

TEST
REPORT

CONTRACT NAME: EVALUATION OF VEHICLE SIDE
STRUCTURES UNDER VARYING
IMPACT CONDITIONS

CONTRACT NUMBER: DTNH22-81-C-07019

TEST DESCRIPTION: CITATION INTO "BUDD" MODIFIED
VW RABBIT (37.5 MPH CLOSING
VELOCITY)

MINICARS TEST NUMBER: 2265

TEST DATE: DECEMBER 14, 1981

REPORT DATE: DECEMBER 1981

MINICARS, INC.

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Under Varying Impact Conditions

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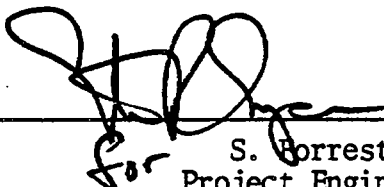
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(37.5 mph Closing Velocity)

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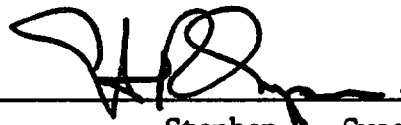
REPORT DATE: December 1981

APPROVED:



for S. Forrest
Project Engineer

APPROVED:



Stephen A. Syson
Head, Crashworthiness Group

APPROVED:



Alan R. Christ
Test Director

METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures				Approximate Conversions from Metric Measures			
Symbol	When You Know	Multiply by	To Find	Symbol	When You Know	Multiply by	To Find
LENGTH				LENGTH			
in	inches	2.5	centimeters	mm	millimeters	0.04	inches
ft	feet	30	centimeters	cm	centimeters	0.4	inches
yd	yards	0.9	meters	m	meters	3.3	feet
mi	miles	1.6	kilometers	km	kilometers	1.1	yards
						0.6	miles
AREA				AREA			
sq in	square inches	6.5	square centimeters	cm ²	square centimeters	0.16	square inches
sq ft	square feet	0.09	square meters	m ²	square meters	1.2	square yards
sq yd	square yards	0.8	square meters	km ²	square kilometers	0.4	square miles
ac	acres	2.5	square kilometers	ha	hectares (10,000 m ²)	2.5	acres
		0.4	hectares				
MASS (weight)				MASS (weight)			
oz	ounces	28	grams	g	grams	0.035	ounces
lb	pounds	0.45	kilograms	kg	kilograms	2.2	pounds
	short tons (2000 lb)	0.9	tonnes	t	tonnes (1000 kg)	1.1	short tons
VOLUME				VOLUME			
teaspoon	teaspoons	5	milliliters	ml	milliliters	0.03	fluid ounces
tablespoon	tablespoons	15	milliliters	ml	fluid ounces	2.1	pints
fluid ounce	fluid ounces	30	milliliters	ml	liters	1.06	quarts
cup	cups	0.24	liters	l	liters	0.26	gallons
pint	pints	0.47	liters	l	cubic meters	35	cubic feet
quart	quarts	0.96	liters	m ³	cubic meters	1.3	cubic yards
gallon	gallons	3.8	liters				
cubic foot	cubic feet	0.03	cubic meters	m ³			
yd ³	cubic yards	0.76	cubic meters	m ³			
TEMPERATURE (exact)				TEMPERATURE (exact)			
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature

*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Mon. Publ. 286, Units of Weights and Measures, Price \$2.25, SD Catalog No. C13.10.286.

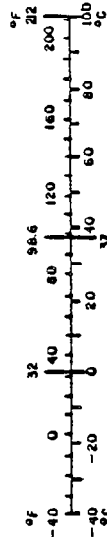


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SECTION 1

TEST OBJECTIVES AND SPECIAL PROCEDURES

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OBJECTIVES:

To provide data for evaluating the side structure and occupant responses of a "Budd" modified VW Rabbit when impacted by a Chevrolet Citation.

SPECIAL PROCEDURES:

The target vehicle was a "Budd" modified VW Rabbit (speed, 14.15 mph) while the impacting vehicle was a 2-door Chevrolet Citation (speed, 28.3 mph). The VW Rabbit was modified for increased side impact protection. This included a stronger left side door structure, interlocks between the left side door and lower sill, and a reinforced B-pillar and roof support structure. The Rabbit contained an ACE damper-equipped SID dummy in the driver position and included an Association Renault-Peugeot (APR) door pad.

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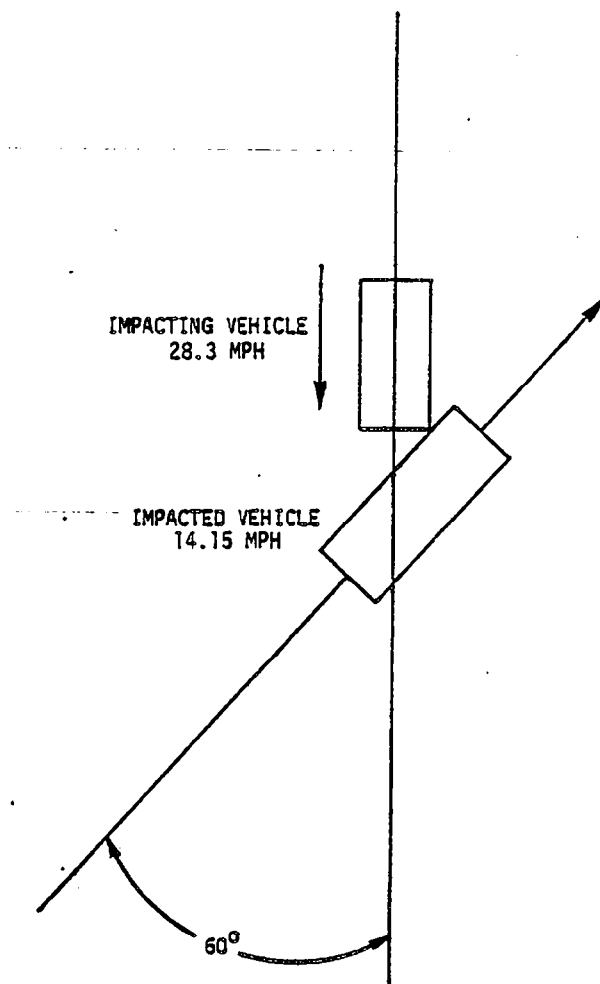
SECTION 2

TEST CONDITIONS

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TEST CONDITIONS:

The Chevrolet Citation was towed into the VW Rabbit at an angle of 60 degrees relative to the VW centerline. The velocities were 28.3 mph for the Citation and 14.15 mph for the VW Rabbit. The first point of impact was intended to be 4.75 inches aft of the driver's door hinge centerline*. The actual point of impact was within 1/2 inch of that point. The VW front seat was adjusted to the mid-track position. The fuel system was drained and refilled with Stoddard solution.



VEHICLE ORIENTATION DIAGRAM

*Also approximately 8 inches from door leading edge.

RECEIVING INSPECTION OF VEHICLE #1

Contractor: Minicars, Inc. Contract No.: DTNH22-81-C-07019
VIN No.: 1763091982
Make: Volkswagen Model: Rabbit 2-door
Year: 1976 Color: Brown
Mfgr Date: November 1975 Date Received: August 27, 1981
Shipping Weight: 1813 lbs Odometer: 70,475.9
Dealer: Budd Company via Dynamic Sciences Inc.

Accessories

Power steering	no	Automatic transmission	no
Power brakes	no	Automatic speed control	no
Power seats	no	Tilting steering wheel	no
Power windows	no	Telescoping steering wheel	no
Tinted glass	no	Air conditioning	no
Radio	yes	Anti-skid brake	no
Clock	no	Rear window defroster	yes

Seats (front): bucket

Brakes

Front: disc
Rear: drum

Tires

Size:	155SR13	Mfgr & Line:	Uniroyal Rallye 180
Ply Rating:	4 Ply + 2 Ply SW	Bias Ply:	no
Radial:	yes		
"Space Saver" spare tire:	no		

Engine

Type:	Gasoline OHC	Cylinders:	4
Transmission, Frwd Speeds:	4	Total Displacement:	97 CID

Fuel Capacity: 11.9 gallons

Restraint System: VW passive belts and knee bar

Remarks

1. Is the vehicle stock throughout? No.
Vehicle left door, B-pillar and roof structure modified by Budd Company.
2. Does vehicle show evidence of prior accident history? No.
Vehicle suspension damaged during or prior to delivery. Repaired before crash.
3. Does vehicle show any significant corrosion? No.
4. Condition of the front bumper and frame: Good.

SUMMARY OF CRASH TEST CONDITIONS (VEHICLE #1)

Test Vehicle Information

Manufacturer:	Volkswagen	Make & Model:	Rabbit 2-door
VIN Number:	1763091982		
Model Year:	1976	Build Date:	November 1975
Transmission:	4-speed manual	Date Received:	August 27, 1981
Body Style:	2-door Hatchback	Color:	Brown
Engine Data		Dealer:	Budd Company
Type:	Gasoline OHC		
Cylinders:	4		
Displacement:	97 CID		

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

Vehicle Mfgr:	Volkswagen	VIN:	1763091982
Date of Mfgr:	November 1975		
GVWR:	2777 lbs	GAWR:	Front, 1809 lbs; Rear, 1276 lbs

Data from "Recommended Tire Pressure" Label on Door, Post, Glovebox, Etc.

Vehicle Load Up to Capacity	Recommended Tire Size:	155SR13
Front: 24 psi	Load Range:	B
Rear: 24 psi		
Vehicle Capacity		
Type of Seats:	bucket	
No. of Occupants (designated seating capacity):	Front, 2; Rear, 2; Total, 4	
Cargo Load:	895 lbs	

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

Total Front Weight:	1015 lbs (56% of total vehicle weight)
Total Rear Weight:	798 lbs (44% of total vehicle weight)
Total Delivered Weight:	1813 lbs

Weight of Test Vehicle with Required Dummies

Total Front Weight:	1315 lbs (54% of total vehicle weight)
Total Rear Weight:	1120 lbs (46% of total vehicle weight)
Total Test Weight:	2436 lbs
Weight of Ballast Secured in Vehicle:	250 lbs

Test Conditions

Date of Test:	December 14, 1981	Ambient Temperature at
Time of Test:	3:30 pm	Impact Area: 65 °F
		Wind Velocity: 5-10 mph

RECEIVING INSPECTION OF VEHICLE #2

Contractor: Minicars, Inc. Contract No.: DTNH22-81-C-07019
VIN No.: 1X087A6106707
Make: Chevrolet Model: Citation 2-door
Year: 1980 Color: Grey/Maroon
Mfgr Date: April 1980 Date Received: June 1981
Shipping Weight: 2625 lbs Odometer: 20974
Dealer: Rosco Morris Motors

Accessories

Power steering	yes	Automatic transmission	no
Power brakes	yes	Automatic speed control	no
Power seats	no	Tilting steering wheel	no
Power windows	no	Telescoping steering wheel	no
Tinted glass	yes	Air conditioning	yes
Radio	yes	Anti-skid brake	no
Clock	no	Rear window defroster	no

Seats (front): split back bench

Brakes

Front: disc
Rear: drum

Tires

Size:	P185/80R13	Mfgr & Line:	Uniroyal
Ply Rating:	3 Ply + 1 Ply SW	Bias Ply:	no
Radial:	yes		
"Space Saver" spare tire:	yes		

Engine

Type:	Gasoline V6	Cylinders:	6
Total Displacement:	2.8 liters	Transmission, Frwd Speeds:	4-speed manual

Fuel Capacity: 14 gallons

Restraint System: 3-point belts

Remarks

1. Is the vehicle stock throughout? Yes.
2. Does vehicle show evidence of prior accident history? No.
3. Does vehicle show any significant corrosion? No.
4. Condition of the front bumper and frame: Very good.

SUMMARY OF CRASH TEST CONDITIONS (VEHICLE #2)

Test Vehicle Information

Manufacturer: General Motors Corp. Make & Model: Chevrolet Citation
VIN Number: 1X087A6106707
Model Year: 1980 Build Date: April 1980
Transmission: 4-speed Manual Date Received: June 1981
Body Style: 2-door Hatchback Color: Grey/Maroon
Engine Data
Type: Gasoline V6
Cylinders: 6
Displacement: 2.8 liters

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

Vehicle Mfgr: General Motors Corp. VIN: 1X087A6106707
Date of Mfgr: April 1980
GVWR: 3552 lbs GAWR: Front, 1921 lbs; Rear, 1581 lbs

Data from "Recommended Tire Pressure" Label on Door, Post, Glovebox, Etc.

Vehicle Load Up to Capacity Recommended Tire Size: P185/80R13
Front: 26 psi Load Range: B
Rear: 26 psi

Vehicle Capacity

Type of Seats: split bench
No. of Occupants (designated seating capacity): Front, 3; Rear, 2; Total, 5
Cargo Load: 895 lbs

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

Total Front Weight: 1680 lbs (64% of total vehicle weight)
Total Rear Weight: 945 lbs (36% of total vehicle weight)
Total Delivered Weight: 2625 lbs

Weight of Test Vehicle with Required Dummies

Total Front Weight: 2158 lbs (60% of total vehicle weight)
Total Rear Weight: 1439 lbs (40% of total vehicle weight)
Total Test Weight: 3597 lbs

Weight of Ballast Secured in Vehicle: 834 lbs

Test Conditions

Date of Test: December 14, 1981 Ambient Temperature at
Time of Test: 3:30 pm Impact Area: 65 °F
Wind Velocity: 5-10 mph

SUMMARY OF CRASH TEST CONDITIONS (cont'd)

Test No.: 2265 Project Title: Eval. of Vehicle Side Structures

Date: 12-14-81 Time: 3:30 pm Temp: 65°F
Wind Velocity: 5-10 mph

Subject Vehicle Data

Description: "Budd" Modified Volkswagen Rabbit, Vehicle #1

	Actual	Intended
Test weight (lbs)	2436	2444
Vehicle orientation (degrees)	0	0
Vehicle velocity (mph)	14.2	15 ± 0.25
Maximum crush (inches)		
Static	10.87	
Dynamic	N/A	
Maximum intrusion (inches)		
Static - with pad	8.5	

Dummies

	Driver	Middle Passenger	Rt. Front Passenger	Left Rear Passenger	Rt. Rear Passenger
Type	SID				
Serial no.	HSRI 387				
Instrumentation					
Head accel.	Triax				
Chest accel.	See				
	Remarks				
Femur L.C.'s	No				
Other	Yes				
Restraint system	None				

Remarks: Upper spine triaxial; lower spine triaxial; left ribs (2 channels) R-L; right rib (2 channels) R-L; pelvic triaxial; upper sternal accelerometer A-P; lower sternal accelerometer A-P; chest deflection R-L; strip switches on hip and shoulder. The SID utilized an "ACE" brand chest damper set to Position 9.

SUMMARY OF CRASH TEST CONDITIONS (cont'd)

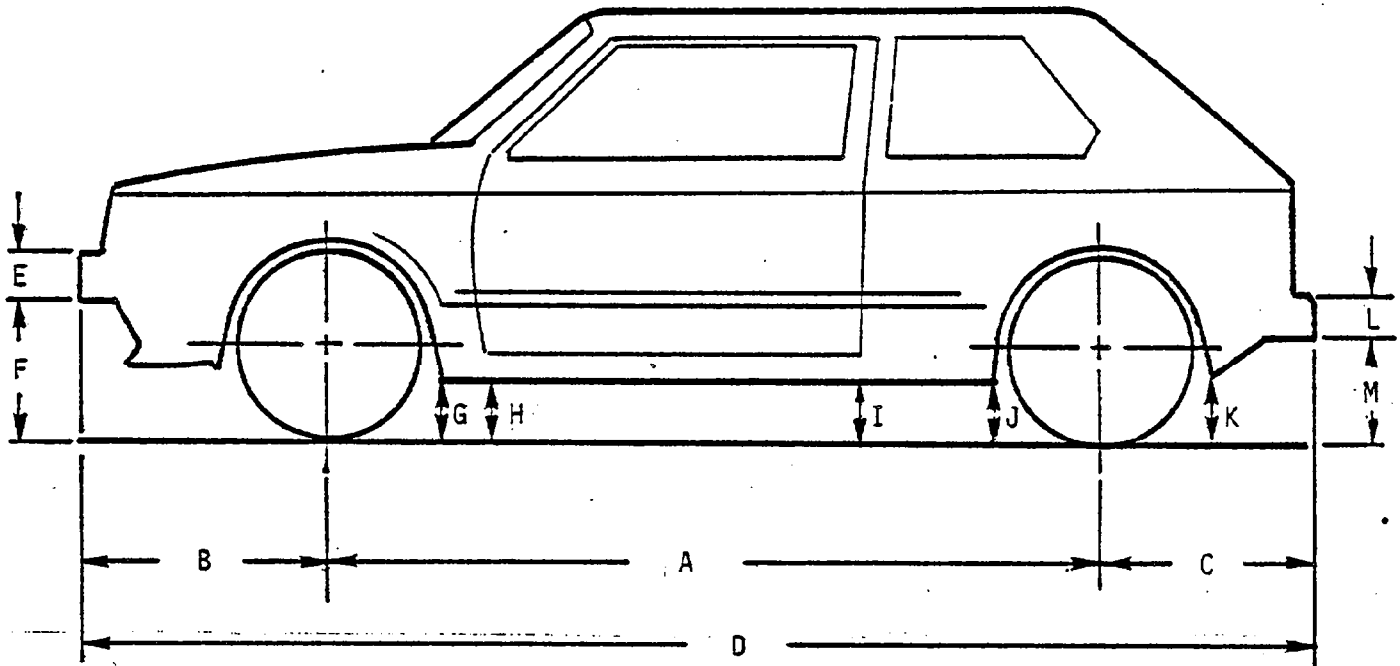
Impacting Vehicle/Object Data

Description: Chevrolet Citation (2-door), Vehicle #2

	<u>Actual</u>	<u>Intended</u>
Test weight (lbs)	3597	3600
Vehicle orientation (degrees)	60	60
Vehicle velocity (mph)	28.3	30 $\pm$ 0.5
Maximum crush (inches)		
Static (frontal)	8.75	
Dynamic	N/A	

Remarks: Two dummies were used for ballast in the front seat. They were restrained with seat belts. No dummy instrumentation was required for the Citation. Five hundred additional pounds of ballast were bolted to the footwells.

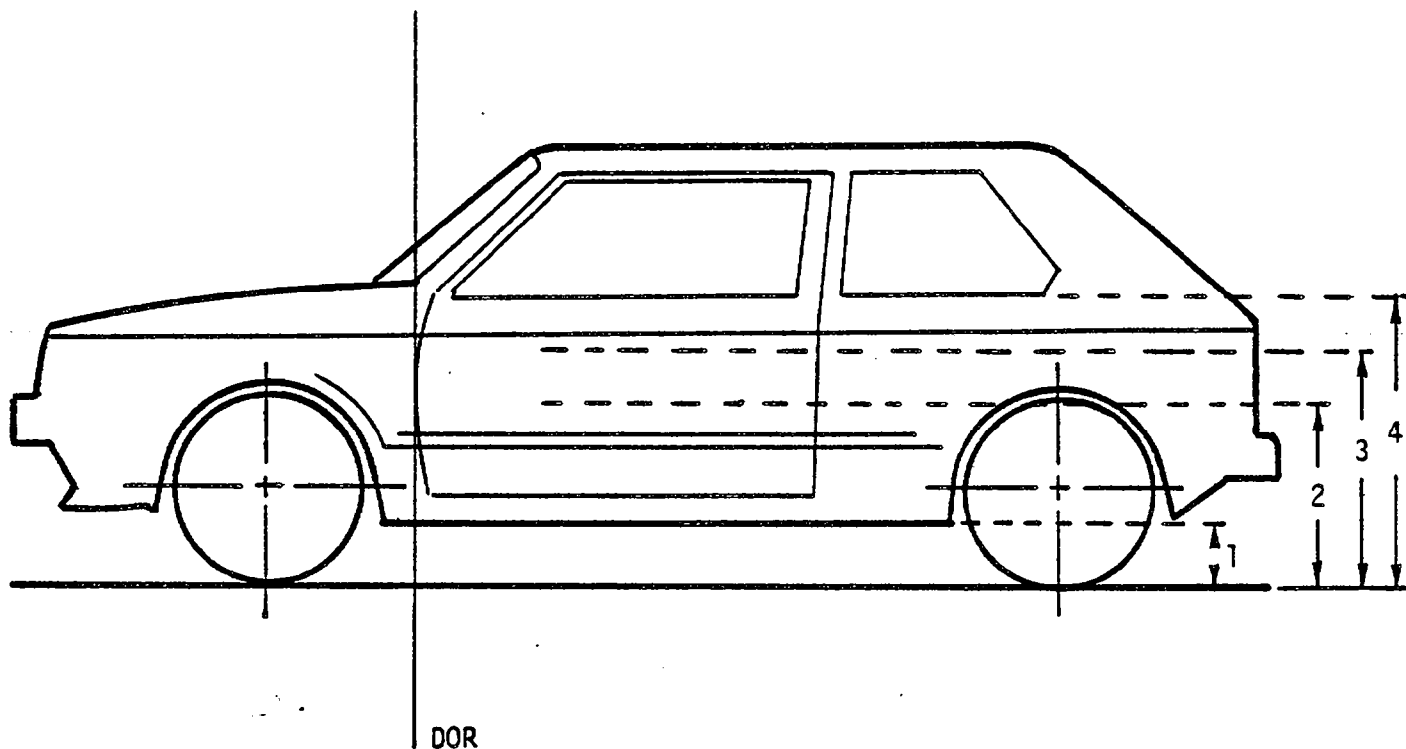
PRE-TEST AND POST-TEST DIMENSION MEASUREMENTS



VEHICLE: Modified 1976 VW Rabbit, 2-door, VIN 1763091982

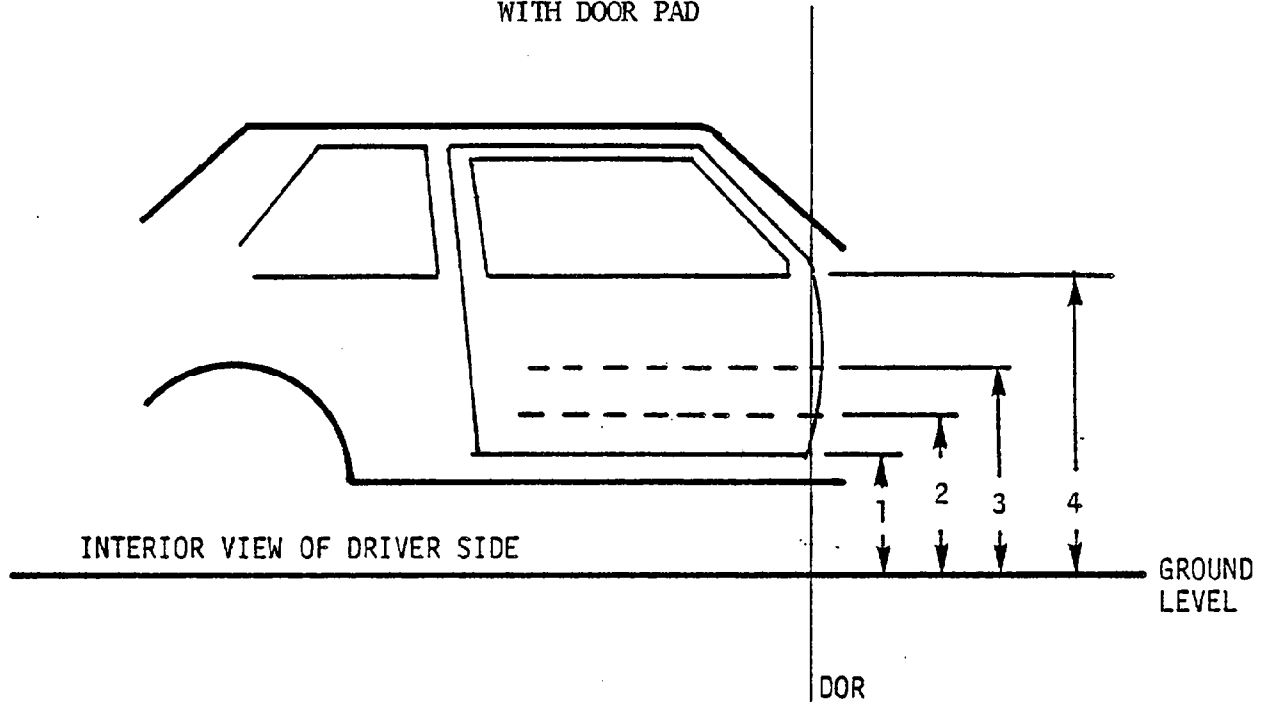
	Pre-Test (inches)	Post-Test (inches)	Change (delta)
A	94.5	94.75	(0.25)
B	32.25	31.5	0.75
C	27.0	26.5	0.50
D	154.2	152.0	2.2
E	4.25	4.25	0.0
F	15.25	16.0	(0.75)
G	9.6	9.5	0.1
H	10.0	9.5	0.5
I	10.5	9.5	1.0
J	10.5	10.0	0.5
K	11.25	11.0	0.25
L	4.25	4.25	0.0
M	15.6	15.75	(0.15)

EXTERIOR STATIC CRUSH FOR VOLKSWAGEN RABBIT



		Level 1 (12")	Level 2 (20")	Level 3 (26")	Level 4 (32")
F R O N T	42	N/A			N/A
	36	+0.25	+0.25	+0.12	N/A
	30	0.00	+0.25	+0.25	0.00
	24	+0.75	+1.00	+0.25	+0.25
	18	+0.25	+0.50	+0.50	+0.50
	12	+0.37	+0.50	+0.75	+0.50
	6	+0.62	+0.50	+0.62	+0.62
	0	+1.12	+2.00	+1.00	+1.12
	6	+1.62	+5.37	+4.25	+3.62
	12	+2.00	+7.62	+6.62	+6.50
R E A R	18	+2.37	+9.50	+9.00	+8.25
	24	+2.37	+10.00	+10.00	+9.81
	30	+1.87	+9.25	+9.75	+10.81
	36	+2.50	+8.87	+9.25	+10.87
	42	+2.50	+7.87	+8.75	+9.62
	48	+1.75	+7.25	+7.87	+8.75
	54	+0.87	+6.25	+8.00	+6.75
	60	+0.50	+4.75	+5.62	+5.12
	66	N/A	+5.00	+3.25	+2.87
	72	+1.12	+0.50	+1.75	+1.62
	78	+1.37	+0.50	+1.50	+0.87
	84	+0.50	-0.25	+1.00	+0.50
	90	+0.25	+0.25	+0.50	+0.25

INTERIOR STATIC INTRUSION FOR VOLKSWAGEN RABBIT
WITH DOOR PAD



		Level 1 (12.5")	Level 2 (17.0")	Level 3 (24.0")	Level 4 (34.5")
DOR	0	-1.30	0.00	N/A	N/A
	6	-1.60	+3.20	+3.25	+2.75
	12	-1.00	+4.95	+5.25	+4.50
	18	-0.75	+6.00	+6.25	+6.70
	24	-0.50	+6.50	+7.50	+7.50
	30	-0.50	+6.50	+7.25	+7.75
	36	-0.50	+6.50	+7.25	+8.25
	42	-0.50	+7.50	+7.50	+8.50
	48	N/A	+3.70	+6.50	+7.00
	54	N/A	+1.70	+6.95	+5.50
	60	N/A	+0.70	+4.60	+4.25

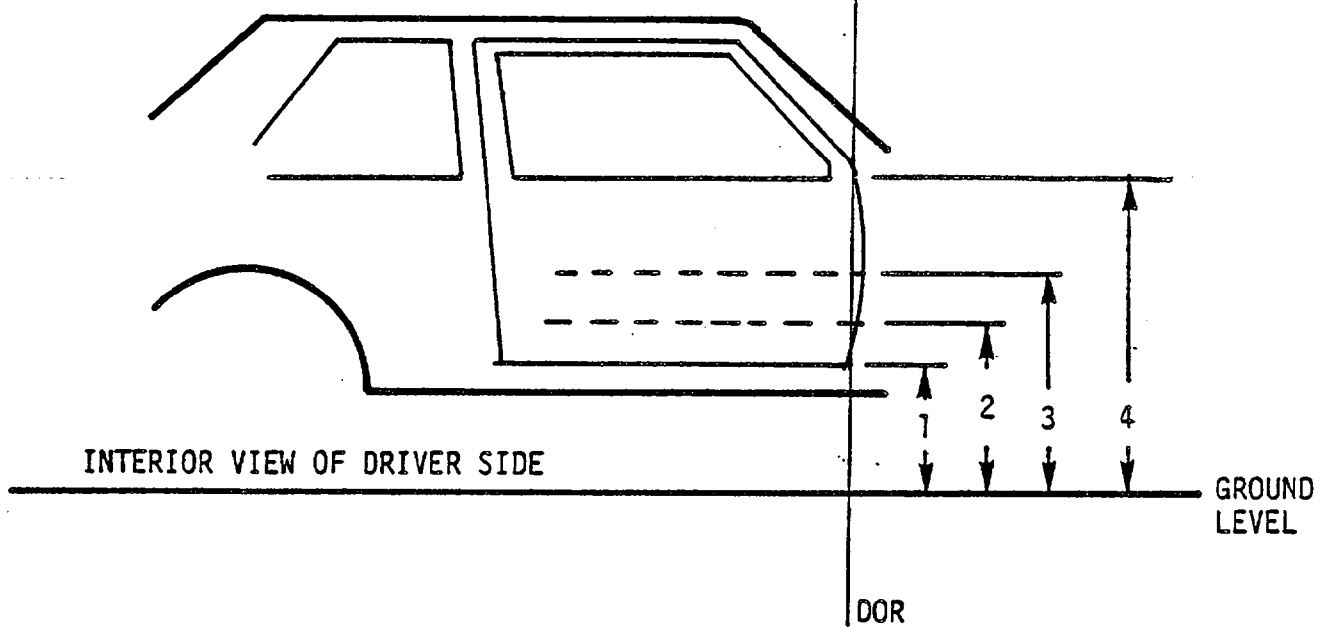
Level 1 = Doorsill Level

Level 2 = Bullet Vehicle Bumper Level

Level 3 = Mid-door Level

Level 4 = Window Sill Level

INTERIOR STATIC INTRUSION FOR VOLKSWAGEN RABBIT
WITHOUT DOOR PAD



		Level 1 (12.5")	Level 2 (17.0")	Level 3 (24.0")	Level 4 (34.5")
DOR	0	-1.30	+1.75	N/A	N/A
	6	-1.60	+2.75	+3.50	+2.50
	12	-1.00	+4.50	+5.00	+4.50
	18	-0.75	+5.50	+6.50	+6.70
	24	-0.50	+5.00	+7.50	+7.45
	30	-0.50	+4.70	+8.65	+7.50
	36	-0.50	+6.70	+7.90	+8.00
	42	-0.50	+5.50	+7.50	+8.45
	48	N/A	+3.45	0.00	0.00
	54	N/A	0.00	0.00	0.00
	60	N/A	0.00	0.00	0.00

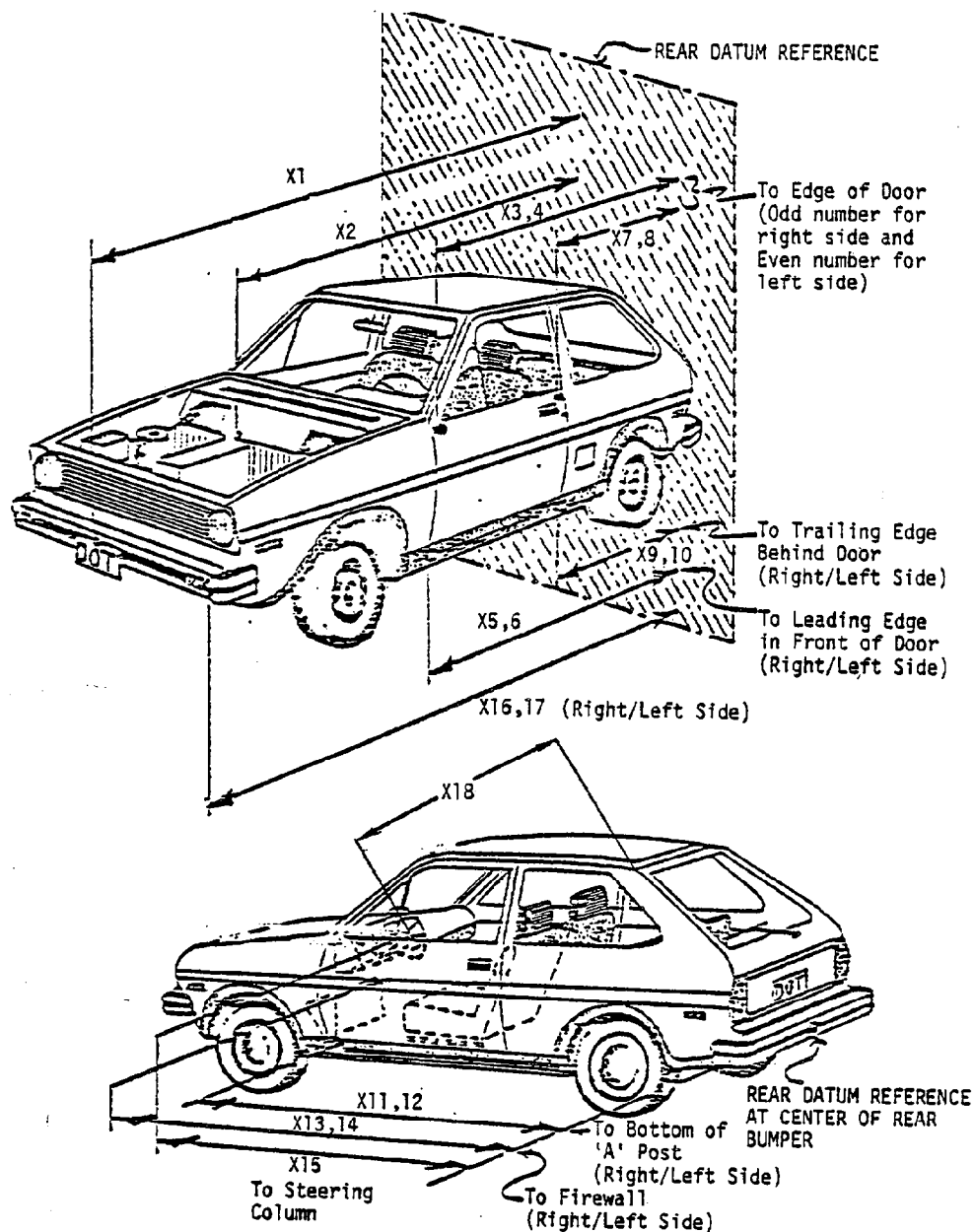
Level 1 = Doorsill Level

Level 2 = Bullet Vehicle Bumper Level

Level 3 = Mid-door Level

Level 4 = Window Sill Level

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

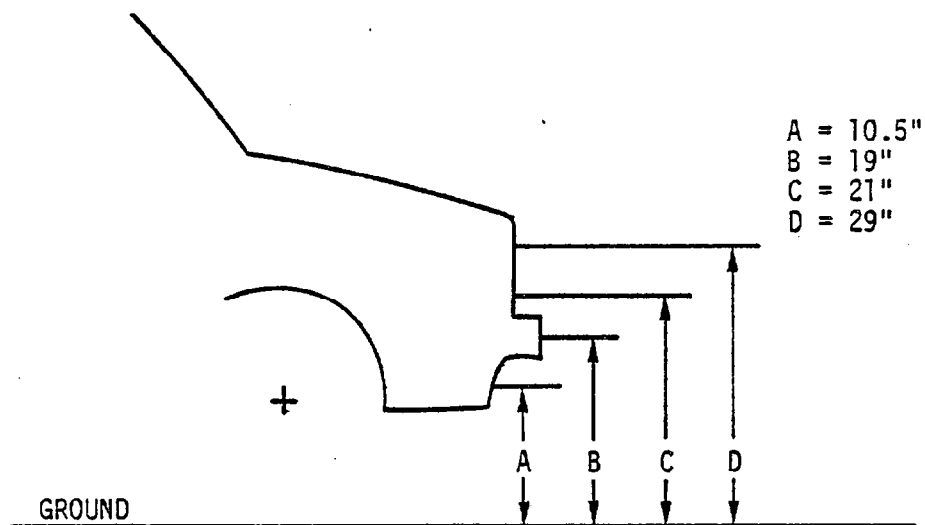


IMPACTING VEHICLE (VEHICLE #2)
PRE-TEST AND POST-TEST MEASUREMENT POINTS
- FRONTALLY IMPACTED VEHICLES

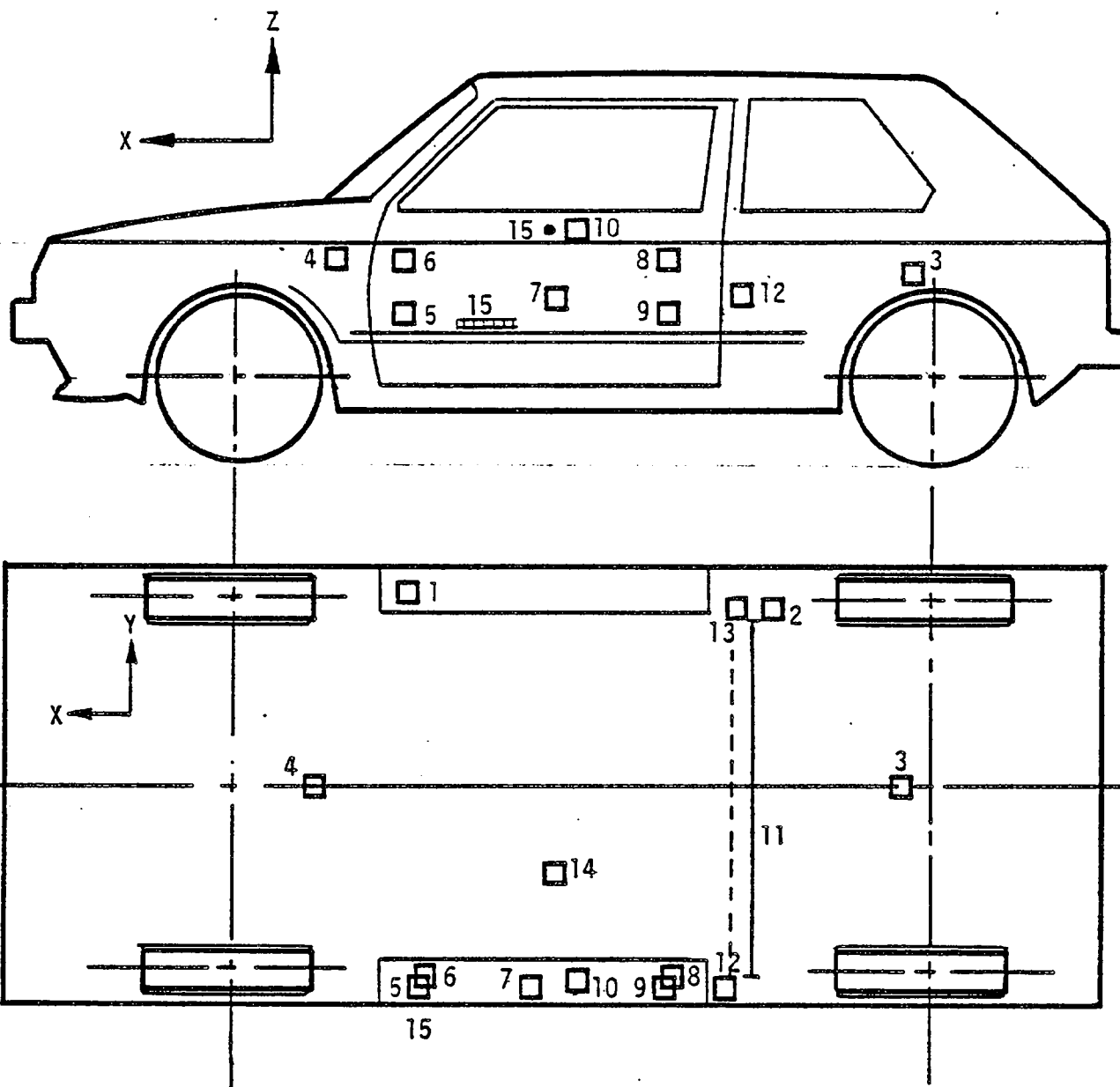
VEHICLE MEASUREMENTS
IMPACTING VEHICLE
(VEHICLE #2)

No.	Type of Measurement	Dimensions (inches)		Crush
		Pre-Test	Post-Test	Delta
X1	Total Length of Vehicle at Centerline	177.5	173.2	4.3
X2	Rear Surface of Vehicle to Firewall	133.0	132.7	0.3
X3	Rear Surface of Vehicle to Upper Leading Edge of Right Door	122.0	122.0	0.0
X4	Rear Surface of Vehicle to Upper Leading Edge of Left Door	122.0	122.0	0.0
X5	Rear Surface of Vehicle to Lower Leading Edge of Right Door	121.0	121.0	0.0
X6	Rear Surface of Vehicle to Lower Leading Edge of Left Door	121.0	121.0	0.0
X7	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	71.1	71.5	-0.4
X8	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	71.2	71.4	-0.2
X9	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	70.5	70.5	0.0
X10	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	70.5	71.0	-0.5
X11	Rear Surface of Vehicle to Bottom of A-Post of Right Side	116.5	116.5	0.0
X12	Rear Surface of Vehicle to Bottom of A-Post of Left Side	117.0	116.5	0.5
X13	Rear Surface of Vehicle to Firewall - Right Side	128.7	128.7	0.0
X14	Rear Surface of Vehicle to Firewall - Left Side	129.0	129.0	0.0
X15	Rear Surface of Vehicle to Steering Wheel Center	105.0	105.0	0.0
X16	Rear Surface of Vehicle to Right Side of Front Bumper	173.2	174.7	-1.5
X17	Rear Surface of Vehicle to Left Side of Front Bumper	173.2	164.0	9.2
X18	Rear Window Header to Steering Wheel Center	66.0	66.0	0.0

CITATION FRONTAL CRUSH



X (inches)	A	B	C	D
30	N/A	8.75	6.75	5.50
25	N/A	8.50	5.75	3.62
20	6.00	7.50	4.75	3.00
15	4.75	6.75	3.87	2.50
10	4.00	5.62	3.50	2.25
5	2.87	4.75	2.75	1.00
0	2.37	4.00	2.12	0.50
5	1.87	3.00	1.50	0.50
10	1.25	2.12	1.00	0.37
15	0.50	1.25	0.37	0.00
20	0.00	0.25	0.00	-0.12
25	0.00	-0.75	-0.62	-0.37
30	-0.50	-1.75	-1.12	-1.12



ACCELEROMETER

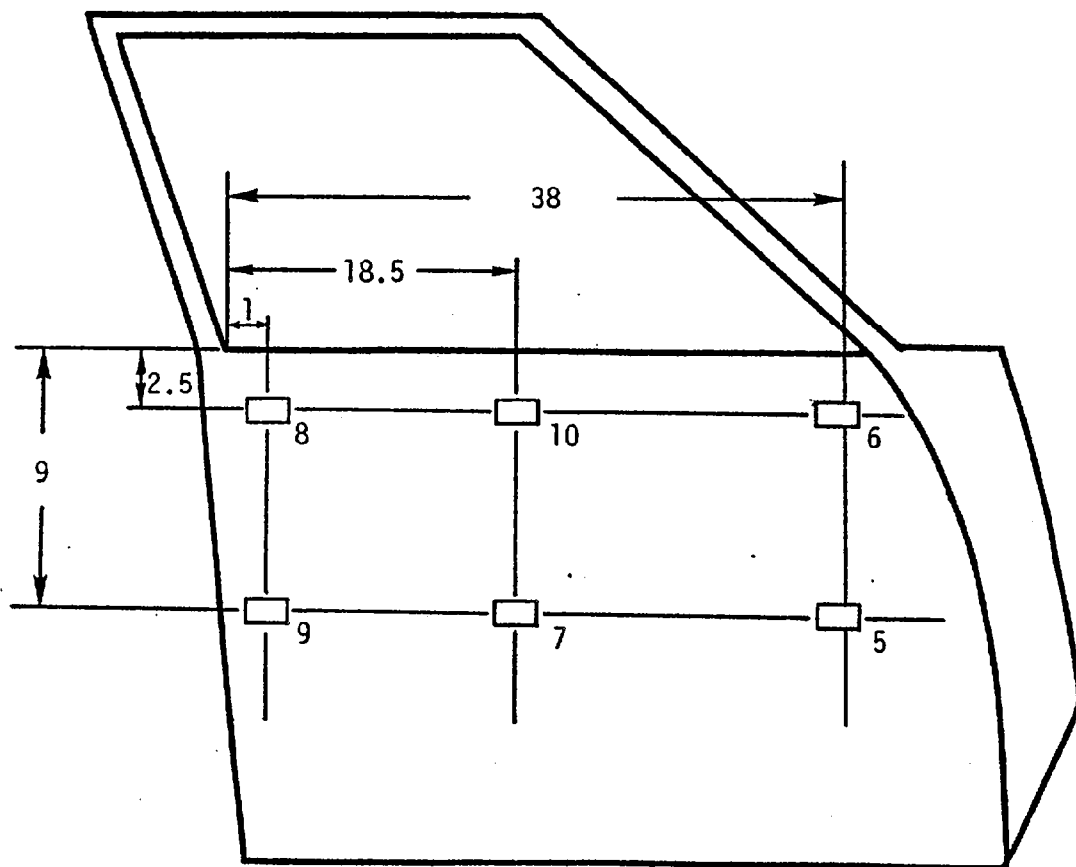


"SLIP STIK" BRASS ROD TRANSDUCER



STRIP CONTACT SWITCH

SUBJECT VEHICLE TRANSDUCER LOCATIONS



□ UNIAXIAL ACCELEROMETER

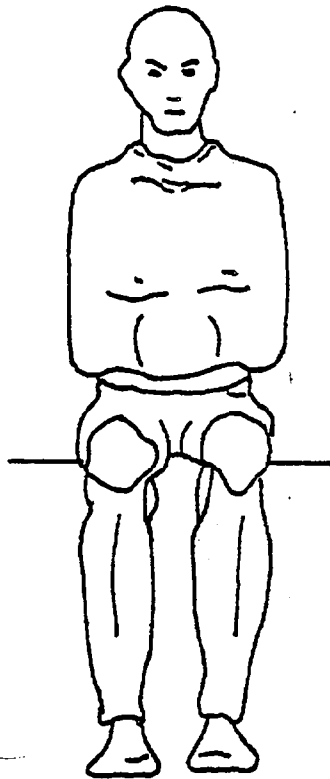
ALL DIMENSIONS IN INCHES

DOOR INSTRUMENTATION
(INSIDE VIEW DRIVER DOOR)

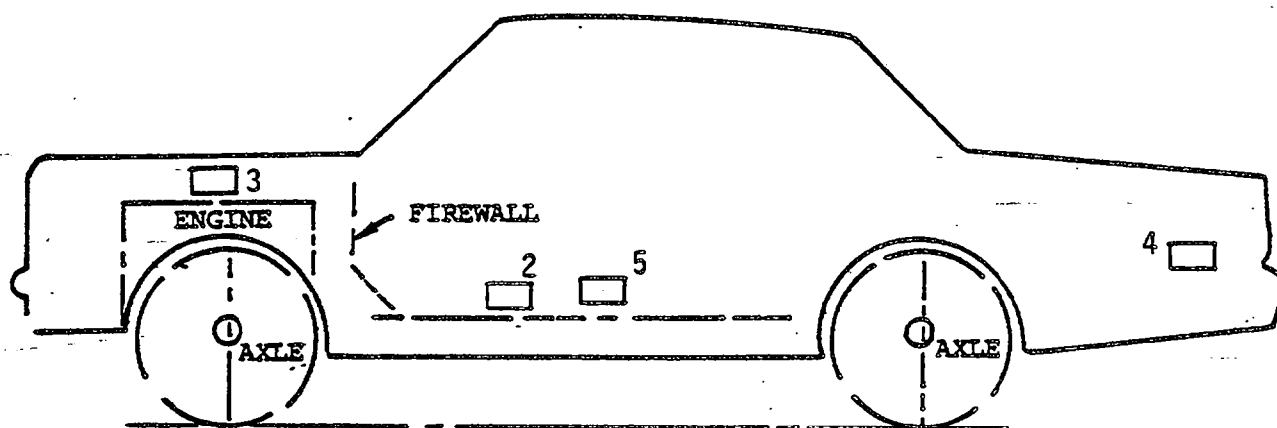
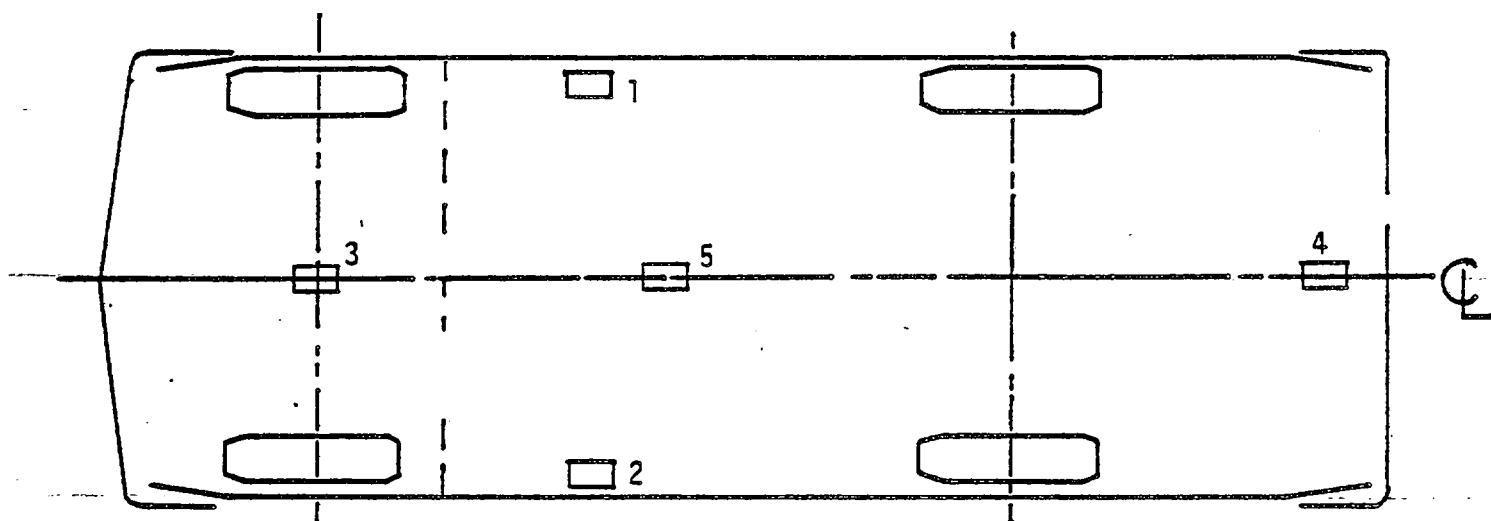
SUBJECT VEHICLE INSTRUMENTATION LOCATIONS

Transducer No.	Description/Location	Type	Direction		
			X	Y	Z
1	Occupant compartment right front doorsill	Uniaxial		X	
2	Occupant compartment right rear doorsill	Uniaxial		X	
3	Rear deck on vehicle centerline (14" aft of floor kickup)	Triaxial	X	X	X
4	Front firewall on vehicle centerline	Biaxial	X	X	
5	Mid front edge of left front door	Uniaxial		X	
6	Upper front corner of left front door	Uniaxial		X	
7	Middle of left front door	Uniaxial		X	
8	Upper rear corner of left front door	Uniaxial		X	
9	Mid-rear edge of left front door	Uniaxial		X	
10	Left front door on windowsill ahead of occupant chest	Uniaxial		X	
11	B-pillar "Slip Stik"	Brass rod transducer			
12	Left B-pillar near door latch	Uniaxial		X	
13	Right B-pillar near door latch	Uniaxial		X	
14	Underneath and attached to left front seat	Uniaxial		X	
15	Strip switch at point of contact				

SIDE IMPACT DUMMY INSTRUMENTATION



Description/Location	Direction		
	X	Y	Z
Head Triaxial	+	+	+
Upper Spine Triaxial	+	+	+
Lower Spine Triaxial	+	+	+
Pelvis Triaxial	+	+	+
Rib Uniaxial (4)		+	
Sternum Uniaxial (2)	+		
Chest Deflection		+	



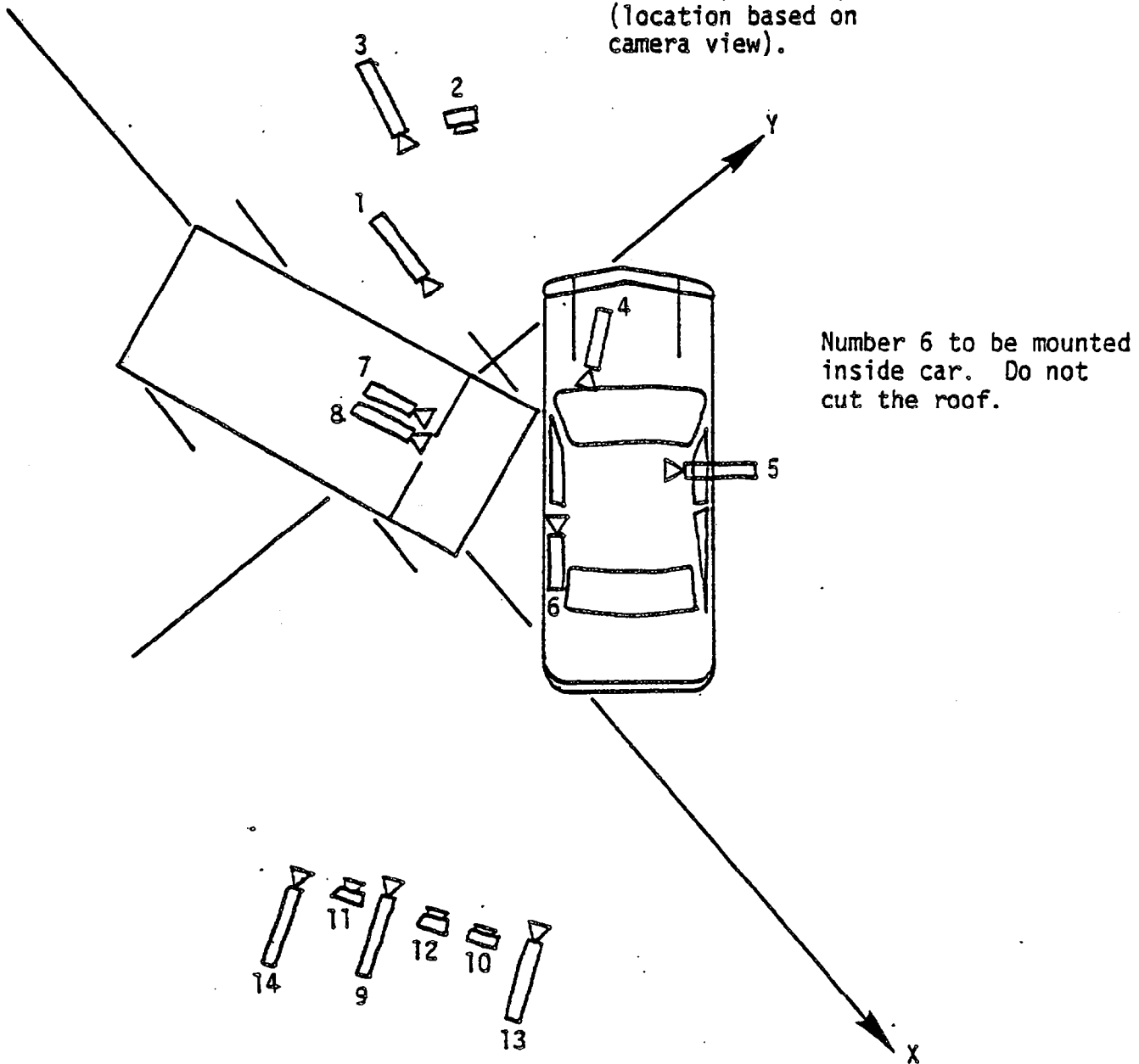
BULLET VEHICLE TRANSDUCER LOCATIONS

BULLET VEHICLE INSTRUMENTATION LOCATIONS

Transducer No.	Description/Location	Type	Direction		
			X	Y	Z
1	Occupant compartment near right side sill	Uniaxial		X	
2	Occupant compartment near left side sill	Uniaxial		X	
3	Engine mounted	Biaxial	X	X	
4	Trunk area (4" from rear bumper)	Biaxial	X	X	
5	Occupant compartment near center of gravity	Triaxial	X	X	X
6	Zero event strip switch on bumper				
7	Impact strip switch on grille				

NOTES:

1. Cameras 15, 16 & 17 are not shown, but are mounted to the overhead tower.
2. Two zero event strobes (inside & outside the Citation) are required (location based on camera view).



CAMERA POSITION DIAGRAM

PHOTOGRAPHIC COVERAGE

Camera Number	Location	Type	Lens (mm)	Speed (fps)	Purpose of Camera Data
1	Offboard	Photosonic	13	1000	Closeup of impact
3	Offboard	Photosonic	13	1000	Closeup of impact
4	Onboard hood	Photosonic	8	1000	Occupant kinematics
5	Onboard driver window	Photosonic	8	1000	Occupant kinematics
6	Onboard rear	Photosonic	8	1000	Occupant kinematics
8	Onboard MBSI	Photosonic	8	1000	Occupant kinematics
9	Offboard	Photosonic	13	1000	Closeup of impact
10	Offboard	Sequential Polaroid			Sequence of impact
11	Offboard	Nikon FM	50	Motor	35 mm sequence of event
13	Offboard	Photosonic	13	1000	Closeup of impact
14	Offboard	Arriflex 16	10-120 Zoom	24	Documentary
15	Tower	Sequential Polaroid			Document point of impact
16	Tower	Photosonic	13	1000	Closeup of impact
17	Tower	Photosonic	8	1000	Overall view

CAMERA POSITIONS

Camera Number	Camera/Magazine	X	Y	Z (Height)
1	Photosonic 19/6	-18'	+10'	29"
3	Photosonic 4/8	-24'	+19'	44"
9	Photosonic 3/12	+10'	-21'	44"
10	Sequential Polaroid	+18'	-25'	44"
11	Nikon	+8'	-26'	54"
13	Photosonic 16/7	+18'	-25'	44"
14	Arriflex 16	+5'	-36'	56"

See Camera Position Diagram for orientation and zero position.

PRE-TEST POSITIONS OF BOTH VEHICLES

<u>VW Rabbit</u>		<u>Citation</u>	
<u>Right Rear</u>	<u>Left Rear</u>	<u>Right Rear</u>	<u>Left Rear</u>
X 34"	X -18"	X -18'	X -18'
Y 0"	Y -30"	Y -3'	Y 3'
<u>Right Front</u>	<u>Left Front</u>	<u>Right Front</u>	<u>Left Front</u>
X -14"	X -5.5'	X -9'	X -9'
Y 7'	Y 4.5'	Y -3'	Y 3'

POST-TEST FINAL RESTING POSITIONS OF BOTH VEHICLES

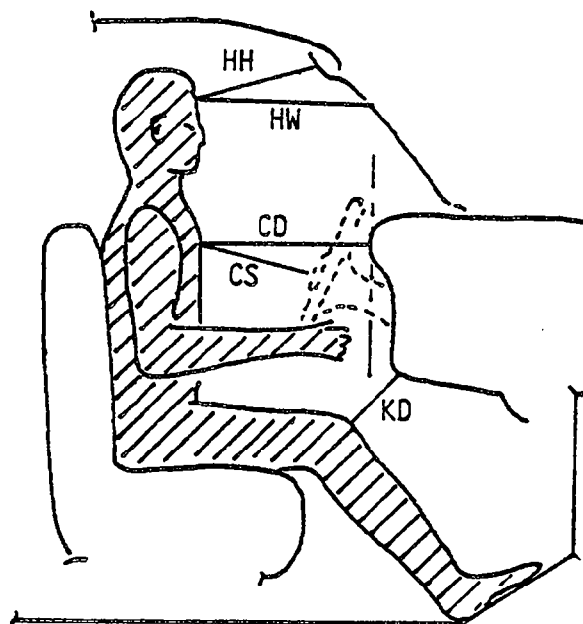
<u>VW Rabbit</u>		<u>Citation</u>	
<u>Right Rear</u>	<u>Left Rear</u>	<u>Right Rear</u>	<u>Left Rear</u>
X 4'6"	X 8.5'	X 56"	X 54'6"
Y 45'	Y 48.5'	Y -4'10"	Y 6"
<u>Right Front</u>	<u>Left Front</u>	<u>Right Front</u>	<u>Left Front</u>
X 9.5'	X 14'	X 64'8"	X 62'10"
Y 39.5'	Y 43'	Y -2'	Y 2'8"

See Camera Position Diagram for orientation. The final resting positions are approximations.

OCCUPANT CLEARANCE DIMENSIONS

	Driver	Passenger
HH	15.75	N/A
HW	21.75	N/A
CD	21.0	N/A
CS	12.0	N/A
KDL	7.0, 2.0*	N/A
KDR	7.0, 2.0*	N/A

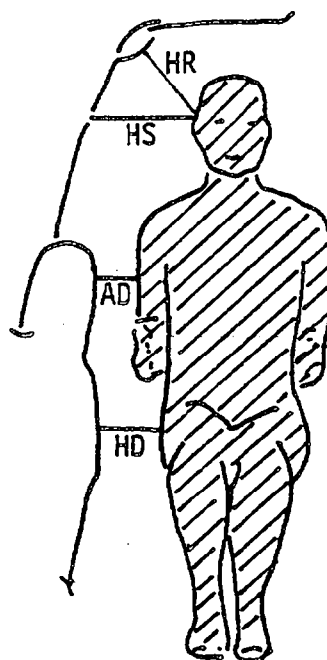
*To dash, to bolster



	Driver	Passenger
HR	6.5	N/A
HS	8.5	N/A
AD	4.5**	N/A
HD	6.5***	N/A

**Contacting pad
***1/2" from pad

NOTE: ALL DIMENSIONS IN INCHES



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SECTION 3

TEST RESULTS

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SUMMARY OF RESULTS

Test Number: 2265

Date: 12-14-81

Project Title: Eval. of Side Structures

Time: 3:30 pm Temperature: 65°F

	<u>Subject Vehicle</u>	<u>Impacting Vehicle/Object</u>
<u>General</u>		
Vehicle/object description	VW Rabbit - Modified	Chevrolet Citation
Test weight (lbs)	2436	3597
Test velocity (mph)	14.15	28.3
<u>Vehicle Response Data</u>		
Maximum crush (inches)		
Static	10.87	8.75
Dynamic	N/A	N/A
Maximum intrusion (inches)	8.50	N/A
<u>Occupant Response</u>		
HIC	288	0.0402 to 0.1128 seconds
Head SI	379	
Max. resultant head Gs	44.0	42.3 (3 msec)
Max. A-P head Gs	18.4	17.1 (3 msec)
Max. S-I head Gs	39.3	37.0 (3 msec)
Max. R-L head Gs	32.2	30.3 (3 msec)
Chest SI	365 upper	1447 lower
Chest A-P deflection (inches)	N/A	N/A
Chest R-L deflection (inches)	1.77	1.76
Max. resultant chest Gs	56.6 upper	55.2 upper (3 msec)
	49.7 lower	49.0 lower (3 msec)
Max. A-P chest Gs	9.2 upper	7.6 upper (3 msec)
	21.1 lower	17.5 lower (3 msec)
Max. S-I chest Gs	15.2 upper	14.9 upper (3 msec)
	10.0 lower	9.7 lower (3 msec)
Max. R-L chest Gs	55.2 upper	54.0 upper (3 msec)
	48.4 lower	47.8 lower (3 msec)
Max. resultant pelvic Gs	39.0	38.2 (3 msec)
Max. A-P pelvic Gs	11.7	9.9 (3 msec)
Max. S-I pelvic Gs	10.4	9.6 (3 msec)
Max. R-L pelvic Gs	37.8	37.1 (3 msec)
Max. femur load - right (lbs)	N/A	
Max. femur load - left (lbs)	N/A	

SUMMARY OF RESULTS (cont'd)

Occupant Response (cont'd)

Max. R-L left upper rib Gs	29.2	26.3 (3 msec)
Max. R-L right upper rib Gs	48.2	47.3 (3 msec)
Max. R-L left lower rib Gs	61.1	57.1 (3 msec)
Max. R-L right lower rib Gs	23.9	21.5 (3 msec)
Max. A-P upper sternum Gs	67.2	51.9 (3 msec)
Max. A-P lower sternum Gs	55.6	41.1 (3 msec)
B(LUR)	5.94814	
B(LLR)	6.66429	
PAP(LUR)	307.475	0.029375 to 0.054375 seconds
PAP(LLR)	2130.12	0.025625 to 0.065625 seconds
Peak power (T1) (lat.)	43,857.8 ft ² /s ³	
Peak power (T1) (res.)	53,034.3 ft ² /s ³	
Peak power (T12) (lat.)	42,555.4 ft ² /s ³	
Peak power (T12) (res.)	47,826.1 ft ² /s ³	
Peak lat. acceleration (T1)	55.2 Gs	54.0 Gs (3 msec)
Peak res. acceleration (T1)	56.6 Gs	55.2 Gs (3 msec)
Peak lat. acceleration (T12)	48.4 Gs	47.8 Gs (3 msec)
Peak res. acceleration (T12)	49.7 Gs	49.0 Gs (3 msec)
Lat. total velocity @ T1	55.2 ft/s	
Lat. total velocity @ T12	48.4 ft/s	
PAP @ T1	2070.27	0.038125 to 0.0625 seconds
PAP @ T12	1883.23	0.025625 to 0.06 seconds

Remarks: Head filter class - 1000; Thorax - FIR; Pelvis - BWF-180.

PHOTOGRAPHS

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PRE-TEST PHOTOGRAPHS



FIGURE 1. SUBJECT AND IMPACTING VEHICLES

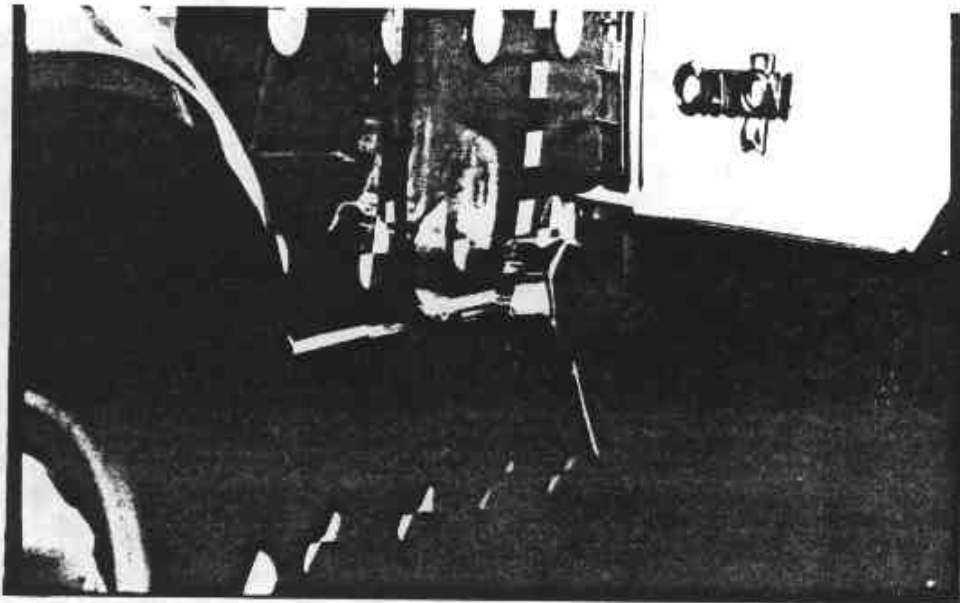


FIGURE 2. CLOSE-UP OF IMPACT POINT

PRE-TEST PHOTOGRAPHS

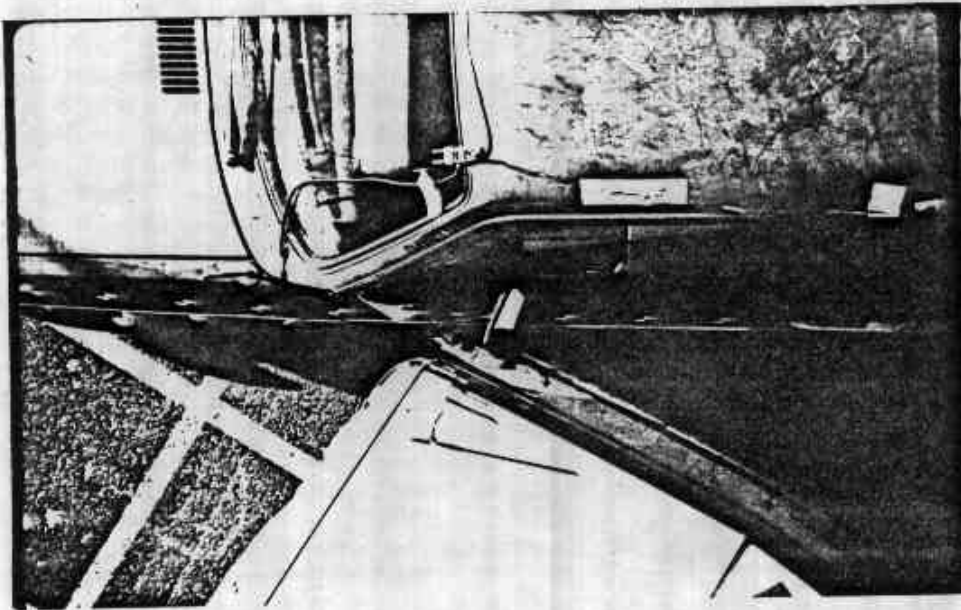


FIGURE 3. OVERHEAD OF IMPACT POINT

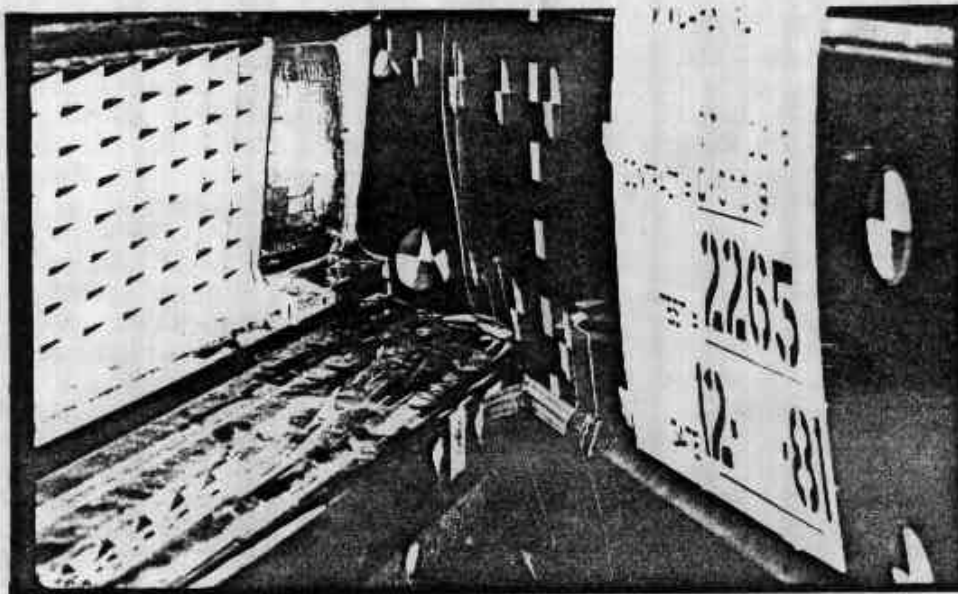


FIGURE 4. CLOSE-UP OF IMPACT POINT

POST-TEST PHOTOGRAPHS



FIGURE 5. PEAK EVENT



FIGURE 6. SUBJECT VEHICLE DAMAGE

POST-TEST PHOTOGRAPHS

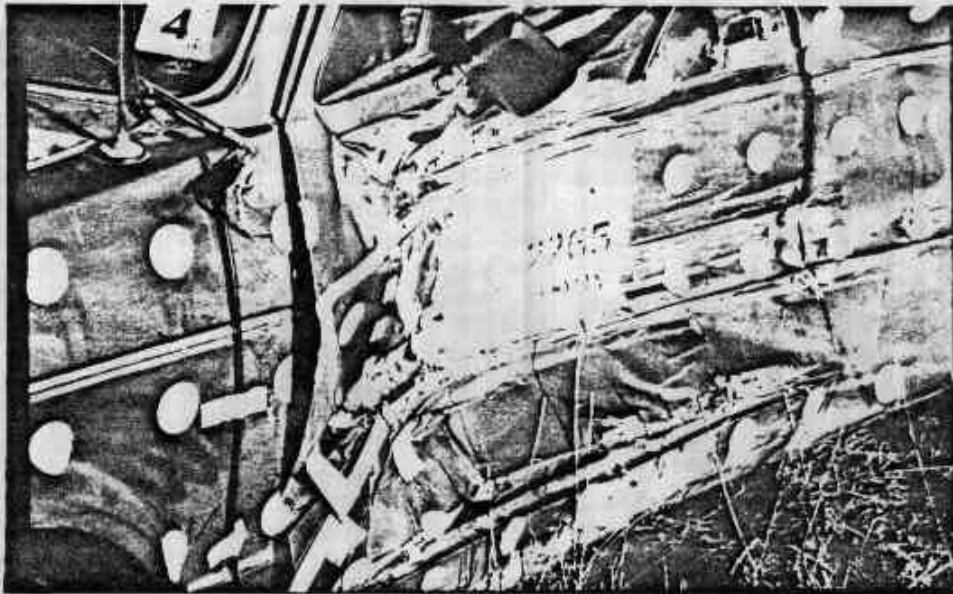


FIGURE 7. SUBJECT VEHICLE DOOR DAMAGE

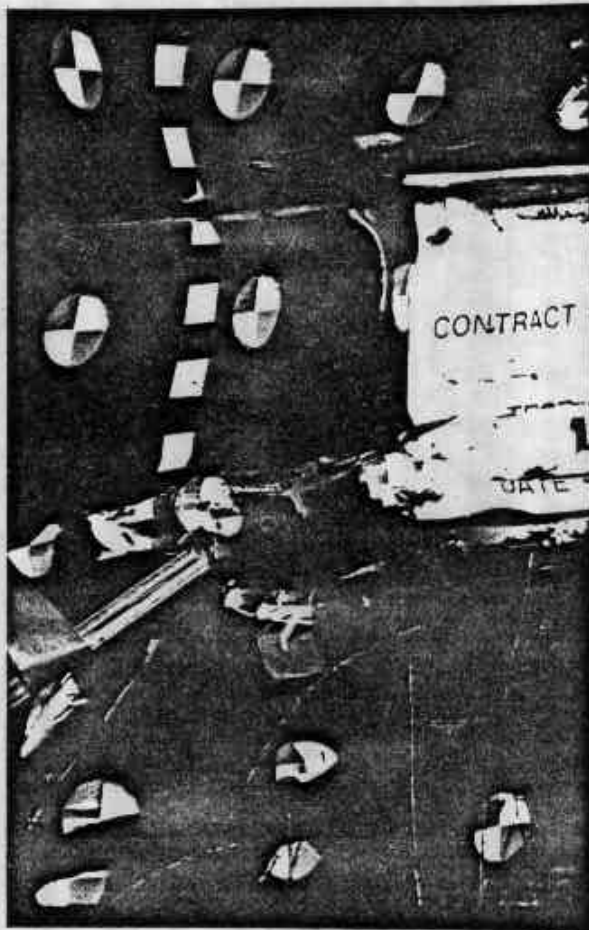


FIGURE 8. CLOSE-UP OF IMPACT POINT

POST-TEST PHOTOGRAPHS

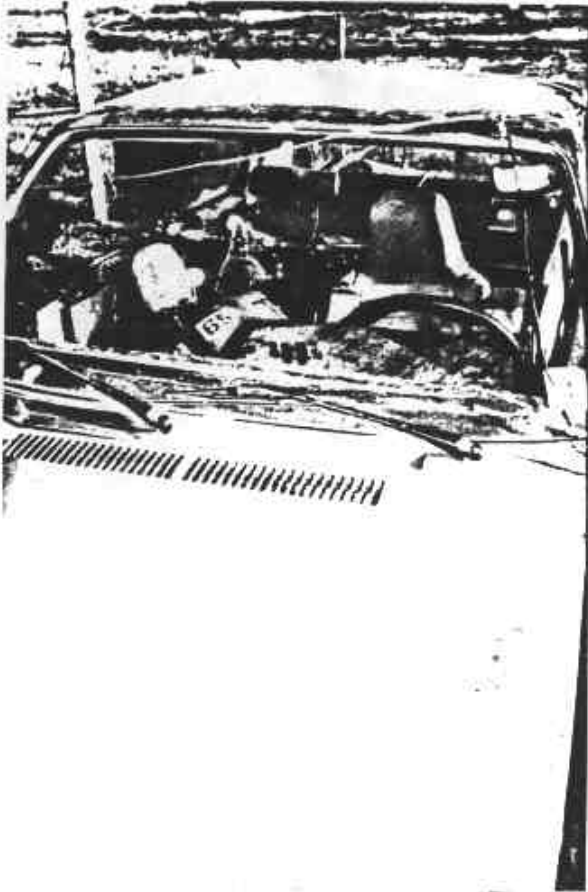


FIGURE 9. CLOSE-UP OF DRIVER
SIDE DAMAGE

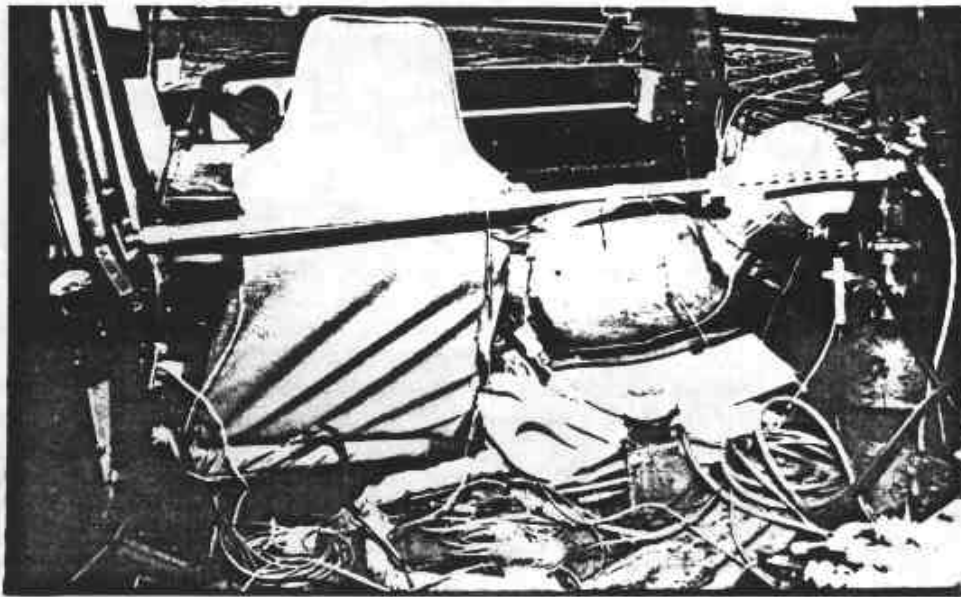


FIGURE 10. FINAL RESTING POSITION, SIDE IMPACT DUMMY, REAR VIEW

POST-TEST PHOTOGRAPHS

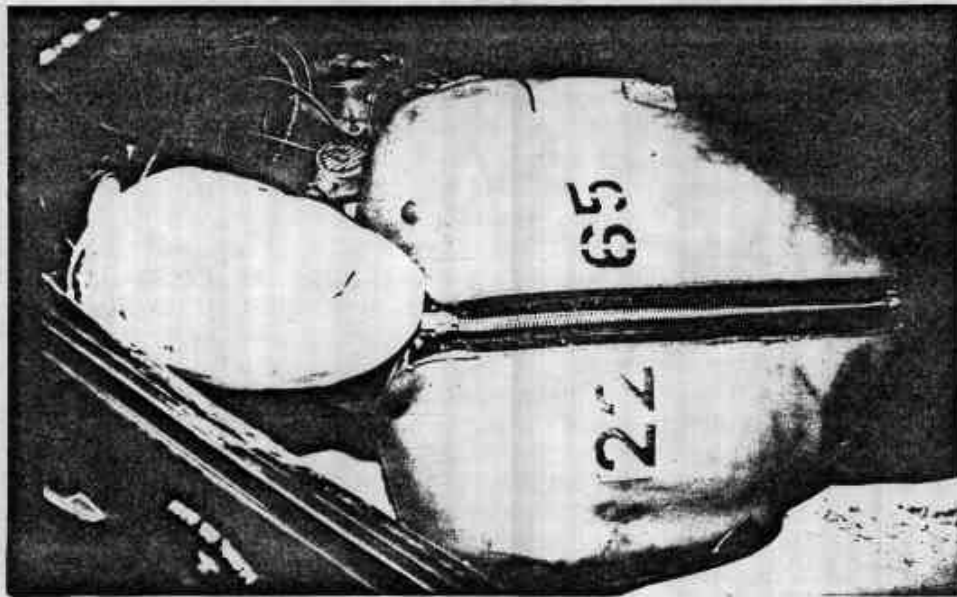


FIGURE 11. FINAL RESTING POSITION, SIDE IMPACT DUMMY,
VIEW THROUGH PASSENGER SIDE WINDOW

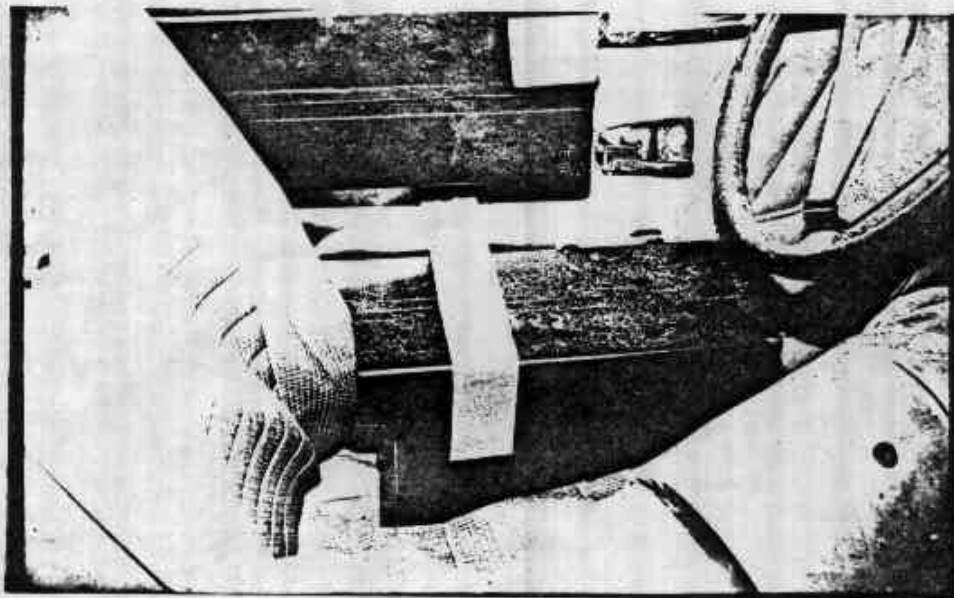


FIGURE 12. SUBJECT VEHICLE DOOR INTRUSION

POST-TEST PHOTOGRAPHS



FIGURE 13. IMPACTING VEHICLE DAMAGE

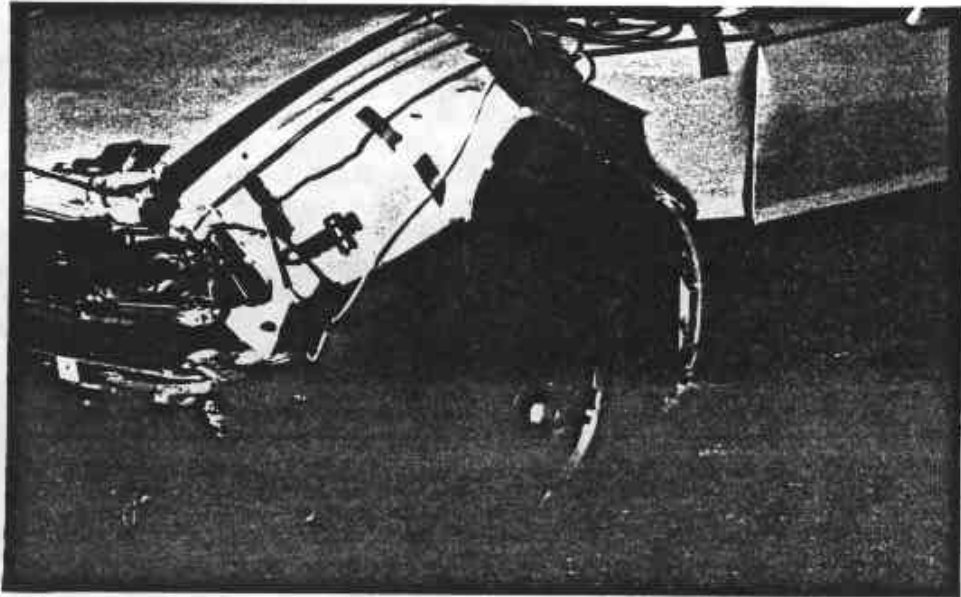


FIGURE 14. IMPACTING VEHICLE, LEFT FRONT FENDER

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DATA TRACES

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VEHICLE 1 - VW RABBIT - 14.2 MPH

TEST 2265

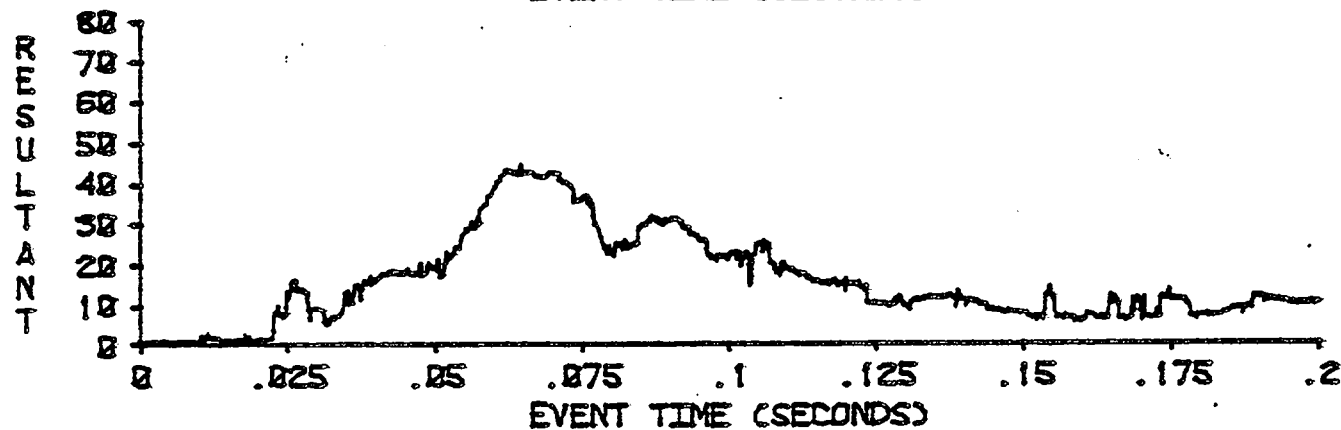
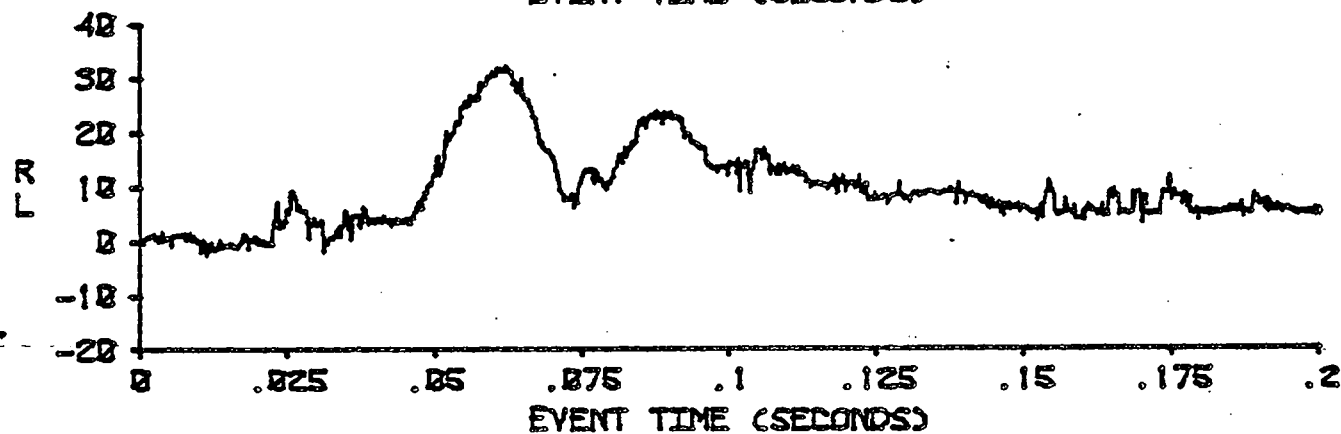
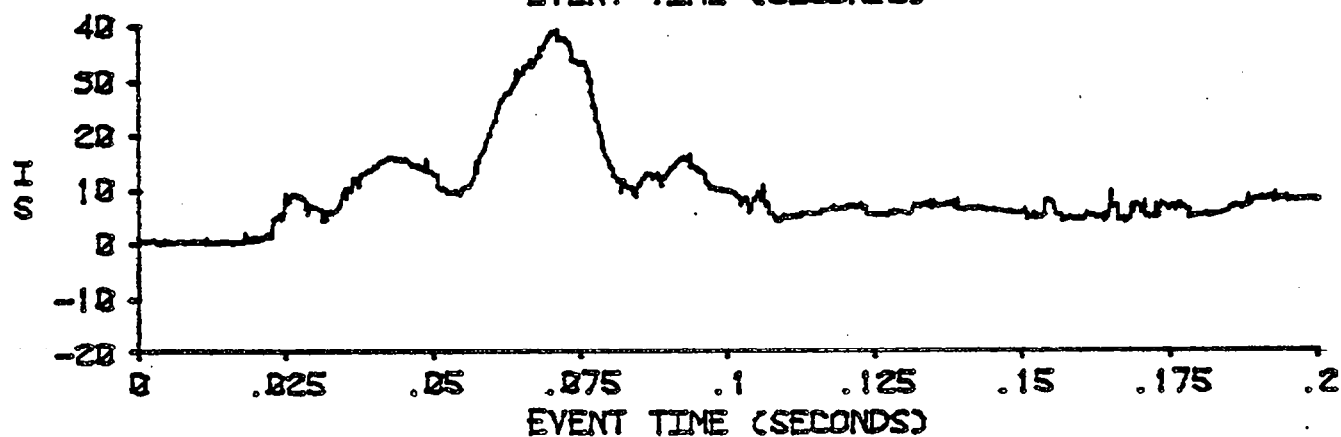
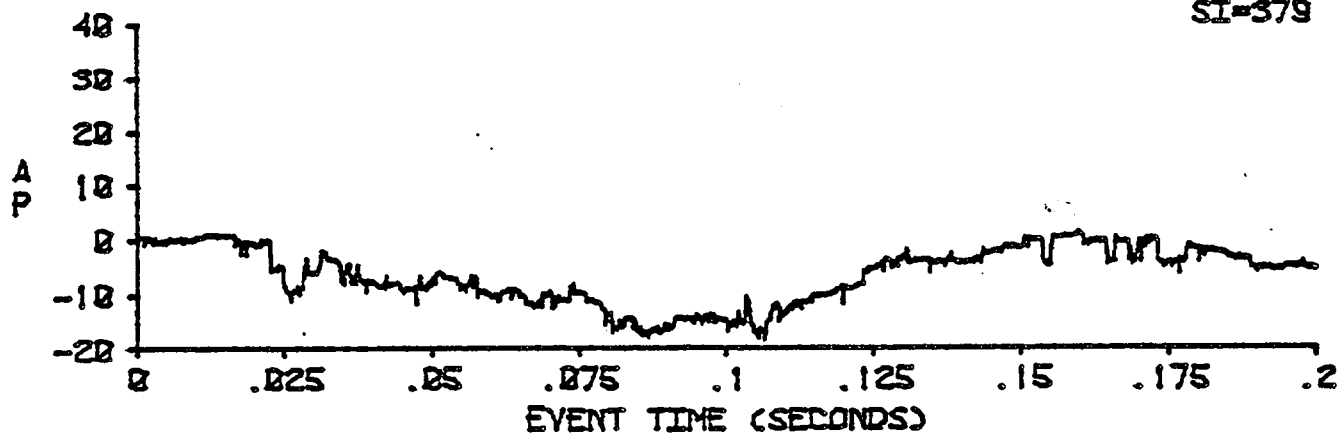
DRIVER HEAD G'S

12/14/81

FILTER CLASS 1800

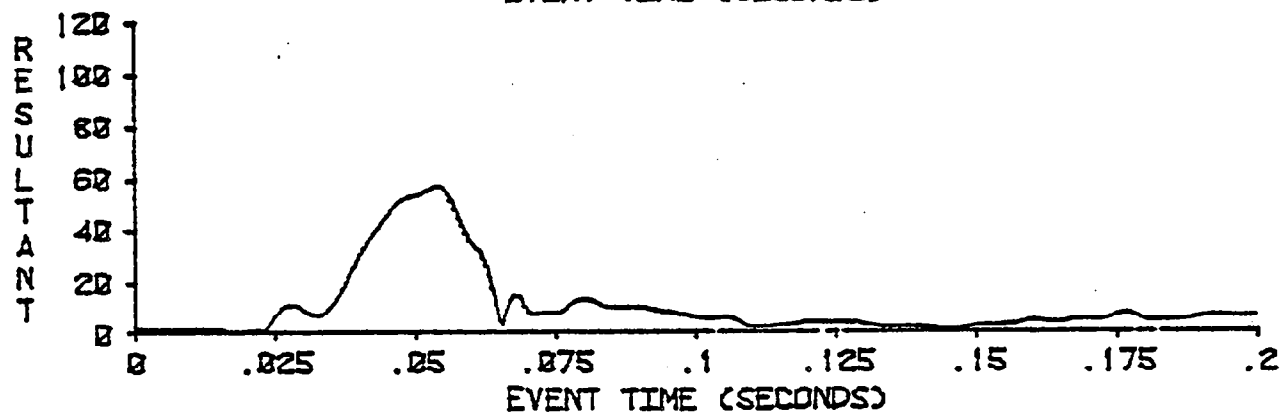
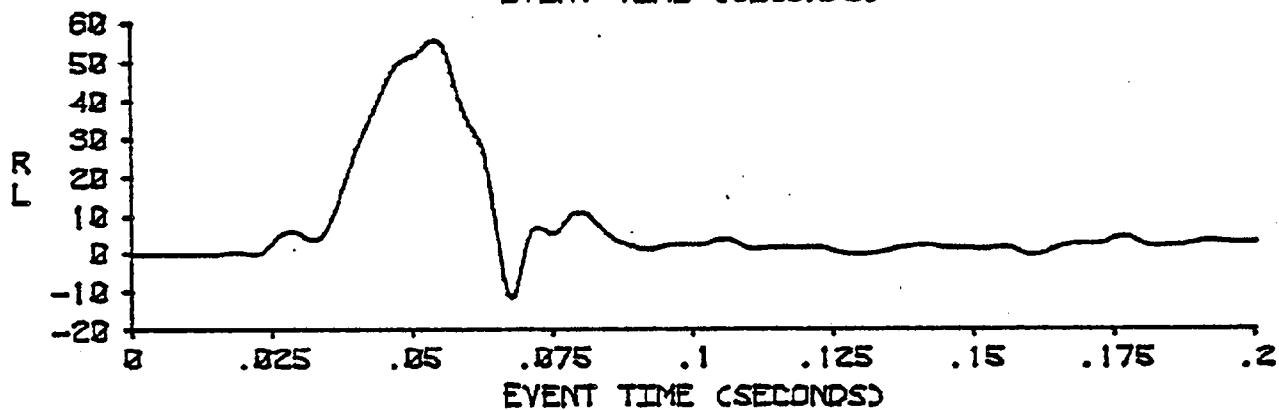
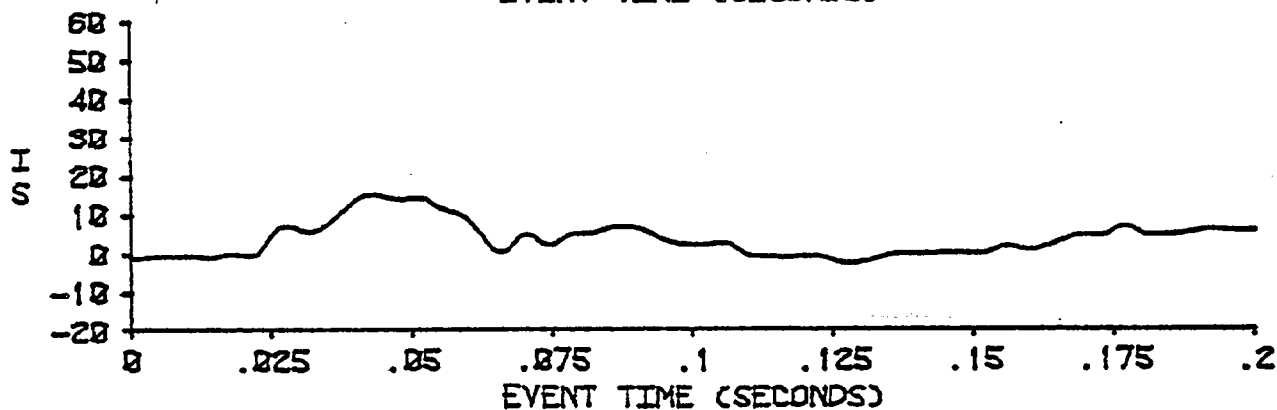
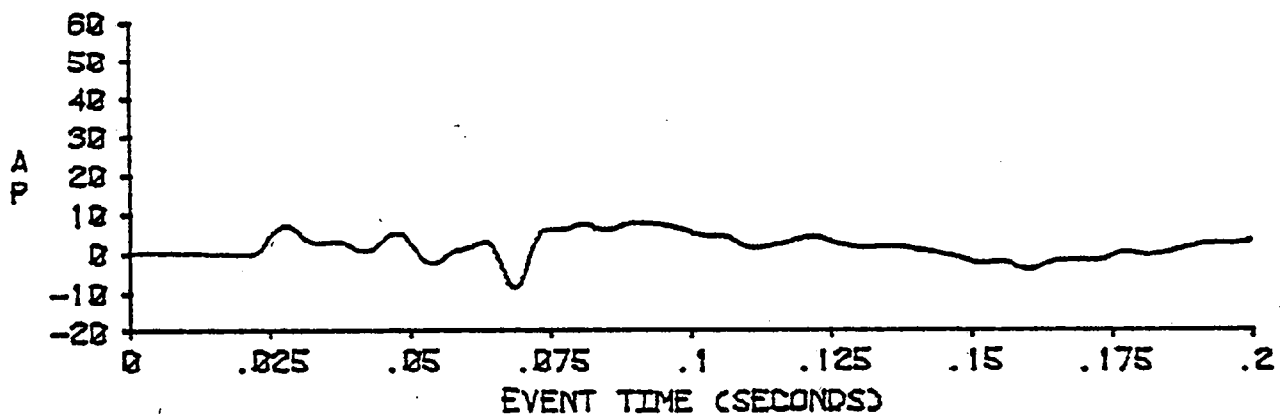
HIC=268 FROM .0402 TO .1128 SECONDS

SI=379



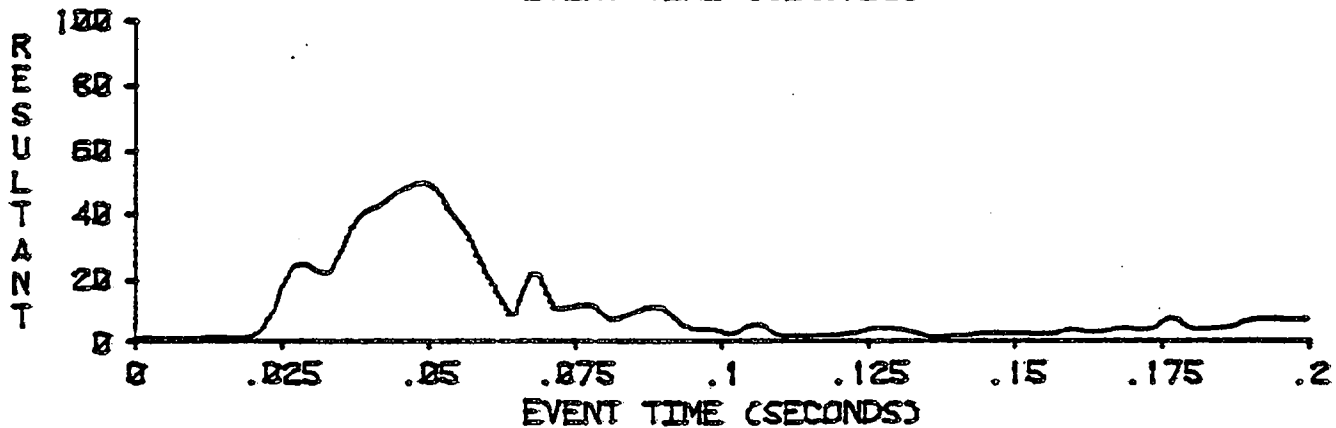
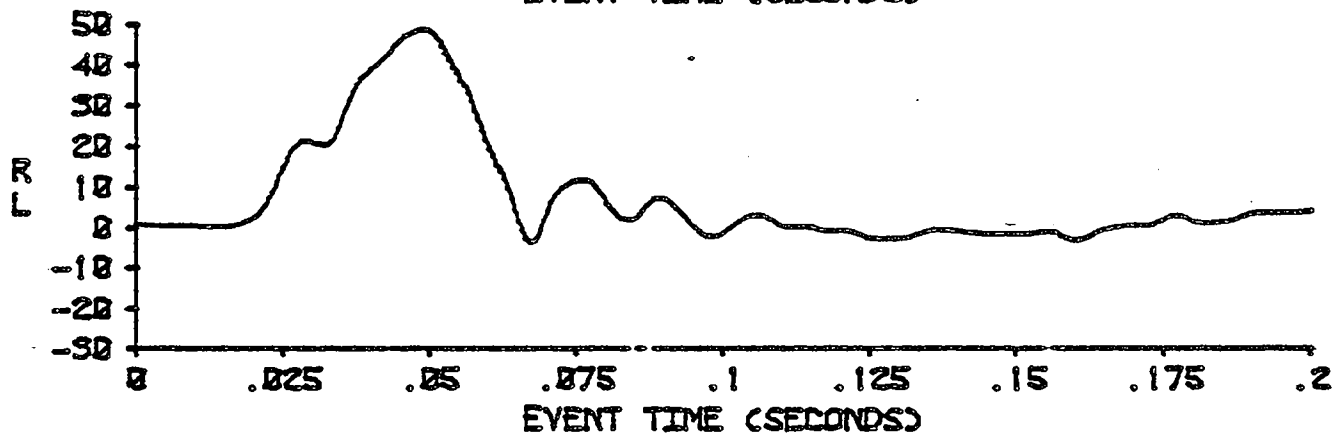
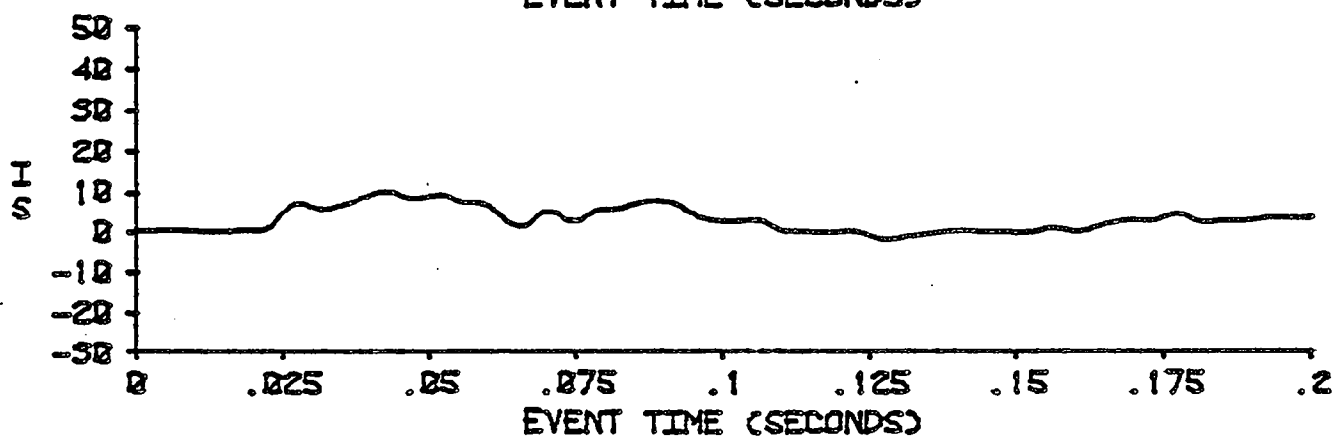
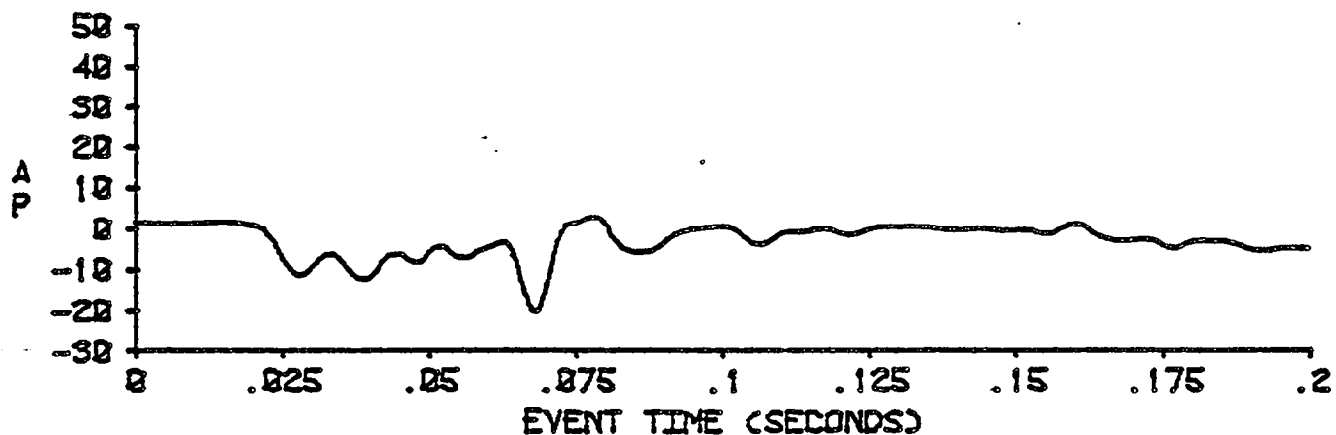
VEHICLE 1 - VW RABBIT - 14.2 MPH
DRIVER UPPER SPINE G'S
FILTER: FIR

TEST 2265
12/14/81
SI=365



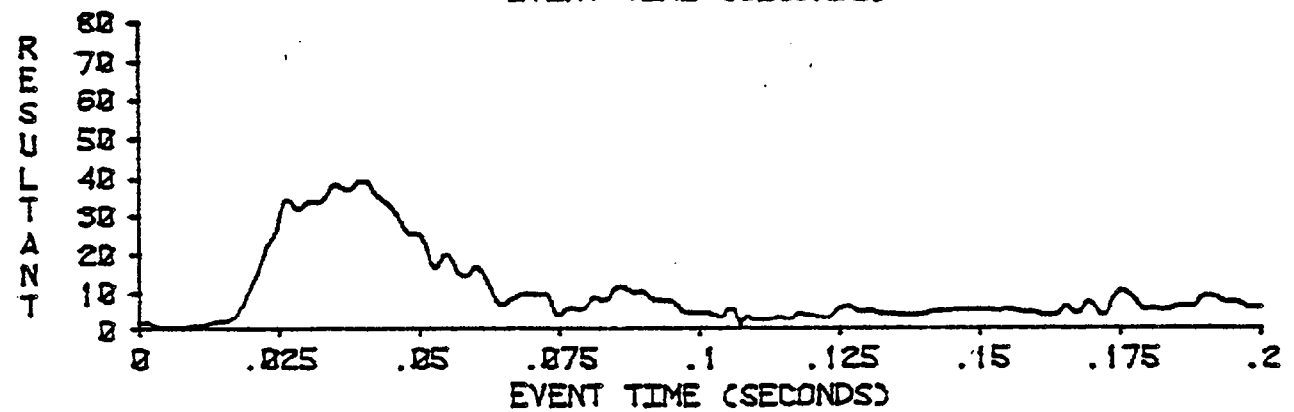
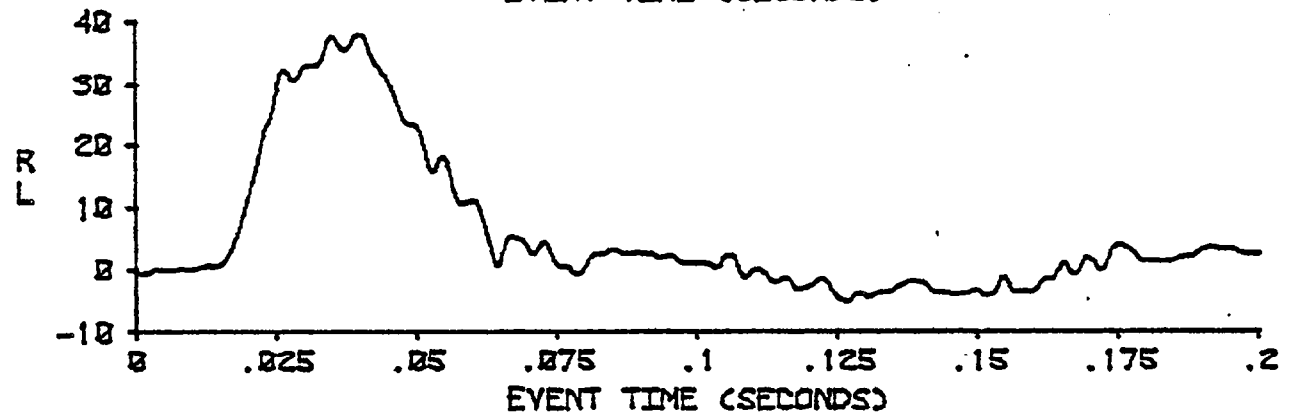
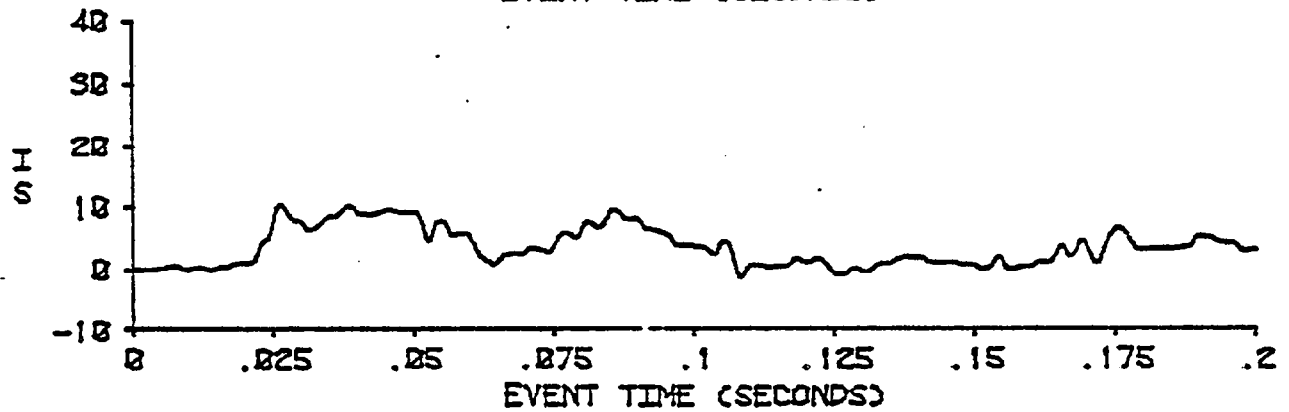
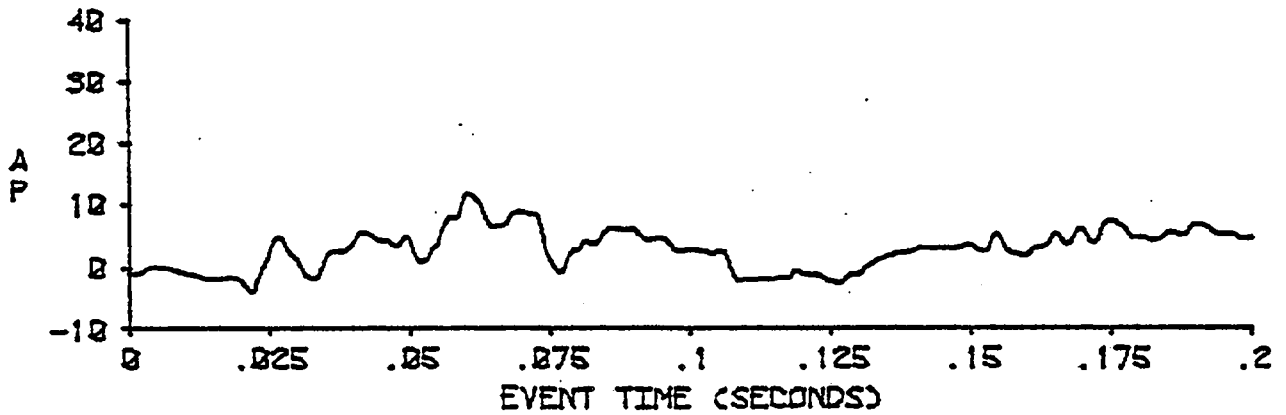
VEHICLE 1 - VW RABBIT - 14.2 MPH
DRIVER LOWER SPINE G'S
FILTER: FIR

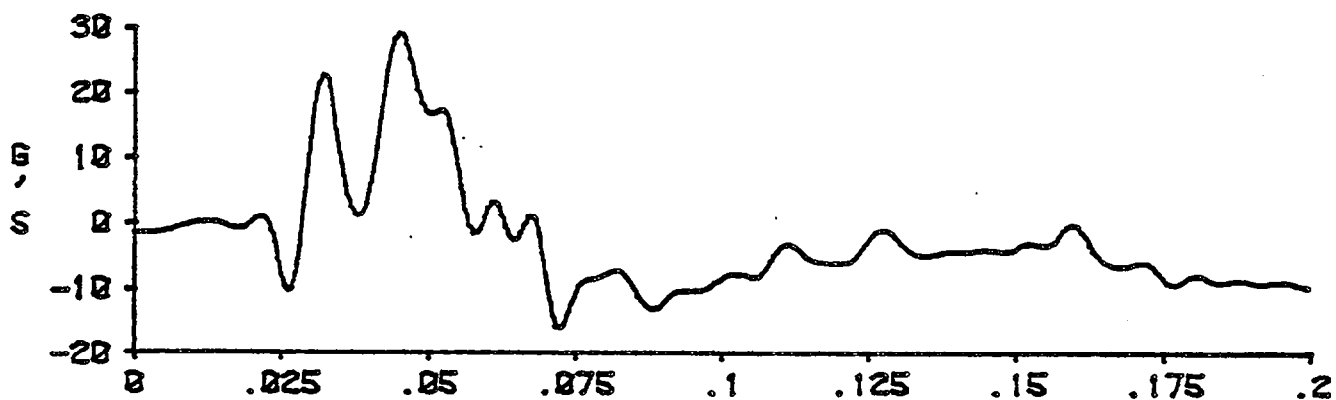
TEST 2265
12/14/81
SI=326



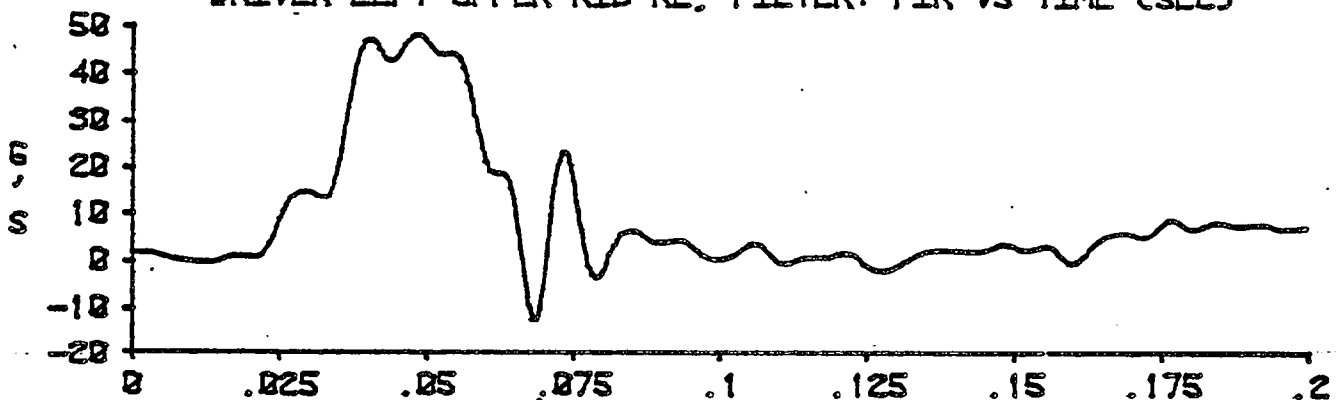
VEHICLE 1 - VW RABBIT - 14.2 MPH
DRIVER PELVIS G'S
FILTER CLASS 180

TEST 2265
12/14/81

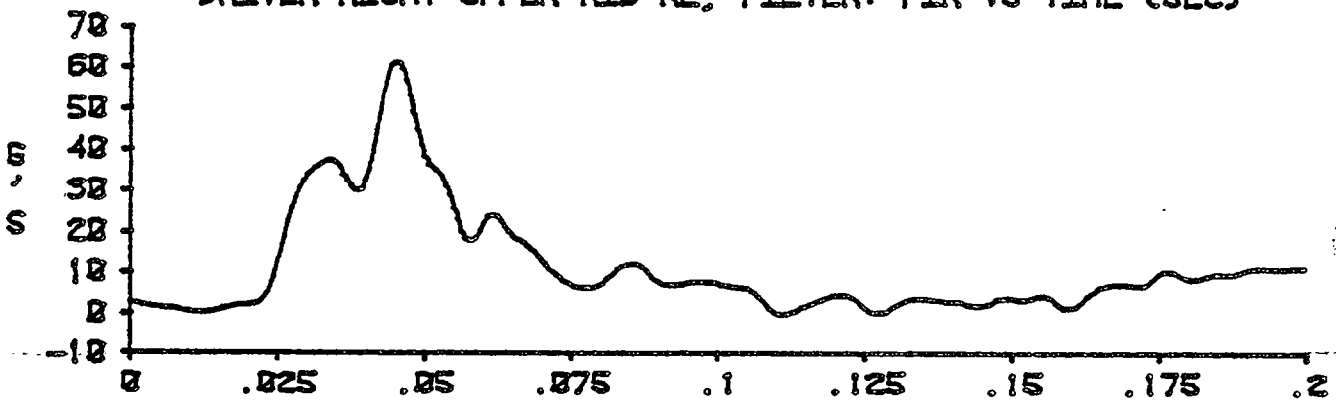




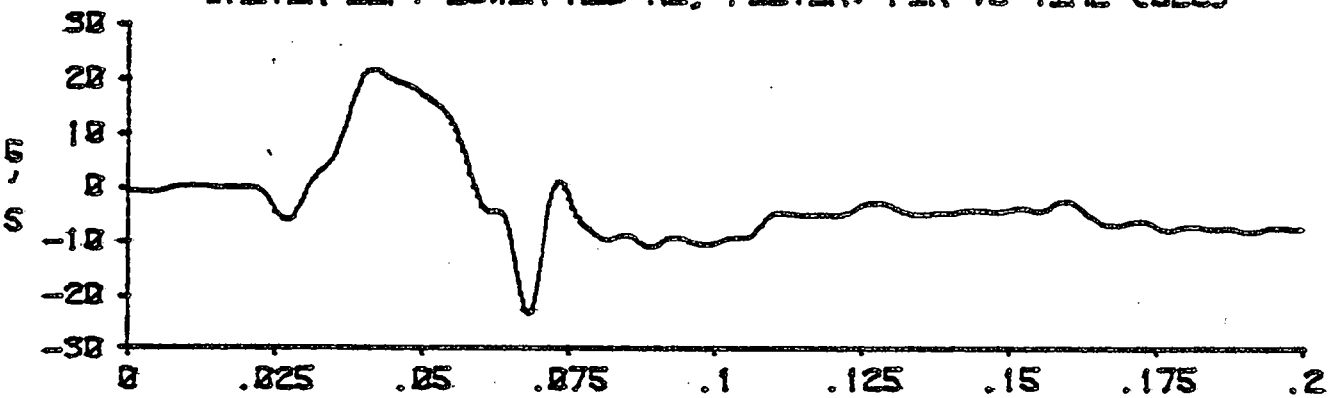
DRIVER LEFT UPPER RIB RL, FILTER: FIR VS TIME (SEC)



DRIVER RIGHT UPPER RIB RL, FILTER: FIR VS TIME (SEC)



DRIVER LEFT LOWER RIB RL, FILTER: FIR VS TIME (SEC)

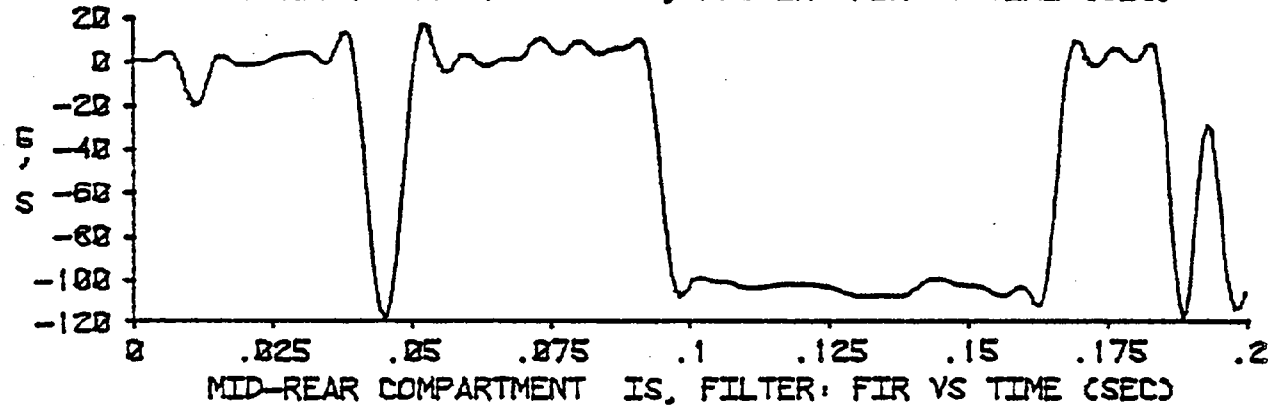
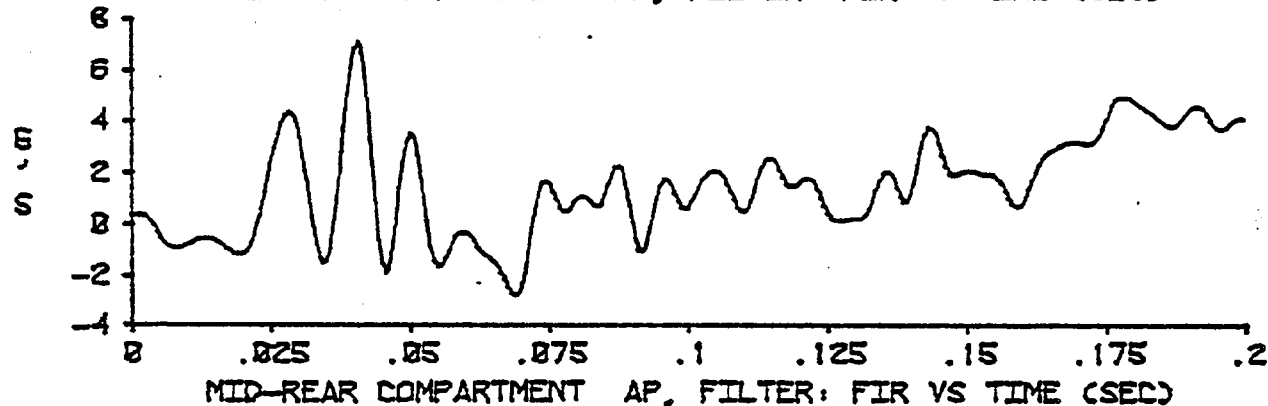
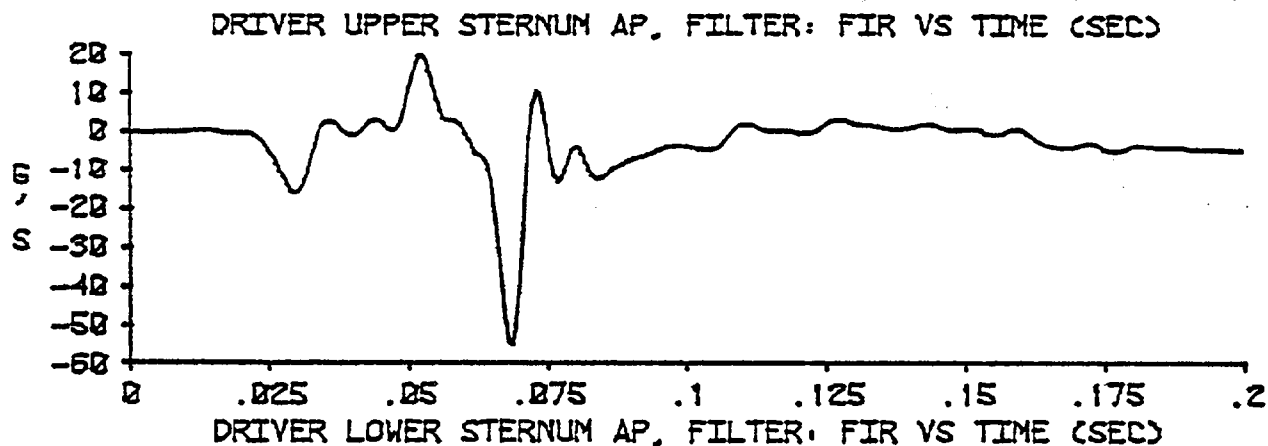
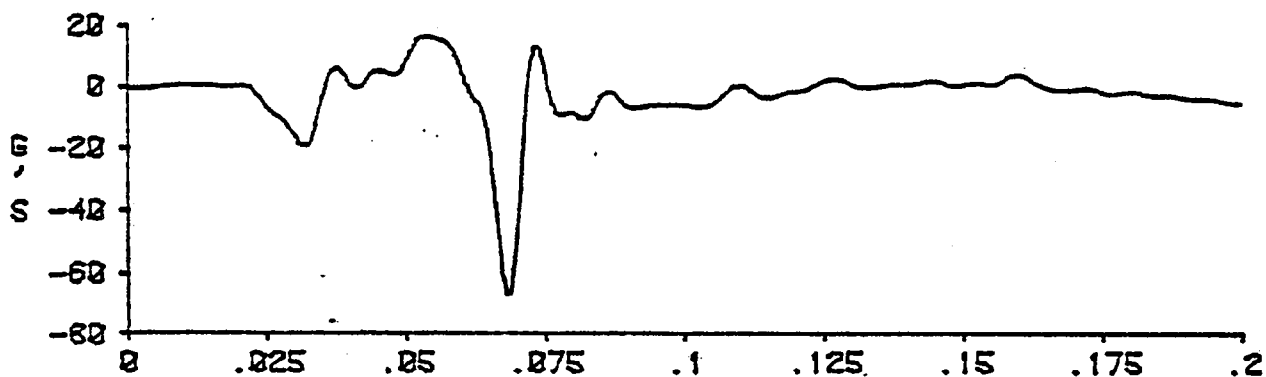


DRIVER RIGHT LOWER RIB RL, FILTER: FIR VS TIME (SEC)

VEHICLE 1 - VW RABBIT - 14.2 MPH

TEST 2265

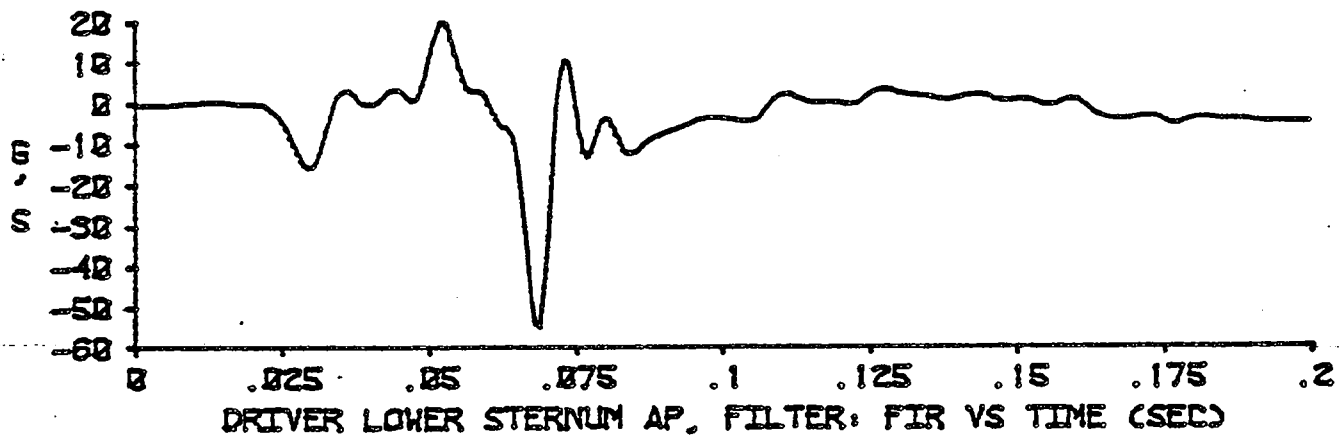
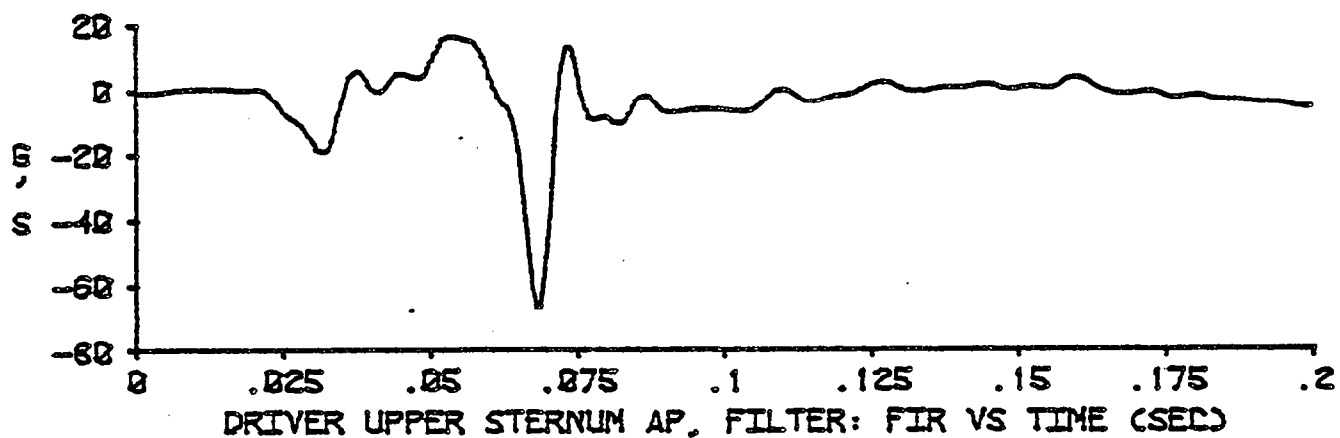
12/14/81



VEHICLE 1 - VW RABBIT - 14.2 MPH

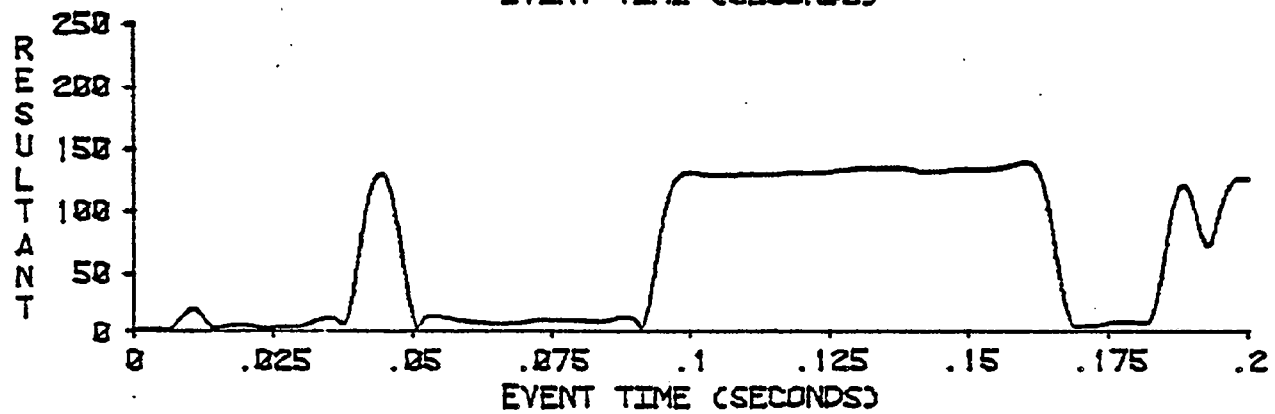
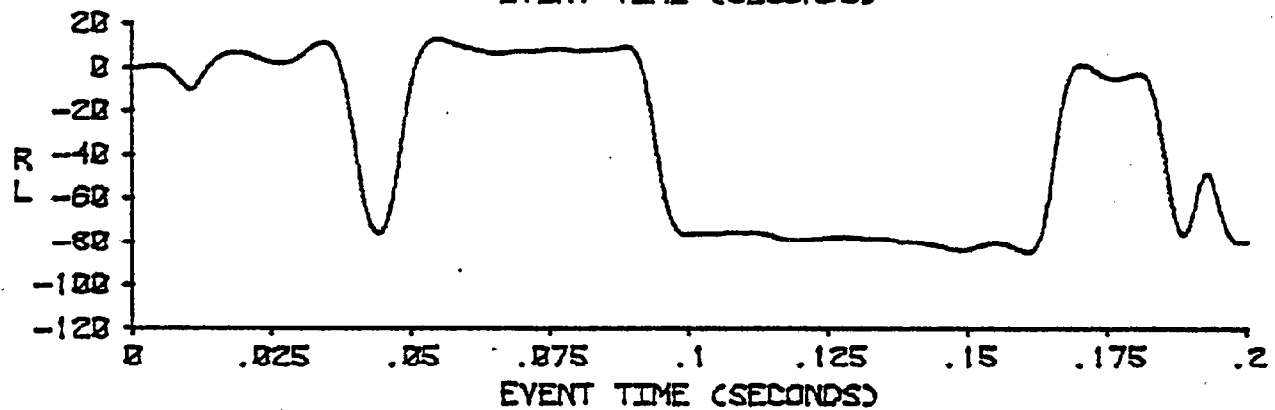
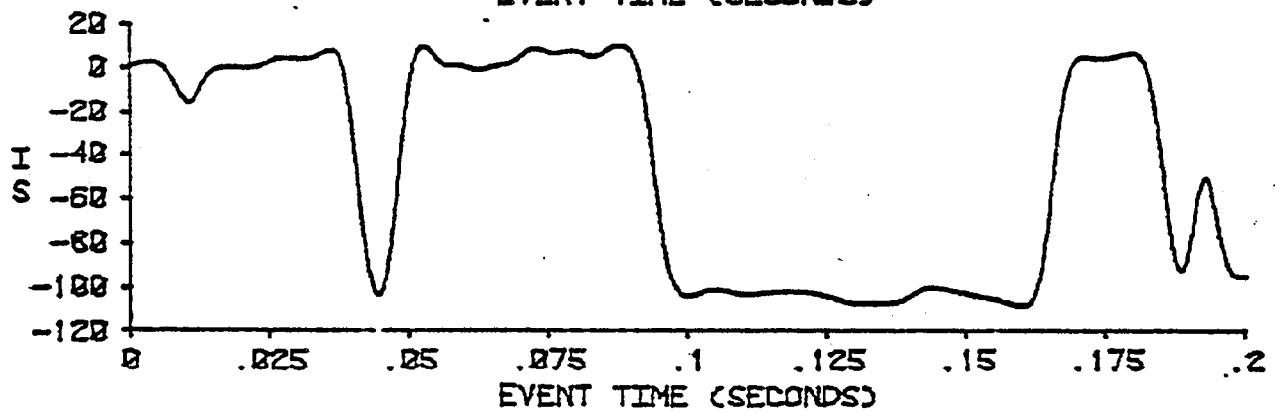
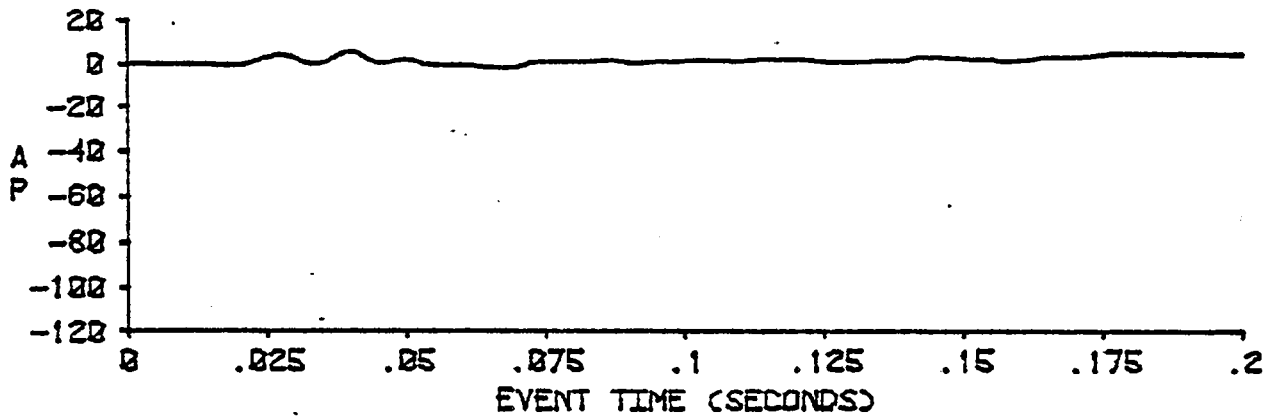
TEST 2265

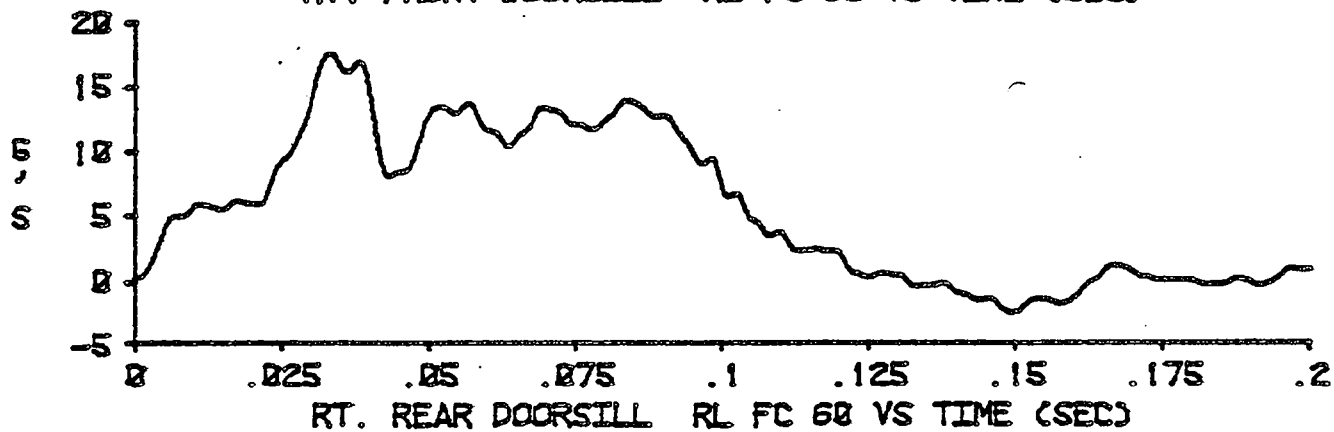
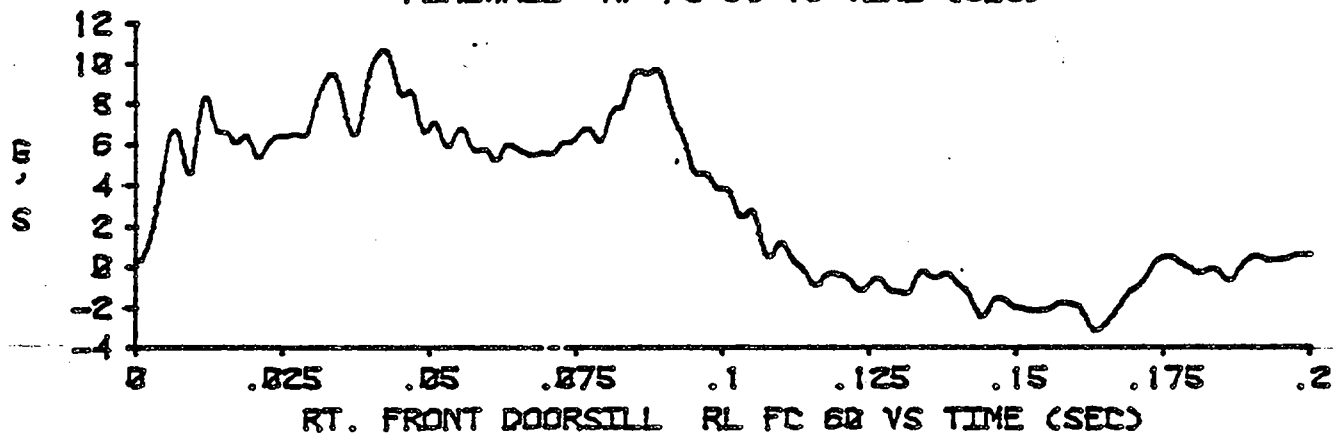
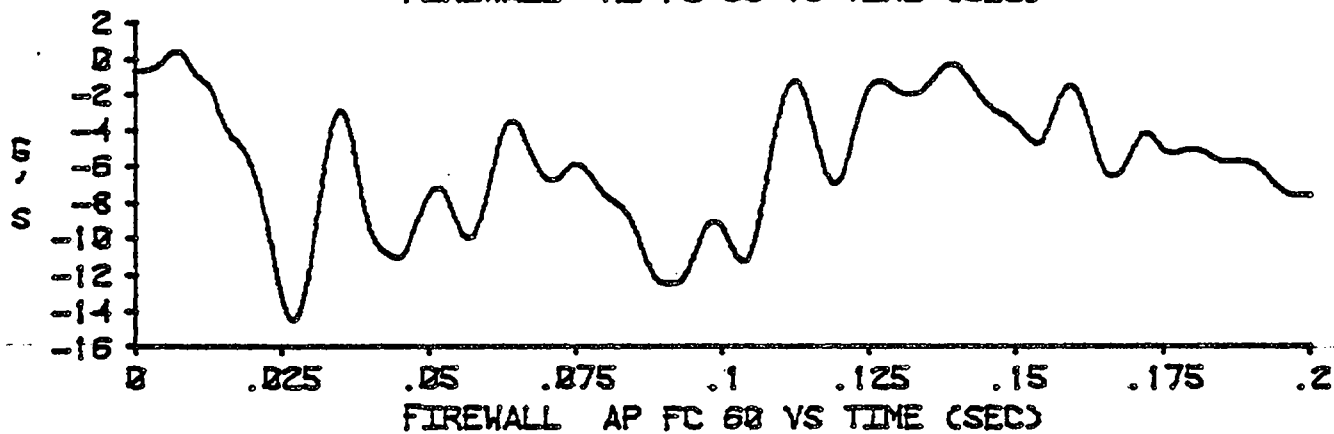
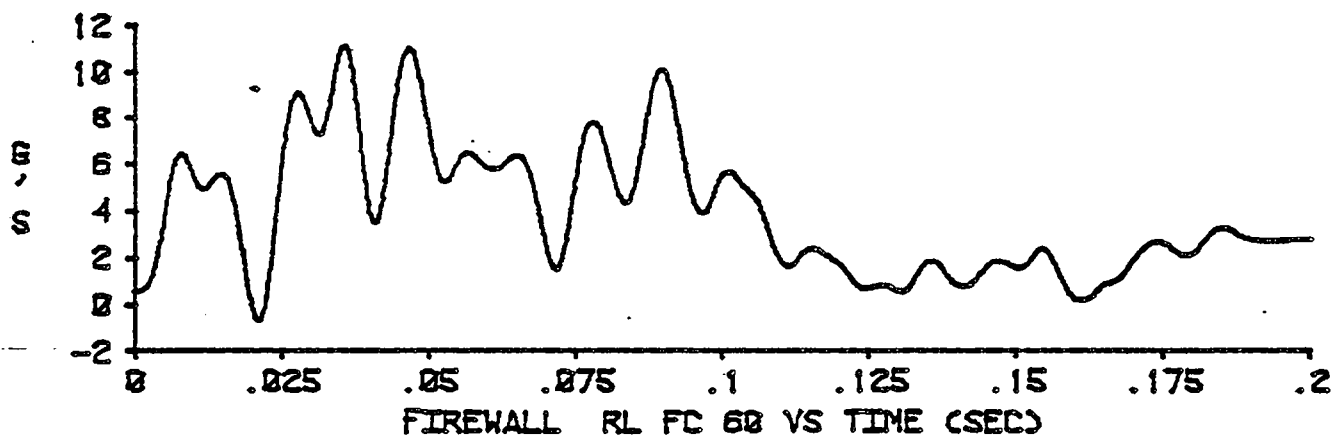
12/14/81



VEHICLE 1 - VW RABBIT - 14.2 MPH
MID-REAR COMPARTMENT G'S
FILTER CLASS 60

TEST 2265
12/14/81

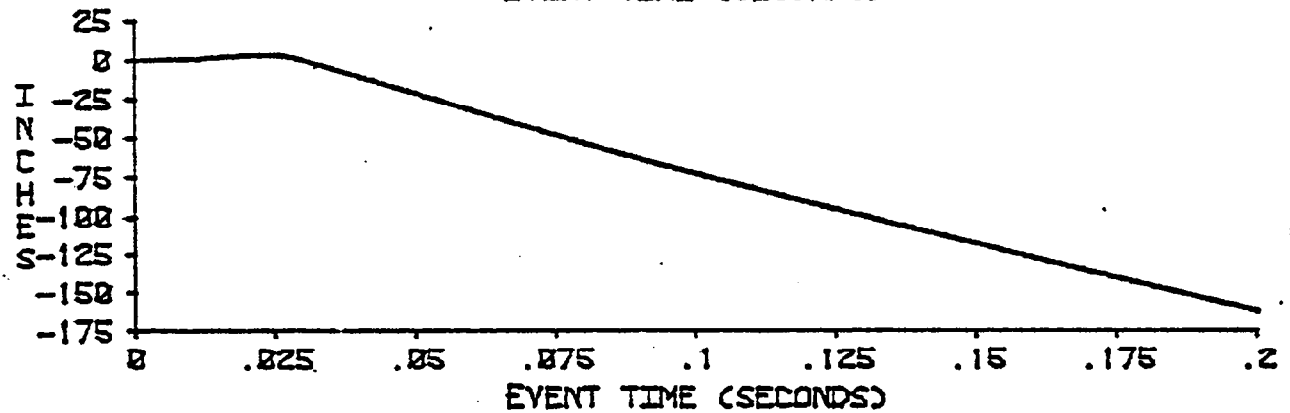
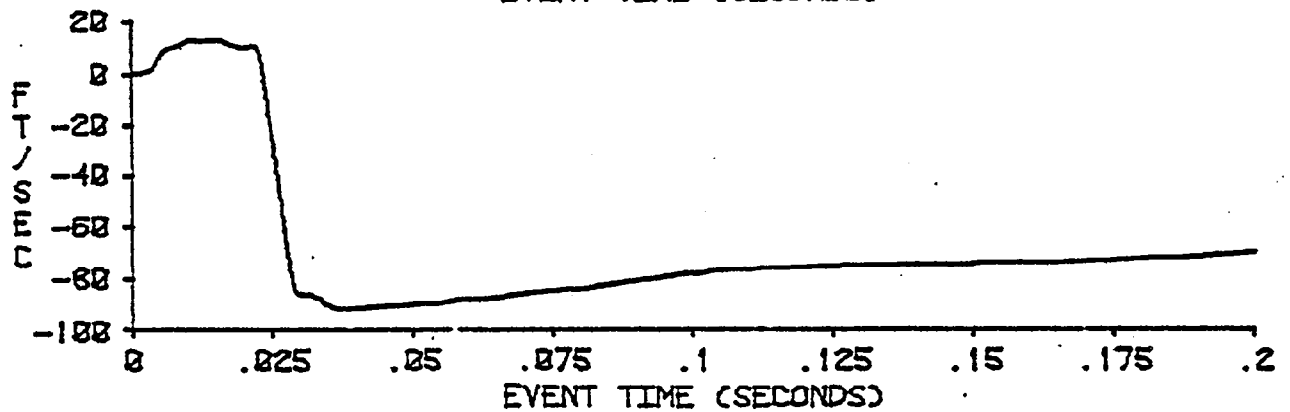
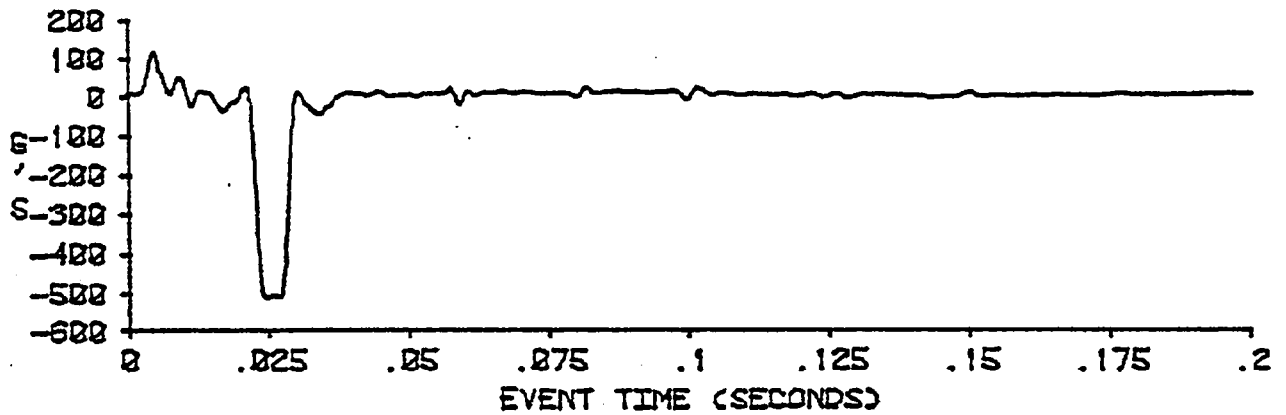




5

VEHICLE 1 - VW RABBIT - 14.2 MPH
DOOR 1 RL
FILTER CLASS 180

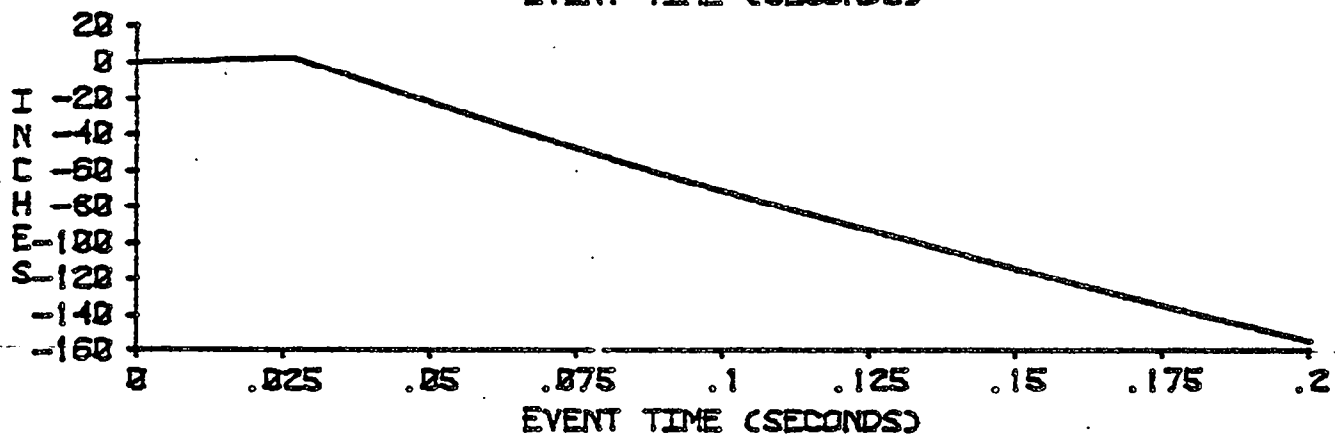
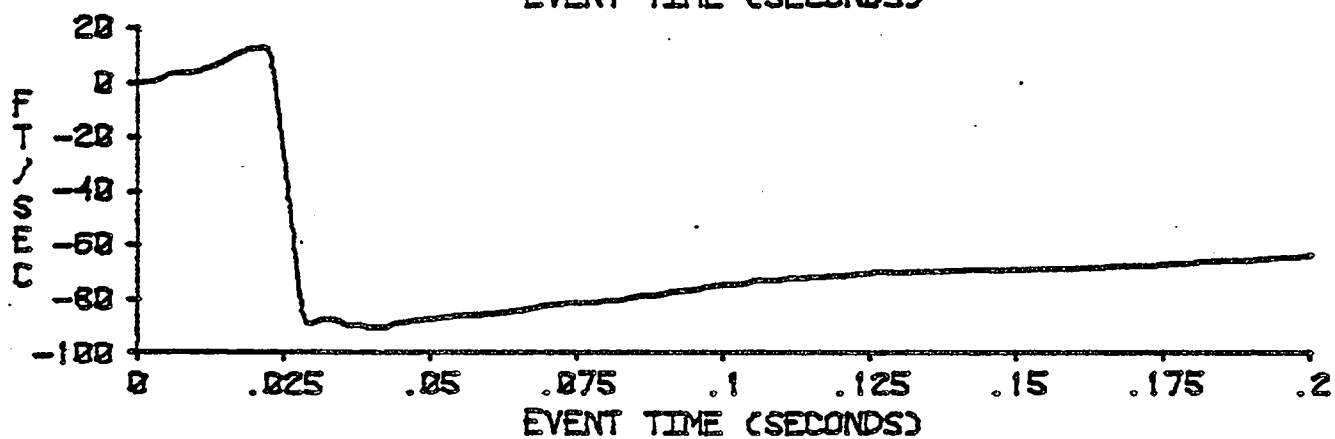
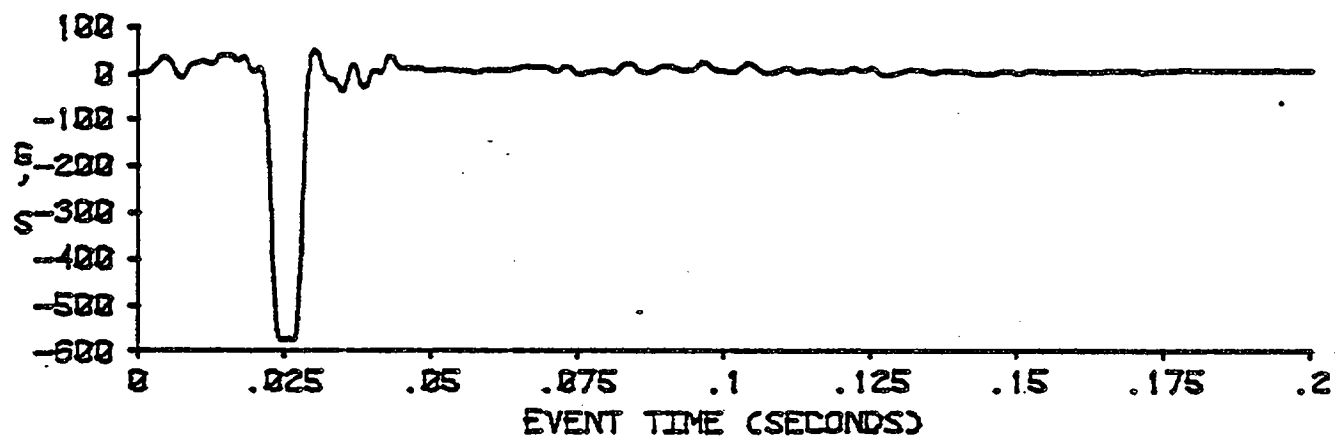
TEST 2265
12/14/81



VEHICLE 1 - VW RABBIT - 14.2 MPH
DOOR 2 RL
FILTER CLASS 160

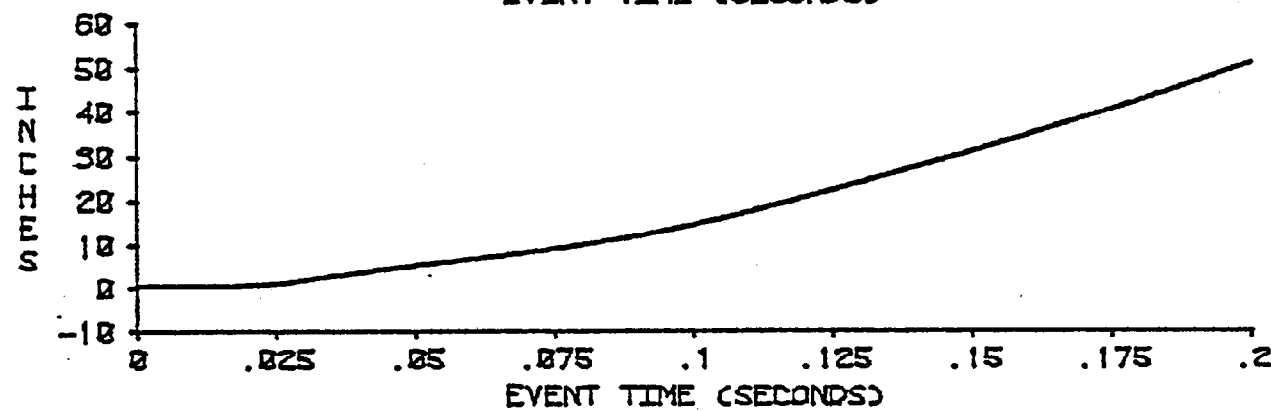
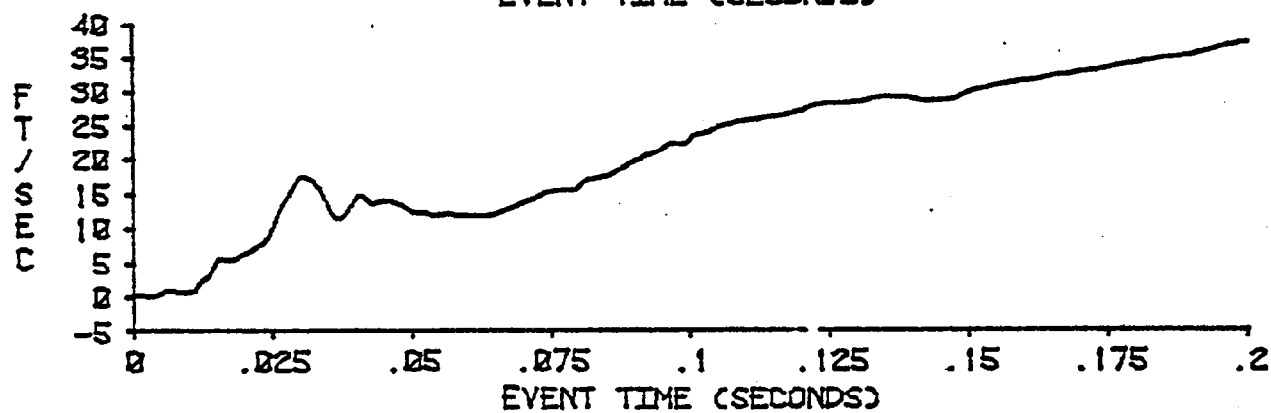
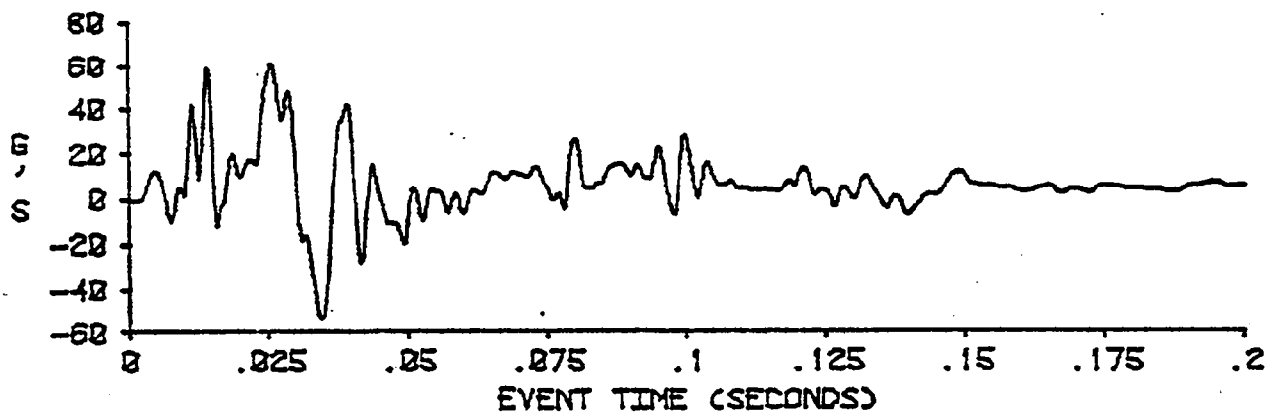
⑥

TEST 2265
12/14/81



⑦
VEHICLE 1 - VW RABBIT - 14.2 MPH
DOOR 3 RL
FILTER CLASS 180

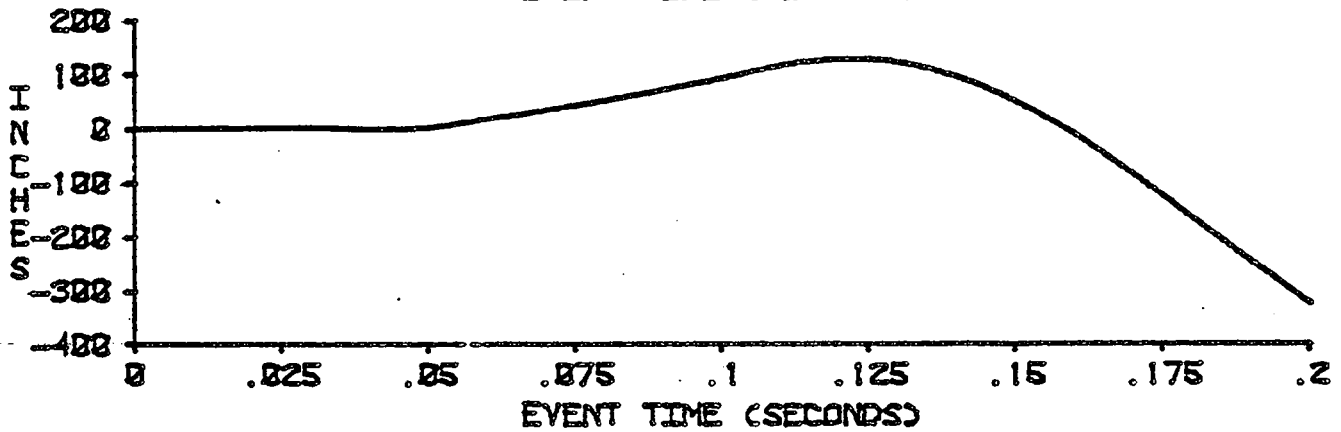
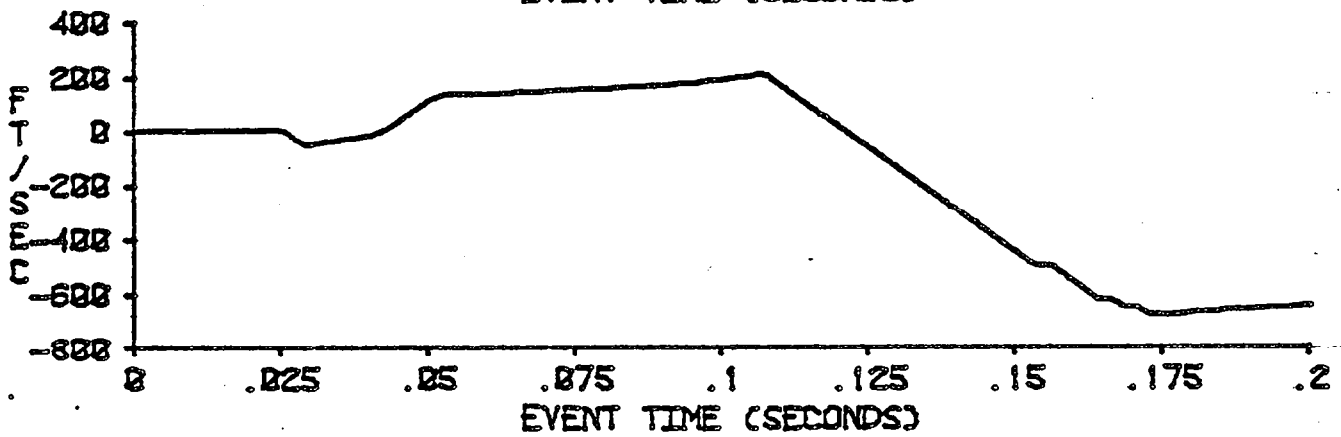
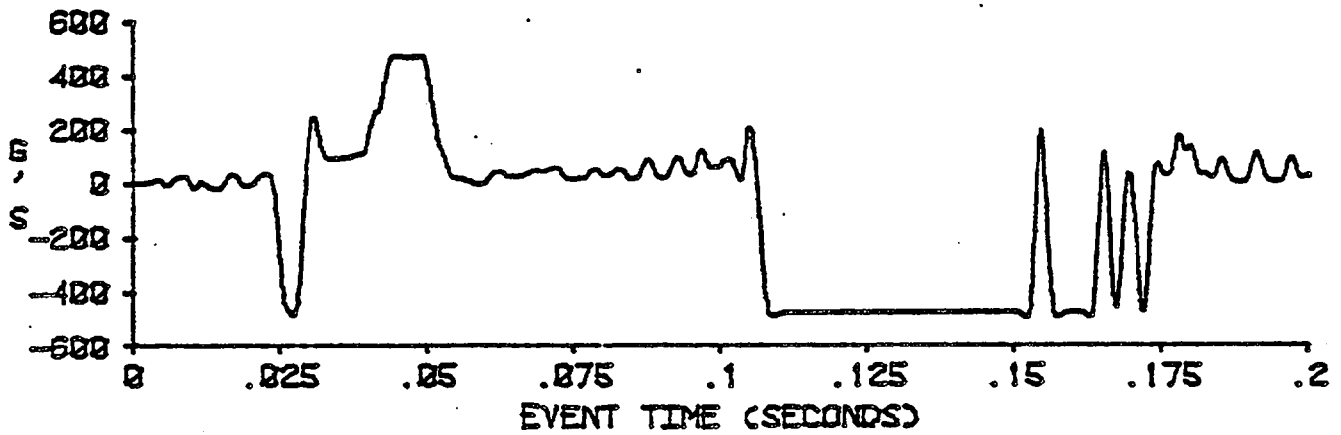
TEST 2265
12/14/81



VEHICLE 1 - VW RABBIT - 14.2 MPH
DOOR 4 RL
FILTER CLASS 180

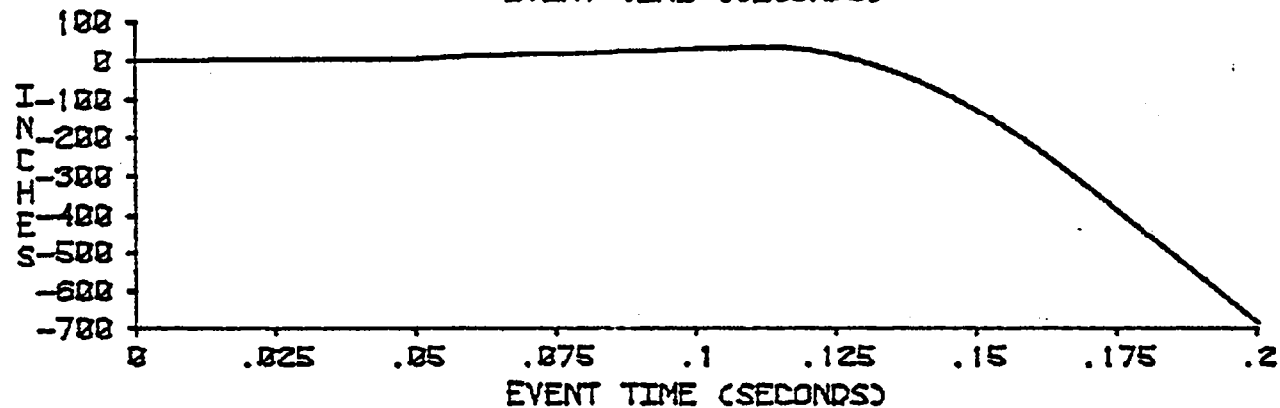
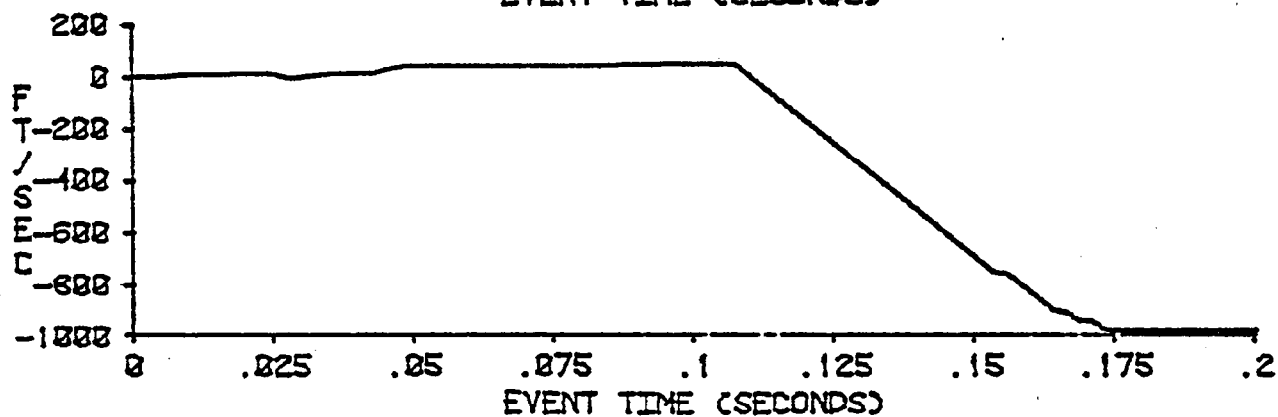
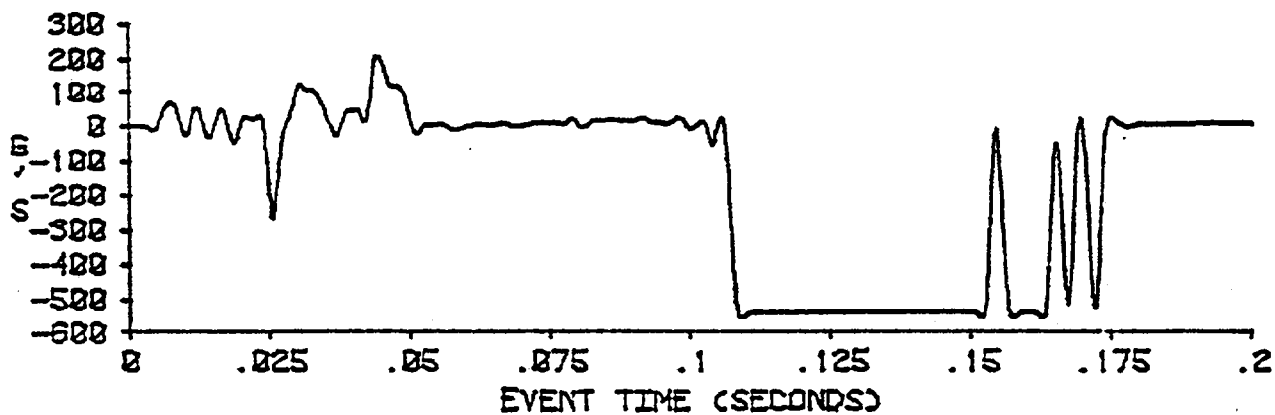
8

TEST 2265
12/14/81



VEHICLE 1 - VW RABBIT - 14.2 MPH
DOOR 5 RL
FILTER CLASS 180

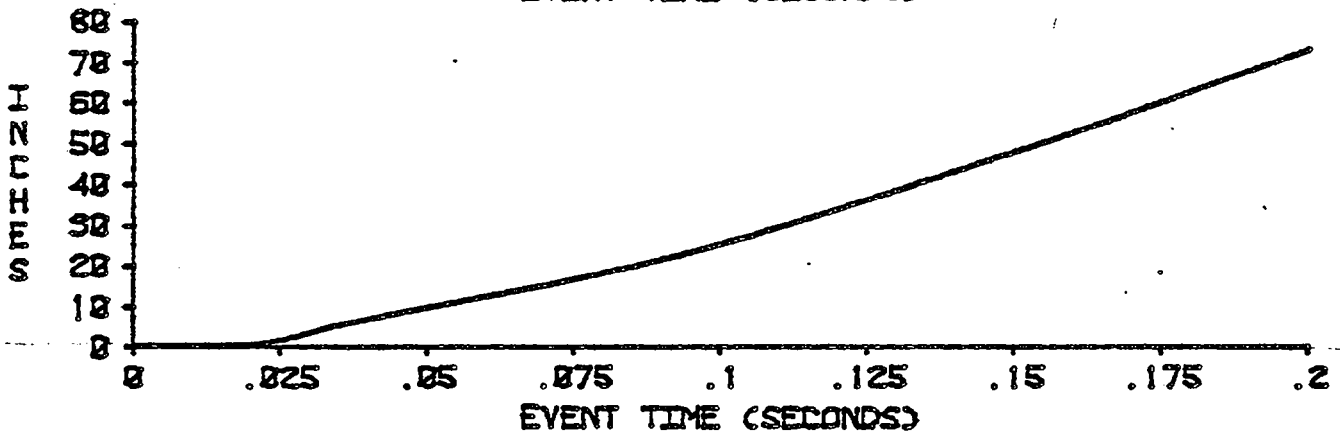
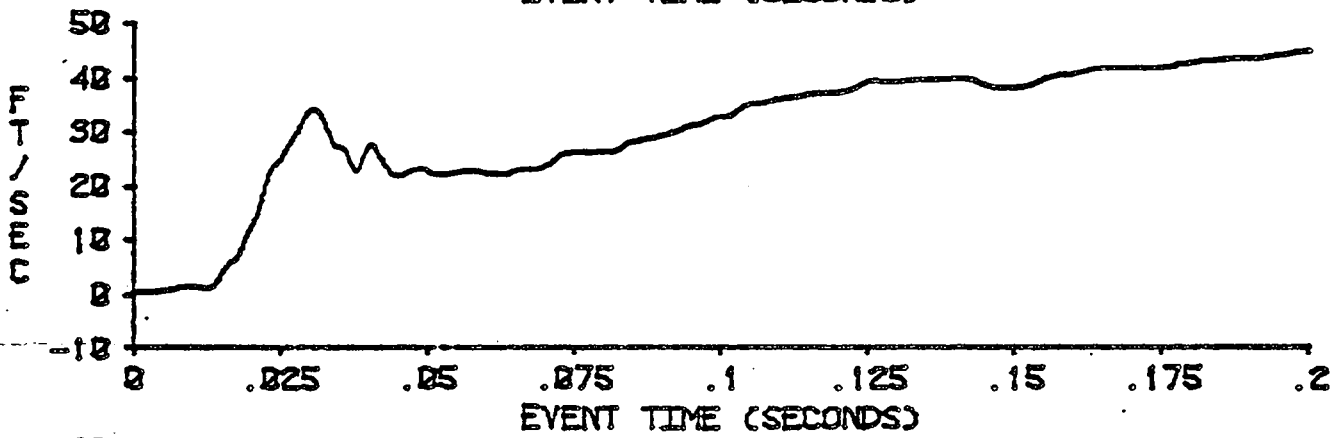
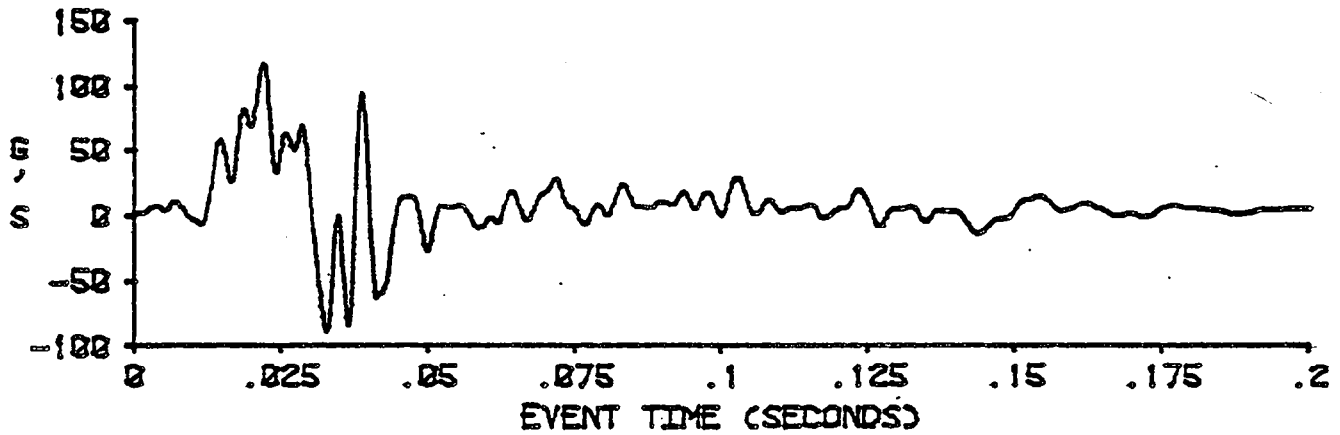
TEST 2265
12/14/81



VEHICLE 1 - VW RABBIT - 14.2 MPH
DOOR 6 RL
FILTER CLASS 180

TEST 2265
12/14/81

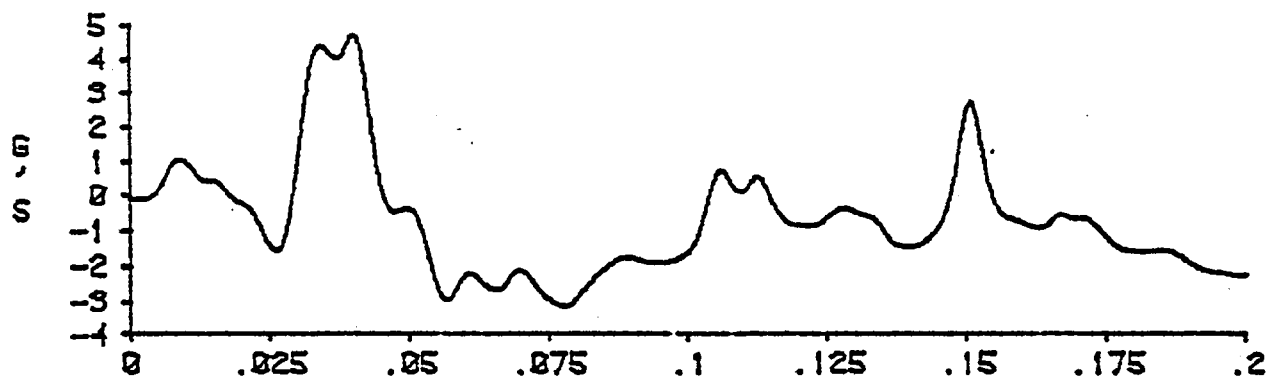
(10)



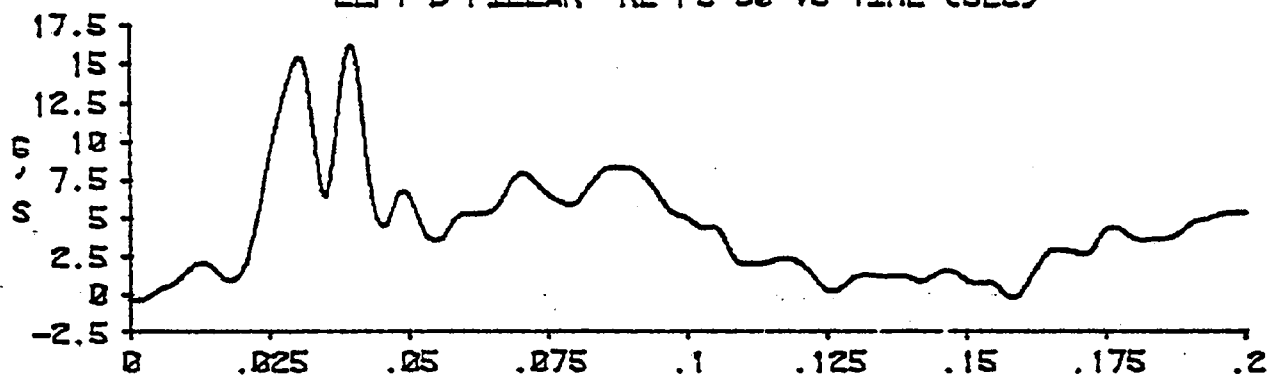
VEHICLE 1 - VW RABBIT - 14.2 MPH

TEST 2265

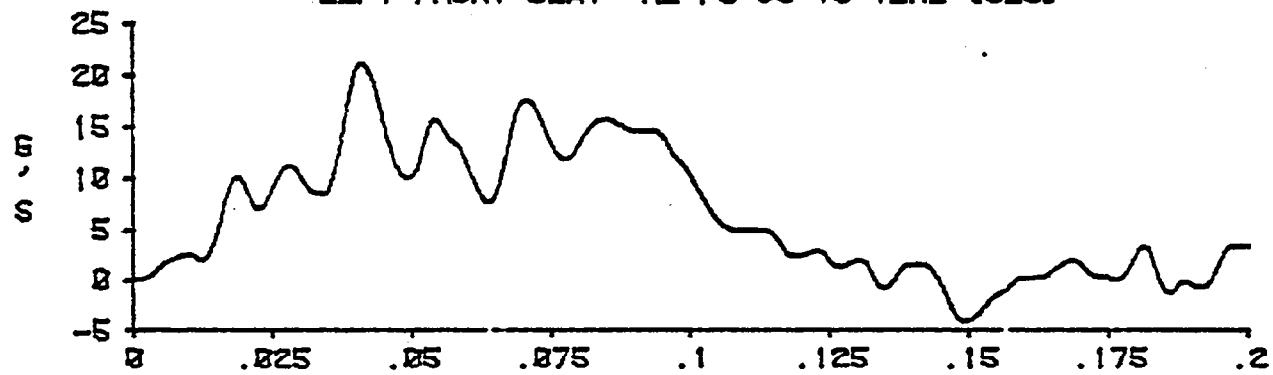
12/14/81



LEFT B PILLAR RL FC 60 VS TIME (SEC)



LEFT FRONT SEAT RL FC 60 VS TIME (SEC)

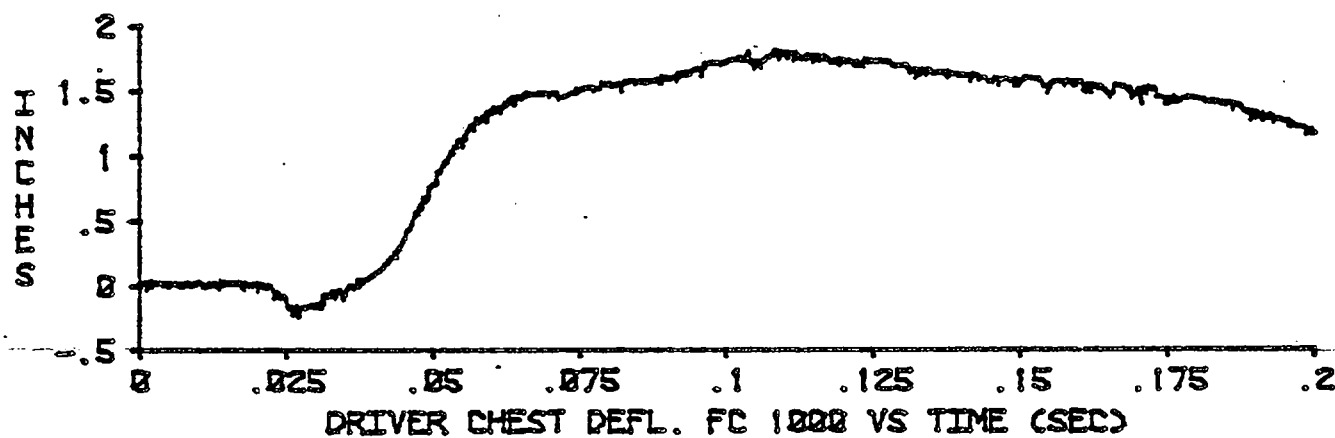
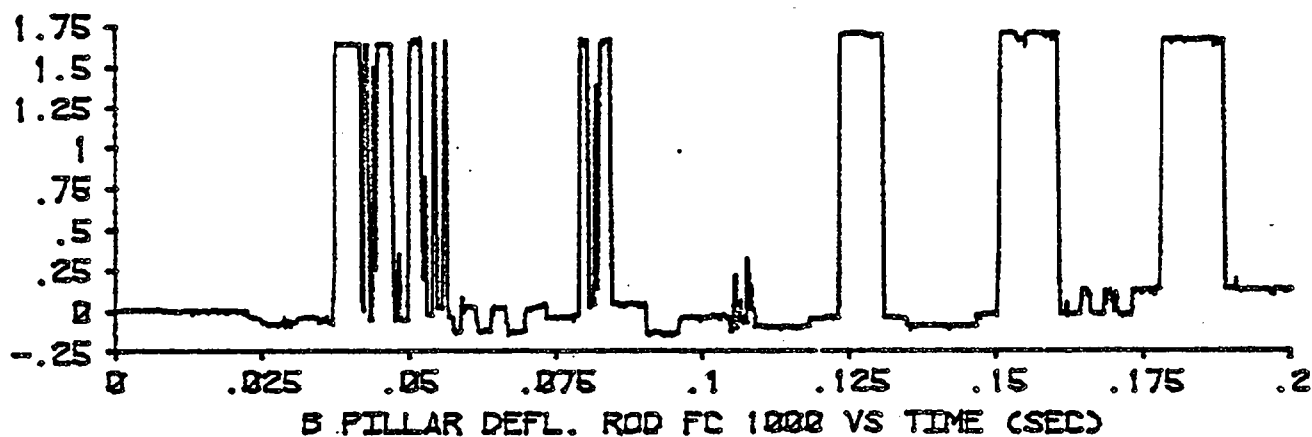


RIGHT B PILLAR RL FC 60 VS TIME (SEC)

VEHICLE 1 - VW RABBIT - 14.2 MPH

TEST 2265

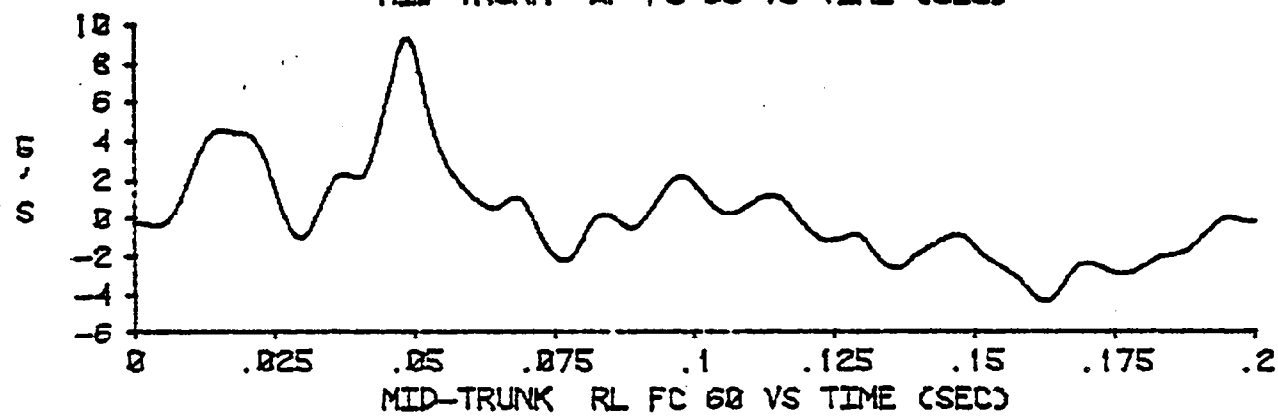
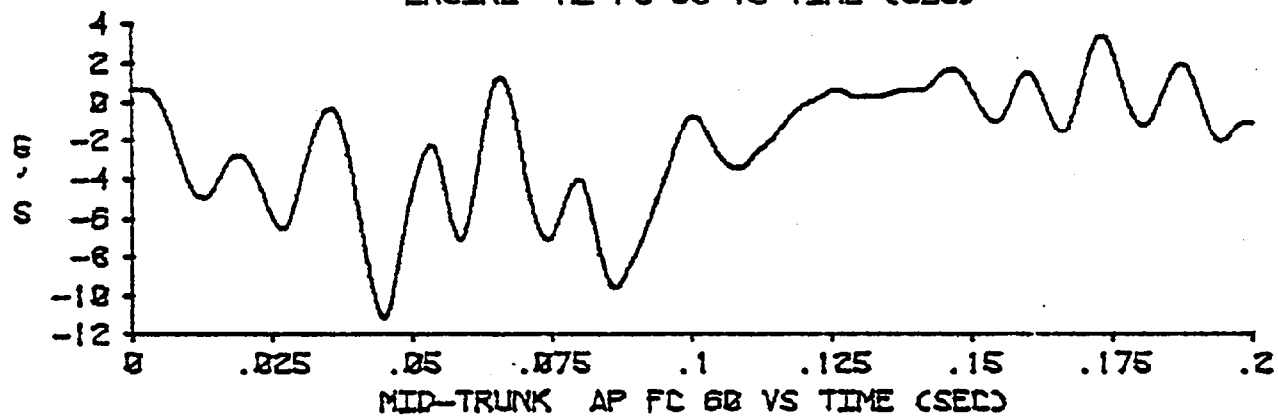
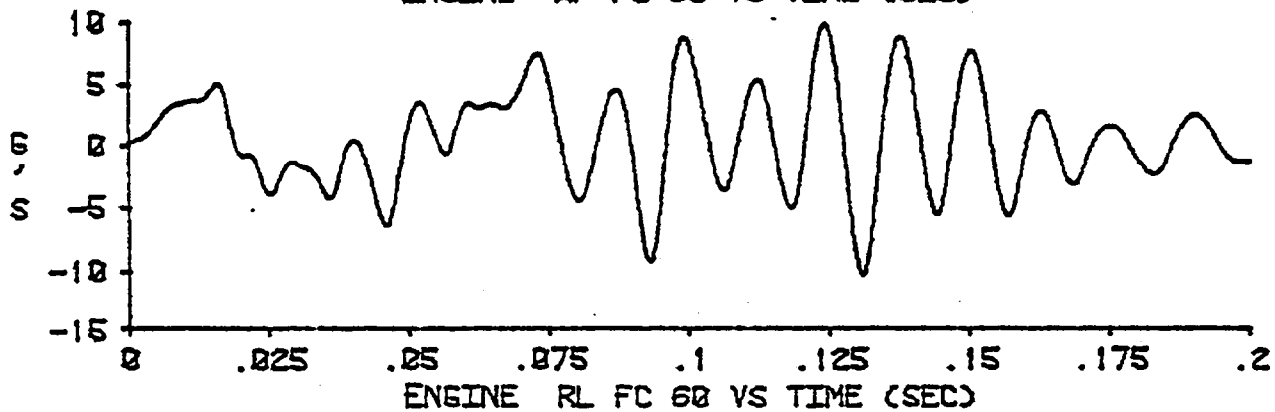
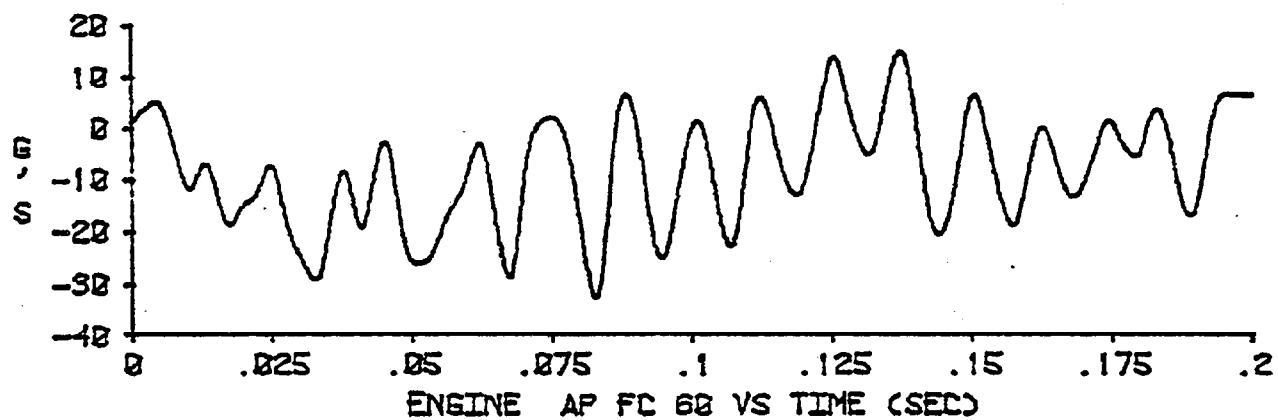
12/14/81



VEHICLE 2 - CITATION - 28.3 MPH

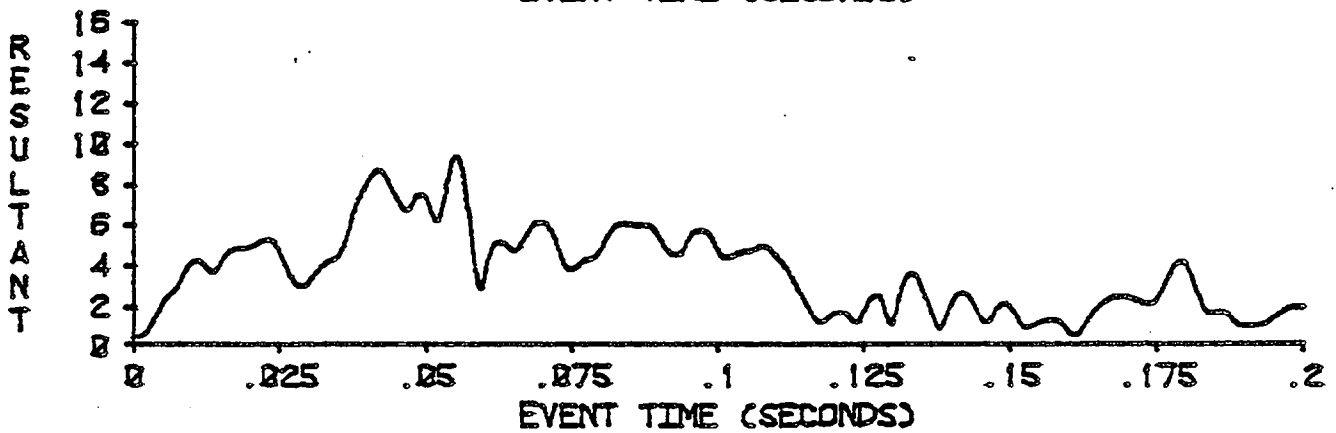
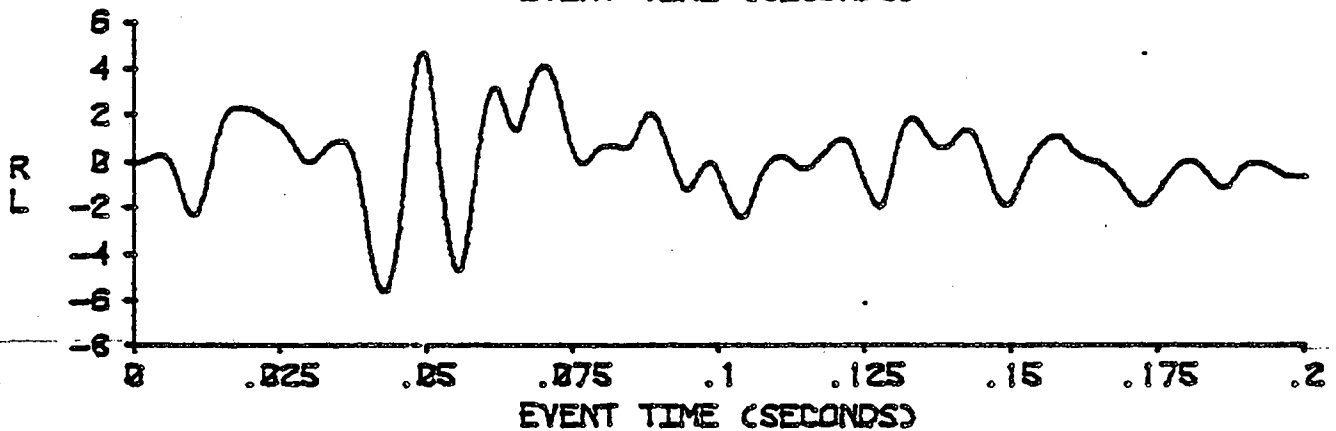
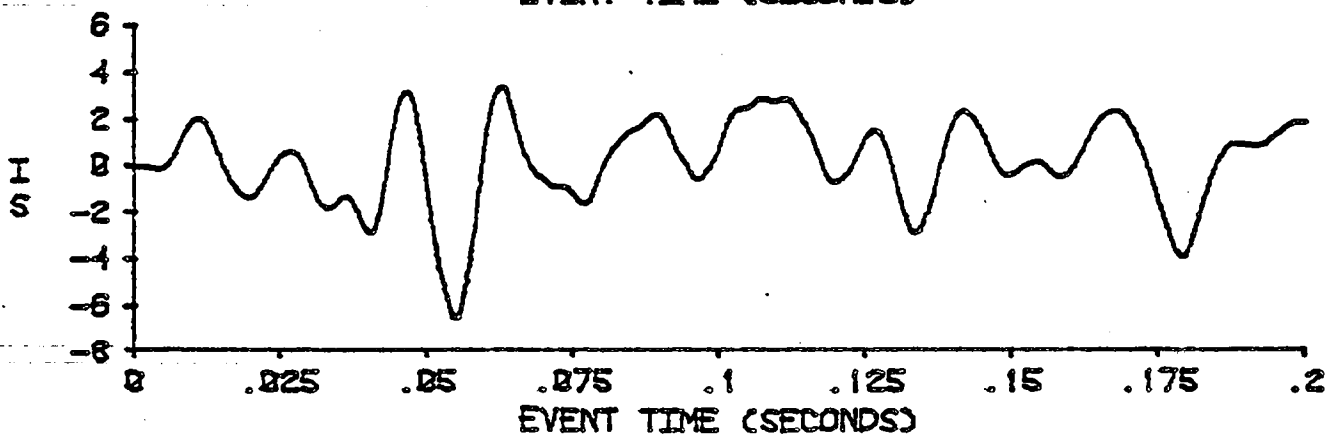
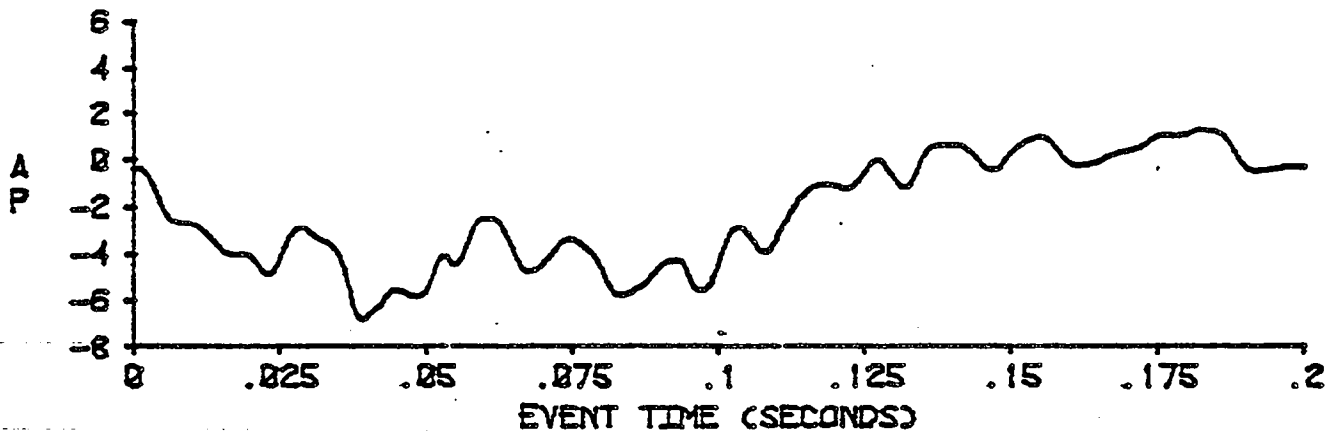
TEST 2265

12/14/81



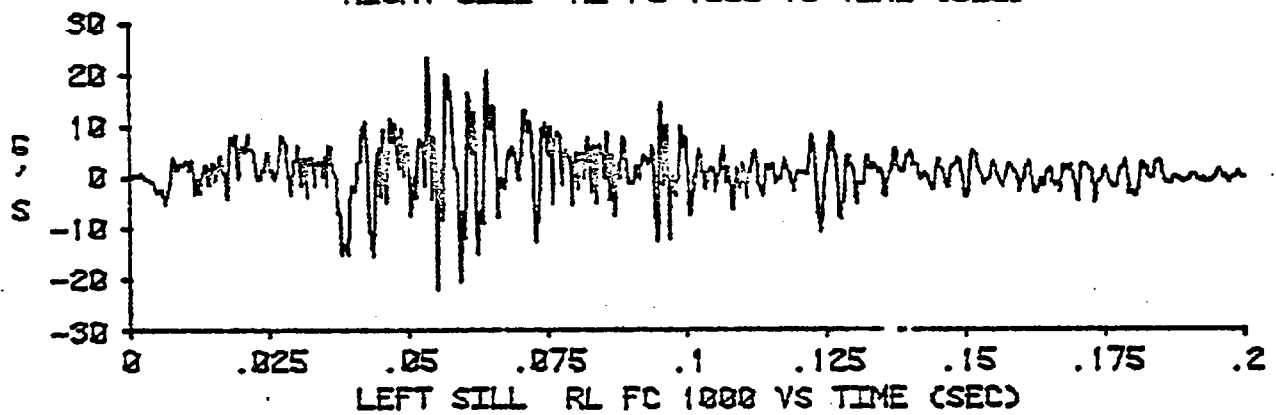
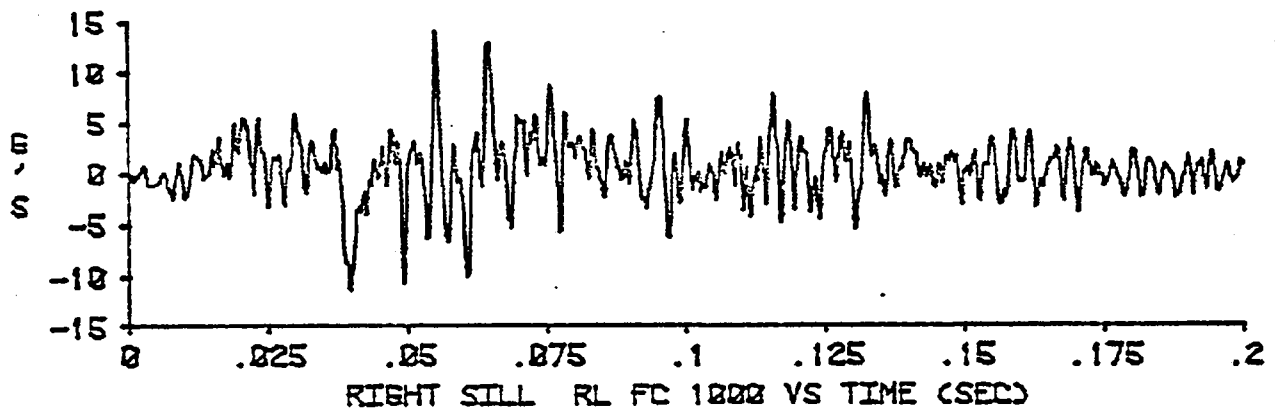
VEHICLE 2 - CITATION - 28.3 MPH
MID-MID COMPARTMENT G'S
FILTER CLASS 60

TEST 2265
12/14/81



VEHICLE 2 - CITATION - 28.3 MPH

TEST 2265
12/14/61



VEHICLE 2 - CITATION - 28.3 MPH

TEST 2265

12/14/81

