TRUCK AND TAXI SURVEY SAMPLE SELECTION

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The truck and taxi survey was one of the several origin and destination surveys conducted by the transportation study staff of the Southeastern Wisconsin Regional Planning Commission as a part of the regional land use-transportation study. The purpose of this survey, which was scheduled for the months of May and June, 1963, was to obtain information relative to the travel of trucks and taxis within the Region.

Obviously, it would be far too costly and time consuming to obtain the necessary travel information by personal contact with each of the approximately 60,000 trucks and 500 taxis\(^1\) within the Region. It was decided, therefore, to personally interview truck and taxi owners in the most highly developed areas of the Region by sampling technique and to contact all other owners in the Region by means of postal questionnaires.

The purpose of this report, then, is to explain in detail the procedures followed in selecting the sample trucks and taxis for the personal interview survey. Since the method used for selecting the sample trucks differed from that used for taxis, the discussion of drawing each sample is handled separately.

SELECTING SAMPLING AREAS

An examination of the general nature of the 2688 square mile Region revealed that, considering population density and socio-economic development, there are three highly developed areas, namely Milwaukee, Racine and Kenosha. More than 80 percent of the Region's population (1.6 million people) reside in these areas. (See Map 1, page 28.) The remainder of the Region contains a number of smaller cities, villages, and towns oriented into essentially rural and rural-urban fringe areas. For the purpose of this report, each reference to the Milwaukee survey area, the Racine survey area, and the Kenosha survey area will apply to these three highly developed portions of the Region where a sampling process was used. (The remaining portion of the Region will be referred to as the postal questionnaire survey area.)

An estimate based on Wisconsin State Motor Vehicle Department records showed that approximately three-fourths or 45,000 of the 60,000 trucks in the Region were garaged in these same three highly developed areas and that, except for a very few, all of the Region's 500 taxis were likewise operated within these areas. A further breakdown indicated that approximately 36,000 of the 45,000 trucks were garaged in the Milwaukee survey area, 5,000 in the Racine survey area, and 4,000 in the Kenosha survey area. The Region's remaining 15,000 trucks, it was revealed, were garaged in the postal questionnaire survey area.

SAMPLE SIZE DETERMINATION

Personal Interview Survey
First, considering the personal interview truck and taxi survey in the Milwaukee, Racine and Kenosha survey areas, it was thought that experience in previous transportation studies served as the best basis for the determination of the sample rates in the purported survey. The sample rates selected, therefore, were based on the standards established by the U.S. Bureau of Public Roads in other metropolitan areas of equivalent sizes. These standards take into account such characteristics, concerning the data and its uses, as population and size of the area.

Previous transportation studies have primarily been concerned with a single metropolitan area and could, therefore, be represented by a single universe from which the samples could be drawn. It was felt, however, that three separate areas would be needed for this survey, and separate consideration would be needed in the determination of sample sizes for each personal interview survey area.

In consideration of all the aforementioned factors, a sample rate of 1 in 12 was selected for the Milwaukee area and a sample rate of 1 in 4 for both the Racine and Kenosha areas.

Postal Questionnaire Survey
Previous studies again served as the basis for the determination of the sample rate for the postal questionnaire survey. A 100 percent sample size was selected for the postal questionnaire survey because there were only approximately 15,000 trucks and less than 100 taxis distributed over the 2113 square mile postal questionnaire survey area.

It was further felt that only by using the 100 percent mail-outs to truck and taxi owners in this area, could a return of an adequate number of completed questionnaires be expected which would be representative of all parts of the postal questionnaire survey area.

SELECTING THE SOURCE
An evaluation and appraisal of all possible sources was made. It was found for example that, though records of truck registrations and taxi licensing in Wisconsin are maintained by the Wisconsin State Motor Vehicle Department, government trucks are not listed by any single agency, and there is no list separating taxi licenses from those of private passenger cars. These limitations were overcome, however, by localizing
the search for valid source information.

**Truck Registrations**

During examination of the records, it was found that there were actually two truck files: 1) a data processing card file of all trucks having a gross weight of less than 8,000 pounds, together with all farm trucks, and 2) a complete file of all truck registration certificates in alphabetical sequence by owners' last name for each post office. This second file also contained records on buses, all types of municipal vehicles, semi-trailers, motorcycles, mobile homes, ambulances, and hearses.

Trucks in Wisconsin may be registered either for the entire year, by quarter or by any combination of quarters. For example, a road building contractor who does not use certain trucks in the winter season, may choose not to license these vehicles until the second quarter of the calendar year which begins on the first of April. By doing this, some of the expense of licensing these vehicles in the first quarter of the year is saved. This, of course, means that the file of truck registrations for any given year is not complete until the end of that calendar year. (No truck license may carry over from one calendar year to the next calendar year.)

**United States Government Trucks**

Since United States Government trucks are not registered or licensed with the State of Wisconsin, no records of these vehicles were available from the state motor vehicle department. Also, it was discovered that no single agency within the Federal government could furnish information about all of the U.S. Government trucks operating within the Region.

Through the use of telephone directories and personal knowledge of the Region, a list was compiled of U.S. Government agencies having trucks garaged within the Region. A letter was written to each of these agencies (post offices, military commands, and the central Federal motor pool) requesting information about each of their trucks. The information obtained included the make, size, and U.S. Government registration number. From the replies to these letters and from further inquiries, a list was compiled of all U.S. Government trucks garaged in the Region.

**Supplemental Truck Samples**

After the survey was underway, further checking of the Wisconsin State Motor Vehicle Department files revealed a considerable number of truck registrations that were filed after April 1st (after the original sample lists had been compiled). It was then decided that these trucks should be included in the universe, since they were operating on the streets and highways of the Region during the survey period. Approximately two man-weeks were required to carefully check the files and hand list all of these vehicles. This listing and subsequent sampling was completed after the middle of June and, therefore, included all registrations through June 15, 1963. Records indicate that approximately 500 additional sample trucks were obtained by this operation.

**Taxi Registrations**

Taxis are licensed with the Wisconsin State Motor Vehicle Department. Unfortunately, however, a separate file for taxis is not maintained. They are included as part of the
passenger car file and cannot be sorted in any convenient manner. Hand sorting of the complete passenger car file would have been the only available means of obtaining a list of taxis from the state motor vehicle department. Fortunately, two other sources of information were available. One source was the records in the clerk's office of each community and the other source was the taxi companies themselves.

Taxis are required to be registered with the municipality in which they operate so that the municipality can exercise some control over operations within its boundaries. A check did reveal that all taxis operating within the three highly developed areas were registered with the appropriate clerk's offices. However, some of the clerk's records were only updated once each year and were not current. Therefore, all of the taxi companies within the Region were also contacted to help compile a complete and accurate list of all taxis.

THE TRUCK SURVEY SAMPLING METHOD
To select the sample trucks and complete the pre-survey operations by the end of April for the interviews, it was necessary to begin obtaining data from the motor vehicle department in March. This was actually prior to the time the sample size had been determined. The Wisconsin State Motor Vehicle Department was most cooperative and willing to make any information available to the study itself. Unfortunately, however, since no duplicate copies of the truck registrations were available in the department files, it was impossible to remove any of the records from the state office building without interfering with their daily operation. After considering various means of drawing the sample, it was decided to make a complete copy of the truck registration file which included all vehicles in the Region except passenger cars and taxis.

To accomplish this, the registration cards were microfilmed with the assistance of the motor vehicle department personnel. This microfilming was completed in about two weeks at a cost of approximately $175.00. It took eleven rolls of microfilm containing approximately 5,500 vehicle registrations per roll to accommodate the information. Originally, it was planned to display the microfilm registrations by the use of a microfilm reader and have the sample data keypunched into cards for electronic sorting or to hand list the desired sample. However, tests using the reader indicated that these procedures were not satisfactory.

First of all, it was found that neither the keypunch operator nor the editor, reading the sample registration certificate and recording the data, were able to keep an accurate count of the certificates. Also, since the film was not marked, there was no means of checking the sampling accuracy at a later time. Because of this and other problems (including a high estimated cost and time requirement) this method was rejected.

It was decided finally to have an enlarged print made of each microfilm roll so that each certificate would be approximately 2 inches by 3 inches in size. (Each roll of microfilm was printed on a continuous paper roll - 8 inches wide and 1500 feet long.)

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2. The microfilm reader is a projector and screen combination unit which displays an enlarged picture of the microfilm onto a lighted glass screen.

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Drawing the Sample

After the sample size had been determined and the prints of all registration certificates were on hand, the physical work of drawing the sample was started. The first step was to separate the data into four groups: the Milwaukee survey area, the Racine survey area, the Kenosha survey area, and the remainder of the Region. The registration certificates were then counted and numbered on the prints in accordance with the selected sample rates of 1 in 12 in the Milwaukee survey area and 1 in 4 in the Racine and Kenosha survey areas. The fact that there were semi-trailers, buses, mobile homes, motorcycles, and municipal vehicles in addition to the trucks complicated the sample selection. It was decided to select the sample vehicles in the following manner (using the Milwaukee survey area as an example). Each twelfth registration certificate was marked and then examined to determine the type of vehicle. If the twelfth registration was a truck, it was selected as a sample. If the twelfth registration was not a truck, it was discarded based on the theory that vehicles other than trucks were distributed randomly throughout the list. This same procedure was followed for the Racine and Kenosha survey areas, except that every fourth vehicle was considered for selection as a sample truck in these areas. All truck registrations in the Region outside the three highly developed areas were set aside for the postal questionnaire survey.

After the sample vehicle registrations were selected, a numerical code was assigned which geographically located the vehicle owner's address. Information on the sample certificate, such as the owner's name and address, the vehicle type, make, year, and license number along with the geographic code was keypunched into IBM cards. The cards were then arranged by quarter section for convenience in making interview assignments by area. Once this was accomplished, a further breakdown by owner's address within the quarter section made possible the assignment, for interview, of all of the sample trucks operated by a single owner on one day or, if necessary, on succeeding days. This procedure minimized the inconvenience to truck owners and resulted in a more satisfactory work schedule for the interviewers.

Some difficulty was experienced during the keypunch operation because some of the information printed on the enlarged microfilm was not legible. At first, it was thought that this was due to poor quality control in the process of enlarging and duplicating the microfilm records on the paper rolls. However, investigation revealed that, in most cases, it was the original copy of the registration certificate in the motor vehicle department files that was not clearly readable. All of the questionable samples were referred back to the source and correctly identified.

The government vehicles were grouped by survey area and the sample was selected in the same manner as that used for taxis (see below).

THE TAXI SAMPLING METHOD

Once a complete list of taxis had been compiled as previously described, the procedure for drawing the sample was relatively simple. The list was sorted and each taxi lo-

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3. The quarter section, representing an area of approximately one quarter square mile, was considered the smallest areal unit for analysis in the land use-transportation study.