

REPORT NO. MGA-90-N001
NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

Honda Motor Co.
1991 HONDA CIVIC DX
4-Door Sedan
NHTSA NO. MM5301

MGA RESEARCH CORPORATION
5000 WARREN ROAD
BURLINGTON, WI 53105



January 4, 1991

FINAL TEST REPORT

Prepared For:

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NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
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		6. Performing Organization Code MGA	
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15. Supplementary Notes			
16. Abstract A 35 mph frontal barrier impact using a 6 load cell barrier was conducted on a 1991 Honda Civic DX 4-door Sedan at the MGA Proving Grounds Crash test facility in Burlington, WI, on December 20, 1990. The barrier impact velocity was 35.0 mph, and the ambient temperature at the barrier face at the time of impact was 72 degrees Fahrenheit. The post-test vehicle maximum crush was 21.1 inches. The test vehicle appeared to comply with the indicant requirements of the following Federal Motor Safety Standards: 1. FMVSS No. 212, "Windshield Mounting" 2. FMVSS No. 219 (Partial), "Windshield Zone Intrusion" 3. FMVSS No. 301, "Fuel System Integrity" With regard to FMVSS No. 208, "Occupant Crash Protection," injury criteria, the driver's head injury criteria (HIC) value was 1068. The chest g's (CLIP) was 49.8. The left and right femur loads were 996 lbs. and 2158 lbs. respectively. The passenger's HIC value was 601. The CLIP for the passenger was 47.0. The left and right femur loads were 765 lbs. and 624 lbs. respectively.			
17. Key Words 35 mph Frontal Barrier Impact Test New Car Assessment Program (NCAP) FMVSS 212 Indicant Testing FMVSS 219 (Partial) Indicant Testing FMVSS 301 Indicant Testing		18. Distribution Statement Copies of this report are available from Technical Reference Division National Highway Traffic Safety Admin. Nassif Building, Room 5108 400 Seventh St., S.W., Washington, DC 20590	
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SECTION 1

PURPOSE AND TEST PROCEDURE

This 35 mph frontal barrier impact test is part of the Composite FY '90 Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH 22-90-D-12121. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 30 mph FMVSS 208/212/219/301 requirements.

The 35 mph frontal barrier impact test was conducted in accordance with the National Highway Traffic Safety Administration (NHTSA) Indicant Test Laboratory Procedure for New Car Assessment Program (NCAP) dated January 1, 1990. Data for FMVSS No. 212, "Windshield Mounting", FMVSS No. 219 (Partial), "Windshield Zone Intrusion", FMVSS No. 301, "Fuel System Integrity", as well as occupant performance data are provided herein.

SECTION 2

SUMMARY OF TEST NUMBER

A load cell barrier consisting of 6 load cells was impacted by a 1991 Honda Civic 4 Door Sedan at a velocity of 35.0 mph. The test was performed at the MGA Proving Grounds and Crash Test Center on December 20, 1990. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The frontal barrier impact event was documented by one real-time camera and 16 high-speed cameras. Camera locations and other pertinent camera information can be found in this report.

Two Part 572, 50th percentile male anthropomorphic test devices (ATDs), were placed in the driver and right-front passenger seating positions according to dummy placement instructions specified in the Laboratory Indicant Test Procedure.

Both ATDs were fully instrumented with head and chest triaxial accelerometers and right/left femur load cells. Seat belt load cells were also on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. The driver ATD (Serial No. 465) and the right-front passenger ATD (Serial No. 466) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C and D.

The 39 channels of data were recorded on 4 tape recorders. Appendix B contains the vehicle, load cell barrier and dummy response data traces.

The driver's head struck the steering wheel rim; the HIC was 1068. The maximum chest deceleration over 3 milliseconds was 49.8 g's. The left and right femur loads were 996 and 2158 pounds, respectively.

The right front passenger's HIC was 601 and maximum chest deceleration over 3 milliseconds was 47.0 g's. The left and right femur loads were 765 and 624 pounds, respectively.

GENERAL TEST AND VEHICLE PARAMETER DATA

Vehicle Year/Make/Model/Body Style: 1991 Honda Civic DX 4 Door Sedan

NHTSA No.: MM5301 VIN: IHGED3641ML008684

Body Color: White Date of Manufacture: 10/90

Engine: 4 Cylinders; C.I.D.; Liters; 1500 CC

 x Gas; Diesel; Turbocharged

Placement Longitudinal; x Transverse

Transmission: 4 Speed; Manual; x Automatic; Overdrive

Final Drive: x Front Wheel; Rear Wheel; Four Wheel

Date Received: 12/5/90 Odometer Reading: 61.2 miles

 A/C; x P/S; x P/B; P/wdo; Tilt Wheel

 P/Seats; Cruise Control

Type of Occupant Restraint: Shoulder belt- motorized passive two-point belt system w/emergency release latch. Lap belt - manual with retractor at lower B-pillar.

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 32 psi, Rear 32 psi

Recommended Tire Size: P175-70R13

Recommended Cold Tire Pressure: Front 32 psi; Rear 32 psi

Tires on Vehicle: P175-70R13 ; Manufacturer: Dunlop

Number of Occupants: 2 Front; 3 Rear; - 3rd Seat; 5 Total

Type of Front Seats: x Bucket; Bench; Split Bench

Type of Front Seat Back: Fixed; x Adj. With; x Lever; Rot. Knob

Vehicle Capacity Weight (VCW) = 830 lbs. (A)

No. of Occupants x 150 lbs. = 750 lbs. (B)

Rated Cargo Weight (RCW) A-B = 80 lbs.

GVWR 3265 lbs. GAWR: Front 1735 lbs. Rear 1580 lbs.

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (WITH MAXIMUM FLUIDS) = UDW:

Right Front = 649 lbs. Right Rear = 459 lbs.
Left Front = 673 lbs. Left Rear = 471 lbs.
TOTAL FRONT WEIGHT = 1322 lbs. (58.7 % of Total Vehicle Weight)
TOTAL REAR WEIGHT = 930 lbs. (41.3 % of Total Vehicle Weight)
TOTAL UNLOADED DELIVERED WEIGHT (UDW) = 2252 lbs.

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight (2252 lbs.)
VCW = Vehicle Capacity Weight (830 lbs.)
DSC = Designated Seating Capacity (5)
RCW = VCW - 150 (DSC) = 80 *lbs.
Target Test Weight = UDW + RCW + (2 dummies x 164 lbs./dummy)
Target Test Weight = 2660 lbs.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 0 POUNDS CARGO:

Right Front = 766 lbs. Right Rear = 589 lbs.
Left Front = 779 lbs. Left Rear = 609 lbs.
TOTAL FRONT WEIGHT = 1545 lbs. (56.3% of Total Vehicle Weight)
TOTAL REAR WEIGHT = 1198 lbs. (43.7% of Total Vehicle Weight)
TOTAL TEST WEIGHT = 2743 lbs.

Weight of ballast secured in vehicle trunk area = 0 lbs.

Vehicle components removed to meet target weight Rear seat, spare tire,
tail lights, rear bumper.

VEHICLE ATTITUDE (all dimensions in inches):

Delivered Attitude: RF 25.4 LF 25.4 RR 25.6 LR 25.4

Test Attitude: RF 24.8 LF 24.6 RR 24 LR 24

Wheel Base: 98.4 in.; C.G. = 43 in. rearward of front wheel C/L

Remarks: Rear bumper removed to meet vehicle weight as per COTR
instructions.

*light trucks and MPVs RCW is 300 lbs. or manufacturer's value whichever is
less

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

POST-IMPACT DATA:

Type of Test: 35 mph frontal Impact Angle: 0 °
 Date of Test: 12/20/90 Time of Test: 4:07PM
 Ambient Temperature: 72 °F at impact area
 Temperature in Occupant Compartment: 72 °F (Spec. Range = 66 to 78°F)
 Windshield Molding Temperature: 72 °F
 Required Impact Velocity Range: 34.5 to 35.5 mph
 Impact Velocity: primary = 35.0 mph, secondary = 35.0 mph
 Distance From Front Bumper to Barrier Face When
 Entering Speed Trap: 234 inches
 Exiting Speed Trap: 192 inches

VEHICLE REBOUND AND CRUSH (inches):

Vehicle Length: Pre-Test = R 164.3 C_L 169.4 L 164.0
 Post-Test = R 146.8 C_L 148.3 L 145.9
 Crush = R 17.5 C_L 21.1 L 18.1
 Distance from front of test vehicle to point of impact (rebound):
 R 25.8 in. C_L 24.8 in. L 25.4 in.

VISIBLE DUMMY CONTACT POINTS:

	<u>Driver</u>	<u>Passenger</u>
Head	<u>steering wheel rim</u>	<u>none</u>
Chest	<u>none</u>	<u>none</u>
Abdomen	<u>none</u>	<u>none</u>
Left Knee	<u>Instrument Panel</u>	<u>Instrument Panel</u>
Right Knee	<u>Instrument Panel</u>	<u>Instrument Panel</u>

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

	<u>Front</u>		<u>Rear</u>	
	<u>Left</u>	<u>Right</u>	<u>Left</u>	<u>Right</u>
Door Opening (without use of tools)	<u>Jammed</u>	<u>Jammed</u>	<u>Opened</u>	<u>Opened</u>

	<u>Front</u>		<u>Rear</u>	
<u>Seat Movement</u>	<u>Left</u>	<u>Right</u>	<u>Left</u>	<u>Right</u>
Seat Back Failure	<u>None</u>	<u>None</u>	<u>N/A</u>	<u>N/A</u>
Seat Shift (in.)	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>

Glazing Damage

Backlight/Windshield Some cracking nearest edge to firewall.

Other Notable Impact Effects: Noticeable roof deformation

SECTION 3

SUMMARY OF RESULTS FOR-----

FMVSS 212, "Windshield Mounting"

FMVSS 219 (Partial), "Windshield Zone Intrusion"

FMVSS 301-75, "Fuel System Integrity"

FMVSS NO. 212, "WINDSHIELD MOUNTING", DATA SHEET

Details of windshield mounting such as retention method, trim type, etc.:

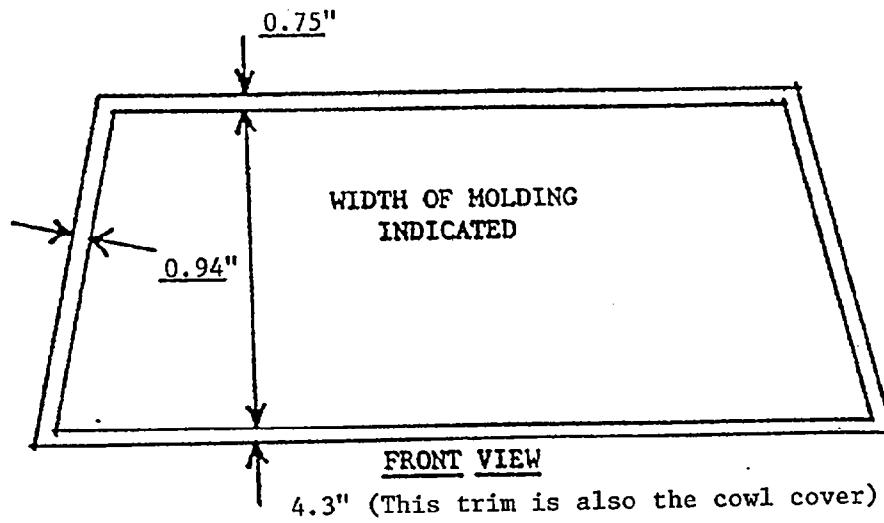
Windhsield glued and gasketed with steel trim.

FMVSS 212 Requirements: The Post-Test periphery retention amount must be at least 75% of teh Pre-Test periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of windshield for vehicles equipped with automatic restraint systems for front occupants.

FMVSS 212 TEST DATA:

	WINDSHIELD PERIPHERY		PERCENT RETENTION
	PRE-TEST (in)	POST-TEST (in)	
RIGHT SIDE	41.4	41.4	0
LEFT SIDE	41.3	41.3	0
TOTAL	82.7	82.7	0

AREA OF RETENTION FAILURE:

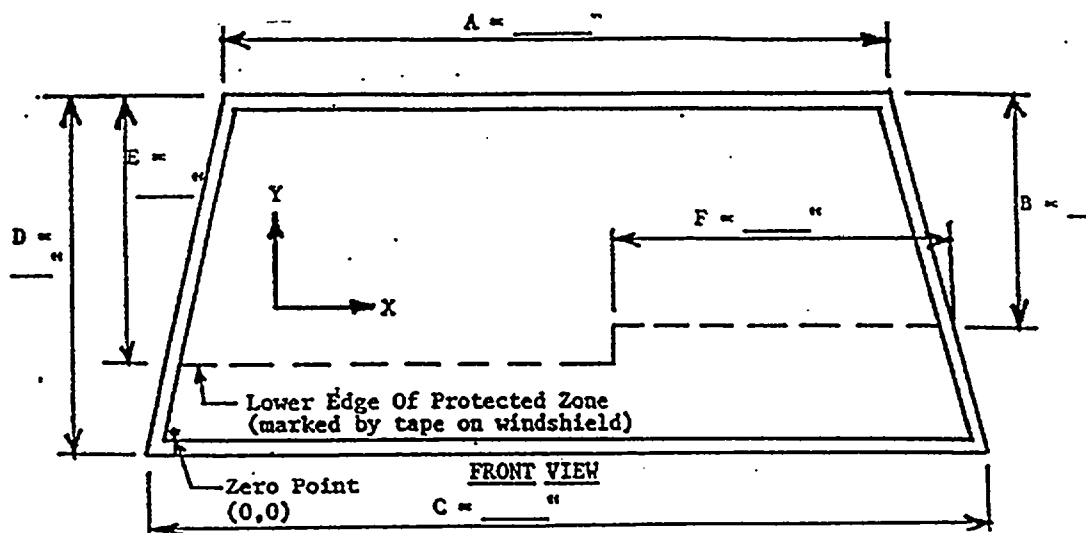


FAILURE DETAILS:

PROTECTED ZONE LOWER EDGE REQUIREMENT:

The lower edge of the protected zone is determined by placing a 6.5" dia. rigid sphere weighing 15 pounds in a position such that it simultaneously contacts the inner surface of the windshield and the top surface of the instrument panel including padding. Draw the locus of points on the inner surface of the windshield contactable by the sphere across the width of the instrument panel. From the outermost contactable points, extend the locus line horizontally to the edges of the windshield, and then draw a line on the inner surface of the windshield below and 1/2" distant from the locus line. The LOWER EDGE OF THE PROTECTED ZONE is the longitudinal projection onto the outer surface of the windshield of this line.

FMVSS 219 TEST DATA:



DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 1/4":

(Show location of penetration on above sketch)

No penetration

A = 44.5 in.
 B = 22.5 in.
 C = 62.0 in.
 D = 29.4 in.
 E = 22.4 in.
 F = 24.6 in.

COORDINATES	
X	Y
1.	N/A
2.	N/A
3.	N/A
4.	N/A

FMVSS NO. 301-75, "FUEL SYSTEM INTEGRITY", DATA SHEETS

TEST VEHICLE NHTSA NO.: MM5301 TEST DATE: Dec. 20, 1990

VEHICLE MAKE/MODEL/BODY STYLE: 1991 Honda Civic DX 4 Door Sedan

USABLE CAPACITY OF VEHICLE'S FUEL TANK: 11.9 Gallons (figure furnished by
vehicle manufacturer)

TEST REQUIREMENTS:

Test vehicle's engine operated to "run dry" condition, and then a small amount of Stoddard solvent which has been dyed RED shall be added to the vehicle's fuel tank. Operate the fuel pump enough to completely fill the fuel system ahead of the fuel tank, and add 92 to 94% of the stated USABLE CAPACITY to the fuel tank.

AMOUNT OF STODDARD SOLVENT ADDED TO VEHICLE'S FUEL TANK:

11.1 Gallons Which is 93.3% of the Stated USABLE CAPACITY.

SOLVENT SPILLAGE MEASUREMENT AFTER 35 MPH FRONTAL BARRIER IMPACT TEST:

	<u>Actual</u>	<u>Maximum Allowed</u>
From impact until vehicle motion ceases -----	<u>0</u>	1 oz.
For 5 min. period after vehicle motion ceases -	<u>0</u>	5 oz.
For next 25 minutes at barrier face -----	<u>0</u>	1 oz./1 minute

SOLVENT SPILLAGE DETAILS:

None

STATIC ROLLOVER MACHINE ROTATION TIME INFORMATION: (Spec. Range = 1 to 3 minute)*

Time reqd. for machine to rotate 90° = N/A minutes, N/A seconds

FMVSS 301-75 Position Hold Time = 5 minutes, 0 seconds

TOTAL ----- = N/A minutes, N/A seconds

Next Whole Minute Interval ----- = N/A minutes

* Static rollover not performed as per NHTSA COTR.

VEHICLE STATIC ROLLOVER DATA:

	First 5 Minutes FROM ONSET OF ROTATION	6th Minute	7th Minute	8th Minute
Maximum Allowable Solvent Spillage--	5 oz.	1 oz.	1 oz.	1 oz.
0 to 90° (filler cap down) -----	N/A	N/A	N/A	N/A
90 to 180° -----	N/A	N/A	N/A	N/A
180 to 270° -----	N/A	N/A	N/A	N/A
270 to 360° -----	N/A	N/A	N/A	N/A

Solvent Spillage Location(s):

N/A - Static rollover not performed as per NHTSA COTR.

SECTION 4

OMI FINAL DATA

Occupant and Vehicle Information

I. OMI DATA

1. Dummy Injury Criteria Data Summary
2. Dummy Positioning Data
3. Seat Belt Positioning Data
4. Seat Belt Performance Assessment Data
5. Driver Dummy to Steering Column Dimensions
6. Camera Locations
7. Vehicle Target Locations

II. OVR DATA

1. Load Cell Barrier Data
2. Vehicle Accelerometer Data
3. Test Vehicle Measurements

III. AID DATA

1. Accident Investigation Damage Data Summary

FMVSS NO. 208, "OCCUPANT CRASH PROTECTION", DATA SHEET

VEH. YR./MAKE/MODEL/BODY STYLE: 1991 Honda Civic DX 4 Door Sedan

VEH. NHTSA NO.: MM5301 TEST DATE: 12/20/90

MAXIMUM ACCELERATION VALUES: (G'S)	DRIVER DUMMY # 465	PASSENGER DUMMY # 466
Head Channel X	104.4	30.8
Head Channel Y	8.4	20.3
Head Channel Z	65.7	57.4
HEAD RESULTANT	112.6	64.3
Chest Channel X	52.5	48.4
Chest Channel Y	20.0	14.4
Chest Channel Z	19.4	18.1
CHEST RESULTANT (CLIP)	49.8	47.0
TIME INTERVAL (msec)	t ₁ = 64.8 t ₂ = 67.9	t ₁ = 51.1 t ₂ = 54.2

HEAD INJURY CRITERIA (HIC) VALUES:

HIC	1068.2	601
t ₁ (seconds)	69.1	62.5
t ₂ (seconds)	89.9	98.5
Avg. Accel. t ₁ to t ₂	76.5	48.9

[The maximum time interval from t₁ to t₂ is 36 milliseconds.]

MAXIMUM FEMUR FORCES:

Left Side (lbs.)	996	765
Right Side (lbs.)	2158	624

MAXIMUM SEAT BELT FORCES:

Lap Belt (lbs.)	853	N/A*
Shoulder Belt (lbs.)	2029	2361

NOTE: All values listed must be occurring during primary impact event.
(Head X, Y, Z and R listed must be during t₁ to t₂ HIC interval)

* No valid data collected for passenger lap belt

HYBRID III NECK AND CHEST DATA SHEET *

VEHICLE YR./MAKE/MODEL/BODY STYLE: 1991 Honda Civic DX 4 Door Sedan

VEHICLE NHTSA NO.: MM5301 TEST DATE: 12/20/90

MAXIMUM VALUES	DRIVER DUMMY #	PASSENGER DUMMY #
Neck Load X	N/A**	N/A**
Neck Load Y	N/A**	N/A**
Neck Load Z	N/A**	N/A**
Neck Moment X	N/A**	N/A**
Neck Moment Y	N/A**	N/A**
Neck Moment Z	N/A**	N/A**
Chest Deflection X (in)	N/A**	N/A**
Time of Max. Occurrence	N/A**	N/A**

Note: All values listed must be occurring during primary impact event.

*For Hybrid III Dummy Application Only

** Hybrid II dummies used.

PART 572 DUMMY IN-VEHICLE POSITION

Test No.: MM5301 Vehicle: 1991 Honda Civic DX 4 Door Sedan

SEAT TYPE:

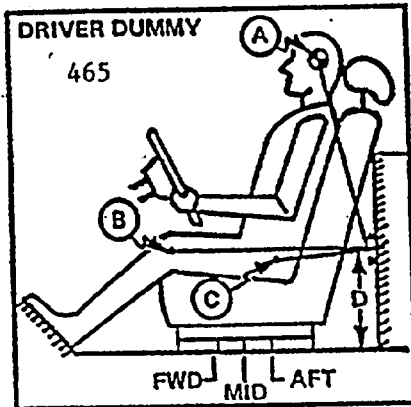
 Bench
 x Bucket

ADJUSTER TYPE:

 x Manual
 Power

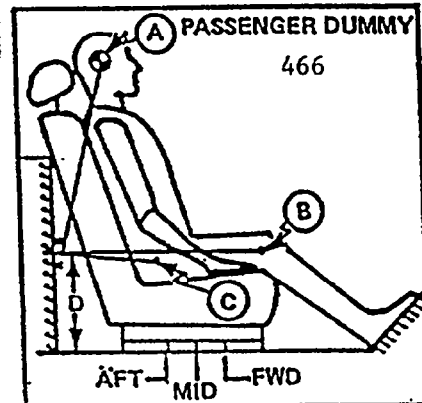
BUCKET SEAT BACK TYPE:

 Fixed
 x Adjustable Reclining



MEASUREMENT LOCATION

- A - Head Target
- B - Knee Joint
- C - Approximate "H" Point
- D - Sill to Reference Point



A = 21.8 in. 4.1 Degrees

B = 21.5 in. -30.6 Degrees

C = 11.75 in. -8.8 Degrees

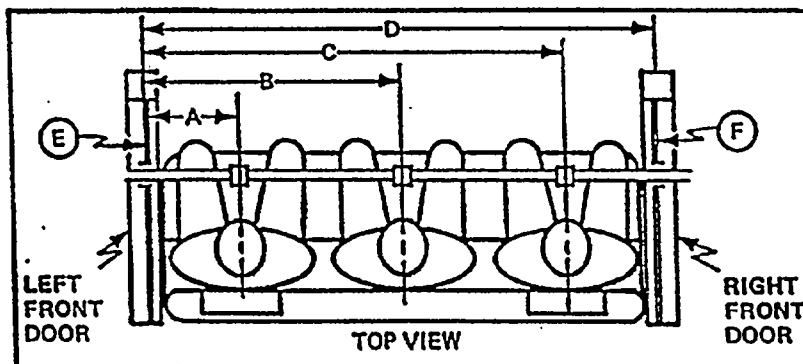
D = N/A in.
Seat notch rearward 11

A = 23.5 in. 3.3 Degrees

B = 23.5 in. 31.4 Degrees

C = 12.8 in. 12.6 Degrees

D = N/A in.
Seat notch rearward 11



A = Left Door to Driver Centerline 57.8 in.

B = Left Door to Center Passenger Centerline N/A in.

C = Left Door to Right Passenger Centerline 41.6 in.

D = Left Door to Right Door 16 in.

E, F = Window Glass Height (Right and Left Must Be Equal) 0 in.

OCCUPANT CLEARANCE DIMENSIONS

	DRIVER	PASSENGER
HH	14.9	14.5
HW	22.0	20.0
CD	25.6	N/A
CS	14.3	N/A
KDL	6.1	7.0
KDR	6.2	7.3
SA	4th notch	4th notch
TA	22.1	22.2
HSW	21.5	N/A

HH = Head to Windshield Header (in. typ.)

HW = Head to Windshield

CD = Chest to Dash

CS = Chest to Steering Wheel

KD (L/R) = Knee to Dash (Left/Right)

SA = Seat Back Angle

TA = Torso Angle

HSW = Head to Steering Wheel

HA = Head Target to "A" Pillar

HR = Head to Side Roof

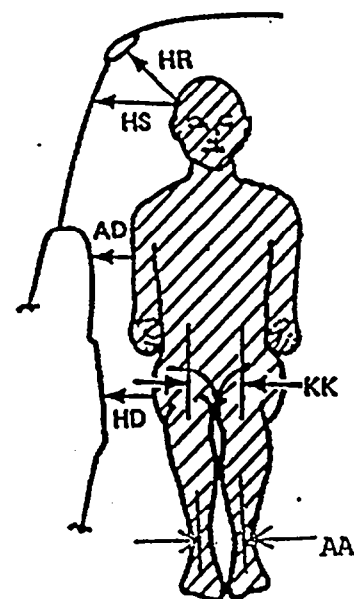
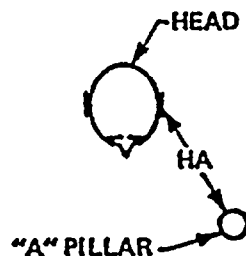
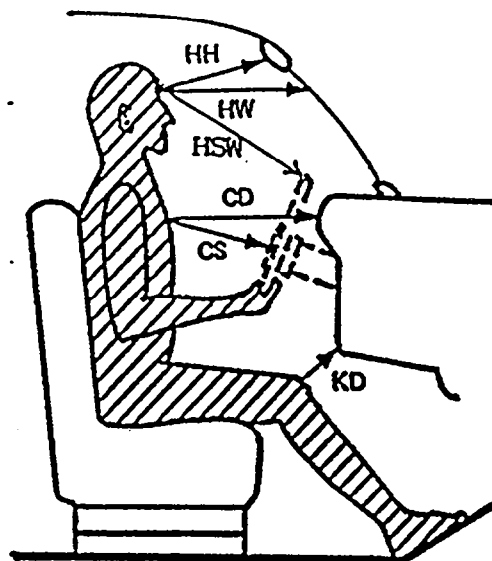
HS = Head to Side Window

AD = Arm to Door

HD = Hip to Door

KK = Knee to Knee

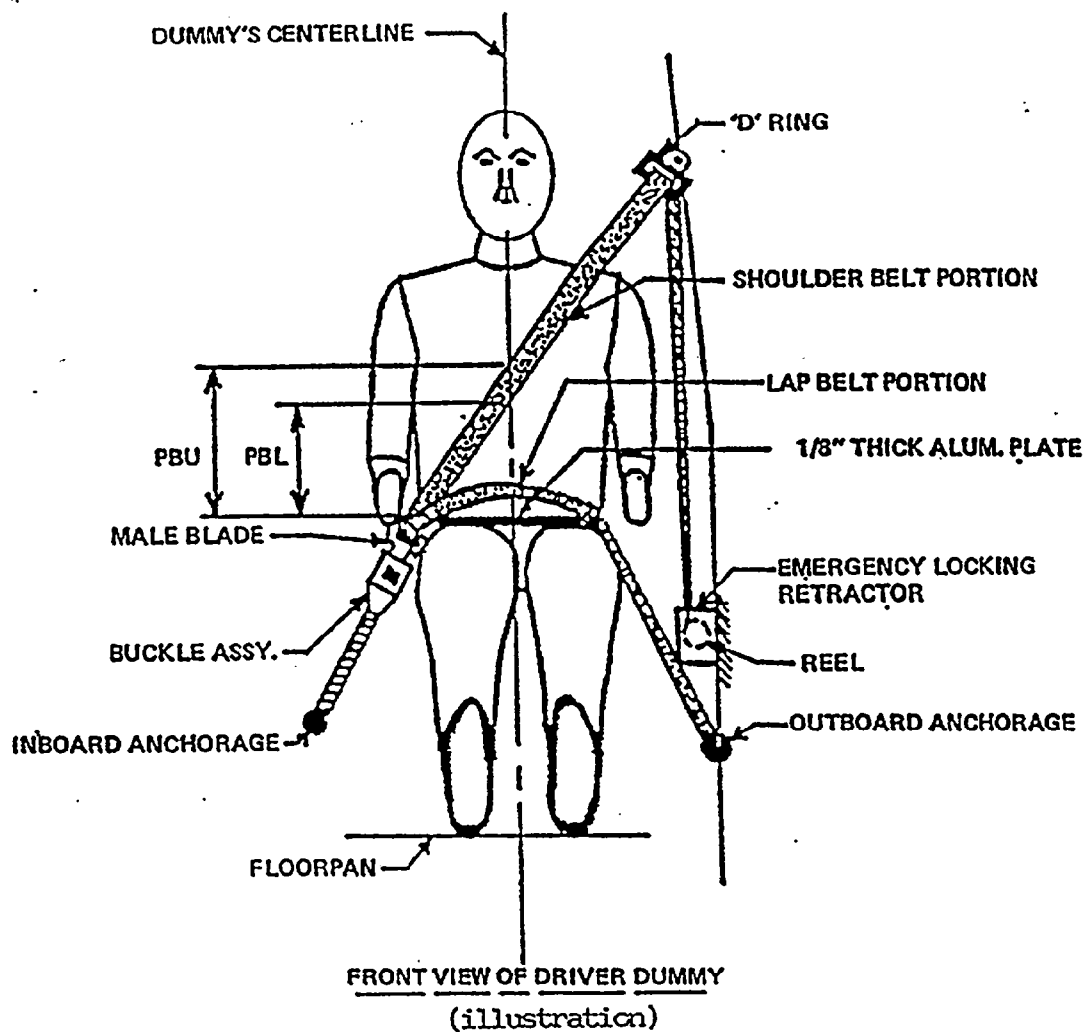
AA = Ankle to Ankle



	DRIVER	PASSENGER
HR	5.5	5.4
HS	N/A*	N/A*
AD	3.6	4.0
HD	6.5	6.2
KK	10.5	8.0
HA	18.0	17.4
AA	11.0	8.0

* Test Run with Windows Down

SEAT BELT POSITIONING DATA



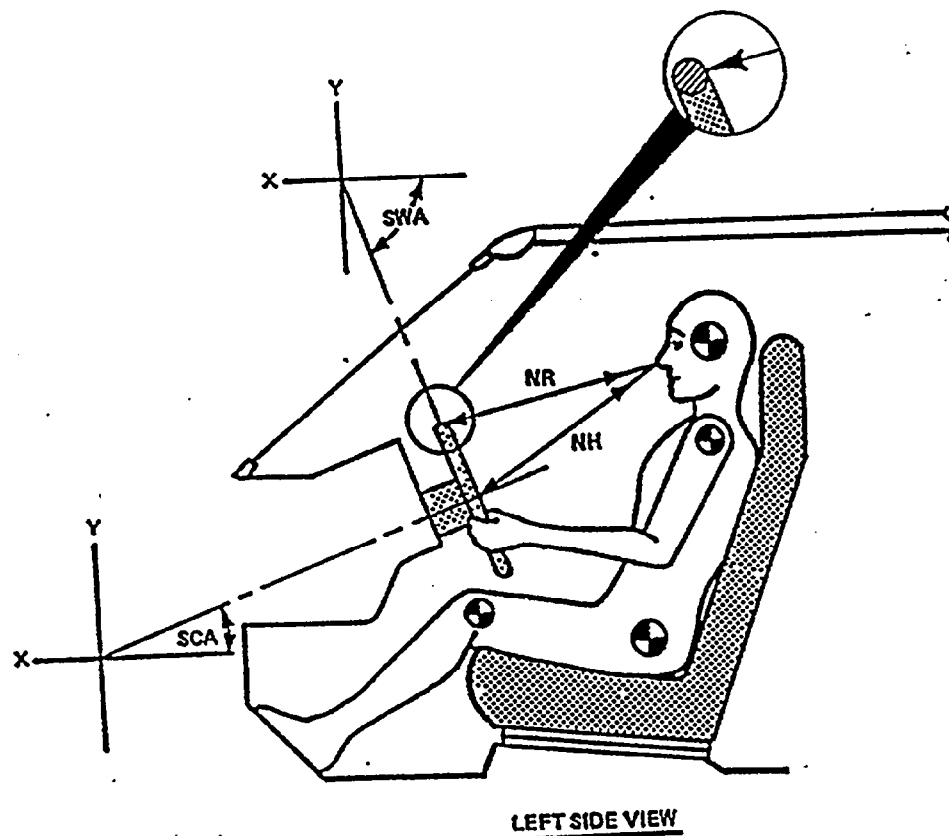
	DRIVER DUMMY	PASSENGER DUMMY
PBU -- Top surface of alum. plate to upper edge (inches)	13.3	13.2
PBL -- Top surface of alum. plate to belt lower edge (inches)	10.3	10.3

LAP BELT TENSION (lbs.)	0.69	0.94
SHOULDER BELT TENSION (lbs.)	0.43	0.62

SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

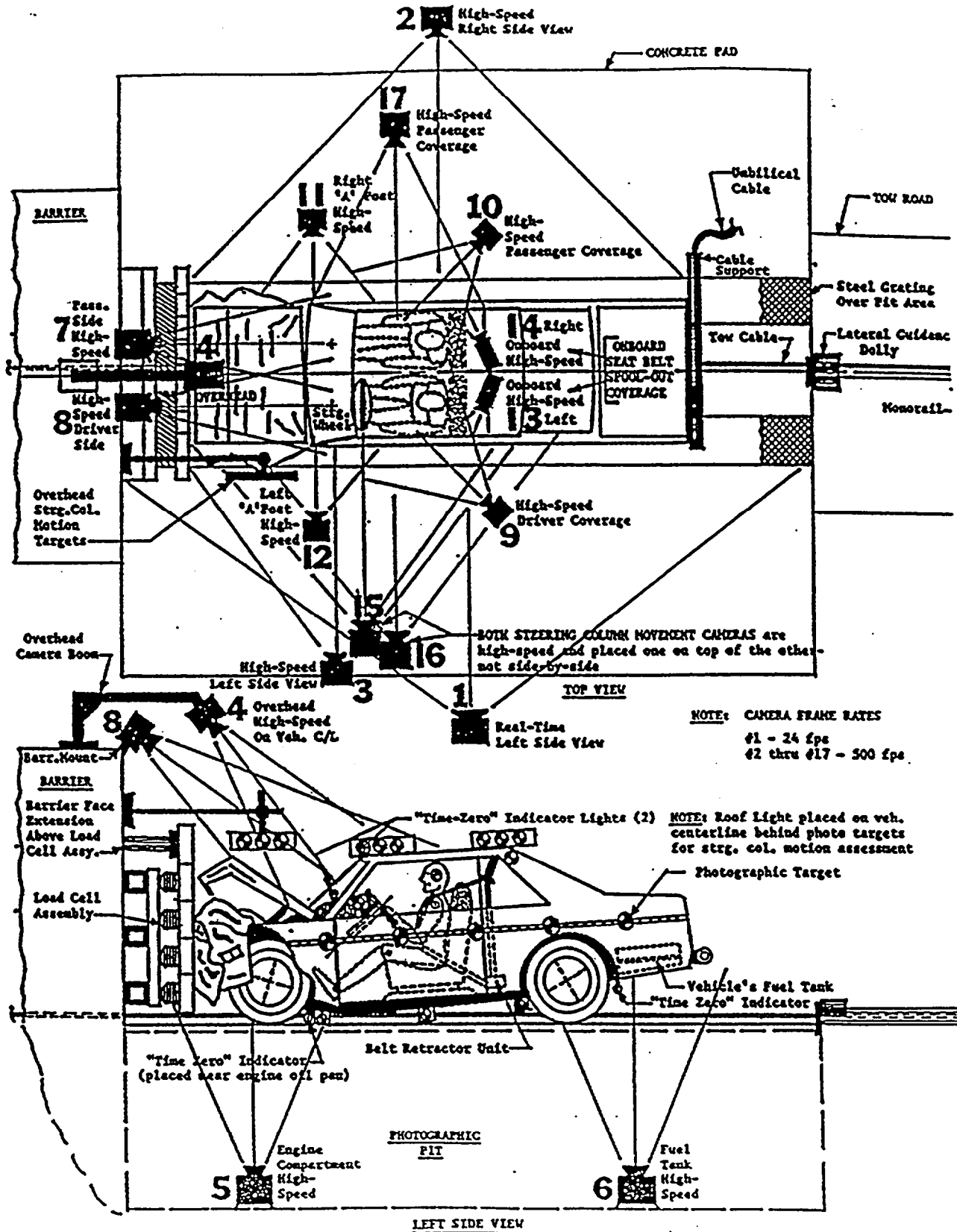
<u>BELT LENGTH DATA:</u>	<u>DRIVER</u>	<u>PASSENGER</u>
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems.	<u>N/A</u>	<u>N/A</u>
Shoulder belt length as measured on Part 572 dummy.	<u>35.5"</u>	<u>34.3"</u>
Lap belt length as measured on Part 572 dummy.	<u>34.0"</u>	<u>32.3"</u>
<u>SHOULDER BELT SPOOL-OFF DATA:</u>		
As determined by film analysis.	<u>1.0"</u>	<u>0.9"</u>
As determined mechanically.	<u>2.8"</u>	<u>0.4"</u>
As determined electronically.	<u>N/A</u>	<u>N/A</u>
<u>BELT STRETCH DATA:</u>		
Measured electronically between shoulder belt load cell and the "D" ring.	<u>N/A</u>	<u>N/A</u>
Measured mechanically.	<u>0"</u>	<u>0"</u>
<u>RETRACTOR LOCK-UP TIME:</u>		
As determined by shoulder belt spool-off.	<u>0.022 sec</u>	<u>0.015 sec</u>

DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSY. REFERENCE DIMENSIONS



		MEASUREMENTS	
<u>NR</u>	-- Distance from tip of dummy's nose to top rear surface of steering wheel rim	19.6	inches
<u>NH</u>	-- Distance from tip of dummy's nose to center of steering column hub	19.6	inches
<u>SCA</u>	-- Angle of steering column relative to the horizontal X axis	24.5	degrees
<u>SWA</u>	-- Angle of steering wheel relative to the horizontal X axis	65.5	degrees

CAMERA REQUIREMENTS FOR 35 MPH FRONTAL BARRIER IMPACT ASSESSMENT PROGRAM TEST



CAMERA LOCATIONS

VEH. NHTSA NO.: MM5301 ; TEST DATE: 12/20/90 ; TIME: 4:07PMVEH. YEAR/MAKE/MODEL/BODY STYLE: 1991 Honda Civic DX 4 Door Sedan

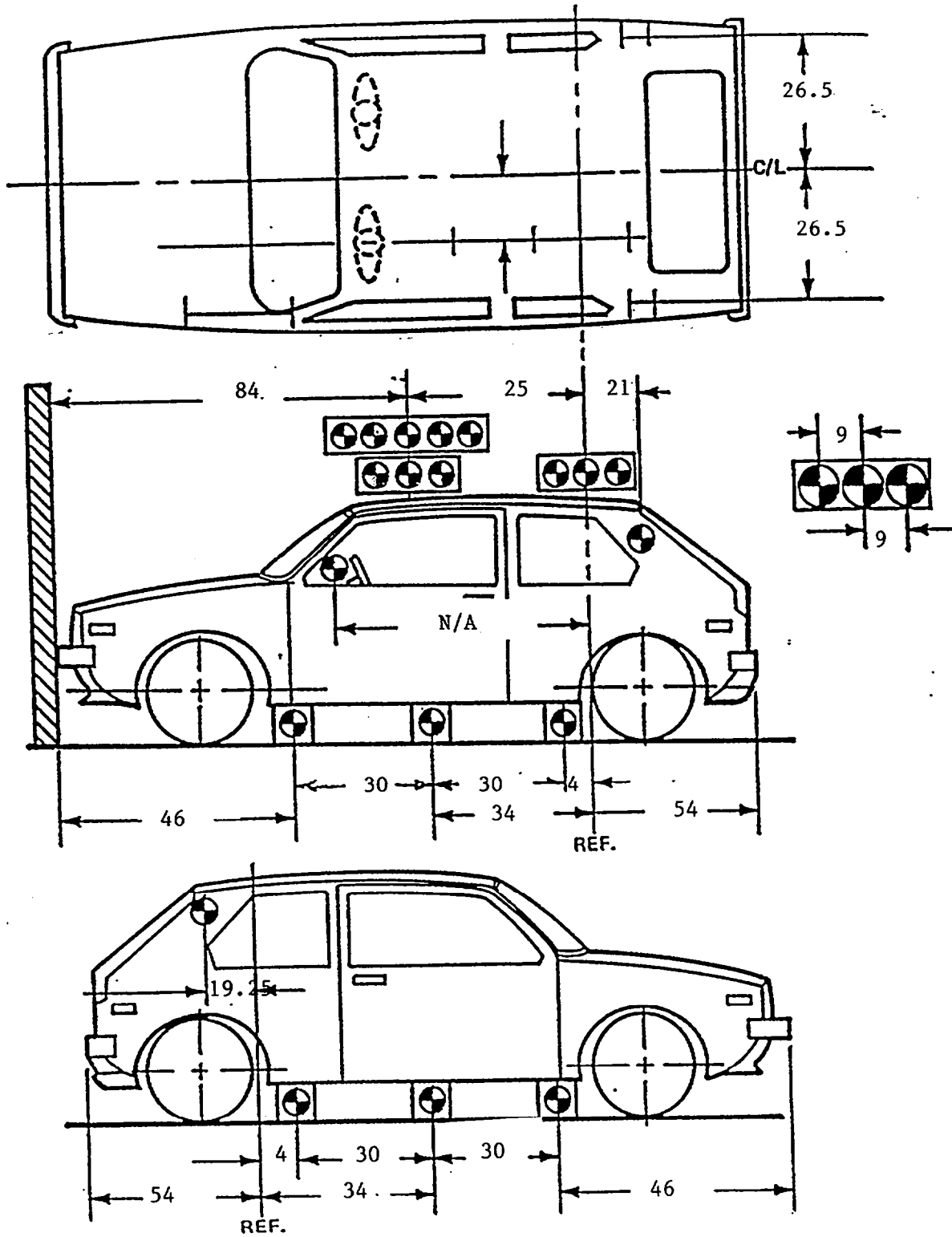
CAMERA NO.	VIEW	CAMERA POSITIONS (in.)*			ANGLE (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Real-Time Left Side View	276	394	71	90	N/A	10	24
2	Right Side View	86	332	41	90	318	13	1000
3	Left Side View	39	372	39	90	357	35	1000
4	Overhead	38	0	152	N/A	N/A	25	500
5	Pit-Engine	36	0	-114	N/A	N/A	13	1000
6	Pit-Fuel Tank	108	0	-122	N/A	N/A	13	1000
7	Front-Passenger	-7	-15	89	40	N/A	13	500
8	Front-Driver	-7	13	89	40	N/A	13	500
9	Left Side-Driver	236	196	48	35	N/A	50	1000
10	Right Side-Passenger	236	194	49	35	N/A	50	1000
11	Right Side-"A" Post	45	116	35	90	101	13	1000
12	Left Side-"A" Post	59	106	35	90	91	13	1000
13	Onboard-Left Side	N/A	N/A	N/A	N/A	N/A	13	1000
14	Onboard-Right Side	N/A	N/A	N/A	N/A	N/A	13	1000
15	Left Side-Steering Col.	76	270	61	90	255	25	1000
16	Left Side-Steering Col.	76	270	40	90	255	25	1000
17	Right Side-Passenger	61	248	40	90	233	35	1000

*X = film plane to monorail centerline

Y = film plane to barrier face

Z = film plane to ground

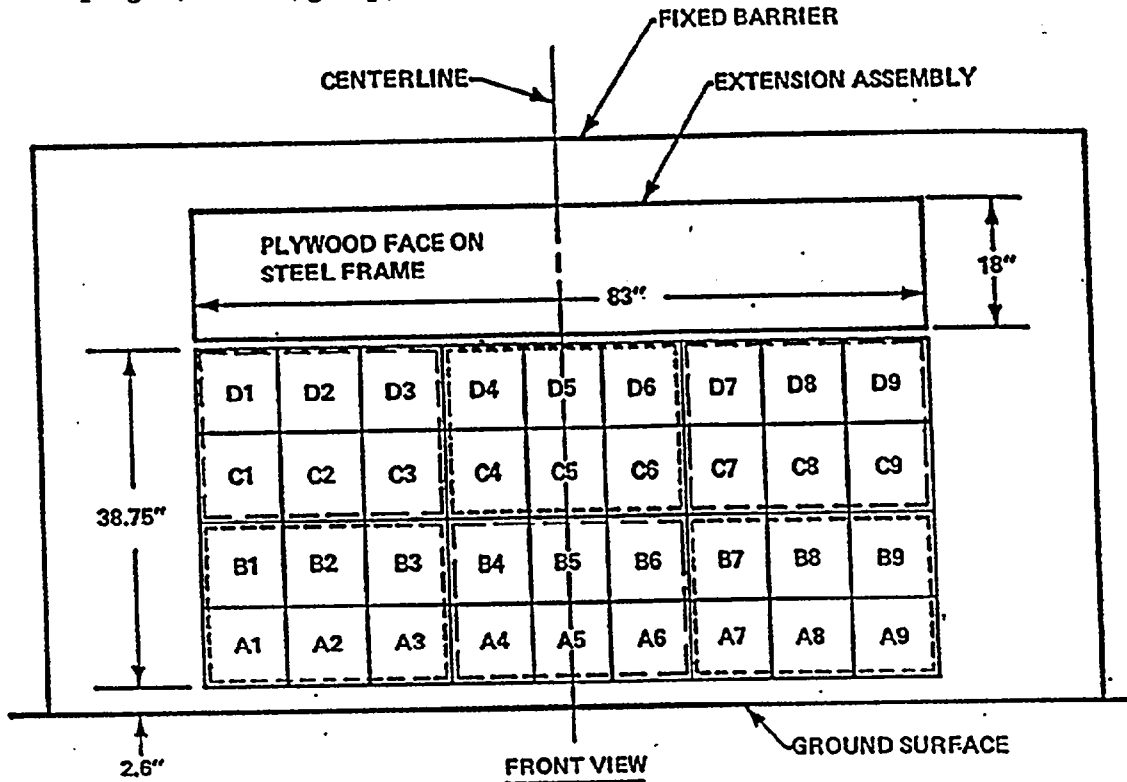
VEHICLE TARGET LOCATIONS



(DIMENSIONS IN INCHES)

LOAD CELL LOCATIONS ON FIXED BARRIER*

36 Load Cells
4 Rows
9 Columns
6 Groupings (6 cells/group)



36 load cell barrier plate not used. Only data for 6 load cells was recorded.

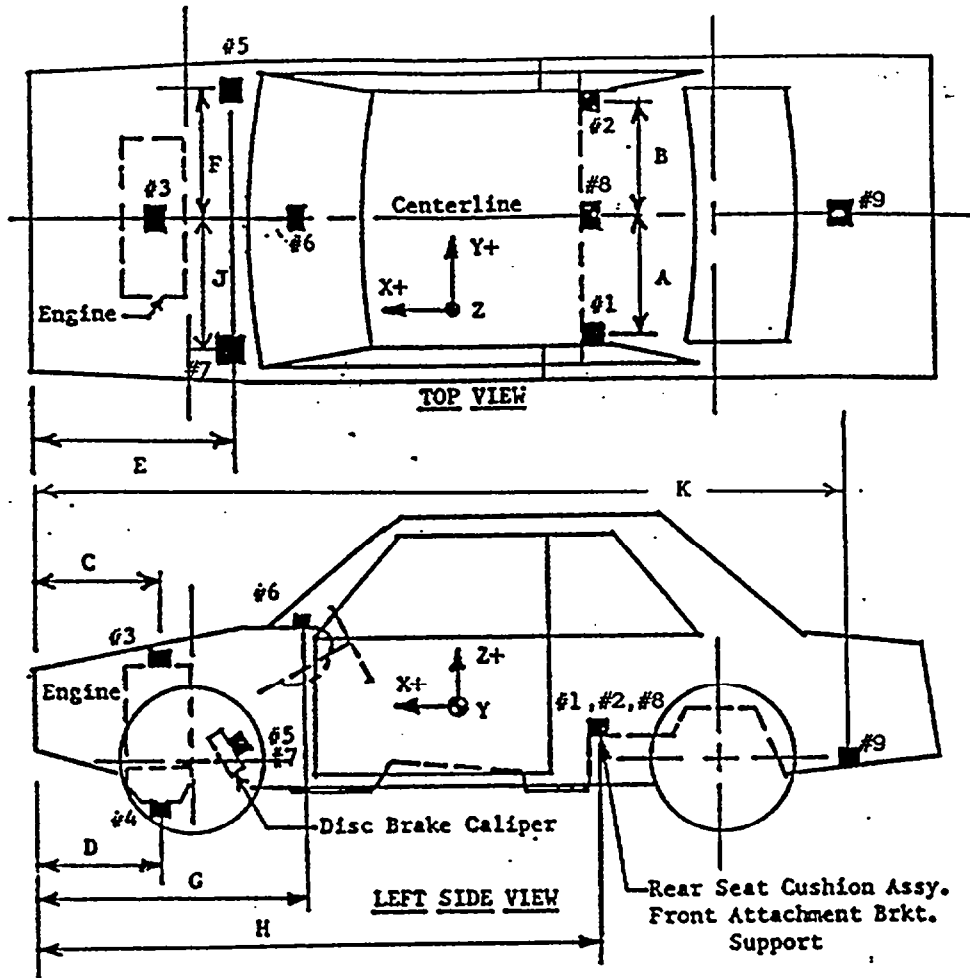
Load Cell 1 = A1 - B3
Load Cell 2 = A4 - B6
Load Cell 3 = A7 - B9

Load Cell 4 = C1 - D3
Load Cell 5 = C4 - D6
Load Cell 6 = C7 - D9

The following data is presented in Appendix B:

- (1) Data from 36 individual load cells
- (2) Total or sum of 36 individual load cells
- (3) Total load vs. vehicle dynamic crush

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

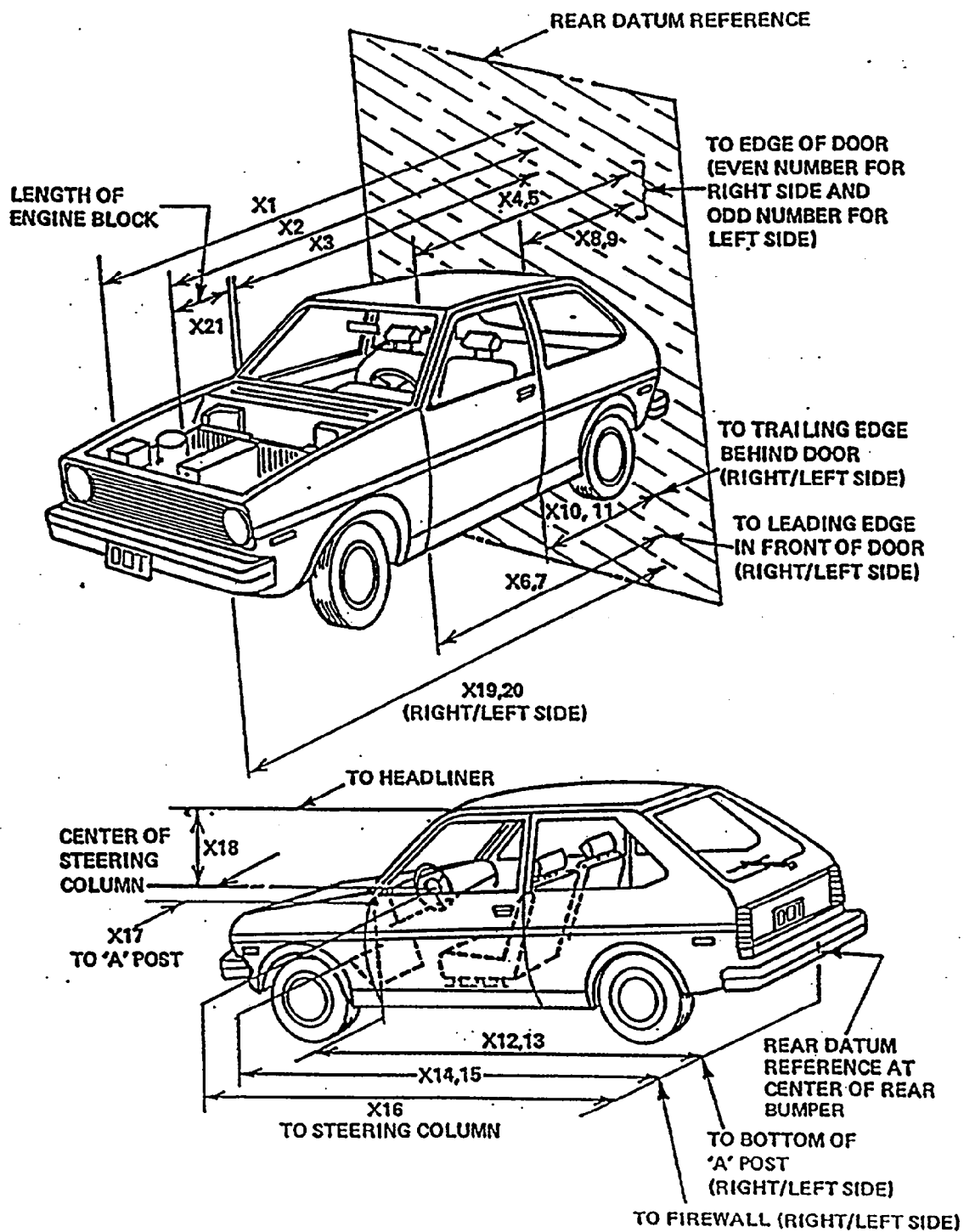


Dimension	Length (in.)
A	20.1
B	20.1
C	23.9
D	29.0
E	27.5
F	25.3
G	44.5
H	144.1
J	25.3
K	160.9

ACCELEROMETER NUMBER *	ACCELEROMETER LOCATION	DIRECTION
1	Left Rear Seat Crossmember	X
2	Right Rear Seat Crossmember	X
3	Top of Engine	X
4	Bottom of Engine	X
5	Right Disc Brake Caliper	X
6	Instrument Panel	X
7	Left Disc Brake Caliper	X
8	Center Rear Crossmember	Z
9	Vehicle Rear	Z

*The accelerometer pack number can be correlated with the vehicle response data traces found in Appendix B.

TEST VEHICLE MEASUREMENTS



TEST VEHICLE MEASUREMENTS

NO.	MEASUREMENT DESCRIPTION:	PRE-TEST (in.)	POST-TEST (in.)	DEFORM. (in.)
X1	Total Length of Test Vehicle at Centerline	169.4	148.3	21.1
X2	Rear Surface of Vehicle to Front of Engine	150.3	141.4	8.9
X3	Rear Surface of Vehicle to Firewall	129.4	125.1	4.3
X4	Rear Surface to Upr. Leading Edge of RT Door	94.4	93.4	1.0
X5	Rear Surface to Upr. Leading Edge of Left Door	94.6	91.9	2.7
X6	Rear Surface to Lwr. Leading Edge of RT Door	118.3	117.9	0.4
X7	Rear Surface to Lwr. Leading Edge of Left Door	118.4	116.6	1.8
X8	Rear Surface to Upr. Trailing Edge of RT Door	74.1	73.3	0.8
X9	Rear Surface to Upr. Trailing Edge of LFT Door	74.7	72.0	2.7
X10	Rear Surface to Lwr. Trailing Edge of RT Door	78.6	78.7	- 0.1
X11	Rear Surface to Lwr. Trailing Edge of LFT Door	79.3	77.5	1.8
X12	Rear Surface to Bottom of "A" Post on RT Side	118.0	N/A	N/A
X13	Rear Surface to Bottom of "A" Post on LFT Side	118.4	116.8	1.6
X14	Rear Surface to Firewall on Right Side	128.9	126.6	2.3
X15	Rear Surface to Firewall on Left Side	128.6	125.8	2.8
X16	Rear Surface to Steering Column	101.8	98.0	3.8
X17	Center of Steering Column to "A" Post	15.1	17.3	- 2.2
X18	Center of Steering Column to Headlining	17.5	20.6	- 3.1
X19	Rear Surface to Right Side of Front Bumper	164.3	146.8	17.5
X20	Rear Surface to Left Side of Front Bumper	164.0	145.9	18.1
X21	Length of Engine Block	15.8	15.8	0

ACCIDENT INVESTIGATION DIVISION DATA

FOR 35 MPH FRONTAL BARRIER IMPACT

VEHICLE MAKE/MODEL/BODY STYLE: 1991 Honda Civic DX 4 Door Sedan

VEH. NHTSA NO.: MM5301 ; VIN: IHGED364ML008684

MODEL YEAR: 1991 ; BUILD DATE: 10/90 ; TEST DATE: 12/20/90

VEH. SIZE CATEGORY: Medium car ; TEST WEIGHT: 2743 lbs.

VEH. WHEELBASE: 98.4in; FRONT OVERHANG: 31.2 in. ; OVERALL WIDTH: 58 in.

ACCELEROMETER DATA:

LOCATION: As per measurements on page 4-13

CALIBRATION PROCEDURE: As per MGA Calibration Procedure

LINEARITY: >99.9% ; INTEGRATION ALGORITHM: Trapezoidal

VEH. IMPACT SPEED: 35.0 mph ; TIME OF SEPARATION: 0.157 sec.

VELOCITY CHANGE: 41 mph

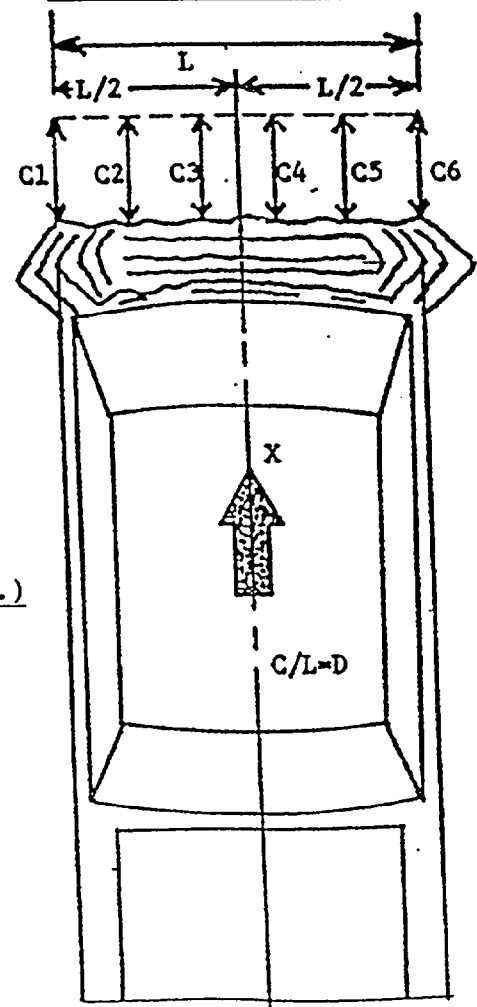
COLLISION DEFORMATION CLASSIFICATION (CDC) CODE:

F (Frontal)

CRUSH DEPTH	C1 =	<u>18.1</u>	<u>inches</u>
DIMENSIONS:	C2 =	<u>18.5</u>	<u>inches</u>
	C3 =	<u>19.8</u>	<u>inches</u>
	C4 =	<u>19.7</u>	<u>inches</u>
	C5 =	<u>18.3</u>	<u>inches</u>
	C6 =	<u>17.5</u>	<u>inches</u>

MIDPOINT OF DAMAGE: D = Vehicle Centerline (Longitud.)

LENGTH OF DAMAGED REGION: L = 58 inches



APPENDIX A
PHOTOGRAPHS

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Photo No. 6 - Post-Test Right Side View	A-6
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Photo No. 8 - Post-Test Right Front Three-Quarter View	A-8
Photo No. 9 - Pre-Test Left Rear Three-Quarter View	A-9
Photo No. 10 - Post-Test Left Rear Three-Quarter View	A-10
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Photo No. 13 - Post-Test Windshield View	A-13
Photo No. 14 - Pre-Test Engine Compartment View	A-14
Photo No. 15 - Post-Test Engine Compartment View	A-15
Photo No. 16 - Pre-Test Fuel Filler Cap View	A-16
Photo No. 17 - Pre-Test Front Underbody View	A-17
Photo No. 18 - Post-Test Front Underbody View	A-18
Photo No. 19 - Pre-Test Rear Underbody View	A-19
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Photo No. 26 - Pre-Test Driver Dummy & Vehicle Interior View (Door Open)	A-26
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Photo No. 29 - Post-Test Passenger Dummy & Vehicle Interior View (Door Open)	A-29
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Photo No. 32 - Post-Test Steering Column Hub/Rim Contact By Dummy Driver	A-32
Photo No. 33 - Post-Test Passenger Dummy Head/Knee Contact	A-33
Photo No. 34 - Post-Test Passenger Dummy Head/IP Contact Area	A-34

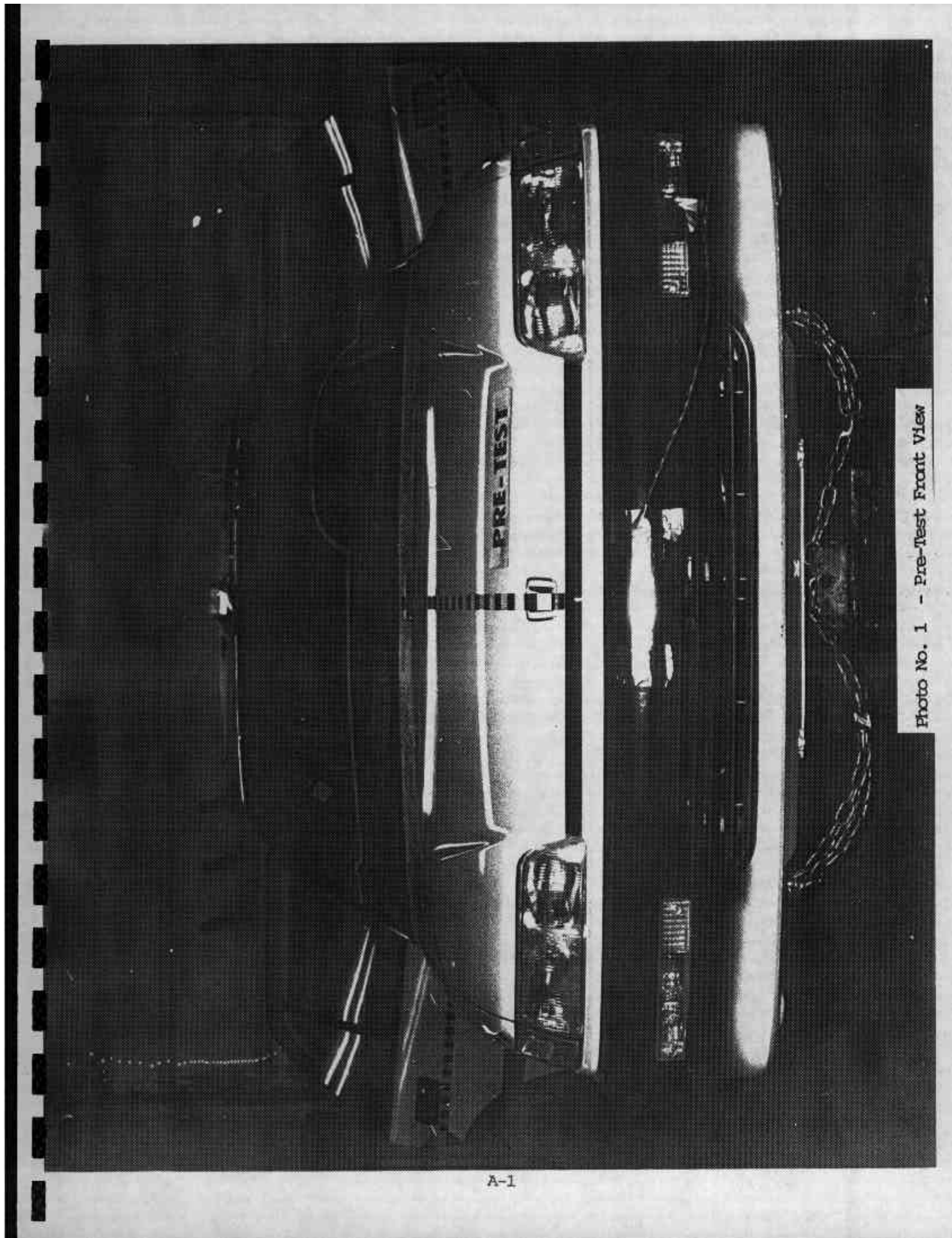


Photo No. 1 - Pre-Test Front View

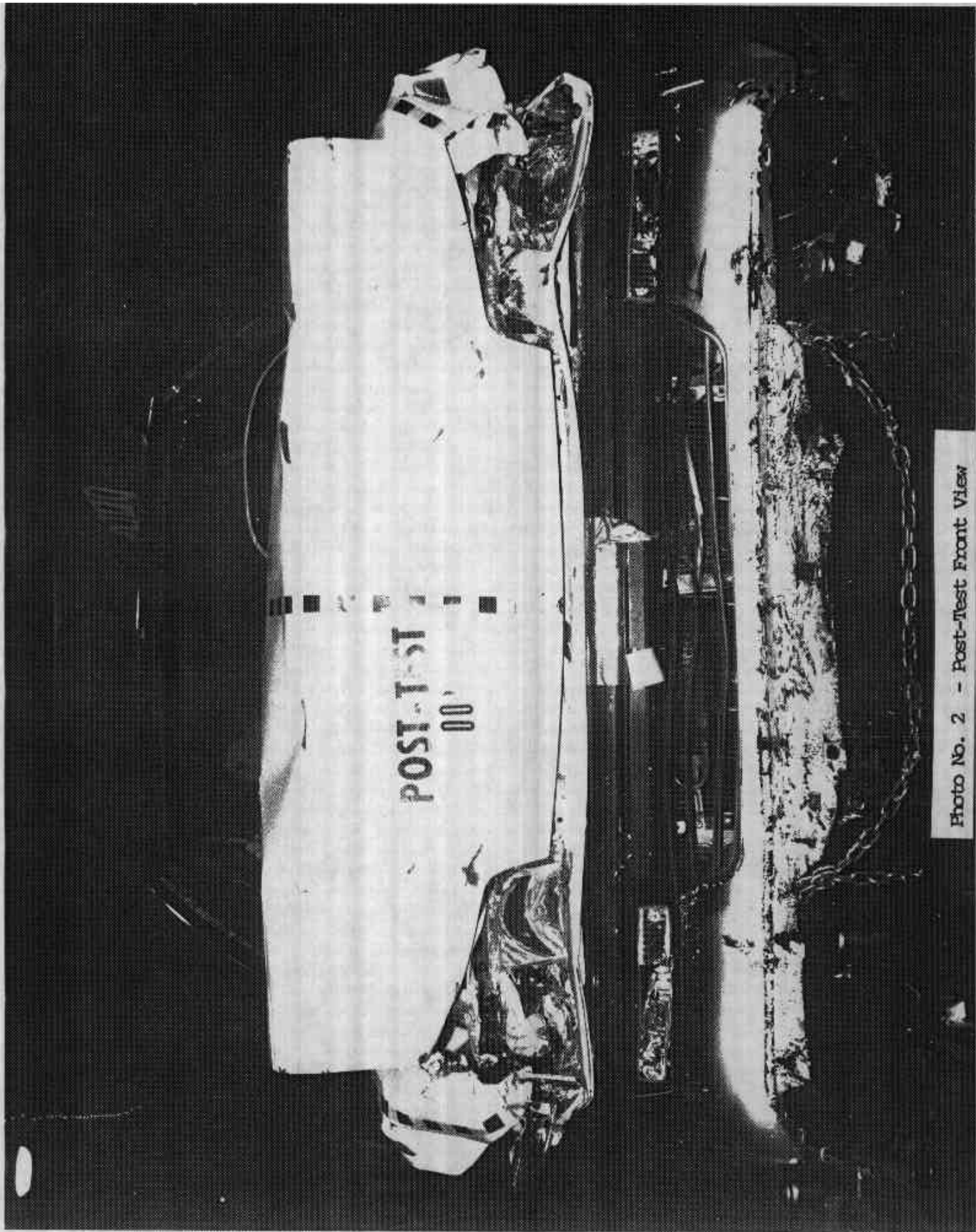


Photo No. 2 - Post-Test Front View

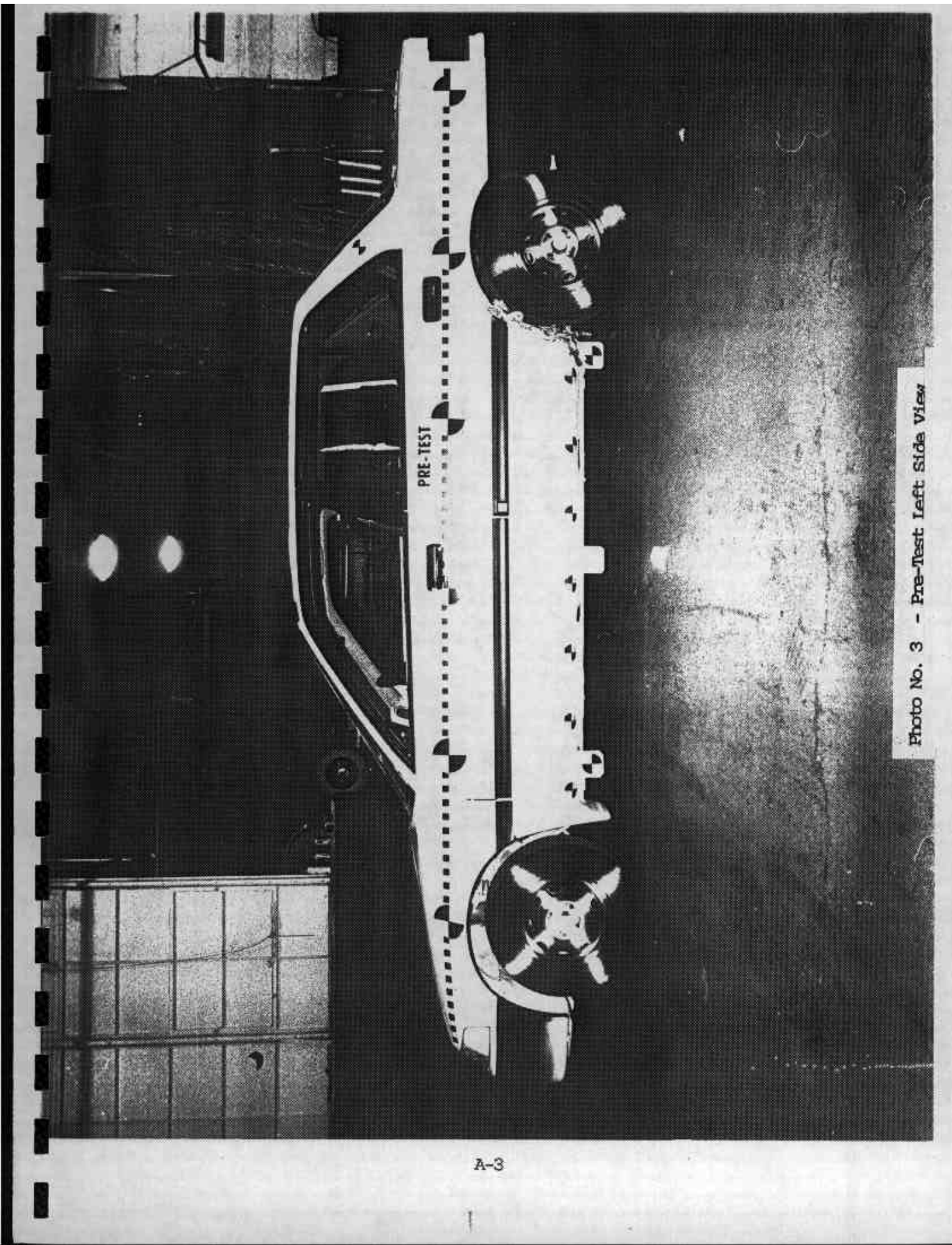
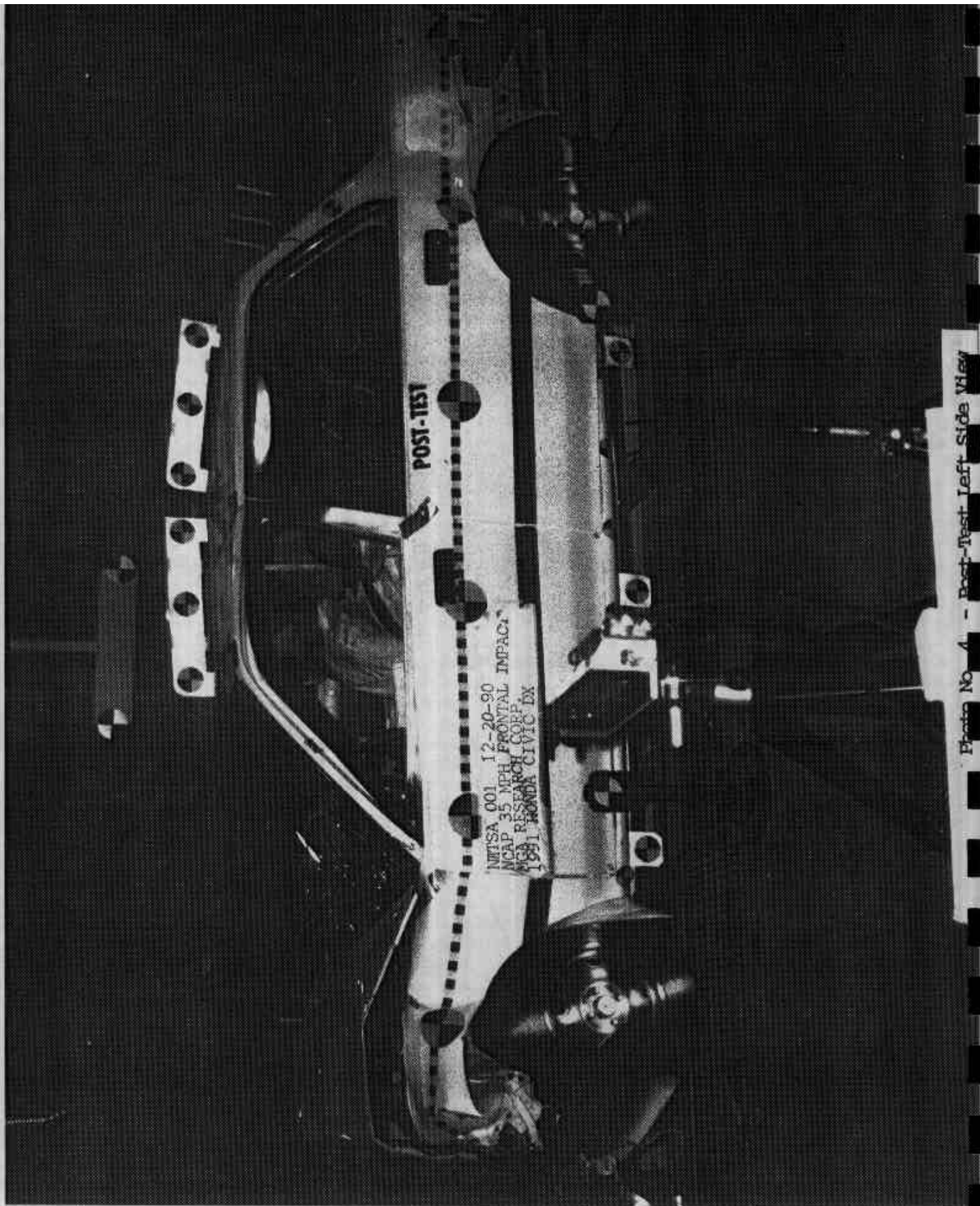


Photo No. 3 - Pre-Test Left Side View



A-4

Photo No. 4 - Post-Test Left Side View

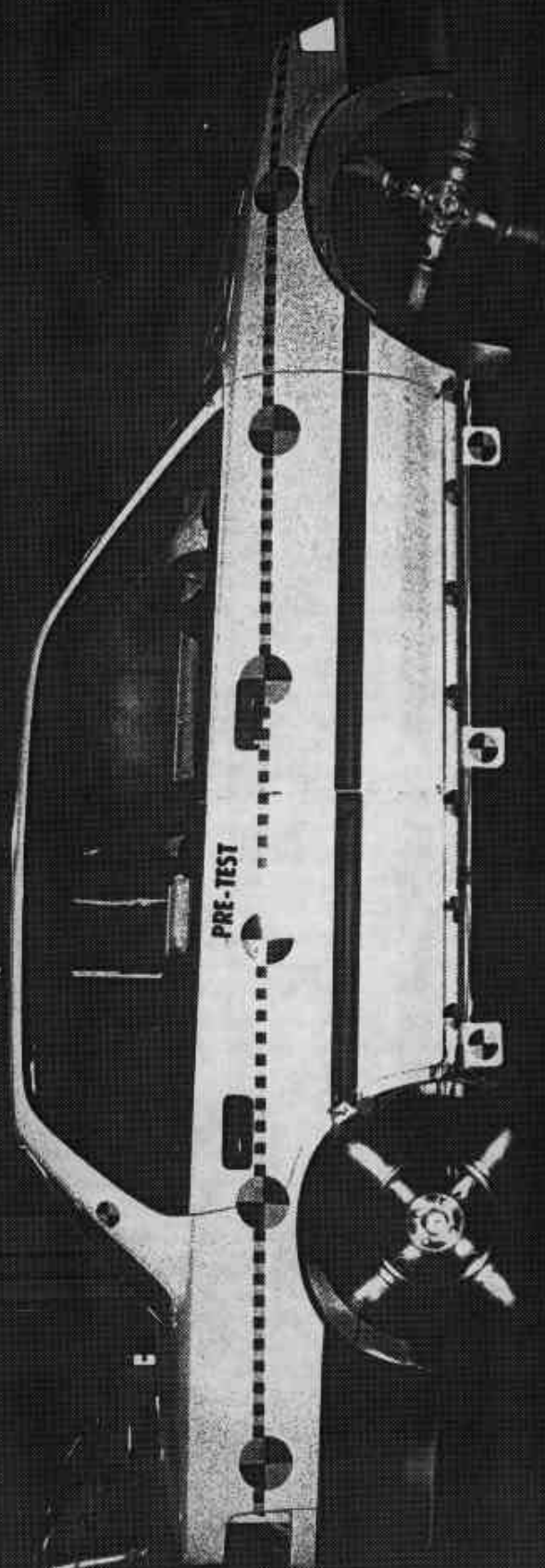


Photo No. 5 - Pre-Test Right Side View

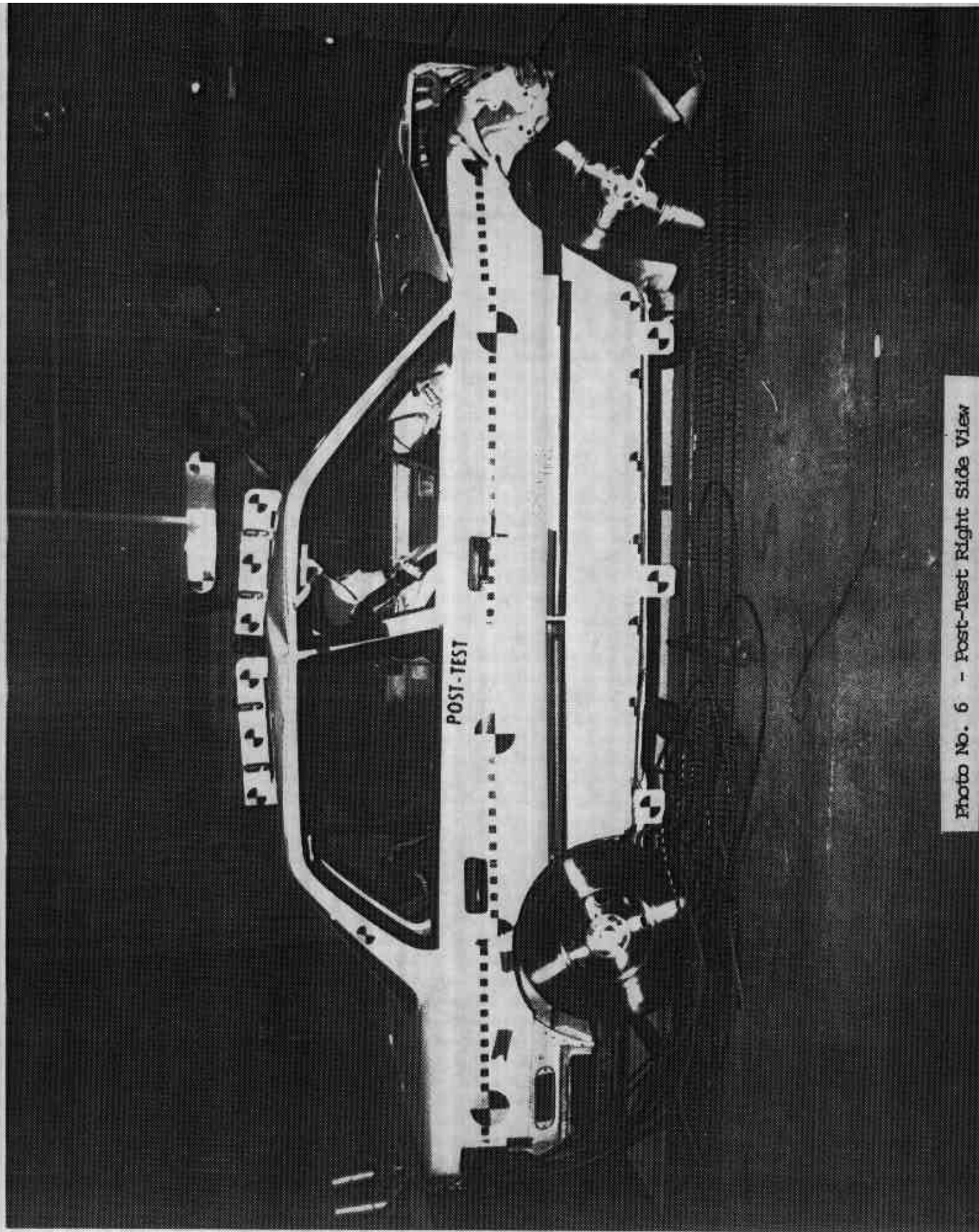


Photo No. 6 - Post-Test Right Side View

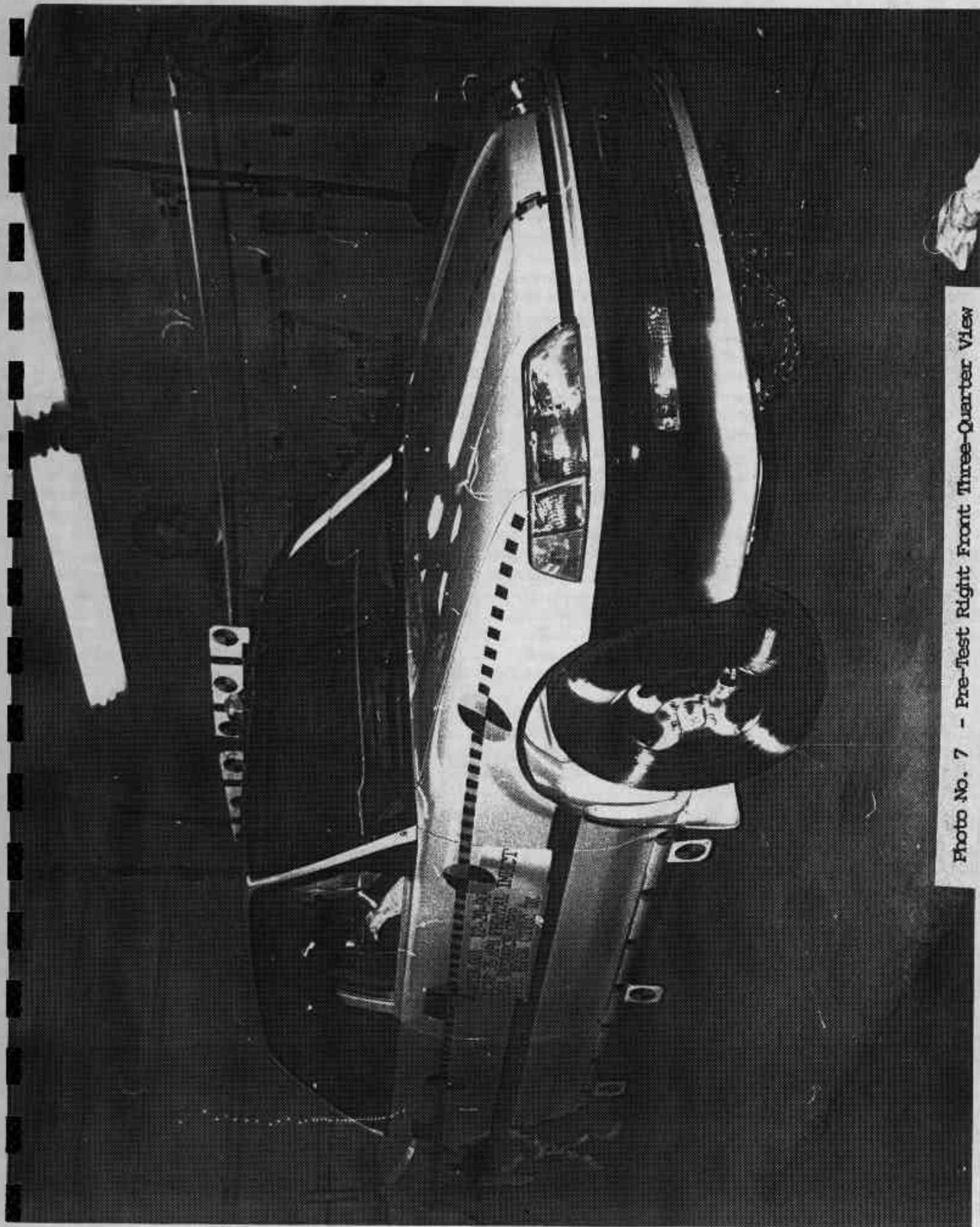


Photo No. 7 - Pre-Test Right Front Three-Quarter View

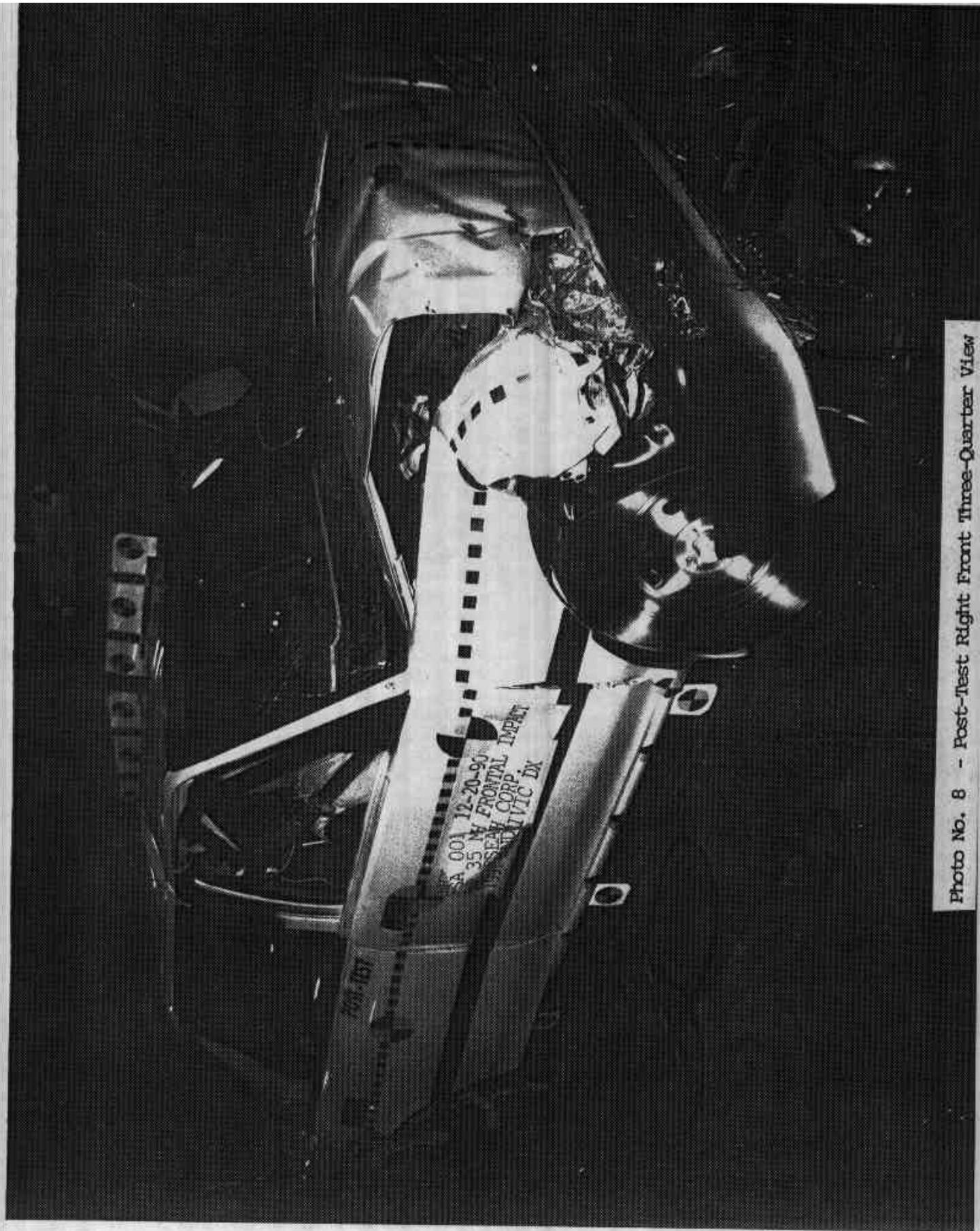


Photo No. 8 - Post-Test Right Front Three-Quarter View

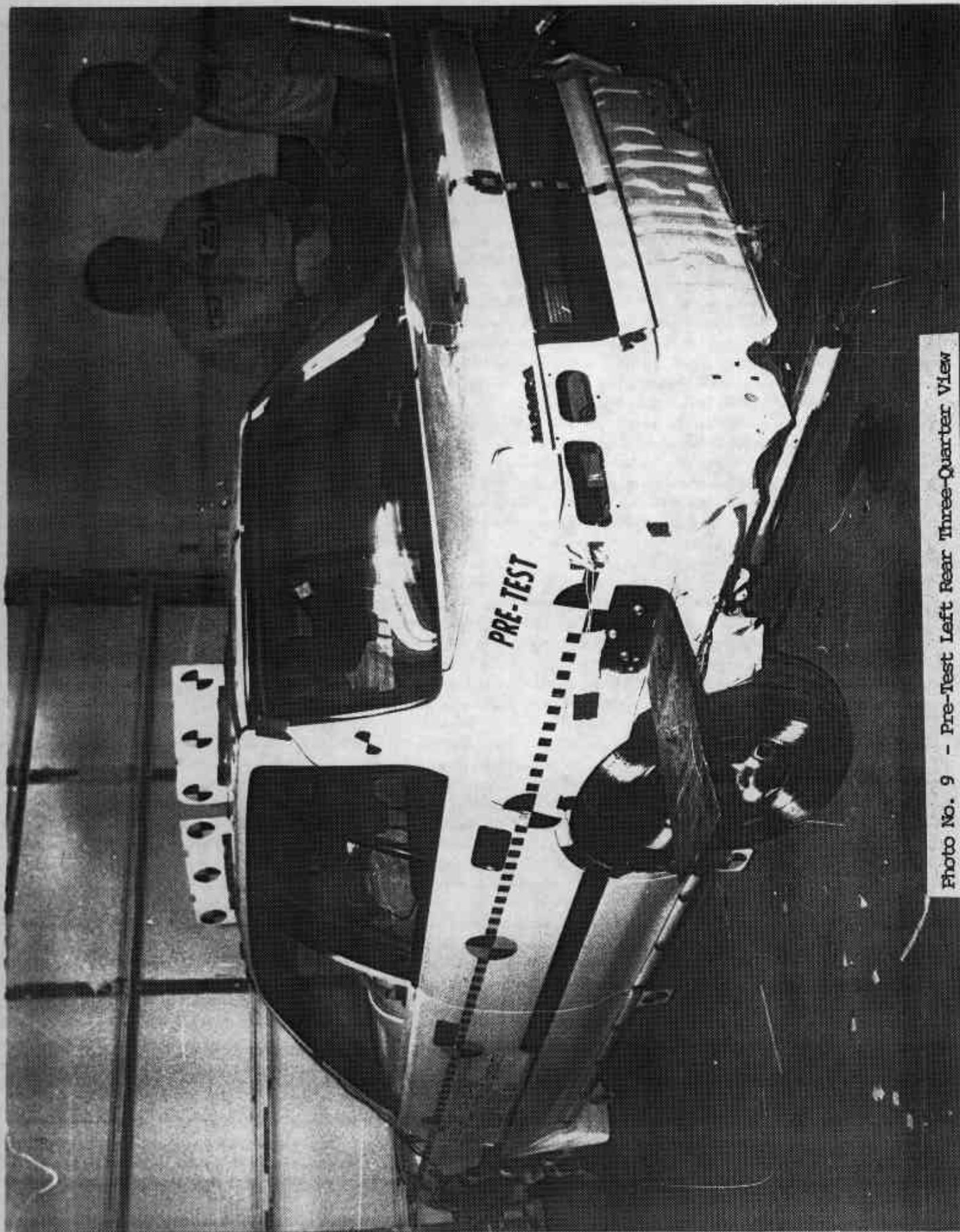
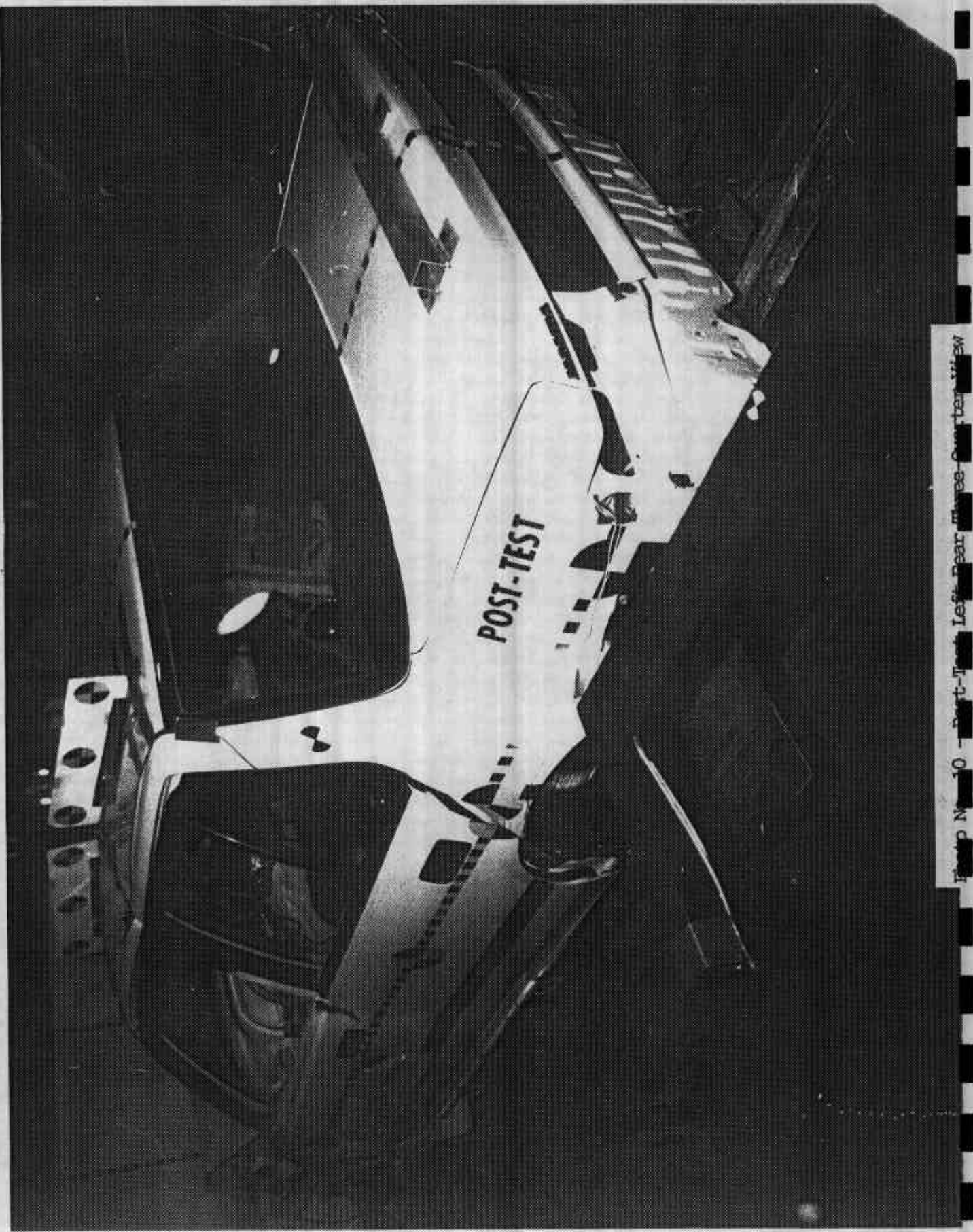


Photo No. 9 - Pre-Test Left Rear Three-Quarter View



A-10

Photo No. 10 - Post-Test Left Rear Three-Quarter View

PHOTOGRAPH NOT APPLICABLE
(ROLLOVER NOT PERFORMED)

Photo No. 11 - Post-Test Top View (Vehicle on Rollover Machine)

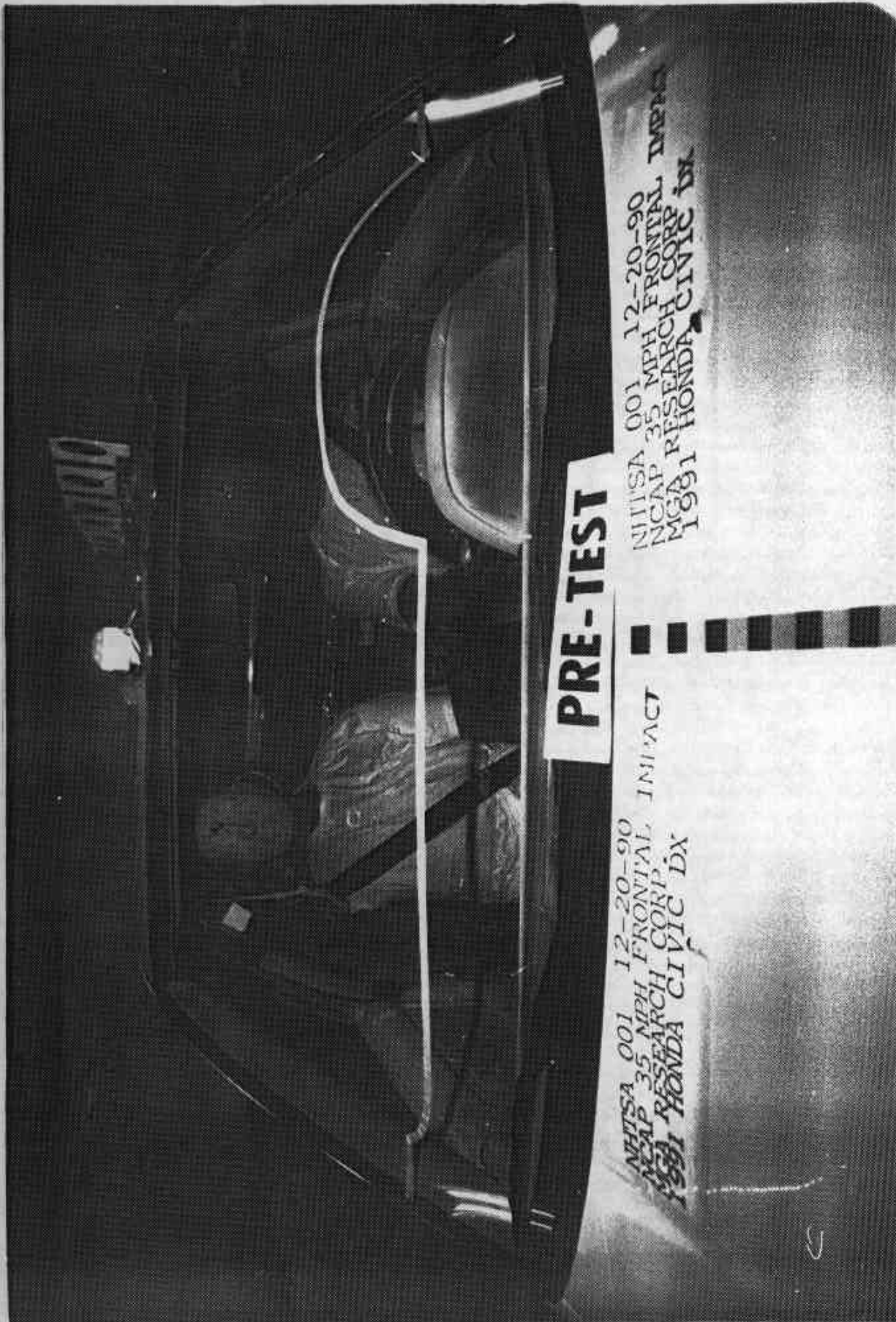




Photo No. 13 - Post-Test Windshield View

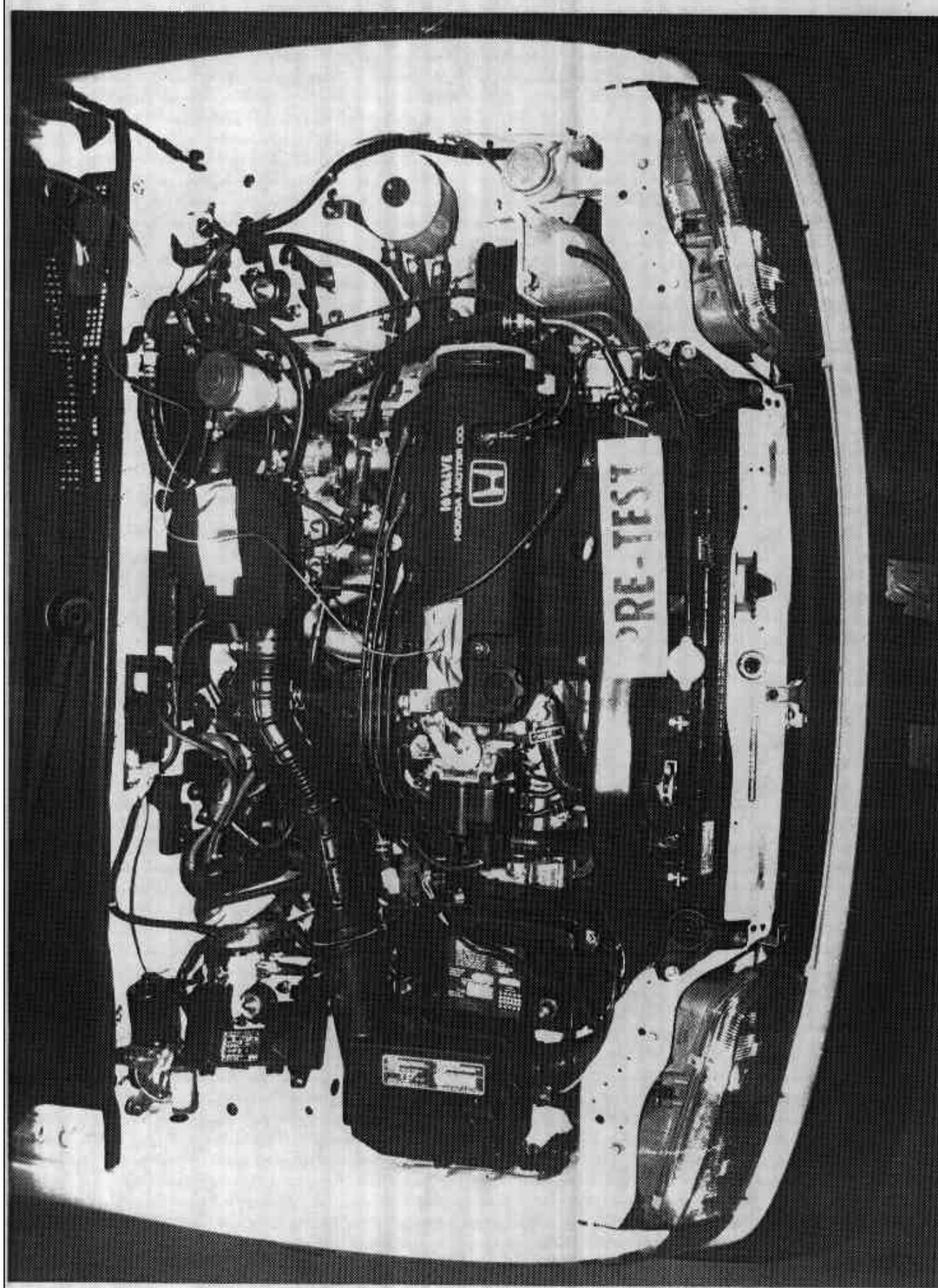


Photo No. 14 - Pre-Test Engine Compartment View

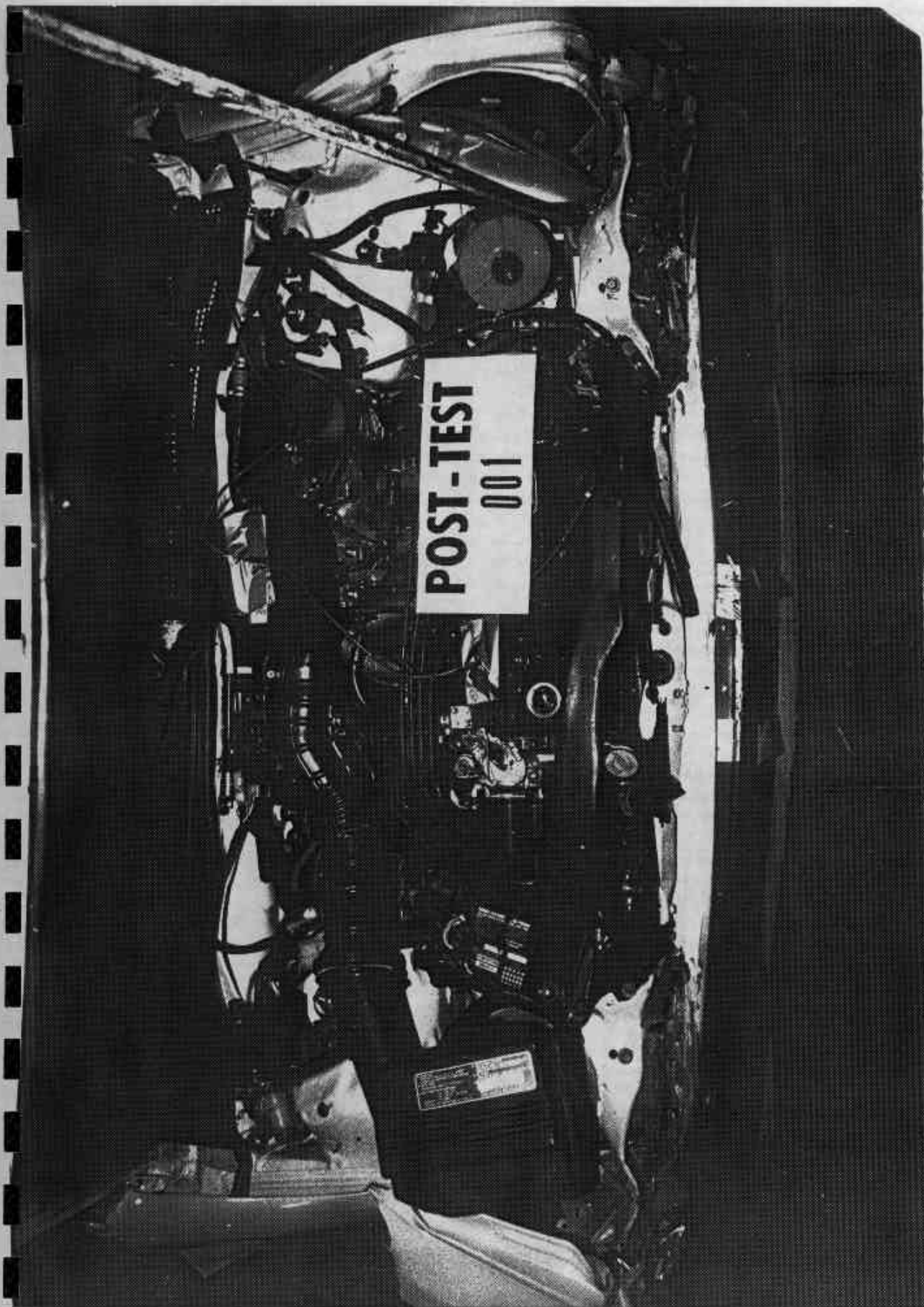


Photo No. 15 - Post-Test Engine Compartment View

PRE-TEST

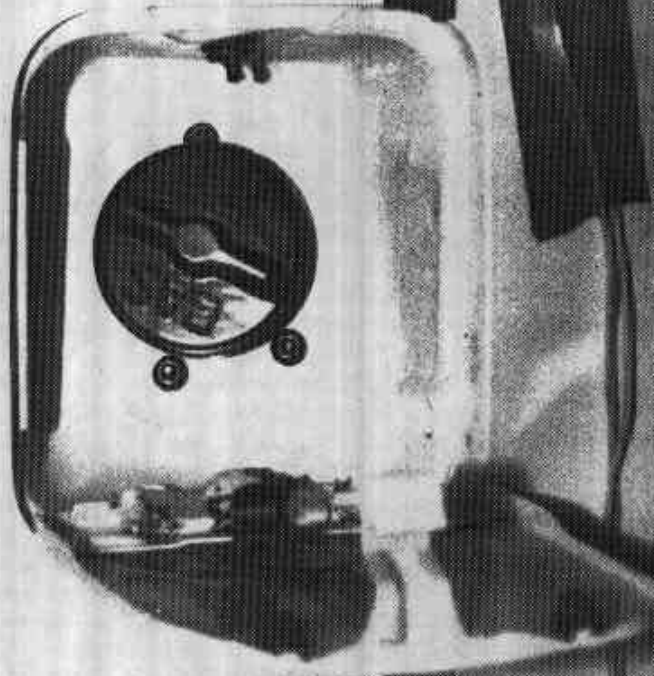
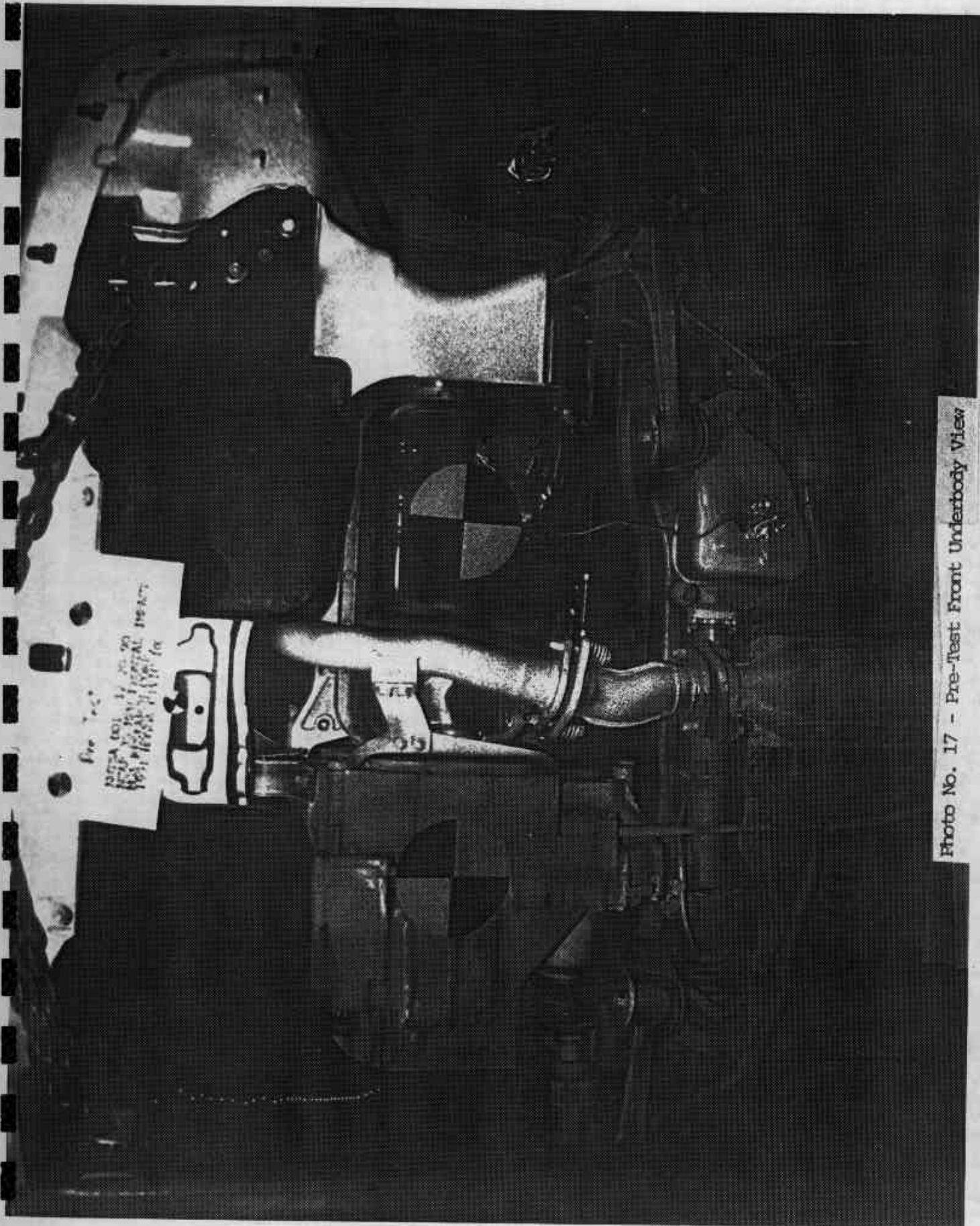


Photo No. 16 - Pre-Test Fuel Filler Cap View



Pre-Test
DATA COL. 14 JUL 68
FUEL INJECTOR
FUEL INJECTOR
FUEL INJECTOR

Photo No. 17 - Pre-Test Front Underbody View

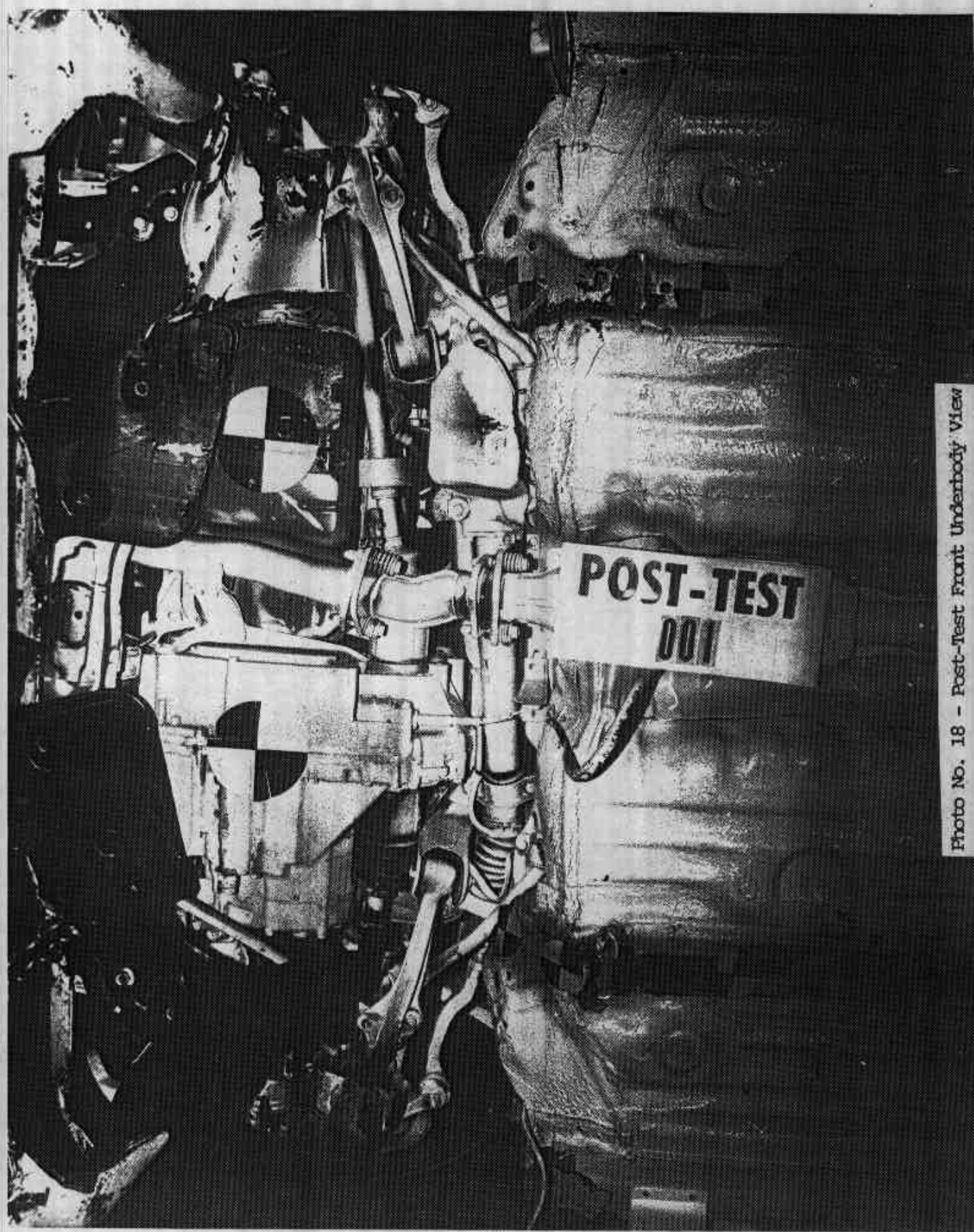


Photo No. 18 - Post-Test Front Underbody View



Photo No. 19 - Pre-Test Rear Underbody View

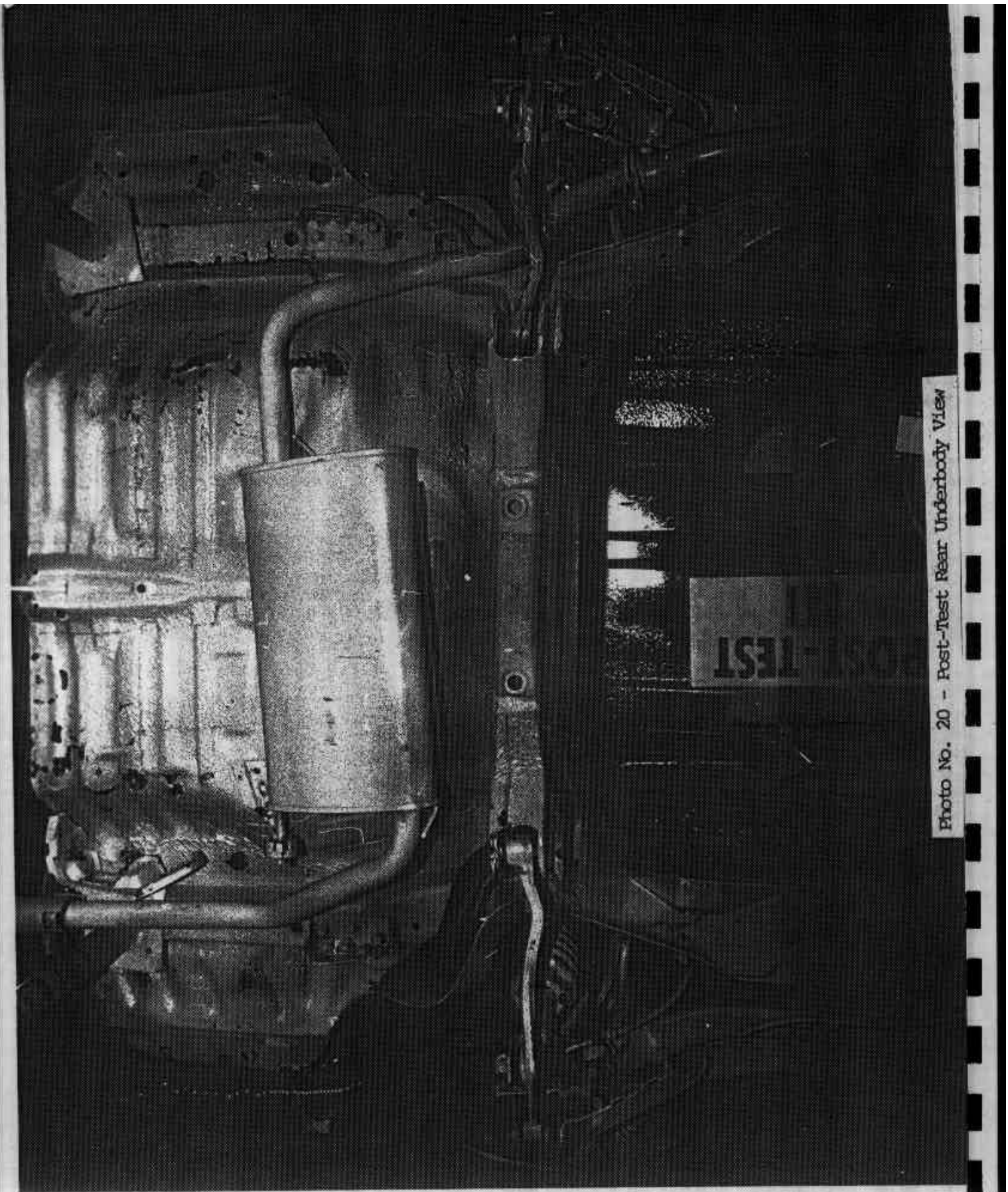
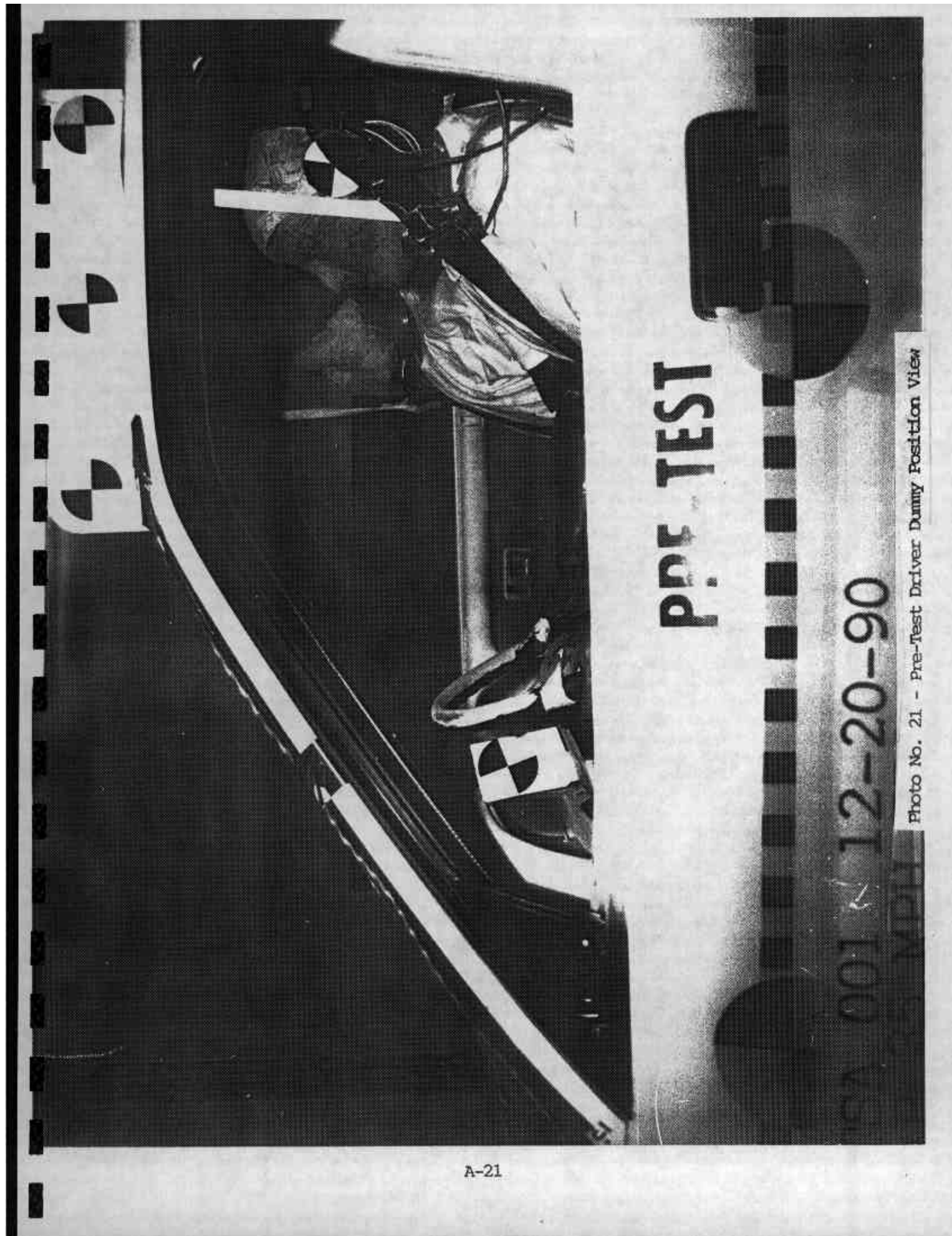


Photo No. 20 - Post-Test Rear Underbody View



PPF TEST

001 12-20-90

MPH

Photo No. 21 - Pre-Test Driver Dummy Position View



POST-TEST

12-20-90

35 MPH FRONTAL IMPACT

RESEARCH CORP.

FLORIDA

Photo No. 22 - Post-Test Driver Dummy Position View



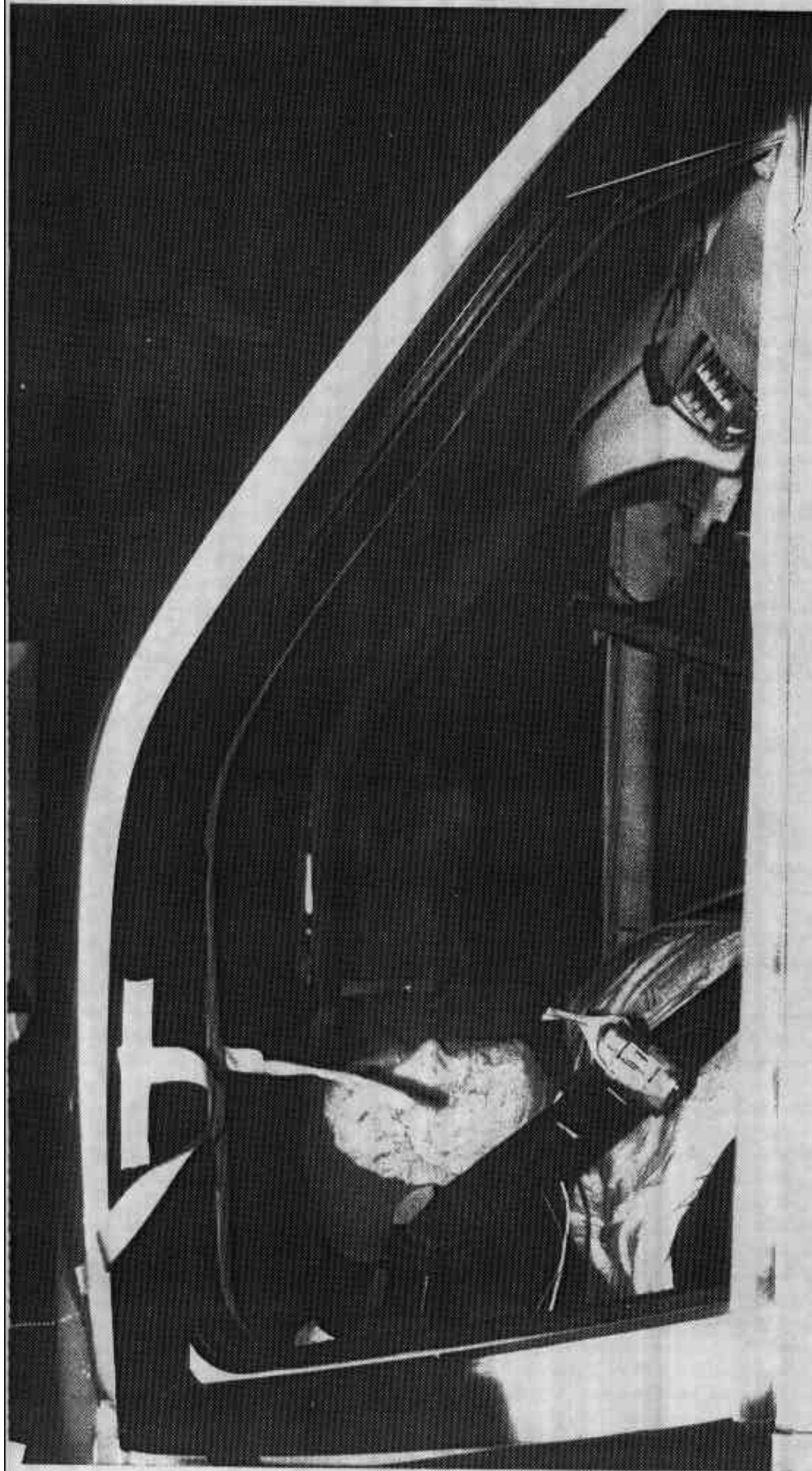
PPE-TEST

NHTSA 001

12-20-9

FRONT

Photo No. 23 - Pre-Test Passenger Dummy Position View



POST-TEST

NHTSA

001

12-20-0

Photo No. 24 - Post-Test Passenger Dummy Position View

PHOTOGRAPH NOT APPLICABLE
(NO SOLVENT SPILLAGE)

Photo No. 25 - Solvent Spillage Location View (if required)

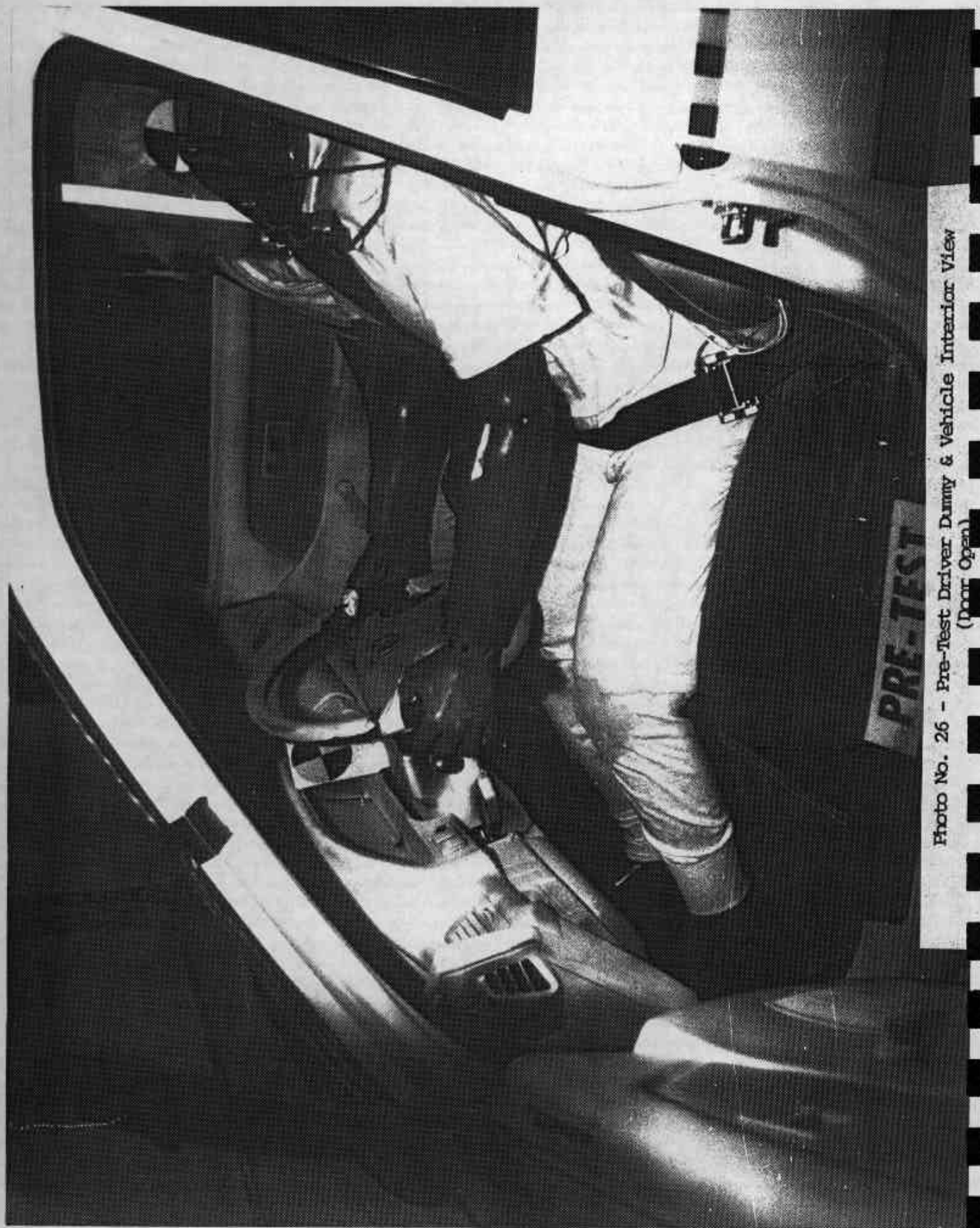


Photo No. 26 - Pre-Test Driver Dummy & Vehicle Interior View
(Door Open)

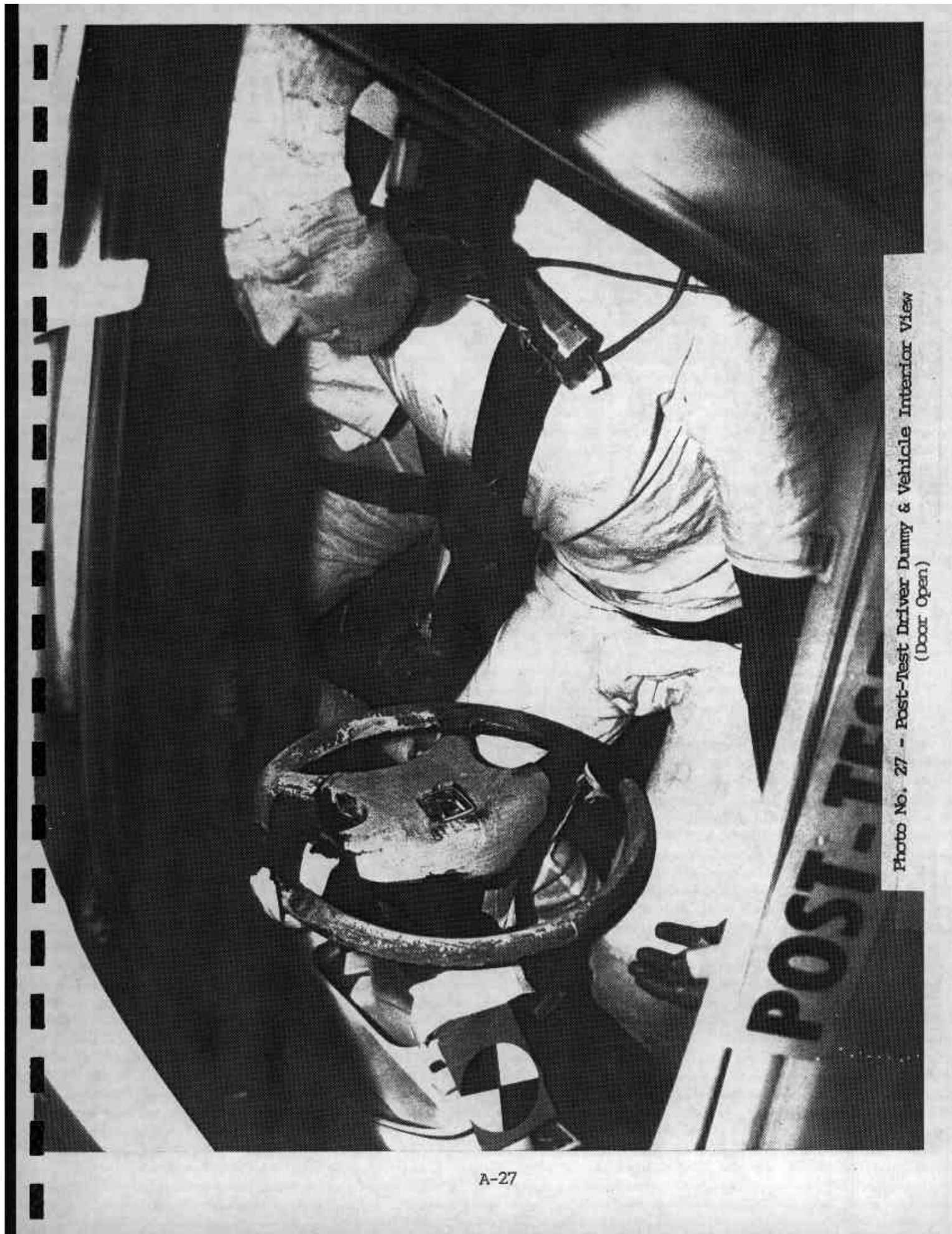


Photo No. 27 - Post-Test Driver Dummy & Vehicle Interior View
(Door Open)

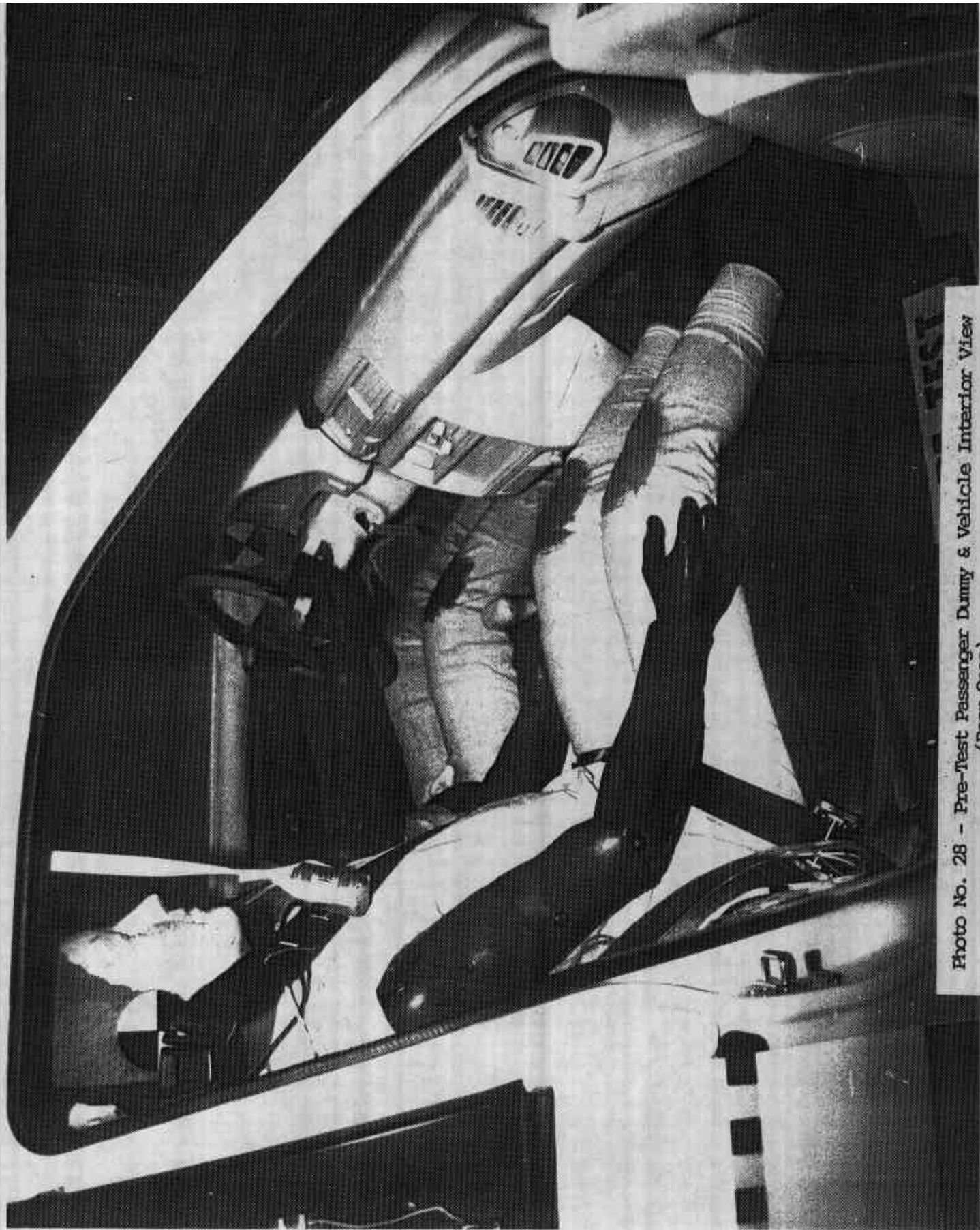


Photo No. 28 - Pre-Test Passenger Dummy & Vehicle Interior View
(Door Open)

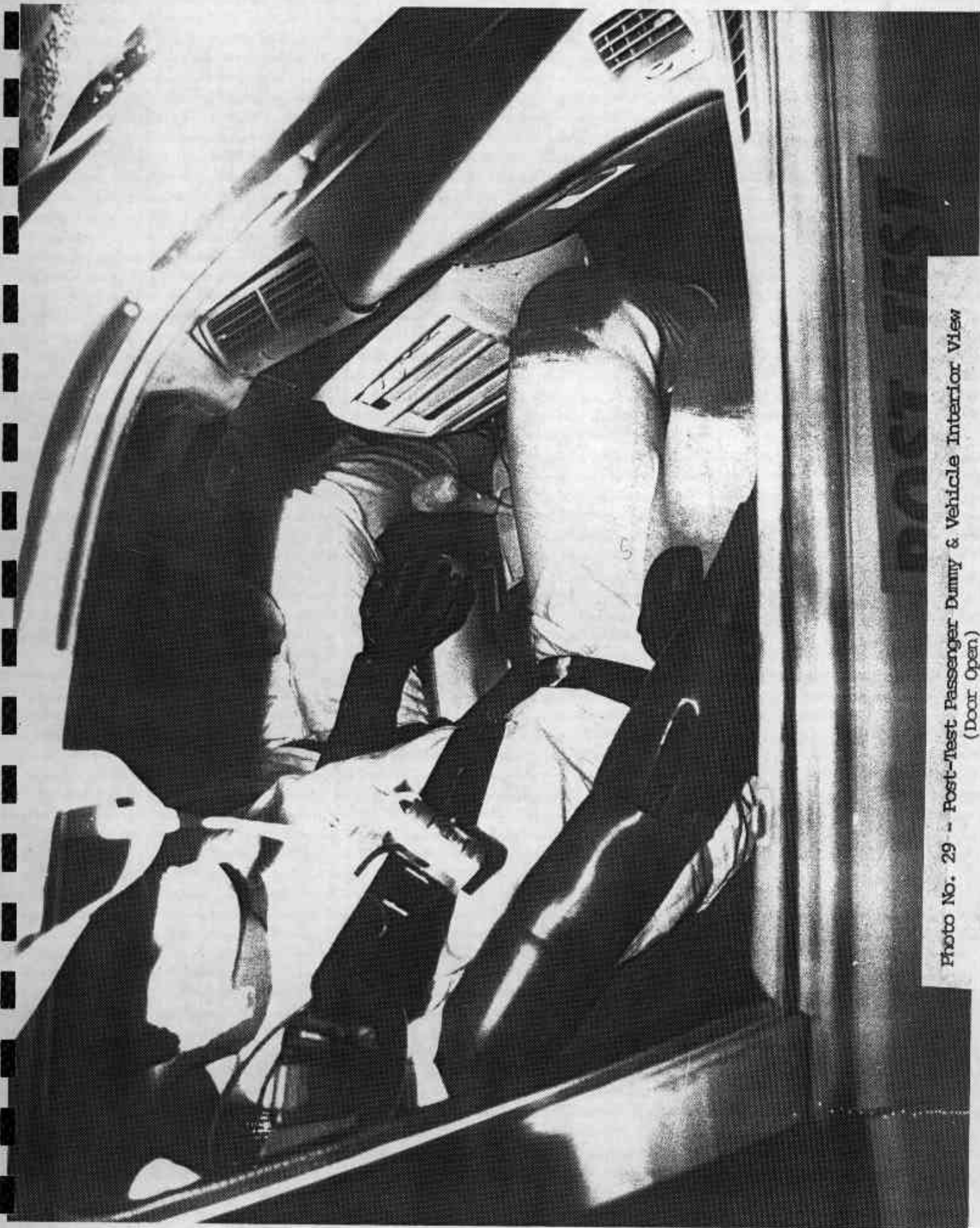


Photo No. 29 - Post-Test Passenger Dummy & Vehicle Interior View
(Door Open)

PHOTOGRAPH NOT APPLICABLE
(NO RESTRAINT PROBLEM)

Photo No. 30 - Restraint System Problem Area View (if required)

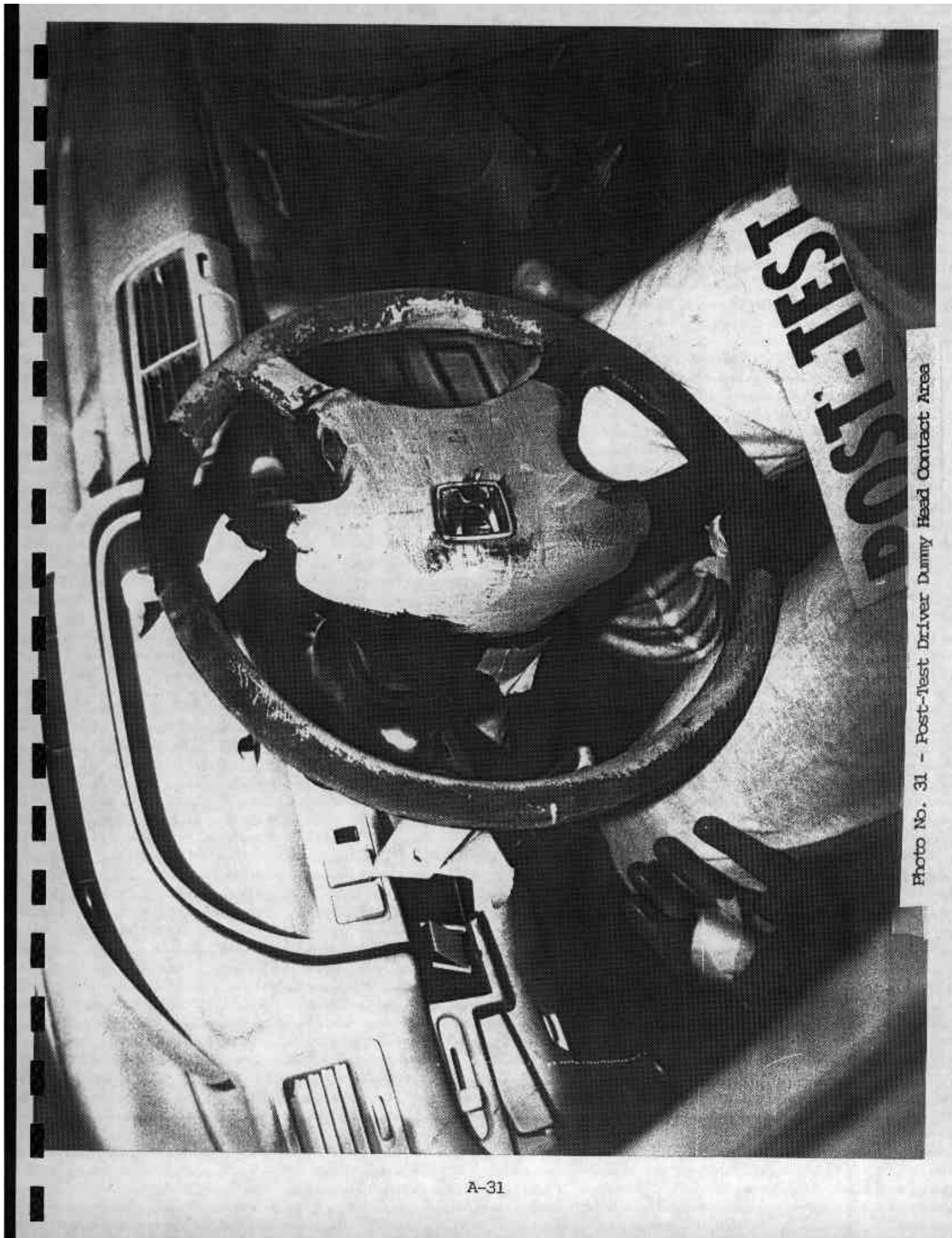


Photo No. 31 - Post-Test Driver Dummy Head Contact Area

SEE PHOTOGRAPH NO. 31

Photo No. 32 - Post-Test Steering Column Hub/Rim Contact
By Dummy Driver

PHOTOGRAPH NOT APPLICABLE
(NO PASSENGER HEAD/KNEE CONTACT)

Photo No. 33 - Post-Test Passenger Dummy Head/Knee Contact

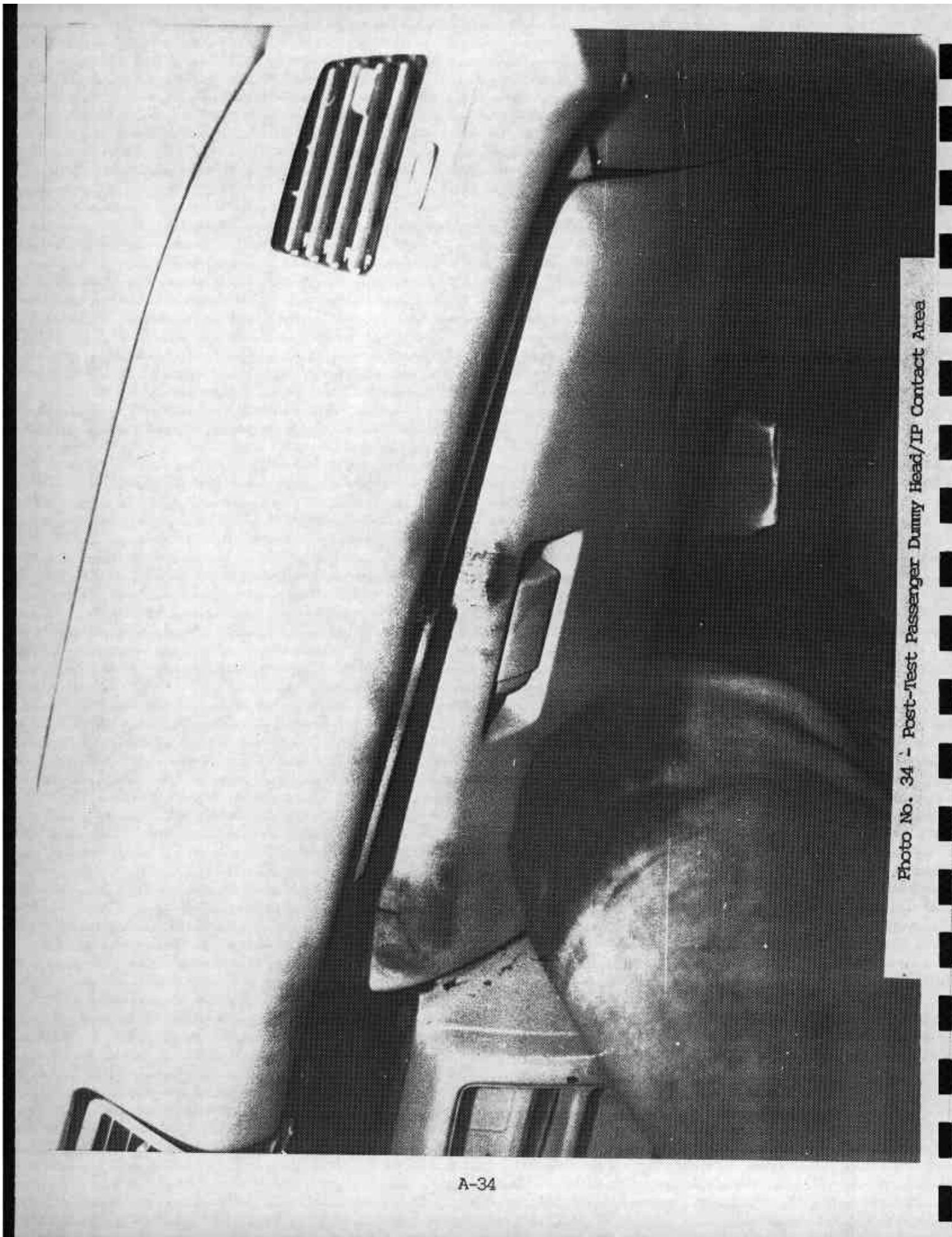


Photo No. 34 - Post-Test Passenger Dummy Head/IP Contact Area

APPENDIX B

VEHICLE, LOAD CELL BARRIER AND DUMMY RESPONSE DATA

1991 HONDA CIVIC DX
NHTSA NO. MM5301

VEHICLE DATA	FILTER CHANNEL CLASS
Accelerations	60
Velocities	180
Displacements	180

<u>Data Plot</u>	<u>Page No.</u>
Right Rear Seat Cross-member X Acceleration vs. Time	B-4
Right Rear Seat Cross-member X Velocity vs. Time	B-5
Right Rear Seat Cross-member X Displacement vs. Time	B-6
Left Rear Seat Cross-member X Acceleration vs. Time	B-7
Left Rear Seat Cross-member X Velocity vs. Time	B-8
Left Rear Seat Cross-member X Displacement vs. Time	B-9
Top of Engine Block X Acceleration vs. Time	B-10
Bottom of Engine Block X Acceleration vs. Time	B-11
Right Front Disc Brake Caliper X Acceleration vs. Time	B-12
Left Front Disc Brake Caliper X Acceleration vs. Time	B-13
Center of Instrument Panel Top Surface X Acceleration vs. Time	B-14
Center Rear Seat Cross-member Z Acceleration vs. Time	B-15
Center Rear Seat Cross-member Z Velocity vs. Time	B-16
Center Rear Seat Cross-member Z Displacement vs. Time	B-17
Vehicle Rear Z Acceleration vs. Time	B-18
Vehicle Rear Z Velocity vs. Time	B-19
Vehicle Rear Z Displacement vs. Time	B-20

1991 HONDA CIVIC DX
NHTSA NO. MM5301

DATA FILE MINIMUMS AND MAXIMUMS

DESCRIPTION	MINIMUM		MAXIMUM	
Crossmember RH X Acc.	Not Available - No Valid Data Collected			
Crossmember RH X Vel.	Not Available - No Valid Data Collected			
Crossmember RH X Disp.	Not Available - No Valid Data Collected			
Crossmember LH X Acc.	-32.2 @	0.04982	4.3 @	0.11993
Crossmember LH X Vel.	-7.6 @	0.21168	35.0 @	0.00000
Crossmember LH X Disp.	0.0 @	0.00000	27.1 @	0.07786
Engine Upper X Acc.	-124.2 @	0.02964	46.8 @	0.03899
Engine Lower X Acc.	-165.8 @	0.02681	35.8 @	0.03653
Caliper RH X Acc.	-115.5 @	0.03075	55.8 @	0.04576
Caliper LH X Acc.	-75.2 @	0.03702	41.0 @	0.06630
Dash Panel X Acc.	Not Available - No Valid Data Collected			
Crossmember CTR Z Acc.	Not Available - No Valid Data Collected			
Crossmember CTR Z Acc.	Not Available - No Valid Data Collected			
Crossmember CTR Z Acc.	Not Available - No Valid Data Collected			
Rear Vehicle Z Acc.	-9.2 @	0.02915	10.2 @	0.10160
Rear Vehicle Z Vel.	-0.2 @	0.04895	5.3 @	0.11648
Rear Vehicle Z Disp.	0.0 @	0.00000	10.1 @	0.21513

DATA PLOT NOT AVAILABLE

NO VALID DATA COLLECTED

Right Rear Seat Cross-member X Acceleration vs. Time

DATA PLOT NOT AVAILABLE

NO VALID DATA COLLECTED

Right Rear Seat Cross-member X Velocity vs. Time

DATA PLOT NOT AVAILABLE

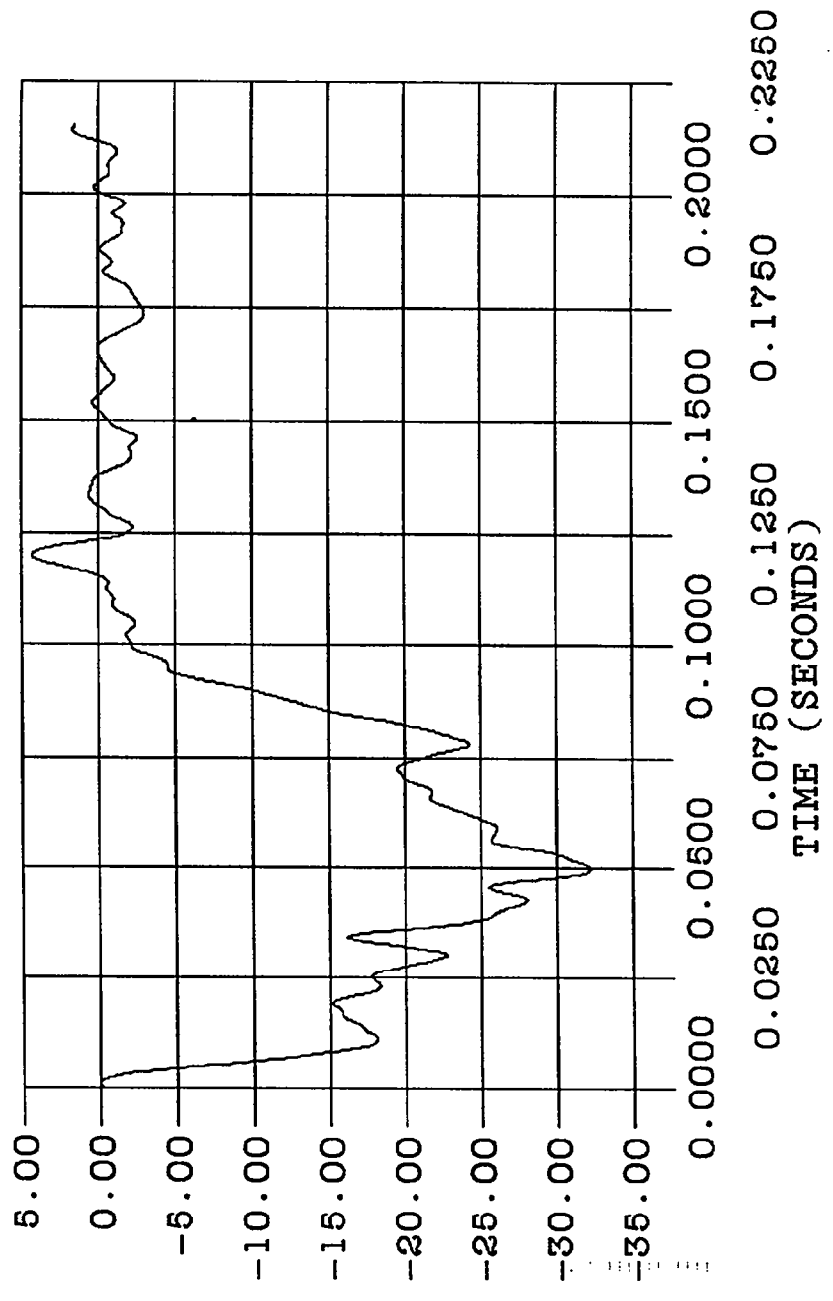
NO VALID DATA COLLECTED

Right Rear Seat Cross-member X Displacement vs. Time

ACCELERATION (G, S)

B-7

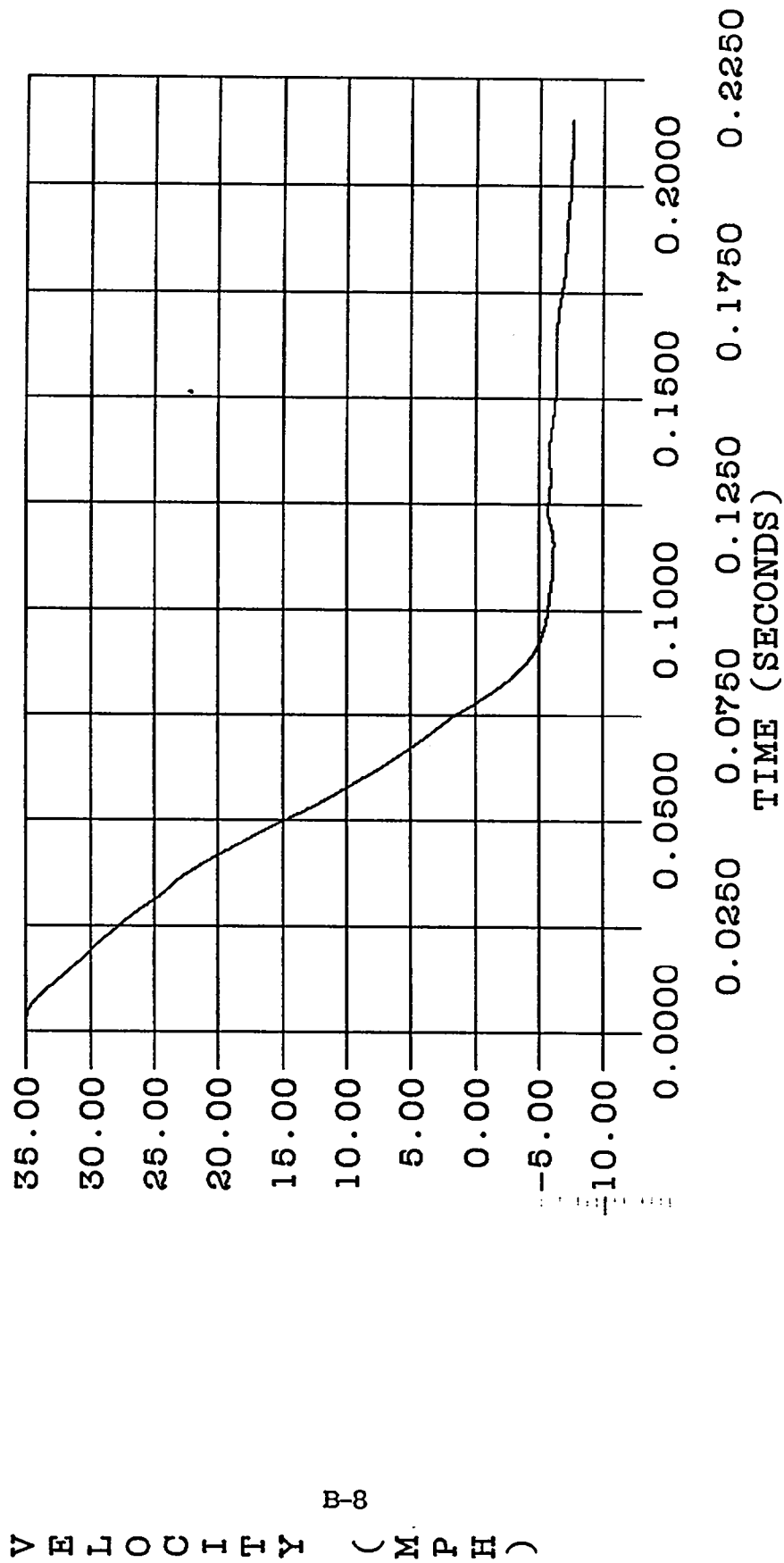
1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91
CROSSMEM LH X ACC



Left Rear Seat Cross-member X Acceleration vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91

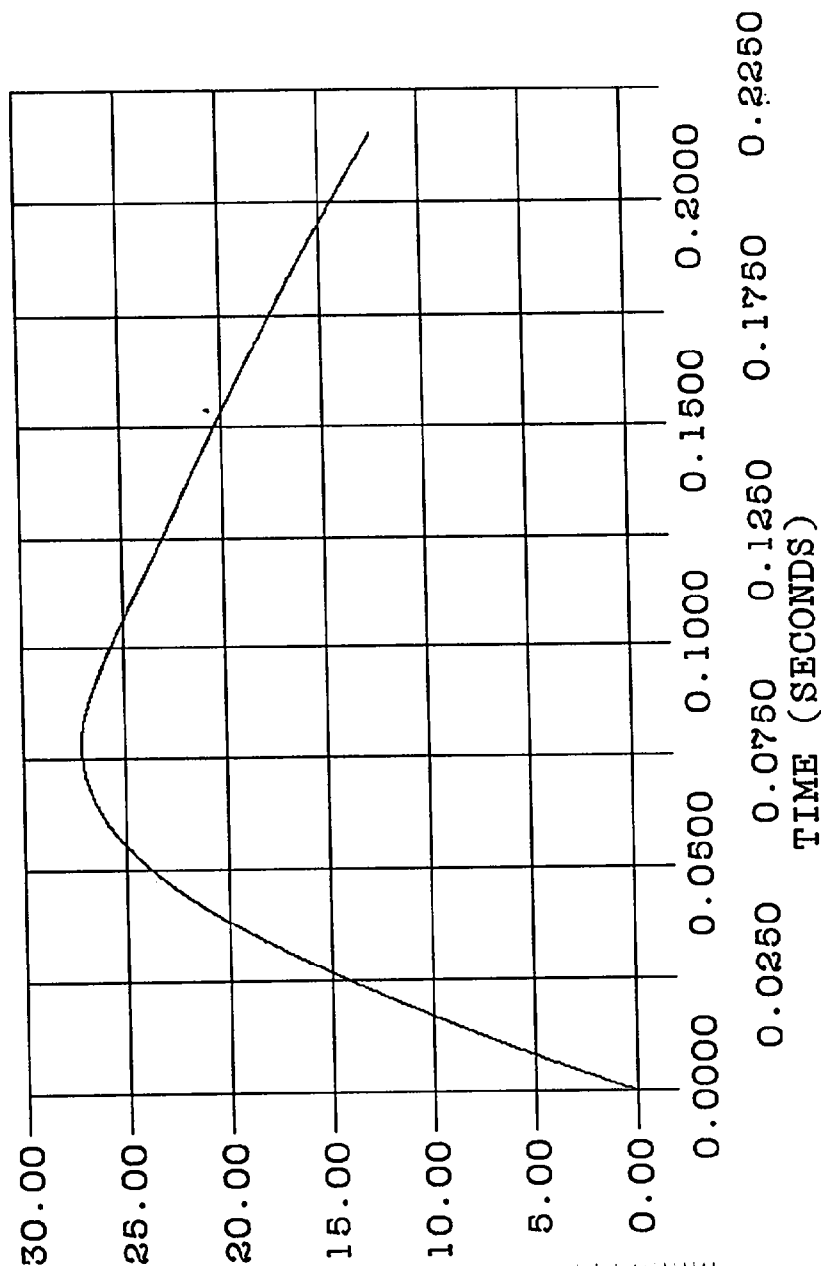
CROSSMEM LH X VEL



Left Rear Seat Cross-member X Velocity vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91
 CROSSMEM LH X DISP

D I S P L A C E M E N T (I N)

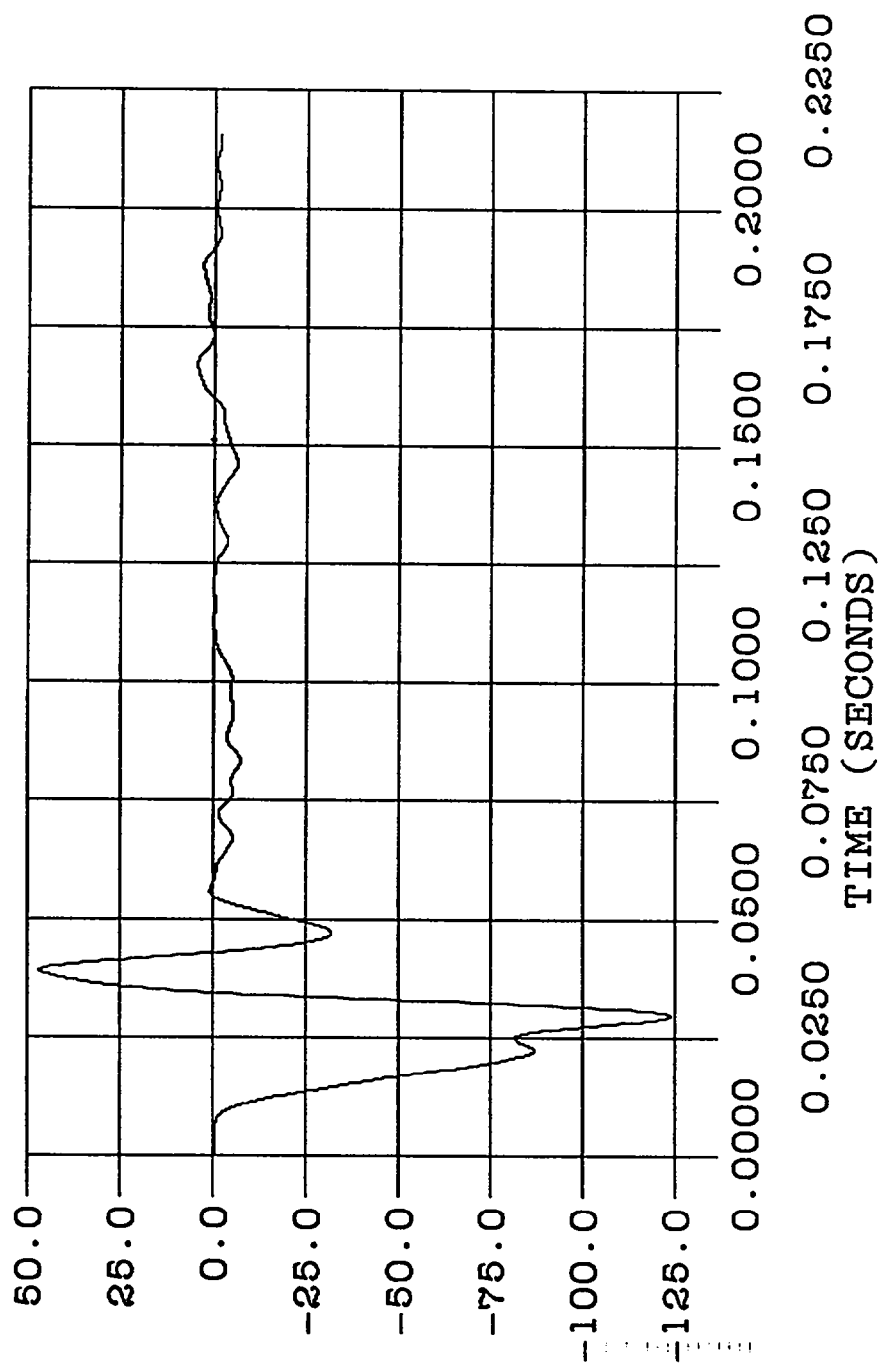


Left Rear Seat Cross-member X Displacement vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91

UPPER ENGINE X ACC

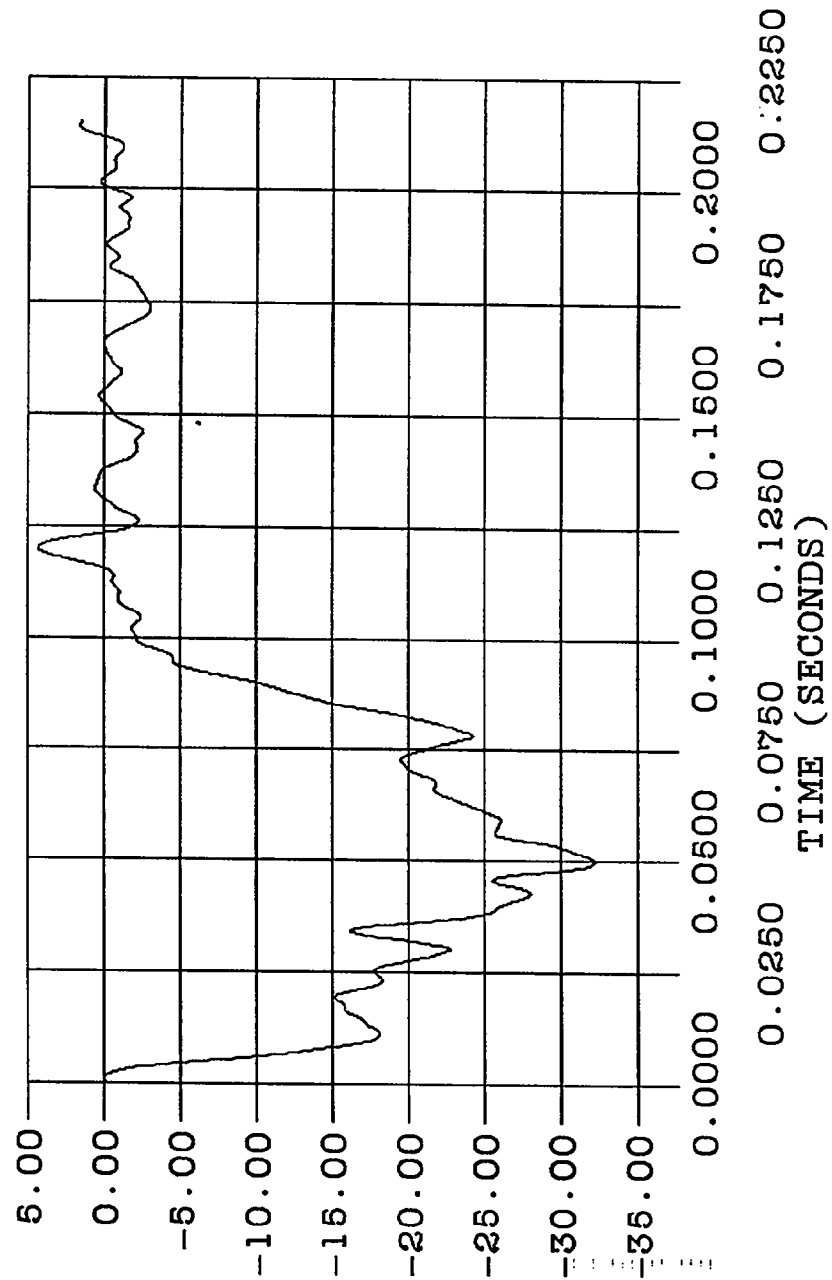
A C C E L E R A T I O N (G , S)



Top of Engine Block X Acceleration vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91
LOWER ENGINE X ACC

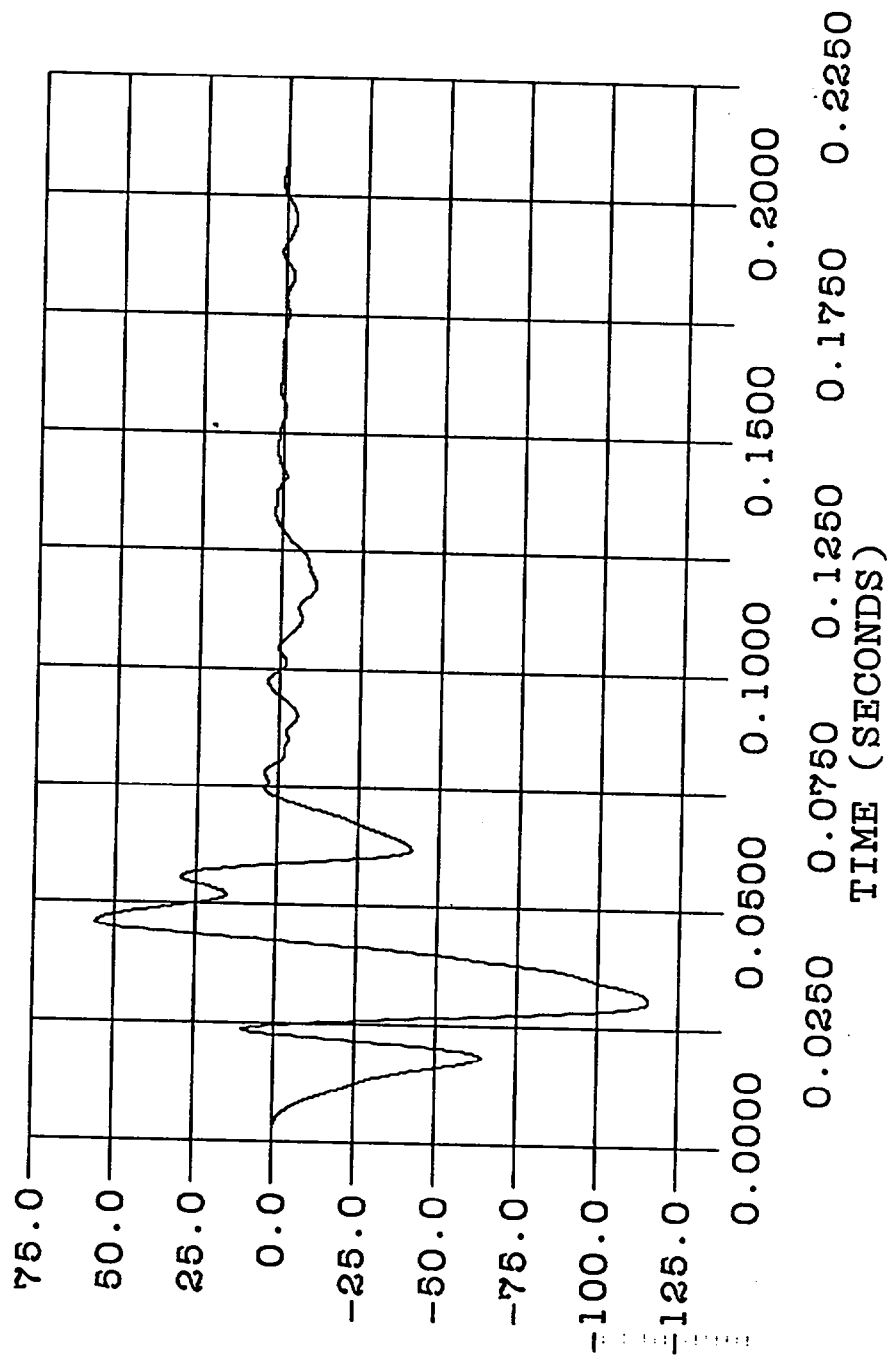
ACCELERATION (G, S)



Bottom of Engine Block X Acceleration vs. Time

1991 HONDA CIVIC NCAP TEST
CALIPER RH X ACC
TEST DATE: 01/27/91

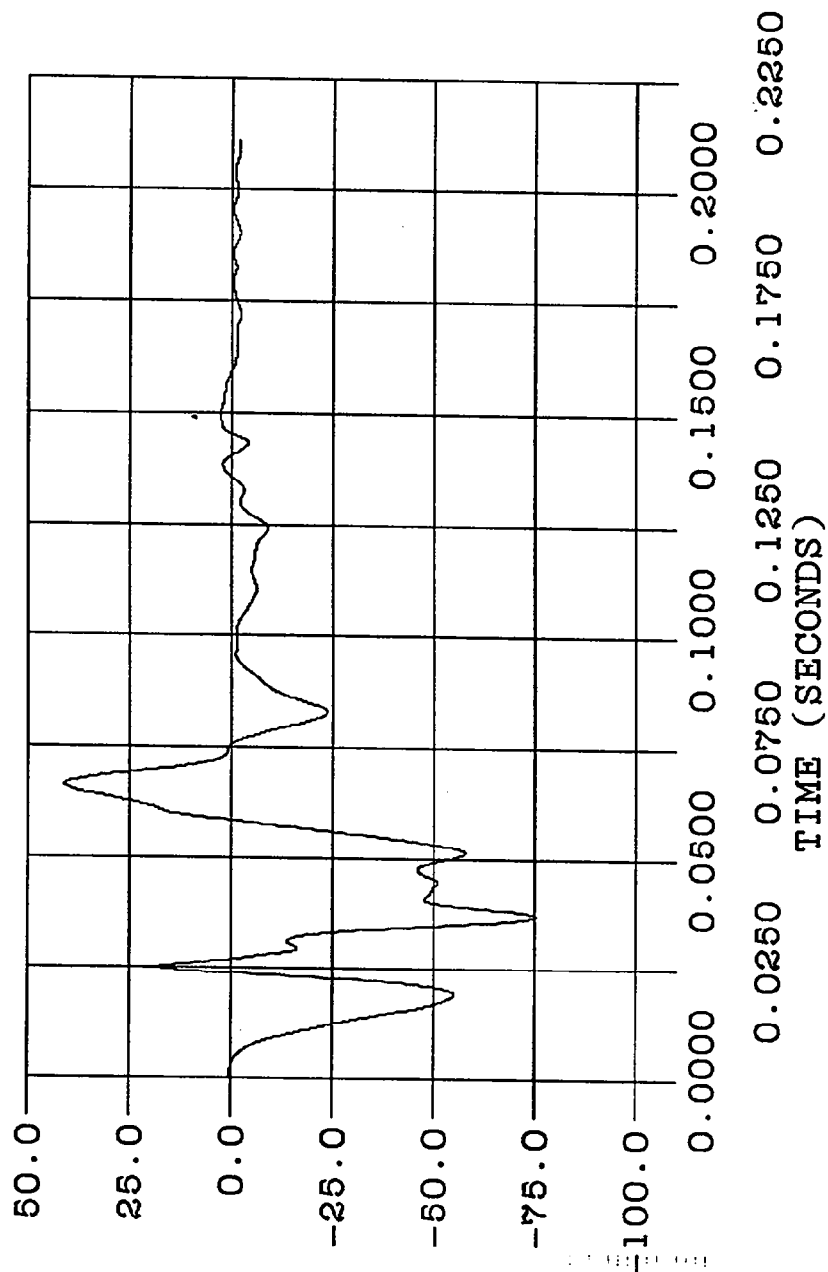
ACCELERATION (G, S)



Right Front Disc Brake Caliper X Acceleration vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91
CALIPER LH X ACC

ACCELERATION (G, S)



Left Front Disc Brake Caliper X Acceleration vs. Time

DATA PLOT NOT AVAILABLE

NO VALID DATA COLLECTED

Center of Instrument Panel Top Surface X Acceleration vs. Time

DATA PLOT NOT AVAILABLE

NO VALID DATA COLLECTED

Center Rear Seat Cross-member Z Acceleration vs. Time

DATA PLOT NOT AVAILABLE

NO VALID DATA COLLECTED

Center Rear Seat Cross-member Z Velocity vs. Time

DATA PLOT NOT AVAILABLE

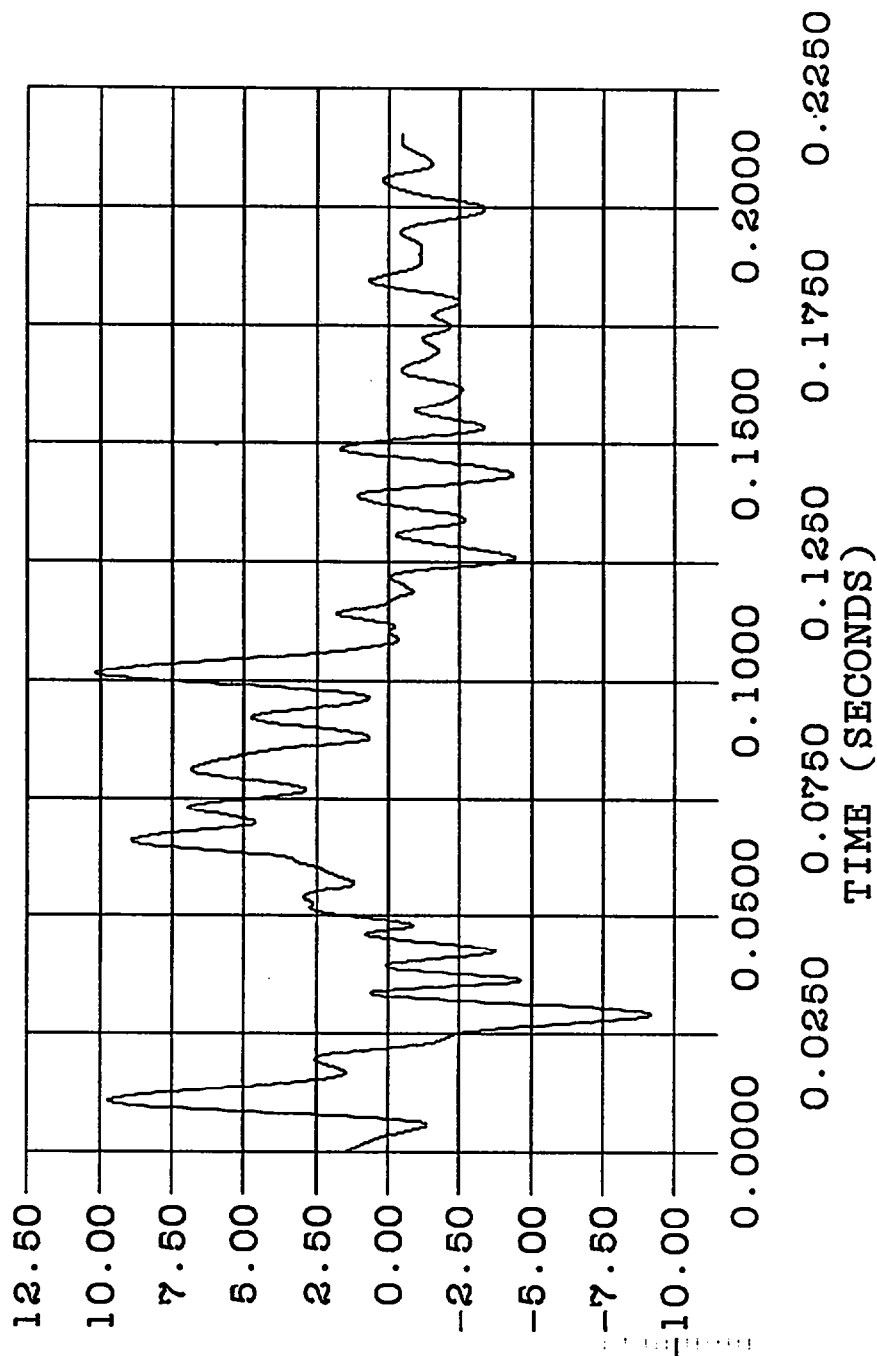
NO VALID DATA COLLECTED

Center Rear Seat Cross-member Z Displacement vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91

REAR VEHICLE Z ACC

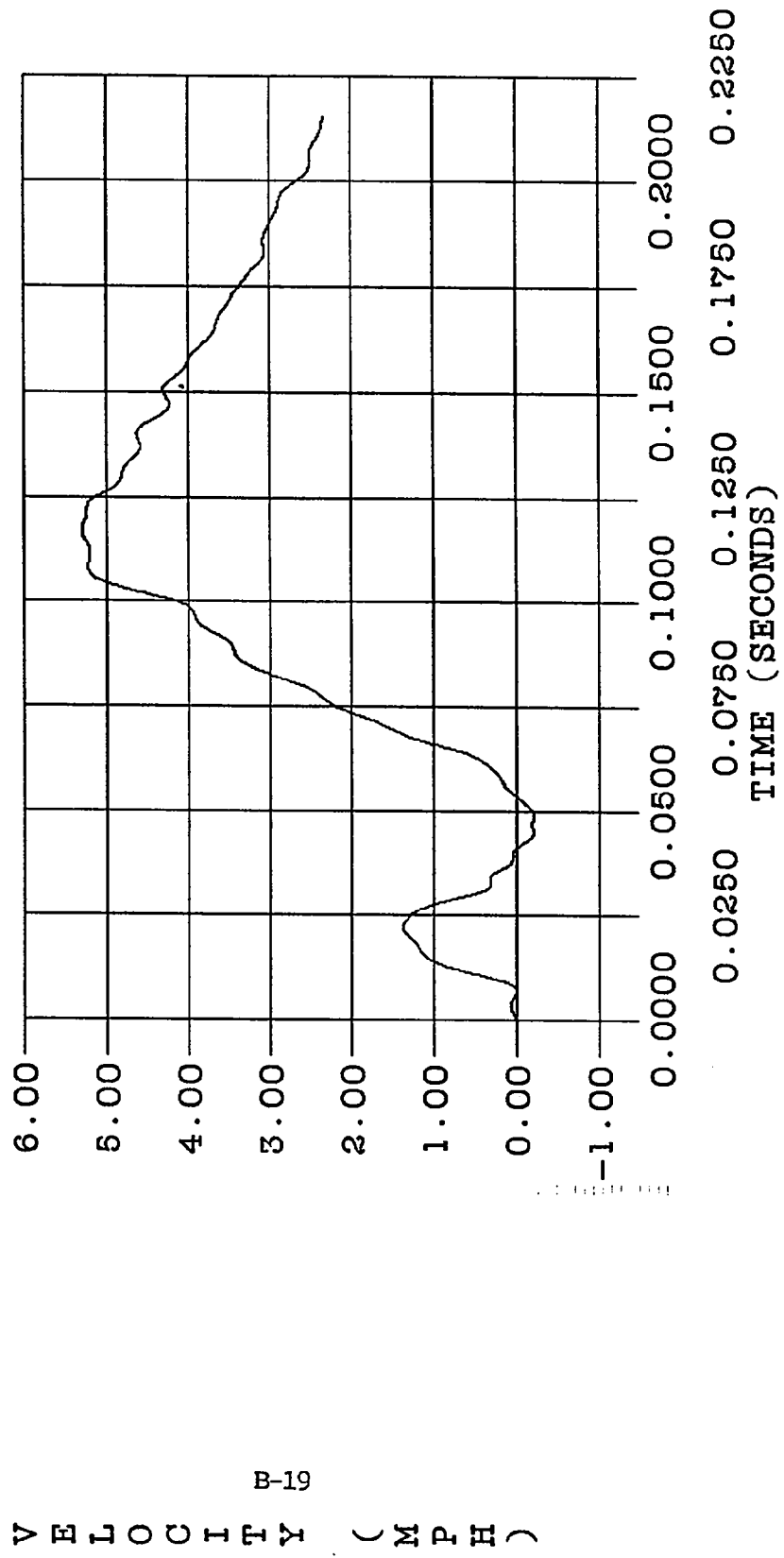
ACCELERATION (G, S)



Vehicle Rear Z Acceleration vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91

REAR VEHICLE Z VEL



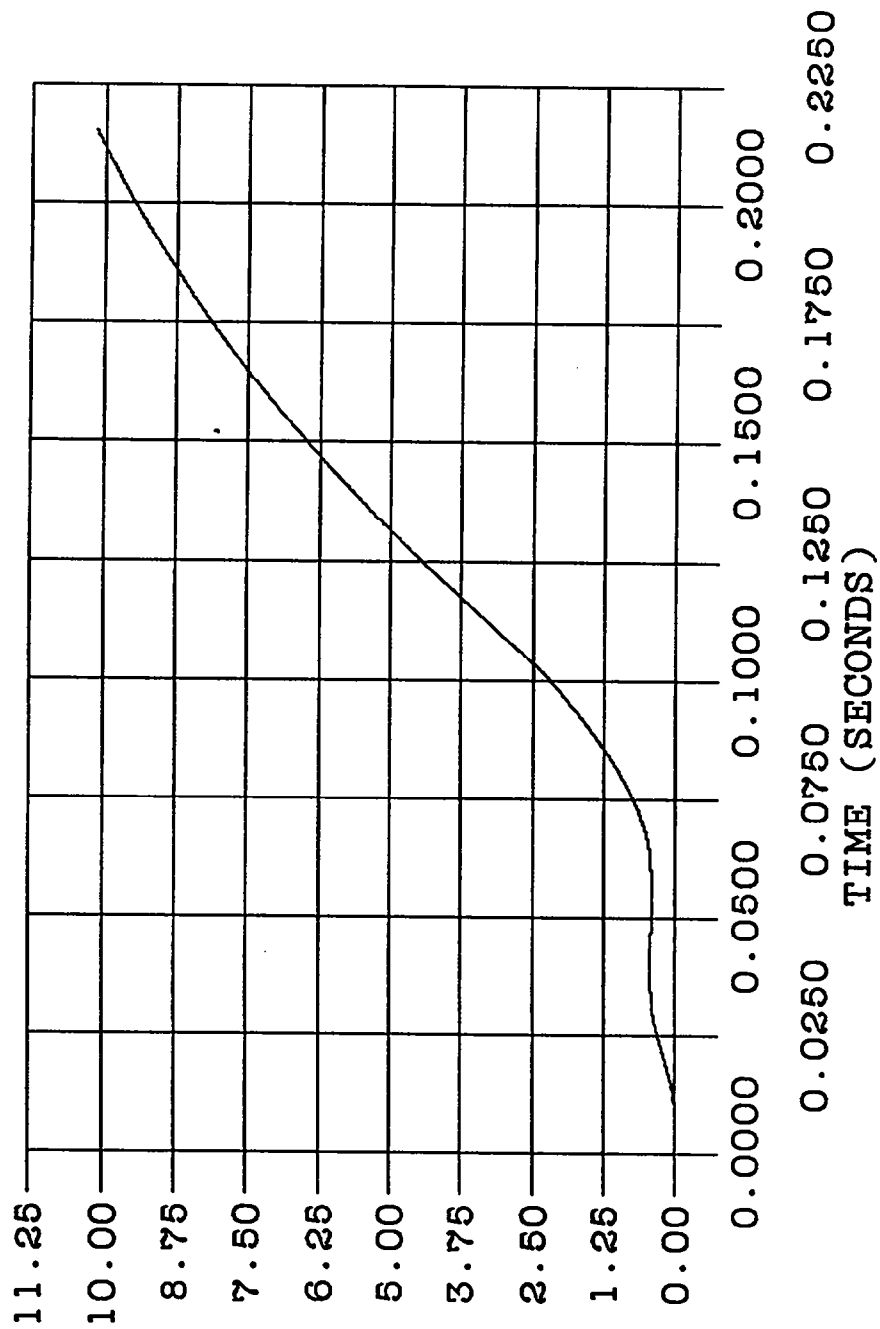
B-19

Vehicle Rear Z Velocity vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91

REAR VEHICLE Z DISP

D I S P L A C E M E N T (I N)



Vehicle Rear Z Displacement vs. Time

1991 HONDA CIVIC DX
NHISA NO. MM5301

LOAD CELL BARRIER DATA

FILTER CHANNEL CLASS

Forces

60

<u>Data Plot</u>	<u>Page No.</u>
Barrier Load Cell A1 Force vs. Time	N/A
Barrier Load Cell A2 Force vs. Time	N/A
Barrier Load Cell A3 Force vs. Time	N/A
Barrier Load Cell A4 Force vs. Time	N/A
Barrier Load Cell A5 Force vs. Time	N/A
Barrier Load Cell A6 Force vs. Time	N/A
Barrier Load Cell A7 Force vs. Time	N/A
Barrier Load Cell A8 Force vs. Time	N/A
Barrier Load Cell A9 Force vs. Time	N/A
Barrier Load Cell B1 Force vs. Time	N/A
Barrier Load Cell B2 Force vs. Time	N/A
Barrier Load Cell B3 Force vs. Time	N/A
Barrier Load Cell B4 Force vs. Time	N/A
Barrier Load Cell B5 Force vs. Time	N/A
Barrier Load Cell B6 Force vs. Time	N/A
Barrier Load Cell B7 Force vs. Time	N/A
Barrier Load Cell B8 Force vs. Time	N/A
Barrier Load Cell B9 Force vs. Time	N/A
Barrier Load Cell C1 Force vs. Time	N/A
Barrier Load Cell C2 Force vs. Time	N/A

Load Cell Barrier Data (cont'd)

<u>Data Plot</u>	<u>Page No.</u>
Barrier Load Cell C3 Force vs. Time	N/A
Barrier Load Cell C4 Force vs. Time	N/A
Barrier Load Cell C5 Force vs. Time	N/A
Barrier Load Cell C6 Force vs. Time	N/A
Barrier Load Cell C7 Force vs. Time	N/A
Barrier Load Cell C8 Force vs. Time	N/A
Barrier Load Cell C9 Force vs. Time	N/A
Barrier Load Cell D1 Force vs. Time	N/A
Barrier Load Cell D2 Force vs. Time	N/A
Barrier Load Cell D3 Force vs. Time	N/A
Barrier Load Cell D4 Force vs. Time	N/A
Barrier Load Cell D5 Force vs. Time	N/A
Barrier Load Cell D6 Force vs. Time	N/A
Barrier Load Cell D7 Force vs. Time	N/A
Barrier Load Cell D8 Force vs. Time	N/A
Barrier Load Cell D9 Force vs. Time	N/A
Sum of 6 Load Cells Force vs. Time	B-24
Sum of Load Cells A1-B3 Force vs. Time	B-25
Sum of Load Cells A4-B6 Force vs. Time	B-26
Sum of Load Cells A7-B9 Force vs. Time	B-27
Sum of Load Cells C1-D3 Force vs. Time	B-28
Sum of Load Cells C4-D6 Force vs. Time	B-29
Sum of Load Cells C7-D9 Force vs. Time	B-30
Sum of 36 Load Cells Force vs. Vehicle Dynamic Crush	B-31

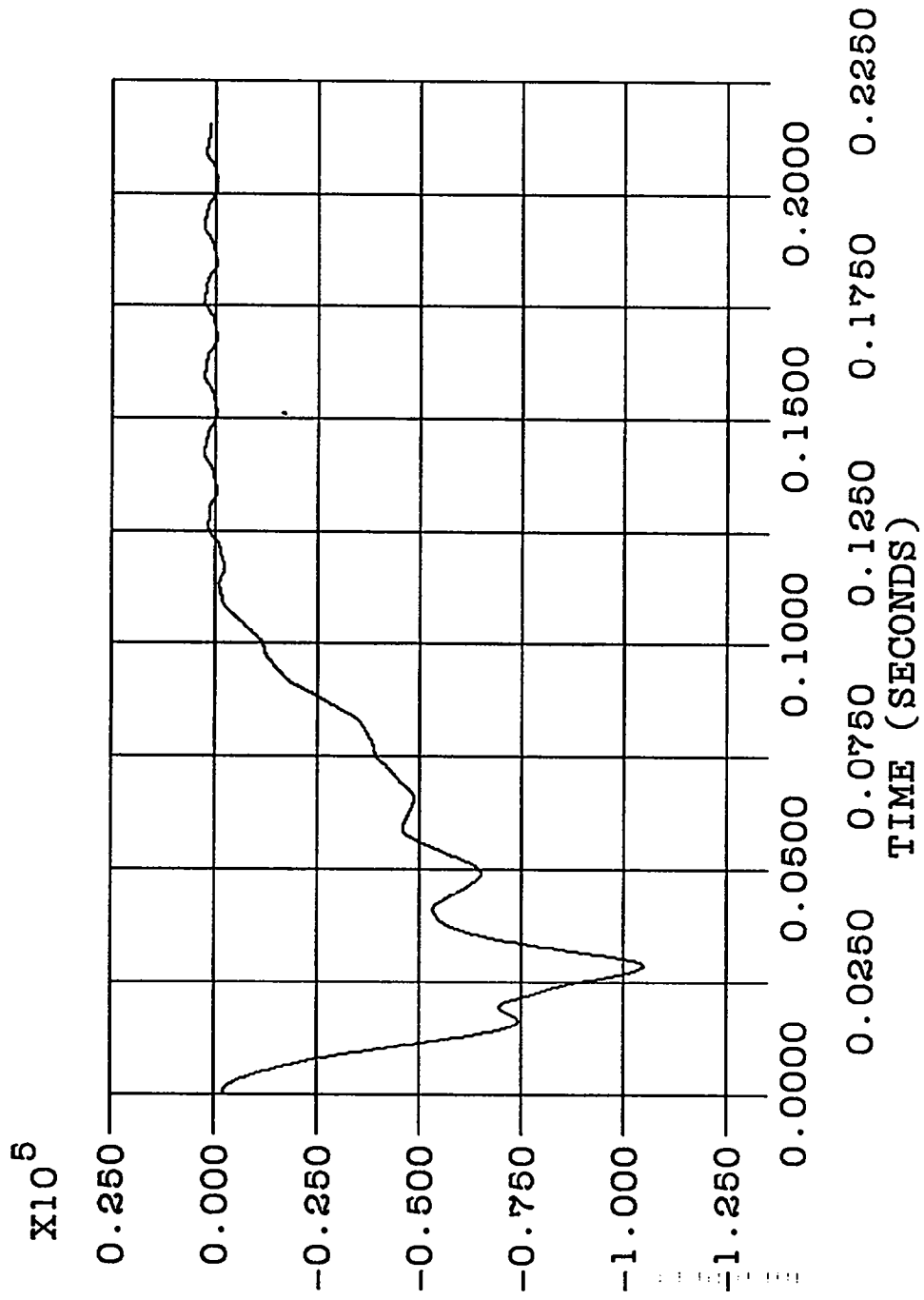
1991 HONDA CIVIC DX
NHTSA NO. MM5301

DATA FILE MINIMUMS AND MAXIMUMS

DESCRIPTION	MINIMUM		MAXIMUM	
=====	=====	=====	=====	=====
Sum of Barrier Forces	-104737.3 @	0.02866	2816.7 @	0.19250
Barrier Load Cell A1-B3	-24088.5 @	0.02017	615.1 @	0.19262
Barrier Load Cell A4-B7	-44185.4 @	0.02854	150.4 @	0.17577
Barrier Load Cell A7-B9	-33147.3 @	0.03075	306.3 @	0.14207
Barrier Load Cell C1-D3	-3428.2 @	0.05252	1083.3 @	0.11021
Barrier Load Cell C4-D7	-6069.4 @	0.05314	578.7 @	0.19274
Barrier Load Cell C7-D9	-8315.5 @	0.05018	547.7 @	0.14231
Sum of Forces/Veh. Disp.	-104737.3 @	15.89065	2816.7 @	15.35500

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91

TOTAL BARRIER FORCE

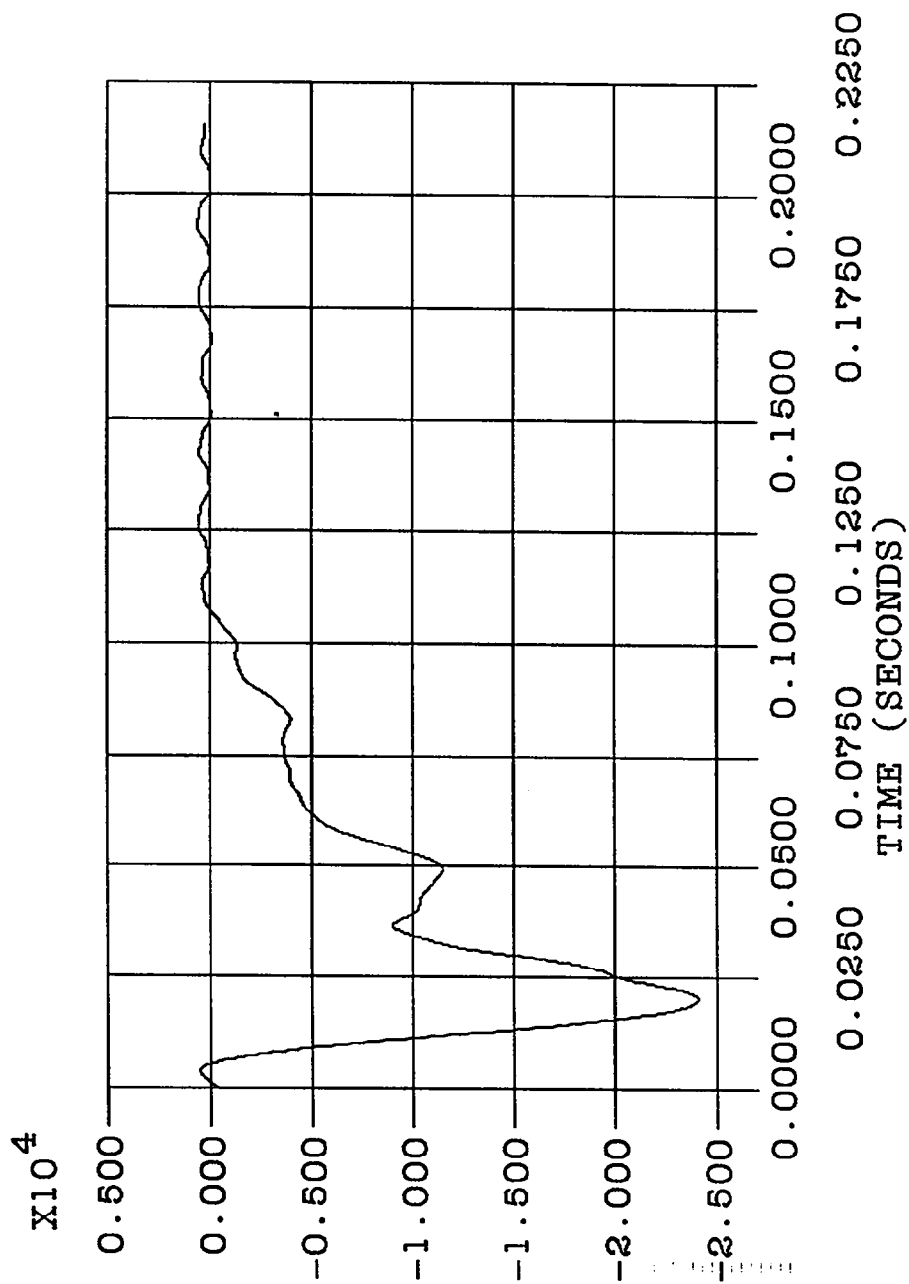


B-24

Sum of 6 Load Cells Force vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91

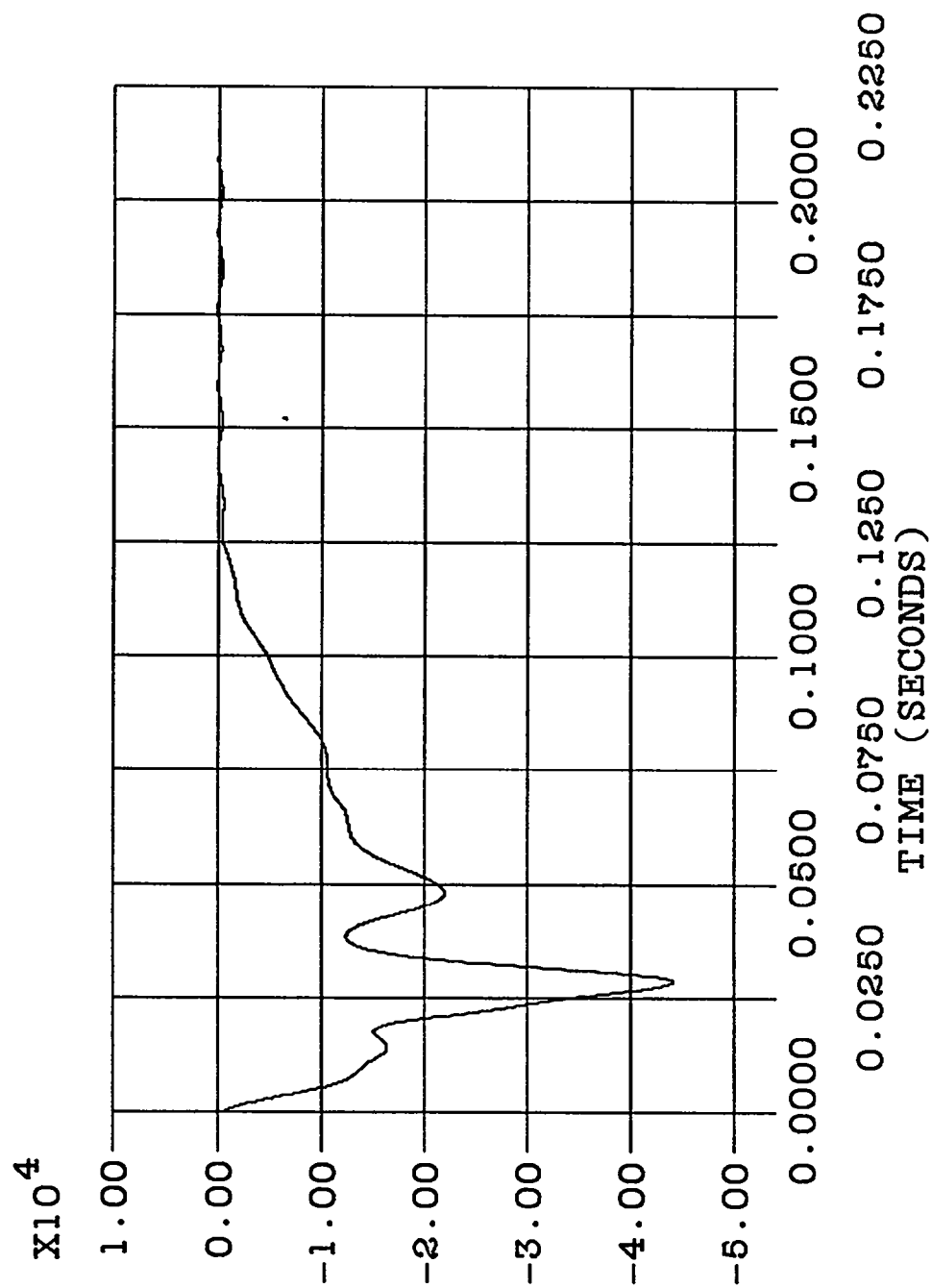
BARRIER LL FORCE



Sum of Load Cells A1-B3 Force vs. Time

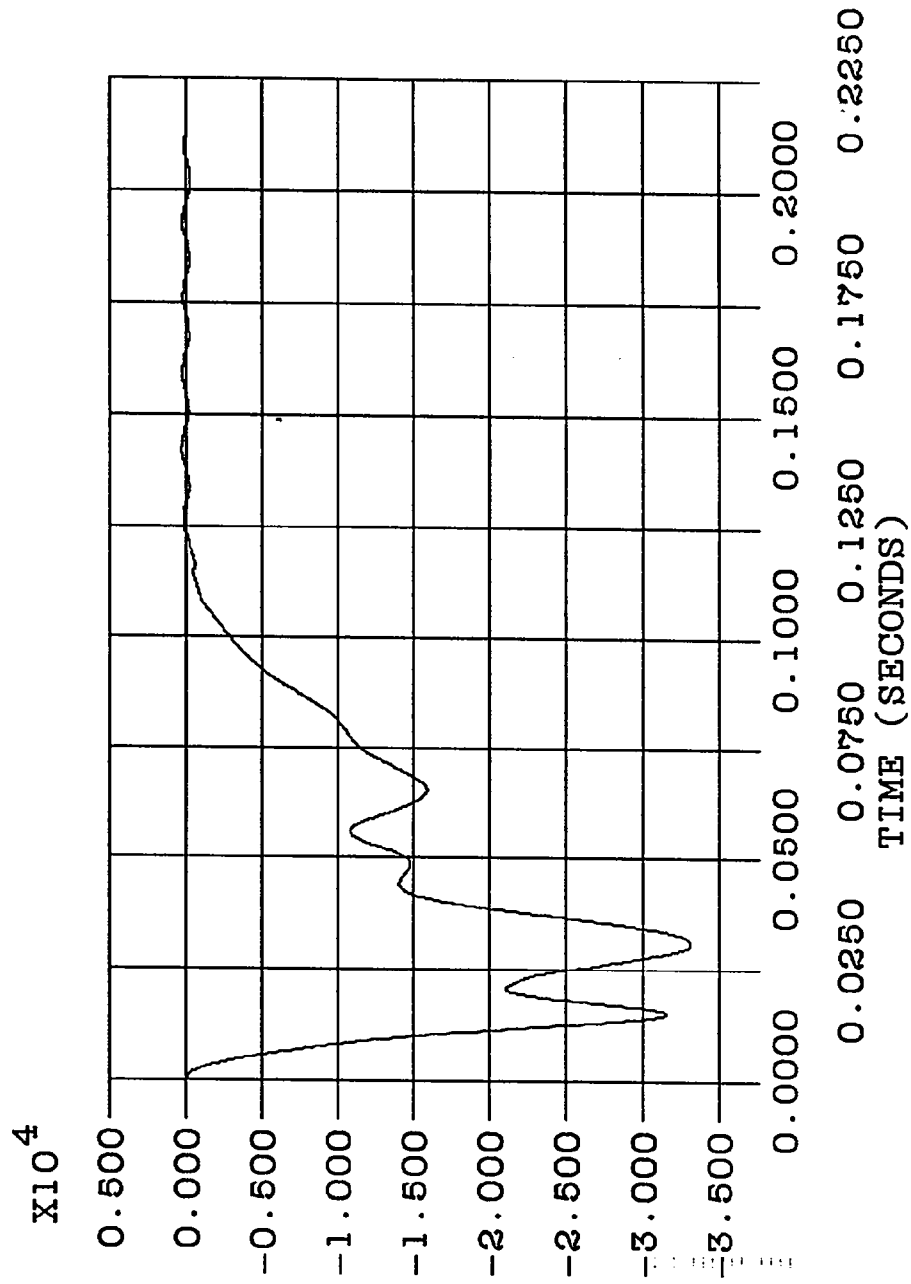
1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91

BARRIER LC FORCE



Sum of Load Cells A4-B6 Force vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91
 BARRIER LR FORCE

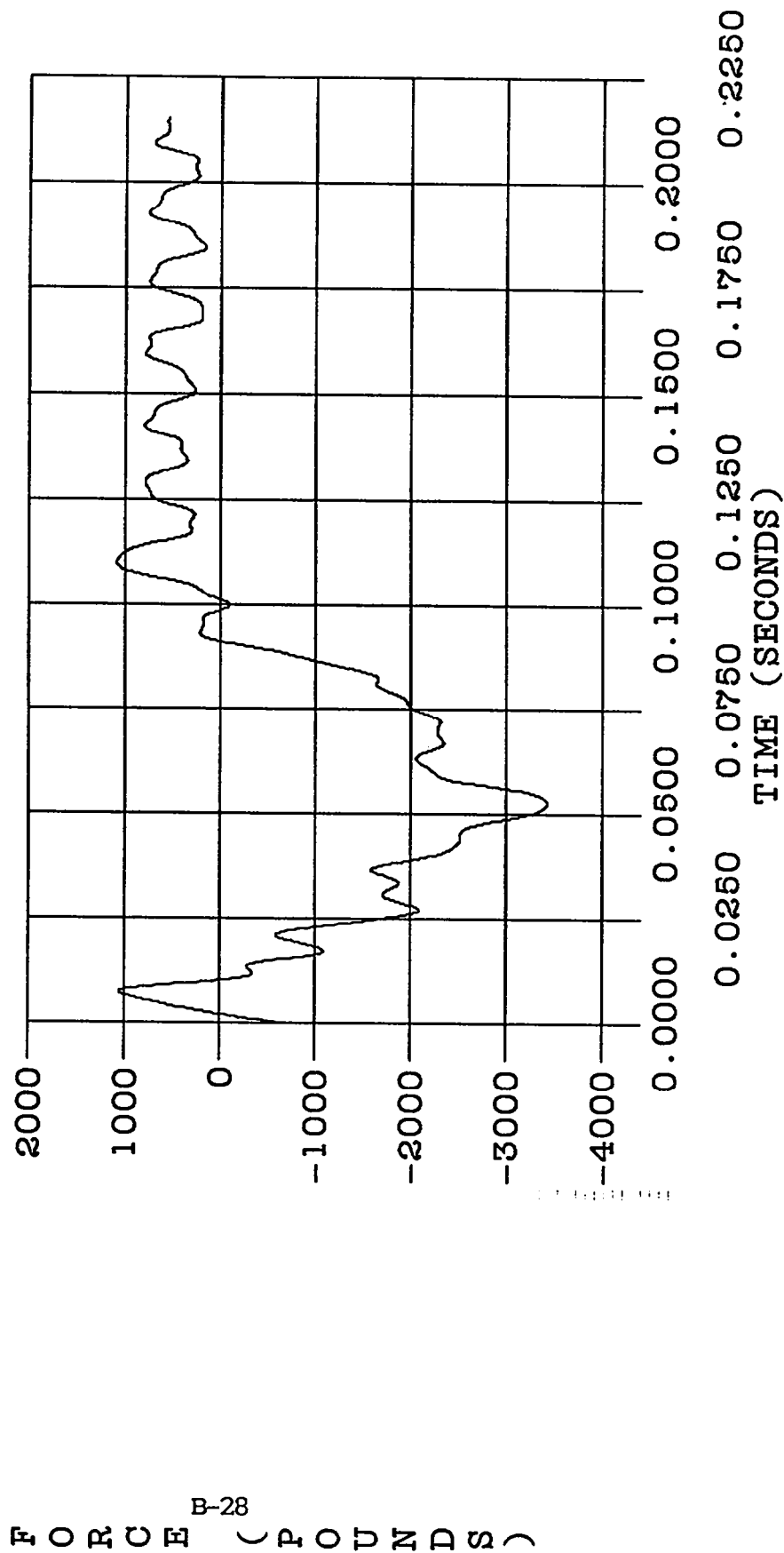


FORCE (POUNDS)

B-27

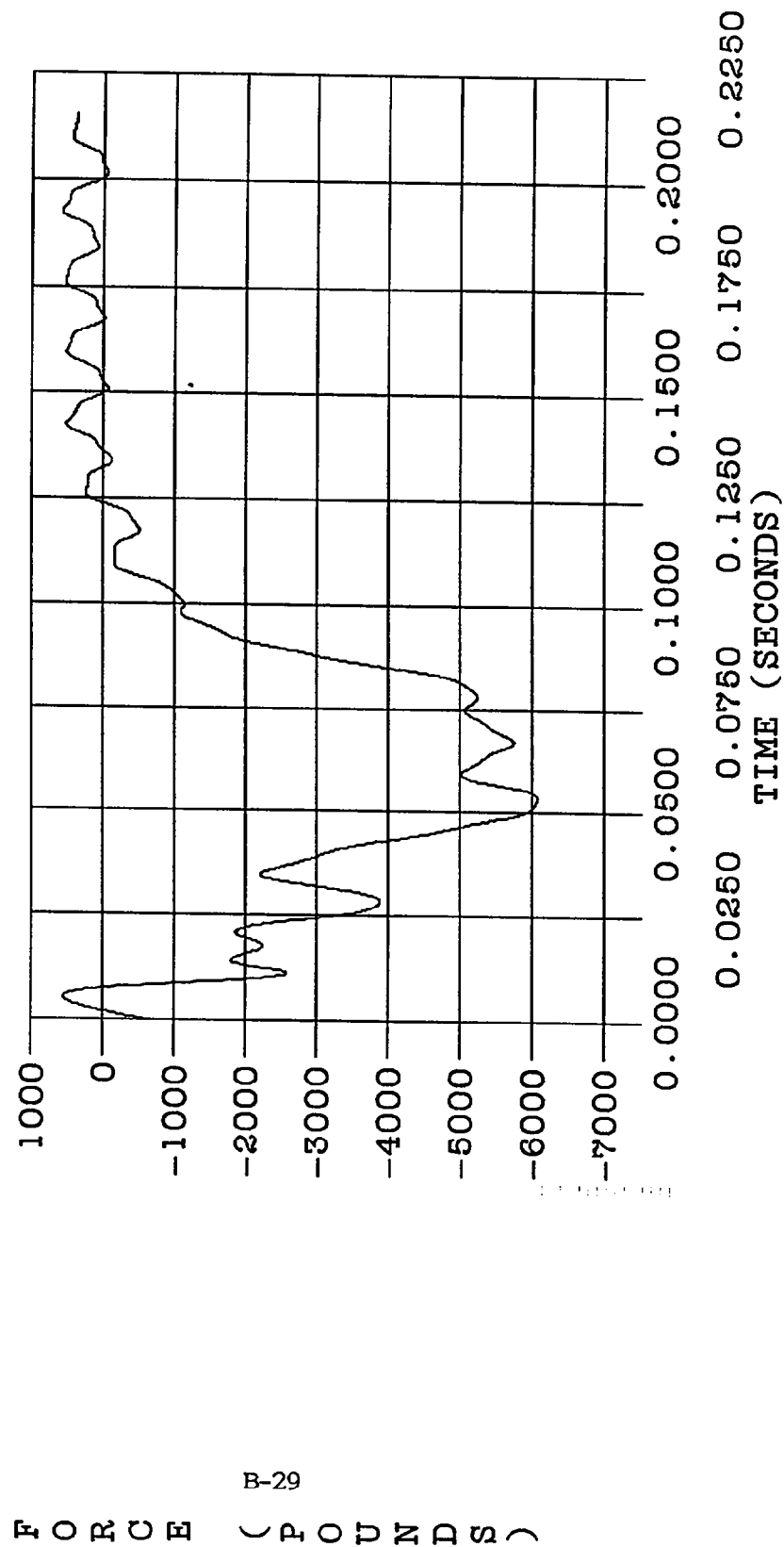
Sum of Load Cells A7-B9 Force vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91
 BARRIER UL FORCE



Sum of Load Cells C1-D3 Force vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91
 BARRIER UC FORCE

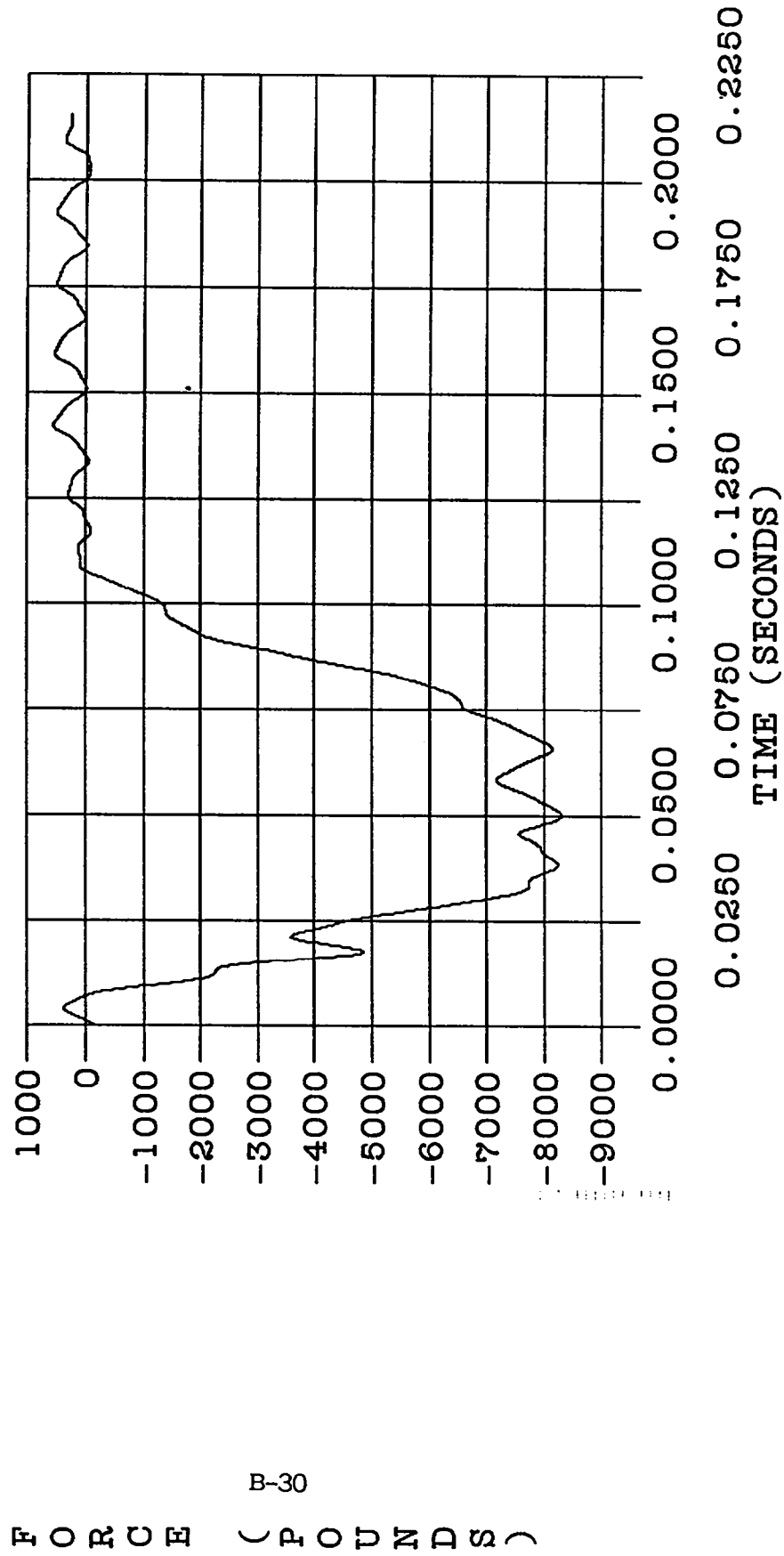


B-29

Sum of Load Cells C4-D6 Force vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91

BARRIER UR FORCE

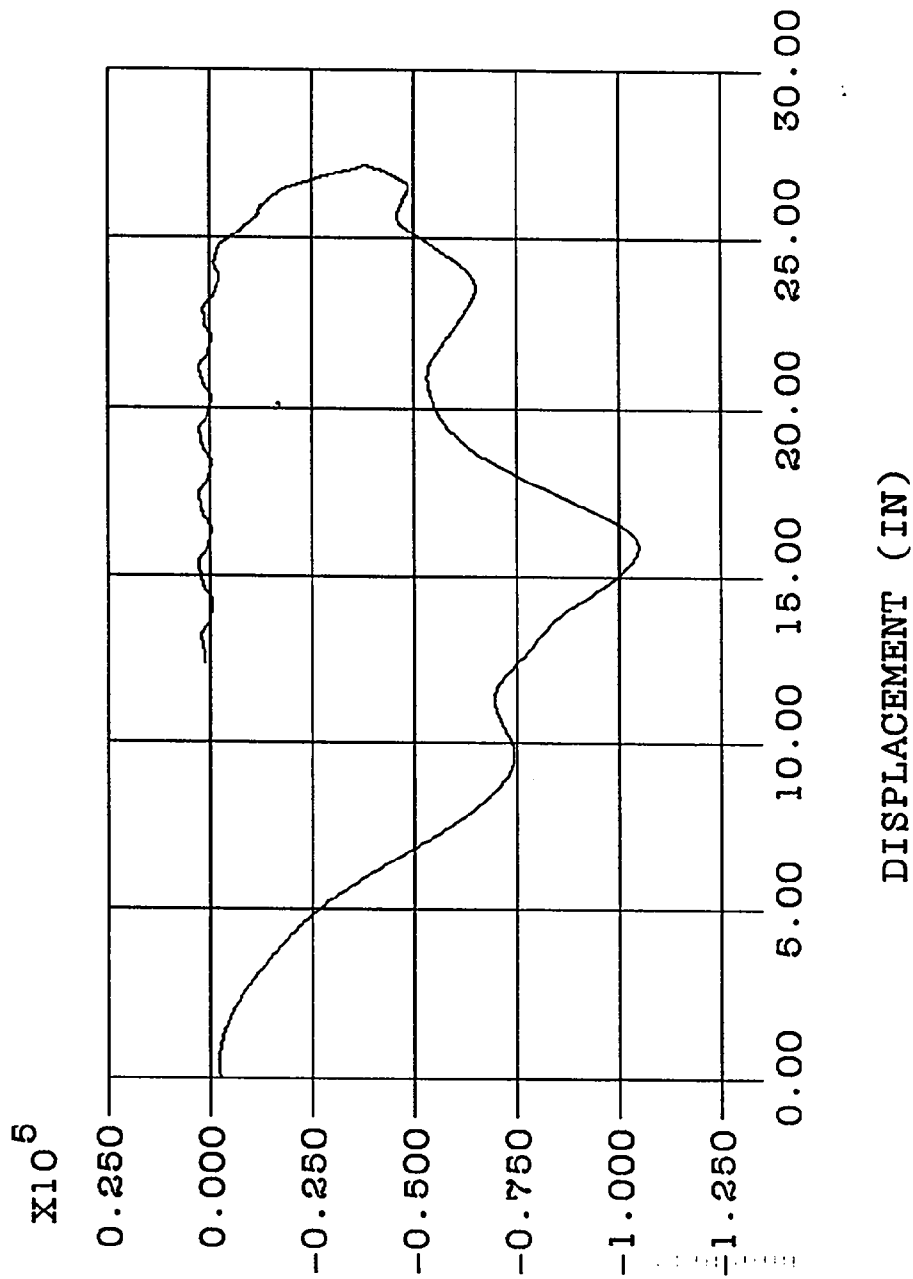


B-30

Sum of Load Cells C7-D9 Force vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91

TOT. BAR. FORCE/DISP



Sum of 36 Load Cells Force vs. Vehicle Dynamic Crush

1991 HONDA CIVIC DX
NHTSA NO. MM5301

DUMMY DATA

CLASS	FILTER CHANNEL
Head Accelerations	1000
Chest Accelerations	180
Femur Forces	600
Belt Loads	60

<u>Data Plot</u>	<u>Page No.</u>
Driver Head X Acceleration vs. Time	B-35
Driver Head Y Acceleration vs. Time	B-36
Driver Head Z Acceleration vs. Time	B-37
Driver Head Resultant Acceleration vs. Time	B-38
Driver Head X Velocity vs. Time	B-39
Driver Chest X Acceleration vs. Time	B-40
Driver Chest Y Acceleration vs. Time	B-41
Driver Chest Z Acceleration vs. Time	B-42
Driver Chest Resultant Acceleration vs. Time	B-43
Driver Right Femur Force vs. Time	B-44
Driver Left Femur Force vs. Time	B-45
Driver Lap Belt Force vs. Time	B-46
Driver Torso Belt Force vs. Time	B-47

Dummy Data (cont'd)

<u>Data Plot</u>	<u>Page No.</u>
Passenger Head X Acceleration vs. Time	B-48
Passenger Head Y Acceleration vs. Time	B-49
Passenger Head Z Acceleration vs. Time	B-50
Passenger Head Resultant Acceleration vs. Time	B-51
Passenger Head X Velocity vs. Time	B-52
Passenger Chest X Acceleration vs. Time	B-53
Passenger Chest Y Acceleration vs. Time	B-54
Passenger Chest Z Acceleration vs. Time	B-55
Passenger Chest Resultant Acceleration vs. Time	B-56
Passenger Right Femur Force vs. Time	B-57
Passenger Left Femur Force vs. Time	B-58
Passenger Lap Belt Force vs. Time	B-59
Passenger Torso Belt Force vs. Time	B-60

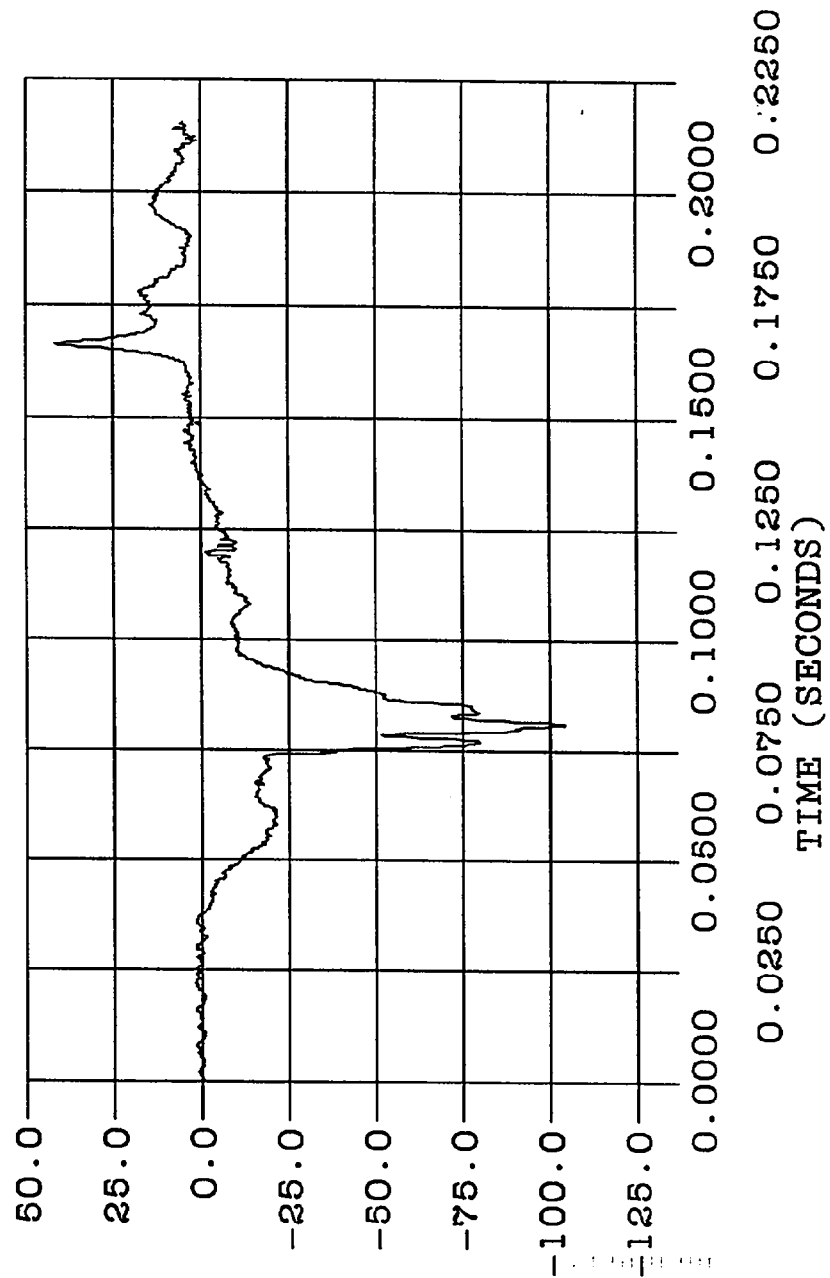
1991 HONDA CIVIC DX
NHTSA NO. MM5301

DATA FILE MINIMUMS AND MAXIMUMS

DESCRIPTION	MINIMUM		MAXIMUM	
Driver Head X Acc.	-104.4 @	0.08118	41.5 @	0.16642
Driver Head Y Acc.	-7.6 @	0.09729	8.4 @	0.08339
Driver Head Z Acc.	-2.3 @	0.02054	65.7 @	0.07823
Driver Head Resultant	0.1 @	0.04440	112.6 @	0.09102
Driver Head X Vel.	-8.6 @	0.13604	35.3 @	0.03764
Driver Chest X Acc.	-52.5 @	0.06691	9.1 @	0.19852
Driver Chest Y Acc.	-7.4 @	0.07245	20.0 @	0.08106
Driver Chest Z Acc.	-4.9 @	0.04121	19.4 @	0.08192
Driver Chest Resultant	0.0 @	0.00480	52.6 @	0.07675
Driver Femur RH Force	-2158.2 @	0.05301	67.2 @	0.11218
Driver Femur LH Force	-996.0 @	0.05375	41.0 @	0.02681
Driver Lap Belt	-0.2 @	0.00467	852.8 @	0.05769
Driver Torso Belt	-8.5 @	0.00000	2028.9 @	0.06704
Passenger Head X Acc.	-30.8 @	0.09840	7.5 @	0.17687
Passenger Head Y Acc.	-5.0 @	0.16777	20.3 @	0.08881
Passenger Head Z Acc.	-1.5 @	0.03223	57.4 @	0.08401
Passenger Head Resultant	0.0 @	0.00197	64.3 @	0.09385
Passenger Head X Vel.	1.8 @	0.13628	35.7 @	0.04010
Passenger Chest X Acc.	-48.4 @	0.05240	6.2 @	0.20947
Passenger Chest Y Acc.	-4.8 @	0.20947	14.4 @	0.07786
Passenger Chest Z Acc.	-10.3 @	0.03555	18.1 @	0.07724
Passenger Chest Resultant	0.0 @	0.01095	48.5 @	0.06224
Passenger Femur RH Force	-623.9 @	0.03333	144.1 @	0.13616
Passenger Femur LH Force	-764.7 @	0.05375	254.1 @	0.06519
Passenger Lap Belt Force	Not Available - No Valid Data Collected			
Passenger Torso Belt Force	-17.4 @	0.20959	2361.5 @	0.06667

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91
DRIVER HEAD X ACC

ACCELERATION (G, S)

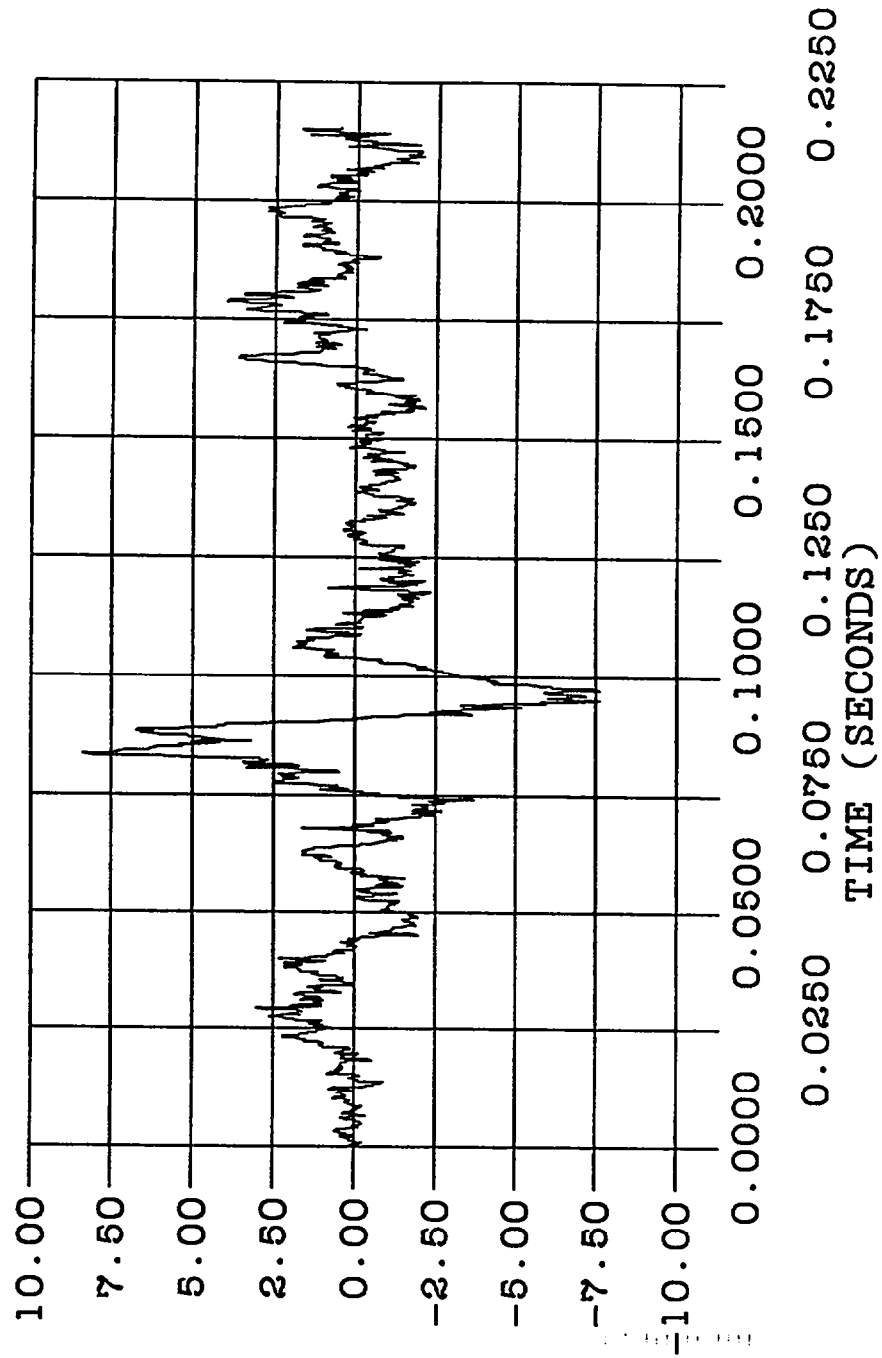


Driver Head X Acceleration vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91

DRIVER HEAD Y ACC

ACCELERATION (G, S)

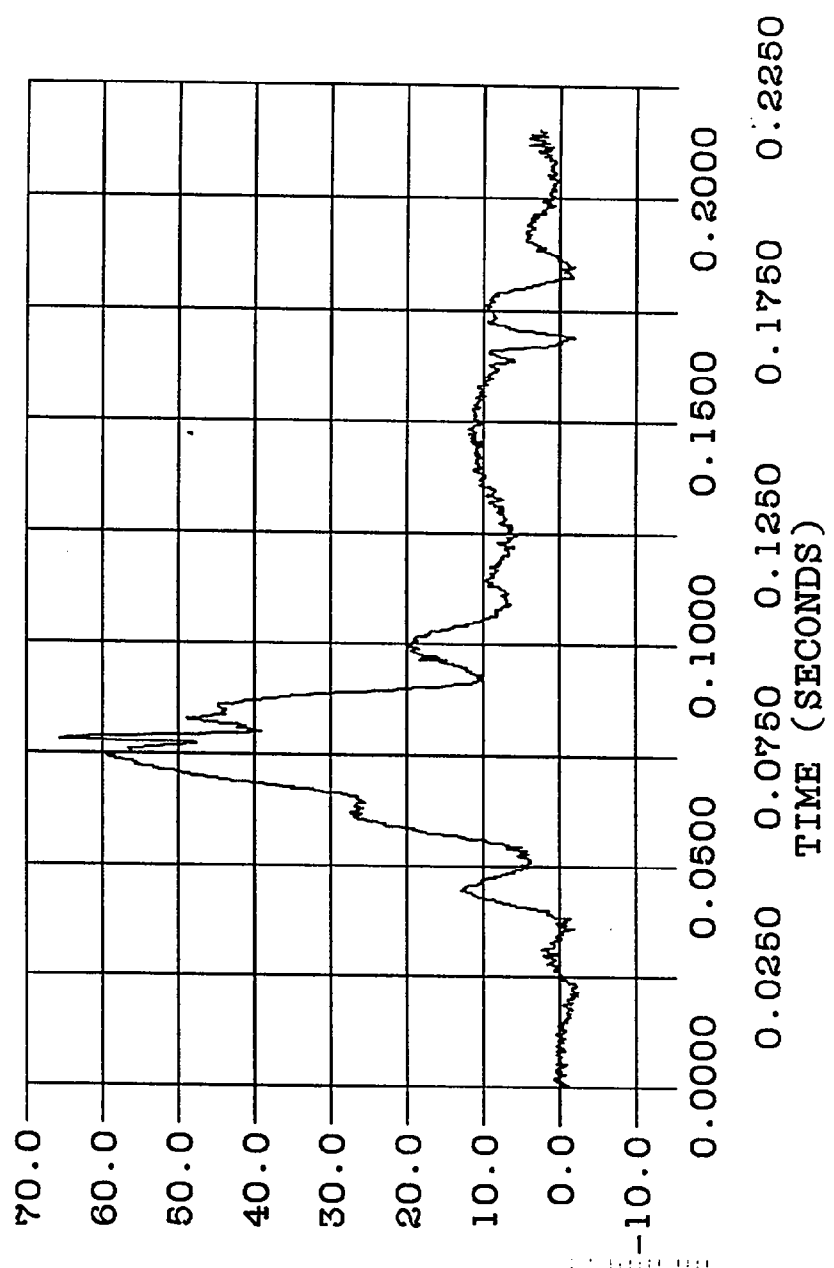


Driver Head Y Acceleration vs. Time

ACCELERATION (G, S)

B-37

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91
DRIVER HEAD Z ACC

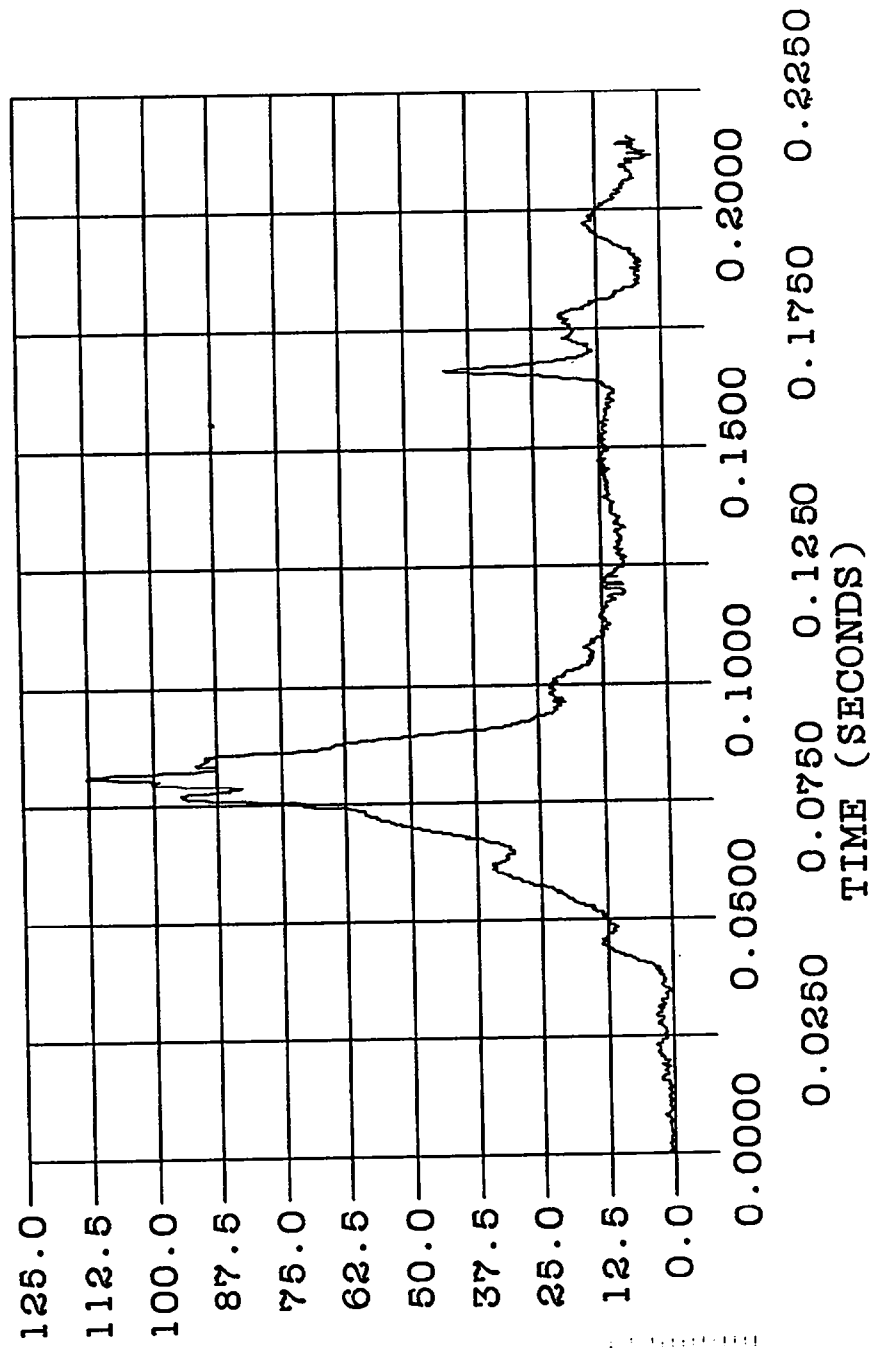


Driver Head Z Acceleration vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91

DRIVER HEAD RES ACC

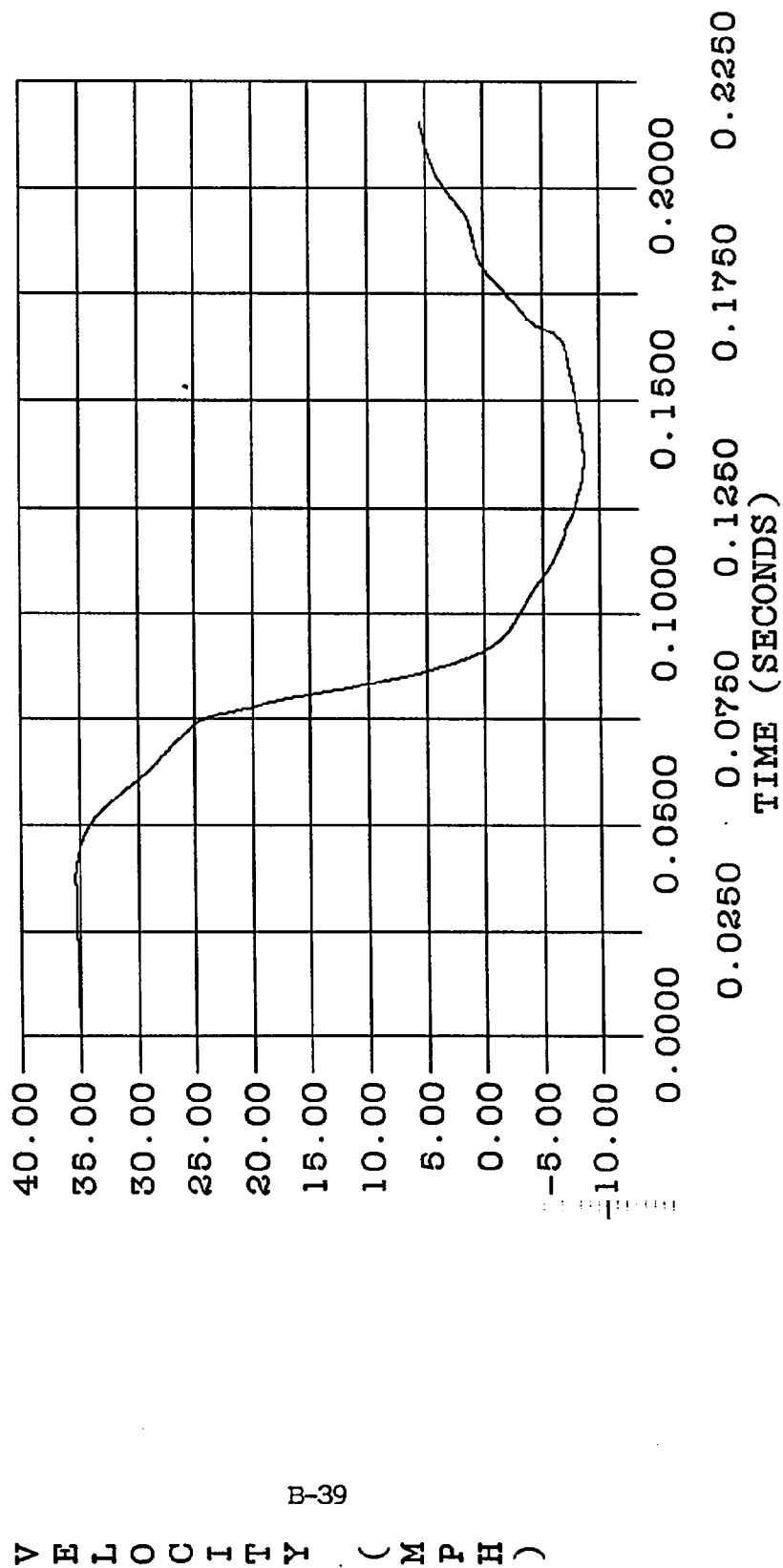
ACCELERATION (G, S)



Driver Head Resultant Acceleration vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91

DRIVER HEAD X VEL

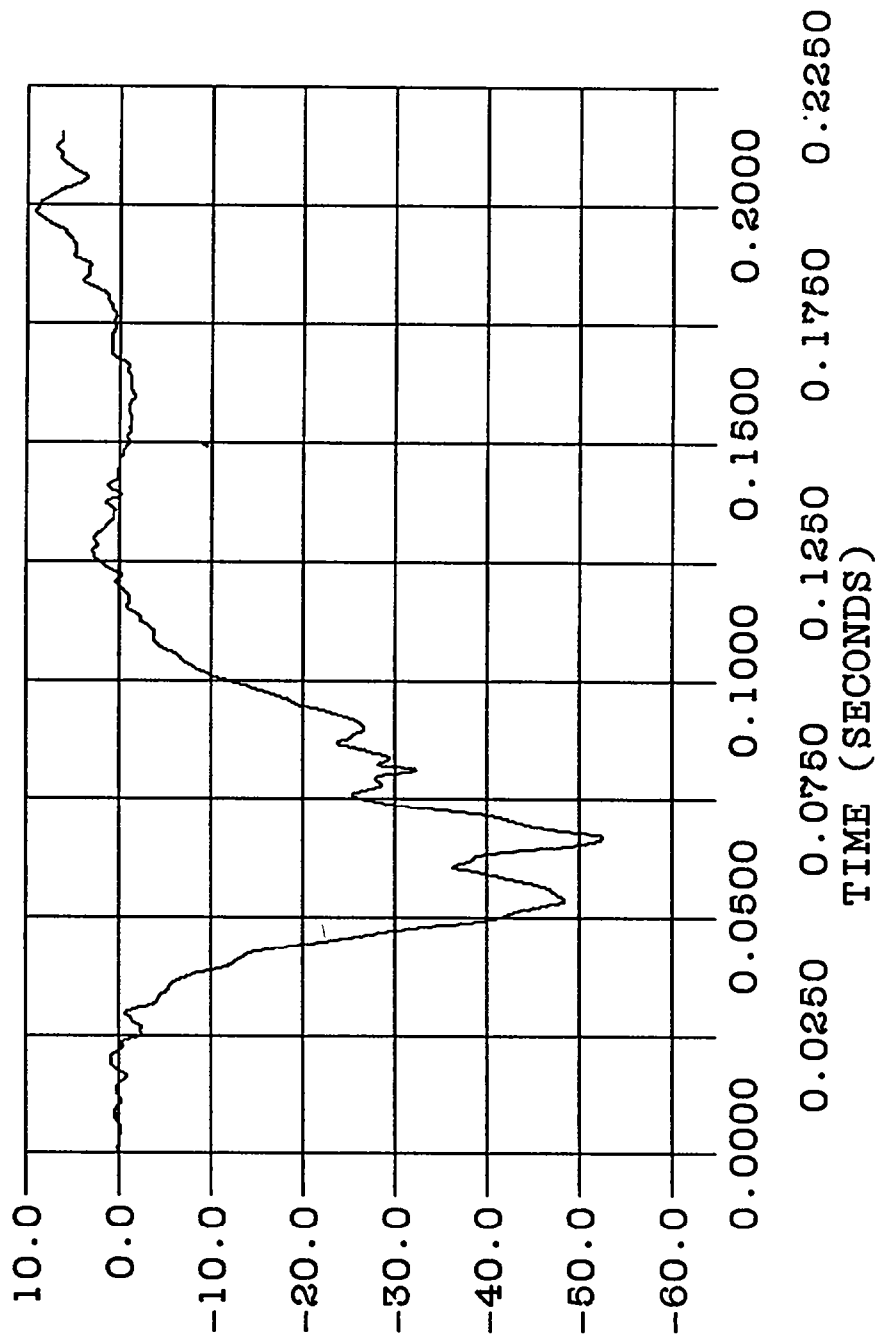


Driver Head X Velocity vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91

DRIVER CHEST X ACC

ACCELERATION (G, S)

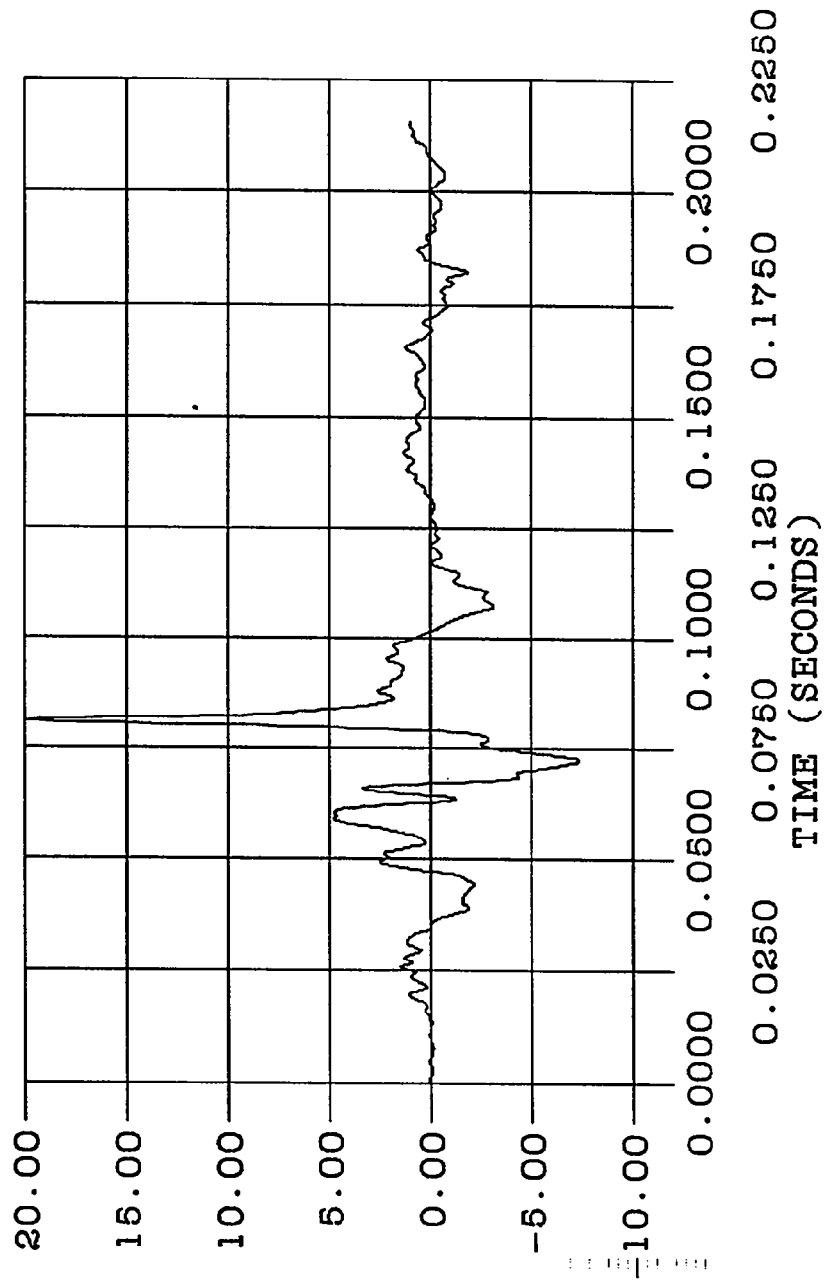


Driver Chest X Acceleration vs. Time

A C C E L E R A T I O N (G , S)

B-41

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91
DRIVER CHEST Y ACC

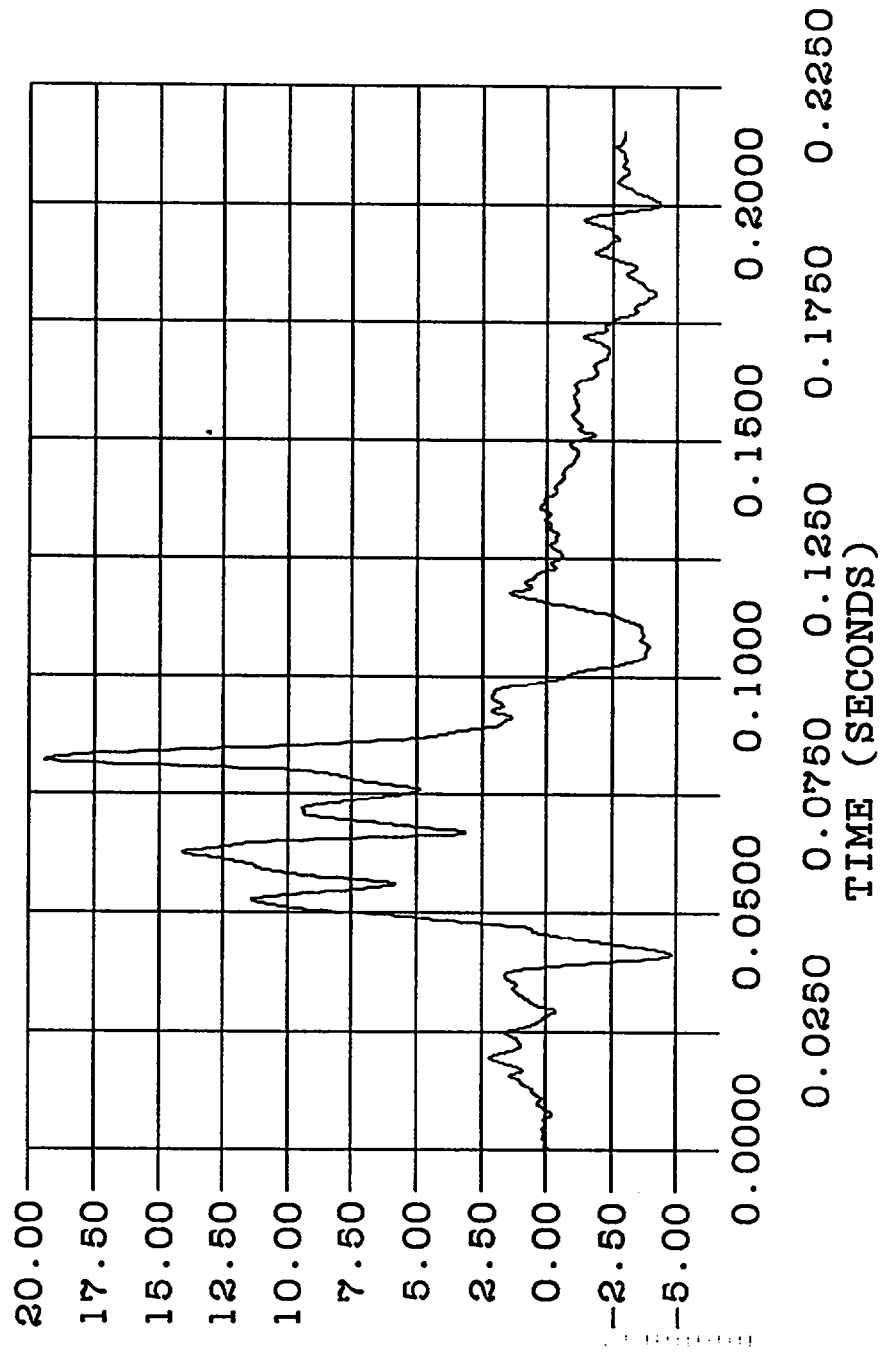


Driver Chest Y Acceleration vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91

DRIVER CHEST Z ACC

ACCELERATION (G, S)

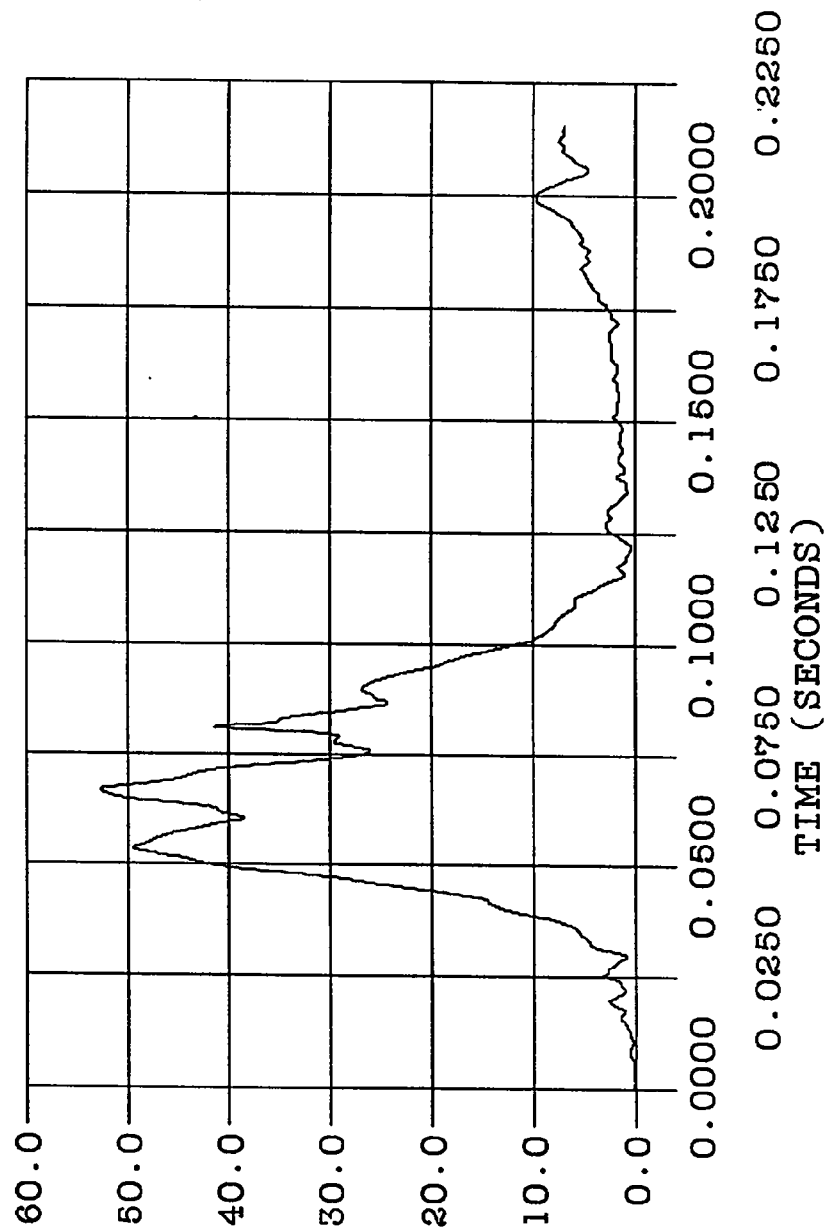


Driver Chest Z Acceleration vs. Time

ACCELERATION (G, S)

B-43

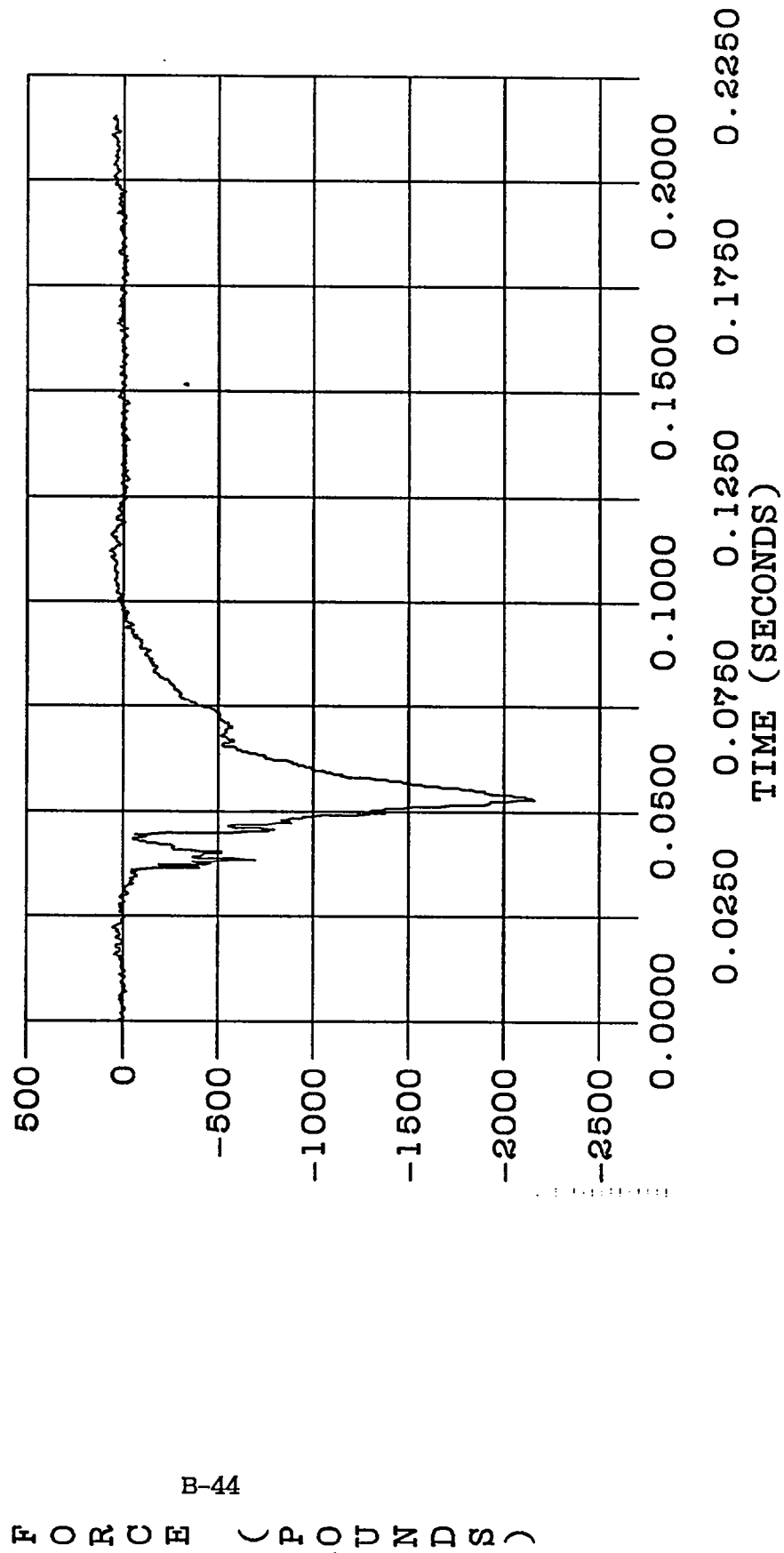
1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91
DRIVER CHEST RES ACC



Driver Chest Resultant Acceleration vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91

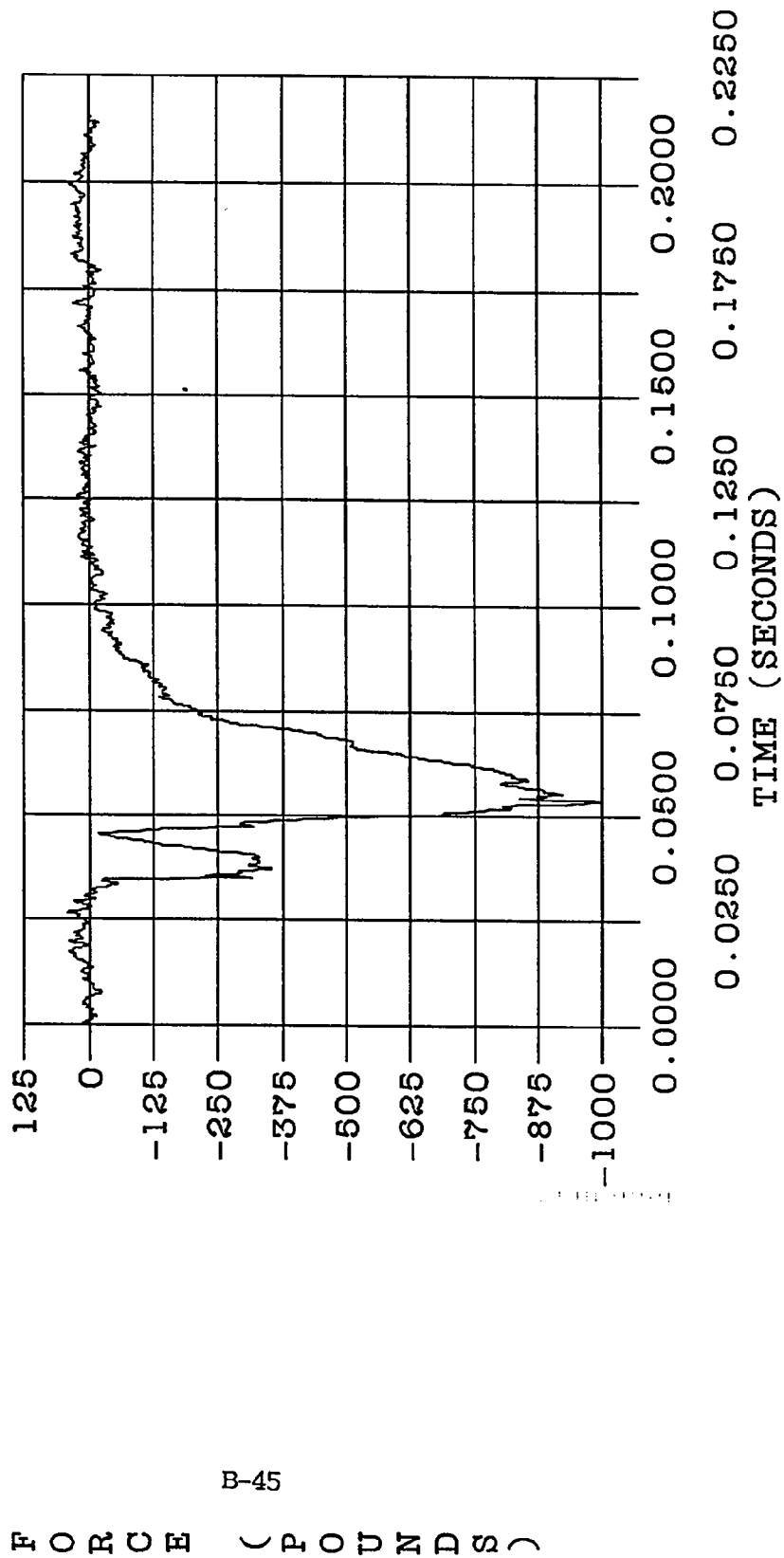
DRIVER RH FEMUR FORCE



Driver Right Femur Force vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91

DRIVER LH FEMUR FORCE

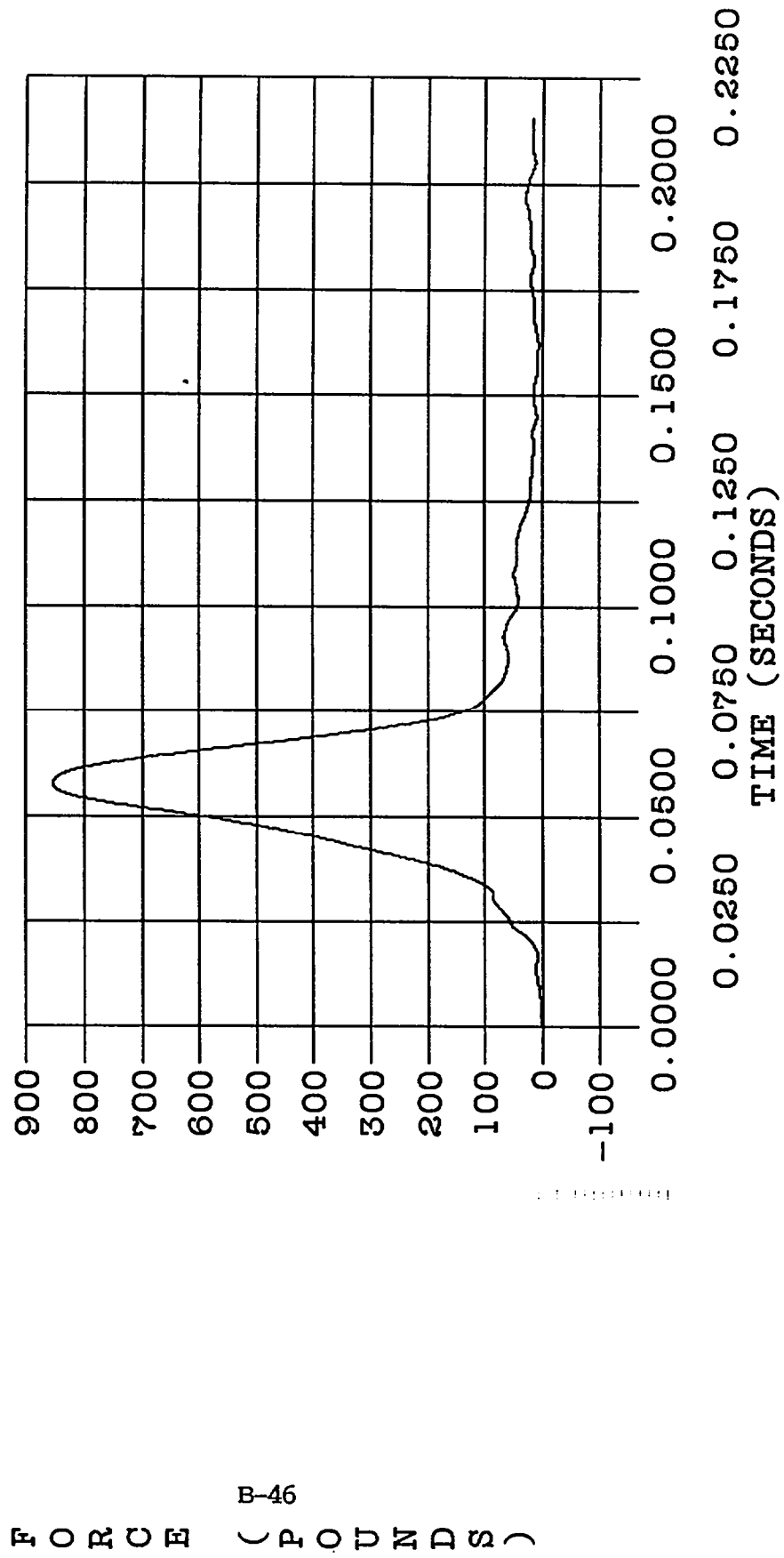


B-45

Driver Left Femur Force vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91

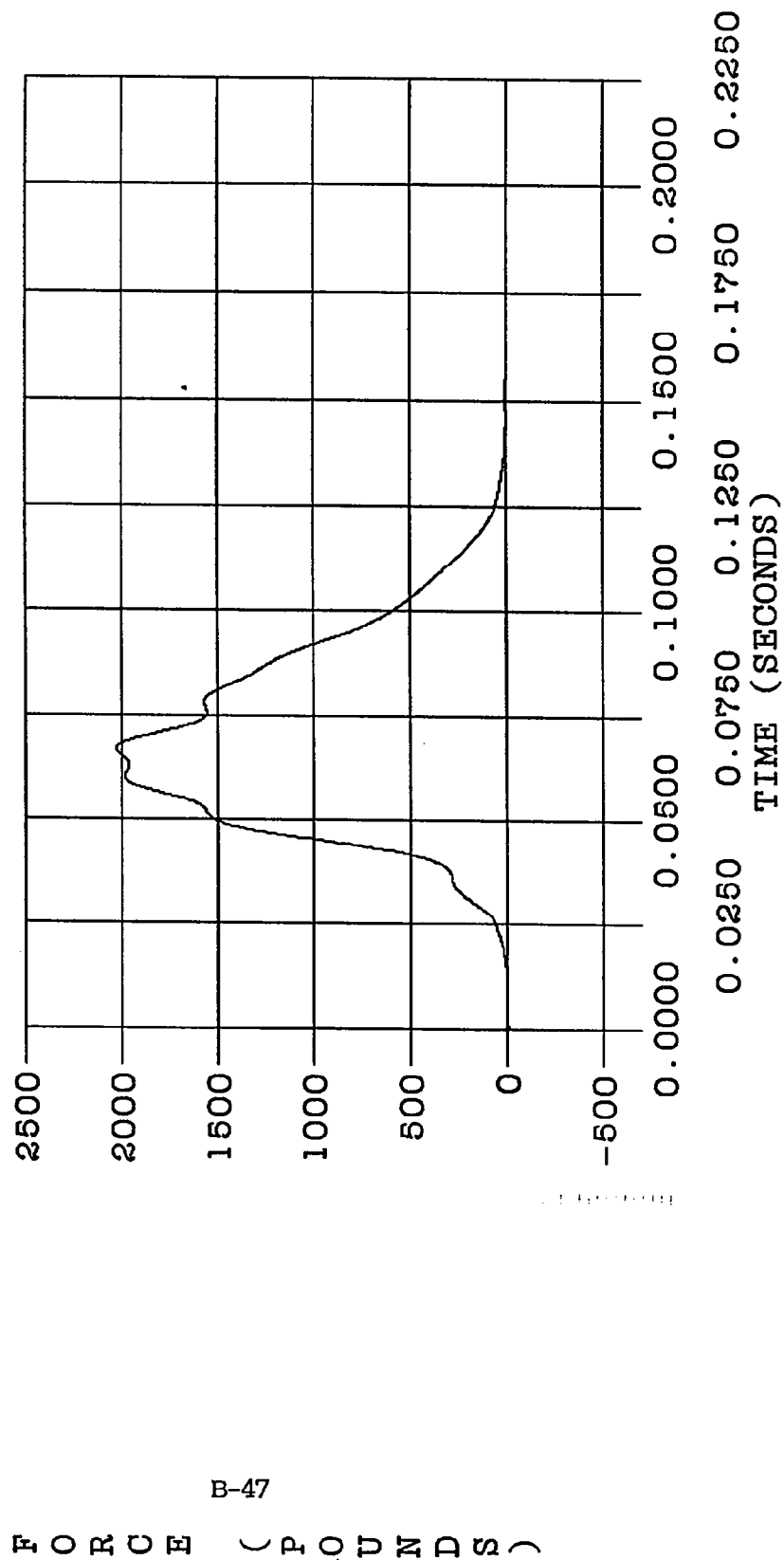
DRIVER LAP BELT



Driver Lap Belt Force vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91

DRIVER TORSO BELT

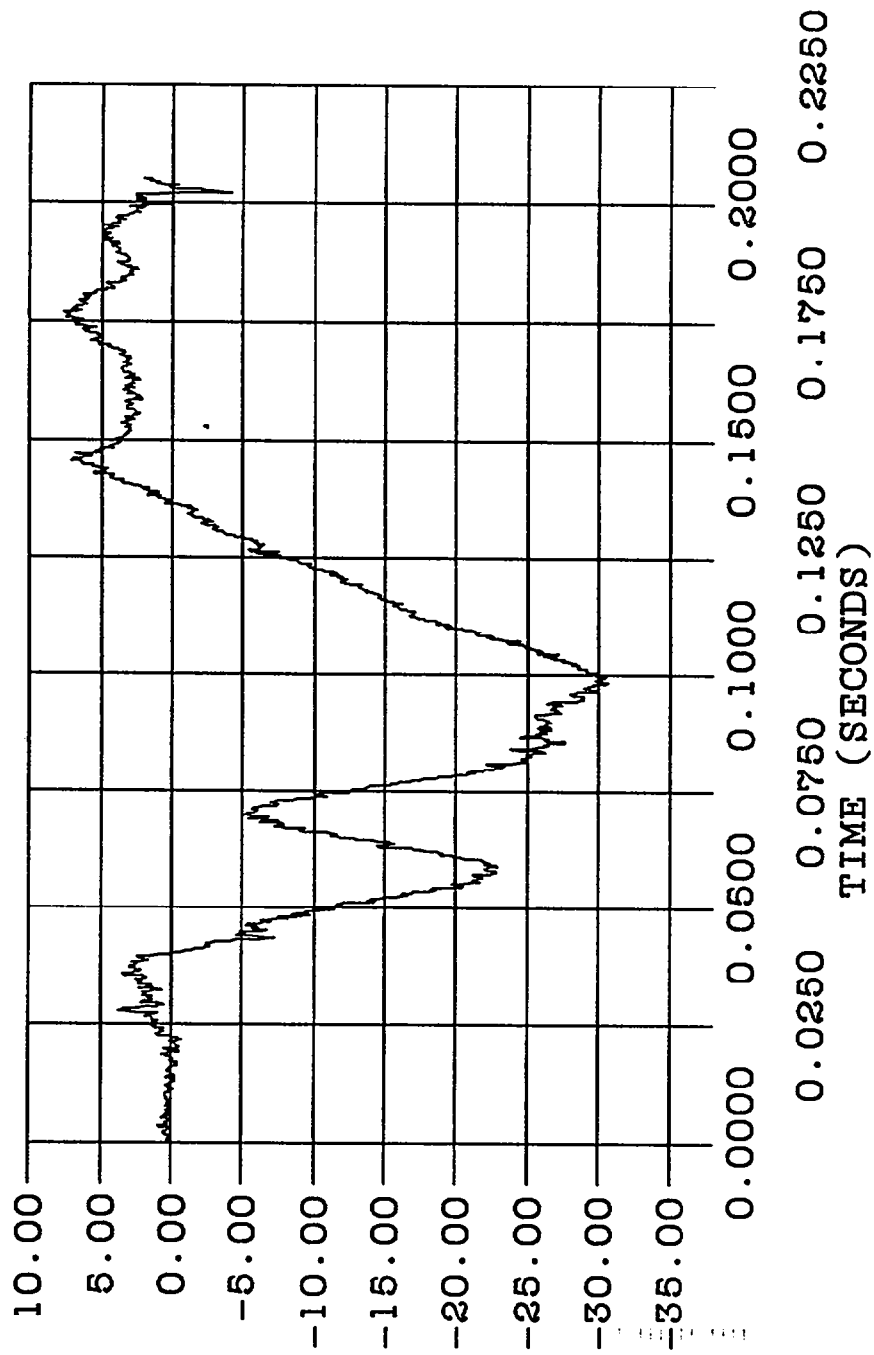


Driver Torso Belt Force vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91

PASS HEAD X ACC

ACCELERATION (G, S)

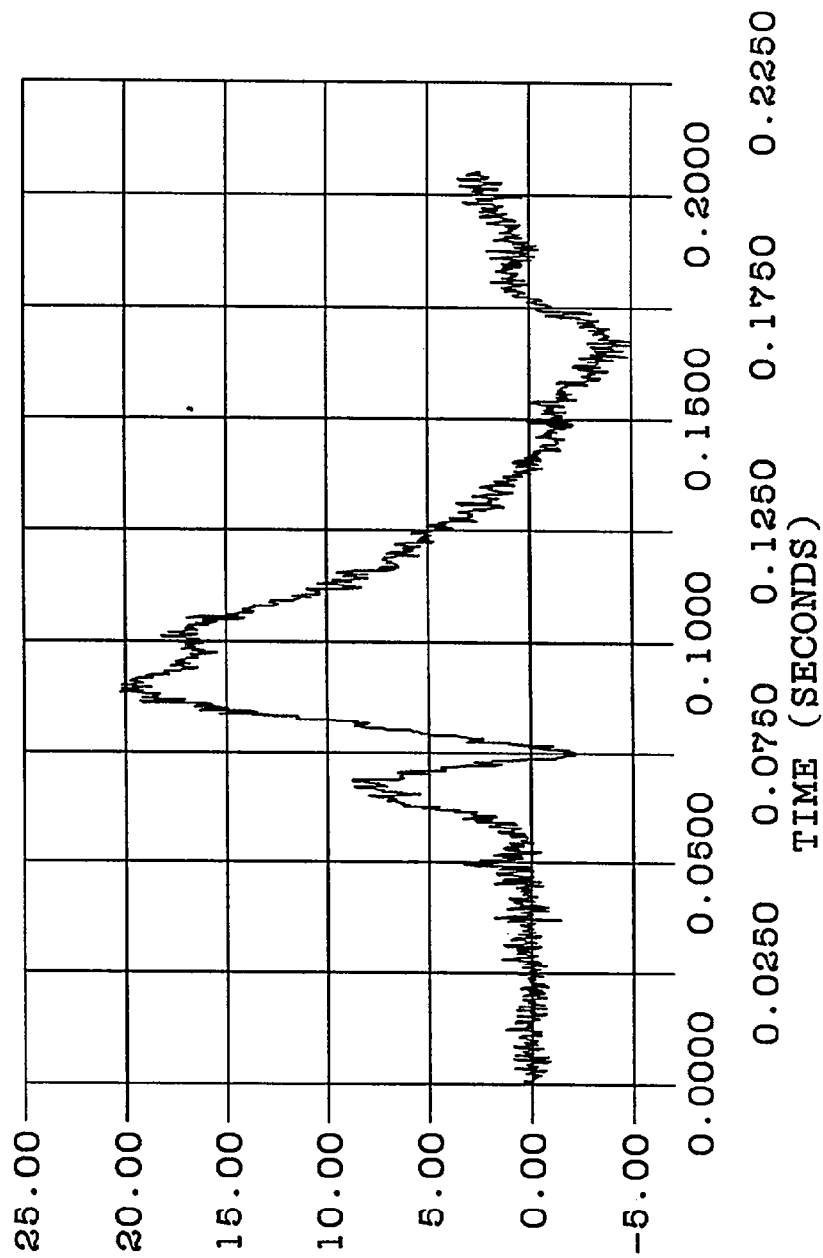


Passenger Head X Acceleration vs. Time

ACCELERATION (G, S)

B-49

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91
PASS HEAD Y ACC

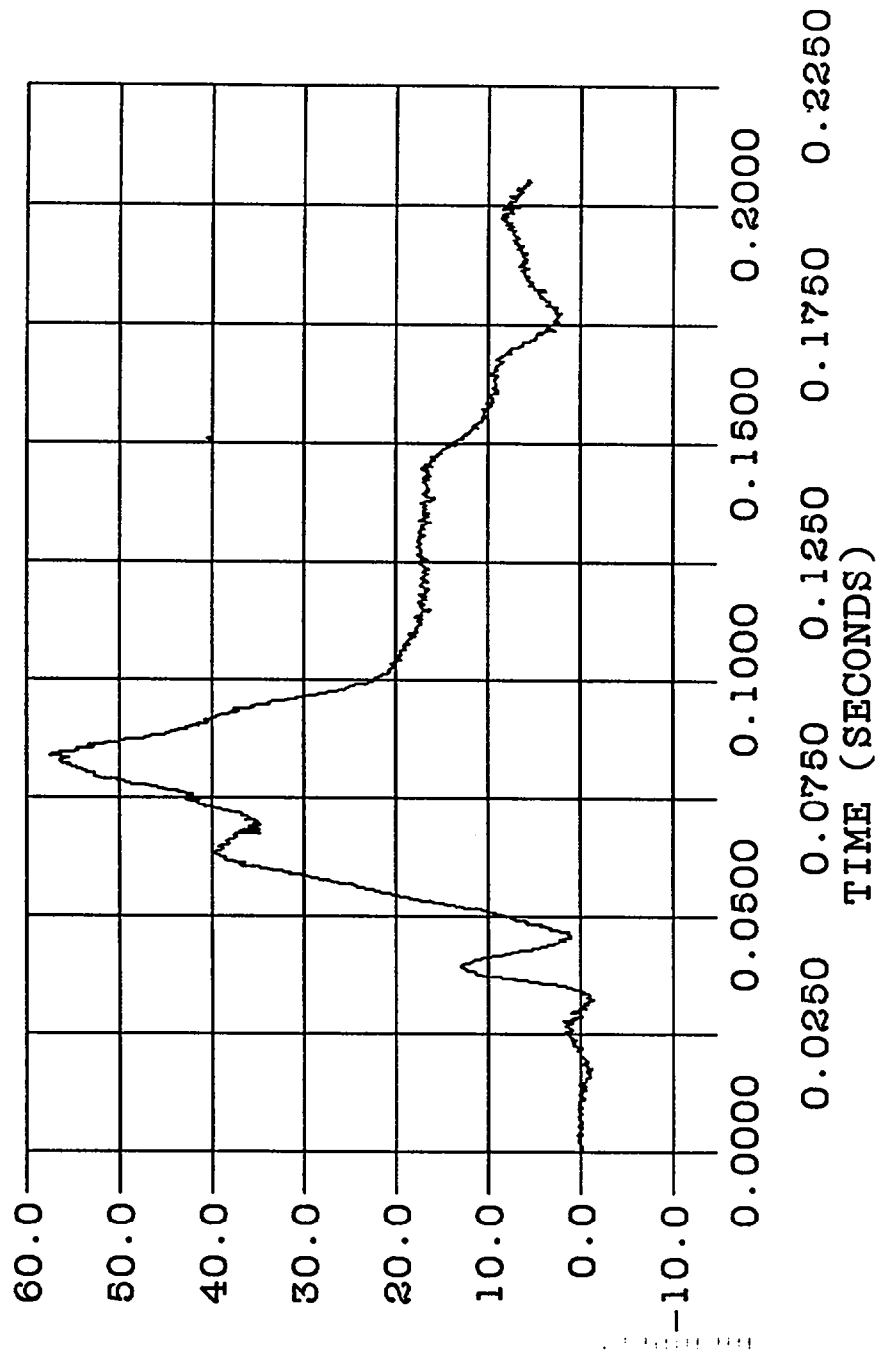


Passenger Head Y Acceleration vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91

PASS HEAD Z ACC

ACCELERATION (G, S)

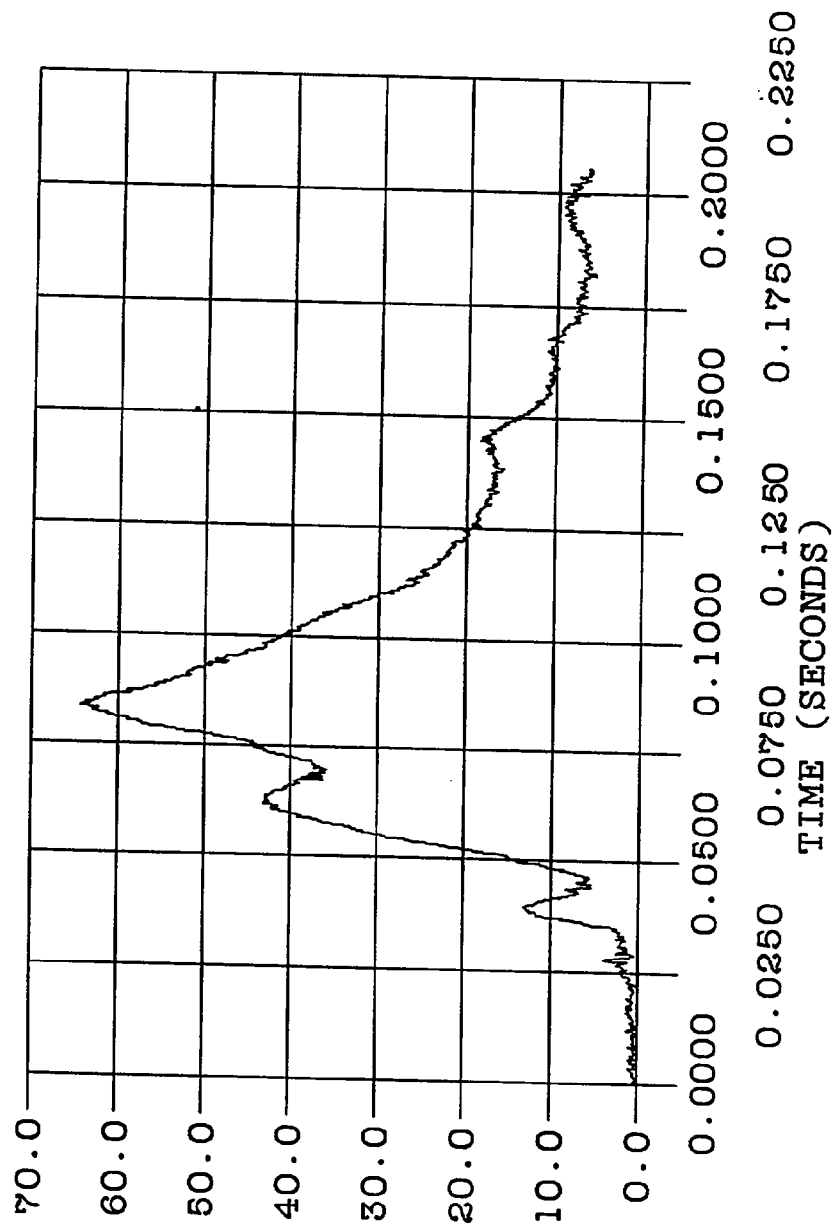


Passenger Head Z Acceleration vs. Time

ACCELERATION (G, S)

B-51

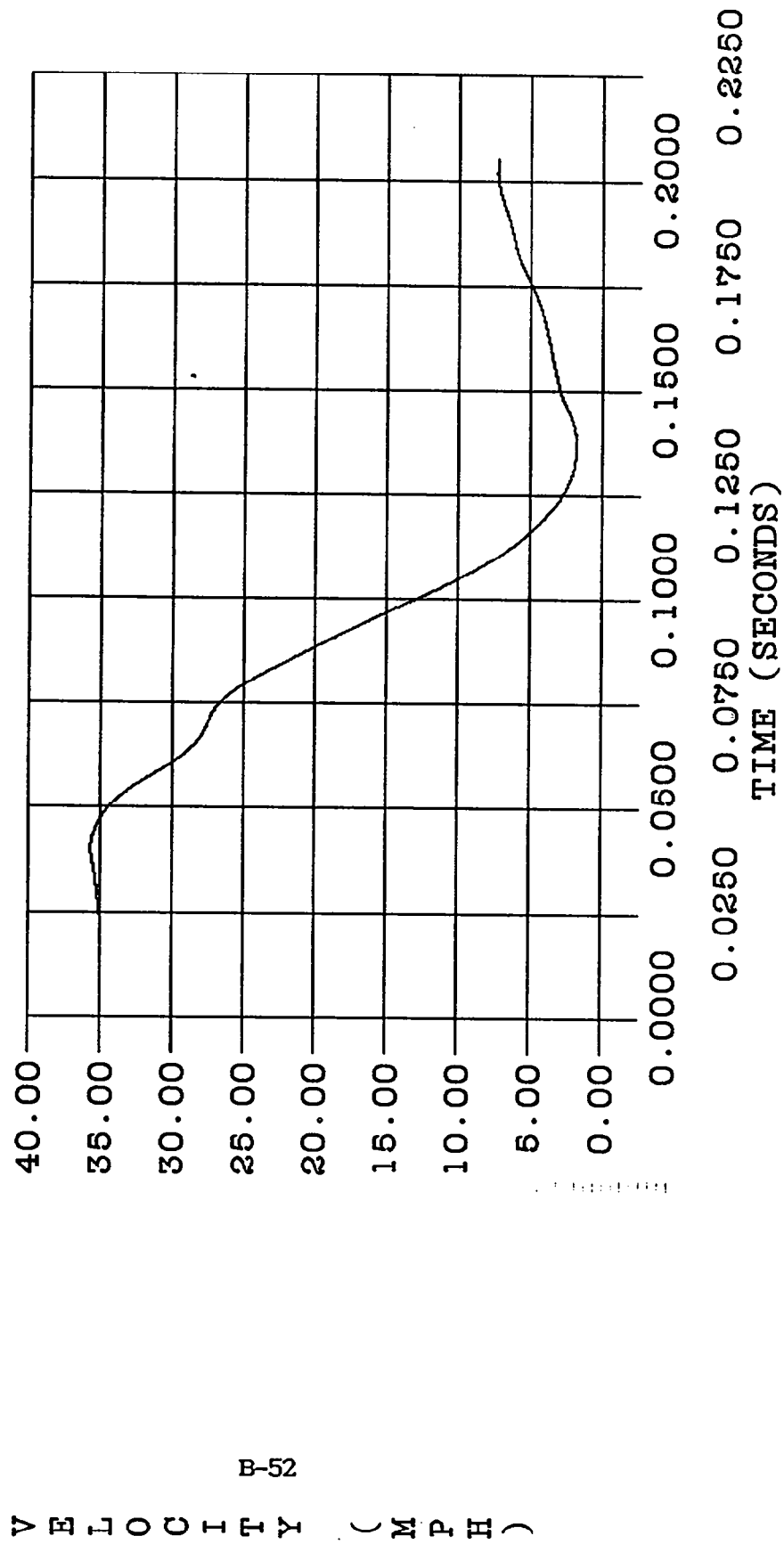
1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91
PASS HEAD RES ACC



Passenger Head Resultant Acceleration vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91

PASS HEAD X VEL



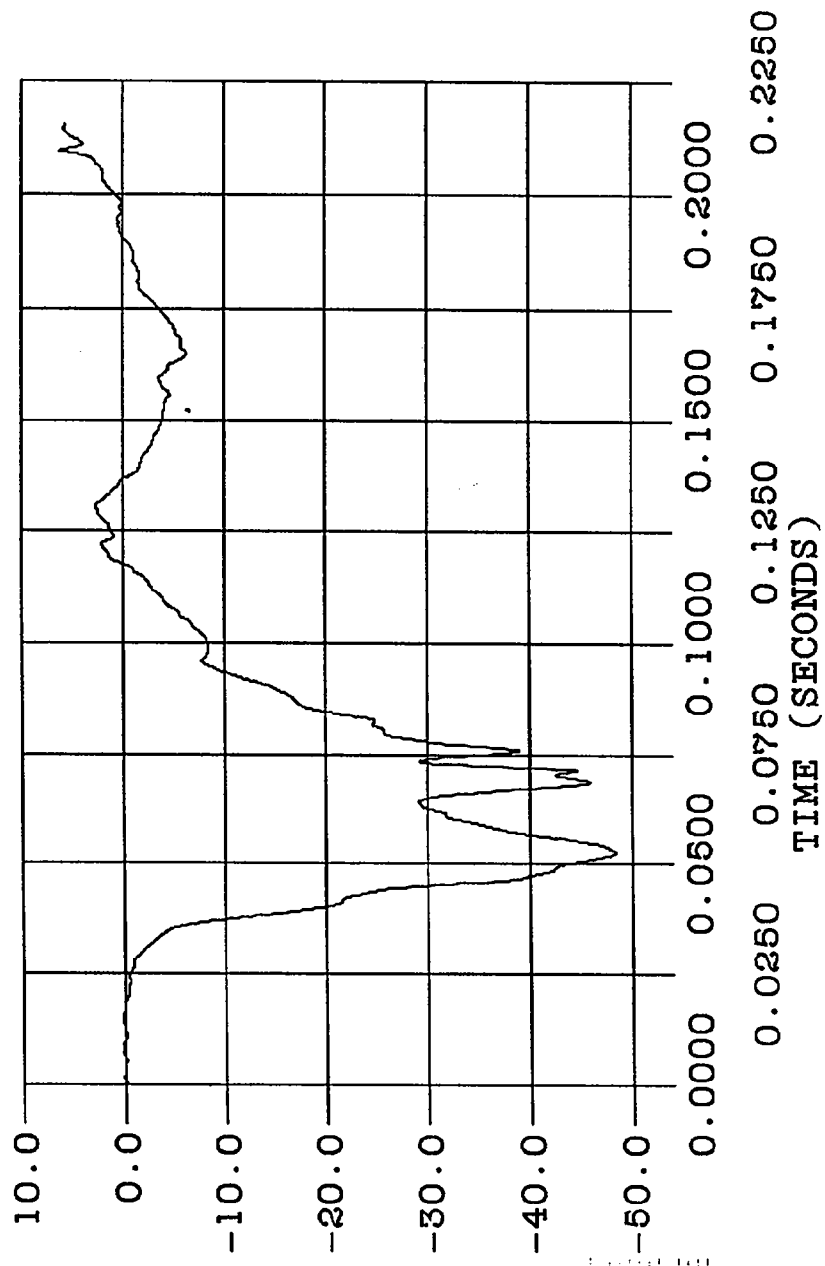
B-52

Passenger Head X Velocity vs. Time

ACCELERATION (G, S)

P-53

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91
PASS CHEST X ACC

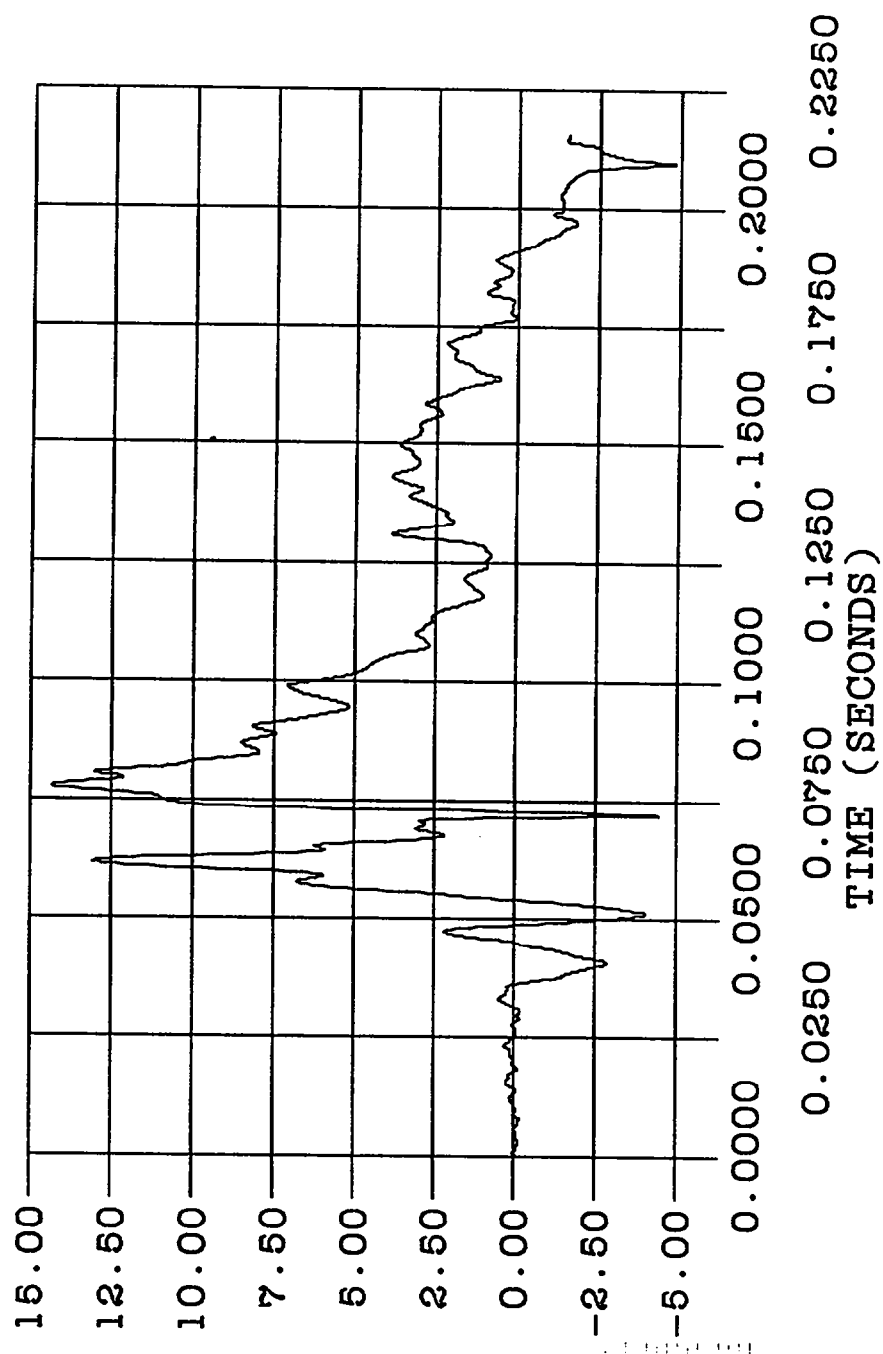


Passenger Chest X Acceleration vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91

PASS CHEST Y ACC

ACCELERATION (G, S)

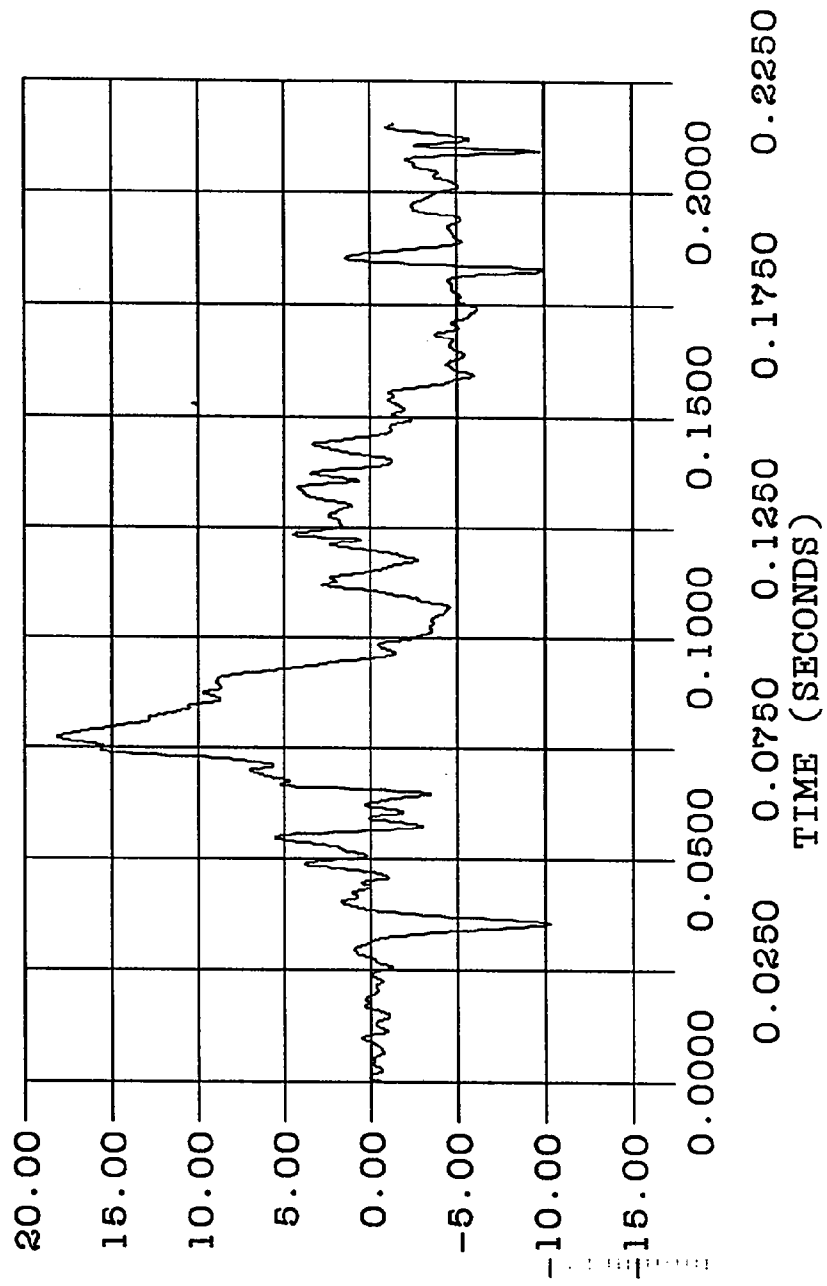


Passenger Chest Y Acceleration vs. Time

ACCELERATION (G, S)

B-55

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91
PASS CHEST Z ACC



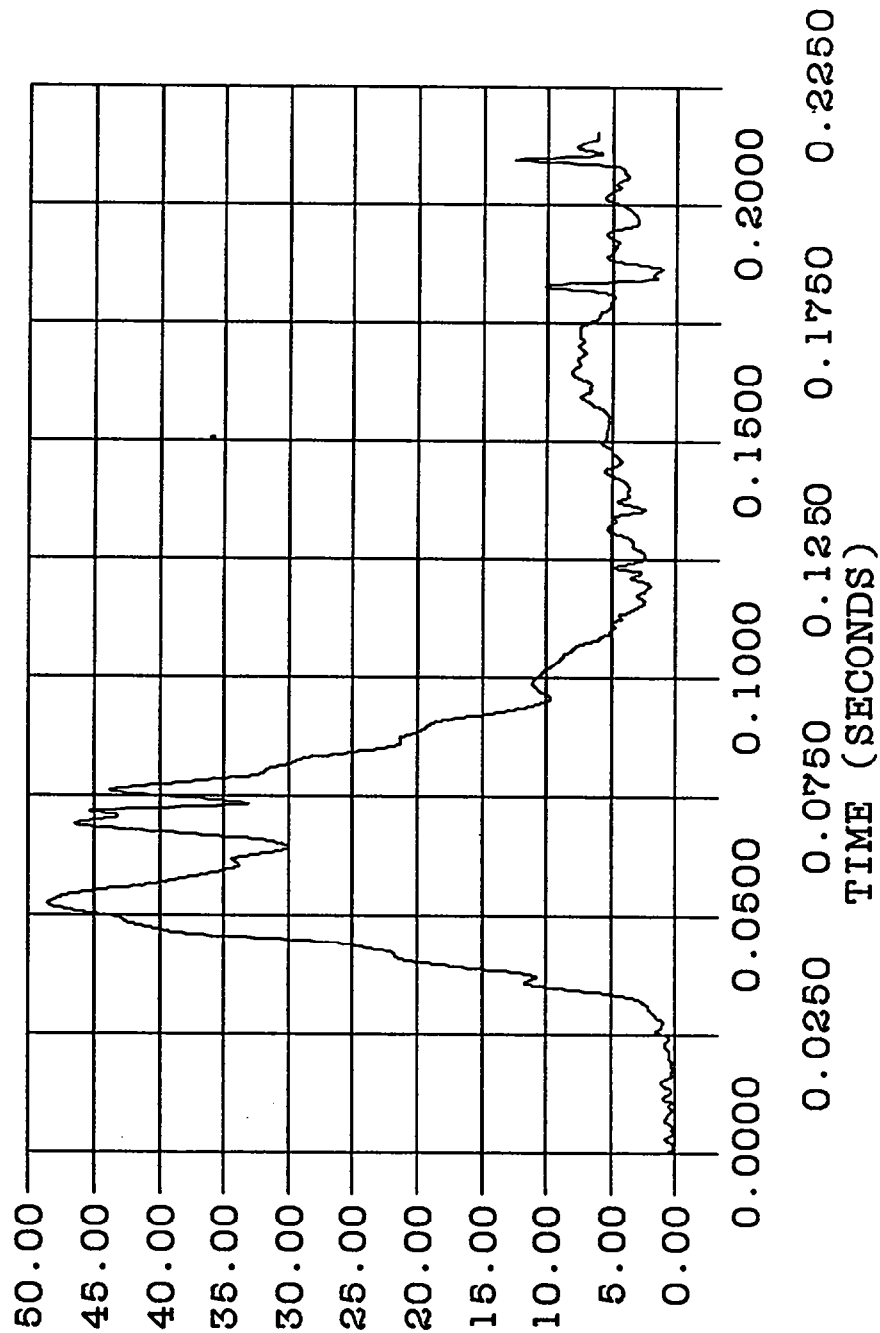
Passenger Chest Z Acceleration vs. Time

A C C E L E R A T I O N (G , S)

B-56

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91

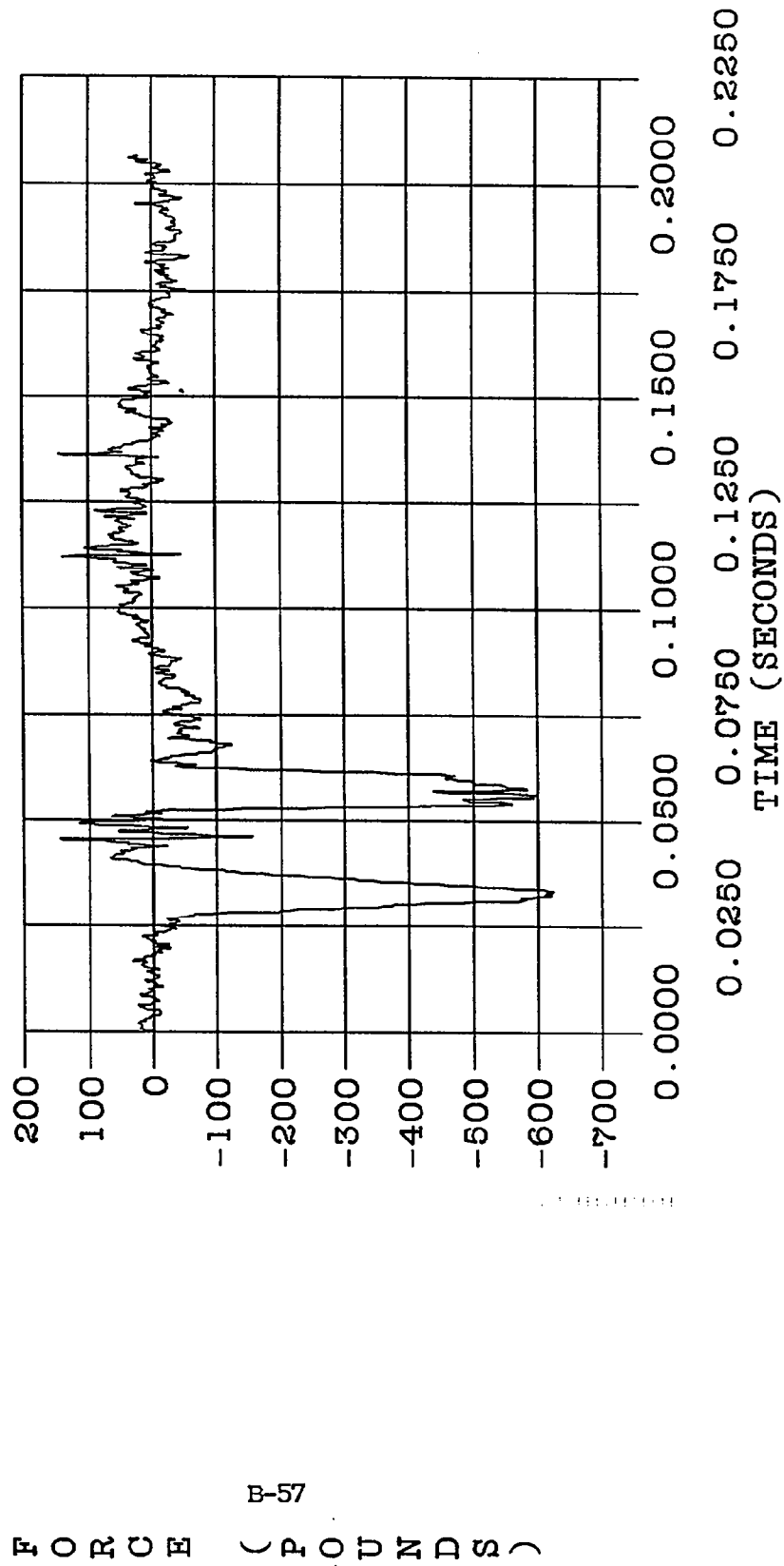
PASS CHEST RES ACC



Passenger Chest Resultant Acceleration vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91

PASS RH FEMUR FORCE

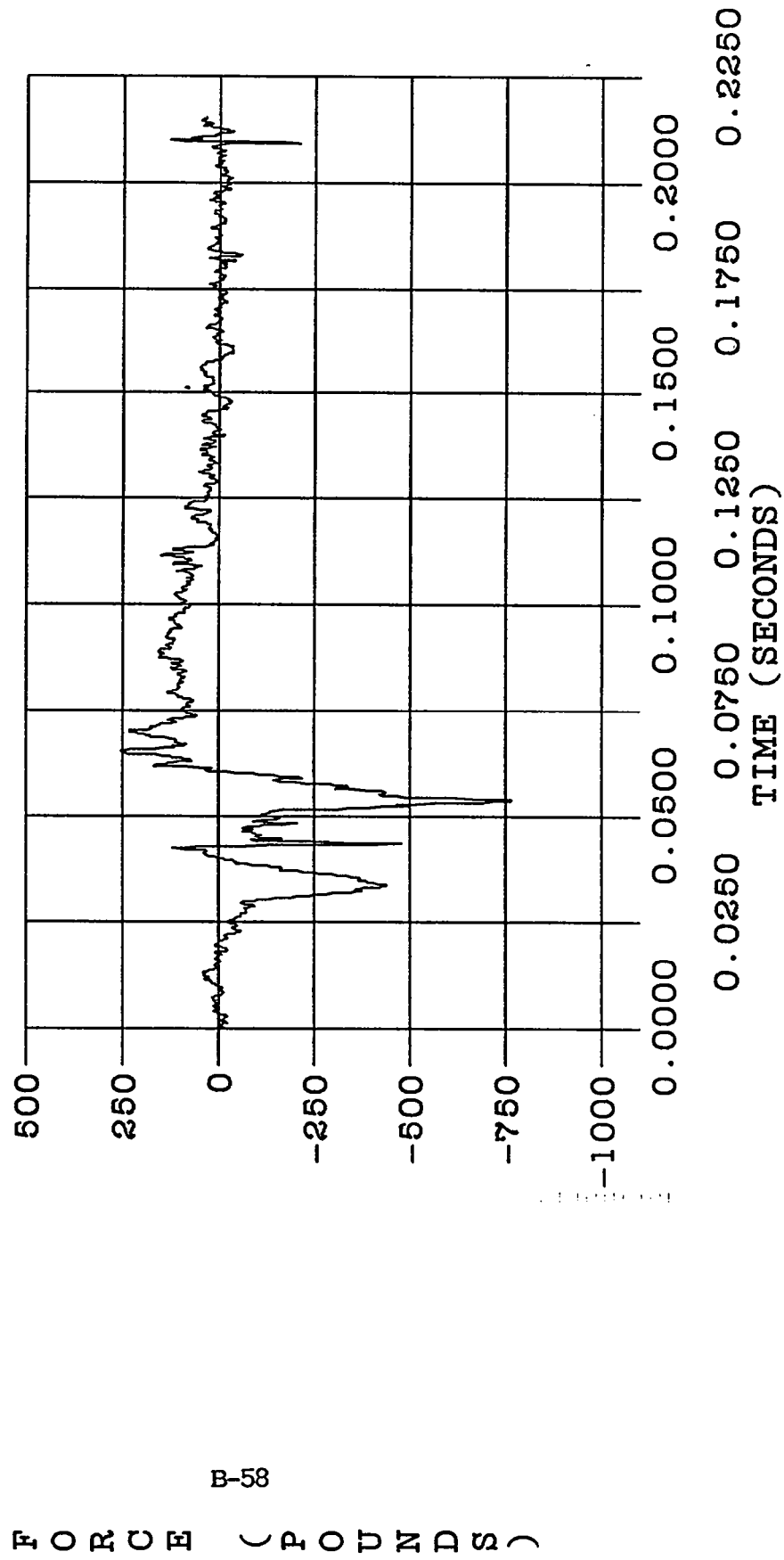


B-57

Passenger Right Femur Force vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91

PASS LH FEMUR FORCE



Passenger Left Femur Force vs. Time

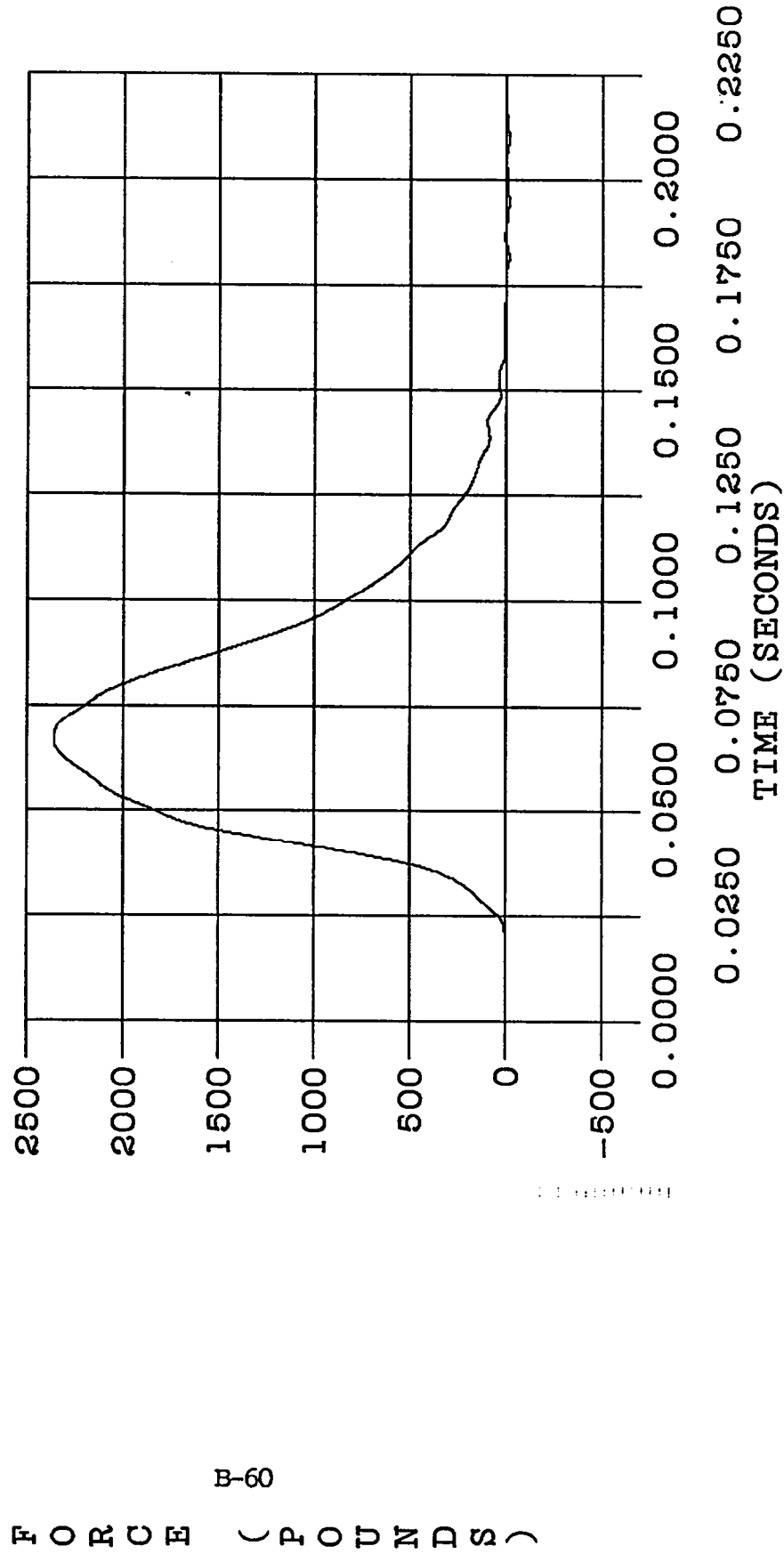
DATA PLOT NOT AVAILABLE

NO VALID DATA COLLECTED

Passenger Lap Belt Force vs. Time

1991 HONDA CIVIC NCAP TEST TEST DATE: 01/27/91

PASS TORSO BELT



Passenger Torso Belt Force vs. Time

APPENDIX C

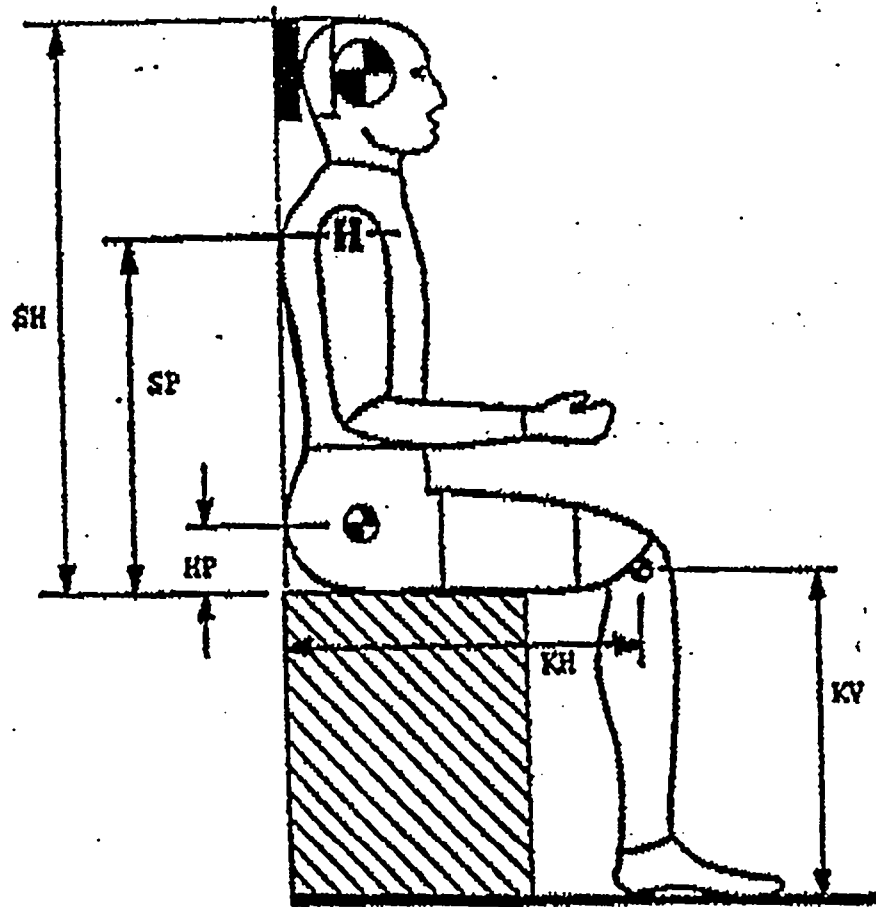
**PART 572 B/E DUMMY CONFIGURATION
AND PERFORMANCE VERIFICATION
DATA SHEETS**

i

PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

NHTSA DUMMY I.D. NO.: 465

I. CONFIGURATION VERIFICATION DATA:



	PART 572 SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
DATE OF CONFIGURATION VERIFICATION		12/19/90	N/A
VERIFICATION NUMBER FOR DUMMY*		1	N/A
SH - Seated Height	35.6 to 35.8"	35.6	N/A
SP - Shoulder Pivot Height	21.8 to 22.4"	22.3	N/A
HP - Hip Pivot Height	3.9" ref.	3.9	N/A
KH - Knee Pivot from back line	20.1 to 20.7"	20.5	N/A
KV - Knee Pivot from floor	19.3 to 19.9"	19.5	N/A
SW - Shoulder Width	17.8 to 18.4"	18.0	N/A
HW - Hip Width	14.0 to 15.4"	14.25	N/A

TECHNICIAN'S NAME: Kevin Heckel

Sequential number beginning with "1" at the start of each fiscal year's crash test program

DUMMY CONFIG. & PERF. VERIF. DATA...continued:

II. PERFORMANCE VERIFICATION DATA:

NHTSA DUMMY I.D. NO.: 465

TECHNICIAN'S NAME: Kevin Heckel

		PRE-TEST (if required)	POST-TEST (if required)	
DATE OF PERFORMANCE VERIFICATION		12/17/90	N/A	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY*		1	N/A	
VERIF. LAB. TEMPERATURE (66 TO 78°F Range)		76 °F	N/A °F	
VERIF. LAB. HUMIDITY (10 to 70% Range)		60 %	N/A %	
TEST PARAMETER	SPECIFICATION			
1. HEAD DROP TEST--				
a. Peak Resultant Accel.	210 to 260G	220.0	N/A	
b. Peak Lateral Acce.	-10G	6.50	N/A	
c. Time above 100G	0.9 to 1.5ms	1.3	N/A	
2. NECK BENDING TEST--				
a. Pendulum Speed	21.5 to 25.5fps	23.8	N/A	
b. Pend. Avg. Decel. over $t_3 - t_2$	20 to 24G	22.9	N/A	
c. Peak Resultant Head Acceleration	26G max.	25.9	N/A	
d. Pendulum Deceleration ($t_2 - t_1$)	-3ms	2.3	N/A	
e. Pendulum Deceleration ($t_3 - t_2$)	25 to 30ms	27.4	N/A	
f. Pendulum Deceleration ($t_4 - t_3$)	-10ms	7.6	N/A	
g. Max. Head Rotation	63 to 73°	64.4	N/A	
h. Chordal Displacement Head Rotation Angle				
0°	Time	-2 to 2ms	0	N/A
	Displ.	-.5 to .5"	0.0	N/A
30°	Time	25.6 to 34.4ms	29.5	N/A
	Displ.	2.1 to 3.1"	2.6	N/A
60°	Time	40.3 to 51.7ms	47.9	N/A
	Displ.	4.3 to 5.3"	4.8	N/A
Maximum (°)	Time	53.2 to 66.8ms	58.7	N/A
	Displ.	5.0 to 6.0"	5.2	N/A

*beginning with "1" at the start of each fiscal year's crash test program

DUMMY CONFIG. & PERF. VERIF. DATA...continued:

II. PERFORMANCE VERIFICATION DATA:

NHTSA DUMMY I.D. NO.:465

TECHNICIAN'S NAME: Kevin Heckel

TEST PARAMETER		SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
2. NECK BENDING TEST-- <u>Continued</u>				
h. Chordal Displacement Head Rotation Angle				
60°	Time	67.0 to 83.0ms	69.4	N/A
	Displ.	4.3 to 5.3 in.	4.8	N/A
30°	Time	85.4 to 104.6ms	91.5	N/A
	Displ.	2.1 to 3.1 in	2.4	N/A
0°	Time	101.0 - 123.0ms	106.5	N/A
	Displ.	-.3 to 0.5 in	0.1	N/A
3. ABDOMINAL COMP. TEST (Preload = 10 lbs)				
a. Force @ .5"		23.3 to 36.5 lb	33.0	N/A
b. Force @ .75"		36.7 to 49.8 lb	45.4	N/A
c. Force @ 1.0"		50 to 63 lbs.	60.5	N/A
d. Force @ 1.3"		73 to 88 lbs.	86.6	N/A
4. LUMBAR FLEXION TEST				
a. Force @ 20°		22 to 34 lbs.	29.9	N/A
b. Force @ 30°		34 to 46 lbs.	40.1	N/A
c. Force @ 40°		46 to 58 lbs.	54.3	N/A
d. Return Angle		12° maximum	10.8	N/A
5. CHEST IMPACT TESTS				
a. High Speed :				
(1) Probe Speed		21.78-22.22 fps	22.0	N/A
(2) Peak Deflection		1.7" maximum	1.5	N/A
(3) Peak Resistive Force		2250 lbs. max.	2186.8	N/A
(4) Internal Hysteresis		50 to 70%	56.0%	N/A
b. Low Speed				
(1) Probe Speed		13.86-14.14fps	13.9	N/A
(2) Peak Deflection		1.1" maximum	0.83	N/A
(3) Peak Resistive Force		1450 lbs. max.	1359.7	N/A
(4) Internal Hysteresis		50 to 70%	54.9%	N/A
6. KNEE IMPACT TESTS				
a. Right Side				
(1) Probe Speed		6.76 to 7.04fps	7.0	N/A
(2) Maximum Force		1850 to 2500lbs	1853.7	N/A
(3) Time Above 1000#		1.7 as minimum	11.8	N/A
b. Left Side				
(1) Probe Speed		6.76 to 7.04fps	7.0	N/A
(2) Maximum Force		1850 to 2500lbs	2051.5	N/A
(3) Time Above 1000#		1.7 as minimum	1.75	N/A

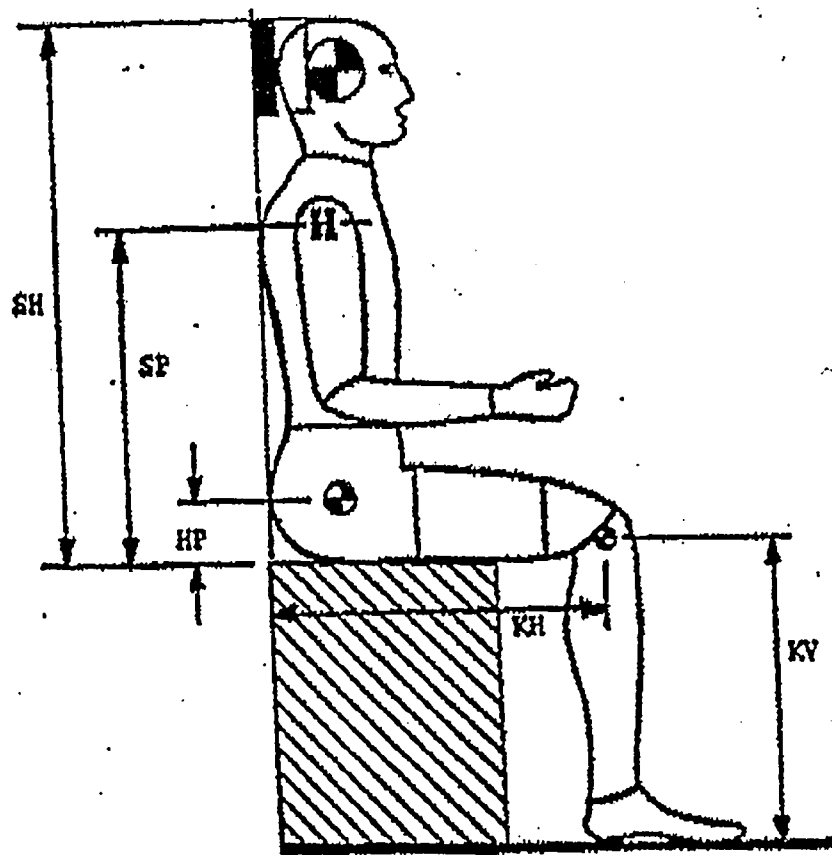
REMARKS:

None

PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

NHTSA DUMMY I.D. NO.: 466

I. CONFIGURATION VERIFICATION DATA:



	PART 572 SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
DATE OF CONFIGURATION VERIFICATION		12/19/90	N/A
VERIFICATION NUMBER FOR DUMMY*		1	N/A
SH - Seated Height	35.6 to 35.8"	35.6	N/A
SP - Shoulder Pivot Height	21.8 to 22.4"	21.9	N/A
HP - Hip Pivot Height	3.9" ref.	3.9	N/A
KH - Knee Pivot from back line	20.1 to 20.7"	20.18	N/A
KV - Knee Pivot from floor	19.3 to 19.9"	19.4	N/A
SW - Shoulder Width	17.8 to 18.4"	18	N/A
HW - Hip Width	14.0 to 15.4"	14.75	N/A

TECHNICIAN'S NAME: Kevin Heckel

Sequential number beginning with "1" at the start of each fiscal year's crash test program

DUMMY CONFIG. & PERF. VERIF. DATA...continued:

II. PERFORMANCE VERIFICATION DATA:

NHTSA DUMMY I.D. NO.: 466

TECHNICIAN'S NAME: Kevin Heckel

		PRE-TEST (if required)	POST-TEST (if required)
DATE OF PERFORMANCE VERIFICATION		12/17/90	N/A
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY*		1	N/A
VERIF. LAB. TEMPERATURE (66 TO 78°F Range)		76 °F	N/A °F
VERIF. LAB. HUMIDITY (10 to 70% Range)		60 %	N/A %
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST---			
a. Peak Resultant Accel.	210 to 260G	215	N/A
b. Peak Lateral Acce.	-10G	6.3	N/A
c. Time above 100G	0.9 to 1.5ms	1.3	N/A
2. NECK BENDING TEST---			
a. Pendulum Speed	21.5 to 25.5fps	23.9	N/A
b. Pend. Avg. Decel. over $t_3 - t_2$	20 to 24G	22.7	N/A
c. Peak Resultant Head Acceleration	26G max.	22.9	N/A
d. Pendulum Deceleration ($t_2 - t_1$)	-3ms	2.4	N/A
e. Pendulum Deceleration ($t_3 - t_2$)	25 to 30ms	27.7	N/A
f. Pendulum Deceleration ($t_4 - t_3$)	-10ms	7.3	N/A
g. Max. Head Rotation	63 to 73°	67.1	N/A
h. Chordal Displacement Head Rotation Angle			
0°	Time	-2 to 2ms	0.0
	Displ.	-.5 to .5"	0.0
30°	Time	25.6 to 34.4ms	28.6
	Displ.	2.1 to 3.1"	2.6
60°	Time	40.3 to 51.7ms	45.3
	Displ.	4.3 to 5.3"	4.9
Maximum (°)	Time	53.2 to 66.8ms	59.0
	Displ.	5.0 to 6.0"	5.4

*beginning with "1" at the start of each fiscal year's crash test program

DUMMY CONFIG. & PERF. VERIF. DATA...continued:

II. PERFORMANCE VERIFICATION DATA:

NHTSA DUMMY I.D. NO.:466

TECHNICIAN'S NAME: Kevin Heckel

TEST PARAMETER		SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
2. NECK BENDING TEST--				
Continued				
h. Chordal Displacement				
Head Rotation Angle				
60°	Time	67.0 to 83.0ms	71.8	N/A
	Displ.	4.3 to 5.3 in.	4.8	N/A
30°	Time	85.4 to 104.6ms	91.2	N/A
	Displ.	2.1 to 3.1 in	2.4	N/A
0°	Time	101.0 - 123.0ms	104.8	N/A
	Displ.	-.3 to 0.5 in	0.1	N/A
3. ABDOMINAL COMP. TEST				
(Preload = 10 lbs)				
a. Force @ .5"		23.3 to 36.5 lb	29.6	N/A
b. Force @ .75"		36.7 to 49.8 lb	48.5	N/A
c. Force @ 1.0"		50 to 63 lbs.	60.0	N/A
d. Force @ 1.3"		73 to 88 lbs.	88.0	N/A
4. LUMBAR FLEXION TEST				
a. Force @ 20°		22 to 34 lbs.	27.9	N/A
b. Force @ 30°		34 to 46 lbs.	42.3	N/A
c. Force @ 40°		46 to 58 lbs.	57.6	N/A
d. Return Angle		12° maximum	6.0	N/A
5. CHEST IMPACT TESTS				
a. High Speed				
(1) Probe Speed		21.78-22.22 fps	22.0	N/A
(2) Peak Deflection		1.7" maximum	1.5	N/A
(3) Peak Resistive Force		2250 lbs. max.	2045.2	N/A
(4) Internal Hysteresis		50 to 70%	54.1	N/A
b. Low Speed				
(1) Probe Speed		13.86-14.14fps	13.9	N/A
(2) Peak Deflection		1.1" maximum	1.1	N/A
(3) Peak Resistive Force		1450 lbs. max.	1251.2	N/A
(4) Internal Hysteresis		50 to 70%	51.0	N/A
6. KNEE IMPACT TESTS				
a. Right Side				
(1) Probe Speed		6.76 to 7.04fps	7.0	N/A
(2) Maximum Force		1850 to 2500lbs	2226.1	N/A
(3) Time Above 1000#		1.7 as minimum	1.7	N/A
b. Left Side				
(1) Probe Speed		6.76 to 7.04fps	7.0	N/A
(2) Maximum Force		1850 to 2500lbs	2172.4	N/A
(3) Time Above 1000#		1.7 as minimum	1.75	N/A

REMARKS:

None

FY- 90 TEST PROGRAM DELIVERY ORDER NO.: 91046 (DATE: 11/19/90) NOTE: Separate Log Sheet is Required for Each GTE Test Dummy.

[CRASH]														
TEST	TEST VEHICLE	VEHICLE	CRASH	DUMMY USAGE	PRE-TEST	STD.208	POST-TEST							
USAGE	YEAR/MAKE/MODEL/BODY STYLE	NHTSA NO.	TEST DATE	IN VEHICLE	VERIFICATION	FAILURE	VERIFICATION							
NO.	YEAR/MAKE/MODEL/BODY STYLE	NHTSA NO.	TEST DATE	DRIVER/PASS.	NO.	DATE	MODE	NO.	DATE	REMARKS:				
1	1991 Honda Civic DX	001	12/20/90	x	1	12/19/90	Pass		N/A					
	4 Door Sedan													
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														

PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION TEST LOG SHEET

LAB. NAME: MGA Research ; CONTRACT NO.: DTNH22- 90 - D - 12121 ; DUMMY I.D. NO.: 466

FY: 90 TEST PROGRAM DELIVERY ORDER NO.: 91046 (DATE: 11/19/90) NOTE: Separate Log Sheet is Required for Each GTE Test Dummy.

TEST	CRASH	VEHICLE	DUMMY USAGE		PRE-TEST		STD. 208		POST-TEST	
			IN VEHICLE	DRIVER/PASS.	NO.	DATE	FAILURE	VERIFICATION		
NO.	YEAR/MAKE/MODEL/BODY STYLE	NHTSA NO.	TEST DATE	DATE	NO.	DATE	MODE	NO.	DATE	REMARKS:
1	1991 Honda Civic DX	001	12/20/90	x	1	12/19/90	Pass		N/A	
2	4 Door Sedan									
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										

APPENDIX D

DUMMY, VEHICLE, AND LABORATORY
INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY:

	DRIVER			calibration	
	Serial #	Manufacturer	Last	Next	
Head X Y Z	DK74J	Endevco	10/90	04/91	
	ED47J	Endevco	10/90	04/91	
	EA45J	Endevco	10/90	04/91	
Chest X Y Z	EC40J	Endevco	10/90	04/91	
	ED0875	Endevco	10/90	04/91	
	DR22J	Endevco	10/90	04/91	
Right Femur Load Cell Left Femur Load Cell	957	GSE	11/90	05/91	
	956	GSE	11/90	05/91	
	N/A	N/A	N/A	N/A	
*Neck Load Cell X Y Z	N/A	N/A	N/A	N/A	
	N/A	N/A	N/A	N/A	
	N/A	N/A	N/A	N/A	
*Neck Moment X Y Z	N/A	N/A	N/A	N/A	
	N/A	N/A	N/A	N/A	
	N/A	N/A	N/A	N/A	
	N/A	N/A	N/A	N/A	
	N/A	N/A	N/A	N/A	
	N/A	N/A	N/A	N/A	
*Chest Deflection Gauge *Hybrid III Use Only	N/A	N/A	N/A	N/A	
	N/A	N/A	N/A	N/A	
	N/A	N/A	N/A	N/A	
Lap Belt Load Cells	661	GSE	11/90	05/91	
Shoulder Belt Load Cells	568	Lebow	11/90	05/91	
Spool-Out Potentiometer	N/A	N/A	N/A	N/A	
Belt Stretch Transducer	N/A	N/A	N/A	N/A	

DUMMY, VEHICLE, AND LABORATORY INSTRUMENT CALIBRATION (6 month cals. min.) (cont'd)

INSTRUMENTS FOR DUMMY:

PASSENGER				
	Serial #	Manufacturer	calibration	
			Last	Next
Head X Y Z	EC45J	Endevco	10/90	04/91
	ED15J	Endevco	10/90	04/91
	DJ87J	Endevco	10/90	04/91
Chest X Y Z	AA20	Endevco	10/90	04/91
	EA71J	Endevco	10/90	04/91
	DK21J	Endevco	10/90	04/91
Right Femur Load Cell	959	GSE	11/90	05/91
Left Femur Load Cell	959	GSE	11/90	05/91
*Neck Load Cell X Y Z	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A
*Neck Moment X Y Z	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A
*Chest Deflection Gauge *Hybrid III Use Only	N/A	N/A	N/A	N/A
Lap Belt Load Cells	211	Lebow	11/90	05/91
Shoulder Belt Load Cells	664	Lebow	11/90	05/91
Spool-Out Potentiometer	N/A	N/A	N/A	N/A
Belt Stretch Transducer	N/A	N/A	N/A	N/A

DUMMY, VEHICLE, AND LABORATORY INSTRUMENT CALIBRATION (6 month cals. min.) (cont'd)

VEHICLE ACCELEROMETERS

	Serial #	Manufacturer	calibration	
			Last	Next
Left Seat Rear Crossmem.	2270026	Kyowa	10/90	04/91
RT Rear Seat Crossmember	3211029	Kyowa	10/90	04/91
Top of Engine	AZ74	Endevco	10/90	04/91
Bottom of Engine	EA04J	Endevco	10/90	04/91
Left Disc Brake Caliper	DM44J	Endevco	10/90	04/91
Right Disc Brake Caliper	DW02J	Endevco	10/90	04/91
Instrument Panel	2270030	Kyowa	10/90	04/91
Center Rear Crossmember Z	1760009	Kyowa	10/90	04/91
Vehicle Rear Z	1760030	Kyowa	10/90	04/91

LABORATORY INSTRUMENTS

	Serial #	Manufacturer	calibration	
			Last	Next
Neck Bending Pendulum Accelerometer	5220070	Kyowa	10/90	04/91
Neck Bending Rotary Potentiometer	N/A	Buorns	Prior to use	Prior to use
Neck Bending Linear Potentiometer	N/A	Buorns	Prior to use	Prior to use
Femur/Chest/Thorax Probe Accelerometer	5220074	Kyowa	10/09	04/91
Lumbar Flexion Force Gauge	Custom Fabricated	-	Prior to use	Prior to use
Lumbar Flexion Rotation Gauge	Custom Fabricated	-	Prior to use	Prior to use
Abdomen Compression Disp. Gauge	4356116	Computer Inst. Corp.	Prior to use	Prior to use
Abdomen Compression Force Gauge	49710	Transducers, Inc.	Prior to use	Prior to use

APPENDIX E

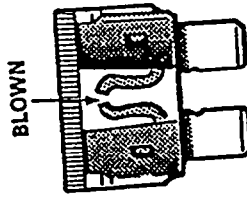
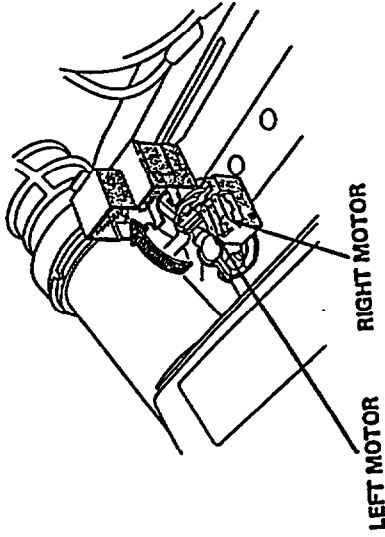
VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT
SYSTEM INSTRUCTIONS

If your car gets stuck in sand, mud, or snow, call a professional towing service for assistance in getting your car out.

CAUTION:

- Do not rev up the engine and allow the wheels to spin freely at high speed. Severe transmission damage may result if the wheels are allowed to spin for more than a few seconds.
- DO NOT try to free a car with automatic transmission from snow, etc. by rocking the car alternately between forward and reverse gears. Severe transmission damage may result from shifting into gear with the wheels moving.

- Proceed as follows if the shoulder belt buckle stalls.
1. Lift the hood and remove the cover from the fuse case (for the automatic shoulder belt buckle motor) located on the battery's ⊕ terminal.
 2. Remove the fuse for the automatic ("passive") shoulder belt buckle motor that does not work.



3. If the fuse has blown, replacing it with a new fuse of the same amperage should allow the shoulder belt buckle motor to work. However, if the fuse hasn't blown, or if a new fuse did not solve the problem, remove the fuse and operate the motor manually.

CAUTION:
Always remove the fuse before manually operating the shoulder belt buckle motor, otherwise the motor may suddenly activate.

Seat Belts

Your Honda is provided with seat belts to minimize the chance of injury to yourself and your passengers in a sudden stop or accident. For precautions on using seat belts for children, babies and pregnant women, see pages 21—25.

Seat belts are most effective when the driver and passengers are sitting up straight and well back in the seat.

WARNING

In the event of a collision, occupants not wearing seat belts could be seriously or fatally injured. Make sure you and all your passengers ALWAYS put on the seat belts before driving away.

CAUTION:

Be careful the seat belts are not damaged by catching or entangling in the door or seat mechanism.

NOTE:

The front seat belt restraint system is different on the car you use. See pages 11 through 14 for the automatic ("passive") shoulder belt system on the Sedan. See pages 15 through 18 for the automatic ("passive") lap/shoulder belt system on the Hatchback.

F
2

[Sedan]

Wearing the Front Seat Belts

The front seats have an automatic ("passive") restraint system consisting of a shoulder belt and knee bolsters. The shoulder belt should remain permanently latched. Always wear the lap belt in addition to the shoulder belt for full protection.

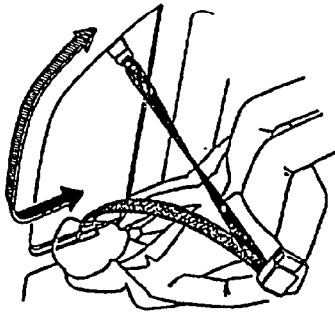
The automatic and manual belts have emergency locking retractors designed to lock only during a sudden stop or impact. Otherwise, they allow some freedom of movement in the seat.

Operation

1. Enter the car and close the door completely. Move the seat a comfortable distance from the steering wheel, sit straight up and well back in the seat.

WARNING

Never drive the car with the doors ajar. The front doors must be closed completely for the front seat belts to function properly.



2. Turn the ignition ON. The shoulder belt buckle will move to its rear locked position. The length of the shoulder belt will adjust automatically to your body and seating position.

Make sure the shoulder belt goes over your shoulder and across your body to evenly distribute the belt's restraining force. If the belt is too near your neck and throat, move toward the center of the seat.

WARNING

Normal movement of the shoulder belt buckle may cause injury. Be sure all parts of your body, especially fingers and hands, are clear of the shoulder buckle while it is moving.

CAUTION:

If the sunvisor is positioned near the door area, movement of the seat belt buckle can damage the sunvisor. Before opening or closing a front door, turning the ignition on or removing the key from the ignition, make sure the sunvisor is returned to its clip above the windshield.

NOTE:

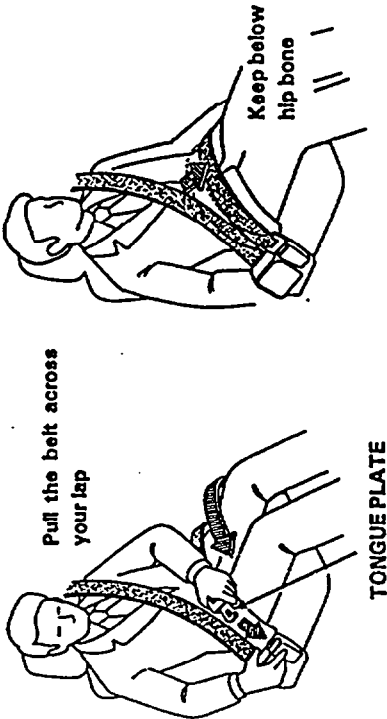
- If the door is not closed completely, the shoulder belt buckle will not move and the door warning light will come on (see page 14).
- If the door is opened with the ignition on, the buckle will release itself from its locked position and move forward.
- If the shoulder belt buckle stops halfway or does not move at all, see page 113 for shoulder belt buckle operation.

3. Take hold of the lap belt's tongue plate and pull it from its retractor. Be sure the belt is not twisted or caught on anything.

NOTE:

If pulled too fast, the belt will lock. If this happens, allow the belt to retract then pull it out more slowly.

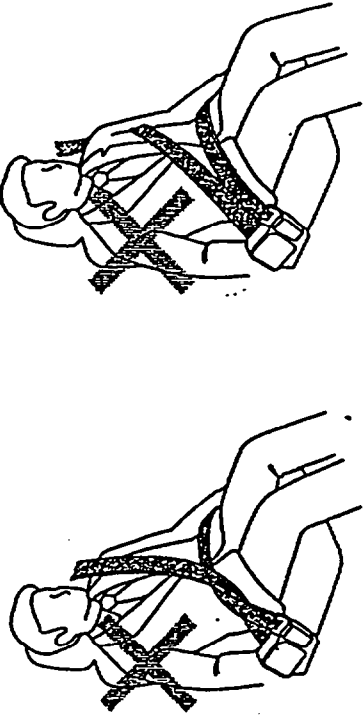
4. Push the tongue plate into the buckle until it clicks locked. Position the belt across your lap, low on your hipbone and below your abdomen. This way, if the car is involved in an accident you would be less likely to slide under the seat belts.



WARNING

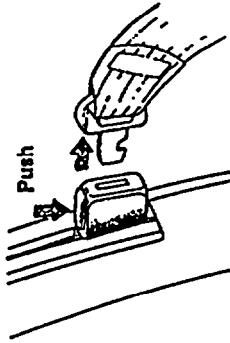
Avoid placing the lap belt across your abdomen. In the event of a collision, the pressure of the belt on the abdomen may increase the extent of injury.

- Never use one belt for more than one person, child or adult.
- Comfort clips sold on the open market are not recommended since they could impair the function and safety of the belts.
- Make sure the strap of the shoulder belt and the lap belt are not crossed.
- Do not wear the shoulder portion of the belt under your arm or out of position. Such use could increase the chance and amount of injury in an accident.



Releasing the Seat Belts

1. To release the manual lap belt, push the "PRESS" button in the buckle, the belt should retract automatically when released.
2. The driver's shoulder belt buckle will release and travel to its off position when the key is removed from the ignition.
3. The shoulder belt buckle will also release and travel to its off position when the door is opened.



Emergency Belt Release

The shoulder belt should always remain buckled. In case of an emergency, however, the shoulder belt can be released from the shoulder belt buckle by pushing the button.

Relatch the shoulder belt before operating the car, making sure the belt is not twisted.

WARNING

Driving with a twisted seat belt can increase your chance and extent of injury during a collision. Be sure the shoulder belt is not twisted before driving the car.

(cont'd)

Lap Belt Warning Indicator:

Both the  light and the warning beeper will go on for about six seconds if the ignition switch is turned on when the driver's lap belt is not fastened. The beeper will not go on if the driver's lap belt is fastened, but the warning light will come on for about six seconds each time, to remind the driver to have passengers put their belts on.

Automatic Shoulder Belt Warning Indicator:

The warning light will come on if either of the automatic shoulder belts is unlatched with the ignition ON. The beeper will sound for approximately six seconds while the warning light is ON. Relatch the belt: the light should go off when the belt is latched. The warning light will also come on while the shoulder belt buckle moves from its front off position to its rear locked position.

Automatic Shoulder Belt Malfunction Indicator:

The warning light will flash and the beeper will sound rapidly if either shoulder belt buckle stops before completing its full cycle (see page 113 for normal operation).

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NOTE:

If the shoulder belt's tensioner mechanism locks and prevents the buckle from moving fully forward when you want to get out, recycle the system by closing the door and reopening it. The buckle should move fully forward; if it does not, recline the seat-back and use Emergency Belt Release (see page 13). When the system does not function by either method, have the system checked by an authorized Honda dealer.

WARNING

If the light and beeper do not function at all or if they come on even with the belts latched and doors fully closed, it indicates a malfunction in the seat belt system. In the event of a collision, severe personal injury could result. The system should be checked immediately by an authorized Honda dealer.

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[Hatchback]

Wearing the Front Seat Belts

The automatic ("passive") lap/shoulder belt system with emergency locking retractors are designed to lock only during a sudden stop or impact. Otherwise, they allow you some freedom of movement in the seat.

NOTE:

The motion-sensing lock mechanisms for the front belts are located in the doors, therefore, if you open the door too quickly, the belt may lock and the door cannot be opened further. If this happens, close the door and open it again more slowly.

- Enter the car and close the door completely. If a door is not completely closed, the warning lights in the ceiling and in the instrument panel will come on and the beeper will sound when the ignition switch is turned on (see page 17).
- The driver's seat should be moved to a comfortable distance from the steering wheel.
- Sit straight up and well back in the seat.
- The seat belt should fit snugly against your body. The shoulder portion of the belt should go over your shoulder and across your body to evenly distribute the belt's restraining force.
- Check that the lap portion of the belt is positioned low on your hipbone and below your abdomen. This way, if the car is involved in an accident, you would be less likely to slide under the seat belts.
- If the belt is too near your neck and throat, move toward the center of the seat.

WARNING

Never drive the car with the doors ajar. The front doors must be closed completely for the front seat belts to function properly.

(cont'd)

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Driver's Belt Unlatched

The warning lights in the ceiling and in the instrument panel will come on and stay on if the driver's belt is not latched. The beeper will sound for approximately six seconds when the ignition is turned on. Relatch the belt; the light should go off.



Front Passenger's Belt Unlatched

The warning light in the ceiling will come on and stay on if the front passenger's seat belt is not securely latched, the beeper sound for approximately six seconds. Relatch the belt; the light should go off.

WARNING

If the lights and beeper do not function at all or if they come on even with the belts latched and doors fully closed, it indicates a malfunction in the seat belt system. In the event of a collision, severe personal injury could result. The system should be checked immediately by an authorized Honda dealer.

E-5

Buckling the Rear Seat Belts

In the rear seat, there are two one-piece combination lap/shoulder belts and a center lap belt.

The seat-backs and seat belts provide best restraint when the occupant is sitting well back and straight up in the seat.

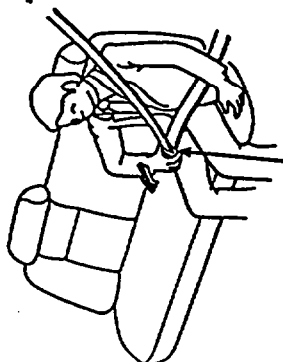
The right and left rear seat belts are one-piece combination lap/shoulder belts with an emergency locking retractor designed to lock only during a sudden stop or impact. Otherwise, they allow you some freedom of movement in the seat.

NOTE:

The emergency locking system of the rear seat belts will also be activated if you pull the belt too fast. If this happens, release the belt slightly then pull it out more slowly.

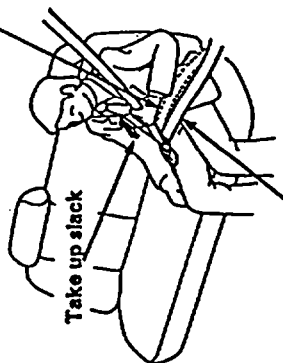
1. Take hold of the tongue plate and pull the belt across your lap. Be sure the belt is not twisted or caught on anything.

Pull the belt across your lap



TONGUE PLATE

Too high



Take up slack

Keep below hip bone

2. Push the tongue plate into the buckle until it clicks locked.

The seat belt should fit snugly against your body. The shoulder portion of the belt should go over your shoulder and across your body to evenly distribute the belt's restraining force.

Check that the lap portion of the belt is positioned low on your hipbone and below your abdomen. This way, if the car is involved in an accident, you will be less likely to slide under the seat belts. If the belt is too near your neck and throat, move toward the center of the seat.

WARNING

Avoid placing the lap belt across your abdomen. In the event of a collision, the pressure of the belt on the abdomen may increase the extent of injury.

(cont'd)

Seat Belts (cont'd)

3. To release the seat belt, push the "PRESS" button in the buckle; the belt should retract automatically when released. If the belt does not fully retract, pull it out and check for kinks or twists.

CAUTION:

Make sure both rear shoulder belts are positioned in front of the rear seat-backs whenever the seat-backs are in their upright position.

Rear Center Seat Belt

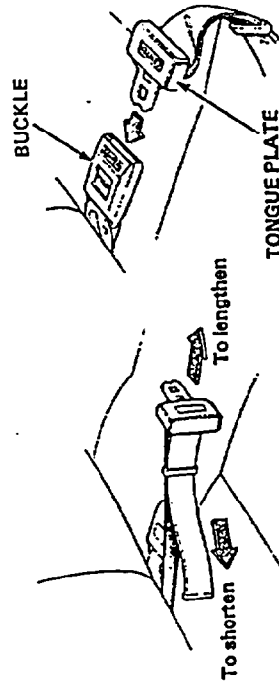
Adjust the center lap belt length to fit snugly but comfortably when buckled.

A slack belt will greatly reduce the protection afforded to the wearer. Hold the tongue plate perpendicular to the belt as shown.

- To shorten, pull the end of the belt away from the tongue plate.
 - To lengthen, pull the tongue plate.
- Push the tongue plate into the buckle until it clicks locked. Position the belt across your lap, not your abdomen, as low on your hips as possible.

WARNING

Avoid placing the lap belt across your abdomen. In the event of a collision, the pressure of the belt on the abdomen may increase the extent of injury.



Child Restraint

Children riding in the car should be restrained to minimize the risk of injury in an accident, sudden stop or sudden maneuver.

According to accident statistics provided to the National Highway Traffic Safety Administration (NHTSA), children are safer when properly restrained in the rear seating positions than in the front seat.

For smaller children, we strongly recommend the use of a commercially available child restraint system that meets the Federal Motor Vehicle Safety Standard (FMVSS) because it offers the most protection against injury. All states now have laws which require that small children must be seated in a child passenger seat restraint system. Check local laws.

Before buying a particular child restraint system, make sure it fits your car seat and seat belts, and fits your child. Follow the child seat manufacturer's instructions when installing the seat.

Children who have outgrown the child restraint system should use one of the seat belts.

- Make sure the belt is snug against the child's body with the shoulder portion going over the shoulder and across the body to evenly distribute the belt's restraining force.
- Check that the lap portion of the belt is positioned low on the child's hipbone and below the abdomen. This way if the car is involved in an accident, the child would be less likely to slide under the seat belts.
- If the belt is too close to the child's neck or throat, you may want to consider putting the child in an automobile booster seat that meets the Federal Motor Vehicle Safety Standard (FMVSS).

WARNING

- Children should never ride unrestrained in an automobile.
- Never use an infant carrier or child safety seat that "hooks" over a seat-back; it may not provide adequate security in an accident.
- Never allow a child to be held in a person's arms while they are in a moving vehicle. Holding a child in a moving vehicle does not provide the child with any means of protection during an accident, even if the person holding the child is wearing a seat belt.

(cont'd)

[Sedan]

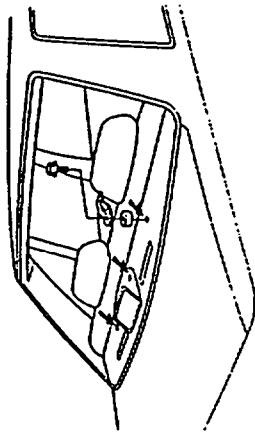
Installation of Child Seat

All child restraint systems are designed to be secured by lap belts or the lap belt portion of a lap-shoulder belt. The automatic shoulder belt system at the front passenger seat should not be used to secure the child restraint system. If a child seat must be installed on the front seat, place the shoulder portion of the belt behind the child seat and secure the child seat with the lap belt only.

Children could be endangered in a crash, if their child restraints are not properly secured. Follow the child seat manufacturer's instructions when installing the seat.

Your Honda automobile is equipped with attachment points specifically for a rear seat mounted child restraint system which uses a top tether.

The tether attachment points are located on the rear tray, just behind the rear seat-back.



WARNING

When the child restraint system is not in use, remove it from the car or secure it with the seat belt to keep it from becoming a projectile in the event of an accident.

NOTE:

See your Honda dealer for installation of the child restraint system.

Pregnant Women

A pregnant woman should use the shoulder and lap belts to help lessen the chance of injury and/or the amount of injury in an accident.

WARNING

It is desirable that a pregnant woman ask her doctor at each medical check-up if she can drive, and also ask about the most appropriate way of wearing the lap/shoulder belt. Lap belts should be worn as low and snugly as possible over the hips.

Inspection

All parts of the seat belts, including the belt fabric, should be regularly inspected for fraying, loosening, wear and other damage. Keep the belts in good condition at all times to reduce the chance of being injured in an accident, and to minimize any injuries that do occur. Make sure the buckles, retractors, tongue plates, guides and anchors all work properly.

Don't let anything get inside the buckle or the retractor; it could cause latch or retractor failure.

Cleaning

The belts should always be kept clean and dry; wet or damp belts can cause rewinding problems. To clean the belts, pull them all the way out of their retractors and use warm water and a mild soap; then let them air-dry fully extended, in the shade, with the car windows open.

WARNING

- Never bleach, dye or clean the belts with chemical solvents; it will weaken the fabric.
- Do not remove the seat belts from the car to wash them.

Replacement

Replace the seat belt if:

1. The belt is cut, punctured, burned, etc.
2. The buckle or retractor does not work properly.
3. It was being worn at the time of a collision (also check for deformation damage at all seat belt anchor points).
4. Its condition is questionable.