U.S. Department of Transportation
National Highway Traffic Safety Administration

SAFETY PROGRAMS FOR LIGHT TRUCKS AND SPORT UTILITY VEHICLES

1990

U.S. Department of Transportation
National Highway Traffic Safety Administration
400 Seventh Street, S.W.
Washington, D.C. 20590

NOTE:

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I: EXECUTIVE SUMMARY

I: EXECUTIVE SUMMARY

The National Highway Traffic Safety Administration (NHTSA) administers the Federal government's programs to promote safe driving and safe vehicles, and is vitally concerned with all aspects of highway safety, including the Federal motor vehicle safety regulations applicable to light trucks and vans (LTVs).[1]

In light of the substantial growth in LTV sales in recent years, NHTSA has been upgrading the safety standards for those vehicles, as well as for passenger cars. The agency is also continuing to emphasize the critical importance of following basic highway safety rules -- such as driving sober, using safety belts, and observing speed limits -- for all motorists in LTVs, as well as in other vehicles.

Our traffic crash data indicate that when the number of occupant deaths in cars and LTVs is compared to the number of registered vehicles, the resulting fatality rates for the two groups are virtually identical. However, there are differences among the sub-classes of LTVs, and differences according to type of crash involvement. While LTVs already have a safety record comparable to cars, NHTSA believes there are some opportunities to improve that record by upgrading vehicle safety. Most of the agency's passenger car safety standards have applied to LTVs for many years. However there are a few which do not. The agency is committed to broaden those regulations where appropriate.

The design and the applicability of light trucks began to change in the 1970's with a trend toward greater passenger use of light trucks and a shift toward more compact vehicles. Consequently NHTSA began in the late 1970's to extend the applicability of its passenger car Federal Motor Vehicle Safety Standards (FMVSSs) to light trucks.

To improve the protection provided to LTV occupants in a crash, the agency extended two crashworthiness standards to those vehicles: FMVSS No. 212, Windshield Mounting - which set windshield retention requirements, and FMVSS No.219, Windshield Zone Intrusion - which regulates the intrusion of vehicle parts from outside the occupant compartment into a defined zone in front of the windshield during a frontal barrier crash test.

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[1] Throughout this report "LTVs" is used as a general term referring to truck and sport utility vehicles with a gross vehicle weight rating of 10,000 pounds or less, including pickup trucks, mini-vans, and full-size vans.

Subsequently the agency also extended to LTVs FMVSS No. 115, Vehicle Identification Number - which requires a unique identification number on each vehicle to reduce the number and seriousness of vehicle accidents by increasing the accuracy and efficiency of vehicle recall campaigns.

During the late 1970's and early 1980's, to further improve the ability of LTVs to avoid crashes and to protect occupants when crashes occur, the agency extended three other crashworthiness standards to LTVs: FMVSS No. 201, Occupant Protection in Interior Impacts - which requires better instrument panel padding, FMVSS No. 203, Impact Protection for the Driver From the Steering Control - requiring the use of energy absorbing steering columns, and FMVSS No. 204, Steering Control Rearward Displacement - which requires limits on the rearward movement of the steering wheel in vehicles with an unloaded weight of 4000 pounds or less. The agency also extended the requirements of its hydraulic brake standard, FMVSS No. 105 Hydraulic Brake Systems, to LTVs. In addition, the standard on Theft Protection (FMVSS No. 114) was extended to LTVs to reduce incidents of theft and subsequent disproportionate involvement of those stolen vehicles in injury producing accidents.

More recently, during the period 1987 - 1988, NHTSA extended to LTVs the requirements of FMVSS No. 208, Occupant Crash Protection -- Dynamic Testing of Safety Belts - which set 30 mile/hour crash test criteria for manual safety belt performance, and FMVSS No. 118, Power-Operated Windows, which is essentially for the protection of children. The agency has also completed action to extend FMVSS No. 204, Steering Column Rearward Displacement, to LTVs with an unloaded weight of up to 5500 pounds or a gross vehicle weight of 10,000 pounds or less.

Since his confirmation, Transportation Secretary Samuel K. Skinner has continued to place a high priority on the safety of all transportation systems, including rulemaking for additional LTV safety standards. In a letter dated June 29, 1989, to the Honorable Ernest F. Hollings, Chairman, Senate Committee on Commerce, Science, and Transportation, the Secretary committed the Department to prompt regulatory action in five specific areas for LTVs -- Head Restraints, Side-Impact Protection, Roof-Crush Resistance, Rear-Seat Lap/Shoulder Belts, and Automatic Crash Protection.

The Department has honored these commitments to the Senate. On September 25, 1989, the agency published a final rule to extend to LTVs FMVSS No. 202, Head Restraints - to reduce the frequency and severity of neck injuries in rear-end and other collisions. On November 2, 1989, the agency also published a final rule to extend to LTVs FMVSS No. 208, Occupant Crash Protection -- Rear-Seat Lap/Shoulder Belts - to provide more effective crash protection to occupants of these vehicles. At the same time, the

agency also proposed to extend the requirements for FMVSS No. 216, Roof Crush Resistance, to LTVs, with final action expected in the summer of 1990. More recently, the agency published on December 22, 1989 a Notice of Proposed Rulemaking (NPRM) proposing to extend FMVSS No. 214, Side-Door Strength to LTVs. A decision on a final rule is expected in the fall of 1990. Finally, the agency published on January 9, 1990 a proposal with regard to FMVSS No. 208, Occupant Crash Protection -- Front-Seat Automatic Crash Protection. In this rulemaking, the agency proposes to extend the automatic crash protection requirements (i.e., air bags or automatic safety belts) to LTVs. A decision on a final rule is expected in the fall of 1990.

In addition, the agency intends to initiate rulemaking for LTVs in two other areas. One is FMVSS No. 108, Lamps, Reflective Devices, and Associated Equipment -- Center High Mounted Stop Lamps, to require those lamps on LTVs. A proposal is expected in the spring of 1990.

Also, NHTSA has already granted a petition for rulemaking to develop a rollover protection standard for all passenger cars, as well as for LTVs and has a comprehensive data collection and research program underway to provide the basis for an effective regulation. Most of the crash avoidance research should be completed by mid-1990.

Assuming that these recently accomplished and pending rulemakings are fully implemented throughout the fleet of LTVs, NHTSA estimates that approximately 2,200 lives will be saved and approximately 101,400 injuries will be prevented or reduced in severity annually. This does not include an estimate of potential savings due to rollover protection rulemaking which is still in the research stage.

This report summarizes the agency's safety regulatory activities which are planned or recently completed, as well as research to further improve the safety of LTVs. This report also updates the information in the April 1988 report titled "Safety Programs for Light Trucks and Multipurpose Passenger Vehicles" which was presented to the Committees on Appropriations, U.S. House of Representatives, and U.S. Senate, and which described occupant containment and protection rulemaking and research for LTVs.

SUMMARY OF EXTENSION OF PASSENGER CAR STANDARDS TO LTVs SINCE 1978

STANDARD	DATE PUBLISHED	DATE EFFECTIVE
105 Hydraulic Brake Systems	Jan. 1981	Sept. 1, 1983
108 NPRM Lamps, Reflective Devices, and Associated Equipment (Center High Mounted Stop Lamps)	-----	Pending
	Dec. 1980	Sept. 1, 1983
114 Theft Protection	Aug. 1978	Sept. 1, 1980
115 Vehicle Identification Number	June 1988	Dec. 21, 1988
118 Power-Operated Window System		
201 Occupant Protection in Interior Impact	Nov. 1979	Sept. 1, 1981
	Sept. 1989	Sept. 1, 1991
202 Head Restraints		
203 Impact Protection for the Driver From the Steering Control System	Nov. 1979	Sept. 1, 1981
204 Steering Control Rearward Displacement		
a. Vehicles with a unloaded weight of 4000 pounds or less	Nov. 1979	Sept. 1, 1981
b. Vehicles with a unloaded weight of 5,500 pounds or less	Nov. 1987	Sept. 1, 1991
208 Occupant Crash Protection		
a. Dynamic crash test of seat belts	Nov. 1987	Sept. 1, 1991
b. Rear-seat lap/shoulder belts	Nov. 1989	Sept. 1, 1991
c. NPRM automatic occupant protection	Jan. 1990	Sept. 1, 1993 (Proposed)
212 Windshield Mounting		
a. Vehicles with a GVWR of 10,000 pounds or less	Aug. 1976	Sept. 1, 1977
b. Vehicles with an unloaded weight of 5,500 pounds or less	April 1980	April 3, 1980
214 NPRM Side Door Strength	Dec. 1989	Sept. 1, 1992 (Proposed)
216 NPRM Roof Crush Resistance	Nov. 1989	Sept. 1, 1991 (Proposed)
219 Windshield Zone Intrusion		
a. Vehicles with a GVWR of 10,000 pounds or less	June 1975	Sept. 1, 1976
b. Vehicles with an unloaded weight of 5,500 pounds or less	April 1980	April 3, 1980

II: BACKGROUND

In NHTSA's early years, the agency's regulatory and research approach was based on a clear distinction between the design and intended purpose of passenger cars and light trucks. Unlike passenger cars, light trucks were viewed as being designed and used primarily as cargo-carrying vehicles rather than as people-carrying vehicles. In addition, because light trucks were structurally different than passenger cars, the agency anticipated that occupants of light trucks would not be as vulnerable to injuries as passenger car occupants. Also, car occupants suffered far more deaths and injuries than did occupants of light trucks. Thus, the initial federal motor vehicle safety standards concentrated on requirements for passenger cars, to reduce deaths and injuries in those vehicles.

However, the trend in recent years has been toward more purchases and more passenger-oriented use of LTVs. Between 1970 and 1988 the number of registered LTVs increased from 14.2 to 37.1 million, a 161 percent increase[2]. This compares to an increase in registered passenger cars of 58 percent over the same period. In terms of total vehicle miles of travel, small truck travel increased 256 percent while total travel by passenger cars increased only 56 percent. Therefore, not only were people purchasing more of these vehicles, but the miles per vehicle were increasing in contrast to relatively stable miles per vehicle for passenger cars.

NHTSA responded to this shift starting in the late 1970s, when the agency extended the applicability of several passenger car standards to light trucks and sport utility vehicles. This response has continued since that time, resulting in the high priority rulemakings discussed in this report.

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[2] Federal Highway Administration annual data for the 2 axle-4 tire truck class of vehicle, which closely corresponds to the class of vehicle in this report.

This report is divided into three major sections. The first provides crash data analyses for the years 1985 through 1988 (the latest complete year for which data are available). The second section describes the regulatory activities directed at LTV safety, many of which were previously mentioned in the April 1988 report. The third section provides information on supporting research in LTV safety.

III: CRASH DATA ANALYSIS

This section expands on the April 1988 report, and presents and comments on fatality rates (vehicle occupant fatalities per million registered vehicles) for light trucks and cars by vehicle size and crash mode for 1985 through 1988. The fatality data and analyses are based on information from the Fatal Accident Reporting System (FARS). The vehicle registration data are from R. L. Polk & Co.

Table 1 combines the data for the years 1985 through 1988 to provide an overall perspective. Tables 2a through 2d address overall fatality rates, Tables 3a through 3d summarize distribution of fatalities by crash mode, and Tables 4a to 4d through 7a to 7d are by crash mode: rollover, frontal, side, and rear, respectively.

Tables 2a through 2d present fatality rates and normalized fatality rates[3] for subcategories of cars and light trucks. Since the fatality rates are based on measure of exposure (number of registered vehicles), the rates can be compared to provide the relative risk of being killed in various types of vehicles. The normalized fatality rates enable one to make the direct comparison of vehicle types more easily.

The following are the conclusions drawn from the tables showing fatalities per registered vehicle.

* The fatality rate for all light trucks is not appreciably different than it is for passenger cars, and the rates for four out five types of LTVs are lower than for either small or medium sized passenger cars.

* The fatality rates for small and standard pickup trucks are higher than the average for LTVs; the rate for small pickups is 35 percent higher than the overall average for passenger cars and 12 percent higher than the rate for small cars.

* The fatality rate for vans, including minivans, is less than the LTV average rate, and is only slightly higher than the rate for large cars.

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[3]The normalized fatality rate (column four) is developed by using the third column fatality rate, "Fatalities/Million Registered Vehicle," and dividing the fatality rate for each type of vehicle by the fatality rate for total vehicles, i.e., the last line in column three.

TABLE 1

1985 - 1988 COMBINED YEARS' DATA
(NATIONAL DATA)

FATALITIES PER REGISTERED VEHICLE

EHICLE TYPE	FATALS	REGISTERED VEHICLES X (1000)	FATALS/ MILLION R.V.	FATALITY RATE/ AVERAGE FATALITY RATE
MALL CAR	58,871	233,531	252.1	1.2
EDIUM CAR	22,273	97,872	227.6	1.1
ARGE CAR	17,198	139,919	122.9	0.6
MALL VAN	736	6,116	120.3	0.6
TANDARD VAN	2,965	21,627	137.1	0.7
OTAL VAN	3,701	27,743	133.4	0.6
MALL PICKUP	8,302	29,386	282.5	1.4
TANDARD PICKUP	14,188	65,300	217.3	1.0
PORT UTILITY VEHICLE	3,935	21,090	186.6	0.9
OTAL CARS	98,342	471,322	208.6	1.0
OTAL LT. TRUCKS	30,126	143,519	209.9	1.0
OTAL	128,468	614,841	208.9	1.0

Table 2a (1988 NATIONAL DATA)
FATALITIES PER REGISTERED VEHICLE

VEHICLE TYPE	FATALS	REGISTERED VEHICLES X (1000)	FATALS/ MILLION R.V.	FATALITY RATE/ AVERAGE FATALITY RATE
SMALL CAR	15,917	66,264	240.2	1.1
MEDIUM CAR	6,029	25,593	235.6	1.1
LARGE CAR	3,745	29,662	126.3	0.6
SMALL VAN	238	2,480	96.0	0.5
STANDARD VAN	737	5,549	132.8	0.6
SMALL PICKUP	2,471	8,988	274.9	1.3
STANDARD PICKUP	3,706	15,924	232.7	1.1
SPORT UTILITY VEHICLE	1,062	5,147	206.3	1.0
TOTAL CARS	25,691	121,519	211.4	1.0
TOTAL LT TRUCKS	8,214	38,088	215.7	1.0
TOTAL	33,905	159,267	212.4	1.0

Table 2b (1987 NATIONAL DATA)
FATALITIES PER REGISTERED VEHICLE

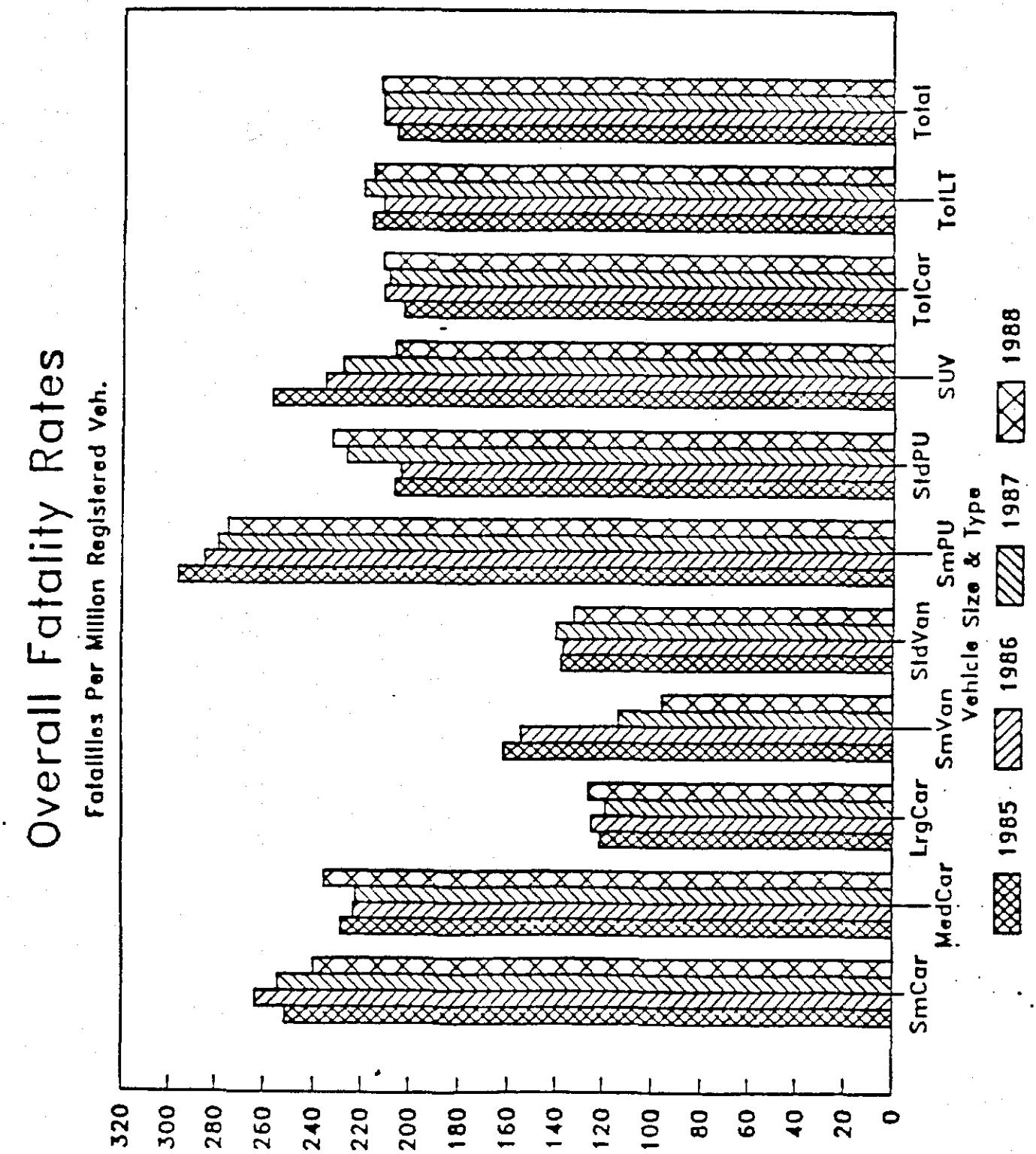
VEHICLE TYPE	FATALS	REGISTERED VEHICLES X (1000)	FATALS/ MILLION R.V.	FATALITY RATE/ AVERAGE FATALITY RATE
SMALL CAR	15,239	59,856	254.6	1.2
MEDIUM CAR	5,639	25,349	222.5	1.1
LARGE CAR	4,098	34,364	119.3	0.6
SMALL VAN	195	1,713	113.8	0.5
STANDARD VAN	765	5,451	140.3	0.7
SMALL PICKUP	2,191	7,844	279.3	1.3
STANDARD PICKUP	3,698	16,327	226.5	1.1
SPORT UTILITY VEHICLE	1,026	4,491	228.5	1.1
TOTAL CARS	24,976	119,569	208.9	1.0
TOTAL LT TRUCKS	7,875	35,826	219.8	1.0
TOTAL	32,851	155,395	211.4	1.0

able 2c (1986 NATIONAL DATA)
ATALITIES PER REGISTERED VEHICLE

EHICLE TYPE	FATALS	REGISTERED VEHICLES X (1000)	FATALS/ MILLION R.V.	FATALITY RATE/ AVERAGE FATALITY RATE
MALL CAR	14,514	54,988	263.9	1.2
EDIUM CAR	5,528	24,738	223.5	1.1
ARGE CAR	4,670	37,284	125.3	0.6
MALL VAN	188	1,213	154.9	0.7
TANDARD VAN	741	5,404	137.1	0.6
MALL PICKUP	1,954	6,861	284.8	1.3
TANDARD PICKUP	3,442	16,870	204.0	1.0
PORT UTILITY VEHICLE	949	4,027	235.7	1.1
OTAL CARS	24,712	117,010	211.2	1.0
OTAL LT TRUCKS	7,274	34,376	211.6	1.0
OTAL	31,986	151,385	211.3	1.0

Table 2d (1985 NATIONAL DATA)
FATALITIES PER REGISTERED VEHICLE

VEHICLE TYPE	FATALS	REGISTERED VEHICLES X (1000)	FATALS/ MILLION R.V.	FATALITY RATE/ AVERAGE FATALITY RATE
SMALL CAR	13,201	52,423	251.8	1.2
MEDIUM CAR	5,077	22,192	228.8	1.1
LARGE CAR	4,685	38,609	121.3	0.6
SMALL VAN	115	710	162.2	0.8
STANDARD VAN	722	5,223	138.2	0.7
SMALL PICKUP	1,686	5,693	296.1	1.4
STANDARD PICKUP	3,342	16,179	206.6	1.0
SPORT UTILITY VEHICLE	898	3,490	257.3	1.3
TOTAL CARS	22,963	113,224	202.8	1.0
TOTAL LT TRUCKS	6,763	31,295	216.1	1.1
TOTAL	29,726	144,519	205.7	1.0


Overall Fatality Rates
Fatalities Per Million Registered Veh.
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
SmCar
MedCar
LrgCar
SmVan
StdVan
SmPU
StdPU
SUV
TolCar
TolLT
Total
Vehicle Size & Type
1985
1986
1987
1988

Tables 3a through 3d distribute the proportions of fatalities in each vehicle type by crash mode. A comparison of the 1985 through 1988 tables illustrates that the relative proportion of fatalities among crash modes has not changed significantly. However, the crash mode involvement of LTVs relative to passenger cars has been maintained at a notably higher level for rollover crashes and at a lower level for side impact crashes. This perspective is presented in detail in the following tables.

Table 3a (1988 NATIONAL DATA)
DISTRIBUTION OF FATALITIES BY CRASH MODE

VEHICLE TYPE	ALL FATALS	FATALS FRONTAL	FATALS SIDE	FATALS REAR	FATALS ROLLOVER	UNKNOWN	TOTAL
SMALL CAR	15,917	40%	28%	4%	26%	2%	100%
MEDIUM CAR	6,029	43%	29%	3%	22%	3%	100%
LARGE CAR	3,745	45%	28%	3%	20%	4%	100%
SMALL VAN	238	45%	15%	5%	33%	3%	100%
STANDARD VAN	737	40%	14%	2%	39%	5%	100%
SMALL PICKUP	2,471	35%	14%	1%	47%	3%	100%
STANDARD PICKUP	3,706	35%	14%	2%	45%	5%	100%
SPORT UTILITY VEHICLE	1,062	24%	10%	2%	60%	4%	100%
TOTAL CARS	25,691	41%	28%	4%	24%	3%	100%
TOTAL LT TRUCKS	8,214	34%	14%	2%	46%	4%	100%
TOTAL	33,905	40%	25%	3%	30%	3%	100%

Table 3b (1987 NATIONAL DATA)
DISTRIBUTION OF FATALITIES BY CRASH MODE

VEHICLE TYPE	ALL FATALS	FATALS. FRONTAL	FATALS SIDE	FATALS REAR	FATALS ROLLOVER	UNKNOWN	TOTAL
SMALL CAR	15,239	40%	27%	4%	25%	3%	100%
MEDIUM CAR	5,639	43%	28%	3%	23%	4%	100%
LARGE CAR	4,098	44%	26%	3%	21%	5%	100%
SMALL VAN	195	44%	13%	3%	37%	3%	100%
STANDARD VAN	765	43%	11%	4%	38%	5%	100%
SMALL PICKUP	2,191	35%	14%	1%	45%	5%	100%
STANDARD PICKUP	3,698	35%	14%	1%	44%	5%	100%
SPORT UTILITY VEHICLE	1,026	22%	10%	1%	65%	2%	100%
TOTAL CARS	24,976	41%	27%	4%	24%	4%	100%
TOTAL LT TRUCKS	7,875	34%	13%	1%	46%	5%	100%
TOTAL	32,851	40%	24%	3%	29%	4%	100%

Table 3c (1986 NATIONAL DATA)
DISTRIBUTION OF FATALITIES BY CRASH MODE

VEHICLE TYPE	ALL FATALS	FATALS FRONTAL	FATALS SIDE	FATALS REAR	FATALS ROLLOVER	UNKNOWN	TOTAl
SMALL CAR	14,514	39%	28%	3%	26%	4%	100%
MEDIUM CAR	5,528	43%	28%	4%	21%	5%	100%
LARGE CAR	4,670	43%	29%	3%	21%	4%	100%
SMALL VAN	188	46%	16%	3%	31%	4%	100%
STANDARD VAN	741	40%	14%	2%	40%	4%	100%
SMALL PICKUP	1,954	36%	13%	2%	45%	5%	100%
STANDARD PICKUP	3,442	37%	12%	1%	45%	6%	100%
SPORT UTILITY VEHICLE	949	21%	7%	2%	66%	3%	100%
TOTAL CARS	24,712	41%	28%	3%	24%	4%	100%
TOTAL LT TRUCKS	7,274	35%	12%	2%	47%	5%	100%
TOTAL	31,986	39%	24%	3%	29%	4%	100%

Table 3d (1985 NATIONAL DATA)
DISTRIBUTION OF FATALITIES BY CRASH MODE

VEHICLE TYPE	ALL FATALS	FATALS FRONTAL	FATALS SIDE	FATALS REAR	FATALS ROLLOVER	UNKNOWN	TOTAl
SMALL CAR	13,201	41%	28%	4%	25%	2%	100%
MEDIUM CAR	5,077	45%	29%	3%	20%	3%	100%
LARGE CAR	4,635	45%	28%	3%	19%	5%	100%
SMALL VAN	115	45%	15%	3%	37%	0%	100%
STANDARD VAN	772	43%	12%	3%	38%	4%	100%
SMALL PICKUP	1,686	40%	14%	1%	42%	3%	100%
STANDARD PICKUP	3,342	38%	14%	1%	41%	6%	100%
SPORT UTILITY VEHICLE	898	21%	10%	1%	65%	3%	100%
TOTAL CARS	22,963	43%	28%	3%	23%	3%	100%
TOTAL LT TRUCKS	6,763	37%	13%	1%	44%	5%	100%
TOTAL	29,726	42%	25%	3%	28%	2%	100%

Tables 4a through 4d, and the bar chart on this page, address rollover accidents. They show that for passenger cars, the fatality rate for small and medium size cars is much higher than the fatality rate for large cars. Among light trucks the fatality rate for rollover accidents is highest for sport utility vehicles and small pickup trucks, and lowest for small vans. A comparison between the rollover rates for LTVs and the average rollover rate for passenger cars indicates that throughout the 1985 - 1988 period the rates for all LTV classes except small vans have remained higher than the passenger car average. The rate for sport utility vehicles is the highest in the range of 2.4 to 3.7 times the rate for passenger cars. However this difference has been dropping throughout the period. In the 1987 to 1988 time period, the rollover rates for the standard pickup was increasing, while the rates in the remaining LTV categories was declining relative to passenger cars. The reason for these changes is not understood, but the agency will continue to monitor these trends.

ROLLOVER FATALITY RATES FOR LTVs AS COMPARED TO THE AVERAGE PASSENGER CAR ROLLOVER RATE:

YEAR	SPORT UTILITY	STD. PICKUP	SM. PICKUP	STD. VAN	SMALL VAN
1985	3.74	1.90	2.76	1.18	1.35
1986	3.06	1.79	2.51	1.07	.94
1987	2.95	2.02	2.52	1.07	.84
1988	2.43	2.03	2.51	1.03	.61

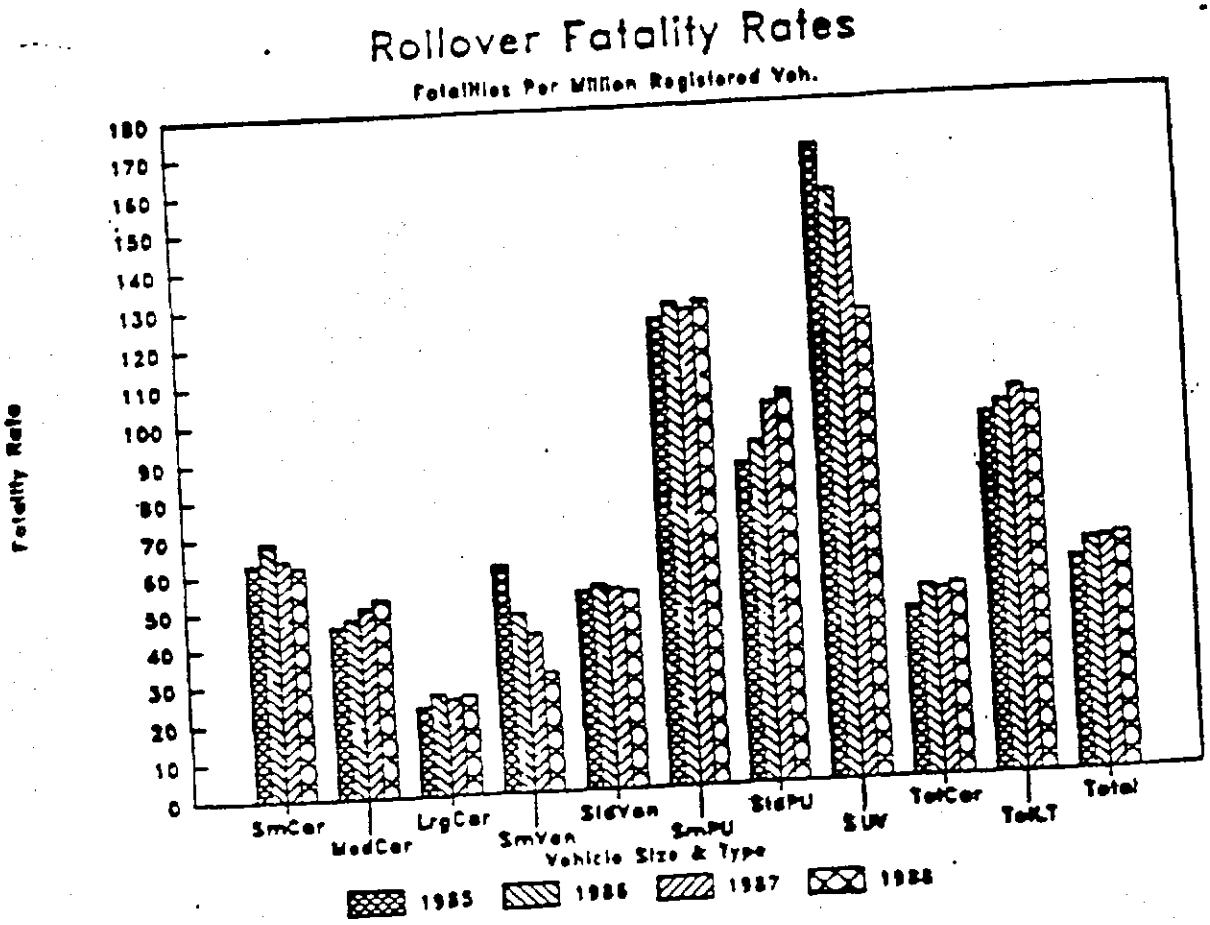


Table 4a (1988 NATIONAL DATA)
FATALITIES IN ROLLOVERS PER REGISTERED VEHICLE

VEHICLE TYPE	FATALS	REGISTERED VEHICLES X (1000)	FATALS/ MILLION R.V.	FATALITY RATE/ AVERAGE FATALITY RATE
SMALL CAR	4,102	66,264	61.9	1.0
MEDIUM CAR	1,345	25,593	52.6	0.8
LARGE CAR	767	29,662	25.9	0.4
SMALL VAN	78	2,480	31.4	0.5
STANDARD VAN	291	5,549	52.4	0.8
SMALL PICKUP	1,152	8,988	128.2	2.1
STANDARD PICKUP	1,654	15,924	103.9	1.7
SPORT UTILITY VEHICLE	640	5,147	124.3	2.0
TOTAL CARS	6,214	121,519	51.1	0.8
TOTAL LT TRUCKS	3,815	38,088	100.2	1.6
TOTAL	10,029	159,607	62.8	1.0

Table 4b (1987 NATIONAL DATA)
FATALITIES IN ROLLOVERS PER REGISTERED VEHICLE

VEHICLE TYPE	FATALS	REGISTERED VEHICLES X (1000)	FATALS/ MILLION R.V.	FATALITY RATE/ AVERAGE FATALITY RATE
SMALL CAR	3,832	59,856	64.0	1.0
MEDIUM CAR	1,278	25,349	50.0	0.8
LARGE CAR	866	34,364	25.4	0.4
SMALL VAN	72	1,713	42.0	0.7
STANDARD VAN	291	5,452	53.4	0.9
SMALL PICKUP	988	7,844	126.0	2.0
STANDARD PICKUP	1,645	16,327	100.8	1.6
SPORT UTILITY VEHICLE	662	4,491	147.4	2.4
TOTAL CARS	5,976	119,569	50.0	0.8
TOTAL LT TRUCKS	3,658	35,826	102.1	1.6
TOTAL	9,634	155,395	62.1	1.0

Table 4c (1986 NATIONAL DATA)
FATALITIES IN ROLLOVERS PER REGISTERED VEHICLE

VEHICLE TYPE	FATALS	REGISTERED VEHICLES X (1000)	FATALS/ MILLION R.V.	FATALITY RATE/ AVERAGE FATALITY RATE
SMALL CAR	3,779	54,988	68.7	1.1
MEDIUM CAR	1,173	24,738	47.7	0.8
LARGE CAR	993	37,284	26.6	0.4
SMALL VAN	58	1,214	47.8	0.8
STANDARD VAN	294	5,404	54.4	0.9
SMALL PICKUP	876	6,861	127.7	2.1
STANDARD PICKUP	1,532	16,870	90.8	1.5
SPORT UTILITY VEHICLE	627	4,027	155.7	2.5
TOTAL CARS	5,945	117,010	50.8	0.8
TOTAL LT TRUCKS	3,387	34,376	98.5	1.6
TOTAL	9,332	151,386	61.6	1.0

Table 4d (1985 NATIONAL DATA)
FATALITIES IN ROLLOVERS PER REGISTERED VEHICLE

VEHICLE TYPE	FATALS	REGISTERED VEHICLES X (1000)	FATALS/ MILLION R.V.	FATALITY RATE/ AVERAGE FATALITY RATE
SMALL CAR	3,290	52,423	62.8	1.1
MEDIUM CAR	1,011	22,192	45.6	0.8
LARGE CAR	899	38,609	23.3	0.4
SMALL VAN	43	710	60.6	1.1
STANDARD VAN	277	5,223	53.0	0.9
SMALL PICKUP	705	5,693	123.8	2.2
STANDARD PICKUP	1,384	16,179	85.5	1.5
SPORT UTILITY VEHICLE	586	3,490	167.9	3.0
TOTAL CARS	5,201	113,224	44.9	0.8
TOTAL LT TRUCKS	2,995	31,295	95.7	1.7
TOTAL	8,196	144,519	56.7	1.0

Tables 5a through 5d and the bar chart on this page address frontal impacts. They consistently show that for passenger cars, the fatality rates for small and medium size cars are quite a bit higher than the fatality rate for large cars. Among light trucks, i.e., the categories of van, pickup, and sport utility vehicle, the fatality rates for frontal impact crashes are highest for small and standard size pickup trucks. Vans of both small and standard size, as well as sport utility vehicles, have lower fatality rates. The tables also show that all light truck vehicle types continue to have lower than average fatality rates except for the small pickup which has the highest normalized fatality rate of all vehicle types for 1985. There has been a decrease in the small pickup fatality rate for 1986, 1987, and 1988. One possible source of this decrease may be a shift in miles driven from a rural to an urban context. The agency will continue to monitor this trend.

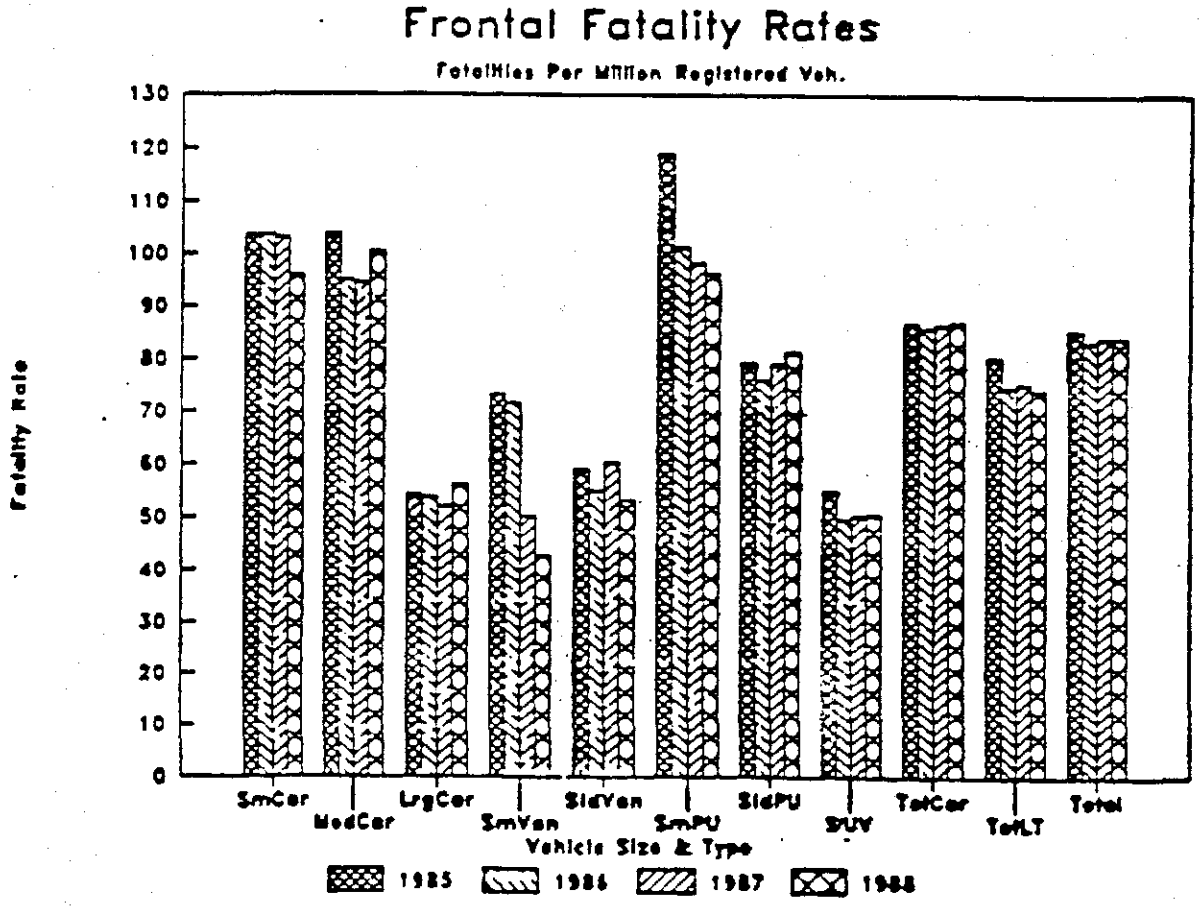


Table 5a (1988 NATIONAL DATA)
FATALITIES IN FRONTAL IMPACTS PER REGISTERED VEHICLE

VEHICLE TYPE	FATALS	REGISTERED VEHICLES X (1000)	FATALS/ MILLION R.V.	FATALITY RATE/ AVERAGE FATALITY RATE
SMALL CAR	6,369	66,264	96.1	1.1
MEDIUM CAR	2,574	25,593	100.6	1.2
LARGE CAR	1,667	29,662	56.2	0.7
SMALL VAN	106	2,480	42.7	0.5
STANDARD VAN	295	5,549	53.2	0.6
SMALL PICKUP	866	8,988	96.4	1.1
STANDARD PICKUP	1,296	15,924	81.4	1.0
SPORT UTILITY VEHICLE	260	5,147	50.5	0.6
TOTAL CARS	10,610	121,519	87.3	1.0
TOTAL LT TRUCKS	2,823	38,088	74.1	0.9
TOTAL	13,433	159,607	84.2	1.0

Table 5b (1987 NATIONAL DATA)
FATALITIES IN FRONTAL IMPACTS PER REGISTERED VEHICLE

VEHICLE TYPE	FATALS	REGISTERED VEHICLES X (1000)	FATALS/ MILLION R.V.	FATALITY RATE/ AVERAGE FATALITY RATE
SMALL CAR	6,169	59,856	103.1	1.2
MEDIUM CAR	2,397	25,349	94.6	1.1
LARGE CAR	1,795	34,363	52.2	0.6
SMALL VAN	86	1,713	50.2	0.6
STANDARD VAN	328	5,452	60.2	0.7
SMALL PICKUP	771	7,844	98.3	1.2
STANDARD PICKUP	1,291	16,327	79.1	0.9
SPORT UTILITY VEHICLE	226	4,491	50.3	0.6
TOTAL CARS	10,361	119,569	86.7	1.0
TOTAL LT TRUCKS	2,702	35,826	75.4	0.9
TOTAL	13,063	155,395	84.1	1.0

Table 5c (1986 NATIONAL DATA)
FATALITIES IN FRONTAL IMPACTS PER REGISTERED VEHICLE

VEHICLE TYPE	FATALS	REGISTERED VEHICLES X (1000)	FATALS/ MILLION R.V.	FATALITY RATE/ AVERAGE FATALITY RATE
SMALL CAR	5,708	54,988	103.8	1.2
MEDIUM CAR	2,352	24,738	95.1	1.1
LARGE CAR	2,008	37,284	53.9	0.6
SMALL VAN	87	1,214	71.7	0.9
STANDARD VAN	297	5,404	55.0	0.7
SMALL PICKUP	695	6,861	101.3	1.2
STANDARD PICKUP	1,284	16,870	76.1	0.9
SPORT UTILITY VEHICLE	200	4,027	49.7	0.6
TOTAL CARS	10,068	117,010	86.0	1.0
TOTAL LT TRUCKS	2,563	34,376	74.6	0.9
TOTAL	12,631	151,386	83.4	1.0

Table 5d (1985 NATIONAL DATA)
FATALITIES IN FRONTAL IMPACTS PER REGISTERED VEHICLE

VEHICLE TYPE	FATALS	REGISTERED VEHICLES X (1000)	FATALS/ MILLION R.V.	FATALITY RATE/ AVERAGE FATALITY RATE
SMALL CAR	5,437	52,423	103.7	1.2
MEDIUM CAR	2,303	22,192	103.8	1.2
LARGE CAR	2,095	38,609	54.3	0.6
SMALL VAN	52	710	73.2	0.9
STANDARD VAN	308	5,223	59.0	0.7
SMALL PICKUP	677	5,693	118.9	1.4
STANDARD PICKUP	1,286	16,179	79.5	0.9
SPORT UTILITY VEHICLE	192	3,490	55.0	0.6
TOTAL CARS	9,835	113,224	86.9	1.0
TOTAL LT TRUCKS	2,515	31,295	80.4	0.9
TOTAL	12,350	144,519	85.5	1.0

Tables 6a through 6d and the bar chart on this page address side impacts. They show that for passenger cars, the fatality rates for small and medium size cars are much higher than the fatality rates for large cars. Among light trucks the fatality rates for side impact are highest for small and standard size pickup trucks. Vans of both small and standard size, as well as sport utility vehicles, have lower fatality rates. The tables also show that all light truck types continue to have a significantly lower fatality rate than do passenger cars. On average, light trucks have less than half the side impact fatality rate of passenger cars.

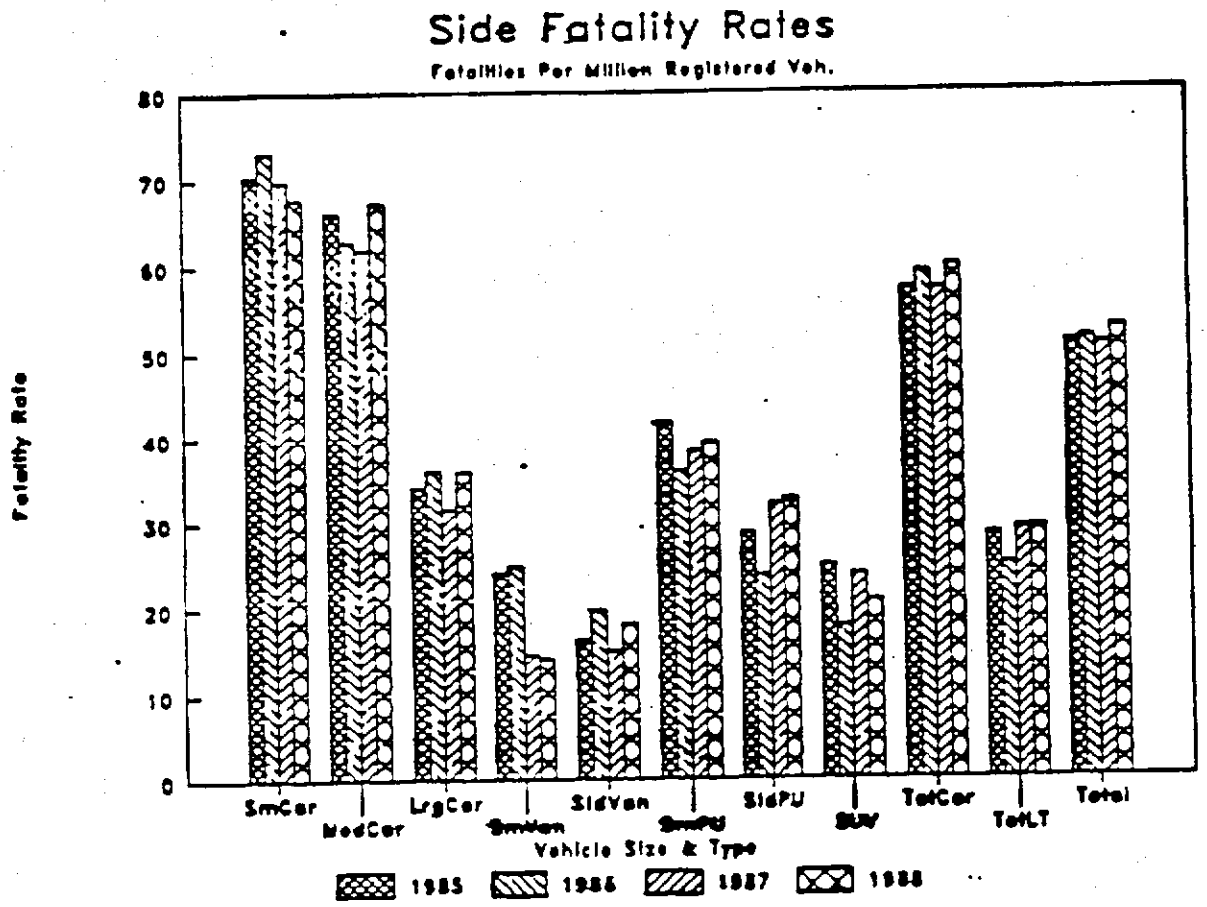


Table 6a (1988 NATIONAL DATA)
FATALITIES IN SIDE IMPACTS PER REGISTERED VEHICLE

VEHICLE TYPE	FATALS	REGISTERED VEHICLES X (1000)	FATALS/ MILLION R.V.	FATALITY RATE/ AVERAGE FATALITY RATE
SMALL CAR	4,483	66,264	67.7	1.3
MEDIUM CAR	1,722	25,593	67.3	1.3
LARGE CAR	1,066	29,662	35.9	0.7
SMALL VAN	35	2,480	14.1	0.3
STANDARD VAN	100	5,549	18.0	0.4
SMALL PICKUP	352	8,988	39.2	0.8
STANDARD PICKUP	517	15,924	32.5	0.6
SPORT UTILITY VEHICLE	106	5,147	20.6	0.4
TOTAL CARS	7,271	121,519	59.8	1.2
TOTAL LT TRUCKS	1,110	38,088	29.1	0.6
TOTAL	8,381	159,607	52.5	1.0

Table 6b (1987 NATIONAL DATA)
FATALITIES IN SIDE IMPACTS PER REGISTERED VEHICLE

VEHICLE TYPE	FATALS	REGISTERED VEHICLES X (1000)	FATALS/ MILLION R.V.	FATALITY RATE/ AVERAGE FATALITY RATE
SMALL CAR	4,175	59,856	69.8	1.4
MEDIUM CAR	1,567	25,349	61.8	1.2
LARGE CAR	1,084	34,364	31.5	0.6
SMALL VAN	25	1,713	14.6	0.3
STANDARD VAN	82	5,452	15.0	0.3
SMALL PICKUP	300	7,844	38.2	0.8
STANDARD PICKUP	523	16,327	32.0	0.6
SPORT UTILITY VEHICLE	106	4,491	23.6	0.5
TOTAL CARS	6,826	119,569	57.1	1.1
TOTAL LT TRUCKS	1,036	35,826	28.9	0.6
TOTAL	7,862	155,395	50.6	1.0

Table 6c (1986 NATIONAL DATA)
FATALITIES IN SIDE IMPACTS PER REGISTERED VEHICLE

VEHICLE TYPE	FATALS	REGISTERED VEHICLES X (1000)	FATALS/ MILLION R.V.	FATALITY RATE/ AVERAGE FATALITY RATE
SMALL CAR	4,021	54,988	73.1	1.4
MEDIUM CAR	1,553	24,738	62.8	1.2
LARGE CAR	1,344	37,284	36.0	0.7
SMALL VAN	30	1,214	24.7	0.5
STANDARD VAN	106	5,404	19.6	0.4
SMALL PICKUP	246	6,861	35.9	0.7
STANDARD PICKUP	396	16,870	23.5	0.5
SPORT UTILITY VEHICLE	71	4,027	17.6	0.3
TOTAL CARS	6,918	117,010	59.1	1.2
TOTAL LT TRUCKS	849	34,376	24.7	0.5
TOTAL	7,767	151,386	51.3	1.0

Table 6d (1985 NATIONAL DATA)
FATALITIES IN SIDE IMPACTS PER REGISTERED VEHICLE

VEHICLE TYPE	FATALS	REGISTERED VEHICLES X (1000)	FATALS/ MILLION R.V.	FATALITY RATE/ AVERAGE FATALITY RATE
SMALL CAR	3,691	52,423	70.4	1.4
MEDIUM CAR	1,466	22,192	66.1	1.3
LARGE CAR	1,318	38,609	34.1	0.7
SMALL VAN	17	710	23.9	0.5
STANDARD VAN	85	5,223	16.3	0.3
SMALL PICKUP	237	5,693	41.6	0.8
STANDARD PICKUP	461	16,179	28.5	0.6
SPORT UTILITY VEHICLE	86	3,490	24.6	0.5
TOTAL CARS	6,475	113,224	57.2	1.1
TOTAL LT TRUCKS	886	31,295	28.3	0.6
TOTAL	7,361	144,519	50.9	1.0

Tables 7a through 7d and the bar chart on this page address rear impacts. They show that for passenger cars, the fatality rates for small and medium size cars are much higher than the fatality rates for large cars. Among light trucks the fatality rate for rear impact is highest for small vans and lowest for standard pickup trucks. The tables also show that all light trucks have lower than average fatality rates in rear impact crashes. In fact, for this type of crash, overall, light trucks have less than half the fatality rates of cars. With fewer than 120 fatalities per year spread among five vehicle types, rear impact LTV fatalities represent a relatively small portion of the overall highway fatality picture, and the wide variation in yearly fatality rates reflects this.

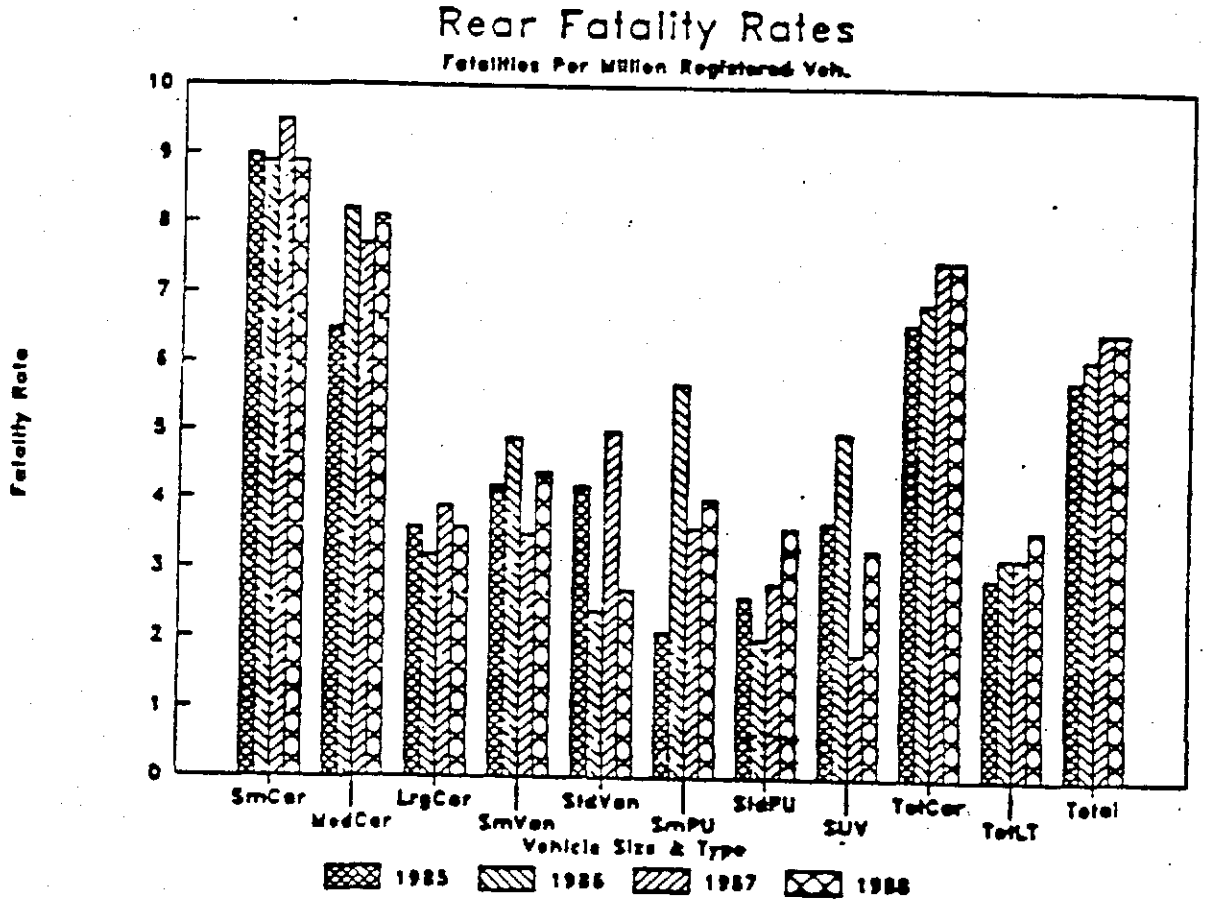


Table 7a (1988 NATIONAL DATA)
FATALITIES IN REAR IMPACTS PER REGISTERED VEHICLE

VEHICLE TYPE	FATALS	REGISTERED VEHICLES X (1000)	FATALS/ MILLION R.V.	FATALITY RATE/ AVERAGE FATALITY RATE
SMALL CAR	593	66,264	8.9	1.4
MEDIUM CAR	208	25,593	8.1	1.2
LARGE CAR	107	29,662	3.6	0.6
SMALL VAN	11	2,480	4.4	0.7
STANDARD VAN	15	5,549	2.7	0.4
SMALL PICKUP	36	8,988	4.0	0.6
STANDARD PICKUP	58	15,924	3.6	0.6
SPORT UTILITY VEHICLE	17	5,147	3.3	0.5
TOTAL CARS	908	121,519	7.5	1.1
TOTAL LT TRUCKS	137	38,088	3.6	0.6
TOTAL	1,045	159,607	6.5	1.0

Table 7b (1987 NATIONAL DATA)
FATALITIES IN REAR IMPACTS PER REGISTERED VEHICLE

VEHICLE TYPE	FATALS	REGISTERED VEHICLES X (1000)	FATALS/ MILLION R.V.	FATALITY RATE/ AVERAGE FATALITY RATE
SMALL CAR	571	59,856	9.5	1.5
MEDIUM CAR	195	25,349	7.7	1.2
LARGE CAR	134	34,364	3.9	0.6
SMALL VAN	6	1,713	3.5	0.5
STANDARD VAN	27	5,452	5.0	0.8
SMALL PICKUP	28	7,844	3.6	0.5
STANDARD PICKUP	46	16,327	2.8	0.4
SPORT UTILITY VEHICLE	8	4,491	1.8	0.3
TOTAL CARS	900	119,569	7.5	1.2
TOTAL LT TRUCKS	115	35,826	3.2	0.5
TOTAL	1,015	155,395	6.5	1.0

Table 7c (1986 NATIONAL DATA)
FATALITIES IN REAR IMPACTS PER REGISTERED VEHICLE

VEHICLE TYPE	FATALS	REGISTERED VEHICLES X (1000)	FATALS/ MILLION R.V.	FATALITY RATE/ AVERAGE FATALITY RATE
SMALL CAR	487	54,988	8.9	1.5
MEDIUM CAR	203	24,738	8.2	1.4
LARGE CAR	118	37,284	3.2	0.5
SMALL VAN	6	1,214	4.9	0.8
STANDARD VAN	13	5,404	2.4	0.4
SMALL PICKUP	39	6,861	5.7	0.9
STANDARD PICKUP	33	16,870	2.0	0.3
SPORT UTILITY VEHICLE	20	4,027	5.0	0.8
TOTAL CARS	808	117,010	6.9	1.1
TOTAL LT TRUCKS	111	34,376	3.2	0.5
TOTAL	919	151,356	6.1	1.0

Table 7d (1985 NATIONAL DATA)
FATALITIES IN REAR IMPACTS PER REGISTERED VEHICLE

VEHICLE TYPE	FATALS	REGISTERED VEHICLES X (1000)	FATALS/ MILLION R.V.	FATALITY RATE/ AVERAGE FATALITY RATE
SMALL CAR	469	52,423	9.0	1.6
MEDIUM CAR	144	22,192	6.5	1.1
LARGE CAR	138	38,609	3.6	0.6
SMALL VAN	3	710	4.2	0.7
STANDARD VAN	22	5,223	4.2	0.7
SMALL PICKUP	12	5,693	2.1	0.4
STANDARD PICKUP	42	16,179	2.6	0.4
SPORT UTILITY VEHICLE	13	3,490	3.7	0.6
TOTAL CARS	752	113,224	6.6	1.1
TOTAL LT TRUCKS	92	31,295	2.9	0.5
TOTAL	844	144,519	5.8	1.0

In summary, the fatality rate for LTVs continues to be lower than for total car categories in side and rear crashes. Fatalities as a consequence of side impact crashes are a much smaller proportion of fatalities for light truck occupants than for passenger car occupants. The same can be said for rear crashes. In frontal crashes of the light truck categories, only small pickups continue to stand out as having a disproportionately high fatality rate compared to the other vehicle types.

In rollover crashes, the sport utility vehicle fatality rates exceeded those of the average for passenger cars by 274 percent (1985), 206 percent (1986), 195 percent (1987), and 143 percent (1988). Since 1985, these fatality rates have consistently dropped. During the same period, the normalized fatality rate for sport utility vehicles dropped from 3.0 to 2.0. However, the rates for this class of vehicle remain significantly higher than those for other classes of vehicles. The fatality rates for small pickups were 176 percent (1985), 155 percent (1986), 152 percent (1987), and 151 percent (1988) above those of the passenger car average. The standard pickup fatality rates exceeded the overall rates for passenger cars by 90 percent (1985), 82 percent (1986), 102 percent (1987), and 103 percent (1988).

IV: SUMMARY OF ACTIVITIES FOR LIGHT TRUCKS AND SPORT UTILITY VEHICLES

IV: SUMMARY OF ACTIVITIES FOR LIGHT TRUCKS AND SPORT UTILITY VEHICLES

In light of the substantial growth in LTV sales in recent years, and an increase in motorists using LTVs as substitutes for passenger cars, NHTSA has been upgrading the safety standards for those vehicles.

While LTVs have an overall safety record comparable to cars, the agency believes there are some opportunities to improve performance by upgrading vehicle safety. Most of the agency's passenger car safety standards apply to LTVs but there are a few which do not. The agency is committed to broaden those regulations where appropriate. Assuming that the recently accomplished and pending rulemakings described below are fully implemented throughout the fleet of LTVs, NHTSA estimates that approximately 2,200 lives will be saved and approximately 101,400 injuries will be prevented or reduced in severity annually.

Section V reports on recent light truck regulatory activities consistent with this goal. Since the April 1988 report, the status of several LTV rulemaking activities has progressed as indicated below:

Part 571.3, **Vehicle Classification:** A Notice of Proposed Rulemaking (NPRM) was issued on October 17, 1988. A decision on the next action for this rulemaking is expected in the summer of 1990.

FMVSS No. 208, Occupant Crash Protection: Regarding automatic occupant protection, an NPRM was published January 9, 1990.

FMVSS 214, Side Impact Protection: An NPRM was issued December 22, 1989.

FMVSS No. 216, Roof Crush Resistance: An NPRM was issued October 26, 1989.

FMVSS No. 108, Lamps, Reflective Devices, and Associated Hardware: Regarding center high mounted stop lamps, an NPRM is expected in the spring of 1990.

FMVSS No. 118, Power Windows: A final rule was published June 24, 1988; effective September 1, 1991.

FMVSS No. 202, Head Restraints: A final rule was published September 25, 1989; effective September 1, 1991.

FMVSS No. 204, Steering Control Rearward Displacement: A final rule was published November 23, 1987; effective September 1, 1991[4].

FMVSS No. 208, Occupant Crash Protection, Dynamic Testing of Safety Belts: A final rule was published November 23,1987; effective September 1, 1991.

FMVSS No. 208, Occupant Crash Protection, Rear-Seat Lap/Shoulder Safety Belts: A final rule was published November 2, 1989; effective September 1, 1991.

Section VII of this report discusses the agency's research plans for light truck safety. Areas of research include braking and handling, frontal crash protection, side impact protection, and rollover research.

The success to date in carrying out the light truck safety agenda reflects the agency's dedication to the goal of safe travel in these vehicles. The following sections of this report describe further the agency's major actions relating to light truck and sport utility vehicle safety.

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[4]It should be mentioned that NHTSA is involved in litigation over the issuance of the final rule for FMVSS No. 204. The National Truck Equipment Association, representing small businesses that manufacture or distribute truck bodies and related equipment, has filed suit claiming the standard is not reasonable, practicable, or appropriate for the type of motor vehicle which its members produce.

V. MAJOR RULEMAKING ACTIONS

FMVSS 108: LIGHTING

CENTER HIGH MOUNTED STOP LAMPS

APRIL 1988 REPORT:

The report indicated that the agency is considering whether to extend to some or all light truck categories the passenger car requirement for a center high mounted stop lamp (CHMSL).

DISCUSSION:

Research was conducted to help determine whether the benefits of a CHMSL in preventing rear-end passenger car crashes would be applicable to light trucks with their different rear-end configurations. CHMSLs have been standard equipment on passenger cars since September 1, 1985, as required by FMVSS No. 108. The purpose of the CHMSL is to safeguard a car from being struck in the rear by another vehicle. When brakes are applied, the CHMSL more effectively alerts drivers of following vehicles than only lower mounted stop lamps. In July 1989, NHTSA issued a report which evaluated the effectiveness, benefits and costs of CHMSLs based on the on-the-road experience during 1987, when approximately one-fourth of the passenger car fleet in the United States was CHMSL-equipped. This effectiveness analysis was based on police reported accident files from eleven States. The evaluation found that:

- O CHMSL-equipped cars were 17 percent less likely to be struck in the rear while braking than cars without CHMSLs (confidence bounds: 13 to 21 percent).
- O When all cars on the road have CHMSLs, the devices will prevent 126,000 police reported accidents, 80,000 nonfatal injuries, and $910 million in property damage per year.
- O CHMSLs add $10.48 (in 1987 dollars) to the lifetime costs of owning and operating a car.
- O At the effectiveness levels observed in the 1987 data, the CHMSL is a very cost effective safety device.

As a result of this report and agency research regarding CHMSL for LTVs, a decision was made in August 1989 to initiate rulemaking.

In September, 1989, NHTSA sent letters to nine manufacturers enclosing this evaluation and asking the manufacturers for their views and recommendations as to the potential for, and locations of, CHMSLs for the various LTVs presently manufactured. This information will be used in the subject rulemaking.

CURRENT STATUS:

ACTION TAKEN: NPRM EXPECTED IN SPRING OF 1990.

FMVSS NO. 118: POWER WINDOWS

APRIL 1988 REPORT:

The agency issued an NPRM in October 1987 that considered a number of proposals regarding power windows.

DISCUSSION:

On June 24, 1988 NHTSA published a final rule in the Federal Register (53 FR 23766) which amended this standard to extend its applicability to light trucks. The agency concluded that power windows in light trucks present the same risk of injury to vehicle occupants as power windows in vehicle types already subject to the standard. This rule also narrowed the restrictions on the opening of power windows. The agency made this change because the only significant risk of injury by a moving power window occurs during the closing. In the NPRM of October 1987, the agency also considered other proposals: extending the standard's requirements to power-operated sunroofs; and either permitting external non-key locking systems to operate power windows and sunroofs, or prohibiting all external operating systems. The agency is reserving judgment on these issues, and will address them further in a subsequent NPRM, which is expected to be published by the summer of 1990.

CURRENT STATUS:

ACTION TAKEN: NPRM ISSUED OCTOBER 1987
FINAL RULE PUBLISHED JUNE 24, 1988
EFFECTIVE DECEMBER 21, 1988.

FMVSS NO. 202: HEAD RESTRAINTS

APRIL 1988 REPORT:

Information presented in the report showed that, in many cases where head restraints are optional, few vehicles were actually equipped with them and manufacturers generally had no future plans to make this equipment standard.

DISCUSSION:

On December 13, 1988, the agency proposed extending the applicability of this standard to trucks, buses, and sport utility vehicles with a gross vehicle weight rating of 10,000 pounds or less. On September 25, 1989 (54 FR 39183), the agency published a final rule extending this standard.

The agency proposed extending this standard to LTVs because national estimates of accident data indicated that approximately 17,800 whiplash injuries occurred annually to front seat occupants 15 years and older in light trucks and vans involved in rear impacts. About 4.6 percent of all occupants in light trucks in reported rear impact accidents suffered whiplash injuries, and 34 percent of those injured in rear impacts suffered whiplash injuries. The agency concluded that these injury rates could be significantly reduced by applying this standard to LTVs. LTV benefits if the entire fleet were equipped with head restraints are estimated to be between 3,690 and 6,273 injuries reduced annually.

The agency also proposed extending the standard because increasing numbers of light trucks and vans are being used to transport passengers instead of or in addition to property. The Census Bureau's "Truck Inventory and Use Survey" shows that pickup truck use has changed between 1967 to 1982 from being 51 percent personal transportation to 66 percent personal transportation, and from 26 percent agricultural use to 12 percent agricultural use. The greater use of light trucks as passenger carrying vehicles is leading to increases in the number of light trucks and vans on the road, and increases in the number of persons exposed to accident situations where whiplash and other injuries are likely to occur. Therefore, it is likely that the overall number of rear impact collisions involving these vehicles and injuries will increase.

CURRENT STATUS:

ACTION TAKEN: NPRM ISSUED DECEMBER 12, 1988
FINAL RULE PUBLISHED SEPTEMBER 25, 1989
EFFECTIVE SEPTEMBER 1, 1991

FMVSS NO. 208: OCCUPANT CRASH PROTECTION

REAR SEAT LAP/SHOULDER SAFETY BELTS

APRIL 1988 REPORT:

An Advance Notice of Proposed Rulemaking (ANPRM) was issued on June 16, 1987. This rulemaking action was taken because analysis of crash data (actual data on vehicle collisions) shows that rear seat lap/shoulder safety belts are more effective in preventing death and reducing injuries than are lap belts alone and that safety belt usage rates have been increasing in LTVs.

DISCUSSION:

An NPRM was issued on November 29, 1988 proposing to establish a new requirement for manufacturers to install lap/shoulder safety belts in all forward-facing rear outboard seating positions in passenger cars, light trucks, sport utility vehicles, and small buses. This rulemaking action was taken because analysis of crash data (actual data on vehicle collisions and safety belt usage rates) showed that rear seat lap/shoulder safety belts are more effective in preventing deaths and reducing injuries than rear seat lap safety belts. The benefit of this rulemaking is augmented by the the adoption of safety belt use laws in 33 States and the District of Columbia and the growing public awareness of the benefits of safety belts, both of which have brought a general nationwide increase in safety belt usage. Further, six of the States require safety belt use in the rear seats, as well as in the front seats. In November, 1989, the agency issued a final rule applicable to LTVs that requires rear seat lap/shoulder safety belts effective September 1, 1991.

The agency also issued consumer information to let the public know which light trucks and passenger cars are equipped with rear seat lap/shoulder safety belts. This information reminds consumers that buckling up is for everybody and wearing safety belts is the best way to protect themselves.

In June, 1989, the agency sent a report to the Committees on Appropriations, U.S. House of Representatives, and U.S. Senate entitled "Rear Seat Lap/Shoulder Belt Retrofit Kit Report". This report addressed those actions by the manufacturers and by NHTSA related to retrofitting rear seat lap/shoulder safety belts. A subsequent report including a "statistically valid random survey" will address those actions related to dealer activities in retrofitting rear seat lap/shoulder safety belts.

Current Status:

ACTION TAKEN: ANPRM ISSUED JUNE 1987
NPRM ISSUED NOVEMBER 23, 1988
CONSUMER INFORMATION ISSUED FEBRUARY 1988
CONSUMER INFORMATION UPDATED JANUARY 1989
FINAL RULE PUBLISHED NOVEMBER 2, 1989.
EFFECTIVE SEPTEMBER 1, 1991

FMVSS NO. 208: OCCUPANT CRASH PROTECTION

AUTOMATIC OCCUPANT CRASH PROTECTION

APRIL 1988 REPORT: NOT ADDRESSED

DISCUSSION:

Another agency priority is the extension of automatic occupant crash protection, currently applicable to front outboard seats in passenger cars, to LTVs. Automatic crash protection means that a vehicle is equipped with occupant restraints that require no action by vehicle occupants. Data from the Fatal Accident Reporting System (FARS) for 1984 through 1988 show fatalities per registered LTV to be increasing. As mentioned previously, this is believed to be due to the increase in sales and use of these vehicles. These same data present occupant fatalities by seating position. Front seat LTV fatalities account for 92 percent of all LTV fatalities. Injures have roughly the same distribution by seating position as fatalities -- with 92 percent in the front seat, based on data from the National Accident Sampling System (NASS). The effectiveness of this rule will be projected along similar reasoning as used when this regulation was proposed for passenger cars. There is the added benefit of being even more effective because of the high involvement of pickup trucks in rollover accidents and the increased effectiveness of safety belts in these accidents. Also, increased use of safety belts should add to the effectiveness of this regulatory action. NHTSA believes that extending the requirement to light trucks could save as many as 2,000 lives each year.

The proposal for LTVs is patterned after the passenger car rulemaking. It included a phase-in of the effective date and an incentive to utilize air bags in the vehicle.

CURRENT STATUS:

ACTION TAKEN: NPRM PUBLISHED JANUARY 9, 1990.
PUBLIC COMMENTS DUE MARCH 12, 1990.
NEXT RULEMAKING EXPECTED FALL 1990.

FMVSS NO. 214: SIDE DOOR STRENGTH

APRIL 1989 REPORT:

An ANPRM was expected to be issued in 1988 which would solicit comments on options to provide protection to light truck and sport utility vehicle occupants in side impact crashes.

DISCUSSION:

NHTSA's efforts to extend side impact requirements to LTVs largely correspond to its efforts for passenger cars. On August 19, 1988, the agency published an ANPRM regarding possible requirements for LTVs in each of the areas where requirements have been established, or are under consideration, for passenger cars. In summary, the ANPRM addressed: (1) extension to LTVs of Standard No. 214's existing requirements, (2) developing dynamic test procedures and performance requirements for LTVs, corresponding to those proposed in the January, 1988 NPRM for passenger cars, and (3) developing requirements for LTVs intended to reduce the risk of head and neck injuries and ejections, corresponding to those addressed in the August, 1988 ANPRM for passenger cars.

Of the various potential side impact requirements for LTVs that were addressed in the ANPRM, NHTSA is the furthest advanced in analyzing the extension of Standard NO. 214's existing requirements to LTVs. The agency has decided to go forward with rulemaking on this issue separately, since addressing all of the potential requirements together could result in unnecessary delays and loss of safety benefits.

As indicated above, FMVSS No. 214 currently applies only to passenger cars. The agency has issued an NPRM to extend the existing requirements of FMVSS No. 214 to LTVs. NHTSA believes that the proposed extension would result in about 110 fewer fatalities and 975 fewer serious-to-critical injuries each year.

CURRENT STATUS:

ACTION TAKEN: ANPRM PUBLISHED AUGUST 19, 1988
NPRM PUBLISHED DECEMBER 22, 1989.
PUBLIC COMMENTS DUE FEBRUARY 20, 1990.
NEXT RULEMAKING EXPECTED SUMMER OF 1990.

FMVSS NO. 216: ROOF CRUSH RESISTANCE

APRIL 1988 REPORT:

NHTSA sought information from LTV manufacturers on the extent to which LTVs met the passenger car requirements for roof crush. The manufacturers' responses are contained in NHTSA Docket 87-11, Notice 1-001. The responses indicated that almost all light trucks meet the passenger car roof crush requirements of the standard.

DISCUSSION:

The agency is proposing to extend the passenger car roof crush standard to light trucks of 10,000 pounds or less gross vehicle weight rating (GVWR). The current compliance of the majority of light truck manufacturers with FMVSS NO. 216 might suggest that an extension is not required. This, however, is assuming that manufacturers will continue to uphold this level of protection. As LTVs continue to grow in popularity and sales, NHTSA believes it is important to ensure that all such vehicles meet at least the minimum standards specified in FMVSS No. 216. Moreover, the agency believes it is important to ensure that any new entrants to the light truck market will follow the lead of their competitors in meeting the proposed requirements. The agency proposed to require an LTV's forward roof edge to withstand a force one and a half times the vehicle's unloaded weight without a deformation of more than five inches. The requirement for cars puts a 5,000 pound ceiling on the applied load, but the LTV proposal is without the 5,000 pound ceiling. When the passenger car standard was issued, the agency believed that requiring the redesign of some large cars which did not meet the standard would not be productive in view of their lower rollover tendency. NHTSA has tentatively determined that there is no equivalent reason why LTVs should have a 5,000 pound limit on the force their roofs must withstand.

CURRENT STATUS:

ACTION TAKEN: NPRM PUBLISHED NOVEMBER 2, 1989.
COMMENTS DUE JANUARY 2, 1990.
NEXT RULEMAKING EXPECTED SUMMER OF 1990.

49 CFR PART 571.3: DEFINITIONS

APRIL 1988 Report:

The report indicated that NHTSA granted a petition (May 7, 1987) from the Insurance Institute for Highway Safety which requested that the agency consider updating the definitions for vehicle classification (49 CFR 571.3).

DISCUSSION:

Because of the many options under consideration and the desire for a wide range of comments by the public, the agency decided to issue an ANPRM in October, 1987. Subsequently, the agency issued an NPRM on October 17, 1988, in which it proposed two options. Both options would eliminate the sport utility vehicle category. Option A had the categories of passenger car, truck, van, and special purpose vehicle. Option B had the categories of passenger car, truck, and special purpose vehicle. No changes were proposed for the existing definitions of "bus", "motorcycle", and "trailer". Comments are currently being analyzed.

CURRENT STATUS:

ACTION TAKEN: **ANPRM ISSUED OCTOBER 1987**
NPRM PUBLISHED OCTOBER 17, 1988
DECISION ON FURTHER RULEMAKING EXPECTED IN SUMMER 1990.

VI. SUMMARY OF LIGHT TRUCK SAFETY RULEMAKING

Summary of Light Truck Safety Rulemaking

		Action	Date (to be) Published
I.	Center High Mounted Stop Lamps (FMVSS No. 108) Extend requirement to LTVs: expected to be issued	NPRM	Spring 1990
II.	Power Windows (FMVSS No. 118) Extended FMVSS No. 118 to LTVs.	Final Rule	June 1988
III.	Head Restraints (FMVSS No. 202) Extended FMVSS No. 202 to LTVs.	Final Rule	Sept. 1989
IV.	Steering Control Rearward Displacement (FMVSS No. 204) Extended FMVSS No. 204 to most LTVs.	Final Rule	Nov. 1987
V.	Occupant Crash Protection (FMVSS No. 208)		
	a. Required dynamic crash tests of seat belts in LTVs.	Final Rule	Nov. 1987
	b. Required rear-seat lap/shoulder safety belts in LTVs.	Final Rule	Nov. 1989
	c. Require automatic occupant crash protection in LTVs: expected to be issued.	NPRM	Jan. 1990
VI.	Side Door Strength (FMVSS No. 214) Extend passenger car side door requirements to LTVs.	NPRM	Dec. 1989
VII.	Roof Crush Resistance (FMVSS No. 216) Extend passenger car roof crush resistance to LTVs.	NPRM	Nov. 1989
VIII.	Definitions (Part 571.3) Decision on rulemaking expected.	Decision	Summer 1990

VII. RESEARCH

ROLLOVER

April 1988 Report:

The report stated that the agency planned to conduct a series of dynamic rollover tests aimed at evaluating the safety aspects of roof structures and ejection prevention while implementing a computer simulation to examine the dynamic stability and rollover propensity of light trucks.

Discussion:

The agency's research is addressing both the propensity of light trucks to roll over in crashes and also the safety performance of light trucks when a rollover occurs. Thus, it includes both crash avoidance and crashworthiness activities. It is estimated that most of the crash avoidance research will be completed by mid-1990 and that the crashworthiness research will be completed by mid-1992.

Propensity to Roll Over: For NHTSA to evaluate the conditions leading to and the effects from rollover accidents, a new data base has been set up which provides specific information about accidents pertaining to rollover. The Maryland State Police Department of Public Safety and Correctional Services of the State of Maryland has participated in a special study of rollover accidents with emphasis on the pre-rollover phase of the accident. Many variables have been recorded, including driver convictions, road conditions, tripping mechanisms, interviews with the driver if possible, and accident scene data. These data have been sorted into files which relate to passenger, driver, vehicle, accident, and tire characteristics. This database became operational in August, 1989, and analyses of rollover crashes have begun. To complement this activity, pickup truck rollover frequency is being analyzed statistically using the state CARDfile accident database, to search for common factors related to the rollover risk of pickup trucks.

In addition, the agency has been examining the dynamic stability and rollover propensity of light trucks. NHTSA is implementing a computer simulation to address the rollover propensity of light trucks. This sophisticated simulation will account for the vehicles' suspension and dynamic tire-road characteristics. Other results of this analysis will be pre-rollover handling characteristics, paths of vehicle motion, and points of first impact. This research program is near completion.

Another simulation-related activity is an analysis of an existing tripped rollover model. This research centered on which factors, such as vehicle weight, wheel base, and inertias, are more likely

to influence the rollover propensity of ligh' trucks and sport utility vehicles. This project has been completed. The sensitivity results show that a vehicle's geometric and wheel-suspension deformation parameters are by far the most influential characteristics in a tripped rollover situation, followed by the vehicle's mass properties.

Also, research was conducted which attempted to explain why some vehicle characteristics which one would not intuitively connect with rollover do indeed appear to be related to rollover. This analysis began in December, 1987 and was completed in July, 1989. The driver-environmental factors found to be influential were age, alcohol use, land-type (urban or rural), speed limit, on or off the roadway, and roadway alignment. When these factors were controlled for the results, with respect to the size and vehicle type, it was concluded that rollover rates across car classes decreased as the class went from subcompact to large cars and rollover rates increased as body types progressed from cars to heavy commercial vehicles. Among all vehicles, utility vehicles were found to have the highest rates for both fatal and non-fatal rollovers.

The culmination of the research on propensity to roll over, most of which will have results available in 1990, will be a program to integrate this information through full scale tests. The goal is to support recommendations to improve the rollover safety characteristics of light trucks and sport utility vehicles. This research program will analyze the interaction of vehicle characteristics and roadside features. Information gathered from previous projects will be integrated as it becomes available, with full scale tests of these vehicles. An advanced vehicle rollover model will be used to illustrate and predict vehicle characteristics affecting light truck rollovers. The full scale tests will validate the computer solutions, and should produce a qualitative ranking of vehicle-specific rollover risk with respect to road conditions. Results should be available in mid-1991.

Recently, the agency's existing stability and control research program has been expanded to include a total of fifty four vehicles in a static laboratory test (side pull) to measure rollover stability and a total of sixteen vehicles in a dynamic test (frequency response) to evaluate rollover and directional stability. Also, for the previously mentioned fifty four vehicles, vehicle parameters will be measured to allow their dynamic frequency response to be evaluated using computer simulations. These additional tests should be completed in the spring of 1990. Handling characteristics of light trucks are being investigated as a possible factor in their high rollover involvement.

Safety Performance Upon Rollover: With regard to the crash conditions after the light truck rollover occurs, the agency has updated an existing rollover initiation test device. This device could handle passenger cars, and has been updated to accommodate heavier vehicles such as light trucks and sport utility vehicles. The updated rollover test device, which includes a stiffer platform suspension and an increased actuation force, will be used to conduct rollover tests of a limited number of light trucks. The report documenting the modifications to this test device was published in April, 1989.

Selection of test conditions is being aided by computer simulation of the tests. In addition, computer simulation is being used to evaluate the benefits of alternative safety measures. One such measure under development is the enhancement of the side window glazing, as a possible means to minimize side window ejection and laceration protection in both rollover and side impact collisions. Ultimately, safety measures will be selected for incorporation in vehicles, and will be tested using the rollover test device. During the rollover tests several events are recorded. These events include roof crush, dummy ejections, performance of door latch systems, and glazing. Initial research results were available in June, 1989.

FRONTAL CRASH PROTECTION

April 1988 Report:

The report indicated that NHTSA is researching the impact characteristics of interior components of light trucks and sport utility vehicles. These included dynamic and static tests for interior components such as the steering assembly, instrument panel, and windshield header to better characterize material properties. These data will be used in computer crash occupant simulation models in order to study light truck occupant crash protection. These studies are being conducted on a continuing basis along with passenger car interior studies.

Discussion:

Light trucks have been tested for force deflection properties of the instrument panel and steering column. The resulting force deflection properties will become governing parameters in a computer simulation to predict injury properties of the head, chest, and femur. This computer simulation may provide guidance to more complex activities such as sled tests and possibly full vehicle tests. Computer modeling results are estimated to be available in January, 1990.

Research into the upgrade of the thorax protection from steering column impacts involves the refinement of test procedures and the generation of new compliance criteria. This research which includes both component and full sled tests has addressed light trucks and sport utility vehicles and was completed in February, 1989. Additional research addressed the risk of facial injury due to contact with the steering wheel by a restrained occupant. The British Government has developed a test method for evaluating facial injury with respect to various steering wheel designs. NHTSA is considering the feasibility of developing a harmonized test plan and performance requirements with Great Britain. Steering wheels representative of light trucks and sport utility vehicles have been tested along with passenger car steering wheels. This project was completed in February 1989. Due to complexity of the issue, the agency is still analyzing the data gathered.

SIDE IMPACT PROTECTION

April 1988 Report:

The goal of the research was to support issuance of an ANPRM to better address the complex issues and potential countermeasures involved in side crashes.

Discussion:

For passenger cars, an NPRM has been issued which would substantially upgrade FMVSS 214: Side Door Strength. The important features of this proposed new "dynamic" performance standard include realistic crash conditions, realistic striking barrier, and a fully instrumented side impact test dummy which would provide measures of injury to the chest and pelvic regions. This proposed rule would also require that car doors not open during the crash test.

For light trucks and sport utility vehicles, an ANPRM was issued on August 19, 1988 to discuss side impact protection requirements, including most of those discussed under the passenger car NPRM. From research results, NHTSA concluded that the major source of harm for light truck occupants is from side impacts with other light trucks. Therefore, as part of this activity, the light truck side impactor may be modified in order to simulate the more harmful crash conditions.

To provide support for possible side impact passenger protection requirements, NHTSA has modified the side impactor test device and conducted dynamic tests of three pickup trucks and one minivan in 1988. A computer simulation will also be used to model various parameters of side impact collisions. This model will provide a means by which to study and optimize crash test procedures. Also, from this model the relative benefits of safety measures, such as increased side door strength, new glazing methods, and improved door latches, can be evaluated. These dynamic tests and computer simulations will provide insight into the complex problems of occupant containment. A report containing the results of the computer simulation and full systems tests should be available in December, 1990.

HYDRAULIC BRAKE SYSTEM PERFORMANCE

April 1988 Report:

The report discussed the fact that accident data point to braking performance and stability as possibly leading to light truck safety problems with rollover crashes.

Discussion:

NHTSA is currently emphasizing light truck braking research. This issue is important due to the varied usage patterns of light trucks. The cargo and passenger loads to which many of these vehicles are subjected vary considerably. Therefore, the amount of force the rear brakes must generate also varies widely. The relative braking force that can be generated by the front axle relative to the rear is called brake balance. If the vehicle has too much rear bias in the brake balance, then the rear brakes will lock up prematurely upon hard braking. This premature rear lockup may cause the vehicle to become directionally unstable. This instability may be a cause of many single vehicle crashes. Many of these single vehicle accidents have resulted in rollovers due to contact with various tripping mechanisms such as a curb or soft shoulder off of the roadway.

The braking research focused on stopping distance performance of light trucks and sport utility vehicles in relation to passenger cars. Thirteen vehicles have been tested including three compact pickups, four standard pickups, three minivans, one standard van, and two sport utility vehicles. Results of these tests, which have been analyzed, will help NHTSA determine whether to propose upgraded braking performance regulations for light trucks. A report on the test findings was completed in April, 1988.

A one year research project will be conducted to determine the effect of variable load proportioning valves, antilock brake systems, and the effects of age on the variability of brake balance. The following research will be included in this project.

In-use brake system testing will experimentally measure the in-use brake distribution for 150 light trucks and sport utility vehicles. Testing of 150 passenger cars is nearing completion. This will enable the agency to compare the in-use braking systems of the different vehicles. The brake balance of these vehicles will be measured by a system of transducers embedded in the roadway. From these measurements, statistical projections

of the effects of brake balance variability on light truck safety will be made. Results should be available in September of 1990.

The effects of antilock brake systems in preventing light truck control loss and rollover was evaluated, to determine the extent to which rear axle antilock brake systems on light trucks and sport utility vehicles influence loss of control and rollover rates. This was accomplished by performing accident data studies using state accident databases such as CARDfile to examine the effect of light truck antilock brake systems on certain accident types. This project began in February 1988 and was completed in September of 1989.

Braking performance and dynamic stability of "high lift" (modified suspension) vehicles will be examined. The use and safety of "high lift" kits for light trucks have concerned many states. In response to several inquires, this research will provide both the public and the State Motor Vehicle Administrators with test data which will show the effects of vehicle lift on handling and braking performance. The handling parameters that will be studied are stopping distance, directional stability, and dynamic rollover characteristics. The project will be completed in early 1990.

VIII. SUMMARY OF RESEARCH PLANS FOR LIGHT TRUCK SAFETY

Research Program Plan

Research Program Title	Starting Date/ Completion Date
I. Rollover	
Accident Data Gathering and Analysis	
a. Maryland Single Vehicle Rollover Study	July 87/ August 89
b. Analysis of Pickup Truck Rollover	March 88/ May 90
c. Influence of Rear Axle ABS on Loss of Control and on Rollover Frequency of LTVs	February 88/ September 89
d. Analysis of Vehicle, Driver, and Roadway Factors in Rollover	August 88/ July 89
e. Additional Analysis of Vehicle and Roadway Factors	August 89/ July 91
Vehicle Dynamics and Computer Simulation	
f. Advanced Rollover Vehicle Model	March 88/ April 90
g. Intermediate Level Models	October 88/ July 89
h. High Camber Angle Tire Testing	April 89/ August 89
i. Sensitivity Analysis of Tripped Rollover	February 87/ July 88
j. Stability and Control Characteristics of LTVs	October 87/ October 90
k. Vehicle Dynamic Stability and Rollover	September 88/ October 90