

ANALYSIS OF HEAVY-DUTY TRUCK USE IN URBAN AREAS

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Daniel F. Blower
Research Associate

Kenneth L. Campbell
Principal Investigator

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<p>16. Abstract</p> <p>In the past, analysis of the contribution of heavy-duty diesel trucks to urban emissions have had to rely on various estimation procedures to allocate diesel truck mileage between urban and rural areas. With the completion of the National Truck Trip Information Survey, actual data on the urban and rural proportions of mileage are available for a nationally representative sample of medium and heavy trucks. In addition, NTTIS includes data on mileage by road class, engine characteristics, fuel economy measures, cargo types and weights, and vehicle weights, as well as many other variables that provide a more detailed look at the operation of medium and heavy trucks in urban areas.</p> <p>In this report, the NTTIS sample and survey methodology are discussed. Variables in the study particularly relevant to urban diesel truck emissions are defined. The bulk of the report is devoted to tables examining the operations of medium and heavy-duty trucks in urban areas. The tables show the structure of the U.S. truck population, the breakdown of truck travel between urban and rural areas by road type, engine horsepower, and gross combination weight. In addition, truck travel in Los Angeles is examined, and travel in certain specific large urban areas is compared with travel in all large urban areas.</p>			
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INTRODUCTION

In the past, analyses of the contribution of heavy-duty diesel trucks to urban emissions have had to rely on various estimation procedures to allocate diesel truck mileage between urban and rural areas. With the completion of the University of Michigan Transportation Research Institute's National Truck Trip Information Survey, actual data on the urban and rural proportions of mileage are available for a nationally representative sample of medium and heavy trucks. In addition, NTTIS includes data on mileage by road class, engine characteristics, cargo types and weights, and vehicle weights, as well as many other variables that will provide a more detailed look at the operation of medium and heavy trucks in urban areas.

The data in this report come from the National Truck Trip Information Survey, or NTTIS. NTTIS is a national survey of the truck population in the United States and how that population is used. The only alternative source of information on the population and use of medium and heavy duty trucks is the Truck Inventory and Use Survey (TIUS), conducted by the Bureau of the Census every five years. TIUS can provide detailed estimates of the size of different components of the truck population. It can also provide estimates of truck usage. But those estimates are limited to typical, annual usage. Travel information in TIUS is distributed among "local," "short haul," and "long haul" trips. Cargo information is limited to the typical weights and types carried. Moreover, there is no information in TIUS about the type of roads used or whether the travel occurred in rural or urban areas. In contrast, the travel information in NTTIS has been collected at the daily level, indeed at the trip level, so that truck travel in NTTIS can be broken down by road type, the population density of the area of travel, time of day, actual gross combination weight, and so on.

The following few sections discuss the sample design and selection procedures for NTTIS, the collection of the data and how those data were evaluated, and the weighting procedures that were employed to derive national population estimates from the sample. Next, the definition and application of data elements that are particularly pertinent to this project will be considered. The final section briefly covers the actual results of the project. The full set of tables examining urban diesel truck mileage is contained in Appendix A.

The NTTIS Sample

Vehicles included in the survey are trucks with a gross vehicle weight rating (GVWR) greater than 10,000 pounds. This means that basically all

trucks of Class 3 and above are included. Excluded are all pickup trucks (regardless of GVWR), all passenger vehicles (such as passenger vans, recreational vehicles, ambulances, and buses of any type), farm tractors, and government-owned trucks.

The sample frame was formed from registration files maintained by the R. L. Polk Company. Polk maintains files of registered vehicles for every state except Oklahoma. The versions of these files reflecting registrations as of July 1, 1983, were used. In addition, the Polk registration data for California does not include trucks with model years prior to 1973. Hence, the NTTIS sampling frame included the contiguous 48 states plus the District of Columbia, except for the state of Oklahoma and pre-1973 model-year trucks in California. The lists were processed to subset the proper weight classes of trucks and to eliminate duplicate registrations.

In order to make sure that the sample would contain a good distribution of tractors and straight trucks, before the sample was drawn an UMTRI-developed algorithm was used to assign vehicles in the registration lists to tractor, straight truck, and unknown power unit type categories. Trucks were then sampled by state, and within a particular state, separately for tractors and straight trucks. Sample sizes were specified for each state, roughly proportional to the size of the truck population in each state, and an interval selection procedure was followed in each stratum. At least 30 straight trucks and 60 tractors were selected from each state. California and Michigan were oversampled to increase the number of tractors that pull two trailers. A total of 8,144 trucks were thus selected to form the NTTIS sample.

Of the original sample of 8,144 vehicles, 564 or 6.9% were determined to be non-sample. Most of these had been destroyed or were no longer registered. A few turned out to be trucks with a GVWR under 10,000 pounds and a handful turned out not to be trucks at all. Of the 7,580 cases left after deleting the non-sample vehicles, interviews were completed for 6,305, for a response rate of 83.2%. The remaining 1,275 cases could not be completed. For many of the incomplete cases, the registration information obtained through R. L. Polk seemed out of date, and despite follow-up checks with state departments of motor vehicles and other sources, the truck still could not be located. Owners refused to cooperate in only about 3% of the cases.

It should be noted that collecting the vehicle-level data for NTTIS produced substantial changes in the distributions of straight trucks and tractors. Based on the Polk registration records, there were 2,497 straight trucks, 5,497 tractors, and 150 unknown power unit types in the original sample of 8,144 trucks. About 40% of the trucks selected as tractors turned out to be straight trucks in actual use, while 4% of the "straight truck" stratum were actually tractors.

Weights were derived which allowed the estimation of national population totals from the sample of trucks and trips. The weights were calculated primarily to compensate for the missing Oklahoma and pre-1973 model year California trucks, for the incomplete cases, and for missing data on the power unit type variable. Some other minor adjustments were also

made. A complete description of the weighting procedures can be found in the introduction to the codebook to NTTIS, *The National Truck Trip Information Survey*, UMTRI Report 88-11.

Survey Methodology

Data collection was divided into two phases. During the first phase, called the implementation phase, each vehicle was located and a description was obtained. Detailed travel information was collected during the second phase. The implementation phase began in January of 1985 and was substantially completed by May of that year. Each case began with the make, model year, Vehicle Identification Number (VIN) of the truck, and the owner's name and address. Interviewers tried to contact the most knowledgeable person available for implementation information. In the case of private persons, the best source was most often the owner himself; with large companies, contact people were typically fleet supervisors, dispatchers, mechanics, drivers, and so on. Once the initial contact was made, interviewers secured the owner's cooperation, confirmed the sample vehicle's identification, obtained descriptive information on the company and truck, including a recent odometer reading for the truck, and made arrangements for acquiring detailed mileage information on each of four random survey days over the following year.

Once the initial interview had been completed, every data element on the interview form was checked by an editor before being sent to keypunch and added to the data file. UMTRI has developed an extensive stock of information on trucks and trucking which was drawn upon to insure the accuracy of interview information. The VIN was decoded to determine the model of the vehicle. Then the physical description of the vehicle was compared with the manufacturer's specifications. Cabstyle, axle count, fuel type, length, and empty weight were all checked. Where equipment or cargo bodies were added to the frame, the editors referred to data on the typical added weight of different types and sizes of cargo bodies, extra axles, and other such equipment. When discrepancies were found between interview information and manufacturers' specs, additional calls were made to clear up the problems. A copy of the implementation interview form has been included in Appendix B.

The implementation phase produced completed cases on 6,305 trucks: 3,704 straight trucks and 2,601 tractors. A subsample of 5,112 trucks was selected for the second phase of the study, the collection of travel information. All tractors and all diesel-powered straight trucks were selected for the "trip" calls. In addition, all the non-diesels registered in California or Michigan were selected, as well as all Class 3 and 4 non-diesel straight trucks registered outside of California or Michigan. The remaining vehicles—non-diesel straight trucks registered outside of Michigan and California in GVWR Classes 5 through 8 or with unknown GVWR—were sampled at a half rate. This procedure resulted in the selection of 2,511 straight trucks and 2,601 tractors, making a total of 5,112 trucks.

During the "trip" phase, interviewers attempted to collect information on the use of each vehicle on four days over the course of a year. The survey year was divided into four quarters, each consisting of 89 days, called "date codes." Date codes were randomly assigned to each vehicle at the time of selection. The list of selected vehicles was sorted by owner, and date codes were assigned in such a way that adjacent vehicles on the list, and therefore vehicles possibly operated by the same owner, were not given consecutive date codes. In each quarter, when a truck's date code came up, an interviewer contacted the owner to find out how the truck was used on its date code. The survey call was made as soon as possible after the designated day, most often on the following day. Tractors trip calls ran from November 3, 1985, through November 4, 1986. Straight truck calls started on February 3, 1986, and were completed on February 5, 1987. Short, two- or three-day "break periods" were introduced between the quarters to allow the staff to prepare for the next quarter of interviewing. The start date for each trip quarter was chosen so that the survey day of any particular vehicle fell on a weekend no more than twice over the course of the survey year.

During the "trip" interviews on each truck, interviewers got the story of how the vehicle was used during the 24 hours of the survey day. The questions covered the driver's age and years with the company; whether the company was operating privately or for-hire; the number and type of trailers pulled, including their length, axle count, cargo body style and empty weight; the type and weight of any cargo; the time of day the truck operated and the route it took. Since the focus of the study was the miles put on by different types and combinations of trucks, whenever the driver, cargo, or vehicle configuration changed, the interviewer started a new trip form. Thus, the data collection scheme was designed to keep separate track of the mileage put on by each combination of driver, cargo and vehicle configuration.

Each completed trip interview form was subjected to the same scrutiny as the implementation phase form. Just as with the vehicle specs, UMTRI maintains an extensive collection of information about the weights and lengths of various types of trailers, the densities and weights of different types of cargoes, and so on. Editors were able to evaluate the travel information for accuracy and completeness. When the descriptions seemed ambiguous or unusual, interviewers made further calls until the editors felt confident of the accuracy of the information. Similarly, each trip was traced on specially prepared maps, so any breaks in the route could be discovered and corrected. A copy of the trip phase interview form can be found in Appendix B.

Variables of Particular Interest

Before turning to the analysis of urban truck mileage, it is appropriate to provide and discuss definitions for some of the variables that are used in this study. It is assumed that the reader is familiar with tractors and straight trucks and with the different weight classes of trucks. But some discussion is necessary of the meanings of "urban" and "rural," the system of

road classification used, and the other data gathered especially for this project.

NTTIS used Federal Highway Administration (FHWA) definitions of "rural," "small urban," and "large urban" areas. State-wide maps showing the FHWA urban areas are not available from either FHWA or the states, so local and county-wide maps with the appropriate boundaries were obtained from each state. UMTRI then prepared special maps of the 48 contiguous states showing these areas. Mappers used these maps to break down the mileage of each trip by area population type, time of day, and road class. The boundaries between the different population type areas are fixed by responsible State and local officials, subject to the approval of the Secretary of Transportation, and often extend beyond corporate and census boundaries. The following, then, are the definitions used for the population area type variable:

Large Urban	50,000 population or more.
Small Urban	5,000 to 49,999 population.
Rural	Less than 5,000 population.

Within the "large urban" category, miles traveled in fifteen particular large urban areas were tracked separately. Collectively, these areas were termed "Specific Large Urban Areas," or SLUAs. While in general the dataset is structured so that it is impossible to tell if urban miles were put on in Detroit or Dodge City, truck travel in each of the SLUAs was coded separately. Thus, for example, the use of trucks in Los Angeles can be compared with those in Washington. The SLUAs consisted of the following:

Boston	Reno
Chicago	Sacramento
Denver	San Diego
Los Angeles	San Francisco
Nashville	Seattle
Newark	Tucson
New York	Washington, D.C.
Philadelphia	

The special maps prepared by UMTRI with the area population types used the Rand McNally *Road Atlas*. This atlas was also used in classifying roads. For the "limited access" roads, this is quite straightforward. Access to a highway is either limited or it is not, and such highways are clearly marked. The distinction between "major artery" and "other" road types is somewhat less well-defined, but again the *Road Atlas's* classifications were

used, which appear to be both consistent and reasonable. In rural areas, the major arteries were almost all U.S. or State highways. In the larger urban areas, some roads are designated major arteries that are not U.S. or State highways. The “other” road type included all remaining public roads. The road type variable categories were:

- | | |
|----------------|--|
| Limited Access | U.S. Interstate highways and state highways which are similar to Interstates in that access to them is limited. |
| Major Artery | All U.S. and state routes that are not limited access, plus some other primary thoroughfares in large urban areas. |
| Other | All public roads that do not fall into the above two categories. |

A series of questions about the engine and fuel economy devices were added to the survey specifically for this study. These questions were asked only for trucks with diesel engines. Concerning the engine, questions covered the make, model, horsepower, and displacement, and whether the engine had been modified from the original specifications. These questions presented some special problems since, compared with the physical dimensions of trucks in general, our experience with data collection on truck engines is limited. Interviewers made a particular point of contacting the most mechanically knowledgeable person available for these questions. Where the VIN contained engine information, the editors compared the descriptions with available manufacturers specs. A series of questions also covered the use of fuel economy and aerodynamic devices in and on the truck. The questions included whether the cab had an aerodynamic design, the addition of other aerodynamic devices, the use of radials, tachograph, engine governor, fuel efficient oils, and so on. In general the questions did not measure the degree of aerodynamic efficiency gained or any increase in fuel economy, but rather whether the truck was spec'd to include such devices and whether the owner had taken other steps to improve fuel economy. The definitions used for these variables are presented in Appendix C. Table 45 in Appendix A shows the amount of usage for each fuel efficiency device for Class 3 to 7 trucks combined and Class 8 trucks. The proportions shown are lower bounds of the estimate; there were missing data in roughly 20% of the cases for each question.

TRUCK TRAVEL IN URBAN AREAS

The major results of this project are contained in the tables in Appendix A. In the following sections, the tables will be briefly discussed in an effort to put them into perspective and to assist in their interpretation.

In most of the tables, trucks are categorized by fuel type, gross vehicle weight rating (GVWR), and power unit type (tractor or straight truck). In examining the tables, the reader will become convinced that these splits correspond to real and important differences in truck usage. Tractors put on roughly twice as many miles as straight trucks. Moreover tractors are typically used quite differently from straight trucks, tractors being used more often for long-hauls on the Interstates, straight trucks for shorter, more local trips. Tractors are overwhelmingly diesel-powered while straight trucks have more of a mix of engine types. On the other hand, the heavier weight classes are predominantly diesel-powered, even among straight trucks. Straight trucks put on somewhat more of their miles in urban areas than tractors, and tend to take shorter trips and cover fewer miles. Thus, splitting truck travel by these categories corresponds more closely to how trucks are actually used in the United States.

The VIN-derived GVWR variable generated by R. L. Polk was used to determine the weight classes. EPA and some other groups break Class 8 trucks into 8a and 8b categories. The 8b category is intended to capture trucks with a GVWR of 50,000 pounds or more. The 8a-8b distinction originated with a variable in TIUS which shows the *typical* gross combination weight of a truck as reported by the owner. Some groups have used this variable as if it were comparable to the manufacturer's GVWR. However, when this variable is compared with the VIN-derived GVWR, the agreement is very poor, except for Class 1 and Class 8. In general, less than a quarter of the trucks have the same code.

This lack of agreement is not all that surprising. Trucks are not always operated at their rated weight. Some vehicles are regularly overloaded, and thus would fall into a typical GVW category that is higher than their GVWR. Other trucks are "over spec'd" for their actual operations, and misleadingly appear in a lighter-duty GVW category. If all the trucks with TIUS GVW codes over 33,000 pounds, which should correspond to Class 8, are combined, they add up to 89% of the trucks with a VIN-derived Class 8 code. But since the 8b trucks are identified by *typical* combination weights while *operating*, these trucks cannot be identified by the manufacturer when they are produced and sold. Because the distinction between 8a and 8b trucks is based on the truck's operations, not on its rating or design, the GVWR code derived from the VIN by R. L. Polk is a more reliable and accurate way of identifying large trucks. When it is desirable to identify a

class of "heavy-heavy" trucks, engine horsepower seems a more appropriate way to subset the Class 8 trucks.

It is hoped that the headings of the tables are self-explanatory for the most part, but one of them warrants some further discussion. Except for the first table, each table includes a column headed "N (trips)." The values in this column show the number of "trips" on which the population proportion estimate is based. A "trip" is essentially an arbitrary unit which was defined to permit the aggregation of the miles traveled by different combinations of truck, cargo, and driver. Whenever any of those things changed, e.g., a trailer was added or some cargo unloaded, a new "trip" began and mileages were accumulated for the new combination. Thus a "trip" does not correspond directly to miles traveled. But information about the number of trips was included to allow an assessment of the number of trips on which the population estimates were based. In many of the tables, truck travel has been split into many categories. Consequently, for some of the categories the number of trips travel estimates are based on is fairly small, and therefore the estimates are less reliable. In general, categories with over 100 trips should be fairly accurate. As the sample size dips below 100, sampling errors get increasingly larger. It is important to keep this in mind while examining the tables.

Some of the GVWR classes have been combined. For the Class 3 to 5 diesel straight trucks and all of the tractor categories except the Class 7 and 8 diesel tractors, because the population totals are so small, the sample sizes are also very small. Combining the straight trucks with the tractors would take care of the sample size problem, but it would obscure some of the basic differences in the use of these two very different types of truck. Consequently for most of the tables, Classes 3 to 5 are combined for the straight trucks and Classes 3 to 6 for the tractors.

The Truck Population and Truck Travel

Tables 1 through 4 and Table 14 in Appendix A provide an overview of the truck population in the United States and its use. Table 1 shows the NTTIS estimates of the national truck population by weight class and fuel type separately for straight trucks and tractors. The first column, headed "N," shows the number of vehicles in the sample. The second column gives the national population estimate and the third column the percent each truck type makes of the whole. The domination of Class 6 gasoline trucks and Class 8 diesels is striking. Class 6 gasoline trucks are virtually all straight trucks, while about 80% of the Class 8 diesels are tractors. Each of these groups has over one million trucks, or about 35% of the total. All other types of trucks make up only about 30% of the total truck population.

Table 2 shows the distribution of total truck travel by truck type and area type. This table is useful for identifying the truck type and area that accounts for the bulk of truck miles. Class 8 diesel tractors in rural areas account for a whopping 44.7% of all truck travel. Class 8 diesel tractors in large urban areas account for another 16.6% of the truck travel. It is also

useful to compare the right-hand column in this table showing the percent of travel by truck type with the population proportions from Table 1. The travel percents by power unit type are the reverse of the population percents. While over 70% of the trucks are straight trucks, tractors actually put on about 70% of the miles.

Tables 1 and 2 thus indicate the major players in both the truck population and truck travel. The next two tables break down that travel by the type of area. Table 3 shows the distribution of travel for each configuration by area type. The distributions are shown as row percents, thus each row sums to 100. Looking at the truck type that accounts for nearly 65% of all truck miles (from Table 2), Class 8 diesel tractors, the reader will note that while 69% of their travel is in rural areas, 26% is in large urban areas. Table 14 repeats Table 3, combining straight trucks and tractors. Table 4 shows the distribution of travel by truck type for each area type, thus each column sums to 100. Almost 54% of the truck travel in large urban areas is by Class 8 diesel tractors, and another 13% is by Class 8 diesel straight trucks.

Tables 1-4 and 14 are quite important in providing a perspective for the rest of the tables. They are useful in showing the overall percent of travel for different truck types, and thus aid in assessing the relative importance of some of the finer detail in subsequent tables.

SLUAs and Large Urban Areas

Tables 5 through 7 compare truck travel in the 15 Specific Large Urban Areas with that in other large urban areas. The first table in the sequence, Table 5, shows the distribution of travel by truck type within non-SLUAs, SLUAs, and all large urban areas. It appears that overall the distribution is about the same. Tables 6 and 7 look at the distribution of travel by road class for different truck types in the Specific Large Urban Areas and in other large urban areas. Again, overall the distributions are fairly similar. It does not appear that the SLUAs are much different from other large urban areas, at least with respect to the way trucks are used in them.

Truck Travel in Los Angeles

Tables 8 through 11-C examine truck travel in the Los Angeles area. Since this analysis is restricted to such a small area, sample sizes are smaller and sampling errors correspondingly greater than the other tables. Categories with an N much less than 50 are probably not very reliable. Tables 8 through 10 show once again the dominance of Class 8 diesels. Table 9 also shows that within that large urban area, most of the travel is on limited access roads, which should indicate fewer starts and stops and more fuel efficient operations.

Tables 11 through 11-C look at the travel of trucks in Los Angeles both by the state of registration and by the certification of the truck's engine. From Table 11-A, it appears that most of the truck travel in Los Angeles is by trucks registered in California. Class 8 non-California diesel tractors account for only 11.6% of the limited access truck travel. Tables 11-B and 11-C break down the travel by the certification of the engine. Only diesel-powered trucks are included in these tables. Though the engine manufacturers supplied complete information on the original certification of the truck engine, in a number of cases the owner indicated that he had subsequently modified the engine. The certification of those engines was accordingly coded "unknown." Table 11-C indicates that a somewhat greater proportion of the truck travel in Los Angeles is by trucks with non-California certified engines. Off the Interstates, the proportion of travel with California certified engines grows somewhat, as would be expected.

Travel in Large Urban Areas by Road Type

Road class can be used as a surrogate to get at the cycle of operation for a truck. Normally travel speeds on the Interstates and other limited access roads are more constant and fuel efficient than on other road types. At the other extreme, one would expect more stop-and-go driving on "other" roads. Tables 12 and 13 look at the distribution of truck travel within large urban areas across road type. Table 12 shows the distribution of travel for the road type variable for each truck type. For tractors, the heavier duty trucks put on many more of their miles on limited access roads. Smaller straight trucks are operated more often as pickup and delivery vehicles and consequently accumulate more of their miles on "primary" (major artery) and "other" roads. Table 13 helps put this in context by showing the relative proportion of travel by each truck type for each road type. It shows that Class 8 diesel tractors put on 71.6% of the truck travel on limited access roads. And even though they put on only 13.2% of their miles on "other" roads, that accounts for almost 28% of all truck travel on "other" roads.

Special Tables for the EPA

Tables 15 through 19 were prepared at the specific request of the EPA for use in preparing the MOBILE 4 projections of emissions. Tables 15 and 16 show the proportion of travel in large urban areas by truck type and model year. Tractors are combined with straight trucks. The reader should bear in mind that the number of trips many of the estimates are based upon are quite small. For the familiar Class 8 diesel, for which sample size is definitely not a problem, it appears that the newer model years are used less in large urban areas than the older trucks.

Total mileage estimates for different truck types by model year and area of operation are shown in Table 17. The use of absolute mileage figures, as opposed to *percentages* of travel, can be problematic. Estimates of total travel can vary widely depending on the source of data and the method of

estimation. NTTIS generated mileage estimates by three different methods. The first was that used by TIUS; that is, the truck operator was asked to estimate his mileage over a 12-month span. NTTIS also generated annual mileage estimates from the surveys of four random travel days, inflating the daily averages thus derived to a yearly estimate. And finally, NTTIS sought an odometer reading on each truck at the beginning and again at the end of the survey.

To put NTTIS total travel figures in context for the EPA, Tables 18 and 19 were prepared. Table 18 compares figures for average annual mileage for similar truck types from NTTIS and TIUS, using the method of operator estimation. The agreement is quite good, with the NTTIS figures slightly higher for both tractors and straight trucks. This was expected since each sample was drawn from the same source and the question was asked in the same way. Table 19 compares the estimates of total travel from the three different methods used in NTTIS. As the table makes clear, each method produced a different answer. When people were asked to estimate their travel, they tended to go high. When each route was followed on a map, it seemed that not all the trips were reported to us. In the end, it was decided that the mileages from actual odometer readings were the most accurate and weighted the mapped miles to reflect the results from the odometer readings. Mileages estimated by this method—mapped miles weighted up to reflect odometer readings—are shown in Tables 17 and 18, and indeed, those mileages were used to determine all of the distributions of mileages in this report.

Truck Travel and Engine Horsepower

Tables 20 through 32 display the results of an analysis of truck travel for different engine horsepowers. Engine information was collected only for diesels, so the analysis includes only diesel-powered trucks. The trucks were divided into two groups by the horsepower of their engines. A cut point of 250 h.p. was chosen, after consultation with members of the MVMA, as a reasonable point at which to separate heavy-duty truck engines from lighter-duty engines.

Table 20 breaks down the U.S. diesel truck population by power unit type, GVWR class and engine size. For each GVWR class, the table shows the proportion of trucks with engines under 251 h.p., over 250 h.p., and unknown horsepower. The first two sections of the table show tractors separately from straight trucks, the last section combines both power unit types. The next four tables of this series, 21-24, examine the distribution of truck travel by engine horsepower across the area type variable. For each truck type and category of horsepower, Table 21 shows the distribution of truck travel among rural, small urban, and large urban areas. Table 22 puts this in context by showing the relative proportion of travel for each combination of horsepower and truck type. Thus, while the straight trucks with engines of 250 h.p. or more put on 5.4% of the large urban travel, tractors with those heavy duty engines accounted for 47.5% of the large

urban travel. Tables 23 and 24 repeat the analysis of Tables 21 and 22, but this time combining tractors with straight trucks.

The next four tables of the series, 25-28, show the distribution of truck travel by engine horsepower for the different road types. From Table 25, it appears that tractors with the heavier-duty engines accumulate more of their miles on limited access roads than those with the lighter-duty engines. This may also be true for straight trucks though the effect is less pronounced, reflecting the use of big engines in construction trucks and the like which operate a lot on other roads. Table 26 shows column percents by road type for the various combinations of engine and truck type, and Tables 27 and 28 repeat the analysis, combining tractors and straight trucks.

Finally, Tables 29 through 32 restrict the analysis to truck travel in large urban areas only. Once again, the first table in this series shows row percents, the second column percents, and the next two tables repeat the analysis combining tractors and straight trucks. An examination of these tables reveals once again the dominance of Class 8 tractors. And it also shows that the bulk of the miles in large urban areas are accumulated by tractors with the larger engines, though the larger engines are used more often on limited access roads.

Truck Travel by Gross Combination Weight

The series of tables on truck travel by gross combination weight and GVWR is limited to trucks with diesel engines. In order to achieve reasonable sample sizes, Class 3 to 7 straight trucks were combined, as were Class 3 to 7 tractors. Thus the tables are for Class 8 diesel tractors, Class 8 diesel straight trucks, Class 3 to 7 tractors, and Class 3 to 7 straight trucks. For each truck type, the increments in gross combination weight (GCW) were chosen to show as much detail as possible while preserving useful sample sizes. Thus, for example, the gross combination weight of the Class 8 diesel tractors is shown in 5,000 pound increments, but the Class 8 diesel straight trucks in 10,000 pound increments.

Tables 33 through 36 show the distribution of travel for the selected truck types for each operating weight for the area type variable. Tables 33 and 34 show the distribution of travel among the different population areas for each combination of truck type and GCW. For example, Table 33 shows that Class 8 diesel tractors with a GCW between 70,000 and 75,000 pounds put 74.2% of their travel in rural areas, 4.7% in small urban, and 21.1% in large urban areas. Tables 35 and 36 put that information in context by showing how the travel was distributed across the different operating weights. The first three columns break down the travel for each area population type and the right-most column breaks down the total travel.

The next series of tables, Tables 37-40, repeat the same analysis, but this time for the road type variable. The first two display the distribution of travel for each vehicle type and each operating weight across the road type variable. The second two tables help with perspective by showing how the

travel for each road type was distributed across the various gross combination weights. So, for example, the data in Table 37 indicate that Class 8 diesel tractors, when operating at the heavier combination weights, travel more on limited access roads. Table 39 shows that while, for limited access roads, there is a secondary peak of travel in the 25,000 to 30,000 pound range (empty tractor-trailers, no doubt) much of the travel is in the more heavily loaded range. The pattern is the reverse for the "other" road types, indicating travel to pick up cargo, but once the cargo is loaded, the bulk of the travel is on limited access roads. Note from Table 37 that only about 6.8% of the Class 8 diesel tractor travel is on the "other" road type.

The final series of tables, Tables 41 through 44, are restricted to travel in large urban areas. With that exception, the pattern of the tables is the same as for Tables 37-40. The first two show for each vehicle type and range of operating weights how the travel was distributed across the various road classes. The second two show how for each road class and truck type travel was distributed across gross combination weight. In looking at the tables, the pattern noted in the previous section is more pronounced in the large urban areas. That is, for Class 8 diesel tractors, the heavier combinations put more of their miles on the limited access roads and fewer on "other" roads. By the same token, more of the travel on "other" roads is by the empty or lightly-loaded combinations, though "other" roads account for only 13.2% of the Class 8 diesel tractor travel.

Appendix A

TABLE 1
U.S Large Truck Population
by Power Unit Type, Weight Class and Fuel Type
National Truck Trip Information Survey File

Truck Type	N	Trucks	Percent
Straight Trucks			
Class 3-5 Gas	421	365,787	11.78%
Class 3-5 Diesel	9	5,053	0.16
Class 6 Gas	1,419	1,075,054	34.62
Class 6 Diesel	127	73,316	2.36
Class 7 Gas	333	132,469	4.27
Class 7 Diesel	295	110,069	3.54
Class 8 Gas	230	90,283	2.91
Class 8 Diesel	719	283,213	9.12
Other/Unk	148	50,069	1.61
All Straight	3,701	2,185,313	70.38%
Tractors			
Class 3-6 Gas	75	36,241	1.17%
Class 3-6 Diesel	47	17,459	0.56
Class 7 Gas	43	16,174	0.52
Class 7 Diesel	215	68,915	2.22
Class 8 Gas	16	6,648	0.21
Class 8 Diesel	2,188	771,333	24.84
Other/Unk	8	3,055	0.10
All Tractors	2,592	919,825	29.62%
Total	6,293	3,105,138	100.00%

TABLE 2
Distribution of Total Travel by Truck Type and Area Type
National Truck Trip Information Survey File

Truck Type	N (trips)	Percent			
		Rural	Small Urban	Large Urban	Total
Straight Trucks					
Class 3-5 Gas	299	1.08%	0.32%	1.16%	2.56%
Class 3-5 Diesel	22	0.08	0.0	0.15	0.24
Class 6 Gas	1037	6.00	0.98	3.35	10.33
Class 6 Diesel	249	0.53	0.12	0.92	1.57
Class 7 Gas	256	0.70	0.11	0.65	1.46
Class 7 Diesel	778	1.26	0.22	1.57	3.06
Class 8 Gas	175	0.66	0.16	0.28	1.10
Class 8 Diesel	1987	4.56	0.89	4.00	9.46
Other/Unk	145	0.49	0.04	0.32	0.85
All Straight	4948	15.37%	2.84%	12.41%	30.62%
Tractors					
Class 3-6 Gas	83	0.36%	0.04%	0.08%	0.48%
Class 3-6 Diesel	152	0.53	0.05	0.34	0.92
Class 7 Gas	54	0.03	0.01	0.07	0.11
Class 7 Diesel	629	1.13	0.15	1.32	2.61
Class 8 Gas	23	0.35	0.01	0.03	0.39
Class 8 Diesel	7187	44.70	3.53	16.56	64.79
Other/Unk	13	0.03	0.0	0.04	0.07
All Tractors	8141	47.14%	3.79%	18.45%	69.38%
Total	13089	62.51%	6.63%	30.86%	100.00%

TABLE 3
Distribution of Travel by Truck Type and Area Type
National Truck Trip Information Survey File

Truck Type	N (trips)	Row Percent by Area Type			Total
		Rural	Small Urban	Large Urban	
Straight Trucks					
Class 3-5 Gas	299	42%	12%	45%	100%
Class 3-5 Diesel	22	36	1	64	100
Class 6 Gas	1037	58	10	32	100
Class 6 Diesel	249	34	7	59	100
Class 7 Gas	256	48	8	45	100
Class 7 Diesel	778	41	7	52	100
Class 8 Gas	175	60	15	25	100
Class 8 Diesel	1987	48	9	42	100
Other/Unk	145	58	5	38	100
All Straight	4948	50%	9%	41%	100%
Tractors					
Class 3-6 Gas	83	75%	8%	17%	100%
Class 3-6 Diesel	152	58	6	36	100
Class 7 Gas	54	30	5	65	100
Class 7 Diesel	629	44	6	51	100
Class 8 Gas	23	89	3	8	100
Class 8 Diesel	7187	69	5	26	100
Other/Unk	13	44	0	56	100
All Tractors	8141	68%	5%	27%	100%

TABLE 4
Distribution of Travel by Truck Type and Area Type
National Truck Trip Information Survey File

Truck Type	N (trips)	Column Percent by Area Type		
		Rural	Small Urban	Large Urban
Straight Trucks				
Class 3-5 Gas	299	1.73%	4.77%	3.76%
Class 3-5 Diesel	22	0.13	0.03	0.49
Class 6 Gas	1037	9.59	14.81	10.85
Class 6 Diesel	249	0.84	1.76	2.99
Class 7 Gas	256	1.12	1.69	2.12
Class 7 Diesel	778	2.02	3.26	5.10
Class 8 Gas	175	1.06	2.46	0.90
Class 8 Diesel	1987	7.30	13.48	12.98
Other/Unk	145	0.79	0.60	1.04
All Straight	4948	24.59%	42.86%	40.23%
Tractors				
Class 3-6 Gas	83	0.58%	0.54%	0.26%
Class 3-6 Diesel	152	0.85	0.83	1.09
Class 7 Gas	54	0.05	0.08	0.23
Class 7 Diesel	629	1.82	2.26	4.29
Class 8 Gas	23	0.56	0.15	0.10
Class 8 Diesel	7187	71.5	53.28	53.67
Other/Unk	13	0.05	0.0	0.13
All Tractors	8141	75.41%	57.14%	59.77%
Total	13089	100.00%	100.00%	100.00%

TABLE 5
Distribution of Travel in Large Urban Areas by Truck Type
National Truck Trip Information Survey File

Truck Type	Column Percent by Area Type					
	Non-SLUA ^a		SLUA ^a		All Large Urban	
	N(trips)	%	N(trips)	%	N(trips)	%
Straight Trucks						
Class 3-5 Gas	247	3.87%	52	3.53%	299	3.76%
Class 3-5 Diesel	18	0.69	4	0.07	22	0.49
Class 6 Gas	877	10.11	160	12.38	1037	10.85
Class 6 Diesel	179	2.51	70	3.99	249	2.99
Class 7 Gas	210	2.39	46	1.56	256	2.12
Class 7 Diesel	605	5.55	173	4.18	778	5.10
Class 8 Gas	160	1.19	15	0.29	175	0.90
Class 8 Diesel	1547	11.86	440	15.29	1987	12.98
Other/Unk	126	1.15	19	0.82	145	1.04
All Straight	3969	39.32%	979	42.11%	4948	40.23%
Tractors						
Class 3-6 Gas	69	0.24%	14	0.31%	83	0.26%
Class 3-6 Diesel	141	1.52	11	0.20	152	1.09
Class 7 Gas	45	0.23	9	0.24	54	0.23
Class 7 Diesel	451	4.12	178	4.64	629	4.29
Class 8 Gas	19	0.08	4	0.15	23	0.10
Class 8 Diesel	5436	54.3	1751	52.35	7187	53.67
Other/Unk	13	0.19		0.0	13	0.13
All Tractors	6174	60.69%	1967	57.89%	8141	59.77%
Total	10143	100.00%	2946	100.00%	13089	100.00%

^aSpecific Large Urban Areas

TABLE 6
Distribution of Travel by Road Class in
15 Specific Large Urban Areas
National Truck Trip Information Survey File

Truck Type	N (trips)	Row Percent by Road Class			Total
		Limited Access	Major Artery	Other	
Straight Trucks					
Class 3-5 Gas	52	2%	18%	80%	100%
Class 3-5 Diesel	4	22	14	64	100
Class 6 Gas	160	46	21	33	100
Class 6 Diesel	70	37	30	33	100
Class 7 Gas	46	29	31	40	100
Class 7 Diesel	173	46	21	33	100
Class 8 Gas	15	45	33	22	100
Class 8 Diesel	440	39	30	30	100
Other/Unk	19	38	0.5	62	100
All Straight	979	38%	25%	37%	100%
Tractors					
Class 3-6 Gas	14	27%	29%	44%	100%
Class 3-6 Diesel	11	46	3	52	100
Class 7 Gas	9	23	44	33	100
Class 7 Diesel	178	40	23	37	100
Class 8 Gas	4	53	33	13	100
Class 8 Diesel	1751	73	14	13	100
All Tractors	1967	70%	15%	15%	100%

TABLE 7
Distribution of Travel by Road Class in All
Other Large Urban Areas (Non-SLUA)
National Truck Trip Information Survey File

Truck Type	N (trips)	Row Percent by Road Class			Total
		Limited Access	Major Artery	Other	
Straight Trucks					
Class 3-5 Gas	247	19%	35%	46%	100%
Class 3-5 Diesel	18	58	3	39	100
Class 6 Gas	877	33	23	44	100
Class 6 Diesel	179	34	36	30	100
Class 7 Gas	210	18	24	57	100
Class 7 Diesel	605	30	29	42	100
Class 8 Gas	160	23	30	47	100
Class 8 Diesel	1547	32	30	39	100
Other/Unk	126	8	31	61	100
All Straight	3969	29%	28%	43%	100%
Tractors					
Class 3-6 Gas	69	31%	62%	7%	100%
Class 3-6 Diesel	141	47	19	34	100
Class 7 Gas	45	28	40	32	100
Class 7 Diesel	451	36	23	41	100
Class 8 Gas	19	57	30	12	100
Class 8 Diesel	5436	68	19	13	100
Other/Unk	13	9	68	23	100
All Tractors	6174	65%	20%	15%	100%

TABLE 8
Distribution of Truck Travel in Los Angeles
by Truck and Road Class
National Truck Trip Information Survey File

Truck Type	N (trips)	Percent			
		Limited Access	Major Artery	Other	Total
Straight Trucks					
Class 3-5 Gas	3	0.00%	0.81%	0.00%	0.81%
Class 3-5 Diesel	0				
Class 6 Gas	32	6.21	0.33	4.24	10.79
Class 6 Diesel	8	1.08	0.24	0.04	1.37
Class 7 Gas	5	0.39	0.02	0.12	0.53
Class 7 Diesel	14	1.55	0.22	0.72	2.50
Class 8 Gas	0				
Class 8 Diesel	70	8.48	0.49	3.98	12.96
Other/Unk	2	0.06	0.03	0.49	0.58
All Straight	134	17.77%	2.15%	9.60%	29.53%
Tractors					
Class 3-6 Gas	8	0.23%	0.11%	0.72%	1.06%
Class 3-6 Diesel	4	0.03	0.05	0.43	0.51
Class 7 Gas	3	0.18	0.26	0.50	0.95
Class 7 Diesel	33	3.96	1.20	4.09	9.26
Class 8 Gas	0				
Class 8 Diesel	275	43.46	5.17	10.05	58.68
Other/Unk	0				
All Tractors	323	47.88%	6.78%	15.80%	70.47%
Total	457	65.66%	8.94%	25.40%	100.00%

TABLE 9
Distribution of Truck Travel in Los Angeles by Road Class
National Truck Trip Information Survey File

Truck Type	N (trips)	Row Percent by Road Class			Total
		Limited Access	Major Artery	Other	
Straight Trucks					
Class 3-5 Gas	3	0.0%	100%	0.0%	100%
Class 3-5 Diesel	0				0.0
Class 6 Gas	32	58	3	39	100
Class 6 Diesel	8	79	18	4	100
Class 7 Gas	5	73	5	22	100
Class 7 Diesel	14	62	9	29	100
Class 8 Gas	0				0.0
Class 8 Diesel	70	65	4	31	100
Other/Unk	2	10	5	85	100
All Straight	134	62%	5%	33%	100%
Tractors					
Class 3-6 Gas	8	22%	11%	67%	100%
Class 3-6 Diesel	4	6	9	85	100
Class 7 Gas	3	20	27	53	100
Class 7 Diesel	33	43	13	44	100
Class 8 Gas	0				0.0
Class 8 Diesel	275	74	9	17	100
Other/Unk	0				0.0
All Tractors	323	68%	10%	22%	100%

TABLE 10
Distribution of Truck Travel in Los Angeles by Road Class
National Truck Trip Information Survey File

Truck Type	N (trips)	Column Percent by Road Class		
		Limited Access	Major Artery	Other
Straight Trucks				
Class 3-5 Gas	3	0.0%	9.08%	0.0%
Class 3-5 Diesel	0			
Class 6 Gas	32	9.46	3.69	16.71
Class 6 Diesel	8	1.64	2.68	0.19
Class 7 Gas	5	0.59	0.31	0.43
Class 7 Diesel	14	2.36	2.51	2.84
Class 8 Gas	0			
Class 8 Diesel	70	12.92	5.34	15.65
Other/Unk	2	0.09	0.31	1.94
All Straight	134	27.07%	24.14%	37.79%
Tractors				
Class 3-6 Gas	8	0.35%	1.27%	2.83%
Class 3-6 Diesel	4	0.05	0.50	1.70
Class 7 Gas	3	0.29	2.89	1.98
Class 7 Diesel	33	6.03	13.41	16.12
Class 8 Gas	0			
Class 8 Diesel	275	66.19	57.77	39.56
Other/Unk	0			
All Tractors	323	72.92%	75.86%	62.20%
Total	457	100.00%	100.00%	100.00%

TABLE 11
Distribution of Travel Across Road Class in Los Angeles
By State of Registration and Truck Type
National Truck Trip Information Survey File

Truck Type and Registration	N (trips)	Row Percent by Road Class			Total
		Limited Access	Major Artery	Other	
Straight Trucks					
Non Calif., Gas	1	0.0%	0.0%	100.0%	100.0%
Non Calif., Class 3-7 Diesel	1	30.0	70.0	0.0	100.0
Non Calif., Class 8 Diesel	0				
Calif., Gas	39	57.8	3.6	38.7	100.0
Calif., Class 3-7 Diesel	21	71.1	6.6	22.3	100.0
Calif., Class 8 Diesel	70	64.8	3.9	31.4	100.0
Other/Unk	2	10.3	4.8	84.8	100.0
All Straights	134	59.7%	4.9%	35.4%	100.0%
Tractors					
Non Calif., Gas	0				
Non Calif., Class 3-7 Diesel	5	5.5%	11.8%	82.7%	100.0%
Non Calif., Class 8 Diesel	35	92.3	1.8	6.0	100.0
Calif., Gas	11	21.1	18.7	60.3	100.0
Calif., Class 3-7 Diesel	32	44.6	12.9	42.4	100.0
Calif., Class 8 Diesel	248	71.7	9.7	18.7	100.0
Other/Unk	0				
All Tractors	331	68.2%	9.5%	22.3%	100.0%
All Trucks	465	65.8%	8.2%	26.0%	100.0%

TABLE 11-A
Distribution of Travel Within Road Class in Los Angeles
By State of Registration and Truck Type
National Truck Trip Information Survey File

Truck Type	N (trips)	Column Percent for Road Class		
		Limited Access	Major Artery	Other
Straight Trucks				
Non Calif., Gas	1	0.0%	0.0%	1.7%
Non Calif., Class 3-7 Diesel	1	0.2	3.3	0.0
Non Calif., Class 8 Diesel	0	0.0	0.0	0.0
Calif., Gas	39	10.5	5.2	17.8
Calif., Class 3-7 Diesel	21	3.4	2.5	2.7
Calif., Class 8 Diesel	70	11.5	5.5	14.1
Other/Unk	2	0.1	0.4	2.3
Subtotal, Straights	134	25.7%	17.0%	38.6%
Tractors				
Non Calif., Gas	0	0.0%	0.0%	0.0%
Non Calif., Class 3-7 Diesel	5	0.1	1.5	3.2
Non Calif., Class 8 Diesel	35	11.6	1.8	1.9
Calif., Gas	11	0.7	4.8	4.8
Calif., Class 3-7 Diesel	32	6.1	14.3	14.7
Calif., Class 8 Diesel	248	55.8	60.7	36.8
Other/Unk	0	0.0	0.0	0.0
Subtotal, Tractors	331	74.3%	83.0%	61.5%
Total, All Trucks	465	100.0%	100.0%	100.0%

TABLE 11-B
Distribution of Travel Across Road Class in Los Angeles
By Engine Certification and Truck Type
Diesel Engines Only
National Truck Trip Information Survey File

Truck Type and Certification	N (trips)	Row Percent by Road Class			Total
		Limited Access	Major Artery	Other	
Straight Trucks					
Federal, Class 3-7	3	28.9%	64.4%	6.7%	100.0%
Federal, Class 8	26	84.6	4.9	10.5	100.0
California, Class 3-7	18	72.0	6.4	21.7	100.0
California, Class 8	44	50.0	3.1	46.9	100.0
Unk, Class 1-7	1	unk.	unk.	unk.	
Unk, Class 8	0				
All Straight	92	65.2%	6.1%	28.7%	100.0%
Tractors					
Federal, Class 3-7	1	100.0%	0.0%	0.0%	100.0%
Federal, Class 8	109	81.8	6.2	12.0	100.0
California, Class 3-7	22	23.2	18.0	58.9	100.0
California, Class 8	111	68.5	10.3	21.2	100.0
Unk, Class 1-7	14	83.1	0.0	16.9	100.0
Unk, Class 8	63	74.0	9.2	16.9	100.0
All Tractors	320	69.7%	9.2%	21.2%	100.0%
All Trucks	412	68.9%	8.6%	22.5%	100.0%

TABLE 11-C
Distribution of Travel Within Road Class in Los Angeles
By Engine Certification and Truck Type
Diesel Engines Only
National Truck Trip Information Survey File

Truck Type and Certification	N (trips)	Column Percent for Road Class		
		Limited Access	Major Artery	Other
Straight Trucks				
Federal, Class 3-7	3	0.2%	3.8%	0.2%
Federal, Class 8	26	7.2	3.3	2.8
California, Class 3-7	18	3.8	2.7	3.5
California, Class 8	44	5.8	2.9	16.5
Unk, Class 1-7	1	unk.	unk.	unk.
Unk, Class 8	0	0.0	0.0	0.0
Subtotal, Straights	92	17.0%	12.7%	22.8%
Tractors				
Federal, Class 3-7	1	0.3%	0.0%	0.0%
Federal, Class 8	109	29.0	17.6	13.0
California, Class 3-7	22	2.8	17.6	22.1
California, Class 8	111	27.5	32.9	26.0
Unk, Class 1-7	14	3.8	0.0	2.4
Unk, Class 8	63	19.6	19.3	13.7
Subtotal, Tractors	320	83.0%	87.3%	77.2%
Total, All Trucks	412	100.0%	100.0%	100.0%

TABLE 12
Distribution of Travel Across Road Class
Within Large Urban Areas by Truck Type
National Truck Trip Information Survey File

Truck Type	N (trips)	Row Percent by Road Class			Total
		Limited Access	Major Artery	Other	
Straight Trucks					
Class 3-5 Gas	299	13.2%	29.4%	57.4%	100%
Class 3-5 Diesel	22	56.5	3.8	39.7	100
Class 6 Gas	1037	36.6	23.0	40.4	100
Class 6 Diesel	249	34.8	34.8	30.4	100
Class 7 Gas	256	21.7	25.4	53.0	100
Class 7 Diesel	778	34.5	26.8	38.7	100
Class 8 Gas	175	23.7	31.0	45.3	100
Class 8 Diesel	2009	34.2	29.9	36.0	100
Other/Unk	145	13.3	25.6	61.1	100
All Straight	4970	31.7%	27.1%	41.2%	100%
Tractors					
Class 3-6 Gas	83	28.5%	51.2%	20.4%	100%
Class 3-6 Diesel	152	49.5	17.1	33.4	100
Class 7 Gas	54	27.7	40.6	31.8	100
Class 7 Diesel	629	37.6	23.0	39.5	100
Class 8 Gas	23	55.9	31.3	12.9	100
Class 8 Diesel	7215	69.3	17.4	13.2	100
Other/Unk	13	8.9	68.6	22.5	100
All Tractors	8169	66.1%	18.2%	15.6%	100%

TABLE 13
Distribution of Travel Across Road Class
Within Large Urban Areas by Truck Type
National Truck Trip Information Survey File

Truck Type	N (trips)	Column Percent for Road Class		
		Limited Access	Major Artery	Other
Straight Trucks				
Class 3-5 Gas	299	1.0%	5.5%	9.1%
Class 3-5 Diesel	22	0.6	0.1	0.9
Class 6 Gas	1037	8.1	12.3	18.2
Class 6 Diesel	249	1.9	4.5	3.3
Class 7 Gas	256	0.8	2.3	4.0
Class 7 Diesel	778	2.9	5.5	6.7
Class 8 Gas	175	0.4	1.3	1.5
Class 8 Diesel	2009	7.7	16.4	16.6
Other/Unk	145	0.3	1.3	2.6
All Straight	4970	23.7%	49.0%	63.1%
Tractors				
Class 3-6 Gas	83	0.2%	0.7%	0.2%
Class 3-6 Diesel	152	1.1	0.9	1.5
Class 7 Gas	54	0.1	0.5	0.3
Class 7 Diesel	629	3.1	4.6	6.7
Class 8 Gas	23	0.1	0.2	0.1
Class 8 Diesel	7215	71.6	43.6	27.9
Other/Unk	13	0.0	0.4	0.1
All Tractors	8169	76.3%	50.9%	36.9%
Total	13139	100%	100%	100%

TABLE 14
Distribution of Travel by Truck Type and Area Type
National Truck Trip Information Survey File

Truck Type	N (trips)	Row Percent by Area Type			Total
		Rural	Small Urban	Large Urban	
Medium and Heavy Trucks					
Class 3-5 Gas	301	44%	12%	44%	100%
Class 3-5 Diesel	38	51	3	45	100
Class 6 Gas	1118	60	9	31	100
Class 6 Diesel	385	41	6	53	100
Class 7 Gas	310	46	8	46	100
Class 7 Diesel	1407	43	6	51	100
Class 8 Gas	198	67	12	21	100
Class 8 Diesel	9224	66	6	28	100
Other/Unk	158	58	4	39	100
Total	13139	63%	7%	31%	100%

TABLE 15
Large Urban Fraction of Travel
By Model Year Cohort
National Truck Trip Information Survey File

Truck Type	Model Year Cohort											
	0-61		62-66		67-71		72-76		77-81		82-84	
	Trips	%	Trips	%	Trips	%	Trips	%	Trips	%	Trips	%
Class 3-5 Gas	18	69.8%	82	8.8%	113	36.5%	39	73.1%	44	57.9%	5	100.0%
Class 3-5 Diesel	4	17.5	1	100.0	1	100.0	18	60.9	8	24.4	6	59.3
Class 6 Gas	43	13.6	98	12.5	152	24.4	456	29.9	351	40.1	18	41.5
Class 6 Diesel	0	0.0	9	29.4	8	97.1	38	22.7	271	53.3	59	76.7
Class 7 Gas	1	0.0	16	2.8	25	34.8	119	59.1	122	50.3	27	20.7
Class 7 Diesel	0	0.0	11	59.8	44	46.2	168	36.3	929	53.7	255	55.5
Class 8 Gas	0	0.0	13	40.0	35	47.4	88	5.7	39	25.5	23	40.0
Class 8 Diesel	65	50.4	68	24.9	544	28.2	1,999	29.0	5,398	28.4	1,142	22.5
Other/Unk	13	77.4	5	53.2	13	0.0	43	45.9	81	37.9	3	0.0

TABLE 16
Large Urban Fraction of Travel
By Selected Model Years
National Truck Trip Information Survey File

Truck Type	Model Years									
	1977		1978		1979		1980		1981	
	Trips	%	Trips	%	Trips	%	Trips	%	Trips	%
Class 3-5 Gas	14	86.7%	9	2.4%	12	44.3%	1	100.0%	8	38.2%
Class 3-5 Diesel	0	0.0	0	0.0	0	0.0	0	0.0	8	24.4
Class 6 Gas	55	18.9	73	46.7	177	38.7	23	55.2	23	46.9
Class 6 Diesel	15	51.0	62	43.5	74	42.8	46	64.7	74	75.0
Class 7 Gas	25	55.3	17	83.8	31	15.6	31	62.9	18	26.8
Class 7 Diesel	96	51.8	188	59.0	123	58.5	235	56.7	287	42.3
Class 8 Gas	8	56.2	3	68.4	10	21.2	3	12.9	15	19.3
Class 8 Diesel	801	30.0	1,104	29.9	1,459	30.7	1,128	25.2	906	25.5
Other/Unk	8	17.2	14	28.2	25	50.8	11	0.0	23	55.4

TABLE 17
Mileage by Area Population Type
10⁸ Miles
National Truck Trip Information Survey File

Truck Type	Trips	Rural	Small Urban	Large Urban
Model Year to 1961				
Class 3-5 Gas	18	0.242	0.008	0.578
Class 3-5 Diesel	4	0.354	0.026	0.081
Class 6 Gas	43	1.342	0.0	0.211
Class 6 Diesel	0			
Class 7 Gas	1	0.0	0.010	0.0
Class 7 Diesel	0			
Class 8 Gas	0			
Class 8 Diesel	65	0.624	0.131	0.766
Other/Unk	13	0.023	0.003	0.091
Model Year 1962-1966				
Class 3-5 Gas	82	2.640	0.338	0.287
Class 3-5 Diesel	1	0.0	0.0	0.028
Class 6 Gas	98	3.178	0.295	0.498
Class 6 Diesel	9	0.360	0.0	0.150
Class 7 Gas	16	0.384	0.170	0.016
Class 7 Diesel	11	0.065	0.007	0.107
Class 8 Gas	13	0.080	0.124	0.136
Class 8 Diesel	68	1.429	0.162	0.528
Other/Unk	5	0.055	0.0	0.062
Model Year 1967-1971				
Class 3-5 Gas	113	2.584	1.047	2.084
Class 3-5 Diesel	1	0.0	0.0	0.039
Class 6 Gas	152	5.230	1.058	2.027
Class 6 Diesel	8	0.011	0.009	0.652
Class 7 Gas	25	0.300	0.041	0.182
Class 7 Diesel	44	0.537	0.083	0.532
Class 8 Gas	35	0.707	0.029	0.663
Class 8 Diesel	544	15.590	2.048	6.909
Other/Unk	13	0.424	0.0	0.0

TABLE 17
(Continued)

Truck Type	Trips	Rural	Small Urban	Large Urban
Model Year 1972-1976				
Class 3-5 Gas	39	0.513	0.143	1.788
Class 3-5 Diesel	18	0.554	0.008	0.874
Class 6 Gas	456	16.831	1.926	7.986
Class 6 Diesel	38	1.305	0.030	0.392
Class 7 Gas	119	1.123	0.051	1.693
Class 7 Diesel	168	2.722	0.282	1.709
Class 8 Gas	88	2.734	0.686	0.208
Class 8 Diesel	1,999	44.552	4.102	19.892
Other/Unk	43	1.225	0.0	1.040
Model Year 1977-1981				
Class 3-5 Gas	44	0.537	0.272	1.110
Class 3-5 Diesel	8	0.432	0.048	0.155
Class 6 Gas	351	9.628	2.211	7.939
Class 6 Diesel	271	2.837	0.586	3.907
Class 7 Gas	122	1.214	0.263	1.494
Class 7 Diesel	929	7.237	1.208	9.780
Class 8 Gas	39	1.324	0.050	0.470
Class 8 Diesel	5,398	150.80	13.316	64.998
Other/Unk	81	1.139	0.178	0.803
Model Year 1982-1984				
Class 3-5 Gas	5	0.0	0.0	0.673
Class 3-5 Diesel	6	0.004	0.002	0.009
Class 6 Gas	18	0.437	0.113	0.390
Class 6 Diesel	59	0.192	0.122	1.034
Class 7 Gas	27	0.518	0.046	0.147
Class 7 Diesel	255	1.435	0.214	2.056
Class 8 Gas	23	0.187	0.0	0.125
Class 8 Diesel	1,142	41.985	3.120	13.068
Other/Unk	3	0.081	0.0	0.0

TABLE 18
Trucks in the United States
Annual Mileage by Power Unit Type

Power Unit Type	NTTIS			TIUS		
	Sample Size	Average Annual Mileage	Total Miles (billions)	Sample Size	Average Annual Mileage	Total Miles (billions)
Straight Trucks	3,621	12,546	26.7	34,455	10,611	26.8
Tractors	2,560	55,149	49.9	19,123	53,128	47.5
Unknown				7	6,508	
Total	6,181	25,260	76.6	53,585	21,741	74.3

TABLE 19
Annual Mileage in NTTIS
by Source of Data

Annual Mileage	Self-Reported		Odometer		Mapped	
	Sample Size	Average Annual Mileage	Sample Size	Average Annual Mileage	Sample Size	Average Annual Mileage
Straight Tractor	3,621	12,546	1,454	9,088	2,344	5,935
	2,560	55,149	1,540	43,180	2,440	29,001
Total	6,181	25,260	2,994	19,412	4,784	12,768

TABLE 20
U.S Large Truck Population
by Power Unit Type, Weight Class and Engine Size
Diesel Trucks Only
National Truck Trip Information Survey File

GVWR Class	Row Percent by Horsepower						Total
	Under 251 H.P.		Over 250 H.P.		Unknown H.P.		
	N	Percent	N	Percent	N	Percent	
Diesel Straight Trucks							
Class 3-5	4	65.2%	0	0.0%	5	34.8%	100.0%
Class 6	53	42.8	1	0.6	66	56.6	100.0
Class 7	161	60.0	8	2.9	98	37.2	100.0
Class 8	276	45.4	190	25.8	196	28.8	100.0
Other/Unk	0	0.0	1	15.2	1	84.8	100.0
All Straight	494	48.6%	200	16.1%	366	35.3%	100.0%
Diesel Tractors							
Class 3-6	17	47.1%	5	12.4%	14	40.5%	100.0%
Class 7	114	54.3	16	8.4	76	37.3	100.0
Class 8	257	13.6	1,258	59.9	540	26.5	100.0
Other/Unk	2	6.9	3	27.5	6	65.5	100.0
All Tractors	390	17.4%	1,282	54.9%	636	27.8%	100.0%
All Diesel Trucks							
Class 3-6	74	44.8%	6	2.3%	85	53.0%	100.0%
Class 7	275	57.8	24	5.0	174	37.2	100.0
Class 8	533	22.1	1,448	50.8	736	27.1	100.0
Other/Unk	2	6.1	4	26.0	7	67.9	100.0
All Trucks	884	28.4%	1,482	41.1%	1,002	30.4%	100.0%

TABLE 21
Distribution of Travel by Truck Type and Area Type
Engines Under 251 H.P., Over 250 H.P., and Unknown H.P.
Separately For Tractors and Straight Trucks
National Truck Trip Information Survey File

Truck Type	N (trips)	Row Percent by Area Type			Total
		Rural	Small Urban	Large Urban	
Straight Trucks, Engines Under 251 Horsepower					
Class 3-5 Diesel	9	33.5%	0.0%	66.5%	100.0%
Class 6 Diesel	114	34.5	8.8	56.7	100.0
Class 7 Diesel	519	43.3	8.7	48.1	100.0
Class 8 Diesel	882	45.8	10.9	43.3	100.0
Other/Unk	0				
Straights, <251 H.P.	1,524	43.4%	9.7%	46.9%	100.0%
Straight Trucks, Engines Over 250 Horsepower					
Class 3-5 Diesel	0				
Class 6 Diesel	4	11.6%	0.0%	88.4%	100.0%
Class 7 Diesel	25	10.0	0.2	89.8	100.0
Class 8 Diesel	807	55.1	8.7	36.1	100.0
Other/Unk	12	88.5	0.0	11.5	100.0
Straights, >250 H.P.	848	53.1%	8.3%	38.6%	100.0%
Straight Trucks, Unknown Engine Horsepower					
Class 3-5 Diesel	13	58.8%	8.5%	32.8%	100.0%
Class 6 Diesel	131	36.1	5.5	58.4	100.0
Class 7 Diesel	234	44.9	4.9	50.3	100.0
Class 8 Diesel	320	36.6	9.9	53.6	100.0
Other/Unk	0				
Unknown H.P. Straight	698	38.9%	7.4%	53.8%	100.0%
All Straights	3,070	44.8%	8.8%	46.4%	100.0%

TABLE 21
(Continued)

Truck Type	N (trips)	Row Percent by Area Type			Total
		Rural	Small Urban	Large Urban	
Tractors, Engines Under 251 Horsepower					
Class 3-6 Diesel	53	52.4%	10.1%	37.6%	100.0%
Class 7 Diesel	386	42.4	7.2	50.4	100.0
Class 8 Diesel	1,088	59.4	6.7	34.0	100.0
Other/Unk	1	100.0	0.0	0.0	100.0
Tractors, <251 H.P.	1,528	56.0%	6.9%	37.1%	100.0%
Tractors, Engines Over 250 Horsepower					
Class 3-6 Diesel	29	85.7%	3.4%	10.9%	100.0%
Class 7 Diesel	78	57.1	4.8	38.1	100.0
Class 8 Diesel	5,292	70.3	5.4	24.4	100.0
Other/Unk	0				
Tractors, >250 H.P.	5,399	70.2%	5.4%	24.4%	100.0%
Tractors, Engines Unknown Horsepower					
Class 3-6 Diesel	70	34.0%	3.7%	62.2%	100.0%
Class 7 Diesel	159	36.5	3.3	60.3	100.0
Class 8 Diesel	803	68.6	5.1	26.3	100.0
Other/Unk	0				
Tractors, Unk H.P.	1,032	66.1%	5.0%	28.9%	100.0%
All Tractors	7,959	67.7%	5.5%	26.8%	100.0%

TABLE 22
Distribution of Travel by Truck Type Within Area Type
Engines Under 251 H.P., Over 250 H.P., and Unknown H.P.
Separately For Tractors and Straight Trucks
National Truck Trip Information Survey File

Truck Type	N (trips)	Column Percent by Area Type		
		Rural	Small Urban	Large Urban
Straight Trucks, Engines Under 251 Horsepower				
Class 3-5 Diesel	9	0.2%	0.0%	0.7%
Class 6 Diesel	114	0.4	1.2	1.6
Class 7 Diesel	519	1.4	3.0	3.3
Class 8 Diesel	882	3.3	8.4	6.7
Other/Unk	0	0.0	0.0	0.0
Straights, <251 H.P.	1,524	5.3%	12.6%	12.3%
Straight Trucks, Engines Over 250 Horsepower				
Class 3-5 Diesel	0	0.0%	0.0%	0.0%
Class 6 Diesel	4	0.0	0.0	0.0
Class 7 Diesel	25	0.0	0.0	0.5
Class 8 Diesel	807	3.4	5.8	4.8
Other/Unk	12	0.0	0.0	0.0
Straights, >250 H.P.	848	3.5%	5.8%	5.4%
Straight Trucks, Unknown Engine Horsepower				
Class 3-5 Diesel	13	0.0%	0.0%	0.0%
Class 6 Diesel	131	0.6	0.9	1.9
Class 7 Diesel	234	0.7	0.9	1.8
Class 8 Diesel	320	1.0	3.0	3.3
Other/Unk	0	0.0	0.0	0.0
Unknown H.P. Straight	698	2.4%	4.8%	7.0%
Subtotal, All Straights	3,070	11.1%	23.2%	24.7%

TABLE 22
(Continued)

Truck Type	N (trips)	Column Percent by Area Type		
		Rural	Small Urban	Large Urban
Tractors, Engines Under 251 Horsepower				
Class 3-6 Diesel	53	0.3%	0.6%	0.5%
Class 7 Diesel	386	1.3	2.3	3.2
Class 8 Diesel	1,088	7.6	9.1	9.2
Other/Unk	1	0.0	0.0	0.0
Tractors, < 251 H.P.	1,528	9.1%	12.0%	12.9%
Tractors, Engines Over 250 Horsepower				
Class 3-6 Diesel	29	0.5%	0.2%	0.1%
Class 7 Diesel	78	0.5	0.5	0.8
Class 8 Diesel	5,292	62.9	51.3	46.6
Other/Unk	0	0.0	0.0	0.0
Tractors, > 250 H.P.	5,399	63.9%	52.0%	47.5%
Tractors, Engines Unknown Horsepower				
Class 3-6 Diesel	70	0.2%	0.3%	0.9%
Class 7 Diesel	159	0.4	0.4	1.5
Class 8 Diesel	803	15.2	12.1	12.4
Other/Unk	0	0.0	0.0	0.0
Tractors, Unk H.P.	1,032	15.8%	12.8%	14.8%
Subtotal, All Tractors	7,959	88.9%	76.8%	75.3%
All Trucks	11,029	100.0%	100.0%	100.0%

TABLE 23
Distribution of Travel by Truck Type and Area Type
Engines Under 251 H.P., Over 250 H.P., and Unknown H.P.
National Truck Trip Information Survey File

Truck Type	N (trips)	Row Percent by Area Type			Total
		Rural	Small Urban	Large Urban	
Trucks with Engines Under 251 Horsepower					
Class 3-6 Diesel	176	38.6%	7.3%	54.1%	100.0%
Class 7 Diesel	905	42.9	7.9	49.2	100.0
Class 8 Diesel	1,970	54.4	8.2	37.3	100.0
Other/Unk	1	100.0	0.0	0.0	100.0
Total, Under 251 H.P.	3,052	50.6%	8.1%	41.3%	100.0%
Trucks with Engines Over 250 Horsepower					
Class 3-6 Diesel	33	83.2%	3.3%	13.6%	100.0%
Class 7 Diesel	103	46.3	3.8	50.0	100.0
Class 8 Diesel	6,099	69.3	5.6	25.1	100.0
Other/Unk	12	88.5	0.0	11.5	100.0
Total, Over 250 H.P.	6,247	69.1%	5.6%	25.4%	100.0%
Trucks with Unknown Engine Horsepower					
Class 3-6 Diesel	214	36.0%	5.0%	59.0%	100.0%
Class 7 Diesel	393	41.4	4.2	54.4	100.0
Class 8 Diesel	1,123	64.9	5.7	29.4	100.0
Other/Unk	0				
Total, Unknown H.P.	1,730	60.5%	5.5%	34.0%	100.0%
Total, All Trucks	11,029	64.1%	6.0%	29.9%	100.0%

TABLE 24
Distribution of Travel by Truck Type and Area Type
Engines Under 251 H.P., Over 250 H.P., and Unknown H.P.
National Truck Trip Information Survey File

Truck Type	N (trips)	Column Percent for Area Type		
		Rural	Small Urban	Large Urban
Trucks with Engines Under 251 Horsepower				
Class 3-6 Diesel	176	0.9%	1.8%	2.7%
Class 7 Diesel	905	2.7	5.3	6.6
Class 8 Diesel	1,970	10.9	17.5	15.9
Other/Unk	1	0.0	0.0	0.0
Subtotal, <251 H.P.	3,052	14.5%	24.6%	25.2%
Trucks with Engines Over 250 Horsepower				
Class 3-6 Diesel	33	0.5%	0.2%	0.2%
Class 7 Diesel	103	0.6	0.5	1.3
Class 8 Diesel	6,099	66.3	57.1	51.4
Other/Unk	12	0.0	0.0	0.0
Subtotal, >250 H.P.	6,247	67.4%	57.8%	52.9%
Trucks with Unknown Engine Horsepower				
Class 3-6 Diesel	214	0.8%	1.2%	2.9%
Class 7 Diesel	393	1.2	1.3	3.3
Class 8 Diesel	1,123	16.2	15.1	15.7
Other/Unk	0	0.0	0.0	0.0
Subtotal, Unk. H.P.	1,730	18.2%	17.6%	21.9%
Total, All Trucks	11,029	100.0%	100.0%	100.0%

TABLE 25
Distribution of Travel by Truck Type Across Road Type:
Engines Under 251 H.P., Over 250 H.P., and Unknown H.P.
Separately For Tractors and Straight Trucks
National Truck Trip Information Survey File

Truck Type	N (trips)	Row Percent by Road Type			Total
		Limited Access	Major Artery	Other	
Straight Trucks, Engines Under 251 Horsepower					
Class 3-5 Diesel	9	38.7%	25.3%	36.0%	100.0%
Class 6 Diesel	114	34.6	39.3	26.2	100.0
Class 7 Diesel	519	38.4	33.7	27.9	100.0
Class 8 Diesel	882	18.6	47.6	33.8	100.0
Other/Unk	0				
Straights, < 251 H.P.	1,524	26.4%	42.1%	31.5%	100.0%
Straight Trucks, Engines Over 250 Horsepower					
Class 3-5 Diesel	0				
Class 6 Diesel	4	41.9%	48.8%	9.3%	100.0%
Class 7 Diesel	25	21.4	24.8	53.8	100.0
Class 8 Diesel	807	34.2	40.4	25.4	100.0
Other/Unk	12	0.0	73.7	26.3	100.0
Straights, > 250 H.P.	848	33.6%	39.8%	26.6%	100.0%
Straight Trucks, Unknown Engine Horsepower					
Class 3-5 Diesel	13	15.6%	40.4%	44.1%	100.0%
Class 6 Diesel	131	17.5	47.4	35.0	100.0
Class 7 Diesel	234	35.9	39.4	24.7	100.0
Class 8 Diesel	320	19.0	49.2	31.9	100.0
Other/Unk	0				
Unknown H.P. Straight	698	23.2%	46.0%	30.8%	100.0%
All Straights	3,070	27.5%	42.5%	30.1%	100.0%

TABLE 25
(Continued)

Truck Type	N (trips)	Row Percent by Road Type			Total
		Limited Access	Major Artery	Other	
Tractors, Engines Under 251 Horsepower					
Class 3-6 Diesel	53	33.2%	41.7%	25.1%	100.0%
Class 7 Diesel	386	34.1	40.2	25.7	100.0
Class 8 Diesel	1,088	44.6	43.0	12.4	100.0
Other/Unk	1	0.0	0.0	100.0	100.0
Tractors, <251 H.P.	1,528	42.2%	42.5%	15.3%	100.0%
Tractors, Engines Over 250 Horsepower					
Class 3-6 Diesel	29	19.3%	63.6%	17.2%	100.0%
Class 7 Diesel	78	50.9	33.3	15.8	100.0
Class 8 Diesel	5,292	60.5	33.2	6.4	100.0
Other/Unk	0				
Tractors, >250 H.P.	5,399	60.1%	33.3%	6.5%	100.0%
Tractors, Engines Unknown Horsepower					
Class 3-6 Diesel	70	63.1%	17.6%	19.3%	100.0%
Class 7 Diesel	159	40.1	29.5	30.3	100.0
Class 8 Diesel	803	69.5	25.4	5.2	100.0
Other/Unk	0				
Tractors, Unk H.P.	1,032	67.9%	25.4%	6.8%	100.0%
All Tractors	7,959	59.3%	33.0%	7.7%	100.0%

TABLE 26
Distribution of Travel by Truck Type Within Road Type
Engines Under 251 H.P., Over 250 H.P., and Unknown H.P.
Separately For Tractors and Straight Trucks
National Truck Trip Information Survey File

Truck Type	N (trips)	Column Percent by Road Type		
		Limited Access	Major Artery	Other
Straight Trucks, Engines Under 251 Horsepower				
Class 3-5 Diesel	9	0.2%	0.2%	1.0%
Class 6 Diesel	114	0.5	0.9	1.9
Class 7 Diesel	519	1.5	2.0	5.1
Class 8 Diesel	882	1.6	6.4	13.9
Other/Unk	0	0.0	0.0	0.0
Straights, <251 H.P.	1,524	3.8%	9.6%	22.0%
Straight Trucks, Engines Over 250 Horsepower				
Class 3-5 Diesel	0	0.0%	0.0%	0.0%
Class 6 Diesel	4	0.0	0.0	0.0
Class 7 Diesel	25	0.1	0.1	0.9
Class 8 Diesel	807	2.5	4.6	9.0
Other/Unk	12	0.0	0.0	0.0
Straights, >250 H.P.	848	2.6%	4.8%	9.9%
Straight Trucks, Unknown Engine Horsepower				
Class 3-5 Diesel	13	0.0%	0.0%	0.1%
Class 6 Diesel	131	0.3	1.4	3.1
Class 7 Diesel	234	0.7	1.2	2.3
Class 8 Diesel	320	0.6	2.6	5.2
Other/Unk	0	0.0	0.0	0.0
Unknown H.P. Straight	698	1.7%	5.2%	10.8%
Subtotal, All Straights	3,070	8.1%	19.6%	42.7%

TABLE 26
(Continued)

Truck Type	N (trips)	Column Percent by Road Type		
		Limited Access	Major Artery	Other
Tractors, Engines Under 251 Horsepower				
Class 3-6 Diesel	53	0.2%	0.4%	0.8%
Class 7 Diesel	386	1.2	2.2	4.4
Class 8 Diesel	1,088	6.7	10.2	9.0
Other/Unk	1	0.0	0.0	0.0
Tractors, <251 H.P.	1,528	8.1%	12.8%	14.2%
Tractors, Engines Over 250 Horsepower				
Class 3-6 Diesel	29	0.1%	0.7%	0.6%
Class 7 Diesel	78	0.6	0.6	0.9
Class 8 Diesel	5,292	63.9	55.0	32.5
Other/Unk	0	0.0	0.0	0.0
Tractors, >250 H.P.	5,399	64.6%	56.3%	33.9%
Tractors, Engines Unknown Horsepower				
Class 3-6 Diesel	70	0.5%	0.2%	0.7%
Class 7 Diesel	159	0.6	0.6	2.0
Class 8 Diesel	803	18.1	10.4	6.5
Other/Unk	0	0.0	0.0	0.0
Tractors, Unk H.P.	1,032	19.2%	11.3%	9.3%
Subtotal, All Tractors	7,959	91.9%	80.4%	57.4%
All Trucks	11,029	100.0%	100.0%	100.0%

TABLE 27
Distribution of Travel by Truck Type Across Road Type:
Engines Under 251 H.P., Over 250 H.P., and Unknown H.P.
National Truck Trip Information Survey File

Truck Type	N (trips)	Row Percent by Road Type			Total
		Limited Access	Major Artery	Other	
Trucks with Engines Under 251 Horsepower					
Class 3-6 Diesel	176	35.1%	37.0%	28.0%	100.0%
Class 7 Diesel	905	36.3	36.8	26.9	100.0
Class 8 Diesel	1,970	35.2	44.7	20.1	100.0
Other/Unk	1	0.0	0.0	100.0	100.0
Total, Under 251 H.P.	3,052	35.4%	42.3%	22.2%	100.0%
Trucks with Engines Over 250 Horsepower					
Class 3-6 Diesel	33	20.0%	63.1%	16.9%	100.0%
Class 7 Diesel	103	44.1	31.3	24.5	100.0
Class 8 Diesel	6,099	58.8	33.6	7.6	100.0
Other/Unk	12	0.0	73.7	26.3	100.0
Total, Over 250 H.P.	6,247	58.4%	33.8%	7.9%	100.0%
Trucks with Unknown Engine Horsepower					
Class 3-6 Diesel	214	30.8%	38.6%	30.6%	100.0%
Class 7 Diesel	393	37.7	35.3	27.0	100.0
Class 8 Diesel	1,123	63.7	28.1	8.2	100.0
Other/Unk	0				
Total, Unknown H.P.	1,730	58.8%	29.6%	11.7%	100.0%
Total, All Trucks	11,029	54.3%	34.5%	11.2%	100.0%

TABLE 28
Distribution of Travel by Truck Type Within Road Type
Engines Under 251 H.P., Over 250 H.P., and Unknown H.P.
National Truck Trip Information Survey File

Truck Type	N (trips)	Column Percent for Road Type		
		Limited Access	Major Artery	Other
Trucks with Engines Under 251 Horsepower				
Class 3-6 Diesel	176	1.0%	1.6%	3.8%
Class 7 Diesel	905	2.7	4.3	9.6
Class 8 Diesel	1,970	8.3	16.5	22.9
Other/Unk	1	0.0	0.0	0.0
Subtotal, < 251 H.P.	3,052	12.0%	22.4%	36.3%
Trucks with Engines Over 250 Horsepower				
Class 3-6 Diesel	33	0.1%	0.7%	0.6%
Class 7 Diesel	103	0.6	0.7	1.7
Class 8 Diesel	6,099	66.4	59.7	41.4
Other/Unk	12	0.0	0.0	0.0
Subtotal, > 250 H.P.	6,247	67.1%	61.1%	43.7%
Trucks with Unknown Engine Horsepower				
Class 3-6 Diesel	214	0.8%	1.6%	4.0%
Class 7 Diesel	393	1.3	1.9	4.4
Class 8 Diesel	1,123	18.8	13.0	11.7
Other/Unk	0	0.0	0.0	0.0
Subtotal, Unk. H.P.	1,730	20.9%	16.5%	20.1%
Total, All Trucks	11,029	100.0%	100.0%	100.0%

TABLE 29
Distribution of Travel in Large Urban Areas
By Truck Type Across Road Type
Engines Under 251 H.P., Over 250 H.P., and Unknown H.P.
Separately For Tractors and Straight Trucks
National Truck Trip Information Survey File

Truck Type	N (trips)	Row Percent by Road Type			Total
		Limited Access	Major Artery	Other	
Straight Trucks, Engines Under 251 Horsepower					
Class 3-5 Diesel	9	58.2%	3.3%	38.6%	100.0%
Class 6 Diesel	114	42.6	23.6	33.8	100.0
Class 7 Diesel	519	39.6	23.1	37.4	100.0
Class 8 Diesel	882	27.0	32.2	40.8	100.0
Other/Unk	0				
Straights, <251 H.P.	1,524	34.2%	27.0%	38.9%	100.0%
Straight Trucks, Engines Over 250 Horsepower					
Class 3-5 Diesel	0				
Class 6 Diesel	4	47.4%	47.4%	5.3%	100.0%
Class 7 Diesel	25	22.2	17.9	59.9	100.0
Class 8 Diesel	807	47.5	20.7	31.8	100.0
Other/Unk	12	0.0	100.0	0.0	100.0
Straights, >250 H.P.	848	45.0%	20.7%	34.4%	100.0%
Straight Trucks, Unknown Engine Horsepower					
Class 3-5 Diesel	13	17.9%	15.0%	67.0%	100.0%
Class 6 Diesel	131	28.2	43.7	28.1	100.0
Class 7 Diesel	234	28.8	36.4	34.8	100.0
Class 8 Diesel	320	26.7	39.5	33.8	100.0
Other/Unk	0				
Unknown H.P. Straight	698	27.6%	39.8%	32.6%	100.0%
All Straights	3,070	34.6%	29.3%	36.1%	100.0%

TABLE 29
(Continued)

Truck Type	N (trips)	Row Percent by Road Type			Total
		Limited Access	Major Artery	Other	
Tractors, Engines Under 251 Horsepower					
Class 3-6 Diesel	53	18.1%	28.0%	53.9%	100.0%
Class 7 Diesel	386	36.8	24.2	39.0	100.0
Class 8 Diesel	1,088	56.2	24.4	19.5	100.0
Other/Unk	0				
Tractors, < 251 H.P.	1,527	49.9%	24.5%	25.6%	100.0%
Tractors, Engines Over 250 Horsepower					
Class 3-6 Diesel	29	61.3%	28.7%	10.0%	100.0%
Class 7 Diesel	78	51.8	22.2	25.9	100.0
Class 8 Diesel	5,292	70.8	17.1	12.2	100.0
Other/Unk	0				
Tractors, > 250 H.P.	5,399	70.4%	17.2%	12.4%	100.0%
Tractors, Engines Unknown Horsepower					
Class 3-6 Diesel	70	64.3%	9.5%	26.2%	100.0%
Class 7 Diesel	159	32.2	20.6	47.2	100.0
Class 8 Diesel	803	74.9	12.8	12.3	100.0
Other/Unk	0				
Tractors, Unk H.P.	1,032	74.9%	12.8%	12.3%	100.0%
All Tractors	7,958	66.8%	17.7%	15.5%	100.0%

TABLE 30
Distribution of Travel in Large Urban Areas
By Truck Type Within Road Type
Engines Under 251 H.P., Over 250 H.P., and Unknown H.P.
Separately For Tractors and Straight Trucks
National Truck Trip Information Survey File

Truck Type	N (trips)	Column Percent by Road Type		
		Limited Access	Major Artery	Other
Straight Trucks, Engines Under 251 Horsepower				
Class 3-5 Diesel	9	0.7%	0.1%	1.3%
Class 6 Diesel	114	1.1	1.8	2.6
Class 7 Diesel	519	2.2	3.7	6.0
Class 8 Diesel	882	3.1	10.5	13.3
Other/Unk	0	0.0	0.0	0.0
Straights, < 251 H.P.	1,524	7.1%	16.1%	23.2%
Straight Trucks, Engines Over 250 Horsepower				
Class 3-5 Diesel	0	0.0%	0.0%	0.0%
Class 6 Diesel	4	0.0	0.1	0.0
Class 7 Diesel	25	0.2	0.5	1.6
Class 8 Diesel	807	3.9	4.8	7.4
Other/Unk	12	0.0	0.0	0.0
Straights, > 250 H.P.	848	4.1%	5.4%	9.0%
Straight Trucks, Unknown Engine Horsepower				
Class 3-5 Diesel	13	0.0%	0.0%	0.1%
Class 6 Diesel	131	0.9	4.1	2.7
Class 7 Diesel	234	0.9	3.2	3.0
Class 8 Diesel	320	1.5	6.3	5.4
Other/Unk	0	0.0	0.0	0.0
Unknown H.P. Straight	698	3.3%	13.6%	11.2%
Subtotal, All Straights	3,070	14.5%	35.2%	43.3%

TABLE 30
(Continued)

Truck Type	N (trips)	Column Percent by Road Type		
		Limited Access	Major Artery	Other
Tractors, Engines Under 251 Horsepower				
Class 3-6 Diesel	53	0.1%	0.6%	1.2%
Class 7 Diesel	386	2.0	3.8	6.1
Class 8 Diesel	1,088	8.8	11.0	8.7
Other/Unk	0	0.0	0.0	0.0
Tractors, < 251 H.P.	1,527	11.0%	15.4%	16.1%
Tractors, Engines Over 250 Horsepower				
Class 3-6 Diesel	29	0.1%	0.2%	0.1%
Class 7 Diesel	78	0.7	0.8	1.0
Class 8 Diesel	5,292	56.0	38.7	27.6
Other/Unk	0	0.0	0.0	0.0
Tractors, > 250 H.P.	5,399	56.9%	39.8%	28.6%
Tractors, Engines Unknown Horsepower				
Class 3-6 Diesel	70	1.0%	0.4%	1.1%
Class 7 Diesel	159	0.8	1.5	3.5
Class 8 Diesel	803	15.8	7.8	7.4
Other/Unk	0	0.0	0.0	0.0
Tractors, Unk H.P.	1,032	17.6%	9.7%	12.0%
Subtotal, All Tractors	7,958	85.5%	64.8%	56.7%
All Trucks	11,028	100.0%	100.0%	100.0%

TABLE 31
Distribution of Travel in Large Urban Areas
By Truck Type Across Road Type
Engines Under 251 H.P., Over 250 H.P., and Unknown H.P.
National Truck Trip Information Survey File

Truck Type	N (trips)	Row Percent by Road Type			Total
		Limited Access	Major Artery	Other	
Trucks with Engines Under 251 Horsepower					
Class 3-6 Diesel	176	42.4%	19.2%	38.4%	100.0%
Class 7 Diesel	905	38.2	23.6	38.2	100.0
Class 8 Diesel	1,970	43.9	27.6	28.5	100.0
Other/Unk	0				
Total, Under 251 H.P.	3,051	42.3%	25.7%	32.1%	100.0%
Trucks with Engines Over 250 Horsepower					
Class 3-6 Diesel	33	58.1%	32.9%	9.0%	100.0%
Class 7 Diesel	103	39.6	20.5	40.0	100.0
Class 8 Diesel	6,099	68.6	17.4	14.0	100.0
Other/Unk	12	0.0	100.0	0.0	100.0
Total, Over 250 H.P.	6,247	67.8%	17.5%	14.6%	100.0%
Trucks with Unknown Engine Horsepower					
Class 3-6 Diesel	214	39.2%	32.9%	27.9%	100.0%
Class 7 Diesel	393	30.3	29.1	40.5	100.0
Class 8 Diesel	1,123	64.8	18.4	16.8	100.0
Other/Unk	0				
Total, Unknown H.P.	1,730	56.3%	21.9%	21.8%	100.0%
Total, All Trucks	11,028	58.9%	20.6%	20.6%	100.0%

TABLE 32
Distribution of Travel in Large Urban Areas
By Truck Type Within Road Type
Engines Under 251 H.P., Over 250 H.P., and Unknown H.P.
National Truck Trip Information Survey File

Truck Type	N (trips)	Column Percent for Road Type		
		Limited Access	Major Artery	Other
Trucks with Engines Under 251 Horsepower				
Class 3-6 Diesel	176	2.0%	2.6%	5.1%
Class 7 Diesel	905	4.3	7.6	12.2
Class 8 Diesel	1,970	11.9	21.4	22.0
Other/Unk	0	0.0	0.0	0.0
Subtotal, < 251 H.P.	3,051	18.1%	31.5%	39.3%
Trucks with Engines Over 250 Horsepower				
Class 3-6 Diesel	33	0.2%	0.3%	0.1%
Class 7 Diesel	103	0.9	1.3	2.5
Class 8 Diesel	6,099	59.9	43.6	34.9
Other/Unk	12	0.0	0.0	0.0
Subtotal, > 250 H.P.	6,247	61.0%	45.2%	37.6%
Trucks with Unknown Engine Horsepower				
Class 3-6 Diesel	214	1.9%	4.6%	3.9%
Class 7 Diesel	393	1.7	4.7	6.5
Class 8 Diesel	1,123	17.3	14.1	12.8
Other/Unk	0	0.0	0.0	0.0
Subtotal, Unk. H.P.	1,730	20.9%	23.3%	23.2%
Total, All Trucks	11,028	100.0%	100.0%	100.0%

TABLE 33
Distribution of Travel by Gross Combination Weight
Across Area Type: Diesel Tractors
National Truck Trip Information Survey File

Gross Combination Weight	N (trips)	Row Percent by Area Type			Total
		Rural	Small Urban	Large Urban	
Class 8 Diesel Tractors					
10K-15K	73	56.9%	3.9%	39.2%	100%
15K-20K	147	54.7	4.9	40.4	100
20K-25K	405	68.3	6.0	25.7	100
25K-30K	1,530	68.0	6.4	25.6	100
30K-35K	777	63.7	5.3	31.0	100
35K-40K	456	64.6	5.7	29.7	100
40K-45K	313	60.3	5.8	33.9	100
45K-50K	370	64.1	6.0	29.9	100
50K-55K	272	63.2	5.7	31.1	100
55K-60K	275	67.0	5.1	27.9	100
60K-65K	231	73.1	4.4	22.5	100
65K-70K	374	71.6	5.2	23.2	100
70K-75K	604	74.2	4.7	21.1	100
75K-80K	672	76.2	5.0	18.8	100
Over 80K	262	72.1	5.8	22.1	100
Unknown	422	63.1	6.0	30.9	100
Total	7,183	68.9%	5.5%	25.7%	100%
Class 3-7 Diesel Tractors					
10K-20K	107	59.8%	4.1%	36.1%	100%
20K-35K	395	42.9	5.3	51.9	100
35K-50K	141	43.7	5.4	50.9	100
Over 50K	68	69.0	7.7	23.3	100
Unknown	64	24.6	8.5	66.9	100
Total	775	47.1%	5.8%	47.2%	100%

TABLE 34
Distribution of Travel by Gross Combination Weight
Across Area Type: Diesel Straight Trucks
National Truck Trip Information Survey File

Gross Combination Weight	N (trips)	Row Percent by Area Type			Total
		Rural	Small Urban	Large Urban	
Class 8 Diesel Straight Trucks					
10K-20K	245	52.5%	9.9%	37.6%	100%
20K-30K	711	47.4	10.6	42.0	100
30K-40K	279	44.9	4.9	50.1	100
40K-50K	234	45.8	13.2	40.9	100
50K-60K	173	41.0	13.6	45.4	100
60K-70K	102	47.8	11.2	41.1	100
70K-80K	107	66.7	7.9	25.4	100
Over 80K	40	75.2	5.1	19.7	100
Unknown	118	33.1	5.3	61.6	100
Total	2,009	47.7%	9.9%	42.4%	100%
Class 3-7 Diesel Straight Trucks					
10K-15K	268	41.4%	6.6%	52.1%	100%
15K-20K	302	32.6	7.2	60.2	100
20K-25K	165	36.7	4.5	58.9	100
25K-30K	103	40.9	4.0	55.2	100
Over 30K	88	51.7	12.6	35.7	100
Unknown	123	45.4	5.4	49.2	100
Total	1,049	39.3%	6.6%	54.1%	100%

TABLE 35
Distribution of Travel by Gross Combination Weight
Within Area Type: Diesel Tractors
National Truck Trip Information Survey File

Gross Combination Weight	N (trips)	Column Percent by Area Type			Total Percent
		Rural	Small Urban	Large Urban	
Class 8 Diesel Tractors					
10K-15K	73	0.5%	0.4%	0.9%	0.6%
15K-20K	147	0.8	0.9	1.7	1.1
20K-25K	405	4.9	5.4	4.9	4.9
25K-30K	1,530	17.1	20.3	17.3	17.3
30K-35K	777	7.2	7.5	9.4	7.8
35K-40K	456	4.9	5.5	6.1	5.3
40K-45K	313	3.9	4.7	5.8	4.4
45K-50K	370	4.7	5.5	5.9	5.1
50K-55K	272	3.0	3.4	4.0	3.3
55K-60K	275	4.2	4.0	4.7	4.3
60K-65K	231	4.3	3.2	3.5	4.1
65K-70K	374	7.5	6.9	6.5	7.2
70K-75K	604	14.1	11.2	10.8	13.1
75K-80K	672	14.6	11.9	9.7	13.2
Over 80K	262	4.0	4.0	3.3	3.8
Unknown	422	4.3	5.1	5.7	4.7
Total	7,183	100.0%	100.0%	100.0%	100.0%
Class 3-7 Diesel Tractors					
10K-20K	107	14.8%	8.3%	8.9%	11.7%
20K-35K	395	42.4	42.4	51.2	46.5
35K-50K	141	18.0	18.0	20.9	19.3
Over 50K	68	20.3	18.6	6.8	13.9
Unknown	64	4.5	12.7	12.2	8.6
Total	775	100.0%	100.0%	100.0%	100.0%

TABLE 36
Distribution of Travel by Gross Combination Weight
Within Area Type: Diesel Straight Trucks
National Truck Trip Information Survey File

Gross Combination Weight	N (trips)	Column Percent by Area Type			Total Percent
		Rural	Small Urban	Large Urban	
Class 8 Diesel Straight Trucks					
10K-20K	245	12.4%	11.3%	10.0%	11.3%
20K-30K	711	32.8	35.1	32.7	33.0
30K-40K	279	11.0	5.8	13.8	11.7
40K-50K	234	12.4	17.3	12.5	12.9
50K-60K	173	8.5	13.6	10.6	9.9
60K-70K	102	6.6	7.4	6.4	6.6
70K-80K	107	8.8	5.0	3.8	6.3
Over 80K	40	3.0	1.0	0.9	1.9
Unknown	118	4.5	3.5	9.4	6.5
Total	2,009	100.0%	100.0%	100.0%	100.0%
Class 3-7 Diesel Straight Trucks					
10K-15K	268	28.3%	26.9%	25.9%	26.9%
15K-20K	302	25.6	33.6	34.4	30.9
20K-25K	165	12.0	8.8	14.0	12.9
25K-30K	103	9.7	5.6	9.5	9.3
Over 30K	88	10.5	15.2	5.3	7.9
Unknown	123	13.9	9.9	10.9	12.0
Total	1,049	100.0%	100.0%	100.0%	100.0%

TABLE 37
Distribution of Travel by Gross Combination Weight
Across Road Type: Diesel Tractors
National Truck Trip Information Survey File

Gross Combination Weight	N (trips)	Row Percent by Road Type			Total
		Limited Access	Major Artery	Other	
Class 8 Diesel Tractors					
10K-15K	73	34.5%	50.1%	15.5%	100%
15K-20K	147	74.5	16.3	9.2	100
20K-25K	405	44.7	46.0	9.3	100
25K-30K	1,530	51.0	40.6	8.4	100
30K-35K	777	53.8	37.0	9.2	100
35K-40K	456	60.1	31.7	8.2	100
40K-45K	313	65.7	26.2	8.2	100
45K-50K	370	68.4	25.0	6.6	100
50K-55K	272	61.0	31.7	7.3	100
55K-60K	275	72.5	23.3	4.2	100
60K-65K	231	70.6	25.5	3.9	100
65K-70K	374	74.8	22.2	3.0	100
70K-75K	604	71.1	25.5	3.4	100
75K-80K	672	59.2	35.6	5.3	100
Over 80K	262	49.4	41.1	9.6	100
Unknown	422	51.1	37.8	11.1	100
Total	7,183	60.5%	32.8%	6.8%	100%
Class 3-7 Diesel Tractors					
10K-20K	107	36.3%	48.7%	15.0%	100%
20K-35K	395	34.3	38.4	27.4	100
35K-50K	141	52.4	28.9	18.7	100
Over 50K	68	45.7	41.2	13.1	100
Unknown	64	25.3	29.9	44.9	100
Total	775	38.8%	37.4%	23.8%	100%

TABLE 38
Distribution of Travel by Gross Combination Weight
Across Road Type: Diesel Straight Trucks
National Truck Trip Information Survey File

Gross Combination Weight	N (trips)	Row Percent by Road Type			Total
		Limited Access	Majory Artery	Other	
Class 8 Diesel Straight Trucks					
10K-20K	245	24.7%	47.9%	27.4%	100%
20K-30K	711	26.4	46.8	26.8	100
30K-40K	279	23.0	42.2	34.9	100
40K-50K	234	17.7	41.6	40.7	100
50K-60K	173	14.9	45.9	39.2	100
60K-70K	102	28.4	50.2	21.4	100
70K-80K	107	36.9	49.9	13.2	100
Over 80K	40	21.4	49.1	29.5	100
Unknown	118	32.0	32.0	35.9	100
Total	2,009	24.6%	45.1%	30.3%	100%
Class 3-7 Diesel Straight Trucks					
10K-15K	268	36.7%	39.9%	23.4%	100%
15K-20K	302	34.3	31.4	34.3	100
20K-25K	165	25.4	43.6	31.0	100
25K-30K	103	22.0	42.6	35.4	100
Over 30K	88	38.5	35.0	26.5	100
Unknown	123	33.6	38.4	28.0	100
Total	1,049	32.9%	37.4%	29.7%	100%

TABLE 39
Distribution of Travel by Gross Combination Weight
Within Road Type: Diesel Tractors
National Truck Trip Information Survey File

Gross Combination Weight	N (trips)	Column Percent by Road Type			Total Percent
		Limited Access	Majority Artery	Other	
Class 8 Diesel Tractors					
10K-15K	73	0.3%	0.9%	1.3%	0.6%
15K-20K	147	1.3	0.5	1.4	1.1
20K-25K	405	3.7	6.9	6.8	4.9
25K-30K	1,530	14.6	21.5	21.5	17.3
30K-35K	777	6.9	8.8	10.6	7.8
35K-40K	456	5.2	5.1	6.4	5.3
40K-45K	313	4.8	3.5	5.3	4.4
45K-50K	370	5.7	3.9	4.9	5.0
50K-55K	272	3.3	3.2	3.5	3.3
55K-60K	275	5.2	3.1	2.7	4.3
60K-65K	231	4.7	3.2	2.4	4.0
65K-70K	374	8.9	4.9	3.2	7.2
70K-75K	604	15.4	10.2	6.6	13.1
75K-80K	672	12.9	14.3	10.3	13.2
Over 80K	262	3.1	4.7	5.3	3.8
Unknown	422	4.0	5.4	7.7	4.7
Total	7,183	100.0%	100.0%	100.0%	100.0%
Class 3-7 Diesel Tractors					
10K-20K	107	10.9%	15.2%	7.4%	11.7%
20K-35K	395	41.1	47.8	53.5	46.5
35K-50K	141	26.1	14.9	15.3	19.3
Over 50K	68	16.3	15.3	7.7	13.9
Unknown	64	5.6	6.9	16.2	8.6
Total	775	100.0%	100.0%	100.0%	100.0%

TABLE 40
Distribution of Travel by Gross Combination Weight
Within Road Type: Diesel Straight Trucks
National Truck Trip Information Survey File

Gross Combination Weight	N (trips)	Column Percent by Road Type			Total Percent
		Limited Access	Majory Artery	Other	
Class 8 Diesel Straight Trucks					
10K-20K	245	11.3%	12.0%	10.2%	11.3%
20K-30K	711	35.4	34.2	29.2	33.0
30K-40K	279	10.9	10.9	13.5	11.7
40K-50K	234	9.3	11.9	17.4	12.9
50K-60K	173	6.0	10.1	12.8	9.9
60K-70K	102	7.6	7.3	4.7	6.6
70K-80K	107	9.5	7.0	2.8	6.3
Over 80K	40	1.6	2.0	1.8	1.9
Unknown	118	8.4	4.6	7.7	6.5
Total	2,009	100.0%	100.0%	100.0%	100.0%
Class 3-7 Diesel Straight Trucks					
10K-15K	268	30.1%	28.7%	21.2%	26.9%
15K-20K	302	32.2	25.9	35.7	30.9
20K-25K	165	10.0	15.0	13.5	12.9
25K-30K	103	6.2	10.6	11.1	9.3
Over 30K	88	9.3	7.4	7.1	7.9
Unknown	123	12.3	12.3	11.4	12.0
Total	1,049	100.0%	100.0%	100.0%	100.0%

TABLE 41
Distribution of Travel by Gross Combination Weight
Across Road Type: Diesel Tractors
Large Urban Areas Only
National Truck Trip Information Survey File

Gross Combination Weight	N (trips)	Row Percent by Road Type			Total
		Limited Access	Major Artery	Other	
Class 8 Diesel Tractors					
10K-15K	73	41.5%	30.7%	27.8%	100%
15K-20K	147	76.0	9.9	14.1	100
20K-25K	405	65.9	19.9	14.2	100
25K-30K	1,530	64.2	21.2	14.6	100
30K-35K	777	62.5	20.5	17.0	100
35K-40K	456	65.5	16.4	18.2	100
40K-45K	313	67.9	14.9	17.2	100
45K-50K	370	69.5	16.7	13.8	100
50K-55K	272	68.3	18.4	13.3	100
55K-60K	275	80.8	12.0	7.2	100
60K-65K	231	77.5	11.7	10.8	100
65K-70K	374	82.7	12.7	4.6	100
70K-75K	604	78.7	14.7	6.6	100
75K-80K	672	76.3	14.7	8.9	100
Over 80K	262	63.3	18.9	17.8	100
Unknown	422	55.3	22.5	22.1	100
Total	7,183	69.5%	17.3%	13.2%	100%
Class 3-7 Diesel Tractors					
10K-20K	107	56.6%	24.2%	19.2%	100%
20K-35K	395	32.7	22.7	44.7	100
35K-50K	141	49.7	20.0	30.3	100
Over 50K	68	68.8	22.2	9.1	100
Unknown	64	26.7	18.5	54.7	100
Total	775	40.1%	21.7%	38.2%	100%

TABLE 42
Distribution of Travel by Gross Combination Weight
Across Road Type: Diesel Straight Trucks
Large Urban Areas Only
National Truck Trip Information Survey File

Gross Combination Weight	N (trips)	Row Percent by Road Type			Total
		Limited Access	Major Artery	Other	
Class 8 Diesel Straight Trucks					
10K-20K	245	34.1%	35.5%	30.3%	100%
20K-30K	711	36.6	30.6	32.8	100
30K-40K	279	26.7	33.1	40.2	100
40K-50K	234	26.9	30.8	42.2	100
50K-60K	173	22.2	31.9	46.0	100
60K-70K	102	50.3	22.8	26.9	100
70K-80K	107	59.9	18.2	21.9	100
Over 80K	40	24.8	49.6	25.6	100
Unknown	118	33.4	22.8	43.8	100
Total	2,009	33.6%	30.1%	36.3%	100%
Class 3-7 Diesel Straight Trucks					
10K-15K	268	45.9%	28.6%	25.5%	100%
15K-20K	302	31.4	25.0	43.6	100
20K-25K	165	25.1	39.2	35.7	100
25K-30K	103	31.7	32.0	36.2	100
Over 30K	88	64.1	11.6	24.4	100
Unknown	123	32.9	26.1	41.0	100
Total	1,049	36.2%	28.0%	35.8%	100%

TABLE 43
Distribution of Travel by Gross Combination Weight
Within Road Type: Diesel Tractors
Large Urban Areas Only
National Truck Trip Information Survey File

Gross Combination Weight	N (trips)	Column Percent by Road Type			Total Percent
		Limited Access	Major Artery	Other	
Class 8 Diesel Tractors					
10K-15K	73	0.5%	1.5%	1.8%	0.9%
15K-20K	147	1.8	0.9	1.8	1.7
20K-25K	405	4.7	5.7	5.3	4.9
25K-30K	1,530	16.0	21.2	19.2	17.3
30K-35K	777	8.4	11.1	12.1	9.4
35K-40K	456	5.7	5.8	8.4	6.1
40K-45K	313	5.7	5.0	7.6	5.8
45K-50K	370	5.9	5.7	6.1	5.9
50K-55K	272	3.9	4.2	4.0	4.0
55K-60K	275	5.5	3.3	2.6	4.7
60K-65K	231	4.0	2.4	2.9	3.5
65K-70K	374	7.7	4.8	2.3	6.5
70K-75K	604	12.2	9.1	5.4	10.8
75K-80K	672	10.6	8.3	6.5	9.7
Over 80K	262	3.0	3.6	4.4	3.3
Unknown	422	4.5	7.4	9.5	5.7
Total	7,183	100.0%	100.0%	100.0%	100.0%
Class 3-7 Diesel Tractors					
10K-20K	107	12.6%	10.0%	4.5%	8.9%
20K-35K	395	41.7	53.4	59.8	51.2
35K-50K	141	25.9	19.2	16.6	20.9
Over 50K	68	11.7	7.0	1.6	6.8
Unknown	64	8.1	10.4	17.5	12.2
Total	775	100.0%	100.0%	100.0%	100.0%

TABLE 44
Distribution of Travel by Gross Combination Weight
Within Road Type: Diesel Straight Trucks
Large Urban Areas Only
National Truck Trip Information Survey File

Gross Combination Weight	N (trips)	Column Percent by Road Type			Total Percent
		Limited Access	Majority Artery	Other	
Class 8 Diesel Straight Trucks					
10K-20K	245	10.2%	11.8%	8.4%	10.0%
20K-30K	711	35.6	33.3	29.5	32.7
30K-40K	279	11.0	15.2	15.3	13.8
40K-50K	234	10.0	12.8	14.5	12.5
50K-60K	173	7.0	11.2	13.4	10.6
60K-70K	102	9.6	4.8	4.7	6.4
70K-80K	107	6.7	2.3	2.3	3.8
Over 80K	40	0.6	1.4	0.6	0.9
Unknown	118	9.3	7.1	11.3	9.4
Total	2,009	100.0%	100.0%	100.0%	100.0%
Class 3-7 Diesel Straight Trucks					
10K-15K	268	32.9%	26.5%	18.4%	25.9%
15K-20K	302	29.8	30.7	41.9	34.4
20K-25K	165	9.8	19.6	14.0	14.0
25K-30K	103	8.3	10.9	9.6	9.5
Over 30K	88	9.3	2.2	3.6	5.2
Unknown	123	9.9	10.2	12.5	10.9
Total	1,049	100.0%	100.0%	100.0%	100.0%

TABLE 45
Use of Fuel Efficiency Devices
By Device Type and GVWR Group
Diesel Trucks Only
National Truck Trip Information Survey File

Device Type	Proportion Using Device	
	Class 3-7	Class 8
Aero. Cab Design	10.6%	7.0%
Aero. Add-Ons	4.7	8.8
Radial Tires	43.4	54.6
Variable Fan	23.7	34.2
Fan Shutter	12.3	29.9
Engine Governor	28.7	24.0
Tachograph	7.1	11.8
Fuel Efficient Oil	22.3	20.0
Efficient Axle Ratio	19.4	18.4
Efficient Engine	45.6	41.3
Other Devices	1.2	2.1
Fuel Efficient Trailer	10.8	27.1

Appendix B

State 1 2

Selection No. 3 4 5

Date Code 6 7

NTTIS COMPANY & POWER UNIT DESCRIPTION

COMPANY DESCRIPTION

OPERATING AUTHORITY:

Is this a daily rental truck? YES [17] → SKIP to Power Unit Description below.
 Is this truck govt. owned? YES [16]
 (city/county/state/federal) 8

Do any of your trucks ever carry goods interstate (across state lines)?

<p>[] YES → Are you</p> <p style="margin-left: 20px;">PRIVATE [] 11 → [] 11 (Carry own goods)</p> <p style="margin-left: 20px;">FOR HIRE [] 12 → [] 12 (Carry other people's goods)</p>	<p style="font-size: 2em;">}</p>	<p>ICC Authorized [] 12 (common/contract)</p> <p>Exempt [] 13</p>	<p style="font-size: 2em;">}</p>	<p>Is the owner also the driver? YES [] 11 NO [] 12</p>
<p>[] NO → Are you</p> <p style="margin-left: 20px;">PRIVATE [] 11 → [] 14 (Carry own goods)</p> <p style="margin-left: 20px;">FOR HIRE [] 12 → [] 15 (Carry other people's goods)</p>				<p>Is the owner also the driver? YES [] 11 NO [] 12</p>
<p>[] UNKNOWN →</p> <p style="margin-left: 20px;">PRIVATE [] 11 → [] 14 (Carry own goods)</p> <p style="margin-left: 20px;">FOR HIRE [] 12 → [] 15 (Carry other people's goods)</p>				<p>Is the owner also the driver? YES [] 11 NO [] 12</p>

POWER UNIT DESCRIPTION

Verify the make, model year, and VIN, and ask for the model name and company unit number.

1. Make _____ Year: 19 ____ VIN _____

2. Model Name _____ Company Unit Number _____

3. EDITOR: Code the base state of operation 13 14

4. POWER UNIT TYPE

Tractor [] 8

Straight Truck [] 11

15

STRAIGHT TRUCK

BODY STYLE:

Van [] 1

Flatbed [] 2

Tanker [] 3

Refrig. [] 5

Dump [] 6

Refuse [] 7

Other [] 8

16

6. CAB STYLE

Cab Forward [] 1

Cab Over [] 2

Short Conventional [] 3

Med. Conventional [] 4

Long Conventional [] 5

18

7. FUEL

Gas [] 1

Diesel [] 2

Other _____ [] 3

(Specify) 19

5. NUMBER OF AXLES

Two [] 2

Three [] 3

Four + [] 4

17

8. Power Unit EMPTY WEIGHT: 20 21 22 23 24 25

9. Power Unit LENGTH: 26 27 28

10. Estimated Annual Mileage for this power unit: 29 30 31 32 33 34

11. Percent of annual mileage for each trip type for this power unit:

- Local (Pickup and delivery, with 50 mile radius) 35 36 37 %
- Short Haul (Intercity, one-way, distance 50-200 miles) 38 39 40 %
- Long Haul (Intercity, one-way, distance 200+ miles) 41 42 43 %

(Total=100%)

12. Does this power unit ever pull twin trailers?

[] Yes Percent of annual mileage with twin trailers: _____ %

[] No (Enter 000.) 44 45 46 %

13. Odometer Reading 47 48 49 50 51 52 Date of Reading 53 54 55 56 57 58

10. Variable Fan Drive []1 YES
[]2 NO/DON'T KNOW
[]9 DIDN'T ASK
42
11. Thermal- Activated Fan Shutter []1 YES
[]2 NO/DON'T KNOW
[]9 DIDN'T ASK
43
12. Road Speed Governor []1 YES
[]2 NO/DON'T KNOW
[]9 DIDN'T ASK
44
13. Trip Recorder (Tachograph) []1 YES
[]2 NO/DON'T KNOW
[]9 DIDN'T ASK
45
14. Oil Designed to Promote Fuel Economy []1 YES
[]2 NO/DON'T KNOW
[]9 DIDN'T ASK
46
15. Axle or Drive Ratio to Maximize Fuel Economy []1 YES
[]2 NO/DON'T KNOW
[]9 DIDN'T ASK
47
16. "Fuel-Efficient" Engine []1 YES
[]2 NO/DON'T KNOW
[]9 DIDN'T ASK
48
17. Other Fuel Conservation Devices []1 YES
[]2 NO/DON'T KNOW
[]9 DIDN'T ASK
49
Specify _____
18. Drive Axles: []1
[]2
[]3
[]4
[]5
[]6
[]7
[]8
50
Single Rear Drive, 2 axles total (4X2)
Tandem Rear Drive, 3 axles total (6X4)
Single Rear Drive with tag axle, 3 axles total (6X2)
Two axles total, all driven (4X4)
Three axles total, all driven (6X6)
Three rear axles, all driven (8X6)
Four rear axles, two driven (10X4)
Other (specify) _____
19. Is the trailer this unit usually pulls "fuel-efficient"? YES []1
NO []2
51

Appendix C

Supplemental Questions on Diesel Engines and Fuel Efficiency Devices

Engine Manufacturer: The manufacturer of the engine.

Model: The model designation of the engine.

Displacement: The displacement of the engine in cubic inches. “Displacement” refers to the volume of the cylinders.

Horsepower: The horsepower of the engine.

The following questions were answered “yes,” “no,” or “don’t know.”

Engine Modified?: The original engine was considered to have been modified if the engine displacement or horsepower had been altered or if the original engine had been replaced with an engine with a different displacement or horsepower. Adding a turbocharger or boring out the cylinders were considered engine modifications since they change horsepower and increase the displacement respectively.

Aerodynamic Cab Design: An aerodynamic cab is one that was specifically designed and promoted to increase aerodynamic efficiency. This includes air deflectors and other aerodynamic devices added by the manufacturer even as optional equipment.

Aerodynamic Devices Added: Such devices include air “dams” or deflectors mounted on the cab. The question refers only to aerodynamic devices added by an end user.

Radial Tires: This question refers to radial tires on the power unit. When the power unit had both bias ply and radials, this question was coded “yes” if a majority of the tires were radials.

Variable Fan Drive: An engine fan that is automatically activated when the engine needs cooling.

Thermal-Activated Fan Shutter: A shutter located in front of the engine fan. When the engine needs cooling the shutter vanes open and allow the fan to draw in fresh air. When cooling is not needed, the shutter closes.

Road Speed Governor: This is a device that prevents the truck from exceeding a set speed. If the respondent indicated an RPM governor, the interviewer checked if its purpose was to protect the engine from over-revving or to limit the speed of the vehicle.

Trip Recorder (Tachograph): A tachograph records the speeds and times a truck is driven.

Low Friction Oil: This is an engine oil specifically designed and promoted as a low viscosity oil which increases the fuel efficiency of the engine.

Axle or Drive Ratio to Maximize Fuel Economy: Some trucks are geared for high mileage; others are geared for maximum power.

Fuel-Efficient Engine: This question asks whether the truck's engine had been designed and promoted as a fuel-efficient model.

Other Fuel Conservation Devices: This included any other devices or additions to the truck that were intended to increase fuel economy.

Drive Axles: The number of drive and non-drive axles on the power unit was noted. This information was recorded in the standard notation, e.g. 6X4, 4X2, etc.

"Fuel-Efficient" Trailer?: For a "yes" response, any trailer feature was accepted that the operator indicated was intended to increase the trailer's aerodynamic efficiency or to lessen its rolling resistance.