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An Analysis of the Impact of Increased Speed Limits on Interstates and on Highways in Louisiana

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A law was passed in mid-year 1997, raising the speed limit on rural interstate highways to 70 MPH. Therefore, 1996 and 1998 were compared. Dependent variables were fatality count, and injury severity. Factors controlled for were road type, speed limit, vehicle type, time of day, weather, driver age and gender and VMT by roadway type and month. and 1998.

Fatal crashes increased by 37% on interstates while fatal crashes in Louisiana as a whole increased by less than 1% during the same period. Fatal crashes on rural interstates increased by 2 crashes per month after the speed limits were raised in August, 1997.

The number of injury crashes on interstates did not increase significantly bit the number of PDO crashes did. The number of fatal crashes on urban interstates with speed limits below 70 mph increased by 13% but the number of fatal crashes on rural interstates increased by 46% during the same period. Involvement of young drivers (age 18 to 20) in fatal crashes on interstates more than tripled between 1996

Youth driver's (ages 18-20) involvement in fatal crashes on interstates increased by 211% from 1996 to 1998, while the involvement of drivers aged 21 and older in fatal crashes increased by 70% during the same period.

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EXECUTIVE SUMMARY

Effective August 15th, 1997, Louisiana raised the speed limit on rural interstates from 65MPH to 70MPH, while speed limits on urban interstates remained unchanged. The purpose of this study is to evaluate the impact of this change in the speed limit on the number of crashes and the severity of crashes. Specifically, the three categories examined were: the increase in fatalities, injuries and property damage crashes by road type and speed limit. Over half a million crashes between 1994 and 1998 were used to analyze the effect of speed limits using dependent variables such as fatality count and injury severity, taking into account road type, speed limit, vehicle type, time of day, weather condition, age of driver, gender of driver and VMT by type of roadway.

To study the effect of the increase in speed limit, two approaches were taken. First, a baseline year, i.e., 1996 was chosen and compared with 1998. Since the speed limit was raised mid-year in 1997, a comparison of 1996 crashes with 1998 crashes was considered to be the most appropriate. Secondly, the crashes were analyzed by months to detect changes in average crashes.

An analysis of the crashes shows that raising speed limits on interstates in 1997 had a significant effect on the number of fatal crashes on rural interstates. The elevated parts of the interstates, in particular, showed a dramatic percentage increase in fatal crashes. Although there was a study done by the Transportation Research Board (1984) suggesting an effect of a speed limit increase on fuel consumption and costs associated with injuries, the Louisiana crash data analysis is inconclusive. In Louisiana the miles per gallon decreased by 0.2% from 1996 to 1998 which could be due to other factors such as an increase in the number of SUV's and light trucks. The number of injuries declined from 87.41 thousand in 1996 to 78.17 thousand in 1998, a decline of over 10%.

KEY FINDINGS

- While the number of fatal crashes increased by less than 1% in Louisiana from 1996 to 1998, the fatal crashes on interstates increased by 37% during the same time period.

- Fatal crashes on rural interstates increased by 2 crashes per month on the average after the speed limits were raised in August of 1997.

- While the number of injury crashes on interstates did not increase significantly, the number of property-damage-only crashes increased by 125 per month on the average.

- While the number of fatal crashes on urban interstates with speed limits below 70mph increased by 13% from 1996 to 1998, the number of fatal crashes on rural interstates with speed limits at 70mph increased by 46% during the same time period.

- Elevated interstates with speed limits of 70mph had a 160% increase in fatal crashes, a 34% increase in injury crashes and a 42% increase in PDO crashes from 1996 to 1998.

- Youth drivers' (ages 18 to 20) in fatal crashes on interstates increased by 211% from 1996 to 1998, while the drivers of ages 21 and older in fatal crashes increased by 70% during the same time period.

- Other changes have taken full effect in 1998, which could have led to a decline in fatal crashes in 1998. The graduated-driver-license law led to an over 50% decline of 15 year-old licensed drivers in 1998 and only 9 drivers of age 15 were involved in fatal crashes compared to 19 in 1997.

1 – INTRODUCTION

This study deals with the impact of increased speed limits on traffic fatalities, injury, and property damage crashes. Crash data from 1994 to 1998 were analyzed to identify the effects of speed limits on the number of crashes by road type, driver's age and other factors. Because the speed limit was changed in August of 1997, the year 1996 was used as a base line and compared to the 1998 crash data. However, the monthly data between 1994 and 1998 were also analyzed to determine if there was an increase in crashes. Specifically, August 1996 to July 1997 was compared to August 1997 to July 1998. Some extraneous factors also exist which may have had an effect on the total number of crashes. For instance, the graduated driver's license law led to an over 50% decline of 15-year-old licensed drivers from 1997 to 1998. Also, vehicle miles traveled (VMT) and the total number of licensed drivers has increased slightly from 1996 to 1998. The decline in 15-year-old licensed drivers should have led to a decline in fatalities and injuries while an increase in the total number of licensed drivers and an increase in VMT may have led to an increase in injuries and fatalities.

BACKGROUND

In 1973 a National Maximum Speed Limit (NMSL) was enacted during the Arab oil embargo with the objective of conserving fuel. In addition to fuel conservation, the annual traffic fatalities declined by 16% from 54,052 in 1973 to 45,196 in 1974. Hence, the United States Congress passed a law making this maximum speed limit permanent and required states to certify the enforcement of NMSL. The 1978 "Surface Transportation Act" required the states to submit data on the percentage of motor vehicles exceeding 55 MPH on public highways with 55 MPH speed limits.

The National Highway System Designation Act of 1995 eliminated the Federal mandate for the National Maximum Speed Limit. This Act (Public Law 104-59) ended over 20 years of federal involvement in establishing speed limits on interstates, US highways and other state roads. Also, states no longer have to submit speed compliance data to the Federal Highway Administration (FHWA).

Many states subsequently raised speed limits. By the end of 1996, 32 states had passed laws to raise speed limits on interstates and other roads. Louisiana raised speed limits on rural interstates to 70 MPH, effective August 15th , 1997. However, on August 20, 1998, the speed limit on the elevated Interstate 10 over the Atachafalaya basin was reduced to 60 MPH. On April 5, 1999, speed limits were also reduced on the elevated parts of Interstate 10 from Baton Rouge to New Orleans and on the elevated parts of Interstate 55 and Interstate 310.

2 – CRASH TRENDS FORM 1992 TO 1998

Table 1 gives an overview of crash trends from 1992 to 1998. The following points highlight the changes that have occurred during this time period.

- In 1998, 807 fatal crashes occurred on Louisiana's roadway, accounting for 926 fatalities.
- Compared with 1996, the year before the speed limit on interstates was increased, the number of fatal crashes increased by less than one-half a percent while the number of fatalities increased by 3%.
- Vehicle miles traveled increased by 6% from 1996 to 1998.
- The total number of fatal crashes experienced essentially no change in 1998 compared to 1996.
- The number of injury crashes declined by 9% from 1996 to 1998 and the number of property damage only crashes increased by 2% during the same time period.
- Other changes have taken full effect in 1998, which could have led to a decline in fatal crashes in 1998. The graduated-driver-license law led to an over 50% decline of 15 year-old licensed drivers. In 1998, only 9 drivers of age 15 were involved in fatal crashes compared to 19 in 1997.

Table 1: Traffic Crash Trends for 1992 to 1998

Year	Vehicle Miles Traveled (100 Million Miles)	Licensed Drivers (1,000)	Population (1,000)	Registered Vehicles (1,000)	Fatal & Injury Crashes (1,000)	All Injuries (1,000)	Fatal Crashes	Fatalities	Driver Fatalities	Number of Vehicles Involved in Fatal Crashes	Property Damage Only Crashes (1,000)
1992	337.6	2,595	4,287	3,113	46.64	76.68	797	892	501		88.2
1993	363.5	2,638	4,220	3,178	47.99	77.90	773	884	478		89.4
1994	374.3	2,608	4,315	3,242	51.51	85.88	748	844	526	1162	93.8
1995	386.2	2,637	4,342	3,512	51.07	84.64	786	903	539	1181	99.5
1996	379.7	2,718	4,351	3,318	52.86	87.41	806	901	533	1248	108.0
1997	387.6	2,750	4,369	3,449	52.35	86.81	833	932	555	1314	112.1
1998	403.3	2,747	4,372	3,449	47.87	78.17	807	926	564	1364	110.6
	Difference										
1 Year	4%	0%	0%	0%	-9%	-10%	-3%	-1%	2%	4%	-1%
5 Years	11%	4%	4%	9%	0%	0%	4%	5%	18%	17%	24%
Average	7%	3%	1%	3%	-6%	-8%	2%	4%	7%	11%	10%

3 – ANALYSIS BY HIGHWAY TYPE

Although the overall increase in fatal crashes from 1996 to 1998 is negligible, when the changes in fatal crashes on interstates with non-interstates are contrasted, a different picture emerges. Table 2 shows the number of crashes by severity from 1994 to 1998 by roadway type. Also included are the percent changes from year to year, the percent changes from 1996 to 1998, and the percentage changes of the average number of crashes from 1994 to 1996 compared to 1998. Some important observations that can be made are listed below.

- While the overall number of fatal crashes in 1998 has not increased compared to 1996, the number of fatal crashes on interstates has increased by 37%.
- The injury crashes have declined by 9% on all roads in Louisiana but have increased by 1% on interstates.
- There was a 2% increase of property-damage-only (PDO) crashes from 1996 to 1998 on all roads compared to a 14% increase of PDO crashes on interstates.
- There was a 23% increase of fatal crashes from 1996 to 1997, the first year that the speed limit was raised on interstates, and an 11% increase from 1997 to 1998.
- US Highways had a smaller increase in crashes than interstates. From 1996 to 1998, US highways had a 3% increase in fatal crashes, a 6% decline of injury crashes and a 7% increase in PDO crashes.

Table 2: Fatal, Injury and PDO Crashes on Interstates, US Highways and all Roads for 1994 to 1998

Year	Fatal	Injury	PDO	Fatal	Injury	PDO	Fatal	Injury	PDO
Year	Interstates			US Highway			All Roads		
1994	89	4,250	7,260	134	10,107	17,876	748	51,514	93,770
1995	83	4,365	7,986	142	10,184	19,311	786	51,069	99,535
1996	82	4,073	8,194	172	9,698	19,198	806	52,864	107,950
1997	101	4,331	9,087	169	9,765	20,303	833	52,353	112,063
1998	112	4,099	9,314	178	9,095	20,456	807	47,869	110,640
Difference									
1995-94	-7%	3%	10%	6%	1%	8%	5%	-1%	6%
1996-95	-1%	-7%	3%	21%	-5%	-1%	3%	4%	8%
1997-96	23%	6%	11%	-2%	1%	6%	3%	-1%	4%
1998-97	11%	-5%	2%	5%	-7%	1%	-3%	-9%	-1%
Average	32%	-3%	19%	19%	-9%	9%	3%	-8%	10%
1998-96	37%	1%	14%	3%	-6%	7%	0%	-9%	2%

Figure 1: Percentage Change in Fatal, Injury and PDO Crashes by Highway Type from 1996 to 1998

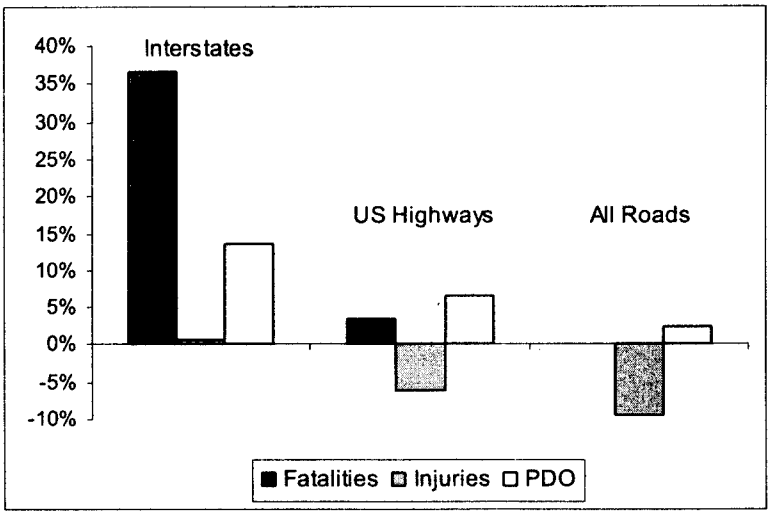


Figure 1 highlights the drastic increase in interstate crashes following the speed limit changes. Interstates had a twelve times higher increase in fatal crashes than US Highways from 1996 to 1998. Both US Highways and other non-interstate roads had a decline in injuries from 1996 to 1998 compared to an increase in injury crashes for interstates. The increase of property damage only crashes was twice as high for interstates than for US Highways from 1996 to 1998.

Figure 2 shows the fatal crashes by month from January 1994 to December 1998 along with the average number of crashes per month for two time periods, January 1994 to July 1997 and August 1997 to December 1998. The average for the first time period, before the speed limit was raised, is 7.3 fatal crashes per month. The average for the second time period, after the speed limit was raised, is 9.3 fatal crashes per month. Thus, the average increased by 2 crashes per month.

Figure 2: Fatal Crashes on Interstates by Month: Jan 1994 to Dec 1998

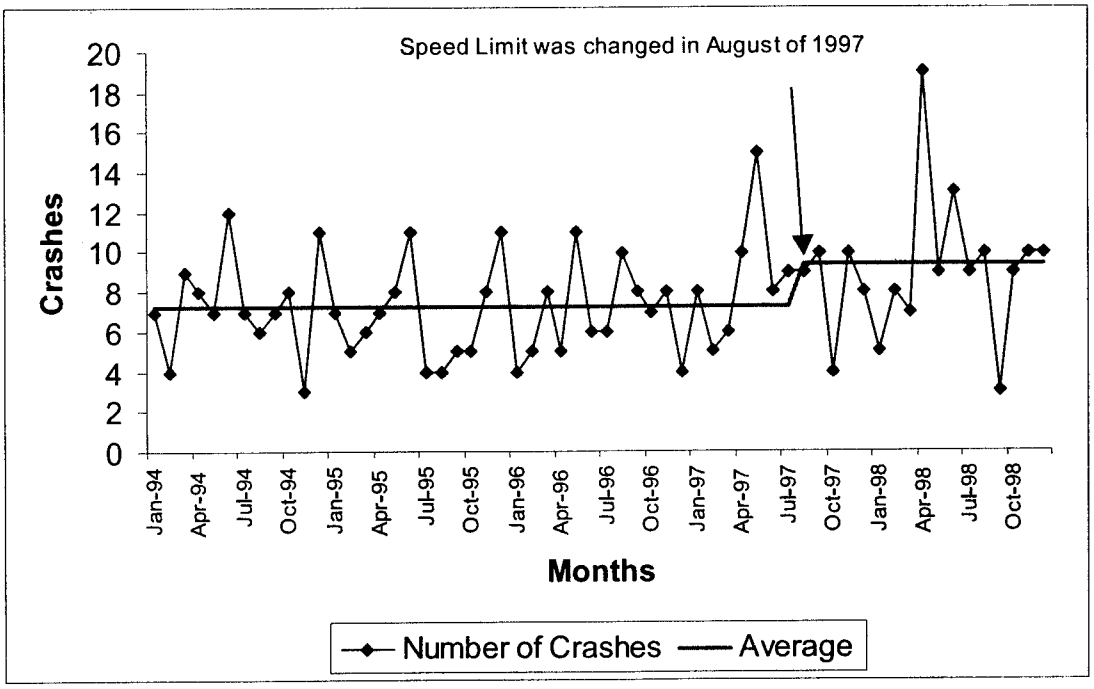
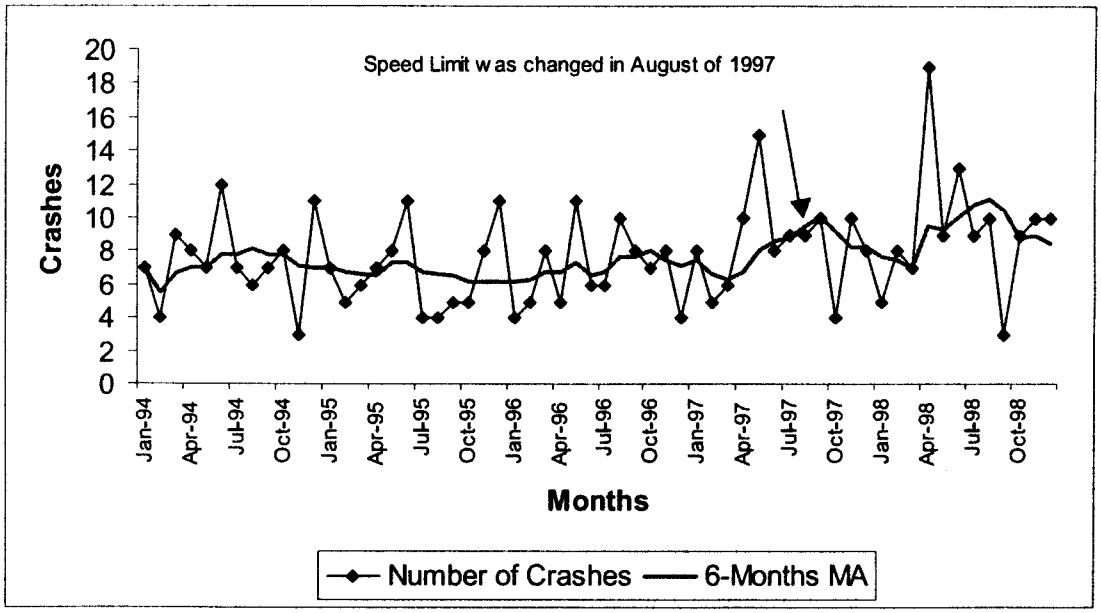


Figure 3 depicts the fatal crashes by month and a 6 months moving average. From January 1996 to April 1997, the average number of fatal crashes varied between 6 and 8 and increased to between 7 and 12 in May of 1997. It is possible that media exposure of discussion in the legislature about changing the speed limit might have affected the attitudes of drivers and police regarding enforcement of speed limits prior to August of 1997. This might explain the high number of fatal crashes on interstates in June of 1997.

Figure 3: Fatal Crashes on Interstates and 6-Months Moving Average Jan 1994 to Dec 1998



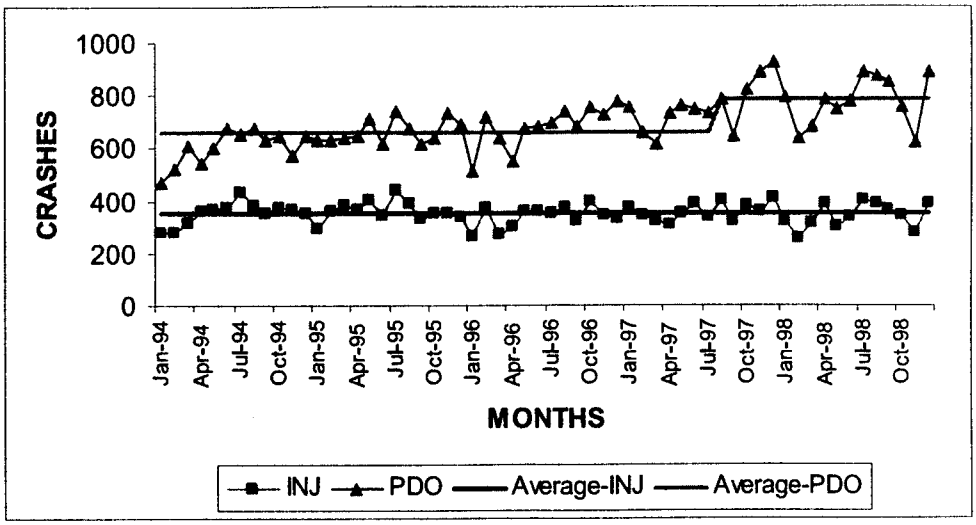
Just as fatal crashes on rural interstates have increased, so have the total number of fatalities on interstates. Table 3 shows the number of fatalities on all interstates from 1986 to 1998. From 1994 to 1998, the cumulative increase in fatalities on interstates was 29%.

Table 3: Fatal Crashes and Fatalities on Interstates: 1994 to 1998

Year	Fatal Crashes	%	Fatalities	%
1994	89		92	
1995	81	-9%	93	1%
1996	82	1%	102	10%
1997	101	23%	116	14%
1998	112	11%	132	14%

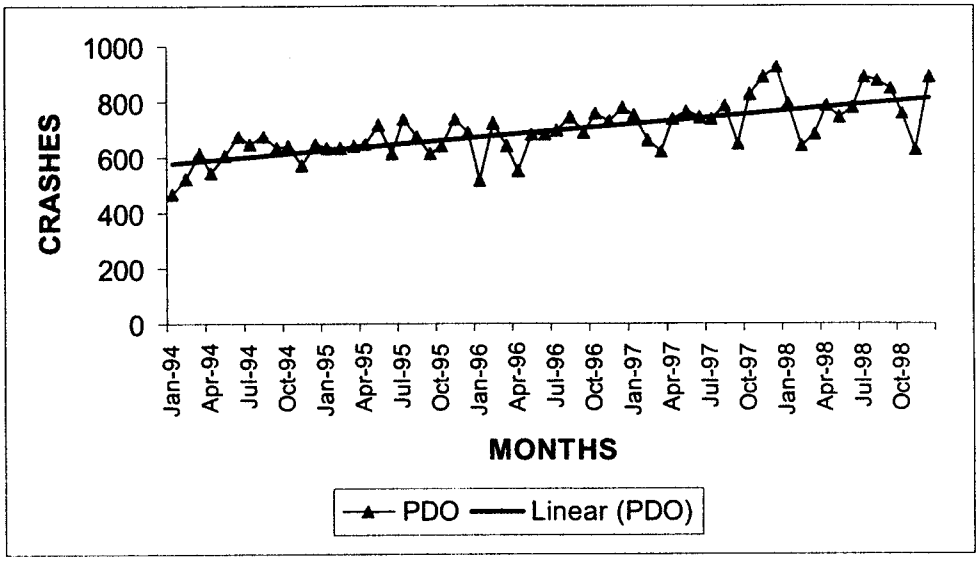
Figure 4 shows that the PDO crashes on interstates also increased from 1996 to 1998, namely, from an average of 662 crashes per month for the time period January 1994 to July 1997, to an average of 787 crashes per month for the time period August 1997 to December 1998. The average number of injury crashes did not increase significantly between these two time periods.

Figure 4: Injury and PDO Crashes on Interstates by Month: Jan 1994 to Dec 1998



However, the trend line in Figure 5 shows that the number of PDO crashes on interstates have been increasing steadily at a rate of 4 crashes per month over the past five years. It is interesting to note that the variation in the number of monthly PDO crashes on interstates seems to have increased after the speed limit was raised.

Figure 5: PDO Crashes on Interstates by Month and Trend Jan 1994 –Dec 1998



4 – RURAL AND URBAN INTERSTATE CRASHES

The speed limit on interstates in Louisiana was raised to 70 MPH, effective August 15th, 1997, except in urban areas. Table 4 depicts the urban interstates with speed limits and mileposts. These urban interstates make up 11% of the mileage for all interstates.

Table 4: Urban Interstate Speed Limits and Mileposts

Route	City	Speed	From	To
I-10	Lake Charles	60	26.25	27.8
I-10	Calcasieu	50	27.8	29.13
I-10	Lake Charles	60	29.13	33.65
I-10	Baton Rouge	60	151.61	153.75
I-10	Miss Bridge	50	153.75	155.20
I-10	Baton Rouge	60	155.20	163.70
I-10	New Orleans	60	223.59	230.87
I-10	New Orleans	60	240.10	247.40
I-12	Baton Rouge	60	0.01	7.15
I-20	Shreveport	60	10.32	19.31
I-20	Bossier City	60	19.31	23.93
I-20	Monroe	60	112.30	120.55
I-20	Miss Bridge	60	116.60	116.75
I-49	Alexandria	60	87.26	91.21
I-49	Shreveport	60	199.40	206.30
I-49	Shreveport	50	206.30	206.80
I-49	Shreveport	40	206.80	207.15
I-110	Baton Rouge	60	0.01	1.23
I-110	Baton Rouge	50	1.23	2.44
I-110	Baton Rouge	60	2.44	8.78
I-210	Lake Charles	60	3.23	0.00
I-220	Shreveport	60	0.00	1.96
I-310	New Orleans	45	9.50	11.30
I-510	New Orleans	60	6.21	9.41
I-610	New Orleans	60	0.00	4.39

Contrasting urban (speed limit <70) with rural (speed limit 70) interstates shows that fatal crashes on rural interstates have increased more than on urban interstates

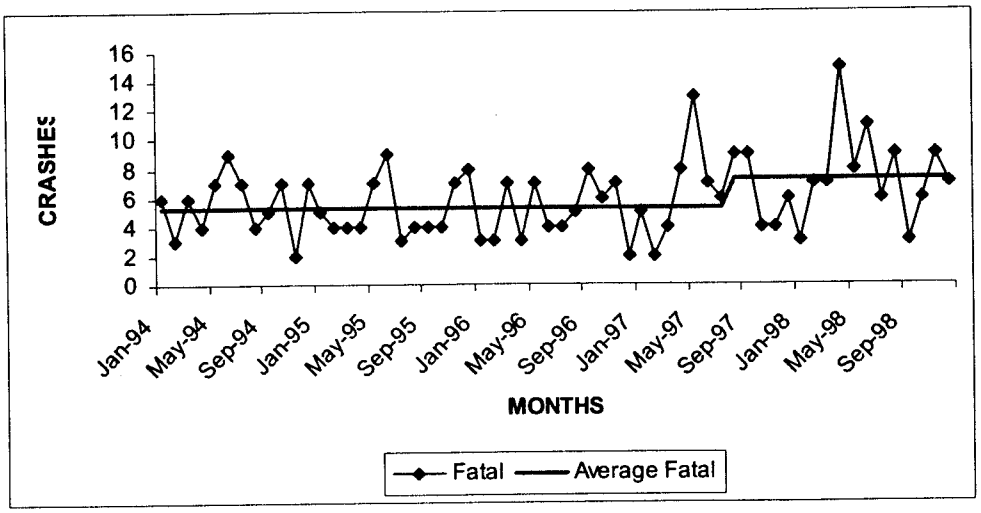
after the speed limit was raised. Table 5 shows the number of fatal crashes on interstates by rural and urban areas from 1994 to 1998. The increase in the number of fatal crashes on interstates with the increased speed limit of 70mph was 31% from 1996 to 1997, and 12% from 1997 to 1998. The cumulative increase from 1996 to 1998 was 46%. The corresponding percentages for urban interstates with lower speed limits were 9% (96 to 97) and 4% (97 to 98). The combined change from 1996 to 1998 was 13% for urban interstates.

Table 5: Fatal Crashes on Interstates by Speed Limits

Year	1994	1995	1996	1997	1998
All	89	81	82	102	112
Percentage		-9%	1%	24%	10%
Speed limit 70 mph	67	62	59	77	86
Percentage		-7%	-5%	31%	12%
Speed limit below 70 mph	22	19	23	25	26
Percentage		-14%	21%	9%	4%

Figure 6 shows fatal crashes on rural interstates only. This comparison shows that on the average fatal crashes on interstates with 70MPH had an increase of about two fatal crashes per month after the speed limit was raised.

Figure 6: Fatal Crashes on Rural Interstates with Speed Limits of 70 MPH from Jan 1994 to Dec 1998



The average number of fatal crashes on urban interstates did not increase after the speed limit was raised on rural interstates. Figure 7 shows the number of fatal crashes by month on urban interstates along with the average. This average remained constant at 1.8 fatal crashes per month from 1996 to 1998.

Figure 7: Fatal Crashes on Urban Interstates with speed limits below 70 MPH, Jan 1994 to Dec 1998

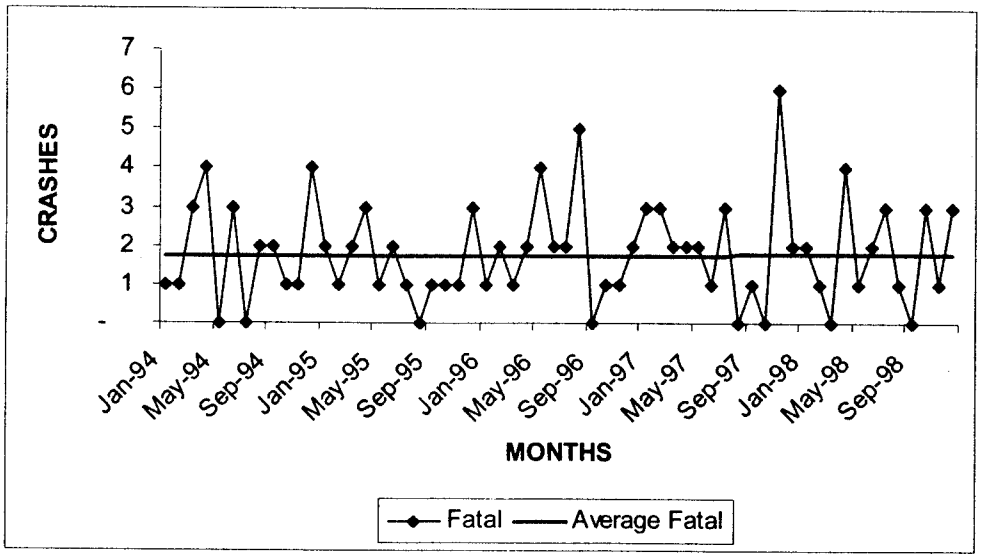


Table 6 shows all crashes by type on interstates. However, the raw numbers need to be interpreted with caution. On one hand there are more rural interstate miles than urban interstate miles; on the other hand there are more vehicle miles traveled on urban interstate miles than on rural interstate miles.

Table 6: Rural and Urban Crashes on Interstates: 1994-1998

		Year				
Crash Type	Urban/Rural	1994	1995	1996	1997	1998
FATAL CRASHES	All Interstates	89	81	82	102	112
	Rural Interstates	67	62	59	77	86
	Urban Interstates	22	19	23	25	26
INJURY CRASHES	All Interstates	4,250	4,365	4,073	4,331	4,099
	Rural Interstates	1,779	1,826	1,910	2,180	2,133
	Urban Interstates	2,471	2,534	2,066	2,149	1,954
PDO CRASHES	All Interstates	7,260	7,986	8,194	9,087	9,314
	Rural Interstates	3,143	3,591	3,853	4,528	4,650
	Urban Interstates	4,115	4,371	4,156	4,507	4,636
ALL CRASHES	All Interstates	11,599	12,432	12,349	13,520	13,525
	Rural Interstates	4,989	5,479	5,822	6,785	6,869
	Urban Interstates	6,608	6,924	6,245	6,681	6,616

The comparison is also made difficult by the fact that the vehicle miles traveled may have changed for rural and urban interstates during the time period studied. Tables 8 to 11 present various ways of adjusting the raw data to obtain a more valid interpretation of the changes.

The following Table 7 presents an estimate of fatal crashes per one million daily vehicle miles traveled; this is based on an estimate of vehicle miles traveled on urban and rural interstates. This estimate shows that rural interstates with speed limits of

70mph had three times as many fatal crashes per vehicle miles traveled as urban interstates.

Table 7: Fatal Crashes per One Million DVMT

Year	1996	1997	1998
All	82	102	112
Per 1 Mil. DVMT	3.1	3.8	4
Crashes on Interstates with Speed limit 70 mph	59	77	86
Per 1 Mil. DVMT	3.7	4.7	4.9
Crashes on Interstates with Speed limit below 70 mph	23	25	26
Per 1 Mil. DVMT	1.4	1.5	1.5

There was a 6.4% increase in vehicle miles traveled for all interstates from 1996 to 1998, but an estimate of the vehicle miles traveled on rural interstates is difficult to obtain. The estimate used in table 7 is based on the sum of the rural and urban interstate mileages of the seven largest parishes with metropolitan areas. While overall only 11% of the interstate miles had speed limits below 70mph, 37% of the interstates in these seven parishes had speed limits below 70mph. The daily vehicle miles traveled on rural interstates were estimated without using the seven parishes. This figure was then extrapolated to obtain the portion of daily vehicle miles traveled on urban interstates. This approach assumes that parishes with rural interstates only are representative for all rural interstates with respect to vehicle miles traveled.

Another way of adjusting the data is to look at percentages. Table 8 shows the crashes by type as a percent of total crashes. The injury crashes on all interstates as a percent of all crashes on interstates fell from 37% in 1994 to 30% in 1998, while the percent of PDO crashes increased from 63% to 69%. The percent of rural interstate crashes increased from 43% in 1994 to 51% in 1998. However, this trend could be due to an increase of traffic in rural areas rather than an effect of the speed limit. The urban interstates, because of the vehicle miles traveled, have a much higher number of crashes per mile. Although the urban interstates make up only 11% of all interstates, in 1998 they account for 50% of all interstate PDO crashes, 48% of all interstate injury crashes and 23% of all interstate fatal crashes.

Table 8: Urban and Rural Crashes on Interstates as Percent of all Crashes

Crash Type	Urban/Rural	1994	1995	1996	1997	1998
FATAL CRASHES	All Interstates	0.8%	0.7%	0.7%	0.8%	0.8%
	Rural Interstates	1.3%	1.1%	1.0%	1.1%	1.3%
	Urban Interstates	0.3%	0.3%	0.4%	0.4%	0.4%
INJURY CRASHES	All Interstates	37%	35%	33%	32%	30%
	Rural Interstates	36%	33%	33%	32%	31%
	Urban Interstates	37%	37%	33%	32%	30%
PDO CRASHES	All Interstates	63%	64%	66%	67%	69%
	Rural Interstates	63%	66%	66%	67%	68%
	Urban Interstates	62%	63%	67%	67%	70%
ALL CRASHES	Rural Interstates	43%	44%	47%	50%	51%
	Urban Interstates	57%	56%	51%	49%	49%

Table 9 shows a similar comparison. However, the percentage is based on the type of interstate crash. For instance, Table 9 indicates, in 1998, 23% of all fatal interstate crashes occur on urban interstates; Table 8 shows that this was 0.4% of all crashes on urban interstates in 1998. This compares to 77% of all fatal interstate crashes occurred on rural interstates in 1998, which was 1.3% of all crashes on interstates. While the percentage of fatal crashes on urban interstates was constant (0.4%) from 1996 to 1998, the percentage of fatal crashes on rural interstates increased from 1% in 1996 to 1.3% in 1998. This means that the percentage of fatal crashes on rural interstates, based on all crashes, increased by 0.3 percentage points from 1996 to 1998.

Table 9: Urban and Rural Crashes on Interstates by Type as Percentage of Type Crashes on Interstates

Crash Type	Urban/Rural	1994	1995	1996	1997	1998
FATAL CRASHES	Rural Interstates	75%	77%	72%	75%	77%
	Urban Interstates	25%	23%	28%	25%	23%
INJURY CRASHES	Rural Interstates	42%	42%	47%	50%	52%
	Urban Interstates	58%	58%	51%	50%	48%
PDO CRASHES	Rural Interstates	43%	45%	47%	50%	50%
	Urban Interstates	57%	55%	51%	50%	50%

Table 10 shows the percentage increase by type of crashes. Rural interstates with speed limits of 70 MPH experienced by far the largest increase in all types of crashes from 1996 to 1997.

Table 10: Percentage Change of Crashes by Type on Interstates

Crash Type	Urban/Rural	1994-95	1995-96	1996-97	1997-98
FATAL CRASHES	All Interstates	-9.0%	1.2%	24.4%	9.8%
	Rural Interstates	-7.5%	-4.8%	30.5%	11.7%
	Urban Interstates	-13.6%	21.1%	8.7%	4.0%
INJURY CRASHES	All Interstates	2.7%	-6.7%	6.3%	-5.4%
	Rural Interstates	2.6%	4.6%	14.1%	-2.2%
	Urban Interstates	2.5%	-18.5%	4.0%	-9.1%
PDO CRASHES	All Interstates	10.0%	2.6%	10.9%	2.5%
	Rural Interstates	14.3%	7.3%	17.5%	2.7%
	Urban Interstates	6.2%	-4.9%	8.4%	2.9%
ALL CRASHES	All Interstates	7.2%	-0.7%	9.5%	0.0%
	Rural Interstates	9.8%	6.3%	16.5%	1.2%
	Urban Interstates	4.8%	-9.8%	7.0%	-1.0%

Table 11 depicts the number of crashes per mile of interstate. It shows that, based on miles, the urban interstates have about 7 to 8 times as many PDO and injury crashes as rural interstates. The number of fatal crashes per mile on urban interstates is about twice as high as on rural interstates.

Table 11: Urban and Rural Crashes per Mile on Interstates

		Year				
Crash Type	Urban/Rural	1994	1995	1996	1997	1998
FATAL CRASHES	All Interstates	10.0	9.1	9.2	11.4	12.5
	Rural Interstates	8.4	7.8	7.4	9.7	10.8
	Urban Interstates	22.4	19.3	23.4	25.4	26.5
INJURY CRASHES	All Interstates	476	489	456	485	459
	Rural Interstates	224	230	240	274	268
	Urban Interstates	2,515	2,579	2,102	2,187	1,988
PDO CRASHES	All Interstates	813	894	917	1,017	1,043
	Rural Interstates	395	452	485	570	585
	Urban Interstates	4,187	4,448	4,229	4,586	4,718
ALL CRASHES	All Interstates	1,299	1,392	1,383	1,514	1,514
	Rural Interstates	628	689	732	854	864
	Urban Interstates	6,724	7,046	6,355	6,799	6,732

Overall, it is evident that while injury and PDO crashes occur predominantly on urban interstates, fatal crashes occur predominantly on rural interstates.

4 – CRASHES ON ELEVATED INTERSTATES

Louisiana has specific problems other states do not have. There are a significant number of elevated interstates (bridges) and highways because of the swamps throughout southern Louisiana. These elevated highways are particularly prone to crashes for two main reasons: (1) there is little room to maneuver when a problem occurs; (2) there is foggy weather during some parts of the year because of the nearby water. For these reasons there may be a higher likelihood crashes resulting in fatalities than on other interstates. Table 12 shows the mileposts of these elevated interstates.

Table 12: Mileposts of Elevated Interstates

Interstate	From	To
I-10 Atachafalaya	117.44	135.3
I-10 Bonnet Carre	210	221.5
I -10 NO East	255.4	261.3
I-55	0	23
I-310	0	5

Table 13 shows the number of crashes on the elevated interstates from 1996 to 1998. It is evident that the number of crashes on elevated interstates increased much more (percentage wise) than on all interstates from 1996 to 1998. The following comparison between 1996 and 1998 highlights the crash propensity of elevated interstates after the speed limit was raised.

- Fatal crashes: an increase of 37% on all interstates versus 160% on elevated interstates,
- Injury crashes: an increase of 1% on all interstates versus 34% on elevated interstates,
- PDO crashes: an increase of 14% on all interstates versus 42% on elevated interstates.

Table 13: Crashes on Elevated Interstates

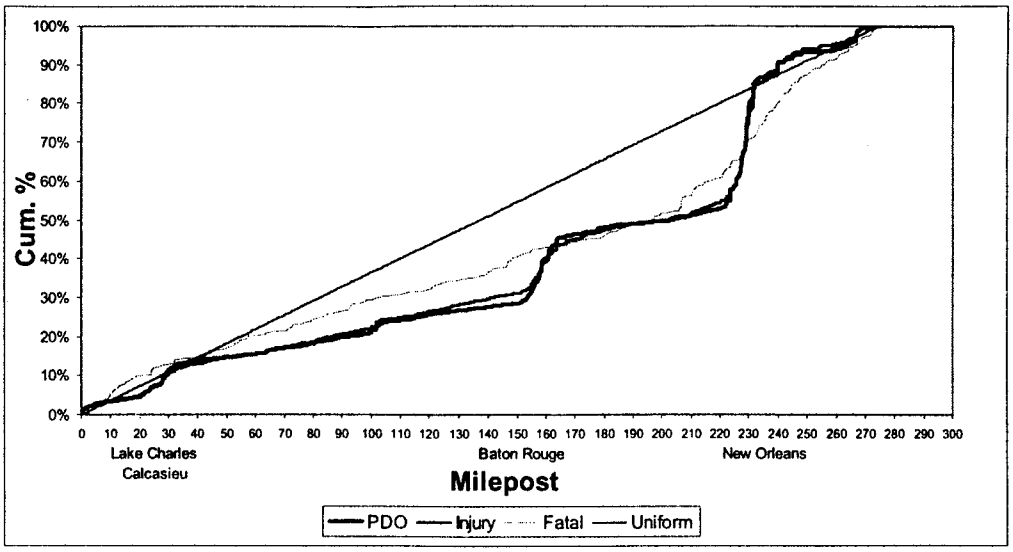
Year	Fatal	Injury	PDO
1996	5	152	248
1997	8	198	331
1998	13	203	351
%Change 96-98	160%	34%	42%

Also, in 1998, the percentage of fatal crashes on interstates was 0.8% for all interstates, but was 2.3% on elevated interstates. Hence, in 1998, a crash was about three times more likely to be fatal on elevated interstates than on regular interstates.

5 - ANALYSIS OF CRASHES BY MILEPOST

An analysis of the crashes by milepost on interstates shows the different characteristics of fatal versus injury and property damage crashes. Figure 8 depicts the cumulative frequency of crashes by severity on Interstate 10 by milepost. The frequency distribution is based on data from 1994 to 1998.

Figure 8: Fatal, Injury and PDO Crashes by Milepost on Interstate 10: 1994 to 1998



The straight line shows the distribution of crashes for a uniform distribution, i.e., if every interstate mile had the same crash likelihood. Two observations can be made from this distribution. The frequency of injury and PDO crashes indicates a strong increase of crashes between mileposts 153 to165 and 222 to 233. This can be expected since these are areas around Baton Rouge and New Orleans with a high traffic volume. However, the distribution of fatal crashes behaves differently. The frequency distribution of fatal crashes follows the uniform distribution up to about milepost 50, showing a lower trend thereafter and increase again at mileposts 206 to 248. This indicates that, overall, fatal crashes are more uniformly distributed with the exception of the areas around New Orleans. However, the fatal crash frequency tends to increase at milepost 210 compared to an increase of PDO and injury crashes at milepost 222. Mileposts 210 to 221.5 cover the elevated part of Interstate 10.

Figure 9 depicts a comparison of fatal crashes on Interstate 10 for the 12 months before the change of the speed limit (August 1996 to July 1997) and the 12 months after the speed limit change (August 1997 to July 1998). The graph shows that there was a significant increase in the frequency of fatal crashes between the mileposts 117 and 140, which includes the elevated interstate over the Atachafalaya.

Figure 9: Fatal Crashes by Milepost on Interstate 10 for 1996/97 and 1997/98

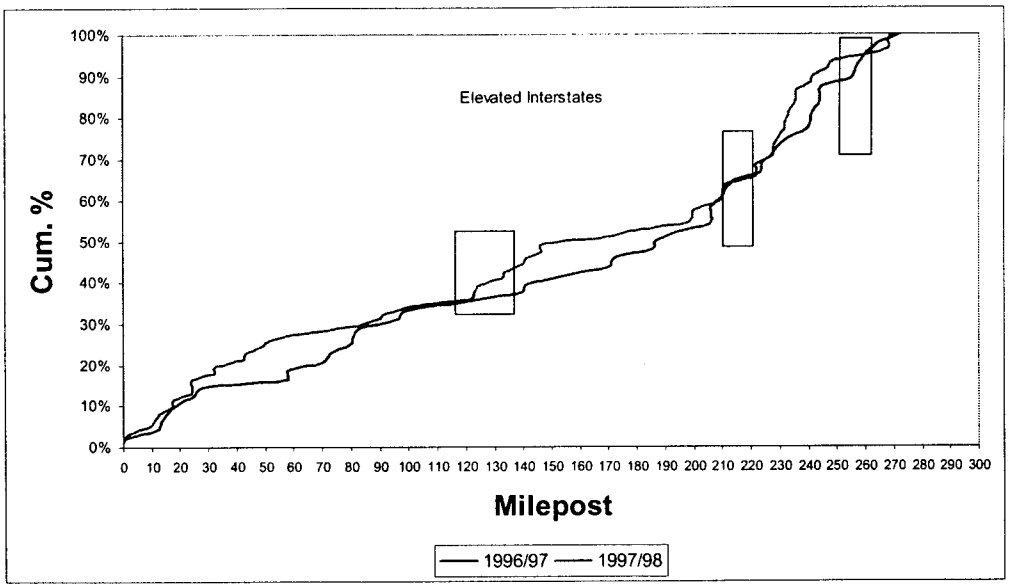
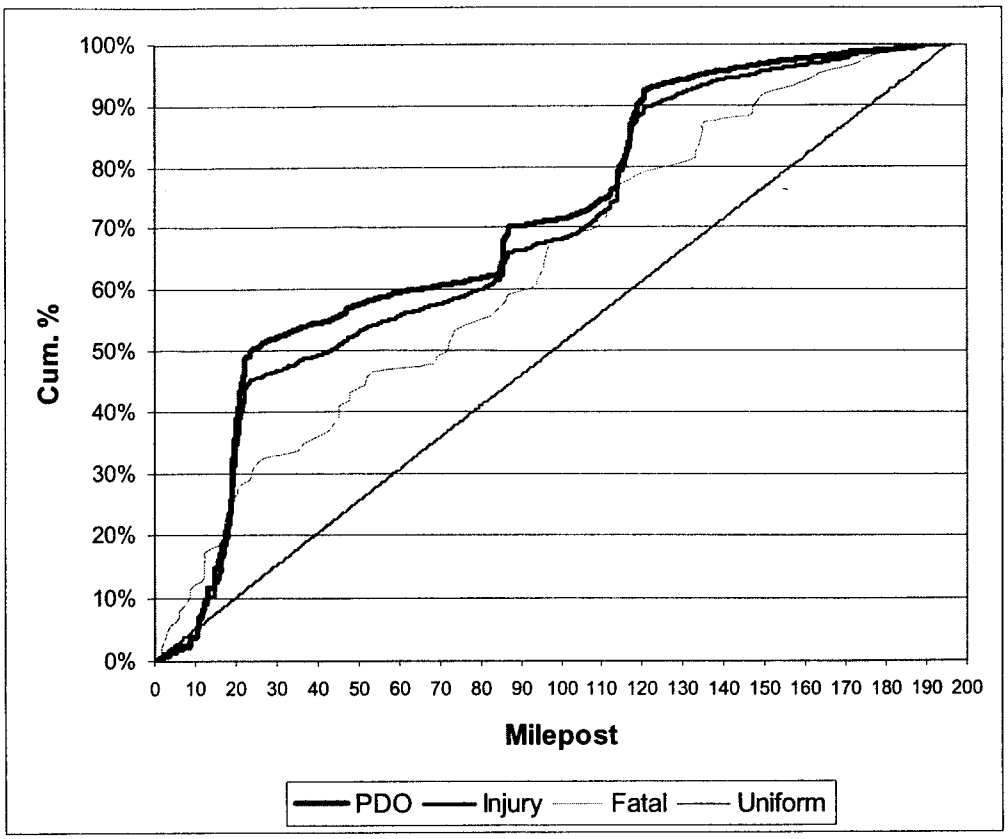


Figure 10 shows the distribution of crashes on Interstate 20 from 1994 to 1998. Fifty percent of all PDO and injury crashes and 30% of all fatal crashes on Interstate 20 occur during the first 25 miles which have a posted speed limit of 60 mph. There are three main areas where PDO and injury crashes occur. They account for 80% of all crashes while accounting for less than 20% of interstate miles. The first and second step increases of the frequencies are in areas with 60 mph speed limits. The distribution of the fatal crashes shows several steps indicating that there are areas where the number of crashes is higher than expected from a uniform distribution. If fatal crashes were to occur equally distributed over the interstate miles, one would expect about one fatal crash every two miles on the average. However, some areas such as between milepost 133 to 135 show up to 6 fatal crashes per mile between 1996 and 1998.

Figure 10: Fatal Crashes by Milepost on Interstate 20 for 1994 to 1998



6 – OTHER FACTORS

This section discusses various other factors. Since 1998 was the first full year the effect of the speed limits could be observed, we will again compare 1998 with 1996.

AGE

Age is a factor in speed-related crashes. Table 14 shows the change in interstate fatal crashes by age from 1996 to 1998. Young drivers had twice as high a percentage increase in fatal crashes on interstates from 1996 to 1998 than drivers of ages 21 and above. While there was an increase of 7% of licensed drivers of ages 18 to 20, there was a 211% increase of involvement in fatal crashes on interstates for this age group. Licensed drivers of ages 21 and above had an increase of 70% in involvement in fatal crashes on interstates.

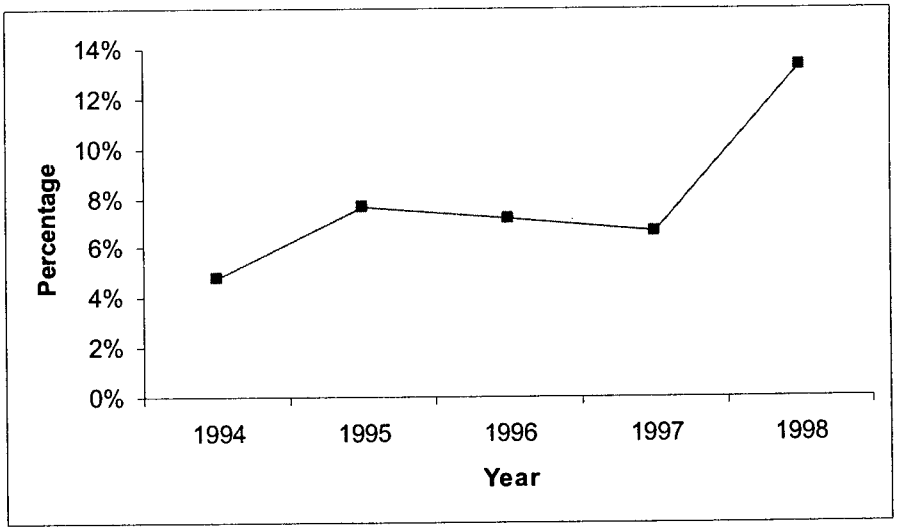
Table 14: Drivers Involved in Crashes on Interstates by Age and Severity: 1996 - 1998

Age	1996	1998	% Change in Drivers Involved in Fatal Crashes	% Change in Licensed Drivers
Fatal				
<18	4	7	75%	-2%
18-20	9	28	211%	7%
>20	102	173	70%	1%
>64	8	7	-13%	0.3%
Injury				
<18	238	219	-8.0%	-2%
18-20	667	764	14.5%	7%
>20	6,788	6,438	-5.2%	1%
>64	448	436	-2.7%	0.3%
PDO				
<18	479	548	14%	-2%
18-20	1240	1539	24%	7%
>20	12,419	14,177	14%	1%
>64	920	1,160	26%	0.3%

The same pattern can be observed for injury and PDO crashes; i.e., 18-to-20-year-old drivers had by far the highest percentage increase of involvement in interstate crashes. For instance, while the involvement of drivers of ages 21 and older and drivers 17 and younger in injury crashes declined from 1996 to 1998, involvement of drivers of ages 18 to 20 in injury crashes increased by 14.5%. Seniors, ages 65 and older, showed a 13% decrease in involvement in fatal interstate crashes from 1996 to 1998.

Figure 11 depicts the percentage of drivers ages 18 to 20 involved in fatal crashes on interstates. An analysis of the percentage of 18 to 20 year-old drivers in interstate fatal crashes from 1994 to 1998 shows that while this percentage was below 8% between 1994 and 1997, it increased to 13% in 1998.

Figure 11: Percentage of Drivers Ages 18 to 20 in Fatal Interstate Crashes



In 1998, only 6% of licensed drivers were of ages 18 to 20 (see Figure 12). While overall 10% of drivers involved in fatal crashes were between 18 and 20 (Figure 13), 13% of drivers in fatal crashes on interstates were of ages 18 to 20 in 1998. This shows that drivers of this age group are over represented among the drivers in fatal crashes and specifically in fatal crashes on interstates.

Figure 12: Licensed Drivers by Age

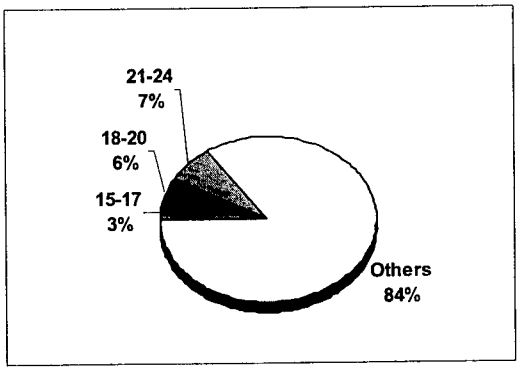
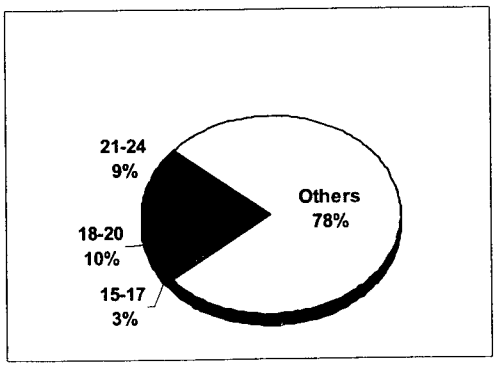


Figure 13: Drivers Involved in Fatal Crashes by Age



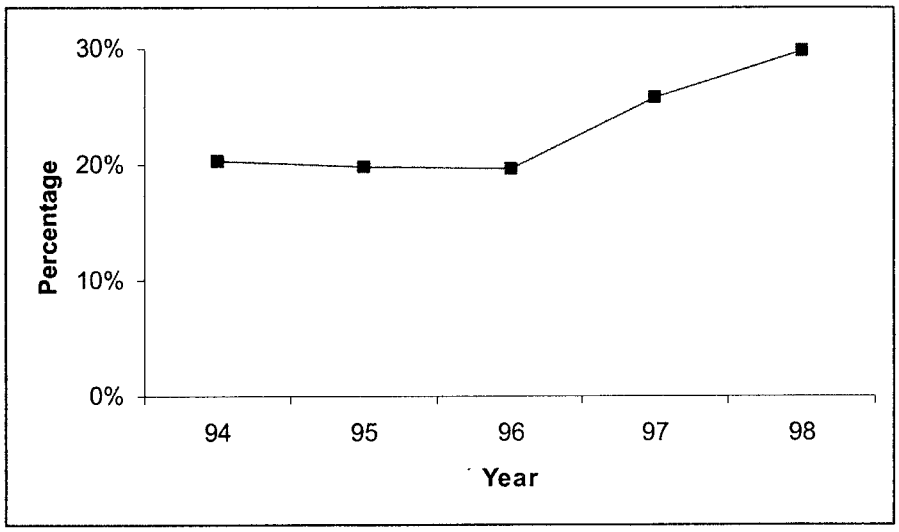
THE GENDER GAP

Although about 50% of drivers are male, they were involved in 70% of the fatal crashes in 1998 in Louisiana. However, females had an over three times higher percentage increase in fatal interstate crashes from 1996 to 1998 than males. This disproportionate increase is not accounted for by the increase in female licensed drivers. However, the increase in PDO crashes and injury crashes is not very different for male and female drivers. While involvement of female drivers in injury crashes declined by 2% from 1996 to 1998, the involvement of male drivers remained unchanged. Both sexes had an increase of 14% in PDO crashes from 1996 to 1998. For Comparison, The number of female drivers involved in all fatal crashes increased by 27% from 1996 to 1998 while the number of male drivers involved in fatal crashes increased by 10%.

Table 15: Fatal Crashes on Interstates by Gender

Gender	1996	1998	% Change in Drivers Involved in Fatal Crashes	% Change in Licensed Drivers
Fatal				
Male	98	148	51%	0.80%
Female	23	63	174%	1.30%
Injury				
Male	4834	4819	0%	0.80%
Female	2924	2878	-2%	1.30%
PDO				
Male	9109	10387	14%	0.80%
Female	5084	5804	14%	1.30%

Figure 14: Trend of Female Drivers Involved in Interstate Fatal Crashes



VEHICLE TYPE

The increase of fatal crashes on interstates by vehicle type ranges from 68% for cars to 74% for trucks. Trucks had the largest percentage increase of involvement in fatal crashes from 1996 to 1998.

Table 16: Vehicles in Fatal Crashes on Interstates

Vehicle Type	1996	1998	% Change
Cars	68	114	68%
Light Trucks	39	66	69%
Trucks	19	33	74%

Large trucks also had the highest increase of fatal crashes on all roads, namely 52%. Table 17 depicts the number of cars, trucks and motorcycles in fatal and injury crashes on all roads.

Table 17: Type of Vehicle Involved in Crashes on all Roadway Types

	Fatal			Injury		
Type	1996	1998	% Change	1996	1998	% Change
Cars	632	723	14%	65,623	56,531	-14%
Light Trucks	428	420	-2%	27,457	28,212	3%
Large Trucks	86	131	52%	2,672	2,301	-14%
Bus	8	1	-88%	347	329	-5%
Motorcycle	23	35	52%	697	649	-7%
All Vehicles	1,252	1,364	9%	100,490	90,008	-10%

DAY OF WEEK

Mondays and Sundays had the largest increase of fatal crashes on interstates from 1996 to 1998. When changes in injury and PDO crashes are taken into consideration, only Sunday had the highest increase in crashes for all three categories.

Table 18: Crashes on Interstates by day of Week

	Fatal			Injury			PDO		
Day of Week	1996	1998	% Change	1996	1998	% Change	1996	1998	% Change
Monday	6	14	133%	567	577	-2%	1353	1199	13%
Tuesday	11	17	55%	589	574	3%	1351	1173	15%
Wednesday	10	11	10%	500	536	-7%	1343	1141	18%
Thursday	14	18	29%	601	610	-1%	1404	1305	8%
Friday	13	12	-8%	699	727	-4%	1670	1539	9%
Saturday	15	17	13%	605	590	3%	1237	1039	19%
Sunday	13	23	77%	538	459	17%	956	798	20%
Total	82	112	37%	4099	4073	1%	9314	8194	14%

TIME OF DAY

The major increases in fatal crashes from 1996 to 1998 occurred between 6 p.m. and 12 a.m. daily.

Table 19: Fatal Crashes on Interstates by Time of Day

Time	1998	1996	% Change
00-6:00am	29	28	4%
6am-12pm	25	17	47%
12pm-6pm	34	23	48%
6pm-12am	24	14	71%
Total	112	82	37%

MULTI-CAR CRASHES

There was an 80% increase in multi-car (more than 2) fatal crashes on interstates from 1996 to 1998. Table 20 shows the frequency of the number of cars involved in crashes. While for injury and PDO crashes the single car crashes had the highest increase, multi-car crashes had the highest increase for fatal crashes.

Table 20: Fatal Crashes on Interstates by Number of Vehicles Involved

	Fatal			Injury			PDO		
Number of Vehicles Involved	1996	1998	% Change	1996	1998	% Change	1996	1998	% Change
1	43	48	12%	917	1046	14%	1800	2119	18%
2	29	46	59%	2447	2404	-2%	5817	6521	12%
>2	10	18	80%	708	638	-10%	573	608	6%

SEATBELT USE

Surveys show that the seatbelt use in Louisiana is increasing. Table 21 shows the seatbelt use by region from 1996 to 1998. Overall seatbelt use increased from 59% in 1996 to 66% in 1998. However, in 1996, 47% of drivers killed on interstates did not wear a seatbelt; this percentage increased to 51% in 1998.

Table 21: Seatbelt Survey: Seatbelt Use by Region

	Ages 5 And Older												
Region	86	87	88	89	90	91	92	93	94	95	96	97	98
1	12%	31%	33%	27%	41%	32%	55%	41%	41%	44%	54%	60%	60%
2	12%	26%	28%	43%	42%	42%	50%	51%	59%	76%	66%	67%	77%
3	11%	38%	46%	43%	37%	44%	46%	55%	52%	74%	60%	58%	61%
4	16%	38%	48%	54%	55%	61%	52%	64%	54%	65%	61%	65%	63%
5	19%	47%	36%	40%	61%	50%	62%	52%	61%	65%	62%	67%	74%
6	17%	39%	32%	40%	42%	46%	40%	52%	52%	53%	54%	63%	63%
7	15%	47%	39%	48%	30%	47%	51%	45%	52%	58%	58%	68%	70%
8	5%	27%	29%	33%	28%	34%	54%	55%	52%	58%	53%	61%	59%
LA	12%	35%	36%	41%	43%	42%	50%	48%	50%	59%	59%	64%	66%
	Ages Under 5 Years												
Region	86	87	88	89	90	91	92	93	94	95	96	97	98
1	32%	61%	35%	51%	30%	35%	85%	48%	25%	68%	78%	80%	75%
2	43%	57%	38%	44%	42%	56%	70%	61%	61%	72%	82%	72%	81%
3	51%	34%	49%	39%	23%	34%	50%	95%	39%	68%	79%	78%	79%
4	48%	44%	46%	57%	75%	73%	64%	41%	52%	54%	79%	81%	64%
5	53%	53%	46%	68%	61%	64%	54%	60%	51%	43%	85%	80%	89%
6	31%	35%	26%	17%	25%	34%	44%	47%	58%	51%	85%	92%	92%
7	64%	47%	30%	32%	60%	52%	85%	54%	78%	58%	89%	90%	91%
8	63%	27%	21%	41%	36%	25%	34%	36%	46%	67%	85%	86%	88%
LA	46%	43%	37%	44%	40%	43%	64%	50%	45%	62%	82%	82%	81%

WEATHER CONDITIONS

Table 22 shows the crashes on interstates by weather conditions with fog having 1.9%, the highest percentage of fatal crashes relative to all crashes. This percentage increased to 3.6% in 1998. The ratio of fatal to injury crashes in fog increased from 4.1% in 1996 to 11.4% in 1998.

Table 22: Weather Condition

1996	Fatal Crashes	Injury Crashes	PDO Crashes	Total Crashes	% Fatl.
Clear	54	2,456	4,842	7,352	0.7%
Cloudy	19	910	1,898	2,827	0.7%
Raining	5	566	1,235	1,806	0.3%
Snowing/Sleeting		25	67	92	0.0%
Fog	3	73	79	155	1.9%
Smoke				0	
Dust		3	2	5	0.0%
Unknown		17	38	55	0.0%
Total	**81**	**4,050**	**8,161**	**12,292**	**0.7%**

1998	Fatal Crashes	Injury Crashes	PDO Crashes	Total Crashes	% Fatl.
Clear	76	2508	5529	8,113	0.9%
Cloudy	25	833	1972	2,830	0.9%
Raining	6	655	1531	2,192	0.3%
Snowing/Sleeting		35	115	150	0.0%
Fog	4	35	71	110	3.6%
Smoke		1	1	2	
Dust		1	4	5	0.0%
Unknown	1	14	47	62	1.6%
Total	**112**	**4,082**	**9,270**	**13,464**	**0.8%**

ROAD CONDITIONS

Table 23 shows that the percentage of fatal crashes on interstates without any road defects remained at 93% from 1996 to 1998.

Table 23: Road Problems on Interstates

1996 Conditions	Fatal Crash	Injury Crash	PDO Crashes	Total Crash	Fatal %	Injury %	PDO %
Road Problems	0	89	68	157	0.0%	56.7%	43%
Construction, Repair	3	124	363	490	0.6%	25.3%	74%
Previous Accident		28	33	61		45.9%	54%
Water on Roadway	1	131	316	448	0.2%	29.2%	71%
Animal in Roadway		12	4	16	0.0%	75.0%	25%
No Defects	77	3682	7410	11,169	0.7%	33.0%	66%
Not Reported	1	7		8	12.5%	87.5%	0%
Total	82	4073	8194	12349	0.7%	33.0%	66%

1998 Conditions	Fatal Crash	Injury Crash	PDO Crashes	Total Crash	Fatal %	Injury %	PDO %
Road Problems	3	89	68	160	1.9%	55.6%	43%
Construction, Repair	3	124	363	490	0.6%	25.3%	74%
Previous Accident	2	28	33	63	3.2%	44.4%	52%
Water on Roadway		131	316	447	0.0%	29.3%	71%
Animal in Roadway		12	4	16	0.0%	75.0%	25%
No Defects	104	3682	8162	11,948	0.9%	30.8%	68%
Not Reported	0	33	368	401	0.0%	8.2%	92%
Total	112	4099	9314	13525	0.8%	30.3%	69%

TYPE OF CRASH

Table 24 shows that the head-on collisions resulting in fatal crashes increased from 1 (1.2%) in 1996 to 12 (10.7%) in 1998. Also, the same way side-swipe collisions increased from 1 (1.2%) to 8 (7.1%) during the same time periods..

Table 24: Collision Type on Interstates

1996 Collision Type	Fatal Crash	Injury Crash	PDO Crashes	Total Crash	Fatal %	Injury %	PDO %
Head-On Collision	1	35	34	70	1.4%	50%	49%
Rear-End Collision	25	2196	4404	6,625	0.4%	33%	66%
Right Angle Collision	6	371	562	939	0.6%	40%	60%
Same Way Side-Swipe	1	313	983	1,297	0.1%	24%	76%
Opposite Way Side-Swipe	4	168	237	409	1.0%	41%	58%
Other Collision	18	475	1040	1,533	1.2%	31%	68%
Non-Collision	27	504	928	1,459	1.9%	35%	64%
Unknown	0	11	6	17	0.0%	65%	35%
Total	82	4,073	8,194	12,349			

1998 Collision Type	Fatal Crash	Injury Crash	PDO Crashes	Total Crash	Fatal %	Injury %	PDO %
Head-On Collision	12	32	43	87	13.8%	37%	49%
Rear-End Collision	30	2100	4642	6,772	0.4%	31%	69%
Right Angle Collision	4	397	737	1,138	0.4%	35%	65%
Same Way Side-Swipe	8	346	1290	1,644	0.5%	21%	78%
Opposite Way Side-Swipe		91	201	292	0.0%	31%	69%
Other Collision	19	288	810	1,117	1.7%	26%	73%
Non-Collision	39	831	1556	2,426	1.6%	34%	64%
Unknown	0	14	35	49	0.0%	29%	71%
Total	112	4,099	9,314	13,525			

COST ESTIMATE

Costs associated with the increase in speed limits are difficult if not impossible to estimate accurately. This section attempts to list the costs according to the research published by the Transportation Research Board [1] and discusses research which shows that "fuel consumption is 14 to 31 percent greater for passenger cars traveling at 70 MPH compared to those traveling 55 MPH" ([1], p107). Table 22 shows the gallons taxed and the estimated vehicle miles traveled form 1996 to 1998. The gallons taxed increased by about the same amount as the vehicle miles traveled from 1996 to 1998, i.e., the increase in gallons taxed from 1996 to 1998 is 0.2% points higher than the increase in VMT. The overall miles per gallon decreased by 0.2% during the same time period. This may be partly attributable to the increased speed limits. However, during the same time period, the number of sport utility vehicles and light trucks, which are less fuel efficient, also increased. This makes it difficult to derive the true impact of increased speed limits on fuel consumption.

Table 25: Daily Vehicle Miles Traveled and Gallons Used

	1996	1997	1998	% Change 96-98
Gallon Taxed*	1,991,239,981	2,080,219,749	2,118,498,923	6.4%
VMT**	379.7	387.6	403.3	6.2%
VMT-Interstates**	97.2	96.9	101.3	4.2%
% VMT on Interstates	25.6%	25.0%	25.1%	-0.5%
Miles per Gallon	19.1	18.6	19.0	-0.2%

*Source Louisiana Department of Revenues

** In 100 Million Miles

The most widely felt effect of the 55 MPH speed limit is the additional time motorists spend on the road. However, most of the travel (85%) is done on urban interstates and roads with speed limits at 55 MPH or below. About 25% of VMT occur on interstates and about 60% of these vehicle miles (i.e., 15% of total VMT) occur on rural areas where the speed limit was increased to 70MPH. For the most part, long distance travel such as commercial trucking and vacation travel is affected. For instance, a trip from Miami, Florida, to Baton Rouge would result in a 3.7 hours greater driving time at 55 MPH than at 70 MPH. A trip from Denver, Colorado, would increase the driving time by 5 hours at 55 MPH rather than 70 MPH.

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