

Survey Methodology for Collecting Freight Truck and Destination Data

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State departments of transportation and metropolitan planning organizations require a specific focus on freight and goods movements as one element of their planning process. A particular challenge is obtaining comprehensive information on freight truck movements. The Washington State Department of Transportation initiated a statewide freight truck origin and destination (O-D) study in April 1993 to meet this challenge. The Washington study is the first in the United States to collect statewide freight truck O-D data through direct personal interviews of truck drivers. Over 300 community service club members were hired and trained to conduct personal interviews at 28 separate locations throughout the state of Washington. A total of 30,000 truck drivers were interviewed, providing Washington with an extensive data base on statewide freight and goods movements. The methodology and procedures utilized to collect statewide freight truck data in Washington are described. Specific issues include research design, interview team recruitment and training, field data collection procedures, as well as ongoing project management requirements. Lessons learned from the Washington study provide insights for other states or regional planning organizations contemplating a freight truck study.

Providing for the efficient intermodal movement of freight and goods is a primary responsibility of state departments of transportation, metropolitan planning organizations (MPOs), and many local governments. This responsibility has received increased emphasis as a result of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), which requires states and MPOs to include a specific focus on freight and goods mobility as one element of their updated transportation plan.

Planning for the efficient movement of freight and goods is hindered by a lack of information on the source and characteristics of freight truck movements on state and regional highways. Freight movement by rail and water can be tracked adequately through Interstate Commerce Commission (ICC) waybill samples, the Corps of Engineers Waterborne Commerce data, and other published sources. However, obtaining comprehensive information on truck freight movements is much more difficult because of the large number of carriers and the numerous potential origins and destinations.

To address this information gap, the Washington State Department of Transportation (WSDOT) initiated a statewide freight truck origin and destination (O-D) study in April 1993. A regionwide freight truck O-D study was first proposed in Washington as an element of the Eastern Washington Intermodal Transportation Study

(EWITS). EWITS is a 6-year ISTEA planning study to define the multimodal network necessary for the efficient movement of freight and people throughout the region of Washington on the east side of the Cascade Mountains. Supplemental funding provided by WSDOT enabled the EWITS freight truck O-D study to be expanded to include the entire state. Washington State University and The Gillis Group, a private consulting firm, were asked to conduct the study.

The Washington study is the first in the United States to collect statewide freight truck O-D data through direct personal interviews of truck drivers. The statewide study involved over 300 persons conducting personal interviews at 28 separate locations. A total of 30,000 truck drivers were interviewed to provide Washington with an extensive data base on statewide freight and goods movements.

The methodology and procedures utilized to collect statewide freight truck data in Washington are described. Specific issues include research design, interview team recruitment and training, field data collection procedures, as well as ongoing project management requirements. In the final section of this paper lessons learned from the Washington study are highlighted as insights for other states or regional planning organizations contemplating a freight truck study.

RESEARCH DESIGN ISSUES

Data Source Alternatives

Aggregate information on U.S. freight truck movements can be obtained from a variety of government and private-sector sources. For example, the Transearch freight flow data base compiled by Reebie and Associates provides aggregate information on commodity movements by mode between major cities. The Census Bureau and the Federal Highway Administration produce the Truck Inventory and Use Survey, the Nationwide Truck Activity and Commodity Survey, and the Commodity Transportation Survey. These government sources also provide a broad picture of major truck flows between regions. However, none of these sources is designed to provide information on freight truck movements in sub-state regions outside major cities or local transportation corridors.

The development of a methodology that would provide statistically reliable and comprehensive information on truck movements throughout the entire state was needed to fulfill research goals outlined for this Washington State freight truck O-D study. In particular, information on a wide array of freight truck characteristics is needed to plan effectively for the statewide freight and goods system. Examples include information on time-of-day movements, truck/trailer configuration, cargo type, payload weight, use of inter-

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modal facilities, and routes utilized between major origins and destinations. Because this information is not available from published secondary sources, it is necessary to collect data directly from trucking firms.

Several specific criteria were developed as guidelines for the design of the statewide truck survey project:

- Data collected should provide statistically reliable information on truck characteristics and commodity flows for all major Washington highways.
- The sample size should be large enough to provide useful freight and goods movement information for major transportation planning regions as well as the state as a whole.
- Information should be developed over a continuous 24-hr period during each of the four seasons.

Among the alternatives, including mail or telephone surveys, roadside interviews of truck drivers are the most effective means of generating truck freight information addressing these three criteria. Several previous studies utilizing roadside interviews provided insights into the development of the Washington freight truck O-D study. Among the most comprehensive of the previous studies is the Ontario Commercial Vehicle Survey of 1988. The Ontario Ministry of Transportation conducted roadside surveys of 19,225 commercial vehicles between March and November 1988. The interviews were conducted by Ministry of Transportation staff at 41 weigh stations and 16 additional roadside locations. The truck driver interviews collected a wide array of information ranging from axle counts and cargo type to vehicle weight. A similar study conducted by Washington State University in 1992 focused on the northwestern Washington border crossing between Canada and the United States. Roadside interviews were conducted by student interviewers as trucks passed through the U.S. port of entry. In addition to collecting information on truck characteristics and commodity type, the Washington State University study documented specific highway routes utilized by the trucks.

Site Selection

Following the lead of the previous studies, permanent weigh stations and ports of entry were utilized as the primary data collection sites for the Washington truck survey. The specific weigh stations utilized as data collection sites were identified through analysis of WSDOT's traffic count and vehicle classification data. Data collection sites were established on all state highways with a significant volume of daily truck traffic. On Washington's major Interstate corridors, multiple data collection sites were identified. In recognition of the importance of expanding international trade, plans were also established for roadside interviews at major U.S.-Canadian border crossings.

To obtain a complete profile of truck movements it is necessary to interview truck drivers traveling in both directions on a given highway segment. On divided highways, this requires identifying two separate interview sites on alternate sides of the highway. In total, interview sites were established at 21 Washington State Patrol weigh stations, three Canadian border locations, and the Oregon port of entry in Umatilla (Figure 1).

Questionnaire Design

Questionnaire design is an important element of a successful methodology for roadside truck driver interviews. The Washington

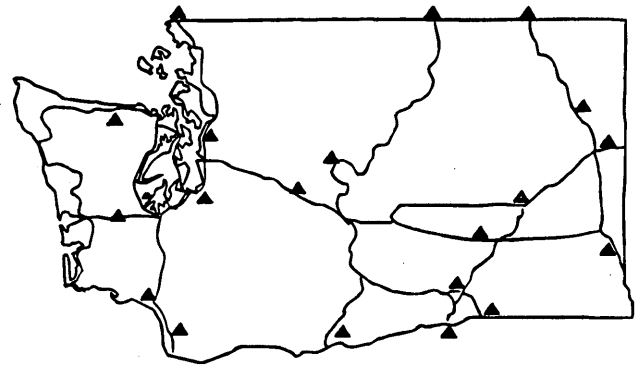


FIGURE 1 Truck interview locations.

statewide truck driver survey collected information on time-of-day movements, vehicle configuration, trucking company location, origin and intended destination, cargo type, vehicle and cargo weight, use of intermodal facilities, and the specific route traveled (Figure 2).

To encourage truck driver participation, the questionnaire was designed to be completed within 3 min. Approximately one-half of the questions (for example, number of axles, trailer style, time of day, hazardous material placard) could be filled out through direct observation by trained interview personnel. Questions to be asked directly to the truck driver focused on cargo, weight, use of intermodal facilities, and route of travel. To the extent possible, check boxes were utilized to minimize necessary writing and enable rapid completion of each interview. A map of major Washington State highways was attached to each questionnaire. Utilizing this map, the interviewers were able to quickly highlight Washington highways utilized by drivers traveling between their stated origin and destination.

Appropriate phrasing of interview questions is also essential. For example, the preliminary questionnaire developed for the Washington truck driver survey requested information on the "payload weight." During the pretest phase of the project, many drivers confused "payload weight" with "gross weight." Consequently, the questionnaire was revised to request, "What is the weight of the cargo that you are carrying today?" Establishing a process for ongoing evaluation and modification to the survey questionnaire is essential.

Interview Dates and Duration

The Washington freight truck O-D study developed data for each of the four seasons—summer, fall, winter, and spring. Particularly in agricultural regions, seasonal differences in truck movements can be substantial. For example, fresh potatoes and grains are harvested in the summer. Apples are harvested in the fall. Consequently, highways important to the transportation of these commodities may have significantly different truck volumes in different seasons.

The Washington truck survey was designed to provide a profile of statewide truck movements during each season. Consequently, it was important to conduct interviews at all 25 sites within as short a time frame as possible during each season. Data collection sites were systematically scheduled to avoid the practical problem of requesting multiple interviews from the same truck driver on a given day. With this constraint, approximately 5 weeks was needed to complete each interview cycle at the 25 sites.

Truck driver interviews at most locations were scheduled for a continuous 24-hr period to provide a comprehensive picture of statewide truck movements. Interviews were also consistently scheduled for Wednesdays to obtain median traffic patterns rather than exceptionally heavy Monday or Friday flows. Maintaining consistency in day-of-week data collection at each site helps to avoid potential statistical bias when the data are aggregated to profile statewide movements.

Sampling Issues

Approximately 4,500 commercial vehicles travel Washington's I-5 corridor each day. Other major Washington freight truck corridors typically support 1,500 to 2,500 trucks per day. Interviewing every truck driver traveling these busy corridors is neither feasible nor necessary. A systematic sampling strategy was developed for the Washington truck survey.

An overall goal of obtaining at least 300 surveys over a 24-hr period at each site was established. One out of every 10 trucks on I-5 and 1 out of every 5 trucks on most other major Washington freight truck corridors were targeted for an interview. On several of the lower-volume routes, 1 out of every 2 commercial vehicles was targeted for an interview. A total of approximately 7,500 truck drivers were interviewed during each of the four survey rounds, providing a data base of 30,000 interviews for the year-long study.

INTERVIEW TEAM RECRUITMENT TRAINING

Recruitment

To obtain an accurate seasonal profile of truck movements throughout the state of Washington, it was necessary to conduct interviews simultaneously at more than six sites across the state. The more typical approach of hiring a team of interviewers to travel from site to site over a period of weeks did not meet the research design goals established for the Washington study. Typically, 15 people are required to cover a 24-hr interview session at each of the sites. On a given day, up to 90 interview personnel are required. Consequently, it was a particular challenge to obtain a very large short-term labor force to successfully complete the study.

To meet this challenge, members of community service clubs with statewide membership were recruited and trained to conduct truck driver interviews. The opportunity was first introduced at a statewide conference of Washington Lions Clubs, which were offered the opportunity to conduct interviews as a fund-raising activity.

As a result of initial recruitment efforts, 15 Lions Clubs and 1 Kiwanis Club agreed to provide at least 15 members who would serve as a local interview team. A total of over 300 service club members participated in the Washington study.

All the clubs were located close to the selected interview sites, which minimized travel costs for the interview team. The club members' personal knowledge of local roads and industries also proved to be a major advantage in communicating and understanding responses provided by truck drivers. Most of the same club members participated in each of the four interview rounds, creating a highly experienced local interview team for future projects.

Training

Interview team training is always an important component of any study involving personal interviews, and a strong training program

is essential when less-experienced personnel are used. A detailed training program for interview team members, including both classroom and on-site instruction, was conducted by The Gillis Group:

Topic	Time Allotted (min)
Project goals and objectives	10
Overview of interview questionnaire	20
Identifying truck and trailer configurations	15
Personal interview techniques	15
Safety requirements	10
Things to bring	5
Questions and answers	30

An individual and customized classroom training session was conducted for each of the 16 service clubs. Each training session began with an overview of the key project goals and objectives so that interviewers would be prepared to answer basic questions from truck drivers concerning the purpose of the study. The interview questionnaire was reviewed in detail. Particular focus was given to ensuring that the interview team members were able to accurately identify the different truck and trailer configurations. Personal interview techniques were also covered. In particular, advice was offered on how to introduce the purpose of the study and request an interview from the truck driver.

Conducting personal interviews of truck drivers at busy weigh stations is a strenuous and potentially dangerous activity. Every effort was made to design a site setup and traffic control plan to prevent the possibility that an unwary interviewer might step into the path of an oncoming truck. In addition, the personal responsibility of each interviewer to be alert and promote on-site safety was stressed in the training. Examples of safety requirements emphasized to the interview team members were to (a) always wear safety vests and hats while on site, (b) never approach a truck when it is moving, (c) not allow traffic congestion to occur in the interview area, and (d) take regular breaks. A manual outlining safety requirements, truck configurations, and other interview guidelines was provided to each team member at the conclusion of the classroom training.

The classroom training session is only the beginning of what should be a continuous process to ensure quality interviews and personnel safety. Ongoing training and instruction were provided by a supervisor assigned from the project management team to each site. Over time most teams became highly adept at conducting the personal interviews, and constant supervision was no longer necessary. However, periodic monitoring of interview activities continued throughout the project.

FIELD DATA COLLECTION PROCEDURES

Equipment Needs

Proper equipment is necessary to ensure both interview personnel safety and accurate results. Equipment utilized at each interview site is as follows: reflective safety vests; clipboards; survey crew signs; headlamps; interview team hats; pens, pencils, and highlighters; weatherproof boxes; and traffic cones. An adequate supply of basic equipment such as clipboards, pens, pencils, highlighters, and staplers is necessary. A large Survey Crew sign was utilized at each site both to inform truck drivers approaching the station that an official survey was taking place and to caution that interview personnel were in the vicinity. All interview personnel were issued safety vests. It is important that high-quality reflective vests be utilized when interview crews are operating in the dark. Headlamps were

For Office Use Only

Survey _____
QCA _____
Input

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION AND
WASHINGTON STATE UNIVERSITY
TRUCK TRAFFIC SURVEY, SPRING 1994

Please Remember - your Club is depending on YOU for the Quality Control Award!

✓ Write neatly!

✓ Do not abbreviate!

✓ Complete all required questions!

Thank You!

CONFIDENTIAL

1) Station location: Tokio Westbound

2) Initials of interviewer: _____

3) Interview shift:

1. Day Shift
7:00 a.m. - 3:00 p.m.

2. Evening Shift
3:00 p.m. - 11:00 p.m.

3. Night Shift
11:00 p.m. - 7:00 a.m.

4) Time of interview: _____ a.m. _____ p.m.

5) Is this truck a part of the "official sample"? a) Yes b) No

6) Truck Configuration

[Check only one truck configuration]

[See Quality Control Notes for definitions]

1. Straight truck
2. Truck and trailer
3. Tractor only
4. Tractor and trailer
5. Tractor with two trailers
6. Other (specify) _____

7) Trailer Style

[If appropriate, check more than one trailer style]

[See Quality Control Notes for definitions]

1. Van (without temperature control)
2. Van with temperature control
3. Flatbed
4. Car carrier
5. Hopper or belly dump
6. Stake and rack
7. Concrete mixer
8. Tanker
9. Float or low boy
10. Dump
11. Container
12. Wood chip
13. Animal carrier
14. Logging
15. Belt
16. Other (specify) _____

8) Total number of axles on the ground: _____

9) Is a hazardous material placard displayed? 1) Yes ID# _____ 2) No

FIGURE 2 Survey questionnaire.

[Please ask the following questions]

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- 10) Trucking company name: _____
 Very Important! Do Not Abbreviate! Be Exact!
- 11) Trucking company home base: City: _____ State/Province: _____
- 12) What is the unloaded weight of this vehicle? _____ lbs.
- 13) Is this vehicle carrying cargo or is it empty? carrying cargo [Ask Q14-21] empty [Ask Q22-27]
- 14) What is the major commodity on board: _____
 Do Not Abbreviate! Be Specific!
- 15) How much does the cargo you are carrying today weigh? _____ lbs.

Complete only the one column that applies to this trip. No round-trip information, please!

Trucks CARRYING Cargo:	Trucks WITHOUT Cargo:
Where did you pick up this cargo?	Where did you pick up this cargo?
16) City: _____	22) City: _____
17) State/Province: _____	23) State/Province: _____
18) Facility: [see Quality Control Notes]	24) Facility: [see Quality Control Notes]
a) <input type="checkbox"/> trucking yard	a) <input type="checkbox"/> trucking yard
b) <input type="checkbox"/> railroad yard	b) <input type="checkbox"/> railroad yard
c) <input type="checkbox"/> river or ocean port	c) <input type="checkbox"/> river or ocean port
d) <input type="checkbox"/> airport	d) <input type="checkbox"/> airport
e) <input type="checkbox"/> factory, processing plant, or sawmill	e) <input type="checkbox"/> factory, processing plant, or sawmill
f) <input type="checkbox"/> warehouse/distribution center or post office	f) <input type="checkbox"/> warehouse/distribution center or post office
g) <input type="checkbox"/> farm or forest	g) <input type="checkbox"/> farm or forest
h) <input type="checkbox"/> retail store or gas station	h) <input type="checkbox"/> retail store or gas station
i) <input type="checkbox"/> job or construction site	i) <input type="checkbox"/> job or construction site
j) <input type="checkbox"/> other: _____	j) <input type="checkbox"/> other: _____
What is the destination of your cargo?	Where will your trip without cargo end?
19) City: _____	25) City: _____
20) State/Province: _____	26) State/Province: _____
21) Facility: [see Quality Control Notes]	27) Facility: [see Quality Control Notes]
a) <input type="checkbox"/> trucking yard	a) <input type="checkbox"/> trucking yard
b) <input type="checkbox"/> railroad yard	b) <input type="checkbox"/> railroad yard
c) <input type="checkbox"/> river or ocean port	c) <input type="checkbox"/> river or ocean port
d) <input type="checkbox"/> airport	d) <input type="checkbox"/> airport
e) <input type="checkbox"/> factory, processing plant, or sawmill	e) <input type="checkbox"/> factory, processing plant, or sawmill
f) <input type="checkbox"/> warehouse/distribution center or post office	f) <input type="checkbox"/> warehouse/distribution center or post office
g) <input type="checkbox"/> farm or forest	g) <input type="checkbox"/> farm or forest
h) <input type="checkbox"/> retail store or gas station	h) <input type="checkbox"/> retail store or gas station
i) <input type="checkbox"/> job or construction site	i) <input type="checkbox"/> job or construction site
k) <input type="checkbox"/> other: _____	k) <input type="checkbox"/> other: _____

- 28) What Washington highways were used to travel between the two locations identified above?
 _____ (Remember, accurately highlight attached map!)
 Write out the highways used to get between the two locations identified above.
- 29) Including this trip, how many times has this truck traveled the above route in the past 7 days?
 _____ Times Don't know

also provided to the night shift to help interview team members see and be seen. Weatherproof boxes were provided at each site as storage for completed surveys.

Site Setup and Traffic Control

Typical site setup and traffic control plans utilized at interview sites are shown in Figures 3 and 4. Procedures at both large and small sites were similar. Site setup and traffic control plans at U.S./Canadian border locations were similar to those utilized at weigh stations.

All interview scheduling was coordinated and approved by the Washington State Commercial Vehicle Enforcement Division or U.S. and Canadian Customs officials in the case of data collection sites at border crossings. Cooperation from the Oregon Department of Transportation was received in conducting interviews at the Umatilla port of entry.

Uniformed officers at the weigh stations or ports of entry conducted enforcement activities as normal. Commercial vehicles entered the weigh station or port of entry checkpoints following the

usual procedures. After enforcement activities were complete, selected trucks would be directed into a designated interview area by the officer in charge or a member of the interview team. Truck drivers were selected for an interview according to predetermined interview procedures. For example, along I-5 every tenth truck was directed to the interview area. Along I-90, every fifth truck was directed to the interview area. At some low-volume locations, every other truck driver was selected for an interview.

While the truck was parking, a member of the interview team completed visual information such as the time of day, number of axles, truck configuration, and the presence of a hazardous materials placard. After the truck came to a complete stop, a member of the team approached the driver requesting an interview. Truck driver participation in the survey was voluntary. Approximately 95 percent of the truck drivers requested to complete an interview agreed to participate. The truck drivers were provided with a coupon for a free cup of coffee as a token of thanks for their participation.

At the smaller weigh station sites, only two and at most three trucks can be safely parked to the side. At stations with a large park-

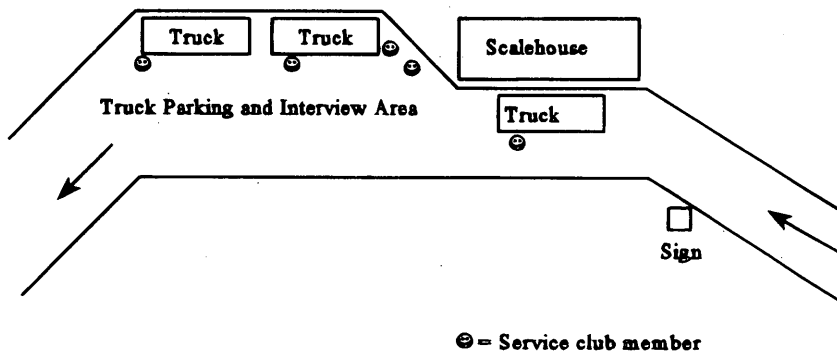


FIGURE 3 Site setup and traffic control plan at smaller weigh stations typical on lower-traffic-volume corridors.

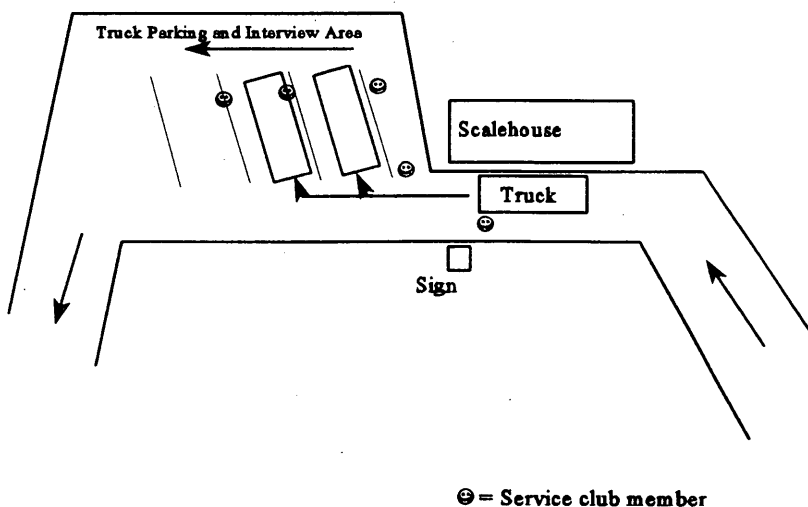


FIGURE 4 Site setup and traffic control plan at weigh stations with large parking area typical of higher-traffic-volume locations on I-5 and at state ports of entry.

ing area, traffic cones were utilized to block off up to four lanes as a designated truck interview area. In all cases a lane was provided to allow trucks not selected for an interview to pass safely back onto the highway.

On average, an experienced interviewer can complete the questionnaire within 3 min. A crew of up to five interview personnel was maintained at each site throughout the 24-hr survey period. This enabled the crew to quickly begin a new interview as soon as the previous one was completed. In most cases space and personnel at the interview sites were adequate to ensure a free flow of traffic. However, during certain busy periods trucks whose drivers would have otherwise been interviewed were allowed to pass by because space to park them safely was not available.

Importance of Uniformed Officers

Cooperation and support from Commercial Vehicle Enforcement Division officers and Customs officials were essential to the success of the field data collection project. Uniformed officers provided two critical services. First, their presence helped to ensure the safety of the interview personnel. Second, the presence of a uniformed officer was likely a major contributing factor to the high level of participation received from truck drivers asked to complete an interview. While passing through weigh stations or ports of entry, truck drivers are prepared to present their records and respond to questions pertaining to enforcement. Many of the truck drivers indicated that they thought they were being asked to park for an enforcement violation. They expressed relief and willing cooperation when they learned that they were only being asked some questions about their destination and cargo.

Quality-Control Procedures

A program of on-site quality control is essential to ensuring accurate data results from the interviews. A strong training program for the interview teams was one tool utilized to support accurate data collection. In addition, a supervisor from the project management team was assigned to each site to check questionnaires for accuracy as they were completed. Problem areas were immediately addressed with interview personnel as necessary.

A quality-control award was established as an extra incentive for service clubs to perform quality work. Small bonus checks were awarded to clubs that provided data entry personnel with the most legible, accurate, and complete questionnaires. As a result many of the clubs instituted their own quality-control measures. Many of the clubs assigned one individual to check each completed questionnaire and make changes as necessary. Several of the clubs rewrote questionnaires that were less legible.

Data quality was also affected by the weather and other events beyond the control of the team. For example, some paper questionnaires got wet during rain showers. Several of the interview sessions took place during snowstorms. To protect the safety of the crew and ensure high-quality data, interviews were often conducted inside the scale house during periods of bad weather.

Particularly along high-traffic-volume corridors, brief interruptions to the data collection occurred. For example, during high-volume periods, the available capacity on the weigh station entry ramp may be inadequate. In these cases, to prevent congestion on the highway it was necessary to shut down enforcement and inter-

view activities until the traffic could clear. In several cases road construction in the vicinity of the weigh station made it necessary to cease interview operations for a period of several hours. At one station, a hazardous material spill resulted in the closing of an interview site for an entire afternoon. Interview teams recorded any breaks in activity or other problems affecting data quality on a site summary sheet provided to the project managers.

LESSONS FROM WASHINGTON FREIGHT TRUCK STUDY

The Washington study is the first in the United States to collect statewide freight truck O-D data through direct personal interviews of truck drivers. This final section highlights several lessons learned from the Washington study as insights for other states or regional planning organizations contemplating a freight truck study.

Lesson 1: Community service clubs can be a viable labor force for conducting personal interviews of truck drivers. However, strong management systems are required. Over 300 community service club members participated as interviewers for the study. In general, service club members proved to be an able and effective labor force for conducting truck interviews. By utilizing service clubs it was possible to assemble a very large labor force willing to work for a 1-day period on a scheduled date. The ability to assemble workers living close to selected interview sites was also an advantage. Individuals living in the area often had personal knowledge of roads and local industries that proved helpful in communicating and accurately recording responses offered by truck drivers.

The use of service clubs as a labor force provided additional benefits to the state and regions beyond data collected for the study. Funds raised from this project were used by the clubs to provide services in their communities, for example, Little League baseball teams, construction of an outdoor community amphitheater, upgrading of bleachers at the baseball field, support of local hospices, provision of eyeglasses and hearing aids to the elderly and disadvantaged, corneal transplants, and ongoing medical research. In addition, hundreds of Washington residents gained a new appreciation of the importance of the highway system in transporting products that they utilize in their daily lives.

Service clubs offer many advantages as an interview labor force. However, they also present several critical challenges that must be addressed through strong management systems. The most significant of these challenges is a lack of uniform skills and physical abilities among service club members. Implementing a strong and consistent training program is essential when utilizing service club members, who may have no previous experience in conducting personal interviews. Training should include both classroom instruction as well as on-site supervision.

The majority of service club members are highly capable individuals with excellent skills required to accurately record information provided by truck drivers. However, the personal skills or physical condition of some members can be a significant hindrance to quality data collection. Consequently, it is recommended that written agreements with the clubs be developed to ensure that persons unable to perform quality work are not assigned to interview tasks. Frequent project management evaluations are recommended to help identify individuals with particular problems. When possible, additional assistance may be offered to help correct data collection problems associated with a particular individual. However, the project management team should retain the authority to dismiss an individual from the interview team if necessary.

Lesson 2: Involvement of uniformed enforcement officers is a critical factor in obtaining cooperation and participation from truck drivers requested to complete interviews. A remarkably high level of cooperation and participation from drivers was obtained in the study. Even though participation was voluntary, approximately 95 percent of the truck drivers asked to participate agreed to an interview. The constant presence of a uniformed officer at all sites was a major factor contributing to participation. When a truck driver interview study is planned, it is essential to solicit cooperation from Commercial Vehicle Enforcement Division officers and Customs officials (for border crossings). In the state of Washington, these organizations were enthusiastic partners. Results from the statewide truck study will also be helpful in planning for more effective commercial vehicle enforcement activities.

Lesson 3: Site setup and the use of systematic sampling techniques are important factors to maintain traffic flows and promote cooperation at the interview sites. The approach of systematically selecting trucks for an interview according to their position in line as they entered the weigh station proved to be an excellent technique to promote smooth traffic flows at the data collection sites. A rhythm was established in which one truck was able to pull out of the designated interview area as another truck pulled in. A commitment to keep personal interviews under 3 min encouraged cooperation among the truck drivers, many of whom were on a tight schedule but willing to spend 3 min. Every station is unique. Enough interviewers were present on site to ensure that drivers did not have to wait for an interview. To maintain interview team safety and cooperation from the drivers, careful attention to site setup and sampling procedures is essential.

Lesson 4: Establishing ongoing procedures for evaluation and modification of procedures is important to quality data collection. Establishing formal systems for evaluation and improvement of

data collection procedures is a key element of a successful survey methodology. Members of the project management team maintained on-call accessibility to both the Washington State Patrol and the clubs during the interviews. An individual from each club was identified as survey coordinator, whose primary responsibility was to coordinate and communicate all survey-related activities among club members. Weekly phone calls were made to both the Washington State Patrol and the service club coordinators to remind them of upcoming survey dates. This consistent communication worked well to build rapport and credibility. It also provided everyone with an opportunity to discuss any issues as they arose and to stay current with the project.

After the second round of data collection, a more formal evaluation took place. Telephone interviews were conducted with each Commercial Vehicle Enforcement officer and with each club coordinator. The interviews provided the opportunity for feedback on the interview process from both a safety and a field perspective. This evaluation process resulted in several changes to the survey instrument to make questions clearer. It also provided a structured review of the data collection process and suggestions for improvements. Most important, the ongoing evaluation process helped to maximize the quality of data collected.

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