CRASH

CITIZENS FOR RELIABLE AND SAFE HIGHWAYS

NHTSA DOCKET NO. 1-11; Notice 09, 57 FED. REG. 252 (January 3, 1992)
SUPPLEMENTAL NOTICE OF PROPOSED RULEMAKING PROCEEDING
Federal Motor Vehicle Safety Standards; Rear Impact Guards; Rear Impact Protection

In a January 3, 1992, Supplemental Notice of Proposed Rulemaking (SNPRM) and a December 30, 1991, Preliminary Regulatory Evaluation (PRE), the National Highway Traffic Safety Administration (NHTSA) proposes to amend Title 49 of the Code of Federal Regulations, Part 571, to require manufacturers of trucks and truck trailers to place a rear underride guard on the trailers of certain combination vehicles, calculates the benefits to be derived from such a guard, and assesses the costs of those benefits. In these comments and the accompanying materials, ***CRASH*** (Citizens for Reliable and Safe Highways) examines in detail the "benefits" analysis. Our threshold inquiry is whether NHTSA has understated the potential benefits.

In discussing potential "benefits," NHTSA asks three questions:

- How many people each year are killed or injured in rear end accidents?
- How many of the annual rear end deaths and injuries result from "underride" understood as complete Passenger Compartment Intrusion (PCI)?
- How many of the PCI deaths and injuries could be avoided by use of the proposed guard?

CRASH's review of the NHTSA data, primarily in the PRE, indicates that at virtually every turn, NHTSA chose the lowest possible figures to calculate the potential "benefits" of any rear underride guard. The resulting benefits calculation -- between 9 and 19 lives per year[1] -- has the effect of distorting the cost/benefits ratio. ***CRASH*** has recalculated the potential deaths and injuries employing the data NHTSA chose to ignore.

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[1] For purposes of these comments we ignore the analysis of death/injury savings which may accrue from use of conspicuity measures, the effect of which in NHTSA's analysis is to lower the rear end guard savings to the 8 to 18 range.

CALCULATION OF REAR END DEATHS

A. DATA ANALYSIS BY DATA SELECTION:

A review of the PRE indicates that, in calculating the number of people killed in rear end accidents each year, NHTSA used selective parts of a 1982 to 1989 FARS data base with the result that the rear end fatality problem appears to be static, i.e., year-to-year fluctuations do not significantly alter the scale of the problem. The 1982-1989 FARS data base in its entirety, extracted from page 11 of the PRE, appears below:

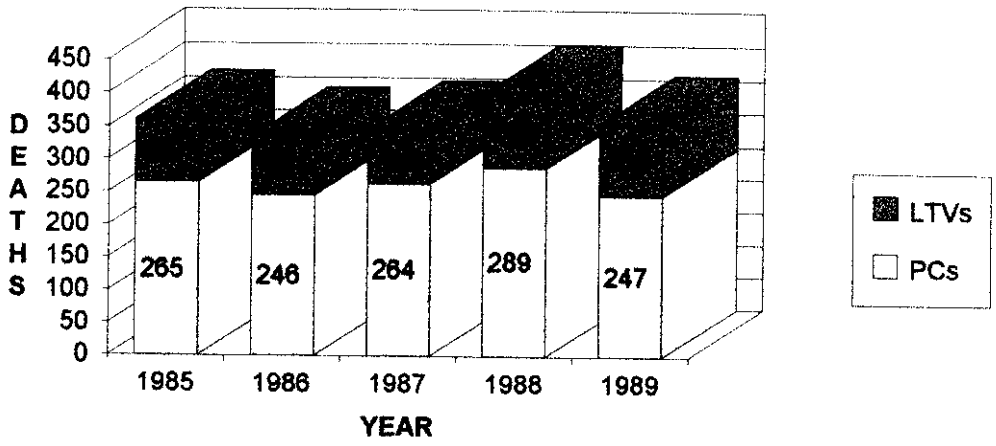
SINGLES	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	AVG
PC's	62	87	59	93	88	108	73	104	84.3
LTV's	18	23	28	26	33	46	35	41	31.3
SUB-TOT	**80**	110	87	119	121	154	108	**145**	115.5
% OF TOT	23.9%	27.4%	25.0%	24.8%	26.5%	30.8%	21.2%	28.9%	**26%**
COMBI	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	AVG
PC's	175	219	201	265	246	264	289	247	238.3
LTV's	80	72	60	95	89	82	112	109	87.4
SUB-TOT	**255**	291	261	360	335	346	401	**356**	325.6
% OF TOT	76.1%	72.6%	75.0%	75.2%	73.5%	69.2%	78.8%	71.1%	**74%**
TOTAL	**335**	401	348	479	456	500	509	**501**	441.1

AVG
262
97
360

According to NHTSA, only that part of the FARS data base relating to combination vehicles for the years 1985 through 1989, highlighted in the shaded portion of the above data table, is germane to the underride rulemaking. This selectively truncated data base, in NHTSA's view, indicates that, on average, 360 persons are killed annually in rear end accidents with combination vehicles. This average is slightly higher than the 325.6 average for the 8 year period beginning in 1982.

At first blush, the calculation appears to overstate slightly the death level. More importantly, though, the use of selective data creates the impression that the rear end death problem is relatively static. The following graph of the five year data block depicts the apparent static character of the annual fatality problem.

1985-1989 FATALITIES - COMBINATION VEHICLES ONLY

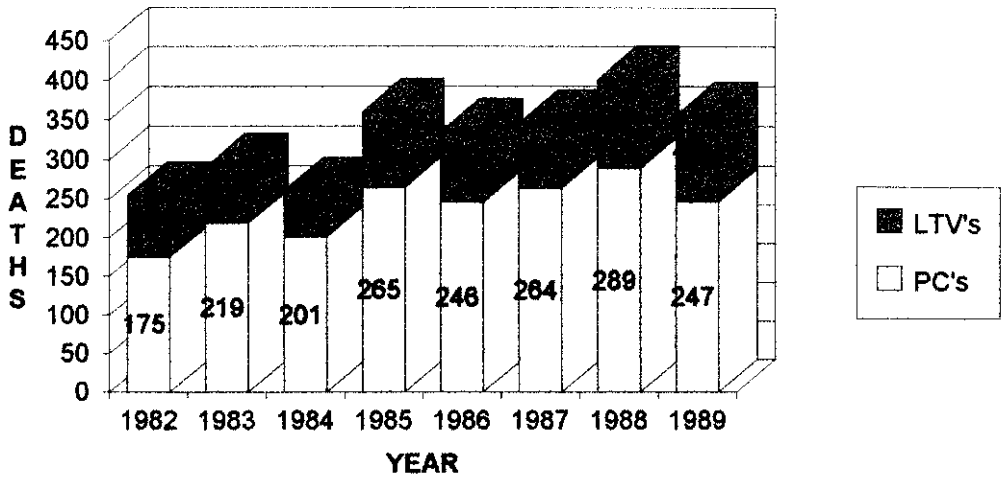


LTV = Light Truck/Van PC = Passenger Car

The 360 (265 + 95) death total in 1985, the first year of the period, is slightly higher than the 356 (247 + 109) deaths in 1989, the last year of the period. The fluctuations in the intervening years are negligible and the average for the five year period is 360 -- exactly equal to the total in the beginning year. Thus, the inference which NHTSA attempts to draw -- that the problem of combination truck underride, rear impact deaths is static -- appears to be supported by the data.

However, those portions of the FARS data base which NHTSA did not use indicate that rear end deaths have been growing. Inclusion of the prior three years in the data set, as in the initial FARS data, results in a dramatically different data analysis.

1982-1989 COMBINATION VEHICLES ONLY



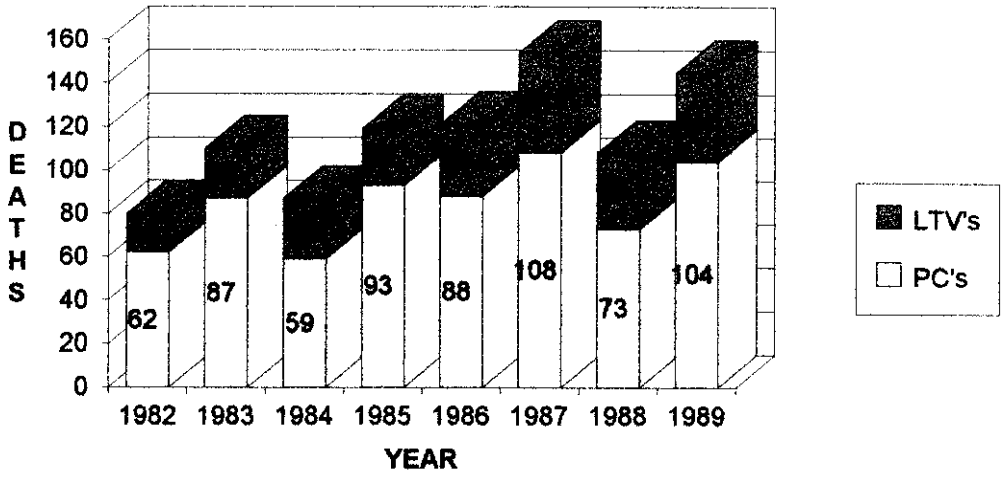
To be sure, the 1982 total of 255 (175 + 80) increases to 356 (247 + 109) in 1989, an increase of 101 (356 - 255), nearly 40% for the seven year period or 5.66% annually.

Additionally, as noted above, the NHTSA proposal only analyses' benefits from the pool of deaths/injuries arising from combination trucks to which the rule will apply -- thereby ignoring any benefits which might be derived by extending the rear guard requirement to single unit trucks which NHTSA proposes to exempt from the rule.

It is significant that those portions of the FARS data base NHTSA deleted from consideration strongly suggest that the problem of rear end death and injury is growing most rapidly for the single unit truck sector of the truck population which NHTSA proposes to exempt from the rear end guard rule.

The 1982 to 1989 single unit truck data from the FARS data base on the preceding page is depicted below:

1982-1989 SINGLE UNIT TRUCKS



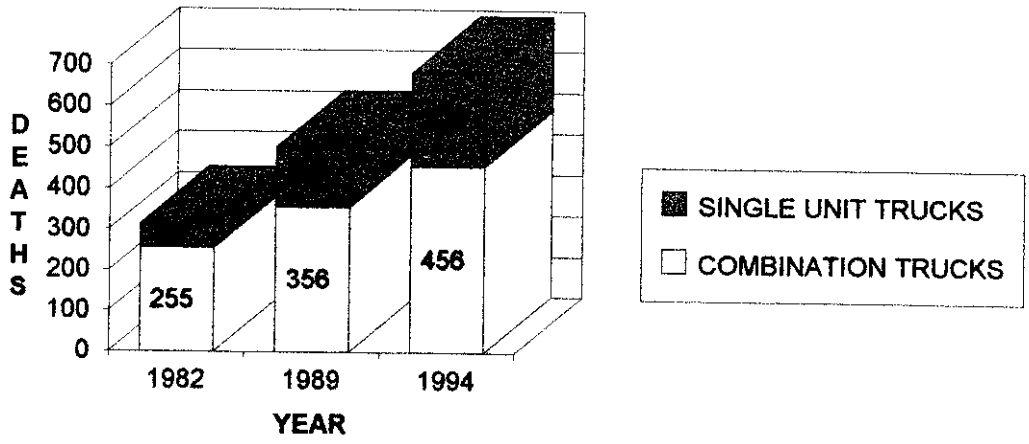
As the graph of the FARS data indicates, single unit trucks killed 80 (62 + 18) persons in 1982 and 145 (104 + 41) persons in 1989. This is an increase of 80% for the entire period, or 11.61% per year, more than double the 5.66% annual rate of increase for the combination vehicles to which NHTSA proposes to apply the rear guard.

The foregoing analysis contradicts NHTSA's conclusion that the problem of rear end death is static suggested by the selective employment of the FARS data. To the contrary, the unadulterated FARS data to the conclusion that the rear end death problem grew from 335 to 501 for all vehicles during the period 1982 through 1989, an overall rate of increase of nearly 50% or 7.14% annually. This conclusion suggests the further inference that the problem has continued to grow since 1989 and will continue to grow until the proposed effective date of 1995.

B. EXTRAPOLATION OF 1989 DATA TO 1995 EFFECTIVE DATE

If the NHTSA analysis is expanded to include the FARS 1982 through 1984 data, and extrapolated to the proposed 1995 date for implementation of the rule, the number of rear end deaths attributed to combination trucks is 456.7. But deaths attributed to single unit trucks grows to 229.2. These figures represent nothing more than an arithmetic application of the annual percentage increases to the 1989 FARS totals for the respective categories.[2] Nonetheless, the extrapolation is critical to an assessment of the potential lives saved by the proposed rule and the cost/benefit analysis that attends such an assessment.

PROJECTED REAR END DEATHS ON JAN 1, 1995 EFFECTIVE DATE



In summary, the NHTSA implication of a static problem for combination trucks leads to a calculation of rear end deaths of 360. Treatment of rear end deaths as a dynamic problem increases that number by for combination vehicles alone of 96.7 (456.7 - 360) on the effective date.. If the figures for the more rapidly increasing single unit trucks are included the rear end death total on effective date increases by another 84.2 (229.2 - 145). Thus, the projected total for rear end deaths for both combination vehicles and single unit trucks on January 1, 1995, calculated on the basis of the rate of in crease from 1982 to 1989, is 685 (456 + 229), an increase of 325 or 90% over the static 360 figure employed by NHTSA.

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[2] The 456 figure for combined trucks is arrived at by adding 100 to the 1989 total of 356. The 100 increase represents 5 years (1989 through 1994) times 20.1 (the average annual increase of 5.66% during the 1982 through 1989 period multiplied by the total of 356 at the end of 1989). The 229 figure for single unit trucks is arrived at similarly by adding 84.2 to the 1989 total of 145. The 84.2 increase represents 5 years times 16.8 , the 11.61% average annual increase for the 1982 -1989 period. See Exhibits 1 and 1A.

The calculations of rear end deaths generally are critical because, as demonstrated below, they become the predicate for NHTSA's calculation that rear underride/PCI deaths, a subset of total rear end deaths, can be reduced by 9 - 19 deaths if the January 3, 1992 proposed rulemaking is adopted.

II. REAR END DEATHS ATTRIBUTED TO "UNDERRIDE"/PCI

In order to calculate potential lives saved by adopting a rear underride guard, NHTSA must establish how many lives are lost to underride. The NHTSA analysis was limited to combination vehicle underride deaths only because it proposed to exempt single unit trucks from the rear guard requirement . The isolation of combination truck underride death data was complicated by the fact, revealed in Table 3 on page 14 of the PRE, that 217 of 1070 underride deaths occurred with "vehicles not in transport," i.e., parked trucks.

TABLE 3 (PAGE 14)

TOTAL UNDERRIDE OCCUPANT FATALITIES BY YRS -- FARS

	PASSENGER CARS			LTV'S			
YEAR	PARKED VEH	MULTI VEH	SUB TOT	PARKED VEH	MULTI VEH	SUB TOT	TOTAL
1982	27	78	105	12	17	29	134
1983	12	80	92	4	18	22	114
1984	25	76	101	9	19	28	129
1985	19	105	124	2	16	18	142
1986	19	102	121	5	19	24	145
1987	17	89	106	8	23	31	137
1988	21	83	104	5	24	29	133
1989	26	75	101	6	29	35	136
		688	854		165	216	1070
	166			51		217	0.2028

The "parked truck" data is a problem because the FARS data upon which NHTSA relies "does not record sufficient data to identify the truck type (single unit vs. combination truck) for a vehicle not in transport." Thus, fully 20% (217/1070 = 20.28%) of the underride deaths cannot, using published FARS data, be attributed conclusively to either combination trucks or single unit trucks. As noted on page five of these comments, NHTSA proposes to exempt single unit trucks from the proposed rule, and the number of rear end deaths with single unit trucks in total (i.e., those attributed to underride plus those not attributed to underride) rose at a rate of 11.66% per year during the period 1982 through 1989.

According to the PRE, NHTSA resolved this statistical problem by examining 26 hard copy reports which, in combination with unspecified FARS

"data runs," permitted NHTSA to conclude that 88%[3] of the side and rear underride deaths in parked vehicles involved combination vehicles. This percentage then is employed to generate Table 4 of the PRE which allocated the "parked truck" deaths between combination trucks and single unit trucks.

This table, NHTSA states, "supports the agency's decision to target combination trucks as it can be seen from this table that the combination truck rear underride problem is worse than the single unit trucks by a factor of 5." Table 4 is reproduced below.

TABLE 4 (PAGE 15)

UNDERRIDE FATALITIES FOR PC/LTV STRIKING HDT

SINGLE UNIT TRUCKS				COMBINATION				TOTAL
SIDE	REAR	OTHER	SUB	SIDE	REAR	OTHER	SUB	
1	14	0	15	67	51	1	119	134
2	17	0	19	43	52	0	95	114
4	12	0	16	50	61	2	113	129
9	8	0	17	58	66	1	125	142
1	16	0	17	62	66	0	128	145
4	12	1	17	46	72	2	120	137
8	12	0	20	56	56	1	113	133
3	9	0	12	71	50	3	124	136
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32	100	1	133	453	474	10	937	1070
4	12.50	0.13	16.63	56.63	59.25	1.25	117.13	133.75

NHTSA expands on this conclusion by asserting gratuitously that "Combination truck side underride countermeasures have been determined not to be cost effective." Table 4 records that the 5 to 1 ratio which supports the agency's targeting of combination truck rear end deaths was not matched by the side underride death problem. Those deaths only enjoy a 4.53 ratio (56.63/12.5 = 4.53) vis a vis single unit truck underride deaths --on average. In any event, NHTSA could not publish its constructed 5 to 1 ratio for combination trucks vs. single unit trucks without accounting for all of the deaths in Table 3, including the deaths attributable to side underride.

As noted above, the unpublished data NHTSA employed to construct the 5 to 1 ratio of combination trucks rear end deaths vs. single unit truck deaths was necessary to generate the total for underride deaths attributed to combination vehicles because the FARS data on parked trucks did not distinguish between combination and single unit trucks. Having constructed the total for combination truck underride deaths, the PRE then calculates the

[3]The 88% figure is arrived at by adding the average for side underride deaths (56.63) to the average for rear underride deaths (59.25) and "other" (1.25). The resulting 116 total (56.63 + 59.25 + 1.25 = 116) for combination vehicles is then divided by the 133.75 total for all vehicles (combination plus single unit trucks) to reach 88% (116/133.75 = 87.57%).

percentage of combination truck underride deaths to combination rear end death generally which is published in Table 5 which appears below.

TABLE 5 (PAGE 16)

PERCENT COMBINATION TRUCK REAR "UNDERRIDE" FATALITIES BY YEAR

	A REAR UNDERRIDE FATALITIES	B REAR END FATALITIES	C PERCENT UNDERRIDE (A/B)
1982	51	255	20.0%
1983	52	291	17.9%
1984	61	261	23.4%
1985	66	360	18.3%
1986	66	335	19.7%
1987	72	346	20.8%
1988	56	401	14.0%
1989	50	356	14.0%
	474	2605	18.2%
AVG	59.25	325.625	18.5%

Standing alone, this is a tortuous route to pursue merely to obtain a percentage of underride deaths attributable to combination vehicles. However, the PRE includes a clear acknowledgment that other studies -- at the state, national and international level -- had uniformly concluded that a much higher percentage of all rear end deaths was attributable to underride.

Specifically, in the benefits analysis section on page 50 of the PRE, NHTSA acknowledges a NASS study that places the underride percentage at 28%, a rate 60% higher than the 17% rate generated in Table 5. In the same discussion, NHTSA reference to a 1979 HSRI study that placed the underride death percentage at 44% of all rear end truck fatalities, two and one half times the NHTSA rate. This study was dismissed as a regional study "not considered to be nationally representative" The discussion of the HSRI study does not indicate explicitly how NHTSA's own percentage, constructed from 26 hard copy FARS reports was neverthelss able to be deemed "nationally representative."

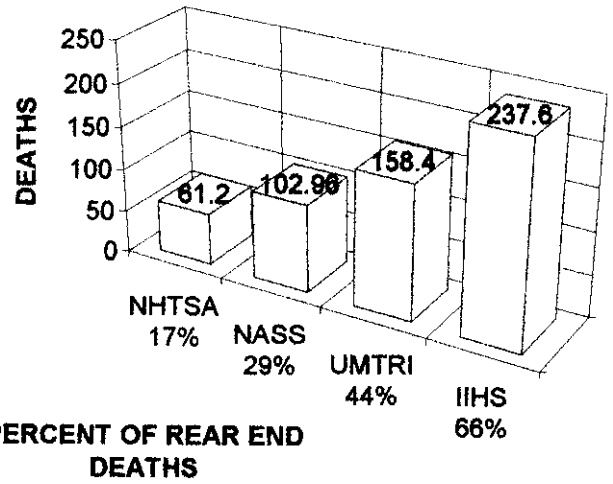
Similarly, NHTSA dismisses a more recent 1986 study in Great Britain by IIHS that placed underride percentage for all rear, side and front end truck accidents at 66%, nearly four times the NHTSA percentage. These data are conclusively dismissed as "not necessarily representative of the U.S. experience." Again, NHTSA declined to discuss how the 26 hard copy FARS reports were somehow able to generate data that was "representative of the U.S. experience."

NHTSA ends its discussion of the benefits statistics by concluding that 50 to 72 rear end deaths in combination vehicles are attributable to rear underride. These totals are arrived at by applying the low and the high ends of the 5 year averages (14% to 20%) from Table 5 to the 360 rear end death total.

The use of the 14% to 20% "range" for underride deaths camouflages the fact that the combination truck underride death total generated by the 26 hard copy reports in Table 5 on page 16 was, in reality, the source for the underride percentages "calculated" on page 50. In short, the logic is circular. The absolute number for underride deaths is constructed from 26 unpublished records and printed in Table 5 on page 16. Thirty-four pages later, the total is used to generate a percentage of underride deaths relative to rear underride deaths generally. That percentage is then used to calculate a range for the absolute number of underride deaths -- 50 to 72.

Because the data are not available in the PRE, CRASH has generated tables that calculate the underride deaths on the basis of the NASS (28%), HSRI (44%), and IIHS (66%) allocations. For comparison's sake, the percentages are applied in three separate charts to: (1) the 360 calculation of rear end deaths for combination vehicles, (2) the 501 calculation of combination and single unit deaths for 1989, (3) the 685 calculation of rear end deaths on January 1, 1995. In the interest of simplicity, the NHTSA underride allocation factor is applied in each chart with a single percentage --17%-- rather than the 14% to 20% "range". Supporting tables are attached as Exhibit 2 to these comments.

UNDERRIDE DEATHS

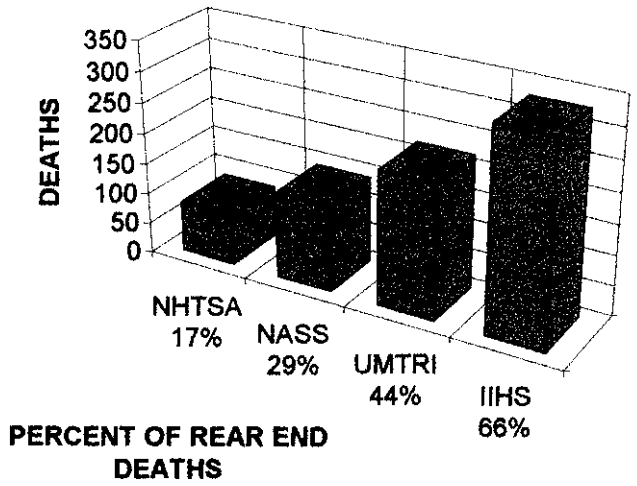


REAR END DEATH TOTAL 360 FOR COMBINATION TRUCKS ONLY

The chart above indicates that the rear end deaths attributable to underride can increase from NHTSA's total of 61 to 238, an increase of nearly 300%, by selecting the IIHS 66% allocation factor which NHTSA rejected.

The chart below indicates that, if the rear end deaths allocated to single-unit trucks are added to the combination truck total for 1989 for a rear end death total of 501, and the IIHS 66% allocation factor is employed, the rear end deaths attributable to underride increase to 331, an increase of 270 or 450% from NHTSA's calculation

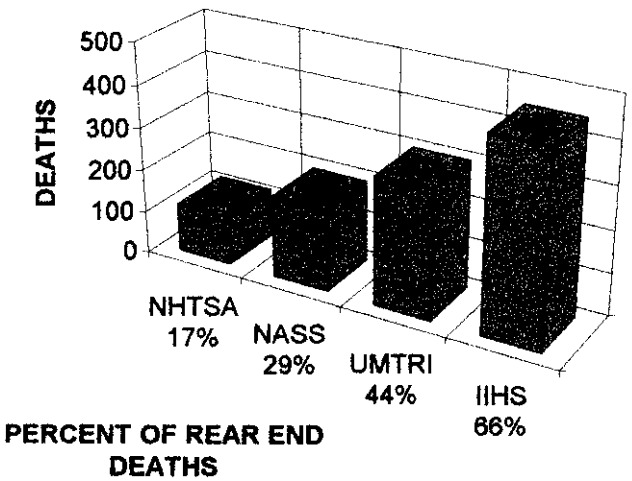
UNDERRIDE DEATHS



REAR END DEATH TOTAL 501 FOR COMBINATION AND SINGLE UNIT

Finally, if one extrapolates a 685 rear end death total for combination trucks and single unit trucks on the 1995 effective date, and employs allocation factors other than NHTSA's, rear end deaths attributable to underride increase to anywhere from 195 to 452, increases of 200% to 600% over the NHTSA projection of 61.

UNDERRIDE DEATHS



REAR END DEATH TOTAL 685 FOR COMBINATION AND SINGLE UNIT

III. PROJECTION OF LIVES SAVED

In its January 3, 1992 Supplemental Notice and the accompanying PRE, NHTSA concludes that of the 360 lives lost annually, 9 to 19 might be saved if the rear guard were adopted as proposed. NHTSA reaches these conclusions by making an assumption relating to the effectiveness of the proposed guard. The PRE indicates that "no controlled accident studies have been conducted from which an effectiveness figure can be derived" (PRE at 51) but NHTSA cites modeling work it conducted which yielded an effectiveness ranging from 17% to 25.8%.

NHTSA also cites an IIHS commissioned study in Great Britain in 1984 that examined 10 crashes. In four crashes where the vehicles were fitted with rear guards meeting the EEC specifications, the study found a 100% effectiveness rate. Although NHTSA disregards the effectiveness rate for purposes of its calculations, NHTSA quotes a portion of the study stating that the study "provides real-world evidence that the EEC specifications for underride protection have resulted in systems that adequately prevent underride in car and truck collisions." NHTSA observes that its proposed guard is "similar to the EEC regulation." (PRE at 51).

For purposes of these comments it is not necessary to debate the relative merits of the different projections of rear guard effectiveness. More important is the application of the effectiveness assumptions to meaningful data as to the rear end death problem in the aggregate and the allocation factor for underride death -- the issues addressed in the preceding two sections of these comments.

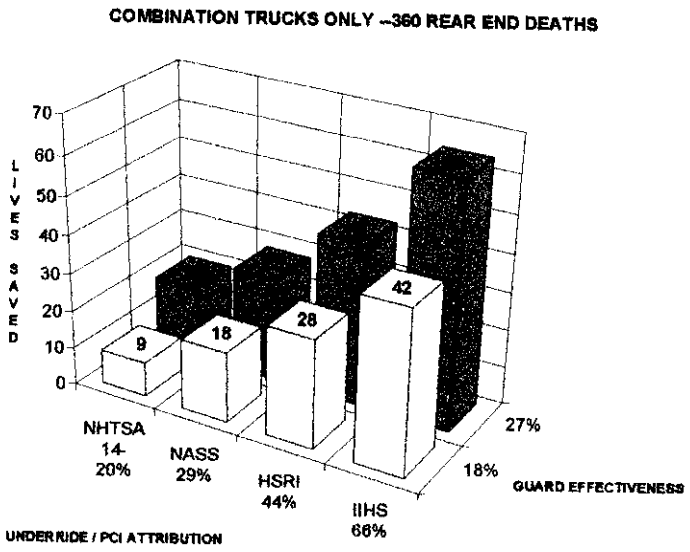
CRASH has applied the 18% and 27% factors to the three data bases generated above:

(1) the 360 rear end death data base for combination vehicles only in the 5 year period ending in 1989,

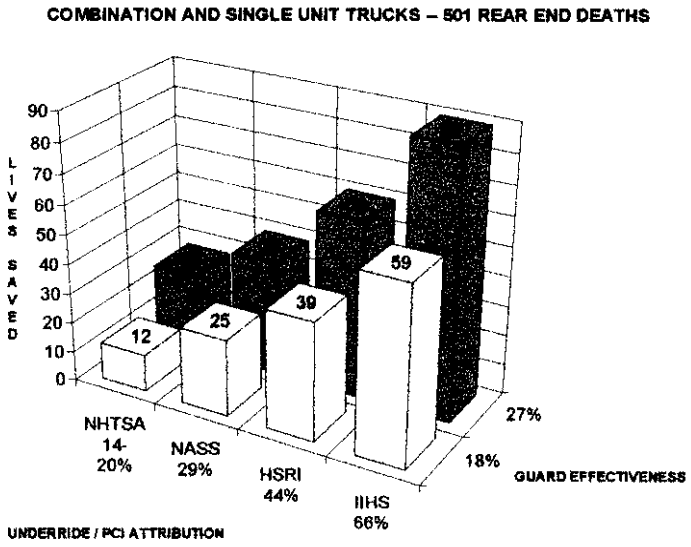
(2) the 501 rear end death data base for combination vehicles and single unit trucks in 1989; and

(3) the 685 rear end death data base for combination and single unit trucks extrapolated to January 1, 1995, the proposed effective date.

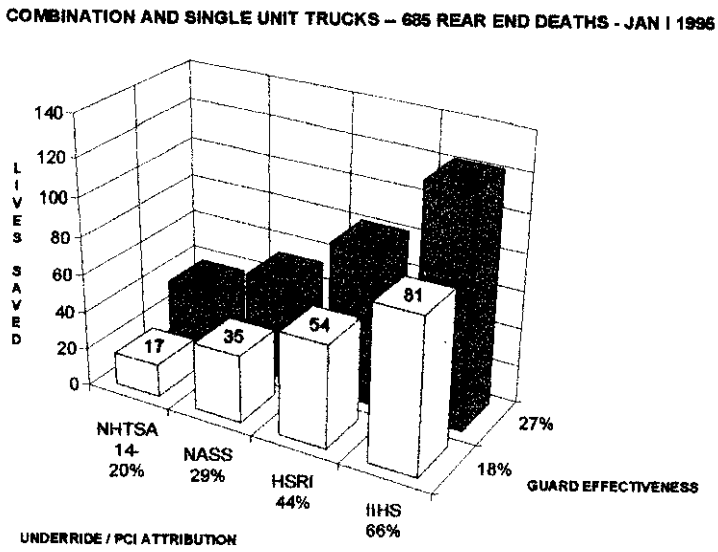
The four rear underride allocation factors -- NHTSA 17%, NASS 29%, HSRI 44% and IIHS 66% -- are applied to all three calculations. The results appear in the exhibits to these comments and are graphed below.



The only variables in the above chart are the alternative underride allocation factors of 29%, 44% and 66% from other sources, and the 18% and 27% guard effectiveness projections. The underlying data base is the 360 calculation for the 1985 to 1989 period. The resulting projections in lives saved increase to a high of 64, three times the highest NHTSA projection in the PRE.



In the chart above, the projection for lives saved assumes that single unit trucks are covered by the rule. The resulting totals reach 89, four times the highest NHTSA projection.



In the last chart, the projections of lives saved is based upon an extrapolation of PCI/underride and rear end deaths to the January 1, 1995 effective date, based upon the actual rate of increase during the years 1982 through 1989. The total for lives saved reaches 122, six times the highest NHTSA projection.

IV. SINGLE UNIT TRUCKS AND SIDE UNDERRIDE

CRASH will not examine in detail here the entire injury analysis that appears in the PRE. It is sufficient for present purposes to note that Table 14 at page 56 of the PRE reflects injuries from combination trucks alone, again on the basis of static data bases, at 3,000. As noted in the text accompanying Table 14, the numbers in Column A of the table were calculated by redistributing data for unknown vehicle types on Table 6B at page 19.

CRASH has reconstructed Table 6B and reconstituted Table 14 as Table 14A to provide the analogous calculation for single unit trucks that does not appear in the PRE. The Tables are attached as Exhibits 4 and 5 to these comments. The conclusions, based upon a simple restatement of the NHTSA data, are straightforward -- injuries from single unit trucks equal 6,823, a figure that exceeds the combination truck figure by 125%. These injuries will not be affected at all by the January 3, 1992, proposal because NHTSA proposes to exempt single unit trucks.

Finally, in assessing the necessity for various guards on trucks and the benefits derived therefrom in the PRE, ***CRASH*** observes that NHTSA proposes no guard for side underride. This area is disregarded notwithstanding the fact

that, according to NHTSA's own data on the subject (PRE at 15), an average of 60.63 people (56.63 for combination trucks and 4 for single unit trucks) were killed during the 1982 to 1989 period in side underride accidents.

The side underride death number is, in fact, higher than the 59.25 PCI/underride death figure for combination trucks alone which NHTSA proposes to remedy with the January 3, 1992 rulemaking. NHTSA's sole comment on the topic is the gratuitous comment quoted above to the effect that "side underride countermeasures have been determined not to be cost effective." NHTSA publishes absolutely no data in support of this conclusion even though, according to its own data, the side underride death problem is measurably more serious than the rear underride problem.

V. CONCLUSION

CRASH concludes that the calculations of rear underride deaths upon which the rulemaking depends are arbitrarily and capriciously understated with the effect of understating the need for the rear guard, understating the potential benefits to be obtained by use of an improved guard, and overstating the cost/benefit ratio associated with such a guard. In addition, the data base upon which the PCI/underride cost/benefit calculations are premised is too small for the agency's extrapolation. Similarly, the agency's use of a highly restrictive definition of underride as only involving full PCI is a pretext for discarding the much higher figures for underride share in other studies.

Perhaps most importantly, the PRE and the Rulemaking fail to acknowledge the need for and potential benefits from vastly improved, and only modestly more expensive, energy absorbing guards that are commercially available in Great Britain at this time.

Lastly, NHTSA provides nothing approaching substantial evidence in support of its decision to exclude from the rulemaking any device to deal with deaths from single unit trucks or side underride, even though NHTSA's own data fully supports the need for such devices.

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