Hugh Pratt
Load Monitor Ltd.
708 Marks Rd.
Suite B
Valley City
Ohio 44280

July 27, 2000

Dear Mr. Pratt:

Enclosed, per your request, is an analysis to predict crash involvement rates for vehicles with and without air bags, shown as Attachment A. To reduce the number of crashes where risky behavior, such as alcohol, etc., might cause the crash only day-time crashes were included in the analysis (6:00 AM to 8:00 PM.) I have also enclosed a resume as Attachment B. Some of my clients and cases for which I have provided consultation:

Client	Case
Caddell & Chapman	Vasquez v. Hyundai
Paul R. Lewis & Associates	Martinez v. Ford
Law Offices of Robert M.N. Palmer, P.C.	Cloud v. Chrysler
Todd Tracy	Ramos v. Ford
Law Offices of James S. Rogers	McWain v. Chrysler
Edwards, Perry & Haas, L.L.P.	Brooks v. GM

Findings: Based on this analysis it is estimated that passenger cars with air bags have slightly higher percent crash involvement rate than cars without air bags in both NASS-CDS and NASS-GES; however, the difference is not statistically different at the 90 percent confidence level. For LTV's the crash rate is slightly higher for vehicles with air bags than without but, again, the difference is not significant at the 90 percent confidence level. From NASS-GES LTV's have a lower crash rate with air bags than without and this finding is statistically significant at the 90 percent confidence level. Based on the results of the statistical tests there is no significant difference in crash involvement rates for passenger cars with air bags compared to cars without air bags. This is also true for LTV's in NASS-CDS; however; LTV's with air bags in NASS-GES have a significantly lower crash involvement rate than LTV's without air bags.

This analysis shows no increase in crash involvement rates for air bags based on statistical tests of the data and actually shows a significantly lower crash involvement rate for LTV's with air bags in the NASS-GES data.

Please let me know if the information is satisfactory or if you would like me to do further analysis.

Sincerely,

Sheldon L. Stucki

Attachment A

Estimate of Crash Involvement Rates for Passenger Vehicles with and without Air Bags in 1997 During Day-Time Hours

Sheldon L. Stucki

Stucki Engineering and Information Services

July 27, 2000

Estimate of Crash Involvement Rates for Passenger Vehicles with and without Air Bags in 1997 During Day-Time Hours

Using available statistics on registered passenger vehicles which are on the road in the U.S. and queries on crash data files, estimates of the rate of crashes per registered vehicles are computed. This rate is compared for passenger cars and light trucks/vans (LTV's) equipped with driver air bags to vehicles not equipped with air bags. To eliminate factors such as alcohol and other high risk behavior, generally more frequent in night time crashes, the analysis considered only crashes between 6:00 AM and 8:00 PM.

The National Highway Traffic Safety Administration (NHTSA) in the Final Regulatory Evaluation for Advanced Air Bags, Final Rule[1], estimated that in calendar year 1997 about 36 percent of the on-road passenger cars and 28 percent of light trucks/vans (LTV's) were equipped with driver side air bags. There were about 125 million passenger cars and about 67 million LTV's registered in the U.S. in 1997[2]. Thus, it is estimated that 45 million passenger cars and about 19 million LTV's on the road were equipped with driver air bags.

The National Analysis Sampling System - Crashworthiness Data System (NASS-CDS) and General Estimates System (NASS-GES) were queried for crash involvement of light vehicles with and without driver air bags (the complete output from these queries can be found in Attachment A.1.)

The NASS is a crash sampling system, currently consisting of 24 primary sampling units (PSU's) throughout the United States, which collects information on specific crashes. The PSU's are areas which are selected to be representative of geography, population density and other factors of the United States when taken as a whole. Within the assigned area in the PSU police accident reports (PAR's) are collected. Since it is not possible at, even the PSU level, to select all PAR crashes for inclusion in NASS-CDS, a sampling system is applied to the PAR's. The first major filter is the requirement that at least one vehicle must be towed from the crash scene and that the vehicle must be a light vehicle, i.e., passenger car, light truck or van. All PAR's within the PSU including those selected for further investigation in NASS-CDS are entered into the NASS-GES files. Thus both NASS-CDS and NASS-GES are crash data files projected, annually, to represent the United States population of tow-away crashes (NASS-CDS) and all police reported crashes (NASS-GES.)

The percentages of passenger cars and light trucks and vans (LTV's) involved in crashes in NASS-CDS and NASS-GES for the 1997 calendar year were retrieved. It should be noted that the specification of LTV's in the crash data files may not be completely consistent with that used in the NHTSA estimate of on-road vehicles with driver air bags; however, the passenger car definition is more straightforward and consistent with NHTSA's number.

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[1] Final Economic Assessment, FMVSS No. 208, Advanced Air Bags, Office of Regulatory Analysis & Evaluation, Plans and Policy, NHTSA, May, 2000.

[2] Traffic Safety Facts 1997, NHTSA, November, 1998.

The weighted numbers (national estimates) and percentages of vehicles with and without driver air bags in 1997 NASS-CDS and 1997 NASS-GES and the NHTSA estimate are as follows (see attachment A.1 for un-weighted numbers):

Day-Light Crashes and On-Road Vehicles with and without Air Bags

	Passenger Cars		**LTV's**	
	Air Bag Equipped	No Air Bag	Air Bag Equipped	No Air Bag
NASS CDS	807,676 (37.4 %)	1,353,501 (62.6 %)	291,597 (32.6 %)	603,294 (67.4 %)
NASS GES	1,265,907 (42.9 %)	1,684,204 (57.1 %)	329,879 (20.7 %)	1,266,502 (79.3 %)
On-Road (NHTSA)	45,000,000 (36 %)	80,000,000 (64 %)	18,760,000 (28 %)	48,240,000 (72 %)

[1] SE = Standard error of the observation due to sampling

Based on the NASS-CDS and GES retrievals of crash involvement of light passenger vehicles and the NHTSA estimates a crash involvement rate per on-road vehicle can be estimated:

Crash Involvement Rates

	Passenger Cars		**LTV's**	
	Air Bag Equipped	No Air Bag	Air Bag Equipped	No Air Bag
NASS CDS	1.79 % SE=0.23%	1.69 % SE=0.19%	1.55 % SE=0.31%	1.25 % SE=0.16%
NASS GES	2.81 % SE=0.56%	2.10 % SE=0.51%	1.76 % SE=0.43%	2.63 % SE=0.26%

The estimates of crash involvement with and without air bags from NASS-CDS and NASS-GES crash data used in this report are based on a sample, and, thus, may differ from true values. The measure of variability used in this paper to estimate the significance of the differences between crash involvement rates with and without air bags is the standard error (SE). The SE is determined using the Survey Data Analysis (SUDAAN®) computer software. The confidence interval for a 90 percent probability was calculated for the difference between cars with air bags and cars without air bags and similarly for LTV's with the following results:

	Cars	LTV's
NASS-CDS	No significant difference	No significant difference
NASS-GES	No significant difference	LTV's with air bags have significantly lower crash involvement rates

Based on this estimate passenger cars with air bags have slightly higher percent higher crash involvement rate than cars without air bags in NASS-CDS and GES; however, not significantly different at the 90 percent confidence level. Similarly, the involvement rate for LTV's with air bags is slightly higher in NASS-CDS but, again, the difference is not statistically significant. The only difference which is significant is the lower crash involvement rate for LTV's with air bags compared to no air bags from NASS-GES.

Attachment A.1

Date: 07-26-2000
Time: 10:44:56

Research Triangle Institute
The CROSSTAB Procedure

Page : 1
Table : 1

Variance Estimation Method: Taylor Series (WR)
1997 NASS-CDS Table 1: Air Bag Presence in Passenger Cars
by: bagin.

bagin	Sample Size	Weighted Size	SE Weighted	Row Percent	SE Row Percent	Col Percent	SE Col Percent
Total	3394	2161176.16	241553.54	100.00	0.00	100.00	0.00
No Air Bag	1968	1353500.66	148649.48	62.63	1.63	62.63	1.63
Air Bag	1426	807675.50	103004.51	37.37	1.63	37.37	1.63

Date: 07-26-2000
Time: 10:46:53

Research Triangle Institute
The CROSSTAB Procedure

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Table : 1

Variance Estimation Method: Taylor Series (WR)
1997 NASS-CDS Table 1: Air Bag Presence in LTVs
by: bagin.

bagin	Sample Size	Weighted Size	SE Weighted	Row Percent	SE Row Percent	Col Percent	SE Col Percent
Total	1407	894891.03	97068.58	100.00	0.00	100.00	0.00
No Air Bag	924	603294.20	76592.64	67.42	5.15	67.42	5.15
Air Bag	483	291596.83	58145.63	32.58	5.15	32.58	5.15

Date: 07-26-2000
Time: 15:28:36

Research Triangle Institute
The CROSSTAB Procedure

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Table : 1

Variance Estimation Method: Taylor Series (WR)
1997 NASS-GES Table 1: Air Bag Presence in Cars
by: bags.

bags	Sample Size	Weighted Size	SE Weighted	Row Percent	SE Row Percent	Col Percent	SE Col Percent
Total	22759	2950111.15	542771.22	100.00	0.00	100.00	0.00
No Air Bag	12490	1684203.85	409510.02	57.09	6.51	57.09	6.51
Air Bag	10269	1265907.30	254765.91	42.91	6.51	42.91	6.51

Date: 07-26-2000
Time: 15:29:05

Research Triangle Institute
The CROSSTAB Procedure

Page : 1
Table : 1

Variance Estimation Method: Taylor Series (WR)
1997 NASS-GES Table 1: Air Bag Presence in LTVs
by: bags.

bags	Sample Size	Weighted Size	SE Weighted	Row Percent	SE Row Percent	Col Percent	SE Col Percent
Total	11732	1596380.95	213161.06	100.00	0.00	100.00	0.00
No Air Bag	9245	1266501.89	164737.20	79.34	3.66	79.34	3.66
Air Bag	2487	329879.06	81374.69	20.66	3.66	20.66	3.66