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National Highway Traffic Safety Administration

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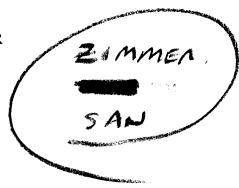
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TRANSPORTATION SCIENCES CENTER ACCIDENT RESEARCH GROUP



Division of Calspan Corporation

CALSPAN REMOTE AIR BAG DEPLOYMENT INVESTIGATION CALSPAN CASE NO. 94-13

VEHICLE: 1994 JAGUAR XJ6 LOCATION: THE PROPERTY OF THE PROPERT

Contract No. DTNH22-94-D-07058

Prepared for:

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

DISCLAIMER

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The crash investigation process is an inexact science which requires that physical evidence such as skid marks, vehicular damage measurements, and occupant contact points are coupled with the investigator's expert knowledge and experience of vehicle dynamics and occupant kinematics in order to determine the pre-crash, crash, and post-crash movements of involved vehicles and occupants.

Because each crash is a unique sequence of events, generalized conclusions cannot be made concerning the crashworthiness performance of the involved vehicle(s) or their safety systems.

TECHNICAL REPORT STANDARD TITLE PAGE

1.	Report No. 94-13	2. Government Accession No.	3. Recipient's Catalog No.			
4.	Title and Subtitle Calspan Remote Air Bag Dep	Novment Investigation	5. Report Date:			
	Vehicle - 1994 Jaguar XJ6 Location - F		6. Performing Organization Code			
<i>7</i> .	Author(s) Accident Research Group		8. Performing Organization Report No.			
9.	Performing Organization Nam Transportation Sciences Cent Accident Research Group		10. Work Unit No. 1115 (0050-0059)			
	Division of Calspan Corporat	tion	11. Contract or Grant No. DTNH22-94-D-07058			
12	2. Sponsoring Agency Name and U.S. Department of Transpor National Highway Traffic Sa Washington, D.C. 20590	rtation	13. Type of Report and Period Covered Technical Report Accident Date 94			
	-		14. Sponsoring Agency Code			

15. Supplementary Notes

Remote investigation of a low speed front-to-rear crash that resulted in deployment of the passenger side air bag in a 1994 Jaguar XI6

16. Abstract

This remote investigation was a follow-up to NASS Case—which involved a three vehicle chain reaction front-to-rear impact sequence. A 1992 Mazda Miata was stopped in a line of traffic behind a 1990 Geo Prizm for a red signal phase at a four-leg intersection. A 1994 Jaguar XJ6 approached the standing traffic at a police reported speed of 40 km/h (25 mph). The 60 year old male driver was not attentive to the driving task and failed to detect the stopped vehicles in sufficient time to avoid the crash. He apparently braked, however, the vehicle continued forward to impact.

The center and right frontal area of the Jaguar struck the rear of the Mazda in a slightly offset 12 o'clock/6 o'clock impact configuration. The pre-impact braking allowed the top of the front bumper of the Jaguar to initially engage then underride the rear bumper of the Mazda. The grille area of the Jaguar subsequently engaged against the Mazda which resulted in an estimated crush depth of 15-20 cm (6-8") at the center area of the grille. As a result of the crash, the Jaguar underwent an estimated velocity change of 12 km/h (8mph). The vehicle was equipped with mechanically triggered driver and passenger side air bag systems. Only the passenger side air bag deployed due to the offset configuration and the low deployment threshold velocity change. The driver of the Jaguar was not wearing the manual belt system and was not injured. The 46 year old female right front occupant was not wearing the manual belt system. She apparently sustained a non-incapacitating injury and was transported by ambulance to a local hospital. The hospital had no record of treatment for the passenger and she refused an interview.

The Mazda was subsequently displaced forward into the rear of the Geo Prizm. Both vehicles sustained minor damage from the secondary impact sequence.

17. Key Words Mechanically triggered driver and passenger air bags Velocity change of 12 km/h (8 mph) Passenger side deployment		18. Distribution Statement General Public				
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of thi Unclassified	s page)	21. No. of Pages 31	22. Price		

CALSPAN REMOTE AIR BAG DEPLOYMENT INVESTIGATION CALSPAN CASE NO. 94-13 VEHICLE: 1994 JAGUAR XJ6

LOCATION: E, FL.

SUMMARY

This remote investigation was a follow-up to Case No. **The Maximum from the National Accident Sampling System (NASS) which involved the deployment of the passenger side air bag on a 1994 Jaguar XJ6. The vehicle was equipped with dual driver and passenger side air bags. On an approach to signalized intersection, the Jaguar impacted the rear of a stopped Mazda Miata and displaced the Mazda into the rear of a stopped Geo Prizm. The Mazda and the Geo were both equipped with diver air bag systems, however, these systems did not deploy.

The crash occurred on 1994, on a six-lane divided federal highway in 1994, during nightime hours on a dry asphalt road surface. The 1992 Mazda Miata was stopped behind a 1990 Geo Prizm in a line of standing traffic in the center southbound travel lane approximately 0.16 km (0.1 miles) from a four-leg intersection for a red signal phase. The 1994 Jaguar XJ6 was traveling in a southerly direction in the center lane on an approach to the intersection and the standing traffic at a driver estimated speed of 40 km/h (25 mph). The driver of the Jaguar was apparently inattentive to the driving task and failed to detect the stopped traffic. He probably braked immediately prior to impact in an attempt to avoid the crash.

The center and right frontal area of the Jaguar impacted the rear of the stopped Mazda Miata in a slightly offset 12 o'clock/6 o'clock impact configuraton. Due to the suspected pre-impact braking by the driver of the Jaguar, the front suspension probably compressed which allowed the front bumper to initially impact and underride the rear of the Mazda. Direct contact damage on the Jaguar began at the right front corner and extended 110 cm (43.3") laterally across the grille and hood face. There was minimal contact damage on the top surface of the bumper, however, no residual crush occurred at bumper level. Both bumper energy absorbing devices (EADs) apparently compressed and returned to their original pre-crash positions. The grille, header panel, and hood face subsequently engaged against the rear of the Mazda and crushed to an estimated depth of 15-20 cm (6-8"). The crush depth was estimated from photographs obtained from the insurance company since the vehicle was under repair at the time of the NASS inspection. Damaged components included the front bumper, both EADs, grille, right headlamp assembly, left headlamp lens, hood, air conditioning condensor, radiator, radiator support panel, right front fender, and the windshield. The windshield damage consisted of a crack that resulted from stress to the frontal structure. The total repair cost was estimated at \$11,028.

The struck Mazda sustained moderate damage that was distributed across the rear of the vehicle. Direct contact damage began at the left rear corner of the bumper and extended approximately 128 cm (50") to the right taillamp assembly. The NASS researcher documented the maximum crush as 7.0 cm (2.7") located at the left rear corner of the bumper.

The front-to-rear impact sequence displaced the Mazda forward into the rear of the stopped Geo Prizm. This secondary impact resulted in minor damage to the involved vehicles. The Mazda sustained approximately 13 cm (5") of front bumper crush located at the right corner. The struck Geo sustained 10 cm (4") of bumper crush located at the left rear corner. Both vehicles came to rest near the point of impact.

The Jaguar sustained a longitudinal velocity change of approximately 12 km/h (8 mph) from its impact with the Mazda Miata. The velocity change was computed by the damage algorithm of the CRASHPC program using estimated crush profiles from both vehicles. The Mazda sustained a barrier equivalent speed change of 22 km/h (14 mph) as it was accelerated from a stopped position into the rear of the Geo Prizm. As a result of the initial offset front-to-rear impact configuration, the passenger side air bag of the Jaguar XJ6 deployed. The driver's side supplemental air bag system did not deploy.

The driver of the Jaguar was a 60 year old male with an unknown height and weight. The police report and the NASS researcher both identified the driver as unrestrained. There was no contact evidence within the vehicle and the driver was reported as not injured. The right front occupant was a 46 year old female. She was not wearing the available 3-point lap and shoulder belt system. The passenger side air bag system did deploy which provided upper thoracic and facial protection in the low speed crash. The NASS researcher noted a possible tissue transfer on the outboard corner of the bag. The passenger was transported by ambulance to a local hospital, however, there was no record of treatment for the patient at the hospital. She subsequently refused an interview, therefore her level of injury was unknown.

The driver's side supplemental air bag was contained in a typical module assembly within a four-spoke steering wheel. Although nondeployed, the module cover appeared to have a center horizontal parting seam which allowed for symetrical flaps hinged at the top and bottom of the module when the wheel is in the 12/6 o'clock position. The perpendicular view of the steering assembly (photograph no.12) shows that the driver's side module protrudes approximately 2.5 cm (1.0") beyond the steering wheel rim, toward the driver.

The deployed passenger side supplemental air bag system was contained within the right mid instrument panel. The large module cover door was mounted in a vertical position and extended from the right edge of the center console to the air vent adjacent to the right A -pillar. The door appeared to be rigid and was hinged at the top surface which allowed it to open in an upward direction. The face of the door was covered with a wood grain trim panel that blended into the remainder of the instrument panel. The bottom edge of the door was covered with a vinyl material that extended along the top of the glove box door. The deployment of the passenger bag bowed the

mid section of the door in an outward direction which cracked the wood grain trim panel. The horizontal surface of the upper instrument panel extended over the module cover door which prevented the door from rotating upward into the windshield.

The Manager of Product Investigation for Jaguar of North America was contacted regarding the passenger air bag deployment in the XJ6. He stated that the current Jaguar Supplemental Restraint System (SRS) consists of two independent, mechanically triggered air bag systems. The mechanical sensing system is incorporated into the driver and passenger air bag modules and each module must independently detect a crash pulse of sufficient magnitude to deploy the respective air bag. There are no electric crash sensors or diagnostic module within the Jaguar SRS for the 1994 model year. The Jaguar representative noted that Jaguar will adopt the Ford electrical SRS system for all 95 and beyond model year vehicles. He stated that a single bag deployment in a dual bag vehicle is not uncommon in offset crashes that involve decelerations at or near the deployment threshold.

SELECTED PRINTS



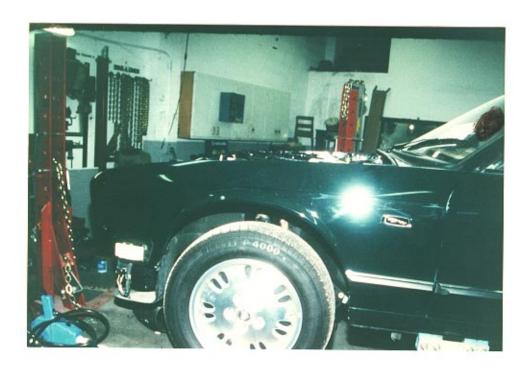
1. Crash location.



2. Frontal view of the disassembled Jaguar XJ6.



3. Left front three-quarter view.



4. Close-up view of the undamaged left front fender.





5 & 6. Right front three-quarter views.



7. Removed and damaged right front fender.



8. Removed front bumper with minimal direct contact evidence.







10. Overall interior view.



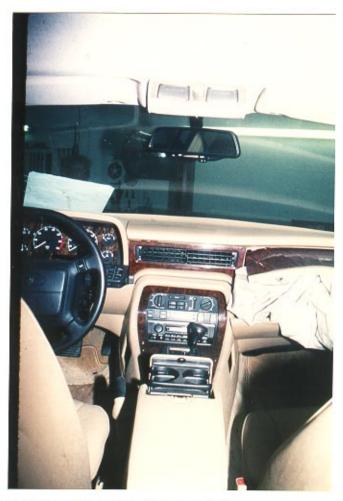
11. Nondeployed driver's side air bag.



12. Perpendicular view of the wheel and air bag module assembly.



13. Driver's seat and manual belt system.



14. View of the dual air bag modules.



15. Deployed passenger side air bag and module cover door.



16. Perpendicular view of the passenger side module cover door.



17. Possible occupant contact evidence on the passenger side air bag.



18. Passenger's seat and manual belt system.



19. Rear view of the struck Mazda Miata.



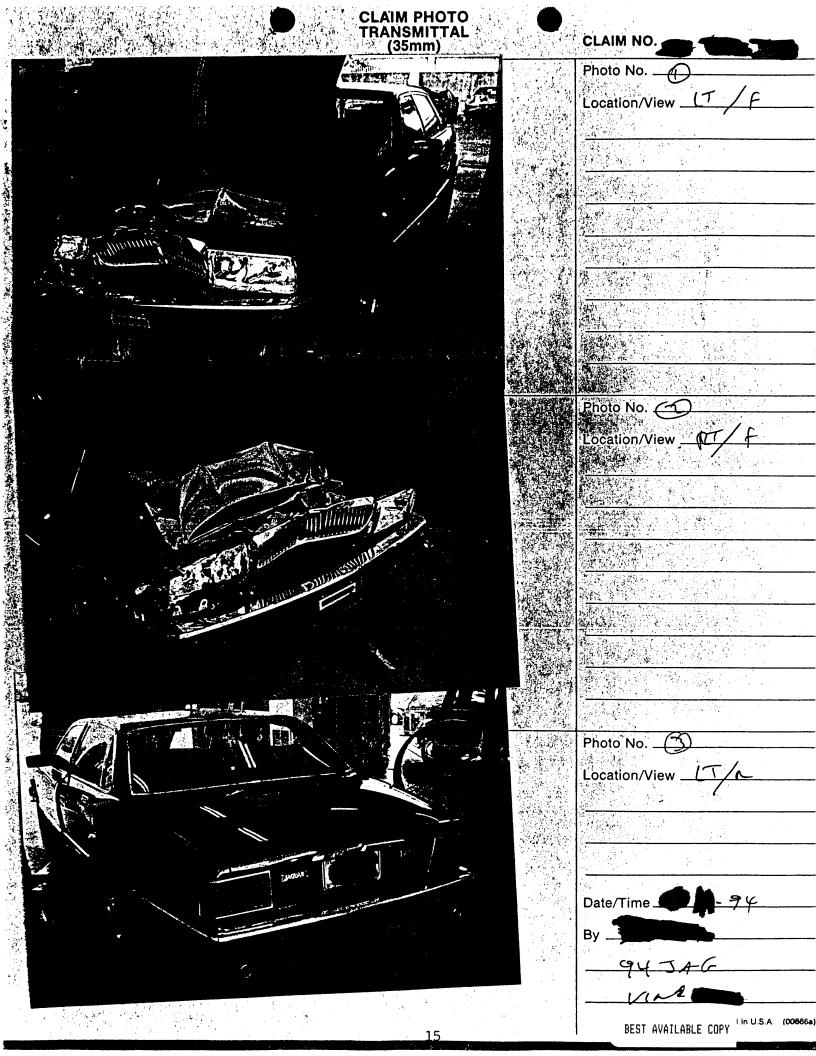
20. Left rear three-quarter view of the struck Mazda.



21. Perpendicular view showing the extent of crush.



22. Secondary impact damage to the right frontal area.



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ATTACHMENT A

Police Accident Report

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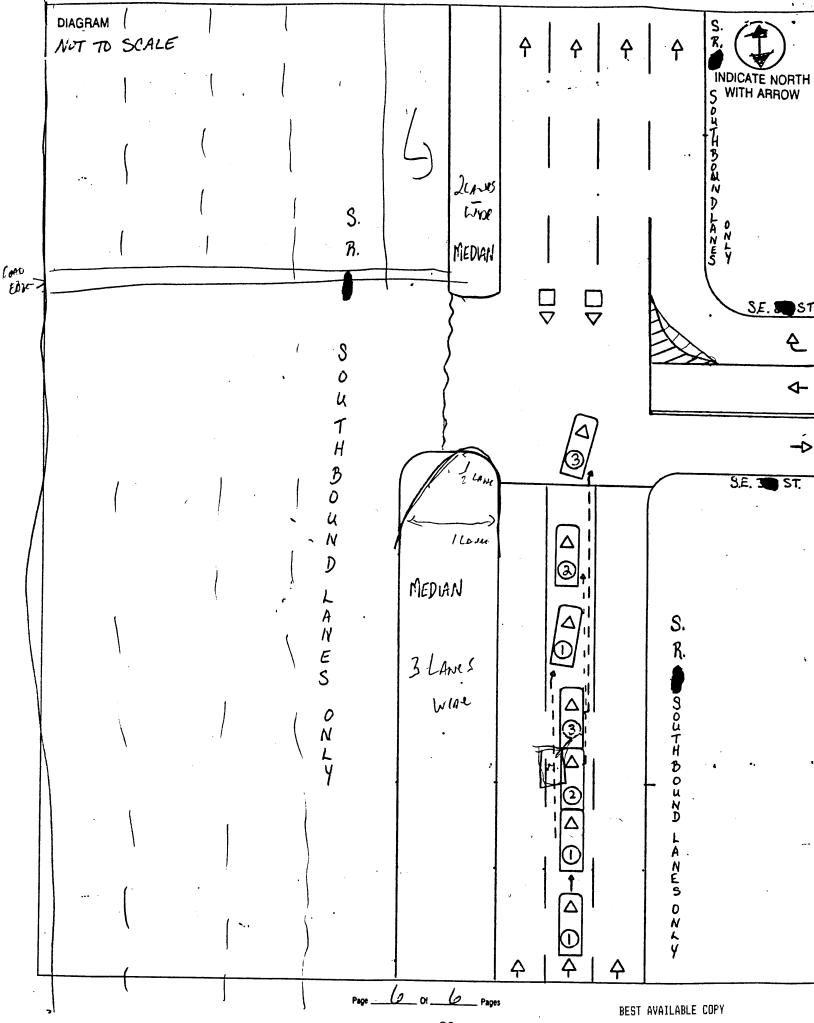
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4 Walking Along Road With Traffic

5 Walking Along Road Against Traffic

6 Working on Vehicle in Road Shoulder 16 Drove Left of Center 08 Standing/Playing 22 Fleeing Police 23 Vehicle Modified 4 Median Exceeded Stated Speed Limit in Road 5 Turn Lane! 77 All Other (Explain) 09 Standing in 77 All Other (Explain) 18 Obstructing Traffic Salety Zone Pedestrian Island 88 Unknown Additional Passengers / Narrative SEC. PASS. • PASSENGER NAME **ADDRESS** Salety CITY & STATE ZIP Age Loc Inj. Equip **Eject** 3 32 6 WITNESS - NAME **ADDRESS** CITY & STATE · ZIP WAS INVESTIGATION 1 Yes 2 No - Where? IS INVESTIGATION 2 No - Why? 1 Yes DATE OF REPORT **PHOTOS** MADE AT SCENE? ALSO, Yes 2 - No 3 - Investigating Agency 4 Other X HOSPITAL \boxtimes M VIOLATOR FL STATUTE NUMBER NAME CHARGE CITATION # 21

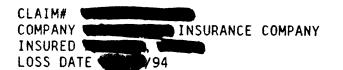
** FLORIDA TRAFFIC CRASH REPORT NARRATIVE / DIAGRAM MAIL TO: DEPT. OF HIGHWAY SAFETY & MOTOR VEHICLES TRAFFIC CRASH RECORDS. DO NOT WRITE IN THIS SPACE
EMS INFO TIME EMS AM PM TIME EMS AM PM COUNTY / CITY CODE DATE OF CRASH INVEST, AGENCY REPORT NUMBER HSMY CRASH REPORT NUMBER
FATALS NOTIFIED ARBUSED ARBUSE
VEHICLE WAS TRAVELING SOUTHBOUND IN THE CENTER LANE OF SOUTHBOUND
S.R. HWY). VEHICLE 2 WAS STUPPED FOR A BED TRAFFIC NIGHT
AT SE ST, FACING SOUTH BOUND IN THE CENTER LANE DE SOUTH BOUND
S.R.D. VEHICLE 3 WAS STOPPED FOR A RED TRAFFIC LIGHT AT
SE ST, FACING SOUTH BOUND IN THE CENTER LANE OF SOUTHBOUND
S.R. DRIVER I FAILED TO NOTICE STOPPED TRAFFIC AT SELECTION
VEHICLE I'S FRONT STRUCK DEHICLE 2'S REAR. VEHICLE 2 TRAVELED
IN A SOUTHBOUND DIRECTION FROM IMPACT. WEHICLE 2'S FRONT
STRUCK VEHICLE 3'S REAR. VEHICLE 3 TRAVELED IN A
SOUTHBOUND DIRECTION FROM IMPACT. VEHICLES CAME TO
FILL REST CARLIC SWELL FOR IN THE
CENTER LANE OF SOUTHBOUND SR DEHICLE I CHARTER CHICA
THE TO HAVAL
REST FACING SOUTHWEST IN THE CENTER LANE OF SOUTHBOUND
J.K.T
1):10 77 : 54:110
VI'S 77: FAILURE TO USE DUE CARE.
WITNESS - NOOME
ADDRESS CITY & STATE ZIP WITNESS - NAME
2 ADDRESS CITY & STATE ZIP
FIRST AID GIVEN BY - NAME: 1 Physician or Nurse 4 Certified 1st Aider 1 Physician or Nurse 5 Characteristics 1 Physician or Nurse 4 Certified 1st Aider 2 Parametic or EMT 5 Other 3 Police Officer 1 Physician or Nurse 4 Certified 1st Aider 2 Parametic or EMT 5 Other 3 Police Officer 1 Physician or Nurse 4 Certified 1st Aider 2 Parametic or EMT 5 Other 3 Police Officer 4 Physician or Nurse 5 Other 4 Physician or Nurse 5 Other 4 Physician or Nurse 6 Physician or Nurse 6 Physician or Nurse 7 P
INVESTIGATION 1 YES 2 NO WHY? MADE AT SCENE? DATE OF REPORT PHOTOS 1 YES 2 NO 3 INVEST. AGENCY 4 OTHER
INVESTIGATOR - RANK & SIGNATURE. ID / BADGE NUMBER DEPARTMENT FHP SO CPD OTHER
HSMV 90005 (Rev. 11/9?) 6 Page 5 of Co Pages 22



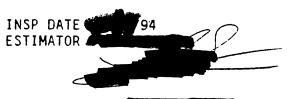
ATTACHMENT B

Jaguar Repair Estimate

1



POLICY# CLAIM REP CLAIMANT TYPE OF LOSS COLL/FIS



LOCATION COMPANY

NON-DRIVE

SHOP ADDRESS CITY STATE

ATTN OF PHONE REF NO.

NAME **ADDRESS** CITY STATE ZIP

HOME PHONE **WORK PHONE**

ELOSIDA LAW STATEL THAT: XXX PERSON WED RICHMOLY AND WITH THE TENT OF THE OFF RICES A STATEMENT OF LIAIM CONTEN OF ANY FALSE, NOTAPHETE OR MELESTER OF A FELONY OF THIRT DEGREE

LIC# ENG/COLOR GREEN CONDITION GOOD

STATE

VIN MILEAGE ACCT'NG CTL#

001991

EC=QUALITY REPLACEMENT PART

N=ADDITIONAL OPERATION

E=NEW PART

I=REPAIR/ALIGN/SUBLET

ET=LABOR/PARTIAL REPLACE RP=RELATED PRIOR DAMAGE

EP=SEE PX REPORT

L=REFINISH

IT=LABOR/PARTIAL REPAIR

EU=QUALITY RECYCLED PARTS

P=CHECK

TE=PART/PARTIAL REPLACE AA=APPEARANCE ALLOWANCE

UP=UNRELATED PRIOR DAMAGE *=USER ENTERED VALUE

-----REMARKS----OD - NONE NOTED. AIR BAG SENSORS UPON INVOICES.

1994 JAGUAR XJ6/XJ12 4 DOOR SEDAN

/G OPTNS B/E2

OPTIONS:

EUROPEAN/COMPOSITE H/LAMPS

TWO-STAGE - EXTERIOR SURFACES

OP	GDE MC DESCRIPTION		MFG. PART NO.	PRICE	AJ%	HOURS	R
E E E	005 01 BUMPER, FRONT 018 COVER, FRONT BUMPER 008 MLDG, FRT BUMPR COVER 012 MLDG, FRT BUMPR COVER 013 MLDG, FRT BUMPR COVER 021 SPOILER, LOWER FRONT 021 09 SPOILER, LOWER FRONT	LT RT	BEC24383 BDC5098 BEC24150 BEC24863 BEC24862 BEC5616 REFINISH	755.00 328.95 451.45 79.50 79.50 283.80		3.4 INC INC INC INC	1 1 1 1 1
Ε	009 FILLER, FRONT BUMPER		BEC14082	14.60		2.4 INC	

CLAIM #	" A	1 LOG NO	DATE	4		
E 020 RETAINER, FRONT BUMPER	DТ		9 0	. .	T.N.C. 1	
					INC 1	
E 006 01 ABS, FRONT ENERGY E 007 01 ABS, FRONT ENERGY	DT	DEC23200	227.8	5 -	.3 1	
E 039 BRKT, FRT BMPR OTR EXTN	N I	BEC23280	227.8		.3 1	
E 039 BRKT, FRT BMPR OTR EXTN E 028 GRILLE ASSEMBLY	KI	DUC477D	4.3		INC 1	
E 020 CDILLE ASSEMBLY	LI	HMB55U3AA	150.00		.3 1	
E 029 GRILLE ASSEMBLY		HMB5502AA			.3 1	
E 037 GRILLE ASSEMBLY		BEC5666		5	.7 1	
E 101 BRKT, GRILLE MOUNTING	Ri			5	1	
E 031 EMBLEM, GRILLE		BBC4770	25.2	5	.2 1	
E 025 HEADLAMP ASSY, HALOGEN	RT		469.7	0	.3 1	
N 973 HEADLAMPS AIM		ADDITIONAL OPERATION			*1	
E 060 RING, BEAM RETAIN	LT	JLM2015			INC 1	
E 026 LENS, HEADLAMP E 135 FILLER, HEADLAMP HSG	LT	JLM2013	214.3	5	.5 1	
E 135 FILLER, HEADLAMP HSG	RT	BDC7070	3.4		1	
E 030 PAKKLAMP ASSEMBLY	K I	DBC11000 ·	37.6	5 .	INC 1	
E 150 LENS, PARKLAMP E 058 LAMP, SIDE MARKER	LT	JLM11244	10.0	5	INC 1	
E 058 LAMP, SIDE MARKER	RT	DBC11664	26.4	5	.2 1	
E 147 LENS,SIDE MARKER	LT	JLM10867	11.50	0	.2 1	
E 083 PANEL, HOOD		JLM11006	1155.00	0	1.5 1	
				TAMES OF H	4 -7 .4	LAMORUS
E 110 CABLE, HOOD LOCK is the contract of	RT	BBC5093 at a trail for minor	+ : 4: 5 > 7 . 0!	5	5.1	Himsonn will
L 084 HINGE, HOOD PANEL E 085 HINGE, HOOD PANEL L 085 HINGE, HOOD PANEL I 078 07 PANEL, RADIATOR SIDE L 078 PANEL, RADIATOR SIDE	LT	REFINISH	A Company	TOLANN C.	3 4	HILES A STATE
E 085 HINGE, HOOD PANEL	RT	CAP1326	31 9	U にほうりゅう (1)	INC 1	O ANGTH V 40
L 085 HINGE, HOOD PANEL	RT	REFINISH		• · · · · · · · · · · · · · · · · · · ·	3 4	
I 078 07 PANEL, RADIATOR SIDE	ΙŤ	REPATRIAL TON	•		1 5+1	
L' 078 PANEL RADIATOR SIDE	IT	REFINISH			1.5^1	
E* 079 07 PANEL, RADIATOR SIDE	PT	CAP6216	38.41	n	4.1 1	
L 079 PANEL, RADIATOR SIDE	PΤ	DEFINISH			.4 4	
E 075 07 CRSMBR, RAD PANEL UPR		CAD6206	39.60	.	4.9 1	
L 075 CRSMBR, RAD PANEL UPR		REFINISH	39.00	•	.4 4	
E 081 07 REINF, RAD SUPT PANEL		CAP6112	73.6	E	1.0 1	
L 081 REINF, RAD SUPT PANEL		REFINISH				
E 200 07 REINF, RAD SUPT PANEL	DT	CAD6120	46.2	c	.1 4	
L 200 REINF, RAD SUPT PANEL	D.T.	REFINISH	40.2	ວ	INC 1	
E 755 RADIATOR	PC 1		501 0	•	.1 4	
		CCC5476	521.80		INC 1	
		CCC5005	33.10	U .	INC 1	
		REFINISH		-	.1 4	
,		CCC5489	353.1		.3 2	
•		ADDITIONAL OPERATION			1.4 2	
		CBC9822	504.00		INC 2	
		CAP6342	67.8	0 1998 8 8	6.8 1	
L 106 PNL, INR FENDER FRONT		REFINISH		•	.5 4	
I 119 07 REINF, INNER FENDER	RT	REPAIR/ALIGN			1.5*1	
L 119 REINF, INNER FENDER		REFINISH			.14	
I 264 07 SIDE MEMBER, FRONT		REPAIR/ALIGN		;	3.0 * 1	5 m
L 264 SIDE MEMBER, FRONT		REFINISH			.34	
E 266 01 COVER, FRT SIDE MEMBER	RT	BEC1446	8.8	5	1	
L 266 COVER, FRT SIDE MEMBER	RT	REFINISH			.14	
E 262 BRKT, SIDE MEMBER	RT	CAP6100	148.8	0 :	INC 1	
L 262 BRKT, SIDE MEMBER	RT	REFINISH			.1 4	
I 103 FENDER, FRONT	LT	REPAIR/ALIGN			3.5 * 1	
L 103 FENDER, FRONT	LT	REFINISH			2.4 4	
E 128 SKIRT, INNER FENDER	RT	BDC7702	80.2		INC 1	
E 114 SHIELD, FRONT SPLASH	RT	BEC11048	6.9		INC 1	
E 177 DUCT, FRONT FENDER	RT	BBC4938	35.20		INC 1	
N 974 SUSPENSION ALIGN, FRT		ADDITIONAL OPERATIO			*2	
		· · ·			_	

CLAIM #	WOOLVOIS 4 DOOK SERVIL	A1 LOG NO	DATE PAY	BEST AVAILABLE COPY	
ECG143	WINDSHIELD, TINTED	NAGS FW652-GT	296.26*	+20 *1	
E 144	RESERVOIR, W/S WASHER	JLM11120	105.00		_
I 208	DOOR SHELL, FRONT	RT REPAIR/ALIGN		1.5*1	_
L 208	DOOR SHELL, FRONT DOOR SHELL, FRONT	RT REFINISH		1.5*4	
N M04	UNDERCOATING	ADDITIONAL OP	ERATION 5.00*		
N M05	RUSTPROOFING	ADDITIONAL OPE	RATION 10.00*		
L M08	STONEGUARD	REFINISH	20,00	.5*4	
N M14	CORROSION PROTECTION	ADDITIONAL OPE	RATION 20.00*	Δ	
L M16	COLOR BLEND	REFINISH	20,00	1.5*4	
N M31	SET-UP FOR REALIGNMEN		ERATION	3.0*3	
N M40	FRAME SIDESWAY, FRON	T ADDITIONAL OPE	RATION	2.0*3	
N M41	FRAME SAG, FRONT	ADDITIONAL OPE	RATION	3.0*3	
E I	PASSENGER AIR BAG MODE		754.05*		
I	DT FOT ATOUT TALLED			2.0*1*	
N .	R AND I MECHANICALS	ADDITIONAL OPE	PATION	1 5424	
EC	COOLANT	** OUALITY RE	PL PART 12 00*	1.5-2-	
EC	FREEON	** QUALITY REF	PL PART 25 00*		
Ε	RI FEMUER OU MILLIS	MIN DADI	. 25 00+	2414	
E I	RT DOOR SD MLDG	NEW PART	45 00*	2+1+	
I	FRT CROSS MEMBER	REPAIR/ALIGN		1 4 7 2 2 7 1 5 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	
EC .	RT DOOR SD MLDG FRT CROSS MEMBER RT FRT TIRE, A THEODOOR HOOD DECALS	AC** OUALITY REF	L-PART 125 00*	ATTI COLANO WAJ AUNUJA	
E	HOOD DECALS	NEW PART . BELL	2 VIA - AUA 0.00*	any pehson who knowingly Files a statement of Ceaim	
87 I		A CO DESCRIPTION OF THE SECTION OF T		FILES A STATEMENT OF CLAIM OF *FELONY OF THIND DEGREE	
	MC MESSAGE				:=:f ;

MC MESSAGE

- 01 CALL DEALER FOR EXACT PART # REQUIRED
- 07 STRUCTURAL PART AS IDENTIFIED BY I-CAR
- 09 INCLUDES 0.6 HOURS MAJOR PANEL TWO-STAGE ALLOWANCE

NTRIES			
		•	8,134.80
•	•		536.21
	•		59.25
			194.40
			8,924.66
TERIAL	6	6.000%	535.48
RATE	REPLACE HRS	REPAIR H	R.S.
		and the second s	1,081.60
			208.00
30.00			240.00
26.00	16.2		421.20
12.00			721.20
			1,950.80
	R	6.000%	117.05
	`		227.00
			11,527.99
			500.00-
			11.027 99
		TERIAL REPLACE HRS 26.00 27.1 52.00 1.1 30.00 26.00 16.2 12.00	TERIAL @ 6.000% RATE REPLACE HRS REPAIR HI 26.00 27.1 14.5 52.00 1.1 2.9 30.00 8.0 26.00 16.2

ADP#AUDATEX A1 U ES LOG DATE 94 15:29:58 047 ACOPY N PXN:CY/00/00/00 CUM:00/00/00 PXS:YN/00/00/00 CUM:00/00/00/00

ATTACHMENT C

CRASHPC Output (Jaguar vs. Mazda)

SUMMARY OF CRASHFC RESULTS USING DAMAGE

CRASHS RECONSTRUCTION

SPEED CHANGE (DAMAGE)

VEHICLE #1

TOTAL 12 KPH (8 MPH)
LONGITUDINAL -12 KPH (-8 MPH)
LATITUDINAL 0 KPH (0 MPH)
PDOF ANGLE 0 DEGREES

ENERGY DISSIPATED = 13923 JOULES (10268 FT-LB)

VEHICLE #2

TOTAL 22 KPH (14 MPH)
LONGITUDINAL 22 KPH (14 MPH)
LATITUDINAL 0 KPH (0 MPH)
PDOF ANGLE -180 DEGREES

ENERGY DISSIPATED = 20285 JOULES (14960 FT-LB)

DIMENSIONS AND INERTIAL PROPERTIES

	VEHICLE #1	VEHICLE #2
CG TO FRONT AXLE	130 CM. (51 IN.)	115 CM. (45 IN.
CG TO REAR AXLE	141 CM. (56 IN.)	122 CM. (48 IN.)
TRACK	150 CM. (59 IN.)	130 CM. (51 IN.)
CG TO FRONT OF VEH	228 CM. (90 IN.)	193 CM. (76 IN.)
CG TO REAR OF VEH	-270 CM. (-106 IN.)	-213 CM. (-84 IN.)
CG TO SIDE OF VEH	92 CM. (36 IN.)	77 CM. (30 IN.)
MOMENT OF INERTIA	17152 KGS (37812 LBS)	5872 KGS (12946 LBS)
VEHICLE MASS	5 KGS (11 LBS)	3 KGS (6 LBS)

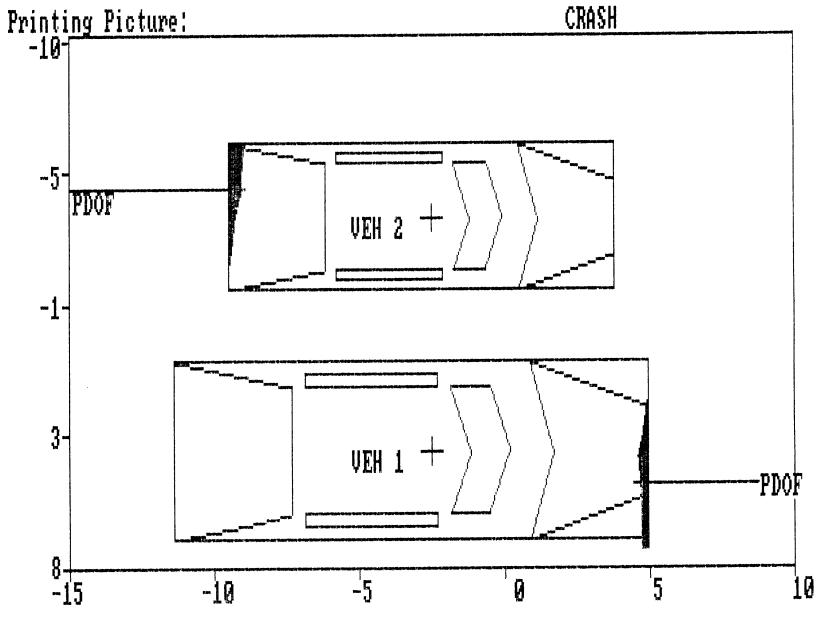
DAMAGE DATA

VEHICLE #	1.	
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VEHICLE #2

SIZE CATEGORY STIFFNESS CATEGORY	3 3	<u>1</u> 1
VEHICLE WEIGHT	1984 KGS (4375 LBS)	1126 K GS (2482 LBS)
ODC	12FDMW1	OSBDEW1
PDOF ANGLE	O DEGREES	180 DEGREES
CRUSH LENGTH	157 CM. (62 IN.)	127 CM. (50 IN.)
Ci	O OM. (O IN.)	18 CM. (7 IN.)
02	5 CM. (2 IN.)	15 CM. (6 IN.)
CG	10 OM. (4 IN.)	13 CM. (5 IN.)
C c‡	8 CM. (3 IN.)	8 CM. (3 IN.)
CB	8 CM. (3 IN.)	5 CM. (2 IN.)
C6	8 CM. (3 IN.)	3 CM. (1 IN.)
D	25 CM. (10 IN.)	-10 CM. (-4 IN.)
D,	35 CM. (14 IN.)	-27 CM. (-11 IN.)

(* INDICATES DEFAULT VALUE)



DAMAGE DESCRIPTION