COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT, KENTUCKY 40601

WILLIAM B. HAZELRIGG
COMMISSIONER

ADDRESS REPLY TO
DEPARTMENT OF HIGHWAYS
DIVISION OF RESEARCH
533 SOUTH LIMESTONE STREET
LEXINGTON, KENTUCKY 40508
Telephone 606-254-4475

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H-2-21

MEMO TO: A. O. Neiser, State Highway Engineer
Chairman, Research Committee

SUBJECT: Research Report (Final), "Determination of Traffic Parameters for the Prediction, Projection, and Computation of EWL's"
KYHPR-64-21, HPR-1(4), Part II

The design of pavements is, in reality, two problems: one pertains to the capabilities of the pavement structure to withstand a certain amount of traffic, and the other pertains to forecasting traffic. Although a structural design may be adequate for a stated summation of traffic, if the traffic forecast is in error, "design life" and "actual life" of pavements will differ. If "traffic age" exceeds the "chronological age", traffic is accumulating at a higher rate than was predicted. For instance, if a pavement designed for a 20-year forecast of traffic actually accumulates that much in 10 years, the forecast was obviously in error. If, in the same instance, the pavement developed concomitant distress, its structural design would not be suspect.

A method of estimating or predicting EWL's for the design of bituminous pavements was recommended to the Department in 1949. It was revised in 1954. A 1958 statistical evaluation of predicted versus actual accumulations of traffic, on approximately 57 projects designed and constructed between 1948 and 1957, indicated that 68 percent of those roads did or would accumulate their 10-year quota of traffic between 6.8 and 16.8 years.

The prediction of equivalent wheel loads (or equivalent axleloads) is much more complicated than predicting gross traffic volume - although, any error in predicting gross traffic compounds the error in equivalent loadings. For instance, the composition of traffic and the spectral distribution of truck types and axle weights are extremely elusive and variable factors - even in retrospection. Presumably, this inability to predict with accuracy exists because we do not have sufficient historical knowledge of the past - that is to say: traffic counts and classification data have not provided true and complete representation of trends in traffic, on either a constitutive or time basis.

The study report transmitted herewith presents an inquiring analysis of available traffic data. From the standpoint of resolving a predictive criterion, subjective parameters were introduced and tested for statistical significance. Even so, residual or unaccountable variances persist. In still another sense, the inherent or natural variability remains high and so does the error of estimate. This does not mean that all predictions will be hopelessly in error: it does mean that in some instances the actual accumulation may be somewhere between half and twice the predicted value but in the majority of cases will conform much closer.

The method or criterion we are proposing for adoption (Appendix F of the report) is quite different from the one now in use. The new method provides factors which offer the best estimate of Kentucky EWL's and(or) AASHO, 18-kip, equivalent axleloads per 1000 vehicles; these may be projected over the design period. Inasmuch as the AASHO basic axle is gaining preminence throughout the country and inasmuch as certain planning statistics are already required by the Bureau of Public Roads to be reported in terms of 18-kip, equivalent loadings, we believe that our pavement design criterion should be converted eventually to that basis. In the meantime both Kentucky EWL's and AASHO axles should be entered on design records. We suggest that each axle of a tandem pair continue to be considered as an individual axle.

This study was a long time "maturing". Much of the effort was consumed in compiling and verifiying the data. The data systems are now amenable to updating again on future occasions.

The study has not been extended to include urban situations as was originally planned - and is concluded with this submission.

Respectfully submitted,

Jas. H. Havens
Director of Research

JHH:em
cc's: Research Committee
R. O. Beauchamp, Assistant State Highway Engineer
W. B. Drake, Assistant State Highway Engineer
J. T. Anderson, Projects Management Engineer
K. B. Johns, Operations Management Engineer
J. R. Harbison, Program Management Engineer
C. G. Cook, Director, Division of Bridges
G. F. Kemper, Director, Division of Construction
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G. W. Asbury, # 11, Manchester
W. Bayes, # 12, Pikeville
R. E. Johnson, Division Engineer, Bureau of Public Roads
D. K. Blythe, Chairman, Department of Civil Engineering, Associate Dean, College of Engineering, U. of Ky.

Attachments

Research Report

DETERMINATION OF TRAFFIC PARAMETERS FOR THE PREDICTION, PROJECTION, AND COMPUTATION OF EWL'S

FINAL REPORT
KYHPR-64-21: HPR-1(4)

by

J. A. Deacon
Formerly Research Engineer
and
R. L. Lynch
Research Engineer

Division of Research
DEPARTMENT OF HIGHWAYS
Commonwealth of Kentucky

in cooperation with the
U.S. Department of Transportation
Federal Highway Administration
Bureau of Public Roads

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INTRODUCTION

One of the first published methods for the structural design of highway pavements was called the Massachusetts Rule and was presented in the eighth annual report of the Massachusetts Highway Commission in 1901 (1). The essence of this procedure was a rather intuitive assumption concerning the distribution of vertical pressures beneath a loaded area. For design purposes, this required the selection of a design load which, since failure was assumed to be catastrophic and not cumulative, could be taken as the largest load that could reasonably be anticipated during the design life of the pavement. The prediction of such a design load was in itself a rather formidable task.

However, as early as the late 1930's, pavement designers began to appreciate that pavements could become distressed not only catastrophically as a result of the single application of a very large load but also cumulatively as a result of the repetitive application of loads of lesser magnitudes. In 1938, Bradbury (2) hypothesized that portland cement concrete pavements could fail as a result of the conventional mechanisms of fatigue. The primary type of failure in flexible pavements was identified by Porter in 1942 (3) as resulting from progressive plastic deformation of the foundation as large repetitions of load were accumulated. Soon thereafter, Hveem and Carmany (4) postulated that repetitive load applications on flexible pavements could cause fatigue-associated distress in the asphalt-bound layers in addition to distress associated with the accumulation of irrecoverable plastic deformations. To apply this knowledge in any gainful way required that the cumulative destructive effects of the diverse spectrum of traffic loads be evaluated and, for design purposes, predicted. This greatly magnified the problems associated with traffic predictions, which heretofore had concentrated on the design-load concept.

A first indication as to how the destructive effects of various repetitive traffic loads might be reduced to a single measure was that made by Bradbury (2). He introduced the problem of flexural-fatigue failure in portland cement concrete pavements and proposed a design procedure based on the linear summation of cycle ratios concept[1] (5) whereby estimates could be made of the age of a pavement at which fatigue cracking would be initiated. Furthermore, he illustrated the practical application of this technique by means of an example problem based on necessary assumptions concerning the distribution of traffic loads, the geometry of the pavement slab, and characterizations of material behavior.

One of the first investigators to be significantly influenced by Bradbury's work was Grumm (7), who, in the early 1940's, sought a means whereby the destructive influence of the magnitude and number of applications of any particular wheel load might be expressed in terms of an equivalent number of applications of a standard or base wheel load. A standard wheel load of 5,000 pounds was selected since it was felt that high-type pavements could

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[1] Investigators of the fatigue of metals have commonly termed this concept "Miner's hypothesis" (6).

withstand an almost unlimited number of applications of wheel loads of smaller magnitudes without exhibiting distress. Grumm introduced the concept of equivalent wheel load (EWL) or load equivalency factors, the number of applications of the standard 5,000-pound wheel load which is equivalent in destructive effect to one application of a wheel load of different magnitude. These factors, which were derived from an analysis of Bradbury's illustrative example and subsequently modified on the basis of observed flexible pavement performance inservice, are shown in Table 1. Note particularly that these factors represent a simple geometric progression for the stipulated wheel loads.

Grumm further suggested that, by using these equivalency factors and traffic estimates that yielded the total number of applications of each wheel load anticipated during a given design period, one could estimate, by summation the total equivalent number of applications of the standard 5,000-pound wheel load -- that is, the total number of EWL's -- that would be anticipated during the design period. Thus, if two different traffic estimates yielded identical estimates of total EWL's, the composite destructive effects of the traffic in the two circumstances were assumed to be the same.

The California investigators were the first to incorporate this means for traffic evaluation into empirical methods for flexible pavement design (7). Their use of the concept, though in a somewhat different form, has continued to the present (8). The Kentucky Department of Highways adopted a modification of the California curves for the structural design of flexible pavements in the mid-1940's (9). In 1949 (9), design curves were published which utilized, as the traffic parameter, the predicted accumulations of EWL's during the design period. On the basis of these predictions, traffic was placed in one of five categories which enabled the selection of an appropriate design curve. In 1959 (10), the number of traffic categories had been increased to 11 and the design curves were modified on the basis of an extensive pavement performance reevaluation.

TABLE 1

ORIGINAL LOAD EQUIVALENCY FACTORS (7)

Wheel Load (lbs)	Equivalency Factor
5,000	1
6,000	2
7,000	4
8,000	8
9,000	16
10,000	32

A nationwide resurgence of interest in the load equivalence concept followed analyses of the AASHO Road Test results (11-14). These analyses focused attention on the validity of expressing the destructive effects of traffic in terms of equivalent loadings, at least insofar as empirical design procedures are concerned. The standard or base load, the method for deriving the equivalency factors, the factors themselves, and some of the methods of analysis were changed to reflect the vast amounts of data from the road test and improved capabilities for analysis. However, the equivalency concept was verified and retained in the interim design guides (13,14).

During the several years immediately prior to 1963, Kentucky had been experiencing some difficulties in obtaining reliable estimates of design EWL's. Average estimates obtained at several locations had been found to agree remarkably well with the actual average EWL's that had been accumulated. However, when EWL estimates at specific locations were compared with actual accumulations, an unacceptably large variation was found. This comparison illustrated the need for a more proper determination of the effects of local conditions on significant parameters of the traffic stream. In addition, the Kentucky procedure offered no basis whatsoever for extrapolation of data to a wide variety of routes -- for example, secondary roads -- for which limited historical data were available.

These observations were largely responsible for the initiation of the current study in September 1963. The major purpose of the study is the reevaluation of traffic parameters used for predicting EWL's for use in pavement-thickness design procedures with the intent of more properly incorporating the influence of local conditions. The more specific objectives of the study are as follow:

1. to establish a proper methodology for obtaining estimates of design EWL's,

2. to identify those characteristics of a particular route or locale which affect the composition and axleload distributions of traffic,

3. to develop a means for relating significant traffic parameters to local conditions, and

4. to provide a means whereby estimates of EWL's by both the Kentucky and AASHO procedures can be compared and the differences evaluated.

Three specific limitations on the scope of this study are worthy of mention. First, the study is basically a traffic study. No attempt has been made to ascertain whether the equivalency factors are of proper magnitude, whether it is essential to distinguish between single and tandem axles, and so forth. Second, the traffic characteristics in rural areas have been found to differ significantly from those in urban areas. It was decided to restrict the scope of this report to rural areas within which the bulk of applicable data have been accumulated. Third, it was decided to assume that accurate estimates of average daily traffic (ADT) would be available to the designer. This assumption appears reasonable since:

1. Reasonably accurate predictions of ADT are currently available on request from the Division of Planning,

2. An extensive study of ADT-prediction procedures is currently programmed in Kentucky (15), and

3. It appears plausible that separate procedures can and should be evolved for predicting traffic volumes and the composition and weight characteristics of the traffic.

PROCEDURES FOR PREDICTING EWL'S

An analysis of the available literature reveals that there are apparently few, if any, procedures for properly relating EWL predictions to local conditions. However, before some of this literature is examined, it is well to review some of the fundamental differences between the Kentucky and AASHO methods of computation.

COMPARISON OF KENTUCKY AND AASHO METHODS (10,13,14)

The major differences in the two methods are described as follow:

1. Base load. Kentucky has retained the 5,000-pound wheel load as the base or standard load. Converting to axleload format, the standard axleload used in Kentucky is the 10,000-pound single axleload. AASHO uses as a standard the 18,000-pound single axleload which is the maximum legal single axleload in many states (16). For empirical correlations, the actual magnitude of the base load is of little practical significance since conversions from one base load to any alternate can readily be made. Of much more significance are the relative magnitudes of the load equivalency factors.

2. Axle types considered. Kentucky considers all axles as single axles while AASHO applies different sets of equivalency factors to single and tandem axles. It is well known that the destructive effects of loads acting singly and in tandem are not identical (16). The matter of ascertaining the importance of this distinction cannot be properly debated here. It should be mentioned, however, that Kentucky defines a tandem axle as the composite of two single axles whose centers lie between 42 and 120 inches (17). At the same time, AASHO specifies that this measurement should be 40 inches or less (13). Whether this distinction is relevant, considering the axle configurations which pass over Kentucky highways and those employed in the AASHO road test, is unknown. However, if it is, the Kentucky procedure may be more in order for Kentucky conditions since the axleloads tend to act separately as the distance between them increases.

3. Derivation of load equivalency factors. Kentucky's equivalency factors are based on the illustrative example of Bradbury and modified as required for compatibility with experience. The factors suggested by AASHO were determined from a statistical analysis of the performance of the road test pavements.

4. Factors affecting load equivalency factors. Kentucky's factors are a function of the magnitude of the single axleloads and are applicable only to flexible pavement design. AASHO's factors are a function of: (1) axleload magnitude, (2) type of pavement (flexible or rigid), (3) type of axle (single or tandem), (4) terminal serviceability rating (an index of the extent of distress at failure), and (5) the structural number (an index representing the composite structural capacity of the pavement). It is reasonable to assume that each of the determining factors selected by AASHO do theoretically affect the magnitudes of the load equivalency factors. For example, Yoder (16) has

pointed out that the equivalency factors depend upon the type and thickness of the pavement. However, recent work at Purdue University (18) indicates that for practical purposes variations in pavement thickness and terminal serviceability have little effect on equivalency factors and can possibly be neglected for pavement design purposes.

5. Two-axle, four-tired vehicles. In the past, only trucks have been considered by Kentucky to contribute to the accumulation of destructive loadings. A truck is defined as a motor vehicle having six or more tires and designed primarily as a freight carrier. Furthermore, all truck axles weighing less than 9,000 pounds are assumed to have negligible effect. AASHO considers all vehicles as contributing to the cumulative destructive effect although the contribution by passenger cars is extremely small.

6. Design EWL's. A minor distinction in terminology is necessary since Kentucky expresses traffic in terms of equivalent wheel loads, and AASHO in terms of equivalent axleloads (EAL's). This presents no difficulty since Kentucky's results can be interpreted in terms of a base single axleload of 10,000 pounds, and AASHO's results in terms of a base wheel load of 9,000 pounds. Both recommend use of a traffic evaluation period of 20 years. A major difference with regard to design procedures is that Kentucky uses total EWL's in all lanes and in both directions. AASHO identifies a single design lane for heavy-duty, multilane facilities and computes EAL's only for that lane. The results are equivalent only when the average annual directional split is 50-50 and when, on multilane facilities, all contributing, one-directional traffic utilizes the same lane. The AASHO approach is perhaps more reasonable, especially due to the rapidly increasing mileage of multilane facilities. For this reason, the approach taken herein is to provide the capability for considering directional splits of other than 50-50 and lane distributions of other than 100 percent of the significant traffic in the design lane.

Table 2 is presented to compare the equivalency factors currently used by Kentucky and AASHO. In studying this table, one should keep clearly in mind the aforementioned distinctions between the two methods.

CURRENT KENTUCKY PROCEDURE

The four parameters of the traffic stream that enter the EWL computations are (1) ADT, (2) average percent trucks, (3) average number of axles per truck, and (4) the average load distribution of truck axles (axleload distribution). For purposes of estimating EWL's, these four parameters must be representative of the average conditions during the design life. Estimates must be made on the basis of data gleaned from traffic volume counts, vehicle classification counts, and weight studies at loadometer stations. Special surveys may be taken if necessary for a particular design project but most often data are obtained from the routinely conducted surveys or from special, statewide surveys.

Estimates of ADT are thought to pose no significant problems. An extensive network of automatic traffic recording (ATR) stations is located within the Commonwealth, and information obtained from these is annually supplemented by numerous counts made for more specific purposes.

TABLE 2

CURRENT LOAD EQUIVALENCY FACTORS[1]

Single Axles			Tandem Axles		
Load (kips)	Kentucky	AASHO[2]	Load (kips)	Kentucky[3]	AASHO[2]
1-3	0	0.0002	2-6		
3-5	0	0.002	6-10		
5-7	0	0.01	10-14		0.01
7-9	0	0.03	14-18		0.05
9-11	1	0.09	18-22		0.12
11-13	2	0.19	22-26		0.26
13-15	4	0.36	26-30		0.50
15-17	8	0.62	30-34		0.86
17-19	16	1.00	34-38		1.38
19-21	32	1.51	38-42		2.08
21-23	64	2.18	42-46		3.00
23-25	128	3.03	46-50		4.17
25-27	256	4.09	50-54		5.63
27-29	512	5.39	54-58		7.41
29-31	1024	6.97	58-62		9.59

[1] The factors used by AASHO relate to truck axles. In addition, two-axle, four-tired vehicles are assumed to contribute 0.0002 EAL's per vehicle.

[2] These factors relate to flexible pavements having a terminal serviceability index of 2.5 and a structural number of 5.

[3] Kentucky does not identify tandem axles separately for purposes of computation.

Accurate estimates of percent trucks are slightly more difficult to obtain. As will be shown later, the percentage of trucks is very much affected by season; the lowest value for rural stations is normally recorded during the summer months when the volume of passenger cars is large. It is essential, therefore, to obtain an annual weighted average of percent trucks. Furthermore, it must be recognized that estimates of percent trucks are made solely on the basis of vehicle classification counts. There apparently has been some tendency in the past to select as a basis for estimation only those counts taken at the loadometer stations. This practice ignores a wealth of data available from other vehicle classification counts and limits consideration to those traffic patterns representative of primary highways on which the bulk of loadometer stations have been operated.

Estimates of the average number of axles per truck likewise should be made on the basis of vehicle classification counts. Accordingly, the above remarks apropos to restricting the basis of estimates to loadometer-station data are equally relevant here. A further consideration is also important. One must not restrict determinations of the average number of axles per truck to those trucks that are actually weighed at a particular loadometer station. The rationale here is obvious since the average number of axles per truck is sensitive only to the relative percentages of the various vehicle types in the traffic stream: the vehicle sampling for weighing purposes is not necessarily in the true proportion.

Estimates of the load distribution of truck axles must be made on the basis of data obtained from loadometer stations. However, caution must be exercised to assure that both vehicle classification and weight data enter the computations unless the weight sampling by vehicle type is in the same proportion as the vehicle types exist in the traffic stream.

As summarized above, estimates of average percent trucks, average number of axles per truck, and axleload distribution have generally been based on vehicle classification and weight data obtained from loadometer stations. To account for the effects of local conditions, the analyst generally exercises his discretion in the selection of a relevant basis for evaluation. Normally considerations would include (1) the nearest loadometer station, (2) the loadometer station with the most similar traffic characteristics, and (3) statewide averages for all loadometer stations falling within a designated volume group. Under many circumstances, the effect of local conditions could be much better assessed if the analyst would extend his range of consideration to include any relevant vehicle classification counts from which estimates of average percent trucks and average number of axles per truck might be made.

With this basic information in mind, Kentucky's current procedure for estimating design EWL's is summarized by the following step-by-step procedure:

1. Estimate the initial ADT (total, two directional).

2. Estimate the average percent trucks. It is assumed that this percentage will not change significantly during the design life. The validity of this assumption is borne out by an analysis of the data assembled herein. While random variations in percent trucks are evidenced from year to year, no overall trend can be noted.

3. Find the initial average daily number of trucks by taking the product of initial ADT and average percent trucks.

4. Find the average daily number of trucks over the 20-year design period. It is assumed in most cases that the annual increase in the number of trucks is constant over the period and equals 4.65 percent of the initial number. The average number then equals the initial number increased by 46.5 percent. In special cases, other percentages may be chosen at the discretion of the analyst. For low volume groups the average increase is taken to be 20 percent. Table 3 summarizes these adjustments.

TABLE 3

KENTUCKY GROWTH ADJUSTMENT FACTORS FOR EWL ESTIMATES

	Volume Group				
	0-399 (vpd)	400-999 (vpd)	1000-1999 (vpd)	2000-2999 (vpd)	3000+ (vpd)
Multiplicative factors to adjust initial daily truck traffic to average over design period	1.200	1.200	1.465	1.465	1.465
Additive factors to adjust initial average number of axles per truck to average over design period	-	0.04	0.08	0.14	0.19
Additive factors to adjust initial axleload distribution to average over design period for following axle load categories (kips)					
9-11	-	0.01	0.04	0.08	0.09
11-13	-	0.01	0.04	0.11	0.13
13-15	-	0.04	0.11	0.23	0.27
15-17	-	-	0.04	0.12	0.15
17-19	-	0.01	0.04	0.09	0.11
19-21	-	-	0.01	0.04	0.05
21-23	-	-	-	-	-
23-25	-	-	-	-	-

5. Estimate the initial average number of axles per truck.

6. Adjust the initial average number of axles per truck to an average over the design period. This is accomplished through the use of additive adjustment factors shown in Table 3. These adjustments are based on an analysis of trend data and reflect increasing utilization of truck types having larger numbers of axles.

7. Estimate the total number of truck axles anticipated during the 20-year design period. This is obtained by taking the products of the adjusted average daily truck traffic (step 4), the adjusted average number of axles per truck (step 6), 365, and 20.

8. Estimate the initial axleload distribution for truck axles. This is the percentages of truck axles which fall within designated axleload intervals. Axles weighing less than 9,000 pounds may be neglected.

9. Estimate the average axleload distribution during the design period by applying the additive corrections shown in Table 3. These corrections are based on an analysis of trend data which indicate that average weights of truck axles have generally increased with time.

10. Find the total number of truck axles expected within each axleload category during the design life. These are obtained by multiplying the total number of truck axles (step 7) by the adjusted percentages within the various load categories (step 9).

11. Compute the EWL's within each axleload category by multiplying the total axles in that category (step 10) by the appropriate equivalency factor (Table 2).

12. Sum the EWL's of step 11 to obtain the final estimate of the total, two-directional EWL's anticipated during the design period.

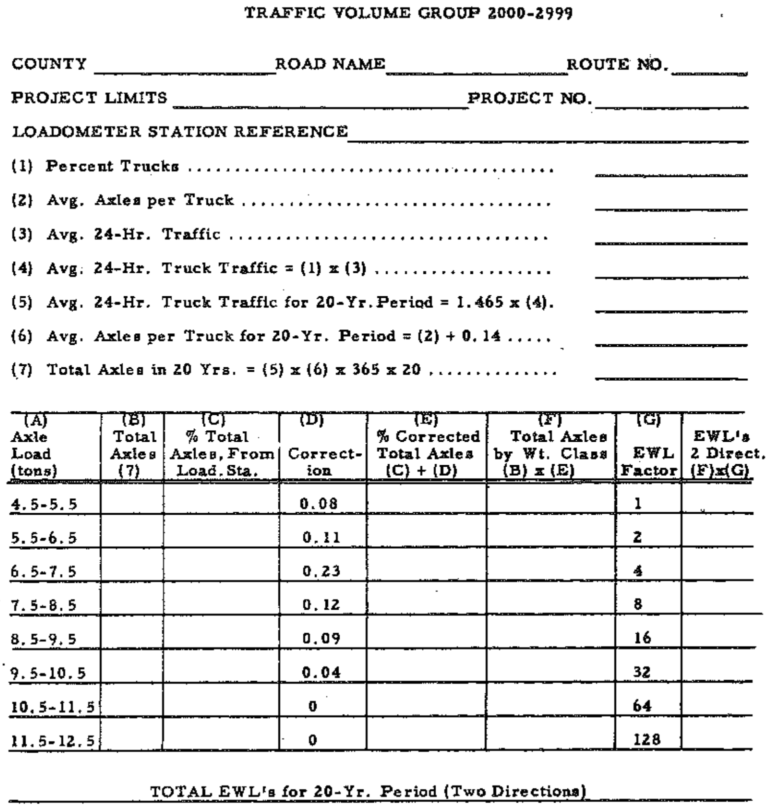
13. Determine the appropriate traffic category using Table 4.

Figure 1 illustrates one of the forms used to facilitate the computational process embodied in the above procedures.

TABLE 4

KENTUCKY DESIGN TRAFFIC CATEGORIES

Category	Two-Directional EWL's (millions)
IA	Less than 0.5
I	0.5-1
II	1-2
III	2-3
IV	3-6
V	6-10
VI	10-20
VII	20-40
VIII	40-80
IX	80-160
X	160-320



TRAFFIC VOLUME GROUP 2000-2999

COUNTY ________ ROAD NAME ________ ROUTE NO. ________

PROJECT LIMITS ________ PROJECT NO. ________

LOADOMETER STATION REFERENCE ________

(1) Percent Trucks .... ________

(2) Avg. Axles per Truck .... ________

(3) Avg. 24-Hr. Traffic .... ________

(4) Avg. 24-Hr. Truck Traffic = (1) x (3) .... ________

(5) Avg. 24-Hr. Truck Traffic for 20-Yr. Period = 1.465 x (4). ________

(6) Avg. Axles per Truck for 20-Yr. Period = (2) + 0.14 ..... ________

(7) Total Axles in 20 Yrs. = (5) x (6) x 365 x 20 .... ________

(A) Axle Load (tons)	(B) Total Axles (7)	(C) % Total Axles, From Load. Sta.	(D) Correction	(E) % Corrected Total Axles (C) + (D)	(F) Total Axles by Wt. Class (B) x (E)	(G) EWL Factor	EWL's 2 Direct. (F)x(G)
4.5-5.5			0.08			1	
5.5-6.5			0.11			2	
6.5-7.5			0.23			4	
7.5-8.5			0.12			8	
8.5-9.5			0.09			16	
9.5-10.5			0.04			32	
10.5-11.5			0			64	
11.5-12.5			0			128	

TOTAL EWL's for 20-Yr. Period (Two Directions) ________

Figure 1. Form for Estimating 20-Year EWL's, 2000-2999 vpd.

CALIFORNIA PROCEDURE

A review of the California procedure for evaluating EWL's (8,19) provides the opportunity for introducing the concept of unit EWL's which are defined as the average EWL's per vehicle and which are a function of vehicle type. For pavement design purposes, California predicts the accumulated equivalent number of 5,000-pound wheel loads on the design lane during a 10-year period. This design EWL is converted to a Traffic Index for entry into the pavement design charts.

First it is necessary to predict the present and future, two-directional, average daily volumes of the various types of dual-tired commercial vehicles. These types are classified according to number of axles per vehicle, and buses are treated as commercial vehicles. These average daily numbers of vehicles are multiplied by EWL-conversion factors for each vehicle type, and the results are summed over all vehicle types to obtain the average annual design EWL in one direction. These conversion factors are shown in the second column of Table 5. These factors automatically convert from two-directional to one-directional volumes and from daily to annual accumulations. For special conditions of traffic, adjustments in the EWL-conversion factors

TABLE 5

CALIFORNIA EWL CONSTANTS FOR DUAL-TIRED COMMERCIAL VEHICLES

Type of Vehicle	Annual Design EWL per Vehicle per Day	Unit EWL
2-axle truck	250	1.37
3-axle truck	815	4.47
4-axle truck	965	5.28
5-axle truck	2385	13.08
6-axle truck	1475	8.09

may be warranted. Corresponding average unit EWL's for the various vehicle types are shown in the third column of Table 5. After the average annual one-directional design EWL has been obtained, it is multiplied by the number of years in the design period and adjusted, if necessary, for lane distribution on multilane facilities.

The important fact to emphasize here is that California largely separates the problem of estimating the composition of the traffic stream (by vehicle type) from the problem of estimating the axle-weight distributions of the various vehicle types. It is apparently assumed, furthermore, that there is some consistency in the average unit EWL's among the various types of highways even though provision is made to adjust these if necessary.

RECENT INVESTIGATIONS IN TEXAS

Two rather recent investigations conducted in Texas shed additional light on both methodology and the effects of local conditions. The first of these (20) was concerned primarily with methodology. The proposed methodology does not seem to differ greatly from that used in Kentucky and is outlined briefly in the following manner:

1. Predictions are made of the average daily traffic (ADT) anticipated throughout the design period.

2. The percentage of trucks can then be estimated using a curve derived from an analysis of past data which relates percent trucks with ADT. Percent trucks are not used directly in the analysis but are computed primarily for use in geometric design and as input to steps 3 and 4.

3. The numbers of both single and tandem axles per 100 vehicles are obtained from a tabulation based on volume group, percent trucks, and highway classification. Multiplication of these numbers by the ADT expressed in hundreds yields the total numbers of single and tandem axles anticipated.

4. Axleload distributions for both single and tandem axles are related to percent trucks. Given these distributions and the numbers of axles obtained in step 3, the numbers of each type of axle in each weight category can be determined. Equivalency factors are then applied and the results summed to obtain the design EAL's.

The second investigation (21) employed a slightly different methodology but focused attention primarily on how to relate axleload distributions at one location to those at other locations. This represented an attempt to ascertain and describe the effect of local conditions on axleload distributions. Data obtained from loadometer stations operated from 1960 through 1963 were grouped by each of the following three classification sets: (1) percent trucks, (2) highway system classification (a composite indication of geometric design standards and percentage of through trucks), and (3) statewide averages.

It was concluded that axleload distributions for design purposes should be obtained from measurements at a nearby loadometer station if such measurements are available and if design and traffic conditions are nearly identical. If not, the statewide average axleload distributions should be used except for highways approaching interstate design standards. For these facilities, average axleload distributions for stations of this high-type design should be used.

PURDUE UNIVERSITY

Recently, Ulbricht (18) has devised an approximate method for estimating EAL's based on a knowledge of ADT and an equivalency coefficient. The equivalency coefficient is the average EAL per vehicle and considers the proportions and weights of all vehicle types in the traffic stream. Using multiple regression techniques, an equivalency coefficient of this type was related to various parameters in the traffic stream including percent trucks and percent multiple-unit trucks. Data from 22 loadometer stations accumulated over a three-year period were utilized and the resulting correlations were found to be most acceptable.

It was suggested, however, that, since the percentages of trucks on highways of the same class are approximately constant, the equivalency coefficient could be related to a classification of highway type by truck usage. The three classes of truck routes are:

1. Class I truck routes - all interstate routes and US-numbered routes connecting major population centers,

2. Class II truck routes - all other primary highways, and

3. Class III truck routes - all secondary state highways.

The equivalency coefficients, based on AASHO's computational procedures, are shown in Table 6.

TABLE 6

EQUIVALENCY COEFFICIENTS BY ROUTE CLASS

Class of Truck Route	Equivalency Coefficients (EAL's per vehicle)	
	Rigid	Flexible and Overlay
I	0.22	0.16
II	0.10	0.07
III	0.03	0.01

To estimate EAL's, it is recommended that vehicle weight and classification data be used directly. However if such data are unavailable, a reasonbly accurate estimate may be made by obtaining the product of the average ADT, the equivalency coefficient, the number of years, and 365. The significance of this work is embodied in use of the equivalency coefficient and the ability to consider local conditions only in terms of the highway class.

CONCLUDING REMARKS

Other organizations (22-24) have also sought appropriate means for estimating EWL's for pavement-design purposes. In addition, still others (25,26) have been concerned with related aspects of the problem--including sampling procedures, methods for obtaining measurements, and so forth. Apparently, however, there has been very little in-depth study of the various effects of local conditions on the pertinent traffic parameters. For example, the effects of time and such a crucial variable as the maximum allowable gross weight have generally remained unknown. It is primarily to this problem that the current study is directed.

PROPOSED METHODOLOGY

During the search for a responsive procedure for predicting EWL's for pavement-design purposes, it was necessary to investigate whether the methodology currently used in Kentucky is sufficiently responsive to both present and future requirements of the design problem. The following criteria were established to enable a proper assessment of both current and possible alternate methodologies:

1. The method must be simple to apply to design situations. It was felt that any refinements requiring laborious and time-consuming computations would be unacceptable to the designer unless significant improvements in accuracy could be realized.

2. If a new methodology is proposed, it must be reasonably simple and straightforward in its development.

3. Full use must be made of all available, relevant data.

4. The methodology should be rational, or at least intuitively appealing, and should lend insight as to the basic relationships entering the design computations.

5. The methodology should yield sufficiently accurate estimates of design EWL's.

6. The methodology should maximize the amount of valid data useful for other than pavement-design purposes.

7. The methodology should be adaptable to possible future considerations of lane and directional distributions.

8. The methodology should be sufficiently general so as to permit use of any chosen set of equivalency factors and to permit separate identification of single and tandem axles.

9. The methodology must be structured so that the effects of local conditions may be properly evaluated.

A review of Kentucky's current method led to the conclusion that it generally satisfied most of the above criteria or, with some modifications, could satisfy most of them. However, certain deficiencies were noted which made attractive the consideration of possible alternatives. In the first place, Kentucky's procedure uses the load distribution of truck axles which, as has been mentioned previously, is dependent on both vehicle classification and weight data. This means that weight data is meaningless in itself without corresponding classification counts. At first glance, this poses no significant problems since the procedures could be modified to use the axleload distributions of the various vehicle types. However, the axleload distributions are difficult to manipulate statistically and a much simpler method would be to collapse the relevant information into a single measure such as unit EWL's.

The average number of axles per truck is a variable related only to the percentages of the various vehicle types in the traffic stream. This manner of viewing these percentages seems to cloud the basic relationships which are contributing to the changing traffic stream. A somewhat arbitrary, additive correction factor (Table 3), applied to adjust for changing basic conditions with time, is not intuitively appealing and lends little insight into the mechanisms at work within the changing system.

Furthermore, the variable, percent trucks, has been examined in some detail and has been found to be relatively insensitive to local conditions and, therefore, rather difficult to predict. For example, percent trucks, though extremely variable from year to year, does not seem to demonstrate significant trends with time. However, the percent of individual truck types are greatly dependent upon year. It was felt, therefore, that benefits would be realized by predicting the percentage of each vehicle type. This would provide a built-in checking procedure[1] as well as additional information to those concerned with the composition of the traffic stream on a designated route.

Finally, Kentucky considers only truck traffic in its analysis. At the same time, weight data obtained from loadometer stations indicate that some two-axle, four-tired, freight vehicles have axles weighing in excess of 9,000 pounds and, therefore, contribute to the accumulation of EWL's. Furthermore, some buses also have a destructive effect on pavement performance. If non-zero equivalency factors for single axle loads under 9,000 pounds are used, the effects of these omissions are somewhat magnified.

A semi-theoretical approach of the type alluded to by Larson (25) was first suggested as an alternate to the Kentucky procedure. Such an approach would be based on postulations of intercity interactions (27) extended to encompass the necessary range of vehicle types. While such an approach is intuitively appealing, development of the procedures and characterization of the system seemed to be rather monumental tasks. This is further complicated by the fact that a significant portion of the traffic in Kentucky is generated from terminals alien to Kentucky. The necessary resources for such an effort were not available and significant advantages over less tedious procedures were not assured.

It was decided, therefore, to adopt an empirical approach which relied on the correlation of significant parameters of the traffic stream with those local conditions of potential importance which could be identified and evaluated rather easily. Gross measures, such as the equivalency coefficient of Ulbricht, were rejected primarily on the basis that much significant data would be lost, the basic relationships entering the design computations would be obscured, and it would be difficult to account at some future time for lane and directional distributions. Significant parameters of the traffic stream chosen to be evaluated were the percentages of the various vehicle types and their average unit EWL's. After these characteristics were predicted for a design situation, the design EWL's were computed as follows:

$$\text{Design EWL's} = \sum_{j}\sum_{i} 365(\text{ADT}_j)(P_i)(D_i)(L_i)(\text{UEWL}_i) \qquad (1)$$

---

[1] The sum of the percentages would have to equal 100 percent.

where j = the jth year,

i = the ith vehicle type,

ADT_j = the average daily traffic in the jth year,

P_i = the predicted percentage of the total traffic stream which is of vehicle type i,

D_i = the annual average percentage of type i vehicles which travel in the critical direction,

L_i = the annual average percentage of type i vehicles traveling in the critical direction in the design lane, and

$UEWL_i$ = the predicted average unit EWL's for vehicle type i.

The design EWL's predicted from Equation 1 represent the predicted accumulations of EWL's in the design lane. This equation can be simplified somewhat when it is possible to predict an average or effective ADT during the design period and when the basis for design is the total accumulation of EWL's in both directions and all lanes. Equation 1 then reduces to

$$\text{Design EWL's} = 365\ (N)(ADT_{eff}) \sum_i (P_i)(UEWL_i) \qquad (2)$$

where N = the design period in years and

ADT_{eff} = the average or effective ADT during the design period.

Equation 2 provides valid estimates for use with Kentucky's current flexible pavement-design procedure.

The proposed methodology, which is embodied in Equations 1 and 2, is found to reasonably satisfy the previously enumerated criteria. It is simple both in development and application. Full use can be made of all relevant data since unit EWL's need only be derived from weight data and the percentages of the vehicle types from classification data. While maximum use is made of classification information, some information is lost when unit EWL's are substituted for axleload distributions. This problem is partially alleviated herein by the subsequent presentation of unit EWL's computed by Kentucky's procedure, by AASHO's procedure, and by a modified AASHO procedure which is explained subsequently. Local conditions enter the analysis in the determination of the traffic parameters of interest--namely, the vehicle percentages and the unit EWL's.

LOCAL CONDITIONS

Having thus established the proposed methodology and identified the traffic parameters of interest, it was then necessary to identify those local conditions thought to be significantly related to the composition of the traffic stream and to the weights of the vehicles included therein. The process used in this identification was largely intuitive since at this stage the available data were not in proper format for analysis.

Several rather general guidelines were available to aid in this selection. Any apparently relevant local condition would have to be amenable to analysis -- that is, it would be necessary to be able to classify each condition both to enable the analysis of past data and to enable subsequent predictions. Furthermore, some rationale would have to be formulated to tentatively substantiate the relationships between the traffic parameters and the local condition. It was soon recognized that many of the relevant conditions could not be treated as continuous variables but would have to be treated as classification sets to which an integer number would be associated for data-processing purposes. Finally, it would be desirable to exclude from the set of local conditions any predictive characteristics of the traffic stream itself except ADT.

The set of local conditions chosen for analysis is shown in Table 7, which also gives information relative to the coding scheme. The data bank code is the code found on the basic data records. The second code is a transformed code used to facilitate the analyses reported herein. For convenience, all local conditions have been treated as classification sets and none as continuous variables.

1. Road type. The road-type category was originally intended to provide an indication of the percentage of through vehicles -- most notably, through trucks -- in the traffic stream. As such it was felt to be indicative of the local- or through-service nature of the route. It was felt that the vehicle weight and composition characteristics would greatly depend on such a classification. However, difficulties were soon apparent in attempting to devise a coding scheme which could, within a reasonable time frame, be applied for all data obtained within the study period (1950-1966). Accordingly, a compromise scheme was adopted which classified the route by the manner in which it was numbered.

2. Direction. Kentucky is geographically situated so that the bulk of interstate truck traffic travels on primarily north-south routes. It was felt, therefore, that the principal direction of a high-type facility might be a significant factor in determining the type of traffic traveling thereon. Accordingly, each route was classified as to its predominant direction. As an aid in making this assessment, terminal or quasi-terminal points were selected and a decision made as to whether north-south or east-west traffic would make major use of the route. Distances separating the quasi-terminal points were extended as the adjuged importance of the route increased. The potential significance of route direction was felt to greatly diminish as the local-service nature of the route increased.

TABLE 7

CODIFICATION OF LOCAL CONDITIONS

Local Condition	Data Bank Code	Code for Subsequently Reported Analyses	Description
Road Type	1	1	Interstate-numbered rural
	2	2	US-numbered rural
	3	3	KY-numbered rural
	4	None	Toll rural
	5	4	Other rural
	6	None	Urban
Direction	1	1	North-South
	2	2	East-West
Alternate Route	1	1	Alternate route is inferior
	2	2	No alternate or alternate of same quality
	3	3	Alternate route is superior
Service Provided	1	1	Primarily provides service to major recreational activities
	2	2	Provides significant service to major recreational activities
	3	3	Provides some service to recreational activities
	4	4	Ordinary
	5	5	Provides some service to mining activities
	6	6	Provides significant service to major mining activities
	7	7	Primarily provides service to major mining activities
	8	8	Provides more than ordinary service to industrial activities
	9	9	Primarily provides service to major concentrations of industrial activities
Volume (ADT)	None	1	0-499
	None	2	500-999
	None	3	1000-1999
	None	4	2000-2999
	None	5	3000-3999
	None	6	4000-5999
	None	7	6000-7999
	None	8	8000-9999

TABLE 7 (Cont'd.)

Local Condition	Data Bank Code	Code for Sebsequently Reported Analyses	Description
Volume (Cont'd.)	None	9	10,000-13,999
	None	10	14,000 or more
Maximum Allowable Gross Weight	None	1	30,000 lbs
	None	2	42,000 lbs
	None	3	59,640 lbs
	None	4	73,280 lbs
Geographical Area	1	1	Western Kentucky (Highway Districts 1 and 2)
	2	2	South Central Kentucky (Highway Districts 3, 4, and 8)
	3	3	North Central Kentucky (Highway Districts 5, 6, and 7)
	4	4	Eastern Kentucky (Highway Districts 9, 10, 11, and 12)
Year	None	1	1950-1951
	None	2	1952-1953
	None	3	1954-1955
	None	4	1956-1957
	None	5	1958-1959
	None	6	1960-1961
	None	7	1962-1963
	None	8	1964-1965
	None	9	1966
Season	1	1	Winter (Jan - Mar)
	2	2	Spring (Apr - June)
	3	3	Summer (July - Sept)
	4	4	Fall (Oct - Dec)
	5	None	Annual average for all seasons

3. Alternate route. The significance of alternate routes became apparent when traffic parameters on certain routes were studied during a time period in which alternate routes having superior geometric design standards were opened to traffic. It was apparent that, if an alternate route is available, through truck traffic tends to become channelized on that route offering the superior service. As an aid toward the classification of particular locations in this regard, the quasi-terminal-point approach was found to be particularly useful. As the importance of the route increased, it was necessary to extend the parallel band within which possible alternate routes were

considered. While three different codes were chosen to represent this local condition, it was felt that codes 1 and 2 would yield similar results and that only code 3 would be significantly different.

4. Service provided. A large number of routes in Kentucky provide service to areas in which rather unusual activities take place in terms of the types of traffic generated. . Most notable among these are those mining areas of the Commonwealth in which the bulk of coal is carried over some segment of the highway system. In fact, inability of current EWL-prediction procedures to adequately treat this important factor was responsible in part for initiation of the current study. It was decided, therefore, to classify each route according to the major activities which it serviced. These activities were classified as recreational, ordinary, mining, and industrial. Mining activities include not only coal mining but also aggregate production and processing. A distinction had to be made between the western and eastern coal-producing regions since much of the coal produced in the western region is transported directly from the mines by rail. As an aid to the classification of routes according to service provided, locations of coal mines, aggregate quarries, and recreational areas were carefully pinpointed.

5. Volume. Traffic volume has long been associated with other significant parameters of the traffic stream. While the expressed intent of this study was to exclude from the set of local conditions any predictive characteristics of traffic, volume was thought to be of such importance that it had to be included. An appropriate measure of volume is the ADT. This seemed not only a logical but also an expedient choice since ADT must be independently projected as a part of the proposed methodology.

6. Maximum allowable gross weight. Kentucky has had four different maximum allowable gross weights during the study period. Even now, different highways are assigned different maximum allowable gross weights to reflect their varying structural capabilities. Composition of the traffic stream is greatly affected by maximum allowable gross weight. As this allowable weight increases, percentages of the larger combinations tend to increase while percentages of the smaller combinations tend to decrease. It was felt that much of the variability which has been attributed to a time factor is in reality a reflection of the changing maximum allowable gross weights. Maps classifying the highway system into trucking categories were extremely useful in codifying historical data in this regard.

7. Geographical area. It was assumed, somewhat arbitrarily, that different geographical areas of the Commonwealth might exhibit somewhat different traffic patterns. This could not be considered as a very basic determinant of traffic characteristics but must be considered as one which, if omitted, could possibly lead to distortions of the predictions. Accordingly, four geographical areas were delineated based on intuitive considerations of the nature of the areas. The delineations were made to coincide with the boundaries of current administrative highway districts in order to facilitate their use in the predictive process. Figure 2 depicts the boundaries of these four areas.

8. Year. Past procedures have considered year as a major independent variable in the analysis and have relied on the application of annual correction factors to the various traffic parameters. It was felt that the apparent effects

of year might be greatly diminished if proper consideration could be afforded to other conditions such as maximum allowable gross weight. However, year was still retained as a possibly significant variable affecting pertinent traffic parameters. Year was progressively coded so that the beginning of the study period was given a code of 1 and the end a code of 9. Subsequent investigation has suggested the possibility that the effects of time might better have been expressed as that interval following a change in maximum allowable gross weight.

9. Season. Season is known to have a significant effect on the composition of the traffic stream. For example, on rural routes serving normal traffic, percent trucks is lowest during the summer and largest during the winter. Since annual averages are required for predictive purposes, it might be reasoned that season should not be included as a part of the predictive procedure. However, since the correlations of traffic parameters with local conditions must be based on historical data and since such data are not necessarily representative of the annual average conditions, season must be considered as a separate part of the analysis.

The above nine items represent that set of local conditions which was chosen for correlation with the significant traffic parameters, unit EWL's and percentages of the various vehicle types. While other local conditions may be equally as significant, they simply have not been identified in this study as being of importance in Kentucky. Data which indicate the actual relative significance of these conditions are presented in the following sections. The relative importance of each local condition varies according to the parameter which is being evaluated.

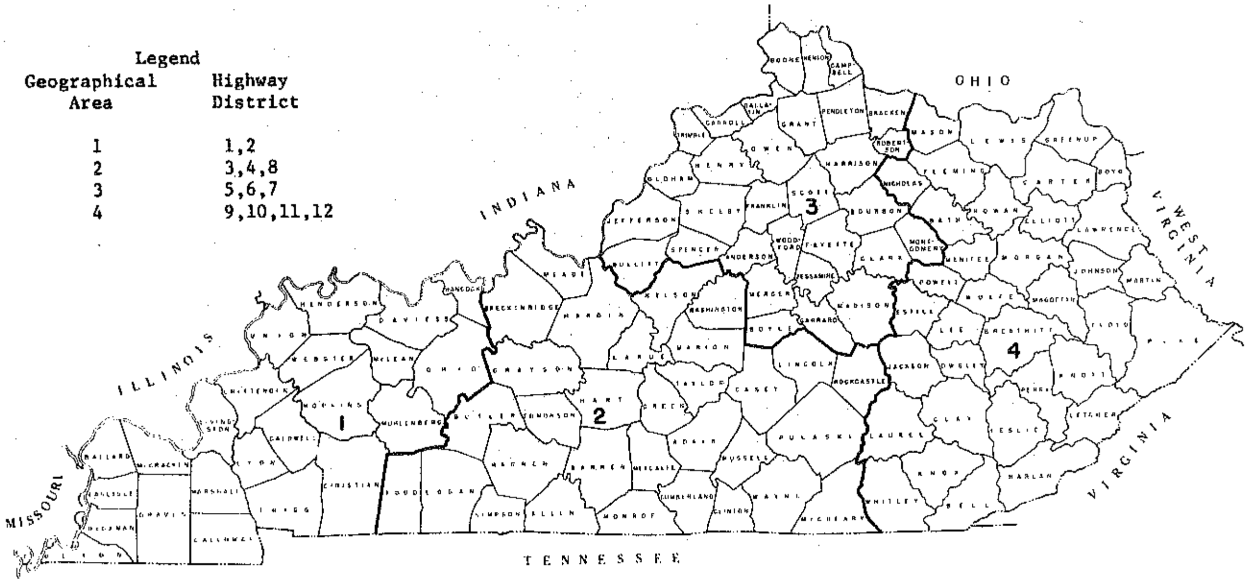


Figure 2. Four Geographical Areas.

DATA ACQUISITION AND ASSIMILATION

The proposed methodology not only enabled but also required separate evaluations of vehicle classification and weight data. This requirement greatly expanded the extent of available data on which the analysis was based. It also required an extensive and prolonged search through existing data files. While much assistance in this endeavor was rendered by personnel of the Division of Planning, significant efforts were directed to the identification of data sources and the transformation of available data into formats amenable to analysis by computer.

APPLICABLE SURVEYS

Loadometer Surveys

The Division of Planning has operated loadometer stations throughout the Commonwealth since 1942 (28). Locations of these stations were revised in 1950, at which time ten permanent stations were established. Since 1950, station locations have been changed periodically to reflect changing needs and travel patterns; none of the original stations is currently in operation. In 1966, ten loadometer stations were operated on rural primary highways and two on urban facilities (29). The permanent loadometer stations have always been located on the higher volume and more important routes.

Both vehicle classification and weight data are available from the loadmeter stations. In general, four 24-hour classification counts are taken annually at each station, one during each season. Weight data are generally taken only once a year during the summer months. The scales are usually operated at each station for 16 hours. During this period, they are alternated between the two directions every two hours yielding a total of eight hours of operation in each direction. All freight vehicles including two-axle, four-tired vehicles are sampled for weighing in approximately the same proportions as they exist in the total traffic stream.

Special Weight Surveys

During the spring and summer months of 1957 and 1964, special vehicle weighing operations were conducted at many locations throughout the Commonwealth. These locations were chosen primarily to extend coverage to low-volume, secondary routes for which virtually no weight data had been otherwise obtained. Vehicle classification counts were conducted in conjunction with the weighing operations. These special weight surveys provide the bulk of weight data available for low-volume facilities.

Toll Roads

Extensive records are kept concerning the types and numbers of vehicles using the toll facilites in Kentucky. Of use to a study such as this would be information concerning the percentages of the various vehicle types using the facilities. Unfortunately, vehicle types are identified solely with respect to the number of axles per vehicle. It is thus impossible to distinguish, for example, between single-unit and combination three-axle trucks. Since this method was not directly compatible with the vehicle-classification scheme adopted for this study, no toll records have been analyzed.

Other Classification Studies

Additional vehicle classification data are available from the ATR stations, from special classification surveys, and from origin-and-destination (O&D) studies. Data prior to 1950 were not suitable for evaluation, however, since trucks were classified only in three categories light, medium, or heavy (28). All available classification data obtained since 1950 have been included in the basic data bank.

DATA SOURCES

While suitable data were available from these various studies, they had not generally been summarized in a form amenable to analysis. The vehicle weight and classification data obtained from the permanent loadometer stations had generally been published in report or tabular form (29). However, the weight data had not been reported by individual station and, therefore, were useless for a detailed study of the effects of local conditions. Other published data (9,10,28) were likewise deficient.

Fortunately, all weight data obtained from the permanent loadometer stations after 1949 had been placed on punched cards. Each card contained information concerning the axle weights of one vehicle. These original cards became the primary source of available weight data.

Vehicle classification data in summarized form were virtually non-existent except for those data taken at the permanent loadometer stations and reported in the W-tables of the vehicle-weight-and-classification-study reports. The bulk of classification data were obtained through a manual search of available files of the Division of Planning.

The study period was chosen to include the years of 1950 through 1966. It is recalled that, for prior years, the weight data were not available on punched cards and that the classification data were not in proper form.

DATA FORMAT

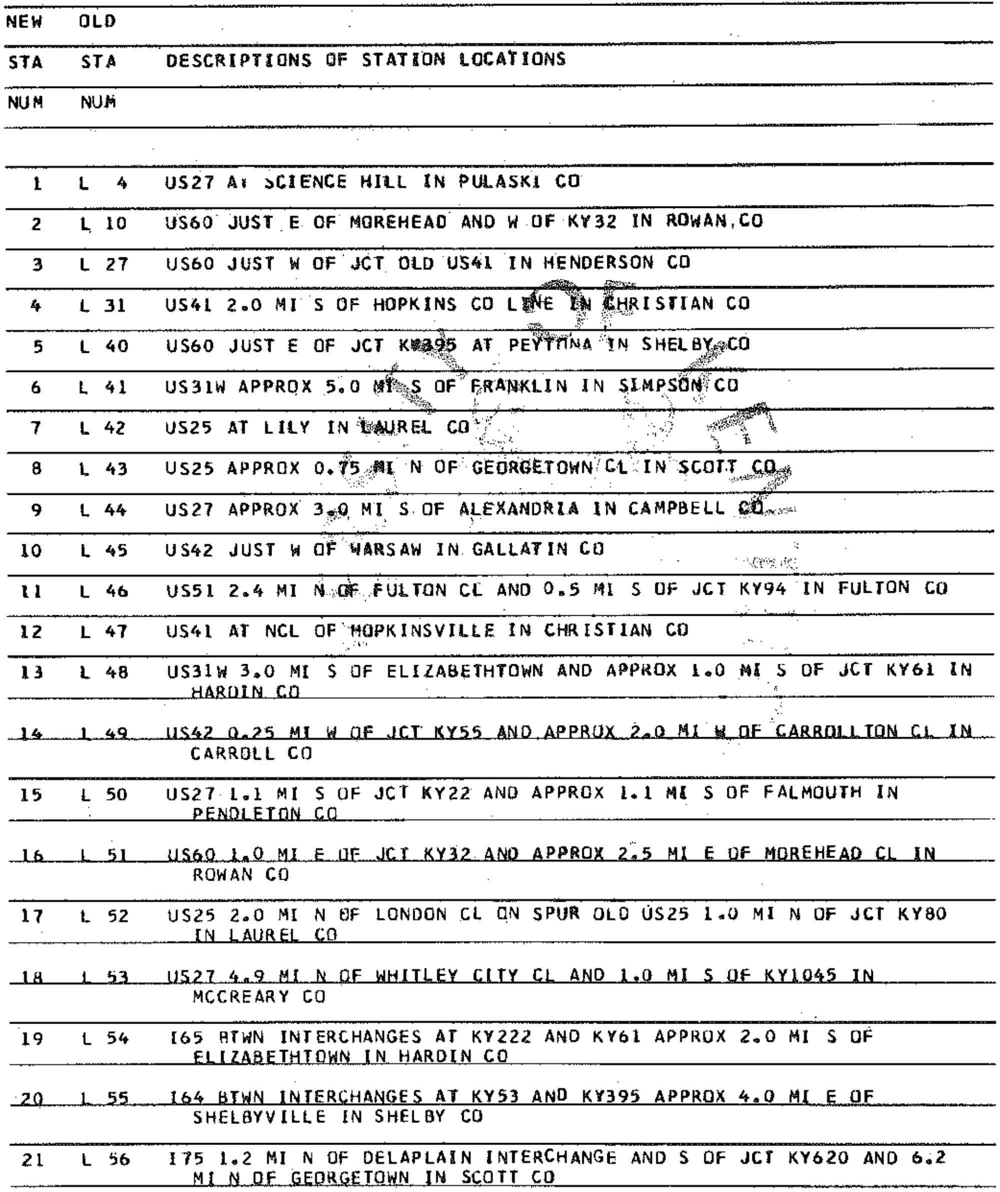
With the exception of toll-road data, all available vehicle classification and weight data obtained from all sources during the study period have been assembled as a part of this study. The resulting data set includes both rural and urban data even through the urban data has yet to be analyzed.

Station Locations

Each location at which data were obtained was assigned a specific station number. Rather extensive efforts were made to assure that each location was assigned only one number even though surveys may have been taken at that location for different purposes and at different times. To assure consistency in the numbering scheme, all past numbers which had been assigned to specific locations were discarded. The stations were then assigned word descriptions as illustrated by Figure 3. Reasonable efforts were made to assure consistency in the descriptions among the many station locations.

Indexes

Two indexes have been provided to assist in the identification and location of relevant vehicle classification data. The first of these is an index by route which lists the station numbers located on a specific route. Figure 4 illustrates this type of index. The second type of index, which is illustrated by Figure 5, enables the identification of those particular locations within each county at which classification data have been obtained and summarized.



NEW STA NUM	OLD STA NUM	DESCRIPTIONS OF STATION LOCATIONS
1	L 4	US27 AT SCIENCE HILL IN PULASKI CO
2	L 10	US60 JUST E OF MOREHEAD AND W OF KY32 IN ROWAN,CO
3	L 27	US60 JUST W OF JCT OLD US41 IN HENDERSON CO
4	L 31	US41 2.0 MI S OF HOPKINS CO LINE IN CHRISTIAN CO
5	L 40	US60 JUST E OF JCT KY395 AT PEYTONA IN SHELBY CO
6	L 41	US31W APPROX 5.0 MI S OF FRANKLIN IN SIMPSON CO
7	L 42	US25 AT LILY IN LAUREL CO
8	L 43	US25 APPROX 0.75 MI N OF GEORGETOWN CL IN SCOTT CO
9	L 44	US27 APPROX 3.0 MI S OF ALEXANDRIA IN CAMPBELL CO
10	L 45	US42 JUST W OF WARSAW IN GALLATIN CO
11	L 46	US51 2.4 MI N OF FULTON CL AND 0.5 MI S OF JCT KY94 IN FULTON CO
12	L 47	US41 AT NCL OF HOPKINSVILLE IN CHRISTIAN CO
13	L 48	US31W 3.0 MI S OF ELIZABETHTOWN AND APPROX 1.0 MI S OF JCT KY61 IN HARDIN CO
14	L 49	US42 0.25 MI W OF JCT KY55 AND APPROX 2.0 MI W OF CARROLLTON CL IN CARROLL CO
15	L 50	US27 1.1 MI S OF JCT KY22 AND APPROX 1.1 MI S OF FALMOUTH IN PENDLETON CO
16	L 51	US60 1.0 MI E OF JCT KY32 AND APPROX 2.5 MI E OF MOREHEAD CL IN ROWAN CO
17	L 52	US25 2.0 MI N OF LONDON CL ON SPUR OLD US25 1.0 MI N OF JCT KY80 IN LAUREL CO
18	L 53	US27 4.9 MI N OF WHITLEY CITY CL AND 1.0 MI S OF KY1045 IN MCCREARY CO
19	L 54	I65 BTWN INTERCHANGES AT KY222 AND KY61 APPROX 2.0 MI S OF ELIZABETHTOWN IN HARDIN CO
20	L 55	I64 BTWN INTERCHANGES AT KY53 AND KY395 APPROX 4.0 MI E OF SHELBYVILLE IN SHELBY CO
21	L 56	I75 1.2 MI N OF DELAPLAIN INTERCHANGE AND S OF JCT KY620 AND 6.2 MI N OF GEORGETOWN IN SCOTT CO

Figure 3. Example of Station-Location Descriptions.

```
ROUTE         COUNTY         STATION NUMBERS WITHIN COUNTY

I 64
              BOYD           195
              CLARK          285  287  312
              FAYETTE        377
              FRANKLIN       441  442
              SHELBY          20   76  890

I 65
              HARDIN          19

I 75
              GRANT           77
              KENTON         632  633
              SCOTT           21

I 264
              JEFFERSON      848

U 23
              BOYD           188  189
              FLOYD           97  431  432  434
              GREENUP        196  502  504  505  506  507  508  509  512  513  514
              JOHNSON        624  625
              LAWRENCE        96  656  657
              LETCHER        659  661
              PIKE            67  784  796  789

U 25
              BOONE          170  629
              FAYETTE        366  368  369  370  371  372  373  374  378  382  384  392
              FAYETTE        393  394  399  400  402  403  406  407  410  411  412  413
              FAYETTE        414  415  416  417  418  419
              GRANT           71  483  484  485  487  488  489
              KENTON         626  627  628  630  631
              LAUREL           7   17  193  206  645  645  650  653
              MADISON        680  703  704
              ROCKCASTLE      69  833  835  837
              SCOTT            8  864  865  873  874
              WHITLEY        194
```

Figure 4. Example of Index by Route.

```
COUNTY      STATION NUMBERS WITHIN COUNTY

ADAIR
            100  101  102  103  104  105  106  107  108  859

ALLEN
            109  110  111  112  113  114  115  116  117  118

ANDERSON
            119  120  121  122  123  443

BALLARD
            124  125  126  127  129

BARREN
             29  135  136  137  138  139  140  141  142  143  144  145  146  147
            148  149  150  151  152  153  154  155  362

BATH
            156  157  158  159  160  161

BELL
             85  162  163  164  165  166  167

BOONE
            168  169  170  171  172  477  629

BOURBON
             47   80  173  174  175  176  177  178  179  180  181  182  183  184
            550
```

Figure 5. Example of Index by County.

Codes

Numerous codes are used to identify and describe the assimilated data. Table 7, which has been presented previously, describes the codes used to classify local conditions of each station at which classification or weight data had been obtained. In addition, use was made of codes to describe other relevant information and variables. These codes are summarized in Tables 8 and 9.

TABLE 8

CODIFICATION OF VARIABLES OTHER THAN LOCAL CONDITIONS

Variable	Data Bank Code	Code for Subsequently Reported Analyses	Description
Source	1	None	Permanent loadometer station
	2	None	O & D survey
	3	None	Special weight survey
	4	None	Toll records
	5	None	ATR classification surveys
	6	None	Special classification surveys
Classification Data Availability	1	None	Corresponding classification data are available
	2	None	Corresponding classification data are not available
Loadometer Data Availability	1	None	Corresponding weight data are available
	2	None	Corresponding weight data are not available
Vehicle Types	1	None	Unclassified vehicles
	2	None	Passenger cars (in-state)
	3	None	Passenger cars (out-of-state)
	4	1	All passenger cars
	5	None	Buses (school)
	6	None	Buses (other)
	7	2	All Buses
	10	None	SU-2A-4T (less than 1 1/2 ton)
	11	None	SU-2A-4T (greater than 1 1/2 ton)
	12	3	All SU-2A-4T
	13	4	SU-2A-6T
	14	5	SU-3A
	15	None	SU-4A (or more)

TABLE 8 (Cont'd.)

Variable	Data Bank Code	Code for Subsequently Reported Analyses	Description
	20	6	C-3A
	21	None	C-4A (2A Trac., 2A Tlr.)
Vehicle Types (Cont'd.)	22	None	C-4A (3A Trac., 1A Tlr.)
	23	7	All C-4A
	24	None	C-5A (3A Trac., 2A Tlr.)
	25	None	C-5A (2A Trac., 3A Tlr.)
	26	8	All C-5A
	27	9	C-6A (or more)
	1	None	Single empty
	2	None	Single loaded
	3	None	All singles
	4	None	Bi-tandem empty
	5	None	Bi-tandem loaded
Axle Type	6	None	All bi-tandems
	7	None	Tri-tandem empty
	8	None	Tri-tandem loaded
	9	None	All tri-tandems
	10	None	All axles (empty)
	11	None	All axles (loaded)
	12	None	All axles (total)
Data Limitation	1	None	Partial count
	2	None	Partial count, location uncertain
	3	None	Location uncertain

The source code provided a means for identifying the type of survey used to obtain the data. The classification-data-availability and loadometer-data-availability codes were used to correlate the two types of data. The vehicle-type codes were established so that codes from 1 to 9 represent passenger vehicles, 10 to 19 represent single-unit trucks, and 20 to 29 represent truck-semitrailer combinations. These codes were selected in order to provide maximum flexibility for possible future use. Experience accumulated during the study, however, dictated a reduction in the number of significant vehicle types to eight for purposes of analysis.

The axle-type code distinguished the type of axle and the condition of the vehicle, that is, empty or loaded. The "all axles" categories treat all axles as if they are single axles. The data-limitation code was used to identify those data obtained from other than 24-hour surveys and/or stations whose locations are uncertain. Finally, it was desirable to codify certain

TABLE 9

WEIGHT-CATEGORY CODES

Code	Axleload Interval (kips)		
	Single Axles	Bi-Tandem Axles	Tri-Tandem Axles
1	0-7	0-14	0-21
2	7-9	14-18	21-27
3	9-11	18-22	27-33
4	11-13	22-26	33-39
5	13-15	26-30	39-45
6	15-17	30-34	45-51
7	17-19	34-38	51-57
8	19-21	38-42	57-63
9	21-23	42-46	63-69
10	23-25	46-50	69-75
11	25-27	50-54	75-81
12	27-29	54-58	81-87
13	29-100	58-100	87-100

standard axleload intervals. The codes chosen to accomplish this are shown in Table 9.

Classification Data

The classification data were placed on punched cards with one card summarizing the results of each count. Figure 6 illustrates the format of the basic data cards. Note that for urban stations (road type 6) most of the local conditions have not been codified. Note also that for partial counts two additional numbers are given. The first represents the length of the count, in hours, and the second represents the hour the count was begun. The daily traffic is the total number of vehicles that were counted.

While the format illustrated by Figure 6 is useful for storing all of the relevant data, it was rather inconvenient for data processing purposes. Therefore the data set was purged of unwanted data and reproduced on punched cards as shown in Figure 7. The local-condition codes shown in Figure 7 are those used for purposes of analysis.

Weight Data

The summarized weight data were placed on magnetic tape for convenient storage and processing. Data for each weighing operation were stored on 96 sequential records. One record was required for each combination of eight vehicle types which were weighed, and the 12 axle types. Figure 8 illustrates the 96 records for one particular operation. The percentages shown represent integer tenths of a percent. Thus the number 1000 represents 100 percent. The

STAT NO	YR	SEASON	SOURCE	C-DATA AVAIL	L-DATA AVAIL	HIGHWAY DIST	RD TYPE	DIRECTION	SERV PROVIDE	ALT ROUTE	MAX ALLOW GROSS WT.	NO OF LANES	NO. LOCAL CARS	NO. FOREIGN CARS	NO OF SING UNIT TRUCKS LESS THAN 3/2 TONS	NO OF SING UNIT TRUCKS TWO AXLE SING TIRE	NO OF SING UNIT TRUCKS TWO AXLE DUAL TIRE	NO OF SING UNIT TRUCKS TRI-AXLE	NO OF COMB TRUCKS TRI-AXLE	NO OF COMB TRUCKS FOUR AXLE	NO OF COMB TRUCKS FIVE AXLE	NO OF COMB TRUCKS SIX-AXLE	SCH BUS	COM BUS	DAILY TRAFC	DATA LIM	HR PERIOD	PART DATA HR
274	49	3	2	1	2	3	2	2	4	2	42000	2	2400	486	332	0	363	11	116	3	2	0	13	42	3768			
275	49	4	2	1	2	3	2	1	4	2	42000	2	847	181	217	0	137	3	11	0	0	0	6	3	1405			
627	49	2	2	1	2	3	6						10928	4297	1095	0	832	0	509	0	0	0	0	213	17874			
628	49	2	2	1	2	3	2	1	4	2	42000	2	4934	2034	611	0	701	0	426	0	0	0	0	240	8946	1	16	14
629	49	2	2	1	2	3	6						6970	2774	876	3	755	8	417	14	0	0	3	314	12134	1	16	6
125	50	1	2	1	2	1	2	2	4	1	42000	2	330	179	103	0	68	3	19	6	0	0	2	6	716	1	8	8
126	50	1	2	1	2	1	2	1	4	2	42000	2	202	404	66	0	97	4	37	6	0	0	0	8	824	1	8	8
127	50	1	2	1	2	1	3	2	4	3	42000	2	45	14	25	0	19	0	1	1	0	0	2	0	107	1	8	8
164	50	2	2	1	2	4	6						758	198	164	0	148	0	1	0	0	0	5	46	1320	1	16	6
275	50	2	6	1	2	1	3	2	4	2	30000	2	243	19	118	0	60	1	2	0	0	0	2	0	445	1	8	8
313	50	2	2	1	2	2	3	1	2	2	30000	2	77	19	66	0	108	0	3	0	0	0	0	0	273			
314	50	2	2	1	2	2	3	1	1	2	30000	2	57	11	38	0	16	0	1	0	0	0	0	0	123			
460	50	4	6	1	2	3	6						4643	717	543	0	480	24	291	15	0	0	14	65	6792			
461	50	4	6	1	2	3	6						6466	855	795	0	667	26	328	20	0	0	20	99	9276			
462	50	4	6	1	2	3	6						2339	194	315	0	243	3	70	7	0	0	23	33	3227			
478	50	4	2	1	2	3	2	1	3	2	42000	2	976	545	182	0	303	25	163	6	0	0	20	30	2250			
598	50	4	6	1	2	1	6						2478	282	470	0	196	9	113	6	0	0	0	24	3578	1	8	6
599	50	4	6	1	2	1	6						2468	270	484	0	212	9	117	6	0	0	0	32	3598	1	8	6
600	50	4	6	1	2	1	6						1392	55	271	0	115	0	9	1	0	0	0	67	1910	1	8	6
601	50	4	6	1	2	1	6						1584	64	273	0	100	0	11	1	0	0	0	73	2106	1	8	6
602	50	4	6	1	2	1	6						2232	409	619	0	295	9	120	3	0	0	1	35	3723	1	8	6
603	50	4	6	1	2	1	2	1	4	2	42000	2	2223	416	645	0	281	9	120	3	0	0	1	33	3731	1	8	6
604	50	4	6	1	2	1	6						527	26	125	0	96	0	0	0	0	0	0	4	778	1	8	6

Figure 6. Example of Basic Classification Data.

R T	D I R	A R	S P	V G	M G W	H D	Y R	S E A	PERCENTAGES									
									CARS	BUSES	SU-2A-4T	SU-2A-6T	SU-3A	C-3A	C-4A	C-5A	C-6A	DAILY TRAFFIC
2	2	1	5	5	2	4	2	2	67.370	1.819	16.473	12.283	0.237	1.529	0.264	0.026	0.0	3794
2	2	1	5	6	2	4	2	3	71.956	1.789	12.749	10.548	0.482	2.178	0.275	0.023	0.0	4361
2	2	1	5	5	2	4	2	4	62.066	2.685	15.961	16.487	0.175	2.422	0.204	0.0	0.0	3427
2	2	1	5	4	2	4	2	1	64.199	3.331	14.973	13.459	0.437	2.894	0.707	0.0	0.0	2972
2	2	1	5	5	2	4	2	2	66.892	3.354	16.400	9.662	0.031	3.538	0.092	0.031	0.0	3250
2	2	1	5	6	2	4	2	3	71.510	1.785	13.166	10.191	0.843	2.108	0.397	0.0	0.0	4033
2	2	1	5	5	2	4	2	4	73.567	2.559	13.204	7.421	0.358	2.226	0.537	0.128	0.0	3908
2	2	1	5	5	2	4	3	1	59.971	3.391	18.290	15.188	0.174	2.754	0.232	0.0	0.0	3450
2	2	1	5	5	2	4	3	2	67.323	2.431	17.784	9.468	0.128	2.252	0.461	0.154	0.0	3908
2	2	1	5	6	2	4	3	3	73.092	1.651	12.757	9.970	0.472	1.522	0.536	0.0	0.0	4664
2	2	1	5	5	2	4	3	4	69.770	2.269	12.520	11.555	0.522	2.634	0.678	0.052	0.0	3834
2	2	1	5	6	2	4	3	1	70.667	2.108	12.244	11.109	0.122	3.000	0.710	0.041	0.0	4933
2	2	1	5	6	2	4	3	2	67.565	1.821	16.315	10.294	0.437	2.573	0.947	0.049	0.0	4119
2	2	1	5	6	2	4	3	3	78.727	1.144	10.827	6.424	0.705	1.716	0.400	0.057	0.0	5246
2	2	1	5	6	2	4	3	4	67.156	1.910	14.328	11.854	1.151	2.572	0.931	0.098	0.0	4083
2	2	1	5	4	2	4	4	1	66.271	2.661	14.815	11.255	0.791	3.812	0.396	0.0	0.0	2781
2	2	1	5	5	2	4	4	2	69.560	1.218	15.104	9.896	0.207	2.979	0.881	0.155	0.0	3860
2	2	1	5	6	2	4	4	3	76.286	0.367	12.249	7.178	0.441	2.401	0.955	0.122	0.0	4082
2	2	1	4	6	2	1	1	3	73.214	0.460	11.450	9.862	0.334	4.325	0.272	0.084	0.0	4786
2	2	1	4	6	2	1	1	4	72.661	0.613	9.219	12.443	0.396	3.976	0.633	0.059	0.0	5055
2	2	1	4	6	2	1	1	1	75.627	1.164	9.078	9.157	0.257	4.144	0.355	0.217	0.0	5067
2	2	1	4	6	2	1	1	2	77.227	0.569	8.891	8.891	0.368	3.717	0.251	0.084	0.0	5972
2	2	1	4	7	2	1	1	3	83.221	0.580	5.719	6.784	0.324	3.062	0.270	0.040	0.0	7414
2	2	1	4	6	2	1	1	4	75.643	0.740	8.388	10.708	0.303	3.799	0.420	0.0	0.0	5949
2	2	1	4	6	2	1	2	1	74.833	1.025	10.097	9.055	0.205	4.357	0.359	0.068	0.0	5853
2	2	1	4	6	2	1	2	2	74.275	0.884	8.911	10.661	0.477	4.208	0.442	0.141	0.0	5656
2	2	1	4	7	2	1	2	3	78.001	0.412	7.745	9.218	0.269	3.627	0.538	0.190	0.0	6314
2	2	1	4	7	2	1	2	4	78.278	0.871	8.033	8.934	0.222	3.219	0.354	0.089	0.0	6772
2	2	1	4	6	2	1	2	1	76.357	1.188	8.277	8.880	0.621	4.111	0.548	0.018	0.0	5473
2	2	1	4	7	2	1	2	2	75.911	1.229	9.099	8.140	0.480	4.617	0.495	0.030	0.0	6671
2	2	1	4	7	2	1	2	3	80.138	0.859	8.573	7.008	0.277	2.701	0.443	0.0	0.0	7220

Figure 7. Example of Modified Classification Data.

```
                                      LOADOMETER SUMMARY
                                   STATION NO   1     YEAR 50

              H   A     T  V                                                               D
  S           IRD L     R  E                  PERCENT OF AXLES                             A
  T           GOIST MAX A  H                                                               I
  A   SS      HAREE     F  I                IN AXLE LOAD CATEGORY                   NO     L
  T   YEO     WDERBALLOWE  C A                                                             Y   A
  I   EAU     A CVN     I  L X                                                      OF         D
  O   ASR     YTTIAGROSSC  E L                                                             T   T
  N   ROC      VICT          E                                                      AXLES  R
      NE      DPOEI WT  L  T                                                               A
  N           IEN V     A  Y     1    2    3    4    5    6    7    8    9   10   11   12   13  F
  O           S   E     N  P                                                               F
              T         E  E                                                               I
                 R      S                                                                  C
                 Y

L  1 503111022142420002 12 1 1000    0    0    0    0    0    0    0    0    0    0    0    0   236 337200000
L  1 503111022142420002 12 2  986    0   14    0    0    0    0    0    0    0    0    0    0    70 337200000
L  1 503111022142420002 12 3  997    0    3    0    0    0    0    0    0    0    0    0    0   306 337200000
L  1 503111022142420002 12 4    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 12 5    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 12 6    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 12 7    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 12 8    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 12 9    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 1210 1000    0    0    0    0    0    0    0    0    0    0    0    0   236 337200000
L  1 503111022142420002 1211  986    0   14    0    0    0    0    0    0    0    0    0    0    70 337200000
L  1 503111022142420002 1212  997    0    3    0    0    0    0    0    0    0    0    0    0   306 337200000
L  1 503111022142420002 13 1  970   15    7    7    0    0    0    0    0    0    0    0    0   134 337200000
L  1 503111022142420002 13 2  639   48   84   66   72   60   24    6    0    0    0    0    0   166 337200000
L  1 503111022142420002 13 3  787   33   50   40   40   33   13    3    0    0    0    0    0   300 337200000
L  1 503111022142420002 13 4    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 13 5    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 13 6    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 13 7    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 13 8    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 13 9    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 1310  970   15    7    7    0    0    0    0    0    0    0    0    0   134 337200000
L  1 503111022142420002 1311  639   48   84   66   72   60   24    6    0    0    0    0    0   166 337200000
L  1 503111022142420002 1312  787   33   50   40   40   33   13    3    0    0    0    0    0   300 337200000
L  1 503111022142420002 14 1 1000    0    0    0    0    0    0    0    0    0    0    0    0     2 337200000
L  1 503111022142420002 14 2 1000    0    0    0    0    0    0    0    0    0    0    0    0     4 337200000
L  1 503111022142420002 14 3 1000    0    0    0    0    0    0    0    0    0    0    0    0     6 337200000
L  1 503111022142420002 14 4 1000    0    0    0    0    0    0    0    0    0    0    0    0     2 337200000
L  1 503111022142420002 14 5  250    0  250  500    0    0    0    0    0    0    0    0    0     4 337200000
L  1 503111022142420002 14 6  500    0  167  333    0    0    0    0    0    0    0    0    0     6 337200000
L  1 503111022142420002 14 7    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 14 8    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 14 9    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 1410 1000    0    0    0    0    0    0    0    0    0    0    0    0     6 337200000
L  1 503111022142420002 1411  417  167   83  167   83    0   83    0    0    0    0    0    0    12 337200000
L  1 503111022142420002 1412  611  111   56  111   56    0   56    0    0    0    0    0    0    18 337200000
L  1 503111022142420002 15 1    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 15 2    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 15 3    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 15 4    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 15 5    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 15 6    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 15 7    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 15 8    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 15 9    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 1510    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 1511    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 1512    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 20 1  813  160   13   13    0    0    0    0    0    0    0    0    0    75 337200000
L  1 503111022142420002 20 2  394   30    0  121  182  212   61    0    0    0    0    0    0    33 337200000
L  1 503111022142420002 20 3  685  120    9   46   56   65   19    0    0    0    0    0    0   108 337200000
L  1 503111022142420002 20 4    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 20 5    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 20 6    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 20 7    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 20 8    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 20 9    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 2010  813  160   13   13    0    0    0    0    0    0    0    0    0    75 337200000
L  1 503111022142420002 2011  394   30    0  121  182  212   61    0    0    0    0    0    0    33 337200000
L  1 503111022142420002 2012  685  120    9   46   56   65   19    0    0    0    0    0    0   108 337200000
L  1 503111022142420002 23 1  750  250    0    0    0    0    0    0    0    0    0    0    0     4 337200000
L  1 503111022142420002 23 2  250  250    0  500    0    0    0    0    0    0    0    0    0     4 337200000
L  1 503111022142420002 23 3  500  250    0  250    0    0    0    0    0    0    0    0    0     8 337200000
L  1 503111022142420002 23 4  500  500    0    0    0    0    0    0    0    0    0    0    0     2 337200000
L  1 503111022142420002 23 5     01000    0    0    0    0    0    0    0    0    0    0    0     2 337200000
L  1 503111022142420002 23 6  250  750    0    0    0    0    0    0    0    0    0    0    0     4 337200000
L  1 503111022142420002 23 7    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 23 8    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 23 9    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 2310  625  375    0    0    0    0    0    0    0    0    0    0    0     8 337200000
L  1 503111022142420002 2311  125  625    0  250    0    0    0    0    0    0    0    0    0     8 337200000
L  1 503111022142420002 2312  375  500    0  125    0    0    0    0    0    0    0    0    0    16 337200000
L  1 503111022142420002 26 1    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 26 2    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 26 3    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 26 4    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 26 5    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 26 6    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 26 7    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 26 8    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 26 9    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 2610    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 2611    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 2612    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 27 1    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 27 2    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 27 3    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 27 4    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 27 5    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 27 6    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 27 7    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 27 8    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 27 9    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 2710    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 2711    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
L  1 503111022142420002 2712    0    0    0    0    0    0    0    0    0    0    0    0    0     0 337200000
```

Figure 8. Example of Basic Weight Data.

"number of axles" represents the number of axles actually weighed.

The basic information summarized in Figure 8 is the axleload distributions by vehicle and axle types. Subsequent to the decision to treat the weight data in terms of unit EWL's, the basic data were transformed as illustrated in Figure 9. Figure 9 shows the data format as used herein for purposes of analysis.

EXTENT OF AVAILABLE DATA

It should be emphasized that, with one exception, all vehicle classification and weight data known to be available for the 17-year study period have been incorporated into the data bank. The one exception is the vehicle-classification data obtainable from toll-road records.

Classification data were available from approximately 730 different rural locations. A total of 1871 counts were taken at these locations and approximately 6,100,000 vehicles were counted. The number of different rural locations at which vehicles were weighed is 51. The total number of vehicles weighed at these locations was approximately 69,000.

										UNIT EWLS			
RT	DIR	AR	SP	VG	MGW	HD	YR	SEA	VEH TYPE	KENTUCKY EWL/VEH	AASHO EWL/VEH	MODIFIED AASHO EWL/VEH	NUMBER OF AXLES
2	1	3	4	3	4	3	9	3	7	1.9920	0.2080	0.2220	24
2	1	3	4	3	4	3	9	3	8	2.3400	0.1703	0.2459	15
2	1	3	4	3	4	3	9	3	9	0.0	0.0	0.0	0
2	2	1	5	6	4	4	9	3	3	0.0	0.0040	0.0040	54
2	2	1	5	6	4	4	9	3	4	2.0020	0.1584	0.1584	158
2	2	1	5	6	4	4	9	3	5	5.6610	0.3470	0.5079	27
2	2	1	5	6	4	4	9	3	6	2.4600	0.2401	0.2401	54
2	2	1	5	6	4	4	9	3	7	9.3360	0.6435	0.7517	136
2	2	1	5	6	4	4	9	3	8	9.3850	0.5452	0.8048	320
2	2	1	5	6	4	4	9	3	9	0.0	0.0	0.0	0
2	1	2	3	9	4	4	9	3	3	0.0	0.0056	0.0056	34
2	1	2	3	9	4	4	9	3	4	5.2340	0.2723	0.2723	292
2	1	2	3	9	4	4	9	3	5	24.6720	0.6710	0.9992	63
2	1	2	3	9	4	4	9	3	6	8.7750	0.6668	0.6668	78
2	1	2	3	9	4	4	9	3	7	23.9600	1.0649	1.3377	346
2	1	2	3	9	4	4	9	3	8	32.0150	1.1882	1.9208	630
2	1	2	3	9	4	4	9	3	9	0.0	0.0	0.0	0
2	1	2	3	4	4	2	9	3	3	0.0	0.0040	0.0040	60
2	1	2	3	4	4	2	9	3	4	2.4500	0.1623	0.1623	98
2	1	2	3	4	4	2	9	3	5	89.2439	0.5923	1.7203	9
2	1	2	3	4	4	2	9	3	6	6.8820	0.5272	0.5272	27
2	1	2	3	4	4	2	9	3	7	19.7600	0.8838	1.1994	104
2	1	2	3	4	4	2	9	3	8	47.7550	1.6340	2.5468	330
2	1	2	3	4	4	2	9	3	9	0.0	0.0	0.0	0
1	1	2	4	7	4	2	9	3	3	0.0	0.0040	0.0040	34
1	1	2	4	7	4	2	9	3	4	1.8380	0.1467	0.1467	186
1	1	2	4	7	4	2	9	3	5	2.6160	0.1792	0.2358	24
1	1	2	4	7	4	2	9	3	6	7.7940	0.5816	0.5816	204
1	1	2	4	7	4	2	9	3	7	10.3320	0.6727	0.7803	800
1	1	2	4	7	4	2	9	3	8	13.1700	0.7154	1.0674	2245

Figure 9. Example of Modified Weight Data.

SUMMARY OF AVAILABLE DATA

The extensive data compilations of this study presented the unique opportunity for obtaining summary statistics of traffic parameters used in estimating EWL's. Such statistics are presented herein for both those parameters currently used in Kentucky and those proposed for future use.

SUMMARY OF PARAMETERS USED IN PRESENT METHOD

The current EWL-prediction procedure requires evaluation of the following traffic parameters: (1) ADT, (2) the average percent trucks, (3) the average number of axles per truck, and (4) the average axleload distribution. One of the difficulties that has been encountered in making EWL estimates in the past has been the lack of a detailed summary of these parameters over a sufficiently long span of time. With the exception of ADT, the data assembled as a part of this study made possible the compilation of such a summary.

The parameters which are summarized include: (1) the average percent trucks, (2) the average number of axles per truck, (3) the average axleload distribution, (4) the average EWL's per 1,000 vehicles, and (5) the average EWL's per 1,000 trucks. Weighted averages of these parameters were computed as a function of year, traffic volume, and geographical area. These three variables were chosen as a basis for the grouping since (1) they have historical significance (<u>10</u>), (2) they are known to influence the magnitudes of the parameters,[1] and (3) they are easily evaluated. The averages were weighted according to the number of vehicles counted at each location. Thus if 12 percent trucks was observed at a location where the 24-hour count was 3,000 vehicles and 18 percent trucks where the corresponding count was 6,000 vehicles, the weighted average would be 16 percent trucks.

Appendix A shows the average percent trucks and the average number of axles per truck as a function of year, traffic volume, and geographical area. Also shown are the statewide averages of these parameters. The average rural traffic in the Commonwealth over the 17-year period consisted of 18.26 percent trucks and the average number of axles per truck was 2.911. A truck was defined in the conventional way as being any freight vehicle having six or more tires. Thus pickup trucks are excluded from these and subsequent tabulations. The tabulations are based on all vehicle classification data including, in part, those obtained at the loadometer stations. Average values of both parameters are highly influenced by traffic volume and somewhat less by geographical area. The influence of year on percent trucks is sporadic and inconsequential -- it is of extreme importance, however, for average number of axles per truck. The statewide average annual change in the number of axles per truck was 0.034 for the lowest volume group and 0.085 for the highest (compare with Table 3).

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[1] An early attempt to estimate EWL's that had been accumulated on Kentucky highways was based on the use of these three variables. The results proved to be highly successful and useful.

Average axleload distributions for truck axles are shown in Appendix B. These distributions were computed on the basis of those stations for which both classification and weight data were available. Thus a large number of entries are zero, especially for the lower volume groups. The total number of axles which were counted are shown in the last columns of the tabulations. Appendix B shows that the percentage of heavier axles generally increased as the traffic volume increased and as the year became more recent. Slight differences in the axleload distributions can be observed among the four geographical area.

Two parameters which incorporate the combined effects of vehicle composition and weight characteristics are the average EWL's contributed by 1,000 vehicles and by 1,000 trucks. These parameters are summarized in Appendix C. The basis for computation was again data obtained from the permanent and special loadometer surveys. As such the statistics are representative only of summer and late spring conditions. EWL's were computed by three different methods: the Kentucky method, the AASHO method, and a modified AASHO method. The modified AASHO method used the AASHO equivalency factors for single axles and treated each tandem axle as two single axles. For any given traffic condition, the modified AASHO EAL's are equal to or slightly greater than the corresponding AASHO EAL's. When computing the Kentucky EWL's, contributions by all four-tired vehicles were assumed to be negligible. These parameters were significantly influenced by year, volume, and geographical area.

SUMMARY OF PARAMETERS USED IN PROPOSED METHOD

The parameters proposed for future use include the percentages of the various vehicle types and their unit EWL's. Weighted means and weighted standard deviations of these parameters were computed as a function of each of the local conditions identified in Table 7. Appendices D and E show the resulting tabulations for the vehicle-type percentages and the unit EWL's, respectively.

Since means and standard deviations were computed, some technique for weighting the raw data had to be selected. Three possible techniques included: (1) weighting by the exact number of vehicles counted or weighed, (2) weighting by a group number based on the number of vehicles counted or weighed, and (3) giving equal weight to each counting or weighing operation. Table 10 shows the effect on mean Kentucky unit EWL's of the three weighting schemes. The weights assigned to the groups in the second method are given on Table 11.

Distinct differences in the mean unit EWL's computed by these three schemes may be noted from Table 10. The third or unweighted method was immediately rejected since it was felt that more importance should be attached to data obtained from a large number of vehicles than to that obtained from a smaller number. The second method of weighting by groups was ultimately selected for the following reasons: (1) it gave more weight to data obtained from larger numbers of vehicles, (2) it could be applied in the multiple regression analysis that was to follow, and (3) it did not give excessive weight to the extremely high-volume stations. Table 11 gives the weights which were assigned and which were used in preparation of Appendices D and E. These weights were used in all subsequent data analyses.

One observation immediately apparent from the tabulations of Appendices D and E is that the data are extremely variable. Coefficients of variation in

TABLE 10

EFFECT OF WEIGHTING ON MEAN KENTUCKY UNIT EWL'S

Vehicle Type	Mean Unit EWL's Weighted by Exact Number of Vehicles Weighed	Groups by Number of Vehicles Weighed	Unweighted
SU-2A-4T	0.02	0.04	0.09
SU-2A-6T	3.31	3.19	3.09
SU-3A	12.55	10.04	8.24
C-3A	9.80	8.89	8.76
C-4A	15.77	15.25	13.40
C-5A	18.92	18.33	15.24

TABLE 11

WEIGHTING BY GROUPS

Vehicle-Type Percentages		Unit EWL's	
Traffic Volume (ADT)	Weight	Number of Vehicles Weighed	Weight
0-499	1	0-15	1
500-999	2	16-30	2
1000-1999	3	31-60	3
2000-2999	4	61-120	4
3000-3999	5	121-240	5
4000-5999	6	241 or more	6
6000-7999	7		
8000-9999	8		
10,000-13,999	9		
14,000 or more	10		

excess of 100 percent are not uncommon.

EFFECTS OF LOCAL CONDITIONS

A first indication of the relative effects of the various local conditions on the traffic parameters can be obtained from Appendices D and E. One must be cautious, however, in interpreting average results such as these because of the non-random nature of the sampling and because of the interactions which exist among many of the local conditions.

The effect of road type on the various traffic parameters is quite pronounced. The road-type classification delineated in this report is not only a functional classification system but also is indicative of the quality of service provided. This results in a larger percentage of the larger types of vehicles using the higher quality highways and a larger percentage of cars on the lower type facilities. Because different highways in Kentucky are classified at different legal gross weights, the larger trucks can be operated efficiently only on the higher quality roads which have the larger weight limits. Interestingly, the average unit EWL's are generally larger for the lower classes of highways. This reflects, in part, a more efficient utilization of vehicle capacities on these roads.

The percentage of passenger cars using north-south routes is not significantly different from that using east-west routes. However, slightly more of the larger trucks use the north-south routes and their unit EWL's are significantly greater. This difference in unit EWL's may be due to the degree to which these vehicles are loaded, the density of the cargo, and significant differences in the average local conditions such as road type and maximum allowable gross weight.

The data support the conclusions that larger vehicles tend to use the superior of two alternate routes and that these vehicles are also more heavily loaded on the superior routes. The vehicle-type percentages and the unit EWL's are not significantly different for routes in which there is no alternate, there is an alternate of equal quality, or there is an alternate of inferior quality.

Service provided also yielded some significant indications as to traffic characteristics. Recreational roads carried much larger percentages of passenger cars and mining roads carried larger percentages of SU-2A-6T and SU-3A trucks, which are the vehicle configurations most often used for hauling coal and aggregates. Furthermore, the SU-2A-6T and SU-3A trucks were loaded much more heavily on the mining roads. Beyond this, the effects of service provided are unknown due to the limited data available for many of the codes and the difficulties associated with evaluating this local condition.

The percentage of passenger cars generally increases as the traffic volume increases. The percentages of the larger vehicle types seem to peak in the range of 4,000 to 6,000 vehicles per day. The weights of the vehicles, as indicated by their average unit EWL's, seem to reach a minimum in this same range.

Maximum allowable gross weight is a significant determinant of the percentages of the various vehicles types. The maximum percentages of C-5A, C-4A, and C-3A vehicles occurred at maximum allowable gross weights of 73,280 pounds, 59,640 pounds, and 42,000 pounds, respectively. These represent legally allowable weights at which the respective vehicle capabilities can be most effectively utilized. The effects of maximum allowable gross weight on average unit EWL's is significant but not readily explainable. A part of the difficulty stems from the relative scarcity of data. Independent data analyses have shown, however, that the mean unit EWL's for the four largest vehicles are essentially constant when the ratio of the vehicle weight capacity to the maximum allowable gross weight is less than one. When the ratio exceeds one, the mean unit EWL's are significantly reduced.

The effects of year are significant on both the vehicle-type percentages and the unit EWL's. However, it is felt that much of the yearly influence is due to changing maximum allowable gross weights, a condition which makes evaluation of these average statistics particularly difficult.

Finally, detection of possible seasonal differences in unit EWL's is impossible since loadometer surveys have been taken only during the summer and later spring months in Kentucky. Significant differences were detected, however, in the vehicle-type percentages with the maximum percentage of cars occurring during the summer months for these rural highways.

PREDICTION OF TRAFFIC PARAMETERS

The proposed methodology requires evaluation of the percentages of the various vehicle types and their unit EWL's. For the sake of simplicity and to assure compatibility between the available classification and weight data, the number of vehicle types was limited to eight. These include (1) cars, (2) buses, (3) single-unit, two-axle, four-tired (SU-2A-4T) trucks, (4) single-unit, two-axle, six-tired (SU-2A-6T) trucks, (5) single-unit, three-axle (SU-3A) trucks, (6) combination, three-axle (C-3A) trucks, (7) combination, four-axle (C-4A) trucks, and (8) combination, five-axle (C-5A) trucks. Unit EWL's were evaluated by each of three methods including the Kentucky method, the AASHO method, and the modified AASHO method. The modified AASHO method uses the AASHO equivalency factors but makes no special recognition of tandem axles.

The approach for relating the traffic parameters with the local conditions was empirical in nature. Each parameter was separately treated as the dependent variable and the local conditions as the independent variables. Each parameter was quantified as a continuous variable while each local condition was codified on the basis of classification sets. The various methods which were considered for correlating the traffic parameters with local conditions are detailed in the following section. Each method was judged with regard to its accuracy, its simplicity, its reasonableness, and its predictability.

METHODS

Combinatorial Analysis

It was recognized at the onset that strong interactions might exist among many of the local conditions. For example, route direction was thought to be significant only for the higher type facilities. Such interactions can be properly treated, when the independent variables are characterized by classification sets, by grouping the available data into categories representative of each possible combination of the independent variables. The average values of the dependent variables within each combination would then serve as the best estimates of future traffic if the future state of each of the relevant local conditions could be established.

Such a scheme proved to be extremely valuable in some preliminary investigations in which the number of local conditions was limited to three: namely, year, geographical area, and traffic volume. The purpose of these investigations was to derive a simple means for estimating past accumulations of EWL's on selected rural highways in Kentucky. The number of possible combinations of the local conditions in this analysis was 340. Unfortunately when the number of local conditions increases, the number of possible combinations of these conditions increases rapidly. In fact the number of possible combinations for all of the local conditions enumerated herein, excluding year and season, exceeds 40,000. Since the available data could not support such a detailed categorization, the combinatorial analysis could not be a feasible approach for this problem.

Means and Correction Factors

Perhaps the easiest way to predict the traffic parameters is to compute their mean values from the available data and to use these values for predictions. This is basically the approach chosen by California in their unit EWL tabulations (Table 5). One way to consider the effects of local conditions is simply to modify the gross means based on intuition and judgement. Since this procedure was judged to be unsatisfactory, the gross-means approach was not pursued further.

If it can be assumed that interactions among the local conditions are inconsequential, then the effects of local conditions can be evaluated by applying a series of correction or adjustment factors to the gross means. There is one correction factor for each local condition and its value is determined by the local-condition code. To apply this procedure, the gross means are first computed. Then average residuals between the actual parameter values and the gross means are computed for each value of one selected local condition. The process is repeated for the second and subsequent local conditions by computing average residuals between actual values and those predicted from the gross means and the correction factors from previously analyzed local conditions. The entire process is iterated to reduce the effect of the chosen sequence of local conditions.

Computer programs for derivation of correction factors verified the feasibility of this approach. It was found that the correction factors converged after a maximum of about five iterations. Furthermore it was shown that the order in which the local conditions were evaluated had no effect on the values of the correction factors.

A very relevant question is whether the correction factors should be additive or multiplicative. It is apparent that the final choice should be based largely on the accuracy attained. However a special problem arose through the use of additive factors -- due to the prediction of several negative percentages and negative unit EWL's. While adjustment procedures can be derived which assure no negative predictions, such procedures are rather arbitrary and are unnecessary if multiplicative factors are used.

The correction-factor approach may be somewhat deficient because consideration of interactions among the local conditions is precluded. This deficiency can be partially alleviated if it is possible to identify two or three local conditions having strong interactions. Average values of the traffic parameters are then computed for all possible combinations of this restricted set of local conditions. The effects of the remaining local conditions are treated independently as correction factors applied to the average basic percentages in much the same manner as outlined above. The primary difference is that in the former case the correction factors are applied to the gross means while in the latter case they are applied to classified means computed for various combinations of the interacting local conditions.

The two immediately preceding methods are based on iterative procedures designed to eliminate the effects of the order in which the correction factors are applied. Accuracy can possibly be improved not only by maintaining a

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The two immediately preceding methods are based on iterative procedures designed to eliminate the effects of the order in which the correction factors are applied. Accuracy can possibly be improved not only by maintaining a specified sequence of correction-factor application but also by selecting values of the correction factors based on both the coded values of the local conditions and on the prior predictions. This approach was also successfully programmed. The prior prediction of percent trucks was used as a determinant of the value of the corrective factor.

Multiple Regression

Detailed study of the data in Appendices D and E led to the identification of another possible method of analysis. Average values of the parameters could be taken from these tables for each of the local conditions. These averages could in turn be averaged over all the local conditions to obtain the desired estimates. This procedure would give equal weight to the importance of each of the local conditions. Since the validity of such a weighting scheme was highly suspect, methods were sought in which a different weight, which would be indicative of the relative importance of the local condition, could be assigned to the averages for each local condition.

Conventional multiple regression techniques were found to provide a suitable answer to the problem. Use was made of a standard, stepwise, multiple regression program in the University of Kentucky statistical library of computer programs (30). This program, called MULTR, satisfactorily established the weights to be applied to the average estimates for each local condition. The weights were found to depend on the particular traffic parameter being evaluated.

One final method was evaluated for correlating the traffic parameters with local conditions. This is a multiple regression technique using dummy variables which is useful in those situations in which the independent variables are treated as classification sets (31). For this problem, the jth local condition, represented by n_j codes, is replaced by (n_j-1) dummy variables. For example, if there are only two local conditions, road type and traffic volume, the dummy variables, which are independent variables, would be as shown on Table 12. No dummy variable is assigned to one category for each local condition in order to make estimates of the constant term and all the coefficients in the regression equation mathematically determinant. The dummy variable is assigned a value of either one, if the local condition is characterized by the corresponding code, or zero if it is not. Table 13 illustrates this procedure for the two local conditions of Table 12. Thus for road-type 2 and traffic-volume 8, dummy variables X_2 and X_{11} would assume values of one and the remaining dummy variables, zero. For road-type 4 and traffic-volume 10, all dummy variables would assume values of zero.

If the effects of the various local conditions are additive, the corresponding regression equation is

$$Y = a_o + a_1X_1 + a_2X_2 + \dots + a_{12}X_{12} \qquad (3)$$

where Y = the traffic parameter of interest,

a_o = regression constant,

a_j = regression coefficients, and

TABLE 12

ILLUSTRATION OF DUMMY VARIABLES

Local Condition	Code	Dummy Variable
Road Type	1	X_1
	2	X_2
	3	X_3
	4	None
Traffic Volume	1	X_4
	2	X_5
	3	X_6
	4	X_7
	5	X_8
	6	X_9
	7	X_{10}
	8	X_{11}
	9	X_{12}
	10	None

TABLE 13

ILLUSTRATION OF VALUES OF DUMMY VARIABLES

Local Condition	Code	Dummy Variable											
		X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}
Road Type	1	1	0	0									
	2	0	1	0									
	3	0	0	1									
	4	0	0	0									
Traffic Volume	1				1	0	0	0	0	0	0	0	0
	2				0	1	0	0	0	0	0	0	0
	3				0	0	1	0	0	0	0	0	0
	4				0	0	0	1	0	0	0	0	0
	5				0	0	0	0	1	0	0	0	0
	6				0	0	0	0	0	1	0	0	0
	7				0	0	0	0	0	0	1	0	0
	8				0	0	0	0	0	0	0	1	0
	9				0	0	0	0	0	0	0	0	1
	10				0	0	0	0	0	0	0	0	0

X_j = dummy variable.

It may be seen, therefore, that a_o becomes the best estimate of the traffic parameter in the above example for road-type 4 and traffic-volume 10. If the effects of the various local conditions are multiplicative, the relation between the traffic parameter and the local condition is shown as follows:

$$Y = b_o b_1^{X_1} b_2^{X_2} \ldots b_{12}^{X_{12}}. \qquad (4)$$

The corresponding regression equation becomes

$$Z = c_o + c_1 X_1 + c_2 X_2 + \ldots + c_{12} X_{12} \qquad (5)$$

where $Z = \ln Y$ and

$c_i = \ln b_i$.

The above procedures and equations can be generalized to include the nine local conditions of Table 7, in which case there are 40 dummy variables. It may further be generalized to include interactions among two or more of the local conditions by redefining the dummy variables so that each dummy variable corresponds to one combination of the interacting local conditions. This greatly increases the number of dummy variables and was not attempted due to program limitations which restrict the number of dummy variables to 50.

Summary

Several possible methods for correlating the relevant traffic parameters with local conditions have been outlined above. The feasibility of each of these has been established as a part of this study. The selection of a particular method must be based, however, on the aforementioned criteria of accuracy, simplicity, reasonableness, and predictability. Following sections of this report present a discussion relative to the selection of appropriate methods. Table 14 summarizes the candidate methods which have been discussed herein. Also presented in Table 14 are abbreviated names of the various methods designed to facilitate future reference. It should be emphasized that most of these methods are readily adaptable to either multiplicative or additive adjustments.

It should also be emphasized that the multiple regression technique using dummy variables is quite similar to the iterative correction factor technique. Differences relate only to the manner in which the various factors and coefficients are established. The multiple regression technique is supported by sound mathematical and statistical theory while the correction factor technique is based more on intuition and judgement.

TABLE 14

METHODS FOR CORRELATION OF
TRAFFIC PARAMETERS WITH LOCAL CONDITIONS

Description	Nomenclature
Combinatorial means	None
Gross means	None
Correction factor based on gross means, no interaction, iterative	FACT1
Correction factor based on classified means, limited interaction, iterative	FACT2
Correction factor based on classified means, limited interaction, prior knowledge	FACT3
Multiple regression, averages	MULTRA
Multiple regression, dummy variables	MULTRD

PREDICTING VEHICLE-TYPE PERCENTAGES

Selection of Predictive Methodology

With the exception of combinatorial means, each of the possible methods of Table 14 for correlating the vehicle type percentages with the local conditions was investigated. The gross means approach was immediately rejected since all other methods were found to yield superior accuracies. The remaining methods were compared on the basis of the four criteria of relative simplicity, reasonableness, accuracy, and predictability and a recommended method was developed.

Of interest first was whether there were significant differences in accuracy between the correction factor techniques and the multiple regression techniques. The other criteria for comparison were assumed to be identical for both of the techniques. Using additive factors (similar to Equation 3) for predicting the percentage of C-4A trucks, correlation coefficients of 0.78, 0.78, and 0.79 were obtained by FACT1, MULTRA, and MULTRD, respectively. The C-4A truck was chosen for this analysis since it has been the largest single contributor to EWL accumulations on rural highways in Kentucky. All available vehicle classification data were used in this and subsequent analyses. Similar estimates of the percentage of cars using FACT1 and MULTRD yielded correlation coefficients of 0.62 and 0.60, respectively. It was, therefore, concluded that there were no significant differences between the correction factor and multiple regression techniques and that an intelligent selection of the best of these techniques would have to be based on other considerations. Similarly no significant difference was observed between the dummy variable (MULTRD) and the averages (MULTRA) multiple regression techniques.

One factor which would dictate a choice of the correction factor techniques would be to verify the necessity for including interaction effects among two or more of the local conditions. Thus estimates were made of the percentages of cars and C-4A trucks using FACT1 and FACT2. In both cases, all nine local conditions were considered and additive factors were used. FACT2 used road type, direction, and alternate route as the three interacting local conditions. Estimates of the percentage of cars yielded correlation coefficients of 0.62 and 0.63 for FACT1 and FACT2, respectively. Similar estimates of the percentage of C-4A trucks yielded correlation coefficients of 0.78 and 0.80 for FACT1 and FACT2, respectively. Since the three interacting local conditions of FACT2 had not been shown to be optimal and since slightly larger accuracies were achieved with FACT2, it was concluded that interaction might well be significant. This led to the immediate rejection of the multiple regression techniques since sufficient program capability was not available for handling even a limited number of interactions. Subsequent analyses showed that the three interacting local conditions used by FACT2 were not optimal and that larger correlation coefficients would have been achieved with FACT2 if other interacting local conditions had been specified.

Having decided that interactions among at least three of the local conditions were significant, it was then necessary to ascertain whether the remaining local conditions should be represented by correction factors (1) which were order independent and derived using iterative procedures or (2) which were order dependent and responsive not only to the local conditions but also to the prior predictions. The variable representing prior predictions was percent trucks; three conditions were chosen depending on whether the prior predictions of percent trucks were less than 15 percent, between 15 and 19 percent, or greater than 19 percent. Additive factors were used and the three interactive local conditions were, as before, road type, direction, and alternate route. Predictions of the percentage of cars yielded correlation coefficients of 0.63 and 0.66 for FACT2 and FACT3, respectively. Predictions of the percentage of C-4A trucks yielded correlation coefficients of 0.80 and 0.82 for FACT2 and FACT3, respectively. These results indicated the slight superiority in accuracy for predictions based on a specified sequence of correction-factor application and prior estimates. At the same time, use of the procedures required by FACT3 were considerably more complicated and susceptible to increased human error. Therefore, FACT2 was chosen for use in predicting the vehicle type percentages.

Remaining to be decided was whether the correction factors should be additive or multiplicative. The criterion of reasonableness weighed heavily in favor of the specification of multiplicative factors since their use negates the possibility of negative predictions. Data were already at hand from previous results of MULTRD with which to ascertain the superior of the two techniques with regard to accuracy. Correlation coefficients of 0.79 and 0.86 for cars and 0.60 and 0.57 for C-4A trucks had been obtained for additive and multiplicative factors, respectively. Since these accuracy determinations were inclusive and since multiplicative factors were superior on the basis of reasonableness, multiplicative factors were selected.

Final Predictive Technique

The method that had been chosen to relate the vehicle type percentages to the local conditions was the correction-factor technique considering interactions among some of the local conditions and applying independent multiplicative correction factors to account for the remainder. However, several remaining items had to be considered in order to establish the viability of the technique as a predictive tool.

Not minor among these was the manner in which the time variable, year, was to be considered in the predictive process. Prior work as summarized in Figure 10 showed how various additive correction factors had been affected by year during the 17-year study period. Certainly data such as these furnished no reasonable basis from which to predict the possible effects of future years. The most promising solution was to exclude year from the analysis and to ascertain how the accuracy was thereby affected. Data were available from prior use of MULTRD and FACT3 which showed that exclusion of year caused a reduction in the correlation coefficients for predictions of the percentages of cars and C-4A trucks of less than 5 percent. It was obvious that this slight decrease in accuracy had to be tolerated and year was subsequently excluded from the analysis.

Remaining to be determined was which of the eight local conditions should be established as those among which interactions are of most significance. Based on the number of possible combinations of the local conditions and the number of available data sets, it was considered feasible to include a maximum of three interacting local conditions. For reasons discussed later, season was excluded as a possible candidate for evaluation. From the remaining seven local conditions, eight of the most promising combinations of three conditions were selected intuitively and analyzed jointly on the basis of relative accuracy and predictability. As a result of this analysis, road type, maximum allowable gross weight, and traffic volume were adjudged to exhibit the most significant interactions among those investigated.

A set of basic percentages were derived for all possible combinations of these three local conditions. Also derived were a set of multiplicative correction factors for each of the remaining five local conditions to be applied independently to the basic percentages. Sheets 3 and 4 of Appendix F show the final set of basic percentages and multiplicative correction factors recommended for use in predicting vehicle type percentages.

It may be noted from Sheet 4 of this appendix that correction factors are given for the various seasons. These factors have been retained primarily to enable comparisons of vehicle type percentages estimated by the proposed methodology with those observed from specific surveys. To be useful for predicting the annual averages that are desired, however, the seasonal factor must be eliminated. To do this, all 1967 traffic volume data obtained from 42 ATR stations in Kentucky were summed by season. An annual average of the seasonal correction factors weighted by the seasonal traffic volumes was computed. These weighted averages, which are shown in the computational portions of Sheet 4, are recommended for use in the predictive process. The fact that these averages approach unity suggests that classification counts have been taken in approximately the same proportions as actual traffic volumes by season.

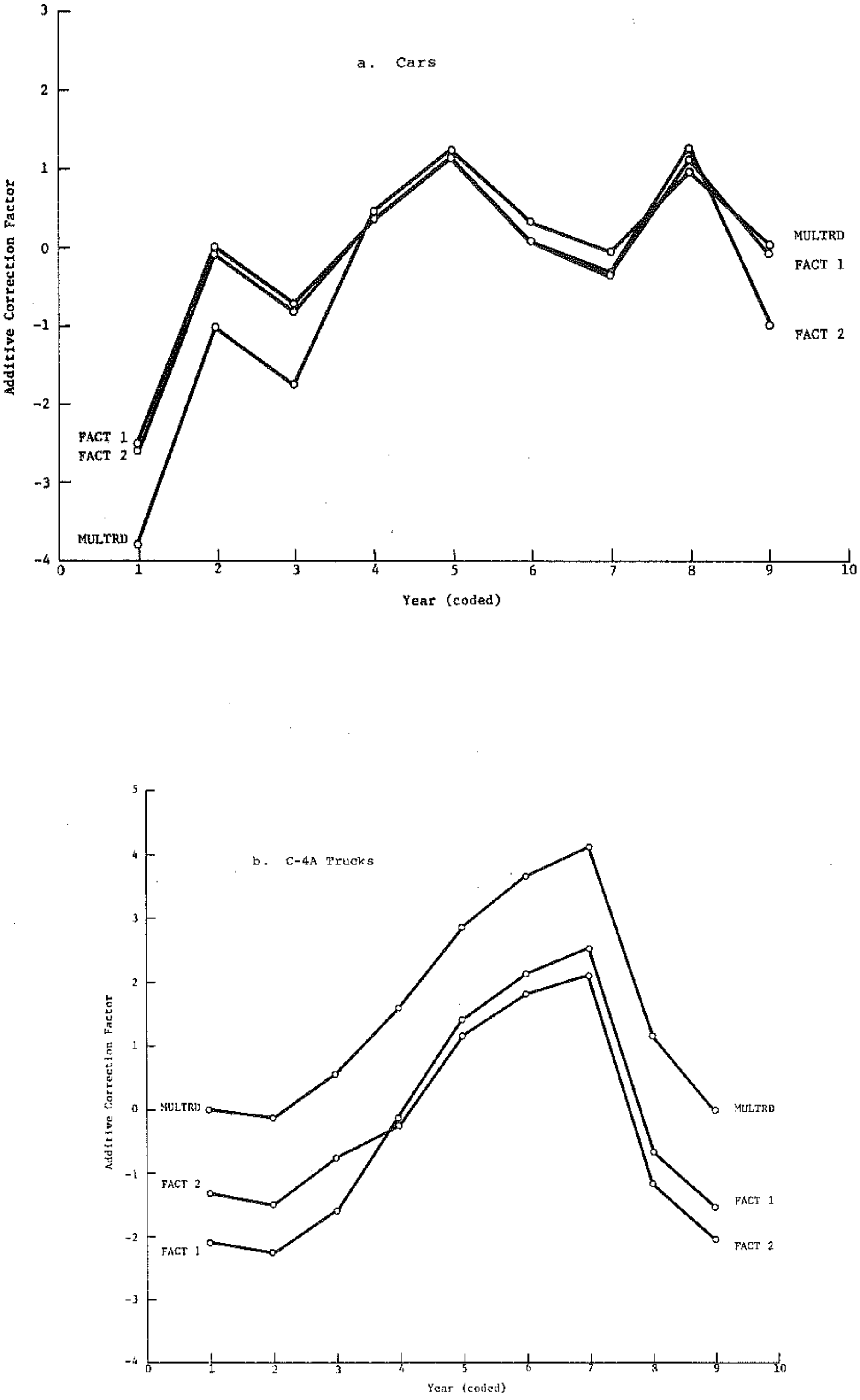

Figure 10. Influence of Year on Additive Correction Factors.

Finally, the criterion of reasonableness dictates that the sum of the predicted percentages must equal 100 percent. Since the percentage of each vehicle type is predicted independently of the remaining vehicle types, the total percentages will rarely equal 100 percent. For this reason, the initial predictions must often be appropriately modified. Several methods for accomplishing this were suggested. However since all preliminary estimates were close to 100 percent, an elaborate adjustment procedure was felt to be unwarranted. It is recommended, therefore, that the adjustments to 100 percent be made by multiplying each initial prediction by 100 divided by the sum of the initial predictions. This procedure is summarized on Sheet 4 of Appendix F.

Accuracy

The procedures described above, together with the basic percentages presented on Sheet 3 of Appendix F and the multiplicative correction factors presented on Sheet 4, were used to estimate vehicle-type percentages for comparison with the actual percentages obtained from past vehicle classification counts. The results of this accuracy comparison are summarized in Table 15.

The accuracy of the proposed predictive technique, as indicated by the correlation coefficients, is not good. Some slight decrease in accuracy resulted from the exclusion of year from the set of local conditions. However, this was necessary in order to establish the technique as a valid, predictive tool. Despite the relative inaccuracy of the technique, it was found superior to others of those investigated on the basis of the four criteria of accuracy, simplicity, reasonableness, and predictability. Table 15 also shows that slight increases in accuracy for most vehicle types were achieved by correcting the initial estimates to a total of 100 percent.

PREDICTING UNIT EWL'S

Selection of Predictive Methodology

In comparison with the vehicle classification data, the available weight data were much less extensive. Most of the weight data had been obtained from rural, primary routes having relatively high-volume, ordinary types of traffic. All had been obtained during the late spring or summer months. Because of this rather limited data, consideration of interactions among even a limited number of local conditions was felt to be unwarranted. In spite of this, however, analyses of Appendix E and other data indicated that an approach such as gross means would be inappropriate since the local conditions did measurably affect the average unit EWL's. Consideration was limited to multiple regression techniques since possible interactions were not to be investigated and since the correction-factor techniques offered no known advantages over the multiple regression techniques.

Only a cursory analysis was made to ascertain the superior of the MULTRA and MULTRD techniques. Kentucky unit EWL estimates using MULTRA were made for the SU-3A trucks which yielded a correlation coefficient of 0.44. Similar estimates were also made using MULTRD, additive techniques and which eliminated year and service provided as independent variables. These yielded a correlation coefficient of 0.59. It was therefore decided that MULTRD was superior to

TABLE 15

ACCURACY OF VEHICLE-TYPE PERCENTAGE ESTIMATES

Vehicle Type	Mean Percent	Standard Deviation	Standard Error		Correlation Coefficient		Number of Vehicles Counted
			Uncorrected	Corrected[1]	Uncorrected	Corrected[1]	
Cars	71.6718	7.1262	5.7059	5.6479	0.5984	0.6098	4,159,168
Buses	0.8592	0.6164	0.4842	0.4843	0.6187	0.6186	46,953
SU-2A-4T	9.0922	3.8732	2.6203	2.5744	0.7364	0.7471	474,626
SU-2A-6T	8.5095	3.8990	3.2277	3.2297	0.5610	0.5602	456,745
SU-3A	1.0016	2.3819	2.1307	2.1244	0.4470	0.4522	52,264
C-3A	3.9378	4.1526	2.6852	2.6831	0.7628	0.7632	239,123
C-4A	4.1038	4.3735	2.6848	2.6772	0.7894	0.7907	263,847
C-5A	0.8230	2.1582	1.5584	1.5448	0.6918	0.6983	56,805

[1] Estimates of vehicle-type percentages were corrected to a total of 100 percent.

MULTRA for the unit EWL predictions. MULTRA did allow a determination of the order of importance of the local conditions with regard to the unit EWL parameter for SU-3A trucks. It rated service provided as the most influencial condition followed in decreasing order of importance by maximum allowable gross weight, volume, road type, direction, geographical area, year, and alternate route.

The next item to be considered was whether the factors should be additive (Equation 3) or multiplicative (Equation 4). Estimates were made of Kentucky unit EWL's for C-4A trucks using MULTRD with both additive and multiplicative factors. The C-4A truck was chosen for this analysis since it has been the single most important contributor to EWL accumulations on rural highways in Kentucky. The additive factors yielded a correlation coefficient of 0.76 and the multiplicative, 0.72. Additive factors were chosen, therefore, not only on the basis of their superior accuracy (which was verified for other of the vehicle types as well) but also because they are slightly easier to derive and use. Some reasonableness was sacrificed because of the possibility for predicting negative unit EWL's but this is overshadowed in part by the slight increases in overall accuracy resulting when negative estimates are set equal to zero.

The method which was finally selected for relating unit EWL's with local conditions was, therefore, additive factors derived using multiple regression with dummy variables. The next problem was to assess its reliability as a predictive tool. The most important local condition with regard to future predictions is year. Estimates of unit EWL's for C-4A trucks were made both including and excluding year as an independent variable. These yielded correlation coefficients of 0.76 and 0.72, respectively. Thus the inclusion of year was found to slightly increase the accuracy with which past unit EWL's for this vehicle type could be estimated. But could year serve as a basis for future predictions? Figure 11 was constructed to ascertain an answer. If attempts were made to extrapolate the data of this figure to future years, the additive correction factor would have to be taken as approximately zero. Thus it would be impossible to discriminate among the effects of future years. Furthermore, because of the interrelationship between year and maximum allowable gross weight, the correction factors for maximum allowable gross weight appear incongruous when year is included as an independent variable. This is apparent from Figure 12. Year was, therefore, excluded as an independent variable for predictive purposes.

Each of the remaining seven local conditions contributed to the analysis, and all were amenable to future predictions with the exception of service provided. Data were available to establish valid correction factors only for service-provided codes of 3, 4, and 5[1]. Therefore due to lack of data, service provided was also eliminated as an independent variable -- causing a further reduction in the correlation coefficient from 0.72 to 0.62. This represents a significant reduction in accuracy and suggests that more accurate future estimates may be partially dependent on the weighing of vehicles on road representing each of the service-provided categories.

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[1] See Appendix E.

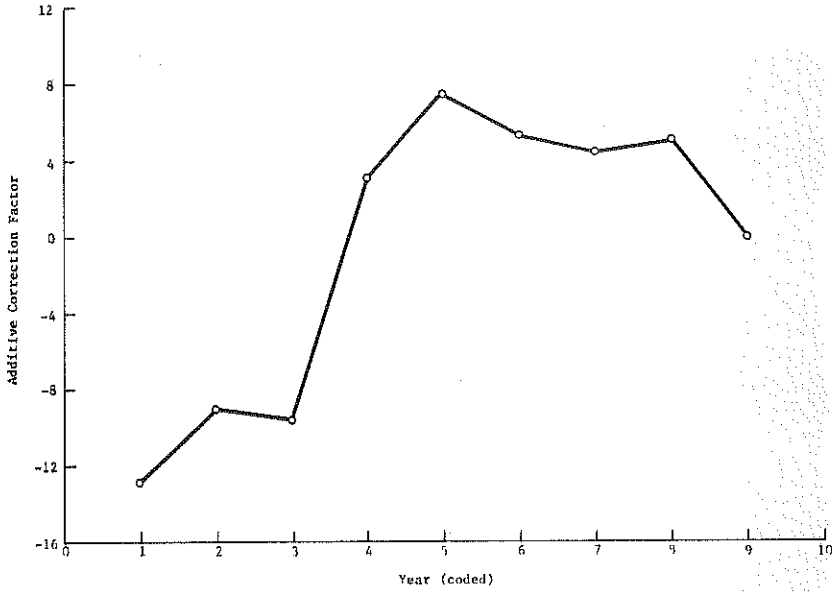

Figure 11. Relationship Between Additive Correction Factor and Year (Unit EWL Estimates for C-4A Trucks).

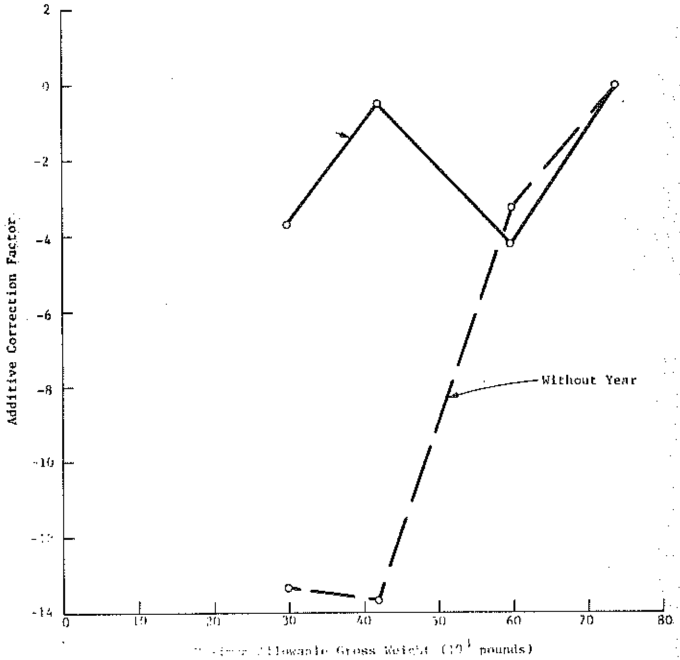

Figure 12. Relationship Between Additive Correction Factor and Maximum Allowable Gross Weight (Unit EWL Estimates for C-4A Trucks).

Sheet 5 of Appendix F shows the final additive correction factors for all vehicle types and all types of unit EWL's. The factors for road-type 4 were assumed the same as those for road-type 3 since no weight data had been obtained for the "other rural roads" category. Furthermore, it was necessary to obtain the factors for volume-group 10 by extrapolation since no data were available for this volume group. The base conditions for the predictions are road-type 2, direction 2, alternate-route 3, volume 5 (except for C-5A where it is 7), maximum-allowable-gross-weight 4, and geographical area 4. Thus the constant term in each case represents the unit EWL predictions for this set of local conditions.

Cars and Buses

To enable valid predictions of EWL accumulations, the predictive methodology must recognize all EWL contributions regardless of their source. This reasoning prompted, for example, the separate consideration of SU-2A-4T vehicles since weight data indicated that these vehicles did make slight contributions to the EWL accumulations. The remaining vehicle types which have not yet been considered herein because no weight data were available for analysis are cars and buses. Each must be investigated with regard to its possible effect on EWL accumulations.

Since the gross weights of typical passenger cars are so small, it must be assumed that cars have zero unit EWL's when evaluated by Kentucky's procedure. This is necessitated by the fact that Kentucky equivalency factors for axleloads less than 9,000 pounds are zero. For such small axleloads, however, the AASHO equivalency factors are not zero. In lieu of valid weight data for car axles, the unit EAL's for cars by AASHO and modified AASHO procedures are assumed to be 0.0002 EAL's per car. This follows from the recommendations of the AASHO Committee on Design (13). This unit EAL is assumed to be constant for all possible sets of local conditions.

Buses, and in particular commercial, intercity buses, pose more significant problems in that their unit EWL's may be rather large. Fortunately with regard to EWL predictions, the numbers of commercial buses on rural highways are rather small so that errors in unit EWL predictions are relatively insignificant in terms of the total EWL accumulations. However, a large percentage of school buses are found on some rural, low-class roads (as much as 6 percent). Assuming the unit EWL contribution of school buses is equal to that of commerical buses, this means that as high as 50 percent of the total EWL's on some rural roads result from school buses.

Information supplied by Southern Greyhound Lines relative to the axle weights of its commercial buses operated in Kentucky enabled the preparation of Table 16. Since none of these buses has, at present, a tandem axle, the estimates for AASHO and modified AASHO unit EAL's are identical. Unfortunately the data of Table 16 fail to represent the entire problem since school buses and buses operated by other agencies and for other purposes are not included. Furthermore, no information is readily available concerning the average loading of these buses and the percentages of the various bus types. Also shown in Table 16 are arbitrary estimates of unit EWL's which have been chosen to represent the average conditions in Kentucky for all types of buses. These estimates are recommended for use in the predictive equations until such time as more

TABLE 16

UNIT EWL'S OF BUSES

	Commercial Buses[1] (Empty)	Commercial Buses[1] (Fully loaded)	Estimate Including Other Buses
Kentucky Unit EWL	3.6	16.0	5
AASHO Unit EAL	0.31	1.06	0.4
Modified AASHO Unit EAL	0.31	1.06	0.4

[1] From information supplied by Southern Greyhound Lines.

valid data become available. Like the unit EWL estimates for cars, these estimates are not responsive to variations in local conditions.

Accuracy

The procedures described above, together with the additive factors presented on Sheet 5 of Appendix F, were used to estimate unit EWL's for comparison with actual unit EWL's obtained from past weight data. The results of this accuracy comparison are summarized in Table 17.

A brief glance at the tabulated correlation coefficients is sufficient to reveal that the accuracy of the estimates leaves much to be desired. However, no other technique investigated herein yielded superior accuracy as long as it was stipulated that the technique had to represent a valid, predictive procedure. Furthermore, it is apparent from Table 17 that this method of accounting for the effects of local conditions is superior to the gross means approach.

Three other points relative to this accuracy comparison are important:

1. The best accuracy was generally achieved for those vehicle types which contribute most significantly to the EWL accumulations.

2. Generally, estimates of Kentucky unit EWL's are more accurate than either AASHO or modified AASHO unit EAL's.

3. The procedure for correcting negative unit EWL's to zero only slightly improved the accuracy of the estimates. The magnitude of the improvement was greatest where the mean unit EWL was lowest, that is, for the SU-2A-4T vehicle.

TABLE 17

ACCURACY OF UNIT EWL ESTIMATES[1]

Vehicle Type	EWL Type	Mean Unit EWL	Standard Deviation	Standard Error		Correlation Coefficient		Number of Vehicles Weighed
				Uncorrected	Corrected[2]	Uncorrected	Corrected[2]	
SU-2A-4T	KY	0.0415	0.644	0.632	0.630	0.192	0.212	12,349
	AASHO	0.0061	0.030	0.030	0.030	0.190	0.198	
	MAASHO[3]	0.0061	0.030	0.030	0.030	0.190	0.198	
SU-2A-6T	KY	3.1945	4.121	3.758	3.752	0.411	0.414	23,389
	AASHO	0.1787	0.088	0.081	0.081	0.377	0.377	
	MAASHO	0.1787	0.088	0.081	0.081	0.377	0.377	
SU-3A	KY	10.0445	16.129	12.973	12.867	0.594	0.603	2,180
	AASHO	0.3391	0.289	0.235	0.234	0.578	0.583	
	MAASHO	0.5290	0.440	0.363	0.362	0.564	0.568	
C-3A	KY	8.8944	6.560	6.109	6.106	0.364	0.366	12,143
	AASHO	0.6071	0.270	0.253	0.253	0.351	0.351	
	MAASHO	0.6071	0.270	0.253	0.253	0.351	0.351	
C-4A	KY	15.2519	9.848	7.766	7.759	0.615	0.615	14,321
	AASHO	0.8076	0.328	0.227	0.226	0.723	0.723	
	MAASHO	0.9872	0.435	0.302	0.301	0.721	0.721	
C-5A	KY	18.3338	15.225	11.478	11.471	0.658	0.658	4,302
	AASHO	0.7865	0.452	0.347	0.347	0.639	0.639	
	MAASHO	1.2088	0.705	0.530	0.530	0.659	0.659	

[1] No weight data were available for cars or buses.

[2] Negative estimates were transformed to zero.

[3] Modified AASHO procedures were used.

EXTENSIONS OF METHODOLOGY

The legal maximum allowable gross weight on Kentucky highways increased three times during the 17-year study period. Each increase has greatly affected the EWL accumulations on those particular highways to which the increase applied. Such effects are due to (1) a redistribution of the relative vehicle-type percentages, (2) an increase in the loading of vehicles having weight capacities near to or greater than the prior maximum allowable gross weight, (3) the utilization of heavier vehicles which, prior to the change, were either prohibited or were uneconomical to operate at reduced payloads, and (4) a reduction in the ADT[1]. The underlying rationale is that the choice of vehicle type by a carrier is dependent both on the characteristics of the shipment and on the efficiency with which various vehicle types may be operated within the legal constraints of maximum allowable gross weights and permissive vehicle types.

Inability of past procedures to consider the effects of maximum allowable gross weight has doubtlessly led to underestimates of design EWL's. This current reevaluation endeavor offers a means for rectifying this situation in the future. Two distinct problems immediately emerge.

The first relates to how and when the maximum allowable gross weight may be expected to change. Since these are legislative and administrative matters, they are largely beyond the purview of the engineer. At the same time, it is the engineer's responsibility to predict design EWL's based upon all the information that is available to him. While the matter is not dealt with in depth herein, it is recommended that estimates of design EWL's for high-type, multilane facilities be based on a maximum allowable gross weight of 89,000 pounds. This is approximately equal to the allowable gross weight of a C-6A truck. As an alternate suggestion, the current maximum allowable gross weight might be considered to govern the first 10 years of the design life and an increased allowable weight, the second.

The second problem, which is within the scope of this study, is how to modify the proposed methodology to incorporate a maximum allowable gross weight which lies outside the range of historical experience. Preliminary attempts to establish relationships between the maximum allowable gross weight and the traffic parameters of interest, namely, the vehicle-type percentages and the unit EWL's, were unsuccessful. Two pertinent variables that were identified, however, included the ratio of vehicle gross weight to the highway maximum allowable gross weight and the payload capacities of all competing vehicle types. Complicating the analysis were time lags occurring after a change in maximum allowable gross weight. These were thought to be caused by (1) a delay in the introduction of new equipment and (2) a delay in administering the change for specific routes. It was felt that the entire study period was represented by unstabilized traffic redistributions.

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[1] These changes may be too small to be actually detected. To illustrate the point, however, fewer C-5A trucks would be required for a given shipment than C-4A trucks due to their increased payload capacity.

A simplified procedure can be used, however, to obtain estimates of the EWL's per 1,000 vehicles for different maximum allowable gross weights. The EWL's for 1,000 vehicles would be predicted for each of the four maximum allowable gross weights and the results plotted as illustrated by Figure 13. The curve would be extrapolated to the future maximum allowable gross weight and the result multiplied by the total number of vehicles expressed in thousands to obtain the final estimate. Figure 13 is based on predictions of AASHO EAL's for the following situation: road-type 2, direction 2, alternate-route 2, service-provided 4, volume 4, and geographical-area 4. The above procedure is recommended for use in the absence of a more refined method.

SUMMARY

Several empirical methods have been investigated for predicting the pertinent traffic parameters on the basis of anticipated local conditions. These methods were compared with respect to the criteria of accuracy, simplicity, reasonableness, and predictability. The chosen method for predicting vehicle type percentages considers three interacting local conditions which establish the base percentages and multiplicative correction factors for independent analysis of the remaining conditions. Year was excluded as an independent variable for predictive purposes. The chosen method for predicting unit EWL's considers additive factors for the independent analysis of each of six local conditions. Year, season, and service provided were excluded as independent

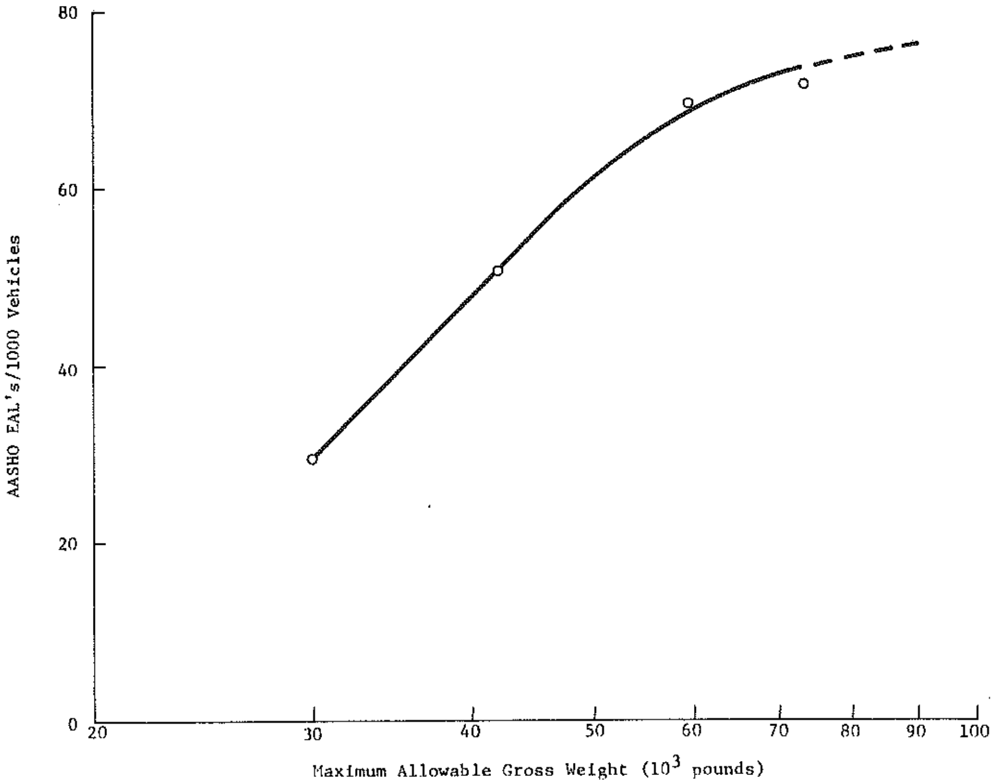


Figure 13. Example Effect of Maximum Allowable Gross Weight on AASHO EAL's per 1,000 Vehicles.

variables for predictive purposes.

Work sheets for predicting design EWL's are included as Appendix F. As such, Appendix F summarizes the recommended procedures and presents the necessary data for computational purposes. These data represent averages over the 17-year study period weighted by the factors of Table 11. An example problem is presented in Appendix G to demonstrate implementation of the recommended procedures.

Appendix F should be used to estimate EWL's for purposes of pavement design except where appropriate data are available for the specific route in question. A method has been given for predicting design EWL's when the anticipated maximum allowable gross weight is in excess of that stipulated in the past. The data of Appendix F may be extended by extrapolation or interpolation as necessary in order to obtain valid estimates. For example, missing entries may have to be obtained by extrapolation or interpolation. Judgment may have to be exercised in other instances, such as for a location at or near the boundary of two geographical areas.

Accuracy of the individual estimates of the traffic parameters, as indicated by Tables 15 and 17, was somewhat discouraging. Nevertheless, the recommended technique represents the best available among those investigated and satisfies the basic requirement for a valid prediction procedure which accounts for the effects of local conditions. A portion of the observed errors is doubtlessly due to inappropriateness of the model. At the same time, other errors remain which could not be diminished by any model. These include (1) errors in obtaining and recording data in the field, (2) errors in coding data and local conditions in the office, (3) errors due to large inherent variabilities in the traffic stream, and (4) errors due to non-random nature of the basic data. In addition, the data are representative only of average weekday conditions and the weight data have been obtained only during the spring and summer months.

The true validity of the proposed model can not be assessed solely on the basis of estimates of the individual traffic parameters. Of considerably more significance is the accuracy of estimates of design EWL's or of estimates of pavement thickness resulting therefrom. These matters are considered in the following section.

ACCURACY VERIFICATION

EWL's were estimated using the proposed method and then compared to actual EWL's for all stations at which both vehicle classification and weight data had been obtained during the study period. There were 51 such stations representing a total of 225 counts for an average of approximately four annual counts per station. Of these, nine were stations for which 11 or more years of data were available and 18 for which seven or more years were available. Thirty-one of the stations were represented by only one or two years of data.

The first comparisons were made on the basis of EWL's per 1,000 vehicles for the 225 individual counts. Table 18 summarizes the results of these accuracy comparisons. The correlation coefficients are relatively small, which indicates that a large portion of the variability in EWL's per 1,000 vehicles for individual counts remains unexplained.

The actual and predicted total daily EWL's were then computed and compared. Figure 14 shows the results of this comparison for Kentucky EWL's. This figure depicts visually the accuracy of estimates of daily EWL's for individual counts.

Table 18 and Figure 14 indicate that the proposed method for predicting EWL's, while superior to all methods investigated herein, does not enable high accuracy in predicting EWL's for individual counts. This is due in large part to the extreme variability in the actual EWL's that are accumulated at individual stations from year to year. Such variability is depicted on Figure 15a for

TABLE 18

ACCURACY OF ESTIMATES OF EWL'S PER 1,000 VEHICLES
FOR 225 INDIVIDUAL COUNTS

Type of EWL	Actual Mean	Standard Deviation	Standard Error	Correlation Coefficient
Kentucky (EWL's/1,000 vehicles)	1535.4	1405.3	1173.1	0.55
AASHO (EAL's/1,000 vehicles)	82.4	54.5	42.4	0.63
Modified AASHO (EAL's/1,000 vehicles)	96.9	70.8	52.2	0.68

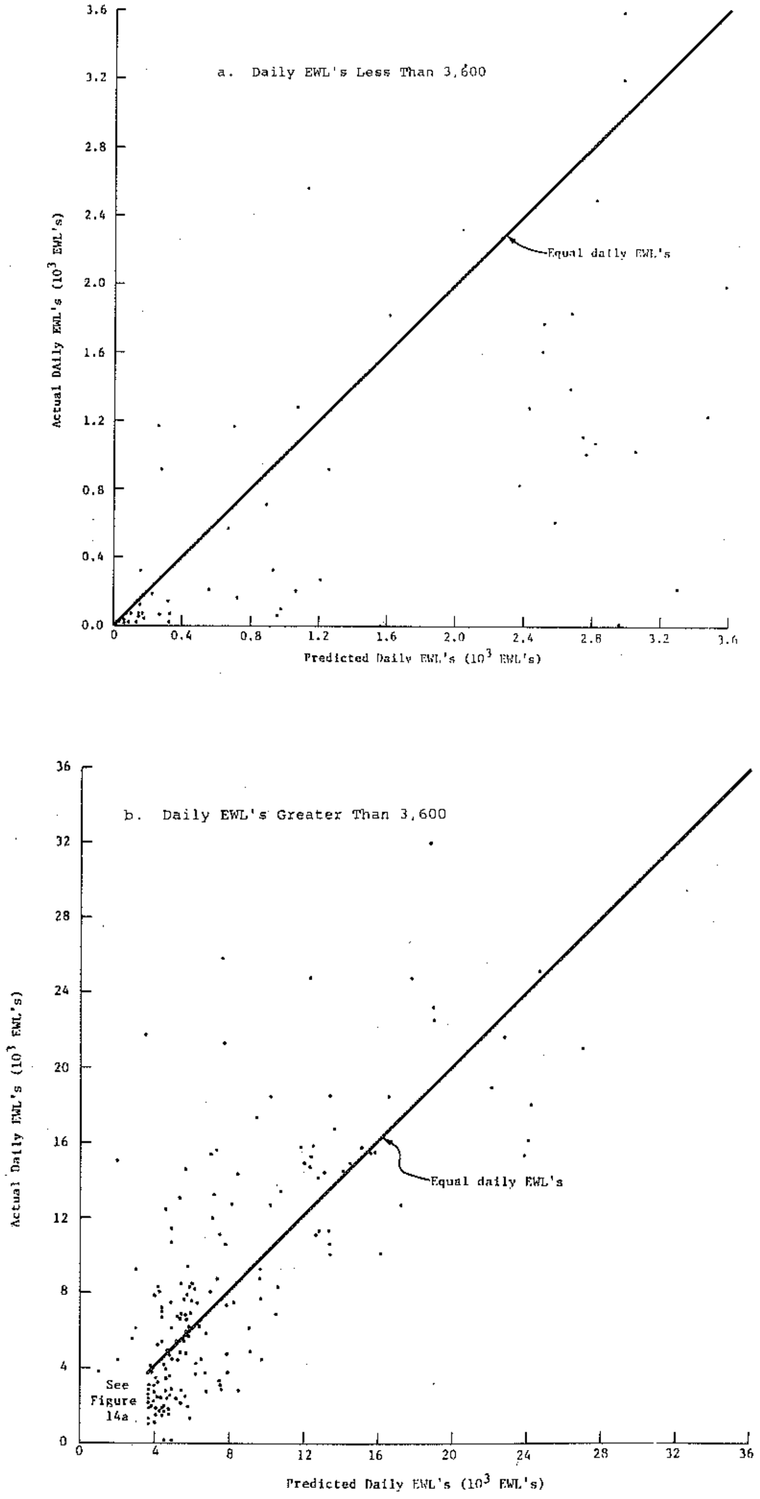


Figure 14. Comparison of ACtual and Predicted Kentucky EWL's per Day for 225 Individual Counts.

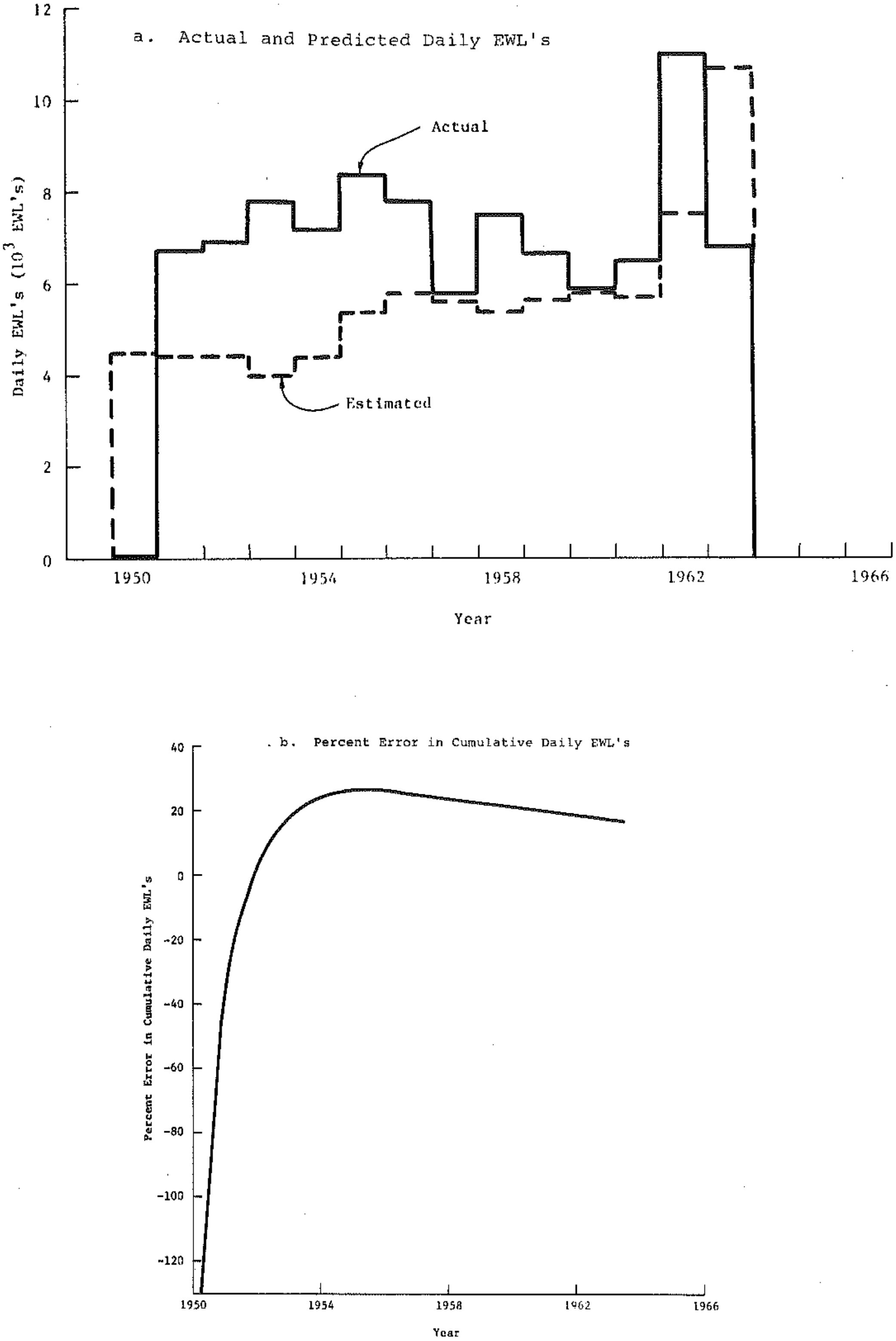


Figure 15. Variability in Kentucky Daily EWL's at Station 8.

Station 8, for which 14 years of data are available. Certainly no predictive procedure can be conceived that would be able to duplicate the actual year-to-year variations that are obvious from this figure. Figure 15a suggests, however, that, if the daily EWL's were accumulated over a period of years, the actual and predicted accumulations might tend to converge. This led to the construction of Figure 15b which shows, for the same station, the percent error in cummulative daily EWL's as a function of year. The percent error was computed by dividing the difference between the actual and predicted values by the actual value. Following a six-year period of initial instability, the percent errors tend to be reduced as the number of years increased. By extrapolation, the percent error at the end of a 20-year design period would be about 6 percent, which certainly represents a tolerable error.

Figure 15b lends support to the hypothesis that the proposed predictive methodology becomes more accurate as the predictive period increases. This is of extreme significance since most flexible pavement designs in Kentucky are based on a 20-year period. Curves similar to that of Figure 15b are shown in Figure 16 for six of the nine stations for which 11 or more years of data have been accumulated. This figure also shows that the percent errors tend to become stablized and reduced as the time increases.

As a further means for validating the proposed methodology, the influence of the accuracy of the EWL estimates on the accuracy of the design pavement thicknesses was also investigated. First the actual and the estimated EWL's for each of the 51 locations were extrapolated to 20-year accumulations. These are shown in Figure 17. Then the combined flexible pavement thicknesses including base and pavement were determined (<u>10</u>). These determinations, which are summarized in Figure 18, were based on an arbitrarily-selected design CBR of 5. Differences in the thicknesses based on estimated actual and predicted EWL's seem rather large at first glance. However, it should be recalled that actual data were available for periods of only one or two years for 31 of the 51 stations. This would, of course, decrease the reliability of the estimates of 20-year accumulations of EWL's. Figure 18b suggests that the percent error for stations with data for a 20-year period would be about 2 percent.

In summary, it is concluded that the proposed method for predicting design EWL's is sufficiently accurate for use in designing flexible pavements. It satisfies the remaining criteria of simplicity, reasonableness, and predictability and provides a suitable means for ascertaining the influence of local conditions.

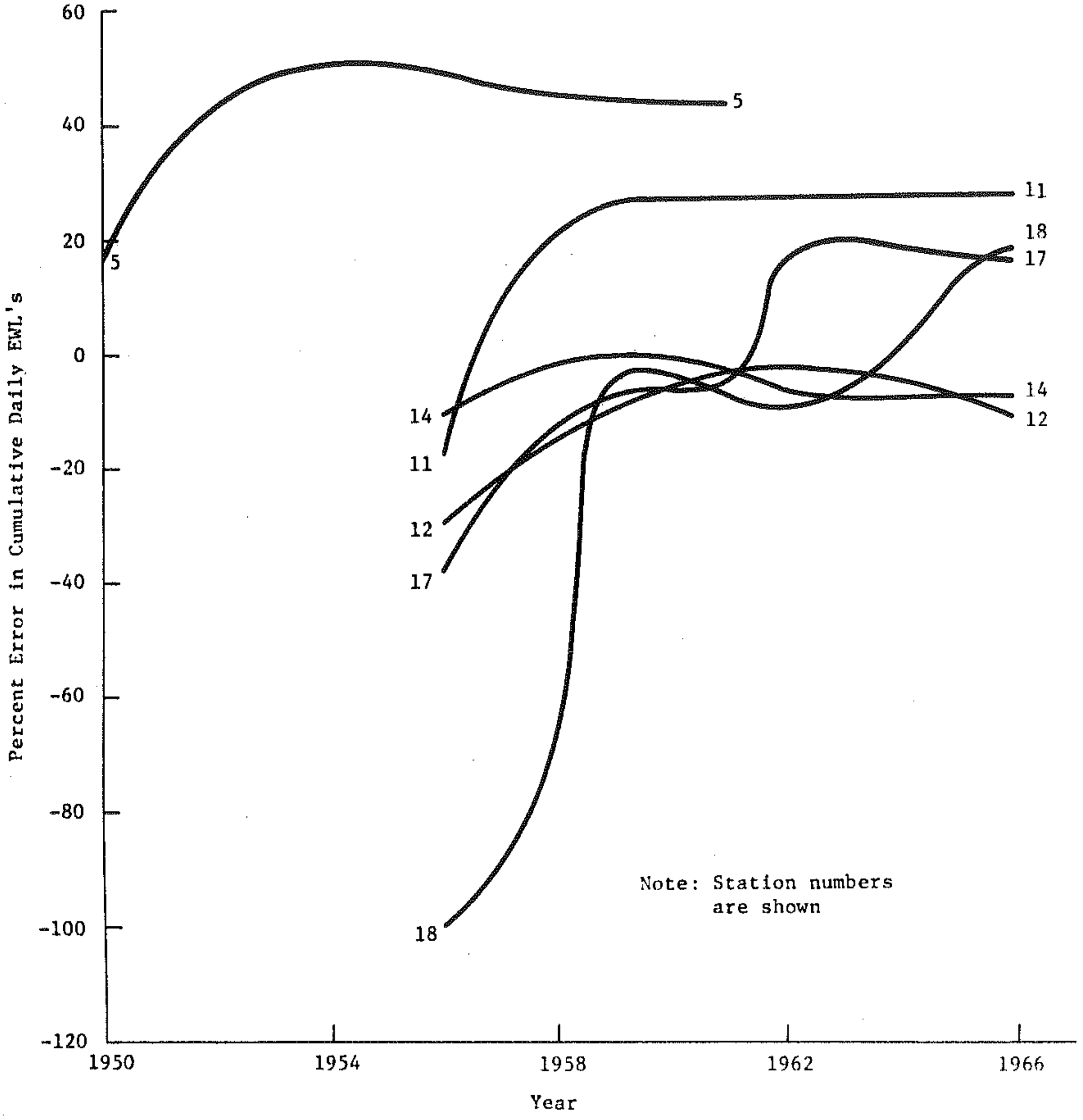
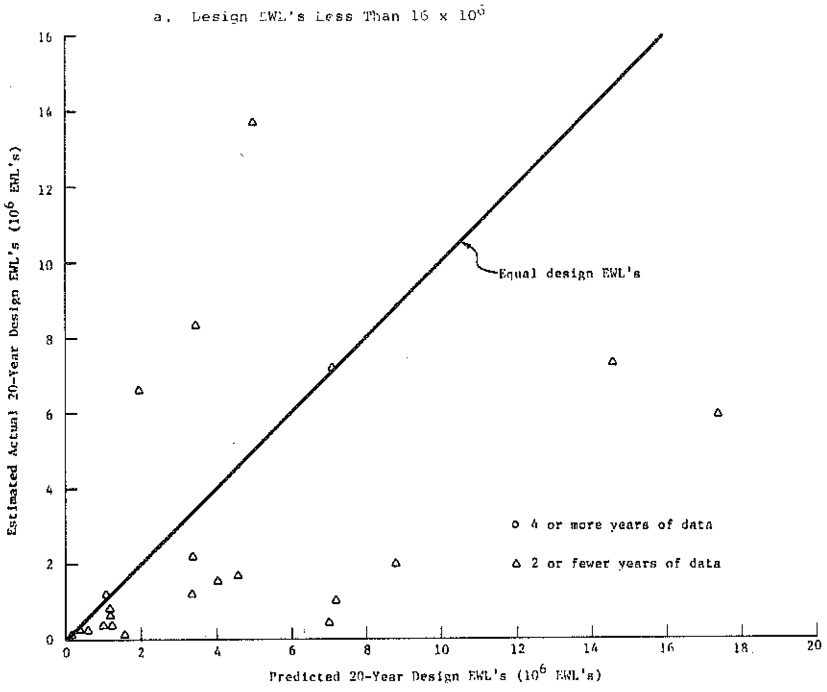


Figure 16. Percent Error in Kentucky Cumulative Daily EWL's as a Function of Time.


a. Design EWL's Less Than 16 x 10^6

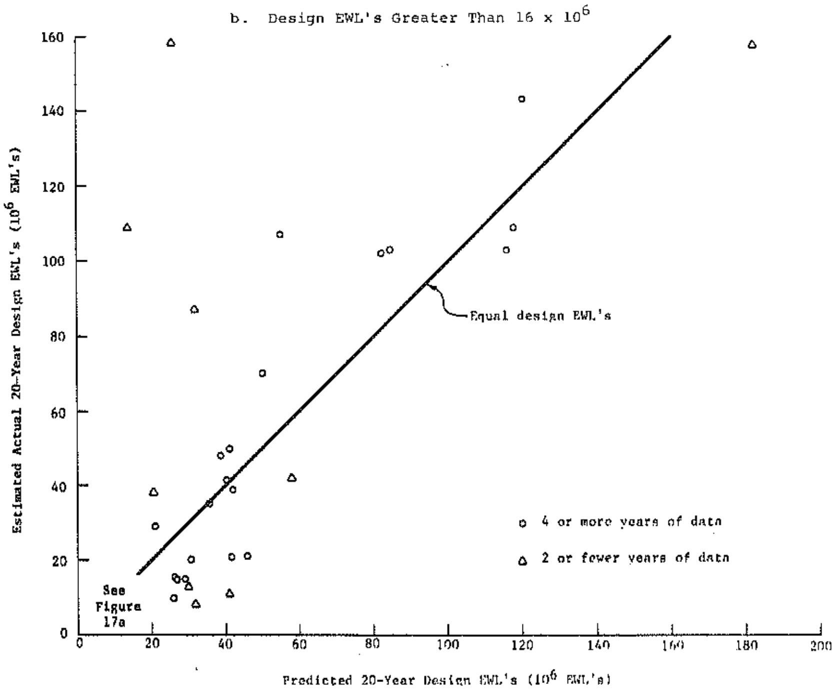
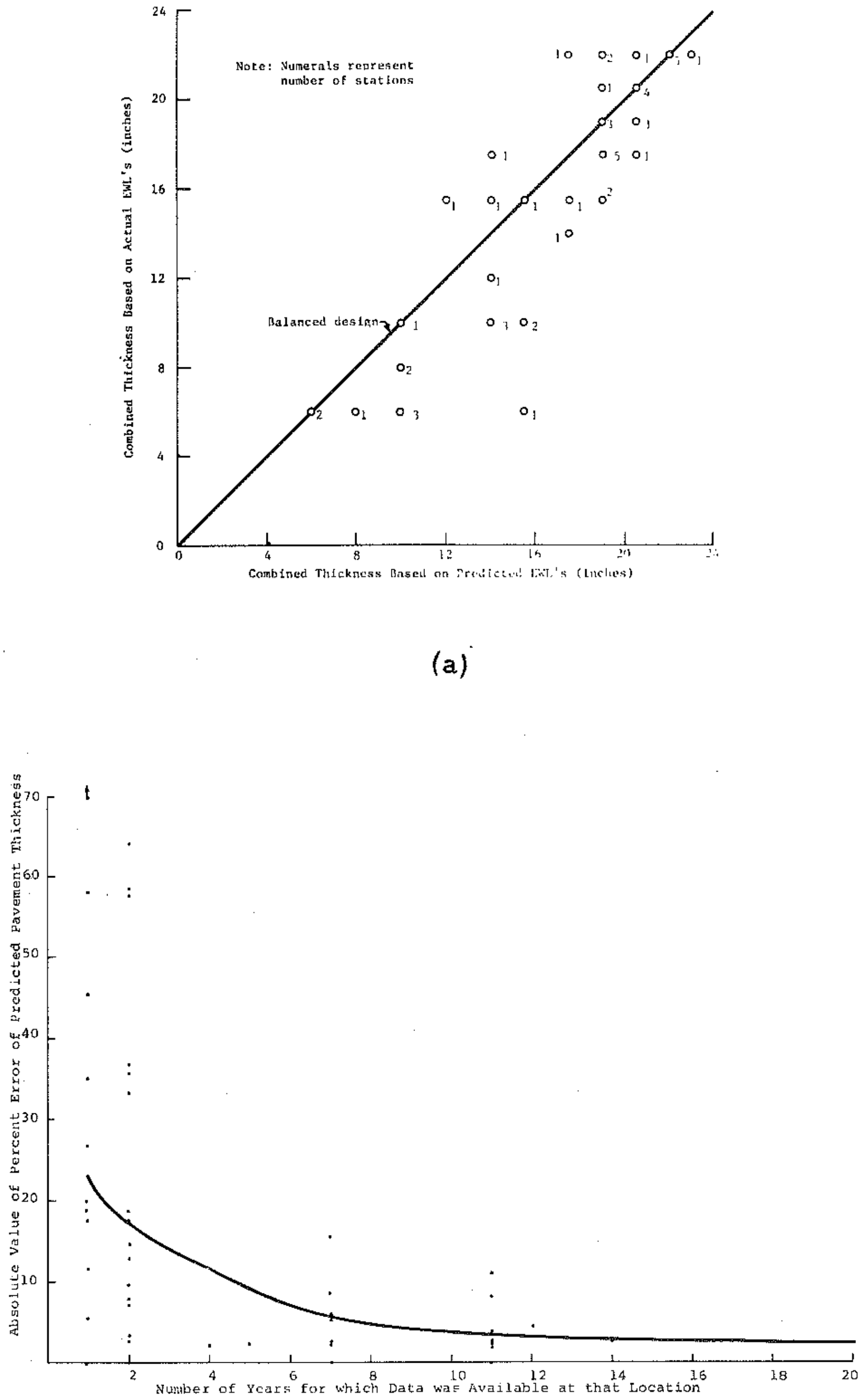

b. Design EWL's Greater Than 16 x 10^6

Figure 17. Actual Versus Predicted 20-Year Design EWL's for All Stations.



(a)

(b)

Figure 18. Flexible Pavement Thickness Based on Actual and Predicted 20-Year EWL Accumulations.

SUMMARY

Difficulties in obtaining reliable estimates of EWL accumulations for flexible pavement design purposes led to the initiation of this study in 1963. When EWL estimates at specific locations were compared with actual EWL accumulations, major discrepancies were often noted. These discrepancies were believed to be associated with the inability of the predictive procedure to differentiate among many of the routes in other than a qualitative manner.

The prerequisites which were established as a basis for comparing alternate predictive procedures included the following:

1. The predictive model should consider as many of the relevant local conditions which determine the composition and weights of the traffic stream as possible,

2. The predictive model should make full use of all available vehicle classification and weight data, and

3. The predictive model should possess the qualities of simplicity, reasonableness, predictibility, and accuracy.

Evaluation of the methodology currently used in Kentucky led to the search for a more responsive empirical method of prediction. It was assumed that sufficently accurate estimates of ADT would be available and, therefore, could be excluded from consideration. Furthermore, the analyses was restricted to rural areas for which the bulk of data was available. The significant traffic parameters were identified as the percentages of the various vehicle types and their unit EWL's. The local conditions which were found to significantly affect the traffic parameters included road type, direction, alternate route, service provided, traffic volume, maximum allowable gross weight, geographical area, year, and season. Analyses were then made to find a suitable empirical method for predicting the traffic parameters on the basis of an analysis of the pertinent local conditions.

The chosen method for predicting vehicle-type percentages consists of a set of basic percentages determined jointly by road type, volume, and maximum allowable gross weight and a series of multiplicative correction factors determined independently by direction, season, alternate route, service provided, and geographical area. Independent predictions are made of the percentage of each vehicle type and the results adjusted so that the sum equals 100 percent. The chosen method for predicting unit EWL's is based on a multiple regression model that considers all of the above local conditions, except year, season, and service provided, in an additive fashion. Adjustments are made so that no estimate yields a negative value. Procedures are provided for estimating Kentucky, AASHO, or modified AASHO unit EWL's.

The recommended methodology, which is presented in Appendix F, was found to provide a suitable means for predicting EWL accumulations. In no case, however, should the recommended methodology be used if valid traffic data are available for the specific route in question.

RECOMMENDATIONS

The following recommendations for implementing and extending the efforts of this study are presented for consideration.

1. The proposed methodology for predicting EWL's for rural highways in Kentucky should be adopted for purposes of flexible pavement design. This method has been shown to be a valid predictive tool which can account for the effects of local conditions.

2. Twenty-year predictions of design EWL's should incorporate the effects of probable changes in maximum allowable gross weight on high-type, multilane highways. Maximum allowable gross weight has been found to significantly affect EWL accumulations. Four different maximum allowable gross weights have been in effect on Kentucky highways during the 17-year study period and future changes are likely to occur.

3. Analogous methodologies should be developed to enable valid predictions of EWL's and associated traffic parameters in urban areas. No method currently exists for accurate predictions of design EWL's in these areas.

4. The data banks developed as a part of this study should be continually and routinely updated and maintained. This is essential not only to facilitate future reevaluations of EWL predictions but also to provide the capability for immediate and accurate recall of traffic data for a multitude of engineering purposes.

5. Responsibility for the maintenance of up-to-date data banks should be assumed by the Division of Planning which now has overall responsibility for data collection systems.

6. Formats of the data banks should be thoroughly reviewed and revised to be compatible not only with past data but also with possible future innovations and changes and to provide a rapid means for future updating. The formats now used were selected primarily to facilitate the objectives of the current study. Certainly the capability for handling new vehicle types such as double bottom trucks and new axle types such as tri-tandem axles must be provided. This might also require certain changes in the current data collection systems.

7. A comprehensive review of current methods for acquiring vehicle classification and weight data appears desirable. The analysis reported herein was hampered by the non-randomness of data caused, in part, by the emphasis which has been placed on the permanent loadometer stations. A minimal number of permanent, fixed stations used to ascertain long-term trends supplemented by additional randomly selected stations used to provide maximum coverage appears advantageous.

8. Investigations should be conducted to ascertain the seasonal variations, if any, of average vehicle weights and unit EWL's.

9. An independent means should be sought for predicting changes in vehicle type percentages and unit EWL's anticipated as a result of future increases in the legal maximum allowable gross weight. Not only would this increase the credibility of future predictions but it would also promote improved understanding of the evolving structure of the traffic stream.

10. The current EWL-calculation procedure which neglects the possible effects of differential lane and directional distributions should be subjected to close scrutiny. Neglect of lane distribution can possibly lead to overdesign on multilane facilities while neglect of directional distribution can possibly lead to both overdesign and underdesign depending on the direction of flow. Both the Asphalt Institute (24) and the Portland Cement Association (23) provide a means of correcting for the effects of lane distribution in their design methods.

11. It is imperative that the contribution to EWL accumulations by buses be studied in some detail. Despite the fact that fully loaded, commerical buses contribute significantly to EWL accumulations, no detailed data on average bus weights are available.

12. Future reevaluations of flexible pavement design procedures must provide a sound basis for justifying or altering the procedure for neglecting to distinguish between single and tandem axles. Both theory (16) and the results of road tests (11) have shown that the destructive effects of single and tandem axles are not identical.

13. Periodic maps of annual EWL accumulations on Kentucky highways would be useful for providing an up-to-date source of information for analysis and design purposes. While the preparation of such a map would currently require excessive expenditures, such an effort would be a small task for a computerized system. It is, therefore, recommended that increasing use be made of high speed data processing systems for the storage and analysis of traffic data. Such a system would provide immediate and accurate information concerning a variety of traffic parameters.

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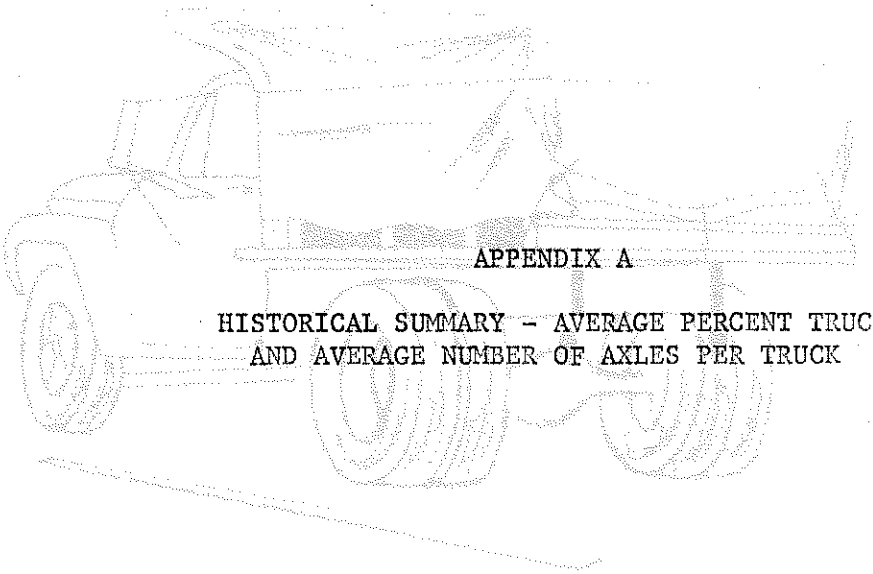


APPENDIX A

HISTORICAL SUMMARY - AVERAGE PERCENT TRUCKS AND AVERAGE NUMBER OF AXLES PER TRUCK

ALL OF KENTUCKY

TOTALS
RURAL HIGHWAYS

	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	ALL YEARS
AVERAGE PERCENT TRUCKS																		
0-499 VPD	19.51	7.37	15.30	13.68	10.51	14.03	9.07	8.61	5.42	8.45	21.65	8.80	11.46	9.77	11.18	10.03	10.21	11.44
500-999 VPD	25.97	18.01	19.01	17.77	22.40	13.61	15.20	12.31	11.96	11.03	15.02	0.0	8.95	13.68	11.85	10.80	10.11	13.83
1000-1999 VPD	26.16	17.37	14.18	14.43	19.17	18.01	17.66	16.16	19.03	17.37	18.16	17.04	14.54	18.18	16.08	14.33	12.18	16.43
2000-3999 VPD	22.93	19.29	19.67	19.15	20.16	18.04	18.44	20.49	17.63	16.80	19.65	17.99	17.50	19.35	15.70	19.55	17.15	18.71
4000-7999 VPD	21.75	19.88	20.45	16.18	20.21	20.69	21.33	21.52	18.75	19.17	20.44	21.06	22.16	22.64	18.99	16.76	19.53	20.08
8000 OR MORE VPD	11.07	15.08	16.78	12.99	15.26	14.78	14.34	13.34	11.95	11.16	12.79	14.42	12.51	15.16	15.06	11.29	17.56	13.81
ALL VOLUMES	22.28	18.89	19.09	17.05	18.99	18.72	19.06	19.50	17.04	17.22	19.27	18.53	18.57	20.54	17.07	14.63	17.52	18.26
AVERAGE NUMBER OF AXLES PER TRUCK																		
0-499 VPD	2.045	2.125	2.323	2.021	2.052	2.035	2.121	2.092	2.000	2.000	2.361	2.141	2.000	2.055	2.191	2.085	2.582	2.147
500-999 VPD	2.167	2.233	2.233	2.093	2.214	2.000	2.173	2.200	2.485	2.109	2.370	0.0	2.138	2.271	2.419	2.344	2.280	2.279
1000-1999 VPD	2.427	2.250	2.272	2.143	2.314	2.404	2.565	2.656	2.805	2.615	2.597	2.749	2.666	2.682	2.771	2.794	2.551	2.581
2000-3999 VPD	2.440	2.480	2.513	2.577	2.568	2.550	2.727	2.904	2.957	2.888	2.986	2.982	2.937	3.081	3.105	3.303	3.298	2.816
4000-7999 VPD	2.529	2.534	2.547	2.545	2.552	2.696	2.854	2.988	2.981	3.005	3.047	3.096	3.238	3.325	3.339	3.444	3.625	3.016
8000 OR MORE VPD	2.327	2.537	2.602	2.611	2.665	2.725	2.762	3.043	2.930	2.829	3.054	3.086	3.054	3.230	3.235	3.450	3.688	3.059
ALL VOLUMES	2.462	2.496	2.517	2.546	2.556	2.628	2.777	2.916	2.953	2.934	2.985	3.028	3.076	3.193	3.183	3.350	3.481	2.911
NUMBER OF VEHICLES COUNTED IN TENS																		
0-499 VPD	103	43	87	139	109	202	100	302	55	43	67	113	29	56	421	130	131	2129
500-999 VPD	88	248	439	97	667	90	145	924	484	200	338	0	307	758	1529	401	622	7337
1000-1999 VPD	525	584	2886	1425	3445	2363	2829	3128	1687	1540	2513	3355	2379	2432	4622	3441	3585	42740
2000-3999 VPD	6553	12479	15333	13113	19400	12774	17744	11765	15215	12036	15029	14416	13962	14118	13699	8286	7890	223812
4000-7999 VPD	4059	7626	11916	14058	11554	15965	18030	13499	16582	19277	15095	16462	14481	20574	21242	12517	13628	246563
8000 OR MORE VPD	373	2858	4635	2756	10453	5027	5216	3004	7348	5184	2982	6733	4038	2724	3501	19256	9806	95895
ALL VOLUMES	11701	23839	35295	31587	45628	36421	44063	32623	41372	38280	36023	41079	35196	40662	45014	44031	35663	618477

WESTERN KENTUCKY

HIGHWAY DISTRICTS 1 AND 2
RURAL HIGHWAYS

	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	ALL YEARS
AVERAGE PERCENT TRUCKS																		
0-499 VPD	19.63	2.90	0.0	0.0	0.0	0.0	0.0	.40	0.0	0.0	20.28	9.37	0.0	0.0	9.07	12.88	17.91	11.64
500-999 VPD	0.0	5.46	0.0	0.0	0.0	0.0	0.0	0.0	6.53	0.0	12.89	0.0	0.0	0.0	14.31	11.45	0.0	10.57
1000-1999 VPD	21.78	0.0	13.33	0.0	16.09	15.08	13.53	18.89	21.00	16.39	23.71	20.91	17.69	22.24	13.37	4.54	11.64	16.58
2000-3999 VPD	27.95	21.47	22.23	23.94	21.03	19.81	21.25	23.39	17.43	18.22	17.32	22.25	19.86	23.80	15.33	23.92	22.75	20.41
4000-7999 VPD	16.23	13.80	14.09	12.73	15.37	16.15	16.90	19.39	15.41	20.85	21.27	21.25	23.04	25.91	18.75	21.30	22.08	18.41
8000 OR MORE VPD	11.07	0.0	0.0	12.99	0.0	0.0	0.0	0.0	10.78	11.82	0.0	14.29	0.0	0.0	0.0	0.0	0.0	12.24
ALL VOLUMES	21.11	17.40	18.36	15.67	18.55	17.57	18.95	21.46	15.52	18.46	19.04	20.54	21.28	24.94	16.92	21.46	21.30	18.71
AVERAGE NUMBER OF AXLES PER TRUCK																		
0-499 VPD	2.143	2.000	0.0	0.0	0.0	0.0	0.0	2.029	0.0	0.0	2.598	2.000	0.0	0.0	2.188	2.136	2.843	2.353
500-999 VPD	0.0	2.036	0.0	0.0	0.0	0.0	0.0	0.0	2.052	0.0	2.063	0.0	0.0	0.0	2.634	2.824	0.0	2.458
1000-1999 VPD	2.574	0.0	2.395	0.0	2.528	2.562	2.864	2.988	2.997	2.496	2.185	3.071	2.897	3.373	2.793	2.068	2.671	2.800
2000-3999 VPD	2.424	2.518	2.539	2.679	2.570	2.561	2.898	3.039	3.038	2.904	2.974	3.196	3.251	3.445	3.191	3.537	3.670	2.954
4000-7999 VPD	2.348	2.354	2.378	2.436	2.401	2.609	2.690	2.917	2.955	3.101	3.113	3.225	3.288	3.473	3.344	3.620	3.630	3.055
8000 OR MORE VPD	2.327	0.0	0.0	2.611	0.0	0.0	0.0	0.0	3.000	3.143	0.0	3.085	0.0	0.0	0.0	0.0	0.0	2.855
ALL VOLUMES	2.407	2.451	2.481	2.582	2.519	2.582	2.821	2.993	2.995	3.018	3.002	3.175	3.245	3.459	3.245	3.543	3.589	2.981
NUMBER OF VEHICLES COUNTED IN TENS																		
0-499 VPD	11	7	0	0	0	0	0	93	0	0	43	16	0	0	129	46	50	394
500-999 VPD	0	51	0	0	0	0	0	0	237	0	86	0	0	0	240	139	0	754
1000-1999 VPD	218	0	129	C	1008	635	532	490	595	84	164	917	438	168	1083	194	436	7091
2000-3999 VPD	1231	2455	2873	1971	4336	2744	4071	3837	5869	2743	3618	3378	2046	2070	5568	2189	1328	52326
4000-7999 VPD	984	2575	2460	3035	2589	3219	3164	2347	4857	2951	2660	1991	2540	2906	7839	2161	3104	51381
8000 OR MORE VPD	373	0	0	2756	0	0	0	0	2467	939	0	1172	0	0	0	0	0	7707
ALL VOLUMES	2817	5088	5462	7763	7933	6599	7767	6767	14025	6715	6571	7475	5024	5144	14859	4728	4918	119654

SOUTH CENTRAL KENTUCKY

HIGHWAY DISTRICTS 3, 4, AND 8
RURAL HIGHWAYS

	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	ALL YEARS
AVERAGE PERCENT TRUCKS																		
0-499 VPD	32.32	9.C9	28.40	15.02	0.0	14.42	0.0	8.28	0.0	0.0	11.11	0.0	0.0	0.0	12.08	0.0	0.0	14.55
500-999 VPD	0.0	19.08	19.71	17.77	21.69	13.61	0.0	11.48	33.55	8.52	10.26	0.0	9.72	16.58	11.75	12.96	10.73	15.06
1000-1999 VPD	35.82	19.65	12.81	17.42	19.89	17.78	21.73	17.36	21.63	17.60	19.57	15.10	14.24	17.72	22.34	15.20	13.26	17.19
2000-3999 VPD	25.28	20.17	20.49	24.05	24.16	18.95	18.31	19.09	16.60	9.22	27.22	14.47	19.40	22.18	12.01	16.48	13.76	19.50
4000-7999 VPD	20.12	17.75	21.62	15.76	27.19	23.40	23.40	22.77	22.48	19.70	19.76	23.64	20.15	23.83	18.48	20.49	18.75	21.12
8000 OR MORE VPD	0.0	15.08	16.78	0.0	15.26	15.06	16.83	13.34	13.30	0.0	11.20	11.16	8.32	14.47	0.0	10.35	7.24	13.90
ALL VOLUMES	24.45	17.85	17.74	20.53	18.53	19.00	20.76	18.14	17.41	18.06	19.39	16.46	17.35	21.14	17.84	15.36	15.03	18.21
AVERAGE NUMBER OF AXLES PER TRUCK																		
0-499 VPD	2.031	2.000	2.589	2.024	0.0	2.026	0.0	2.091	0.0	0.0	2.000	0.0	0.0	0.0	2.178	0.0	0.0	2.121
500-999 VPD	0.0	2.326	2.330	2.093	2.275	2.000	0.0	2.113	2.868	2.064	2.000	0.0	2.161	2.226	2.424	2.053	2.298	2.291
1000-1999 VPD	2.448	2.299	2.249	2.165	2.245	2.376	2.592	2.599	2.834	2.649	2.822	2.698	2.714	2.994	3.041	2.923	2.614	2.670
2000-3999 VPD	2.516	2.466	2.532	2.578	2.630	2.539	2.688	2.729	2.981	2.282	3.114	2.796	2.994	2.787	2.823	3.065	2.888	2.710
4000-7999 VPD	2.561	2.576	2.411	2.493	2.589	2.772	3.015	3.216	3.217	3.107	3.244	3.286	3.319	3.499	3.351	3.864	3.706	3.220
8000 OR MORE VPD	0.0	2.537	2.602	0.0	2.665	2.729	2.844	3.043	2.913	0.0	3.088	3.214	3.114	3.477	0.0	3.678	3.449	2.861
ALL VOLUMES	2.511	2.500	2.512	2.509	2.619	2.670	2.869	3.025	3.041	2.989	3.110	3.081	3.113	3.350	3.193	3.485	3.286	2.936
NUMBER OF VEHICLES COUNTED IN TENS																		
0-499 VPD	40	6	26	84	0	133	0	93	0	0	10	0	0	0	177	0	0	567
500-999 VPD	0	98	171	97	235	90	0	271	92	92	43	0	90	189	257	144	338	2207
1000-1999 VPD	155	160	1797	522	795	364	923	1516	487	1262	1398	1625	1248	1145	1488	1160	1872	17917
2000-3999 VPD	1465	3303	3492	2919	4442	2830	2418	466	1592	1015	2108	2461	2533	1135	1270	1392	3718	38549
4000-7999 VPD	761	1203	796	1658	840	3336	4151	3860	2832	6384	3334	3127	3304	6100	5189	2221	4983	54081
8000 OR MORE VPD	0	2858	4635	0	10453	3308	1516	3004	4036	0	2137	2898	1097	1912	0	2471	1169	41494
ALL VOLUMES	2421	7627	10916	5281	16765	10061	9008	9210	9040	8753	9031	10110	8271	10482	8382	7377	12080	154815

NORTH CENTRAL KENTUCKY

HIGHWAY DISTRICTS 5, 6, AND 7
RURAL HIGHWAYS

	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	ALL YEARS
AVERAGE PERCENT TRUCKS																		
0-499 VPD	9.77	8.06	9.80	12.87	8.37	11.89	9.07	9.47	5.06	8.45	0.0	8.08	11.46	5.02	15.42	8.07	4.46	9.50
500-999 VPD	0.0	0.0	12.09	0.0	0.0	0.0	0.0	11.45	7.95	13.14	0.0	0.0	7.46	0.0	8.65	3.85	0.0	9.74
1000-1999 VPD	0.0	0.0	11.84	12.15	0.0	17.58	13.14	12.76	9.51	0.0	12.59	0.0	10.99	11.55	12.24	13.91	9.94	12.37
2000-3999 VPD	19.09	18.93	19.05	16.36	18.86	17.08	17.30	22.00	17.83	18.22	19.78	20.60	17.58	19.38	17.00	20.31	19.87	18.63
4000-7999 VPD	25.45	25.90	23.10	20.21	23.92	23.96	22.39	21.82	20.38	18.52	20.73	20.79	25.06	21.18	20.40	14.22	21.51	21.51
8000 OR MORE VPD	0.0	0.0	0.0	0.0	0.0	14.25	12.64	0.0	0.0	4.41	0.0	20.03	12.15	0.0	12.39	10.48	19.28	12.83
ALL VOLUMES	21.77	22.27	20.67	17.86	21.03	19.62	18.59	20.83	19.02	16.41	20.11	20.57	19.23	20.04	16.98	12.47	19.22	18.67
AVERAGE NUMBER OF AXLES PER TRUCK																		
0-499 VPD	2.039	2.160	2.000	2.029	2.000	2.013	2.121	2.179	2.000	2.000	0.0	2.056	2.000	2.077	2.161	2.036	2.000	2.074
500-999 VPD	0.0	0.0	2.206	0.0	0.0	0.0	0.0	2.267	2.051	2.133	0.0	0.0	2.171	0.0	2.325	2.000	0.0	2.240
1000-1999 VPD	0.0	0.0	2.401	2.180	0.0	2.544	2.592	2.757	2.050	0.0	2.262	0.0	2.553	2.233	2.377	2.826	2.345	2.495
2000-3999 VPD	2.544	2.571	2.552	2.570	2.618	2.603	2.760	2.963	2.948	2.988	3.084	3.091	2.939	3.116	3.173	3.373	3.618	2.874
4000-7999 VPD	2.560	2.599	2.594	2.632	2.589	2.749	2.851	2.890	2.945	3.031	2.975	3.071	3.300	3.388	3.454	3.233	3.722	2.972
8000 OR MORE VPD	0.0	0.0	0.0	0.0	0.0	2.718	2.691	0.0	0.0	2.672	0.0	2.953	3.013	0.0	3.315	3.470	3.887	3.374
ALL VOLUMES	2.550	2.586	2.569	2.592	2.602	2.688	2.795	2.902	2.937	2.990	3.013	3.061	3.114	3.250	3.246	3.359	3.732	2.962
NUMBER OF VEHICLES COUNTED IN TENS																		
0-499 VPD	52	31	61	27	63	64	100	89	40	43	0	67	29	26	80	35	34	840
500-999 VPD	0	0	89	0	0	0	0	467	99	109	0	0	157	0	442	60	0	1423
1000-1999 VPD	0	0	565	283	0	307	527	549	105	0	294	0	393	390	1653	1043	904	6942
2000-3999 VPD	2299	3485	6571	5822	5949	4700	7534	4566	4040	6471	5900	4476	5392	5377	3152	2354	1761	79846
4000-7999 VPD	1845	3334	6813	4487	4760	5127	8025	4529	5477	5974	6730	7220	4933	6333	5854	4682	3218	89340
8000 OR MORE VPD	0	0	0	0	0	1719	2848	0	0	1967	0	1681	2066	0	1827	13836	5814	31758
ALL VOLUMES	4195	6850	14039	10619	10773	11917	19034	10200	9761	14564	12924	13443	12959	12125	13008	22009	11730	210148

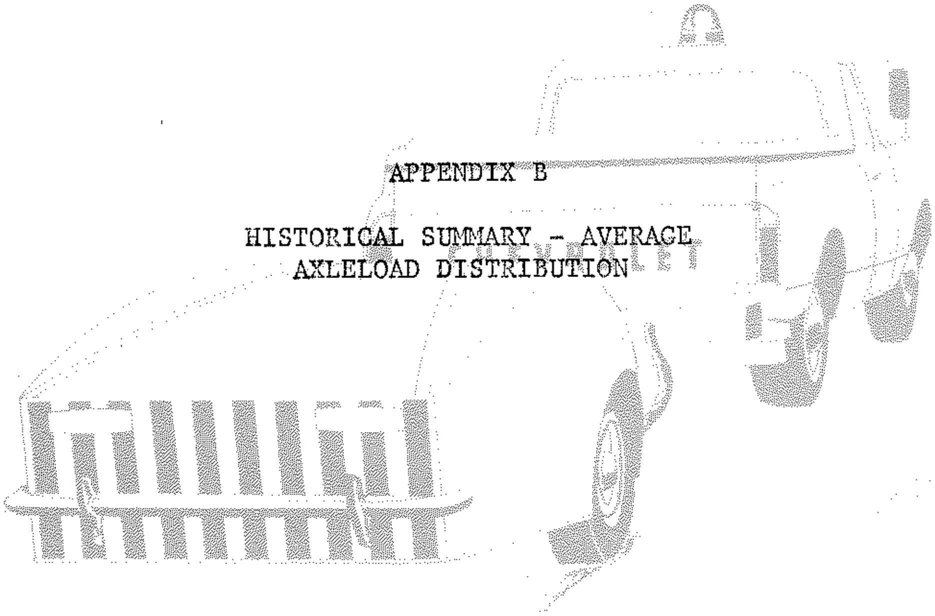
EASTERN KENTUCKY

HIGHWAY DISTRICTS 9, 10, 11, AND 12
RURAL HIGHWAYS

	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	ALL YEARS
AVERAGE PERCENT TRUCKS																		
0-499 VPD	0.0	0.0	0.0	10.43	13.45	28.33	0.0	11.15	6.33	0.0	33.58	10.10	0.0	13.02	4.41	8.76	6.26	10.81
500-999 VPD	25.97	23.48	21.75	0.0	22.78	0.0	15.20	15.67	6.35	0.0	16.87	0.0	11.70	12.71	13.30	11.07	9.37	15.71
1000-1999 VPD	22.56	16.51	22.43	12.95	20.71	19.97	18.63	13.91	16.15	16.30	16.27	16.56	15.69	21.51	16.02	15.61	12.82	17.70
2000-3999 VPD	22.39	17.11	17.11	16.02	17.21	16.85	17.77	14.51	18.17	13.83	17.21	13.74	14.98	17.07	16.42	16.54	17.48	16.60
4000-7999 VPD	21.39	16.31	18.66	14.76	16.94	18.09	20.17	21.06	17.82	18.06	19.66	19.50	19.49	21.20	17.42	14.97	15.02	18.20
8000 OR MORE VPD	0.0	0.0	0.0	0.0	0.0	0.0	15.63	0.0	8.90	16.73	16.30	14.61	18.62	16.79	17.38	15.48	18.31	16.47
ALL VOLUMES	22.33	17.10	18.36	14.98	17.91	17.96	18.38	17.30	16.90	16.72	17.88	16.41	17.21	18.78	16.71	15.63	16.33	17.26
AVERAGE NUMBER OF AXLES PER TRUCK																		
0-499 VPD	0.0	0.0	0.0	2.000	2.097	2.235	0.0	2.000	2.000	0.0	2.000	2.367	0.0	2.048	2.667	2.047	2.100	2.107
500-999 VPD	2.167	2.182	2.156	0.0	2.183	0.0	2.173	2.171	2.000	0.0	2.513	0.0	2.056	2.290	2.369	2.125	2.256	2.252
1000-1999 VPD	2.192	2.228	2.228	2.103	2.243	2.306	2.383	2.368	2.563	2.430	2.287	2.393	2.222	2.255	2.587	2.665	2.485	2.342
2000-3999 VPD	2.247	2.354	2.320	2.467	2.415	2.449	2.463	2.513	2.837	2.616	2.680	2.635	2.674	2.331	2.995	3.040	3.220	2.640
4000-7999 VPD	2.618	2.526	2.573	2.513	2.571	2.593	2.738	2.868	2.830	2.703	2.901	2.899	3.017	2.920	2.963	3.197	3.203	2.817
8000 OR MORE VPD	0.0	0.0	0.0	0.0	0.0	0.0	2.799	0.0	2.805	2.774	2.996	3.108	3.082	2.727	3.174	3.265	3.296	3.078
ALL VOLUMES	2.313	2.356	2.399	2.469	2.418	2.507	2.578	2.678	2.814	2.701	2.752	2.794	2.861	2.850	2.971	3.111	3.193	2.726
NUMBER OF VEHICLES COUNTED IN TENS																		
0-499 VPD	0	0	0	28	46	6	0	27	16	0	14	30	0	30	34	49	48	327
500-999 VPD	88	98	180	0	432	0	145	186	55	0	209	0	61	549	589	58	284	2954
1000-1999 VPD	153	425	455	619	1641	1057	848	573	500	194	657	813	310	730	399	1046	373	10789
2000-3999 VPD	1558	3236	2397	2400	4672	2500	3721	2896	3715	1808	3402	4101	3992	5537	3709	2361	1084	53091
4000-7999 VPD	469	515	1847	4877	3366	4282	2689	2764	3416	3967	2371	4124	3704	5235	2360	3454	2323	51762
8000 OR MORE VPD	0	0	0	0	0	0	852	0	845	2278	845	982	876	912	1674	2949	2824	14936
ALL VOLUMES	2268	4274	4879	7925	10157	7844	8254	6447	8546	8248	7498	10050	8942	12912	9765	9917	6936	133860

APPENDIX B

HISTORICAL SUMMARY - AVERAGE AXLELOAD DISTRIBUTION



ALL OF KENTUCKY

RURAL HIGHWAYS

PERCENT OF TOTAL TRUCK AXLES BY WEIGHT GROUP

YEAR	ADT	UNDER 7000	7000 TO 8999	9000 TO 10999	11000 TO 12999	13000 TO 14999	15000 TO 16999	17000 TO 18999	19000 TO 20999	21000 TO 22999	23000 TO 24999	25000 TO 26999	27000 TO 28999	29000 TO 99999	TOTAL AXLES
1950	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	85.09	6.54	1.53	1.57	2.06	1.89	0.87	0.37	0.06	0.02	0.0	0.0	0.0	11411.
	4000-7999	79.66	8.64	2.03	3.40	1.82	2.36	1.70	0.23	0.13	0.03	0.0	0.0	0.0	7728.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	82.90	7.39	1.73	2.31	1.96	2.08	1.20	0.32	0.09	0.02	0.0	0.0	0.0	19140.
1951	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	63.02	5.95	4.64	6.68	7.43	7.52	3.87	0.85	0.03	0.0	0.0	0.0	0.0	9539.
	4000-7999	60.85	7.21	5.41	6.00	6.64	7.50	4.90	1.26	0.20	0.02	0.0	0.0	0.0	7198.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	62.08	6.50	4.97	6.39	7.09	7.51	4.32	1.03	0.10	0.01	0.0	0.0	0.0	16737.
1952	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	59.32	7.53	4.91	5.85	7.15	7.99	5.89	1.11	0.19	0.06	0.0	0.0	0.0	8996.
	4000-7999	62.57	6.48	5.44	5.16	6.97	7.67	5.11	0.44	0.12	0.03	0.0	0.0	0.0	9338.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	60.98	7.00	5.18	5.50	7.06	7.82	5.49	0.77	0.15	0.05	0.0	0.0	0.0	18335.
1953	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	58.97	7.78	5.05	5.49	7.71	7.62	6.56	0.80	0.04	0.0	0.0	0.0	0.0	7035.
	4000-7999	59.35	8.14	5.33	6.06	7.21	7.10	5.96	0.64	0.11	0.08	0.02	0.0	0.0	11131.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	59.20	8.00	5.22	5.84	7.40	7.30	6.19	0.70	0.08	0.05	0.01	0.0	0.0	18166.
1954	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	54.48	8.84	5.94	6.58	7.77	8.17	6.86	1.02	0.33	0.0	0.0	0.0	0.0	8986.
	4000-7999	58.28	8.47	5.51	6.04	5.81	8.08	6.95	0.78	0.04	0.05	0.0	0.0	0.0	9635.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	56.45	8.65	5.72	6.30	6.76	8.12	6.91	0.90	0.18	0.03	0.0	0.0	0.0	18621.
1955	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	58.63	10.53	5.01	4.97	7.02	7.65	4.66	1.36	0.11	0.05	0.0	0.0	0.0	5720.
	4000-7999	54.34	10.78	5.32	6.24	7.45	6.98	7.55	1.18	0.09	0.06	0.01	0.0	0.0	15081.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	55.52	10.71	5.24	5.89	7.33	7.16	6.75	1.23	0.09	0.06	0.01	0.0	0.0	20802.
1956	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	58.43	9.50	3.59	4.11	10.10	6.87	5.67	1.73	0.0	0.0	0.0	0.0	0.0	746.
	2000-3999	49.15	11.98	6.60	8.41	9.05	8.03	5.84	0.89	0.03	0.02	0.0	0.0	0.0	12754.
	4000-7999	50.67	10.99	5.16	6.26	8.91	9.30	7.46	1.05	0.15	0.02	0.0	0.02	0.0	16346.
	8000 OR MORE	52.91	10.90	5.50	6.43	8.01	7.91	7.29	0.94	0.11	0.0	0.0	0.0	0.0	3723.
	ALL VOLUMES	50.51	11.32	5.71	7.05	8.89	8.61	6.79	0.99	0.10	0.02	0.0	0.01	0.0	33568.
1957	0-499	74.69	8.67	4.99	4.77	3.28	1.65	1.47	0.47	0.0	0.0	0.0	0.0	0.0	544.
	500-999	72.81	8.41	4.00	4.65	3.02	2.74	1.85	1.53	0.65	0.19	0.17	0.0	0.0	1706.
	1000-1999	58.55	11.02	6.34	6.24	6.43	5.39	3.64	1.78	0.43	0.17	0.0	0.0	0.0	2586.
	2000-3999	45.33	14.20	7.14	7.51	8.93	7.44	7.19	1.88	0.16	0.04	0.11	0.03	0.03	9848.
	4000-7999	45.78	12.54	6.12	6.47	9.00	9.34	8.62	1.86	0.13	0.09	0.03	0.0	0.0	15681.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	48.76	12.65	6.33	6.66	8.32	7.88	7.22	1.82	0.19	0.09	0.06	0.01	0.01	30365.
1958	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	49.80	13.52	4.73	6.41	6.55	10.12	6.94	1.69	0.25	0.0	0.0	0.0	0.0	904.
	2000-3999	43.05	14.65	6.05	6.24	8.05	10.69	9.14	1.91	0.14	0.07	0.0	0.0	0.0	7490.
	4000-7999	42.79	13.55	6.52	6.21	8.57	10.55	9.65	2.03	0.09	0.03	0.02	0.0	0.0	17944.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	43.10	13.86	6.33	6.23	8.35	10.57	9.41	1.99	0.11	0.04	0.01	0.0	0.0	26338.
1959	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	48.31	9.17	1.47	5.57	6.84	9.45	5.98	11.30	1.66	0.0	0.25	0.0	0.0	1100.
	2000-3999	43.89	15.45	6.04	6.09	9.42	10.25	6.81	1.78	0.24	0.03	0.0	0.0	0.0	8549.
	4000-7999	39.56	16.64	6.72	6.48	10.51	8.98	8.28	2.56	0.25	0.0	0.0	0.03	0.0	13811.
	8000 OR MORE	47.44	13.82	5.71	7.07	7.99	9.04	6.90	1.54	0.39	0.10	0.0	0.0	0.0	4487.
	ALL VOLUMES	42.50	15.53	6.14	6.42	9.63	9.40	7.52	2.50	0.32	0.02	0.01	0.01	0.0	27948.
1960	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	39.92	15.74	7.54	6.87	9.91	11.54	6.95	1.46	0.03	0.03	0.0	0.0	0.0	8039.
	4000-7999	42.49	15.63	8.37	8.24	9.91	8.37	5.59	1.17	0.05	0.10	0.03	0.07	0.0	14592.
	8000 OR MORE	44.99	15.80	6.94	6.60	10.22	9.06	5.70	0.69	0.0	0.0	0.0	0.0	0.0	4252.
	ALL VOLUMES	42.12	15.69	7.90	7.57	9.96	9.43	6.01	1.18	0.03	0.06	0.01	0.04	0.0	26883.
1961	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	49.05	10.03	5.34	4.85	3.24	7.88	13.41	5.07	1.12	0.0	0.0	0.0	0.0	959.
	2000-3999	35.36	18.30	7.08	8.32	9.86	11.31	7.83	1.63	0.20	0.11	0.0	0.0	0.0	5449.
	4000-7999	36.76	17.16	11.32	8.27	9.90	9.67	5.99	0.75	0.18	0.0	0.0	0.0	0.0	11358.
	8000 OR MORE	46.11	16.12	6.41	6.43	7.25	8.73	6.86	1.76	0.14	0.03	0.10	0.07	0.0	11552.
	ALL VOLUMES	40.59	16.72	8.40	7.44	8.63	9.55	6.91	1.45	0.20	0.03	0.04	0.03	0.0	29318.
1962	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	41.74	16.84	8.99	5.86	9.63	10.38	5.75	0.64	0.16	0.0	0.0	0.0	0.0	6137.
	4000-7999	36.86	18.28	12.71	9.86	9.64	7.67	4.35	0.50	0.08	0.02	0.02	0.0	0.02	18560.
	8000 OR MORE	35.66	17.98	10.45	7.12	9.14	9.74	6.49	1.77	0.0	0.88	0.25	0.39	0.13	5023.
	ALL VOLUMES	37.66	17.93	11.56	8.57	9.55	8.58	5.00	0.74	0.08	0.16	0.05	0.07	0.03	29720.
1963	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	37.16	17.25	9.77	7.20	7.60	10.01	8.36	2.38	0.19	0.08	0.0	0.0	0.0	9178.
	4000-7999	33.13	18.14	10.85	7.59	9.90	10.35	7.61	1.94	0.30	0.08	0.10	0.0	0.0	22824.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	34.28	17.89	10.54	7.48	9.24	10.26	7.83	2.07	0.27	0.08	0.07	0.0	0.0	32002.
1964	0-499	73.42	10.26	5.70	3.78	2.40	1.03	1.26	2.15	0.0	0.0	0.0	0.0	0.0	435.
	500-999	56.73	14.72	7.24	5.26	7.52	4.03	1.95	1.68	0.55	0.13	0.20	0.0	0.0	1350.
	1000-1999	53.86	16.71	7.67	4.69	3.32	4.24	3.33	1.25	2.33	1.85	0.50	0.08	0.17	2976.
	2000-3999	36.81	18.38	10.43	6.89	7.39	8.60	6.97	3.04	0.99	0.27	0.13	0.07	0.03	13439.
	4000-7999	26.39	17.89	12.32	10.16	12.99	12.26	6.96	0.90	0.12	0.0	0.0	0.0	0.0	9223.
	8000 OR MORE	38.00	16.73	10.90	7.20	9.43	9.81	6.11	1.43	0.27	0.12	0.0	0.0	0.0	10547.
	ALL VOLUMES	37.08	17.45	10.64	7.51	8.95	9.23	6.20	1.87	0.66	0.28	0.09	0.03	0.02	37970.
1965	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	62.17	15.56	4.35	1.02	5.09	2.87	6.57	2.38	0.0	0.0	0.0	0.0	0.0	440.
	2000-3999	28.64	19.62	12.90	8.83	9.31	11.58	5.44	2.38	1.02	0.14	0.07	0.0	0.07	7521.
	4000-7999	27.98	18.07	13.09	10.26	13.19	10.71	5.51	1.00	0.17	0.0	0.0	0.02	0.0	12218.
	8000 OR MORE	33.79	18.71	10.59	7.93	9.53	11.41	5.71	1.77	0.49	0.04	0.04	0.0	0.0	17597.
	ALL VOLUMES	31.22	18.65	11.78	8.78	10.62	11.12	5.60	1.65	0.48	0.05	0.03	0.01	0.01	37776.
1966	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	67.96	12.89	6.10	7.50	4.48	0.59	0.49	0.0	0.0	0.0	0.0	0.0	0.0	408.
	2000-3999	26.35	18.56	11.20	8.64	11.12	12.08	7.90	2.92	0.97	0.21	0.06	0.0	0.0	6717.
	4000-7999	29.35	20.33	13.10	9.39	12.37	11.23	3.39	0.70	0.13	0.0	0.0	0.0	0.0	15350.
	8000 OR MORE	30.28	19.38	11.80	9.00	10.96	11.30	5.03	1.62	0.52	0.12	0.0	0.0	0.0	20051.
	ALL VOLUMES	29.68	19.53	12.12	9.07	11.43	11.30	4.85	1.48	0.44	0.09	0.01	0.0	0.0	42527.
ALL YEARS	0-499	74.12	9.38	5.31	4.33	2.89	1.38	1.38	1.22	0.0	0.0	0.0	0.0	0.0	979.
	500-999	65.71	11.20	5.43	4.92	5.01	3.31	1.89	1.59	0.60	0.16	0.18	0.0	0.0	3056.
	1000-1999	54.90	12.78	5.67	5.26	5.40	5.96	5.17	2.91	1.10	0.59	0.17	0.02	0.05	10118.
	2000-3999	48.46	13.18	7.03	6.54	7.99	8.67	6.16	1.56	0.29	0.07	0.03	0.01	0.01	146809.
	4000-7999	44.09	14.20	8.32	7.35	9.18	8.97	6.47	1.21	0.14	0.04	0.02	0.01	0.00	228020.
	8000 OR MORE	37.75	17.36	9.58	7.64	9.39	10.22	5.95	1.57	0.33	0.13	0.04	0.04	0.01	77233.
	ALL VOLUMES	44.86	14.34	8.04	7.07	8.72	8.96	6.22	1.42	0.24	0.08	0.03	0.01	0.01	466215.

WESTERN KENTUCKY

HIGHWAY DISTRICTS 1 AND 2
RURAL HIGHWAYS

PERCENT OF TOTAL TRUCK AXLES BY WEIGHT GROUP

YEAR	ADT	UNDER 7000	7000 TO 8999	9000 TO 10999	11000 TO 12999	13000 TO 14999	15000 TO 16999	17000 TO 18999	19000 TO 20999	21000 TO 22999	23000 TO 24999	25000 TO 26999	27000 TO 28999	29000 TO 99999	TOTAL AXLES
1950	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	77.77	6.88	2.98	2.91	4.57	3.13	1.38	0.37	0.0	0.0	0.0	0.0	0.0	1985.
	4000-7999	78.26	7.29	4.36	5.91	1.30	1.94	0.71	0.0	0.23	0.0	0.0	0.0	0.0	1666.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	77.99	7.07	3.61	4.28	3.08	2.59	1.07	0.20	0.10	0.0	0.0	0.0	0.0	3650.
1951	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	57.60	4.31	5.93	8.97	9.14	10.01	3.17	0.87	0.0	0.0	0.0	0.0	0.0	1490.
	4000-7999	65.88	8.14	5.09	5.50	5.25	8.01	1.54	0.44	0.15	0.0	0.0	0.0	0.0	1838.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	62.17	6.42	5.47	7.05	6.99	8.91	2.27	0.63	0.08	0.0	0.0	0.0	0.0	3328.
1952	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	52.98	7.49	4.64	6.65	7.15	9.55	6.99	3.87	0.52	0.18	0.0	0.0	0.0	1453.
	4000-7999	66.30	5.61	7.97	7.80	6.55	4.01	1.13	0.36	0.26	0.0	0.0	0.0	0.0	2100.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	60.85	6.37	6.61	7.33	6.79	6.28	3.53	1.80	0.37	0.07	0.0	0.0	0.0	3553.
1953	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	61.72	6.47	4.57	6.22	8.29	8.62	3.67	0.44	0.0	0.0	0.0	0.0	0.0	1863.
	4000-7999	67.94	9.19	7.62	5.96	3.11	3.92	2.01	0.12	0.13	0.0	0.0	0.0	0.0	1785.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	64.77	7.80	6.06	6.09	5.75	6.32	2.86	0.28	0.06	0.0	0.0	0.0	0.0	3647.
1954	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	53.38	8.68	5.28	9.67	9.47	7.44	4.31	0.86	0.91	0.0	0.0	0.0	0.0	1599.
	4000-7999	61.92	9.79	6.50	8.28	6.23	3.53	2.55	1.21	0.0	0.0	0.0	0.0	0.0	1915.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	58.03	9.29	5.94	8.91	7.70	5.30	3.35	1.05	0.42	0.0	0.0	0.0	0.0	3514.
1955	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	57.59	6.95	5.62	5.88	8.18	9.61	4.81	1.20	0.15	0.0	0.0	0.0	0.0	2168.
	4000-7999	60.58	9.67	8.27	7.43	6.44	4.45	2.75	0.41	0.0	0.0	0.0	0.0	0.0	1753.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	58.93	8.17	6.81	6.57	7.40	7.30	3.89	0.85	0.08	0.0	0.0	0.0	0.0	3920.
1956	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	46.08	11.95	7.23	8.19	9.52	9.44	6.78	0.82	0.0	0.0	0.0	0.0	0.0	2951.
	4000-7999	51.75	9.97	5.70	5.95	8.71	9.73	7.07	0.87	0.18	0.06	0.0	0.0	0.0	4428.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	49.48	10.76	6.31	6.85	9.03	9.61	6.96	0.85	0.11	0.03	0.0	0.0	0.0	7380.
1957	0-499	79.66	10.24	4.95	0.46	2.31	1.92	0.46	0.0	0.0	0.0	0.0	0.0	0.0	140.
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	57.06	10.28	7.43	7.02	7.62	4.15	2.43	2.23	1.22	0.58	0.0	0.0	0.0	733.
	2000-3999	43.91	14.85	7.76	8.22	6.95	7.37	7.78	2.59	0.21	0.05	0.19	0.06	0.06	4712.
	4000-7999	40.69	12.43	7.23	5.98	12.82	9.95	9.88	0.70	0.22	0.10	0.0	0.0	0.0	2433.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	44.76	13.62	7.52	7.30	8.71	7.76	7.80	1.93	0.30	0.12	0.11	0.03	0.04	8018.
1958	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	36.35	11.80	3.63	3.46	7.23	16.38	17.45	3.51	0.0	0.12	0.0	0.0	0.0	2258.
	4000-7999	41.67	12.58	6.00	4.98	8.64	12.70	12.17	1.26	0.0	0.0	0.0	0.0	0.0	2884.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	39.34	12.27	4.96	4.32	8.02	14.31	14.49	2.24	0.0	0.05	0.0	0.0	0.0	5143.
1959	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	43.77	13.55	4.79	2.83	6.26	14.60	9.95	3.38	0.87	0.0	0.0	0.0	0.0	1569.
	4000-7999	32.36	15.89	5.43	7.36	12.49	13.05	11.67	1.76	0.0	0.0	0.0	0.0	0.0	3539.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	35.86	15.17	5.23	5.97	10.57	13.53	11.14	2.26	0.27	0.0	0.0	0.0	0.0	5108.
1960	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	31.79	16.47	5.35	4.10	7.66	21.06	13.57	0.0	0.0	0.0	0.0	0.0	0.0	1960.
	4000-7999	35.35	13.20	9.35	7.44	12.19	11.63	9.72	1.12	0.0	0.0	0.0	0.0	0.0	3136.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	33.98	14.46	7.81	6.16	10.45	15.26	11.20	0.69	0.0	0.0	0.0	0.0	0.0	5096.
1961	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	29.88	18.13	7.59	6.92	6.14	16.13	12.79	2.42	0.0	0.0	0.0	0.0	0.0	1826.
	4000-7999	30.15	15.72	8.28	7.05	12.37	15.34	9.56	1.35	0.18	0.0	0.0	0.0	0.0	3557.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	30.06	16.54	8.04	7.01	10.26	15.60	10.66	1.71	0.12	0.0	0.0	0.0	0.0	5382.
1962	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	35.54	16.55	8.34	3.91	10.13	14.32	10.61	0.60	0.0	0.0	0.0	0.0	0.0	2052.
	4000-7999	30.32	16.68	9.28	7.02	11.52	13.69	10.73	0.66	0.09	0.0	0.0	0.0	0.0	3868.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	32.13	16.63	8.96	5.94	11.04	13.91	10.69	0.64	0.06	0.0	0.0	0.0	0.0	5920.
1963	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	29.62	16.73	9.97	5.74	6.24	15.35	12.99	2.82	0.34	0.19	0.0	0.0	0.0	2447.
	4000-7999	27.60	15.07	11.36	8.09	12.03	13.73	9.67	2.13	0.0	0.09	0.23	0.0	0.0	4840.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES.	28.28	15.63	10.89	7.30	10.09	14.27	10.79	2.36	0.12	0.12	0.15	0.0	0.0	7287.
1964	0-499	76.30	5.00	5.13	7.61	4.77	0.0	0.0	1.18	0.0	0.0	0.0	0.0	0.0	110.
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	54.49	15.25	9.74	4.47	4.35	7.39	2.71	1.03	0.57	0.0	0.0	0.0	0.0	914.
	2000-3999	31.95	17.79	10.59	6.86	8.07	10.15	9.12	3.60	1.16	0.40	0.18	0.11	0.02	5796.
	4000-7999	28.67	16.04	12.36	10.30	12.79	10.73	7.81	1.14	0.16	0.0	0.0	0.0	0.0	4479.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	32.91	16.77	11.17	8.04	9.61	10.06	7.99	2.39	0.70	0.21	0.09	0.06	0.01	11299.
1965	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	33.42	20.13	12.47	8.28	9.20	14.04	1.44	0.34	0.0	0.34	0.17	0.0	0.17	3003.
	4000-7999	27.07	17.78	14.20	10.33	12.74	10.02	5.97	1.62	0.21	0.0	0.0	0.06	0.0	5053.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	29.44	18.65	13.55	9.57	11.42	11.52	4.28	1.14	0.13	0.13	0.06	0.04	0.06	8057.
1966	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	27.26	18.11	6.94	6.46	11.40	15.19	11.29	2.47	0.73	0.15	0.0	0.0	0.0	2466.
	4000-7999	28.96	16.49	14.68	9.98	11.50	12.55	3.98	1.61	0.25	0.0	0.0	0.0	0.0	5166.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	28.41	17.02	12.18	8.85	11.47	13.41	6.34	1.89	0.40	0.05	0.0	0.0	0.0	7631.
ALL YEARS	0-499	78.18	7.94	5.03	3.60	3.39	1.08	0.26	0.52	0.0	0.0	0.0	0.0	0.0	250.
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	55.63	13.04	8.71	5.60	5.81	5.95	2.58	1.56	0.86	0.26	0.0	0.0	0.0	1647.
	2000-3999	42.09	13.79	7.36	6.42	8.01	11.60	8.22	1.94	0.34	0.12	0.06	0.02	0.02	41598.
	4000-7999	40.11	13.58	9.29	7.75	10.27	10.51	7.16	1.16	0.13	0.02	0.02	0.01	0.0	54439.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	41.31	13.65	8.45	7.14	9.22	10.87	7.52	1.50	0.23	0.06	0.04	0.01	0.01	97934.

SOUTH CENTRAL KENTUCKY

HIGHWAY DISTRICTS 3, 4, AND 8
RURAL HIGHWAYS

PERCENT OF TOTAL TRUCK AXLES BY WEIGHT GROUP

YEAR	ADT	UNDER 7000	7000 TO 8999	9000 TO 10999	11000 TO 12999	13000 TO 14999	15000 TO 16999	17000 TO 18999	19000 TO 20999	21000 TO 22999	23000 TO 24999	25000 TO 26999	27000 TO 28999	29000 TO 99999	TOTAL AXLES
1950															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	85.60	6.71	1.41	2.00	1.84	1.66	0.71	0.07	0.0	0.0	0.0	0.0	0.0	3551.
	4000-7999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	85.60	6.71	1.41	2.00	1.84	1.66	0.71	0.07	0.0	0.0	0.0	0.0	0.0	3551.
1951															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	62.04	5.54	5.06	5.93	9.36	9.01	2.70	0.36	0.0	0.0	0.0	0.0	0.0	2961.
	4000-7999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	62.04	5.54	5.06	5.93	9.36	9.01	2.70	0.36	0.0	0.0	0.0	0.0	0.0	2961.
1952															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	60.66	7.18	5.64	7.00	7.78	8.11	2.62	0.93	0.0	0.09	0.0	0.0	0.0	3420.
	4000-7999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	60.66	7.18	5.64	7.00	7.78	8.11	2.62	0.93	0.0	0.09	0.0	0.0	0.0	3420.
1953															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	69.46	7.14	3.77	3.27	6.85	4.75	4.17	0.27	0.31	0.0	0.0	0.0	0.0	934.
	4000-7999	60.43	6.94	5.13	5.43	11.25	8.11	1.92	0.29	0.31	0.18	0.0	0.0	0.0	2230.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	63.10	7.00	4.73	4.79	9.95	7.12	2.59	0.29	0.31	0.13	0.0	0.0	0.0	3164.
1954															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	55.58	8.49	5.62	5.77	7.62	8.87	6.07	1.62	0.35	0.0	0.0	0.0	0.0	3332.
	4000-7999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	55.58	8.49	5.62	5.77	7.62	8.87	6.07	1.62	0.35	0.0	0.0	0.0	0.0	3332.
1955															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	60.63	12.38	3.70	4.39	5.42	6.50	4.83	1.92	0.0	0.23	0.0	0.0	0.0	1338.
	4000-7999	53.59	12.79	5.75	5.84	8.13	8.43	4.51	0.86	0.0	0.11	0.0	0.0	0.0	2997.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	55.76	12.66	5.12	5.39	7.30	7.83	4.61	1.19	0.0	0.15	0.0	0.0	0.0	4335.
1956															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	58.43	9.50	3.59	4.11	10.10	6.87	5.67	1.73	0.0	0.0	0.0	0.0	0.0	746.
	2000-3999	47.48	11.27	6.82	6.98	9.69	9.38	7.08	1.22	0.07	0.0	0.0	0.0	0.0	3277.
	4000-7999	47.09	13.73	4.73	6.76	11.59	9.61	6.24	0.26	0.0	0.0	0.0	0.0	0.0	3615.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	48.37	12.26	5.52	6.60	10.63	9.25	6.54	0.82	0.03	0.0	0.0	0.0	0.0	7638.
1957															
	0-499	72.41	10.54	4.83	8.89	2.13	1.20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	161.
	500-999	73.05	10.96	4.60	4.00	3.00	2.60	1.02	0.0	0.52	0.0	0.26	0.0	0.0	650.
	1000-1999	53.28	12.24	6.88	6.73	7.07	7.12	5.33	1.35	0.0	0.0	0.0	0.0	0.0	1276.
	2000-3999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4000-7999	39.31	12.77	5.42	6.15	10.24	13.42	11.27	1.36	0.07	0.0	0.0	0.0	0.0	3999.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	46.72	12.40	5.62	6.11	8.58	10.62	8.63	1.18	0.10	0.0	0.03	0.0	0.0	6086.
1958															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	49.80	13.52	4.73	6.41	6.55	10.12	6.94	1.69	0.25	0.0	0.0	0.0	0.0	904.
	2000-3999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4000-7999	38.28	15.24	6.39	5.42	7.31	12.87	11.73	2.63	0.06	0.0	0.07	0.0	0.0	5110.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	40.01	14.98	6.14	5.57	7.20	12.46	11.01	2.49	0.09	0.0	0.06	0.0	0.0	6014.
1959															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	48.31	9.17	1.47	5.57	6.84	9.45	5.98	11.30	1.66	0.0	0.25	0.0	0.0	1100.
	2000-3999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4000-7999	41.08	17.33	7.92	6.01	12.95	8.31	4.85	1.42	0.12	0.0	0.0	0.0	0.0	4669.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	42.46	15.77	6.69	5.93	11.79	8.53	5.07	3.30	0.42	0.0	0.05	0.0	0.0	5769.
1960															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	41.74	15.75	6.86	5.68	10.12	7.19	5.62	6.82	0.23	0.0	0.0	0.0	0.0	1083.
	4000-7999	35.55	17.44	12.23	13.06	11.32	7.40	1.78	0.75	0.09	0.20	0.09	0.09	0.0	4051.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	36.85	17.09	11.10	11.50	11.07	7.35	2.59	2.03	0.12	0.16	0.07	0.07	0.0	5134.
1961															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	49.05	10.03	5.34	4.85	3.24	7.88	13.41	5.07	1.12	0.0	0.0	0.0	0.0	959.
	2000-3999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4000-7999	32.72	20.04	16.01	11.37	10.05	6.46	2.90	0.22	0.23	0.0	0.0	0.0	0.0	4573.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	35.55	18.30	14.16	10.24	8.87	6.71	4.73	1.06	0.39	0.0	0.0	0.0	0.0	5532.
1962															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	41.98	16.83	11.57	10.60	9.32	6.13	3.04	0.27	0.27	0.0	0.0	0.0	0.0	1296.
	4000-7999	34.38	19.76	17.13	14.25	9.08	4.14	1.15	0.10	0.0	0.0	0.0	0.0	0.0	5548.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	35.82	19.20	16.08	13.56	9.13	4.52	1.51	0.14	0.05	0.0	0.0	0.0	0.0	6844.
1963															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	44.12	14.53	5.06	8.16	4.02	6.62	10.80	6.08	0.61	0.0	0.0	0.0	0.0	1474.
	4000-7999	29.17	20.89	11.99	9.17	10.41	10.43	6.72	1.00	0.16	0.0	0.06	0.0	0.0	5753.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	32.22	19.59	10.58	8.96	9.11	9.66	7.55	2.03	0.25	0.0	0.05	0.0	0.0	7227.
1964															
	0-499	75.18	8.87	4.90	2.41	0.74	2.51	0.89	4.50	0.0	0.0	0.0	0.0	0.0	179.
	500-999	73.33	4.80	7.36	3.63	3.63	1.82	1.82	1.82	1.82	0.0	0.0	0.0	0.0	86.
	1000-1999	57.88	14.57	8.76	2.89	4.67	4.69	3.83	1.43	1.00	0.27	0.0	0.0	0.0	599.
	2000-3999	39.85	18.38	9.55	6.51	5.83	7.58	6.44	4.27	1.37	0.14	0.0	0.09	0.0	2891.
	4000-7999	24.24	19.63	12.29	10.02	13.18	13.70	6.16	0.68	0.08	0.0	0.0	0.0	0.0	4744.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	33.49	18.47	10.90	8.10	9.72	10.63	5.94	2.04	0.60	0.07	0.0	0.03	0.0	8499.
1965															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	27.08	15.22	11.39	8.69	6.55	10.30	10.11	7.09	3.58	0.0	0.0	0.0	0.0	2053.
	4000-7999	23.29	19.15	12.29	11.27	15.08	12.90	5.51	0.39	0.12	0.0	0.0	0.0	0.0	5464.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	24.32	18.08	12.05	10.56	12.75	12.19	6.77	2.22	1.06	0.0	0.0	0.0	0.0	7517.
1966															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	21.92	15.30	12.82	9.06	13.12	11.40	7.54	5.59	2.67	0.36	0.22	0.0	0.0	1779.
	4000-7999	25.12	22.95	13.59	10.38	12.91	10.90	3.78	0.29	0.09	0.0	0.0	0.0	0.0	7393.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	24.49	21.46	13.44	10.12	12.95	11.00	4.51	1.32	0.59	0.07	0.04	0.0	0.0	9172.
ALL YEARS															
	0-499	73.87	9.66	4.86	5.48	1.40	1.89	0.47	2.37	0.0	0.0	0.0	0.0	0.0	340.
	500-999	73.09	10.24	4.92	3.95	3.07	2.51	1.11	0.21	0.67	0.0	0.23	0.0	0.0	736.
	1000-1999	52.19	11.35	4.96	5.37	6.43	7.90	6.99	4.06	0.67	0.03	0.05	0.0	0.0	5584.
	2000-3999	52.96	11.06	6.55	6.27	7.29	7.57	5.17	2.39	0.66	0.06	0.01	0.01	0.0	29390.
	4000-7999	34.75	17.84	10.80	9.26	11.18	9.89	5.33	0.79	0.10	0.03	0.02	0.01	0.0	60146.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	41.76	15.30	9.10	8.07	9.62	8.98	5.33	1.47	0.31	0.03	0.02	0.01	0.0	96196.

NORTH CENTRAL KENTUCKY

HIGHWAY DISTRICTS 5, 6, AND 7
RURAL HIGHWAYS

PERCENT OF TOTAL TRUCK AXLES BY WEIGHT GROUP

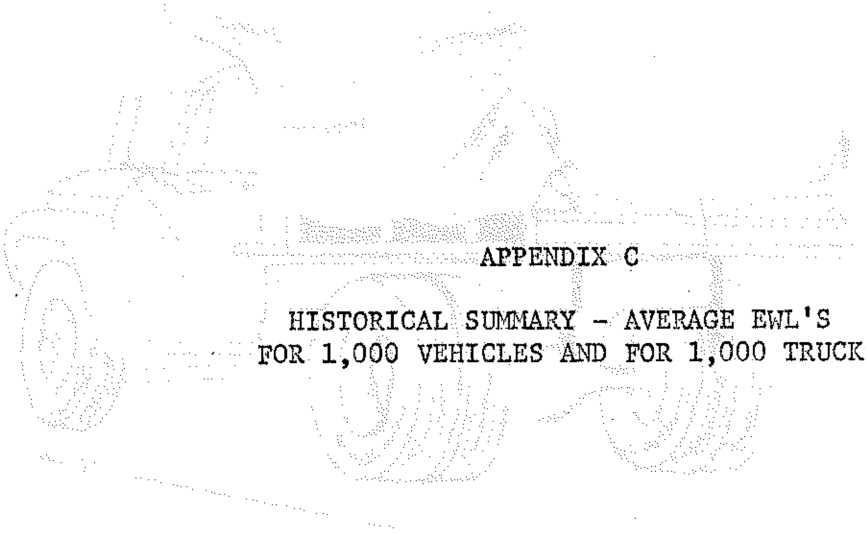
YEAR	ADT	UNDER 7000	7000 TO 8999	9000 TO 10999	11000 TO 12999	13000 TO 14999	15000 TO 16999	17000 TO 18999	19000 TO 20999	21000 TO 22999	23000 TO 24999	25000 TO 26999	27000 TO 28999	29000 TO 99999	TOTAL AXLES
1950	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	92.31	7.69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3946.
	4000-7999	71.28	9.39	2.45	4.78	3.47	4.38	3.47	0.52	0.19	0.07	0.0	0.0	0.0	3435.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	82.52	8.48	1.14	2.22	1.62	2.04	1.62	0.24	0.09	0.03	0.0	0.0	0.0	7381.
1951	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	60.91	7.61	4.37	6.42	6.40	6.89	6.15	1.18	0.07	0.0	0.0	0.0	0.0	3833.
	4000-7999	59.68	6.74	5.46	7.59	7.69	7.09	4.80	1.32	0.19	0.05	0.0	0.0	0.0	3239.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	60.07	7.21	4.87	6.96	6.99	6.98	5.53	1.24	0.12	0.02	0.0	0.0	0.0	7072.
1952	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	60.43	7.83	4.41	4.62	6.63	7.33	8.22	0.28	0.23	0.0	0.0	0.0	0.0	4124.
	4000-7999	58.69	6.75	4.49	4.32	6.23	8.91	9.75	0.69	0.16	0.0	0.0	0.0	0.0	3586.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	59.62	7.33	4.45	4.48	6.45	8.07	8.93	0.47	0.20	0.0	0.0	0.0	0.0	7710.
1953	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	55.44	3.50	5.54	5.65	7.64	7.81	8.35	1.07	0.0	0.0	0.0	0.0	0.0	4238.
	4000-7999	53.36	9.89	4.68	5.07	6.15	6.36	12.85	1.51	0.0	0.05	0.06	0.0	0.0	3390.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	54.52	9.12	5.16	5.40	6.98	7.17	10.35	1.27	0.0	0.02	0.03	0.0	0.0	7629.
1954	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	54.01	9.18	6.46	6.03	7.23	7.89	8.51	0.59	0.09	0.0	0.0	0.0	0.0	4055.
	4000-7999	54.15	9.43	5.21	5.40	5.94	8.46	10.58	0.70	0.0	0.13	0.0	0.0	0.0	3572.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	54.07	9.30	5.88	5.73	6.62	8.16	9.48	0.64	0.05	0.06	0.0	0.0	0.0	7628.
1955	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	58.44	12.93	5.21	4.41	6.85	6.43	4.40	1.18	0.15	0.0	0.0	0.0	0.0	2215.
	4000-7999	50.66	10.92	4.66	5.48	7.01	7.39	12.33	1.35	0.17	0.0	0.03	0.0	0.0	6298.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	52.69	11.44	4.80	5.20	6.97	7.14	10.26	1.31	0.16	0.0	0.02	0.0	0.0	8513.
1956	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	50.13	12.01	6.06	10.31	9.20	6.49	5.26	0.55	0.0	0.0	0.0	0.0	0.0	3689.
	4000-7999	49.38	10.92	5.22	6.59	8.18	9.30	8.81	1.43	0.14	0.01	0.0	0.01	0.0	7187.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	49.64	11.29	5.50	7.85	8.53	8.35	7.61	1.13	0.09	0.01	0.0	0.01	0.0	10876.
1957	0-499	73.12	8.66	5.40	3.87	5.39	0.98	1.90	0.68	0.0	0.0	0.0	0.0	0.0	183.
	500-999	70.21	8.99	5.05	6.42	3.47	2.68	1.80	0.48	0.41	0.48	0.0	0.0	0.0	428.
	1000-1999	72.11	7.39	5.62	6.50	3.74	3.74	0.89	0.0	0.0	0.0	0.0	0.0	0.0	207.
	2000-3999	40.59	14.00	6.60	7.49	13.09	8.71	8.14	1.27	0.10	0.0	0.0	0.0	0.0	3469.
	4000-7999	51.48	12.22	5.79	5.69	5.79	7.43	8.19	2.94	0.19	0.22	0.06	0.0	0.0	5365.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	49.25	12.55	6.04	6.36	8.26	7.48	7.61	2.12	0.16	0.15	0.03	0.0	0.0	9652.
1958	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	41.28	16.97	7.65	7.75	9.65	8.71	6.43	1.30	0.27	0.0	0.0	0.0	0.0	4060.
	4000-7999	49.31	12.19	5.80	7.13	7.56	8.16	7.82	1.72	0.22	0.08	0.0	0.0	0.0	5876.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	46.03	14.15	6.55	7.38	8.41	8.39	7.26	1.55	0.24	0.05	0.0	0.0	0.0	9937.
1959	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	41.69	16.43	6.73	6.96	10.49	9.88	6.52	1.20	0.05	0.04	0.0	0.0	0.0	5753.
	4000-7999	42.85	16.54	6.53	6.32	7.23	6.97	8.99	4.01	0.51	0.0	0.0	0.06	0.0	5604.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	42.26	16.48	6.63	6.65	8.88	8.44	7.73	2.59	0.28	0.02	0.0	0.03	0.0	11357.
1960	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	39.19	16.41	8.58	8.79	11.46	9.91	4.89	0.71	0.0	0.06	0.0	0.0	0.0	3797.
	4000-7999	49.30	15.66	5.85	5.94	8.18	7.52	5.93	1.41	0.04	0.09	0.0	0.09	0.0	7406.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	45.88	15.92	6.77	6.90	9.29	8.33	5.57	1.17	0.03	0.08	0.0	0.06	0.0	11203.
1961	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	38.13	18.38	6.83	9.02	11.74	8.88	5.32	1.24	0.30	0.16	0.0	0.0	0.0	3623.
	4000-7999	46.37	14.40	8.57	4.52	6.58	9.75	8.55	1.07	0.20	0.0	0.0	0.0	0.0	1989.
	8000 OR MORE	47.97	14.52	6.79	5.80	6.92	8.74	6.55	2.48	0.11	0.0	0.0	0.11	0.0	7093.
	ALL VOLUMES	44.91	15.60	7.08	6.52	8.24	8.94	6.51	1.90	0.18	0.05	0.0	0.06	0.0	12705.
1962	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	42.42	18.33	9.78	5.36	8.87	11.06	3.35	0.66	0.17	0.0	0.0	0.0	0.0	1497.
	4000-7999	41.13	18.07	11.49	8.39	9.18	7.26	3.59	0.67	0.12	0.03	0.03	0.0	0.03	9145.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	41.31	18.11	11.25	7.97	9.14	7.80	3.56	0.67	0.12	0.03	0.03	0.0	0.03	10641.
1963	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	34.76	19.67	10.71	8.58	9.71	10.21	5.45	0.84	0.0	0.08	0.0	0.0	0.0	3722.
	4000-7999	38.18	19.20	10.42	7.35	9.16	9.00	4.82	1.33	0.41	0.08	0.04	0.0	0.0	7373.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	37.03	19.36	10.52	7.77	9.34	9.40	5.03	1.16	0.28	0.08	0.03	0.0	0.0	11095.
1964	0-499	71.44	13.15	8.95	3.23	1.61	0.0	1.61	0.0	0.0	0.0	0.0	0.0	0.0	116.
	500-999	58.43	12.98	6.64	7.11	7.07	2.61	2.67	1.56	0.72	0.21	0.0	0.0	0.0	812.
	1000-1999	64.06	17.58	2.14	2.14	2.48	4.07	7.11	0.0	0.0	0.41	0.0	0.0	0.0	584.
	2000-3999	29.41	21.13	12.78	9.76	10.18	10.11	5.51	1.13	0.0	0.0	0.0	0.0	0.0	2247.
	4000-7999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	8000 OR MORE	37.65	17.95	11.19	8.07	10.04	10.29	4.24	0.45	0.05	0.08	0.0	0.0	0.0	5944.
	ALL VOLUMES	39.48	18.19	10.60	7.96	9.27	9.11	4.54	0.66	0.09	0.09	0.0	0.0	0.0	9703.
1965	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	62.17	15.56	4.35	1.02	5.09	2.07	6.57	2.38	0.0	0.0	0.0	0.0	0.0	440.
	2000-3999	24.12	22.68	14.67	9.60	11.76	9.66	6.44	0.95	0.12	0.0	0.0	0.0	0.0	2464.
	4000-7999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	8000 OR MORE	32.41	18.95	11.81	8.79	10.68	11.81	4.50	0.80	0.14	0.06	0.04	0.0	0.0	12681.
	ALL VOLUMES	31.94	19.45	12.05	8.70	10.70	11.22	4.87	0.87	0.14	0.05	0.03	0.0	0.0	15586.
1966	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	67.96	12.89	6.10	7.50	4.48	0.59	0.49	0.0	0.0	0.0	0.0	0.0	0.0	408.
	2000-3999	28.63	21.35	14.29	10.50	9.40	9.45	4.77	1.44	0.0	0.17	0.0	0.0	0.0	2472.
	4000-7999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	8000 OR MORE	29.94	19.72	12.38	9.93	11.55	11.96	3.79	0.59	0.11	0.03	0.0	0.0	0.0	14099.
	ALL VOLUMES	30.67	19.79	12.51	9.95	11.07	11.32	3.85	0.70	0.09	0.05	0.0	0.0	0.0	16979.
ALL YEARS	0-499	72.47	10.40	6.70	3.62	3.92	0.60	1.79	0.42	0.0	0.0	0.0	0.0	0.0	299.
	500-999	62.49	11.61	6.09	6.87	5.83	2.63	2.37	1.18	0.61	0.30	0.0	0.0	0.0	1240.
	1000-1999	65.54	14.58	4.16	3.72	3.84	2.84	4.53	0.64	0.0	0.15	0.0	0.0	0.0	1638.
	2000-3999	47.96	14.12	7.15	7.01	8.75	8.05	5.94	0.90	0.09	0.03	0.0	0.0	0.0	59206.
	4000-7999	49.22	13.26	6.64	6.35	7.42	7.76	7.55	1.52	0.19	0.06	0.02	0.01	0.00	73463.
	8000 OR MORE	35.09	18.28	11.02	8.55	10.23	11.09	4.58	0.97	0.11	0.04	0.01	0.02	0.0	39817.
	ALL VOLUMES	45.88	14.68	7.78	7.05	8.46	8.52	6.26	1.18	0.14	0.05	0.01	0.01	0.00	175663.

EASTERN KENTUCKY

HIGHWAY DISTRICTS 9, 10, 11, AND 12
RURAL HIGHWAYS

PERCENT OF TOTAL TRUCK AXLES BY WEIGHT GROUP

YEAR	ADT	UNDER 7000	7000 TO 8999	9000 TO 10999	11000 TO 12999	13000 TO 14999	15000 TO 16999	17000 TO 18999	19000 TO 20999	21000 TO 22999	23000 TO 24999	25000 TO 26999	27000 TO 28999	29000 TO 99999	TOTAL AXLES
1950															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	76.93	3.54	3.36	2.61	4.08	4.89	2.43	1.71	0.36	0.09	0.0	0.0	0.0	1929.
	4000-7999	91.49	8.51	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7628.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	85.33	6.41	1.42	1.10	1.73	2.07	1.09	0.72	0.15	0.04	0.0	0.0	0.0	4557.
1951															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	78.22	3.81	2.96	6.54	4.02	2.97	0.50	0.99	0.0	0.0	0.0	0.0	0.0	1254.
	4000-7999	59.17	7.14	5.60	4.01	6.25	7.70	7.98	1.88	0.28	0.0	0.0	0.0	0.0	2121.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	66.25	5.90	4.62	4.95	5.42	5.94	5.20	1.55	0.17	0.0	0.0	0.0	0.0	3375.
1952															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4000-7999	64.24	6.72	4.93	4.48	7.94	8.55	2.83	0.23	0.0	0.08	0.0	0.0	0.0	3652.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	64.24	6.72	4.93	4.48	7.94	8.55	2.83	0.23	0.0	0.08	0.0	0.0	0.0	3652.
1953															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4000-7999	60.04	6.77	4.94	7.38	7.72	8.69	4.00	0.30	0.08	0.08	0.0	0.0	0.0	3727.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	60.04	6.77	4.94	7.38	7.72	8.69	4.00	0.30	0.08	0.08	0.0	0.0	0.0	3727.
1954															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4000-7999	60.16	7.03	5.32	5.56	5.51	9.85	5.86	0.65	0.08	0.0	0.0	0.0	0.0	4148.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	60.16	7.03	5.32	5.56	5.51	9.85	5.86	0.65	0.08	0.0	0.0	0.0	0.0	4148.
1955															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4000-7999	57.94	9.54	4.76	7.21	8.06	6.36	4.43	1.50	0.07	0.13	0.0	0.0	0.0	4033.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	57.94	9.54	4.76	7.21	8.06	6.36	4.43	1.50	0.07	0.13	0.0	0.0	0.0	4033.
1956															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	53.01	12.80	6.38	7.84	7.65	7.02	4.16	1.02	0.06	0.07	0.0	0.0	0.0	2837.
	4000-7999	66.21	6.67	4.06	3.79	5.76	5.58	4.30	1.82	0.61	0.0	0.0	0.21	0.0	1116.
	8000 OR MORE	52.91	10.90	5.50	6.43	8.01	7.91	7.29	0.94	0.11	0.0	0.0	0.0	0.0	3723.
	ALL VOLUMES	54.88	10.99	5.61	6.57	7.55	7.39	5.70	1.10	0.16	0.03	0.0	0.03	0.0	7675.
1957															
	0-499	73.97	0.0	4.30	6.51	2.20	4.30	6.51	2.20	0.0	0.0	0.0	0.0	0.0	60.
	500-999	74.32	5.37	2.67	4.12	2.74	2.92	2.74	3.82	0.93	0.20	0.19	0.0	0.0	628.
	1000-1999	72.11	10.36	2.76	2.86	3.35	2.80	1.77	3.38	0.62	0.0	0.0	0.0	0.0	376.
	2000-3999	59.24	12.77	6.53	5.56	5.86	5.02	3.54	1.15	0.12	0.12	0.12	0.0	0.0	1667.
	4000-7999	47.74	12.84	6.59	8.10	9.78	7.41	5.71	1.64	0.05	0.0	0.06	0.0	0.0	3884.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	54.77	11.86	5.97	6.82	7.69	6.10	4.67	1.82	0.18	0.05	0.08	0.0	0.0	6609.
1958															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	62.12	11.93	5.21	6.39	4.11	6.60	2.48	0.93	0.0	0.22	0.0	0.0	0.0	1171.
	4000-7999	39.83	14.09	8.09	6.75	11.54	9.54	7.87	2.29	0.0	0.0	0.0	0.0	0.0	4074.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	44.81	13.61	7.45	6.67	9.88	8.88	6.67	1.98	0.0	0.05	0.0	0.0	0.0	5245.
1959															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	54.33	13.31	4.43	6.14	8.44	6.43	4.18	2.42	0.12	0.0	0.0	0.0	0.0	1228.
	4000-7999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	8000 OR MORE	47.44	13.82	5.71	7.07	7.99	9.04	6.90	1.54	0.39	0.10	0.0	0.0	0.0	4487.
	ALL VOLUMES	48.92	13.71	5.44	6.87	8.08	8.48	6.31	1.73	0.37	0.07	0.0	0.0	0.0	5714.
1960															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	53.91	12.41	8.49	6.42	6.47	5.07	3.87	1.36	0.0	0.0	0.0	0.0	0.0	1198.
	4000-7999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	8000 OR MORE	44.99	15.80	6.94	6.60	10.22	9.06	5.70	0.69	0.0	0.0	0.0	0.0	0.0	4252.
	ALL VOLUMES	46.95	15.06	7.28	6.56	9.84	8.19	5.30	0.83	0.0	0.0	0.0	0.0	0.0	5450.
1961															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4000-7999	55.21	15.07	7.19	6.33	7.58	5.12	3.01	0.49	0.0	0.0	0.0	0.0	0.0	1240.
	8000 OR MORE	43.14	18.65	5.82	7.43	7.76	8.71	7.34	0.67	0.19	0.07	0.27	0.0	0.0	4459.
	ALL VOLUMES	45.77	17.87	6.12	7.19	7.72	7.93	6.40	0.59	0.15	0.05	0.21	0.0	0.0	5699.
1962															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	50.56	15.60	6.54	4.79	10.02	7.62	3.51	1.06	0.30	0.0	0.0	0.0	0.0	1292.
	4000-7999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	8000 OR MORE	35.66	17.98	10.45	7.12	9.14	9.74	6.49	1.77	0.0	0.88	0.25	0.39	0.13	5023.
	ALL VOLUMES	38.71	17.49	9.65	6.65	9.32	9.30	5.98	1.63	0.06	0.70	0.20	0.31	0.10	6315.
1963															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	48.31	14.83	11.69	5.27	8.07	4.79	5.70	1.85	0.0	0.0	0.0	0.0	0.0	1535.
	4000-7999	35.64	16.35	9.63	5.57	8.31	8.96	10.84	3.82	0.60	0.19	0.11	0.0	0.0	4858.
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	38.68	15.98	10.12	5.50	8.25	7.84	9.60	3.35	0.45	0.14	0.08	0.0	0.0	6393.
1964															
	0-499	60.00	26.67	0.0	0.0	6.66	0.0	6.67	0.0	0.0	0.0	0.0	0.0	0.0	30.
	500-999	50.54	19.72	8.29	2.24	9.07	7.00	0.67	1.88	0.0	0.0	0.59	0.0	0.0	452.
	1000-1999	43.71	19.10	8.46	7.86	1.89	0.75	1.12	2.19	6.60	5.80	1.69	0.27	0.56	879.
	2000-3999	51.20	17.28	8.97	4.85	5.14	4.84	3.92	2.05	1.06	0.35	0.25	0.0	0.09	2505.
	4000-7999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	8000 OR MORE	38.44	15.15	10.54	6.09	8.64	9.19	8.52	2.69	0.57	0.16	0.0	0.0	0.0	4603.
	ALL VOLUMES	43.48	16.48	9.70	5.68	6.92	6.88	5.97	2.40	1.31	0.80	0.28	0.03	0.08	8469.
1965															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4000-7999	45.74	15.45	12.37	6.79	8.45	5.70	4.14	1.17	0.19	0.0	0.0	0.0	0.0	1701.
	8000 OR MORE	37.34	18.06	7.43	5.73	6.54	10.39	8.81	4.26	1.37	0.0	0.07	0.0	0.0	4916.
	ALL VOLUMES	39.50	17.39	8.70	6.00	7.03	9.19	7.61	3.46	1.07	0.0	0.05	0.0	0.0	6617.
1966															
	0-499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4000-7999	41.28	20.52	8.89	5.70	12.56	9.65	1.27	0.13	0.0	0.0	0.0	0.0	0.0	2791.
	8000 OR MORE	31.07	18.57	10.43	6.79	9.54	9.76	7.96	4.04	1.48	0.35	0.0	0.0	0.0	5953.
	ALL VOLUMES	34.33	19.20	9.94	6.44	10.51	9.72	5.83	2.79	1.01	0.24	0.0	0.0	0.0	8743.
ALL YEARS															
	0-499	69.31	8.90	2.87	4.34	3.69	2.87	6.56	1.47	0.0	0.0	0.0	0.0	0.0	90.
	500-999	64.36	11.38	5.02	3.33	5.39	4.63	1.87	3.01	0.54	0.11	0.35	0.0	0.0	1080.
	1000-1999	52.12	16.51	6.77	6.38	2.32	1.36	1.32	2.54	4.83	4.08	1.19	0.19	0.39	1249.
	2000-3999	58.22	12.07	6.60	5.65	6.49	5.52	3.54	1.47	0.27	0.10	0.05	0.0	0.01	16616.
	4000-7999	54.13	11.29	6.36	5.76	7.93	7.70	5.26	1.35	0.14	0.05	0.02	0.01	0.0	39972.
	8000 OR MORE	40.57	16.37	8.05	6.66	8.51	9.29	7.42	2.20	0.57	0.21	0.07	0.05	0.02	37415.
	ALL VOLUMES	49.68	13.46	7.04	6.07	7.80	7.82	5.71	1.73	0.39	0.18	0.06	0.03	0.01	96422.



APPENDIX C

HISTORICAL SUMMARY - AVERAGE EWL'S FOR 1,000 VEHICLES AND FOR 1,000 TRUCKS

ALL OF KENTUCKY

RURAL HIGHWAYS

YEAR	ADT	KY EWLS /1000 VEH	KY EWLS /1000 TRUCKS	AASHO EWLS /1000 VEH	AASHO EWLS /1000 TRUCKS	MOD AASHO EWLS /1000 VEH	MOD AASHO EWLS /1000 TRUCKS
1950	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	310.31	1455.41	22.39	105.02	22.63	106.15
	4000-7999	442.58	2083.47	30.89	145.42	31.46	148.09
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	362.46	1702.51	25.74	120.91	26.11	122.65
1951	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	842.04	4954.34	60.79	357.66	61.78	363.49
	4000-7999	991.78	5985.61	67.09	404.92	68.06	410.75
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	907.10	5395.96	63.53	377.90	64.51	383.73
1952	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	1223.06	6595.86	81.48	439.44	83.28	449.13
	4000-7999	932.52	5380.51	64.96	374.82	66.02	385.57
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	1069.77	5975.13	72.77	406.53	74.60	416.67
1953	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	1060.15	6368.84	73.83	443.5	75.06	455.73
	4000-7999	1042.83	6246.31	70.23	420.69	71.40	428.14
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	1049.47	6293.19	71.61	429.42	73.16	438.70
1954	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	1211.57	7519.13	81.59	506.36	83.24	516.61
	4000-7999	1154.29	6438.80	78.71	439.03	80.76	450.50
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	1182.82	6948.07	80.14	470.77	82.00	481.67
1955	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	994.62	6153.14	66.72	412.76	68.39	423.09
	4000-7999	1305.55	7518.12	85.59	492.90	88.76	511.12
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	1212.96	7131.82	79.97	470.27	82.69	486.21
1956	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	1059.30	6721.48	69.28	439.59	74.13	470.37
	2000-3999	1114.30	7271.41	73.28	478.10	81.28	530.40
	4000-7999	1461.19	8679.96	88.79	527.47	99.66	592.01
	8000 OR MORE	1168.96	7478.34	76.63	490.22	82.73	529.29
	ALL VOLUMES	1280.75	7968.12	80.79	502.64	89.83	558.85
1957	0-499	143.43	1665.41	11.29	131.11	11.28	131.02
	500-999	649.22	5026.36	30.73	237.90	31.35	242.74
	1000-1999	880.01	6415.85	48.92	356.64	54.81	399.63
	2000-3999	1809.66	11582.38	87.12	557.59	103.49	662.36
	4000-7999	2061.47	10681.24	116.07	601.42	135.64	702.80
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	1619.96	9899.48	85.97	525.38	100.22	612.41
1958	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	1578.71	8242.29	95.10	496.50	107.66	562.09
	2000-3999	2017.63	11321.97	115.72	649.38	135.83	762.22
	4000-7999	2125.77	11517.89	121.28	657.13	143.18	775.79
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	2073.93	11333.73	118.69	648.62	139.72	763.55
1959	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	4092.46	18564.88	181.90	825.17	207.20	939.93
	2000-3999	1608.59	9689.88	95.22	573.57	110.25	664.10
	4000-7999	2669.17	12153.99	146.65	667.77	174.28	793.56
	8000 OR MORE	1621.06	9295.17	95.01	544.79	107.31	615.32
	ALL VOLUMES	2150.07	11207.61	119.91	625.04	140.02	729.89
1960	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	1641.94	9858.78	98.25	590.07	117.07	703.09
	4000-7999	1899.38	9922.10	103.18	539.02	119.68	625.20
	8000 OR MORE	1740.95	7388.06	81.13	483.03	93.11	554.35
	ALL VOLUMES	1700.94	9486.91	97.73	545.08	114.18	636.85
1961	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	2625.14	15136.74	117.97	680.20	152.75	880.77
	2000-3999	1915.63	11546.01	108.05	651.21	131.14	790.39
	4000-7999	1496.11	8955.32	93.66	560.65	109.81	657.29
	8000 OR MORE	2276.62	10844.87	116.19	553.47	134.67	640.55
	ALL VOLUMES	1898.84	10419.42	105.42	578.46	124.41	682.69
1962	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	1311.34	8214.41	81.58	511.04	96.56	604.85
	4000-7999	1814.24	8146.41	110.09	494.33	128.59	577.41
	8000 OR MORE	4631.48	24879.33	141.44	759.79	162.71	874.07
	ALL VOLUMES	2212.30	11122.75	108.38	544.91	126.46	635.82
1963	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	2111.72	11808.73	111.74	624.87	140.49	785.64
	4000-7999	2736.02	13219.54	140.53	679.00	175.67	848.76
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	2529.81	12797.97	131.02	662.82	164.05	829.90
1964	0-499	212.48	2321.21	13.49	147.35	13.80	150.75
	500-999	660.73	6018.39	31.85	290.11	35.57	324.01
	1000-1999	2750.31	21924.32	61.98	494.06	80.86	644.55
	2000-3999	2403.19	16509.46	93.25	640.63	122.06	838.55
	4000-7999	2580.12	12582.21	145.39	709.03	191.31	932.93
	8000 OR MORE	1914.58	10827.84	102.09	577.38	130.50	738.05
	ALL VOLUMES	2165.96	13957.96	92.49	596.03	119.90	772.68
1965	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	648.84	5488.82	38.95	329.51	42.17	356.75
	2000-3999	4307.38	18323.27	171.99	718.28	235.99	985.59
	4000-7999	2312.68	12021.78	122.09	634.67	165.98	882.79
	8000 OR MORE	2125.40	12657.60	106.75	635.75	141.24	841.11
	ALL VOLUMES	2483.39	13446.36	119.34	646.17	160.24	867.61
1966	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	124.81	1224.13	11.02	108.06	12.19	119.57
	2000-3999	4242.08	19196.12	178.98	809.90	258.26	1168.67
	4000-7999	2103.74	9950.58	118.34	559.72	162.62	769.18
	8000 OR MORE	2226.14	12915.09	110.68	642.10	150.61	873.80
	ALL VOLUMES	2393.75	12659.71	119.27	630.76	164.66	870.83
ALL YEARS	0-499	174.42	1969.65	12.28	138.64	12.41	140.17
	500-999	654.62	5452.23	31.25	260.31	33.33	277.63
	1000-1999	1876.57	13100.04	69.28	483.61	83.02	579.52
	2000-3999	1582.74	9244.37	86.19	503.41	101.27	591.50
	4000-7999	1729.32	9162.77	101.05	535.41	110.36	627.12
	8000 OR MORE	2156.28	12187.75	106.28	600.70	133.29	753.36
	ALL VOLUMES	1724.43	9690.09	94.26	529.66	111.85	628.51

WESTERN KENTUCKY

HIGHWAY DISTRICTS 1 AND 2
RURAL HIGHWAYS

YEAR	ADT	KY EWLS /1000 VEH	KY EWLS /1000 TRUCKS	AASHO EWLS /1000 VEH	AASHO EWLS /1000 TRUCKS	MOD AASHO EWLS /1000 VEH	MOD AASHO EWLS /1000 TRUCKS
1950	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	759.92	2168.86	59.48	169.76	59.37	169.46
	4000-7999	218.33	1467.59	16.64	111.88	16.75	112.58
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	391.47	1835.99	30.34	142.29	30.38	142.46
1951	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	1146.97	5706.79	85.86	427.18	86.36	429.67
	4000-7999	370.54	3535.67	27.73	264.57	28.11	268.25
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	585.92	4456.26	43.85	333.52	44.27	336.69
1952	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	1888.32	10814.62	112.96	646.94	114.08	653.33
	4000-7999	426.58	3081.70	30.62	221.23	32.07	231.71
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	917.21	6091.65	58.26	386.93	59.60	395.82
1953	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	1129.23	5246.52	84.27	391.52	85.92	399.20
	4000-7999	266.38	2554.13	20.30	194.67	20.59	197.42
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	529.29	3832.73	39.79	288.15	40.50	293.24
1954	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	1507.15	7741.24	98.43	505.56	99.74	512.31
	4000-7999	588.83	3755.45	42.09	268.47	43.21	275.57
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	925.59	5424.46	62.78	367.75	63.96	374.70
1955	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	1706.36	6831.86	117.98	472.37	120.75	483.45
	4000-7999	518.21	3512.94	38.48	260.83	40.49	274.45
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	994.21	5274.94	70.33	373.14	72.64	385.41
1956	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	1631.87	8577.77	104.91	551.44	119.89	630.21
	4000-7999	1330.79	7934.64	79.96	476.75	92.66	552.46
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	1432.40	8170.15	88.38	504.10	101.85	580.93
1957	0-499	56.79	767.88	5.42	73.28	5.41	73.19
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	1642.67	10076.78	69.32	425.26	84.94	521.06
	2000-3999	2873.30	15311.34	114.30	609.09	142.39	758.79
	4000-7999	2052.74	10890.56	120.53	639.48	142.19	754.37
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	2324.85	13059.21	104.38	586.34	127.49	716.13
1958	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	3845.75	19813.19	199.78	1029.25	249.52	1280.37
	4000-7999	1953.50	12159.39	117.30	730.13	136.44	849.26
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	2658.11	15354.95	148.01	855.02	178.18	1029.26
1959	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	2641.80	14920.86	130.28	735.79	165.31	933.65
	4000-7999	2776.21	13458.80	160.89	779.98	195.25	946.54
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	2729.62	13916.26	150.28	766.16	184.87	947.50
1960	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	3024.73	14599.41	172.26	831.42	219.76	1060.70
	4000-7999	1883.66	11252.77	112.92	674.57	135.79	811.17
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	2247.47	12480.37	131.84	732.11	162.56	902.70
1961	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	2937.58	15652.41	156.97	836.37	201.05	1071.27
	4000-7999	2463.43	13728.55	147.65	822.83	175.15	976.11
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	2619.16	14379.61	150.71	827.41	183.46	1008.31
1962	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	2533.78	12080.99	148.22	706.71	183.76	876.18
	4000-7999	2691.97	13083.91	160.74	781.23	194.66	946.12
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	2636.67	12728.92	156.36	754.85	190.85	921.36
1963	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	3983.87	19200.56	185.38	893.48	255.36	1230.75
	4000-7999	3949.71	16499.34	189.30	790.77	247.82	1035.22
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	3961.66	17357.75	187.93	823.41	250.46	1097.36
1964	0-499	96.44	1518.86	7.32	115.23	7.32	115.23
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	528.14	5596.71	25.99	275.41	35.59	377.11
	2000-3999	3334.01	21593.87	119.40	773.32	163.37	1058.11
	4000-7999	2492.44	12719.33	134.79	687.84	180.75	927.39
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	2508.05	16445.85	103.86	681.03	140.98	924.42
1965	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	4396.70	18992.10	128.42	554.71	190.26	821.87
	4000-7999	2508.22	13858.65	137.26	654.10	193.94	924.18
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	3420.10	15739.42	134.22	617.69	192.67	886.69
1966	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	4511.35	20178.55	198.75	888.98	291.02	1301.71
	4000-7999	2607.39	11831.79	133.09	603.93	189.29	858.94
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	3200.72	14458.78	153.55	693.64	220.99	998.30
ALL YEARS	0-499	76.06	1104.32	6.34	92.07	6.34	92.03
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	863.69	7508.10	39.04	339.34	50.45	438.53
	2000-3999	2695.85	13571.59	127.94	644.09	160.24	806.70
	4000-7999	1705.59	9963.16	96.45	563.39	119.38	697.34
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	2036.06	11388.09	105.66	590.95	131.53	735.68

SOUTH CENTRAL KENTUCKY

HIGHWAY DISTRICTS 3, 4, AND 8
RURAL HIGHWAYS

YEAR	ADT	KY EWLS /1000 VEH	KY EWLS /1000 TRUCKS	AASHO EWLS /1000 VEH	AASHO EWLS /1000 TRUCKS	MOD AASHO EWLS /1000 VEH	MOD AASHO EWLS /1000 TRUCKS
1950							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	227.90	999.82	18.63	81.75	19.64	86.15
	4000-7999	0.0	0.0	0.0	0.0	0.0	0.0
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	227.90	999.82	18.63	81.75	19.64	86.15
1951							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	835.58	4620.11	64.52	356.77	65.05	359.68
	4000-7999	0.0	0.0	0.0	0.0	0.0	0.0
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	835.58	4620.11	64.52	356.77	65.05	359.68
1952							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	1066.60	5126.78	75.32	362.03	76.95	369.86
	4000-7999	0.0	0.0	0.0	0.0	0.0	0.0
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	1066.60	5126.78	75.32	362.03	76.95	369.86
1953							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	576.51	4242.01	38.95	286.62	40.54	298.33
	4000-7999	1082.56	5643.21	74.61	388.91	75.14	391.68
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	884.43	5204.46	60.65	356.88	61.59	362.45
1954							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	1387.30	7855.73	92.02	521.09	93.41	528.96
	4000-7999	0.0	0.0	0.0	0.0	0.0	0.0
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	1387.30	7855.73	92.02	521.09	93.41	528.96
1955							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	1006.89	6340.77	62.70	394.84	63.69	401.07
	4000-7999	1519.52	6545.74	106.15	457.29	108.21	466.16
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	1300.70	6476.56	87.60	436.21	89.21	444.19
1956							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	1059.30	6721.48	69.28	439.59	74.13	470.37
	2000-3999	1571.84	8349.27	102.10	542.31	112.05	595.16
	4000-7999	1356.48	7868.98	90.56	525.36	103.32	599.34
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	1410.22	7957.43	92.78	523.54	103.39	583.39
1957							
	0-499	70.62	852.91	7.29	88.04	7.28	87.97
	500-999	385.62	3357.78	18.26	158.99	18.29	159.23
	1000-1999	916.01	6234.20	59.73	406.53	65.52	445.95
	2000-3999	0.0	0.0	0.0	0.0	0.0	0.0
	4000-7999	2776.52	12788.21	162.65	749.14	194.49	895.78
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	1579.39	9459.04	93.40	559.36	109.28	654.48
1958							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	1578.71	8242.29	95.10	496.50	107.66	562.09
	2000-3999	0.0	0.0	0.0	0.0	0.0	0.0
	4000-7999	2905.50	14790.28	155.02	789.11	189.91	966.74
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	2661.67	13611.57	144.01	736.43	174.80	893.90
1959							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	4092.46	18564.88	181.90	825.17	207.20	939.93
	2000-3999	0.0	0.0	0.0	0.0	0.0	0.0
	4000-7999	1775.64	8779.01	114.66	566.91	129.01	637.85
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	2285.16	11079.10	129.45	627.61	146.21	708.85
1960							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	2286.08	12674.01	113.27	627.69	139.60	773.92
	4000-7999	2248.09	10085.20	120.13	538.92	132.36	593.80
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	2258.74	10705.92	118.19	560.20	134.39	636.99
1961							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	2625.14	15136.74	117.97	680.20	152.75	880.77
	2000-3999	0.0	0.0	0.0	0.0	0.0	0.0
	4000-7999	1470.81	6930.96	103.73	488.82	115.66	545.03
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	1749.64	8625.64	107.17	528.35	124.62	614.37
1962							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	1066.17	5672.09	69.55	377.79	80.19	435.61
	4000-7999	1228.79	4815.44	95.03	372.41	108.40	424.80
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	1177.14	5002.98	87.90	373.59	100.51	427.16
1963							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	3123.32	13971.48	153.52	686.74	184.97	827.43
	4000-7999	2834.52	11852.79	163.39	683.22	199.78	835.39
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	2911.12	12387.31	160.77	684.11	195.85	833.38
1964							
	0-499	433.35	3930.03	24.10	218.54	24.73	224.30
	500-999	275.29	4608.04	14.23	238.16	14.22	238.03
	1000-1999	761.89	6376.45	37.21	311.44	42.79	358.12
	2000-3999	1831.14	14503.14	75.33	596.60	97.00	768.28
	4000-7999	2674.77	12447.22	156.84	729.89	202.71	943.31
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	1840.75	12200.55	92.28	611.66	117.96	781.85
1965							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	6584.16	25212.53	262.93	1006.83	353.67	1354.30
	4000-7999	2654.53	12364.95	151.31	704.83	205.02	955.00
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	3722.91	16377.77	181.66	799.16	245.44	1079.72
1966							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	5757.33	28047.28	199.29	970.85	299.92	1461.10
	4000-7999	2404.97	10386.22	141.05	609.14	191.18	825.65
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	3183.98	14122.97	154.58	685.67	216.45	960.10
ALL YEARS							
	0-499	237.11	2485.28	15.00	157.27	15.29	160.29
	500-999	361.20	3518.88	17.37	169.19	17.39	169.38
	1000-1999	1750.10	10593.95	89.77	543.41	103.74	627.98
	2000-3999	1662.07	9014.03	87.38	473.91	102.49	555.84
	4000-7999	2115.11	9822.65	127.73	593.17	153.90	714.73
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	1857.23	9481.88	105.94	540.85	126.13	643.96

NORTH CENTRAL KENTUCKY

HIGHWAY DISTRICTS 5, 6, AND 7
RURAL HIGHWAYS

YEAR	ADT	KY EWLS /1000 VEH	KY EWLS /1000 TRUCKS	AASHO EWLS /1000 VEH	AASHO EWLS /1000 TRUCKS	MOD AASHO EWLS /1000 VEH	MOD AASHO EWLS /1000 TRUCKS
1950							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	0.0	0.0	1.93	11.99	1.86	11.56
	4000-7999	1094.54	3994.58	72.42	264.32	74.04	270.22
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	364.07	1835.12	25.38	127.91	25.87	130.39
1951							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	939.74	6057.86	63.94	412.21	65.70	423.51
	4000-7999	1674.11	6345.56	113.39	429.78	114.69	434.70
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	1180.39	6188.25	80.15	420.17	81.75	428.58
1952							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	1104.27	6350.38	75.03	431.50	77.17	443.81
	4000-7999	1995.03	7977.15	132.50	529.79	137.15	548.39
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	1425.86	7079.68	95.78	475.56	98.83	490.69
1953							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	1171.98	7346.45	80.17	502.53	82.45	516.81
	4000-7999	2466.60	9872.28	154.70	619.18	158.09	632.73
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	1604.78	8458.45	105.09	553.89	107.73	567.84
1954							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	1018.06	7166.87	70.30	494.86	72.21	508.33
	4000-7999	2124.88	8486.76	138.70	553.98	143.35	572.55
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	1382.86	7779.63	92.84	522.30	95.66	538.15
1955							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	664.21	5406.94	45.29	368.69	46.79	380.88
	4000-7999	2085.19	9949.60	132.57	632.55	137.85	657.78
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	1528.77	8705.31	98.39	560.27	102.20	581.93
1956							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	791.50	6130.18	53.91	417.53	59.93	464.14
	4000-7999	1750.86	9505.36	107.60	584.14	118.91	645.55
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	1339.12	8340.46	84.56	526.64	93.60	582.94
1957							
	0-499	195.50	2064.39	14.85	156.86	14.84	156.71
	500-999	498.78	4116.97	26.51	218.70	26.81	221.16
	1000-1999	131.93	1532.91	11.49	133.51	11.49	133.51
	2000-3999	1545.34	10025.94	96.35	625.12	110.45	716.57
	4000-7999	1982.28	10940.32	101.41	559.69	118.63	654.73
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	1541.24	9730.27	85.28	538.42	98.46	621.61
1958							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	1728.30	9159.04	107.97	572.19	121.69	644.87
	4000-7999	1736.09	9408.38	98.53	533.94	115.44	625.61
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	1733.06	9310.23	102.19	548.99	117.87	633.19
1959							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	1541.78	8931.07	97.90	567.08	110.41	639.57
	4000-7999	3480.49	14094.80	167.08	679.88	203.71	824.97
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	2303.88	11414.43	125.41	621.33	147.09	728.73
1960							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	1443.34	8294.38	95.31	547.74	107.90	620.08
	4000-7999	1763.07	9303.51	91.74	484.09	107.07	564.99
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	1652.52	8973.77	92.97	504.89	107.36	582.99
1961							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	1519.90	9651.02	89.10	565.77	104.06	660.77
	4000-7999	1244.62	8664.40	68.28	475.33	86.39	601.38
	8000 OR MORE	3099.01	10860.89	158.45	555.29	181.71	636.82
	ALL VOLUMES	2093.96	10166.21	112.23	544.90	131.30	637.49
1962							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	1092.57	7289.17	72.76	485.44	82.35	549.41
	4000-7999	1729.46	8056.14	96.65	450.20	111.31	518.49
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	1609.23	7948.93	92.14	455.13	105.84	522.81
1963							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	1525.97	8786.92	94.85	546.16	112.37	647.04
	4000-7999	1830.60	10085.41	103.17	568.38	122.08	672.55
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	1722.57	9637.98	100.22	560.72	118.63	663.76
1964							
	0-499	123.74	825.55	10.88	72.56	10.94	73.00
	500-999	546.86	5614.63	28.80	285.18	32.35	320.25
	1000-1999	671.83	4784.88	37.53	267.32	40.89	291.19
	2000-3999	1994.69	9810.60	119.46	587.57	149.63	735.93
	4000-7999	0.0	0.0	0.0	0.0	0.0	0.0
	8000 OR MORE	1664.31	8963.17	101.09	544.41	124.95	672.91
	ALL VOLUMES	1358.85	8165.06	81.10	487.34	99.31	596.74
1965							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	648.84	5488.82	38.95	329.51	42.17	356.75
	2000-3999	2571.70	11150.50	146.77	636.37	191.26	829.28
	4000-7999	0.0	0.0	0.0	0.0	0.0	0.0
	8000 OR MORE	1898.65	10963.34	104.89	605.65	136.77	789.75
	ALL VOLUMES	1897.52	10751.86	105.59	598.32	137.11	776.91
1966							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	124.81	1224.13	11.02	108.06	12.19	119.57
	2000-3999	2670.05	11522.04	141.20	609.33	188.83	814.87
	4000-7999	0.0	0.0	0.0	0.0	0.0	0.0
	8000 OR MORE	1813.57	10270.57	102.99	583.23	138.83	786.24
	ALL VOLUMES	1792.44	10096.90	100.92	568.50	135.70	764.43
ALL YEARS							
	0-499	171.46	1514.71	13.52	119.45	13.53	119.57
	500-999	531.87	4956.64	28.09	261.76	30.62	285.34
	1000-1999	416.63	3647.20	25.81	225.97	27.91	244.30
	2000-3999	1207.25	7440.09	77.30	476.41	86.76	534.69
	4000-7999	1914.63	9239.88	110.34	532.49	123.68	596.90
	8000 OR MORE	2006.82	10415.81	111.42	578.30	142.24	738.28
	ALL VOLUMES	1592.43	8703.03	94.07	514.10	108.58	593.42

EASTERN KENTUCKY

HIGHWAY DISTRICTS 9, 10, 11, AND 12
RURAL HIGHWAYS

YEAR	ADT	KY EWLS /1000 VEH	KY EWLS /1000 TRUCKS	AASHO EWLS /1000 VEH	AASHO EWLS /1000 TRUCKS	HOD AASHO EWLS /1000 VEH	HOD AASHO EWLS /1000 TRUCKS
1950							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	956.83	3961.22	58.04	240.29	58.05	240.33
	4000-7999	0.0	0.0	2.66	12.42	2.61	12.21
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	432.74	1911.19	27.71	122.36	27.69	122.27
1951							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	339.03	2042.87	25.09	151.20	25.23	152.00
	4000-7999	1258.32	7716.17	81.17	497.74	82.67	506.92
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	884.44	5384.79	58.36	355.31	59.31	361.07
1952							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	0.0	0.0	0.0	0.0	0.0	0.0
	4000-7999	671.99	4380.96	49.84	324.91	50.41	328.67
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	671.99	4380.96	49.84	324.91	50.41	328.67
1953							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	0.0	0.0	0.0	0.0	0.0	0.0
	4000-7999	851.88	5358.67	61.01	383.78	62.17	391.05
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	851.88	5358.67	61.01	383.78	62.17	391.05
1954							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	0.0	0.0	0.0	0.0	0.0	0.0
	4000-7999	935.59	6070.91	65.99	428.18	67.18	435.55
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	935.59	6070.91	65.99	428.18	67.18	435.55
1955							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	0.0	0.0	0.0	0.0	0.0	0.0
	4000-7999	823.79	6401.68	53.50	415.71	55.60	432.03
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	823.79	6401.68	53.50	415.71	55.60	432.03
1956							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	838.27	6300.10	55.23	415.05	59.74	448.96
	4000-7999	985.65	8881.76	44.85	404.15	46.83	421.98
	8000 OR MORE	1168.96	7478.34	76.63	490.22	82.73	529.29
	ALL VOLUMES	1068.50	7285.25	62.19	449.28	66.87	483.04
1957							
	0-499	523.94	4690.00	33.75	302.59	33.75	302.59
	500-999	1160.29	7402.78	52.44	334.57	54.21	345.87
	1000-1999	596.15	4581.61	33.37	256.47	33.75	259.35
	2000-3999	665.01	5773.23	37.54	325.90	40.48	351.45
	4000-7999	1596.90	8252.04	96.87	500.59	108.56	561.00
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	1114.63	7197.18	64.34	415.47	70.64	456.14
1958							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	686.75	4965.96	42.43	306.85	45.76	330.87
	4000-7999	2004.37	10495.63	122.35	640.68	139.79	731.99
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	1593.54	9129.78	97.43	558.22	110.47	632.90
1959							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	966.89	7123.39	57.42	423.97	63.93	472.09
	4000-7999	0.0	0.0	0.0	0.0	0.0	0.0
	8000 OR MORE	1621.06	9295.17	95.01	544.79	107.31	615.32
	ALL VOLUMES	1439.56	8797.90	84.61	517.11	95.31	582.51
1960							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	633.79	5480.46	41.19	356.18	46.10	398.68
	4000-7999	0.0	0.0	0.0	0.0	0.0	0.0
	8000 OR MORE	1240.95	7388.04	81.13	483.03	93.11	554.35
	ALL VOLUMES	1052.50	6936.87	68.73	453.02	78.52	517.52
1961							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	0.0	0.0	0.0	0.0	0.0	0.0
	4000-7999	466.05	4267.00	32.41	296.22	36.53	333.91
	8000 OR MORE	1580.57	10818.35	80.42	550.56	94.49	646.71
	ALL VOLUMES	1251.85	9254.40	66.25	489.77	77.38	572.04
1962							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	742.93	6439.25	46.57	403.62	53.26	461.49
	4000-7999	0.0	0.0	0.0	0.0	0.0	0.0
	8000 OR MORE	4631.68	24879.33	141.44	759.79	162.71	874.07
	ALL VOLUMES	3425.79	20862.14	112.92	682.20	128.77	784.19
1963							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	963.02	7057.94	54.63	399.70	67.21	491.85
	4000-7999	3140.19	16069.33	142.73	730.40	184.32	943.21
	8000 OR MORE	0.0	0.0	0.0	0.0	0.0	0.0
	ALL VOLUMES	2431.20	13792.12	114.04	646.95	146.18	829.28
1964							
	0-499	117.62	2666.13	8.31	188.33	9.00	204.02
	500-999	1248.51	7415.76	52.36	310.86	59.02	350.54
	1000-1999	11332.49	64093.06	183.30	1036.67	250.56	1417.10
	2000-3999	1713.36	13505.86	58.93	464.51	70.40	554.96
	4000-7999	0.0	0.0	0.0	0.0	0.0	0.0
	8000 OR MORE	2164.23	12901.26	103.19	614.94	136.09	810.48
	ALL VOLUMES	2816.88	18568.42	90.17	594.38	116.53	768.16
1965							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	0.0	0.0	0.0	0.0	0.0	0.0
	4000-7999	904.83	6831.36	55.14	416.30	65.02	490.90
	8000 OR MORE	2577.43	16373.70	110.47	701.79	150.14	953.77
	ALL VOLUMES	2076.35	13848.31	93.90	626.24	124.64	831.27
1966							
	0-499	0.0	0.0	0.0	0.0	0.0	0.0
	500-999	0.0	0.0	0.0	0.0	0.0	0.0
	1000-1999	0.0	0.0	0.0	0.0	0.0	0.0
	2000-3999	0.0	0.0	0.0	0.0	0.0	0.0
	4000-7999	988.76	5873.34	63.83	379.15	83.74	497.41
	8000 OR MORE	3032.63	18476.56	175.71	765.92	173.65	1057.95
	ALL VOLUMES	2387.20	14427.30	106.17	641.65	145.25	877.86
ALL YEARS							
	0-499	297.10	4020.71	19.54	264.59	19.93	269.73
	500-999	1194.53	7408.04	52.40	324.96	56.08	347.76
	1000-1999	6823.03	43403.54	120.32	765.43	159.50	1014.60
	2000-3999	905.06	6486.69	48.80	349.76	54.41	390.00
	4000-7999	1163.51	7267.70	70.05	437.55	78.44	489.98
	8000 OR MORE	2272.45	13799.02	102.28	621.07	126.32	767.08
	ALL VOLUMES	1569.53	9994.51	76.89	489.63	90.40	575.63

APPENDIX D

AVERAGE VEHICLE-TYPE PERCENTAGES AS A FUNCTION OF LOCAL CONDITIONS

MEANS OF VEHICLE TYPE PERCENTAGES
RURAL KENTUCKY HIGHWAYS
1950-1966

LOCAL CONDITION	CODE	CARS	BUSES	SU-2A-4T	SU-2A-6T	SU-3A	C-3A	C-4A	C-5A	TOTAL VEH
ROAD TYPE	1	70.993	0.311	4.838	5.387	0.700	2.363	11.092	4.316	341175
	2	71.523	0.920	8.542	8.450	1.043	4.508	4.265	0.740	5196622
	3	72.692	0.649	13.848	9.981	0.864	0.942	0.830	0.190	538587
	4	74.897	1.045	14.707	7.769	0.329	1.037	0.210	0.005	14874
DIRECTION	1	71.648	0.884	8.614	8.302	0.885	4.255	4.472	0.930	3934241
	2	71.697	0.816	9.902	8.861	1.198	3.399	3.478	0.641	2157017
ALT ROUTE	1	71.502	0.933	9.370	8.673	0.837	4.297	3.624	0.759	1264033
	2	71.346	0.855	8.872	8.459	1.072	4.120	4.360	0.908	4340900
	3	74.825	0.717	10.293	8.538	0.796	1.491	3.079	0.250	486325
SERVICE PROVIDED	1	79.656	0.365	11.118	5.097	0.312	2.363	0.741	0.349	12717
	2	74.003	0.325	11.766	7.911	1.598	0.868	2.293	1.235	67011
	3	71.501	0.923	8.967	8.364	0.827	3.704	4.858	0.855	883817
	4	73.096	0.789	8.333	8.067	0.747	3.997	4.152	0.809	3343836
	5	68.629	0.894	9.534	9.402	1.271	4.914	4.421	0.930	1370128
	6	60.105	0.739	12.656	13.171	7.573	1.472	2.815	1.469	74622
	7	71.867	1.465	13.809	8.933	1.010	1.360	1.369	0.187	251972
	8	80.579	1.030	9.209	5.888	0.277	1.446	1.275	0.296	84805
	9	65.532	0.085	11.957	8.766	0.553	0.979	10.596	1.532	2350
VOLUME	1	69.057	1.123	17.709	10.870	0.228	0.775	0.187	0.051	20861
	2	69.167	0.884	15.777	11.429	0.689	1.343	0.610	0.100	72488
	3	70.238	0.899	12.148	10.780	0.862	2.182	2.531	0.359	425482
	4	71.064	0.967	10.027	8.788	1.126	3.667	3.606	0.750	1138208
	5	70.762	1.026	8.661	8.537	1.266	5.341	3.949	0.453	1100189
	6	71.297	0.750	8.327	8.281	0.974	4.537	4.920	0.908	1686873
	7	71.973	0.629	6.644	7.522	0.969	3.484	6.967	1.811	772005
	8	77.004	0.763	6.423	4.244	0.643	3.083	4.320	1.520	427408
	9	80.251	0.681	5.884	5.058	0.482	3.611	2.688	1.344	374324
	10	78.398	0.526	7.328	6.415	0.453	4.114	2.539	0.226	73420
MAGW	1	74.125	0.529	14.967	9.145	0.469	0.404	0.313	0.048	166380
	2	71.018	1.153	9.261	9.771	0.870	7.009	0.879	0.032	2041497
	3	71.763	0.791	8.435	8.101	1.079	2.978	6.598	0.248	2517781
	4	72.032	0.556	8.702	6.943	1.208	1.289	5.679	3.586	1365600
AREA	1	70.693	0.641	9.916	7.998	1.339	3.458	4.704	1.241	1200319
	2	72.207	0.823	8.563	8.385	0.651	4.358	4.236	0.771	1548147
	3	73.220	0.899	7.095	7.825	0.836	4.912	4.421	0.785	2006277
	4	69.718	1.041	11.806	10.097	1.324	2.502	2.953	0.555	1336515
YEAR	1	69.257	1.348	9.349	11.227	0.521	7.810	0.467	0.019	355399
	2	71.578	1.220	9.023	9.585	0.691	7.354	0.518	0.029	666026
	3	70.325	1.111	9.188	9.807	1.190	7.329	1.018	0.030	821119
	4	71.854	0.881	8.298	8.536	0.900	4.888	4.561	0.072	766862
	5	73.498	0.704	8.905	7.669	0.655	2.549	5.954	0.063	796518
	6	71.554	0.758	8.807	8.037	1.395	2.152	7.084	0.209	761350
	7	71.327	0.626	8.645	8.149	1.052	1.598	7.652	0.950	758579
	8	72.549	0.599	10.233	7.088	1.389	0.968	4.207	2.966	804565
	9	72.487	0.562	10.013	6.826	0.890	0.927	3.215	5.080	360840
SEASON	1	69.027	1.049	8.968	9.282	1.196	5.069	4.633	0.770	1183755
	2	72.125	0.913	9.048	8.268	0.916	4.225	4.025	0.471	1460505
	3	74.337	0.643	9.168	7.650	0.982	2.828	3.463	0.923	2061552
	4	69.599	0.948	9.141	9.350	0.945	4.237	4.662	1.112	1385446
AVERAGES		71.667	0.859	9.092	8.509	1.001	3.937	4.104	0.823	

STANDARD DEVIATIONS OF VEHICLE TYPE PERCENTAGES
RURAL KENTUCKY HIGHWAYS
1950-1966

LOCAL CONDITION	CODE	CARS	BUSES	SU-2A-4T	SU-2A-6T	SU-3A	C-3A	C-4A	C-5A	TOTAL VEH
ROAD TYPE	1	4.108	0.159	1.303	1.314	0.353	1.095	4.771	4.090	341175
	2	6.908	0.605	3.189	3.419	2.460	4.326	4.155	1.982	5196622
	3	8.934	0.634	4.238	6.043	2.296	1.289	1.545	0.848	538587
	4	7.272	0.939	5.415	4.665	0.779	1.696	0.576	0.022	14874
DIREC-TION	1	7.279	0.611	3.513	3.901	1.981	4.312	4.549	2.394	3934241
	2	6.924	0.623	4.299	3.871	2.929	3.808	3.984	1.670	2157017
ALT ROUTE	1	5.619	0.650	4.069	3.655	1.077	4.276	3.802	1.818	1264033
	2	7.341	0.608	3.707	3.876	2.732	4.235	4.543	2.347	4340900
	3	7.817	0.574	4.474	4.600	1.096	1.481	3.938	0.510	486325
SERVICE PROVIDED	1	9.810	0.356	5.647	3.515	0.346	3.748	0.699	0.652	12717
	2	7.048	0.333	3.361	4.472	1.684	0.737	1.716	1.480	67011
	3	6.141	0.557	3.435	3.664	0.975	3.667	3.876	1.907	883817
	4	6.500	0.605	3.722	3.616	0.675	4.064	4.631	2.180	3343836
	5	6.582	0.571	3.686	3.954	2.388	4.840	4.366	2.462	1370128
	6	16.481	0.506	4.116	7.222	4.194	1.388	3.691	2.480	74622
	7	5.315	0.746	3.103	4.087	1.748	1.074	1.594	0.366	251972
	8	4.415	0.716	2.683	1.726	0.252	1.859	1.505	1.189	84805
	9	0.063	0.0	0.004	0.004	0.000	0.000	0.008	0.0	2350
VOLUME	1	9.758	1.319	5.423	6.453	0.579	3.450	0.469	0.292	20861
	2	8.233	0.839	4.250	5.598	1.309	2.392	1.177	0.290	72488
	3	7.893	0.719	3.684	5.986	1.464	3.136	3.611	1.135	425482
	4	6.994	0.663	3.361	3.407	3.603	3.720	4.133	2.090	1138208
	5	7.938	0.643	3.272	3.378	3.253	5.096	4.289	1.346	1100189
	6	6.088	0.482	3.355	3.383	1.120	4.424	4.941	2.375	1686873
	7	4.882	0.306	2.261	2.367	0.890	2.960	4.137	3.268	772005
	8	4.741	0.722	2.398	2.078	0.427	3.016	3.044	2.488	427408
	9	4.494	0.250	2.389	1.843	0.226	3.034	2.109	2.562	374324
	10	3.219	0.265	1.576	1.374	0.344	2.148	1.383	0.410	73420
MAGW	1	9.168	0.753	4.618	7.506	1.400	0.734	0.603	0.119	166380
	2	7.713	0.651	3.810	3.988	2.155	5.060	1.085	0.071	2041497
	3	6.725	0.522	3.401	3.268	2.803	2.428	4.580	0.814	2517781
	4	6.223	0.439	3.448	2.736	1.951	0.932	3.837	3.552	1365600
AREA	1	6.247	0.460	3.123	3.016	2.493	3.411	4.701	2.885	1200319
	2	7.292	0.529	3.887	3.859	0.546	4.483	4.822	2.216	1548147
	3	6.605	0.650	3.043	2.940	0.703	4.665	4.434	2.023	2006277
	4	7.934	0.710	3.729	5.208	4.273	2.974	3.041	1.271	1336515
YEAR	1	7.658	0.657	4.170	4.012	0.379	5.370	0.339	0.051	355399
	2	7.178	0.648	3.608	3.460	0.602	5.155	0.390	0.051	666026
	3	8.174	0.600	4.139	4.580	3.356	4.543	0.835	0.059	821119
	4	6.226	0.525	3.365	3.365	1.392	3.468	3.626	0.199	766862
	5	6.512	0.588	3.713	3.065	1.113	1.947	4.599	0.116	796518
	6	7.797	0.488	3.857	3.562	4.465	1.629	4.785	0.759	761350
	7	6.568	0.539	3.811	4.941	1.722	1.070	5.205	1.430	758579
	8	6.803	0.515	3.968	2.788	2.391	0.787	3.369	3.094	804565
	9	5.714	0.492	4.000	2.452	0.824	0.800	2.184	4.581	360840
SEASON	1	7.621	0.626	3.820	4.097	3.217	4.619	4.889	2.141	1183755
	2	6.501	0.601	3.824	3.136	1.599	4.375	4.318	1.439	1460505
	3	6.715	0.566	3.963	4.171	2.790	3.337	3.568	2.268	2061552
	4	6.539	0.603	3.839	3.740	1.260	4.163	4.865	2.574	1385446
AVERAGES		7.123	0.616	3.874	3.899	2.382	4.153	4.374	2.158	

APPENDIX E

AVERAGE UNIT EWL'S AS A FUNCTION OF LOCAL CONDITIONS

UNIT EWL'S

VEHICLE TYPE SU-2A-4T

LOCAL CONDITION	CODE	KENTUCKY		AASHO		MODIFIED AASHO		TOTAL VOLUME
		MEAN	STD. DEV	MEAN	STD DEV	MEAN	STD DEV	
ROAD TYPE	1	0.0	0.0	0.0040	0.0	0.0040	0.0	157
	2	0.0406	0.7016	0.0063	0.0331	0.0063	0.0331	10465
	3	0.0533	0.2558	0.0054	0.0061	0.0054	0.0061	1727
	4	0.0	0.0	0.0	0.0	0.0	0.0	0
DIRECTION	1	0.0475	0.8253	0.0065	0.0389	0.0065	0.0389	6575
	2	0.0329	0.1679	0.0055	0.0055	0.0055	0.0055	5774
ALT ROUTE	1	0.0945	1.0063	0.0084	0.0471	0.0084	0.0471	5628
	2	0.0052	0.0279	0.0045	0.0022	0.0045	0.0022	6630
	3	0.0	0.0	0.0042	0.0007	0.0042	0.0007	91
SERVICE PROVIDED	1	0.0	0.0	0.0	0.0	0.0	0.0	0
	2	4.0000	6.9282	0.1925	0.3265	0.1925	0.3265	61
	3	0.0095	0.0378	0.0049	0.0031	0.0049	0.0031	2047
	4	0.0106	0.0589	0.0049	0.0040	0.0049	0.0040	5530
	5	0.0039	0.0128	0.0044	0.0011	0.0044	0.0011	4234
	6	0.0	0.0	0.0040	0.0	0.0040	0.0	123
	7	0.4062	0.5828	0.0145	0.0133	0.0145	0.0133	354
	8	0.0	0.0	0.0	0.0	0.0	0.0	0
	9	0.0	0.0	0.0	0.0	0.0	0.0	0
VOLUME	1	0.0	0.0	0.0041	0.0004	0.0041	0.0004	522
	2	0.0035	0.0113	0.0045	0.0014	0.0045	0.0014	874
	3	0.1053	0.3329	0.0072	0.0085	0.0072	0.0085	1112
	4	0.1625	1.5534	0.0121	0.0732	0.0121	0.0732	2059
	5	0.0035	0.0104	0.0044	0.0010	0.0044	0.0010	2829
	6	0.0083	0.0435	0.0047	0.0034	0.0047	0.0034	3599
	7	0.0272	0.1079	0.0060	0.0068	0.0060	0.0068	939
	8	0.0	0.0	0.0040	0.0	0.0040	0.0	367
	9	0.0	0.0	0.0046	0.0008	0.0046	0.0008	48
	10	0.0	0.0	0.0	0.0	0.0	0.0	0
MAGW	1	0.0	0.0	0.0041	0.0003	0.0041	0.0003	1346
	2	0.0159	0.0663	0.0052	0.0046	0.0052	0.0046	5256
	3	0.0258	0.1656	0.0050	0.0043	0.0050	0.0043	4579
	4	0.2042	1.7772	0.0139	0.0837	0.0139	0.0837	1168
AREA	1	0.1220	1.3475	0.0100	0.0635	0.0100	0.0635	2835
	2	0.0055	0.0340	0.0045	0.0026	0.0045	0.0026	2316
	3	0.0118	0.0625	0.0050	0.0041	0.0050	0.0041	3105
	4	0.0368	0.1949	0.0053	0.0048	0.0053	0.0048	4093
YEAR	1	0.0143	0.0388	0.0052	0.0030	0.0052	0.0030	1710
	2	0.0033	0.0110	0.0043	0.0010	0.0043	0.0010	1898
	3	0.0425	0.1222	0.0072	0.0082	0.0072	0.0082	1184
	4	0.0005	0.0023	0.0041	0.0003	0.0041	0.0003	3744
	5	0.0151	0.0515	0.0054	0.0040	0.0054	0.0040	901
	6	0.0	0.0	0.0042	0.0003	0.0042	0.0003	857
	7	0.0	0.0	0.0041	0.0006	0.0041	0.0006	446
	8	0.2749	1.8140	0.0157	0.0849	0.0157	0.0849	1354
	9	0.0078	0.0202	0.0051	0.0023	0.0051	0.0023	255
AVERAGES		0.0415	0.6443	0.0061	0.0302	0.0061	0.0302	12349

UNIT EWL'S

VEHICLE TYPE SU-2A-6T

LOCAL CONDITION	CODE	KENTUCKY		AASHO		MODIFIED AASHO		TOTAL VOLUME
		MEAN	STD DEV	MEAN	STD DEV	MEAN	STD DEV	
ROAD TYPE	1	2.2685	0.5453	0.1587	0.0281	0.1587	0.0281	1534
	2	3.1048	3.3595	0.1807	0.0858	0.1807	0.0858	20412
	3	4.5115	8.4677	0.1751	0.1189	0.1751	0.1189	1443
	4	0.0	0.0	0.0	0.0	0.0	0.0	0
DIRECTION	1	3.0705	3.1701	0.1807	0.0888	0.1807	0.0888	13408
	2	3.3920	5.2869	0.1756	0.0855	0.1756	0.0855	9981
ALT ROUTE	1	3.3950	5.4725	0.1759	0.0894	0.1759	0.0894	9159
	2	3.0805	3.1475	0.1796	0.0860	0.1796	0.0860	13868
	3	3.1264	1.8013	0.1995	0.0966	0.1995	0.0966	362
SERVICE PROVIDED	1	0.0	0.0	0.0	0.0	0.0	0.0	0
	2	1.9257	0.0881	0.1292	0.0293	0.1292	0.0293	125
	3	3.8928	4.9832	0.1977	0.1188	0.1977	0.1188	4601
	4	2.6179	1.5532	0.1688	0.0664	0.1688	0.0664	11910
	5	2.6471	1.4473	0.1701	0.0641	0.1701	0.0641	6409
	6	4.4380	0.0	0.2422	0.0	0.2422	0.0	74
	7	25.9040	15.0036	0.4497	0.1615	0.4497	0.1615	270
	8	0.0	0.0	0.0	0.0	0.0	0.0	0
	9	0.0	0.0	0.0	0.0	0.0	0.0	0
VOLUME	1	1.8008	1.7673	0.1271	0.0908	0.1271	0.0908	330
	2	3.2372	2.2850	0.1858	0.0963	0.1858	0.0963	813
	3	5.8139	10.0731	0.2202	0.1576	0.2202	0.1576	1189
	4	2.5431	1.6875	0.1563	0.0753	0.1563	0.0753	3130
	5	2.8495	3.7822	0.1714	0.0897	0.1714	0.0897	5011
	6	2.8852	1.5332	0.1783	0.0580	0.1783	0.0580	6574
	7	2.9626	1.2014	0.1871	0.0456	0.1871	0.0456	3842
	8	5.3893	7.5039	0.2159	0.1100	0.2159	0.1100	2219
	9	3.7450	1.4890	0.2202	0.0521	0.2202	0.0521	281
	10	0.0	0.0	0.0	0.0	0.0	0.0	0
MAGW	1	2.8900	2.5882	0.1641	0.1049	0.1641	0.1049	1022
	2	2.1692	1.1340	0.1489	0.0632	0.1489	0.0632	9155
	3	3.9911	5.6487	0.1983	0.0946	0.1983	0.0946	8941
	4	3.5293	4.0008	0.1973	0.0871	0.1973	0.0871	4271
AREA	1	2.5419	1.1985	0.1673	0.0615	0.1673	0.0615	4635
	2	2.8446	2.5915	0.1729	0.1038	0.1729	0.1038	4005
	3	2.6522	1.3028	0.1758	0.0651	0.1758	0.0651	8614
	4	4.9630	7.7775	0.1992	0.1148	0.1992	0.1148	6135
YEAR	1	1.8375	1.2318	0.1277	0.0743	0.1277	0.0743	3187
	2	2.2072	0.7977	0.1569	0.0458	0.1569	0.0458	2911
	3	2.3002	1.1231	0.1601	0.0611	0.1601	0.0611	2546
	4	2.7588	1.6759	0.1714	0.0713	0.1714	0.0713	4798
	5	3.8248	2.5026	0.2304	0.1132	0.2304	0.1132	2068
	6	3.4185	2.1679	0.1863	0.0660	0.1863	0.0660	2047
	7	4.4785	6.8524	0.2007	0.1049	0.2007	0.1049	1791
	8	4.7680	7.6833	0.2025	0.1099	0.2025	0.1099	3131
	9	2.6030	1.2171	0.1725	0.0511	0.1725	0.0511	910
AVERAGES		3.1945	4.1207	0.1787	0.0876	0.1787	0.0876	23389

UNIT EAL'S

VEHICLE TYPE SU-3A

LOCAL CONDITION	CODE	KENTUCKY		AASHO		MODIFIED AASHO		TOTAL VOLUME
		MEAN	STD DEV	MEAN	STD DEV	MEAN	STD DEV	
ROAD TYPE	1	6.1290	5.5267	0.2661	0.1553	0.4151	0.2680	140
	2	9.1080	12.9214	0.3260	0.2476	0.5116	0.3824	1890
	3	23.1424	35.4535	0.5358	0.5667	0.8017	0.8447	150
	4	0.0	0.0	0.0	0.0	0.0	0.0	0
DIRECTION	1	9.4560	14.4354	0.3279	0.2560	0.5169	0.3958	1299
	2	10.9966	18.5041	0.3573	0.3334	0.5486	0.5024	881
ALT ROUTE	1	10.6581	18.9923	0.3481	0.3470	0.5304	0.5199	831
	2	9.7835	14.3797	0.3367	0.2503	0.5319	0.3900	1310
	3	6.5808	4.2205	0.2450	0.1177	0.4059	0.1714	39
SERVICE PROVIDED	1	0.0	0.0	0.0	0.0	0.0	0.0	0
	2	5.4435	0.4339	0.2649	0.0141	0.3755	0.0103	47
	3	14.3703	22.6647	0.3578	0.3261	0.5663	0.5063	399
	4	7.6126	6.2635	0.3207	0.2091	0.5064	0.3202	1132
	5	5.6740	5.5134	0.2671	0.2039	0.4113	0.3198	472
	6	4.9920	0.0	0.3640	0.0	0.4494	0.0	4
	7	58.8783	37.4635	1.1404	0.5208	1.6980	0.7850	126
	8	0.0	0.0	0.0	0.0	0.0	0.0	0
	9	0.0	0.0	0.0	0.0	0.0	0.0	0
VOLUME	1	1.3986	1.7418	0.0830	0.0969	0.1355	0.1615	7
	2	3.6633	4.9677	0.1931	0.2266	0.2837	0.3245	42
	3	25.2502	36.2287	0.5347	0.5813	0.8314	0.8531	149
	4	8.3661	15.4769	0.2863	0.3027	0.4476	0.5016	236
	5	7.0448	7.3153	0.2930	0.2356	0.4646	0.3569	436
	6	7.2825	3.9445	0.3271	0.1519	0.5152	0.2367	634
	7	9.3329	7.4444	0.3650	0.2036	0.5749	0.3332	414
	8	20.7772	27.7086	0.4686	0.3234	0.6967	0.4581	230
	9	19.9960	6.6129	0.6245	0.0658	0.9402	0.0834	32
	10	0.0	0.0	0.0	0.0	0.0	0.0	0
MAGW	1	2.0433	2.2627	0.1366	0.1446	0.1880	0.1941	23
	2	5.6330	4.3851	0.2550	0.1746	0.4105	0.2758	780
	3	14.0285	21.5711	0.4228	0.3502	0.6516	0.5204	942
	4	10.6706	14.3586	0.3453	0.2578	0.5392	0.4249	435
AREA	1	7.6802	6.9326	0.3311	0.2309	0.5062	0.3570	437
	2	7.4554	14.7594	0.2429	0.2599	0.4021	0.4370	266
	3	7.5774	5.6396	0.3226	0.1918	0.5135	0.3014	926
	4	18.5590	28.1782	0.4510	0.4288	0.6762	0.6332	551
YEAR	1	4.4404	4.7505	0.1967	0.2055	0.3242	0.3185	132
	2	5.6077	4.3604	0.2538	0.1710	0.4121	0.2751	249
	3	6.2953	3.5361	0.2852	0.1161	0.4620	0.1947	294
	4	5.9579	6.1718	0.2543	0.1856	0.3936	0.2931	480
	5	10.2700	8.4896	0.4069	0.2595	0.6461	0.3971	168
	6	12.3121	16.0816	0.4554	0.3120	0.6866	0.4653	232
	7	17.6219	23.3043	0.4529	0.3081	0.6884	0.4615	185
	8	16.0872	26.7364	0.4312	0.4453	0.6464	0.6632	339
	9	15.4322	22.6324	0.3591	0.2158	0.6207	0.4438	101
AVERAGES		10.0445	16.1289	0.3391	0.2884	0.5290	0.4399	2180

UNIT EWL'S

VEHICLE TYPE C-3A

LOCAL CONDITION	CODE	KENTUCKY		AASHO		MODIFIED AASHO		TOTAL VOLUME
		MEAN	STD DEV	MEAN	STD DEV	MEAN	STD DEV	
ROAD TYPE	1	6.7608	2.2514	0.5077	0.1167	0.5077	0.1167	705
	2	9.0137	5.8794	0.6159	0.2394	0.6159	0.2394	11376
	3	10.4281	17.8593	0.5984	0.7486	0.5984	0.7486	62
	4	0.0	0.0	0.0	0.0	0.0	0.0	0
DIRECTION	1	9.3428	7.6731	0.6280	0.2913	0.6280	0.2913	7105
	2	8.1347	3.9101	0.5718	0.2256	0.5718	0.2256	5038
ALT ROUTE	1	8.4253	6.3817	0.5821	0.2917	0.5821	0.2917	4929
	2	9.2079	6.6523	0.6241	0.2545	0.6241	0.2545	7167
	3	5.5420	4.7296	0.4132	0.2985	0.4132	0.2985	47
SERVICE PROVIDED	1	0.0	0.0	0.0	0.0	0.0	0.0	0
	2	5.6940	0.0636	0.4366	0.0419	0.4366	0.0419	29
	3	9.7485	9.6735	0.6483	0.2595	0.6483	0.2595	2197
	4	9.2643	6.3190	0.6245	0.3051	0.6245	0.3051	6569
	5	7.7847	3.5523	0.5547	0.2013	0.5547	0.2013	3319
	6	7.2180	0.0	0.4378	0.0	0.4378	0.0	6
	7	7.3890	2.9251	0.5536	0.2384	0.5536	0.2384	23
	8	0.0	0.0	0.0	0.0	0.0	0.0	0
	9	0.0	0.0	0.0	0.0	0.0	0.0	0
VOLUME	1	19.9770	30.3074	0.9099	1.1607	0.9099	1.1607	17
	2	16.2083	28.6535	0.6966	0.7156	0.6966	0.7156	42
	3	7.3226	5.0268	0.5110	0.3181	0.5110	0.3181	169
	4	7.9436	3.5492	0.5534	0.2332	0.5534	0.2332	1227
	5	8.9645	4.0120	0.6320	0.2284	0.6320	0.2284	3508
	6	8.9114	4.2455	0.6118	0.2388	0.6118	0.2388	4092
	7	8.5588	3.0719	0.6002	0.1719	0.6002	0.1719	2384
	8	8.7348	2.7545	0.6101	0.1431	0.6101	0.1431	614
	9	6.1510	1.8555	0.5118	0.1096	0.5118	0.1096	90
	10	0.0	0.0	0.0	0.0	0.0	0.0	0
MAGW	1	12.8738	20.5063	0.7000	0.8534	0.7000	0.8534	45
	2	9.6780	7.7532	0.6449	0.2886	0.6449	0.2886	6571
	3	8.5961	3.4246	0.5947	0.1778	0.5947	0.1778	4217
	4	7.0790	3.0314	0.5299	0.1814	0.5299	0.1814	1310
AREA	1	6.9609	3.2860	0.5066	0.1929	0.5066	0.1929	1846
	2	10.0704	11.7014	0.6292	0.3517	0.6292	0.3517	2108
	3	9.3217	4.5760	0.6455	0.2564	0.6455	0.2564	6278
	4	8.5918	3.9560	0.5982	0.2350	0.5982	0.2350	1911
YEAR	1	6.0827	4.5240	0.4413	0.2981	0.4413	0.2981	1586
	2	9.8519	3.7674	0.6809	0.2163	0.6809	0.2163	2428
	3	11.6798	3.1798	0.7797	0.1775	0.7797	0.1775	2508
	4	9.8127	9.6333	0.6215	0.2470	0.6215	0.2470	2569
	5	8.7034	2.7507	0.6090	0.1455	0.6090	0.1455	811
	6	7.0257	3.3398	0.5028	0.1429	0.5028	0.1429	717
	7	6.4242	2.2730	0.4913	0.1428	0.4913	0.1428	588
	8	9.5955	10.9791	0.6356	0.4598	0.6356	0.4598	618
	9	6.7403	3.5619	0.5265	0.2183	0.5265	0.2183	318
AVERAGES		8.8944	6.5605	0.6071	0.2702	0.6071	0.2702	12143

UNIT EWL'S

VEHICLE TYPE C-4A

LOCAL CONDITION	CODE	KENTUCKY		AASHO		MODIFIED AASHO		TOTAL VOLUME
		MEAN	STD DEV	MEAN	STD DEV	MEAN	STD DEV	
ROAD TYPE	1	11.5470	3.1531	0.7181	0.1480	0.8419	0.1827	3150
	2	15.4852	9.3296	0.8218	0.3289	1.0090	0.4381	10945
	3	21.5461	22.1746	0.7775	0.5681	0.9627	0.7273	226
	4	0.0	0.0	0.0	0.0	0.0	0.0	0
DIRECTION	1	16.9244	10.8113	0.8775	0.3361	1.0784	0.4500	9391
	2	11.9912	6.4898	0.6712	0.2619	0.8092	0.3396	4930
ALT ROUTE	1	13.3289	12.6905	0.6862	0.3333	0.8306	0.4306	3037
	2	16.0684	8.3921	0.8596	0.3108	1.0547	0.4190	10983
	3	12.7608	7.7463	0.6295	0.3381	0.7407	0.4039	301
SERVICE PROVIDED	1	0.0	0.0	0.0	0.0	0.0	0.0	0
	2	58.6528	24.3714	1.6165	0.4985	2.1276	0.6607	62
	3	16.4054	8.0706	0.8791	0.2929	1.0907	0.4059	2847
	4	15.1038	9.4972	0.7882	0.3024	0.9566	0.4002	8146
	5	13.1598	7.3966	0.7602	0.3488	0.9217	0.4434	3243
	6	0.0	0.0	0.0420	0.0	0.0360	0.0	1
	7	16.0787	7.3192	0.7129	0.1243	0.9165	0.2513	22
	8	0.0	0.0	0.0	0.0	0.0	0.0	0
	9	0.0	0.0	0.0	0.0	0.0	0.0	0
VOLUME	1	2.4000	3.3226	0.2196	0.2473	0.2476	0.2937	6
	2	23.9338	24.4528	0.8037	0.4604	0.9274	0.5300	52
	3	19.4607	11.7079	0.8820	0.4056	1.1488	0.5731	238
	4	21.3722	15.7455	0.9466	0.4386	1.2020	0.5954	1497
	5	12.6771	6.2434	0.7406	0.3017	0.8961	0.3886	2358
	6	12.9852	6.9260	0.7584	0.3277	0.9114	0.4175	3500
	7	15.0196	5.4130	0.8271	0.2134	1.0047	0.2874	4220
	8	14.9399	3.8819	0.8371	0.1341	1.0072	0.1951	2171
	9	16.3311	6.8235	0.8478	0.1941	1.0357	0.2701	279
	10	0.0	0.0	0.0	0.0	0.0	0.0	0
MAGW	1	13.7774	18.6630	0.4636	0.5245	0.5769	0.7028	47
	2	8.0703	12.4310	0.4174	0.3652	0.4864	0.4588	979
	3	16.3872	5.2233	0.9053	0.1975	1.1073	0.2764	8449
	4	17.4440	11.6178	0.8797	0.2940	1.0869	0.4095	4846
AREA	1	19.8425	13.0430	0.9628	0.3858	1.2106	0.5133	2875
	2	15.3652	9.8347	0.8192	0.3744	1.0128	0.5095	2954
	3	13.1103	5.1497	0.7402	0.2212	0.8865	0.2784	6278
	4	13.7991	10.5943	0.7401	0.3117	0.8883	0.3965	2214
YEAR	1	2.0570	3.0218	0.1502	0.1530	0.1624	0.1737	121
	2	5.3724	4.7603	0.3600	0.2272	0.4053	0.2544	290
	3	4.8393	2.5664	0.3420	0.1147	0.3824	0.1340	373
	4	16.4120	7.2948	0.8705	0.2376	1.0629	0.3147	2981
	5	18.3276	5.7624	0.9859	0.2045	1.2163	0.2929	2281
	6	16.1736	5.5891	0.9015	0.2127	1.1048	0.3104	2529
	7	16.2239	6.7317	0.8827	0.2431	1.0707	0.3332	2662
	8	19.5410	16.3683	0.8885	0.3677	1.1092	0.4963	2171
	9	13.9529	6.3093	0.7586	0.1993	0.9315	0.2894	913
AVERAGES		15.2519	9.8483	0.8076	0.3278	0.9872	0.4349	14321

UNIT EWL'S

VEHICLE TYPE C-5A

LOCAL CONDITION	CODE	KENTUCKY		AASHO		MODIFIED AASHO		TOTAL VOLUME
		MEAN	STD DEV	MEAN	STD DEV	MEAN	STD DEV	
ROAD TYPE	1	14.1246	3.4435	0.7327	0.1480	1.1051	0.2335	2443
	2	19.9525	17.3973	0.8094	0.5165	1.2548	0.8035	1834
	3	16.9600	15.7222	0.7266	0.5043	1.0556	0.7961	25
	4	0.0	0.0	0.0	0.0	0.0	0.0	0
DIRECTION	1	22.1451	16.6855	0.8960	0.4594	1.3887	0.7212	3074
	2	11.3953	8.5081	0.5872	0.3605	0.8812	0.5377	1228
ALT ROUTE	1	13.5862	13.5004	0.6378	0.4999	0.9682	0.7514	420
	2	20.2235	15.4663	0.6473	0.4195	1.3078	0.6645	3865
	3	9.2112	9.3769	0.4344	0.3237	0.6181	0.4793	17
SERVICE PROVIDED	1	0.0	0.0	0.0	0.0	0.0	0.0	0
	2	59.1900	0.0	1.9175	0.0	2.9333	0.0	18
	3	24.6747	14.9258	0.9700	0.4662	1.5137	0.7405	693
	4	16.6637	14.7646	0.7391	0.3791	1.1254	0.5895	2831
	5	14.5289	12.5650	0.6784	0.4702	1.0425	0.7208	759
	6	0.0	0.0	0.0	0.0	0.0	0.0	0
	7	2.0000	0.0	0.2000	0.0	0.3100	0.0	1
	8	0.0	0.0	0.0	0.0	0.0	0.0	0
	9	0.0	0.0	0.0	0.0	0.0	0.0	0
VOLUME	1	0.0	0.0	0.0	0.0	0.0	0.0	0
	2	19.6875	18.7011	0.7495	0.6140	1.1102	0.9673	8
	3	16.5100	12.1248	0.7503	0.4722	1.1109	0.7039	21
	4	30.7183	23.3535	1.1061	0.5303	1.7054	0.8374	467
	5	14.0957	14.8700	0.5638	0.4782	0.8716	0.7228	283
	6	13.3145	10.0277	0.6597	0.4170	1.0157	0.6590	410
	7	15.5617	7.6670	0.7677	0.3216	1.1701	0.4890	1518
	8	16.7488	10.1251	0.7653	0.3218	1.1738	0.5259	1100
	9	24.3595	6.9884	1.0246	0.1493	1.6212	0.2735	495
	10	0.0	0.0	0.0	0.0	0.0	0.0	0
MAGW	1	19.1883	14.8582	0.8583	0.5144	1.1931	0.7380	8
	2	13.1143	18.5255	0.5579	0.6282	0.8543	0.9559	26
	3	9.5589	11.0585	0.5092	0.4859	0.7660	0.7453	205
	4	22.4187	14.6691	0.9208	0.3413	1.4250	0.5408	4063
AREA	1	24.4670	19.3083	0.9349	0.4542	1.4566	0.7138	924
	2	21.5264	16.6279	0.9135	0.4929	1.3842	0.7660	1231
	3	12.5637	7.7264	0.6330	0.3491	0.9617	0.5227	1694
	4	17.2719	13.7429	0.7322	0.4636	1.1408	0.7466	453
YEAR	1	26.0000	0.0	0.9820	0.0	1.8140	0.0	1
	2	10.9571	22.9561	0.3820	0.7675	0.6030	1.1120	13
	3	12.4667	3.3519	0.8251	0.1991	1.0941	0.3089	7
	4	11.1105	11.3202	0.5671	0.4504	0.8490	0.7072	42
	5	11.9062	15.4840	0.6465	0.6853	0.9249	1.0180	34
	6	5.9875	6.5137	0.3427	0.3171	0.5229	0.5173	74
	7	15.5248	7.5415	0.7105	0.2798	1.1140	0.4360	427
	8	24.4939	17.4904	0.9531	0.3848	1.4735	0.6083	2003
	9	20.3362	11.1413	0.8969	0.3209	1.3849	0.5251	1701
AVERAGES		18.3338	15.2253	0.7865	0.4518	1.2088	0.7051	4302

APPENDIX F

WORK SHEETS FOR PREDICTING DESIGN EWL'S

PREDICTION OF DESIGN EWLS SHEET- 1 OF 5
(RURAL ONLY) DATE-
DESCRIPTION OF PROJECT AND COMPUTATIONS PREPARATOR-

DESCRIPTION OF PROJECT

ROUTE NAME- ROUTE NUMBER-

PROJECT NUMBER- COUNTY-

PROJECT LIMITS-

LOADOMETER STATION REFERENCE (IF ANY)-

DESCRIPTION OF TRAFFIC AND DESIGN PERIOD

DESIGN PERIOD (INCLUSIVE DATES)-

DESIGN PERIOD (YEARS)-

DESIGN OR EFFECTIVE ADT (VEHICLES PER DAY)-

TYPE OF EWL (CIRCLE)- KY AASHO MODIFIED AASHO

COMPUTATIONS

VEHICLE TYPE	ADJUSTED FRACTION (FROM SHEET 4)		UNIT EWLS (FROM SHEET 5)		
CARS		X		=	
BUSES		X		=	
SU-2A-4T		X		=	
SU-2A-6T		X		=	
SU-3A		X		=	
C-3A		X		=	
C-4A		X		=	
C-5A		X		=	
			AVERAGE UNIT EWL	=	= SUM

DESIGN EWLS = 365 X	X	X	=
	DESIGN PERIOD (YEARS)	ADT (VEHICLES PER DAY)	SUM	DESIGN EWLS

COMPARISON WITH REFERENCE STATION

MAY 1968

PREDICTION OF DESIGN EWLS (RURAL ONLY) DETERMINATION OF LOCAL CONDITIONS	SHEET- 2 OF 5 DATE- PREPARATOR-

** FOR EACH OF THE FOLLOWING LOCAL CONDITIONS, CIRCLE THE APPROPRIATE CODE **

LOCAL CONDITION	CODE	DESCRIPTION
ROAD TYPE	1	INTERSTATE-NUMBERED RURAL ROUTE
	2	US-NUMBERED RURAL ROUTE
	3	KY-NUMBERED RURAL ROUTE
	4	OTHER RURAL ROUTE
DIRECTION	1	SERVES PREDOMINANTLY NORTH-SOUTH TRAFFIC
	2	SERVES PREDOMINANTLY EAST-WEST TRAFFIC
ALTERNATE ROUTE	1	ALTERNATE ROUTE PROVIDES INFERIOR SERVICE
	2	NO ALTERNATE ROUTE OR SAME QUALITY OF SERVICE
	3	ALTERNATE ROUTE PROVIDES SUPERIOR SERVICE
SERVICE PROVIDED	1	PRIMARILY PROVIDES SERVICE TO MAJOR RECREATIONAL ACTIVITIES
	2	PROVIDES SIGNIFICANT SERVICE TO MAJOR RECREATIONAL ACTIVITIES
	3	PROVIDES SOME SERVICE TO RECREATIONAL ACTIVITIES
	4	ORDINARY
	5	PROVIDES SOME SERVICE TO MINING ACTIVITIES
	6	PROVIDES SIGNIFICANT SERVICE TO MAJOR MINING ACTIVITIES
	7	PRIMARILY PROVIDES SERVICE TO MAJOR MINING ACTIVITIES
	8	PROVIDES MORE THAN ORDINARY SERVICE TO INDUSTRIAL ACTIVITIES
	9	PRIMARILY PROVIDES SERVICE TO MAJOR INDUSTRIAL ACTIVITIES
VOLUME	1	0-499 VEHICLES PER DAY
	2	500-999 VEHICLES PER DAY
	3	1000-1999 VEHICLES PER DAY
	4	2000-2999 VEHICLES PER DAY
	5	3000-3999 VEHICLES PER DAY
	6	4000-5999 VEHICLES PER DAY
	7	6000-7999 VEHICLES PER DAY
	8	8000-9999 VEHICLES PER DAY
	9	10000-13999 VEHICLES PER DAY
	10	14000 OR MORE VEHICLES PER DAY
MAXIMUM ALLOWABLE GROSS WEIGHT	1	30,000 POUNDS
	2	42,000 POUNDS
	3	59,640 POUNDS
	4	73,280 POUNDS
	OTHER	POUNDS
GEOGRAPHICAL AREA	1	WESTERN (HIGHWAY DISTRICTS 1 AND 2)
	2	SOUTH CENTRAL (HIGHWAY DISTRICTS 3, 4, AND 8)
	3	NORTH CENTRAL (HIGHWAY DISTRICTS 5, 6, AND 7)
	4	EASTERN (HIGHWAY DISTRICTS 9, 10, 11, AND 12)
SEASON	1	WINTER (JANUARY-MARCH)
	2	SPRING (APRIL-JUNE)
	3	SUMMER (JULY-SEPTEMBER)
	4	FALL (OCTOBER-DECEMBER)

MAY 1968

PREDICTION OF DESIGN EWLS
(RURAL ONLY)
BASIC VEHICLE TYPE PERCENTAGES

SHEET- 3 OF 5
DATE-
PREPARATOR-

** SELECT BASIC PERCENTAGES FOR EACH VEHICLE TYPE AND TRANSFER TO SHEET 4 **

ROAD TYPE	MAX ALLOW GR WEIGHT	VOLUME GROUP	CARS	BUSES	SU-2A-4T	SU-2A-6T	SU-3A	C-3A	C-4A	C-5A
1	1	1								
1	1	2								
1	1	3								
1	1	4								
1	1	5								
1	1	6								
1	1	7								
1	1	8								
1	1	9								
1	1	10								
1	2	1								
1	2	2								
1	2	3								
1	2	4								
1	2	5								
1	2	6								
1	2	7								
1	2	8								
1	2	9								
1	2	10								
1	3	1								
1	3	2								
1	3	3								
1	3	4								
1	3	5	63.232	0.520	4.211	5.809	0.534	4.544	20.424	0.732
1	3	6	70.827	0.379	4.753	4.946	0.633	2.767	14.191	1.511
1	3	7	71.744	0.483	3.839	4.664	0.665	2.419	14.401	1.793
1	3	8								
1	3	9								
1	3	10								
1	4	1								
1	4	2								
1	4	3	63.555	0.213	9.073	11.460	1.221	0.585	7.322	6.579
1	4	4								
1	4	5	73.548	0.274	6.841	7.266	0.790	2.002	8.602	0.686
1	4	6	68.765	0.224	4.778	6.036	0.775	2.964	13.016	3.451
1	4	7	71.526	0.316	4.905	5.164	0.726	1.861	8.112	7.397
1	4	8	75.539	0.225	4.589	4.694	0.624	1.361	6.718	6.258
1	4	9	74.209	0.387	5.575	4.357	0.496	1.654	4.744	8.585
1	4	10								
2	1	1	72.804	0.672	14.234	9.353	0.813	1.682	0.336	0.113
2	1	2	80.650	0.620	10.911	6.492	0.515	0.387	0.432	0.001
2	1	3	76.797	0.186	12.914	8.711	0.167	0.422	0.729	0.082
2	1	4	75.593	1.142	12.319	8.944	0.001	1.936	0.068	0.001
2	1	5	83.253	1.211	9.455	5.366	0.001	0.655	0.066	0.001
2	1	6								
2	1	7								
2	1	8								
2	1	9								
2	1	10								
2	2	1	60.112	3.077	11.493	12.907	1.659	10.458	0.301	0.001
2	2	2	64.433	1.443	12.902	14.914	0.717	5.226	0.350	0.022
2	2	3	69.220	1.091	11.578	12.356	0.683	4.378	0.659	0.041
2	2	4	70.700	1.381	9.788	10.067	0.652	6.766	0.623	0.029
2	2	5	68.870	1.346	8.354	9.733	1.217	9.255	1.205	0.028
2	2	6	71.011	1.065	8.621	9.385	0.830	7.996	1.054	0.038
2	2	7	73.835	0.854	6.890	8.620	0.720	7.865	1.176	0.048
2	2	8	77.521	0.978	5.667	6.420	0.603	7.974	0.822	0.023
2	2	9	78.190	0.869	6.134	6.537	0.470	7.160	0.632	0.015
2	2	10	79.856	0.841	6.122	5.538	0.538	5.872	1.150	0.089
2	3	1	74.075	0.001	12.141	10.906	0.618	0.207	1.853	0.207
2	3	2	69.791	1.135	12.824	9.658	1.501	2.473	2.554	0.071
2	3	3	69.429	1.175	10.008	9.973	0.887	2.743	5.702	0.089
2	3	4	70.021	0.852	9.185	8.249	1.350	3.231	6.847	0.273
2	3	5	71.708	0.913	8.278	7.942	1.349	3.172	6.406	0.239
2	3	6	71.246	0.681	7.610	8.059	0.948	3.721	7.526	0.217
2	3	7	71.600	0.711	6.727	8.304	1.041	3.335	8.153	0.136
2	3	8	78.508	0.873	6.315	5.999	0.588	1.876	5.768	0.081
2	3	9	81.951	0.618	5.934	4.694	0.534	1.974	4.216	0.086
2	3	10	75.521	0.447	8.083	7.681	0.453	4.102	3.706	0.015
2	4	1								
2	4	2	71.153	1.004	12.001	9.902	0.863	0.823	3.351	0.909
2	4	3	70.782	1.039	11.351	9.092	1.047	0.890	3.929	1.876
2	4	4	70.012	0.791	9.867	7.272	1.947	1.349	5.001	3.768
2	4	5	71.397	0.569	9.704	7.076	1.325	1.303	5.990	2.643
2	4	6	71.632	0.497	9.259	7.552	1.370	1.056	5.042	3.599
2	4	7	71.768	0.457	8.051	6.614	1.231	1.410	6.401	4.076
2	4	8	74.020	0.538	7.343	7.206	0.747	1.122	5.284	3.750
2	4	9	81.499	0.510	5.365	3.645	0.472	0.904	4.081	3.527
2	4	10	84.122	0.138	7.477	4.377	0.286	0.642	1.824	1.141

MAY 1968

SHEET- 3 OF 5 (CONTINUED)

ROAD TYPE	MAX ALLOW GR WEIGHT	VOLUME GROUP	CARS	BUSES	SU-2A-4T	SU-2A-6T	SU-3A	C-3A	C-4A	C-5A
3	1	1	67.622	0.911	19.113	11.924	0.078	0.237	0.096	0.027
3	1	2	71.247	0.560	16.919	10.596	0.228	0.263	0.170	0.026
3	1	3	73.944	0.351	14.699	9.282	0.865	0.436	0.360	0.071
3	1	4	75.504	0.641	14.607	7.493	0.531	0.408	0.715	0.109
3	1	5	83.605	0.252	11.461	4.214	0.162	0.160	0.137	0.016
3	1	6	71.009	0.403	11.510	16.640	0.181	0.131	0.131	0.001
3	1	7								
3	1	8								
3	1	9								
3	1	10								
3	2	1	66.133	1.336	17.311	13.006	0.067	1.534	0.620	0.001
3	2	2	64.883	1.170	16.148	14.708	0.606	2.037	0.339	0.118
3	2	3	67.313	0.860	13.882	14.039	0.909	2.706	0.271	0.027
3	2	4	76.486	0.737	11.591	8.586	0.480	1.401	0.704	0.022
3	2	5	72.275	0.834	13.036	10.328	2.215	1.169	0.141	0.008
3	2	6	71.060	0.751	13.269	10.497	3.248	0.802	0.376	0.006
3	2	7								
3	2	8								
3	2	9								
3	2	10								
3	3	1	69.088	0.705	15.207	10.273	1.812	0.504	1.208	1.208
3	3	2	67.131	0.935	18.324	9.656	1.987	0.783	1.005	0.186
3	3	3	69.209	0.783	13.691	12.020	1.029	1.133	1.911	0.230
3	3	4	73.298	0.471	11.800	9.634	1.355	0.744	2.244	0.462
3	3	5	78.092	0.714	11.862	7.463	0.276	0.886	0.697	0.016
3	3	6	76.516	0.576	13.882	6.991	0.557	0.434	0.898	0.154
3	3	7								
3	3	8	79.709	1.031	11.543	6.130	0.908	0.306	0.283	0.095
3	3	9	86.144	0.805	7.992	3.906	0.321	0.419	0.378	0.042
3	3	10								
3	4	1	72.722	1.225	18.545	6.994	0.517	0.001	0.001	0.001
3	4	2	72.373	0.834	16.541	8.409	0.645	0.208	0.889	0.109
3	4	3	71.124	0.495	15.111	9.623	0.707	0.186	1.597	1.164
3	4	4	70.993	0.355	13.922	9.286	0.875	0.447	2.303	1.829
3	4	5								
3	4	6	77.766	0.216	12.934	5.797	0.697	0.448	1.325	0.825
3	4	7								
3	4	8								
3	4	9								
3	4	10								
4	1	1	72.020	1.120	17.667	9.029	0.073	0.080	0.016	0.001
4	1	2	76.173	0.688	13.379	7.277	1.493	0.658	0.306	0.035
4	1	3	82.974	0.214	9.889	3.389	0.001	2.459	1.080	0.001
4	1	4								
4	1	5								
4	1	6								
4	1	7								
4	1	8								
4	1	9								
4	1	10								
4	2	1								
4	2	2								
4	2	3								
4	2	4								
4	2	5								
4	2	6	76.911	1.607	9.879	7.203	0.536	3.845	0.025	0.001
4	2	7								
4	2	8								
4	2	9								
4	2	10								
4	3	1	72.918	3.126	12.501	11.459	0.001	0.001	0.001	0.001
4	3	2								
4	3	3								
4	3	4								
4	3	5								
4	3	6								
4	3	7								
4	3	8								
4	3	9								
4	3	10								
4	4	1								
4	4	2								
4	4	3								
4	4	4								
4	4	5								
4	4	6								
4	4	7								
4	4	8								
4	4	9								
4	4	10								

MAY 1968

PREDICTION OF DESIGN EWLS
(RURAL ONLY)
ADJUSTED VEHICLE TYPE PERCENTAGES

SHEET- 4 OF 5
DATE-
PREPARATOR-

** SELECT THE APPROPRIATE FACTORS AND PERFORM THE INDICATED CALCULATIONS **

VEHICLE TYPE	CODE	BASIC PERCENT	ALTERNATE ROUTE	SERVICE PROVIDED	DIRECTION	AREA	SEASON	UNADJUSTED PERCENT	ADJUSTMENT FACTOR	ADJUSTED PERCENT
	1		1.011	1.028	0.998	0.994	0.966			
	2		0.994	1.029	1.002	0.999	1.005			
	3		1.019	0.999		1.016	1.038			
	4	FROM		1.011		0.984	0.969			
CARS	5	SHEET		0.975						
	6	3		0.856						
	7			1.023						
	8			1.122						
	9			0.881						
		X	X	X	X	X	0.997 - 0.001 =		X	=
	1		0.993	0.646	1.052	0.772	1.185			
	2		1.012	0.618	0.913	1.008	1.026			
	3		0.903	1.065		1.076	0.808			
	4	FROM		0.946		1.099	1.090			
BUSES	5	SHEET		1.000						
	6	3		0.862						
	7			1.492						
	8			1.059						
	9			0.194						
		X	X	X	X	X	1.015 - 0.001 =		X	=
	1		0.970	0.924	0.973	1.101	0.977			
	2		1.002	1.058	1.045	0.952	1.013			
	3		1.051	0.955		0.827	0.973			
	4	FROM		1.004		1.236	1.047			
SU-2A-4T	5	SHEET		0.952						
	6	3		1.024						
	7			1.188						
	8			1.059						
	9			0.869						
		X	X	X	X	X	1.002 - 0.001 =		X	=
	1		0.967	0.631	0.990	0.918	1.061			
	2		1.014	1.003	1.016	0.998	0.966			
	3		0.957	0.953		0.942	0.906			
	4	FROM		1.008		1.172	1.122			
SU-2A-6T	5	SHEET		1.039						
	6	3		1.184						
	7			0.875						
	8			0.707						
	9			0.856						
		X	X	X	X	X	1.008 - 0.001 =		X	=
	1		0.826	0.338	0.941	1.225	1.057			
	2		1.037	1.195	1.096	0.869	0.989			
	3		1.066	0.950		1.022	0.963			
	4	FROM		0.856		0.916	1.017			
SU-3A	5	SHEET		1.081						
	6	3		5.802						
	7			1.095						
	8			0.405						
	9			0.474						
		X	X	X	X	X	1.003 - 0.001 =		X	=
	1		1.034	1.509	1.054	0.853	1.269			
	2		1.006	0.770	0.911	1.089	0.942			
	3		0.854	1.143		1.160	0.847			
	4	FROM		0.956		0.824	1.047			
C-3A	5	SHEET		1.118						
	6	3		0.821						
	7			0.551						
	8			0.458						
	9			1.775						
		X	X	X	X	X	1.012 - 0.001 =		X	=
	1		0.965	0.713	1.038	1.109	1.073			
	2		1.004	0.784	0.931	1.006	0.982			
	3		1.050	1.145		1.062	0.962			
	4	FROM		0.952		0.818	1.010			
C-4A	5	SHEET		1.145						
	6	3		0.884						
	7			0.476						
	8			0.507						
	9			5.743						
		X	X	X	X	X	1.003 - 0.001 =		X	=
	1		1.137	0.893	0.903	1.637	0.847			
	2		0.958	0.560	1.169	0.903	1.108			
	3		1.044	0.995		0.890	1.050			
	4	FROM		0.943		0.748	0.949			
C-5A	5	SHEET		1.065						
	6	3		3.383						
	7			0.421						
	8			1.289						
	9			4.851						
		X	X	X	X	X	0.996 - 0.001 =		X	=

ADJUSTMENT FACTOR = 100 DIVIDED BY THE SUM OF UNADJUSTED PERCENTAGES = 100/ =

** TRANSFER ADJUSTED PERCENTAGES TC SHEET 1 IN FORM OF FRACTIONS **

MAY 1968

PREDICTION OF DESIGN EWLS
(RURAL ONLY)
KENTUCKY UNIT EWLS

SHEET- 5A OF 5
DATE-
PREPARATOR-

** SELECT THE APPROPRIATE FACTORS AND PERFORM THE INDICATED CALCULATIONS **

VEHICLE TYPE	CODE	ROAD TYPE	DIRECTION	ALTERNATE ROUTE	VOLUME	MAX ALLOW GR WEIGHT	GEOGRAPHICAL AREA	DESIGN UNIT EWLS
CARS	NO ADJUSTMENT FOR LOCAL CONDITIONS							0.0
BUSES	NO ADJUSTMENT FOR LOCAL CONDITIONS							5.0000
	1	-0.0558	0.1380	0.2085	-0.0705	-0.2626	0.0952	
	2	0.0	0.0	-0.0276	-0.0099	-0.2392	0.0549	
	3	0.0864		0.0	0.1255	-0.2164	0.0550	
	4	0.0864			0.1672	0.0	0.0	
SU-2A-4T	5				0.0			
	6				0.0351			
	7				0.0287			
	8				0.0750			
	9				-0.0732			
	10				-0.1000			
-0.0126	+	+	+	+	+	+		=
	1	-2.0564	-0.2839	2.2585	-0.7779	-5.0383	-1.9670	
	2	0.0	0.0	2.1273	-1.0558	-1.7376	-1.2755	
	3	4.6334		0.0	1.9819	-0.2062	-1.5929	
	4	4.6334			-0.5837	0.0	0.0	
SU-2A-6T	5				0.0			
	6				0.0229			
	7				0.0523			
	8				1.9806			
	9				0.6512			
	10				0.6512			
3.0751	+	+	+	+	+	+		=
	1	-10.9730	-2.7084	17.5781	7.2226	-39.7040	-6.9528	
	2	0.0	0.0	19.3231	-8.0255	-5.2789	-4.0088	
	3	30.2142		0.0	11.6134	-0.0070	-4.0948	
	4	30.2142			-0.4663	0.0	0.0	
SU-3A	5				0.0			
	6				0.6799			
	7				2.0945			
	8				13.2101			
	9				11.9481			
	10				15.0000			
-3.5442	+	+	+	+	+	+		=
	1	-2.8149	1.4048	2.0100	15.0693	3.2959	-1.2290	
	2	0.0	0.0	2.3167	10.7394	1.8672	1.6609	
	3	-6.5899		0.0	0.0475	0.6460	1.5798	
	4	-6.5899			0.1055	0.0	0.0	
C-3A	5				0.0			
	6				0.6203			
	7				1.0269			
	8				2.1082			
	9				-0.2893			
	10				-1.0000			
3.5422	+	+	+	+	+	+		=
	1	-8.1940	5.4152	6.9641	-11.0420	-12.8400	5.8598	
	2	0.0	0.0	2.9261	10.8637	-13.4640	3.8274	
	3	11.5870		0.0	3.5083	-4.0138	3.5870	
	4	11.5870			5.9763	0.0	0.0	
C-4A	5				0.0			
	6				1.1323			
	7				2.9108			
	8				5.7066			
	9				3.8931			
	10				2.0000			
6.6562	+	+	+	+	+	+		=
	1	-10.4700	7.0554	11.8208	0.0	-10.7050	5.0642	
	2	0.0	0.0	10.4758	7.7269	-8.8009	5.1384	
	3	0.6376		0.0	4.8169	-13.6780	0.2145	
	4	0.6376			11.8375	0.0	0.0	
C-5A	5				0.6752			
	6				0.7452			
	7				0.0			
	8				8.4447			
	9				8.9648			
	10				9.5000			
3.4575	+	+	+	+	+	+		=

** TRANSFER DESIGN UNIT EWLS TO SHEET 1. A NEGATIVE ESTIMATE SHOULD BE TRANSFERRED AS ZERO **

MAY 1968

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                              PREDICTION OF DESIGN EALS          SHEET- 5B OF 5
                                   (RURAL ONLY)                  DATE-
                                 AASHO UNIT EALS                 PREPARATOR-

           ** SELECT THE APPROPRIATE FACTORS AND PERFORM THE INDICATED CALCULATIONS **

VEHICLE  CODE   ROAD     DIRECTION    ALTERNATE    VOLUME     MAX ALLOW    GEOGRAPHICAL     DESIGN UNIT
 TYPE           TYPE                    ROUTE                 GR WEIGHT       AREA              EALS

CARS      NO ADJUSTMENT FOR LOCAL CONDITIONS                                                   0.0002

BUSES     NO ADJUSTMENT FOR LOCAL CONDITIONS                                                   0.4000

            1   -0.0054   0.0067      0.0087     -0.0034    -0.0085      0.0054
            2    0.0      0.0        -0.0026      0.0011    -0.0110      0.0033
            3   -0.0004               0.0         0.0048    -0.0105      0.0033
            4   -0.0004                           0.0092     0.0         0.0
SU-2A-4T    5                                     0.0
            6                                     0.0018
            7                                     0.0019
            8                                     0.0041
            9                                    -0.0024
           10                                    -0.0040

     0.0042 +         +          +          +          +          +                  =

            1   -0.0684   0.0101      0.0104     -0.0463    -0.0471     -0.0166
            2    0.0      0.0        -0.0030      0.0130    -0.0622     -0.0036
            3    0.0164               0.0         0.0300    -0.0160     -0.0075
            4    0.0164                          -0.0212     0.0         0.0
SU-2A-6T    5                                     0.0
            6                                     0.0120
            7                                     0.0150
            8                                     0.0399
            9                                     0.0457
           10                                     0.0500

     0.2053 +         +          +          +          +          +                  =

            1   -0.2121  -0.0393      0.3249     -0.0227    -0.6798     -0.0533
            2    0.0      0.0         0.3647     -0.1991    -0.1176     -0.0718
            3    0.5827               0.0         0.1238     0.0088     -0.0059
            4    0.5827                          -0.0421     0.0         0.0
SU-3A       5                                     0.0
            6                                     0.0459
            7                                     0.0687
            8                                     0.1796
            9                                     0.3304
           10                                     0.5000

     0.0413 +         +          +          +          +          +                  =

            1   -0.1476   0.0897      0.1549      0.3328     0.1924     -0.0810
            2    0.0      0.0         0.1676      0.1140     0.0792      0.0392
            3   -0.1686               0.0        -0.0527     0.0184      0.0948
            4   -0.1686                          -0.0137     0.0         0.0
C-3A        5                                     0.0
            6                                     0.0181
            7                                     0.0495
            8                                     0.0885
            9                                    -0.0195
           10                                    -0.1000

     0.3093 +         +          +          +          +          +                  =

            1   -0.2805   0.1343      0.2687     -0.2546    -0.6893      0.2214
            2    0.0      0.0         0.2251      0.2150    -0.5778      0.1642
            3    0.3662               0.0         0.0238    -0.0647      0.1214
            4    0.3662                           0.0924     0.0         0.0
C-4A        5                                     0.0
            6                                     0.0347
            7                                     0.0665
            8                                     0.1726
            9                                     0.1161
           10                                     0.0500

     0.4607 +         +          +          +          +          +                  =

            1   -0.2848   0.2440      0.5151      0.0       -0.1902      0.1855
            2    0.0      0.0         0.3840      0.0219    -0.3416      0.2141
            3    0.0649               0.0         0.0824    -0.4093      0.0771
            4    0.0649                           0.2334     0.0         0.0
C-5A        5                                    -0.1448
            6                                    -0.0087
            7                                     0.0
            8                                     0.2307
            9                                     0.2705
           10                                     0.3000

     0.2395 +         +          +          +          +          +                  =

        ** TRANSFER DESIGN UNIT EWLS TO SHEET 1. A NEGATIVE ESTIMATE SHOULD BE TRANSFERRED
           AS ZERO **
                                                                       MAY 1968
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                 PREDICTION OF DESIGN EALS      SHEET- 5C OF 5
                       (RURAL ONLY)             DATE-
                 MODIFIED AASHO UNIT EALS       PREPARATOR-

    ** SELECT THE APPROPRIATE FACTORS AND PERFORM THE INDICATED CALCULATIONS **

VEHICLE CODE  ROAD   DIRECTION  ALTERNATE  VOLUME   MAX ALLOW  GEOGRAPHICAL   DESIGN UNIT
 TYPE         TYPE                ROUTE             GR WEIGHT     AREA          EALS

CARS    NO ADJUSTMENT FOR LOCAL CONDITIONS                                      0.0002

BUSES   NO ADJUSTMENT FOR LOCAL CONDITIONS                                      0.4000

          1  -0.0054  0.0067      0.0087  -0.0034   -0.0085       0.0054
          2   0.0     0.0        -0.0026   0.0011   -0.0110       0.0033
          3  -0.0004              0.0      0.0048   -0.0105       0.0033
          4  -0.0004                       0.0082    0.0          0.0
SU-2A-4T  5                                0.0
          6                                0.0018
          7                                0.0019
          8                                0.0041
          9                               -0.0024
         10                               -0.0040

     0.0042 +       +         +         +         +        +                =

          1  -0.0684  0.0101      0.0104  -0.0463   -0.0471      -0.0166
          2   0.0     0.0        -0.0030   0.0130   -0.0622      -0.0036
          3   0.0164              0.0      0.0300   -0.0160      -0.0075
          4   0.0164                      -0.0212    0.0          0.0
SU-2A-6T  5                                0.0
          6                                0.0120
          7                                0.0150
          8                                0.0399
          9                                0.0457
         10                                0.0500

     0.2053 +       +         +         +         +        +                =

          1  -0.3421 -0.0617      0.4541   0.0270   -1.0956      -0.0845
          2   0.0     0.0         0.5409  -0.3139   -0.1770      -0.0847
          3   0.8838              0.0      0.2000    0.0005       0.0138
          4   0.8838                      -0.0668    0.0          0.0
SU-3A     5                                0.0
          6                                0.0739
          7                                0.1118
          8                                0.2420
          9                                0.4745
         10                                0.7000

     0.0959 +       +         +         +         +        +                =

          1  -0.1476  0.0897      0.1549   0.3328    0.1924      -0.0810
          2   0.0     0.0         0.1676   0.1140    0.0792       0.0392
          3  -0.1686              0.0     -0.0527    0.0184       0.0948
          4  -0.1686                      -0.0137    0.0          0.0
C-3A      5                                0.0
          6                                0.0181
          7                                0.0495
          8                                0.0885
          9                               -0.0195
         10                               -0.1000

     0.3093 +       +         +         +         +        +                =

          1  -0.4230  0.1498      0.3778  -0.3316   -0.8691       0.3229
          2   0.0     0.0         0.3329   0.2304   -0.7595       0.2472
          3   0.4594              0.0      0.0944   -0.1122       0.1670
          4   0.4594                       0.1464    0.0          0.0
C-4A      5                                0.0
          6                                0.0369
          7                                0.0913
          8                                0.2376
          9                                0.1805
         10                                0.1300

     0.5147 +       +         +         +         +        +                =

          1  -0.4868  0.3980      0.8240   0.0      -0.4514       0.2764
          2   0.0     0.0         0.6346   0.0507   -0.5495       0.3063
          3   0.1140              0.0      0.0968   -0.6707       0.1134
          4   0.1140                       0.3610    0.0          0.0
C-5A      5                               -0.2156
          6                               -0.0018
          7                                0.0
          8                                0.3658
          9                                0.4506
         10                                0.5400

     0.3417 +       +         +         +         +        +                =

   ** TRANSFER DESIGN UNIT EALS TO SHEET 1. A NEGATIVE ESTIMATE SHOULD BE TRANSFERRED
      AS ZERO **
                                                         MAY 1968
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APPENDIX G

EXAMPLE PROBLEM

PREDICTION OF DESIGN EWLS
(RURAL ONLY)
DESCRIPTION OF PROJECT AND COMPUTATIONS

SHEET- 1 OF 5
DATE- 8-15-68
PREPARATOR- LYNCH

DESCRIPTION OF PROJECT

ROUTE NAME-
ROUTE NUMBER- US 27
PROJECT NUMBER- KYHPR-21
COUNTY- McCREARY
PROJECT LIMITS- 2 TO 4 MILES NORTH OF WHITLEY CITY
LOADOMETER STATION REFERENCE (IF ANY)- 4.9 MILES NORTH OF WHITLEY CITY

DESCRIPTION OF TRAFFIC AND DESIGN PERIOD

DESIGN PERIOD (INCLUSIVE DATES)- 1970-1990
DESIGN PERIOD (YEARS)- 20
DESIGN OR EFFECTIVE ADT (VEHICLES PER DAY)- 2900
TYPE OF EWL (CIRCLE)- [✓ KY] AASHO MODIFIED AASHO

COMPUTATIONS

VEHICLE TYPE	ADJUSTED FRACTION (FROM SHEET 4)		UNIT EWLS (FROM SHEET 5)		
CARS	.7045	X	0	=	0
BUSES	.0094	X	5.0000	=	0.0470
SU-2A-4T	.0893	X	0.3199	=	0.0286
SU-2A-6T	.0713	X	3.0593	=	0.2181
SU-3A	.0160	X	8.5954	=	0.1375
C-3A	.0184	X	9.0301	=	0.1662
C-4A	.0614	X	24.8012	=	1.5228
C-5A	.0297	X	37.9646	=	1.1275
			AVERAGE UNIT EWL	=	3.2477 = SUM

DESIGN EWLS = 365 X 20 (DESIGN PERIOD (YEARS)) X 2900 (ADT (VEHICLES PER DAY)) X 3.2477 (SUM) = 68,750,000 (DESIGN EWLS)

COMPARISON WITH REFERENCE STATION

PREDICTION OF DESIGN EWLS
(RURAL ONLY)
DESCRIPTION OF PROJECT AND COMPUTATIONS

SHEET- 1 OF 5
DATE- 8-15-68
PREPARATOR-LYNCH

DESCRIPTION OF PROJECT

ROUTE NAME-
ROUTE NUMBER- US 27
PROJECT NUMBER- KYHPR-21
COUNTY-McCREARY
PROJECT LIMITS-2 TO 4 MILES NORTH OF WHITLEY CITY
LOADOMETER STATION REFERENCE (IF ANY)-4.9 MILES NORTH OF WHITLEY CITY

DESCRIPTION OF TRAFFIC AND DESIGN PERIOD

DESIGN PERIOD (INCLUSIVE DATES)- 1970-1990
DESIGN PERIOD (YEARS)- 20
DESIGN OR EFFECTIVE ADT (VEHICLES PER DAY)- 2900
TYPE OF EWL (CIRCLE)- KY [✓ AASHO] MODIFIED AASHO

COMPUTATIONS

VEHICLE TYPE	ADJUSTED FRACTION (FROM SHEET 4)		UNIT EWLS (FROM SHEET 5)		
CARS	,7045	X	0,0002	=	,000141
BUSES	,0094	X	0,4000	=	,003760
SU-2A-4T	,0893	X	0,0198	=	,001768
SU-2A-6T	,0713	X	0,1876	=	,013376
SU-3A	,0160	X	0,2528	=	,004045
C-3A	,0184	X	0,5921	=	,010895
C-4A	,0614	X	1,0767	=	,066109
C-5A	,0297	X	1,3150	=	,039056
			AVERAGE UNIT EWL	=	,139150 SUM

DESIGN EWLS = 365 X 20 X 2900 X ,139150 = 2,946,000

	DESIGN PERIOD (YEARS)	ADT (VEHICLES PER DAY)	SUM	DESIGN EWLS

COMPARISON WITH REFERENCE STATION

MAY 1968

PREDICTION OF DESIGN EWLS
(RURAL ONLY)
DESCRIPTION OF PROJECT AND COMPUTATIONS

SHEET- 1 OF 5
DATE- 8-15-68
PREPARATOR- LYNCH

DESCRIPTION OF PROJECT

ROUTE NAME-

ROUTE NUMBER- US 27

PROJECT NUMBER- KYHPR-21

COUNTY- McCREARY

PROJECT LIMITS- 2 TO 4 MILES NORTH OF WHITLEY CITY

LOADOMETER STATION REFERENCE (IF ANY)- 4.9 MILES NORTH OF WHITLEY CITY

DESCRIPTION OF TRAFFIC AND DESIGN PERIOD

DESIGN PERIOD (INCLUSIVE DATES)- 1970-1990

DESIGN PERIOD (YEARS)- 20

DESIGN OR EFFECTIVE ADT (VEHICLES PER DAY)- 2900

TYPE OF EWL (CIRCLE)- KY AASHO [✓ MODIFIED AASHO]

COMPUTATIONS

VEHICLE TYPE	ADJUSTED FRACTION (FROM SHEET 4)		UNIT EWLS (FROM SHEET 5)		
CARS	.7045	X	0.0002	=	.000141
BUSES	.0094	X	0.4000	=	.003760
SU-2A-4T	.0893	X	0.0198	=	.001768
SU-2A-6T	.0713	X	0.1876	=	.013376
SU-3A	.0160	X	0.4236	=	.006778
C-3A	.0184	X	0.5921	=	.010895
C-4A	.0614	X	1.3910	=	.085407
C-5A	.0297	X	2.0416	=	.060636

AVERAGE UNIT EWL = .182761 = SUM

DESIGN EWLS = 365	X	20	X	2900	X	.182761	=	3,870,000
		DESIGN PERIOD (YEARS)		ADT (VEHICLES PER DAY)		SUM		DESIGN EWLS

COMPARISON WITH REFERENCE STATION

MAY 1968

PREDICTION OF DESIGN EWLS (RURAL ONLY)	SHEET- 2 OF 5 DATE- 8-15-68
DETERMINATION OF LOCAL CONDITIONS	PREPARATOR- LYNCH

** FOR EACH OF THE FOLLOWING LOCAL CONDITIONS, CIRCLE THE APPROPRIATE CODE **

LOCAL CONDITION	CODE	DESCRIPTION
ROAD TYPE	1	INTERSTATE-NUMBERED RURAL ROUTE
	[✓ 2]	US-NUMBERED RURAL ROUTE
	3	KY-NUMBERED RURAL ROUTE
	4	OTHER RURAL ROUTE
DIRECTION	[✓ 1]	SERVES PREDOMINANTLY NORTH-SOUTH TRAFFIC
	2	SERVES PREDOMINANTLY EAST-WEST TRAFFIC
ALTERNATE ROUTE	1	ALTERNATE ROUTE PROVIDES INFERIOR SERVICE
	[✓ 2]	NO ALTERNATE ROUTE OR SAME QUALITY OF SERVICE
	3	ALTERNATE ROUTE PROVIDES SUPERIOR SERVICE
SERVICE PROVIDED	1	PRIMARILY PROVIDES SERVICE TO MAJOR RECREATIONAL ACTIVITIES
	2	PROVIDES SIGNIFICANT SERVICE TO MAJOR RECREATIONAL ACTIVITIES
	[✓ 3]	PROVIDES SOME SERVICE TO RECREATIONAL ACTIVITIES
	4	ORDINARY
	5	PROVIDES SOME SERVICE TO MINING ACTIVITIES
	6	PROVIDES SIGNIFICANT SERVICE TO MAJOR MINING ACTIVITIES
	7	PRIMARILY PROVIDES SERVICE TO MAJOR MINING ACTIVITIES
	8	PROVIDES MORE THAN ORDINARY SERVICE TO INDUSTRIAL ACTIVITIES
	9	PRIMARILY PROVIDES SERVICE TO MAJOR INDUSTRIAL ACTIVITIES
VOLUME	1	0-499 VEHICLES PER DAY
	2	500-999 VEHICLES PER DAY
	3	1000-1999 VEHICLES PER DAY
	[✓ 4]	2000-2999 VEHICLES PER DAY
	5	3000-3999 VEHICLES PER DAY
	6	4000-5999 VEHICLES PER DAY
	7	6000-7999 VEHICLES PER DAY
	8	8000-9999 VEHICLES PER DAY
	9	10000-13999 VEHICLES PER DAY
	10	14000 OR MORE VEHICLES PER DAY
MAXIMUM ALLOWABLE GROSS WEIGHT	1	30,000 POUNDS
	2	42,000 POUNDS
	3	59,640 POUNDS
	[✓ 4]	73,280 POUNDS
	OTHER	______ POUNDS
GEOGRAPHICAL AREA	1	WESTERN (HIGHWAY DISTRICTS 1 AND 2)
	[✓ 2]	SOUTH CENTRAL (HIGHWAY DISTRICTS 3, 4, AND 8)
	3	NORTH CENTRAL (HIGHWAY DISTRICTS 5, 6, AND 7)
	4	EASTERN (HIGHWAY DISTRICTS 9, 10, 11, AND 12)
SEASON	1	WINTER (JANUARY-MARCH)
	2	SPRING (APRIL-JUNE)
	3	SUMMER (JULY-SEPTEMBER)
	4	FALL (OCTOBER-DECEMBER)

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PREDICTION OF DESIGN EWLS
(RURAL ONLY)
BASIC VEHICLE TYPE PERCENTAGES

SHEET- 3 OF 5
DATE- 8-15-68
PREPARATOR- LYNCH

** SELECT BASIC PERCENTAGES FOR EACH VEHICLE TYPE AND TRANSFER TO SHEET 4 **

ROAD TYPE	MAX ALLOW GR WEIGHT	VOLUME GROUP	CARS	BUSES	SU-2A-4T	SU-2A-6T	SU-3A	C-3A	C-4A	C-5A
1	1	1								
1	1	2								
1	1	3								
1	1	4								
1	1	5								
1	1	6								
1	1	7								
1	1	8								
1	1	9								
1	1	10								
1	2	1								
1	2	2								
1	2	3								
1	2	4								
1	2	5								
1	2	6								
1	2	7								
1	2	8								
1	2	9								
1	2	10								
1	3	1								
1	3	2								
1	3	3								
1	3	4								
1	3	5	63.232	0.520	4.211	5.809	0.534	4.544	20.424	0.732
1	3	6	70.827	0.379	4.753	4.946	0.633	2.767	14.191	1.511
1	3	7	71.744	0.483	3.839	4.664	0.665	2.419	14.401	1.793
1	3	8								
1	3	9								
1	3	10								
1	4	1								
1	4	2								
1	4	3	63.555	0.21[illegible]	9.073	11.460	1.221	0.585	7.322	6.579
1	4	4								
1	4	5	73.548	0.274	6.841	7.266	0.790	2.002	8.602	0.686
1	4	6	68.765	0.224	4.778	6.036	0.775	2.964	13.016	3.451
1	4	7	71.526	0.316	4.905	5.164	0.726	1.861	8.112	7.397
1	4	8	75.539	0.225	4.589	4.694	0.624	1.361	6.718	6.258
1	4	9	74.209	0.387	5.575	4.357	0.496	1.654	4.744	8.585
1	4	10								
2	1	1	72.804	0.672	14.234	9.353	0.813	1.682	0.336	0.113
2	1	2	80.650	0.620	10.911	6.492	0.515	0.387	0.432	0.001
2	1	3	76.797	0.186	12.914	8.711	0.167	0.422	0.729	0.082
2	1	4	75.593	1.142	12.319	8.944	0.001	1.936	0.068	0.001
2	1	5	83.253	1.211	9.455	5.366	0.001	0.655	0.066	0.001
2	1	6								
2	1	7								
2	1	8								
2	1	9								
2	1	10								
2	2	1	60.112	3.077	11.493	12.907	1.659	10.458	0.301	0.001
2	2	2	64.433	1.443	12.902	14.914	0.717	5.226	0.350	0.022
2	2	3	69.220	1.091	11.578	12.356	0.683	4.378	0.659	0.041
2	2	4	70.700	1.381	9.788	10.067	0.652	6.766	0.623	0.029
2	2	5	68.870	1.346	8.354	9.733	1.217	9.255	1.205	0.028
2	2	6	71.011	1.065	8.621	9.385	0.830	7.996	1.054	0.038
2	2	7	73.835	0.854	6.890	8.620	0.720	7.865	1.176	0.048
2	2	8	77.521	0.978	5.667	6.420	0.603	7.974	0.822	0.023
2	2	9	78.190	0.869	6.134	6.537	0.470	7.160	0.632	0.015
2	2	10	79.856	0.841	6.122	5.538	0.538	5.872	1.150	0.089
2	3	1	74.075	0.001	12.141	10.906	0.618	0.207	1.853	0.207
2	3	2	69.791	1.135	12.824	9.658	1.501	2.473	2.554	0.071
2	3	3	69.429	1.175	10.008	9.973	0.887	2.743	5.702	0.089
2	3	4	70.021	0.852	9.185	8.249	1.350	3.231	6.847	0.273
2	3	5	71.708	0.913	8.278	7.942	1.349	3.172	6.406	0.239
2	3	6	71.246	0.681	7.610	8.059	0.948	3.721	7.526	0.217
2	3	7	71.600	0.711	6.727	8.304	1.041	3.335	8.153	0.136
2	3	8	78.508	0.873	6.315	5.999	0.588	1.876	5.768	0.081
2	3	9	81.951	0.618	5.934	4.694	0.534	1.974	4.216	0.086
2	3	10	75.521	0.447	8.083	7.681	0.453	4.102	3.706	0.015
2	4	1								
2	4	2	71.153	1.004	12.001	9.902	0.863	0.823	3.351	0.909
2	4	3	70.782	1.039	11.351	9.092	1.047	0.890	3.929	1.876
2	4	4	70.012	0.791	9.867	7.272	1.947	1.349	5.001	3.768
2	4	5	71.397	0.569	9.704	7.076	1.325	1.303	5.990	2.643
2	4	6	71.632	0.497	9.259	7.552	1.370	1.056	5.042	3.599
2	4	7	71.768	0.457	8.051	6.614	1.231	1.410	6.401	4.076
2	4	8	74.020	0.538	7.343	7.206	0.747	1.122	5.284	3.750
2	4	9	81.499	0.510	5.365	3.645	0.472	0.904	4.081	3.527
2	4	10	84.122	0.138	7.477	4.377	0.286	0.642	1.824	1.141

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ROAD TYPE	MAX ALLOW GR WEIGHT	VOLUME GROUP	CARS	BUSES	SU-2A-4T	SU-2A-6T	SU-3A	C-3A	C-4A	C-5A
3	1	1	67.622	0.911	19.113	11.924	0.078	0.237	0.096	0.027
3	1	2	71.247	0.560	16.919	10.596	0.228	0.263	0.170	0.026
3	1	3	73.944	0.351	14.699	9.282	0.865	0.436	0.360	0.071
3	1	4	75.504	0.641	14.607	7.493	0.531	0.408	0.715	0.109
3	1	5	83.605	0.252	11.461	4.214	0.162	0.160	0.137	0.016
3	1	6	71.009	0.403	11.510	16.640	0.181	0.131	0.131	0.001
3	1	7								
3	1	8								
3	1	9								
3	1	10								
3	2	1	66.133	1.336	17.311	13.006	0.067	1.534	0.620	0.001
3	2	2	64.883	1.170	16.148	14.708	0.606	2.037	0.339	0.118
3	2	3	67.313	0.860	13.882	14.039	0.909	2.706	0.271	0.027
3	2	4	76.486	0.737	11.591	8.586	0.480	1.401	0.704	0.022
3	2	5	72.275	0.834	13.036	10.328	2.215	1.169	0.141	0.008
3	2	6	71.060	0.751	13.269	10.497	3.248	0.802	0.376	0.006
3	2	7								
3	2	8								
3	2	9								
3	2	10								
3	3	1	69.088	0.705	15.207	10.273	1.812	0.504	1.208	1.208
3	3	2	67.131	0.935	18.324	9.656	1.987	0.783	1.005	0.186
3	3	3	69.209	0.783	13.691	12.020	1.029	1.133	1.911	0.230
3	3	4	73.298	0.471	11.800	9.634	1.355	0.744	2.244	0.462
3	3	5	78.092	0.714	11.862	7.463	0.276	0.886	0.697	0.016
3	3	6	76.516	0.576	13.882	6.991	0.557	0.434	0.898	0.154
3	3	7								
3	3	8	79.709	1.031	11.543	6.130	0.908	0.306	0.283	0.095
3	3	9	86.144	0.805	7.992	3.906	0.321	0.419	0.378	0.042
3	3	10								
3	4	1	72.722	1.225	18.545	6.994	0.517	0.001	0.001	0.001
3	4	2	72.373	0.834	16.541	8.409	0.645	0.208	0.889	0.109
3	4	3	71.124	0.495	15.111	9.623	0.707	0.186	1.597	1.164
3	4	4	70.993	0.355	13.922	9.286	0.875	0.447	2.303	1.829
3	4	5								
3	4	6	77.766	0.216	12.934	5.797	0.697	0.448	1.375	0.825
3	4	7								
3	4	8								
3	4	9								
3	4	10								
4	1	1	72.020	1.120	17.667	9.029	0.073	0.080	0.016	0.001
4	1	2	76.173	0.688	13.379	7.277	1.493	0.658	0.306	0.035
4	1	3	82.974	0.214	9.889	3.389	0.001	2.459	1.080	0.001
4	1	4								
4	1	5								
4	1	6								
4	1	7								
4	1	8								
4	1	9								
4	1	10								
4	2	1								
4	2	2								
4	2	3								
4	2	4								
4	2	5								
4	2	6	76.911	1.607	9.879	7.203	0.536	3.845	0.025	0.001
4	2	7								
4	2	8								
4	2	9								
4	2	10								
4	3	1	72.918	3,126	12.501	11.459	0.001	0.001	0.001	0.001
4	3	2								
4	3	3								
4	3	4								
4	3	5								
4	3	6								
4	3	7								
4	3	8								
4	3	9								
4	3	10								
4	4	1								
4	4	2								
4	4	3								
4	4	4								
4	4	5								
4	4	6								
4	4	7								
4	4	8								
4	4	9								
4	4	10								

PREDICTION CF DESIGN EWLS
(RURAL ONLY)
ADJUSTED VEHICLE TYPE PERCENTAGES

SHEET- 4 OF 5
DATE- 8-15-68
PREPARATOR- LYNCH

** SELECT THE APPROPRIATE FACTORS AND PERFORM THE INDICATED CALCULATIONS **

VEHICLE TYPE	CODE	BASIC PERCENT	ALTERNATE ROUTE	SERVICE PROVIDED	DIRECTION	AREA	SEASON	UNADJUSTED PERCENT	ADJUSTMENT FACTOR	ADJUSTED PERCENT
	1		1.011	1.028	0.998	0.994	0.966			
	2		0.994	1.029	1.002	0.999	1.005			
	3		1.019	0.999		1.016	1.038			
	4	FROM		1.011		0.984	0.969			
CARS	5	SHEET		0.975						
	6	3		0.856						
	7			1.023						
	8			1.122						
	9			0.881						
		70.012 x	.994 x	.999 x	.998 x	.999 x	0.997 - 0.001 =	69,105 x	1.0195 =	70.453
	1		0.993	0.646	1.052	0.772	1.185			
	2		1.012	0.618	0.913	1.008	1.026			
	3		0.903	1.065		1.076	0.808			
	4	FROM		0.946		1.099	1.090			
BUSES	5	SHEET		1.000						
	6	3		0.862						
	7			1.492						
	8			1.059						
	9			0.194						
		0.791 x	1.012 x	1,065 x	1,052 x	1,008 x	1.015 - 0.001 =	0,917 x	1,0195 =	0.935
	1		0.970	0.924	0.973	1.101	0.977			
	2		1.002	1.058	1.045	0.952	1.013			
	3		1.051	0.955		0.827	0.973			
	4	FROM		1.004		1.236	1.047			
SU-2A-4T	5	SHEET		0.952						
	6	3		1.024						
	7			1.188						
	8			1.059						
	9			0.869						
		9,867 x	1,002 x	,955 x	.973 x	,952 x	1.002 - 0.001 =	8,762 x	1,0195 =	8,933
	1		0.967	0.631	0.990	0.918	1.061			
	2		1.014	1.003	1.016	0.998	0.966			
	3		0.957	0.953		0.942	0.906			
	4	FROM		1.008		1.172	1.122			
SU-2A-6T	5	SHEET		1.039						
	6	3		1.184						
	7			0.875						
	8			0.707						
	9			0.856						
		7.272 x	1,014 x	,953 x	,990 x	,998 x	1.008 - 0.001 =	6,998 x	1,0195 =	7.134
	1		0.826	0.338	0.941	1.225	1.057			
	2		1.037	1.195	1.096	0.869	0.989			
	3		1.066	0.950		1.022	0.963			
	4	FROM		0.856		0.916	1.017			
SU-3A	5	SHEET		1.081						
	6	3		5.802						
	7			1.095						
	8			0.405						
	9			0.474						
		1.947 x	1,037 x	,950 x	,941 x	,869 x	1.003 - 0.001 =	1,572 x	1.0195 =	1.603
	1		1.034	1.509	1.054	0.853	1.269			
	2		1.006	0.770	0.911	1.089	0.942			
	3		0.854	1.143		1.160	0.847			
	4	FROM		0.956		0.824	1.047			
C-3A	5	SHEET		1.118						
	6	3		0.821						
	7			0.551						
	8			0.458						
	9			1.775						
		1.349 x	1.006 x	1.143 x	1.054 x	1,089 x	1.012 - 0.001 =	1,801 x	1,0195 =	1,836
	1		0.965	0.713	1.038	1.109	1.073			
	2		1.004	0.784	0.931	1.006	0.982			
	3		1.050	1.145		1.062	0.962			
	4	FROM		0.952		0.818	1.010			
C-4A	5	SHEET		1.145						
	6	3		0.884						
	7			0.476						
	8			0.507						
	9			5.743						
		5,001 x	1.004 x	1.145 x	1,038 x	1,006 x	1.003 - 0.001 =	6,020 x	1,0195 =	6,137
	1		1.137	0.893	0.903	1.637	0.847			
	2		0.958	0.560	1.169	0.903	1.108			
	3		1.044	0.995		0.890	1.050			
	4	FROM		0.943		0.748	0.949			
C-5A	5	SHEET		1.065						
	6	3		3.383						
	7			0.421						
	8			1.289						
	9			4.851						
		3,768 x	.958 x	,995 x	.903 x	.903 x	0.996 - 0.001 =	2,916 x	1,0195 =	2,973

ADJUSTMENT FACTOR = 100 DIVIDED BY THE SUM OF UNADJUSTED PERCENTAGES = 100/ 98.091 = 1,0195

** TRANSFER ADJUSTED PERCENTAGES TC SHEET 1 IN FORM OF FRACTIONS **

MAY 1968

PREDICTION OF DESIGN EWLS
(RURAL ONLY)
KENTUCKY UNIT EWLS

SHEET- 5A OF 5
DATE- 8-15-68
PREPARATOR- LYNCH

** SELECT THE APPROPRIATE FACTORS AND PERFORM THE INDICATED CALCULATIONS **

VEHICLE TYPE	CODE	ROAD TYPE	DIRECTION	ALTERNATE ROUTE	VOLUME	MAX ALLOW GR WEIGHT	GEOGRAPHICAL AREA	DESIGN UNIT EWLS
CARS	NO ADJUSTMENT FOR LOCAL CONDITIONS							0.0
BUSES	NO ADJUSTMENT FOR LOCAL CONDITIONS							5.0000
	1	-0.0958	0.1380	0.2085	-0.0705	-0.2626	0.0952	
	2	0.0	0.0	-0.0276	-0.0099	-0.2392	0.0549	
	3	0.0864		0.0	0.1255	-0.2164	0.0550	
	4	0.0864			0.1672	0.0	0.0	
SU-2A-4T	5				0.0			
	6				0.0351			
	7				0.0287			
	8				0.0750			
	9				-0.0732			
	10				-0.1000			
	-0.0126 +	0 +	.1380 +	-.0276 +	.1672 +	0 +	.0549	= 0.3199
	1	-2.0564	-0.2839	2.2585	-0.7779	-5.0383	-1.9670	
	2	0.0	0.0	2.1273	-1.0558	-1.7376	-1.2755	
	3	4.6334		0.0	1.9819	-0.2062	-1.9929	
	4	4.6334			-0.5837	0.0	0.0	
SU-2A-6T	5				0.0			
	6				0.0229			
	7				0.0523			
	8				1.9806			
	9				0.6512			
	10				0.6512			
	3.0751 +	0 +	-.2839 +	2.1273 +	-.5837 +	0 +	-1.2755	= 3.0593
	1	-10.9730	-2.7084	17.5781	7.2226	-39.7040	-6.9528	
	2	0.0	0.0	19.3231	-8.0255	-5.2789	-4.0088	
	3	30.2142		0.0	11.6134	-0.0070	-4.0948	
	4	30.2142			-0.4663	0.0	0.0	
SU-3A	5				0.0			
	6				0.6799			
	7				2.0945			
	8				13.2101			
	9				11.9481			
	10				15.0000			
	-3.5442 +	0 +	-2.7084 +	19.3231 +	-.4663 +	0 +	-4.0088	= 8.5954
	1	-2.8149	1.4048	2.0100	15.0693	3.2959	-1.2290	
	2	0.0	0.0	2.3167	10.7394	1.8672	1.6609	
	3	-6.5899		0.0	0.0475	0.6460	1.5798	
	4	-6.5899			0.1055	0.0	0.0	
C-3A	5				0.0			
	6				0.6203			
	7				1.0269			
	8				2.1082			
	9				-0.2893			
	10				-1.0000			
	3.5422 +	0 +	1.4048 +	2.3167 +	.1055 +	0 +	1.6609	= 9.0301
	1	-8.1940	5.4152	6.5641	-11.0420	-12.8400	5.8598	
	2	0.0	0.0	2.9261	10.8637	-13.4640	3.8274	
	3	11.5870		0.0	3.5083	-4.0138	3.5870	
	4	11.5870			5.9763	0.0	0.0	
C-44	5				0.0			
	6				1.1323			
	7				2.9108			
	8				5.7066			
	9				3.8931			
	10				2.0000			
	6.6562 +	0 +	5.4152 +	2.926 +	5.9763 +	0 +	3.8274	= 24.8012
	1	-10.4700	7.0554	11.8208	0.0	-10.7050	5.0642	
	2	0.0	0.0	10.4758	7.7269	-8.8009	5.1384	
	3	0.6376		0.0	4.8169	-13.6780	0.2145	
	4	0.6376			11.8375	0.0	0.0	
C-5A	5				[illegible]			
	6				0.7452			
	7				0.0			
	8				9.4447			
	9				8.9648			
	10				9.5000			
	3.4575 +	0 +	7.0554 +	10.4758 +	11.8375 +	0 +	5.1384	= 37.9646

** TRANSFER DESIGN UNIT EWLS TO SHEET 1. A NEGATIVE ESTIMATE SHOULD BE TRANSFERRED AS ZERO **

MAY 1968

PREDICTION OF DESIGN EALS
(RURAL ONLY)
AASHO UNIT EALS

SHEET- 5B OF 5
DATE- 8-15-68
PREPARATOR- LYNCH

** SELECT THE APPROPRIATE FACTORS AND PERFORM THE INDICATED CALCULATIONS **

VEHICLE TYPE	CODE	ROAD TYPE	DIRECTION	ALTERNATE ROUTE	VOLUME	MAX ALLOW GR WEIGHT	GEOGRAPHICAL AREA	DESIGN UNIT EALS
CARS	NO ADJUSTMENT FOR LOCAL CONDITIONS							0.0002
BUSES	NO ADJUSTMENT FOR LOCAL CONDITIONS							0.4000
	1	-0.0054	0.0067	0.0087	-0.0034	-0.0085	0.0054	
	2	0.0	0.0	-0.0026	0.0011	-0.0110	0.0033	
	3	-0.0004		0.0	0.0048	-0.0105	0.0033	
	4	-0.0004			0.0082	0.0	0.0	
SU-2A-4T	5				0.0			
	6				0.0018			
	7				0.0019			
	8				0.0041			
	9				-0.0024			
	10				-0.0040			
	0.0042 +	0 +	.0067 +	-.0026 +	.0082 +	0 +	.0033 =	0.0198
	1	-0.0684	0.0101	0.0104	-0.0463	-0.0471	-0.0166	
	2	0.0	0.0	-0.0030	0.0130	-0.0622	-0.0036	
	3	0.0164		0.0	0.0300	-0.0160	-0.0075	
	4	0.0164			-0.0212	0.0	0.0	
SU-2A-6T	5				0.0			
	6				0.0120			
	7				0.0150			
	8				0.0399			
	9				0.0457			
	10				0.0500			
	0.2053 +	0 +	.0101 +	-.0030 +	-.0212 +	0 +	-.0036 =	0.1876
	1	-0.2121	-0.0393	0.3249	-0.0227	-0.6798	-0.0533	
	2	0.0	0.0	0.3647	-0.1991	-0.1176	-0.0718	
	3	0.5827		0.0	0.1238	0.0088	-0.0059	
	4	0.5827			-0.0421	0.0	0.0	
SU-3A	5				0.0			
	6				0.0459			
	7				0.0687			
	8				0.1796			
	9				0.3304			
	10				0.5000			
	0.0413 +	0 +	-.0393 +	.3647 +	-.0421 +	0 +	-.0718 =	0.2528
	1	-0.1476	0.0897	0.1549	0.3328	0.1924	-0.0810	
	2	0.0	0.0	0.1676	0.1140	0.0792	0.0392	
	3	-0.1686		0.0	-0.0527	0.0184	0.0948	
	4	-0.1686			-0.0137	0.0	0.0	
C-3A	5				0.0			
	6				0.0181			
	7				0.0495			
	8				0.0985			
	9				-0.0195			
	10				-0.1000			
	0.3093 +	0 +	.0897 +	.1676 +	-.0137 +	0 +	.0392 =	0.5921
	1	-0.2805	0.1343	0.2687	-0.2546	-0.6893	0.2214	
	2	0.0	0.0	0.2251	0.2150	-0.5778	0.1642	
	3	0.3662		0.0	0.0238	-0.0647	0.1214	
	4	0.3662			0.0924	0.0	0.0	
C-4A	5				0.0			
	6				0.0347			
	7				0.0665			
	8				0.1726			
	9				0.1161			
	10				0.0500			
	0.4607 +	0 +	.1343 +	.2251 +	.0924 +	0 +	.1642 =	1.0767
	1	-0.2848	0.2440	0.5151	0.0	-0.1902	0.1855	
	2	0.0	0.0	0.3840	0.0219	-0.3416	0.2141	
	3	0.0649		0.0	0.0824	-0.4093	0.0771	
	4	0.0649			0.2334	0.0	0.0	
C-5A	5				-0.1448			
	6				-0.0087			
	7				0.0			
	8				0.2307			
	9				0.2705			
	10				0.3000			
	0.2395 +	0 +	.2440 +	.3840 +	.2334 +	0 +	.2141 =	1.3150

** TRANSFER DESIGN UNIT EWLS TO SHEET 1. A NEGATIVE ESTIMATE SHOULD BE TRANSFERRED AS ZERO **

MAY 1968

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                              PREDICTION OF DESIGN EALS        SHEET- 5C OF 5
                                   (RURAL ONLY)                DATE-       8-15-68
                              MODIFIED AASHO UNIT EALS         PREPARATOR- LYNCH

              ** SELECT THE APPROPRIATE FACTORS AND PERFORM THE INDICATED CALCULATIONS **

VEHICLE  CODE  ROAD     DIRECTION   ALTERNATE   VOLUME    MAX ALLOW   GEOGRAPHICAL    DESIGN UNIT
 TYPE          TYPE                   ROUTE               GR WEIGHT       AREA            EALS

CARS     NO ADJUSTMENT FOR LOCAL CONDITIONS                                                0.0002

BUSES    NO ADJUSTMENT FOR LOCAL CONDITIONS                                                0.4000

          1   -0.0054    0.0067      0.0087    -0.0034    -0.0085      0.0054
          2    0.0       0.0        -0.0026     0.0011    -0.0110      0.0033
          3   -0.0004                0.0        0.0048    -0.0105      0.0033
          4   -0.0004                           0.0082     0.0         0.0
SU-2A-4T  5                                     0.0
          6                                     0.0018
          7                                     0.0019
          8                                     0.0041
          9                                    -0.0024
         10                                    -0.0040

   0.0042 +   0   + ,0067  +-,0026+ ,0082+    0    + .0033    =  0.0198

          1   -0.0684    0.0101      0.0104    -0.0463    -0.0471     -0.0166
          2    0.0       0.0        -0.0030     0.0130    -0.0622     -0.0036
          3    0.0164                0.0        0.0300    -0.0160     -0.0075
          4    0.0164                          -0.0212     0.0         0.0
SU-2A-6T  5                                     0.0
          6                                     0.0120
          7                                     0.0150
          8                                     0.0399
          9                                     0.0457
         10                                     0.0500

   0.2053 +   0   + .0101  +-,0030 -,0212+    0    + -,0036   =  0.1876

          1   -0.3421   -0.0617      0.4541     0.0270    -1.0956     -0.0845
          2    0.0       0.0         0.5409    -0.3139    -0.1770     -0.0847
          3    0.8838                0.0        0.2000     0.0005      0.0138
          4    0.8838                          -0.0668     0.0         0.0
SU-3A     5                                     0.0
          6                                     0.0739
          7                                     0.1118
          8                                     0.2420
          9                                     0.4745
         10                                     0.7000

   0.0959 +   0   +-.0617  + .5409+ -.0668+   0    + -.0847   =  0.4236

          1   -0.1476    0.0897      0.1549     0.3328     0.1924     -0.0810
          2    0.0       0.0         0.1676     0.1140     0.0792      0.0392
          3   -0.1686                0.0       -0.0527     0.0184      0.0948
          4   -0.1686                          -0.0137     0.0         0.0
C-3A      5                                     0.0
          6                                     0.0181
          7                                     0.0495
          8                                     0.0885
          9                                    -0.0195
         10                                    -0.1000

   0.3093 +   0   + ,0897  + ,1676 +-,0137+   0    + ,0392    =  0.5921

          1   -0.4230    0.1498      0.3778    -0.3316    -0.8691      0.3229
          2    0.0       0.0         0.3329     0.2304    -0.7595      0.2472
          3    0.4594                0.0        0.0944    -0.1122      0.1670
          4    0.4554                           0.1464     0.0         0.0
C-4A      5                                     0.0
          6                                     0.0369
          7                                     0.0913
          8                                     0.2376
          9                                     0.1805
         10                                     0.1300

   0.5147 +   0   + ,1498  + ,3329 + ,1464 +  0    + ,2472    =  1,3910

          1   -0.4868    0.3980      0.8240     0.0       -0.4514      0.2764
          2    0.0       0.0         0.6346     0.0507    -0.5495      0.3063
          3    0.1140                0.0        0.0968    -0.6707      0.1134
          4    0.1140                           0.3610     0.0         0.0
C-5A      5                                    -0.2156
          6                                    -0.0018
          7                                     0.0
          8                                     0.3658
          9                                     0.4506
         10                                     0.5400

   0.3417 +   0   + ,3980  + ,6346 + ,3610 +  0    + ,3063    =  2,0416

   ** TRANSFER DESIGN UNIT EWLS TO SHEET 1. A NEGATIVE ESTIMATE SHOULD BE TRANSFERRED
      AS ZERO **
                                                                MAY 1968
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