

Safety Study

HAMILTON COUNTY, OH: IR-71 / 75
ODOT DISTRICT 8

KENTON COUNTY, KY: IR-71 / 75
KYTC DISTRICT 6



COMPLETED BY:



IN ASSOCIATION WITH:



COMPLETION DATE:

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Crash Analyses

An analysis of available data was conducted for collisions within the project study area. These analyses are presented separately for Ohio and Kentucky due to the differences in available data for each state. The Ohio analysis includes the I-75 and I-71 corridors within the project area located in Ohio. The Kentucky analysis includes the portion of the I-75 corridor project area in Kentucky.

Methodology. Collisions were plotted, by year on aerial photography of the study area utilizing GIS shapefiles. A single dot represents each accident, color-coded based on accident type. Where details could be determined from the available data, the dot representing a crash was placed in the correlating lane and location as designated by the corresponding crash report. Where the exact location could not be determined, collisions were plotted near the recorded mile marker.

The plots for the I-75 corridor in Ohio can be found in Attachment A plots for the I-71 corridor in Ohio in Attachment B and I-75 in Kentucky corridor plots can be found in Attachment C.

Along with maps, graphs were also developed to show trends along the corridor at various mile-points and aid in correlation of accident types to geometric and operational deficiencies. Four different graphs were made for each section displaying road condition, type, severity and time as they relate to crash location. The three sets of graphs include the I-75 corridor located in Ohio from SLM 0.00 to SLM 2.90, the I-71 corridor in Ohio from SLM 0.30 to SLM 0.90, and the I-75 corridor located in Kentucky from SLM 187.70 to 191.80. These graphs may be found in Attachment D.

Ohio

The portion of I-75 corridor under study has been documented as a congested freeway with a history of high accident frequency. The sections of this corridor, along with the sections of I-71 on the High Crash Location Identification System (HCLIS), are shown in Table 1 below. This system is used to identify high hazard locations throughout the state. Many sections located in the study area show up on this list. Overall, four sections on I-75 and three sections on I-71 appear on the list. Three sections on I-75 in the study area rank in the top one hundred on the HCLIS list.

Table 1: Highway Safety Program Listings in Study Area				
	Begin Mile	End Mile	Location Type	HCLIS Rank
I-75 Corridor Segments and Interchanges	0.00	0.49	Section	22
	0.50	0.99	Section	28
	1.00	2.90	Section	36
	3.04	4.14	Section	170
I-71 Corridor Segments and Interchanges	0.00	0.29	Section	96
	0.30	0.59	Section	559
	0.60	1.10	Section	53

Source: ODOT Office of Roadway Safety and Mobility High Crash Location Identification System

Safety Hot Spots were also identified using Data from the Office of Roadway Safety and Mobility. The Hot Spot locations are based on the total number of accidents over a three year period in an area regardless of traffic volume and other factors. Ohio roadways are divided into two-mile segments, and the number of crashes is compared to a given rate to establish if a hot spot exists. The entire study corridor is included as a Safety Hot Spot. Table 2 below lists the Safety Hot Spots in the study area.

Table 2: Safety Hot Spots					
	Begin Mile	End Mile	# of Crashes	# Fatal	# of Injuries
I-75 Corridor Segments	0.22	2.22	1005	4	239
	2.22	4.22	802	2	205
I-71 Corridor Segments	0.00	2.00	721	2	162

Source: ODOT Office of Roadway Safety and Mobility Safety Hot Spot List, 2001-2003

Two sections of I-75 within the study area and a section of I-71 are among the most congested in the state. Congested areas were identified using data from the Office of Roadway Safety and Mobility. According to the office, congested areas are determined by calculating a roadway's volume to capacity ratio; roadways with a ratio greater than one are considered congested. The section of I-71 from SLM 0.48 to 0.50 is ranked third, from SLM 1.15 to 1.34 is ranked fourth and one of the I-75 sections from SLM 0.71 to 0.90 is ranked second. Table 3 below displays the congested areas within the study area.

Table 3: Congested Sections			
	Begin Mile	End Mile	Rank
I-75 Corridor Segments	0.71	0.90	2
	1.35	17.47	31
I-71 Corridor Segments	0.00	0.22	62
	0.48	0.50	3
	1.15	1.34	4

Source: ODOT Office of Roadway Safety and Mobility Congestion List

Crash Data Analyses. Crash reports from ODPS were analyzed to determine crash rates throughout the study area and to provide support for observations made throughout the study corridor. Along I-75 within the study area, 1049 accidents were logged between the years 2001 and 2003 and 150 accidents were logged on I-71 in the study area during this same time period. The crash data in Appendices A and B show each accident for I-75 and I-71 respectively and includes severity, location, time of day, road condition, and accident type.

Along I-75, the crash severity rate ([fatality accidents + injury accidents] / total accidents) is 0.233. Of the 1049 total crashes, 504 of the accidents (48%) were attributed to rear-end type crashes; while another 256 (25.3%) were attributed to sideswipes. Approximately 67.8% of the crashes occurred during daylight, and about 69.4% occurred on dry pavement, suggesting that road and light conditions may not be large factors in influencing accidents since the majority of them occurred during favorable situations.

Along I-71, the crash severity rate is 0.188. Of the accidents on I-71 37.3% of them were rear-ends, 16.7% were sideswipe and 14.7% were fixed object crashes. Around 58% of the crashes that occurred along I-71 occurred on dry pavement, and approximately 54.7% occurred during daylight hours, suggesting that road and light conditions may not be large factors in influencing accidents since the majority of them took place during favorable situations.

Crash rates (accidents / million vehicle miles traveled) were also determined for segments along the two corridors in the study area. Each corridor was broken down into smaller segments and, based on 2002 Average Daily Traffic, (ADT) crash rates were calculated for each segment and compared to the statewide average. Crash rates for each corridor were calculated with an ADT that used a

weighted average of the ADTs throughout the corridors. These crash rates are shown in Table 3.

The overall crash rates for all segments along both Northbound and Southbound I-75 were higher than the average crash rates for similar facilities in Ohio. The worst segment has a crash rate more than six times greater than the statewide average. Overall, the corridor has a crash rate of 3.54 acc/mvmt, which is more than two times greater than the statewide average rate of 1.338 acc/mvmt.

Along I-71, the crash rates for all of the segments are greater than the statewide average rates. The worst segment has a crash rate more than nineteen times the statewide average. The overall crash rate for the corridor is 5.26 accidents / million vehicle miles traveled (acc/mvmt), which is nearly four times the statewide average rate of 1.338 acc/mvmt. Table 3 shows crash rates for each segment.

Table 3: Crash Rates			
	Begin Mile	End Mile	Crash Rate
I-75 Corridor Segments	0.00	0.22	4.27
	0.22	0.41	5.90
	0.41	0.50	7.95
	0.50	0.63	8.30
	0.63	0.71	4.96
	0.71	0.86	2.42
	0.86	1.25	3.51
	1.25	1.43	3.10
	1.43	1.91	2.94
	1.91	2.52	2.55
	2.52	2.90	1.98
I-71 Corridor Segments	0.22	0.27	25.66
	0.27	0.48	6.27
	0.48	0.50	11.95
	0.50	0.90	1.85

Crash Data Observations. After reviewing the crash reports from ODPS and plotting the accidents in GIS, several observations were made about the corridors in the study area.

I-75 Northbound Observations

- There is a high concentration of rear-end accidents at SLM 0.10 right before the I-71/I-75 interchange.
- There is a high concentration of rear-end accidents at SLM 1.90 near the Findlay Street bridge.
- There is a high concentration of sideswipe accidents at SLM 0.20 near the I-71/I-75 interchange.
- High concentrations of sideswipe crashes were observed at SLM 1.00 near the 9th Street entrance ramp.
- High concentrations of sideswipe crashes were observed at SLM 1.20 near the Gest Street entrance ramp.
- There is a high concentration of wet road conditions and fixed object accidents at SLM 1.30 on a curve near the ramp bridges for Gest Street
- There is a high concentration of wet road conditions and fixed object accidents at SLM 1.70 on a curve near the entrance ramp from Ezzard Charles.

I-75 Southbound Observations

- Approximately 56% of the accidents that occurred on I-75 happened in the southbound lanes.
- There is a high concentration of rear-end accidents at SLM 0.10 where I-71 and I-75 merge together.
- There is a high concentration of rear-end accidents at SLM 1.00 near the 9th Street exit ramp.
- There is a high concentration of wet road condition and rear-end accidents at SLM 1.50 near the Ezzard Charles exit.
- There is a high concentration of rear-end accidents at SLM 1.80 near the Western Hills Viaduct exit.
- There is a high concentration of fixed object accidents at SLM 1.40 near the exit for Ezzard Charles.
- There is a high concentration of sideswipe accidents on southbound I-75 at SLM 0.10 and 0.20 near the I-71/I-75 interchange.
- There is a high concentration of sideswipe accidents near SLM 2.70 near the Western Hills Viaduct exit ramps.

I-71 Northbound Observations

- Approximately 57% of the accidents on I-71 were northbound.
- A high concentration of sideswipe crashes were observed near SLM 0.50, the area includes traffic exiting too the 2nd Street and entrance traffic merging from US 50 EB.
- A high concentration of rear-end and sideswipe accidents were observed near SLM 0.80 between the Race Street and Vine Street bridges.

I-71 Southbound Observations

- A high concentration of fixed object crashes were observed near SLM 0.50 this area has merging traffic from 3rd Street and exit ramps to US 50 NB.
- There are high concentrations of rear-end accidents between SLM 0.70 and 0.80 between Elm Street and Vine Street.

Kentucky

Crash Data Analyses. Traffic Crash data was collected from KYTC Division of Traffic Operations Traffic Safety Data Service for the study area, including I-71/75 from SLM 187.70 near the Dixie Highway, US 25, exit to SLM 191.77 at the Kentucky/Ohio border. The data includes a summary of crashes in the study area occurring between 2001 and 2003. All crashes were analyzed by the study team any inaccurate or missing data were corrected.

The accidents were plotted by year utilizing GIS shapefiles overlying aerial photography of the project corridor. A single dot represents each accident, and each dot is color-coded based on accident type. Observations based on the crash data may be found in the *Crash Rate Observation* Section of this report. These plots for the I-71/75 corridor can be found in Attachment C.

Crash reports from KYTC were analyzed to determine crash rates throughout the study area and to provide support for observations. Along the I-71/75 corridor within the study area, 676 accidents were logged between the years 2001 and 2003. The crash data in Attachment C shows each accident for I-71/75 and includes severity, location, date, time of day, weather condition, light condition, road condition, and accident type.

Along I-71/75, the crash severity rate ([fatality accidents + injury accidents] / total accidents) is 0.1953. Of the 676 total crashes, 349 of the accidents (51.6%) were attributed to rear-end type crashes; while another 219 (32.4%) were attributed to sideswipes. Approximately 67.3% of the crashes occurred during daylight, and about 74.3% occurred on dry pavement, suggesting that road and light conditions may not be large factors in influencing accidents since the majority of them took place during favorable situations.

Crash rates (accidents / million vehicle miles traveled) were also determined by the KYTC Division of Traffic Operations Traffic Safety Data Service. The overall crash rate for the corridor was found to be 130.363 acc/100mvmt. When compared to the average crash rates in Kentucky as found in Table 4 of the Kentucky Transportation Center College of Engineering “Analysis of Traffic Crash Data in Kentucky (2000-2004)” report, see Attachment E, the project area has a crash rate nearly 1.33 times higher than the average of 93 for the years 2000-2003 for similar types of roadway for 100 million vehicle miles traveled.

The Critical Rate Factor also calculated by the KYTC Division of Traffic Operations Traffic Safety Data Service for this corridor was found to be 1.304, nearly 7.67 times higher than the average of 0.17 in Kentucky for similar roadway types as compared to Table B-10 from the Kentucky Transportation Center College of Engineering “Analysis of Traffic Crash Data in Kentucky (2000-2004)” report, see Attachment E.

Crash Data Observations. After reviewing the crash reports from KYTC and plotting the accidents in GIS, several observations were made about the corridor in the study area.

I-71/75 Northbound Observations

- Approximately 56.4% of the accidents that occurred on I-71/75 happened in the northbound lanes.
- There is a high concentration of single vehicle crashes near SLM 189.70 on a curve.
- There are a high concentration of rear-end accidents at SLM 188.8 and 188.90 north of the Kyle’s Lane exit.

- There is a high concentration of rear-end accidents at SLM 191.00 near the 12th Street/Pike Street exit.
- There is a high concentration of rear-end accidents at SLM 191.20 near the 5th Street exit.

I-71/75 Southbound Observations

- There is a high concentration of rear-end accidents near the southbound 12th Street/Pike Street exit ramp.
- There is a high concentration of rear-end accidents near the 5th Street exit ramp from I-71/75 southbound.
- There is a high concentration of sideswipe accidents near the 5th Street exit ramp southbound.