UNIVERSITY OF KENTUCKY College of Engineering

Kentucky Transportation Center

Research Report
KTC -13-08/KSP1-12-1F

2013 Safety Belt Usage Survey in Kentucky

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2013 SAFETY BELT USAGE SURVEY IN KENTUCKY

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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.

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 providing secondary enforcement was passed in 1994 with the primary enforcement law passed in 2006. 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. 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.

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 continued to increase over the years. Examples of the increasing rates are 60 percent in 2000, 66 percent in 2004, 73 percent in 2008, and 84 percent in 2012.

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 of about 98 percent in recent years. However, while usage rates are very high, studies have found problems with the proper use of child safety seats.

The survey methodology used to collect data has been revised slightly a few times. For several years, the statewide belt use survey was based on 200 observation sites in 58 counties 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 relatively large number of sites scattered in so many counties made the data collection time-consuming. The most recent survey design (prior to the design used for the 2013 survey) collected data at 160 sites in 18 counties.

The National Highway Traffic Safety Administration (NHTSA) has issued new Uniform Criteria for State Observational Surveys of Seat Belt Use. The final rule was published in Federal Register Volume 76, Number 63. The revised methodology is described in detail in the following

section of this report. The methodology considers the experience of the past 30 years of safety belt data collection in Kentucky along with the guidelines contained in the final rule. The new methodology was implemented beginning with the 2013 statewide survey.

The objective of the survey summarized in this report was to establish a statewide safety belt usage rate in Kentucky for 2013. This rate can be compared to those determined from previous surveys. The 2013 statewide survey continues to document the increase in usage associated with the change in the law to allow primary enforcement and related evaluation and enforcement.

2.0 SURVEY METHODOLOGY

2.1 SELECTION OF COUNTIES AND NUMBER OF SITES IN EACH COUNTY

- The numbers of fatalities were summarized for Kentucky's 120 counties for the five-year period of 2006 through 2010. The source of the data was Kentucky's crash data base (Collision Report Analysis for Safety Highways (CRASH)). The county totals were sorted with the counties in the lowest 15th percentile identified. Excluding these counties from the total of 120 counties resulted in 75 remaining counties to be considered as a potential survey county.

- The procedure used the past few years involved data collection in 18 counties with 160 sites. The past data collection has resulted in a standard error of only about one percent. Based on past experience, the decision was made to sample 20 percent of the 75 counties which resulted in the need to identify 15 counties for data collection.

- The method selected to ensure a geographical distribution of counties across the state was to randomly select a county in each of the 12 Transportation Cabinet highway districts. The districts have a similar number of counties and provide a good distribution across the state. Three of the districts include the major urban areas in the state. Two counties were selected in these three urban districts resulting in the selection of a total of 15 counties.

- One county from each rural highway district and two counties from the three urban highway districts were randomly selected. The only exception to the random selection was that Jefferson and Fayette Counties (in two of the urban districts) were selected automatically. This was done because these counties (which contain Louisville and Lexington) have much higher vehicle miles traveled than any other county and any meaningful statewide sample must include these counties.

- The objective was to identify 150 data collection sites in the 15 selected counties. Considering the results from past data collection, this number of sites would easily meet the 2.5 percentage point standard error criteria. Additional data would be collected if the standard error is found to exceed 2.5 percent.

- Past experience has shown that the number of vehicles observed vary dramatically by site (depending on the average daily traffic (ADT) at the site). A range in observations from as low as about 50 to as high as almost 1,000 is expected. Based on previous surveys, there would be no sites with zero observations and the total statewide sample size should be over 50,000. The number of sites in each county was selected based on the vehicle miles traveled (VMT) in each county. Six categories of VMT were determined with the number of sites in a county varying from six to 22. Counties with the lowest VMT have smaller number of sites with the highest number of sites in Jefferson County (22 sites) and Fayette County (16 sites) which have a much higher VMT than other counties.

- Following (in Table 1) is a list of the counties selected. The number of fatalities and VMT traveled are given for each county. The six groupings of counties (based on VMT) are shown with the number of sites in each county noted.

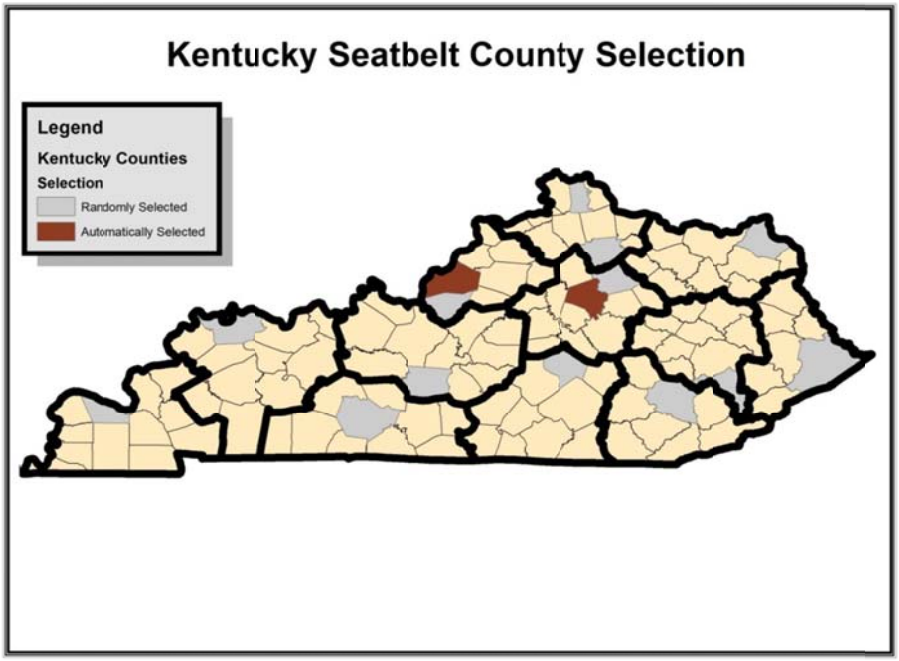
Table 1. Selected Counties

County	Number of Fatalities (2006-2010)	Percent of Statewide Fatalities	Highway District	VMT (x1,000)	Population	VMT Group	Number of Sites
Harrison	24	1.97	6	149,652	18,654	1	6
Clay	52	4.27	11	210,588	23,930	1	6
Bourbon	23	1.89	7	217,836	19,828	1	6
Lincoln	49	4.02	8	247,395	25,072	1	6
Perry	49	4.02	10	340,146	29,241	2	8
Greenup	29	2.38	9	348,777	37,388	2	8
Hart	48	3.94	4	423,369	18,561	2	8
Henderson	56	4.60	2	524,601	45,462	3	10
Pike	123	10.10	12	766,020	65,331	3	10
McCracken	70	5.75	1	792,502	65,109	3	10
Bullitt	55	4.52	5	930,991	75,028	3	10
Warren	95	7.80	3	1,347,271	105,862	4	12
Kenton	51	4.19	6	1,460,873	157,629	4	12
Fayette	127	10.43	7	2,855,813	282,114	5	16
Jefferson	367	30.13	5	6,539,839	713,877	6	22

- Following is a list of the counties selected sorted by highway district. The three urban districts have two counties with one county in the other nine districts.

District Number	County	Number of Sites
1	McCracken	10
2	Henderson	10
3	Warren	12
4	Hart	8
5	Bullitt	10
	Jefferson	22
6	Kenton	12
	Harrison	6
7	Bourbon	6
	Fayette	16
8	Lincoln	6
9	Greenup	8
10	Perry	8
11	Clay	6
12	Pike	10

- The following map shows the distribution of the districts and counties across the state.



2.2 ASSIGN SITES BY HIGHWAY TYPE

- After the counties and the total numbers of data collection sites in each county were determined, the next step was to assign the number of sites by highway type (in each county). The following three roadway types (road class stratum) were used:

    1. limited access
    2. arterials
    3. local

    The survey sites in each county were distributed into the three highway types based on the VMT for each highway type in that county. In seven of the 15 counties there were no roads in the "limited access" category. Therefore, since there was no VMT and no chance of selection, no road segments for this category were included for these seven counties.

- The numbers of sites were adjusted so that at least one site was placed in a highway type category if the county had any roads in that category.

- The following data (Table 2) show the number of sites by county and highway type. Of the 150 sites, there are 43 sites on limited access roadways with 67 sites on arterials and 40 sites on local roads.

    The table assigns the number of sites in each of the three road classes based on the vehicle miles traveled in each road class. The adjusted number was determined based on the distribution using vehicle miles traveled to ensure that the proper number of sites was provided in each county.

Table 2 **Number of Sites in each County by Roadway Class**

County	Sites Allocated	County VMT	Road Class Stratum	Road Class VMT	Number of Sites if Allocated by VMT	Adjusted Number of Sites	Adjusted Total
Jefferson	**22**	6,538,839,240	1	3,424,627,751	11.52	**11**	22
			2	2,665,785,337	8.97	**9**	
			3	448,426,153	1.51	**2**	
Fayette	**16**	2,855,812,630	1	1,019,472,164	5.71	**6**	16
			2	1,265,598,299	7.09	**7**	
			3	570,742,166	3.20	**3**	
Bourbon	**6**	217,836,350	1	0	0.00	**0**	6
			2	138,269,100	3.81	**4**	
			3	79,567,250	2.19	**2**	
Bullitt	**10**	930,990,570	1	494,107,859	5.31	**5**	10
			2	234,167,018	2.52	**3**	
			3	202,715,693	2.18	**2**	
Clay	**6**	210,587,750	1	0	0.00	**0**	6
			2	104,637,470	2.98	**3**	
			3	105,950,280	3.02	**3**	
Greenup	**8**	348,776,980	1	0	0.00	**0**	8
			2	216,940,991	4.98	**5**	
			3	131,835,989	3.02	**3**	
Harrison	**6**	149,652,490	1	0	0.00	**0**	6
			2	74,279,292	2.98	**3**	
			3	75,373,198	3.02	**3**	
Hart	**8**	423,368,750	1	276,205,327	5.22	**5**	8
			2	15,474,129	0.29	**1**	
			3	131,689,294	2.49	**2**	
Henderson	**10**	524,601,430	1	41,372,008	0.79	**1**	10
			2	342,108,540	6.52	**7**	
			3	141,120,881	2.69	**2**	
Kenton	**12**	1,460,873,030	1	829,034,625	6.81	**7**	12
			2	351,472,650	2.89	**3**	
			3	280,365,755	2.30	**2**	
Lincoln	**6**	247,394,860	1	0	0.00	**0**	6
			2	150,841,056	3.66	**4**	
			3	96,553,804	2.34	**2**	
McCracken	**10**	792,502,460	1	228,178,782	2.88	**3**	10
			2	340,918,903	4.30	**4**	
			3	223,404,774	2.82	**3**	
Perry	**8**	340,145,980	1	0	0.00	**0**	8
			2	169,095,048	3.98	**4**	
			3	171,050,932	4.02	**4**	
Pike	**10**	766,019,970	1	0	0.00	**0**	10
			2	452,117,144	5.90	**6**	
			3	313,902,826	4.10	**4**	
Warren	**12**	1,347,270,910	1	544,629,990	4.85	**5**	12
			2	456,725,567	4.07	**4**	
			3	345,915,353	3.08	**3**	
Totals	**150**	17,154,673,400	1	6,857,628,506	43.09	**43**	150
			2	6,978,430,544	64.93	**67**	
			3	3,318,614,350	41.98	**40**	
			-	17,154,673,400	150.00	**150**	

2.3 SELECTION OF DATA COLLECTION SITES

- After the counties and number of sites (by roadway type) in each county were selected, the next portion of the methodology involved: a) a random selection of roadway segments in each roadway type and b) the selection of specific sites within the segment. A file containing all roads in the state (including both state maintained and locally maintained) was used to randomly select roadway segments. The source of the road segment data used to select the sites was the Highway Performance Monitoring System (HPMS) file. This file is updated annually and contains data for all public roadways. No exclusions were made.

- The segments were divided into the three highway type categories previously noted. Segments were randomly selected (by highway type). The length of the segments was considered with longer sections more likely to be selected than shorter sections. The number of randomly selected segments selected for each highway type category in each county was higher than required to allow for segments where an appropriate data collection site could not be identified.

- The randomly selected segments were inspected (either using a computer file or through a site visit). The identified numbers of data collection sites (shown in Table 2) were identified for each county and highway type (using the randomly selected segments). The sites were selected to ensure that the observers could obtain data in a safe and effective manner.

- A list of the 150 data collection sites (and alternate sites) is attached as Appendix A. The county and road name or number is given along with a reference to locate the observation site. The highway where the data is to be collected is identified. The probability of selection for each site is provided.

- At least one alternative site was identified for each highway type in each county to allow for the situation where data could not be obtained at one of the identified sites. If a site was temporarily unavailable, the data collection was rescheduled for a similar day and time. If a site was unavailable for a substantial period of time, the alternative site was used with data at a similar day and time. To provide consistency, the alternate site replaced the original site in future surveys.

- The number of approaches (by direction of travel) and the number of lanes on the approaches on the specified road was identified at each site. The approach and lane used for data collection was randomly selected.

- The data collectors were positioned at a location to ensure their safety while collecting data.

2.4 DATA COLLECTION PROCEDURE

- The observation times for the 150 sites were randomly assigned (with consideration of grouping sites in counties). Sites within relatively close geographic proximity were assigned as data collection clusters. The first site within each cluster was assigned a random day and time for completion. Next, all other sites within a cluster were assigned a random time on the same day in order to maximize efficiency (and minimize time and travel costs).

- One hour of data was collected at each site. Data were collected with either one or two data collectors (depending on the number of directions of travel included). One hour was required if data were taken by one data collector on one direction of travel with ½ hour collected for two data collectors on two directions of travel. There is a reasonable assumption that for sites where one observer is used the observed vehicles in one direction on a specific route in one hour will equal the number of vehicles on both directions on that route in ½ hour. Sites requiring only one observer are low-volume roads or T-intersections. On higher traffic volume roads an equal distribution of traffic flow in each direction cannot be assumed; therefore, two observers were used with one in each direction. The use of a variable observation period (as described) would not affect the probability of selection.

- The objective was to collect data between June 1 and July 31. A guideline used when selecting data collection times is that data will be collected between 7 am and 6 pm with all days of the week eligible. The schedule included rush hour and non-rush hour observations. Start times were staggered to ensure a representative number of sites by day of the week and time of day.

- Data were collected through direct observation. The form used for the data collection is shown as Appendix B. The form provides general information such as the site number and the date and time data were collected. For drivers and front seat passengers the categories are:

    1. safety belt used (shoulder belt is in front of shoulder),
    2. safety belt not used (shoulder belt not in front of shoulder), and
    3. unknown (cannot be determined if belt is used).

  The presence or absence of a right front seat passenger is shown by comparing the total number of drivers and passengers in the sample size. Observation for any right seat passenger was obtained for all vehicles. The number of vehicles at a site with a driver only can be determined by subtracting the total number of front seat passengers from the total number of vehicles observed. The ratio of the total number of recorded unknown values of

belt use to the total number of drivers and passengers observed must not exceed 10 percent. Additional data would be collected if the nonresponse threshold was surpassed.

- The following vehicle types (both in-state and out-of-state vehicles) were included in the data collection:

    1. passenger car (including commercial vehicles under 10,000 pounds),
    2. pickup,
    3. van, and
    4. SUV.

    Separate data for motorcycles and bicycles were also collected to compare current data to past data for these categories.

- Before the start of data collection, the data collectors were provided training on the data collection procedure. The training included:

    1. an overview of the project,
    2. description of the data collection form and procedure,
    3. scheduling procedures,
    4. identification of survey sites (and alternatives), and
    5. input of data.

    After the classroom portion of the training, the data collectors conducted trial surveys at locations representing the three roadway types included in the survey. The trial survey results were evaluated to ensure that the data collectors provided consistent and accurate data.

- Times and locations were assigned with data collected using the previously described form. There was no indication to drivers that the data collectors were conducting a safety belt survey. At low volume locations, data for the driver and outboard front seat passenger were obtained for all vehicles so there was no need for a random selection. For high volume locations the random selection process was achieved by recording data for the next vehicle in view after recording the previous data. For each vehicle, the usage for the driver and any outboard front seat passenger was obtained. At intersections, data were collected for vehicles either stopped or moving slowly. At overpasses on limited access highways, an observation position was determined to allow for an unobstructed view of the vehicle's front seat.

- The objective was that a quality control monitor would conduct random, unannounced visits and collected data at a minimum of 15 of the data collection sites. It is anticipated that there were be approximately four to six data collectors with a couple of quality control monitors. All data collectors were monitored on at least two occasions.

2.5 USAGE RATE CALCULATIONS

- Following is a summary of the calculation of the statewide seat belt usage rate.

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

  First, estimated rates were calculated for each of the road strata within each county. Observed usage rates for all of the sites within each stratum-county combination were combined by simple averaging, as shown in the following 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 13 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 (excluding unknown usage) whose belt use was observed at the site).

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

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

  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 were obtained by combining and weighting the rates from the sampled counties in each category by their VMT values and probabilities of being selected:

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

where $VMT_{i(j)}$ = total VMT for county *i* in category *j* and $W_{i(j)}$ = the inverse of the probability of the county's selection: where j is one of the three following categories:

<u>One county randomly selected from district (j = 1)</u>

Highway districts 1,2,3,4,8,9,10,11, and 12

$W_{i(1)} = \frac{\sum_{L=1}^{x_m} VMT_{L(1)}}{VMT_{i(1)}}$ where m = county i's district, x_m = the number of counties in district m, L is the L^{th} county in district m, $VMT_{L(1)}$ = the VMT in county L, $VMT_{i(1)}$ = the VMT in county i.

<u>One county randomly selected from district and one county certainly selected (j = 2)</u>

Highway districts 5 and 7

$W_{i(2)} = \frac{\sum_{L=1}^{y_m} VMT_{L(2)}}{VMT_{i(2)}}$ where m = county i's district, y_m = the number of counties in district m excluding the certain county, L is the L^{th} county in district m, $VMT_{L(2)}$ = the VMT in county L, $VMT_{i(2)}$ = the VMT in county i.

Or for certainty counties:

$W_{i(2)} = 1$

<u>Two counties randomly selected from district (j = 3)</u>

Highway district 6 only

$W_{i(3)} = \frac{\sum_{L=1}^{11} VMT_{L(3)}}{2 \times VMT_{i(3)}}$ where L is the L^{th} county in district 6, $VMT_{L(3)}$ = the VMT in county L, $VMT_{i(3)}$ = the VMT in county i.

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

$$p = \frac{\sum_{j=1}^{3} VMT_j \, p_j}{\sum_{j=1}^{3} VMT_j} \qquad (4)$$

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.) were calculated using the same procedure.

2.6 NONRESPONSIVE JUDGEMENT

- Given the data collection protocol described in this plan and past experience, including the provision for the use of alternate observation sites, road segments with non-zero eligible volume and yet zero observations conducted should not occur. Nevertheless, if eligible vehicles passed an eligible site or an alternate eligible site during the observation time but no usable data were collected for some reason, this site would be considered a "nonresponding site." The weight for a non-responding site will be distributed over other sites in the same road type in the same PSU.

  Let:

  $$\pi_{gchi} = \pi_{gc}\pi_{hi|gc}$$

  be the road segment selection probability, and

  $$w_{gchi} = \frac{1}{\pi_{gchi}}$$

  be the road segment weight.

The non-responding site nonresponse adjustment factor:

$$f_{gch} = \frac{\sum_{all\ i} w_{gchi}}{\sum_{responding\ i} w_{gchi}}$$

would be multiplied to all weights of non-missing road segments in the same road type of the same county and the missing road segments would be dropped from the analysis file. However, if there were no vehicles passing the site during the selected observation time (60 minutes) then this is simply an empty block at this site and this site would not be considered as a non-responding site and would not require nonresponse adjustment.

2.7 IMPUTATION

No imputation was done on missing data.

2.8 STANDARD ERROR CALCULATION

- The standard error of the overall seat belt use rate was calculated using the following procedure. Standard error of estimate values was estimated through a jackknife approach, based on the general formula:

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

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., 150; and $\hat{p}_i$ = the estimated statewide belt use proportion with site *i* excluded from the calculation.

The relative error rate, i.e., $\hat{\sigma}_{\hat{p}} / \hat{p}$, was also calculated, as well as the 95% confidence interval, i.e., $\hat{p} \pm 1.96\hat{\sigma}_{\hat{p}}$. These values were 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 highways and road classifications are summarized in Table 3. The overall statewide rate in 2013, using the data collected at 150 sites and the described weighting procedure, is 85.0 percent. The 95 percent confidence interval is plus or minus about 0.9 percent (84.1 to 85.9).

- The sample size of all front seat occupants was approximately 59,000. The rate by the road class ranged from 89.7 percent on limited access highways to 79.2 percent on local roads. The statewide rate for drivers was 85.4 percent compared to 83.6 percent for front seat passengers.

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

	PERCENT USAGE BY TYPE		
ROAD CLASSIFICATION	DRIVERS	PASSENGERS	ALL
Limited Access	89.9	88.8	89.7
Arterials	85.6	83.0	85.1
Locals	79.7	77.9	79.2
All	85.4	83.6	85.0

- A summary of the data collected (by site) is given in Appendix D. For each of the 150 sites, the usage rate and sample size are given for all front seat occupants, drivers, and front seat passengers. The relative error and confidence interval are given for the "all front seat occupants" category. The percent "unknown" is given for each site.

- Usage rates ranged from 57.6 (a rural location in Clay County) to 95.4 (an urban interstate location in Kenton County). There were 28 sites which had a usage rate of 90 percent or more with 21 of these sites on a limited access road. The highest rate found on a non-limited access road was 92.1 percent at a high-volume urban arterial in Fayette County.

- The highest percent unknown was 7.6 percent. Only seven sites had five or more percent unknown.

- A substantial difference in usage rate (for all front seat occupants) was noted when vehicle type and road class were considered (Table 4). The rate varied by vehicle type from 77.2 percent for pickup trucks to 88.4 percent for vans.

- For each vehicle type the lowest usage rate was on local roads with the highest on limited access highways.

- The lowest usage was 69.4 percent for pickups on local roads.

- The highest usage rate (91.9 percent) was for vans on limited access highways.

TABLE 4. USAGE RATE FOR FRONT-SEAT OCCUPANTS (BY ROAD CLASS AND VEHICLE TYPE)

	PERCENT USAGE BY VEHICLE TYPE				
ROAD CLASSIFICATION	PC	PU	VAN	SUV	ALL*
Limited Access	90.2	83.4	91.9	91.6	89.7
Arterials	86.2	76.3	88.1	88.0	85.1
Locals	82.3	69.4	84.4	85.1	79.2
All	86.6	77.2	88.4	88.0	85.0

PC – passenger car
PU – pickup
VAN – van
SUV – sport utility vehicle

- Usage rate by county is shown in Table 5. The rate varied from a high of 88.7 percent in Kenton County to a low of 68.5 percent in Clay County. The rate is over 87 percent in four of the counties and less than 80 percent in four counties.

- The county with the second lowest rate (72.2) was in Pike County with the third lowest rate (74.8 percent) in Perry County. All of these counties are located in the southeast portion of the state.

TABLE 5. USAGE RATE FOR FRONT-SEAT OCCUPANTS (BY COUNTY)

	PERCENT USAGE BY TYPE		
COUNTY	DRIVERS	PASSENGERS	ALL
Bourbon	81.7	78.1	81.0
Bullitt	86.4	87.0	86.6
Clay	68.9	67.4	68.5
Fayette	88.3	86.3	87.9
Greenup	82.6	76.4	80.8
Harrison	78.0	80.2	78.5
Hart	85.3	88.2	86.0
Henderson	84.2	75.8	82.4
Jefferson	87.9	86.3	87.7
Kenton	88.6	88.5	88.7
Lincoln	82.1	81.8	82.0
McCracken	88.5	87.8	88.4
Perry	77.1	69.6	74.8
Pike	73.8	66.6	72.2
Warren	85.3	84.4	85.1
All	85.4	83.6	85.0

- The usage rate by county and vehicle type is given by Table 6. The rate varied from a high of 95.3 percent for vans in Lincoln County to a low of 54.5 percent for pickup trucks in Clay County.

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

	PERCENT USAGE BY VEHICLE TYPE				
COUNTY	PC	PU	VAN	SUV	ALL
Bourbon	84.3	75.0	84.5	82.6	81.0
Bullitt	88.5	78.8	87.0	89.7	86.6
Clay	74.6	54.5	72.5	75.7	68.5
Fayette	87.3	81.1	92.0	91.9	87.9
Greenup	82.4	72.1	93.6	86.4	80.8
Harrison	86.6	67.3	81.0	86.0	78.5
Hart	87.5	80.0	86.1	88.4	86.0
Henderson	86.8	71.1	91.0	86.6	82.4
Jefferson	89.0	80.2	88.6	88.9	87.7
Kenton	89.4	77.5	88.6	93.3	88.7
Lincoln	86.7	71.8	95.3	87.6	82.0
McCracken	89.6	80.9	94.0	90.7	88.4
Perry	77.6	67.9	83.2	77.9	74.8
Pike	74.0	63.6	77.8	78.1	72.2
Warren	85.6	77.6	92.2	90.0	85.1
All	86.6	77.2	88.4	88.0	85.0

- While the data collection procedure has changes several times, the usage rate in 2013 can still be compared to the statewide rates from past years (Table 7). Statewide rates have dramatically increased from four percent in 1982 to 85 percent in 2013. The changes over the years can be related to changes in safety belt legislation and increased enforcement and education.

TABLE 7. 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
2012	84	84	98
2013	85	85	**

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

- Survey locations have changed as a result of changes in the data collection procedure (in 1990, 1999, 2009, and 2013). For the past several years, a mini-survey of 21 sites has been conducted (selected from the 200 sites for the survey first used prior to the change in 2009).

  This mini-survey was conducted in 2013 to allow a comparison of identical sites over a long time period. The results for the mini-survey sites are given in Appendix E. The usage rate at these locations in 2013 was 85.8 percent. This shows consistency with the 2013 data. The rate in 2012 increased by 2.4 percent compared to 2012. Rates increased at 11 locations and decreased at seven locations with three not changing.

- Bicycle helmet use was observed while data were collected. Only 32 bicyclists were observed with 15 using helmets (47 percent). The very small sample size does not allow any conclusions about trends but does support the opinion that bicycle helmet usage rate continues to be very low.

- Helmet use by motorcyclists was also observed during the survey. Kentucky had a statewide law requiring the use of a helmet by a motorcyclist until it was repealed in 1998. Surveys before repeal of the law found a helmet usage rate of over 95 percent. Motorcyclist helmet usage rates for 1999 through 2013 are given in Table 8. The average usage rate for the 15 years after repeal of mandatory helmet usage is 57.5 percent (with 56.6 percent in 2013). The usage rate over these years has ranged from a low of 50 percent in 2010 to a high of 70 percent in 2000.

TABLE 8. 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
2012	833	53
2013	487	57

4.0 RECOMMENDATIONS

- The data show that the level of safety belt usage in 2013 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. The variation of safety belt usage by county and vehicle type show where more emphasis should be placed.

- Consideration should be given to a modification in the driver point system to add points for a citation for failure to use a safety belt. This could aid enforcement.

Appendix A.

Data Collection Sites

Appendix A- Table 1. Data Collection Sites

Site	County	Road Type	Road Surveyed	Reference	Section Length (mi)	Total Length (mi)	Probability of Selection
1	Bourbon	Arterial	US 27	Fords Mill Rd	1.335	61.22	0.0218
2	Bourbon	Arterial	US 460	US 27	0.941	61.22	0.0154
3	Bourbon	Arterial	US 460	US 68	12.402	61.22	0.2026
4	Bourbon	Arterial	US 68	4th Street	0.844	61.22	0.0138
5	Bourbon	Local Road	Castle Blvd	KY 1939	0.54	329.975	0.0016
6	Bourbon	Local Road	KY 1678	KY 57 (Briar Hill Rd)	7.63	329.975	0.0231
7	Bullitt	Arterial	KY 44	US 31EX	2.97	67.52	0.0440
8	Bullitt	Arterial	KY 61	KY 44	2.52	67.52	0.0373
9	Bullitt	Arterial	US 31E	KY 44	1.569	67.52	0.0232
10	Bullitt	Limited Access	I-65	KY 733 overpass	8.465	19.871	0.4260
11	Bullitt	Limited Access	I-65	KY 245 interchange	3.801	19.871	0.1913
12	Bullitt	Limited Access	I-65	KY 3219 overpass	3.801	19.871	0.1913
13	Bullitt	Limited Access	I-65	KY 61 overpass	7.606	19.871	0.3828
14	Bullitt	Limited Access	I-65	KY 1526 interchange	7.606	19.871	0.3828
15	Bullitt	Local Road	Armstrong Ln	KY 44	0.576	727.145	0.0008
16	Bullitt	Local Road	Smith Ln	Hillview Blvd	0.506	727.145	0.0007
17	Clay	Arterial	Hal Rogers Pkwy	KY 80 underpass	25.336	41.431	0.6115
18	Clay	Arterial	US 421	2nd Street	8.808	41.431	0.2126
19	Clay	Arterial	US 421	KY 638	1.997	41.431	0.0482
20	Clay	Local Road	KY 11	US 421	17.732	729.333	0.0243
21	Clay	Local Road	KY 638	KY 472	8.222	729.333	0.0113
22	Clay	Local Road	KY 1524	US 421	0.369	729.333	0.0005
23	Fayette	Arterial	Cooper Dr	Nicholasville Rd	0.078	155.491	0.0005
24	Fayette	Arterial	Man O War Blvd	Clays Mill Rd	4.4	155.491	0.0283
25	Fayette	Arterial	Man O War Blvd	Tates Creek Rd	4.4	155.491	0.0283
26	Fayette	Arterial	New Circle Rd	N. Broadway	1.58	155.491	0.0102
27	Fayette	Arterial	Russell Cave Rd	New Circle Rd	9.117	155.491	0.0586
28	Fayette	Arterial	Versailles Rd	Man O War Blvd.	1.516	155.491	0.0097
29	Fayette	Arterial	Winchester Rd	Elkhorn Dr	1.173	155.491	0.0075
30	Fayette	Limited Access	I-64	KY 859 interchange	7.71	49.024	0.1573
31	Fayette	Limited Access	I-64	Yarnallton Pk overpass	3.729	49.024	0.0761
32	Fayette	Limited Access	I-75	KY 353 overpass	7.016	49.024	0.1431
33	Fayette	Limited Access	I-75	KY 418 interchange	6.187	49.024	0.1262
34	Fayette	Limited Access	KY 4	Alumni Dr interchange	2.905	49.024	0.0593
35	Fayette	Limited Access	KY 4	Georgetown Rd interchange	2.085	49.024	0.0425

Appendix A- Table 1. Data Collection Sites (continued)

Site	County	Road Type	Road Surveyed	Reference	Section Length (mi)	Total Length (mi)	Probability of Selection
36	Fayette	Local Road	Alexandria Dr	Versailles Rd	2.776	1240.085	0.0022
37	Fayette	Local Road	Kenesaw Dr	Tates Creek Rd	0.575	1240.085	0.0005
38	Fayette	Local Road	Newtown Pk	Ironworks Rd	3.141	1240.085	0.0025
39	Greenup	Arterial	KY 10	US 23	11.582	66.893	0.1731
40	Greenup	Arterial	KY 67	US 23	7.53	66.893	0.1126
41	Greenup	Arterial	KY 693	KY 207 (Argillite Rd)	1.656	66.893	0.0248
42	Greenup	Arterial	US 23	KY 67	8.595	66.893	0.1285
43	Greenup	Arterial	US 23	KY 10	10.813	66.893	0.1616
44	Greenup	Local Road	KY 2	US 23	0.373	929.912	0.0004
45	Greenup	Local Road	KY 827	KY 7	5.647	929.912	0.0061
46	Greenup	Local Road	Pond Run Rd	KY 750	0.902	929.912	0.0010
47	Harrison	Arterial	KY 36	Locust St	15.309	47.165	0.3246
48	Harrison	Arterial	US 27	KY 32	1.067	47.165	0.0226
49	Harrison	Arterial	US 62	US 27	0.273	47.165	0.0058
50	Harrison	Local Road	KY 1054	KY 36	6.851	499.878	0.0137
51	Harrison	Local Road	KY 1842	KY 32	6.214	499.878	0.0124
52	Harrison	Local Road	KY 392	US 62	11.337	499.878	0.0227
53	Hart	Arterial	US 31W	KY 218	6.758	21.574	0.3132
54	Hart	Limited Access	I-65	KY 2746 overpass	20.666	20.665	1.0000
55	Hart	Limited Access	I-65	Rest area	20.666	20.665	1.0000
56	Hart	Limited Access	I-65	Rowletts Cave Springs Rd overpass	20.666	20.665	1.0000
57	Hart	Limited Access	I-65	KY 88 overpass	20.666	20.665	1.0000
58	Hart	Limited Access	I-65	KY 728 interchange	20.666	20.665	1.0000
59	Hart	Local Road	KY 728	US 31W	13.329	711.88	0.0187
60	Hart	Local Road	KY 88	US 31E	12.665	711.88	0.0178
61	Henderson	Arterial	KY 351	US 41A	1.817	98.715	0.0184
62	Henderson	Arterial	KY 425	US 60	2.429	98.715	0.0246
63	Henderson	Arterial	KY 425	US 41A	2.429	98.715	0.0246
64	Henderson	Arterial	US 41	Watson Ln	4.994	98.715	0.0506
65	Henderson	Arterial	US 41	KY 425	3.738	98.715	0.0379
66	Henderson	Arterial	US 41A	KY 136 (Sand Ln)	2.709	98.715	0.0274
67	Henderson	Arterial	US 60	KY 425	1.573	98.715	0.0159
68	Henderson	Limited Access	Breathitt Pkwy	KY 812 overpass	2.052	4.457	0.4604
69	Henderson	Local Road	KY 3	US 60	0.073	752.948	0.0001
70	Henderson	Local Road	KY 416	KY 351	5.274	752.948	0.0070
71	Jefferson	Arterial	2nd Street	Broadway (US 150)	0.61	445.833	0.0014
72	Jefferson	Arterial	Bardstown Rd	Taylorsville Rd	3.768	445.833	0.0085
73	Jefferson	Arterial	Barret Ave	Broadway (US 150)	1.072	445.833	0.0024
74	Jefferson	Arterial	Bluegrass Pkwy	Hurstbourne Pkwy	0.13	445.833	0.0003
75	Jefferson	Arterial	Crittenden Dr	Central Ave	2.754	445.833	0.0062

Appendix A- Table 1. Data Collection Sites (continued)

Site	County	Road Type	Road Surveyed	Reference	Section Length (mi)	Total Length (mi)	Probability of Selection
76	Jefferson	Arterial	Newburg Rd	Trevilian Way	1.854	445.833	0.0042
77	Jefferson	Arterial	KY 841	National Turnpike	4.216	445.833	0.0095
78	Jefferson	Arterial	Phillips Ln	Fairgrounds Road	0.772	445.833	0.0017
79	Jefferson	Arterial	Shepherdsville Rd	Outer Loop (KY 1065)	0.689	445.833	0.0015
80	Jefferson	Limited Access	I-264	KY 1932 interchange	3.396	109.343	0.0311
81	Jefferson	Limited Access	I-64	Cannons Ln interchange	6.77	109.343	0.0619
82	Jefferson	Limited Access	I-264	US 42 interchange	2.192	109.343	0.0200
83	Jefferson	Limited Access	I-265	Smyra Parkway	9.64	109.343	0.0882
84	Jefferson	Limited Access	I-265	Preston Hwy interchange	2.159	109.343	0.0197
85	Jefferson	Limited Access	I-64	English Station Rd overpass	4.415	109.343	0.0404
86	Jefferson	Limited Access	I-65	Outer Loop interchange	1.143	109.343	0.0105
87	Jefferson	Limited Access	I-65	Fern Valley Rd interchange	3.272	109.343	0.0299
88	Jefferson	Limited Access	I-71	KY 1694 overpass	2.252	109.343	0.0206
89	Jefferson	Limited Access	I-71	Lime Kiln Ln overpass	4.097	109.343	0.0375
90	Jefferson	Limited Access	KY-841	US 42 overpass	1.575	109.343	0.0144
91	Jefferson	Local Road	McCawley Rd	Preston Highway	0.085	2977.538	0.0000
92	Jefferson	Local Road	W. Manslick Rd	3rd Street Rd	2.256	2977.538	0.0008
93	Kenton	Arterial	KY 17	Dudley Pk	2.729	70.185	0.0389
94	Kenton	Arterial	KY 1829	KY 1303	2.895	70.185	0.0412
95	Kenton	Arterial	US 25	KY 236	2.29	70.185	0.0326
96	Kenton	Limited Access	I-275	KY 16 interchange	4.451	19.423	0.2292
97	Kenton	Limited Access	I-275	KY 1303 interchange	4.451	19.423	0.2292
98	Kenton	Limited Access	I-275	Hulbert Ave	1.75	19.423	0.0901
99	Kenton	Limited Access	I-75	Kyles Ln interchange	2.477	19.423	0.1275
100	Kenton	Limited Access	I-75	Buttermilk Pike interchange	2.98	19.423	0.1534
101	Kenton	Limited Access	I-75	Dixie Highway interchange	2.98	19.423	0.1534
102	Kenton	Limited Access	I-75	KY 236 interchange	1.038	19.423	0.0534
103	Kenton	Local Road	KY 2047	KY 16	2.587	920.539	0.0028
104	Kenton	Local Road	Marshall Rd	Taylor Mill Rd	2.497	920.539	0.0027
105	Lincoln	Arterial	US 150	US 27	8.473	51.441	0.1647

Appendix A- Table 1. Data Collection Sites (continued)

Site	County	Road Type	Road Surveyed	Reference	Section Length (mi)	Total Length (mi)	Probability of Selection
106	Lincoln	Arterial	US 150	Spring Valley Dr	0.125	51.441	0.0024
107	Lincoln	Arterial	US 27	KY 78	2.182	51.441	0.0424
108	Lincoln	Arterial	US 27	Lancaster St	2.182	51.441	0.0424
109	Lincoln	Local Road	Goshen Rd	US 150	0.421	633.961	0.0007
110	Lincoln	Local Road	KY 2750	US 150	0.974	633.961	0.0015
111	McCracken	Arterial	Jefferson St	N. 9th St	0.052	95.398	0.0005
112	McCracken	Arterial	KY 994	S. 21st St	0.748	95.398	0.0078
113	McCracken	Arterial	US 60	KY 996	7.118	95.398	0.0746
114	McCracken	Arterial	US 60	KY 284 (Bridge St)	3.258	95.398	0.0342
115	McCracken	Limited Access	I-24	US 62 interchange	6.707	17.319	0.3873
116	McCracken	Limited Access	I-24	US 68 interchange	5.235	17.319	0.3023
117	McCracken	Limited Access	I-24	KY 994 overpass	6.707	17.319	0.3873
118	McCracken	Local Road	KY 1288	US 45	3.294	760.039	0.0043
119	McCracken	Local Road	KY 1954	KY 348	3.04	760.039	0.0040
120	McCracken	Local Road	Highland Church Rd	US 62	1.632	760.039	0.0021
121	Perry	Arterial	Hal Rogers Pkwy	Morton Blvd.	6.474	41.192	0.1572
122	Perry	Arterial	KY 15	KY 451	5.007	41.192	0.1216
123	Perry	Arterial	KY 15	KY 80	9.211	41.192	0.2236
124	Perry	Arterial	KY 80	Justice Dr	6.74	41.192	0.1636
125	Perry	Local Road	KY 451	KY 28	0.823	738.756	0.0011
126	Perry	Local Road	KY 1096	Polly Hollow	5.42	738.756	0.0073
127	Perry	Local Road	KY 451	Main St	1.904	738.756	0.0026
128	Perry	Local Road	KY 1146	KY 476	10.527	738.756	0.0142
129	Pike	Arterial	KY 1426	KY 1460	0.738	118.625	0.0062
130	Pike	Arterial	KY 194	KY 632	13.683	118.625	0.1153
131	Pike	Arterial	US 119	US 23	2.672	118.625	0.0225
132	Pike	Arterial	US 119	KY 308	2.021	118.625	0.0170
133	Pike	Arterial	US 23	Julius Avenue	1.956	118.625	0.0165
134	Pike	Arterial	US 23	Island Creek Rd	1.956	118.625	0.0165
135	Pike	Local Road	Dorton Hill Rd	US 23	0.226	1226.433	0.0002
136	Pike	Local Road	KY 122	US 460	15.942	1226.433	0.0130
137	Pike	Local Road	KY 3218	US 23	3.247	1226.433	0.0026
138	Pike	Local Road	KY 610	KY 805	7.969	1226.433	0.0065
139	Warren	Arterial	KY 234	KY 880	2.347	82.267	0.0285
140	Warren	Arterial	KY 446	Corvette Dr	0.97	82.267	0.0118
141	Warren	Arterial	US 231	KY 880	1.413	82.267	0.0172
142	Warren	Arterial	US 31W	KY 1402	1.249	82.267	0.0152
143	Warren	Limited Access	I-65	KY 240 overpass	5.689	36.621	0.1553
144	Warren	Limited Access	I-65	US 231 interchange	1.43	36.621	0.0390

Appendix A- Table 1. Data Collection Sites (continued)

Site	County	Road Type	Road Surveyed	Reference	Section Length (mi)	Total Length (mi)	Probability of Selection
145	Warren	Limited Access	I-65	Bristow Road overpass	7.565	36.621	0.2066
146	Warren	Limited Access	I-65	KY 101 interchange	5.312	36.621	0.1451
147	Warren	Limited Access	Natcher Pkwy	US 231 interchange	5.003	36.621	0.1366
148	Warren	Local Road	KY 1297	KY 101	9.264	1318.503	0.0070
149	Warren	Local Road	KY 622	US 231	3.229	1318.503	0.0024
150	Warren	Local Road	KY 101	US 31W	0.568	1318.503	0.0004

Appendix A- Table 2. Alternate Data Collection Sites (continued)

Site	Road Class	County	Road Surveyed	Reference
151	Arterial	Bourbon	US 627 (Winchester Rd)	KY 57
152	Local Road	Bourbon	KY 57	US 627 (Winchester Rd)
153	Arterial	Bullitt	KY 61	KY 1526
154	Limited Access	Bullitt	I-65	KY 44 interchange
155	Local Road	Bullitt	KY 1531	KY 1319
156	Arterial	Clay	US 421	KY 638
157	Local Road	Clay	KY 472	Bray Creek Rd
158	Arterial	Fayette	Tates Creek Rd	Lansdowne Dr
159	Limited Access	Fayette	I-64	KY 1678 overpass
160	Local Road	Fayette	Alexandria Dr	US 421
161	Arterial	Greenup	US 23	Ferry St
162	Local Road	Greenup	KY 503 (Naples Rd)	KY 207 (Argillite Rd)
163	Arterial	Harrison	US 27 (Falmouth Rd)	KY 1032 (Berry-Kelat Rd)
164	Local Road	Harrison	KY 19	US 62
165	Arterial	Hart	US 31W	Union St
166	Limited Access	Hart	I-65	rest area
167	Local Road	Hart	KY 88	US 31W
168	Arterial	Henderson	US 41	Marywood Dr
169	Limited Access	Henderson	Breathitt Parkway	KY 2099 overpass
170	Local Road	Henderson	KY 812	KY 1078
171	Arterial	Jefferson	KY 146	Whipps Mill Rd
172	Limited Access	Jefferson	I-71	Zorn Ave interchange
173	Local Road	Jefferson	W Kentucky St	S 7th Street
174	Arterial	Kenton	KY 16	U Grand Ave
175	Limited Access	Kenton	I-275	US 25 interchange
176	Local Road	Kenton	Autumn Rd	Old Turkey Foot Rd
177	Arterial	Lincoln	US 27	shopping center ent. (Stanford)
178	Local Road	Lincoln	KY 1770	US 150
179	Arterial	McCracken	KY 1286	US 62
180	Limited Access	McCracken	I-24	KY 787 overpass
181	Local Road	McCracken	Powers Rd	KY 131
182	Arterial	Perry	KY 15	KY 1095
183	Local Road	Perry	KY 1146	KY 80
184	Arterial	Pike	US 23	Island Creek Rd
185	Local Road	Pike	KY 468	KY 292
186	Arterial	Warren	US 68	US 231
187	Limited Access	Warren	Natcher Parkway	KY 884 overpass
188	Local Road	Warren	KY 263	KY 185

Appendix B.

Data Collection Form

SAFETY BELT DATA COLLECTION FORM

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

Location: _____ Sheet #: _____

Observer: _____ Comment: _____

DRIVER USAGE

Vehicle	Safety Belt	None	Unknown
PC			
PU			
VAN			
SUV			

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

Vehicle	Safety Belt	None	Unknown
PC			
PU			
VAN			
SUV			

USAGE OF MOTORCYCLE HELMET

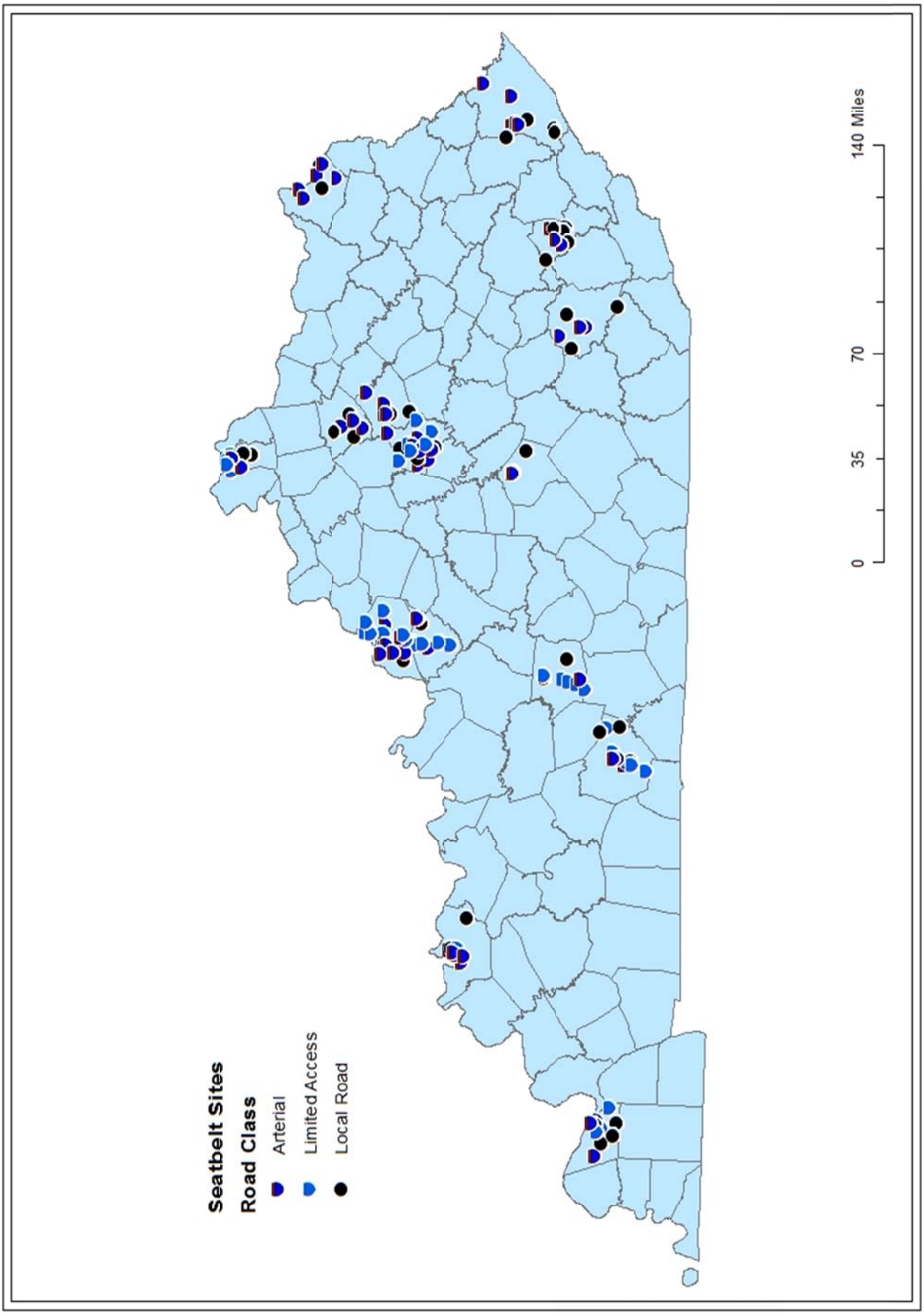
YES	NO

USAGE OF BICYCLE HELMET

YES	NO

Appendix C.

Data Collection Site Map


Seatbelt Sites
Road Class
Arterial
Limited Access
Local Road
0
35
70
140 Miles

Appendix D.

Summary of Data (by Site)

APPENDIX D. SUMMARY OF DATA

	ALL FRONT SEAT OCCUPANTS					CATEGORY			
						DRIVERS		FRONT SEAT PASSENGERS	
Location Number	Sample	Percent Usage	Relative Error*	Confidence Interval*	Percent Unknown	Sample	Percent Usage	Sample	Percent Usage
1	367	82.8	4.7	3.9	1.6	286	82.9	81	82.7
2	240	82.9	5.7	4.8	3.2	201	83.6	39	79.5
3	221	81.0	6.4	5.2	3.1	170	81.2	51	80.4
4	405	84.7	4.1	3.5	1.5	331	85.2	74	82.4
5	117	77.8	9.7	7.5	4.1	97	78.4	20	75.0
6	140	77.9	8.8	6.9	4.1	110	80.0	30	70.0
7	660	84.2	3.3	2.8	2.5	547	83.9	113	85.8
8	588	81.8	3.8	3.1	2.6	449	82.2	139	80.6
9	690	87.2	2.9	2.5	2.3	586	87.4	104	86.5
10	941	91.6	1.9	1.8	1.5	698	91.1	243	93.0
11	370	86.8	4.0	3.5	3.4	288	84.4	82	95.1
12	1052	91.4	1.8	1.7	1.6	772	90.7	280	93.6
13	428	95.3	2.1	2.0	0.2	327	96.0	101	93.1
14	520	87.5	3.2	2.8	2.3	407	88.7	113	83.2
15	239	82.0	5.9	4.9	3.6	210	82.4	29	79.3
16	219	76.7	7.3	5.6	0.5	178	76.4	41	78.0
17	215	80.0	6.7	5.3	2.3	155	80.0	60	80.0
18	451	77.2	5.0	3.9	4.7	356	76.1	95	81.1
19	444	73.4	5.6	4.1	3.1	329	76.6	115	64.3
20	244	65.2	9.2	6.0	2.0	171	66.1	73	63.0
21	78	57.7	19.0	11.0	3.7	55	56.4	23	60.9
22	85	57.6	18.2	10.5	4.5	58	58.6	27	55.6
23	314	87.9	4.1	3.6	1.3	260	88.1	54	87.0
24	495	92.1	2.6	2.4	1.6	412	91.5	83	95.2
25	563	86.5	3.3	2.8	0.9	440	87.3	123	83.7
26	624	84.5	3.4	2.8	1.0	501	85.4	123	80.5
27	337	81.3	5.1	4.2	1.5	267	84.6	70	68.6
28	351	90.3	3.4	3.1	0.6	270	90.0	81	91.4
29	636	87.1	3.0	2.6	1.2	465	88.2	171	84.2
30	142	84.5	7.0	6.0	6.6	105	82.9	37	89.2
31	673	91.1	2.4	2.2	1.8	533	91.6	140	89.3
32	941	91.9	1.9	1.7	1.1	689	91.6	252	92.9
33	468	90.0	3.0	2.7	2.5	373	90.6	95	87.4
34	572	87.1	3.2	2.7	0.5	462	88.3	110	81.8
35	469	86.1	3.6	3.1	0.6	373	87.1	96	82.3
36	504	84.5	3.7	3.2	2.5	399	85.2	105	81.9
37	95	91.6	6.1	5.6	3.1	91	91.2	4	100.0
38	214	89.3	4.6	4.1	0.5	171	90.1	43	86.0
39	238	84.5	5.4	4.6	3.6	180	85.6	58	81.0
40	69	79.7	11.9	9.5	6.8	53	83.0	16	68.8
41	492	84.8	3.7	3.2	2.4	386	84.7	106	84.9

APPENDIX D. SUMMARY OF DATA

	ALL FRONT SEAT OCCUPANTS					CATEGORY			
						DRIVERS		FRONT SEAT PASSENGERS	
Location Number	Sample	Percent Usage	Relative Error*	Confidence Interval*	Percent Unknown	Sample	Percent Usage	Sample	Percent Usage
42	508	87.6	3.3	2.9	1.9	385	87.8	123	87.0
43	345	84.1	4.6	3.9	3.1	234	87.2	111	77.5
44	144	80.6	8.0	6.5	1.4	104	79.8	40	82.5
45	57	64.9	19.1	12.4	5.0	39	71.8	18	50.0
46	42	81.0	14.7	11.9	6.7	32	81.3	10	80.0
47	269	82.5	5.5	4.5	3.2	196	83.7	73	79.5
48	412	83.7	4.3	3.6	3.1	317	83.6	95	84.2
49	126	83.3	7.8	6.5	2.3	88	84.1	38	81.6
50	79	75.9	12.4	9.4	4.8	59	72.9	20	85.0
51	68	76.5	13.2	10.1	5.6	55	74.5	13	84.6
52	71	69.0	15.6	10.8	1.4	59	69.5	12	66.7
53	200	82.5	6.4	5.3	1.0	159	85.5	41	70.7
54	680	90.9	2.4	2.2	1.6	456	92.5	224	87.5
55	226	91.6	3.9	3.6	3.0	171	90.6	55	94.5
56	693	89.0	2.6	2.3	1.3	501	89.2	192	88.5
57	621	89.4	2.7	2.4	1.6	423	89.4	198	89.4
58	503	90.9	2.8	2.5	1.4	354	90.1	149	92.6
59	83	84.3	9.3	7.8	3.5	63	84.1	20	85.0
60	90	70.0	13.5	9.5	2.2	69	65.2	21	85.7
61	376	87.5	3.8	3.3	1.6	298	88.6	78	83.3
62	201	88.6	5.0	4.4	3.8	162	87.7	39	92.3
63	178	82.6	6.7	5.6	2.7	142	84.5	36	75.0
64	586	90.4	2.6	2.4	1.3	430	91.4	156	87.8
65	156	87.8	5.8	5.1	2.5	119	88.2	37	86.5
66	597	86.3	3.2	2.8	2.5	476	85.9	121	87.6
67	430	87.0	3.7	3.2	2.5	334	86.8	96	87.5
68	475	85.5	3.7	3.2	2.9	375	85.9	100	84.0
69	211	78.7	7.0	5.5	2.8	165	82.4	46	65.2
70	41	61.0	24.5	14.9	4.7	32	68.8	9	33.3
71	701	80.6	3.6	2.9	2.0	541	82.3	160	75.0
72	649	83.8	3.4	2.8	0.9	536	83.8	113	84.1
73	328	83.5	4.8	4.0	2.7	281	83.6	47	83.0
74	389	88.4	3.6	3.2	0.8	333	89.5	56	82.1
75	652	85.4	3.2	2.7	2.5	538	85.7	114	84.2
76	558	90.5	2.7	2.4	1.9	476	91.0	82	87.8
77	527	81.2	4.1	3.3	3.7	438	80.6	89	84.3
78	351	87.5	4.0	3.5	1.1	293	87.7	58	86.2
79	562	84.5	3.5	3.0	4.1	470	85.1	92	81.5
80	706	87.7	2.8	2.4	3.2	595	86.9	111	91.9
81	489	89.2	3.1	2.8	2.8	413	89.6	76	86.8
82	522	89.5	2.9	2.6	1.5	449	89.5	73	89.0

APPENDIX D. SUMMARY OF DATA

	ALL FRONT SEAT OCCUPANTS					CATEGORY			
						DRIVERS		FRONT SEAT PASSENGERS	
Location Number	Sample	Percent Usage	Relative Error*	Confidence Interval*	Percent Unknown	Sample	Percent Usage	Sample	Percent Usage
83	480	86.9	3.5	3.0	1.0	393	88.3	87	80.5
84	564	90.1	2.7	2.5	3.4	479	90.2	85	89.4
85	427	95.1	2.2	2.1	0.2	327	94.5	100	97.0
86	508	89.0	3.1	2.7	3.1	414	87.0	94	97.9
87	463	85.5	3.7	3.2	1.3	400	86.3	63	81.0
88	431	93.3	2.5	2.4	0.2	377	93.4	54	92.6
89	388	95.4	2.2	2.1	1.3	313	96.2	75	92.0
90	619	87.1	3.0	2.6	2.1	498	89.0	121	79.3
91	330	83.0	4.9	4.0	2.7	259	82.6	71	84.5
92	176	89.8	5.0	4.5	2.8	145	90.3	31	87.1
93	628	89.2	2.7	2.4	2.5	540	89.1	88	89.8
94	423	89.6	3.2	2.9	0.2	357	89.4	66	90.9
95	837	90.0	2.3	2.0	0.9	654	89.8	183	90.7
96	349	88.8	3.7	3.3	1.7	300	89.7	49	83.7
97	620	89.4	2.7	2.4	2.2	509	89.4	111	89.2
98	893	90.3	2.2	1.9	2.1	699	89.8	194	91.8
99	494	87.9	3.3	2.9	2.2	414	88.9	80	82.5
100	1157	93.5	1.5	1.4	1.0	886	94.1	271	91.5
101	515	91.3	2.7	2.4	1.5	436	91.5	79	89.9
102	476	90.3	2.9	2.7	1.2	417	89.9	59	93.2
103	89	78.7	10.8	8.5	7.3	66	75.8	23	87.0
104	168	87.5	5.7	5.0	0.6	144	88.2	24	83.3
105	322	85.4	4.5	3.9	2.4	259	87.3	63	77.8
106	226	83.2	5.9	4.9	1.3	170	82.4	56	85.7
107	318	85.5	4.5	3.9	2.8	256	84.8	62	88.7
108	569	82.1	3.8	3.2	2.1	426	82.9	143	79.7
109	64	79.7	12.4	9.9	1.5	47	80.9	17	76.5
110	27	77.8	20.2	15.7	3.6	21	76.2	6	83.3
111	274	88.7	4.2	3.7	2.8	219	87.7	55	92.7
112	286	88.5	4.2	3.7	2.4	240	89.2	46	84.8
113	392	87.0	3.8	3.3	2.2	324	87.3	68	85.3
114	535	88.6	3.0	2.7	1.8	416	89.2	119	86.6
115	340	86.2	4.3	3.7	0.6	265	86.8	75	84.0
116	182	89.6	5.0	4.4	3.7	152	90.1	30	86.7
117	686	88.2	2.7	2.4	1.3	480	89.2	206	85.9
118	99	85.9	8.0	6.9	2.0	81	86.4	18	83.3
119	67	89.6	8.2	7.3	1.5	55	87.3	12	100.0
120	460	91.7	2.7	2.5	1.7	381	92.4	79	88.6
121	406	84.0	4.2	3.6	1.7	282	83.3	124	85.5
122	308	88.0	4.1	3.6	2.8	243	87.7	65	89.2
123	428	81.5	4.5	3.7	2.5	298	82.2	130	80.0

APPENDIX D. SUMMARY OF DATA

	ALL FRONT SEAT OCCUPANTS					CATEGORY			
						DRIVERS		FRONT SEAT PASSENGERS	
Location Number	Sample	Percent Usage	Relative Error*	Confidence Interval*	Percent Unknown	Sample	Percent Usage	Sample	Percent Usage
124	502	83.5	3.9	3.2	1.4	351	88.0	151	72.8
125	50	68.0	19.0	12.9	2.0	37	70.3	13	61.5
126	85	60.0	17.4	10.4	7.6	57	70.2	28	39.3
127	100	63.0	15.0	9.5	1.0	74	64.9	26	57.7
128	121	71.1	11.4	8.1	2.4	93	71.0	28	71.4
129	306	74.5	6.6	4.9	1.6	237	76.4	69	68.1
130	163	66.9	10.8	7.2	4.7	116	66.4	47	68.1
131	423	79.4	4.8	3.9	0.7	325	81.2	98	73.5
132	444	79.1	4.8	3.8	1.6	326	81.9	118	71.2
133	274	70.8	7.6	5.4	2.8	203	71.4	71	69.0
134	462	78.1	4.8	3.8	0.6	352	80.7	110	70.0
135	179	72.1	9.1	6.6	2.7	135	74.1	44	65.9
136	137	67.2	11.7	7.9	3.5	110	69.1	27	59.3
137	150	68.7	10.8	7.4	0.7	121	70.2	29	62.1
138	254	65.7	8.9	5.8	0.4	209	67.0	45	60.0
139	599	87.0	3.1	2.7	1.5	472	88.1	127	82.7
140	581	87.3	3.1	2.7	2.8	452	87.8	129	85.3
141	964	86.0	2.5	2.2	0.9	746	86.1	218	85.8
142	478	86.2	3.6	3.1	1.4	372	86.8	106	84.0
143	488	92.4	2.5	2.3	1.4	342	92.4	146	92.5
144	365	91.2	3.2	2.9	1.6	270	91.5	95	90.5
145	465	91.0	2.9	2.6	1.3	331	91.5	134	89.6
146	485	93.2	2.4	2.2	1.6	320	94.1	165	91.5
147	109	82.6	8.6	7.1	3.5	85	82.4	24	83.3
148	53	73.6	16.1	11.9	3.6	40	70.0	13	84.6
149	179	78.8	7.6	6.0	2.2	147	80.3	32	71.9
150	92	73.9	12.1	9.0	2.1	74	74.3	18	72.2

Appendix E.

Mini-Survey Data

APPENDIX D. Mini-Survey Data

Site	County	VMT%	Intersection Description	Town	2008	2009	2010	2011	2012	2013
5	Barren	3.46	I-65 at Exit 53	Cave City	82	88	87	89	91	91
11	Meade	6.00	US 31W at KY 1638	Muldraugh	76	85	83	82	85	88
27	Grayson	6.95	KY 259 at US 62	Leitchfield	70	79	77	81	81	84
37	Logan	3.07	US 68 at US 79	Russellville	70	79	78	81	79	84
44	Hopkins	2.13	Pennyrile Parkway at Exit 44	Madisonville	84	86	83	87	87	87
54	Henderson	3.52	Us 41A at 5th St.	Henderson	73	78	75	83	84	85
63	Calloway	3.35	KY 1637 at 16th	Murray	72	75	76	79	82	82
76	Shelby	8.31	I-64 at Exit 28	Simpsonville	82	85	87	86	89	88
80	Woodford	1.92	US 60 at US 62	Versailles	79	84	86	89	84	94
88	Oldham	4.01	KY 146 at KY 329B	La Grange	82	84	86	89	89	88
98	Franklin	1.41	KY 2820 at US 127	Frankfort	69	74	74	75	80	87
110	Kenton	17.65	I-75 at Exit 186	Crescent Springs	85	87	87	88	88	91
121	Jefferson	8.71	US 31W at KY 841	Louisville	71	77	74	79	78	85
144	Boone	7.65	US 42 at US 25	Walton	75	77	83	84	87	86
154	Boyd	2.48	I-64 at Exit 185	Ashland	80	81	81	85	86	84
166	Lincoln	6.56	US 27 at US 150	Stanford	70	74	76	77	80	86
174	Carter	5.94	US 60 at KY 7	Grayson	67	72	67	72	78	80
180	Floyd	3.13	KY 680 at KY 122	Drift	56	57	57	60	60	70
188	Rowan	0.41	I-64 at Exit 137	Morehead	81	85	83	84	86	84
194	Laurel	1.89	US 25E at US 25	Corbin	68	74	77	79	79	79
200	Pulaski	1.45	KY 80 at KY 2296	Somerset	75	75	74	76	84	79
					75.6	79.9	79.8	82.2	83.4	85.8