

APPENDIX B

**Crash Analysis of Before and After I-64 Full-Closure
2008 Annual Report**

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Dr. Hojong Baik and Daxiao Liu (Student)

Executive Summary

On January 2, 2008, the Missouri Department of Transportation (MoDOT) closed I-64 for reconstruction purposes. During the planning stages of this reconstruction project, the plan to close all lanes of roadways was met with concern from many aspects, inciting questions from traffic safety engineers and even the general public alike: *Could closing the roadway possibly contribute to more (or less) crashes than before? And, if noticeable changes existed in the number and types of crashes, are the changes due to closing the roadway or other influencing factors?*

This study aims to answer these questions by examining crash data before and after the closure, and by providing objective explanations to the changes if any. To achieve this goal, this study conducts two analyses (i.e., Crash Analysis and Crash Rate analysis). In this report, we describe basic methods applied to the analyses, the data sets acquired for the analyses, and resulting conclusions. This study is an on-going research project, and thus will be continued to extend the analyses with more crash data whenever it is available. The main findings from two analyses are summarized as follow:

Crash Analysis:

The research team evaluated 5-year (2004-2008) crashes data that occurred on 16 different roadways in the vicinity of the I-64 closure. Using the data set, 1-year (i.e., 2008) post-closure crashes are compared to 4-year (2004-2007) pre-closure crashes in various ways. Table 1 and Figures 1-3 show the total number of crashes on each routes investigated. The major findings from the crash analysis are as follow:

- 1) Compared to year 2007, the number of crashes in 2008 slightly increased in the routes such as I-70 (4%), I-44 (4%), I-55 (5%) and MO 100 (6%) whereas the number decreased in the routes such as I-270, I-170, MO 340, US40/I-64 and MO141. Other routes almost stayed at the level same.
- 2) It is found that the crash increase on I-70 in 2008 was partly due to the record breaking heavy rain in 2008. This finding is confirmed by figure S-37 (Appendix page 57) showing the increasing trend of the out-of-control crashes on the same highway in 2008.
- 3) In cases of MO100 or I-70, the increasing trend started before the I-64 closure (i.e., before 2008). So, it is hard to infer whether the I-64 closure causes the crash to increase.
- 4) Although each route shows its own trend, the overall crashes on all three types of highways (i.e., interstate, MO, and US highways) have decreased in 2008.
- 5) The observational inspections conducted in this study leads us to a tentative conclusion that there is no strong evidence proving that I-64 closure contributed to the crash increase on the highways that are potentially influenced by the closure. Continuation of

this crash analysis through 2009 and 2010 will provide additional information that will either confirmed the tentative conclusion or provide information that changes this initial conclusion.

Table 1 shows the trend in total crashes for the various highways identified as highways that could be potentially impacted by the I-64 construction project.

Table 1: Total Crashes by year (2004 - 2008)

	Route	2004	2005	2006	2007	2008
Interstate Highway	I-44	1,100	1,061	1,037	1,086	1,126
	I-270	2,103	2,201	2,302	2,287	2,083
	I-64	1,624	1,610	1,494	1,205	717
	I-70	1,907	1,998	2,004	2,072	2,161
	I-170	906	827	904	873	815
	I-55	964	948	963	948	994
	All IS	8,604	8,645	8,704	8,471	7,896
MO Highway	MO366	655	645	652	519	526
	MO30	1,298	1,297	1,049	1,048	941
	MO100	1,179	1,085	1,019	1,086	1,146
	MO115	455	432	382	370	385
	MO180	879	822	721	689	675
	MO340	1,068	935	1,059	1,053	998
	All MO	5,534	5,216	4,882	4,765	4,671
US highway and ExpressWay	MO141	503	566	504	589	503
	RtD	728	682	636	690	699
	US61	853	828	819	791	761
	US67	484	386	396	358	345
	US40	489	536	553	529	344
	All US	3,057	2,998	2,908	2,957	2,652
Overall		17,195	16,859	16,494	16,193	15,219

Index value provides an easy way to display and show trends or changes. An established base year can be used to compare against other years to show increases or decreases from the base year. Example – 100 crashes occurred in the base year and 90 crashes occurred in the next year – the index value would be 0.9 (90 divided by 100) or a 10 percent reduction. Year 2004 is the based year and Figure 1 through 3 shows the resulting index values each highway type group.

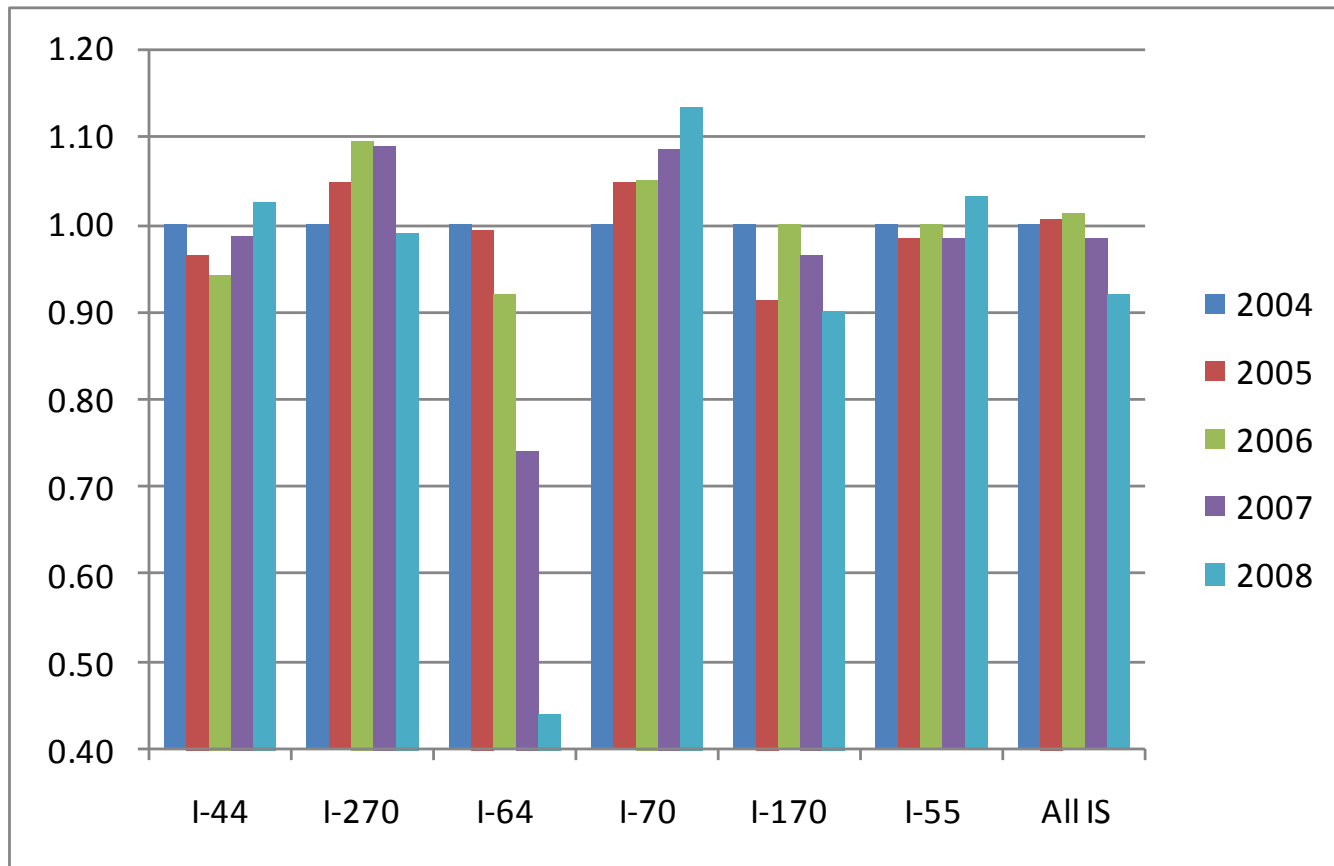


Figure 1: 5-year Crashes, Interstate Highway (2004 through 2008)

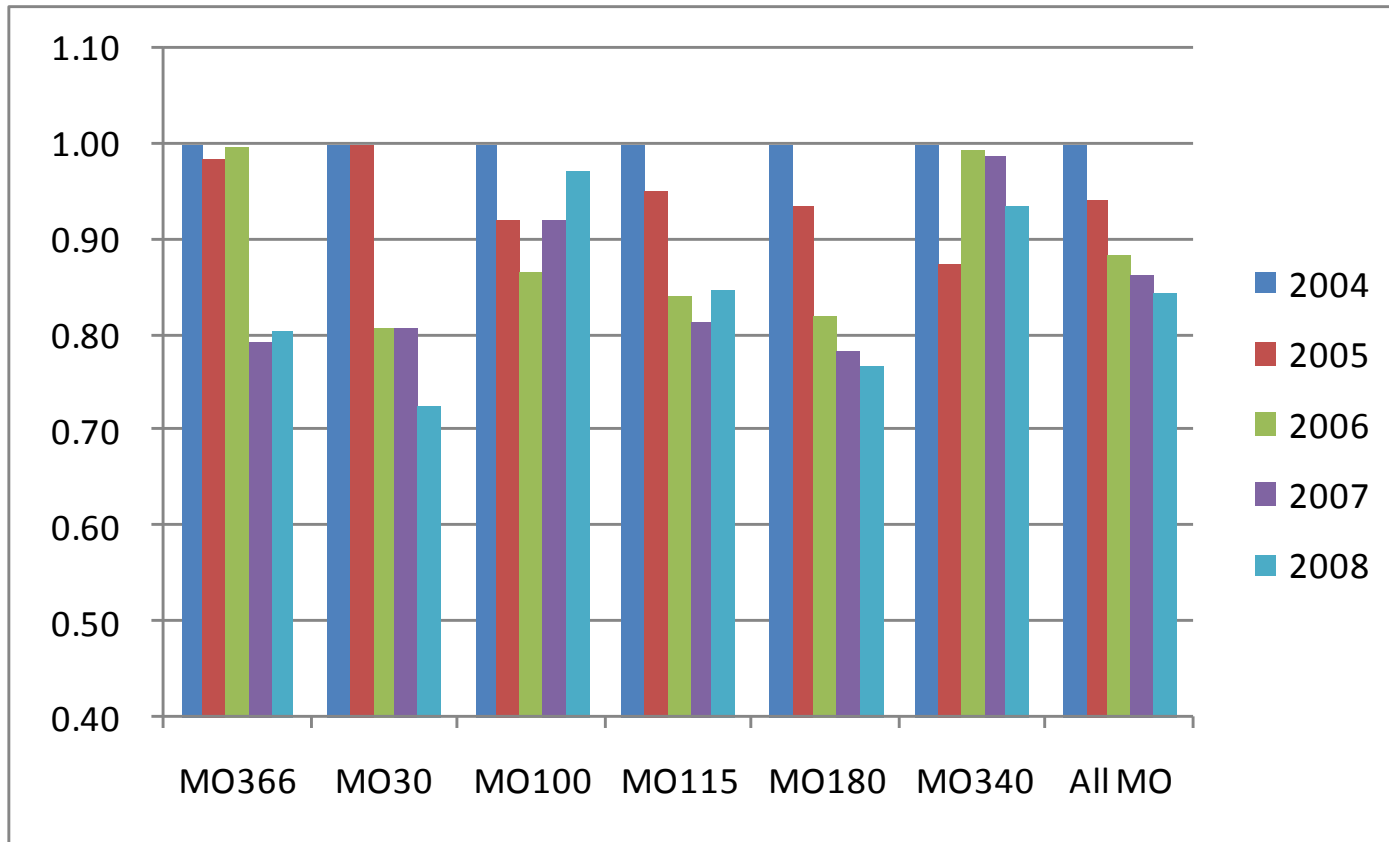


Figure 2: 5-year Crashes, MO Highway (2004 through 2008)

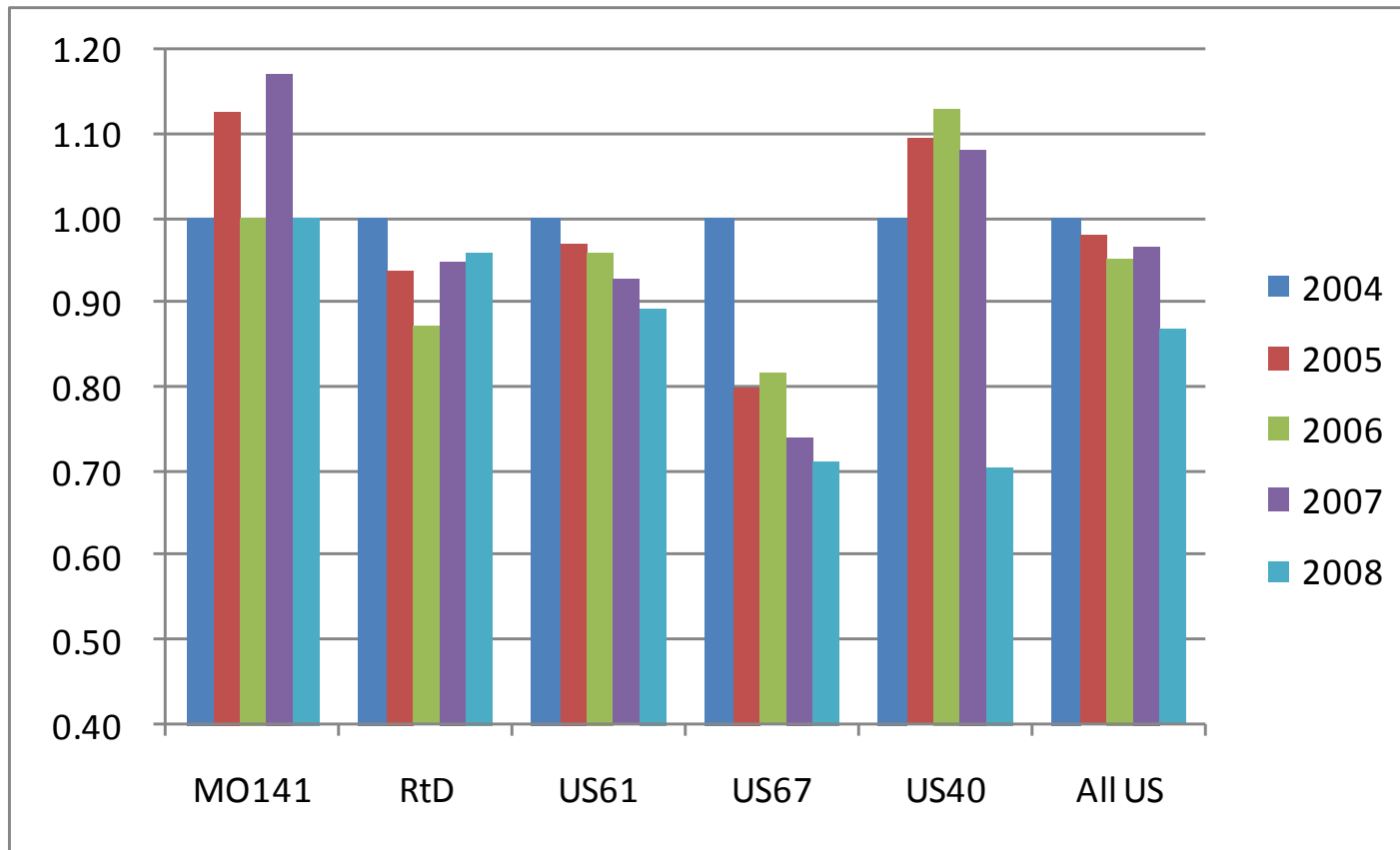


Figure 3: 5-year Crashes, US Routes and Expressways (2004 through 2008)

Crash Rates Analysis:

The crash rate represents the intensity of crashes relative to total vehicle miles traveled. For example, if roadway A shows a higher crash rate than roadway B, it indicates that roadway A is more vulnerable to crashes than roadway B in case the traffic volume and the roadway lengths of both roadways are same (i.e., under the same condition.) Table 2 and Figures 4 and 5 present the crash rates on the roadway investigated, and the major findings from the crash analysis are as follow:

- 1) Compared to year 2007, crash rates on most routes either decrease or remain about same in 2008 except for six routes including I-70 (4%), I-55 (6%), MO 366 (4%), MO100 (8%), MO115 (6%) and MO Route D (3%).
- 2) However, it is hard to conclude that I-64 closure caused the crash rate to increase in year 2008 since either this increasing trend started before the I-64 closure or less the highest crash rate over the four baseline years (2005 through 2007).
- 3) The I-55 Southbound section showed an increase in 2008, further investigation is recommended when more crash data are available.
- 4) US-61 shows the highest crash rates over the evaluated years, but the crash rate decreased in 2008 as compared to 2007. Since US-61 is routed over both US-40 and US-67 in the study area, some recent indications have risen that crashes might be logged to the wrong route causing a higher rate for US-61 and lesser for US-40 and US-67.

Table 2: All Crash Rate (Both Directions)

		2004	2005	2006	2007	2008
Interstate Highway	I-44	162	157	150	156	157
	I-270	154	161	165	162	155
	I-64	226	226	207	169	119
	I-70	196	205	215	218	226
	I-170	217	199	215	206	193
	I-55	153	151	143	139	147
MO Highway	MO366	392	396	406	321	335
	MO30	568	579	465	466	427
	MO100	553	521	498	530	572
	MO115	645	611	647	633	673
	MO180	461	441	444	424	425
	MO340	516	471	465	462	433
US highway and ExpressWay	MO141	350	404	353	412	359
	RtD	407	388	364	396	409
	US40	100	110	120	116	77
	US67	346	290	325	294	268
	US61	900	894	800	833	818

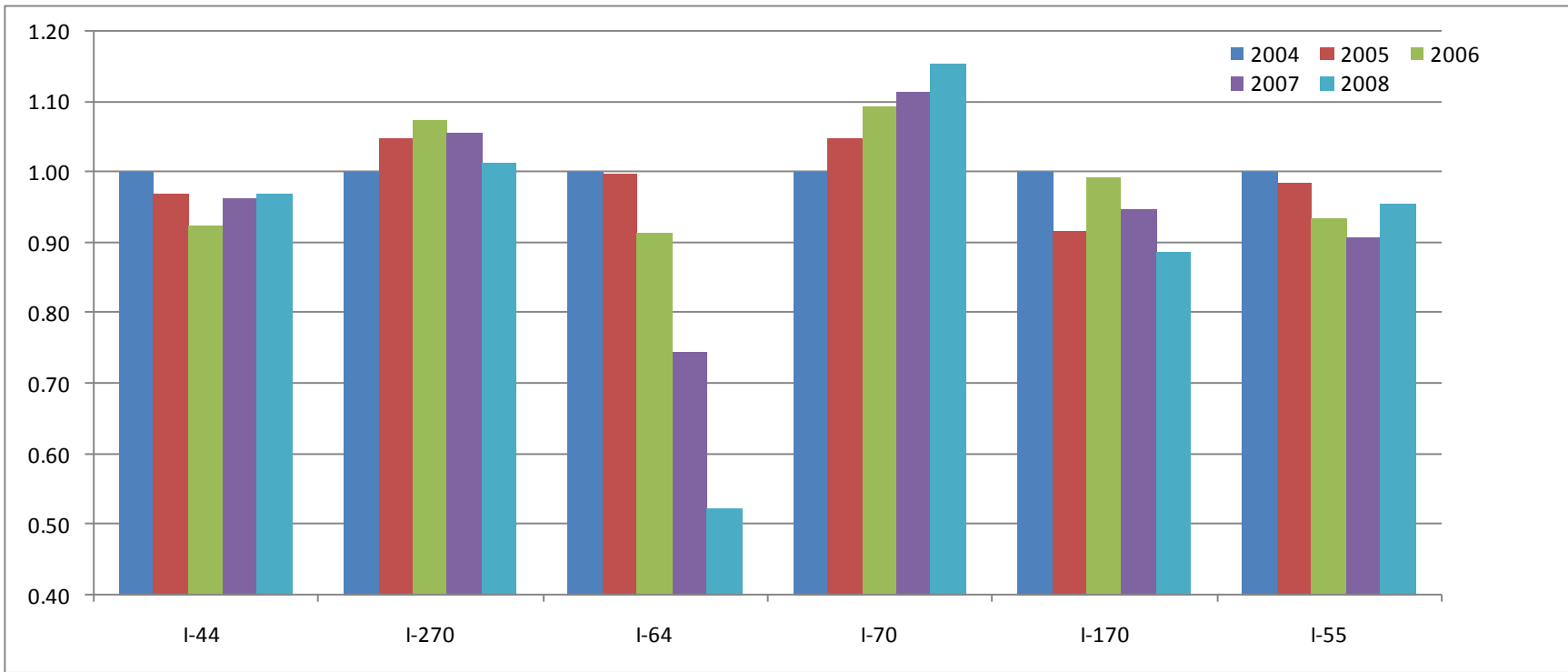


Figure 4: 5-year Relative Crash Rate, Interstate Highway (Both Directions, Base year: 2004)

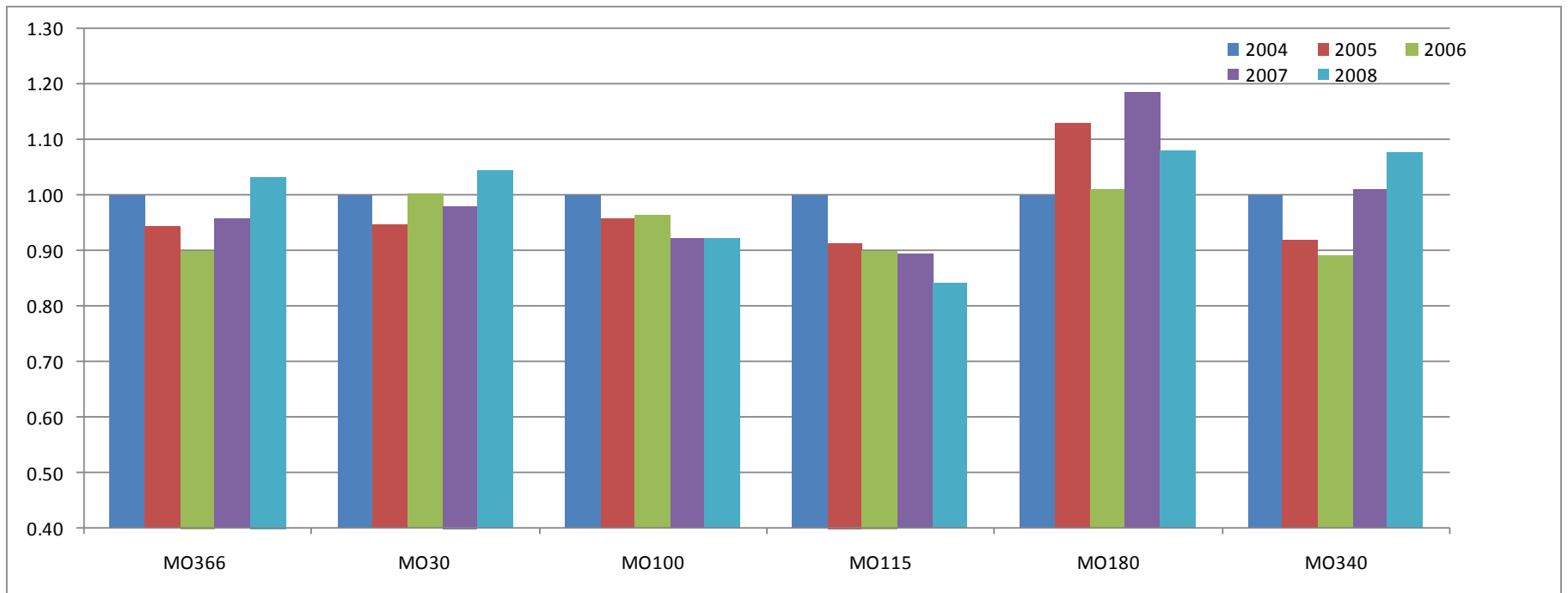


Figure 5: 5-year Relative Crash Rate, MO Highway (Both Directions, Base year: 2004)

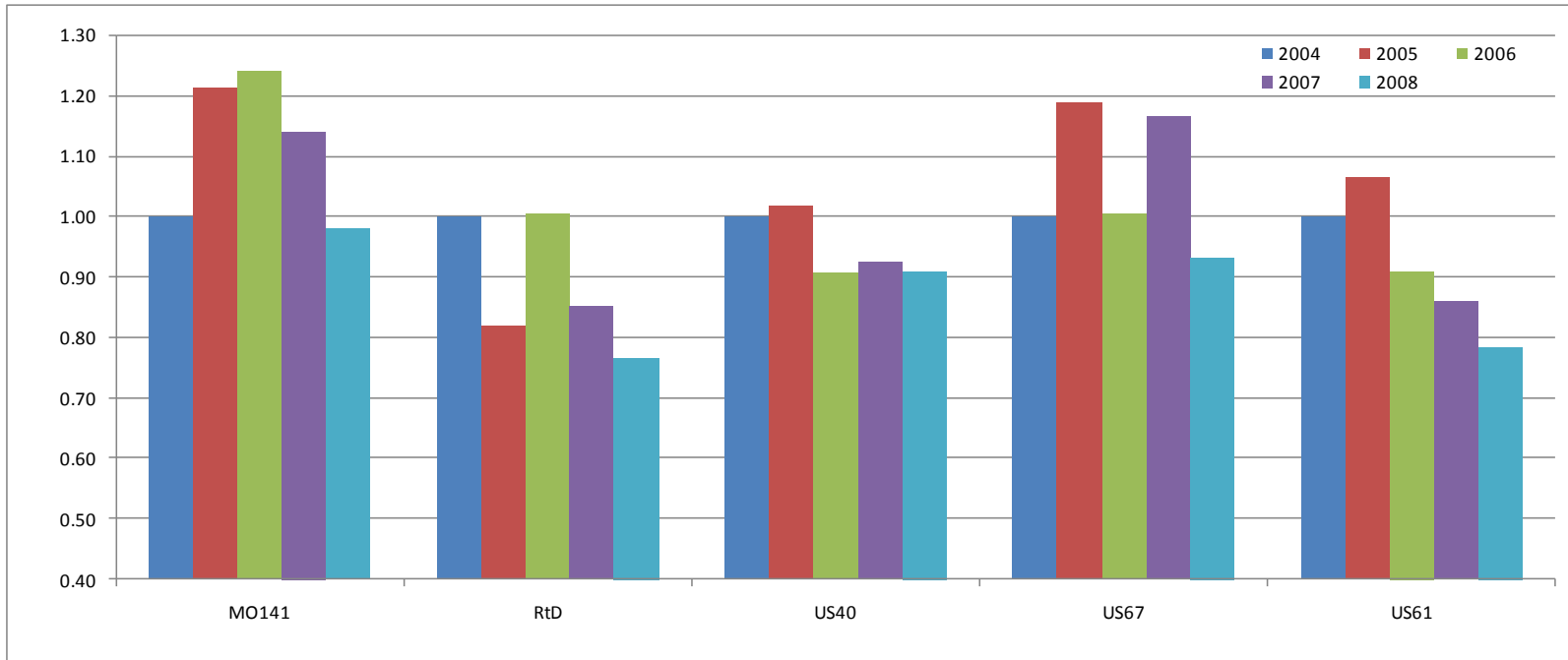


Figure 6: 5-year Relative Crash Rate, US Highway and Expressway (Both Directions, Base year: 2004)

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1 Introduction

1.1 Main goal and objectives of this study

On January 2, 2008, the Missouri Department of Transportation (MoDOT) closed I-64 for reconstruction purposes. During the planning stages of this reconstruction project, the plan to close all lanes of roadways was met with concern from many aspects, inciting questions from traffic safety engineers and even the general public alike: *Could closing the roadway possibly contribute to more (or less) crashes than before? And, if noticeable changes existed in the number and types of crashes, are the changes due to closing the roadway or other influencing factors?*

This study aims to answer these questions by examining crash data before and after the closure, and by providing objective explanations to the changes if any. In other words, this study will decide whether the I-64 project impact the crashes during the construction period. In order to achieve the goal, we set two objectives: 1) to examine crash data collected from roadways in the vicinity of the I-64 closure area, and 2) identify analytical evidences proving any impacts of I-64 closure on the crashes.

1.2 Methodology

The crash analysis is considered as a complicate and challenging task. This is mainly because there are multiple factors are involved in crashes. For instance, the contributing factors could be roadway, congestion, weather, human error or combination of these factors. In order to investigate the multifaceted contributing factors efficiently, following three procedural steps are set up in this study:

Step 1 (data acquirement): As the first step of the analysis, the crash data will be obtained from MoDOT's Transportation Management System (TMS) database for selected roadways whose traffic patterns could potentially be influenced by I-64 closure. In addition to the crash data, annual average daily traffic (AADT) is also acquired to identify any causal relationship between traffic volume and crashes.

Step 2 (develop a data retrieving tool): This study develops a computer programming tool that can efficiently and promptly extract the information required for the analysis from the crash data. The tool is also designed to effectively represent the extracted data in a various formats such as graphs and tables so that it can provide the analysts with a flexible tool for examining the multifaceted crash data.

Step 3 (analyzing the crash data): Adopting observational before-after analysis methods, this step examines the data extracted from the crash data using the tool developed in step 2 from different angles. For example, the crash data is extracted in a chronological sequence with different influencing factors such as cause, severity type, weather, etc, and then examined to identify any evidence proving the impact of I-64 closure on the crashes on roadway around the construction area.

This crash analysis is an on-going task. The results reported in this study are based on 5-year crash data that includes 4-year of before and 1-year of after the I-64 closure data. In order to include more data points after the closure, the analysis will be repeated when full set of 2009 crash data is available. In the meantime, literature reviews will be carried out and more scientific before-after analysis methods will be tested to the data sets.

2 Data Collection

2.1 Crash Data

MoDOT provided the research team with the crash data and the traffic volume data for 17 roadways selected by the team. Table S1 summarizes the list of roadways and data sets that are to be acquired. Besides crash data, AADT is also requested to investigate potential relationship between crashes and traffic volume. In order to find historical trend in crashes, all data is obtained for 5-year time period (i.e., 2004-2008). In the table, cells in green indicate the routes and data sets that are analyzed and included in this study and other data sets in pink are to be analyzed in the near future.

Table S1: Crash and AADT data collected

Route	From	To	Crash Data	AADT
I-44	Route 141	I-55	2004 through 2008	2004 through 2008
I-55	St. Louis County	Illinois State Line	2004 through 2008	2004 through 2008
I-64	St. Louis County	I-55	2004 through 2008	2004 through 2008
I-70	St. Louis County	I-55	2004 through 2008	2004 through 2008
I-170	i-270	I-64	2004 through 2008	2004 through 2008
I-270	370	I-55	2004 through 2008	2004 through 2008
30	St. Louis County	I-55	2004 through 2008	2004 through 2008
61-67	I-55	I-270	2004 through 2008	2004 through 2008
100	Route 141	Chouteau Avenue	2004 through 2008	2004 through 2008
115	I-70	Kingshighway Blvd.	2004 through 2008	2004 through 2008
141	I-44	Route 340	2004 through 2008	2004 through 2008
180	I-270	Kingshighway Blvd.	2004 through 2008	2004 through 2008
340	Route 141	Skinker Parkway	2004 through 2008	2004 through 2008
364 - D	St. Louis County	Skinker Parkway	2004 through 2008	2004 through 2008
366	I-44	Route 30	2004 through 2008	2004 through 2008
Clayton Road	Route 141	Skinker Blvd.	2004 through 2008	2004 through 2008
Forest Park Parkway	I-170	Kingshighway Blvd.	2004 through 2008	2004 through 2008
Hanley Road	Paage Avenue	Manchester Road	2004 through 2008	2004 through 2008
Ladue Road	Route 141	I-170	2004 through 2008	2004 through 2008

(Green: routes included in this study, pink: routes to be included in the near future.)

Table S2 shows an example of the crash data provided by MoDOT. As seen in the table, each crash record includes information on the location by a route log mile system, direction, time, severity, cause, surface, light, weather, etc. Using the data sets provided, a data dictionary is developed for each categorical field such as severity type, cause, weather, light, etc. Then, the data dictionaries are used as basic information in developing the data extraction tool.

Table S2: Crash Data on I-44 (Sample)

County	Dir	Cont Log	Accident Class	Accident Date	Severity	Image #	Intersection #	Log Unit	Intrsc	Intrchg	Crpd	Light Cond	Road Surf Con	Weather Conc	Tway Id	Property Dam	Day of Week	Time
ST. LOUIS	IS	44 E	272.383	REAR END	9/4/2006	PROPERTY DAMAGE ONLY	60099048	307719	14.173	Y	Y	DAYLIGHT	WET	CLOUDY	9	OTHER	MON	1452
ST. LOUIS	IS	44 E	272.387	BACKING	7/19/2006	PROPERTY DAMAGE ONLY	3060005461	307719	14.177	Y	Y	DAYLIGHT	DRY	CLEAR	9	NONE	WED	1100
ST. LOUIS	IS	44 E	272.391	REAR END	8/6/2004	PROPERTY DAMAGE ONLY	40094836	307719	14.181	Y	Y	DAYLIGHT	DRY	CLEAR	9	NONE	FRI	1225
ST. LOUIS	IS	44 E	272.396	REAR END	3/21/2004	PROPERTY DAMAGE ONLY	40032463	307719	14.186	Y	Y	DAYLIGHT	DRY	CLEAR	9	NONE	SUN	1225
ST. LOUIS	IS	44 E	272.397	REAR END	6/22/2006	MINOR INJURY	60024432	307719	14.187	Y	Y	DAYLIGHT	WET	RAIN	9	NONE	THU	1700
ST. LOUIS	IS	44 E	272.399	REAR END	12/9/2004	PROPERTY DAMAGE ONLY	40149538	307719	14.189	Y	Y	DAYLIGHT	DRY	CLEAR	9	NONE	THU	737
ST. LOUIS	IS	44 E	272.403	REAR END	12/18/2005	PROPERTY DAMAGE ONLY	50139513	307719	14.193	Y	Y	DAYLIGHT	DRY	CLOUDY	9	NONE	SUN	1125
ST. LOUIS	IS	44 E	272.404	REAR END	4/26/2005	PROPERTY DAMAGE ONLY	50050215	307719	14.194	Y	Y	DAYLIGHT	DRY	CLEAR	9	NONE	TUE	830
ST. LOUIS	IS	44 E	272.406	REAR END	2/18/2004	PROPERTY DAMAGE ONLY	40026233	307719	14.196	Y	Y	DAYLIGHT	DRY	CLEAR	9	NONE	WED	930
ST. LOUIS	IS	44 E	272.406	REAR END	3/19/2004	PROPERTY DAMAGE ONLY	40032443	307719	14.196	Y	Y	DAYLIGHT	DRY	CLEAR	9	NONE	FRI	645
ST. LOUIS	IS	44 E	272.406	REAR END	3/22/2004	PROPERTY DAMAGE ONLY	40032535	307719	14.196	Y	Y	DAYLIGHT	DRY	CLEAR	9	NONE	MON	1325
ST. LOUIS	IS	44 E	272.406	REAR END	6/1/2004	PROPERTY DAMAGE ONLY	40074040	307719	14.196	Y	Y	DAYLIGHT	DRY	CLEAR	9	NONE	TUE	1315
ST. LOUIS	IS	44 E	272.406	REAR END	7/8/2004	PROPERTY DAMAGE ONLY	40084142	307719	14.196	Y	Y	DARK W/ STREET LIGHTS ON	DRY	CLEAR	9	NONE	THU	2115
ST. LOUIS	IS	44 E	272.406	REAR END	3/2/2005	PROPERTY DAMAGE ONLY	50032008	307719	14.196	Y	Y	DAYLIGHT	DRY	CLEAR	9	NONE	WED	805
ST. LOUIS	IS	44 E	272.406	OUT OF CONTROL	7/4/2005	PROPERTY DAMAGE ONLY	50081177	307719	14.196	Y	Y	DAYLIGHT	WET	CLOUDY	9	NONE	MON	1430
ST. LOUIS	IS	44 E	272.406	REAR END	8/13/2005	PROPERTY DAMAGE ONLY	50093364	307719	14.196	Y	Y	DARK W/ STREET LIGHTS OFF	WET	CLOUDY	9	NONE	SAT	2127
ST. LOUIS	IS	44 E	272.406	PASSING	9/26/2006	PROPERTY DAMAGE ONLY	60099480	307719	14.196	Y	Y	DARK W/ STREET LIGHTS ON	DRY	CLEAR	9	NONE	TUE	543
ST. LOUIS	IS	44 E	272.406	BACKING	2/12/2007	PROPERTY DAMAGE ONLY	70026787	307719	14.196	Y	Y	DAYLIGHT	DRY	CLOUDY	9	NONE	MON	720
ST. LOUIS	IS	44 E	272.406	REAR END	1/31/2007	PROPERTY DAMAGE ONLY	70036507	307719	14.196	Y	Y	DAYLIGHT	DRY	CLEAR	9	NONE	WED	658
ST. LOUIS	IS	44 E	272.406	REAR END	4/3/2007	MINOR INJURY	70051925	307719	14.196	Y	Y	DAYLIGHT	DRY	CLEAR	9	NONE	TUE	814
ST. LOUIS	IS	44 E	272.406	REAR END	5/7/2007	MINOR INJURY	70062486	307719	14.196	Y	Y	DAYLIGHT	DRY	CLEAR	9	NONE	MAY	1555
ST. LOUIS	IS	44 E	272.406	REAR END	5/23/2007	PROPERTY DAMAGE ONLY	70067866	307719	14.196	Y	Y	DAYLIGHT	DRY	CLEAR	9	NONE	WED	1355
ST. LOUIS	IS	44 E	272.406	REAR END	6/25/2007	PROPERTY DAMAGE ONLY	70079777	307719	14.196	Y	Y	DAYLIGHT	DRY	CLOUDY	9	NONE	MAY	1255
ST. LOUIS	IS	44 E	272.406	REAR END	8/10/2007	PROPERTY DAMAGE ONLY	70099522	307719	14.196	Y	Y	DAYLIGHT	DRY	CLEAR	9	NONE	FRI	1810
ST. LOUIS	IS	44 E	272.406	REAR END	2/23/2008	PROPERTY DAMAGE ONLY	80023215	307719	14.196	Y	Y	DAYLIGHT	WET	CLEAR	9	NONE	SAT	1505
ST. LOUIS	IS	44 E	272.406	REAR END	2/26/2008	MINOR INJURY	80023257	307719	14.196	Y	Y	DAYLIGHT	DRY	CLOUDY	9	NONE	TUE	1630
ST. LOUIS	IS	44 E	272.406	PASSING	5/3/2008	PROPERTY DAMAGE ONLY	80061302	307719	14.196	Y	Y	DAYLIGHT	DRY	CLOUDY	9	NONE	SAT	1100
ST. LOUIS	IS	44 E	272.406	OUT OF CONTROL	8/4/2008	MINOR INJURY	80112531	307719	14.196	Y	Y	DAYLIGHT	DRY	CLEAR	9	NONE	MON	915
ST. LOUIS	IS	44 E	272.406	REAR END	8/22/2008	PROPERTY DAMAGE ONLY	80114781	307719	14.196	Y	Y	DAYLIGHT	DRY	CLEAR	9	NONE	FRI	745
ST. LOUIS	IS	44 E	272.406	REAR END	9/9/2008	MINOR INJURY	80126655	307719	14.196	Y	Y	DAYLIGHT	DRY	CLEAR	9	NONE	TUE	700
ST. LOUIS	IS	44 E	272.406	DEER	10/18/2008	PROPERTY DAMAGE ONLY	80134538	307719	14.196	Y	Y	DARK W/ STREET LIGHTS ON	DRY	CLEAR	9	NONE	SAT	1100
ST. LOUIS	IS	44 E	272.406	REAR END	3/17/2004	PROPERTY DAMAGE ONLY	1040017412	307719	14.196	Y	Y	DAYLIGHT	DRY	CLEAR	9	NONE	WED	650

It should be noted that when a crash happened at an interchange (or intersection) of a roadway is reported, it could be reported at either of the intersecting roadways. To avoid any practical confusion, MoDOT applies a hierarchical rule that entitles the primary road to the roadway which is higher in the highway system hierarchy, and the secondary to the other roadway. For example, if a crash happened at the interchange of I-44 E and MO 141 E, it is reported on I-44 as the primary roadway and MO141 as a secondary roadway. Depending on what type of roadway is used in the analysis, two different results can be obtained. For the consistency and a realistic view of what is happening, this report includes crashes occurring on the mainline roadway to mainline roadway and crashes occurring within the interchanges to the secondary roadway.

The location of each crash is reported using a continuous log system where a crash location is measured from a certain starting point of the roadway within the state to the crash location. It is pointed out that AADT data is reported using a single logging system for both directions, but the crash data is reported using two logging systems that are different by direction. For example, AADT data on I-44 in St. Louis are recorded in miles ranged from 272 to 290 mile for both directions, but crashes on I-44 E are recorded in the same range of 272-290 mile, but crashes on I-44 W is recorded in the range of 0-18 mile. It is believed that adjustment of log system is doable, but mainly due to lack of time, crash rate analysis that requires the AADT information is based on one way in this study. However, the crash analysis that does not require any log information considers all crashes for both directions.

Very few records are found to be incomplete (see Table S3) and are ignored in the analysis assuming that the impact of the elimination is negligible.



Table S3: Missing Record Information in I-55SB BROWSER

1	County	Desg	TravelwayDir	Cont Log	Accident C	Accident Da	Severity R	Image #	Intersecti	Log Unit	Intrsc	Intrchg	Grpd	Light Conc	Road Surf	Weather C	Tway Id	Property I	Day of We	Time
1994	ST. LOUIS	IS	55 S	12.33	PASSING	10/12/2006	PROPERTY	60111749	313256	4,268	Y	Y		DAYLIGHT	DRY	CLEAR	13 NONE	THU	1220	
1995	ST. LOUIS	IS	55 S	12.33	REAR END	12/10/2006	PROPERTY	60138134	313256	4,268	Y	Y		DARK W/	DRY	CLOUDY	13 NONE	SUN	1830	
1996	ST. LOUIS	IS	55 S	12.33	REAR END	4/20/2007	MINOR IN	70057321	313256	4,268	Y	Y		DAYLIGHT	DRY	CLEAR	13 NONE	FRI	1015	
1997	ST. LOUIS	IS	55 S	12.33							Y	Y		DARK W/	DRY	CLEAR	13 NONE	FRI	2356	
1998	ST. LOUIS	IS	55 S	12.33	PASSING	11/10/2007	PROPERTY	70129340	313256	4,268	Y	Y		DAYLIGHT	DRY	CLEAR	13 NONE	SAT	1259	
1999	ST. LOUIS	IS	55 S	12.33	REAR END	11/26/2007	PROPERTY	70129684	313256	4,268	Y	Y		DAYLIGHT	WET	RAIN	13 NONE	MON	1225	
2000	ST. LOUIS	IS	55 S	12.33	REAR END	12/22/2007	PROPERTY	70140794	313256	4,268	Y	Y		DAYLIGHT	DRY	CLEAR	13 NONE	SAT	825	
2001	ST. LOUIS	IS	55 S	12.33	REAR END	1/25/2008	PROPERTY	80012033	313256	4,268	Y	Y		DARK W/	DRY	CLEAR	13 NONE	FRI	2210	
2002	ST. LOUIS	IS	55 S	12.33	OUT OF CL	3/18/2008	PROPERTY	80036800	313256	4,268	Y	Y		NOT STAT	WET	CLOUDY	13 NONE	TUE	800	
2003	ST. LOUIS	IS	55 S	12.33	REAR END	3/24/2008	PROPERTY	80036910	313256	4,268	Y	Y		DAYLIGHT	WET	CLEAR	13 NONE	MON	900	

2.2 AADT Data

Table S4 shows a sample of AADT data obtained from MODOT. As seen in the table, AADT data includes information on segment name, starting and ending continuous logs, direction, year, and AADT traffic counts. Directions for certain road sections are reported as 'U' rather than either 'E', 'W', 'S' or 'N' indicating an undivided roadway. In this case, it is assumed that the AADT is equally allocated to both directions.

Table S4: AADT Data

		Missouri Department of Transportation Transportation Planning Traffic Information (TR50) Sort: Year						June 2, 2009 10:58:31 AM	
TR50Y1		2008 AADT							
ST. LOUIS COUNTY  IS 270 E (Travelway Id : 6135)		Traffic Information (TR50) Sort : Year							
Description	Continuous Beg Log	Continuou s End Log	Dir	Site ID	St Svs	FC	Section	Year	Quantity
IS 55 to MO 21	0.545	2.145	E		IS	IS	1	2008	77,902
			W		IS	IS			64,237
MO 21 to MO 30	2.145	3.915	E	742	IS	IS	1	2008	74,423
			W		IS	IS			71,448
MO 30 to IS 44	3.915	6.128	E		IS	IS	1	2008	80,396
			W		IS	IS			77,200
IS 44 to BIG BEND BLVD	6.128	7.634	E	736	IS	IS	2	2008	73,831
			W		IS	IS			72,574
BIG BEND BLVD to DOUGHER	7.634	8.734	E		IS	IS	2	2008	83,741
			W		IS	IS			82,347
DOUGHERTY FERRY RD to M	8.734	10.260	E		IS	IS	2	2008	78,602
			W		IS	IS			77,290
MO 100 to IS 64	10.260	12.702	E	725	IS	IS	3	2008	84,178
			W		IS	IS			79,379
IS 64 to RT AB	12.702	13.847	E	724	IS	IS	4	2008A	94,920
			W		IS	IS			93,553
RT AB to MO 340	13.847	14.993	E		IS	IS	4	2008	100,940
			W		IS	IS			115,182
MO 340 to MO 364-RT D	14.993	16.810	E	616	IS	IS	5	2008	94,738
			W		IS	IS			87,326
MO 364-RT D to DORSETT RI	16.810	17.937	E		IS	IS	6	2008	82,110
			W		IS	IS			87,471
DORSETT RD to IS 70	17.937	20.315	E	701	IS	IS	6	2008	82,366
			W		IS	IS			88,709

3 Crash Data Analysis Results

3.1 Crash Analysis

In this study, crash data from 2004 through 2007 is used to develop the baseline information. Four years of pre-closure crash data is expected to provide a good base to evaluate and compare to the I-64 construction closure period. For more efficient comparison, all tables and graphs from the tool are grouped into three categories according to the roadway type, i.e.

- a) Type 1: Interstate highways including I-170, I-270, I-44, I-55, I-64 and I-70,
- b) Type 2: Missouri Highways including MO 30, MO 100, MO 115, MO 180, MO 340 and MO 366, and
- c) Type 3: US highways and Expressways including US40, MO141, MO Route-D, US61 and US67.

In order to understand a basic picture about the number of crashes trend changing from 2004 to 2008, all crashes happening from 2004 through 2008 on all roadways are summarized. Table S5 and Figures S1-S3 illustrate the total number of crashes by roadway type. In 2008, compared with the 2007 year crash data, the number of crashes on most of the routes didn't change dramatically. Here, the total crashes on I-64 in 2008 are 488 less than those in 2007 (reduced by 40%). Obviously, this reduction is due to the 5-mile re-construction closure. However, it should also be noticed that total crashes on all Interstate highways also decreased by 575 during the same period, and this overall reduction exceeds the reduction on I-64. This indicates that although I-64 closure caused the traffic to spread to other routes, the total regional crashes on major interstate highways around the closure area still decreased.

Compared to year 2007, the number of crashes on 2008 slightly increased in the routes such as I-70, I-44, I-55 and MO 100 whereas the number decreased in the routes such as I-270, I-170, MO 340, US40 and MO141. Other routes almost stayed at the level same. However, it is interesting to observe (in Table S5) that although each route has its own trend, the overall crashes on all three types of highways decreased in 2008 (i.e., after I-64 re-construction closure) compared to the previous year, 2007. The table also reveals that during the 5-year (2004-2008) period, the overall crashes on both MO and US highways have been continuously decreasing, and furthermore total crashes on all routes investigated have been decreasing since 2004. Considering the increasing traffic, this can be considered as a remarkable result.

Table S5: Total Crashes by year (2004 - 2008)

	Route	2004	2005	2006	2007	2008
Interstate Highway	I-44	1,100	1,061	1,037	1,086	1,126
	I-270	2,103	2,201	2,302	2,287	2,083
	I-64	1,624	1,610	1,494	1,205	717
	I-70	1,907	1,998	2,004	2,072	2,161
	I-170	906	827	904	873	815
	I-55	964	948	963	948	994
	All IS	8,604	8,645	8,704	8,471	7,896
MO Highway	MO366	655	645	652	519	526
	MO30	1,298	1,297	1,049	1,048	941
	MO100	1,179	1,085	1,019	1,086	1,146
	MO115	455	432	382	370	385
	MO180	879	822	721	689	675
	MO340	1,068	935	1,059	1,053	998
	All MO	5,534	5,216	4,882	4,765	4,671
US highway and ExpressWay	MO141	503	566	504	589	503
	RtD	728	682	636	690	699
	US61	853	828	819	791	761
	US67	484	386	396	358	345
	US40	489	536	553	529	344
	All US	3,057	2,998	2,908	2,957	2,652
Overall		17,195	16,859	16,494	16,193	15,219

Another way to represent the trend is to use 'relative' values where the total crashes on the base year is set to be '1' and the crashes in the other years are relative to that value. Table S6 shows 5-year 'relative' crashes for routes investigated. (In the table, the base year is 2004.)

Although Table S6 is a reflection of the previous table, the table shows the trend more clearly. As seen in the table, the overall crashes on both US and MO highways have continuously decreased for the past 5 years (20004-2008) resulting in 14% and 16% less crashes in 2008 (compared to 2004) on US and MO highways respectively. The same information is depicted in Figures S1-S3 by roadway type.

Table S6: Relative Crashes by year (2004 - 2008)

	Route	2004	2005	2006	2007	2008
Interstate Highway	I-44	1.00	0.96	0.94	0.99	1.02
	I-270	1.00	1.05	1.09	1.09	0.99
	I-64	1.00	0.99	0.92	0.74	0.44
	I-70	1.00	1.05	1.05	1.09	1.13
	I-170	1.00	0.91	1.00	0.96	0.90
	I-55	1.00	0.98	1.00	0.98	1.03
	All IS	1.00	1.00	1.01	0.98	0.92
MO Highway	MO366	1.00	0.98	1.00	0.79	0.80
	MO30	1.00	1.00	0.81	0.81	0.72
	MO100	1.00	0.92	0.86	0.92	0.97
	MO115	1.00	0.95	0.84	0.81	0.85
	MO180	1.00	0.94	0.82	0.78	0.77
	MO340	1.00	0.88	0.99	0.99	0.93
	All MO	1.00	0.94	0.88	0.86	0.84
US highway and ExpressWay	MO141	1.00	1.13	1.00	1.17	1.00
	RtD	1.00	0.94	0.87	0.95	0.96
	US61	1.00	0.97	0.96	0.93	0.89
	US67	1.00	0.80	0.82	0.74	0.71
	US40	1.00	1.10	1.13	1.08	0.70
	All US	1.00	0.98	0.95	0.97	0.87
Overall		1.00	0.98	0.96	0.94	0.89

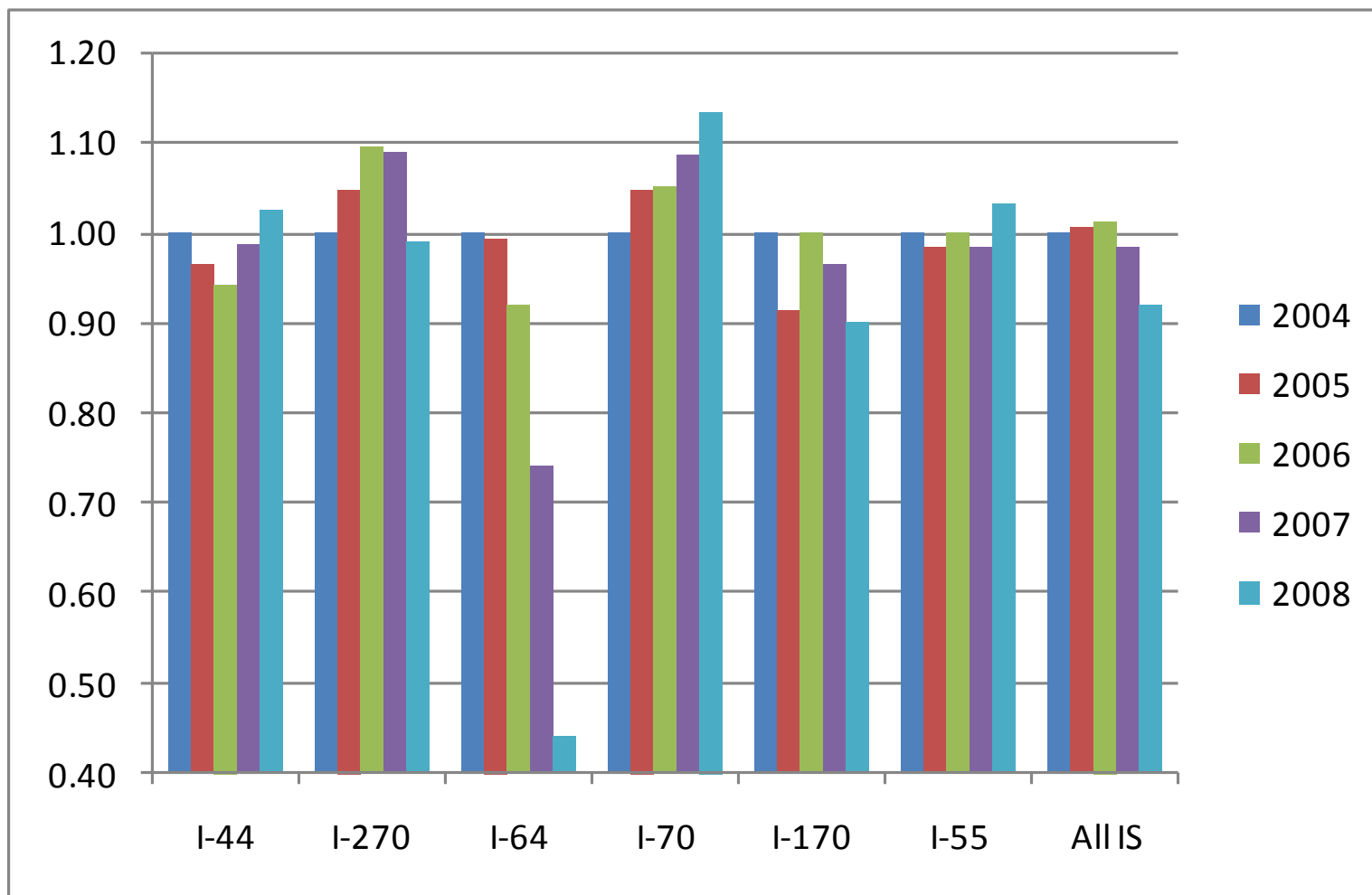


Figure S1: 5-year Crashes, Interstate Highway (2004 through 2008)

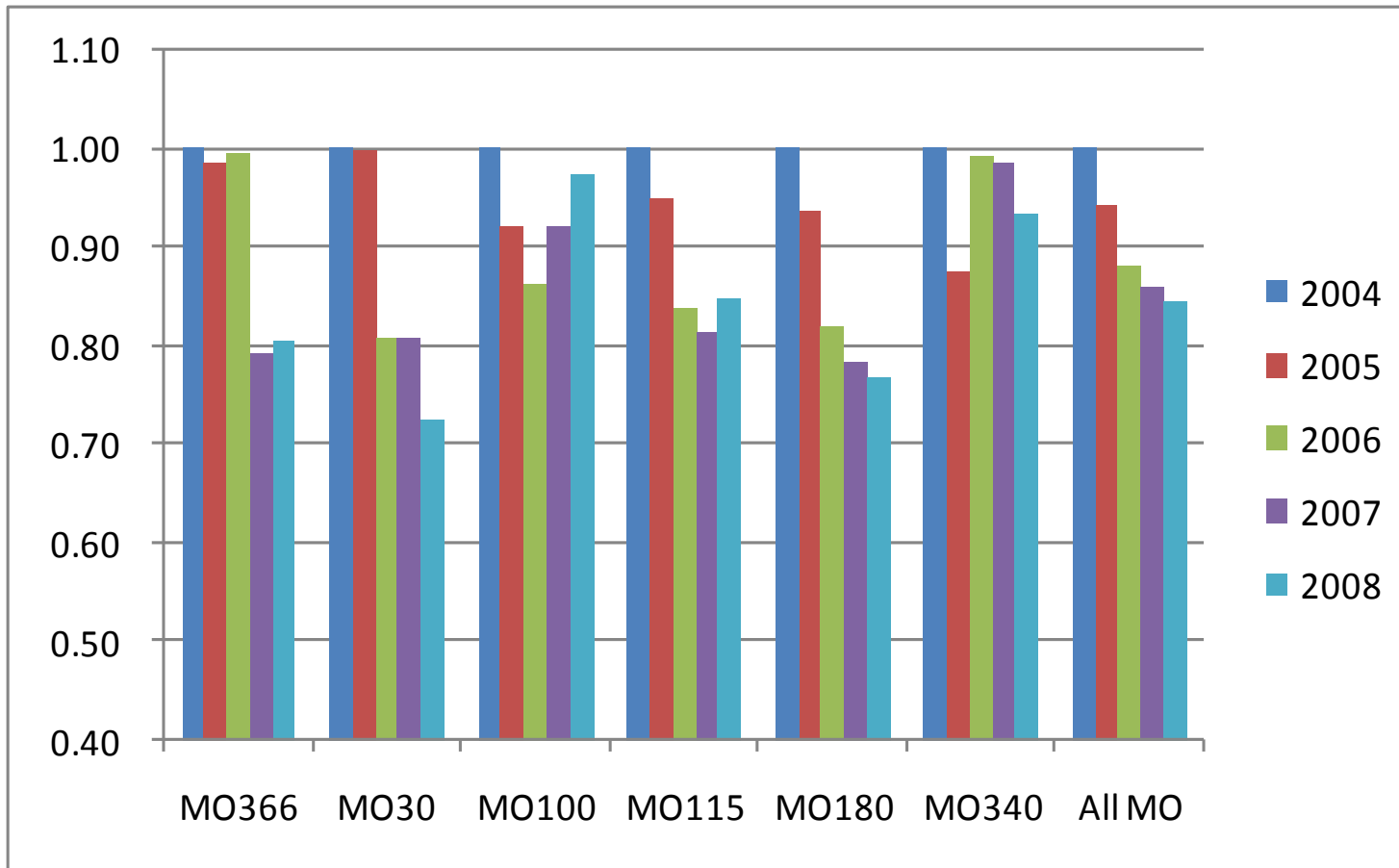


Figure S2: 5-year Crashes, MO Highway (2004 through 2008)

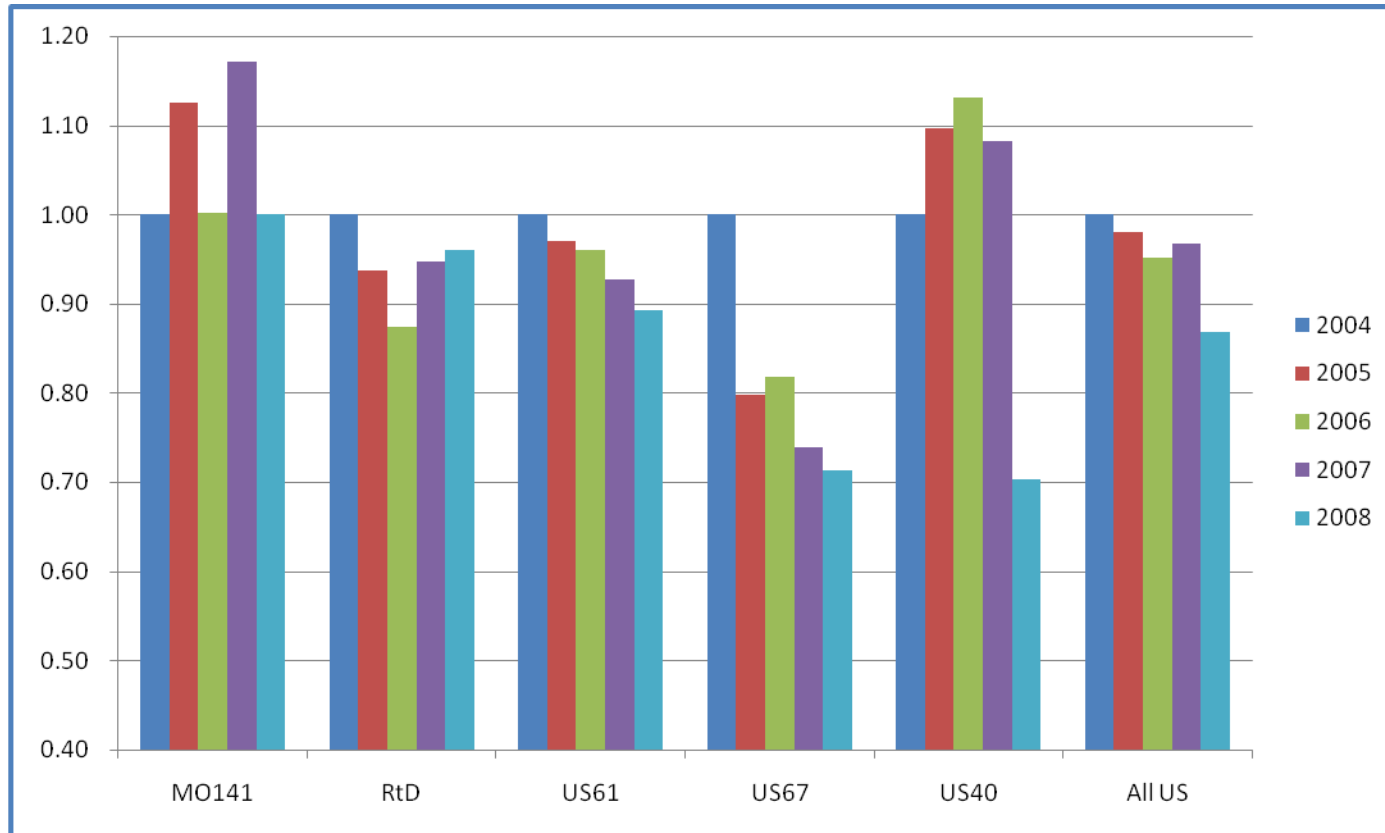


Figure S3: 5-year Crashes, US Routes and Expressways (2004 through 2008)

For more detailed evaluation, various types of figures are prepared and presented in Appendix based on the combination of influencing variables such as direction, crash severity, crash cause, and weather condition. As explained earlier, the research team has developed a computer programming tool that effectively and promptly extracts the crash data at any type of data query requests. The tool is also designed to summarize and report the resulting data in both graph and table formats. We expect the tool can help analysts to save time required for data manipulation and to evaluate results more efficiently.

In order to examine any changes in the crash severity before and after the closure, 30 graphs (= 3 groups of roadways x 2 directions x 5 severity types) are prepared and presented in Figures S16-S30 in the Appendix. After closely inspecting the graphs, the research team has created a summary table (as shown in Table S7) which explains the inspection results in a more systematic way. In the Table, values given in the 'increase' column denote the number of consecutive years during which the increase has been continued. The significance (in the last column in each item) was judged to be 'Yes' if a crash increase is continued for 3 or more years and it exceeds both the 4-year (i.e., 2004-2007) average and the 4-year highest number of crashes.

As seen in Table S7, most critical crash increases are observed in cases where the increasing trend started from 3 or more years ago. The number of crashes on I-70 East bound roadway, for example, has continuously increased for last 4 years (i.e., before the I-64 closure), and in 2008 it exceeded the 4-year highest value. (This observation can be crosschecked in Figures S16 in the Appendix.) Particularly, Property Damage Only (PDO) crashes have increased for 5 consecutive years on the same roadway. This observation suggests us to pay more attention to this route, but also implies that the crash increase after I-64 closure (i.e., in 2008) could be caused by the increasing trend that started from before the I-64 closure.

There are several cases showing 1-year increase where the crashes increase not continuously, but in year 2008 only. As seen in the table, almost all those cases do not exceed the 4-year highest crashes. These cases can be interpreted as either in the middle of increasing pattern or just one occasion where it will be reduced next year. Since those increases are not significantly large (because they are still within the 4-yr highest value range), it is hard to say those increases are due to the I-64 closure. We might have better understating of those cases when more data points are available in one or two years.

Blank cells in the table indicate that compared to 2007, crashes are either reduced or remained at the same level in 2008. Based on the 'total' crashes in the table, only 5 routes show crash increases, and others experienced less or same level of crashes in 2008 compared to the previous year 2007.

Table S8 summarizes the crash data by three major causes that are observed from Figures S31-S36 in the Appendix. It is noteworthy that read-end crashes on MO-100 East bound increase for last 3-year in row exceeding the 4-year highest value. This observation suggests us further engineering investigation on this roadway. This investigation is beyond the high-level investigation as scoped for this study). Similar to the previous case, it is hard to conclude that I-64 closure caused the crash increase in year 2008 since this increasing trend started before the I-64 closure. Other 1-year increase cases are unlikely to be significant in that they are still less the 4-year maximum (in US61-S) or slightly higher than the 4-year maximum (in US340-W).

In order to investigate any monthly variation in the crash data, 12 graphs (=2 directions x 6 highways) prepared and presented in Figures S40-S45 in the Appendix. As summarized in Table S9, no noticeable changes in crash are found before and after I-64 closure. One thing noticeable is that for past 5 consecutive years, December crashes on I-270 Westbound have been continuously increased. This also suggests a further more detailed investigation of crashes along this roadway for the month of December.

It is said that year 2008 was one of the wettest years in St. Louis¹ history. Apparently, weather is an important factor that influences vehicle accidents. In order to analyze the weather effect on the crashes, crashed occurred only on rainy days are collected and analyzed. Figures S46-S40 in Appendix provides the results of the analysis, and findings are summarized in Table S10. As shown in the table, rainy crashes on 8 routes keep increasing for past three years. On I-70-E, particularly, about 200 accidents (out of total 1211 accidents) happened on rainy days in 2008, and the number exceeds the 4-year highest (see Figure S46). From this observation, it can be said that the rainy day crashes significantly contribute to the crash increase on I-70-E. This finding is confirmed by Figure S37 showing the increasing trend of the out-of-control crashes on the same highway for past three years.

Although solid statistical validation is needed, this quick inspection described above leads us to a tentative conclusion that there is no strong evidence proving that I-64 closure contributed to the crash increase on the highways that are potentially influenced by the closure.

¹ For more detail, see http://www.usatoday.com/weather/news/2009-01-01-missouri-precipitation_N.htm.

Table S7: Summary of Crashes by Severity Type (2004 - 2008)

	Route	Direction	Total				PDO				Minor				Disabling				Fatal			
			Increase	Exceeding 4-yr average?	Exceeding 4-yr high?	Significant? (Judgement)	Increase	Exceeding 4-yr average?	Exceeding 4-yr high?	Significant? (Judgement)	Increase	Exceeding 4-yr average?	Exceeding 4-yr high?	Significant? (Judgement)	Increase	Exceeding 4-yr average?	Exceeding 4-yr high?	Significant? (Judgement)	Increase	Exceeding 4-yr average?	Exceeding 4-yr high?	Significant? (Judgement)
Interstate Highway	I-44	E W	3 Y N M				3 Y N N			1 Y N N				1 Y M N								
	I-270	E W								1 Y N N												
	I-70	E W	1 Y Y M				5 Y Y Y			1 Y N N				4 Y Y Y					3 Y Y Y			
	I-170	E W								1 N N N									1 Y M N			
	I-55	S N																	1 Y Y M			
MO Highway	MO366	E W					1 N N N															
	MO30	E W												1 N N N								
	MO100	E W	3 Y N N				3 Y Y M			1 Y N N												
	MO115	S N	1 Y N N				1 N N N			1 Y Y N				1 Y M N								
	MO141	S N																				
	MO180	E W																				
	MO340	E W					1 M N N			3 Y Y N				3 Y Y Y								
US Highway	RtD	E W	3 Y Y M				3 Y Y M							1 Y N N					1 Y Y N			
	US61	S N												1 N N N								
	US67	S N								3 M Y N				1 Y N N								
	US40	E W																				

Y: Yes M: Maybe N: No

Table S8: Summary of Crashes by Major Three Causes (2004 - 2008)

	Route	Direction	Rea-End				Passing				Out-fo-Control			
			Increase	Exceeding 4-yr average?	Exceeding 4-yr high?	Significant? (Judgement)	Increase	Exceeding 4-yr average?	Exceeding 4-yr high?	Significant? (Judgement)	Increase	Exceeding 4-yr average?	Exceeding 4-yr high?	Significant? (Judgement)
Interstate Highway	I-44	E W	3	Y	N	N					3	Y	N	N
	I-270	E W									3	Y	N	N
	I-70	E W								3	Y	Y	Y	
	I-170	E W								3	Y	Y	Y	
	I-55	S N	3	Y	Y	N					3	Y	Y	M
MO Highway	MO366	E W												
	MO30	E W								3	Y	N	M	
	MO100	E W	3	Y	Y	Y								
	MO115	S N					1	M	N	N	1	Y	N	N
	MO141	S N												
	MO180	E W												
	MO340	E W	1	Y	Y	N								
US Highway	RtD	E W					1	Y	N	N	3	Y	N	M
	US61	S N	1	Y	N	N	1	Y	N	N				
	US67	S N								3	Y	Y	Y	
	US40	E W												

Y: Yes M: Maybe N: No

Table S9: Summary of Crashes by Month (2004 - 2008)

	Route	Direction	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			Increase Exceeding 4-yr average? Exceeding 4-yr high? Significant? (Judgement)	Increase Exceeding 4-yr average? Exceeding 4-yr high? Significant? (Judgement)	Increase Exceeding 4-yr average? Exceeding 4-yr high? Significant? (Judgement)	Increase Exceeding 4-yr average? Exceeding 4-yr high? Significant? (Judgement)	Increase Exceeding 4-yr average? Exceeding 4-yr high? Significant? (Judgement)	Increase Exceeding 4-yr average? Exceeding 4-yr high? Significant? (Judgement)	Increase Exceeding 4-yr average? Exceeding 4-yr high? Significant? (Judgement)	Increase Exceeding 4-yr average? Exceeding 4-yr high? Significant? (Judgement)	Increase Exceeding 4-yr average? Exceeding 4-yr high? Significant? (Judgement)	Increase Exceeding 4-yr average? Exceeding 4-yr high? Significant? (Judgement)	Increase Exceeding 4-yr average? Exceeding 4-yr high? Significant? (Judgement)	Increase Exceeding 4-yr average? Exceeding 4-yr high? Significant? (Judgement)
Interstate Highway	I-44	E W												
	I-270	E W												3 5
	I-70	E W					4 Y Y Y							
	I-170	E W												
	I-55	S N												
MO Highway	MO366	E W	HAVE NOT CHECKED											
	MO30	E W												
	MO100	E W												
	MO115	S N												
	MO141	S N												
	MO180	E W												
	MO340	E W												
US Highway	RtD	E W												
	US61	S N												
	US67	S N												
	US40	E W												

Y: Yes M: Maybe N: No

Table S10: Summary of Weather Type (2004 - 2008)

	Route	Direction	Rainy Day				Snow Day			
			Increase	Exceeding 4-yr average?	Exceeding 4-yr high?	Significant? (Judgement)	Increase	Exceeding 4-yr average?	Exceeding 4-yr high?	Significant? (Judgement)
Interstate Highway	I-44	E	3	Y	N	N	Haven't Checked			
		W								
	I-270	E								
		W	3	Y	N	N				
	I-70	E	3	Y	Y	Y				
W		3	Y	N	N					
I-170	E									
	W									
I-55	S	3	Y	Y	Y					
	N									
MO Highway	MO366	E								
		W								
	MO30	E								
		W								
	MO100	E	3	Y	N	N				
		W								
	MO115	S								
N										
MO141	S									
	N									
MO180	E	3	Y	N	N					
	W									
MO340	E									
	W									
US Highway	RtD	E	3	Y	N	N				
		W								
	US61	S	1	Y	N	N				
		N								
US67	S									
	N									
US40	E									
	W									

Y: Yes M: Maybe N: No

3.2 Crash Rate Analysis

The crash rate represents the intensity of crashes relative to total vehicle miles traveled. For example, if roadway A shows a higher crash rate than roadway B, it indicates that roadway A is more vulnerable to crashes than roadway B in case the traffic volume and the roadway lengths of both roadways are same (i.e., under the same condition.) Unlike the crash rate that treats all severity types equally, the severity rate assigns higher weights to fatality and injury than property damage only crash. Due to the different weights, the severity rate provides more explanation of the characteristics of the crashes than the crash rate. For a given segment of a roadway, crash rate (CR) and severity rate (SR) are given by:

$$CR = \frac{100,000,000 \times \text{Crash}}{AADT \times \text{Length} \times \text{Days}} \quad (1)$$

$$SR = \frac{100,000,000 \times [10(\text{FAT}) + 4(\text{INJ}) + N]}{AADT \times \text{Length} \times \text{Days}} \quad (2)$$

Where, CRASH = Number of crashes for the section, Days = Number of days for the study, AADT = Annual Average Daily Traffic, Length = Length of Section, FAT = Number of fatal crashes, INJ = Number of injury crashes, N = Number of property damage only crashes.

Similarly, overall crash rate (OCR) and overall severity rate (OSR) for a given route are calculated by following equations:

$$OCR = \frac{100,000,000 \times \text{Crash}}{\text{weighted AADT} \times \text{Length} \times \text{Days}} \quad (3)$$

$$OSR = \frac{100,000,000 \times [10(\text{FAT}) + 4(\text{INJ}) + N]}{\text{weighted AADT} \times \text{Length} \times \text{Days}} \quad (4)$$

Where, Length = Length of the route,

$$\text{weighted AADT} = \frac{\sum_{\text{all segments}} AADT_i \times \text{Length}_i}{\sum_{\text{all segments}} \text{Length}_i} .$$

As explained, crash rate calculation requires not only the number of crashes but also traffic volumes (in vehicles per day), length of the roadway (in miles) and period being evaluated (in days). MoDOT provided the team with AADT information for the highways, and Table S11 summarizes the segment of highways AADT of which are used in this study.

Table S11: Highway Segments where AADT Data are acquired

		Starting Pt	Ending pt	miles
Interstate Highway	I-44	Antire Rd	Jefferson Ave	18.31
	I-270	I-55	US67	23.46
	I-70	LP 70	Walnut	21.18
	I-170	I-270	Galleria Pkwy	11.13
	I55	Il State Line	MERAMEC BOTTOM RD	17.00
MO Highway	MO366	I44	Grand-Nos	18.86
	MO30	JEFFERSON CO LINE	CITY LIMIT	15.70
	MO100	Baxter Rd	6th St	18.43
	MO115	I70	I70 E JCT	10.25
	MO180	ST CHARLES ROCK RD	KINGSHIGHWAY	13.92
	MO340	LADUE RD	PENNSYLVANIA	11.30
US highway and ExpressWay	MO141	MO340	I55	21.40
	RtD	IS 270	Skinker Parkway	15.23
	US40	MISSOURI RESEARCH PARK	STADIUM	12.57
	US67	MO 94	BAUMGARTNER RD	12.00
	US61	MISSOURI RESEARCH PARK	BAUMGARTNER RD	6.00

The team also developed an analytical tool that calculates the CR, SR, OCR and OSR in an automatic way. The tool is designed to be able to calculate CR and SR not only by original segments of a given roadway (defined by MoDOT) but also by any segment length (defined by users). Tables S18-S32 listed in Appendix present CR, SR, OCR and SCR calculated for the roadways investigated based on the 1-mile section length.

Annual Average Daily Traffic (AADT)

5-year AADT are summarized in Table S12, and Figures S4 and S5. Observations made from the table are as follow:

- 1) I-270 is the busiest route, but interestingly AADT in 2008 slightly dropped from the previous year;
- 2) Similar to I-270, traffics on all MO highways decreased in 2008 from the previous year,
- 3) Similar to MO highways, traffics on all US highways decreased in 2008 from the previous year,
- 4) Unlike the other routes, I-44 traffic has constantly increased for the past 5 year and the increase in year 2008 is quite significant, and
- 5) MO100E, MO141S, and MO180E showed exactly same AADTs in 2006 and 2007

Figures S4 and S5 provide graphical representations of the Table S12. For better picture of the historical trend in AADT, the 'relative' AADT values corresponding to Table S12 are also presented in Table S13 (also in Figures S6 and S7).

Note: To maintain consistency in this report, we are using AADT provided through MoDOT. We understand from work completed in the Mobility section of this report that traffic volumes increased on most of routes during 2008. This increase was associated with these routes being alternative routes during the I-64 closure. In a future report, we will show crash rates using both MoDOT's AADT and actual Interstate AADT collected from roadside detection devices.

Table S12: AADT (unit: vehicles/day)

		2004	2005	2006	2007	2008
Interstate Highway	I-44 E	49,973	50,325	53,637	53,610	55,011
	I-270 E	80,564	80,662	82,115	82,937	82,116
	I-64 E	63,787	63,742	66,777	66,632	65,759
	I-70 E	64,044	64,379	61,448	62,105	62,142
	I-170 E	51,202	51,261	51,061	51,572	51,252
	I-55 S	51,686	51,746	54,939	55,489	55,145
	I-44 W	53,581	53,726	52,332	52,890	54,667
	I-270 W	79,402	79,499	81,534	82,350	81,474
	I-64 W	67,448	67,256	65,627	64,463	62,273
	I-70 W	62,494	63,068	60,598	61,229	61,703
	I-170 W	51,753	51,812	52,758	53,286	52,956
	I-55 N	50,069	50,127	54,204	54,746	54,407
	I-44	103,554	104,050	105,969	106,500	109,679
	I-270	159,966	160,161	163,650	165,286	163,590
	I-64	131,235	130,998	132,404	131,095	128,032
	I-70	126,538	127,447	122,046	123,334	123,846
	I-170	102,955	103,073	103,820	104,858	104,208
	I-55	101,755	101,872	109,144	110,235	109,552
MO Highway	MO366	41,603	40,727	40,070	40,368	39,104
	MO30	39,837	39,207	39,599	39,358	38,129
	MO100	38,928	38,107	37,511	37,511	36,607
	MO115	27,594	27,737	23,173	22,942	22,388
	MO180	43,558	42,639	37,163	37,163	36,268
	MO340	50,179	48,258	39,492	39,498	39,782
US highway and Expressway	MO141	35,759	35,003	35,672	35,672	34,946
	RtD	51,585	50,912	50,639	50,432	49,302
	US40	106,765	106,550	105,118	104,120	102,156
	US67	34,834	34,096	30,392	30,392	29,391
	US61	43,273	42,427	46,873	43,455	42,463

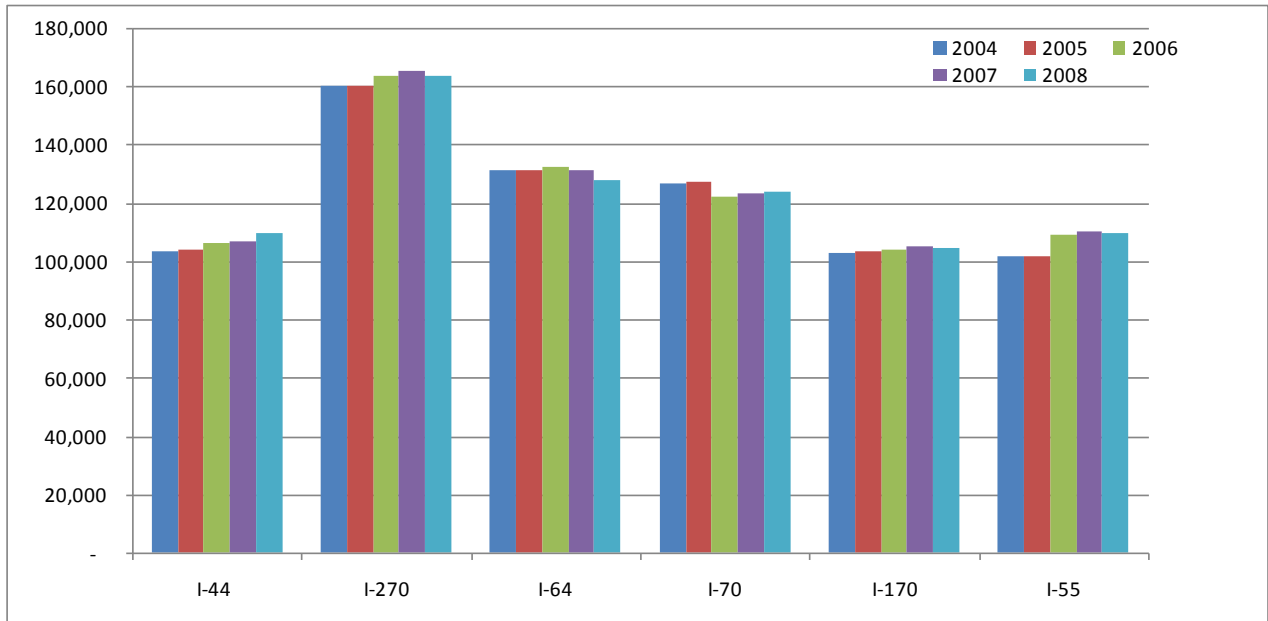


Figure S4: AADT, Interstate Highway (Both Directions, unit: vehicles/day)

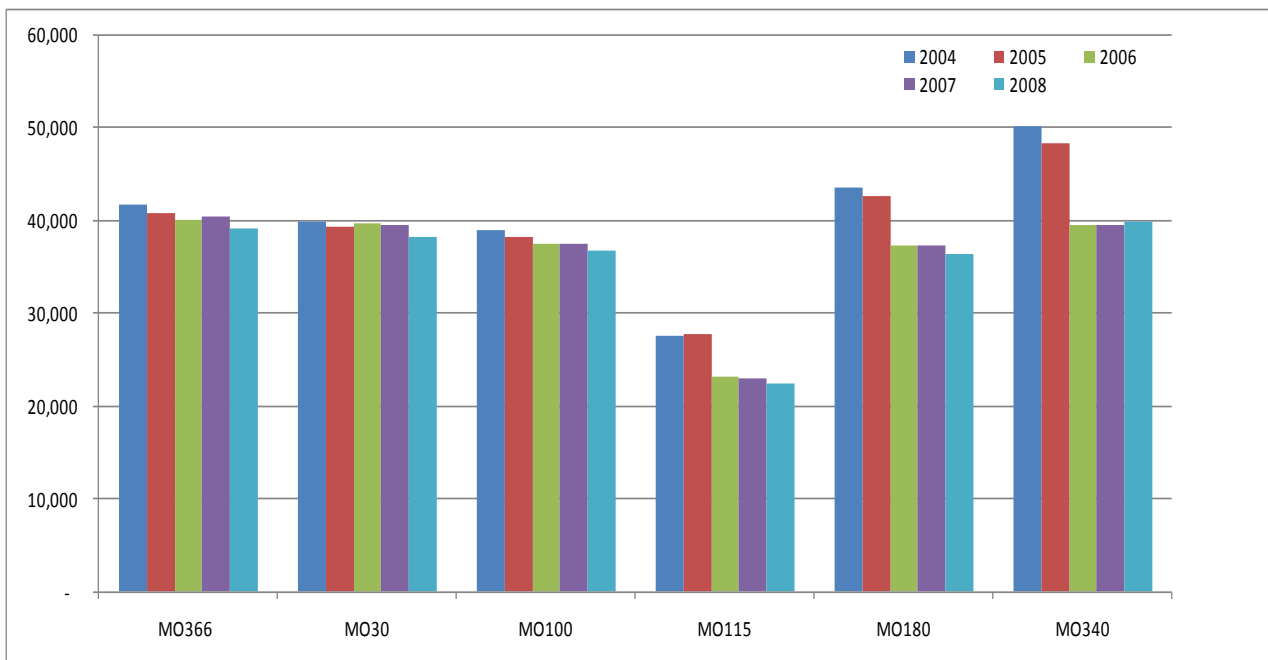


Figure S5: AADT, MO Highway (Both Directions, unit: vehicles/day)

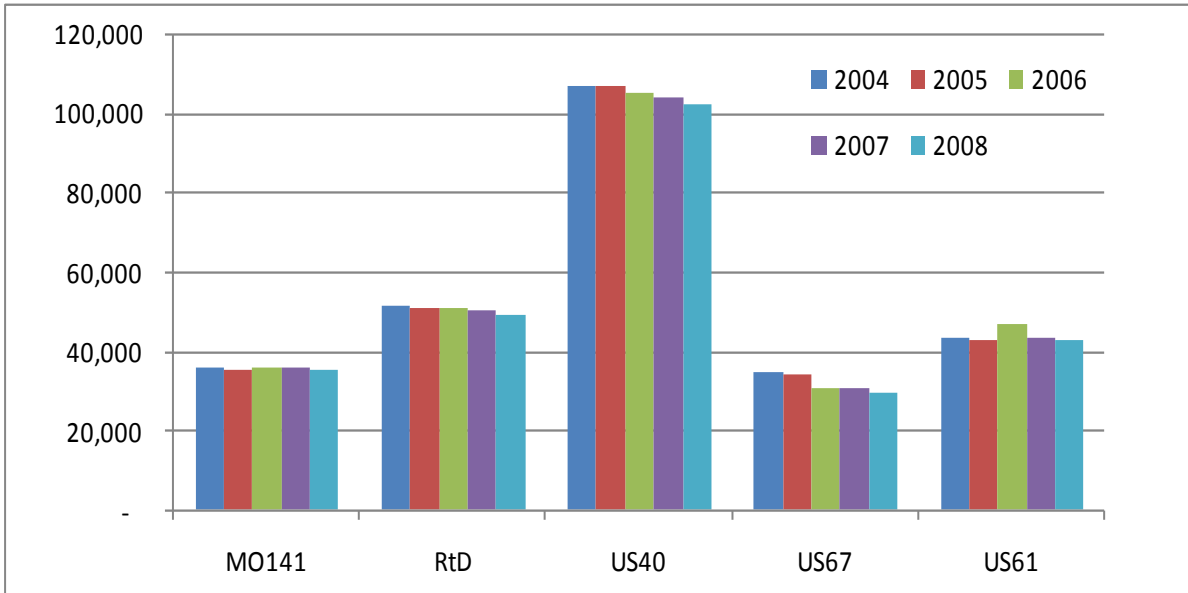


Figure S6: AADT, US Routes and Expressway (Both Directions, unit: vehicles/day)

Table S13: Relative AADT (unit: vehicles/day)

		2004	2005	2006	2007	2008
Interstate Highway	I-44 E	1.00	1.01	1.07	1.07	1.10
	I-270 E	1.00	1.00	1.02	1.03	1.02
	I-64 E	1.00	1.00	1.05	1.04	1.03
	I-70 E	1.00	1.01	0.96	0.97	0.97
	I-170 E	1.00	1.00	1.00	1.01	1.00
	I-55 S	1.00	1.00	1.06	1.07	1.07
	I-44 W	1.00	1.00	0.98	0.99	1.02
	I-270 W	1.00	1.00	1.03	1.04	1.03
	I-64 W	1.00	1.00	0.97	0.96	0.92
	I-70 W	1.00	1.01	0.97	0.98	0.99
	I-170 W	1.00	1.00	1.02	1.03	1.02
	I-55 N	1.00	1.00	1.08	1.09	1.09
	I-44	1.00	1.00	1.02	1.03	1.06
	I-270	1.00	1.00	1.02	1.03	1.02
	I-64	1.00	1.00	1.01	1.00	0.98
	I-70	1.00	1.01	0.96	0.97	0.98
	I-170	1.00	1.00	1.01	1.02	1.01
	I-55	1.00	1.00	1.07	1.08	1.08
MO Highway	MO366	1.00	0.98	0.96	0.97	0.94
	MO30	1.00	0.98	0.99	0.99	0.96
	MO100	1.00	0.98	0.96	0.96	0.94
	MO115	1.00	1.01	0.84	0.83	0.81
	MO180	1.00	0.98	0.85	0.85	0.83
	MO340	1.00	0.96	0.79	0.79	0.79
US highway and Expressway	MO141	1.00	0.98	1.00	1.00	0.98
	RtD	1.00	0.99	0.98	0.98	0.96
	US40	1.00	1.00	0.98	0.98	0.96
	US67	1.00	0.98	0.87	0.87	0.84
	US61	1.00	0.98	1.08	1.00	0.98

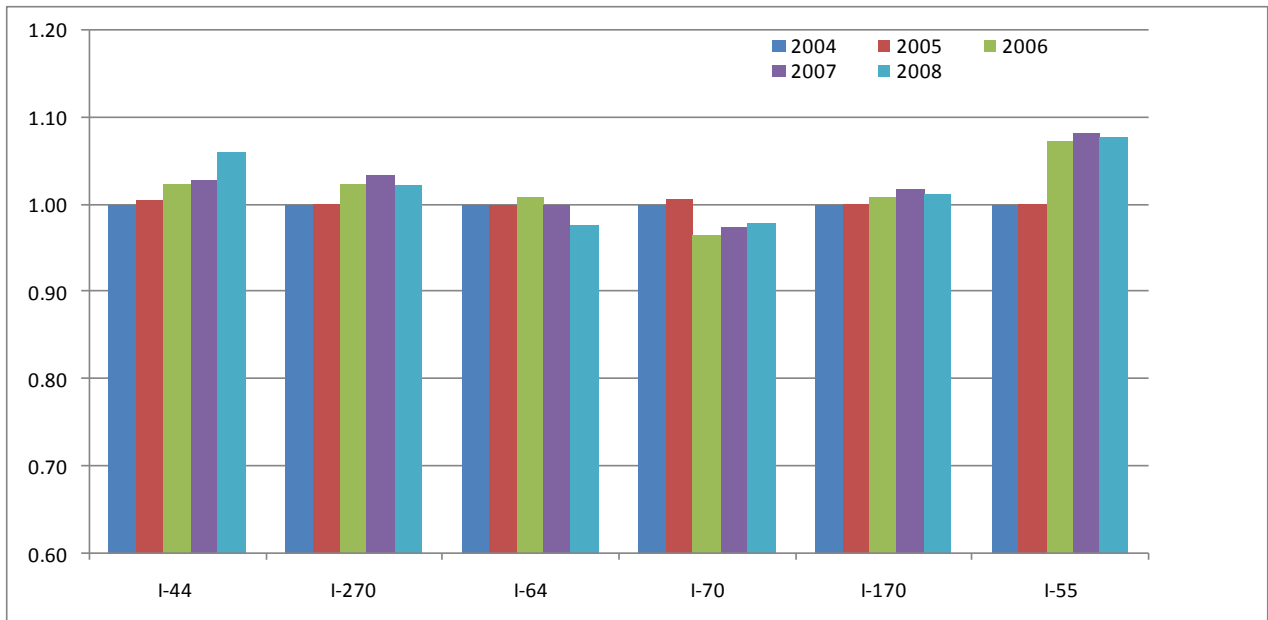


Figure S7: Relative AADT, Interstate Highway (Both Directions, unit: vehicles/day)

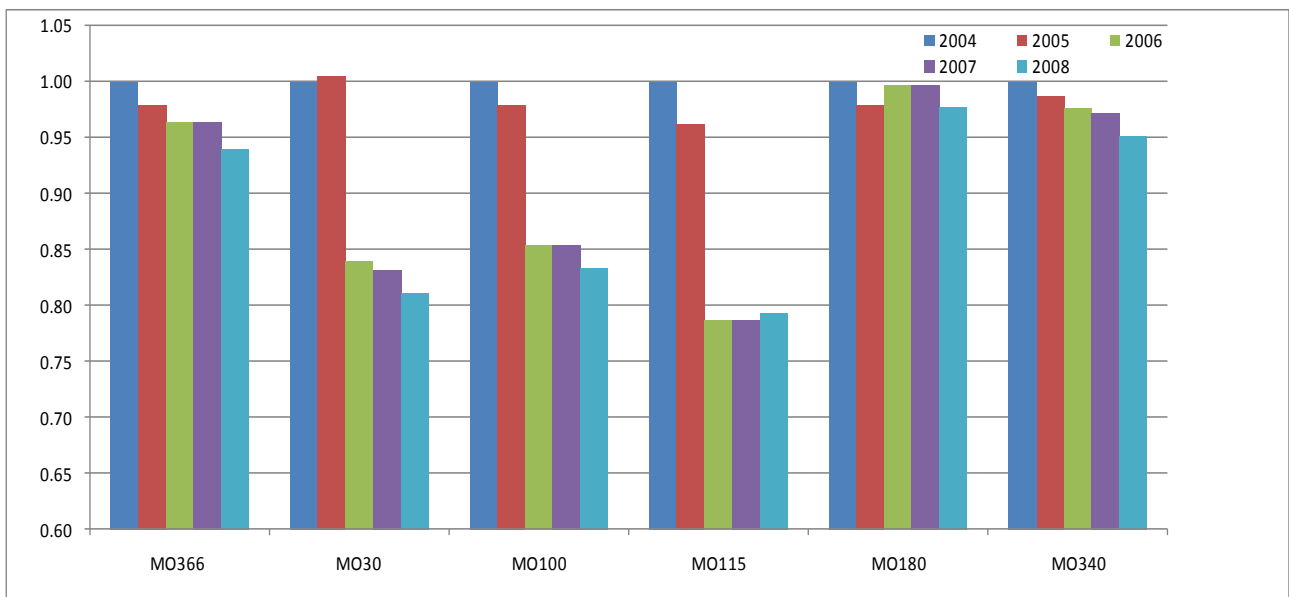


Figure S8: Relative AADT, MO Highway (Both Directions, unit: vehicles/day)

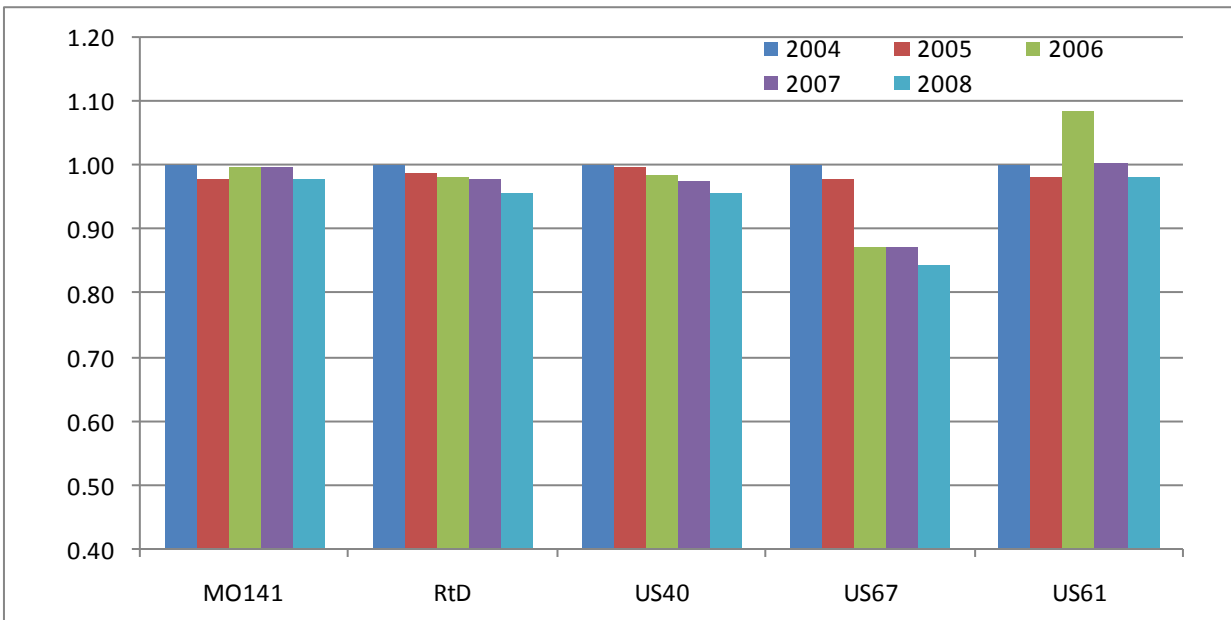


Figure S9: Relative AADT, US Highway and Expressway (Both Directions, unit: vehicles/day)

5-year crash rates (2004-2008)

Crash rates over the past 5 years (2004-2008) are presented in Table S14 (also in Figures S10, S11 and S12), and the corresponding 'relative' crash rates are provided in Table S15 (also in Figures S13, S14 and S15)².

Table S14 clearly shows that crashes on local routes are significantly higher than those on interstate highways. This is an obvious result because drivers on local routes are exposed to much more conflicts caused by frequent access roads and traffic control devices such as traffic signals, stop signs, etc. than those on the interstate highway. MO highways show unbalanced crash rates by direction. Particularly, the Route 115 corridor appears to be more vulnerable to crashes than other routes. It is also shown that compared to Year 2007, crash rates on most routes either decrease or remain same except I-70 E and I-55 S in 2008.

Another fact to be noted is that the crash rates on I-70 and MO100 keep increasing for past 3-5 years and they exceeded the 4-year (2004-2007) highest value. Again, this observation urges us to conduct further investigation on how and why these increases happen, but one reason for the increase on I-70 E was partially explained in the previous section (i.e., rainy day crashes.) It is also observed that the increasing trend of the two interstate highways started before the I-64 closure (i.e., before 2008). So, it is hard to decide whether the crash rate increases are caused by the I-64 closure or by other factors. The crash rate for MO115 also increases in 2008, but considering the up-and-down patterns shown in the past 4 years, it is also hard to determine whether it is due to local effect or due to the I-64 closure.

It should be also remarked that although the total crashes on I-44 increased in 2008 compared to 2007 (See Table S5), the crash rate on the highway slightly drops in 2008 (See Figure S8). From the traffic safety viewpoint, this indicates that the safety on I-44 was improved in year 2008 compared to the year 2007, which is a contradicting conclusion that could be reached at if only the number of crashes is used.

Table S15 (along with Figures S13 and S14 and S15) illustrates 5-year 'relative' crash rates for routes investigated. (In the graph, year 2004 is the base year.) Although, trends observed in this table (and Figures) are very parallel to those in 5-year crash rates in Table S14 (and Figures S8 and S9), it is more clear to see the growth rate by percentage. Compared to year 2004, for example, crashes on I-70 increases by more than 20% whereas crashes on other interstate highways slightly decrease (in I-44, I-270, I-55) or considerably decrease (in I-170).

² It should be noted that due to the different logging systems used in AADT and crash data records, the crash and injury rate analyses in this study is for one-way. (For more details, see section 2-2)

It is generally observed that in most of the routes, the crash rates decrease in 2008 compared to 2007 except several routes (such as I-44, I-70, MO-366, MO-100, MO-115, Route-D) showing slightly increased crash rates. Nonetheless, those increased crash rates (except I-70) are still below either the 4-year (2004-2007) average crash rate or the 4-year highest rate. It is noteworthy that the crash rate in I-70 has been continuously increased since year 2004. Apparently, this increasing trend in I-70 started even before the I-64 closure. One more to be noted is that among all these routes, the south direction of US 61 highway shows unreasonably high crash rates ranging from 1500 to 1700. After closely examining the raw crash data, the team found out that highly concentrated crashes are recorded in a segment of the highway (around the continuous loop of I-70).

From this observation, we can tentatively conclude that no observational evidence is found to prove the fact that I-64 closure influences increases in crashes in the highways around the closure. (We use 'tentatively' in the statement since the statistical analysis should be applied to confirm the statement. The analysis will be carried out when more data points are available.)

Table S14: Overview of All Crash Rate (2004 through 2008)

		2004	2005	2006	2007	2008
Interstate Highway	I-44 E	163	170	154	164	160
	I-270 E	184	181	196	192	181
	I-64 E	233	237	205	172	129
	I-70 E	204	220	237	234	252
	I-170 E	292	250	253	241	240
	I-55 S	164	157	141	139	162
	I-44 W	161	145	145	147	154
	I-270 W	123	140	133	132	130
	I-64 W	220	216	209	165	108
	I-70 W	188	190	192	203	200
	I-170 W	143	148	178	171	146
	I-55 N	142	145	146	139	131
	I-44	162	157	150	156	157
	I-270	154	161	165	162	155
I-64	226	226	207	169	119	
I-70	196	205	215	218	226	
I-170	217	199	215	206	193	
I-55	153	151	143	139	147	
MO Highway	MO366	392	396	406	321	335
	MO30	568	579	465	466	427
	MO100	553	521	498	530	572
	MO115	645	611	647	633	673
	MO180	461	441	444	424	425
	MO340	516	471	465	462	433
US highway and Expressway	MO141	350	404	353	412	359
	RtD	407	388	364	396	409
	US40	100	110	120	116	77
	US67	346	290	325	294	268
	US61	900	894	800	833	818

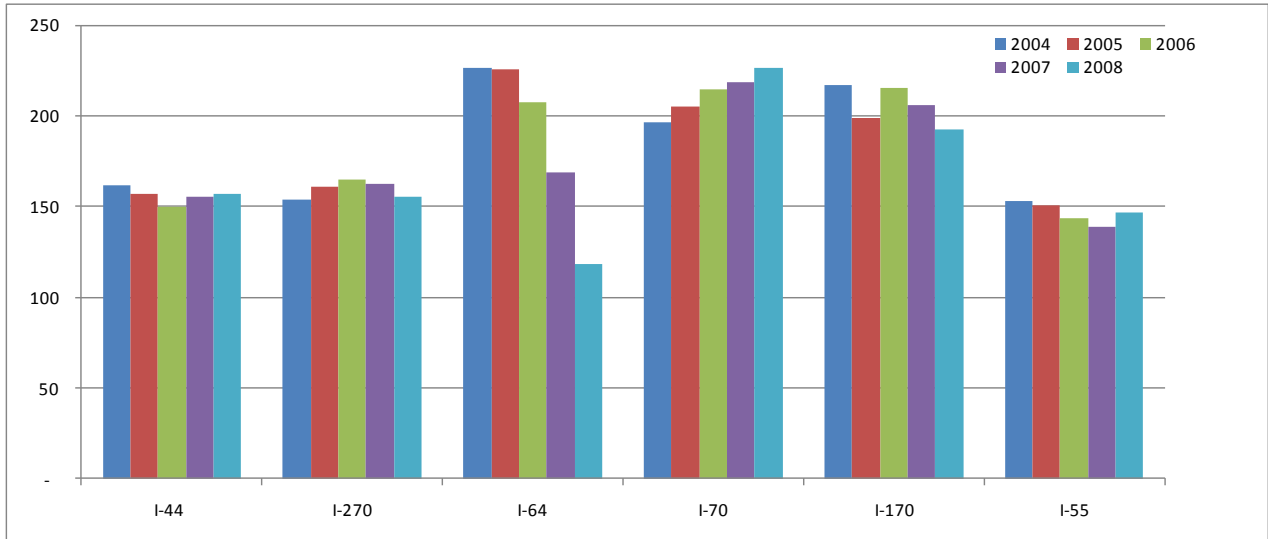


Figure S10: All Crash Rate, Interstate Highway (Both Directions, 2004 through 2008)

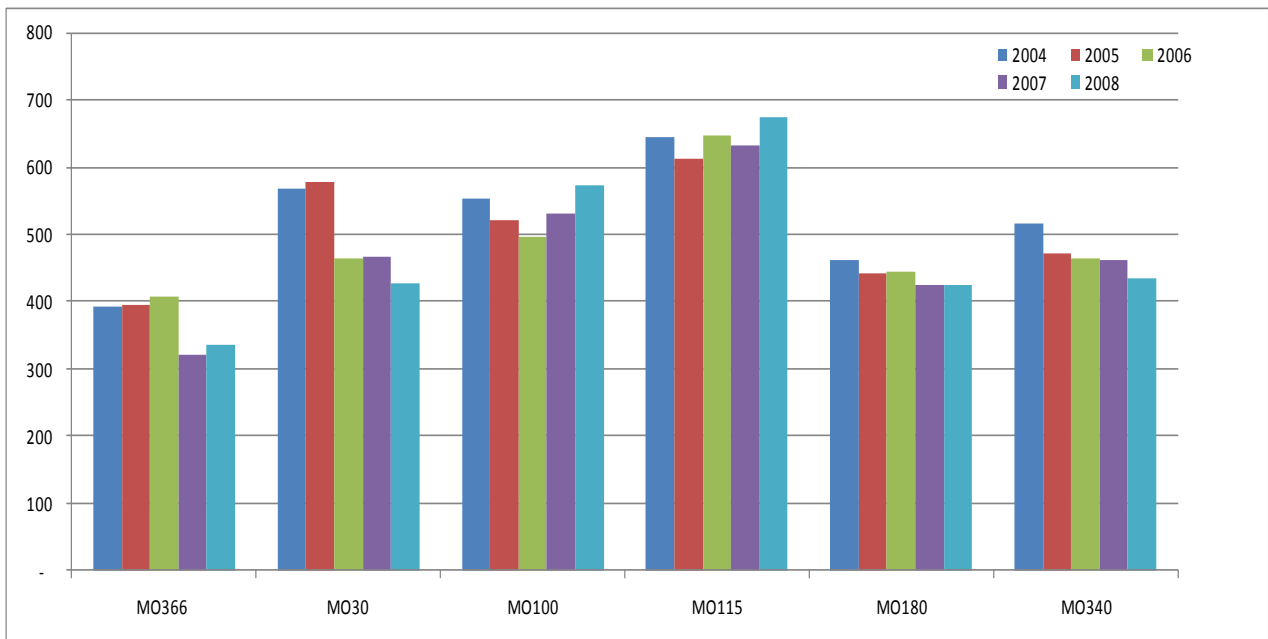


Figure S11: All Crash Rate, MO Highway (Both Directions, 2004 through 2008)

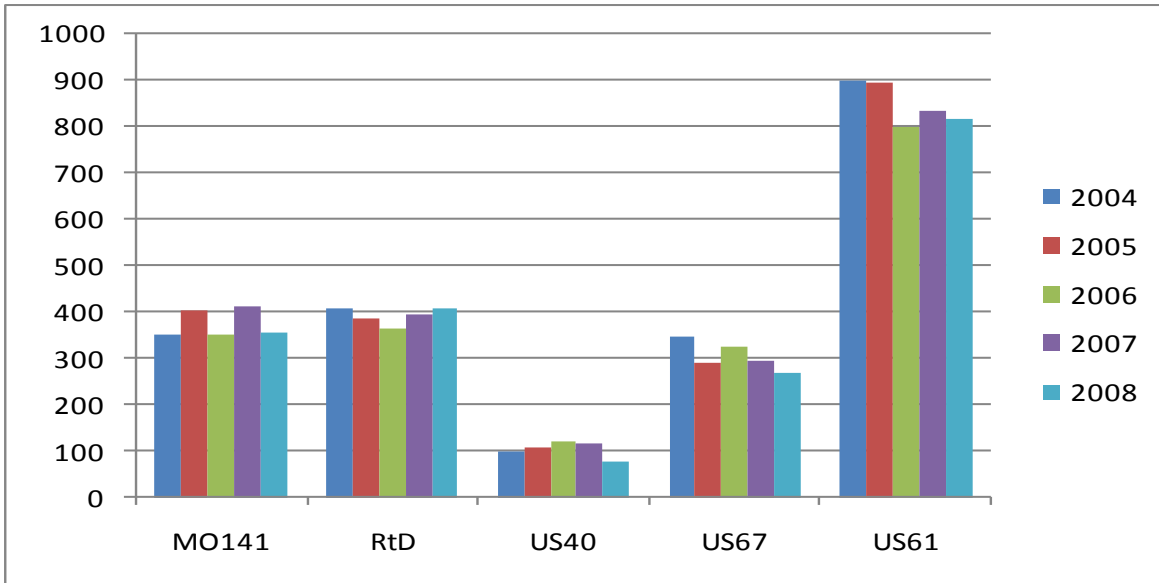


Figure S12: All Crash Rate, US Highway and Expressway (Both Directions, 2004 through 2008)

Table S15: 5-year Relative All Crash Rate (Base year: 2004)

		2004	2005	2006	2007	2008
Interstate Highway	I-44 E	1.00	1.04	0.94	1.01	0.98
	I-270 E	1.00	0.98	1.07	1.04	0.98
	I-64 E	1.00	1.02	0.88	0.74	0.55
	I-70 E	1.00	1.08	1.16	1.15	1.24
	I-170 E	1.00	0.86	0.87	0.83	0.82
	I-55 S	1.00	0.96	0.86	0.85	0.99
	I-44 W	1.00	0.90	0.90	0.92	0.96
	I-270 W	1.00	1.14	1.08	1.07	1.06
	I-64 W	1.00	0.98	0.95	0.75	0.49
	I-70 W	1.00	1.01	1.02	1.08	1.07
	I-170 W	1.00	1.03	1.25	1.20	1.02
	I-55 N	1.00	1.02	1.02	0.98	0.92
	I-44	1.00	0.97	0.92	0.96	0.97
	I-270	1.00	1.05	1.07	1.06	1.01
	I-64	1.00	1.00	0.92	0.75	0.52
	I-70	1.00	1.05	1.09	1.11	1.15
	I-170	1.00	0.92	0.99	0.95	0.89
	I-55	1.00	0.98	0.93	0.91	0.96
MO Highway	MO366	1.00	1.01	1.04	0.82	0.85
	MO30	1.00	1.02	0.82	0.82	0.75
	MO100	1.00	0.94	0.90	0.96	1.03
	MO115	1.00	0.95	1.00	0.98	1.04
	MO180	1.00	0.96	0.96	0.92	0.92
	MO340	1.00	0.91	0.90	0.89	0.84
US highway and Expressway	MO141	1.00	1.15	1.01	1.18	1.02
	RtD	1.00	0.95	0.89	0.97	1.00
	US40	1.00	1.10	1.20	1.16	0.77
	US67	1.00	0.84	0.94	0.85	0.77
	US61	1.00	0.99	0.89	0.93	0.91

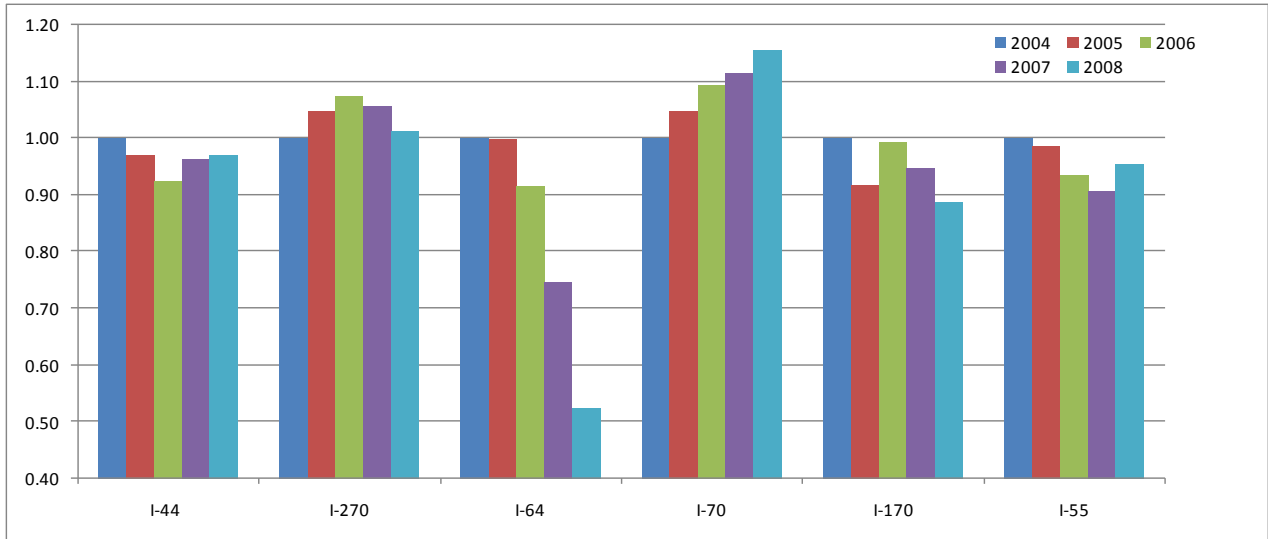


Figure S13: Relative All Crash Rate, Interstate Highway (Both Directions, Base year: 2004)

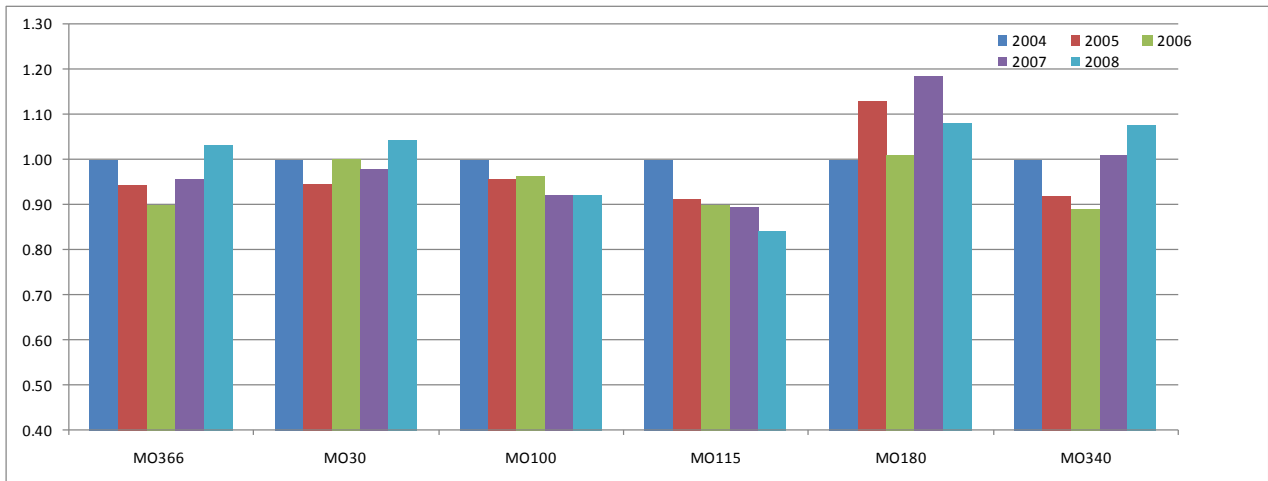


Figure S14: Relative All Crash Rate, MO Highway (Both Directions, Base year: 2004)

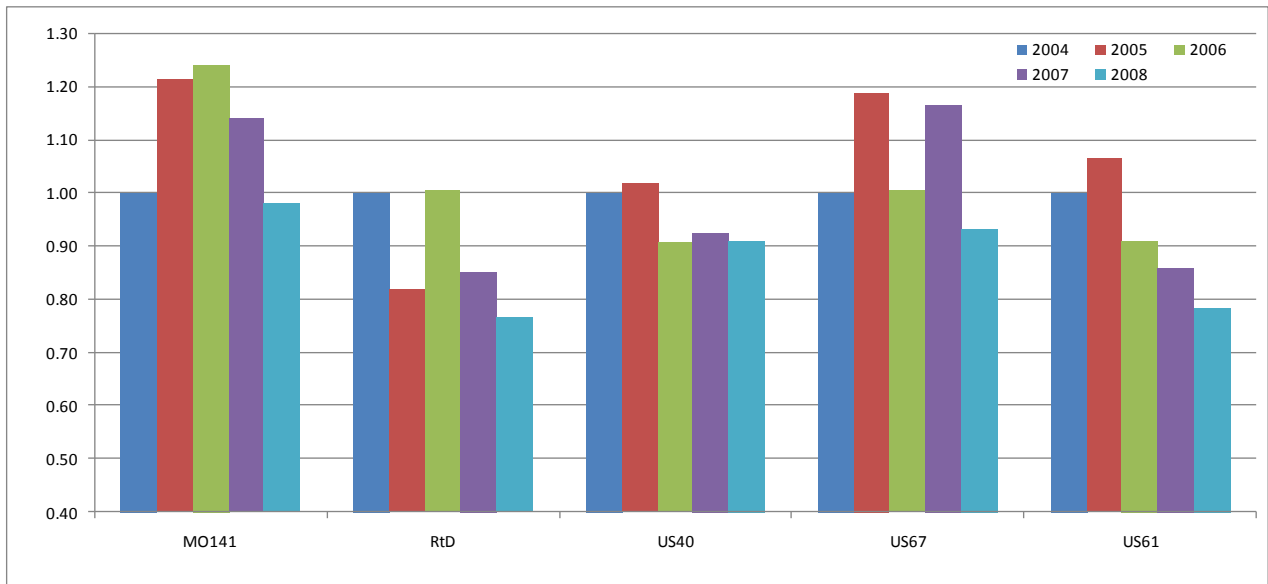


Figure S15: Relative All Crash Rate, US Highway and Expressway (Both Directions, Base year: 2004)

Appendix 1: Crashes (2004-2008)

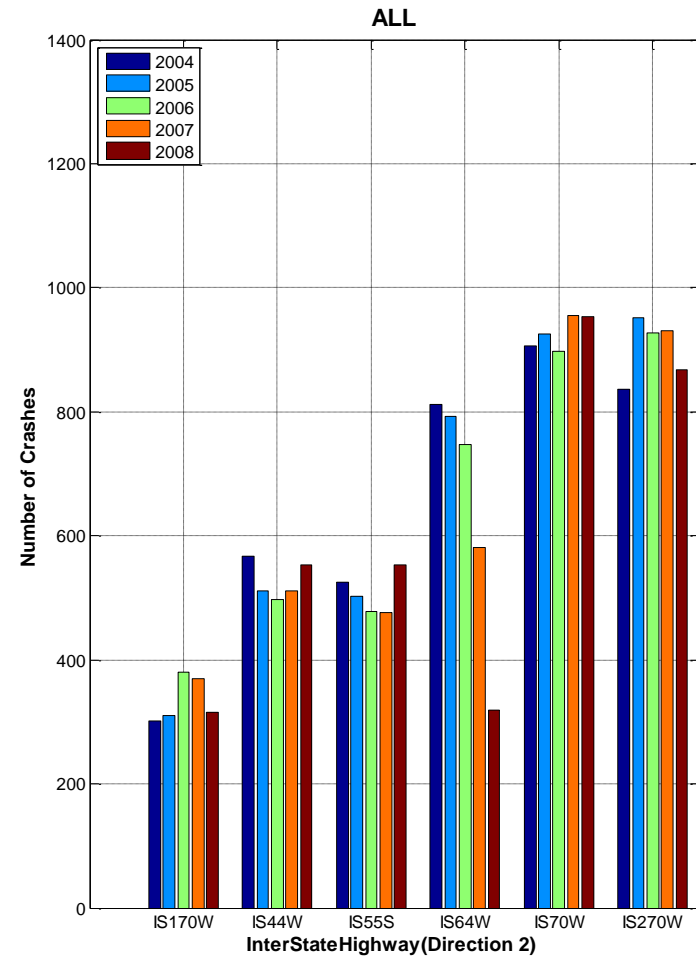
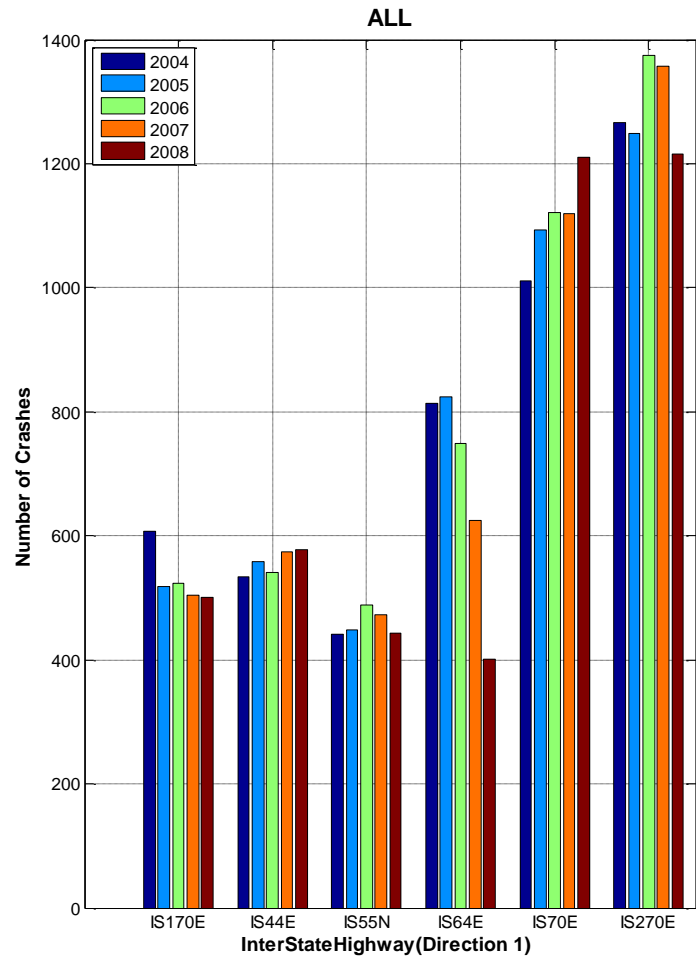


Figure S16 : All Crashes on Interstate Highway (Both directions, 2004-2008)

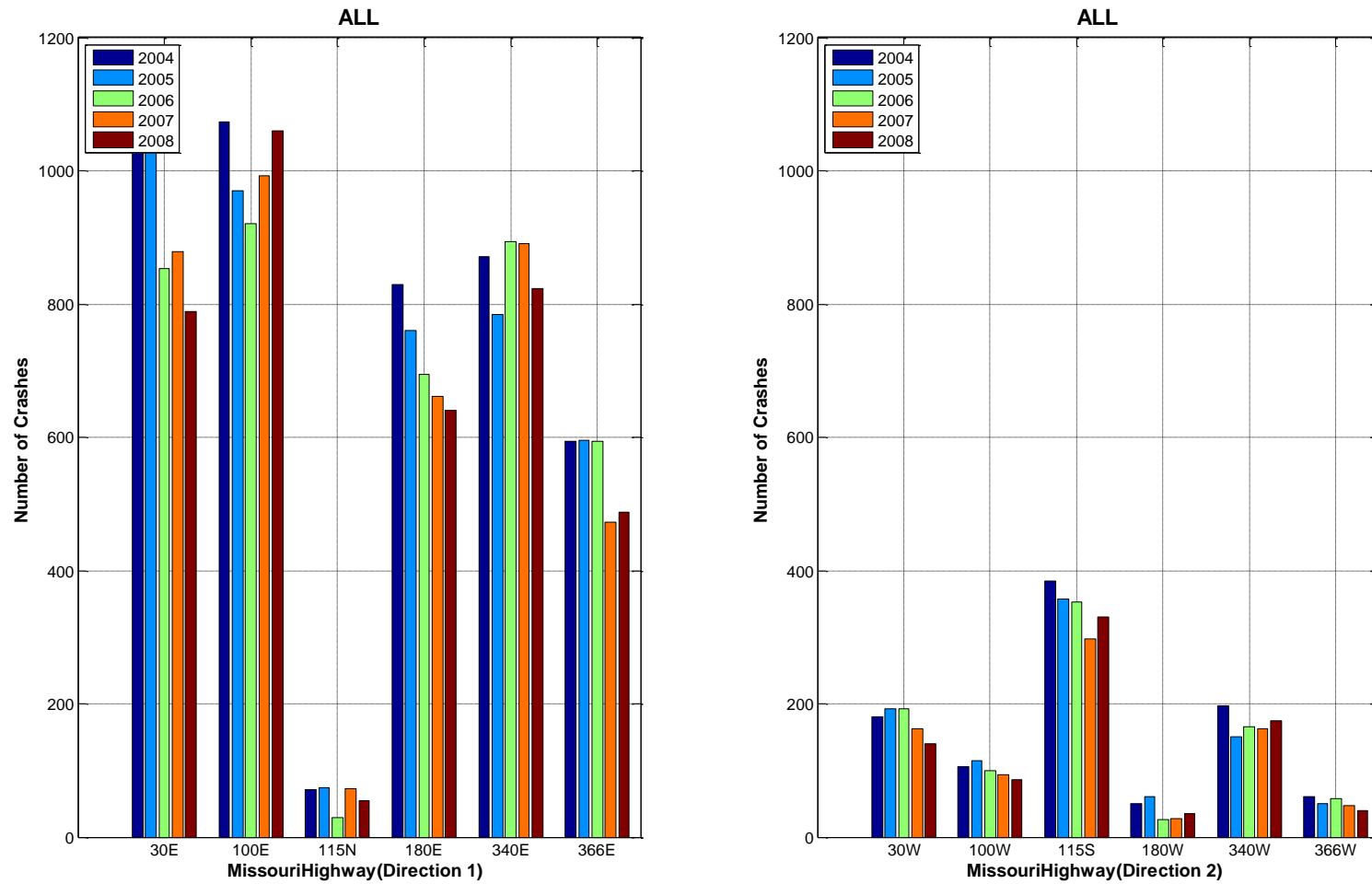


Figure S17: All Crashes on MO Highway (Both directions, 2004-2008)

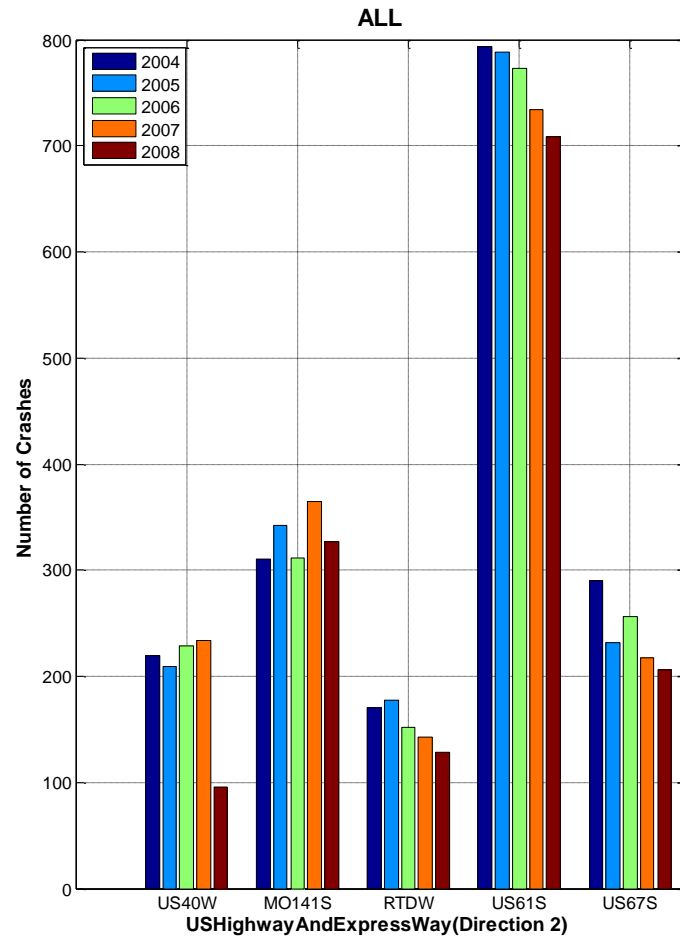
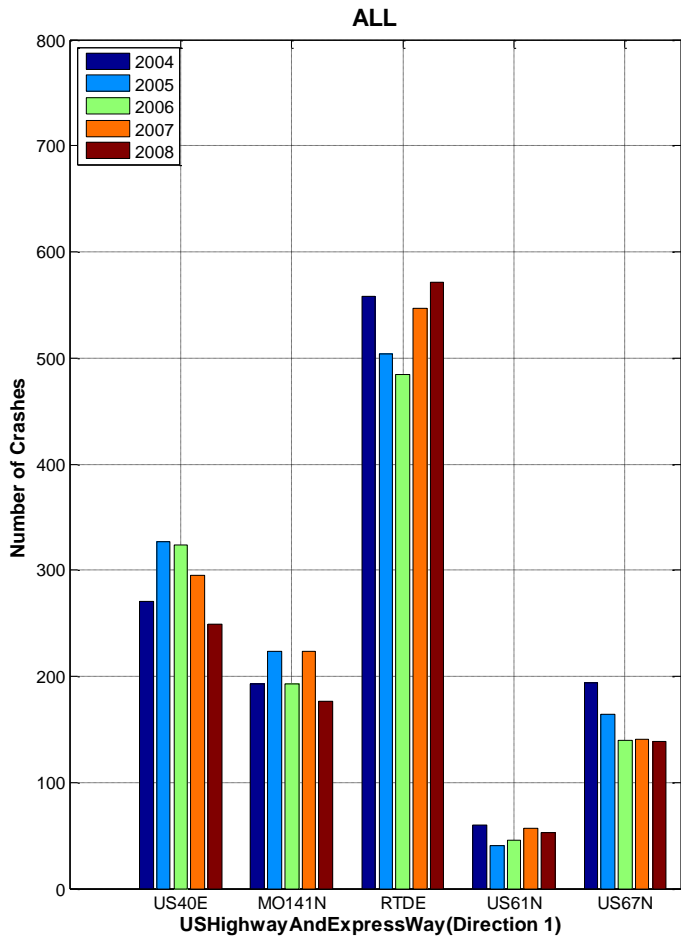


Figure S18: All Crashes on US Highway and Expressway (Both directions, 2004-2008)

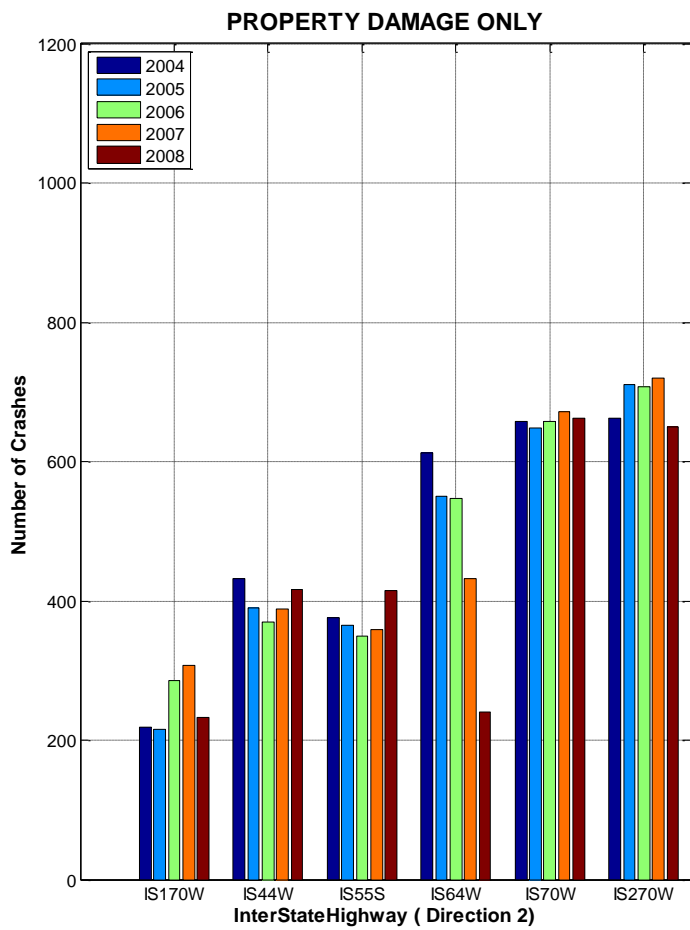
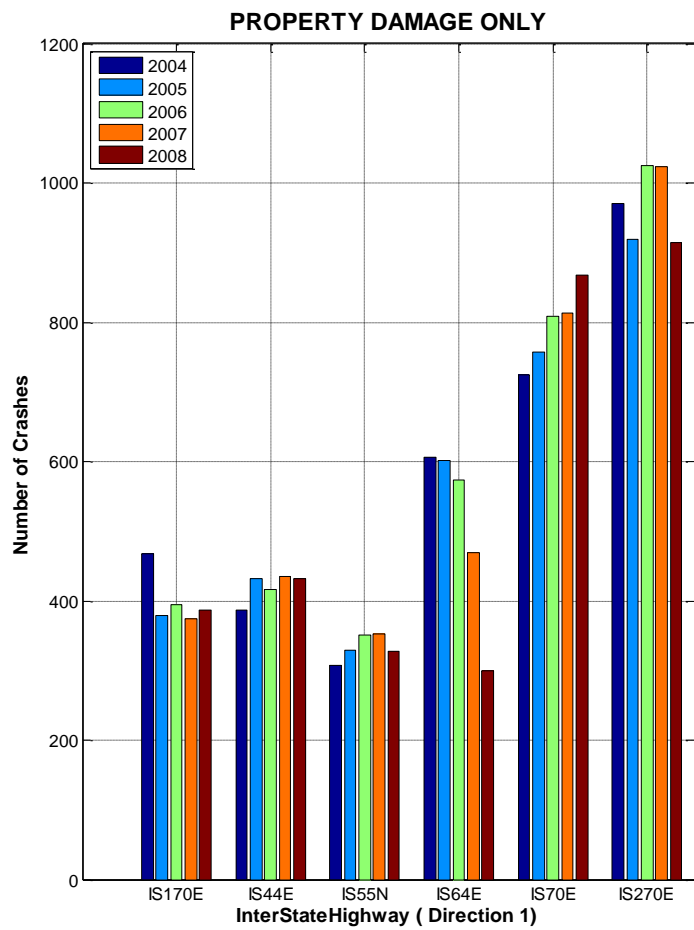


Figure S19: Property Damage in Interstate Highway (Both directions, 2004-2008)

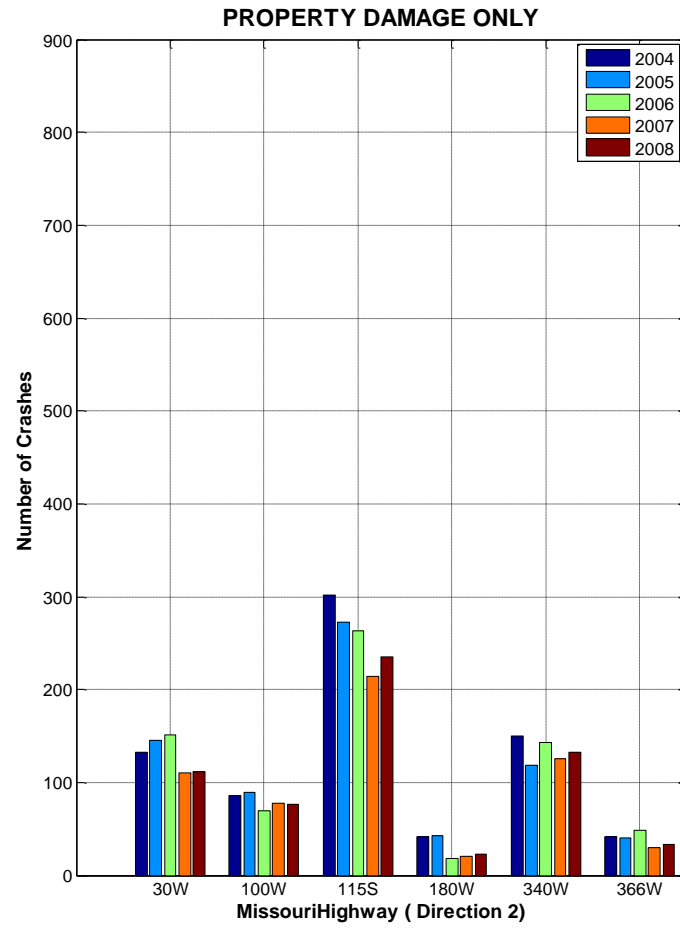
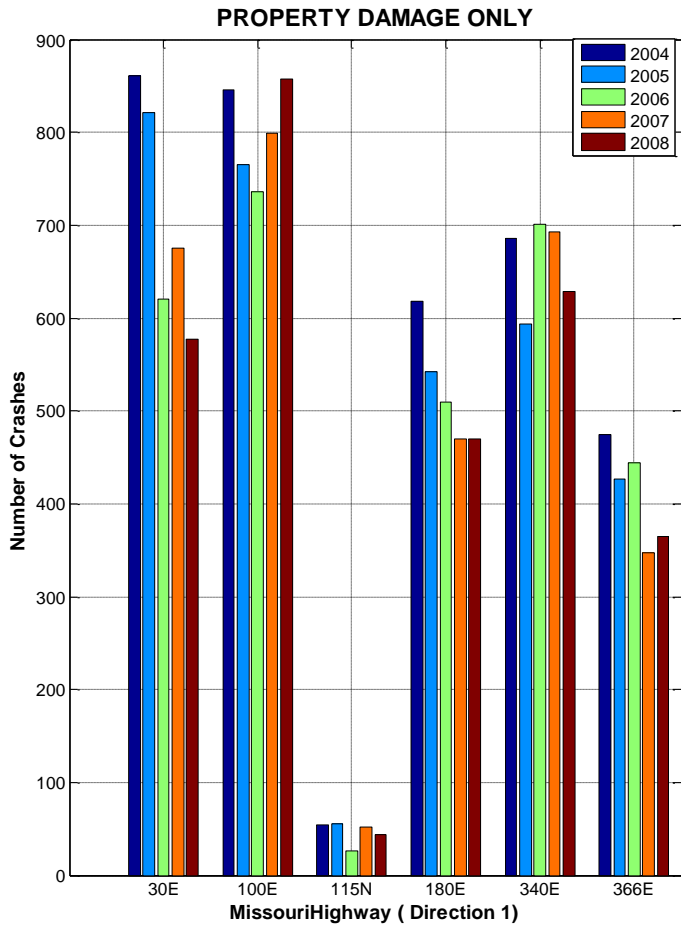


Figure S20: Property Damage in Missouri Highway (Both directions, 2004-2008)

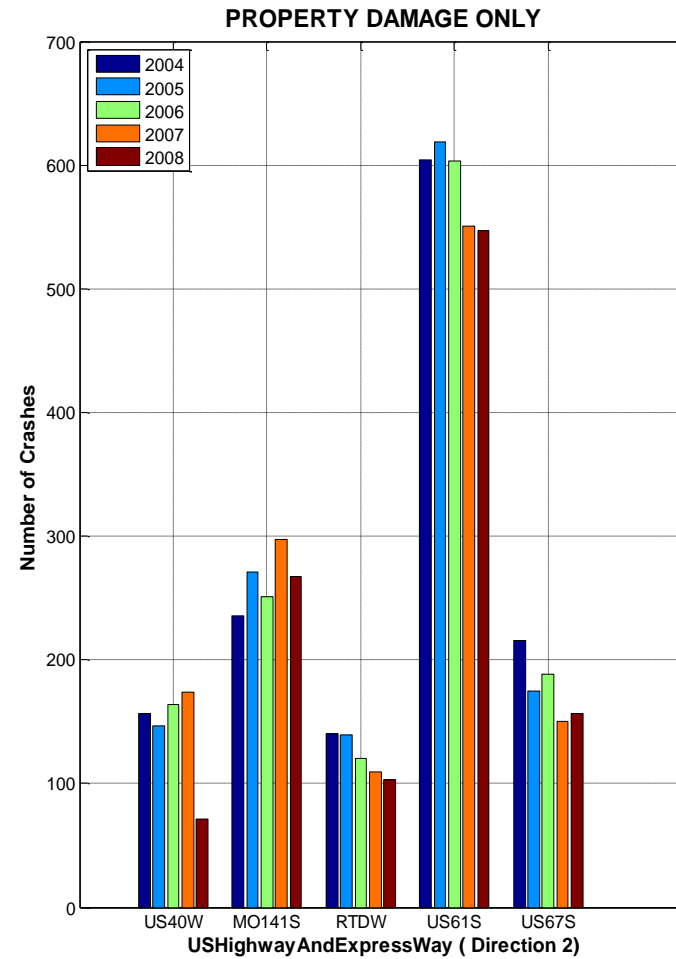
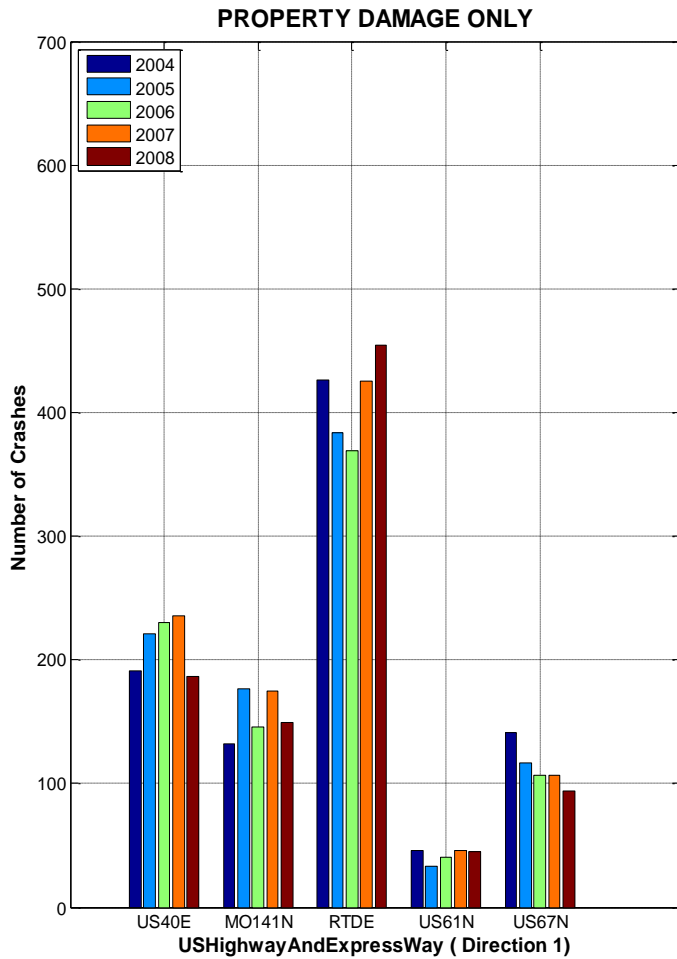


Figure S21: Property Damage in US Highway and Expressway (Both directions, 2004-2008)

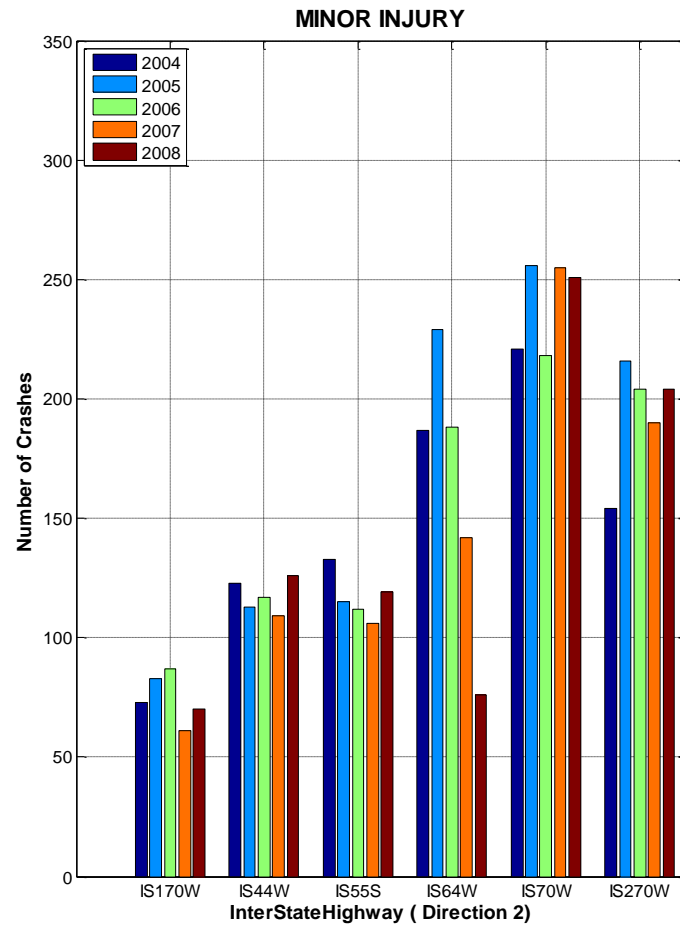
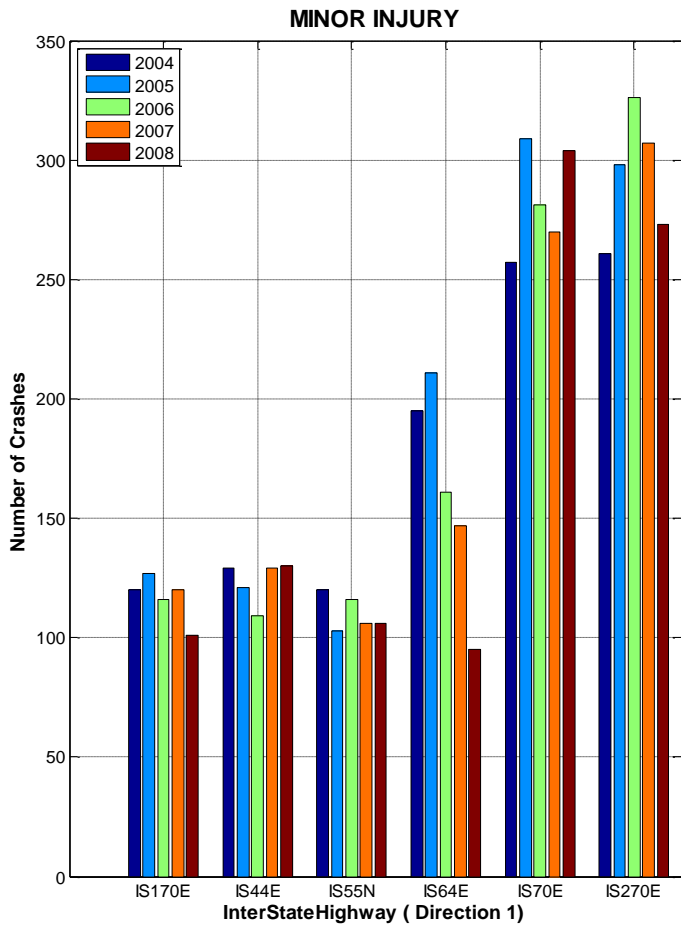


Figure S22: Minor Injury in Interstate Highway (Both directions, 2004-2008)

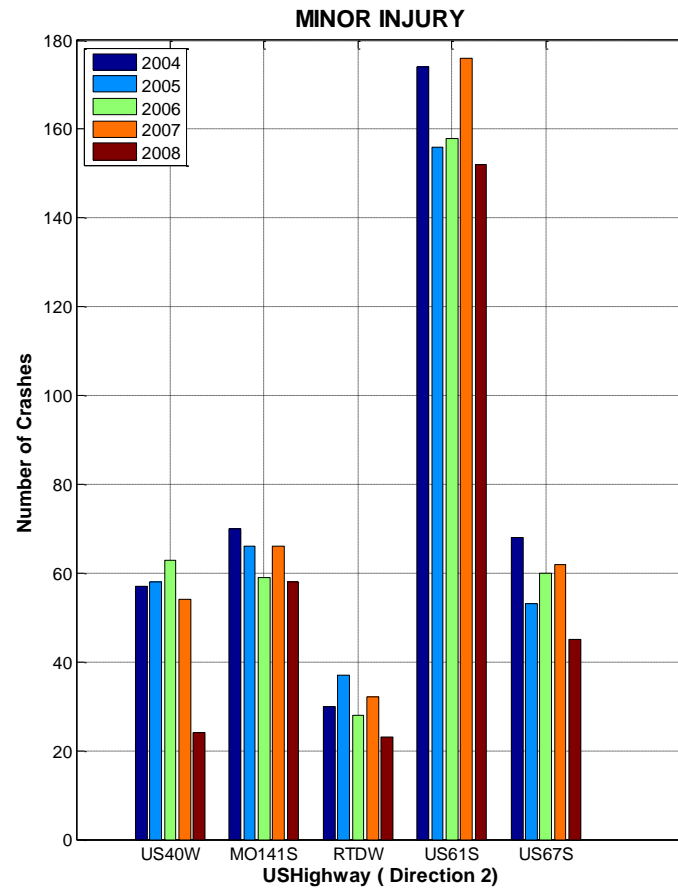
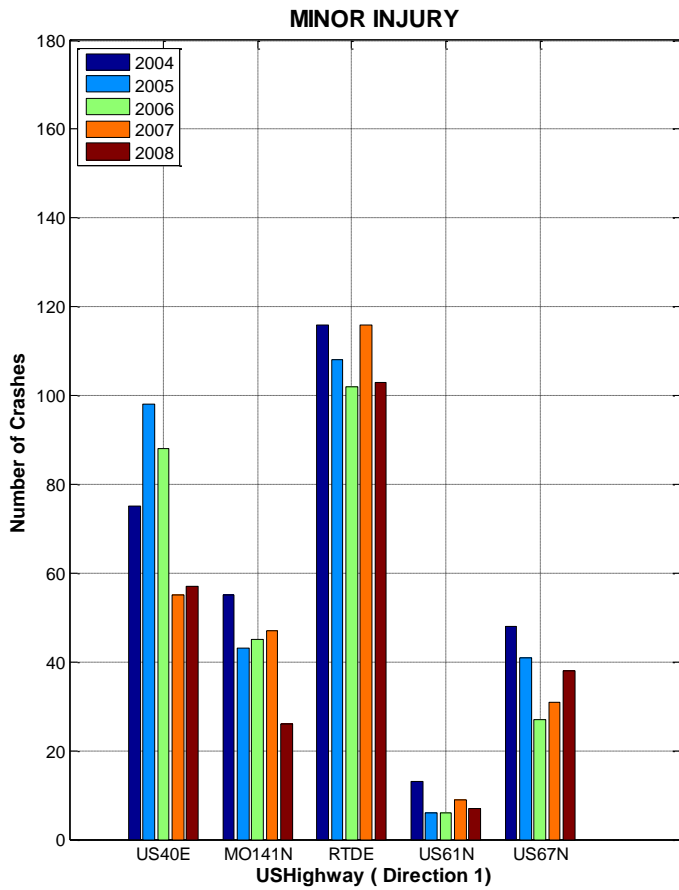


Figure S23: Minor Injury in US Highway and Expressway (Both directions, 2004-2008)

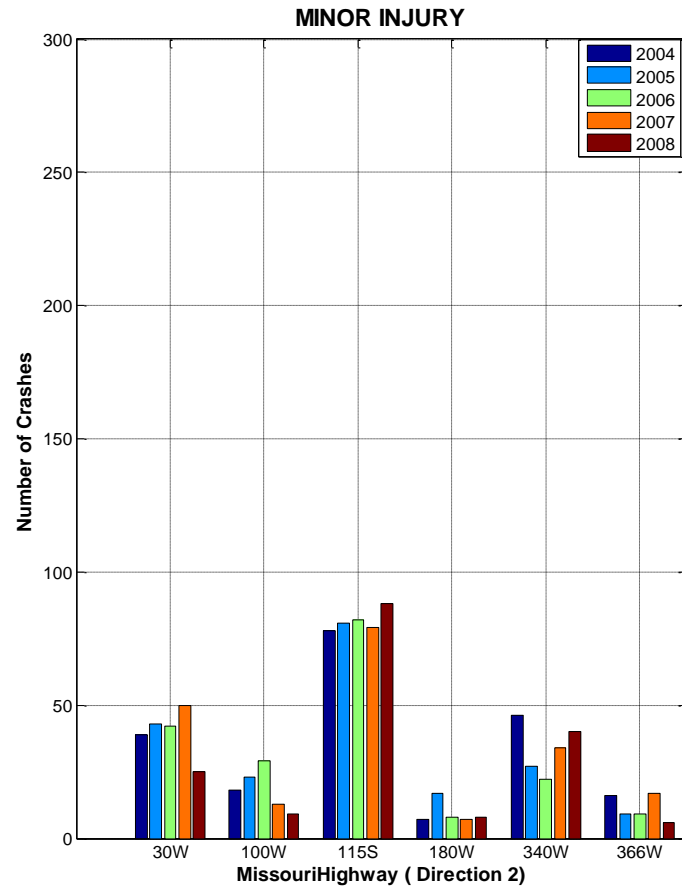
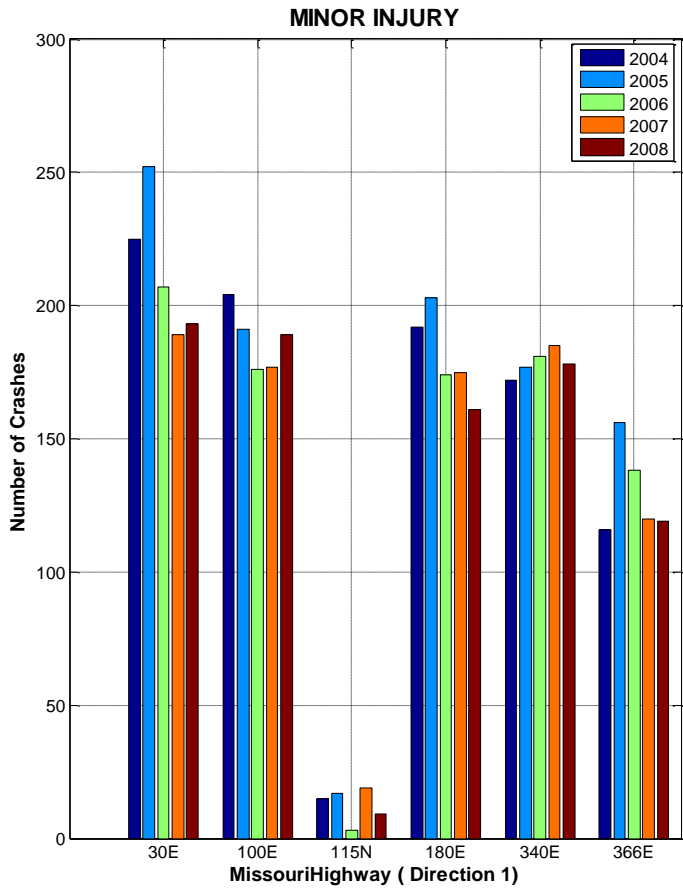


Figure S24: Minor Injury in Missouri Highway (Both directions, 2004-2008)

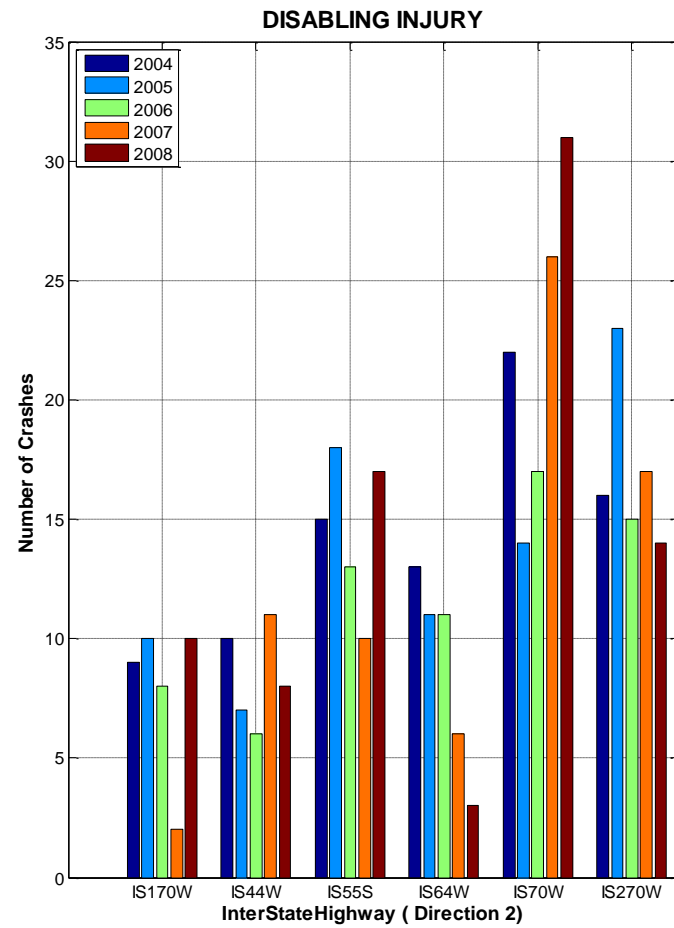
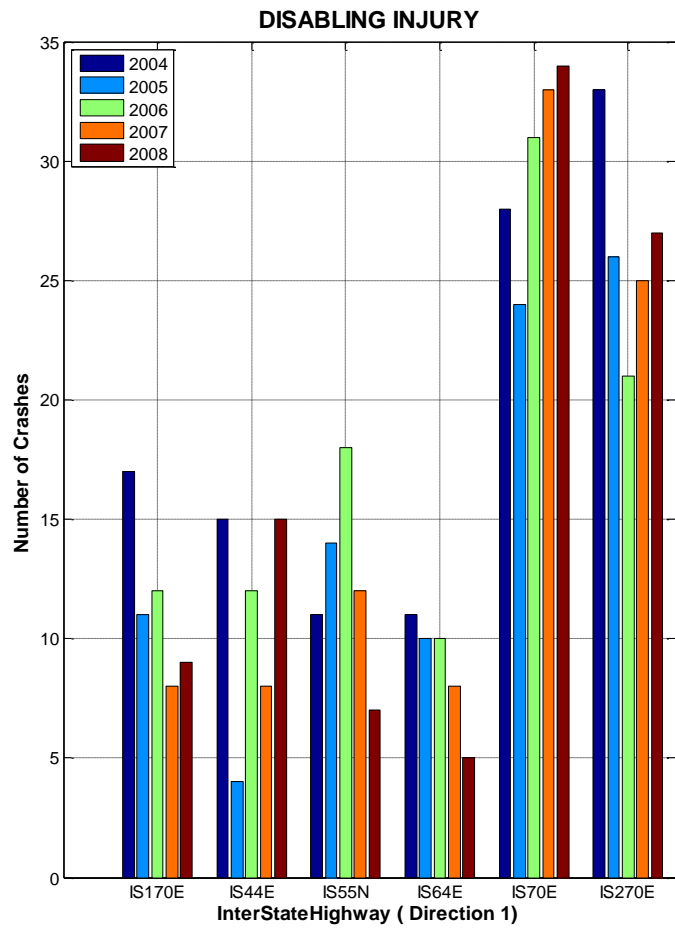


Figure S25: Disabling Injury in Interstate Highway (Both directions, 2004-2008)

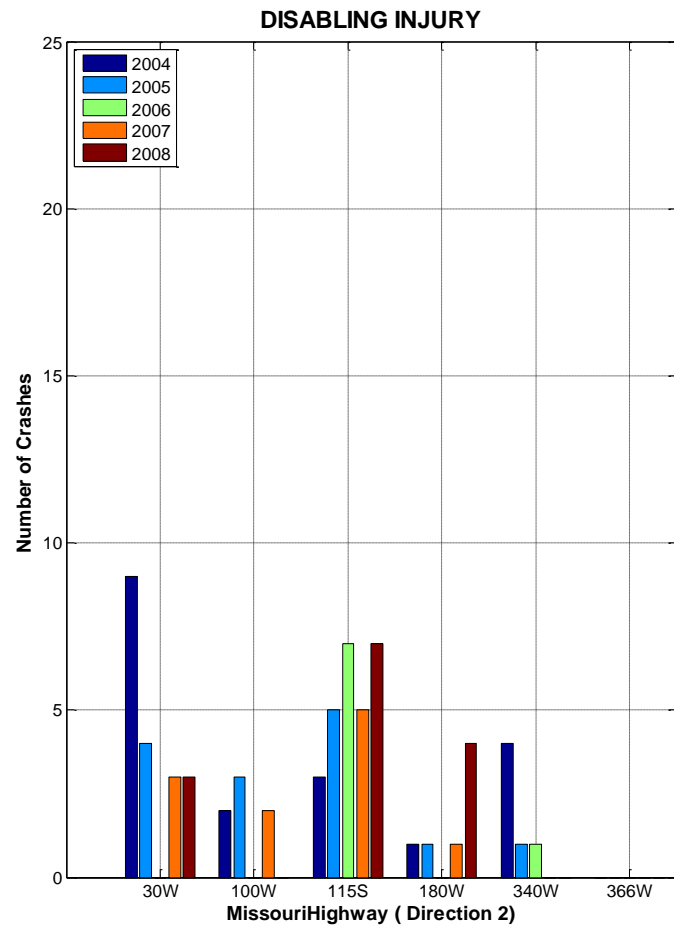
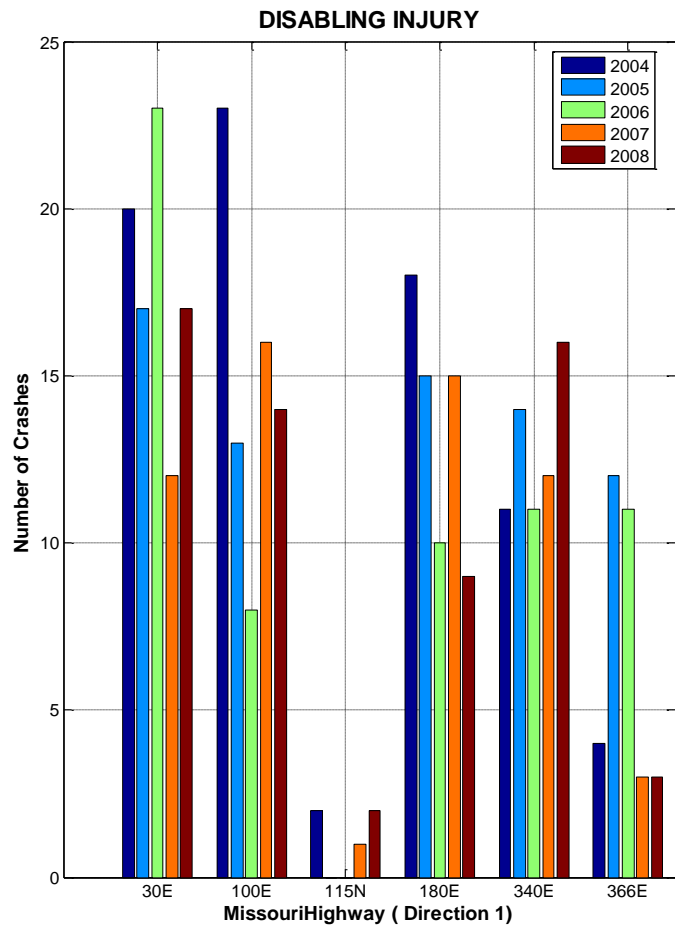


Figure S26: Disabling Injury in Missouri Highway (Both directions, 2004-2008)

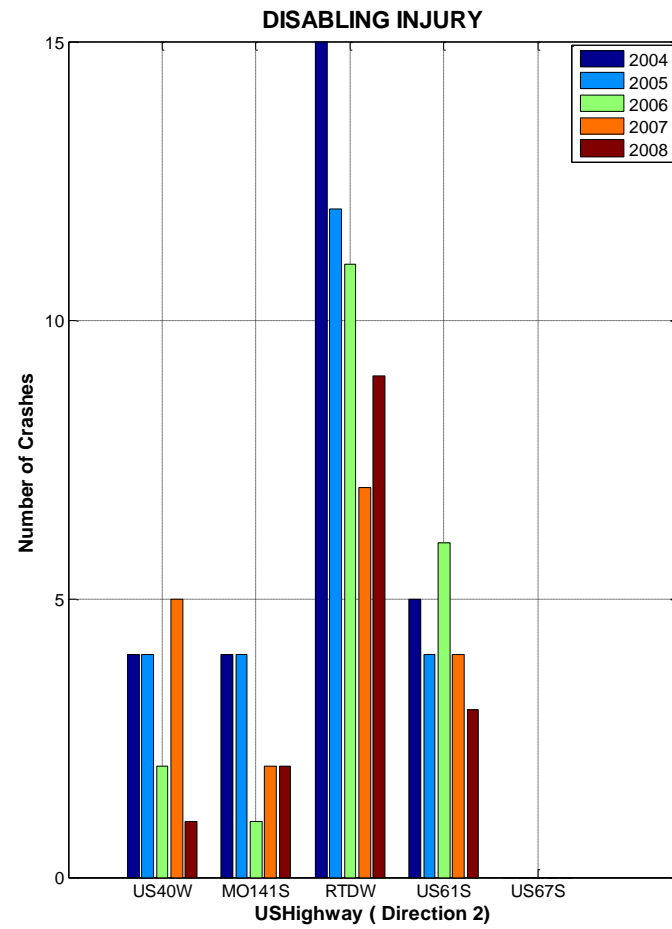
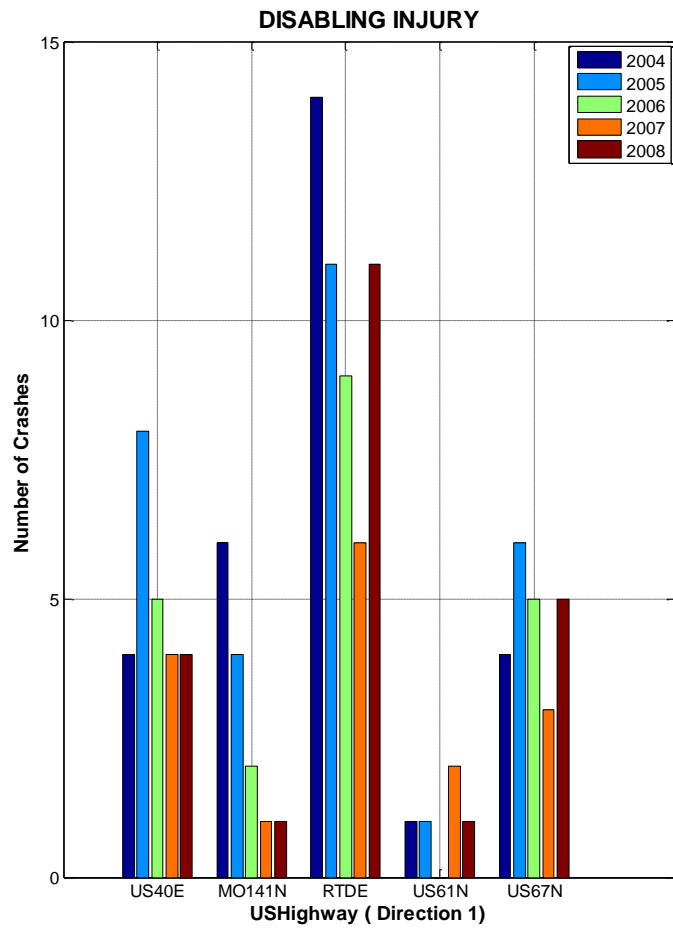


Figure S27: Disabling Injury in US Highway and Expressway (Both directions, 2004-2008)

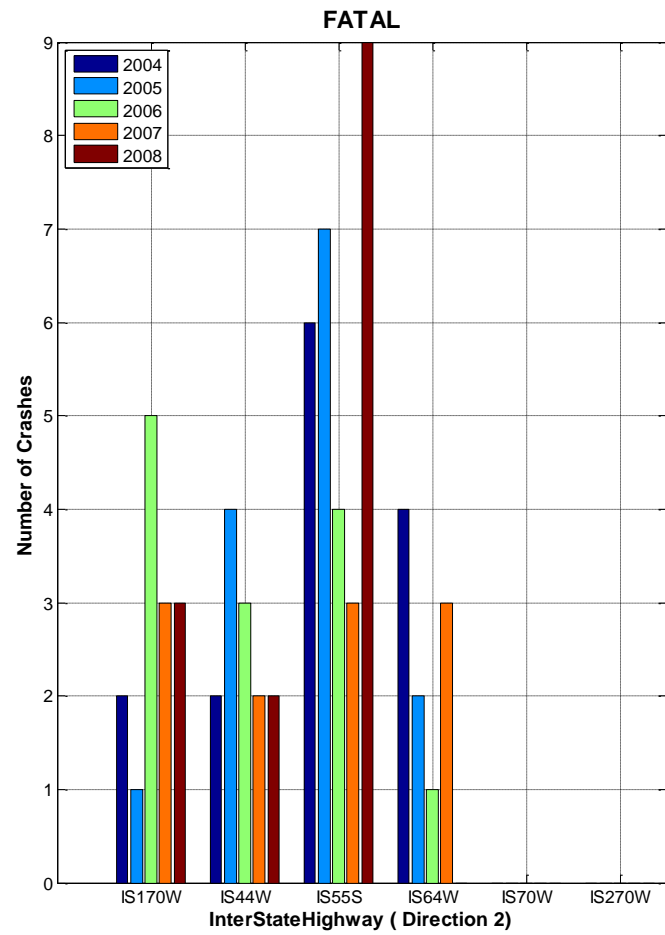
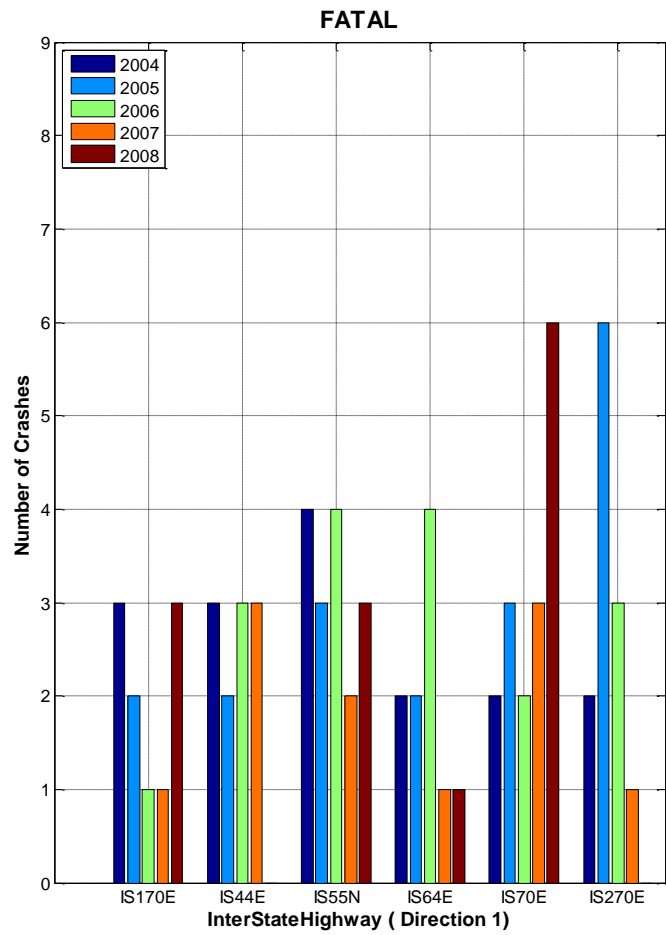


Figure S28: Fatality in Interstate Highway (Both directions, 2004-2008)

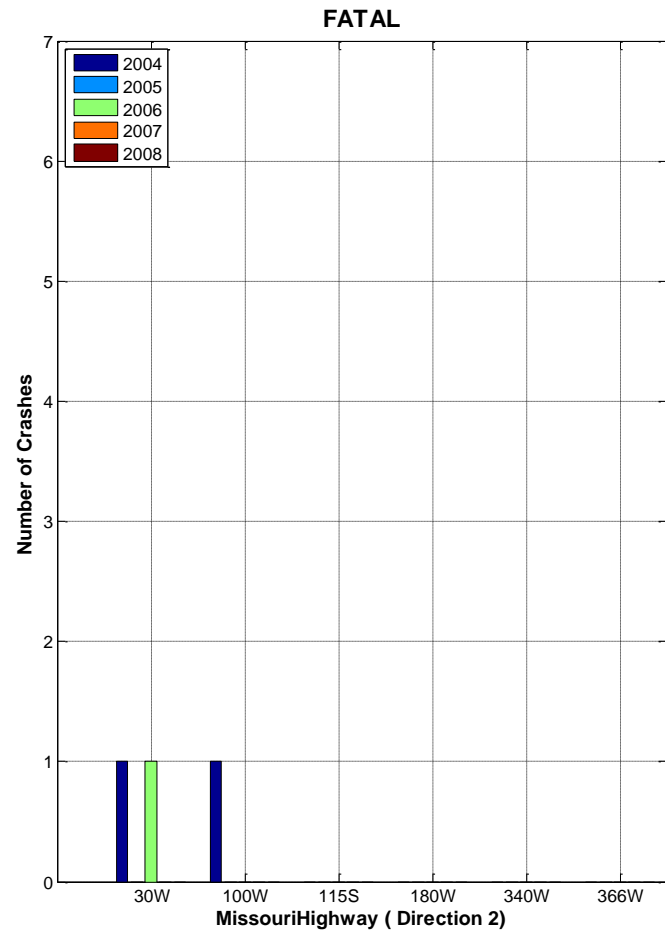
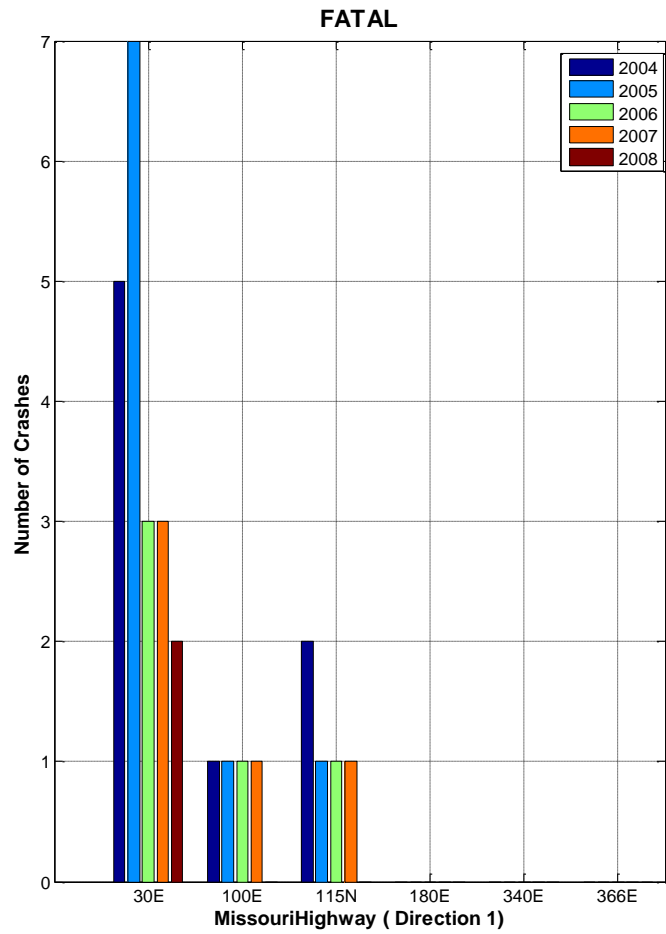


Figure S29: Fatality in Missouri Highway (Both directions, 2004-2008)

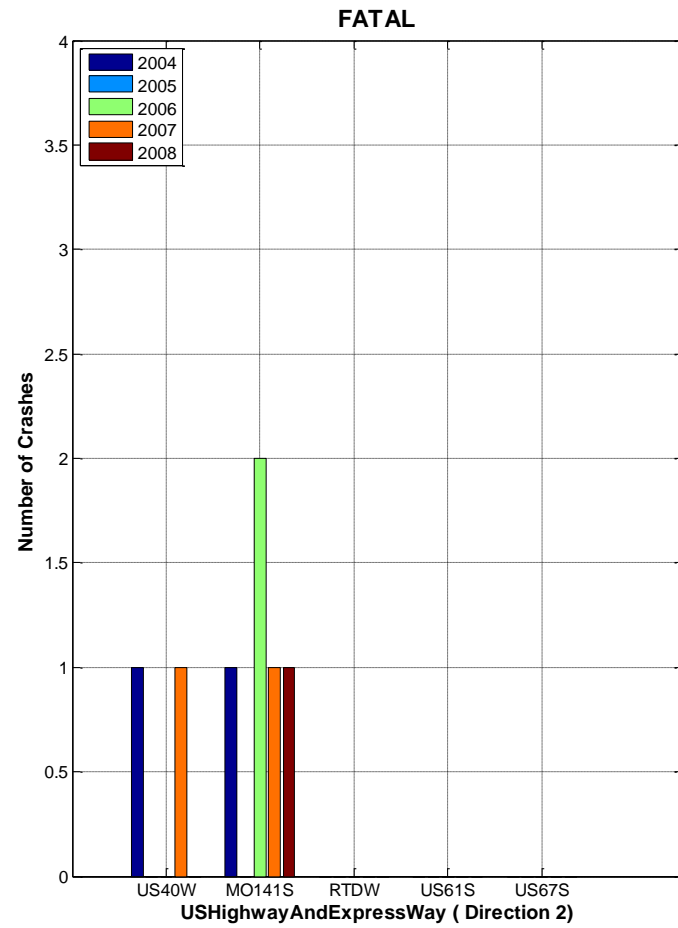
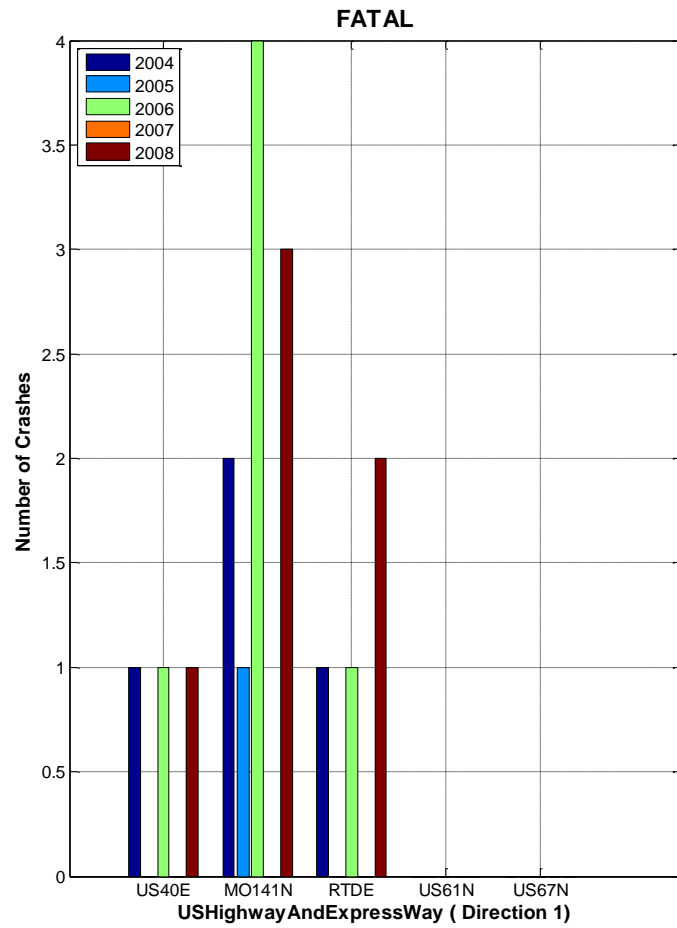


Figure S30: Fatality in US Highway and Expressway (Both directions, 2004-2008)

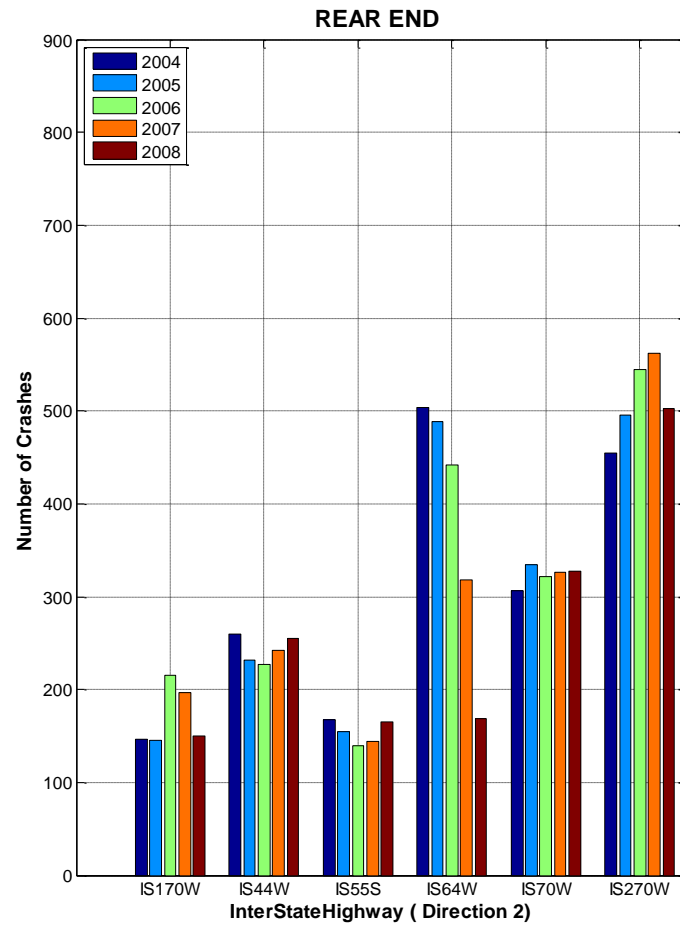
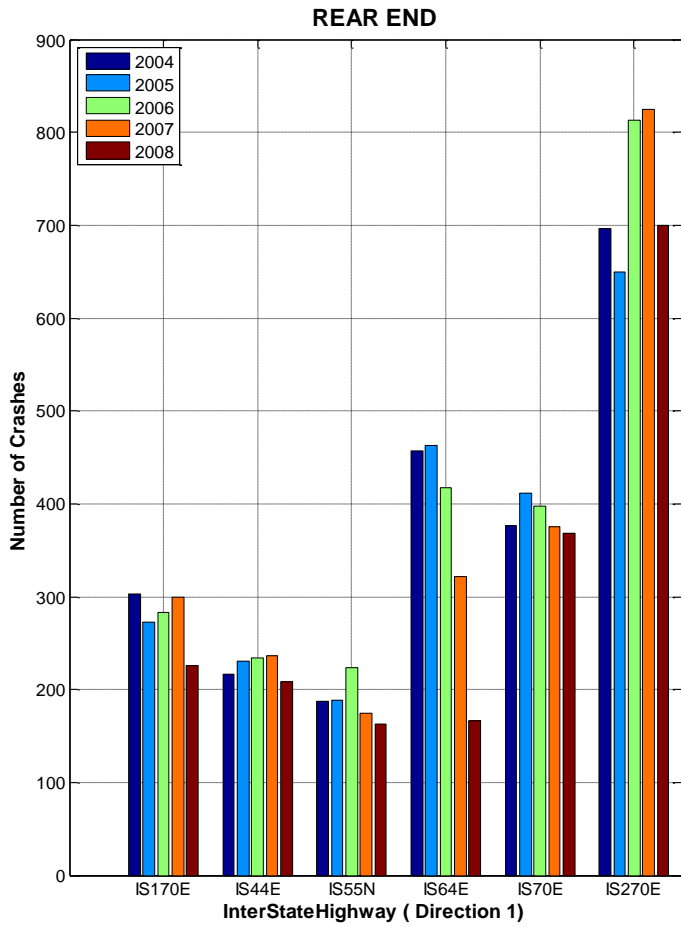


Figure S31: REAR-END in Inter-State Highway (Both directions, 2004-2008)

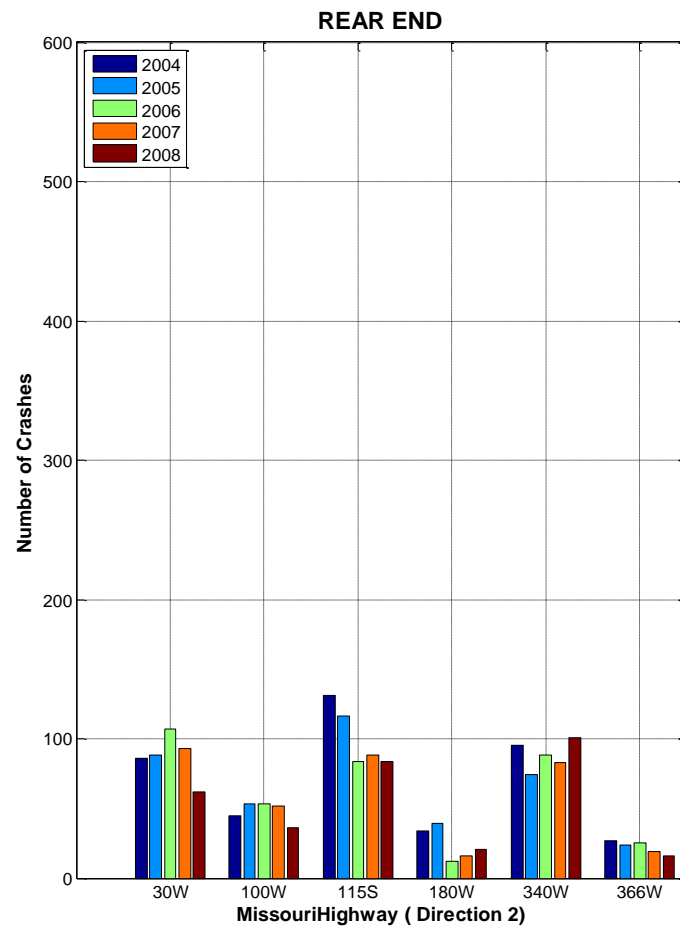
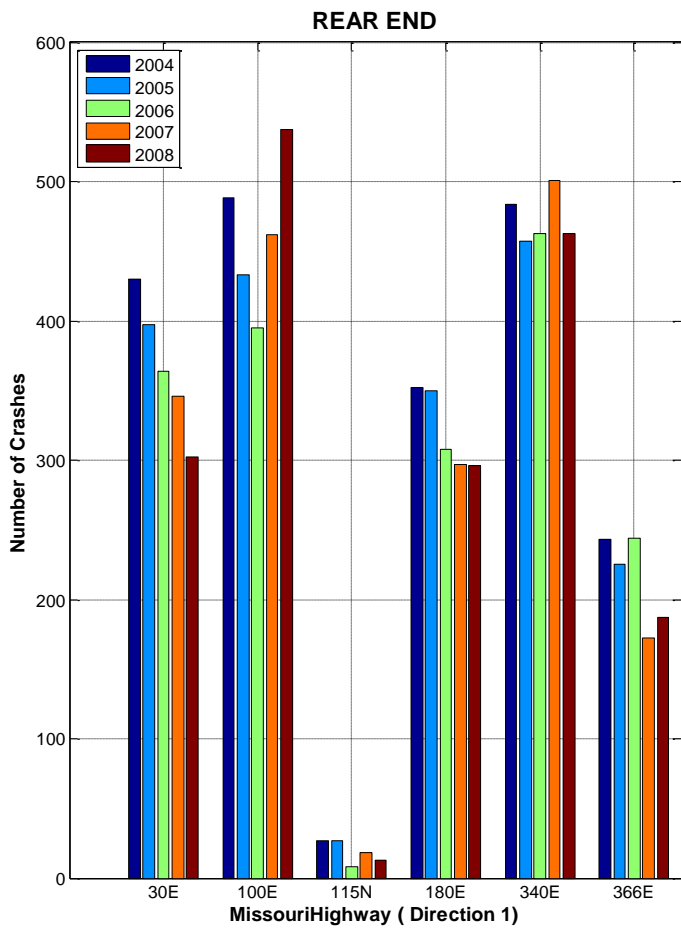


Figure S32: REAR-END in MO Highway (Both directions, 2004-2008)

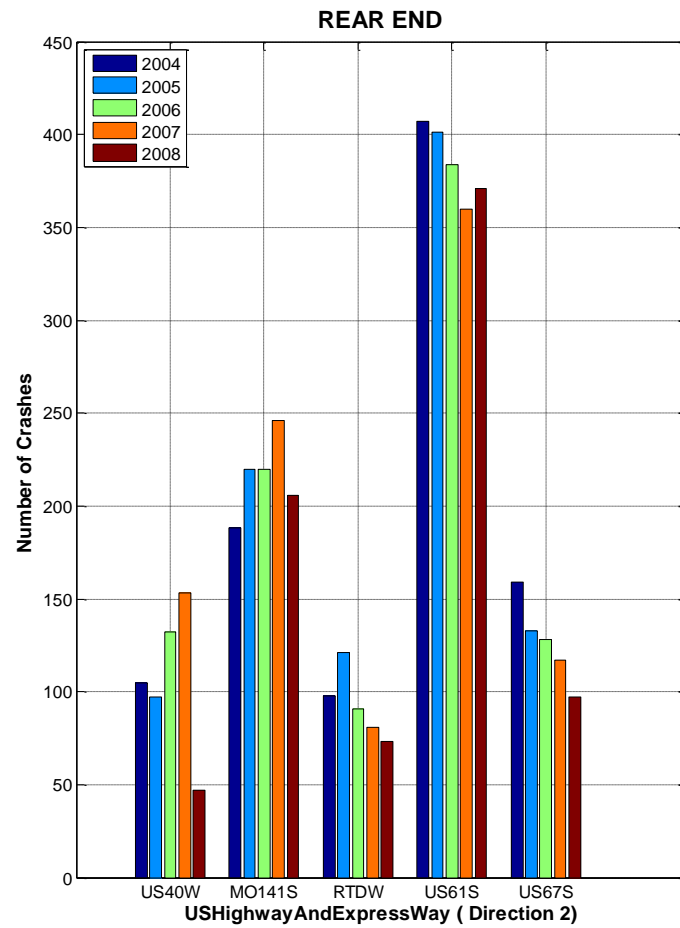
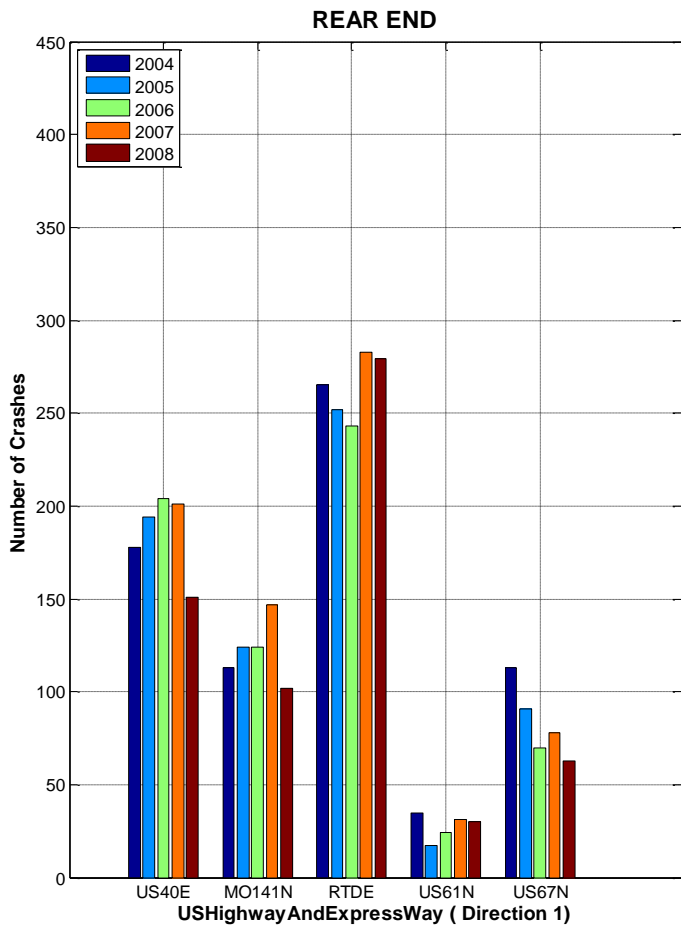


Figure S33: REAR-END in US Highway (Both directions, 2004-2008)

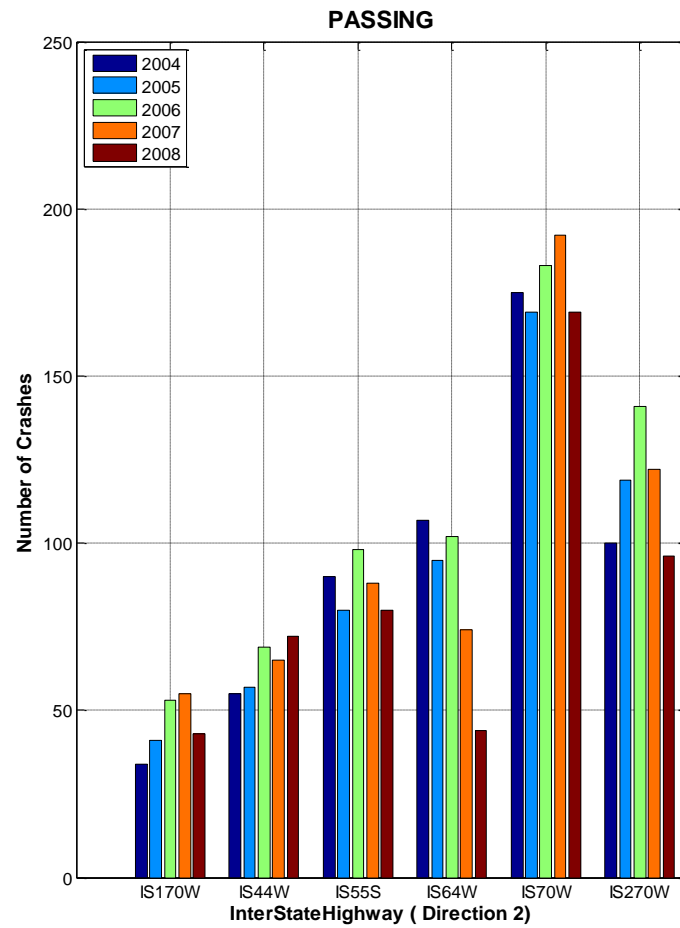
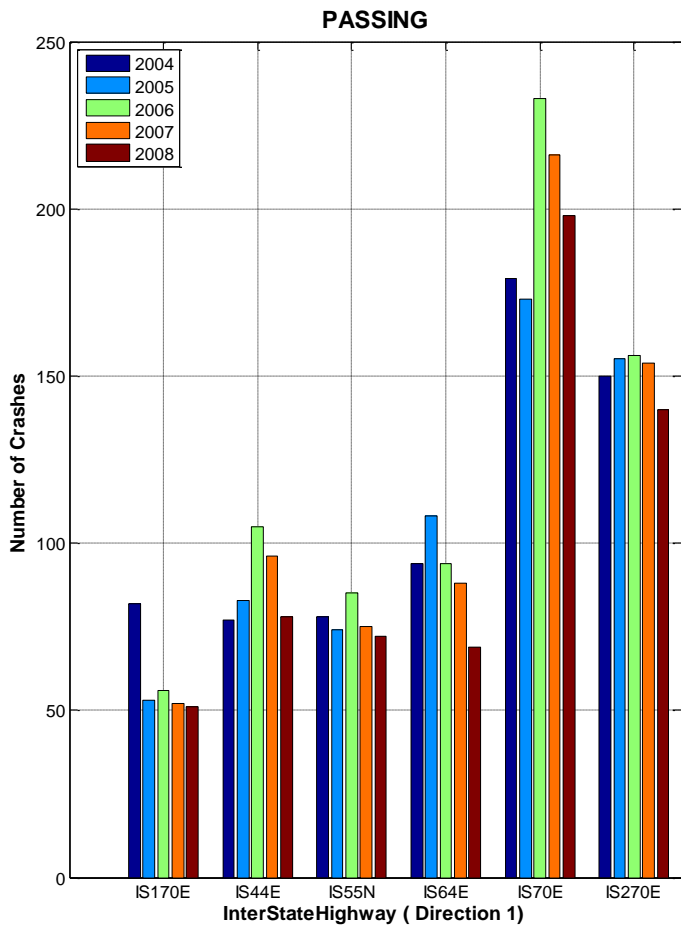


Figure S34: PASSING in Inter-State Highway (Both directions, 2004-2008)

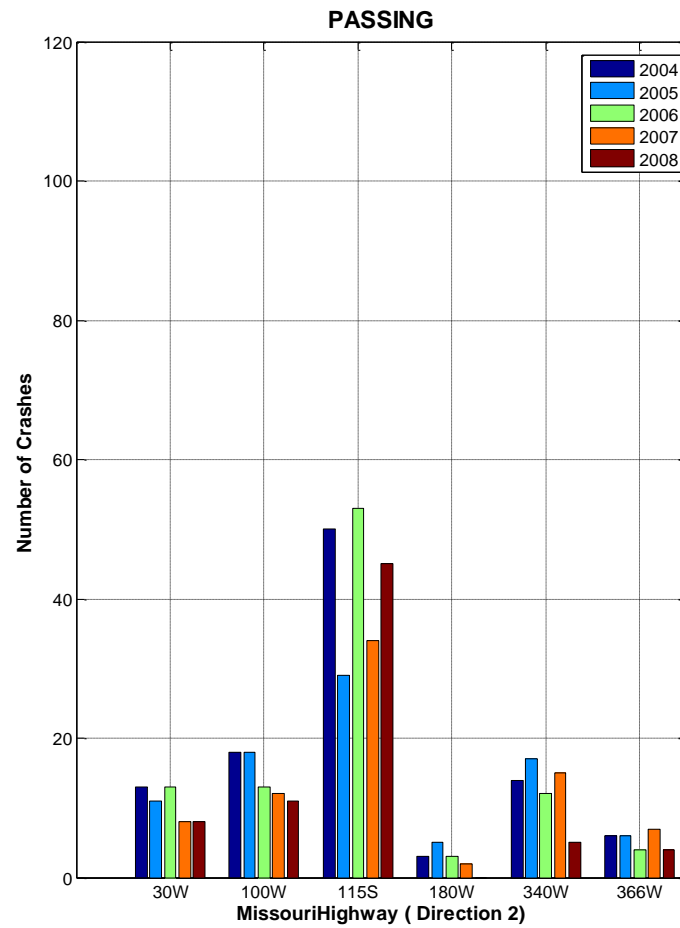
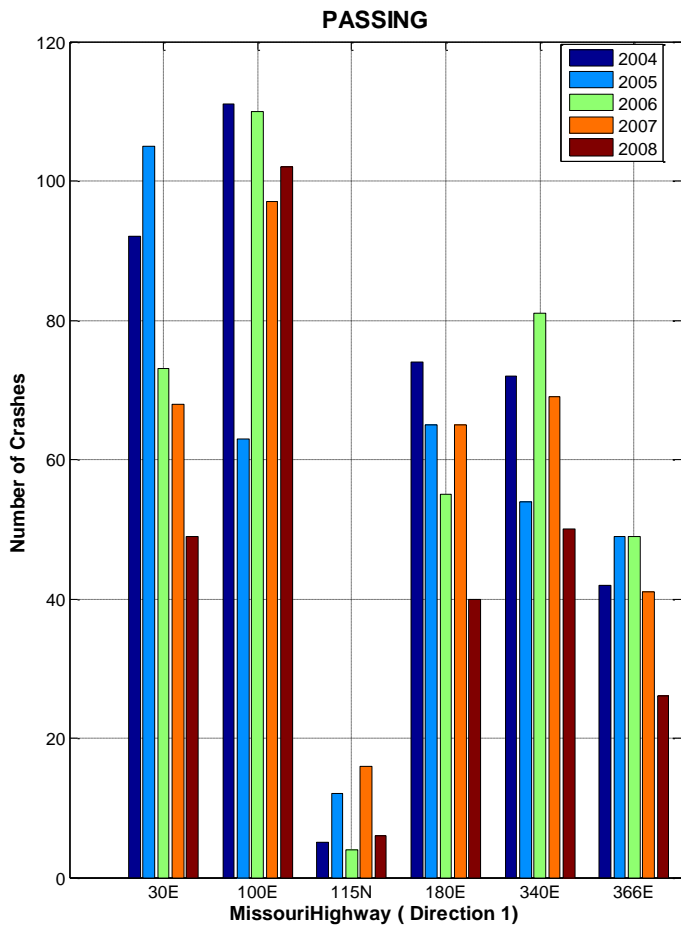


Figure S35: PASSING in Missouri Highway (Both directions, 2004-2008)

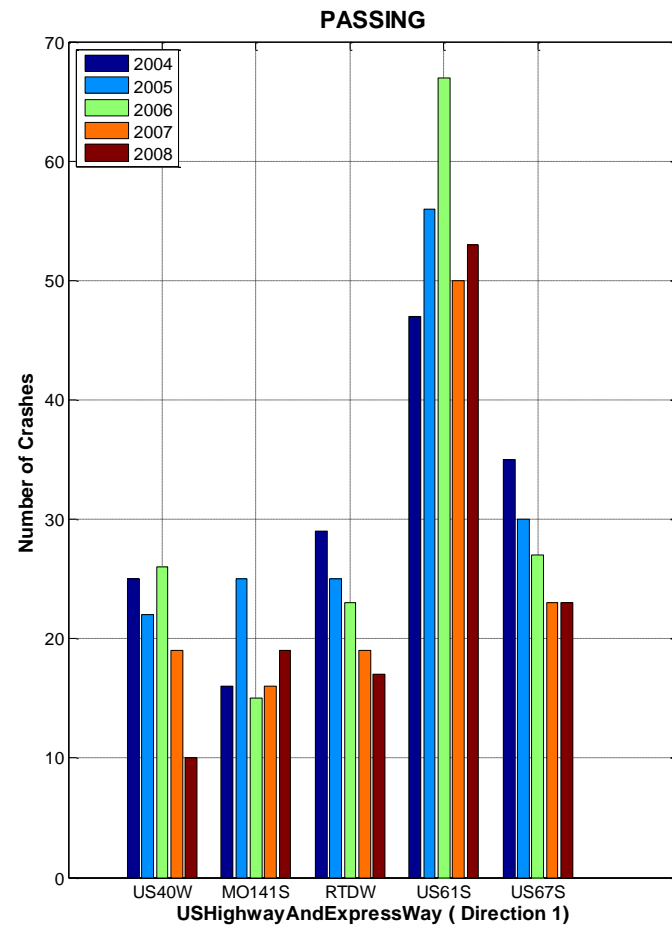
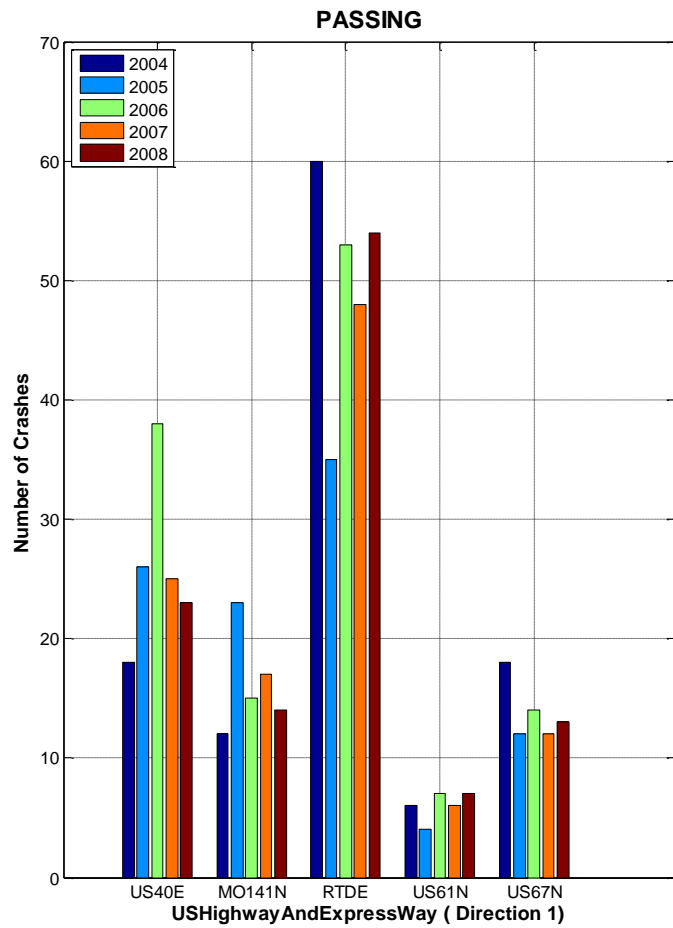


Figure S36: PASSING in US Highway (Both directions, 2004-2008)

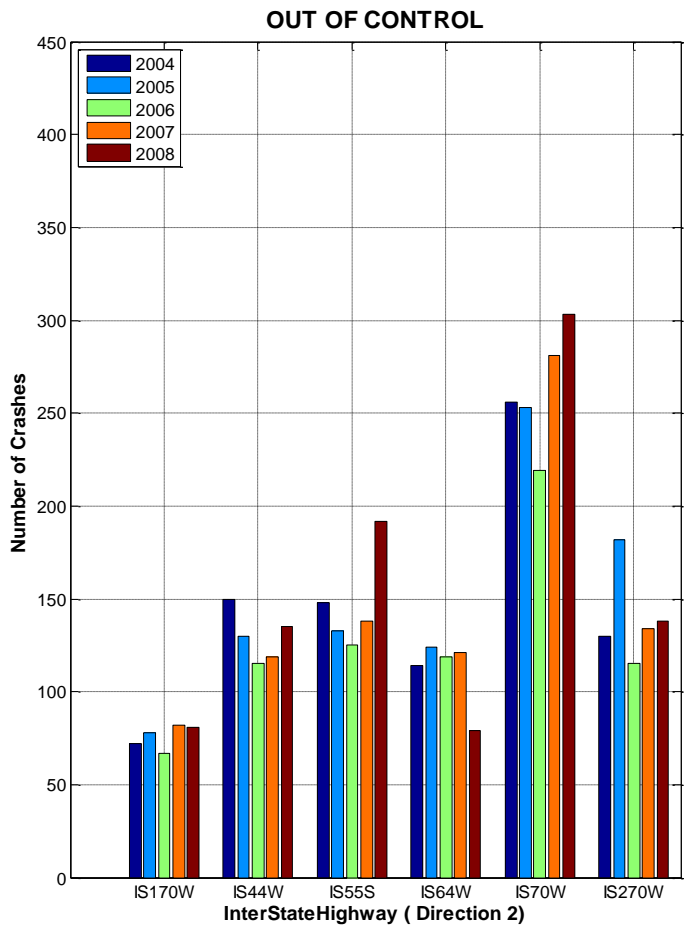
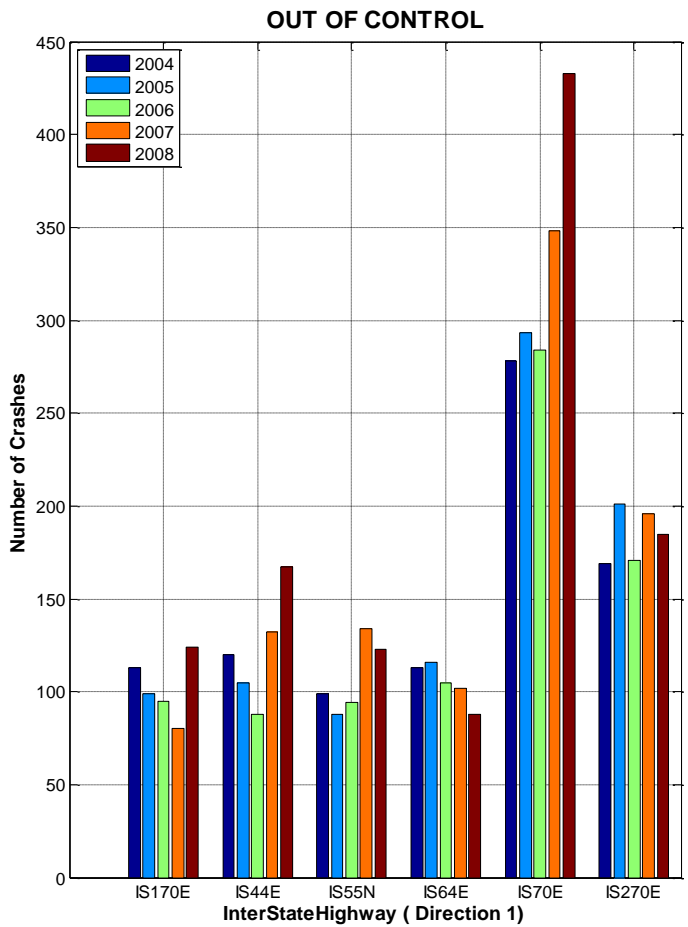


Figure S37: Out of Control in Interstate Highway (Both directions, 2004-2008)

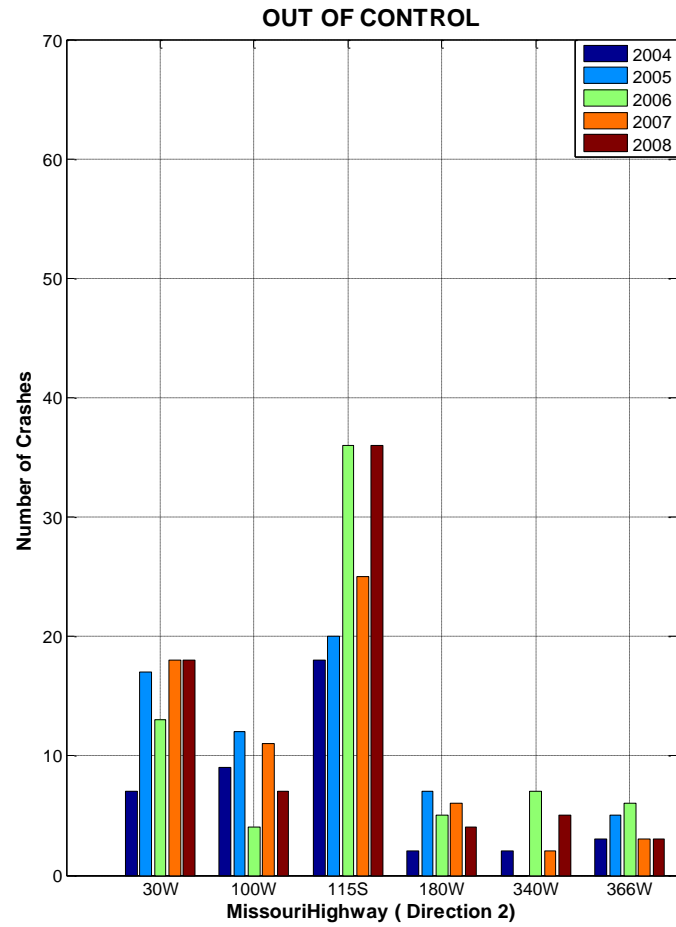
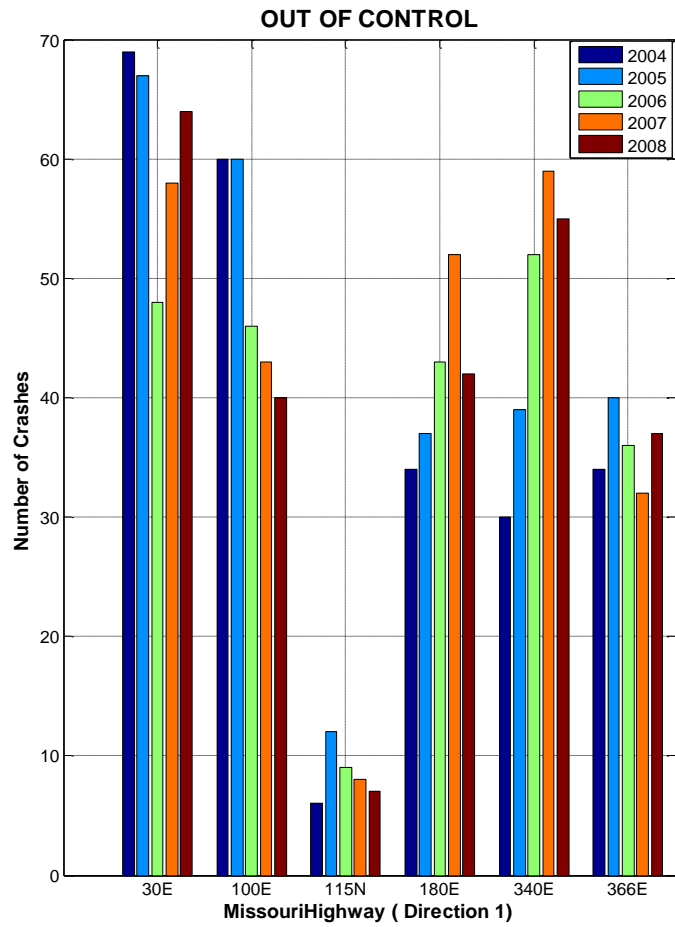


Figure S38: Out of Control in Missouri Highway (Both directions, 2004-2008)

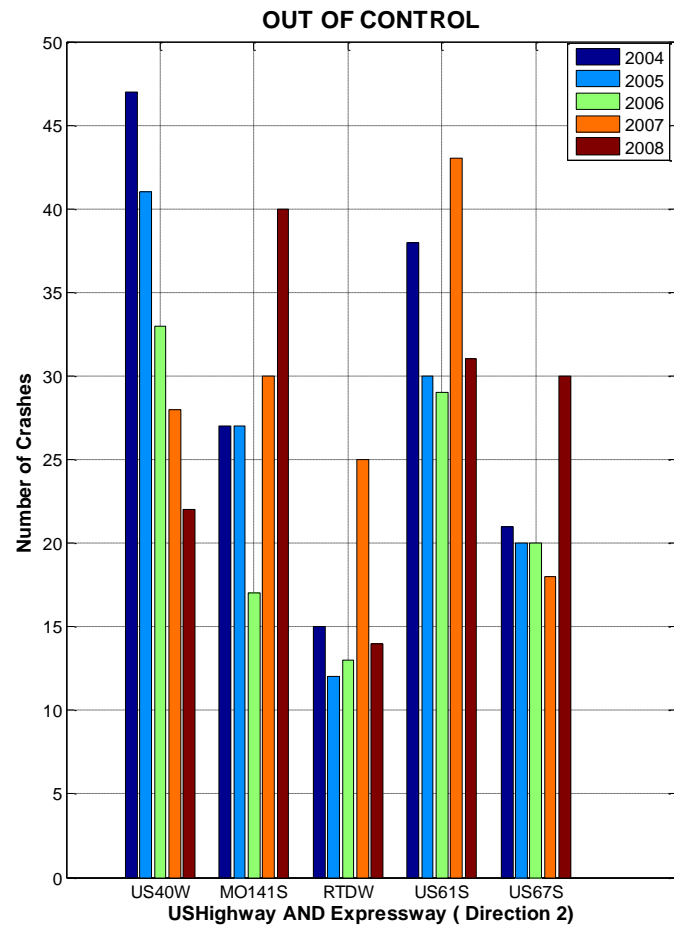
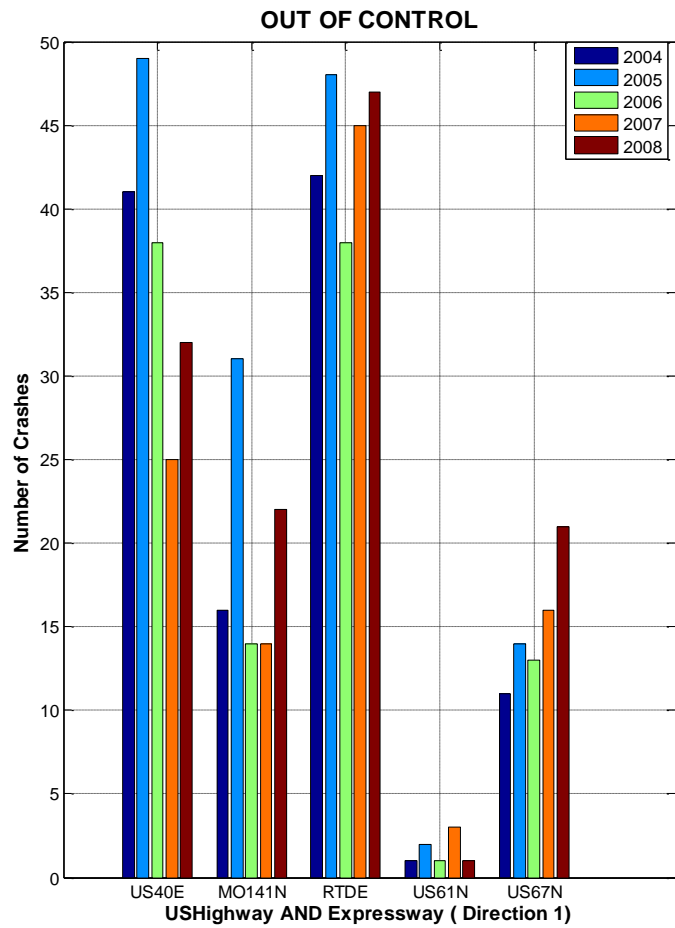


Figure S39: Out of Control in US Highway (Both directions, 2004-2008)

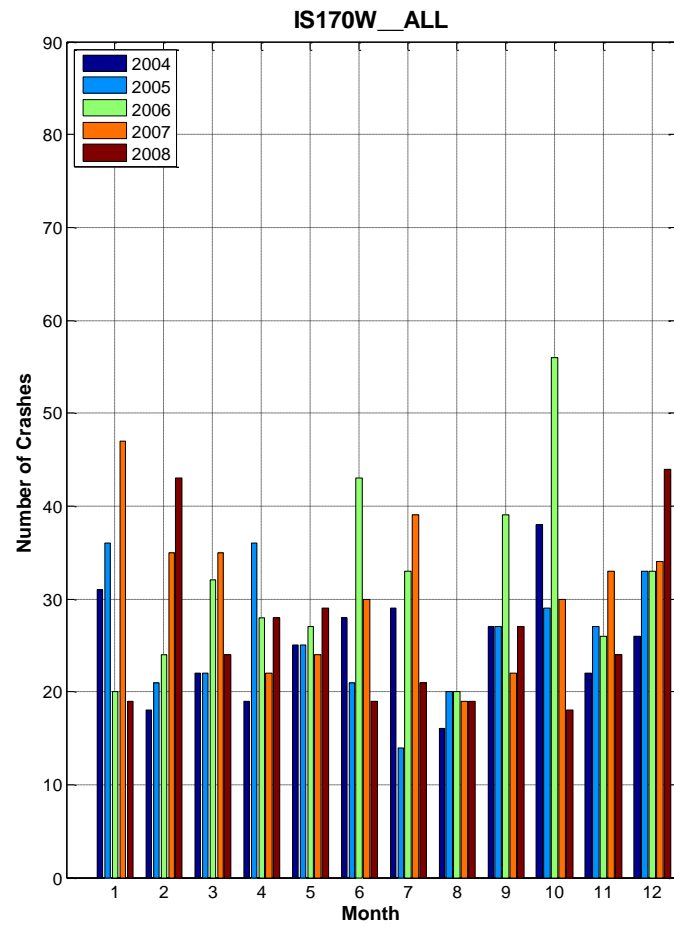
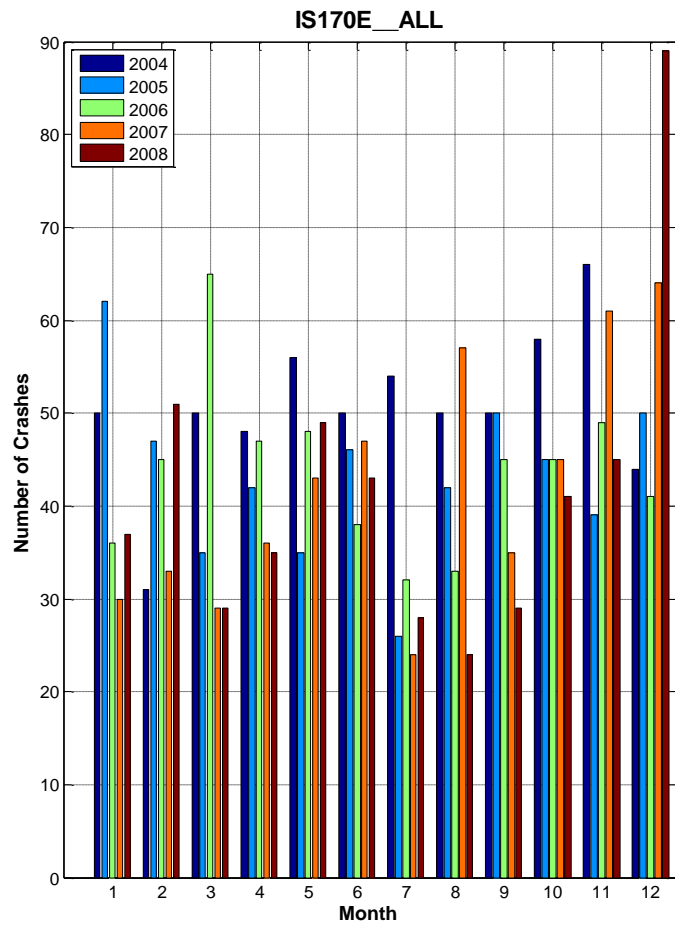


Figure S40: Crashes by Month on IS170 (Both directions, 2004-2008)

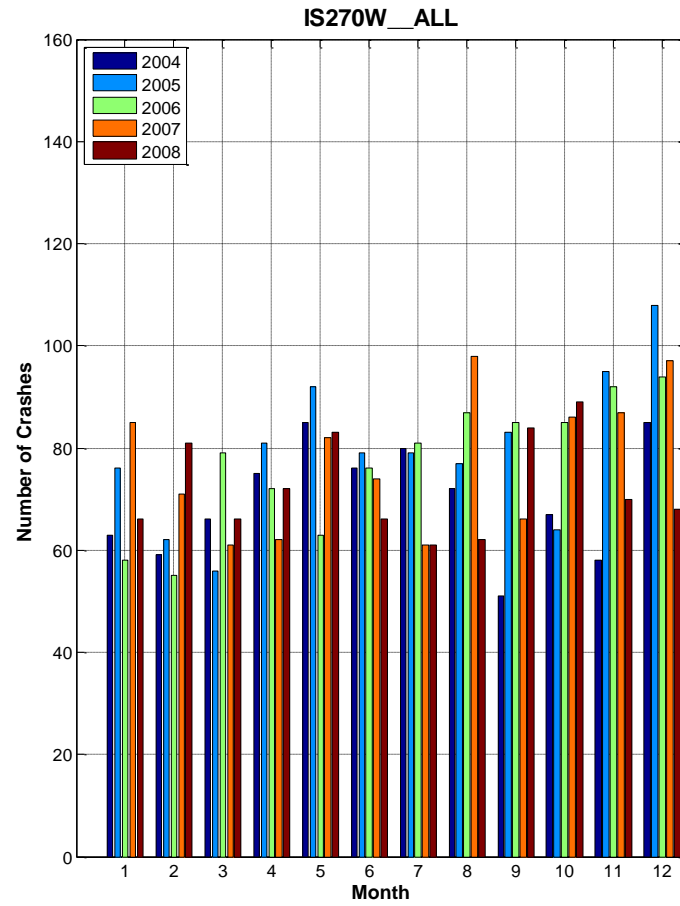
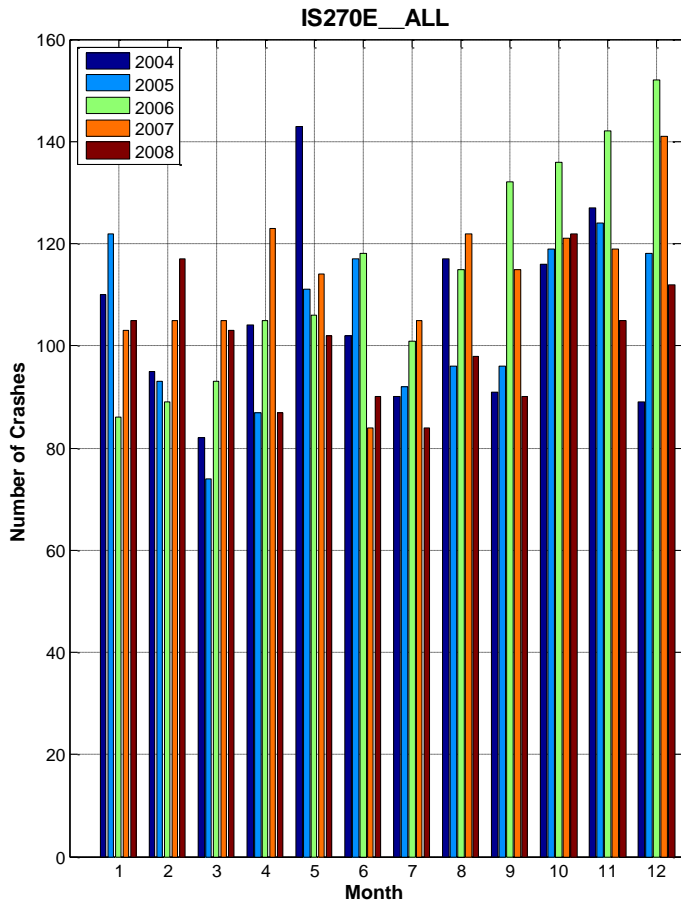


Figure S41: Crashes by Month on I-270 (Both directions, 2004-2008)

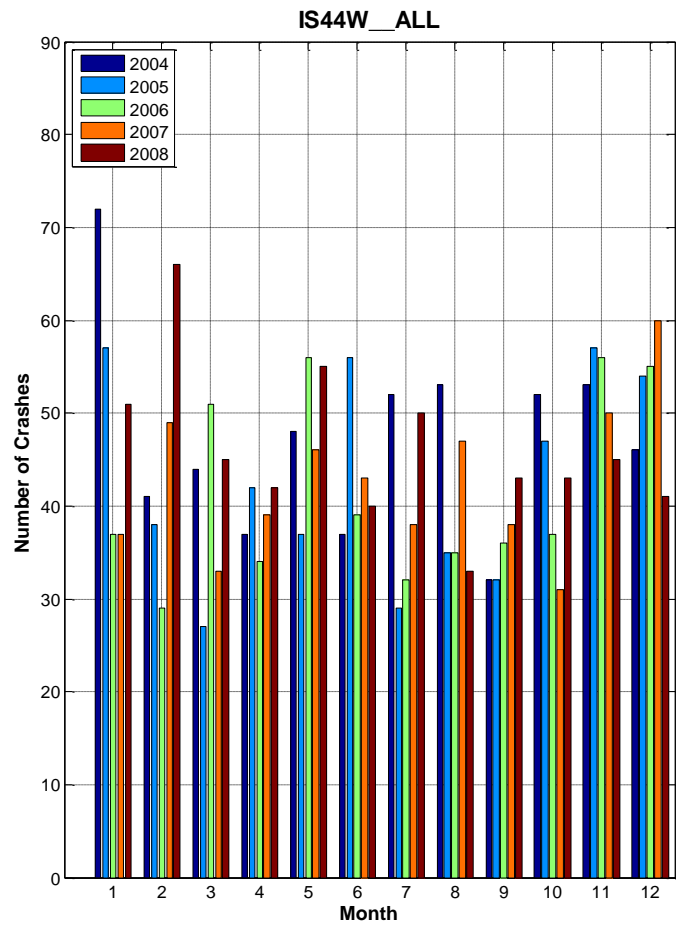
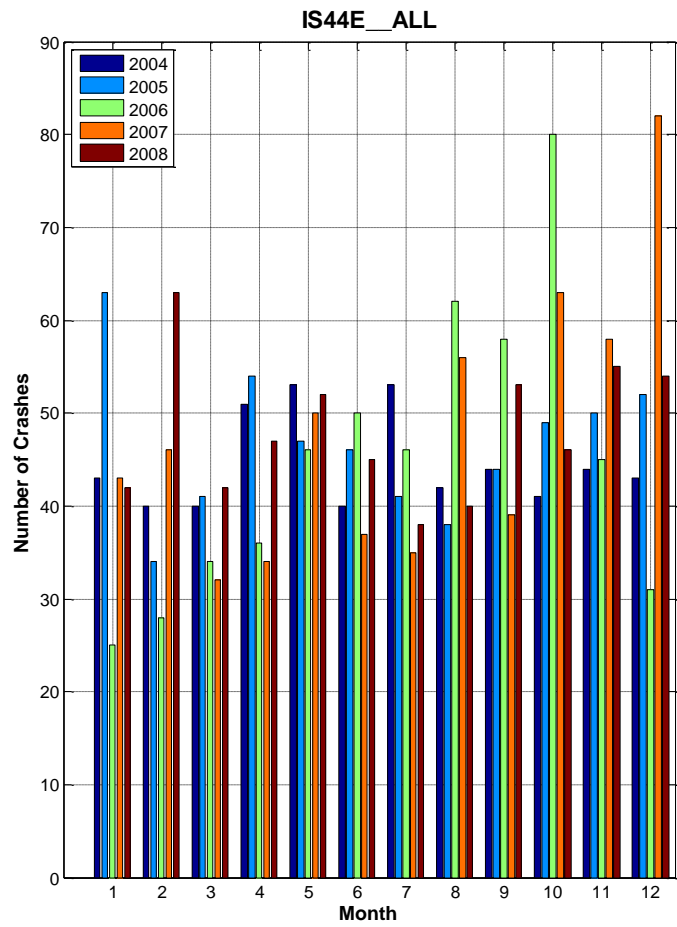


Figure S42: Crashes by Month on I-44 (Both directions, 2004-2008)

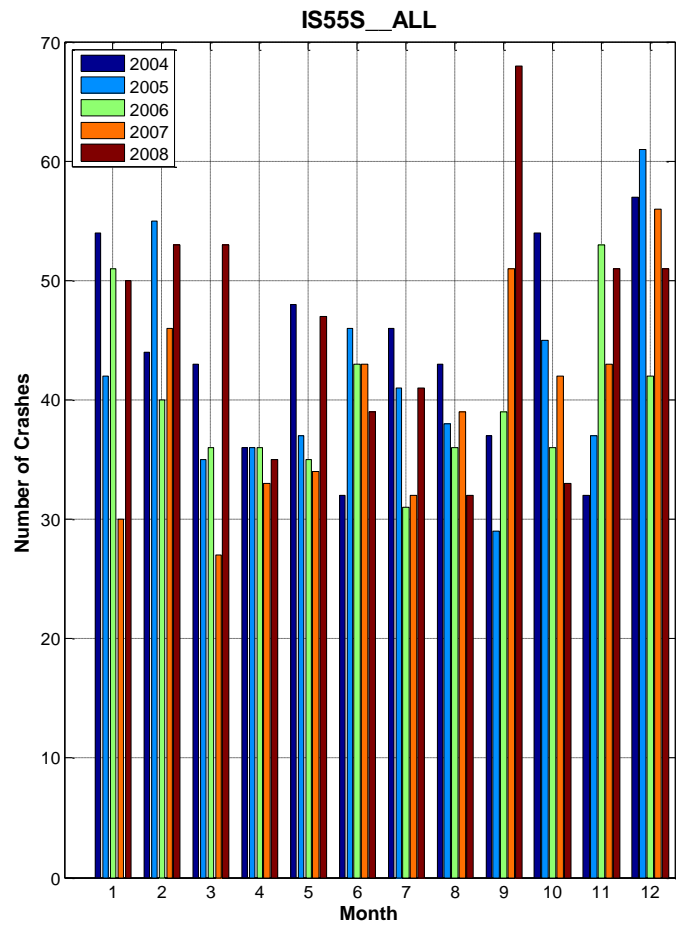
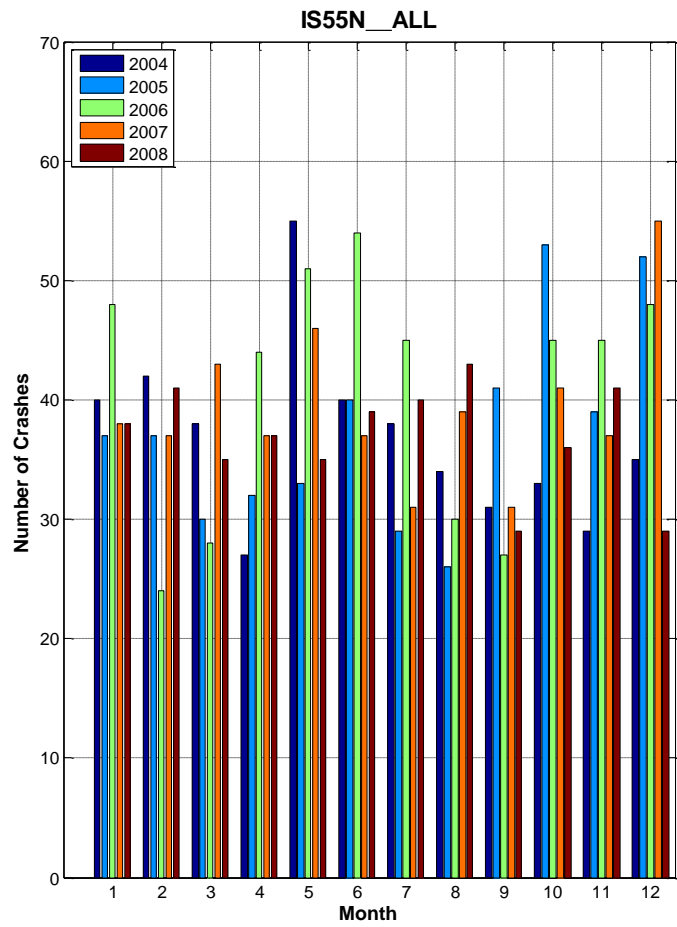


Figure S43: Crashes by Month on I-55 (Both directions, 2004-2008)

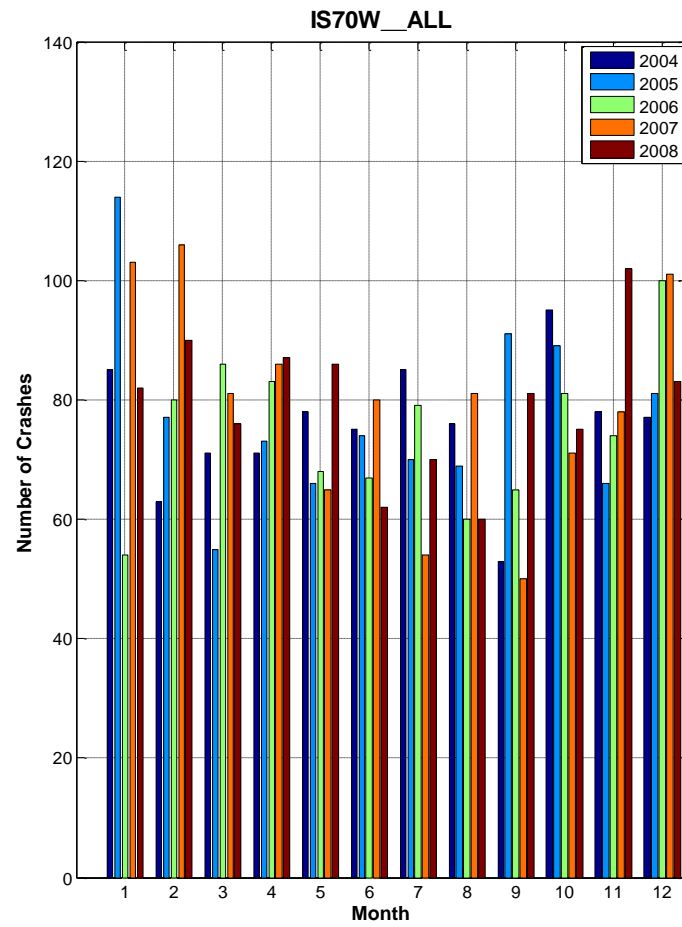
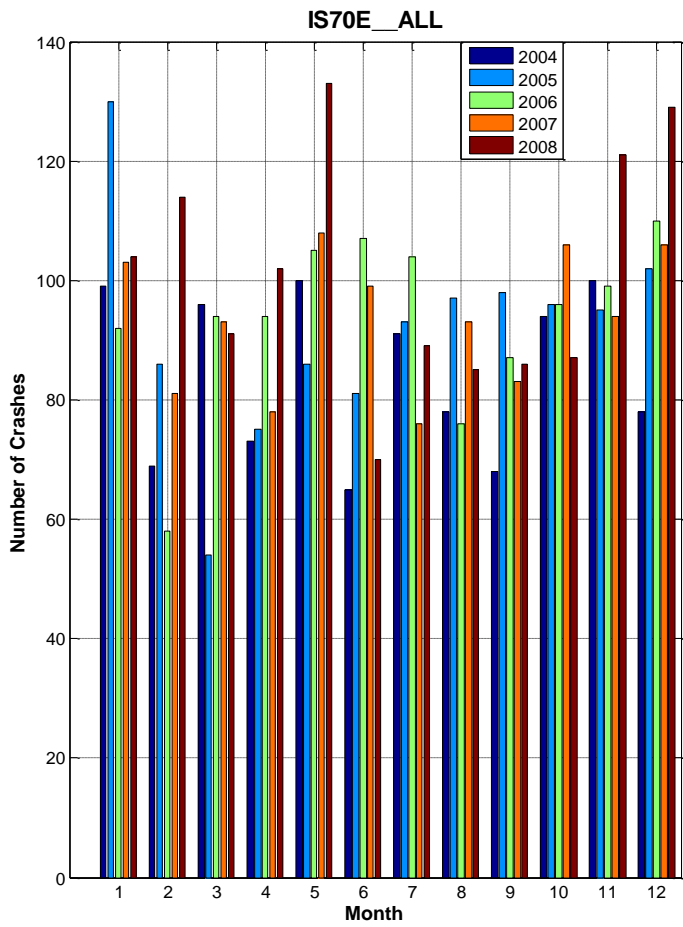


Figure S44: Crashes by Month on I-70 (Both directions, 2004-2008)

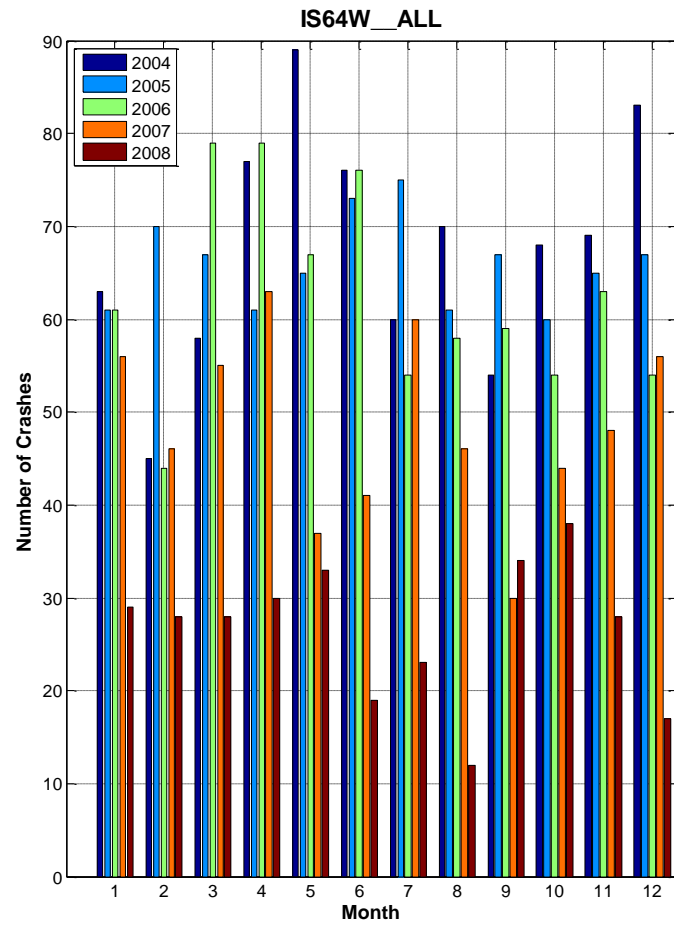
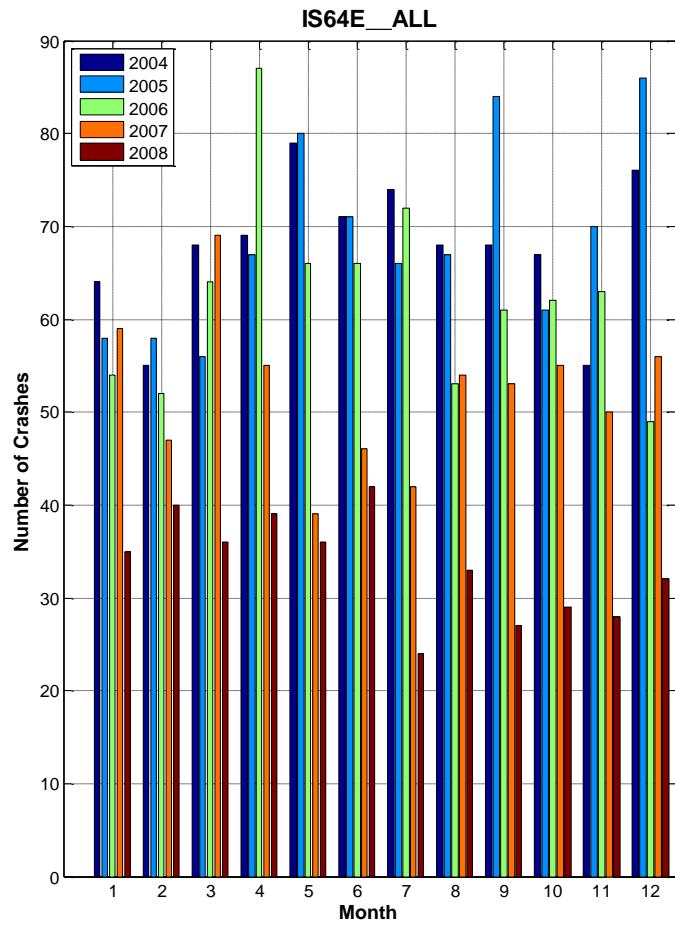


Figure S45: Crashes by Month on I-64 (Both directions, 2004-2008)

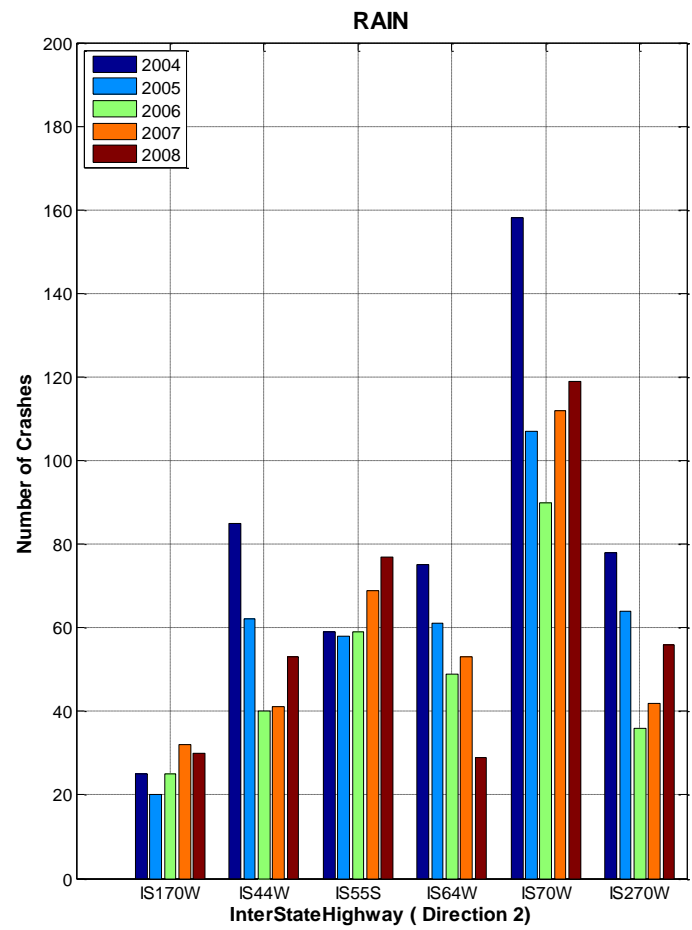
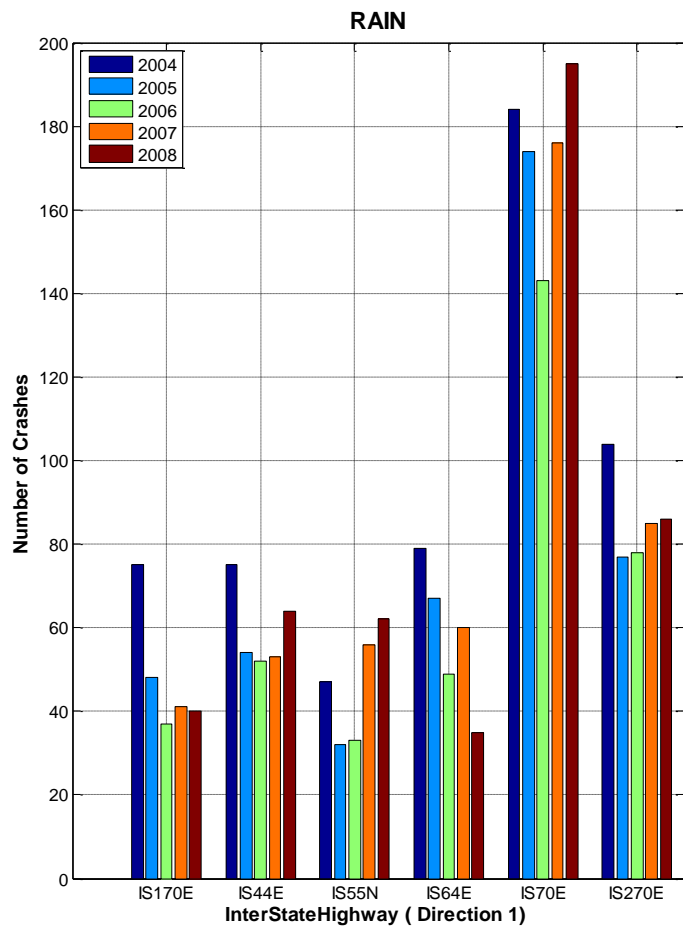


Figure S46: Crashes on Inter-State Highways on Rainy days (Both directions, 2004-2008)

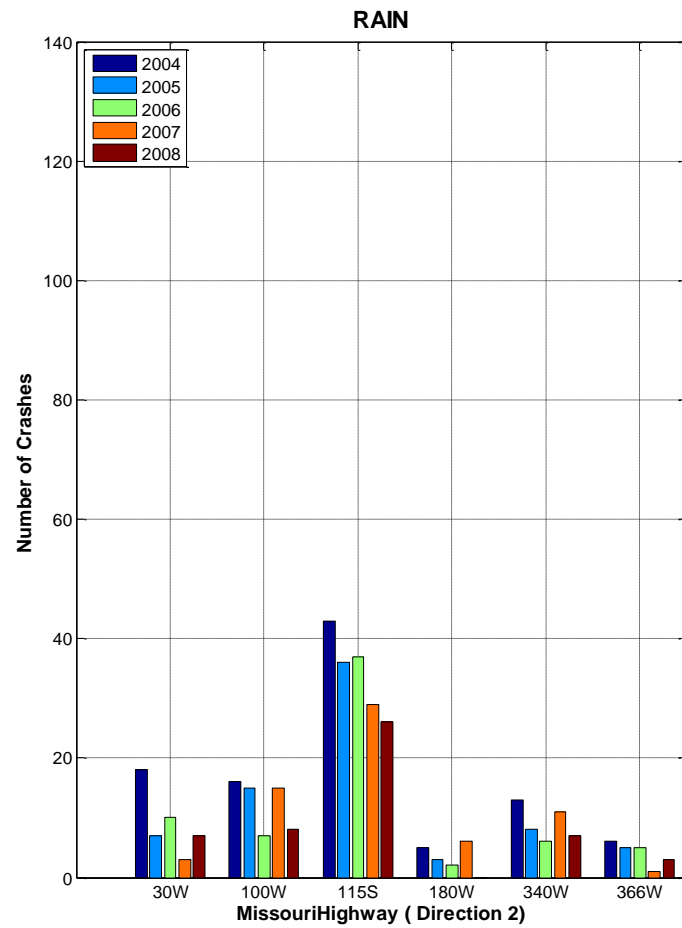
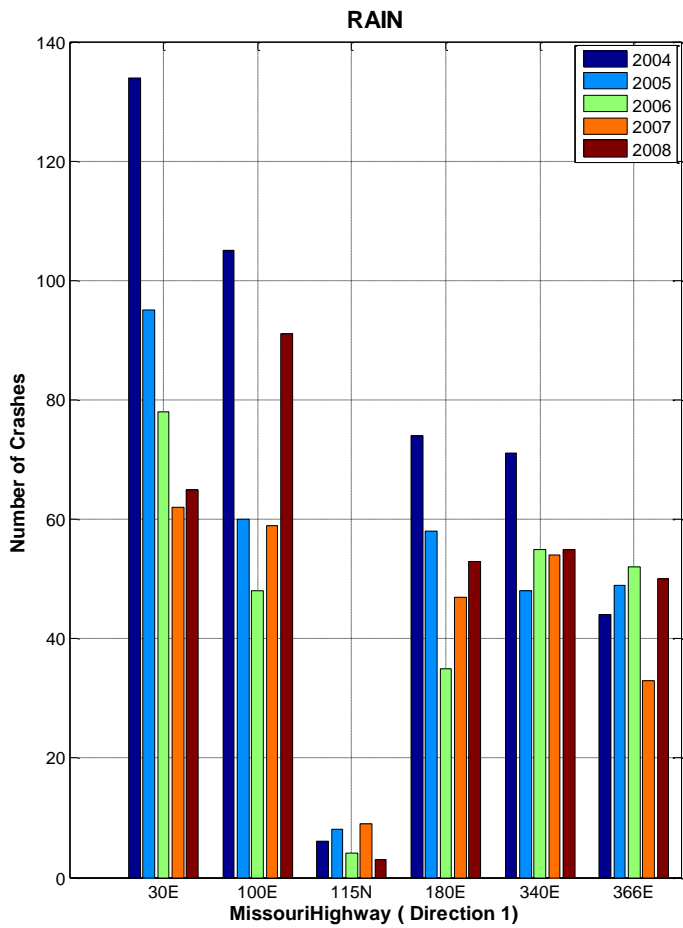


Figure S47: Crashes on Missouri Highways on Rainy days (Both directions, 2004-2008)

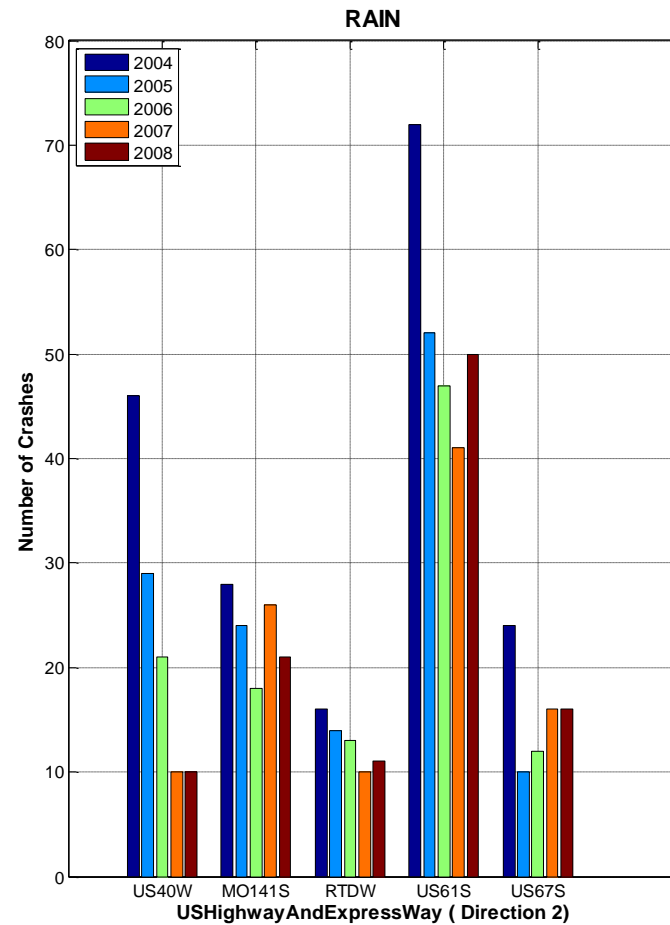
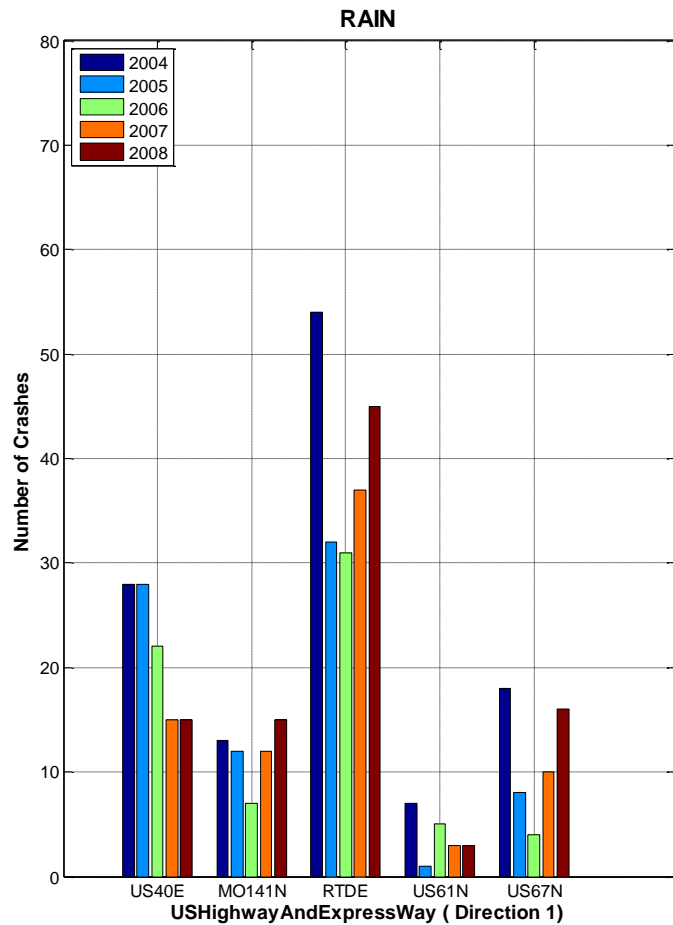


Figure S48: Crashes on US Highway and Expressways on Rainy days (Both directions, 2004-2008)

Appendix 2: Crash Rates (2004-2005)

Table S16: Crash and Severity Rates (I-270 East, 2004)

2004 segment Name	Direction	Cont. Log (start)	Cont. Log (end)	Length (mi)	AADT	Crashes	Fatality	Injury	Property	Crash Rate	Severity Rate
IS 55<->MO 21	E	0.545	1	0.455	74800	41	0	5	36	3.3	4.51
IS 55<->MO 21	E	1	2	1	74800	21	0	3	18	0.77	1.1
IS 55<->MO 21<->MO 30	E	2	3	1	71920	81	0	21	60	3.09	5.49
MO 21<->MO 30<->IS 44	E	3	4	1	71921	91	0	19	72	3.47	5.64
MO 30<->IS 44	E	4	5	1	77195	44	0	9	35	1.56	2.52
MO 30<->IS 44	E	5	6	1	77195	43	0	7	36	1.53	2.27
MO 30<->IS 44<->BIG BEND BLVD	E	6	7	1	73932	106	0	24	82	3.93	6.6
IS 44<->BIG BEND BLVD<->DOUGHERTY FERRY RD	E	7	8	1	77074	48	0	14	34	1.71	3.2
BIG BEND BLVD<->DOUGHERTY FERRY RD<->MO 100	E	8	9	1	81985	42	0	5	37	1.4	1.9
DOUGHERTY FERRY RD<->MO 100	E	9	10	1	78231	15	0	4	11	0.53	0.95
DOUGHERTY FERRY RD<->MO 100<->IS 64	E	10	11	1	82313	85	0	22	63	2.83	5.03
MO 100<->IS 64	E	11	12	1	83747	16	0	6	10	0.52	1.11
MO 100<->IS 64<->RT AB	E	12	13	1	85119	44	0	16	28	1.42	2.96
IS 64<->RT AB<->MO 340	E	13	14	1	89214	48	0	16	32	1.47	2.95
RT AB<->MO 340<->MO 364-RT D	E	14	15	1	93994	86	0	13	73	2.51	3.64
MO 340<->MO 364-RT D	E	15	16	1	94098	46	0	13	33	1.34	2.47
MO 340<->MO 364-RT D<->DORSETT RD	E	16	17	1	93984	122	0	32	90	3.56	6.35
MO 364-RT D<->DORSETT RD<->IS 70	E	17	18	1	93515	83	0	18	65	2.43	4.01
DORSETT RD<->IS 70	E	18	19	1	93753	39	2	7	30	1.14	2.28
DORSETT RD<->IS 70	E	19	20	1	93753	54	0	14	40	1.58	2.81
DORSETT RD<->IS 70<->MO 180	E	20	21	1	82081	42	0	6	36	1.4	2
IS 70<->MO 180<->MO 370	E	21	22	1	58103	47	0	11	36	2.22	3.77
MO 180<->MO 370	E	22	23	1	56638	21	0	9	12	1.02	2.32
MO 180<->MO 370<->MCDONALD BLVD<->US 67	E	23	24	1	71023	1	0	0	1	0.04	0.04
MCDONALD BLVD<->US 67	E	24	25	1	63419	0	0	0	0	0	0
MCDONALD BLVD<->US 67<->IS 170	E	25	26	1	62566	0	0	0	0	0	0
US 67<->IS 170<->GRAHAM RD<->RT N	E	26	27	1	60976	0	0	0	0	0	0
GRAHAM RD<->RT N<->WASHINGTON-ELIZABETH AVE	E	27	28	1	62620	0	0	0	0	0	0
RT N<->WASHINGTON-ELIZABETH AVE<->WEST FLORISSANT AVE	E	28	29	1	61546	0	0	0	0	0	0
WASHINGTON-ELIZABETH AVE<->WEST FLORISSANT AVE<->RT AC	E	29	30	1	60985	0	0	0	0	0	0
WEST FLORISSANT AVE<->RT AC<->OLD HALLS FERRY RD<->MO 367	E	30	31	1	51285	0	0	0	0	0	0
OLD HALLS FERRY RD<->MO 367	E	31	32	1	53388	0	0	0	0	0	0
OLD HALLS FERRY RD<->MO 367<->BELLEFONTAINE RD	E	32	33	1	47377	0	0	0	0	0	0
MO 367<->BELLEFONTAINE RD<->LILAC AVE	E	33	34	1	35522	0	0	0	0	0	0
BELLEFONTAINE RD<->LILAC AVE<->LILAC AVE	E	34	35	1	29838	0	0	0	0	0	0
LILAC AVE<->LILAC AVE<->RT H-RIVERVIEW AVE<->	E	35	35.749	0.749	27311	0	0	0	0	0	0
Overall					80563.71776	1266	2	294	970	1.84	3.14

Table S17: Crash and Severity Rates (I-270 East, 2005)

2005 segment Name	Direction	Cont. Log (start)	Cont. Log (end)	Length (mi)	AADT	Crashes	Fatality	Injury	Property	Crash Rate	Severity Rate
IS 55<->MO 21	E	0.545	1	0.455	74875	38	1	3	34	3.06	4.52
IS 55<->MO 21	E	1	2	1	74875	18	1	8	9	0.66	1.87
IS 55<->MO 21<->MO 30	E	2	3	1	72016	80	0	12	68	3.05	4.43
MO 21<->MO 30<->IS 44	E	3	4	1	72019	111	1	25	85	4.23	7.44
MO 30<->IS 44	E	4	5	1	77272	64	0	18	46	2.28	4.2
MO 30<->IS 44	E	5	6	1	77272	39	1	12	26	1.39	2.99
MO 30<->IS 44<->BIG BEND BLVD	E	6	7	1	74032	118	0	25	93	4.38	7.16
IS 44<->BIG BEND BLVD<->DOUGHERTY FERRY RD	E	7	8	1	77170	45	0	15	30	1.6	3.2
BIG BEND BLVD<->DOUGHERTY FERRY RD<->MO 100	E	8	9	1	82067	67	0	20	47	2.24	4.25
DOUGHERTY FERRY RD<->MO 100	E	9	10	1	78309	14	0	4	10	0.49	0.91
DOUGHERTY FERRY RD<->MO 100<->IS 64	E	10	11	1	82420	65	0	17	48	2.17	3.87
MO 100<->IS 64	E	11	12	1	83864	25	0	9	16	0.82	1.7
MO 100<->IS 64<->RT AB	E	12	13	1	85238	57	0	15	42	1.84	3.29
IS 64<->RT AB<->MO 340	E	13	14	1	89334	49	0	12	37	1.51	2.61
RT AB<->MO 340<->MO 364-RT D	E	14	15	1	94088	40	0	8	32	1.17	1.87
MO 340<->MO 364-RT D	E	15	16	1	94230	55	0	12	43	1.6	2.65
MO 340<->MO 364-RT D<->DORSETT RD	E	16	17	1	94109	94	1	18	75	2.74	4.58
MO 364-RT D<->DORSETT RD<->IS 70	E	17	18	1	93610	56	0	16	40	1.64	3.05
DORSETT RD<->IS 70	E	18	19	1	93884	53	1	20	32	1.55	3.57
DORSETT RD<->IS 70	E	19	20	1	93884	51	0	14	37	1.49	2.72
DORSETT RD<->IS 70<->MO 180	E	20	21	1	82175	52	0	22	30	1.74	3.94
IS 70<->MO 180<->MO 370	E	21	22	1	58182	38	0	10	28	1.79	3.21
MO 180<->MO 370	E	22	23	1	56717	18	0	9	9	0.87	2.18
MO 180<->MO 370<->MCDONALD BLVD<->US 67	E	23	24	1	71097	2	0	0	2	0.08	0.08
MCDONALD BLVD<->US 67	E	24	25	1	63482	0	0	0	0	0	0
MCDONALD BLVD<->US 67<->IS 170	E	25	26	1	62640	0	0	0	0	0	0
US 67<->IS 170<->GRAHAM RD<->RT N	E	26	27	1	61048	0	0	0	0	0	0
GRAHAM RD<->RT N<->WASHINGTON-ELIZABETH AVE	E	27	28	1	62704	0	0	0	0	0	0
RT N<->WASHINGTON-ELIZABETH AVE<->WEST FLORISSANT AVE	E	28	29	1	61607	0	0	0	0	0	0
WASHINGTON-ELIZABETH AVE<->WEST FLORISSANT AVE<->RT AC	E	29	30	1	61046	0	0	0	0	0	0
WEST FLORISSANT AVE<->RT AC<->OLD HALLS FERRY RD<->MO 367	E	30	31	1	51339	0	0	0	0	0	0
OLD HALLS FERRY RD<->MO 367	E	31	32	1	53463	0	0	0	0	0	0
OLD HALLS FERRY RD<->MO 367<->BELLEFONTAINE RD	E	32	33	1	47896	0	0	0	0	0	0
MO 367<->BELLEFONTAINE RD<->LILAC AVE	E	33	34	1	35948	0	0	0	0	0	0
BELLEFONTAINE RD<->LILAC AVE<->LILAC AVE	E	34	35	1	30183	0	0	0	0	0	0
LILAC AVE<->LILAC AVE<->RT H-RIVERVIEW AVE<->	E	35	35.749	0.749	27636	0	0	0	0	0	0
Overall					80662.20955	1249	6	324	919	1.81	3.3

Table S18: Crash and Severity Rates (I-270 East, 2006)

2006 segment Name	Direction	Cont. Log (start)	Cont. Log (end)	Length (mi)	AADT	Crashes	Fatality	Injury	Property	Crash Rate	Severity Rate
IS 55<->MO 21	E	0.545	1	0.455	77612	42	1	7	34	3.27	5.6
IS 55<->MO 21	E	1	2	1	77612	16	0	1	15	0.57	0.67
IS 55<->MO 21<->MO 30	E	2	3	1	74649	77	0	20	57	2.83	5.04
MO 21<->MO 30<->IS 44	E	3	4	1	74652	110	0	28	82	4.05	7.14
MO 30<->IS 44	E	4	5	1	80097	40	0	11	29	1.37	2.5
MO 30<->IS 44	E	5	6	1	80097	39	0	7	32	1.34	2.06
MO 30<->IS 44<->BIG BEND BLVD	E	6	7	1	74393	108	0	26	82	3.99	6.87
IS 44<->BIG BEND BLVD<->DOUGHERTY FERRY RD	E	7	8	1	77170	53	0	11	42	1.89	3.06
BIG BEND BLVD<->DOUGHERTY FERRY RD<->MO 100	E	8	9	1	82067	54	0	13	41	1.81	3.11
DOUGHERTY FERRY RD<->MO 100	E	9	10	1	78309	12	1	2	9	0.42	0.95
DOUGHERTY FERRY RD<->MO 100<->IS 64	E	10	11	1	82420	74	0	24	50	2.47	4.87
MO 100<->IS 64	E	11	12	1	83864	37	0	14	23	1.21	2.59
MO 100<->IS 64<->RT AB	E	12	13	1	87827	75	0	20	55	2.35	4.22
IS 64<->RT AB<->MO 340	E	13	14	1	98106	61	0	14	47	1.71	2.88
RT AB<->MO 340<->MO 364-RT D	E	14	15	1	103263	71	0	11	60	1.89	2.77
MO 340<->MO 364-RT D	E	15	16	1	94385	61	0	18	43	1.78	3.35
MO 340<->MO 364-RT D<->DORSETT RD	E	16	17	1	91995	103	0	31	72	3.08	5.85
MO 364-RT D<->DORSETT RD<->IS 70	E	17	18	1	81820	62	0	18	44	2.08	3.89
DORSETT RD<->IS 70	E	18	19	1	82059	68	0	16	52	2.28	3.88
DORSETT RD<->IS 70	E	19	20	1	82059	67	0	17	50	2.24	3.95
DORSETT RD<->IS 70<->MO 180	E	20	21	1	87139	51	1	10	40	1.61	2.84
IS 70<->MO 180<->MO 370	E	21	22	1	67793	65	0	16	49	2.63	4.58
MO 180<->MO 370	E	22	23	1	66086	26	0	11	15	1.08	2.45
MO 180<->MO 370<->MCDONALD BLVD<->US 67	E	23	24	1	82842	3	0	1	2	0.1	0.2
MCDONALD BLVD<->US 67	E	24	25	1	73969	0	0	0	0	0	0
MCDONALD BLVD<->US 67<->IS 170	E	25	26	1	68073	0	0	0	0	0	0
US 67<->IS 170<->GRAHAM RD<->RT N	E	26	27	1	61048	0	0	0	0	0	0
GRAHAM RD<->RT N<->WASHINGTON-ELIZABETH AVE	E	27	28	1	62704	0	0	0	0	0	0
RT N<->WASHINGTON-ELIZABETH AVE<->WEST FLORISSANT AVE	E	28	29	1	61607	0	0	0	0	0	0
WASHINGTON-ELIZABETH AVE<->WEST FLORISSANT AVE<->RT AC	E	29	30	1	61046	0	0	0	0	0	0
WEST FLORISSANT AVE<->RT AC<->OLD HALLS FERRY RD<->MO 367	E	30	31	1	51339	0	0	0	0	0	0
OLD HALLS FERRY RD<->MO 367	E	31	32	1	53463	0	0	0	0	0	0
OLD HALLS FERRY RD<->MO 367<->BELLEFONTAINE RD	E	32	33	1	48146	0	0	0	0	0	0
MO 367<->BELLEFONTAINE RD<->LILAC AVE	E	33	34	1	36156	0	0	0	0	0	0
BELLEFONTAINE RD<->LILAC AVE<->LILAC AVE	E	34	35	1	30358	0	0	0	0	0	0
LILAC AVE<->LILAC AVE<->RT H-RIVERVIEW AVE<->	E	35	35.749	0.749	34934	0	0	0	0	0	0
Overall					82115.4321	1375	3	347	1025	1.96	3.48

Table S19: Crash and Severity Rates (I-270 East, 2007)

2007 segment Name	Direction	Cont. Log (start)	Cont. Log (end)	Length (mi)	AADT	Crashes	Fatality	Injury	Property	Crash Rate	Severity Rate
IS 55<->MO 21	E	0.545	1	0.455	78388	34	0	7	27	2.62	4.24
IS 55<->MO 21	E	1	2	1	78388	18	0	4	14	0.63	1.05
IS 55<->MO 21<->MO 30	E	2	3	1	75395	66	0	15	51	2.4	4.04
MO 21<->MO 30<->IS 44	E	3	4	1	75398	111	0	24	87	4.04	6.67
MO 30<->IS 44	E	4	5	1	80898	38	0	5	33	1.29	1.8
MO 30<->IS 44	E	5	6	1	80898	36	0	7	29	1.22	1.94
MO 30<->IS 44<->BIG BEND BLVD	E	6	7	1	75138	120	1	30	89	4.39	8.01
IS 44<->BIG BEND BLVD<->DOUGHERTY FERRY RD	E	7	8	1	77941	43	0	7	36	1.52	2.26
BIG BEND BLVD<->DOUGHERTY FERRY RD<->MO 100	E	8	9	1	82888	56	0	9	47	1.86	2.75
DOUGHERTY FERRY RD<->MO 100	E	9	10	1	79092	12	0	2	10	0.42	0.63
DOUGHERTY FERRY RD<->MO 100<->IS 64	E	10	11	1	83244	70	0	14	56	2.31	3.7
MO 100<->IS 64	E	11	12	1	84703	35	0	14	21	1.14	2.5
MO 100<->IS 64<->RT AB	E	12	13	1	88706	72	0	21	51	2.23	4.18
IS 64<->RT AB<->MO 340	E	13	14	1	99087	64	0	13	51	1.77	2.86
RT AB<->MO 340<->MO 364-RT D	E	14	15	1	104296	68	0	14	54	1.79	2.9
MO 340<->MO 364-RT D	E	15	16	1	95329	61	0	9	52	1.76	2.54
MO 340<->MO 364-RT D<->DORSETT RD	E	16	17	1	92915	135	0	39	96	3.99	7.45
MO 364-RT D<->DORSETT RD<->IS 70	E	17	18	1	82638	73	0	19	54	2.43	4.32
DORSETT RD<->IS 70	E	18	19	1	82880	52	0	17	35	1.72	3.41
DORSETT RD<->IS 70	E	19	20	1	82880	59	0	17	42	1.96	3.65
DORSETT RD<->IS 70<->MO 180	E	20	21	1	88011	50	0	17	33	1.56	3.15
IS 70<->MO 180<->MO 370	E	21	22	1	68471	57	0	16	41	2.29	4.21
MO 180<->MO 370	E	22	23	1	66747	22	0	9	13	0.91	2.02
MO 180<->MO 370<->MCDONALD BLVD<->US 67	E	23	24	1	83670	5	0	3	2	0.16	0.46
MCDONALD BLVD<->US 67	E	24	25	1	74709	0	0	0	0	0	0
MCDONALD BLVD<->US 67<->IS 170	E	25	26	1	68753	0	0	0	0	0	0
US 67<->IS 170<->GRAHAM RD<->RT N	E	26	27	1	61658	0	0	0	0	0	0
GRAHAM RD<->RT N<->WASHINGTON-ELIZABETH AVE	E	27	28	1	63331	0	0	0	0	0	0
RT N<->WASHINGTON-ELIZABETH AVE<->WEST FLORISSANT AVE	E	28	29	1	62223	0	0	0	0	0	0
WASHINGTON-ELIZABETH AVE<->WEST FLORISSANT AVE<->RT AC	E	29	30	1	61656	0	0	0	0	0	0
WEST FLORISSANT AVE<->RT AC<->OLD HALLS FERRY RD<->MO 367	E	30	31	1	51852	0	0	0	0	0	0
OLD HALLS FERRY RD<->MO 367	E	31	32	1	53998	0	0	0	0	0	0
OLD HALLS FERRY RD<->MO 367<->BELLEFONTAINE RD	E	32	33	1	47920	0	0	0	0	0	0
MO 367<->BELLEFONTAINE RD<->LILAC AVE	E	33	34	1	35929	0	0	0	0	0	0
BELLEFONTAINE RD<->LILAC AVE<->LILAC AVE	E	34	35	1	30167	0	0	0	0	0	0
LILAC AVE<->LILAC AVE<->RT H-RIVERVIEW AVE<->	E	35	35.749	0.749	34714	0	0	0	0	0	0
Overall					82936.66766	1357	1	332	1024	1.92	3.34

Table S20: Crash and Severity Rates (I-270 East, 2008)

2008 segment Name	Direction	Cont. Log (start)	Cont. Log (end)	Length (mi)	AADT	Crashes	Fatality	Injury	Property	Crash Rate	Severity Rate
IS 55<->MO 21	E	0.545	1	0.455	77902	40	0	5	35	3.09	4.25
IS 55<->MO 21	E	1	2	1	77902	11	0	3	8	0.39	0.7
IS 55<->MO 21<->MO 30	E	2	3	1	74927	85	0	18	67	3.11	5.08
MO 21<->MO 30<->IS 44	E	3	4	1	74931	78	0	9	69	2.85	3.84
MO 30<->IS 44	E	4	5	1	80396	33	0	8	25	1.12	1.94
MO 30<->IS 44	E	5	6	1	80396	26	0	8	18	0.89	1.7
MO 30<->IS 44<->BIG BEND BLVD	E	6	7	1	74671	102	0	32	70	3.74	7.26
IS 44<->BIG BEND BLVD<->DOUGHERTY FERRY RD	E	7	8	1	77458	35	0	5	30	1.24	1.77
BIG BEND BLVD<->DOUGHERTY FERRY RD<->MO 100	E	8	9	1	82374	44	0	8	36	1.46	2.26
DOUGHERTY FERRY RD<->MO 100	E	9	10	1	78602	10	0	3	7	0.35	0.66
DOUGHERTY FERRY RD<->MO 100<->IS 64	E	10	11	1	82728	85	0	21	64	2.81	4.9
MO 100<->IS 64	E	11	12	1	84178	38	0	11	27	1.24	2.31
MO 100<->IS 64<->RT AB	E	12	13	1	87379	143	0	38	105	4.48	8.06
IS 64<->RT AB<->MO 340	E	13	14	1	95841	57	0	13	44	1.63	2.74
RT AB<->MO 340<->MO 364-RT D	E	14	15	1	100897	68	0	12	56	1.85	2.82
MO 340<->MO 364-RT D	E	15	16	1	94738	32	0	4	28	0.93	1.27
MO 340<->MO 364-RT D<->DORSETT RD	E	16	17	1	92339	75	0	19	56	2.23	3.92
MO 364-RT D<->DORSETT RD<->IS 70	E	17	18	1	82126	69	0	14	55	2.3	3.7
DORSETT RD<->IS 70	E	18	19	1	82366	43	0	13	30	1.43	2.73
DORSETT RD<->IS 70	E	19	20	1	82366	32	0	9	23	1.06	1.96
DORSETT RD<->IS 70<->MO 180	E	20	21	1	87465	41	0	21	20	1.28	3.26
IS 70<->MO 180<->MO 370	E	21	22	1	68047	54	0	16	38	2.17	4.11
MO 180<->MO 370	E	22	23	1	66333	14	0	10	4	0.58	1.82
MO 180<->MO 370<->MCDONALD BLVD<->US 67	E	23	24	1	83151	0	0	0	0	0	0
MCDONALD BLVD<->US 67	E	24	25	1	74246	0	0	0	0	0	0
MCDONALD BLVD<->US 67<->IS 170	E	25	26	1	68327	0	0	0	0	0	0
US 67<->IS 170<->GRAHAM RD<->RT N	E	26	27	1	61276	0	0	0	0	0	0
GRAHAM RD<->RT N<->WASHINGTON-ELIZABETH AVE	E	27	28	1	62939	0	0	0	0	0	0
RT N<->WASHINGTON-ELIZABETH AVE<->WEST FLORISSANT AVE	E	28	29	1	61838	0	0	0	0	0	0
WASHINGTON-ELIZABETH AVE<->WEST FLORISSANT AVE<->RT AC	E	29	30	1	61274	0	0	0	0	0	0
WEST FLORISSANT AVE<->RT AC<->OLD HALLS FERRY RD<->MO 367	E	30	31	1	51530	0	0	0	0	0	0
OLD HALLS FERRY RD<->MO 367	E	31	32	1	53663	0	0	0	0	0	0
OLD HALLS FERRY RD<->MO 367<->BELLEFONTAINE RD	E	32	33	1	45788	0	0	0	0	0	0
MO 367<->BELLEFONTAINE RD<->LILAC AVE	E	33	34	1	34178	0	0	0	0	0	0
BELLEFONTAINE RD<->LILAC AVE<->LILAC AVE	E	34	35	1	28698	0	0	0	0	0	0
LILAC AVE<->LILAC AVE<->RT H-RIVERVIEW AVE<->	E	35	35.749	0.749	33023	0	0	0	0	0	0
Overall					82115.58272	1215	0	300	915	1.81	3.14

Table S21: Crash and Severity Rates (I-70 East, 2004)

2004 segment Name	Direction	Cont. Log (start)	Cont. Log (end)	Length (mi)	AADT	Crashes	Fatality	Injury	Property	Crash Rate	Severity Rate
LP 70<->EARTH CITY EXPY	E	230.123	231	0.877	82949	16	0	7	9	0.6	1.39
LP 70<->EARTH CITY EXPY<->IS 270	E	231	232	1	84280	52	0	11	41	1.69	2.76
EARTH CITY EXPY<->IS 270<->MO 180	E	232	233	1	76121	43	1	10	32	1.55	2.95
IS 270<->MO 180	E	233	234	1	55781	16	0	9	7	0.79	2.11
IS 270<->MO 180<->US 67	E	234	235	1	54330	43	0	8	35	2.17	3.38
MO 180<->US 67<->CYPRESS RD<->AIRFLIGHT DR	E	235	236	1	84691	60	0	16	44	1.94	3.49
CYPRESS RD<->AIRFLIGHT DR<->MO 115	E	236	237	1	95060	35	0	6	29	1.01	1.53
AIRFLIGHT DR<->MO 115<->IS 170	E	237	238	1	80552	40	0	11	29	1.36	2.48
MO 115<->IS 170<->NORTH HANLEY RD	E	238	239	1	77791	47	0	12	35	1.66	2.92
IS 170<->NORTH HANLEY RD<->RT N	E	239	240	1	63964	30	0	11	19	1.28	2.7
NORTH HANLEY RD<->RT N<->BERMUDA RD<->RT U	E	240	241	1	63452	24	0	4	20	1.04	1.55
BERMUDA RD<->RT U<->JENNINGS STATION RD	E	241	242	1	65606	101	0	26	75	4.22	7.48
RT U<->JENNINGS STATION RD<->JENNINGS STATION RD	E	242	243	1	63343	49	0	20	29	2.12	4.71
JENNINGS STATION RD<->JENNINGS STATION RD<->GOODFELLOW BLVD<->RIVERVIEW DR<->KINGSHIGHWAY BLV	E	243	244	1	61492	28	0	5	23	1.25	1.92
RIVERVIEW DR<->KINGSHIGHWAY BLVD<->SHREVE AVE	E	244	245	1	53403	44	0	15	29	2.26	4.57
KINGSHIGHWAY BLVD<->SHREVE AVE<->WEST FLORISSANT AVE<->BROADWAY	E	245	246	1	49881	44	0	13	31	2.42	4.56
WEST FLORISSANT AVE<->BROADWAY<->ADELAIDE AVE<->GRAND AVE	E	246	247	1	54330	72	1	28	43	3.63	8.32
ADELAIDE AVE<->GRAND AVE<->MO 115-SALISBURY ST	E	247	248	1	58358	47	0	12	35	2.21	3.9
GRAND AVE<->MO 115-SALISBURY ST<->10TH-11TH STS	E	248	249	1	46618	49	0	11	38	2.88	4.82
MO 115-SALISBURY ST<->10TH-11TH STS<->6TH-7TH STS<->MO 799	E	249	250	1	39924	40	0	14	26	2.74	5.63
6TH-7TH STS<->MO 799<->MEMORIAL-PINE<->MEMORIAL-WALNUT<->	E	250	251	1	41316	52	0	17	35	3.45	6.83
MEMORIAL-WALNUT<->	E	251	251.3	0.3	44066	79	0	19	60	16.37	28.19
Overall					64044	1011	2	285	724	2.04	3.81

Table S22: Crash and Severity Rates (I-70 East, 2005)

2005 segment Name	Direction	Cont. Log (start)	Cont. Log (end)	Length (mi)	AADT	Crashes	Fatality	Injury	Property	Crash Rate	Severity Rate
LP 70<->EARTH CITY EXPY	E	230.123	231	0.877	83032	11	0	6	5	0.41	1.09
LP 70<->EARTH CITY EXPY<->IS 270	E	231	232	1	82774	54	2	11	41	1.79	3.48
EARTH CITY EXPY<->IS 270<->MO 180	E	232	233	1	73909	53	0	14	39	1.97	3.53
IS 270<->MO 180	E	233	234	1	55859	26	0	13	13	1.28	3.2
IS 270<->MO 180<->US 67	E	234	235	1	54389	36	0	9	27	1.82	3.18
MO 180<->US 67<->CYPRESS RD<->AIRFLIGHT DR	E	235	236	1	84793	66	0	22	44	2.14	4.28
CYPRESS RD<->AIRFLIGHT DR<->MO 115	E	236	237	1	95155	42	0	15	27	1.21	2.51
AIRFLIGHT DR<->MO 115<->IS 170	E	237	238	1	80632	55	0	14	41	1.87	3.3
MO 115<->IS 170<->NORTH HANLEY RD	E	238	239	1	77874	58	0	11	47	2.05	3.21
IS 170<->NORTH HANLEY RD<->RT N	E	239	240	1	64050	25	0	6	19	1.07	1.84
NORTH HANLEY RD<->RT N<->BERMUDA RD<->RT U	E	240	241	1	65330	30	0	7	23	1.26	2.14
BERMUDA RD<->RT U<->JENNINGS STATION RD	E	241	242	1	68893	82	0	24	58	3.27	6.14
RT U<->JENNINGS STATION RD<->JENNINGS STATION RD	E	242	243	1	66533	34	0	8	26	1.4	2.39
JENNINGS STATION RD<->JENNINGS STATION RD<->GOODFELLOW BLVD<->RIVERVIEW DR<->KINGSHIGHWAY BLV E	E	243	244	1	62914	42	0	24	18	1.83	4.98
RIVERVIEW DR<->KINGSHIGHWAY BLVD<->SHREVE AVE	E	244	245	1	53456	55	0	13	42	2.83	4.83
KINGSHIGHWAY BLVD<->SHREVE AVE<->WEST FLORISSANT AVE<->BROADWAY	E	245	246	1	49944	63	0	20	43	3.47	6.77
WEST FLORISSANT AVE<->BROADWAY<->ADELAIDE AVE<->GRAND AVE	E	246	247	1	54384	67	0	19	48	3.38	6.26
ADELAIDE AVE<->GRAND AVE<->MO 115-SALISBURY ST	E	247	248	1	58417	58	0	25	33	2.73	6.25
GRAND AVE<->MO 115-SALISBURY ST<->10TH-11TH STS	E	248	249	1	46665	59	1	14	44	3.47	6.48
MO 115-SALISBURY ST<->10TH-11TH STS<->6TH-7TH STS<->MO 799	E	249	250	1	39969	67	0	26	41	4.61	9.97
6TH-7TH STS<->MO 799<->MEMORIAL-PINE<->MEMORIAL-WALNUT<->	E	250	251	1	41360	44	0	15	29	2.92	5.91
MEMORIAL-WALNUT<->	E	251	251.3	0.3	44110	66	0	17	49	13.7	24.29
Overall					64379	1093	3	333	757	2.2	4.27

Table S23: Crash and Severity Rates (I-70 East, 2006)

2006 segment Name	Direction	Cont. Log (start)	Cont. Log (end)	Length (mi)	ADT	Crashes	Fatality	Injury	Property	Crash Rate	Severity Rate
LP 70<->EARTH CITY EXPY	E	230.123	231	0.877	83032	21	0	9	12	0.79	1.81
LP 70<->EARTH CITY EXPY<->IS 270	E	231	232	1	83359	60	0	8	52	1.98	2.77
EARTH CITY EXPY<->IS 270<->MO 180	E	232	233	1	76092	59	0	14	45	2.13	3.65
IS 270<->MO 180	E	233	234	1	60013	28	0	11	17	1.28	2.79
IS 270<->MO 180<->US 67	E	234	235	1	58434	39	0	12	27	1.83	3.53
MO 180<->US 67<->CYPRESS RD<->AIRFLIGHT DR	E	235	236	1	67382	58	0	14	44	2.36	4.08
CYPRESS RD<->AIRFLIGHT DR<->MO 115	E	236	237	1	73012	46	0	8	38	1.73	2.63
AIRFLIGHT DR<->MO 115<->IS 170	E	237	238	1	61869	60	0	22	38	2.66	5.59
MO 115<->IS 170<->NORTH HANLEY RD	E	238	239	1	63476	60	0	23	37	2.6	5.58
IS 170<->NORTH HANLEY RD<->RT N	E	239	240	1	67349	30	0	9	21	1.22	2.33
NORTH HANLEY RD<->RT N<->BERMUDA RD<->RT U	E	240	241	1	65741	30	0	7	23	1.25	2.13
BERMUDA RD<->RT U<->JENNINGS STATION RD	E	241	242	1	67207	67	0	9	58	2.74	3.84
RT U<->JENNINGS STATION RD<->JENNINGS STATION RD	E	242	243	1	64905	49	0	11	38	2.07	3.47
JENNINGS STATION RD<->JENNINGS STATION RD<->GOODFELLOW BLVD<->RIVERVIEW DR<->KINGSHIGHWAY BLV E	E	243	244	1	62200	35	0	10	25	1.55	2.87
RIVERVIEW DR<->KINGSHIGHWAY BLVD<->SHREVE AVE	E	244	245	1	53456	36	0	9	27	1.85	3.24
KINGSHIGHWAY BLVD<->SHREVE AVE<->WEST FLORISSANT AVE<->BROADWAY	E	245	246	1	49944	63	0	17	46	3.47	6.27
WEST FLORISSANT AVE<->BROADWAY<->ADELAIDE AVE<->GRAND AVE	E	246	247	1	54384	46	0	9	37	2.32	3.69
ADELAIDE AVE<->GRAND AVE<->MO 115-SALISBURY ST	E	247	248	1	58417	53	0	19	34	2.49	5.17
GRAND AVE<->MO 115-SALISBURY ST<->10TH-11TH STS	E	248	249	1	46665	54	0	19	35	3.18	6.53
MO 115-SALISBURY ST<->10TH-11TH STS<->6TH-7TH STS<->MO 799	E	249	250	1	39969	59	1	20	38	4.06	8.8
6TH-7TH STS<->MO 799<->MEMORIAL-PINE<->MEMORIAL-WALNUT<->	E	250	251	1	41360	71	0	23	48	4.72	9.3
MEMORIAL-WALNUT<->	E	251	251.3	0.3	44110	98	1	29	68	20.35	40.28
Overall					61448	1122	2	312	808	2.37	4.38

Table S24: Crash and Severity Rates (I-70 East, 2007)

2007 segment Name	Direction	Cont. Log (start)	Cont. Log (end)	Length (mi)	AADT	Crashes	Fatality	Injury	Property	Crash Rate	Severity Rate
LP 70<->EARTH CITY EXPY	E	230.123	231	0.877	83862	7	0	3	4	0.26	0.6
LP 70<->EARTH CITY EXPY<->IS 270	E	231	232	1	83123	43	0	9	34	1.42	2.31
EARTH CITY EXPY<->IS 270<->MO 180	E	232	233	1	75309	63	0	16	47	2.3	4.05
IS 270<->MO 180	E	233	234	1	60613	21	0	4	17	0.95	1.5
IS 270<->MO 180<->US 67	E	234	235	1	59019	39	0	10	29	1.82	3.21
MO 180<->US 67<->CYPRESS RD<->AIRFLIGHT DR	E	235	236	1	68056	65	0	17	48	2.62	4.68
CYPRESS RD<->AIRFLIGHT DR<->MO 115	E	236	237	1	73742	42	0	11	31	1.56	2.79
AIRFLIGHT DR<->MO 115<->IS 170	E	237	238	1	62488	41	0	12	29	1.8	3.39
MO 115<->IS 170<->NORTH HANLEY RD	E	238	239	1	64111	68	0	18	50	2.91	5.23
IS 170<->NORTH HANLEY RD<->RT N	E	239	240	1	68022	35	0	5	30	1.41	2.02
NORTH HANLEY RD<->RT N<->BERMUDA RD<->RT U	E	240	241	1	67071	33	0	12	21	1.35	2.83
BERMUDA RD<->RT U<->JENNINGS STATION RD	E	241	242	1	69072	91	1	23	67	3.62	6.72
RT U<->JENNINGS STATION RD<->JENNINGS STATION RD	E	242	243	1	66706	49	0	13	36	2.02	3.62
JENNINGS STATION RD<->JENNINGS STATION RD<->GOODFELLOW BLVD<->RIVERVIEW DR<->KINGSHIGHWAY BLV E	E	243	244	1	63327	26	0	7	19	1.13	2.04
RIVERVIEW DR<->KINGSHIGHWAY BLVD<->SHREVE AVE	E	244	245	1	53991	55	1	15	39	2.8	5.55
KINGSHIGHWAY BLVD<->SHREVE AVE<->WEST FLORISSANT AVE<->BROADWAY	E	245	246	1	50443	56	0	17	39	3.05	5.83
WEST FLORISSANT AVE<->BROADWAY<->ADELAIDE AVE<->GRAND AVE	E	246	247	1	54928	62	0	15	47	3.1	5.35
ADELAIDE AVE<->GRAND AVE<->MO 115-SALISBURY ST	E	247	248	1	59001	48	0	19	29	2.24	4.89
GRAND AVE<->MO 115-SALISBURY ST<->10TH-11TH STS	E	248	249	1	47132	51	1	12	38	2.97	5.6
MO 115-SALISBURY ST<->10TH-11TH STS<->6TH-7TH STS<->MO 799	E	249	250	1	40368	85	0	27	58	5.78	11.3
6TH-7TH STS<->MO 799<->MEMORIAL-PINE<->MEMORIAL-WALNUT<->	E	250	251	1	41773	68	0	18	50	4.47	8.02
MEMORIAL-WALNUT<->	E	251	251.3	0.3	44551	72	0	20	52	14.8	27.13
Overall					62105	1120	3	303	814	2.34	4.29

Table S25: Crash and Severity Rates (I-70 East, 2008)

2008 segment Name	Direction	Cont. Log (start)	Cont. Log (end)	Length (mi)	AADT	Crashes	Fatality	Injury	Property	Crash Rate	Severity Rate
LP 70<->EARTH CITY EXPY	E	230.123	231	0.877	83342	10	0	0	10	0.37	0.37
LP 70<->EARTH CITY EXPY<->IS 270	E	231	232	1	83840	60	1	12	47	1.96	3.43
EARTH CITY EXPY<->IS 270<->MO 180	E	232	233	1	76620	45	0	14	31	1.61	3.11
IS 270<->MO 180	E	233	234	1	60237	14	0	5	9	0.64	1.32
IS 270<->MO 180<->US 67	E	234	235	1	58653	57	0	18	39	2.66	5.18
MO 180<->US 67<->CYPRESS RD<->AIRFLIGHT DR	E	235	236	1	67634	75	0	28	47	3.04	6.44
CYPRESS RD<->AIRFLIGHT DR<->MO 115	E	236	237	1	73285	63	0	17	46	2.36	4.26
AIRFLIGHT DR<->MO 115<->IS 170	E	237	238	1	62101	48	0	16	32	2.12	4.24
MO 115<->IS 170<->NORTH HANLEY RD	E	238	239	1	63713	71	1	13	57	3.05	5.12
IS 170<->NORTH HANLEY RD<->RT N	E	239	240	1	67600	43	0	13	30	1.74	3.32
NORTH HANLEY RD<->RT N<->BERMUDA RD<->RT U	E	240	241	1	67787	39	0	12	27	1.58	3.03
BERMUDA RD<->RT U<->JENNINGS STATION RD	E	241	242	1	70648	102	0	32	70	3.96	7.68
RT U<->JENNINGS STATION RD<->JENNINGS STATION RD	E	242	243	1	68228	58	2	16	40	2.33	4.98
JENNINGS STATION RD<->JENNINGS STATION RD<->GOODFELLOW BLVD<->RIVERVIEW DR<->KINGSHIGHWAY BLV E	E	243	244	1	63783	35	1	11	23	1.5	3.31
RIVERVIEW DR<->KINGSHIGHWAY BLVD<->SHREVE AVE	E	244	245	1	53656	57	0	12	45	2.91	4.75
KINGSHIGHWAY BLVD<->SHREVE AVE<->WEST FLORISSANT AVE<->BROADWAY	E	245	246	1	50130	58	0	16	42	3.17	5.79
WEST FLORISSANT AVE<->BROADWAY<->ADELAIDE AVE<->GRAND AVE	E	246	247	1	54588	74	0	16	58	3.71	6.12
ADELAIDE AVE<->GRAND AVE<->MO 115-SALISBURY ST	E	247	248	1	58635	47	0	8	39	2.2	3.32
GRAND AVE<->MO 115-SALISBURY ST<->10TH-11TH STS	E	248	249	1	46839	51	1	16	34	2.98	6.32
MO 115-SALISBURY ST<->10TH-11TH STS<->6TH-7TH STS<->MO 799	E	249	250	1	40118	78	0	26	52	5.33	10.65
6TH-7TH STS<->MO 799<->MEMORIAL-PINE<->MEMORIAL-WALNUT<->	E	250	251	1	41514	66	0	21	45	4.36	8.51
MEMORIAL-WALNUT<->	E	251	251.3	0.3	44275	60	0	16	44	12.38	22.28
Overall					62142	1211	6	338	867	2.52	4.74

Table S26: Crash and Severity Rates (Mo100 East, 2004)

2004 segment N:Direction	Cont. Log (r	Cont. Log (r	Length (mi)	AADT	Crashes	Fatality	Injury	Property	Crash Rate	Severity Ra
RT OO<->N U	88.811	89	0.189	8079	0	0	0	0	0	0
RT OO<->N U	89	90	1	8079	0	0	0	0	0	0
RT OO<->N U	90	91	1	8079	0	0	0	0	0	0
RT OO<->N U	91	92	1	8929	0	0	0	0	0	0
MELROSE F U	92	93	1	12034	0	0	0	0	0	0
BEGIN DIV U	93	94	1	9230	0	0	0	0	0	0
RT T<->W L E	94	95	1	8601	0	0	0	0	0	0
RT T<->W L E	95	96	1	7110	0	0	0	0	0	0
MO 109<-> E	96	97	1	9412	0	0	0	0	0	0
MO 109<-> E	97	98	1	14255	0	0	0	0	0	0
WESTGLEN E	98	99	1	30386	0	0	0	0	0	0
OLD STATE U	99	100	1	47483	0	0	0	0	0	0
MO 340<-> U	100	101	1	47966	0	0	0	0	0	0
MO 340<-> U	101	102	1	47966	0	0	0	0	0	0
MO 340<-> U	102	103	1	50206	0	0	0	0	0	0
BAXTER RD U	103	104	1	29527	79	0	18	61	733.02	1234.07
MO 141<-> E	104	105	1	21942	96	0	24	72	1198.68	2097.68
MO 141<-> E	105	106	1	29569	50	0	14	36	463.28	852.43
BEGIN DIV E	106	107	1	20898	127	0	28	99	1664.97	2766.21
RT JJ<->GE' E	107	108	1	13670	57	0	12	45	1142.39	1863.9
RT JJ<->GE' E	108	109	1	20123	96	0	25	71	1307.03	2328.15
GEYER RD< U	109	110	1	26811	94	0	20	74	960.55	1573.67
US 61-67<- U	110	111	1	26698	103	0	13	90	1056.98	1457.19
US 61-67<- U	111	112	1	23181	55	0	5	50	650.04	827.32
MCKNIGHT U	112	113	1	19492	77	0	15	62	1082.28	1714.79
MCKNIGHT U	113	114	1	18482	65	0	15	50	963.54	1630.61
BIG BEND - U	114	115	1	12042	43	0	11	32	978.31	1729.11
ST LOUIS CI U	115	116	1	9533	27	0	7	20	775.96	1379.49
ST LOUIS CI U	116	117	1	9533	16	0	1	15	459.83	546.05
ST LOUIS CI U	117	118	1	9563	88	0	19	69	2521.13	4154.14
VANDEVEN U	118	119	1	9585	0	0	0	0	0	0
VANDEVEN U	119	120	1	9585	0	0	0	0	0	0
VANDEVEN U	120	121	1	8464	0	0	0	0	0	0
CHOUTEAL U	121	121.431	0.431	6642	0	0	0	0	0	0
Overall				19404	1073	0	227	846	1009.99	1651

Table S27: Crash and Severity Rates (Mo100 East, 2005)

2005 segment N:Direction	Cont. Log (:	Cont. Log (r	Length (mi)	AADT	Crashes	Fatality	Injury	Property	Crash Rate	Severity	Ra
RT OO<->N U	88.811	89	0.189	8055	0	0	0	0	0	0	0
RT OO<->N U	89	90	1	8055	0	0	0	0	0	0	0
RT OO<->N U	90	91	1	8055	0	0	0	0	0	0	0
RT OO<->N U	91	92	1	8903	0	0	0	0	0	0	0
MELROSE F U	92	93	1	12001	0	0	0	0	0	0	0
BEGIN DIV U	93	94	1	9202	0	0	0	0	0	0	0
RT T<->W L E	94	95	1	8575	0	0	0	0	0	0	0
RT T<->W L E	95	96	1	6962	0	0	0	0	0	0	0
MO 109<->E	96	97	1	9211	0	0	0	0	0	0	0
MO 109<->E	97	98	1	13950	0	0	0	0	0	0	0
WESTGLEN E	98	99	1	29745	0	0	0	0	0	0	0
OLD STATE U	99	100	1	41207	0	0	0	0	0	0	0
MO 340<->U	100	101	1	46958	0	0	0	0	0	0	0
MO 340<->U	101	102	1	46958	0	0	0	0	0	0	0
MO 340<->U	102	103	1	50599	0	0	0	0	0	0	0
BAXTER RD U	103	104	1	28902	74	0	16	58	703.4	1159.66	
MO 141<->E	104	105	1	21481	99	0	17	82	1266.13	1918.38	
MO 141<->E	105	106	1	28943	35	1	9	25	332.22	673.93	
BEGIN DIV E	106	107	1	20456	102	0	20	82	1369.87	2175.67	
RT JJ<->GE'E	107	108	1	13383	71	0	12	59	1457.48	2196.49	
RT JJ<->GE'E	108	109	1	19701	89	0	28	61	1241.08	2412.44	
GEYER RD< U	109	110	1	26248	91	0	13	78	952.45	1360.65	
US 61-67<- U	110	111	1	26137	58	0	13	45	609.64	1019.56	
US 61-67<- U	111	112	1	22691	48	0	10	38	581.15	944.36	
MCKNIGHT U	112	113	1	19075	71	0	20	51	1022.57	1886.71	
MCKNIGHT U	113	114	1	18088	58	0	13	45	880.92	1473.26	
BIG BEND - U	114	115	1	11790	46	0	6	40	1071.87	1491.3	
ST LOUIS CI U	115	116	1	9333	15	0	2	13	441.54	618.15	
ST LOUIS CI U	116	117	1	9333	17	0	1	16	500.41	588.72	
ST LOUIS CI U	117	118	1	9362	96	0	24	72	2817.09	4929.91	
VANDEVEN U	118	119	1	9384	0	0	0	0	0	0	0
VANDEVEN U	119	120	1	9384	0	0	0	0	0	0	0
VANDEVEN U	120	121	1	8286	0	0	0	0	0	0	0
CHOUTEAU U	121	121.431	0.431	6502	0	0	0	0	0	0	0
Overall				18995	970	1	204	765	935.28	1534.06	

Table S28: Crash and Severity Rates (Mo100 East, 2006)

2006 segment N.Direction	Cont. Log (mi)	Cont. Log (mi)	Length (mi)	AADT	Crashes	Fatality	Injury	Property	Crash Rate	Severity Rate
RT OO<->N U	88.811	89	0.189	9738	0	0	0	0	0	0
RT OO<->N U	89	90	1	9738	0	0	0	0	0	0
RT OO<->N U	90	91	1	9738	0	0	0	0	0	0
RT OO<->N U	91	92	1	10051	0	0	0	0	0	0
MELROSE F U	92	93	1	11192	0	0	0	0	0	0
BEGIN DIV U	93	94	1	8657	0	0	0	0	0	0
RT T<->W L E	94	95	1	8090	0	0	0	0	0	0
RT T<->W L E	95	96	1	7467	0	0	0	0	0	0
MO 109<-> E	96	97	1	9901	0	0	0	0	0	0
MO 109<-> E	97	98	1	13952	0	0	0	0	0	0
WESTGLEN E	98	99	1	29502	0	0	0	0	0	0
OLD STATE U	99	100	1	38581	0	0	0	0	0	0
MO 340<-> U	100	101	1	38517	0	0	0	0	0	0
MO 340<-> U	101	102	1	38517	0	0	0	0	0	0
MO 340<-> U	102	103	1	41635	0	0	0	0	0	0
BAXTER RD U	103	104	1	26764	83	0	16	67	851.97	1344.68
MO 141<-> E	104	105	1	20624	106	0	17	89	1411.99	2091.34
MO 141<-> E	105	106	1	26954	42	0	9	33	428.08	703.27
BEGIN DIV E	106	107	1	19802	103	0	21	82	1428.98	2303.02
RT JJ<->GE' E	107	108	1	13156	51	0	5	46	1064.99	1378.22
RT JJ<->GE' E	108	109	1	20530	73	0	10	63	976.86	1378.31
GEYER RD< U	109	110	1	26839	65	0	14	51	665.34	1095.26
US 61-67<- U	110	111	1	26602	60	0	13	47	619.63	1022.4
US 61-67<- U	111	112	1	23153	43	0	11	32	510.22	901.79
MCKNIGHT U	112	113	1	19534	60	0	12	48	843.84	1350.14
MCKNIGHT U	113	114	1	18528	73	0	14	59	1082.41	1705.17
BIG BEND - U	114	115	1	12257	43	0	11	32	963.79	1703.44
ST LOUIS C U	115	116	1	9896	27	0	10	17	749.55	1582.39
ST LOUIS C U	116	117	1	9896	14	0	6	8	388.66	888.36
ST LOUIS C U	117	118	1	9738	77	0	15	62	2172.3	3441.82
VANDEVEN U	118	119	1	9619	0	0	0	0	0	0
VANDEVEN U	119	120	1	9619	0	0	0	0	0	0
VANDEVEN U	120	121	1	8497	0	0	0	0	0	0
CHOUTEAL U	121	121.431	0.431	3398	0	0	0	0	0	0
Overall				18952	920	0	184	736	889.1	1422.56

Table S29: Crash and Severity Rates (Mo100 East, 2007)

2007 segment N:Direction	Cont. Log (mi)	Cont. Log (mi)	Length (mi)	AADT	Crashes	Fatality	Injury	Property	Crash Rate	Severity Rate
RT OO<->M U	88.811	89	0.189	9738	0	0	0	0	0	0
RT OO<->M U	89	90	1	9738	0	0	0	0	0	0
RT OO<->M U	90	91	1	9738	0	0	0	0	0	0
RT OO<->M U	91	92	1	10051	0	0	0	0	0	0
MELROSE F U	92	93	1	11192	0	0	0	0	0	0
BEGIN DIV U	93	94	1	8657	0	0	0	0	0	0
RT T<->W L E	94	95	1	8090	0	0	0	0	0	0
RT T<->W L E	95	96	1	7467	0	0	0	0	0	0
MO 109<-> E	96	97	1	9901	0	0	0	0	0	0
MO 109<-> E	97	98	1	13952	0	0	0	0	0	0
WESTGLEN E	98	99	1	29502	0	0	0	0	0	0
OLD STATE U	99	100	1	38581	0	0	0	0	0	0
MO 340<-> U	100	101	1	38517	0	0	0	0	0	0
MO 340<-> U	101	102	1	38517	0	0	0	0	0	0
MO 340<-> U	102	103	1	41635	0	0	0	0	0	0
BAXTER RD U	103	104	1	26764	100	0	26	74	1026.47	1827.12
MO 141<-> E	104	105	1	20624	118	0	8	110	1571.84	1891.53
MO 141<-> E	105	106	1	26954	43	0	11	32	438.27	774.62
BEGIN DIV E	106	107	1	19802	123	0	26	97	1706.45	2788.6
RT JJ<->GE` E	107	108	1	13156	50	0	10	40	1044.11	1670.57
RT JJ<->GE` E	108	109	1	20530	80	0	17	63	1070.53	1753
GEYER RD< U	109	110	1	26839	74	0	20	54	757.47	1371.63
US 61-67<- U	110	111	1	26602	67	0	10	57	691.93	1001.74
US 61-67<- U	111	112	1	23153	42	0	7	35	498.36	747.54
MCKNIGHT U	112	113	1	19534	58	1	8	49	815.71	1279.82
MCKNIGHT U	113	114	1	18528	76	0	17	59	1126.9	1883.1
BIG BEND - U	114	115	1	12257	63	0	14	49	1412.07	2353.44
ST LOUIS CI U	115	116	1	9896	24	0	6	18	666.27	1165.97
ST LOUIS CI U	116	117	1	9896	7	0	0	7	194.33	194.33
ST LOUIS CI U	117	118	1	9738	68	0	13	55	1918.39	3018.65
VANDEVENU	118	119	1	9619	0	0	0	0	0	0
VANDEVENU	119	120	1	9619	0	0	0	0	0	0
VANDEVENU	120	121	1	8497	0	0	0	0	0	0
CHOUTEAU U	121	121.431	0.431	3398	0	0	0	0	0	0
Overall				18952	993	1	193	799	959.65	1527.9

Table S30: Crash and Severity Rates (Mo100 East, 2008)

2008 segment N.Direction	Cont. Log (Cont. Log (Length (mi),AADT	Crashes	Fatality	Injury	Property	Crash Rate	Severity Ra	
RT OO<->M U	88.811	89	0.189 9446	0	0	0	0	0	0	
RT OO<->M U	89	90	1 9446	0	0	0	0	0	0	
RT OO<->M U	90	91	1 9446	0	0	0	0	0	0	
RT OO<->M U	91	92	1 9763	0	0	0	0	0	0	
MELROSE F U	92	93	1 10922	0	0	0	0	0	0	
BEGIN DIV U	93	94	1 8449	0	0	0	0	0	0	
RT T<->W L E	94	95	1 7895	0	0	0	0	0	0	
RT T<->W L E	95	96	1 7287	0	0	0	0	0	0	
MO 109<-> E	96	97	1 9662	0	0	0	0	0	0	
MO 109<-> E	97	98	1 13616	0	0	0	0	0	0	
WESTGLEN E	98	99	1 28791	0	0	0	0	0	0	
OLD STATE U	99	100	1 37652	0	0	0	0	0	0	
MO 340<-> U	100	101	1 37589	0	0	0	0	0	0	
MO 340<-> U	101	102	1 37589	0	0	0	0	0	0	
MO 340<-> U	102	103	1 40632	0	0	0	0	0	0	
BAXTER RD U	103	104	1 26119	84	0	23	61	881.11	1604.88	
MO 141<-> E	104	105	1 20127	108	0	20	88	1470.12	2286.85	
MO 141<-> E	105	106	1 26305	37	0	6	31	385.36	572.84	
BEGIN DIV E	106	107	1 19325	140	0	26	114	1984.8	3090.61	
RT JJ<->GE' E	107	108	1 12839	74	0	18	56	1579.09	2731.4	
RT JJ<->GE' E	108	109	1 20036	125	0	28	97	1709.25	2857.87	
GEYER RD< U	109	110	1 26192	127	0	23	104	1328.44	2050.19	
US 61-67<- U	110	111	1 25960	66	0	8	58	696.54	949.83	
US 61-67<- U	111	112	1 22594	47	0	8	39	569.92	860.94	
MCKNIGHT U	112	113	1 19063	75	0	8	67	1077.9	1422.82	
MCKNIGHT U	113	114	1 18081	95	0	13	82	1439.49	2030.44	
BIG BEND - U	114	115	1 11962	29	0	8	21	664.2	1213.89	
ST LOUIS CI U	115	116	1 9658	12	0	5	7	340.41	765.92	
ST LOUIS CI U	116	117	1 9658	4	0	2	2	113.47	283.67	
ST LOUIS CI U	117	118	1 9504	37	0	7	30	1066.6	1671.97	
VANDEVENU U	118	119	1 9387	0	0	0	0	0	0	
VANDEVENU U	119	120	1 9387	0	0	0	0	0	0	
VANDEVENU U	120	121	1 8292	0	0	0	0	0	0	
CHOUTEAU U	121	121.431	0.431 3317	0	0	0	0	0	0	
Overall				18495	1060	0	203	857	1046.82	1648.24