Research Report
KTC-11-13/KSP1-11-1F

KENTUCKY TRANSPORTATION CENTER

2011 SAFETY BELT USAGE SURVEY IN KENTUCKY

OUR MISSION

We provide services to the transportation community through research, technology transfer and education. We create and participate in partnerships to promote safe and effective transportation systems.

OUR VALUES

Teamwork
Listening and communicating along with courtesy and respect for others.

Honesty and Ethical Behavior
Delivering the highest quality products and services.

Continuous Improvement
In all that we do.

Research Report
KTC-11-13/KSP1-11-1F

2011 SAFETY BELT USAGE SURVEY IN KENTUCKY

By

Kenneth R. Agent
Transportation Research Engineer

Eric R. Green
Transportation Research Engineer

Kentucky Transportation Center
College of Engineering
University of Kentucky
Lexington, Kentucky

in cooperation with
Kentucky Transportation Cabinet
Commonwealth of Kentucky

August 2011

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

The objective of this study was to establish 2011 safety belt and child safety seat usage rates in Kentucky. The 2011 survey continues to document the results after enactment of the original "secondary enforcement" statewide mandatory safety belt law in 1994 and the subsequent change to "primary enforcement" which was enacted in 2006. Data were collected at 160 randomly selected sites in 18 counties across Kentucky. Data from the individual sites were combined into a statewide percentage considering roadway functional classification, county, and vehicle miles traveled.

The data show that the usage rate in 2011 (82.2 percent) showed an increase of about two percent from that in 2010 (80.3 percent) and 2009 (79.7 percent) and an increase of several percentage points compared to 2008 (73.3 percent). The usage rate had increased from 67 percent in 2006 to 72 percent in 2007 after the enactment of "primary enforcement" legislation. The rate had increased from 42 percent in 1993 to 58 percent in 1994 after enactment of the original mandatory safety belt law.

The 2011 statewide usage rate for children under the age of four was determined to be 97 percent. This continues the very high rate for this age category.

Usage rates varied as a function of the highway functional classification. The highest rate of 88.0 percent was on interstates and parkways, with the lowest rate of 74.4 percent on collector roads. The rate by county varied from a high of 87.2 percent in Fayette County to a low of 65.1 in Pike County. The usage rate by vehicle type varied from a high of 86.8 percent for vans to a low of 71.7 percent for pickup trucks.

The statewide usage rate for motorcycle helmets was 52 percent. This was similar to the 50 percent found in 2010 and was a reduction from 64 percent in 2009 and 58 percent in 2008.

Observations showed that about 8.6 percent of the drivers were either talking on their cell phone or keying on their phone.

1.0 INTRODUCTION AND BACKGROUND

The use of safety belts and child safety seats has been shown to be an effective means to reduce injuries to motor-vehicle occupants involved in traffic crashes. There have been various methods used in efforts to increase safety belt and safety seat usage. Past efforts have included public information campaigns, local and statewide legislation, and enforcement of the legislation. Examples of statewide enforcement and education campaigns are the "Click It or Ticket" (CIOT) and "Buckle Up Kentucky: It's the Law & It's Enforced" campaigns conducted around Memorial Day in recent years.

The most recent legislation in Kentucky in this area changed the statewide legislation requiring the use of safety belts for all vehicle occupants from secondary to primary enforcement. A statewide law including secondary enforcement was passed in 1994 with the primary enforcement law passed in 2006. The 2006 primary enforcement legislation included an educational period with warning citations through December 2006 with citations with fines starting in January 2007.

The first legislation in this area in Kentucky was a law enacted by the 1982 Kentucky General Assembly requiring use of a "child restraint system" for children 40 inches or less in height. The 1988 Kentucky General Assembly strengthened this law by adding a fine. Next, prior to the statewide law, local safety belt usage laws were enacted in several jurisdictions in Kentucky. The first such local law, with an effective date of July 1990, was enacted by the Lexington-Fayette Urban County Government. Prior to the statewide law, the combined population of the counties and cities having a local ordinance represented approximately one-third of the statewide population. The original statewide law in 1994 replaced the various local ordinances.

Statewide observational surveys were first conducted in Kentucky in 1982 and have been conducted annually to document safety belt and safety seat usage. The safety belt usage rate for drivers increased each survey year from only four percent in 1982 to 58 percent in 1994, following enactment of the statewide secondary law. The rate has increased over the years. Examples of the increasing rates are 60 percent in 2000, 62 percent in 2002, 66 percent in 2004, 67 percent in 2006, and 73 percent in 2008.

Statewide usage of child safety seats (CSS) or safety belts for children under four years of age increased from about 15 percent in 1982, before enactment of the mandatory child restraint law, to 30 percent for 1984 through 1986. After a financial penalty was added to the law, this percentage increased to almost 50 percent in 1988. There has been a continued increase in usage with rates such as 72 percent in 1994, 89 percent in 1999 and 98 percent in 2008. However, while usage rates are very high, studies have found problems with the proper use of child safety seats.

In recent years, the statewide belt use and CSS use survey, based on 200 observation sites in 58 counties, has been taken in the weeks immediately after completion of the "Click It or Ticket" (CIOT) campaign's enforcement and publicity activities around Memorial Day. Mini-surveys (taken at 21 of the 200 statewide sites) were taken prior to the CIOT, in April, and during the enforcement portion of the CIOT. The design included 200 sites in 58 counties, and the relatively large number of sites scattered in so many counties made the data collection time-consuming. The design made it difficult to measure the effects of specific programs such as CIOT, where the transient effects are likely to decay before observations can be completed.

Accordingly, a new design was developed for collecting seat belt usage data in Kentucky. The new design, detailed in subsequent sections, follows National Highway Transportation Safety Administration (NHTSA) requirements and is generally similar to designs in other states that have been approved in recent years. The new design was implemented starting with the 2009 survey and followed many of the elements of the previous design.

The objective of the survey summarized in this report was to establish statewide safety belt and child safety seat usage rates in Kentucky for 2011. These rates can be compared to those determined from previous surveys. The 2011 statewide survey continues to document the change in usage associated with the change in the law to allow primary enforcement and related evaluation and enforcement.

2.0 PROCEDURE

2.1 DATA COLLECTION PROCEDURE

The data collection procedure used in the initial surveys, which started in 1982, was first modified for the 1990 survey, when the number of sample sites was expanded and the observation procedure was modified so that the entire procedure would be comparable to surveys taken in other states. The data collection form was changed along with the site selection procedure. The procedure and data collection form remained the same for the 1990 through 1998 surveys. A modification starting with the 1999 survey was that the age and sex of the driver and front seat occupants was no longer coded but the type of vehicle was coded.

Data for the surveys collected from 1982 through 1989 were conducted at 23 sites in 19 cities across the state. In 1990, to make the survey results more comparable to measurements in other states and to include all types of roadways, the number of sites was expanded to include data from rural locations and interstates. The design included 100 sites. The distribution of the sites was based on vehicle miles traveled statewide for various categories of roads in counties with varying populations. The variables

considered in the 1990 stratification process were the rural or urban designation of the road, the functional classification of the road, vehicle miles traveled, and the county population.

In 1999, an updated sampling design plan was implemented as part of a nationwide effort by NHTSA to use a common methodology in all states to select observational sites. As part of this sampling design plan, data was collected at 200 sites, typically at intersections. For interstates and parkways, data were generally taken at the intersection of a ramp with a cross road. The basis for collecting data at intersections was that it would increase accuracy since data would be collected for vehicles either stopped or moving slowly. This design plan was used from 1999 through 2008.

The data collection form used in the 2011 survey is shown in Figure 1. The form shown in Figure 1 was first used in 1999. The change from the previous surveys was the addition of a category for distracted drivers. Safety belt usage is recorded for drivers as well as front seat passengers sitting in the outboard position. These occupant positions are equipped with the combination lap belt/shoulder harness type of safety belt which enables observations to be performed more easily than positions equipped only with a lap belt (and meets NHTSA requirements). The exception is for children under four years of age, with restraint data collected for both the front and rear seats.

The type of vehicle is coded for drivers and front seat passengers. Four categories of vehicles are used: passenger car (PC), pickup (PU), van, and sports utility vehicle (SUV).

For drivers and front-seat passengers (over three years of age), usage is classified as either using a shoulder belt properly (over the shoulder; not, for example, under the arm or behind the back) or not using a restraint. For children one to three years of age, the categories include safety seat, booster seat, harness or belt, or no restraint. For children under one year of age, the categories are either safety seat or no restraint.

Three additional types of information are obtained. Starting with the 1993 survey, the use of motorcycle helmets was noted. The 1997 survey was the first in which the use of bicycle helmets was noted. The 2010 survey was the first which included data for distracted drivers. A driver was noted as distracted if there was use of a cell phone or the driver was keying (which could be texting, web browsing or dialing a number). Other possible distractions include: using navigation systems, an MP3 player, radio or laptop. It should be noted that most of these are isolated events; however cell phone usage is the more likely to be observed by the data collectors due to its prolonged usage.

Each data collector is provided with a training period prior to beginning data collection. As part of the training, the data collectors review the guidelines and previous reports and collect trial sets of field data. The observers then collect data simultaneously at a sample of different types of locations. The data are then reviewed by the project manager before formal data collection is started.

The quality control of the data is the responsibility of the project manager. This includes a review of completed data collection forms as the survey progresses to check for any problem areas or questionable data.

The following list of guidelines for data collection is given to each observer.

1. Include the driver so the number of vehicles included in the sample will be known.

2. Data are typically collected at intersections with each observer collecting data on only one approach at the intersection or for one direction of travel for non-intersection sites.

3. Include all vehicles on the approach at low-volume locations. If the data cannot be collected in all lanes due to high volumes, split the time interval among the through lanes.

4. If traffic volume is too high to obtain data for all vehicles, record data for the next vehicle in view after recording the previous data.

5. Obtain a random sample of vehicles independent of whether the occupants are wearing a safety belt. Do not attempt to include all vehicles having an occupant wearing a safety belt at a location where all vehicles cannot be obtained.

6. Attempt to include data for children less than four years of age for any vehicle in the sample in which such a child is a passenger, regardless of where the child is seated.

7. At intersections, only include vehicles either stopped or moving slowly. Obtain data from an observation point such that the occupants can be readily observed.

8. Except for children under four years of age, collect data only for drivers and for passengers in the right-front seat (exclude the center front and rear seating positions).

9. Collect data during daylight hours on weekdays and weekends.

10. Collect one "observer hour" of data at each site. This could be one hour for one approach for a one-way road or 30 minutes for two approaches if the route has two-way traffic.

11. Begin and end data collection at a specified time.

12. Collect data for specified types of passenger motor vehicles (cars, pickup trucks, vans, and sport utility vehicles).

13. Collect data for both in-state and out-of-state vehicles.

14. If a problem such as weather or road construction prevents data from being collected on the assigned day and time for a specific location, a new day and time will be randomly selected by the project manager for data collection.

15. The time period in which data are collected at specific sites are randomly assigned to the data collectors by the project manager.

Observation schedules are set up so that sites are clustered with several sites completed within a single day. To the extent practicable, schedules are set up to provide balance by time of day and day of week.

If a site could not be surveyed because of construction activities, safety concerns, or some other legitimate reason, the location was abandoned. Observers were instructed to travel to a designated alternate site (same county, same road stratum) and observe at that site as nearly as possible to the assigned time, then to continue the assigned schedule by going to the next assigned site. Alternate sites were selected during the initial sampling process.

The surveys continue during mild inclement weather, as long as observations could be recorded with high accuracy and observer safety. In the event of severe inclement weather, the surveys were discontinued until such time as the weather improved. Then, the surveys were resumed according to the original schedule with the next time slot and the appropriate site. If the amount of time lost was short, the observer continued the survey at the site where the disruption occurred and the remaining observations were made as closely to the scheduled time as possible.

2.2 DATA COLLECTION LOCATIONS

It was decided that data would, whenever possible, be obtained at intersections. For interstates and parkways, data were generally taken at the intersection of a ramp with a cross road. However, at rural interstate locations where the ramp volume was low and not representative of the interstate, data was taken from overpasses. The basis for collecting data at intersections was that it increased accuracy since data would be collected for vehicles either stopped or moving slowly.

A computer file was used to select the locations. The file is the Highway Performance Monitoring System (HPMS). Characteristics of road segments for all state maintained roads are contained in this file. This information includes the county, route, beginning and ending milepoint, and the number of intersections or interchanges within the segment.

A multi-stage area probability sampling approach was used in the survey design. In the first stage, primary sampling units were randomly selected. The primary sampling unit for the Kentucky survey is the county. Kentucky has a total of 120 counties, and

county population was the measure of sampling unit size for the purpose of defining the initial set of sampling units to be considered. NHTSA guidelines allow exclusion from the survey coverage of the least populated units which represent 15 percent of the state's population. The 55 least populous counties, which collectively comprise nearly 15 percent of the state's population, were excluded from the sampling process. The 65 most populous counties, which together account for 85 percent of the state's population, contain the set of eligible roadway segments.

Appendix A shows a listing of Kentucky's 120 counties, ranked using 2008 Census estimates from most to least populous. The 65 counties included in the sampling population, as per the above criterion, are identified in Appendix A. Also, the 55 least populated counties which were excluded from the sampling population are identified. The counties selected for data collection are highlighted.

Based on NHTSA guidelines for a 65 sampling unit population, a sample of 18 counties was selected. The 18-county sample was chosen using a two-step procedure. First, the two largest counties (Jefferson and Fayette), comprising nearly one-fourth of the state's population, were automatically placed into the first category. Then, 16 additional counties were selected from the remaining 63 eligible counties to make up the second category of the survey sample, with probability for selection proportional to the population of the county. The selection was done without replacement.

Once the 18 survey counties were chosen, second stage sampling of individual route segments in each of the counties was performed. The qualifying route segments comprising the sampling population were identified from the Kentucky HPMS file. The 160 sites were made up of 16 sites in each of the two largest counties and eight sites in each of the remaining 16 counties. Segments were selected to sample across roadway functional class strata according to the criteria and procedures described below. The sample sites within each county-stratum were selected without replacement. The 18 counties and the number of sites in each are shown in Table 1.

Roadway segments were divided into the following four functional classification groups:

Road Class Stratum	Description
1	Interstates and Parkways
2	Other Principal Arterials
3	Minor Arterials
4	Collectors

For a given county, segments were randomly chosen from each of the four classification groups. The number of sites per stratum within each county are in proportion to the distribution of vehicle miles traveled (VMT) across strata within the county, with the guideline that no more than half of the segments in a county are from one stratum. Twice as many segments as needed were chosen (two segments for county-strata with only one required segment). The order of selection was retained; the first segments chosen are the primary observation sites and, whenever replacements were needed, they were taken in the order chosen. Six of the proposed counties have no road segments in the "Interstates and Parkways" stratum. In those cases, the sites were distributed among the other classes according to VMT.

Table 2 lists, for each county-stratum, total VMT and numbers of road segment observation sites. A listing of the 160 survey locations is given in Appendix B. A map showing the counties where data were collected is presented in Figure 2.

2.3 SEAT BELT USAGE RATE AND VARIABILITY CALCULATIONS

Calculation of Overall Seat Belt Usage Rate

Seat belt usage rates are calculated using formulas based on the proportion of the state's total VMT "represented" by the site. Seat belt usage rate calculations follow a four-step process.

First, estimated rates are calculated for each of the road strata within each county. Observed usage rates for all of the sites within each stratum-county combination are combined by simple averaging, as shown in formula (1). (Since the sites' original probability of inclusion in the sample was proportional to their VMT, averaging their usage rates makes use of that sampling probability to reflect their different VMTs).

$$p_{i(j)k} = \sum_{l=1}^{n_{i(j)k}} p_{i(j)kl} / n_{i(j)k} \qquad (1)$$

where $i(j)$ = county i within category j (category 1 = the 2 certain-selection counties, Jefferson and Fayette Counties, and category 2 = the 16 random-selection counties); k = road functional class stratum; l = site within stratum and county; $n_{i(j)k}$ = number of sites within the stratum-county combination; and $p_{i(j)kl}$ = the observed seat belt use rate at site $i(j)kl = B_{i(j)kl}/O_{i(j)kl}$ (where $B_{i(j)kl}$ = total number of belted occupants (drivers and outboard front-seat passengers) observed at the site and $O_{i(j)kl}$ = total number of occupants whose belt use was observed at the site).

Second, a county-by-county seat belt use rate, $p_{i(j)}$, is obtained by combining county-stratum seat belt use rates across strata within counties, weighted by the class's relative contribution to total county VMT:

$$p_{i(j)} = \frac{\sum_k VMT_{i(j)k}\, p_{i(j)k}}{\sum_k VMT_{i(j)k}} \tag{2}$$

where $VMT_{i(j)k}$ = VMT of all roads in stratum k in county $i(j)$, and $p_{i(j)k}$ = seat belt use rate for stratum k in county $i(j)$.

In the third step, category-weighted seat belt use rates are obtained by combining and weighting the rates from the sampled counties in each category by their VMT values and probabilities of being selected:

$$p_j = \frac{\sum_i VMT_{i(j)} W_{i(j)}\, p_{i(j)}}{\sum_i VMT_{i(j)} W_{i(j)}} \tag{3}$$

where $VMT_{i(j)}$ = total VMT for county i in region j and $W_{i(j)}$ = the inverse of the probability of the county's selection: $W_{i(1)} = 1$ for the certainty counties and $W_{i(2)} = \frac{\sum_{l=1}^{63} Pop_{l(2)}}{16 * Pop_{i(2)}}$ where 63 = the number of high population counties in category 2 and 16 = the number of those counties to be selected.

Finally, the statewide belt use proportion is calculated by combining the category proportions weighted by their proportion of statewide VMT:

$$p = \frac{\sum_{j=1}^{2} VMT_j\, p_j}{\sum_{j=1}^{2} VMT_j} \tag{4}$$

The result is a combination of the individual site seat belt usage rates weighted to reflect each site's importance in the total state VMT.

Estimates of subgroups of occupants, such as drivers or passengers and vehicle type (passenger car, pickup, etc.) are calculated in the same way.

Calculation of the Standard Error of the Overall Seat Belt Use Rate

Standard error of estimate values is estimated through a jackknife approach, based on the general formula:

$$\hat{\sigma}_{\hat{p}} = [\frac{n-1}{n}\sum_{i=1}^{n}(\hat{p}_i - \hat{p})^2]^{1/2} \quad (5)$$

where $\hat{\sigma}_{\hat{p}}$ = standard deviation (standard error) of the estimated statewide seat belt use proportion $\hat{p}$ (equivalent to *p* in the notation of formulas 1-4); *n* = the number of sites, i.e., 160; and $\hat{p}_i$ = the estimated statewide belt use proportion with site *i* excluded from the calculation.

The relative error rate, i.e., $\hat{\sigma}_{\hat{p}} / \hat{p}$, is also calculated, as well as the 95% confidence interval, i.e., $\hat{p} \pm 1.96\hat{\sigma}_{\hat{p}}$. These values are reported for the overall statewide seatbelt use rate.

3.0 SURVEY RESULTS

Usage rates for all front seat occupants (drivers and passengers) for the various types of highways and road classifications are summarized in Table 3. The overall statewide rate in 2011, using the data collected at 160 sites and the described weighting procedure, is 82.2 percent. The 95 percent confidence interval is plus or minus about 1.0 percent (81.1 to 83.2). The sample size of all front seat occupants was 74,550. The highest rate by the functional classification of the highway is 88.0 percent for interstates and parkways with the lowest 74.4 percent for collector roads.

The overall statewide rate for drivers in 2011 is 82.8 percent. Drivers accounted for 79 percent of front seat occupants so they dominated the percentage determined for all front seat occupants. The usage rate for front seat passengers is 79.7 percent.

Usage rates for children under four years of age are given in Table 4. These rates are for children in both the front and the rear seats. The usage rates for both children less than one year of age (94 percent) and for children one to three years of age (97 percent) are very high. The usage rate for the combination of these categories, or children less than four years of age, is 97 percent. The lowest rate (94 percent) is on collector roads.

The sample size for children under four years of age was 439. This age category corresponds to the children for which the mandatory child restraint law would apply. The 2011 usage rate remains high and compares to the high of 98.6 percent in 2009. This percentage was only about 15 percent in 1982 before enactment of the child restraint law, increased to approximately 30 percent after enactment of the law having no penalty, and

increased again to almost 50 percent in 1988 after the addition of a monetary penalty to the child restraint law.

A summary of the data collected is given in Appendix C. For each of the 160 data sites, the usage rate and sample size are given for all front seat occupants, drivers, front-seat passengers, and children under four years of age (both front and rear seat). The relative error and confidence interval are given for the "all front seat occupants" category. Usage rates for front seat occupants ranged from 51.9 percent (a rural location in Pike County) to 94.1 percent (an interstate location in Fayette County). There were only four sites which had a usage rate below 60 percent with all of these at rural locations. There were 14 sites which had a usage rate of over 90 percent with 11 of these sites on an interstate. The highest rate found on a non-interstate or parkway was 91 percent at a "other principle arterial" location in Fayette County.

A substantial difference in usage rate (for all front seat occupants) was noted when vehicle type and road class were considered (Table 5). The rate varied substantially from 86.8 for vans to 71.7 percent for pickup trucks. The rate for passenger cars is 84.4 percent with 84.8 percent for sport utility vehicles. It can be seen that use of safety belts is much lower in pickup trucks than any other vehicle type, and pickup trucks made up about 20 percent of the sample. The largest portion of the sample was for passenger cars (46 percent) with 22 percent for sport utility vehicles and 12 percent for vans.

Usage rate by county is shown in Table 6. The rate varied from a high of 87.2 percent in Fayette County to a low of 65.1 percent in Pike County. The rates are higher in the more populated counties. The rate is over 80 percent in 13 of the 18 counties and less than 70 percent in only two counties (Pike and Knott Counties). The rate in 2011 decreased from 2010 in only two counties (with the largest decrease of 2.3 percent in Pike County). The largest increases were in Jessamine, Mercer, and Mason Counties with an increase of over four percent.

The usage rate by county and vehicle type is given in Table 7. The rates varied from a high of 93.6 percent for vans in Calloway County to a low of 48.4 percent for pickups in Pike County.

While the data collection procedure changed in 1990, 1999, and 2009, the usage rate in 2011 can still be compared to the statewide rates from past years (Table 8). The previous studies showed that statewide driver usage rates have dramatically increased over the past 28 years from four percent in 1982 to 82 percent in 2011. The changes over the years can be related to changes in safety belt legislation and increased enforcement and education.

For the past several years a mini-survey of 21 sites (selected from the 200 sites for the full survey used prior to 2009) has been conducted. This mini-survey was conducted in 2011 to compare to the data from the procedure implemented in 2009. The results are

given in Appendix D. A usage rate of 82.2 percent was determined in 2011 at these locations. This is identical to that found using the current procedure.

Helmet use by motorcyclists was also observed. Kentucky had a statewide law requiring the use of a helmet by a motorcyclist until it was repealed starting July 1998. The results of surveys taken during the mandatory usage period had found a usage rate of over 95 percent. Data taken in 1998 both before and after the effective date of the repeal found 96 percent before and 76 percent after. The motorcycle helmet usage for 1999 through 2011 is given in Table 9. The average usage rate for the 13 years after the repeal of mandatory helmet usage is 59 percent (with 52 percent in 2011). Motorcycle helmet usage over these years has ranged from a low of 50 percent in 2010 to a high of 70 percent in 2000.

Bicycle helmet use was observed while data were being collected. Only 57 bicyclists were observed with 14 using helmets (25 percent). The very small sample size does not allow any conclusions about trends but does support the opinion that the usage rate continues to be very low.

Distracted driving was documented for the first time in 2010 with this data also collected in 2011. The data were collected for drivers and summarized by vehicle type and seat belt usage. The percentages of drivers observed as being distracted were calculated for all categories. The table summarizing the data is shown in Appendix E. The percentages were not weighted as the seatbelt data but used data equally for all sites. The distracted percentage ranged from a low of 7.3 percent (van drivers not wearing a seatbelt) to 10.3 percent (passenger car drivers not wearing a seatbelt). The distracted driver percentage was the lowest for vans and the highest for SUVs when summarized by any seatbelt use. The overall distracted driver percentage was 8.6 percent with the percentage slightly lower for buckled drivers. The rate increased slightly from 2010 (7.6 percent).

4.0 SUMMARY

Observations were taken at 160 sites across Kentucky to obtain safety belt usage rates. The 2011 survey resulted in a sample size of 74,550 front seat occupants (including 59,016 drivers). The data collection procedure and site selection criteria were based on national criteria. The usage rate for all front seat occupants is 82.2 percent.

A “secondary enforcement” statewide safety belt law was passed in Kentucky in 1994 with a law allowing “primary enforcement” enacted in 2006. Prior to the original 2004 statewide law, there were local ordinances passed in several cities and counties which covered approximately one-third of the statewide population. The increase in usage over the past 29 years (as shown in Table 8) can be directly related to the changes in legislation and the related enforcement (along with continued education).

Usage is highest on interstates and lowest on local roads. When type of vehicle is considered, usage is highest for vans and lowest for pickup trucks. Usage is higher in the more urban counties compared to the most rural.

The statewide usage rate for children under the age of four (including both the front and rear seat) was determined to be 97.0 percent in 2011. This very high rate has existed for many years. One reason for the very high usage for small children is that primary, rather than secondary, enforcement has applied for many years.

The motorcycle helmet law was repealed in 1998. There had been a very high compliance with the requirement to wear a helmet (over 95 percent), but the helmet usage percentage has decreased (with 52 percent in 2011). This shows the large decrease in usage related to the repeal of the mandatory usage law. The percentage of a small sample of bicyclists observed wearing a safety helmet is very low. Observations showed that 8.6 percent of drivers were observed either talking on a cell phone or keying on their phone.

5.0 RECOMMENDATIONS

The data show that the level of safety belt usage in 2011 is the highest since the start of the surveys in 1982. The large increase over the years can be related to the enactment and enforcement of safety belt laws and increased education.

The data support maintaining the education and enforcement efforts of the primary safety belt law. An increase in the current fine of $25 may be justified. The variation of usage by county and vehicle type show where more emphasis should be placed.

Figure 1. Data Collection Form

SAFETY BELT DATA COLLECTION FORM

Date: _____ Starting Time: _____ Ending Time: _____ Int #: _____

Location: _____ Sheet #: _____

Observer: _____ Comment: _____

DRIVER USAGE

Vehicle	Harness or Belt	Distracted	None	Distracted
PC				
PU				
VAN				
SUV				

FRONT-SEAT OCCUPANT USAGE (OVER 3 YEARS OF AGE)

Vehicle	Harness or Belt	None
PC		
PU		
VAN		
SUV		

USAGE FOR CHILDREN (1-3 YEARS OF AGE)

Position	Safety Seat	Booster Seat	Harness or Belt	None
FRONT				
REAR				

USAGE FOR INFANTS (UNDER 1 YEAR OF AGE)

Position	Safety Seat	None
FRONT		
REAR		

USAGE OF MOTORCYCLE HELMET

YES	NO

USAGE OF BICYCLE HELMET

YES	NO

Figure 2. Selected Counties for Seatbelt Sites

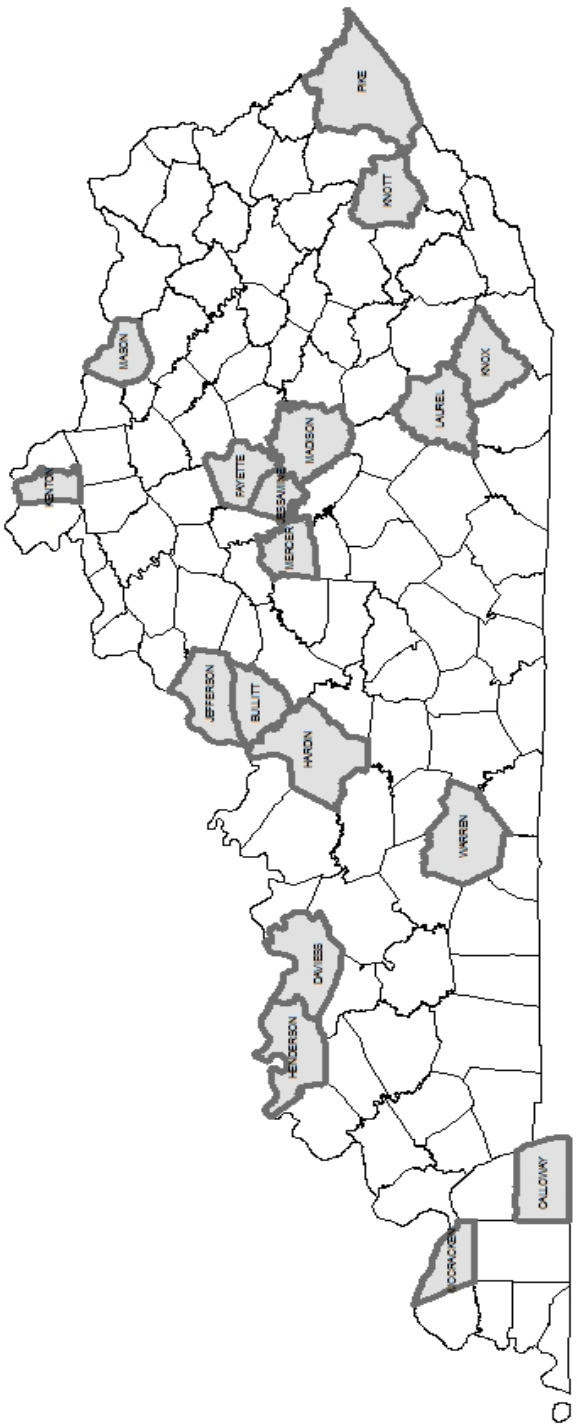

Table 1. Survey Counties

	Geographical Area	Number of Observational Sites
1	**Jefferson County**	**16***
2	**Fayette County**	**16***
3	Knott County	8**
4	Calloway County	8**
5	McCracken County	8**
6	Kenton County	8**
7	Jessamine County	8**
8	Daviess County	8**
9	Mason County	8**
10	Henderson County	8**
11	Bullitt County	8**
12	Madison County	8**
13	Mercer County	8**
14	Warren County	8**
15	Knox County	8**
16	Laurel County	8**
17	Pike County	8**
18	Hardin County	8**
	Total Observational Sites	160

* Certainty counties were allotted 16 observational sites
** Remaining counties were allotted 8 observational sites

Table 2. Number of Site Allocations per Road Class (by County)

County	Sites Allocated	County VMT (excl. local)	Road Class Stratum	County-Stratum VMT	Number of Sites if Allocated by VMT	**Adjusted Number of Sites**
Jefferson	**16**	5,662,204,013	1	3,428,202,911	9.69	**8**
			2	1,566,486,454	4.43	**5**
			3	579,805,454	1.64	**2**
			4	87,709,194	0.25	**1**
Fayette	**16**	2,037,784,505	1	1,029,408,590	8.08	**8**
			2	787,888,177	6.19	**6**
			3	127,945,572	1.00	**1**
			4	92,542,166	0.73	**1**
Knott	**8**	179,437,128	1	0	0.00	**0**
			2	76,675,145	3.42	**4**
			3	27,965,271	1.25	**1**
			4	74,796,712	3.33	**3**
Calloway	**8**	225,344,385	1	0	0.00	**0**
			2	122,621,989	4.35	**4**
			3	24,724,978	0.88	**1**
			4	77,997,418	2.77	**3**
McCracken	**8**	654,652,877	1	222,383,178	2.72	**3**
			2	234,563,650	2.87	**3**
			3	111,779,953	1.37	**1**
			4	85,926,095	1.05	**1**
Kenton	**8**	1,334,349,118	1	881,553,987	5.29	**4**
			2	184,867,682	1.11	**2**
			3	164,856,523	0.99	**1**
			4	103,070,925	0.62	**1**
Jessamine	**8**	305,461,484	1	0	0.00	**0**
			2	167,871,821	4.40	**4**
			3	81,446,197	2.13	**2**
			4	56,143,466	1.47	**2**
Daviess	**8**	602,740,652	1	136,543,073	1.81	**2**
			2	246,801,576	3.28	**3**
			3	87,825,388	1.17	**1**
			4	131,570,615	1.75	**2**
Mason	**8**	189,886,599	1	0	0.00	**0**
			2	105,884,656	4.46	**4**
			3	53,221,561	2.24	**2**
			4	30,780,382	1.30	**2**

Table 2. Number of Site Allocations per Road Class (by County) (continued)

Henderson	**8**	419,993,200	1	125,760,931	2.40	**3**
			2	174,912,763	3.33	**3**
			3	63,157,348	1.20	**1**
			4	56,162,157	1.07	**1**
Bullitt	**8**	775,709,682	1	488,512,652	5.04	**4**
			2	129,479,561	1.34	**2**
			3	103,252,166	1.06	**1**
			4	54,465,304	0.56	**1**
Madison	**8**	856,419,740	1	461,576,486	4.31	**4**
			2	144,133,180	1.35	**1**
			3	177,822,202	1.66	**2**
			4	72,887,872	0.68	**1**
Mercer	**8**	181,201,996	1	16,672,470	0.74	**1**
			2	110,799,013	4.89	**4**
			3	20,283,349	0.90	**1**
			4	33,447,164	1.48	**2**
Warren	**8**	1,151,750,666	1	555,176,045	3.86	**4**
			2	210,819,131	1.46	**1**
			3	216,445,264	1.50	**2**
			4	169,310,226	1.18	**1**
Knox	**8**	258,196,709	1	0	0.00	**0**
			2	171,673,943	5.32	**4**
			3	6,051,320	0.19	**1**
			4	80,471,446	2.49	**3**
Laurel	**8**	737,805,854	1	343,237,792	3.72	**4**
			2	104,908,513	1.14	**1**
			3	86,681,538	0.94	**1**
			4	202,978,010	2.20	**2**
Pike	**8**	689,274,190	1	0	0.00	**0**
			2	400,718,551	4.65	**4**
			3	77,534,043	0.90	**1**
			4	211,021,597	2.45	**3**
Hardin	**8**	1,113,356,778	1	510,918,645	3.67	**3**
			2	240,082,313	1.73	**2**
			3	208,398,866	1.50	**2**
			4	153,956,954	1.11	**1**
Totals	**160**	17,375,569,577	1	8,199,946,761	51.32	**48**
			2	5,181,188,117	59.69	**57**
			3	2,219,196,993	22.52	**24**
			4	1,775,237,706	26.47	**31**

TABLE 3. USAGE RATE FOR FRONT-SEAT OCCUPANTS (BY ROAD CLASS)

ROAD CLASSIFICATION	PERCENT USAGE BY TYPE		
	DRIVERS	PASSENGERS*	ALL*
Interstates and Other Expressways	88.4	86.4	88.0
Other Principal Arterials	80.7	77.0	80.1
Minor Arterials	80.6	79.0	80.3
Collectors	75.2	71.5	74.4
All	82.8	79.7	82.2

TABLE 4. USAGE RATE FOR CHILDREN (FRONT AND REAR) BY ROAD CLASS

ROAD CLASSIFICATION	PERCENT USAGE BY AGE (YEARS)		
	UNDER 1	1 TO 3	UNDER 4
Interstates and Other Expressways	90.6	100.0	99.2
Other Principal Arterials	99.8	95.1	96.7
Minor Arterials	99.6	93.3	95.6
Collectors	92.2	97.4	93.6
All	93.9	97.3	97.0

TABLE 5. USAGE RATE FOR FRONT-SEAT OCCUPANTS (BY ROAD CLASS AND VEHICLE TYPE)

ROAD CLASSIFICATION	PERCENT USAGE BY VEHICLE TYPE				
	PC	PU	VAN	SUV	ALL*
Interstates and Other Expressways	89.4	78.8	91.1	89.4	88.0
Other Principal Arterials	82.4	69.1	85.0	82.7	80.1
Minor Arterials	82.4	68.9	87.3	83.3	80.3
Collectors	79.1	62.0	81.3	80.2	74.4
All	84.4	71.7	86.8	84.8	82.2

*Including children under four

TABLE 6. USAGE RATE FOR FRONT-SEAT OCCUPANTS (BY COUNTY)

COUNTY	PERCENT USAGE BY TYPE		
	DRIVERS	PASSENGERS*	ALL*
Bullitt	85.8	81.9	85.1
Calloway	82.7	72.7	81.3
Daviess	84.6	80.5	83.9
Fayette	87.5	85.8	87.2
Hardin	85.4	83.5	85.0
Henderson	82.2	78.1	81.5
Jefferson	84.5	82.1	84.0
Jessamine	83.1	79.8	82.4
Kenton	86.6	84.2	86.0
Knott	71.1	64.4	69.7
Knox	74.7	68.2	72.9
Laurel	80.9	78.6	80.3
Madison	84.7	82.4	84.2
Mason	78.9	77.0	78.4
McCracken	85.1	79.7	84.1
Mercer	77.8	71.3	76.6
Pike	65.5	62.7	65.1
Warren	84.8	85.2	84.9
All	82.8	79.7	82.2

*Including children under four

TABLE 7. USAGE RATE FOR FRONT-SEAT OCCUPANTS (BY COUNTY AND VEHICLE TYPE)

COUNTY	PERCENT USAGE BY VEHICLE TYPE				
	PC	PU	VAN	SUV	ALL*
Bullitt	85.2	78.6	91.3	88.0	85.1
Calloway	83.7	68.7	93.6	83.9	81.3
Daviess	87.5	70.6	88.4	88.5	83.9
Fayette	89.4	77.0	88.2	89.2	87.2
Hardin	88.3	75.1	89.2	87.1	85.0
Henderson	80.1	72.1	85.4	90.4	81.5
Jefferson	85.6	73.3	87.1	85.9	84.0
Jessamine	86.1	70.8	86.1	84.2	82.4
Kenton	86.7	78.8	90.6	86.0	86.0
Knott	75.3	58.8	74.2	72.9	69.7
Knox	76.3	65.1	78.1	74.1	72.9
Laurel	83.4	67.5	88.9	81.4	80.3
Madison	86.1	77.7	85.3	86.7	84.2
Mason	80.0	68.4	85.2	83.1	78.4
McCracken	85.6	76.9	91.2	84.2	84.1
Mercer	79.1	67.4	81.8	80.4	76.6
Pike	73.1	48.4	81.2	73.0	65.1
Warren	86.9	72.0	92.5	89.5	84.9
All	84.4	71.7	86.8	84.8	82.2

*Including children under four

TABLE 8. TREND IN STATEWIDE USAGE RATES

YEAR	PERCENT USING SAFETY BELTS: ALL FRONT SEAT OCCUPANTS	DRIVERS	CHILDREN UNDER FOUR YEARS OF AGE*
1982	**	4	15
1983	**	6	24
1984	**	7	30
1985	9	9	29
1986	13	13	30
1988	20	21	48
1989	25	26	49
1990	33	32	57
1991	39	39	57
1992	40	41	62
1993	42	42	61
1994	58	58	72
1995	54	54	66
1996	55	55	79
1997	54	54	82
1998	54	54	80
1999	59	59	89
2000	60	60	87
2001	62	62	89
2002	62	62	93
2003	66	65	95
2004	66	66	96
2005	67	67	94
2006	67	68	94
2007	72	72	98
2008	73	74	98
2009	80	80	99
2010	80	81	96
2011	82	83	97

*Children using either safety seat or safety belt. Children seated in front or rear seat.
**Data not available.

TABLE 9. TREND IN MOTORCYCLE HELMET USAGE

	PERCENT USING HELMET	
YEAR	SAMPLE SIZE	PERCENT USAGE
1999	452	65
2000	427	70
2001	395	56
2002	596	57
2003	512	56
2004	631	58
2005	918	59
2006	949	60
2007	897	56
2008	1,244	58
2009	537	64
2010	780	50
2011	699	52

Appendix A:

County Populations

APPENDIX A. Population of Kentucky Counties (2008 Census Estimates)

County	Population	Percent Total	Cumulative Percent Total
Jefferson	**713,877**	**16.72**	**16.72**
Fayette	**282,114**	**6.61**	**23.33**
Kenton	**157,629**	**3.69**	**27.02**
Boone	115,231	2.70	29.72
Warren	**105,862**	**2.48**	**32.20**
Hardin	**98,546**	**2.31**	**34.51**
Daviess	**94,418**	**2.21**	**36.72**
Campbell	87,038	2.04	38.76
Madison	**82,192**	**1.93**	**40.68**
Christian	79,820	1.87	42.55
Bullitt	**75,028**	**1.76**	**44.31**
Pike	**65,331**	**1.53**	**45.84**
McCracken	**65,109**	**1.53**	**47.37**
Pulaski	60,851	1.43	48.79
Laurel	**57,586**	**1.35**	**50.14**
Oldham	56,874	1.33	51.47
Franklin	48,844	1.14	52.62
Boyd	48,560	1.14	53.75
Jessamine	**46,716**	**1.09**	**54.85**
Hopkins	46,338	1.09	55.93
Henderson	**45,462**	**1.06**	**57.00**
Scott	44,549	1.04	58.04
Nelson	43,113	1.01	59.05
Floyd	42,094	0.99	60.04
Barren	41,566	0.97	61.01
Shelby	41,157	0.96	61.98
Whitley	38,668	0.91	62.88
Graves	37,487	0.88	63.76
Greenup	37,388	0.88	64.64
Calloway	**36,240**	**0.85**	**65.48**
Clark	35,691	0.84	66.32
Knox	**32,810**	**0.77**	**67.09**
Marshall	31,189	0.73	67.82
Muhlenberg	31,187	0.73	68.55
Harlan	30,783	0.72	69.27
Perry	29,241	0.68	69.96
Bell	29,055	0.68	70.64
Boyle	28,933	0.68	71.31
Carter	27,454	0.64	71.96
Logan	27,117	0.64	72.59

County	Population	Percent Total	Cumulative Percent Total
Meade	27,043	0.63	73.23
Montgomery	25,618	0.60	73.83
Grant	25,549	0.60	74.42
Grayson	25,497	0.60	75.02
Lincoln	25,072	0.59	75.61
Woodford	24,526	0.57	76.18
Taylor	24,069	0.56	76.75
Johnson	24,056	0.56	77.31
Clay	23,930	0.56	77.87
Letcher	23,890	0.56	78.43
Ohio	23,789	0.56	78.99
Rowan	22,733	0.53	79.52
Mercer	**21,920**	**0.51**	**80.03**
Anderson	21,347	0.50	80.53
Wayne	20,696	0.48	81.02
Bourbon	19,828	0.46	81.48
Breckinridge	19,132	0.45	81.93
Allen	19,090	0.45	82.38
Marion	19,063	0.45	82.82
Harrison	18,654	0.44	83.26
Hart	18,561	0.43	83.70
Adair	17,773	0.42	84.11
Mason	**17,414**	**0.41**	**84.52**
Knott	**17,385**	**0.41**	**84.93**
Spencer	17,382	0.41	85.34
McCreary	17,315	0.41	85.74
Russell	17,296	0.41	86.15
Garrard	17,021	0.40	86.54
Simpson	17,019	0.40	86.94
Rockcastle	16,788	0.39	87.34
Lawrence	16,443	0.39	87.72
Casey	16,214	0.38	88.10
Breathitt	15,813	0.37	88.47
Henry	15,741	0.37	88.84
Union	15,024	0.35	89.19
Pendleton	14,992	0.35	89.54
Estill	14,948	0.35	89.89
Fleming	14,735	0.35	90.24
Morgan	14,156	0.33	90.57
Powell	13,859	0.32	90.89
Lewis	13,807	0.32	91.22
Larue	13,722	0.32	91.54

County	Population	Percent Total	Cumulative Percent Total
Webster	13,669	0.32	91.86
Jackson	13,645	0.32	92.18
Trigg	13,418	0.31	92.49
Butler	13,276	0.31	92.80
Magoffin	13,151	0.31	93.11
Caldwell	12,866	0.30	93.41
Todd	12,173	0.29	93.70
Edmonson	12,085	0.28	93.98
Bath	11,750	0.28	94.26
Leslie	11,639	0.27	94.53
Green	11,613	0.27	94.80
Martin	11,602	0.27	95.07
Washington	11,595	0.27	95.35
Monroe	11,547	0.27	95.62
Owen	11,432	0.27	95.88
Carroll	10,627	0.25	96.13
Metcalfe	10,288	0.24	96.37
McLean	9,681	0.23	96.60
Livingston	9,591	0.22	96.83
Clinton	9,568	0.22	97.05
Crittenden	9,244	0.22	97.27
Trimble	9,012	0.21	97.48
Hancock	8,663	0.20	97.68
Bracken	8,569	0.20	97.88
Ballard	8,323	0.19	98.08
Lyon	8,245	0.19	98.27
Gallatin	8,071	0.19	98.46
Lee	7,414	0.17	98.63
Elliott	7,280	0.17	98.80
Wolfe	6,989	0.16	98.97
Fulton	6,855	0.16	99.13
Cumberland	6,817	0.16	99.29
Nicholas	6,811	0.16	99.45
Menifee	6,744	0.16	99.60
Carlisle	5,162	0.12	99.72
Hickman	4,936	0.12	99.84
Owsley	4,634	0.11	99.95
Robertson	2,202	0.05	100.00
KENTUCKY	**4,269,245**		

*Highlighted counties are those included for belt use observation.

Appendix B:

Survey Locations

APPENDIX B. SURVEY LOCATIONS

Site Number	Road Classification	County	Road Surveyed	Reference
1	Interstates and Other Expressways	Bullitt	I-65	Exit 105 (KY 61)
2	Interstates and Other Expressways	Bullitt	I-65	Exit 117 (KY 44)
3	Interstates and Other Expressways	Bullitt	I-65	Exit 121 (1526)
4	Interstates and Other Expressways	Bullitt	I-65	Exit 112 (KY 245)
5	Other Principal Arterials	Bullitt	US-31E	KY 44
6	Other Principal Arterials	Bullitt	KY-44	KY 61 (N Buckman St)
7	Minor Arterials	Bullitt	KY-1450	KY 1526 (Brooks Hill Rd / John D. Harper Blvd)
8	Collectors	Bullitt	W Blue Lick Rd (KY 2673)	KY 61
9	Other Principal Arterials	Calloway	US-641 (12th St)	KY 94 (Main St)
10	Other Principal Arterials	Calloway	US-641	KY 80
11	Other Principal Arterials	Calloway	KY-121	Lowe's Dr
12	Other Principal Arterials	Calloway	US-641 (12th St)	Glendale Rd
13	Minor Arterials	Calloway	KY-822 (16th St)	KY 94 (Main St)
14	Collectors	Calloway	KY-822 (16th St)	KY 821 (Sycamore St)
15	Collectors	Calloway	KY-2075 (4th St)	US-641
16	Collectors	Calloway	KY-121	US 641 (Glendale Rd)
17	Interstates and Other Expressways	Daviess	US-60B	US 431 (Frederica St)
18	Interstates and Other Expressways	Daviess	US-60B	US 60 (T-intersection)
19	Other Principal Arterials	Daviess	US-431 (Frederica St)	Tamarack Rd
20	Other Principal Arterials	Daviess	KY-54 (Leitchfield Rd)	KY 3143 (Fairview Dr)
21	Other Principal Arterials	Daviess	US-60	KY 331 (Industrial Dr)
22	Minor Arterials	Daviess	KY-2698 (Carter Rd)	Buckland Square
23	Collectors	Daviess	KY-298	Breckenridge St
24	Collectors	Daviess	KY-1432 (Burlew Blvd)	KY 2155 (New Hartford Rd)
25	Interstates and Other Expressways	Fayette	KY-4	Exit 2 (US 68/Harrodsburg Rd)
26	Interstates and Other Expressways	Fayette	I-75	Exit 108 (Man O' War Blvd)
27	Interstates and Other Expressways	Fayette	I-75	Exit 104 (Ky 418-Athens)
28	Interstates and Other Expressways	Fayette	KY-4	Exit 18 (KY 1974/Tates Creek Rd)
29	Interstates and Other Expressways	Fayette	KY-4	Exit 6 (KY 1681/Old Frankfort Pk)
30	Interstates and Other Expressways	Fayette	I-75	Exit 115 (KY 922/Newtown Pk)
31	Interstates and Other Expressways	Fayette	I-64	Exit 87 (KY 859/Haley Rd)
32	Interstates and Other Expressways	Fayette	KY-4	Exit 14 (US 25/Richmond Rd)
33	Other Principal Arterials	Fayette	US-60	Sir Barton Way
34	Other Principal Arterials	Fayette	US-60	Walton Ave
35	Other Principal Arterials	Fayette	KY-1974	Cooper Dr
36	Other Principal Arterials	Fayette	KY-1974	Armstrong Mill Rd
37	Other Principal Arterials	Fayette	KY-922	Nandino Blvd/Lexmark Dr
38	Other Principal Arterials	Fayette	US-25	Upper St
39	Minor Arterials	Fayette	US-421	Masterson Station Dr.
40	Collectors	Fayette	KY-1968 (Parkers Mill Rd)	Man O War Blvd
41	Interstates and Other Expressways	Hardin	WK-9001	US 31WB (Elizabethtown Bypass over WK Pkwy)
42	Interstates and Other Expressways	Hardin	I-65	Exit 94 (US 62/Bardstown Rd over I-65)
43	Interstates and Other Expressways	Hardin	I-65	Exit 86 (Glendale)
44	Other Principal Arterials	Hardin	KY-61	Sportsmans Lane Road
45	Other Principal Arterials	Hardin	US-31W	Walmart Dr (Towne Mall)
46	Minor Arterials	Hardin	KY-251	Poplar Street (4 way stop)
47	Minor Arterials	Hardin	US-62	Ring Rd
48	Collectors	Hardin	KY-224	US 31W (T-intersection)
49	Interstates and Other Expressways	Henderson	EB-9004	KY-425
50	Interstates and Other Expressways	Henderson	AU-9005	Exit 10
51	Interstates and Other Expressways	Henderson	US-41	Marywood Dr
52	Other Principal Arterials	Henderson	KY-425 (Henderson Bypass)	US 41
53	Other Principal Arterials	Henderson	US-41A	5th St
54	Other Principal Arterials	Henderson	US-60	KY 425/KY 136 (Bypass)
55	Minor Arterials	Henderson	US-41A	KY 425
56	Collectors	Henderson	KY-136	US 41
57	Interstates and Other Expressways	Jefferson	I-64	Exit 10 (Cannons Ln)
58	Interstates and Other Expressways	Jefferson	I-64	Exit 15 (S. Hurstbourne Pkwy)
59	Interstates and Other Expressways	Jefferson	I-264	Exit 9 (Taylor Blvd)
60	Interstates and Other Expressways	Jefferson	I-65	Exit 128 (Fern Valley Rd)
61	Interstates and Other Expressways	Jefferson	I-71	Exit 9 (I-265)
62	Interstates and Other Expressways	Jefferson	I-71	Exit 2 (Zorn Ave)
63	Interstates and Other Expressways	Jefferson	I-265	Exit 27 (Shelbyville Rd.)
64	Interstates and Other Expressways	Jefferson	KY-841	US 42 (T-intersection)
65	Other Principal Arterials	Jefferson	KY-1747	KY 864 (Fegenbush Ln)
66	Other Principal Arterials	Jefferson	US-31W	Garrs Ln
67	Other Principal Arterials	Jefferson	US-42 (Brownsboro Rd)	Haldeman Rd
68	Other Principal Arterials	Jefferson	US-42	US 60

APPENDIX B. SURVEY LOCATIONS

Site Number	Road Classification	County	Road Surveyed	Reference
69	Other Principal Arterials	Jefferson	KY-2054	KY 2054 (Algonquin Ave) @ KY 1931 (S. 7th St)
70	Minor Arterials	Jefferson	KY-1020 (3rd St)	Central Ave
71	Minor Arterials	Jefferson	KY-146	Factory Ln/Chamberlain Ln
72	Collectors	Jefferson	KY-329	US 42 (T-intersection)
73	Other Principal Arterials	Jessamine	US-27	KY 1980 (Brannon Crossing)
74	Other Principal Arterials	Jessamine	US-27	Elizabeth Dr.
75	Other Principal Arterials	Jessamine	US-27	Edgewood Dr.
76	Other Principal Arterials	Jessamine	US-68	KY 1980 (Brannon Crossing)
77	Minor Arterials	Jessamine	KY-169	N. Central Ave (4 way stop)
78	Minor Arterials	Jessamine	KY-169	US 27
79	Collectors	Jessamine	KY-29	KY 1268
80	Collectors	Jessamine	KY-1981	KY 169 (2 T intersection)
81	Interstates and Other Expressways	Kenton	I-75	Exit 186
82	Interstates and Other Expressways	Kenton	I-75	Exit 166
83	Interstates and Other Expressways	Kenton	I-275	Exit 79
84	Interstates and Other Expressways	Kenton	I-75	Exit 184 (exit B)
85	Other Principal Arterials	Kenton	KY-1120	Garrard St
86	Other Principal Arterials	Kenton	KY-17 (Madison Ave)	20th St
87	Minor Arterials	Kenton	KY-16	36th St
88	Collectors	Kenton	KY-1501	KY 17
89	Other Principal Arterials	Knott	KY-15	Horseshoe Bend Rd
90	Other Principal Arterials	Knott	KY-80	KY 1087/1098
91	Other Principal Arterials	Knott	KY-80	KY 160
92	Other Principal Arterials	Knott	KY-15 (Smithboro Rd)	KY 1088
93	Minor Arterials	Knott	KY-160	KY 80
94	Collectors	Knott	Ky 899	KY 160
95	Collectors	Knott	KY-1410 (Burgeys Creek Rd)	KY 160 (T-intersection)
96	Collectors	Knott	KY-1231	KY 15 (T-intersection)
97	Other Principal Arterials	Knox	US-25E	KY 11 (Morris St in Heidrick, KY)
98	Other Principal Arterials	Knox	US-25E	KY 312 (Master St)
99	Other Principal Arterials	Knox	KY-3041	US 25E
100	Other Principal Arterials	Knox	US-25E	KY 11 (Daniel Boone Dr)
101	Minor Arterials	Knox	KY-312	SHOPPING CENTER ENTRANCE
102	Collectors	Knox	KY-6	KY 11
103	Collectors	Knox	KY-223	US 25
104	Collectors	Knox	KY-3436 (Hart Rd)	KY 6
105	Interstates and Other Expressways	Laurel	I-75	Exit 49 (KY 909)
106	Interstates and Other Expressways	Laurel	I-75	Exit 29 (US 25/Corbin Bypass)
107	Interstates and Other Expressways	Laurel	HR-9006	KY 354/KY 30
108	Interstates and Other Expressways	Laurel	I-75	Exit 41 (KY 80)
109	Other Principal Arterials	Laurel	KY-192	KY 1006
110	Minor Arterials	Laurel	US-25	3rd St
111	Collectors	Laurel	KY-472 (Johnson Rd)	KY 80 (Hal Rodger Pkwy)
112	Collectors	Laurel	KY-490	KY 30 (School St)
113	Interstates and Other Expressways	Madison	I-75	Exit 76 (Berea/KY 21)
114	Interstates and Other Expressways	Madison	I-75	Exit 97 (US 25)
115	Interstates and Other Expressways	Madison	I-75	Exit 87 (Eastern Bypass)
116	Interstates and Other Expressways	Madison	I-75	Exit 90 (Richmond/US 25)
117	Other Principal Arterials	Madison	US-25	Keeneland Dr
118	Minor Arterials	Madison	KY-21	Dogwood Dr
119	Minor Arterials	Madison	KY-52	KY 374 (Moberly Rd)
120	Collectors	Madison	US-25	KY 627/KY 3055/White Hall Shrine Rd
121	Other Principal Arterials	Mason	US-68	US 62/KY 1236
122	Other Principal Arterials	Mason	US-62 (AA Highway)	KY 9 (Clyde T Barbour Blvd)
123	Other Principal Arterials	Mason	KY-9 (AA Highway)	Walmart Entrance
124	Other Principal Arterials	Mason	KY-9 (AA Highway)	US 62 (Lexington Rd)
125	Minor Arterials	Mason	KY-8 (3rd St)	Market St
126	Minor Arterials	Mason	KY-10 (Mason Lewis Rd)	Main St
127	Collectors	Mason	Ky 2515/Old Main	US 62
128	Collectors	Mason	KY-1448 (KY-11)	KY 9 (AA Highway)
129	Interstates and Other Expressways	McCracken	I-24	Exit 4 (Hinkleville Rd)
130	Interstates and Other Expressways	McCracken	I-24	KY 994 overpass
131	Interstates and Other Expressways	McCracken	I-24	Exit 16 (US 68)
132	Other Principal Arterials	McCracken	US-45 (Joe Clifton Dr)	US 60
133	Other Principal Arterials	McCracken	US-60X (S. 4th St)	US 45X (Kentucky Ave)
134	Other Principal Arterials	McCracken	US-60	KY 994 (Old Mayfield Rd)
135	Minor Arterials	McCracken	KY-284 (Old Benton Rd)	KY 450 (Frontage Rd)
136	Collectors	McCracken	KY-339 (Clinton Rd)	US 45 (Lone Oak Rd)

APPENDIX B. SURVEY LOCATIONS

Site Number	Road Classification	County	Road Surveyed	Reference
137	Interstates and Other Expressways	Mercer	BG-9002	Bondville Rd overpass
138	Other Principal Arterials	Mercer	US-127	US 127 Bypass
139	Other Principal Arterials	Mercer	US-127	Cardinal Dr
140	Other Principal Arterials	Mercer	US-127	US 68 (Mooreland Ave)
141	Other Principal Arterials	Mercer	US-68	Main St
142	Minor Arterials	Mercer	US-68	US 127 Bypass
143	Collectors	Mercer	KY-33	Hughley Ln.
144	Collectors	Mercer	KY-390	At RR Crossing (Ky 1941/Fairview)
145	Other Principal Arterials	Pike	US-23	KY 1426
146	Other Principal Arterials	Pike	US-119	KY 1426
147	Other Principal Arterials	Pike	US-23 (N. Mayo Tr)	US-119 (Buckley Creek Rd)
148	Other Principal Arterials	Pike	US-23	KY 2061 (Cowpen Rd)
149	Minor Arterials	Pike	KY-632	KY 194
150	Collectors	Pike	KY-308	US-119
151	Collectors	Pike	KY-194	US-119
152	Collectors	Pike	KY-1384	Porter Rd
153	Interstates and Other Expressways	Warren	I-65	Exit 26 (KY 234)
154	Interstates and Other Expressways	Warren	WN-9007 (Natcher)	Exit 7 (US 23)
155	Interstates and Other Expressways	Warren	I-65	Exit 22 (US 231)
156	Interstates and Other Expressways	Warren	I-65	Exit 38 (KY101)
157	Other Principal Arterials	Warren	US-231	Smallhouse Rd
158	Minor Arterials	Warren	US-231X	Normal Street
159	Minor Arterials	Warren	KY-185	Double Springs
160	Collectors	Warren	US-31W	KY 242

Appendix C:

Summary of Data

APPENDIX C. SUMMARY OF DATA

	ALL FRONT SEAT OCCUPANTS				CATEGORY					
					DRIVERS		FRONT SEAT PASSENGERS		UNDER FOUR (FRONT AND REAR)	
Location Number	Sample	Percent Usage	Relative Error*	Confidence Interval*	Sample	Percent Usage	Sample	Percent Usage	Sample	Percent Usage
1	334	90.4	3.5	3.2	240	91.3	94	88.3	0	---
2	403	86.1	3.9	3.4	322	86.3	81	85.2	10	100.0
3	605	87.1	3.1	2.7	531	87.9	74	81.1	1	100.0
4	362	92.0	3.0	2.8	267	92.5	95	90.5	0	---
5	858	81.8	3.2	2.6	761	82.3	97	78.4	11	100.0
6	666	76.6	4.2	3.2	535	78.7	131	67.9	6	100.0
7	617	81.2	3.8	3.1	488	81.4	129	80.6	4	75.0
8	395	71.9	6.2	4.4	304	73.7	91	65.9	6	100.0
9	676	85.7	3.1	2.6	578	85.3	98	87.8	1	100.0
10	346	83.2	4.7	3.9	273	84.2	73	79.5	2	100.0
11	334	81.1	5.2	4.2	292	82.5	42	71.4	0	---
12	494	81.0	4.3	3.5	443	82.6	51	66.7	0	---
13	400	82.8	4.5	3.7	312	84.6	88	76.1	3	100.0
14	410	79.0	5.0	3.9	350	80.0	60	73.3	0	---
15	160	76.9	8.5	6.5	133	79.7	27	63.0	2	0.0
16	257	79.4	6.2	4.9	221	82.4	36	61.1	0	---
17	654	88.5	2.8	2.4	548	88.9	106	86.8	0	---
18	372	80.6	5.0	4.0	306	80.1	66	83.3	0	---
19	722	84.8	3.1	2.6	567	84.3	155	86.5	5	100.0
20	670	85.1	3.2	2.7	553	86.1	117	80.3	2	100.0
21	355	83.1	4.7	3.9	299	86.0	56	67.9	0	---
22	525	84.4	3.7	3.1	451	84.7	74	82.4	4	100.0
23	274	83.2	5.3	4.4	236	83.5	38	81.6	0	---
24	344	81.1	5.1	4.1	278	82.4	66	75.8	3	100.0
25	547	89.4	2.9	2.6	447	90.4	100	85.0	3	100.0
26	530	90.8	2.7	2.5	407	90.4	123	91.9	7	100.0
27	458	88.4	3.3	2.9	349	88.0	109	89.9	6	100.0
28	648	83.5	3.4	2.9	490	83.9	158	82.3	1	100.0
29	576	85.2	3.4	2.9	463	85.5	113	84.1	3	100.0
30	593	94.1	2.0	1.9	497	93.8	96	95.8	9	100.0
31	743	86.8	2.8	2.4	578	87.7	165	83.6	13	100.0
32	505	86.5	3.4	3.0	419	87.6	86	81.4	6	100.0
33	806	88.5	2.5	2.2	624	88.1	182	89.6	16	100.0
34	482	81.1	4.3	3.5	410	81.2	72	80.6	2	100.0
35	783	91.4	2.1	2.0	658	91.0	125	93.6	8	87.5
36	426	85.0	4.0	3.4	381	86.4	45	73.3	3	100.0
37	826	88.4	2.5	2.2	708	88.4	118	88.1	6	100.0
38	514	86.2	3.5	3.0	420	86.4	94	85.1	13	100.0
39	523	90.1	2.8	2.6	419	89.3	104	93.3	0	---
40	294	77.9	6.1	4.7	229	79.9	65	70.8	0	---
41	433	88.2	3.4	3.0	314	87.6	119	89.9	0	---
42	659	89.2	2.7	2.4	452	89.8	207	87.9	0	---
43	632	93.4	2.1	1.9	430	94.7	202	90.6	2	100.0
44	403	82.6	4.5	3.7	310	82.6	93	82.8	3	66.7
45	644	84.6	3.3	2.8	498	84.9	146	83.6	6	83.3
46	337	82.8	4.9	4.0	268	83.2	69	81.2	6	100.0
47	619	85.0	3.3	2.8	499	87.4	120	75.0	0	---
48	203	70.9	8.8	6.2	168	70.8	35	71.4	3	100.0
49	305	87.9	4.2	3.7	235	88.5	70	85.7	0	---
50	187	85.0	6.0	5.1	138	85.5	49	83.7	0	---
51	391	87.5	3.8	3.3	312	88.5	79	83.5	5	100.0
52	250	80.0	6.2	5.0	199	80.4	51	78.4	3	100.0
53	682	81.8	3.5	2.9	559	83.9	123	72.4	4	100.0
54	259	83.4	5.4	4.5	220	85.5	39	71.8	1	100.0

APPENDIX C. SUMMARY OF DATA

	ALL FRONT SEAT OCCUPANTS				CATEGORY					
					DRIVERS		FRONT SEAT PASSENGERS		UNDER FOUR (FRONT AND REAR)	
Location Number	Sample	Percent Usage	Relative Error*	Confidence Interval*	Sample	Percent Usage	Sample	Percent Usage	Sample	Percent Usage
55	248	79.0	6.4	5.1	202	77.2	46	87.0	0	---
56	39	71.8	19.7	14.1	33	72.7	6	66.7	0	---
57	1123	91.2	1.8	1.7	937	91.2	186	90.9	0	---
58	928	90.1	2.1	1.9	826	90.0	102	91.2	2	100.0
59	481	85.2	3.7	3.2	391	87.0	90	77.8	2	100.0
60	620	87.6	3.0	2.6	542	88.0	78	84.6	1	100.0
61	592	87.2	3.1	2.7	483	88.6	109	80.7	1	100.0
62	271	85.6	4.9	4.2	236	85.2	35	88.6	1	100.0
63	449	84.6	3.9	3.3	377	85.1	72	81.9	9	100.0
64	516	86.4	3.4	3.0	419	86.6	97	85.6	8	87.5
65	682	87.2	2.9	2.5	584	87.3	98	86.7	13	100.0
66	985	71.9	3.9	2.8	803	73.7	182	63.7	2	100.0
67	520	80.6	4.2	3.4	475	80.2	45	84.4	0	---
68	599	81.1	3.9	3.1	512	81.6	87	78.2	3	100.0
69	215	66.0	9.6	6.3	178	66.3	37	64.9	6	100.0
70	298	81.2	5.5	4.4	229	81.2	69	81.2	0	---
71	560	84.3	3.6	3.0	469	84.9	91	81.3	4	100.0
72	115	87.0	7.1	6.2	100	87.0	15	86.7	2	100.0
73	673	90.5	2.4	2.2	560	90.9	113	88.5	6	100.0
74	734	88.7	2.6	2.3	568	88.7	166	88.6	4	100.0
75	724	86.6	2.9	2.5	566	87.5	158	83.5	8	100.0
76	808	83.4	3.1	2.6	647	83.3	161	83.9	2	100.0
77	193	79.3	7.2	5.7	146	78.8	47	80.9	2	100.0
78	122	73.8	10.6	7.8	97	76.3	25	64.0	2	100.0
79	368	77.7	5.5	4.3	284	77.5	84	78.6	3	100.0
80	212	75.0	7.8	5.8	169	77.5	43	65.1	1	100.0
81	621	89.9	2.6	2.4	519	90.9	102	84.3	1	100.0
82	911	91.0	2.0	1.9	632	91.0	279	91.0	0	---
83	997	88.8	2.2	2.0	828	88.4	169	90.5	0	---
84	438	86.3	3.7	3.2	362	86.5	76	85.5	6	100.0
85	557	74.9	4.8	3.6	404	79.5	153	62.7	3	100.0
86	769	73.7	4.2	3.1	608	76.3	161	64.0	4	75.0
87	455	81.8	4.3	3.5	351	81.5	104	82.7	6	100.0
88	284	88.7	4.1	3.7	241	88.0	43	93.0	4	100.0
89	168	68.5	10.3	7.0	140	70.0	28	60.7	0	---
90	158	71.5	9.8	7.0	132	73.5	26	61.5	0	---
91	170	77.6	8.1	6.3	135	78.5	35	74.3	0	---
92	206	75.2	7.8	5.9	164	73.8	42	81.0	1	100.0
93	230	68.3	8.8	6.0	168	72.6	62	56.5	0	---
94	385	72.2	6.2	4.5	313	71.9	72	73.6	2	0.0
95	92	63.0	15.6	9.9	75	65.3	17	52.9	1	100.0
96	85	64.7	15.7	10.2	75	65.3	10	60.0	1	100.0
97	334	88.3	3.9	3.4	273	89.4	61	83.6	1	100.0
98	597	76.2	4.5	3.4	423	77.1	174	74.1	6	100.0
99	249	68.3	8.5	5.8	191	69.1	58	65.5	1	100.0
100	859	70.7	4.3	3.0	596	72.0	263	67.7	1	100.0
101	539	75.1	4.9	3.6	416	74.5	123	77.2	6	83.3
102	156	59.6	12.9	7.7	109	64.2	47	48.9	1	100.0
103	101	62.4	15.1	9.4	77	63.6	24	58.3	1	100.0
104	131	77.1	9.3	7.2	90	82.2	41	65.9	0	---
105	768	89.2	2.5	2.2	535	89.2	233	89.3	0	---
106	385	86.8	3.9	3.4	268	88.1	117	83.8	6	100.0
107	330	78.2	5.7	4.5	257	79.4	73	74.0	0	---
108	751	88.8	2.5	2.3	511	89.2	240	87.9	2	100.0

APPENDIX C. SUMMARY OF DATA

	ALL FRONT SEAT OCCUPANTS				CATEGORY					
					DRIVERS		FRONT SEAT PASSENGERS		UNDER FOUR (FRONT AND REAR)	
Location Number	Sample	Percent Usage	Relative Error*	Confidence Interval*	Sample	Percent Usage	Sample	Percent Usage	Sample	Percent Usage
109	682	77.4	4.1	3.1	530	78.7	152	73.0	2	100.0
110	557	75.2	4.8	3.6	427	74.5	130	77.7	6	100.0
111	178	81.5	7.0	5.7	131	81.7	47	80.9	1	100.0
112	314	68.2	7.6	5.2	236	69.1	78	65.4	1	100.0
113	1008	89.6	2.1	1.9	688	90.0	320	88.8	3	100.0
114	984	89.3	2.2	1.9	652	88.7	332	90.7	0	---
115	560	86.8	3.2	2.8	433	87.5	127	84.3	4	100.0
116	510	89.0	3.0	2.7	372	89.0	138	89.1	0	---
117	570	83.3	3.7	3.1	498	83.7	72	80.6	5	100.0
118	224	72.3	8.1	5.9	168	73.2	56	69.6	2	50.0
119	304	79.3	5.7	4.6	238	80.7	66	74.2	1	100.0
120	214	78.5	7.0	5.5	163	79.8	51	74.5	4	100.0
121	431	78.9	4.9	3.9	308	83.4	123	67.5	3	100.0
122	772	75.9	4.0	3.0	597	76.9	175	72.6	4	100.0
123	480	79.6	4.5	3.6	356	78.7	124	82.3	1	100.0
124	486	82.3	4.1	3.4	401	82.8	85	80.0	3	100.0
125	205	76.1	7.7	5.8	155	75.5	50	78.0	3	100.0
126	204	75.5	7.8	5.9	161	73.9	43	81.4	2	100.0
127	194	77.8	7.5	5.8	158	78.5	36	75.0	3	100.0
128	292	82.2	5.3	4.4	235	83.0	57	78.9	2	100.0
129	298	90.9	3.6	3.3	209	91.4	89	89.9	2	100.0
130	685	87.9	2.8	2.4	506	88.1	179	87.2	3	100.0
131	734	84.7	3.1	2.6	552	86.4	182	79.7	2	100.0
132	581	85.4	3.4	2.9	478	88.1	103	72.8	4	100.0
133	383	86.4	4.0	3.4	332	88.0	51	76.5	0	---
134	540	82.6	3.9	3.2	449	83.3	91	79.1	6	83.3
135	347	77.5	5.7	4.4	288	77.8	59	76.3	3	100.0
136	194	80.9	6.8	5.5	157	81.5	37	78.4	2	100.0
137	246	87.8	4.7	4.1	207	87.0	39	92.3	0	---
138	292	77.7	6.1	4.8	231	78.8	61	73.8	1	100.0
139	439	83.6	4.1	3.5	334	83.5	105	83.8	2	100.0
140	572	70.5	5.3	3.7	445	72.6	127	63.0	2	100.0
141	165	75.2	8.8	6.6	139	77.7	26	61.5	0	---
142	189	80.4	7.0	5.7	155	82.6	34	70.6	2	100.0
143	660	71.5	4.8	3.4	538	71.4	122	72.1	4	100.0
144	122	64.8	13.1	8.5	97	67.0	25	56.0	2	100.0
145	579	75.6	4.6	3.5	504	76.8	75	68.0	2	100.0
146	366	68.9	6.9	4.7	276	68.1	90	71.1	2	50.0
147	605	71.2	5.1	3.6	474	72.6	131	66.4	1	100.0
148	626	68.1	5.4	3.7	479	67.6	147	69.4	1	100.0
149	239	51.9	12.2	6.3	193	52.3	46	50.0	2	100.0
150	79	62.0	17.3	10.7	63	61.9	16	62.5	1	100.0
151	213	57.7	11.5	6.6	186	58.1	27	55.6	2	100.0
152	101	56.4	17.1	9.7	79	58.2	22	50.0	0	---
153	894	90.6	2.1	1.9	625	91.0	269	89.6	0	---
154	365	85.2	4.3	3.6	274	85.0	91	85.7	0	---
155	767	89.7	2.4	2.2	557	90.5	210	87.6	0	---
156	874	93.6	1.7	1.6	615	93.3	259	94.2	2	100.0
157	784	82.3	3.2	2.7	581	81.2	203	85.2	3	100.0
158	534	86.5	3.3	2.9	442	86.7	92	85.9	7	85.7
159	438	79.0	4.8	3.8	348	79.0	90	78.9	5	100.0
160	234	74.8	7.4	5.6	181	74.6	53	75.5	1	100.0

*Percent (using .95 probability)

Appendix D:

Mini-Survey Data

APPENDIX D. Mini-Survey Data

Site	County	VMT%	Intersection Description	Town	2007	2008	2009	2010	2011
5	Barren	3.46	I-65 at Exit 53	Cave City	81	82	88	87	89
11	Meade	6.00	US 31W at KY 1638	Muldraugh	72	76	85	83	82
27	Grayson	6.95	KY 259 at US 62	Leitchfield	64	70	79	77	81
37	Logan	3.07	US 68 at US 79	Russellville	67	70	79	78	81
44	Hopkins	2.13	Pennyrile Parkway at Exit 44	Madisonville	83	84	86	83	87
54	Henderson	3.52	Us 41A at 5th St.	Henderson	69	73	78	75	83
63	Calloway	3.35	KY 1637 at 16th	Murray	68	72	75	76	79
76	Shelby	8.31	I-64 at Exit 28	Simpsonville	83	82	85	87	86
80	Woodford	1.92	US 60 at US 62	Versailles	77	79	84	86	89
88	Oldham	4.01	KY 146 at KY 1817	La Grange	75	82	84	86	89
98	Franklin	1.41	KY 2820 at US 127	Frankfort	69	69	74	74	75
110	Kenton	17.65	I-75 at Exit 186	Crescent Springs	86	85	87	87	88
121	Jefferson	8.71	US 31W at KY 841	Louisville	70	71	77	74	79
144	Boone	7.65	US 42 at US 25	Walton	70	75	77	83	84
154	Boyd	2.48	I-64 at Exit 185	Ashland	81	80	81	81	85
166	Lincoln	6.56	US 27 at US 150	Stanford	70	70	74	76	77
174	Carter	5.94	US 60 at KY 7	Grayson	63	67	72	67	72
180	Floyd	3.13	KY 680 at KY 122	Drift	60	56	57	57	60
188	Rowan	0.41	I-64 at Exit 137	Morehead	79	81	85	83	84
194	Laurel	1.89	US 25E at US 25	Corbin	68	68	74	77	79
200	Pulaski	1.45	KY 80 at KY 2296	Somerset	72	75	75	74	76
					74.0	75.6	79.9	79.8	82.2

Appendix E:

Distracted Driving Data

APPENDIX E. PERCENT OF DRIVERS THAT WERE OBSERVERED TO BE DISTRACTED

ROAD CLASSIFICATION	PERCENT DISTRACTED BY VEHICLE TYPE				
	PC	PU	VAN	SUV	ALL
Wearing Seatbelt	8.1	7.7	7.8	10.1	8.5
Not Wearing Seatbelt	10.3	7.8	7.3	10.1	9.1
All	8.4	7.8	7.7	10.1	8.6

For more information or a complete publication list, contact us at:

KENTUCKY TRANSPORTATION CENTER

176 Raymond Building
University of Kentucky
Lexington, Kentucky 40506-0281

(859) 257-4513
(859) 257-1815 (FAX)
1-800-432-0719
www.ktc.uky.edu
ktc@engr.uky.edu