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REVIEW OF HIGHWAY COST ALLOCATION METHODOLOGIES

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16. Abstract

The objectives of the current cost allocation study, the fifth in a series begun in 1982, include the following: 1) to evaluate current cost allocation methodologies and identify possible changes to Kentucky practices; and 2) to determine the 1991 fiscal year levels of cost responsibility and revenue contribution for each of several classes of highway users. Additional objectives include an evaluation of the equity of tax proposals advanced by the Kentucky Motor Transport Association, a preliminary determination of the revenue and cost implications of the Extended-Weight Coal Haul System, and an evaluation of the efficiency with which certain highway user taxes have been collected.

As was the case in other recent cost-allocation studies, incremental cost assignment has been replaced with various highway use measures including vehicle-miles of travel, axle-miles, passenger-car-equivalent miles, and equivalent-single-axle-load miles.

Results from the analysis indicate that cost responsibility was borne most heavily by passenger cars and motorcycles (44.2 percent). Other cost responsibilities were 24.6 percent for heavy trucks; 20.4 percent for pickups and vans; and 10.8 for all other groups. When compared to revenue for each vehicle class; cars, pickups and vans, and heavy trucks exceeded their cost responsibility, while medium trucks fell significantly short. From a limited examination of the Extended-Weight Coal Haul System, it was found that an estimated $2 million are lost annually from the Road Fund because fewer trucks are registered. Heavier weights of coal-decal trucks add approximately $9 million annually to pavement overlay costs. Related to tax collection, it was found that the weight-distance tax was collected at an efficiency of about 70 percent and other user-reported fuel taxes in the range of 75 to 77 percent.

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EXECUTIVE SUMMARY

In recent years, costs of highway facilities have generally been considered to be the responsibility of highway users. Although the private sector has recently been called upon to assume more cost responsibility, highways are primarily financed from tax revenues and user tolls. A continuing task related to assessment of highway user fees is determination of the appropriate level of taxation for each class of highway user. Cost allocation in various forms has traditionally been a tool to achieve an equitable assignment of user responsibility. This highway cost allocation study is the fifth in a recent series begun in the early 1980s by the Transportation Cabinet and the Kentucky Transportation Center (formerly the Kentucky Transportation Research Program). Its primary objective is to determine the level of revenue contribution and cost responsibility for each class of highway user.

The current study parallels much of the work performed in Kentucky's previous studies; however, the process continues to be streamlined and automated to permit analyses to be performed and evaluated within relatively short periods of time. As was the case in the two most recent studies, various highway use and wear measures including vehicle-miles of travel, axle-miles, passenger-car-equivalent-miles, and equivalent-single-axle-load-miles have been used as the basis for cost allocations. The base year for the study is fiscal year (FY) 1991, which is the most recent time period for which revenue and cost data are available. Highway use or travel activity is generally reported on a calendar-year basis, and 1990 has been used because it is the most recent year for which complete data are available.

Highway user classes, with which revenue and cost responsibility were associated, totaled 17 and included motorcycles, cars, buses, and 14 registered or declared weight classes of trucks. Primary sources of revenue allocated to the various classes of highway users include fuel taxes, registration or license fees, usage taxes, road tolls, other motor carrier taxes, other Federal taxes, and miscellaneous taxes and fees. Primary expenditure categories include construction, maintenance and operation, administration, and enforcement. Construction expenditures were further subdivided into preliminary design and engineering, rights of way, utilities, grading and drainage, pavements and shoulders, and bridges.

One of the objectives of this study was to review and evaluate recent highway cost allocation literature. This was achieved by comparing the current practices of five states to the method used by Kentucky. The review indicated that there is a wide variety of approaches taken by the several states. Most studies have adopted the general principles of the 1982 federal study, but a few have made adjustments to the methods used for cost allocation. The difference in the roadway types, the "basic" vehicle, the determination of expenditures and revenues, and the amount of travel by each vehicle class were reasons for different revenue-to-cost ratios among the states. The reliability and sensitivity of such studies were also examined, and it was determined that continuous evaluation and update are desirable.

Another issue examined in this study was the construction costs for bridges and their allocation among the highway users. The literature review indicated that the incremental method is widely used for allocating bridge construction costs. However, this approach is not ideal for bridge cost allocation because the cost of long-span bridges is relatively insensitive to traffic loads, bridge design procedures do not allow for accurate modeling of incremental costs, and incremental cost procedures are time consuming and costly. A more reasonable approach is allocation of costs by PCE-miles or by a combination of PCE-miles to allocate basic costs and ton-miles to allocate residual (truck) costs.

A basic premise of this study was that only the state-maintained system of highways should be of interest to those attempting to recoup costs (by assigning them to the appropriate highway user) expended to construct and maintain the system. In 1990, the state-maintained highway system comprised approximately 28,000 miles of the 70,000 miles of roads and streets in Kentucky while accommodating approximately 90 percent of all travel in the state. Expenditures on Kentucky's roads and streets by the Transportation Cabinet totaled approximately $1,007 million, of which $845 million or 84 percent was spent on improving, maintaining, and operating the state-maintained system. Road Fund receipts totaled $1,007 million, of which $853 million was categorized as revenues attributed to state-maintained highways.

Results from the analysis indicate that cost responsibility is borne most heavily by passenger cars and motorcycles (44.16 percent). Heavy trucks, those with gross weights of 60,000 pounds or more, were responsible for 24.64 percent of the cost. Pickups and other vehicles registered in the 6,000-pound category were responsible for 20.40 percent of the cost. Cost responsibility borne by all other groups totaled 10.80 percent. Annual cost responsibilities in dollars and percentages for grouped classes of vehicles are shown in the following tabulation.

Vehicle Type	**Total Annual Cost Responsibility**	
	Thousand Dollars	Percent
Cars	373,172	44.16
Buses	11,293	1.34
Pickups and Vans	172,377	20.40
Light Trucks	21,423	2.53
Medium Trucks	58,542	6.93
Heavy Trucks	208,241	24.64

Revenues generated by vehicle class show that the groups bearing the most cost responsibility also contribute the largest share of revenue. Passenger cars generate the most (44.69 percent), followed by heavy trucks (25.46 percent), and pickups (22.49 percent). All other vehicles contributed a total of 7.36 percent. Annual revenue generated for the grouped classes of vehicles is presented in the following tabulation.

Vehicle Type	Total Annual Revenue	
	Thousand Dollars	Percent
Cars	381,329	44.69
Buses	2,430	0.28
Pickups and Vans	191,882	22.49
Light Trucks	22,938	2.69
Medium Trucks	37,494	4.39
Heavy Trucks	217,261	25.46

In order to evaluate taxation equity, the ratio of percentage revenue generated to percentage cost allocated was calculated and is presented in the following tabulation. A ratio of 1.00 indicates that the revenue and cost percentages are in balance for a particular vehicle type.

Vehicle Type	Ratio of Percent Revenue Generated to Percent Cost Responsibility
Cars	1.01
Buses	0.21
Pickups and Vans	1.10
Light Trucks	1.06
Medium Trucks	0.63
Heavy Trucks	1.03

The weight-distance tax imposed in 1988 on trucks grossing 60,000 pounds or more included a temporary surcharge of 1.15 cents per mile. Removal of this surcharge as well as other taxing schemes were evaluated. The effects of the removal of the surcharge and repeal

of the 2.85 cents weight-distance tax after the removal of the surcharge are summarized as follow:

Vehicle Type	Ratio of Percent Revenue Generated to Percent Cost Responsibility	
	Remove Surcharge	Repeal Tax
Cars	1.03	1.09
Buses	0.22	0.23
Pickups and Vans	1.12	1.19
Light Trucks	1.08	1.14
Medium Trucks	0.65	0.68
Heavy Trucks	0.97	0.80

Highway user revenues on a revenue per vehicle-mile basis is another means to examine potential inequities among vehicle types. Using the most recent data available from this analysis and other sources, it was determined that passenger cars contributed approximately 2.0 cents per mile in revenue as compared to 43.6-cents-per-mile to operate. For large trucks, the revenue contribution was 10.1 cents per mile.

As part of the study, a preliminary analysis of the cost and revenue implications of the "Extended Weight Coal and Coal By-Products Haul Road System" was performed. Although this was a limited examination of the system, the findings indicated that, despite the coal-decal fee structure, an estimated $2 million are lost annually from the Road Fund because fewer trucks are registered. Heavier weights of coal-decal trucks add approximately $9 million annually to pavement overlay costs, and larger and heavier trucks increase costs of construction and reconstruction of pavements, shoulders, bridges, and culverts, rehabilitation of pavements, shoulders, and bridges, and routine maintenance of pavements and shoulders.

A secondary, but important, objective of the study was to determine the efficiency with which various Kentucky taxes are being collected. Due to the methods of collecting user taxes and our ability to assess them, the analysis focused on the weight-distance tax and user-reported fuel taxes. Considering the estimated vehicle-miles of travel and the mileage based tax rate on heavy vehicles, revenue generated by the weight-distance tax should have totalled approximately $86,808,000 in FY 1991. This compares to actual receipts of $61,046,000 or a collection efficiency of about 70 percent. The user-reported fuel taxes were compared to revenues using reported gallons of fuel consumed, estimates of fuel-tax revenues from the heavy-vehicle surtax, and the normal use fuel tax. The efficiency of collection was in the

range of 75 to 77 percent. These rates indicate a moderate improvement in the efficiency of tax collection since FY 1989.

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INTRODUCTION

In the United States, government bears primary responsibility for providing and maintaining public roads and streets. Although the private sector has recently been called upon to shoulder more of the load, highways are largely financed from tax revenues and user tolls. Primary goals of those responsible for drafting highway tax legislation include an equitable assignment of responsibility to various groups of taxpayers and an efficient system for tax administration. Highway cost allocation studies seek to assure that the goals of equity and efficiency are met.

To pay for roads, both general taxes and those scaled specifically to road use are collected. In Kentucky, almost all of the revenue for financing the state highway system is generated from either user taxes or from tolls. Since the issue of user vs. non-user responsibility is thus largely preempted, the focus of state highway cost allocation studies in Kentucky is narrowed to one of assigning cost responsibility to the several groups of road users. Estimates are also required of the contributions of each group to revenue collections.

The primary objectives of the highway cost allocation study reported herein--the fifth of a recent series begun in 1982--include the following:

- to evaluate current cost allocation methodologies and to identify and implement desired changes to Kentucky practices;
- to determine an equitable assignment of cost responsibility to the various classes of highway users in Kentucky;
- to estimate current revenue contributions from these classes based on current taxation policy; and
- to determine the extent to which each user class is meeting its cost responsibility.

Additional objectives include an evaluation of the equity of tax proposals being advanced by the Kentucky Motor Transport Association, a preliminary determination of the revenue and cost implications of the extended-weight coal haul system, and an evaluation of the efficiency with which certain of Kentucky's taxes are being collected.

This report begins by presenting an overview of highway cost allocation studies completed previously. Next, a survey of state practices is presented where several methodological issues are analyzed. Then, an overview of the bridge construction costs is given. Next, methodological modifications incorporated following the 1990 study are identified. At this point, the distribution of the registered truck weights is presented. The next section presents the analysis and results of the study followed by its summary and

findings. A set of Appendices is also included presenting all the technical documentation and supporting data.

BACKGROUND AND OVERVIEW

Kentucky's first highway cost allocation study, applying incremental cost analysis, was published in 1956 as part of an in-depth study of highway finance (1). Despite fundamental changes both in the population of highway users and in the nature and extent of highway expenditures, 25 years lapsed before an update was published in 1982 (2). The current study is the fourth update since 1982, following studies in 1986 (unpublished), in 1988 (3), and in 1990 (4).

Cost allocations in 1982 were based on a combination of road use (vehicle miles of travel) and incremental costs. Abandoning incremental cost procedures, the 1986 study extended highway use measures to include both axle-miles and passenger-car-equivalent (PCE) miles of travel and adopted elements of the consumption theory of cost allocation from a 1982 Federal study (5). Although a few minor adjustments were made in 1988, the fundamental methodology was unchanged. However, what had largely been a manual process was automated through development of a set of integrated spreadsheets. This reduced the level of effort required for future updates, enabling frequent adjustments to reflect changing patterns of traffic and evolving public priorities for highway expenditures. The 1990 study built upon and refined the integrated process begun in 1988 and examined in depth the results of legislative changes enacted in 1988.

Figure 1 illustrates schematically the relationships between various sources of revenue and the highway systems on which they are expended in Kentucky. Since the current study seeks to provide information useful to those who formulate and implement state taxation policy and to those who manage the state system of highways, its focus is 1) on state tax policies and the revenue generated therefrom and 2) on the costs of providing and maintaining the state highway system. These elements are highlighted on Figure 1 by doublelining. To the maximum practical extent, revenue generated by road users that is not expended on the state-maintained system has been excluded from the analysis. Examples include the 26 percent of normal fuel-tax revenue dedicated by statute for county and municipal road aid, 30 percent of truck license fees, and ad valorem taxes. Since Federal tax revenue returned to Kentucky, collected largely from Kentucky road users, figures so predominantly in financing Kentucky's state highway system, it is included in the analysis despite the fact that Federal tax rates are set largely independently of Kentucky conditions.

The base year for the study is fiscal year (FY) 1991, the most recent year for which complete financial data are available. Travel activity is generally reported on a calendar-year basis, and 1990 is the most recent year for which complete tabulations are available. Because travel activity, especially that of one user group relative to that of others, normally evolves slowly, the slight disparity in time periods poses no serious threat to a valid analysis.

User classes, identified in Table 1, number 17 and include motorcycles, cars, buses, and 14 truck classes. Registered (or declared) gross weight was chosen as the basis for truck

categorization because differential truck tax rates are determined primarily by registered weight.

Primary sources of user revenue include fuel taxes, registration and license fees, usage taxes, road tolls, other motor carrier taxes, other Federal taxes, and miscellaneous taxes and fees. In a few instances, available data are sufficiently detailed to identify the link between a specific revenue total and a specific user class. For example, available tabulations indicate the fees collected specifically from automobile registrations. In other cases, the link between revenue and user class is less direct. For example, revenue from truck weight-distance taxes must be allocated to the three classes of trucks having registered (or declared) weights in excess of 59,999 pounds. Although in this instance estimated truck miles of travel for the three classes provided a direct basis for allocation, in other situations more arbitrary allocation rules were required. Table 2 summarizes the guidelines used to allocate revenue to the various user classes.

Primary expenditure categories include construction, maintenance and operation, administration, and enforcement. Construction expenditures are further subdivided into preliminary design and engineering, rights of way, utilities, grading and drainage, pavements and shoulders, and bridges. Allocations were based on estimates of the annualized cost of replacing the entire highway plant, appropriately scaled to the level of construction funding in FY 1991. Allocations of highway expenditures to the various user groups were based either on measures of use (vehicle-miles, axle-miles, or passenger-car-equivalent miles) or wear (equivalent-single-axle-load miles) according to the guidelines of Table 3.

Two integrated spreadsheets, one for cost allocation and the second for revenue allocation, provide a convenient mechanism for data input, computation, and tabular output. Detailed technical documentation of these spreadsheets and their use is provided in Appendix A. Appendix A also identifies the nature and source of required travel, cost, and revenue data.

SURVEY OF STATE PRACTICES

INTRODUCTION

The continuing increase in transportation demand coupled with progressive deterioration of the nations's highway infrastructure have prompted many states to reexamine the adequacy, reasonableness, and fairness of their highway tax structures. Many of these examinations have been patterned, at least in part, after the comprehensive Federal cost allocation study which was completed in 1982. Although methodologies at state and Federal levels are often quite similar, findings are expected to be different because of wide differences in the state and Federal highway systems, expenditure responsibilities, and prevailing traffic conditions. Moreover, similar types of differences among the states are expected to contribute to significant state-by-state fluctuations in highway user cost responsibility.

One objective of the current study was to review and evaluate recent highway cost allocation literature. An AASHTO survey (6) has identified active states (Table 4), and six of these were selected for detailed evaluation including Kentucky, Minnesota, Vermont, California, Virginia, and Indiana. A general description of two important cost allocation strategies is first presented, followed by the state-by-state comparisons.

STRATEGIES

Over the past decades, a number of different techniques have been used to allocate costs among the various highway users. The majority may be grouped into one of four categories including 1) level of use, 2) costs imposed, 3) benefits received, and 4) induced wear or consumption of facility components. Each technique is theoretically appealing, and each is capable of providing equitable cost allocations. Methodological choice is more often based on study resources, data availability, and analytical capability, however, than it is on theoretical and conceptual considerations.

Level of use, measured by vehicle miles, axle miles, or passenger-car-equivalent miles, is used to allocate some of the cost elements in almost every study. The notion that user contributions should be proportionate to level of use is readily acceptable and easily understood by users and policymakers alike.

Imposed-cost techniques are typically of two types, incremental cost and marginal cost. Incremental-cost techniques are useful when it is possible to relate the design, and hence the cost, of individual highway elements to vehicle size and weight. The notion is that base costs should be shared by all highway users while incremental costs should be borne only by larger vehicles. Assigning cost responsibility to larger and heavier vehicles in proportion to the added cost necessary to accommodate these vehicles is universally appealing. Although the more encompassing marginal-cost techniques, which determine the

relative costs charged to each vehicle class based on the marginal cost to society imposed by their use of the highway, are also highly appealing, they are largely unsuitable for routine use because of both heavy data requirements and uncommon complexity.

Benefit-based methods are founded on the premise that cost responsibility by highway users should be proportional to the level of benefits they receive from highway use. Benefit-based methods are not popular because of the difficulty of accurately measuring the relative benefits of highway use. However, payload ton miles, a surrogate for highway benefits, has been used to distribute costs among a subset of the user population, namely, freight operators. Also, it may sometimes be practical to base the allocation on the reduction in user cost due to highway improvements. Were it not for their practical difficulties, benefit-based procedures would likely enjoy greater popularity as an equitable way to allocate cost responsibility.

Finally, wear or consumption has been used as a basis for cost allocation for infrastructure elements which undergo traffic-induced wear that can be reasonably associated with vehicle size and weight. Such concepts have principally been applied to the deterioration of pavement, which is greatly accelerated as vehicles become larger and axle loads increase. Although assignment of cost responsibility based on traffic-induced wear is conceptually attractive, its use is very limited because most infrastructure elements do not directly deteriorate as a result of traffic.

In the typical cost allocation study, several different allocation techniques are used. Expenditures are categorized in considerable detail, and an appropriate allocation technique is selected for each expenditure category. Level of use is probably the most common allocation technique, and wear appears to be increasingly used as a basis for allocating pavement expenditures. The majority of studies conducted at the state level have also applied either the incremental or the Federal method to selected cost elements. Because of the relative complexity of these techniques, a brief description is in order.

The basic concept of the incremental method is to separate all costs into two categories; first those costs to provide a "base" highway system assuming that all vehicles that will use it are "basic" ones and second those additional costs to accommodate larger and heavier vehicles (7). Vehicles having automobile characteristics are usually defined as "basic" vehicles. The costs for the "base" system are distributed among all vehicles in proportion to their use of the system. Additional costs for larger and heavier vehicles are assigned exclusively to them. Thus, heavier vehicles share their portion of the "base" system cost and the cost they occasion due to their size. Each incremental vehicle class shares all the costs for vehicles its size and smaller, leaving the largest and heaviest to pay for all costs at the last increment. Any costs where there are no differences between large and "basic" vehicles are considered common costs and are allocated in proportion to the use of the system by each class.

The Federal method, presented in the Federal Highway Cost Allocation Study, evolved from the incremental method by developing new procedures for allocating costs for some

expenditures and adapting the procedures of the incremental method for others (5). The basic difference between the traditional incremental method and the Federal method is the way they treat pavement costs. The Federal method uses a minimum thickness method for new pavement costs, where the costs are based upon the estimated strength required for a minimum pavement thickness without regard to any basic design vehicle. This method reduces the pavement thickness by removing equivalent single axle loads (ESALs) until reaching a point where any further removal will make construction of the pavement impractical. Pavement costs are distributed among vehicle classes in proportion to ESALs.

Pavement rehabilitation costs are also allocated differently between the two methodologies. The incremental method uses the same methodology as for new pavements, while the Federal method uses a consumption approach. This approach simulates consumption or wear of pavements using distress models. Another difference between the two methods is for replacement and repair costs for bridges. The incremental method uses the same incremental approach as for other expenditures. The Federal method allocates bridge replacement costs based upon a function which considers the reasons for replacement and treats the costs for bridge repairs as common costs.

Advocates of the Federal method argue that the incremental method provides all the economies of scale to heavier vehicles since the cost for adding pavement thickness is reduced drastically with every inch added. On the other hand, advocates of the incremental method argue that the "base" highway system would be constructed regardless of whether larger and heavier vehicles were allowed to use it. The Federal method of handling pavement rehabilitation and bridge replacement allocates more equitably the costs for these expenditures among vehicle classes. Previous highway cost allocation studies (HCASs) have shown that both methods produce similar results for all items other than pavements and bridges. If expenditures for pavements and bridges are large, then the two methods will produce different results. Some believe that, because of the importance of pavement expenditures, both methods should be applied and the results should be compared.

Because the Federal method has been endorsed by AASHTO, several studies completed at the state level present their results based on this method. However, some states are using both methods to present their findings but draw their recommendations from the Federal method.

HIGHWAY COST ALLOCATION STUDIES

The selected HCASs include those performed at the state level for Kentucky (4) and Virginia (8), Minnesota (9), Vermont (10), California (11), and Indiana (12). The study performed for Virginia was completed in 1991, while the HCASs for Minnesota and Vermont were completed in 1990. The study for Kentucky was updated in 1990. Finally, the study for California was completed in 1987 and for Indiana, in 1984. These particular studies were selected for review herein because of their currency and the availability of suitable

documentation. First, the general characteristics of the studies will be presented, followed by a description of revenue sources, items of expenditures, and cost allocation methodologies followed by each state. Finally, the ratios determining the equity issue will be presented and discussed.

General Characteristics

The number of vehicle classes used by each state varied from a maximum of 14 in Kentucky and Indiana to a minimum of 9 in Vermont and Virginia. Minnesota and California included 10 vehicle classes. Kentucky truck study findings were also presented using 14 registered weight classes.

All states used functional classification as a basis for stratifying the highway system for analysis except Kentucky, where federal aid classification was used, and Virginia, where an administrative classification was used.

For the Minnesota study, the roadway system covered by state expenditures included the state trunk system, which serves interstate travel, and state aid highways which include the county state aid highway system and municipal state aid street system. The latter roadways are the responsibility of the local governments but projects are eligible to receive state aid. The study for Vermont indicated that state responsibility is limited to interstate, freeway, and principal arterial roadways. The study for California was primarily focused on the state highway system, but it was expanded to include expenditures for all local streets and roads. The study performed for Indiana included the entire highway system of the state excluding toll roads. Kentucky included all state maintained highways. Finally, the study for Virginia included all state maintained roads as determined by administrative classification.

Revenues

Minnesota revenues included fuel taxes, registration fees, license fees, and excise taxes. Vermont revenues included fuel taxes, registration fees, purchase and use taxes, and other fees that support the state's transportation fund. Virginia revenues were obtained from fuel taxes, road use taxes, motor vehicle sales and use tax, registration and license fees, excise taxes, and weight fees. California revenues included fuel taxes, weight fees, registration and license fees. Purchase (sales) taxes were excluded from California revenue sources. Indiana revenues included fuel taxes, registration fees, weight and use fees, and purchase taxes. License fees were excluded from Indiana revenues. Kentucky revenues included fuel taxes, registration and license fees, excise taxes, weight fees, purchase and use taxes, and toll road payments. For all states, non-user fees were excluded from the revenue sources.

Expenditures

Minnesota and Vermont expenditure classes included capital improvements, maintenance, commercial vehicle programs, and other programs. Expenditures related to

administration and enforcement were excluded. The HCASs for the remaining four states indicated that expenditures included capital outlay, maintenance, administrative, enforcement, and other programs costs. In addition to these common expenditures, California also included expenditures for its Department of Motor Vehicles.

For all studies, capital improvement and capital outlay costs were the same. These costs were further divided into several subcategories which generally included new pavements, pavement rehabilitation, new bridges, bridge replacement, grading and drainage, preliminary design and construction engineering, and rights of way.

A comparison chart for the general characteristics, the revenue sources, and expenditure items is presented in Table 5.

COST ALLOCATION METHODOLOGIES

HCASs for Minnesota, Vermont, and California determined the responsibility for expenditures using both the incremental and Federal methods. Because these studies used the Federal method for their major findings, only these methodologies will be examined. The other three studies varied in the degree to which they followed the Federal method. The method applied by each HCAS is detailed for each expenditure category in the following sections.

New Pavement

Minnesota, Vermont, and California used the minimum pavement thickness method as adopted in the Federal procedure. Virginia allocated costs for new pavement using vehicle-miles of travel (VMT) for the basic pavement and ESALs for additional strength and width requirements. The basic pavement was defined as one with 6.5 or 7.5 inches of thickness, depending upon traffic volume, and 10 feet wide. Indiana modified the incremental method by determining pavement thickness increments instead of traffic increments and distributing the costs according to ESALs. The minimum pavement thickness was taken as 4.5 inches. The Kentucky study allocated pavement expenditures in proportion to ESAL-miles on each class of the state maintained system.

Pavement Rehabilitation

Minnesota and Vermont used the consumption method as developed in the Federal study. California applied the same method but the percentages between the load and non-load results are included indicating that 70 percent of the costs are distributed based on ESALs and 30 percent based on VMT. Virginia allocated pavement rehabilitation costs the same way as new pavement costs. Indiana used a similar methodology for load related portions as the one used for new pavements. For non-load portions, the costs were distributed according to VMT. The proportions between load and non-load related costs varied depending on the

location of the highway. Kentucky allocated these expenditures in proportion to axle-miles allocating 80 percent of the expenditures to all vehicles and the remaining 20 percent to trucks having six or more tires.

New Bridges

Minnesota, Vermont, California, and Indiana studies used an incremental analysis of bridge strength for the allocation of expenditures for new bridges. Virginia used the incremental analysis of structural construction cost developed by Sinclair and Associates (13). Kentucky allocated the costs for new bridges in proportion to passenger car equivalent (PCE) miles.

Bridge Replacement

Minnesota, Vermont, and California used the Federal method which applies an incremental analysis of bridge strength and a special bridge replacement function. This function takes into consideration replacement costs incurred because of load bearing deficiencies and assigns these costs to vehicles operating at weights over the load bearing capacities of replaced bridges. Virginia indicated that load deficiencies are very small and determined that this analysis would be impractical. Indiana allocated these costs in proportion to ESALs, and Kentucky allocated the costs for bridge replacement similar to the way used for new bridges, that is, in proportion to PCE-miles.

Grading

Minnesota, Vermont, California, and Virginia used an incremental analysis of earthwork requirements as incorporated in the Federal method. The costs were allocated to vehicle classes (weight-to-power ratios) based on incremental savings in grading costs proportional to their VMT. Indiana used a similar method where the costs for the minimum road width (as defined by AASHTO standards) were allocated in proportion to VMT among all vehicle classes, and the remainder was allocated in proportion to PCE-miles. Kentucky allocated grading costs in proportion to PCE-miles.

Drainage

In the Minnesota, Vermont, and California studies, drainage expenditures were included in the grading component. Virginia used an incremental method for box culverts if the heights of fill above the structure were less than 10 feet and a proportional allocation by VMT if they were more than 10 feet. Indiana and Kentucky allocated these expenditures similar to the method for allocating grading costs.

Preliminary Design and Construction Engineering

Minnesota and Vermont allocated these costs using a prorated basis on other capital outlays for construction. Other studies allocated these expenditures in proportion to VMT. The only exception was Indiana, which excluded costs of preliminary design and construction engineering.

Right of Way

With one exception, all studies allocated these expenditures in proportion to VMT. Indiana was the only exception, where cost for the required basic right of way (as defined by AASHTO standards) was allocated in proportion to VMT, and costs for additional right of way were allocated in proportion to PCE-miles.

Enforcement

For all studies enforcement costs were allocated in proportion to VMT. This item of expenditures was not included in the Minnesota and Vermont studies.

Miscellaneous

Minnesota, Vermont, California, and Virginia allocated miscellaneous costs in proportion to VMT. Kentucky allocated them in proportion to axle miles. Miscellaneous expenditures were not included in the Indiana study.

A comparative chart summarizing the methodological issues adopted by each state is presented in Table 6.

TRAVEL TRENDS

Because each state used a different number of vehicle classes, the comparisons herein dictated the use of a "least-common-denominator" set of eight classes including automobiles, motorcycles, pickups and vans, buses, single-unit or straight trucks having two axles, single-unit trucks having three or more axles, combination trucks having four or fewer axles, and combination trucks having five or more axles. Table 7 presents the comparative travel trends for each state in a percentage form. The last line in this table identifies the total VMT for the highway system investigated by each state. Significant differences in the amount and composition of travel are readily apparent. For example, travel in the state of California far exceeds the travel in all other states. Moreover, there are surprisingly large differences among the states in the amount of combination truck travel with Kentucky and Indiana experiencing the heaviest concentrations.

RESULTS

One ultimate purpose of cost allocation studies is to examine the equity of cost responsibilities and revenues generated by each vehicle class using the highway system. To determine this revenue-to-cost responsibility, ratios of revenue to cost for the various vehicle classes are often compared. A ratio of one indicates a balance between revenue generated by user taxes and the assigned or allocated cost responsibility. Revenue-cost ratios for each of the six states are presented in Table 8. This table indicates rather remarkable differences among the states. In Indiana, passenger vehicles bear much greater financial responsibility than their fair share of costs would indicate. On the other hand, truckers in California are shouldering the heavier tax burden. In the other four states, passenger vehicles seem to be more equitably treated by existing tax laws.

Disparity in the tax burden is even more evident between truck classes. Only in Vermont and, to a lesser extent, Virginia are operators of single unit or straight trucks and operators of combination trucks on equal footing. In California, Indiana, and Minnesota, straight trucks appear to bear a disproportionally large portion of the revenue responsibility. In Kentucky, on the other hand, combination trucks bear a larger tab than their straight-truck counterparts.

The rather large differences in revenue-cost ratios among the six states may be attributed to many factors including travel patterns, tax exemptions, topography and geography, current highway needs and expenditure patterns, and, of course, financial policy and tax law. Significant differences in travel patterns, for example, are evident among the six states. Even though the proportion of travel among the vehicle classes was somewhat similar, the fact is that actual VMT (or measures of travel other than percentages) influences the cost responsibility of the vehicle classes. Another reason for such differences is the inclusion/exclusion of tax exempt vehicles. It is possible that some states may have included tax-exempt vehicles in their travel projections and, because these vehicles did not pay their fair share of revenues, reliability of the revenue-cost ratios would be adversely affected.

Another factor affecting these ratios is the way that each state has defined the vehicle classes. As mentioned, several different schemes were used, and an attempt was made herein to bring all groups to a common basis. Different topographic conditions and geographic location for each state also play an important role in the determination of revenue-cost ratios. Each geographic region poses its own unique characteristics for travel, roadway design, and climatic conditions. These factors affect the allocation of revenues and expenditures among the various vehicle classes.

Differences in the revenue-cost ratios may also be attributed to the different highway system needs of each state. For example, states that place a high priority on the construction of new pavements will, thus, increase the cost responsibility of heavy trucks. On the other hand, if there is a need for more maintenance activities and pavement rehabilitation, then different cost responsibilities will be allocated. A detailed comparison of the proportions of

the expenditures by each type of activity was not feasible herein because of inconsistent reporting of expenditure data. Such differences may not only be noted among states but also could probably be observed during different time periods for the same state.

The different ratios among the states for the various vehicle classes may also be attributed to different shares of cost responsibilities and revenues by each vehicle class. Tables 9 and 10 present the proportions of expenditures and revenues by vehicle class for each state. These figures indicate a wide variety of shares among the vehicle classes which may be attributed to factors such as identified above. For a number of states, the cost responsibility of combination trucks was high due to the high proportion of expenditures for new pavements and pavement rehabilitation.

Other useful comparisons include revenue and expenditure for each vehicle class expressed on a per vehicle-mile basis. These figures are presented in Tables 11 and 12. These methods facilitate comparisons among the various vehicle classes to determine the costs and revenues they generate based on their amounts of travel. Even though these methods are relatively inaccurate--because many expenditures and revenues are not based on VMT--they may be used for comparisons among the vehicle classes to determine the relative cost responsibility and revenue contribution. Again, a wide variety among the values in these tables is noted. Except for California, the cost responsibility of single unit trucks was more than double of that for passenger vehicles. Moreover, a greater variation existed between single unit and combination trucks than for passenger vehicles and trucks. On a per mile of travel basis, the cost responsibility for single unit trucks slightly exceeded that of combination trucks in Kentucky but was only about one fourth that of combinations in California. Similarly diverse patterns were noted for revenues per vehicle mile.

RELIABILITY OF HIGHWAY COST ALLOCATION STUDIES

Because the most important reason for conducting a HCAS is to determine if there is equity between costs generated by highway users and revenues attributed to them, it is apparent that their reliability and sensitivity are of central importance. In all studies, data limitations were mentioned as a problem. Traffic mix, relations between mileage and registered weights for trucks, and tax-exempt vehicles are some of the data items reported as being inadequate. A few studies mentioned the need to update data collection techniques to produce more accurate data. Kentucky completed a sensitivity analysis to test the impact of uncertainty of data on the final revenue-to-cost ratios. Results indicated that the impact of some variables was very high while, for others, the impact was likely to be minimal. Altogether, this preliminary analysis suggested that, pending the development of more refined estimates, the revenue-cost ratio developed using Kentucky data and procedures may be considered to be a normally distributed random variable having a coefficient of variation in the range of 5 to 11 percent.

Moreover, items that are included in the revenues and expenditures are not uniform among the states. For example, California, Minnesota, and Vermont included, as expenditures, aid provided to local authorities while the other states did not. The presence or absence of expenditure and revenue items is an important issue when HCASs are conducted. At the present time, there are no universally accepted guidelines indicating which items should be included or excluded at the state level. A sensitivity analysis included in the California study indicated that the inclusion of a comprehensive set of programs related to highways (inclusion of expenditures for Department of Motor Vehicles, enforcement, and other mass transit programs) resulted in lower equity ratios for light trucks and higher ratios for heavy vehicles.

Also, all studies noted the need to continuously update the data base and to perform periodic evaluation of the cost responsibilities and revenue generation of the various classes of highway users. The completion of a HCAS should not be considered as a one-time event but rather should be viewed as part of a continuous process with periodic updates. Inflation, changes in travel patterns, new taxation schemes, new trends in vehicle registrations, and changes in highway needs are factors that influence the revenues and expenditures and therefore may change the status of certain users relative to taxation equity. It is reasonable to assume that the states will go through a dynamic process where changes will occur over time. For example, highway system needs are shifting from construction of new pavements to maintenance and rehabilitation. Such a change will affect the proportion of expenditures between new pavements and rehabilitation, and, as a result, will affect the cost responsibilities of all vehicle classes.

Another important issue which may reduce the reliability of these studies is the definition of the "base" highway system and "basic" vehicle. For those expenditures allocated among vehicle classes based on an incremental method, such definition is essential and may vary among the states. For example, Virginia used two different "basic" pavement thicknesses depending on traffic volume while Indiana used one for all roads. Similarly, Virginia assumed a 10-foot wide pavement as the base width and Indiana, a 9-foot wide pavement. Other studies suggest that 12-foot pavements should be the minimum width, both for safety reasons and due to the fact that this width is used currently for designing and constructing most new highways.

SUMMARY AND CONCLUSIONS

This review of six recent state HCASs indicated that a variety of approaches is taken by the several states. Most studies adopted general principles of the 1982 Federal study, but a few have made adjustments to the methods used for cost allocation. Most of these studies were initiated because of the desire to reevaluate the fairness of the taxation policies among the various vehicle classes at the state level.

By applying the methodology used by the Federal Highway Administration in the Federal HCAS (FHCAS), certain problems arise. First, the FHCAS focused on highways to which Federal funds are applied, namely, primary facilities serving predominantly interstate travel. However, at the state level, a variety of roadways must be considered, and each carries a different mixture of traffic. Second, revenues and expenditures are determined in a more uniform fashion for the FHCAS while greater variation exists among the states. Third, different characteristics exist among states based upon their geographic location, types of urban centers, and urbanization level. A number of states have a greater portion covered by urbanized areas, and each has unique highway needs based on its location.

The revenue-to-cost ratios for vehicle classes are considered as an important final outcome of HCASs. When these ratios were compared among the studies examined, no consistent trends were noted for specific vehicle classes. For example, for passenger vehicles, three states (Minnesota, Virginia, and Vermont) indicated a very small overpayment, California showed a large underpayment, Indiana a large overpayment, and Kentucky an equity between revenues and expenditures. Results were even more diverse when these overall ratios were broken down to other subclasses within this group. The differences in these relationships may be attributed to several factors including different travel patterns among the states for the same vehicle class, different highway needs among the states, different expenditure proportions among the various items considered by each state, different geographic location, and different taxation policy.

Although very few states have directly addressed the reliability and sensitivity of their HCASs, these are obviously of critical importance. Hypothetical scenarios regarding inclusion or exclusion of revenues or expenditures are the primary sensitivity analyses performed by existing studies. The most reasonable way to determine the reliability of HCASs may be to compare the results of the preselected methodology with other alternatives. Level-of-use, incremental, Federal, and ton-mile methods are well developed, and it is expected that in the future two additional methodologies (marginal cost and benefits), which are not used widely at the present, may become easier to perform and the required data for their completion may become available. Because no set guidelines exist for a nationwide methodology for HCAS at the state level, the choice of methodology is clearly an arbitrary one.

The items included as revenues and expenditures varied among the states. For all states, non-user revenues were rightfully excluded. Some states included all other revenues paid by highway users regardless of whether or not they are dedicated to highway purposes while others considered only those revenues dedicated to highway use. Similar problems exist for the determination of the expenditures to be included or excluded. Four of the HCASs included expenditures related to enforcement of highway rules while the other two did not consider them as part of the cost responsibility of the highway users. For several other revenue and expenditure categories, the agencies conducting these studies face the question of whether it is appropriate is to include or exclude them from the corresponding category.

Continuous evaluation and update of results from HCASs are necessities. Traffic trends change, highway system needs alter, vehicle characteristics evolve, and financial and economic values vary over time. Inflation rates and market fluctuations are very important elements that ought to be seriously considered. If current taxation rates are retained, then revenues attributed to each vehicle class will be reduced in the future if no special care is given. Among all revenue sources, only purchase taxes are structured to follow inflation. One may argue that revenues will be increased if the travel trends increase. On the other hand, the future is uncertain regarding which of the two, travel or inflation, will increase at a faster pace. Only a periodic update will enable legislation to adjust taxation schemes to achieve equity among vehicle classes as well as between revenues and expenditures.

SPECIAL INVESTIGATION OF BRIDGE CONSTRUCTION COSTS

The survey of state practices revealed that the incremental cost method is widely used, particularly for allocating the costs of pavement and bridge construction. Because several years have passed since Kentucky has applied incremental cost techniques, a special study was launched to reexamine the applicability of these techniques to Kentucky investigations (14). The specific focus was on newly constructed and reconstructed bridges spanning the state's highways and waterways. The primary objectives of the study were to calibrate the incremental cost model for Kentucky bridges and to examine competitive alternatives including level-of-use and benefits-based techniques.

Incremental cost analyses for bridge construction require detailed design of specific bridges for a range of hypothetical traffic loadings. The analysis is made tractable only by selecting a limited set of the most common structures being constructed in the state. Based on a review of construction records for all bridges constructed on the state-maintained system from 1979 through 1989, four of the most common bridge types were selected for analysis; 1) a 46-foot prestressed box bridge, 2) an 80-foot prestressed girder bridge, 3) a 230-foot prestressed continuous bridge, and 4) a 356-foot continuous steel girder bridge. Actual construction quantities were determined from a detailed analysis of two bridges representative of each of these four bridge types, and costs were projected to the base year of 1990.

Fortunately, bridges similar both in type and in length to these typical Kentucky bridges had been analyzed by Sinclair (13) for the Federal HCAS (5). These bridges had been designed for a wide span of design traffic loadings, and detailed models were available relating construction quantities to design loadings. Theoretically, it was a trivial matter to apply Kentucky average unit bid prices to Sinclair's construction quantities to determine total bridge construction cost and, then, its relationship to design traffic. Actually, the process was more difficult and less exact because several pay items in Kentucky differed significantly from those evaluated by Sinclair.

Unfortunately, bridges are designed on the basis of somewhat arbitrary loading conditions rather than on the basis of traffic that will actually cross them. Conceptually, design loads envelop critical truck loading conditions, and load repetitions seldom directly influence design details. To make use of the recalibrated Sinclair models, it was necessary to develop relationships between actual traffic loads and the design loads that drive construction cost estimates. For the sake of simplicity, traffic loads and design loads were deemed to be equivalent when they produced identical bending moments in each of the typical Kentucky bridges.

Once the cost model had been calibrated and extrapolated to the population of on-the-road vehicles, application of the incremental cost analysis was primarily an accounting matter. The highway system was stratified by Federal aid classification, and totals of the number and square footage of bridges of each type which had been constructed on each Federal aid system were developed based on information contained in the bridge construction database.

Traffic estimates were obtained directly from the 1990 Kentucky HCAS (4). The base vehicle was a four-tired vehicle, such as a pickup truck, loaded to 5,000 pounds. System-wide, basic bridge construction costs were allocated equally to all vehicle classes based on level of use. Cost increments attributed to heavier vehicles were allocated, again according to level of use, only to these more demanding vehicles. Level-of-use measures for the basic cost allocation included vehicle-miles, axle-miles, and passenger-car-equivalent (PCE) miles. For the residual cost analysis, costs due to heavier vehicles, only vehicle-miles was used as an allocator.

In addition to the incremental cost analysis, two other allocation techniques were examined. First, the total costs of bridge construction were allocated directly based on level of use. Once again, the three common level-of-use measures were used, vehicle-miles, axle-miles, and PCE-miles. Second, payload ton-miles, a surrogate for benefits, was used to allocate residual (non-basic) costs among the truck population. PCE-miles was used in this analysis as the means for splitting total costs into basic and residual components.

Final results of the analysis are shown in Table 13. With all allocators, the incremental method assigns greater cost responsibility to trucks than does the total cost method. Among allocators, the greatest responsibility is assigned to trucks by PCE-miles, followed in order by axle-miles and vehicle-miles. Ton-mile allocations assign relatively greater cost responsibility to combination trucks, those that carry the greatest payload, than to straight trucks.

Based on this extended experience in calibrating the incremental cost model for Kentucky conditions, it is not recommended for routine use for the following reasons:

1. Because of continuous changes in both the truck population and in the allocation of bridge construction and reconstruction dollars to the various highway systems, cost allocation models must be periodically recalibrated when accuracy is to be maintained. Periodic updates are extremely difficult with the incremental method because of its complexity and expense.

2. Because the Sinclair design models differ significantly from Kentucky practice, new models would have to be developed to replace them. Other new models would have to be constructed and calibrated as a result of any future changes in bridge design and construction practice in Kentucky.

3. Because bridge design, and hence construction cost, is affected only indirectly by the nature and volume of anticipated traffic loading, information needed to calibrate the incremental cost model requires assumptions that may compromise its accuracy and integrity. Among the difficulties in calibrating the incremental model are the following:

- Bridge design practice does not provide the capability to link bridge costs to loading frequency and to occasional overloads.

- Bridges must be designed to withstand their own weight (dead load) and a variety of live loads including traffic, wind, earthquakes, and thermal forces. The design of longer spans is driven primarily by dead load and natural forces, not traffic loads. Under such conditions, incremental cost procedures assign negligible cost increments to progressively larger and heavier vehicles.

- Although bridge design, and hence construction costs, is driven by a maximum loading envelop, cost allocations are traditionally based on the distribution of operating weights of the various vehicle types.

- Real trucks are usually equated to design loads by the bending moments they impose on typical spans ignoring effects of impact, load distribution, truck trains, etc.

- When military vehicles, garbage trucks, fire engines, or other non-commercial vehicles drive bridge design, incremental cost practices that assign costs to less critical vehicles are conceptually unappealing.

- Because vehicle width does not directly influence bridge width in conventional design practice, incremental cost allocation procedures must either ignore possible cost increments associated with vehicle width or must utilize arbitrary rules for allocating costs of bridge width increments to the various vehicle types.

In conclusion, incremental cost procedures are of questionable suitability for bridge cost allocations because 1) the way bridges are designed is unsuitable for accurately developing the cost models necessary to support incremental analysis, 2) the cost of many spans, particularly longer ones, is relatively insensitive to traffic loading, and 3) incremental cost procedures are time consuming and costly. Allocating total bridge costs by PCE-miles seems to be a reasonable substitute although it allocates smaller costs to trucks than the incremental method and smaller costs to combination trucks than the ton-mile method. A combined procedure which allocates basic costs by PCE-miles and residual (truck) costs by ton-miles may be preferred.

MODIFICATIONS TO 1990 PROCEDURES

The Kentucky study completed in 1990 (4) incorporated a number of significant methodological changes. Although the review of state practices and the special investigation of bridge construction costs offered potential for further change during the current study, no changes of great consequence were judged as being necessary.

Only three changes were suggested by the review of HCASs conducted by other states including 1) use of functional classification as the basis for stratifying Kentucky's highway system for analysis, 2) incorporation of a predictive methodology to enable future ex post facto analyses designed to document data and methodological reliability, and 3) development of new tables to identify cost responsibilities and revenue contributions based on truck axle configuration in addition to other tables based on registered or declared weights.

Because functional classification is the primary basis for collecting, storing, and processing both traffic and roadway data, stratifying the highway system by functional classification instead of Federal-aid classification is certainly desirable. Unfortunately, construction cost estimates, performed originally by the Division of Planning in 1980, had not been converted to functional classification and resources were not available to permit their conversion and updating for use in the current study. Given both the inherent desirability of changing to a functional classification basis as well as redefinition of the Federal-aid program as a result of recent Congressional action, conversion to functional classification should be considered to be a necessary component of any future Kentucky investigations.

Adding a predictive component to the cost allocation methodology was the second major change that was considered. The notion was that predictions made for future periods could be tested during future ex post facto evaluations. One definitive measure of the reliability of Kentucky cost allocation techniques would be the extent to which actual realizations matched past projections. Although such an extension would doubtlessly be useful, its potential benefits were not judged to be sufficiently great to warrant the rather considerable costs associated with its development and implementation. Hesitancy was also expressed about developing a new set of independently generated revenue forecasts.

It thus turns out that the only methodological change initiated as a consequence of the literature review was the development of new tables summarizing cost and revenue allocations on the basis of axle configuration in addition to registered weight.

Four other changes, described as follows, were made during the current study:

- Until recently, manual traffic classifications had distinguished between school buses and other buses. Because automatic classifiers, on which increasing reliance is being placed, do not make such distinctions, it was necessary to combine these two bus categories into one. Because the revenue implications of school bus operations are different than those of other buses, this change was made with some loss of accuracy.

Fortunately, the small extent of bus activity in the state should ameliorate the adverse consequence.

- Pavement costs continue to be allocated using ESAL-miles. ESAL-miles are computed from the product of VMT and average ESALs per vehicle. Statewide averages, which have been used in the past, were replaced with averages which distinguish between Interstate and non-Interstate travel as well as between urban and rural conditions. Enabling this change, which will increase the accuracy of ESAL-mile estimates, was the adoption by the Division of Planning in 1989 of an enhanced truck weighing program using weigh-in-motion scales. Statewide average unit ESALs are now available by functional classification and on a much more representative basis than permitted by the limited sampling program of the past.

- Usage tax payments by vehicle type were obtained for the first time directly from the AVIS file rather than from a rather complex and inexact estimation routine that had been necessary in prior years.

- Finally, the method for allocating total Federal proceeds to the four Table D1 categories (Federal fuel tax revenue, Federal usage taxes on trucks and trailers, Federal motor carrier use taxes, and other Federal taxes) has been changed. The allocation is now based strictly on the proportions reported in Table FE-9, "Federal Highway Trust Fund Receipts Attributable to Highway Users in Each State," of the current version of Highway Statistics. Federal fuel revenues of Table D5 have been adjusted accordingly.

The special investigation of bridge construction costs confirmed the efficacy of using PCE-miles as the basis for allocating the costs of newly constructed and reconstructed bridges while raising a significant question about the ability to accurately apply incremental cost techniques to bridge construction costs. No methodological changes were initiated as a result of this investigation.

DISTRIBUTION OF REGISTERED TRUCK WEIGHTS

Perhaps the greatest change in the 1990 Kentucky HCAS (4) was the development of new distributions representing the frequencies with which trucks of given axle configuration are registered at given levels of gross weight. The need for such distributions arises from the fact that on-the-road traffic monitoring typically identifies trucks by axle configuration while tax rates and operating fees are based, in part, on registered or declared gross weight. The key link enabling on-the-road activity to be expressed in terms of registered weights is the frequency distribution of registered weights (for example, the percentage of five-axle tractor-semitrailer combinations operating at each of the gross weight categories ranging from 6,000 to 80,000 pounds).

Unfortunately, data necessary for determining the frequency distribution of registered weights are not routinely collected. In 1990, the new frequency distributions (Table 14) were developed on the basis of a sample of trucks involved in Kentucky accidents. For straight trucks, analysis focused on Kentucky-registered trucks involved in accidents in 1988. The AVIS file was used to match axle configuration from the accident record with registered weight. For combination trucks, analysis focused on apportioned-registered Kentucky trucks involved in accidents during 1987 and 1988. Kentucky's cab card file, containing information on all apportioned trucks operating in Kentucky including those having out-of-state plates, provided a basis for validating the frequency distributions developed from the accident samples.

Concern lingered, however, about possible bias due to the accident-based sampling procedure. As a result, a special field survey was undertaken in the summer of 1991 to provide additional data with which to further examine registered weight distributions. All observations were taken at truck inspection stations on Interstate highways. During the first part of the survey, visual inspection was made of axle configuration, and papers were examined to match axle configuration with registered weight. It soon became apparent that this rather time-consuming procedure would not yield a sample of sufficient size to permit meaningful analyses. Thereafter, the field observer recorded both axle configuration as well as KYU and unit numbers. Subsequently, this information was entered into a computer file and matched with registered weights through the centralized file maintained in Frankfort. Although only about half of the observations were successfully matched, data for slightly more than 2,100 trucks were collected. In addition to the Interstate field study, additional data were collected for apportioned-registered Kentucky trucks involved in accidents during 1989-90. Procedures similar to those used in 1990 were repeated.

Thus, three different frequency distributions were available for comparison, one used in 1990 and based on 1987-88 accident sampling, one based on 1989-90 accident sampling, and one based on Interstate observations in 1991. Graphical comparisons of the three frequency distributions indicated that they differed significantly (Figures 2-10). No "matches" were found in the distributions of straight truck weights (Figures 2-5). For single trailers, frequency distributions based on the two sets of accident data (1987-88 and 1989-90)

appeared to match quite well but, on the whole, Interstate trucks appear to have slightly greater registered weights (Figures 6-9). The data for multiple trailer trucks were too sparse to be conclusive (Figure 10).

Chi squared testing was used to identify any statistical similarity in the registered weight distributions between the 1991 and 1987-88 data sets (Table 15), the 1991 and 1989-90 data sets (Table 16), and the 1987-88 and 1989-90 data sets (Table 17). With but very minor exception, this analysis revealed statistically significant differences among the three registered weight distributions.

Although statistical tests were not performed, average gross weights were also compared (Table 18). Once again, considerable differences were noted for straight trucks. For single trailer trucks, on the other hand, the matches were quite good especially between the 1987-88 data and the 1989-90 data.

Unfortunately, the true frequency distributions of registered weight remain elusive quantities. Based largely on the analyses reported herein and in 1990 (4), the most reasonable distribution for straight trucks appears to be that developed in 1990. On Interstate highways, combination trucks appear to be registered at slightly larger weights than on more typical highways. The similarity between distributions based on 1987-88 and 1989-90 accident samples suggests that combination trucks should be represented by distributions based on the combined 1987-88 and 1989-90 samples. The resulting distributions are summarized in Table 19.

ANALYSIS AND RESULTS

In 1991, the state-maintained highway system comprised approximately 28,000 miles of the 70,000 miles of roads and streets in Kentucky while accommodating approximately 90 percent of all travel in the state. Before Federal reimbursements totaling almost $182 million, Road Fund expenditures by the Transportation Cabinet on Kentucky's roads and streets were approximately $1,007 million, of which an estimated $845 million or 84 percent was spent on improving, maintaining, and operating the state-maintained highway system. The distribution of state-system expenditures is summarized in Table C1 of Appendix C: the bulk, approximately 64 percent, was for activities related to construction or reconstruction.

Road Fund and Federal Fund receipts in FY 1991 totaled approximately $1,007 million. The largest contributor to the Road Fund, bringing in approximately $350 million, was the state fuel tax. Usage taxes contributed the second largest amount, approximately $212 million. Road Fund receipts also included $38 million from bond sales. Highway user revenue attributed to state-maintained highways, excluding local aid and revenue from the sale of bonds but including Federal assistance, totaled approximately $853 million. The distribution of this total among the several sources of revenue is detailed in Table D1 of Appendix D.

ALLOCATION OF HIGHWAY COSTS AND REVENUES

As indicated in Table 3, four different measures were used in allocating highway cost elements to the various user groups. These measures included vehicle miles, axle miles, passenger-car-equivalent (PCE) miles, and equivalent-single-axle-load (ESAL) miles. Among these measures, vehicle miles allocates the greatest proportion of costs to cars, followed in order by axle miles, PCE-miles, and ESAL-miles (Table 20). The pattern is reversed for larger and heavier vehicles. The five-axle tractor-semitrailer, for example, contributes a relatively small 5.96 percent of the vehicle miles of travel when compared with 13.41 percent of the axle miles, 17.32 percent of the PCE-miles, and 50.68 percent of the ESAL-miles. ESAL-miles are used only to allocate the costs of constructing pavements and shoulders, estimated to represent approximately 18.8 percent of the annual sum expended on the state-maintained system.

A summary of the annual capital costs and the annual maintenance/administrative costs attributable to each major vehicle class is presented in Table 21 (details are provided in Appendix C). Total cost responsibility is borne most heavily by passenger cars and motorcycles (44.16 percent) followed in order by heavy trucks grossing 60,000 pounds or more (24.64 percent) and vehicles registered at 6,000 pounds such as pickup trucks and vans (20.40 percent). Cost responsibility borne by all other groups totals 10.80 percent.

Table 22 compares these findings with results of three prior studies. Changes recorded from 1982 to 1988 are probably influenced more significantly by methodological

enhancements in the 1988 study than by changes in travel patterns and/or in the nature of the highway budget. Between 1988 and 1990, the decrease in cost responsibility of cars parallels almost exactly their decrease in relative travel. The same is true for pickups. Despite more travel by the heaviest trucks, their percentage share of highway costs also diminished somewhat between 1988 and 1990, as a result of increased maintenance and administration expenditures in 1990 and allocating pavement costs to the heaviest trucks based on a corrected gross weight of 80,000 pounds instead of the 82,000 pounds used previously. Trucks of intermediate size shouldered a greater percentage of the responsibility. For all vehicle classes, very small changes were noted between the 1990 and 1992 studies. The travel trends and ratio of cost to travel were very similar and only a very small decrease in the cost responsibility of cars was noted followed by a corresponding increase, similar in magnitude, by heavy trucks.

Table 23 summarizes the effect of selected factors on changes noted in cost responsibility between the 1990 and 1992 studies. The effect on cost responsibility due to changes in either travel or expenditure levels between the two periods is captured by the columns titled costs, highway miles and volume, vehicle types, and weight-distance table. Changes affected by procedural modifications are presented under the heading of one bus type, while column ESALs indicates changes due to a combination of new data and procedural changes. Heavy trucks showed a 6.34 percent increase on cost responsibility which is mainly due to new data for ESALs and vehicle types. For the same reasons, light trucks showed the largest reduction in cost responsibility (16.78 percent).

Table 24 summarizes the FY 1991 revenue generated by each major vehicle class. Vehicle classes contributing most to the revenue total are generally the same as those bearing the largest cost responsibility. Passenger cars and motorcycles generate the most (44.69 percent), followed by heavy trucks (25.46 percent), and pickups and vans (22.49 percent). All other vehicles contribute a total of 7.36 percent.

The ratio between the percentage of revenue contributed by each vehicle class and its percentage of cost responsibility provides a convenient means for assessing the equity of current taxation policy (Table 25). A ratio of one indicates perfect balance. All primary contributors to highway user revenue over contribute at various rates. The over contribution for passenger automobiles is about 1 percent, for pickups/vans is about 10 percent, and for heavy trucks is about 3 percent. Light trucks (ratio of 1.06) and medium trucks (ratio of 0.63) are generally smaller contributors both to the revenue pool and to the total cost responsibility.

UNIT COST AND REVENUE ESTIMATES

Highway-user costs and revenues are often easier to comprehend when expressed on a unit basis rather than as aggregated totals. Cost and revenue per vehicle mile are effective and convenient expressions. Combining the cost and revenue totals of Tables 21 and 24 with

travel estimates of Table 26, unit estimates--representing user taxes collected by Federal and state governments in FY 1991 which were used to provide and maintain Kentucky's state highway system--are presented in Table 27.

In FY 1991, approximately 2.0 cents per mile were collected from passenger cars for the purpose of upgrading and maintaining Kentucky's state highways. This represents approximately 4.6 percent of the 43.6-cents-per-mile cost to operate an intermediate-size car in the 1991 model year (16). On a per mile basis, the largest trucks paid approximately five times more than cars, 10.1 cents per mile.

Expressed another way, the intermediate-size car, traveling 15,000 miles annually on Kentucky highways, contributes approximately $300 to state highways. The large truck, when traveling 100,000 miles in Kentucky, contributes approximately $10,100.

MOTOR CARRIER INDUSTRY LEGISLATIVE PROPOSALS

Prior to the 1992 Legislative session, the Kentucky Motor Transport Association, Inc. (KMTA) proposed a variety of changes in Kentucky's highway taxation structure (17). The KMTA has taken a firm stand in opposition to Kentucky's weight-distance tax, and repeal of the weight-distance tax is the centerpiece of its legislative agenda. It has also argued that, to avoid paying Kentucky's usage tax, many motor carriers have domiciled their vehicles in other states to the economic detriment of Kentucky and its motor carrier industry. As a result, the KMTA has also proposed that the usage tax be applied only to trucks grossing 26,000 pounds or less.

To compensate for the revenue lost by eliminating the weight-distance and heavier-vehicle usage taxes, the KMTA has proposed increases in some of the existing highway user tax rates. Among the taxes considered for possible rate increases are the heavy vehicle fuel surtax, the special fuel tax, the gasoline tax, truck registration and license fees, and automobile registration fees.

The equity of the various KMTA proposals is of potential interest to state legislators and others who are concerned with Kentucky highway finance. Accordingly, the effects of several possible tax alternatives, which have been developed from the KMTA's proposals, are evaluated herein. In keeping with the basic philosophy of this study, attention has been restricted to highway user tax revenue which is deposited in the Road Fund and used to maintain and improve Kentucky's state-maintained highway system. Accordingly, omitted from consideration herein are KMTA's proposals regarding other taxes, such as the sales tax on parts and accessories, occupational taxes, property taxes, and local vehicle insurance taxes. Revenue from these taxes is not expended on the state-maintained highway system and, hence, should be excluded from state cost allocation studies.

This study is limited to examining the equity of various tax proposals by allocating the costs of providing a modern highway plant to the various classes of highway users. It does not consider other issues of highway finance such as the impact of various tax proposals on the state's economic prosperity or on its motor carrier industry. The KMTA addresses a number of these important issues in its analysis (17).

The following eight tax alternatives are evaluated herein:

1. Remove the 1.15¢ weight-distance surcharge;

2. Repeal the 2.85¢ weight-distance tax and remove the surcharge;

3. Repeal the weight-distance tax and eliminate usage tax for trucks grossing 32,000 pounds or more;

4. Repeal the weight-distance tax, eliminate usage tax for trucks grossing 32,000 pounds or more, and increase the heavy vehicle fuel surtax by 12¢ per gallon;

5. Repeal the weight-distance tax, eliminate usage tax for trucks grossing 32,000 pounds or more, increase the heavy vehicle fuel surtax by 7.7¢ per gallon, and increase the special fuel tax by 3¢ per gallon (dedicating all revenue from this increase to the Road Fund);

6. Repeal the weight-distance tax, eliminate usage tax for trucks grossing 32,000 pounds or more, increase the gasoline tax by 1¢ per gallon, and increase the special fuel tax by 5¢ per gallon;

7. Repeal the weight-distance tax, eliminate usage tax for trucks grossing 32,000 pounds or more, and increase truck registration, permit, and license fees by 89 percent; and

8. Repeal the weight-distance tax, eliminate usage tax for trucks grossing 32,000 pounds or more, and increase the automobile registration fee by $21.50.

In identifying these tax alternatives, the intent was to include the kinds of changes envisioned by the Kentucky Motor Transport Association: no claim is made that these eight alternatives are exhaustive nor that they precisely duplicate the KMTA proposals. It has been generally assumed that the Road Fund portion of revenue increments will remain unchanged from current practice. The fifth alternative from the above list is an exception because it proposes that all revenue from the special fuels tax increase be deposited into the Road Fund. The annual change in the Road Fund balance due to each of these proposals has been estimated independently of the KMTA's figures. The estimates developed herein are compatible with data used elsewhere in this investigation but may not match KMTA's estimates. It has been assumed that the changes in tax rates are not of sufficiently large

magnitude to affect the amount of travel in the State, the number of vehicles registered, etc. Finally, the KMTA estimate of a $5 million reduction in administrative costs due to repeal of the weight-distance tax has not been included in the computations.

Each of the eight proposals would increase the relative tax burden on automobiles and reduce the relative tax burden on heavy trucks (those of 60,000-pound gross weight or more), and each would reduce the annual revenue deposited into the Road Fund (Table 28). The revenue shortfall would range from a minimum of about $17 million (removal of the weight-distance surcharge) to a maximum of about $70 million (repeal of the weight-distance tax and elimination of usage tax on heavier vehicles). The KMTA's proposed tax rate increases were designed to produce a net revenue increment of about $42 million. Independent estimates made herein project net revenue increments ranging from a minimum of $28.5 million (1¢ increase per gallon of gasoline and 5¢ increase per gallon of special fuel) to a maximum of $43 million ($21.50 increase in automobile registration fees). Although most of the specific proposals fail to meet the KMTA target of $42 million, this target is certainly attainable if the number and magnitude of tax rate increases are sufficiently large.

Tax equity among the various classes of highway users is achieved when the income generated by each class matches its cost responsibility, yielding a revenue-to-cost ratio of one. The KMTA proposals would unbalance the near equity that has been achieved under current tax policy for both automobiles and heavy trucks (Table 29). Beneficiaries of the KMTA proposals would generally be the heavy trucks. The revenue surplus collected from cars, pickups and vans, and light trucks would escalate.

In summary, the KMTA proposals, as interpreted herein, would create a substantial Road Fund revenue shortfall and would threaten the equity that is currently achieved between the revenue contributions and the cost responsibilities of the various classes of highway users. Possible impacts of the KMTA proposals on Kentucky's economy and on its motor carrier industry have not been assessed herein but are of great potential significance.

EXTENDED-WEIGHT SYSTEM

Introduction

Because of the importance of efficient coal transportation to the state's economy, Kentucky has established a special coal-haul system on which coal trucks may operate at weights considerably in excess of normal legal maximums. Designated annually by the Secretary of Transportation, this "Extended Weight Coal and Coal By-Products Haul Road System" generally includes road segments carrying 50,000 or more tons of coal and coal by-products annually but excludes both Interstate highways and those segments posing a safety threat. The annual purchase of a special decal allows coal trucks to operate on the extended-weight system at the following gross weight limits:

Coal-Truck Type	Legal Gross Weight (Pounds)	
	Normal[a] (Without Decal)	With Decal[b]
3-Axle, Single-Unit	59,400	94,500
4-Axle, Single-Unit	77,000	105,000
Single-Trailer Trucks of 5 or More Axles	80,000	126,000

[a]Including 10-percent allowance for axle overload.
[b]Including 5-percent allowance for gross weight overload.

The extended-weight system embraces approximately 3,500 miles of roadway including approximately 270 miles on non-state-maintained facilities. Located in 75 of Kentucky's 120 counties, its state-maintained component comprises 11.3 percent of the statewide highway mileage, carries 19.2 percent of the statewide travel, and supports 34.2 percent of the statewide ESAL-miles of loading. Because the extended-weight system is such a large and significant part of the state-maintained highway system, the Study Advisory Committee requested a preliminary analysis of its cost and revenue implications. This analysis is presented herein.

Methodology

A conventional cost allocation analysis, comparing the revenue generated by highway operations with the cost responsibilities occasioned by them, was not an especially attractive approach to analyzing economic effects of the extended-weight system. Available data were not expected to be sufficiently detailed to permit an accurate analysis, and resources were insufficient to permit extended study. More importantly, the general thesis that underlies state cost allocation efforts--namely, that roads and streets should be financed principally by their users--was suspect. If the extended-weight system was originally implemented to promote the economic welfare of the Commonwealth generally, then the general taxpayer could be expected to share a portion of the increased highway costs occasioned by heavier coal trucks. Since the coal decal fees are relatively small and insufficient to cover the highway cost increment, this may well have been the intent of the Legislature when it established the extended-weight system in 1986.

Even though a comprehensive cost allocation study was therefore inappropriate, the revenue and cost implications of the extended-weight system remained of considerable interest. Certainly additional revenue is being generated as a result of the coal-decal fees, and additional highway costs are being incurred to accommodate the heavier loadings. Quantifying and documenting these revenue and cost increments became the focus of this investigation.

Revenue implications of the extended-weight system are both direct and indirect. The coal decal fee is a direct implication, adequately documented and easy to comprehend. The indirect implications are more subtle. Larger payloads mean fewer trucks[1], and fewer trucks mean reduced registration fees and perhaps reduced fuel taxes. Because the effect of truck weight on fuel efficiency and, hence, on fuel taxes is not well documented, only two revenue sources, coal decal fees and truck registration fees, are evaluated herein.

It is well recognized that the costs of providing the highway infrastructure are influenced by the sizes and weights of the trucks that use them. Almost all cost elements are affected: larger vehicles generally require flatter slopes, wider cross sections, thicker pavements, stronger bridges, more frequent and extensive maintenance, etc. Generally, however, most investigators of large-truck impacts focus on the costs of constructing, maintaining, and replacing bridges, pavements, and shoulders (18-20). Other cost effects of heavy trucks are more difficult to quantify.

The analysis reported herein focused on pavement overlay or restoration costs. Pavement overlay costs are substantial in Kentucky, and excellent data are available to quantify implications of the extended-weight system. Detailed examination of other pavement cost elements (construction, reconstruction, rehabilitation, and recurring maintenance) as well as bridge and shoulder cost elements is left to future investigations.

Geographically, the study was limited to the 75 extended-weight-system counties: 38 are classified as coal-producing counties and 37, as coal-impact counties. Only state-maintained highways, classified as either on the extended-weight system or on a base system, were considered. The base system included all highways of comparable functional classification as those included within the extended-weight system. It provided a frame of reference to which the extended-weight system could be compared. Analyses were disaggregated to the level of functional highway classification. System mileages for extended-weight and base systems are summarized in Table 30.

The base year for this analysis was 1990. However, to reduce the effects of minor year-by-year fluctuations and thus increase accuracy, 1989-1991 vehicle classification and weight data were used. In addition, average resurfacing frequency was based on experience during the period, 1988-1990, and average resurfacing costs, 1988-1991.

Data Requirements

The analysis required development of detailed information describing:

- System mileage,

[1]Larger trucks would also generally mean fewer drivers, an unfortunate economic consequence in a depressed economy.

- Average traffic volumes,
- Typical composition of the traffic stream,
- Average pavement damage factors (ESALs) by vehicle type,
- Average annual resurfacing mileage,
- Average unit costs of resurfacing, and
- Average rideability indices.

Basic data sources included files of the Divisions of Maintenance and Planning and the Pavement Management Branch. The detailed analysis is documented in Appendix F.

Extent and Cost of Resurfacing Program

Approximately 1,470 miles of roadway on the extended-weight and base systems are resurfaced annually (Table 31) at a total cost of approximately $45.2 million (Table 32). The unit cost of the 1-inch resurfacing layer, including cost of surface preparation such as leveling and milling, averages approximately $31,000 per mile.

When comparing the extended-weight system with the base system, a considerably larger percentage of the extended-weight system is resurfaced each year (14.4 percent vs. 6.0 percent) at a substantially greater unit cost ($42,100 per mile vs. $25,700 per mile) (Tables 33 and 34, respectively). To better comprehend the net result of these differences, approximately $13.6 million would be saved annually if resurfacing of the extended-weight system had been programmed to the same norms (annual percentage of mileage resurfaced and average unit resurfacing costs) as the base system (Table 35).

Importantly, the $13.6 million increment can not be attributed solely to the heavier weights of the coal-decal trucks. Coal haulage would be concentrated on the extended-weight system even if increased truck weights were not permitted, and any such concentration of heavy trucks would intensify the rate of pavement wear and, hence, the costs of pavement restoration. Moreover, extended-weight highways carry almost twice the traffic volume of base highways (Table 36), and their pavements are maintained to a slightly superior condition on average (Table 37). To accurately assess the incremental effect of the extended-weight system requires substantially more detailed analysis.

Incremental Resurfacing Costs

As summarized above, pavement resurfacing costs for both the extended-weight system and the base system are known with reasonable accuracy. In order to determine the incremental resurfacing costs due solely to the extended-weight/coal-decal system, estimates are also required of "normal" resurfacing costs, costs that would have been incurred if coal-truck weight limits had been held to pre-extended-weight system levels. The difference, then, is the impact directly attributable to extended-weight limits.

The approach taken herein required two key assumptions. The first is that resurfacing costs are directly related to traffic wear as measured by equivalent-single-axle-loads (ESALs). This assumption seems reasonable although some have argued 1) that environmental factors also contribute to pavement wear and affect the frequency and cost of resurfacing and 2) that ESALs, originally developed as a measure of traffic damage for designing new pavements, may not accurately reflect traffic effects on pavement resurfacing frequency and cost.

The second key assumption is that 1) the volume of coal transported by highway and 2) the routes used for coal transport are unaffected by the extended-weight/coal-decal system. To the extent that effective competition exists between truck and train, the increase in trucking productivity resulting from increased payloads would ultimately increase both the volume of coal moving by highway as well as the cost of maintaining pavement surface condition to acceptable levels. To assume that coal tonnages on the highway system remain constant effectively understates the impact of the extended-weight system. Nevertheless, accurate techniques for estimating coal tonnages that may have been diverted from the railroads were unavailable. Because of the way the extended-weight system is designated, that is, by coal haulage exceeding 50,000 tons per year, any initial effect of the extended-weight designation on the routes used for coal transport is likely to have been small. Because the extended-weight system is redesignated annually, it is not likely to affect the shipper's choice of route unless the extended-weight system eventually evolves into a "super" system of roadways designated and provided specifically for efficient coal transport.

The following summarizes the procedure used to determine incremental resurfacing costs:

- Determine the annual resurfacing cost for the extended-weight and base systems in the 75 extended-weight counties (Table F26);
- Determine the respective annual ESAL-miles for all traffic loads (Tables F21 and F22);
- Determine the resurfacing cost per ESAL-mile (Table F28);
- Determine the annual ESAL-miles due solely to coal-decal trucks (Table F29);
- Determine the percentage reduction in ESAL-miles by substituting trucks of conventional loading for coal-decal trucks (Table F30);
- Determine the hypothetical annual ESAL-miles due solely to lighter trucks that would substitute for coal-decal trucks (Table F31); and
- Determine the hypothetical resurfacing cost increment associated with the extended-weight/coal-decal system (Table F32).

As outlined above, the overall process for determining the resurfacing cost increment is generally straightforward given the detailed information that was accumulated for the statewide highway cost allocation study. The first of two exceptions involves determining the travel patterns of coal-decal trucks. Manually collected vehicle classification data record the total number of coal trucks (based on body style) and permit summary tabulations such as those of Tables F5 and F6 which show the percentage of coal trucks within the truck population as a function of roadway classification, extended-weight or base system, and coal-producing or coal-impact counties. Although these percentages would represent reasonable upper bounds, it is unfortunate that no traffic database identifies the particular subset of coal trucks displaying the special coal decals associated with the extended-weight system.

As a result, it was necessary to rely primarily on a smaller data set, that containing weight data, to identify coal-decal trucks. Any truck was considered to be a coal-decal truck if its weight exceeded normal legal maximums (59,400 pounds for three-axle straight trucks, 77,000 pounds for four-axle straight trucks, and 80,000 pounds for five- and six-axle single-trailer trucks). This assumption resulted in two kinds of unavoidable error: conventional trucks carrying overloads were considered to have been decaled, and decaled trucks traveling empty or with partial loads were considered to be conventional trucks. The resulting percentages of decaled trucks (Tables F7 and F8) very likely understate their presence in the typical traffic stream. Because the size of the data base prevented reliable estimates for each of the functional classes, the only possible class distinction was between rural and urban facilities.

In addition to the difficulty of identifying coal-decal trucks, information was required on typical payloads both of coal-decal trucks and conventional coal trucks. Typical payloads were assumed to be the difference between legal maximum loading and empty (tare) weights. To determine empty weights of coal-decal trucks, a rather involved procedure was followed. Focussing on the routes most likely to be heavily populated by coal-decal trucks, extended-weight-system routes in coal-producing counties, typical axle spacings were determined for the more heavily laden trucks. Still concentrating on extended-weight-system routes in coal-producing counties, gross weight distributions were then obtained for the entire population of trucks within these axle-spacing ranges (Figures 11-14). Gross weight distributions for five- and six-axle trucks were bimodally shaped with the smaller mode representing typical empty weight and the larger mode representing typical loaded weight (Figures 13-14). Using an average empty weight of 40,000 pounds, the estimated payload for these trucks is 86,000 pounds.

Weight data for four-axle straight trucks were limited in extent. The gross weight distribution showed a peak at around 70,000 pounds, much lower than expected, with no observable peak in the range of "empty" weights. When empty, these trucks are apparently operated with the lift axle raised, making them appear to be three-axle trucks. The gross-weight distribution for three-axle trucks showed a broad peak in the "empty" weight range with local maxima at 29,000 and 35,000 pounds. It was assumed that the smaller maximum, 29,000 pounds, represented the average empty weight for the three-axle truck and that the

larger maximum, 35,000 pounds, was representative of the empty, four-axle truck. For conventional coal trucks, empty weights were assumed to be 4,000 to 5,000 pounds lighter than for coal-decal trucks. The assumed truck weights for empty and loaded trucks with and without the coal-decal are presented in Table 38.

Results of the payload analysis are summarized in Table F30. Coal-decal trucks can carry much heavier payloads than conventional trucks, up to 41,000 pounds more for combination vehicles. ESAL computations, assuming fully loaded trucks, show that the increased payload is gained at the expense of greater pavement wear (Table F30). A fully-loaded combination truck with decal results in about 6.5 times more wear than a comparable fully-loaded conventional truck (Table F30). This effect is somewhat offset by the fact that a considerably larger number of conventional truck operations is necessary to move a given volume of coal than the number of decaled truck operations. The net reduction in ESAL-miles expected by replacing coal-decal trucks with conventional coal trucks ranges from about 42 to about 71 percent (Table F30).

Based on these considerations, the extended-weight/coal-decal system adds approximately $9.08 million annually to the cost of resurfacing pavements in the 75 extended-weight counties (Table 39). Interestingly, a full one-third of the added expense is for accommodating overweight trucks, whether decaled or not, on the base system.

Incremental Revenue

Of the total of 3,877 decaled coal trucks, approximately two-thirds were five- and six-axle combinations. Most of the remainder of the decals were issued to three-axle straight trucks (Table 40). Assuming the empty miles traveled by each truck equal the loaded miles, it is projected that average annual mileage are 26,000 miles, 60,000 miles, and 87,000 miles for three-axle, four-axle, and five- or six-axle coal trucks, respectively, assuming all operations are within the 75-county area.

Revenue from decal fees totaled approximately $1.1 million. Because 40 percent of these fees is distributed to local government, only about $680,000 is available for upkeep of the state-maintained highway system. Coal-decal trucks must also be registered at a gross weight of 80,000 pounds. Approximately $897,000 in added revenue was generated by this requirement, overwhelmingly from three-axle trucks.

Offsetting these sums are fees lost due to fewer truck registrations. To transport a given volume of coal requires a smaller fleet of heavier trucks than that of lighter trucks. Without the increased payload of decaled trucks, approximately 3,400 more coal trucks would theoretically be needed (Table F33). Because these trucks are not required under provisions of the extended-weight system, approximately $3.5 million in registration fees are lost annually. The net revenue effect of the extended-weight/coal-decal system is estimated to be a loss of almost $2 million in decal and registration fees (Table 40) that would otherwise be available for state-maintained highways.

Pavement Maintenance and Rehabilitation Costs

In Kentucky, pavement resurfacing and rehabilitation on the extended weight system is addressed by two state-funded programs. The pavement resurfacing program (211 Account) is administered by the Division of Maintenance and essentially involves a thin overlay repair strategy. Usually, the thickness of this overlay varies from 1 to 1.5 inches, depending on the type of bituminous surface mix used. For pavements having more severe distress and for situations where estimates of ESALs indicate inadequate pavement structure, thick overlays are required, to extend the fatigue life of the pavement structure. Those projects involving thick overlays are administered through the Primary and Parkway rehabilitation program (212 Account). In addition to thick overlays, these projects also address other conditions for the roadway such as guardrail, drainage structures, etc. In summary, the resurfacing program typically addresses only the repair of the pavement where the parkway and primary rehabilitation program not only rehabilitates the pavement but also addresses the overall roadway section.

These two divergent approaches result in a considerable variation in cost per mile. The thin overlay costs are approximately $100,000 per mile for a four-lane roadway while the cost for the thicker overlay is approximately five times larger (ranging from approximately $350,000 to $730,000 per mile, with an average of $500,000 per mile). The cost per mile for the thin overlay rehabilitation concept probably is representative of average or perhaps below average rehabilitation costs whereas the expanded scope of the primary and parkway rehabilitation program results in much higher costs. Although a significant portion of the primary and parkway rehabilitation program costs has been spent on extended-weight system highways, determinations have not been made of the amount attributed specifically to the extended-weight/coal decal system.

In addition to resurfacing and rehabilitation, pavements require annual maintenance, such as crack and joint filling, patching, chip sealing, and pothole repair. Preliminary indications suggest that pavement surface maintenance expenditures are greater in coal-producing regions than in other parts of the state. For example, maintenance costs in the four highway Districts producing most of Kentucky's coal (Districts 2, 10, 11, and 12) average almost $300 per mile more each year than in non-coal-producing regions (Table 41). However, whether more annual maintenance is required on extended-weight highways than on base-system highways has not yet been documented. Presumably, though, if maintenance programs are sensitive to the added pavement wear caused by heavier trucks, extended-weight pavements might prove more costly to maintain. On the other hand, their more frequent resurfacing might moderate maintenance demands.

Summary

The purpose of this special study was to examine the cost and revenue implications of Kentucky's extended-weight/coal-decal system. Although the examination could be only

partially completed within the framework of the available resources and time constraints, the following interim findings are significant:

- The extended-weight system, an extensive conduit for Kentucky coal, includes over 11 percent of the state-maintained mileage and carries over 19 percent of the vehicle miles of travel.

- Because heavier payloads mean fewer truck registrations, the coal-decal fee structure results in a net loss of revenue to the Road Fund, estimated at almost $2 million annually.

- The heavier weights of coal-decal trucks add approximate $9 million annually to pavement overlay costs.

- Larger and heavier trucks increase, to an undetermined extent, other highway costs including:

  - Construction and reconstruction of pavements, shoulders, bridges, and culverts;
  - Rehabilitation of pavements, shoulders, and bridges;
  - Routine maintenance of pavements and shoulders; and
  - Others.

EFFICIENCY OF TAX COLLECTION

Another secondary objective of this study was to determine the efficiency with which certain Kentucky user taxes are being collected, namely the weight-distance tax and user-reported fuel taxes.

Motor carriers operating large trucks--those having more than two axles and having declared gross weights above 26,000 pounds--are assessed both weight-distance and fuel taxes based on information they supply quarterly to the Division of Motor Carriers on a "Kentucky Highway Quarterly Tax Return." The weight-distance tax rate, $0.0285 per truck mile with a surcharge of $0.0115 per mile, applies to the operation of trucks having a combined gross or licensed weight of 60,000 pounds or more. Two types of fuel tax, the heavy vehicle surtax of $0.02 per gallon applying also to trucks grossing 60,000 pounds or more and the normal use tax currently at $0.052 per gallon for large trucks grossing more than 26,000 pounds, are also assessed based on the quarterly tax return. Although the third fuel tax, $0.15 per gallon of gasoline and $0.12 per gallon of special fuel, is collected from the motor carrier by the dealer, the quarterly tax return may be used to support a claim for overpayment providing the fuel was used for out-of-state travel. Claims for overpayment can be validated only by detailed audit of individual carriers.

Turning first to the weight-distance tax, travel in Kentucky by trucks grossing more than 59,999 pounds has been estimated herein to total approximately 2,170,217,000 truck miles in calendar year 1990. Neglecting both the negligible contribution of farm trucks and the slight increase in travel expected from calendar year 1990 to fiscal year 1991, the weight-distance tax should have generated approximately $86,808,000 in revenue during fiscal year 1991. Actual receipts, totaling approximately $61,046,000, were 70.3 percent of the expected amount. Table 42 presents the estimated and reported revenues for the weight-distance tax for both the 1990 and 1992 studies. The tax collection efficiency for the 1990 period was 67.4 percent indicating an increase in the efficiency of collecting the weight-distance tax between 1990 and 1992. Although the potential for error in the estimation of heavy truck mileage is acknowledged, the travel data supporting this finding are considered to be quite good, and no bias that would result in a significant overestimate has been identified. The FY 1991 $26 million shortfall in weight-distance tax collections is expected to continue to diminish in future years as both carriers and state agencies become more adept at administering this tax, implemented in April of 1988, and as improved truck monitoring strategies are implemented.

Estimates of revenue expected from fuel taxes are somewhat more difficult to develop not only because of the several different types of fuel that are used and differential tax rates (depending both on type of fuel and the vehicle that consumes it) but also because average rates of fuel consumption are not known with great certainty. Fortunately, opportunity exists in a cost allocation study to adjust estimated gallonages to agree with those on which fuel taxes were actually collected. For the 1992 study period, estimates of the fuel used for highway travel total 1,701,792,000 gallons of gasoline and gasohol and 528,113,000 gallons of special fuel (Table 43). Compared with the gallonages on which fuel taxes were collected in FY 1991, these estimates are 7.2 percent low and 8.2 percent high, respectively. Altogether, this study estimated about 4 percent less fuel than was "consumed" statewide.

Using gallonages reported by the Revenue Cabinet, estimated Road Fund revenue from fuel taxes compared with reported collections is shown in Table 44 along with the 1990 data. On the basis of these comparisons, the efficiency of collecting user-reported fuel taxes, the heavy vehicle surtax, and the normal use tax, is about 77 or 76 percent. Both figures indicated an increased efficiency when compared to the 1990 data. However, in both periods the dealer collection of fuel taxes, as is the practice with normal fuel taxes, is much more efficient.

SUMMARY AND FINDINGS

The current highway cost and revenue allocation study is the fifth of a recent Kentucky series begun in 1982. Experience gained with each study has resulted in subsequent refinements that have enlarged the data base, enhanced the accuracy, and simplified the study process. One of the long-term aims is to develop an easy-to-use process for continuously monitoring effects of changes in traffic patterns, in finance and tax policy, and in highway expenditures.

Passenger automobiles remain the largest single revenue source, contributing about 45 percent of the total user revenue, and they slightly exceed their equitable cost assignment by about 1 percent. Pickups and light trucks continue to contribute more in revenue than their cost responsibility, by 10 percent and 6 percent, respectively. Heavy trucks also exceed their cost assignment by 3 percent, while medium trucks and buses fail to meet their responsibility.

Despite any methodological and/or data imprecision that may have influenced the above estimates, operators of heavy trucks are indisputedly playing a much more central role in financing the state highway system now than in the past. Even if their tax rates are unchanged, continued increases in revenue are expected as trucking garners an even greater share of the nation's freight business. This study examined the impact of several taxing alternatives proposed by the trucking industry and determined that these proposals would unbalance the near equity that has been achieved under current tax policy for both automobiles and heavy trucks. The application of these tax alternatives would benefit heavy trucks and it would create a substantial Road Fund revenue shortfall.

In FY 1991, approximately 2.0 cents per mile of operation were collected from passenger cars for the purpose of upgrading and maintaining Kentucky's state highways. Collections generally increase for progressively larger vehicles: 80,000-pound trucks contribute approximately 10.1 cents per mile. Although available data on operating expenses are limited, these road user taxes appear to comprise a relatively small portion of operating expenses. At such levels of taxation, the largest trucks traveling about 100,000 miles in Kentucky each year would make annual contributions of $10,100. At 15,000 miles a year, a car would contribute $300.

A review and evaluation of recent highway cost allocation literature was conducted as part of this study. The review, which compared Kentucky's approach to that of five other states, indicated that there is a wide variety of approaches taken by the several states but most studies have adopted the general principles of the 1982 Federal study. Different revenue-to-cost ratios by vehicle class among the states were attributed to differences in roadway types, "basic" vehicle, determination of expenditures and revenues, and amount of travel by each vehicle class. The reliability and sensitivity of such studies was also examined, and it was determined that continuous evaluation and update are desirable.

The allocation of bridge construction costs among the highway users was another issue examined in this study. The literature review indicated that the incremental method is widely used for allocating bridge construction costs. However, this approach may not be suitable for bridge cost allocation due to bridge design procedures and difficulties and low accuracy of modeling incremental costs. A more reasonable approach is allocation of costs by PCE-miles or by a combination of PCE-miles and residual (truck) costs by ton-miles.

An examination of the cost and revenue ramifications of the extended-weight system was conducted within this study, which was partially completed within the framework of the available resources and time constraints. This analysis indicated that the current coal-decal fee structure may produce a loss of approximately $2 million annually to the Road Fund, the heavier truck weights increase the pavement overlay costs as well as the construction, reconstruction, and rehabilitation of pavements, shoulders, and bridges.

In regard to tax collection efficiency, this study also sought to determine how completely current taxes are being collected. Although this is a difficult task, there appears to be little opportunity for highway users to avoid full payment of those taxes that contribute most to the revenue totals, in particular, normal fuel taxes and vehicle usage taxes. Taxes assessed on the basis of user-reported information, namely, the heavy vehicle fuel surtax, the normal use surtax, and the weight-distance tax, appear to have been collected with about a 70 to 75 percent efficiency. Efficiency of collecting these taxes should continue to increase as experience accumulates and more effective monitoring and auditing procedures are implemented.

This cost and revenue allocation study has not dealt with a number of issues central to highway finance. It has not sought to determine whether the level of revenue currently being collected is sufficient to meet the needs for an efficient and effective highway system. Neither has it sought to address the balance between user and non-user responsibilities for the highway infrastructure nor the varying responsibilities for local roads and streets in contrast with the state highway system. It has not addressed the possibility that post-1991 Federal surface transportation legislation may well alter the nature and level of Federal participation in highway finance and, henceforth, the state responsibility as well. Finally, it should be emphasized that cost allocation studies do not determine tax policy. While they provide indispensable information to the policy maker regarding the equity of alternative tax policies, they do not consider a host of other critical factors including competitive balance among modes, economic development and prosperity, funding levels necessary to maintain and enhance efficient commerce, energy conservation, etc.

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TABLE 1. VEHICLE TYPES FOR COST AND REVENUE ALLOCATION

Motorcycles
Cars
Buses
Trucks (Registered or Declared Weight Class, Pounds)
6,000
10,000
14,000
18,000
22,000
26,000
32,000
38,000
44,000
55,000
59,999
62,000
73,280
80,000

TABLE 2. GUIDELINES FOR ALLOCATION OF REVENUES TO VEHICLE CLASSES

Element	Method of Allocation
Fuel tax revenue	
Kentucky, heavy vehicle surtax	To trucks over 59,999 pounds based on revenue estimates from VMT on state-maintained system, rates of fuel consumption, and tax rates
Kentucky, normal use	To trucks over 26,000 pounds based on revenue estimates from VMT on state-maintained system, rates of fuel consumption, and tax rates
Kentucky, normal	To all classes based on revenue estimates from VMT on state-maintained system, rates of fuel consumption, and tax rates
Federal	"
Vehicle registration fees & license fees	
Cars	To cars, 100 percent
Buses	To buses, 100 percent
Motorcycles	To motorcycles, 100 percent
Trucks	
Kentucky	To trucks based on revenue estimates from number of registered trucks and registration fees (with separate adjustments for farm trucks, other exempt trucks, and 6,000-pound trucks) (Table D7)
Apportioned	To trucks based on number of vehicle identification cards issued
Vehicle ID cards	"
Permits	"
Other	To all classes based on relative VMT on state-maintained system
Miscellaneous	"
Operator's license fees	"
Usage Taxes	
Kentucky, buses	To buses, 100 percent
Kentucky, other vehicles	To all classes other than buses based on analysis of AVIS file
Federal, trucks & trailers	To trucks over 33,000 pounds based on relative VMT on state-maintained system
Road tolls	To all classes based on toll collection receipts (Table D8)

TABLE 2. GUIDELINES FOR ALLOCATION OF REVENUES TO VEHICLE CLASSES (CONTINUED)

Element	Method of Allocation
Other motor carrier taxes	
Kentucky, weight-distance	To trucks over 59,999 pounds based on relative VMT on state-maintained system
Kentucky, extended-weight	To 80,000-pound trucks
Federal, use	To trucks over 54,999 pounds based on relative VMT on state-maintained system
Other Federal taxes	To all classes based on relative VMT on state-maintained system

TABLE 3. GUIDELINES FOR ALLOCATION OF COSTS TO VEHICLE CLASSES

Element	Method of Allocation
Capital	
Preliminary design & engineering	To all classes based on relative VMT on each specific class of state-maintained highway
Rights of way	"
Utilities	"
Grading and drainage	To all classes based on relative PCE-miles on each specific class of state-maintained highway
Pavements and shoulders	To all classes based on relative ESAL-miles on each specific class of state-maintained highway
Bridges	To all classes based on relative PCE-miles on each specific class of state-maintained highway
Maintainance and traffic services	
Roads	80 percent to all classes based on relative axle miles on state-maintained highways and 20 percent to trucks having 6 or more tires based on relative axle miles on state-maintained highways
Structures	To all classes based on relative PCE-miles on state-maintained highways
Traffic services	To all classes based on relative VMT on state-maintained highways
Administation	"
Enforcement	
Motor carrier	To trucks having 6 or more tires based on relative VMT on state-maintained highways
Other	To all classes based on relative VMT on state-maintained highways
Miscellaneous	To all classes based on realtive axle-miles on state-maintained highways

TABLE 4. SUMMARY OF PRIOR STATE COST ALLOCATION STUDIES

State	Date	Current Status	Notes
Alabama	--		
Alaska	--		
Arizona	--		Using national study
Arkansas	--		Used national study
California	1987	1990 Update	Legislative use
Colorado	1988	1991 Update (?)	Possible legislative use
Connecticut	1982		
Delaware	1988		Possible legislative use
Florida	1989		"Quick-look" study
Georgia	1982		
Hawaii	--		
Idaho	--		
Illinois	--		
Indiana	1988		Internal use
Iowa	--		Study in planning stage
Kansas	1985	1988 Update	Update used to validate 1985 results
Kentucky	1990	1992 Update	
Louisiana	--		
Maine	1989		Legislative use
Maryland	1989	1990 Update (?)	Revenue analysis only
Massachusetts	--		
Michigan	--		
Minnesota	1991		
Mississippi	--		
Missouri	1984		No legislative use
Montana	--		
Nebraska	--		
Nevada	1988	1990 Update	Legislative use
New Hampshire	--		
New Jersey	--		
New Mexico	1972		
New York	--		
North Carolina	1983		No serious legislative use
North Dakota	--		
Ohio	1982		
Oklahoma	--		
Oregon	1986	In progress	Extensive legislative use
Pennsylvania	1990		
Rhode Island	--		
South Carolina	--		
South Dakota	--		
Tennessee	1975		
Texas	--	In progress	
Utah	1976		No legislative use
Vermont	1991		
Virginia	1991		
Washington	1977		
West Virginia	--		
Wisconsin	1982	In progress	
Wyoming	1981		

TABLE 5. COMPARISON OF GENERAL FEATURES OF SELECTED HIGHWAY COST ALLOCATION STUDIES

Item	States					
	KY	MN	VA	CA	VT	IN
Classes of vehicles	8	10	9	10	9	14
Highway classification	Federal Aid	Functional	Adminstr.	Functional	Functional	Functional
Revenues						
Fuel taxes	Y	Y	Y	Y	Y	Y
Registration fees	Y	Y	Y	Y	Y	Y
License fees	Y	Y	Y	Y	NA	N
Tolls	Y	NA	N	NA	NA	NA
Non-user revenue	N	N	N	N	N	N
Motor veh. excise tax	Y	Y	Y	NA	NA	NA
Weight fees	Y	NA	Y	Y	NA	Y
Purchase and use tax	Y	NA	Y	N	Y	Y
Miscellaneous	Y	NA	Y	Y	Y	NA
Expenditures						
Capital	Y	Y	Y	Y	Y	Y
Maintenance	Y	Y	Y	Y	Y	Y
Administration	Y	N	Y	Y	N	Y
Enforcement	Y	N	Y	Y	N	Y
Other programs	Y	Y	Y	Y	Y	Y
Dept. of Motor Veh.	NA	NA	NA	Y	NA	NA
Commercial Veh. Program	NA	Y	NA	NA	Y	NA

Notes: Y - Item is included.
N - Item is not included.
NA - Item is not applicable.

TABLE 6. COMPARISON OF SPECIFIC COST ALLOCATION METHODOLOGIES

Item	States					
	KY	MN	VA	CA	VT	IN
New pavement	Proportional ESAL	Federal Method (1)	Basic VMT Remainder ESAL	Federal Method (1)	Federal Method (1)	Incremental using ESALS
Pavment Rehabilitation	Proportional Axle-mi (2)	Consumption Method	Basic VMT Remainder ESAL	Consumption Method	Comsumption Method	Incremental using ESALS
New Bridges	Proportional PCE-VMT	Incremental Method	Incremental Method	Incremental Method	Incremental Method	Incremental Method
Bridge Replacement	Proportional PCE-VMT	Federal Method (3)	NA	Federal Method (3)	Federal Method (3)	Proportional ESAL
Grading	Proportional PCE-VMT	Federal Method (4)	Incremental	Federal Method (4)	Federal Method (4)	Basic VMT, Remainder PCE-VMT
Drainage	Proportional PCE-VMT	(5)	Incremental (6)	(5)	(5)	Basic VMT, Remainder PCE-VMT
Preliminary & Construction Eng.	Proportional VMT	Prorate on Captl Outlay	Proportional VMT	Proportional VMT	Prorate on Captl Outlay	NA
ROW	Proportional VMT	Proportional VMT	Proportional VMT	Proportional VMT	Proportional VMT	Proportional VMT
Enforcement	Proportional VMT	NA	Proportional VMT	Proportional VMT	NA	Proportional VMT
Miscellaneous	Proportional Axle-miles	Proportional VMT	Proportional VMT	Proportional VMT	Proportional VMT	NA

Notes: VMT - Vehicle Miles of Travel.
NA - Not Applicable.
PCE - Passenger Car Equivalent.
ROW - Right of Way.
(1) - Minimum Pavement Thickness Method as described in the Federal Highway Cost Allocation Study.
(2) - 80% of expenditures is allocated among all vehicles and 20% among trucks with 6 or more tires.
(3) - Incremental Analysis of Bridge Strength and Special Bridge Replacement Function as described in the Federal Highway Cost Allocation Study.
(4) - Incremental Analysis of Earthwork Requirements as described in the Federal Highway Cost Allocation Study.
(5) - Expenditures for drainage are included with grading expenditures.
(6) - Incremental based on box culvert fill height, 2 increments.

TABLE 7. TRAVEL TRENDS AMONG THE STATES BY VEHICLE CLASS (PERCENT OF VMT)

Vehicle Type	States					
	KY	MN	VA	CA	VT	IN
Passenger Vehicles	88.8	92.8	92.1	93.3	92.6	89.0
Automobiles	62.7	67.6	70.9	75.0	74.1	--
Motorcyles	0.2	0.9	--	0.7	0.8	--
Pickups & Vans	25.5	23.8	20.4	17.2	17.5	--
Buses	0.4	0.5	0.8	0.4	0.2	0.2
Single Unit Trucks	3.9	2.9	3.6	3.1	4.1	3.5
2 Axle	3.0	2.1	2.7	2.6	3.2	2.7
3+ Axles	0.9	0.8	0.9	0.5	0.9	0.8
Combination Trucks	7.3	4.1	4.2	3.3	3.2	7.3
4 or less Axles	0.5	0.7	0.3	0.3	0.6	0.7
5+ Axles	6.8	3.4	3.8	3.0	2.6	6.6
Total	100.0	100.0	100.0	100.0	100.0	100.0
Total Mileage	28,296	36,940	57,453	210,670	40,755	38,746
Period	FY 1989	FY 1989	FY 1989	FY 1986	FY 1989	FY 1983

Note: Detailed data for the passenger vehicles were not available for Indiana.

TABLE 8. REVENUE TO COST RATIOS BY VEHICLE CLASS

Vehicle Type	States					
	KY	MN	VA	CA	VT	IN
Passenger Vehicles	0.99	1.05	1.06	0.87	1.02	1.24
Automobiles	0.98	1.05	--	0.84	0.99	--
Motorcyles	1.06	0.82	--	1.60	1.45	--
Pickups & Vans	1.06	1.06	--	1.01	1.15	--
Buses	0.32	0.85	0.30	1.99	0.75	0.83
Single Unit Trucks	0.63	1.11	0.81	3.97	0.97	1.13
2 Axle	0.75	0.99	0.77	4.01	1.13	1.19
3+ Axles	0.46	1.31	0.85	3.94	0.80	1.04
Combination Trucks	1.27	0.70	0.93	1.00	0.97	0.62
4 or less Axles	1.13	1.07	--	2.35	1.04	0.51
5+ Axles	1.28	0.64	--	0.89	0.96	0.63

Note: Cells with -- denote absence of detailed data for this vehicle class.

TABLE 9. COST RESPONSIBILITY BY VEHICLE CLASS (PERCENTAGES)

Vehicle Type	States					
	KY	MN	VA	CA	VT	IN
Passenger Vehicles	67.1	79.9	71.1	81.0	78.7	52.9
Automobiles	45.6	59.1	54.7*	63.7	62.6	--
Motorcyles	0.1	0.7	--	0.9	0.6	--
Pickups & Vans	20.2	20.2	16.3	16.4	15.4	--
Buses	1.1	0.9	2.0	0.5	0.3	0.5
Single Unit Trucks	13.0	4.9	9.4	3.2	10.3	10.5
2 Axle	7.4	3.1	5.3	2.6	5.7	6.8
3+ Axles	5.5	1.8	4.0	0.6	4.6	3.7
Combination Trucks	20.0	14.3	17.7	15.3	10.6	36.3
4 or less Axles	1.3	2.2	1.3	1.2	1.9	3.6
5+ Axles	18.7	12.1	16.4	14.1	8.7	32.7
Total	100.0	100.0	100.0	100.0	100.0	100.0
Total Costs (000's)	742,427	963,200	1,458,807	8,082,000	402,570	574,017
Period	FY 1989	FY 1989	FY 1989	5 year plan	FY 1991-93	FY 1983

Note: Cells with -- denote absence of detailed data for this vehicle class.
* Automobiles and motorcycles combined.

TABLE 10. REVENUES BY VEHICLE CLASS (PERCENTAGES)

Vehicle Type	States					
	KY	MN	VA	CA	VT	IN
Passenger Vehicles	66.5	83.7	75.5	70.9	79.5	65.3
Automobiles	44.6	61.8	--	53.3	61.1	--
Motorcyles	0.2	0.6	--	1.5	0.9	--
Pickups & Vans	21.4	21.3	--	16.4	17.5	--
Buses	0.4	0.8	0.6	0.9	0.3	0.4
Single Unit Trucks	8.1	5.4	7.5	12.9	10.0	11.8
2 Axle	5.6	3.0	4.1	10.3	6.3	8.0
3+ Axles	2.5	2.4	3.4	2.5	3.6	3.8
Combination Trucks	25.3	10.1	16.5	15.4	10.3	22.5
4 or less Axles	1.4	2.3	--	2.9	2.0	1.8
5+ Axles	23.9	7.8	--	12.5	8.3	20.7
Total	100.0	100.0	100.0	100.0	100.0	100.0
Total Revenue (000's)	829,957	967,800	1,443,910	7,474,600	408,150	574,017
Period	FY 1989	FY 1989	FY 1989	5 year plan	FY 1991-93	FY 1983

Note: Cells with -- denote absence of detailed data for the vehicle class.

TABLE 11. REVENUE PER VEHICLE MILE BY VEHICLE CLASS (CENTS/MILE)

Vehicle Type	States					
	KY*	MN	VA	CA	VT	IN
Passenger Vehicles	2.0	2.4	2.1	1.1	2.0	1.1
Automobiles	1.9	2.4	--	1.0	1.9	--
Motorcyles	1.7	1.6	--	2.9	2.8	--
Pickups & Vans	2.2	2.3	--	1.3	2.3	--
Buses	2.5	3.8	1.7	3.0	3.0	3.4
Single Unit Trucks	5.5	5.0	5.2	6.0	5.5	5.1
2 Axle	4.9	3.9	3.8	5.6	4.5	4.5
3+ Axles	7.2	7.9	9.0	8.0	8.9	7.2
Combination Trucks	9.2	6.0	9.8	6.1	7.3	4.3
4 or less Axles	8.2	6.4	--	7.8	7.7	2.9
5+ Axles	9.2	5.9	--	5.8	7.3	4.6
All Vehicles	2.6	2.6	2.5	1.4	2.3	1.5

Note: Cells with -- denote absence of detailed data for this vehicle class.
* Revenue total matched with expenditure total.

TABLE 12. EXPENDITURE PER VEHICLE MILE BY VEHICLE CLASS (CENTS/MILE)

Vehicle Type	States					
	KY	MN	VA	CA	VT	IN
Passenger Vehicles	2.0	2.3	2.0	1.3	1.9	0.9
Automobiles	1.9	2.3	2.0*	1.3	1.9	--
Motorcyles	1.6	2.0	--	2.0	1.9	--
Pickups & Vans	2.1	2.2	2.0	1.5	2.0	--
Buses	7.7	4.5	5.8	1.7	4.0	4.5
Single Unit Trucks	8.7	4.5	6.5	1.6	5.6	7.6
2 Axle	6.5	3.9	5.0	1.5	4.0	7.8
3+ Axles	15.7	6.0	11.0	2.2	11.2	7.0
Combination Trucks	7.2	8.5	10.6	6.6	7.4	7.1
4 or less Axles	7.3	6.0	10.1	3.6	7.2	5.8
5+ Axles	7.2	9.2	10.6	7.1	7.5	7.2
All Vehicles	2.6	2.6	2.5	1.5	2.2	1.5

Note: Cells with -- denote absence of detailed data for this vehicle class.
* Automobiles and motorcycles combined.

TABLE 13. ALLOCATION OF BRIDGE CONSTRUCTION COSTS

Vehicle Type	Incremental Cost			Level of Use			Benefits
	VMT	Axle-Mile	PCE-Mile	VMT	Axle-Mile	PCE-Mile	PCE-Mile & Ton Miles
Passenger Vehicles	78.25	74.04	68.16	92.21	87.14	80.18	80.18
Automobiles	51.84	48.92	44.97	61.16	57.64	52.96	52.96
Motorcycles	0.27	0.12	0.12	0.32	0.30	0.14	0.14
Pickups & Vans	25.76	24.50	22.57	30.28	28.77	26.49	26.49
Buses	0.38	0.50	0.50	0.45	0.43	0.59	0.59
Straight Trucks	7.62	9.09	11.16	3.66	3.90	7.02	4.60
2 Axles	4.11	4.90	6.02	2.82	2.64	4.70	2.57
3 Axles	2.39	2.85	3.50	0.69	0.98	1.89	1.55
4 or More Axles	1.12	1.34	1.64	0.15	0.28	0.43	0.48
Single Trailer Trucks	13.86	16.55	20.29	4.04	8.76	12.56	14.68
4 or Less Axles	0.72	0.86	1.05	0.27	0.47	0.72	0.59
5 Axles	12.50	14.93	18.30	3.61	7.85	11.26	13.28
6 or More Axles	0.64	0.76	0.94	0.16	0.44	0.58	0.81
Multiple Trailer Trucks	0.27	0.32	0.39	0.09	0.20	0.24	0.54
5 Axles	0.18	0.21	0.26	0.08	0.17	0.20	0.33
6 or More Axles	0.09	0.11	0.13	0.01	0.03	0.04	0.21
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

TABLE 14. FREQUENCY DISTRIBUTION OF REGISTERED GROSS WEIGHTS (1990 STUDY)

Gross Weight (lbs)	Axle Configuration									
	Straight Trucks				Single Trailer			Multiple Trailer		
	2-Axle 4-Tire	2-Axle 6-Tire	3-Axle	4 or More Axles	4 or Less Axles	5-Axle	6 or More Axles	5 or Less Axles	6-Axle	7 or More Axles
6,000	100.00	1.56	1.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10,000	0.00	8.25	0.28	0.95	0.32	0.00	0.00	0.00	0.00	0.00
14,000	0.00	7.90	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18,000	0.00	13.28	1.67	2.86	0.00	0.00	0.00	0.00	0.00	0.00
22,000	0.00	7.54	2.22	0.95	0.00	0.19	0.00	0.00	0.00	0.00
26,000	0.00	24.63	2.78	0.00	0.65	0.10	0.00	0.00	0.00	0.00
32,000	0.00	16.74	5.56	2.86	6.80	0.00	0.00	0.00	0.00	0.00
38,000	0.00	8.49	5.28	3.81	4.85	0.28	0.00	0.00	0.00	0.00
44,000	0.00	3.47	17.78	2.86	7.77	0.95	0.00	11.11	0.00	0.00
55,000	0.00	4.31	31.38	11.43	9.71	1.42	1.01	11.11	0.00	0.00
62,000	0.00	0.36	0.83	2.86	14.89	1.23	1.01	11.11	0.00	0.00
73,280	0.00	0.72	12.50	57.13	10.03	4.65	2.02	11.11	0.00	0.00
80,000	0.00	2.75	17.78	14.29	44.98	91.18	95.96	55.56	100.00	100.00
Sample Size		836	360	105	309	1,055	99	9	1	1

TABLE 15. COMPARISONS OF 1991 AND 1987-88 DISTRIBUTIONS OF REGISTERED GROSS WEIGHTS

Truck Type	Number of Axles	Chi Square	Degrees of Freedom	Statistically Similar?
Straight Trucks	2	20.9	11	No
	3	11.8	8	Yes
	4	18.6	7	No
	All	86.3	12	No
Single Trailer Trucks	4 or less	119.9	6	No
	5	76.8	7	No
	6 or more	2.4	2	Yes
	All	190.0	9	No
Multiple Trailer Trucks	All	160.2	4	No

TABLE 16. COMPARISONS OF 1991 AND 1989-90 DISTRIBUTIONS OF REGISTERED GROSS WEIGHTS

Truck Type	Number of Axles	Chi Square	Degrees of Freedom	Statistically Similar?
Straight Trucks	2	1,293.4	8	No
	3	26.0	6	No
	4	15.9	4	No
	All	1,334.3	8	No
Single Trailer Trucks	4 or less	102.4	6	No
	5	71.7	7	No
	6 or more	3.03	1	Yes
	All	166.9	7	No
Multiple Trailer Trucks	All	15.7	1	No

TABLE 17. COMPARISONS OF 1989-90 AND 1987-88 DISTRIBUTIONS OF REGISTERED GROSS WEIGHTS

Truck Type	Number of Axles	Chi Square	Degrees of Freedom	Statistically Similar?
Straight Trucks	2	293.1	10	No
	3	114.7	11	No
	4	25.5	7	No
	All	515.5	11	No
Single Trailer Trucks	4 or less	38.8	8	No
	5	29.3	7	No
	6 or more	10.7	3	No
	All	58.7	9	No
Multiple Trailer Trucks	All	5.4	4	Yes

TABLE 18. AVERAGE REGISTERED GROSS WEIGHTS

Truck Type	Number of Axles	Average Gross Weight, 1,000 Pounds (Number of Observations)		
		1991 Sample	1989-90 Sample	1987-88 Sample
Straight Trucks	2	26.5 (102)	40.4 (142)	27.9 (836)
	3	59.3 (54)	66.0 (186)	54.5 (360)
	4	71.6 (38)	73.0 (70)	65.8 (105)
	All	44.5 (194)	58.1 (398)	38.3 (1301)
Single Trailer Trucks	4 or less	64.1 (77)	66.7 (338)	65.5 (309)
	5	79.7 (1593)	78.4 (1164)	78.5 (1055)
	6 or more	80.0 (58)	78.6 (141)	79.4 (99)
	All	79.0 (1728)	76.0 (1643)	75.8 (1463)
Multiple Trailer Trucks	All	79.5 (217)	78.2 (10)	70.6 (11)

TABLE 19. FREQUENCY DISTRIBUTION OF REGISTERED GROSS WEIGHTS (CURRENT STUDY)

	Axle Configuration									
	Straight Trucks				Single Trailer			Multiple Trailer		
Gross Weight (lbs)	2-Axle 4-Tire	2-Axle 6-Tire	3-Axle	4 or More Axles	4 or Less Axles	5-Axle	6 or More Axles	5 or Less Axles	6-Axle	7 or More Axles
6,000	100.00	1.56	1.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10,000	0.00	8.25	0.28	0.95	0.15	0.00	0.00	0.00	0.00	0.00
14,000	0.00	7.90	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18,000	0.00	13.28	1.67	2.86	0.00	0.00	0.00	0.00	0.00	0.00
22,000	0.00	7.54	2.22	0.95	0.00	0.09	0.00	0.00	0.00	0.00
26,000	0.00	24.63	2.78	0.00	0.77	0.14	0.00	0.00	0.00	0.00
32,000	0.00	16.74	5.56	2.86	5.10	0.14	0.83	0.00	0.00	0.00
38,000	0.00	8.49	5.28	3.81	3.86	0.23	0.42	0.00	0.00	0.00
44,000	0.00	3.47	17.78	2.86	7.57	0.63	0.00	5.56	0.00	0.00
55,000	0.00	4.31	31.38	11.43	13.91	2.07	1.25	5.56	0.00	0.00
62,000	0.00	0.36	0.83	2.86	14.06	1.40	0.42	11.11	0.00	0.00
73,280	0.00	0.72	12.50	57.13	7.88	3.74	1.67	5.56	0.00	0.00
80,000	0.00	2.75	17.78	14.29	46.70	91.56	95.41	72.21	100.00	100.00
Sample Size		836	360	105	647	2,219	240	18	2	1

TABLE 20. PERCENT OF COST RESPONSIBILITY BY VEHICLE TYPE FOR VARIOUS TRAVEL MEASURES, STATE-MAINTAINED SYSTEM

Vehicle Type	Vehicle Miles		Axle Miles		PCE Miles		ESAL Miles	
	1990	Current	1990	Current	1990	Current	1990	Current
Motorcycles	0.24	0.25	0.21	0.23	0.10	0.10	0.00	0.00
Cars	62.68	61.97	56.28	55.75	50.43	50.52	2.36	1.71
Buses	0.38	0.37	0.35	0.33	0.46	0.45	1.54	2.27
Straight Trucks								
2 Axles, 4 Tires	25.53	26.58	22.93	23.91	20.54	21.67	1.93	1.47
2 Axles, 6 Tires	2.98	2.73	2.68	2.46	4.35	4.04	11.25	8.34
3 Axles	0.73	0.77	0.98	1.04	1.70	1.85	7.32	9.84
4 or More Axles	0.19	0.24	0.34	0.43	0.47	0.65	4.82	4.82
Single-Trailer Trucks								
4 or Less Axles	0.46	0.56	0.82	1.01	1.16	1.51	3.61	11.42
5 Axles	6.34	5.96	14.22	13.41	19.31	17.32	60.53	50.68
6 or More Axles	0.24	0.31	0.66	0.83	0.84	1.11	2.70	6.39
Multiple-Trailer Trucks								
5 or More Axles	0.20	0.22	0.44	0.50	0.54	0.66	3.45	2.67
6 Axles	0.03	0.03	0.09	0.08	0.10	0.10	0.48	0.30
7 or More Axles	0.00	0.01	0.00	0.02	0.00	0.02	0.01	0.09
Subtotal, Combinations	7.27	7.09	16.23	15.85	21.95	20.72	70.78	71.55
Subtotal, Trucks	36.70	37.41	43.16	43.69	49.01	48.93	96.10	96.02
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

TABLE 21. SUMMARY DISTRIBUTION OF ANNUAL COST RESPONSIBILITY

Vehicle Type[a]	Annual Capital Cost ($000's)	Annual Maintenance/ Administrative Cost ($000's)	Total Annual Cost Responsibility	
			Thousand Dollars	Percent
Cars	220,867	152,305	373,172	44.16
Buses	10,379	914	11,293	1.34
Pickups and Vans	107,046	65,331	172,377	20.40
Light Trucks	12,367	9,056	21,423	2.53
Medium Trucks	46,487	12,055	58,542	6.93
Heavy Trucks	143,629	64,612	208,241	24.64
Total	540,775	304,273	845,048	100.00

[a] Cars include motorcycles as well as passenger automobiles, 6,000-pound trucks are considered to be pickups and vans, light trucks have gross weights of 10,000 to 26,000 pounds, medium trucks have gross weights from 32,000 to 59,999 pounds, and heavy trucks have gross weights of 60,000 pounds or more.

TABLE 22. COMPARISONS OF COST RESPONSIBILITY IN 1982, 1988, 1990, AND 1992 STUDIES

Vehicle Type[a]	Percent Cost Responsibility				Percent Travel (VMT)				Normalized Ratio of Cost to Travel			
	1982	1988	1990	1992	1982	1988	1990	1992	1982	1988	1990	1992
Cars	32.76	46.74	45.69	44.16	65.89	63.73	62.93	62.22	0.50	0.73	0.73	0.71
Buses	2.75	1.45	1.11	1.34	0.58	0.40	0.38	0.37	4.74	3.63	2.92	3.62
Pickups & Vans	12.83	20.75	20.23	20.40	20.88	25.68	25.59	26.63	0.61	0.81	0.79	0.77
Light Trucks	13.37	3.17	3.04	2.53	4.89	2.63	1.91	1.77	2.73	1.21	1.59	1.43
Medium Trucks	11.04	3.10	6.76	6.93	2.40	1.26	1.82	1.89	4.60	2.46	3.71	3.67
Heavy Trucks	27.25	24.79	23.17	24.64	5.36	6.30	7.38	7.12	5.08	3.93	3.14	3.46

[a] Cars include motorcycles as well as passenger automobiles, 6,000-pound trucks are considered to be pickups and vans, light trucks have gross weights of 10,000 to 26,000 pounds, medium trucks have gross weights from 32,000 to 55,000 pounds, and heavy trucks have gross weights of 62,000 pounds or more.

TABLE 23. EFFECT OF SELECTED FACTORS ON CHANGE IN COST RESPONSIBILITY FROM 1990 TO 1992

Vehicle Type	1990	Factor Evaluated at 1992 Level						1992
		Costs (Table C1)	Hwy Miles & Volume (Table C2)	Vehicle Types (Table C4)	One Bus Type	ESAL's (Table C10)	Weight Dist. (Table C21)	
Allocation of Cost Responsibility (%)								
Cars	45.69	45.25	45.74	44.69	45.69	45.27	45.69	44.16
Buses	1.11	1.16	1.12	0.95	1.15	1.28	1.15	1.34
Pickups & Vans	20.23	20.15	20.26	20.71	20.23	19.82	20.23	20.40
Light Trucks	3.04	2.99	3.04	2.81	3.04	2.71	3.04	2.53
Medium Trucks	6.76	6.92	6.75	6.76	6.74	6.47	6.73	6.93
Heavy Trucks	23.17	23.54	23.09	24.08	23.14	24.44	23.16	24.64
Change from 1990 to 1992 (%)								
Cars		-0.96	0.11	-2.19	0.00	-0.92	0.00	-3.35
Buses		4.50	0.90	-14.41	3.60	15.32	3.60	20.72
Pickups & Vans		-0.39	0.15	2.37	0.00	-2.03	0.00	0.84
Light Trucks		-1.64	0.00	-7.57	0.00	-10.86	0.00	-16.78
Medium Trucks		2.37	-0.15	0.00	-0.30	-4.29	-0.44	2.51
Heavy Trucks		1.60	-0.35	3.93	-0.13	5.48	-0.04	6.34

TABLE 24. SUMMARY DISTRIBUTION OF ANNUAL REVENUE GENERATED, STATE-MAINTAINED SYSTEM

Vehicle Type[a]	Annual Fuel Tax Revenue ($000's)	Annual Usage Tax Revenue ($000's)	Other Annual Revenue ($000's)	Total Annual Revenue	
				Thousand Dollars	Percent
Cars	172,515	143,325	65,489	381,329	44.69
Buses	2,122	39	269	2,430	0.28
Pickups & Vans	112,044	55,823	24,015	191,882	22.49
Light Trucks	14,181	4,655	4,092	22,938	2.69
Medium Trucks	17,911	10,067	9,516	37,494	4.39
Heavy Trucks	84,465	20,007	112,789	217,261	25.46
Total	403,239	233,926	216,170	853,335	100.00

[a] Cars include motorcycles as well as passenger automobiles, 6,000-pound trucks are considered to be pickups and vans, light trucks have gross weights of 10,000 to 26,000 pounds, medium trucks have gross weights from 32,000 to 59,999 pounds, and heavy trucks have gross weights of 60,000 pounds or more.

TABLE 25. RELATIVE HIGHWAY USER REVENUE IMBALANCES AMONG VEHICLE TYPES

Vehicle Type[a]	Ratio of Percent Revenue Generated to Percent Cost Responsibility
Cars	1.01
Buses	0.21
Pickups and Vans	1.10
Light Trucks	1.06
Medium Trucks	0.63
Heavy Trucks	1.03

[a] Cars include motorcycles as well as passenger automobiles, 6,000-pound trucks are considered to be pickups and vans, light trucks have gross weights of 10,000 to 26,000 pounds, medium trucks have gross weights from 32,000 to 59,999 pounds, and heavy trucks have gross weights of 60,000 pounds or more.

TABLE 26. DISTRIBUTION OF VEHICLE-MILES TRAVELED (THOUSANDS)

Vehicle Type[a]	State Maintained		Total	
	Vehicle-Miles	Percent	Vehicle-Miles	Percent
Cars	18,849,240	62.22	20,998,657	62.43
Buses	110,902	0.37	121,615	0.36
Pickups & Vans	8,067,708	26.63	9,148,395	27.20
Light Trucks	537,381	1.77	589,578	1.75
Medium Trucks	573,074	1.89	608,538	1.81
Heavy Trucks	2,157,445	7.12	2,170,217	6.45
Total	30,295,750	100.00	33,637,000	100.0

[a] Cars include motorcycles as well as passenger automobiles, 6,000-pound trucks are considered to be pickups and vans, light trucks have gross weights of 10,000 to 26,000 pounds, medium trucks have gross weights from 32,000 to 59,999 pounds, and heavy trucks have gross weights of 60,000 pounds or more.

TABLE 27. REVENUE AND COST RESPONSIBILITY PER VEHICLE MILE

Vehicle Type[a]	Revenue per Vehicle-Mile (Cents)	Cost Responsibility per Vehicle-Mile[b] (Cents)
Cars	2.02	2.00
Buses	2.19	10.28
Pickups & Vans	2.38	2.16
Light Trucks	4.27	4.02
Medium Trucks	6.54	10.32
Heavy Trucks	10.07	9.75
Average	2.82	2.82

[a] Cars include motorcycles as well as passenger automobiles, 6,000-pound trucks are considered to be pickups and vans, light trucks have gross weights of 10,000 to 26,000 pounds, medium trucks have gross weights from 32,000 to 59,999 pounds, and heavy trucks have gross weights of 60,000 pounds or more.

[b] Adjusted to equal the revenue total of $853,335,000.

TABLE 28. ESTIMATED EFFECTS OF MAJOR LEGISLATIVE POSSIBILITIES - REVENUE CONTRIBUTIONS (%)

Taxation Proposal	Cars	Buses	Pickups and Vans	Light Trucks	Medium Trucks	Heavy Trucks	Estimated Change in Road Fund Balance
Existing Taxes	44.69	0.28	22.49	2.69	4.40	25.46	None
Remove Weight-Distance Surcharge	45.62	0.29	22.96	2.74	4.49	23.90	($17,551,000)
Repeal Weight Distance	48.13	0.31	24.22	2.90	4.73	19.72	($61,046,000)
Repeal Weight Distance, Eliminate Usage for 32,000 and More	48.66	0.31	24.48	2.93	3.94	19.69	($69,627,000)
Repeal Weight Distance, Eliminate Usage for 32,000 and More, 12¢ Increase Heavy Vehicle Fuel Surtax	46.68	0.30	23.49	2.81	3.77	22.95	($36,459,000)
Repeal Weight Distance, Eliminate Usage for 32,000 and More, 7.7¢ Increase in Heavy Vehicle Fuel Surtax, 3¢ Increase in Special Fuel (for Road Fund Only)	46.58	0.34	23.44	2.95	3.99	22.70	($33,970,000)
Repeal Weight Distance, Eliminate Usage for 32,000 and More, 1¢ Increase in Gasoline, 5¢ Increase in Special Fuel	47.77	0.36	24.15	3.04	4.10	20.58	($41,166,000)
Repeal Weight Distance, Eliminate Usage for 32,000 and More, 89% Increase in Truck Registrations, Permits, and Licenses	46.19	0.29	23.86	3.08	4.48	22.10	($27,763,000)
Repeal Weight Distance, Eliminate Usage for 32,000 and More, $21.50 Increase in Car Registration	51.32	0.29	23.21	2.78	3.73	18.66	($26,664,000)

TABLE 29. ESTIMATED EFFECTS OF MAJOR LEGISLATIVE POSSIBILITIES - REVENUE TO COST RATIO

Taxation Proposal	Cars	Buses	Pickups and Vans	Light Trucks	Medium Trucks	Heavy Trucks
Existing Taxes	1.01	0.21	1.10	1.06	0.63	1.03
Remove Weight-Distance Surcharge	1.03	0.22	1.12	1.08	0.65	0.97
Repeal Weight Distance	1.09	0.23	1.19	1.14	0.68	0.80
Repeal Weight Distance, Eliminate Usage for 32,000 and More	1.10	0.23	1.20	1.16	0.57	0.80
Repeal Weight Distance, Eliminate Usage for 32,000 and More, 12¢ Increase in Heavy Vehicle Fuel Surtax	1.06	0.22	1.15	1.11	0.54	0.93
Repeal Weight Distance, Eliminate Usage for 32,000 and More, 7.7¢ Increase in Heavy Vehicle Fuel Surtax, 3¢ Increase in Special Fuel (for Road Fund Only)	1.06	0.26	1.15	1.16	0.58	0.92
Repeal Weight Distance, Eliminate Usage for 32,000 and More, 1¢ Increase in Gasoline, 5¢ Increase in Special Fuel	1.08	0.27	1.18	1.20	0.59	0.84
Repeal Weight Distance, Eliminate Usage for 32,000 and More, 89% Increase in Truck Registrations, Permits, and Licenses	1.05	0.22	1.17	1.22	0.65	0.90
Repeal Weight Distance, Eliminate Usage for 32,000 and More, $21.50 Increase in Car Registration	1.16	0.22	1.14	1.10	0.54	0.76

TABLE 30. SYSTEM MILEAGES (STATE-MAINTAINED COMPONENTS)

Location	Extended-Weight System	Base System
Coal-Producing Counties	2,455	9,307
Coal-Impact Counties	718	7,577
All Counties	3,173	16,884

TABLE 31. AVERAGE ANNUAL RESURFACING MILEAGE (ROADWAY MILES)

Location	Extended-Weight System	Base System	Total
Coal-Producing Counties	370	485	855
Coal-Impact Counties	86	529	615
All Counties	456	1,014	1,470

TABLE 32. EQUIVALENT AVERAGE ANNUAL RESURFACING COSTS (MILLIONS)

Location	Extended-Weight System	Base System	Total
Coal-Producing Counties	$15.0	$12.0	$27.0
Coal-Impact Counties	$4.2	$14.0	$18.2
All Counties	$19.2	$26.0	$45.2

TABLE 33. PERCENT OF MILEAGE RESURFACED ANNUALLY

Location	Extended-Weight System	Base System
Coal-Producing Counties	15.0	5.2
Coal-Impact Counties	12.0	7.0
All Counties	14.4	6.0

TABLE 34. AVERAGE RESURFACING COSTS (DOLLARS PER MILE)

Location	Extended-Weight System	Base System
Coal-Producing Counties	40,600	24,700
Coal-Impact Counties	48,500	26,600
All Counties	42,100	25,700

TABLE 35. ANNUAL RESURFACING COST INCREMENT BEYOND BASE-SYSTEM NORMS

Location	Expenditure Increment (Millions)
Coal-Producing Counties	$11.44
Coal-Impact Counties	$2.14
All Counties	$13.58

TABLE 36. AVERAGE ANNUAL DAILY TRAFFIC

Location	Extended-Weight System	Base System
Coal-Producing Counties	4,350	2,187
Coal-Impact Counties	7,297	3,291
All Counties	5,017	2,682

TABLE 37. AVERAGE RIDEABILITY INDEX

Location	Extended-Weight System	Base System
Coal-Producing Counties	2.66	2.53
Coal-Impact Counties	3.19	2.75
All Counties	2.78	2.63

TABLE 38. ASSUMED TRUCK WEIGHTS

Coal-Truck Type	Gross Weight (Pounds)			
	Normal (Without Decal)		With Decal	
	Empty	Loaded[a]	Empty	Loaded[b]
3-Axle, Single-Unit	25,000	59,400	29,000	94,500
4-Axle, Single-Unit	31,000	77,000	35,000	105,000
Single-Trailer Trucks of 5 or More Axles	35,000	80,000	40,000	126,000

[a]Including 10-percent allowance for axle overload.
[b]Including 5-percent allowance for gross weight overload.

TABLE 39. ANNUAL RESURFACING COST INCREMENT ATTRIBUTED TO COAL-DECAL SYSTEM

Location	Expenditure Increment (Millions)		
	Extended-Weight System	Base System	Total
Coal-Producing Counties	$5.42	$2.03	$7.45
Coal-Impact Counties	$0.60	$1.03	$1.63
All Counties	$6.01	$3.07	$9.08

TABLE 40. ANNUAL REVENUE INCREMENT GENERATED BY COAL-DECAL SYSTEM

Truck Type	Number of Coal Trucks With Decals	Decal Fees	Added Registration Fees (80,000-Pound Registration)	Lost Registration Fees (Fewer Trucks)	Total
3-Axle, Single Unit	1,217	$195,000	$871,000	($599,000)	$467,000
4-Axle, Single Unit	193	$50,000	$26,000	($113,000)	($37,000)
Single-Trailer Combination	2,467	$888,000	---	($2,832,000)	($1,944,000)
Total	3,877	$680,000*	$897,000	($3,544,000)	($1,967,000)

*Remaining 40 percent distributed to counties

TABLE 41. AVERAGE ANNUAL SURFACE MAINTENANCE COSTS (DOLLARS PER MILE)

Location	Rural Secondary (RS) System	Maintenance Project (MP) System	Total
Coal Producing Districts	$901	$1,035	$976
Other Highway Districts	$565	$723	$652

TABLE 42. WEIGHT DISTANCE TAX FOR 1990 AND 1992 STUDIES

Year	Estimated Revenue ($1,000)	Reported Revenue ($1,000)	Percent of Estimate
1990	83,771	56,462	67.4
1992	86,808	61,046	70.3

TABLE 43. FUEL GALLONAGE FOR 1990 AND 1992 STUDIES

Year	Fuel Type	Estimated Gallonage (1,000)	Reported Gallonage (1,000)	Percent of Estimate
1990	Gasoline/Gasohol	1,678,321	1,810,990	107.9
	Special Fuel	519,647	495,884	95.4
	Total	2,197,968	2,306,874	105.0
1992	Gasoline/Gasohol	1,701,792	1,833,750	107.8
	Special Fuel	528,113	488,179	92.4
	Total	2,229,905	2,321,929	104.1

TABLE 44. FUEL TAXES FOR 1990 AND 1992 STUDIES

Year	Fuel Tax	Estimated Revenue ($1,000)	Reported Revenue ($1,000)	Percent of Estimate
1990	Heavy Vehicle Surtax	7,471	5,384	72.1
	Normal Use	16,920	12,084	71.4
	Normal	245,054	248,666	101.5
1992	Heavy Vehicle Surtax	7,191	5,528	76.9
	Normal Use	16,504	12,435	75.3
	Normal	246,897	242,326	98.1

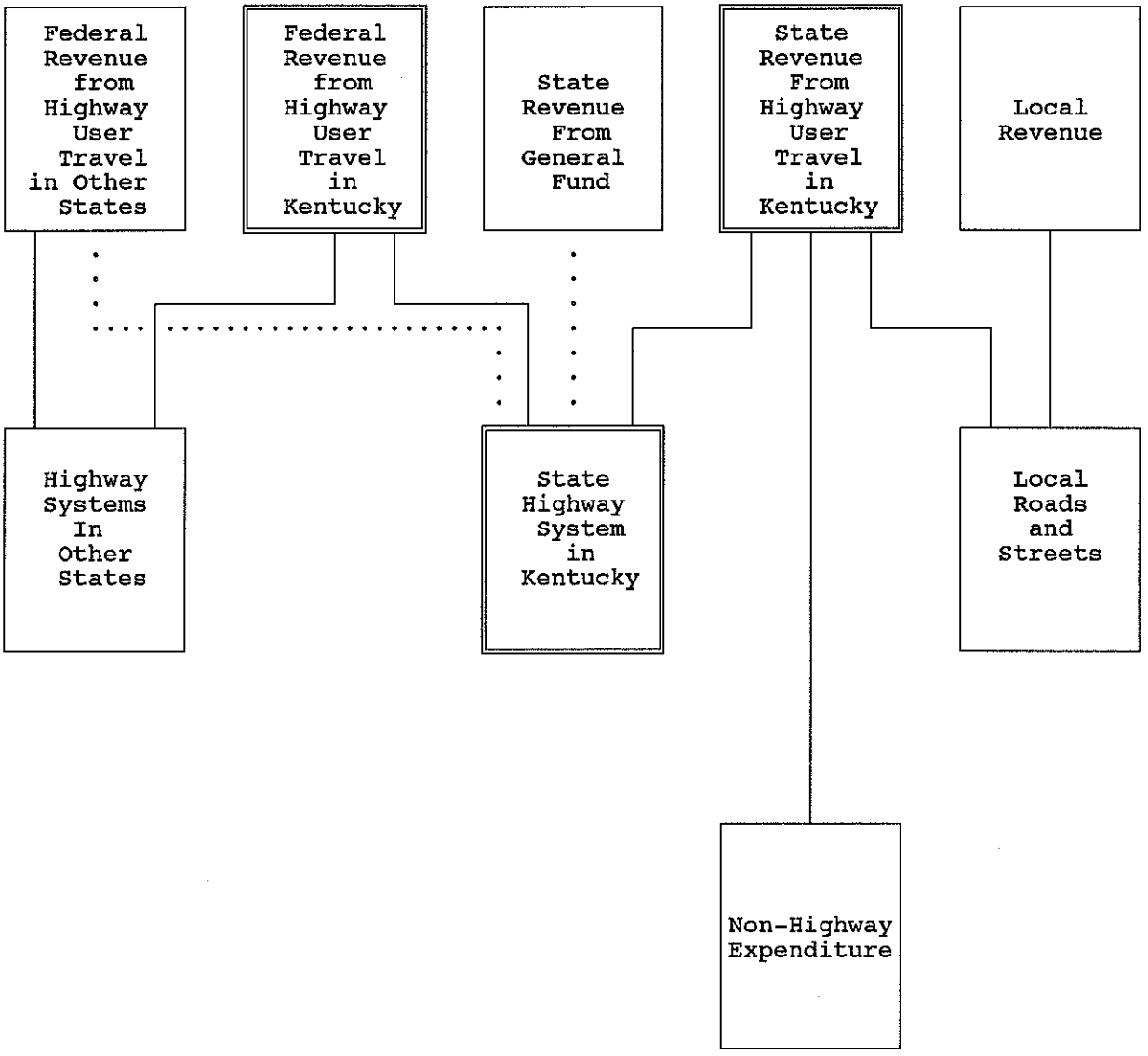

Figure 1. Revenue Sources for Kentucky's Highways Highlighting Road-User Contributions to the State-Maintained System

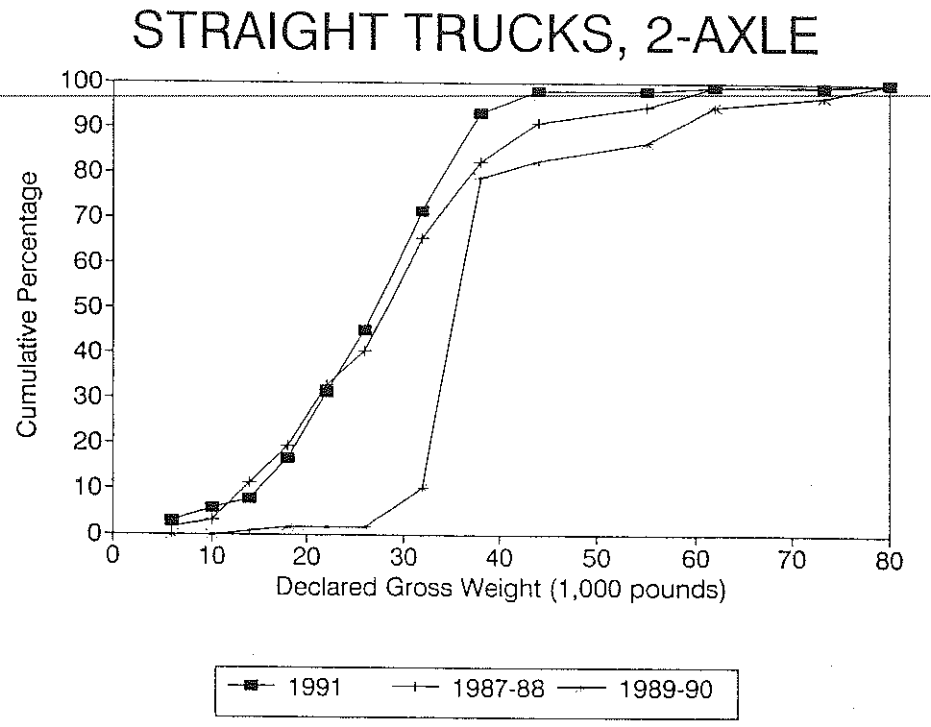

Figure 2. Weight Distributions for 2-Axle Straight Trucks

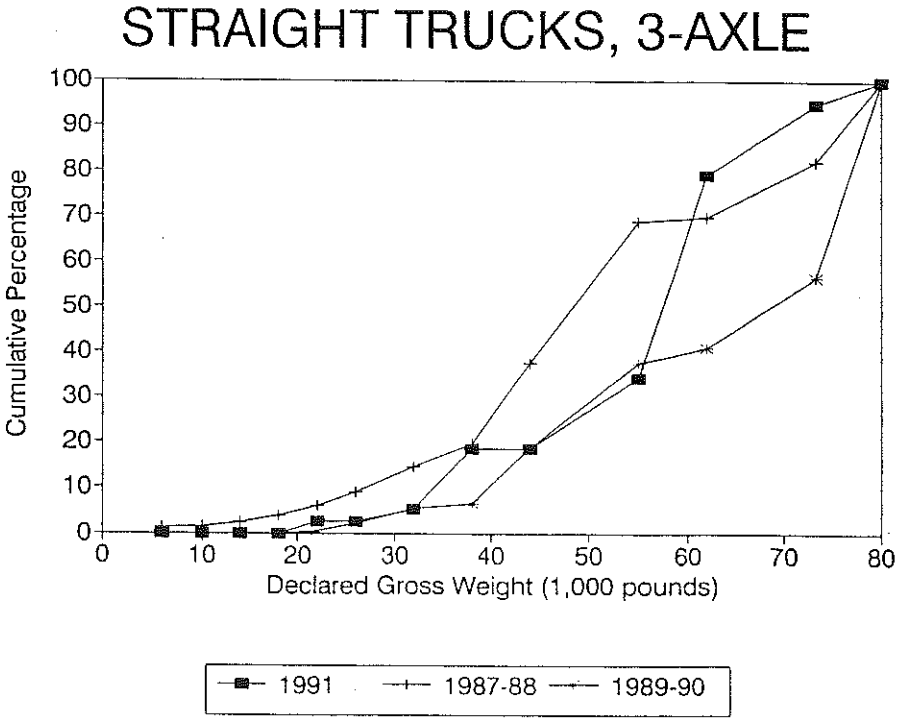

Figure 3. Weight Distributions for 3-Axle Straight Trucks

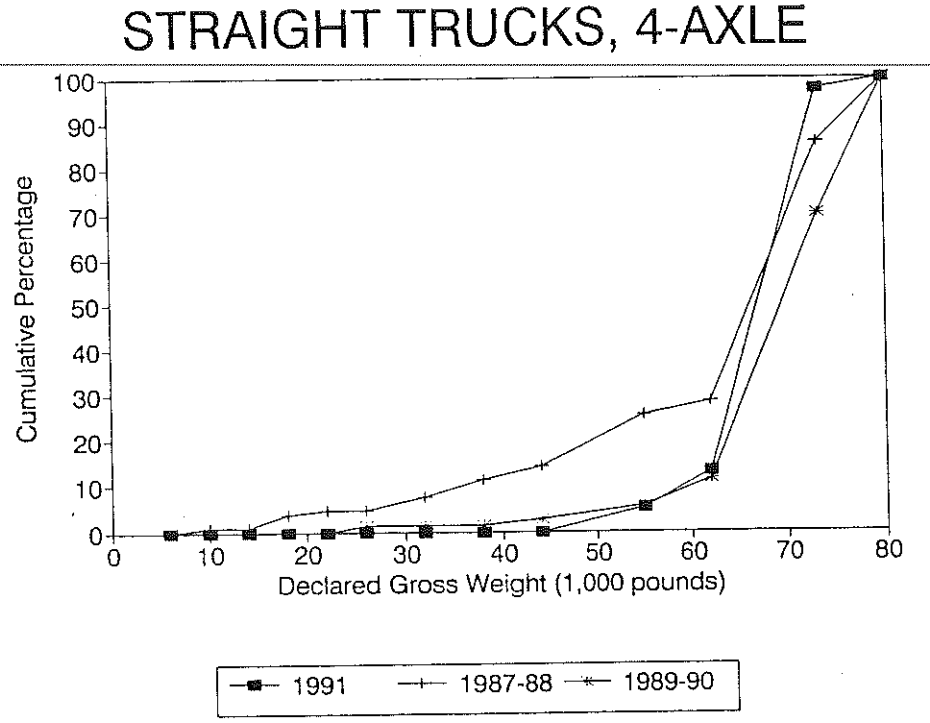

Figure 4. Weight Distributions for 4-Axle Straight Trucks

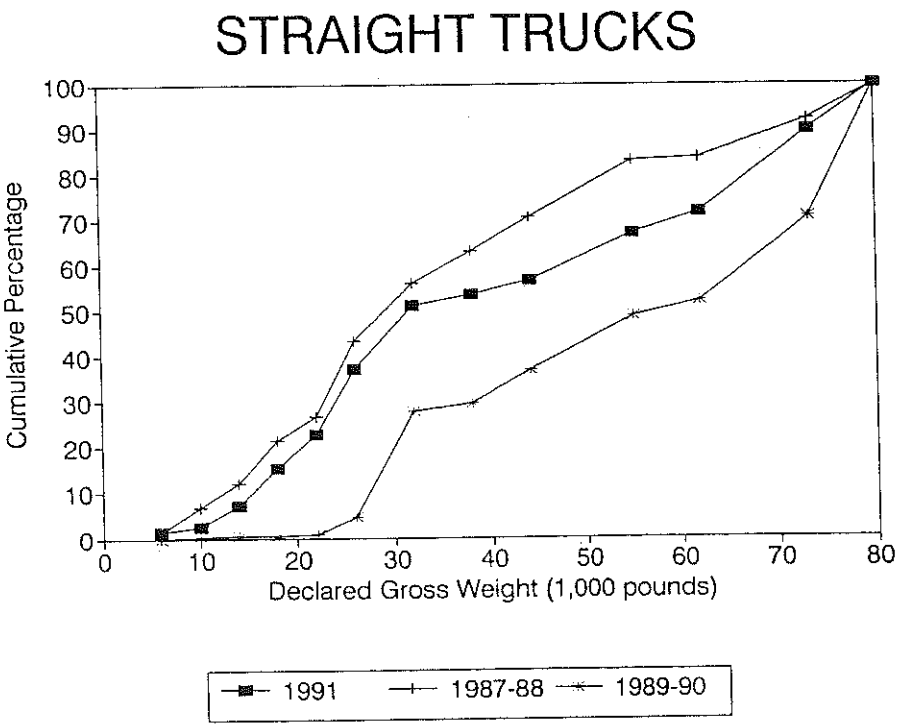

Figure 5. Weight Distributions for All Straight Trucks

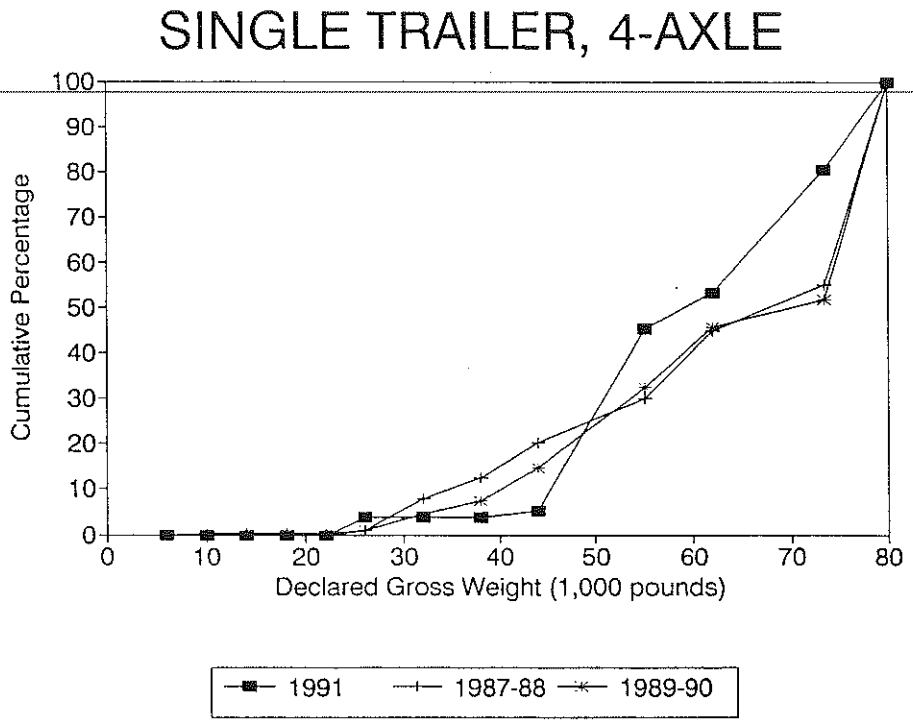

Figure 6. Weight Distributions for 4-Axle Single Trailer Trucks

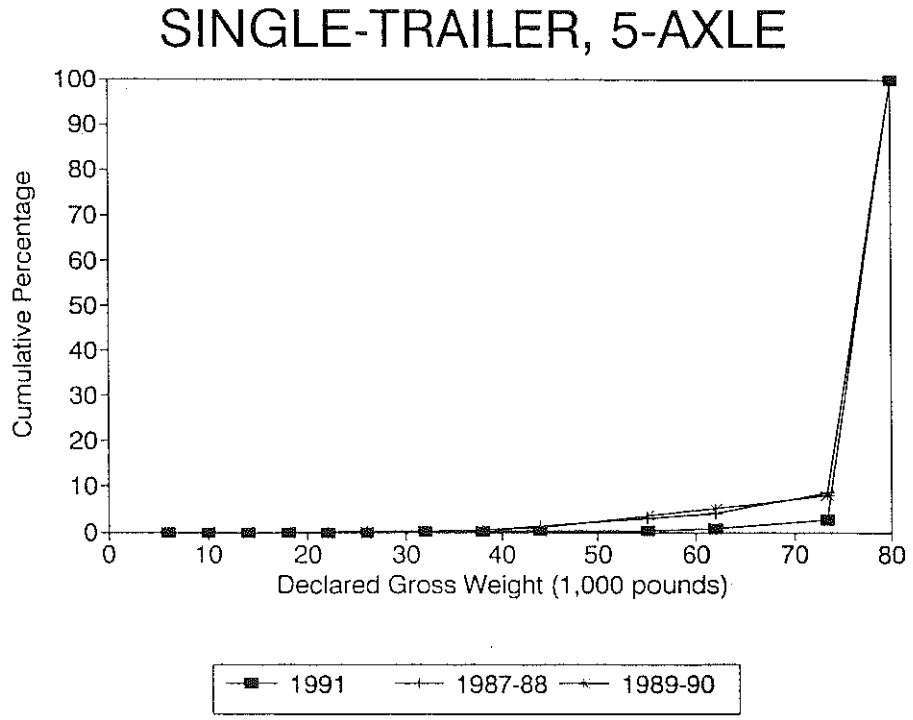

Figure 7. Weight Distributions for 5-Axle Single Trailer Trucks

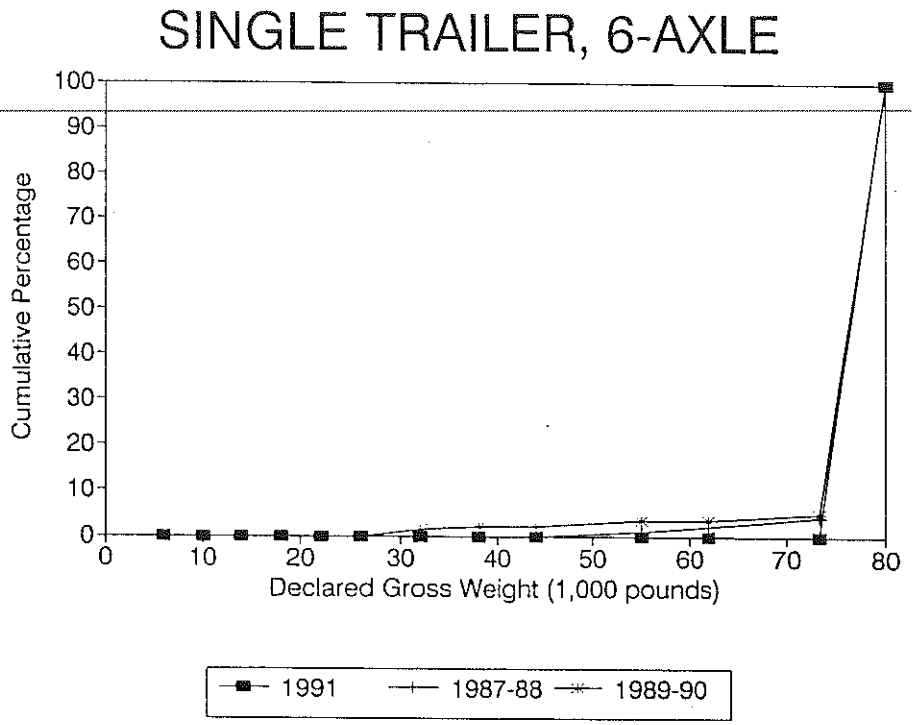

Figure 8. Weight Distributions for 6-Axle Single Trailer Trucks

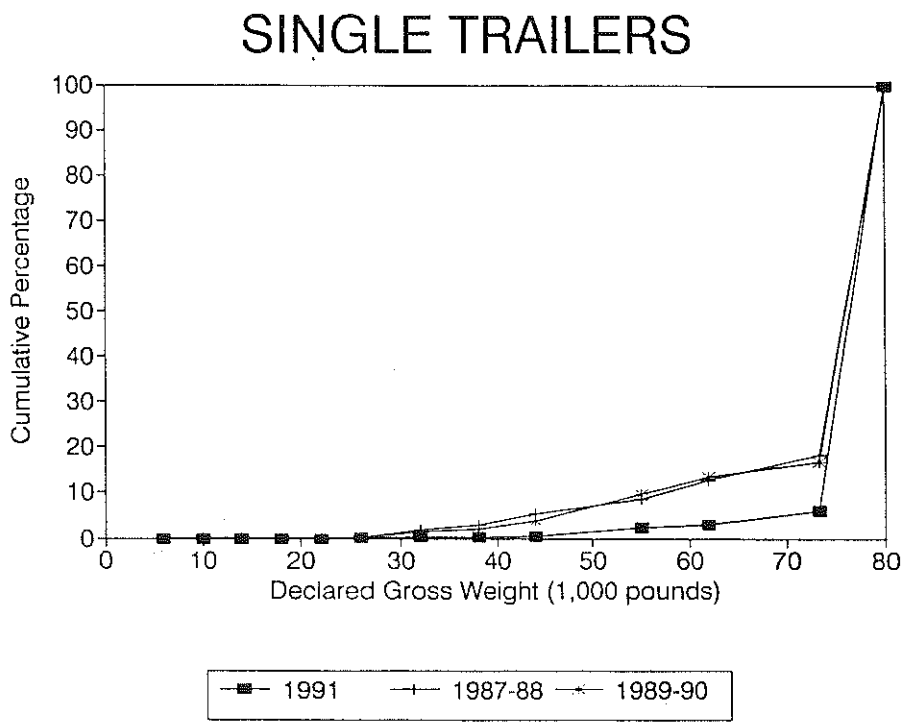

Figure 9. Weight Distributions for All Single Trailer Trucks

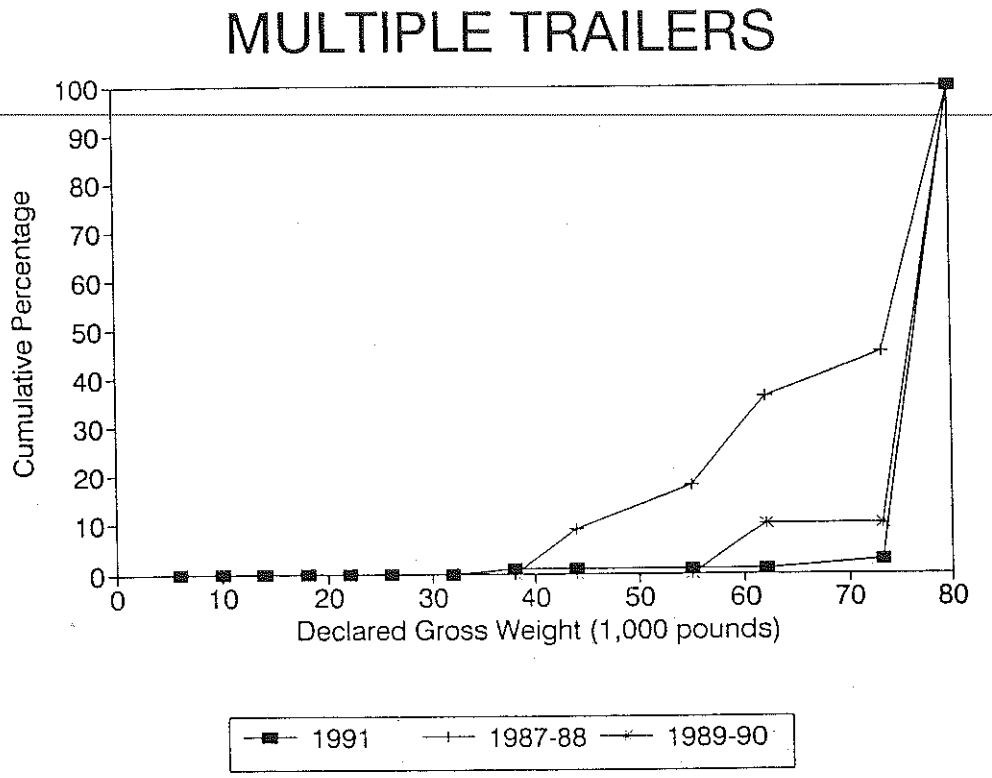

Figure 10. Weight Distributions for All Multiple Trailer Trucks

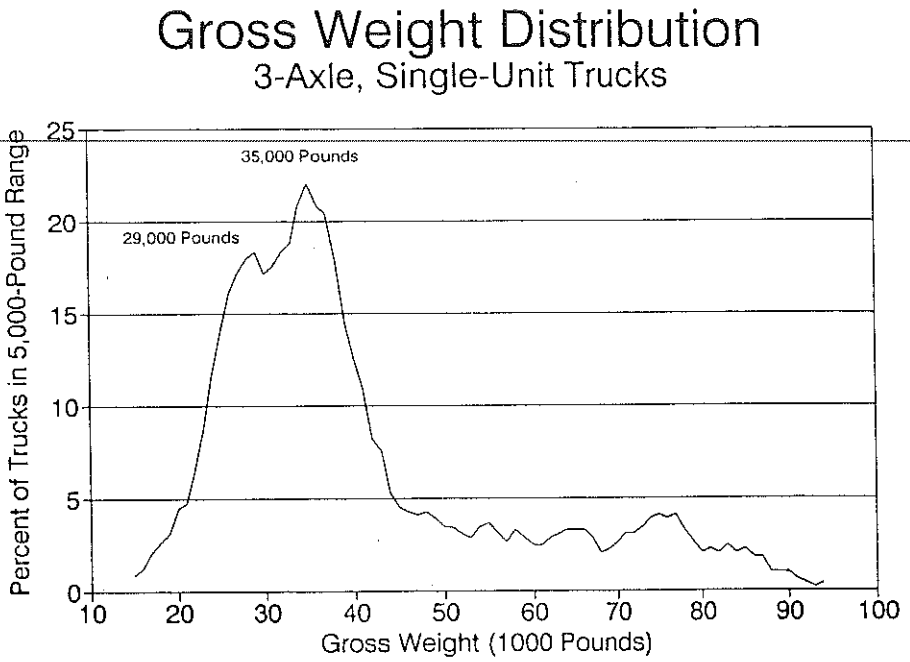

Figure 11. Gross Weight Distribution of Three-axle, Single-unit Trucks

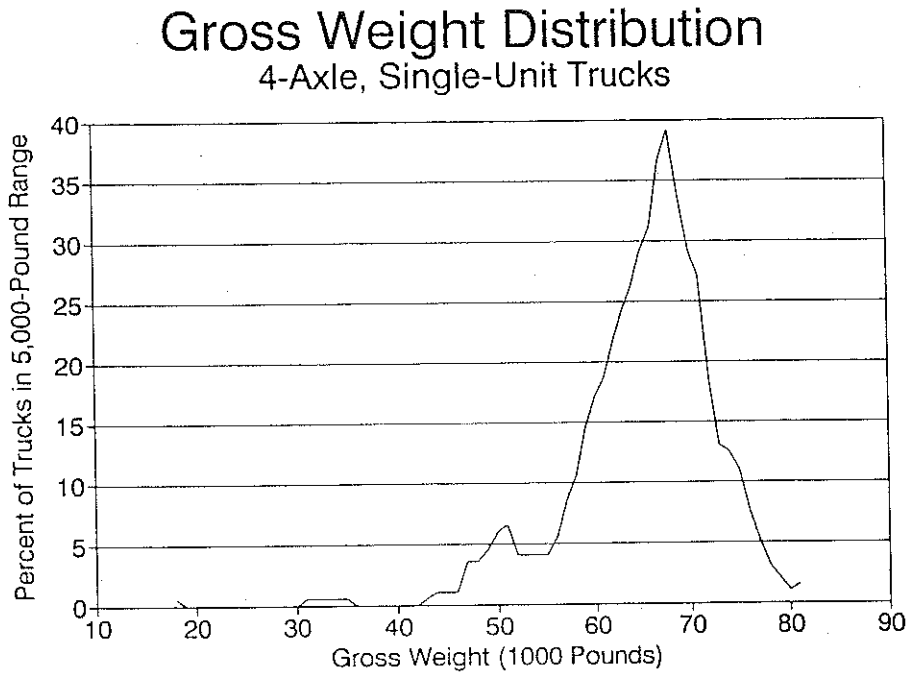

Figure 12. Gross Weight Distribution of Four-axle, Single-unit Trucks

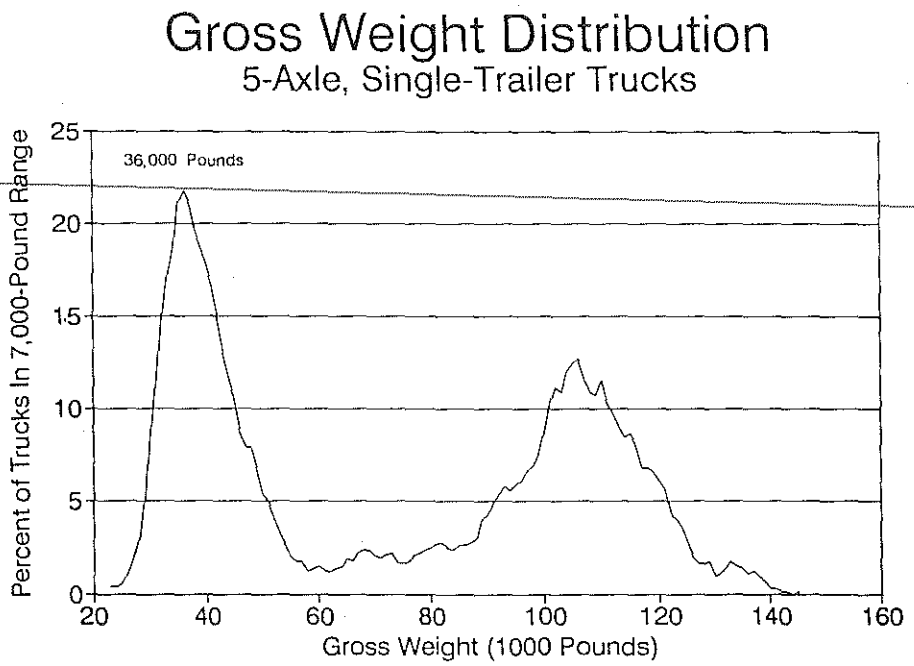

Figure 13. Gross Weight Distribution of Five-axle, Single-trailer Trucks

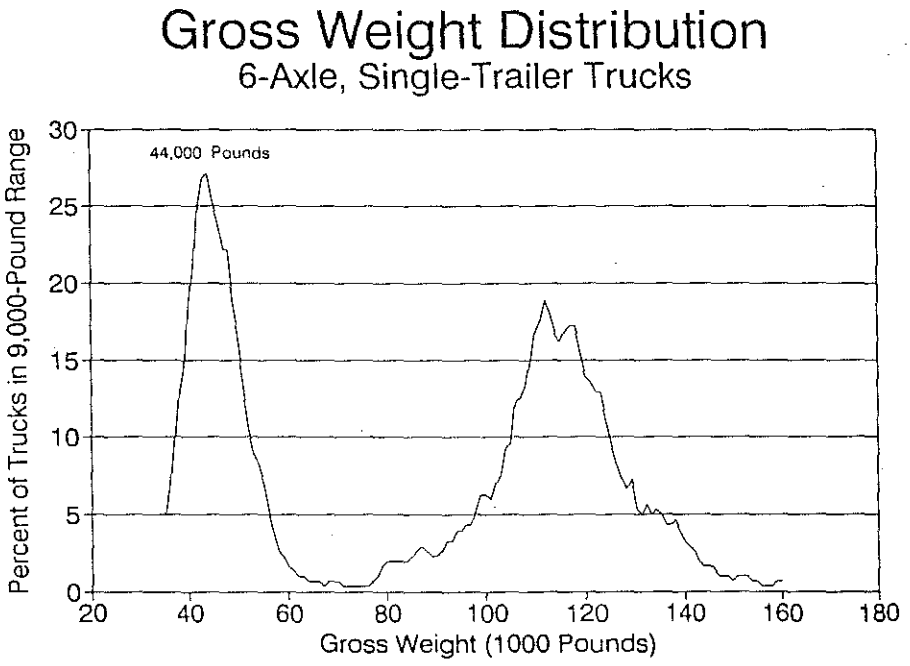

Figure 14. Gross Weight Distribution of Six-axle, Single-trailer Trucks

APPENDIX A

TECHNICAL DOCUMENTATION

1. GENERAL CONCEPTS

- The analysis is limited to those costs and revenues associated with the state-maintained system of highways.
- Allocation guidelines are identified in Tables A1-A3.
- The annualized cost of constructing the entire state-maintained system is scaled to the level of the annual budget for capital improvements.

2. PROCEDURE

Two primary SuperCalc4 spreadsheets are used in updating the cost and revenue allocations. HCAXX-1.CAL is used for cost allocations and HCAXX-2.CAL is used for revenue allocations. The update requires that new information be supplied to both HCAXX-1.CAL and HCAXX-2.CAL. Additionally, information from HCAXX-1.CAL must be transferred to HCAXX-2.CAL during the updating process.

Begin the process by copying and renaming the two files to reflect the new date. Update HCAXX-1.CAL as required and execute a recalculation. Unprotect and blank A1.AC73 in HCAXX-2.CAL. Transfer the VALUES of AF136.AW182 of HCAXX-1.CAL to A1 of HCAXX-2.CAL and from DB734.DL759 to S48. (NOTE: The process of unprotecting, blanking, and partial loading is more easily accomplished by executing the HCAXX-2.CAL macro, LOAD, by pressing <ALT-F5> and entering LOAD.) Update HCAXX-2.CAL as required and execute a recalculation.

A wide carriage printer, set to condensed print, or a suitable alternative must be used to obtain the printouts. Any table can be output manually or all tables can be output using macros, labeled PRINT, within HCAXX-1.CAL and HCAXX-2.CAL. (NOTE: To use the print macro, turn off the borders, press <ALT-F5>, and enter PRINT.)

3. FILE IDENTIFICATION

HCAXX-1.CAL	The SuperCalc4 spreadsheet used for allocating highway costs to various vehicle types and weight categories
HCAXX-2.CAL	The SuperCalc4 spreadsheet used for allocating highway revenues to various vehicle types and weight categories
HCAIXX-1.CAL	A SuperCalc4 spreadsheet into which Interstate classification data is entered on a segment by segment basis. Data from the spreadsheet is manually input to HCAIXX-2.CAL.
HCAIXX-2.CAL	A SuperCalc4 spreadsheet used to calculate travel (VMT) on

Kentucky Interstates and the average composition of the traffic stream (percentages by vehicle type) on Interstate highways as a function of location (rural/urban) and number of lanes.

HCAXX.BAS — A QuickBasic4 program to compute vehicle-type percentages for input to Table C3

C*.DAT — Vehicle classification data for input to HCAXX.BAS, one record for each station with federal aid, rural/urban, and number-of-lanes codes added. Produced by combining classification data with information extracted from the Roadway Characteristics Inventory file.

HCAFUELS.CAL — A SuperCalc4 spreadsheet which computes the average percentage of diesel fuel usage for input to Table D4

HCAFUNDS.CAL — A SuperCalc4 spreadsheet which categorizes and sums highway revenue and expenditure data extracted from "The Financial Report to Management for the Period of July 1, 1990 to June 30, 1991"

HCATOLLS.CAL — A SuperCalc4 spreadsheet which sums toll road revenue for input into Table D8

4. INPUT

TABLE C1 — Annual expenditures for construction, maintenance and traffic services, administration, enforcement, and miscellaneous needs for state-maintained system
Source: Financial Report to Management for the Period of July 1, 1990 to June 30, 1991 (see Appendix B), 1990 State Highway Expenditures (Form FHWA 532), and 1990 Highway Statistics.

TABLE C2 — Highway miles, vehicle-miles traveled, and AADT by highway classification
Source: 1991 Roadway Characteristics Inventory (RCI) file, Division of Planning, KYDOH and 1990 Highway Statistics (Total VMT)

TABLE C3 — Terrain/land use percentages by highway classification
Source: Division of Planning, KYDOH

TABLE C4 — Vehicle-type percentages by Federal-Aid highway classification, rural/urban designation, and number of lanes
Source: 1987-1990 Vehicle Classification Files and 1991 RCI file,

Division of Planning, KYDOH

TABLE C7	Basic passenger car equivalents Source: Highway Capacity Manual (TRB Special Report 209) and 1982 Federal Cost Allocation Study
TABLE C10	Unit pavement damage factors (ESALs/vehicle) by vehicle type and highway type Source: 1989 and 1990 Loadometer (WIM) Files, Division of Planning, KYDOH
Unnumbered table	1980 highway construction cost per mile by construction element, highway classification, and terrain/land use Source: 1980 construction costs per mile, Division of Planning, KYDOH
TABLE C11	Construction cost conversion factor (to convert costs to current year values) (BI477) Source: Construction Cost Indices, Estimating Staff, KYDOH
Unnumbered table	Service lives of highway elements (BM479.BV479) Source: Report UKTRP-81-22
TABLE C21	Percentage of vehicles by axle type in various registered weight categories Source: Sample comprised of Kentucky-licensed trucks involved in reported accidents for the period 1987 through 1990. Type of truck, number of axles, license number, and VIN obtained from accident file (Department of State Police). Registered weight obtained from apportionment file (Division of Motor Vehicle Licensing) of Kentucky trucks by matching license number. Registered weight obtained from AVIS file (Division of Motor Vehicle Licensing) by matching with VIN and license number. Data from the cab card file is used to proportion 62,000-pound trucks between 59,999- and 62,000-pound declared weight categories.
TABLE D1	Statewide revenue totals Source: Highway Statistics (1990), FHWA; Kentucky Highway Income (Form FHWA-531 and Notes on FHWA-531), Division of Planning, KYDOH; Financial Report to Management for the Period July 1, 1990 to June 30, 1991, KYTC, Division of Accounts
TABLE D3	Percentage of trucks that are diesel powered as a function of gross weight

Source: Annual sales/production data from Motor Vehicle Manufacturers' Association, Virginia Reinfeldt and Rob Birch, 313-872-4311

TABLE D4 Fuel consumption rates (Table VM-1), percentage of cars and buses that are diesel powered, and statewide gallons of gasoline/LPG, gasohol, and diesel fuel
Source: 1990 Highway Statistics for fuel consumption rates, Motor Vehicle Manufacturers' Association for percentage of diesel powered cars, Division of Planning for consumption totals for all fuel classes, and Department of Pupil Transportation (Perry Watson, 564-4718) for percentage of diesel-powered school buses

TABLE D5 Kentucky and Federal fuel tax rates by vehicle type
Source: Kentucky Revised Statutes for Kentucky rates; supplemental information from a revenue source summary prepared by Sandra Pullen with the KYTC Office of General Counsel; Highway Statistics 1990 for Federal rates; a summary of Federal tax rates prepared by James Getzewich from FHWA's Office of Highway Funding and Motor Fuels Division (202-366-0170)

TABLE D5 Percentage of Kentucky regular fuel taxes deposited in Road Fund (CK287)
Source: Kentucky Revised Statutes and 1990 Highway Statistics

TABLE D6 Motor vehicle registration fees (truck fees are automatically transferred for computations to Table D7)
Source: Department of Motor Vehicle Regulation, KYTC; Kentucky Revised Statutes

TABLE D7 Number of Kentucky trucks by registered weight class
Source: Report No. R2145, Department of Motor Vehicle Regulation, Division of Motor Vehicle Licensing, KYTC

TABLE D7 Equation for reduction in registration fees for farm trucks (DL337.DQ337)
Source: Kentucky Revised Statutes

TABLE D7 Equation for reduction in registration fees for exempt trucks (DH339.DQ339)
Source: Kentucky Revised Statutes

TABLE D7 Number of Truck I.D. cards issued (DD359.DR359)
Source: Department of Administrative Services, Division of Automated

Services; Department of Vehicle Regulation, Division of Motor Carriers

TABLE D8 Revenue from toll roads by toll-system vehicle code
Source: Department of Fiscal Management, Division of Toll Facilities, KYTC (Nancy Craig)

TABLE D9 Distribution of usage tax revenue among vehicle classes
Source: Special analysis of AVIS file, Division of Automated Services (Jon Clark)

5. TABLE LOCATIONS

Tables are located in SuperCalc4 files as follows:

Table Number	File	Range
C1	HCA92-1.CAL	A1.D24
C2	HCA92-1.CAL	E25.J65
C3	HCA92-1.CAL	K66.Q120
C4	HCA92-1.CAL	R121.AI159
C5	HCA92-1.CAL	AJ160.BA206
C6	HCA92-1.CAL	AJ209.BA255
C7	HCA92-1.CAL	AN258.AR280
C8	HCA92-1.CAL	AJ284.AZ296
C9	HCA92-1.CAL	AJ298.BA331
1980 unit highway construction costs	HCA92-1.CAL	BB370.BL422
C10	HCA92-1.CAL	AJ333.BA368
Service lives of highway elements	HCA92-1.CAL	BM479.BV479
C11	HCA92-1.CAL	BB423.BL477
C12	HCA92-1.CAL	BM481.BW511
C13	HCA92-1.CAL	BX513.CO544
C14	HCA92-1.CAL	BX545.CO576
C15	HCA92-1.CAL	BX577.C0608
C16	HCA92-1.CAL	BX610.C0641
C17	HCA92-1.CAL	BX643.C0674
C18	HCA92-1.CAL	BX676.CO707
C19	HCA92-1.CAL	CP709.DE731
C20	HCA92-1.CAL	CP732.DE755
Factors to distribute pavement costs	HCA92-1.CAL	DF783.DP806
Axles/truck	HCA92-1.CAL	DQ764.DQ779

Workspace to compute axles/truck	HCA92-1.CAL	DR764.DS779
Factors to distribute G&D and bridge costs	HCA92-1.CAL	DF807.DP830
C21	HCA92-1.CAL	DF757.DP782
C22	HCA92-1.CAL	DQ832.EJ853
C23	HCA92-1.CAL	DQ857.EJ875
C24	HCA92-1.CAL	EK876.EZ895
PRINT macro	HCA92-1.CAL	E74.E100
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C5 from HCA92-1.CAL (from AJ160.BA206 to A1, Values)	HCA92-2.CAL	A1.R47
C21 from HCA92-1.CAL (from DF757.DP782 to S48, Values)	HCA92-2.CAL	S48.AC73
D1	HCA92-2.CAL	AD74.AF120
D2	HCA92-2.CAL	AH129.BC173
D3	HCA92-2.CAL	BD174.BO202
D4	HCA92-2.CAL	BP203.CE230
D5	HCA92-2.CAL	CF231.CY287
D6	HCA92-2.CAL	CZ288.DB321
D7	HCA92-2.CAL	DC322.DR360
D8	HCA92-2.CAL	DS361.DU391
Workspace for toll allocations to vehicle type & wt	HCA92-2.CAL	DW393.EN410
D9	HCA92-2.CAL	DV417.EO462
Workspace	HCA92-2.CAL	FC472.FM485
D10	HCA92-2.CAL	FB489.FQ536
LOAD macro	HCA92-2.CAL	AD1.AD6
PRINT macro	HCA92-2.CAL	AE1.AE50

6. TABLE C1. SUMMARY OF EXPENDITURES ON STATE-MAINTAINED SYSTEM

The Transportation Cabinet's "Financial Report to Management for the Period of July 1, 1990 to June 30, 1991" was the primary source for expenditure data. The following essential expenditure categories were used:

Expenditures
- Capital
- Maintenance and Traffic Services
- Administration
- Enforcement
  - Motor Carriers
  - Other
- Miscellaneous

Appendix B links specific cost items identified in the "Financial Report ..." to the above categories.

A rather complex algorithm, built into the spreadsheets, is used to distribute capital costs into six elements including preliminary design and engineering, rights-of-way, utilities, grade and drain, pavements and shoulders, and bridges.

The maintenance and traffic services total is split between roads, structures, and traffic services based on relative proportions reported in 1990 State Highway Expenditures (Form FHWA 532).

Rural Secondary expenditures were distributed among capital, maintenance and administration categories based on information provided by the Division of Rural and Municipal Aid (Steve Taylor).

7. TABLE C2. HIGHWAY SYSTEM MILEAGE AND VEHICLE-MILES TRAVELED

This table is updated with data from the Roadway Characteristic Inventory File (RCI). It is categorized by highway classification, rural/urban designation, and number of lanes with data for mileage, thousands of vehicle-miles traveled, and annual average daily traffic. The mileage and vehicle-miles traveled were summed overall and a weighted mean for annual average daily traffic was calculated. The number of lanes-primary direction and the number of lanes-other direction were summed to determine the total number of lanes for each section.

The 1991 RCI File identified 33,720 sections with 19,839 having AADT recorded. The mean AADT for each category was calculated based only on those records listing a non-zero AADT. This mean was weighted by the section length. Vehicle-miles traveled was calculated using the following formula:

VMT = (Section length * AADT * 365)/1000

If a record did not have an AADT, the weighted mean AADT was used to estimate

the vehicle-miles of travel.

Examination of a frequency distribution of AADT produced concern about repeated occurrences of certain AADT values and some unusually high values. Manual adjustment was made to this questionable data so that the total vehicle-miles of travel conformed to reasonable expectations.

A SAS program read the data and applied a set of criteria for record inclusion: the primary check was the Federal-aid system status which indicates if the section is open to traffic. A highway classification variable was created based on the Federal-aid system code and the governmental level of control.

There are eight highway classification categories--Interstate, Federal-Aid Primary, Federal-Aid Urban, Federal-Aid Secondary, Non-Federal-Aid State Maintained, Non-Federal-Aid County Maintained, Non-Federal-Aid City Maintained, and Non-Federal-Aid Other. The first four categories are determined solely by the Federal-aid code whereas the governmental level of control is used to help identify the four remaining categories.

This data set is sorted by highway classification, rural/urban designation and number of lanes. A mean AADT weighted by section length is computed. This weighted AADT is then used together with the aforementioned formula to make the necessary estimates in cases where AADTs have not been recorded.

Sums are calculated for number of sections, mileage, vehicle-miles traveled, number of sections with AADT, and mileage with AADT. The SAS procedure MEANS is used exclusively to obtain the desired statistics.

8. TABLE C4. PERCENTAGE OF TRAFFIC STREAM BY VEHICLE TYPE

A. Because of the significance of travel on the Interstate system, Interstate travel was treated in greater detail than travel on other types of highways.

1990 AADTs were extracted from the historical volume (TVS) file for each of the Interstate segments. Data for all classification counts that had been conducted on Interstate highways in the period, 1986-90, were manually extracted from hard copy reports and entered into a SuperCalc4 spreadsheet, HCAI92-1.CAL. These two sets of data were combined in another spreadsheet, HCAI92-2.CAL. Rural/urban designation and number of lanes, obtained from the printout of the statewide mileage tape, were also added to HCAI92-2.CAL. The computation of vehicle miles traveled by each vehicle type on each segment of Interstate was straightforward. A sort was then made on rural/urban designation and lanes of travel and cumulative vehicle miles of travel were obtained for each vehicle type on each category of Interstate

highway. Percentage-composition of the traffic stream was determined from these vehicle mile estimates.

B. The necessary information for other types of highways was a by-product of the classification summary program, CLASSUM, which is executed annually to update the ESAL model used for pavement design. The CLASSUM program is maintained by the Kentucky Transportation Center. This classification summary program produces two permanent output files along with a paper-copy printout. One of the files, CLASSUM.YR19XX, contains daily volumes of each vehicle type for the four seasons as well as annual average daily volumes for each vehicle type. This file was accessed from magnetic tape and the records with a "1" in column 1 were read to determine county, station, route, milepoint and Federal-aid system codes. The records with "3" in column 1 were read to determine the annual average daily volume of each vehicle type.

C. Four files so produced--one for each of the four most recent years of data--were downloaded to floppy disks and printouts of these files were obtained.

D. The above files were supplemented with information from other parts of the classification tape (the header records) and the RCI file. This information included rural/urban designation and number of lanes from the RCI file. In cases where this information were not available from computer with the RCI file, then the latest statewide mileage tape was used. Federal-Aid category was obtained from the classification file annually processed by KTC for the Division of Planning.

Extract for each of the above stations:

(1) Federal-Aid type of highway coded as follows:

1 Interstates
2 Federal-Aid Primary
3 Federal-Aid Urban
4 Federal-Aid Secondary
5 Non-Federal-Aid, State Maintained
6 Non-Federal-Aid, County Maintained
7 Non-Federal-Aid, City Maintained
8 Non-Federal-Aid, Maintained by Other Agencies

For codes 5-8, individual records were scanned and data supplied manually.

(2) Rural/urban designation coded as follows:

1 Rural
2 Urban and suburban

(3) Number of lanes coded as follows:

1 1, 2, or 3 lanes (considered 2 lanes)
2 4 or more lanes (considered 4 lanes)

E. HCA92.BAS was run to produce the information needed in Table C4 for the non-Interstate highways.

9. TABLE C10. DISTRIBUTION OF EQUIVALENT-SINGLE-AXLE-LOAD-MILES TRAVELED

With exception of the damage factors, ESAL'S per vehicle, Table C9 is computed based on previously supplied information. Damage factors are usually developed using the three most recent years of weight data. The mainframe program, EALCON, provides the necessary averages for Interstate and non-Interstate highways located in both rural and urban areas.

10. TABLE D1. SUMMARY OF REVENUE ATTRIBUTED TO STATE-MAINTAINED SYSTEM

The Transportation Cabinet's "Financial Report to Management for the Period of July 1, 1990 to June 30, 1991" was used to determine the revenue deposited in the state road and Federal funds and, hence, attributed to the state-maintained system. The following essential categories were used:

Revenue
- Fuel Tax
  - Heavy Vehicle Surtax
  - Normal Use
  - Normal
- Registration and License Fees
  - Cars
  - Buses
  - Motorcycles
  - Trucks
    - Kentucky
    - Apportioned
    - Vehicle Identification Cards
    - Permits
  - Other
- Miscellaneous
- Operator's License Fees
- Usage Taxes
  - Buses
  - Other Vehicles
- Road Tolls
- Other Motor Carrier Taxes
  - Weight-Distance
  - Extended-Weight Permits
- Federal Aid

Appendix B links specific revenue items identified in the "Financial Report ..." to the above categories.

In addition, Federal-aid revenue was distributed to fuel, usage (trucks and trailers), use, and other categories based on the proportion of Federal aid shown in the Financial Report and the Federal Aid Highway Trust Fund receipts from Kentucky as shown in Table FE-9 of "Highway Statistics".

11. TABLE D9. TOTAL REVENUE GENERATED

The distribution of usage tax among the vehicle classes is determined by a special analysis of the AVIS file. Results are entered manually into Table D9.

TABLE A1. GUIDELINES FOR ALLOCATION OF TOTAL KENTUCKY COSTS AND REVENUES TO STATE-MAINTAINED HIGHWAY SYSTEM[a]

Element	Method of Allocation
Cost	
Capital	
Preliminary design and engineering	Cost estimates reflect only state-maintained mileage and are adjusted to annual level of capital expenditures
Rights of way	"
Utilities	"
Grading and drainage	"
Pavements and shoulders	"
Bridges	"
Maintenance and Traffic Services	
Roads	Input to Table C1 includes only Road Fund expenditures
Structures	"
Traffic Services	"
Administration	"
Enforcement	
Motor carriers	"
Other	"
Miscellaneous	"
Revenue	
Ad valorem taxes	None
Fuel tax revenue	
Ky, heavy vehicle surtax	100 percent
Ky, normal use	74 percent (Road Fund revenue)
Ky, normal	"
Federal	100 percent
Vehicle registration and license fees	
Cars	100 percent
Buses	"
Motorcycles	"
Trucks	
Kentucky	70 percent (Road Fund revenue)
Apportioned	"
Vehicle ID Cards	100 percent
Permits	"
Other	"

TABLE A1. GUIDELINES FOR ALLOCATION OF TOTAL KENTUCKY COSTS AND REVENUES TO STATE-MAINTAINED HIGHWAY SYSTEM (CONTINUED)

Element	Method of Allocation
Miscellaneous	100 percent
Operator's license fees	Approximately 70 percent
Usage taxes	
Ky, buses	100 percent
Ky, other vehicles	"
Federal, trucks & trailers	"
Road tolls	"
Other motor carrier taxes	
Ky, weight-distance	"
Ky, extended-weight	60 percent
Federal, use	100 percent
Other Federal taxes	"

*See also Appendix B.

TABLE A2. VEHICLE CLASSES FOR COST AND REVENUE ALLOCATION

Motorcycles
Cars
Buses
Trucks (Registered Weight Class, Pounds)
6,000
10,000
14,000
18,000
22,000
26,000
32,000
38,000
44,000
55,000
59,999
62,000
73,280
80,000

TABLE A3. GUIDELINES FOR ALLOCATION OF COSTS AND REVENUES TO VEHICLE CLASSES

Element	Method of Allocation
Cost	
Capital	
Preliminary design and engineering	To all classes based on relative VMT on each specific class of state-maintained highway
Rights of way	"
Utilities	"
Grading and drainage	To all classes based on relative PCE-miles on each specific class of state-maintained highway
Pavements and shoulders	To all classes based on relative ESAL-miles on each specific class of state-maintained highway
Bridges	To all classes based on relative PCE-miles on each specific class of state-maintained highway
Maintenance & traffic services	
Roads	80 percent to all classes based on relative axle miles on state-maintained highways and 20 percent to trucks having 6 or more tires based on relative axle miles on state-maintained highways
Structures	To all classes based on relative PCE-miles on state-maintained highways
Traffic services	To all classes based on relative VMT on state-maintained highways
Administration	"
Enforcement	
Motor carrier	To trucks having 6 or more tires based on relative VMT on state-maintained highways
Other	To all classes based on relative VMT on state-maintained highways
Miscellaneous	To all classes based on relative axle miles on state-maintained highways

TABLE A3. GUIDELINES FOR ALLOCATION OF COSTS AND REVENUES TO VEHICLE CLASSES (CONTINUED)

Element	Method of Allocation
Revenue	
Fuel tax revenue	
Ky, heavy vehicle surtax	To trucks over 59,999 pounds based on revenue estimates from VMT on state-maintained system, rates of fuel consumption, and tax rates
Ky, normal use	To trucks over 26,000 pounds based on revenue estimates from VMT on state-maintained system, rates of fuel consumption, and tax rates
Kentucky, normal	To all classes based on revenue estimates from VMT on state-maintained system, rates of fuel consumption, and tax rates
Federal	"
Vehicle registration fees & license fees	
Cars	To cars, 100 percent
Buses	To buses, 100 percent
Motorcycles	To motorcycles, 100 percent
Trucks	
Kentucky	To trucks based on revenue estimates from number of registered trucks and registration fees (with separate adjustments for farm trucks, other exempt trucks, and 6,000-pound trucks) (Table D7)
Apportioned	To trucks based on number of vehicle identification cards issued
Vehicle ID cards	"
Permits	"
Other	To all classes based on relative VMT on state-maintained system
Miscellaneous	"
Operator's license fees	"

TABLE A3. GUIDELINES FOR ALLOCATION OF COSTS AND REVENUES TO VEHICLE CLASSES (CONTINUED)

Element	Method of Allocation
Usage taxes	
Ky, buses	To buses, 100 percent
Ky, other vehicles	To all classes other than buses based on analysis of AVIS file
Federal, trucks & trailers	To trucks over 33,000 pounds based on relative VMT on state-maintained system
Road tolls	To all classes based on toll collection receipts (Table D8)
Other motor carrier taxes	
Ky, weight-distance	To trucks over 59,999 pounds based on relative VMT on state-maintained system
Ky, extended-weight	To 80,000-pound trucks
Federal, use	To trucks over 54,999 pounds based on relative VMT on state-maintained system
Other Federal taxes	To all classes based on relative VMT on state-maintained system

APPENDIX B

IDENTIFICATION OF COST AND REVENUE ELEMENTS

EXPENDITURES ON STATE-MAINTAINED SYSTEM

CATEGORY	EXPENDITURE
CAPITAL	
Appalachian federal aid	12,608,377.20
Bridge replacement federal aid	36,856,798.39
Bridges	292,724.95
Compensation time leave	492,480.29
Consolidated primary federal aid	26,230,452.29
Construction engineering	1,378,989.97
Debt payment acceleration	.00
Debt service	14,098,056.00
Economic development debt svc	
Economic development lease rentals	66,299,981.00
Federal aid safer off-systems	
Federal highway beautification	
Highway planning	2,754,793.98
Highway safety federal aid	4,983,333.00
Industrial access roads	1,967,999.05
Insurance clearing	-151,285.83
Interstate federal aid	95,766,382.53
Local match for federal projects	.00
Metropolitan planning	325,071.89
Miscellaneous federal aid	6,466,228.40
Non-federal aid construction	114,492,607.22
Primary federal aid	118,111.43
Project development	430,414.60
Regular leave overlay	1,747,478.07
Research	1,703,284.13
Resource recovery lease rentals	41,764,412.44
Rural primary federal aid	.00
Rural secondary (capital share)	52,700,000.00
Rural secondary federal aid	14,843,338.48
Secondary federal aid	
Special service contracts	1,393,694.22
Specialized programs (capital share)	429,178.98
State engineering administration	1,385,732.74
State federal aid matching	.00
Toll road lease rentals	33,297,837.25
Transitional quarter federal aid	8,494.66
Urban federal aid	.00
Urban systems federal aid	6,089,099.61
Subtotal	540,774,066.94
MAINTENANCE AND TRAFFIC SERVICES	
Bridge maintenance	6,103,926.48
Central sign shop	718,837.38
Depreciation of equipment	-6,972,025.40
Energy recovery coop agreement	18,581.90
Energy recovery road fund	1,562,477.92
Equipment	27,545,300.26
Equipment rental	-28,158,828.05
Garage machinery and equipment	166,265.44
Maintenance	96,187,263.92
Maintenance emergency	49,511.60
New mn and const equipment	7,725,783.51
Purchases administration	380,656.57
Rural secondary (maintenance share)	34,800,000.00
Snow and ice reserve	.00
Specialized programs (mn share)	400,000.00

Statewide resurfacing projects	44,196,001.39
Toll road operations	6,960,707.58
Toll road 4-R	10,297,874.68
Traffic	21,444,198.11
Subtotal	223,426,533.29
ADMINISTRATION	
Accounts administration	1,572,178.06
Administration earnings	-1,181,698.49
Administrative earnings	-599,457.44
Administrative services	130,584.62
Audits administration	1,825,958.17
Automated driver licensing	
Automated services	1,511,410.93
Automated vehicle info systems	
Automation equipment	3,174,705.05
Board of claims	704,277.02
Budget administration	300,285.20
Buildings and equipment	5,906,955.00
Computer and data control svcs	8,429,127.95
Construction and service	1,994,007.21
Contract procurement	780,406.68
Dept of Fiscal Management	174,432.60
Dept of Vehicle Reg-Comm off	201,818.84
Design-location	1,749,621.62
Disposal cost of excess land	164,097.82
District administration	11,119,441.74
District overhead planning	100,322.73
DOH Commissioner's Office	111,932.45
Employee safety and health	702,149.19
Environmental analysis	107,190.81
General counsel	1,360,471.35
Lots and building maintenance	6,187,679.87
Management svcs administration	1,222,325.12
Materials	166,613.16
Minority affairs	520,630.22
New office, engr eqmt, & supply	1,496,633.41
Office of the Secretary	850,519.41
Office, engr, & supply adm	2,932,455.63
Personnel administration	826,218.43
Public relations	150,901.24
Resource recovery adm earnings	-51,722.82
Right of way	260,463.20
Rural secondary (adm share)	2,449,058.47
Specialized programs (adm share)	400,000.00
Unemployment insurance	257,002.11
Unredeemed checks	72,439.27
Utility	22,362.23
Workmen's compensation	3,301,009.61
Subtotal	61,404,807.67
ENFORCEMENT, MOTOR CARRIER	
Motor carrier safety assistance	2,317,502.16
Motor carriers	1,546,966.12
Motor vehicle dealer board	
Motor vehicle enforcement	7,321,896.47
Subtotal	11,186,364.75
ENFORCEMENT, OTHER	
Alcoholic driver education	50,000.00
Driver education	353,385.20
Driver history record-DUI	119,800.31

Driver's license	2,219,421.09
Motor vehicle licensing	2,408,861.78
Photo license	975,251.80
State police	
Traffic offender's school	519,066.48
Vehicle titling	1,608,075.61
Subtotal	8,253,862.27
EXCLUDED EXPENDITURES (NON-USER OR OFF-SYSTEM)	
ADD districts fin assistance	283,217.20
County road aid	63,651,460.29
Economic development road-AA hwy	4,896,431.18
Fed veh regulation reimbursement	-1,832,040.00
Federal engr reimbursement	-551,187.53
Federal highway reimbursement	-175,048,437.39
Federal planning reimbursement	-2,665,436.32
Federal research reimbursement	-537,676.88
Investment purchases over sales	
Mass transportation	161,710.96
Motor pool depreciation	-2,218,450.33
Motor pool equip rental	-2,034,907.12
Motor pool operations	5,276,418.16
Municipal aid	26,691,444.97
Other economic development	1,750,721.21
Pay prior year disbursements	13,212,162.72
Purchases - motor pool	3,193,821.59
Resource recovery-KY 80	3,825.67
Resource recovery-RR27	22,411,860.80
Resource recovery-Series A	18,012,511.17
Transportation center	190,000.00
Subtotal	-25,152,549.65

REVENUE ATTRIBUTED TO STATE-MAINTAINED SYSTEM

("SOURCE" references the item number in an unpublished tabulation of highway revenue sources, Kentucky Transportation Cabinet)

CATEGORY	REVENUE	SOURCE
FUEL, KENTUCKY, HEAVY VEHICLE		
Heavy vehicle fuel surtax	5,528,098.22	5
Subtotal	5,528,098.22	
FUEL, KENTUCKY, NORMAL USE		
Motor fuels normal use 22.2%	3,730,416.33	3-4
Motor fuels normal use 51.8%	8,704,304.79	3-4
Subtotal	12,434,721.12	
FUEL, KENTUCKY, NORMAL		
Motor fuels normal 22.2%	72,697,781.54	1-2
Motor fuels normal 51.8%	169,628,156.93	1-2
Subtotal	242,325,938.47	
VEHICLE REGISTRATION AND LICENSE FEES, BUSES		
Bus certificates and permits	2,050.00	19
Bus-except city & surburban	29,565.86	13
City and suburban bus		14
Subtotal	31,615.86	
VEHICLE REGISTRATION AND LICENSE FEES, CARS		
Amateur radio plates	1,362.00	62
Army reserve license plates	5,040.84	66
Civic event license plates	1,085.00	70
Civil air patrol license	606.50	60
Collegiate license plates	16,352.00	69
Contract taxicab permits	6,351.00	21
Dealer demonstrator tags	6,681.26	51
DES license plates	5,156.34	58
General Assembly license plates	425.00	63
Historic vehicle license	17,688.12	50
Judicial license plates	175.00	64
National Guard license plates	5,756.80	59
Passenger car license	22,528,561.50	42,54-55
Pearl Harbor survivor plates	75.00	67
Personalized license plates	344,173.70	56,61
POW license plates	613.44	53
Purple heart recipient plates		68
Taxi license	15,306.75	15
Volunteer fireman license plates	24,714.75	57
Subtotal	22,980,125.00	
VEHICLE REGISTRATION AND LICENSE FEES, MOTORCYCLES		
Motorcycle license	161,322.43	43
Subtotal	161,322.43	
VEHICLE REGISTRATION AND LICENSE FEES, KENTUCKY TRUCKS		
Coal truck special tags		
Truck license (70%)	16,491,855.56	44-49
Subtotal	16,491,855.56	
VEHICLE REGISTRATION AND LICENSE FEES, APPORTIONED TRUCKS		
Proportionate trk registration (70%)	15,900,787.82	71
Subtotal	15,900,787.82	

VEHICLE REGISTRATION AND LICENSE FEES, TRUCK ID CARDS		
Motor carrier ID cards	6,895,824.10	23
Subtotal	6,895,824.10	
VEHICLE REGISTRATION AND LICENSE FEES, TRUCK PERMITS		
Hazardous radioactive permits	17,350.00	34
Highway special permits	6,453,600.00	27-32
Industrial hauling permits	5,680.00	33
Non-reciprocal permits	283,875.00	24
Truck permits	403,671.88	20
Truck trip permits	569,355.00	10
U-Drive-It permits	15,500.00	22
Subtotal	7,749,031.88	
VEHICLE REGISTRATION AND LICENSE FEES, OTHER		
County clerks penalty	218,006.71	80
Dealer license	252,132.68	52
Drive away & utility trailer	14,265.00	25-26
Motor vehicle title receipts	2,397,009.62	75
Temporary tags	303,168.50	76
Trailer license	898,450.96	79
Transfer motor license	534,589.83	78
U-Drive-It license	313,035.49	16
Subtotal	4,930,658.79	
MISCELLANEOUS		
Highway miscellaneous receipts	167,150.84	109
Interest earned on investments	27,564,654.40	106
Logo receipts	749,600.00	99
Miscellaneous rentals	271,050.69	102
Motor Vehicle Commission receipts	619,202.20	137
Overnight time deposits	4,964,295.00	107
Property damage	524,313.70	108
Proposal sales	73,436.75	100
Record copy sales	1,441.40	105
Refund of prior year disbursements	1,564,810.34	131
Sales of excess land	475,671.32	133
Salvage sale of old equipment	100,462.06	132
Specification and blue print	148,136.56	101
State and other agency aid	2,463,016.77	121
Temporary mobile home permits	4,704.00	77
Treasurer's unredeemed checks	88,138.75	128
Unredeemed imprest checks	1,085.85	129
Subtotal	39,781,170.63	
OPERATOR'S LICENSE FEES		
Alcoholic driver education		90
Driver's lic-driver education	337,693.25	83
Driver's lic. photograph	960,101.55	84
Motor vehicle operator's license	3,402,708.50	82,86-89
Operator's license reinstatement	201,760.02	94
Traffic offender school	824,115.91	81
Subtotal	5,726,379.23	
USAGE TAXES, KENTUCKY BUSES		
Usage tax on buses	39,148.68	
Subtotal	39,148.68	
USAGE TAXES, OTHER KENTUCKY VEHICLES		
Historical vehicle usage	.00	40
Motor vehicle rental usage	7,295,793.59	

Motor vehicle usage	205,055,083.87	38
U-Drive-It penalty & int	43,202.08	40
Subtotal	212,394,079.54	
ROAD TOLLS		
Audubon Parkway	988,017.41	111
Blue Grass Parkway	2,543,030.70	111
Cumberland Parkway	2,937,783.09	111
Daniel Boone Parkway	2,548,024.00	111
Green River Parkway	2,993,055.39	111
Jackson Purchase Parkway	1,963,840.63	111
Pennyrile Parkway	3,692,588.98	
Subtotal	17,666,340.20	
OTHER MOTOR CARRIER TAXES, KENTUCKY WEIGHT-DISTANCE		
Weight distance & use tax int	1,540,459.15	11
Weight distance surtax	17,085,022.25	7
Weight distance tax	42,420,626.90	6
Subtotal	61,046,108.30	
OTHER MOTOR CARRIER TAXES, KENTUCKY EXTENDED-WEIGHT		
Coal haul co-op agreement	.00	35
Coal road recovery fines (60%)	25,203.00	37
Overweight coal truck decal (60%)	585,825.98	36
Subtotal	611,028.98	
FEDERAL AID		
Federal Aid Motor Carrier Safety	1,832,040.00	
FHWA Aid	178,808,738.12	
Subtotal	180,640,778.12	
EXCLUDED REVENUE (NON-USER OR OFF-SYSTEM FUNDS)		
Alcohol producers license		9
Cold check clearing	.00	110
Driver history record fees	4,364,324.78	92
DUI service fees	137,265.26	97
Economic development	6,713,748.58	
Fines and forfeitures	14,033.66	103
Highway loss claims	4,761.30	127
Junk yard license	7,226.58	98
Medical alert stickers	2,876.00	96
Motor fuels normal use 18.3%	3,075,072.94	3-4
Motor fuels normal use 7.7%	1,293,883.14	3-4
Motor fuels normal 18.3%	59,926,549.65	1-2
Motor fuels normal 7.7%	25,214,996.31	1-2
Motor pool receipts	4,381,616.34	104
MV license computer service	232,145.57	81
Off system road aid	563,616.44	122
Operating transfers - in		
Operator's license name sales	19,840.36	93
Resource recovery	31,808,446.90	126
Sales and use tax	3,354,104.69	8
Transfer from Energy Cabinet	1,823.03	
Subtotal	141,116,331.53	

APPENDIX C

FY 1991 COST ALLOCATION TABLES

TABLE C1. SUMMARY OF EXPENDITURES ON STATE-MAINTAINED SYSTEM

ACTIVITY	EXPENDITURE (THOUSAND DOLLARS)	
CAPITAL		540,774
MAINTENANCE AND TRAFFIC SERVICES		
ROADS	164,489	
STRUCTURES	11,685	
TRAFFIC SERVICES	47,252	
SUBTOTAL		223,426
ADMINISTRATION		61,405
ENFORCEMENT		
MOTOR CARRIERS	11,186	
OTHER ENFORCEMENT	8,254	
SUBTOTAL		19,440
MISCELLANEOUS		0
TOTAL		845,045

TABLE C2. HIGHWAY SYSTEM MILEAGE AND VEHICLE-MILES TRAVELED

HIGHWAY CLASSIFICATION	RURAL OR URBAN	NUMBER OF LANES	MILEAGE	VEHICLE-MILES TRAVELED (THOUSANDS)	ANNUAL AVERAGE DAILY TRAFFIC
INTERSTATE	RURAL	4	548.57	4,094,664	20,450
		6	30.72	450,239	40,154
	URBAN	4	107.05	1,540,815	39,434
		6	76.29	1,694,002	60,835
FEDERAL-AID PRIMARY	RURAL	2	2,477.47	3,634,287	4,019
		4	840.01	2,176,579	7,099
	URBAN	2	178.75	632,672	9,697
		4	296.77	2,155,913	19,903
FEDERAL-AID URBAN	URBAN	2	1,798.22	4,079,489	6,215
		4	225.49	1,440,079	17,497
FEDERAL-AID SECONDARY	RURAL	2	7,185.68	4,772,769	1,820
		4	43.02	108,088	6,884
NON-FEDERAL AID STATE MAINTAINED	RURAL	2	14,227.41	3,351,468	645
		4	4.80	6,207	3,543
	URBAN	2	130.47	156,820	3,293
		4	.95	1,647	4,750
NON-FEDERAL AID COUNTY MAINTAINED	RURAL	2	35,003.25	1,916,428	150
	URBAN	2	1,447.20	264,114	500
NON-FEDERAL AID CITY MAINTAINED	RURAL	2	1,774.55	97,157	150
	URBAN	2	3,281.02	898,179	750
NON-FEDERAL AID OTHER AGENCIES	RURAL	2	354.88	84,180	650
	URBAN	2	173.70	81,144	1,280
STATE-MAINTAINED SYSTEM			28,171.67	30,295,738	2,946
TOTAL STATEWIDE			70,206.27	33,636,940	1,313

TABLE C3. MILEAGE AND VEHICLE-MILES TRAVELED ON STATE-MAINTAINED HIGHWAY SYSTEM AS A FUNCTION OF TERRAIN/LAND USE

HIGHWAY CLASSIFICATION	RURAL OR URBAN	NUMBER OF LANES	TERRAIN/LAND USE CLASS	TERRAIN/LAND USE PERCENT	MILEAGE	VEHICLE-MILES TRAVELED (THOUSANDS)
INTERSTATE	RURAL	4	FLAT	25.40	139.34	1,040,045
			ROLLING	54.30	297.87	2,223,402
			MOUNTAIN	20.30	111.36	831,217
		6	FLAT	7.56	2.32	34,038
			ROLLING	92.44	28.40	416,201
			MOUNTAIN	.00	.00	0
	URBAN	4	CBD	2.17	2.32	33,436
			OUTLYING	97.83	104.73	1,507,379
		6	CBD	10.23	7.80	173,296
			OUTLYING	89.77	68.49	1,520,706
FEDERAL-AID PRIMARY	RURAL	2	FLAT	16.45	407.54	597,840
			ROLLING	52.13	1,291.51	1,894,554
			MOUNTAIN	31.42	778.42	1,141,893
		4	FLAT	20.48	172.03	445,763
			ROLLING	61.34	515.26	1,335,114
			MOUNTAIN	18.18	152.71	395,702
	URBAN	2	CBD	13.04	23.31	82,500
			OUTLYING	86.96	155.44	550,172
		4	CBD	23.90	70.93	515,263
			OUTLYING	76.10	225.84	1,640,650
FEDERAL-AID URBAN	URBAN	2	CBD	13.35	240.06	544,612
			OUTLYING	86.65	1,558.16	3,534,877
		4	CBD	32.22	72.65	463,993
			OUTLYING	67.78	152.84	976,086
FEDERAL-AID SECONDARY	RURAL	2	FLAT	15.00	1,077.85	715,915
			ROLLING	56.18	4,036.92	2,681,342
			MOUNTAIN	28.82	2,070.91	1,375,512
		4	FLAT	30.50	13.12	32,967
			ROLLING	59.49	25.59	64,302
			MOUNTAIN	10.01	4.31	10,820
NON-FEDERAL AID STATE MAINTAINED	RURAL	2	FLAT	18.99	2,701.79	636,444
			ROLLING	56.72	8,069.79	1,900,953
			MOUNTAIN	24.29	3,455.84	814,072
		4	FLAT	.00	.00	0
			ROLLING	68.43	3.28	4,247
			MOUNTAIN	31.57	1.52	1,960
	URBAN	2	CBD	19.50	25.44	30,580
			OUTLYING	80.50	105.03	126,240
		4	CBD	.00	.00	0
			OUTLYING	100.00	.95	1,647
STATE-MAINTAINED SYSTEM					28,171.67	30,295,738

TABLE C4. PERCENT OF TRAFFIC STREAM BY VEHICLE TYPE

HIGHWAY CLASSIFICATION	RURAL OR URBAN	NUMBER OF LANES	MOTOR-CYCLES	CARS	BUSES	SINGLE-UNIT TRUCKS				SINGLE TRAILER			MULTIPLE TRAILERS			TOTAL
						2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE	4 OR MORE AXLES	4 OR LESS AXLES	5-AXLE	6 OR MORE AXLES	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES	
INTERSTATE	RURAL	4	.21	52.91	.24	18.31	3.21	.65	.23	1.52	21.26	.23	1.09	.14	.01	100.00
		6	.09	47.45	.31	21.57	3.77	.60	.10	.85	23.68	.21	1.28	.08	.00	100.00
	URBAN	4	.20	64.59	.28	21.32	2.73	.59	.21	.84	8.67	.11	.37	.06	.01	100.00
		6	.24	66.85	.26	20.54	2.79	.60	.23	.50	7.55	.11	.26	.06	.00	100.00
FEDERAL-AID PRIMARY	RURAL	2	.18	59.39	.30	30.49	3.21	1.05	.25	.42	4.01	.67	.02	.01	.00	100.00
		4	.21	58.43	.26	26.51	3.27	.95	.31	.70	8.27	.88	.15	.05	.01	100.00
	URBAN	2	.19	67.73	.68	26.37	2.66	.42	.10	.31	1.43	.09	.02	.00	.00	100.00
		4	.23	70.88	.42	23.25	2.13	.44	.10	.40	2.03	.04	.06	.01	.01	100.00
FEDERAL-AID URBAN	URBAN	2	.31	72.14	.50	23.97	1.82	.40	.15	.19	.48	.02	.01	.00	.01	100.00
		4	.23	74.24	.35	21.73	1.84	.43	.23	.23	.70	.02	.00	.00	.00	100.00
FEDERAL-AID SECONDARY	RURAL	2	.26	57.69	.37	33.95	3.10	1.17	.39	.41	2.18	.47	.01	.00	.00	100.00
		4	.14	56.19	.21	34.46	2.61	.40	.04	.21	5.54	.20	.00	.00	.00	100.00
NON-FEDERAL AID STATE MAINTAINED	RURAL	2	.41	57.82	.49	35.32	2.53	1.02	.25	.34	1.48	.32	.01	.00	.01	100.00
		4	.41	57.82	.49	35.32	2.53	1.02	.25	.34	1.48	.32	.01	.00	.01	100.00
	URBAN	2	.11	70.10	.97	26.12	2.15	.01	.46	.01	.07	.00	.00	.00	.00	100.00
		4	.11	70.10	.97	26.12	2.15	.01	.46	.01	.07	.00	.00	.00	.00	100.00
NON-FEDERAL AID COUNTY MAINTAINED	RURAL	2	.36	58.66	.18	37.34	3.10	.30	.06	.00	.00	.00	.00	.00	.00	100.00
	URBAN	2	.26	72.98	.54	24.21	1.42	.20	.05	.23	.08	.03	.00	.00	.00	100.00
NON-FEDERAL AID CITY MAINTAINED	RURAL	2	.36	58.66	.18	37.34	3.10	.30	.06	.00	.00	.00	.00	.00	.00	100.00
	URBAN	2	.26	72.98	.54	24.21	1.42	.20	.05	.23	.08	.03	.00	.00	.00	100.00
NON-FEDERAL AID OTHER AGENCIES	RURAL	2	.31	63.16	.48	30.61	2.56	1.39	.18	.24	.99	.07	.01	.00	.00	100.00
	URBAN	2	.02	69.37	.56	24.95	2.68	.52	.11	.51	.99	.23	.05	.00	.01	100.00

TABLE C5. DISTRIBUTION OF VEHICLE-MILES TRAVELED (THOUSANDS)

HIGHWAY CLASSIFICATION	RURAL OR URBAN	NUMBER OF LANES	MOTOR-CYCLES	CARS	BUSES	SINGLE-UNIT TRUCKS				SINGLE TRAILER			MULTIPLE TRAILERS			TOTAL
						2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE	4 OR MORE AXLES	4 OR LESS AXLES	5-AXLE	6 OR MORE AXLES	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES	
INTERSTATE	RURAL	4	8,693	2,166,429	9,656	749,745	131,238	26,435	9,611	62,161	870,444	9,331	44,763	5,652	517	4,094,664
		6	389	213,634	1,376	97,131	16,978	2,721	472	3,835	106,621	958	5,767	352	4	450,239
	URBAN	4	3,124	995,238	4,238	328,566	42,090	9,165	3,193	12,985	133,661	1,736	5,763	930	125	1,540,815
		6	4,124	1,132,380	4,399	347,868	47,297	10,187	3,877	8,534	127,948	1,907	4,488	932	65	1,694,002
FEDERAL-AID PRIMARY	RURAL	2	6,542	2,158,403	10,903	1,108,094	116,661	38,160	9,086	15,264	145,735	24,350	727	363	0	3,634,287
		4	4,571	1,271,775	5,659	577,011	71,174	20,678	6,747	15,236	180,003	19,154	3,265	1,088	218	2,176,579
	URBAN	2	1,202	428,509	4,302	166,836	16,829	2,657	633	1,961	9,047	569	127	0	0	632,672
		4	4,959	1,528,111	9,055	501,250	45,921	9,486	2,156	8,624	43,765	862	1,294	216	216	2,155,913
FEDERAL-AID URBAN	URBAN	2	12,646	2,942,943	20,397	977,854	74,247	16,318	6,119	7,751	19,582	816	408	0	408	4,079,489
		4	3,312	1,069,115	5,040	312,929	26,497	6,192	3,312	3,312	10,081	288	0	0	0	1,440,079
FEDERAL-AID SECONDARY	RURAL	2	12,409	2,753,410	17,659	1,620,355	147,956	55,841	18,614	19,568	104,046	22,432	477	0	0	4,772,769
		4	151	60,735	227	37,247	2,821	432	43	227	5,988	216	0	0	0	108,088
NON-FEDERAL AID STATE MAINTAINED	RURAL	2	13,741	1,937,819	16,422	1,183,738	84,792	34,185	8,379	11,395	49,602	10,725	335	0	335	3,351,468
		4	25	3,589	30	2,192	157	63	16	21	92	20	1	0	1	6,207
	URBAN	2	173	109,931	1,521	40,961	3,372	16	721	16	110	0	0	0	0	156,820
		4	2	1,155	16	430	35	0	8	0	1	0	0	0	0	1,647
NON-FEDERAL AID COUNTY MAINTAINED	RURAL	2	6,899	1,124,177	3,450	715,594	59,409	5,749	1,150	0	0	0	0	0	0	1,916,428
	URBAN	2	697	192,740	1,416	63,942	3,750	539	137	602	217	85	0	0	0	264,114
NON-FEDERAL AID CITY MAINTAINED	RURAL	2	350	56,992	175	36,278	3,012	291	58	0	0	0	0	0	0	97,157
	URBAN	2	2,371	655,455	4,814	217,449	12,754	1,832	467	2,048	737	287	0	0	0	898,179
NON-FEDERAL AID OTHER AGENCIES	RURAL	2	261	53,168	404	25,767	2,155	1,170	152	202	833	59	8	0	0	84,180
	URBAN	2	16	56,290	454	20,245	2,175	422	89	414	803	187	41	0	8	81,144
STATE-MAINTAINED SYSTEM			76,064	18,773,176	110,902	8,052,209	828,065	232,536	72,986	170,889	1,806,725	93,363	67,413	9,534	1,888	30,295,738
TOTAL STATEWIDE			86,659	20,911,998	121,615	9,131,486	911,320	242,540	75,039	174,155	1,809,315	93,980	67,462	9,534	1,896	33,636,940
STATE-MAINTAINED AVERAGE (%)			.25	61.97	.37	26.58	2.73	.77	.24	.56	5.96	.31	.22	.03	.01	100.00
STATEWIDE AVERAGE (%)			.26	62.17	.36	27.15	2.71	.72	.22	.52	5.38	.28	.20	.03	.01	100.00

TABLE C6. DISTRIBUTION OF AXLE-MILES TRAVELED (THOUSANDS)

HIGHWAY CLASSIFICATION	RURAL OR URBAN	NUMBER OF LANES	MOTOR-CYCLES	CARS	BUSES	SINGLE-UNIT TRUCKS			SINGLE TRAILER			MULTIPLE TRAILERS				TOTAL
						2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE	4 OR MORE AXLES	4 OR LESS AXLES	5-AXLE	6 OR MORE AXLES	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES	
INTERSTATE	RURAL	4	17,387	4,332,858	19,311	1,499,490	262,476	79,304	38,444	248,644	4,352,218	55,983	223,814	33,914	3,620	11,167,465
		6	778	427,268	2,752	194,263	33,955	8,163	1,889	15,339	533,105	5,748	28,833	2,114	30	1,254,238
	URBAN	4	6,249	1,990,477	8,476	657,133	84,181	27,494	12,771	51,938	668,305	10,413	28,816	5,580	873	3,552,706
		6	8,248	2,264,759	8,798	695,737	94,593	30,560	15,506	34,134	639,740	11,440	22,439	5,590	453	3,831,997
FEDERAL-AID PRIMARY	RURAL	2	13,083	4,316,807	21,806	2,216,188	233,321	114,480	36,343	61,056	728,675	146,098	3,634	2,181	0	7,893,672
		4	9,142	2,543,551	11,318	1,154,022	142,348	62,033	26,990	60,944	900,016	114,923	16,324	6,530	1,524	5,049,664
	URBAN	2	2,404	857,017	8,604	333,671	33,658	7,972	2,531	7,845	45,236	3,416	633	0	0	1,302,988
		4	9,917	3,056,222	18,110	1,002,500	91,842	28,458	8,624	34,495	218,825	5,174	6,468	1,294	1,509	4,483,437
FEDERAL-AID URBAN	URBAN	2	25,293	5,885,887	40,795	1,955,707	148,493	48,954	24,477	31,004	97,908	4,895	2,040	0	2,856	8,268,308
		4	6,624	2,138,229	10,081	625,858	52,995	18,577	13,249	13,249	50,403	1,728	0	0	0	2,930,993
FEDERAL-AID SECONDARY	RURAL	2	24,818	5,506,821	35,318	3,240,710	295,912	167,524	74,455	78,273	520,232	134,592	2,386	0	0	10,081,043
		4	303	121,469	454	74,494	5,642	1,297	173	908	29,940	1,297	0	0	0	235,978
NON-FEDERAL AID STATE MAINTAINED	RURAL	2	27,482	3,875,638	32,844	2,367,477	169,584	102,555	33,515	45,580	248,009	64,348	1,676	0	2,346	6,971,053
		4	51	7,178	61	4,385	314	190	62	84	459	119	3	0	4	12,911
	URBAN	2	345	219,862	3,042	81,923	6,743	47	2,885	63	549	0	0	0	0	315,459
		4	4	2,309	32	860	71	0	30	1	6	0	0	0	0	3,313
NON-FEDERAL AID COUNTY MAINTAINED	RURAL	2	13,798	2,248,353	6,899	1,431,188	118,819	17,248	4,599	0	0	0	0	0	0	3,840,905
	URBAN	2	1,395	385,480	2,831	127,884	7,501	1,616	549	2,409	1,083	507	0	0	0	531,255
NON-FEDERAL AID CITY MAINTAINED	RURAL	2	700	113,985	350	72,557	6,024	874	233	0	0	0	0	0	0	194,722
	URBAN	2	4,742	1,310,910	9,628	434,898	25,508	5,497	1,868	8,191	3,683	1,725	0	0	0	1,806,651
NON-FEDERAL AID OTHER AGENCIES	RURAL	2	522	106,336	808	51,535	4,310	3,510	606	808	4,167	354	42	0	0	172,998
	URBAN	2	32	112,579	909	40,491	4,349	1,266	357	1,655	4,017	1,120	203	0	57	167,035
STATE-MAINTAINED SYSTEM			152,128	37,546,352	221,803	16,104,419	1,656,129	697,608	291,943	683,558	9,033,625	560,177	337,067	57,202	13,214	67,355,224
TOTAL STATEWIDE			173,317	41,823,995	243,229	18,262,972	1,822,640	727,619	300,156	696,622	9,046,574	563,881	337,312	57,202	13,271	74,068,791
STATE-MAINTAINED (%)			.23	55.74	.33	23.91	2.46	1.04	.43	1.01	13.41	.83	.50	.08	.02	100.00
STATEWIDE AVERAGE (%)			.26	62.17	.36	27.15	2.71	.72	.22	.52	5.38	.28	.20	.03	.01	100.00

TABLE C7. PASSENGER CAR EQUIVALENTS AS A FUNCTION OF REGISTERED WEIGHT

REGISTERED WEIGHT (LBS)	FLAT	ROLLING	MTN
6,000	1.00	1.00	1.00
10,000	1.05	1.15	1.40
14,000	1.10	1.30	1.80
18,000	1.15	1.50	2.20
22,000	1.20	1.65	2.50
26,000	1.25	1.80	2.80
32,000	1.35	2.05	3.40
38,000	1.40	2.30	3.95
44,000	1.50	2.50	4.50
55,000	1.65	2.95	5.50
59,999	1.70	3.15	5.95
62,000	1.75	3.25	6.15
73,280	1.90	3.70	7.20
80,000	2.00	4.00	8.00

TABLE C8. PASSENGER CAR EQUIVALENTS AS A FUNCTION OF VEHICLE TYPE

				SINGLE-UNIT TRUCKS				SINGLE TRAILER			MULTIPLE TRAILERS		
TERRAIN	MOTOR-CYCLES	CARS	BUSES	2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE	4 OR MORE AXLES	4 OR LESS AXLES	5-AXLE	6 OR MORE AXLES	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES
FLAT	.50	1.00	1.50	1.00	1.28	1.64	1.80	1.80	1.87	1.98	1.92	2.00	2.00
ROLLING	.50	1.00	1.50	1.00	1.88	2.94	3.40	3.42	3.66	3.96	3.75	4.00	4.00
MOUNTAINOUS	.50	1.00	1.50	1.00	3.03	5.50	6.53	6.61	7.03	7.89	7.41	8.00	8.00

TABLE C9. DISTRIBUTION OF PASSENGER-CAR-EQUIVALENT-MILES TRAVELED (THOUSANDS)

						SINGLE-UNIT TRUCKS				SINGLE TRAILER			MULTIPLE TRAILERS			
HIGHWAY CLASSIFICATION	RURAL OR URBAN	NUMBER OF LANES	MOTOR-CYCLES	CARS	BUSES	2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE	4 OR MORE AXLES	4 OR LESS AXLES	5-AXLE	6 OR MORE AXLES	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES	TOTAL
INTERSTATE	RURAL	4	4,347	2,166,429	14,483	749,745	257,641	82,776	34,889	227,323	3,388,192	39,691	180,341	24,327	2,226	7,172,410
		6	195	213,634	2,064	97,131	31,161	7,740	1,549	12,644	376,211	3,646	20,845	1,356	16	768,193
	URBAN	4	1,562	995,238	6,357	328,566	54,006	15,072	5,741	23,424	250,023	3,445	11,049	1,860	249	1,696,594
		6	2,062	1,132,380	6,599	347,868	60,686	16,753	6,971	15,395	239,336	3,784	8,603	1,863	129	1,842,430
FEDERAL-AID PRIMARY	RURAL	2	3,271	2,158,403	16,354	1,108,094	250,236	134,760	37,451	63,446	645,266	118,536	3,343	1,791	0	4,540,951
		4	2,285	1,271,775	8,489	577,011	140,077	64,949	24,578	55,898	703,686	81,738	13,196	4,699	940	2,949,320
	URBAN	2	601	428,509	6,453	166,836	21,593	4,370	1,138	3,538	16,923	1,130	243	0	0	651,334
		4	2,479	1,528,111	13,582	501,250	58,921	15,601	3,877	15,557	81,866	1,712	2,480	431	431	2,226,298
FEDERAL-AID URBAN	URBAN	2	6,323	2,942,943	30,596	977,854	95,266	26,837	11,004	13,983	36,629	1,619	782	0	816	4,144,651
		4	1,656	1,069,115	7,560	312,929	33,999	10,184	5,956	5,975	18,856	572	0	0	0	1,466,802
FEDERAL-AID SECONDARY	RURAL	2	6,205	2,753,410	26,489	1,620,355	314,205	194,545	75,641	80,171	454,274	107,545	2,163	0	0	5,635,003
		4	76	60,735	340	37,247	5,117	1,212	139	737	20,685	810	0	0	0	127,098
NON-FEDERAL AID STATE MAINTAINED	RURAL	2	6,871	1,937,819	24,633	1,183,738	173,613	113,372	32,324	44,303	205,445	48,661	1,439	0	1,539	3,773,755
		4	13	3,589	46	2,192	353	237	68	93	434	103	3	0	3	7,135
	URBAN	2	86	109,931	2,282	40,961	4,326	26	1,297	28	205	0	0	0	0	159,143
		4	1	1,155	24	430	45	0	14	0	2	0	0	0	0	1,671
STATE-MAINTAINED SYSTEM			38,032	18,773,176	166,353	8,052,209	1,501,244	688,433	242,636	562,515	6,438,034	412,995	244,486	36,328	6,350	37,162,790
STATE-MAINTAINED (%)			.10	50.52	.45	21.67	4.04	1.85	.65	1.51	17.32	1.11	.66	.10	.02	100.00

TABLE C10. DISTRIBUTION OF EQUIVALENT-SINGLE-AXLE-LOAD-MILES TRAVELED (THOUSANDS)

HIGHWAY CLASSIFICATION	RURAL OR URBAN	NUMBER OF LANES	MOTOR-CYCLES	CARS	BUSES	SINGLE-UNIT TRUCKS				SINGLE TRAILER			MULTIPLE TRAILERS			TOTAL
						2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE	4 OR MORE AXLES	4 OR LESS AXLES	5-AXLE	6 OR MORE AXLES	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES	
INTERSTATE	RURAL	4	0	6,499	4,222	4,498	33,269	12,126	13,611	30,732	611,661	8,219	60,721	5,515	590	791,664
		6	0	641	602	583	4,304	1,248	669	1,896	74,923	844	7,823	344	5	93,880
	URBAN	4	0	2,986	1,963	1,971	10,662	6,202	4,767	7,142	80,905	1,385	6,090	693	108	124,873
		6	0	3,397	2,038	2,087	11,980	6,893	5,788	4,693	77,447	1,521	4,742	694	56	121,338
FEDERAL-AID PRIMARY	RURAL	2	0	6,475	7,316	6,649	43,433	67,917	21,978	78,889	225,685	61,622	806	574	0	521,344
		4	0	3,815	3,797	3,462	26,498	36,802	16,322	78,745	278,753	48,473	3,621	1,719	400	502,407
	URBAN	2	0	1,286	3,353	1,001	5,639	2,359	1,460	1,073	7,421	731	214	0	0	24,537
		4	0	4,584	7,057	3,007	15,388	8,422	4,976	4,718	35,896	1,107	2,185	367	429	88,137
FEDERAL-AID URBAN	URBAN	2	0	8,829	15,898	5,867	24,880	14,487	14,123	4,241	16,061	1,048	689	0	812	106,934
		4	0	3,207	3,928	1,878	8,879	5,498	7,645	1,812	8,268	370	0	0	0	41,485
FEDERAL-AID SECONDARY	RURAL	2	0	8,260	11,849	9,722	55,084	99,387	45,027	101,135	161,126	56,769	529	0	0	548,888
		4	0	182	152	223	1,050	770	105	1,173	9,273	547	0	0	0	13,476
NON-FEDERAL AID STATE MAINTAINED	RURAL	2	0	5,813	11,019	7,102	31,568	60,842	20,268	58,893	76,813	27,141	372	0	617	300,449
		4	0	11	20	13	58	113	38	109	142	50	1	0	1	556
	URBAN	2	0	330	1,186	246	1,130	14	1,665	9	90	0	0	0	0	4,668
		4	0	3	12	3	12	0	17	0	1	0	0	0	0	49
STATE-MAINTAINED SYSTEM			0	56,320	74,414	48,313	273,835	323,078	158,458	375,259	1,664,464	209,827	87,793	9,906	3,018	3,284,685
STATE-MAINTAINED (%)			.00	1.71	2.27	1.47	8.34	9.84	4.82	11.42	50.67	6.39	2.67	.30	.09	100.00

INTERSTATE RURAL (ESAL/VEH)	.0000	.0030	.4373	.0060	.2535	.4587	1.4162	.4944	.7027	.8809	1.3565	.9758	1.1400
INTERSTATE URBAN (ESAL/VEH)	.0000	.0030	.4632	.0060	.2533	.6767	1.4930	.5500	.6053	.7978	1.0567	.7454	.8700
NON-INTERSTATE RURAL (ESAL/VEH)	.0000	.0030	.6710	.0060	.3723	1.7798	2.4190	5.1683	1.5486	2.5307	1.1092	1.5792	1.8400
NON-INTERSTATE URBAN (ESAL/VEH)	.0000	.0030	.7794	.0060	.3351	.8878	2.3080	.5471	.8202	1.2841	1.6889	1.7012	1.9900

TABLE C11. UNIT HIGHWAY CONSTRUCTION/PURCHASE COSTS

HIGHWAY CLASSIFICATION	RURAL OR URBAN	NUMBER OF LANES	TERRAIN/ LAND USE CLASS	UNIT COST PER MILE (THOUSANDS OF DOLLARS) PRELIMINARY DESIGN & ENGR.	RIGHT-OF-WAY	UTILITIES	GRADE & DRAIN	PAVEMENT & SHOULDER	BRIDGE	TOTAL
INTERSTATE	RURAL	4	FLAT	156	208	52	1,351	1,143	847	3,756
			ROLLING	156	416	104	1,766	1,143	847	4,431
			MOUNTAINOUS	208	520	208	3,221	1,247	847	6,250
		6	FLAT	161	260	57	1,662	1,455	847	4,442
			ROLLING	161	468	114	2,078	1,455	847	5,122
			MOUNTAINOUS	260	571	229	3,844	1,662	847	7,413
	URBAN	4	CBD	623	4,468	520	9,039	3,013	4,268	21,931
			OUTLYING	468	3,221	364	6,754	2,598	4,268	17,671
		6	CBD	1,559	22,339	831	22,339	7,793	4,268	59,127
			OUTLYING	520	3,637	520	18,702	6,234	4,268	33,880
FEDERAL-AID PRIMARY	RURAL	2	FLAT	104	748	42	935	727	361	2,916
			ROLLING	104	156	83	1,247	727	361	2,678
			MOUNTAINOUS	125	218	125	1,870	935	361	3,633
		4	FLAT	135	187	52	1,143	1,039	361	2,916
			ROLLING	135	364	104	1,559	1,039	361	3,561
			MOUNTAINOUS	182	468	208	2,857	1,143	361	5,218
	URBAN	2	CBD	312	2,805	312	5,195	2,078	606	11,307
			OUTLYING	260	1,870	156	4,156	1,714	606	8,762
		4	CBD	520	4,156	623	7,793	2,805	606	16,502
			OUTLYING	416	3,013	364	6,234	2,442	606	13,074
FEDERAL-AID URBAN	URBAN	2	CBD	312	2,805	312	5,195	2,078	152	10,853
			OUTLYING	260	1,870	156	4,156	1,714	152	8,308
		4	CBD	520	4,156	623	7,793	2,805	152	16,048
			OUTLYING	416	3,013	364	6,234	2,442	152	12,620
FEDERAL-AID SECONDARY	RURAL	2	FLAT	88	104	42	831	571	113	1,750
			ROLLING	88	125	83	1,143	571	113	2,124
			MOUNTAINOUS	104	260	125	2,078	623	113	3,303
		4	FLAT	135	187	52	1,143	1,039	113	2,669
			ROLLING	187	364	104	1,559	1,039	113	3,365
			MOUNTAINOUS	182	436	208	2,701	1,143	113	4,784
NON-FEDERAL AID STATE MAINTAINED	RURAL	2	FLAT	73	83	42	727	520	56	1,500
			ROLLING	73	104	83	1,039	520	56	1,874
			MOUNTAINOUS	88	208	125	1,870	592	56	2,939
		4	FLAT	104	166	52	935	935	56	2,248
			ROLLING	104	312	104	1,351	935	56	2,861
			MOUNTAINOUS	156	390	208	2,338	1,039	56	4,186
	URBAN	2	CBD	312	2,909	260	4,676	2,078	203	10,437
			OUTLYING	260	2,390	156	3,637	1,559	203	8,203
		4	CBD	416	3,637	520	7,273	2,494	203	14,541
			OUTLYING	343	2,857	364	5,715	2,182	203	11,663

EXPANDED FROM 1980 COST ESTIMATES USING CONSTRUCTION COST CONVERSION FACTOR OF: 1.0390

TABLE C12. UNADJUSTED ANNUAL COSTS OF THE HIGHWAY SYSTEM (THOUSAND DOLLARS)

HIGHWAY CLASSIFICATION	RURAL OR URBAN	NUMBER OF LANES	SYSTEM MILES	TOTAL ANNUAL PRELIMINARY DESIGN AND ENG. COST	TOTAL ANNUAL RIGHT-OF-WAY COST	TOTAL ANNUAL UTILITIES COST	TOTAL ANNUAL GRADE AND DRAIN COST	TOTAL ANNUAL PAVEMENT & SHOULDER COST	TOTAL ANNUAL BRIDGE COST	TOTAL ANNUAL COST
INTERSTATE	RURAL	4	548.57	1,826	2,106	1,227	21,460	15,963	9,290	51,872
		6	30.72	99	139	68	1,257	1,117	520	3,200
	URBAN	4	107.05	1,008	3,477	786	14,565	6,976	9,138	35,950
		6	76.29	955	4,234	841	29,103	12,194	6,512	53,839
FEDERAL-AID PRIMARY	RURAL	2	2,477.47	5,472	6,760	4,427	68,943	49,090	17,864	152,556
		4	840.01	2,412	2,910	1,884	28,720	22,216	6,057	64,199
	URBAN	2	178.75	953	3,561	630	15,342	7,873	2,166	30,524
		4	296.77	2,614	9,753	2,527	39,212	18,760	3,595	76,461
FEDERAL-AID URBAN	URBAN	2	1,798.22	9,591	35,875	6,353	154,457	79,252	5,456	290,984
		4	225.49	2,025	7,625	2,017	30,379	14,425	684	57,155
FEDERAL-AID SECONDARY	RURAL	2	7,185.68	13,338	11,532	12,771	196,261	105,346	16,276	355,524
		4	43.02	147	136	85	1,330	1,129	97	2,924
NON-FEDERAL AID STATE MAINTAINED	RURAL	2	14,227.41	21,772	17,811	24,278	336,253	191,062	15,965	607,142
		4	4.80	12	16	13	160	116	5	322
	URBAN	2	130.47	704	3,250	460	10,018	5,414	529	20,374
		4	.95	7	27	7	109	52	4	205
STATE-MAINTAINED SYSTEM			28,172	62,934	109,212	58,373	947,568	530,985	94,159	1,803,231

TABLE C13. DISTRIBUTION OF UNADJUSTED ANNUAL PRELIMINARY DESIGN AND ENGINEERING COST RESPONSIBILITY (THOUSAND DOLLARS)

HIGHWAY CLASSIFICATION	RURAL OR URBAN	NUMBER OF LANES	MOTOR-CYCLES	CARS	BUSES	SINGLE-UNIT TRUCKS				SINGLE TRAILER			MULTIPLE TRAILERS			TOTAL
						2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE	4 OR MORE AXLES	4 OR LESS AXLES	5-AXLE	6 OR MORE AXLES	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES	
INTERSTATE	RURAL	4	4	966	4	334	59	12	4	28	388	4	20	3	0	1,826
		6	0	47	0	21	4	1	0	1	23	0	1	0	0	99
	URBAN	4	2	651	3	215	28	6	2	8	87	1	4	1	0	1,008
		6	2	638	2	196	27	6	2	5	72	1	3	1	0	955
FEDERAL-AID PRIMARY	RURAL	2	10	3,250	16	1,668	176	57	14	23	219	37	1	1	0	5,472
		4	5	1,409	6	639	79	23	7	17	199	21	4	1	0	2,412
	URBAN	2	2	645	6	251	25	4	1	3	14	1	0	0	0	953
		4	6	1,853	11	608	56	12	3	10	53	1	2	0	0	2,614
FEDERAL-AID URBAN	URBAN	2	30	6,919	48	2,299	175	38	14	18	46	2	1	0	1	9,591
		4	5	1,504	7	440	37	9	5	5	14	0	0	0	0	2,025
FEDERAL-AID SECONDARY	RURAL	2	35	7,694	49	4,528	413	156	52	55	291	63	1	0	0	13,338
		4	0	83	0	51	4	1	0	0	8	0	0	0	0	147
NON-FEDERAL AID STATE MAINTAINED	RURAL	2	89	12,589	107	7,690	551	222	54	74	322	70	2	0	2	21,772
		4	0	7	0	4	0	0	0	0	0	0	0	0	0	12
	URBAN	2	1	494	7	184	15	0	3	0	0	0	0	0	0	704
		4	0	5	0	2	0	0	0	0	0	0	0	0	0	7
STATE-MAINTAINED SYSTEM			190	38,753	268	19,131	1,648	546	162	247	1,739	201	38	6	4	62,934

TABLE C14. DISTRIBUTION OF UNADJUSTED ANNUAL RIGHT-OF-WAY COST RESPONSIBILITY (THOUSAND DOLLARS)

HIGHWAY CLASSIFICATION	RURAL OR URBAN	NUMBER OF LANES	MOTOR-CYCLES	CARS	BUSES	SINGLE-UNIT TRUCKS				SINGLE TRAILER			MULTIPLE TRAILERS			TOTAL
						2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE	4 OR MORE AXLES	4 OR LESS AXLES	5-AXLE	6 OR MORE AXLES	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES	
INTERSTATE	RURAL	4	4	1,114	5	386	67	14	5	32	448	5	23	3	0	2,106
		6	0	66	0	30	5	1	0	1	33	0	2	0	0	139
	URBAN	4	7	2,246	10	741	95	21	7	29	302	4	13	2	0	3,477
		6	10	2,830	11	869	118	25	10	21	320	5	11	2	0	4,234
FEDERAL-AID PRIMARY	RURAL	2	12	4,015	20	2,061	217	71	17	28	271	45	1	1	0	6,760
		4	6	1,700	8	771	95	28	9	20	241	26	4	1	0	2,910
	URBAN	2	7	2,412	24	939	95	15	4	11	51	3	1	0	0	3,561
		4	22	6,913	41	2,267	208	43	10	39	198	4	6	1	1	9,753
FEDERAL-AID URBAN	URBAN	2	111	25,880	179	8,599	653	144	54	68	172	7	4	0	4	35,875
		4	18	5,660	27	1,657	140	33	18	18	53	2	0	0	0	7,625
FEDERAL-AID SECONDARY	RURAL	2	30	6,653	43	3,915	358	135	45	47	251	54	1	0	0	11,532
		4	0	77	0	47	4	1	0	0	8	0	0	0	0	136
NON-FEDERAL AID STATE MAINTAINED	RURAL	2	73	10,299	87	6,291	451	182	45	61	264	57	2	0	2	17,811
		4	0	9	0	6	0	0	0	0	0	0	0	0	0	16
	URBAN	2	4	2,278	32	849	70	0	15	0	2	0	0	0	0	3,250
		4	0	19	0	7	1	0	0	0	0	0	0	0	0	27
STATE-MAINTAINED SYSTEM			305	72,171	487	29,436	2,576	711	237	377	2,613	212	68	11	7	109,212

TABLE C15. DISTRIBUTION OF UNADJUSTED ANNUAL UTILITIES COST RESPONSIBILITY (THOUSAND DOLLARS)

HIGHWAY CLASSIFICATION	RURAL OR URBAN	NUMBER OF LANES	MOTOR-CYCLES	CARS	BUSES	SINGLE-UNIT TRUCKS				SINGLE TRAILER			MULTIPLE TRAILERS			TOTAL
						2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE	4 OR MORE AXLES	4 OR LESS AXLES	5-AXLE	6 OR MORE AXLES	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES	
INTERSTATE	RURAL	4	3	649	3	225	39	8	3	19	261	3	13	2	0	1,227
		6	0	32	0	15	3	0	0	1	16	0	1	0	0	68
	URBAN	4	2	508	2	168	21	5	2	7	68	1	3	0	0	786
		6	2	562	2	173	23	5	2	4	64	1	2	0	0	841
FEDERAL-AID PRIMARY	RURAL	2	8	2,629	13	1,350	142	46	11	19	178	30	1	0	0	4,427
		4	4	1,101	5	499	62	18	6	13	156	17	3	1	0	1,884
	URBAN	2	1	427	4	166	17	3	1	2	9	1	0	0	0	630
		4	6	1,791	11	587	54	11	3	10	51	1	2	0	0	2,527
FEDERAL-AID URBAN	URBAN	2	20	4,583	32	1,523	116	25	10	12	30	1	1	0	1	6,353
		4	5	1,498	7	438	37	9	5	5	14	0	0	0	0	2,017
FEDERAL-AID SECONDARY	RURAL	2	33	7,368	47	4,336	396	149	50	52	278	60	1	0	0	12,771
		4	0	48	0	29	2	0	0	0	5	0	0	0	0	85
NON-FEDERAL AID STATE MAINTAINED	RURAL	2	100	14,038	119	8,575	614	248	61	83	359	78	2	0	2	24,278
		4	0	8	0	5	0	0	0	0	0	0	0	0	0	13
	URBAN	2	1	322	4	120	10	0	2	0	0	0	0	0	0	460
		4	0	5	0	2	0	0	0	0	0	0	0	0	0	7
STATE-MAINTAINED SYSTEM			183	35,567	250	18,210	1,537	528	153	226	1,490	192	29	4	4	58,373

TABLE C16. DISTRIBUTION OF UNADJUSTED ANNUAL GRADE AND DRAIN COST RESPONSIBILITY (THOUSAND DOLLARS)

HIGHWAY CLASSIFICATION	RURAL OR URBAN	NUMBER OF LANES	MOTOR-CYCLES	CARS	BUSES	SINGLE-UNIT TRUCKS				SINGLE TRAILER			MULTIPLE TRAILERS			TOTAL
						2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE	4 OR MORE AXLES	4 OR LESS AXLES	5-AXLE	6 OR MORE AXLES	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES	
INTERSTATE	RURAL	4	13	6,482	43	2,243	771	248	104	680	10,138	119	540	73	7	21,460
		6	0	350	3	159	51	13	3	21	616	6	34	2	0	1,257
	URBAN	4	13	8,544	55	2,821	464	129	49	201	2,146	30	95	16	2	14,565
		6	33	17,887	104	5,495	959	265	110	243	3,781	60	136	29	2	29,103
FEDERAL-AID PRIMARY	RURAL	2	50	32,770	248	16,824	3,799	2,046	569	963	9,797	1,800	51	27	0	68,943
		4	22	12,384	83	5,619	1,364	632	239	544	6,852	796	128	46	9	28,720
	URBAN	2	14	10,093	152	3,930	509	103	27	83	399	27	6	0	0	15,342
		4	44	26,915	239	8,829	1,038	275	68	274	1,442	30	44	8	8	39,212
FEDERAL-AID URBAN	URBAN	2	236	109,673	1,140	36,441	3,550	1,000	410	521	1,365	60	29	0	30	154,457
		4	34	22,142	157	6,481	704	211	123	124	391	12	0	0	0	30,379
FEDERAL-AID SECONDARY	RURAL	2	216	95,898	923	56,435	10,943	6,776	2,635	2,792	15,822	3,746	75	0	0	196,261
		4	1	636	4	390	54	13	1	8	217	8	0	0	0	1,330
NON-FEDERAL AID STATE MAINTAINED	RURAL	2	612	172,665	2,195	105,475	15,469	10,102	2,880	3,947	18,306	4,336	128	0	137	336,253
		4	0	80	1	49	8	5	2	2	10	2	0	0	0	160
	URBAN	2	5	6,920	144	2,578	272	2	82	2	13	0	0	0	0	10,018
		4	0	75	2	28	3	0	1	0	0	0	0	0	0	109
STATE-MAINTAINED SYSTEM			1,294	523,516	5,492	253,796	39,958	21,819	7,303	10,406	71,293	11,031	1,266	201	195	947,568

TABLE C17. DISTRIBUTION OF UNADJUSTED ANNUAL PAVEMENT AND SHOULDER COST RESPONSIBILITY (THOUSAND DOLLARS)

HIGHWAY CLASSIFICATION	RURAL OR URBAN	NUMBER OF LANES	MOTOR-CYCLES	CARS	BUSES	SINGLE-UNIT TRUCKS				SINGLE TRAILER			MULTIPLE TRAILERS			TOTAL
						2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE	4 OR MORE AXLES	4 OR LESS AXLES	5-AXLE	6 OR MORE AXLES	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES	
INTERSTATE	RURAL	4	0	131	85	91	671	245	274	620	12,334	166	1,224	111	12	15,963
		6	0	8	7	7	51	15	8	23	892	10	93	4	0	1,117
	URBAN	4	0	167	110	110	596	346	266	399	4,520	77	340	39	6	6,976
		6	0	341	205	210	1,204	693	582	472	7,783	153	477	70	6	12,194
FEDERAL-AID PRIMARY	RURAL	2	0	610	689	626	4,090	6,395	2,070	7,428	21,251	5,802	76	54	0	49,090
		4	0	169	168	153	1,172	1,627	722	3,482	12,326	2,143	160	76	18	22,216
	URBAN	2	0	412	1,076	321	1,809	757	469	344	2,381	235	69	0	0	7,873
		4	0	976	1,502	640	3,275	1,793	1,059	1,004	7,641	236	465	78	91	18,760
FEDERAL-AID URBAN	URBAN	2	0	6,543	11,782	4,348	18,439	10,737	10,467	3,143	11,903	776	511	0	602	79,252
		4	0	1,115	1,366	653	3,087	1,912	2,658	630	2,875	129	0	0	0	14,425
FEDERAL-AID SECONDARY	RURAL	2	0	1,585	2,274	1,866	10,572	19,075	8,642	19,410	30,924	10,895	102	0	0	105,346
		4	0	15	13	19	88	64	9	98	777	46	0	0	0	1,129
NON-FEDERAL AID STATE MAINTAINED	RURAL	2	0	3,697	7,007	4,517	20,075	38,691	12,889	37,451	48,847	17,260	236	0	392	191,062
		4	0	2	4	3	12	24	8	23	30	10	0	0	0	116
	URBAN	2	0	382	1,375	285	1,310	16	1,931	10	104	0	0	0	0	5,414
		4	0	4	13	3	13	0	18	0	1	0	0	0	0	52
STATE-MAINTAINED SYSTEM			0	16,158	27,677	13,851	66,464	82,389	42,071	74,537	164,588	37,938	3,753	432	1,127	530,985

TABLE C18. DISTRIBUTION OF UNADJUSTED ANNUAL BRIDGE COST RESPONSIBILITY (THOUSAND DOLLARS)

HIGHWAY CLASSIFICATION	RURAL OR URBAN	NUMBER OF LANES	MOTOR-CYCLES	CARS	BUSES	SINGLE-UNIT TRUCKS				SINGLE TRAILER			MULTIPLE TRAILERS			TOTAL
						2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE	4 OR MORE AXLES	4 OR LESS AXLES	5-AXLE	6 OR MORE AXLES	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES	
INTERSTATE	RURAL	4	6	2,806	19	971	334	107	45	294	4,389	51	234	32	3	9,290
		6	0	145	1	66	21	5	1	9	255	2	14	1	0	520
	URBAN	4	8	5,361	34	1,770	291	81	31	126	1,347	19	60	10	1	9,138
		6	7	4,003	23	1,230	215	59	25	54	846	13	30	7	0	6,512
FEDERAL-AID PRIMARY	RURAL	2	13	8,491	64	4,359	984	530	147	250	2,538	466	13	7	0	17,864
		4	5	2,612	17	1,185	288	133	50	115	1,445	168	27	10	2	6,057
	URBAN	2	2	1,425	21	555	72	15	4	12	56	4	1	0	0	2,166
		4	4	2,468	22	809	95	25	6	25	132	3	4	1	1	3,595
FEDERAL-AID URBAN	URBAN	2	8	3,874	40	1,287	125	35	14	18	48	2	1	0	1	5,456
		4	1	499	4	146	16	5	3	3	9	0	0	0	0	684
FEDERAL-AID SECONDARY	RURAL	2	18	7,953	77	4,680	908	562	218	232	1,312	311	6	0	0	16,276
		4	0	47	0	29	4	1	0	1	16	1	0	0	0	97
NON-FEDERAL AID STATE MAINTAINED	RURAL	2	29	8,198	104	5,008	734	480	137	187	869	206	6	0	7	15,965
		4	0	3	0	2	0	0	0	0	0	0	0	0	0	5
	URBAN	2	0	365	8	136	14	0	4	0	1	0	0	0	0	529
		4	0	3	0	1	0	0	0	0	0	0	0	0	0	4
STATE-MAINTAINED SYSTEM			101	48,250	435	22,233	4,101	2,039	687	1,326	13,263	1,246	396	66	15	94,159

TABLE C19. SUMMARY DISTRIBUTION OF UNADJUSTED ANNUAL CAPITAL EXPENDITURE RESPONSIBILITY (THOUSAND DOLLARS)

				SINGLE-UNIT TRUCKS				SINGLE TRAILER			MULTIPLE TRAILERS			
	MOTOR-CYCLES	CARS	BUSES	2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE	4 OR MORE AXLES	4 OR LESS AXLES	5-AXLE	6 OR MORE AXLES	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES	TOTAL
PRELIM. DESIGN & ENGR.	190	38,753	268	19,131	1,648	546	162	247	1,739	201	38	6	4	62,934
RIGHT-OF-WAY	305	72,171	487	29,436	2,576	711	237	377	2,613	212	68	11	7	109,212
UTILITIES	183	35,567	250	18,210	1,537	528	153	226	1,490	192	29	4	4	58,373
GRADE & DRAIN	1,294	523,516	5,492	253,796	39,958	21,819	7,303	10,406	71,293	11,031	1,266	201	195	947,568
PAVEMENT & SHOULDERS	0	16,158	27,677	13,851	66,464	82,389	42,071	74,537	164,588	37,938	3,753	432	1,127	530,985
BRIDGES	101	48,250	435	22,233	4,101	2,039	687	1,326	13,263	1,246	396	66	15	94,159
STATE-MAINTAINED SYSTEM	2,074	734,414	34,609	356,657	116,284	108,032	50,613	87,119	254,985	50,821	5,550	720	1,352	1,803,231

TABLE C20. SUMMARY DISTRIBUTION OF ANNUAL MAINTENANCE AND ADMINISTRATION EXPENDITURE RESPONSIBILITY (THOUSAND DOLLARS)

				SINGLE-UNIT TRUCKS				SINGLE TRAILER			MULTIPLE TRAILERS			
	MOTOR-CYCLES	CARS	BUSES	2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE	4 OR MORE AXLES	4 OR LESS AXLES	5-AXLE	6 OR MORE AXLES	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES	TOTAL
MAINTENANCE AND TRAFFIC SERVICES														
ROADS	297	73,354	433	31,463	7,323	3,085	1,291	3,022	39,943	2,477	1,490	253	58	164,489
STRUCTURES	12	5,903	52	2,532	472	216	76	177	2,024	130	77	11	2	11,685
TRAFFIC SERVICES	119	29,280	173	12,559	1,292	363	114	267	2,818	146	105	15	3	47,252
ADMINISTRATION	154	38,050	225	16,321	1,678	471	148	346	3,662	189	137	19	4	61,405
ENFORCEMENT														
MOTOR CARRIERS					2,821	792	249	582	6,155	318	230	32	6	11,186
OTHER ENFORCEMENT	21	5,115	30	2,194	226	63	20	47	492	25	18	3	1	8,254
MISCELLANEOUS	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STATE-MAINTAINED SYSTEM	603	151,702	914	65,068	13,811	4,991	1,897	4,441	55,094	3,285	2,057	334	74	304,271

TABLE C21. PERCENTAGE OF VEHICLES BY AXLE CLASS IN REGISTERED WEIGHT CATEGORIES

REGISTERED (DECLARED) WEIGHT (LBS)	SINGLE-UNIT TRUCKS				SINGLE TRAILER			MULTIPLE TRAILERS		
	2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE	4 OR MORE AXLES	4 OR LESS AXLES	5-AXLE	6 OR MORE AXLES	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES
6,000	100.00	1.56	1.11	.00	.00	.00	.00	.00	.00	.00
10,000	.00	8.25	.28	.95	.15	.00	.00	.00	.00	.00
14,000	.00	7.90	.83	.00	.00	.00	.00	.00	.00	.00
18,000	.00	13.28	1.67	2.86	.00	.00	.00	.00	.00	.00
22,000	.00	7.54	2.22	.95	.00	.09	.00	.00	.00	.00
26,000	.00	24.63	2.78	.00	.77	.14	.00	.00	.00	.00
32,000	.00	16.74	5.56	2.86	5.10	.14	.83	.00	.00	.00
38,000	.00	8.49	5.28	3.81	3.86	.23	.42	.00	.00	.00
44,000	.00	3.47	17.78	2.86	7.57	.63	.00	5.56	.00	.00
55,000	.00	4.31	31.38	11.43	13.91	2.07	1.25	5.56	.00	.00
59,999	.00	.20	.46	1.59	5.83	.58	.17	4.61	.00	.00
62,000	.00	.16	.37	1.27	8.23	.82	.25	6.50	.00	.00
73,280	.00	.72	12.50	57.13	7.88	3.74	1.67	5.56	.00	.00
80,000	.00	2.75	17.78	14.29	46.70	91.56	95.41	72.21	100.00	100.00
TOTAL	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

TABLE C22. SUMMARY DISTRIBUTION OF ANNUAL CAPITAL EXPENDITURE RESPONSIBILITY BY REGISTERED WEIGHT CATEGORY (THOUSAND DOLLARS), UNADJUSTED

	MOTOR-CYCLES	CARS	BUSES	TRUCK REGISTERED WEIGHT CLASS (POUNDS) 6,000	10,000	14,000	18,000	22,000	26,000	32,000	38,000	44,000	55,000	59,999	62,000	73,280	80,000	TOTAL
PRELIM. DESIGN & ENGR.	190	38,753	268	19,163	139	135	233	139	425	328	189	191	336	35	44	263	2,103	62,934
RIGHT-OF-WAY	305	72,171	487	29,484	217	209	361	215	661	502	287	271	474	53	67	378	3,069	109,212
UTILITIES	183	35,567	250	18,240	130	126	217	130	397	306	177	180	316	31	40	243	1,840	58,373
GRADE & DRAIN	1,294	523,516	5,492	253,957	1,205	1,630	3,600	2,612	9,524	8,820	5,917	6,278	13,393	1,317	1,678	12,714	94,621	947,568
PAVEMENT & SHOULDERS	0	16,158	27,677	13,854	99	369	1,672	1,959	12,928	18,567	17,315	16,504	55,279	4,151	4,801	50,502	289,150	530,985
BRIDGES	101	48,250	435	22,249	124	167	368	268	978	908	611	657	1,433	183	244	1,478	15,704	94,159
TOTAL	2,074	734,414	34,609	356,947	1,915	2,636	6,451	5,323	24,913	29,431	24,496	24,080	71,231	5,771	6,873	65,578	406,486	1,803,231

TABLE C23. SUMMARY DISTRIBUTION OF COST RESPONSIBILITY ADJUSTED TO ANNUAL BUDGET LEVEL (THOUSAND DOLLARS)

				TRUCK REGISTERED WEIGHT CLASS (POUNDS)														
	MOTOR-CYCLES	CARS	BUSES	6,000	10,000	14,000	18,000	22,000	26,000	32,000	38,000	44,000	55,000	59,999	62,000	73,280	80,000	TOTAL
ANNUAL CAPITAL EXPENDITURES	622	220,245	10,379	107,046	574	791	1,935	1,596	7,471	8,826	7,346	7,222	21,362	1,731	2,061	19,666	121,902	540,774
ANNUAL MAINTENANCE & ADMINISTRATION EXPENDITURES	603	151,702	914	65,331	1,152	1,113	1,945	1,208	3,638	2,973	1,825	2,208	4,293	756	1,020	4,403	59,189	304,271
STATE-MAINTAINED SYSTEM	1,225	371,947	11,293	172,377	1,726	1,903	3,880	2,804	11,109	11,799	9,171	9,429	25,654	2,487	3,081	24,069	181,091	845,045
PERCENTAGE	.145	44.015	1.336	20.399	.204	.225	.459	.332	1.315	1.396	1.085	1.116	3.036	.294	.365	2.848	21.430	100.000

TABLE C24. SUMMARY DISTRIBUTION OF COST RESPONSIBILITY ADJUSTED TO ANNUAL BUDGET LEVEL (THOUSAND DOLLARS)

				SINGLE-UNIT TRUCKS				SINGLE TRAILER			MULTIPLE TRAILERS			
	MOTOR-CYCLES	CARS	BUSES	2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE	4 OR MORE AXLES	4 OR LESS AXLES	5-AXLE	6 OR MORE AXLES	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES	TOTAL
ANNUAL CAPITAL EXPENDITURES	622	220,245	10,379	106,959	34,873	32,398	15,179	26,126	76,468	15,241	1,664	216	405	540,774
ANNUAL MAINTENANCE & ADMINISTRATION EXPENDITURES	603	151,702	914	65,068	13,811	4,991	1,897	4,441	55,094	3,285	2,057	334	74	304,271
STATE-MAINTAINED SYSTEM	1,225	371,947	11,293	172,027	48,684	37,388	17,076	30,567	131,562	18,526	3,721	550	480	845,045
PERCENTAGE	.145	44.015	1.336	20.357	5.761	4.424	2.021	3.617	15.569	2.192	.440	.065	.057	100.000

TABLE C25. BIVARIATE SUMMARY DISTRIBUTION OF COST RESPONSIBILITY ADJUSTED TO ANNUAL BUDGET LEVEL (THOUSAND DOLLARS)

REGISTERED WEIGHT (POUNDS)	MOTOR-CYCLES	CARS	BUSES	SINGLE-UNIT TRUCKS 2-AXLE 4-TIRE	SINGLE-UNIT TRUCKS 2-AXLE 6-TIRE	SINGLE-UNIT TRUCKS 3-AXLE	SINGLE-UNIT TRUCKS 4 OR MORE AXLES	SINGLE TRAILER 4 OR LESS AXLES	SINGLE TRAILER 5-AXLE	SINGLE TRAILER 6 OR MORE AXLES	MULTIPLE TRAILERS 5 OR LESS AXLES	MULTIPLE TRAILERS 6-AXLE	MULTIPLE TRAILERS 7 OR MORE AXLES	TOTAL	PERCENT
NONE	1,225	371,947	11,293	0	0	0	0	0	0	0	0	0	0	384,464	45.496
6,000	0	0	0	172,027	282	68	0	0	0	0	0	0	0	172,377	20.399
10,000	0	0	0	0	1,676	19	23	8	0	0	0	0	0	1,726	.204
14,000	0	0	0	0	1,839	65	0	0	0	0	0	0	0	1,903	.225
18,000	0	0	0	0	3,631	154	95	0	0	0	0	0	0	3,880	.459
22,000	0	0	0	0	2,458	248	39	0	59	0	0	0	0	2,804	.332
26,000	0	0	0	0	10,505	422	0	81	100	0	0	0	0	11,109	1.315
32,000	0	0	0	0	9,503	1,157	232	731	111	66	0	0	0	11,799	1.396
38,000	0	0	0	0	6,295	1,469	423	738	204	42	0	0	0	9,171	1.085
44,000	0	0	0	0	2,466	4,630	291	1,332	553	0	156	0	0	9,429	1.116
55,000	0	0	0	0	4,611	12,751	1,874	3,843	2,223	170	183	0	0	25,654	3.036
59,999	0	0	0	0	176	147	198	1,238	568	19	141	0	0	2,487	.294
62,000	0	0	0	0	136	114	150	1,663	794	27	196	0	0	3,081	.365
73,280	0	0	0	0	873	5,673	10,333	2,387	4,356	252	195	0	0	24,069	2.848
80,000	0	0	0	0	4,233	10,472	3,417	18,547	122,593	17,951	2,849	550	480	181,091	21.430
TOTAL	1,225	371,947	11,293	172,027	48,684	37,388	17,076	30,567	131,562	18,526	3,721	550	480	845,045	100.000
PERCENT	.145	44.015	1.336	20.357	5.761	4.424	2.021	3.617	15.569	2.192	.440	.065	.057	100.000	

TABLE C26. BIVARIATE SUMMARY DISTRIBUTION OF COST RESPONSIBILITY ADJUSTED TO ANNUAL BUDGET LEVEL (CENTS PER VEHICLE MILE)

REGISTERED WEIGHT (POUNDS)	MOTOR-CYCLES	CARS	BUSES	SINGLE-UNIT TRUCKS				SINGLE TRAILER			MULTIPLE TRAILERS		
				2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE	4 OR MORE AXLES	4 OR LESS AXLES	5-AXLE	6 OR MORE AXLES	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES
NONE	1.61	1.98	10.18										
6,000				2.14	2.18	2.64							
10,000					2.45	2.93	3.33	3.03					
14,000					2.81	3.35							
18,000					3.30	3.97	4.55						
22,000					3.94	4.81	5.61		3.65				
26,000					5.15	6.53		6.17	3.96				
32,000					6.86	8.95	11.14	8.39	4.39	8.48			
38,000					8.95	11.96	15.21	11.19	4.92	10.59			
44,000					8.58	11.20	13.95	10.30	4.86		4.17		
55,000					12.92	17.47	22.46	16.17	5.94	14.53	4.89		
59,999					10.60	13.77	17.08	12.42	5.42	12.08	4.53		
62,000					10.28	13.21	16.23	11.83	5.36	11.73	4.48		
73,280					14.65	19.52	24.78	17.72	6.45	16.14	5.21		
80,000					18.59	25.33	32.77	23.24	7.41	20.15	5.85	5.76	25.41
AVERAGE	1.61	1.98	10.18	2.14	5.88	16.08	23.40	17.89	7.28	19.84	5.52	5.76	25.41

APPENDIX D

FY 1991 REVENUE ALLOCATION TABLES

TABLE D1. SUMMARY OF REVENUE ATTRIBUTED TO STATE-MAINTAINED SYSTEM
(THOUSAND DOLLARS)

SOURCE	REVENUE	
FUEL TAX REVENUE		
KENTUCKY, HEAVY VEHICLE SURTAX	5,528	
KENTUCKY, NORMAL USE	12,435	
KENTUCKY, NORMAL	242,326	
FEDERAL	142,950	
SUBTOTAL		403,239
VEHICLE REGISTRATION AND LICENSE FEES		
CARS	22,980	
BUSES	32	
MOTORCYCLES	161	
TRUCKS		
KENTUCKY	16,492	
APPORTIONED	15,901	
VEHICLE ID CARDS	6,896	
PERMITS	7,749	
OTHER	4,931	
SUBTOTAL		75,142
MISCELLANEOUS		39,781
OPERATOR'S LICENSE FEES		5,726
USAGE TAXES		
KENTUCKY, BUSES	39	
KENTUCKY, OTHER VEHICLES	212,394	
FEDERAL, TRUCKS AND TRAILERS	21,493	
SUBTOTAL		233,926
ROAD TOLLS		17,666
OTHER MOTOR CARRIER TAXES		
KENTUCKY, WEIGHT-DISTANCE	61,046	
KENTUCKY, EXTENDED-WEIGHT PERMIT	611	
FEDERAL, USE	11,279	
SUBTOTAL		72,936
OTHER FEDERAL TAXES		4,919
TOTAL		853,335

TABLE D2. DISTRIBUTION OF VEHICLE-MILES TRAVELED (THOUSANDS)

HIGHWAY CLASSIFICATION	RURAL OR URBAN	NO. OF LANES	MOTOR-CYCLES	CARS	BUSES	REGISTERED WEIGHT CLASS FOR TRUCKS (POUNDS) 6,000	10,000	14,000	18,000	22,000	26,000	32,000	38,000	44,000	55,000	59,999	62,000	73,280	80,000	TOTALS
INTERSTATE	RURAL	4	8,693	2,166,429	9,656	752,086	11,086	10,587	18,145	11,357	34,756	28,180	17,345	22,207	44,320	11,289	15,616	49,838	883,085	4,094,675
		6	389	213,634	1,376	97,426	1,419	1,364	2,314	1,441	4,436	3,360	2,000	2,369	4,713	1,163	1,610	5,359	105,866	450,239
	URBAN	4	3,124	995,238	4,238	329,325	3,548	3,401	5,834	3,528	10,909	8,511	4,995	5,327	9,970	1,978	2,685	9,644	138,559	1,540,814
		6	4,124	1,132,380	4,399	348,719	3,980	3,821	6,562	3,944	12,177	9,225	5,333	5,265	9,787	1,653	2,211	9,568	130,856	1,694,003
FEDERAL-AID PRIMARY	RURAL	2	6,542	2,158,403	10,903	1,110,338	9,841	9,533	16,390	9,861	30,116	23,095	13,292	13,207	23,526	2,363	3,003	17,901	175,975	3,634,287
		4	4,571	1,271,775	5,659	578,351	6,017	5,794	9,990	6,052	18,474	14,445	8,474	8,808	16,594	2,460	3,266	15,386	200,462	2,176,579
	URBAN	2	1,202	428,509	4,302	167,128	1,405	1,352	2,297	1,342	4,247	3,100	1,692	1,287	2,106	230	290	1,324	10,860	632,672
		4	4,959	1,528,111	9,055	502,071	3,848	3,706	6,318	3,733	11,702	8,784	4,919	4,342	7,391	987	1,291	5,151	49,544	2,155,913
FEDERAL-AID URBAN	URBAN	2	12,646	2,942,943	20,397	979,193	6,241	6,001	10,307	6,036	18,828	13,941	7,746	6,386	10,536	907	1,084	7,450	28,847	4,079,489
		4	3,312	1,069,115	5,040	313,411	2,240	2,145	3,717	2,176	6,738	5,060	2,855	2,429	4,137	386	463	3,500	13,354	1,440,079
FEDERAL-AID SECONDARY	RURAL	2	12,409	2,753,410	17,659	1,623,283	12,569	12,152	21,113	12,666	38,290	29,735	17,308	17,758	31,210	2,653	3,230	24,514	142,808	4,772,769
		4	151	60,735	227	37,296	235	226	383	228	717	519	287	231	420	57	75	345	5,956	108,088
NON-FEDERAL AID STATE	RURAL	2	13,741	1,937,819	16,422	1,185,441	7,188	6,982	12,071	7,276	21,992	17,074	9,922	10,454	18,104	1,446	1,762	12,621	71,154	3,351,468
		4	25	3,589	30	2,195	13	13	22	13	41	32	18	19	34	3	3	23	132	6,207
	URBAN	2	173	109,931	1,521	41,014	285	266	469	262	831	587	315	142	237	20	17	444	306	156,820
		4	2	1,155	16	431	3	3	5	3	9	6	3	1	2	0	0	5	3	1,647
NON-FEDERAL AID COUNTY	RURAL	2	6,899	1,124,177	3,450	716,585	4,928	4,741	8,018	4,618	14,792	10,298	5,391	3,117	4,496	164	131	1,803	2,820	1,916,428
	URBAN	2	697	192,740	1,416	64,006	313	301	511	296	944	693	376	277	436	49	61	230	779	264,125
NON-FEDERAL AID CITY	RURAL	2	350	56,992	175	36,329	250	240	407	234	750	522	273	158	228	8	7	91	143	97,157
	URBAN	2	2,371	655,455	4,814	217,668	1,065	1,023	1,738	1,007	3,209	2,358	1,279	941	1,482	166	208	781	2,648	898,215
NON-FEDERAL AID OTHER	RURAL	2	261	53,168	404	25,814	183	180	310	191	566	442	260	308	524	29	34	297	1,209	84,180
	URBAN	2	16	56,290	454	20,284	182	175	298	175	552	414	229	192	315	39	50	187	1,292	81,144
STATE-MAINTAINED SYSTEM			76,064	18,773,176	110,902	8,067,708	69,916	67,347	115,938	69,918	214,262	165,654	96,505	100,233	183,087	27,595	36,607	163,071	1,957,767	30,295,749
TOTAL STATEWIDE			86,659	20,911,998	121,615	9,148,395	76,837	74,007	127,220	76,439	235,075	180,381	104,315	105,226	190,567	28,049	37,098	166,461	1,966,658	33,636,998
STATE-MAINTAINED AVG (%)			.25	61.97	.37	26.63	.23	.22	.38	.23	.71	.55	.32	.33	.60	.09	.12	.54	6.46	100.00
STATEWIDE AVG (%)			.26	62.17	.36	27.20	.23	.22	.38	.23	.70	.54	.31	.31	.57	.08	.11	.49	5.85	100.00

TABLE D3. PERCENTAGE OF DIESEL-POWERED TRUCKS BY TRUCK CLASS

REGISTERED WEIGHT (LBS)	STATEWIDE VMT (THOUSANDS)										PERCENT DIESEL BY WEIGHT CLASS
	SINGLE-UNIT TRUCKS				SINGLE TRAILER			MULTIPLE TRAILERS			
	2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE	4 OR MORE AXLES	4 OR LESS AXLES	5-AXLE	6 OR MORE AXLES	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES	
6,000	9,131,486	14,217	2,692	0	0	0	0	0	0	0	.80
10,000	0	75,184	679	713	261	0	0	0	0	0	10.17
14,000	0	71,994	2,013	0	0	0	0	0	0	0	3.68
18,000	0	121,023	4,050	2,146	0	0	0	0	0	0	16.76
22,000	0	68,714	5,384	713	0	1,628	0	0	0	0	55.56
26,000	0	224,458	6,743	0	1,341	2,533	0	0	0	0	55.56
32,000	0	152,555	13,485	2,146	8,882	2,533	780	0	0	0	67.94
38,000	0	77,371	12,806	2,859	6,722	4,161	395	0	0	0	99.60
44,000	0	31,623	43,124	2,146	13,184	11,399	0	3,751	0	0	99.60
55,000	0	39,278	76,109	8,577	24,225	37,453	1,175	3,751	0	0	99.60
59,999	0	1,823	1,116	1,193	10,153	10,494	160	3,110	0	0	99.60
62,000	0	1,458	897	953	14,333	14,836	235	4,385	0	0	99.60
73,280	0	6,562	30,317	42,870	13,723	67,668	1,569	3,751	0	0	99.60
80,000	0	25,061	43,124	10,723	81,331	1,656,609	89,667	48,715	9,534	1,896	99.60
PERCENT DIESEL BY AXLE CLASS	.800	52.634	92.111	95.057	97.512	99.454	99.337	99.600	99.600	99.600	

TABLE D4. FUEL CONSUMPTION BY VEHICLE TYPE

				SINGLE-UNIT TRUCKS				SINGLE TRAILER			MULTIPLE TRAILERS			
	MOTOR-CYCLES	CARS	BUSES	2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE	4 OR MORE AXLES	4 OR LESS AXLES	5-AXLE	6 OR MORE AXLES	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES	TOTAL
FUEL EFFICIENCY (MILES PER GALLON)	50.00	20.92	6.36	14.09	7.29	7.29	7.29	5.49	5.49	5.49	5.49	5.49	5.49	
PERCENTAGE SPECIAL FUELS	.000	1.29	72.10	.80	52.63	92.11	95.06	97.51	99.45	99.34	99.60	99.60	99.60	
STATEWIDE, 1,000 GALLONS (UNADJUSTED)														
GASOLINE & GASOHOL	1,733	986,722	5,335	642,898	59,212	2,625	509	789	1,798	113	49	7	1	1,701,792
GASOLINE (INCLUDES LPG)	1,397	795,169	4,299	518,092	47,717	2,115	410	636	1,449	91	40	6	1	1,371,421
GASOHOL	336	191,554	1,036	124,807	11,495	510	99	153	349	22	10	1	0	330,371
SPECIAL FUELS	0	12,895	13,787	5,185	65,798	30,646	9,785	30,933	327,767	17,005	12,239	1,730	344	528,113
TOTAL	1,733	999,617	19,122	648,083	125,010	33,270	10,293	31,722	329,566	17,118	12,288	1,737	345	2,229,905
STATEWIDE, 1,000 GALLONS (ADJUSTED)														
GASOLINE & GASOHOL	1,868	1,063,233	5,749	692,749	63,803	2,828	548	850	1,938	122	53	7	1	1,833,750
GASOLINE (INCLUDES LPG)	1,505	856,827	4,633	558,265	51,417	2,279	442	685	1,561	99	43	6	1	1,477,762
GASOHOL	363	206,407	1,116	134,484	12,386	549	106	165	376	24	10	1	0	355,988
SPECIAL FUELS	0	11,920	12,744	4,793	60,823	28,328	9,045	28,594	302,983	15,719	11,314	1,599	318	488,179
TOTAL	1,868	1,075,153	18,493	697,541	124,626	31,156	9,593	29,444	304,921	15,841	11,367	1,606	319	2,321,929

TABLE D5. MOTOR FUEL TAX REVENUE BY REGISTERED WEIGHT CATEGORIES (THOUSAND DOLLARS)

	MOTOR-CYCLES	CARS	BUSES	REGISTERED WEIGHT CLASS FOR TRUCKS (POUNDS) 6,000	10,000	14,000	18,000	22,000	26,000	32,000	38,000	44,000	55,000	59,999	62,000	73,280	80,000	TOTALS
KENTUCKY RATES (DOLLARS/GALLON)																		
HEAVY VEHICLE SURTAX															.020	.020	.020	
NORMAL USE, GASOLINE										.022	.022	.022	.022	.022	.022	.022	.022	
NORMAL USE, GASOHOL										.022	.022	.022	.022	.022	.022	.022	.022	
NORMAL USE, SPECIAL FUELS										.052	.052	.052	.052	.052	.052	.052	.052	
NORMAL, GASOLINE	.150	.150	.150	.150	.150	.150	.150	.150	.150	.150	.150	.150	.150	.150	.150	.150	.150	
NORMAL, GASOHOL	.150	.150	.150	.150	.150	.150	.150	.150	.150	.150	.150	.150	.150	.150	.150	.150	.150	
NORMAL, SPECIAL FUELS	.120	.120	.120	.120	.120	.120	.120	.120	.120	.120	.120	.120	.120	.120	.120	.120	.120	
FEDERAL RATES (DOLLARS/GALLON)																		
GASOLINE	.080	.080	.000	.080	.080	.080	.080	.080	.080	.080	.080	.080	.080	.080	.080	.080	.080	
GASOHOL	.020	.020	.007	.020	.020	.020	.020	.020	.020	.020	.020	.020	.020	.020	.020	.020	.020	
SPECIAL FUELS	.140	.140	.040	.140	.140	.140	.140	.140	.140	.140	.140	.140	.140	.140	.140	.140	.140	
STATEWIDE FUEL, 1,000 GALLONS (ADJUSTED)																		
GASOLINE	1,505	856,827	4,633	559,092	4,253	4,081	6,879	3,933	12,735	8,784	4,533	2,266	3,113	171	169	1,024	3,764	1,477,762
GASOHOL	363	206,407	1,116	134,683	1,025	983	1,657	947	3,068	2,116	1,092	546	750	41	41	247	907	355,988
SPECIAL FUELS	0	11,920	12,744	6,056	5,226	5,040	8,809	5,574	16,412	14,028	8,871	12,108	23,619	4,368	5,929	23,623	323,850	488,179
TOTAL	1,868	1,075,153	18,493	699,831	10,504	10,104	17,345	10,454	32,215	24,929	14,496	14,920	27,482	4,581	6,139	24,893	328,521	2,321,929
FUEL REVENUE, STATE-MAINTAINED SYSTEM (UNADJUSTED)																		
KENTUCKY																		
HEAVY VEHICLE SURTAX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	123	498	6,570	7,191
NORMAL USE	0	0	0	0	0	0	0	0	0	717	433	512	972	172	232	930	12,538	16,504
NORMAL	207	119,077	1,770	77,547	1,050	1,010	1,730	1,037	3,212	2,456	1,412	1,387	2,526	412	550	2,239	29,276	246,897
TOTAL	207	119,077	1,770	77,547	1,050	1,010	1,730	1,037	3,212	3,173	1,845	1,899	3,498	583	904	3,666	48,385	270,592
FEDERAL																		
GASOLINE	120	68,546	0	44,727	340	326	550	315	1,019	703	363	181	249	14	13	82	301	117,850
GASOHOL	7	4,128	8	2,694	20	20	33	19	61	42	22	11	15	1	1	5	18	7,105
SPECIAL FUELS	0	1,669	510	848	732	706	1,233	780	2,298	1,964	1,242	1,695	3,307	612	830	3,307	45,339	67,071
TOTAL	128	74,343	518	48,269	1,092	1,052	1,817	1,114	3,378	2,709	1,626	1,887	3,571	626	844	3,394	45,658	192,026
FUEL REVENUE, STATE-MAINTAINED SYSTEM (ADJUSTED)																		
KENTUCKY																		
HEAVY VEHICLE SURTAX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	94	383	5,051	5,528
NORMAL USE	0	0	0	0	0	0	0	0	0	540	326	386	732	129	174	700	9,446	12,435
NORMAL	203	116,873	1,737	76,111	1,031	991	1,698	1,017	3,152	2,410	1,386	1,362	2,479	404	540	2,197	28,734	242,326
TOTAL	203	116,873	1,737	76,111	1,031	991	1,698	1,017	3,152	2,951	1,712	1,747	3,212	533	808	3,280	43,232	260,289
FEDERAL																		
GASOLINE	90	51,028	0	33,296	253	243	410	234	758	523	270	135	185	10	10	61	224	87,731
GASOHOL	5	3,073	6	2,005	15	15	25	14	46	32	16	8	11	1	1	4	14	5,289
SPECIAL FUELS	0	1,242	379	631	545	525	918	581	1,711	1,462	925	1,262	2,462	455	618	2,462	33,752	49,929
TOTAL	95	55,343	385	35,933	813	783	1,352	829	2,515	2,017	1,211	1,405	2,658	466	629	2,527	33,989	142,950
KENTUCKY STATE-MAINTAINED	203	116,873	1,737	76,111	1,031	991	1,698	1,017	3,152	2,951	1,712	1,747	3,212	533	808	3,280	43,232	260,289
FEDERAL STATE-MAINTAINED	95	55,343	385	35,933	813	783	1,352	829	2,515	2,017	1,211	1,405	2,658	466	629	2,527	33,989	142,950

KY NORMAL & NORMAL USE TAXES FOR ROAD FUND DEPOSIT 74.00 PERCENT

TABLE D6. MOTOR VEHICLE REGISTRATION FEES

GENERAL FEES	
PASSENGER CARS	11.50
FARM TRUCKS	11.50
SCHOOL AND CHURCH BUSES	11.50
MOTORCYCLES	5.00
MOTOR VEHICLE DEALERS	25.00
HOUSE CARS	20.00
TRAILERS DRAWN BY PASSENGER CARS	4.50
TRAILERS DRAWN BY TRUCKS	19.50
HOUSE TRAILERS	9.50
TRUCK FEES	
MAXIMUM REGISTERED WEIGHT (POUNDS)	
0 - 6,000	11.50
6,001 - 10,000	24.00
10,001 - 14,000	30.00
14,001 - 18,000	50.00
18,001 - 22,000	132.00
22,001 - 26,000	160.00
26,001 - 32,000	216.00
32,001 - 38,000	300.00
38,001 - 44,000	474.00
44,001 - 55,000	544.00
55,001 - 62,000	882.00
62,001 - 73,280	1,125.00
73,281 - 80,000	1,260.00

TABLE D7. TRUCK REGISTRATION REVENUE

	REGISTERED WEIGHT CLASS FOR TRUCKS (POUNDS)														TOTALS
	6,000	10,000	14,000	18,000	22,000	26,000	32,000	38,000	44,000	55,000	59,999	62,000	73,280	80,000	
NUMBER OF KENTUCKY REGISTRATIONS															
FARM TRUCKS								102,428	141	358		40	45	318	103,330
OTHER TRUCKS	667,964	17,122	8,522	9,411	3,275	8,184	4,349	1,040	1,941	2,089		342	968	3,245	728,452
EXEMPT TRUCKS					462	1,019	799	250	1,004	1,108		213	483	307	5,645
TOTAL	667,964	17,122	8,522	9,411	3,737	9,203	5,148	103,718	3,086	3,555	0	595	1,496	3,870	837,427
REGISTRATION FEE (DOLLARS)															
FARM TRUCKS	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	189.60	217.60	352.80	352.80	450.00	504.00	
OTHER TRUCKS	11.50	24.00	30.00	50.00	132.00	160.00	216.00	300.00	474.00	544.00	882.00	882.00	1,125.00	1,260.00	
EXEMPT TRUCKS					99.00	120.00	162.00	225.00	355.50	408.00	661.50	661.50	843.75	945.00	
UNADJUSTED REVENUE FROM KENTUCKY TRUCKS (THOUSAND DOLLARS)															
FARM TRUCKS	0	0	0	0	0	0	0	825	19	55	0	10	14	112	1,034
OTHER TRUCKS	5,377	288	179	329	303	917	658	218	644	795	0	211	762	2,862	13,543
EXEMPT TRUCKS	0	0	0	0	32	86	91	39	250	316	0	99	285	203	1,401
TOTAL	5,377	288	179	329	335	1,002	748	1,082	913	1,166	0	320	1,062	3,177	15,978
ADJUSTED REVENUE (THOUSAND DOLLARS)															
KENTUCKY															
FARM TRUCKS	0	0	0	0	0	0	0	851	19	56	0	10	15	116	1,067
OTHER TRUCKS	5,550	297	185	340	312	946	679	225	665	821	0	218	787	2,954	13,979
EXEMPT TRUCKS	0	0	0	0	33	88	94	41	258	327	0	102	294	210	1,446
APPORTIONED	66	72	50	56	26	111	238	245	225	651	114	149	657	13,240	15,901
VEHICLE ID CARDS	29	31	22	24	11	48	103	106	98	282	49	65	285	5,742	6,896
PERMITS	32	35	25	27	13	54	116	119	110	317	55	73	320	6,452	7,749
TOTAL	5,677	435	282	448	395	1,248	1,230	1,588	1,374	2,455	219	617	2,357	28,713	47,038
NUMBER OF VEHICLE ID CARDS:	2,257	2,457	1,722	1,924	887	3,802	8,144	8,378	7,693	22,258	3,890	5,103	22,441	452,497	543,453

TABLE D8. TOLL ROAD REVENUES AND THEIR ALLOCATION (UNADJUSTED)

VEHICLE TOLL CODE	REVENUE (DOLLARS)	ALLOCATION PROCEDURE*
1	10,927,158	TO CARS AND 6,000-LB WEIGHT BASED ON VMT OF CARS AND SU-2A-4T VEHICLES
2	215,618	SAME AS ABOVE
3	217,455	SAME AS ABOVE
4	455,157	TO BUSES AND WEIGHT DISTRIBUTION OF SU-2A-6T
5	257,464	TO REGISTERED WEIGHT DISTRIBUTION OF SU-3A
6	369,876	TO SU-4A AND ST-4A BASED ON RELATIVE VMT AND REGISTERED WEIGHT DISTRIBUTIONS
7	4,878,536	TO REGISTERED WEIGHT DISTRIBUTION OF ST-5A
8	138,941	TO REGISTERED WEIGHT DISTRIBUTION OF MT-6A
TOTAL	17,460,205	

*VMT ALLOCATIONS BASED ON TRAVEL ON 4-LANE, RURAL, FEDERAL-AID PRIMARY HIGHWAYS

TABLE D9. TOTAL REVENUE GENERATED (THOUSAND DOLLARS)

	MOTOR-CYCLES	CARS	BUSES	REGISTERED WEIGHT CLASS FOR TRUCKS (POUNDS) 6,000	10,000	14,000	18,000	22,000	26,000	32,000	38,000	44,000	55,000	59,999	62,000	73,280	80,000	TOTALS
FUEL TAXES																		
KENTUCKY, HEAVY VEHICLE SURTAX															94	383	5,051	5,528
KENTUCKY, NORMAL USE										540	326	386	732	129	174	700	9,446	12,435
KENTUCKY, NORMAL	203	116,873	1,737	76,111	1,031	991	1,698	1,017	3,152	2,410	1,386	1,362	2,479	404	540	2,197	28,734	242,326
FEDERAL	95	55,343	385	35,933	813	783	1,352	829	2,515	2,017	1,211	1,405	2,658	466	629	2,527	33,989	142,950
VEHICLE REGISTRATION AND LICENSE FEES																		
CARS		22,980																22,980
BUSES			32															32
MOTORCYCLES	161																	161
TRUCKS																		
KENTUCKY				5,550	297	185	340	345	1,034	772	1,117	942	1,204		330	1,096	3,280	16,492
APPORTIONED				66	72	50	56	26	111	238	245	225	651	114	149	657	13,240	15,901
VEHICLE ID CARDS				29	31	22	24	11	48	103	106	98	282	49	65	285	5,742	6,896
PERMITS				32	35	25	27	13	54	116	119	110	317	55	73	320	6,452	7,749
OTHER	12	3,056	18	1,313	11	11	19	11	35	27	16	16	30	4	6	27	319	4,931
MISCELLANEOUS	100	24,651	146	10,594	92	88	152	92	281	218	127	132	240	36	48	214	2,571	39,781
OPERATOR'S LICENSE FEES	14	3,548	21	1,525	13	13	22	13	40	31	18	19	35	5	7	31	370	5,726
USAGE TAXES																		
KENTUCKY, BUSES			39															39
KENTUCKY, OTHER VEHICLES	1,129	142,196		55,823	1,647	762	827	375	1,054	785	4,746	458	577	87	121	423	1,384	212,394
FEDERAL, TRUCKS AND TRAILERS											809	840	1,534	231	307	1,366	16,406	21,493
ROAD TOLLS		7,907	34	3,597	37	36	64	43	121	109	76	115	252	48	65	306	4,856	17,666
OTHER MOTOR CARRIER TAXES																		
KENTUCKY, WEIGHT-DISTANCE															1,036	4,614	55,396	61,046
KENTUCKY, EXTENDED-WEIGHT PERMITS																	611	611
FEDERAL, USE													872	131	174	777	9,325	11,279
OTHER FEDERAL TAXES	12	3,048	18	1,310	11	11	19	11	35	27	16	16	30	4	6	26	318	4,919
TOTAL	1,727	379,602	2,430	191,882	4,091	2,976	4,601	2,788	8,482	7,394	10,318	6,123	11,894	1,766	3,824	15,949	197,488	853,335
PERCENTAGE	.202	44.484	.285	22.486	.479	.349	.539	.327	.994	.867	1.209	.718	1.394	.207	.448	1.869	23.143	100.000

TABLE D10. TOTAL REVENUE GENERATED (THOUSAND DOLLARS)

				SINGLE-UNIT TRUCKS				SINGLE TRAILER			MULTIPLE TRAILERS			
	MOTOR-CYCLES	CARS	BUSES	2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE	4 OR MORE AXLES	4 OR LESS AXLES	5-AXLE	6 OR MORE AXLES	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES	TOTAL
FUEL TAXES														
KY, HEAVY VEHICLE SURTAX					76	177	127	274	4,465	234	146	25	5	5,528
KY, NORMAL USE					1,093	868	297	752	8,608	447	316	46	9	12,435
KY, NORMAL	203	116,873	1,737	75,965	11,969	3,231	1,008	2,448	26,380	1,367	977	140	28	242,326
FEDERAL	95	55,343	385	35,864	10,058	3,375	1,114	2,738	31,033	1,609	1,138	166	33	142,950
VEHICLE REGISTRATION & LICENSE FEES														
CARS		22,980												22,980
BUSES			32											32
MOTORCYCLES	161													161
TRUCKS														
KENTUCKY				5,539	4,149	1,421	435	753	3,792	178	206	16	3	16,492
APPORTIONED				66	1,061	816	293	836	11,737	617	397	64	13	15,901
VEHICLE ID CARDS				29	460	354	127	363	5,090	267	172	28	6	6,896
PERMITS				32	517	398	143	408	5,720	300	193	31	6	7,749
OTHER	12	3,056	18	1,311	135	38	12	28	294	15	11	2		4,931
MISCELLANEOUS	100	24,651	146	10,573	1,087	305	96	224	2,372	123	89	13	2	39,781
OPERATOR'S LICENSE FEES	14	3,548	21	1,522	157	44	14	32	341	18	13	2		5,726
USAGE TAXES														
KY, BUSES			39											39
KY, OTHER VEHICLES	1,129	142,196		55,716	8,961	1,337	340	681	1,834	95	97	7	1	212,394
FEDERAL, TRUCKS AND TRAILERS					1,395	1,667	565	1,346	15,084	776	565	80	16	21,493
ROAD TOLLS		7,907	34	3,590	594	338	127	325	4,346	227	150	24	5	17,666
OTHER MOTOR CARRIER TAXES														
KY, WEIGHT-DISTANCE					851	2,017	1,501	3,037	49,139	2,571	1,607	270	53	61,046
KY, EXTENDED-WEIGHT PERMITS					7	13	3	25	516	28	15	3	1	611
FEDERAL, USE					321	692	298	672	8,499	439	303	45	9	11,279
OTHER FEDERAL TAXES	12	3,048	18	1,307	134	38	12	28	293	15	11	2		4,919
TOTAL	1,727	379,602	2,430	191,514	43,025	17,128	6,512	14,970	179,544	9,325	6,406	962	190	853,335
PERCENTAGE	.202	44.484	.285	22.443	5.042	2.007	.763	1.754	21.040	1.093	.751	.113	.022	100.000

APPENDIX E

INTERSTATE TRAVEL

During the course of this work, a detailed estimate was made of travel in 1990 on Kentucky's Interstate highways. Analyzed on a segment-by-segment basis, average annual daily traffic volumes (AADTs) were extracted from the Division of Planning's historical volume file (TVS). Actual 1990 counts were used where available: otherwise, estimates of 1990 AADT were based on extrapolations from counts in previous years. Vehicle classification data was taken from the classification counting program conducted during 1986-1990. During this period, classification counts were available at approximately 80 Interstate locations. Averages were used at those locations for which data were available for two or more years within this five-year period. For the majority of segments--those not included in the classification counting program--estimates of traffic composition were based on counts available at the most appropriate nearby location.

Results of this investigation are summarized in Tables E1-E10 of this appendix. Tables E1-E9 detail estimates for individual Interstate segments, and Table E10 summarizes the statewide totals. In these summaries, the category of cars is considered to include not only passenger cars but also motorcycles and two-axle, four-tire trucks. Buses include both school and commercial buses. Trucks include all other vehicles having six or more tires. The rural/urban code categories are defined as follows:

Rural/Urban Code	Meaning
1	Rural
2	Small Urban
3	Urban

TABLE E1. TRAVEL ON I 24 IN KENTUCKY

RURAL-URBAN	NO. LANES	BEGIN MP	END MP	1990 AADT	1990 PERCENT TRUCKS	1990 VMT (MILLIONS) TOTAL	CARS	BUSES	TRUCKS
1	4	.00	2.96	18,100	19.62	19.54	15.69	.02	3.83
2	4	2.96	4.33	21,800	19.62	10.90	8.75	.01	2.14
2	4	4.33	6.39	26,600	14.87	19.99	17.00	.02	2.97
2	4	6.39	6.90	22,000	14.87	4.08	3.47	.00	.61
1	4	6.90	16.16	19,300	14.87	65.27	55.49	.07	9.71
1	4	16.16	17.32	16,200	22.88	6.86	5.28	.01	1.57
1	4	17.32	24.94	16,200	22.88	45.06	34.72	.03	10.31
1	4	24.94	26.56	13,100	22.88	7.73	5.96	.01	1.77
1	4	26.56	29.35	14,000	29.03	14.28	10.09	.05	4.14
1	4	29.35	30.72	14,000	29.03	7.00	4.94	.02	2.03
1	4	30.72	33.88	15,000	30.80	17.30	11.94	.03	5.33
1	4	33.88	39.51	15,000	30.80	30.80	21.26	.05	9.49
1	4	39.51	41.60	13,900	30.80	10.64	7.35	.02	3.28
1	4	41.60	44.69	8,940	32.05	10.08	6.85	.00	3.23
1	4	44.69	54.84	8,280	32.05	30.67	20.83	.01	9.83
1	4	54.84	55.63	8,280	32.05	2.38	1.62	.00	.76
1	4	55.63	57.39	8,390	32.05	5.39	3.66	.00	1.73
1	4	57.39	65.35	8,390	32.05	24.38	16.55	.01	7.81
1	4	65.35	69.83	8,190	33.04	13.40	8.93	.04	4.43
1	4	69.83	72.76	8,190	33.04	8.75	5.83	.03	2.89
1	4	72.76	85.63	9,430	33.04	44.32	29.54	.14	14.64
1	4	85.63	93.37	15,300	34.63	43.22	28.15	.10	14.97
TOTALS				12,970	26.58	442.03	323.87	.69	117.47

TABLE E2. TRAVEL ON I 64 IN KENTUCKY

RURAL-URBAN	NO. LANES	BEGIN MP	END MP	1990 AADT	1990 PERCENT TRUCKS	1990 VMT (MILLIONS) TOTAL	CARS	BUSES	TRUCKS
3	6	.00	.85	51,000	8.19	15.82	14.52	.01	1.30
3	6	.85	2.60	58,700	9.68	37.49	33.77	.09	3.63
3	6	2.60	3.80	65,100	9.68	28.51	25.68	.07	2.76
3	6	3.80	4.50	63,600	9.68	16.25	14.64	.04	1.57
3	6	4.50	5.10	75,200	8.02	16.47	15.06	.09	1.32
3	8	5.10	6.45	71,300	8.02	35.24	32.21	.20	2.82
3	4	6.45	7.95	68,200	9.63	37.12	33.47	.07	3.57
3	4	7.95	10.31	69,800	9.63	60.20	54.29	.11	5.80
3	4	10.31	12.28	61,200	8.20	43.94	40.11	.22	3.60
3	4	12.28	14.89	98,000	8.44	93.68	85.58	.20	7.90
3	4	14.89	17.07	55,200	8.44	43.92	40.12	.10	3.70
3	4	17.07	18.89	52,800	8.44	34.96	31.94	.08	2.95
1	4	18.89	23.97	30,300	21.48	56.25	44.07	.12	12.08
1	4	23.97	31.84	26,300	21.48	75.53	59.17	.16	16.22
1	4	31.84	35.16	22,400	21.48	27.15	21.27	.06	5.83
1	4	35.16	43.33	25,500	21.73	76.03	59.41	.10	16.52
1	4	43.33	46.30	25,200	21.73	27.33	21.35	.04	5.94
1	4	46.30	47.76	25,200	21.73	13.41	10.48	.02	2.91
1	4	47.76	53.12	21,000	23.92	41.06	31.20	.04	9.82
1	4	53.12	57.90	25,500	23.92	44.50	33.81	.04	10.64
1	4	57.90	59.43	22,600	25.66	12.64	9.38	.02	3.24
1	4	59.43	65.27	22,600	25.66	48.17	35.75	.06	12.36
1	4	65.27	67.11	18,400	25.66	12.33	9.15	.02	3.16
1	4	67.11	68.94	18,400	25.66	12.29	9.12	.02	3.15
1	4	68.94	71.00	20,600	21.26	15.52	12.22	.00	3.30
2	4	71.00	74.48	20,600	21.26	26.16	20.60	.00	5.56
1	4	80.95	87.49	24,300	17.06	57.95	48.01	.05	9.89
1	4	87.49	89.48	29,300	17.06	21.30	17.65	.02	3.63
1	4	89.48	94.23	29,300	17.06	50.83	42.11	.05	8.67
2	4	94.23	96.25	32,000	17.06	23.50	19.47	.02	4.01
1	4	96.25	97.68	26,500	17.06	13.83	11.46	.01	2.36
1	4	97.68	101.74	16,800	18.51	24.90	20.27	.01	4.61
1	4	101.74	104.26	26,900	18.51	24.79	20.19	.01	4.59
1	4	104.26	109.62	26,900	18.51	52.64	42.87	.02	9.74
1	4	109.62	112.50	15,100	29.48	15.85	11.14	.03	4.67
1	4	112.50	115.65	14,500	29.48	16.68	11.73	.03	4.92
1	4	115.65	121.23	14,500	29.48	29.55	20.78	.05	8.71
1	4	121.23	123.03	13,700	29.48	8.98	6.31	.02	2.65
1	4	123.03	128.96	11,400	29.48	24.67	17.35	.04	7.27
1	4	128.96	137.29	11,400	29.48	34.66	24.38	.06	10.22
1	4	137.29	148.67	9,950	29.48	41.33	29.07	.08	12.19
1	4	148.67	156.27	9,950	29.48	27.60	19.41	.05	8.14
1	4	156.27	161.45	9,140	29.48	17.30	12.17	.03	5.10
1	4	161.45	171.61	11,800	29.49	43.74	30.76	.08	12.90
1	4	171.61	180.81	12,500	28.49	42.00	29.90	.14	11.96
1	4	180.81	181.37	12,500	28.49	2.54	1.81	.01	.72
1	4	181.37	185.47	11,400	21.59	17.06	13.33	.04	3.68
1	4	185.47	190.72	13,600	21.59	26.09	20.39	.07	5.63
1	4	190.72	191.51	17,800	17.70	5.09	4.18	.00	.90
TOTALS				22,530	18.98	1574.84	1273.15	2.88	298.86

TABLE E3. TRAVEL ON I 65 IN KENTUCKY

RURAL-URBAN	NO. LANES	BEGIN MP	END MP	1990 AADT	1990 PERCENT TRUCKS	1990 VMT (MILLIONS) TOTAL	CARS	BUSES	TRUCKS
1	4	.00	1.98	26,000	28.96	18.80	13.28	.08	5.44
1	4	1.98	6.00	23,300	25.13	34.15	25.46	.11	8.58
1	4	6.00	13.71	25,200	25.13	70.95	52.89	.23	17.83
1	4	13.71	20.54	25,200	25.13	62.80	46.82	.20	15.78
2	4	20.54	22.35	25,600	25.13	16.91	12.61	.05	4.25
2	4	22.35	28.01	30,400	28.51	62.77	44.70	.17	17.89
1	4	28.01	35.56	33,900	28.51	93.49	66.58	.26	26.65
1	4	35.56	37.51	27,800	44.98	19.78	10.84	.04	8.89
1	4	37.51	42.89	27,000	44.98	53.01	29.05	.11	23.84
1	4	42.89	43.13	27,000	44.98	2.39	1.31	.01	1.08
1	4	43.13	47.36	26,400	44.98	40.68	22.30	.09	18.30
1	4	47.36	52.43	23,800	44.98	44.06	24.15	.09	19.82
1	4	52.43	53.96	22,100	42.92	12.33	6.99	.05	5.29
1	4	53.96	57.63	22,100	42.92	29.61	16.78	.13	12.71
1	4	57.63	64.15	22,600	42.92	53.82	30.49	.23	23.10
1	4	64.15	70.41	23,500	42.92	53.66	30.40	.23	23.03
1	4	70.41	74.62	22,500	42.92	34.62	19.61	.15	14.86
1	4	74.62	75.90	22,500	42.92	10.46	5.93	.04	4.49
1	4	75.90	78.66	20,500	42.92	20.69	11.72	.09	8.88
1	4	78.66	80.39	20,500	42.92	12.94	7.33	.06	5.56
1	4	80.39	85.58	20,800	42.92	39.39	22.31	.17	16.91
1	4	85.58	91.13	27,900	30.97	56.53	38.80	.22	17.50
2	6	91.13	93.21	27,000	24.80	20.47	15.33	.06	5.08
2	6	93.21	94.06	25,700	24.80	8.01	6.00	.02	1.99
1	6	94.06	103.31	29,500	34.69	99.57	64.59	.44	34.54
1	6	103.31	104.70	29,500	34.69	15.00	9.73	.07	5.20
1	6	104.70	111.83	32,900	33.26	85.60	56.95	.18	28.47
1	6	111.83	116.67	35,800	33.26	63.21	42.05	.13	21.02
1	6	116.67	121.59	44,100	23.22	79.26	60.54	.30	18.41
3	6	121.59	123.18	59,000	23.22	34.24	26.16	.13	7.95
3	6	123.18	124.98	59,000	23.22	38.76	29.61	.15	9.00
3	8	124.98	126.67	75,400	13.49	46.59	40.22	.09	6.28
3	8	126.67	128.30	86,100	13.49	51.19	44.19	.10	6.90
3	8	128.30	129.80	114,000	13.77	62.42	53.67	.15	8.60
3	6	129.80	130.77	85,700	11.23	30.34	26.79	.14	3.41
3	6	130.77	132.96	96,200	11.23	76.65	67.68	.36	8.61
3	6	132.96	135.31	106,000	11.23	91.08	80.42	.43	10.23
3	6	135.31	136.50	97,000	14.96	42.17	35.81	.05	6.31
3	6	136.50	137.32	97,000	14.96	28.96	24.59	.04	4.33
TOTALS				34,265	28.36	1717.38	1224.70	5.64	487.03

TABLE E4. TRAVEL ON I 71 IN KENTUCKY

RURAL- URBAN	NO. LANES	BEGIN MP	END MP	1990 AADT	1990 PERCENT TRUCKS	1990 VMT (MILLIONS) TOTAL	CARS	BUSES	TRUCKS
3	4	.00	1.75	52,200	9.81	33.38	29.88	.23	3.28
3	4	1.75	4.97	47,200	9.81	55.37	49.56	.38	5.43
3	4	4.97	9.06	37,800	16.95	56.53	46.79	.16	9.58
3	4	9.06	11.32	31,500	25.19	25.89	19.27	.10	6.52
1	4	11.32	14.48	31,500	25.19	36.38	27.07	.14	9.16
1	4	14.48	17.48	31,800	25.19	34.81	25.90	.14	8.77
1	4	17.48	21.87	34,000	25.19	54.49	40.55	.22	13.73
1	4	21.87	24.73	25,500	37.35	26.60	16.58	.08	9.93
1	4	24.73	27.71	25,500	37.35	27.76	17.31	.09	10.37
1	4	27.71	33.86	17,100	38.91	38.39	23.33	.12	14.94
1	4	33.86	38.09	17,200	38.91	26.53	16.13	.08	10.32
1	4	38.09	38.81	17,200	38.91	4.53	2.76	.01	1.76
1	4	38.81	42.80	17,200	38.91	25.07	15.24	.08	9.76
1	4	42.80	44.31	15,900	38.91	8.76	5.33	.03	3.41
1	4	44.31	53.43	14,800	38.91	49.27	29.95	.15	19.17
1	4	53.43	56.67	14,800	38.91	17.51	10.64	.05	6.81
1	4	56.67	61.77	15,000	38.91	27.92	16.97	.09	10.87
1	4	61.77	69.89	19,600	35.31	58.06	37.44	.12	20.50
1	4	69.89	72.09	19,600	35.31	15.72	10.14	.03	5.55
1	4	72.09	77.72	19,300	35.31	39.71	25.61	.08	14.02
TOTALS				23,360	29.26	662.69	466.45	2.36	193.89

TABLE E5. TRAVEL ON I 75 IN KENTUCKY

RURAL-URBAN	NO. LANES	BEGIN MP	END MP	1990 AADT	1990 PERCENT TRUCKS	1990 VMT (MILLIONS) TOTAL	CARS	BUSES	TRUCKS
1	4	.00	10.55	22,400	35.68	86.24	54.96	.52	30.77
2	4	10.55	15.46	22,300	35.68	39.95	25.46	.24	14.25
1	4	15.46	24.66	26,200	35.68	88.05	56.11	.53	31.41
2	4	24.66	27.94	26,100	25.58	31.25	23.17	.09	7.99
2	4	27.94	28.85	26,100	25.58	8.65	6.41	.02	2.21
1	4	28.85	38.19	27,900	25.58	95.07	70.49	.26	24.32
1	4	38.19	40.70	27,200	25.58	24.99	18.53	.07	6.39
1	4	40.70	49.13	22,300	29.10	68.60	48.49	.14	19.96
1	4	49.13	50.77	27,700	27.36	16.53	11.99	.02	4.52
1	4	50.77	58.95	27,700	27.36	82.77	60.03	.10	22.65
1	4	58.95	62.01	21,200	27.36	23.63	17.14	.03	6.47
1	4	62.01	73.41	25,100	31.52	104.44	71.36	.17	32.92
1	4	73.41	75.52	25,100	31.52	19.31	13.19	.03	6.09
2	4	75.52	80.00	25,000	31.52	40.92	27.96	.07	12.90
1	4	80.00	87.19	29,000	24.05	76.05	57.66	.10	18.29
2	4	87.19	89.80	32,900	17.05	31.43	26.04	.02	5.36
1	4	89.80	94.73	34,400	17.05	61.88	51.28	.05	10.55
1	4	94.73	97.04	36,400	17.05	30.66	25.41	.02	5.23
1	4	97.04	97.54	39,300	17.05	7.24	6.00	.01	1.24
1	4	97.54	98.52	39,300	17.05	13.96	11.57	.01	2.38
1	4	98.52	103.89	36,600	19.93	71.79	57.09	.40	14.31
3	4	103.89	109.71	37,100	24.87	78.74	59.03	.13	19.58
3	4	109.71	110.89	42,900	20.66	18.56	14.69	.04	3.83
3	4	110.89	111.23	36,900	20.66	4.54	3.59	.01	.94
3	6	111.23	112.86	49,700	20.66	29.55	23.39	.06	6.10
3	6	112.86	115.24	47,400	20.66	41.28	32.67	.08	8.53
3	6	115.24	117.94	47,600	20.66	46.94	37.16	.09	9.70
1	4	117.94	119.87	32,500	16.33	22.88	19.13	.02	3.74
1	4	119.87	120.79	32,800	16.33	11.00	9.20	.01	1.80
1	4	120.79	124.87	32,800	16.33	48.80	40.79	.04	7.97
2	4	124.87	125.53	27,600	16.33	6.65	5.56	.01	1.09
1	4	125.53	129.20	27,000	16.33	36.18	30.24	.03	5.91
1	4	129.20	136.47	26,900	26.13	71.37	52.57	.15	18.65
1	4	136.47	143.24	23,700	26.13	58.57	43.14	.12	15.31
1	4	143.24	144.44	23,700	26.13	10.42	7.67	.02	2.72
1	4	144.44	154.18	21,800	26.13	77.44	57.04	.16	20.24
1	4	154.18	158.54	22,900	26.13	36.52	26.90	.08	9.54
1	4	158.54	165.90	30,700	24.76	82.44	61.86	.17	20.41
1	4	165.90	166.26	28,400	24.76	3.75	2.82	.01	.93
1	4	166.26	169.44	28,400	23.02	32.92	25.28	.07	7.58
1	4	169.44	171.32	28,400	23.02	19.45	14.93	.04	4.48
1	4	171.32	172.54	32,000	23.02	14.35	11.02	.03	3.30
1	6	172.54	175.36	51,300	25.20	52.80	39.41	.09	13.31
3	6	175.36	180.11	59,500	13.58	102.98	88.80	.20	13.98
3	6	180.11	181.26	71,600	13.58	30.08	25.94	.06	4.08
3	6	181.26	182.46	117,000	13.58	51.37	44.30	.10	6.98
3	6	182.46	183.31	125,000	13.58	38.87	33.52	.07	5.28
3	6	183.31	183.77	125,000	13.58	20.94	18.06	.04	2.84
3	6	183.77	184.72	97,300	13.58	33.56	28.94	.06	4.56
3	6	184.72	186.35	103,000	12.94	61.32	53.28	.10	7.93
3	6	186.35	187.72	110,000	12.94	55.17	47.94	.09	7.14
3	6	187.72	188.68	95,500	12.94	33.36	28.99	.06	4.32
3	6	188.68	190.28	97,200	12.94	56.87	49.42	.10	7.36
3	6	190.28	190.67	100,000	11.48	14.05	12.41	.03	1.61
3	6	190.67	191.22	106,000	11.48	21.51	18.99	.05	2.47
3	6	191.22	191.78	129,000	11.48	26.13	23.07	.06	3.00
TOTALS				33,926	22.63	2374.79	1832.04	5.39	537.39

TABLE E6. TRAVEL ON I 264 IN KENTUCKY

RURAL-URBAN	NO. LANES	BEGIN MP	END MP	1990 AADT	1990 PERCENT TRUCKS	1990 VMT (MILLIONS) TOTAL	CARS	BUSES	TRUCKS
3	6	.00	1.50	37,000	8.61	20.26	18.28	.23	1.74
3	4	1.50	2.70	49,600	6.49	21.67	20.21	.06	1.41
3	6	2.70	3.89	51,900	6.49	22.68	21.14	.06	1.47
3	6	3.89	5.22	51,300	6.49	24.81	23.13	.07	1.61
3	6	5.22	7.48	39,900	6.49	32.93	30.70	.09	2.14
3	6	7.48	9.23	66,700	5.58	42.68	39.99	.31	2.38
3	4	9.23	10.17	72,500	5.58	24.72	23.16	.18	1.38
3	4	10.17	11.03	94,100	5.66	29.78	28.06	.04	1.68
3	4	11.03	11.89	91,000	5.66	28.47	26.82	.03	1.61
3	4	11.89	12.19	96,900	5.66	10.61	10.00	.01	.60
3	4	12.19	12.84	113,000	8.35	26.81	24.53	.04	2.24
3	4	12.84	13.49	115,000	8.35	27.28	24.97	.04	2.28
3	4	13.49	14.65	98,100	6.84	41.36	38.43	.10	2.83
3	4	14.65	15.82	91,500	6.84	39.34	36.56	.09	2.69
3	4	15.82	17.16	91,900	6.84	44.91	41.74	.10	3.07
3	4	17.16	18.05	70,600	6.84	22.83	21.22	.05	1.56
3	4	18.05	19.07	77,200	6.84	28.77	26.74	.07	1.97
3	4	19.07	19.94	65,500	6.84	20.78	19.31	.05	1.42
3	4	19.94	22.28	39,900	4.16	34.12	32.61	.09	1.42
3	4	22.28	23.06	37,600	4.16	10.61	10.14	.03	.44
TOTALS				66,001	6.47	555.40	517.75	1.73	35.94

TABLE E7. TRAVEL ON I 265 IN KENTUCKY

RURAL-URBAN	NO. LANES	BEGIN MP	END MP	1990 AADT	1990 PERCENT TRUCKS	1990 VMT (MILLIONS) TOTAL	CARS	BUSES	TRUCKS
3	4	10.25	11.74	54,700	10.60	29.71	26.41	.15	3.15
3	4	11.74	13.54	44,800	9.27	29.47	26.62	.11	2.73
3	4	13.54	15.19	41,000	10.40	24.63	21.97	.10	2.56
3	4	15.19	17.31	39,000	10.40	30.21	26.94	.13	3.14
3	4	17.31	21.49	31,300	12.91	47.81	41.44	.20	6.17
3	4	21.49	23.76	31,300	12.91	25.89	22.44	.11	3.34
3	4	23.76	25.50	35,100	11.13	22.30	19.77	.05	2.48
3	4	25.50	26.84	34,600	11.13	16.88	14.97	.04	1.88
3	4	26.84	30.48	24,100	11.13	32.08	28.43	.08	3.57
3	4	30.48	32.56	21,000	11.13	15.92	14.11	.04	1.77
3	4	32.56	34.12	24,000	11.13	13.61	12.07	.03	1.51
3	4	34.12	34.73	33,400	11.13	7.46	6.61	.02	.83
TOTALS				23,351	11.20	295.98	261.77	1.06	33.14

TABLE E8. TRAVEL ON I 275 IN KENTUCKY

RURAL-URBAN	NO. LANES	BEGIN MP	END MP	1990 AADT	1990 PERCENT TRUCKS	1990 VMT (MILLIONS) TOTAL	CARS	BUSES	TRUCKS
3	6	.00	1.58	39,500	13.78	22.81	19.58	.08	3.14
3	6	1.58	1.99	39,500	13.78	5.93	5.09	.02	.82
3	6	1.99	3.97	34,200	13.78	24.65	21.17	.09	3.40
3	6	3.97	7.04	23,800	18.29	26.66	21.78	.01	4.88
3	4	7.04	11.43	23,300	18.29	37.37	30.52	.01	6.84
3	4	11.43	13.87	17,700	18.29	15.72	12.84	.01	2.88
3	6	73.06	74.90	60,400	8.56	40.59	36.99	.12	3.47
3	6	74.90	77.04	58,500	6.18	45.63	42.68	.12	2.82
3	6	77.04	77.58	64,000	8.97	12.61	11.47	.02	1.13
3	6	77.58	78.76	64,000	8.97	27.68	25.16	.04	2.48
3	6	78.76	79.80	64,300	8.97	24.22	22.02	.03	2.17
3	6	79.80	82.48	65,400	8.97	63.95	58.13	.09	5.74
3	6	82.48	83.78	66,900	8.97	31.87	28.96	.04	2.86
TOTALS				12,416	11.23	379.69	336.39	.68	42.62

TABLE E9. TRAVEL ON I 471 IN KENTUCKY

RURAL-URBAN	NO. LANES	BEGIN MP	END MP	1990 AADT	1990 PERCENT TRUCKS	1990 VMT (MILLIONS) TOTAL	CARS	BUSES	TRUCKS
3	6	.00	.73	33,700	4.77	8.97	8.53	.01	.43
3	6	.73	2.47	71,500	4.77	45.54	43.31	.05	2.17
3	6	2.47	3.96	71,400	4.77	38.75	36.86	.05	1.85
3	6	3.96	4.59	73,900	4.77	16.89	16.06	.02	.81
3	6	4.59	5.45	73,200	4.77	22.98	21.85	.03	1.10
3	6	5.45	5.75	75,800	4.77	8.24	7.84	.01	.39
TOTALS				67,417	4.77	141.37	134.45	.17	6.75

TABLE E10. 1990 TRAVEL ON KENTUCKY INTERSTATE HIGHWAYS

HIGHWAY	1990 AADT	1990 PERCENT TRUCKS	1990 VMT (MILLIONS)			
			TOTAL	CARS	BUSES	TRUCKS
I 24	12,970	26.58	442.03	323.87	.69	117.47
I 64	22,530	18.98	1,574.84	1,273.15	2.88	298.86
I 65	34,265	28.36	1,717.38	1,224.70	5.64	487.03
I 71	23,360	29.26	662.69	466.45	2.36	193.89
I 75	33,926	22.63	2,374.79	1,832.04	5.39	537.39
I 264	66,001	6.47	555.40	517.75	1.73	35.94
I 265	23,351	11.20	295.98	261.77	1.06	33.14
I 275	12,416	11.23	379.69	336.39	.68	42.62
I 471	67,417	4.77	141.37	134.45	.17	6.75
TOTAL		21.53	8,144.17	6,370.57	20.60	1,753.11

APPENDIX F

EXTENDED-WEIGHT SYSTEM

TABLE F1. MILEAGE OF EXTENDED-WEIGHT SYSTEM (ROADWAY MILES)

FUNCTIONAL CLASS	STATE-MAINTAINED HIGHWAYS	NON-STATE-MAINTAINED HIGHWAYS	TOTAL
	COAL-PRODUCING COUNTIES		
2	539.0	---	539.0
6	163.4	---	163.4
7	936.3	---	936.3
8	480.4	---	480.4
9	102.1	---	102.1
12	27.6	---	27.6
14	25.4	---	25.4
16	80.6	---	80.6
17	5.8	---	5.8
Unclassified	94.4	264.3	358.7
Subtotal	2,455.0	264.3	2,719.3
	COAL-IMPACT COUNTIES		
2	112.2	---	112.2
6	227.9	---	227.9
7	145.7	---	145.7
8	1.8	---	1.8
9	11.0	---	11.0
12	22.7	---	22.7
14	91.9	---	91.9
16	41.9	---	41.9
17	---	---	---
Unclassified	63.1	2.8	65.9
Subtotal	718.2	2.8	721.0
	ALL EXTENDED-WEIGHT SYSTEM COUNTIES		
2	651.2	---	651.2
6	391.3	---	391.3
7	1,082.0	---	1,082.0
8	482.2	---	482.2
9	113.1	---	113.1
12	50.3	---	50.3
14	117.3	---	117.3
16	122.5	---	122.5
17	5.8	---	5.8
Unclassified	157.5	267.1	424.6
Total	3,173.2	267.1	3,440.3

TABLE F2. MILEAGE OF BASE SYSTEM (ROADWAY MILES)

FUNCTIONAL CLASS	STATE-MAINTAINED HIGHWAYS	NON-STATE-MAINTAINED HIGHWAYS	TOTAL
	COAL-PRODUCING COUNTIES		
2	662.5	---	662.5
6	379.1	---	379.1
7	2,476.2	---	2,476.2
8	3,439.5	2.3	3,441.8
9	1,015.4	1.6	1,017.0
12	41.5	---	41.5
14	95.1	.7	95.8
16	179.7	14.7	194.4
17	83.7	37.4	121.1
Unclassified	934.7	---	934.7
Subtotal	9,307.4	56.7	9,364.1
	COAL-IMPACT COUNTIES		
2	252.0	---	252.0
6	479.4	---	479.4
7	1,780.8	---	1,780.8
8	2,631.6	---	2,631.6
9	795.1	1.5	796.6
12	51.9	---	51.9
14	269.9	2.4	272.3
16	397.5	15.5	413.0
17	105.3	56.5	161.8
Unclassified	813.1	---	813.1
Subtotal	7,576.6	75.9	7,652.5
	ALL EXTENDED-WEIGHT SYSTEM COUNTIES		
2	914.5	---	914.5
6	858.5	---	858.5
7	4,257.0	---	4,257.0
8	6,071.1	2.3	6,073.4
9	1,810.5	3.1	1,813.6
12	93.4	---	93.4
14	365.0	3.1	368.1
16	577.2	30.2	607.4
17	189.0	93.9	282.9
Unclassified	1,747.8	---	1,747.8
Total	16,884.0	132.6	17,016.6

TABLE F3. AVERAGE ANNUAL DAILY TRAFFIC ON EXTENDED-WEIGHT SYSTEM (VEHICLES PER DAY)

FUNCTIONAL CLASS	STATE-MAINTAINED HIGHWAYS	NON-STATE-MAINTAINED HIGHWAYS	TOTAL
COAL-PRODUCING COUNTIES			
2	7,464	---	7,464
6	4,460	---	4,460
7	2,638	---	2,638
8	1,675	---	1,675
9	4,154	---	4,154
12	16,539	---	16,539
14	23,180	---	23,180
16	9,208	---	9,208
17	4,568	---	4,568
Unclassified	4,389	N/A	N/A
Average	4,350	N/A	N/A
COAL-IMPACT COUNTIES			
2	7,862	---	7,862
6	4,303	---	4,303
7	3,206	---	3,206
8	428	---	428
9	713	---	713
12	22,049	---	22,049
14	13,037	---	13,037
16	16,072	---	16,072
17	---	---	---
Unclassified	8,397	N/A	N/A
Average	7,297	N/A	N/A
ALL EXTENDED-WEIGHT SYSTEM COUNTIES			
2	7,533	---	7,533
6	4,369	---	4,369
7	2,714	---	2,714
8	1,670	---	1,670
9	3,819	---	3,819
12	19,026	---	19,026
14	15,233	---	15,233
16	11,556	---	11,556
17	4,568	---	4,568
Unclassified	5,995	N/A	N/A
Average	5,017	N/A	N/A

TABLE F4. AVERAGE ANNUAL DAILY TRAFFIC ON BASE SYSTEM (VEHICLES PER DAY)

FUNCTIONAL CLASS	STATE-MAINTAINED HIGHWAYS	NON-STATE-MAINTAINED HIGHWAYS	TOTAL
COAL-PRODUCING COUNTIES			
2	6,825	---	6,825
6	3,975	---	3,975
7	1,894	---	1,894
8	678	646	678
9	729	83	728
12	10,846	---	10,846
14	15,531	9,480	15,486
16	6,236	8,215	6,385
17	2,592	3,112	2,753
Unclassified	3,526	---	3,526
Average	2,187	4,328	2,200
COAL-IMPACT COUNTIES			
2	6,450	---	6,450
6	3,436	---	3,436
7	1,642	---	1,642
8	557	---	557
9	430	133	429
12	14,350	---	14,350
14	17,186	26,525	17,268
16	9,429	10,422	9,467
17	4,239	4,199	4,225
Unclassified	9,045	---	9,045
Average	3,291	6,095	3,319
ALL EXTENDED-WEIGHT SYSTEM COUNTIES			
2	6,722	---	6,722
6	3,674	---	3,674
7	1,789	---	1,789
8	626	646	626
9	598	107	597
12	12,793	---	12,793
14	16,755	22,676	16,804
16	8,435	9,348	8,478
17	3,510	3,766	3,594
Unclassified	6,094	---	5,785
Average	2,682	5,340	2,671

TABLE F5. PERCENTAGE OF TRUCKS WITH COAL ON EXTENDED-WEIGHT SYSTEM

FUNCTIONAL CLASS	STATE-MAINTAINED HIGHWAYS	NON-STATE-MAINTAINED HIGHWAYS
COAL-PRODUCING COUNTIES		
2	16.32	---
6	17.69	---
7	25.79	---
8	36.43	---
9	N/A	---
12	5.05	---
14	8.57	---
16	1.06	---
17	N/A	---
Unclassified	N/A	N/A
COAL-IMPACT COUNTIES		
2	.09	---
6	.81	---
7	3.64	---
8	N/A	---
9	N/A	---
12	.00	---
14	.00	---
16	N/A	---
17	---	---
Unclassified	N/A	N/A
ALL EXTENDED-WEIGHT SYSTEM COUNTIES		
2	11.47	---
6	12.06	---
7	23.27	---
8	36.43	---
9	N/A	---
12	2.54	---
14	4.65	---
16	1.06	---
17	N/A	---
Unclassified	N/A	N/A

TABLE F6. PERCENTAGE OF TRUCKS WITH COAL ON BASE SYSTEM

FUNCTIONAL CLASS	STATE-MAINTAINED HIGHWAYS	NON-STATE-MAINTAINED HIGHWAYS
COAL-PRODUCING COUNTIES		
2	19.75	---
6	8.84	---
7	19.00	---
8	25.10	N/A
9	N/A	N/A
12	N/A	---
14	.00	N/A
16	.08	N/A
17	N/A	N/A
Unclassified	N/A	---
COAL-IMPACT COUNTIES		
2	.00	---
6	.73	---
7	2.16	---
8	N/A	---
9	N/A	N/A
12	.00	---
14	.00	N/A
16	.00	N/A
17	N/A	N/A
Unclassified	N/A	---
ALL EXTENDED-WEIGHT SYSTEM COUNTIES		
2	10.55	---
6	7.04	---
7	16.23	---
8	25.10	N/A
9	N/A	N/A
12	.00	---
14	.00	N/A
16	.03	N/A
17	N/A	N/A
Unclassified	N/A	---

TABLE F7. PERCENTAGE OF TRUCKS WITH COAL DECAL ON EXTENDED-WEIGHT SYSTEM

FUNCTIONAL CLASS	PERCENT OF SU-3A WITH DECAL (59,400 LBS +)	PERCENT OF SU-4A WITH DECAL (77,000 LBS +)	PERCENT OF C-5A + WITH DECAL (80,000 LBS +)
	COAL-PRODUCING COUNTIES		
2	11.76	11.89	22.77
6	11.76	11.89	22.77
7	11.76	11.89	22.77
8	11.76	11.89	22.77
9	11.76	11.89	22.77
12	2.35	2.56	3.25
14	2.35	2.56	3.25
16	2.35	2.56	3.25
17	2.35	2.56	3.25
Unclassified			
Average			
	COAL-IMPACT COUNTIES		
2	3.25	3.51	6.71
6	3.25	3.51	6.71
7	3.25	3.51	6.71
8	3.25	3.51	6.71
9	3.25	3.51	6.71
12	1.99	.82	2.04
14	1.99	.82	2.04
16	1.99	.82	2.04
17	1.99	.82	2.04
Unclassified			
Average			

TABLE F8. PERCENTAGE OF TRUCKS WITH COAL DECAL ON BASE SYSTEM

FUNCTIONAL CLASS	PERCENT OF SU-3A WITH DECAL (59,400 LBS +)	PERCENT OF SU-4A WITH DECAL (77,000 LBS +)	PERCENT OF C-5A + WITH DECAL (80,000 LBS +)
	COAL-PRODUCING COUNTIES		
2	4.33	.00	11.48
6	4.33	.00	11.48
7	4.33	.00	11.48
8	4.33	.00	11.48
9	4.33	.00	11.48
12	1.49	15.38	18.88
14	1.49	15.38	18.88
16	1.49	15.38	18.88
17	1.49	15.38	18.88
Unclassified			
Average			
	COAL-IMPACT COUNTIES		
2	1.99	2.56	6.09
6	1.99	2.56	6.09
7	1.99	2.56	6.09
8	1.99	2.56	6.09
9	1.99	2.56	6.09
12	2.50	3.45	3.85
14	2.50	3.45	3.85
16	2.50	3.45	3.85
17	2.50	3.45	3.85
Unclassified			
Average			

TABLE F9. VEHICLE-TYPE PERCENTAGES ON EXTENDED-WEIGHT SYSTEM

FUNCTIONAL CLASS	MOTOR-CYCLES	CARS	BUSES	SINGLE-UNIT TRUCKS				SINGLE-TRAILER TRUCKS			MULTI-TRAILER TRUCKS			TOTAL
				2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE	4 OR MORE AXLES	4 OR LESS AXLES	5-AXLE	6 OR MORE AXLES	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES	
COAL-PRODUCING COUNTIES														
2	.17	54.06	.20	31.61	2.72	2.04	.78	.33	4.57	2.86	.64	.02	.00	100.00
6	.28	56.99	.12	32.64	1.90	1.99	.34	.23	1.91	3.56	.03	.01	.00	100.00
7	.21	55.01	.27	33.20	2.17	2.65	.93	.27	3.55	1.56	.17	.01	.00	100.00
8	.40	47.14	.38	37.22	2.09	2.35	3.64	.59	4.43	1.73	.03	.00	.00	100.00
9														.00
12	.09	71.96	.29	20.23	1.23	.91	.67	.35	2.36	1.84	.06	.01	.00	100.00
14	.42	63.76	.18	25.71	2.32	1.17	.37	.51	4.88	.57	.10	.00	.01	100.00
16	1.09	75.83	.35	17.66	1.33	1.35	.24	.69	1.09	.17	.00	.00	.20	100.00
17														.00
Unclassified														.00
COAL-IMPACT COUNTIES														
2	.21	63.72	.16	25.73	2.45	1.10	.21	.80	3.72	1.54	.25	.10	.01	100.00
6	.44	57.05	.21	30.68	1.89	2.75	1.23	.63	3.05	2.03	.04	.00	.00	100.00
7	.10	59.56	.29	32.26	2.72	.69	.24	.32	3.42	.38	.02	.00	.00	100.00
8														.00
9														.00
12	.33	59.46	.21	30.41	4.12	.71	.08	.86	3.46	.08	.26	.02	.00	100.00
14	.17	76.96	.96	16.13	1.22	1.23	.36	.96	.84	1.04	.06	.03	.04	100.00
16														.00
17	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Unclassified														.00

TABLE F10. VEHICLE-TYPE PERCENTAGES ON BASE SYSTEM

FUNCTIONAL CLASS	MOTOR-CYCLES	CARS	BUSES	SINGLE-UNIT TRUCKS				SINGLE-TRAILER TRUCKS			MULTI-TRAILER TRUCKS			TOTAL
				2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE	4 OR MORE AXLES	4 OR LESS AXLES	5-AXLE	6 OR MORE AXLES	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES	
COAL-PRODUCING COUNTIES														
2	.19	54.94	.20	30.75	2.60	1.06	.35	.35	6.55	2.81	.10	.10	.00	100.00
6	.38	59.40	.18	34.63	1.61	1.13	.84	.15	.91	.76	.01	.00	.00	100.00
7	.59	56.89	.31	32.25	2.69	1.73	.82	.54	3.30	.84	.02	.01	.01	100.00
8	.30	50.13	.36	39.74	2.27	1.48	1.49	.08	2.79	1.32	.03	.01	.00	100.00
9														.00
12														.00
14	.73	67.56	.31	21.28	1.83	.94	.26	.88	3.72	2.19	.15	.11	.04	100.00
16	.26	72.05	23.06	.06	.96	1.60	.43	.08	.23	1.23	.04	.00	.00	100.00
17														.00
Unclassified														.00
COAL-IMPACT COUNTIES														
2	.51	68.61	.27	19.21	2.17	1.39	.69	1.47	4.30	1.11	.23	.01	.03	100.00
6	.47	59.10	.39	33.76	2.58	1.93	.26	.19	.70	.62	.00	.00	.00	100.00
7	.28	69.29	.34	24.72	2.46	.95	.15	.28	1.18	.27	.08	.00	.00	100.00
8														.00
9														.00
12	.37	81.74	.10	13.72	1.04	1.39	.27	.26	.71	.36	.03	.00	.01	100.00
14	.17	71.90	.37	23.57	1.71	.83	.11	.29	.84	.15	.05	.00	.01	100.00
16	.21	77.90	1.04	17.76	1.39	1.28	.08	.04	.07	.23	.00	.00	.00	100.00
17														.00
Unclassified														.00

TABLE F11. VEHICLE-TYPE PERCENTAGES INCLUDING DECAL COAL TRUCKS ON EXTENDED-WEIGHT SYSTEM

FUNCTIONAL CLASS	MOTOR-CYCLES	CARS	BUSES	SINGLE-UNIT TRUCKS						SINGLE-TRAILER TRUCKS				MULTI-TRAILER TRUCKS			TOTAL
				2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE W/O DECAL	3-AXLE WITH DECAL	4-AXLE W/O DECAL	4-AXLE WITH DECAL	4-AXLE W/O DECAL	5-AXLE W/O DECAL	6-AXLE W/O DECAL	ALL WITH DECAL	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES	
COAL-PRODUCING COUNTIES																	
2	.17	54.06	.20	31.61	2.72	1.80	.24	.69	.09	.33	3.53	2.21	1.69	.64	.02	.00	100.00
6	.28	56.99	.12	32.64	1.90	1.76	.23	.30	.04	.23	1.48	2.75	1.25	.03	.01	.00	100.00
7	.21	55.01	.27	33.20	2.17	2.34	.31	.82	.11	.27	2.74	1.20	1.16	.17	.01	.00	100.00
8	.40	47.14	.38	37.22	2.09	2.07	.28	3.21	.43	.59	3.42	1.34	1.40	.03	.00	.00	100.00
9																	
12	.09	71.96	.29	20.23	1.23	.89	.02	.65	.02	.35	2.28	1.78	.14	.06	.01	.00	100.00
14	.42	63.76	.18	25.71	2.32	1.14	.03	.36	.01	.51	4.72	.55	.18	.10	.00	.01	100.00
16	1.09	75.83	.35	17.66	1.33	1.32	.03	.23	.01	.69	1.05	.16	.04	.00	.00	.20	100.00
17																	
Unclassified																	
COAL-IMPACT COUNTIES																	
2	.21	63.72	.16	25.73	2.45	1.06	.04	.20	.01	.80	3.47	1.44	.35	.25	.10	.01	100.00
6	.44	57.05	.21	30.68	1.89	2.66	.09	1.19	.04	.63	2.85	1.89	.34	.04	.00	.00	100.00
7	.10	59.56	.29	32.26	2.72	.67	.02	.23	.01	.32	3.19	.35	.25	.02	.00	.00	100.00
8																	
9																	
12	.33	59.46	.21	30.41	4.12	.70	.01	.08	.00	.86	3.39	.08	.07	.26	.02	.00	100.00
14	.17	76.96	.96	16.13	1.22	1.21	.02	.36	.00	.96	.82	1.02	.04	.06	.03	.04	100.00
16																	
17	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
Unclassified																	
ALL EXTENDED-WEIGHT SYSTEM COUNTIES (ESTIMATED)																	
2	.18	55.80	.19	30.55	2.67	1.67	.20	.60	.08	.41	3.52	2.07	1.45	.57	.03	.00	100.00
6	.37	57.02	.17	31.52	1.89	2.27	.15	.81	.04	.46	2.26	2.26	.73	.04	.00	.00	100.00
7	.19	55.73	.27	33.05	2.26	2.07	.27	.73	.09	.28	2.81	1.07	1.02	.15	.01	.00	100.00
8	.40	47.15	.38	37.21	2.09	2.07	.28	3.20	.43	.59	3.42	1.34	1.40	.03	.00	.00	100.00
9	.26	53.42	.24	33.59	2.22	1.98	.26	1.24	.17	.36	2.80	1.86	1.36	.22	.01	.00	100.00
12	.22	65.42	.25	25.55	2.74	.79	.02	.35	.01	.62	2.86	.89	.10	.16	.02	.00	100.00
14	.25	72.61	.70	19.29	1.58	1.18	.03	.36	.01	.81	2.11	.86	.08	.07	.02	.03	100.00
16	.69	72.21	.46	20.33	1.97	1.14	.03	.23	.00	.79	1.55	.35	.05	.08	.01	.11	100.00
17	.53	70.52	.27	21.20	1.63	1.12	.03	.42	.01	.52	2.69	.83	.12	.05	.00	.07	100.00
Unclassified	.31	62.18	.32	27.60	2.25	1.42	.09	.62	.05	.59	2.75	1.16	.49	.14	.02	.02	100.00

TABLE F12. VEHICLE-TYPE PERCENTAGES INCLUDING DECAL COAL TRUCKS ON BASE SYSTEM

FUNCTIONAL CLASS	MOTOR-CYCLES	CARS	BUSES	SINGLE-UNIT TRUCKS						SINGLE-TRAILER TRUCKS				MULTI-TRAILER TRUCKS			TOTAL
				2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE W/O DECAL	3-AXLE WITH DECAL	4-AXLE W/O DECAL	4-AXLE WITH DECAL	4-AXLE W/O DECAL	5-AXLE W/O DECAL	6-AXLE W/O DECAL	ALL WITH DECAL	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES	
COAL-PRODUCING COUNTIES																	
2	.19	54.94	.20	30.75	2.60	1.01	.05	.35	.00	.35	5.80	2.49	1.07	.10	.10	.00	100.00
6	.38	59.40	.18	34.63	1.61	1.08	.05	.84	.00	.15	.81	.67	.19	.01	.00	.00	100.00
7	.59	56.89	.31	32.25	2.69	1.66	.07	.82	.00	.54	2.92	.74	.48	.02	.01	.01	100.00
8	.30	50.13	.36	39.74	2.27	1.42	.06	1.49	.00	.08	2.47	1.17	.47	.03	.01	.00	100.00
9																	
12																	
14	.73	67.56	.31	21.28	1.83	.93	.01	.22	.04	.88	3.02	1.78	1.12	.15	.11	.04	100.00
16	.26	72.05	23.06	.06	.96	1.58	.02	.36	.07	.08	.19	1.00	.28	.04	.00	.00	100.00
17																	
Unclassified																	
COAL-IMPACT COUNTIES																	
2	.51	68.61	.27	19.21	2.17	1.36	.03	.67	.02	1.47	4.04	1.04	.33	.23	.01	.03	100.00
6	.47	59.10	.39	33.76	2.58	1.89	.04	.25	.01	.19	.66	.58	.08	.00	.00	.00	100.00
7	.28	69.29	.34	24.72	2.46	.93	.02	.15	.00	.28	1.11	.25	.09	.08	.00	.00	100.00
8																	
9																	
12	.37	81.74	.10	13.72	1.04	1.36	.03	.26	.01	.26	.68	.35	.04	.03	.00	.01	100.00
14	.17	71.90	.37	23.57	1.71	.81	.02	.11	.00	.29	.81	.14	.04	.05	.00	.01	100.00
16	.21	77.90	1.04	17.76	1.39	1.25	.03	.08	.00	.04	.07	.22	.01	.00	.00	.00	100.00
17																	
Unclassified																	
ALL EXTENDED-WEIGHT SYSTEM COUNTIES (ESTIMATED)																	
2	.27	58.55	.22	27.70	2.49	1.11	.04	.44	.00	.65	5.33	2.11	.88	.13	.08	.01	100.00
6	.43	59.24	.29	34.18	2.12	1.50	.04	.53	.00	.17	.73	.63	.13	.00	.00	.00	100.00
7	.47	61.65	.32	29.36	2.60	1.38	.05	.56	.00	.44	2.22	.56	.33	.04	.01	.01	100.00
8	.35	56.13	.35	34.40	2.32	1.41	.05	1.05	.00	.30	2.26	.96	.35	.06	.01	.00	100.00
9	.38	58.60	.28	31.67	2.33	1.32	.05	.71	.00	.40	2.66	1.07	.43	.06	.02	.00	100.00
12	.42	77.24	4.46	12.57	1.17	1.32	.03	.27	.03	.34	1.03	.74	.29	.05	.02	.01	100.00
14	.31	70.85	.36	23.02	1.74	.84	.02	.13	.01	.43	1.34	.54	.30	.07	.03	.02	100.00
16	.22	76.55	6.11	13.69	1.29	1.32	.03	.14	.02	.05	.09	.40	.07	.01	.00	.00	100.00
17	.33	74.77	4.16	15.84	1.38	1.17	.03	.20	.02	.29	.87	.61	.25	.05	.02	.01	100.00
Unclassified	.36	67.94	1.55	23.46	1.92	1.27	.03	.39	.01	.40	1.63	.70	.25	.06	.01	.01	100.00

TABLE F13. UNIT ESALs ON EXTENDED-WEIGHT SYSTEM (ESALs PER VEHICLE)

FUNCTIONAL CLASS	MOTOR-CYCLES	CARS	BUSES	SINGLE-UNIT TRUCKS						SINGLE-TRAILER TRUCKS				MULTI-TRAILER TRUCKS		
				2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE W/O DECAL	3-AXLE WITH DECAL	4-AXLE W/O DECAL	4-AXLE WITH DECAL	4-AXLE W/O DECAL	5-AXLE W/O DECAL	6-AXLE W/O DECAL	ALL WITH DECAL	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES
COAL-PRODUCING COUNTIES																
2	.000	.003	.927	.006	.474	.791	13.928	2.347	9.335	11.278	.501	.429	8.596	1.297	8.616	3.570
6	.000	.003	.927	.006	.474	.791	13.928	2.347	9.335	11.278	.501	.429	8.596	1.297	8.616	3.570
7	.000	.003	.927	.006	.474	.791	13.928	2.347	9.335	11.278	.501	.429	8.596	1.297	8.616	3.570
8	.000	.003	.927	.006	.474	.791	13.928	2.347	9.335	11.278	.501	.429	8.596	1.297	8.616	3.570
9	.000	.003	.927	.006	.474	.791	13.928	2.347	9.335	11.278	.501	.429	8.596	1.297	8.616	3.570
12	.000	.003	.414	.006	.424	.669	6.625	2.132	4.861	.458	.627	.439	5.007	1.361	2.308	1.169
14	.000	.003	.414	.006	.424	.669	6.625	2.132	4.861	.458	.627	.439	5.007	1.361	2.308	1.169
16	.000	.003	.414	.006	.424	.669	6.625	2.132	4.861	.458	.627	.439	5.007	1.361	2.308	1.169
17	.000	.003	.414	.006	.424	.669	6.625	2.132	4.861	.458	.627	.439	5.007	1.361	2.308	1.169
Unclassified																
COAL-IMPACT COUNTIES																
2	.000	.003	.437	.006	.492	.649	12.109	2.358	11.832	.830	.547	.485	5.798	1.007	2.121	8.757
6	.000	.003	.437	.006	.492	.649	12.109	2.358	11.832	.830	.547	.485	5.798	1.007	2.121	8.757
7	.000	.003	.437	.006	.492	.649	12.109	2.358	11.832	.830	.547	.485	5.798	1.007	2.121	8.757
8	.000	.003	.437	.006	.492	.649	12.109	2.358	11.832	.830	.547	.485	5.798	1.007	2.121	8.757
9	.000	.003	.437	.006	.492	.649	12.109	2.358	11.832	.830	.547	.485	5.798	1.007	2.121	8.757
12	.000	.003	.365	.006	.249	.689	6.194	2.193	9.466	.491	.497	.407	3.376	.947	1.467	.579
14	.000	.003	.365	.006	.249	.689	6.194	2.193	9.466	.491	.497	.407	3.376	.947	1.467	.579
16	.000	.003	.365	.006	.249	.689	6.194	2.193	9.466	.491	.497	.407	3.376	.947	1.467	.579
17	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Unclassified																

TABLE F14. UNIT ESALs ON BASE SYSTEM (ESALs PER VEHICLE)

FUNCTIONAL CLASS	MOTOR-CYCLES	CARS	BUSES	SINGLE-UNIT TRUCKS						SINGLE-TRAILER TRUCKS				MULTI-TRAILER TRUCKS		
				2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE W/O DECAL	3-AXLE WITH DECAL	4-AXLE W/O DECAL	4-AXLE WITH DECAL	4-AXLE W/O DECAL	5-AXLE W/O DECAL	6-AXLE W/O DECAL	ALL WITH DECAL	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES
COAL-PRODUCING COUNTIES																
2	.000	.003	2.340	.006	6.302	1.049	12.295	1.845	16.392	.888	.616	.375	12.040	12.574	22.142	6.104
6	.000	.003	2.340	.006	6.302	1.049	12.295	1.845	16.392	.888	.616	.375	12.040	12.574	22.142	6.104
7	.000	.003	2.340	.006	6.302	1.049	12.295	1.845	16.392	.888	.616	.375	12.040	12.574	22.142	6.104
8	.000	.003	2.340	.006	6.302	1.049	12.295	1.845	16.392	.888	.616	.375	12.040	12.574	22.142	6.104
9	.000	.003	2.340	.006	6.302	1.049	12.295	1.845	16.392	.888	.616	.375	12.040	12.574	22.142	6.104
12	.000	.003	1.345	.006	.404	.650	12.217	1.740	16.288	.588	.533	.578	9.749	2.122	.180	1.596
14	.000	.003	1.345	.006	.404	.650	12.217	1.740	16.288	.588	.533	.578	9.749	2.122	.180	1.596
16	.000	.003	1.345	.006	.404	.650	12.217	1.740	16.288	.588	.533	.578	9.749	2.122	.180	1.596
17	.000	.003	1.345	.006	.404	.650	12.217	1.740	16.288	.588	.533	.578	9.749	2.122	.180	1.596
Unclassified																
COAL-IMPACT COUNTIES																
2	.000	.003	.728	.006	.268	.809	5.796	2.339	7.728	.619	.640	.640	2.912	1.265	1.140	1.330
6	.000	.003	.728	.006	.268	.809	5.796	2.339	7.728	.619	.640	.640	2.912	1.265	1.140	1.330
7	.000	.003	.728	.006	.268	.809	5.796	2.339	7.728	.619	.640	.640	2.912	1.265	1.140	1.330
8	.000	.003	.728	.006	.268	.809	5.796	2.339	7.728	.619	.640	.640	2.912	1.265	1.140	1.330
9	.000	.003	.728	.006	.268	.809	5.796	2.339	7.728	.619	.640	.640	2.912	1.265	1.140	1.330
12	.000	.003	1.096	.006	.431	.982	10.886	2.279	9.966	.651	.626	.446	3.015	.706	.233	1.771
14	.000	.003	1.096	.006	.431	.982	10.886	2.279	9.966	.651	.626	.446	3.015	.706	.233	1.771
16	.000	.003	1.096	.006	.431	.982	10.886	2.279	9.966	.651	.626	.446	3.015	.706	.233	1.771
17	.000	.003	1.096	.006	.431	.982	10.886	2.279	9.966	.651	.626	.446	3.015	.706	.233	1.771
Unclassified																

TABLE F15. VEHICLE MILES ON EXTENDED-WEIGHT SYSTEM (1000s)

FUNCTIONAL CLASS	MOTOR-CYCLES	CARS	BUSES	SINGLE-UNIT TRUCKS						SINGLE-TRAILER TRUCKS				MULTI-TRAILER TRUCKS			TOTAL
				2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE W/O DECAL	3-AXLE WITH DECAL	4-AXLE W/O DECAL	4-AXLE WITH DECAL	4-AXLE W/O DECAL	5-AXLE W/O DECAL	6-AXLE W/O DECAL	ALL WITH DECAL	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES	
COAL-PRODUCING COUNTIES																	
2	2,496	793,833	2,937	464,171	39,941	26,433	3,523	10,092	1,362	4,846	51,827	32,434	24,843	9,398	294	0	1,468,430
6	745	151,593	319	86,822	5,054	4,671	623	797	108	612	3,924	7,313	3,313	80	27	0	265,999
7	1,893	495,935	2,434	299,310	19,563	21,081	2,810	7,387	997	2,434	24,717	10,862	10,490	1,533	90	0	901,535
8	1,175	138,452	1,116	109,317	6,138	6,090	812	9,420	1,271	1,733	10,048	3,924	4,120	88	0	0	293,705
9	410	82,511	375	52,119	3,437	3,084	411	1,940	262	550	4,322	2,902	2,130	337	15	0	154,805
12	150	119,895	483	33,706	2,049	1,481	36	1,088	29	583	3,804	2,966	227	100	17	0	166,614
14	903	137,021	387	55,251	4,986	2,455	59	775	20	1,096	10,146	1,185	381	215	0	21	214,902
16	2,953	205,416	948	47,839	3,603	3,571	86	633	17	1,869	2,857	446	111	0	0	542	270,890
17	52	6,819	26	2,050	157	108	3	40	1	50	260	80	11	5	0	7	9,670
Unclassified	575	91,763	387	42,834	2,973	2,445	247	1,353	153	642	4,154	2,159	1,266	223	11	45	151,227
Subtotal	11,351	2,223,239	9,413	1,193,419	87,902	71,419	8,608	33,525	4,219	14,414	116,059	64,272	46,891	11,978	454	615	3,897,777
COAL-IMPACT COUNTIES																	
2	676	205,161	515	82,844	7,888	3,427	115	652	24	2,576	11,174	4,626	1,136	805	322	32	321,972
6	1,575	204,195	752	109,811	6,765	9,523	320	4,248	155	2,255	10,184	6,778	1,220	143	0	0	357,923
7	170	101,548	494	55,002	4,638	1,138	38	395	14	546	5,440	604	435	34	0	0	170,497
8	1	169	1	83	7	4	0	2	0	2	9	3	1	0	0	0	281
9	7	1,721	6	846	67	42	1	15	1	17	91	35	9	3	1	0	2,863
12	603	108,626	384	55,555	7,527	1,271	26	145	1	1,571	6,192	143	132	475	37	0	182,687
14	743	336,551	4,198	70,538	5,335	5,272	107	1,561	13	4,198	3,598	4,455	168	262	131	175	437,307
16	614	167,658	1,438	57,197	6,563	2,337	47	536	4	2,237	5,177	1,348	136	393	61	49	245,797
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Unclassified	483	122,516	708	52,298	4,796	2,434	72	796	24	1,381	5,306	1,850	410	244	58	19	193,396
Subtotal	4,874	1,248,145	8,496	484,173	43,585	25,448	727	8,351	236	14,781	47,171	19,843	3,646	2,360	610	276	1,912,722
ALL EXTENDED-WEIGHT SYSTEM COUNTIES																	
2	3,172	998,994	3,452	547,014	47,830	29,860	3,638	10,744	1,386	7,422	63,001	37,060	25,979	10,203	616	32	1,790,403
6	2,320	355,788	1,071	196,633	11,819	14,194	942	5,045	262	2,867	14,108	14,092	4,533	223	27	0	623,922
7	2,064	597,482	2,929	354,312	24,201	22,219	2,848	7,782	1,011	2,980	30,157	11,466	10,925	1,567	90	0	1,072,032
8	1,176	138,621	1,117	109,400	6,145	6,094	812	9,421	1,271	1,734	10,057	3,928	4,120	88	0	0	293,986
9	417	84,232	382	52,965	3,504	3,126	412	1,956	262	566	4,413	2,937	2,139	340	16	0	157,668
12	753	228,521	867	89,261	9,576	2,752	61	1,233	30	2,154	9,996	3,109	359	575	53	0	349,301
14	1,646	473,573	4,585	125,789	10,321	7,727	166	2,336	33	5,294	13,745	5,640	548	477	131	196	652,208
16	3,567	373,074	2,386	105,036	10,166	5,908	133	1,170	21	4,106	8,034	1,794	247	393	61	591	516,687
17	52	6,819	26	2,050	157	108	3	40	1	50	260	80	11	5	0	7	9,670
Unclassified	1,058	214,279	1,095	95,132	7,769	4,879	319	2,148	177	2,022	9,460	4,009	1,675	466	69	65	344,623
Total	16,225	3,471,383	17,909	1,677,592	131,487	96,867	9,335	41,876	4,455	29,196	163,230	84,116	50,538	14,337	1,064	891	5,810,500

TABLE F16. VEHICLE MILES ON BASE SYSTEM (1000s)

FUNCTIONAL CLASS	MOTOR-CYCLES	CARS	BUSES	SINGLE-UNIT TRUCKS						SINGLE-TRAILER TRUCKS				MULTI-TRAILER TRUCKS			TOTAL
				2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE W/O DECAL	3-AXLE WITH DECAL	4-AXLE W/O DECAL	4-AXLE WITH DECAL	4-AXLE W/O DECAL	5-AXLE W/O DECAL	6-AXLE W/O DECAL	ALL WITH DECAL	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES	
COAL-PRODUCING COUNTIES																	
2	3,136	906,713	3,301	507,489	42,910	16,736	757	5,776	0	5,776	95,689	41,052	17,734	1,650	1,650	0	1,650,370
6	2,090	326,716	990	190,474	8,855	5,946	269	4,620	0	825	4,431	3,700	1,054	55	0	0	550,027
7	10,100	973,855	5,307	552,063	46,048	28,332	1,282	14,037	0	9,244	50,005	12,729	8,136	342	171	171	1,711,822
8	2,554	426,693	3,064	338,256	19,322	12,052	545	12,682	0	681	21,021	9,946	4,016	255	85	0	851,173
9	986	149,519	709	92,787	6,194	3,490	158	2,364	0	757	8,102	3,426	1,495	108	81	7	270,183
12	813	114,682	19,197	17,530	2,292	2,055	31	480	87	789	2,632	2,279	1,143	156	90	33	164,290
14	3,935	364,219	1,671	114,721	9,866	4,992	76	1,186	216	4,744	16,268	9,577	6,015	809	593	216	539,104
16	1,063	294,701	94,321	245	3,927	6,447	98	1,488	271	327	763	4,081	1,127	164	0	0	409,022
17	392	55,276	9,253	8,449	1,105	991	15	231	42	380	1,269	1,098	551	75	44	16	79,187
Unclassified	4,912	723,715	48,960	318,200	23,979	15,374	545	8,188	213	4,170	30,472	15,732	7,227	702	461	100	1,202,950
Subtotal	29,981	4,336,090	186,773	2,140,215	164,496	96,416	3,776	51,053	828	27,693	230,653	103,620	48,499	4,316	3,176	543	7,428,128
COAL-IMPACT COUNTIES																	
2	3,026	407,043	1,602	113,967	12,874	8,082	164	3,989	105	8,721	23,957	6,184	1,955	1,365	59	178	593,271
6	2,826	355,330	2,345	202,977	15,512	11,373	231	1,523	40	1,142	3,952	3,501	483	0	0	0	601,235
7	2,988	739,523	3,629	263,833	26,255	9,937	202	1,560	41	2,988	11,827	2,706	942	854	0	0	1,067,287
8	2,247	351,328	1,783	138,552	12,858	7,464	152	1,912	50	3,460	10,350	3,350	888	553	18	54	535,017
9	524	81,946	416	32,317	2,999	1,741	35	446	12	807	2,414	781	207	129	4	12	124,791
12	1,006	222,201	272	37,296	2,827	3,684	94	709	25	707	1,856	941	112	82	0	27	271,839
14	2,878	1,217,305	6,264	399,053	28,951	13,701	351	1,798	64	4,910	13,674	2,442	645	847	0	169	1,693,053
16	2,873	1,065,695	14,228	242,962	19,016	17,073	438	1,057	38	547	921	3,025	158	0	0	0	1,368,030
17	407	125,745	820	29,897	2,248	1,853	48	241	9	320	846	386	49	43	0	11	162,924
Unclassified	8,993	1,917,280	11,230	593,876	50,780	33,991	772	6,782	197	11,319	32,934	11,586	2,635	1,745	45	224	2,684,389
Subtotal	27,768	6,483,397	42,588	2,054,730	174,320	108,900	2,486	20,016	581	34,922	102,731	34,903	8,076	5,617	126	675	9,101,836
ALL EXTENDED-WEIGHT SYSTEM COUNTIES																	
2	6,161	1,313,757	4,903	621,456	55,784	24,819	922	9,765	105	14,497	119,647	47,236	19,688	3,015	1,710	178	2,243,641
6	4,916	682,046	3,335	393,451	24,367	17,319	500	6,143	40	1,967	8,383	7,201	1,538	55	0	0	1,151,261
7	13,088	1,713,379	8,935	815,896	72,303	38,270	1,484	15,597	41	12,232	61,832	15,435	9,078	1,196	171	171	2,779,109
8	4,801	778,021	4,848	476,808	32,180	19,515	697	14,594	50	4,141	31,372	13,295	4,904	808	103	54	1,386,191
9	1,510	231,465	1,125	125,104	9,193	5,230	193	2,810	12	1,563	10,516	4,207	1,702	237	85	19	394,974
12	1,819	336,884	19,469	54,826	5,119	5,739	126	1,188	112	1,495	4,488	3,220	1,255	238	90	60	436,129
14	6,814	1,581,524	7,936	513,774	38,817	18,693	427	2,984	280	9,654	29,942	12,019	6,661	1,655	593	385	2,232,157
16	3,936	1,360,396	108,548	243,208	22,942	23,520	535	2,545	308	874	1,684	7,106	1,285	164	0	0	1,777,052
17	799	181,021	10,073	38,346	3,353	2,844	63	472	51	701	2,115	1,485	600	119	44	27	242,111
Unclassified	13,905	2,640,994	60,190	912,076	74,758	49,366	1,316	14,970	410	15,489	63,406	27,318	9,863	2,447	506	324	3,887,338
Total	57,749	10,819,486	229,361	4,194,945	338,817	205,315	6,262	71,069	1,409	62,615	333,384	138,522	56,575	9,933	3,302	1,218	16,529,963

TABLE F17. AXLE MILES ON EXTENDED-WEIGHT SYSTEM (1000s)

FUNCTIONAL CLASS	MOTOR-CYCLES	CARS	BUSES	SINGLE-UNIT TRUCKS						SINGLE-TRAILER TRUCKS				MULTI-TRAILER TRUCKS			TOTAL
				2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE W/O DECAL	3-AXLE WITH DECAL	4-AXLE W/O DECAL	4-AXLE WITH DECAL	4-AXLE W/O DECAL	5-AXLE W/O DECAL	6-AXLE W/O DECAL	ALL WITH DECAL	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES	
COAL-PRODUCING COUNTIES																	
2	4,993	1,587,667	5,874	928,341	79,883	79,299	10,568	40,368	5,447	19,383	259,135	194,606	134,870	46,990	1,762	0	3,399,186
6	1,490	303,186	638	173,644	10,108	14,013	1,868	3,187	430	2,447	19,619	43,880	18,855	399	160	0	593,922
7	3,786	991,869	4,868	598,619	39,127	63,243	8,429	29,550	3,988	9,737	123,585	65,170	56,071	7,663	541	0	2,006,245
8	2,350	276,905	2,232	218,634	12,277	18,271	2,435	37,679	5,085	6,931	50,242	23,545	21,912	441	0	0	678,938
9	820	165,022	751	104,238	6,873	9,251	1,233	7,761	1,047	2,198	21,610	17,413	11,600	1,684	93	0	351,595
12	300	239,791	966	67,412	4,099	4,442	107	4,351	114	2,333	19,021	17,796	1,247	500	100	0	362,579
14	1,805	274,043	774	110,502	9,971	7,366	177	3,099	81	4,384	50,732	7,111	1,950	1,075	0	150	473,221
16	5,905	410,832	1,896	95,678	7,206	10,713	258	2,534	67	7,477	14,284	2,673	572	0	0	3,792	563,887
17	103	13,639	53	4,100	315	324	8	161	4	200	1,299	483	60	26	2	47	20,823
Unclassified	1,149	183,525	773	85,668	5,945	7,335	740	5,410	613	2,567	20,769	12,956	6,814	1,113	65	318	335,761
Subtotal	22,702	4,446,477	18,826	2,386,838	175,803	214,257	25,823	134,100	16,876	57,656	580,295	385,633	253,178	59,889	2,722	4,308	8,785,384
COAL-IMPACT COUNTIES																	
2	1,352	410,322	1,030	165,687	15,777	10,280	345	2,610	95	10,303	55,868	27,754	6,059	4,025	1,932	225	713,664
6	3,150	408,390	1,503	219,621	13,529	28,569	960	16,992	618	9,020	50,921	40,670	6,642	716	0	0	801,300
7	341	203,096	989	110,004	9,275	3,415	115	1,579	57	2,182	27,199	3,626	2,225	170	0	0	364,274
8	1	338	1	166	13	12	0	6	0	7	45	21	5	1	1	0	618
9	14	3,442	13	1,692	135	126	4	62	2	67	454	211	48	15	6	1	6,290
12	1,206	217,251	767	111,110	15,053	3,814	77	580	5	6,284	30,960	859	663	2,375	219	0	391,225
14	1,487	673,102	8,396	141,075	10,670	15,815	321	6,246	52	16,793	17,992	26,731	939	1,312	787	1,224	922,943
16	1,229	335,316	2,876	114,394	13,126	7,010	142	2,145	18	8,947	25,884	8,090	712	1,966	369	344	522,569
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Unclassified	967	245,032	1,416	104,596	9,592	7,303	216	3,183	97	5,523	26,531	11,098	2,170	1,218	348	135	419,426
Subtotal	9,747	2,496,289	16,991	968,347	87,171	76,344	2,181	33,402	944	59,126	235,853	119,061	19,455	11,799	3,661	1,930	4,142,303
ALL EXTENDED-WEIGHT SYSTEM COUNTIES																	
2	6,345	1,997,988	6,904	1,094,029	95,659	89,579	10,914	42,977	5,542	29,686	315,003	222,360	140,929	51,014	3,694	225	4,112,851
6	4,639	711,576	2,142	393,266	23,637	42,582	2,827	20,179	1,048	11,467	70,539	84,550	25,497	1,115	160	0	1,395,223
7	4,127	1,194,965	5,857	708,624	48,402	66,658	8,543	31,129	4,045	11,919	150,784	68,796	58,295	7,834	541	0	2,370,519
8	2,351	277,243	2,233	218,800	12,290	18,283	2,435	37,685	5,085	6,938	50,287	23,565	21,917	442	1	0	679,556
9	835	168,464	763	105,930	7,008	9,377	1,237	7,823	1,050	2,265	22,063	17,624	11,648	1,698	99	1	357,885
12	1,506	457,042	1,734	178,522	19,152	8,255	184	4,931	119	8,617	49,982	18,655	1,910	2,875	319	0	753,804
14	3,292	947,145	9,170	251,578	20,642	23,181	498	9,345	133	21,177	68,724	33,842	2,889	2,386	787	1,375	1,396,164
16	7,134	746,148	4,772	210,072	20,331	17,724	400	4,679	84	16,424	40,168	10,764	1,284	1,966	369	4,137	1,086,456
17	103	13,639	53	4,100	315	324	8	161	4	200	1,299	483	60	26	2	47	20,823
Unclassified	2,116	428,557	2,189	190,264	15,538	14,638	957	8,593	710	8,090	47,300	24,054	8,984	2,331	413	453	755,187
Total	32,449	6,942,766	35,817	3,355,185	262,974	290,602	28,004	167,502	17,820	116,782	816,149	504,694	272,633	71,687	6,384	6,238	12,927,686

TABLE F18. AXLE MILES ON BASE SYSTEM (1000s)

FUNCTIONAL CLASS	MOTOR-CYCLES	CARS	BUSES	SINGLE-UNIT TRUCKS						SINGLE-TRAILER TRUCKS				MULTI-TRAILER TRUCKS			TOTAL
				2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE W/O DECAL	3-AXLE WITH DECAL	4-AXLE W/O DECAL	4-AXLE WITH DECAL	4-AXLE W/O DECAL	5-AXLE W/O DECAL	6-AXLE W/O DECAL	ALL WITH DECAL	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES	
COAL-PRODUCING COUNTIES																	
2	6,271	1,813,427	6,601	1,014,978	85,819	50,209	2,272	23,105	0	23,105	478,447	246,309	94,695	8,252	9,902	0	3,863,395
6	4,180	653,432	1,980	380,949	17,711	17,839	807	18,481	0	3,300	22,153	22,202	5,800	275	0	0	1,149,109
7	20,199	1,947,711	10,613	1,104,125	92,096	84,997	3,847	56,148	0	36,975	250,025	76,371	42,583	1,712	1,027	1,198	3,729,628
8	5,107	853,386	6,128	676,512	38,643	36,156	1,636	50,730	0	2,724	105,107	59,674	21,535	1,277	511	0	1,859,127
9	1,972	299,038	1,418	185,575	12,388	10,469	474	9,456	0	3,026	40,509	20,556	7,978	540	486	47	593,934
12	1,626	229,365	38,395	35,059	4,584	6,166	93	1,919	349	3,154	13,161	13,674	6,297	780	542	230	355,394
14	7,871	728,438	3,342	229,443	19,731	14,976	227	4,744	862	18,976	81,342	57,464	32,567	4,043	3,558	1,509	1,209,095
16	2,127	589,401	188,641	491	7,853	19,341	293	5,953	1,082	1,309	3,816	24,487	6,613	818	0	0	852,224
17	784	110,553	18,506	16,898	2,209	2,972	45	925	168	1,520	6,343	6,591	3,035	376	261	111	171,298
Unclassified	9,824	1,447,429	97,920	636,400	47,958	46,123	1,634	32,751	851	16,681	152,361	94,389	38,901	3,509	2,767	702	2,630,200
Subtotal	59,963	8,672,180	373,546	4,280,431	328,992	289,247	11,328	204,212	3,312	110,771	1,153,264	621,717	259,483	21,582	19,055	3,798	16,412,881
COAL-IMPACT COUNTIES																	
2	6,051	814,086	3,204	227,935	25,748	24,247	492	15,955	419	34,884	119,785	37,106	10,236	6,823	356	1,246	1,328,573
6	5,652	710,659	4,690	405,954	31,024	34,119	693	6,093	160	4,569	19,762	21,004	2,666	0	0	0	1,247,043
7	5,977	1,479,046	7,258	527,667	52,511	29,812	605	6,240	164	11,954	59,135	16,237	4,915	4,269	0	0	2,205,789
8	4,494	702,656	3,567	277,103	25,717	22,391	455	7,646	201	13,839	51,751	20,097	4,691	2,764	107	375	1,137,853
9	1,048	163,892	832	64,633	5,998	5,223	106	1,783	47	3,228	12,071	4,688	1,094	645	25	87	265,400
12	2,012	444,403	544	74,593	5,654	11,052	283	2,835	101	2,827	9,279	5,646	602	408	0	190	560,428
14	5,756	2,434,610	12,529	798,105	57,902	41,103	1,054	7,192	257	19,639	68,371	14,651	3,340	4,233	0	1,185	3,469,928
16	5,746	2,131,391	28,455	485,924	38,031	51,219	1,313	4,227	151	2,189	4,604	18,152	916	0	0	0	2,772,318
17	815	251,489	1,640	59,793	4,497	5,560	143	965	34	1,282	4,230	2,318	264	217	0	76	333,322
Unclassified	17,985	3,834,560	22,459	1,187,753	101,559	101,974	2,315	27,130	788	45,277	164,671	69,518	13,959	8,724	268	1,566	5,600,505
Subtotal	55,536	12,966,793	85,176	4,109,459	348,641	326,699	7,459	80,065	2,323	139,688	513,657	209,416	42,719	28,083	756	4,725	18,921,197
ALL EXTENDED-WEIGHT SYSTEM COUNTIES																	
2	12,323	2,627,513	9,805	1,242,912	111,567	74,456	2,765	39,060	419	57,990	598,233	283,415	104,931	15,074	10,258	1,246	5,191,968
6	9,832	1,364,091	6,670	786,902	48,735	51,957	1,500	24,574	160	7,870	41,915	43,206	8,466	275	0	0	2,396,152
7	26,176	3,426,757	17,871	1,631,792	144,607	114,809	4,452	62,388	164	48,929	309,160	92,608	47,498	5,981	1,027	1,198	5,935,417
8	9,601	1,556,042	9,695	953,616	64,360	58,546	2,091	58,376	201	16,563	156,858	79,771	26,225	4,041	618	375	2,996,979
9	3,021	462,930	2,250	250,208	18,386	15,691	580	11,240	47	6,254	52,579	25,244	9,072	1,185	511	135	859,334
12	3,638	673,768	38,938	109,652	10,238	17,218	377	4,753	450	5,981	22,439	19,319	6,900	1,188	542	420	915,823
14	13,627	3,163,048	15,871	1,027,548	77,634	56,079	1,280	11,937	1,119	38,616	149,712	72,115	35,908	8,276	3,558	2,695	4,679,023
16	7,873	2,720,792	217,096	486,415	45,884	70,560	1,606	10,180	1,233	3,498	8,419	42,639	7,529	818	0	0	3,624,541
17	1,599	362,042	20,146	76,692	6,706	8,532	188	1,890	203	2,802	10,573	8,909	3,300	593	261	187	504,621
Unclassified	27,809	5,281,989	120,379	1,824,153	149,517	148,097	3,949	59,881	1,639	61,958	317,031	163,907	52,860	12,233	3,035	2,268	8,230,705
Total	115,499	21,638,973	458,722	8,389,890	677,633	615,946	18,787	284,277	5,635	250,460	1,666,921	831,133	302,202	49,665	19,811	8,523	35,334,078

TABLE F19. PASSENGER-CAR-EQUIVALENT MILES ON EXTENDED-WEIGHT SYSTEM (1000s)

FUNCTIONAL CLASS	MOTOR-CYCLES	CARS	BUSES	SINGLE-UNIT TRUCKS						SINGLE-TRAILER TRUCKS				MULTI-TRAILER TRUCKS			TOTAL
				2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE W/O DECAL	3-AXLE WITH DECAL	4-AXLE W/O DECAL	4-AXLE WITH DECAL	4-AXLE W/O DECAL	5-AXLE W/O DECAL	6-AXLE W/O DECAL	ALL WITH DECAL	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES	
COAL-PRODUCING COUNTIES																	
2	1,248	793,833	4,405	464,171	75,090	77,713	10,357	34,312	4,630	16,476	204,198	129,089	98,379	33,833	1,175	0	1,948,909
6	372	151,593	479	86,822	9,501	13,732	1,830	2,709	366	2,080	15,459	29,107	13,120	287	106	0	327,565
7	947	495,935	3,651	299,310	36,779	61,979	8,260	25,117	3,389	8,276	97,385	43,229	41,540	5,517	361	0	1,131,674
8	587	138,452	1,674	109,317	11,540	17,906	2,386	32,027	4,322	5,892	39,591	15,618	16,314	317	0	0	395,943
9	205	82,511	563	52,119	6,461	9,066	1,208	6,597	890	1,868	17,028	11,551	8,435	1,212	62	0	199,777
12	75	119,895	725	33,706	3,853	4,353	105	3,698	97	1,983	14,989	11,805	901	360	67	0	196,611
14	451	137,021	580	55,251	9,373	7,218	174	2,634	69	3,726	39,977	4,717	1,507	774	0	86	263,560
16	1,476	205,416	1,422	47,839	6,773	10,499	253	2,154	57	6,355	11,256	1,773	439	0	0	2,167	297,879
17	26	6,819	40	2,050	296	317	8	137	4	170	1,024	320	45	19	1	27	11,302
Unclassified	287	91,763	580	42,834	5,589	7,188	726	4,599	521	2,182	16,366	8,594	5,012	801	43	181	187,265
Subtotal	5,675	2,223,239	14,119	1,193,419	165,255	209,972	25,306	113,985	14,345	49,008	457,273	255,803	185,690	43,120	1,815	2,462	4,960,486
COAL-IMPACT COUNTIES																	
2	338	205,161	773	82,844	14,830	10,074	338	2,218	81	8,758	44,024	18,410	4,500	2,898	1,288	129	396,663
6	787	204,195	1,127	109,811	12,718	27,998	940	14,443	525	7,667	40,126	26,978	4,831	515	0	0	452,661
7	85	101,548	742	55,002	8,719	3,346	112	1,342	49	1,855	21,433	2,406	1,722	123	0	0	198,483
8	0	169	1	83	12	12	0	5	0	6	35	14	4	1	0	0	343
9	4	1,721	9	846	127	123	4	53	2	57	357	140	36	11	4	0	3,493
12	301	108,626	575	55,555	14,150	3,738	76	493	4	5,342	24,397	570	522	1,710	146	0	216,205
14	372	336,551	6,297	70,538	10,030	15,499	315	5,309	44	14,274	14,178	17,732	664	945	525	700	493,971
16	307	167,658	2,157	57,197	12,338	6,870	139	1,823	15	7,605	20,397	5,367	538	1,416	246	197	284,270
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Unclassified	242	122,516	1,062	52,298	9,017	7,157	212	2,706	82	4,695	20,906	7,362	1,623	877	232	77	231,064
Subtotal	2,437	1,248,145	12,744	484,173	81,941	74,817	2,138	28,392	802	50,257	185,852	78,977	14,440	8,495	2,441	1,103	2,277,153
ALL EXTENDED-WEIGHT SYSTEM COUNTIES																	
2	1,586	998,994	5,178	547,014	89,920	87,788	10,696	36,531	4,711	25,233	248,222	147,499	102,879	36,730	2,463	129	2,345,572
6	1,160	355,788	1,606	196,633	22,219	41,730	2,771	17,152	891	9,747	55,585	56,085	17,951	803	106	0	780,226
7	1,032	597,482	4,393	354,312	45,498	65,325	8,372	26,460	3,438	10,131	118,818	45,635	43,261	5,640	361	0	1,330,157
8	588	138,621	1,675	109,400	11,553	17,918	2,387	32,032	4,322	5,897	39,626	15,632	16,317	318	0	0	396,287
9	209	84,232	573	52,965	6,588	9,189	1,212	6,650	892	1,925	17,386	11,691	8,470	1,223	66	0	203,270
12	376	228,521	1,300	89,261	18,003	8,090	181	4,191	101	7,324	39,385	12,375	1,423	2,070	213	0	412,816
14	823	473,573	6,877	125,789	19,403	22,718	488	7,943	113	18,000	54,155	22,449	2,172	1,718	525	786	757,531
16	1,784	373,074	3,579	105,036	19,111	17,369	392	3,977	72	13,960	31,652	7,140	977	1,416	246	2,364	582,150
17	26	6,819	40	2,050	296	317	8	137	4	170	1,024	320	45	19	1	27	11,302
Unclassified	529	214,279	1,642	95,132	14,606	14,345	937	7,304	603	6,876	37,272	15,956	6,634	1,678	275	259	418,329
Total	8,112	3,471,383	26,863	1,677,592	247,196	284,790	27,444	142,377	15,147	99,265	643,125	334,780	200,130	51,615	4,256	3,565	7,237,639

TABLE F20. PASSENGER-CAR-EQUIVALENT MILES ON BASE SYSTEM (1000s)

FUNCTIONAL CLASS	MOTOR-CYCLES	CARS	BUSES	SINGLE-UNIT TRUCKS						SINGLE-TRAILER TRUCKS				MULTI-TRAILER TRUCKS			TOTAL
				2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE W/O DECAL	3-AXLE WITH DECAL	4-AXLE W/O DECAL	4-AXLE WITH DECAL	4-AXLE W/O DECAL	5-AXLE W/O DECAL	6-AXLE W/O DECAL	ALL WITH DECAL	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES	
COAL-PRODUCING COUNTIES																	
2	1,568	906,713	4,951	507,489	80,670	49,205	2,227	19,639	0	19,639	377,016	163,385	70,225	5,941	6,601	0	2,215,272
6	1,045	326,716	1,485	190,474	16,648	17,482	791	15,709	0	2,805	17,457	14,727	4,176	198	0	0	609,713
7	5,050	973,855	7,960	552,063	86,570	83,297	3,770	47,726	0	31,429	197,020	50,660	32,218	1,233	685	685	2,074,219
8	1,277	426,693	4,596	338,256	36,325	35,433	1,604	43,120	0	2,315	82,825	39,584	15,904	919	340	0	1,029,191
9	493	149,519	1,064	92,787	11,645	10,259	464	8,038	0	2,572	31,921	13,636	5,920	389	324	27	329,059
12	407	114,682	28,796	17,530	4,309	6,043	91	1,631	296	2,681	10,371	9,070	4,526	562	361	131	201,488
14	1,968	364,219	2,507	114,721	18,547	14,677	222	4,033	733	16,130	64,097	38,118	23,821	2,911	2,372	863	669,938
16	532	294,701	141,481	245	7,382	18,954	287	5,060	920	1,113	3,007	16,243	4,465	589	0	0	494,977
17	196	55,276	13,879	8,449	2,077	2,913	44	786	143	1,292	4,999	4,372	2,182	271	174	63	97,116
Unclassified	2,456	723,715	73,440	318,200	45,080	45,201	1,601	27,839	723	14,179	120,060	62,612	28,620	2,526	1,845	401	1,468,497
Subtotal	14,991	4,336,090	280,159	2,140,215	309,253	283,462	11,102	173,580	2,815	94,156	908,772	412,406	192,057	15,539	12,703	2,170	9,189,470
COAL-IMPACT COUNTIES																	
2	1,513	407,043	2,403	113,967	24,203	23,762	482	13,562	356	29,652	94,391	24,613	7,740	4,912	237	712	749,550
6	1,413	355,330	3,517	202,977	29,162	33,436	679	5,179	136	3,884	15,572	13,933	1,914	0	0	0	667,132
7	1,494	739,523	5,443	263,833	49,360	29,216	593	5,304	139	10,161	46,598	10,771	3,732	3,074	0	0	1,169,242
8	1,124	351,328	2,675	138,552	24,174	21,943	446	6,499	171	11,763	40,780	13,331	3,518	1,990	71	214	618,578
9	262	81,946	624	32,317	5,638	5,118	104	1,516	40	2,744	9,512	3,109	821	464	17	50	144,281
12	503	222,201	408	37,296	5,315	10,831	278	2,409	86	2,403	7,312	3,745	443	294	0	109	293,633
14	1,439	1,217,305	9,396	399,053	54,428	40,281	1,033	6,114	218	16,694	53,876	9,718	2,555	3,047	0	677	1,815,835
16	1,436	1,065,695	21,341	242,962	35,749	50,195	1,287	3,593	128	1,861	3,628	12,041	626	0	0	0	1,440,542
17	204	125,745	1,230	29,897	4,227	5,449	140	820	29	1,089	3,333	1,538	195	156	0	43	174,095
Unclassified	4,496	1,917,280	16,845	593,876	95,466	99,934	2,269	23,060	670	38,485	129,761	46,114	10,436	6,281	179	895	2,986,046
Subtotal	13,884	6,483,397	63,882	2,054,730	327,722	320,165	7,310	68,055	1,974	118,735	404,762	138,913	31,981	20,220	504	2,700	10,058,934
ALL EXTENDED-WEIGHT SYSTEM COUNTIES																	
2	3,081	1,313,757	7,354	621,456	104,873	72,967	2,709	33,201	356	49,291	471,407	187,998	77,966	10,854	6,839	712	2,964,822
6	2,458	682,046	5,002	393,451	45,810	50,918	1,470	20,888	136	6,689	33,029	28,660	6,090	198	0	0	1,276,845
7	6,544	1,713,379	13,403	815,896	135,930	112,513	4,363	53,029	139	41,590	243,618	61,430	35,950	4,306	685	685	3,243,460
8	2,400	778,021	7,271	476,808	60,498	57,375	2,049	49,620	171	14,078	123,604	52,915	19,422	2,910	412	214	1,647,769
9	755	231,465	1,688	125,104	17,283	15,377	568	9,554	40	5,316	41,433	16,745	6,741	853	341	77	473,340
12	910	336,884	29,204	54,826	9,624	16,874	369	4,040	382	5,084	17,682	12,815	4,970	855	361	240	495,121
14	3,407	1,581,524	11,903	513,774	72,976	54,958	1,255	10,146	951	32,824	117,973	47,836	26,376	5,959	2,372	1,540	2,485,774
16	1,968	1,360,396	162,822	243,208	43,131	69,148	1,574	8,653	1,048	2,973	6,635	28,284	5,090	589	0	0	1,935,519
17	400	181,021	15,110	38,346	6,304	8,361	184	1,606	172	2,382	8,331	5,910	2,377	427	174	107	271,211
Unclassified	6,952	2,640,994	90,285	912,076	140,546	145,135	3,870	50,899	1,393	52,664	249,821	108,725	39,056	8,808	2,023	1,296	4,454,543
Total	28,875	10,819,486	344,042	4,194,945	636,975	603,627	18,412	241,636	4,790	212,891	1,313,534	551,319	224,038	35,759	13,207	4,870	19,248,404

TABLE F21. EQUIVALENT-SINGLE-AXLE-LOAD MILES ON EXTENDED-WEIGHT SYSTEM (1000s)

FUNCTIONAL CLASS	MOTOR-CYCLES	CARS	BUSES	SINGLE-UNIT TRUCKS						SINGLE-TRAILER TRUCKS				MULTI-TRAILER TRUCKS			TOTAL
				2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE W/O DECAL	3-AXLE WITH DECAL	4-AXLE W/O DECAL	4-AXLE WITH DECAL	4-AXLE W/O DECAL	5-AXLE W/O DECAL	6-AXLE W/O DECAL	ALL WITH DECAL	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES	
COAL-PRODUCING COUNTIES																	
2	0	2,381	2,722	2,785	18,932	20,909	49,066	23,686	12,713	54,651	25,965	13,914	213,551	12,189	2,530	0	455,996
6	0	455	296	521	2,396	3,695	8,670	1,870	1,004	6,900	1,966	3,137	28,479	104	229	0	59,721
7	0	1,488	2,256	1,796	9,273	16,675	39,131	17,338	9,306	27,452	12,383	4,660	90,170	1,988	777	0	234,694
8	0	415	1,035	656	2,910	4,817	11,305	22,108	11,866	19,543	5,034	1,683	35,412	114	0	0	116,899
9	0	248	348	313	1,629	2,439	5,724	4,554	2,444	6,198	2,165	1,245	18,309	437	133	0	46,186
12	0	360	200	202	869	990	236	2,319	139	267	2,385	1,302	1,139	136	38	0	10,583
14	0	411	160	332	2,114	1,643	391	1,652	99	502	6,362	520	1,906	292	0	25	16,409
16	0	616	393	287	1,528	2,389	569	1,351	81	856	1,791	196	555	0	0	633	11,245
17	0	20	11	12	67	72	17	86	5	23	163	35	57	7	1	8	585
Unclassified	0	275	318	257	1,390	1,901	3,398	3,152	1,419	5,423	2,161	928	10,806	289	90	53	31,861
Subtotal	0	6,670	7,739	7,161	41,107	55,531	118,509	78,115	39,076	121,815	60,376	27,621	400,385	15,556	3,799	719	984,178
COAL-IMPACT COUNTIES																	
2	0	615	225	497	3,881	2,224	1,394	1,538	281	2,138	6,112	2,243	6,589	811	683	282	29,513
6	0	613	328	659	3,328	6,180	3,874	10,017	1,828	1,872	5,571	3,287	7,074	144	0	0	44,775
7	0	305	216	330	2,282	739	463	931	170	453	2,976	293	2,521	34	0	0	11,711
8	0	1	0	0	3	3	2	4	1	1	5	2	5	0	0	0	27
9	0	5	3	5	33	27	17	36	7	14	50	17	52	3	2	1	272
12	0	326	140	333	1,874	876	160	318	11	771	3,077	58	445	450	54	0	8,894
14	0	1,010	1,532	423	1,328	3,632	663	3,424	122	2,061	1,788	1,813	566	248	192	101	18,907
16	0	503	525	343	1,634	1,610	294	1,176	42	1,098	2,573	549	459	372	90	28	11,297
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Unclassified	0	368	270	314	1,776	1,617	755	1,838	281	866	2,808	849	2,242	238	107	31	14,360
Subtotal	0	3,744	3,240	2,905	16,140	16,909	7,621	19,282	2,743	9,275	24,959	9,113	19,953	2,301	1,129	444	139,757
ALL EXTENDED-WEIGHT SYSTEM COUNTIES																	
2	0	2,997	2,948	3,282	22,813	23,132	50,460	25,224	12,994	56,789	32,077	16,158	220,140	13,000	3,213	282	485,509
6	0	1,067	624	1,180	5,724	9,875	12,544	11,887	2,832	8,771	7,537	6,425	35,553	248	229	0	104,496
7	0	1,792	2,473	2,126	11,555	17,414	39,594	18,269	9,476	27,905	15,359	4,953	92,691	2,022	777	0	246,405
8	0	416	1,035	656	2,913	4,820	11,307	22,112	11,867	19,545	5,039	1,685	35,417	115	0	0	116,926
9	0	253	351	318	1,662	2,466	5,741	4,590	2,451	6,212	2,215	1,262	18,361	440	135	1	46,458
12	0	686	340	536	2,743	1,866	396	2,637	150	1,038	5,463	1,360	1,584	586	92	0	19,477
14	0	1,421	1,692	755	3,442	5,275	1,054	5,076	221	2,563	8,150	2,334	2,472	541	192	126	35,316
16	0	1,119	917	630	3,162	3,999	863	2,527	123	1,954	4,364	744	1,014	372	90	662	22,542
17	0	20	11	12	67	72	17	86	5	23	163	35	57	7	1	8	585
Unclassified	0	643	588	571	3,166	3,519	4,153	4,989	1,701	6,289	4,968	1,777	13,048	527	198	84	46,221
Total	0	10,414	10,979	10,066	57,247	72,439	126,130	97,396	41,819	131,090	85,335	36,734	420,338	17,857	4,928	1,163	1,123,934

TABLE F22. EQUIVALENT-SINGLE-AXLE-LOAD MILES ON BASE SYSTEM (1000s)

FUNCTIONAL CLASS	MOTOR-CYCLES	CARS	BUSES	SINGLE-UNIT TRUCKS						SINGLE-TRAILER TRUCKS				MULTI-TRAILER TRUCKS			TOTAL
				2-AXLE 4-TIRE	2-AXLE 6-TIRE	3-AXLE W/O DECAL	3-AXLE WITH DECAL	4-AXLE W/O DECAL	4-AXLE WITH DECAL	4-AXLE W/O DECAL	5-AXLE W/O DECAL	6-AXLE W/O DECAL	ALL WITH DECAL	5 OR LESS AXLES	6-AXLE	7 OR MORE AXLES	
COAL-PRODUCING COUNTIES																	
2	0	2,720	7,724	3,045	270,416	17,557	9,313	10,657	0	5,129	58,945	15,394	213,514	20,752	36,542	0	671,709
6	0	980	2,317	1,143	55,807	6,238	3,309	8,524	0	733	2,729	1,388	12,696	692	0	0	96,555
7	0	2,922	12,418	3,312	290,195	29,720	15,766	25,898	0	8,209	30,803	4,773	97,955	4,305	3,790	1,045	531,111
8	0	1,280	7,170	2,030	121,765	12,642	6,707	23,399	0	605	12,949	3,730	48,354	3,211	1,885	0	245,725
9	0	449	1,660	557	39,034	3,661	1,942	4,362	0	672	4,991	1,285	18,000	1,359	1,795	41	79,805
12	0	344	25,820	105	926	1,336	380	835	1,420	464	1,403	1,317	11,143	331	16	52	45,893
14	0	1,093	2,248	688	3,986	3,245	922	2,064	3,511	2,790	8,671	5,536	58,644	1,716	107	344	95,564
16	0	884	126,861	1	1,586	4,190	1,191	2,590	4,406	192	407	2,359	10,992	347	0	0	156,007
17	0	166	12,445	51	446	644	183	402	684	223	676	635	5,371	160	8	25	22,120
Unclassified	0	2,171	70,578	1,909	133,814	15,031	6,694	15,039	3,466	3,371	18,506	6,518	83,472	6,381	7,498	342	374,791
Subtotal	0	13,008	269,240	12,841	917,976	94,264	46,407	93,770	13,487	22,387	140,080	42,935	560,140	39,253	51,642	1,850	2,319,280
COAL-IMPACT COUNTIES																	
2	0	1,221	1,166	684	3,450	6,539	951	9,330	810	5,398	15,333	3,958	5,692	1,726	68	237	56,562
6	0	1,066	1,707	1,218	4,157	9,201	1,338	3,563	309	707	2,529	2,240	1,407	0	0	0	29,444
7	0	2,219	2,642	1,583	7,036	8,039	1,169	3,649	317	1,850	7,569	1,732	2,744	1,080	0	0	41,630
8	0	1,054	1,298	831	3,446	6,038	878	4,471	388	2,142	6,624	2,144	2,587	699	20	71	32,692
9	0	246	303	194	804	1,408	205	1,043	91	500	1,545	500	603	163	5	17	7,625
12	0	667	298	224	1,218	3,618	1,028	1,615	252	460	1,162	420	338	58	0	48	11,405
14	0	3,652	6,866	2,394	12,478	13,454	3,824	4,098	640	3,196	8,560	1,089	1,946	598	0	300	63,095
16	0	3,197	15,593	1,458	8,196	16,766	4,766	2,408	376	356	576	1,349	476	0	0	0	55,518
17	0	377	899	179	969	1,820	517	550	86	209	530	172	149	31	0	19	6,506
Unclassified	0	5,752	11,020	3,563	17,163	30,349	6,605	15,747	1,679	7,106	20,964	6,760	7,722	1,962	51	343	136,786
Subtotal	0	19,450	41,791	12,328	58,918	97,232	21,283	46,473	4,948	21,924	65,392	20,365	23,665	6,317	144	1,035	441,263
ALL EXTENDED-WEIGHT SYSTEM COUNTIES																	
2	0	3,941	8,890	3,729	273,867	24,095	10,264	19,987	810	10,528	74,277	19,352	219,206	22,478	36,610	237	728,271
6	0	2,046	4,024	2,361	59,964	15,438	4,647	12,087	309	1,440	5,259	3,628	14,103	692	0	0	125,998
7	0	5,140	15,059	4,895	297,231	37,760	16,935	29,547	317	10,058	38,372	6,505	100,700	5,385	3,790	1,045	572,740
8	0	2,334	8,469	2,861	125,211	18,680	7,585	27,870	388	2,746	19,573	5,873	50,941	3,910	1,905	71	278,418
9	0	694	1,962	751	39,838	5,069	2,147	5,405	91	1,171	6,536	1,785	18,603	1,522	1,799	58	87,431
12	0	1,011	26,118	329	2,144	4,954	1,408	2,450	1,672	924	2,565	1,737	11,481	389	16	101	57,298
14	0	4,745	9,113	3,083	16,464	16,699	4,747	6,162	4,152	5,986	17,231	6,625	60,589	2,314	107	644	158,659
16	0	4,081	142,455	1,459	9,782	20,956	5,957	4,998	4,782	549	983	3,708	11,468	347	0	0	211,525
17	0	543	13,344	230	1,415	2,464	700	952	770	432	1,206	807	5,520	190	8	45	28,626
Unclassified	0	7,923	81,597	5,472	150,977	45,381	13,299	30,786	5,144	10,477	39,470	13,279	91,194	8,344	7,549	685	511,577
Total	0	32,458	311,031	25,170	976,893	191,496	67,690	140,242	18,435	44,311	205,472	63,299	583,805	45,570	51,785	2,884	2,760,543

TABLE F23. AVERAGE ANNUAL RESURFACING MILEAGE (ROADWAY MILES)
(1988-1990 DATA)

FUNCTIONAL CLASS	EXTENDED-WEIGHT SYSTEM	BASE SYSTEM	TOTAL
COAL-PRODUCING COUNTIES			
2	92.53	42.47	135.00
6	28.10	19.37	47.47
7	147.60	96.77	244.37
8	63.10	145.10	208.20
9	13.33	82.27	95.60
12	5.57	5.27	10.84
14	6.17	.97	7.14
16	8.50	11.57	20.07
17	.00	7.40	7.40
Unclassified	4.70	74.30	79.00
Subtotal	369.60	485.49	855.09
COAL-IMPACT COUNTIES			
2	26.43	35.03	61.46
6	15.70	27.70	43.40
7	12.13	113.83	125.96
8	.00	147.87	147.87
9	.00	55.90	55.90
12	3.60	3.03	6.63
14	15.27	23.40	38.67
16	3.73	19.50	23.23
17	---	8.53	8.53
Unclassified	9.47	93.93	103.40
Subtotal	86.33	528.72	615.05
ALL EXTENDED-WEIGHT SYSTEM COUNTIES			
2	118.96	77.50	196.46
6	43.80	47.07	90.87
7	159.73	210.60	370.33
8	63.10	292.97	356.07
9	13.33	138.17	151.50
12	9.17	8.30	17.47
14	21.44	24.37	45.81
16	12.23	31.07	43.30
17	.00	15.93	15.93
Unclassified	14.17	168.23	182.40
Total	455.93	1014.21	1470.14

TABLE F24. AVERAGE PERCENTAGE OF MILEAGE RESURFACED ANNUALLY

FUNCTIONAL CLASS	EXTENDED-WEIGHT SYSTEM	BASE SYSTEM	TOTAL
COAL-PRODUCING COUNTIES			
2	17.17	6.41	11.24
6	17.20	5.11	8.75
7	15.76	3.91	7.16
8	13.13	4.22	5.31
9	13.06	8.10	8.55
12	20.18	12.70	15.69
14	24.29	1.02	5.93
16	10.55	6.44	7.71
17	.00	8.84	8.27
Unclassified	4.98	7.95	7.68
Subtotal	15.05	5.22	7.27
COAL-IMPACT COUNTIES			
2	23.56	13.90	16.88
6	6.89	5.78	6.14
7	8.33	6.39	6.54
8	.00	5.62	5.62
9	.00	7.03	6.93
12	15.86	5.84	8.89
14	16.62	8.67	10.69
16	8.90	4.91	5.29
17	---	8.10	8.10
Unclassified	15.01	11.55	11.80
Subtotal	12.02	6.98	7.41
ALL EXTENDED-WEIGHT SYSTEM COUNTIES			
2	18.27	8.47	12.55
6	11.19	5.48	7.27
7	14.76	4.95	6.94
8	13.09	4.83	5.43
9	11.79	7.63	7.88
12	18.23	8.89	12.16
14	18.28	6.68	9.50
16	9.98	5.38	6.19
17	.00	8.43	8.18
Unclassified	9.00	9.63	9.57
Total	14.37	6.01	7.33

TABLE F25. AVERAGE UNIT COSTS (DOLLARS/MILE) OF RESURFACING (1988-1991 MP SYSTEM DATA)

FUNCTIONAL CLASS	EXTENDED-WEIGHT SYSTEM	BASE SYSTEM
COAL-PRODUCING COUNTIES		
2	77,308	59,564
6	43,824	38,276
7	40,262	28,644
8	43,207	28,100
9	45,771	28,433
12		
14	97,644	66,686
16	64,516	35,685
17	---	10,436
Unclassified	85,140	32,474
COAL-IMPACT COUNTIES		
2	66,423	54,381
6	53,153	43,599
7	30,672	31,152
8	---	26,734
9	---	21,836
12	23,363	95,895
14	78,800	56,959
16	47,815	31,878
17	---	38,440
Unclassified		43,799
ALL EXTENDED-WEIGHT SYSTEM COUNTIES		
2	76,517	57,124
6	46,858	41,966
7	39,579	29,856
8	43,207	27,558
9	45,771	25,523
12	23,363	95,895
14	85,272	57,320
16	59,373	32,769
17		27,828
Unclassified	85,140	39,345

TABLE F26. EQUIVALENT AVERAGE ANNUAL RESURFACING COSTS (DOLLARS) ADJUSTED TO 1990 EXPENDITURE LEVEL (MILEAGE FROM TABLE F23 AND UNIT COSTS FROM TABLE F25)

FUNCTIONAL CLASS	EXTENDED-WEIGHT SYSTEM	BASE SYSTEM	TOTAL
COAL-PRODUCING COUNTIES			
2	5,430,337	1,920,374	7,350,712
6	934,842	562,828	1,497,670
7	4,511,298	2,104,235	6,615,533
8	2,069,680	3,095,234	5,164,915
9	463,170	1,775,759	2,238,929
12	412,877	266,787	679,664
14	457,352	49,105	506,457
16	416,300	313,429	729,729
17	0	58,625	58,625
Unclassified	303,774	1,831,658	2,135,433
Subtotal	14,999,630	11,978,035	26,977,665
COAL-IMPACT COUNTIES			
2	1,332,709	1,446,129	2,778,839
6	633,501	916,803	1,550,304
7	282,438	2,691,922	2,974,360
8	0	3,000,985	3,000,985
9	0	926,626	926,626
12	63,849	220,576	284,425
14	913,451	1,011,808	1,925,258
16	135,392	471,895	607,287
17	0	248,916	248,916
Unclassified	825,528	3,123,117	3,948,645
Subtotal	4,186,867	14,058,778	18,245,645
ALL EXTENDED-WEIGHT SYSTEM COUNTIES			
2	6,763,047	3,366,504	10,129,550
6	1,568,343	1,479,631	3,047,974
7	4,793,736	4,796,157	9,589,892
8	2,069,680	6,096,219	8,165,900
9	463,170	2,702,385	3,165,555
12	476,725	487,363	964,089
14	1,370,803	1,060,913	2,431,715
16	551,692	785,324	1,337,016
17	0	307,541	307,541
Unclassified	1,129,303	4,954,775	6,084,078
Total	19,186,497	26,036,813	45,223,310

TABLE F27. ANNUAL RESURFACING EXPENDITURE INCREMENT FOR EXTENDED-WEIGHT SYSTEM BEYOND BASE-SYSTEM NORMS

FUNCTIONAL CLASS	EQUIVALENT EXTENDED-WEIGHT SYSTEM EXPENDITURES (DOLLARS)	HYPOTHESIZED RESURFACING ON EXTENDED-WEIGHT MILEAGE			EXPENDITURE INCREMENT (DOLLARS)
		MILEAGE RESURFACED ANNUALLY	UNIT COSTS (DOLLARS/MILE)	HYPOTHESIZED EXPENDITURES (DOLLARS)	
COAL-PRODUCING COUNTIES					
2	5,430,337	34.6	45,217	1,562,388	3,867,950
6	934,842	8.3	29,057	242,591	692,251
7	4,511,298	36.6	21,745	795,653	3,715,645
8	2,069,680	20.3	21,332	432,316	1,637,364
9	463,170	8.3	21,585	178,555	284,615
12	412,877	3.5	0	0	412,877
14	457,352	.3	50,624	13,115	444,237
16	416,300	5.2	27,090	140,581	275,719
17	0	.5	7,922	4,062	-4,062
Unclassified	303,774	7.5	24,652	184,988	118,786
Subtotal	14,999,630	128.1	27,755	3,554,249	11,445,381
COAL-IMPACT COUNTIES					
2	1,332,709	15.6	41,283	643,872	688,838
6	633,501	13.2	33,098	435,816	197,685
7	282,438	9.3	23,649	220,245	62,192
8	0	.1	20,295	2,053	-2,053
9	0	.8	16,577	12,820	-12,820
12	63,849	1.3	72,797	96,475	-32,627
14	913,451	8.0	43,240	344,517	568,934
16	135,392	2.1	24,200	49,742	85,650
17	---	---	---	---	---
Unclassified	825,528	7.3	33,249	242,367	583,161
Subtotal	4,186,867	50.1	40,862	2,047,907	2,138,960
ALL EXTENDED-WEIGHT SYSTEM COUNTIES					
2	6,763,047	55.2	39,978	2,206,259	4,556,787
6	1,568,343	21.5	31,622	678,407	889,936
7	4,793,736	53.5	18,979	1,015,898	3,777,837
8	2,069,680	23.3	18,667	434,369	1,635,312
9	463,170	8.6	22,172	191,375	271,795
12	476,725	4.5	21,583	96,475	380,250
14	1,370,803	7.8	45,664	357,632	1,013,170
16	551,692	6.6	28,863	190,323	361,369
17	0	.5	8,310	4,062	-4,062
Unclassified	1,129,303	15.2	28,190	427,355	701,947
Total	19,186,497	190.6	29,390	5,602,156	13,584,341

TABLE F28. AVERAGE ANNUAL RESURFACING COSTS PER ESAL-MILE (CENTS PER ESAL-MILE)

FUNCTIONAL CLASS	EXTENDED-WEIGHT SYSTEM	BASE SYSTEM	TOTAL
COAL-PRODUCING COUNTIES			
2	1.191	.286	.652
6	1.565	.583	.958
7	1.922	.396	.864
8	1.770	1.260	1.424
9	1.003	2.225	1.777
12	3.901	.581	1.203
14	2.787	.051	.452
16	3.702	.201	.436
17	.000	.265	.258
Unclassified	.953	.489	.525
Average	1.524	.516	.817
COAL-IMPACT COUNTIES			
2	4.516	2.557	3.228
6	1.415	3.114	2.089
7	2.412	6.466	5.576
8	.000	9.179	9.172
9	.000	12.152	11.733
12	.718	1.934	1.401
14	4.831	1.604	2.348
16	1.198	.850	.909
17	---	3.826	3.826
Unclassified	5.749	2.283	2.612
Average	2.996	3.186	3.140
ALL EXTENDED-WEIGHT SYSTEM COUNTIES			
2	1.393	.462	.835
6	1.501	1.174	1.322
7	1.945	.837	1.171
8	1.770	2.190	2.066
9	.997	3.091	2.364
12	2.448	.851	1.256
14	3.882	.669	1.254
16	2.447	.371	.571
17	.000	1.074	1.053
Unclassified	2.443	.969	1.091
Average	1.707	.943	1.164

TABLE F29. ANNUAL ESAL-MILES OF COAL DECAL TRUCKS (1000s)

FUNCTIONAL CLASS	EXTENDED-WEIGHT SYSTEM	BASE SYSTEM	TOTAL
COAL-PRODUCING COUNTIES			
2	275,330	222,827	498,157
6	38,153	16,005	54,158
7	138,608	113,721	252,329
8	58,583	55,060	113,643
9	26,477	19,942	46,419
12	1,514	12,943	14,457
14	2,396	63,078	65,474
16	1,206	16,589	17,795
17	80	6,238	6,318
Unclassified	15,624	93,631	109,255
Subtotal	557,970	620,034	1,178,003
COAL-IMPACT COUNTIES			
2	8,263	7,453	15,716
6	12,776	3,055	15,831
7	3,153	4,231	7,384
8	7	3,854	3,861
9	76	899	975
12	617	1,618	2,235
14	1,351	6,410	7,762
16	795	5,618	6,413
17	---	752	752
Unclassified	3,278	16,006	19,284
Subtotal	30,317	49,895	80,213
ALL EXTENDED-WEIGHT SYSTEM COUNTIES			
2	283,593	230,280	513,873
6	50,929	19,060	69,989
7	141,761	117,952	259,713
8	58,591	58,914	117,504
9	26,553	20,841	47,394
12	2,130	14,561	16,692
14	3,748	69,488	73,236
16	2,000	22,207	24,207
17	80	6,990	7,070
Unclassified	18,902	109,637	128,539
Total	588,287	669,929	1,258,216

TABLE F30. HYPOTHETICAL PERCENT REDUCTION IN ESAL-MILES WITHOUT COAL DECAL SYSTEM

COAL TRUCK TYPE	DECAL	EMPTY WEIGHT (POUNDS)	MAXIMUM LOAD (POUNDS)	PAYLOAD (POUNDS)	ESALs PER TRUCK	REDUCTION IN ESAL-MILES BY ELIMINATION OF DECALS (PERCENT)
3-Axle Single-Unit	With Decal	29,000	94,500	65,500	26.4	61.1
	Without Decal	25,000*	59,400	34,400	5.4	
4-Axle Single-Unit	With Decal	35,000	105,000	70,000	13.9	42.0
	Without Decal	31,000*	77,000	46,000	5.3	
5- and 6-Axle Single-Trailer	With Decal	40,000	126,000	86,000	9.1	70.6
	Without Decal	35,000*	80,000	45,000	1.4	

*Assumed

TABLE F31. HYPOTHETICAL ANNUAL ESAL-MILES OF COAL TRUCKS WITHOUT COAL DECAL SYSTEM (1000s)

FUNCTIONAL CLASS	EXTENDED-WEIGHT SYSTEM	BASE SYSTEM	TOTAL
COAL-PRODUCING COUNTIES			
2	89,274	66,404	155,678
6	12,333	5,022	17,354
7	47,152	34,941	82,092
8	21,700	16,829	38,529
9	9,031	6,049	15,079
12	507	4,248	4,755
14	770	19,639	20,409
16	432	6,252	6,684
17	27	2,048	2,074
Unclassified	5,324	29,160	34,484
Subtotal	186,549	190,590	377,139
COAL-IMPACT COUNTIES			
2	2,643	2,514	5,157
6	4,649	1,115	5,764
7	1,020	1,446	2,466
8	3	1,328	1,330
9	26	310	336
12	200	646	846
14	496	2,433	2,929
16	274	2,214	2,488
17	---	295	295
Unclassified	1,116	5,817	6,933
Subtotal	10,426	18,118	28,544
ALL EXTENDED-WEIGHT SYSTEM COUNTIES			
2	91,917	68,918	160,834
6	16,982	6,136	23,118
7	48,172	36,387	84,559
8	21,702	18,157	39,859
9	9,057	6,358	15,415
12	707	4,894	5,601
14	1,266	22,072	23,338
16	706	8,467	9,172
17	27	2,343	2,369
Unclassified	6,441	34,977	41,417
Total	196,975	208,708	405,683

TABLE F32. HYPOTHETICAL ANNUAL RESURFACING COST INCREMENT DUE TO COAL DECAL SYSTEM (DOLLARS)

FUNCTIONAL CLASS	EXTENDED-WEIGHT SYSTEM	BASE SYSTEM	TOTAL
COAL-PRODUCING COUNTIES			
2	2,215,695	447,204	2,662,899
6	404,182	64,023	468,205
7	1,757,971	312,124	2,070,094
8	653,013	481,573	1,134,587
9	174,960	309,141	484,101
12	39,261	50,546	89,806
14	45,321	22,321	67,642
16	28,643	20,767	49,410
17	0	11,107	11,107
Unclassified	98,201	315,080	413,280
Subtotal	5,417,247	2,033,885	7,451,132
COAL-IMPACT COUNTIES			
2	253,798	126,278	380,076
6	114,977	60,425	175,402
7	51,452	180,055	231,507
8	0	231,835	231,835
9	0	71,585	71,585
12	2,992	18,801	21,793
14	41,347	63,780	105,127
16	6,243	28,932	35,175
17	---	17,480	17,480
Unclassified	124,277	232,633	356,910
Subtotal	595,087	1,031,803	1,626,890
ALL EXTENDED-WEIGHT SYSTEM COUNTIES			
2	2,469,493	573,482	3,042,975
6	519,159	124,448	643,607
7	1,809,423	492,179	2,301,601
8	653,013	713,408	1,366,422
9	174,960	380,725	555,686
12	42,253	69,347	111,599
14	86,669	86,100	172,769
16	34,886	49,699	84,585
17	0	28,587	28,587
Unclassified	222,478	547,713	770,191
Total	6,012,334	3,065,688	9,078,023

TABLE F33. ANNUAL REVENUE GENERATED BY COAL DECAL SYSTEM (DOLLARS)

TRUCK TYPE	NUMBER WITH DECALS	DECAL FEES		ADDED FEES DUE TO 80,000-POUND REGISTRATION*		LOST FEES DUE TO FEWER TRUCK REGISTRATIONS			TOTAL
		UNIT	TOTAL	UNIT	TOTAL	NUMBER	UNIT	TOTAL	
3-Axle, Single-Unit	1,217	160	194,720	716	871,372	1,100	544	-598,538	467,554
4-Axle, Single-Unit	193	260	50,180	135	26,055	101	1,125	-113,283	-37,048
Single-Trailer Combination	2,467	360	888,120	0	0	2,248	1,260	-2,832,116	-1,943,996
Total	3,877		679,812**		897,427			-3,543,936	-1,966,697

*Assumes registration fees of $544, $1,125, and $1,260 for 3-axle single-unit trucks, 4-axle single-unit trucks, and single-trailer combinations, respectively, without the coal decal system
**Remaining 40 percent distributed to counties

TABLE F34. AVERAGE RIDEABILITY INDEX

FUNCTIONAL CLASS	EXTENDED-WEIGHT SYSTEM	BASE SYSTEM	TOTAL
	COAL-PRODUCING COUNTIES		
2	3.15	3.12	3.13
6	2.91	3.12	3.06
7	2.75	2.75	2.75
8	2.07	2.36	2.32
9	2.30	2.29	2.29
12	2.89	2.85	2.87
14	3.25	3.04	3.08
16	2.78	2.83	2.81
17	2.41	2.52	2.51
Unclassified	1.71	2.06	2.03
Average	2.66	2.53	2.56
	COAL-IMPACT COUNTIES		
2	3.19	3.37	3.31
6	3.20	3.14	3.16
7	3.15	2.95	2.97
8	2.44	2.63	2.63
9	2.99	2.41	2.42
12	3.70	3.16	3.32
14	2.98	2.95	2.96
16	3.14	2.83	2.86
17	---	2.74	2.74
Unclassified	3.49	2.50	2.57
Average	3.19	2.75	2.79
	ALL EXTENDED-WEIGHT SYSTEM COUNTIES		
2	3.16	3.19	3.18
6	3.08	3.13	3.11
7	2.80	2.83	2.83
8	2.07	2.48	2.45
9	2.37	2.34	2.34
12	3.26	3.02	3.10
14	3.04	2.97	2.99
16	2.90	2.83	2.84
17	2.41	2.64	2.64
Unclassified	2.42	2.26	2.28
Average	2.78	2.63	2.65