

REPORT NO. MGA-90-N007

NEW CAR ASSESSMENT PROGRAM (NCAP)

FRONTAL BARRIER IMPACT TEST

Nissan
1991 Nissan Pathfinder
(MPV) 4 Door
NETSA NO. MM5203

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105



April 29, 1992

FINAL REPORT

Prepared For:

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16. Abstract A 35 mph frontal barrier impact using a 30 load cell barrier was conducted on a 1991 Nissan Pathfinder at the MGA Proving Grounds Crash Test Facility in Burlington, Wisconsin, on April 14, 1992. The barrier impact velocity was 35.0 mph, and the ambient temperature at the time of impact was 70 degrees Fahrenheit. The post-test Average crush was 19.7 inches. The test vehicle appeared to comply with the indicant requirements of the following Federal Motor Vehicle Safety standards. 1. FMVSS 212, "Windshield Mounting" 2. FMVSS 219 (Partial), "Windshield Zone Intrusion" 3. FMVSS 301, "Fuel System Integrity" With regard to FMVSS 208, "Occupant Crush Protection" injury criteria, the driver's HIC was 1211 and the 3 millisecond clip (chest g's) was 67.2. The left and right femur maximum loads for the driver were 2050 lbs. and 1983 lbs. respectively. The passenger's HIC was 817 and the 3 millisecond clip was 61.2. The left and right femur maximum loads for the passenger were 1361 lbs. and 2189 lbs. respectively.		13. Type of Report and Period Covered Final Report January 1992 - May 1992	
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SECTION 1

PURPOSE AND TEST PROCEDURE

This 35 mph frontal barrier impact test is part of the Composite FY'91 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 208/212/219/301-75 requirements.

The 35 mph frontal barrier impact test was conducted in accordance with the National Highway Traffic Safety Administration (NHTSA) Indicant Test 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. 301-75, "Fuel System Integrity," as well as occupant performance data are provided herein.

Section 2

SUMMARY OF TEST NUMBER MM5203

A load cell barrier consisting of 30 load cells was impacted by a 1991 Nissan Pathfinder 4-door at a velocity of 35.0 mph. The test was performed at the MGA Proving Grounds and Crash Test Center on April 14, 1992. 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 15 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 computers. Appendix B contains the vehicle, load cell barrier and dummy response data traces.

The driver's head struck the steering wheel rim and hub; the HIC was 1211. The maximum chest deceleration over 3 milliseconds was 67.2 g's and the left and right femur loads were 2050 and 1983 pounds respectively.

The right front passenger's HIC was 817 and maximum chest deceleration over 3 milliseconds was 61.2 g's. The left and right femur load were 1361 and 2189 pounds respectively.

GENERAL TEST AND VEHICLE PARAMETER DATA

Vehicle Year/Make/Model/Body Style: 1991 Nissan Pathfinder 4 Door

NHTSA No.: MM5203 VIN.: JN8HD17Y0MW034391

Body color: Tan Date of Manufacture: 3/91

Engine: 6 Cylinders; C.I.D.; 3.1 liters; CC

 X Gas; Diesel; Turbocharged

 X Longitudinal; Transverse

Transmission: 5 Speed; X Manual; Automatic; Overdrive

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

Date Received: 5/24/91 Odometer Reading: 140

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

 P/seats; Cruise Control

Type of Occupant Restraint: The vehicle was equipped with
non-motorized Type II restraints. The shoulder belt retrator
is located on the inboard side of the vehicle B-Post.

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 26 psi, Rear 26 psi

Recommended Tire Size: P235/75R15

Recommended Cold Tire Pressure: Front 26 psi, Rear 29 psi

Tires on Vehicle: P235/75R15; Manufacturer: General

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 Level Rot. Knob

Vehicle Capacity Weight (VCW) = 1100 lbs. (A)

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

Rated Cargo Weight (RCW) A-B = 350 lbs.

GVWR 5150 lbs. GAWR: Front 2500 lbs. Rear 2850 lbs.

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

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

Right Front = 1022 lbs. Right Rear = 932 lbs.
Left Front = 1057 lbs. Left Rear = 921 lbs.
TOTAL FRONT WEIGHT = 2079 lbs. (52.9% of Total Vehicle Weight)
TOTAL REAR WEIGHT = 1853 lbs. (47.1% of Total Vehicle Weight)
TOTAL UNLOADED DELIVERED WEIGHT (UDW) = 3932 lbs.

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight (3932 lbs.)
VCW = Vehicle Capacity Weight (1100 lbs.)
DSC = Designated Seating Capacity (5)
RCW = VCW - 150 (DSC) = 300 *lbs.
Target Test Weight = UDW + RCW + (2 dummies x 164 lbs./dummy)
Target Test Weight = 4560 lbs.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND CARGO:

Right Front = 1123 lbs. Right Rear = 1148 lbs.
Left Front = 1111 lbs. Left Rear = 1174 lbs.
TOTAL FRONT WEIGHT = 2234 lbs. (49% of Total Vehicle Weight)
TOTAL REAR WEIGHT = 2322 lbs. (51% of Total Vehicle Weight)
TOTAL TEST WEIGHT = 4556 lbs.

Weight of ballast secured in vehicle trunk area = 288 lbs.

Vehicle components removed to meet target weight: Rear seat
and miscellaneous rear panels

VEHICLE ATTITUDE (all dimensions in inches):

Delivered Attitude: RF 33.9 LF 33.5 RR 34.8 LR 34.9
Test Attitude: RF 31.8 LF 31.5 RR 32.5 LR 32.3
Wheel Base: 104.5 in.; C.G. = 49.3 in. rearward of front wheel C/L
Remarks: None

*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: 35mph Frontal Impact Impact Angle: 0°
 Date of Test: April 14, 1992 Time of Test: 4:30 p.m.
 Ambient Temperature: 70°F (Spec. Range = 66 to 78°F)
 Temperature in Occupant Compartment: 73°F
 Windshield Molding Temperature: 70°F
 Required Impact Velocity Range: 34.5 to 35.1 mph
 Impact Velocity: primary = 35.0 mph, secondary = 35.1 mph
 Distance From Front Bumper to Barrier Face When
 Entering Speed Trap: 51.4 inches
 Exiting Speed Trap: 12.0 inches

VEHICLE REBOUND AND CRUSH (inches):

Vehicle Length: Pre-test = R 170.5 C_L 171.4 L 169.8
 Post-test = R 153.1 C_L 154.3 L 153.3
 Crush = R 17.4 C_L 17.1 L 16.5

Distance from front of test vehicle to point of impact (rebound):

R 20.3 in. C_L 20.5 in. L 20.3 in.

VISIBLE DUMMY CONTACT POINTS:

	<u>Driver</u>	<u>Passenger</u>
Head	<u>to steering wheel rim and hub</u>	<u>Chin to Chest</u>
		<u>Head to Left Thigh</u>
Chest	<u>to steering wheel</u>	<u>None</u>
Abdomen	<u>to steering wheel rim</u>	<u>None</u>
Left Knee	<u>to instrument panel</u>	<u>to instrument panel</u>
Right Knee	<u>to instrument panel</u>	<u>to 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>Opened</u>	<u>Opened</u>	<u>Jammed</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 Movement	<u>No</u>	<u>No</u>	<u>N/A</u>	<u>N/A</u>
Seat Shift (in.)	<u>0.0"</u>	<u>0.0"</u>	<u>N/A</u>	<u>N/A</u>

Glazing Damage

Backlight/Windshield None

Other Notable Impact Effects: None

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.:

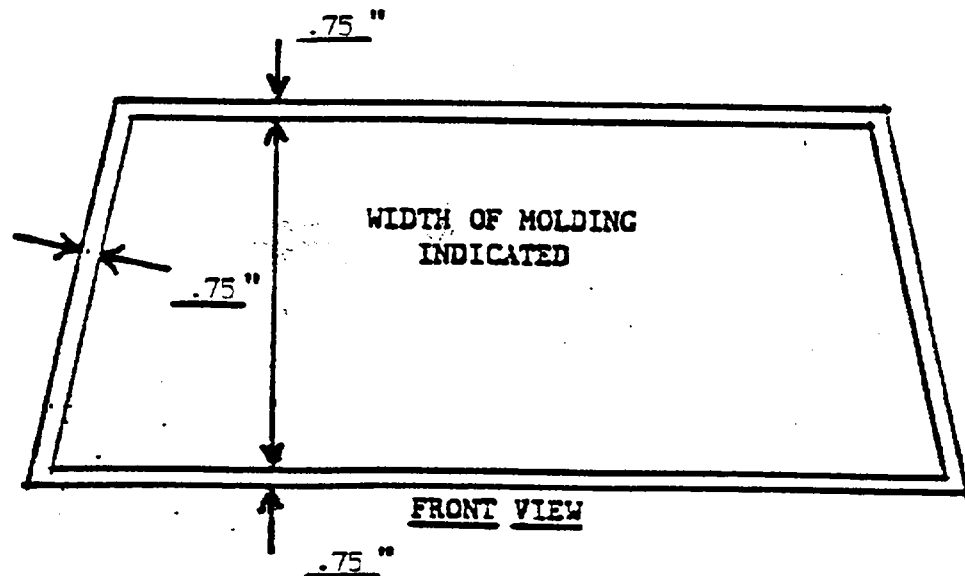
Steel trim with glue retention

FMVSS 212 Requirements: The Post-Test periphery retention amount must be at least 75% of the 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	80.5	80.5	100%
LEFT SIDE	80.5	80.5	100%
TOTAL	160	160	100%

AREA OF RETENTION FAILURE:



FAILURE DETAILS:

NONE

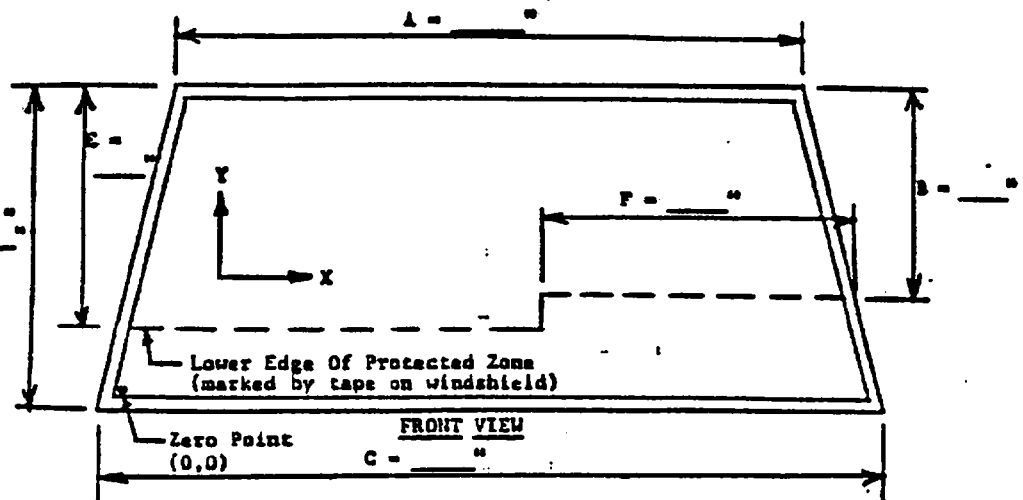
FMVSS NO. 219, "WINDSHIELD ZONE INTRUSION", DATA SHEET

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:

A= 48.5 in.
B= 13.9 in.
C= 53.5 in.
D= 26.8 in.
E= 16.6 in.
F= 25.5 in.



DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 1/4":
(Show location of penetration)

NONE

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

TEST VEHICLE NETSA NO.: MM5203 TEST DATE: April 14, 1992
VEHICLE MAKE/MODEL/BODY STYLE: 1991 NISSAN PATHFINDER 4 DOOR
USABLE CAPACITY OF VEHICLE'S FUEL TANK: 21.1 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:

19.4 Gallons Which is 92 % of the Stated USABLE CAPACITY.

SOLVENT SPILLAGE MEASUREMENT AFTER 35 MPH FRONTAL BARRIER IMPACT TEST:

	<u>Actual</u>	<u>Maximum Allowable</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 3min.)

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

* Not applicable - test not performed as per NETSA COTR

FMVSS NO. 301-75 TEST DATA . . . Continued:

*VEHICLE STATIC ROLLOVER DATA:

	<u>First 5 Minutes</u> <u>FROM ONSET OF ROTATION</u>	<u>6th</u> <u>Minute</u>	<u>7th</u> <u>Minute</u>	<u>8th</u> <u>Minute</u>
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

* Not Applicable - test not performed as per NETSA 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 NISSAN PATHFINDER 4 DOOR

VEH. NHTSA NO.: MM5203 TEST DATE: April 14, 1992

MAXIMUM ACCELERATION VALUES: (g's)	DRIVER DUMMY #465	PASSENGER DUMMY #466
Head Channel X	-156.8	-54.7
Head Channel Y	-25.2	6.7
Head Channel Z	87.8	76.3
HEAD RESULTANT	160.5	77.8
Chest Channel X	-66.7	-60.7
Chest Channel Y	-20.1	12.6
Chest Channel Z	-31.5	-36.0
CHEST RESULTANT	67.2	61.2
TIME INTERVAL (msec) [0.003 seconds minimum]	t ₁ = 54.7 t ₂ = 57.7	t ₁ = 52.2 t ₂ = 55.2

HEAD INJURY CRITERIA (HIC)
VALUES:

HIC	1211	817
t ₁ = (msec)	55.2	56.1
t ₂ = (msec)	91.2	92.0
Avg. Accel. t ₁ to t ₂ (g's)	64.7	55.2

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

MAXIMUM FEMUR FORCES:

Right Side (lbs.)	-1983	-2189
Left Side (lbs.)	-2050	-1361

MAXIMUM SEAT BELT FORCES:

Lap Belt (lbs.)	1743	2406
Shoulder Belt (lbs.)	2271	2062

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

HYBRID III NECK AND CHEST DATA SHEET*

VEHICLE YR./MAKE/MODEL/BODY STYLE: 1991 NISSAN PATHFINDER 4 DOOR

VEHICLE NHTSA NO.: MM5203 TEST DATE: April 14, 1992

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 occur during primary impact event.
* For Hybrid III Dummy Application Only

PART 572 DUMMY IN-VEHICLE POSITION

Test No.: MM5203 Vehicle: 1991 NISSAN PATHFINDER 4 DOOR

SEAT TYPE:

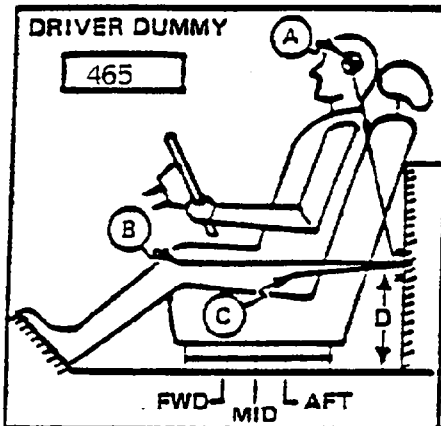
 Bench
 X Bucket
 Split Bench

ADJUSTER TYPE:

 X Manual
 Power

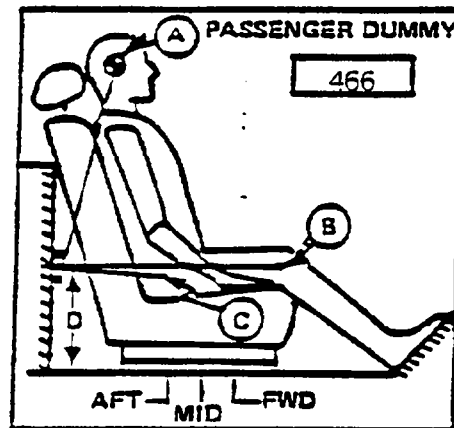
BUCKET SEAT BACK TYPE:

 Fixed
 X Adjustable Reclining



MEASUREMENT LOCATION

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

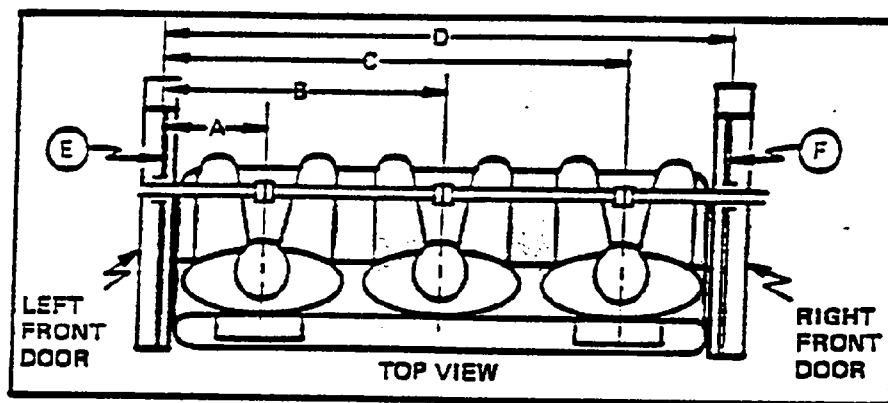


A = 23.8 in. 14.1 Degrees
 B = 25.4 in. 11.6 Degrees
 C = 9.9 in. .4 Degrees
 D = 10.5 in.

Seat notch rearward 7

A = 24.2 in. 13.7 Degrees
 B = 25.6 in. 18.3 Degrees
 C = 10.9 in. .9 Degrees
 D = 10.5 in.

Seat notch rearward 7



465

DUMMY ID

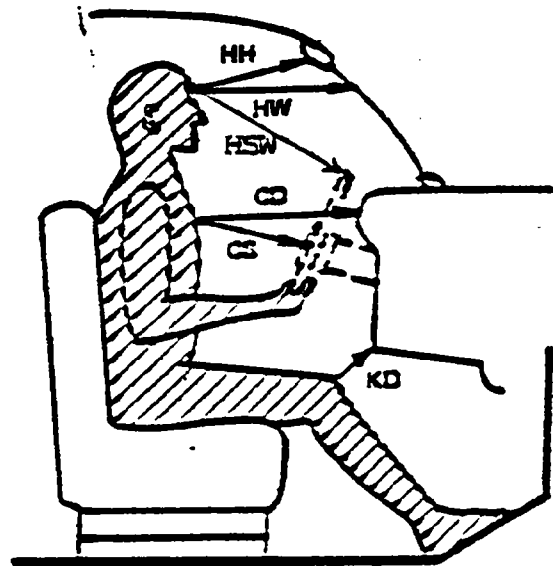
466

A = Left Door to Driver Centerline 59.3 in.
 B = Left Door to Center Passenger Centerline 43.8 in.
 C = Left Door to Right Passenger Centerline 29.3 in.
 D = Left Door to Right Door 14.8 in.
 E, F = Window Glass Height (Right and Left Must Be Equal) 0 in.

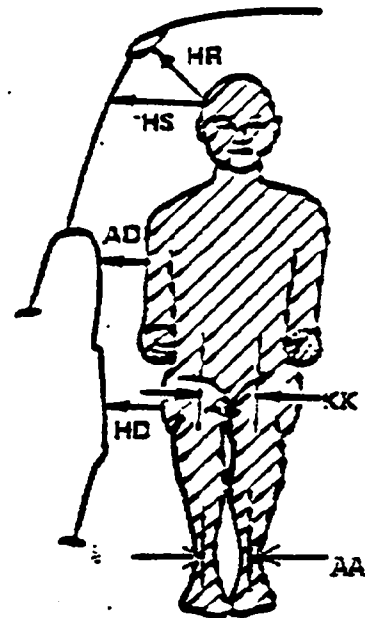
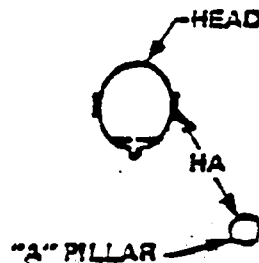
OCCUPANT CLEARANCE DIMENSIONS

Units (in.)

	Driver	Passenger
HH	15.5	13.9
HW	23.1	22.6
CD	22.6	21.1
CS	11.4	N/A
KDL	6.4	6.8
KDR	6.5	7.0
SA	7th, 25°	7th, 25°
TA	18.4°	16.7°
HSW	18.7	N/A

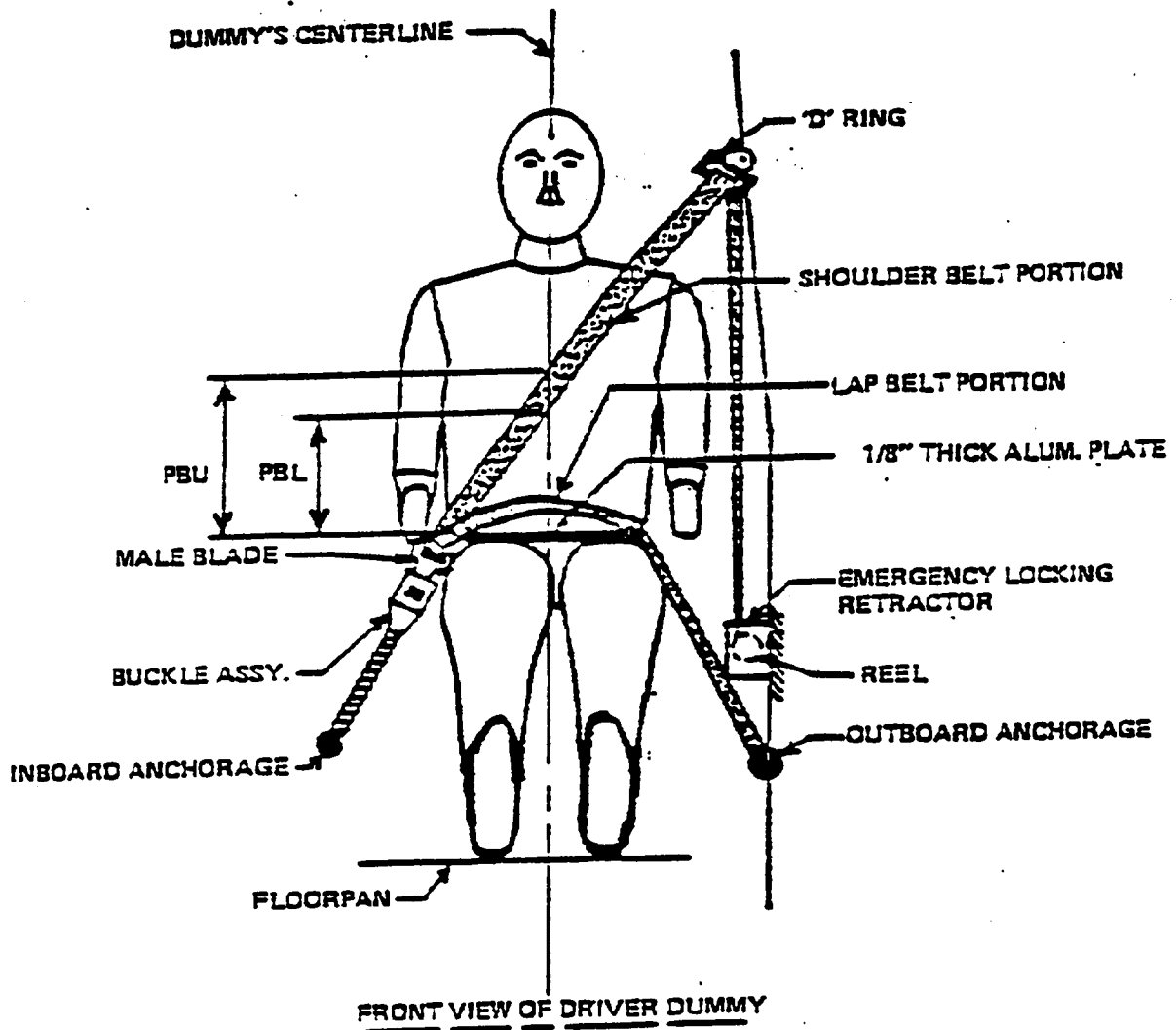


HH = Head to Windshield Header
 HW = Head to Windshield
 CD = Chest to Dash
 CS = Chest to Steering Wheel
 KD(L\R) = Knees to Dash (Left/Right)
 SA = Seat Back Angle
 TA = Torso Angle
 HSW = Head to Steering Wheel
 HA = Head Target to A Pillar
 HR = Head to Side Roof
 HS = Head to Side Window
 AD = Arm to Door
 HD = Hip to Door
 KK = Knee to Knee
 AA = Ankle to Ankle



	Driver	Passenger
HR	7.9	8.2
HS	N/A	N/A
AD	2.7	3.3
HD	6.5	6.5
KK	14.3	12
HA	18.9	17.4
AA	14.5	11.8

SEAT BELT POSITIONING DATA



(illustration)

		DRIVER DUMMY	PASSENGER DUMMY
<u>PBU</u> --	Top surface of alum. plate to upper edge (inches)	14.0	14.0
<u>PBL</u> --	Top surface of alum. plate to belt lower edge (inches)	11.0	11.0
<u>LAP BELT TENSION</u> (lbs.)		44 oz.	40 oz.
<u>SHOULDER BELT TENSION</u> (lbs.)		1.5 lbs.	1.5 lbs.

SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

BELT LENGTH DATA:

	<u>Driver</u>	<u>Passenger</u>
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems.	<u>108.5"</u>	<u>108.1"</u>
Shoulder belt length as measured on Part 572 Dummy.	<u>35.5"</u>	<u>35.3"</u>
Lap belt length as measured on Part 572 Dummy.	<u>34.0"</u>	<u>34.0"</u>

SHOULDER BELT SPOOL-OFF DATA:

As determined by film analysis	<u>2"</u>	<u>2"</u>
As determined mechanically	<u>2.0"</u>	<u>2.0"</u>
As determined electronically	<u>1.8"</u>	<u>1.8"</u>

BELT STRETCH DATA:

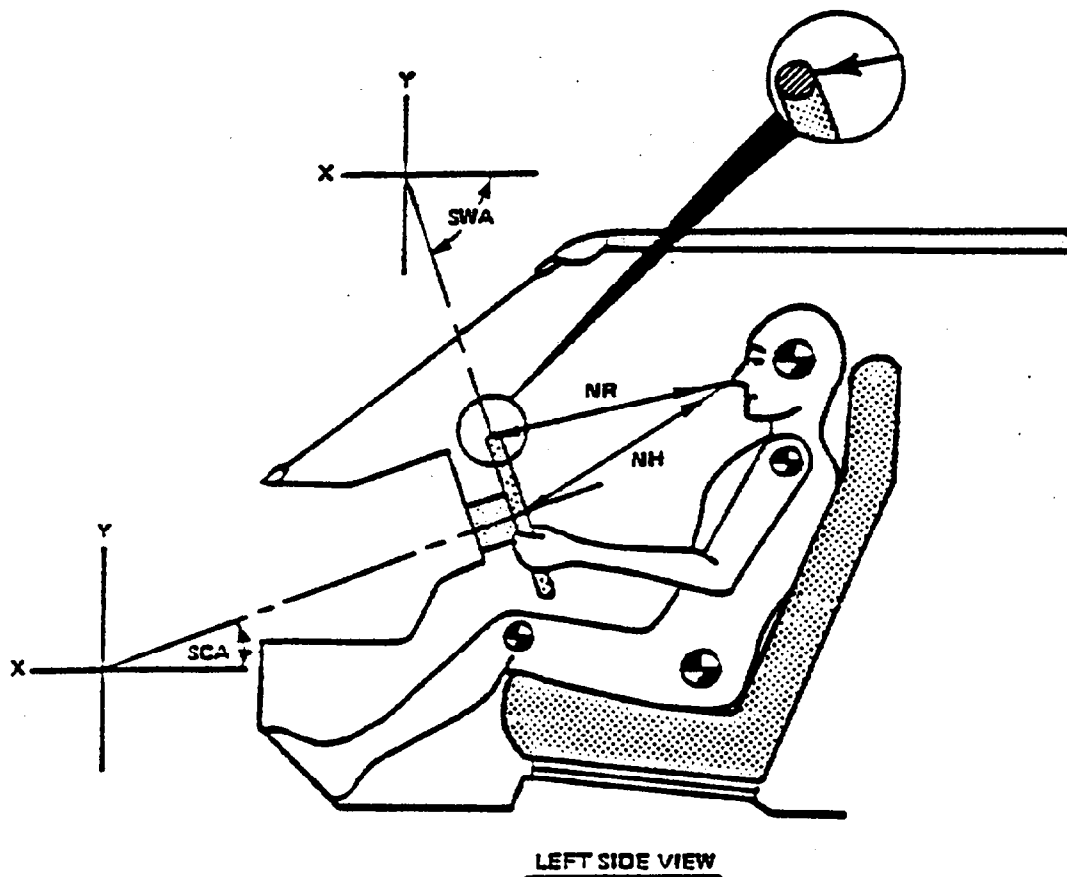
Measured electronically between shoulder belt load cell and the "D" ring.	<u>*</u>	<u>*</u>
Measured mechanically	<u>0</u>	<u>0</u>

RETRACTOR LOCK-UP TIME:

As determined by shoulder belt spool-off observed in on-board cameras	<u>16 msec</u>	<u>16 msec</u>
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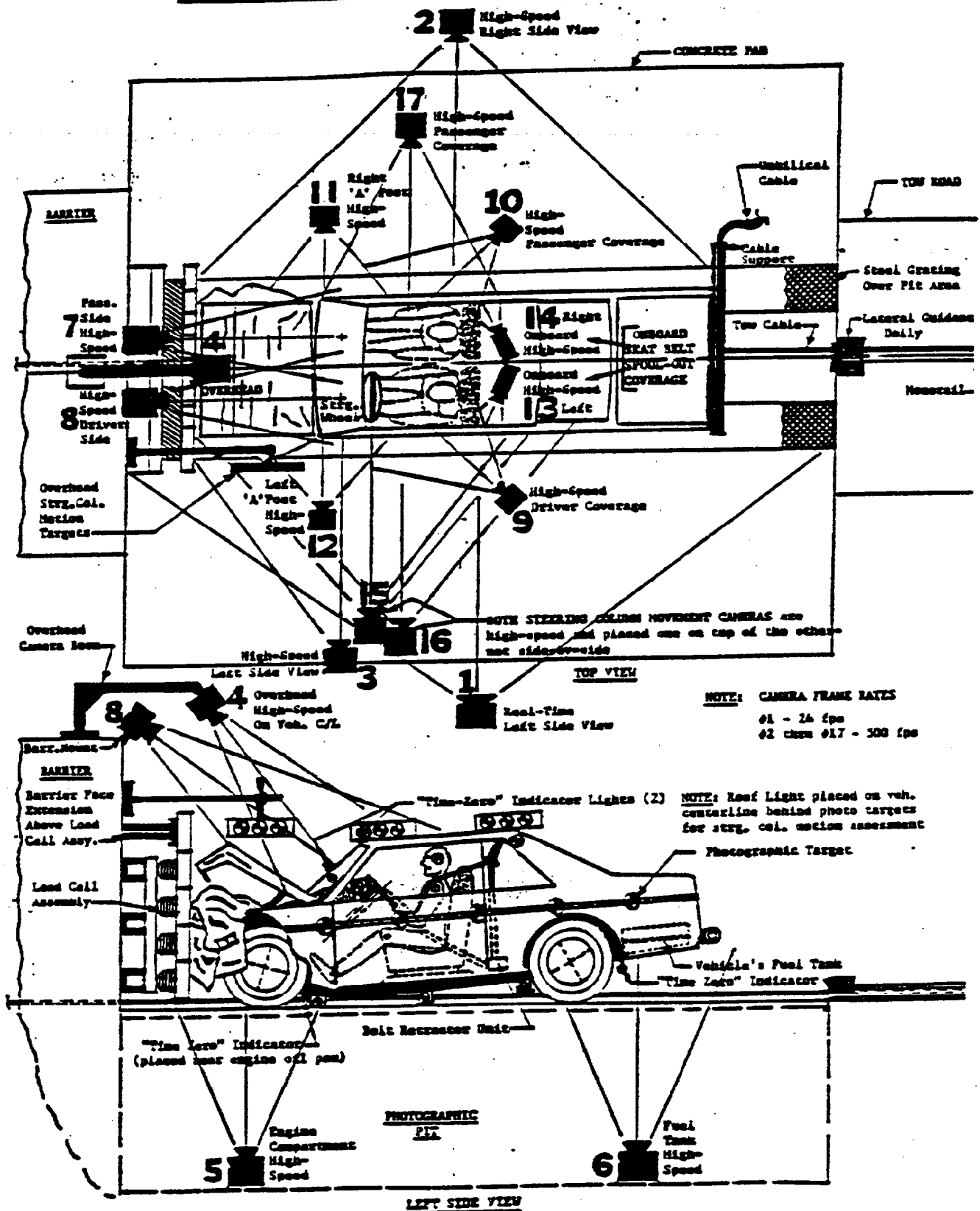
Electronic measurement not used, per NHTSA COTR.

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	17.75 Inches
<u>NH</u> ----	Distance from tip of dummy's nose to center of steering column hub	18.75 Inches
<u>SCA</u> ---	Angle of Steering column relative to the horizontal X axis	24 Degrees
<u>SWA</u> ---	Angle of steering wheel relative to the horizontal X axis	66 Degrees

CAMERA REQUIREMENTS FOR 15 MPH FRONTAL BARRIER IMPACT ASSESSMENT PROGRAM TEST



CAMERA LOCATIONS

VEH. NHTSA NO.: MM5203 ; TEST DATE: April 14, 1992 ; TIME: 4:30 pm

VEH. YEAR/MAKE/MODEL/BODY STYLE: 1991 NISSAN PATHFINDER 4 DOOR

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	-	-	-	-	-	-	24
2	Right Side View	77	277	51	90	282	13	909
3	Left Side View	30	275	51	90	280	25	*
4	Overhead	35	0	142	0	147	13	513
5	Pit-Engine	39	0	-102	0	-107	13	1010
6	Pit-Fuel Tank	108	0	-118	0	-123	13	952
7	Front-Passenger	7	12	87	30	92	13	507
8	Front-Driver	7	12	87	30	92	13	518
9	Left Side-Driver	264	206	59	45	208	50	1010
10	Right Side-Passenger	254	231	52	45	235	50	1020
11	Right Side-"A" Post	48	188	45	90	193	25	**
12	Left Side-"A" Post	48	208	54	90	213	13	870
13	Onboard-Left Side	-	-	-	-	-	35	1015
14	Onboard-Right Side	-	-	-	-	-	35	950
15	Left Side-Steering Col.	74	292	61	90	297	25	*
16	Left Side-Steering Col.	74	292	40	90	297	25	1010
17	Right Side-Passenger	48	208	54	90	213	13	870

No High Speed Film Available, film jam in camera.

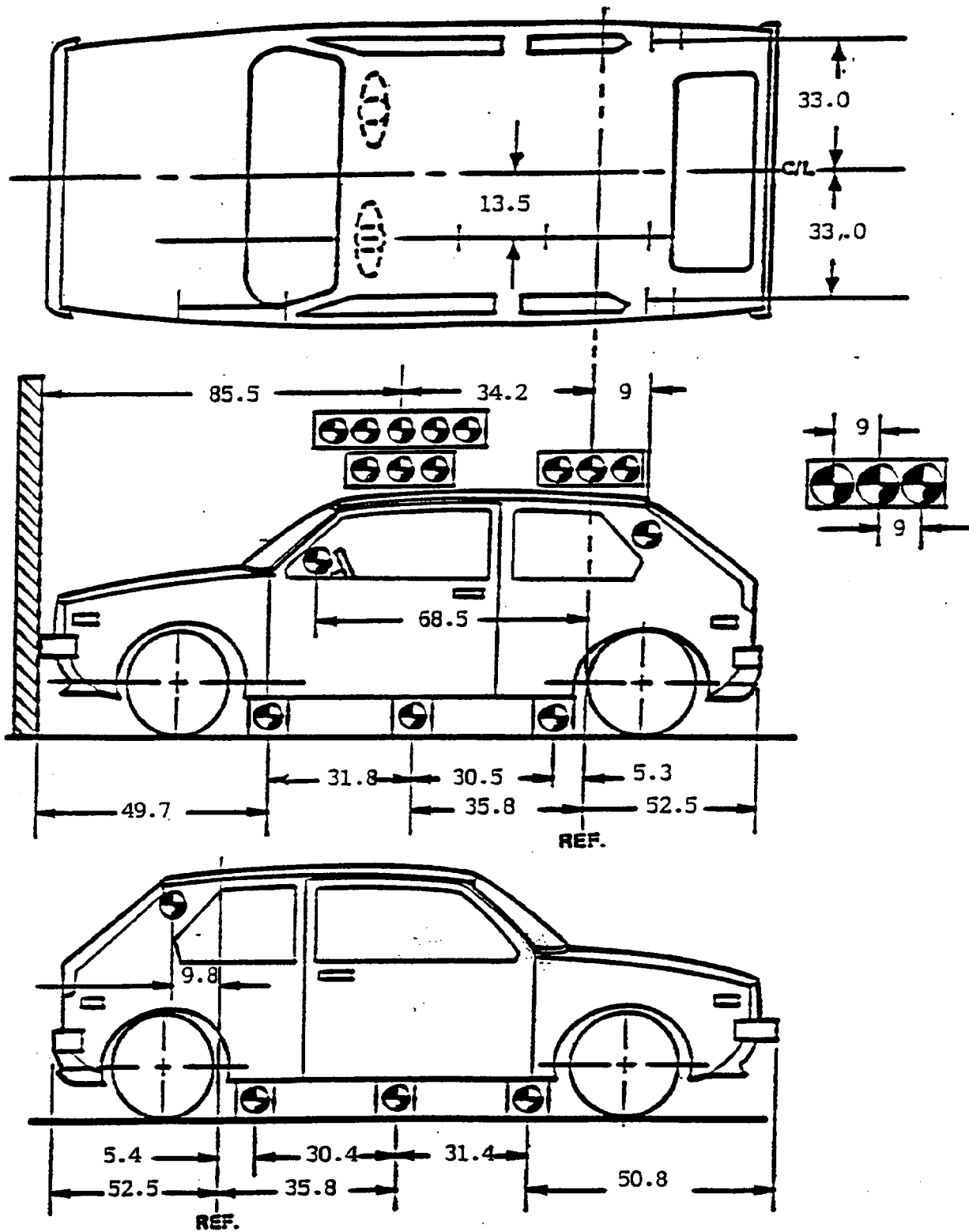
*Timing marks not visible.

X = film plane to monorail centerline

Y = film plane to barrier face

Z = film plane to ground

VEHICLE TARGET LOCATIONS



(DIMENSIONS IN INCHES)

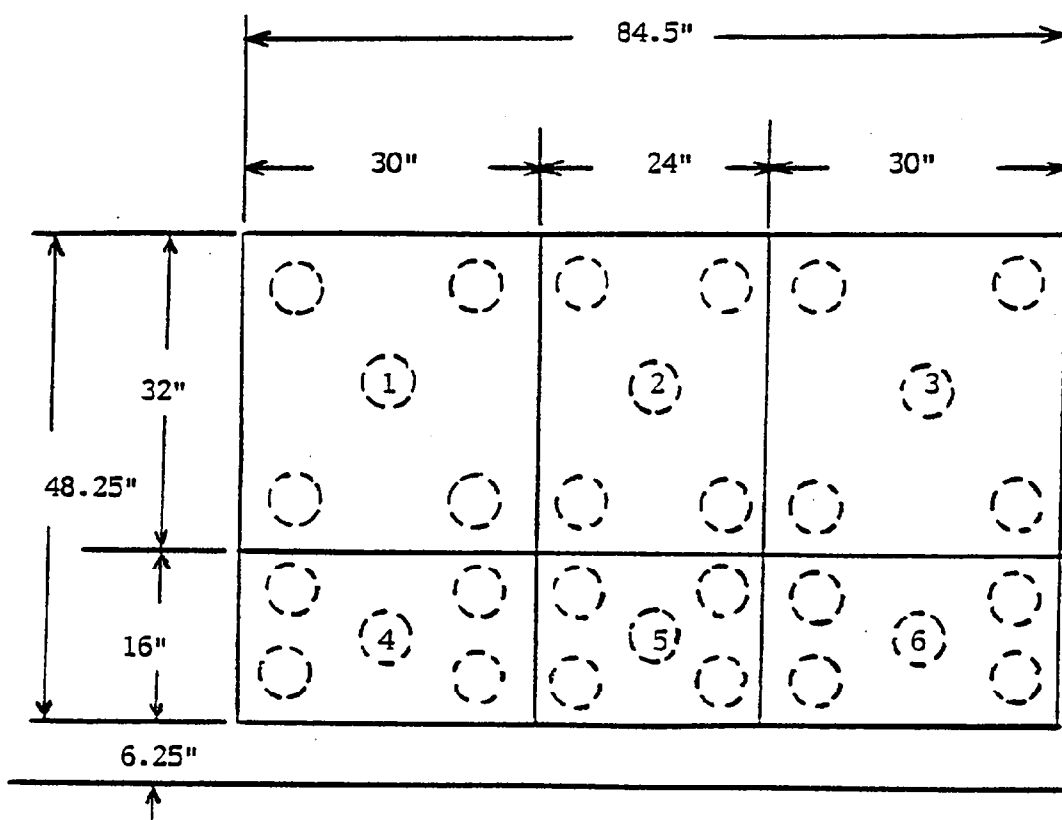
LOAD CELL LOCATIONS ON FIXED BARRIER

30 Load Cells

6 Rows

9 Columns

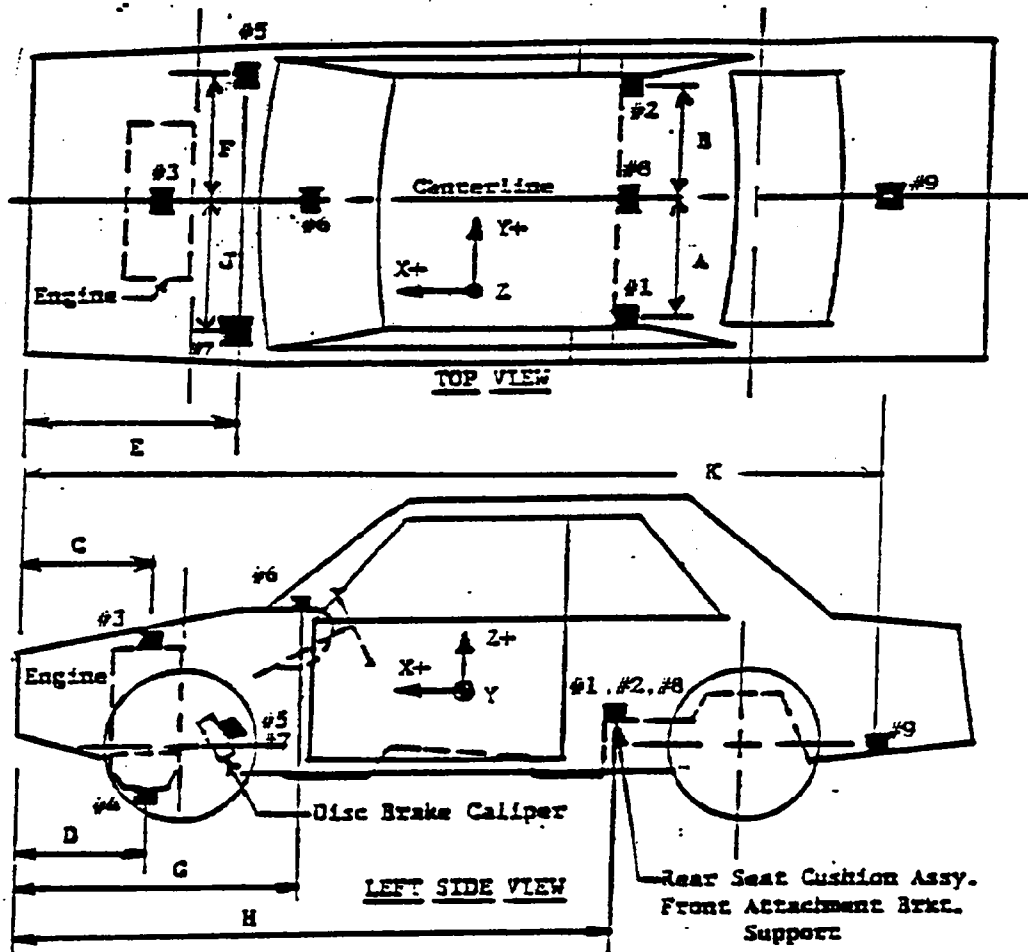
6 Groupings (5 cells/group)



The following data is presented in Appendix B:

- (1) Total or Sum of 30 individual load cells
- (2) Data from 6 Groupings shown above (5 cells/group)

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY



Units: (in.)

Dimension	Length
A	-16.8
B	17.3
C	27
D	29
E	32.5
F	32
G	46.5
H	109
J	-32
K	159

ACCELEROMETER	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 Side Brake Caliper	X
6	Instrument Panel	X
7	Left Disc Brake Caliper	X
8	Center Rear Crossmember	Z
9	Vehicle Rear	Z

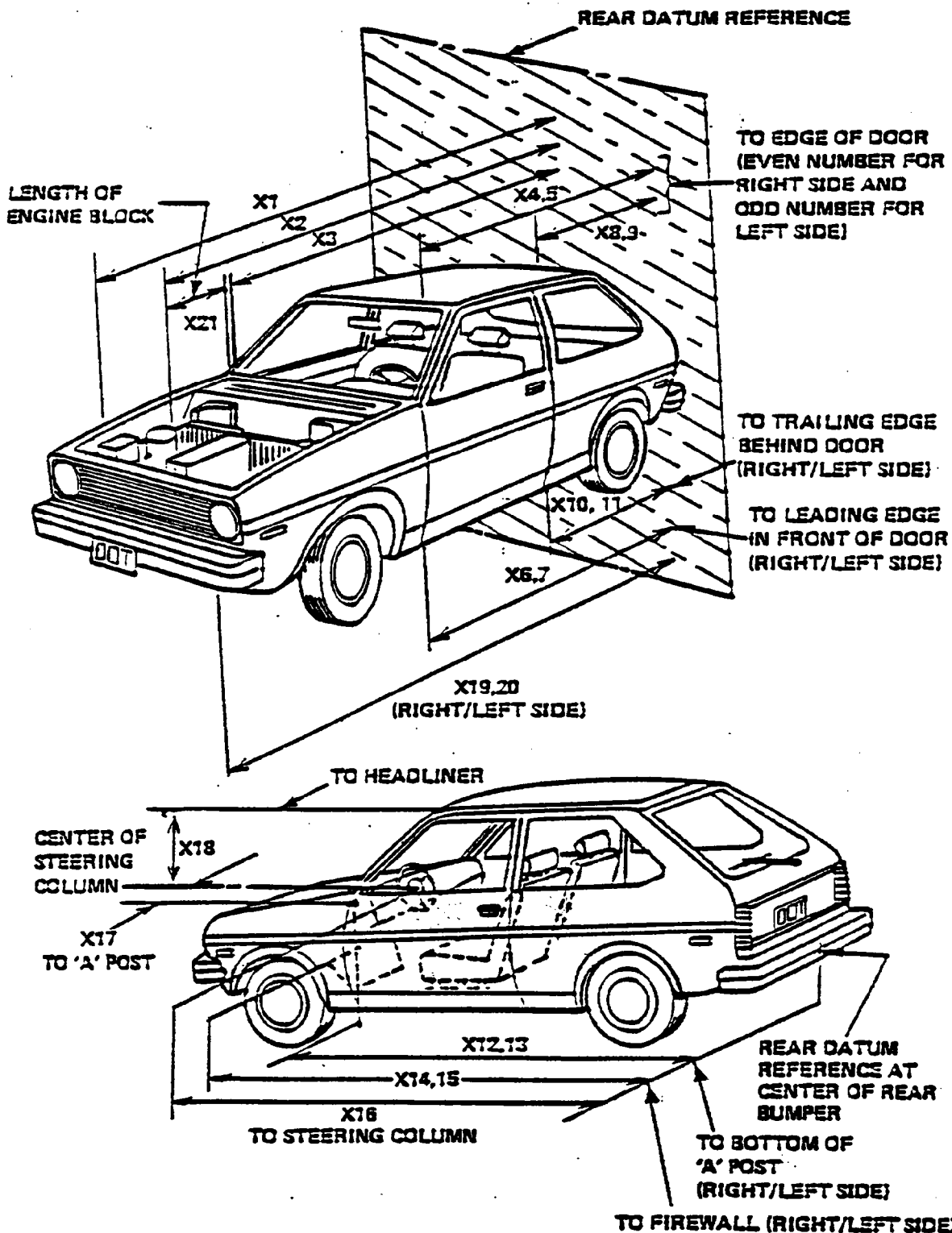
* The accelerometer pack number can be correlated with the vehicle response data traces in Appendix B.

TEST VEHICLE MEASUREMENTS

No.	MEASUREMENT DESCRIPTION:	Pre-Test (in.)	Post-Test (in.)	Diff. (in.)
X1	Total Length of Test Vehicle at Centerline	171.4	154.3	17.1
X2	Rear Surface of Vehicle to Front of Engine	152.3	139.0	13.3
X3	Rear Surface of Vehicle to Firewall	133.7	132.5	1.2
X4	Rear Surface to Upr. Leading Edge of Rt. Door	124.1	123.8	0.3
X5	Rear Surface to Upr. Leading Edge of Left Door	123.8	126.3	-2.5
X6	Rear Surface to Lwr. Leading Edge of Rt. Door	123.1	122.8	0.3
X7	Rear Surface to Lwr. Leading Edge of Left Door	122.8	125.4	-2.6
X8	Rear Surface to Upr. Trailing Edge of Rt. Door	80.1	80.0	0.1
X9	Rear Surface to Upr. Trailing Edge of Left Door	80.1	82.5	-2.4
X10	Rear Surface to Lwr. Trailing Edge of Rt. Door	79.3	79.0	0.3
X11	Rear Surface to Lwr. Trailing Edge of Left Door	78.8	79.6	-0.8
X12	Rear Surface to Bottom of 'A' Post on Rt. Side	123.0	122.5	0.5
X13	Rear Surface to Bottom of 'A' Post on Left Side	122.9	124.0	-1.1
X14	Rear Surface to Firewall on Right Side	132.9	132.5	0.4
X15	Rear Surface to Firewall on Left Side	132.5	134.0	-1.5
X16	Rear Surface to Steering Column	106.0	107.3	-1.3
X17	Center of Steering Column to 'A' Post	16.5	17.5	-1.0
X18	Center of Steering Column to Headlining	16.3	16.0	0.3
X19	Rear Surface to Right Side of Front Bumper	170.5	153.1	17.4
X20	Rear Surface to Left Side of Front Bumper	169.8	153.3	16.5
X21	Length of Engine Block	17.3	17.3	0

*Refer to following page for No. locations

TEST VEHICLE MEASUREMENTS



ACCIDENT INVESTIGATION DIVISION DATA
FOR 35 MPH FRONTAL BARRIER IMPACT

VEHICLE MAKE/MODEL/BODY STYLE: 1991 NISSAN PATHFINDER 4 DOOR
VEH. NHTSA NO.: MM5203; VIN: JN8HD17YOMW034391
MODEL YEAR: 1991; BUILD DATE: 3/91; TEST DATE: 4/14/92
VEH. SIZE CATEGORY: MPV; TEST WEIGHT: 4556
VEH. WHEELBASE: 104.5; FRONT OVERHANG: N/A; OVERALL WIDTH: 59.4

ACCELEROMETER DATA:

LOCATION: As per measurements on pages 4-13
CALIBRATION PROCEDURE: As per MGA Calibration Procedure
LINEARITY: >99.9%; INTEGRATION ALGORITHM: Trapezoidal

VEH: IMPACT SPEED: 35.0 mph; TIME OF SEPARATION: .058 seconds

VELOCITY CHANGE: 40.4 mph

COLLISION DEFORMATION CLASSIFICATION (CDC) CODE:

F (Frontal)

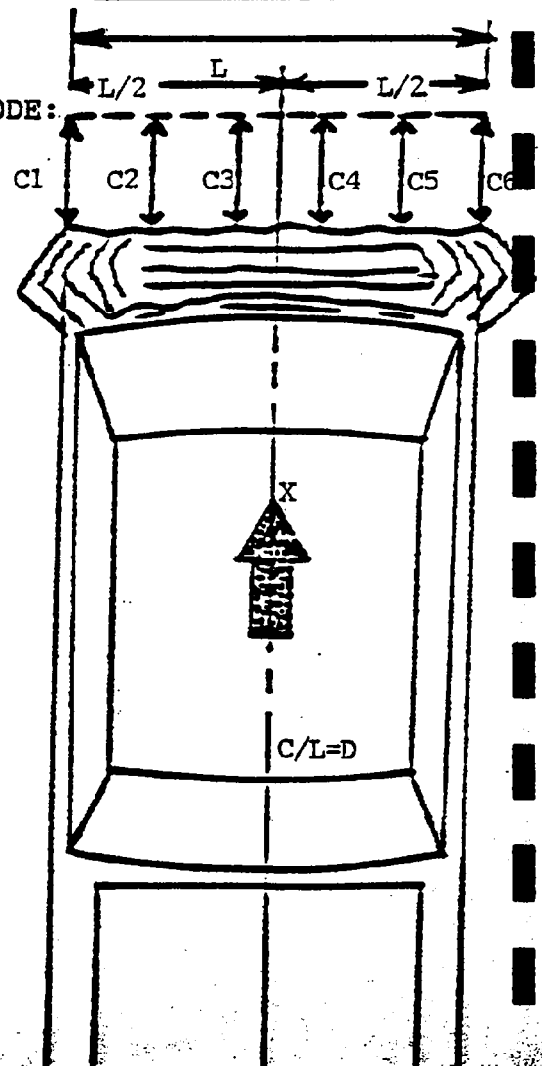
CRUSH DEPTH DIMENSIONS:

C1 =	<u>16.5</u>	inches
C2 =	<u>19.5</u>	inches
C3 =	<u>17.9</u>	inches
C4 =	<u>18.9</u>	inches
C5 =	<u>18.4</u>	inches
C6 =	<u>17.4</u>	inches

18.1

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

LENGTH OF DAMAGED REGION: L = 59.4 inches



APPENDIX A
PHOTOGRAPHS

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NOT APPLICABLE

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

NO PHOTO AVAILABLE

Photo No. 19 - Pre-Test Rear Underbody View

NO PHOTO AVAILABLE

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

NOT REQUIRED

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

NOT REQUIRED

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

NO PHOTO AVAILABLE

Photo No. 14 - Pre-Test Engine Compartment View

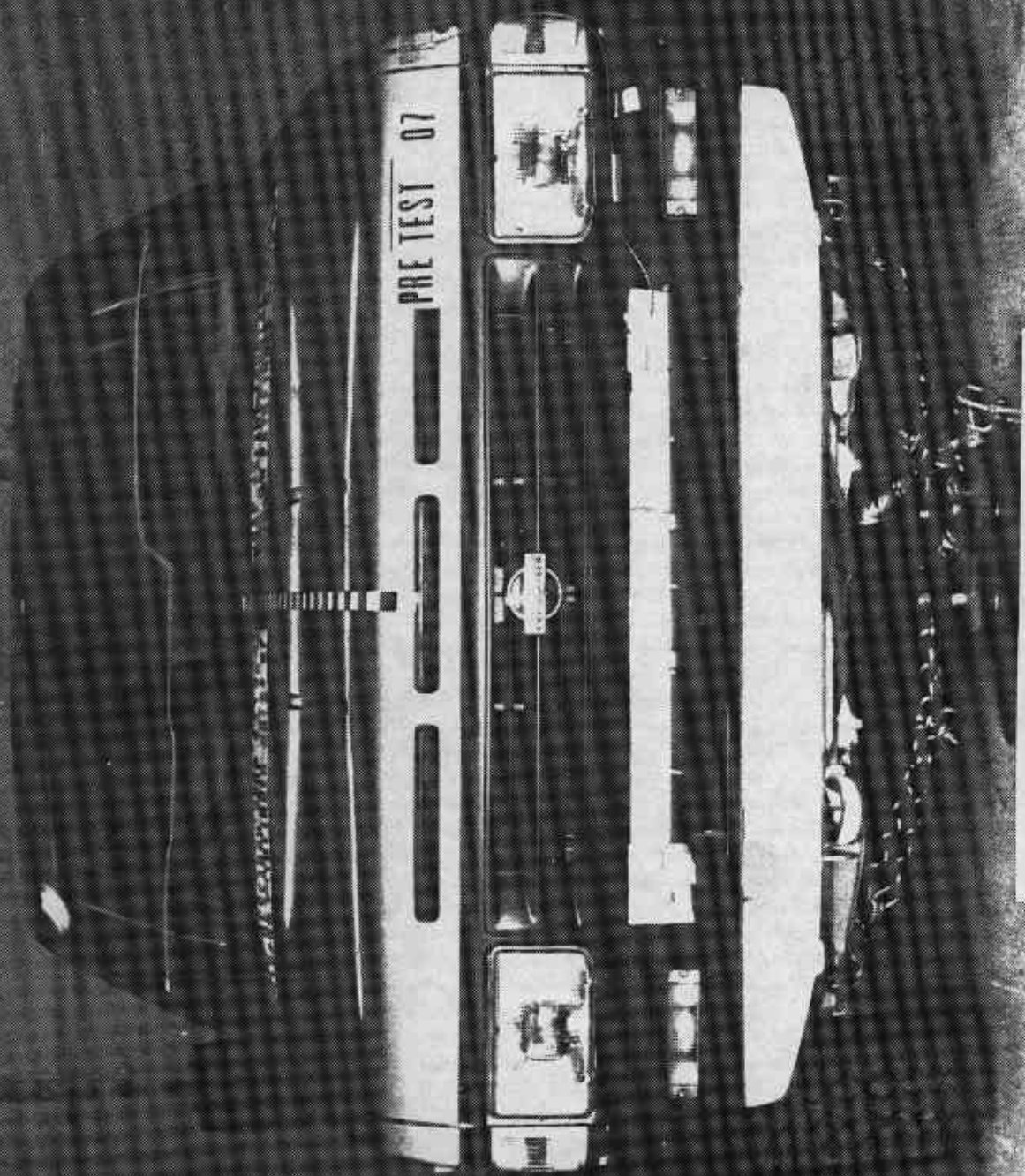


Photo No. 1 - Pre-Test Front View

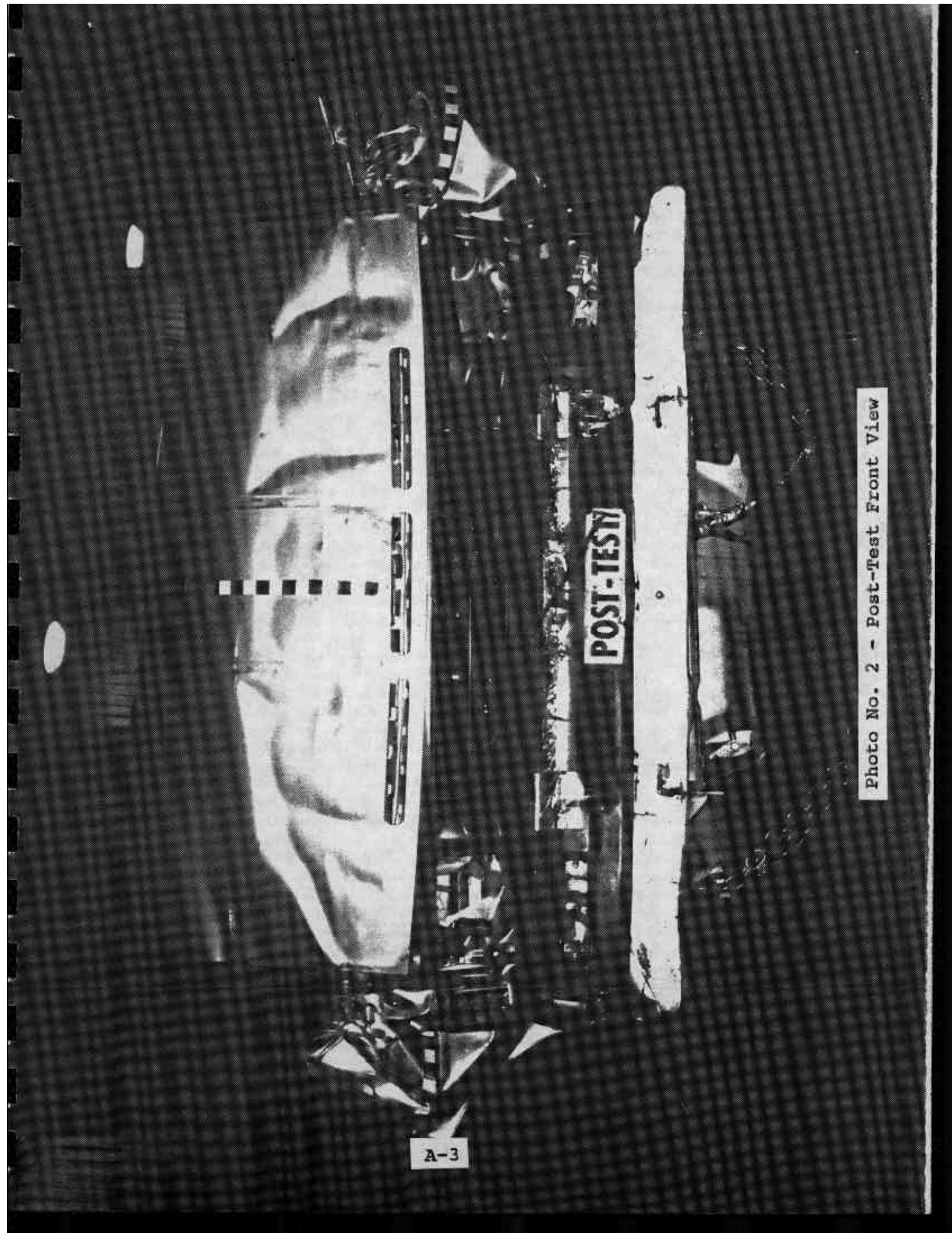


Photo No. 2 - Post-Test Front View

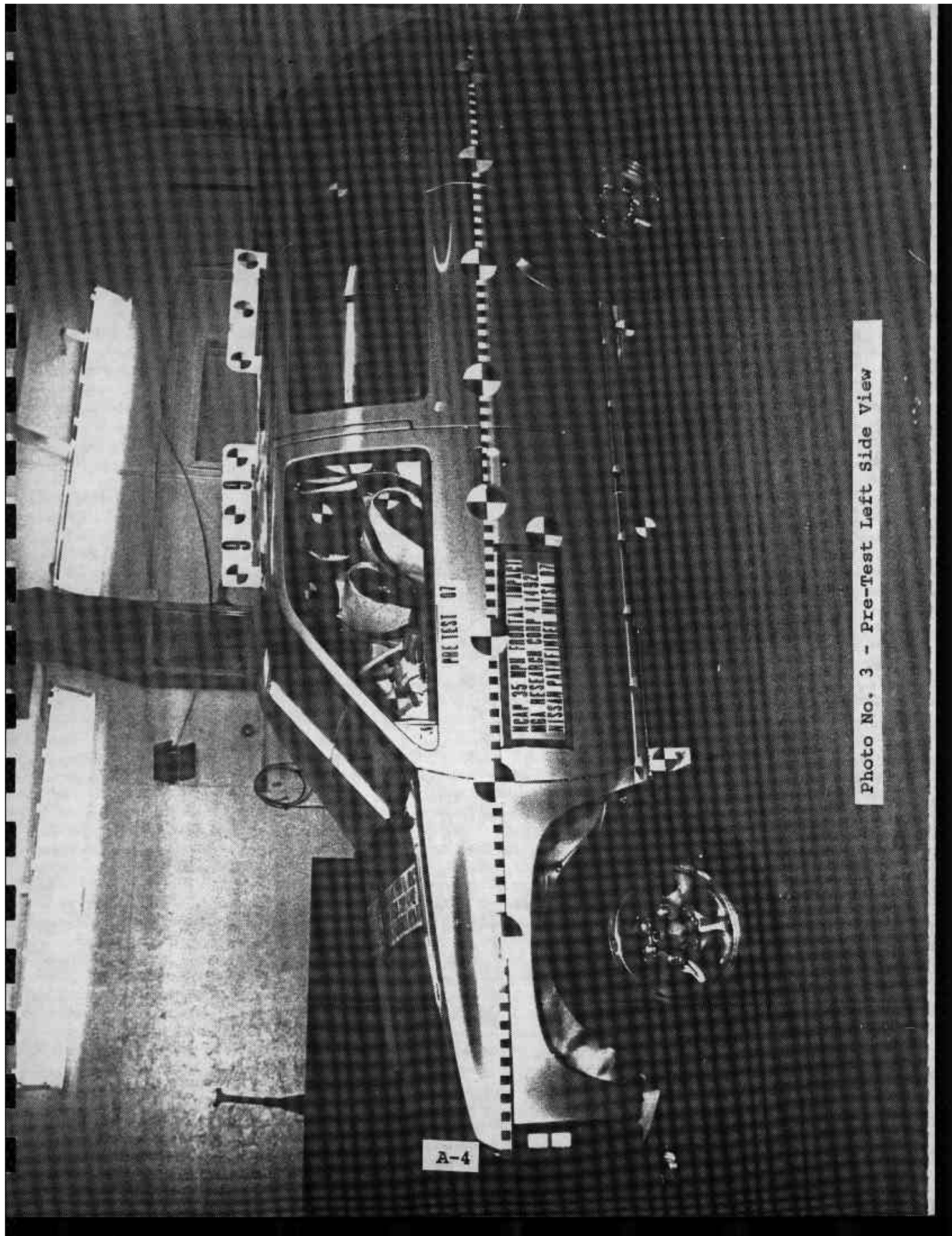


Photo No. 3 - Pre-Test Left Side View

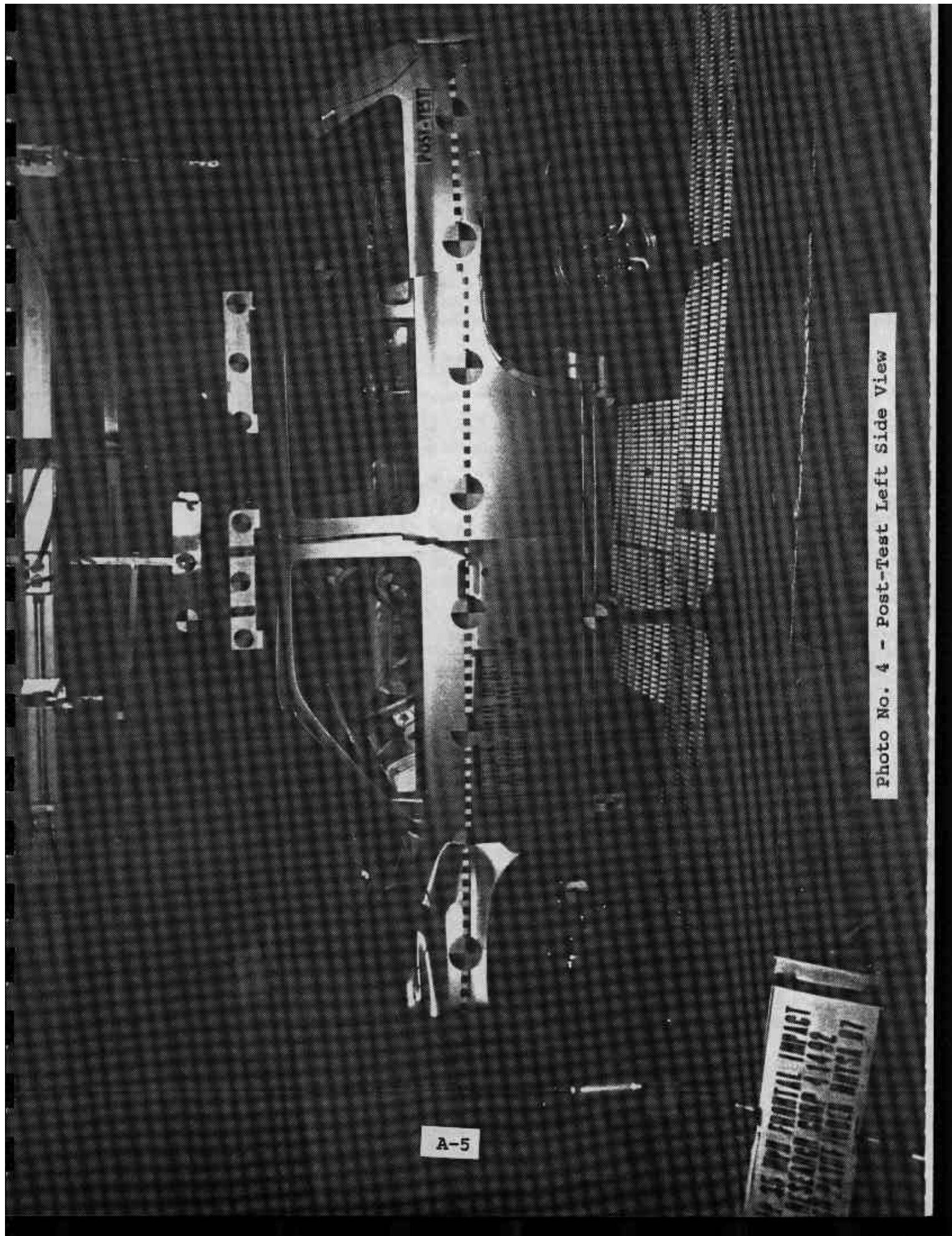


Photo No. 4 - Post-Test Left Side View

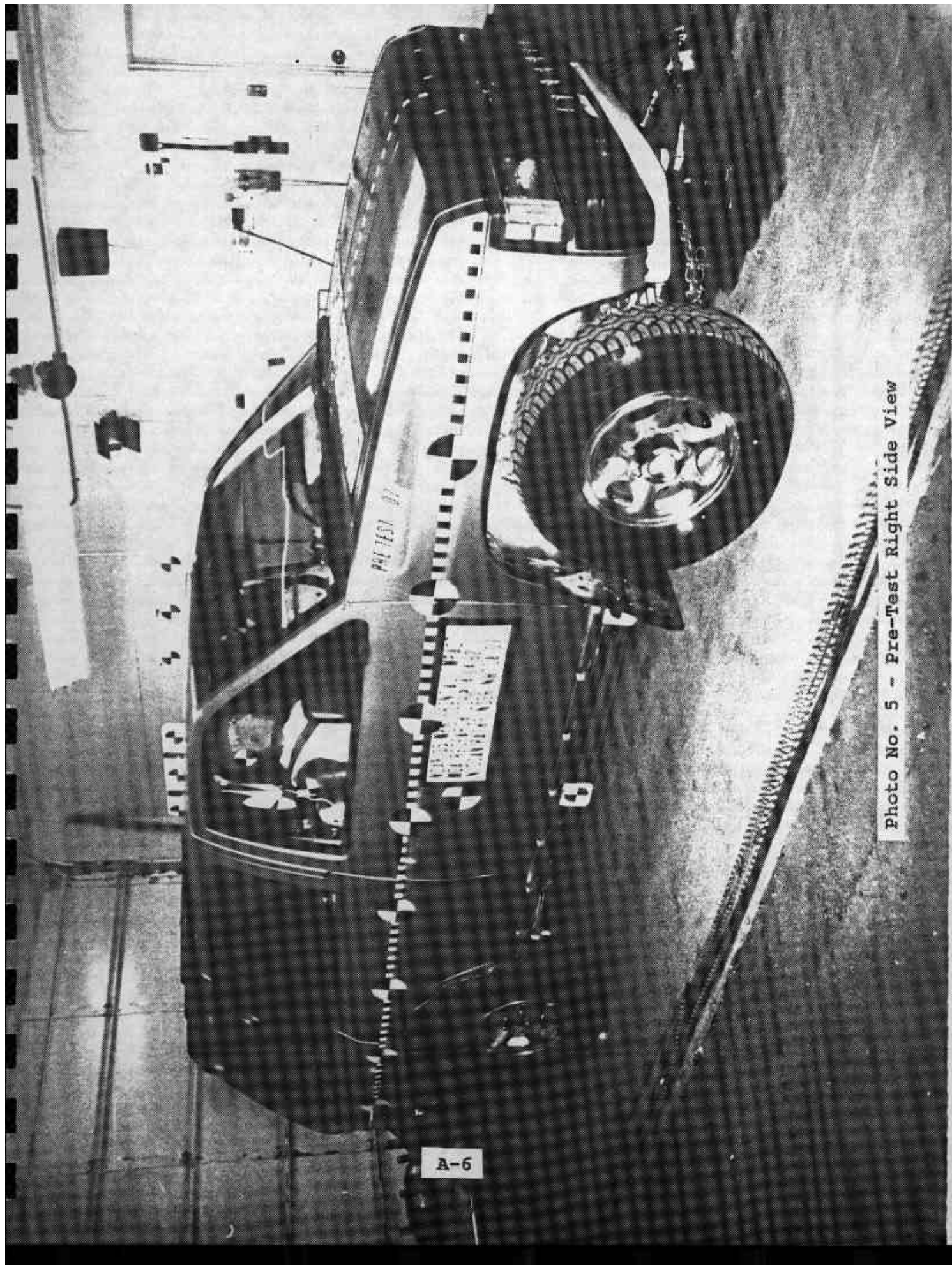


Photo No. 5 - Pre-Test Right Side View

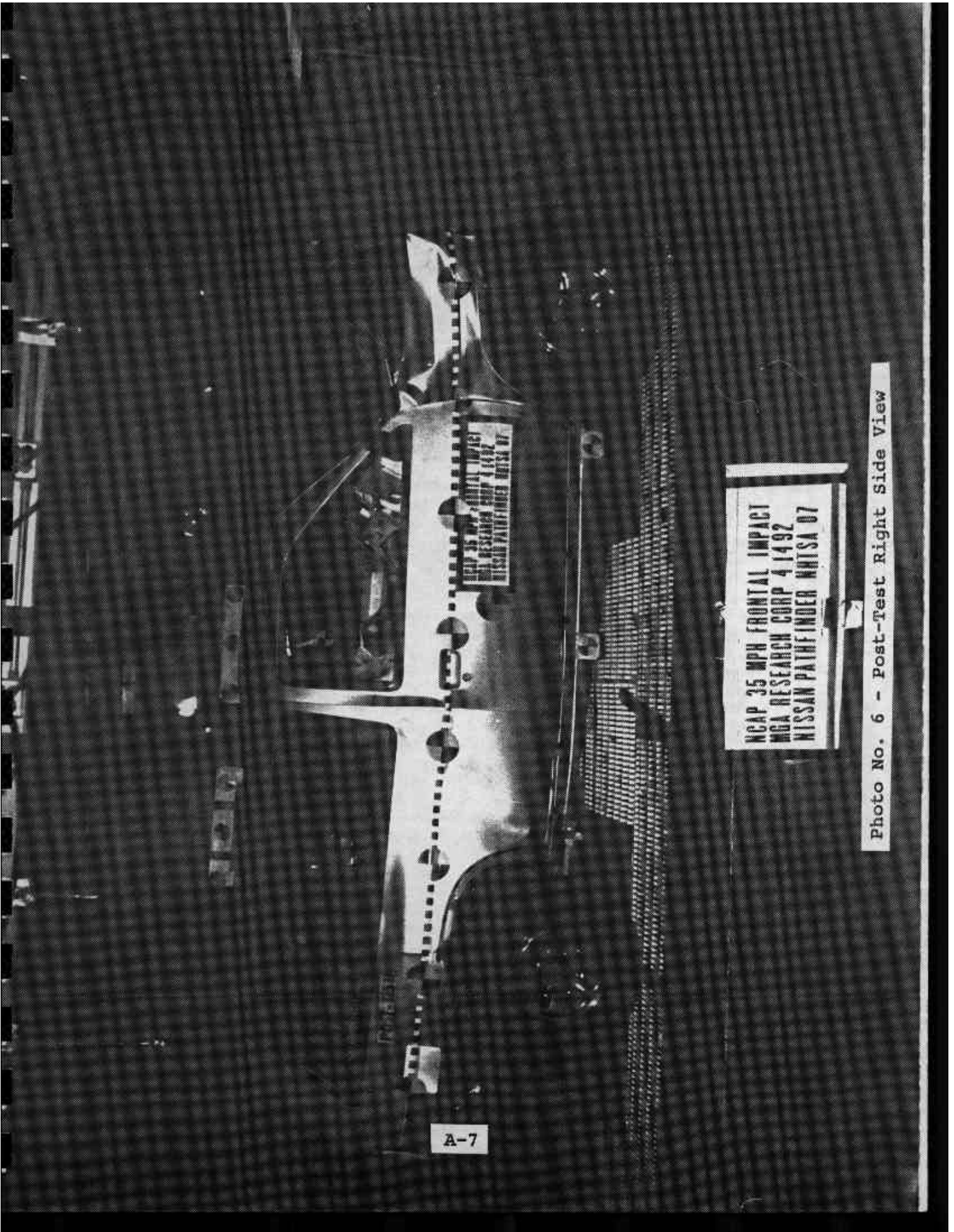


Photo No. 6 - Post-Test Right Side View



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

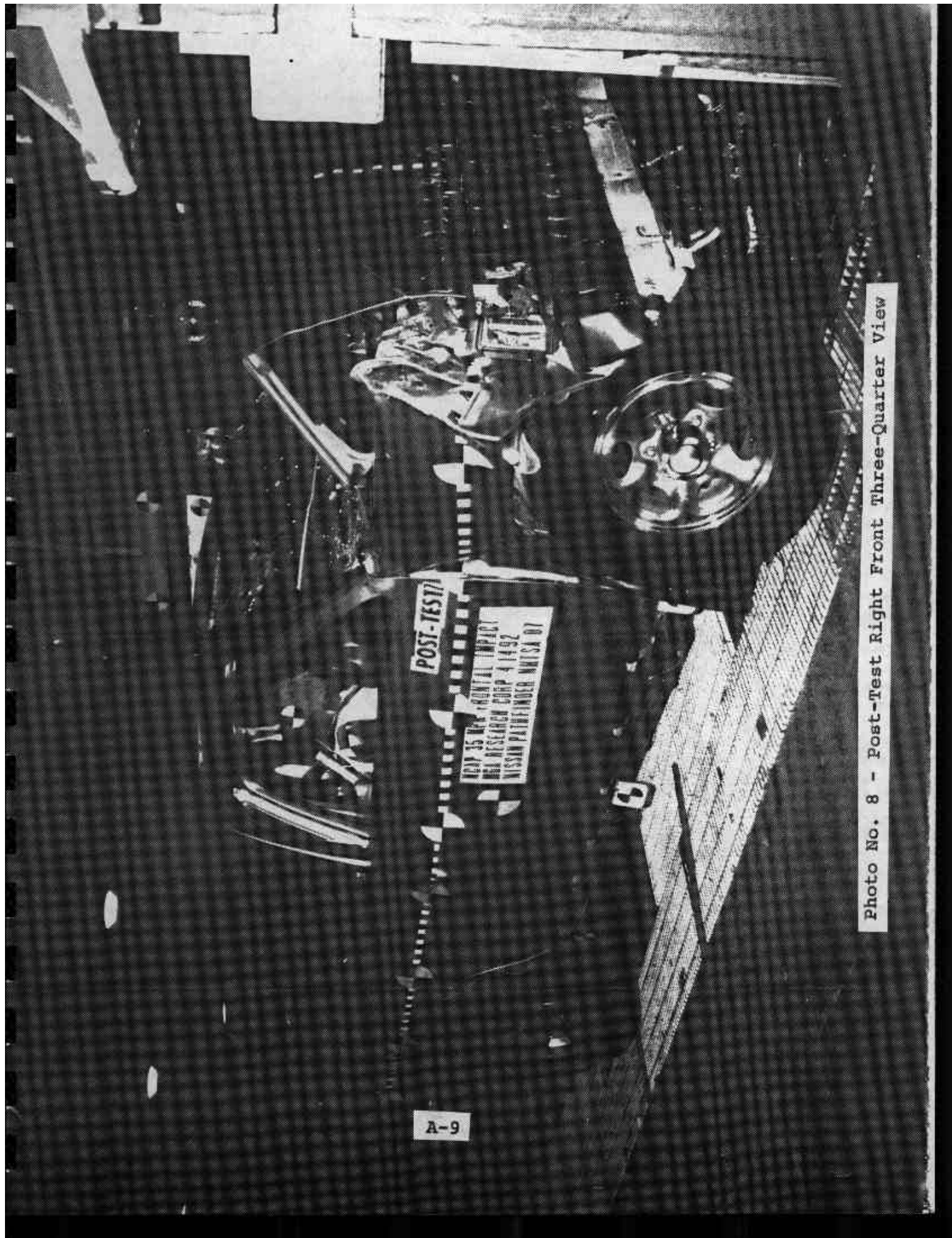


Photo No. 8 - Post-Test Right Front Three-Quarter View

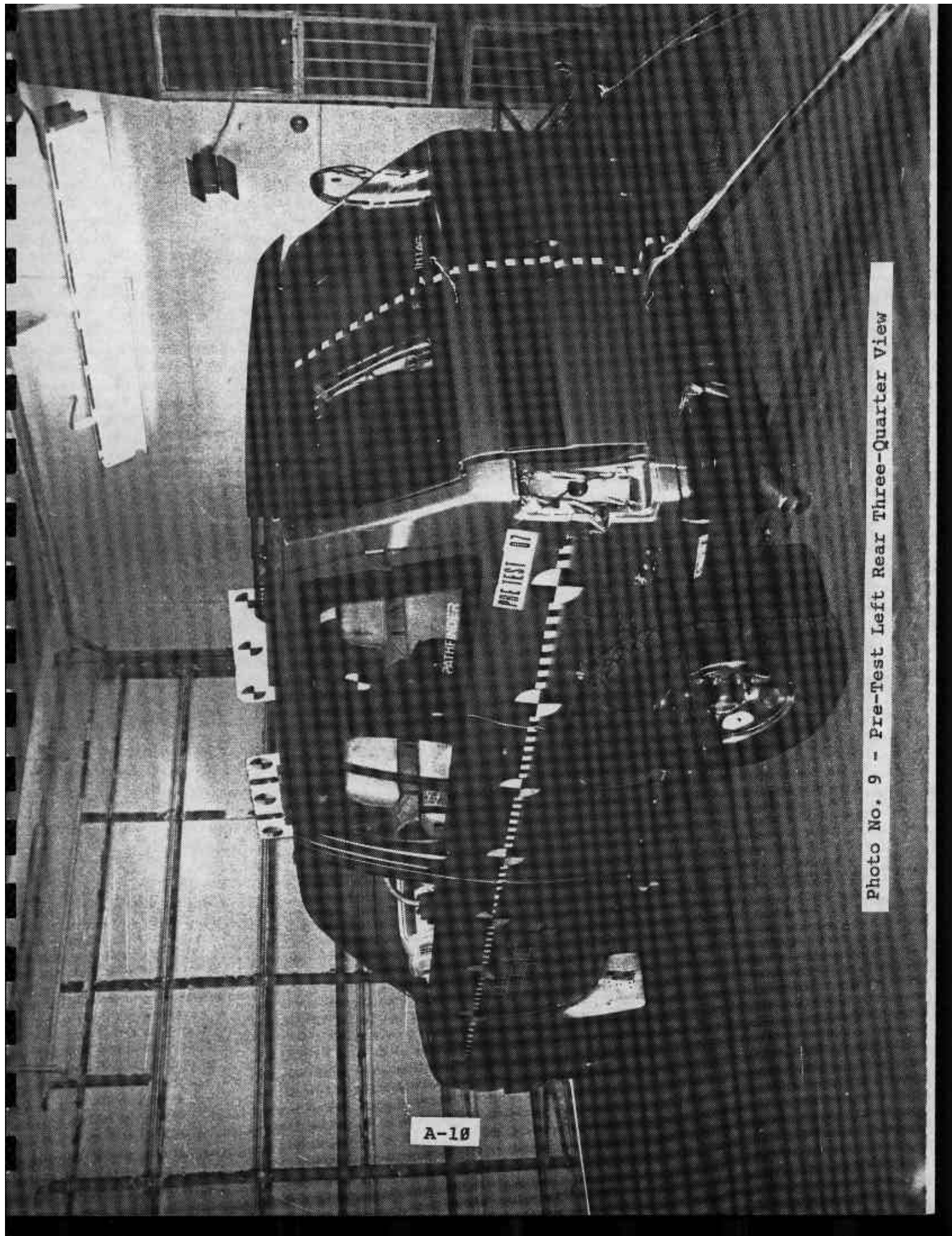


Photo No. 9 - Pre-Test Left Rear Three-Quarter View

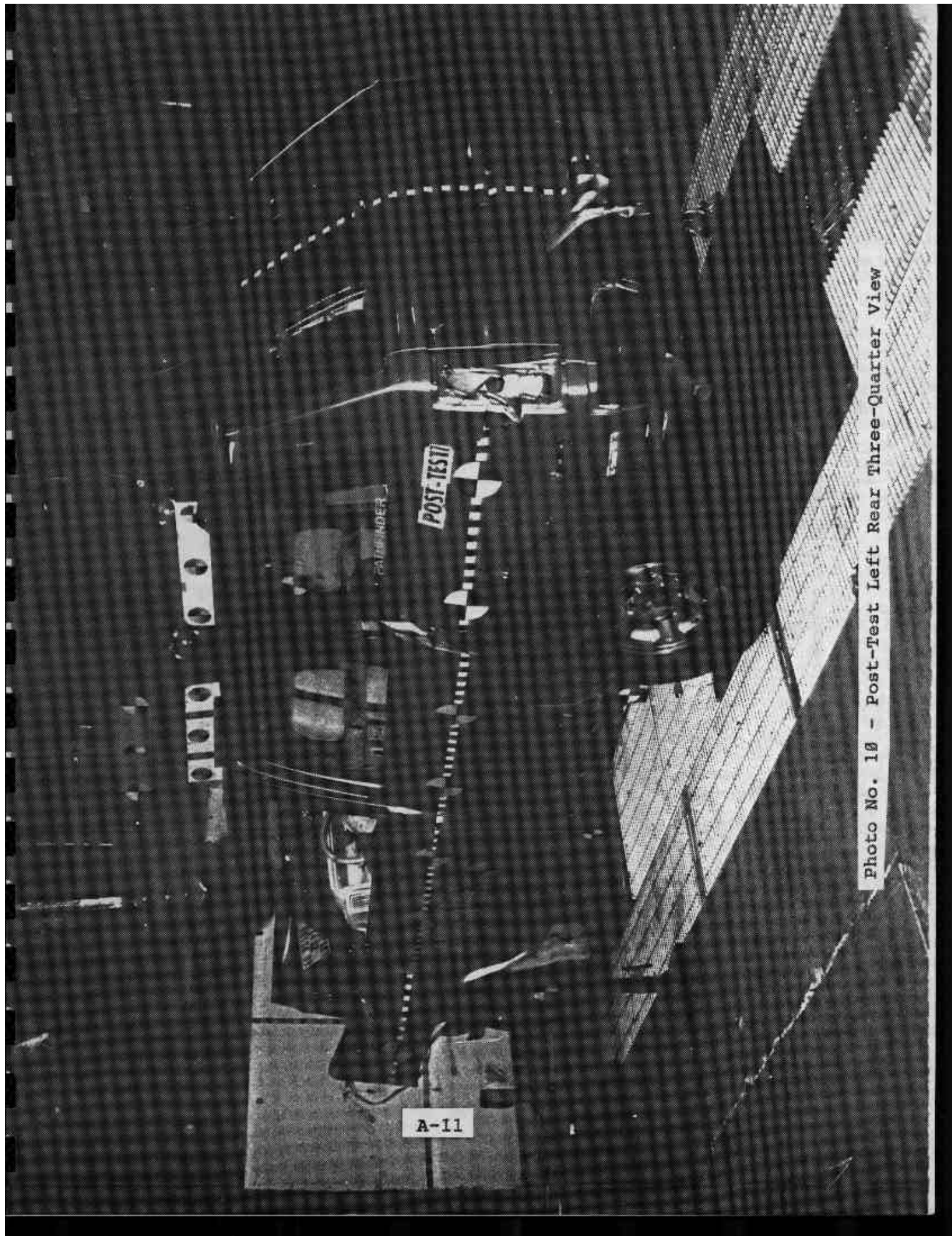
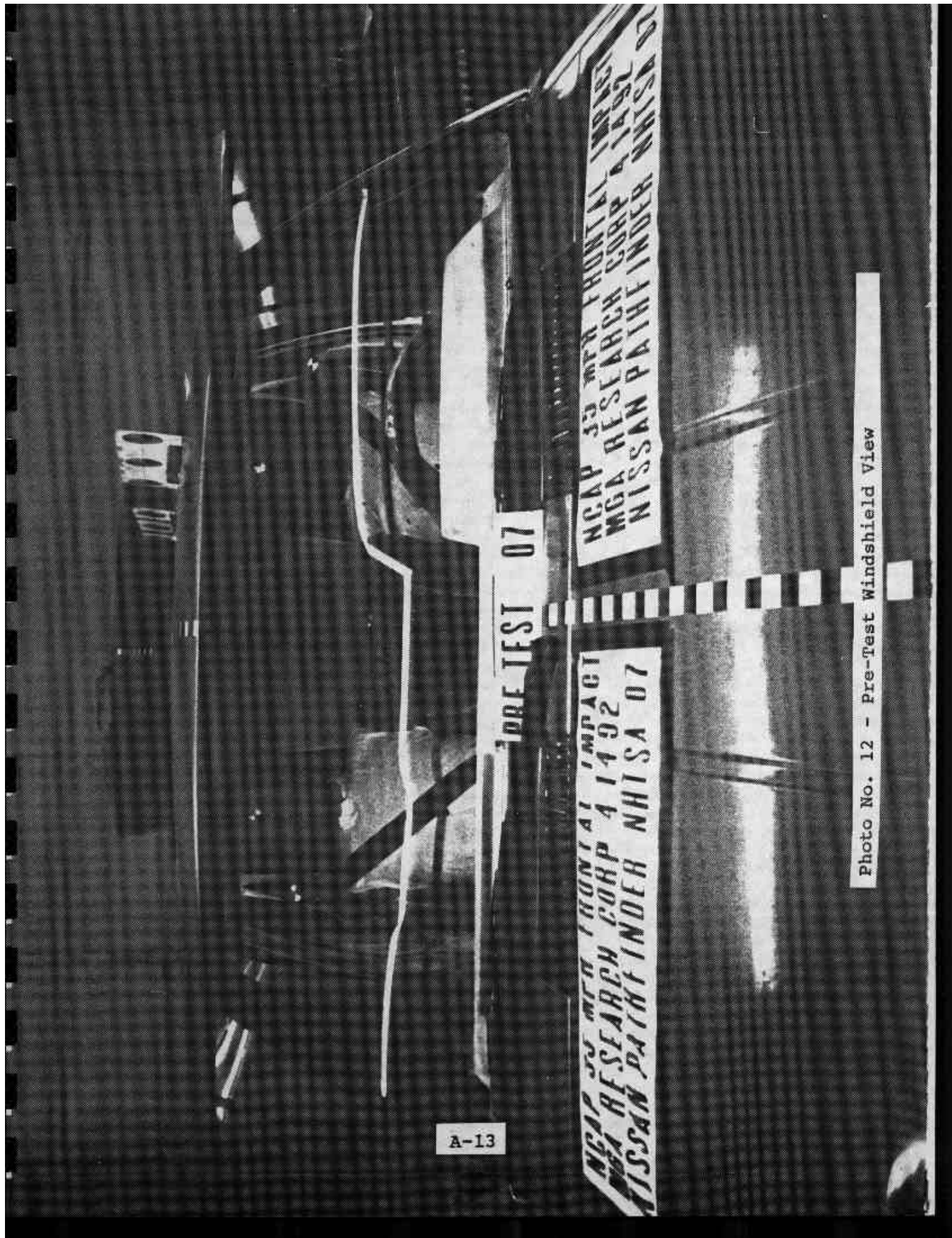


Photo No. 10 - Post-Test Left Rear Three-Quarter View



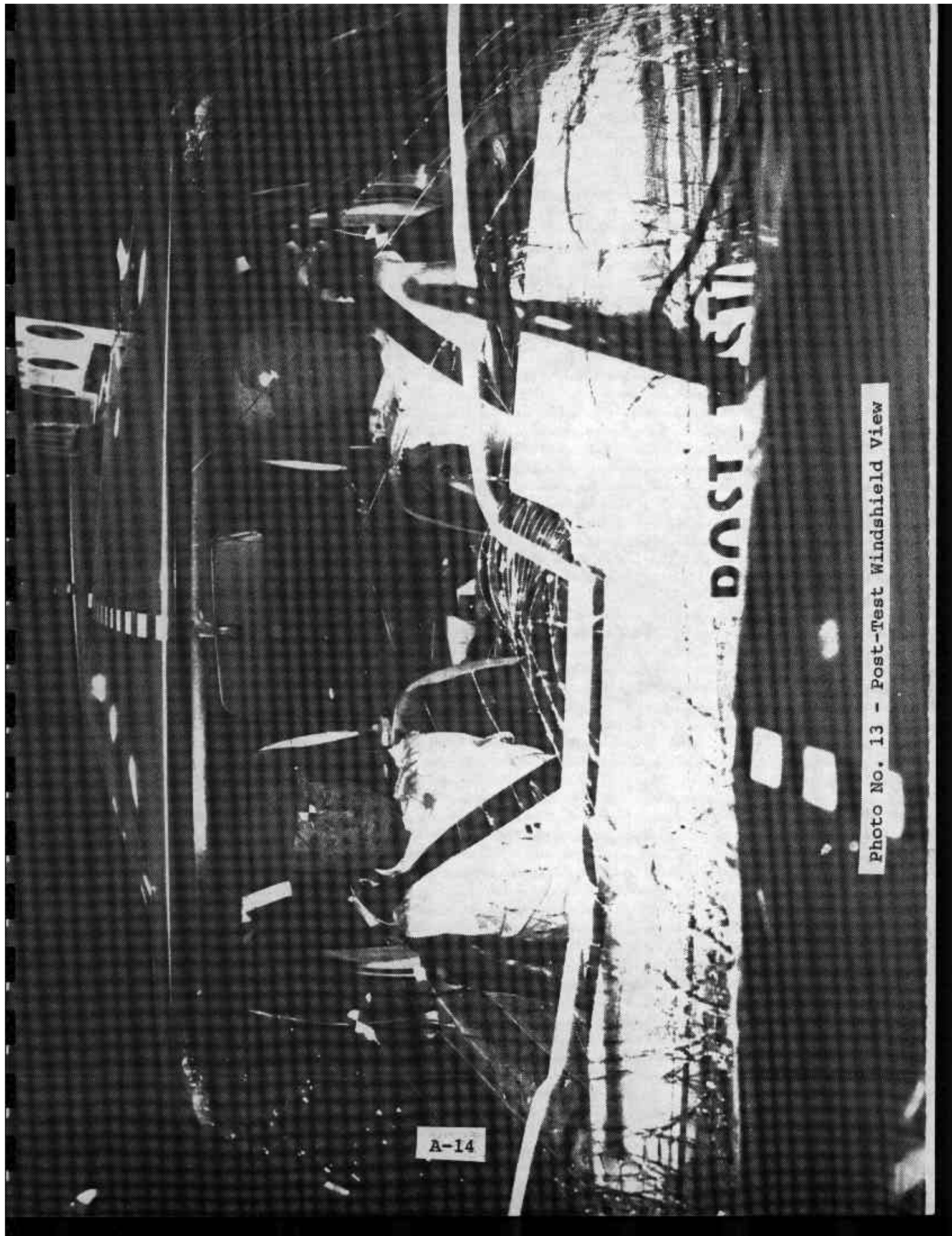
A-13

PRE TEST 07

NCAP 33 MPA FRONTAL IMPACT
MGA RESEARCH CORP 41492
NISSAN PAINT INDER NHTSA 07

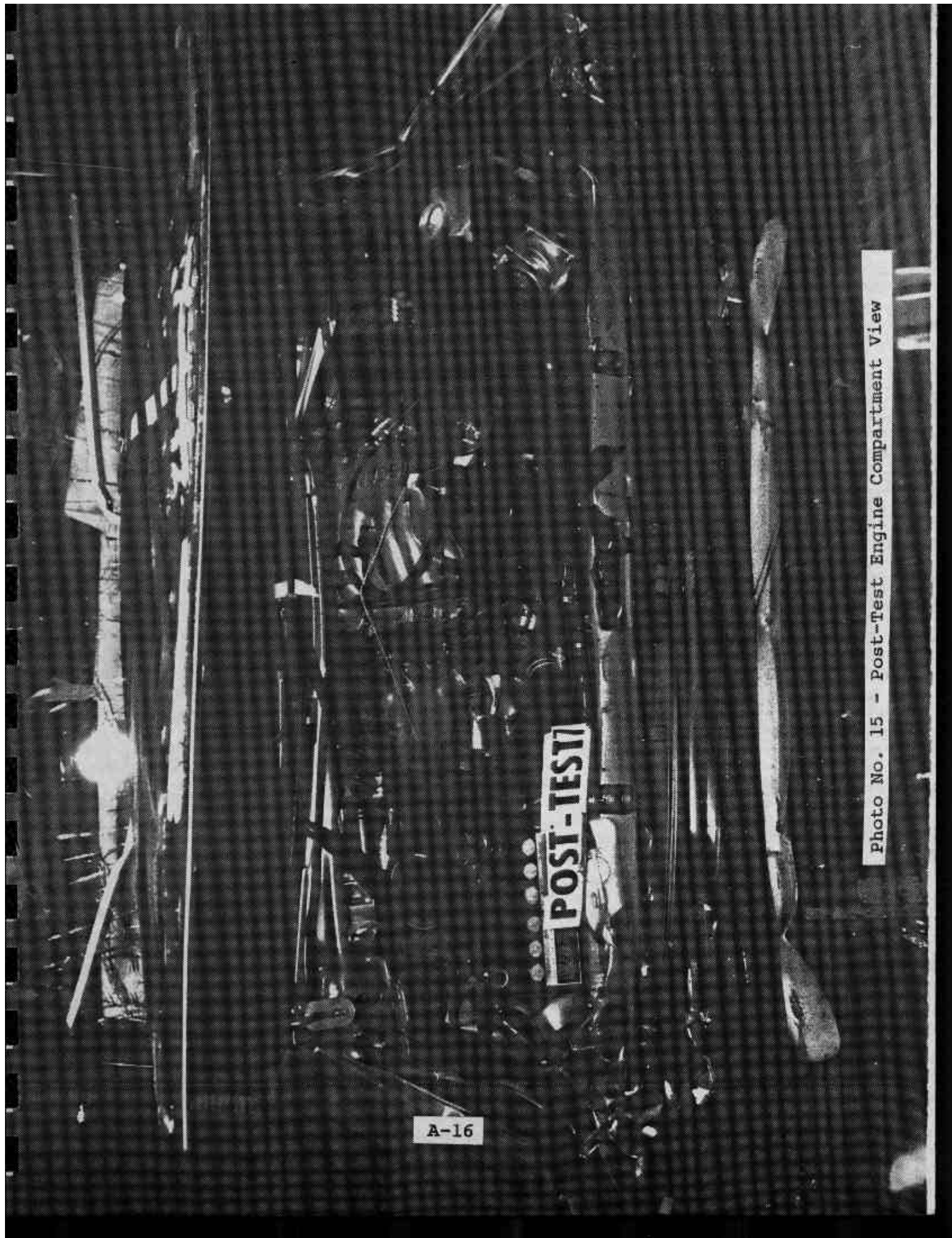
NCAP 33 MPA FRONTAL IMPACT
MGA RESEARCH CORP 41492
NISSAN PAINT INDER NHTSA 07

Photo No. 12 - Pre-Test Windshield View



A-14

Photo No. 13 - Post-Test Windshield View

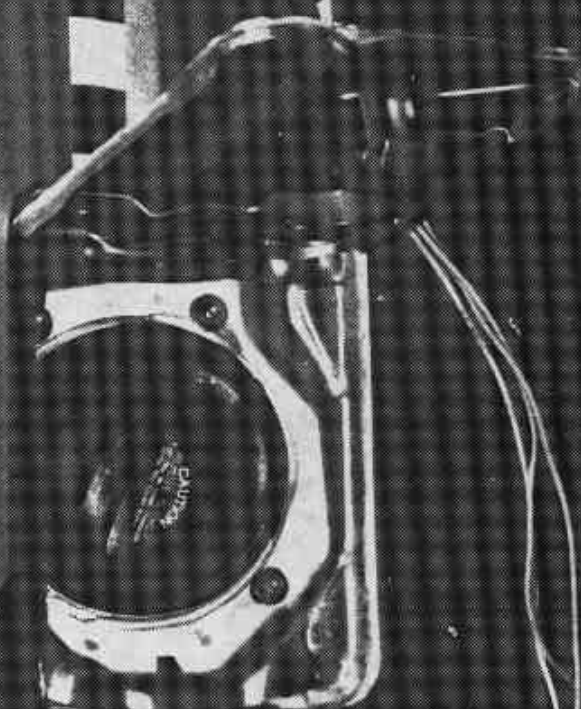


A-16

POST-TEST

Photo No. 15 - Post-Test Engine Compartment View

PRE TEST 07



A-17

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

Photo No. 17 - Pre-Test Front Underbody View

A-18

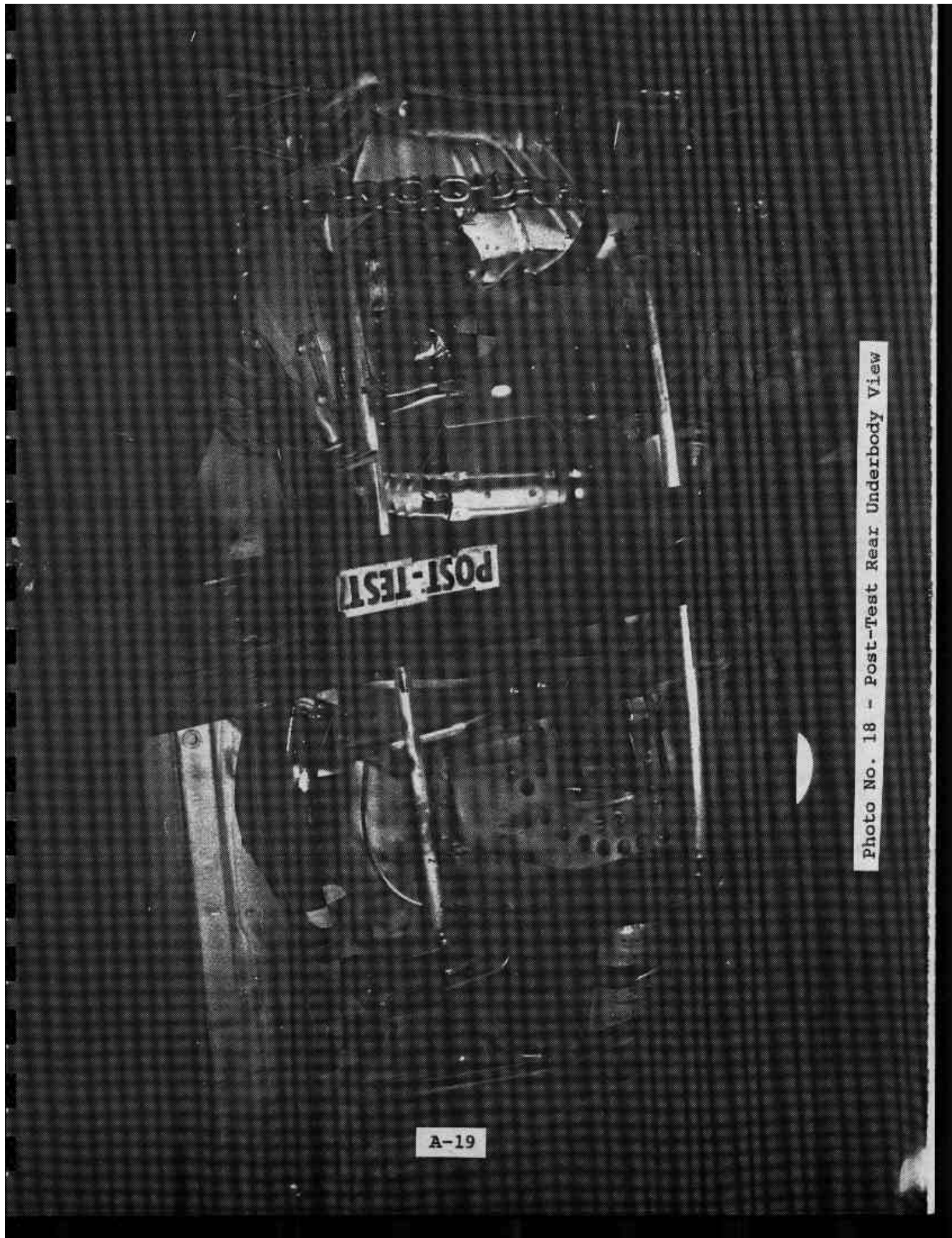


Photo No. 18 - Post-Test Rear Underbody View

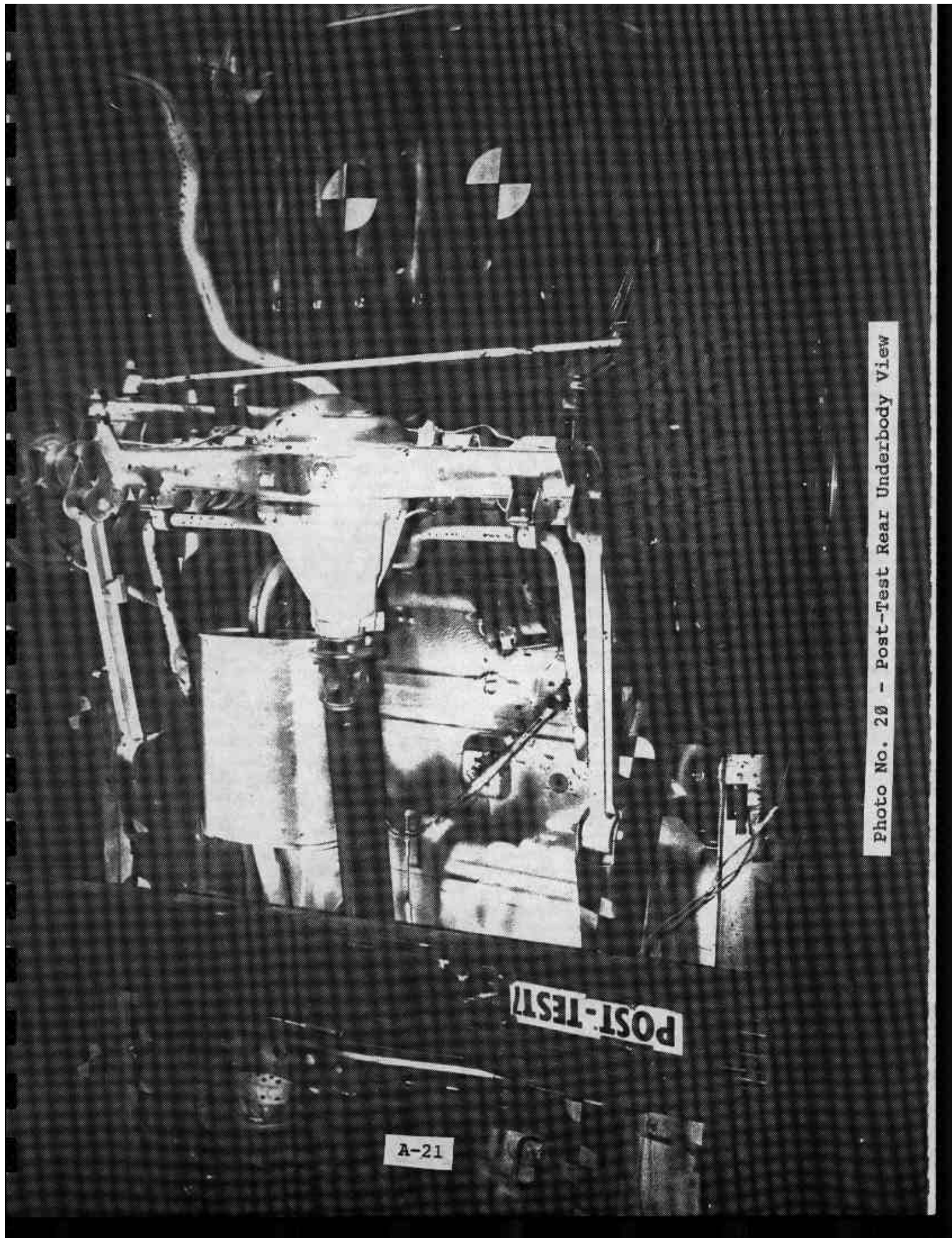
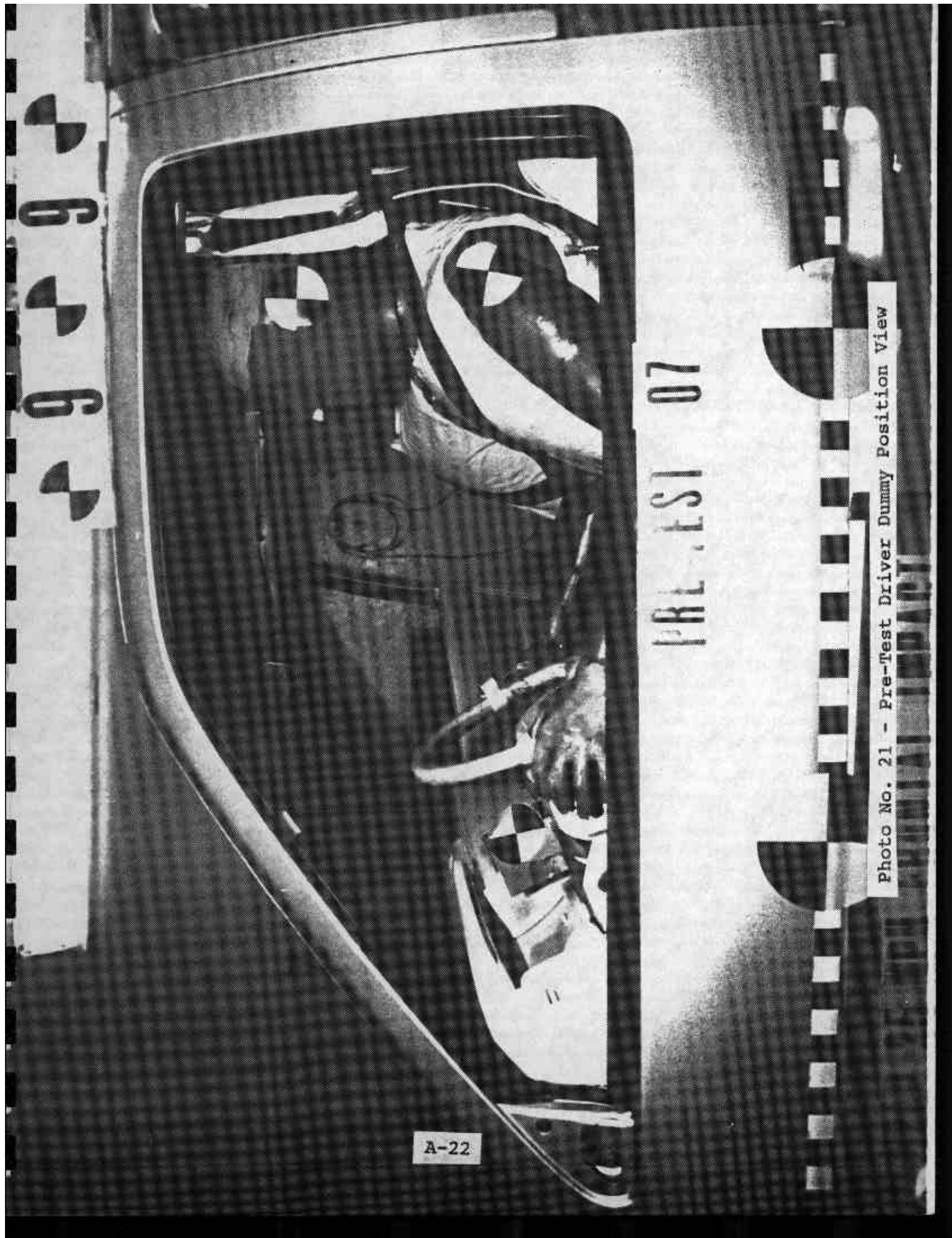


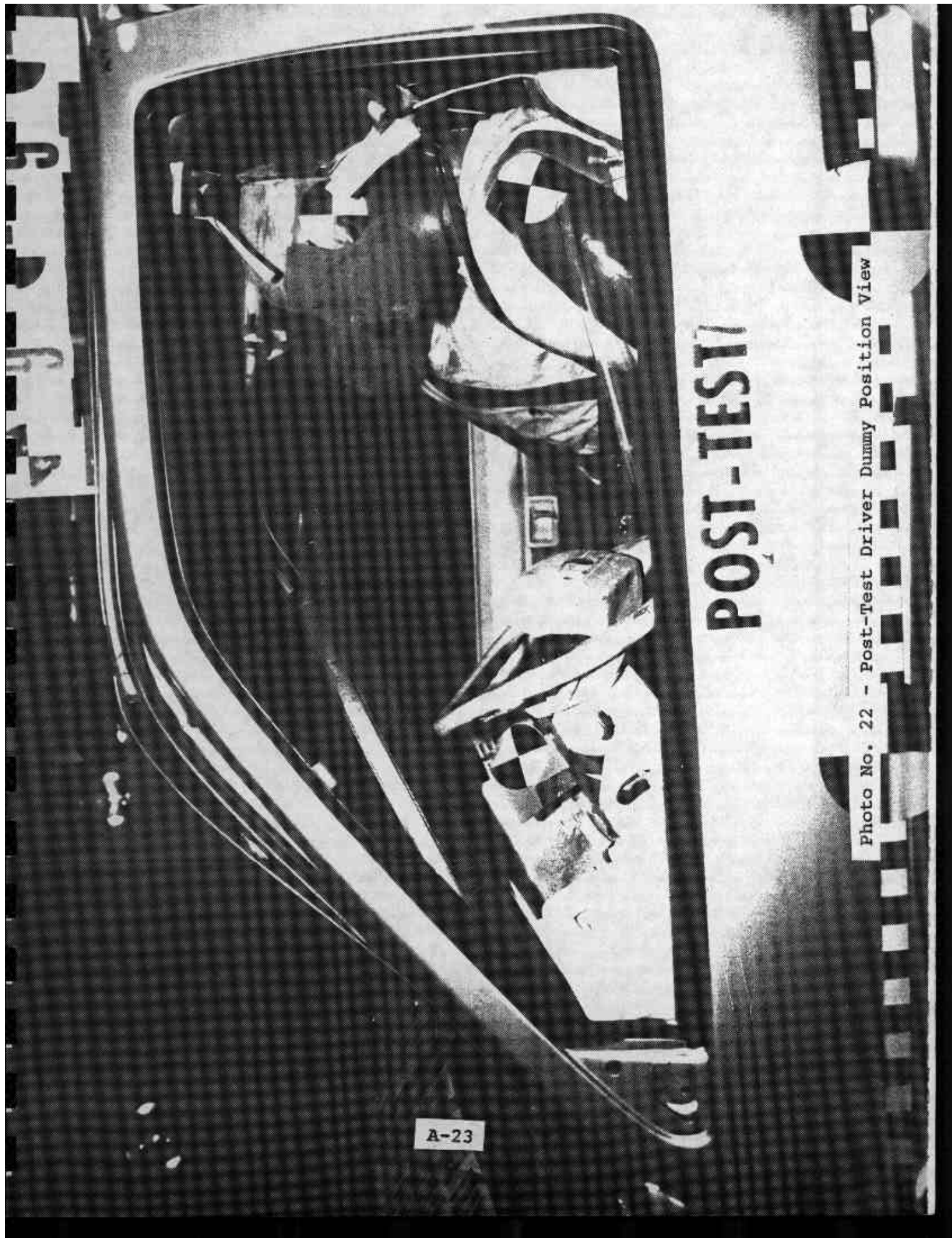
Photo No. 20 - Post-Test Rear Underbody View



A-22

PRETEST 07

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



A-23

POST-TEST

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



A-25

POST-TEST

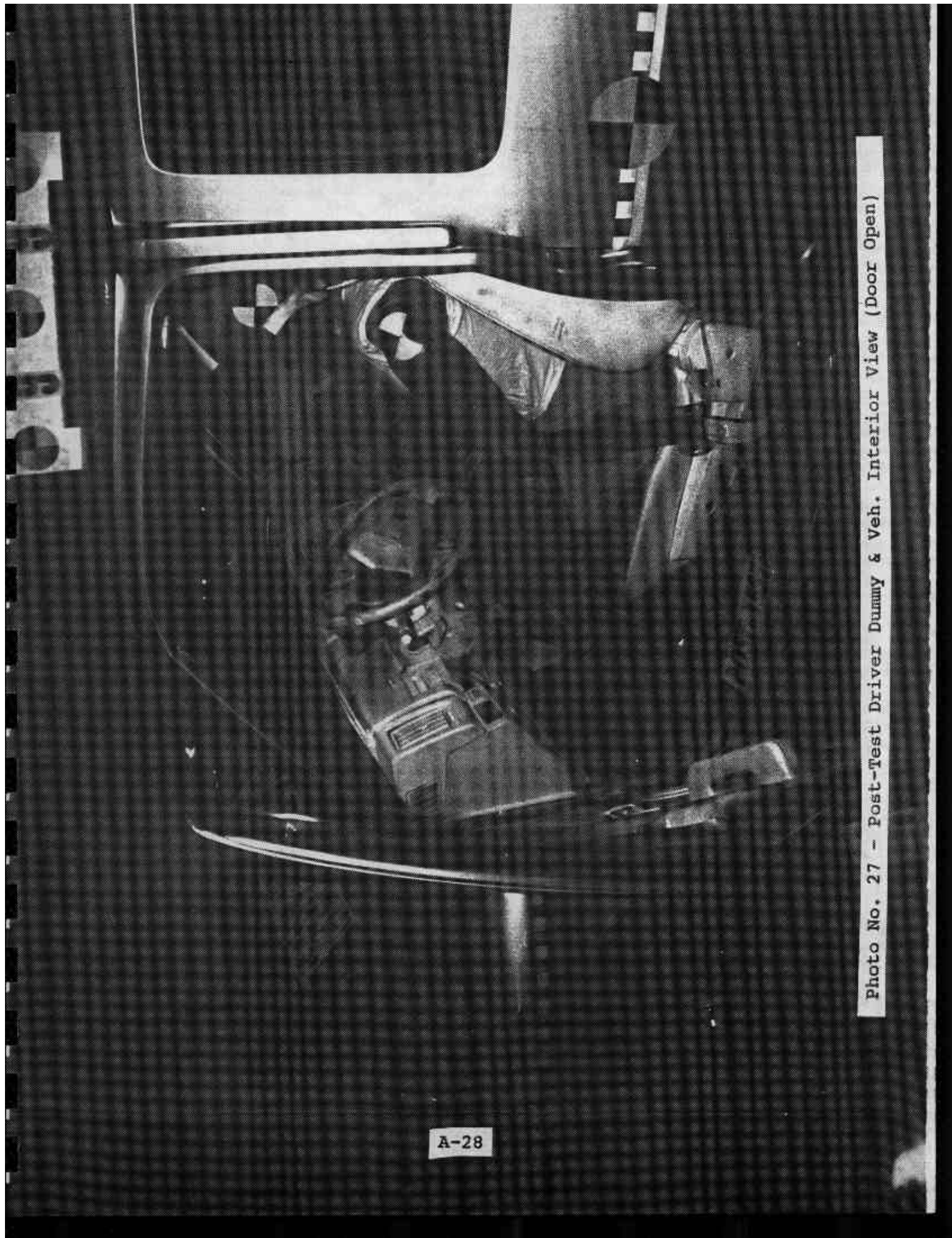
Photo No. 24 - Post-Test Passenger Dummy Position View

NCAP 35 MPH FRONTAL IMPACT



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

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A-28

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

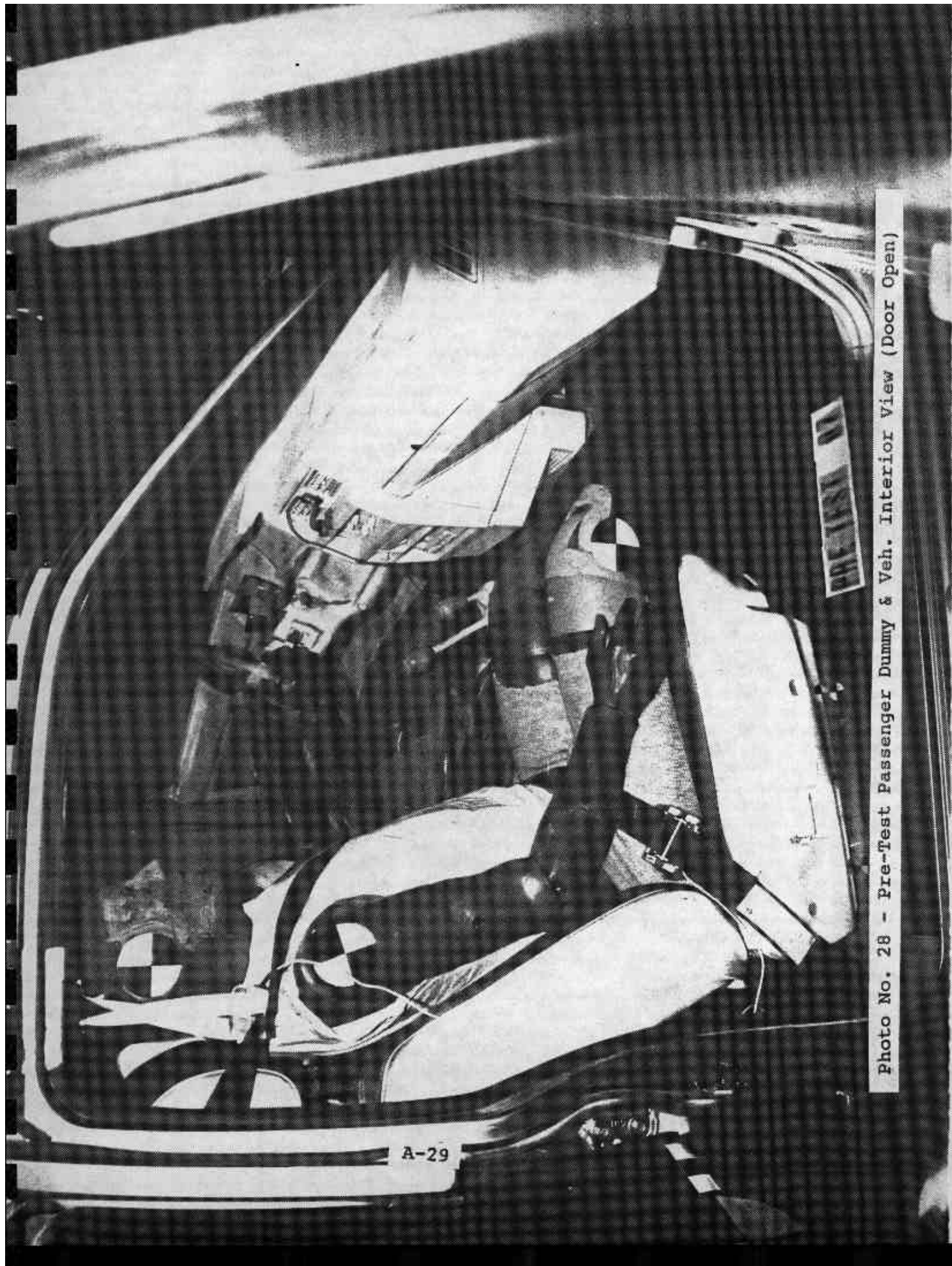


Photo No. 28 - Pre-Test Passenger Dummy & Veh. Interior View (Door Open)



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

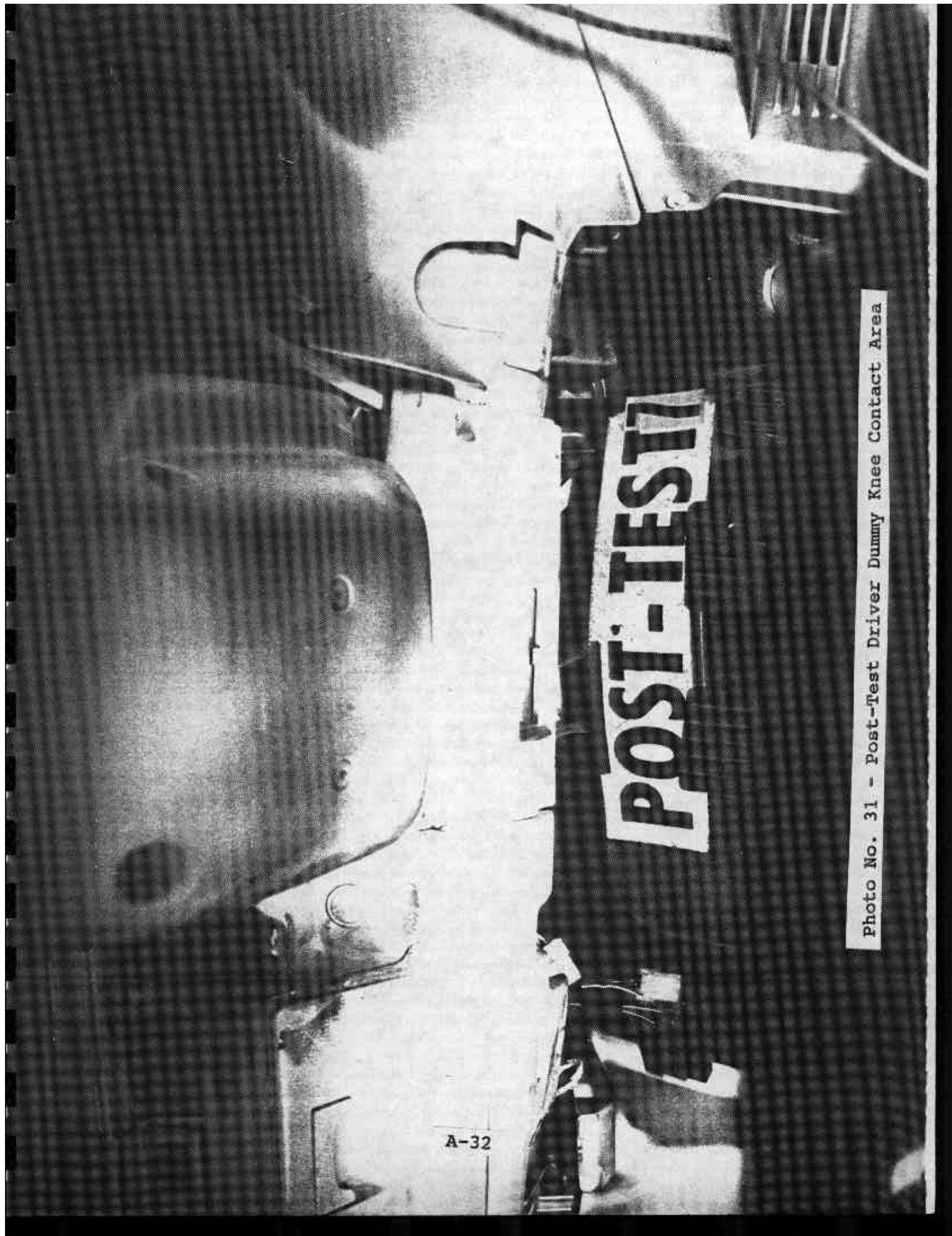


Photo No. 31 - Post-Test Driver Dummy Knee Contact Area



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

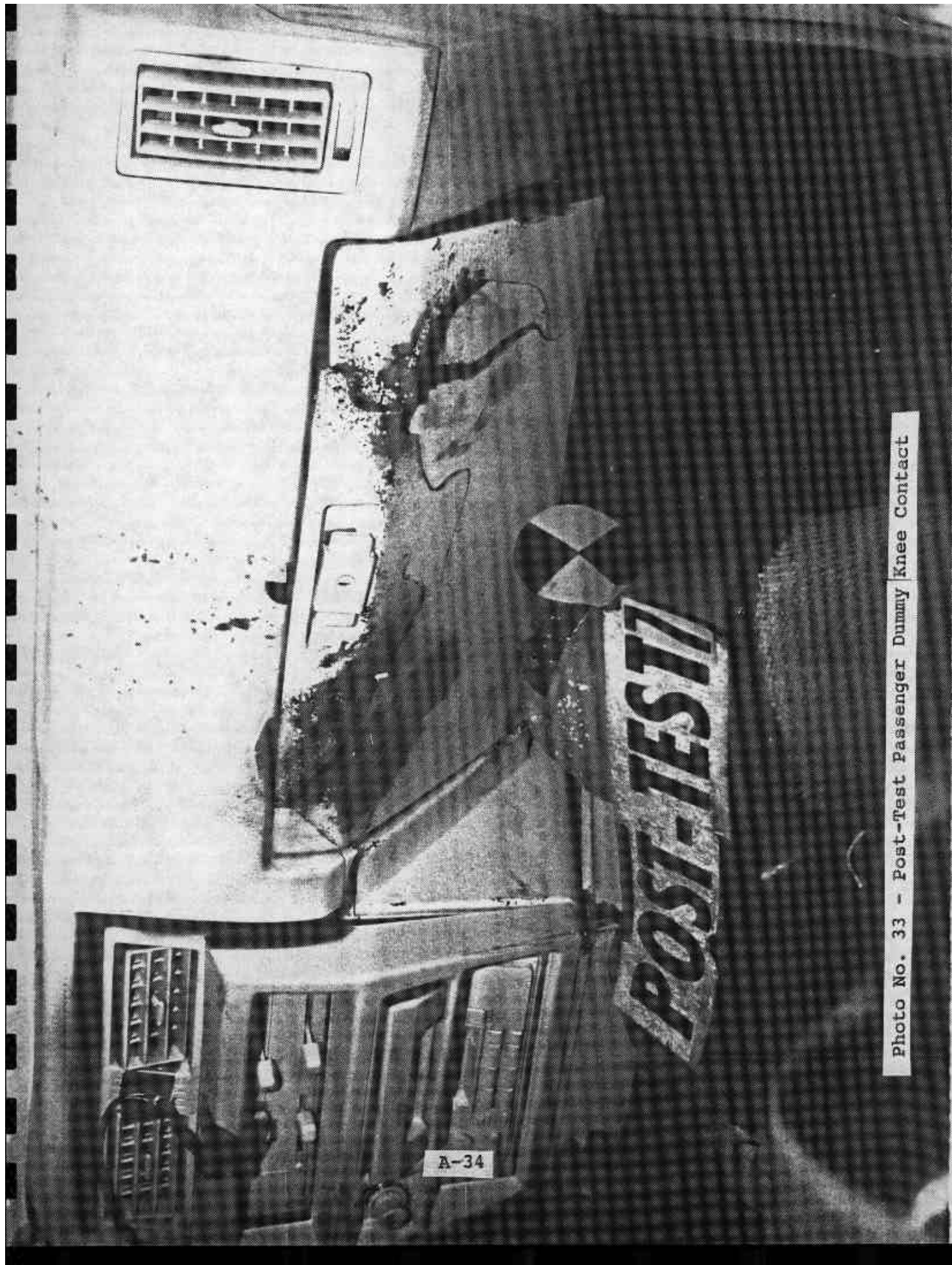


Photo No. 33 - Post-Test Passenger Dummy Knee Contact

APPENDIX B

Vehicle, Load Cell Barrier and Dummy Response Data

1991 NISSAN PATHFINDER (MPV)

NHTSA NO.: MM5203

VEHICLE DATA	FILTER CHANNEL CLASS
Head Accelerometers	1000 (1650 Hz)
Chest Accelerometers	180 (300 Hz)
Vehicle Accelerometers	60 (100 Hz)
Barrier Load Cells	60 (100 Hz)
Femur Load Cells	600 (1000 Hz)
Lap and Torso Belts	60 (100 Hz)

Data Plot

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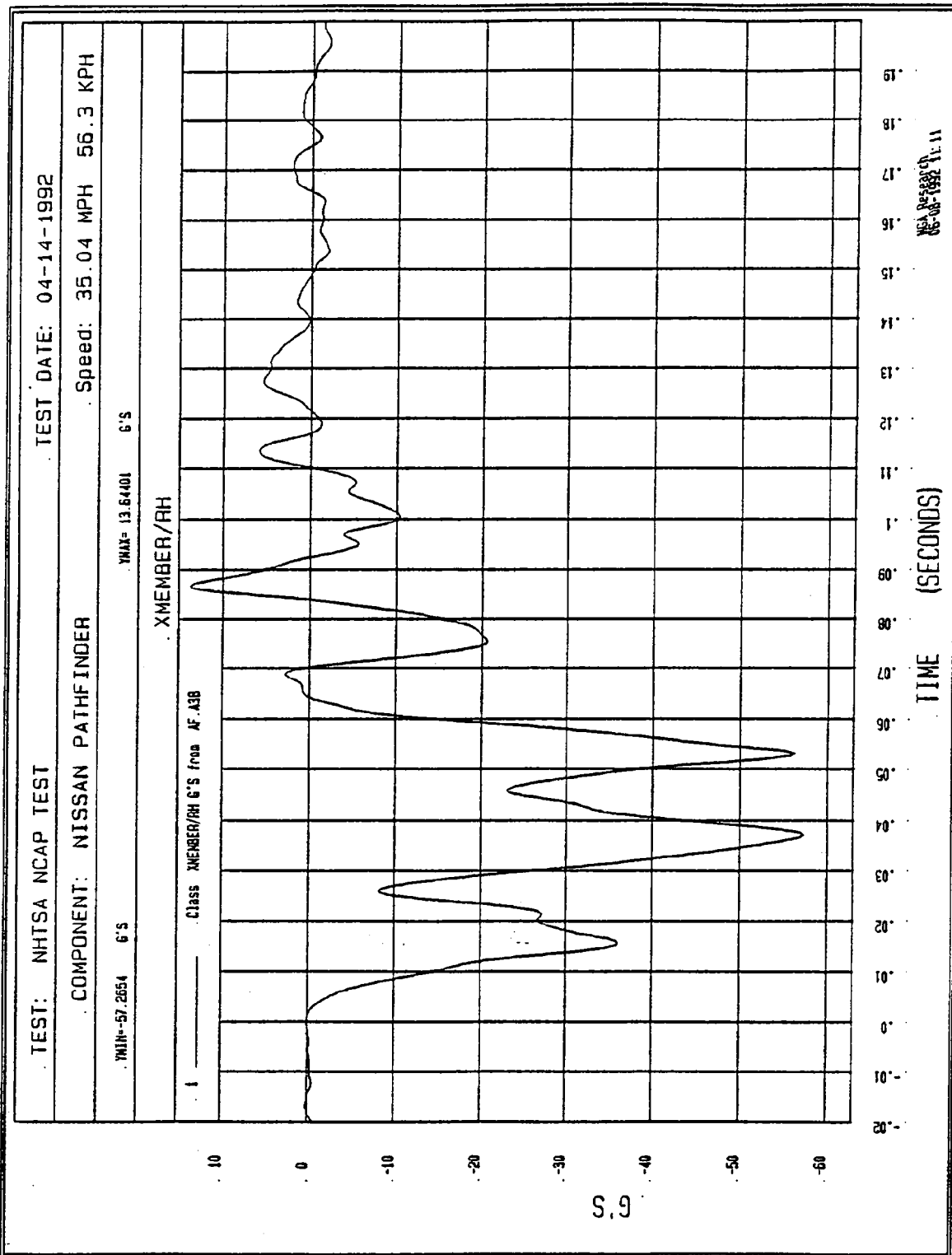


Figure B-1 - Right Rear Seat Crossmember X Acceleration vs. Time

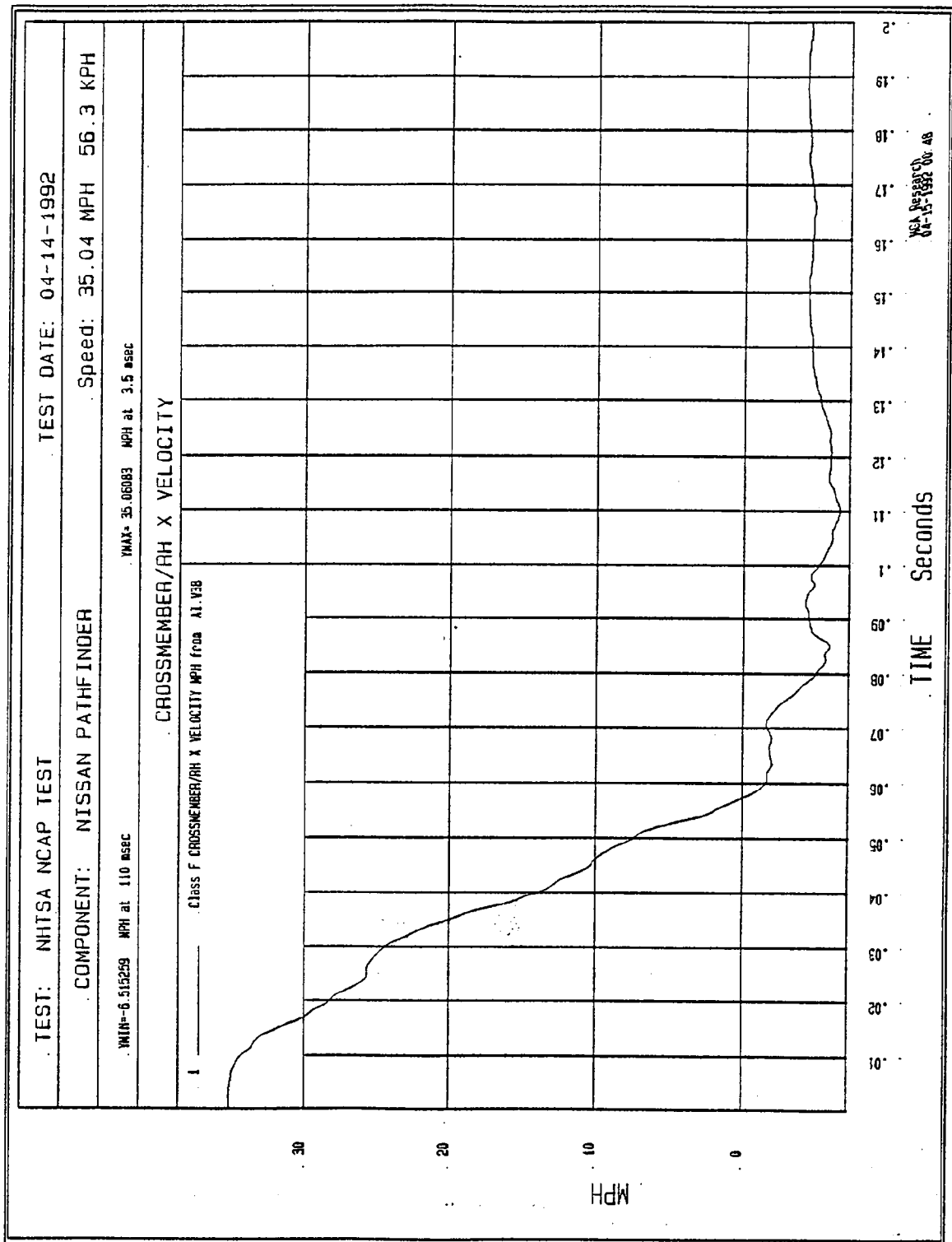


Figure B-2 - Right Rear Seat Crossmember X Velocity vs. Time

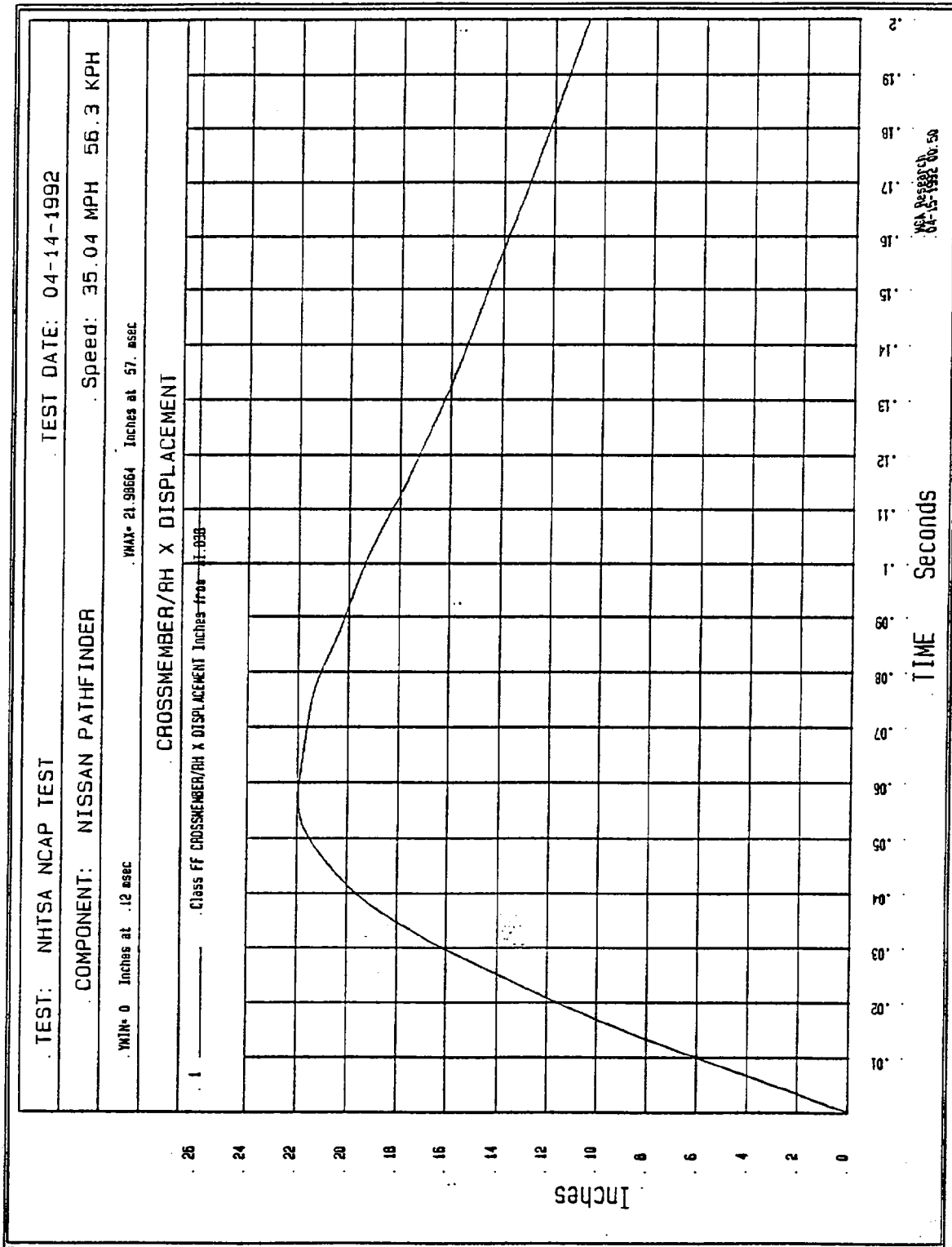


Figure B-3 - Right Rear Seat Crossmember X Displacement vs. Time

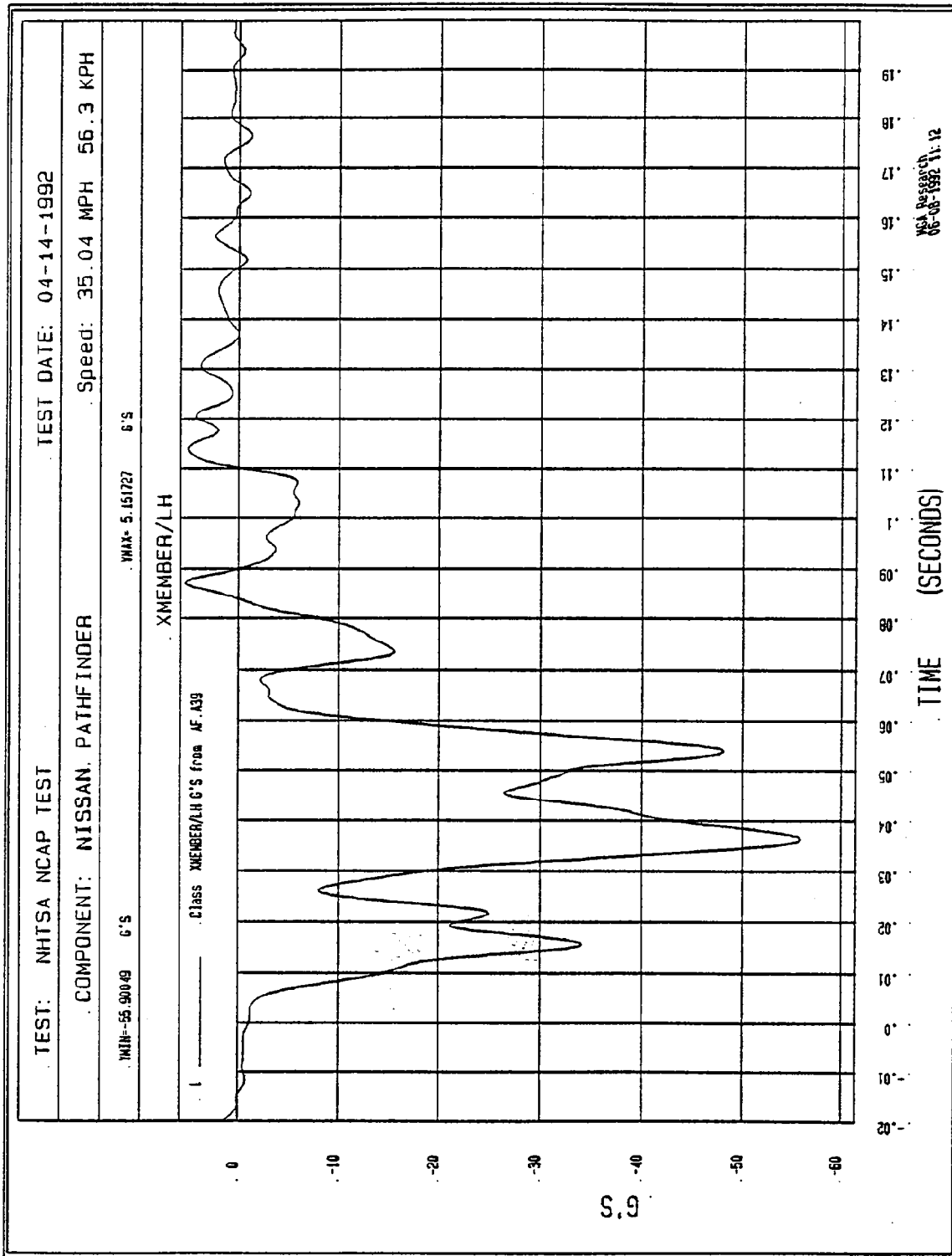


Figure B-4 - Left Rear Seat Crossmember X Acceleration vs. Time

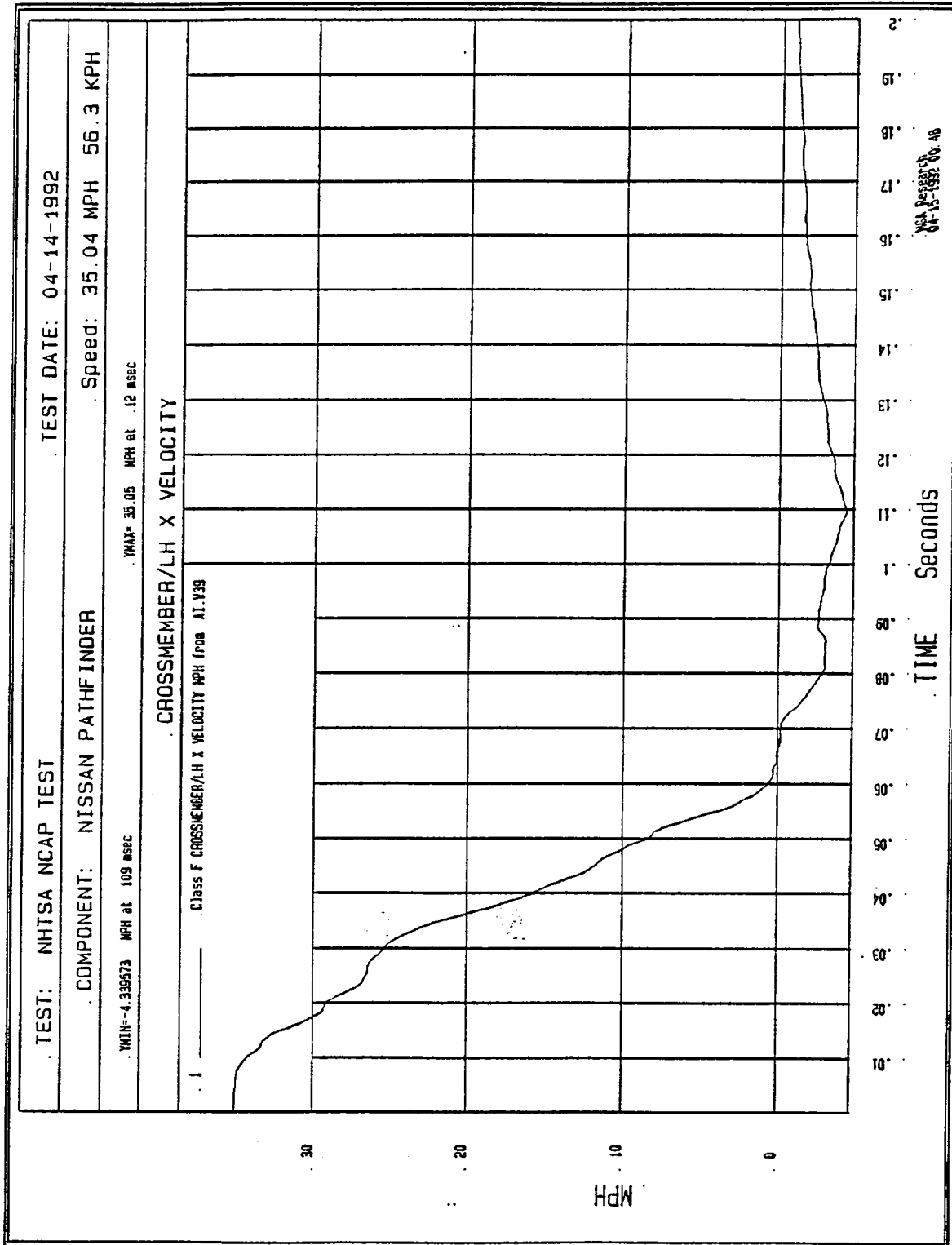


Figure B-5 - Left Rear Seat Crossmember X Velocity vs. Time

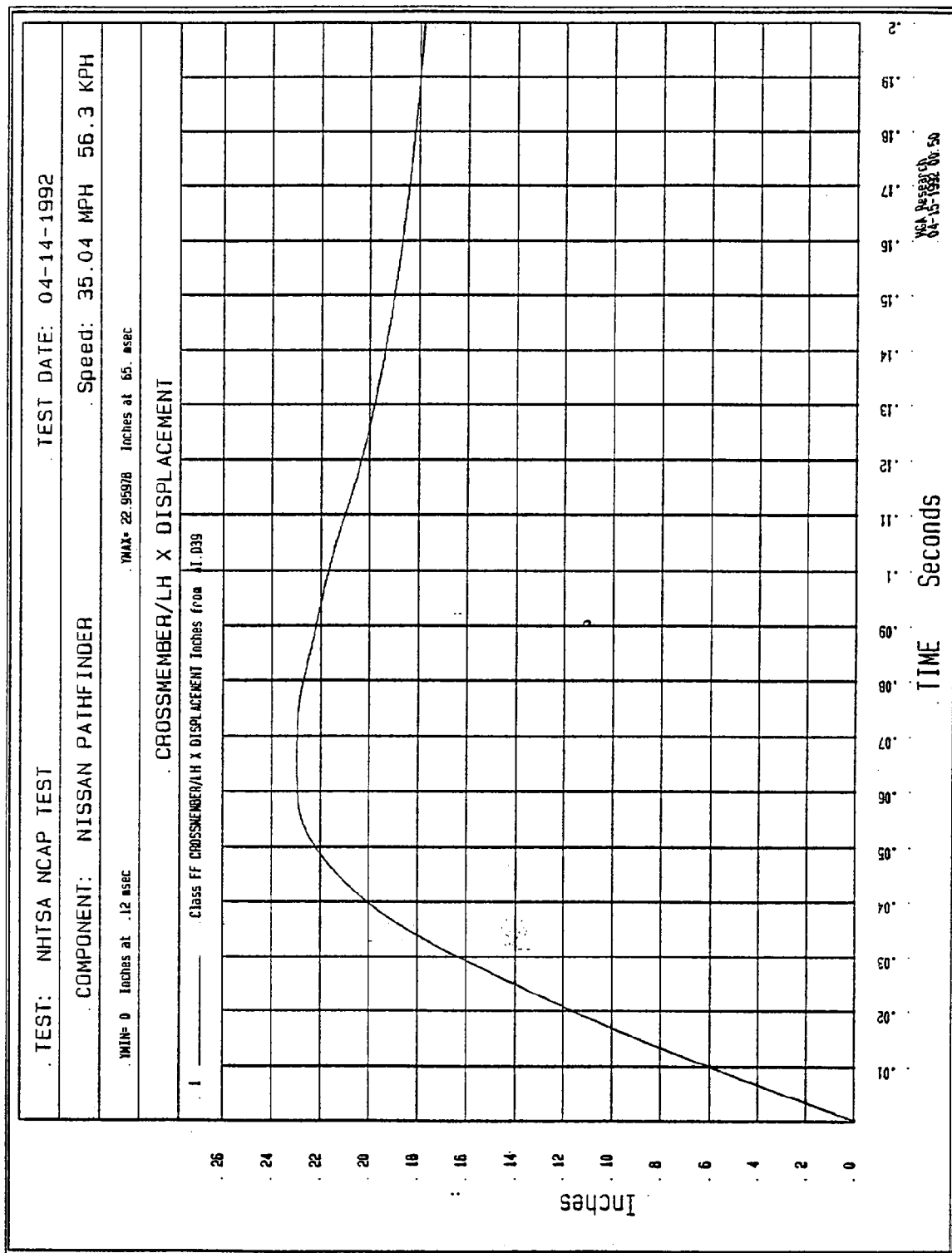


Figure B-6 - Left Rear Seat Crossmember X Displacement vs. Time

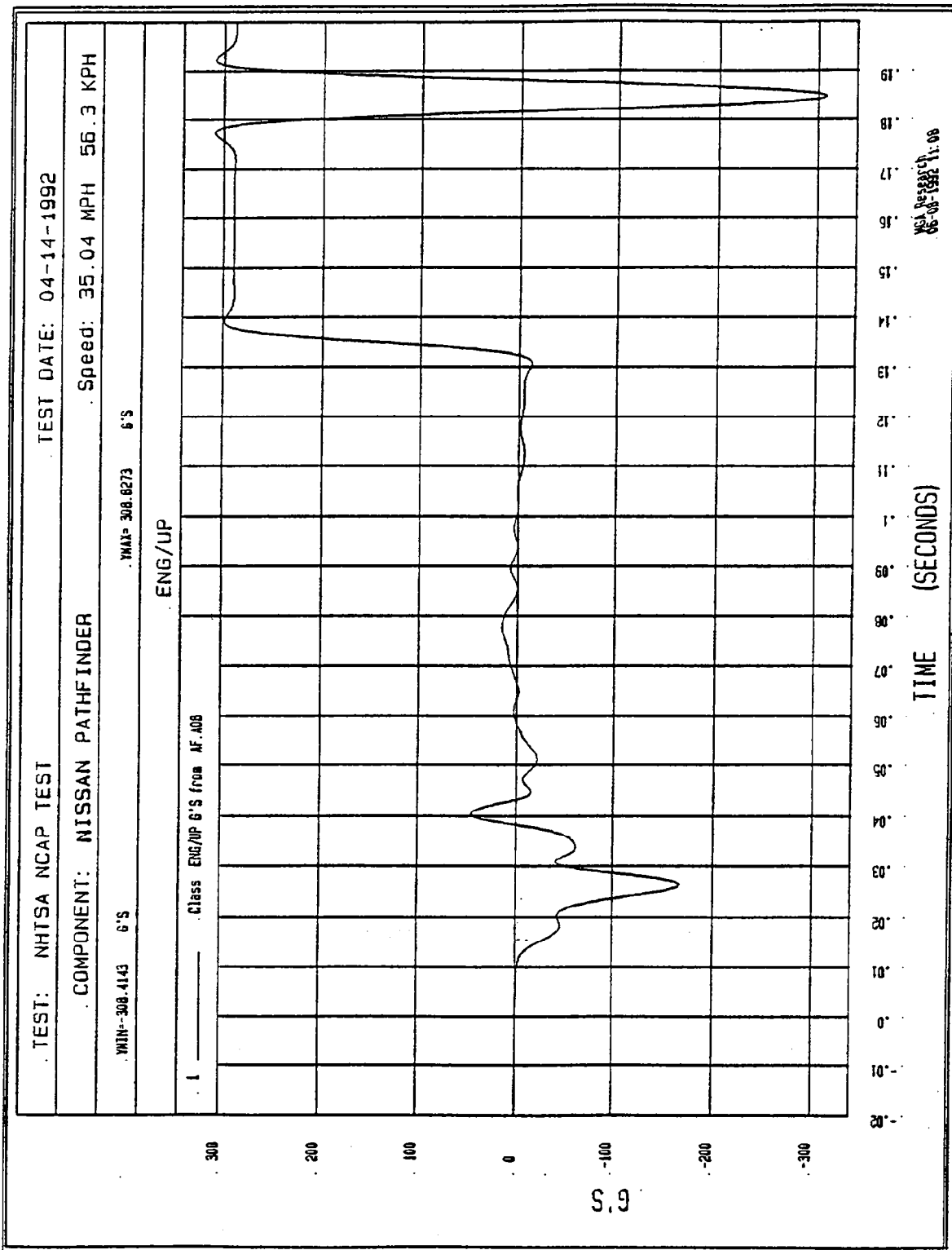


Figure B-7 - Top of Engine Block X Acceleration vs. Time

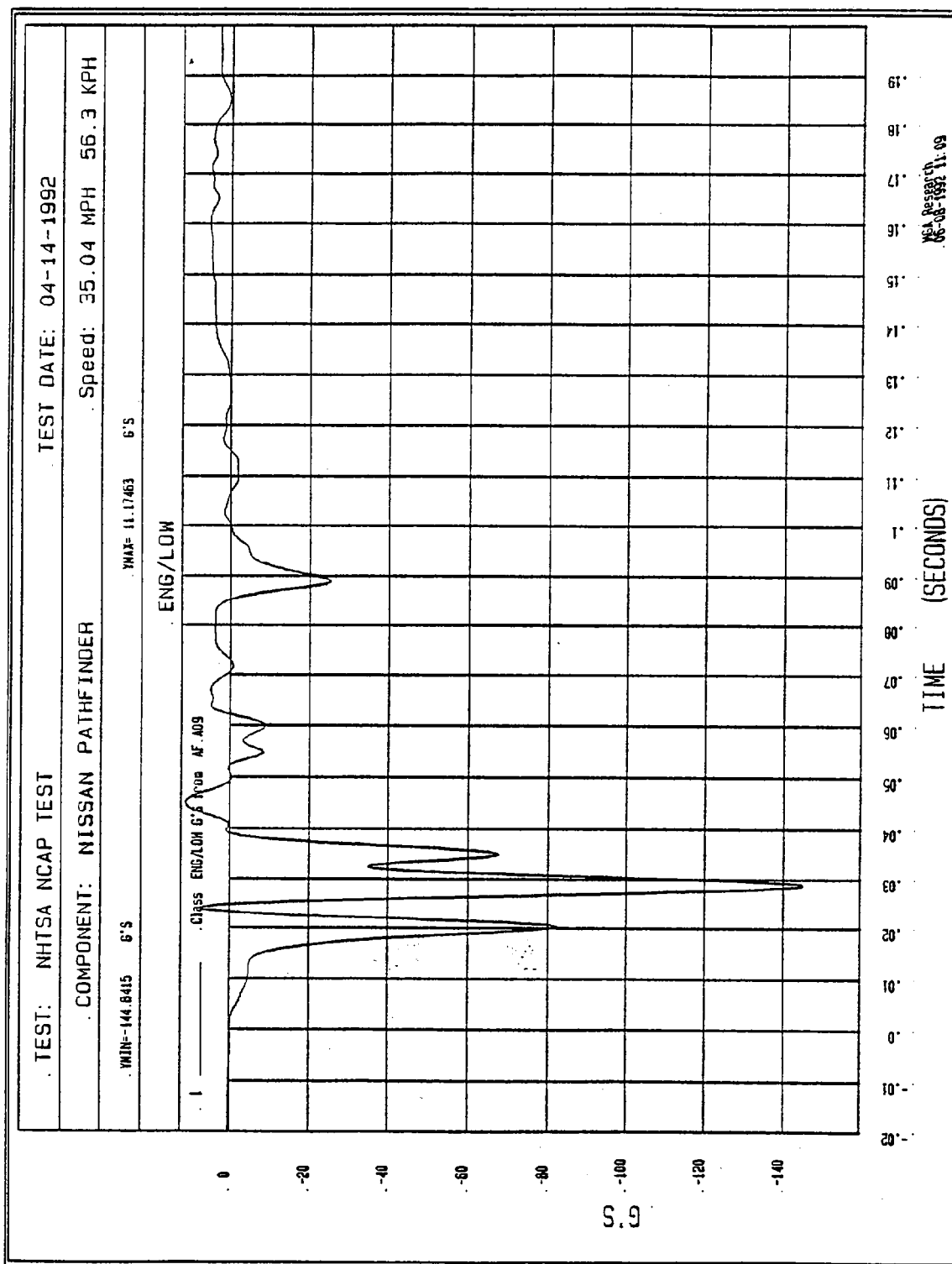


Figure B-8 - Bottom of Engine Block X Acceleration vs. Time

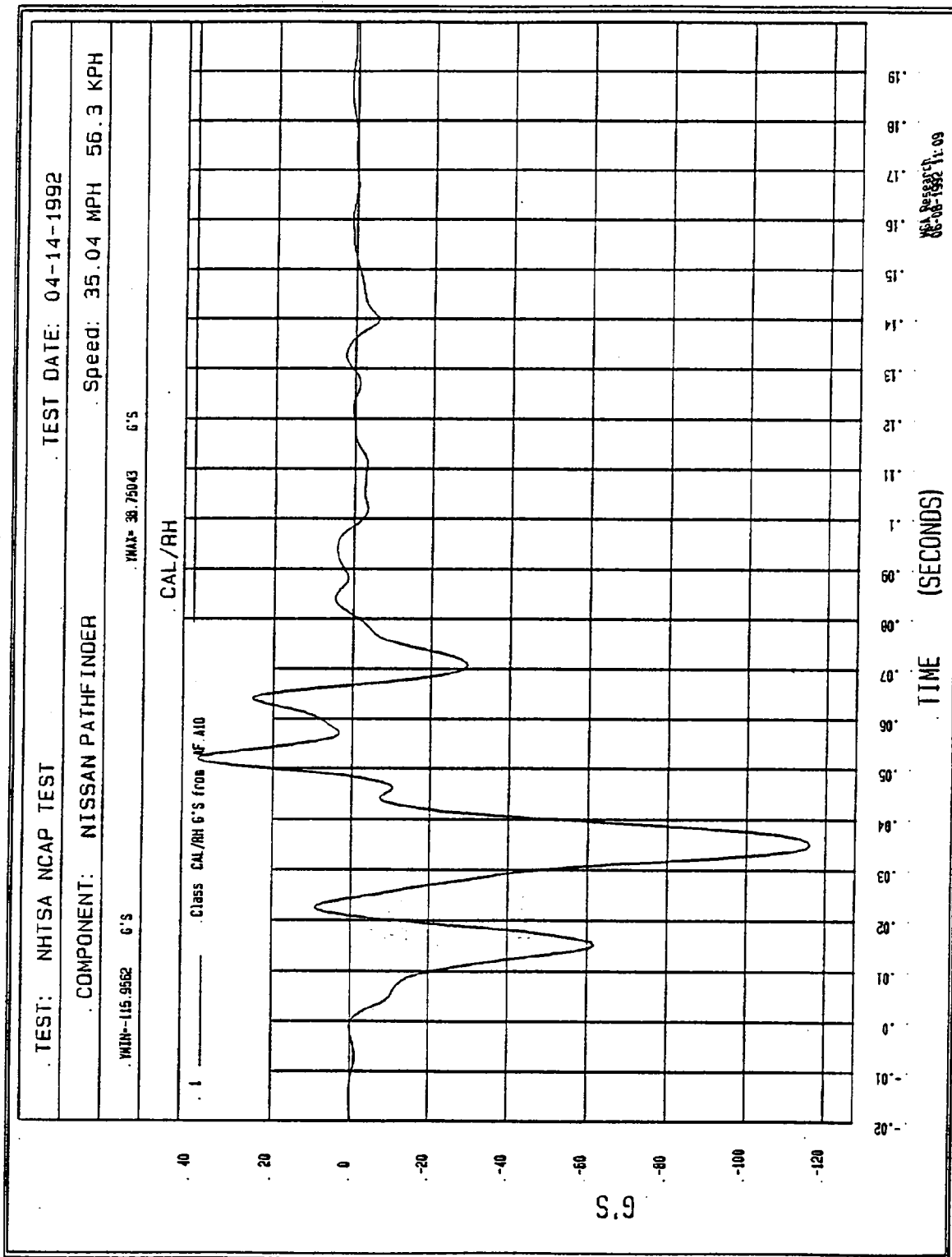


Figure B-9 - Right Front Disc Brake Caliper X Acceleration vs. Time

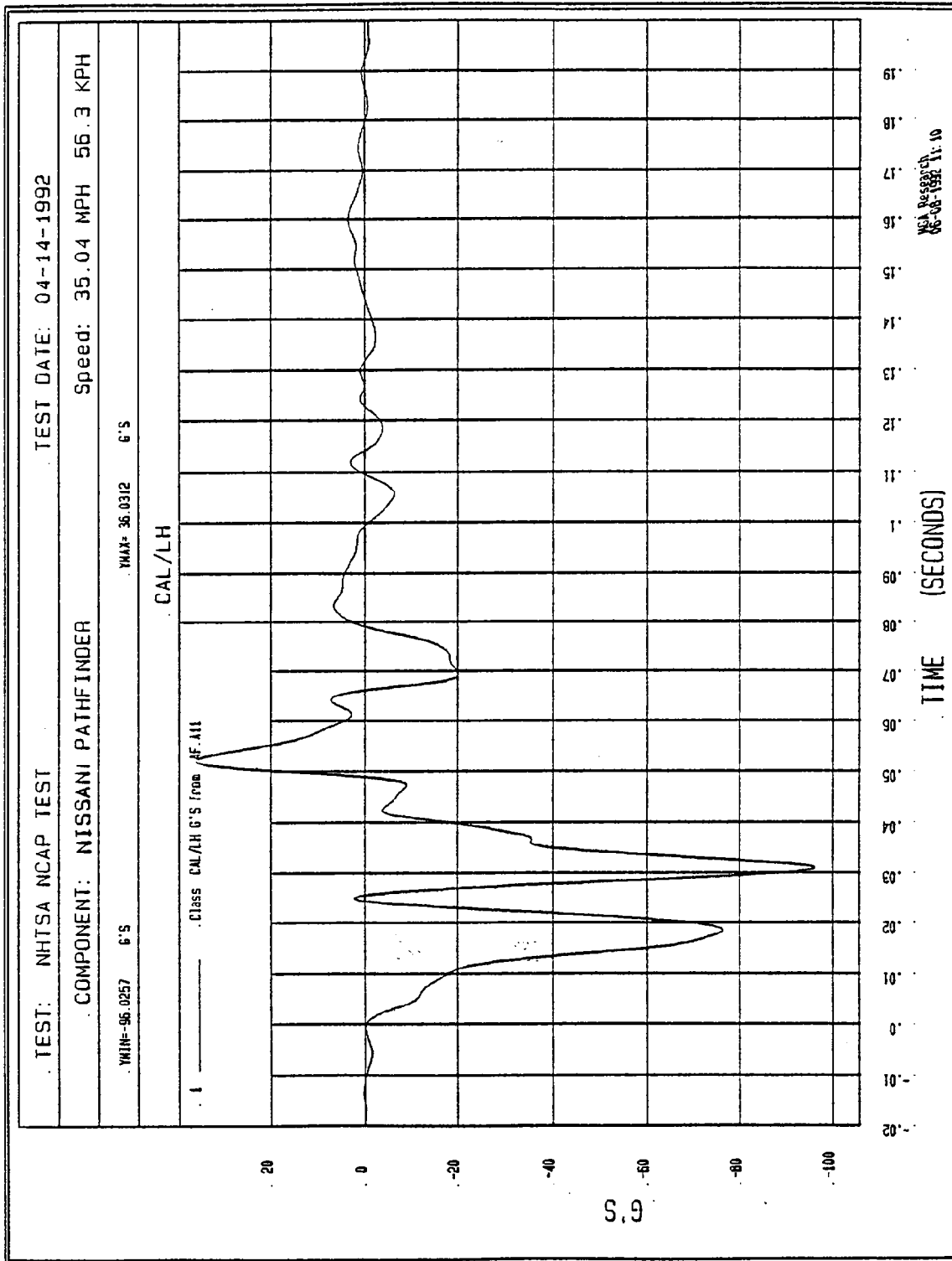


Figure B-10 - Left Front Disc Brake Caliper X Acceleration vs. Time

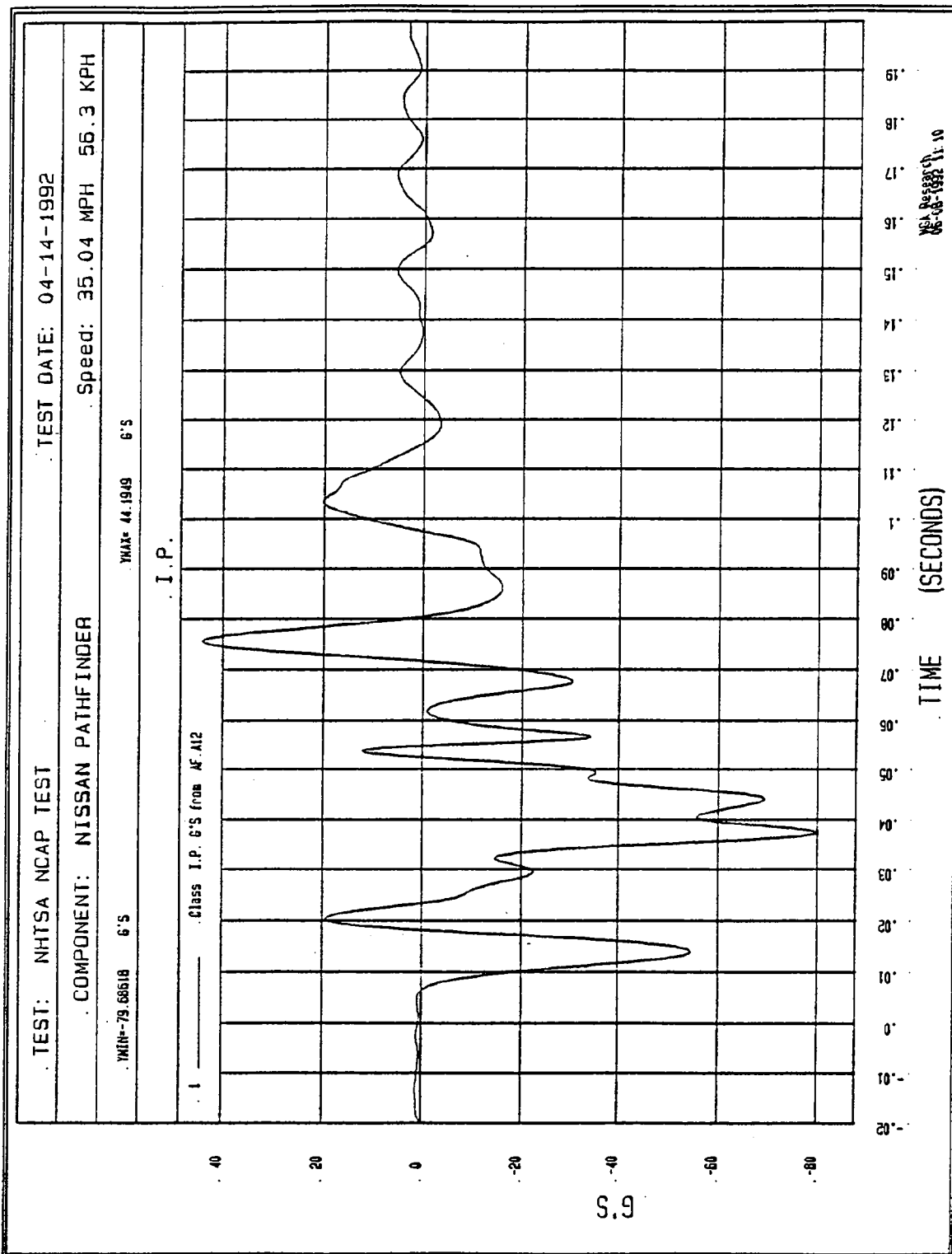


Figure B-11 - Center of Instrument Panel Top Surface X Acceleration vs. Time

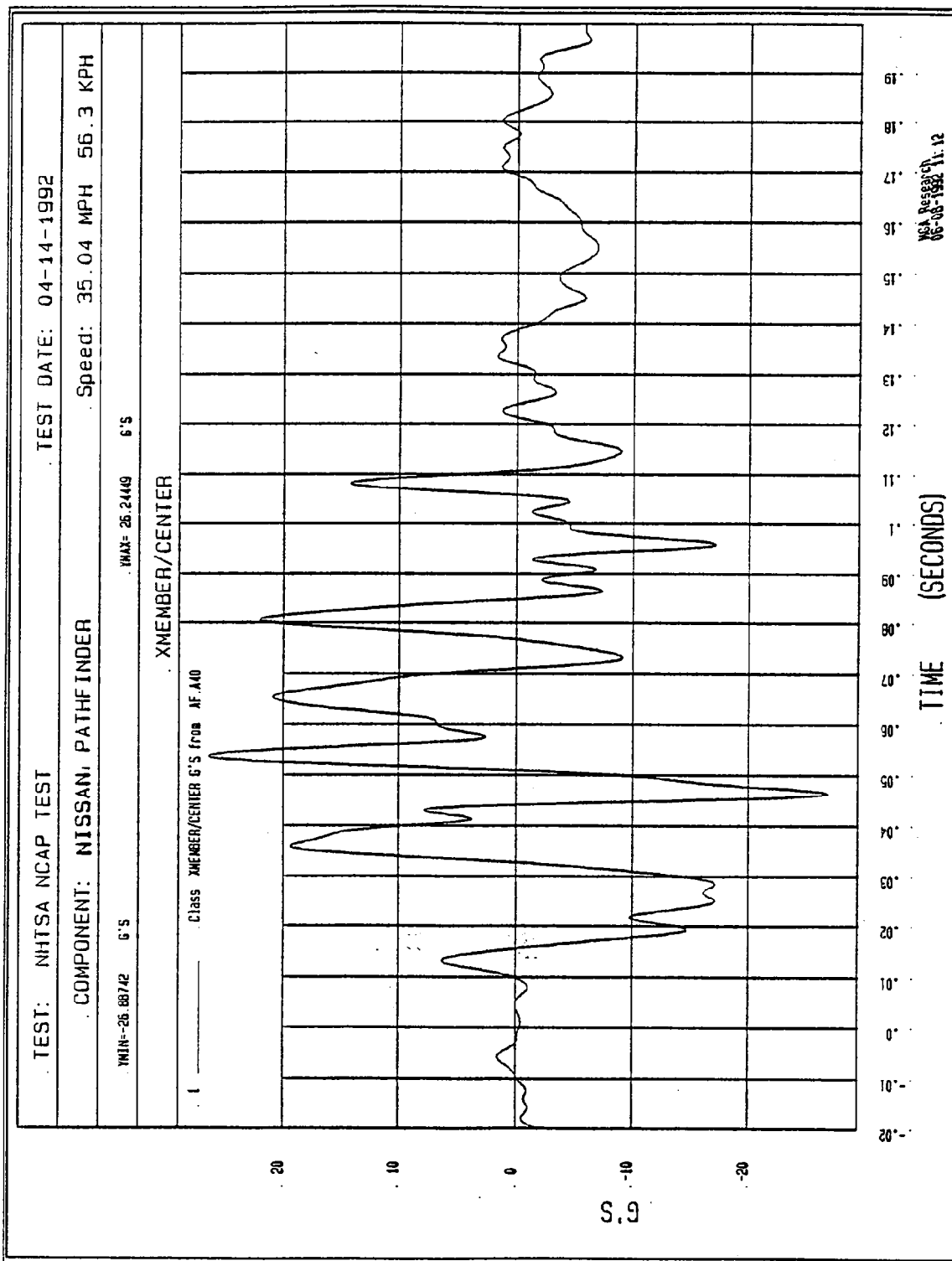


Figure B-12 - Center Rear Crossmember Z Acceleration vs. Time

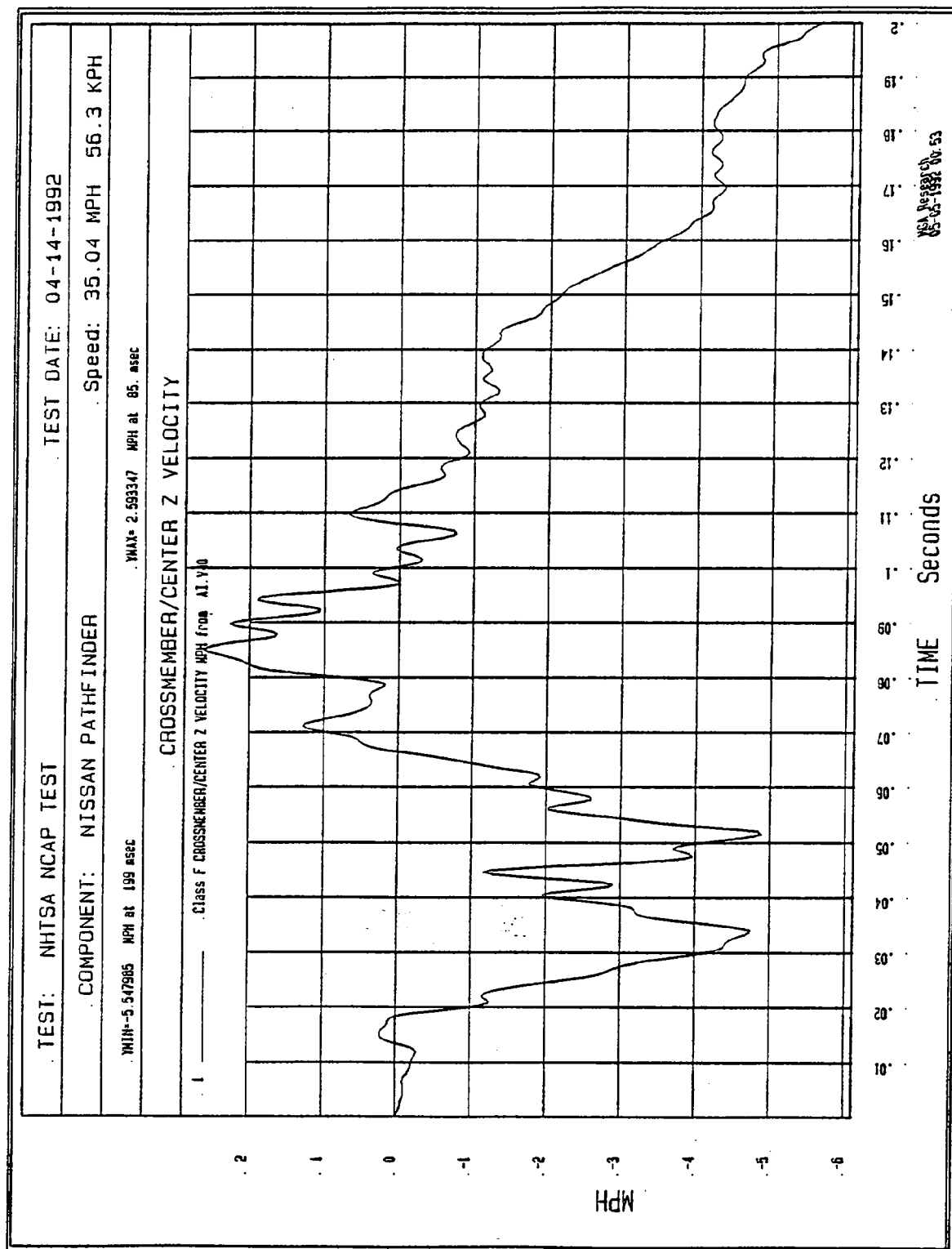


Figure B-13 - Center Rear Seat Crossmember Z Acceleration vs. Time

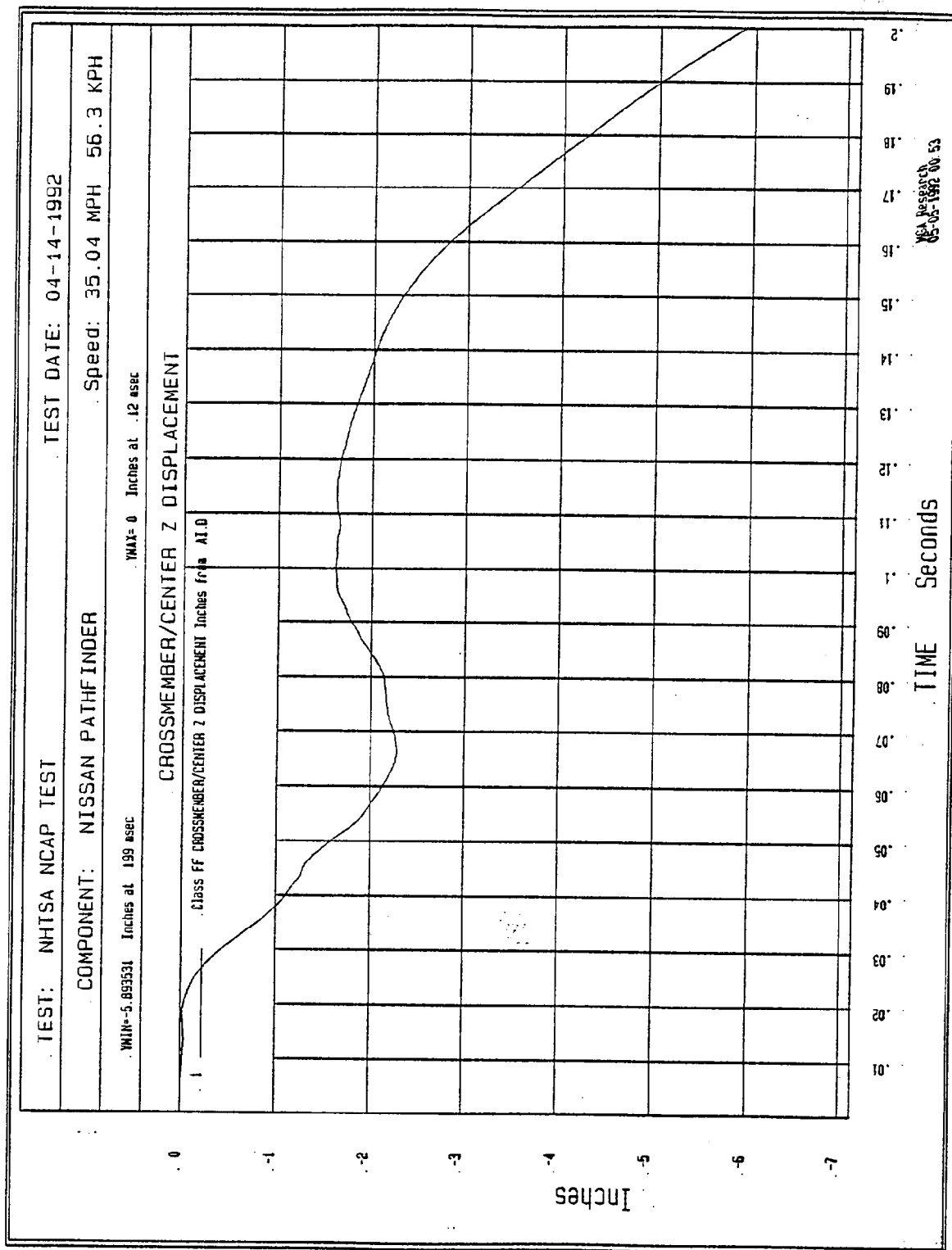


Figure B-14 - Center Rear Seat Crossmember Z Displacement vs. Time

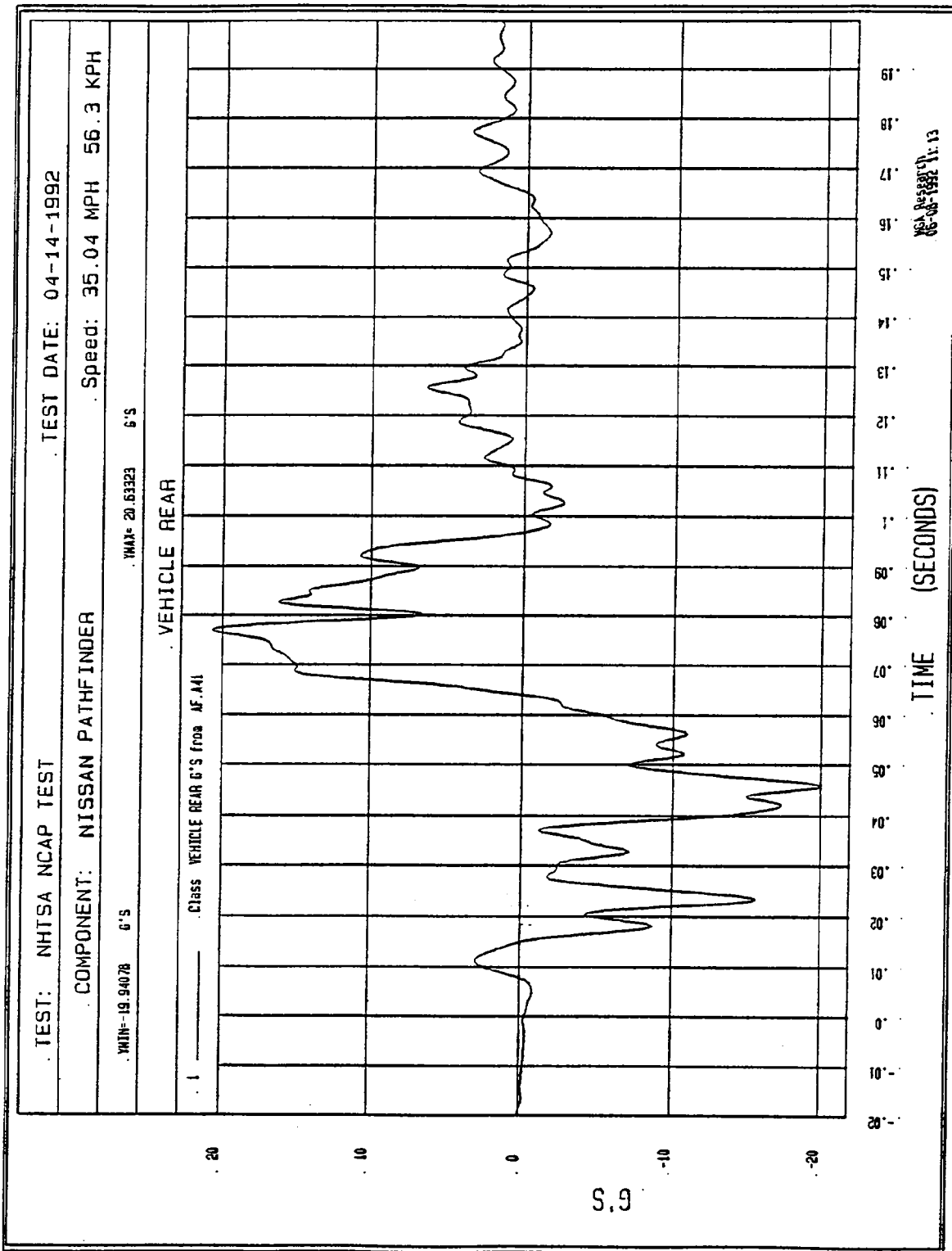


Figure B-15 - Vehicle Rear Z Acceleration vs. Time

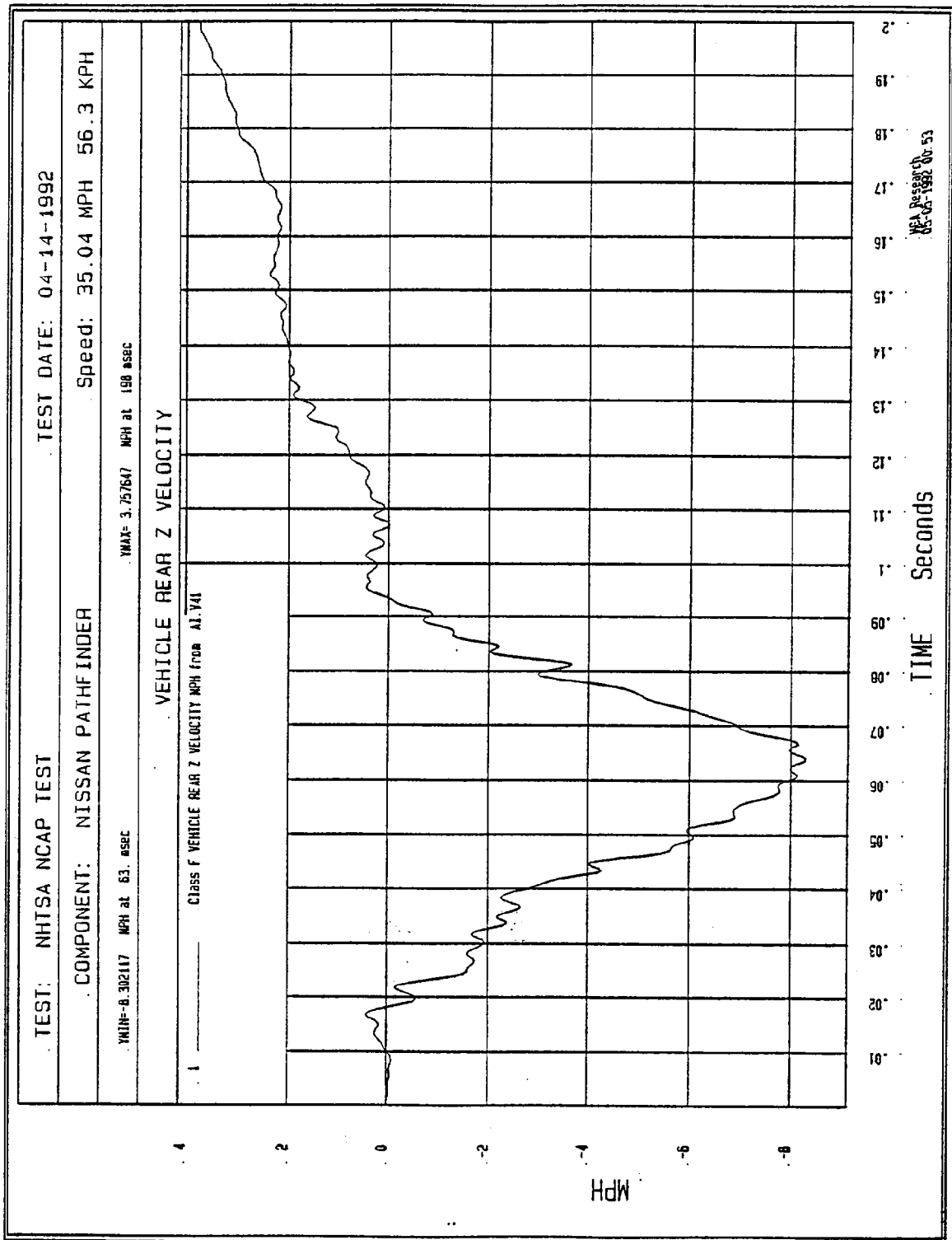


Figure B-16 - Vehicle Rear Z Velocity vs. Time

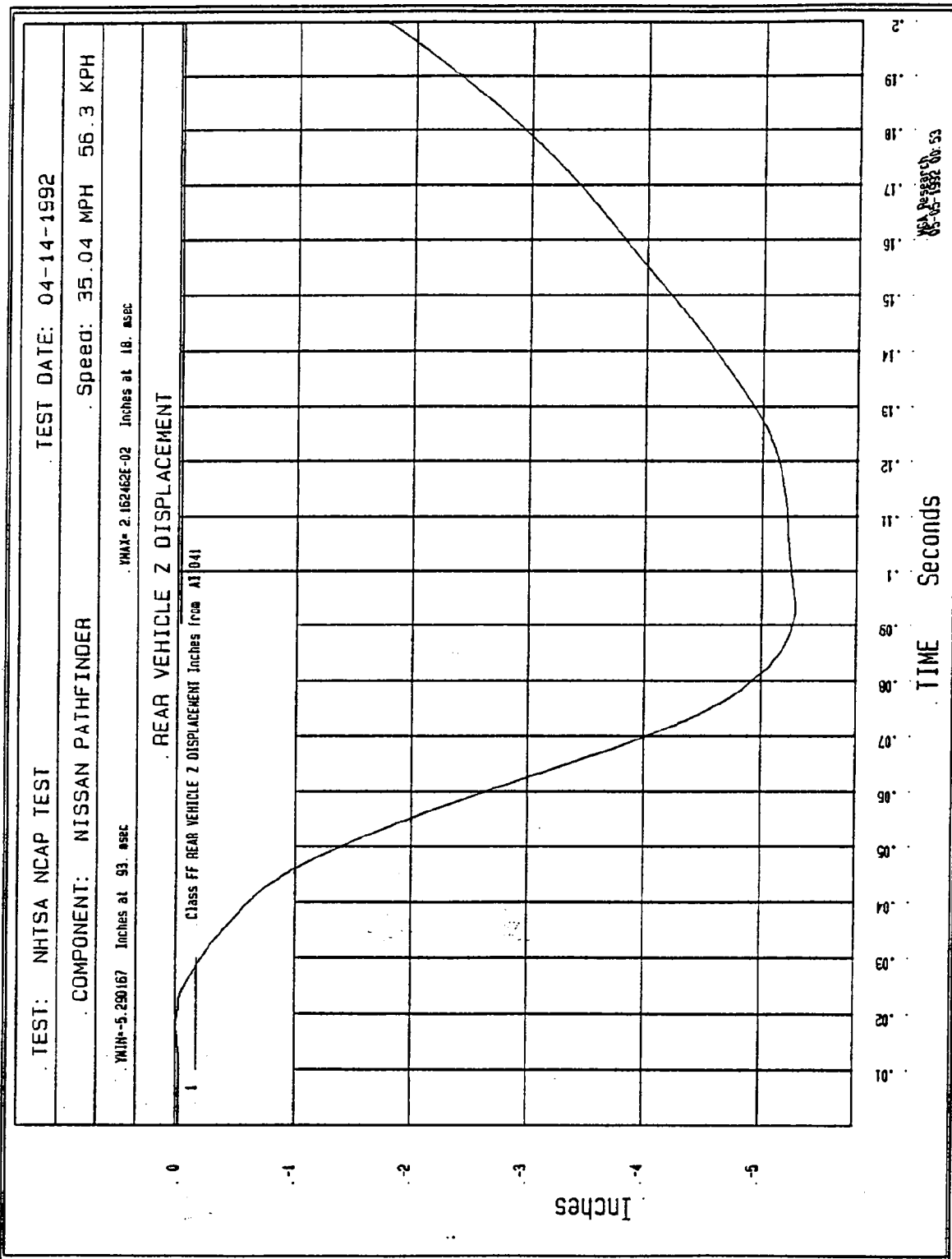


Figure B-17 - Vehicle Rear Z Displacement vs. Time

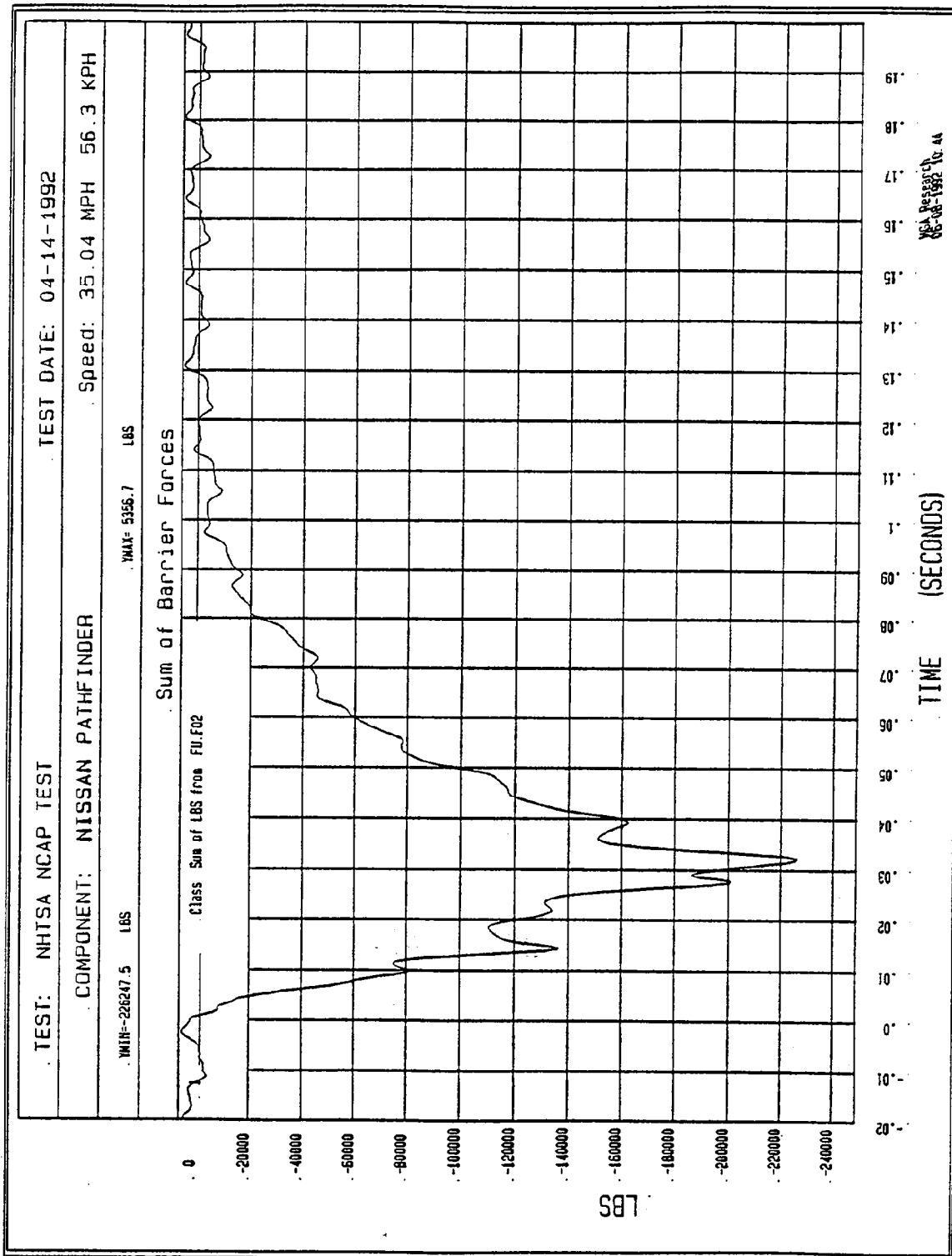


Figure B-18 - Sum of 6 Load Cells Force vs. Time

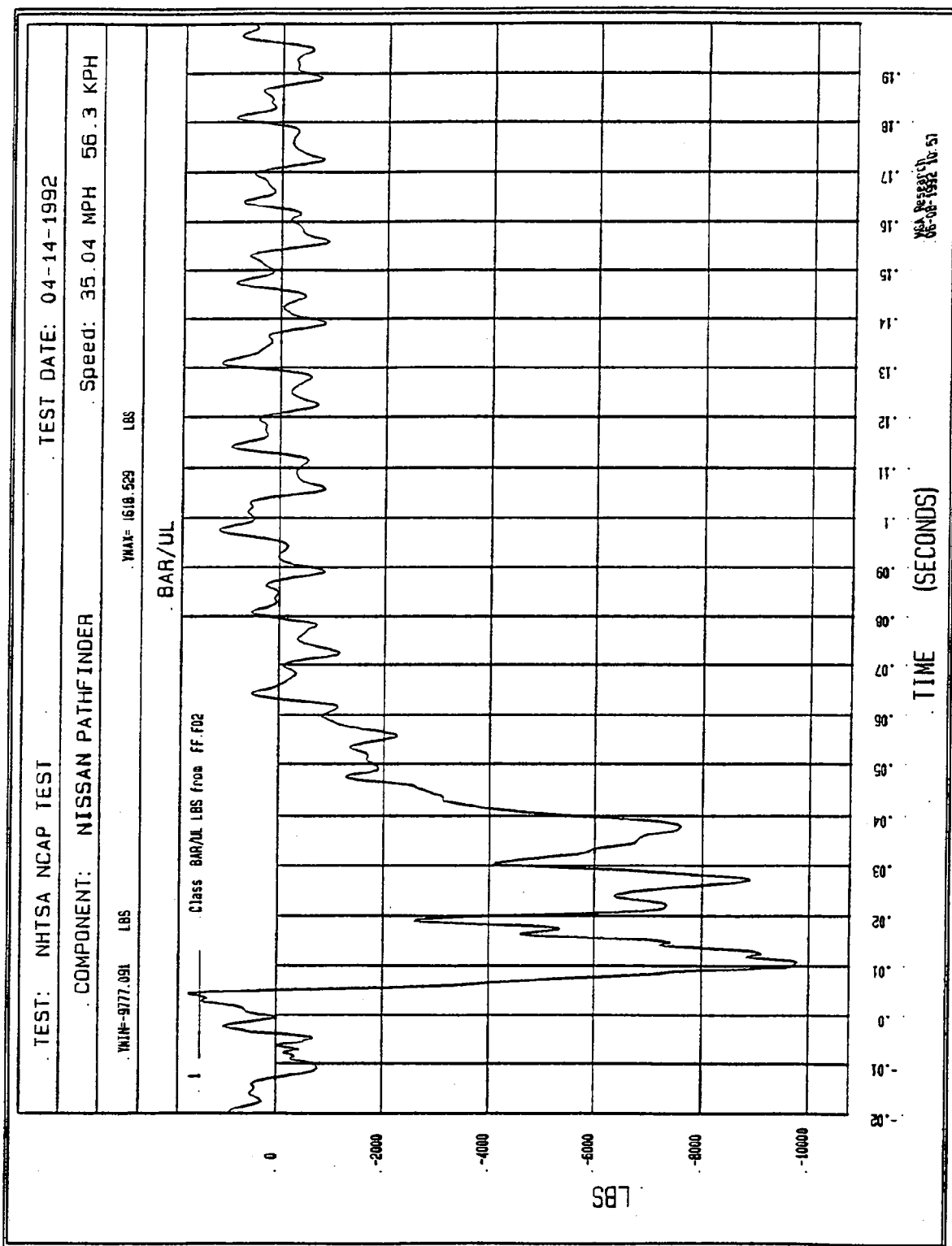


Figure B-19 - Sum of Load Cells A1 - B3 Force vs. Time

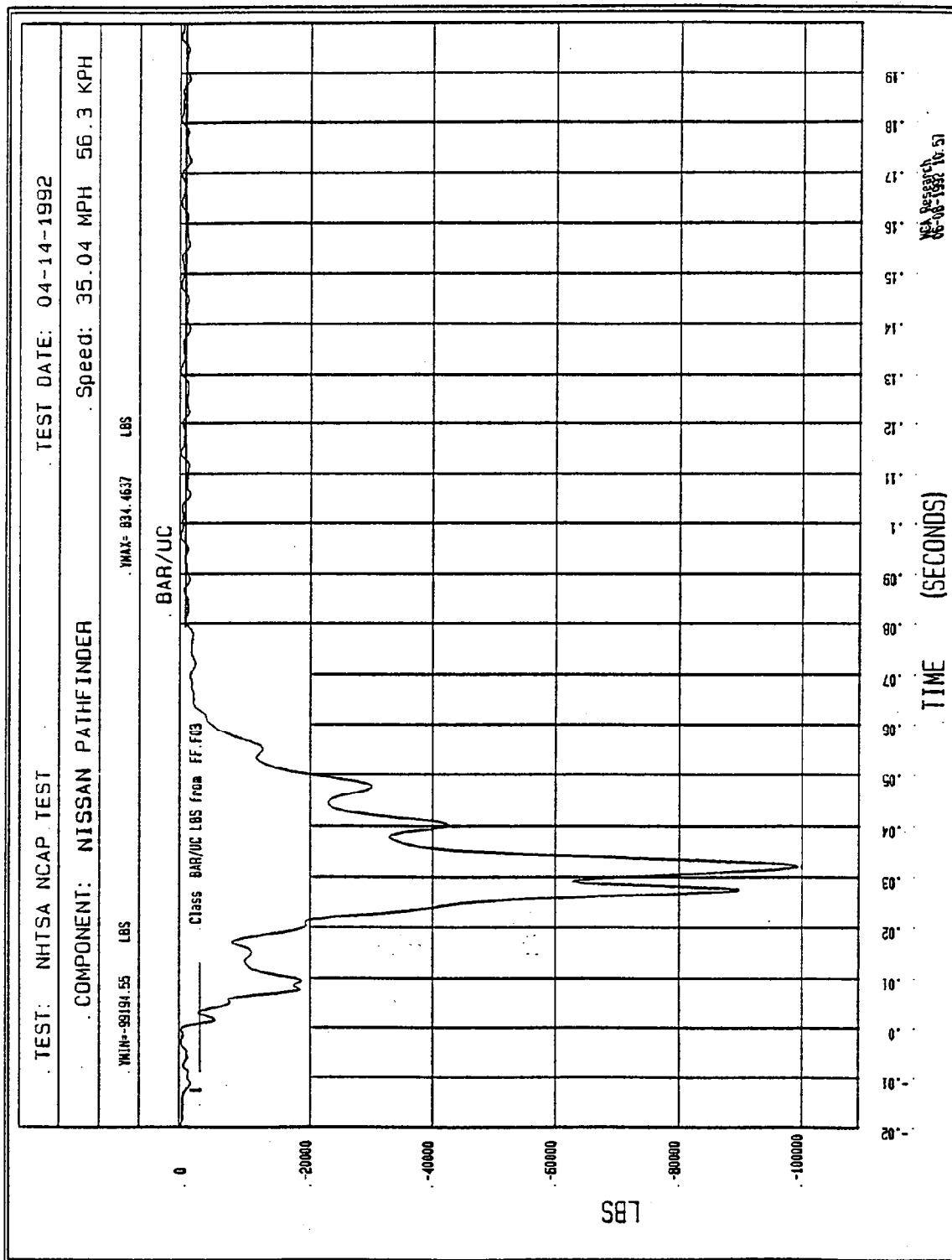
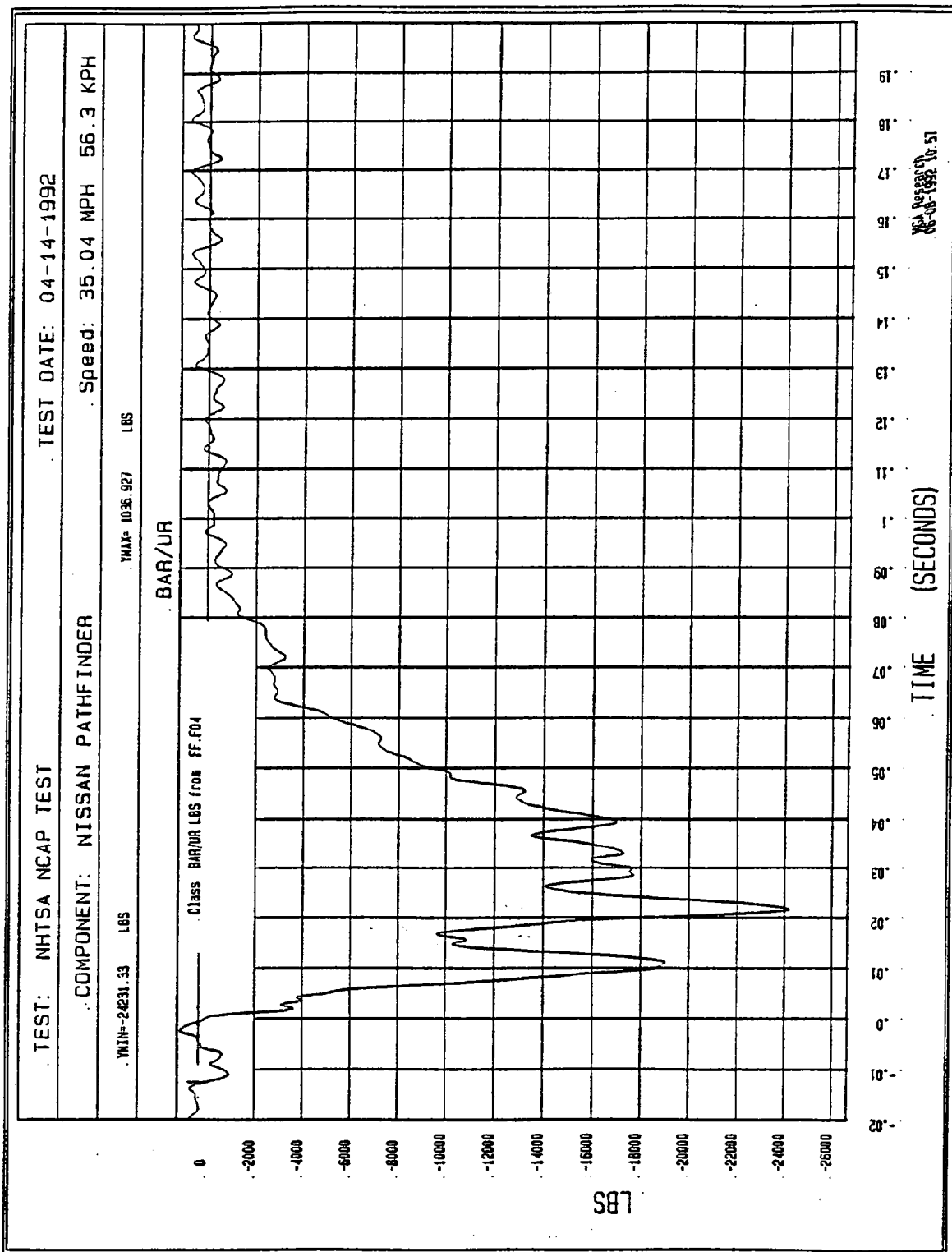


Figure B-20 - Sum of Load Cells A4-B6 Force vs. Time



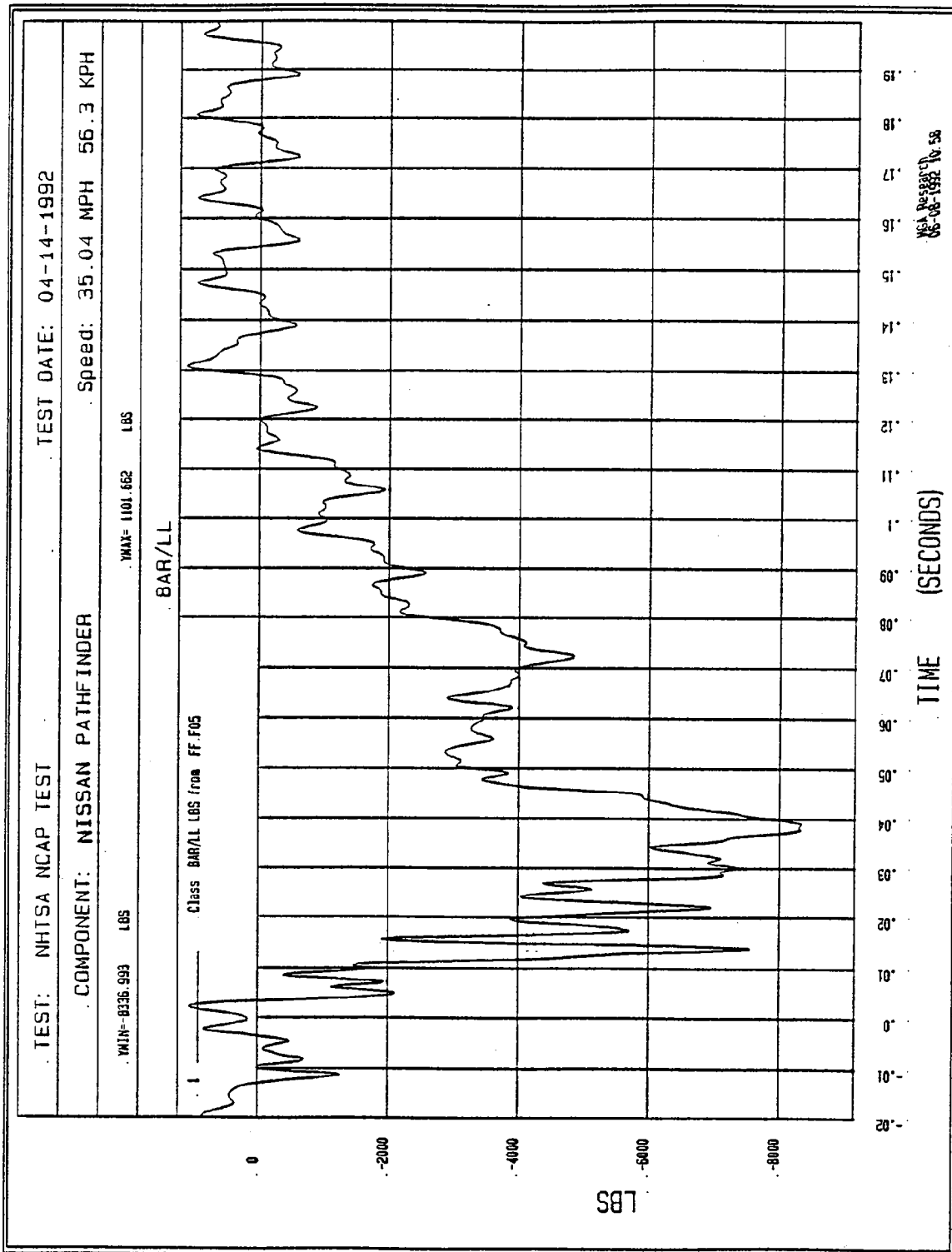


Figure B-22 - Sum of Load Cells Cl-D3 Force vs. Time

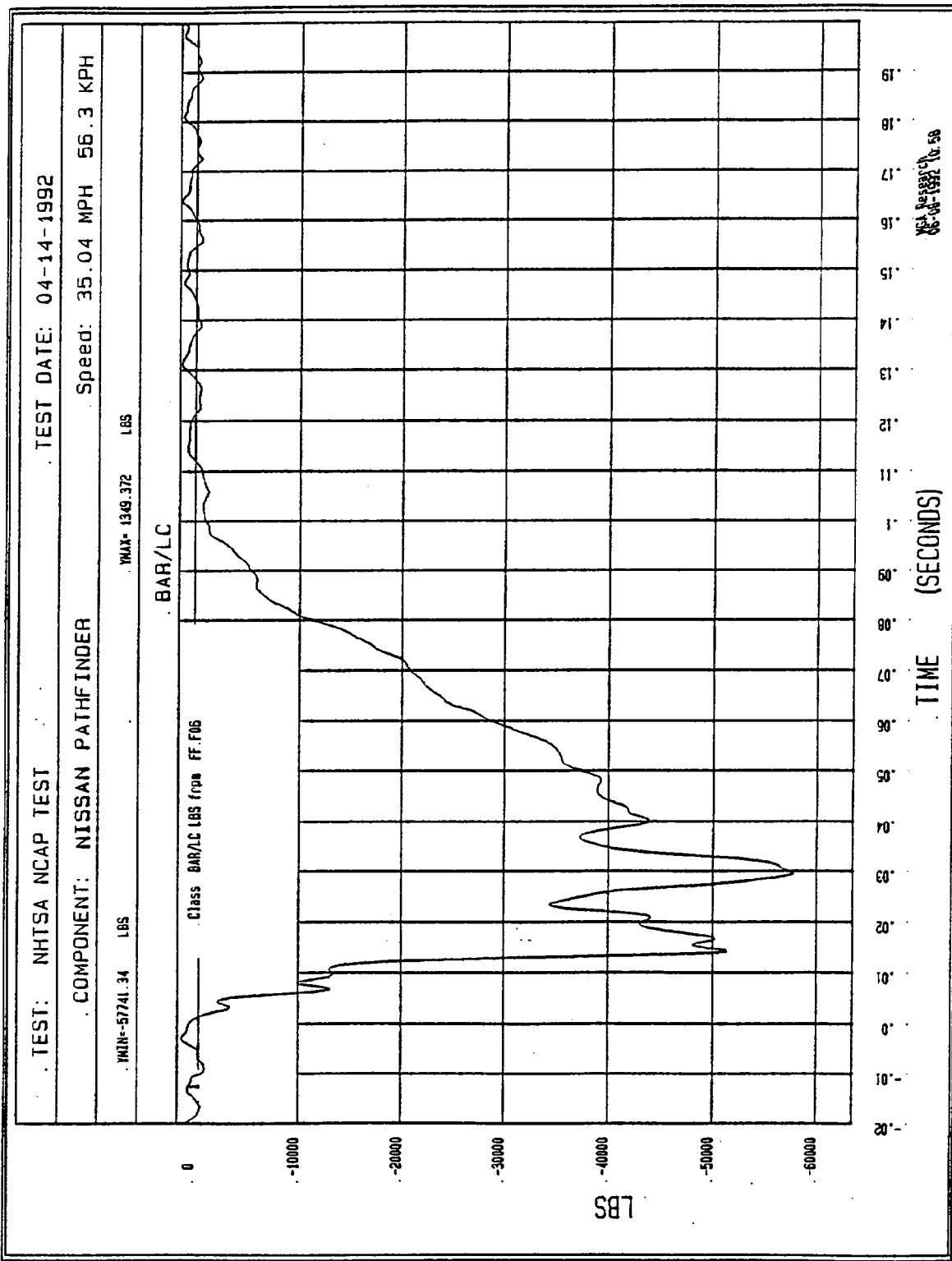


Figure B-23 - Sum of Load Cells C4-D6 Force vs. Time

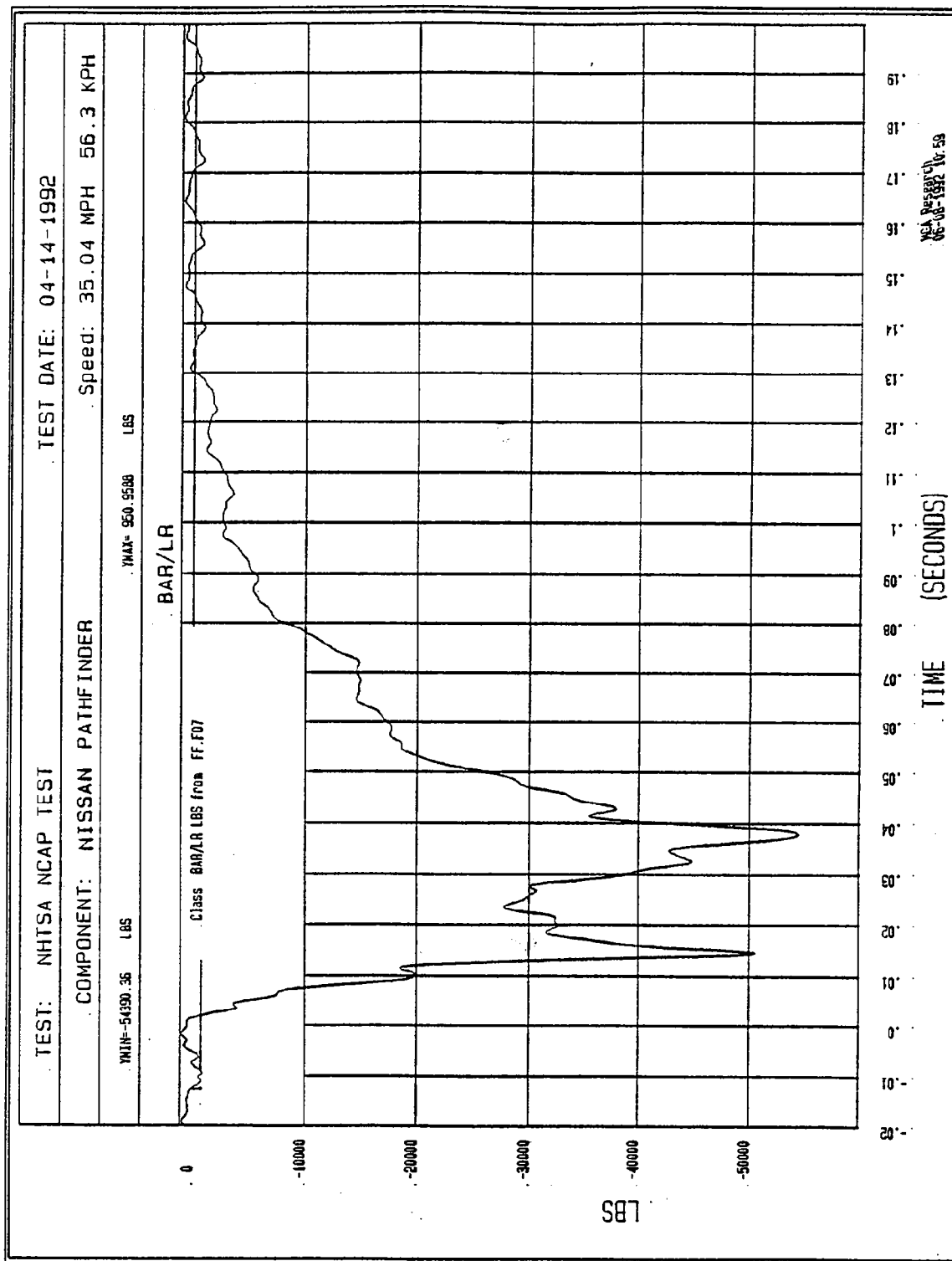


Figure B-24 - Sum of Load Cells C7-D9 Force vs. Time

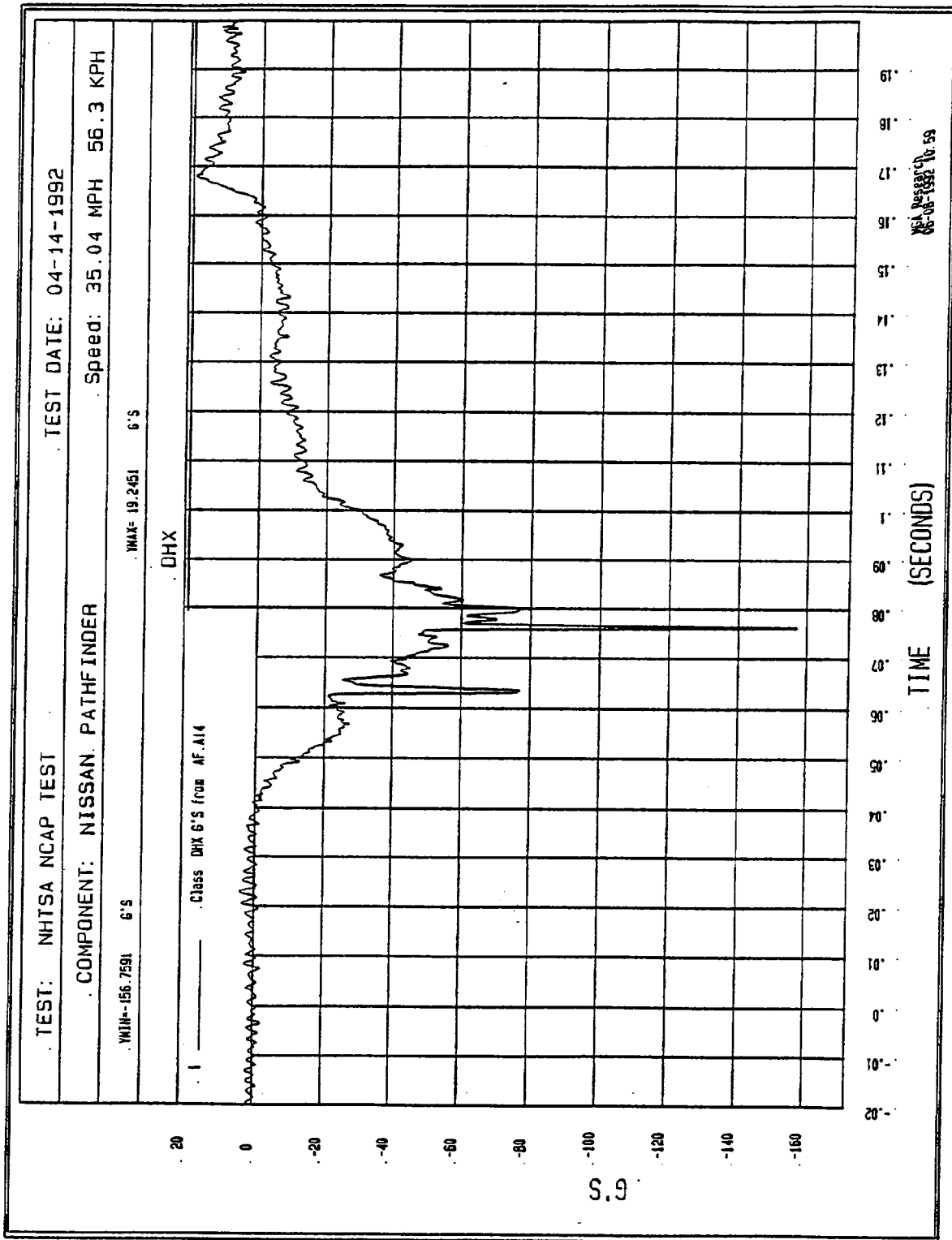


Figure B-25 - Driver Head X Acceleration vs. Time

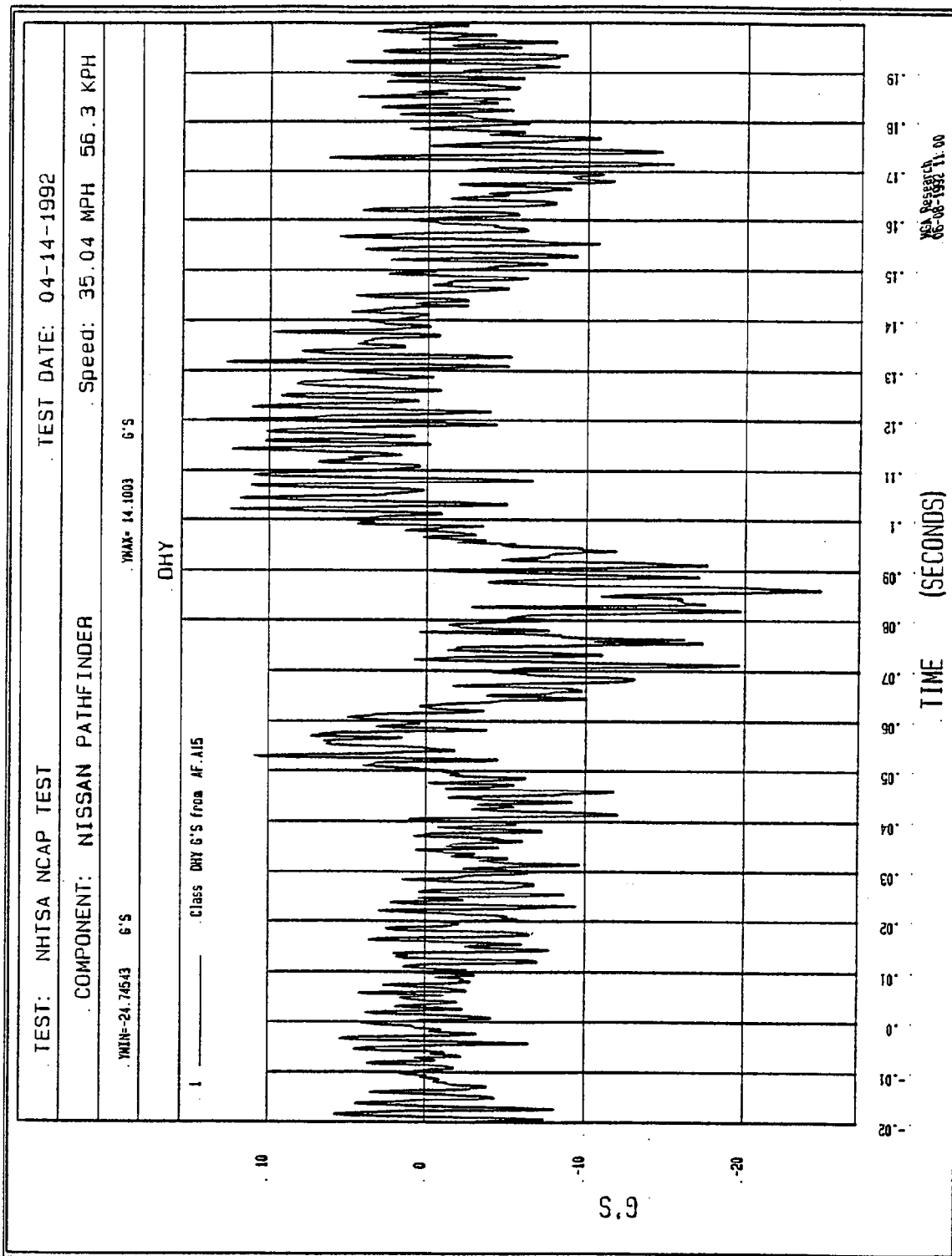


Figure B-26 - Driver Head Y Acceleration vs. Time

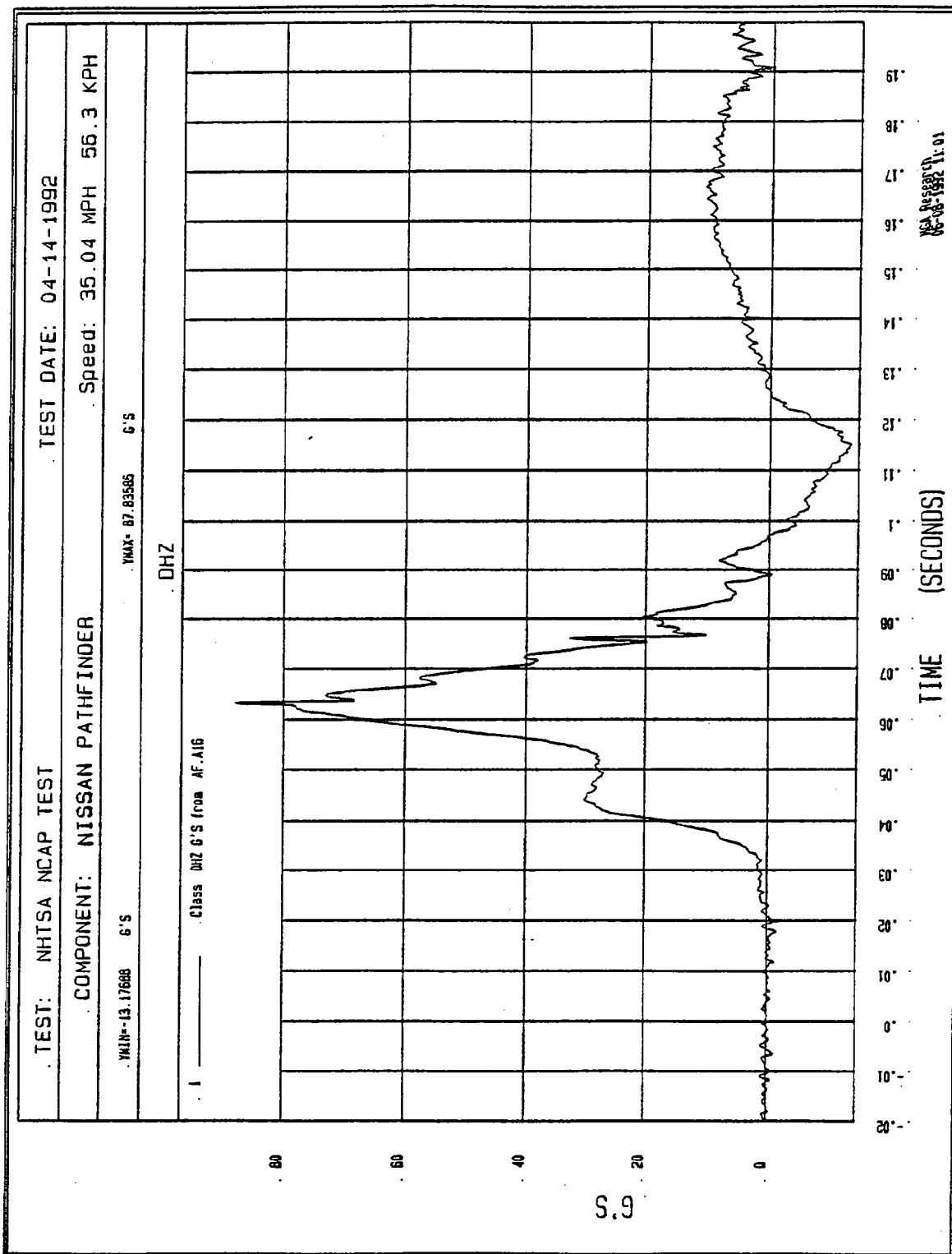


Figure B-27 - Driver Head Z Acceleration vs. Time

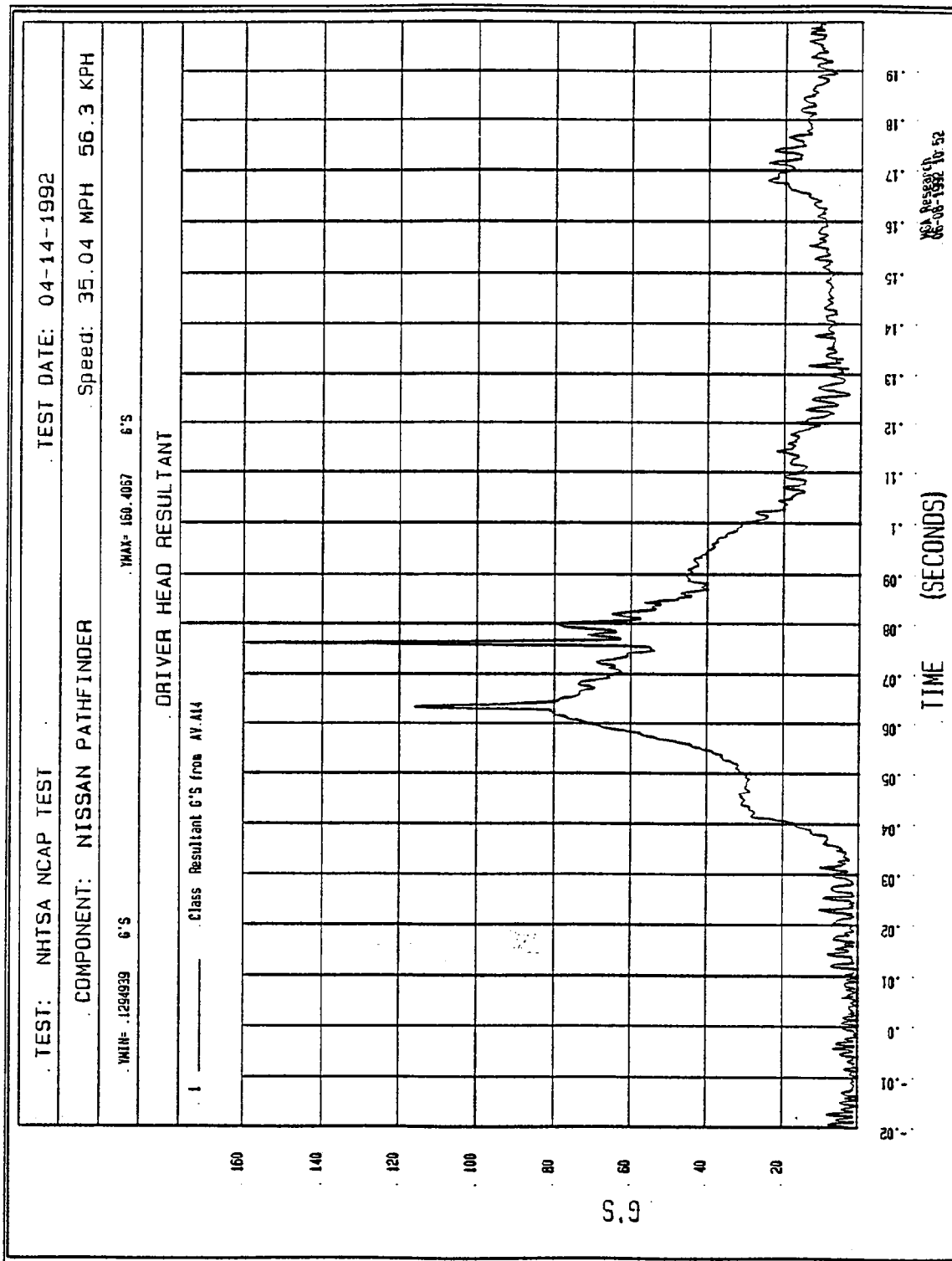


Figure B-28 - Driver Head Resultant Acceleration vs. Time

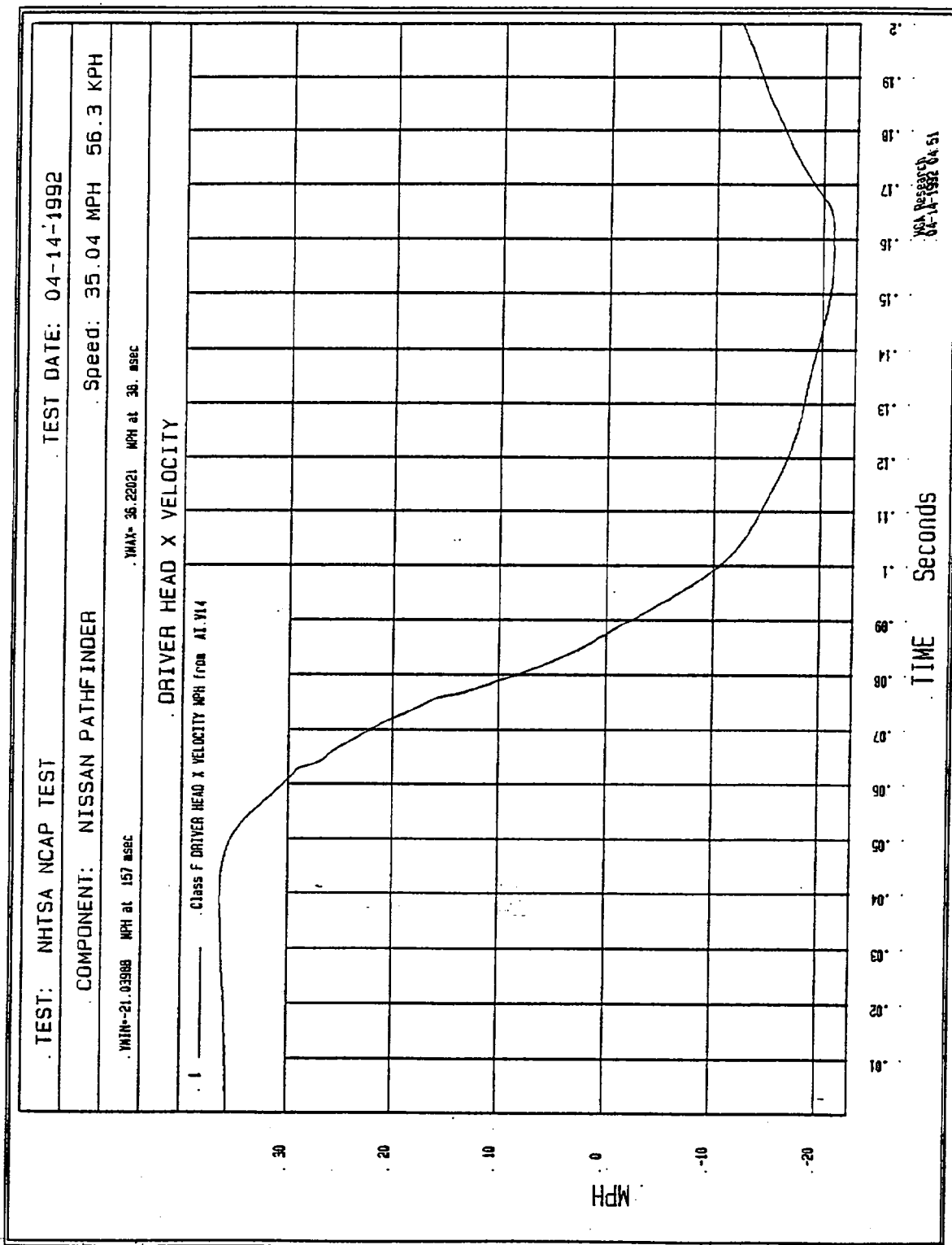


Figure B-29 - Driver Head X Velocity vs. Time

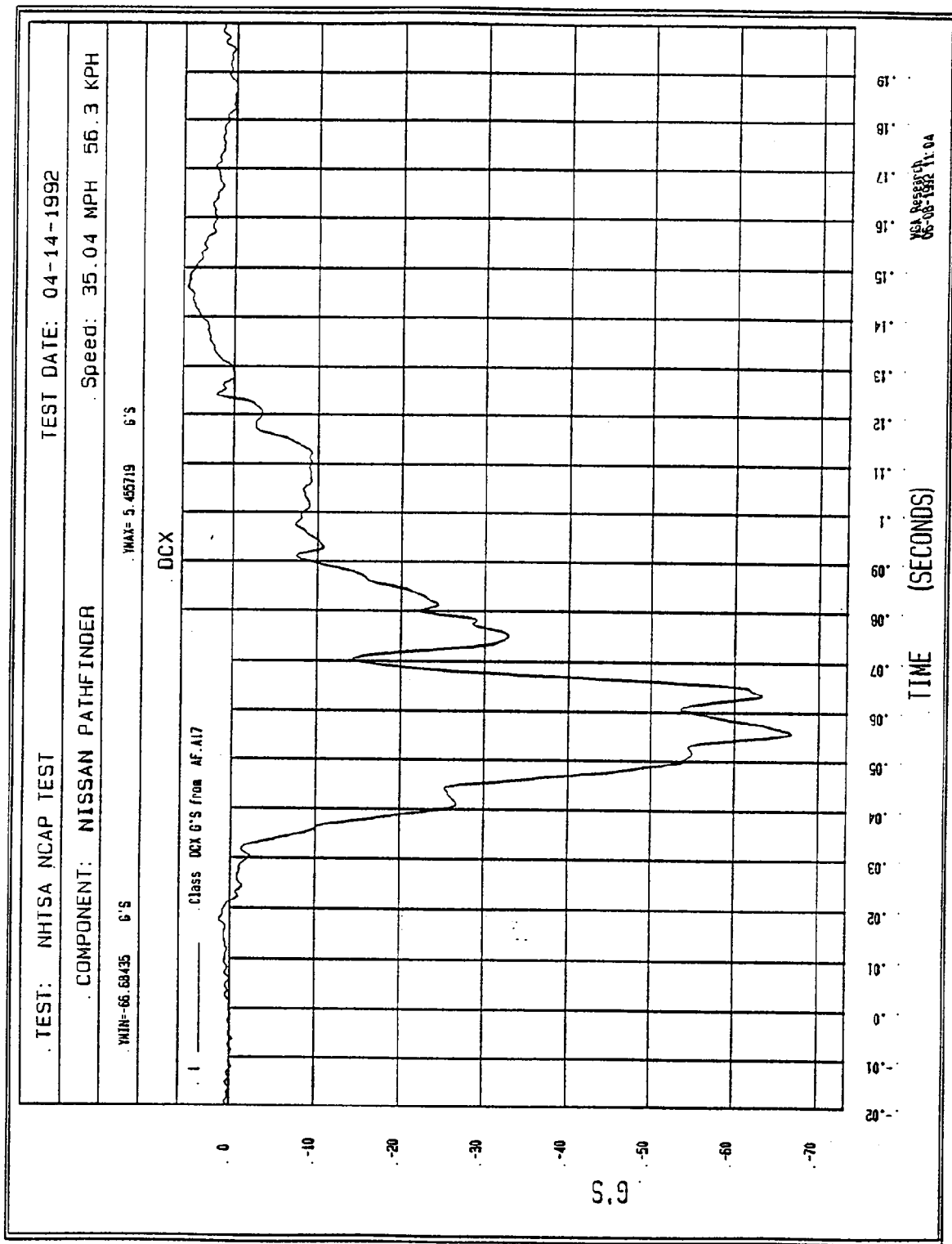


Figure B-30 - Driver Chest X Acceleration vs. Time

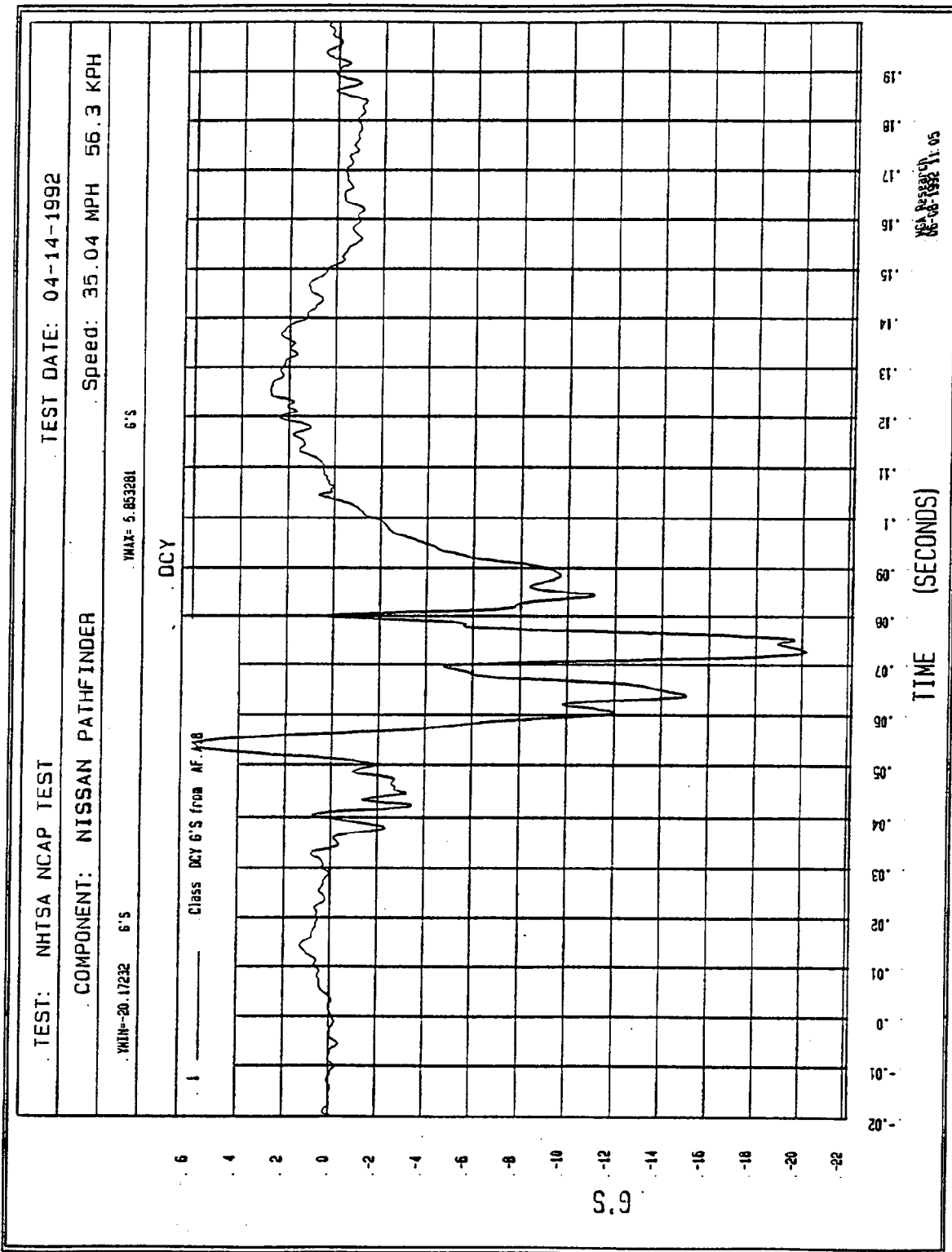


Figure B-31 - Driver Chest Y Acceleration vs. Time

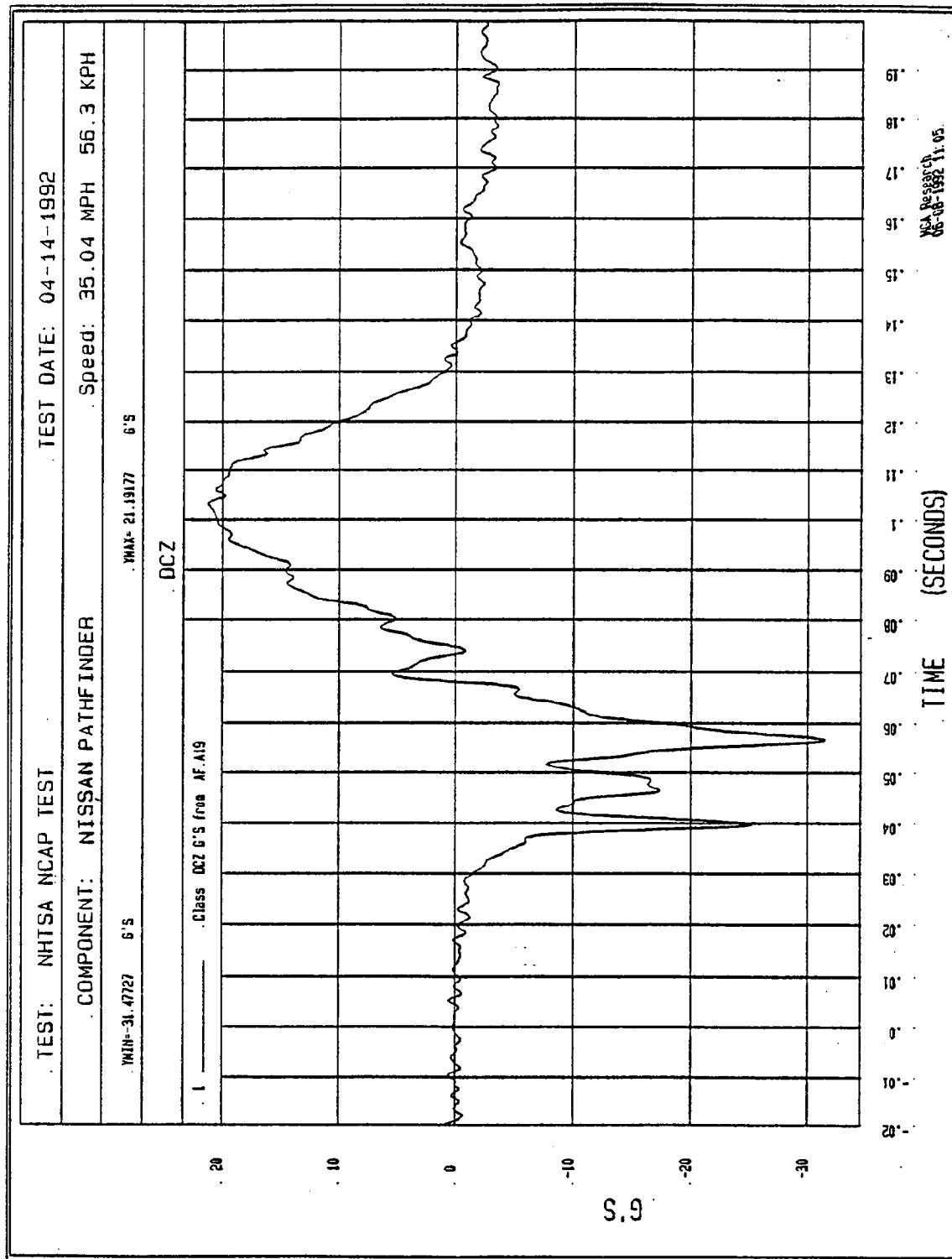


Figure B-32 - Driver Chest Z Acceleration vs. Time

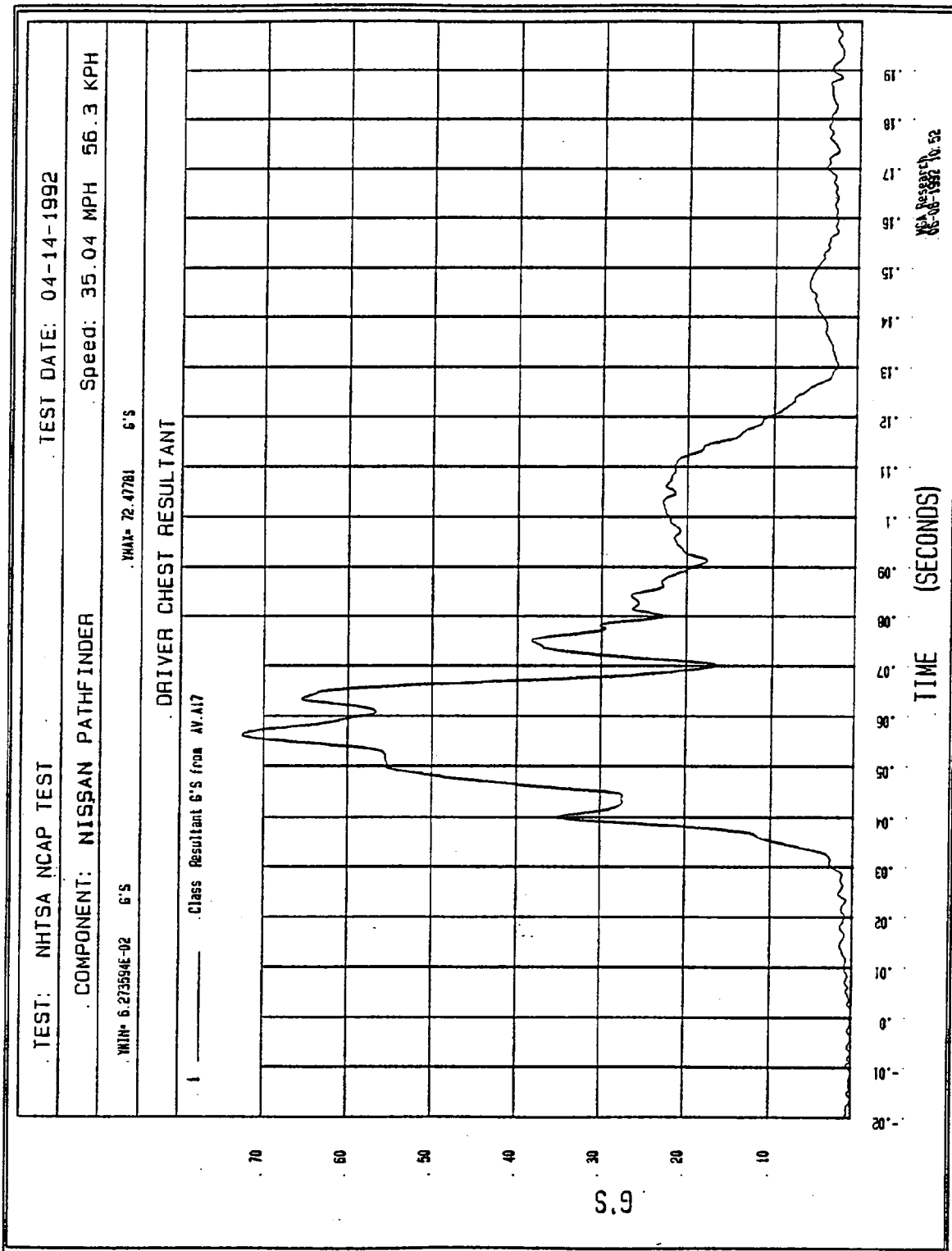


Figure B-33 - Driver Chest Resultant Acceleration vs. Time

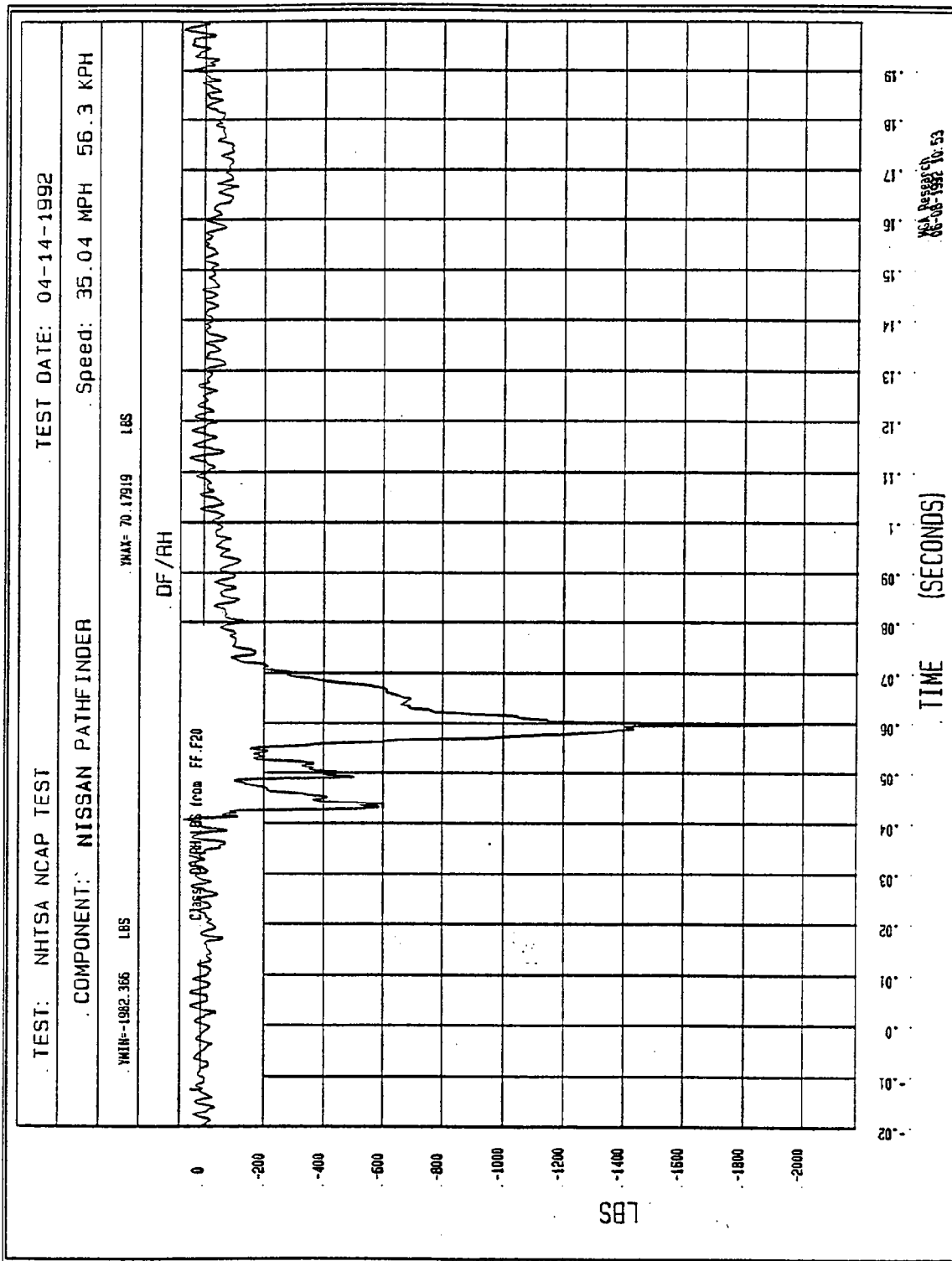


Figure B-34 - Driver Right Femur Force vs. Time

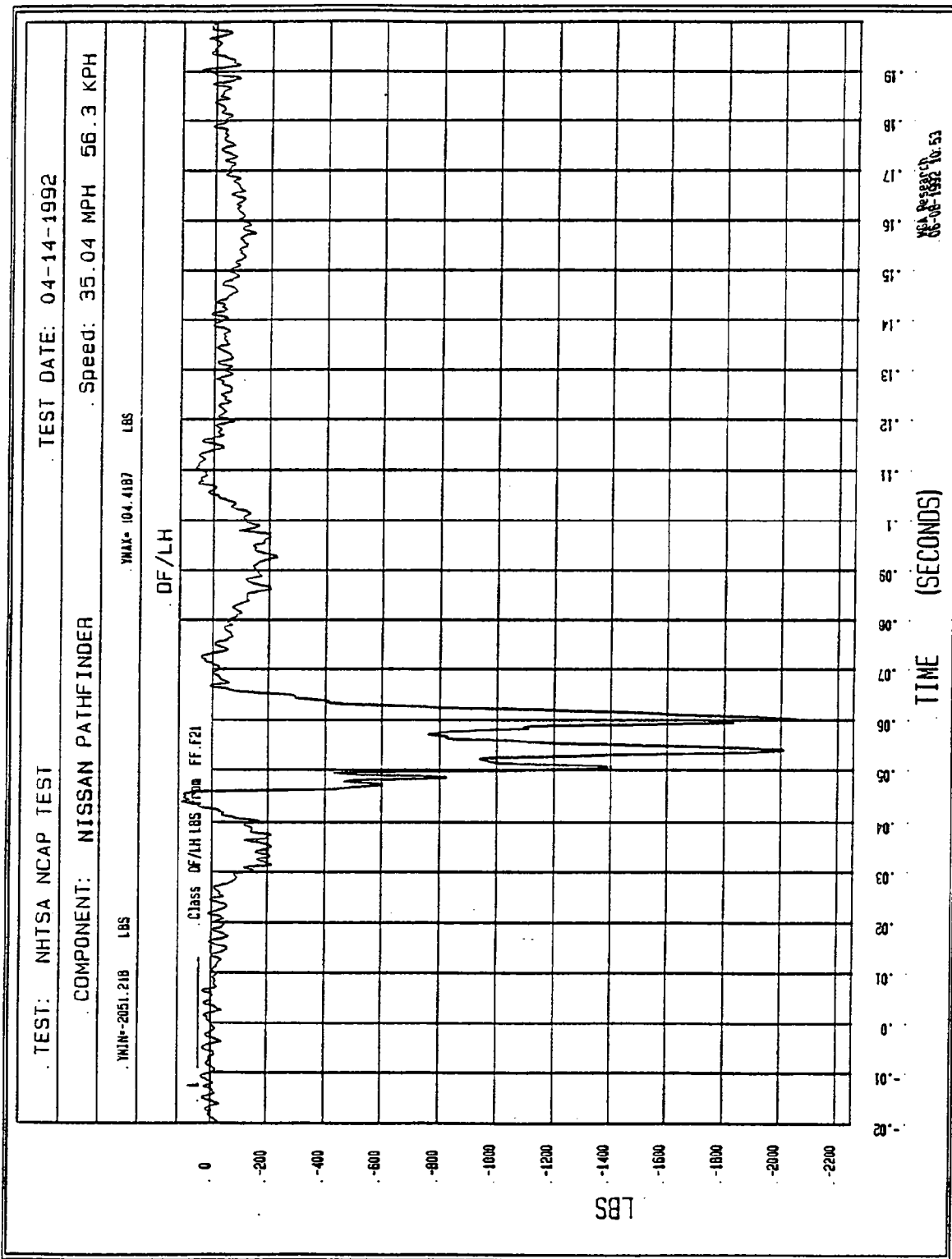


Figure B-35 - Driver Left Femur Force vs. Time

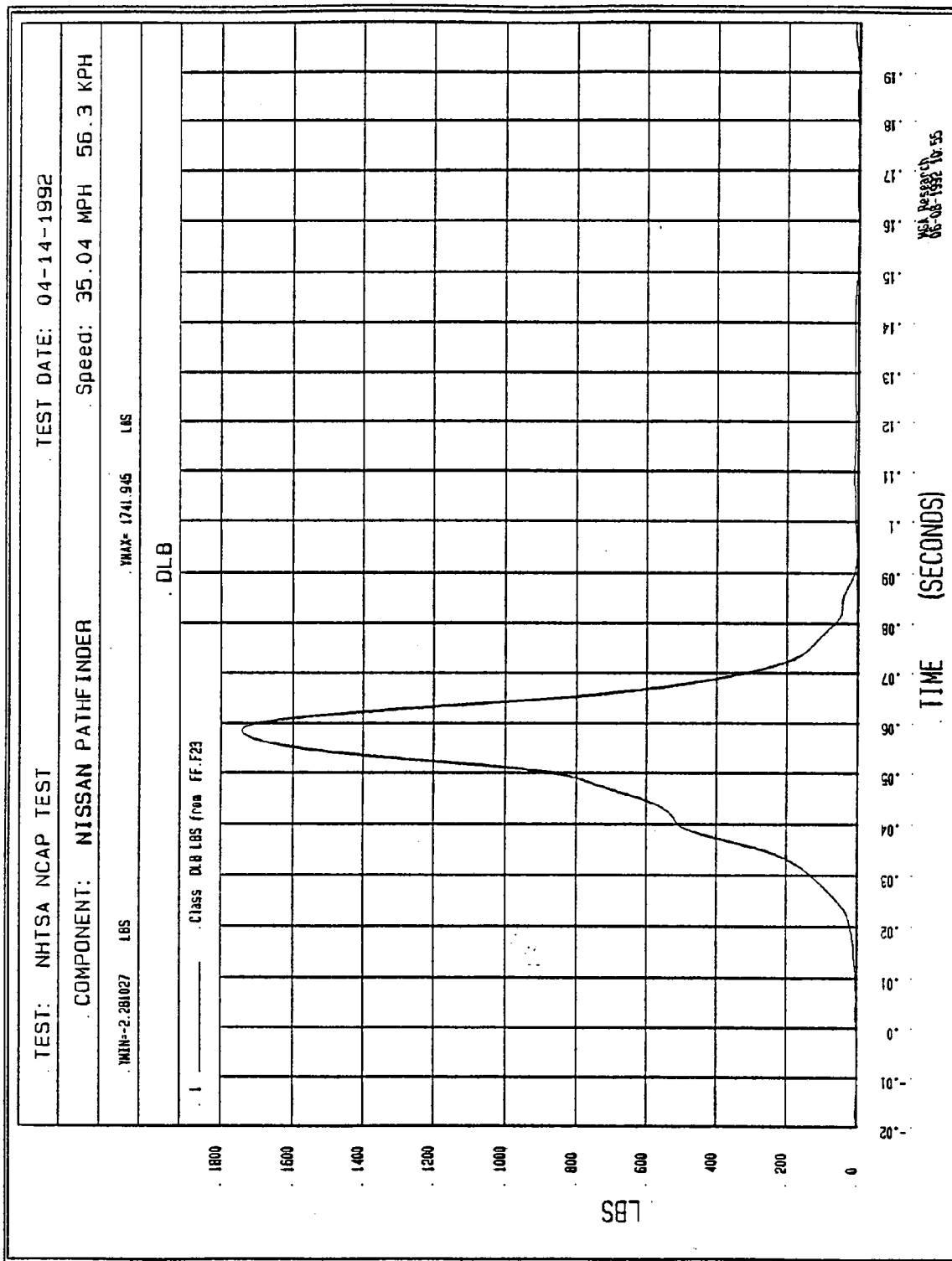


Figure B-36 - Driver Lap Belt Force vs. Time

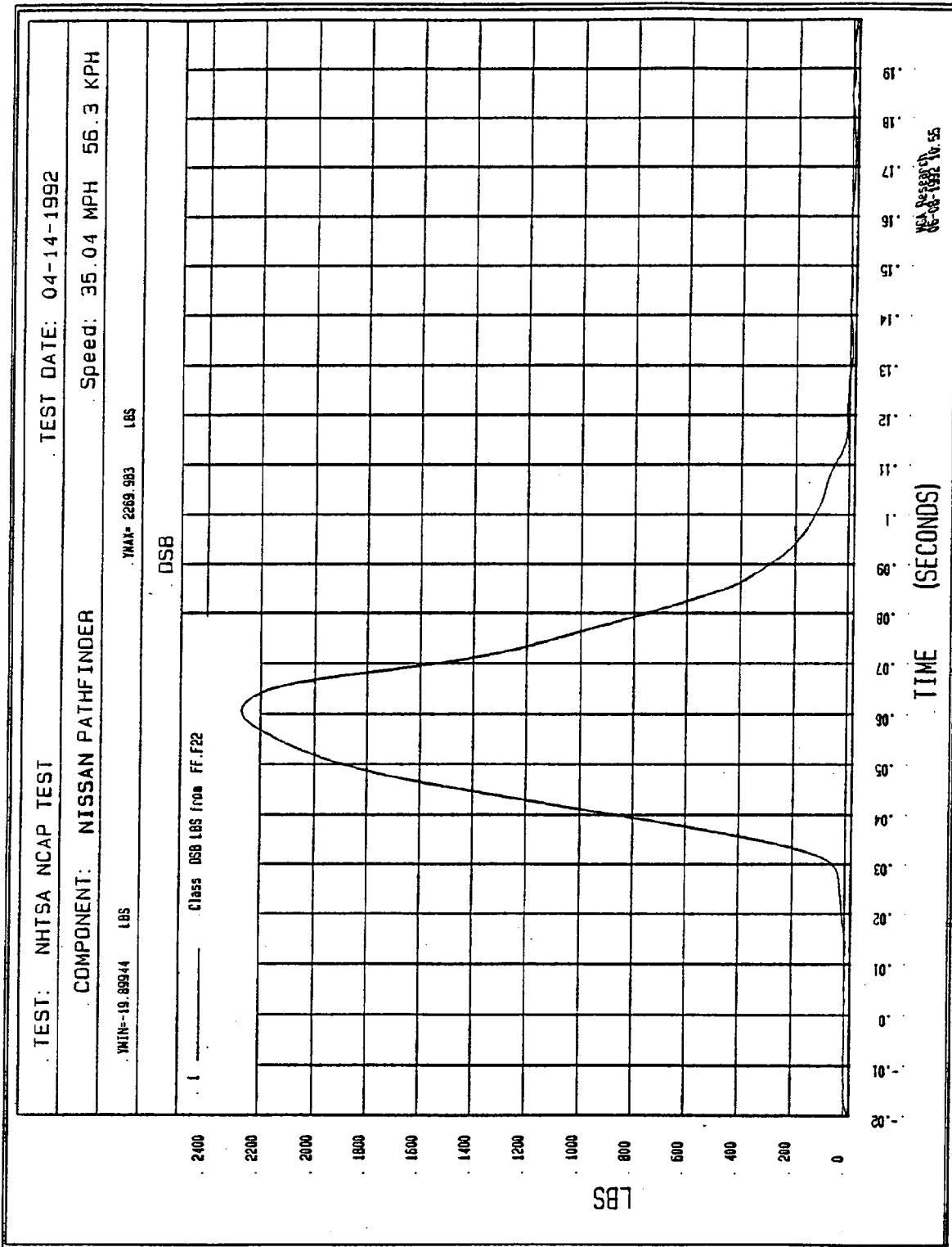


Figure B-37 - Driver Torso Belt Force vs. Time

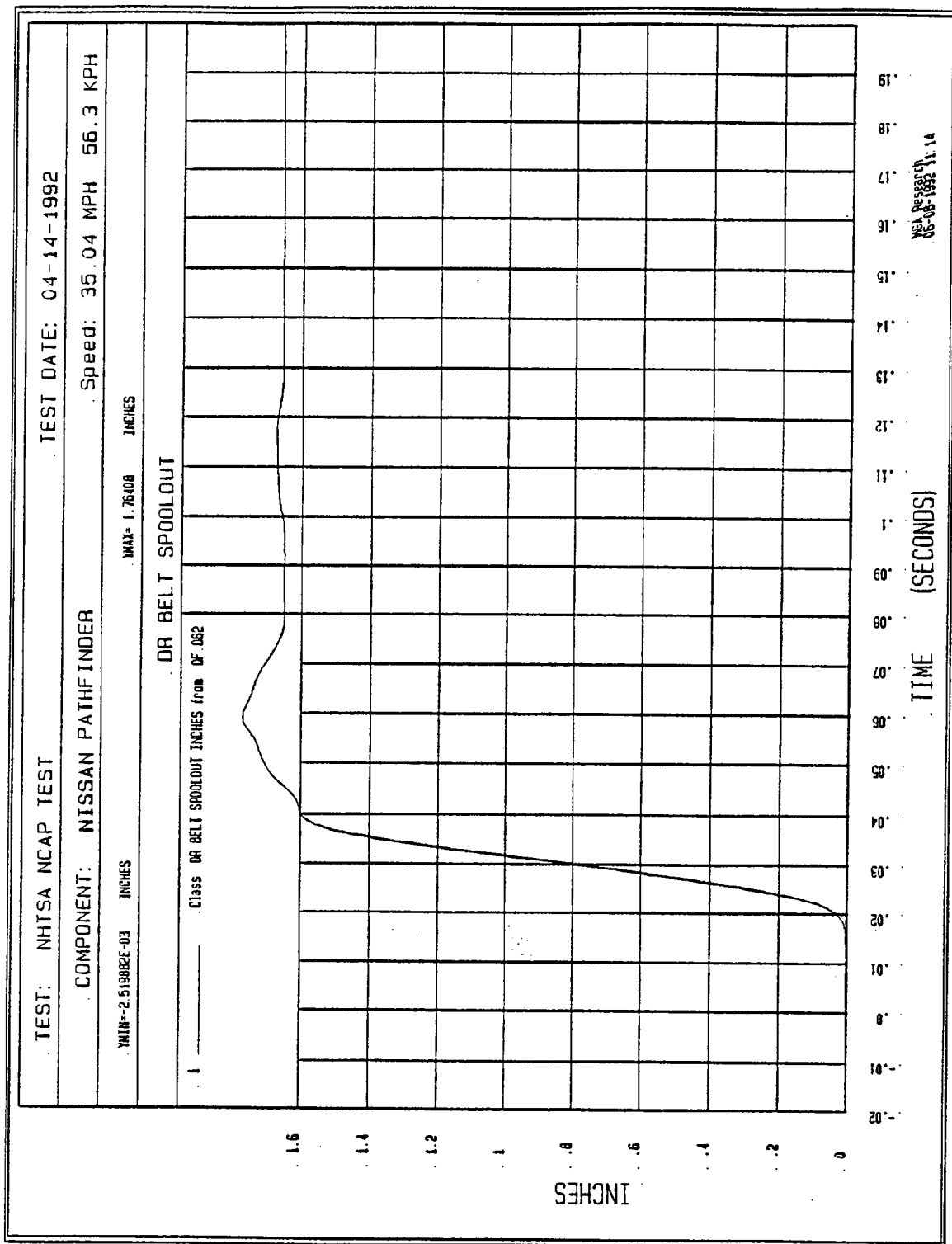


Figure B-38 - Driver Torso Belt Spool-out vs. Time

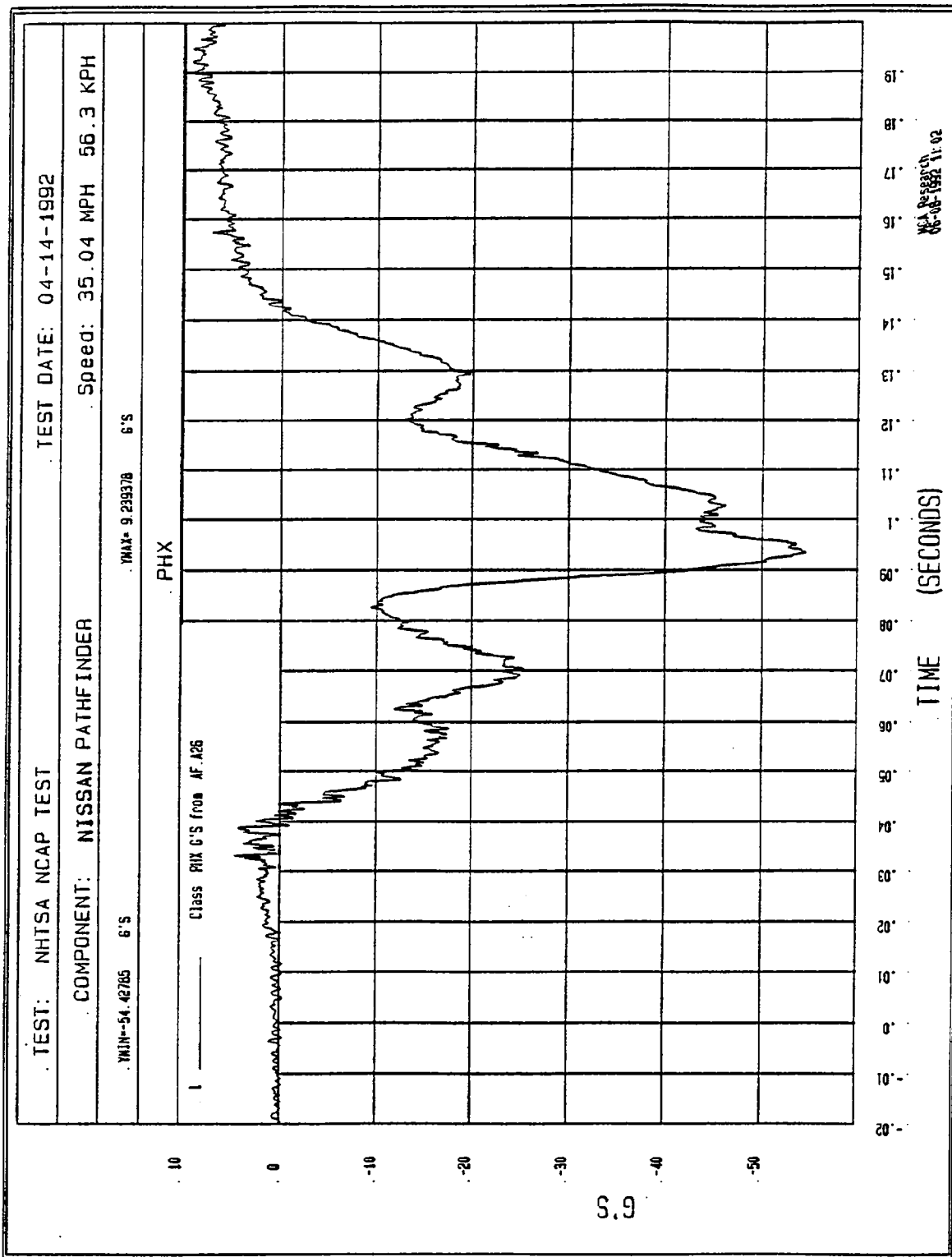


Figure B-39 - Passenger Head X Acceleration vs. Time

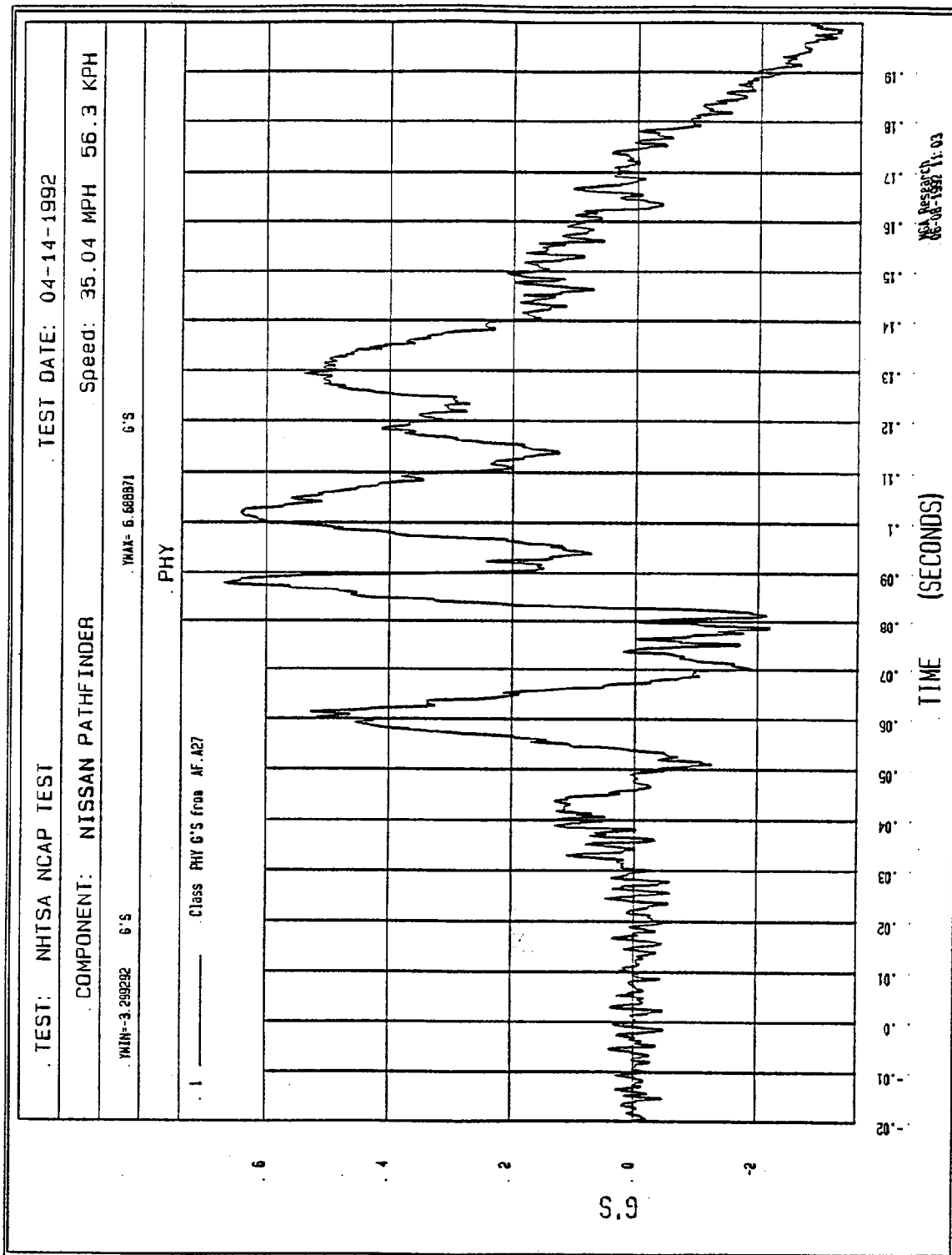


Figure B-40 - Passenger Head Y Acceleration vs. Time

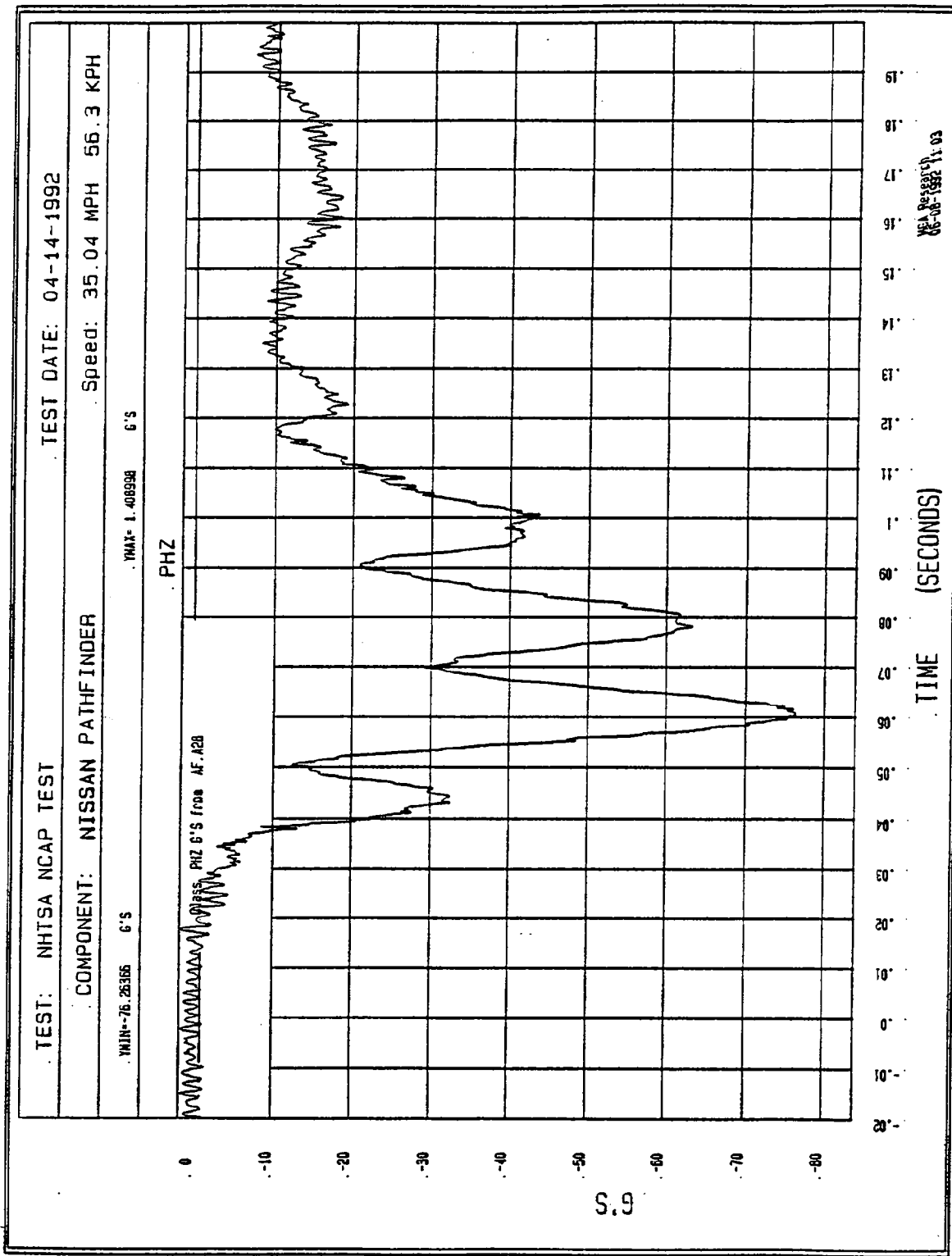


Figure B-41 - Passenger Head Z Acceleration vs. Time

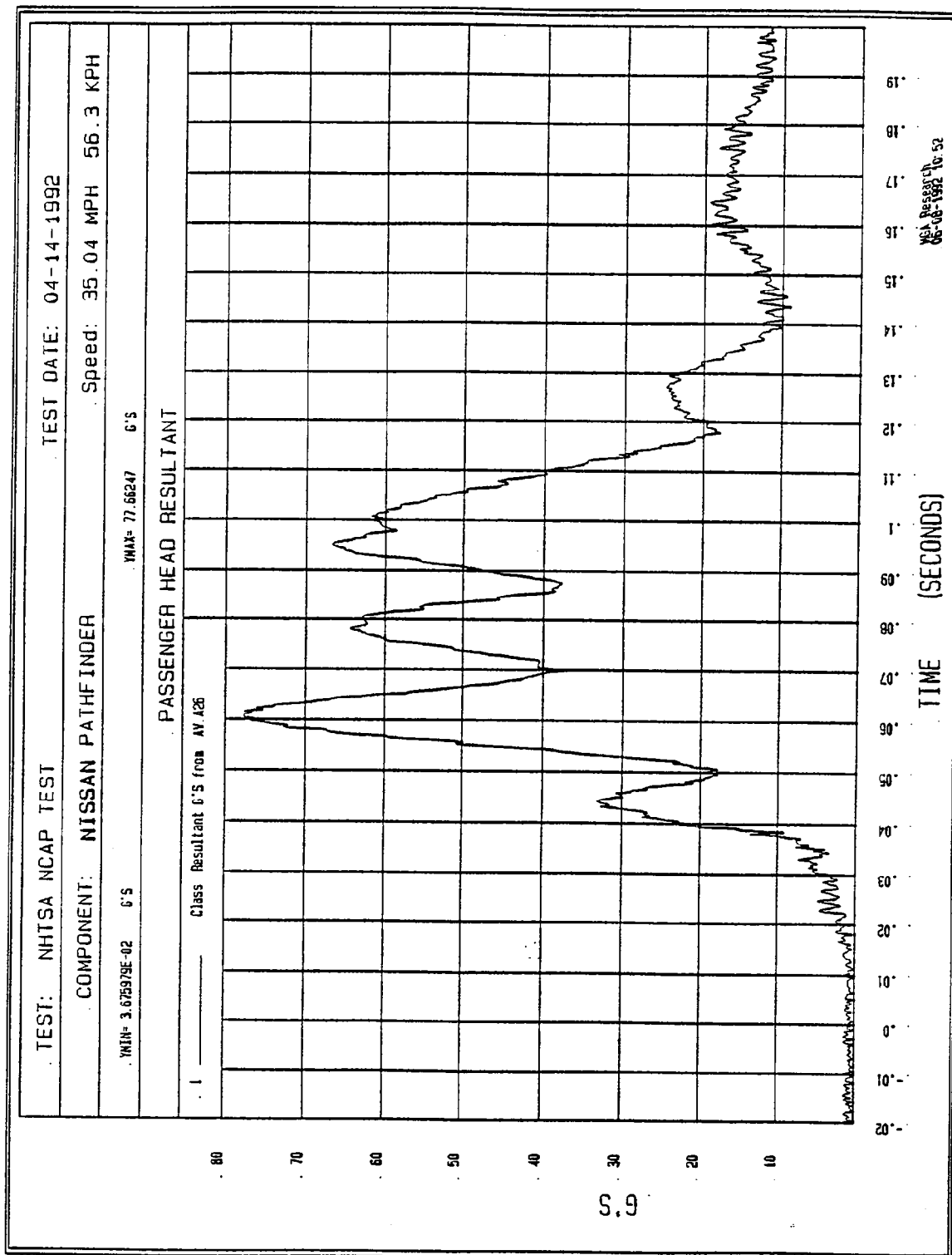


Figure B-42 - Passenger Head Resultant vs. Time

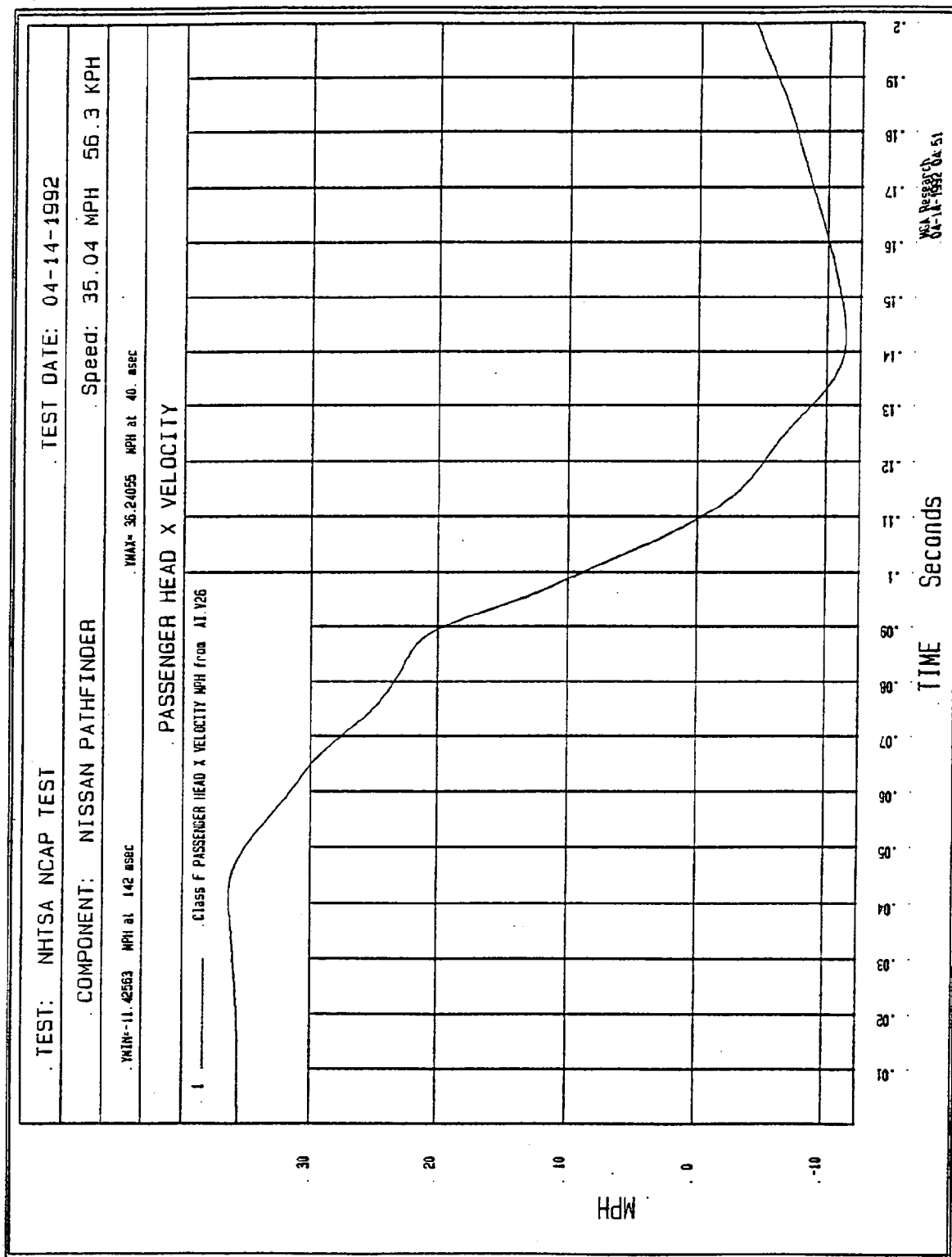


Figure B-43 - Passenger Head X Velocity vs. Time

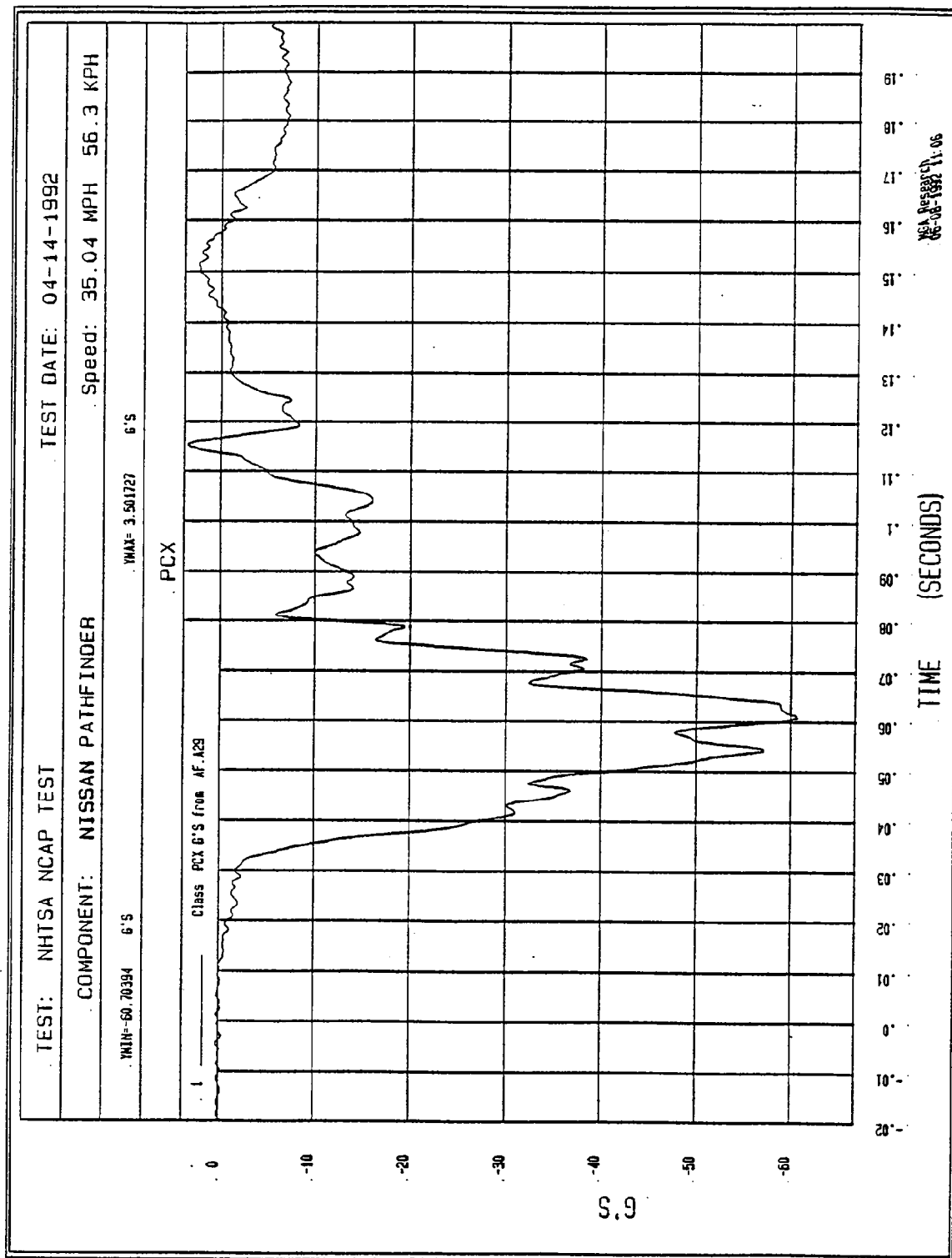


Figure B-44 - Passenger Chest X Acceleration vs. Time

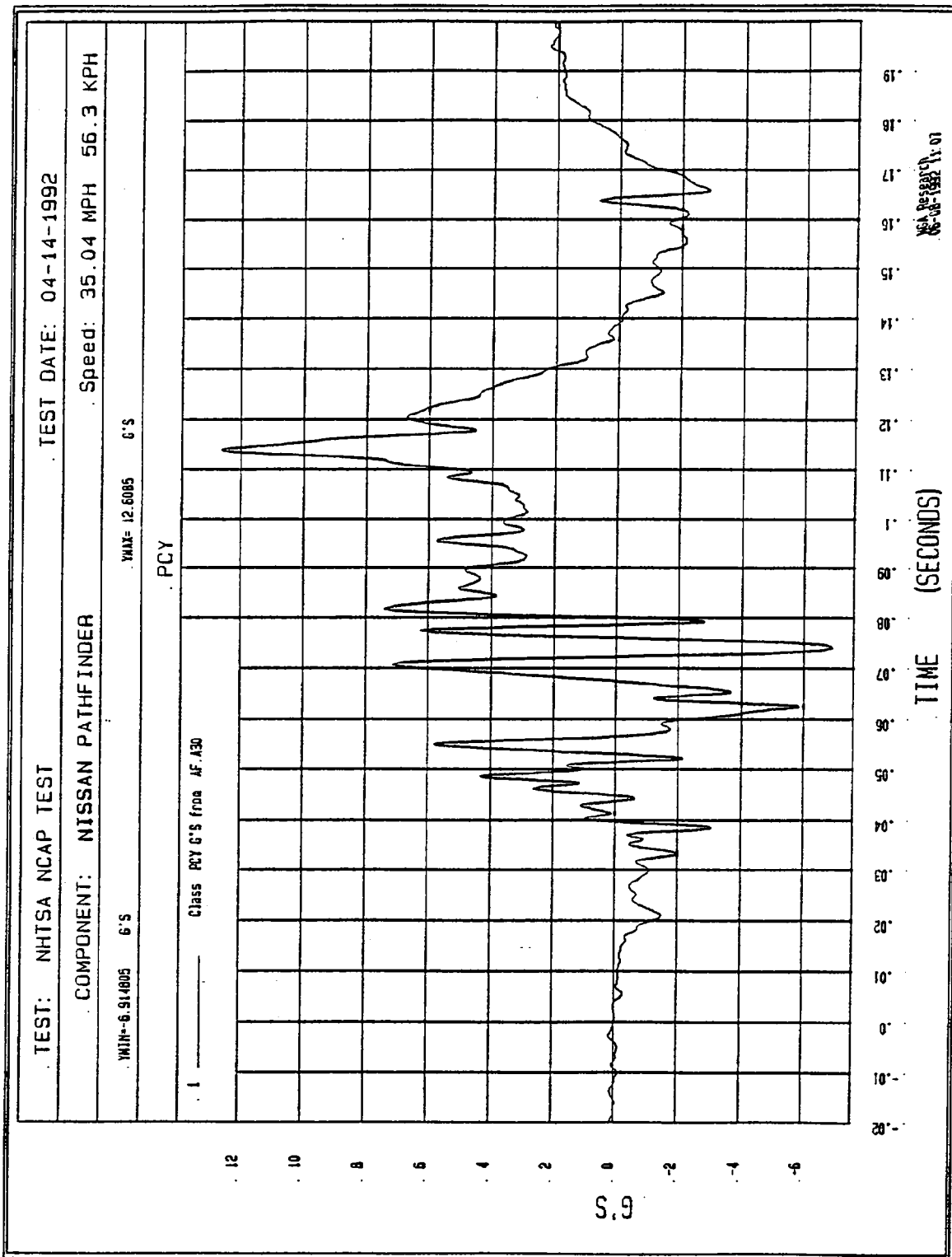


Figure B-45 - Passenger Chest Y Acceleration vs. Time

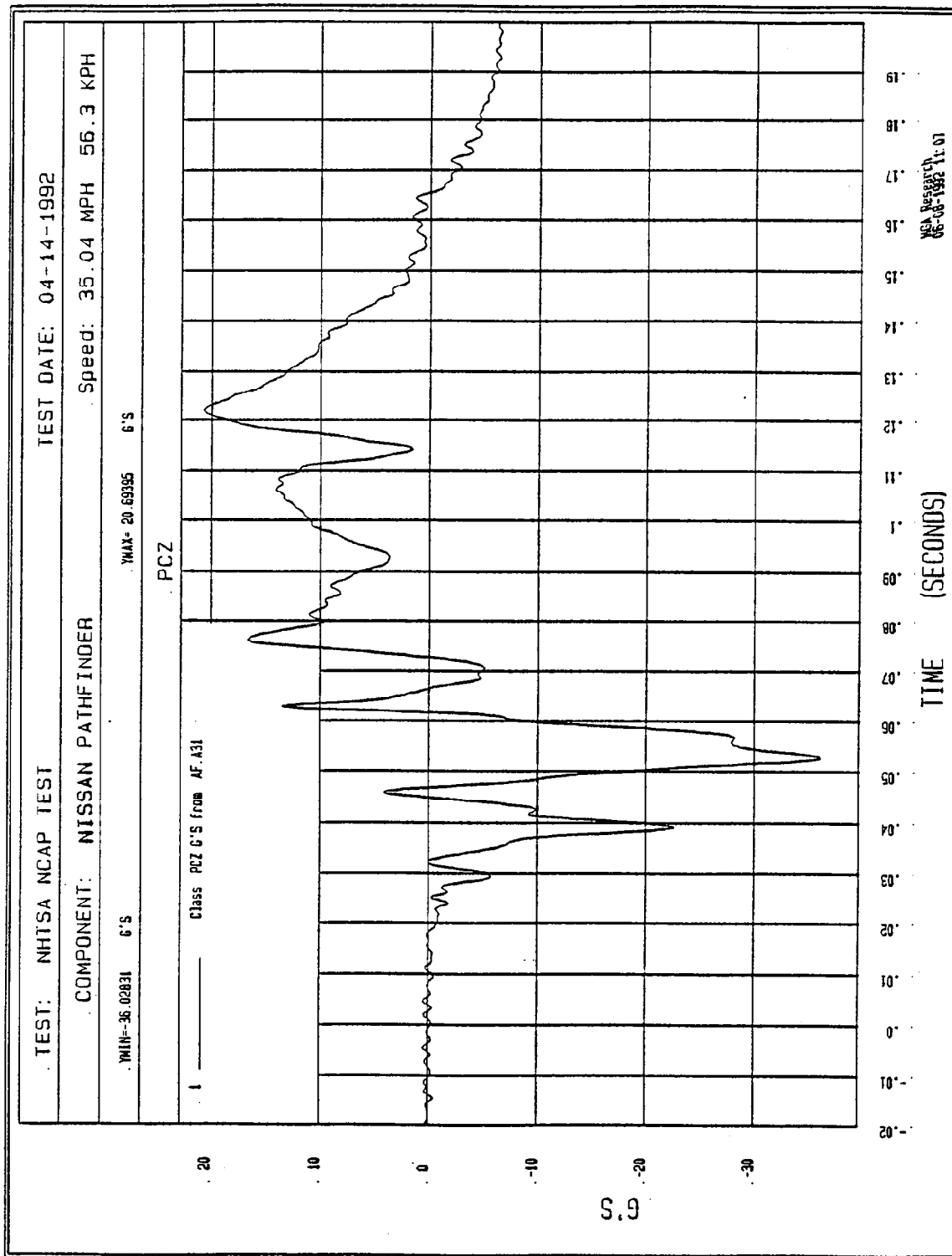


Figure B-46 - Passenger Chest Z Acceleration vs. Time

Figure B-47 - Passenger Chest Resultant Acceleration vs. Time

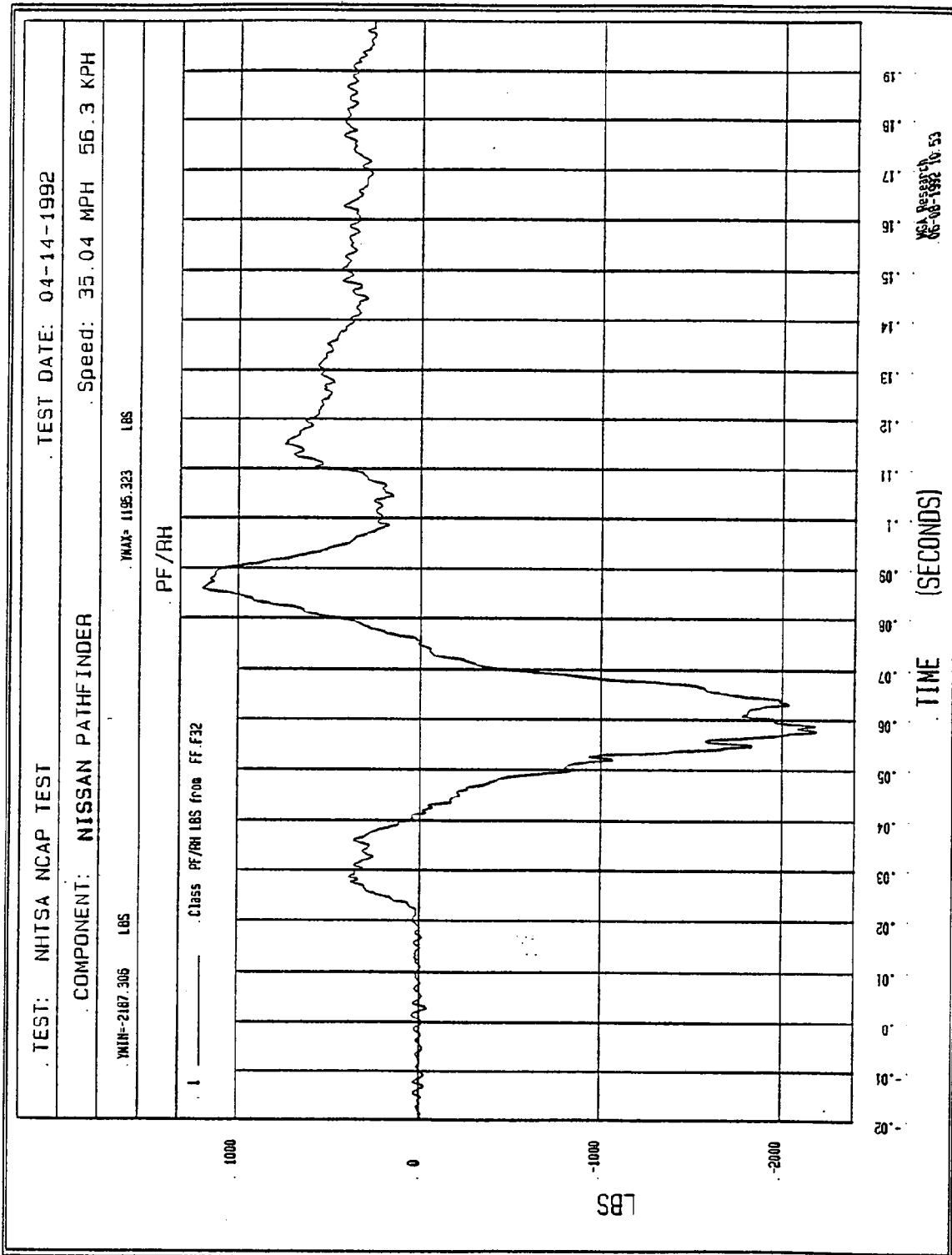


Figure B-48 - Passenger Right Femur Force vs. Time

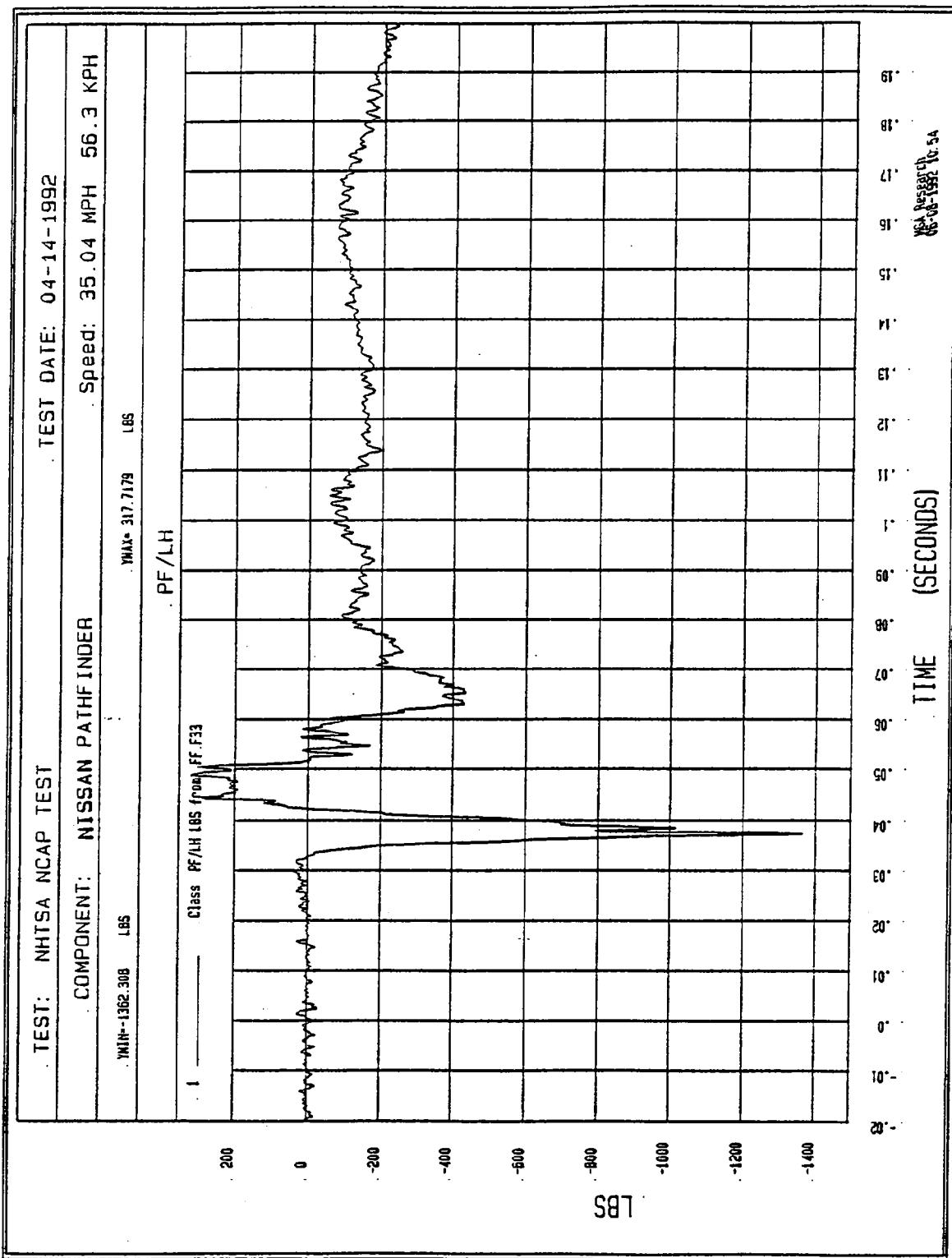


Figure B-49 - Passenger Left Femur Force vs. Time

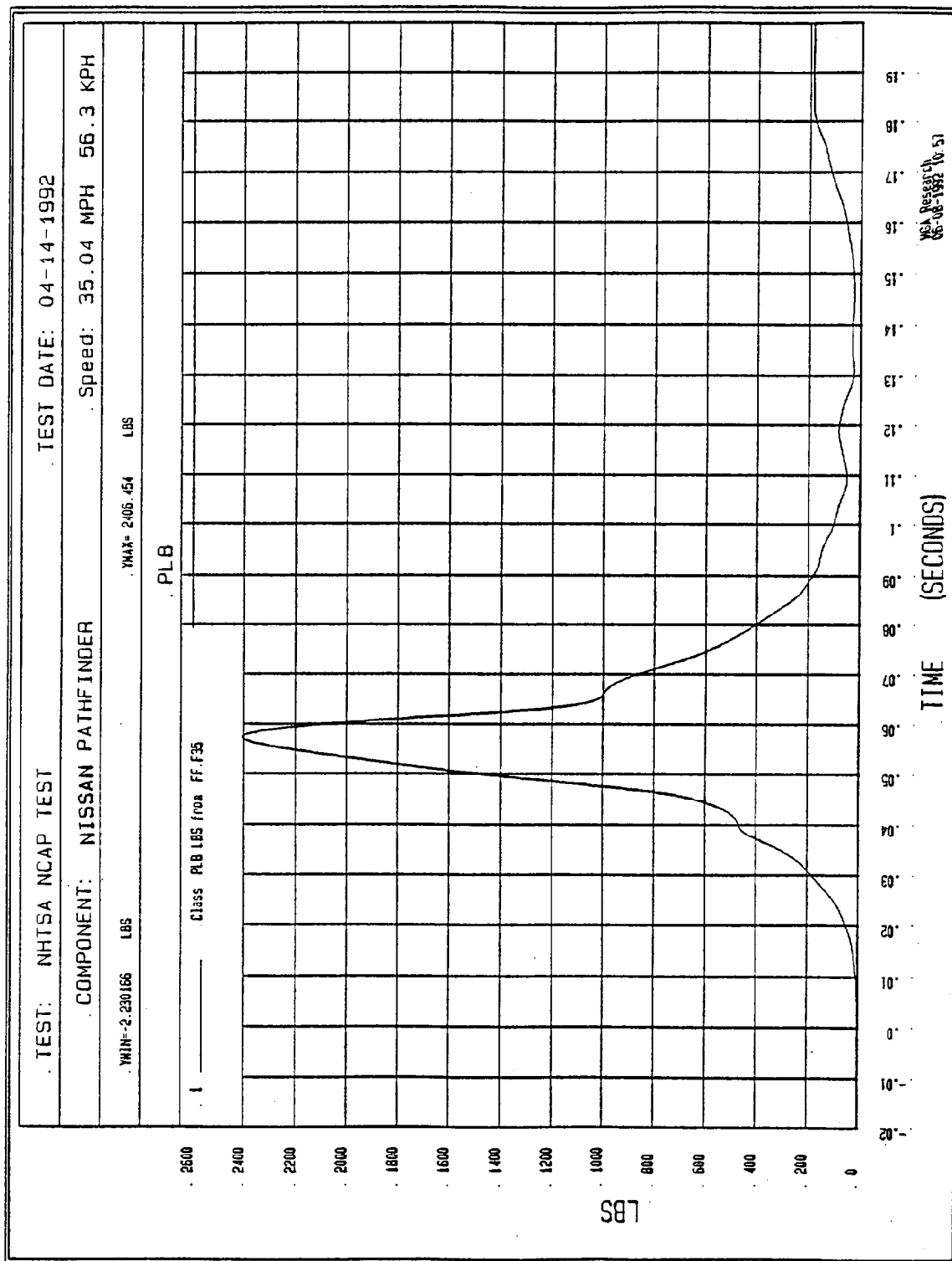


Figure B-50 - Passenger Lap Belt Force vs. Time

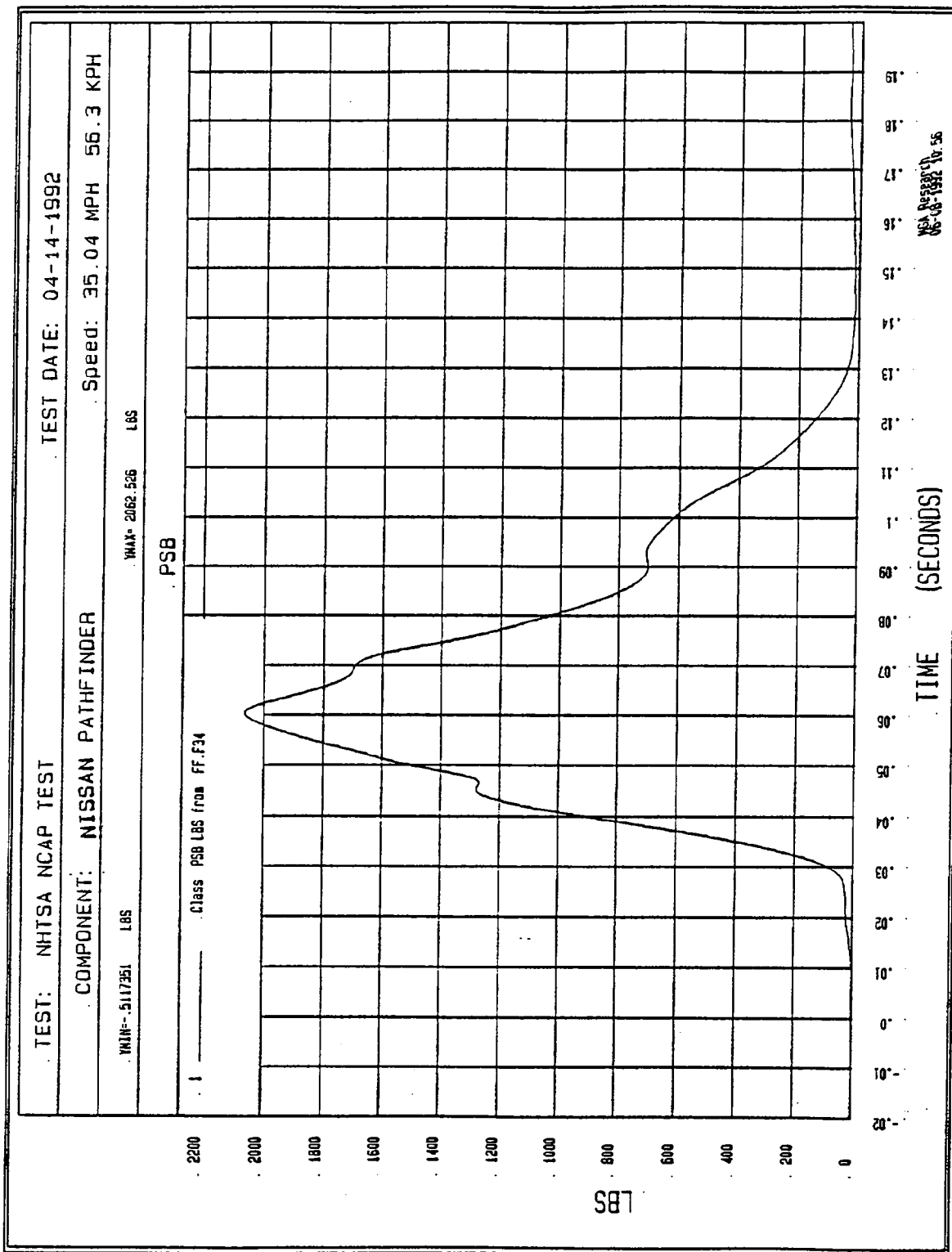


Figure B-51 - Passenger Torso Belt Force vs. Time

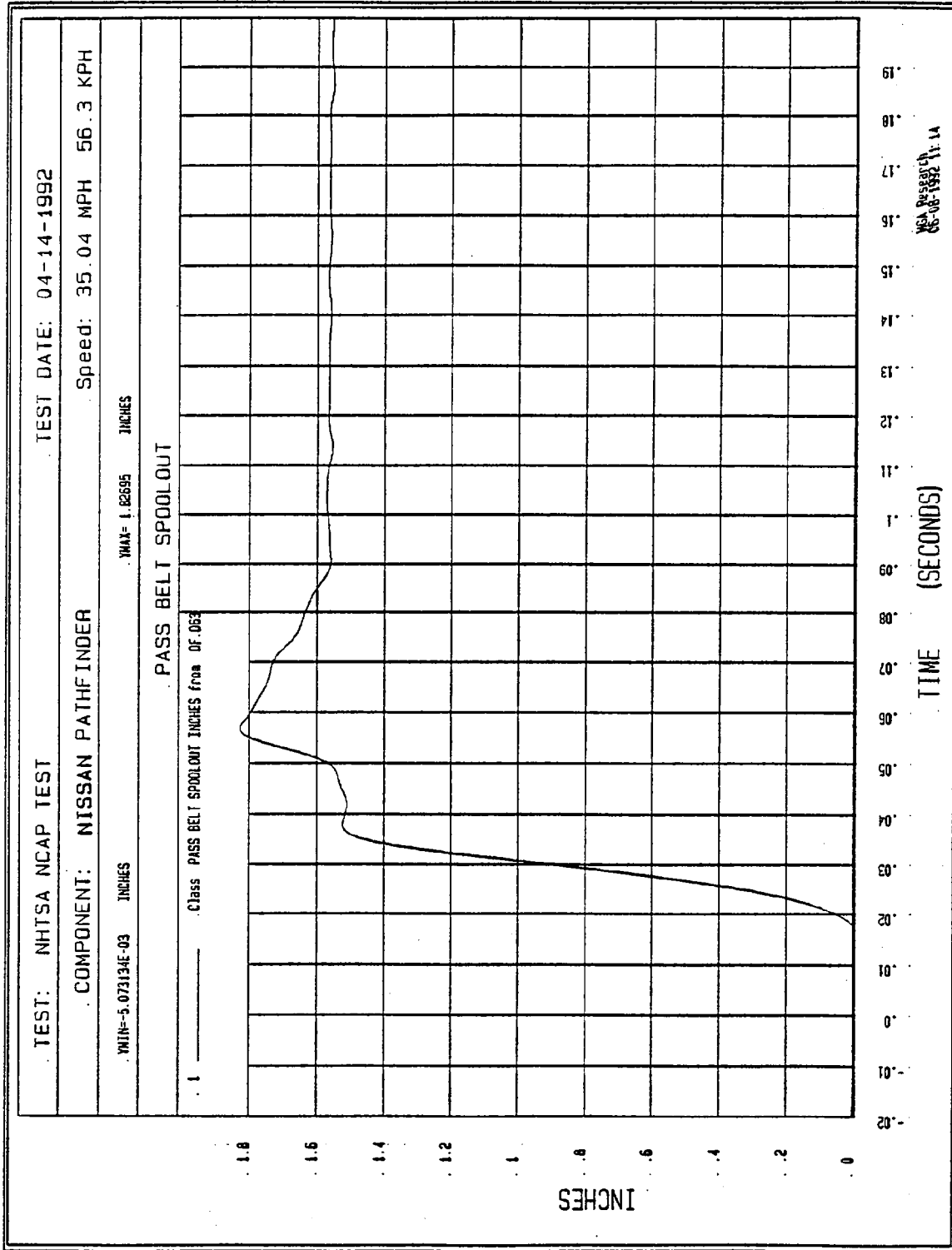


Figure B-52 - Passenger Torso Belt Spool-out vs. Time

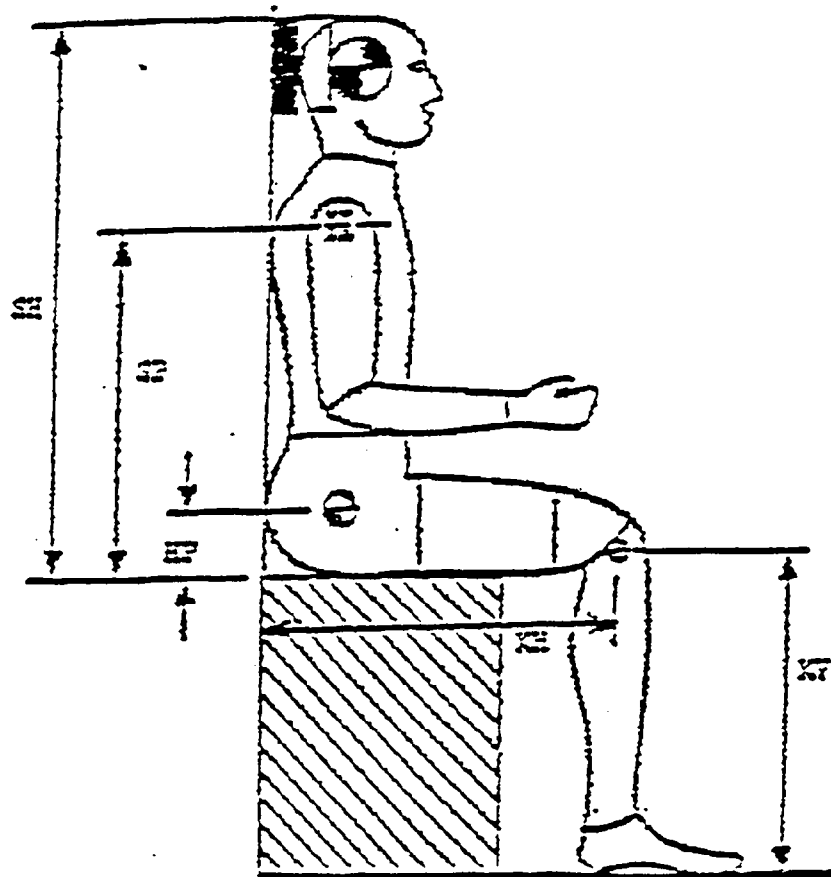
APPENDIX C

Dummy Configuration & Performance Verification Data

PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 465 DUMMY CALIBRATION BY: Roni Dermer

I. CONFIGURATION VERIFICATION DATA



DESCRIPTION	SPECIFICATION	ACTUAL MEASUREMENT
SH - Seated Height	35.6" to 35.8"	35.6
SP - Shoulder Pivot Height	21.8" to 22.4"	21.9
HP - Hip Pivot Height	3.9" ref.	3.9
KH - Knee Pivot From Back Line	20.1" to 20.7"	20.6
KV - Knee Pivot From Floor	19.3" to 19.9"	19.5
SW - Shoulder Width	17.8" to 18.4"	18.1
HW - Hip Width	14.0" to 15.4"	14.8

PART 572 DUMMY CONFIGURATION AND PERFORMANCE (CONT.)

II. PERFORMANCE VERIFICATION DATA

DUMMY NO.: 465 DUMMY CALIBRATION BY: Roni Dermer
 VERIFICATION LABORATORY TEMPERATURE (66° - 78°F): 70°
 DATE OF CALIBRATION: April 2, 1992

		SPECIFICATION	MEASUREMENT
HEAD DROP TEST			
A. Peak Resultant Acc.		210 to 260 g's	258
B. Peak Lateral Acc.		< 10 g's	1
C. Time above 100 g.		0.9 to 1.5 msec.	1.4
NECK BENDING TEST			
A. Pendulum Speed		21.5 to 25.5 fps	23.5
B. Pendulum Average Decel. Over $t_3 - t_2$		20 to 24 g's	24
C. Peak Resultant Head Acc.		26 g maximum	26
D. Pendulum Decel ($t_2 - t_1$)		$\leq = 3$ ms	2.2
E. Pendulum Decel ($t_3 - t_2$)		25 to 30 ms	27
F. Pendulum Decel ($t_4 - t_3$)		$\leq = 10$ ms	7
G. Max Head Rotation		63° to 73°	68°
H. Chordal Displacement Head Rotation Angle			
0°	Time	-2 to 2 ms	0
	Displ.	-0.5 to 0.5 in	0.0
30°	Time	25.6 to 34.4 ms	26.3
	Displ.	2.1 to 3.1 in	2.6
60°	Time	40.3 to 51.7 ms	42.4
	Displ.	4.3 to 5.3 in	4.9
Maximum (68°)	Time	53.2 to 66.8 ms	57.2
	Displ.	5.0 to 6.0 in	5.5
60°	Time	67.0 to 83.0 ms	70.4
	Displ.	4.3 to 5.3 in	4.8
30°	Time	85.4 to 104.6 ms	89.2
	Displ.	2.1 to 3.1 in	2.5
0°	Time	101.0 to 123.0 ms	103.2
	Displ.	0 to 0.5 in	0.4

PART 572 DUMMY CONFIGURATION AND PERFORMANCE (CONT.)

	SPECIFICATION	MEASUREMENT
ABDOMINAL COMPRESSION TEST (Preload = 10 lbs.)		
Force @ 0.5 in	23.3 to 36.5 lbs	29.5
Force @ 0.75 in	36.7 to 49.8 lbs	43.5
Force @ 1.0 in	50 to 63 lbs	60
Force @ 1.3 in	73 to 88 lbs	87

	SPECIFICATION	MEASUREMENT
LUMBAR FLEXION TEST		
A. Force @ 20°	22 to 34 lbs	26
B. Force @ 30°	34 to 46 lbs	36
C. Force @ 40°	46 to 58 lbs	46
D. Return Angle	12° Maximum	12°

	SPECIFICATION	MEASUREMENT
CHEST IMPACT TESTS		
A. High Speed		
(1) Probe Speed	21.78 to 22.22 fps	21.81
(2) Peak Deflection	1.7 in. (maximum)	1.4
(3) Peak Resistive Force	2250 lbs. (maximum)	2,106
(4) Internal Hysteresis	50% to 70%	57%
B. Low Speed		
(1) Probe Speed	13.86 to 14.14 fps	13.93
(2) Peak Deflection	1.1 in. (maximum)	0.8
(3) Peak Resistive Force	1450 lbs. (maximum)	1,311
(4) Internal Hysteresis	50% to 70%	52%

PART 572 DUMMY CONFIGURATION AND PERFORMANCE (CONT.)

	SPECIFICATION	MEASUREMENT
KNEE IMPACT TESTS		
A. Right Side		
(1) Probe Speed	6.67 to 7.04 fps	6.80
(2) Maximum Force	1850 to 2500 lbs.	2,382
(3) Time Above 1000 lbs.	1.7 msec. (minimum)	1.9
B. Left Side		
(1) Probe Speed	6.67 to 7.04 fps	7.04
(2) Maximum Force	1850 to 2500 lbs.	2,173
(3) Time Above 1000 lbs.	1.7 msec. (minimum)	2.1

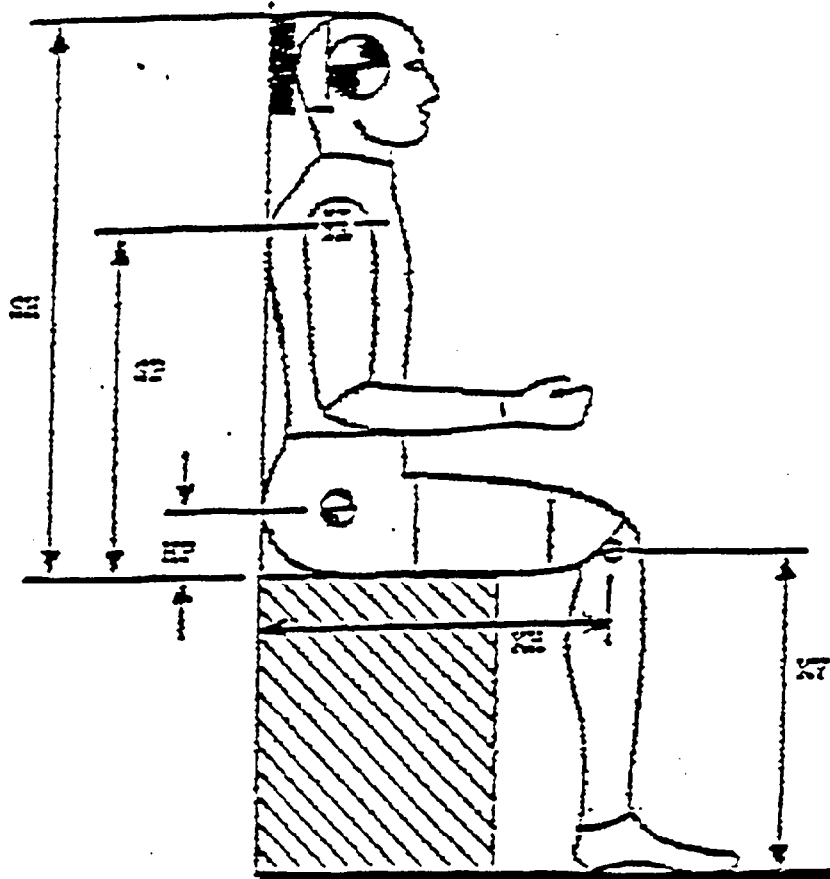
RD#1.P572/dmd

PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 466

DUMMY CALIBRATION BY: Roni Dermer

I. CONFIGURATION VERIFICATION DATA



DESCRIPTION	SPECIFICATION	ACTUAL MEASUREMENT
SH - Seated Height	35.6" to 35.8"	35.6
SP - Shoulder Pivot Height	21.8" to 22.4"	22.2
HP - Hip Pivot Height	3.9" ref.	3.9
KH - Knee Pivot From Back Line	20.1" to 20.7"	20.4
KV - Knee Pivot From Floor	19.3" to 19.9"	19.3
SW - Shoulder Width	17.8" to 18.4"	18
HW - Hip Width	14.0" to 15.4"	14.75

PART 572 DUMMY CONFIGURATION AND PERFORMANCE (CONT.)

II. PERFORMANCE VERIFICATION DATA

DUMMY NO.: 466 DUMMY CALIBRATION BY: Roni Dermer
 VERIFICATION LABORATORY TEMPERATURE (66° - 78°F): 70°
 DATE OF CALIBRATION: April 2, 1992

		SPECIFICATION	MEASUREMENT
HEAD DROP TEST			
A. Peak Resultant Acc.		210 to 260 g's	260
B. Peak Lateral Acc.		< 10 g's	3
C. Time above 100 g.		0.9 to 1.5 msec.	1.4
NECK BENDING TEST			
A. Pendulum Speed		21.5 to 25.5 fps	23.4
B. Pendulum Average Decel. Over $t_3 - t_2$		20 to 24 g's	24
C. Peak Resultant Head Acc.		26 g maximum	25
D. Pendulum Decel ($t_2 - t_1$)		≤ 3 ms	2
E. Pendulum Decel ($t_3 - t_2$)		25 to 30 ms	27
F. Pendulum Decel ($t_4 - t_3$)		≤ 10 ms	6
G. Max Head Rotation		63 to 73°	69°
H. Chordal Displacement Head Rotation Angle			
0°	Time	-2 to 2 ms	0
	Displ.	-0.5 to 0.5 in	0.0
30°	Time	25.6 to 34.4 ms	27.0
	Displ.	2.1 to 3.1 in	2.6
60°	Time	40.3 to 51.7 ms	41.7
	Displ.	4.3 to 5.3 in	4.9
Maximum (69°)	Time	53.2 to 66.8 ms	57.2
	Displ.	5.0 to 6.0 in	5.6
60°	Time	67.0 to 83.0 ms	70.5
	Displ.	4.3 to 5.3 in	4.8
30°	Time	85.4 to 104.6 ms	89.2
	Displ.	2.1 to 3.1 in	2.4
0°	Time	101.0 to 123.0 ms	102.7
	Displ.	0 to 0.5 in	0.3

PART 572 DUMMY CONFIGURATION AND PERFORMANCE (CONT.)

	SPECIFICATION	MEASUREMENT
ABDOMINAL COMPRESSION TEST (Preload = 10 lbs.)		
Force @ 0.5 in	23.3 to 36.5 lbs	31.8
Force @ 0.75 in	36.7 to 49.8 lbs	44.7
Force @ 1.0 in	50 to 63 lbs	61
Force @ 1.3 in	73 to 88 lbs	85

	SPECIFICATION	MEASUREMENT
LUMBAR FLEXION TEST		
A. Force @ 20°	22 to 34 lbs	23
B. Force @ 30°	34 to 46 lbs	36
C. Force @ 40°	46 to 58 lbs	50
D. Return Angle	12° Maximum	12°

	SPECIFICATION	MEASUREMENT
CHEST IMPACT TESTS		
A. High Speed		
(1) Probe Speed	21.78 to 22.22 fps	21.78
(2) Peak Deflection	1.7 in. (maximum)	1.3
(3) Peak Resistive Force	2250 lbs. (maximum)	2,194
(4) Internal Hysteresis	50% to 70%	56%
B. Low Speed		
(1) Probe Speed	13.86 to 14.14 fps	13.89
(2) Peak Deflection	1.1 in. (maximum)	0.8
(3) Peak Resistive Force	1450 lbs. (maximum)	1,247
(4) Internal Hysteresis	50% to 70%	57%

PART 572 DUMMY CONFIGURATION AND PERFORMANCE (CONT.)

	SPECIFICATION	MEASUREMENT
KNEE IMPACT TESTS		
A. Right Side		
(1) Probe Speed	6.67 to 7.04 fps	7.04
(2) Maximum Force	1850 to 2500 lbs.	2,221
(3) Time Above 1000 lbs.	1.7 msec. (minimum)	1.8
B. Left Side		
(1) Probe Speed	6.67 to 7.04 fps	7.04
(2) Maximum Force	1850 to 2500 lbs.	2,018
(3) Time Above 1000 lbs.	1.7 msec. (minimum)	2.0

RD#1.P572/dmd

APPENDIX D

Dummy, Vehicle and Laboratory Calibration Data

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 465

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	A07F	Endevco	1/06/92
Head Y	A06M	Endevco	1/06/92
Head Z	EA45	Endevco	1/24/92
Chest X	A88H	Endevco	1/20/92
Chest Y	A96P	Endevco	1/20/92
Chest Z	A11M	Endevco	1/20/92
Right Femur Load Cell	932	GSE	4/13/92
Left Femur Load Cell	953	GSE	4/13/92
*Neck Load Cell X			
*Neck Load Cell Y			
*Neck Load Cell Z			
*Neck Moment X			
*Neck Moment Y			
*Neck Moment Z			
*Chest Deflection Gauge			
Lap Belt Load Cell	657	Eaton	4/14/92
Torso Belt Load Cell	211	GSE	4/14/92
Spool-Out Potentiometer	3	Bourns	4/13/92
Belt Stretch Transducer			

*Hybrid III use only.

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 466

	PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	DK21	Endevco	12/05/91
Head Y	A87M	Endevco	1/06/92
Head Z	ED16	Endevco	1/31/92
Chest X	BA26	Endevco	2/05/92
Chest Y	A16A	Endevco	1/06/92
Chest Z	ED47	Endevco	2/11/92
Right Femur Load Cell	945	GSE	4/13/92
Left Femur Load Cell	948	GSE	4/13/92
*Neck Load Cell X			
*Neck Load Cell Y			
*Neck Load Cell Z			
*Neck Moment X			
*Neck Moment Y			
*Neck Moment Z			
*Chest Deflection Gauge			
Lap Belt Load Cell	624	Eaton	4/14/92
Torso Belt Load Cell	212	GSE	4/14/92
Spool-Out Potentiometer	4	Bourns	4/13/92
Belt Stretch Transducer			

*Hybrid III use only.

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

VEHICLE ACCELEROMETERS		
	SERIAL NO.	CALIBRATION DATE
Left Rear Seat Crossmember X	295826	3/25/92
Right Rear Seat Crossmember X	295846	3/25/92
Top of Engine X	A67PJ	1/21/92
Bottom of Engine X	DM96J	2/06/92
Left Brake Caliper X	ED15J	2/08/92
Right Brake Caliper X	EC40J	1/07/92
Instrument Panel X	2260048	2/06/92
Center Rear Crossmember Z	295821	3/25/92
Vehicle Rear Z	295824	1/25/92

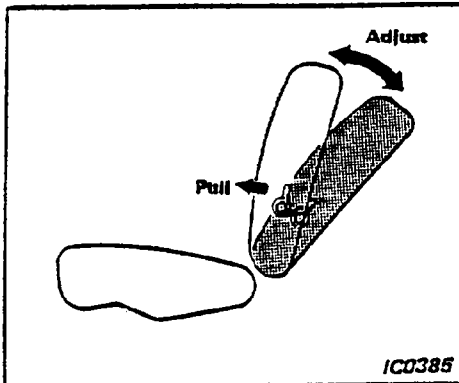
0-4

LABORATORY INSTRUMENTS		
	SERIAL NO.	CALIBRATION DATE
Neck Bending Pendulum Accelerometer	5220072	10/15/91
Neck Bending Rotary Potentiometer	N/A	PRIOR TO USE
Neck Bending Linear Potentiometer	N/A	PRIOR TO USE
Femur/Chest/Thorax Probe Accelerometer	2270026	2/07/92
Lumbar Flexion Force Gauge	Custom Fab.	PRIOR TO USE
Lumbar Flexion Rotation Gauge	Custom Fab.	PRIOR TO USE
Abdomen Compression Displacement Gauge	4856160	10/18/91
Abdomen Compression Force Gauge	49710	10/18/91

APPENDIX E

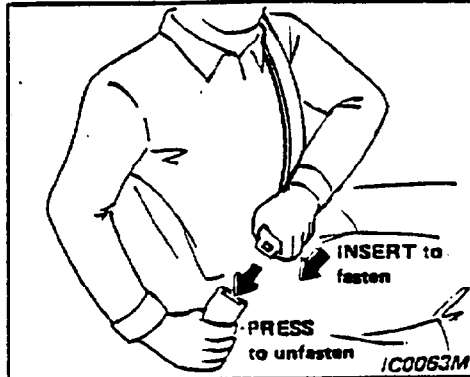
Vehicle Owner's Occupant Restraint System Instructions

SEAT BELTS 3-POINT TYPE WITH RETRACTOR



Pull the reclining lever and position the seat back at the desired angle. Release the reclining lever after positioning the seat at the desired angle.

The seat belts are most effective when the rider is sitting well back and straight up in the seat.



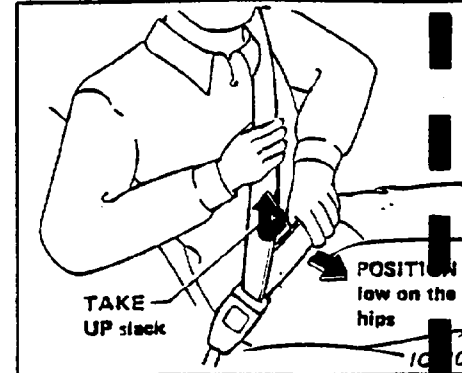
Every person who drives or rides in this vehicle should wear a seat belt at all times.

Fastening the belts

1. Adjust the seat.

The seatback should not be in a reclining position any more than needed for comfort. Seat belts are most effective when the passenger sits well back and straight up in the seat.

2. Slowly pull the seat belt out of the retractor and insert the tongue into the buckle until it snaps.



The retractor is designed to lock during sudden stop or on impact. A slow pull motion will permit the belt to move and allow you some freedom of movement in the seat.

3. Position the lap belt portion low on the hips as shown.
4. Pull the shoulder belt portion toward the retractor to take up extra slack.

Unfastening the belts

To unfasten the belt, press the button on the buckle. The seat belt will automatically retract.

2-POINT TYPE WITH RETRACTOR

Checking seat belt operation

Your seat belt retractors are designed to lock belt movement by two separate methods:

- 1) When the belt is pulled quickly from the retractor.

- 2) When the vehicle slows down rapidly.

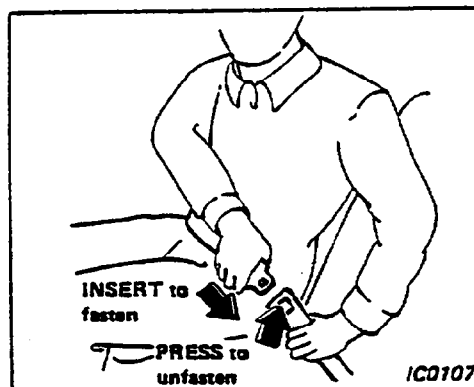
To increase your confidence in the belts, check the operation as follows:

- Grasp the shoulder belt and pull quickly forward. The retractor should lock and restrict further belt movement.

If the retractor does not lock during this check or if you have any question about belt operation, see your NISSAN dealer.

Replacing front seat belt (3-point type only)

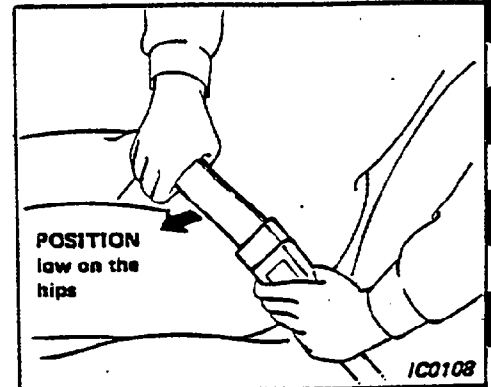
The front seat belts are shock absorber types. Replace the belt when the loop has been pulled out and "REPLACE BELT" is visible as this indicator means the seat belt has been overstressed.



Fastening the belts

1. Slowly pull the seat belt out of the retractor and insert the tongue into the buckle until it snaps.

If the retractor locks and restricts further movement, let the belt rewind into the retractor, then slowly pull the belt out.



2. Position the lap belt low on the hips as shown.
3. Pull the belt toward the retractor to take up extra slack.

Unfastening the belts

To unfasten the belt, press the button on the buckle. The seat belt will automatically retract.