Research Report
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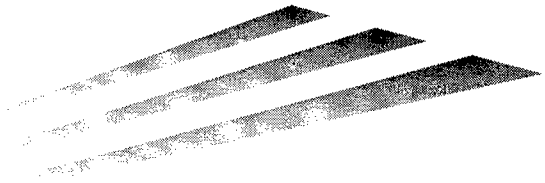
INVESTIGATION AND ANALYSIS OF HEAVY TRUCK ACCIDENTS



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INVESTIGATION AND ANALYSIS OF HEAVY TRUCK ACCIDENTS
(KYSPR-98-181)

by

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in cooperation with

Kentucky Transportation Cabinet
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16. Abstract

The objectives of this study were to investigate and analyze traffic accidents involving trucks and to study the relationship between heavy loads and truck braking efficiency. Field tests were made to determine the effect of increased loads on the ability of a truck to brake to a stop and determine if the trucks could meet the requirements of the Federal Motor Carrier Safety Regulations. The test combination truck with a gross weight of up to 151,180 was able to meet both braking distance and maximum G requirements. The test single-unit truck failed to meet requirements only at the maximum weight tested of 120,680 pounds.

Accident data were analyzed for the three-year period of 1994 through 1996. Characteristics of truck accidents were compared to all accidents. A detailed analysis was conducted for all fatal accidents involving a truck. Average and critical numbers and rates of truck accidents were calculated and one-mile sections having a critical rate were located with an investigation conducted at a sample of these sections.

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1.0 INTRODUCTION

Traffic accidents involving heavy trucks are more severe and represent higher percentages of fatal accidents than collisions involving other types of vehicles. In Kentucky, trucks are involved in about 7 percent of all accidents but are involved in approximately 13 percent of fatal accidents (1).

Kentucky has an Extended-Weight Coal Haul Road System which allows trucks to haul loads significantly in excess of those permitted on other types of roads in the state. There have been indications that trucks operating with total weights more than 40,000 pounds beyond the legal limit for most roads may present unanticipated and undesirable braking, handling, and operational characteristics (2, 3).

The objectives of this project were to investigate and analyze traffic accidents involving trucks, to identify locations having a high number of truck accidents, and to study the relationship between heavy loads and braking efficiency.

2.0 PROCEDURE

2.1 Truck Braking Characteristics

Field tests were made to determine the effect of increased loads on the ability of a truck to brake to a stop. The truck brake testing was conducted in Johnson County on KY 3 approximately between milepoints 1.2 and 1.6. KY 3 in this area is a rural, four-lane roadway with a tangent section approximately 2,000 feet in length with an upgrade for northbound traffic of 0.7 percent. It has a speed limit of 55 mph. Braking tests were conducted on October 21 and 22, 1997.

The tests were run at target speeds of 20 and 40 mph, except for a few runs at 50 mph. The test procedure for stopping distance testing described in Federal Motor Vehicle Safety Standard (FMVSS) No. 121 was used. Test results were compared to the braking requirements described in Part 393.52 of the Federal Motor Carrier Safety Regulations (FMCSR). Copies of FMVSS No. 121 and a portion of FMCSR Part 393.52 are included as Appendix A. All brake applications were made by fully depressing the pedal as rapidly as possible. With only a few exceptions, all stops were made in the southbound direction with a 0.7 percent downgrade. Except for one instance, all tests were made with engine retarders off. Time was allowed between test runs to allow the brakes to cool which resulted in initial brake temperatures that were less than 200 degrees Fahrenheit.

A three-axle single unit dump truck and an eight-axle combination truck were used in the tests. Both vehicles were new. While the brakes were new and

properly adjusted, the brakes did not represent optimum braking which would occur with seasoned brakes. The combination vehicle had three liftable axles (two on the trailer and one on the tractor) and was tested with various numbers of axles (five through eight) down. Tests were conducted with the vehicles empty and loaded to various weights. The maximum weight on the single-unit truck was 120,680 pounds with the maximum weight on the combination truck of 150,180 pounds. Selected specifications for the single-unit dump truck, the tractor unit, and the dump semitrailer follow:

	Single-Unit Dump	Tractor	Dump Semitrailer
Make	Mack	Mack	Benson
No. of Axles	3	4(1 is liftable)	4(2 are liftable)
Steer Axle Rating, lb.	20,000	14,300	N/A
Drive Axle Rating, lb.	65,000	50,000	N/A
Trailer Axle Rating, lb.	N/A	N/A	unknown
Steer Axle Brakes	16.5 in x 7 in	16.5 in x 5 in	N/A
Drive Axle Brakes	18 in x 7 in	16.5 in x 7 in	N/A
Trailer Axle Brakes	N/A	N/A	16.5 in x 7 in

Two types of data were collected. The vehicles were equipped with fifth wheel systems to measure speed and stopping distance. These data were collected by Radlinski & Associates, Inc. Pressure instrumentation was also used to measure brake system control line pressure and to insure that full applications were being made. The digital readout for the fifth wheel mounted in the cab displayed current speed and also determined initial speed, based on closure of a tape switch on the pedal, and stopping distance from first pedal movement until the vehicle stopped. The fifth wheel was calibrated prior to testing by driving over a 500-foot measured course to check distance. Tire pressure was adjusted as necessary so that the measured distance was within plus or minus two feet in 500 feet (0.4 percent).

The second source of data was a dynamometer and braking test computer (VC2000). The measuring device built into the VC2000 is a high-precision accelerometer which measures motion as a rate-of-change of speed (deceleration). The primary outputs from this device were the average and maximum G. Also obtained were the speed and the time and distance to stop from this speed. Data are collected above a threshold value of 0.2G. The device was mounted to the windshield for the single unit truck but was mounted outside the cab on the tractor trailer to avoid faulty triggering due to the air ride suspension system.

There were several other participants in the truck brake tests in addition to the Kentucky Transportation Center and Radlinski & Associates. Following is a listing of those participating and their role in the tests.

University of Kentucky Transportation Center

The research staff from the Transportation Center was primarily responsible for arranging the logistics necessary to conduct the tests including site selection, dates for tests, data collection, and coordinating arrangements for drivers, equipment, and traffic control.

Radlinski and Associates, Inc.

Personnel from Radlinski and Associates served as expert consultants and were also responsible for equipping the test vehicles with instrumentation to measure braking distances with a fifth wheel assembly and driver monitors. Radlinski and Associates was also responsible for interpretation and analysis of results from the test data collected using the fifth wheel system.

Kentucky Transportation Cabinet

The Transportation Cabinet provided traffic control and enforcement to insure a safe working environment at the test site. A lane closure was set up to allow testing to be conducted in the closed lane adjacent to the shoulder in the southbound lane of KY 3. The Division of Vehicle Enforcement provided three vehicles to insure better adherence to the traffic control devices as a vehicle entered the lane closure and also in the area where brakes were being applied. Vehicle Enforcement officers also conducted pre-trip inspections of the test trucks, primarily focused on the braking systems, prior to the brake tests.

World Wide Equipment, Inc.

Trucks used in the testing were provided by World Wide Equipment. Included were a single-unit three-axle dump truck and a tractor trailer equipped with eight axles. The tractor unit had been equipped with a drop axle to allow it to operate with either three or four axles. The trailer had been equipped with two drop axles to allow it to operate with either two, three, or four axles.

Beechfork Processing

The facilities of Beechfork Processing were used as the staging site for the trucks to be stored and inspected prior to the testing. In addition, Beechfork provided the coal, gravel, equipment, and personnel necessary to load the trucks to the desired levels.

Stephens Truck and Trailer Sales

Mike Stephens served as the driver to take the trucks to the coal loading facility at Beechfork Processing to load the required loads on each truck prior to testing.

Higgins Trucking

Greg Higgins served as the driver of the trucks during all tests conducted.

2.2 Analysis of Truck Accidents

All reported traffic accidents are sent to the Kentucky State Police and coded into a computer file. The types of vehicles involved are identified and coded. The vehicle codes which would correspond to either a single unit or combination truck were used to identify an accident in which a truck was involved. All accidents in which a truck was involved, according to the vehicle type codes, were identified and placed into a separate file for analysis. Data were obtained for the three-year period of 1994 through 1996.

2.2.1 Characteristics of Truck Accidents

Computer programs were used to summarize characteristics of accidents involving one or more trucks. The results were compared to the characteristics of all accidents. Examples of the types of data summarized include accident severity, type of accident, and contributing factors.

2.2.2 Detailed Analysis of Fatal Truck Accidents

A copy of the uniform police report was obtained for fatal accidents involving trucks. The police report was analyzed in detail. For example, the accident type was placed into several specific categories.

2.2.3 Truck High Accident Locations

The average accident rate for collisions involving trucks was determined considering: accidents involving trucks, total traffic volume, highway classification, and rural/urban classification. Data from two files were used to assign accidents involving trucks to a specific highway location and type of highway. These files were the accident file and a separate file maintained by the Transportation Cabinet with roadway characteristic data. The accident site was identified by county, route, and milepoint using the accident file. The location of the accident was then matched to the characteristics of that location (traffic volume, highway classification, and rural/urban classification) using information contained on the roadway characteristics file.

A critical number of accidents was determined for each highway type category. One mile sections having the critical number, or more, of truck accidents were identified. The accident rate, critical rate, and critical rate factor (accident rate divided by critical rate) were calculated for each section. Some locations with a critical rate factor of one or more were investigated to determine if there was a link between the accidents which could be addressed with a specific countermeasure.

3.0 RESULTS

3.1 Truck Braking Characteristics

The braking tests were conducted with the primary objective of determining whether the test combination and single unit trucks could meet the requirements of the FMCSR. Specifically, Part 393.52 of the FMCSR requires that a single-unit truck weighing more than 10,000 pounds must stop within a distance of 35 feet from a speed of 20 mph and that the maximum deceleration (G force) attained during the brake tests be equal to 0.435. Similarly, for combination vehicles, the required braking distance is 40 feet from a speed of 20 mph and the maximum deceleration must also equal 0.435.

The braking distances obtained using the fifth wheel instrumentation are given in Table 1. The maximum and average G values obtained from the VC2000 accelerometer are given in Tables 2 and 3, respectively. The values given in these tables represent the average of the runs made at a given speed and weight. Two or three runs were made for each speed and weight in most instances. Data collected for each run are given in Appendix B.

The single unit three-axle truck was tested with weights of 40,900 (empty); 57,840; 98,280; and 120,680 pounds. This truck met FMCSR requirements in all but a few tests. The single-unit test truck with a total weight of 120,680 pounds had an average braking distance of 40 feet which is above the 35-foot requirement. The maximum G value of 0.40 at this weight also failed to meet the required value of 0.435. The test truck with a weight of 98,280 pounds failed to meet the braking distance requirement for some of the test runs and had an average braking distance of 36 feet.

The combination truck with five, six, seven, and eight axle configurations was tested with weights of 44, 940 (empty); 81,120; 120,660; and 151,180 pounds. The test truck was able to meet the FMCSR requirements for both braking distance and maximum G value for all test weights.

For the tests conducted at speeds of 40 and 50 mph, the single-unit truck with weights of 98,280 and 120,680 pounds resulted in the only test conditions where the maximum G value attained was less that the FMCSR requirements.

There was a definite pattern of increasing braking distance with increasing weight for both the single unit truck and the combination truck. There was also a pattern of decreasing braking distance as the number of axles was increased on the combination tractor and trailer.

3.2 Analysis of Truck Accidents

Accidents involving trucks were identified for the three-year period of 1994 through 1996. Characteristics of these accidents were compared to all accidents. Some detailed analyses were conducted using copies of the police reports of fatal accidents involving trucks. Roadway sections having a high number of truck accidents were identified with a review performed at a sample of these locations.

The number of truck accidents has remained fairly stable in recent years. The total number of this type of accident decreased from 1992 to 1994 but then increased in 1995 and 1996. For the five-year period of 1992 through 1996, truck accidents represented 7.2 percent of all accidents, 5.9 percent of injury accidents, and 13.1 percent of fatal accidents. Following are the numbers of truck accidents, total as well as fatal accidents, involving trucks over the past five years:

Year	Total Truck Accidents	Fatal Truck Accidents
1992	10,291	85
1993	9,677	99
1994	8,919	99
1995	9,055	102
1996	9,975	95

Comparing 1996 to the previous four-year average shows an increase of 5.2 percent in total accidents and a decrease of 1.0 percent in fatal accidents.

3.2.1 Characteristics of Truck Accidents

A comparison of the characteristics of all accidents with those involving one or more trucks is given in Table 4 (for the three-year period of 1994 through 1996). Following is a summary of the analysis considering a list of variables.

Variable	Comparison
Severity	The percent of fatal accidents involving trucks was about two times that for all accidents. The percent of injury accidents was similar with the percentage slightly higher for all accidents compared to truck accidents.
Aid System	The largest differences were a higher percentage of truck accidents on both rural and urban interstates and rural arterial roadways and a lower percentage on urban arterial and local streets.

Speed Limit	A higher percentage of truck accidents occurred on roadways with a speed limit of more than 45 mph.
Type of Accident	A higher percentage of truck accidents involved collisions with another vehicle and overturning while a lower percentage involved collisions with deer and fixed objects such as a tree, fence, or earth embankment/rock cut/ditch.
Contributing Factors	Considering factors related to the driver, truck accidents had a lower percentage related to unsafe speed, failure to yield right-of-way, following too close, disregarding traffic control devices, and alcohol or drug involvement with a higher percentage related to improper passing and improper turn. Truck accidents had a higher percentage involving a vehicular factor with the largest difference for defective brakes. A lower percentage of truck accidents involved animal action or water on the road with a higher percentage involving a defective shoulder, road construction, or an improperly parked vehicle.

A comparison of all fatal accidents with fatal accidents involving trucks is given in Table 5. Following is a summary of the analysis.

Variable	Comparison
Aid System	The largest differences were a higher percentage of fatal accidents involving trucks on rural and urban interstates and rural arterials and a lower percentage on rural collectors and local roads and urban arterials.
Directional Analysis	The percentage of fatal truck accidents at intersections was higher than for all accidents (primarily the result of angle accidents). There were several major differences between the percentages of non-intersection accidents. There were higher percentages of trucks involved in a rear end, head on, same and opposite direction sideswipe, and parked vehicle accidents with a lower percentage involving fixed object and ran off road accidents.
Driver Seatbelt Usage	The percent usage was higher in truck accidents. This would be partially related to the higher percentage of truck accidents on interstates which have a high seatbelt usage rate.

Directional Analysis	The percentage of truck accidents occurring at intersections was lower than for all accidents. The largest differences for non-intersection accidents were a higher percentage of truck accidents involving a same direction sideswipe and overturned in the road and a lower percentage for fixed object, ran off road, and animal related.
Driver Seatbelt Usage	Reported percent usage was slightly higher in truck accidents. It should be noted that this reported rate is much higher than that found in observational surveys.
Time of Day	The largest differences were the higher percentage of truck accidents occurring between 6 a.m. and 12 a.m. with a lower percentage between 6 p.m. and 12 p.m.
Day of Week	The percentage of truck accidents was higher during week days and lower on the weekend.
Month	There were no large differences when month was considered.
Number of Vehicles	A smaller percentage of truck accidents was single vehicle.
Land Use	A higher percentage of truck accidents occurred in rural, industrial, and limited access locations with a smaller percentage in residential, business, and school zones.
Road Surface Condition	The percentage of truck accidents on a dry surface was slightly higher.
Weather	A slightly higher percentage of truck accidents occurred during clear conditions with a lower percentage during rain.
Road Character	The only difference was a slightly higher percentage of truck accidents occurring on a grade. The percent on a curve was very similar.
Light Condition	A higher percentage of truck accidents occurred during daylight conditions.

Time of Day	A higher percentage of fatal truck accidents occurred between 6:00 a.m. and noon with a lower percentage between 6 p.m. and midnight.
Day of Week	The percentage of fatal truck accidents was higher for week days and lower on the weekend.
Month	The percent of truck accidents was higher from December through February and lower from March through May.
Number of Vehicles	The percent of fatal single vehicle truck accidents was very low compared to all fatal accidents (16 percent compared to 54 percent).
Land Use	A higher percentage of fatal truck accidents occurred on limited access highways with a lower percentage in residential areas.
Road Surface Condition	A lower percentage of fatal truck accidents occurred on a wet pavement.
Weather	A higher percentage of fatal truck accidents occurred during snow conditions.
Road Character	A higher percentage of fatal truck accidents occurred on straight and level roadway sections.
Light Condition	A higher percentage of fatal truck accidents occurred during daylight.
Speed Limit	A higher percentage of fatal truck accidents occurred where the speed limit was over 55 mph with a lower percentage where the speed limit was 45 mph or less.
Type of Accident	A much higher percentage of truck accidents involved another vehicle while a much lower percentage involved a collision with a fixed object or a non-collision accident.
Contributing Factors	Considering factors related to the driver, fatal truck accidents had a lower percentage related to unsafe speed and alcohol involvement and a higher percentage related to failure to yield right-of-way, improper passing, disregard traffic controls, and improper turn. Fatal truck

Contributing Factors (continued)

accidents had a higher percentage involving a vehicular factor with the largest differences for defective lighting or brakes. Trucks also had a higher percentage involving debris in the road or an improperly parked vehicle.

A directional analysis code is assigned to each accident as a method of describing the type of collision which occurred. This code was used to identify locations which had the highest number of specific types of accidents. One type of collision was an angle impact at an intersection. This generally involved a right angle type of impact. There were 36 intersections which had three or more of this type of collision in the three-year period involving a truck; this decreased to 13 intersections with four or more angle collisions and two intersections with more than four accidents. The majority of these intersections were in urban areas (30 intersections) with most of those at an intersection with a traffic signal (22 intersections). Of the six intersections in rural areas, three had a traffic signal. Following is a list of the 13 intersections with four or more angle collisions.

County	Intersecting Roadways	Rural/Urban	Signal
Campbell	KY 8 - Second Street	Urban	No
Daviess	US 60 - Ewing Road	Urban	No
Daviess	US 60 - J.R. Miller Blvd.	Urban	Yes
Jefferson	US 150 - 12th Street	Urban	Yes
Jefferson	KY 1020 - W. Market	Urban	Yes
Jefferson	KY 1631 - Hiawatha Ave.	Urban	No
Jefferson	KY 1703 - I 264 off ramp	Urban	Yes
Jessamine	US 27 - KY 169	Rural	Yes
Kenton	KY 8 - Main Street	Urban	Yes
Knott	KY 80 - KY 160	Rural	No
Logan	US 431 - Second Street	Urban	Yes
Marshall	US 62 - Purchase Pkwy.	Rural	Yes
Martin	KY 645 - KY 40	Rural	No

The intersections with more than four accidents were both in Jefferson County (eight at KY 1703 and I 264 off ramp and five at KY 1020 and W. Market).

Non-intersection rear end accidents in which one vehicle was either stopped or moving were summarized using the directional analysis codes. There were 67 specific milepoints which had three or more of this type of collision in the three-year period. All but 18 of these specific locations were on interstates. There were 19 milepoints having five or more rear end accidents with all but two of these locations on interstates. These two sites were on KY 922 in Fayette County near Nandino Boulevard (six collisions) and US 41 in Henderson County near Watson Lane (five

collisions). Sites having a high number of this type of collision were generally on urban interstates. While there have been several fatal rear end collisions on non-interstate, rural highways, those have occurred at isolated locations. Following is a summary of the locations with the highest number of rear end collisions. Sites with the highest numbers were at interchanges on I 65 in Jefferson County. The location reference was determined using the milepoint information.

County	Route	Location	Number
Jefferson	I 65	South End of Kennedy Bridge	20
Jefferson	I 64	I 65 interchange	13
Jefferson	I 264	KY 864 interchange	13
Kenton	I 75	KY 1072 interchange	10
Kenton	I 75	US 25 interchange	9
Jefferson	I 65	KY 1631 interchange	8
Jefferson	I 65	Muhammad Ali Blvd. interchange	7
Jefferson	I 65	St. Catherine St. interchange	7

There were a limited number of collisions coded as head-on. The highest number of this type of impact, for any specific county and route, was three accidents with this number occurring on US 45 in Graves County, KY 1862 in Letcher County, US 119 in Pike County, and KY 194 in Pike County.

There were a very large number of opposite direction sideswipe collisions. The number occurring in a one-mile section were analyzed. The following numbers of one-mile sections were found with specific numbers of accidents.

Number of Opposite Direction Sideswipe Collisions in a One-Mile Section	Number of Sections
3	47
4	21
5	7
6	9
7	3
8	1
9	1
11	1
15	1

Following is a list of the sections with a maximum length of one mile having five or more opposite direction sideswipe collisions.

County	Route	Milepoint Range	Number
Pike	US 119	22.257-23.083	15
Pike	US 119	20.151-20.883	11
Pike	US 119	14.063-14.863	9
Muhlenberg	US 431	2.879-3.454	8
Boone	KY 338	0.076-0.473	7
Letcher	US 119	10.665-11.596	7
Trimble	US 421	18.772-19.000	7
Boone	KY 18	14.714-15.636	6
Floyd	KY 979	13.072-14.032	6
Henderson	US 41	16.724-17.692	6
Jessamine	US 68	0.400-1.371	6
Letcher	US 119	11.778-12.498	6
Letcher	US 119	14.800-15.439	6
Mercer	US 68	18.500-18.700	6
Pike	US 23	0.466-1.280	6
Pike	US 119	13.199-13.829	6
Christian	US 41A	3.000-4.000	5
Henderson	US 41A	13.540-14.527	5
Jefferson	KY 1631	3.145-3.660	5
Johnson	KY 1428	2.380-3.379	5
Laurel	US 25E	1.334-1.900	5
Pike	KY 122	0.250-0.900	5
Pulaski	US 27	16.100-17.100	5

The majority of these sections were in southeastern Kentucky. The routes with the highest number of opposite direction sideswipe collisions were US 119 in Pike County and US 119 in Letcher County.

There were 41 one-mile sections with three or more fixed object collisions. Of this number, 26 sections had three collisions. Following is a list of the 15 one-mile sections with four or more fixed object collisions.

County	Route	Milepoint Range	Number
Jefferson	I 65	136.421-136.723	9
Jefferson	US 60A	3.409-3.409	8
Letcher	US 119	15.428-15.961	8
Barren	I 65	46.500-47.355	6
Kenton	KY 17	22.434-22.689	6
Fayette	US 27	8.275-9.258	5
Whitley	I 75	14.700-15.300	5

County	Route	Milepoint Range	Number
Fayette	KY 1681	4.595-5.537	4
Fayette	I 75	117.943-118.250	4
Henderson	US 41	16.158-16.730	4
Hopkins	W.K. Pkwy.	38.171-39.019	4
Jefferson	US 31W	20.919-21.435	4
Jefferson	I 64	5.129-5.279	4
Jefferson	I 65	134.000-134.987	4
Trimble	US 421	19.187-19.287	4

Six of the 15 sections were on interstates. Five were in Jefferson County with three of those on an interstate.

Only six one-mile sections were identified which had three or more truck accidents in which the directional analysis indicated "overturned in road." Following is a list of those sections.

County	Route	Milepoint Range	Number
Warren	Natcher Parkway	0.000-0.300	6
Jefferson	KY 861	10.246-10.269	5
Boone	I 71	77.095-77.600	3
Carroll	KY 227	5.247-5.839	3
Jefferson	I 65	125.000-125.311	3
Woodford	KY 33	10.100-10.500	3

The highest number of this type of accident occurred on the Natcher Parkway at the ramp exiting to I 65.

The highest number of pedestrian collisions was in Jefferson County. The routes in Jefferson County with more than one pedestrian collision were KY 61 with three and US 31W and I 65 with two. The only other county and route with more than one was I 75 in Laurel County.

One-mile sections having three or more accidents involving a parked vehicle were identified. There were 21 sections with three accidents, four sections with four accidents, six sections with five accidents, and three sections with six accidents. Following is a list of the 13 one-mile sections which had four or more of this type of accident.

County	Route	Milepoint Range	Number
Bourbon	US 68X	1.420-1.665	6
Jefferson	US 31E	15.271-15.838	6
Jefferson	US 31W	21.388-22.135	6
Boyd	US 23	18.235-18.523	5
Jefferson	US 42	0.127-1.022	5
Jefferson	KY 864	14.941-15.430	5
Jessamine	KY 29	2.149-2.154	5
Mason	KY 8	11.615-11.845	5
Union	KY 56	13.100-13.400	5
Campbell	KY 8	2.249-2.439	4
Fayette	US 27	5.409-6.368	4
Kenton	KY 17	22.050-22.885	4
Kenton	KY 17	23.414-23.796	4

There were 27 accidents (having a coded county, route, and milepoint) in which the roadway surface was coded as muddy. Counties with the largest number of this type of accident were Pike County with six and Leslie County with five. Four of the accidents of this type occurred in Leslie County on KY 2009.

The characteristics of truck accidents, by highway type, are given in Table 6. The highways are classified into rural and urban categories as well as two lane, four lane (non interstate), and interstate. Following is a summary of the comparison of several variables by highway type.

Variable	Comparison
Severity	Rural accidents were the most severe with the highest percentage of fatal collisions on rural, four lane (non interstate) highways.
Directional Analysis	The highest percentage of accidents occurring at intersections was on urban two lane and four lane roads with about 50 percent of this type. The highest percentage at intersections on rural roads was on four lane highways resulting from the high percentage of angle collisions. Considering non-intersection accidents, the highest percentage of rear end and same direction sideswipe collisions were on interstates. Single vehicle accidents (fixed object, ran off road, and overturned in road) were more frequent on rural highways.

Driver Seatbelt Usage	Usage was highest on interstates.
Time of Day	The percentage between midnight and 6 a.m. was highest on interstates.
Day of Week	The percentage on weekends was highest on interstates.
Month	No significant differences were noted.
Number of Vehicles	Single vehicle accidents were higher on rural roadways with the highest percentages on two lane and interstates.
Road Surface Condition	The percentage on snow or ice was highest on interstates.
Weather	The percentage during snow was highest on interstates.
Road Character	The highest percentage on a curve was on rural, two lane highways. The highest percentage on a grade was on rural interstates.
Light Condition	The percentage during darkness was highest on interstates.
Type of Accident	The percentage involving collisions with other motor vehicles was higher on urban roadways. Considering fixed object collisions, there was a higher percentage involving guardrails and median/barrier on interstates and a higher percentage involving a tree, fence, culvert/head wall or earth embankment/rock cut/ditch on two lane highways (especially rural). The percentage of non-collision accidents was highest on rural highways.
Contributing Factors	The percentage involving unsafe speed was highest on interstates. Disregarding traffic controls and improper turn were most common on urban two lane and four lane roadways. Falling asleep was listed most often on rural interstates. Defective brakes were a factor most often on rural two lane and urban two lane and four lane roadways. Tire problems were listed most often on interstates as was road construction and a slippery surface.

3.2.2 Detailed Analysis of Fatal Truck Accidents

An attempt was made to obtain copies of the police report and investigation for all fatal accidents in which a truck was involved (as indicated by the computer records). For the three-year period of 1994 through 1996, police reports were located for 284 of the 296 case numbers located on the computer file. Each report was reviewed with each accident classified into one of several categories describing the type of accident. When information was available, the type of load was noted. The accident locations were summarized (by county and route).

Following are the most common accident descriptions found as a result of the review of the report and investigation.

Accident Description	Number
Other vehicle crossed centerline into path of truck	62
Other vehicle pulled or turned into travel path of truck	39
Single vehicle	26
Other vehicle ran into rear of slow moving truck	23
Pedestrian	20
Other vehicle crossed median into path of travel of truck	16
Truck crossed centerline into path of other vehicle	15
Other vehicle ran into rear of truck stopped on road	14
Vehicle hit side of truck trailer while truck making turn	13
Truck ran into rear of vehicle(s) on road	13
Other vehicle ran into truck stopped off road	10

The action which resulted in the collision was related to actions of the other driver, rather than the truck driver, in the majority of the accidents.

Given the weight differential between the vehicles, the fatality was almost always associated with an occupant in the other vehicle as opposed to the truck. Excluding the single vehicle accidents, the truck driver sustained fatal injuries in only three percent of the collisions.

Considering the trucks for which a determination would be made, the majority of the trucks (64 percent) were loaded. There was a wide variety of loads listed and, in several cases, the type of load could not be identified. Following is a list of the most common loads for trucks in which the type of load could be identified.

Type of Load	Number
Coal	21
Food Products	17
Gravel/Sand	13
Steel	11
Liquid (fuel, etc.)	11
Timber, Logs	9

Five of the accidents involving a liquid were single vehicle which may be related to a shifting load.

In addition to the 21 accidents involving a loaded coal truck, another 13 involved a truck which was identified as an empty coal truck. Of those 34 accidents in which a loaded or unloaded coal truck was involved, 10 of the trucks were a single unit with 24 a combination. The most common accident types involving a coal truck were 12 in which the other vehicle crossed the centerline into the path of the truck, seven where the other vehicle pulled or turned into the path of the truck, and seven where the other vehicle ran into the rear of a slow-moving truck.

Of the 23 collisions where a slow-moving truck was hit in the rear, 70 percent occurred during non-daytime hours. This compares to 40 percent of all fatal truck accidents which occur during non-daylight hours. The truck was loaded in 21 of the collisions. The most common load was coal with seven (two in Pike County and one each in Floyd, Knott, Letcher, Perry, and Rockcastle Counties). Eleven of the collisions occurred on an interstate with eight on a rural, four lane highway. The most common reason for the collision on an interstate was the truck was either merging or exiting (five collisions). The most common explanation for the non-interstate collisions involved a grade (five collisions) or the truck just pulling onto the roadway (four collisions).

Lighting was a factor in the accidents in which a vehicle hit the side of the truck trailer while the truck was making a turn. Twelve of the 13 accidents of this type occurred during darkness.

The counties with the highest number of fatal truck accidents were Jefferson County with 20 and Pike County with 12. Of the 20 fatal accidents in Jefferson County, eight were on an interstate. Six involved a pedestrian and six were a rear end into the truck. Of the 12 fatal accidents in Pike County, seven involved a coal truck. Five involved the other vehicle crossing the centerline, two were rear end into the truck, and two involved the truck trailer swinging into the opposing lane.

The following counties and routes had four or more fatal accidents; I 65 in Hardin County, US 31E in Allen County, KY 80 in Floyd County, US 23 in Lawrence County, KY 194 in Pike County, and I 65 in Warren County. Two of the four accidents on I 65 in Hardin County were same direction sideswipe collisions. Three of the four accidents on KY 80 in Floyd County involved an angle collision at an intersection.

A directional analysis code is assigned to each accident to describe the type of collision. This code was analyzed to determine if locations with similar types of collisions could be identified. One intersection was located which had more than one angle collision. Two fatal accidents occurred in Martin County at the intersection of KY 645 and KY 40. Both involved angle collisions where a vehicle on KY 40 attempted to cross KY 645 and was hit by a truck. The county with the largest number of fatal angle collisions was Floyd County which had four with three occurring on KY 80. Pike County had the largest number of head on or opposite direction sideswipe collisions with seven and three occurred on KY 194. One half of the pedestrian accidents occurred on an interstate.

3.2.3 Truck High Accident Locations

Locations having a high number and rate of truck accidents were identified. Truck accidents, total roadway volume, and highway classification were used to calculate average rates and critical numbers of accidents in a one-mile section. The following rates and numbers of accidents were determined.

Highway Type	Average Rate (Accidents per 100 MVM)	Critical Number of Accidents
Rural		
Two Lane	18	2
Four Lane	13	5
Interstate	13	9
Parkway	10	4
Urban		
Two Lane	18	5
Four Lane	21	11
Interstate	17	21
Parkway	18	7

A total of 504 one-mile sections having a critical rate factor of 1.0 or above were identified. A summary of the number of sections, by county and type of highway, is given in Table 7. The majority of the sections (51 percent) were on

rural, two lane highways with the second highest percent (15 percent) on urban, four lane highways (non-interstate). The following 14 counties had 10 or more sections identified:

County	Number
Pike	63
Jefferson	53
Boone	23
Fayette	21
Floyd	12
Hopkins	12
Kenton	11
Letcher	11
Logan	11
Perry	11
Christian	10
Daviess	10
Harlan	10
Henderson	10

The heavy coal truck traffic in southeastern Kentucky would explain several of the counties (Pike, Floyd, Letcher, Perry, and Harlan). Two of the counties (Jefferson and Fayette) had the highest number of sections in urban areas.

Following is a description of the types of locations identified in each of these counties.

Pike County

All but two of the 63 sections were rural, two lane highways. The routes with the highest number of sections were KY 194 with 15 and US 119 with 13 sections. The next highest numbers were five on US 23 and US 460 and four on KY 122. Seventeen routes had at least one section. The sections with the highest CRF were two on US 119 between milepoints 20 and 23. Of 34 collisions at these two sections, 21 were opposite direction sideswipe type of collisions. Of the 55 accidents at the 15 sections on KY 194, the most common types of accidents were 18 opposite direction sideswipes and nine single vehicle, run-off-road.

Jefferson County

All but one of the sections were at urban locations. Slightly over one half were urban, non-interstate with four or more lanes. Twelve were on interstates. The 53 sections with a CRF of one or more were distributed among 20 routes. The largest number on any route was six on US 31E, US 31W, and I 65 followed by five on KY 61 and four on KY 1020 and I 64. The highest CRF was on US 31W in downtown Louisville near Broadway. Of 23 accidents in this section, 10 were angle collisions at an intersection. The second highest CRF was on KY 864 in downtown Louisville near Broadway. Of 22 accidents in this section, nine were angle collisions at an intersection.

Boone County

The 23 sections were distributed among 11 routes. The highest number on any route was four on US 25 and I 75 with three on KY 20 and US 42. Fourteen were in a rural area with nine in an urban area. The highest CRF was on KY 338 adjacent to the interchange with I 71/I 75. The second highest was on KY 18 at its interchange with I71/I 75.

Fayette County

All of the sections were on urban roads with the 21 sections distributed among nine routes. The highest number was five on US 27 followed by three on KY 4, US 60, and I 75. The highest CRF was on I 75 at the US 60 interchange with 27 of the 43 accidents in this section involving a same direction sideswipe collision. The second highest CRF was on KY 1681 around the KY 4 interchange with four of the seven accidents involving a collision with a fixed object.

Floyd County

All of the sections were on rural roads with the 12 sections on seven routes. The highest number was three on KY 194 with two on US 23, KY 122, and KY 979. The highest CRF was on KY 979 (near Grethel) with six of the 11 accidents involving an opposite direction sideswipe.

Hopkins County

All of the sections were on rural roads. Six routes were represented with six of the 12 sections on the Pennyrile Parkway. The most common type of collision at the Pennyrile Parkway locations was a same direction sideswipe (14 of 42 accidents) followed by seven rear end collisions. The largest number of accidents at any one of

these sections was near the KY 281 interchange with eight of the 12 collisions for this section involving a same direction sideswipe.

Kenton County

All of the sections were on urban roads. Six routes were represented with five of the 11 sections on I 75. The highest CRF was for a section of KY 17 in Newport. The most common accident in the section (11 of 37 collisions) involved a bridge and a railroad overpass contained within the section. The second highest CRF was for a section of I 75 at the US 25 interchange. Of 93 collisions in this section, 52 involved a same direction sideswipe while 21 involved a rear end collision.

Letcher County

All of the sections were on rural, two lane roadways. There were locations on four roads with six of the 11 sites on US 119. There were 45 accidents at the US 119 locations which were between milepoints 10 and 17. Twenty-four of the accidents were an opposite direction sideswipe collision with ten involving a collision with a fixed object.

Logan County

The majority of the 11 sections were on rural roadways. There were locations on four roads with four on US 431. A unique situation in this county is there are both US 79 and KY 79 routes and the computer considers the route number and could not assign an accident to either of these specific routes. The location with the highest CRF was on US 431 in Russellville with 16 of 23 accidents at an intersection and eight of those involving an angle collision.

Perry County

All 11 sections were on five rural roads with the highest number of four sections on KY 15. The highest CRF was on KY 15 between milepoints 17 and 18 with nine of the 14 collisions involving either a same direction or opposite direction sideswipe.

Christian County

The ten sections were divided among six roads with six in rural areas. The largest number of sections was four on US 41A. The highest CRF resulted from five accidents on a low volume portion on KY 695. There were two sections which had the highest number of collisions with one having the next highest CRF. One of

these sections was on US 41 in Hopkinsville near the US 41A intersection with the second on US 41 around the I 24 interchange.

Daviess County

Seven of the ten sections were in urban areas. Locations were identified on three roads with seven on US 60. There were four sections, including the two highest CRFs, on US 60 between milepoints 11.5 and 15.4 which extend through Owensboro. Of the 83 accidents in these four sections, 50 were at an intersection with 24 of these involving an angle collision.

Harlan County

All ten of the sections were on rural, two lane roadways. Five routes were represented with four on US 431 and three on US 119. Of the 17 accidents on the four US 431 sites, nine involved an opposite direction sideswipe collision.

Henderson County

The ten sections were equally divided between rural and urban areas. Locations were identified on four roads with four on US 41 and three on US 60. The highest CRF was for two sections on US 41 between milepoints 16 and 18. This is a four lane, urban section with numerous access points and intersections. Of the 68 accidents in these two sections, 24 were rear end and 16 were a sideswipe.

Site visits were made to several of the high accident sections identified across the state. As an aid to the investigation, the high accident locations were sorted in descending order by critical rate factor and highway type. These summaries are given in Appendix C. Also, for each section, a printout of information relating to each accident was made. The specific location and accident description was given to determine if the accidents were occurring at a specific location within the one-mile section and if an accident type pattern could be identified.

The common type of accident occurring at the high accident sections on two-lane, rural roadways was opposite direction sideswipe collisions. These accidents were typically related to restricted pavement width and roadway geometrics. For example, nine sections were identified in an approximate 13-mile section of US 119 in Pike County (between milepoints 10 and 23). Of 93 truck accidents in these sections, 52 (56 percent) were opposite direction sideswipe.

Specific high accident spots within a section were identified in some instances. For example, seven of the nine accidents identified in a section on US

431 in Muhlenberg County occurred at one site which was a narrow bridge. All of the collisions at this location involved an opposite direction sideswipe.

The most frequent types of accidents occurring at the high accident sections on urban interstates were same direction sideswipe and rear end collisions. For example, 93 accidents were identified on I 75 in Kenton County between milepoints 187 and 188 (near the US 25 interchange). Of this number, 52 were same direction sideswipe and 26 were rear end. A total of 112 accidents were located on I 65 in Jefferson County between milepoints 136.2 and 137.1 (near the south end of the Kennedy Bridge). Of this number, 47 were same direction sideswipe and 41 were rear end. These types of accidents were related to merging maneuvers and traffic congestion.

A location on a rural interstate was in Madison County on I 75 between milepoints 81.8 and 82.7. A rest area is located in this section and the accidents have involved same direction sideswipe and rear end collisions and impacts with a parked vehicle.

To illustrate the analysis which can be made of a specific location, following is an analysis of the accidents at the locations with the ten highest CRFs. The limitations of the data are found when individual sections are analyzed in detail. Problems with properly locating accidents and with assigning accurate roadway characteristics, such as traffic volume and number of lanes, were found when the detailed analysis was conducted.

Kenton County; KY 17; Milepoint 22.1 - 23.0

There were 37 truck accidents on this section of urban roadway. The average ADT is 4,855 with a CRF of 9.30. A railroad underpass is located in this section with 11 bridge-related collisions. The second most common collision was at an intersection with ten of this type.

Jefferson County; US 31W; Milepoint 18.6 - 19.6

There were 23 accidents on this section of urban roadway. The high accident rate at this location resulted from the low traffic volume given in the computer file. The actual accident rate would be much lower using a more accurate traffic volume. Twelve of the accidents were at an intersection with ten involving an angle collision.

Hopkins County; KY 70; Milepoint 0.3 - 1.1

There were 11 accidents reported for this section. However, when the accident information was reviewed, it was found that most of the reports had been given the wrong milepoint so this was not actually a high accident location.

Letcher County; US 119; Milepoint 15.0 - 16.0

This was one of several sections along this portion of US 119 which had a high CRF. This is a rural, two lane roadway. Of 14 accidents in this section, eight involved a collision with a fixed object and five were opposite direction sideswipe collisions.

Jefferson County; KY 864; Milepoint 14.9 - 15.9

A low traffic volume resulted in a high accident rate. Of 22 accidents, 13 were at an intersection and nine involved an angle collision. Five were collisions with a parked vehicle.

Johnson County; US 23; Milepoint 4.2 - 5.2

The high rate at this location resulted from a traffic volume which was too low. There were eight accidents with no pattern noted.

Daviess County; US 60; Milepoint 12.6 - 13.6

This is an urban street in Owensboro and was one of several sections of US 60 with a CRF more than one. Of 31 accidents, 16 were at intersections with eight involving an angle collision. There were seven rear end collisions not at an intersection.

Johnson County; US 23; Milepoint 6.1 - 7.0

The high accident rate at this location resulted from a reported traffic volume which was too low. There were seven accidents with no pattern noted.

Pike County; US 119; Milepoint 22.5 - 22.9
Pike County; US 119; Milepoint 20.0 - 20.9

These are two of nine sections on US 119 in Pike County with a CRF of more than one. US 119 is typically a rural, two lane roadway (except for some reconstruction which has occurred at some of the high accident locations). Of the 34 accidents, 21 involved an opposite direction sideswipe collision.

4.0 SUMMARY AND CONCLUSIONS

4.1 Truck Braking Characteristics

The braking tests showed that combination trucks could meet the Federal Motor Carrier Safety Regulation (FMCSR) braking distance and deceleration requirements at 20 mph for weights up to the maximum tested weight of approximately 150,000 pounds. The single unit truck met requirements up to about 98,000 pounds but did not at 120,000 pounds.

The braking distance increased with weight for both the single unit and combination truck. The braking distance decreased as the number of axles was increased for the combination tractor and trailer.

4.2 Truck Accident Analysis

The number of truck accidents has remained fairly stable for the past several years. A comparison of truck accidents with all accidents found several differences. The percentage of truck accidents involving a fatality is higher than all accidents. Considering fatal accidents, there is a higher percentage of truck accidents at intersections due to the higher percentage of angle collisions. For fatal accidents not at an intersection, the major differences were the higher percentage of trucks involved in rear end, head on, same and opposite direction sideswipe, and parked vehicle collisions. The percentage of fatal single vehicle truck accidents was much less than for all accidents.

The detailed analysis of fatal truck accidents revealed common types of accidents. The most common types involved a driver crossing the centerline into the path of the truck or pulling or turning into the path of the truck. The large number of nighttime collisions involving a vehicle either colliding with the rear of a slow-moving or stopped truck or colliding with the side of a trailer as a truck was making a turn shows the importance of lighting and reflective devices on the rear and side of the truck. The rear end collisions show the importance of proper underride devices on the rear of the trailer.

Locations having the highest number or rate of truck accidents were identified. Either specific locations or sections having the highest number of specific types of collisions were identified. The types of collisions included: angle at an intersection, non-intersection rear end , head on, opposite direction sideswipe, fixed object, overturned in road, pedestrian, and parked vehicle. One-mile sections having the highest critical rate factors were located. Pike County had the largest number of sections identified. The characteristics at the high accident locations were analyzed.

5.0 REFERENCES

1. Agent, K.R. and Pigman, J.P.; "Analysis of Traffic Accident Data in Kentucky (1992-1996)," Kentucky Transportation Center, University of Kentucky, KTC-97-18, September 1997.

2. Agent, K.R. and Pigman, J.P.; "Evaluation of Highway Geometrics Related to Large Trucks," Kentucky Transportation Center, University of Kentucky, KTC-91-4, May 1991.

3. Pigman, J.G.; Crabtree, J.D.; Agent, K.R.; Graves, R.C.; and Deacon, J.A.; "Impacts of the Extended-Weight Coal Haul Road System," Kentucky Transportation Center, University of Kentucky, KTC-95-25, December 1995.

TABLE 1. BRAKING DISTANCE USING FIFTH WHEEL DEVICE

VEHICLE TYPE	WEIGHT	BRAKING DISTANCE (FEET) 20 MPH	40 MPH	50 MPH
SU3A	Empty	28	110	
	57,840	30	123	
	98,280	36	179	
	120,680	40	197	
C5A	Empty	29		
	81,120	33	121	252
	120,660	35	140	
	150,180	40		
C6A	Empty	26		
	81,120	31		
	120,660	33	126	
	150,180	36	144	304
C7A	81,120	30		
	120,660	33	114	
	150,180	35	124	
C8A	Empty	25		
	81,120	28	108	
	120,660	32	114	
	150,180	32	110	

TABLE 2. MAXIMUM G VALUES USING VC2000 ACCELEROMETER

VEHICLE TYPE	WEIGHT	MAXIMUM G VALUE 20 MPH	40 MPH	50 MPH
SU3A	Empty	.66	.62	
	57,840	.59	.59	
	98,280	.50	.39	
	120,680	.40	.38	
C5A	Empty	.69		
	81,120	.58	.54	.47
	120,660	.54	.52	
	150,180	.44		
C6A	Empty	.73		
	81,120	.63		
	120,660	.57	.54	.51
	150.180	.52	.46	.44
C7A	81,120	.63		
	120,660	.57	.58	
	150,180	.57	.54	
C8A	Empty	.93		
	81,120	.66	.69	
	120,660	.61	.58	
	150,180	.62	.59	

TABLE 3. AVERAGE G VALUES USING VC2000 ACCELEROMETER

VEHICLE TYPE	WEIGHT	AVERAGE G VALUE		
		20 MPH	40 MPH	50 MPH
SU3A	Empty	.58	.50	
	57,840	.52	.46	
	98,280	.44	.28	
	120,680	.37	.29	
C5A	Empty	.60		
	81,120	.52	.48	.39
	120,660	.49	.41	
	150,180	.41		
C6A	Empty	.63		
	81,120	.55		
	120,660	.52	.47	.42
	150,180	.47	.42	.35
C7A	81,120	.56		
	120,660	.52	.52	
	150,180	.51	.49	
C8A	Empty	.66		
	81,120	.59	.56	
	120,660	.53	.52	
	150,180	.55	.55	

TABLE 4. COMPARISON OF ALL ACCIDENTS TO TRUCK ACCIDENTS

VARIABLE	CATEGORY	PERCENT OF TOTAL ALL ACCIDENTS	PERCENT OF TOTAL TRUCK ACCIDENTS
Severity	Fatal	0.56	1.34
	Injury	27.7	26.3
Aid System	Rural		
	Interstate	2.3	10.2
	Arterial	9.8	19.6
	Collector	17.7	22.0
	Local	9.9	1.7
	Urban		
	Interstate-Expressway	4.1	14.3
	Arterial	33.7	30.6
	Collector	4.9	1.5
	Local	17.5	0.2
Directional Analysis	Intersection		
	Angle	14.7	10.0
	Rear end	10.0	8.8
	Opposing left turn	1.5	1.0
	Fixed object	1.3	1.5
	Same direction sideswipe	2.7	4.3
	Bicycle	0.26	0.0
	Pedestrian	0.26	0.0
	All Intersections	35.3	28.6
	Non-Intersection		
	Rear end	16.8	18.9
	Head on	0.57	0.7
	Same direction sideswipe	5.6	13.9
	Opposite direction sideswipe	9.4	11.2
	Driveway related	0.97	0.65
	Parked vehicle	6.6	3.6
	Pedestrian	0.66	0.26
	Fixed object	10.1	6.2
	Ran off road	5.9	4.7
	Overturned in road	0.93	2.3
	Bicycle	0.27	0.05
	Animal	3.1	1.6
	Bridge	0.17	0.35
	Interchange ramp	0.07	0.19
	Train	0.07	0.07
Driver Seatbelt Usage	Yes	81.1	87.9
Time of Day	Midnight - 5:59 am	7.6	7.6
	6:00 am - 11:59 am	28.9	34.3
	Noon - 5:59 pm	45.0	43.9
	6:00 pm - 11:59 pm	18.5	14.2
Day of Week	Mon - Fri	68.7	86.4
	Sat - Sun	31.3	13.6

TABLE 4. COMPARISON OF ALL ACCIDENTS TO TRUCK ACCIDENTS (continued)

VARIABLE	CATEGORY	PERCENT OF TOTAL ALL ACCIDENTS	PERCENT OF TOTAL TRUCK ACCIDENTS
Month	Dec - Feb	24.3	23.1
	March - May	24.7	24.1
	June - August	24.5	25.9
	Sept - Nov	26.5	26.9
Number of Vehicles	One	24.8	19.2
	Two	69.3	73.3
	More than two	5.8	7.5
Land Use	Rural	30.0	43.9
	Business	32.4	31.0
	Industrial	0.70	1.2
	Residential	19.4	6.9
	School	1.4	0.60
	Park	0.20	0.09
	Private Property	0.30	0.23
	Limited Access	4.3	16.1
Road Surface Conditions	Dry	71.7	74.4
	Wet	22.1	18.8
	Snow/Ice	5.9	6.4
	Slush	0.20	0.23
	Muddy	0.10	0.14
Weather	Clear	59.2	61.4
	Raining	15.7	13.7
	Snowing	3.3	4.0
	Fog/Smog/Smoke	0.80	1.1
	Sleet/Hail	0.60	0.87
	Cloudy	20.5	18.9
Road Character	Straight & Level	60.2	57.3
	Straight & Grade	17.5	19.2
	Straight & Hillcrest	3.8	3.2
	Curve & Level	8.5	8.5
	Curve & Grade	8.5	10.4
	Curve & Hillcrest	1.6	1.4
Light Condition	Daylight	72.4	78.0
	Dawn	1.7	2.0
	Dusk	2.6	1.6
	Darkness-lighted/on	11.0	6.9
	Darkness-lighted/off	0.8	10.4
	Darkness-not lighted	11.5	1.4
Speed Limit (mph)	35 or less	48.7	24.4
	40 to 45	16.7	16.8
	50 to 55	27.7	42.1
	Over 55	3.7	14.4

TABLE 4. COMPARISON OF ALL ACCIDENTS TO TRUCK ACCIDENTS (continued)

VARIABLE	CATEGORY	PERCENT OF TOTAL ALL ACCIDENTS	PERCENT OF TOTAL TRUCK ACCIDENTS
Type Accident 1st event			
Collision with Non-fixed object			
	Other Vehicle	75.0	80.3
	Pedestrian	0.92	0.29
	Bicycle	0.54	0.07
	Animal	0.48	0.37
	Train	0.07	0.07
	Deer	2.63	1.2
Collision with Fixed object			
	Utility pole	1.8	1.3
	Guard rail	1.4	1.6
	Crash cushion	0.04	0.03
	Sign post	0.62	0.56
	Tree	2.2	0.65
	Building/wall	0.36	0.19
	Curbing	0.43	0.16
	Fence	1.6	0.51
	Bridge	0.37	0.74
	Culvert/head wall	0.60	0.35
	Median/barrier	0.46	0.40
	Snow embankment	0.06	0.07
	Earth embankment/rock cut/ditch	4.7	3.3
	Fire hydrant	0.14	0.14
	Guardrail end treatment	0.25	0.34
	Other fixed objects	1.1	0.79
Non-collision			
	Overturned	0.97	2.5
	Fire/explosion	0.21	0.25
	Submersion	0.02	0.00
	Ran off roadway	1.7	1.8
	Other	0.78	1.4
Contributing Factors (Percent of all accidents in which listed as factor)			
Human			
	Unsafe speed	7.9	7.3
	Failure to yield right of way	16.1	14.6
	Following too closely	5.8	5.6
	Inproper passing	1.3	1.9
	Disregard traffic control	3.3	2.1
	Improper turn	2.4	3.2
	Alcohol involvement	4.7	2.1
	Drug	0.33	0.23
	Sick	0.17	0.13
	Fell asleep	1.3	1.6
	Lost consciousness	0.28	0.24
	Driver inattention	33.1	34.3
	Distraction	2.1	1.9
	Physical Disability	0.23	0.17
Vehicular			
	Defective brakes	1.4	2.1
	Lighting defective	0.25	0.45
	Steering defective	0.48	0.38
	Tire problem	0.80	1.5
	Tow hitch defective	0.10	0.36
	Load problem	0.30	2.0
Environmental			
	Animal action	3.5	1.9
	Glare	0.85	0.57
	View obstruction	3.4	3.5
	Debris in roadway	0.67	1.1
	Improper/non-working traffic control	0.12	0.09
	Defective shoulder	0.20	0.54
	Hole/bump	0.15	0.22
	Road construction	0.46	1.6
	Improperly parked vehicle	0.31	0.45
	Fixed object	0.18	0.24
	Slippery surface	12.9	11.7
	Water pooling	1.0	0.84

TABLE 5. COMPARISON OF ALL FATAL ACCIDENTS TO FATAL TRUCK ACCIDENTS

VARIABLE	CATEGORY	PERCENT OF TOTAL ALL ACCIDENTS	PERCENT OF TOTAL TRUCK ACCIDENTS
Aid System	Rural		
	Interstate	5.8	13.5
	Arterial	49.7	57.4
	Collector	14.3	7.1
	Local	9.2	3.7
	Off-Street	0.06	0.02
	Urban		
	Interstate-Expressway	3.3	12.5
	Arterial	15.4	4.4
	Collector	0.37	0.34
	Local	1.7	1.0
	Parking Lot	0.14	0.00
Directional Analysis	Intersection		
	Angle	9.9	13.2
	Rear end	0.73	1.7
	Opposing left turn	0.28	0.34
	Fixed object	0.18	0.00
	Same direction sideswipe	0.23	0.68
	Bicycle	0.14	0.00
	Pedestrian	0.83	0.68
	All intersection accidents	13.5	18.2
	Non-Intersection		
	Rear end	3.8	13.2
	Head on	8.0	0.00
	Same direction sideswipe	1.8	5.4
	Opposing Direction sideswipe	10.7	17.9
	Driveway related	2.1	2.4
	Parked vehicle	1.1	3.7
	Pedestrian	7.1	6.8
	Fixed object	25.6	4.1
	Ran off road	14.1	2.0
	Overturned in road	4.00	3.7
	Bicycle	0.60	0.00
	Animal	0.28	0.00
	Train	0.60	0.00
Driver Seatbelt Usage	Yes	46.7	59.0
Time of Day	Midnight - 5:59 am	16.7	16.9
	6:00 am - 11:59 am	21.0	30.4
	Noon - 5:59 pm	33.2	35.1
	6:00 pm - 11:59 pm	29.1	17.6
Day of Week	Mon - Fri	69.1	83.8
	Sat - Sun	30.9	16.2
Month	Dec - Feb	22.2	27.0
	March - May	24.3	19.3
	June - August	25.4	24.7
	Sept- Nov	28.1	29.1

TABLE 5. COMPARISON OF ALL FATAL ACCIDENTS TO FATAL TRUCK ACCIDENTS (continued)

VARIABLE	CATEGORY	PERCENT OF TOTAL ALL ACCIDENTS	PERCENT OF TOTAL TRUCK ACCIDENTS
Number of Vehicles	One	53.7	16.3
	Two	39.4	70.8
	More than two	7.0	13.2
Land Use	Rural	69.3	70.8
	Business	12.0	13.2
	Industrial	0.55	0.68
	Residential	10.0	4.1
	School	0.55	0.34
	Park	0.18	0.00
	Private Property	0.41	0.34
	Limited Access	6.9	10.5
Road Surface Conditions	Dry	78.1	79.7
	Wet	18.1	15.2
	Snow/Ice	3.4	4.7
	Slush	0.09	0.34
	Muddy	0.05	0.00
Weather	Clear	62.1	62.4
	Raining	11.6	10.2
	Snowing	2.2	4.7
	Fog/Smog/Smoke	2.5	3.7
	Sleet/Hail	0.69	0.34
	Cloudy	20.8	18.6
Road Character	Straight & Level	39.0	46.4
	Straight & Grade	18.8	22.4
	Straight & Hillcrest	4.5	4.1
	Curve & Level	16.9	8.8
	Curve & Grade	17.8	15.6
	Curve & Hillcrest	3.0	2.7
Light Condition	Daylight	54.1	60.5
	Dawn	2.6	3.0
	Dusk	2.8	1.0
	Darkness-lighted/on	7.1	6.1
	Darkness-lighted/off	0.97	1.0
	Darkness-not lighted	32.4	28.4
Speed Limit (mph)	35 or less	14.5	8.8
	40 to 45	9.0	6.8
	50 to 55	65.2	64.2
	Over 55	9.0	19.3

TABLE 5. COMPARISON OF ALL FATAL ACCIDENTS TO FATAL TRUCK ACCIDENTS (continued)

VARIABLE	CATEGORY	PERCENT OF TOTAL ALL ACCIDENTS	PERCENT OF TOTAL TRUCK ACCIDENTS
Type Accident 1st event			
Collision with Non-fixed object			
	Other Vehicle	45.2	83.1
	Pedestrian	7.9	7.4
	Bicycle	0.73	0.00
	Animal	0.23	0.00
	Train	0.60	0.00
	Deer	0.05	0.00
Collision with Fixed object			
	Utility pole	2.8	0.00
	Guard rail	2.3	1.0
	Crash cushion	0.05	0.00
	Sign post	1.1	0.68
	Tree	10.5	0.68
	Building/wall	0.23	0.00
	Curbing	0.37	0.00
	Fence	1.4	0.34
	Bridge	16.5	0.34
	Culvert/head wall	2.3	0.34
	Median/barrier	0.50	0.00
	Snow embankment	0.05	0.00
	Earth embankment/rock cut/ditch	10.8	2.0
	Fire hydrant	0.00	0.00
	Guardrail end treatment	0.96	0.00
	Other fixed objects	1.5	0.00
Non-collision			
	Overturned	3.9	3.7
	Fire/explosion	0.00	0.00
	Submersion	0.18	0.00
	Ran off roadway	3.4	0.00
	Other	1.0	0.34
Contributing Factors (Percent of all accidents in which listed as factor)			
Human			
	Unsafe speed	25.9	15.9
	Failure to yield right of way	17.4	26.7
	Following too closely	0.32	0.68
	Inproper passing	2.0	2.0
	Disregard traffic control	4.7	6.4
	Improper turn	0.46	1.4
	Alcohol involvement	20.9	9.1
	Drug	1.7	1.4
	Sick	0.41	0.34
	Fell asleep	4.9	4.7
	Lost consciousness	1.1	1.0
	Driver inattention	20.2	25.7
	Distraction	1.7	2.4
	Physical Disability	0.46	0.68
Vehicular			
	Defective brakes	0.87	2.0
	Lighting defective	0.73	2.7
	Steering defective	0.50	0.34
	Tire problem	2.3	2.0
	Tow hitch defective	0.14	0.00
	Load problem	2.0	1.0
Environmental			
	Animal action	0.55	0.34
	Glare	0.92	1.7
	View obstruction	3.8	4.1
	Debris in roadway	0.55	1.7
	Improper/non-working traffic control	0.00	0.00
	Defective shoulder	0.37	0.00
	Hole/bump	0.50	0.00
	Road construction	0.14	0.00
	Improperly parked vehicle	0.29	1.0
	Fixed object	0.14	0.00
	Slippery surface	11.0	13.9
	Water pooling	1.4	1.0

TABLE 6. COMPARISON OF TRUCK ACCIDENTS BY HIGHWAY TYPE

		PERCENT OF TOTAL					
		RURAL ACCIDENTS			URBAN ACCIDENTS		
VARIABLE	CATEGORY	2-LANE	4-LANE	INTERSTATE	2-LANE	4-LANE	INTERSTATE
Severity	Fatal	2.0	3.6	2.1	0.51	0.28	0.59
	Injury	30.8	30.0	27.1	20.8	21.5	24.9
Directional Analysis	Intersection						
	Angle	7.9	13.7	1.0	19.3	17.9	1.7
	Rear end	4.7	9.3	1.4	13.8	18.3	6.7
	Opposing left turn	1.4	1.3	0.10	1.3	1.0	0.15
	Fixed object	1.2	0.83	0.35	3.4	1.9	0.93
	Same direction sideswipe	2.3	4.5	0.89	4.8	10.8	6.7
	Bicycle	0.0	0.10	0.0	0.07	0.06	0.0
	Pedestrian	0.03	0.0	0.05	0.04	0.06	0.0
	All Intersections	21.0	32.0	4.5	47.4	50.9	18.0
	Non-Intersection						
	Rear end	15.0	16.6	23.3	18.1	20.1	25.9
	Head on	1.3	0.83	0.05	0.65	0.19	0.26
	Same direction sideswipe	6.0	15.3	29.8	5.8	10.8	35.4
	Opposite direction sideswipe	22.2	9.3	2.3	8.7	6.4	1.7
	Driveway related	0.97	0.52	0.35	0.72	0.78	0.04
	Parked vehicle	3.6	3.1	4.6	5.5	2.5	1.9
	Pedestrian	0.23	0.41	0.35	0.18	0.31	0.26
	Fixed object	7.8	4.6	8.8	5.4	3.1	4.1
	Ran off road	9.0	3.6	5.6	1.8	0.67	1.4
	Overturned in road	3.9	2.9	2.4	0.91	0.64	1.2
	Bicycle	0.04	0.10	0.0	0.11	0.06	0.04
	Animal	1.8	1.7	4.0	0.40	0.17	0.93
	Bridge	0.30	0.0	0.10	0.83	0.47	0.11
	Interchange ramp	0.04	0.10	0.25	0.0	0.17	0.78
	Train	0.07	0.41	0.0	0.14	0.06	0.0
Driver Seatbelt Usage	Yes	81.7	84.9	92.7	87.3	91.4	94.8
Time of Day	Midnight - 5:59 am	6.4	9.2	17.9	3.9	4.4	9.1
	6:00 am - 11:59 am	35.6	33.1	27.7	37.2	35.4	31.4
	Noon - 5:59 pm	45.1	43.7	33.1	47.7	48.6	41.3
	6:00 pm - 11:59 pm	12.9	14.0	21.3	11.2	11.5	18.1
Day of Week	Mon - Fri	87.4	90.3	79.5	87.9	88.3	83.9
	Sat - Sun	12.6	9.7	20.5	12.1	11.7	16.1

.BLE 6. COMPARISON OF TRUCK ACCIDENTS BY HIGHWAY TYPE (continued)

PERCENT OF TOTAL

.RIABLE	CATEGORY	RURAL ACCIDENTS 2-LANE	4-LANE	INTERSTATE	URBAN ACCIDENTS 2-LANE	4-LANE	INTERSTATE
.nth	Dec - Feb	22.2	25.4	25.4	20.6	23.3	24.9
	March - May	23.5	23.0	26.1	24.3	22.8	25.6
	June - August	27.3	24.0	23.0	27.9	25.8	23.7
	Sept - Nov	27.0	27.6	25.4	27.2	28.2	25.9
.mber of Vehicles	One	26.7	16.9	26.3	14.6	8.3	10.4
	Two	68.0	77.5	66.4	78.2	82.9	76.1
	More than two	5.3	5.6	7.3	7.2	8.8	13.5
.ad Surface Conditions	Dry	74.3	76.4	70.0	75.8	75.6	73.6
	Wet	19.6	16.6	15.0	19.9	20.7	17.8
	Snow/Ice	5.4	6.3	14.8	4.0	3.4	8.2
	Slush	0.14	0.31	0.54	0.18	0.19	0.26
	Muddy	0.37	0.10	0.0	0.04	0.0	0.04
eather	Clear	63.4	61.7	58.0	61.7	59.7	59.7
	Raining	13.5	12.3	12.3	14.8	15.0	13.8
	Snowing	3.3	4.2	9.5	2.2	2.4	4.8
	Fog/Smog/Smoke	1.8	2.9	1.4	0.33	0.36	0.41
	Sleet/Hail	0.62	0.93	2.6	0.25	0.31	1.4
	Cloudy	17.1	17.6	16.1	20.6	22.1	19.7
.ad Character	Straight & Level	44.2	56.2	55.4	67.2	71.7	58.0
	Straight & Grade	17.0	21.5	32.4	17.3	18.2	17.1
	Straight & Hillcrest	4.7	4.7	2.7	3.5	2.2	1.6
	Curve & Level	14.7	8.0	2.7	5.7	3.1	9.3
	Curve & Grade	16.7	7.7	6.2	5.2	4.2	12.3
	Curve & Hillcrest	2.7	1.4	0.50	0.69	0.39	1.4
ght Condition	Daylight	80.3	76.1	59.4	86.0	83.4	71.8
	Dawn	2.1	3.1	2.5	1.5	1.6	1.9
	Dusk	1.6	1.3	2.0	1.2	1.5	2.0
	Darkness-lighted/on	2.2	3.7	5.5	7.2	9.8	17.7
	Darkness-lighted/off	0.39	1.3	1.1	0.51	0.64	0.97
	Darkness-not lighted	13.1	14.0	29.2	3.3	2.7	5.4

TABLE 6. COMPARISON OF TRUCK ACCIDENTS BY HIGHWAY TYPE (continued)

		PERCENT OF TOTAL					
		RURAL ACCIDENTS			URBAN ACCIDENTS		
VARIABLE	CATEGORY	2-LANE	4-LANE	INTERSTATE	2-LANE	4-LANE	INTERSTATE
Type Accident 1st event							
	Collision with Non-fixed object						
	Other Vehicle	72.7	82.7	73.0	85.2	91.4	89.1
	Pedestrian	0.26	0.41	0.40	0.22	0.36	0.26
	Bicycle	0.04	0.01	0.0	0.18	0.11	0.0
	Animal	0.72	0.21	0.40	0.14	0.06	0.07
	Train	0.07	0.41	0.0	0.14	0.06	0.0
	Deer	1.1	1.4	3.6	0.29	0.17	0.82
	Collision with Fixed object						
	Utility pole	1.3	0.31	0.54	2.7	1.5	0.56
	Guard rail	1.5	1.2	3.9	0.62	0.39	1.7
	Crash cushion	0.01	0.0	0.0	0.0	0.0	0.19
	Sign post	0.50	0.72	0.69	0.76	0.56	0.33
	Tree	1.2	0.41	0.49	0.58	0.19	0.04
	Building/wall	0.23	0.21	0.15	0.36	0.56	0.11
	Curbing	0.11	0.0	0.10	0.36	0.22	0.04
	Fence	1.1	0.01	0.20	0.36	0.08	0.07
	Bridge	0.49	0.52	0.44	1.60	1.3	0.15
	Culvert/head wall	0.80	0.31	0.10	0.18	0.03	0.11
	Median/barrier	0.03	0.31	0.54	0.0	0.11	1.6
	Snow embankment	0.0	0.0	0.35	0.04	0.06	0.11
	Earth embankment/rock cut/ditch	6.5	2.3	3.3	1.3	0.42	0.86
	Fire hydrant	0.10	0.21	0.05	0.40	0.22	0.0
	Guardrail end treatment	0.33	0.31	0.99	0.0	0.14	0.19
	Other fixed objects	1.1	0.41	0.30	1.4	0.67	0.04
	Non-collision						
	Overturned	4.2	3.2	2.5	0.98	0.83	1.4
	Fire/explosion	0.20	0.21	0.94	0.0	0.0	0.04
	Submersion	0.0	0.0	0.0	0.0	0.0	0.0
	Ran off roadway	3.1	1.2	2.5	0.94	0.22	0.74
	Other	1.5	2.1	2.6	1.2	0.72	0.82
Contributing Factors (Percent of all accidents in which listed as factor)							
	Human						
	Unsafe speed	9.6	7.3	11.7	3.3	3.4	6.7
	Failure to yield right of way	14.2	17.7	12.5	12.9	16.3	17.1
	Following too closely	3.6	3.8	4.5	5.9	8.1	8.1
	Inproper passing	2.7	0.93	2.2	1.8	1.2	1.1
	Disregard traffic control	1.5	2.6	0.30	3.5	4.4	0.56
	Improper turn	2.4	3.4	0.79	6.2	5.4	1.1
	Alcohol involvement	2.4	2.6	2.4	1.7	1.8	1.9
	Drug	0.20	0.31	0.25	0.22	0.06	0.33
	Sick	0.13	0.10	0.25	0.11	0.03	0.15
	Fell asleep	1.1	1.8	5.8	0.29	0.28	1.4
	Lost consciousness	0.21	0.31	0.35	0.25	0.14	0.26
	Driver inattention	34.5	37.3	30.5	41.6	39.1	23.4
	Distraction	2.0	1.7	2.9	1.8	1.3	2.0
	Physical Disability	0.16	0.0	0.15	0.36	0.14	0.19

\BLE 6. COMPARISON OF TRUCK ACCIDENTS BY HIGHWAY TYPE (continued)

\RIABLE	CATEGORY	PERCENT OF TOTAL					
		RURAL ACCIDENTS			URBAN ACCIDENTS		
		2-LANE	4-LANE	INTERSTATE	2-LANE	4-LANE	INTERSTATE
)ntributing Factors ercent of all accidents in)ich listed as factor)							
Vehicular							
	Defective brakes	2.6	1.4	1.4	2.3	2.4	0.82
	Lighting defective	0.92	0.21	0.25	0.29	0.17	0.11
	Steering defective	0.44	0.31	0.69	0.18	0.11	0.37
	Tire problem	1.5	1.7	4.5	0.58	0.47	1.7
	Tow hitch defective	0.41	0.31	0.84	0.22	0.06	0.22
	Load problem	3.0	2.2	2.1	1.2	1.2	1.5
Environmental							
	Animal action	2.3	2.3	4.6	0.58	0.36	0.74
	Glare	0.77	0.72	0.15	0.91	0.44	0.26
	View obstruction	4.6	3.9	1.8	4.1	2.8	2.7
	Debris in roadway	0.93	1.8	3.3	0.43	0.17	1.7
	Improper/non-working traffic control	0.09	0.10	0.0	0.14	0.14	0.04
	Defective shoulder	1.3	0.10	0.05	0.36	0.11	0.04
	Hole/bump	0.27	0.10	0.25	0.25	0.06	0.26
	Road construction	0.70	0.93	2.2	0.51	0.75	5.6
	Improperly parked vehicle	0.44	0.41	0.79	0.33	0.42	0.22
	Fixed object	0.29	0.21	0.10	0.33	0.22	0.22
	Slippery surface	12.3	11.9	18.0	8.9	8.4	11.9
	Water pooling	0.69	1.20	1.7	0.40	0.50	1.2

Table 7. ONE-MILE SECTIONS WITH CRF 1.0 OR ABOVE

	NUMBER OF SECTIONS								
	TYPE OF HIGHWAY								
	RURAL				URBAN				
COUNTY	TWO LANE	FOUR LANE	INTER.	PKWY.	TWO LANE	FOUR LANE	INTER.	PKWY.	TOTAL
Adair	1	0	0	0	0	0	0	0	1
Allen	1	0	0	0	0	0	0	0	1
Anderson	2	1	0	2	0	0	0	0	5
Ballard	6	0	0	0	0	0	0	0	6
Barren	1	0	1	0	0	1	0	0	3
Bath	0	0	1	0	0	0	0	0	1
Bell	1	2	0	0	0	2	0	0	5
Boone	11	0	3	0	4	3	2	0	23
Bourbon	1	0	0	0	1	0	0	0	2
Boyd	1	2	0	0	2	3	0	0	8
Boyle	5	0	0	0	2	1	0	0	8
Bracken	2	0	0	0	0	0	0	0	2
Breathitt	2	0	0	0	0	0	0	0	2
Breckinridge	0	0	0	0	0	0	0	0	0
Bullitt	3	0	1	0	0	1	0	0	5
Butler	1	0	0	0	0	0	0	0	1
Caldwell	0	0	0	0	1	0	0	0	1
Calloway	1	0	0	0	1	0	0	0	2
Campbell	1	0	0	0	5	2	0	0	8
Carlisle	0	0	0	0	0	0	0	0	0
Carroll	2	0	1	0	0	0	0	0	3
Carter	2	0	0	0	0	0	0	0	2
Casey	0	0	0	0	0	0	0	0	0
Christian	3	2	0	1	2	1	0	0	9
Clark	0	0	0	0	2	0	0	0	2
Clay	1	0	0	0	0	0	0	0	1
Clinton	0	0	0	0	0	0	0	0	0
Crittenden	2	0	0	0	0	0	0	0	2
Cumberland	0	0	0	0	0	0	0	0	0
Daviess	3	0	0	0	5	2	0	0	10
Edmonson	0	0	0	0	0	0	0	0	0
Elliott	0	0	0	0	0	0	0	0	0
Estill	0	0	0	0	0	0	0	0	0
Fayette	0	0	0	0	3	13	3	0	19
Fleming	0	0	0	0	0	0	0	0	0
Floyd	9	3	0	0	0	0	0	0	12
Franklin	2	0	4	0	0	1	0	0	7
Fulton	0	0	0	0	0	0	0	0	0
Gallatin	1	0	2	0	0	0	0	0	3
Garrard	0	0	0	0	0	0	0	0	0

Table 7. ONE-MILE SECTIONS WITH CRF 1.0 OR ABOVE (continued)

	NUMBER OF SECTIONS								
	TYPE OF HIGHWAY								
	RURAL				URBAN				
COUNTY	TWO LANE	FOUR LANE	INTER.	PKWY.	TWO LANE	FOUR LANE	INTER.	PKWY.	TOTAL
Grant	1	1	2	0	0	0	0	0	4
Graves	6	0	0	0	0	0	0	0	6
Grayson	1	0	0	2	0	0	0	0	3
Green	0	0	0	0	0	0	0	0	0
Greenup	1	0	0	0	0	0	0	0	1
Hancock	1	0	0	0	0	0	0	0	1
Hardin	4	0	0	0	0	2	2	0	8
Harlan	10	0	0	0	0	0	0	0	10
Harrison	3	0	0	0	2	0	0	0	5
Hart	0	0	1	0	0	0	0	0	1
Henderson	4	0	0	1	1	4	0	0	10
Henry	1	0	2	0	0	0	0	0	3
Hickman	0	0	0	0	0	0	0	0	0
Hopkins	5	0	0	6	0	0	0	1	12
Jackson	0	0	0	0	0	0	0	0	0
Jefferson	0	0	0	0	14	27	12	0	53
Jessamine	2	0	0	0	1	0	0	0	3
Johnson	1	2	0	0	0	0	0	0	3
Kenton	0	0	0	0	4	2	5	0	11
Knott	3	0	0	0	0	0	0	0	3
Knox	0	0	0	0	0	0	0	0	0
Larue	0	0	0	0	0	0	0	0	0
Laurel	2	0	1	0	1	2	0	1	7
Lawrence	0	4	0	0	0	0	0	0	4
Lee	0	0	0	0	0	0	0	0	0
Leslie	3	0	0	0	0	0	0	0	3
Letcher	11	0	0	0	0	0	0	0	11
Lewis	0	0	0	0	0	0	0	0	0
Lincoln	2	0	0	0	0	0	0	0	2
Livingston	1	0	0	0	0	0	0	0	1
Logan	5	2	0	0	4	0	0	0	11
Lyon	0	1	1	2	0	0	0	0	4
McCracken	0	0	0	0	1	1	0	0	2
McCreary	0	0	0	0	0	0	0	0	0
McLean	0	0	0	0	0	0	0	0	0
Madison	1	0	5	0	1	1	1	0	9
Magoffin	1	0	0	0	0	0	0	0	1
Marion	1	0	0	0	1	0	0	0	2
Marshall	2	0	0	0	0	0	0	0	2
Martin	5	1	0	0	0	0	0	0	6

Table 7. ONE-MILE SECTIONS WITH CRF 1.0 OR ABOVE (continued)

	NUMBER OF SECTIONS								
	TYPE OF HIGHWAY								
	RURAL				URBAN				
COUNTY	TWO LANE	FOUR LANE	INTER.	PKWY.	TWO LANE	FOUR LANE	INTER.	PKWY.	TOTAL
Mason	1	0	0	0	0	0	0	0	1
Meade	0	0	0	0	0	0	0	0	0
Menifee	0	0	0	0	0	0	0	0	0
Mercer	1	0	0	0	0	1	0	0	2
Metcalfe	0	0	0	0	0	0	0	0	0
Monroe	0	0	0	0	0	0	0	0	0
Montgomery	0	0	1	0	0	0	0	0	1
Morgan	0	0	0	0	0	0	0	0	0
Muhlenberg	5	1	0	0	0	0	0	0	6
Nelson	0	0	0	0	0	0	0	0	0
Nicholas	0	0	0	0	0	0	0	0	0
Ohio	3	0	0	2	0	0	0	0	5
Oldham	1	0	1	0	0	0	0	0	2
Owen	5	0	0	0	0	0	0	0	5
Owsley	0	0	0	0	0	0	0	0	0
Pendleton	0	0	0	0	0	0	0	0	0
Perry	10	1	0	0	0	0	0	0	11
Pike	61	2	0	0	0	0	0	0	63
Powell	0	0	0	0	0	0	0	0	0
Pulaski	3	0	0	0	2	1	0	0	6
Robertson	0	0	0	0	0	0	0	0	0
Rockcastle	0	0	0	0	0	0	0	0	0
Rowan	3	0	0	0	0	0	0	0	3
Russell	0	0	0	0	0	0	0	0	0
Scott	1	1	1	0	0	0	0	0	3
Shelby	0	0	1	0	1	1	0	0	3
Simpson	5	0	1	0	1	0	0	0	7
Spencer	0	0	0	0	0	0	0	0	0
Taylor	1	0	0	0	0	0	0	0	1
Todd	2	0	0	0	0	0	0	0	2
Trigg	3	0	0	0	0	0	0	0	3
Trimble	0	0	0	0	0	0	0	0	0
Union	5	0	0	0	0	0	0	0	5
Warren	1	0	0	1	1	6	0	0	9
Washington	2	0	0	0	0	0	0	0	2
Wayne	0	0	0	0	0	0	0	0	0
Webster	0	0	0	1	0	0	0	0	1
Whitley	2	0	3	0	1	0	0	0	6
Wolfe	1	0	0	0	0	0	0	0	1
Woodford	1	0	0	0	0	0	0	0	1
Total	259	26	33	18	64	78	25	2	505

APPENDIX A. FMVSS NO. 121 AND FMCSR PART 393.52

TITLE 49--TRANSPORTATION

CHAPTER V--NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION, DEPARTMENT OF TRANSPORTATION

PART 571--FEDERAL MOTOR VEHICLE SAFETY STANDARDS

Subpart B--Federal Motor Vehicle Safety Standards

Sec 571.121 Standard No. 121.; Air brake systems.

S1. Scope. This standard establishes performance and equipment requirements for braking systems on vehicles equipped with air brake systems.

S2. Purpose. The purpose of this standard is to insure safe braking performance under normal and emergency conditions.

S3. Application. This standard applies to trucks, buses, and trailers equipped with air brake systems. However, it does not apply to:

(a) Any trailer that has a width of more than 102.36 inches with extendable equipment in the fully retracted position and is equipped with two short track axles in a line across the width of the trailer.

(b) Any vehicle equipped with an axle that has a gross axle weight rating (GAWR) of 29,000 pounds or more;

(c) Any truck or bus that has a speed attainable in 2 miles of not more than 33 mph;

(d) Any truck that has a speed attainable in 2 miles of not more than 45 mph, an unloaded vehicle weight that is not less than 95 percent of its gross vehicle weight rating (GVWR), and no capacity to carry occupants other than the driver and operating crew;

(e) Any trailer that has a GVWR of more than 120,000 pounds and whose body conforms to that described in the definition of heavy hauler trailer set forth in S4;

(f) Any trailer that has an unloaded vehicle weight which is not less than 95 percent of its GVWR; and

(g) Any load divider dolly.

S5.3 Service brakes--road tests. The service brake system on each truck tractor manufactured before March 1, 1997, shall, under the conditions of S6, meet the requirements of S5.3.3 and S5.3.4, when tested without adjustments other than those specified in this standard. The service brake system on each truck tractor manufactured on or after March 1, 1997, shall, under the conditions of S6, meet the requirements of S5.3.1, S5.3.3, S5.3.4, and S5.3.6, when tested without adjustments other than those specified in this standard. The service brake system on each bus and truck (other than a truck tractor) manufactured before March 1, 1998, shall, under the conditions of S6, meet the requirements of S5.3.3, and S5.3.4, when tested without adjustments other than those specified in this standard. The service brake system on each bus and truck (other than a truck tractor) manufactured on or after March 1, 1998, shall, under the conditions of S6, meet the requirements of S5.3.1, S5.3.3, and S5.3.4 when tested without adjustments other than those specified in this standard. The service brake system on each trailer shall, under the conditions of S6, meet the requirements of S5.3.3, S5.3.4, and S5.3.5 when tested without adjustments other than those specified in this standard. However, a heavy hauler trailer and the truck and trailer portions of an auto transporter need not meet the requirements of S5.3.

S5.3.1 Stopping distance--trucks and buses. When stopped six times for each combination of vehicle type, weight, and speed specified in S5.3.1.1, in the sequence specified in Table I, each truck tractor manufactured on or after March 1, 1997, and each single unit vehicle manufactured on or after March 1, 1998, shall stop at least once in not more than the distance specified in Table II, measured from the point at which movement of the service brake control begins, without any part of the vehicle leaving the roadway, and with wheel lockup permitted only as follows:

(a) At vehicle speeds above 20 mph, any wheel on a nonsteerable axle other than the two rearmost nonliftable, nonsteerable axles may lock up, for any duration. The wheels on the two rearmost nonliftable, nonsteerable axles may lock up according to S5.3.1(b).

(b) At vehicle speeds above 20 mph, one wheel on any axle or two wheels on any tandem may lock up for any duration.

(c) At vehicle speeds above 20 mph, any wheel not permitted to lock in S5.3.1 (a) or (b) may lock up repeatedly, with each lockup occurring for a duration of one second or less.

(d) At vehicle speeds of 20 mph or less, any wheel may lock up for any duration.

S5.3.1.1 Stop the vehicle from 60 mph on a surface with a peak friction coefficient of 0.9 with the vehicle loaded as follows:

(a) Loaded to its GVWR,

(b) In the truck tractor only configuration plus up to 500 lbs., and

(c) At its unloaded vehicle weight (except for truck tractors) plus up to 500 lbs. (including driver and instrumentation). If the speed attainable in two miles is less than 60 mph, vehicle shall stop from a speed in Table II that is 4 to 8 mph less than the speed attainable in 2 miles.

S5.7.1 Emergency brake system performance. When stopped six times for each combination of weight and speed specified in S5.3.1.1, except for a loaded truck tractor with an unbraked control trailer, on a road surface having a PFC of 0.9, with a single failure in the service brake system of a part designed to contain compressed air or brake fluid (except failure of a common valve, manifold, brake fluid housing, or brake chamber housing), the vehicle shall stop at least once in not more than the distance specified in Column 5 of Table II, measured from the point at which movement of the service brake control begins, except that a truck-tractor tested at its unloaded vehicle weight plus up to 500 pounds shall stop at least once in not more than the distance specified in Column 6 of Table II. The stop shall be made without any part of the vehicle leaving the roadway, and with unlimited wheel lockup permitted at any speed.

Table I--Stopping Sequence

1. Burnish.
2. Stops on a peak friction coefficient surface of 0.5:
   (a) With the vehicle at gross vehicle weight rating (GVWR), stop the vehicle from 30 mph using the service brake, for a truck tractor with a loaded unbraked control trailer.
   (b) With the vehicle at unloaded weight plus up to 500 lbs., stop the vehicle from 30 mph using the service brake, for a truck tractor.
3. Manual adjustment of the service brakes allowed for truck tractors, within the limits recommended by the vehicle manufacturer.
4. Other stops with vehicle at GVWR:
   (a) 60 mph service brake stops on a peak friction coefficient surface of 0.9, for a truck tractor with a loaded unbraked control trailer, or for a single-unit vehicle.
   (b) 60 mph emergency brake stops on a peak friction coefficient of 0.9, for a single-unit vehicle. Truck tractors are not required to be tested in the loaded condition.
5. Parking brake test with the vehicle loaded to GVWR.
6. Manual adjustment of the service brakes allowed for truck tractors and single-unit vehicles, within the limits recommended by the vehicle manufacturer.
7. Other stops with the vehicle at unloaded weight plus up to 500 lbs.:
   (a) 60 mph service brake stops on a peak friction coefficient surface of 0.9, for a truck tractor or for a single-unit vehicle.
   (b) 60 mph emergency brake stops on a peak friction coefficient of 0.9, for a truck tractor or for a single-unit vehicle.
8. Parking brake test with the vehicle at unloaded weight plus up to 500 lbs.
9. Final inspection of service brake system for condition of adjustment.

Table II--Stopping Distance in Feet

Vehicle speed in miles per hour	Service brake			Emergency brake		
	PFC 0.9	PFC 0.9	PFC 0.9	PFC 0.9	PFC 0.9	PFC 0.9
	(1)	(2)	(3)	(4)	(5)	(6)
20	32	35	38	40	83	85
25	49	54	59	62	123	131
30	70	78	84	89	170	186
35	96	106	114	121	225	250
40	125	138	149	158	288	325
45	158	175	189	200	358	409
50	195	216	233	247	435	504
55	236	261	281	299	520	608
60	280	310	335	355	613	720

Note: (1) Loaded and unloaded buses; (2) Loaded single unit trucks; (3) Unloaded truck tractors and single unit trucks; (4) Loaded truck tractors tested with an unbraked control trailer; (5) All vehicles except truck tractors; (6) Unloaded truck tractors.

TITLE 49--TRANSPORTATION

DEPARTMENT OF TRANSPORTATION

PART 393--PARTS AND ACCESSORIES NECESSARY FOR SAFE OPERATION

Subpart C--Brakes

Sec. 393.52. Brake performance.

(a) Upon application of its service brakes, a motor vehicle or combination of motor vehicles must under any condition of loading in which it is found on a public highway, be capable of--

(1) Developing a braking force at least equal to the percentage of its gross weight specified in the table in paragraph (d) of this section;

(2) Decelerating to a stop from 20 miles per hour at not less than the rate specified in the table in paragraph (d) of this section; and

(3) Stopping from 20 miles per hour in a distance, measured from the point at which movement of the service brake pedal or control begins, that is not greater than the distance specified in the table in paragraph (d) of this section.

(b) Upon application of its emergency brake system and with no other brake system applied, a motor vehicle or combination of motor vehicles must, under any condition of loading in which it is found on a public highway, be capable of stopping from 20 miles per hour in a distance, measured from the point at which movement of the emergency brake control begins, that is not greater than the distance specified in the table in paragraph (d) of this section.

(c) Conformity to the stopping-distance requirements of paragraphs (a) and (b) of this section shall be determined under the following conditions:

(1) Any test must be made with the vehicle on a hard surface that is substantially level, dry, smooth, and free of loose material.

(2) The vehicle must be in the center of a 12-foot-wide lane when the test begins and must not deviate from that lane during the test.

(d) Vehicle brake performance table:

Type of motor vehicle	Service brake systems			Emergency brake systems
	Braking force as a percentage of gross vehicle or combination weight	Deceleration in feet per second per second	Application and braking distance in feet from initial speed of 20 m.p.h.	Application and braking distance in feet from initial speed of 20 m.p.h.
A. Passenger-carrying vehicles.				
(1) Vehicles with a seating capacity of 10 persons or less, including driver, and built on a passenger car chassis.....	65.2	21	20	54
(2) Vehicles with a seating capacity of more than 10 persons, including driver, and built on a passenger car chassis; vehicles built on a truck or bus chassis and having a manufacturer's GVWR of 10,000 lbs. or less...	52.8	17	25	66
(3) All other passenger-carrying vehicles.....	43.5	14	35	85
B. Property-carrying vehicles.				
(1) Single unit vehicles having a manufacturer's GVWR of 10,000 lbs. or less...	52.8	17	25	66
(2) Single unit vehicles having a manufacturer's GVWR of more than 10,000 lbs., except truck tractors. Combinations of a 2-axle towing vehicle and trailer having a GVWR of 3,000 lbs. or less. All combinations of 2 or less vehicles in driveaway or towaway operation.	43.4	14	35	85
(3) All other property-carrying vehicles and combinations of property-carrying vehicles...	43.5	14	40	90

Note: (a) There is a definite mathematical relationship between the figures in columns 2 and 3. If the decelerations set forth in column 3 are divided by 32.2 feet per second per second, the figures in column 2 will be obtained. (For example, 21 divided by 32.2 equals 65.2 percent.) Column 2 is included in the tabulation because certain brake-testing devices utilize this factor.
(b) The decelerations specified in column 3 are an indication of the effectiveness of the basic brakes, and as measured in practical brake testing are the maximum decelerations attained at some time during the stop. These decelerations as measured in brake tests cannot be used to compute the values in column 4 because the deceleration is not sustained at the same rate over the entire period of the stop. The deceleration increases from zero to a maximum during a period of brake-system application and brake-force buildup. Also, otherfactors may cause the deceleration to decrease after reaching a maximum. The added distance which results because maximum deceleration is not sustained is included in the figures in column 4 but is not indicated by the usual brake-testing devices for checking deceleration.

(c) The distances in column 4 and the decelerations in column 3 are not directly related. ``Brake-system application and braking distance in feet'' (column 4) is a definite measure of the overall effectiveness of the braking system, being the distance traveled between the point at which the driver starts to move the braking controls and the point at which the vehicle comes to rest. It includes distance traveled while the brakes are being applied and distance traveled while the brakes are retarding the vehicle.
(d) The distance traveled during the period of brake-system application and brake-force buildup varies with vehicle type, being negligible for many passenger cars and greatest for combinations of commercial vehicles. This fact accounts for the variation from 20 to 40 feet in the values in column 4 for the various classes of vehicles.
(e) The terms ``GVWR'' and ``GVW'' refer to the manufacturer's gross vehicle rating and the actual gross vehicle weight, respectively.

APPENDIX B. TRUCK BRAKING TESTS

TABLE B-1. SUMMARY OF TRUCK BRAKING TESTS

			FIFTH WHEEL DATA		VC 2000 DATA	
RUN NUMBER	TRUCK TYPE	WEIGHT (lbs.)	SPEED (mph)	STOPPING DISTANCE (ft.)	AVERAGE G	MAXIMUM G
7	SU3A	40,900	20.3	30	0.55	0.61
10	SU3A	40,900	20.4	26	0.59	0.71
11	SU3A	40,900	20.6	28	0.60	0.67
13	SU3A	40,900	41.7	114	0.47	0.60
14	SU3A	40,900	40.0	108	0.51	0.63
16	SU3A	40,900	40.5	107	0.53	0.63
17	C5A	44,940	20.7	29	0.61	0.71
18	C5A	44,940	20.7	29	0.60	0.68
19	C5A	44,940	20.3	28	0.60	0.69
20	C6A	44,940	20.1	26	0.63	0.71
21	C6A	44,940	20.7	27	0.62	0.69
22	C6A	44,940	20.7	26	0.64	0.78
23	C8A	44,940	20.2	25	0.66	0.93
24	SU3A	57,840	20.3	30	0.52	0.64
25	SU3A	57,840	20.1	30	0.51	0.57
26	SU3A	57,840	19.9	29	0.51	0.56
27	SU3A	57,840	39.8	121	0.47	0.58
28	SU3A	57,840	40.5	124	0.45	0.60
31	C8A	81,120	40.3	108	0.57	0.69
32	C8A	81,120	20.8	28	0.59	0.66
33	C8A	81,120	20.2	28	0.60	0.67
34	C5A	81,120	21.0	32	0.52	0.59
35	C5A	81,120	20.0	34	0.52	0.58
36	C8A	81,120	40.5	107	0.55	0.61
37	C5A	81,120	40.6	120	0.49	0.54
38	C5A	81,120	40.4	122	0.47	0.53
39	C6A	81,120	20.5	31	0.55	0.63
40	C7A	81,120	20.2	30	0.56	0.63
41	C5A	81,120	53.8	252	0.39	0.47
42	SU3A	98,280	40.1	176	0.30	0.38
43	SU3A	98,280	20.2	39	0.40	0.44
44	SU3A	98,280	20.3	42	0.39	0.43
46	SU3A	98,280	39.7	182	0.27	0.39
47	SU3A	98,280	20.7	37	0.42	0.46
48	C8A	120,660	40.9	114	0.52	0.58
49	C8A	120,660	20.8	32	0.54	0.61
50	C8A	120,660	20.0	32	0.52	0.61

* No data

TABLE B-1. SUMMARY OF TRUCK BRAKING TESTS (continued)

			FIFTH WHEEL DATA		VC 2000 DATA	
RUN NUMBER	TRUCK TYPE	WEIGHT (lbs.)	SPEED (mph)	STOPPING DISTANCE (ft.)	AVERAGE G	MAXIMUM G
51	C8A	120,660	40.2	114	0.52	0.58
52	C7A	120,660	20.6	33	0.53	0.57
53	C7A	120,660	20.2	33	*	*
56	SU3A	98,280	20.1	36	0.44	0.49
59	SU3A	98,280	20.2	35	0.44	0.50
60	SU3A	98,280	20.4	36	0.44	0.49
61	SU3A	98,280	20.4	36	0.46	0.50
62	SU3A	98,280	20.6	34	*	*
64	SU3A	98,280	20.3	39	0.46	0.50
65	C6A	120,660	41.0	119	0.50	0.56
66	C6A	120,660	20.8	32	0.52	0.57
67	C6A	120,660	20.6	33	0.51	0.57
69	C6A	120,660	40.0	131	0.44	0.52
70	C5A	120,660	20.8	35	0.49	0.53
71	C5A	120,660	20.2	35	0.48	0.54
72	C5A	120,660	40.1	140	0.41	0.47
73	C7A	120,660	40.0	114	0.52	0.58
74	SU3A	120,680	40.2	210	0.27	0.38
75	SU3A	120,680	20.4	40	0.38	0.42
76	SU3A	120,680	20.3	41	0.36	0.39
78	C6A	120,660	*	*	0.42	0.51
79	SU3A	120,680	40.4	184	0.30	0.41
80	SU3A	150,180	20.4	40	0.35	0.38
81	C6A	150,180	40.7	144	0.42	0.46
82	C6A	150,180	20.8	36	0.47	0.51
83	C6A	150,180	21.0	35	0.48	0.52
84	C7A	150,180	40.7	124	0.49	0.54
85	C7A	150,180	20.5	34	0.51	0.56
86	C7A	150,180	20.7	33	0.52	0.58
87	C8A	150,180	40.7	110	0.55	0.59
88	C8A	150,180	20.7	32	0.54	0.61
89	C8A	150,180	20.2	32	0.55	0.62
90	C5A	150,180	20.4	40	0.40	0.44
91	C5A	150,180	20.5	40	0.42	0.45
92	C6A	150,180	49.6	304	0.35	0.44

* No data

APPENDIX C. HIGH ACCIDENT ONE-MILE SECTIONS

Following is a series of tables listing the one-mile sections on various roadway types which had a critical rate factor (CRF) of one or more. Sections are given for the following eight categories of highways.

- rural, two lane
- rural, four lane (non-interstate or parkway)
- rural interstate
- rural parkway
- urban, two lane
- urban, four lane (non-interstate or parkway)
- urban interstate
- urban parkway

A critical number of accidents was determined for each highway category. If this number of accidents was located in one mile or less, an accident rate for the section was calculated and compared to a calculated critical accident rate. The critical number of accidents could be found in less than one mile. This explains why the difference in the beginning and ending milepoints can be less than one mile.

The data used to determine the traffic volume, highway classification, and rural/urban classification were obtained from a computer file. When reviewing the sections with the highest CRF, this information should be checked. It was found that some of the locations with the highest CRFs had assigned traffic volumes which were too low. This resulted in incorrectly high accident rates and resulted in a high CRF. The milepoint assigned to each accident must also be verified.

TABLE C-1. RURAL, TWO LANE ONE MILE SECTIONS WITH A CRF OF ONE OR MORE

COUNTY	ROUTE	MILEPOINT RANGE START	MILEPOINT RANGE END	ADT	NUMBER ACCIDENTS	ACCIDENT RATE*	CRITICAL RATE	CRF
Hopkins	KY 70	0.3	1.1	587	11	711	232	7.37
Letcher	US 119	15.0	16.0	1421	14	900	138	6.53
Pike	US 119	22.5	22.9	5022	16	291	62	4.72
Pike	US 119	20.1	20.9	5022	18	327	74	4.44
Letcher	US 119	11.8	12.5	1421	9	578	138	4.20
Floyd	KY 979	13.7	14.7	2345	11	428	106	4.05
Christian	KY 695	7.7	8.7	474	5	963	266	3.62
Jessamine	KY 29	2.1	2.2	524	5	871	249	3.49
Pike	US 119	13.2	14.2	5368	14	238	72	3.33
Letcher	US 119	16.3	16.8	1421	7	450	138	3.27
Muhlenberg	US 431	2.9	3.6	3020	9	272	93	2.92
Barreb	US 31	1.0	1.9	3733	10	245	84	2.90
Simpson	US 31W	2.0	2.8	7117	14	180	64	2.83
Letcher	US 119	10.7	11.6	1421	6	386	138	2.80
Martin	KY 1439	0.8	1.7	1439	6	381	137	2.78
Simpson	KY 100	12.6	12.8	4852	11	207	75	2.77
Leslie	KY 2009	2.5	3.3	1010	5	452	167	2.71
Boone	KY 338	0.2	0.3	7444	13	159	62	2.56
Pike	KY 122	0.0	0.9	2727	7	234	98	2.39
Pike	KY 122	9.2	10.0	2727	7	234	98	2.39
Pike	KY 194	54.3	55.2	2089	6	262	112	2.34
Letcher	US 119	13.9	14.8	1421	5	321	138	2.33
Letcher	KY 1862	5.2	5.6	1441	5	317	137	2.32
Daviess	US 60	18.2	19.1	11313	15	121	53	2.28
Union	KY 56	12.3	13.3	4816	9	171	75	2.27
Boone	KY 14	7.5	8.0	11600	12	94	43	2.20
Logan	US 79	5.9	6.6	2417	6	227	104	2.18
Harlan	US 421	0.7	1.6	2488	6	220	103	2.15
Pike	US 119	11.6	12.5	5368	9	153	72	2.14
Pike	US 119	14.3	14.9	5368	9	153	72	2.14
Pike	US 23	1.2	2.1	7591	11	132	62	2.14
Jefferson	US 31	0.0	0.6	16061	17	97	47	2.06
Pike	KY 199	5.8	6.2	549	3	499	242	2.06
Owen	KY 355	12.4	13.0	1165	4	314	154	2.04
Trigg	US 68	14.5	15.2	3718	7	172	84	2.04
Marshall	US 641	8.3	8.8	5107	7	125	61	2.04
Pike	KY 2061	0.0	0.5	1155	4	316	155	2.04
Jessamine	US 68	0.4	1.4	2840	6	193	96	2.01
Bullit	KY 1526	7.0	8.0	1219	4	300	150	2.00
Perry	KY 15	16.9	17.9	12532	14	102	51	1.99
Trigg	US 68	8.2	8.7	2950	6	186	94	1.97
Pike	KY 194	55.3	56.1	2089	5	219	112	1.95
Pulaski	KY 80	0.0	1.0	2096	5	218	112	1.95
Letcher	US 23	3.6	4.6	7591	10	120	62	1.94
Pike	KY 612	2.3	2.9	680	3	403	212	1.90
Muhlenberg	US 431	18.3	18.9	10635	12	103	54	1.90
Pike	US 119	15.5	16.3	5368	8	136	72	1.90
Letcher	US 119	9.7	10.7	1418	4	258	138	1.87
Letcher	KY 1862	3.5	3.9	1441	4	254	137	1.85
Boone	KY 20	7.0	7.7	2320	5	197	106	1.85
Floyd	KY 979	12.2	13.1	2345	5	195	106	1.84
Hardin	US 31W	2.9	3.7	1485	4	246	134	1.83
Whitley	KY 92	7.1	7.6	1505	4	243	133	1.82
Boyd	US 60	0.1	0.9	7073	9	116	64	1.82
Pike	KY 80	0.0	1.0	5853	8	125	69	1.81
Harlan	US 421	8.9	9.8	2488	5	184	103	1.79
Perry	KY 476	13.0	13.3	808	3	339	191	1.78
Logan	US 79	11.8	12.4	807	3	340	191	1.78
Floyd	KY 194	0.6	1.1	819	3	335	189	1.77
Union	US 60	16.3	17.0	11956	12	92	52	1.76
Pike	US 23	0.0	0.8	7591	9	108	62	1.75
Pike	KY 194	19.0	19.9	3743	6	146	84	1.74
Graves	KY 1241	0.1	0.4	867	3	316	183	1.73
Pike	KY 1056	7.6	8.6	2653	5	172	99	1.73
Pike	US 119	18.8	19.7	5022	7	127	74	1.73

TABLE C-1. RURAL, TWO LANE ONE MILE SECTIONS WITH A CRF OF ONE OR MORE (continued)

COUNTY	ROUTE	MILEPOINT RANGE START	MILEPOINT RANGE END	ADT	NUMBER ACCIDENTS	ACCIDENT RATE*	CRITICAL RATE	CRF
Breathitt	KY 30	27.1	27.6	882	3	311	181	1.72
Pike	US 460	14.1	15.0	6410	8	114	66	1.72
Henderson	US 41	3.3	4.0	1710	4	214	125	1.71
Ohio	KY 85	8.2	8.7	1715	4	213	124	1.71
Marion	KY 49	7.2	7.4	891	3	307	180	1.71
Pike	KY 194	16.3	17.3	1751	4	209	123	1.70
Boone	KY 338	0.0	0.2	9590	10	95	56	1.69
Floyd	KY 122	27.2	27.8	2786	5	164	97	1.69
Pike	KY 292	1.1	1.2	926	3	296	176	1.68
Pike	KY 610	0.0	0.8	1806	4	202	121	1.67
Pike	KY 194	8.7	9.4	947	3	289	174	1.67
Crittenden	US 60	8.9	9.7	9812	10	93	56	1.66
Pike	KY 468	8.3	8.8	2962	5	154	94	1.64
Pike	KY 197	12.7	13.5	2962	5	154	94	1.64
Martin	KY 292	8.6	9.6	2955	5	155	94	1.64
Pike	KY 1441	7.3	8.0	1879	4	194	118	1.64
Pike	KY 611	0.0	0.8	983	3	279	170	1.64
Ballard	KY 51	3.1	4.0	5682	7	113	70	1.61
Pike	KY 194	39.7	40.5	1078	3	254	161	1.58
Boone	KY 536	3.5	4.3	365	2	500	316	1.58
Hardin	US 31W	1.3	2.1	2095	4	174	112	1.56
Pulaski	KY 80	1.1	1.8	2096	4	174	112	1.56
Leslie	US 421	2.2	2.8	2136	4	171	111	1.54
Perry	KY 476	11.5	12.5	1136	3	241	156	1.54
Henderson	US 41	0.0	1.0	3380	5	135	88	1.53
Franklin	KY 1665	0.0	0.8	1172	3	234	153	1.52
Ohio	KY 54	8.6	8.9	2247	4	163	108	1.51
Hopkins	US 62	12.4	12.9	3470	5	132	87	1.51
Madison	KY 627	0.0	0.7	6410	7	100	66	1.50
Todd	US 79	1.8	2.0	2305	4	158	107	1.49
Pike	US 119	5.7	6.5	11684	10	78	52	1.49
Henderson	US 60	19.3	19.8	3542	5	129	86	1.49
Pike	US 119	21.4	22.3	5022	6	109	74	1.48
Boone	KY 18	4.9	5.8	2340	4	156	106	1.48
Harlan	KY 221	1.8	2.8	3577	5	128	86	1.48
Harlan	KY 38	0.1	0.4	3713	5	123	85	1.46
Trigg	US 68	17.3	18.2	5123	6	107	73	1.46
Muhlenberg	US 62	22.5	23.4	2410	4	152	104	1.45
Pulaski	KY 192	6.3	6.9	1318	3	208	144	1.45
Harrison	KY 982	0.2	0.4	477	2	383	265	1.45
Harrison	KY 982	1.7	2.0	477	2	383	265	1.45
Magoffin	KY 30	0.2	0.5	1329	3	206	143	1.44
Woodford	KY 33	10.0	10.5	2470	4	148	103	1.44
Hopkins	KY 70	9.3	9.6	2510	4	146	102	1.43
Pike	US 119	10.0	10.8	5368	6	102	72	1.43
Knott	KY 550	4.1	4.4	1349	3	203	142	1.43
Greenup	KY 207	6.0	6.7	500	2	365	257	1.42
Rowan	KY 32	4.6	5.2	7032	7	91	64	1.42
Rowan	KY 32	3.2	4.2	7032	7	91	64	1.42
Laurel	US 25	1.7	2.5	8903	8	82	58	1.41
Daviees	US 60	5.7	6.6	3950	5	116	82	1.41
Simpson	KY 383	1.1	1.4	513	2	356	253	1.41
Pike	KY 3419	0.4	0.6	1429	3	192	137	1.40
Graves	KY 58	1.5	1.8	1441	3	190	137	1.39
Graves	US 45	1.7	1.8	1464	3	187	136	1.38
Breathitt	KY 476	6.3	7.0	1502	3	182	134	1.37
Bell	KY 74	7.4	8.0	554	2	330	241	1.37
Boone	US 42	5.1	5.8	4132	5	111	80	1.37
Hardin	US 31W	4.0	4.2	1485	3	184	134	1.37
Henry	KY 146	2.7	3.6	2734	4	134	98	1.37
Daviees	KY 142	1.6	2.1	563	2	324	238	1.36
Pike	US 460	9.4	10.1	9410	8	78	57	1.36
Pike	US 460	7.3	8.1	9410	8	78	57	1.36
Perry	KY 15	15.5	16.0	13662	10	67	50	1.35
Floyd	KY 122	26.1	26.9	2786	4	131	97	1.35

TABLE C-1. RURAL, TWO LANE ONE MILE SECTIONS WITH A CRF OF ONE OR MORE (continued)

COUNTY	ROUTE	MILEPOINT RANGE START	MILEPOINT RANGE END	ADT	NUMBER ACCIDENTS	ACCIDENT RATE*	CRITICAL RATE	CRF
Carter	US 60	5.1	5.5	2816	4	130	96	1.34
Anderson	US 62	6.2	6.4	594	2	307	230	1.33
Ballard	US 60	0.3	0.8	4451	5	103	78	1.32
Pike	KY 194	20.0	20.5	2901	4	126	95	1.32
Pike	KY 632	4.5	5.5	2920	4	125	95	1.32
Pike	KY 194	29.1	29.9	2901	4	126	95	1.32
Clay	KY 80	0.0	0.9	2941	4	124	94	1.32
Pike	KY 194	25.5	26.3	2901	4	126	95	1.32
Perry	KY 80	0.0	0.7	4475	5	102	78	1.32
Pike	KY 468	7.3	8.2	2962	4	123	94	1.31
Lincoln	KY 698	1.9	2.0	622	2	294	224	1.31
Martin	KY 40	15.8	16.6	10109	8	72	55	1.31
Pike	KY 1499	1.9	2.7	2958	4	123	94	1.31
Union	US 60	4.5	5.1	4610	5	99	77	1.29
Perry	KY 699	6.5	6.5	1711	3	160	125	1.29
Perry	KY 699	7.7	8.2	1711	3	160	125	1.29
Christian	US 68	0.6	1.4	4704	5	97	76	1.28
Pike	KY 612	0.0	0.0	680	2	269	212	1.27
Mason	US 62	3.2	3.5	681	2	268	212	1.27
Taylor	KY 210	0.5	0.5	3182	4	115	91	1.26
Grant	KY 22	13.4	14.4	1812	3	151	121	1.25
Owen	KY 22	5.6	6.4	715	2	255	205	1.24
Todd	US 79	3.2	4.0	1852	3	148	119	1.24
Pike	KY 122	12.7	12.9	3326	4	110	89	1.23
Bourbon	KY 627	1.1	1.4	1880	3	146	118	1.23
Marshall	US 62	5.1	5.8	7139	5	64	53	1.22
Pike	KY 1056	4.5	5.2	1951	3	140	116	1.21
Whitley	KY 904	0.2	1.0	1950	3	141	116	1.21
Graves	KY 121	12.0	12.6	5218	5	88	72	1.21
Pike	KY 1056	6.4	6.5	1951	3	140	116	1.21
Hopkins	US 41A	9.6	10.6	5311	5	86	72	1.20
Butler	KY 79	2.5	3.0	789	2	231	193	1.20
Wolfe	KY 191	1.0	1.6	2014	3	136	114	1.19
Logan	US 79	10.8	10.8	807	2	226	191	1.19
Bullit	KY 480	4.0	5.0	2002	3	137	115	1.19
Carroll	KY 36	3.7	4.2	3634	4	101	85	1.18
Floyd	KY 194	3.2	3.8	819	2	223	189	1.18
Floyd	KY 194	2.7	3.2	819	2	223	189	1.18
Martin	KY 40	11.9	12.2	7404	6	74	63	1.18
Carroll	KY 36	4.7	5.7	3634	4	101	85	1.18
Mercer	US 68	10.4	11.4	2070	3	132	113	1.17
Pike	KY 632	7.5	8.2	3674	4	99	85	1.17
Hardin	US 31W	0.2	1.0	2095	3	131	112	1.17
Letcher	US 23	1.8	2.7	7591	6	72	62	1.17
Pike	KY 194	43.5	44.2	2089	3	131	112	1.17
Pike	KY 194	59.8	60.6	2089	3	131	112	1.17
Martin	KY 40	7.7	8.1	2084	3	131	112	1.17
Scott	US 460	9.7	10.5	5516	5	83	71	1.17
Graves	KY 121	5.5	6.3	5568	5	82	70	1.16
Campbell	US 24	0.0	0.9	7690	6	71	62	1.16
Perry	KY 28	12.2	12.8	2140	3	128	111	1.16
Pike	US 460	6.1	7.0	9870	7	65	56	1.16
Adair	KY 80	9.7	10.6	874	2	209	182	1.15
Logan	US 431	18.0	18.9	7770	6	71	61	1.15
Hancock	KY 69	1.9	2.1	863	2	212	183	1.15
Boyle	US 150	0.5	1.2	2162	3	127	110	1.15
Pike	KY 119	3.5	4.4	14763	9	56	48	1.15
Boyle	US 150	2.1	3.0	2162	3	127	110	1.15
Muhlenberg	US 431	11.5	12.1	5669	5	81	70	1.15
Grayson	KY 79	2.8	3.7	2224	3	123	109	1.13
Floyd	KY 7	0.0	0.7	2230	3	123	108	1.13
Bracken	KY 8	1.2	2.0	914	2	200	177	1.13
Washington	KY 555	0.0	0.8	3926	4	93	82	1.13
Bracken	KY 8	0.2	1.2	914	2	200	177	1.13
Warren	US 231	3.0	3.9	8022	6	68	61	1.13

TABLE C-1. RURAL, TWO LANE ONE MILE SECTIONS WITH A CRF OF ONE OR MORE (continued)

COUNTY	ROUTE	MILEPOINT RANGE START	MILEPOINT RANGE END	ADT	NUMBER ACCIDENTS	ACCIDENT RATE*	CRITICAL RATE	CRF
Washington	US 150	8.5	9.4	10392	7	62	55	1.12
Pike	KY 292	3.0	3.5	926	2	197	176	1.12
Simpson	KY 100	14.9	15.7	2298	3	119	107	1.12
Pike	KY 80	1.7	2.2	6050	5	75	68	1.11
Pike	KY 194	6.2	6.4	947	2	193	174	1.11
Pike	KY 194	12.7	13.7	947	2	193	174	1.11
Boone	KY 20	8.4	9.1	2310	3	119	106	1.11
Pike	KY 194	12.0	12.7	947	2	193	174	1.11
Perry	KY 15	0.0	0.7	8180	6	67	60	1.11
Muhlenberg	US 431	7.9	8.4	4159	4	88	80	1.10
Calloway	KY 94	11.5	12.4	4146	4	88	80	1.10
Henderson	US 60	21.9	22.9	2360	3	116	105	1.10
Christian	KY 107	5.3	6.1	991	2	184	169	1.09
Pike	KY 119	8.9	9.9	8526	6	64	59	1.09
Logan	KY 79	0.4	1.4	2417	3	113	104	1.09
Harlan	KY 72	9.6	10.2	2409	3	114	104	1.09
Union	KY 109	5.5	5.6	999	2	183	168	1.09
Pike	KY 194	17.6	17.9	4164	4	88	80	1.09
Allen	US 31	7.4	8.2	6369	5	72	67	1.08
Leslie	KY 2009	1.6	2.5	1010	2	181	167	1.08
Crittenden	US 60	18.7	19.0	2491	3	110	103	1.07
Harlan	US 421	7.1	7.7	2488	3	110	103	1.07
Harrison	US 27	0.0	0.2	4375	4	84	78	1.07
Knott	KY 7	8.1	8.6	2521	3	109	102	1.07
Gallatin	US 127	2.5	3.0	2522	3	109	102	1.07
Boone	US 25	4.0	4.9	6424	5	71	66	1.07
Boone	US 25	5.1	5.6	6424	5	71	66	1.07
Knott	KY 7	9.4	9.8	2521	3	109	102	1.07
Harlan	US 421	4.1	4.9	2488	3	110	103	1.07
Boone	US 25	2.4	3.0	6424	5	71	66	1.07
Graves	US 45	10.4	11.2	4372	4	84	78	1.07
Floyd	KY 2030	5.0	5.0	1065	2	172	162	1.06
Laurel	US 25	15.9	16.3	6581	5	69	66	1.06
Boyle	KY 52	0.8	1.6	4450	4	82	78	1.06
Anderson	KY 151	1.4	2.0	4396	4	83	78	1.06
Harlan	KY 119	12.5	13.2	9149	5	50	47	1.05
Owen	US 127	6.2	6.7	1090	2	168	160	1.05
Pike	US 460	4.7	5.7	11500	7	56	53	1.05
Owen	US 127	6.7	7.5	1090	2	168	160	1.05
Owen	US 127	7.5	8.4	1090	2	168	160	1.05
Ballard	KY 286	0.3	0.9	2634	3	104	100	1.04
Johnson	KY 40	7.4	8.4	2654	3	103	99	1.04
Ballard	US 60	10.0	10.8	4611	4	79	77	1.04
Pike	US 23	4.4	5.3	4601	4	79	77	1.04
Union	KY 109	1.5	2.0	4582	4	80	77	1.04
Ballard	KY 286	5.9	6.9	2634	3	104	100	1.04
Ballard	KY 286	3.3	4.2	2634	3	104	100	1.04
Letcher	KY 160	5.9	6.7	1119	2	163	158	1.04
Pike	KY 119	7.8	8.4	11684	7	55	52	1.04
Harlan	KY 119	4.3	5.3	6930	5	66	64	1.03
Ohio	US 62	3.3	4.0	2690	3	102	99	1.03
Harlan	KY 119	5.5	6.3	6930	5	66	64	1.03
Boyle	US 68	2.0	2.5	1135	2	161	156	1.03
Pike	KY 122	2.0	2.4	2727	3	100	98	1.03
Simpson	KY 100	2.3	2.3	1150	2	159	155	1.02
Livingston	US 60	18.1	18.2	2750	3	100	98	1.02
Franklin	KY 1665	3.9	4.0	1172	2	156	153	1.02
Rowan	KY 32	2.1	3.0	7032	5	65	64	1.02
Boyle	US 150	4.5	5.0	4850	4	75	75	1.01
Oldham	KY 393	4.0	4.9	4786	4	76	75	1.01
Bullit	KY 61	1.8	2.0	4854	4	75	75	1.01
Carter	KY 2	2.0	2.8	2878	3	95	95	1.00
Perry	KY 15	18.9	19.8	12532	7	51	51	1.00
Lincoln	KY 39	8.3	9.3	1202	2	152	151	1.00
Hopkins	KY 41	9.2	9.7	4884	4	75	75	1.00

*Accidents per 100 million vehicle miles

TABLE C-2. RURAL, FOUR LANE (NON-INTERSTATE OR PARKWAY) ONE MILE SECTIONS WITH A CRF OF ONE OR MORE

COUNTY	ROUTE	MILEPOINT RANGE START	MILEPOINT RANGE END	ADT	NUMBER ACCIDENTS	ACCIDENT RATE*	CRITICAL RATE	CRF
Johnson	US 23	4.2	5.2	639	8	143	195	5.85
Johnson	US 23	6.1	7.0	639	7	0	195	5.12
Boyd	US 23	1.1	2.0	10,941	15	125	44	2.85
Lyon	US 62	6.5	7.0	7,281	9	113	52	2.16
Lawrence	US 23	17.9	18.4	10,238	9	80	45	1.78
Muhlenburg	US 431	16.6	17.5	5,178	6	106	61	1.74
Pike	US 23	30.8	31.7	22,158	14	58	34	1.70
Bell	US 25	13.1	14.1	12,062	9	68	42	1.61
Bell	US 25	12.0	13.0	12,912	9	64	41	1.54
Floyd	US 23	10.5	11.4	16,971	10	54	37	1.45
Martin	KY 645	4.6	4.7	5,258	5	87	60	1.44
Lawrence	US 23	4.9	5.4	7,648	6	72	51	1.40
Anderson	US 127	1.8	2.2	11,387	9	72	53	1.36
Christian	US 41A	6.9	7.8	16,000	9	51	38	1.35
Lawrence	US 23	14.3	15.2	8,348	6	66	49	1.33
Perry	KY 80	11.3	11.8	8,888	6	62	48	1.29
Floyd	US 23	12.5	13.4	19,331	9	43	36	1.20
Christian	US 41A	4.9	5.8	16,000	8	46	38	1.20
Grant	KY 22	11.1	11.2	11,941	8	61	52	1.18
Logan	US 68	20.3	20.8	7,620	5	60	51	1.17
Logan	US 68	16.4	16.9	7,946	5	57	50	1.14
Boyd	US 23	5.6	6.1	10,941	6	50	44	1.14
Garrard	US 27	2.8	3.2	10,298	7	62	55	1.13
Scott	US 460	0.0	0.5	3,935	4	93	82	1.13
Lawrence	US 23	8.2	8.5	8,348	5	55	49	1.11
Floyd	KY 80	2.3	3.2	12,781	6	43	41	1.04
Pike	US 23	28.1	28.6	29,100	10	31	31	1.01

*Accidents per 100 million vehicle miles

TABLE C-3. RURAL INTERSTATE ONE-MILE SECTIONS WITH A CRF OF ONE OR MORE

COUNTY	ROUTE	MILEPOINT RANGE START	MILEPOINT RANGE END	ADT	NUMBER ACCIDENTS	ACCIDENT RATE	CRITICAL RATE*	CRF
Oldham	I-71	20.900	21.869	12681	12	86	42	2.08
Boone	I-75	174.700	175.564	74306	49	60	29	2.05
Madison	I-75	81.800	82.739	17653	13	67	37	1.83
Franklin	I-64	54.771	55.672	31300	17	50	30	1.64
Madison	I-75	84.000	85.000	17653	10	52	37	1.41
Gallatin	I-71	61.100	62.100	20325	11	49	35	1.41
Gallatin	I-71	62.700	63.700	21800	11	46	34	1.35
Montgomery	I-64	109.321	110.200	19550	10	47	35	1.32
Bath	I-64	119.973	120.800	17303	9	48	37	1.28
Madison	I-75	82.900	83.870	17653	9	47	37	1.27
Madison	I-75	80.666	81.600	17653	9	47	37	1.27
Grant	I-75	157.744	158.644	35068	14	36	29	1.24
Lyon	I-24	38.900	39.900	19688	9	42	35	1.18
Scott	I-75	135.968	136.968	34628	13	34	29	1.17
Franklin	I-64	53.222	54.118	31300	12	35	30	1.15
Carroll	I-71	39.012	40.000	20688	9	40	35	1.14
Boone	I-75	170.900	171.900	48527	16	30	27	1.13
Barren	I-65	46.019	47.000	25327	10	36	32	1.11
Henry	I-71	27.200	28.114	25987	10	35	32	1.09
Franklin	I-64	47.182	48.000	30179	11	33	31	1.09
Simpson	I-65	0.063	1.000	34263	12	32	30	1.08
Hart	I-65	63.717	64.500	27405	10	33	32	1.05
Grant	I-75	144.405	145.400	36012	12	30	29	1.05
Henry	I-71	34.800	35.752	23397	9	35	33	1.05
Boone	I-71	76.000	77.000	23743	9	35	33	1.04
Shelby	I-64	38.000	39.000	32000	11	31	30	1.04
Franklin	I-64	52.218	53.118	27800	10	33	31	1.04
Laurel	I-75	31.553	32.300	32100	11	31	30	1.04
Madison	I-75	91.000	92.000	45700	14	28	27	1.03
Bullit	I-65	115.000	116.000	57517	16	25	26	1.00

*Accidents per 100 million vheicle miles

TABLE C-4. RURAL PARKWAY ONE-MILE SECTIONS WITH A CRF OF ONE OR MORE

COUNTY	ROUTE	MILEPOINT RANGE START	MILEPOINT RANGE END	ADT	NUMBER ACCIDENTS	ACCIDENT RATE*	CRITICAL RATE	CRF
Anderson	BG PARKWAY	58.0	58.9	8,712	10	105	42	2.52
Hopkins	WK PARKWAY	38.1	39.0	9,345	8	78	40	1.94
Warren	NATCHER PKWY	0.0	1.0	12,600	13	94	51	1.85
Grayson	WK PARKWAY	107.0	107.9	9,284	7	69	40	1.70
Christian	PENNYRILE PKWY	24.0	24.9	8,197	6	67	43	1.56
Lyon	WK PARKWAY	0.0	0.3	6,700	5	68	47	1.45
Henderson	PENNYRILE PKWY	68.0	68.9	13,021	7	49	35	1.40
Hopkins	PENNYRILE PKWY	32.6	33.0	13,216	7	48	35	1.39
Hopkins	PENNYRILE PKWY	36.7	37.3	19,501	8	37	30	1.25
Lyon	WK PARKWAY	3.0	3.5	6,700	4	55	47	1.16
Hopkins	PENNYRILE PKWY	53.6	54.4	10,524	5	43	38	1.13
Webster	PENNYRILE PKWY	61.0	61.8	7,438	4	49	45	1.10
Hopkins	PENNYRILE PKWY	34.0	35.0	15,311	6	36	33	1.09
Ohio	WK PARKWAY	74.6	75.1	7,613	4	48	44	1.09
Hopkins	PENNYRILE PKWY	28.9	29.5	7,910	4	46	43	1.06
Ohio	WK PARKWAY	76.0	77.0	8,228	4	44	43	1.04
Grayson	WK PARKWAY	91.8	92.5	8,433	4	43	42	1.03
Anderson	BG PARKWAY	51.4	52.3	8,729	4	42	42	1.01

*Accident per 100 million vehicle miles

TABLE C-5. URBAN, TWO LANE ONE-MILE SECTIONS WITH A CRF OF ONE OR MORE

COUNTY	ROUTE	MILEPOINT RANGE START	MILEPOINT RANGE END	ADT	NUMBER ACCIDENTS	ACCIDENT RATE	CRITICAL RATE*	CRF
Kenton	KY 17	22.1	23.0	4,855	37	696	75	9.30
Jefferson	US 31W	18.6	19.6	3,046	23	690	93	7.43
Jefferson	KY 864	14.9	15.9	3,620	22	555	93	5.97
Daviess	US 60	12.6	13.6	9,607	31	295	56	5.22
Logan	US 431	14.2	15.2	9,162	23	229	57	3.99
Harrison	US 27	5.8	6.2	7,954	16	184	50	3.66
Daviess	US 60	11.5	12.5	9,048	20	202	58	3.49
Shelby	US 60	10.0	11.0	10,804	19	161	54	2.97
Jefferson	US 31	15.2	15.8	18,881	29	140	49	2.84
Daviess	US 231	13.9	14.8	9,177	16	159	57	2.77
Christian	US 41	11.5	12.5	10,409	17	149	55	2.72
Daviess	US 60	13.6	14.1	6,672	13	178	72	2.49
Warren	US 68	11.6	12.6	8,743	13	136	59	2.32
Boyle	US 127	4.5	5.3	5,863	11	171	75	2.27
Jefferson	KY 61	10.1	11.0	6,859	12	160	71	2.26
Jefferson	KY 61	11.3	12.3	8,739	12	125	59	2.14
Fayette	KY 1681	4.6	5.6	3,574	7	179	86	2.08
Bourbon	US 68X	0.5	1.5	8,772	11	115	58	1.96
Jefferson	KY 1020	10.2	11.0	6,824	9	120	65	1.86
Campbell	KY 10	3.7	4.0	232	2	787	432	1.82
McCracken	US 45X	1.8	2.8	7,554	9	109	62	1.75
Jefferson	KY 1819	10.3	11.3	3,775	6	145	84	1.73
Jessamine	KY 169	9.8	10.5	3,763	6	146	84	1.73
Campbell	KY 1120	0.0	0.7	10,477	11	96	60	1.59
Jefferson	KY 155	7.6	8.5	10,538	10	87	55	1.59
Jefferson	KY 1020	4.1	5.0	19,824	15	69	44	1.58
Logan	US 68	9.8	10.7	9,128	7	70	47	1.48
Clark	US 60	6.6	7.3	13,739	11	73	50	1.48
Jefferson	US 31	13.8	14.8	25,121	16	58	41	1.43
Jefferson	KY 1819	11.5	12.1	5,452	6	101	71	1.41
Simpson	US 31W	5.2	5.7	9,108	8	80	58	1.39
Boyd	US 60	10.0	11.0	21,526	14	59	43	1.39
Jefferson	US 60	0.0	0.8	9,196	8	79	57	1.38
Marion	US 68	10.7	11.7	11,377	9	72	53	1.36
Logan	US 431	13.1	14.0	7,766	7	82	61	1.34
Boone	KY 1829	0.0	0.9	20,765	13	57	43	1.33
Boyle	US 150	13.9	14.4	9,970	8	73	56	1.32
Boone	US 25	9.1	9.9	16,567	11	61	46	1.31
Fayette	US 421	0.3	1.3	14,428	10	63	49	1.30
Campbell	US 27	7.1	8.1	17,450	11	58	46	1.26
Caldwell	KY 91	11.4	12.2	4,905	5	93	74	1.25
Harrison	US 62	9.5	9.9	4,980	5	92	74	1.24
Daviess	US 231	12.8	13.8	11,073	8	66	54	1.23
Boyd	KY 168	4.1	5.0	7,014	6	78	64	1.22
Campbell	US 27	9.5	10.5	21,298	13	56	48	1.17
Boone	KY 1017	0.8	1.5	17,044	10	54	46	1.17
Fayette	US 27	11.6	12.5	12,316	8	59	51	1.15
Calloway	KY 641	7.7	8.6	20,127	11	50	44	1.15
Pulaski	KY 80	20.3	21.3	10,832	6	51	44	1.14
Clark	KY 89	14.9	15.9	7,825	6	70	61	1.14
Whitley	US 25W	29.6	30.4	12,700	8	58	51	1.13
Jefferson	KY 1934	0.0	1.0	18,058	10	51	45	1.12
Laurel	KY 80	11.7	12.0	4,139	4	88	80	1.10
Henderson	U S60	7.4	8.3	8,396	6	65	59	1.10
Jefferson	KY 2051	0.0	0.7	13,215	8	55	50	1.10
Logan	US 431	11.8	12.8	6,318	5	72	67	1.08
Pulaski	KY 1247	6.9	7.6	11,143	7	57	53	1.07
Christian	US 68	9.6	10.5	13,918	8	52	49	1.07
Boone	KY 20	17.4	18.4	6,506	5	70	66	1.06
Kenton	KY 8	3.4	4.4	6,814	5	67	65	1.04
Kenton	KY 17	10.2	11.1	6,805	5	67	65	1.04
Campbell	KY 8	1.5	2.4	14,559	8	50	49	1.03
Madison	US 25	16.0	16.9	20,497	11	49	48	1.02
Kenton	KY 1303	3.0	3.7	15,225	8	48	48	1.00

*Accidents per 100 million vehicle miles

TABLE C-6. URBAN, FOUR LANE (NON-INTERSTATE OR PARKWAY) ONE-MILE SECTIONS WITH A CRF OF ONE OR MORE

COUNTY	ROUTE	MILEPOINT RANGE START	MILEPOINT RANGE END	ADT	NUMBER ACCIDENTS	ACCIDENT RATE	CRITICAL RATE*	CRF
JEFFERSON	US 31W	20.3	21.2	8,022	17	194	67	2.91
CHRISTIAN	US 41A	4.0	4.5	16,289	17	95	38	2.52
BOONE	KY 18	14.6	15.3	33,472	38	104	42	2.48
LAUREL	KY 80	9.9	10.8	15,721	22	128	52	2.44
JEFFERSON	US 150	1.0	1.9	18,425	24	119	50	2.39
JEFFERSON	US 42	0.5	1.0	14,978	20	122	53	2.29
JEFFERSON	KY 31	16.1	17.1	11,779	17	132	58	2.28
JEFFERSON	KY 1934	3.7	4.7	9,576	13	124	62	1.99
WARREN	US 231	8.8	9.7	14,794	17	105	53	1.96
HENDERSON	US 41	15.9	16.8	38,840	33	78	40	1.93
HENDERSON	US 41	16.9	17.8	42,521	34	73	39	1.85
FAYETTE	KY 353	0.0	0.4	5,642	8	129	70	1.85
MERCER	US 127	3.6	4.4	18,891	17	82	44	1.85
FAYETTE	US 25	14.2	15.1	16,313	15	84	47	1.80
JEFFERSON	KY 1703	2.2	2.3	23,375	19	74	42	1.79
PULASKI	US 27	16.0	17.0	36,846	29	72	41	1.76
JEFFERSON	KY 864	11.1	12.0	44,100	33	68	39	1.75
FAYETTE	US 27	6.1	6.8	25,586	21	75	45	1.66
WARREN	US 231	9.8	10.7	13,242	13	90	55	1.62
JEFFERSON	KY 2054	2.0	3.0	12,024	12	91	57	1.59
CAMPBELL	US 27	15.7	16.6	38,431	26	62	40	1.53
FAYETTE	US 27	7.3	8.3	21,694	17	72	47	1.51
BOYD	US 23	17.7	18.7	20,284	16	72	48	1.49
JEFFERSON	KY 1631	2.8	3.8	31,880	22	63	42	1.49
DAVIESS	US 60	14.5	15.4	26,532	19	65	45	1.47
BOONE	US 42	12.4	13.4	19,131	15	72	49	1.46
WARREN	US 31W	12.4	13.4	19,026	15	72	49	1.46
JEFFERSON	KY 61	4.7	5.5	27,034	19	64	44	1.45
JEFFERSON	KY 61	3.7	4.6	26,387	18	62	45	1.39
BARREN	KY 90	9.3	9.9	13,108	10	70	50	1.38
BOYD	US 23	16.7	17.4	20,723	15	66	48	1.38
JEFFERSON	US 31W	14.4	15.3	48,254	27	51	38	1.34
JEFFERSON	US 60A	0.0	0.9	23,525	16	62	46	1.34
SHELBY	US 60	11.4	11.9	9,788	8	75	56	1.33
WARREN	KY 880	7.1	8.0	13,811	11	73	55	1.33
JEFFERSON	US 31W	17.6	18.3	9,800	8	75	56	1.33
JEFFERSON	US 60	3.5	4.4	24,013	16	61	46	1.33
JEFFERSON	KY 1631	4.0	4.9	30,819	19	56	43	1.32
JEFFERSON	KY 1020	3.0	3.7	21,140	13	56	43	1.31
FAYETTE	US 27	9.3	9.9	21,528	13	55	43	1.29
FAYETTE	US 27	3.7	4.7	34,460	20	53	42	1.28
CHRISTIAN	US 41A	2.9	3.9	16,600	12	66	51	1.28
BOONE	US 42	13.5	14.3	32,277	19	54	42	1.27
McCRACKEN	US 45	6.6	7.5	23,258	15	59	46	1.27
JEFFERSON	KY 1065	2.5	3.5	30,083	18	55	43	1.27
WARREN	US 31W	17.8	18.5	14,619	8	50	39	1.27
JEFFERSON	US 60A	2.3	3.2	19,087	13	62	49	1.26
DAVIESS	US 60	16.7	17.2	17,672	11	57	45	1.25
BELL	KY 74	15.2	16.1	15,532	11	65	53	1.23
HARDIN	US 31W	15.7	16.7	17,613	12	62	50	1.23
HARDIN	US 62	17.4	18.3	15,526	11	65	53	1.23
FAYETTE	KY 4	10.0	10.8	38,523	21	50	40	1.23
JEFFERSON	KY 1065	4.3	5.1	34,402	19	50	42	1.21
CAMPBELL	KY 9	11.1	12.0	18,312	12	60	50	1.20
BELL	US 25	2.4	3.3	19,639	9	42	35	1.18
JEFFERSON	US 31W	16.5	17.5	19,797	12	55	49	1.14
HENDERSON	US 41A	14.5	15.5	22,213	13	53	47	1.14
FAYETTE	KY 4	14.0	14.9	39,933	20	46	40	1.14
JEFFERSON	US 31	11.2	12.1	35,366	18	46	41	1.13
JEFFERSON	US 31W	4.5	5.5	25,300	14	51	45	1.12
KENTON	KY 371	2.7	3.3	25,089	14	51	45	1.12
FAYETTE	US 60	4.6	5.4	30,769	16	47	43	1.11
JEFFERSON	US 31	13.1	13.6	24,345	12	45	41	1.10
HENDERSON	US 41A	15.5	16.1	23,904	13	50	46	1.08
JEFFERSON	KY 61	6.8	7.6	26,946	14	47	44	1.07
MADISON	KY 876	7.8	8.6	29,751	15	46	43	1.07
LAUREL	US 25	0.9	1.8	31,410	14	41	38	1.07
FAYETTE	US 25	16.1	17.0	19,187	11	52	49	1.07
KENTON	US 25	8.0	9.0	19,261	11	52	49	1.06
FRANKLIN	US 60	9.8	10.7	19,293	11	52	49	1.06
BOYD	US 23	14.7	15.5	21,940	12	50	47	1.06
WARREN	US 31W	13.4	14.3	19,810	10	46	44	1.05
JEFFERSON	KY 1934	4.7	5.7	30,418	15	45	43	1.05
FAYETTE	US 60	8.8	9.7	27,903	14	46	44	1.04
FAYETTE	KY 4	8.7	9.7	36,600	17	42	41	1.04
FAYETTE	US 60	6.1	7.0	25,896	13	46	45	1.02
JEFFERSON	KY 1020	9.0	9.9	15,350	8	48	48	1.00

*Accidents per 100 million vehicle miles

TABLE C-7. URBAN INTERSTATE ONE-MILE SECTIONS WITH A CRF OF ONE OR MORE

COUNTY	ROUTE	MILEPOINT RANGE START	MILEPOINT RANGE END	ADT	NUMBER ACCIDENTS	ACCIDENT RATE	CRITICAL RATE*	CRF
Kenton	I-75	187.0	188.0	85,901	93	99	28	3.47
Jefferson	I-65	136.2	137.1	122,855	112	83	27	3.14
Fayette	I-75	109.0	110.0	53,234	43	74	32	2.32
Jefferson	I-65	133.7	134.7	125,114	62	45	26	1.71
Jefferson	I-65	130.6	131.4	137,426	67	45	26	1.71
Jefferson	I-65	134.8	135.8	126,072	59	43	26	1.62
Hardin	I-65	90.4	91.3	40,101	24	55	34	1.60
Jefferson	I-64	5.1	5.4	131,215	57	40	26	1.51
Jefferson	I-264	12.9	13.6	151,087	61	37	26	1.44
Hardin	I-65	94.5	95.3	14,500	9	57	39	1.44
Kenton	I-75	188.1	189.1	102,332	43	38	27	1.40
Boone	I-75	182.1	183.1	115,590	45	36	27	1.32
Jefferson	I-64	5.6	6.5	95,642	34	32	28	1.17
Fayette	I-75	110.0	111.0	51,600	21	37	32	1.16
Jefferson	I-65	131.7	132.7	132,000	43	30	26	1.14
Kenton	I-75	183.3	184.3	141,073	45	29	26	1.13
Jefferson	I-264	11.7	12.6	143,290	44	28	26	1.09
Jefferson	I-64	14.0	15.0	86,557	29	31	28	1.08
Jefferson	I-64	3.5	4.5	64,937	23	32	30	1.07
Boone	I-75	181.1	182.0	115,590	36	28	27	1.06
Kenton	I-75	184.5	185.0	147,591	43	27	26	1.04
Jefferson	I-65	132.7	133.6	128,375	38	27	26	1.03
Kenton	I-75	81.6	82.6	84,051	27	29	29	1.03
Madison	I-75	89.8	90.8	45,871	14	28	27	1.03
Fayette	I-75	112.0	113.0	62,833	21	31	31	1.00

*Accidents per 100 million vehicle miles

TABLE C-8. URBAN PARKWAY ONE-MILE SECTIONS WITH A CRF OF ONE OR MORE

COUNTY	ROUTE	MILEPOINT RANGE START	MILEPOINT RANGE END	ADT	NUMBER ACCIDENTS	ACCIDENT RATE	CRITICAL RATE*	CRF
Laurel	DANIEL BOONE PKWY	3.0	3.3	7,760	6	71	44	1.61
Hopkins	PENNYRILE PKWY	43.4	44.4	25,733	12	43	40	1.06

*Accidents per 100 million vehicle miles