

DOT 267

TEST
REPORT

CONTRACT NAME: DUMMY RESPONSE IN SIDE IMPACT

CONTRACT NUMBER: DOT-HS-8-01941, TASK ORDER NO. 2

TEST DESCRIPTION: MALIBU INTO VOLKSWAGEN; TEST #2
OF A THREE TEST SERIES

TEST NUMBER: 1955

DATE: FEBRUARY 3, 1981

MINICARS, INC.

TEST REPORT

CONTRACT NAME: Dummy Response in Side Impact

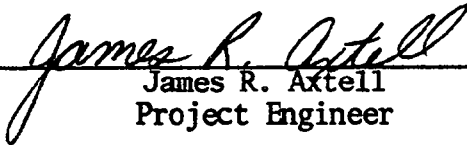
CONTRACT NUMBER: DOT-HS-8-01941, Task Order No. 2

TEST DESCRIPTION: Malibu into VW; Test #2
of a three test series

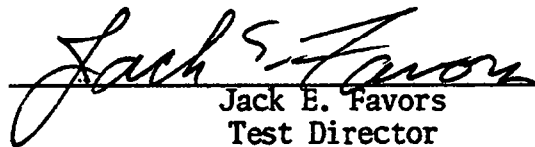
TEST NUMBER: 1955

DATE: February 6, 1981

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ABBREVIATIONS		
N/A - Not Available		
DNA - Data Not Available		
DNR - Data Not Required		

INTRODUCTION

GENERAL OBJECTIVES

Under Contract DOT-HS-8-01941, Task Order No. 2, Minicars is conducting six side impact crash tests. These tests are broken into two series of three tests each. The objective of each three-test series is to reenact, as closely as possible, a representative real world accident in which one vehicle was impacted on its side. The mechanical response of the new NHTSA side impact dummy, in the impacted vehicle, is recorded and analyzed for comparison to the injuries of the actual accident victim.

Vehicle response is also recorded for both vehicles, in order to more closely duplicate actual crash conditions in subsequent tests.

SECTION 1

TEST OBJECTIVES AND SPECIAL PROCEDURES

OBJECTIVES:

To conduct a side impact car-to-car crash with a newly designed NHTSA side impact dummy seated in the laterally impacted target car. Data from this test will be compared to injury severities of actual accident victims.

SPECIAL PROCEDURES:

A Chevrolet Malibu impacts the driver's side of a Volkswagen sedan. The Malibu's forward velocity is 17.5 ± 0.5 mph. The Volkswagen's forward velocity is 35.0 ± 0.5 mph. Speeds and impact conditions have been determined by a series of SMAC computer runs and a previous crash test.

SUMMARY OF CRASH TEST CONDITIONS (cont'd)

Test No.: 1955 Project Title: Dummy Response in Side Impact

Date: 12-5-80 Time: 11:45 a.m. Temp: 65°F

Impacted Vehicle/Object Data

Description: Volkswagen Sedan

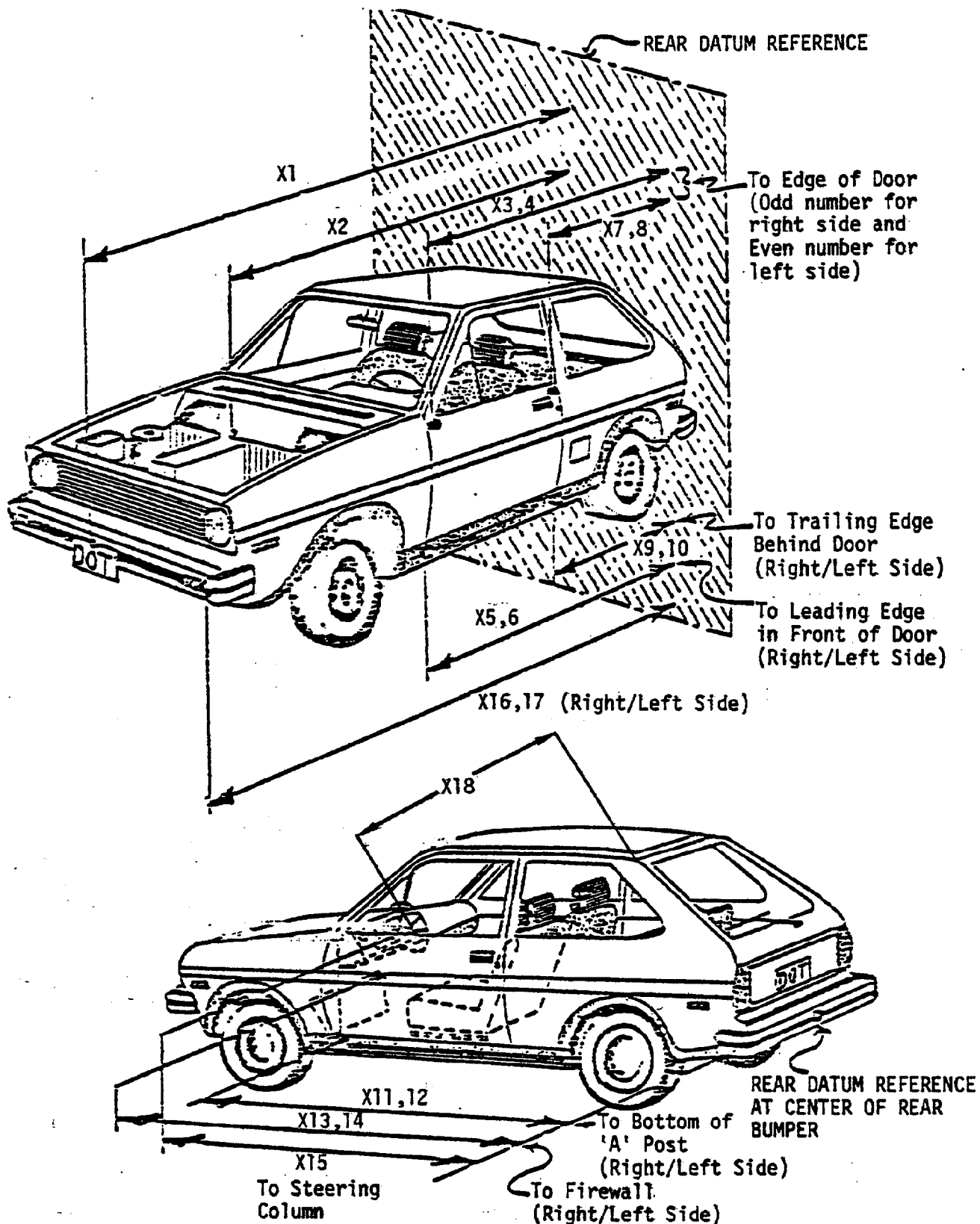
	<u>Actual</u>	<u>Intended</u>
Test weight (lbs)	2100	2085 + 50
Vehicle orientation (degrees)	270	270
Vehicle velocity (mph)	36.35	35.0 + 0.5
Maximum crush (inches)		
Static	12.35	10
Dynamic	-	12

Dummies

	<u>Driver</u>	<u>Middle Passenger</u>	<u>Rt. Front Passenger</u>	<u>Left Rear Passenger</u>	<u>Rt. Rear Passenger</u>
Type	NHTSA				
Serial no.	T1-1				
Instrumentation					
Head accel.	x				
Chest accel.	x				
Femur L.C.'s					
Other - Pelvic Gs	x*				
Restraint system					

Remarks: *See page 17 for a summary of the dummy instrumentation.

PRE-TEST AND POST-TEST MEASUREMENT POINTS - FRONTALLY IMPACTED VEHICLES



SECTION 2

TEST CONDITIONS

SUMMARY OF CRASH TEST CONDITIONS

Test No.: 1955 Project Title: Dummy Response in Side Impact

Date: 12-5-80 Time: 11:45 a.m. Temp: 65°F

Subject Vehicle Data

Description: 1972 Chevrolet Malibu Classic

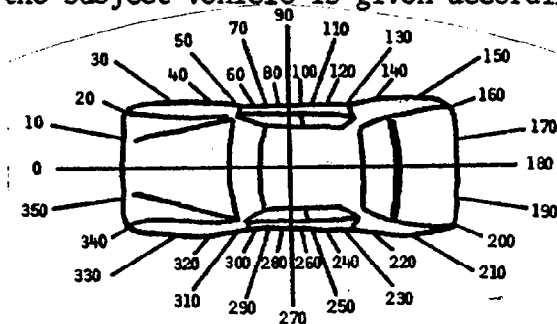
	Actual	Intended
Test weight (lbs)	3830	3688 + 50
Vehicle orientation (degrees)*	0	0
Vehicle velocity (mph)	18.25	17.5 + 0.5
Maximum crush (inches)		
Static	3.3	5
Dynamic	-	6
Maximum intrusion (inches)	0	0

Dummies

	Driver	Middle Passenger	Rt. Front Passenger	Left Rear Passenger	Rt. Rear Passenger
Type	P. 572 50 M		P. 572 50 M		
Serial no.	M6-3		M8-3		
Instrumentation					
Head accel.	x		x		
Chest accel.	x		x		
Femur L.C.'s	x		x		
Other					
Restraint system	3 point Belts		3 point Belts		

Remarks:

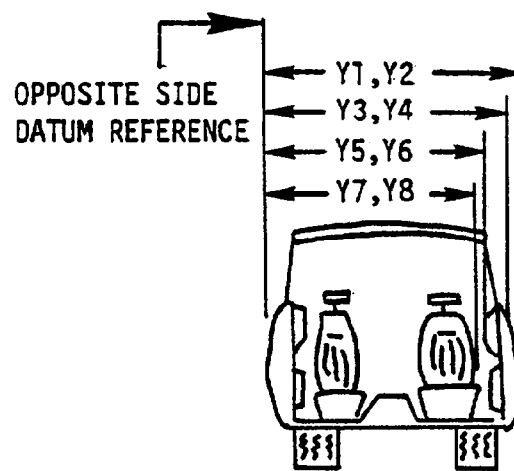
*The orientation of the subject vehicle is given according to the following diagram:



VEHICLE MEASUREMENTS - Chevrolet Malibu

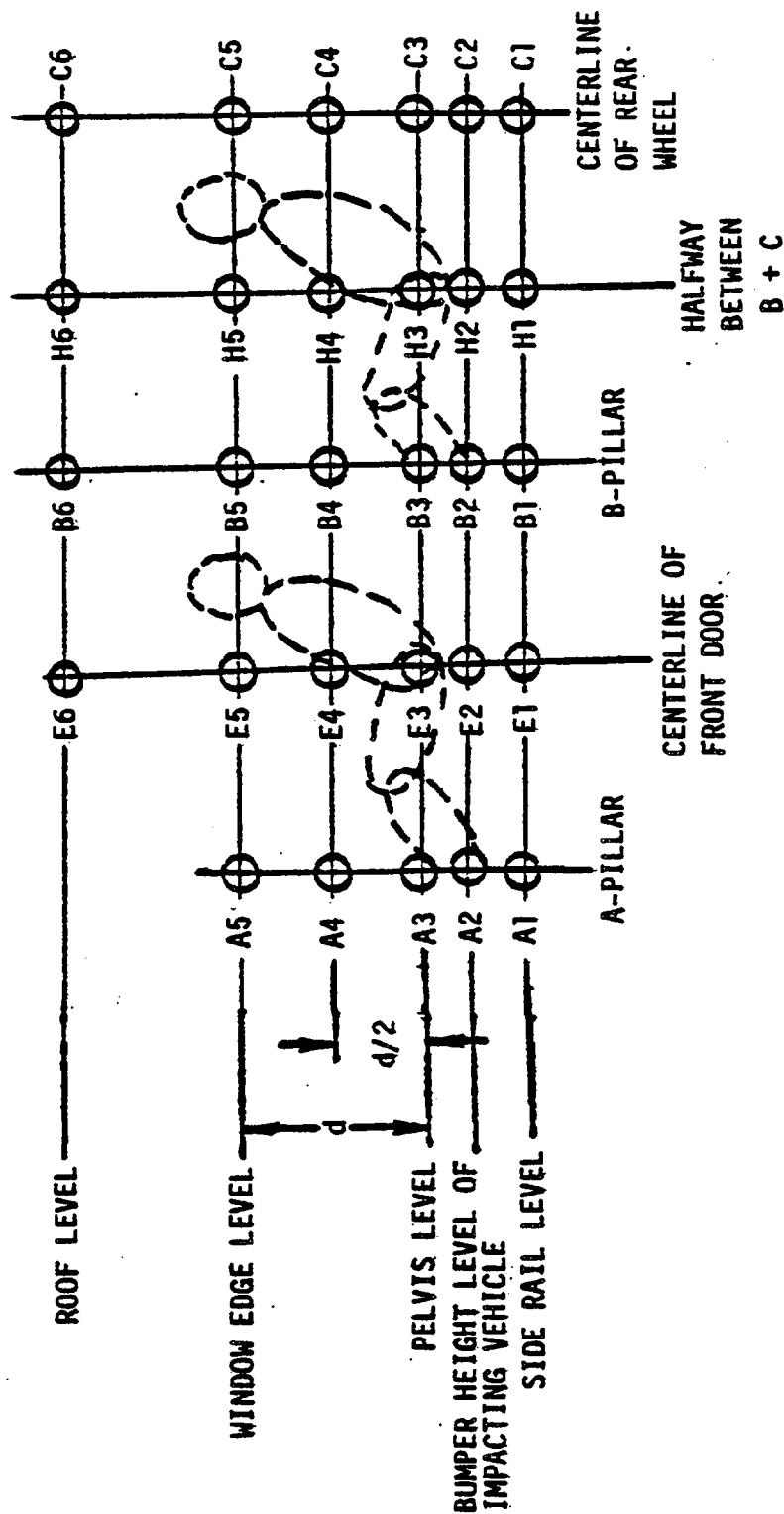
No.	Type of Measurement	Dimensions (inches)	
		Pre-Test	Post-Test
X1	Total Length of Vehicle at Centerline	196.4	193.5
X2	Rear Surface of Vehicle to Firewall	133.2	133.2
X3	Rear Surface of Vehicle to Upper Leading Edge of Right Door	127.0	127.4
X4	Rear Surface of Vehicle to Upper Leading Edge of Left Door	127.0	126.75
X5	Rear Surface of Vehicle to Lower Leading Edge of Right Door	129.8	130.2
X6	Rear Surface of Vehicle to Lower Leading Edge of Left Door	129.7	129.7
X7	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	81.0	81.5
X8	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	81.1	81.0
X9	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	79.9	80.25
X10	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	80.0	80.0
X11	Rear Surface of Vehicle to Bottom of A-Post of Right Side	127.1	128.0
X12	Rear Surface of Vehicle to Bottom of A-Post of Left Side	127.0	127.0
X13	Rear Surface of Vehicle to Firewall - Right Side	142.7	141.0
X14	Rear Surface of Vehicle to Firewall - Left Side	142.0	142.0
X15	Rear Surface of Vehicle to Steering Wheel Center	117.0	116.75
X16	Rear Surface of Vehicle to Right Side of Front Bumper	190.5	190.5
X17	Rear Surface of Vehicle to Left Side of Front Bumper	190.5	187.25
X18	Rear Window Header to Steering Wheel Center	53.1	53.1

PRE-TEST AND POST-TEST MEASUREMENT POINTS -
LATERAL IMPACT VEHICLE - Volkswagen Sedan



No.	Measurement	Value (inches)	
		Pre-	Post-
Y1	Exterior Width at Front Dummy's H-Pt Location	54.2	46.6
Y2	Exterior Width at Rear Dummy's H-Pt Location	54.2	45.6
Y3	Exterior Width at Front Dummy's Shoulder-Pt Location	51.5	47.3
Y4	Exterior Width at Rear Dummy's Shoulder-Pt Location	50.0	39.0
Y5	Interior Width at Front Dummy's H-Pt Location	48.25	43.5
Y6	Interior Width at Rear Dummy's H-Pt Location	N/A	N/A
Y7	Interior Width at Front Dummy's Shoulder-Pt Location	46.75	42.1
Y8	Interior Width at Rear Dummy's Shoulder-Pt Location	N/A	N/A

MAXIMUM OCCUPANT COMPARTMENT INTRUSION WILL BE MEASURED RELATIVE TO AN UNDEFERRED VEHICLE REFERENCE LINE. EXTERIOR INTRUSION SHALL BE MEASURED, AND CONTOUR MAPS OF THE IMPACTED AND IMPACTING VEHICLES WILL BE PREPARED.



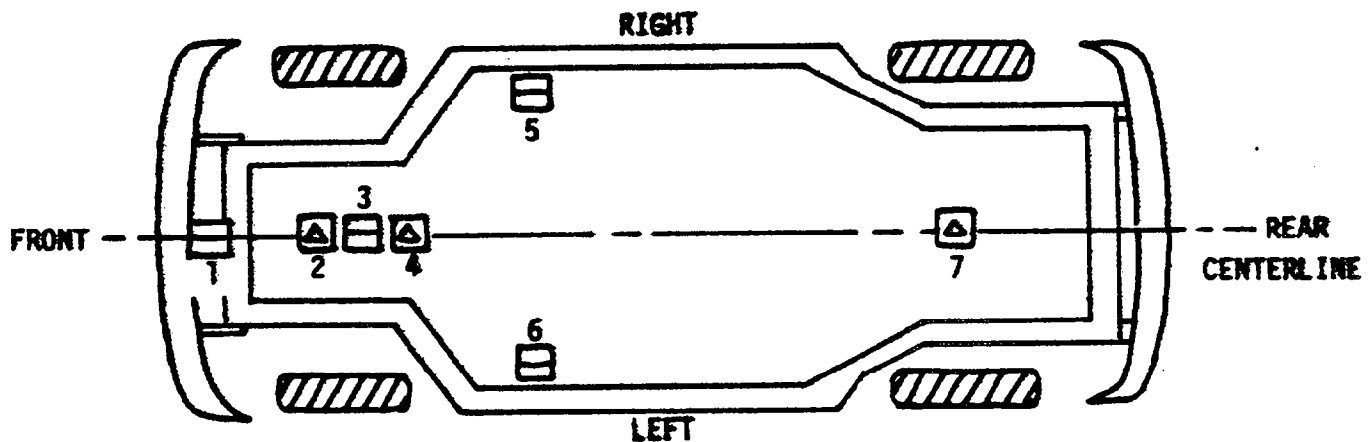
○ LOCATIONS AT WHICH INTRUSION MEASUREMENTS ARE MADE

INTRUSION MEASUREMENT

Volkswagen Sedan

Location (See Figure 1)	Pre-Test (inches)	Post-Test (inches)	Crush (inches)
A1	3.0	4.5	1.5
A2	6.8	8.6	1.8
A3	6.6	8.75	2.15
A4	6.5	8.75	2.25
A5	7.75	8.25	0.50
B1	3.0	3.5	0.5
B2	4.5	15.5	11.0
B3	4.25	15.75	11.5
B4	4.25	11.1	6.85
B5	5.5	11.5	6.0
B6	9.5	9.75	0.25
C1	2.75	2.5	0
C2	4.5	4.0	0
C3	4.4	4.5	0.1
C4	3.5	DNA	DNA
C5	9.25	13.0	3.75
C6	DNA	DNA	DNA
E1	3.0	10.0	7.0
E2	5.25	10.9	5.65
E3	4.9	12.5	7.60
E4	5.0	13.0	8.0
E5	6.25	10.5	4.25
E6	10.1	10.0	0
H1	3.0	DNA	DNA
H2	3.0	12.0	9.0
H3	4.9	13.75	8.6
H4	4.9	17.25	12.35
H5	7.0	18.0	11.0
H6	9.75	10.3	0.55

VEHICLE: BULLET VEHICLE - Chevrolet Malibu



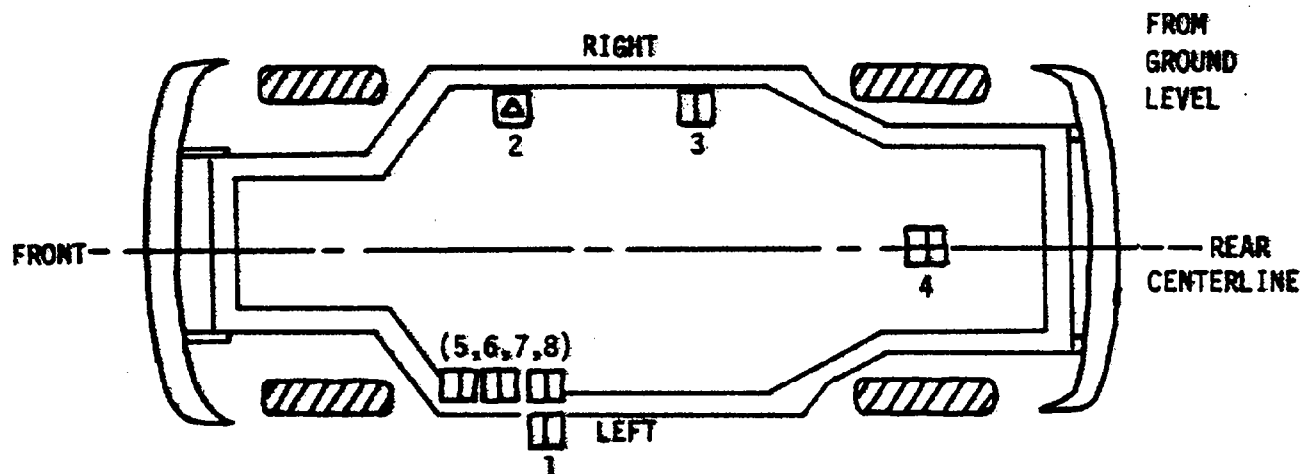
Linear Accelerometers

-  Longitudinal
-  Lateral
-  Vertical
-  Triaxial

Vehicle Transducer Locations

No.	Description of Location	X	Y	Z
1	Behind Front Bumper	x	-	-
2	Engine	x	x	x
3	Front Suspension Right Side (Unsprung Mass)	x	-	-
4	Firewall on Vehicle Centerline	x	x	x
5	Rocker Panel Inside Car	x	-	-
6	Rocker Panel Inside Car	x	-	-
7	Vehicle Centerline, Trunk Floor Right Behind Rear Seat	x	x	x

VEHICLE: TARGET VEHICLE - Volkswagen Sedan



Linear Accelerometers

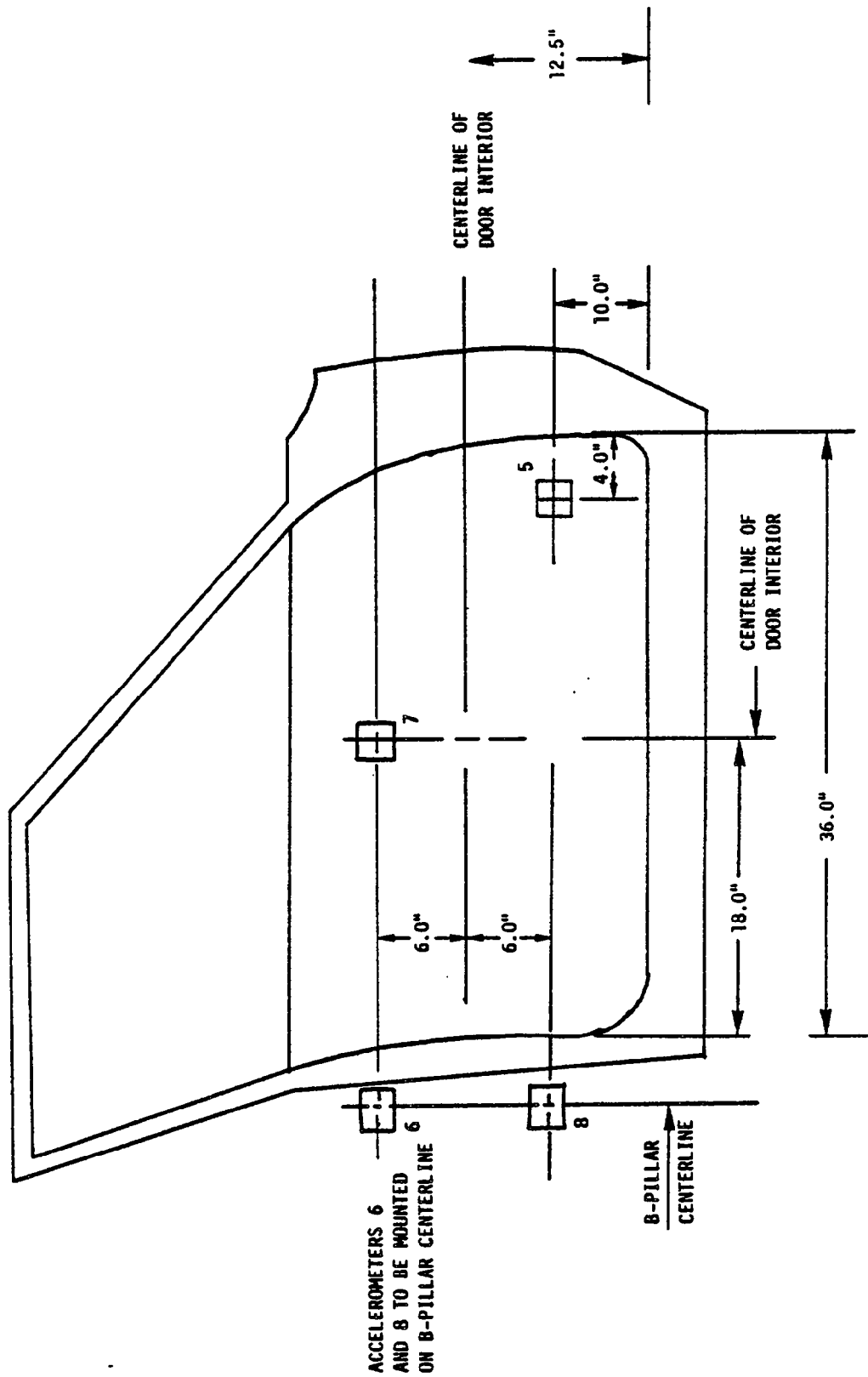
-  Longitudinal
-  Lateral
-  Triaxial

Vehicle Transducer Locations

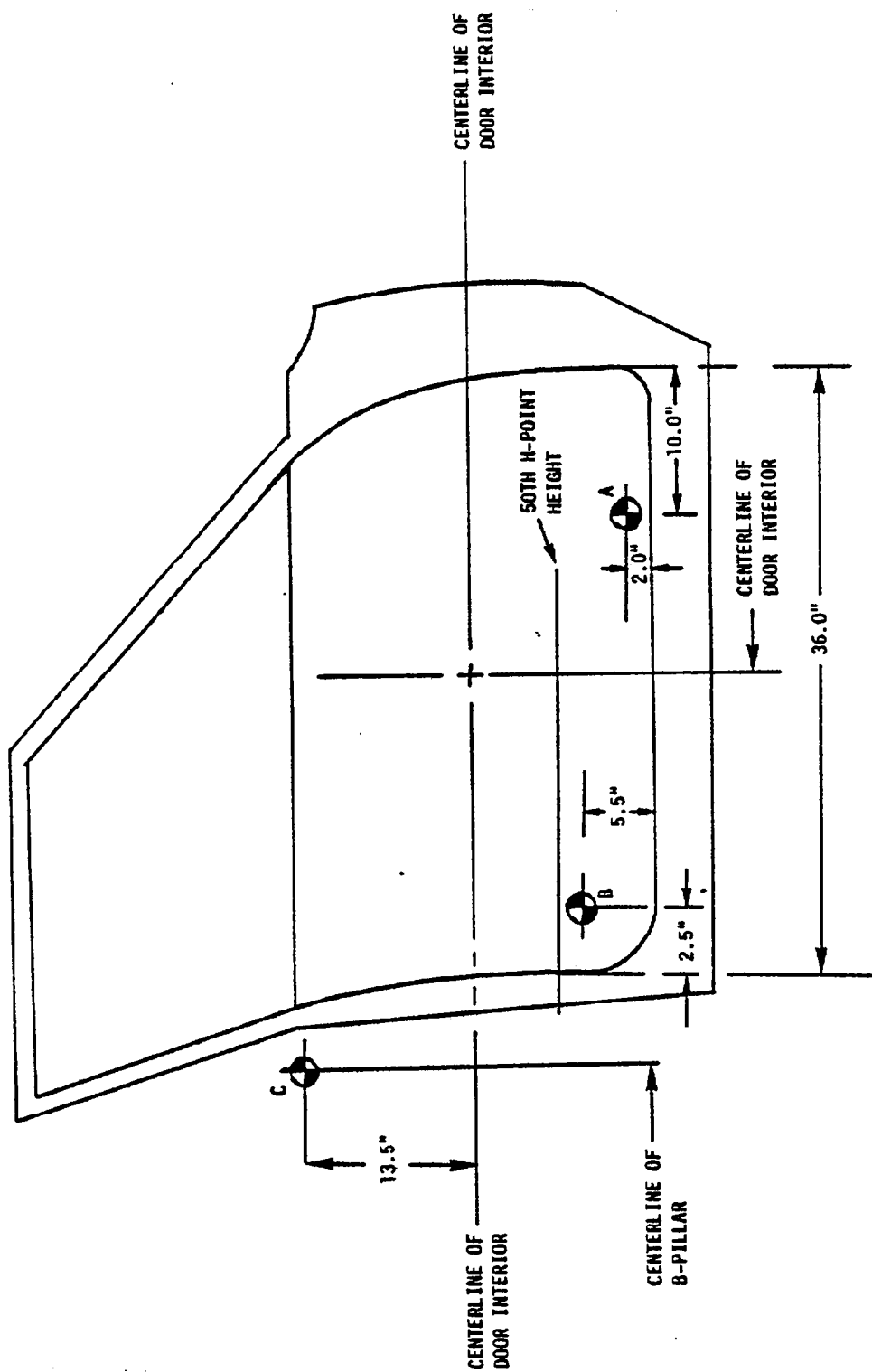
No.	Description of Location	X	Y	Z
Accelerometers				
1	14 Inches Forward of B-pillar Mounted on Rocker Panel (inside)		x	
2	Inside on Rocker Panel Front Door Area	x	x	x
3	Inside on Rocker Panel Front Door Area		x	
4	Trunk Floor on Vehicle Centerline Directly Behind Rear Seat	x	x	
5,6 7,8	See Door Accelerometer Locations		x	

Displacement (String Potentiometer) - See String Potentiometer Locations

- A Lower Forward Location on Left
Inner Door
- B Rear Left Inner Door
- C Across B-pillars



DOOR ACCELEROMETER LOCATIONS: Volkswagen Sedan



STRING POTENTIOMETER LOCATIONS: Volkswagen Sedan

INSTRUMENTATION SUMMARY

VEHICLE: TARGET VEHICLE - Volkswagen Sedan

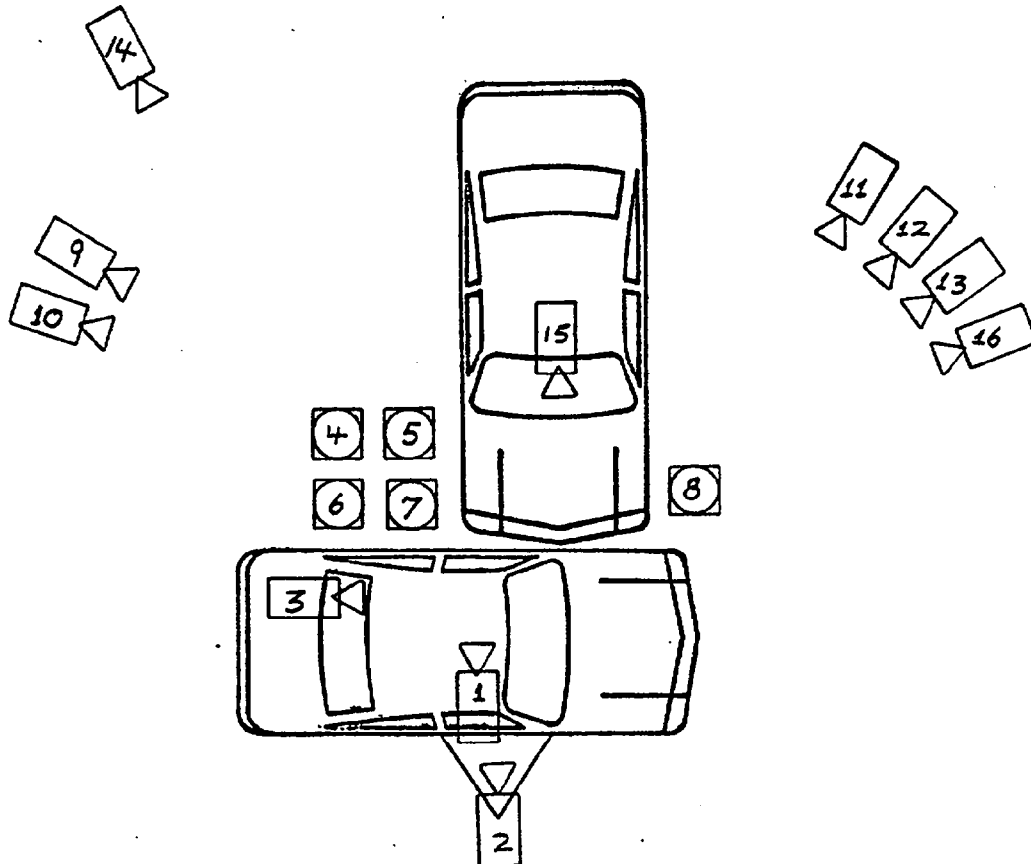
Instrument	Number	Total Number of Channels
Vehicle Accelerometers	8 Locations	11
Dummy*	1 Location	20
Load Cells	None	0
Rate Sensors	1 Location	3
String Potentiometers	3 Locations	3
		Total = 37

VEHICLE: BULLET VEHICLE - Chevrolet Malibu

Instrument	Number	Total Number of Channels
Vehicle Accelerometers	7 Locations	13
Dummies	2 Locations	16
Load Cells	None	0
Rate Sensors	1 Location	3
Strain Gauges	None	0
String Potentiometers	None	0
		Total = 32

*Head Acceleration: 3 Channels (Triaxial)
 Upper Spine Acceleration: 3 Channels (Triaxial)
 Lower Spine Acceleration: 3 Channels (Triaxial)
 Left Ribs Acceleration: 2 Channels (RL)
 Right Ribs Acceleration: 2 Channels (RL)
 Pelvis Acceleration: 3 Channels (Triaxial)
 Upper Sternal Acceleration: 1 Channel (AP)
 Lower Sternal Acceleration: 1 Channel (AP)
 Chest Deflection: 2 Channels (RL)

CRASH CONFIGURATION AND CAMERA LOCATIONS



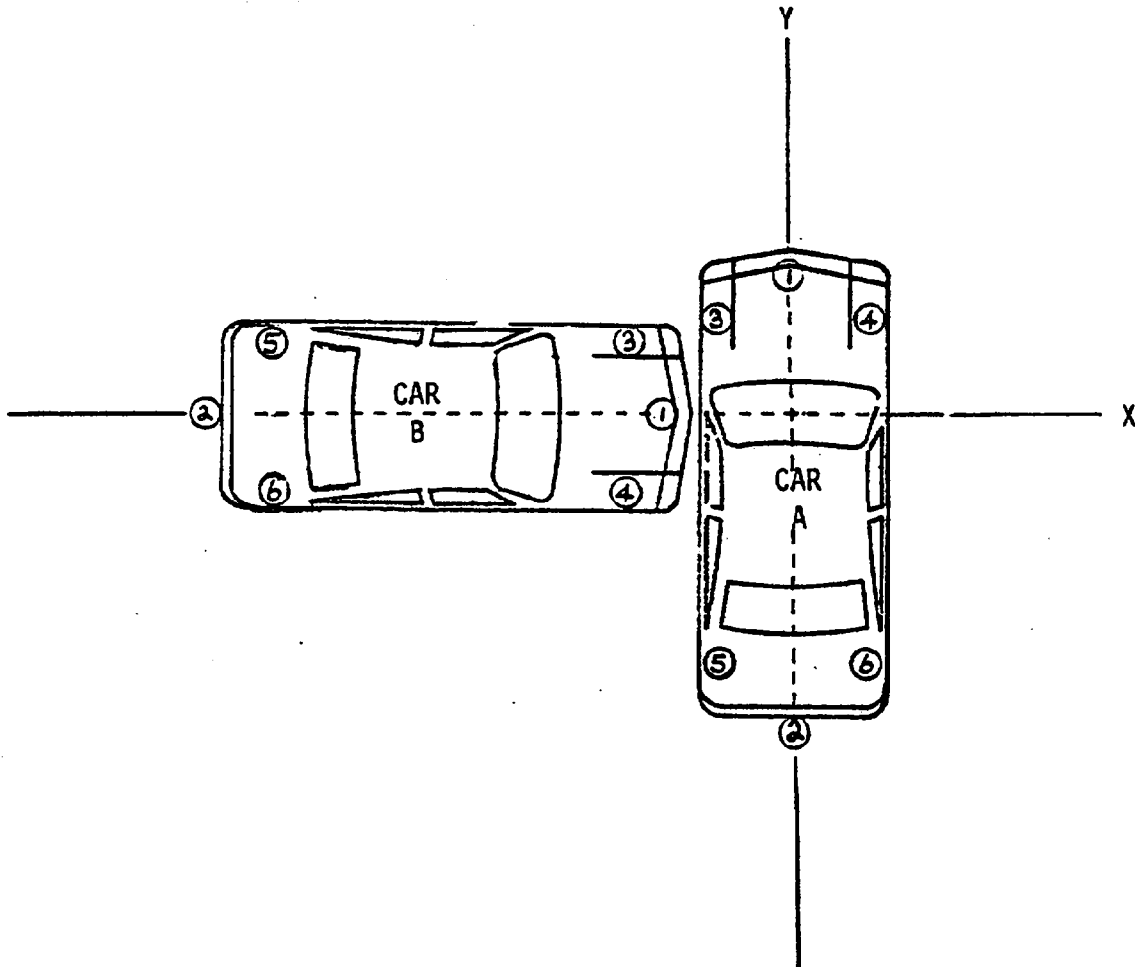
Camera numbers are keyed to Camera Information table.

CAMERA INFORMATION

Camera Number	Location	Type	Lens (mm)	Speed (fps)	Purpose of Camera Data
1	Volkswagen -- On-board	Photosonic 1B	8mm	1000	Views dummy through hole cut in roof
2	Volkswagen -- On-board	Photosonic 1B	8mm	1000	Dummy kinematics through passenger window
3	Volkswagen -- On-board	Photosonic 1B	8mm	1000	View along interior sidewall
4	Tower mounted overhead	Photosonic 1B	13mm	1000	Vehicle speed and crush at impact zone
5	Tower mounted overhead	Photosonic 1B	8mm	1000	Wide angle view
6	Tower mounted overhead	Photosonic 1B	5.3mm	1000	Overall view of both cars
7	Tower mounted overhead	Sequence Polaroid	N/A	N/A	Determine impact point
8	Tower mounted oblique	Photosonic 1B	13mm	1000	Oblique view of impact
9	Offboard	Photosonic 1B	13mm	1000	Close-up of impact zone
10	Offboard	Nikon FM	50mm	Motor-drive	35mm sequence of event
11	Offboard	Photosonic 1B	13mm	1000	Close-up of impact zone
12	Offboard	Nikon FM	35-105 zoom	Motor-drive	35mm sequence of event
13	Offboard	Bronica ETR	75mm	N/A	Peak event still
14	Offboard	Arriflex 16mm	10-120 zoom	24	Documentary
15	Malibu -- On-board	GSAP-16mm	17mm	32	Documentary of impact
16	Offboard	Sequence Polaroid	N/A	N/A	Determine impact point

EVENT CONFIGURATION

Test Number: 1955
Car A: Volkswagen Sedan
Car B: Chevrolet Malibu



- 1 Front Bumper Centerline
- 2 Rear Bumper Centerline
- 3 Left Front Wheel Centerline
- 4 Right Front Wheel Centerline
- 5 Left Rear Wheel Centerline
- 6 Right Rear Wheel Centerline

Car A Velocity	<u>36.35 mph</u>
Car B Velocity	<u>18.25 mph</u>
Angle of Impact	<u>270 degrees</u>
Intended Offset	<u>7.25 inches</u>
Actual Offset	<u>11.75 inches</u>
Offset measured from Point 3 on Car A to Point 1 on Car B.	

SUMMARY OF TEST CONDITIONS

ST VEHICLE INFORMATION:

Vehicle Manufacturer: General Motors
 Make/Model: Chevrolet Malibu Classic
 Body Style: Coupe Model Year: 1972
 VIN: 136371L146658 Build Date: 1971
 NHTSA No.: None Color: Brown
 Engine Data: 8 cylinders; 350 in³ / cc displacement
 Transmission Data: 3 speed () Manual / (X) Automatic
 Date Vehicle Received by Laboratory: DNA
 Dealer's Name & Address: Private Party

Data from Certification Label on Left Door Rear Face or 'B' Post:

Vehicle Manufactured by: General Motors
 Date of Manufacture: 1971 VIN: 136371L146658
 GVWR: 4780 lbs.; GAWR: Front = 2370 lbs.; Rear = 2410 lbs.

Data from "Recommended Tire Pressure" Label on Door, Post, Glove Box, etc.:

Vehicle Load: Front Rear
 Up to Capacity 2 6 psi 3 0 psi

Recommended Tire Size:	Load Range:
E78 x 14	(B) C D

Vehicle Capacity:
 Type of Seats - ☐ Bench
☐ Bucket
☒ Split Bench

Number of Occupants = 3 Front
 (Designated Seating Capacity) 3 Rear
6 Total

Cargo Load = 1 1 0 0 lbs.
 Total = 1 1 0 0 lbs.

Weight of Test Vehicle as Received from Dealer (with maximum fluids):

Right Side = 1 8 0 0 lbs.
 Left Side = 1 8 4 0 lbs.

Total Front Weight = 2 1 1 0 lbs. (58 % of Total Vehicle Weight)
 Total Rear Weight = 1 5 3 0 lbs. (42 % of Total Vehicle Weight)
 Total Delv. Weight = 3 6 4 0 lbs.

Weight of Test Vehicle with Required Dummies and -0- lbs. Cargo:

Right Side = 1 9 1 0 lbs.
 Left Side = 1 9 2 0 lbs.

Total Front Weight = 2 2 2 0 lbs. (58 % of Total Vehicle Weight)
 Total Rear Weight = 1 6 1 0 lbs. (42 % of Total Vehicle Weight)
 Total Test Weight = 3 8 3 0 lbs.

Weight of Ballast Secured in Vehicle Trunk Area = 0 0 0 lbs.

T CONDITIONS:

Date of Test: 12-5-80 Time of Test: 11:45 am / pm
 Ambient Temperature: 65 °F at Impact Area

SUMMARY OF TEST CONDITIONS

TEST VEHICLE INFORMATION:

Vehicle Manufacturer: Volkswagen
 Make/Model: Volkswagen
 Body Style: 2-door sedan Model Year: 1970
 VIN: 1102448286 Build Date: 1970
 NHTSA No.: None Color: Tan/Gold
 Engine Data: 4 cylinders; in³ / cc displacement
 Transmission Data: 4 speed (X) Manual / () Automatic
 Date Vehicle Received by Laboratory: DNA
 Dealer's Name & Address: GFE

Data from Certification Label on Left Door Rear Face or 'B' Post:

Vehicle Manufactured by: Volkswagen
 Date of Manufacture: DNA VIN: 1102448286
 GVWR: DNA lbs.; GAWR: Front = DNA lbs.; Rear = DNA lbs.

Data from "Recommended Tire Pressure" Label on Door, Post, Glove Box, etc.:

Vehicle Load: Front Rear
 Up to Capacity 1 8 psi 2 7 psi

Recommended Tire Size:	Load Range:
155 SR15	(B) C D

Vehicle Capacity:
 Type of Seats - ☐ Bench
☒ Bucket
☐ Split Bench

Number of Occupants = 2 Front
 (Designated Seating Capacity) 2 Rear
4 Total

Cargo Load = 8 3 8 lbs.
 Total = 8 3 8 lbs.

Weight of Test Vehicle as Received from Dealer (with maximum fluids):

Right Side = 9 6 0 lbs.
 Left Side = 9 6 0 lbs.
 Total Front Weight = 7 5 0 lbs. (39 % of Total Vehicle Weight)
 Total Rear Weight = 1 1 7 0 lbs. (61 % of Total Vehicle Weight)
 Total Delv. Weight = 1 9 2 0 lbs.

Weight of Test Vehicle with Required Dummies and -0- lbs. Cargo:

Right Side = 1 0 1 0 lbs.
 Left Side = 1 0 9 0 lbs.
 Total Front Weight = 8 2 0 lbs. (39 % of Total Vehicle Weight)
 Total Rear Weight = 1 2 8 0 lbs. (61 % of Total Vehicle Weight)
 Total Test Weight = 2 1 0 0 lbs.

Weight of Ballast Secured in Vehicle Trunk Area = 0 0 0 lbs.

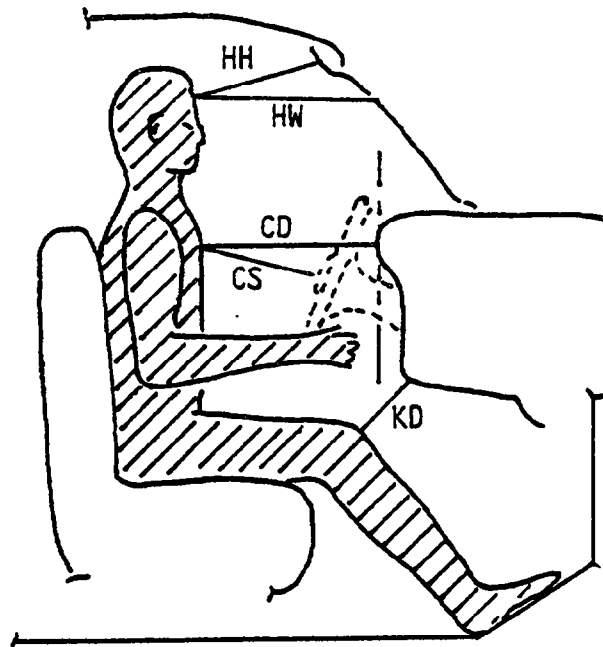
TEST CONDITIONS:

Date of Test: 12-5-80 Time of Test: 11:45 (am) / pm
 Ambient Temperature: 65 °F at Impact Area

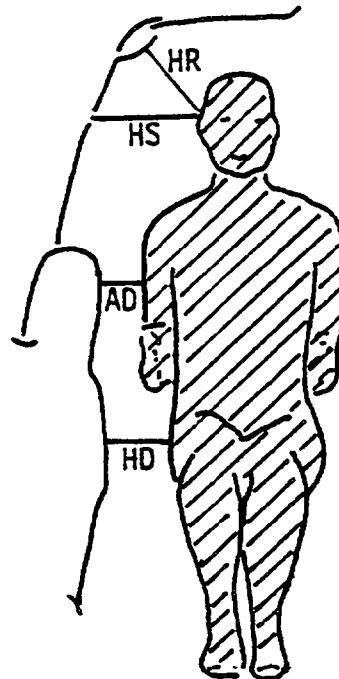
OCCUPANT CLEARANCE DIMENSIONS

Chevrolet Malibu

	Driver	Passenger
HH	17.0	17.5
HW	19.0	20.0
CD	24.0	22.0
CS	16.25	N/A
KDL	7.0	8.0
KDR	7.0	8.5



	Driver	Passenger
HR	5.5	5.5
HS	8.0	7.5
AD	4.5	6.25
HD	8.0	9.5

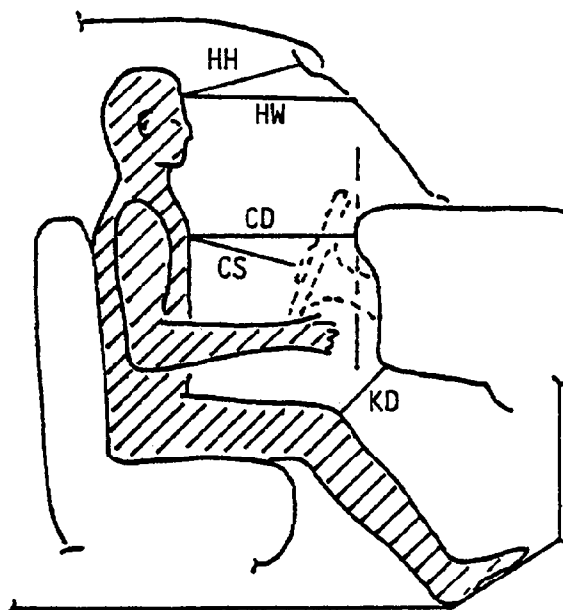


NOTE: ALL DIMENSIONS IN INCHES

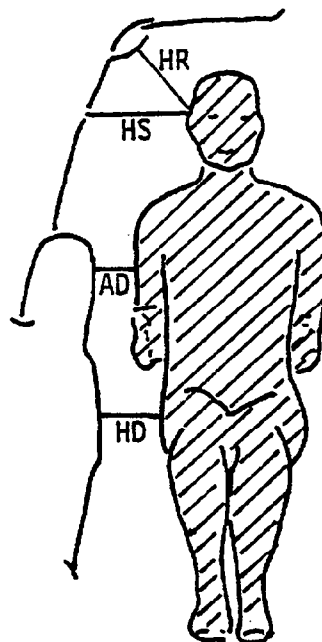
OCCUPANT CLEARANCE DIMENSIONS

Volkswagen Sedan

	Driver	Passenger
HH	15.5	
HW	17.25	
CD	20.5	
CS	15.0	
KDL	7.25	
KDR	7.25	



	Driver	Passenger
HR	5.5	
HS	7.0	
AD	2.0	
HD	5.5	



NOTE: ALL DIMENSIONS IN INCHES

SECTION 3

TEST RESULTS

SUMMARY OF RESULTS

Test No.: 1955

Project Title: Dummy Response in Side Impact

Date: 12-5-80

Time: 11:45 a.m.

Temp: 65°F

General

Vehicle/Obj

Description

Test weight (lbs)

Test velocity (mph)

170 ①
Chevrolet Malibu

3830

18.25

Volkswagen Sedan ②

2100

36.35

Vehicle Response Data

Max. crush (in.)

Static

3.3

12.35

Dynamic

-

-

Max. intrusion (in.)

0

0

Occupant Response

HIC

19

6

45

Head SI

23

8

67

Maximum resultant

head Gs

15

8

25

Maximum A-P head Gs

14

8

10

Maximum S-I head Gs

8

0

20

Maximum R-L head Gs

2

0

25

Chest SI

10

5

-

Chest A-P deflec-

tion (in.) Upper

-

-

1.1

Chest R-L deflec-

tion (in.) Lower

-

-

0.85

Maximum resultant

chest Gs

12

10

-

Maximum A-P chest Gs

8

10

-

Maximum S-I chest Gs

0

2

-

Maximum R-L chest Gs

4

2

-

Maximum resultant

pelvic Gs

-

-

84

Maximum A-P pelvic Gs

-

-

14

Maximum S-I pelvic Gs

-

-

10

Maximum R-L pelvic Gs

-

-

82

Maximum femur load -

right (lbs)

70

200

-

Maximum femur load -

left (lbs)

50

80

-

SUMMARY OF RESULTS (cont'd)

Subject Vehicle					Impacted Vehicle/Object				
DR.	MFP	RFP	LRP	RRP	DR.	MFP	RFP	LRP	RRP

Restraint Response

Left Upper Rib Data

BLUR	*
Peak Acceleration (Gs)	*
Peak Acceleration (Gs) (3 msec)	*

Upper Spine R-L

Peak Acceleration (Gs)	55
Peak Acceleration (Gs) (3 msec)	35
Peak Power (ft ² /sec ³)	21584

Upper Spine Resultant

Peak Acceleration (Gs)	56
Peak Acceleration (Gs) (3 msec)	36
Peak Power (ft ² /sec ³)	24221

Lower Spine R-L

Peak Acceleration (Gs)	72
Peak Acceleration (Gs) (3 msec)	63
Peak Power (ft ² /sec ³)	35433

Lower Spine Resultant

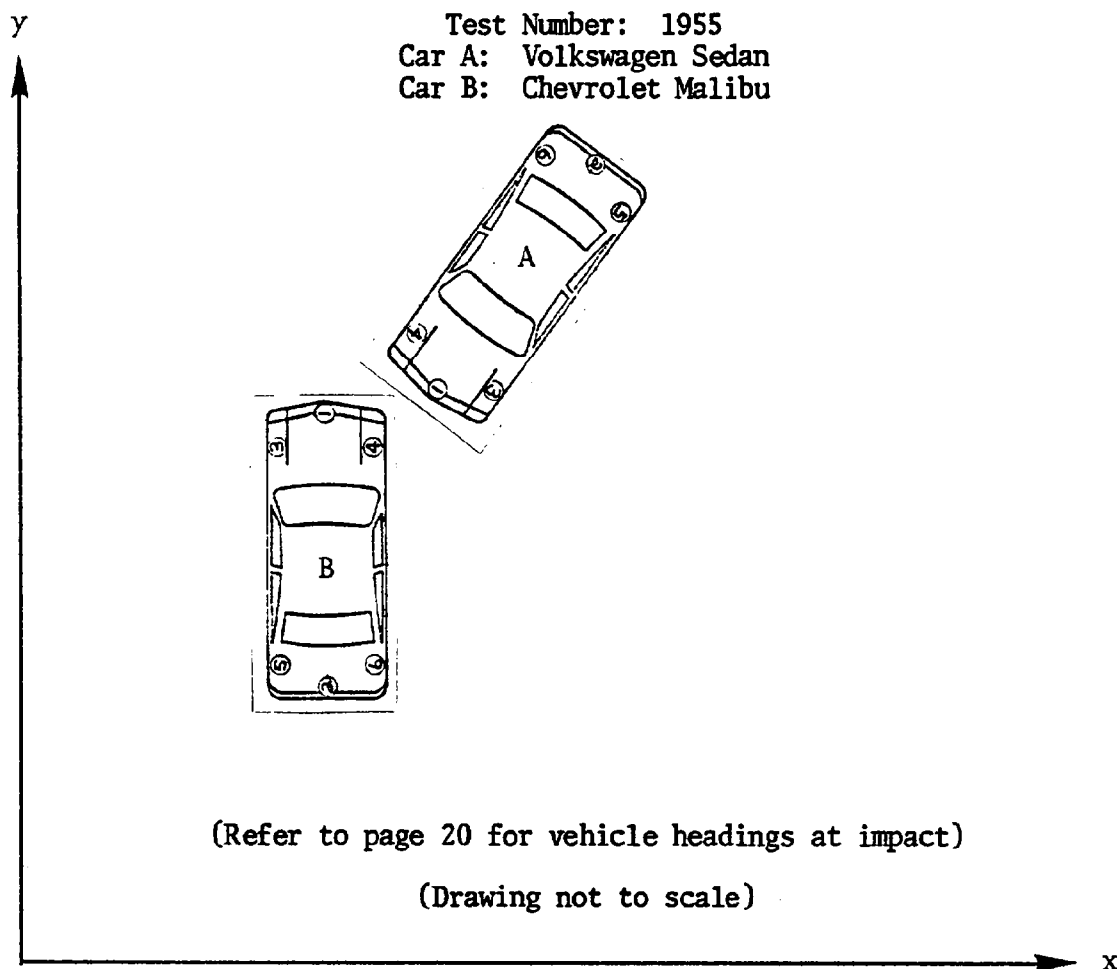
Peak Acceleration (Gs)	74
Peak Acceleration (Gs) (3 msec)	64
Peak Power (ft ² /sec ³)	43591

Remarks: *The following data channels were not recorded due to tape recorder failure:

Volkswagen driver ribs
Volkswagen driver upper and lower sternal
Volkswagen right front rocker triaxial
Volkswagen left front rocker RL
Volkswagen mid-trunk (AP and RL)
Volkswagen right rear rocker RL

Other Data Anomalies: Noise on Malibu driver left femur caused
by bad load cell.
Noise on Malibu yaw gyro, unknown case.

POST-TEST VEHICLE POSITIONS



Position		Car A		Car B	
Number	Description	X	Y	X	Y
1	Front Bumper Centerline	15'5"	47'6"	11'9"	49'5"
2	Rear Bumper Centerline	27'7"	55'6"	11'10"	33'6"
3	Left Front Wheel Centerline	19'0"	47'2"	9'1"	46'8"
4	Right Front Wheel Centerline	16'0"	50'9"	14'8"	46'11"
5	Left Rear Wheel Centerline	25'1"	51'9"	9'1"	37'5"
6	Right Rear Wheel Centerline	22'1"	56'11"	14'8"	37'5"

PHOTOGRAPHS



FIGURE 1. PRE-TEST VOLKSWAGEN RIGHT SIDE



FIGURE 2. PRE-TEST VOLKSWAGEN FRONT



FIGURE 3. PRE-TEST VOLKSWAGEN REAR



FIGURE 4. PRE-TEST LEFT HAND SIDE FENDER DAMAGE



FIGURE 5. PRE-TEST MALIBU FRONT



FIGURE 6. PRE-TEST VEHICLE IMPACT POSITION



FIGURE 7. PRE-TEST VEHICLE IMPACT POSITION

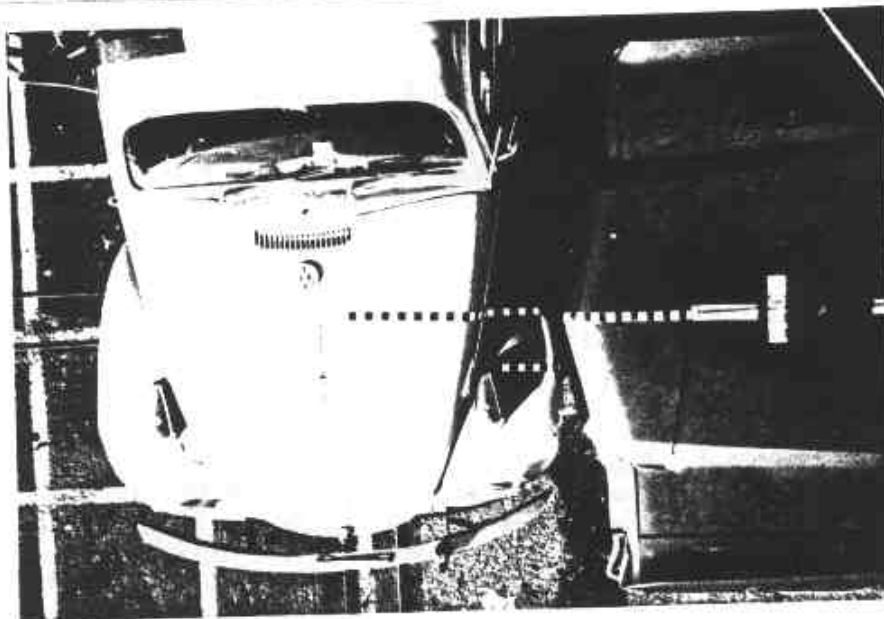


FIGURE 8. PRE-TEST VEHICLE IMPACT POSITION



FIGURE 9. PRE-TEST VOLKSWAGEN DUMMY POSITION



FIGURE 10. TEST 1955 IMPACT



FIGURE 11. TEST 1955 IMPACT

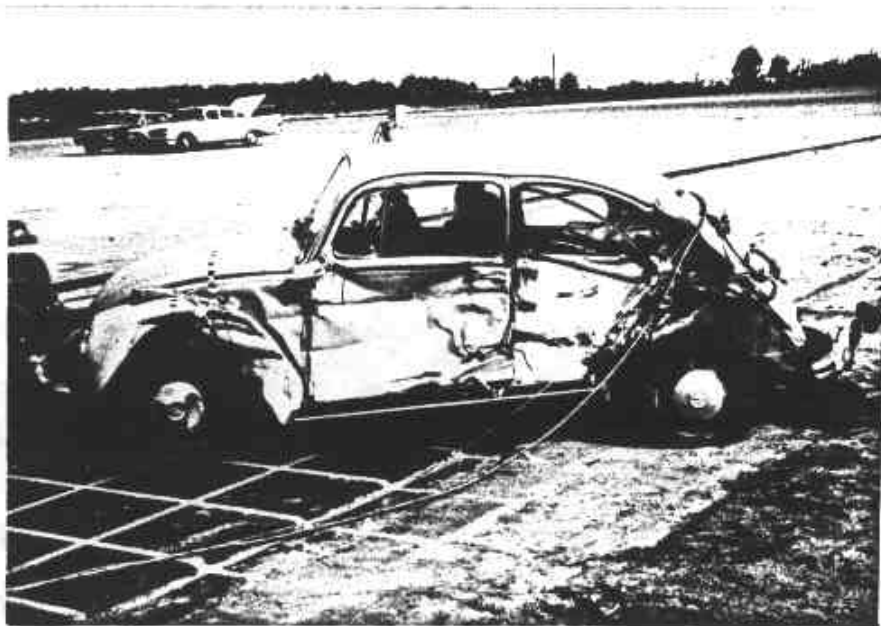


FIGURE 12. POST-TEST VOLKSWAGEN LEFT SIDE

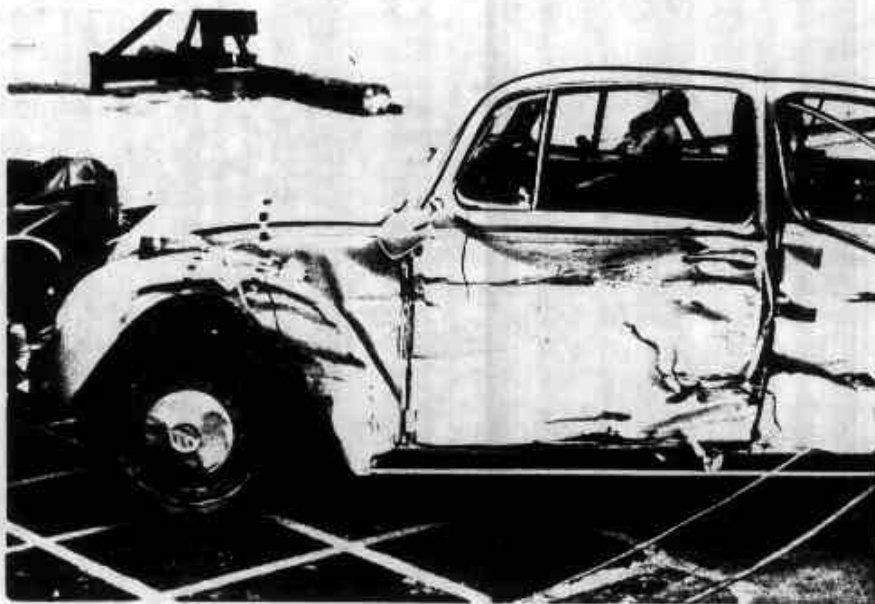


FIGURE 13. POST-TEST VOLKSWAGEN LEFT SIDE



FIGURE 14. POST-TEST VOLKSWAGEN LEFT SIDE



FIGURE 15. POST-TEST VOLKSWAGEN LEFT FRONT



FIGURE 16. POST-TEST VOLKSWAGEN DUMMY END POSITION

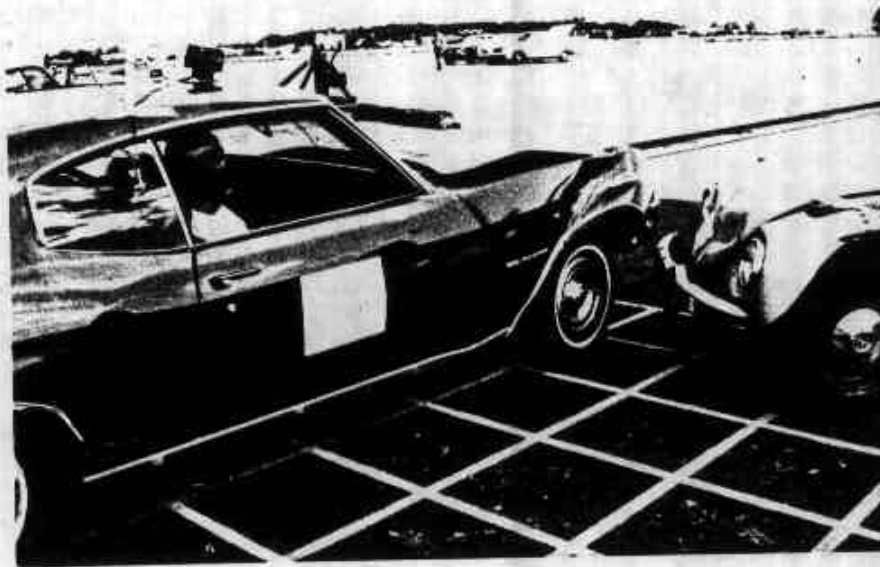


FIGURE 17. POST-TEST MALIBU RIGHT HAND SIDE



FIGURE 18. POST-TEST MALIBU LEFT HAND SIDE



FIGURE 19. MALIBU FRONT

TEST DATA TRACES

VEHICLE 2 - V.W. BUG - 36.35 MPH

DRIVER HEAD G'S

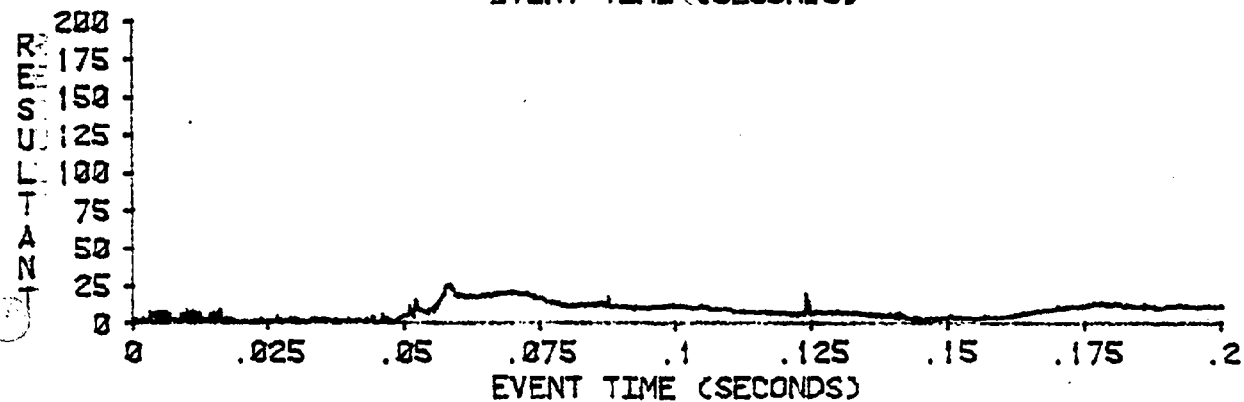
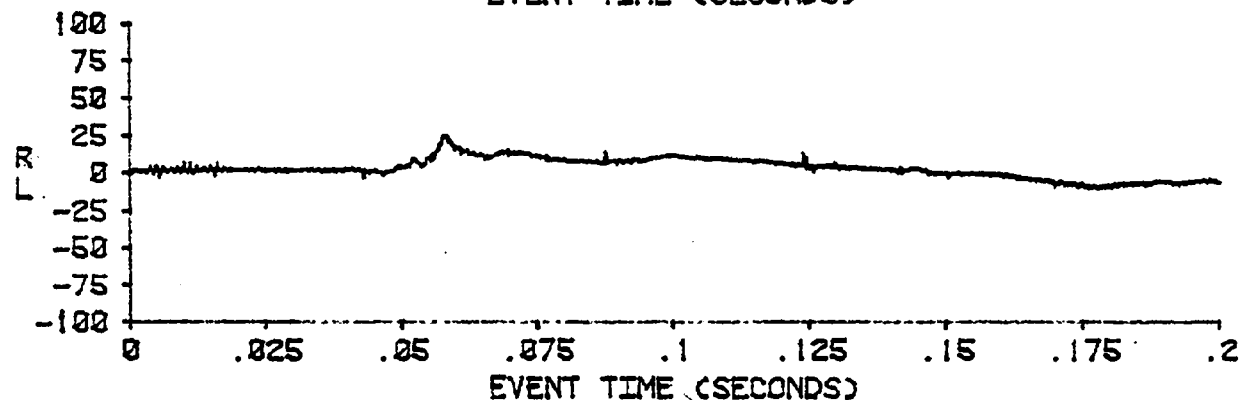
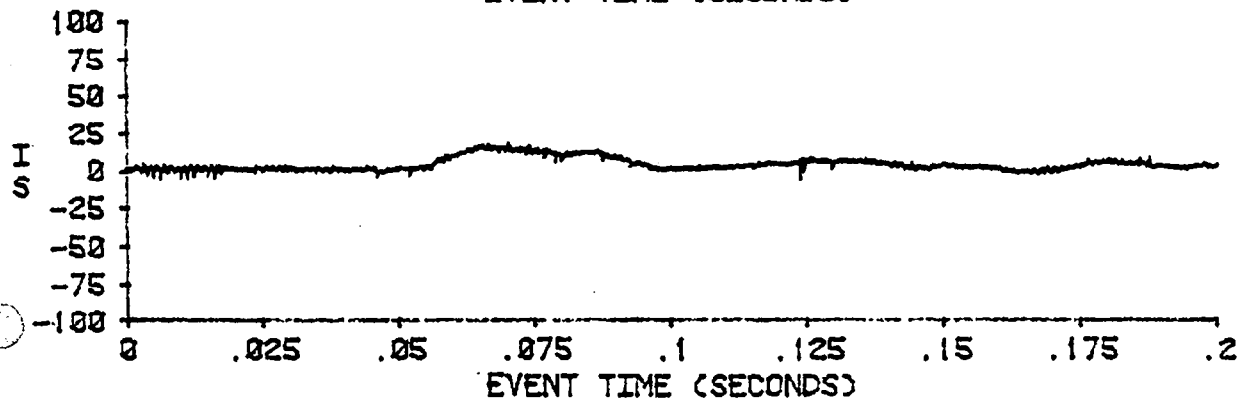
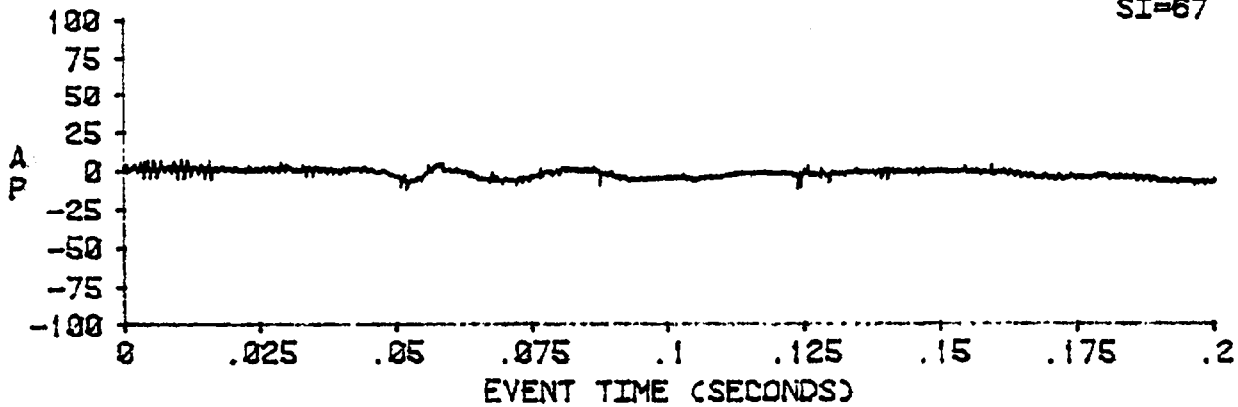
FILTER CLASS 1000

TEST 1955

04 DEC 80

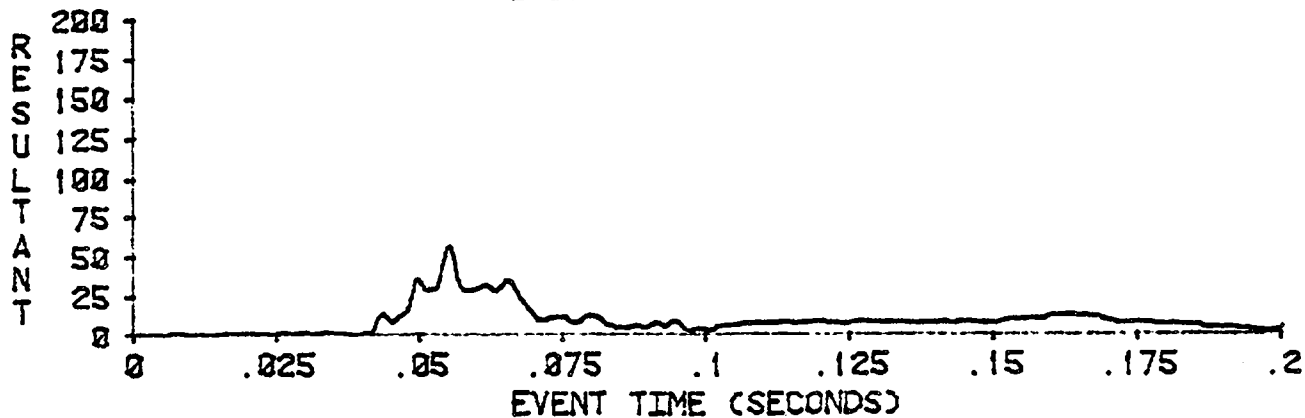
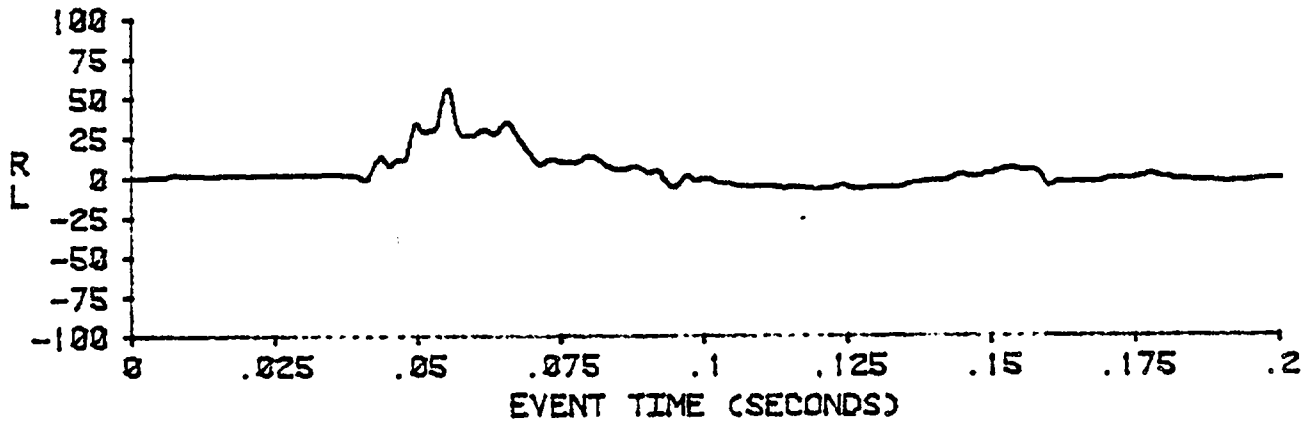
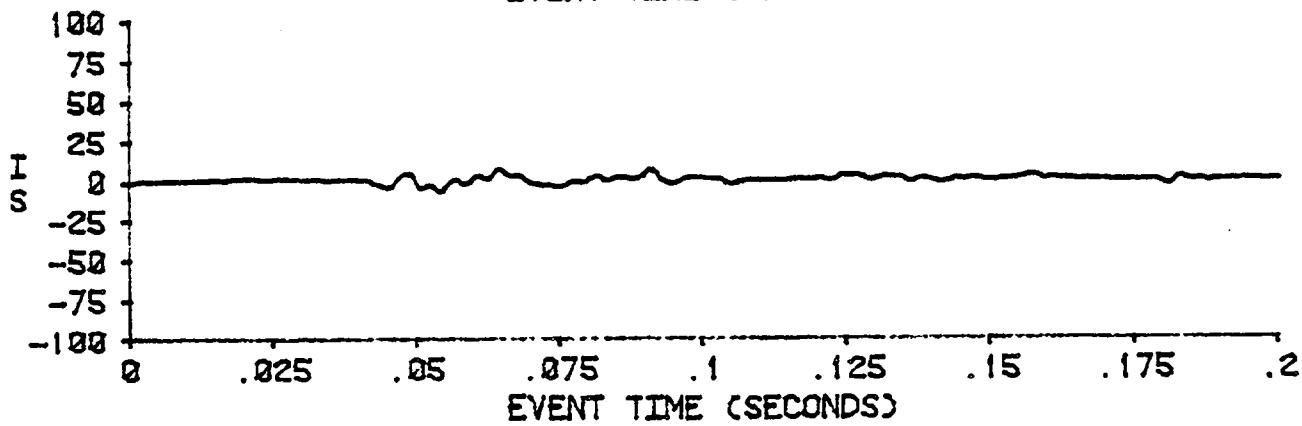
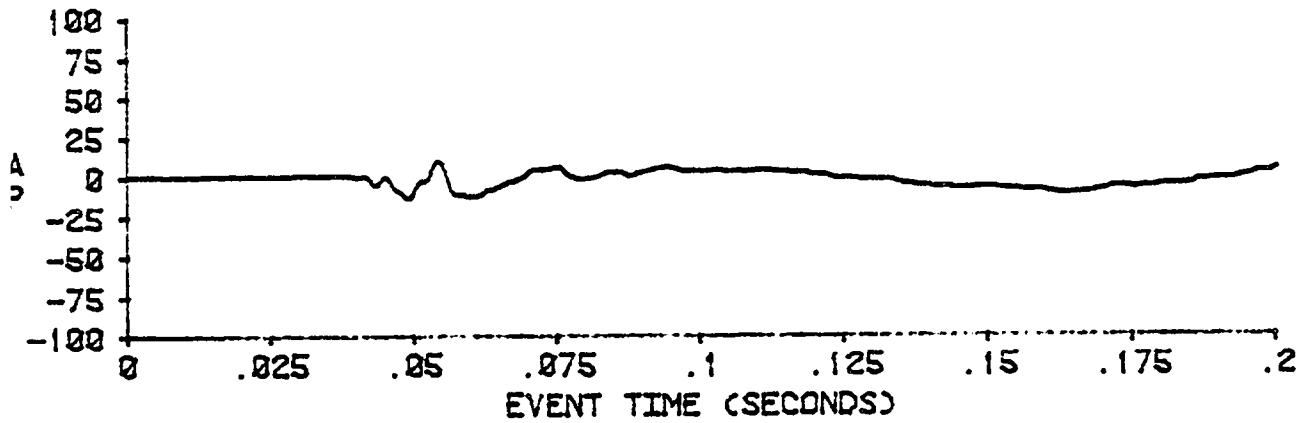
HIC=45 FROM .05 TO .1998 SECONDS

SI=67



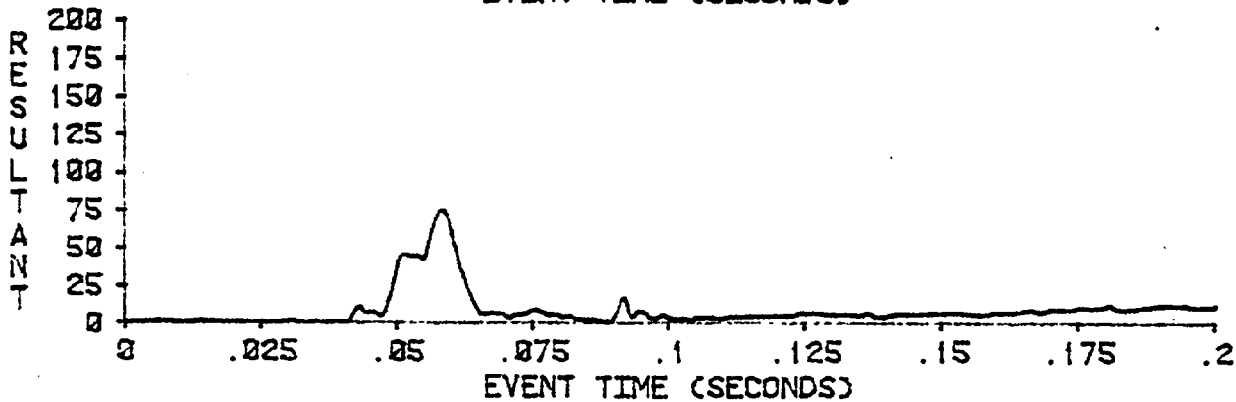
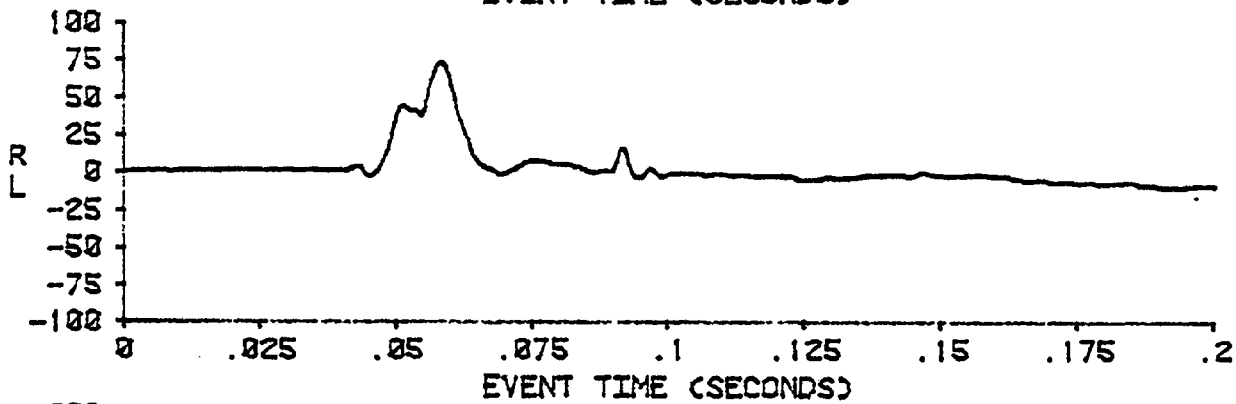
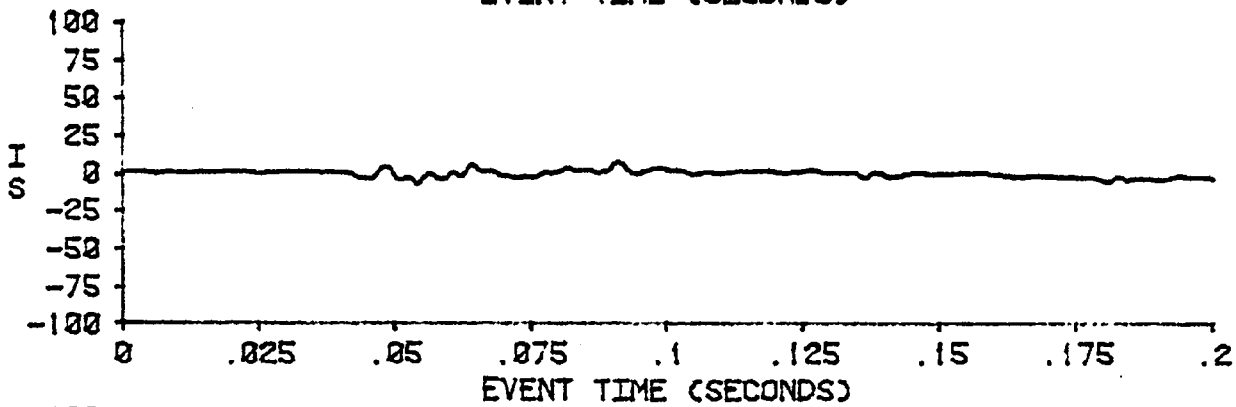
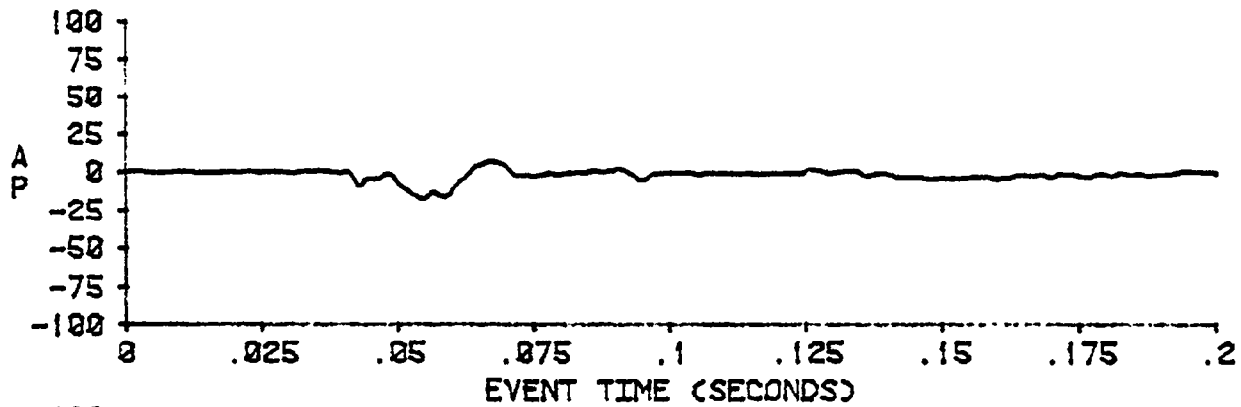
VEHICLE 2 - V.W. BUG - 36.35 MPH
DRIVER UPPER SPINE G'S
FILTER CLASS 180

TEST 1955
04 DEC 80
SI=161



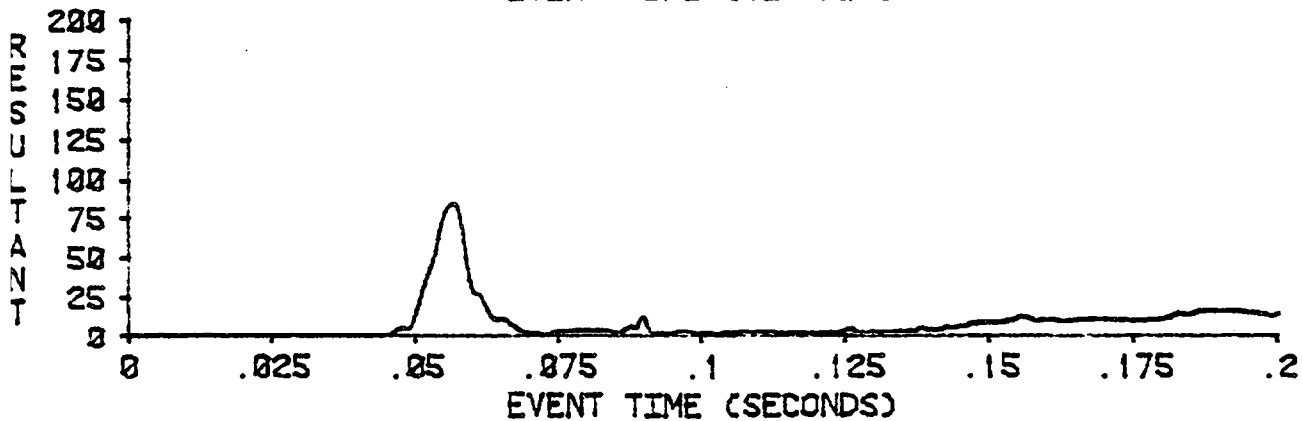
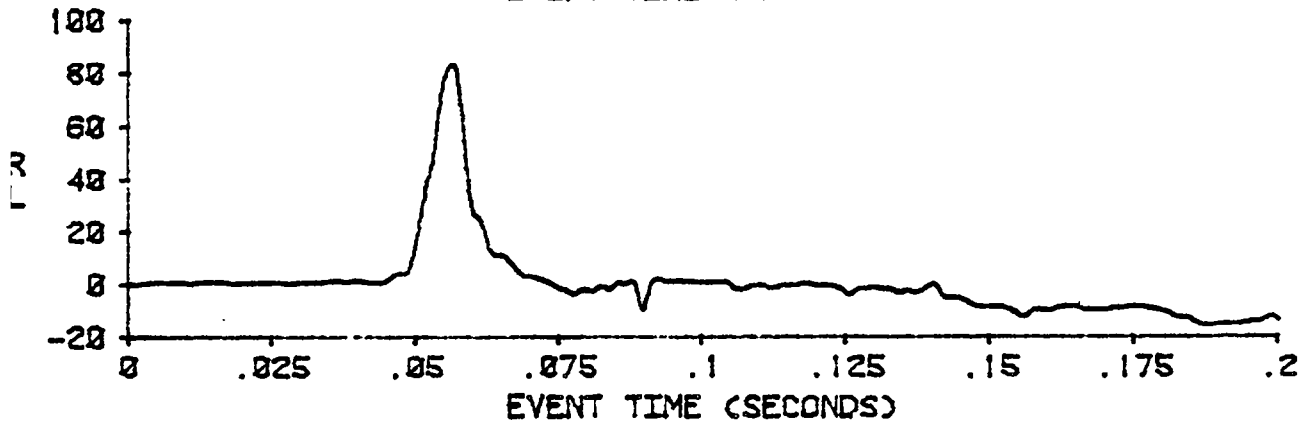
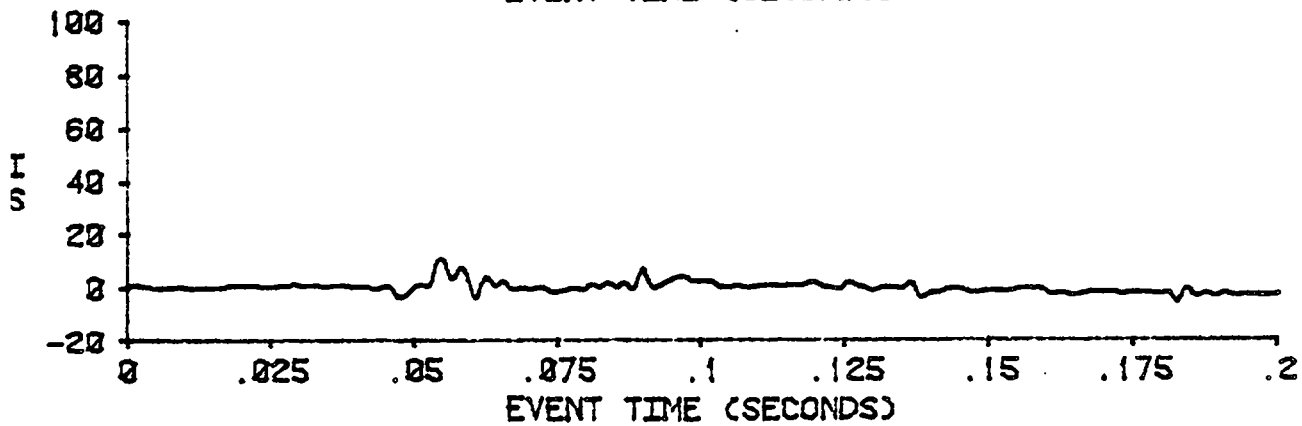
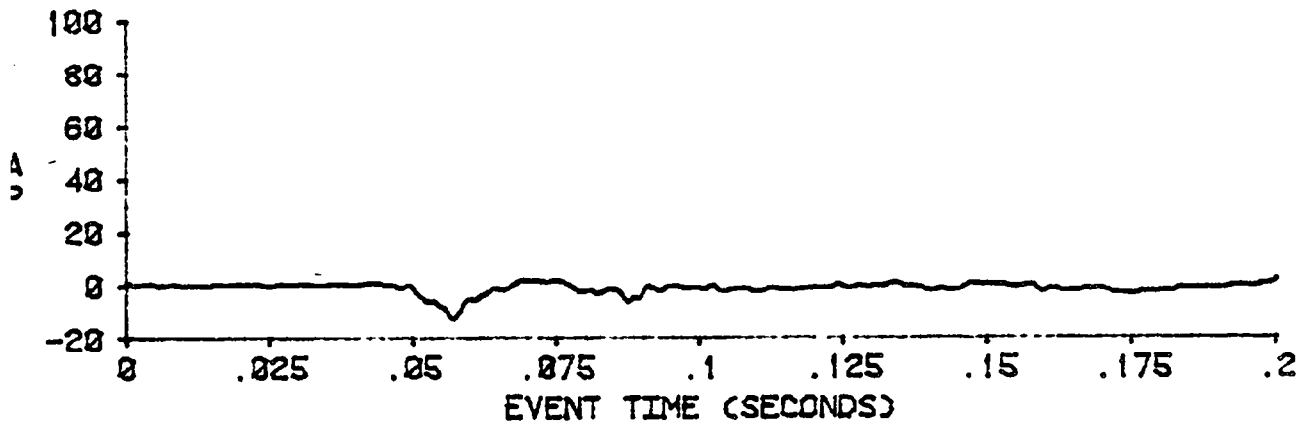
VEHICLE 2 - V.W. BUG - 36.35 MPH
DRIVER LOWER SPINE G'S
FILTER CLASS 180

TEST 1955
04 DEC 80
SI-293



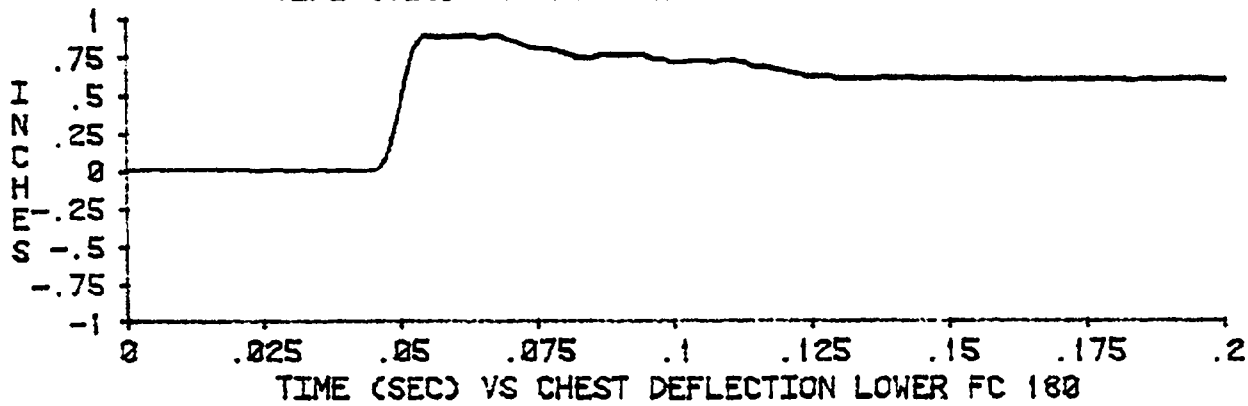
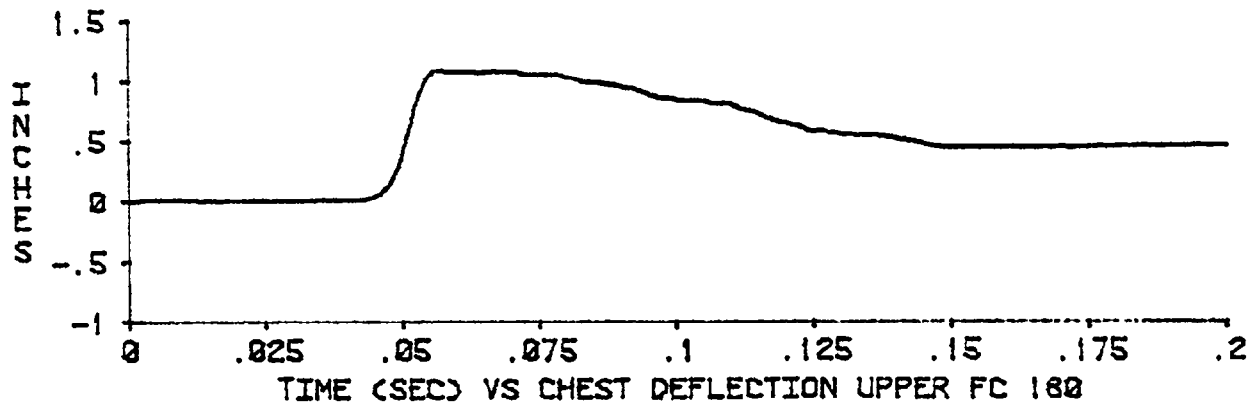
VEHICLE 2 - V.W. BUG - 36.35 MPH
DRIVER PELVIS G'S
FILTER CLASS 180

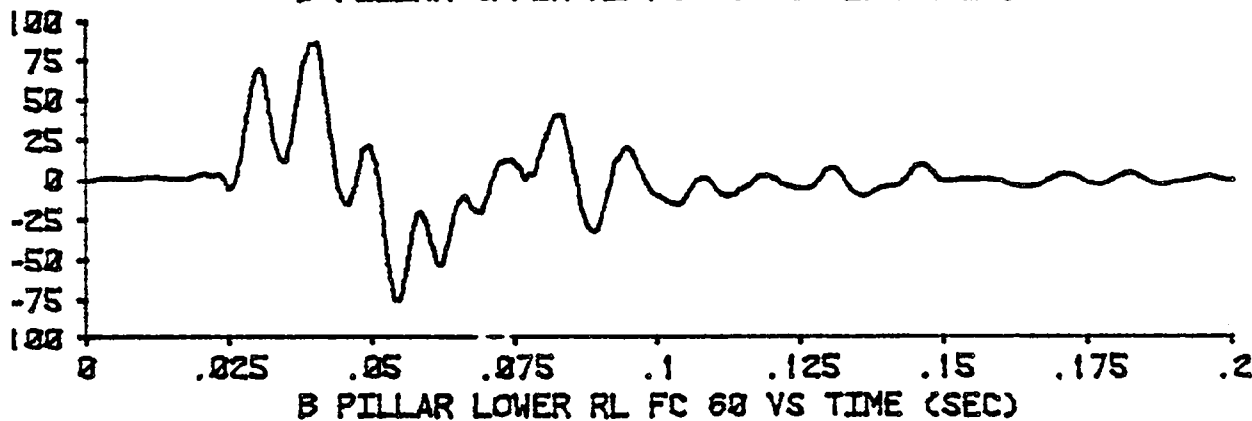
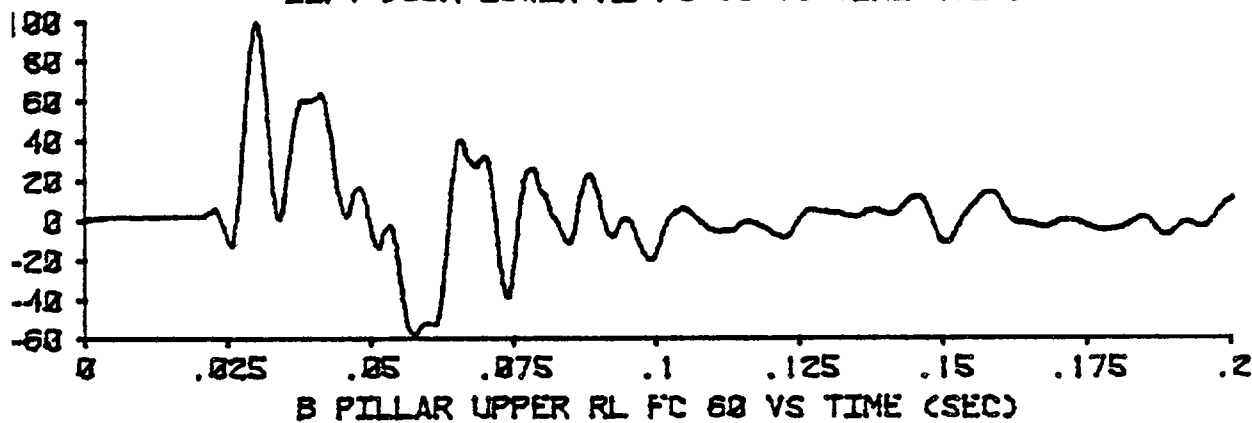
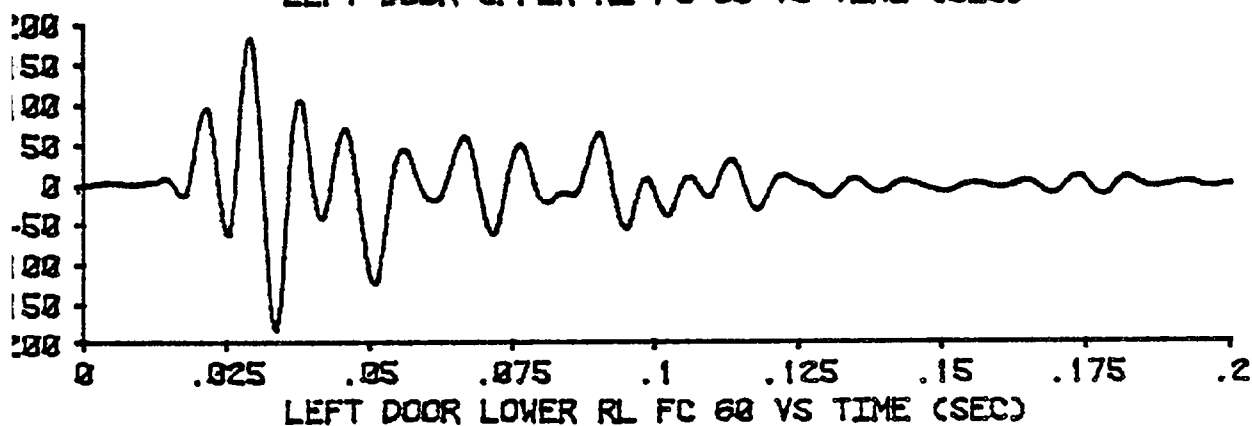
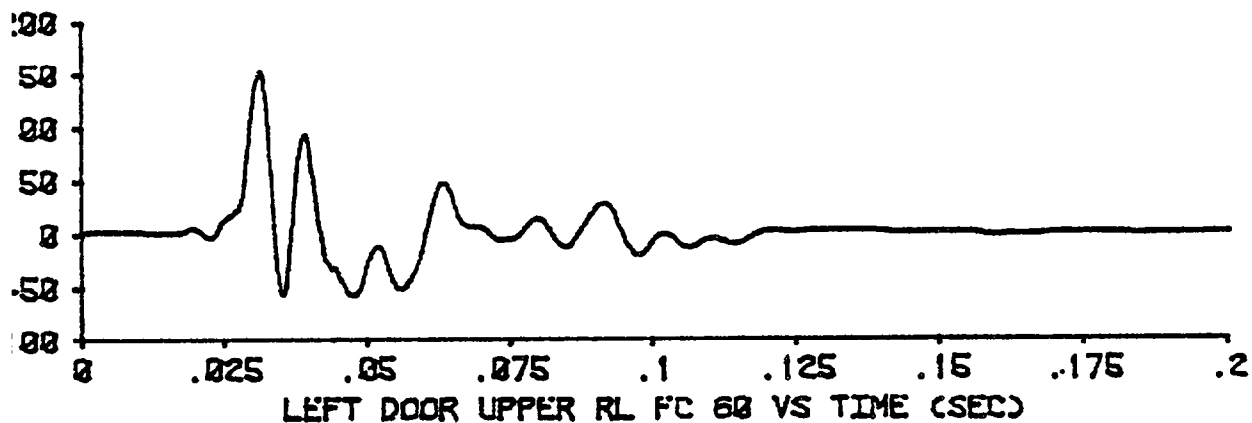
TEST 1955
04 DEC 80



VEHICLE 2 - V.W. BUG - 36.35 MPH

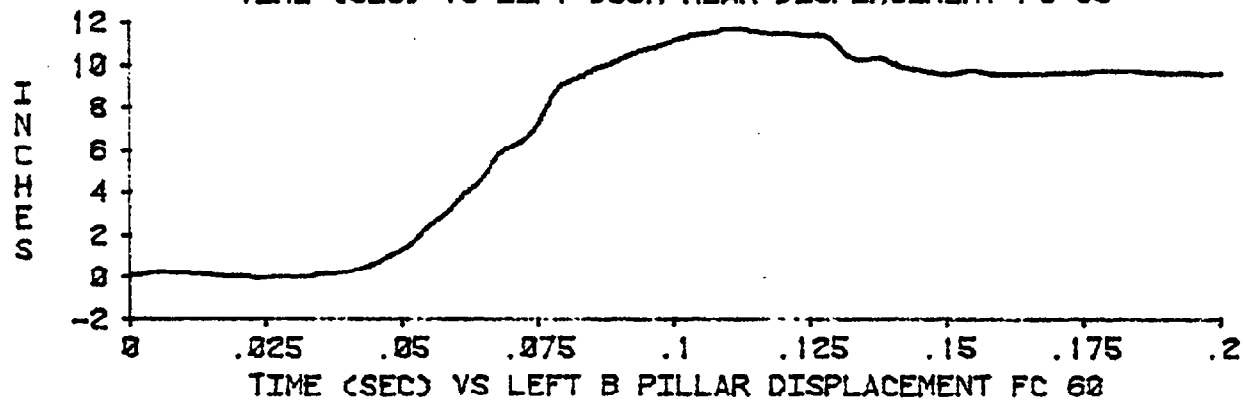
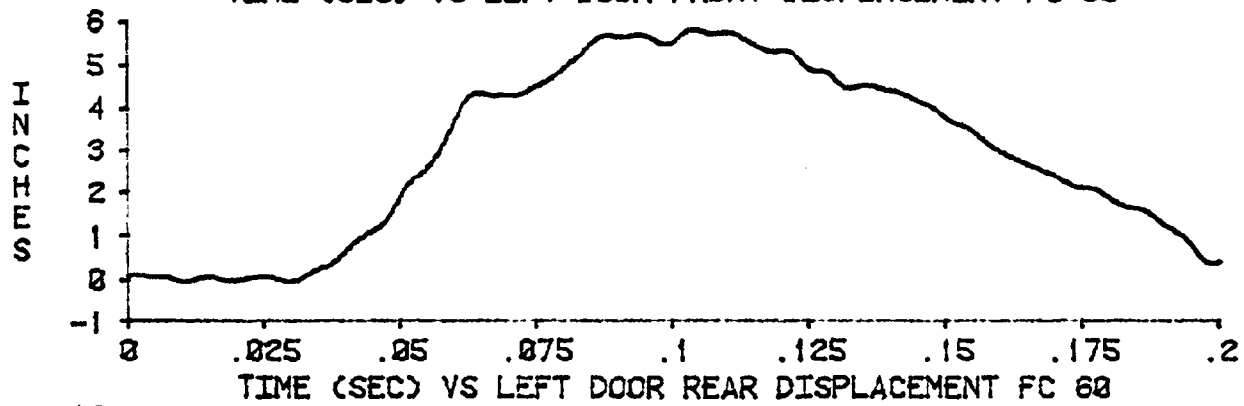
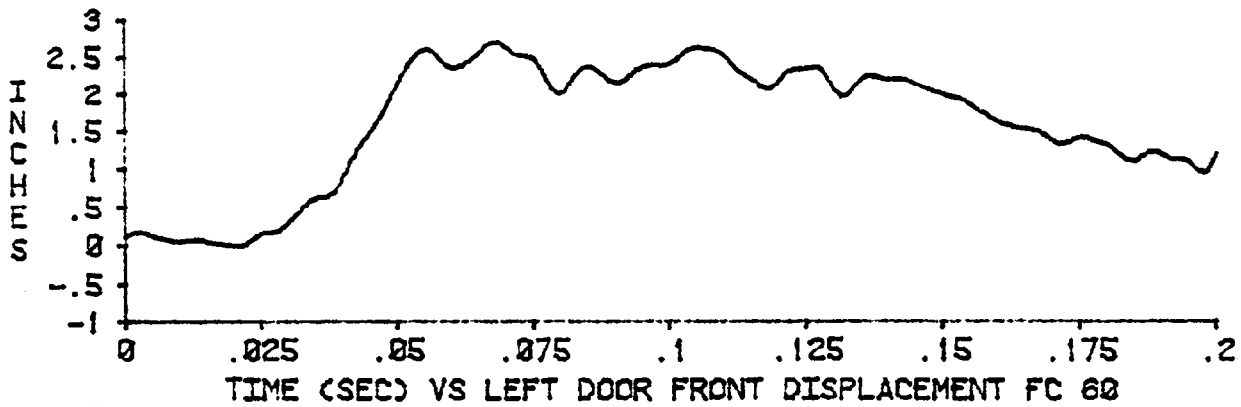
TEST 1955
04 DEC 80





VEHICLE 2 - V.W. BUG - 36.35 MPH

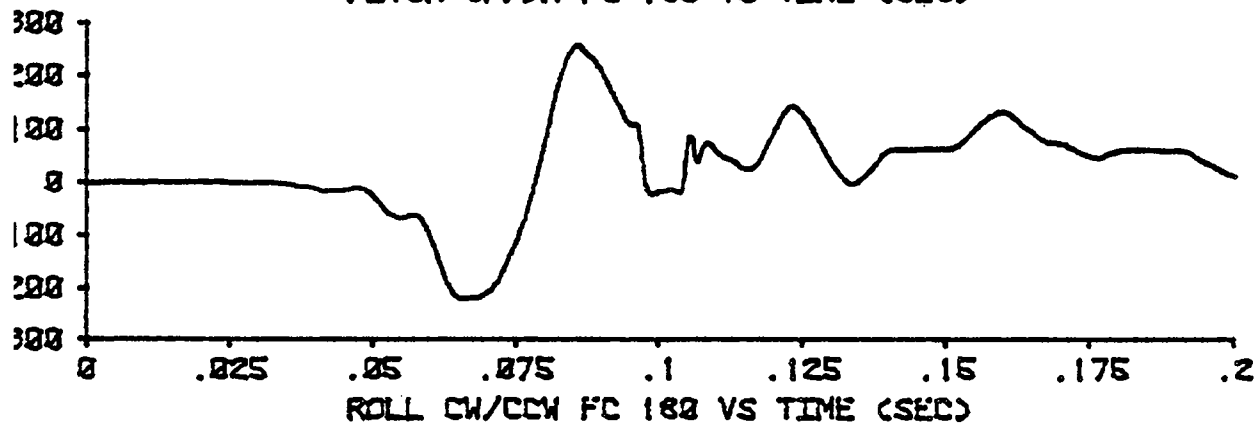
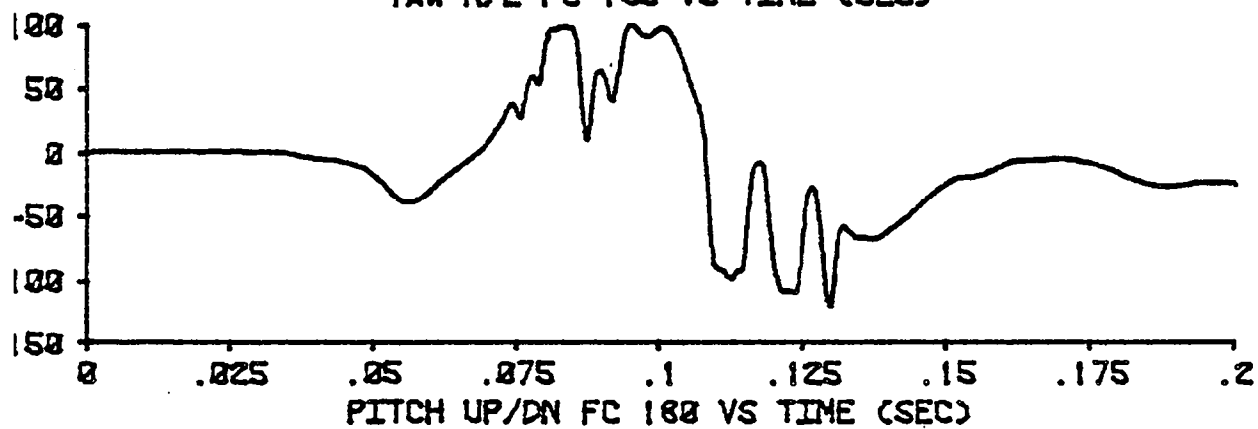
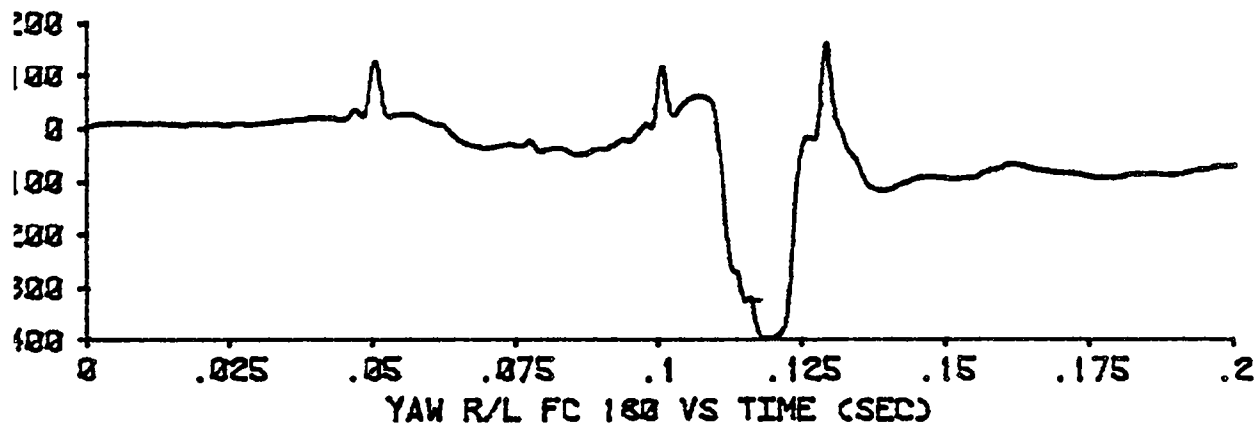
TEST 1955
04 DEC 60



VEHICLE 2 - V.W. BUG - 36.35 MPH

TEST 1955

04 DEC 68



VEHICLE 1 - CHEV. MALIBU - 18.25 MPH

DRIVER HEAD G'S

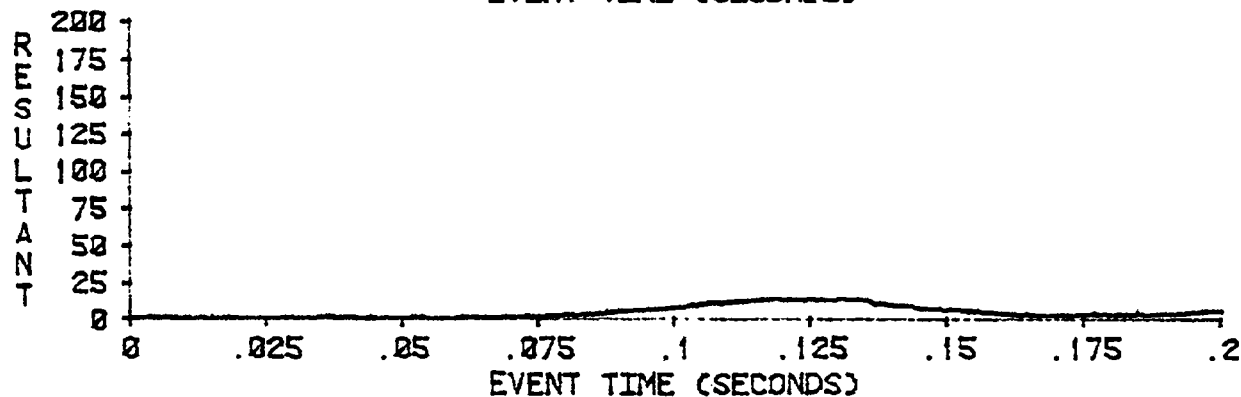
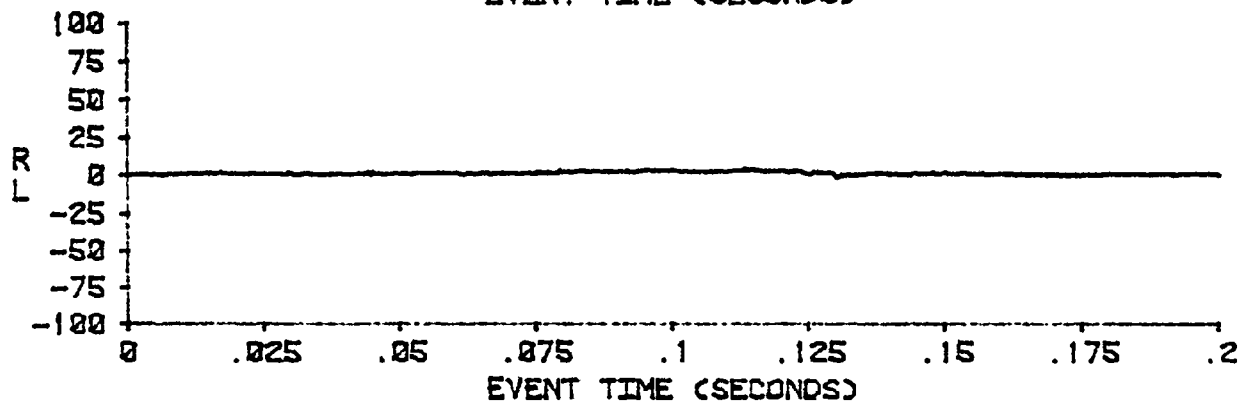
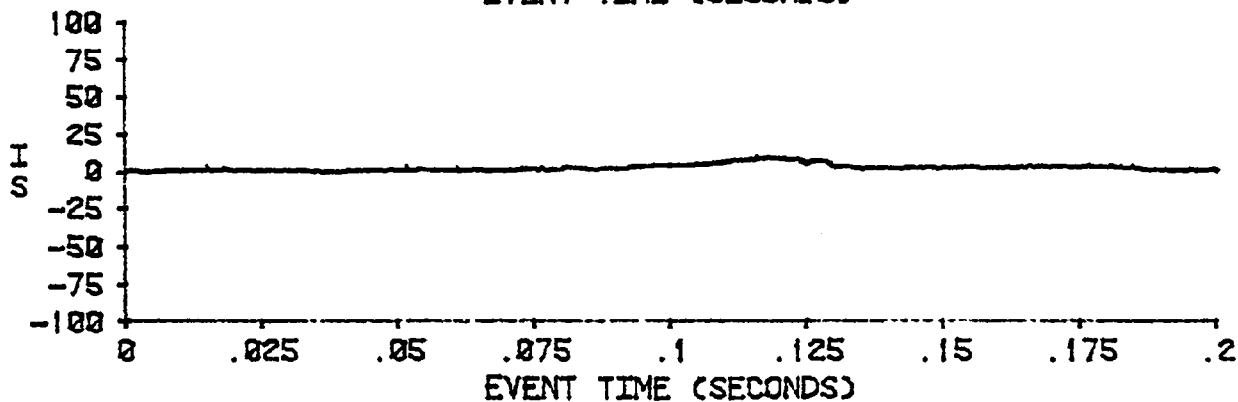
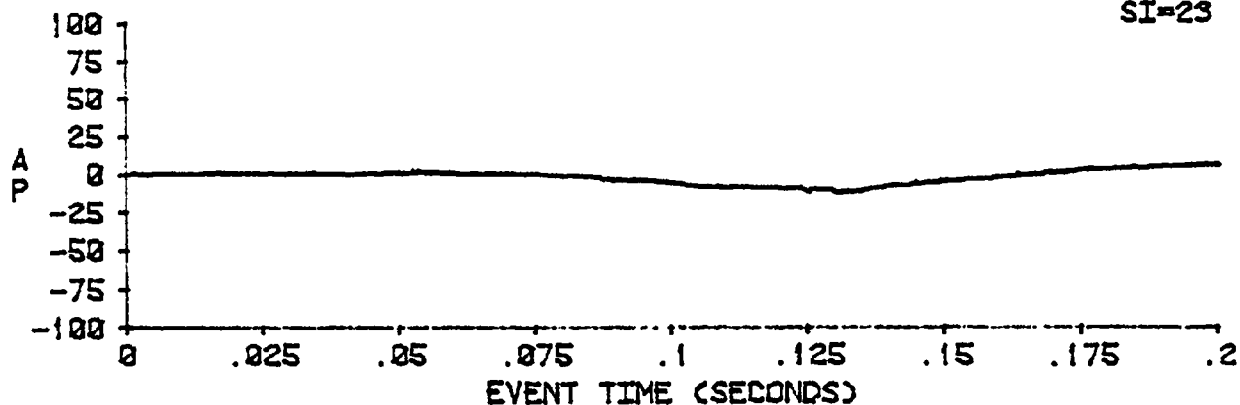
FILTER CLASS 1000

TEST 1955

04 DEC 80

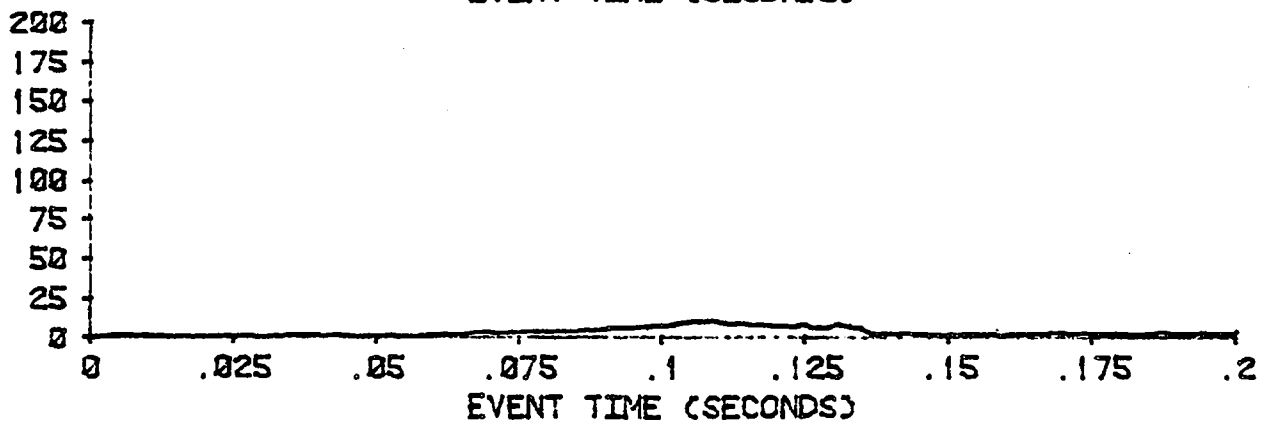
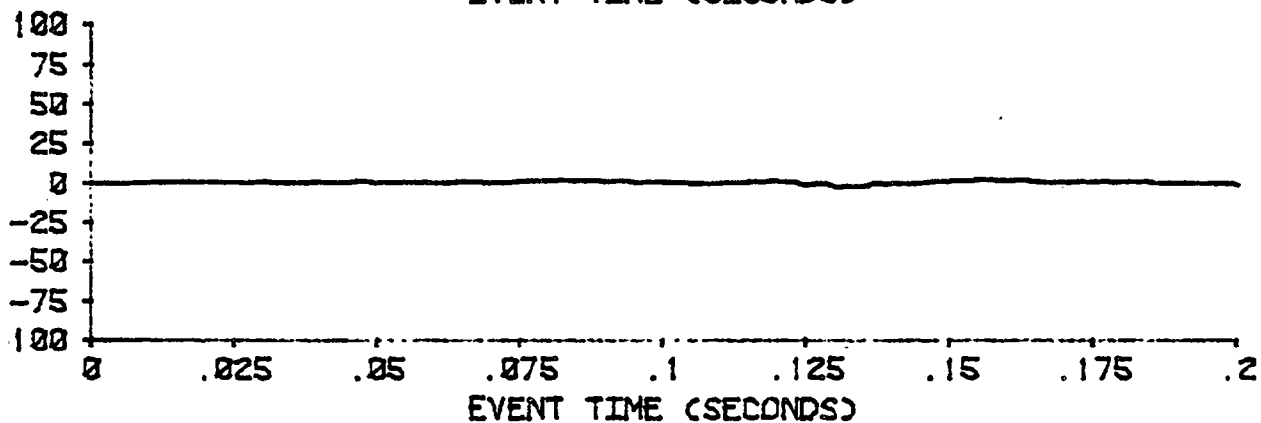
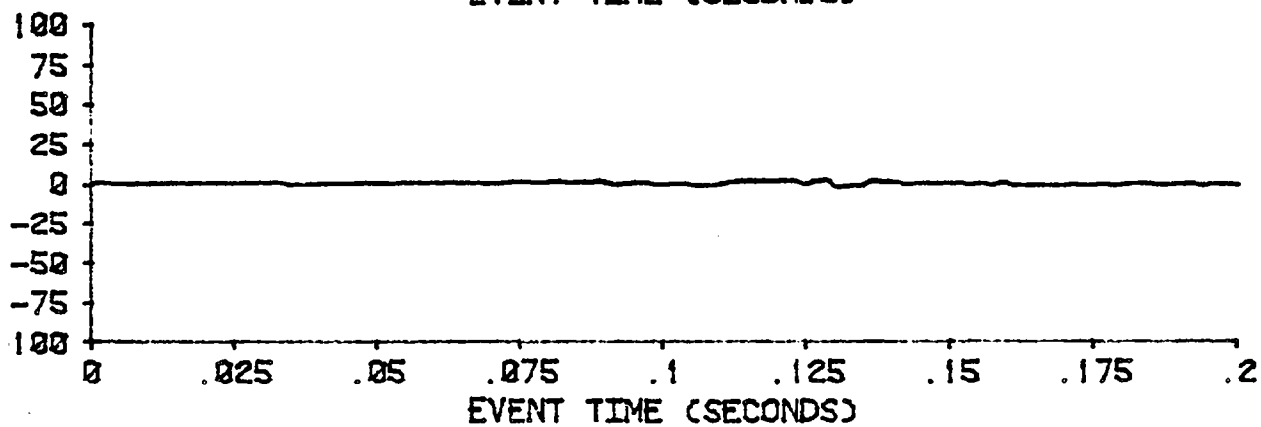
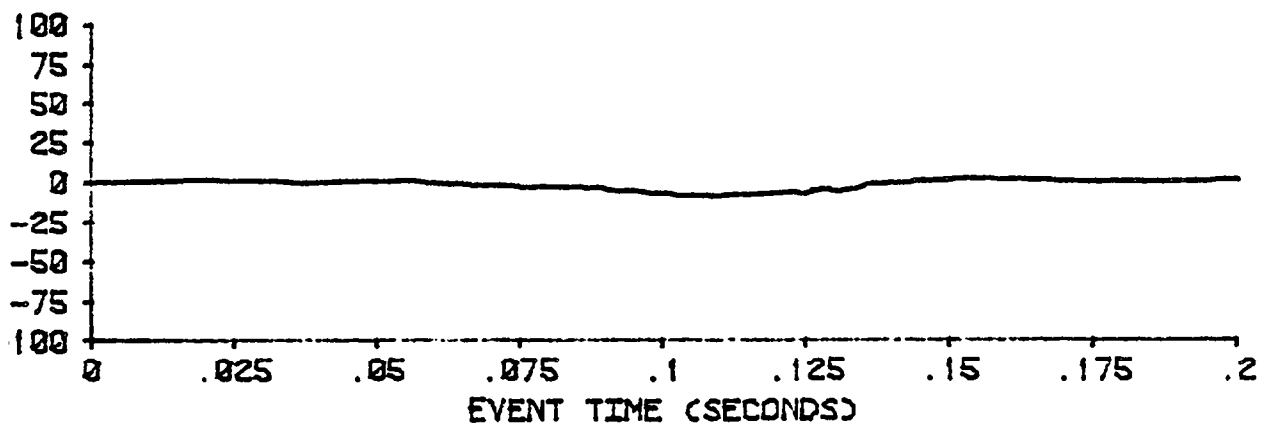
HIC=19 FROM .095 TO .1484 SECONDS

SI=23



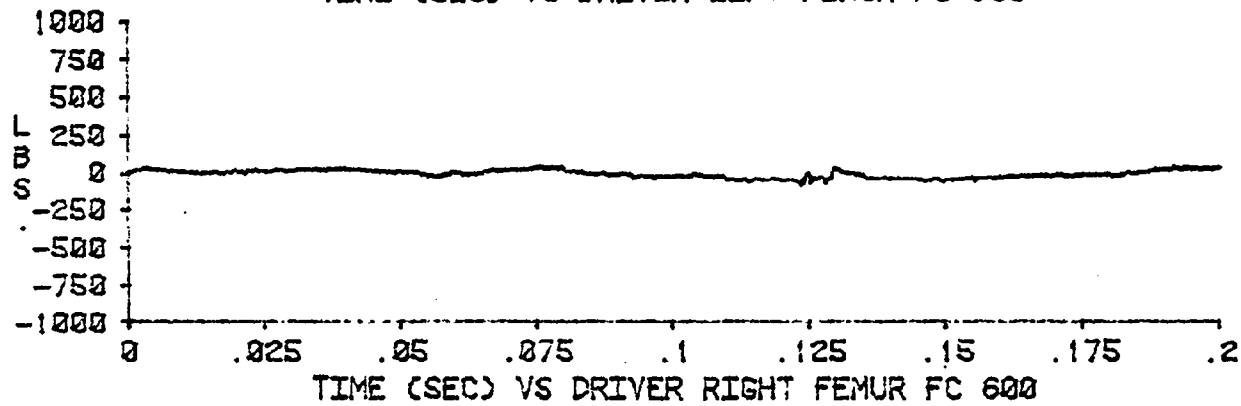
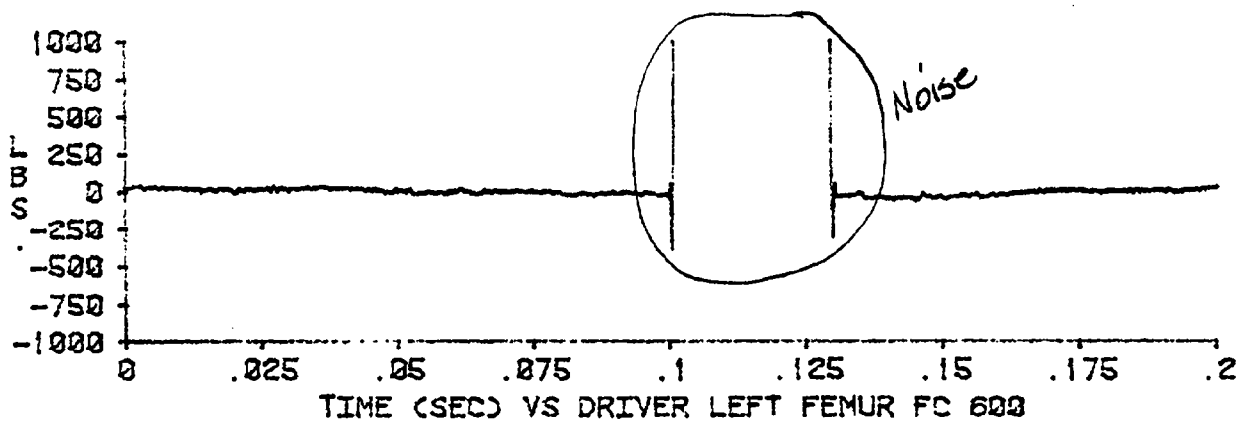
VEHICLE 1 - CHEV. MALIBU -18.25 MPH
DRIVER CHEST G'S
FILTER CLASS 100

TEST 1955
04 DEC 60
SI=10



VEHICLE 1 - CHEV. MALIBU - 18.25 MPH

TEST 1955
04 DEC 80



VEHICLE 1 - CHEV. MALIBU - 18.25 MPH

TEST 1955

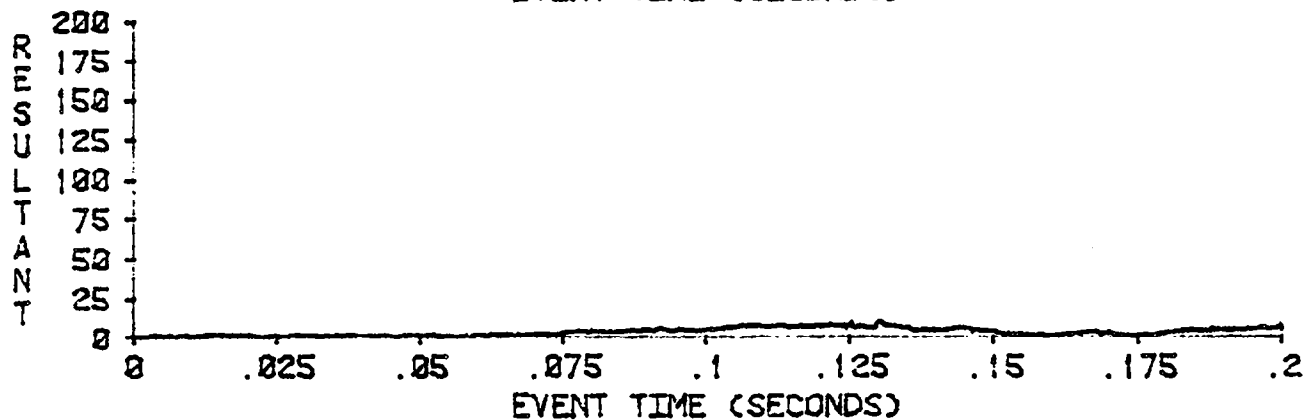
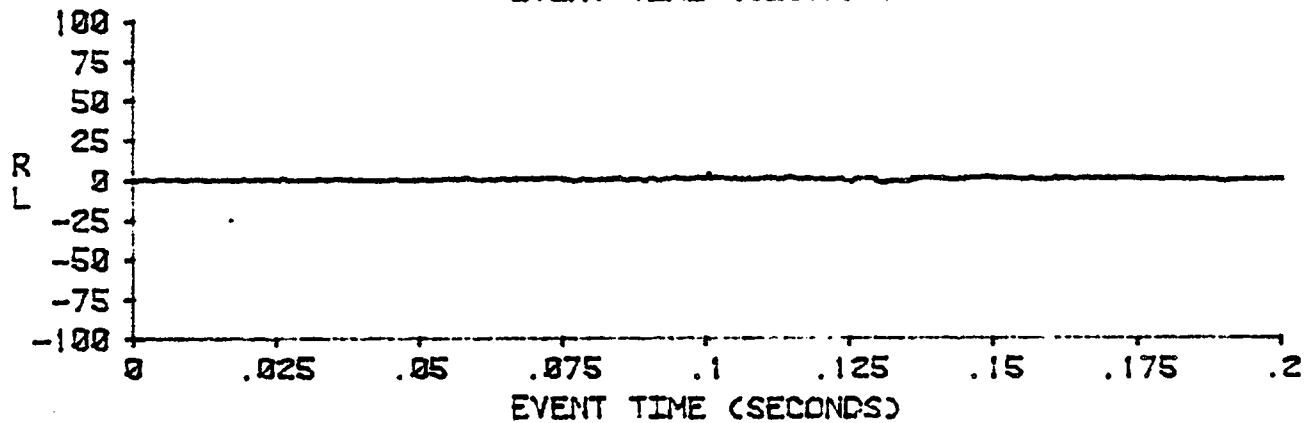
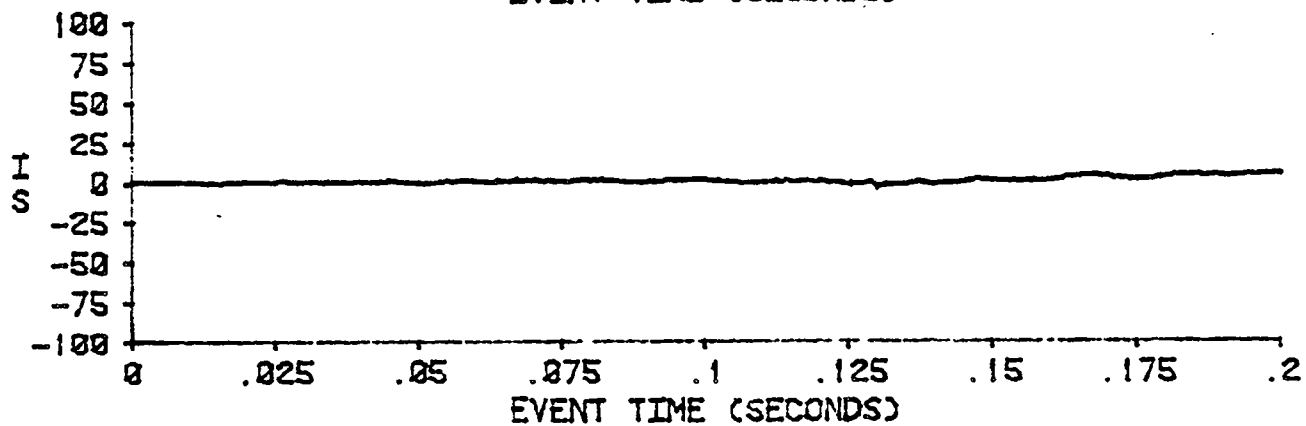
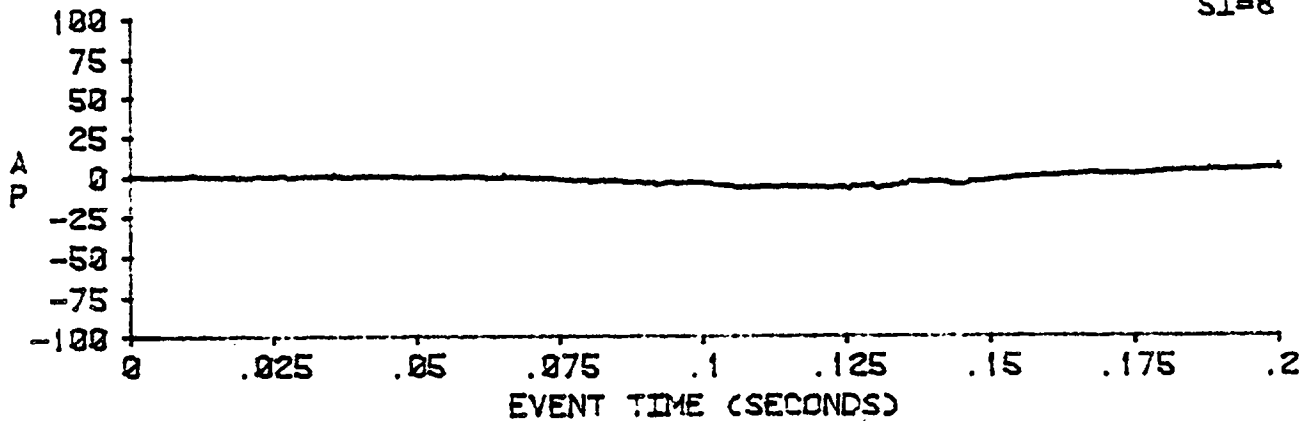
PASS. HEAD G'S

04 DEC 80

FILTER CLASS 1000

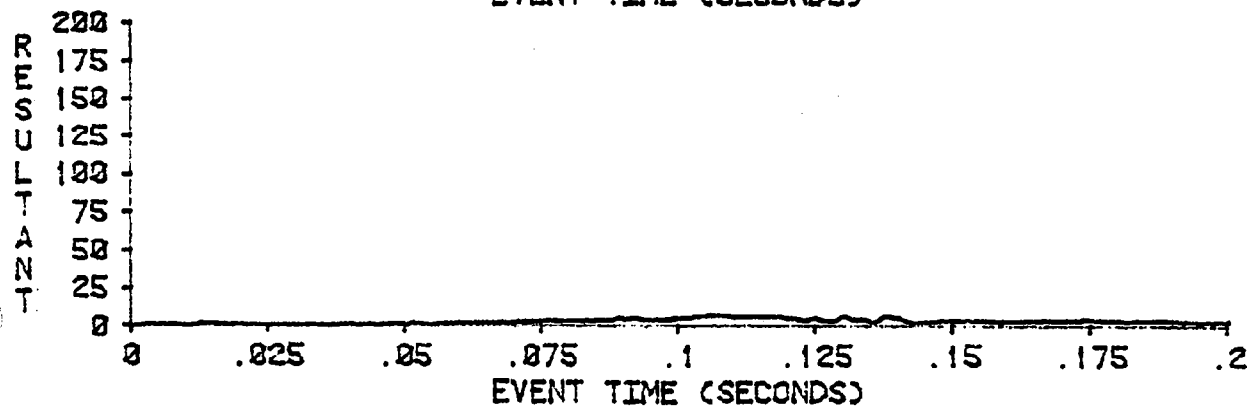
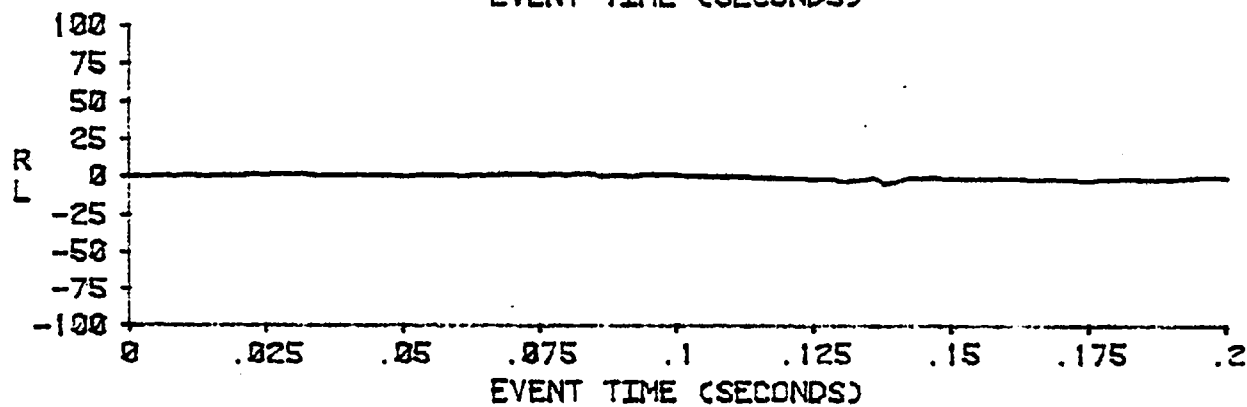
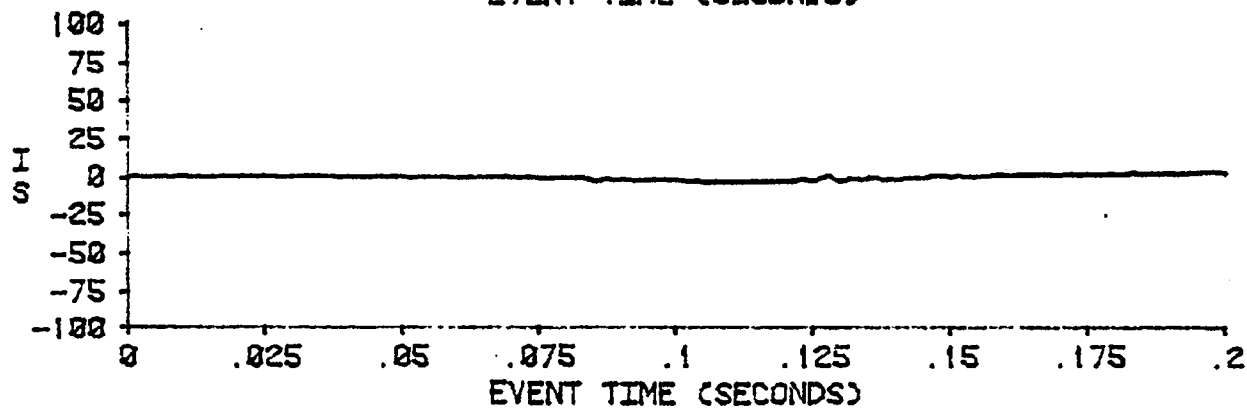
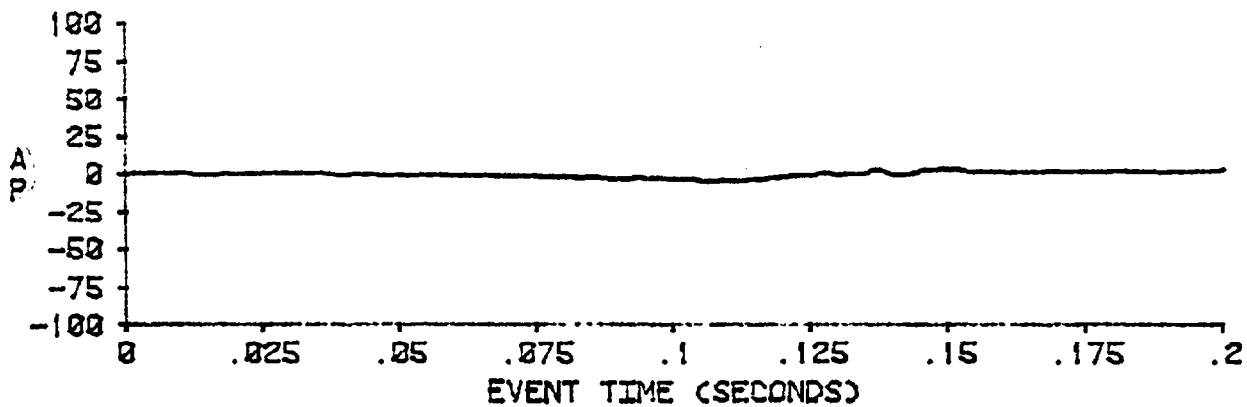
HIC=6 FROM .074 TO .1998 SECONDS

SI=6



VEHICLE 1 - CHEV. MALIBU - 18.25 MPH
PASS. CHEST G'S
FILTER CLASS 180

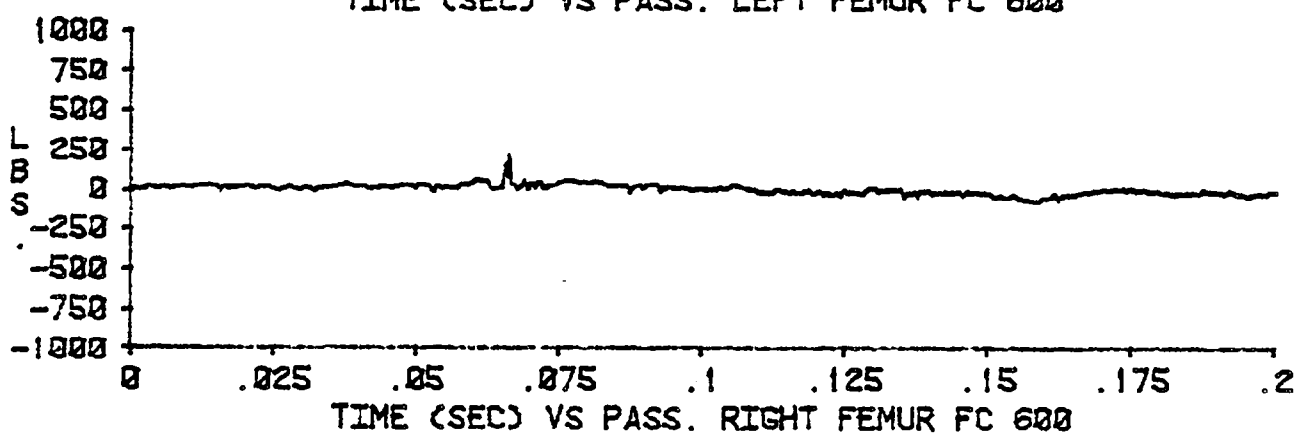
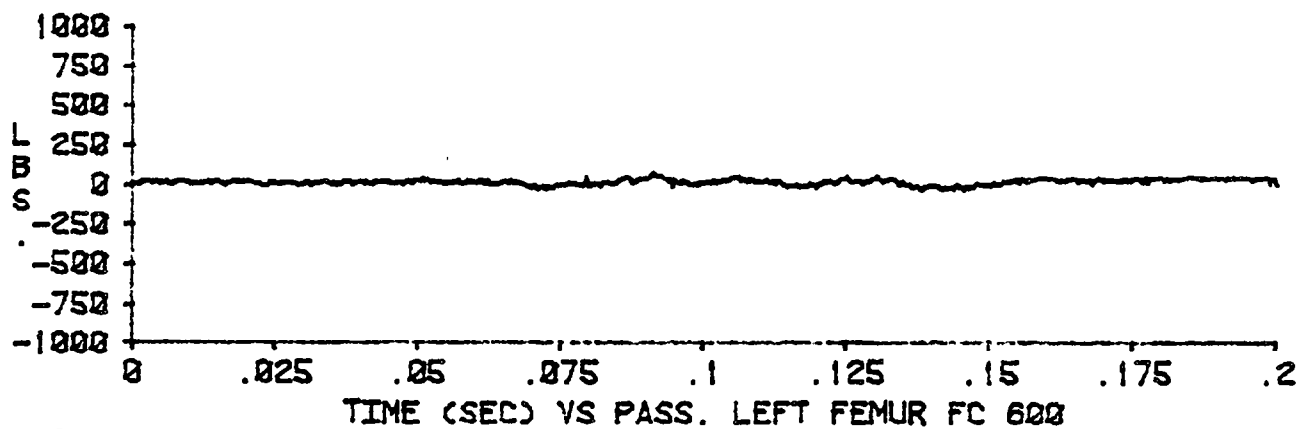
TEST 1955
04 DEC 80
SI=5



VEHICLE 1 - CHEV. MALIBU - 18.25 MPH

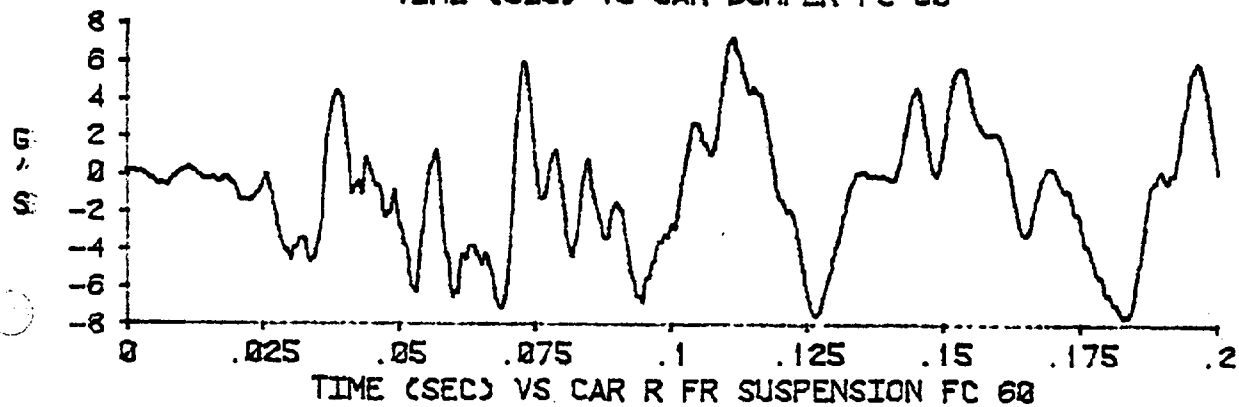
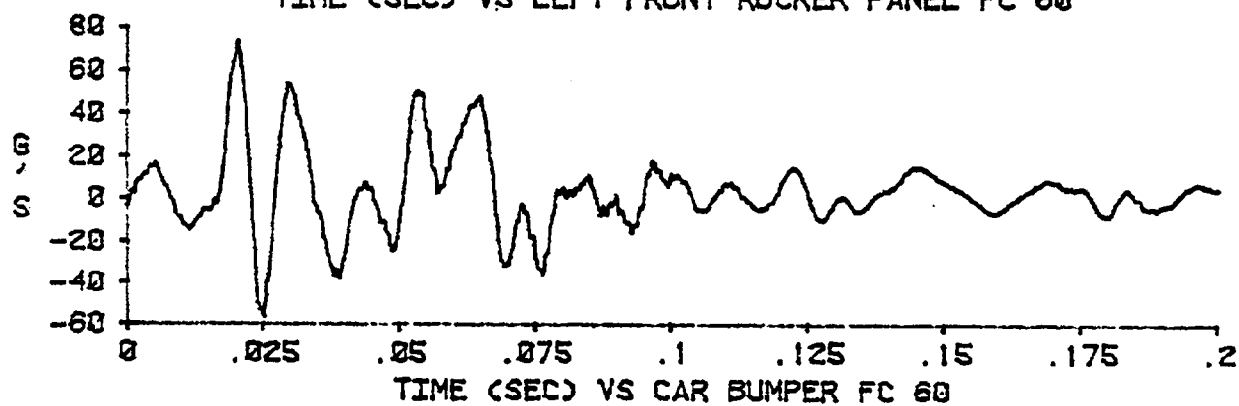
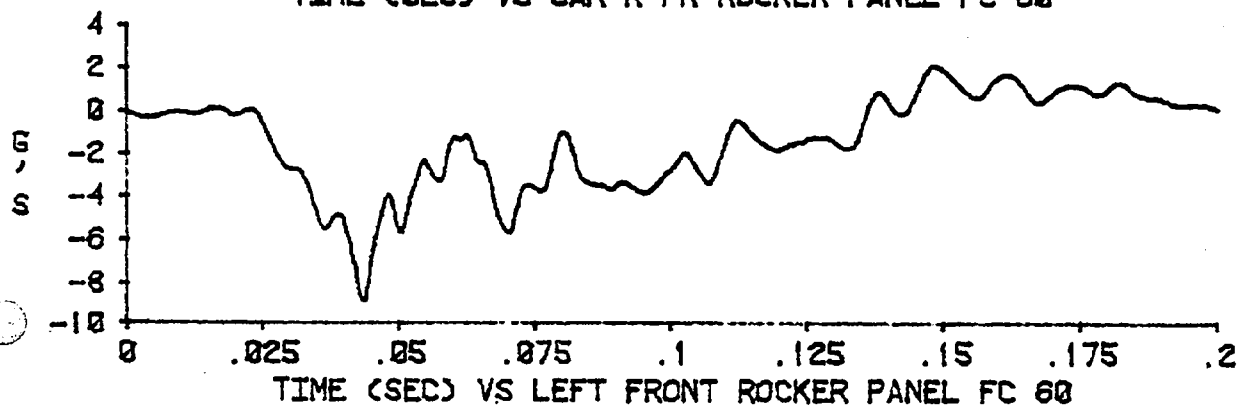
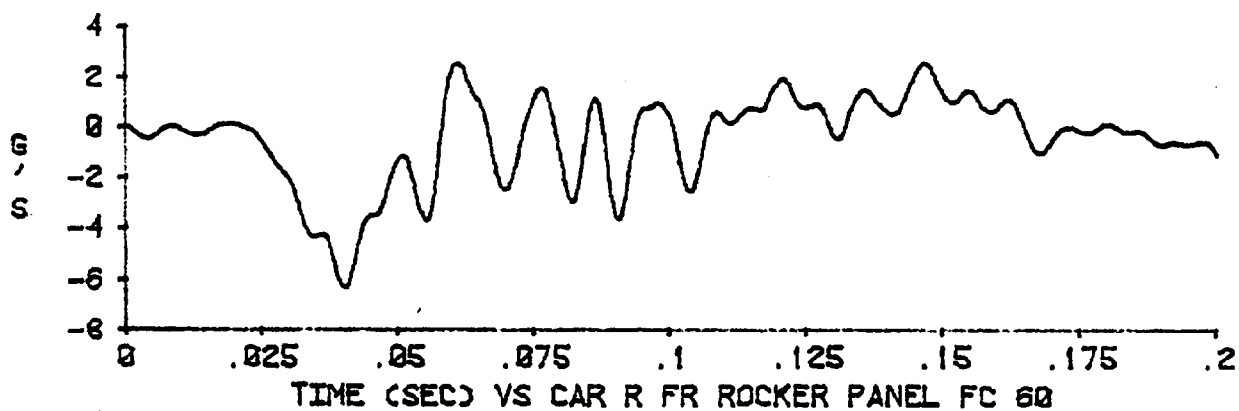
TEST 1955

04 DEC 68



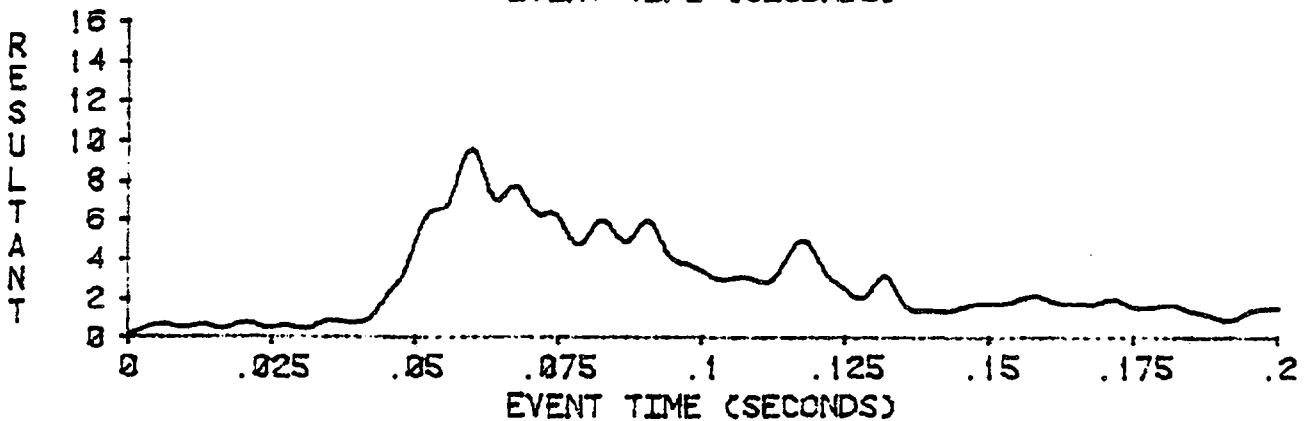
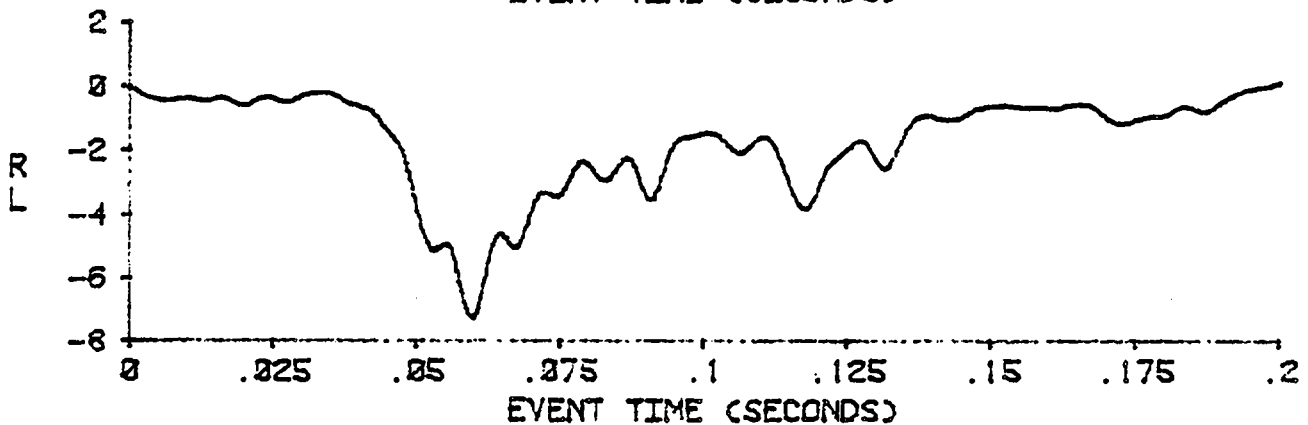
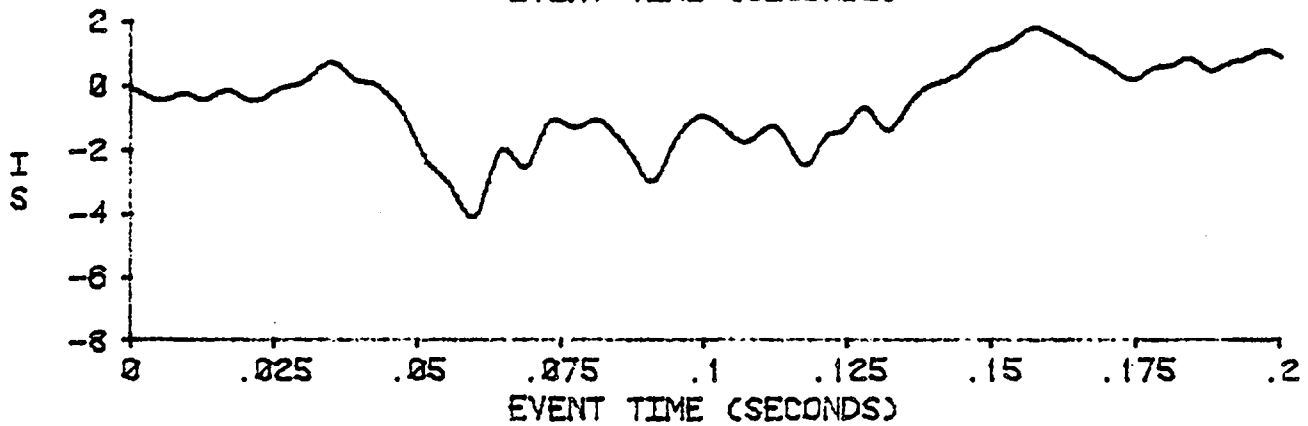
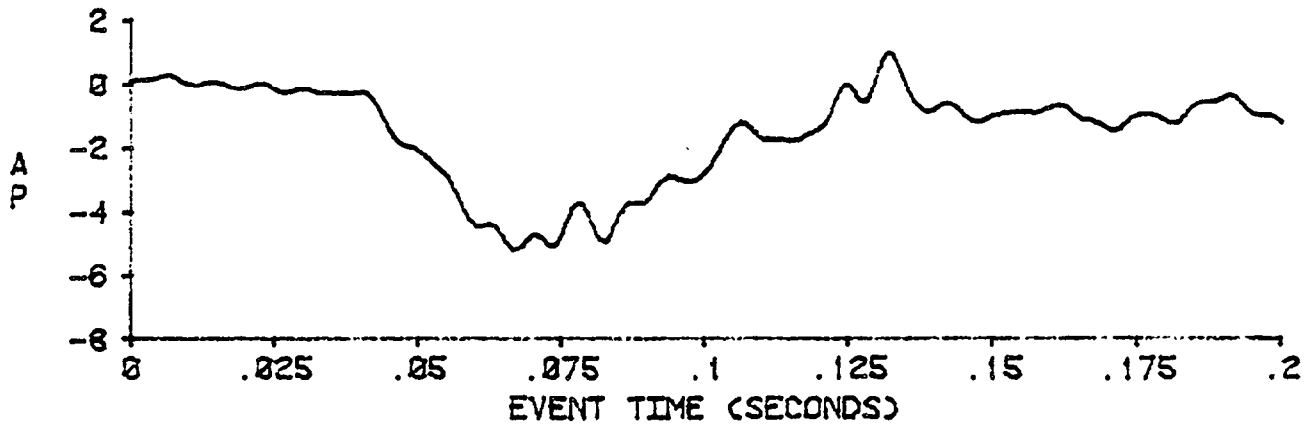
VEHICLE 1 - CHEV. MALIBU - 18.25 MPH

TEST 1955
04 DEC 80



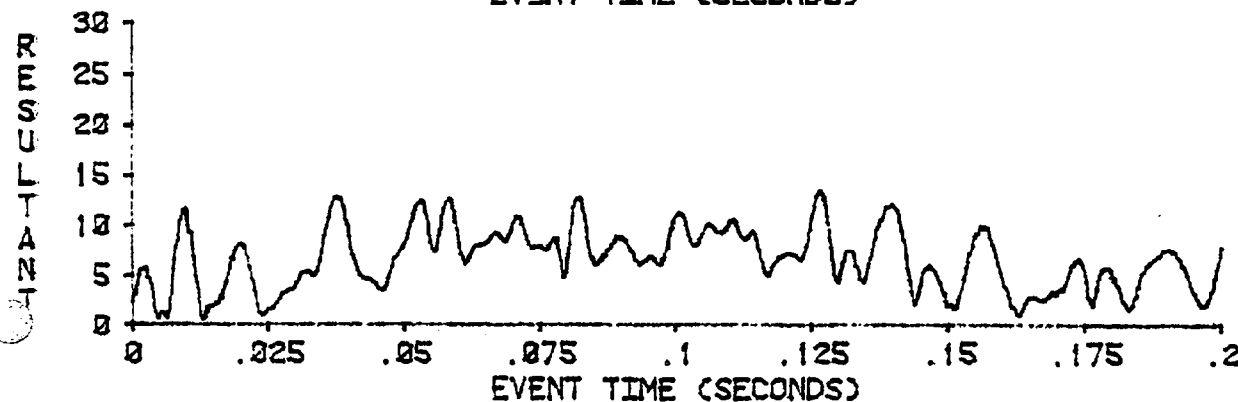
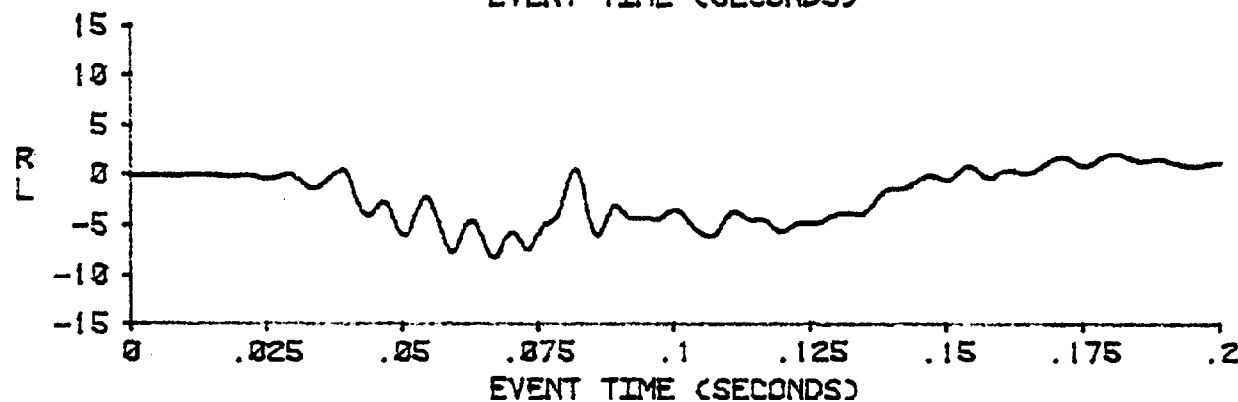
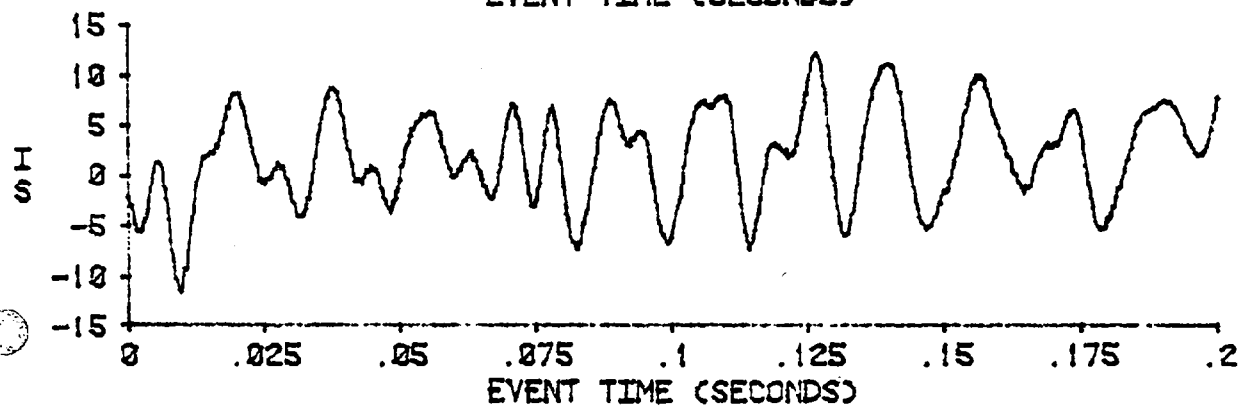
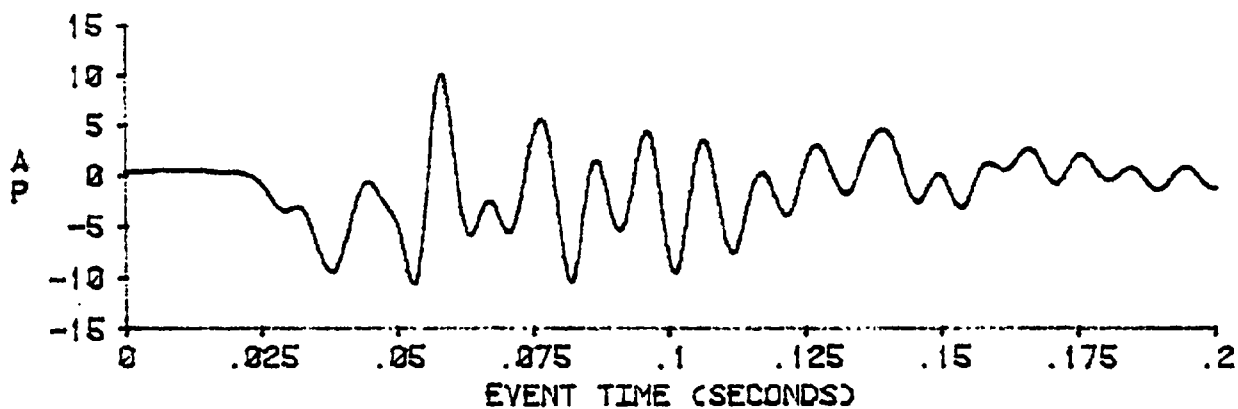
VEHICLE 1 - CHEV. MALIBU - 18.25 MPH
ENGINE G'S G'S
FILTER CLASS 60

TEST 1955
04 DEC 80



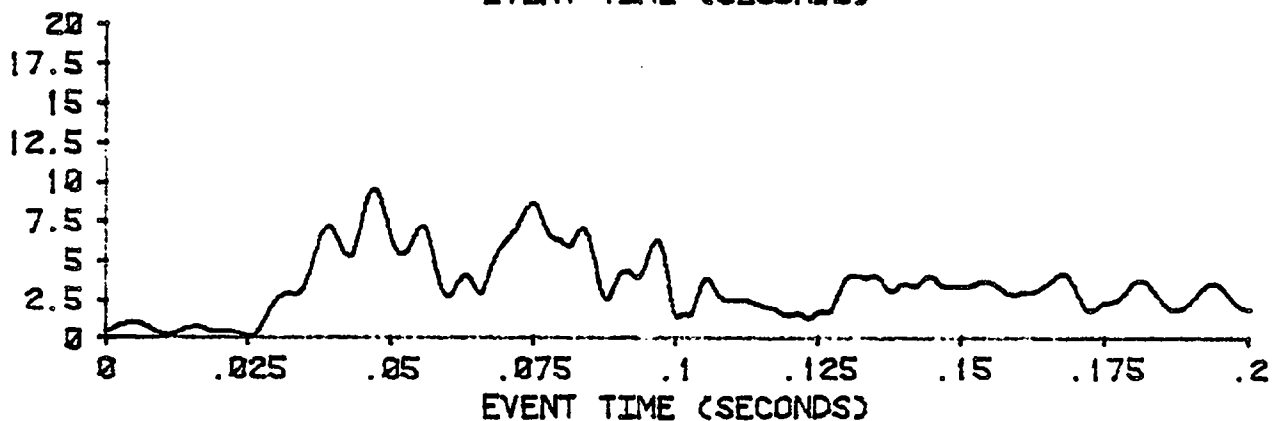
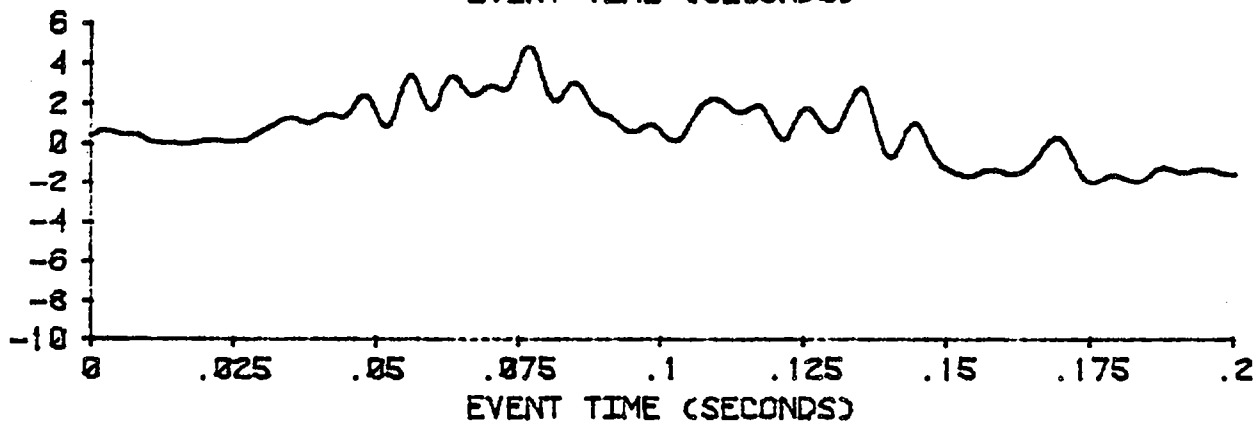
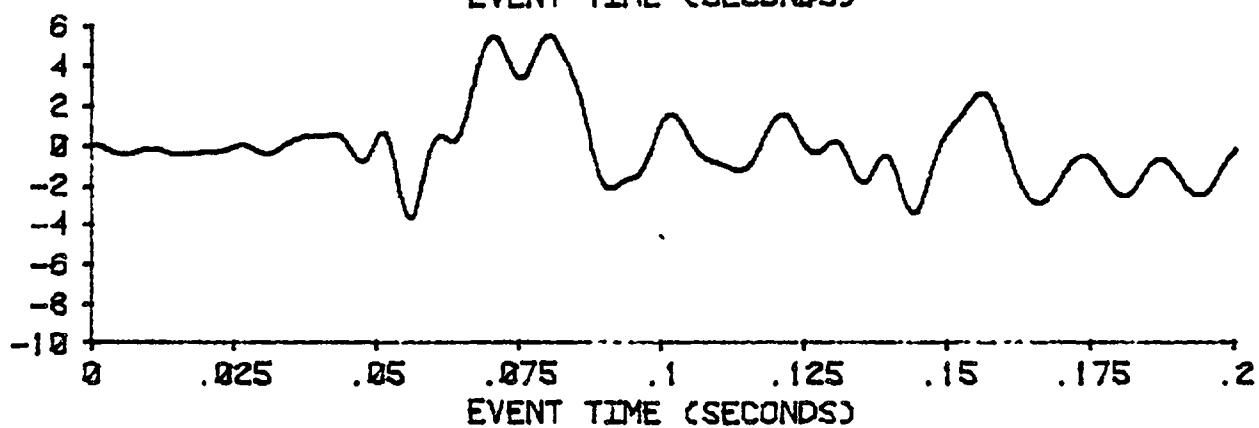
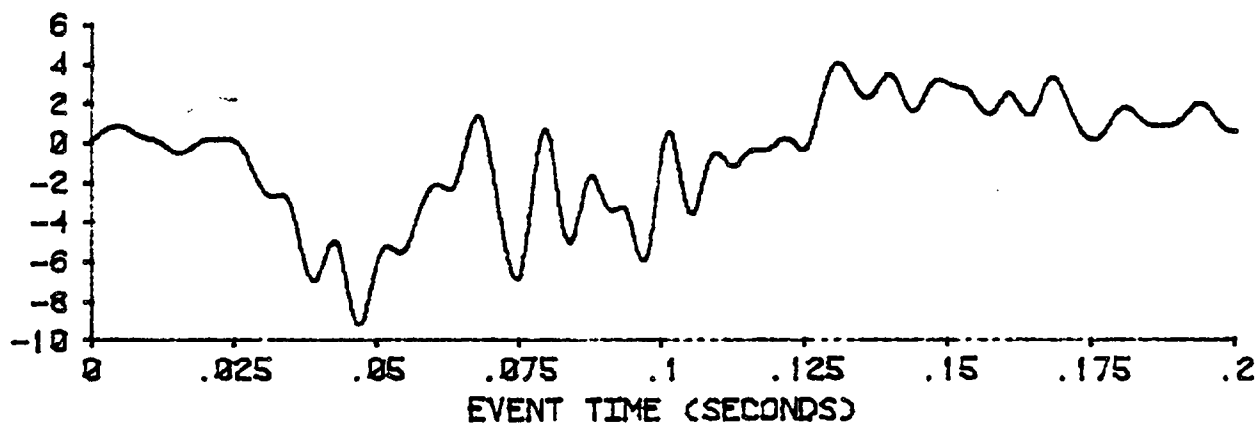
VEHICLE 1 - CHEV. MALIBU - 18.25 MPH
CAR FIREWALL G'S
FILTER CLASS 60

TEST 1955
04 DEC 80



VEHICLE 1 - CHEV. MALIBU - 18.25 MPH
CAR MID TRUNK G'S
FILTER CLASS 60

TEST 1955
04 DEC 80



VEHICLE 1 - CHEV. MALIBU - 18.25 MPH

TEST 1955
04 DEC 80

