 bpi; Hardcopy; CD-ROM | Significant Features and/or Limitations: Data limited to trucks 4-years old and older. NTACS suffered from a low response rate and data inconsistency problems. Where possible, the collected data were adjusted to compensate for and to decrease the extent of these problems. |
| Corresponding Printed Source: 1990 Nationwide Truck Activity and Commodity Survey, Selected Tabulations | **Sponsoring Organization**: Department of Transportation, Federal Highway Administration, Federal Railroad Administration, Office of the Secretary of Transportation |
| Performing Organization: Department of Commerce, Bureau of | **Availability**: Tape, Printed Source: Oak Ridge National Laboratory, P.O. Box 2008, |

| | |
|---|---|
| Census, Oak Ridge National Laboratory | Bldg. 5500A, MS6366, Oak Ridge, TN 37831-6366; telephone, (615)574-5957; fax, (615)574-3851<br>CD-ROM: Transportation Data Sampler - DOT/Bureau of Transportation Statistics, 400 7th Street, SW, Room 2104, Washington, DC 20590; telephone, (202)366-3282; fax, (202)366-3640 |
| **Contact for Additional Information**:<br>Stacy Davis, Data Manager<br>Oak Ridge National Laboratory<br>(615)574-5957 | **Contact for Additional Information**:<br>Jim March, Data Manager<br>DOT/FHWA, HPP-12<br>(202)366-9237 |

**Notes:**

There has been no update to this document. A summary report can be accessed at:
http://www.osti.gov/bridge/servlets/purl/10165452-0oJbvf/10165452.pdf

## Occupational Compensation Surveys Publication

| **MODE**: Demographics, Flows, etc. | **GEOGRAPHY**: National, state, metropolitan | **USEFULNESS**: Marginal | USE WITH MANUAL: Growth factor |
|---|---|---|---|

**SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES

**TITLE**: Occupational Compensation Surveys Publication

**Abstract**: This publication presents occupational earnings estimates by metropolitan area for selected occupations. Among the occupations studied are four levels of local truck drivers, forklift operators, material handling laborers and warehouse specialists. Surveys combine data for most industries, but data are published separately for the transportation, communication, electric, gas and sanitary services industry division. Several occupational compensation surveys conducted biennially for the Employment Standards Administration of the Department of Labor relate to specific transportation industries: Alaskan Air Transportation, Deep Sea Freighters, and Deep Sea Tankers.

**Source of Data**: Large sample survey of business establishments representing all MSAs in the U.S. are conducted via personal interviews every three or four years, with data for interviewing years collected by combination of mail, telephone and personal, visits.

**Attributes**:

| **Geographic Coverage of Data**: National | **Time span of Data Source**: Annual |
|---|---|
| **Update Frequency**: Annual, Biennial | **Sponsoring Organization**: Department of Labor, Bureau of Labor Statistics, Division of Occupational Pay and Benefit Levels |

**Availability**: DOL/Inquiries and Correspondence Branch, Office of Publications, Bureau of Labor Statistics, Washington, DC 20212; telephone, (202)606-5902

**Contact for Additional Information**:
Staff, Data Analysis
DOL/BLS, Division of Occupational Pay and Benefit Levels, OCSP Information (202) 606-6219
Fax (202) 606-7856

**Notes:**

Description update:

The **National Compensation Survey (NCS)** provides comprehensive measures of occupational wages; employment cost trends, and benefit incidence and detailed plan provisions. Detailed occupational earnings are available for metropolitan and non-metropolitan areas, broad geographic regions, and on a national basis. The index component of the NCS (ECI) measures changes in labor costs. Average hourly employer cost for employee compensation is presented in the ECEC.

The updated datasets can be accessed at:
http://www.bls.gov/NCS/#data

## Occupational Employment Statistics Publication

| **MODE**: Demographics, Flows, etc. | **GEOGRAP HY**: National, state | **USEFULNESS**: Marginal | USE WITH MANUAL: Base year statistics |
|---|---|---|---|
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: Occupational Employment Statistics Publication | | | |
| **Abstract**: This publication provides employment statistics by detailed occupation within detailed industries. Statistics on the occupational profile of transportation employment are provided at the 2 and 3-digit SIC level of detail on a three year cycle. | | | |
| **Source of Data**: Annual sample of 250,000 employer units conducted by State employment security agencies in cooperation with the Bureau of Labor Statistics. Sample is conducted using mail surveys, telephone follow-up, and personal interviews. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: National | | **Time span of Data Source**: Current Year | |
| **Update Frequency**: Annual | | **Sponsoring Organization**: Department of Labor, Bureau of Labor Statistics, Office of Employment and Unemployment Statistics | |
| **Availability**: DOL/Inquiries and Correspondence Branch, Office of Publications, Bureau of Labor Statistics, Washington, DC 20212; telephone, (202) 606-5902 | | | |
| **Contact for Additional Information**: Mike McElray Data Manager DOL/BLS/Occupational Employment Statistics (202) 606-6516 Fax (202) 606-6645 | | | |

**Notes:**

The Occupational Employment Statistics (OES) program produces employment and wage estimates for over 800 occupations. These are estimates of the number of people employed in certain occupations, and estimates of the wages paid to them. Self-employed persons are not included in the estimates. These estimates are available for the nation as a whole, for individual States, and for metropolitan and nonmetropolitan areas; national occupational estimates for specific industries are also available.

Information and publications can be accessed at:

http://www.bls.gov/OES/

## Occupational Employment Statistics

| **MODE**: | **GEOGRAPHY**: | **USEFULNESS**: | USE WITH MANUAL: |
|---|---|---|---|
| Demographics, Flows, etc. | National, state, detailed Sub-areas, other | Marginal | Base year statistics |

**SOURCE**: FOR-HIRE TRUCKING INDUSTRY SIZE STUDY

**TITLE**: Occupational Employment Statistics

**CONTENT**: The Occupational Employment Statistics (OES) covers wage and salary employment by occupation for establishments in nonagricultural industries. The OES is an annual survey that provides employment by detailed occupation within detailed private industries, plus state and local governments.

**METHODOLOGY**: According to the BLS, the OES is a federal-state cooperative program. State employment agencies mail a BLS survey to a sample of about 250,000 employer units, the collect and compile the data. Employment estimates are based upon survey results adjusted to reflect total industry employment.

Statistics are derived for employment by occupation and industry for about 750 occupations (which include trucking activity occupations such as truck drivers, dispatchers and truck mechanics) and 400 industries. The states also conduct the SIC coding of establishments, with the occupational data shown separately.

**Notes:**

The most recent data can be accessed at:
http://www.bls.gov/OES/#data

## Occupational Outlook Handbook

| **MODE**: Demographics, Flows, etc. | **GEOGRAPHY**: National, state | **USEFULNESS**: Marginal | USE WITH MANUAL: Growth factor, base year statistics, forecast statistics |
|---|---|---|---|
| **SOURCE**: FOR-HIRE TRUCKING INDUSTRY SIZE STUDY | | | |
| **TITLE**: Occupational Outlook Handbook | | | |
| **CONTENT**: Current and projected occupational employment data include employees in private and government sectors, and estimates for self-employed persons (for total employment only and not at the industry level). | | | |
| METHODOLOGY: According to the BLS, the employment estimates are derived from the BLS industry-employment matrix, which includes data for more than 500 detailed occupations and 250 detailed industries. The main sources of data used in the matrix are Current Employment Statistics (CES) estimates for total wage and salary jobs by industry, and Occupational Employment Statistics (OES) data for employment by occupation within detailed industries. | | | |

**Notes:**

The most recent data refers to: The Occupation Outlook Handbook (OOH), 2008-09 Edition

For hundreds of different types of jobs—such as teacher, lawyer, and nurse—the *Occupational Outlook Handbook* tells you:

- the training and education needed
- earnings
- expected job prospects
- what workers do on the job
- working conditions

Information can be accessed at:

http://www.bls.gov/OCO/

## Payroll Reports

| **MODE**: Demographics, Flows, etc. | **GEOGRAPHY**: National, state, county | **USEFULNESS**: Marginal | USE WITH MANUAL: Base year statistics, establish sampling base for survey |
|---|---|---|---|
| **SOURCE**: FOR-HIRE TRUCKING INDUSTRY SIZE STUDY | | | |
| **TITLE**: Payroll Reports | | | |
| **CONTENT**: Payroll information reported to the states each month depicting employment, hours worked, establishment name, address, and type of business. | | | |
| **TYPOLOGY MAPPING**: The payroll data are very detailed and provide state-and-county-level coverage of payroll data for all business establishments, but only within the SIC structure. As such, only for-hire carriers (SIC 4213) will be reflected as trucking operations in the data. Payroll data for private fleet operations will be represented in the particular company's SIC category. | | | |
| AVAILABILITY: Data are available to government agencies only. | | | |

**Notes:**

No information available.

## Regional Economic Information System (REIS)

| | | | |
|---|---|---|---|
| **MODE**: Demographics, Flows, etc., Multi-mode | **GEOGRAPHY**: National, state, metropolitan, county | **USEFULNESS**: Very useful | USE WITH MANUAL: Growth factor, base year statistics, forecast statistics |
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: Regional Economic Information System (REIS) | | | |
| **Abstract**: The REIS contains estimates of annual personal income by major source, per capita personal income, earnings by two-digit SIC industry, full- and part-time employment by one-digit SIC industry, regional economic profiles, transfer payments by major program, and farm income and expenses for states, metropolitan areas and counties. In addition, other information includes BEA estimates of quarterly personal income by state (1969-1992); Census Bureau data on intercounty flows for 1960, 1970 and 1980; BEA's latest gross state product estimates for 1977-1989; its projections to 2040 of income and employment for states and metropolitan areas; and total commuter's income flows, 1969-1991. | | | |
| **Source of Data**: Department of Commerce/Bureau of Economic Analysis. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: National | | **Time span of Data Source**: 1969-1991 | |
| **First Developed**: 1991 | | **Update Frequency**: Annual | |
| **Number of Records**: Not Available | | **File Size**: 450MB | |
| **File Format**: ASCII | | **Media**: CD-ROM | |
| **Sponsoring Organization**: Department of Commerce, Bureau of Economic Analysis, Regional Economic Measurement System | | **Availability**: DOC/Bureau of Economic Analysis, Regional Economic Measurement Division, BE-55, Washington, DC 20230; telephone, (202) 523-5360. Price, $35. | |
| **Contact for Additional Information**: REIS Staff, DOC/Bureau of Economic Analysis (202) 606-5360 | | | |

**Notes:**

Dataset description found at:

http://www.ciesin.org/datasets/reis/reis-home.html

No online datasets available.

For more information contact:

Name: CIESIN user services

Email: ciesin.info@ciesin.org

## Truck Inventory and Use Survey

| | | | |
|---|---|---|---|
| **MODE**: Highway | **GEOGRAPHY**: National, state | **USEFULNESS**: Marginal | USE WITH MANUAL: Base year statistics, growth factor |
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: Truck Inventory and Use Survey | | | |
| **Abstract**: This data base provides detailed information collected from a 152,000 truck sample producing state universe estimates for the United States, including a national summary of the nation's truck population. Data include year of truck model, average weight, state of registration, major use, principal products carried, annual and lifetime miles, vehicle body type and size, axle arrangement, maintenance, area of operation, size class, leasing arrangements, miles per gallon, and hazardous materials carried. | | | |
| **Source of Data**: Owners of private and commercial trucks registered in each state complete a mail survey. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: National | | **Time span of Data Source**: 1987 (Results of the state reports from the 1992 TIUS are expected to be released in Fall 1993 through Summer 1994. The U.S. summary report and microdata tape are expected to be released in Fall 1994. | |
| **First Developed**: 1990 | | **Update Frequency**: Every Five Years | |
| **Last update**: 1985 | | **Number of Records**: 104,600 Logical Records; 424 Character Logical Record Length | |
| **File Size**: ~44MB | | **File Format**: Not Available | |
| **Media**: Microdata File, Hardcopy | | **Sponsoring Organization**: Department of Commerce, Bureau of the Census | |
| **Significant Features and/or Limitations**: Only source of comprehensive data collected for trucks that are classified by their physical and operational characteristics and that also provide microdata analysis from a public-use tape to data users of the transportation community. The records on, the microdata tape are modified to avoid disclosure of a sampled vehicle or operating company. | | **Availability**: Data File - DOC/Bureau of the Census, Customer Services, Washington, DC 20233; telephone, (301) 763-4100. Printed Source - Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402; telephone (202) 783-3238., Price, $1.50/Individual State Report; $9.50/U.S. Summary Report; $175/Microdata File. Data available for 1963, 1967, 1972, 1977, 1982, and 1987 surveys. | |
| **Contact for Additional Information**: Bill Bostic, Project Manager | | | |

| | | | |
|---|---|---|---|
| DOC/Bureau | of | the | Census |
| (301) 763-2735 | | | |

**Notes:**

After 1997, this survey was replaced by the Vehicle Inventory and Use Survey (VIUS).

The latest information as of 2002, when it was discontinued can be accessed at:
http://www.census.gov/svsd/www/vius/2002.html

## Truck Weight Study Data Database

| MODE: Highway | **GEOGRAPHY**: National, state | **USEFULNESS**: Useful | USE WITH MANUAL: Growth factor |
|---|---|---|---|
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: Truck Weight Study Data Database | | | |
| **Abstract**: This data base contains weigh-in-motion data from the states submitted in accordance with the Traffic Monitoring Guide. Summary files are produced for generating weight reports. | | | |
| **Source of Data**: State Departments of Transportation submit data to FHWA in accordance with the Traffic Monitoring Guide. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: National | | **Time span of Data Source**: 1986-present | |
| **First Developed**: 1989 (supersedes data base dating to 1930) | | **Update Frequency**: Annual | |
| **Last update**: 1993 | | **Number of Records**: 40,000,000 | |
| **File Size**: 3GB | | **File Format**: ASCII | |
| **Media**: Read/Write Optical Disk | | **Significant Features and/or Limitations**: Amount of data varies tremendously by state because some states submit data from continuously operating weigh-in-motion sites whereas others submit the minimum 48 hours of data from each weigh-in-motion site. Some states have not submitted weigh-in-, motion data because of various problems with the equipment, etc. | |
| **Sponsoring Organization**: Department of Transportation, Federal Highway Administration, Office of Highway Information Management | | **Availability**: DOT/FHWA, Office of Highway Information Management, HPM-30, 400 7th Street, SW, Washington, DC 20590; telephone, (202) 366-0175. No cost to customer if magnetic or optical disks are supplied. | |
| **Contact for Additional Information**: Ralph Gillmann, Data Managers DOT/FHWA, HPM-30 (202)366-0175 | | **Contact for Additional Information**: Perry Kent, Data Manager DOT/FHWA, HPM-30 (202)366-0175 | |

**Notes:**

No updated information could be found.

## Vehicle Classification and Vehicle Miles Travelled (VCVMT) Database

| **MODE**: | **GEOGRAPHY**: | **USEFULNESS**: | USE WITH |
|---|---|---|---|
| Highway | National, state | Marginal | MANUAL: VMT related |

**SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES

**TITLE**: Vehicle Classification and Vehicle Miles Travelled (VCVMT) Database

**Abstract**: This data base is a compilation of vehicle classification type by highway functional classification by state. Depicts the vehicle type in each functional classification as a percentage of annual vehicle miles travelled (AVMT). One table is developed each year that contains data for all the states.

**Source of Data**: Data collected by each state.

**Attributes**:

| | |
|---|---|
| **Geographic Coverage of Data**: National | **Time span of Data Source**: 1985-present |
| **First Developed**: 1985 | **Update Frequency**: Annual |
| **Last update**: 1991 | **Number of Records**: 612 |
| **File Size**: 471KB | **File Format**: LOTUS |
| **Media**: Disk, Hardcopy | Corresponding Printed Source: Highway Statistics |
| **Sponsoring Organization**: Department of Transportation, Federal Highway Administration, Office of Highway Information Management | **Availability**: DOT/FHWA, Office of Highway Information Management, HPM-30, 400 7th Street, SW, Washington, DC 20590; telephone, (202)366-5052. |

**Contact for Additional Information**:
William Grush
Data Manager
DOT/FHWA, HPM-30
(202)366-5052

**Notes:**

No updated information could be found.

## *C.1. SUBPART a: AIR*

### Airport Activity Statistics of Certificated Route Air Carriers Publication

| **MODE**: Air | **GEOGRAPHY**: Facility- airport, marine port, etc. | **USEFULNESS**: Useful | USE WITH MANUAL: Growth factor/Base year statistics/Forecast statistics |
|---|---|---|---|

**SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES

**TITLE**: Airport Activity Statistics of Certificated Route Air Carriers Publication

**Abstract**: This report presents detailed data on the volume of revenue passengers, freight express, and mail traffic carried by U.S. certificated route air carriers for each airport and individual airline; and total departures by airport, airline, and aircraft model operated. Scheduled/nonscheduled service shown by airport and carrier are included.

**Source of Data**: Data are derived from RSPA Form Schedules T-100 and T-3.

**Attributes**:

| | |
|---|---|
| **Geographic Coverage of Data**: National | **Time span of Data Source**: 1993 |
| **First Developed**: 1962 | **Update Frequency**: Annual |
| **Last update**: 06/93 | **Sponsoring Organization**: Department of Transportation, Federal Aviation Administration, Statistics and Forecast Branch and Research and Special Programs Administration, Office of Airline Statistics |

**Availability**: Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402; telephone (202)512-1800 or National Technical Information Service, Springfield, VA 22161; telephone, (703)487-4650

| **Contact for Additional Information**: | **Contact for Additional Information**: |
|---|---|
| Patricia Beardsley, Data Manager<br>DOT/FAA, APO-110<br>(202)267-8032<br>fax (202)267-9636 | Paul Gravel, Data Manager<br>DOT/RSPA/DAI-1<br>(202)366-9059<br>fax (202)366-3383 |

**Notes:**

Updated publication for 12 months ending December 31,1994 is provided by the U.S. Department of Transportation through the Federal Aviation Administration Washington DC.

Reports can be accessed at:

http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA310183&Location=U2&doc=GetTRDoc.pdf

## Aviation Data and Analysis System (ADAS)

| | | | |
|---|---|---|---|
| **MODE**: Air | **GEOGRAPHY**: Facility- airport, marine port, etc. | **USEFULNESS**: Specialized | USE WITH MANUAL: Growth factor |
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: Aviation Data and Analysis System (ADAS) | | | |
| **Abstract**: This system provides access to official agency activity forecasts and approved benefit/cost methodologies for any airport or group of airports reported by the system. ADA also provides all the tools necessary to study the effects on the benefit/cost ratio of changes in costs, aviation activities, or airport specifics such as runway utilization, existing minima, or weather data. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: National | | **Time span of Data Source**: 1993 | |
| **First Developed**: 1993 | | **Update Frequency**: Not Available | |
| **Last update**: Unknown | | **Number of Records**: ~4,000 | |
| **File Size**: Not Available | | **File Format**: Not Available | |
| **Media**: Not Available | | **Significant Features and/or Limitations**: Descriptive historical and forecasted data are stored for approximately 4,000 airports nationwide. | |
| **Sponsoring Organization**: Department of Transportation, Federal Aviation Administration, Information Systems Branch | | **Availability**: DOT/FAA, Information Systems Branch, APO-130, 800 Independence Ave., SW, Washington, DC 20591; telephone, (202) 267-3550; fax (202)267-5800. | |
| **Contact for Additional Information**: Staff, DOT/FAA, APO-130 (202)267-3550 | | | |

**Notes:**

No updated information could be found.

## FAA Statistical Handbook of Aviation Publication

| | | | |
|---|---|---|---|
| **MODE**: Air | **GEOGRAPHY**: National | **USEFULNESS**: Specialized | USE WITH MANUAL: |
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: FAA Statistical Handbook of Aviation Publication | | | |
| **Abstract**: This report covers statistical data from the Federal Aviation Administration, National Airspace System, airports, airport activity, U.S. air carrier fleet, U.S. civil air carrier operating data, airmen, general aviation aircraft, aircraft accidents, aeronautical production, and imports/exports. | | | |
| **Source of Data**: Federal Aviation Administration. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: National | | **Time span of Data Source**: 1991 | |
| **First Developed**: 1945 | | **Update Frequency**: Annual | |
| **Sponsoring Organization**: Department of Transportation, Federal Aviation Administration, Statistics and Forecast Branch | | **Availability**: Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402; telephone (202)512-1800 or National Technical Information Service, Springfield, VA 22161; telephone (703)487-4650 | |
| **Contact for Additional Information**: Patricia Beardsley<br>Statistician<br>DOT/FAA, APO-110<br>(202)267-8032 | | | |

**Notes:**

Different Aviation Handbooks and Manuals are provided by the Federal Aviation Administration. These documents can be accessed at:

http://www.faa.gov/library/manuals/aviation/

Data is available for:

Accidents & Incidents Reports

Aviation Data & Statistics

Commercial Space Data

Forecasts

Passengers & Cargo

Safety

Funding & Grant Data

Data can be accessed at: http://www.faa.gov/data_research/

## Terminal Area Forecast

| | | | |
|---|---|---|---|
| **MODE**: Air | **GEOGRAPHY**: Facility- airport, marine port, etc. | **USEFULNESS**: Marginal | USE WITH MANUAL: Growth factor |
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: Terminal Area Forecast | | | |
| **Abstract**: Twelve-year forecast of aviation activity at selected airports in the U.S., encompassing at least those airports with towers and/or receiving commercial service. For each airport, detailed forecasts are made for the four major user groups of the air traffic control system: air carrier, air taxi/commuter, general aviation, and military. Summary tables contain national, FAA regional, and state aviation data and other airport specific highlights. Forecasts are prepared to meet the budget and planning needs of the FAA and to provide airport specific information that can be used by state and local aviation authorities, by the aviation industry, and by the general public. | | | |
| **Source of Data**: FAA-developed. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: National | | **Time span of Data Source**: Twelve Years | |
| **First Developed**: 1993 | | **Update Frequency**: Annual | |
| **Last update**: 1992 | | **Number of Records**: Not Available | |
| **File Size**: Not Available | | **File Format**: Not Available | |
| **Media**: Hardcopy | | **Corresponding Printed Source**: Terminal Area Forecast | |
| **Sponsoring Organization**: Department of Transportation, Federal Aviation Administration, Statistics and Forecast Branch | | **Availability**: Printed Source: Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402; telephone (202)512-1800 or National Technical Information Service, Springfield, VA 22161; telephone (703)487-4650 | |
| **Contact for Additional Information**: Staff, DOT/FAA, APO-110 (202)267-3355 | | | |

**Notes:**

Information and the latest data can be accessed at:

http://aspm.faa.gov/main/taf.asp

## *C.2. SUBPART b: PIPELINE*

### Capacity and Service on the Interstate Natural Gas Pipeline System Publication

| | | | |
|---|---|---|---|
| **MODE**: Pipeline | **GEOGRAPHY**: National, other | **USEFULNESS**: Specialized | USE WITH MANUAL: |
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: Capacity and Service on the Interstate Natural Gas Pipeline System Publication | | | |
| **Abstract**: This report identifies and quantifies the capability of the national natural gas pipeline infrastructure to transport natural gas to the natural gas markets of the country. The report examines the capabilities of the pipelines that make up this network to move gas across regional and state borders and compares these to 1990 levels of natural gas flow to and within regional markets. In addition, envisioned and currently approved plans to construct major new pipelines and expand existing systems are presented and assessed relative to the needs of the current and near-term marketplace. | | | |
| **Source of Data**: A variety of government (federal, state, and regional) publications and industry documents, data bases, interviews, and industry analytical reports. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: National | | **Time span of Data Source**: 1990 | |
| **First Developed**: 1990 | | **Update Frequency**: One-Time Special Report | |
| **Last update**: 06/92 | | **Sponsoring Organization**: Department of Energy, Energy Information Administration, National Energy Information Center | |
| **Availability**: National Technical Information Service, Springfield, VA 22161; telephone (703)487-4650 | | | |
| **Contact for Additional Information**: Staff, DOE/EIA/National Energy Information Center (202)586-8800 Fax (202)586-0727 | | | |

**Notes:**

U.S. Data about Natural Gas related topics is provided by the Energy Information Administration, an official Energy Statistics from the U.S. Government can be accessed at:

http://www.eia.doe.gov/oil_gas/natural_gas/info_glance/natural_gas.html

## Statistics of Interstate Natural Gas Pipeline Companies

| | | | |
|---|---|---|---|
| **MODE**: Pipeline | **GEOGRAPHY**: National, other | **USEFULNESS**: Specialized | USE WITH MANUAL: |
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: Statistics of Interstate Natural Gas Pipeline Companies | | | |
| **Abstract**: This data base contains financial and operational data on major interstate natural gas pipeline companies as defined by the Federal Energy Regulatory Commission (FERC). | | | |
| **Source of Data**: Data are collected on FERC Form 2, Annual Report of Major Natural Gas Companies, from interstate natural gas companies subject to the accounting and reporting requirements of the FERC. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: National | | **Time span of Data Source**: Current year | |
| **First Developed**: 1976 | | **Update Frequency**: Annual | |
| **Last update**: 04/92 | | **Number of Records**: 240/year | |
| **File Size**: 2.5-3.0MB | | **File Format**: EBCDIC | |
| **Media**: 9-Track Tape, 1600/6250 bpi; Hardcopy | | Significant Features and/or Limitations: Data are company specific to the reporting company. | |
| Corresponding Printed Source: Statistics of Interstate Natural Gas Pipeline Companies 1990 | | **Sponsoring Organization**: Department of Energy, Energy Information Administration | |
| **Availability**: National Technical Information Service, Springfield, VA 22161; telephone (703)487-4650. Requests for tape conversion to disk can be made through NTIS. | | | |
| **Contact for Additional Information**: Juanita Mack Data Manager EIA/National Energy Information Center (202)586-6169 | | | |

**Notes:**

Statistical Information about Natural Gas Pipeline Companies is also provided by the Bureau of Transportation Statistics. Data can be accessed at:

http://www.bts.gov/publications/national_transportation_statistics/html/table_natural_gas_pipeline_profile.html

## *C.3. SUBPART c: RAIL*

### Carload Waybill Sample

| | | | |
|---|---|---|---|
| **MODE**: Rail | **GEOGRAPHY**: National, state, other | **USEFULNESS**: Specialized | USE WITH MANUAL: |
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: Carload Waybill Sample | | | |
| **Abstract**: This data base contains rail shipment data such as origin and destination points, type of commodity, number of cars, tons, revenue, length of haul, participating railroads, and interchange locations. The waybill sample contains confidential information and is used primarily by Federal and state agencies. The public-use version of the sample, however, contains aggregated nonconfidential data. Movements are aggregated to the BEA-to-BEA level at the 5-digit STCC level. For a particular commodity, the origin or destination BEA is not included unless there are at least three freight stations in the BEA and there are at least two more freight stations than railroads in the BEA. | | | |
| **Source of Data**: Annual stratified sample of waybills for railroads which terminate over 4,500 cars per year. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: National | | **Time span of Data Source**: 1991 | |
| **First Developed**: Unknown | | **Update Frequency**: Annual | |
| **Last update**: 1993 | | **Number of Records**: >350,000 | |
| **File Size**: Not Available | | **File Format**: ASCII | |
| **Media**: 9-track Tape, 6250 bpi, CD-ROM | | **Significant Features and/or Limitations**: The waybill sample contains confidential information and is used primarily by Federal and state agencies. There is, however, a public-use version that contains aggregate nonconfidential data. | |
| Corresponding Printed Source: Carload Waybill Statistics: Territorial Distribution, Traffic and Revenue by Commodity Class | | **Sponsoring Organization**: Interstate Commerce Commission | |
| Performing Organization: Department of Transportation, Federal Railroad | | **Availability**: CD-ROM: DOT/Bureau of Transportation Statistics, 400 7th | |

| | |
|---|---|
| Administration, Office of Policy Systems | Street, SW, Room 2104, Washington, DC 20590; telephone, (202) 366-3282; fax, (202) 366-3640. Tape: Mr. James Nash, ICC, Office of Economics, 12th and Constitution, Washington, DC 20423; telephone, (202) 927-5740; fax, (202) 927-6225. Printed Source: National Technical Information System, Springfield, VA 22161; telephone, (703) 487-4650 |

| | | | |
|---|---|---|---|
| **Contact** | **for** | **Additional** | **Information**: |
| James | Nash, | Data | Manager |
| ICC, | Office | of | Economics |
| (202) 927-5740 | | | |

**Notes:**

The Carload Waybill Sample is a stratified sample of carload waybills for all U.S. rail traffic submitted by those rail carriers terminating 4,500 or more revenue carloads annually

The most recent data for 2007 is provided by the Surface Transportation Board, can be accessed at:

http://www.stb.dot.gov/stb/industry/econ_waybill.html

What are the requirements for obtaining access to the confidential Carload Waybill Sample?

The requestor must submit a written request explaining the need for the data and how it will be used . Requests from “other users” are posted in the Federal Register for 14 days pending objections from shippers or railroads. If, there are no objections, the requestor then signs a confidentiality agreement valid for the period of one year. Thirty days prior to the expiration date of the agreement, the requestor must submit a written request for an annual extension of the agreement or all waybill data must be either re turned to the STB, or certified as destroyed and the requestor must not keep any copies

## FRA National Planning Network

| | | | |
|---|---|---|---|
| **MODE**: Rail | **GEOGRAPHY**: National, state, metropolitan, other | **USEFULNESS**: Specialized | USE WITH MANUAL: |
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: FRA National Planning Network | | | |
| **Abstract**: This database presents a digital representation of the major continental U.S. railway systems, covering some 186,000 miles of track. Link attributes include owning railroads, trackage rights railroads, state, previous owning railroads, subsidiary railroads, FAA region, passenger service, U.S. Geological Survey (USGS) region, and significance in civil rail lines important to national defense. All links in original USGS data are retained. Links subsequently abandoned are so identified. Node attributes include name, state (where there is a name), standard point location code, and junction code, if any. | | | |
| **Source of Data**: USGS 1:2,000,000 digital line graph. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: National | | **Time span of Data Source**: Current | |
| **First Developed**: 1990 | | **Update Frequency**: As Required | |
| **Number of Records**: 11,010/Nodes; 15,800/Links | | **File Size**: 13MB | |
| **File Format**: ASCII | | **Media**: Disk | |
| Significant Features and/or Limitations: Locational accuracy of the network is approximately +/- 1,200 meters for those links carrying shape point data. | | **Sponsoring Organization**: Department of Transportation, Federal Railroad Administration, Office of Policy Systems | |
| **Availability**: DOT/FRA, Office of Policy Systems, RRP-20, 400 7th Street, SW, Washington, DC 20590: telephone (202)366-2920; Fax (202)366-7688. | | | |
| **Contact for Additional Information**: Raphael Kedar<br>Director, DOT/FRA, RRP-20<br>(202)366-2920 | | | |

**Notes:**

No updated information could be found.

## Grade Crossing Inventory System (GCIS)

| | | | |
|---|---|---|---|
| **MODE**: Rail, highway | **GEOGRAPHY**: National, state, other | **USEFULNESS**: Specialized, useful | USE WITH MANUAL: Network related |

**SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES

**TITLE**: Grade Crossing Inventory System (GCIS)

**Abstract**: This system contains a record of every public and private crossing in the U.S. along with the accident history of each crossing. Information includes the identification number, railroad, railroad division, subdivision, milepost and branch, state, county, city or nearest city, street or highway, and crossing type. In addition, public grade crossing information such as number of daily train movements, train speeds, type and number of tracks, details of crossing protection both active and passive, crossing angle, number of traffic lanes, daily highway traffic volume, pavement markings, advance warning signs, crossing surface, highway system, and percentage of trucks is available.

**Source of Data**: Information is supplied by the railroads and states on an optional basis.

**Attributes**:

| | |
|---|---|
| **Geographic Coverage of Data**: National | **Time span of Data Source**: Current Year |
| **First Developed**: 1973 | **Update Frequency**: Continual |
| **Number of Records**: ~600,000 | **File Size**: ~200MB |
| **File Format**: Sequential | **Media**: 9-track Tape, Disk, Hardcopy |
| Corresponding Printed Source: Railroad-Highway Crossing Accidents | **Sponsoring Organization**: Department of Transportation, Federal Railroad Administration, Data Analysis Branch |

**Availability**: DOT/FRA, Data Analysis Branch, RRS-22.1, 400 7th Street, SW, Washington, DC 20590; telephone, (202)366-2760. Price, $35/tape, non-government agencies. No charge to government agencies, railroad, or railroad labor requestors.

**Contact for Additional Information**:
Robert Finkelstein, Chief
DOT/FRA, RRS-22
(202)366-2760
Fax (202)366-7592

**Notes:**

The last update was in 03/31/09. Access to the Latest Highway-Rail Crossing Inventory Data can be accessed at:

http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/Downloaddbf.aspx

This source can also provide data for:

Public crossings

Private crossing

Crossing History

**SUBPART**

**d: WATER**

## American Intermodal Equipment Inventory

| **MODE**: | **GEOGRAPHY**: | **USEFULNESS**: | USE WITH |
|---|---|---|---|
| Waterway | National | Specialized | MANUAL: |

**SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES

**TITLE**: American Intermodal Equipment Inventory

**Abstract**: This system records all intermodal equipment of U.S.-flag intermodal marine carriers and major container leasing companies operating in the U.S. It includes for each company the type and number, dimensions of containers and trailers. Chassis are shown by types, number of units and containers carried. The size and number of slots available on container vessels and barges is recorded. Forty foot equivalent units of trailers along with automobile capacity are also included for Ro/Ro ships and barges.

**Source of Data**: Survey of U.S.-flag carriers and major leasing companies operating in the U.S.

**Attributes**:

| | |
|---|---|
| **Geographic Coverage of Data**: National | **Time span of Data Source**: 1991-present |
| **First Developed**: 1991 | **Update Frequency**: Annual |
| **Number of Records**: 1,000 | **File Size**: 250K |
| **File Format**: ASCII, dBASE | **Media**: Disk |
| Significant Features and/or Limitations: Only source of aggregated data on American-owned containers, chassis, trailers and vessels, that are essential for planning most efficient use of U.S. intermodal equipment. | **Corresponding Printed Source**: Inventory of American Intermodal Equipment |
| **Sponsoring Organization**: Department of Transportation, Maritime Administration, Office of Port and Intermodal Development | **Availability**: DOT/MARAD, Office of Port and Intermodal Development, MAR-831, 400 7th Street, SW, Washington, DC 20590; telephone, (202)366-4357. Data available in second half of year following close of period. |

**Contact for Additional Information**:
Doris Bautch
Data Manger
DOT/MARAD, MAR-831
(202)366-4357

**Notes:**

No updated information could be found.

## Analysis of Ports for National Defense

| | | | |
|---|---|---|---|
| **MODE**: Waterway | **GEOGRAPHY**: National, facility-airport, marine port, etc. | **USEFULNESS**: Specialized | USE WITH MANUAL: |
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: Analysis of Ports for National Defense | | | |
| **Abstract**: This system includes data on specific evaluations of the commercial ports capabilities to support early deployment of DoD military units during a contingency. Port areas analyzed include Baltimore, Boston, Charleston, Hampton Roads, Jacksonville, Morehead City, Narraganset Bay, New York and New Jersey, Philadelphia, Savannah, Wilmington (NC), Beaumont, Houston, New Orleans, Gulfport, Port Arthur, Pascagoula, Lake Charles, Port Hueneme, Los Angeles, Long Beach, and San Diego. Military Ocean Terminals in New Jersey and Oakland are also evaluated. Data include number and characteristics of berths, ship mixes, staging areas, inloading/outloading positions, cargo handling apparatus, rail and highway access, and general information on port facilities. Also included is a theoretical cargo throughput capability for each port. | | | |
| **Source of Data**: MTMC conducts this study through site visits and questionnaires. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: Continental United States and military ocean terminals in New Jersey and Oakland | | **Time span of Data Source**: 1977-present | |
| **Update Frequency**: Every Three Years | | **Last update**: 1994 | |
| **Sponsoring Organization**: Department of Defense, Department of Army, Military Traffic Management Command, Transportation Engineering Agency | | **Availability**: Department of Army, Military Traffic Management Command, Transportation Engineering Agency, 720 Thimble Shoals Blvd., S130, Newport News, VA 23606-2475; telephone (804)599-1186; fax (804)599-1563. | |
| **Contact for Additional Information**: Ralph Compton, Data Manager MTMCTEA (804)599-1186 | | | |

**Notes:**

Updated information provided by The Maritime Administration through the Office of Port Infrastructure Development and Congestion Mitigation can be found at:

http://www.marad.dot.gov/ports_landing_page/infra_dev_congestion_mitigation/Infra_Dev_Congest_Mitiga.htm

For data inquiries

Contacts

Robert Bouchard, Director

Office of Infrastructure Development and Congestion Mitigation

Maritime Administration

1200 New Jersey Ave., SE (MAR-510, #W21-224)

Washington, DC 20590

Tel.: (202) 366-5076 (202) 366-5076

Fax: (202) 366-6988

robert.bouchard@dot.go

## Estimated Waterborne Commerce Statistics Publication

| **MODE**: Multi-mode, waterway | **GEOGRAPHY**: National, other | **USEFULNESS**: Specialized | USE WITH MANUAL: |
|---|---|---|---|
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: Estimated Waterborne Commerce Statistics Publication | | | |
| **Abstract**: The estimated Waterborne Commerce Statistics report provides tonnage estimates of the national waterborne commerce and selected waterways by major commodity groupings for the most recent calendar year. It also shows actual annual tonnage by commodity for nine years prior to the year being estimated. | | | |
| **Source of Data**: Vessel operating companies file vessel operation reports and lock performance monitoring systems reports. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: National | | **Time span of Data Source**: 1989-1992 | |
| **First Developed**: 1989 | | **Update Frequency**: Annual | |
| **Last update**: 1992 | | **Significant Features and/or Limitations**: Timely estimates and 10-year trends. | |
| **Sponsoring Organization**: Department of Defense, Department of Army, U.S. Army Corps of Engineers, Products and Services Office | | **Availability**: U.S. Army Corps of Engineers, Products and Services Office, Waterborne Commerce Statistics Center, P.O. Box 61280, New Orleans, LA 70161-1280, telephone, (504)862-1424; fax (504)862-1423 | |
| **Contact for Additional Information**: Thomas Mire, Data Manager COE/Waterborne Commerce Statistics Center (504)862-1424 Fax (504)862-1423 | | **Contact for Additional Information**: Roy Walsh, Data Manager COE/Waterborne Commerce Statistics Center (504)862-1424 Fax (504)862-1423 | |

**Notes:**

Navigation Data Center handles special requests on a case by case basis for commerce and vessel statistics which are not contained in standard products. A charge for these will depend upon the nature and complexity.

Contact**:**

Mr. David Penick, Chief, Waterborne Commerce Statistics Center, (504) 862-1404 (504) 862-1404 ; E-mail: david.penick@usace.army.mil; or Jay Wieriman, Quality Control, Products and Services Office, Waterborne Commerce Statistics Center, (504) 862-1402.

Information about the US Army Corps of Engineers Navigation Data Center can be found at: http://www.iwr.usace.army.mil/NDC/index.htm

## Exposure Data Base (EDB)

| MODE: | GEOGRAPHY: | USEFULNESS: | USE WITH MANUAL: |
|---|---|---|---|
| Waterway | National, demographics, Flows, etc. | Specialized | |

**SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES

**TITLE**: Exposure Data Base (EDB)

**Abstract**: This system was developed to provide accurate program Measures of Effectiveness (MOE) and effective resource allocation using operational data concerning vessel inventories on specific waterways by gross tonnage and vessel type. System generates matrices of commercial vessel transits and cargo data in a port area, region or district, and nationwide in domestic and foreign trade during a time frame. These transits would become an indicator or predictor of the amount of the industry's exposure to particular hazards, being compared to the number of incidents (pollution, casualties, deaths) occurring within the same time frame.

**Source of Data**: U.S. Army Corps of Engineers, domestic traffic; Bureau of Census, foreign trade.

**Attributes**:

| | |
|---|---|
| **Geographic Coverage of Data**: National | **Time span of Data Source**: Current Year |
| **First Developed**: Unknown | **Update Frequency**: Annual |
| **Number of Records**: Not Available | **File Size**: Not Available |
| **File Format**: Write One Read Many | **Media**: 9-track Tape, CD-ROM |

**Significant Features and/or Limitations**: System will generate a measure of effectiveness that is independent of current data gathering practices in the Marine Safety program, and provides vessel and cargo activity reports unavailable from any other system. The EBD can be used in conjunction, with other data bases such as the casualty and pollution data bases. It can also be used independently to provide throughput data for risk analysis projects.

| | |
|---|---|
| **Sponsoring Organization**: Department of Transportation, United States Coast Guard, Marine Safety Evaluation Branch | **Availability**: DOT/USCG, Marine Safety Evaluation Branch, G-MMI-3, 2100 2nd Street, Washington, DC 20593; telephone (202)267-1430, fax (202)267-1416 |

**Contact for Additional Information**:
CDR Thomas Tansey, Data Manager
DOT/USCG, G-MMI-3
(202)267-1430

**Notes:**

No updated information could be found.

## Maritime Statistical Information System

| **MODE**: Waterway | **GEOGRAPHY**: National, other | **USEFULNESS**: Specialized | USE WITH MANUAL: |
|---|---|---|---|
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: Maritime Statistical Information System | | | |
| **Abstract**: This system contains detailed information on U.S. oceanborne foreign trade statistics by commodity, vessel, port, weight and value; vessel data on all merchant vessels over 1,000 gross tons and worldwide itineraries for the same vessels. | | | |
| **Source of Data**: Bureau of Census for foreign trade data; Lloyd's Maritime Information Services primarily for vessel data and exclusively for itinerary data/ | | | |
| **Geographic Coverage of Data**: National/Oceanborne Foreign; Worldwide/Merchant Fleet and Itinerary | | **Time span of Data Source**: 1989-present | |
| **First Developed**: 1991 | | **Update Frequency**: Monthly/Foreign Trade; Quarterly/Vessel and Itinerary | |
| **Last update**: 07/93 | | **Number of Records**: 6 Million/Year - Foreign Trade; 40,000 - Vessel Characteristics; 1 million/Year - Itinerary | |
| **File Size**: ~1GB/Year | | **File Format**: ASCII, dBASE | |
| **Media**: Disk | | Significant Features and/or Limitations: Foreign Trade data available at the individual vessel level, linked to vessel characteristics and movements. Data base contains proprietary and copyright information and can only be released in summary form. | |
| Corresponding Printed Source: United States Oceanborne Foreign Trade Routes, Merchant Fleets of the World, Vessel Inventory Report | | **Sponsoring Organization**: Department of Transportation, Maritime Administration, Office of Trade Analysis and Insurance | |
| **Availability**: DOT/MARAD, Office of Trade Analysis and Insurance, MAR-570, 400 7th Street, SW, Washington, DC 20590; telephone, (202)366-2277. Publications are free; price for special requests depends upon data requested. | | | |
| **Contact for Additional Information**:<br>Robert Brown, Chief DOT/MARAD, MAR-570 (202)366-2277 | | | |

**Notes:** No updated information could be found.

## Origin and Destination of Waterborne Commerce of the United States, Public Domain Data

| | | | |
|---|---|---|---|
| **MODE**: Multi-mode, waterway | **GEOGRAPHY**: National, state, other | **USEFULNESS**: Specialized | USE WITH MANUAL: |
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: Origin and Destination of Waterborne Commerce of the United States, Public Domain Data | | | |
| **Abstract**: This database contains aggregated information that depicts waterborne commodity movements between 26 geographical regions or between individual states of the U.S. This database protects the confidentiality of the data provided by the individual companies and provides the origin/destination commodity flows. | | | |
| **Source of Data**: Vessel operating companies file vessel operations reports. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: National, U.S. Territories | | **Time span of Data Source**: 1985-1992 | |
| **First Developed**: 1985 | | **Update Frequency**: Annual | |
| **Last update**: 1992 | | **Number of Records**: 400 | |
| **File Size**: 10,000 Bytes | | **File Format**: ASCII | |
| **Media**: Disk, Hardcopy | | Significant Features and/or Limitations: All companies moving commerce by water are required by law to report. | |
| **Sponsoring Organization**: Department of Defense, Department of Army, U.S. Army Corps of Engineers, Products and Services Office | | **Availability**: U.S. Army Corps of Engineers, Products and Services Office, Waterborne Commerce Statistics Center, P.O. Box 61280, New Orleans, LA 70161-1280, telephone, (504)862-1424; fax (504)862-1423. Price, $5, data file; $15, printed source. | |
| **Contact for Additional Information**: Thomas Mire, Data Manager COE/Waterborne Commerce Statistics Office (504)862-1424 | | **Contact for Additional Information**: Roy Walsh, Data Manager COE/Waterborne Commerce Statistics Office (504)862-1424 | |

**Notes:**

Statistical information about Waterborne Commerce is provided by the US Army Corps of Engineers through the Navigation Data Center.

Information available includes:

Waterborne Commerce of the U.S.

Commodity Movements from the Public Domain database

Principal U.S. Ports and all 50 States and U.S. Territories – Waterborne Tonnage.

Data can be found at:

http://www.iwr.usace.army.mil/ndc/wcsc/wcsc.htm

## Port Facilities Inventory

| | | | |
|---|---|---|---|
| **MODE**: Waterway | **GEOGRAPHY**: National, facility- airport, marine port, etc. | **USEFULNESS**: Specialized, useful | USE WITH MANUAL: |
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: Port Facilities Inventory | | | |
| **Abstract**: This system contains detailed information on more than 4,000 major ocean and river port facilities, including location, physical characteristics, cargo handling equipment and capacities. | | | |
| **Source of Data**: Data are purchased from the U.S. Army Corps of Engineers which systematically surveys all U.S. ports; additional data supplied periodically port authorities. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: Major U.S. ocean and river port facilities | | **Time span of Data Source**: 1988-1994 | |
| **First Developed**: 1976 | | **Update Frequency**: As Information is Available | |
| **Number of Records**: 4,000 | | **File Size**: 8MB | |
| **File Format**: ASCII, dBASE | | **Media**: Disk | |
| Significant Features and/or Limitations: Extensive detail on major U.S. port facilities, both ocean and river; does not include all U.S. port facilities. | | **Sponsoring Organization**: Department of Transportation, Maritime Administration, Office of Port and Intermodal Development | |
| **Availability**: DOT/MARAD, Office of Port and Intermodal Development, MAR-832, 400 7th Street, SW, Washington, DC 20590; telephone, (202)366-5477; fax (202)366-6988. | | | |
| **Contact for Additional Information**: William Dean, Data Manager<br>DOT/MARAD, MAR-832<br>(202)366-5477<br>fax (202)366-6988 | | | |

**Notes:**

Port facility Data can be accessed from the US Army Corps of Engineers Navigation Data Center at: http://www.ndc.iwr.usace.army.mil/ports/ports.htm

## Port Series, 1921-Present

| **MODE**: Waterway | **GEOGRAPHY**: National, facility-airport, marine port, etc. | **USEFULNESS**: Specialized, useful | USE WITH MANUAL: Growth factor |
|---|---|---|---|
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: Port Series, 1921-Present | | | |
| **Abstract**: The fifty-seven reports in the port series include information on commercial facilities at the principal U.S. Coastal, Great Lakes and Inland Ports. Each report consists of complete listings of a port area's waterfront facilities, including information on berthing, cranes, transit sheds, grain elevators, marine repair plants, fleeting areas, and docking and storage facilities. Aerial maps show the locations of the described facilities. | | | |
| **Source of Data**: Facility operators, port organizations, transportation companies conduct on-site investigations. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: U.S. Coastal, Inland Ports, and Waterways | | **Time span of Data Source**: Varies 1-10 Years | |
| **First Developed**: 1987/Data File; 1921/Printed Source | | **Update Frequency**: Every 8-12 Years | |
| **Number of Records**: ~10,000 | | **File Size**: 56MB | |
| **File Format**: ASCII | | **Media**: Tape, CD-ROM, Diskettes, Hardcopy | |
| **Significant Features and/or Limitations**: Contains complete physical data on each facility limited by knowledge of on-site informants. | | **Corresponding Printed Source**: Port Series 1921-Present | |
| **Sponsoring Organization**: Department of Defense, Department of Army, U.S. Army Corps of Engineers, CEWRC, Navigation Data Center | | **Availability**: U.S. Army Corps of Engineers, CEWRC, Navigation Data Center, Ports and Waterways Division, Casey Building, Ft. Belvoir, VA 22060-5586; telephone, (703)355-3315; fax (703)355-0047. Price, $6-$26 depending on size. | |
| **Contact for Additional Information**: John Vetter, Data Manager COE/CEWRC, | **Contact for Additional Information**: Bob Ray, Data Manager COE/CEWRC, Navigation Data Center | **Contact for Additional Information**: Jim Feagans, Data Manager COE/CEWRC, Navigation Data Center (703)355-3315 | **Contact for Additional Information**: Sid Formal, Data Manager COE/CEWRC, Navigation Data Center (703)355-3315 |

| | | | |
|---|---|---|---|
| Navigation Data Center (703)355-3315 | (703)355-3315 | | |

**Notes:**

Port Series publications can be accessed at:
http://www.ndc.iwr.usace.army.mil/ports/ports.htm

## Tonnage for Selected United States Ports

| | | | |
|---|---|---|---|
| **MODE**: Waterway | **GEOGRAPHY**: National, facility-airport, marine port, etc. | **USEFULNESS**: Specialized, useful | USE WITH MANUAL: Growth factor |
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: Tonnage for Selected United States Ports | | | |
| **Abstract**: This data base provides listings of tons handled at U.S. Ports for a given calendar year. The ports are sorted by total, domestic, and foreign tonnage and alphabetically. | | | |
| **Source of Data**: Vessel operating companies file vessel operation reports. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: National, U.S. Territories | | **Time span of Data Source**: 1992 | |
| **First Developed**: 1986 | | **Update Frequency**: Annual | |
| **Last update**: 1992 | | **Number of Records**: 600 | |
| **File Size**: 50,000 Bytes | | **File Format**: ASCII | |
| **Media**: Disk, Hardcopy | | Corresponding Printed Source: Tonnage for Selected United States Ports | |
| **Sponsoring Organization**: Department of Defense, Department of Army, U.S. Army Corps of Engineers, Products and Services Office | | **Availability**: U.S. Army Corps of Engineers, Products and Services Office, Waterborne Commerce Statistics Center, P.O. Box 61280, New Orleans, LA 70161-1280, telephone (504)862-1424; fax (504)862-1423 | |
| **Contact for Additional Information**: Thomas Mire, Data Manager COE/Waterborne Commerce Statistics Center (504)862-1424 | | **Contact for Additional Information**: Roy Walsh, Data Manager COE/Waterborne Commerce Statistics Center (504)862-1424 | |

**Notes:**

Tonnage data can be accessed from the US Army Corps of Engineers Navigation Data Center at: http://www.iwr.usace.army.mil/ndc/index.htm

## U.S. Waterborne Exports and Outbound Intransit Shipments (TM-780)

| | | | |
|---|---|---|---|
| **MODE**: Waterway | **GEOGRAPHY**: National, other | **USEFULNESS**: Specialized | USE WITH MANUAL: |
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: U.S. Waterborne Exports and Outbound Intransit Shipments (TM-780) | | | |
| **Abstract**: This data base provides information on the shipping weight and value by type of vessel service by Customs district and port of lading by foreign port or country/area of unlading by SITC Rev. 3 and by country of destination. The report presents percentage of containerized cargo. In-transit tables present data on country of origin and destination. An annual version (TA-780) is also available. | | | |
| **Source of Data**: U.S. Customs Service. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: National, U.S. Customs Districts and Ports of Lading, Foreign Ports of Countries of Unlading, Countries of Origin/Destination | | **Time span of Data Source**: 1989-present | |
| **First Developed**: 1989 | | **Update Frequency**: Monthly | |
| **Number of Records**: ~200,000/Month | | **File Size**: 20-25MB | |
| **File Format**: Flat ASCII | | **Media**: Disk, Tape | |
| **Sponsoring Organization**: Department of Commerce, Bureau of the Census, Foreign Trade Division | | **Availability**: DOC/Bureau of the Census, Foreign Trade Division, Room 2179-3, Washington, DC 20233; telephone, (301)457-1237. | |
| **Contact for Additional Information**: Norman Teague<br>Data Manager<br>DOC/Bureau of the Census, Foreign Trade Division<br>(301)763-5140 | | | |

**Notes:**

U.S. Waterway Data data can be accessed from the US Army Corps of Engineers Navigation Data Center at:

http://www.iwr.usace.army.mil/ndc/data/dictionary/ddimex.htm#Foreign Ports File

Information about the database is described at:

http://www.iwr.usace.army.mil/ndc/data/dictionary/ddimex.htm

For information concerning prices, availability and order forms for this specific document contact:

Trade Data Services Branch
Foreign Trade Division
Bureau of the Census
Washington, D.C. 20233
PHONE 301-457-2242
FAX 301-457-2647

## U.S. Waterborne General Imports and Inbound Intransit Shipments (TM-380)

| **MODE**: | **GEOGRAPHY**: | **USEFULNESS**: | USE WITH MANUAL: |
|---|---|---|---|
| Waterway | National, other | Specialized | |

**SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES

**TITLE**: U.S. Waterborne General Imports and Inbound Intransit Shipments (TM-380)

**Abstract**: This data base presents type of vessel services by U.S. Customs port by foreign port by SITC commodity by country of origin. Data provided include shipping weight, customs value, import charges, and percentage of containerized and containerized and noncontainerized cargo. Inbound intransit shipments are also included. An annual version (TA-380) is also available.

**Source of Data**: U.S. Customs Service.

**Attributes**:

| | |
|---|---|
| **Geographic Coverage of Data**: National, U.S Customs Districts and Ports of Unlading, Foreign Ports of Lading, Countries of Origin/Destination | **Time span of Data Source**: 1989-present |
| **First Developed**: 1989 | **Update Frequency**: Monthly |
| **Number of Records**: ~200,000/Month | **File Size**: 20MB |
| **File Format**: Flat ASCII | **Media**: Tape |
| **Sponsoring Organization**: Department of Commerce, Bureau of the Census, Foreign Trade Division | **Availability**: DOC/Bureau of the Census, Foreign Trade Division, Room 2179-3, Washington, DC 20233; telephone, (301)457-2317; Fax, (301)457-1237. |

**Contact for Additional Information**:
Norman Teague, Data Manager
DOC/Bureau of the Census, Foreign Trade Division
(301)457-2317

**Notes:**

U.S. Waterway Data data can be accessed from the US Army Corps of Engineers Navigation Data Center at:

http://www.iwr.usace.army.mil/ndc/data/dictionary/ddimex.htm#Foreign Ports File

Information about the database is described at:
http://www.iwr.usace.army.mil/ndc/data/dictionary/ddimex.htm

For information concerning prices, availability and order forms for this specific document contact:

Trade Data Services Branch
Foreign Trade Division
Bureau of the Census
Washington, D.C. 20233

PHONE 301-457-2242
FAX 301-457-2647

## Waterborne Commerce of the United States, Parts 1 thru 5 Publication

| | | | |
|---|---|---|---|
| **MODE**: Multi-mode, waterway | **GEOGRAPHY**: National, other | **USEFULNESS**: Specialized | USE WITH MANUAL: |
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: Waterborne Commerce of the United States, Parts 1 thru 5 Publication | | | |
| **Abstract**: The statistics of waterborne commerce have been published in five parts by the regional offices of the Corps of Engineers since 1953. Prior to 1953, the statistics were published annually as Part 2 of the annual report of the Chief of Engineers. Tables give tonnage and ton-miles of freight traffic by commodities; comparative statement of traffic, trips, and drafts of vessels. Parts include: Part 1-Atlantic Coast Area; Part 2-Gulf Coast, Mississippi River System and Antilles (Puerto Rico and Virgin Islands); Part 3--Great Lakes Area; Part 4-Pacific Coast, Alaska, and Pacific Islands area; and Part 5--National Summaries. | | | |
| **Source of Data**: Vessel operating companies file vessel operating reports. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: National, U.S. Territories | | **Time span of Data Source**: 1953-present | |
| **First Developed**: 1953 | | **Update Frequency**: Annual | |
| Significant Features and/or Limitations: All companies moving commerce by water are required by law to report. Hardcopy dates back to 1920. | | **Sponsoring Organization**: Department of Defense, Department of Army, U.S. Army Corps of Engineers, Products and Services Office | |
| **Availability**: U.S. Army Corps of Engineers, Products and Services Office, Waterborne Commerce Statistics Center, P.O. Box 61280, New Orleans, LA 70161-1280, telephone (504)862-1424; fax (504)862-1423. Price, $17.50. | | | |
| **Contact for Additional Information**: Thomas Mire, Data Manager COE/Waterborne Commerce Statistics Center (504)862-1424 | | **Contact for Additional Information**: Roy Walsh, Data Manager COE/Waterborne Commerce Statistics Center (504)862-1424 | |

**Notes:**

Waterborne Commerce data can be accessed from the US Army Corps of Engineers Navigation Data Center at:

http://www.iwr.usace.army.mil/ndc/wcsc/wcsc.htm

Also Updated versions of the 5 Publications can be downloaded from:

http://www.iwr.usace.army.mil/NDC/publications.htm

## Waterborne Transportation Lines of the United States

| **MODE**: Waterway | **GEOGRAPHY**: National, facility-airport, marine port, etc. | **USEFULNESS**: Specialized, useful | USE WITH MANUAL: |
|---|---|---|---|
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: Waterborne Transportation Lines of the United States | | | |
| **Abstract**: This system contains information on vessel operators, characteristics and description of operations for all domestic vessel operations. Major data content include alphabetical listing of operators, description of vessels (net registered tons, length, breadth, draft loaded, horse power, capacity, highest point above waterline, cargo handling equipment, year built, home base), description of operations (principal commodities carried and areas served). General ferries, floating equipment used in construction work such as dredges, pile drivers, fishing vessels, and recreational craft are not included. | | | |
| **Source of Data**: Vessel operating companies complete annual questionnaire. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: National, U.S. Territories | | **Time span of Data Source**: 1940-1992 | |
| **First Developed**: 1940 | | **Update Frequency**: Annual | |
| **Last update**: 1992 | | **Number of Records**: 40,000, Vessels | |
| **File Size**: 9MB; Owners/Operators, 3,200 | | **File Format**: ASCII | |
| **Media**: Tape, Disk, Hardcopy | | **Corresponding Printed Source**: Waterborne Transportation Lines of the United States | |
| **Sponsoring Organization**: Department of Defense, Department of Army, U.S. Army Corps of Engineers, Products and Services Office | | **Availability**: U.S. Army Corps of Engineers, Products and Services Office, Waterborne Commerce Statistics Center, P.O. Box 61280, New Orleans, LA 70161-1280; telephone (504)862-1424; fax (504)862-1423. Price, $50/data file; $10/printed source. | |
| **Contact for Additional Information**: Thomas Mire, Data Manager COE/Waterborne Commerce Statistics Center (504)862-1424 | | **Contact for Additional Information**: Roy Walsh, Data Manager COE/Waterborne Commerce Statistics Center (504)862-1424 | |

**Notes:**

The reports and data about the Waterborne Transportation Lines of the United States (WTLUS) can be accessed at:

http://www.iwr.usace.army.mil/NDC/publications.htm

Waterborne Transportation Lines of the United States (WTLUS) contains summary information of the vessel companies and their American flag vessels operating or available for operation on 31 December 2007 in the transportation of freight and passengers.

National Summaries, Volume 1, provides a summary of the vessel data detailed in the WTLUS.

Vessel Company Summary, Volume 2, provides a summary of vessel companies listed alphabetically by company name. Included in this publication are: the business address and telephone number, the Engineer District number, the TSOperator number (for usage in querying computer data), principal commodities carried, the points or localities and waterways between which or on which operated and the number of vessels reported by vessel type.

Vessel Characteristics, Volume 3, lists the vessel companies alphabetically and describes each vessel surveyed by indicating its name and number, Coast Guard number, net tonnage, type by VTCC code (Vessel Type, Construction and Characteristics) and ICST code (International Classification of Ships by Type; see Terminology for VTCC and ICST), register and overall length and breadth, loaded and light draft, horsepower, carrying capacity in short tons or units of cargo and number of passengers, height of fixed superstructures, cargo handling equipment, operating headquarters, and year built or rebuilt.

### *C.4. SUBPART e: MULTIMODAL AND OTHER*

**A compendium of selected regional transportation, and demographic statistics (NYMTC)**

| | | | |
|---|---|---|---|
| **MODE**: Highway, Multi-Mode | **GEOGRAPHY**: State, metropolitan, | **USEFULNESS**: Useful | USE WITH MANUAL: Network related |
| **SOURCE**: NYMTC | | | |
| **TITLE**: 1997 Regional Transportation Statistical Report | | | |
| **Abstract**: A compendium of selected regional transportation, and demographic statistics | | | |
| **Source of Data**: | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: | | **Time span of Data Source**: 1986-1997 | |
| **First Developed**: | | **Update Frequency**: Annual data for selected transportation characteristics | |
| **Number of Records:** | | **File Size**: | |
| **File Format**: Transport-Truck trips | | **Media**: | |
| **Significant Features and/or Limitations**: NYMTC - A Report Card for the Region, Includes transit information. | | **Corresponding Printed Source**: | |
| **Sponsoring Organization**: NYMTC - Monitoring & Analysis Unit | | **Performing Organization**: NYMTC | |
| **Availability**: | | | |
| **Contact for Additional Information:** Written by Leokadia Glogowski | | **Contact for Additional Information**: www.nymtc.org | |

**Notes:**

Regional Transportation and Demographic Statistics are provided by the New York Metropolitan Transportation Council (NYMTC). Information can be accessed at the Data and Model section of:

http://www.nymtc.org/

## Census of Population and Housing, 1990: Census Transportation Planning Package (CTPP)

| **MODE**: | **GEOGRAPHY**: | **USEFULNESS**: | USE WITH MANUAL: |
|---|---|---|---|
| Demographics, Flows, etc., multi-mode | National, state, county, metropolitan, Detailed sub-areas | Very useful | Growth factor, base year statistics |

**SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES

**TITLE**: Census of Population and Housing, 1990: Census Transportation Planning Package (CTPP)

**Abstract**: The CTPP is a set of cost reimbursable special tabulations, produced for the Department of Transportation in each state. The detailed cross-tabulations have been designed to meet the needs of state and local transportation planners, and are provided for counties, places of 2,500 or more inhabitants and custom-defined traffic analysis zones (TAZs). The CTPP is a continuation of the 1970 and 1980 Urban Transportation Planning Package programs.

Geographic Coverage: The CTPP statewide tabulations will provide data for persons who live or work in the state. Data will be tabulated for the state, each county, county subdivision (only available for 9 states for workplace data), and place of 2,500 or more persons. Totals for state parts of MSAs, CMSAs, and PMSAs will also be provided, as will urbanized area totals (place of residence data only). The statewide tabulations will consist of six parts: Part A, tabulations by place of residence; Part B, tabulations by place of work; Part C tabulations by place of residence by place of work; Part D, tabulations by place of residence for areas of 75,000 or more persons; Part E, tabulations by place of work for areas of 75,000 or more persons; Part F, tabulations of place of residence by place of work for areas of 75,000 or more persons. Urban tabulations produced for the metropolitan planning organizations (MPO) in each area where the Census TIGER/Line files contain address ranges. Data will be tabulated for either standard census **GEOGRAPHY** like census tracts of block groups, or for locally-defined, custom geographic areas like traffic analysis zones. Subtotals for study area, CTPP Region, MSA, CMSA, PMSA, and urbanized area (place of residence data only) will also be provided. The urban tabulation will consist or seven parts: Part 1, tabulations by small area of residence; Part 2 tabulations by small area of work; Part 3, tabulations of small area of residence by small area of work; Part 4, tabulations of large area of residence; Part 6 tabulations of super district of residence by super district of work for regions with 1 million of more persons; Part 7, tabulations by census tract of work; and Part 8, tabulations of small area of residence by small area of work for regions with one million or more persons. There is no Part 5 in the urban element 1990 CTPP.

**Source of Data**: 1990 Census of Population and Housing. Approximately 17.7 million housing units were sampled nationwide.

**Attributes**:

| **Geographic Coverage of Data**: National. | **Time span of Data Source**: 1990 |
|---|---|

| | |
|---|---|
| (See **Abstract** for more detail.) | |
| **Update Frequency**: Every Ten Years | **File Format**: ASCII, EBCDIC |
| **Media**: 9-track Tape, 6250/1600 bpi, Tape Cartridge, IBM 3480 Compatible | **Significant Features and/or Limitations**: 1990 Census data are based on a sample, and subject to sampling and nonsampling errors. |
| **Sponsoring Organization**: Department of Commerce, Bureau of the Census, Journey-to-Work and Migration Statistics Branch | **Availability**: Summer 1993, continuing into 1994. Contact the state transportation agency or local metropolitan planning organization. |
| **Contact for Additional Information**: Ernest Wilson (Hotline) Subject-Matter Specialists DOC/Bureau of the Census, Journey-to-Work and Migration Statistics Branch (301)763-2201 | **Contact for Additional Information**: Phillip A. Salopek Subject-Matter Specialists DOC/Bureau of the Census, Journey-to-Work and Migration Statistics Branch (301)763-3850 |
| SUMMARY OF ADDITIONAL SOURCES WHICH MAY BE OF INTEREST: U.S. Waterborne Exports and General Imports (Source-U.S. Customs Service and Canadian Customs; Sponsoring Organization: Department of Commerce, Bureau of the Census, Foreign Trade Division); Great Lakes State Overseas Trade Report (Source-Journal of Commerce P.I.E.R.S. subscription; bills of lading and vessel manifests; Sponsoring Organization-Department of Transportation, Saint Lawrence Seaway Development Corporation); St. Lawrence Seaway Annual Traffic Report (Source- Vessel Transit Declarations filed by vessel representatives using Seaway lock facilities; Sponsoring Organization -Department of Transportation, Saint Lawrence Seaway Development Corporation, St. Lawrence Seaway Authority (Canadian)) | |

**Notes:**

Information about the 2000 Census Transportation Planning Product (CTPP), which is a set of special tabulations from decennial census demographic surveys designed for transportation planners can be accessed at:

http://www.fhwa.dot.gov/ctpp/

From 1970 to 2000, the CTPP and its predecessor, UTPP, used data from the decennial census long form. Because of the large sample size, the data are reliable and accurate.

The CTPP 2000 is divided into three parts.

Part 1 contains residence end data summarizing worker and household characteristics

Part 2 contains place of work data summarizing worker characteristics

Part 3 contains contains journey-to-work flow data

Data products can be accessed at:

http://www.fhwa.dot.gov/ctpp/dataprod.htm

## Coal Distribution Data

| | | | |
|---|---|---|---|
| **MODE**: Multi-mode | **GEOGRAPHY**: State | **USEFULNESS**: Specialized | USE WITH MANUAL: |
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: Coal Distribution Data | | | |
| **Abstract**: This database contains information on coal distribution by origin, destination (state, Canada, and overseas), consumer category, and method of transportation. Coal production/purchases, stocks and distribution by secondary methods of transportation are also reported. | | | |
| **Source of Data**: Data are collected on Form EIA-6, "Coal Distribution Report" from U.S. companies that owned or purchased coal and distributed in excess of 50,000 tons during a year. These companies include mining companies, wholesale coal dealers, and, retail coal dealers. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: Worldwide | | **Time span of Data Source**: Current Quarter | |
| **First Developed**: 1977 | | **Update Frequency**: Quarterly | |
| **Last update**: 09/30 | | **Number of Records**: Varies 2,500-8,500 | |
| **File Size**: Varies | | **File Format**: ASCII | |
| **Media**: Disk; Hardcopy | | **Significant Features and/or Limitations**: Data not company specific. | |
| **Corresponding Printed Source**: Coal Distribution was discontinued with the fourth quarter publication, 1991. Selected distribution tables have been incorporated into the Quarterly Coal Report and the Coal Industry Annual. | | **Sponsoring Organization**: Department of Energy, Energy Information Administration, Survey Management Division | |
| **Availability**: Diskette: Survey Management Division, Energy Information Administration, EI-52, Washington, DC 20585; telephone, (202)254-5400. Printed Source: Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402; telephone, (202)512-1800. | | | |
| **Contact for Additional Information**: Thomas S. Murphy<br>Survey Manager<br>DOE/EIA, EI-522<br>(202)254-5561<br>Fax (202)254-8503 | | | |

**Notes:**

Coal Distribution data reports and tables until 2007 can be accessed at:

http://www.eia.doe.gov/cneaf/coal/page/coaldistrib/coal_distributions.html

## Coal Supply and Transportation Model (CSTM)

| | | | |
|---|---|---|---|
| **MODE**: Waterway, rail | **GEOGRAPHY**: National, other | **USEFULNESS**: Specialized | USE WITH MANUAL: |
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: Coal Supply and Transportation Model (CSTM) Model; may also be interested in National Coal Model (NCM) from same source | | | |
| **Abstract**: This model projects distribution patterns of coal supply and intermodal movements of coal. Both rail and water movements are represented, covering all major U.S. rail lines and barges by collier routes. Rail shipments are differentiated by sector and various adjustments are possible for coal cleaning, use of compliance coal, etc. A complete set of reports is produced that show detailed shipments, production, and transportation routes. Information on steam and metallurgical coal exports is also included. | | | |
| **Source of Data**: DOE-developed. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: National | | **Time span of Data Source**: Current | |
| **First Developed**: 1991 | | **Media**: 9-track tape, 1600/6250 bpi | |
| Significant Features and/or Limitations: Written in Fortran IV. The program requires a VS FORTRAN compiler on an IBM 3084 computer under a MVS/XA operating system. | | **Sponsoring Organization**: Department of Energy, Energy Information Administration | |
| **Availability**: National Technical Information Service, Springfield, VA; 22161; Telephone: (703)487-4650 | | | |
| **Contact for Additional Information**: Coal Supply and Transportation Model: Richard Newcombe Data Manager EIA/National Energy Information Center (202)586-2415 | | **Contact for Additional Information**: National Coal Model Robert Manicke Data Manager EIA/National Energy Information Center (202)586-2157 | |

**Notes:**

The Energy Information Administration, an Official Energy Statistics from the U.S. Government offers Coal Information about process, production, reserves, distribution, consumption, stocks, imports and Exports and Databases at:

http://www.eia.doe.gov/fuelcoal.html

## Data Bank: U.S. Exports of Domestic and Foreign Merchandise (EM-545)

| | | | |
|---|---|---|---|
| **MODE**: Demographics, Flows, etc., Multi-mode | **GEOGRAPHY**: Metropolitan | **USEFULNESS**: Specialized | USE WITH MANUAL: |
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: Data Bank: U.S. Exports of Domestic and Foreign Merchandise (EM-545) | | | |
| **Abstract**: This data base presents current month and cumulative data on the net quantity, value, and shipping weight for 10-digit Schedule B by number, by country of destination, by Custom district of export, and by method of transportation. An annual tape (EA-645) is also available. | | | |
| **Source of Data**: U.S. Customs Service and Canadian Customs. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: National, U.S. Customs Districts of Exportations, Countries of Destination | | **Time span of Data Source**: 1989-present | |
| **First Developed**: 1989 | | **Update Frequency**: Monthly | |
| **Number of Records**: 840,000 | | **File Size**: 230MB | |
| **File Format**: ASCII | | **Media**: Tape | |
| **Sponsoring Organization**: Department of Commerce, Bureau of the Census, Foreign Trade Division | | **Availability**: DOC/Bureau of the Census, Foreign Trade Division, Room 2179-3, Washington, DC 20233; telephone, (301)763-5140. Price, $2400. | |
| **Contact for Additional Information**: Yvonne Tayler DOC/Bureau of the Census, Foreign Trade Division (301)763-5140 | | **Contact for Additional Information**: Gerline Roundtree DOC/Bureau of the Census, Foreign Trade Division (301)763-5140 | |
| | | | |

**Notes:**

Information about U.S. Exports of Domestic and Foreign Merchandise is offered by the U.S. Department of Commerce through the ITA International Trade Administration and the Office of Trade and Industry Information at:

http://www.trade.gov/td/industry/otea/OTII/OTII-index.html

## Data Bank: U.S. General Imports and Imports for Consumption (IM-145)

| | | | |
|---|---|---|---|
| **MODE**: Demographics, Flows, etc., Multi-mode | **GEOGRAPHY**: National, other | **USEFULNESS**: Specialized | USE WITH MANUAL: |
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: Data Bank: U.S. General Imports and Imports for Consumption (IM-145) | | | |
| **Abstract**: This data base contains data on the net quantity and value of imports for consumption and general imports by 10-digit HTSUSA commodity code by country of origin by Customs districts of entry and unlading. Method of transportation is included. An annual tape (IA-245) is also available. | | | |
| **Source of Data**: U.S. Customs Service. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: National, U.S. Customs Districts of Entry and Unlading, Country of Origin | | **Time span of Data Source**: 1989-present | |
| **First Developed**: 1989 | | **Update Frequency**: Monthly | |
| **Number of Records**: 1,000,000 | | **File Size**: 570MB | |
| **File Format**: ASCII | | **Media**: Tape | |
| **Sponsoring Organization**: Department of Commerce, Bureau of the Census, Foreign Trade Division | | **Availability**: DOC/Bureau of the Census, Foreign Trade Division, Room 2179-3, Washington, DC 20233; telephone, (301)763-5140. Price, $2400. | |
| **Contact for Additional Information**: Yvonne Taylor DOC/Bureau of the Census, Foreign Trade Division (301)763-5140 | | **Contact for Additional Information**: Gerline Roundtree DOC/Bureau of the Census, Foreign Trade Division (301)763-5140 | |

**Notes:**

Information about U.S. Exports of Domestic and Foreign Merchandise is offered by the U.S. Department of Commerce through the ITA International Trade Administration and the Office of Trade and Industry Information at:

http://www.trade.gov/td/industry/otea/OTII/OTII-index.html

## Economic Census

| **MODE**: | **GEOGRAPHY**: | **USEFULNESS**: | USE WITH |
|---|---|---|---|
| Demographics, Flows, etc. | National | Specialized | MANUAL: |
| **SOURCE**: FOR-HIRE TRUCKING INDUSTRY SIZE STUDY | | | |
| **TITLE**: Economic Censuses | | | |
| **CONTENT**: The censuses present complete, detailed statistics of specific economic sectors. Information covered includes employment by industry, establishments and payroll. The Economic Censuses provide statistics about business establishments once every five years, for the years ending in 2 and 7. The censuses do not cover the Post Office, railroad transportation, and large certified passenger air carriers. | | | |

**Notes:**

The most recent Economic Census is:
2007 Economic Census.

Information and data about the 2007 economic census and surveys is provided by the U.S. Census Bureau and can be accessed at:

http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=ECN

## Employee Occupational Database

| **MODE**: | **GEOGRAPHY**: | **USEFULNESS**: | USE WITH |
|---|---|---|---|
| Demographics, Flows, etc. | National | Specialized | MANUAL: |
| **SOURCE**: FOR-HIRE TRUCKING INDUSTRY SIZE STUDY | | | |
| **TITLE**: Employee Occupational Database | | | |
| **CONTENT**: Occupational employment information is available from a database of employee records. | | | |
| METHODOLOGY: Occupational counts are based on a search of job titles -- there is a code for each title. | | | |
| AVAILABILITY: The occupational employment information is not available in publication. A computer program would have to be written to pull the data. | | | |
| RELATED DATA SOURCES: The Postal Service database is a specialized segment. The Occupational Employment in Federal Government database does not include the Postal Service and Employment and Wages provides total Postal Service employment, but not by occupation. | | | |

**Notes:**

No updated information could be found.

## Fresh Fruit & Vegetable Shipments

| **MODE**: | **GEOGRAPHY**: | **USEFULNESS**: | USE WITH |
|---|---|---|---|
| Demographics, Flows, etc., multi-mode | National, state, metropolitan | Specialized, useful | MANUAL: |
| **SOURCE**: FOR-HIRE TRUCKING INDUSTRY SIZE STUDY | | | |
| **TITLE**: Fresh Fruit & Vegetable Shipments | | | |
| **CONTENT**: For each mode of transport, data are collected from regulatory agencies, shippers, and transportation firms. The data include type of fresh fruit or vegetable, origination, destination, mode, tonnage, and rate ranges. The data are reported for major cities and for states. Exports are also reported. | | | |
| **METHODOLOGY**: Several sources are used to report the data. The agencies, federal and state, that inspect and report movements by commodity are the major sources of information. Shippers and transportation firms are also utilized but are not sampled with any statistical procedure. Data are compiled without the ability to cross-check redundant reporting throughout. | | | |
| **AVAILABILITY**: Data are published weekly and annually. | | | |

**Notes:**

A 2007 report about Fresh Fruit and Vegetable Shipments is provided by the United Stated Department of Agriculture and can be accessed at:

http://www.ams.usda.gov/AMSv1.0/getfile?dDocName=STELPRDC5067296

## Hazardous Materials Registration Program Database

| MODE: | GEOGRAPHY: | USEFULNESS: | USE WITH MANUAL: |
|---|---|---|---|
| Multi-mode | Other | Marginal | Establish sampling base for survey |

**SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES

**TITLE**: Hazardous Materials Registration Program Database

**Abstract**: This system contains information supplied by certain offerors and transporters of hazardous materials on an annual registration statement required by amendments to the Hazardous Materials Transportation Act of 1974, Public Law 93-633. System contains information on the name and principal place of business of each registrant, and on the activities in which the registrant engaged during the previous year that required registration. Fees collected as part of this program fund grants that support emergency response planning and training programs of state and Indian tribal governments.

**Source of Data**: Hazardous materials offerors and transporters; Form DOT F5800.2.

**Attributes**:

| | |
|---|---|
| **Geographic Coverage of Data**: National | **Time span of Data Source**: 1992-Present |
| **First Developed**: 1992 | **Update Frequency**: Daily |
| **Number of Records**: 75,000 | **File Size**: 2 Files - 10MB, 40MB |
| **File Format**: System 1032 (VAX) | **Media**: 9-track Tape, Disk, Printout |
| **Significant Features and/or Limitations**: Only offerors and transporters meeting certain criteria must register. | **Sponsoring Organization**: Department of Transportation, Research and Special Programs Administration, Office of Hazardous Materials Planning and Analysis |

**Availability**: Government: DOT/RSPA, Office of Hazardous Materials Planning and Analysis, DHM-60, 400 7th Street, SW, Washington, DC 20590; telephone (202)366-4109; fax (202)366-7435

**Contact for Additional Information**:
David W. Donaldson
Program Manager
DOT/RSPA, DHM-60
(202)366-4109

**Notes:**

The U.S. Department of Transportation, through its Pipeline and Hazardous Materials Safety Administration, offers a collection of organized information, usually the results of experience, observation or

experiment, or a set of premises. It may consist of numbers, words, or images, particularly as measurements or observations of a set of variables. It also provides statistics of a collection, analysis, interpretation or explanation, of the data. In particular the information provided refers to incident statistics.

The information can be accessed at:

http://www.phmsa.dot.gov/hazmat/library/data-stats

## Industry Productivity and Technology Studies Publication

| **MODE**: Demographics, Flows, etc., Multi-mode | **GEOGRAP HY**: National | **USEFULNESS**: Specialized | USE WITH MANUAL: Growth factor |
|---|---|---|---|
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: Industry Productivity and Technology Studies Publication | | | |
| **Abstract**: This program develops indexes of productivity for individual industries. Statistics on industry labor productivity are published for railroad transportation, bus carriers, intercity trucking, air transportation, and petroleum pipelines. Also, statistics for multifactor productivity are published for railroad transportation. | | | |
| **Source of Data**: Synthesis of other statistics from output/input data from various government sources and trade associations. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: National | | **Time span of Data Source**: Current Year | |
| **Update Frequency**: Annual | | **Sponsoring Organization**: Department of Labor, Bureau of Labor Statistics, Division of Industry Productivity Studies | |
| **Availability**: DOL/Inquiries and Correspondence Branch, Office of Publications, Bureau of Labor Statistics, Washington, DC 20212; telephone (202)606-5902 | | | |
| **Contact for Additional Information**: Kent Kunze<br>Chief<br>DOL/BLS/Division of Productivity Studies<br>(202)606-5618<br>Fax, (202)606-5664 | | | |

**Notes:**

Information provided by the United States Department of Labor about product by industries and technology publications can be accessed through:

http://www.dol.gov/dol/topic/statistics/index.htm

## Nationwide Personal Transportation Survey (NPTS) and the American Travel Survey (ATS)

| | | | |
|---|---|---|---|
| **MODE**: Demographic, Multi-Mode | **GEOGRAPHY**: National, state, metropolitan, County, | **USEFULNESS**: Useful | USE WITH MANUAL: Network related |
| **SOURCE**: US DOT BTS | | | |
| **TITLE**: Nationwide Personal Transportation Survey (NPTS) and the American Travel Survey (ATS) | | | |
| **Abstract**: The 1995 American Travel Survey (ATS) was conducted by the Bureau of Transportation Statistics to obtain information about the long-distance travel of persons living in the United States. The survey collected quarterly information related to the characteristics of persons, households, and tirps for approximately 80,000 American households.<br>The Nationwide Personal Transportation Survey (NPTS) and the American Travel Survey (ATS) are household-based travel surveys conducted every five years by the U.S. Department of Transportation. Survey data are collected from a sample of U.S. households and expanded to provide national estimates of trips and miles by travel mode, purpose, and a host of other characteristics. The emphasis of the NPTS is on daily, local trips while the emphasis of the ATS is on long-distance travel in the United States. These two surveys are being coordinated in 2000. See a PDF of the NPTS/ATS 2000 brochure. | | | |
| **Source of Data**: The NPTS/ATS 2000 is a ONEDOT effort of the Bureau of Transportation Statistics and the Federal Highway Administration. | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: National | | **Time span of Data Source**: | |
| **First Developed**: 1994 | | **Update Frequency**: | |
| **Number of Records** | | **File Size**: | |
| **File Format**: | | **Media**: Internet | |
| **Significant Features and/or Limitations**: Pretest Field Materials, NPTS Diary, ATS Calendar, Sample map from the ATS Survey (450 K), Household Interview (MS Word or PDF), Travel Day Questionnaire (MS Word or PDF), Long Trip Questionnaire (MS Word or PDF) | | **Corresponding Printed Source**: | |
| **Sponsoring Organization**: Department of Transportation, Federal Highway Administration, Highway Needs and Investment Branch | | **Performing Organization**: | |

| **Availability**: | |
|---|---|
| **Contact for Additional Information**: http://www.bts.gov/ats/ | **Contact for Additional Information**: |

**Notes:**

Information about the 1995 NPTS and the 2008 National Household Travel Survey (NHTS) questionnaire can be accessed at:

http://nhts.ornl.gov/publications.shtml

Information about the 2001 National Household Travel Survey (NHTS) can be accessed at:

http://nhts.ornl.gov/

Information about the 1995 American Travel Survey can be found at:

http://www.bts.gov/publications/1995_american_travel_survey/

## Occupational Employment Database

| **MODE**: | **GEOGRAPHY**: | **USEFULNESS**: | USE WITH |
|---|---|---|---|
| Demographics, flows, etc. | National | Specialized | MANUAL: |

**SOURCE**: FOR-HIRE TRUCKING INDUSTRY SIZE STUDY

**TITLE**: Occupational Employment Database

**CONTENT**: Occupational information and company business activities are collected annually by the IRS from tax forms.

**METHODOLOGY**: The IRS maintains and updates administrative records on companies and individuals. The occupational information comes from two sources: 1) Form 1040, where individuals fill in a box, and 2) Schedule C (for self-employed persons and sole proprietorships) where individuals fill in a code box for the business activity.

Example: For the Schedule C, business activity code 6338 is defined as "Trucking, local and long-distance, including trash collection without dump." According to the IRS, 1991 data shows there were 349,327 forms coded 6338 -- a conservative estimate of self-employed independents.

**Notes:**

The most recent data can be accessed at:
http://www.bls.gov/OES/#data

## Occupational Employment in Federal Government

| **MODE**: | **GEOGRAPHY**: | **USEFULNESS**: | USE WITH |
|---|---|---|---|
| Demographics, Flows, etc. | National | Specialized | MANUAL: |
| **SOURCE**: FOR-HIRE TRUCKING INDUSTRY SIZE STUDY | | | |
| **TITLE**: Occupational Employment in Federal Government | | | |
| **CONTENT**: The Office of Personnel Management (OPM) maintains and publishes a statistical series on Federal employment and payrolls with information by agency, type of position and appointment, and characteristics of employees. | | | |

**Notes:**

The most recent data can be accessed at:
http://www.bls.gov/emp/

## Operating Permits

| | | | |
|---|---|---|---|
| **MODE**: Highway, demographics, flows, etc. | **GEOGRAPHY**: National, state | **USEFULNESS**: Specialized | USE WITH MANUAL: |
| **SOURCE**: FOR-HIRE TRUCKING INDUSTRY SIZE STUDY | | | |
| **TITLE**: Operating Permits | | | |
| **CONTENT**: Registration for operating authority varies from state to state. In general, the data collected include carrier's base of operations, headquarters location, some measure of financial viability, proof of insurance, principal commodity hauled, type of equipment to be used, safety record, and carrier personnel. | | | |
| **TYPOLOGY MAPPING**: For-hire carriers seeking operating authority within states must file varying kinds of reports with state agencies. The required information can provide detail on fleet size, employment, commodity, etc. Government and private fleets are not required to file reports. | | | |

**Notes:**

No updated information could be found.

## Quarterly & Annual Financial Reports

| | | | |
|---|---|---|---|
| **MODE**: Highway | **GEOGRAPHY**: National, state, metropolitan | **USEFULNESS**: Marginal | USE WITH MANUAL: |
| **SOURCE**: FOR-HIRE TRUCKING INDUSTRY SIZE STUDY | | | |
| **TITLE**: Quarterly & Annual Financial Reports | | | |
| **CONTENT**: Balance sheet and income statements with accompanying descriptions of publicly-traded carrier operations as related to financial performance. | | | |
| **TYPOLOGY MAPPING**: Only carriers whose equity shares are traded publicly will be required to file financial reports with the SEC. This includes a few for-hire carriers, and a few private fleets whose trucking subsidiaries are reported as distinct operating divisions. | | | |

**Notes:**

The Economic and Statistics Administration offers Economic Indicators at:
http://www.economicindicators.gov/
Among the indicators provided, there are Quarterly and Annual Financial Reports.

Also the reports or reference information could be accessed through the SEC webpage.

## Quarterly Financial & Operating Reports

| | | | |
|---|---|---|---|
| **MODE**: Highway | **GEOGRAPHY**: National, state, metropolitan | **USEFULNESS**: Specialized | USE WITH MANUAL: |
| **SOURCE**: FOR-HIRE TRUCKING INDUSTRY SIZE STUDY | | | |
| **TITLE**: Quarterly Financial & Operating Reports | | | |
| **CONTENT**: Balance sheet, income statement, and operating statistics of motor carriers required to file. Revisions are being made to the structure and definition of the accounts to be reported. | | | |
| TYPOLOGY MAPPING: Only Class I & II for-hire carriers which report to the ICC are represented in this detailed database. Class I carriers are defined as having $10 million or more in annual operating revenue. Class II carriers are defined as having at least $3 million but less than $10 million in annual operating revenue. | | | |
| AVAILABILITY: Data are available to the public and are compiled by secondary sources. Reports in their raw form are available as recorded by the Interstate Commerce Commission. | | | |

**Notes:**

The Economic and Statistics Administration offers Economic Indicators at:
http://www.economicindicators.gov/
Among the indicators provided, there are Quarterly and Annual Financial Reports.

Also the reports or reference information could be accessed through the SEC webpage.

## Seven NY Metropolitan agencies truck toll data

| | | | |
|---|---|---|---|
| **MODE**: Highway, Multi-Mode | **GEOGRAPHY**: State, metropolitan, | **USEFULNESS**: Useful | USE WITH MANUAL: Network related |
| **SOURCE**: NYMTC | | | |
| **TITLE**: Truck Toll Volumes | | | |
| **Abstract**: Seven NY Metropolitan agencies truck toll data | | | |
| **Source of Data**: | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: | | **Time span of Data Source**: | |
| **First Developed**: | | **Update Frequency**: Annual and quarterly volume by crossing facility | |
| **Number of Records:** 1979-1997 | | **File Size**: | |
| **File Format**: Transport-Truck trips | | **Media**: | |
| **Significant Features and/or Limitations**: Includes the Annual commercial vehicle registration | | **Corresponding Printed Source**: | |
| **Sponsoring Organization**: NYMTC - Monitoring & Analysis Unit | | **Performing Organization**: | |
| **Availability**: | | | |
| **Contact for Additional Information**: www.nymtc.org | | **Contact for Additional Information**: www.nymtc.org | |

**Notes:**

Truck Toll data can be accessed at:

http://www.nymtc.org/data_services/TTV.html

## Surface Transborder Commodity Data

| MODE: Demographics, Flows, etc., Multi-mode | GEOGRAPHY: National, state | USEFULNESS: Specialized | USE WITH MANUAL: |
|---|---|---|---|

**SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES

**TITLE**: Surface Transborder Commodity Data

**Abstract**: The Bureau of Census provides the Bureau of Transportation Statistics with unpublished freight flow data by commodity type of mode of transportation (rail, truck or pipeline) for U.S. exports and imports to and from Canada and Mexico. The purpose of this program is to provide information needed to monitor increased traffic associated with the North American Free Trade Agreement and provide border communities better data to plan transportation improvements.

**Source of Data**: Bureau of the Census, Foreign Trade Division

**Attributes**:

| | |
|---|---|
| **Geographic Coverage of Data**: U.S., Canada, Mexico | **Time span of Data Source**: 04/93-03/94 |
| **First Developed**: 1993 | **Update Frequency**: Monthly |
| **Last update**: 06/93 | **Number of Records**: ~1 Million/Month (3/4 Million/Canada; 1/4 Million/Mexico) |
| **File Size**: 1.87MB (3 Months of Data, 04/93-06/93) | **File Format**: dBASE |
| **Media**: Disk | Significant Features and/or Limitations: Files are organized by commodity detail or by geographic detail to satisfy Census confidentiality regulations. |
| **Sponsoring Organization**: Department of Transportation, Bureau of Transportation Statistics | Performing Organization: Department of Commerce, Bureau of the Census, Foreign Trade Division |

**Availability**: DOT/Bureau of Transportation Statistics, 400 7th Street, SW, Room 2104, Washington, DC 20590; telephone (202)366-3282; fax (202)366-3640

**Contact for Additional Information**:
Joel Palley
Industry Economist
DOT/Federal Railroad Administration, RRP-31
(202)366-0348

**Notes:**

The Bureau of Transportation Statistics offers information about the North American Transborder Freight Data through the Research and Innovative Technology Administration. The information can be accessed at:

http://www.bts.gov/programs/international/transborder/

## Transportation Energy Data Book, Edition 14 Publication

| | | | |
|---|---|---|---|
| **MODE**: Demographics, Flows, etc., Multi-mode | **GEOGRAPHY**: National | **USEFULNESS**: Useful, specialized | USE WITH MANUAL: |

**SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES

**TITLE**: Transportation Energy Data Book, Edition 14 Publication

**Abstract**: This publication is a statistical compendium containing over 200 pages of tables and figures. It is designed for use as a desk-top reference. The data book represents an assembly and display of statistics and information that characterize transportation activity, and presents data on other factors that influence transportation energy use.

**Source of Data**: Collected from various published and unpublished sources.

**Attributes**:

| | |
|---|---|
| **Geographic Coverage of Data**: National, Some International | **Time span of Data Source**: 1970-present |
| **First Developed**: 1976 | **Update Frequency**: Annual |
| **Last update**: 1994 | **Sponsoring Organization**: Department of Energy, Office of Transportation Technologies |
| **Performing Organization**: Oak Ridge National Laboratory | **Availability**: Oak Ridge National Laboratory, P.O. Box 2008, Bldg. 5500A, MS 6366, Oak Ridge, TN 37831-6366; telephone (615) 574-5957; fax (615)574-3851 |

**Contact for Additional Information**:
Stacy Davis
Data Manager
Oak Ridge National Laboratory
(615)574-5957

**Notes:**

The latest edition can be accessed at:

http://www-cta.ornl.gov/data/Index.shtml

## Truck Toll Volumes (NY Metropolitan)

| | | | |
|---|---|---|---|
| **MODE**: Highway, Multi-Mode | **GEOGRAPHY**: State, metropolitan, | **USEFULNESS**: Useful | USE WITH MANUAL: Network related |
| **SOURCE**: NYMTC | | | |
| **TITLE**: Truck Toll Volumes | | | |
| **Abstract**: Seven NY Metropolitan agencies truck toll data | | | |
| **Source of Data**: | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: | | **Time span of Data Source**: | |
| **First Developed**: | | **Update Frequency**: Annual and quarterly volume by crossing facility | |
| **Number of Records:** 1979-1997 | | **File Size**: | |
| **File Format**: Transport-Truck trips | | **Media**: | |
| **Significant Features and/or Limitations**: Includes the Annual commercial vehicle registration | | **Corresponding Printed Source**: | |
| **Sponsoring Organization**: NYMTC - Monitoring & Analysis Unit | | **Performing Organization**: | |
| **Availability**: | | | |
| **Contact for Additional Information**: www.nymtc.org | | **Contact for Additional Information**: www.nymtc.org | |

**Notes:**

Truck Toll data can be accessed at:

http://www.nymtc.org/data_services/TTV.html

## U.S. Trade with Puerto Rico and U.S. Possessions (FT-985) Publication

| | | | |
|---|---|---|---|
| **MODE**: Demographics, Flows, etc., Multi-mode | **GEOGRAPHY**: National, other | **USEFULNESS**: Specialized | USE WITH MANUAL: |
| **SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES | | | |
| **TITLE**: U.S. Trade with Puerto Rico and U.S. Possessions (FT-985) Publication | | | |
| **Abstract**: This publication presents data on shipments to and from, and from and to the United States and Puerto Rico and U.S. possessions. The report shows for each territory by commodity, net quantity, value, vessel value, shipping weight, and air value and shipping weight information. | | | |
| **Source of Data**: U.S. Customs Service | | | |
| **Attributes**: | | | |
| **Geographic Coverage of Data**: U.S., Puerto Rico, American Samoa, Guam, and U.S. Virgin Islands | | **Time span of Data Source**: 1990-1992 | |
| **First Developed**: 1990 | | **Update Frequency**: Annual | |
| **Sponsoring Organization**: Department of Commerce, Bureau of the Census, Foreign Trade Division | | **Availability**: DOC/Bureau of the Census, Foreign Trade Division, Room 2179-3, Washington, DC 20233; telephone, (301)763-5140. Price, $10. | |
| **Contact for Additional Information**: Yvonne Taylor Data Manager DOC/Bureau of the Census, Foreign Trade Division (301)763-5140 | | **Contact for Additional Information**: Gerline Roundtree Data Manager DOC/Bureau of the Census, Foreign Trade Division (301)763-5140 | |

**Notes:**

Publications spanning from 1995 to 2008 can be accessed at:
https://www.census.gov/prod/www/abs/ftdpr895.html

## Worldwide Household Goods Information System for Transportation (WHIST)

| **MODE**: Demographics, Flows, etc. | **GEOGRAPHY**: National | **USEFULNESS**: Specialized | USE WITH MANUAL: |
|---|---|---|---|

**SOURCE**: DIRECTORY OF TRANSPORTATION DATA SOURCES

**TITLE**: Worldwide Household Goods Information System for Transportation (WHIST)

**Abstract**: The WHIST data base provides MTMC with an automated means of acquiring, processing, storing and reporting personal property rate and shipment information. It is a centralized data base of personal property data with the decision support tools necessary to easily retrieve and display this information in a variety of formats. The system is responsible for the acquisition of data from a number of outside sources, assuring validity of the data and formatting and displaying the data on appropriate WHIST hardware components both for use by internal MTMC users and for redistribution to external organizations. This system works in conjunction with the Transportation Operational Personal Property System (TOPS).

**Source of Data**: Service finance centers process data.

**Attributes**:

| **Geographic Coverage of Data**: National | **Time span of Data Source**: Latest 4 years |
|---|---|
| **First Developed**: 1988 | **Update Frequency**: Monthly |
| **Number of Records**: 6,235,289 | **File Size**: 13GB |
| **File Format**: Flat File | **Media**: Tape |
| Corresponding Printed Source: MSR-Q Progress Report | **Sponsoring Organization**: Department of Defense, Department of Army, Headquarters, Military Traffic Management Command, Headquarters |

**Availability**: HQMTMC, 5611 Columbia Pike, Falls Church, VA 22041-5050. Data previously provided under TSC OMNI Contract DTRS-57-89-D-0034 by PRC Corporation.

| **Contact for Additional Information**: | **Contact for Additional Information**: | **Contact for Additional Information**: | **Contact for Additional Information**: |
|---|---|---|---|
| William Jackson, Functional<br>MTMC-IM-D<br>(703)756-1192<br>Fax (703)756-2871 | Robert Dyer, Programmer<br>MTMC-IM-D<br>(703)756-1192<br>Fax (703)756-2871 | Betsy Cunningham, Functional<br>MTMC-OP-CM-O<br>(703)756-1192<br>Fax (703)756-2871 | Irene Stegall, Data Manager<br>MTMC-OP-CM-D<br>(703)756-1192<br>Fax (703)756-2871 |

**Notes:**

The Military Traffic Management Command changed its name on Jan. 1, 2004 the Surface Deployment and Distribution Command. Information could be found at:

http://www.globalsecurity.org/military/agency/army/mtmc.htm

### *C.5. Other data sources or tools.*

This section presents a series of data sources or tools provided by public or private entities that could provide relevant information for freight demand modeling.

**Bureau of Economic Analysis.**

**Description:**

U.S. Department of Commerce

Bureau of Economic Analysis

Methodology papers

Descriptions of the methodologies used to prepare BEA's National, Industry, Regional, and International accounts data are accessible on this page:

http://www.bea.gov/methodologies/index.htm

**U.S. Census Bureau**

**Description:**

Publications

Transportation

Transportation data range from the size of truck fleets to the cost of public warehousing. People use the data to analyze passenger and commodity traffic; calculate fuel consumption; and locate stores, improve highways, and the like where traffic is heaviest. People also use the data in determining investing in equipment and service facilities, and planning parking and shuttle connections.

The different transportation related Census documents can be accessed at:

http://www.census.gov/prod/www/abs/transpor.html#92census

**Bureau of Transportation Statistics**

**Description:**

**Bureau of Transportation Statistics**

The BTS mission is to create, manage, and share transportation statistical knowledge with public and private transportation communities and the Nation.

**RITA. Research and Innovative Technology Administration**

The Research and Innovative Technology Administration (RITA) coordinates the U.S. Department of Transportation's (DOT) research programs and is charged with advancing the deployment of cross-cutting technologies to improve our Nation's transportation system.

RITA brings together important data, research and technology transfer assets of the Department of Transportation, including:

Bureau of Transportation Statistics (BTS)

Intelligent Transportation Systems (ITS)

National Transportation Library (NTL)

Positioning, Navigation and Timing (PNT)

Research, Development and Technology (RD&T)

Transportation Safety Institute (TSI)

University Transportation Centers (UTCs)

Volpe National Transportation Systems Center (Volpe)

RITA also provides strategic direction and oversight of DOT's Intelligent Transportation Systems Program.

List of Databases:

http://www.transtats.bts.gov/DataIndex.asp

## 2009 National Transportation Atlas Database

**Description:**

RITA Research and Innovative Technology Administration

Bureau of Transportation Statistics

2009 National Transportation Atlas Database

The National Transportation Atlas Databases 2009 (NTAD2009) is a set of nationwide geographic databases of transportation facilities, transportation networks, and associated infrastructure. These datasets include spatial information for transportation modal networks and intermodal terminals, as well as the related attribute information for these features. Metadata documentation, as prescribed by the Federal Geographic Data Committee, is also provided for each database. The data support research, analysis, and decision-making across all modes of transportation. They are most useful at the national level, but have major applications at regional, state, and local scales throughout the transportation community.

The different files and more information can be accessed at:

http://www.bts.gov/publications/national_transportation_atlas_database/2009/

## For-hire Trucking Industry Size Study

**Description:**

The For-Hire Trucking Industry Size Study is intended to provide a basis for measuring the extent, size, and activity of carriers involved in for-hire carriage. The study has four key purposes: (1) to build a consensus and establish definitions of the for-hire trucking industry and its components; (2) to identify methods to measure various dimensions of the for-hire industry and its components; (3) to identify data elements, frequencies of collection, and other requirements to support the recommended methods of measurement; and (4) to present guidelines, policies or options for users to incorporate these data. The study draws upon research, discussions and consultation from an established study group and from a group of interested parties. Four primary tasks were included: (A) Identify Interest Groups; (B) General Issues Concerning Definitions and Measurement; (C) Define Methods and Data to Implement the Measures; and (D) Feasibility of Data Acquisition from For-Hire Carriers. In the initial tasks, a framework was developed to evaluate the key issues that affect the measurement and the analysis of trucking activity. Definitions of trucking activity were proposed and discussed. Alternative categorization structures for all trucking, and for individual segments, were evaluated. The measurement issues are not restricted to analysis of the for-hire industry, but also encompass trucking activity among private and government fleets. In general, the term "trucking industry" is used to specify activity among firms whose primary economic output is trucking transportation, i.e., for-hire carriers; the broader term "trucking activity" is used for describing commercial fleet activity for all establishments. The report establishes a common ground for describing individual segments of trucking activity, to identify the most important kinds of data that can be used to measure trucking activity, and begins the process of identifying more appropriate data on this economic segment. A separate Data Inventory Report (Volume II) has been prepared as a companion to this report to identify and evaluate the major information sources of trucking activity.

For-Hire Trucking Industry Size Study. Volume I - Final Report

http://ntlsearch.bts.gov/tris/search.do?b1=1&f1=0&t1=kw%3A%22hire+trucking+industry+size+study%22&r=1&d=all&p=4&z=1&s=yr&o=1&new=n

For-Hire Trucking Industry Size Study. Volume Ii - Data Inventory Report

http://ntlsearch.bts.gov/tris/search.do?b1=1&f1=0&t1=kw%3A%22hire+trucking+industry+size+study%22&r=1&d=all&p=5&z=1&s=yr&o=1&new=n

## DataFerret

**Description:**

DataFerret

http://dataferrett.census.gov/

DataFerrett helps you locate and retrieve data across the Internet to the desktop or system, regardless of where the data resides. DataFerrett is a unique data mining and extraction tool. DataFerrett allows the user to select a databasket full of variables and then recode those variables as needed. The user can then develop and customize tables. By selecting the results in the table the user can create a chart or graph for a visual presentation into an html page. Save the data in the databasket and save the tables for continued reuse. Among the data that could be mined are:

American Community Survey (ACS)
American Housing Survey (AHS)
Behavioral Risk Factor Surveillance System (BRFSS)
Consumer Expenditure Survey (CES)
County Business Patterns (CBP)
Current Population Survey (CPS)
Decennial Census of Population and Housing (Census2000)
Decennial Census of Population and Housing (Census1990)
Delaware Statistics
Harvard MIT Data Center Collection
Home Mortgage Disclosure Act (HMDA)
Maryland Statistics
National Ambulatory Medical Care Survey (NAMCS)
National Health and Nutrition Examination Survey (NHANES)
National Health Interview Survey (NHIS)
National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (FHWAR)
Small Area Income and Poverty Estimates (SAIPE),
Social Security Administration,
Survey of Income and Program Participation (SIPP),
Survey of Program Dynamics (SPD),

## Freight Analysis Framework

**Description:**

The Freight Analysis Framework (FAF) integrates data from a variety of sources to estimate commodity flows and related freight transportation activity among states, regions, and major international gateways. FAF version 2 (FAF2) provides estimates for 2002 and the most recent year plus forecasts through 2035.

http://ops.fhwa.dot.gov/freight/freight_analysis/faf/index.htm

**FAF2 Commodity Origin-Destination Data and Documentation: 2002–2035**

The FAF Commodity Origin-Destination Database estimates tonnage and value of goods shipped by type of commodity and mode of transportation among and within 114 areas, as well as to and from 7 international trading regions though the 114 areas plus 17 additional international gateways. The 2002 estimate is based primarily on the Commodity Flow Survey and other components of the Economic Census. Forecasts are included for 2010 to 2035 in 5 year increments.

http://ops.fhwa.dot.gov/freight/freight_analysis/faf/faf2_com.htm

## U.S. County-level Freight-movement Data by Commodity Group and Mode of Transportation

**Description:**

HS Global Insight's Global Commerce & Transport practice equips transportation providers and government agencies with the information they need to increase profitability, justify long-term infrastructure investments, and support transportation decision-making needs.

**Transearch® and Related Applications**

Our Transearch database provides U.S. county-level freight-movement data by commodity group and mode of transportation. The historical database combines primary shipment data obtained from 22 of the nation's largest freight carriers with information from public sources, and is accompanied with 30-year forecasts consistent with IHS Global Insight's macro forecasts. Transearch is compiled and produced annually, providing you with the most comprehensive information on domestic freight activity available.

Information can be found at:

http://www.ihsglobalinsight.com/ProductsServices/ProductDetail2322.htm

## D&B Industry Reports

**Description:**

Dun & Bradstreet, Inc.

D&B is the world’s leading source of commercial information and insight on businesses, enabling companies to Decide with Confidence® for 167 years. D&B’s global commercial database contains more than 140

million business records. The database is enhanced by D&B's proprietary DUNSRight® Quality Process, which provides our customers with quality business information. This quality information is the foundation of our global solutions that customers rely on to make critical business decisions.

http://www.dnb.com/us/dbproducts/product_overview/index.html?cm_re=HomepageB*TopNav*ProductsTab

http://smallbusiness.dnb.com/make-informed-business-decisions/12316286-1.html