

V2127

REPORT NO. MGA-95-N002

NEW CAR ASSESSMENT PROGRAM (NCAP)

FRONTAL BARRIER IMPACT TEST

Chrysler Corporation
1995 Plymouth Neon
4 Door
NHTSA NO. MB0300

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: August 12, 1994

Report Date: October 4, 1994

FINAL REPORT

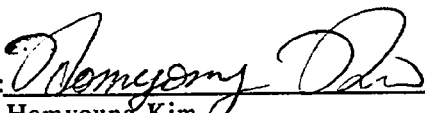
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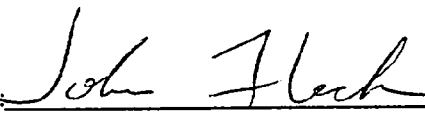
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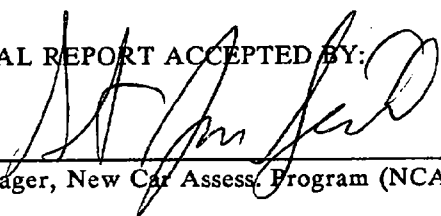
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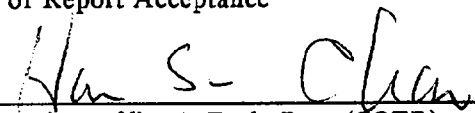
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OCT 20 1994
Date of Report Acceptance


Contracting Officer's Tech. Rep. (COTR)

OCT 20 1994
Date of Report Acceptance

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. MGA-95-N002		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle NHTSA New Car Assessment Program (NCAP) Frontal Barrier Impact Test of a 1995 Plymouth Neon 4 Door Sedan NHTSA No. MB0300 to the requirements of FMVSS No. 208, 212, 219 (partial) and 301.				5. Report Date October 4, 1994	
				6. Performing Organization Code MGA	
7. Author(s) Homyoung Kim				8. Performing Organization Report No. MGA-OMI-002	
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105				10. Work Unit No. MGA-95-DOT-2	
				11. Contract or Grant No. DTNH22-90-D-12121	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Vehicle Safety Compliance (Mail Code: NEF-30) 400 Seventh St., S.W., Room 6115 Washington, D.C. 20590				13. Type of Report and Period Covered Final Report August 1994	
				14. Sponsoring Agency Code DOT/NHTSA/RM/OMI	
15. Supplementary Notes					
16. Abstract A 56 kph (35 mph) frontal barrier impact using a 30 load cell barrier was conducted on a 1995 Plymouth Neon 4 Door Sedan at the MGA Proving Grounds and Crash Test Center in Burlington, WI. on August 12, 1994. The barrier impact velocity was 56.3 kph (35.0 mph), and the ambient temperature at the time of impact was 21°C. The post-test maximum static crush was 622 mm. The test vehicle appeared to comply with the 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 Crash Protection" injury criteria, the driver's HIC was 1087.6 and the 3 msec. Clip (Chest g's) was 51.5 g's. The left and right femur loads for the driver were 5310 and 7174 Newtons, respectively. The passenger's HIC was 923.8 and the 3 msec Clip was 54.9 g's. The left and right femur maximum loads were 5732 and 5143 Newtons 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 Ref. Division, NHTSA, NASSIF Building, Room 5108 400 Seventh Street, S.W. Washington, D.C. 20590	
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages 195	
				22. Price	

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SECTION 1

PURPOSE AND TEST PROCEDURE

This 35 mph frontal barrier impact test is part of the Composite FY'95 Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-90-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 48 kph (30 mph) FMVSS 208/212/219/301-75 requirements.

The 56 kph (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 FRONTAL BARRIER IMPACT TEST

A load cell barrier consisting of 30 load cells was impacted by a 1995 Plymouth Neon 4-Door at a velocity of 56.3 kph (35.0 mph). The test was performed at the MGA Proving Grounds and Crash Test Center on August 12, 1994. 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 572E, 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, neck load cell, and right/left femur load cells. The driver was also instrumented with right and left lower leg sensors. 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. Both the driver ATD (Serial No. 37) and the right-front passenger ATD (Serial No. 36) had one prior exposure (for the 1995 Nissan Maxima NCAP test) but did not exceed injury criteria. Certification details, along with instrumentation calibration data, are found in Appendix C and D.

The 61 channels of data were recorded on 6 computers. Appendix B contains the vehicle, load cell barrier and dummy response data traces. During the test, the data cable of the left front brake caliper accelerometer was cut at 40 milliseconds after impact.

The driver's head struck the inflated airbag. The driver HIC was 1087.6. The maximum chest deceleration over 3 milliseconds was 51.5 g's. The left and right femur loads were 5310 and 7174 Newtons respectively.

The right front passenger's HIC was 923.8 and maximum chest deceleration over 3 milliseconds was 54.9 g's. The left and right femur loads were 5732 and 5143 Newtons respectively.

GENERAL TEST AND VEHICLE PARAMETER DATA

Vehicle Yr/Make/Model/Body Style: 1995/Plymouth/Neon/4 Door Sedan

NHTSA No.: MB0300 VIN.: 3P3ES47C2ST339761

Body color: Green Date of Manufacture: 5-94

Engine: 4 Cylinders; C.I.D.; 2.0 liters; CC

X Gas; Diesel; Turbocharged

 Longitudinal; X Transverse

Transmission: 3 Speed; Manual; X Automatic; Overdrive

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

Odometer Reading: 171 miles

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

 P/seats; Tilt Wheel; Cruise Control;

Type of Occupant Restraint: Driver and passenger airbag and type II belt system

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 2.2 kg/cm² (32 Psi) Rear 2.2 kg/cm² (32 Psi)

Recommended Tire Size: P165/80R13

Recommended Cold Tire Pressure: Front 2.2 kg/cm²; Rear 2.2 kg/cm²

Tires on Vehicle: P185/70R13 ; Manufacturer: Goodyear

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

Vehicle Capacity Weight (VCW) = 392 kg. (A)

No. of Occupants x 68.0 kg. = 340 kg. (B)

Rated Cargo Weight (RCW) A-B = 52 kg.

GVWR 1571 kg. GAWR: Front 865 kg.; Rear 740 kg.

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

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

Right Front = 348 kg Right Rear = 188 kg
Left Front = 358 kg Left Rear = 191 kg
TOTAL FRONT WEIGHT = 706 kg (65 % of Total Vehicle Weight)
TOTAL REAR WEIGHT = 379 kg (35 % of Total Vehicle Weight)
TOTAL UNLOADED DELIVERED WEIGHT (UDW) = 1085 kg

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight 1085 kg
VCW = Vehicle Capacity Weight 392 kg DSC = Designated Seating Capacity 5
RCW = VCW - 68 (DSC) = 52 *kg
Target Test Weight = UDW + RCW + (2 dummies x 75.8 kg/dummy)
Target Test Weight = 1289 kg

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND CARGO:

Right Front = 392 kg Right Rear = 251 kg
Left Front = 394 kg Left Rear = 251 kg
TOTAL FRONT WEIGHT = 786 kg (61 % of Total Vehicle Weight)
TOTAL REAR WEIGHT = 502 kg (39 % of Total Vehicle Weight)
TOTAL TEST WEIGHT = 1288 kg

Weight of ballast secured in vehicle trunk area = 0 kg

Vehicle components removed to meet target weight: Rear seat back & cushion,
spare tire, rear bumper, exhaust pipe, tail lamps, jack and tool kit.

VEHICLE ATTITUDE (all dimensions in mm):

Delivered Attitude: RF 667 LF 665 RR 686 LR 683

Test Attitude: RF 667 LF 664 RR 670 LR 664

Wheel Base: 2648 mm; C.G. = 1032 mm rearward of front wheel C/L

Remarks: None

*light trucks and MPVs RCW is 136 kgs 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 Impact Angle: 90°
Date of Test: August 12, 1994 Time of Test: 1:40 p.m.
Ambient Temperature: 21 °C (Spec. Range = 18.8 to 25.6°C)
Temperature in Occupant Compartment: 21° C
Windshield Molding Temperature: 21° C
Required Impact Velocity Range: 55.5 to 57.1 kph
Impact Velocity: primary = 56.3 kph; secondary = 56.5 kph
Distance From Front Bumper to Barrier Face When
Entering Speed Trap: 1210 mm
Exiting Speed Trap: 210 mm

VEHICLE REBOUND AND CRUSH (mm):

Vehicle Length: Pre-test = R 4021 C_L 4210 L 4046
Post-test = R 3486 C_L 3588 L 3556
Crush = R 535 C_L 622 L 490

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

R 718 mm C_L 649 mm L 737 mm

VISIBLE DUMMY CONTACT POINTS:

	<u>Driver</u>	<u>Passenger</u>
Head	<u>To airbag</u>	<u>To airbag</u>
Chest	<u>To airbag</u>	<u>To airbag</u>
Abdomen	<u>No visible contact</u>	<u>No visible contact</u>
Left Knee	<u>To lower dash panel</u>	<u>To lower dash panel</u>
Right Knee	<u>To lower dash panel</u>	<u>To lower dash panel</u>

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

	<u>Front</u>		<u>Rear</u>	
<u>Door Opening</u>	<u>Left</u>	<u>Right</u>	<u>Left</u>	<u>Right</u>
(without use of tools)	<u>Yes</u>	<u>Yes</u>	<u>Yes</u>	<u>Yes</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>0</u>	<u>0</u>	<u>N/A</u>	<u>N/A</u>
Seat Shift (mm)	<u>0</u>	<u>0</u>	<u>N/A</u>	<u>N/A</u>

Glazing Damage

Backlight/Windshield Cracked windshield

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.:

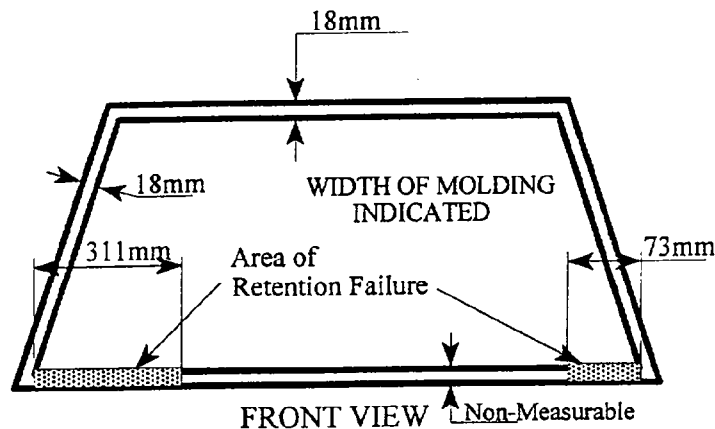
Windshield set in rubber molding within windshield frame

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 (mm)	POST-TEST (mm)	
RIGHT SIDE	2022	1711	85%
LEFT SIDE	2022	1949	96%
TOTAL	4044	3660	91%

AREA OF RETENTION FAILURE:



FAILURE DETAILS: Left Bottom: 73 mm
Right Bottom: 311 mm

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 contacted by the sphere across the width of the instrument panel. From the outermost contact 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= 1056 mm

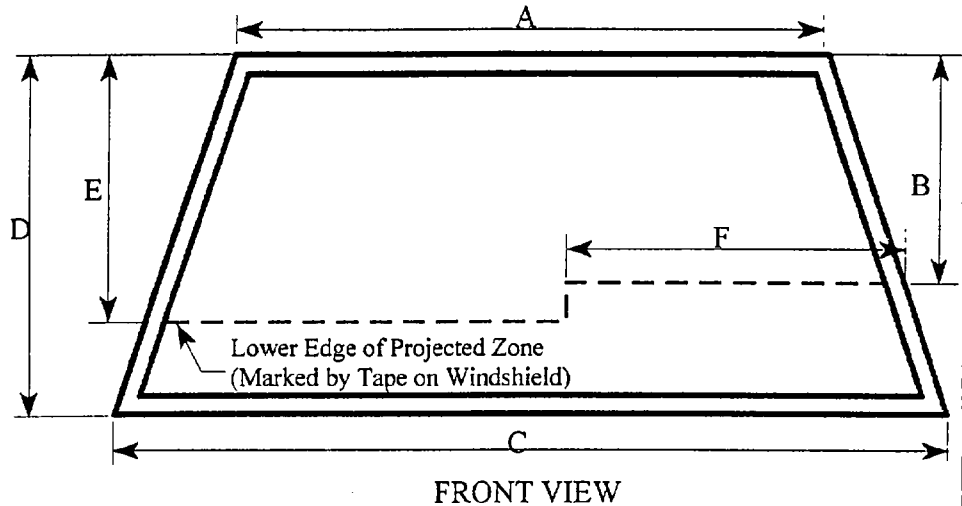
B= 493 mm

C= 1567 mm

D= 710 mm

E= 525 mm

F= 502 mm



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

NONE

FMVSS NO. 301-75, FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

FMVSS NO. 301

TEST VEHICLE NHTSA NO.: MB0300 Test Date: August 12, 1994

Vehicle Mfr./Make/Model: 1995/Plymouth/Neon/4 Door Sedan

Usable Capacity of Vehicle's Fuel Tank: 42 Liters
(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:

39 Liters which is 93% of the stated USABLE CAPACITY.

TEST VEHICLE IMPACT TYPE: X Frontal (35 mph)

 Oblique (30 mph) with ° barrier face first

 contacting (driver/passenger) side

 Rear Moving Barrier (30 mph)

 Side Impact MDB (33.2 mph)

FUEL SPILLAGE MEASUREMENT:

1. From impact until vehicle motion ceases
2. For 5 minute period after vehicle motion ceases
3. For next 25 minutes

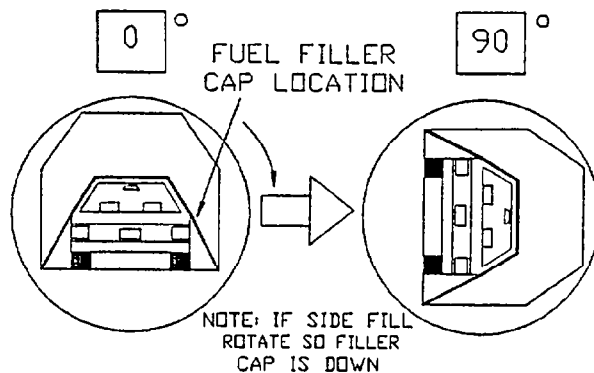
ACTUAL	MAX ALLOWED
0	1 OZ
0	5 OZ
0	1 oz./1 MIN

SOLVENT SPILLAGE DETAILS: None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 0° - 90°

Vehicle NHTSA ID No.: MB0300



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 53 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 53 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min FROM onset of rotation	6th min.	7th min.	8th min. if reqd.
------------------------------------	----------	----------	-------------------

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
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III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0
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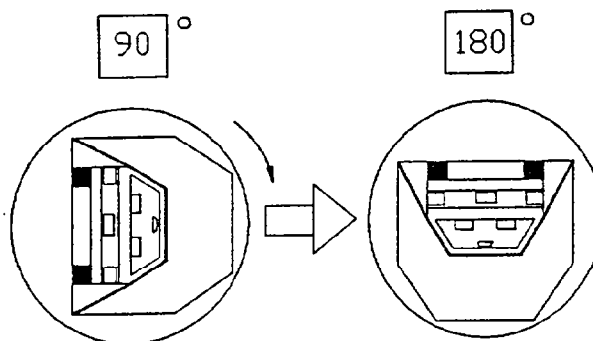
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 90° - 180°

Vehicle NHTSA ID No.: MB0300



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 29 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds
TOTAL 7 minutes 29 seconds
Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min FROM onset of rotation	6th min.	7th min.	8th min. if reqd.
------------------------------------	----------	----------	-------------------

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
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III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0
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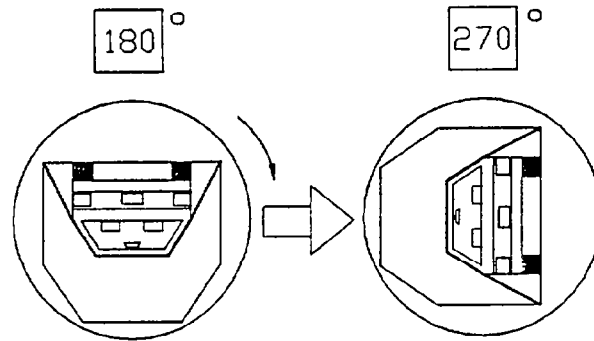
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 180° - 270°

Vehicle NHTSA ID No.: MB0300



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 16 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds
TOTAL 7 minutes 16 seconds
Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min FROM onset of rotation	6th min.	7th min.	8th min. if reqd.
------------------------------------	----------	----------	-------------------

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
----------	---------	---------	---------

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0
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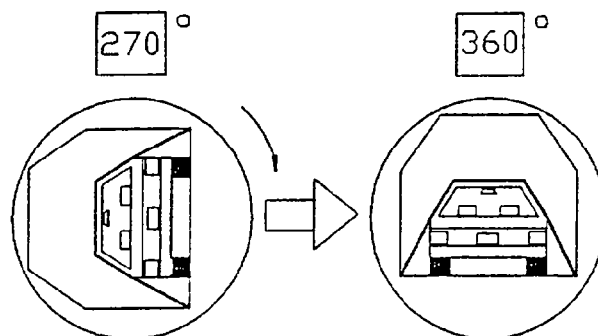
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 270° - 360°

Vehicle NHTSA ID No.: MB0300



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 39 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 39 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min FROM onset of rotation	6th min.	7th min.	8th min. if reqd.
------------------------------------	----------	----------	-------------------

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
----------	---------	---------	---------

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0
---	---	---	---

Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

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. Camera Locations
6. 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: 1995/Plymouth/Neon/4 Door Sedan

VEH. NHTSA NO.: MB0300 TEST DATE: August 12, 1994

MAX. ACCELERATION VALUES: (g's)	DRIVER # <u>37</u>	PASSENGER # <u>36</u>
Head Channel X	-78.7	-72.9
Head Channel Y	29.7	7.5
Head Channel Z	29.7	36.1
HEAD RESULTANT	83.0	74.0
Chest Channel X	-51.6	-54.4
Chest Channel Y	-10.0	5.3
Chest Channel Z	-15.8	19.5
CHEST RESULTANT (CLIP)	51.5	54.9
TIME INTERVAL (msec) [0.003 seconds minimum]	t ₁ = 66.3 t ₂ = 69.4	t ₁ = 63.8 t ₂ = 66.8

HEAD INJURY CRITERIA (HIC) VALUES:

HIC	1087.6	923.8
t ₁ = (msec)	58.5	58.6
t ₂ = (msec)	90.1	90.8
Avg. Accel. t ₁ to t ₂ (g's)	65.2	60.7

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

MAX. COMPRESSIVE FEMUR FORCES:

Right Side (N)	7174	5143
Left Side (N)	5310	5732

MAXIMUM SEAT BELT FORCES:

Lap Belt (N)	3856	2853
Shoulder Belt (N)	5525	8705

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: 1995/Plymouth/Neon/4 Door Sedan

VEHICLE NHTSA NO.: MB0300 TEST DATE: August 12, 1994

MAXIMUM VALUES	DRIVER DUMMY #37	PASSENGER DUMMY #36
Neck Load X (N)	-809.9	-642.6
Neck Load Y (N)	314.7	188.1
Neck Load Z (N)	-2389.1	-2678.8
Neck Moment X (N.M)	16.3	-13.8
Neck Moment Y (N.M)	-62.5	-50.6
Neck Moment Z (N.M)	-20.9	-12.7
Chest Deflection X (mm)	37.8	36.0
Time of Max. Occurrence	72 msec.	63 msec.

PART 572 DUMMY IN-VEHICLE POSITION

Vehicle NHTSA No.: MB0300 Vehicle: 1995 Plymouth Neon 4 Door

SEAT TYPE:

 Bench
 X Bucket
 Split Bench

ADJUSTER TYPE:

Driver: X Manual
 Power

 Passenger: X Manual
 Power

BUCKET SEAT BACK TYPE:

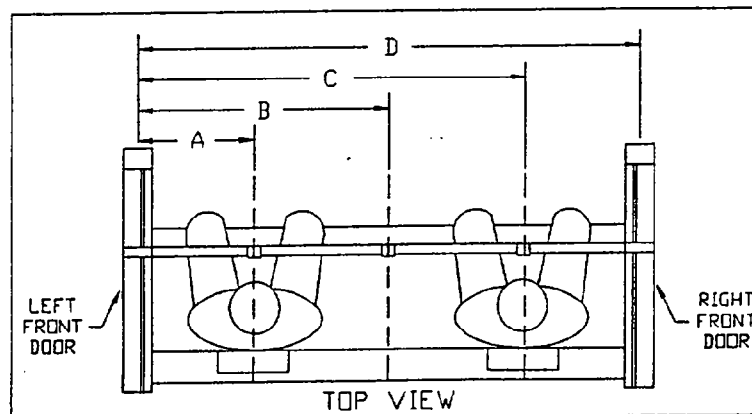
 Fixed
 X Adjustable Reclining

Driver

Seat notch 12th from front

Passenger

Seat notch 12th from front



37 DUMMY ID 36

A = Left Door to Driver Centerline	<u>391</u> mm
B = Left Door to Center Passenger Centerline	<u>728</u> mm
C = Left Door to Right Passenger Centerline	<u>1076</u> mm
D = Left Door to Right Door	<u>1456</u> mm

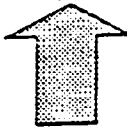
FRONT SEAT MEASUREMENT TABLE

Units (mm)

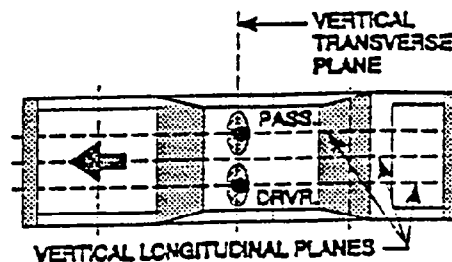
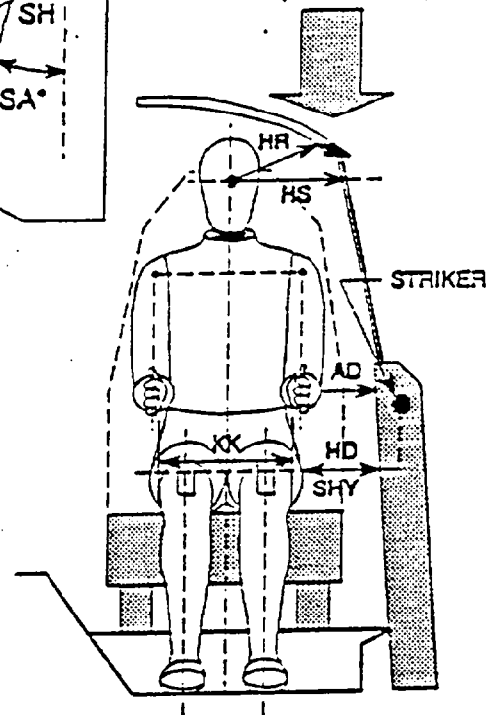
	DRIVER (Serial #37)	PASSENGER (Serial #36)
WA°	27.7°	
SWA°	68.6°	N/A
SCA°	N/A	N/A
SA°	24°	24°
HZ	203	194
HH	391	364
HW	641	600
HR	210	206
NR	425 Angle 13.7°	N/A
CD	559	505
CS	337	N/A
RA	203	N/A
KDL	143 Angle 28.2°	140
KDR	127	146 Angle 17.0°
PA°	23.7°	21.4°
TA°	41.0°	42.1°
KK	305	225
ST	533 Angle 88.7°	533 Angle 84.2°
SK	549 Angle 1.2°	569 Angle 2.7°
SH	216 Angle 31.0°	208 Angle 29.3°
SHY	248	241
HS	279	278
HD	121	111
AD	89	89

N/A = Not Applicable

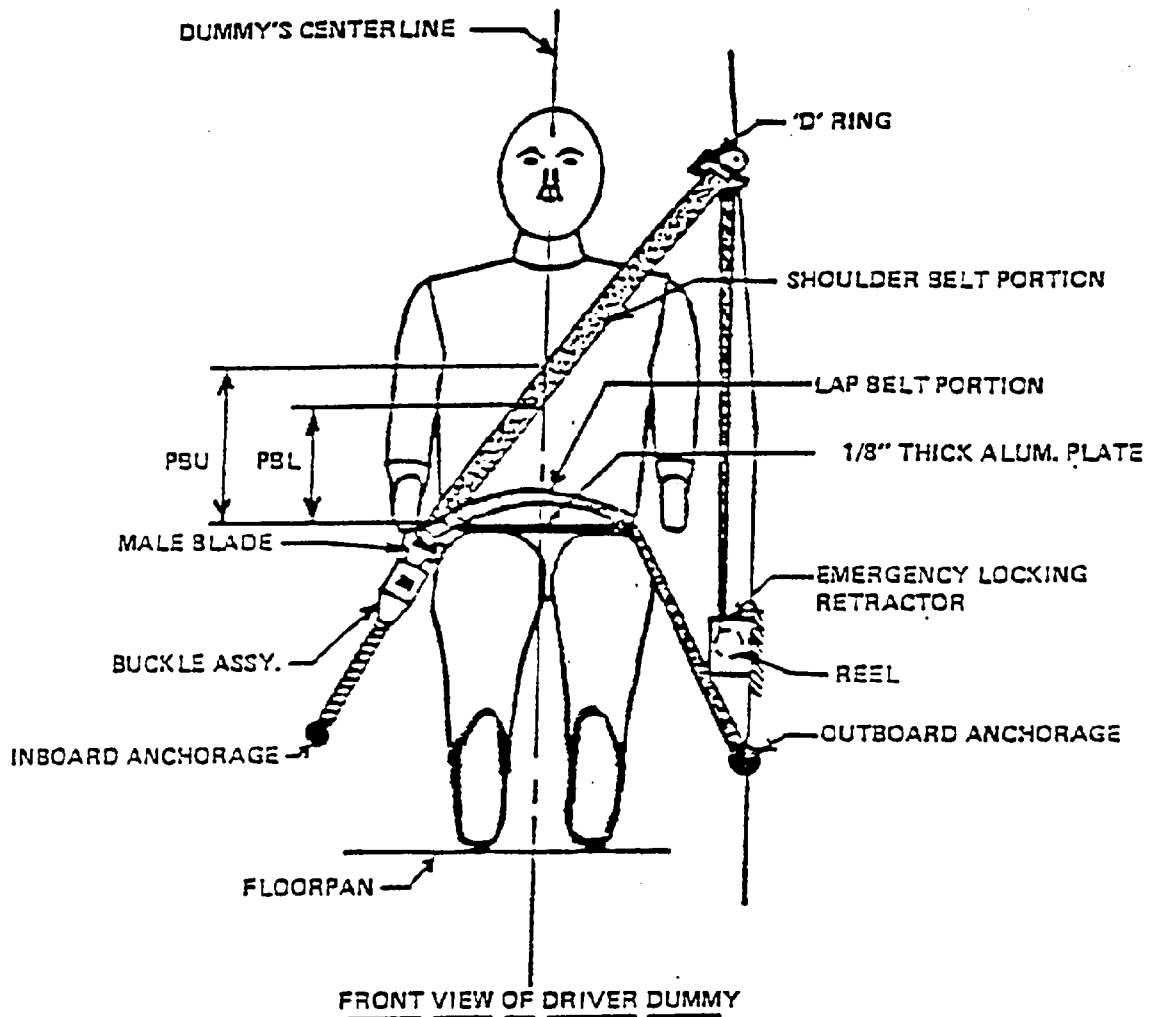
1. The first step in the process of creating a new product is to identify a market need. This involves conducting market research to understand what consumers want and what problems they are facing. Once a need is identified, the next step is to develop a concept that addresses this need. This is often done through brainstorming sessions with a team of designers and engineers. The concept is then refined through prototyping and testing, ensuring that it meets the requirements of the market. Finally, the product is launched and its performance is monitored to ensure it continues to meet the needs of the market.



- AD - Arm to Door
HD - H-Point to Door
HR - Head to Side Header
HS - Head to Side Window
KK - Knee to Knee
SHY- Striker to H-Point (Y Direction)



SEAT BELT POSITIONING DATA



(illustration)

		Dimension = mm	
		DRIVER DUMMY	PASSENGER DUMMY
<u>PBU</u> --	Top surface of alum. plate to upper edge	324	359
<u>PBL</u> --	Top surface of alum. plate to belt lower edge	247	274

Note: Adjustable "D" ring set in the fourth position for the highest.

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>414 mm</u>	<u>416 mm</u>
Shoulder belt length as measured on Part 572 Dummy.	<u>776 mm</u>	<u>810 mm</u>
Lap belt length as measured on Part 572 Dummy.	<u>769 mm</u>	<u>745 mm</u>

SHOULDER BELT SPOOL-OFF DATA:

As determined by film analysis	<u>86 mm</u>	<u>114 mm</u>
As determined mechanically	<u>113 mm</u>	<u>141 mm</u>
As determined electronically	<u>90</u>	<u>107</u>

BELT STRETCH DATA:

Measured electronically between shoulder belt load cell and the "D" ring.	<u>NR</u>	<u>NR</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>34 msec</u>	<u>33 msec</u>
---	----------------	----------------

NR = Not Recorded

CAMERA LOCATIONS

VEH. NHTSA NO.: MB0300 ; TEST DATE: August 12, 1994; TIME: 1:40 p.m.

VEH. YEAR/MAKE/MODEL/BODY STYLE: 1995/Plymouth/Neon/4 Door Sedan

CAMERA POSITION NO.	VIEW	CAMERA POSITIONS (mm.) *			ANGLE (deg)	FILM PLANE TO HEAD TARGET (mm)	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Real-Time Left Side View	-	-	-	-	-	10	24
2	Left Front View	990	8420	1180	90°	8077	25	1010
3	Steering Column Top	2120	8070	1570	90°	7727	25	1000
4	Steering Column Bottom	2140	8070	1035	90°	7727	25	1170
5	Left Driver Close-up	1690	6150	985	90°	5807	35	1000
6	Left Angle	4240	5000	1950	50°		50	913
7	Driver Onboard Seat Belt						35	583
8	Passenger Onboard Seat Belt						35	548
9	Right Overall	2330	-7790	985	90°	7447	113	909
10	Right Front	1130	-7530	1100	90°	7187	25	1053
11	Right Passenger Close-up	1530	-6780	1085	90°	6437	50	1000
12	Right Angle	3940	-5070	2165	50°		35	784
13	Top View Wide	400	15	4390			13	1149
14	Top Driver	-320	385	2350			13	1064
15	Top Passenger	-250	-400	2460			13	926
16	Pit Engine	930	0	-3195			13	1020
17	Fuel Tank	2090	0	-3095			13	971

* COORDINATES:

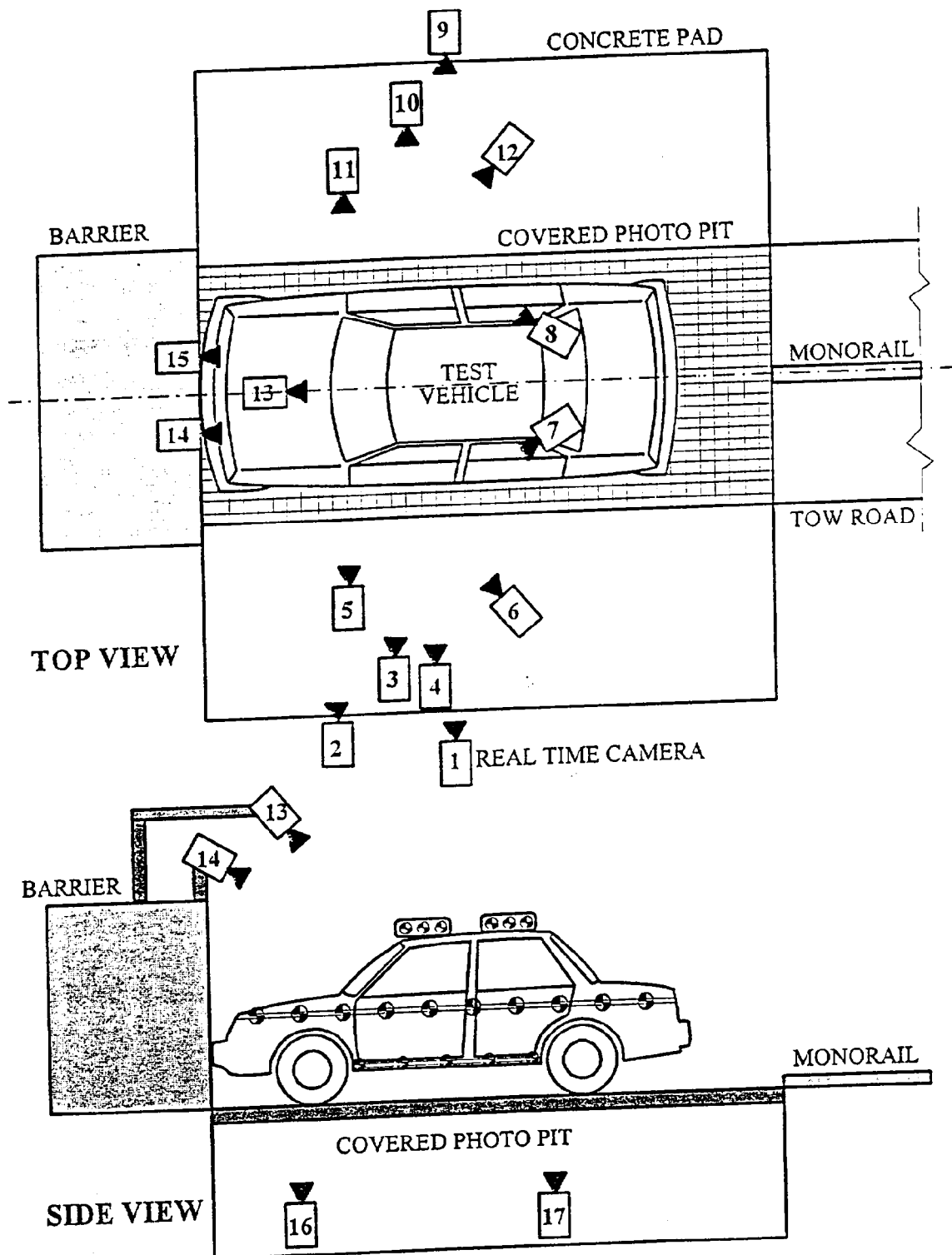
X = film plane to monorail centerline

Y = film plane to barrier face

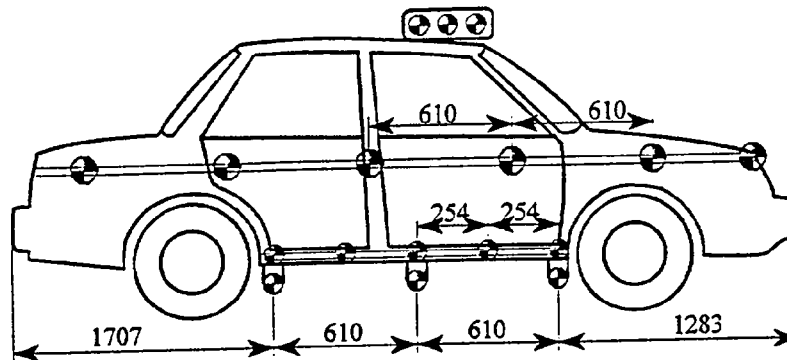
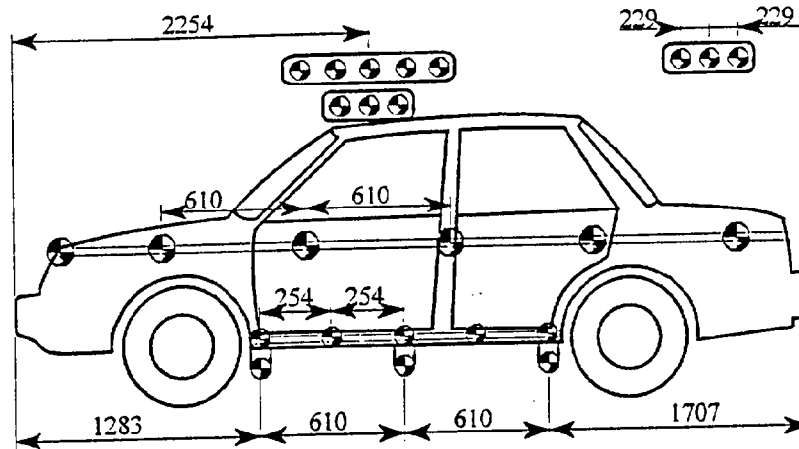
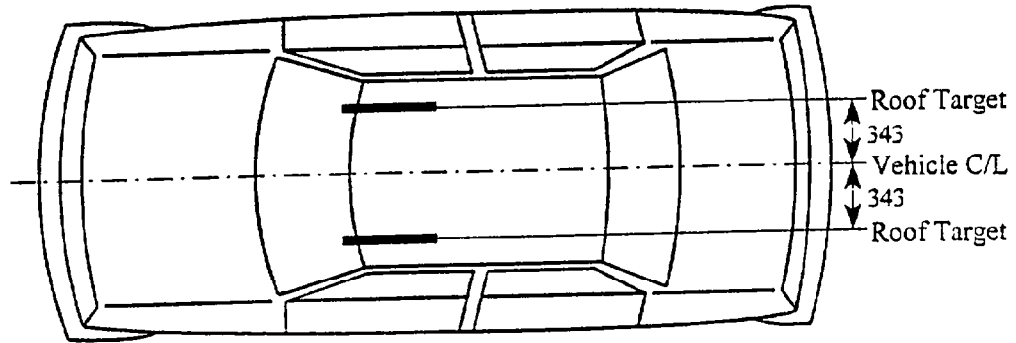
Z = film plane to ground

ORIGIN: For X and Y it is the Impact Point. For Z it is the Floor.

CAMERA LOCATIONS (Cont'd)



VEHICLE TARGET LOCATIONS



(DIMENSIONS IN MM)

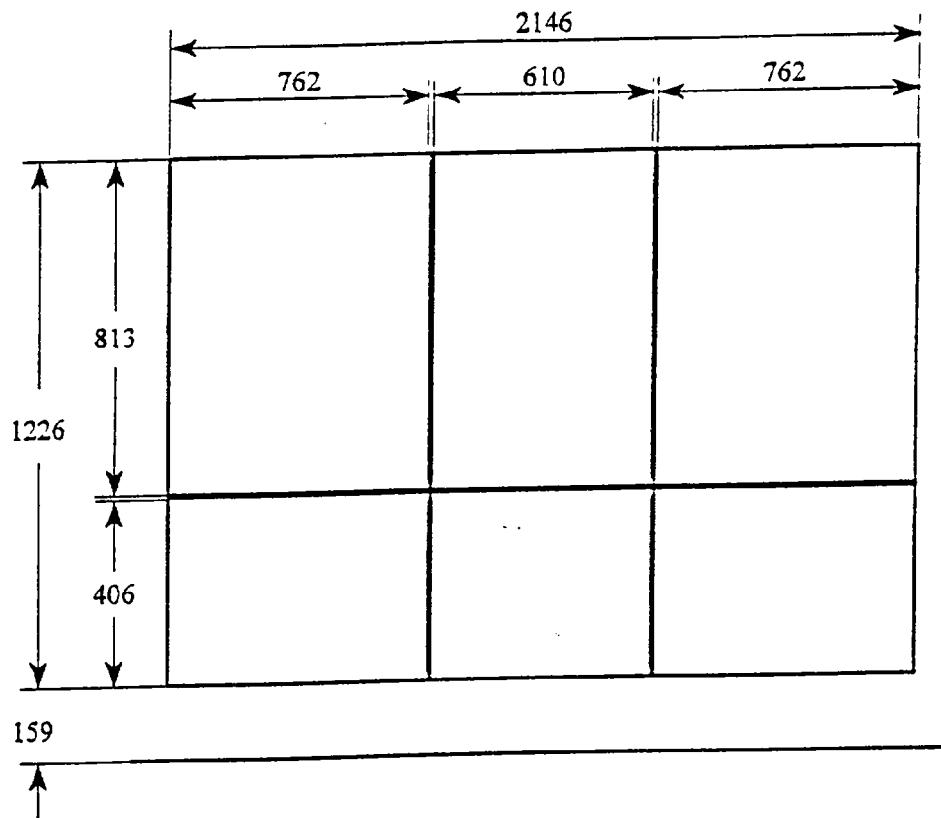
LOAD CELL LOCATIONS ON FIXED BARRIER

30 Load Cells

6 Rows

9 Columns

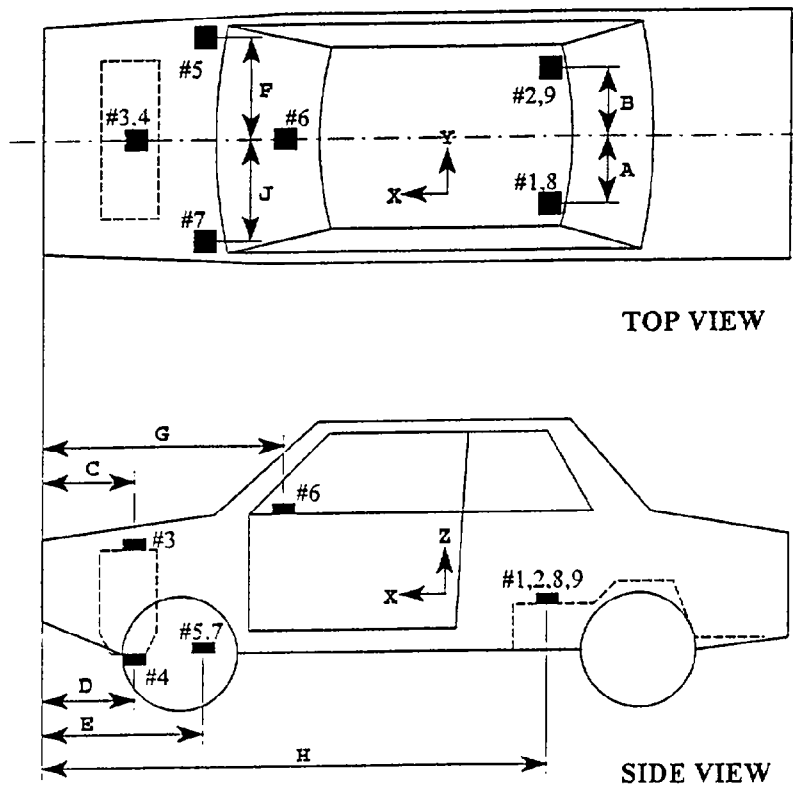
6 Groupings (5 cells/group)



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: (mm)

Dimension	Length
A	540
B	540
C	696
D	716
E	531
F	681
G	1404
H	2588
J	681

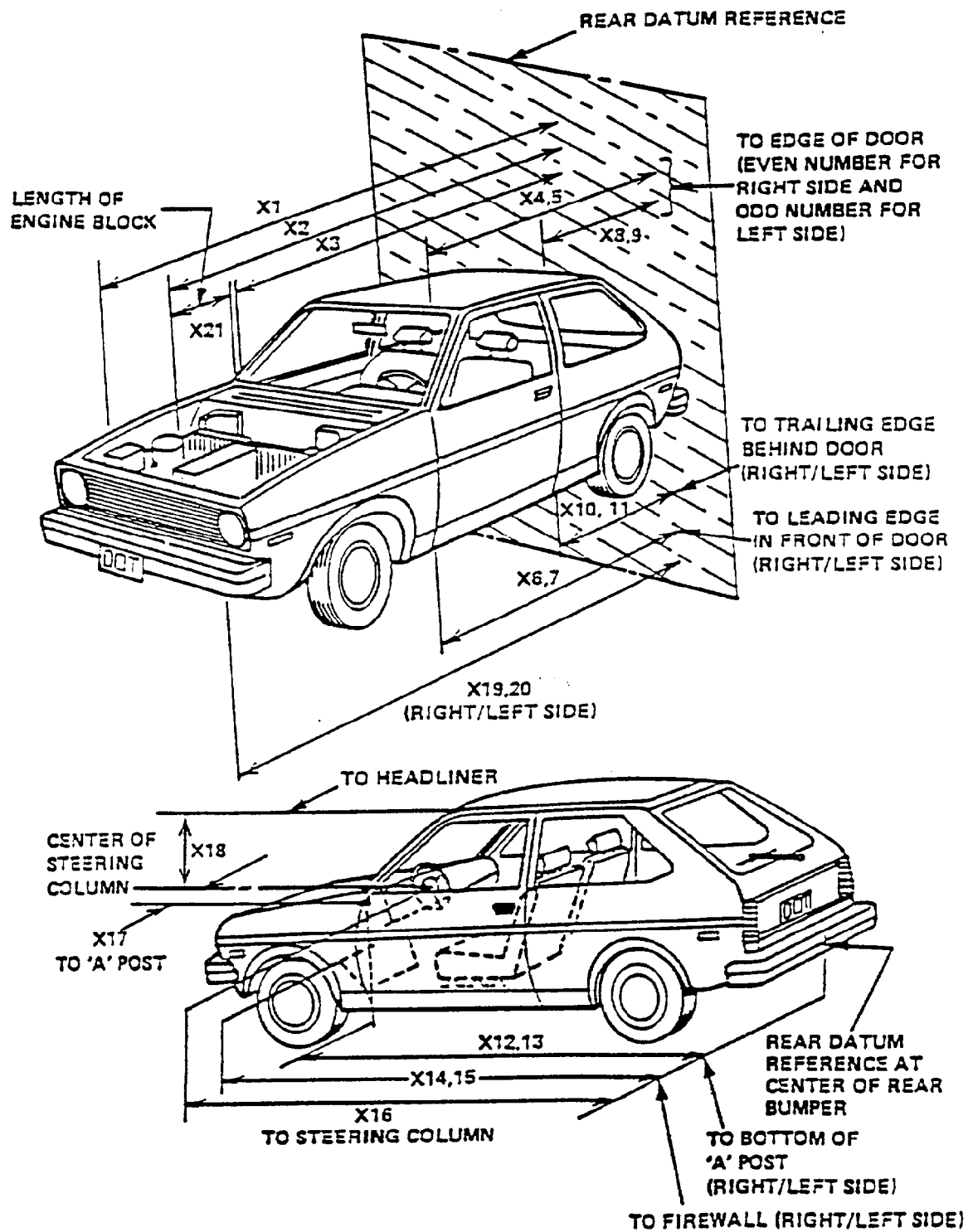
ACCELEROMET	ACCELEROMETER	DIRECTIO
1 and 8	Left Rear Seat Crossmember	X
2 and 9	Right Rear Seat Crossmember	X
3	Top of Engine	X
4	Bottom of Engine	X
5	Right Side Brake Caliper	X
6	Instrument Panel	X
7	Left Disc Brake Caliper	X

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

TEST VEHICLE MEASUREMENTS

No.	MEASUREMENT DESCRIPTION:	Pre-Test (mm)	Post-Test (mm)	Diff. (mm)
X1	Total Length of Test Vehicle at Centerline	4210	3588	622
X2	Rear Surface of Vehicle to Front of Engine	3600	3242	358
X3	Rear Surface of Vehicle to Firewall	3117	2994	123
X4	Rear Surface to Upr. Leading Edge of Rt. Door	2819	2732	87
X5	Rear Surface to Upr. Leading Edge of Left Door	2819	2721	98
X6	Rear Surface to Lwr. Leading Edge of Rt. Door	2873	2775	98
X7	Rear Surface to Lwr. Leading Edge of Left Door	2870	2775	95
X8	Rear Surface to Upr. Trailing Edge of Rt. Door	1820	1727	93
X9	Rear Surface to Upr. Trailing Edge of Left Door	1809	1724	85
X10	Rear Surface to Lwr. Trailing Edge of Rt. Door	1803	1718	85
X11	Rear Surface to Lwr. Trailing Edge of Left Door	1800	1713	87
X12	Rear Surface to Bottom of 'A' Post on Rt. Side	2901	2813	88
X13	Rear Surface to Bottom of 'A' Post on Left Side	2911	2791	120
X14	Rear Surface to Firewall on Right Side	3152	2988	164
X15	Rear Surface to Firewall on Left Side	3146	3019	127
X16	Rear Surface to Steering Column	2385	2299	86
X17	Center of Steering Column to 'A' Post	368	324	44
X18	Center of Steering Column to Headlining	403	376	27
X19	Rear Surface to Right Side of Front Bumper	4021	3486	535
X20	Rear Surface to Left Side of Front Bumper	4046	3556	490
X21	Length of Engine Block	445	445	0

TEST VEHICLE MEASUREMENTS



VEHICLE MAKE/MODEL/BODY STYLE: 1995 Plymouth/Neon/4 Door Sedan

MODEL YEAR: 1995 ; BUILD DATE: 5-94 ; TEST DATE: August 12, 1994

VEH. SIZE CATEGORY: Compact; TEST WEIGHT: 1288 kg

VEH. WHEELBASE: 2648 mm; FRONT OVERHANG: 851 mm; OVERALL WIDTH: 1722 mm

LOCATION: As per measurements on pages 4-12

CALIBRATION PROCEDURE: As per MGA Calibration Procedure

LINEARITY: >99.9%; INTEGRATION ALGORITHM: Trapezoidal

VEH: IMPACT SPEED: 56.3 kph; TIME OF SEPARATION: 75 msec

VELOCITY CHANGE: 67.3 kph

COLLISION DEFORMATION CLASSIFICATION (CDC) CODE:

CRUSH DEPTH
DIMENSIONS:

C1 = 430 mm

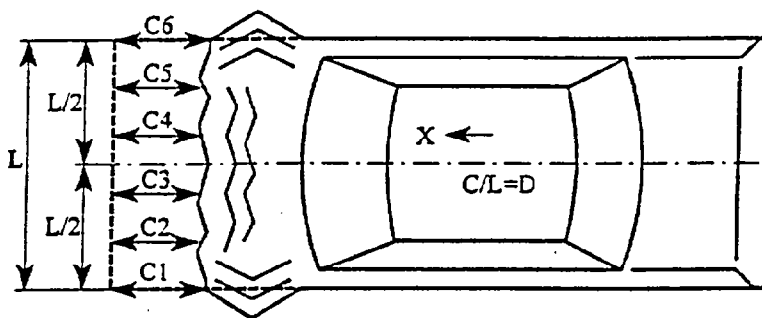
C2 = 508 mm

C3 = 543 mm

C4 = 546 mm

C5 = 503 mm

C6 = 475 mm



MIDPOINT OF DAMAGE: D = Vehicle Centerline
(Longitude)

LENGTH OF DAMAGED REGION: L = 1359 mm.

APPENDIX A
PHOTOGRAPHS

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Photo No. A-33 - Pre-Test Passenger Dummy Position Right Side View (Door Open)	A-33
Photo No. A-34 - Post-Test Passenger Dummy Position Right Side View (Door Open)	A-34
Photo No. A-35 - Pre-Test Passenger Seat Position View	A-35
Photo No. A-36 - Post-Test Passenger Seat Position View	A-36
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Photo No. A-43 - Rollover 180°	A-43
Photo No. A-44 - Rollover 270°	A-44
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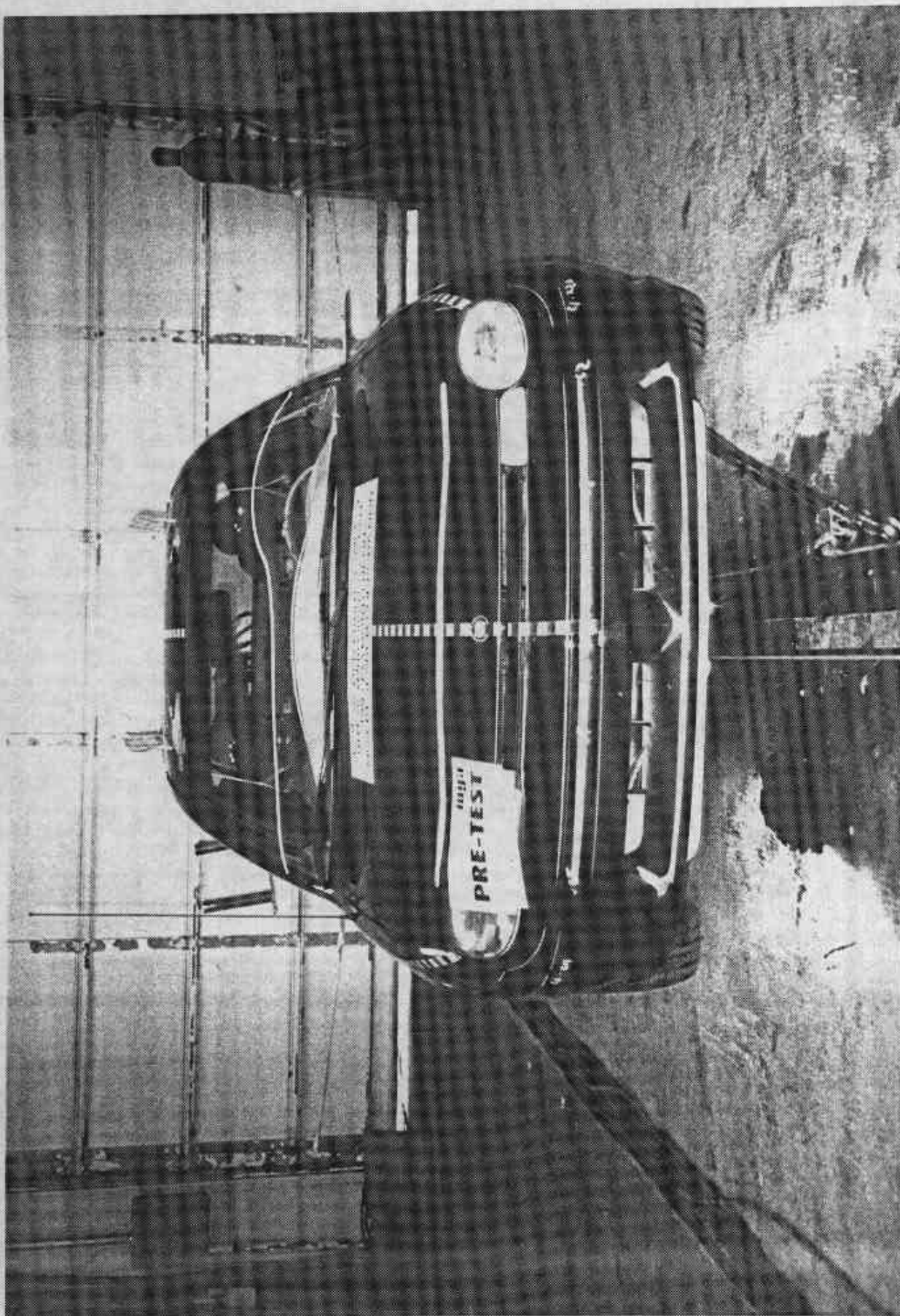


Photo No. A-1 - Pre-Test Front View of Test Vehicle

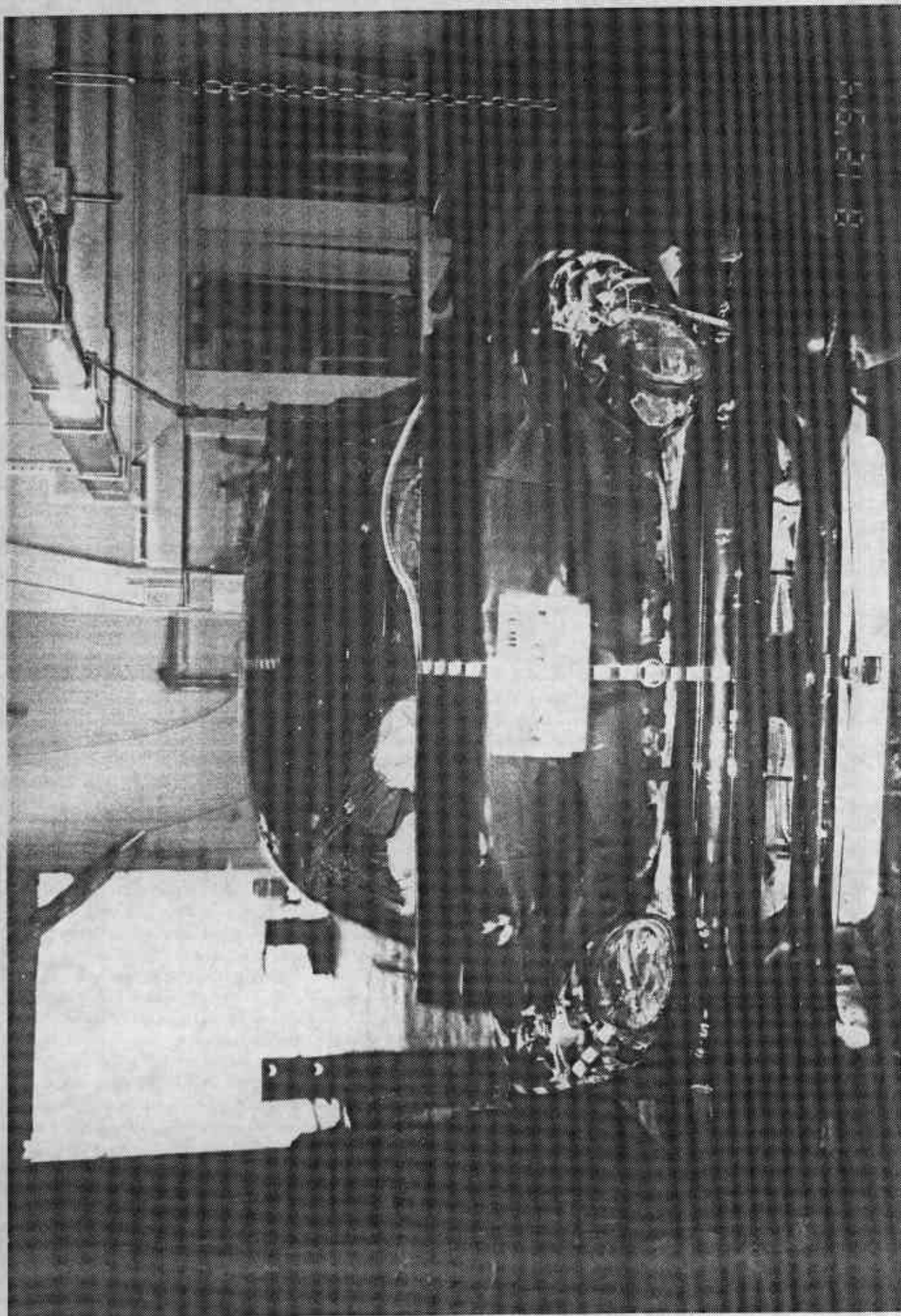


Photo No. A-2 - Post-Test Front View of Test Vehicle

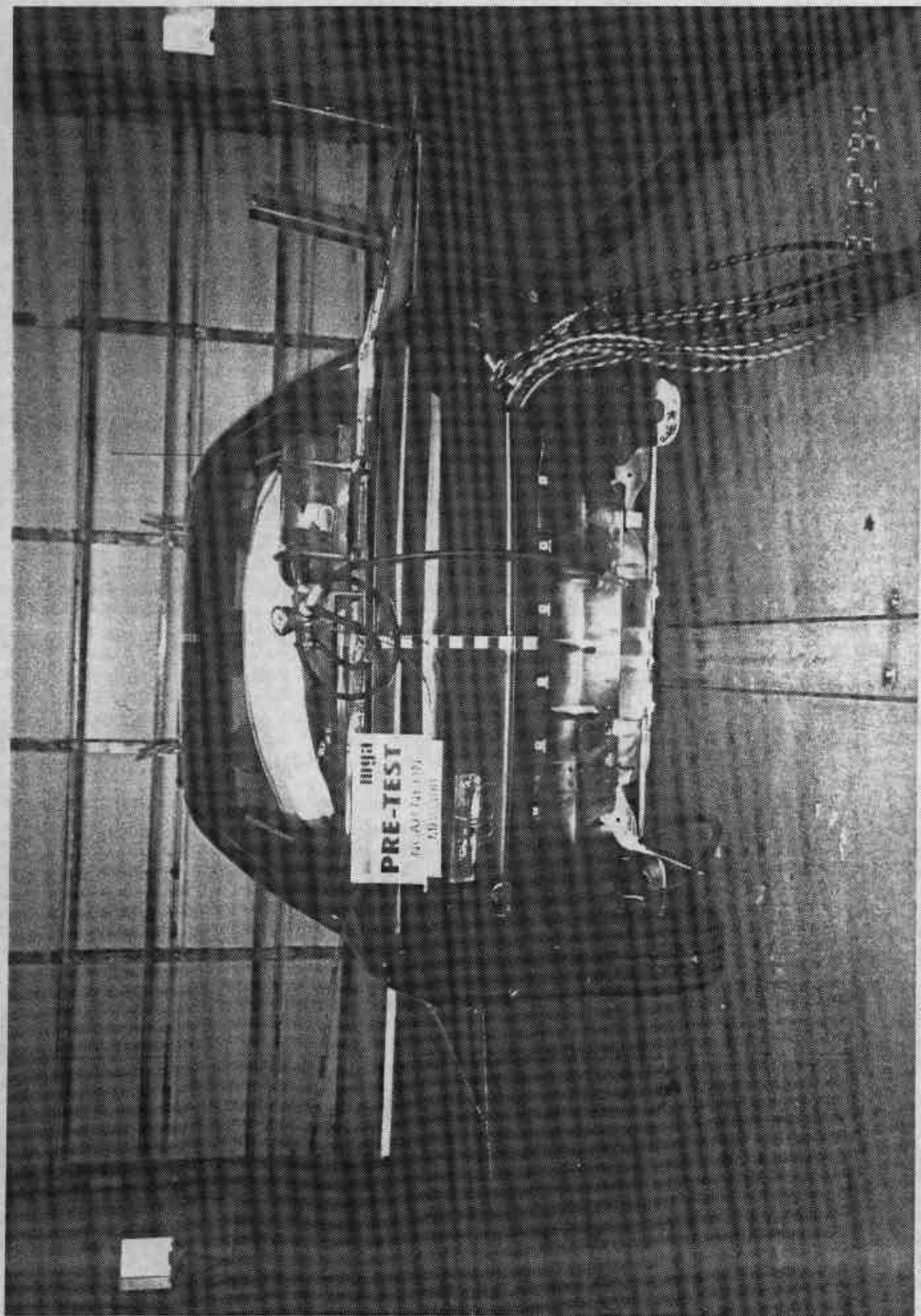


Photo No. A-3 - Pre-Test Rear View of Test Vehicle

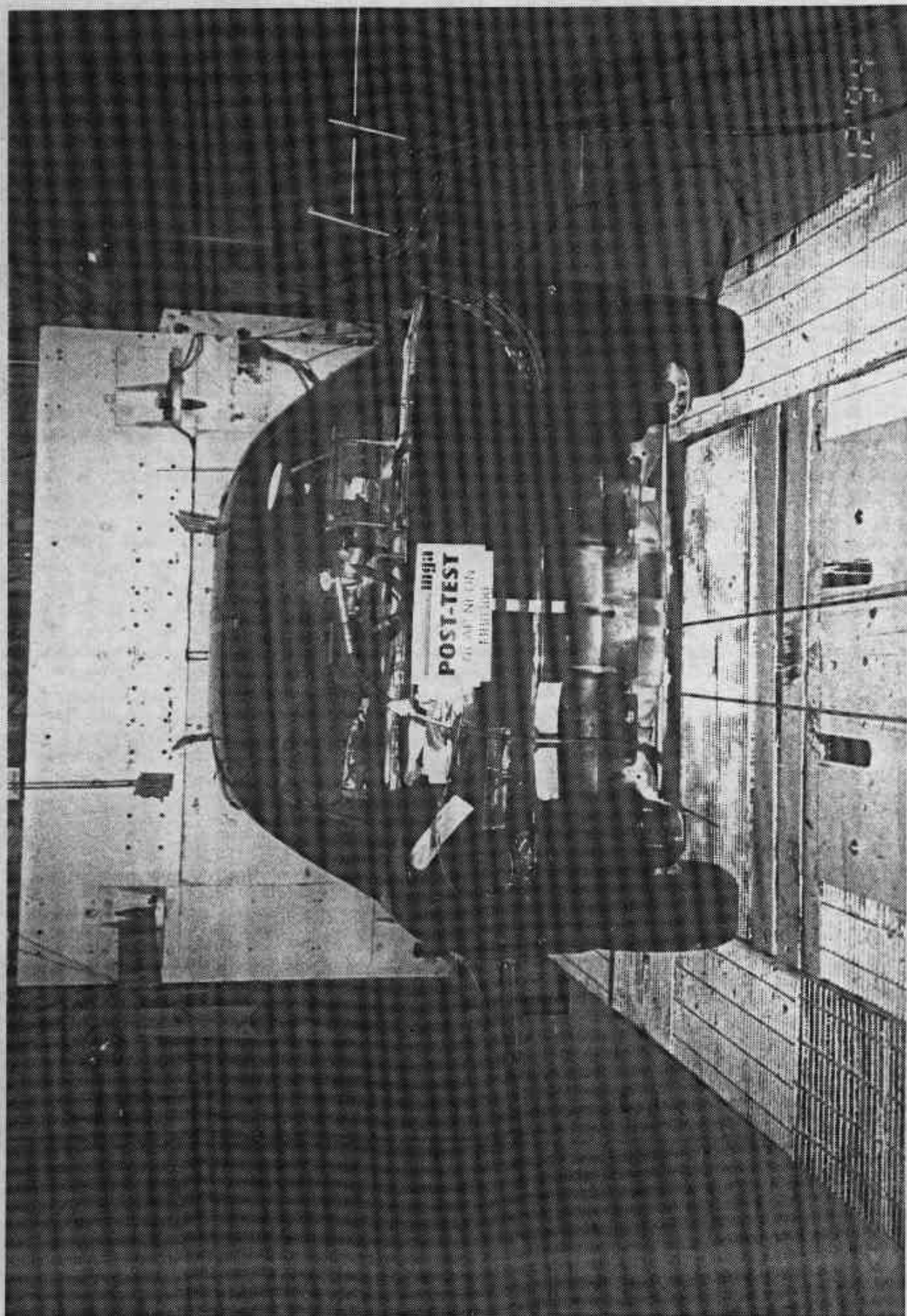


Photo No. A-4 - Post-Test Rear View of Test Vehicle

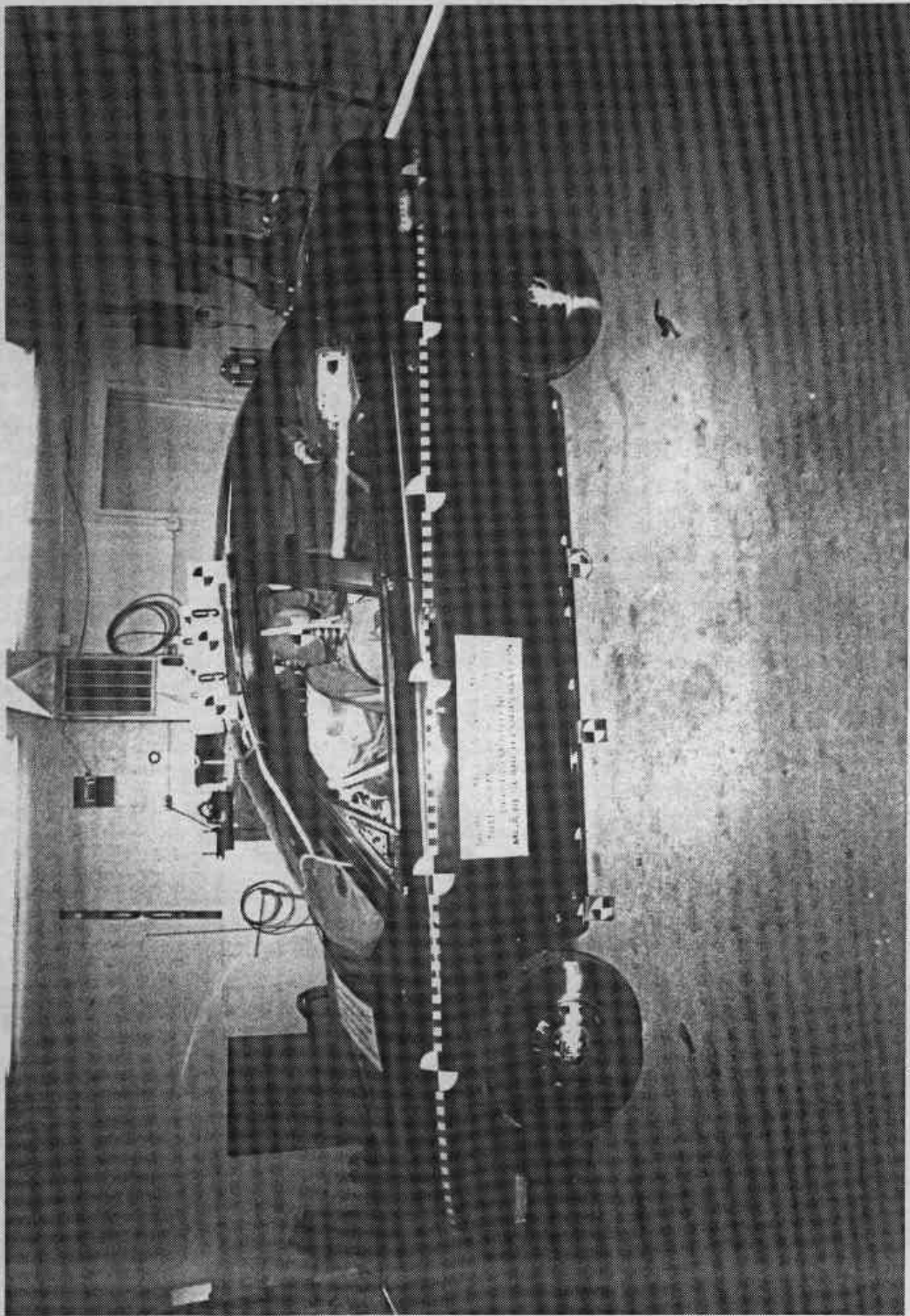
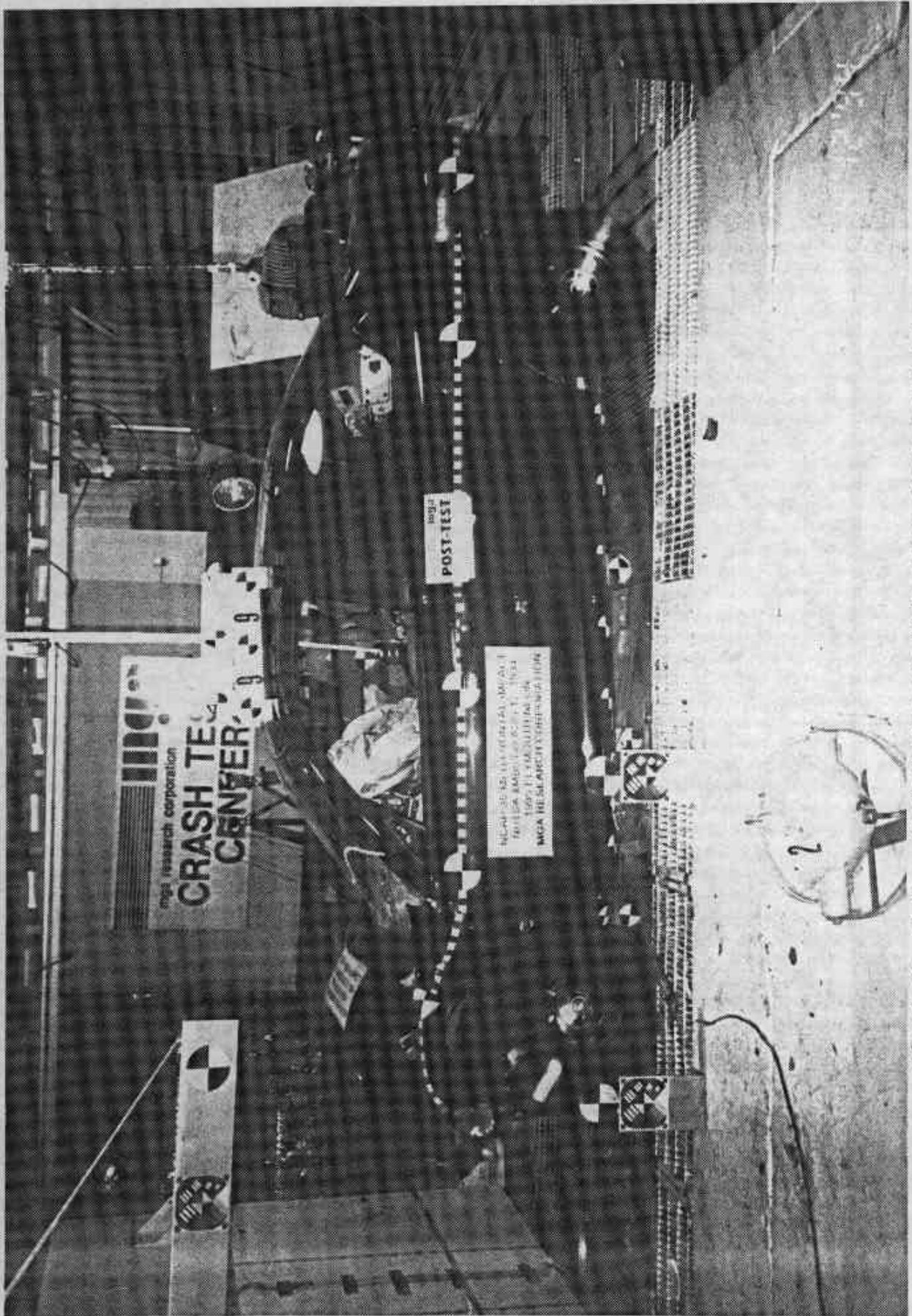
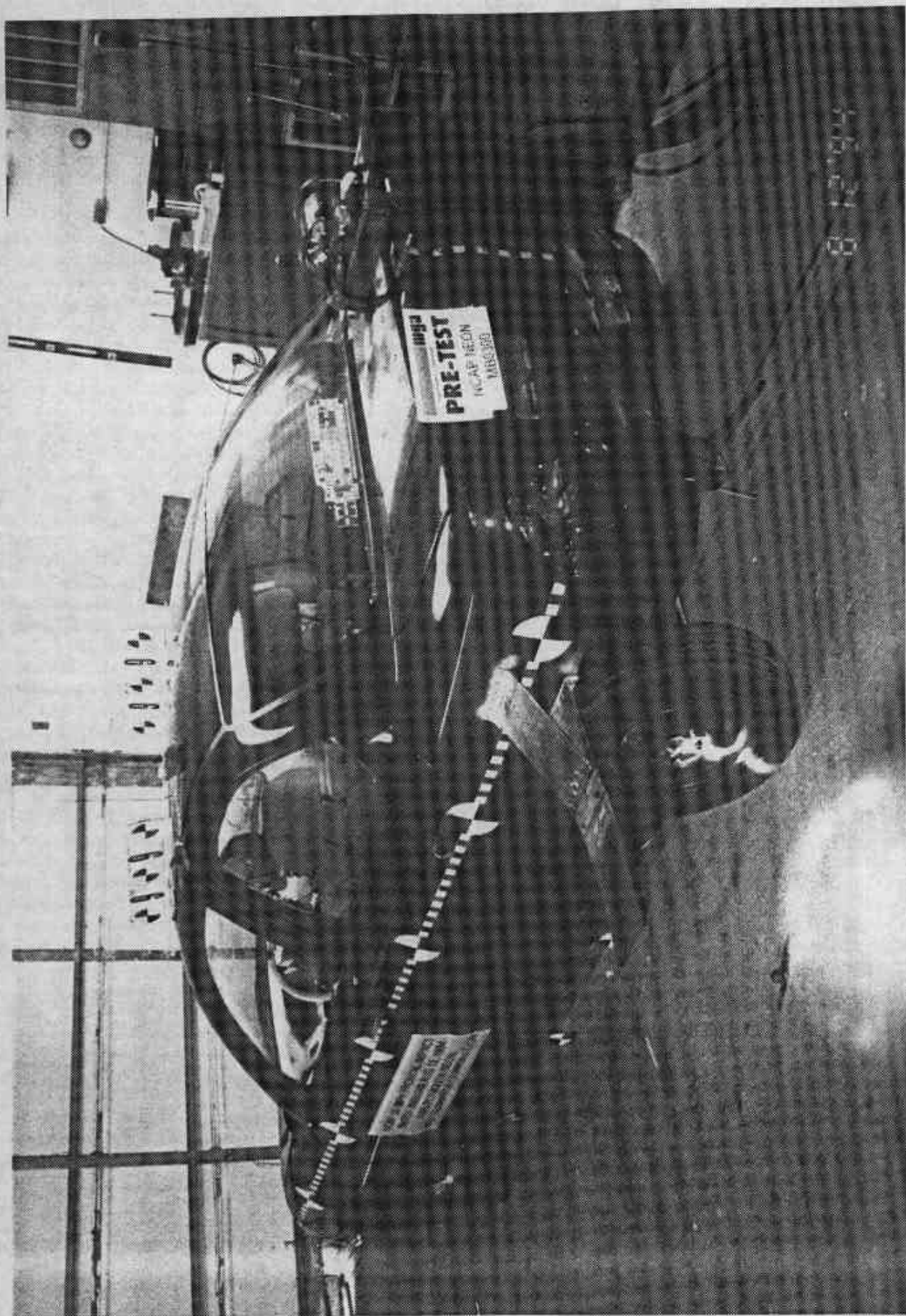


Photo No. A-5 - Pre-Test Left Side View of Test Vehicle



A-6

Photo No. A-6 - Post-Test Left Side View of Test Vehicle



A-7

Photo No. A-7 - Pre-Test Left Rear Three-Quarter View of Test Vehicle

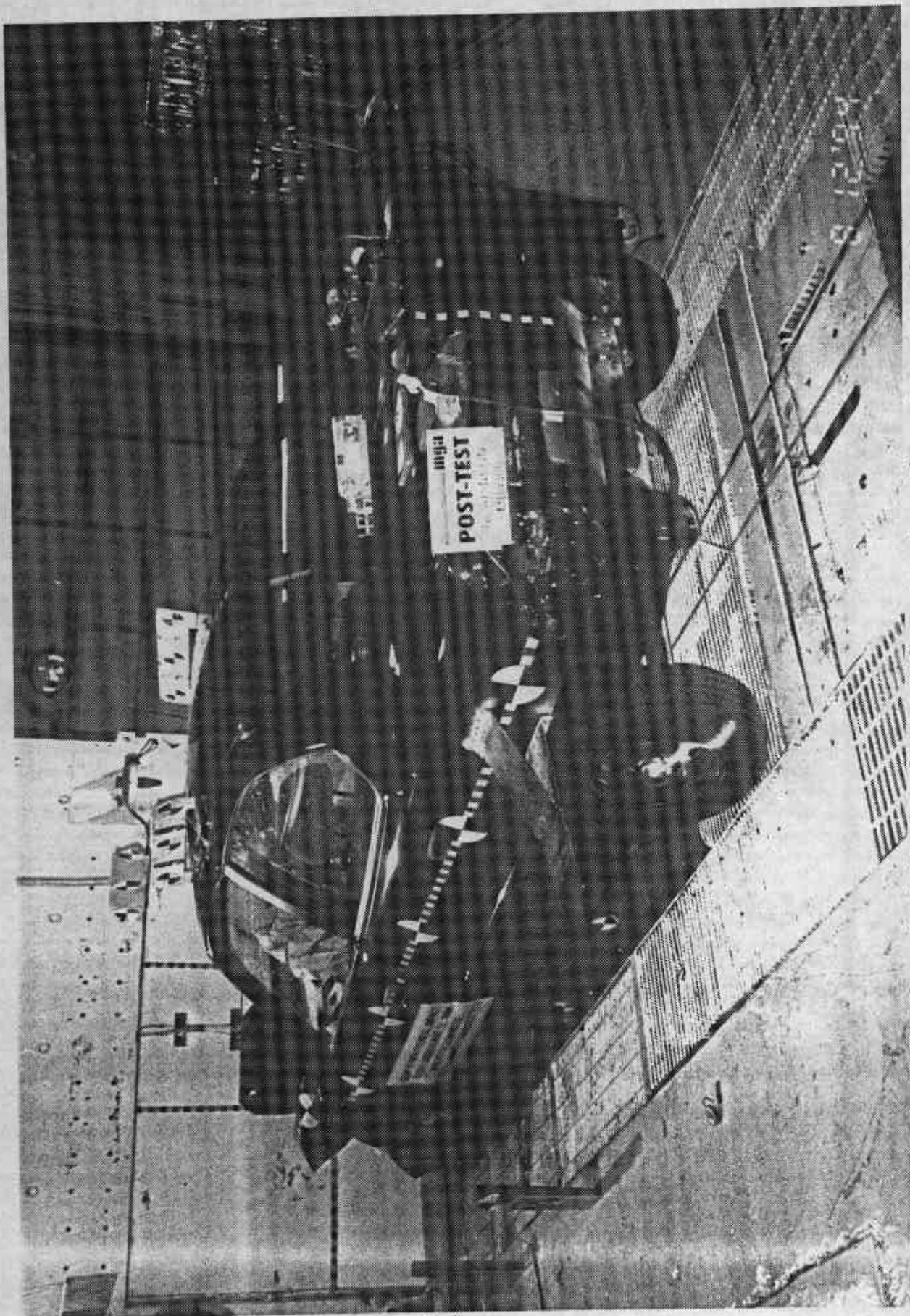
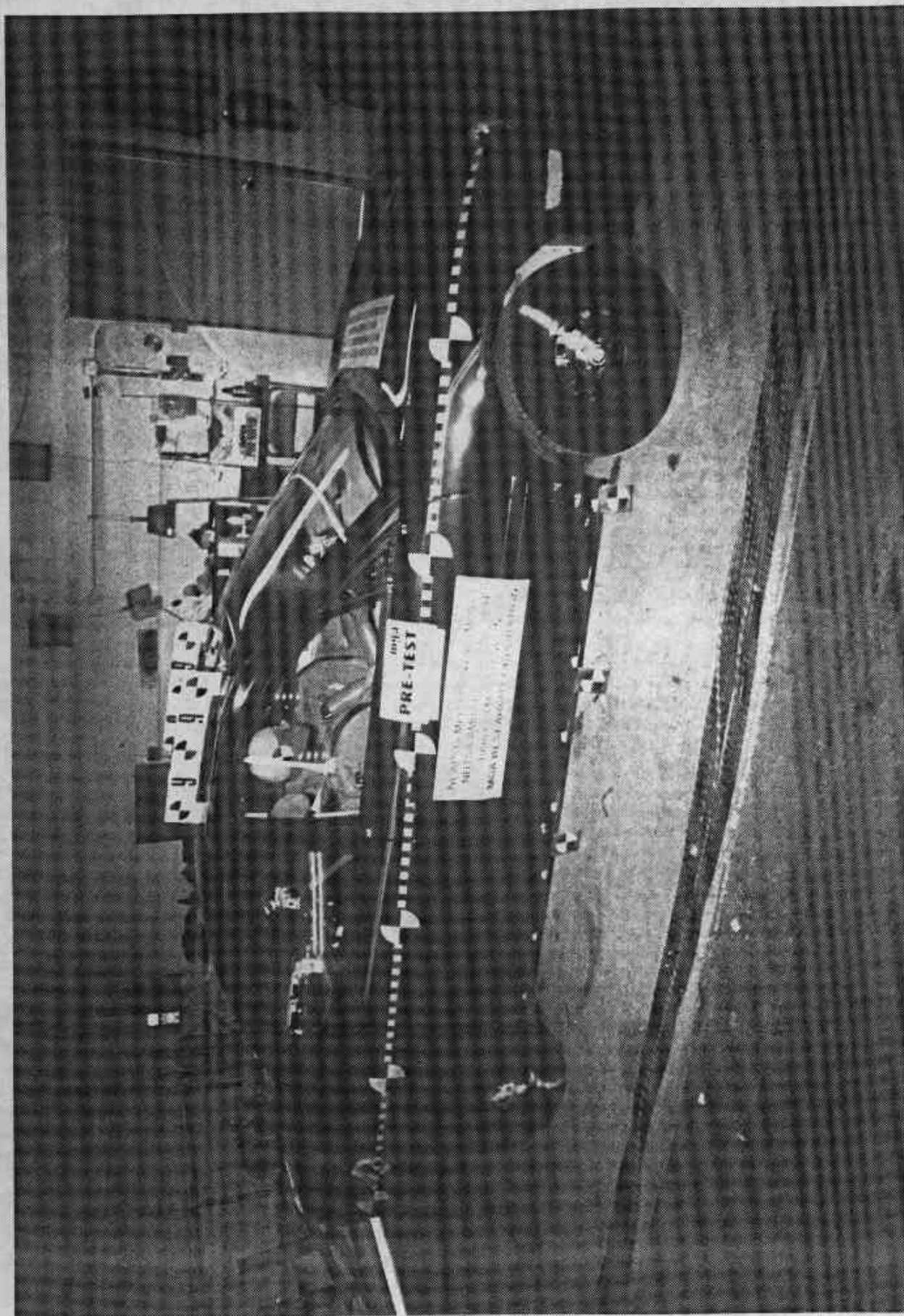


Photo No. A-8 - Post-Test Left Rear Three-Quarter View of Test Vehicle



A-9

Photo No. A-9 - Pre-Test Right Side View of Test Vehicle

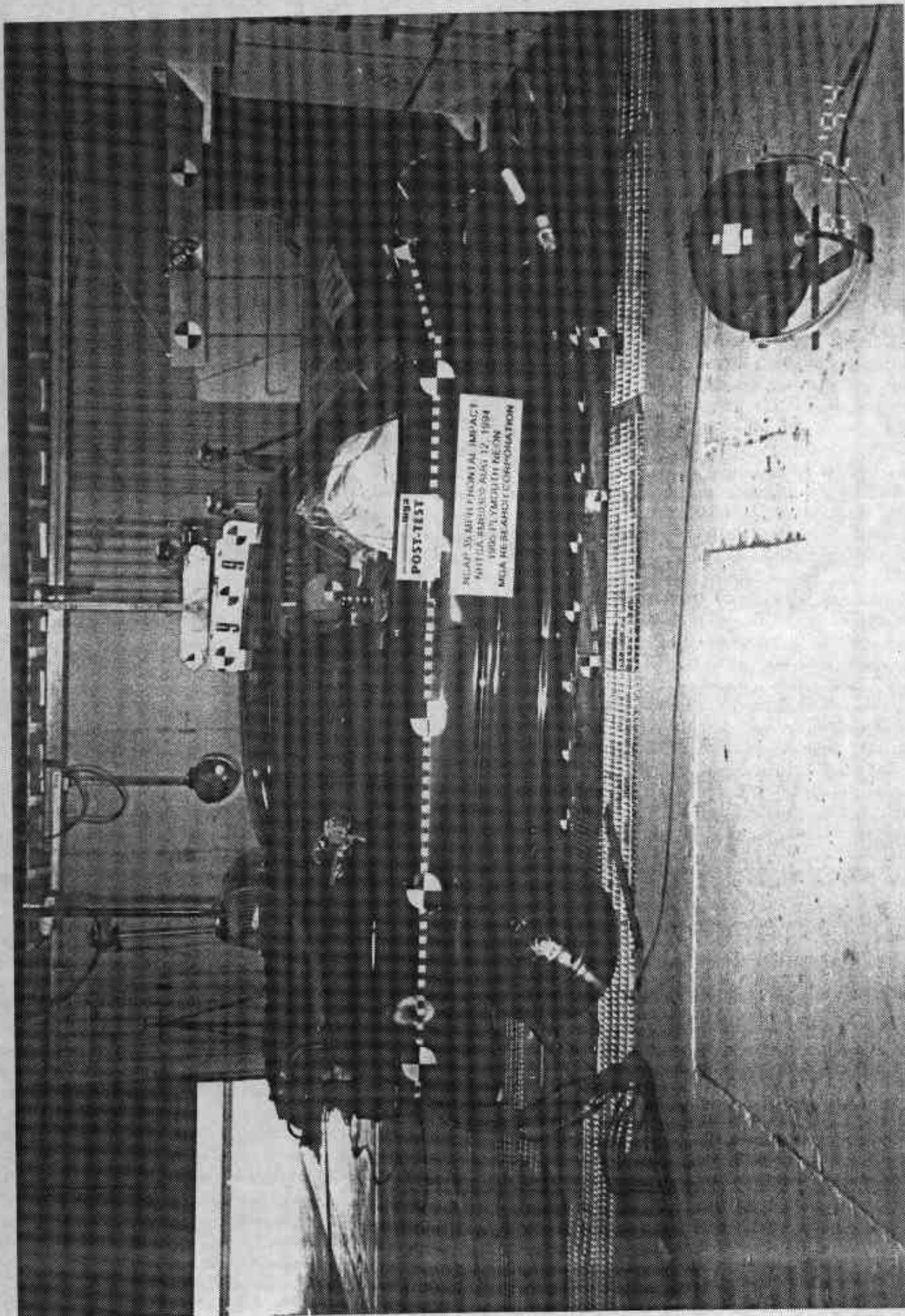


Photo No. A-10 - Post-Test Right Side View of Test Vehicle

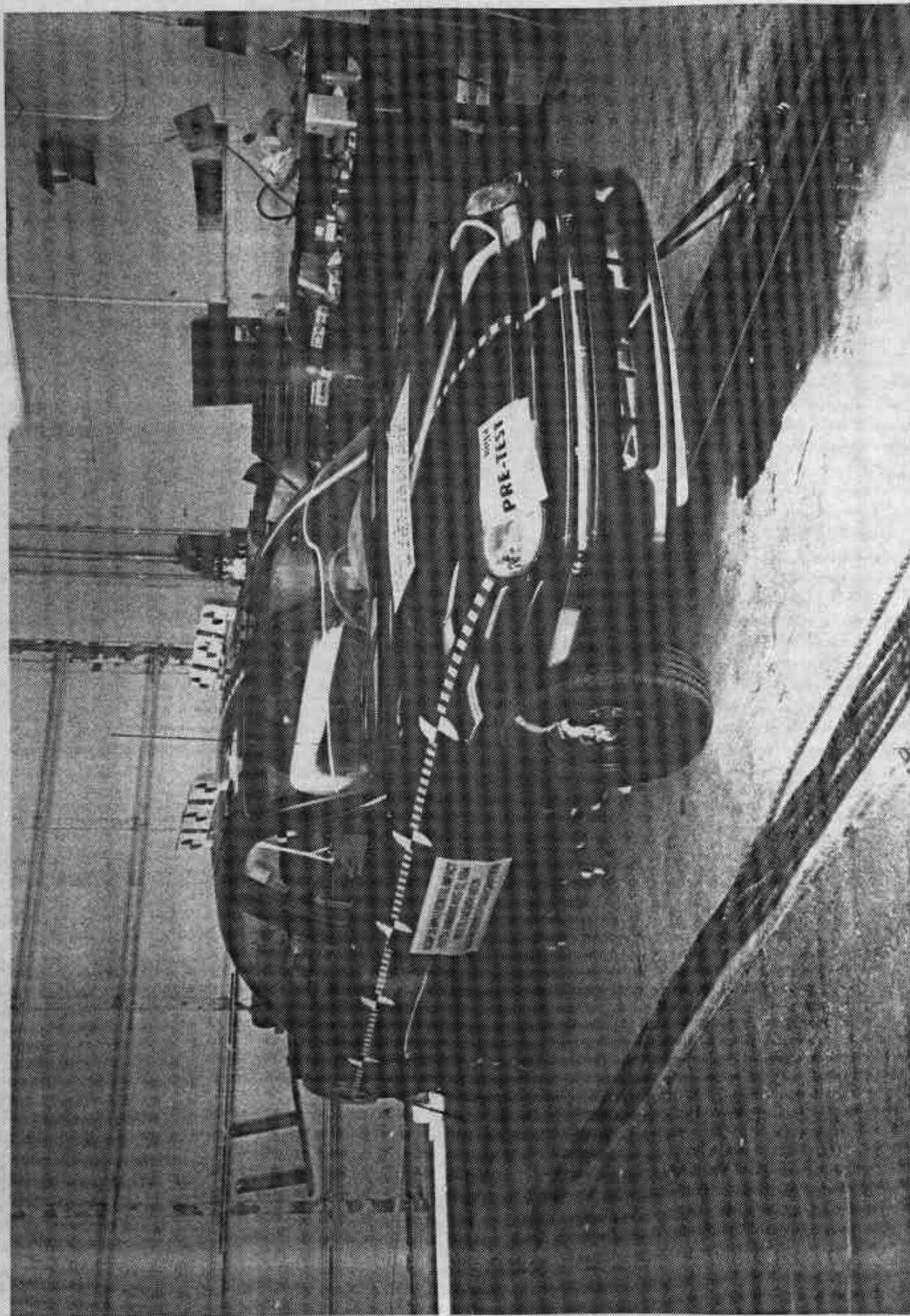


Photo No. A-11 - Pre-Test Right Front Three-Quarter View of Test Vehicle

A-11

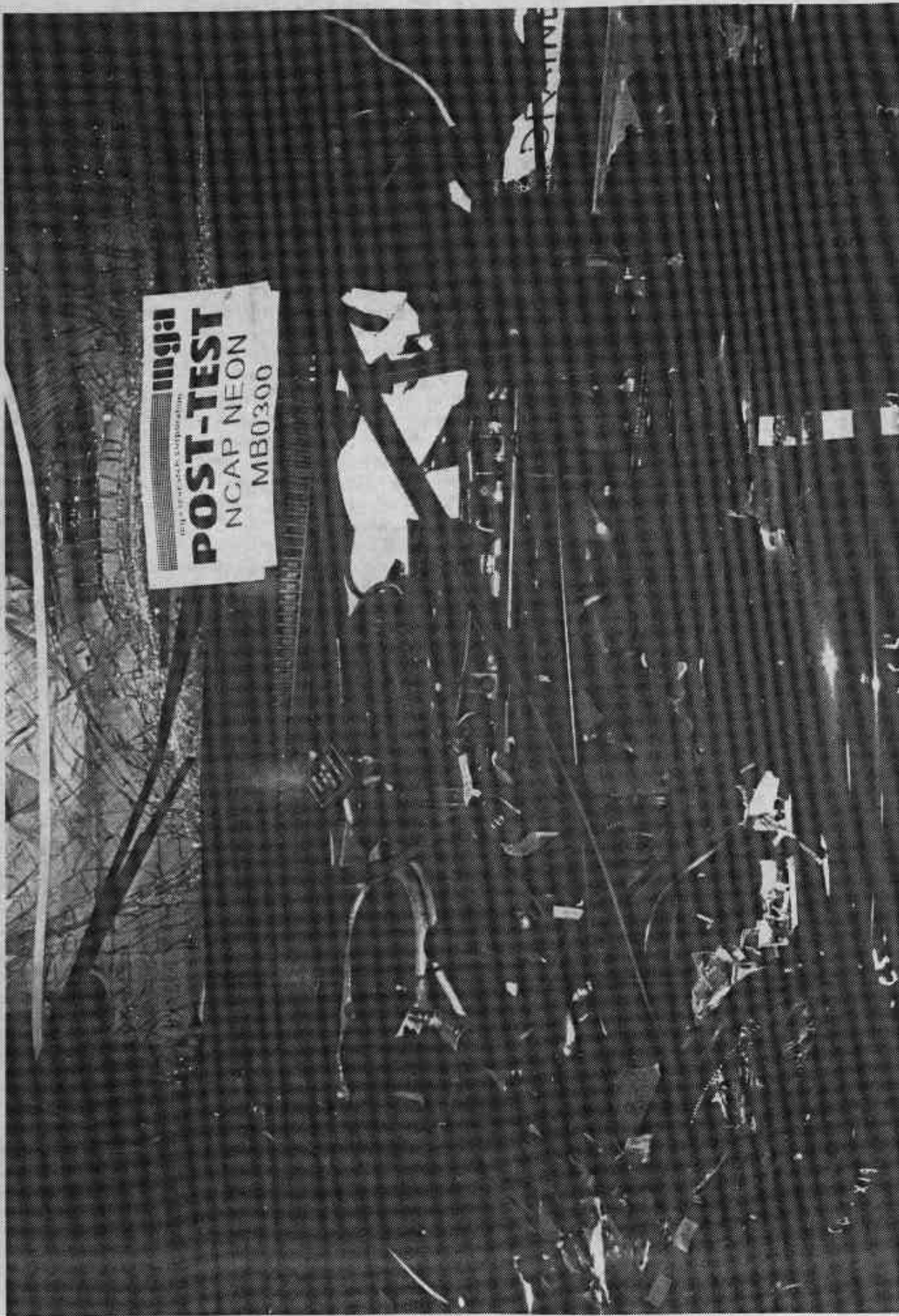


Photo No. A-13 - Post-Test Engine Compartment View



Photo No. A-14 - Pre-Test Fuel Filler Cap View

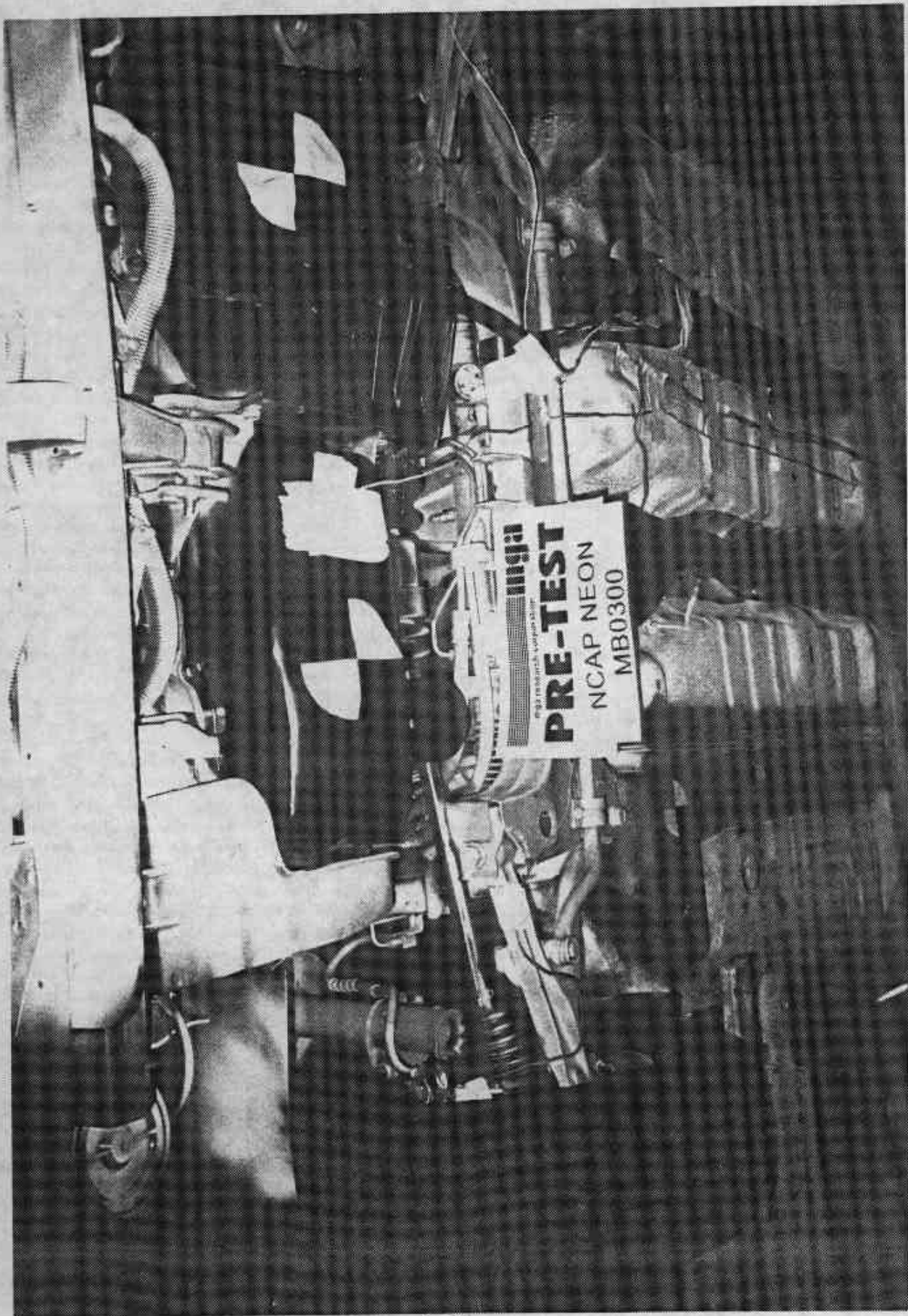


Photo No. A-15 - Pre-Test Front Underbody View

A-15

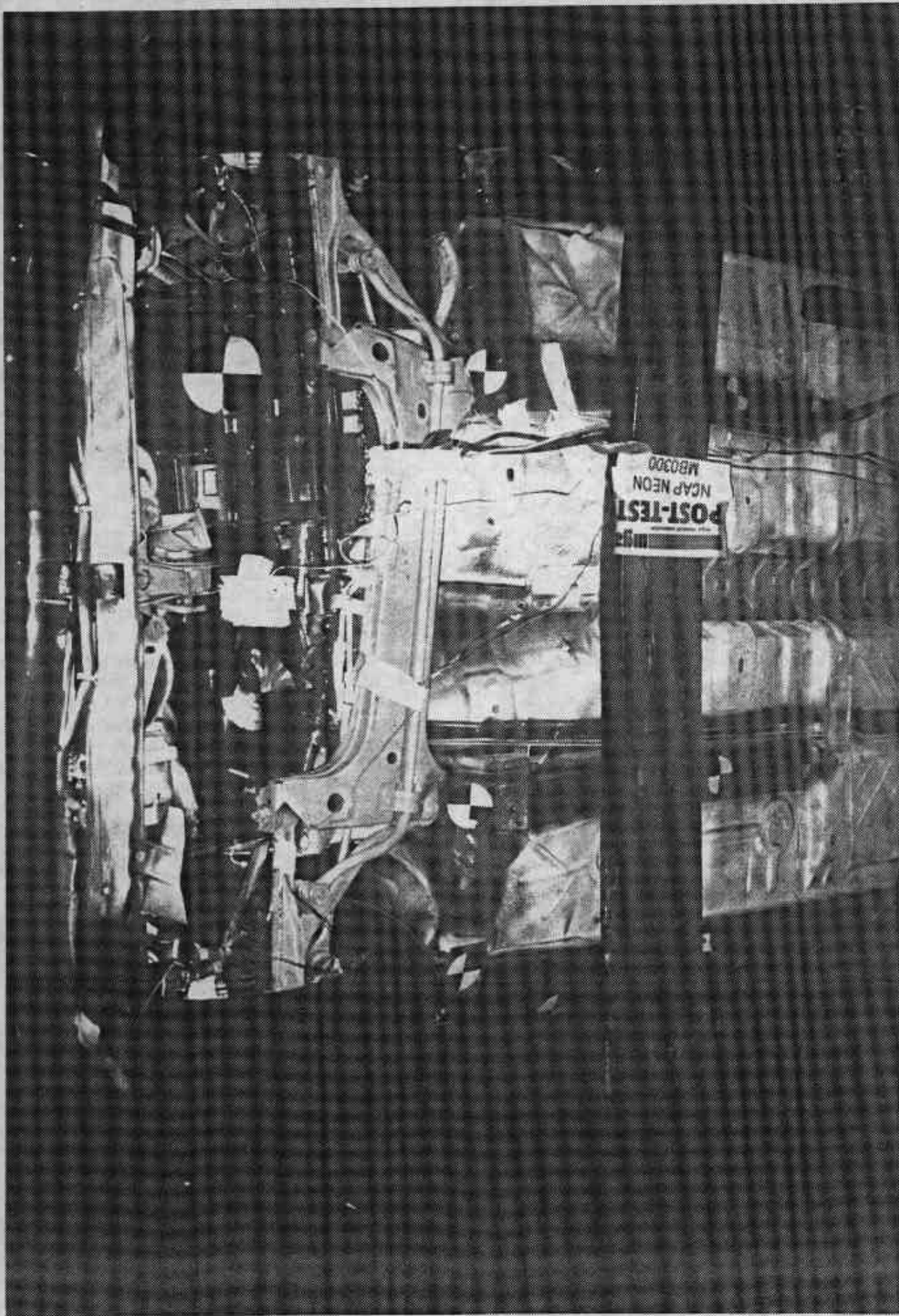
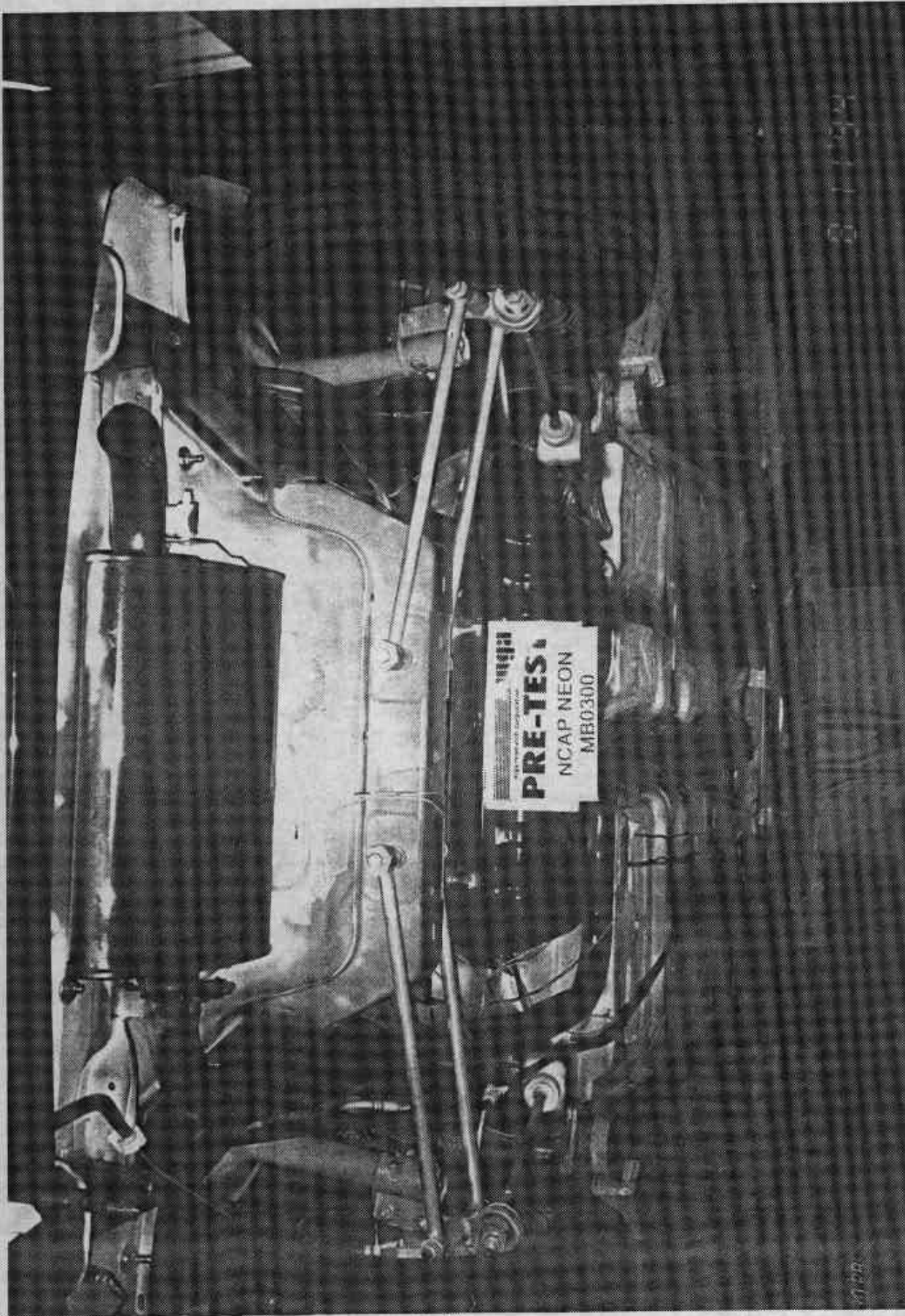


Photo No. A-16 - Post-Test Front Underbody View

A-16



A-17

Photo No. A-17 - Pre-Test Rear Underbody View

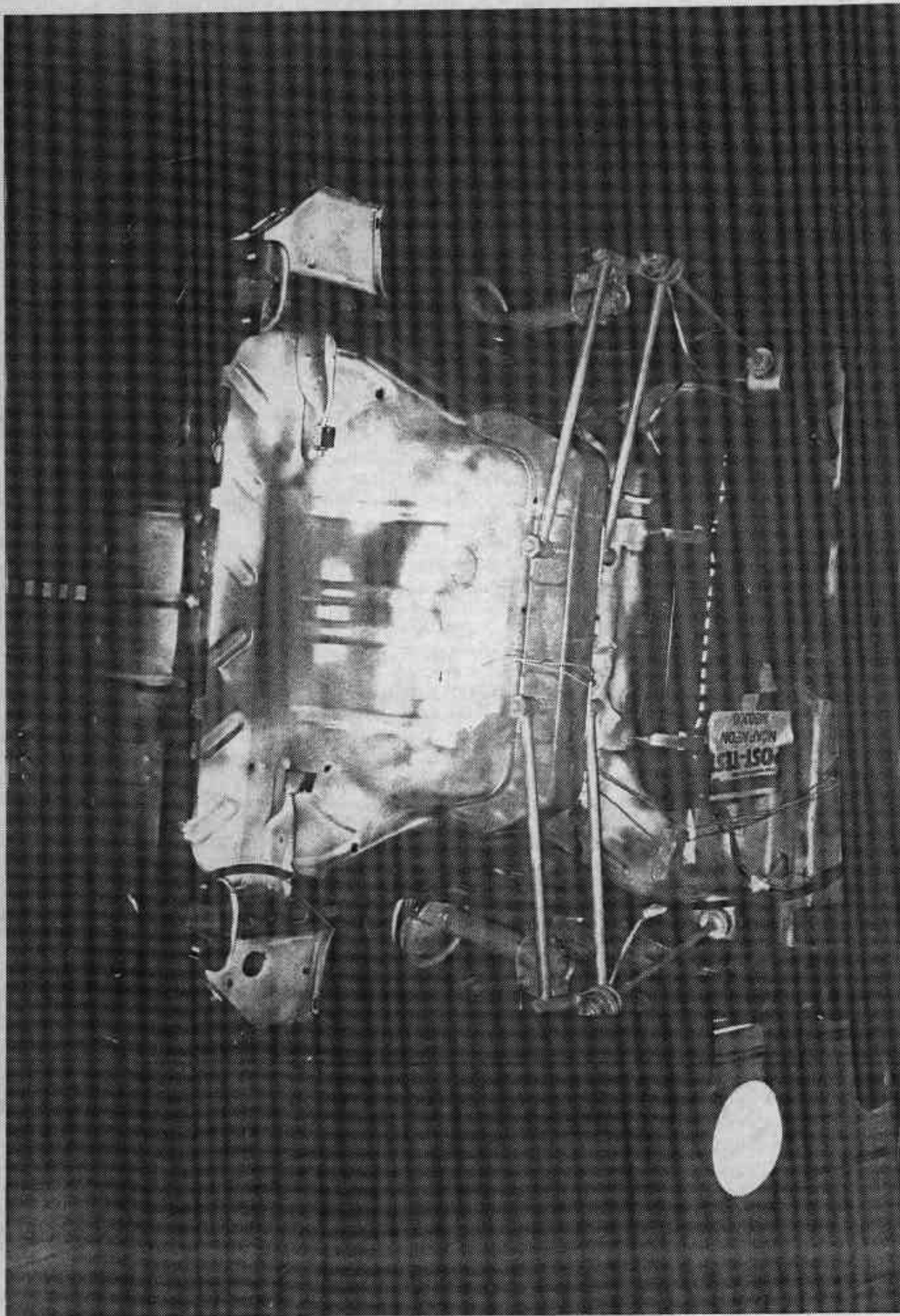


Photo No. A-18 - Post-Test Rear Underbody View

A-18

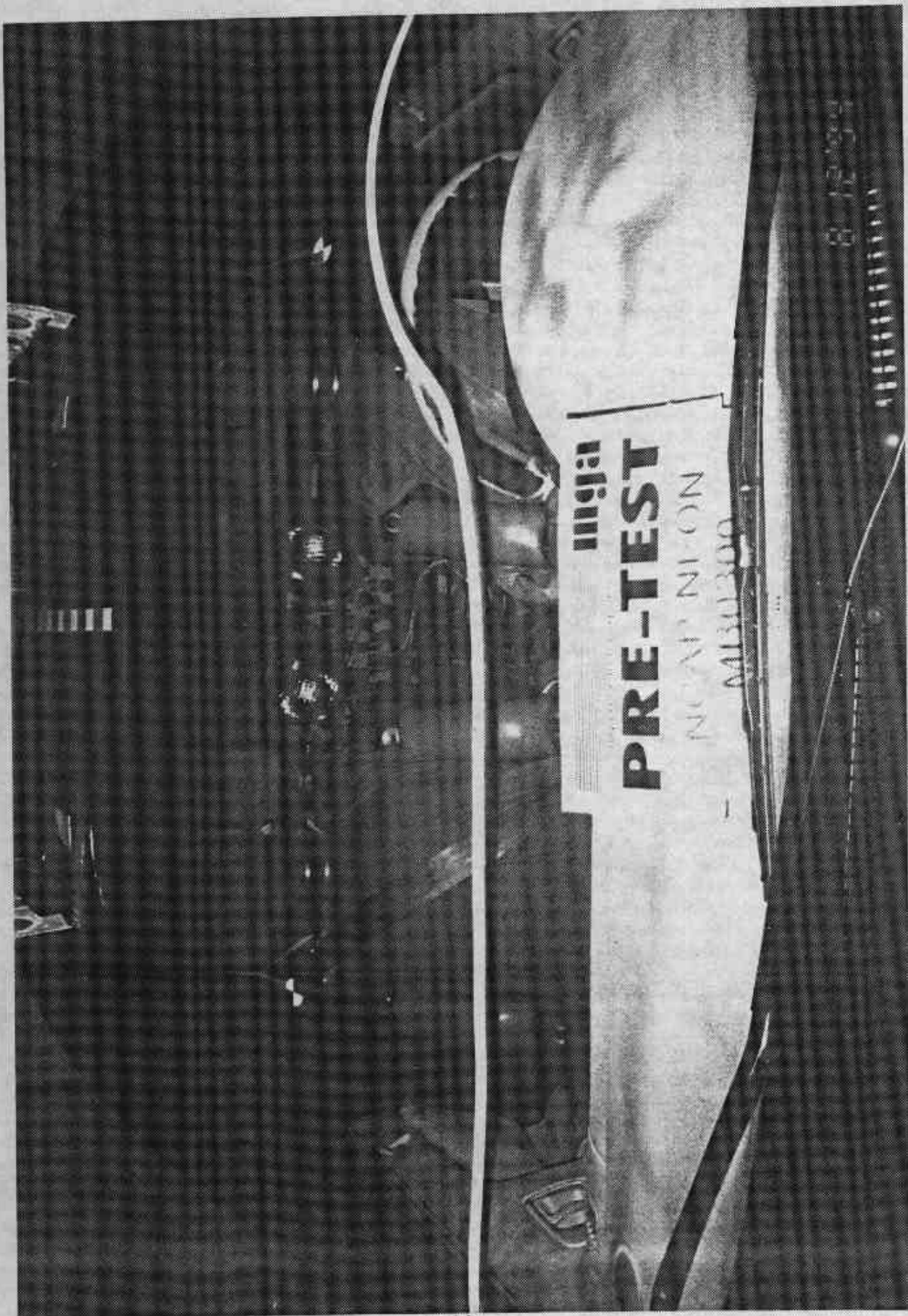


Photo No. A-19 - Pre-Test Windshield View



Photo No. A-20 - Post-Test Windshield View

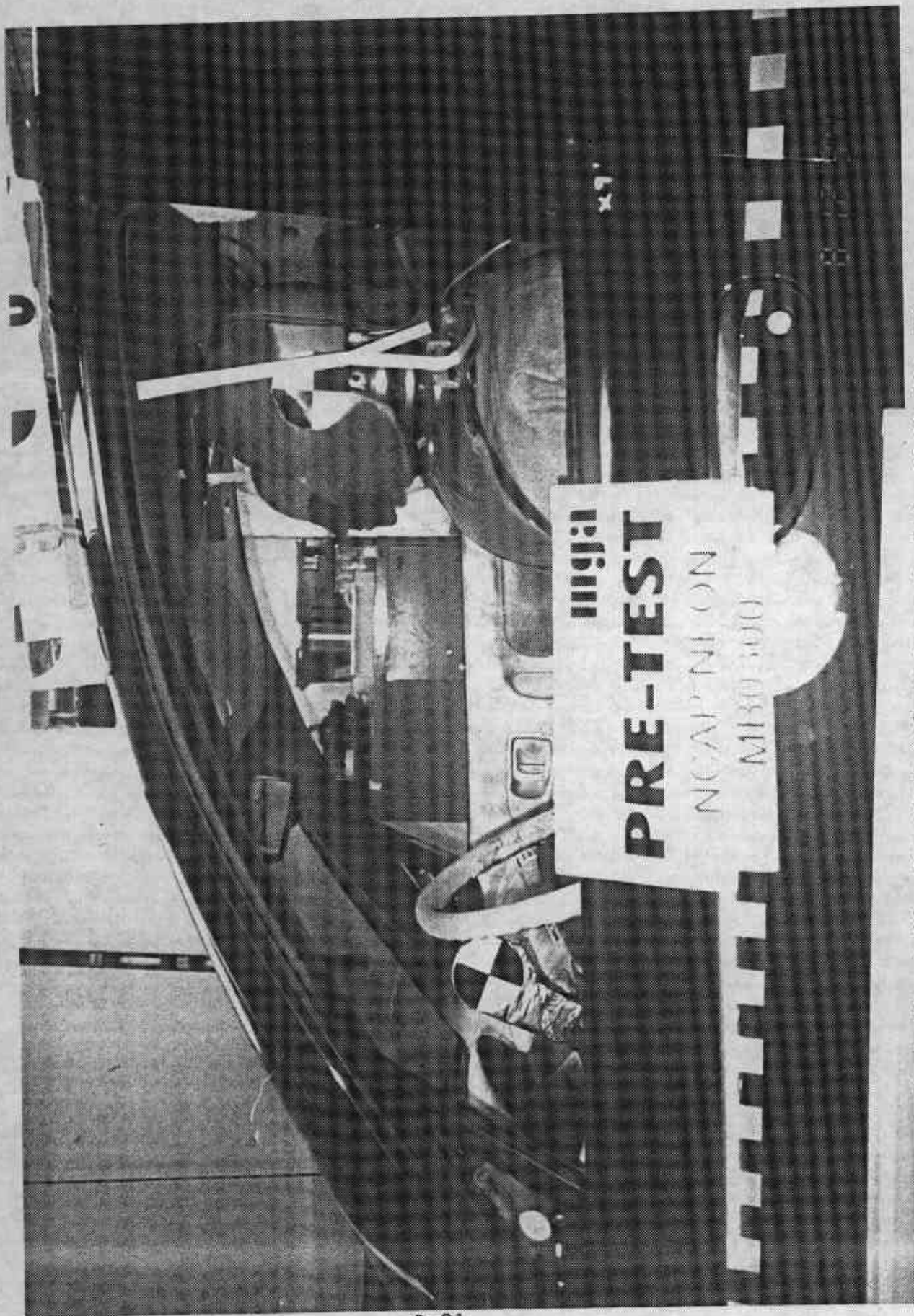
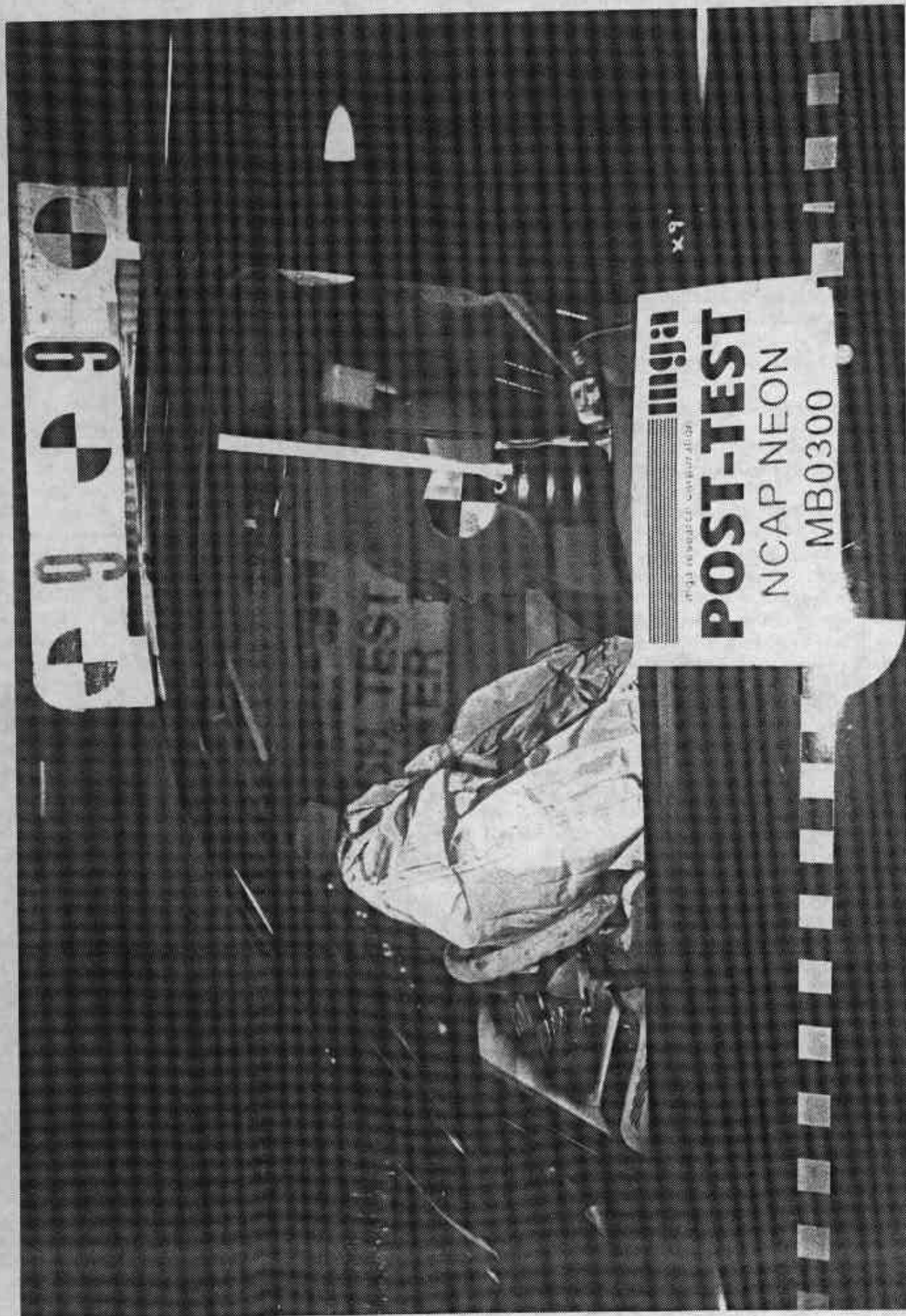


Photo No. A-21 - Pre-Test Driver Dummy Position Left Side View



A-22

Photo No. A-22 - Post-Test Driver Dummy Position Left Side View



Photo No. A-23 - Pre-Test Driver Dummy Position Left Side View (Door Open)

A-23



Photo No. A-24 - Post-Test Driver Dummy Position Left Side View (Door Open)



Photo No. A-25 - Pre-Test Driver Seat Position View



Photo No. A-26 - Post-Test Driver Seat Position View



Photo No. A-27 - Pre-Test Driver Dummy Knee Position

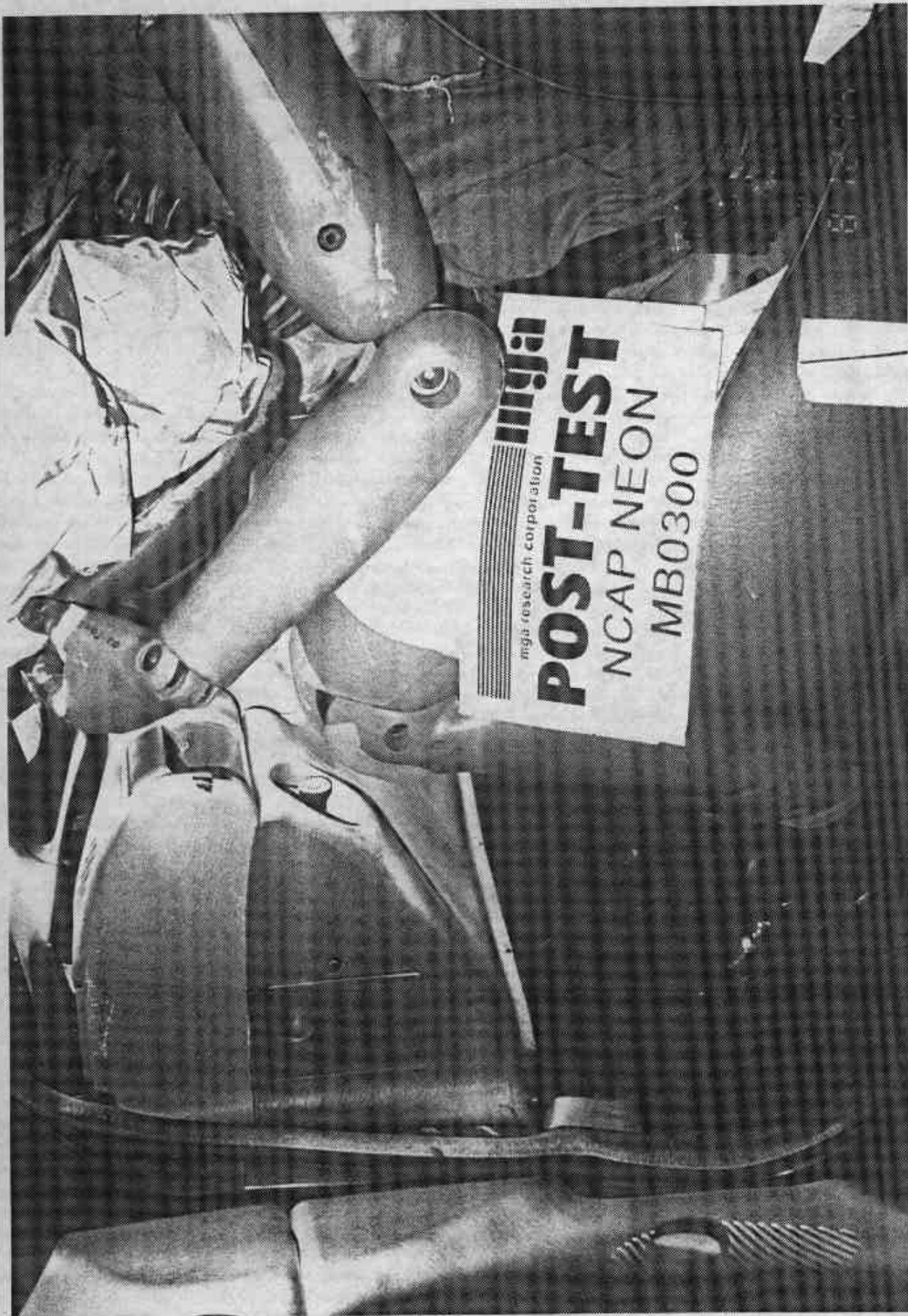


Photo No. A-28 - Post-Test Driver Dummy Knee Position

A-28

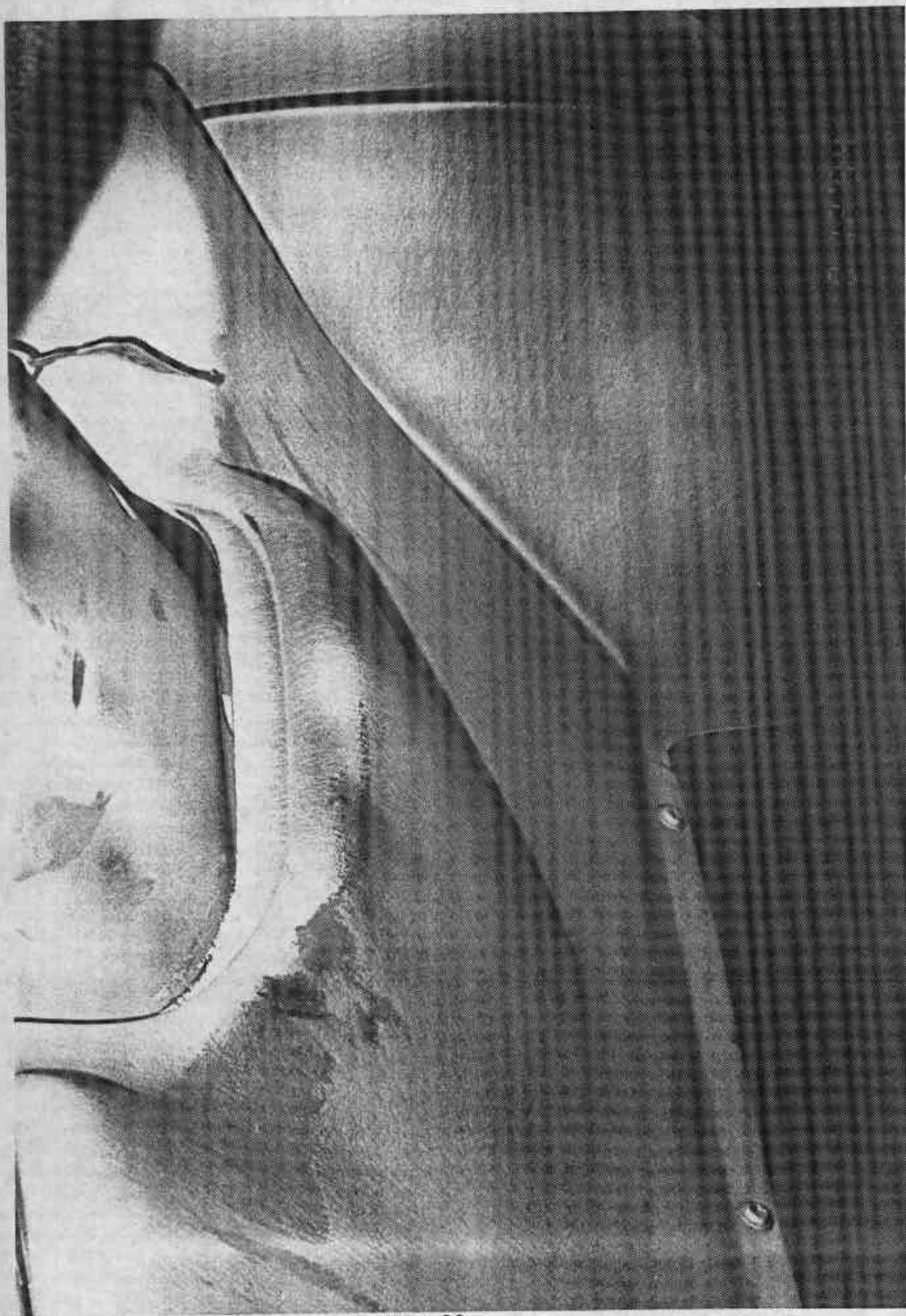


Photo No. A-29 - Post-Test Driver Dummy Knee Contact



Photo No. A-30 - Post-Test Driver Airbag Contact

A-30

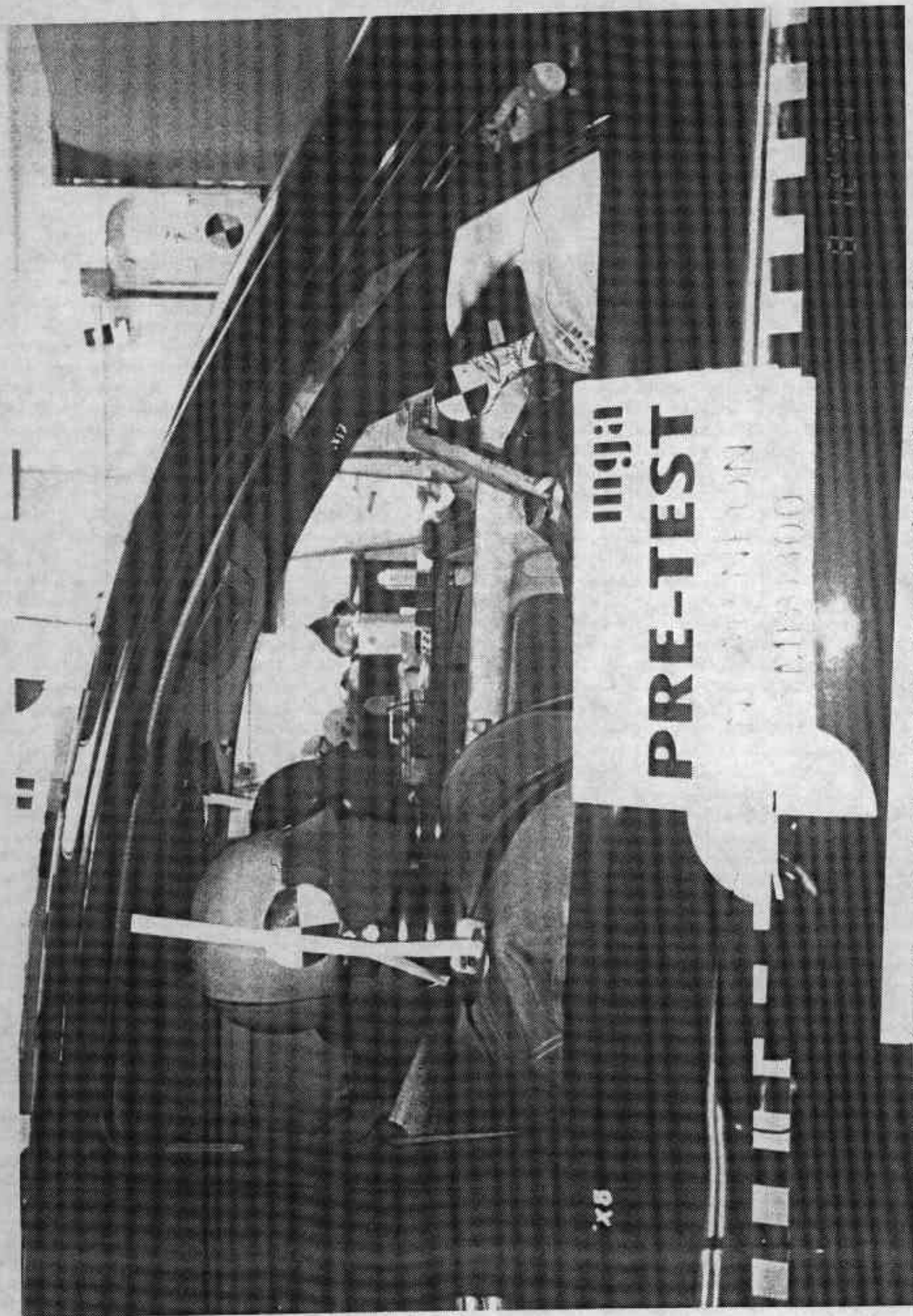
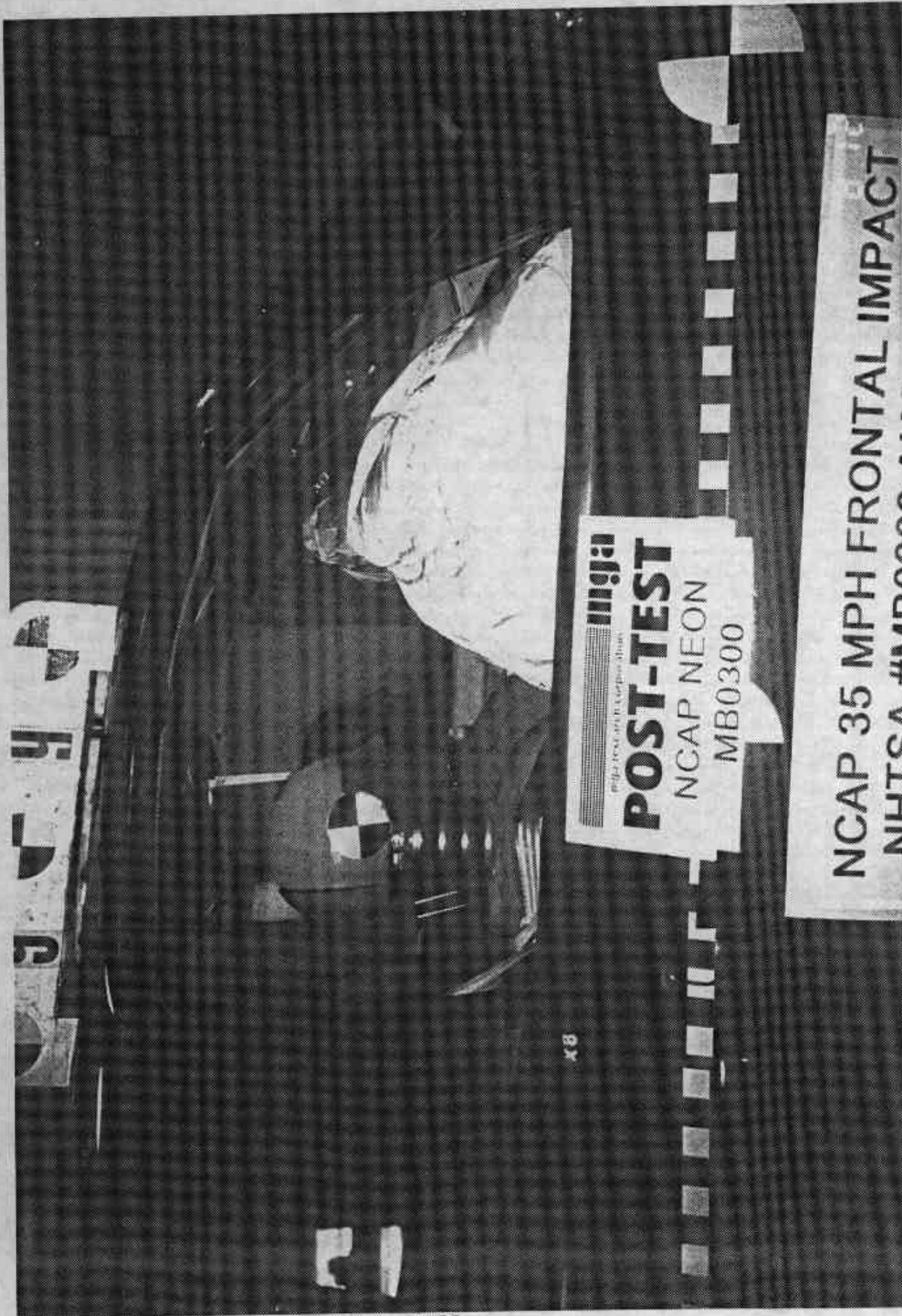


Photo No. A-31 - Pre-Test Passenger Dummy Position Right Side View

A-31



NCAP 35 MPH FRONTAL IMPACT
NHTCA

Photo No. A-32 - Post-Test Passenger Dummy Position Right Side View



A-33

Photo No. A-33 - Pre-Test Passenger Dummy Position Right Side View (Door Open)



Photo No. A-34 - Post-Test Passenger Dummy Position Right Side View (Door Open)



A-35

Photo No. A-35 - Pre-Test Passenger Seat Position View

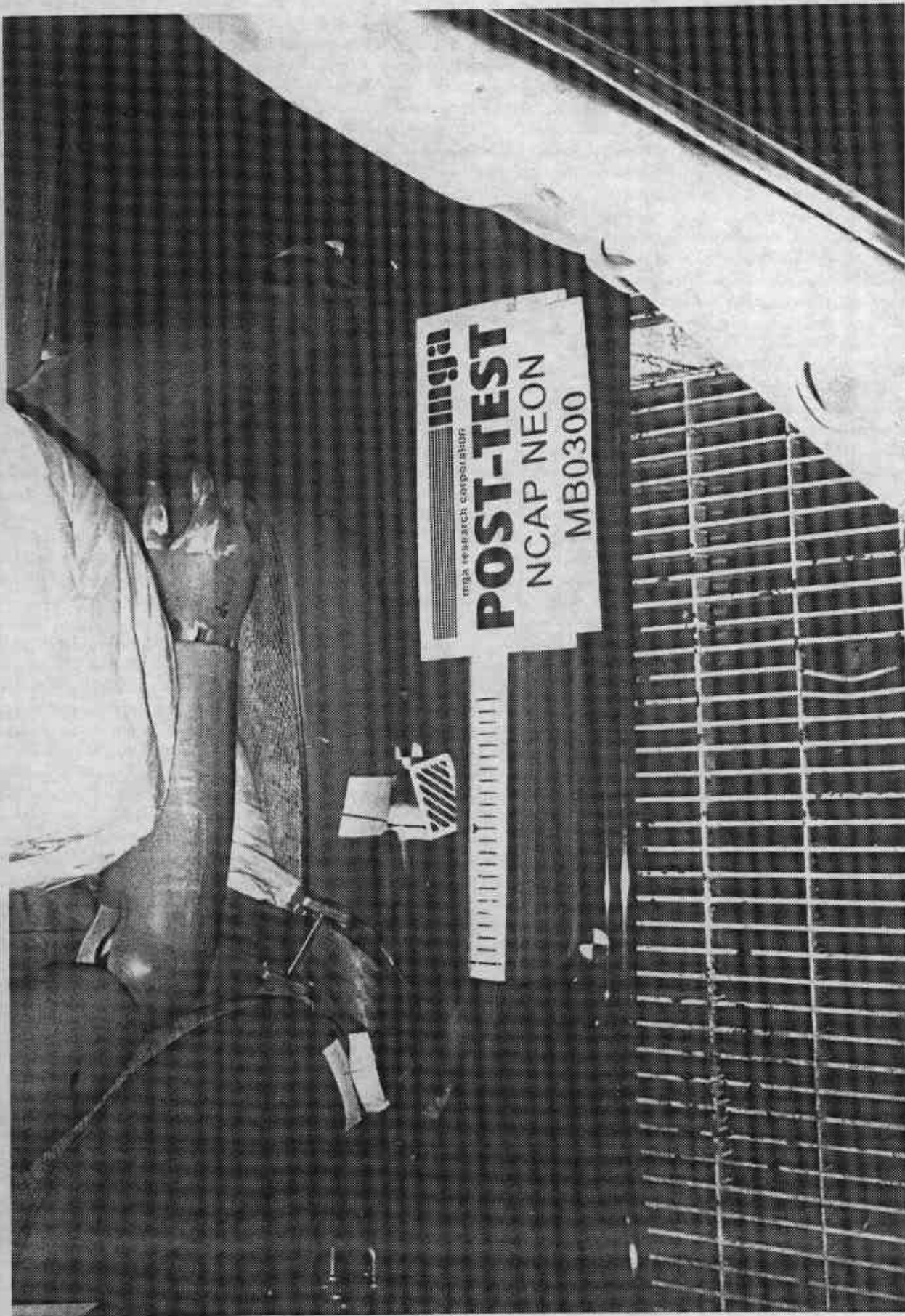


Photo No. A-36 - Post-Test Passenger Seat Position View

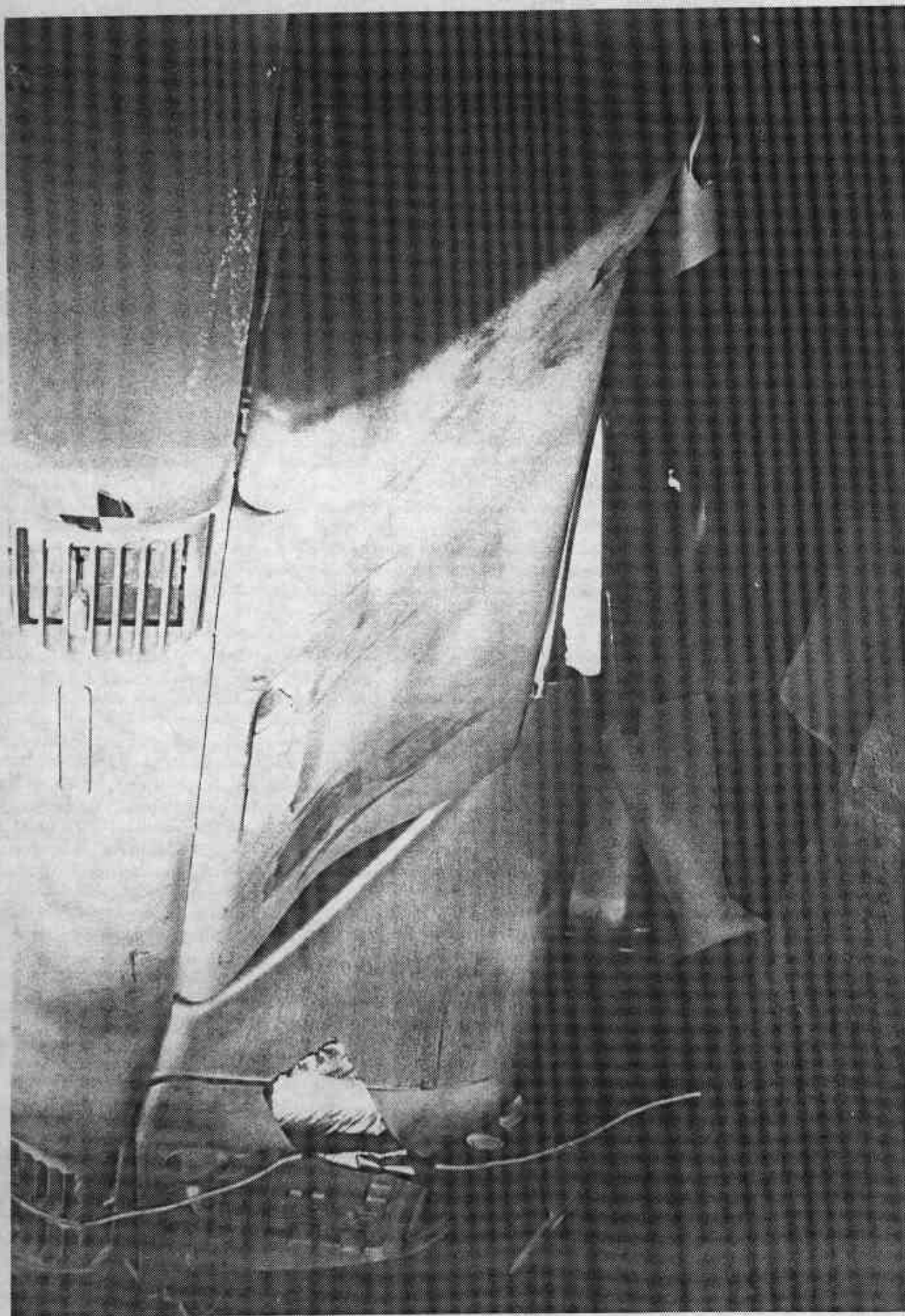


Photo No. A-37 - Pre-Test Passenger Dummy Knee Position

A-37



Photo No. A-38 - Post-Test Passenger Dummy Knee Position



A-39

Photo No. A-39 - Post-Test Passenger Dummy Knee Contact



A-40

Photo No. A-40 - Post-Test Passenger Airbag Contact

MADE BY CHRYSLER CORPORATION

DATE OF MFG: 5-54

GVWR: 43463 LB

CURR: 1907 LB

GVWR: 1631 LB

1571 KG

700KG: 8865 KG

REAR: 2740 KG

VIN: 37-35347-225133761

WGT: 853160 748

PLANT: MS

TYPE: PASSENGER CAR

TOTAL WGT

48300051



THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR VEHICLE SAFETY STANDARDS AND
THEFT PREVENTION STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.

8-12-54

Photo No. A-41 - Vehicle Certification Label

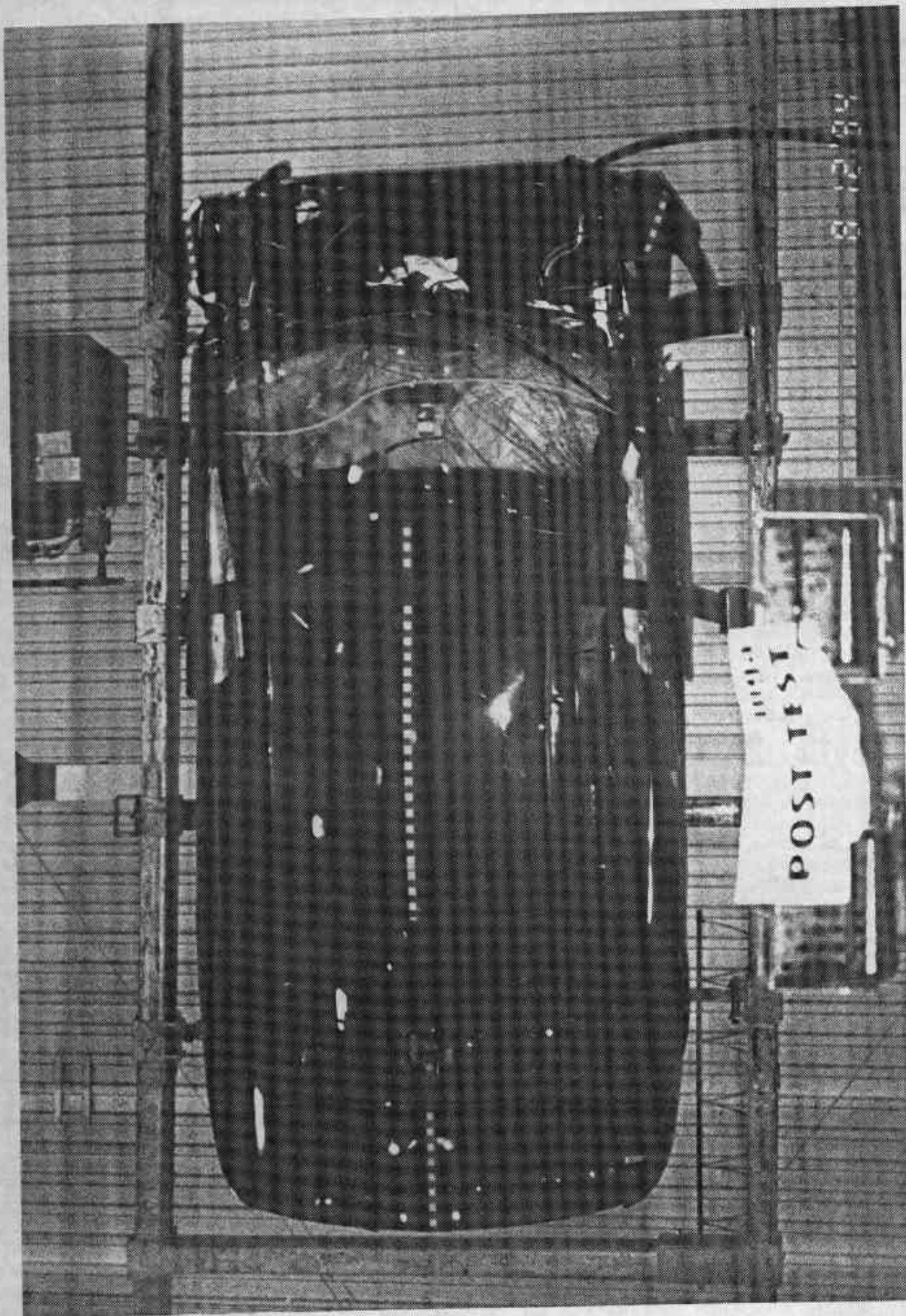


Photo No. A-42 - Rollover 90°

A-42

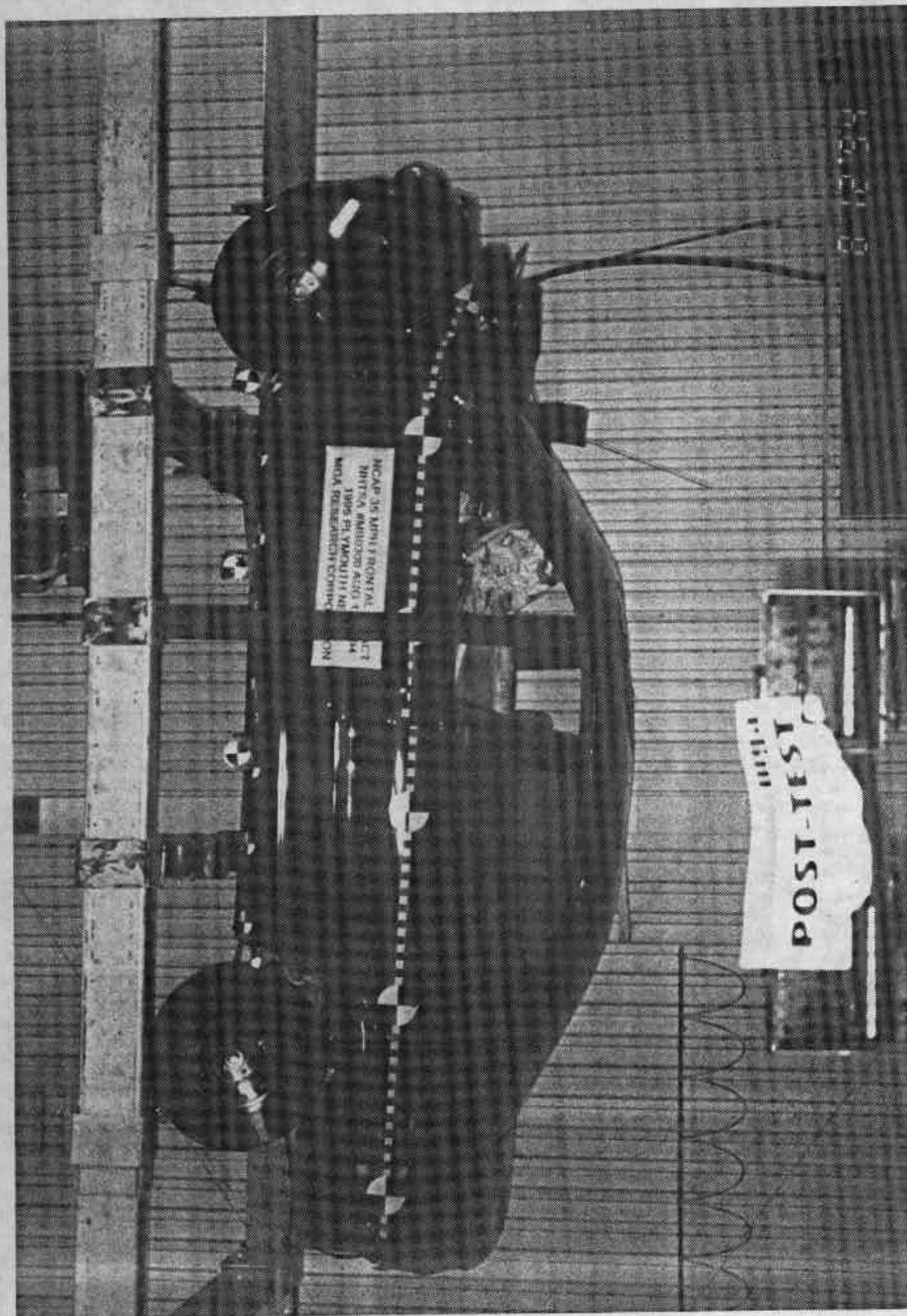


Photo No. A-43 - Rollover 180°

A-43

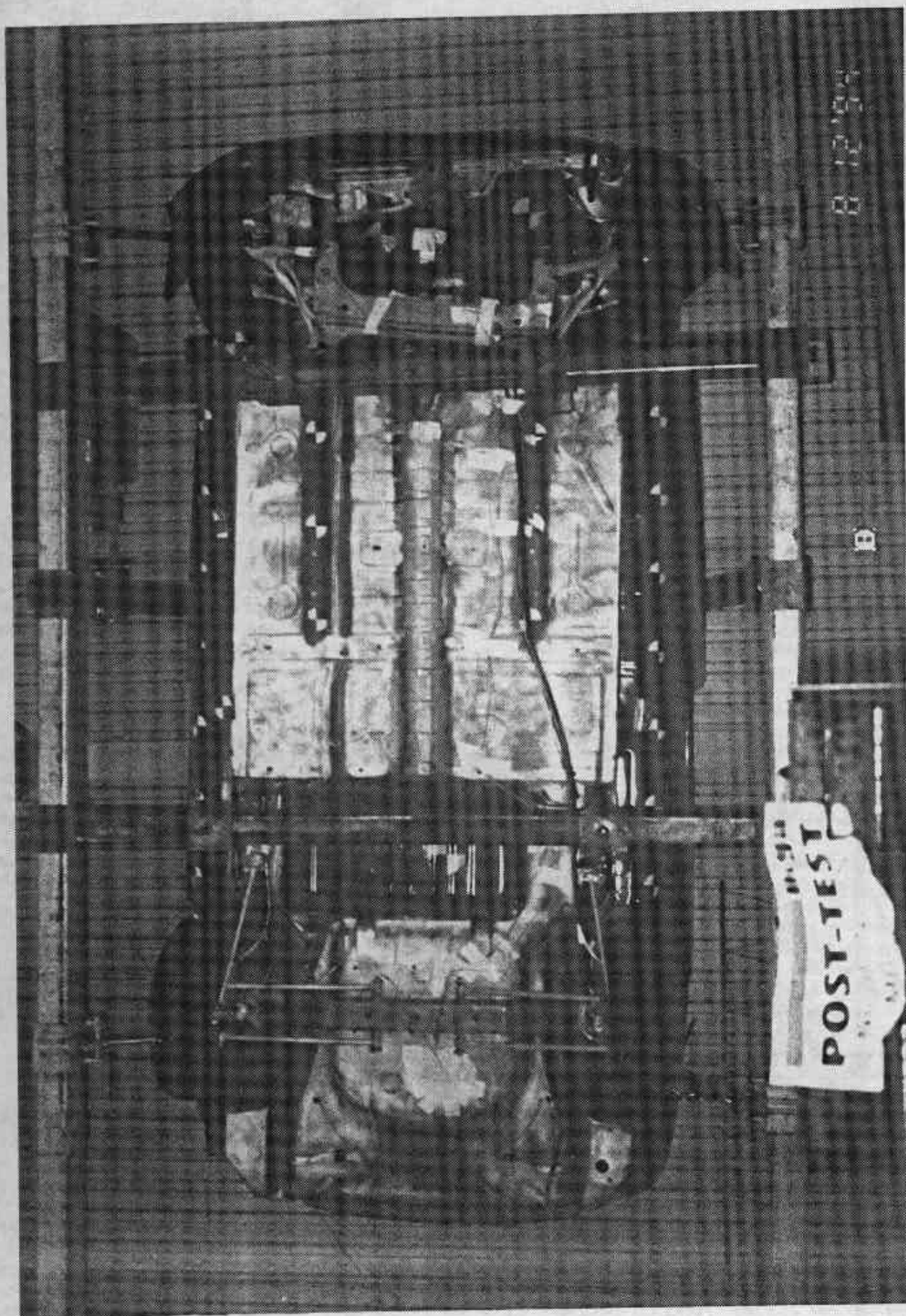
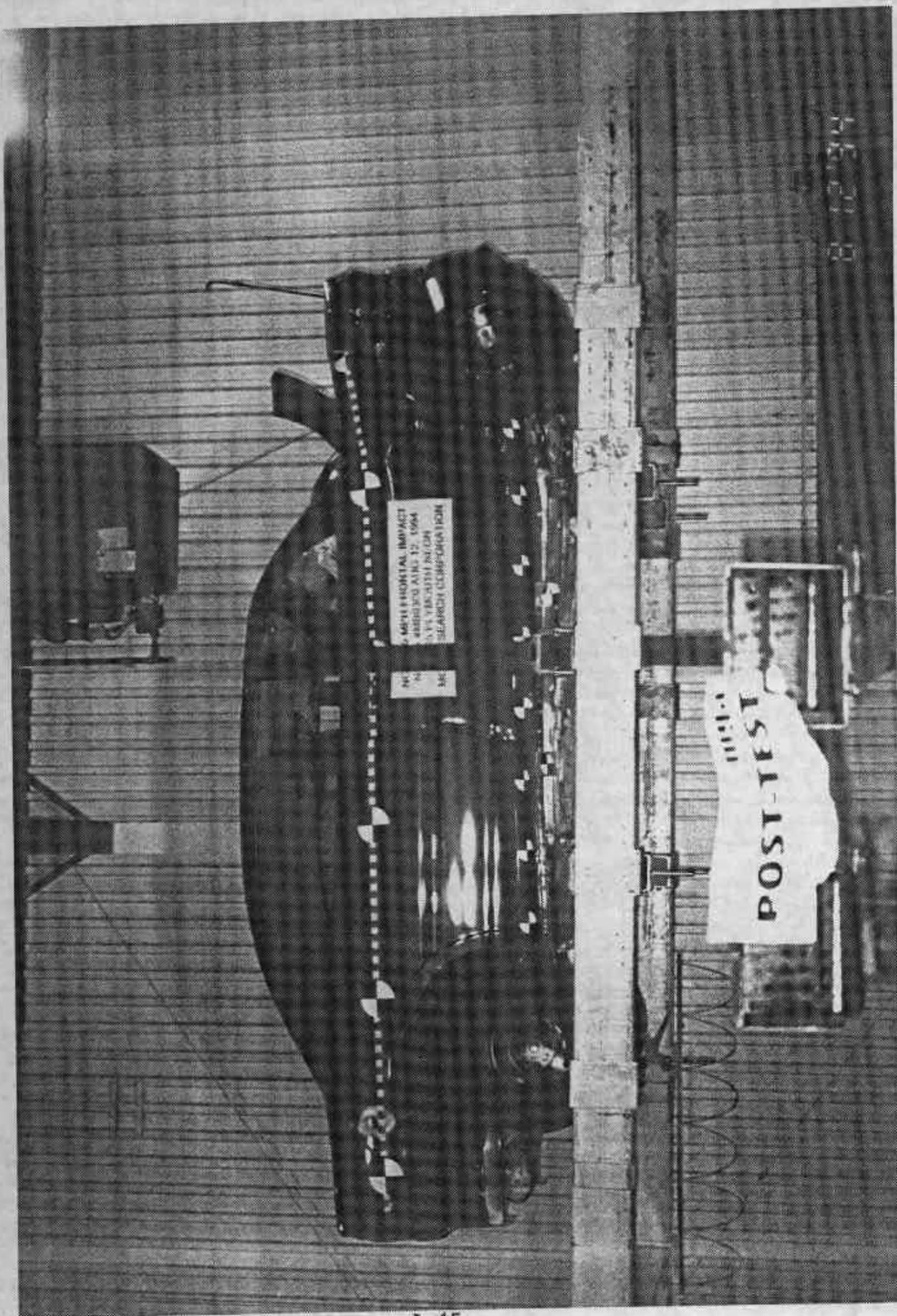


Photo No. A-44 - Rollover 270°

A-44



A-45

Photo No. A-45 - Rollover 360°

APPENDIX B

Vehicle, Load Cell Barrier and Dummy Response Data

1995 PLYMOUTH NEON 4-DOOR

NHTSA NO.: MB0300

<u>VEHICLE DATA</u>	<u>FILTER CHANNEL CLASS</u>
Head Accelerations	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)

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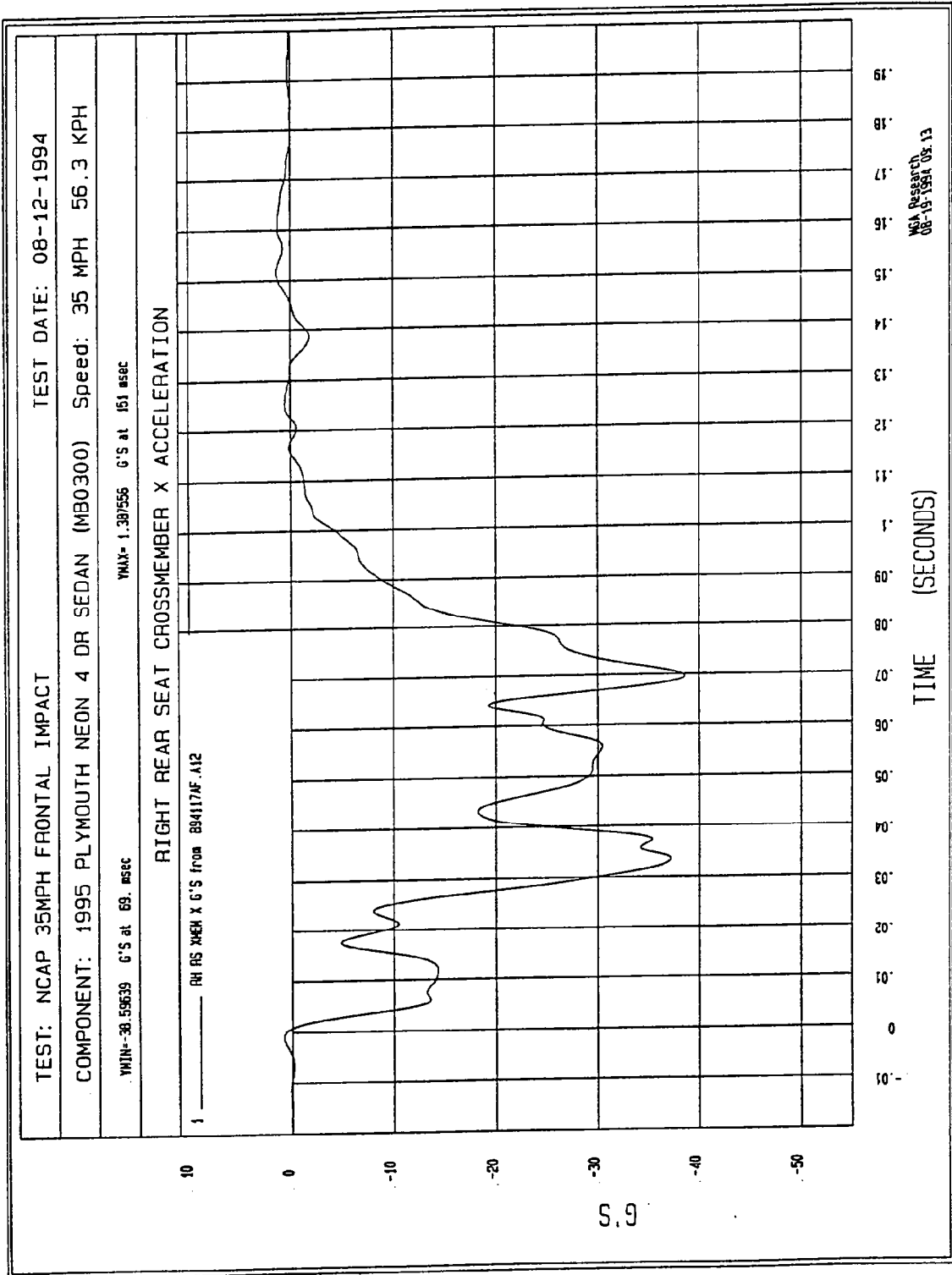


Figure B-1 - Right Rear Seat Crossmember X Accel. vs. Time

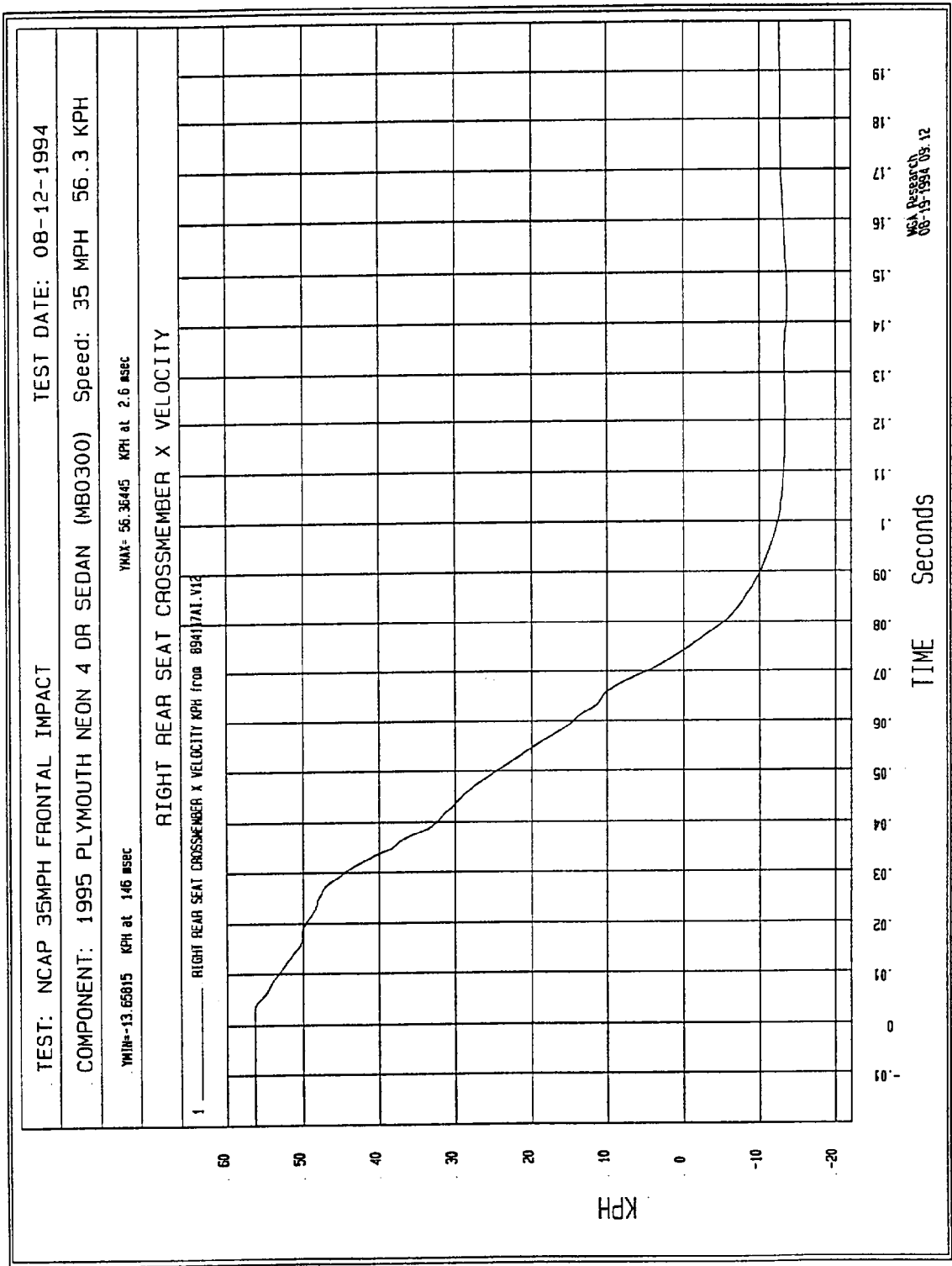


Figure B-2 - Right Rear Seat Crossmember X Velocity vs. Time

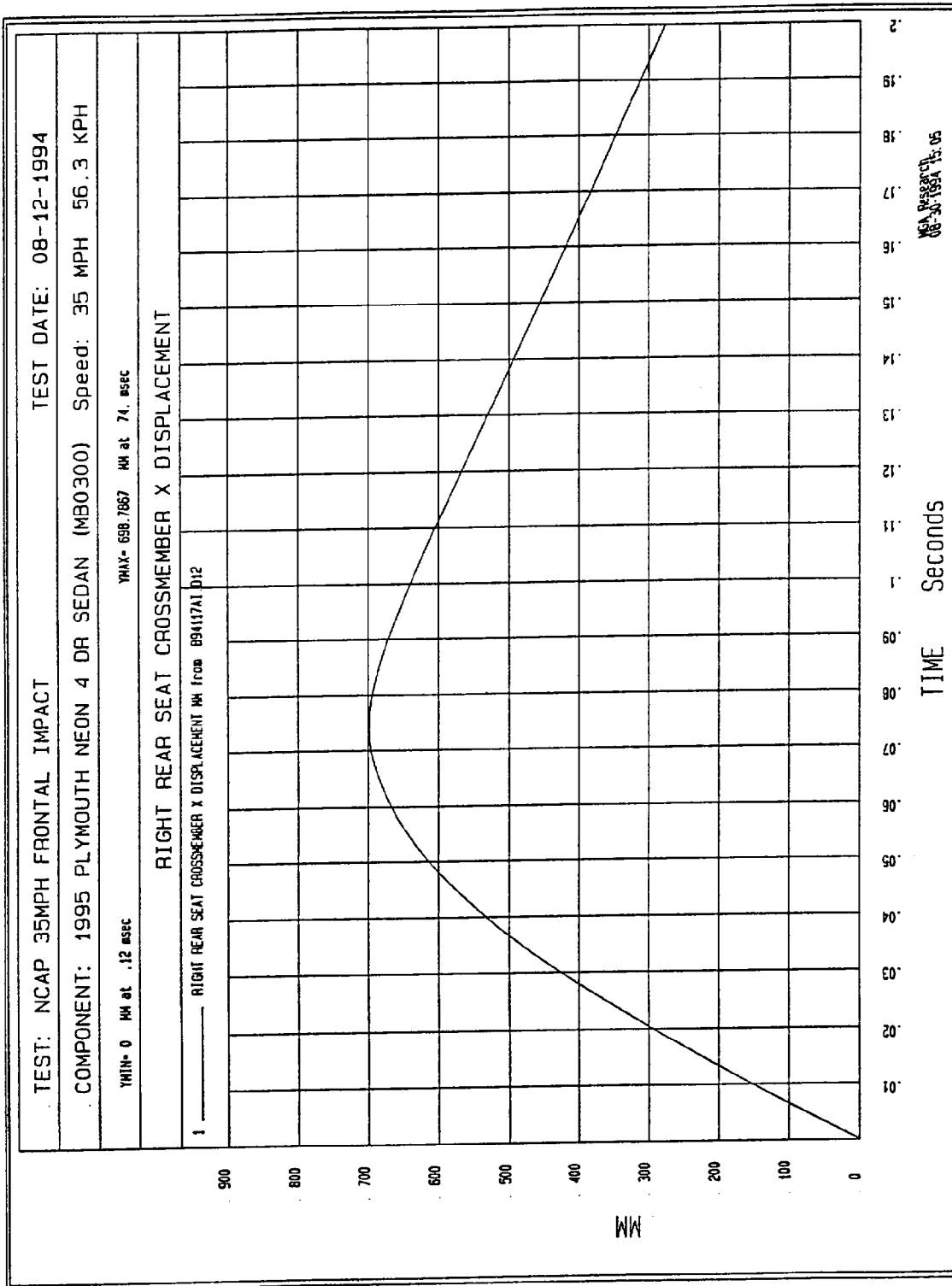


Figure B-3 - Right Rear Seat Crossmember X Displacement vs. Time

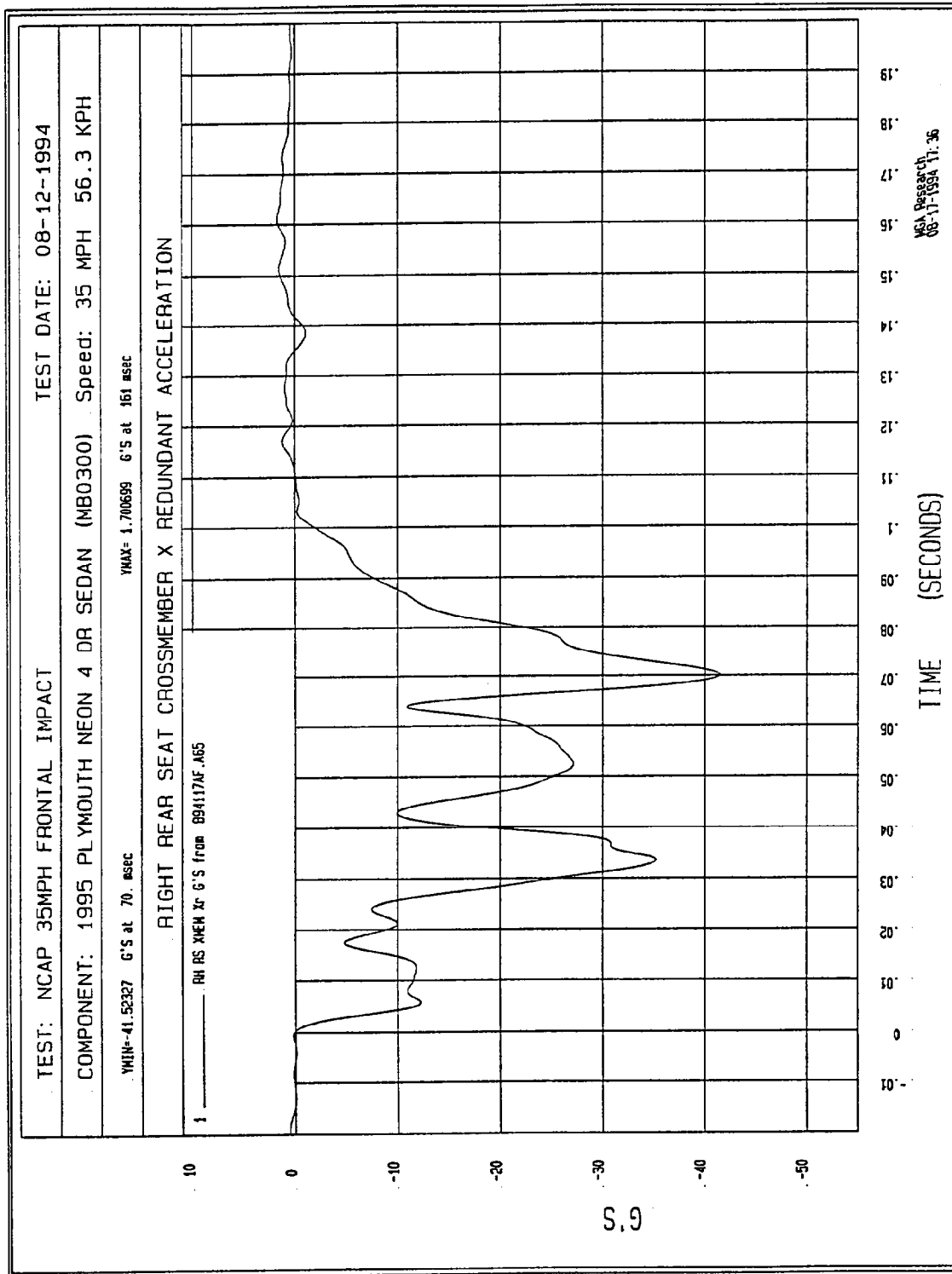


Figure B-4 - Right Rear Seat Crossmember X Redundant Acceleration vs. Time

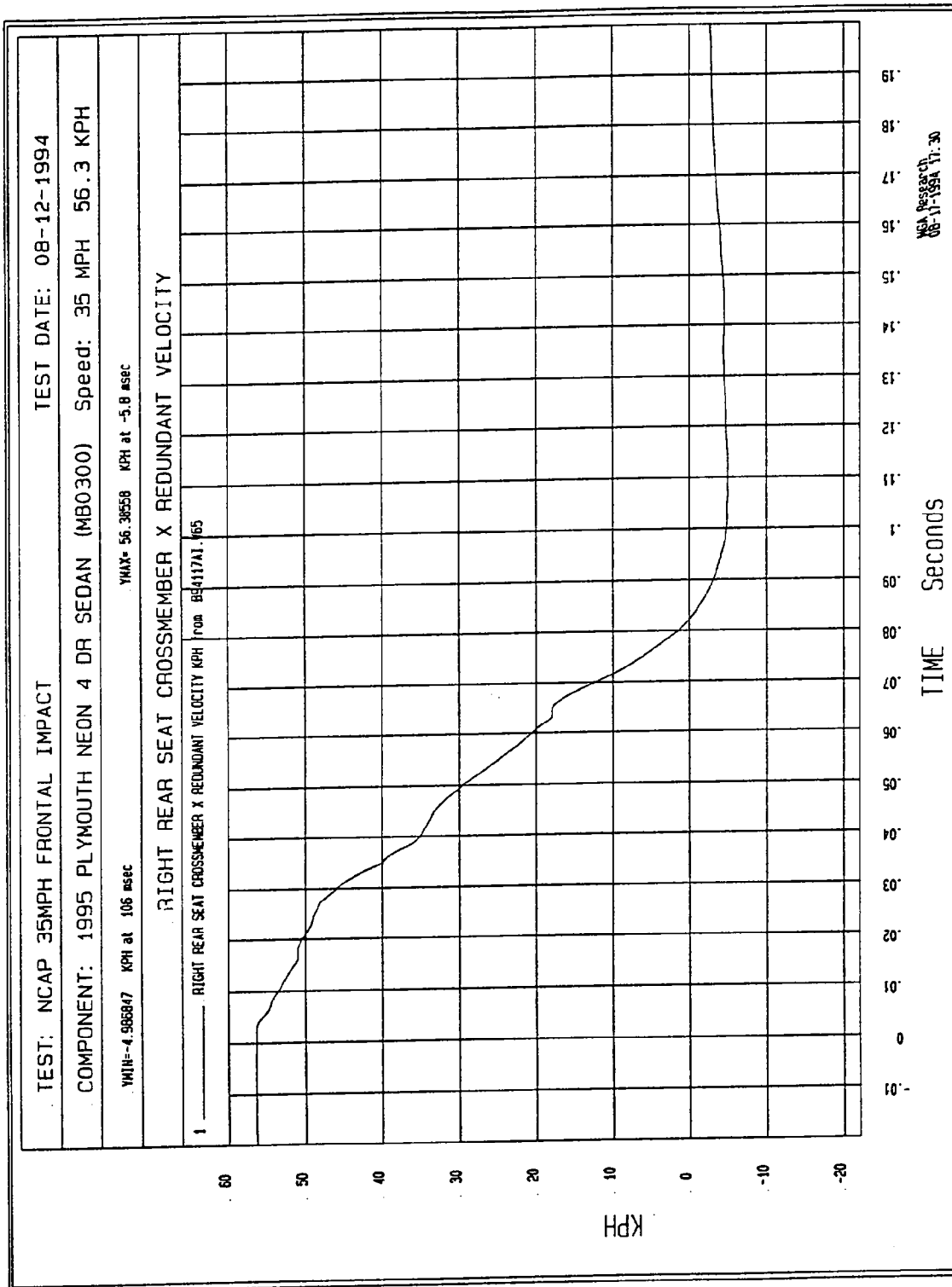


Figure B-5 - Right Rear Seat Crossmember X Redundant Velocity vs. Time

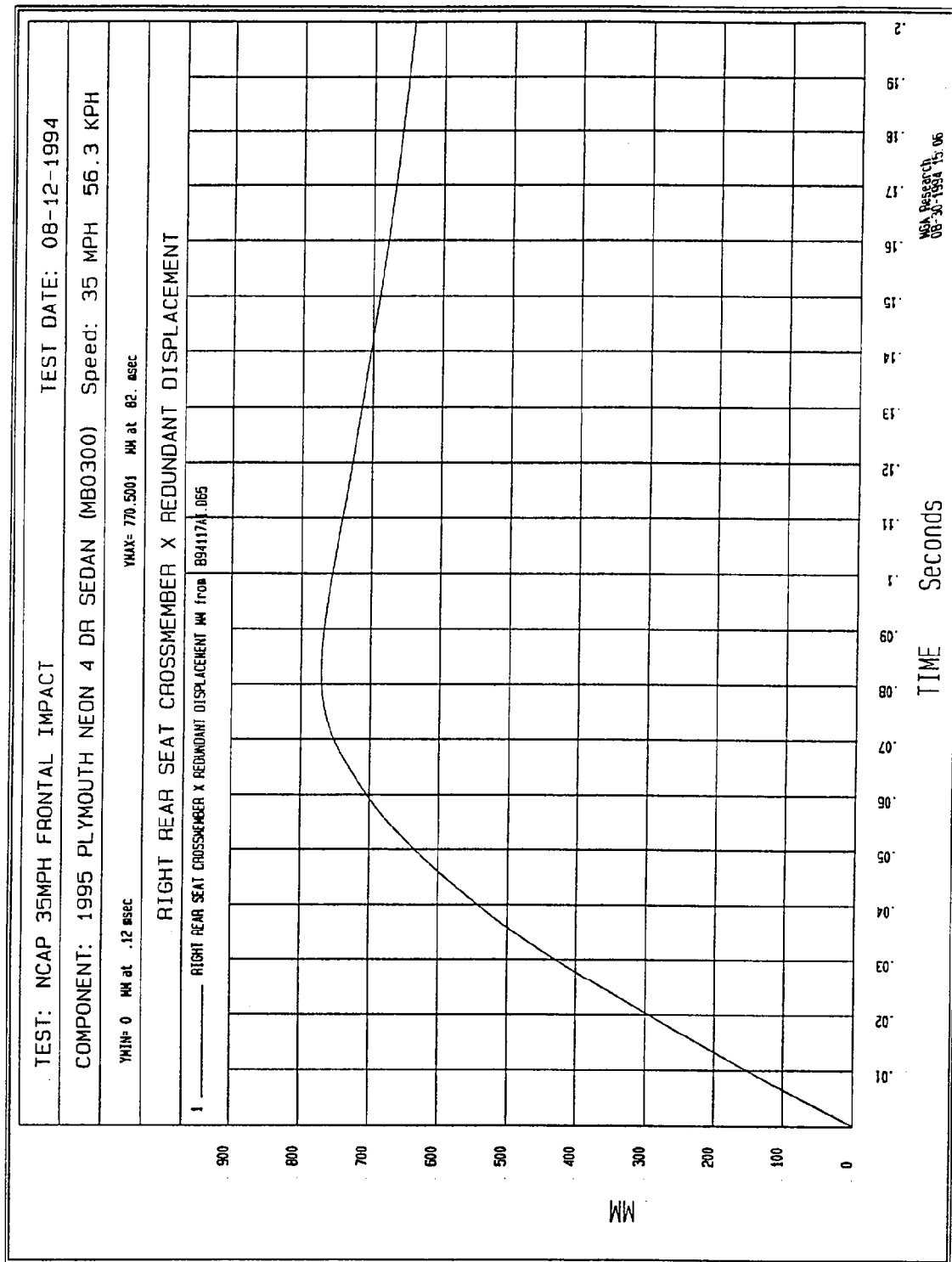


Figure B-6 - Right Rear Seat Crossmember X Redundant Displacement vs. Time

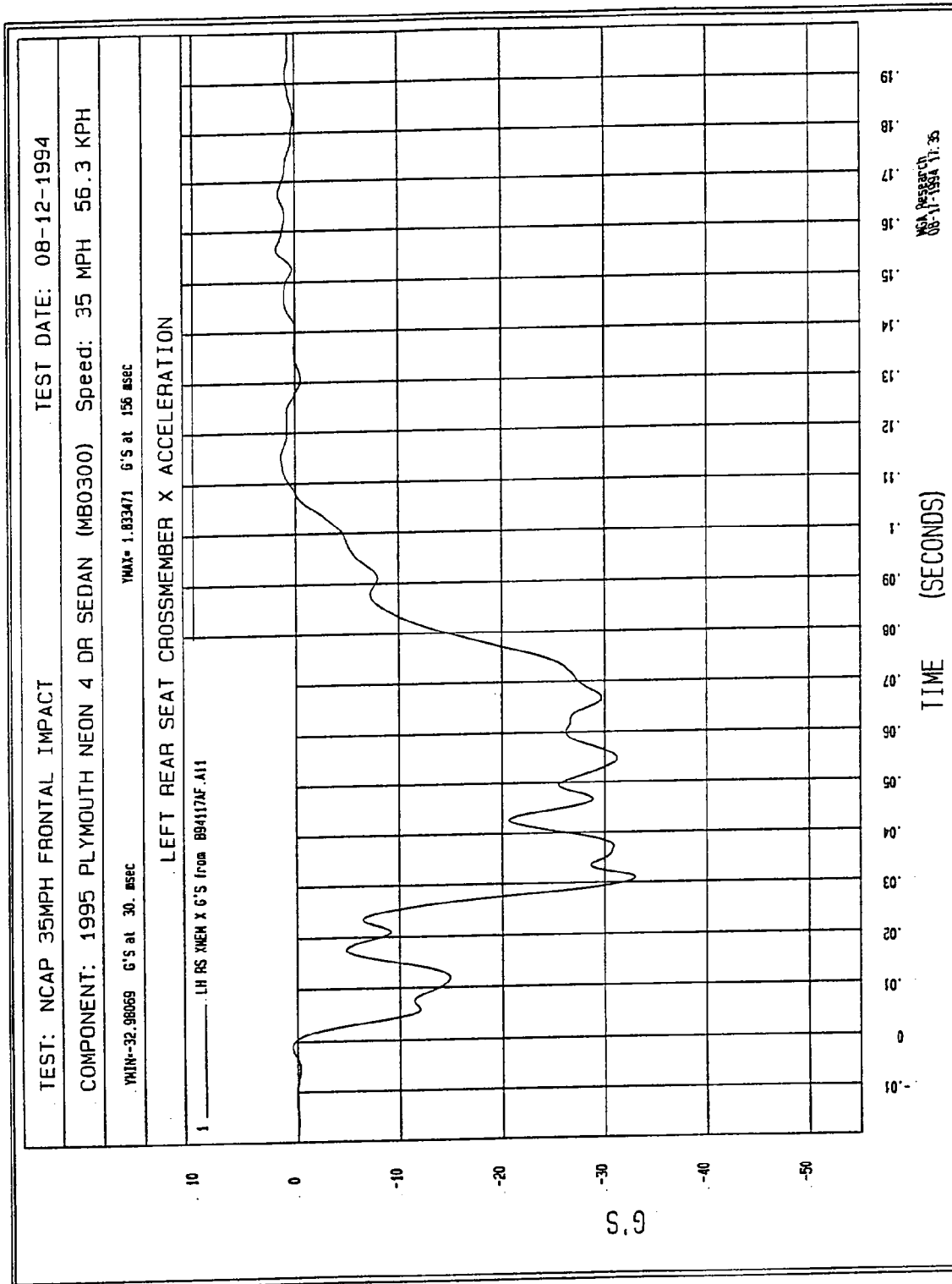


Figure B-7 - Left Rear Seat Crossmember X Acceleration vs. Time

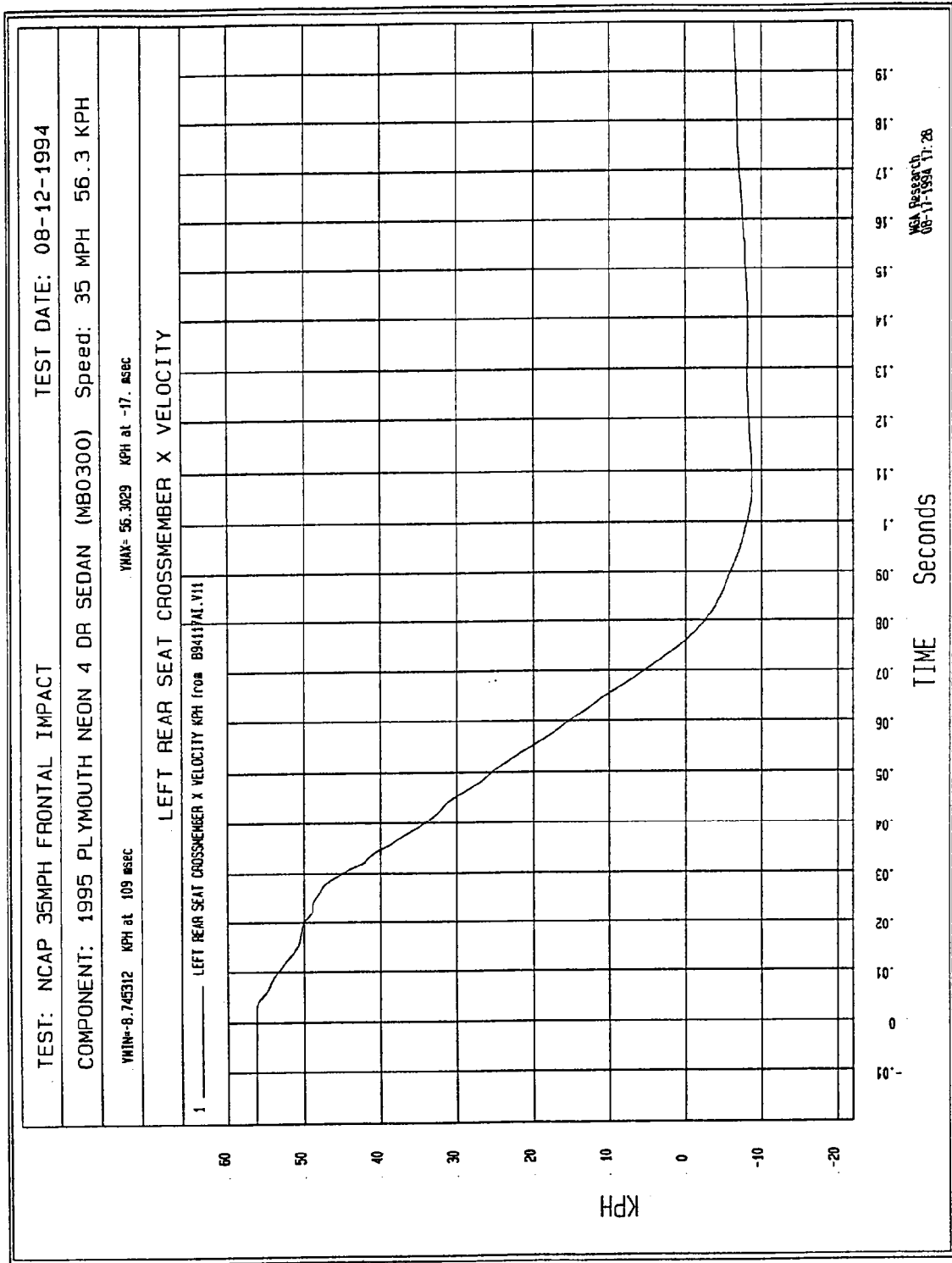


Figure B-8 - Left Rear Seat Crossmember X Velocity vs. Time

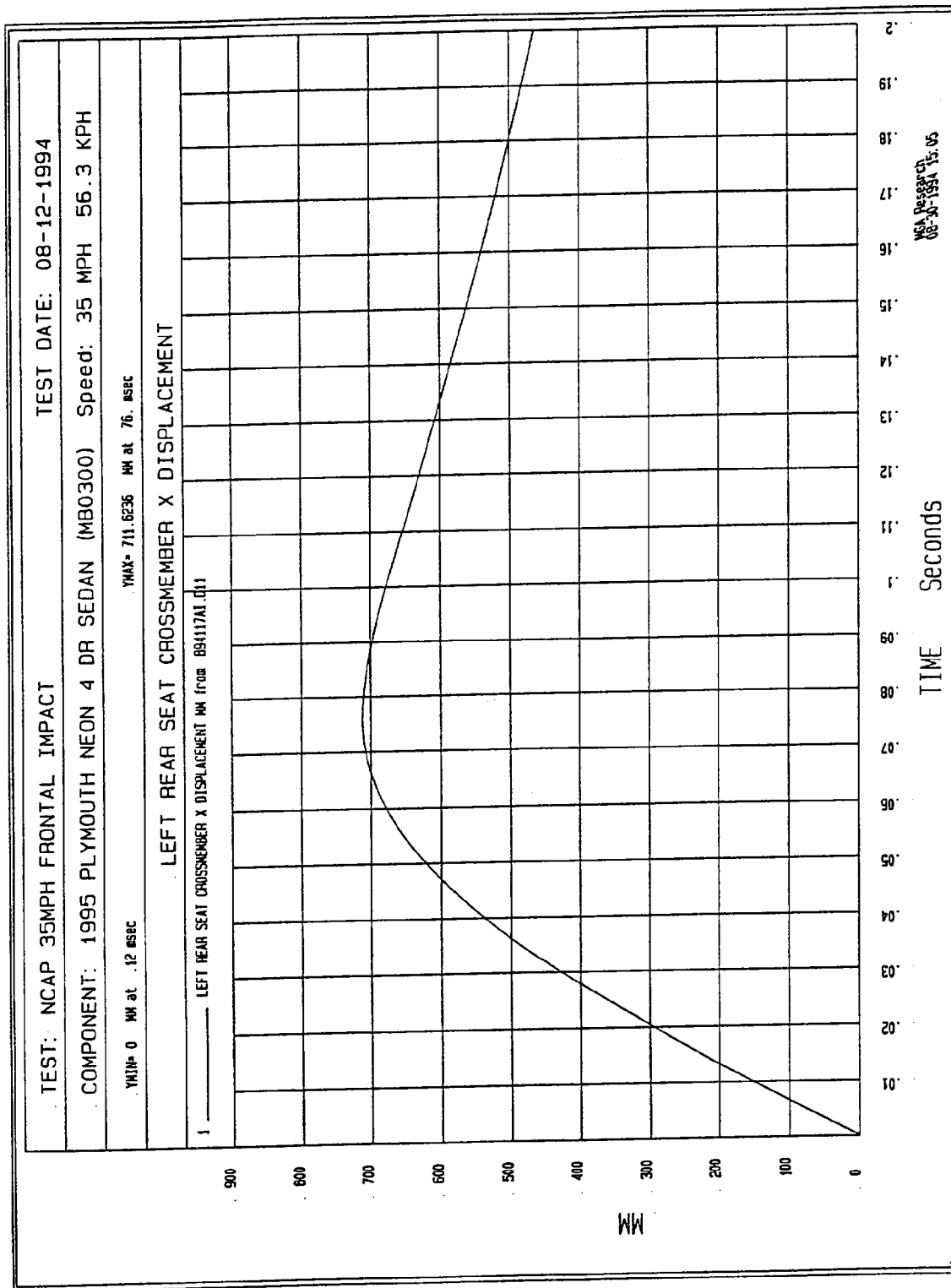


Figure B-9 - Left Rear Seat Crossmember X Displacement vs. Time

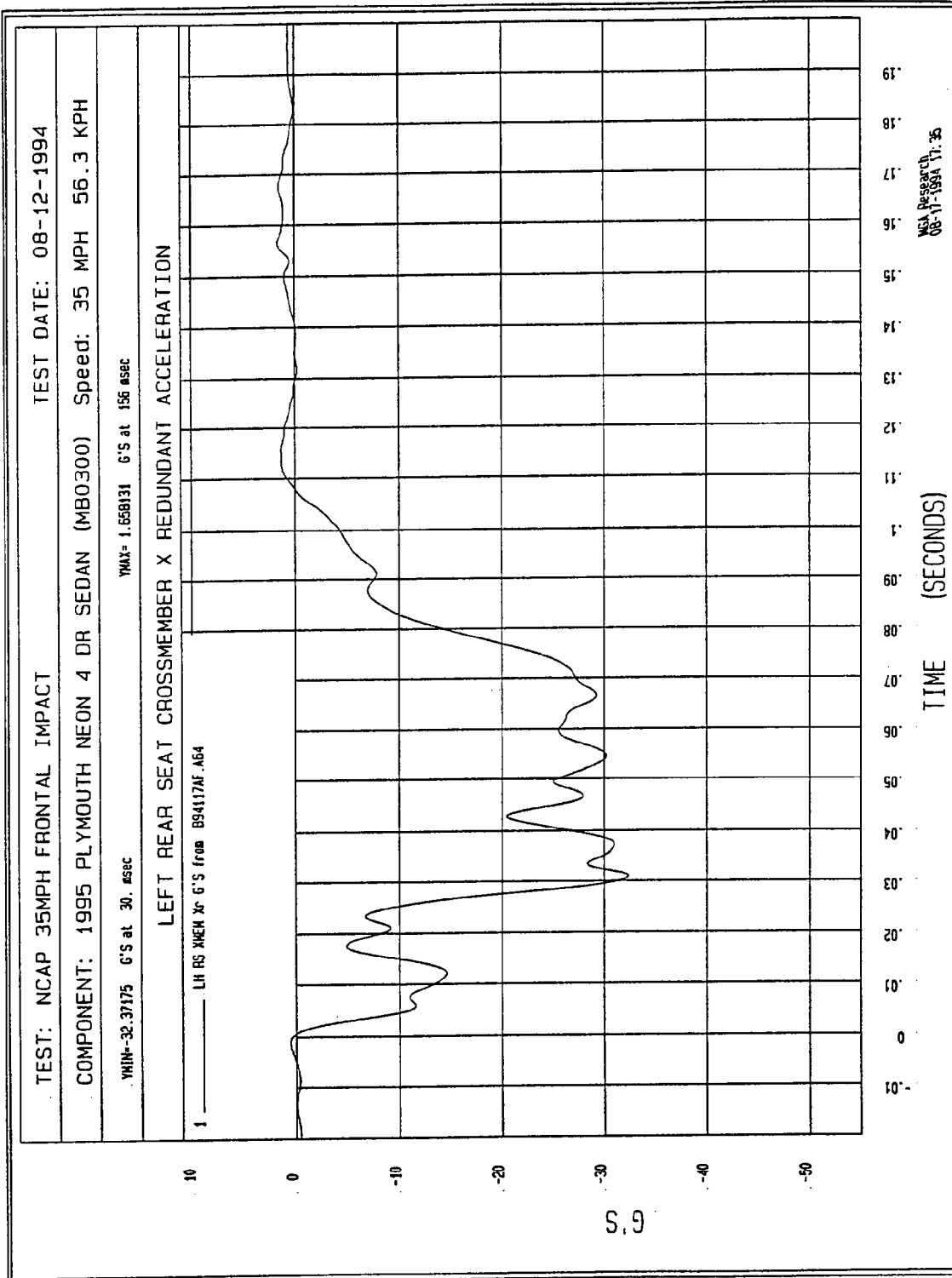


Figure B-10 - Left Rear Seat Crossmember X Redundant Acceleration vs. Time

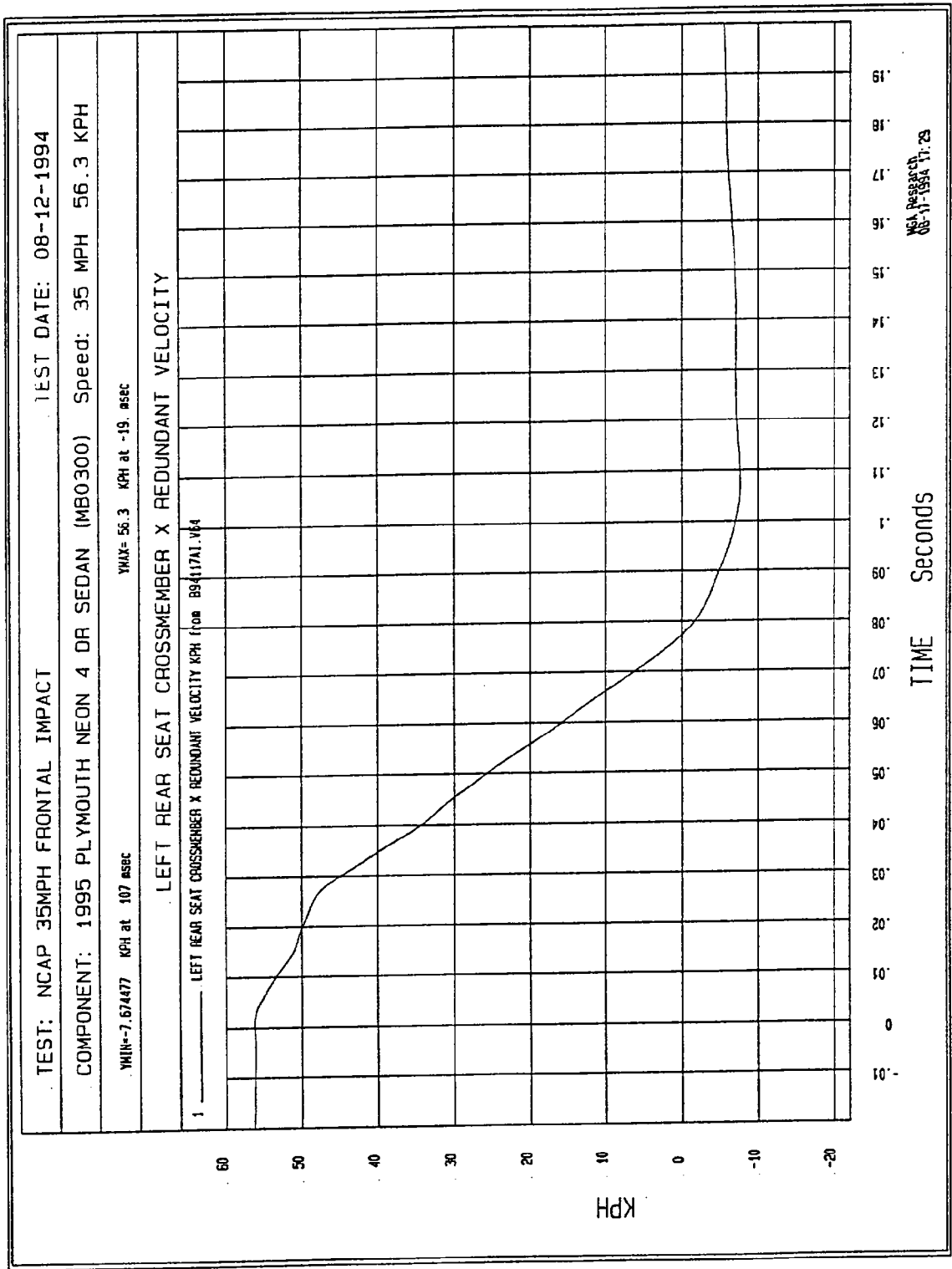


Figure B-11 - Left Rear Seat Crossmember X Redundant Velocity vs. Time

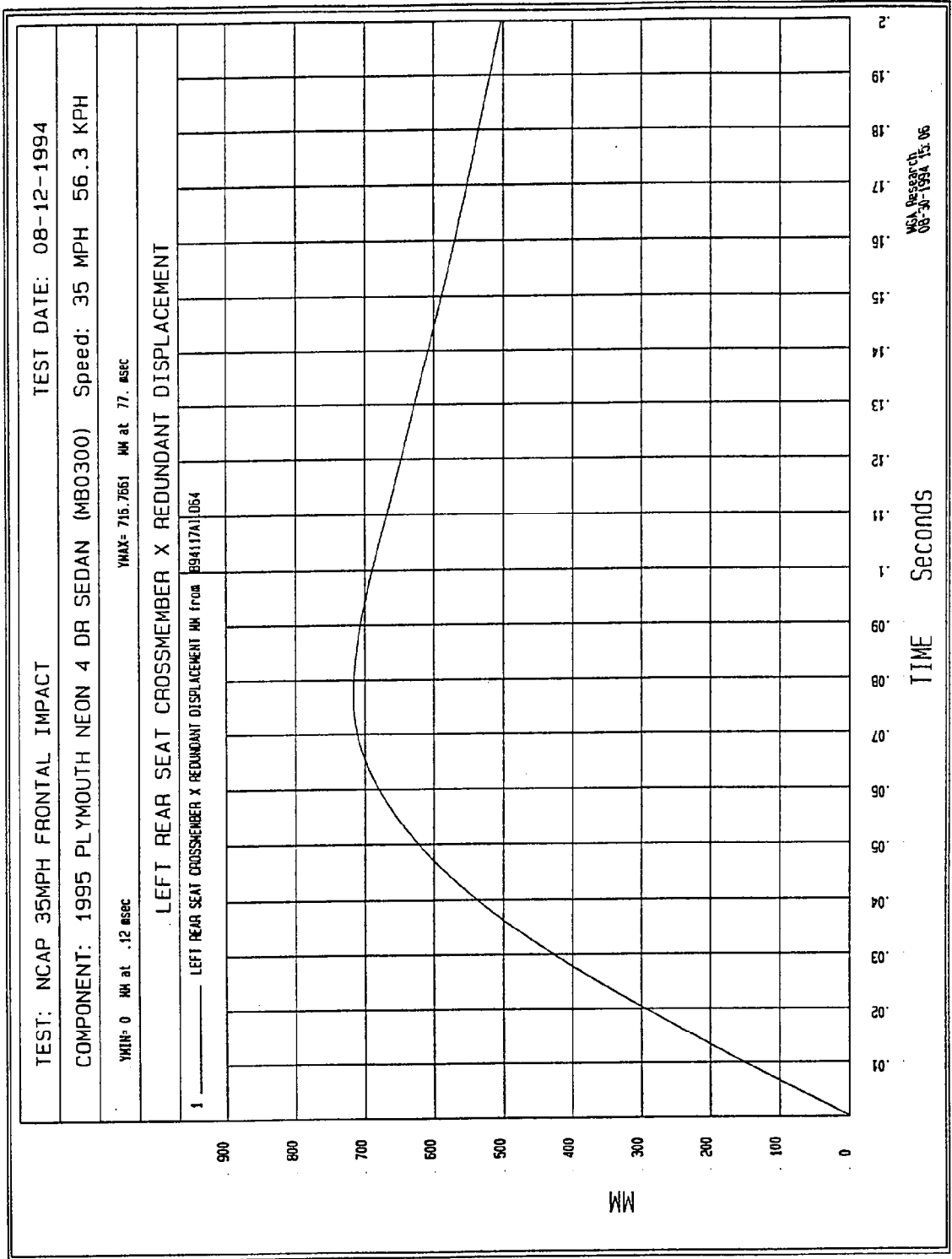


Figure B-12 - Left Rear Seat Crossmember X Redundant Displacement vs. Time

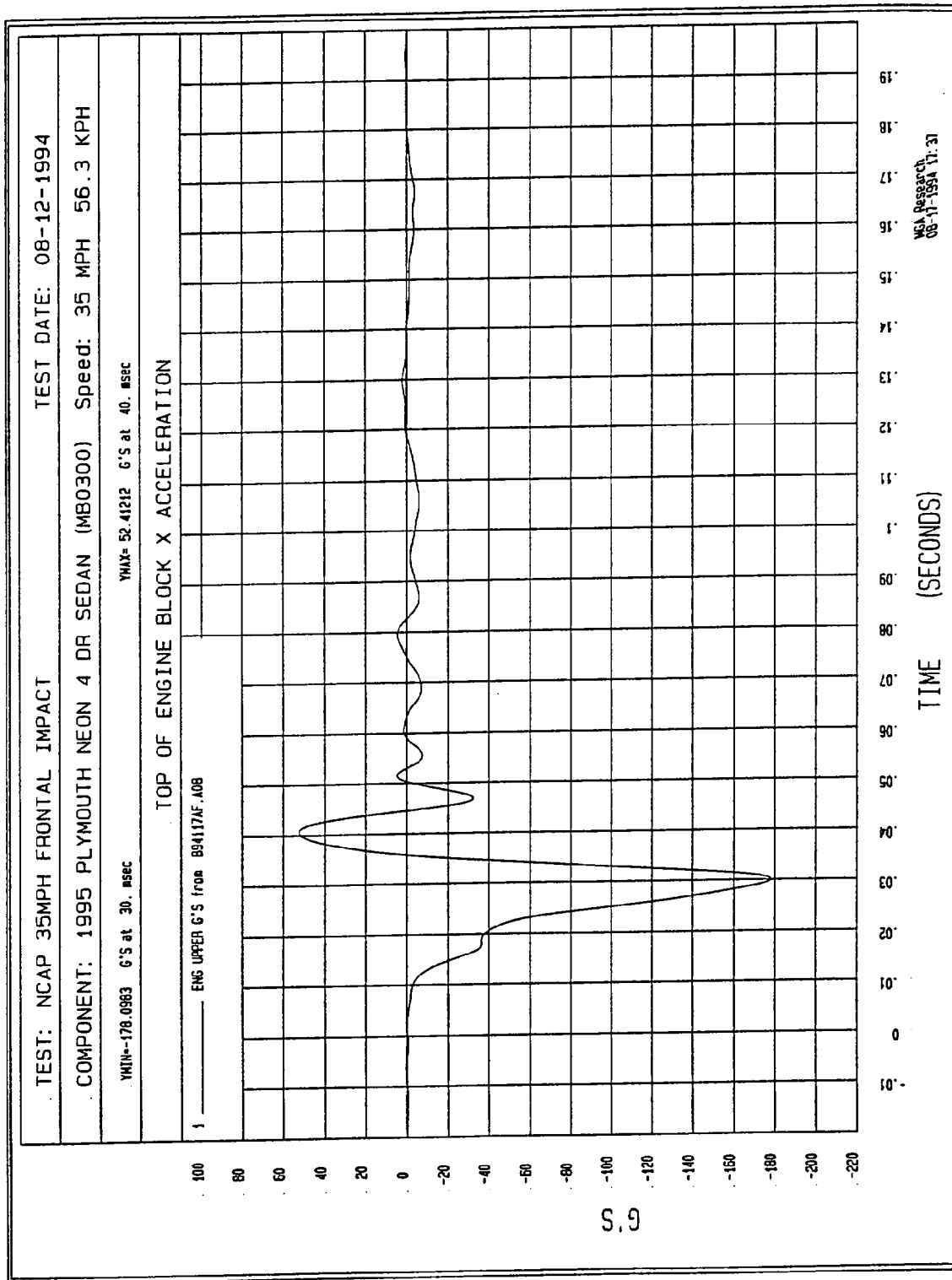


Figure B-13 - Top of Engine Block X Acceleration vs. Time

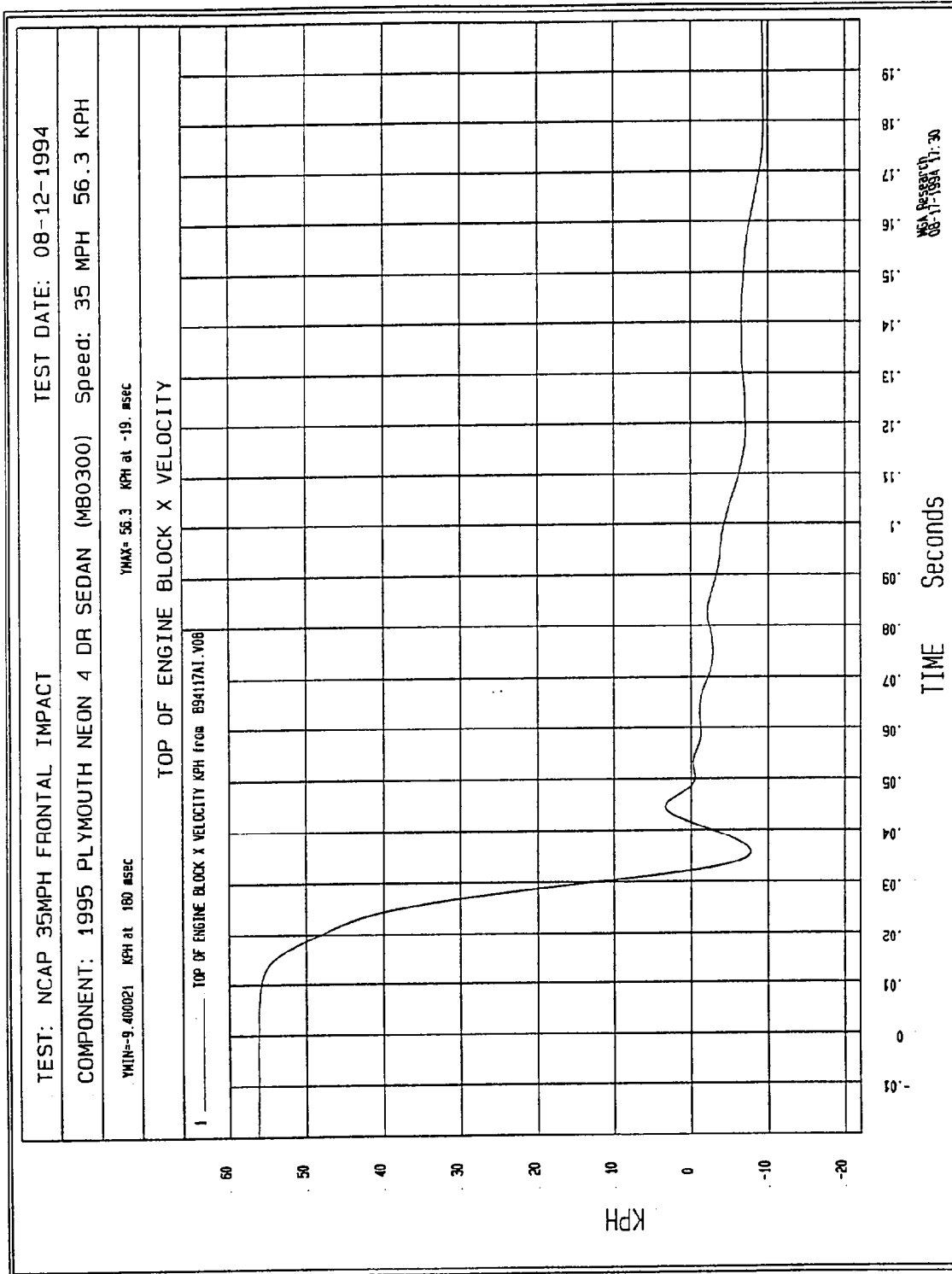


Figure B-14 - Top of Engine Block X Velocity vs. Time

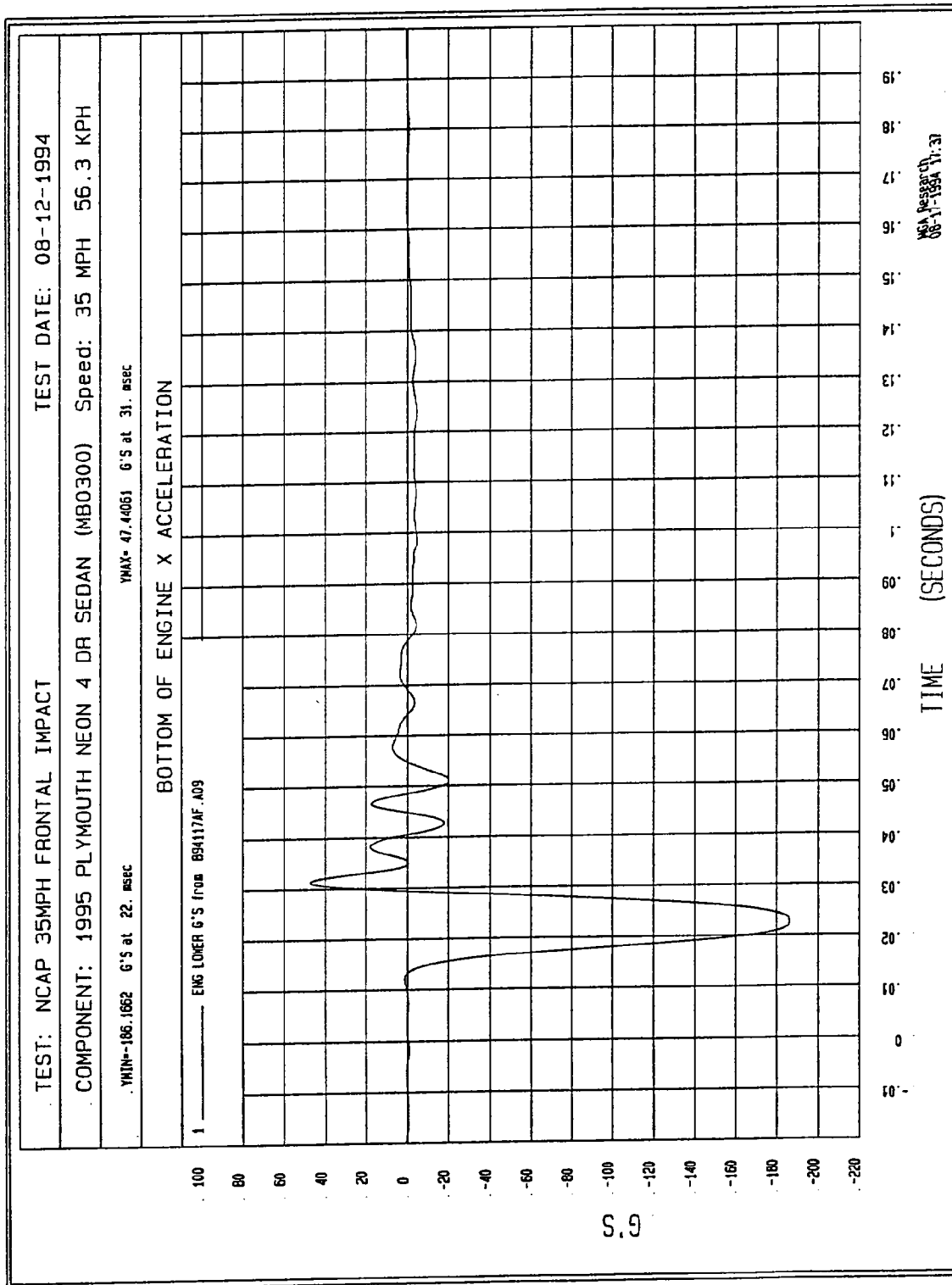


Figure B-15 - Bottom of Engine X Acceleration vs. Time

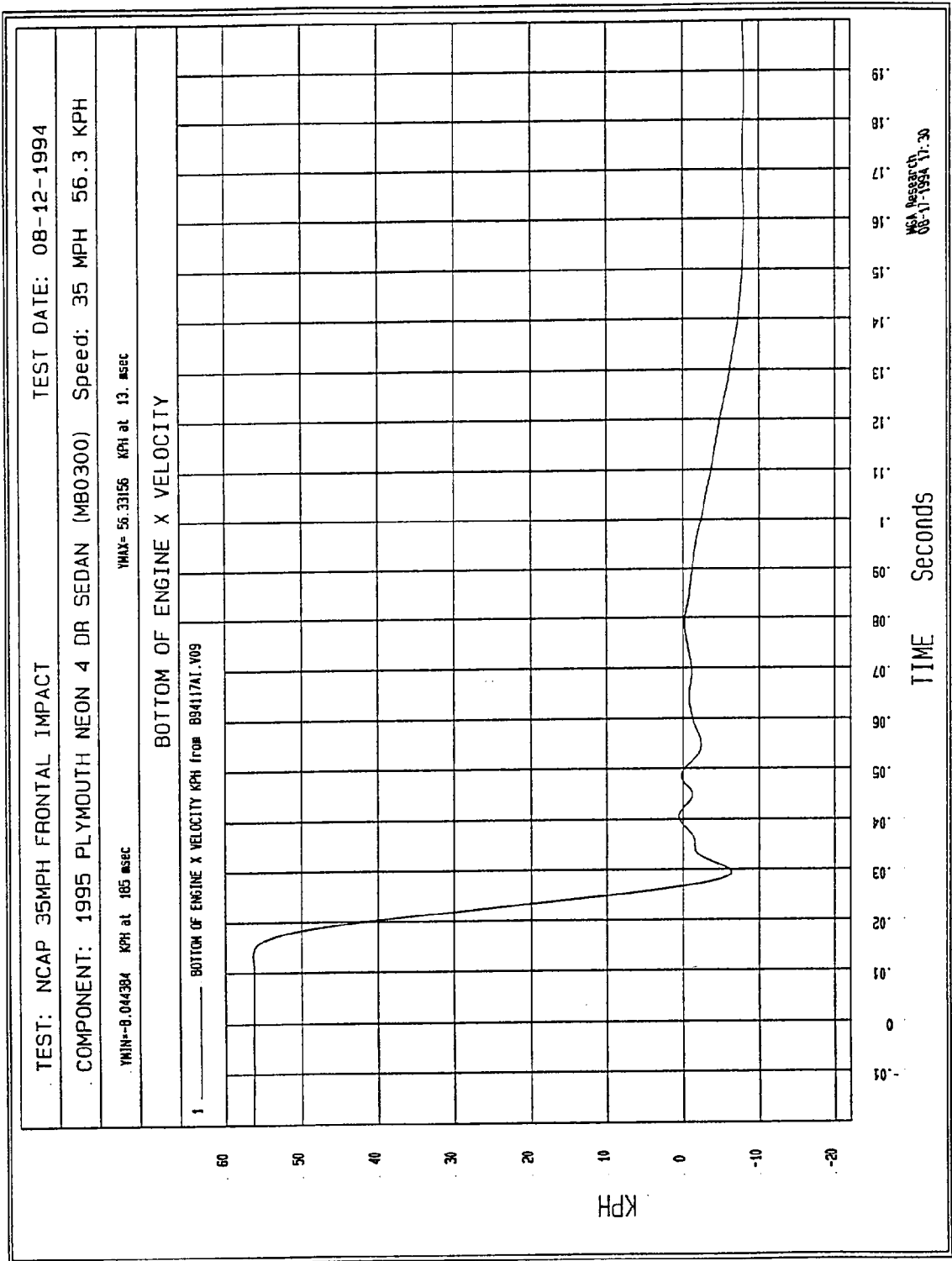


Figure B-16 - Bottom of Engine X Velocity vs. Time

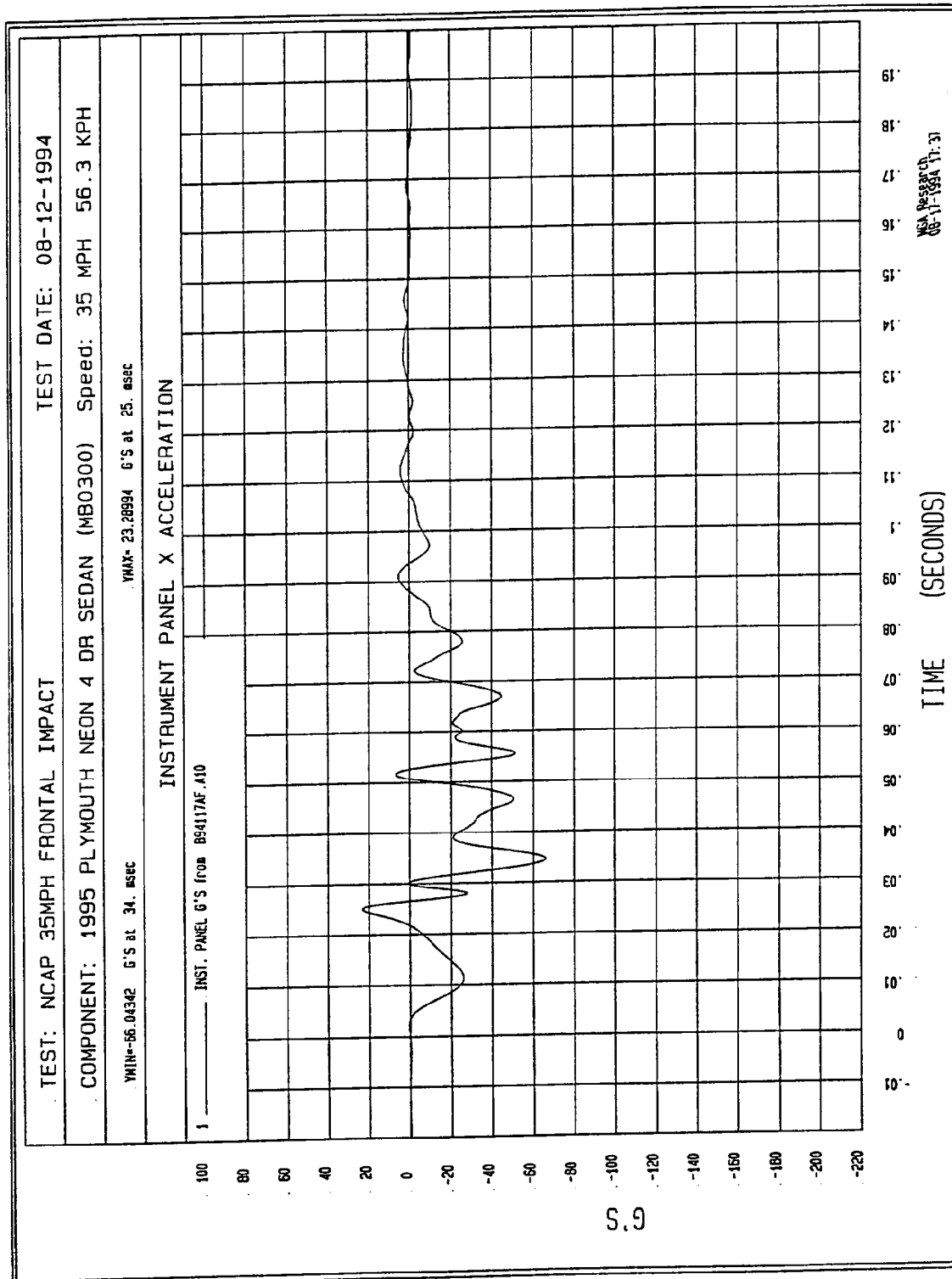


Figure B-17 - Instrument Panel X Acceleration vs. Time

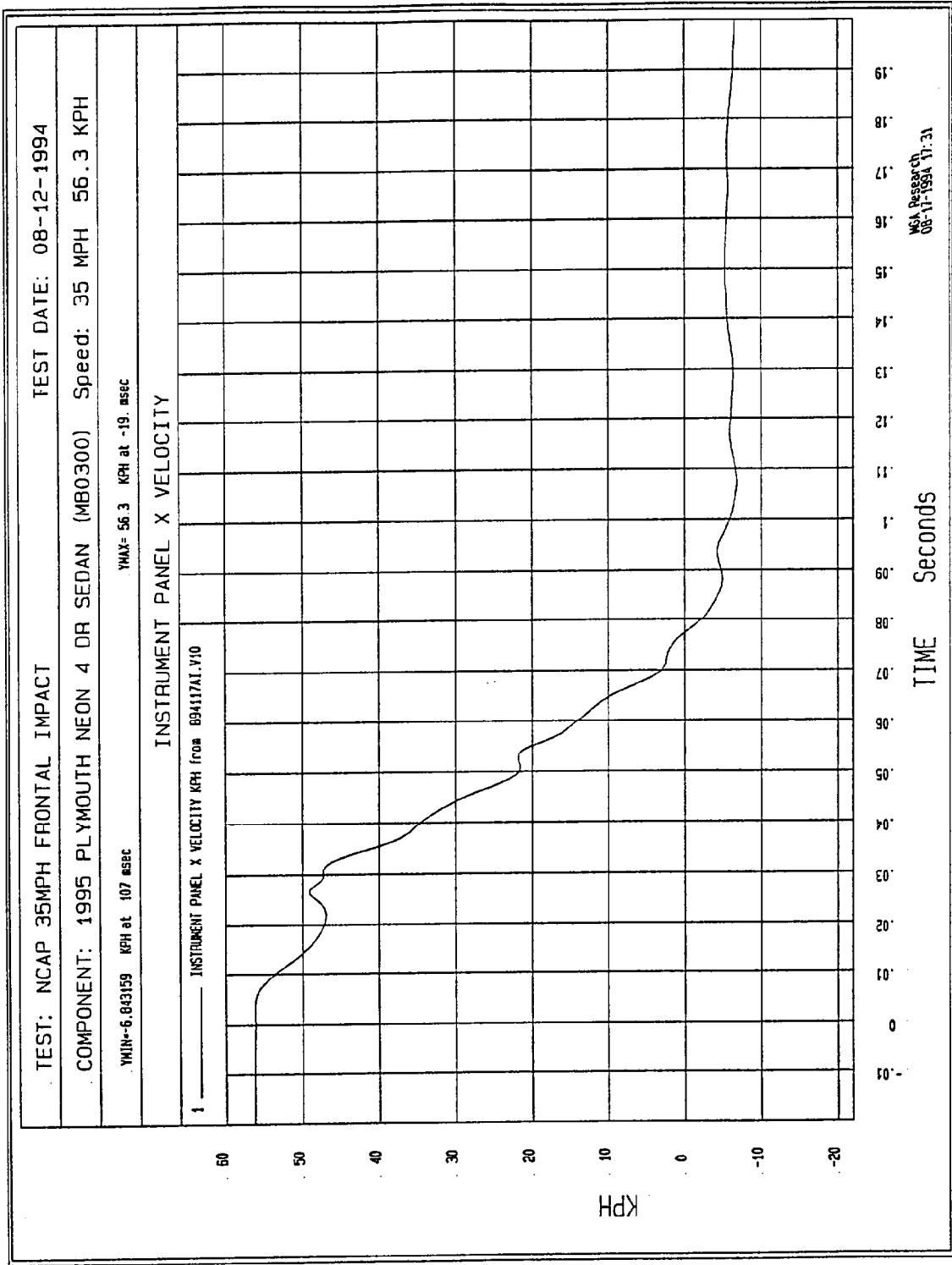


Figure B-18 - Instrument Panel X Velocity vs. Time

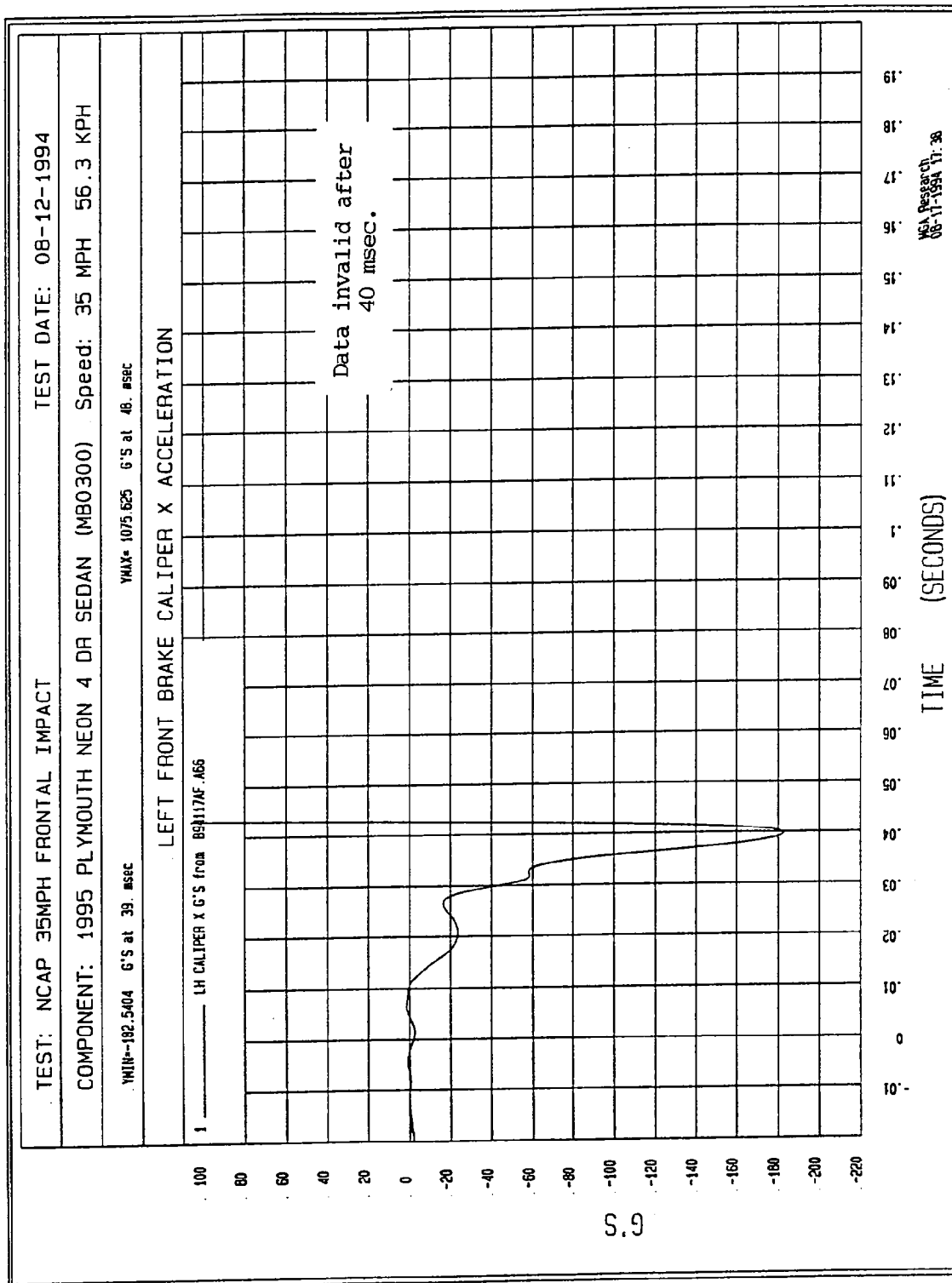


Figure B-19 - Left Brake Caliper X Acceleration vs. Time

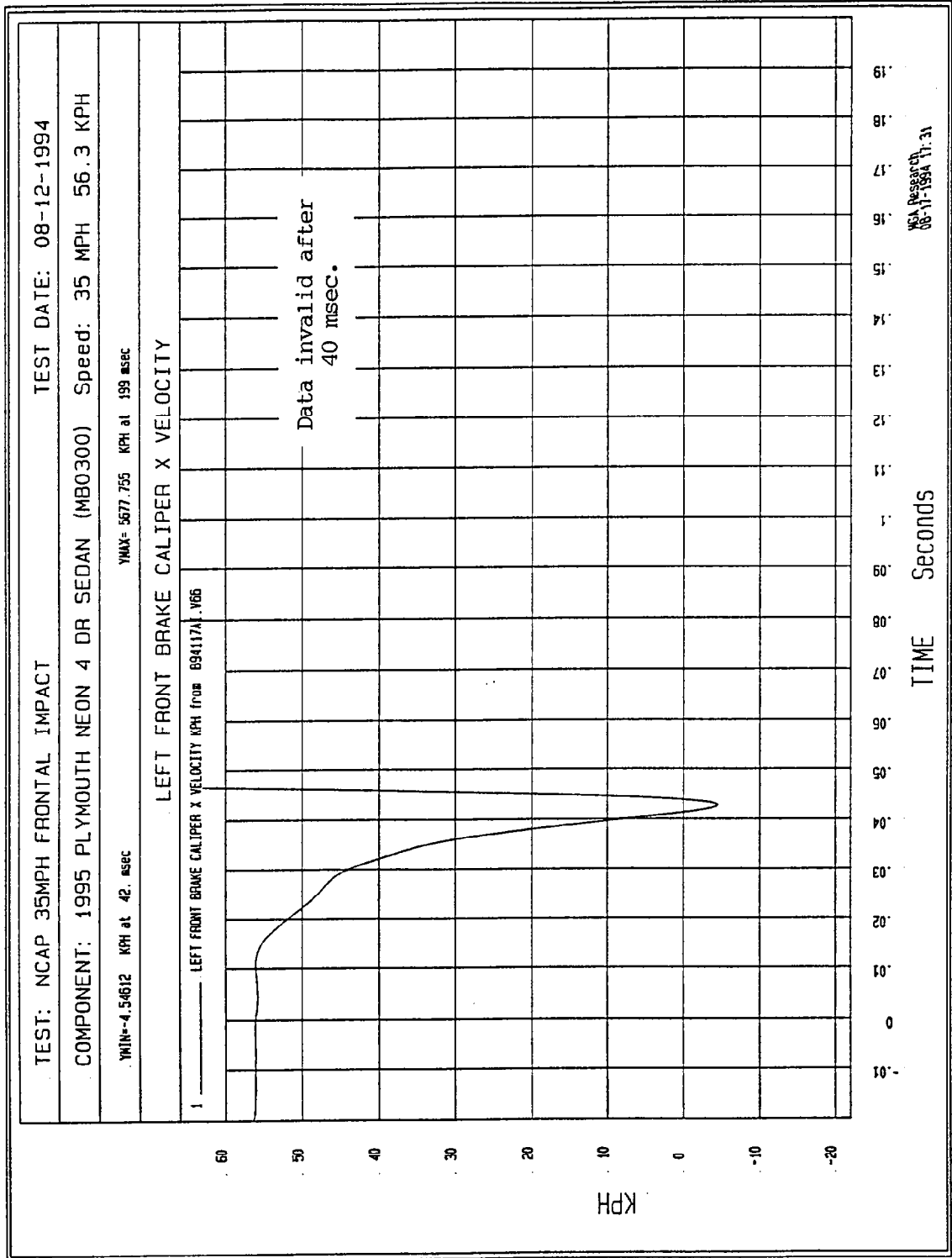


Figure B-20 - Left Brake Caliper X Velocity vs. Time

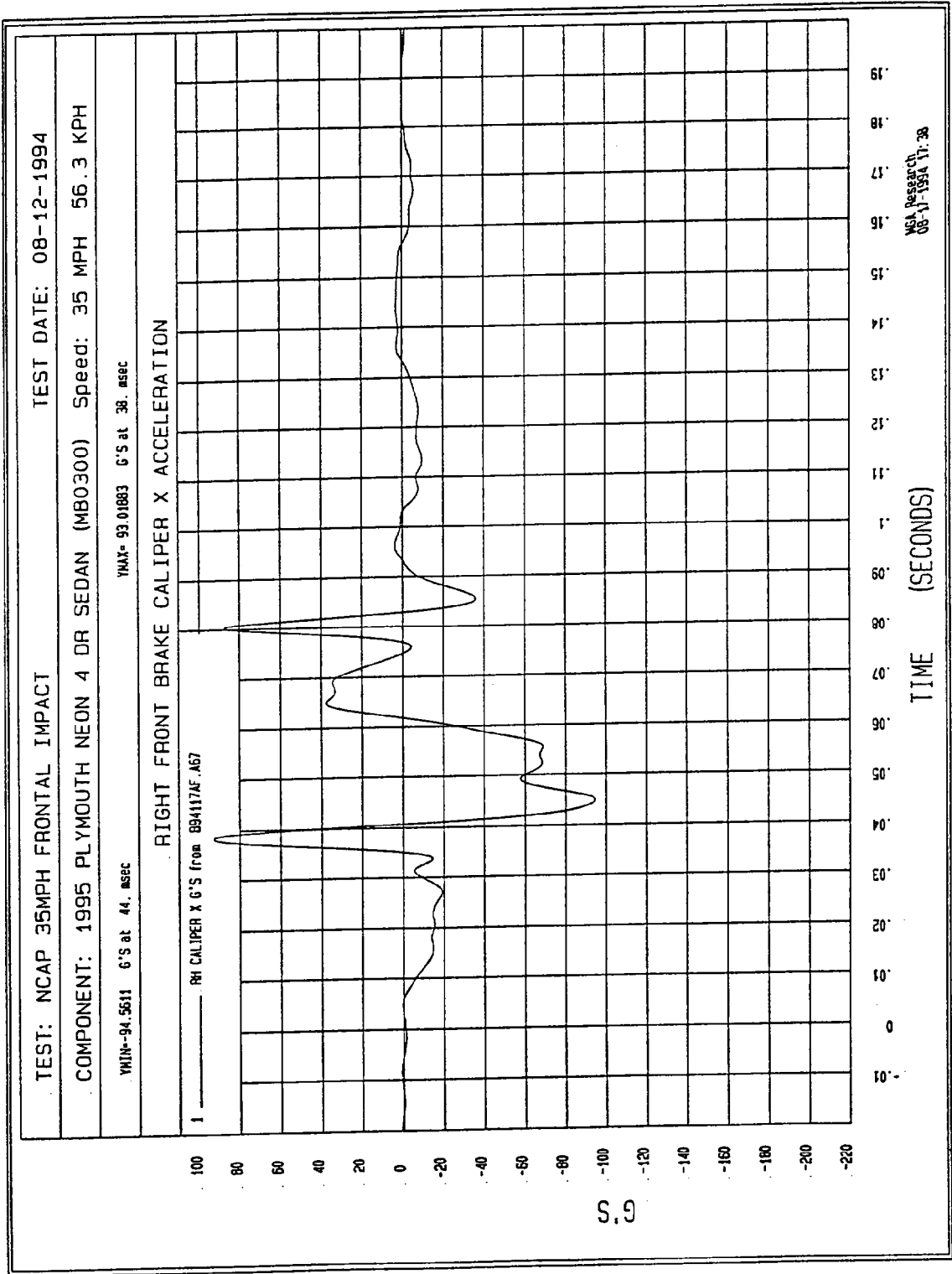


Figure B-21 - Right Brake Caliper X Acceleration vs. Time

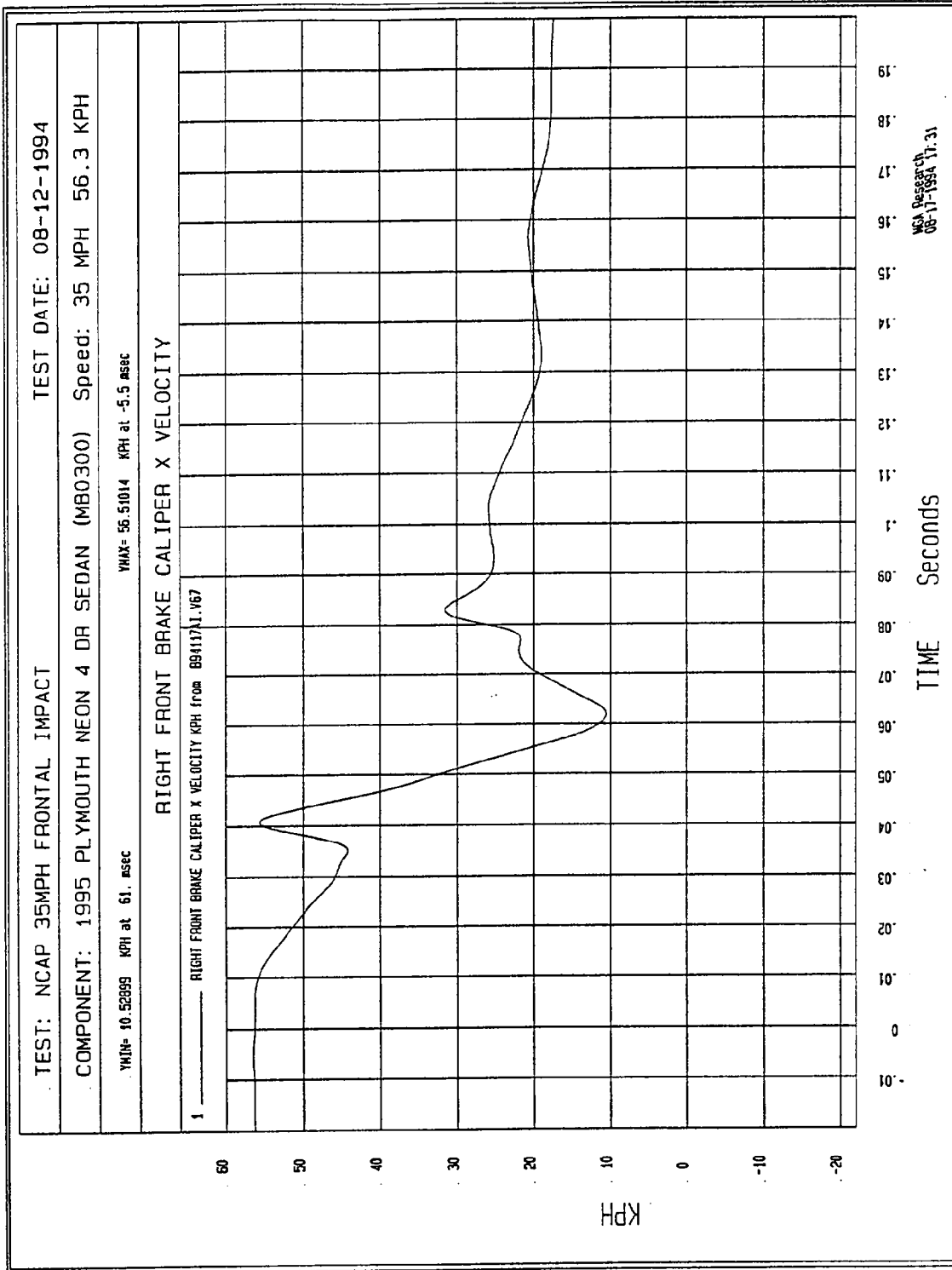


Figure B-22 - Right Brake Caliper X Velocity vs. Time

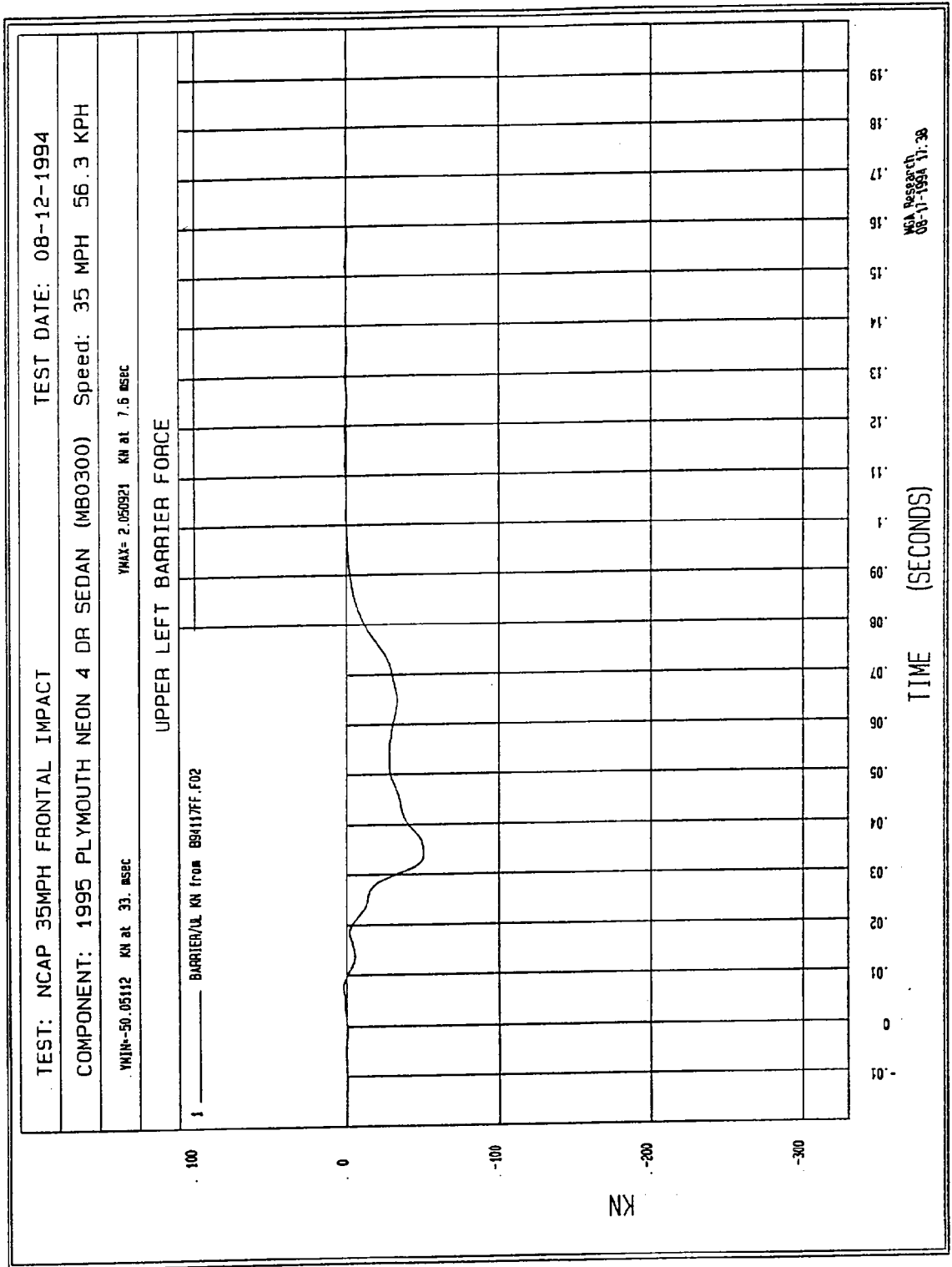
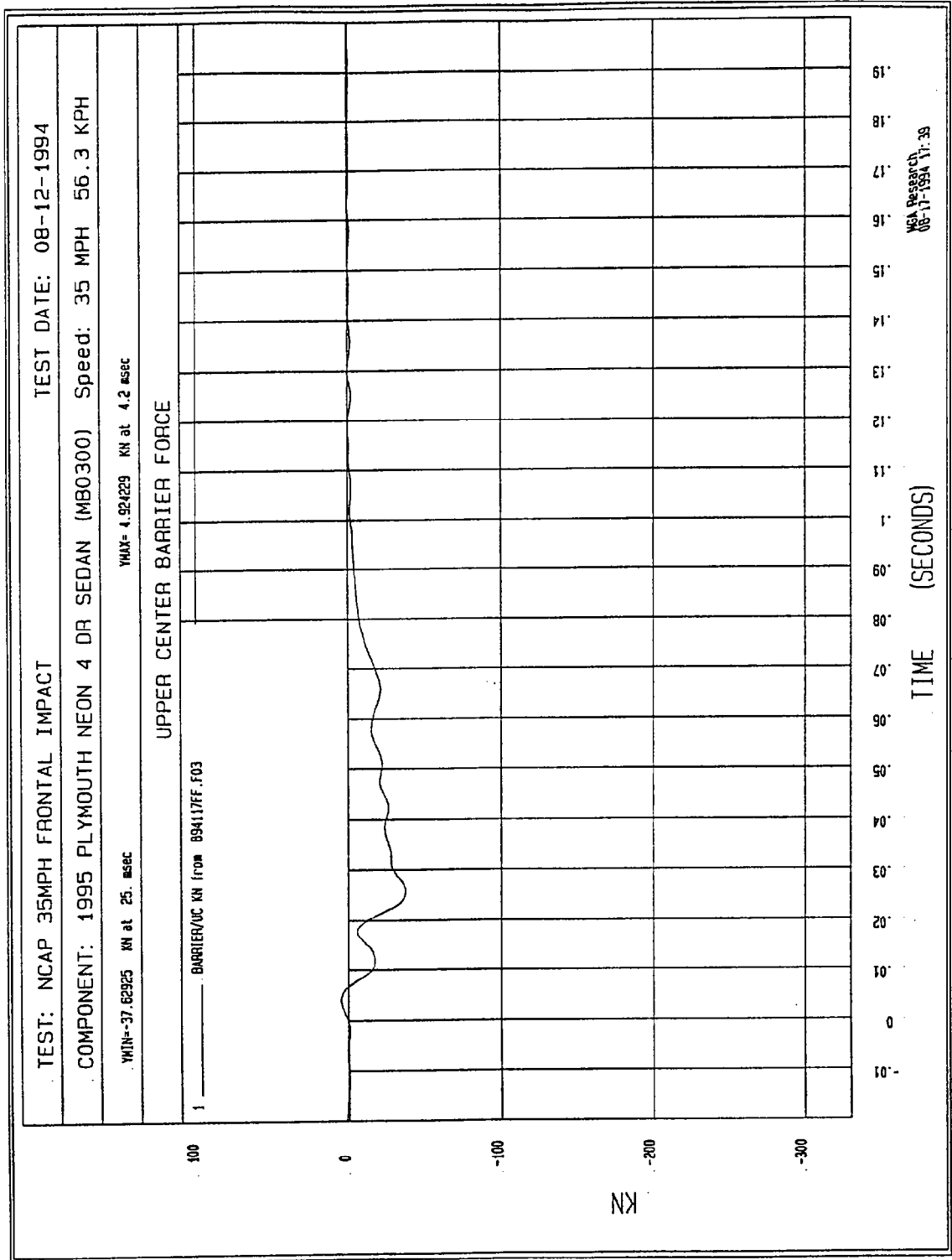


Figure B-23 - Upper Left Barrier Force vs. Time



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Figure B-24 - Upper Center Barrier Force vs. Time

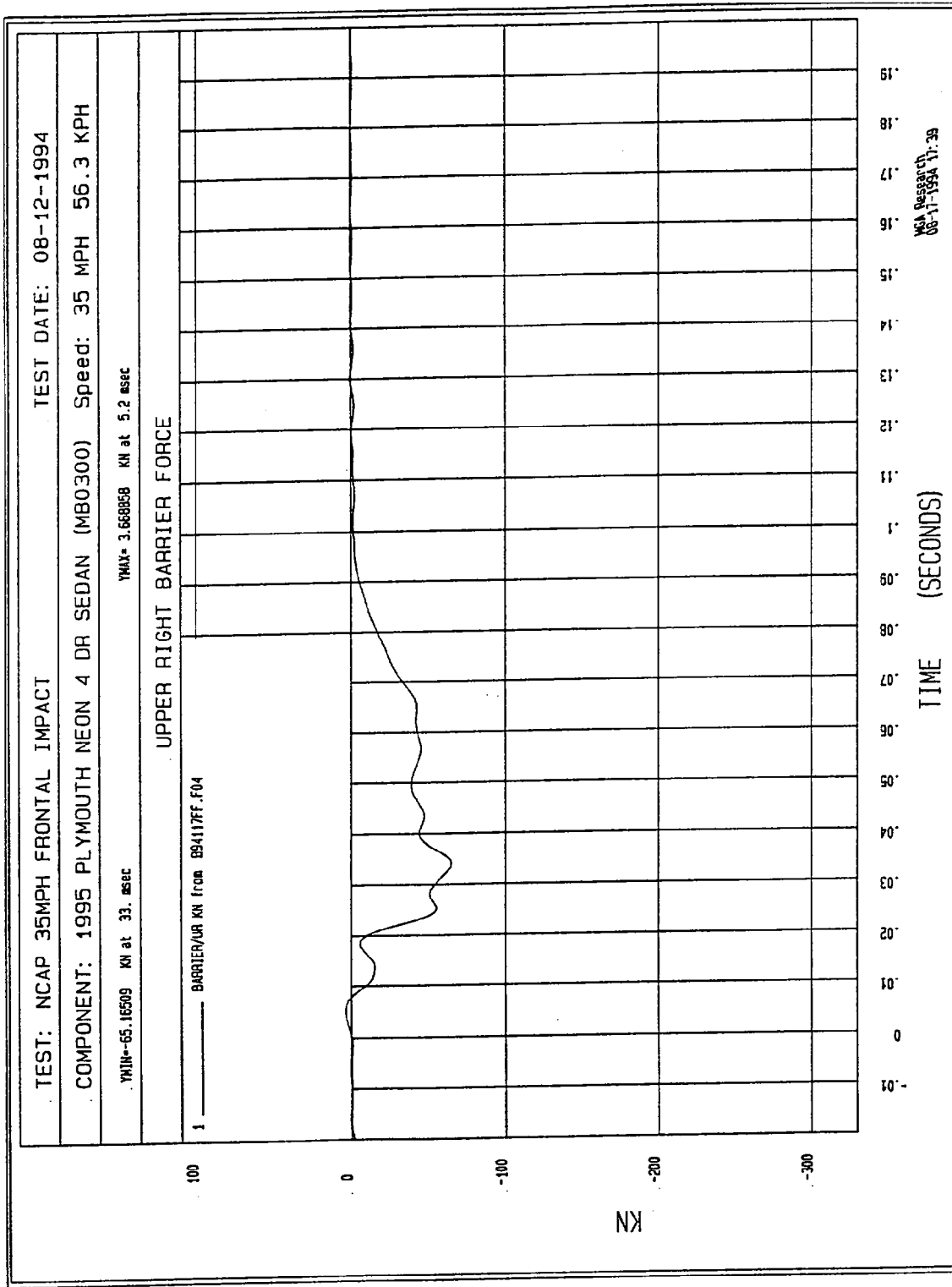


Figure B-25 - Upper Right Barrier Force vs. Time

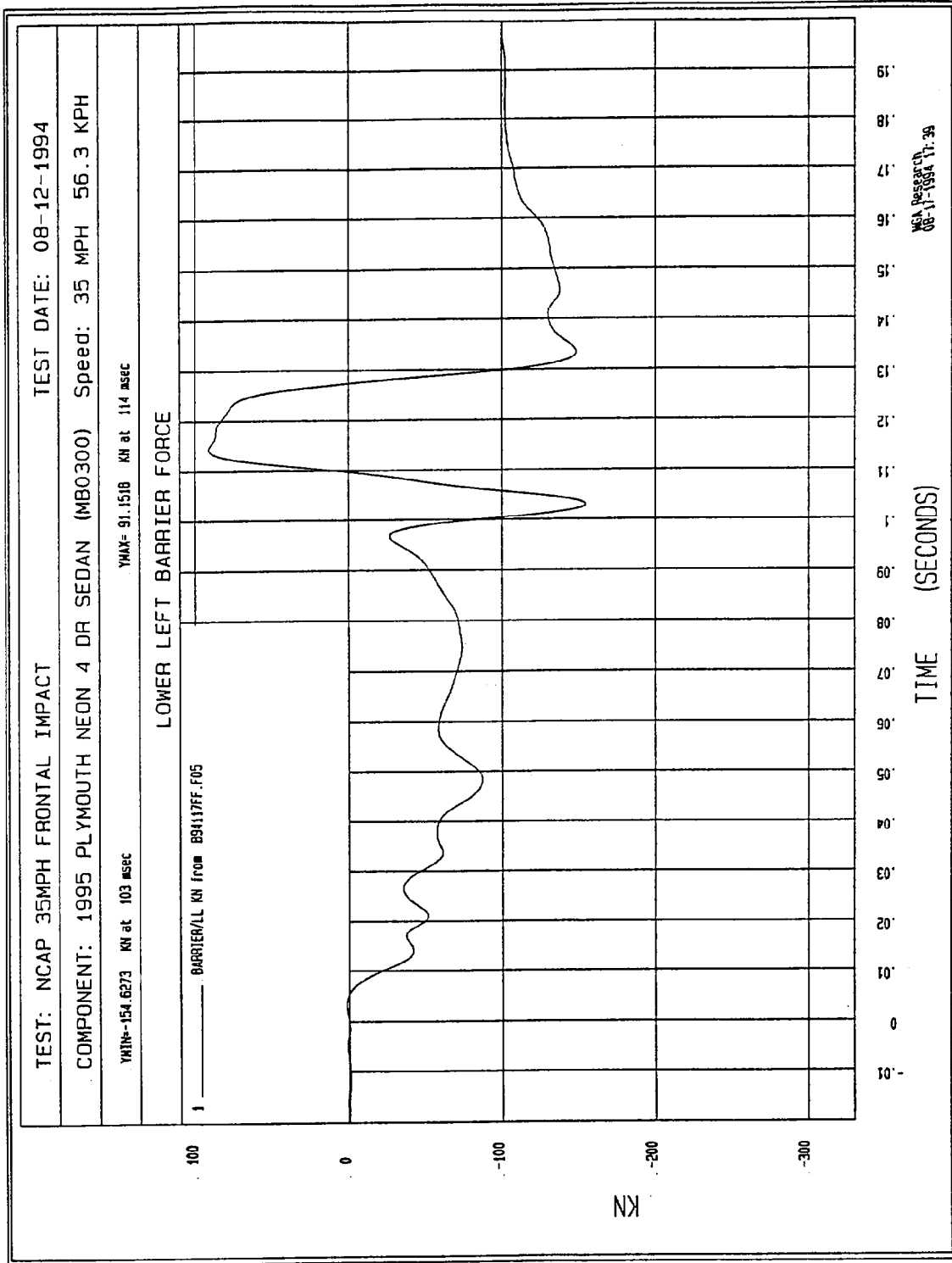


Figure B-26 - Lower Left Barrier Force vs. Time

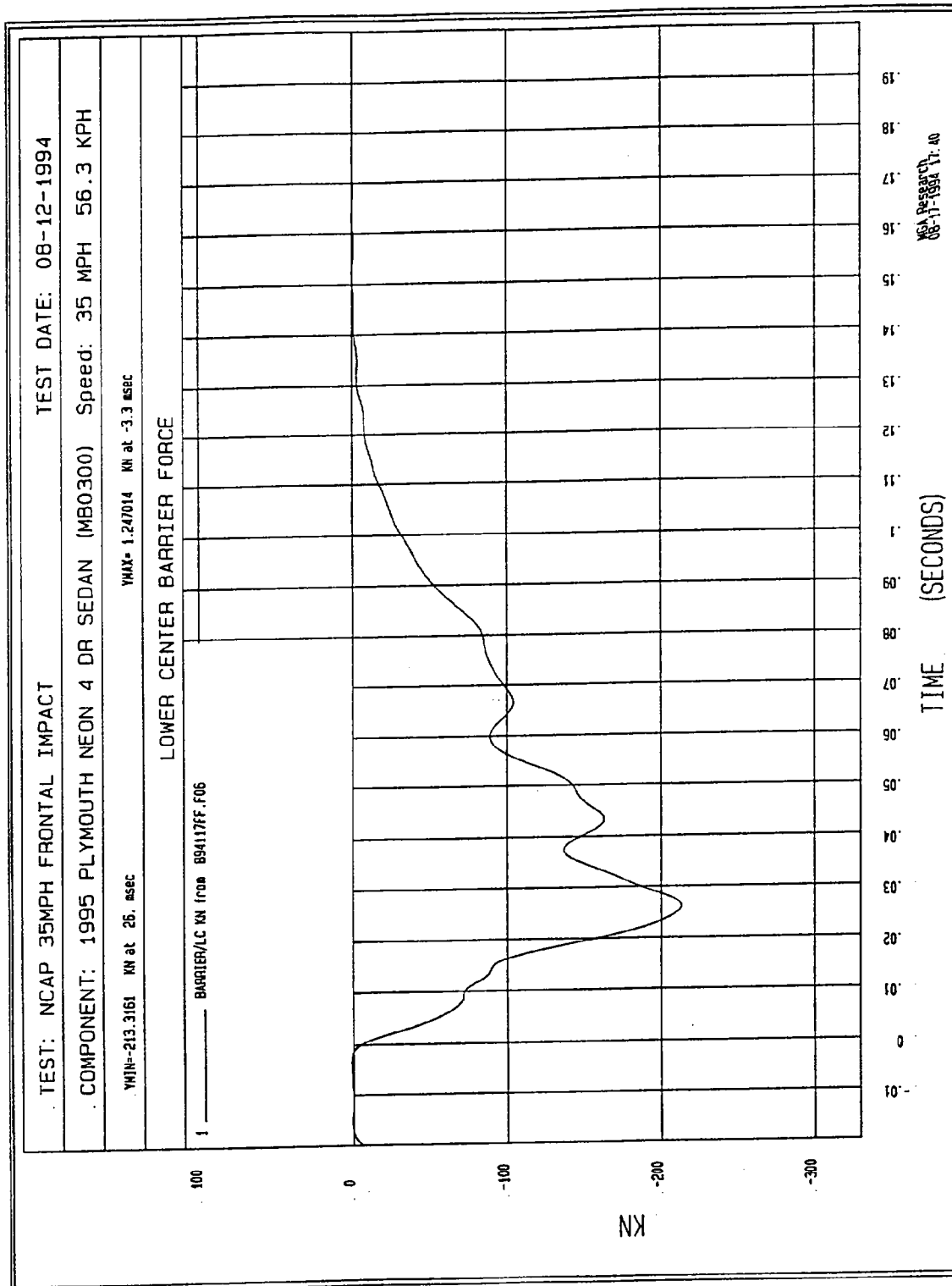


Figure B-27 - Lower Center Barrier Force vs. Time

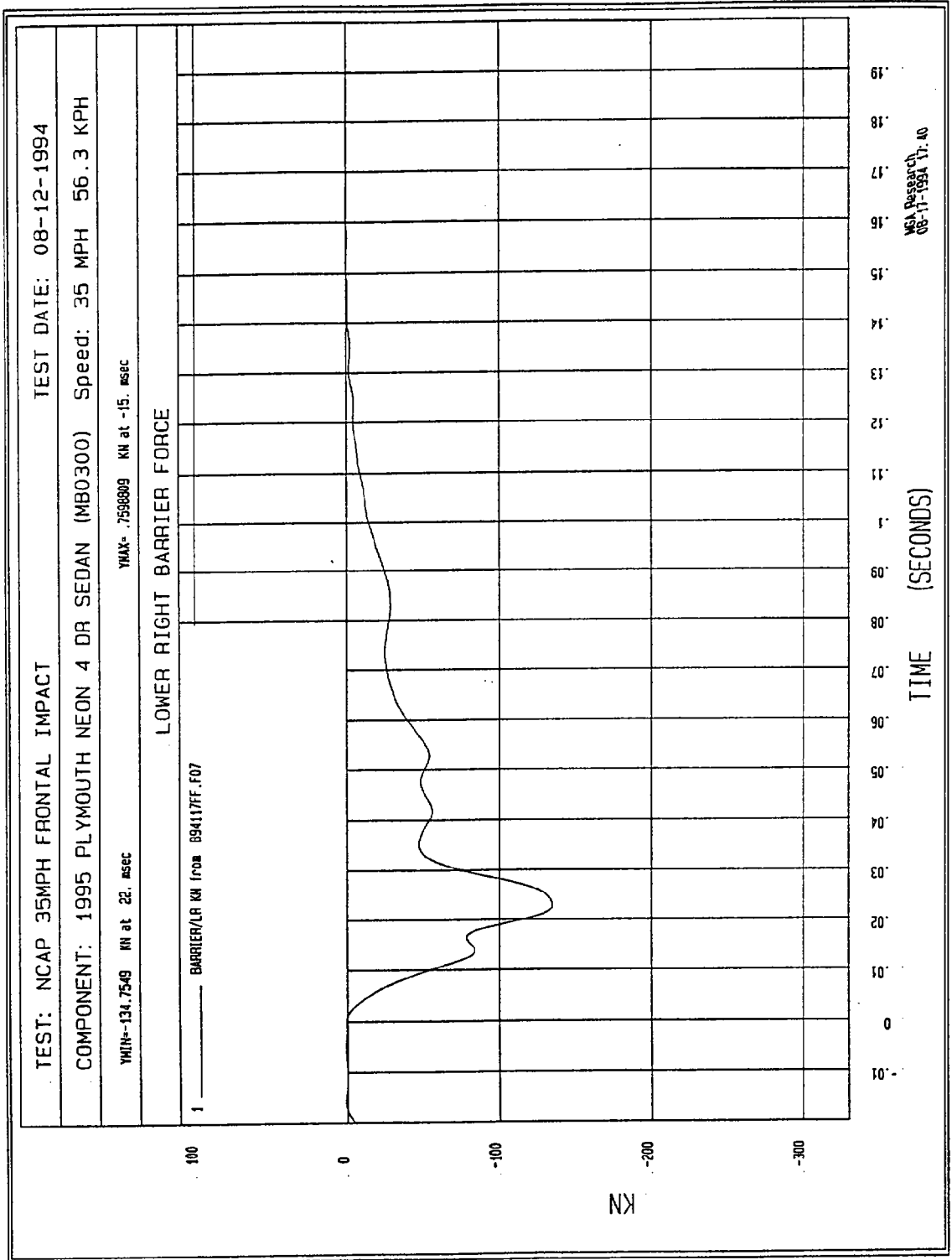


Figure B-28 - Lower Right Barrier Force vs. Time

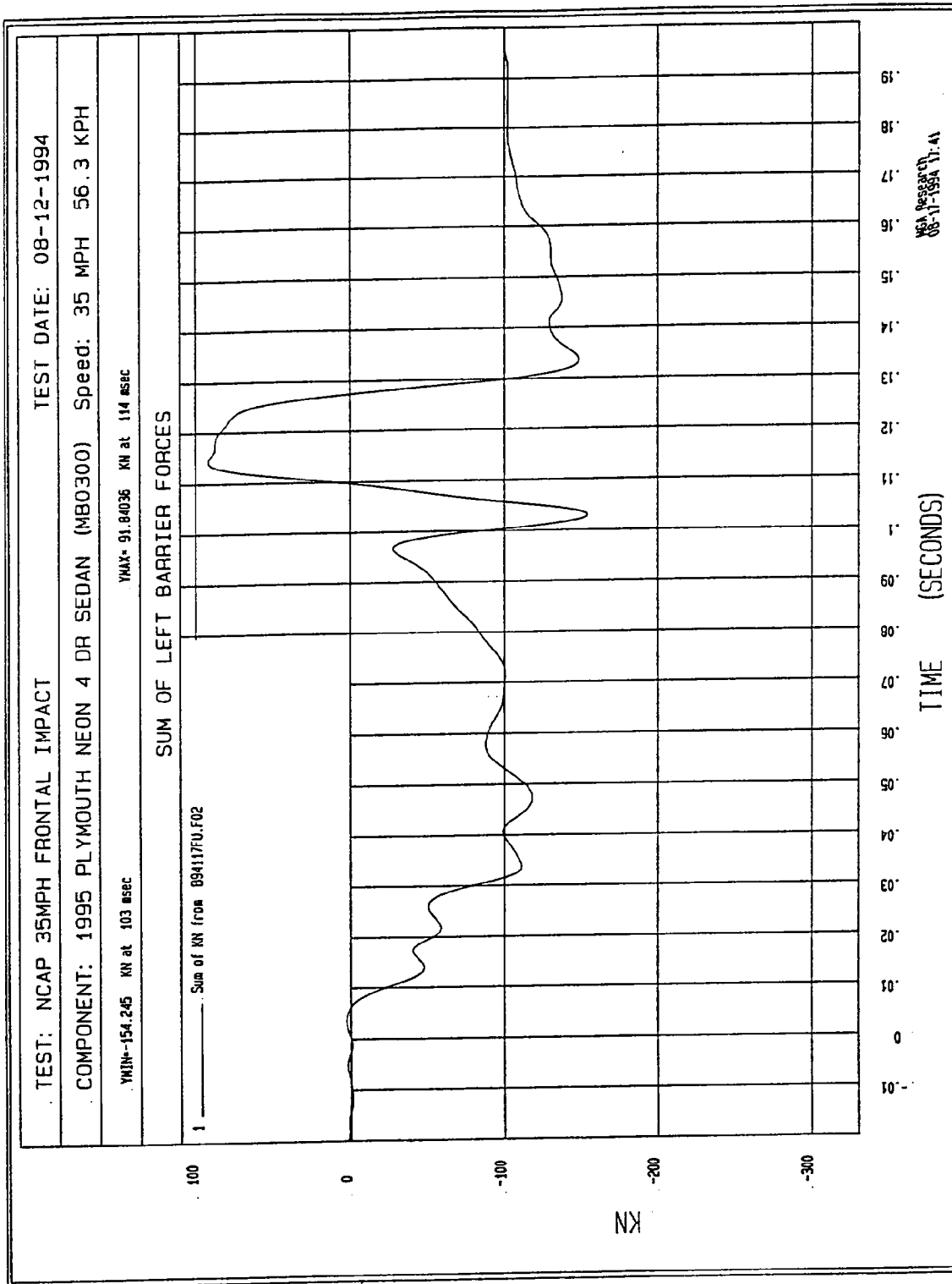
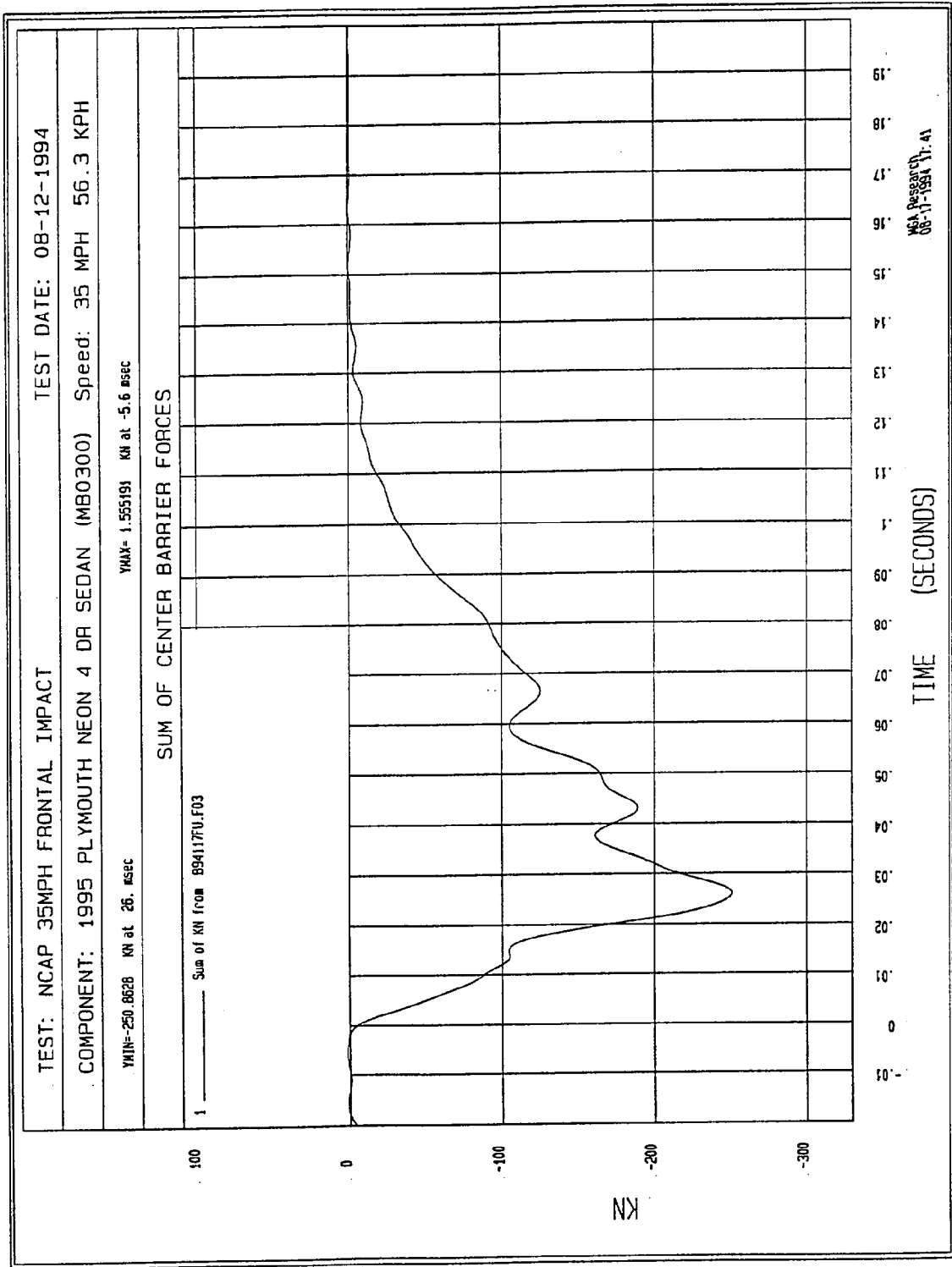


Figure B-29 - Sum of Left Barrier Forces vs. Time



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Figure B-30 - Sum of Center Barrier Forces vs. Time

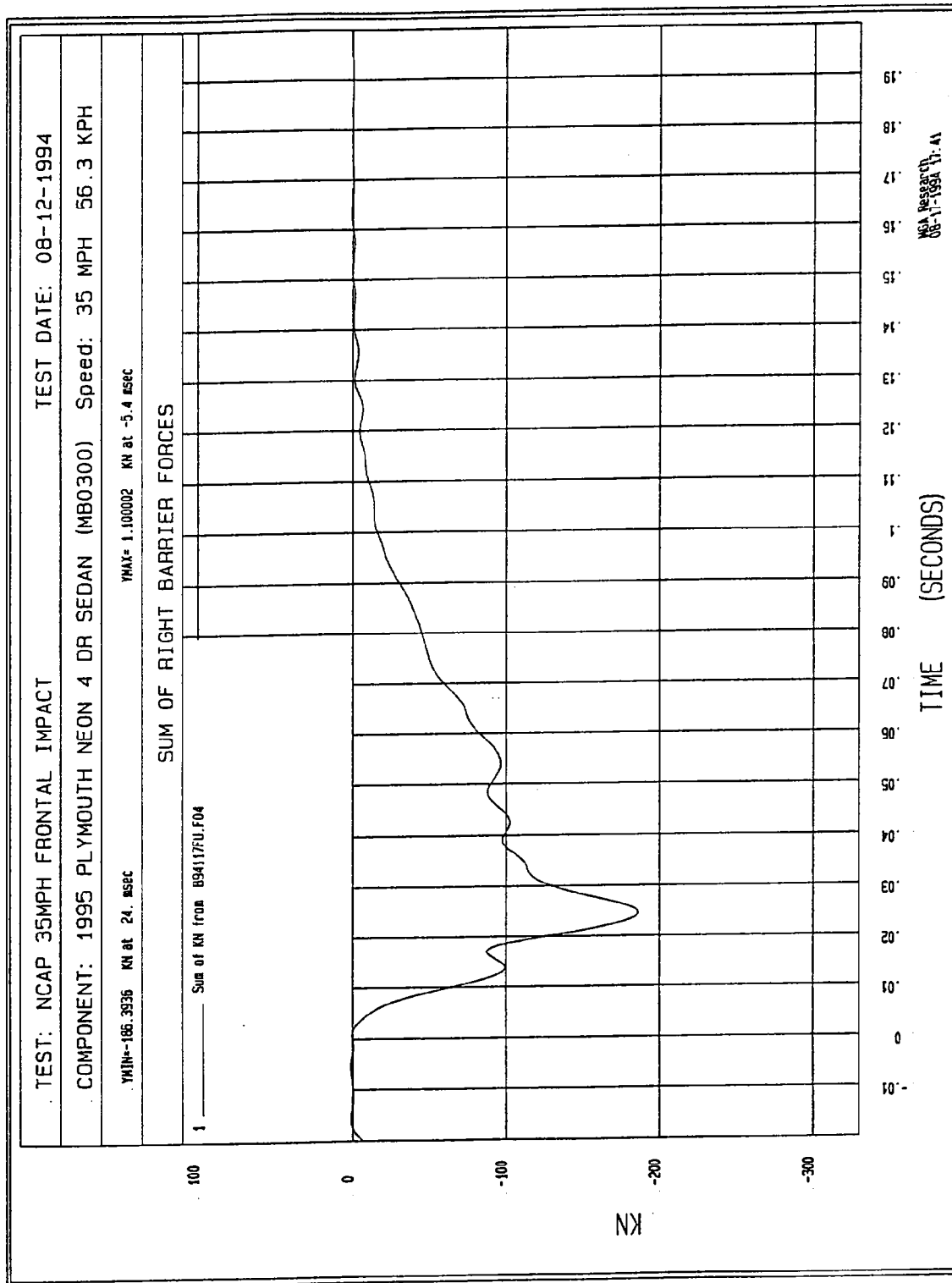


Figure B-31 - Sum of Right Barrier Forces vs. Time

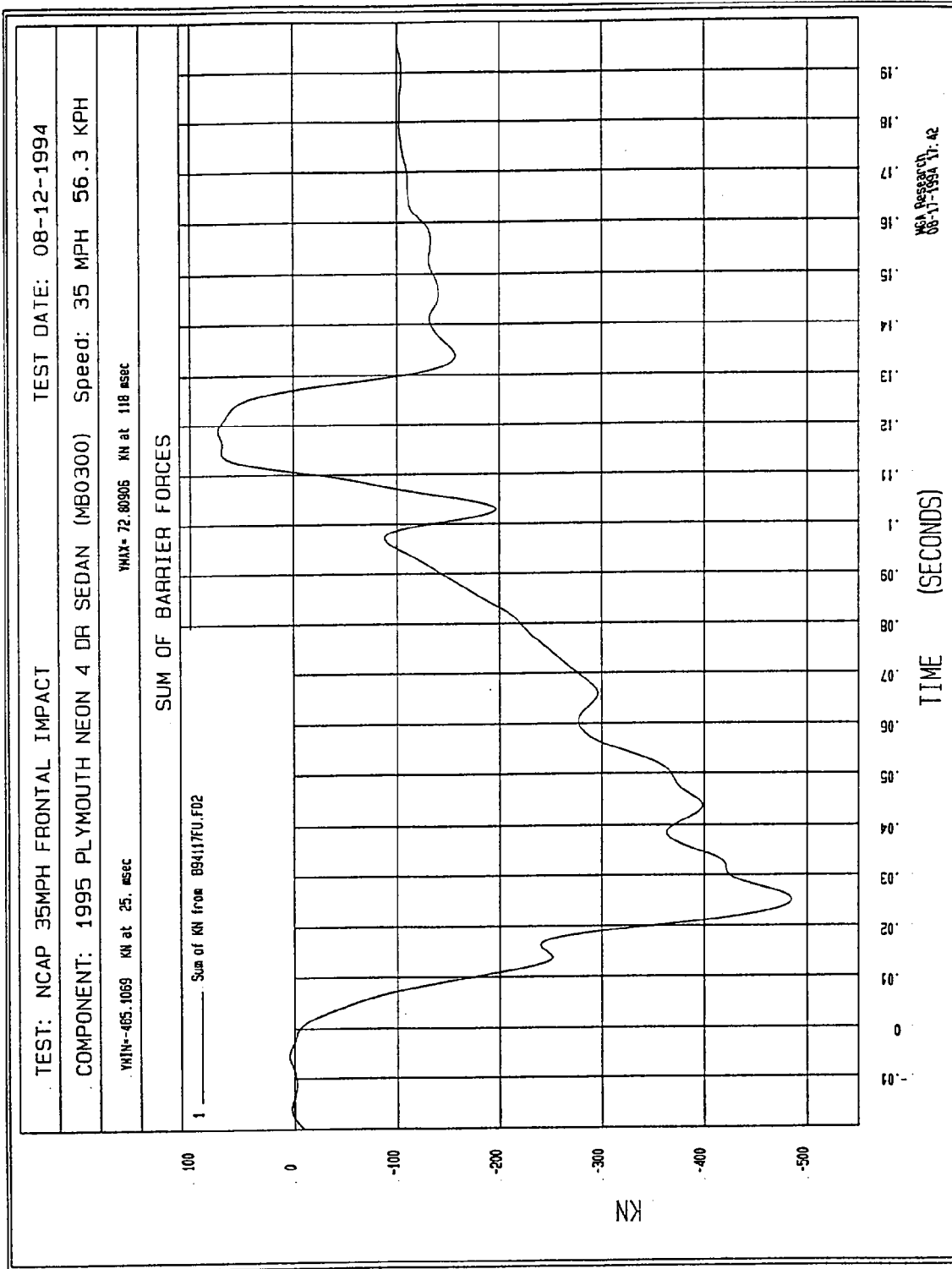


Figure B-32 - Sum of Barrier Forces vs. Time

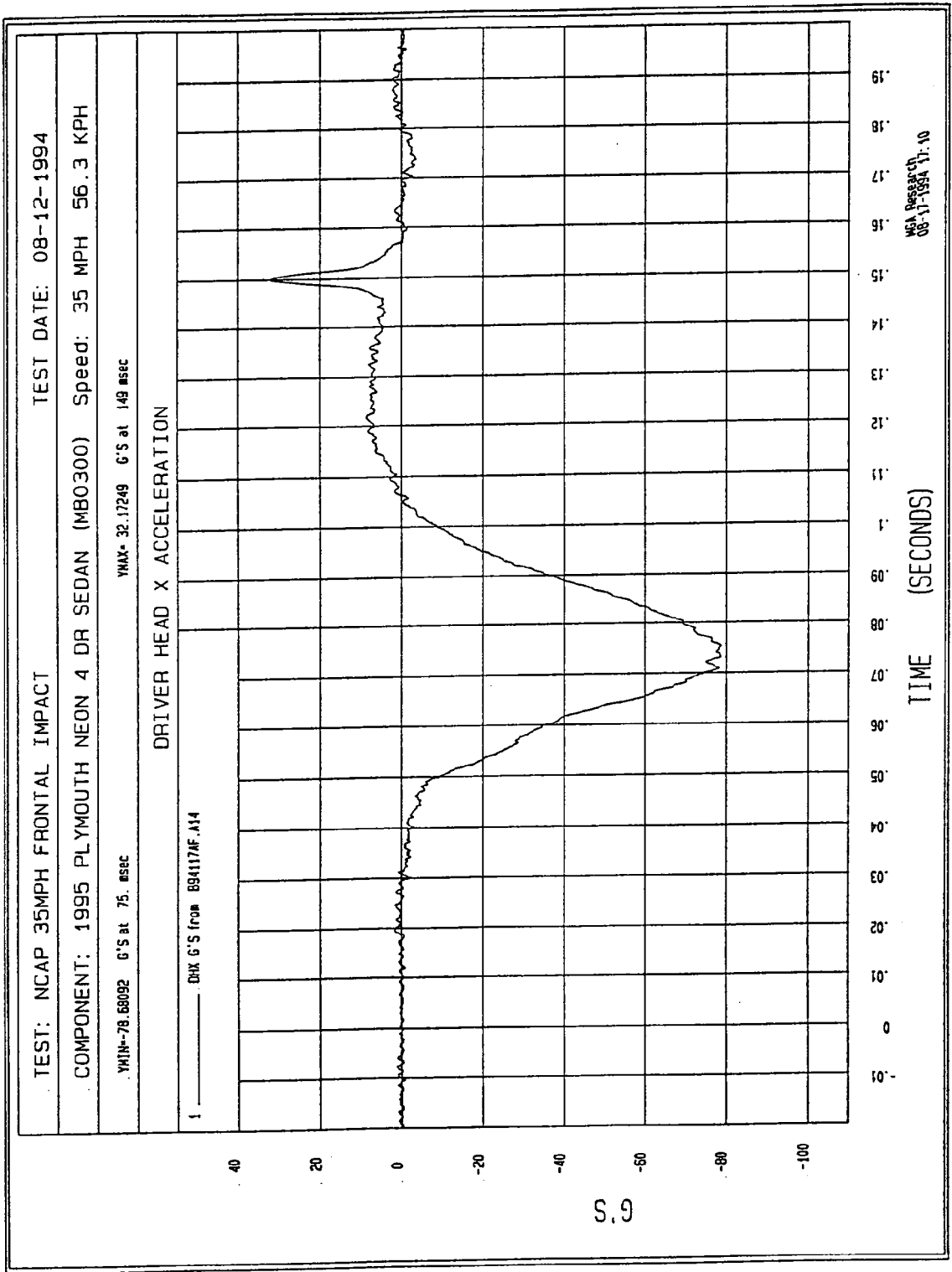


Figure B-33 - Driver Head X Acceleration vs. Time

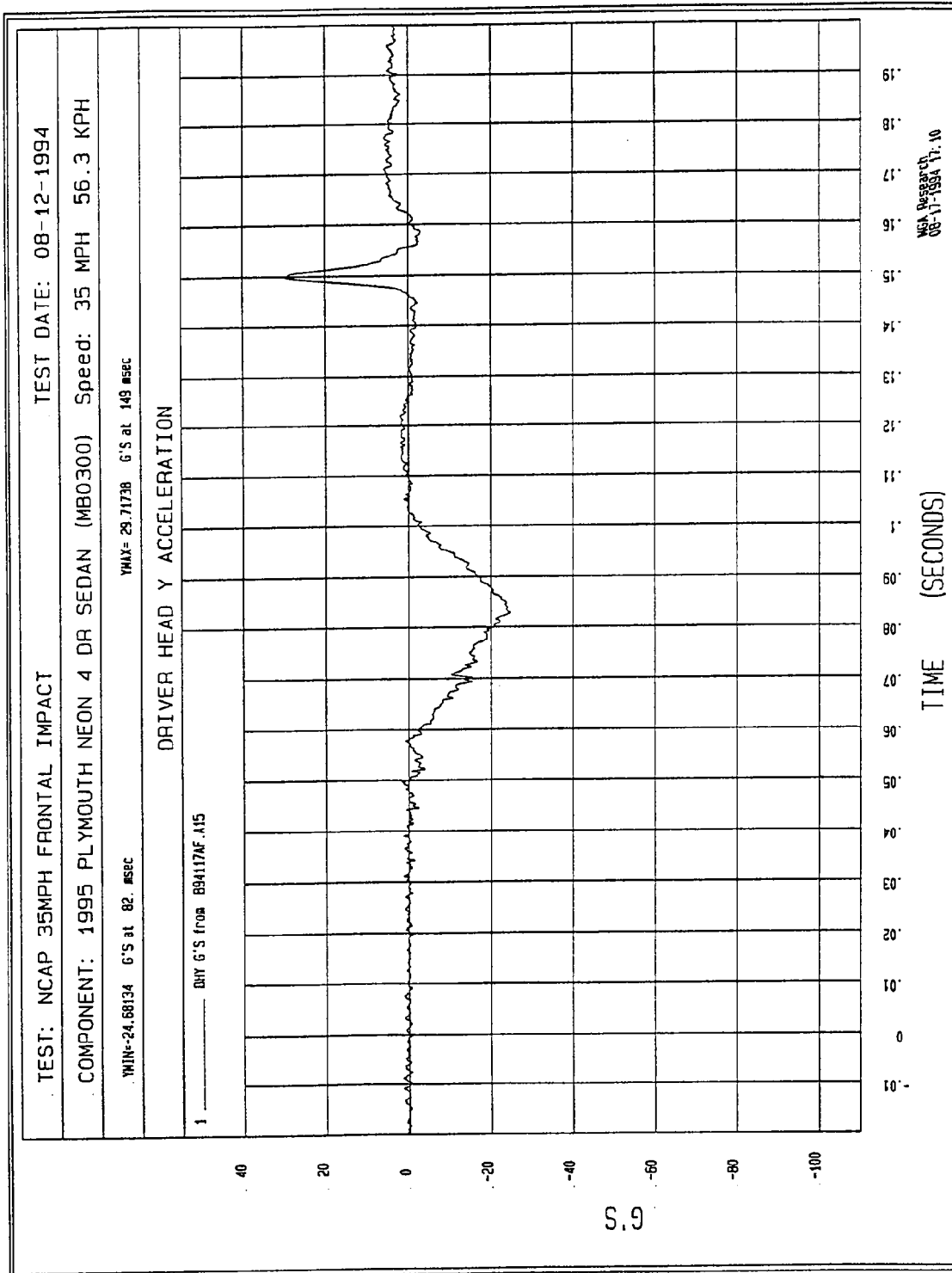


Figure B-34 - Driver Head Y Acceleration vs. Time

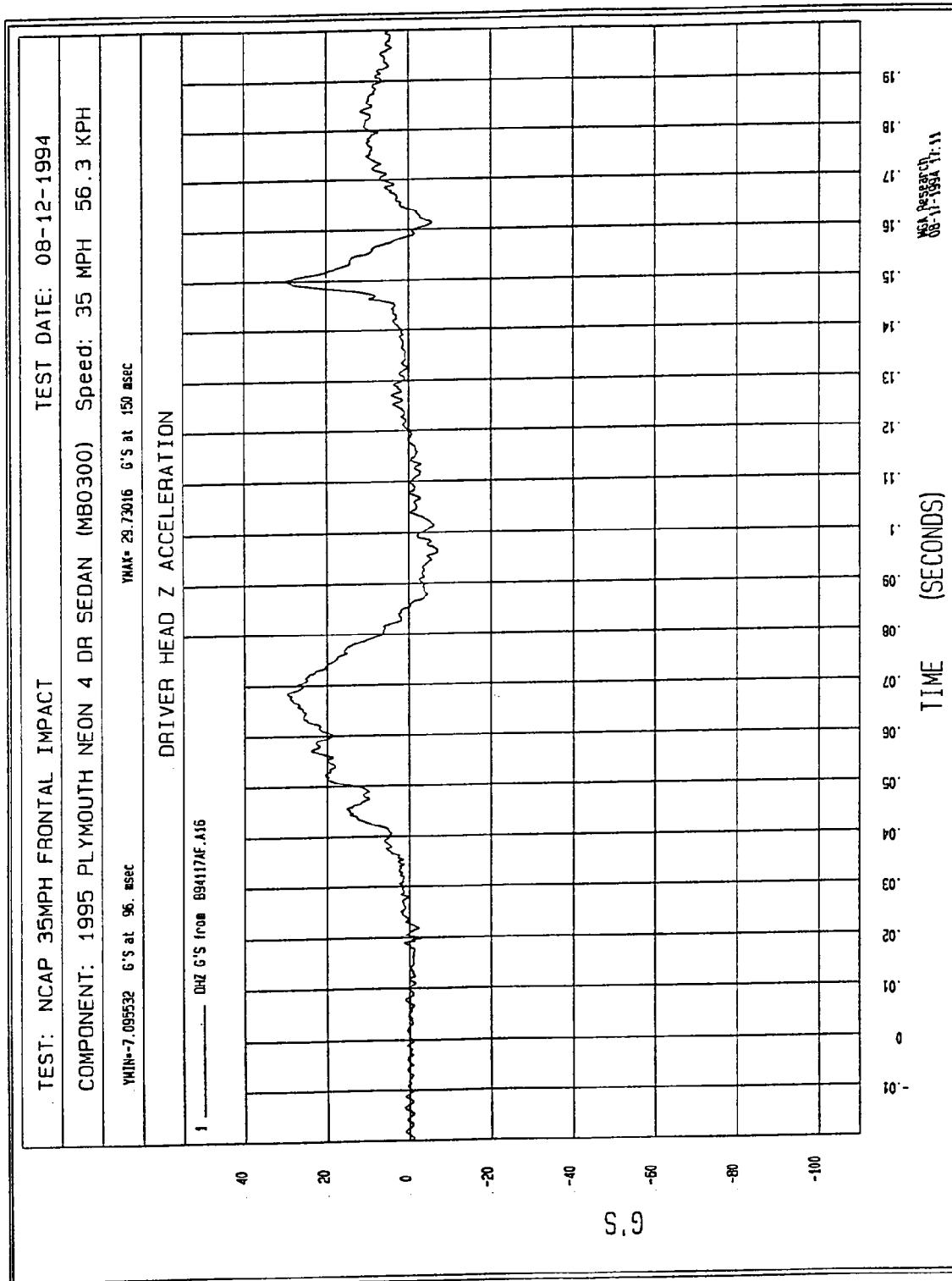


Figure B-35 - Driver Head Z Acceleration vs. Time

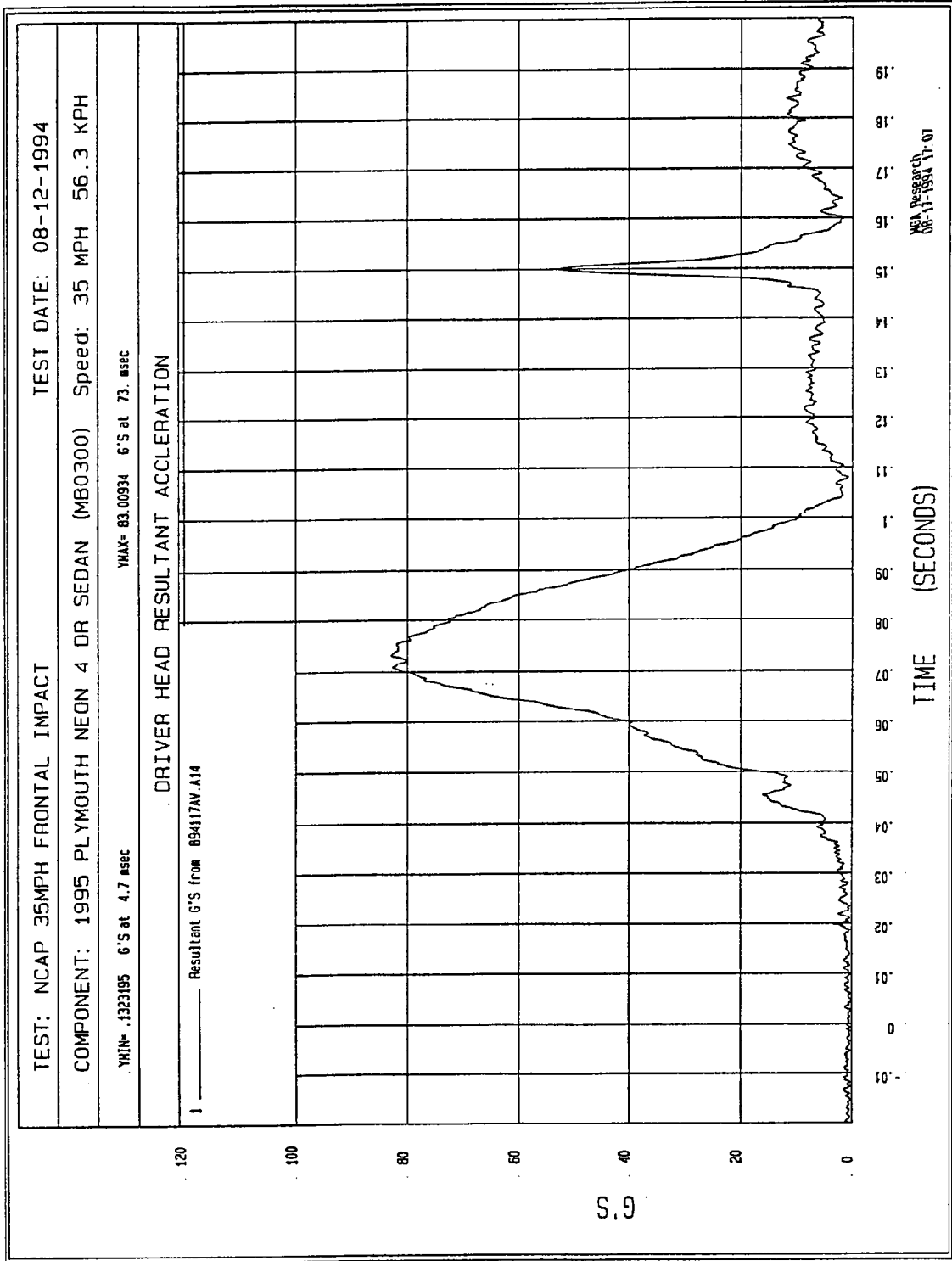


Figure B-36 - Driver Head Resultant Acceleration vs. Time

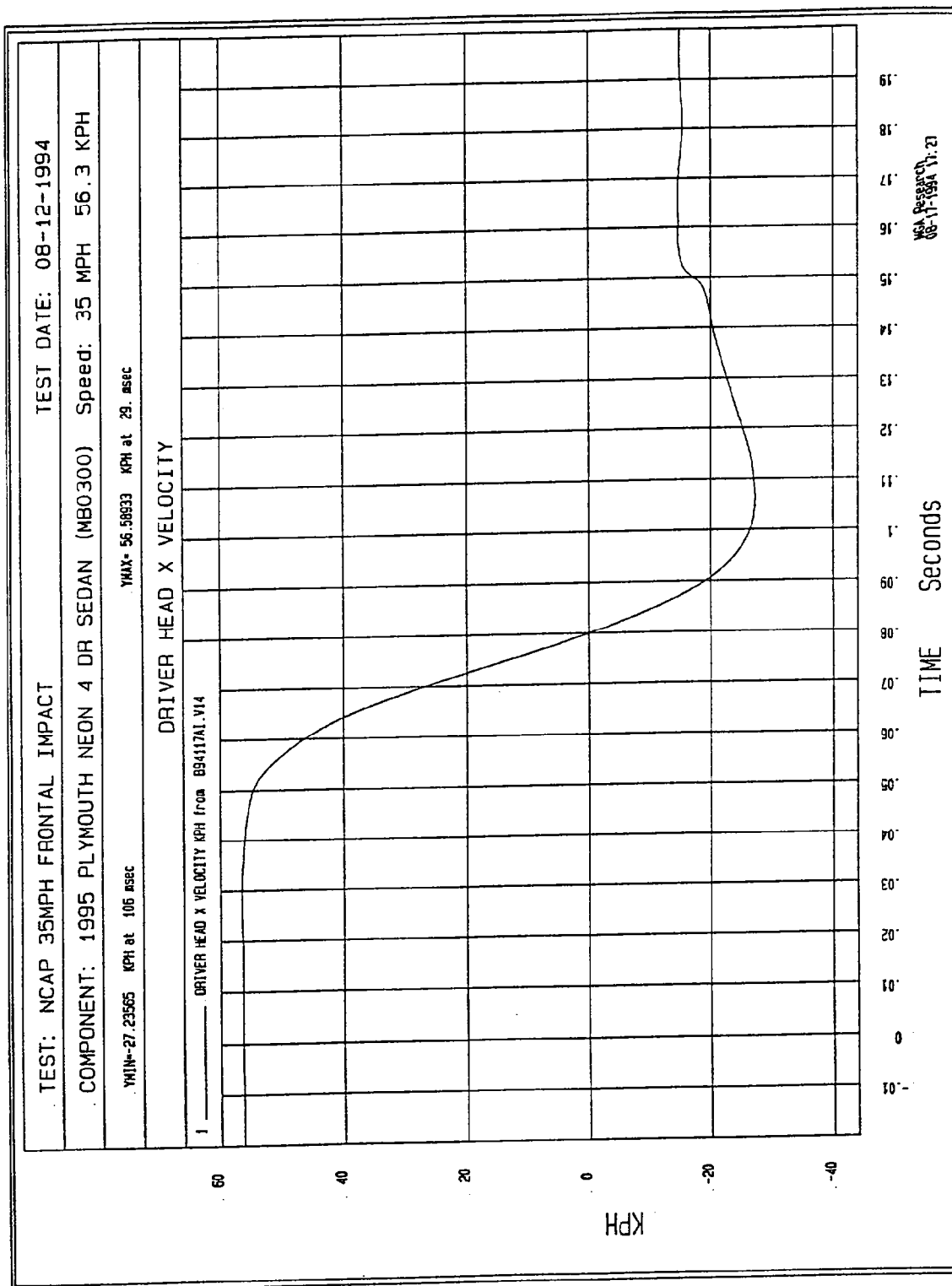


Figure B-37 - Driver Head X Velocity vs. Time

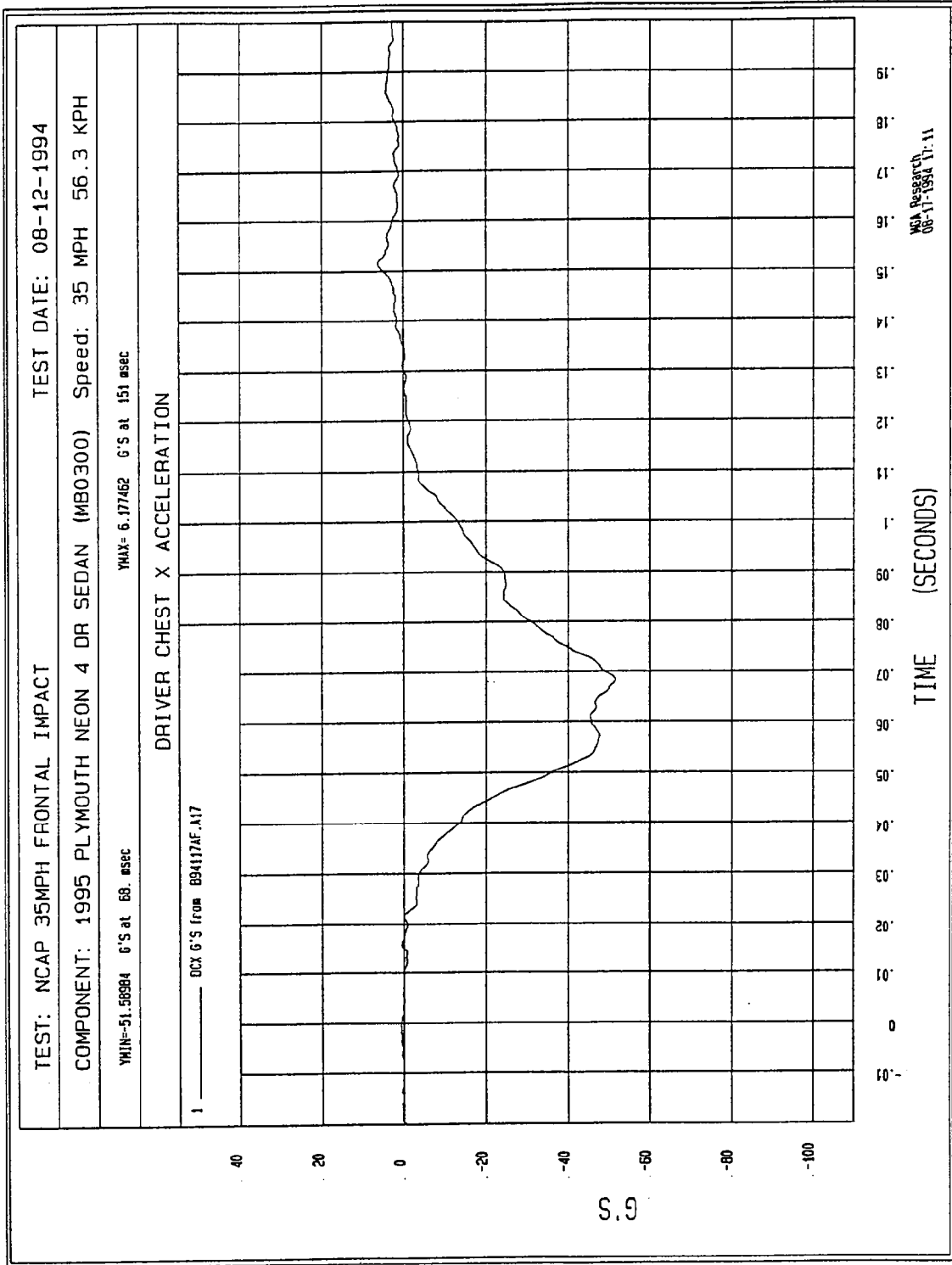


Figure B-38 - Driver Chest X Acceleration vs. Time

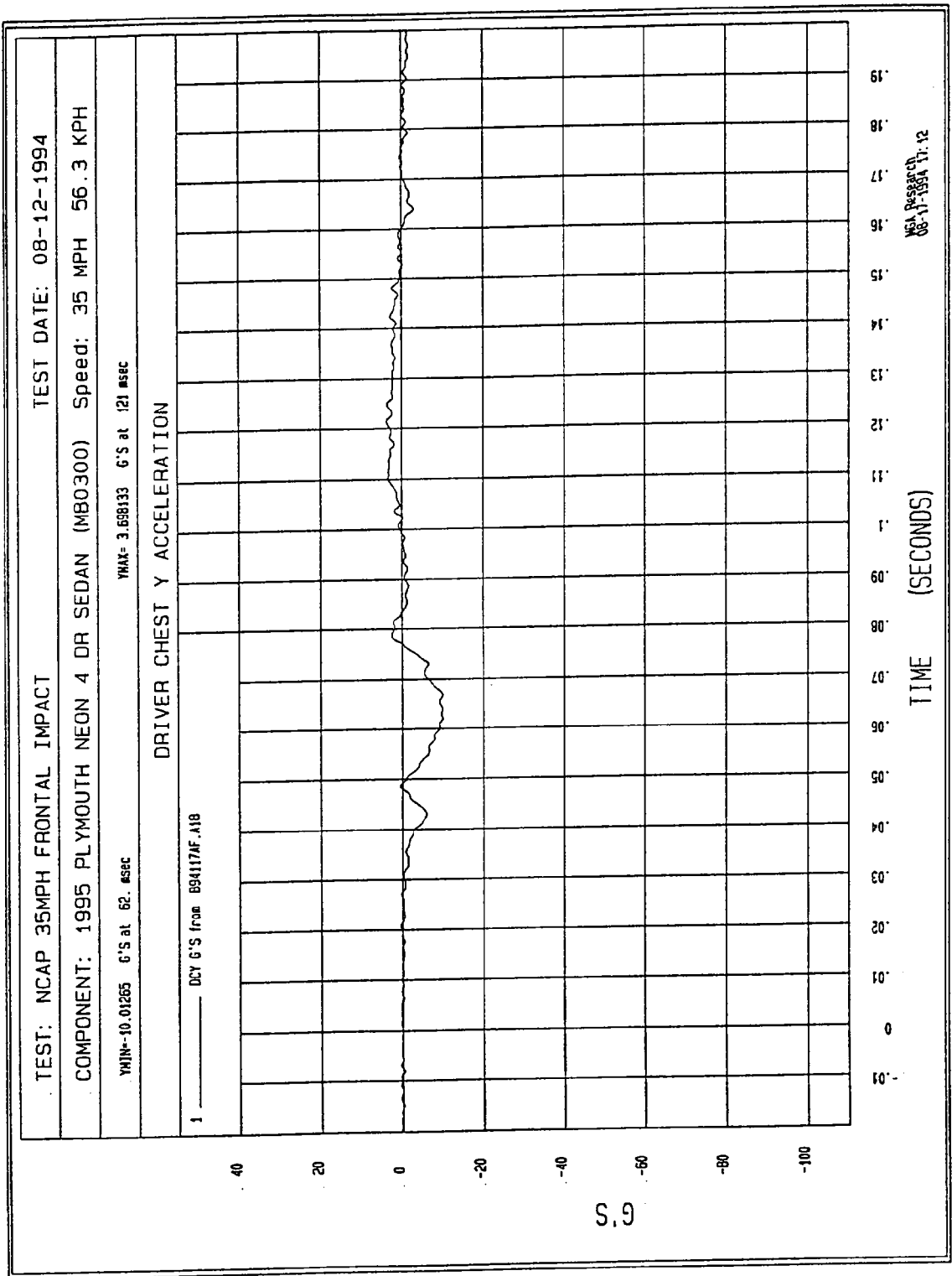
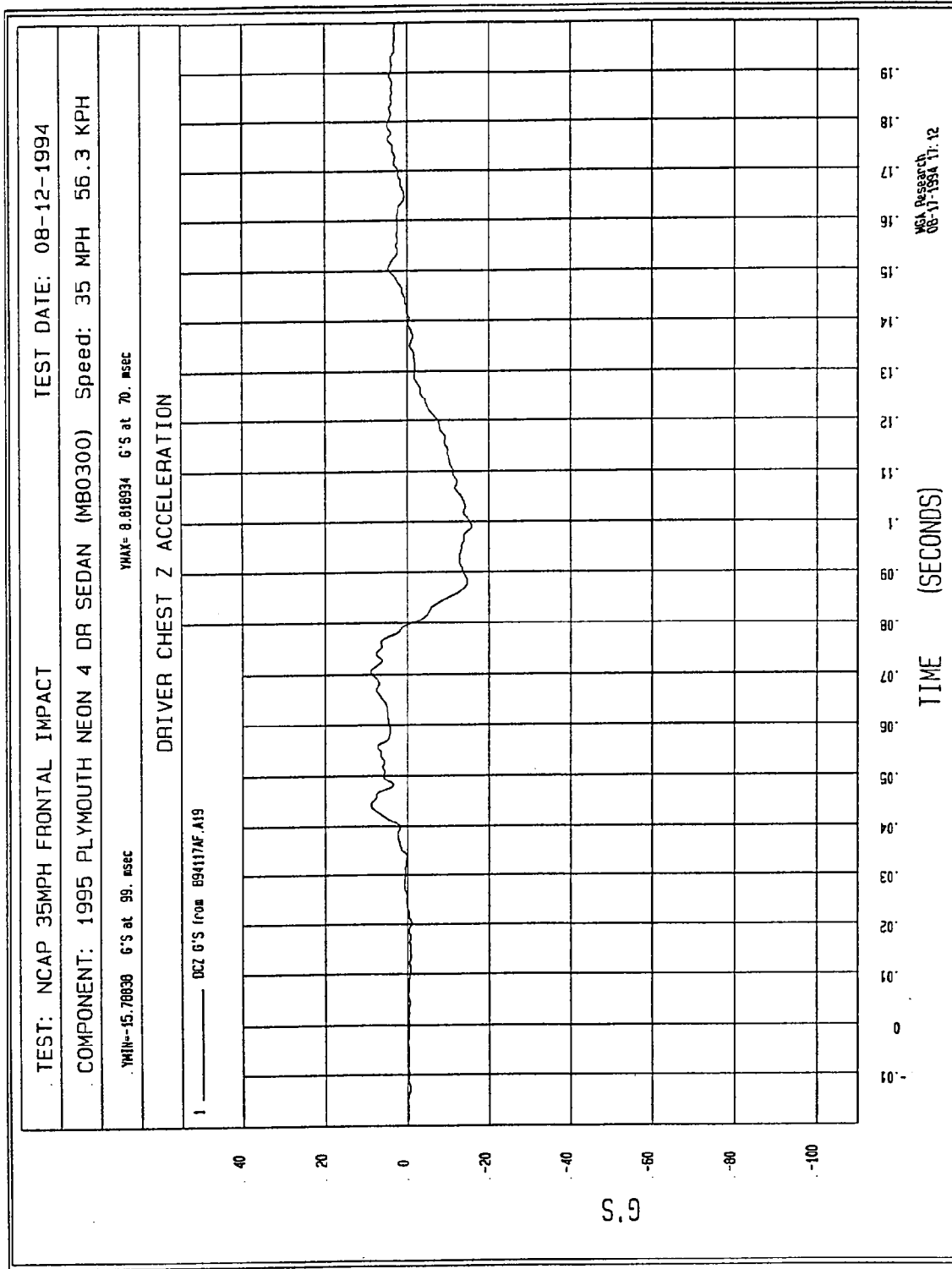


Figure B-39 - Driver Chest Y Acceleration vs. Time



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Figure B-40 - Driver Chest Z Acceleration vs. Time

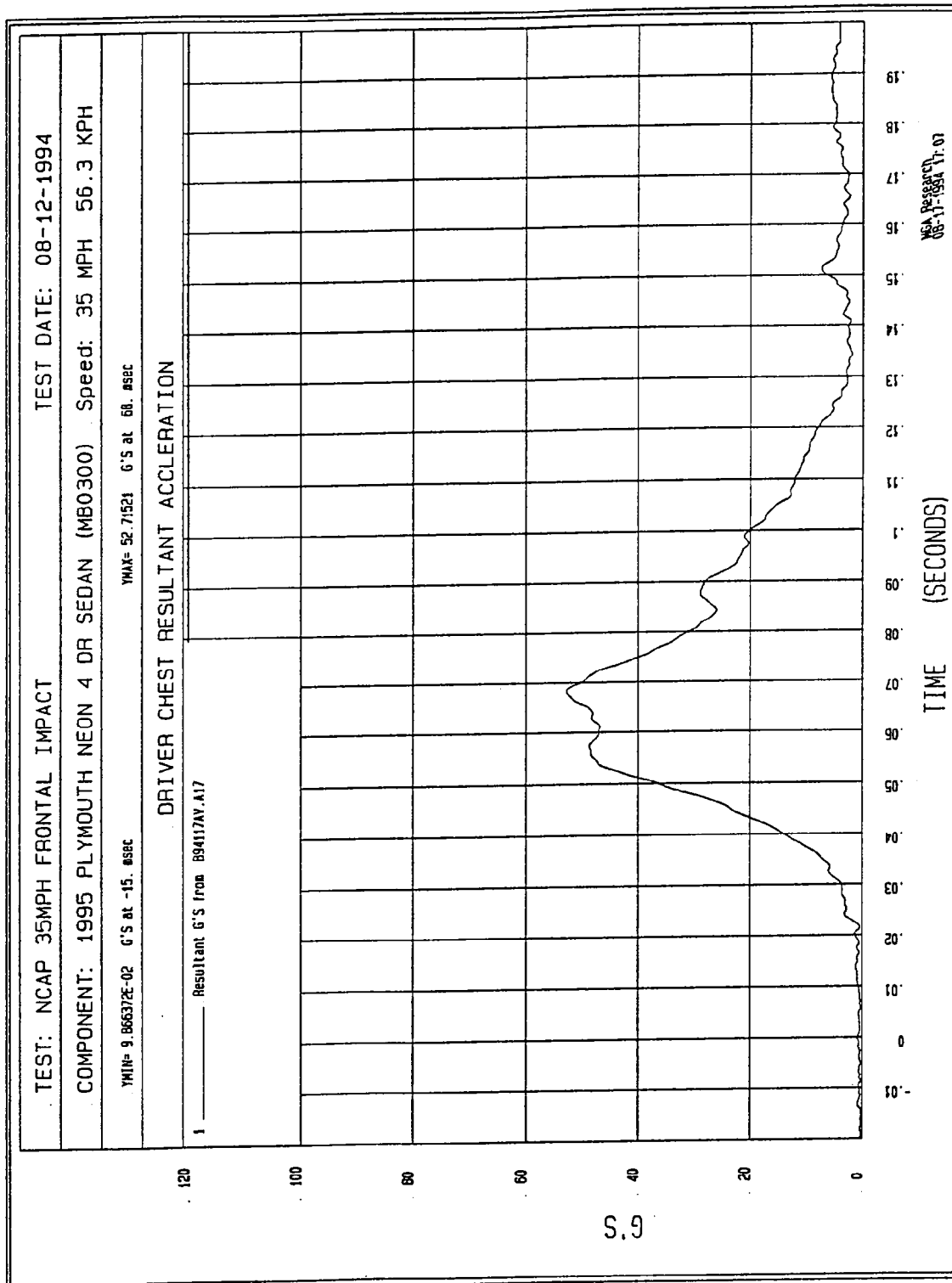


Figure B-41 - Driver Chest Resultant vs. Time

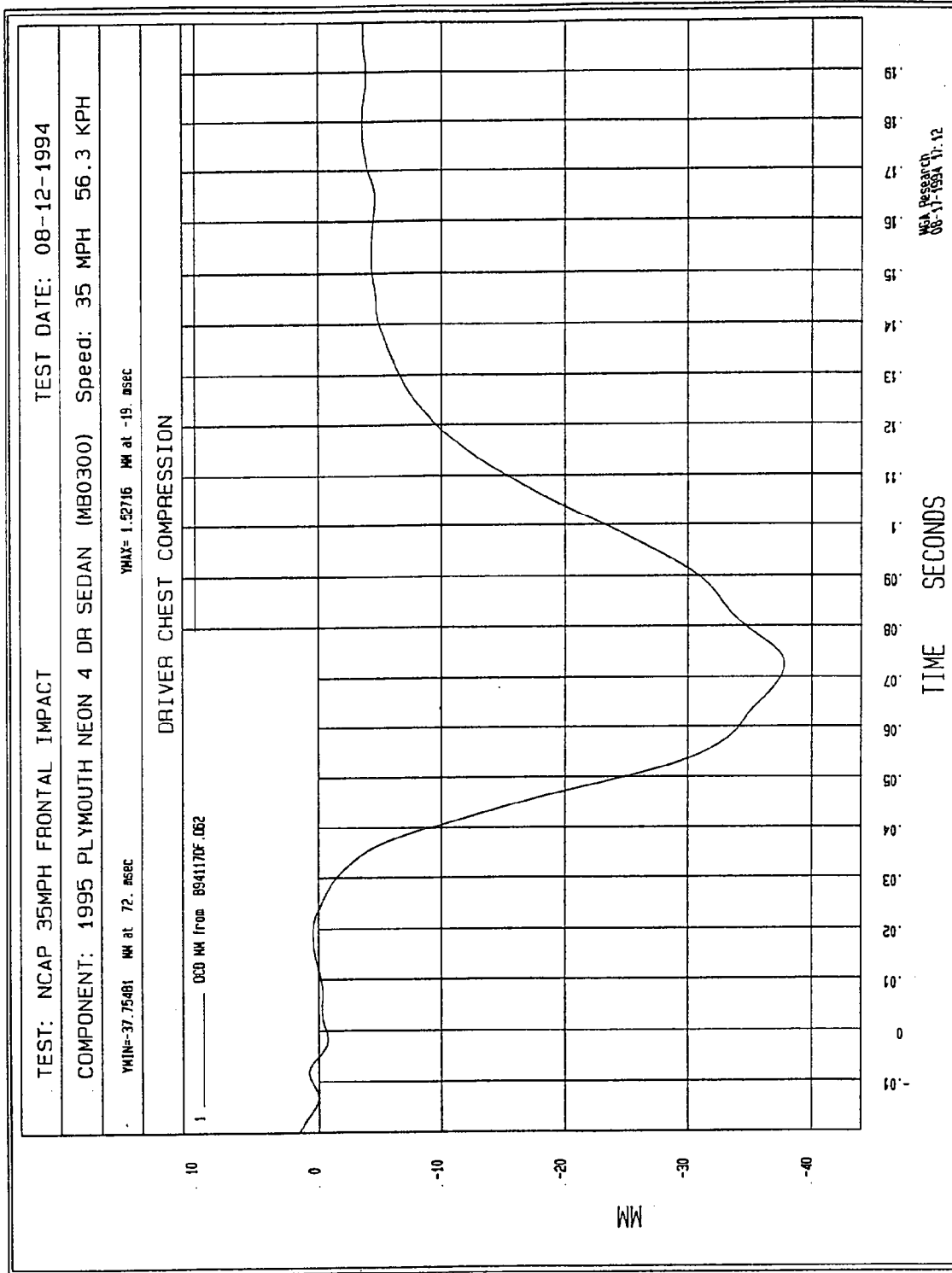


Figure B-42 - Driver Chest Compression vs. Time

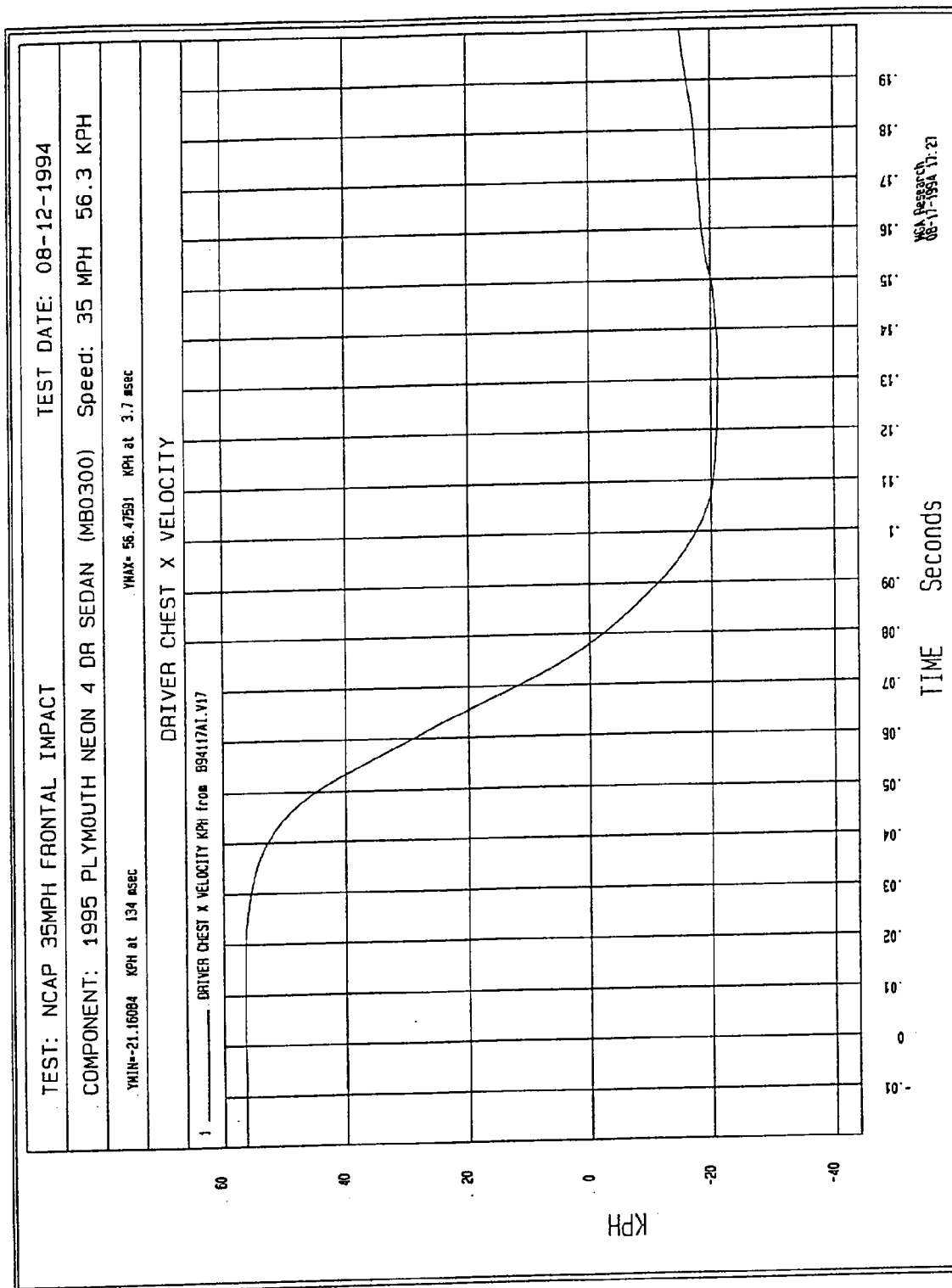


Figure B-43 - Driver Chest X Velocity vs. Time

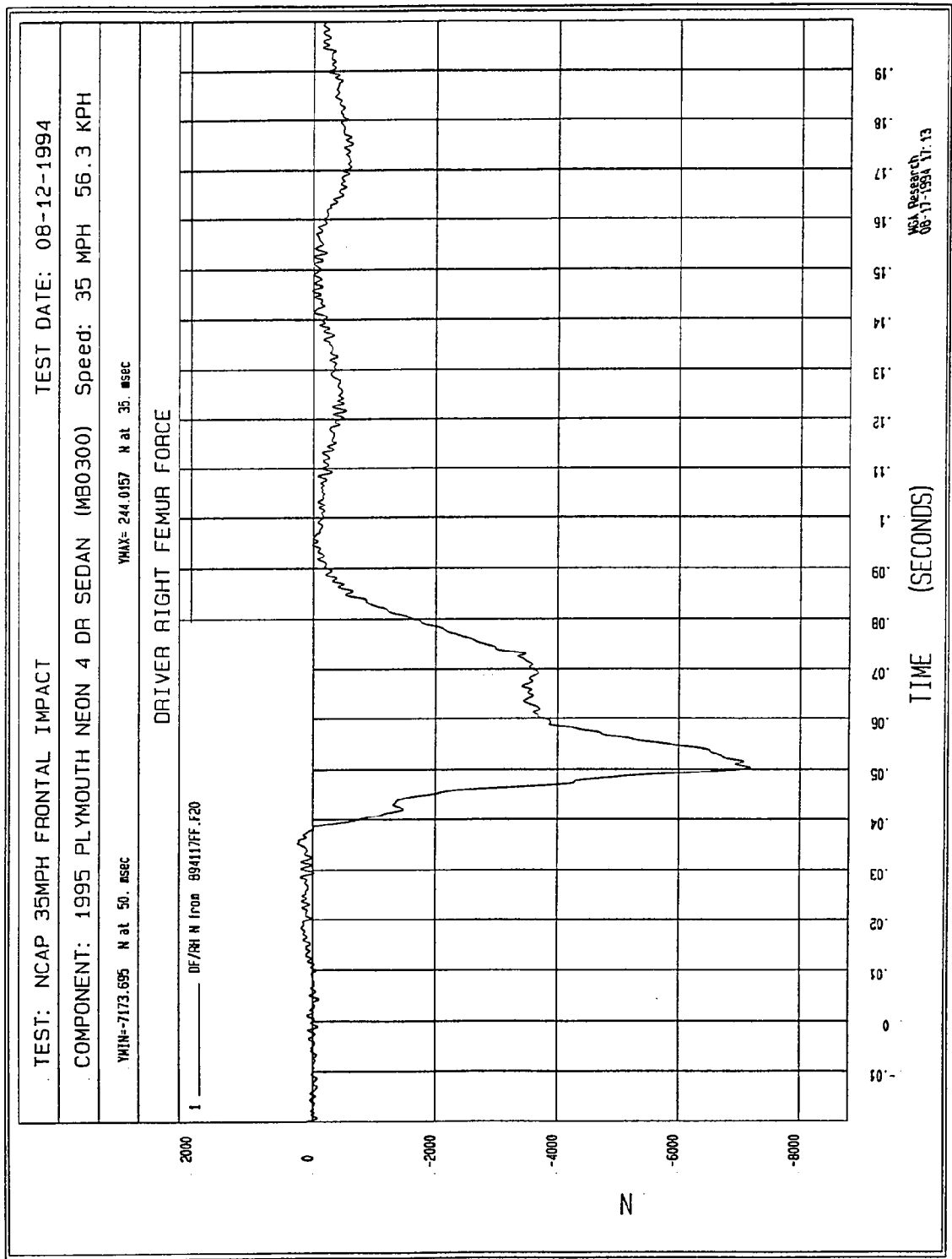


Figure B-44 - Driver Right Femur Force vs. Time

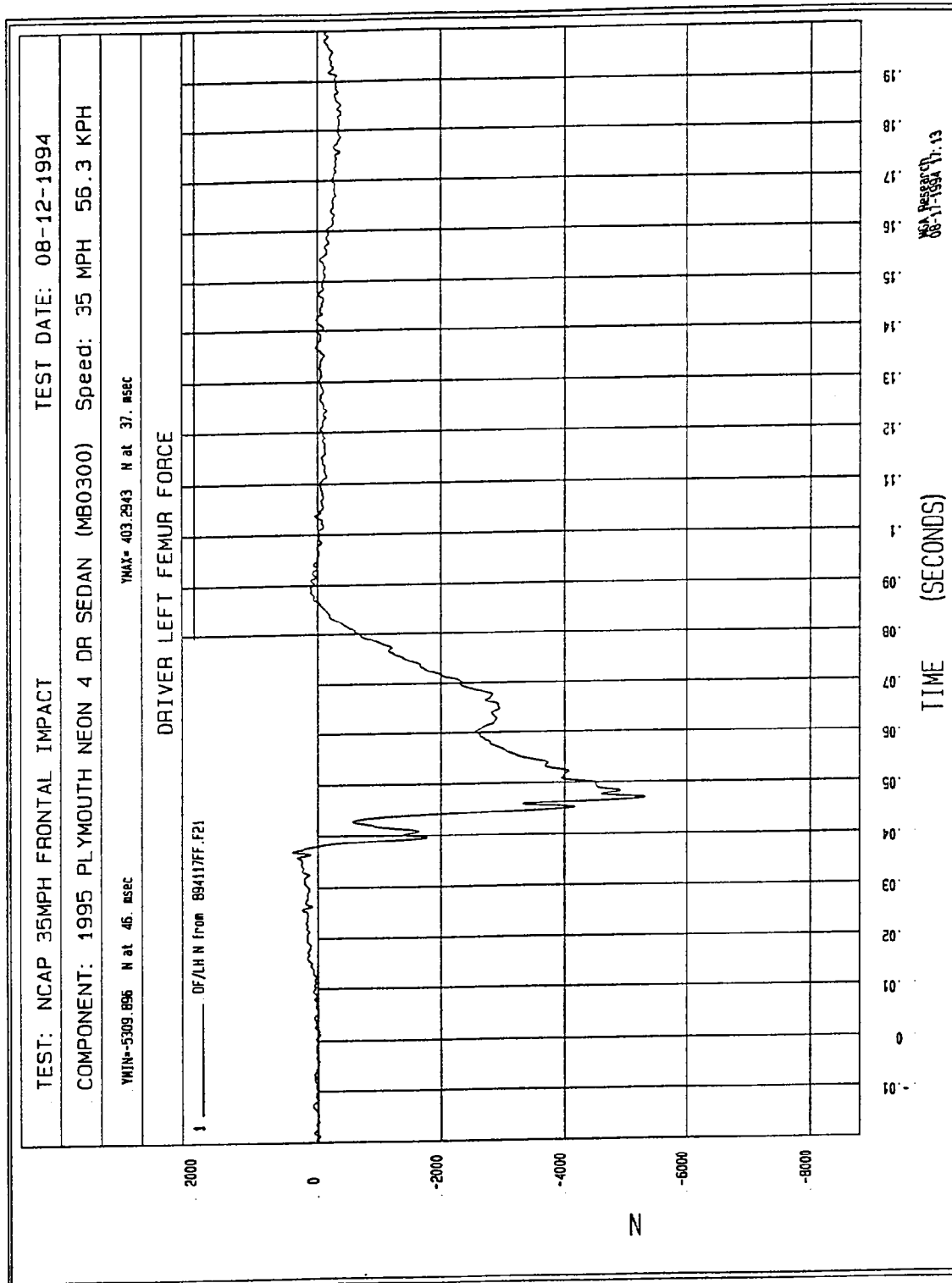


Figure B-45 - Driver Left Femur Force vs. Time

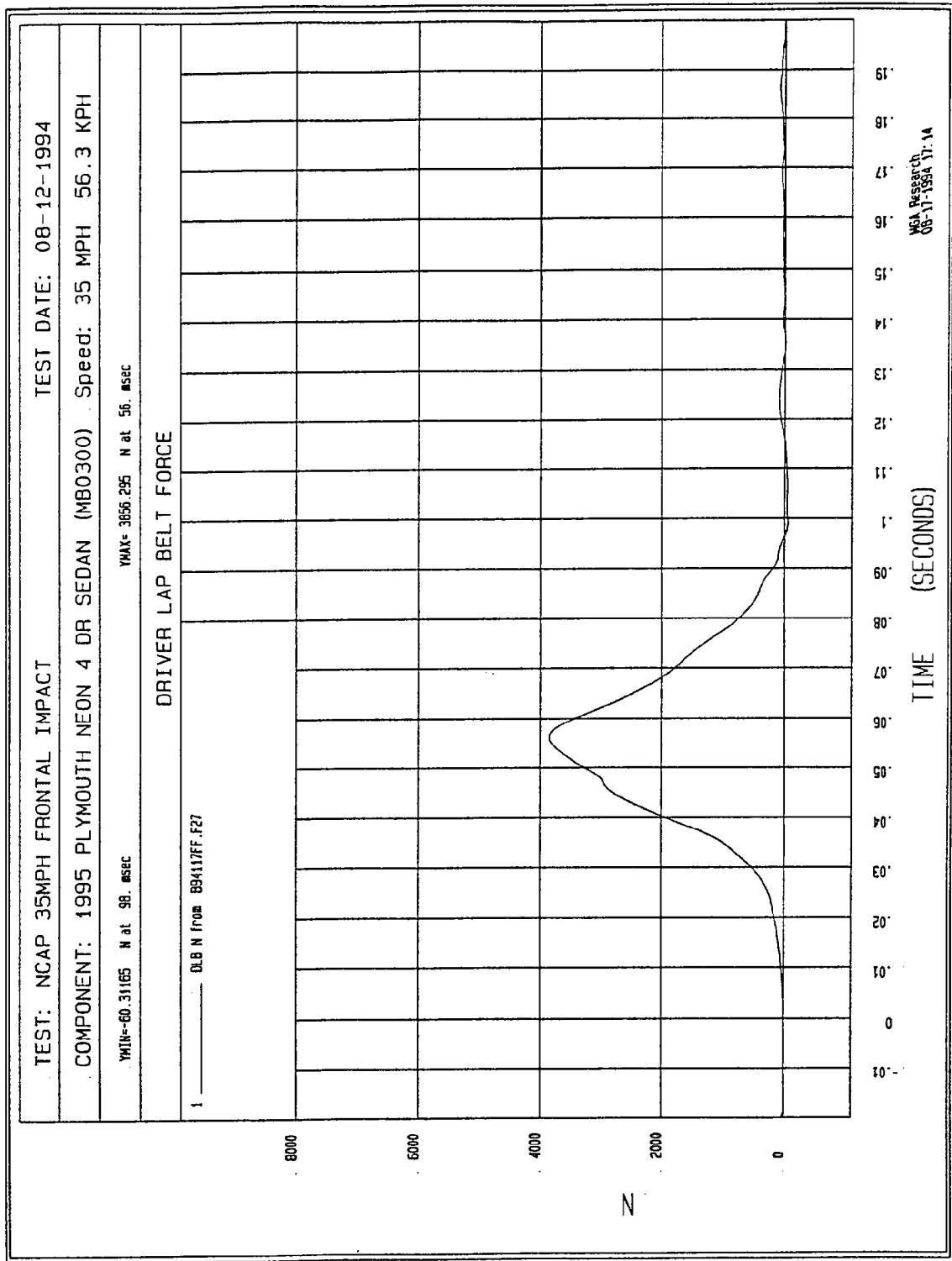


Figure B-46 - Driver Lap Belt Force vs. Time

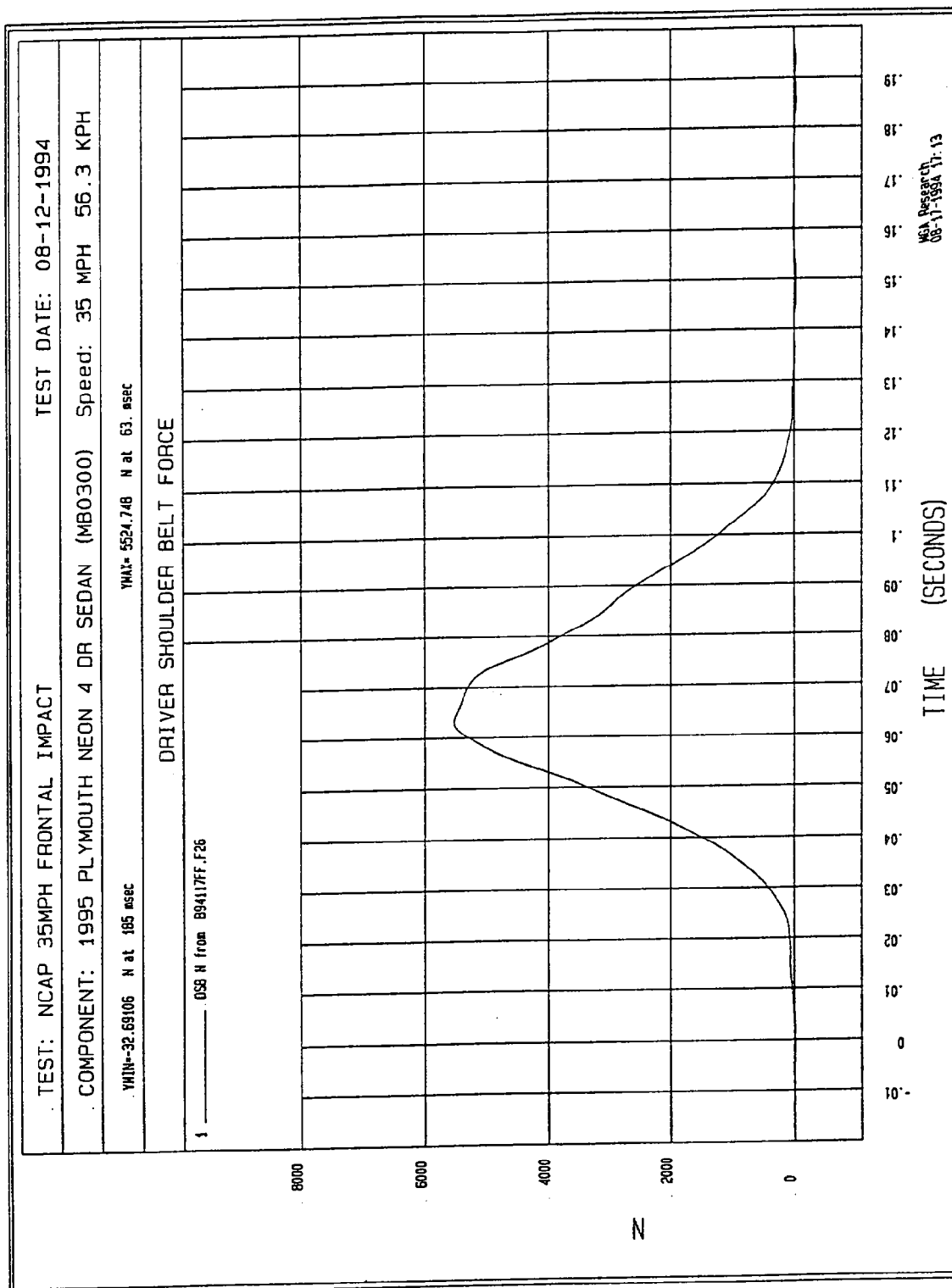


Figure B-47 - Driver Shoulder Belt Force vs. Time

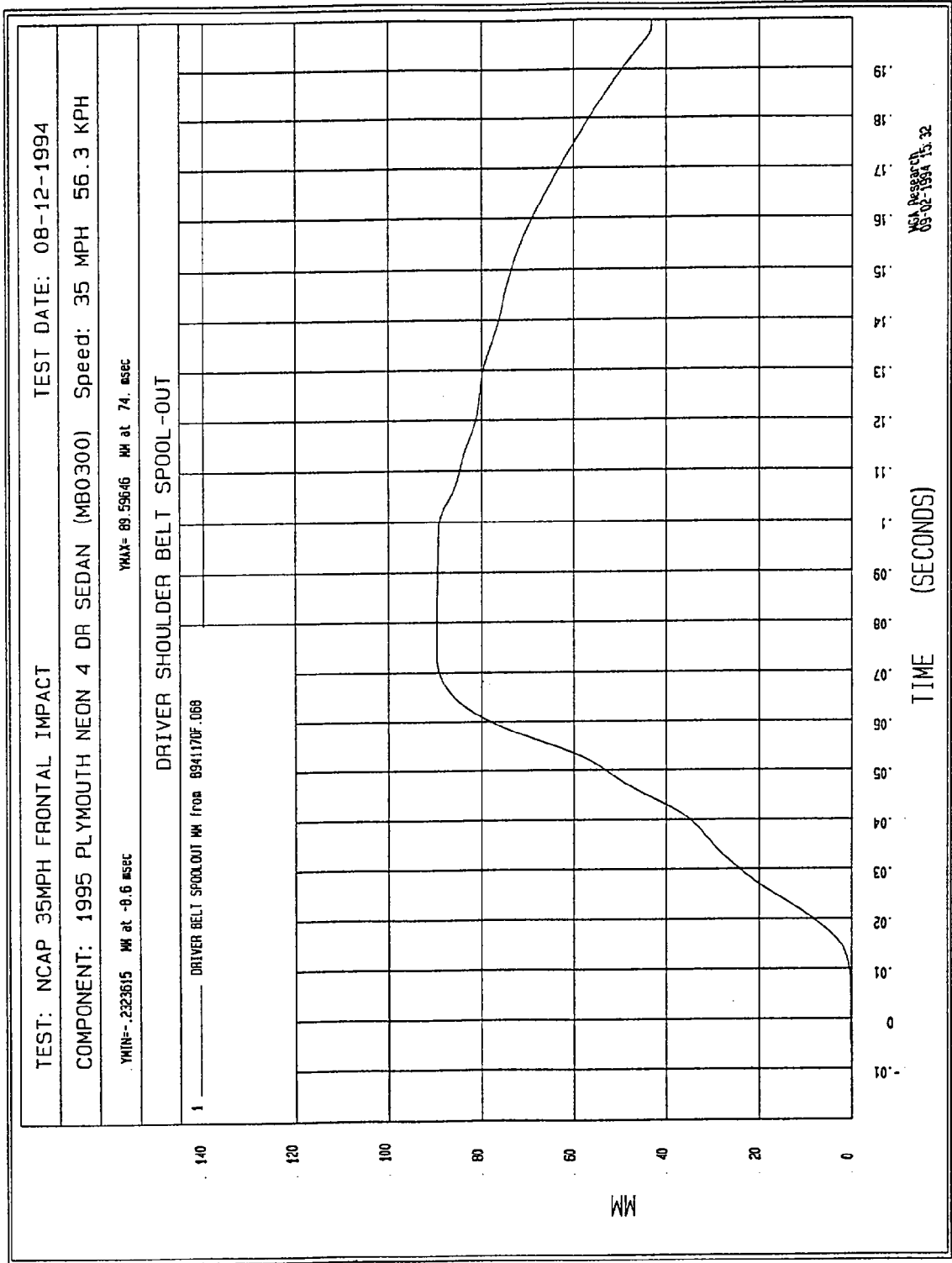


Figure B-48 - Driver Shoulder Belt Spool-out vs. Time

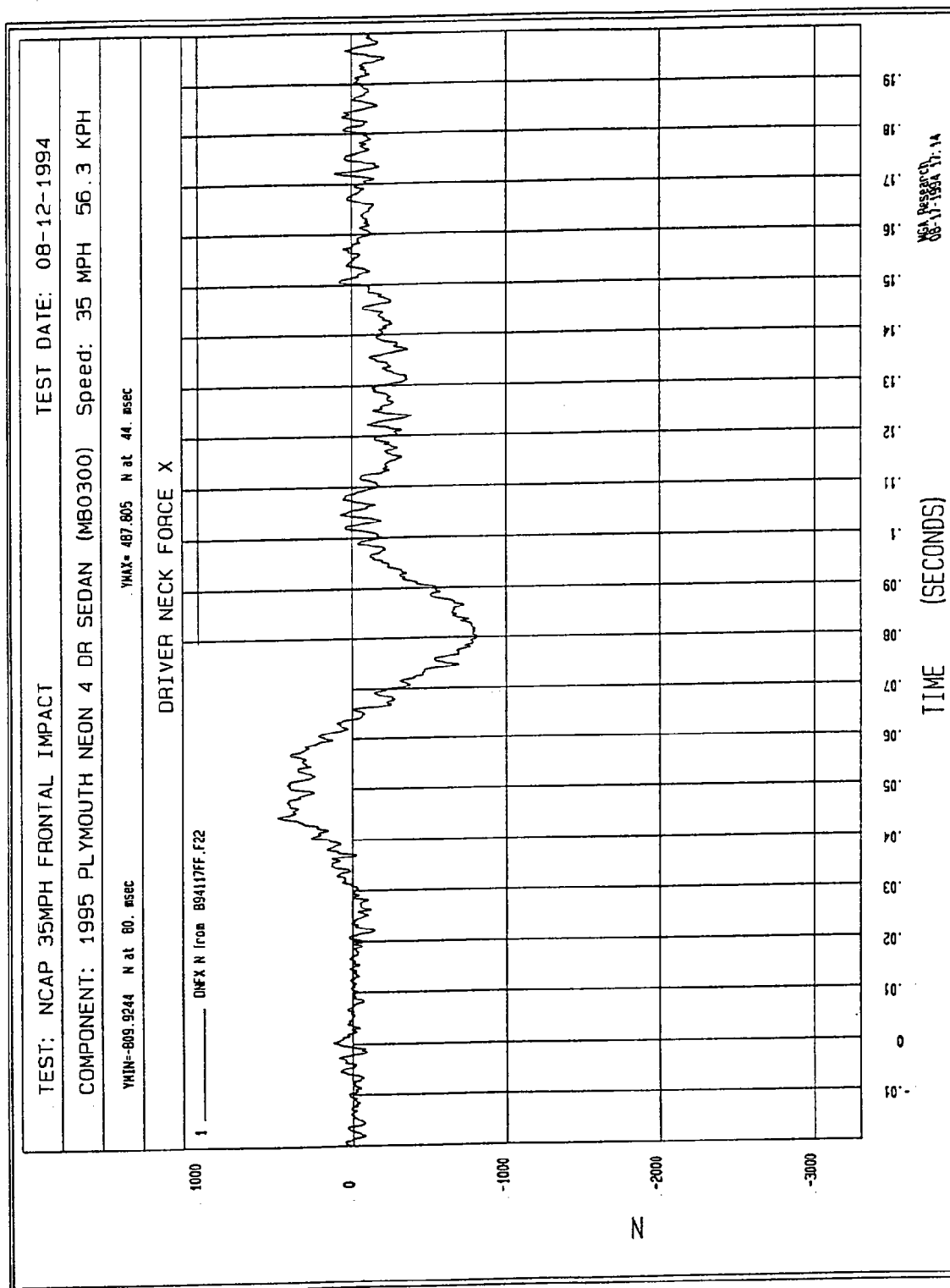
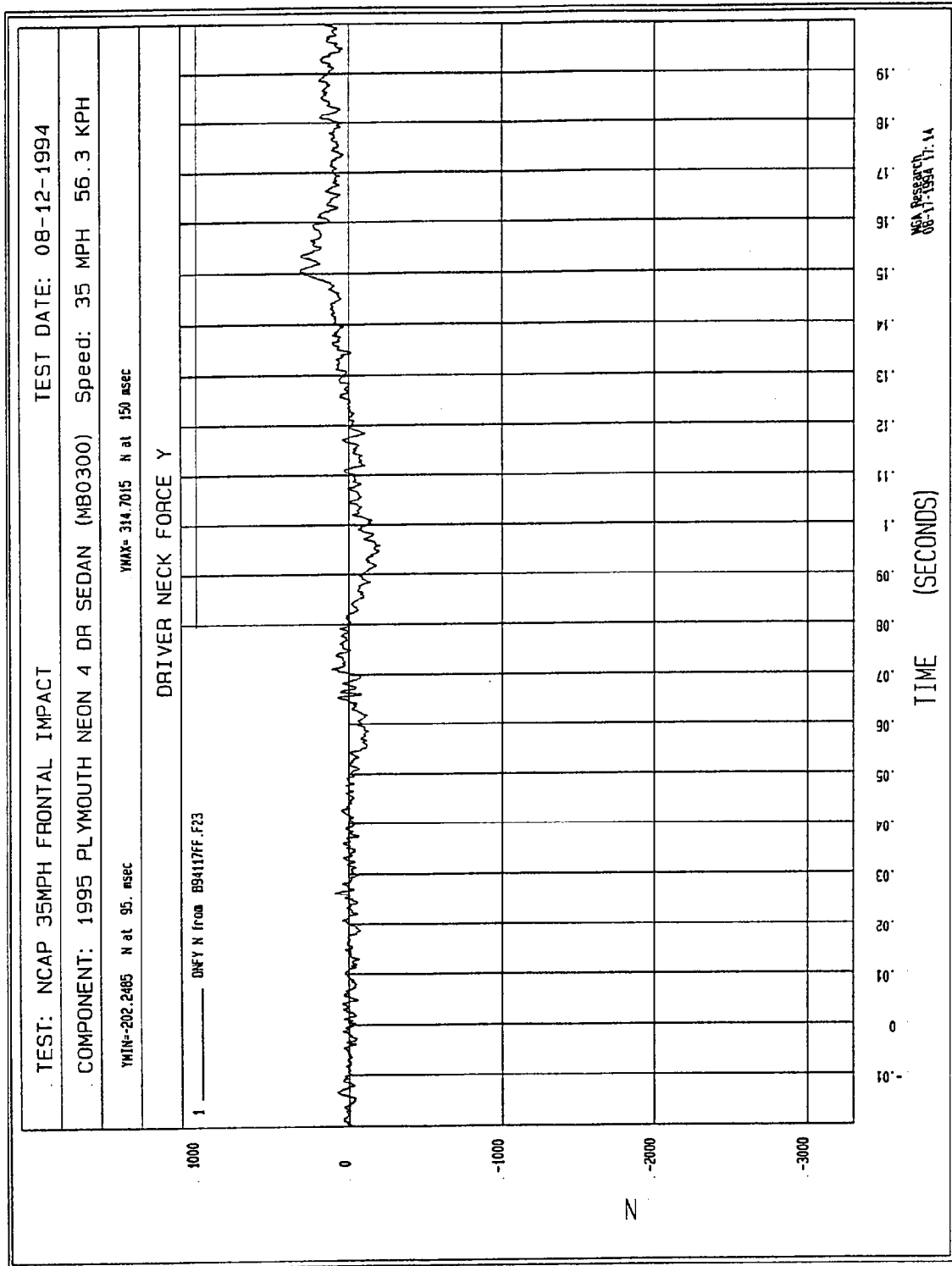


Figure B-49 - Driver Neck Force X vs. Time



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Figure B-50 - Driver Neck Force Y vs. Time

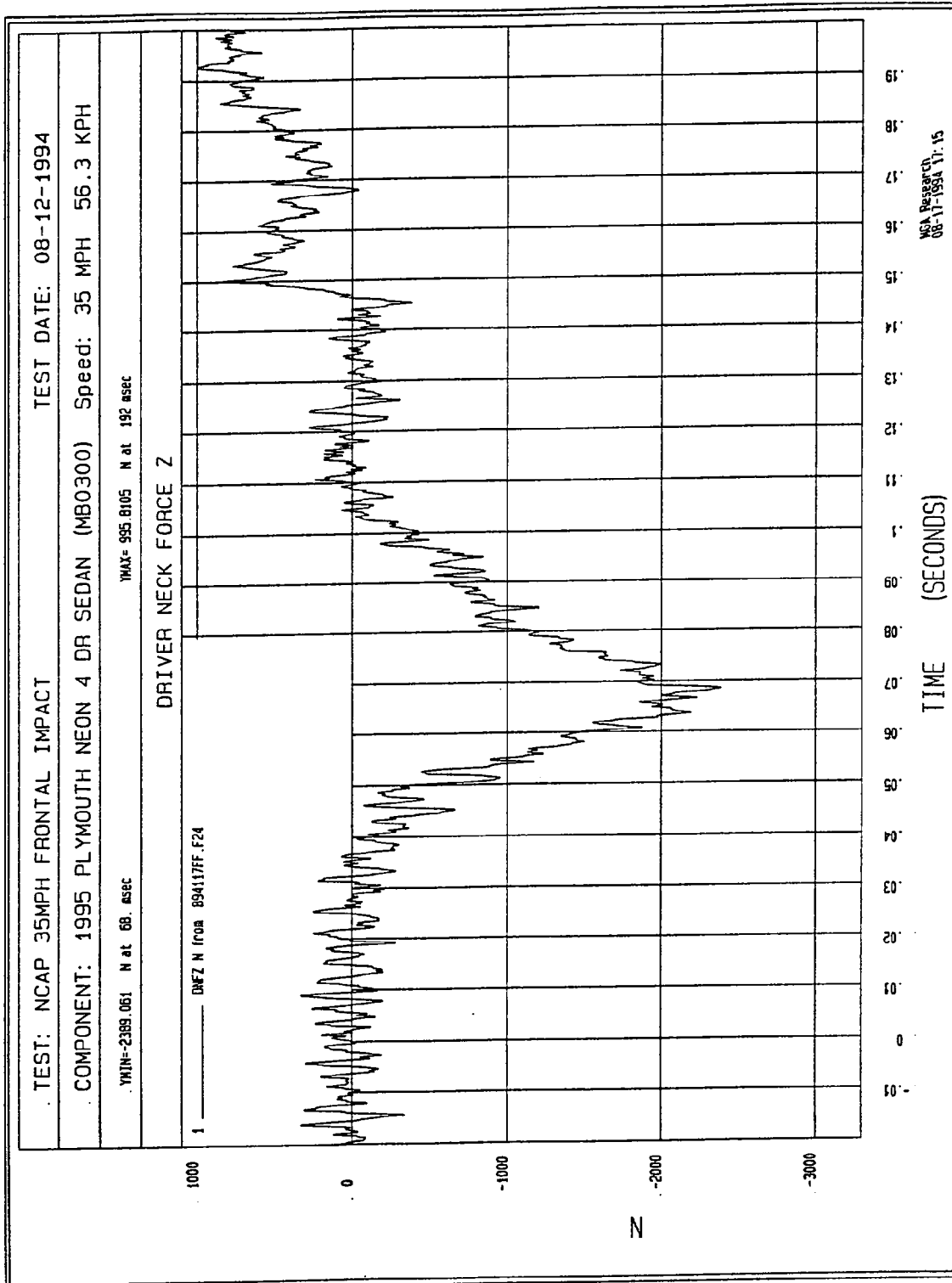


Figure B-51 - Driver Neck Force Z vs. Time

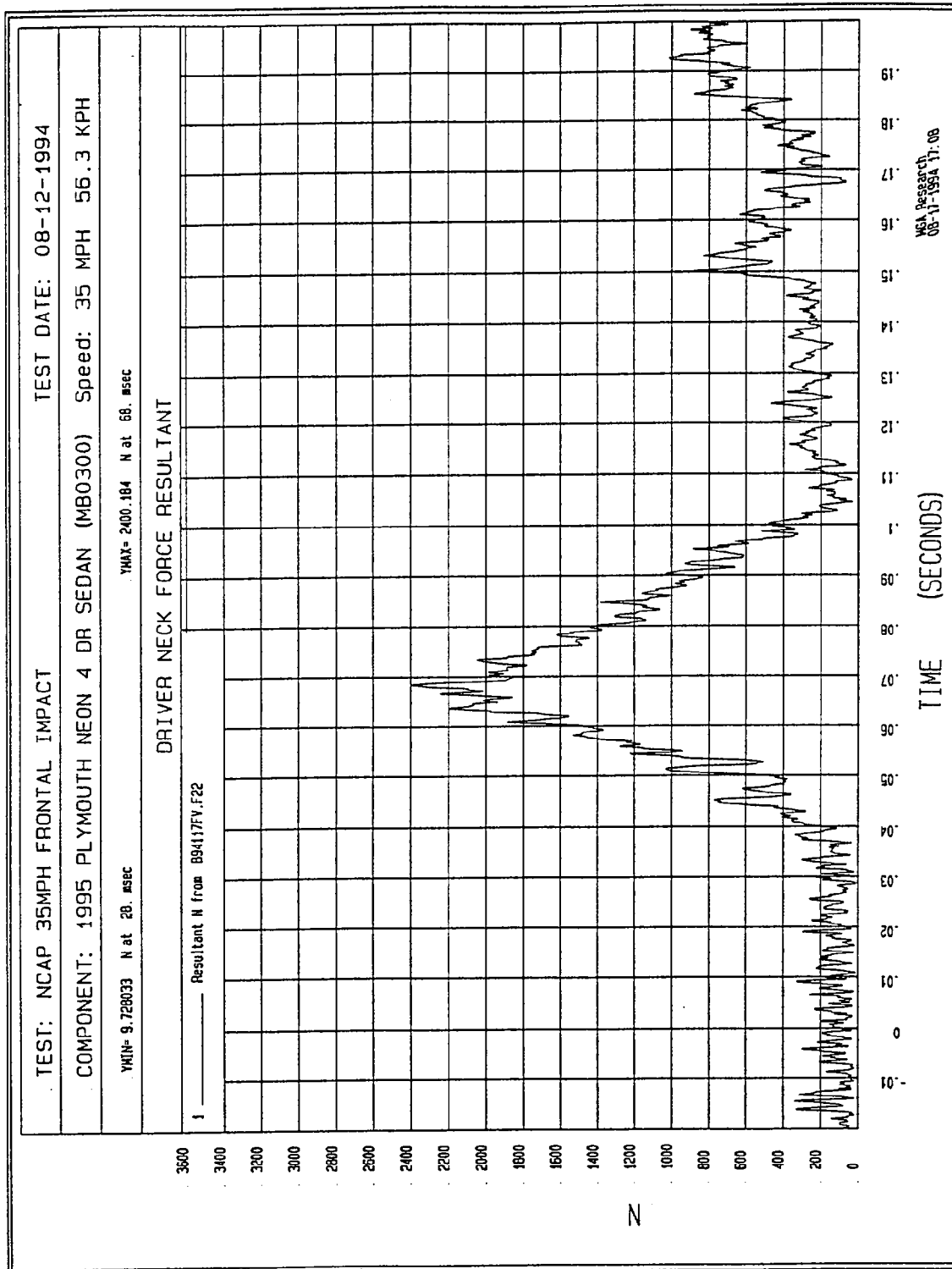


Figure B-52 - Driver Neck Force Resultant vs. Time

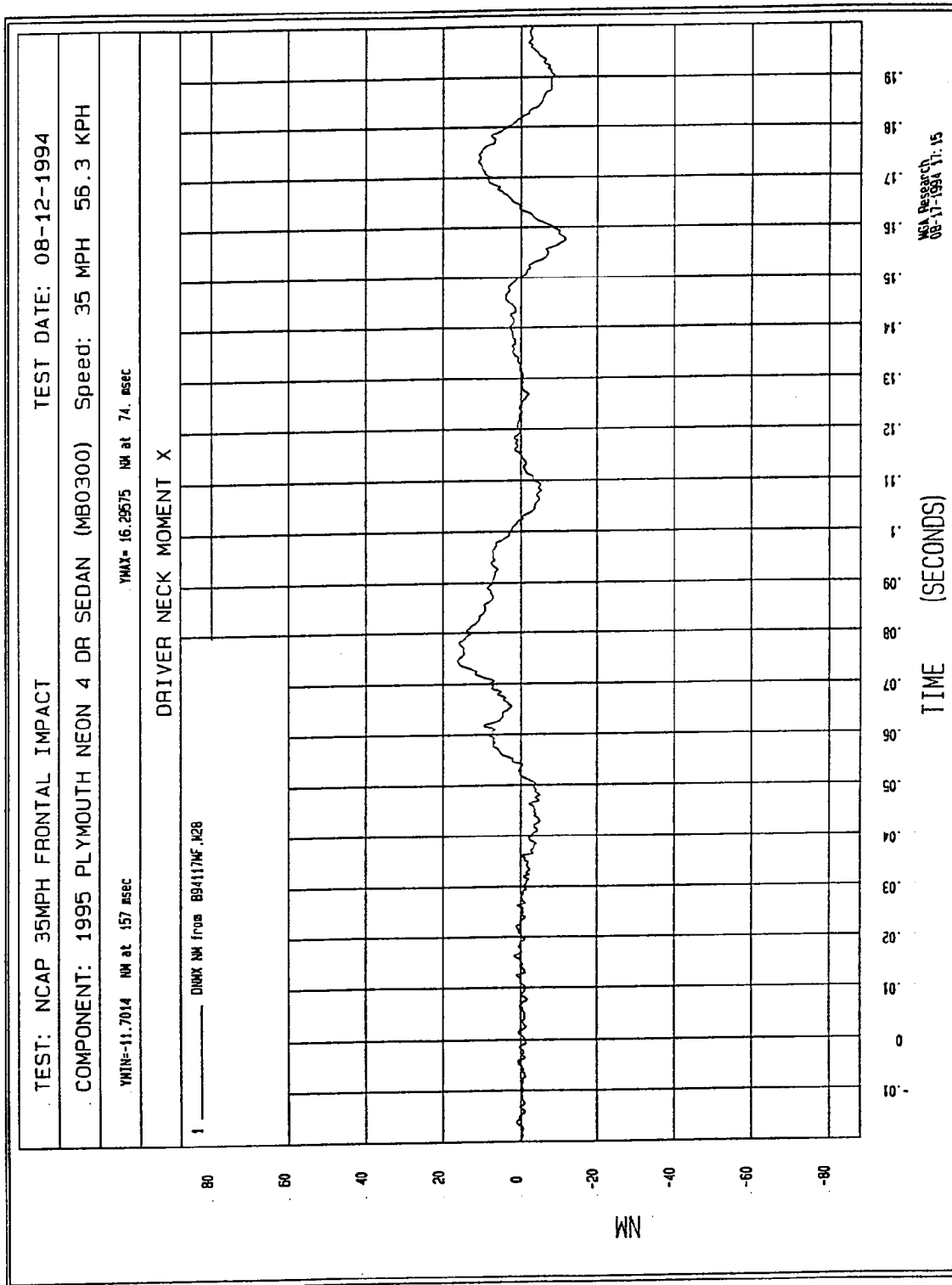


Figure B-53 - Driver Neck Moment X vs. Time

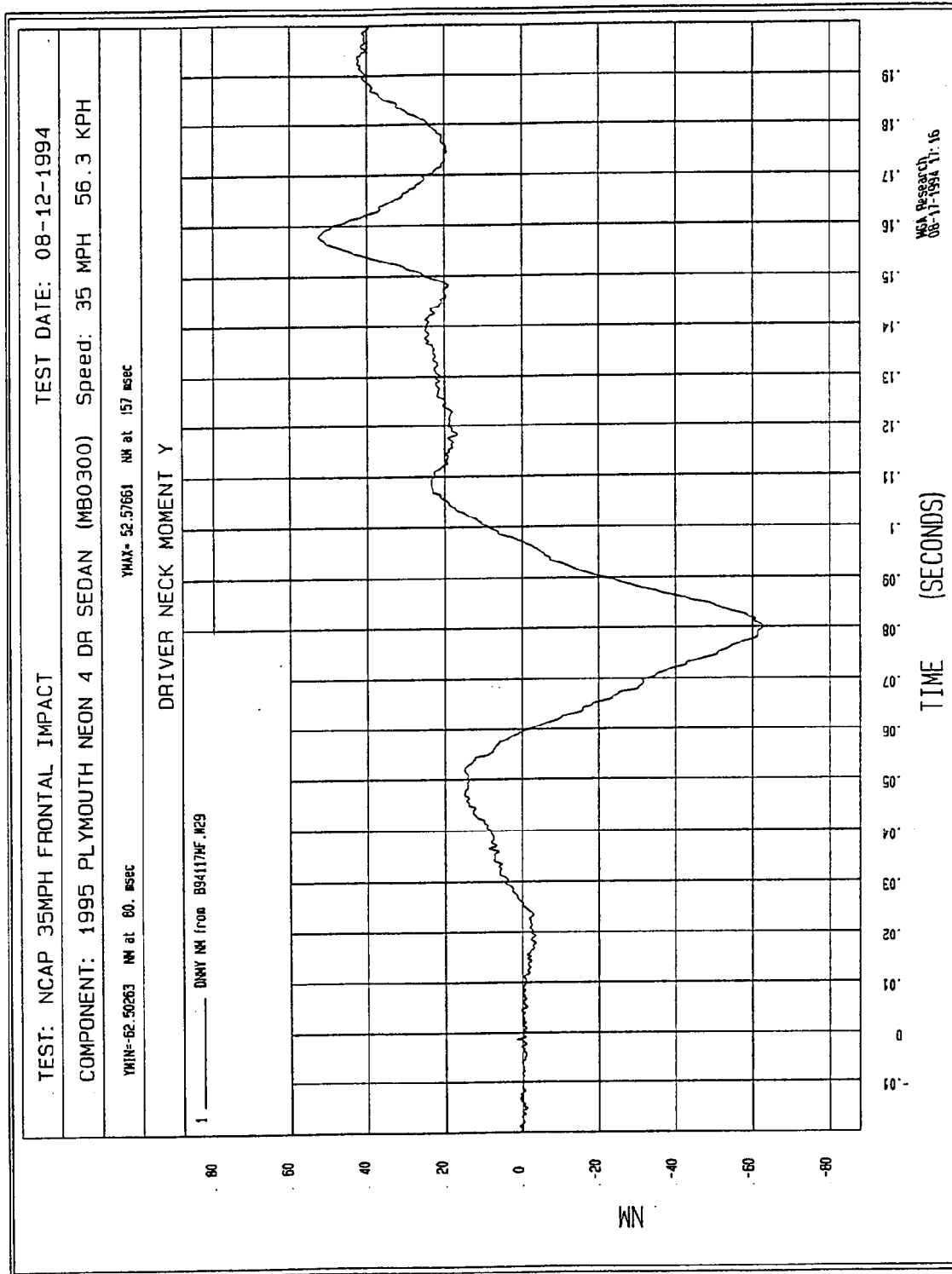


Figure B-54 - Driver Neck Moment Y vs. Time

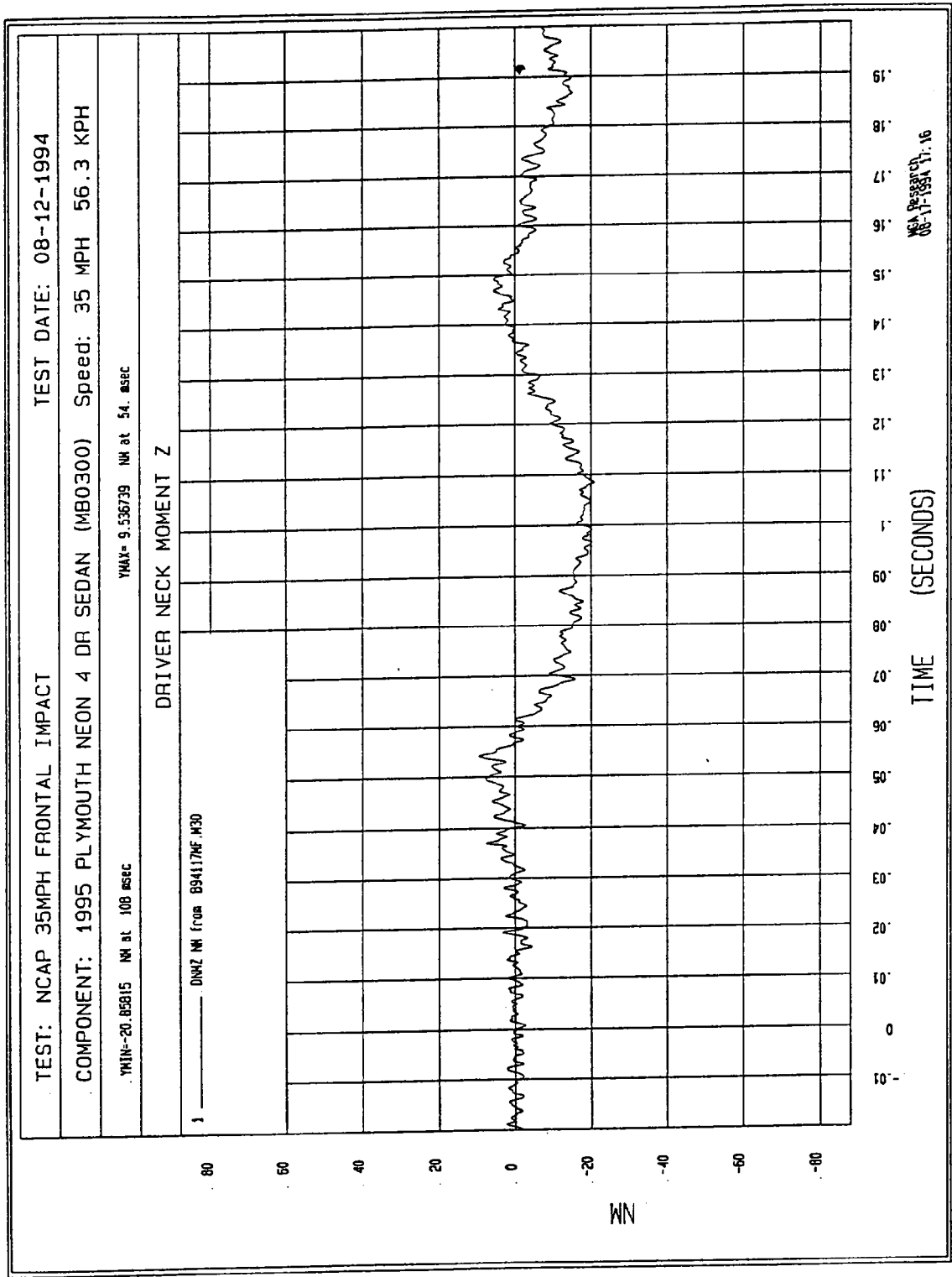


Figure B-55 - Driver Neck Moment Z vs. Time

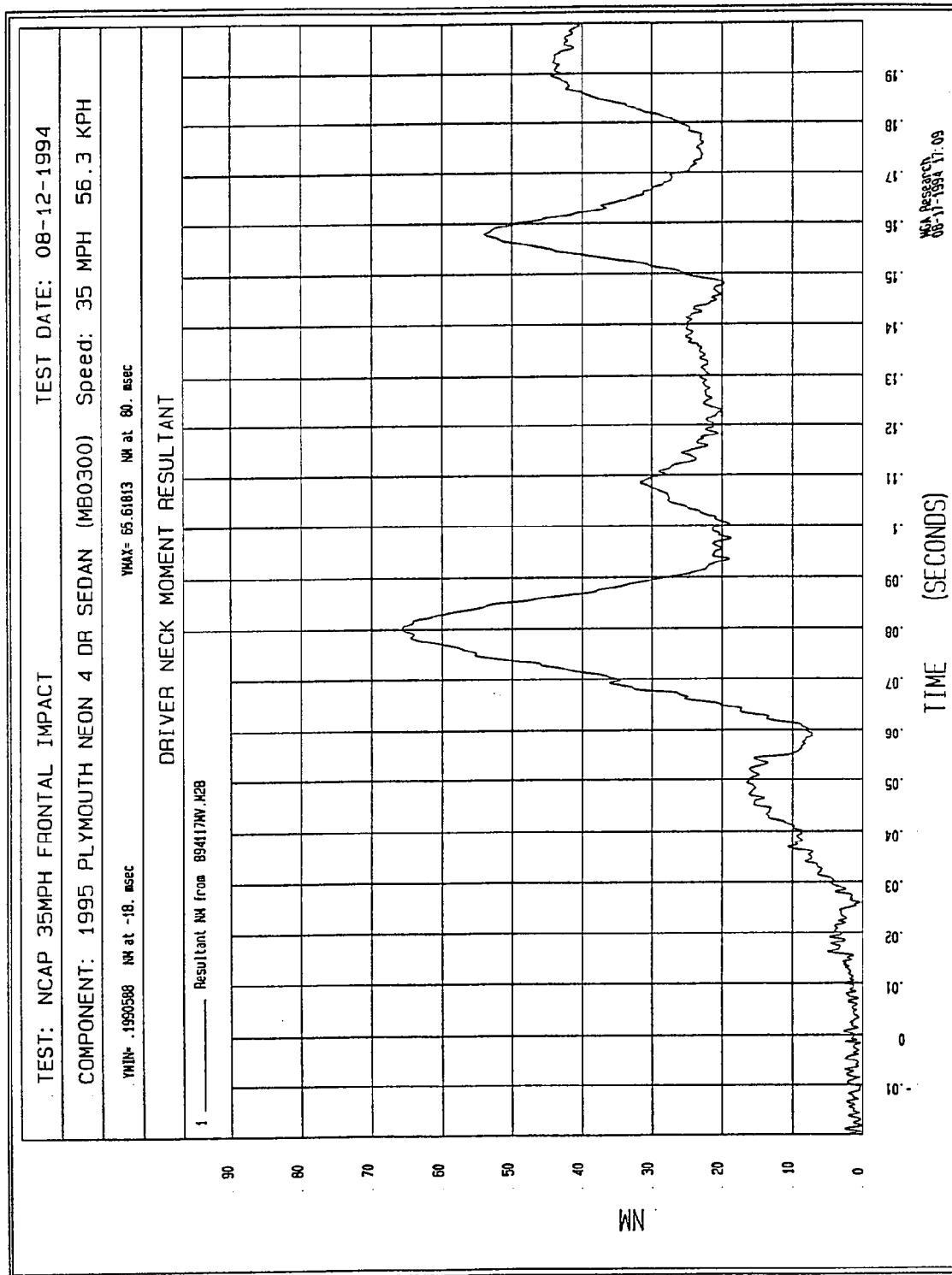


Figure B-56 - Driver Neck Moment Resultant vs. Time

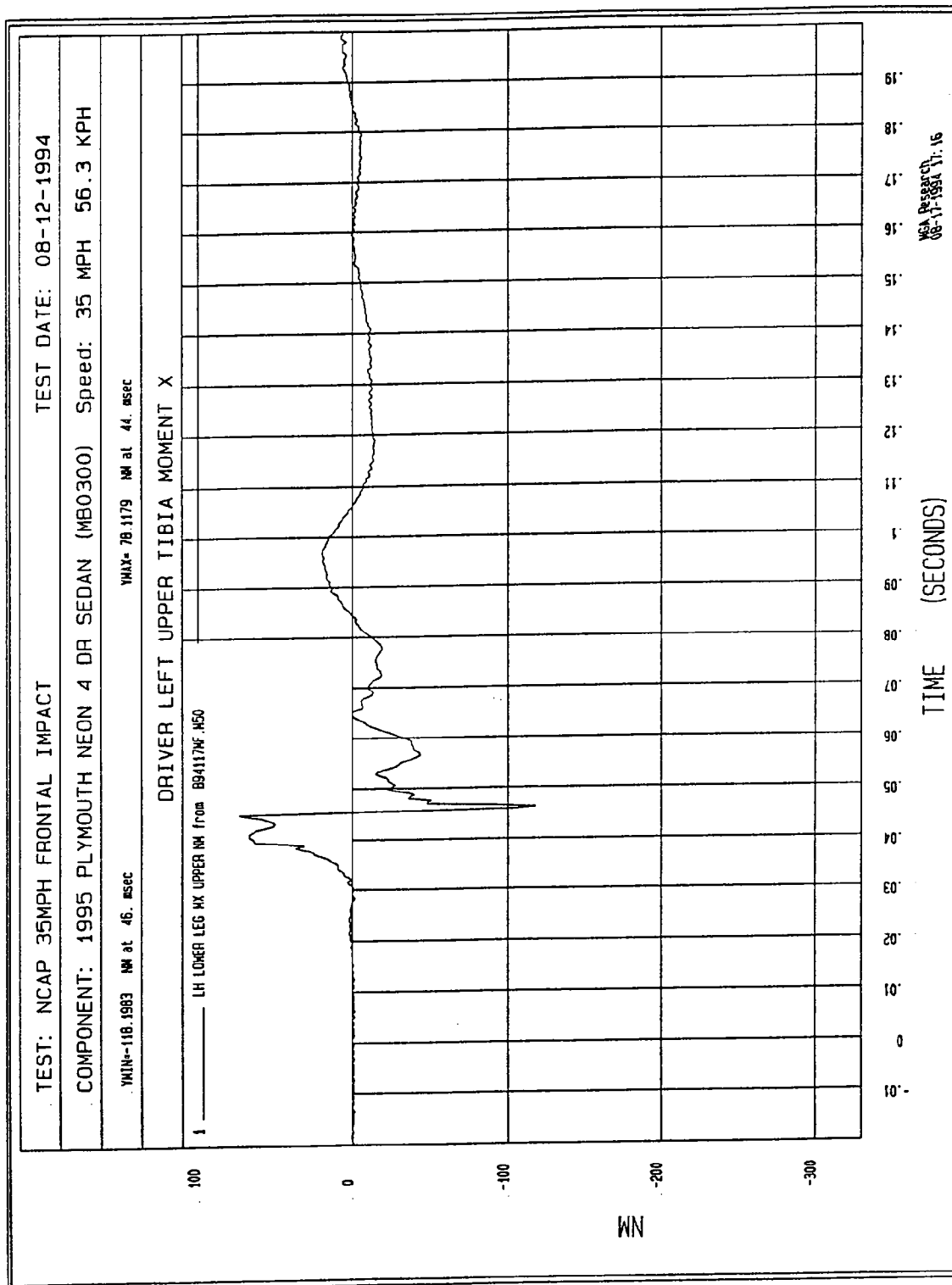


Figure B-57 - Driver Left Upper Tibia Moment X vs. Time

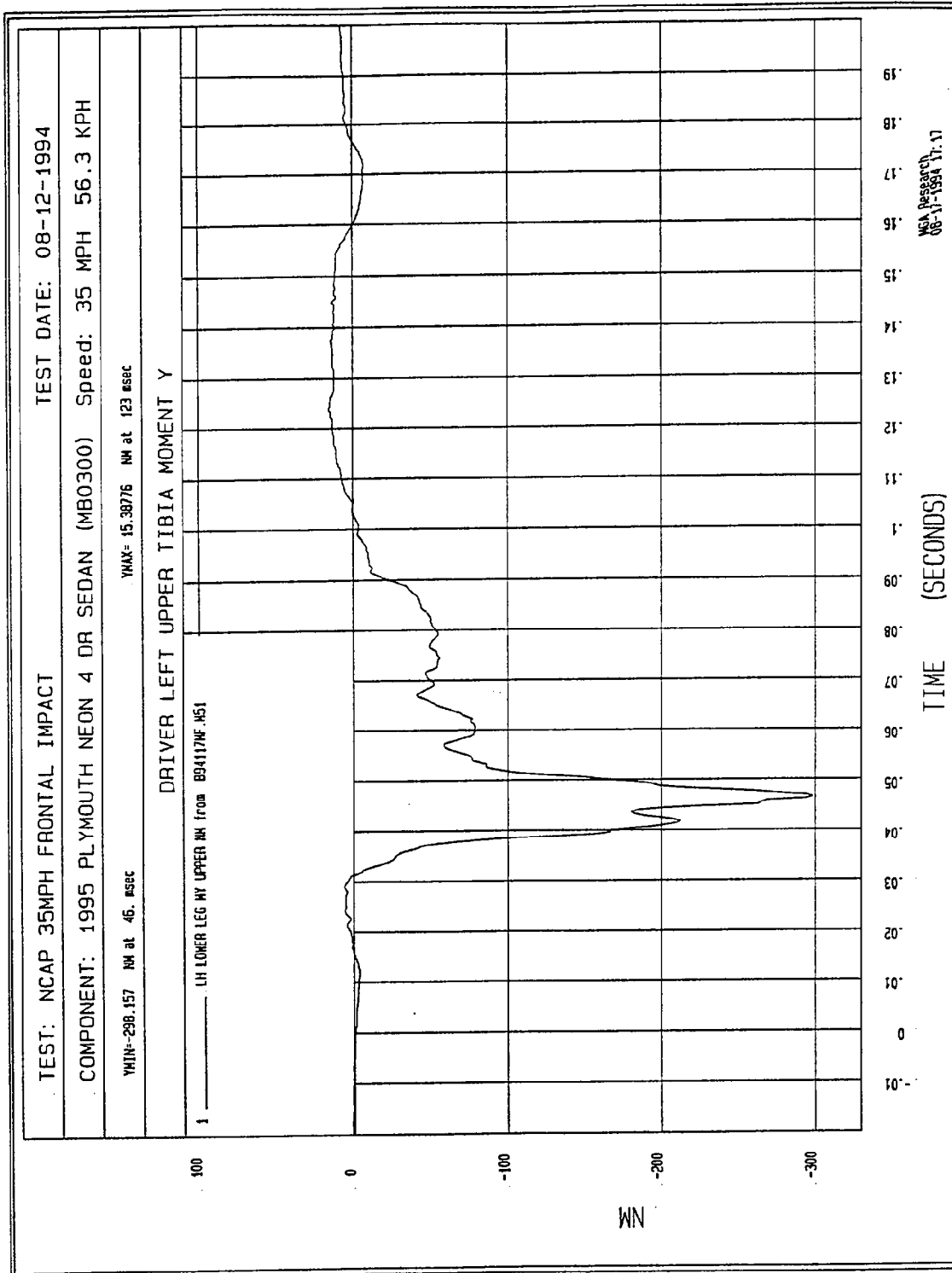


Figure B-58 - Driver Left Upper Tibia Moment Y vs. Time

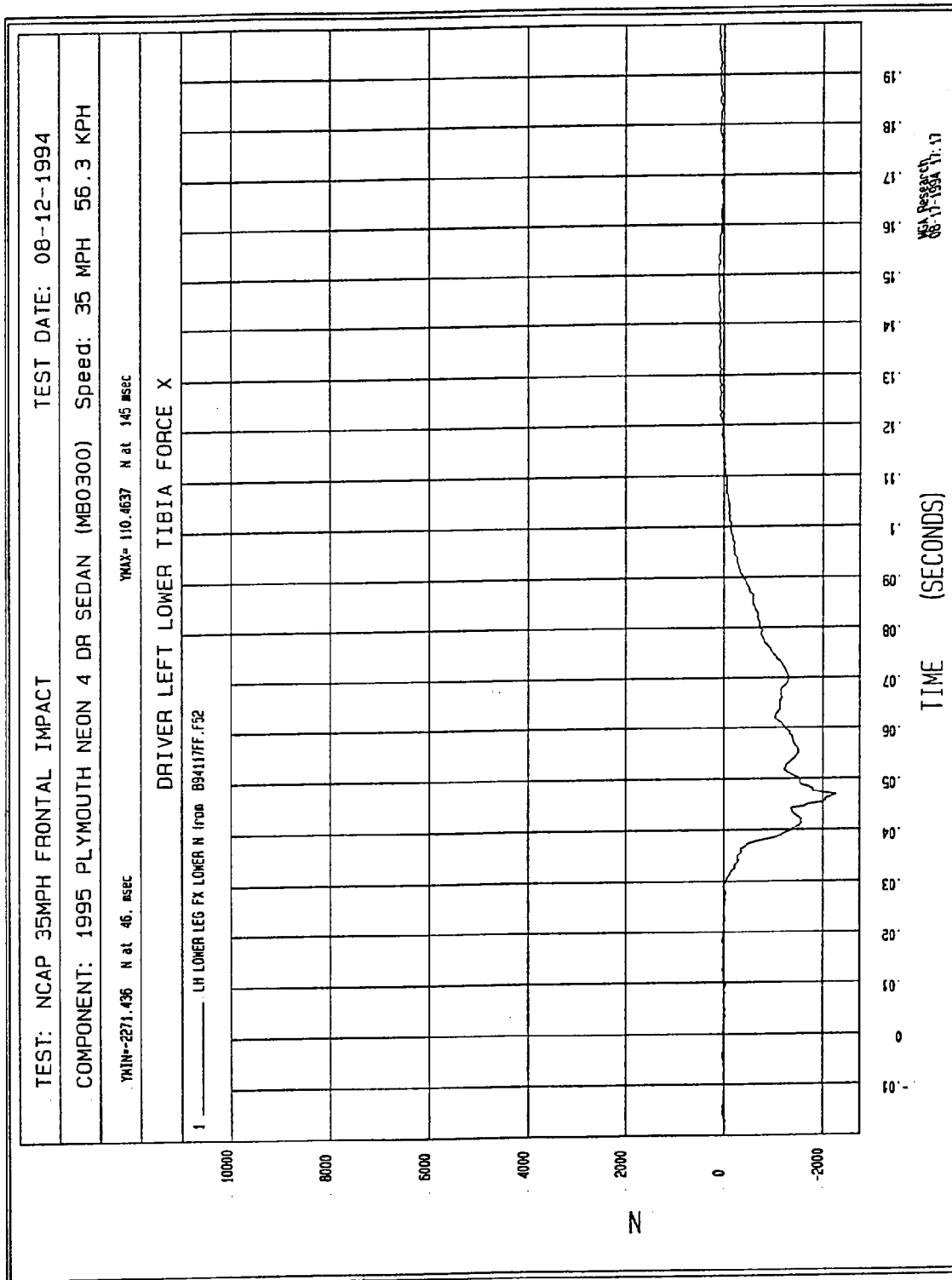


Figure B-59 - Driver Left Lower Tibia Force X vs. Time

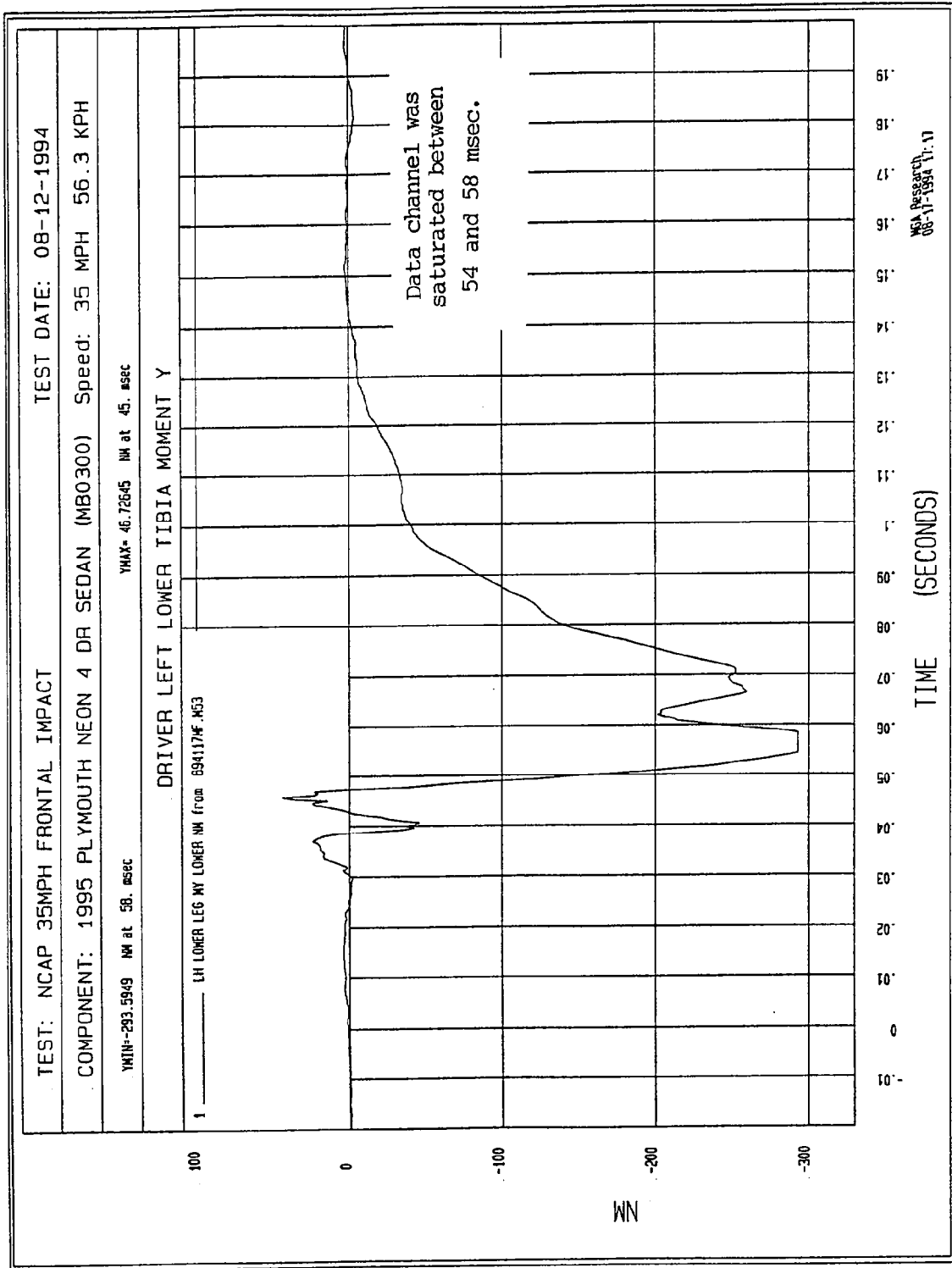


Figure B-60 - Driver Left Lower Tibia Moment Y vs. Time

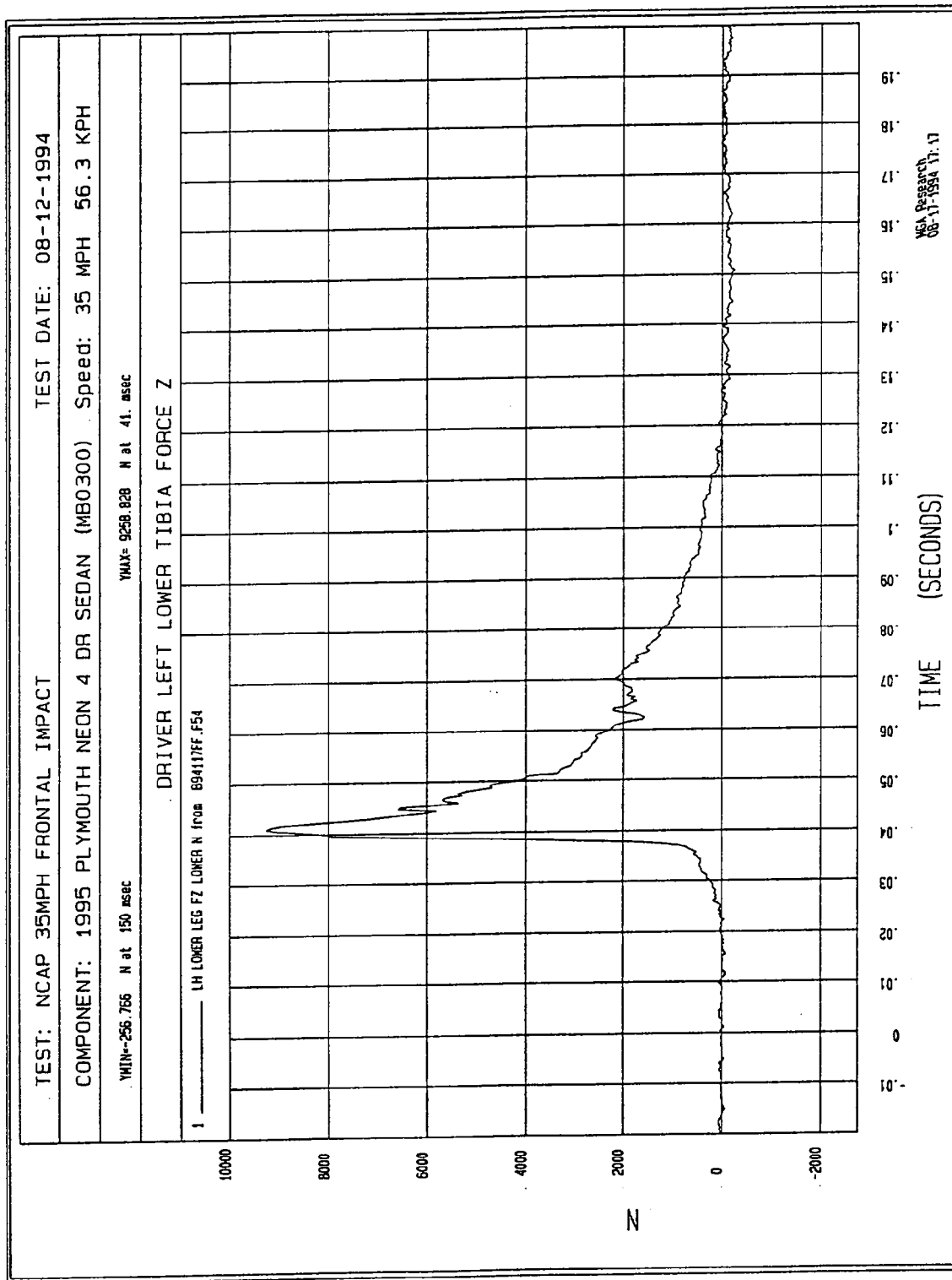


Figure B-61 - Driver Left Lower Tibia Force Z vs. Time

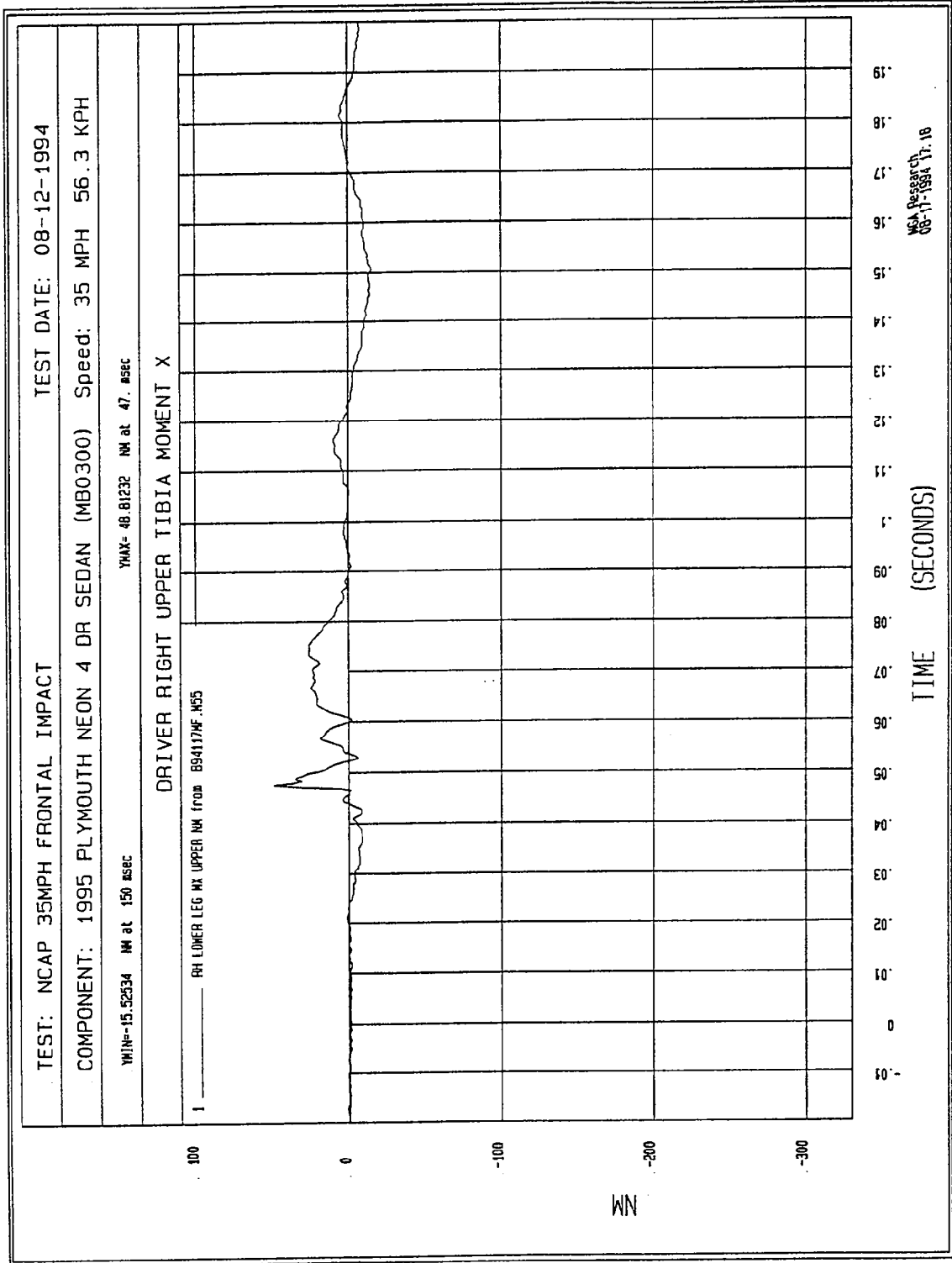


Figure B-62 - Driver Right Upper Tibia Moment X vs. Time

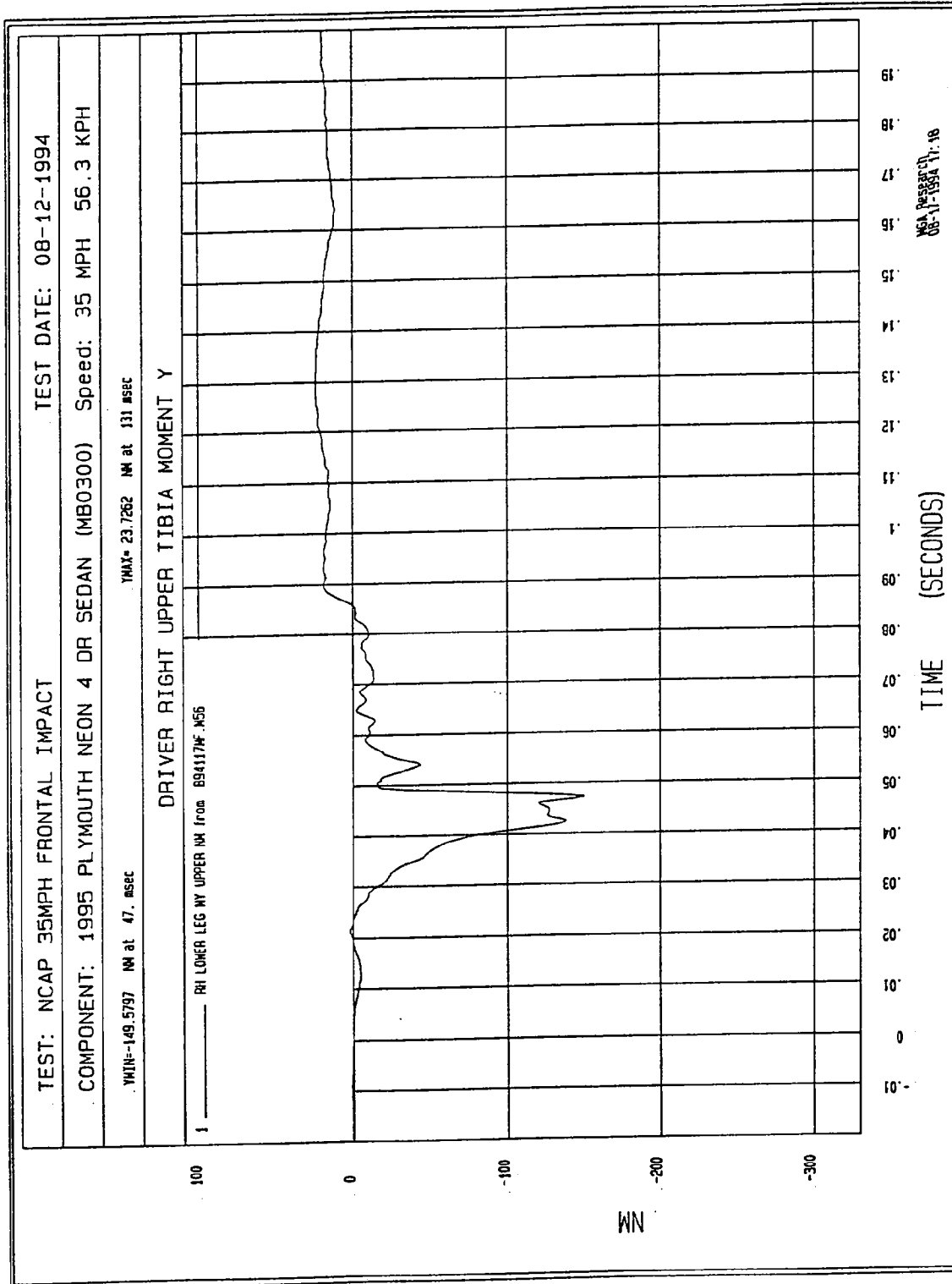


Figure B-63 - Driver Right Upper Tibia Moment Y vs. Time

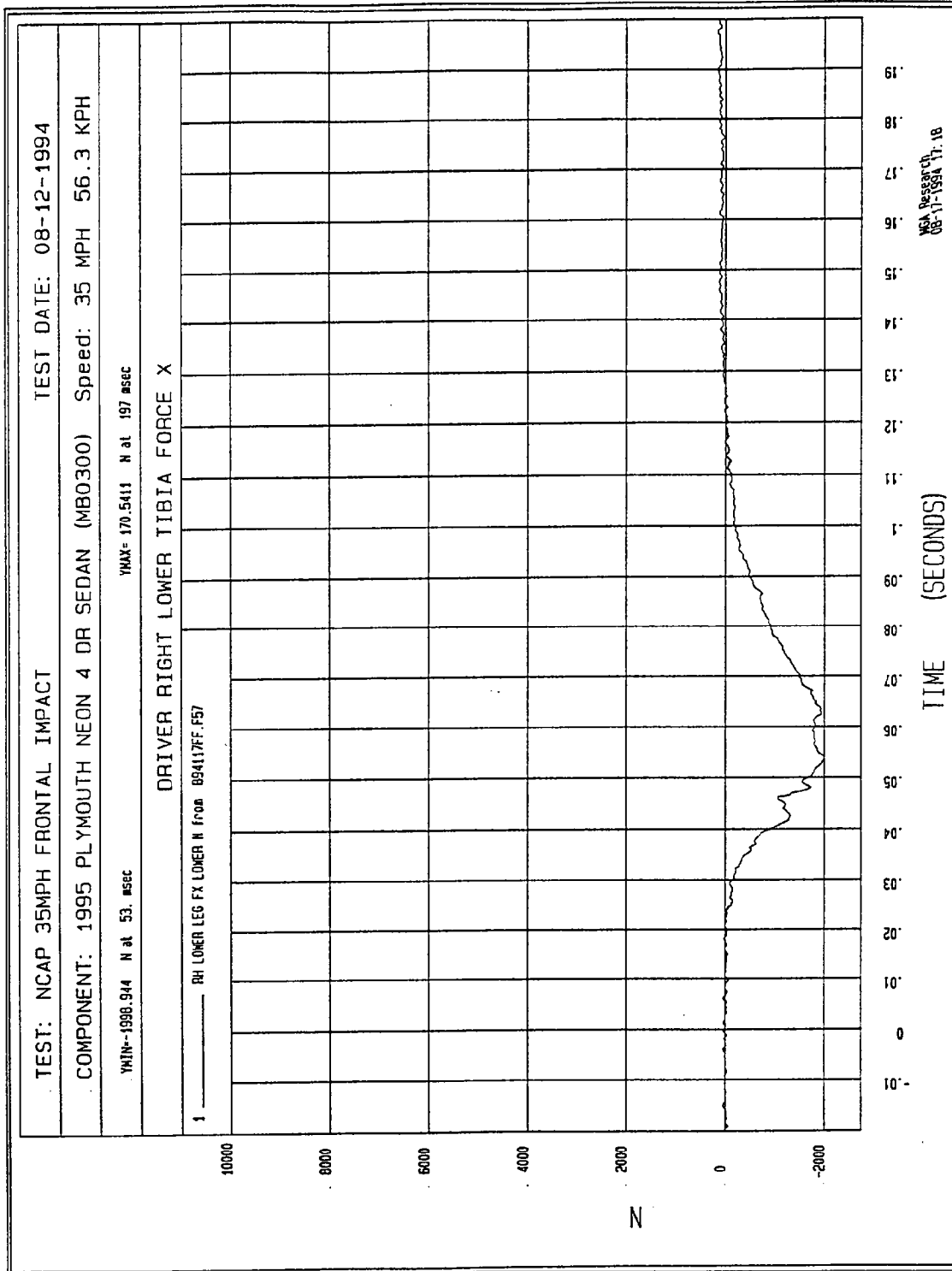


Figure B-64 - Driver Right Lower Tibia Force X vs. Time

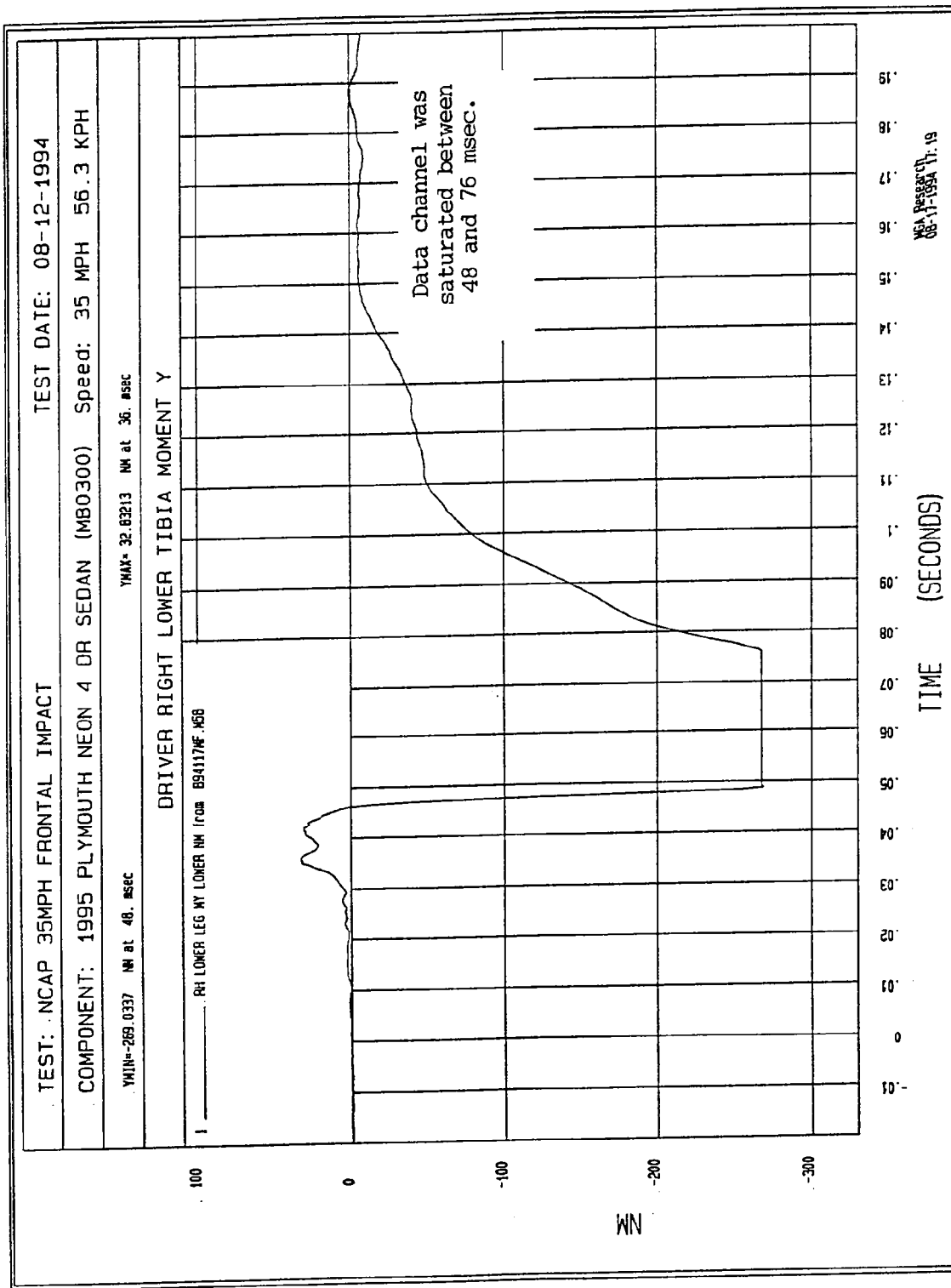


Figure B-65 - Driver Right Lower Tibia Moment Y vs. Time

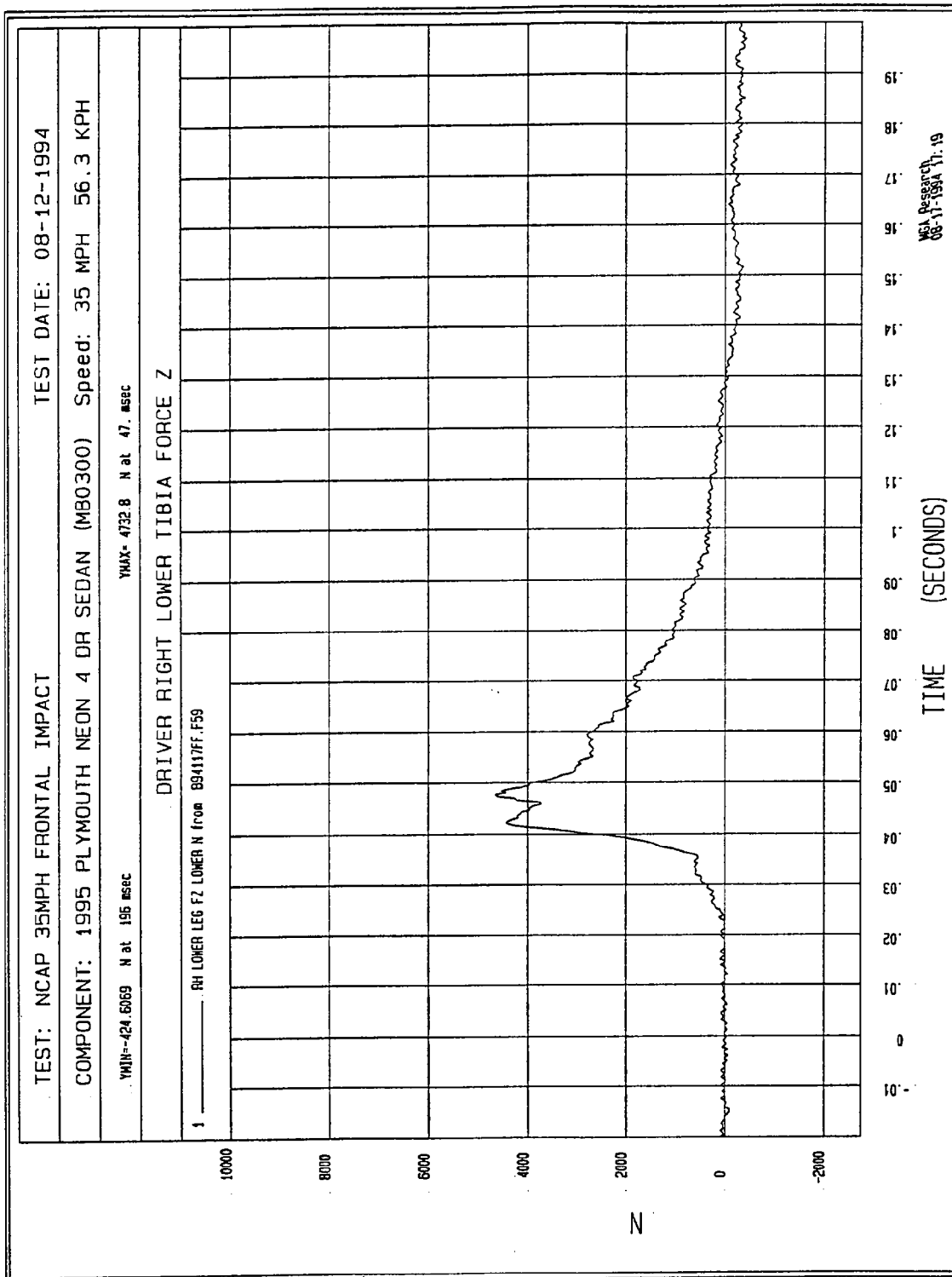


Figure B-66 - Driver Right Lower Tibia Force Z vs. Time

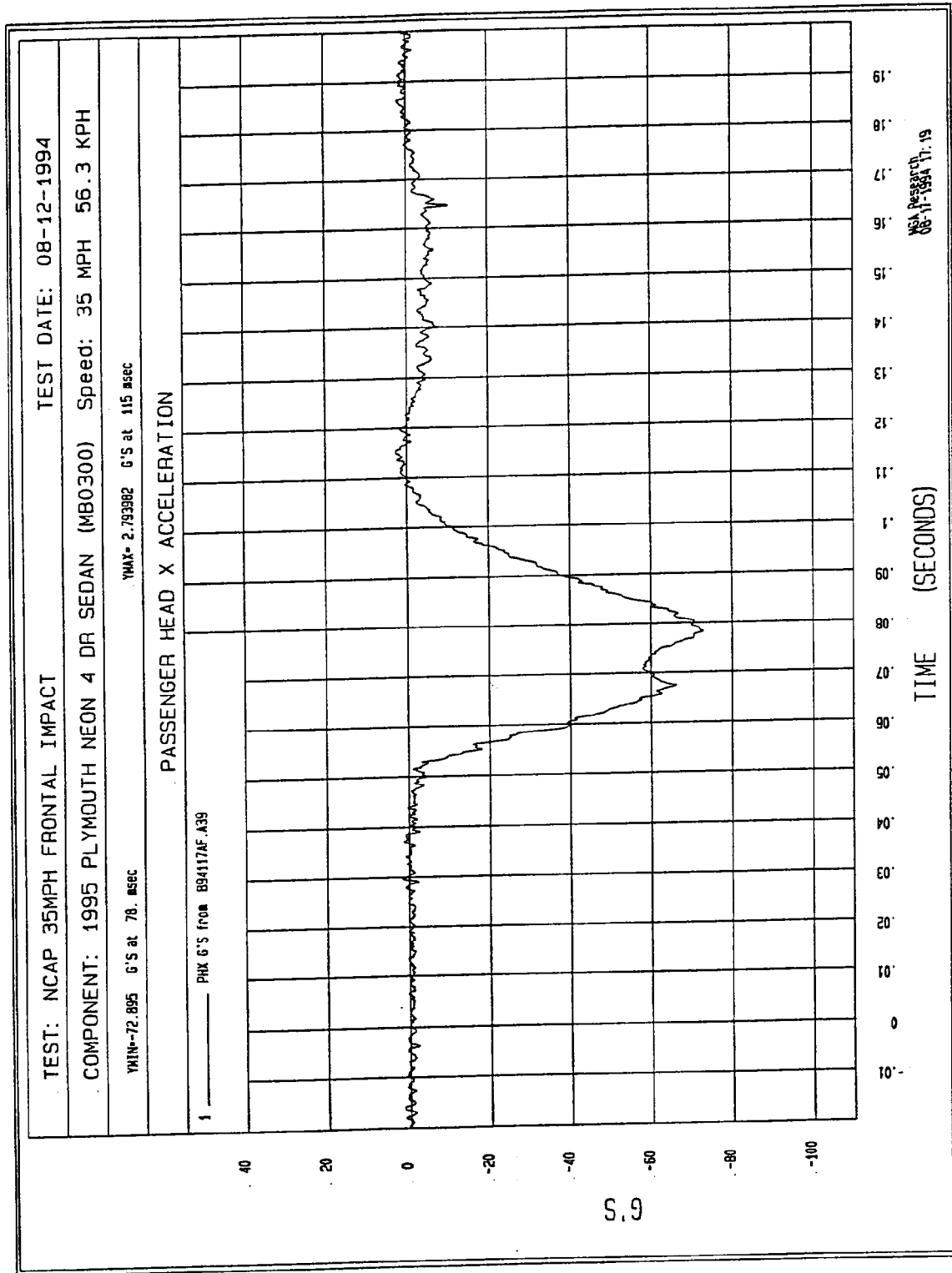
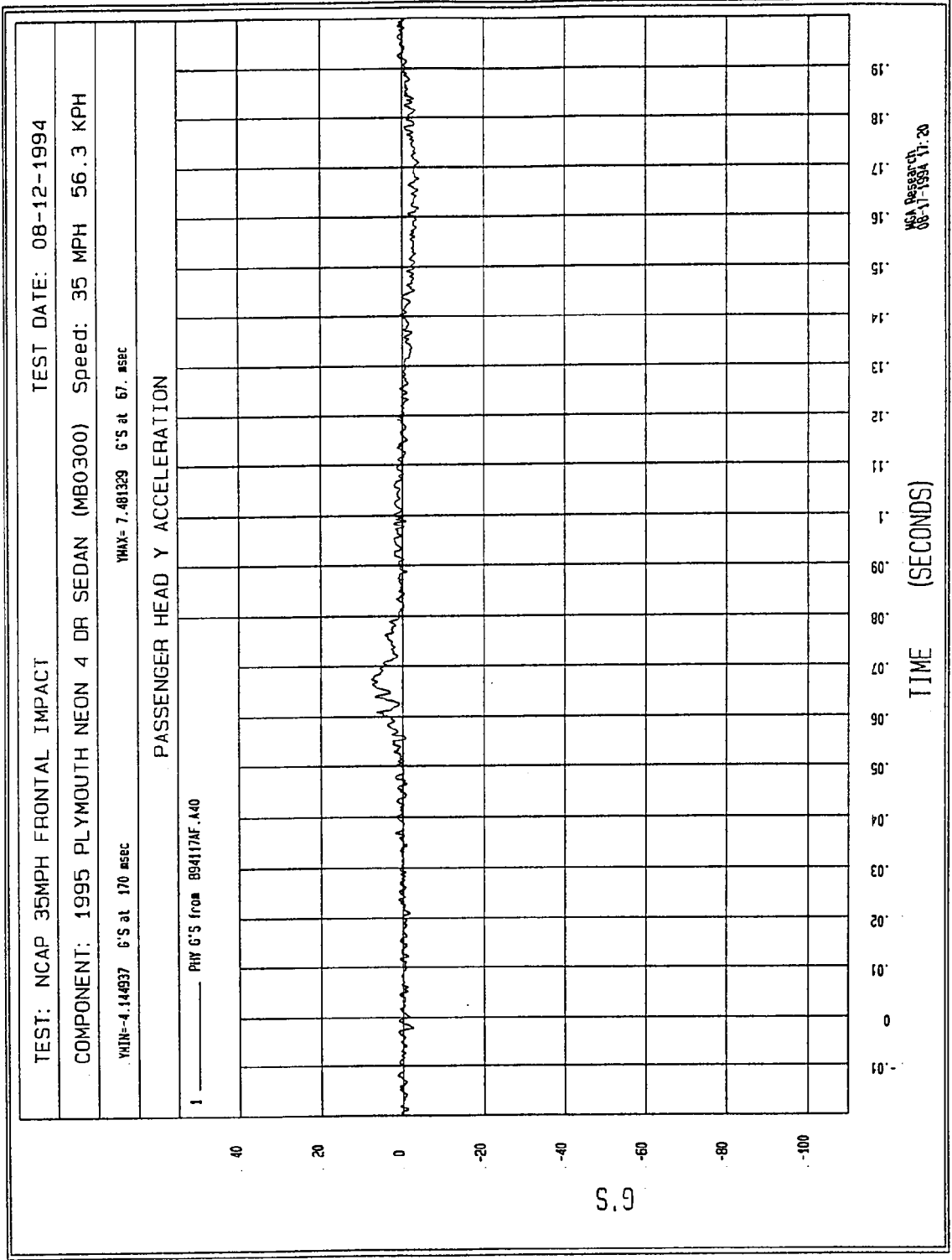


Figure B-67 - Passenger Head X Acceleration vs. Time



B-68

Figure B-68 - Passenger Head Y Acceleration vs. Time

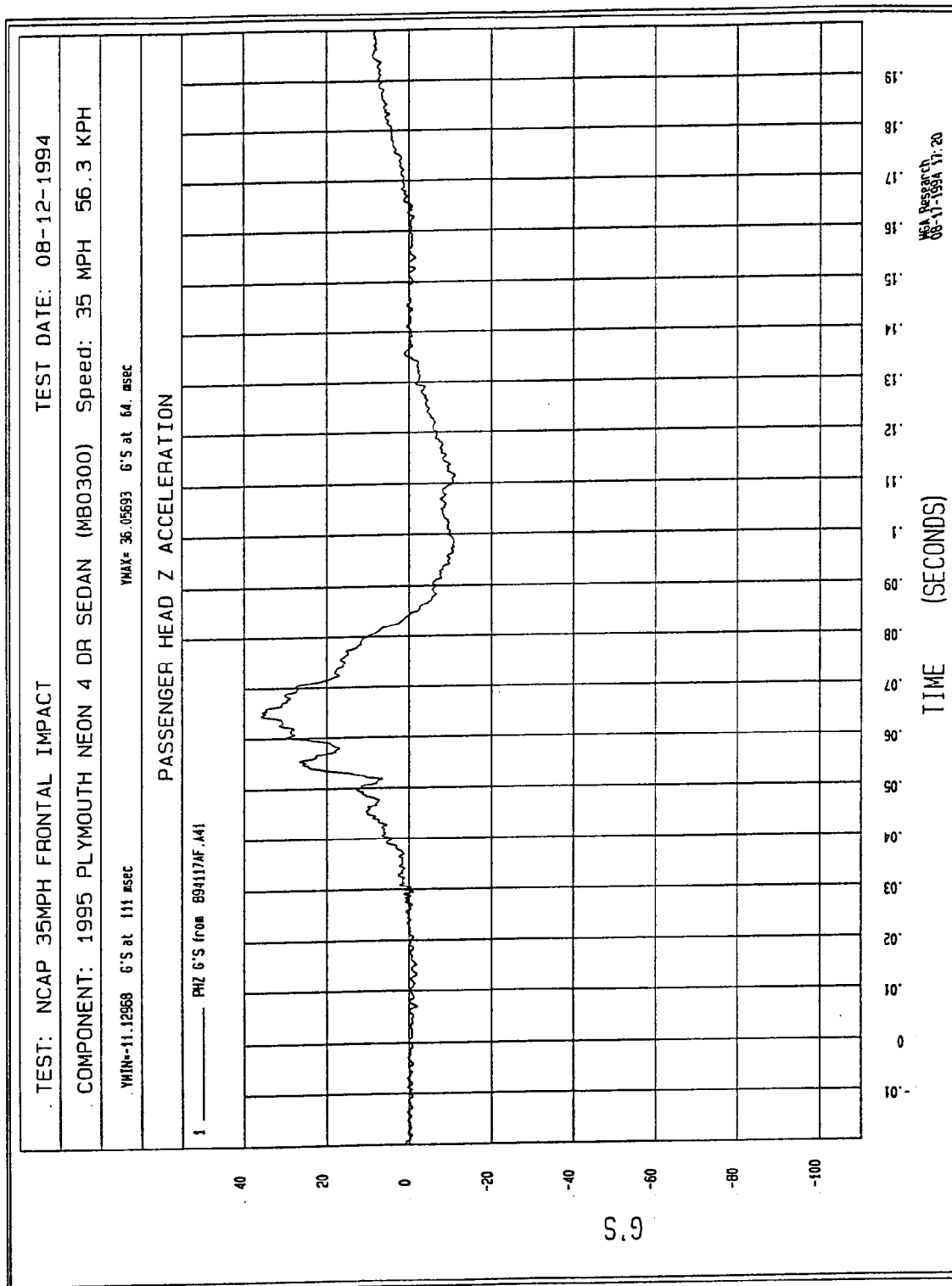


Figure B-69 - Passenger Head Z Acceleration vs. Time

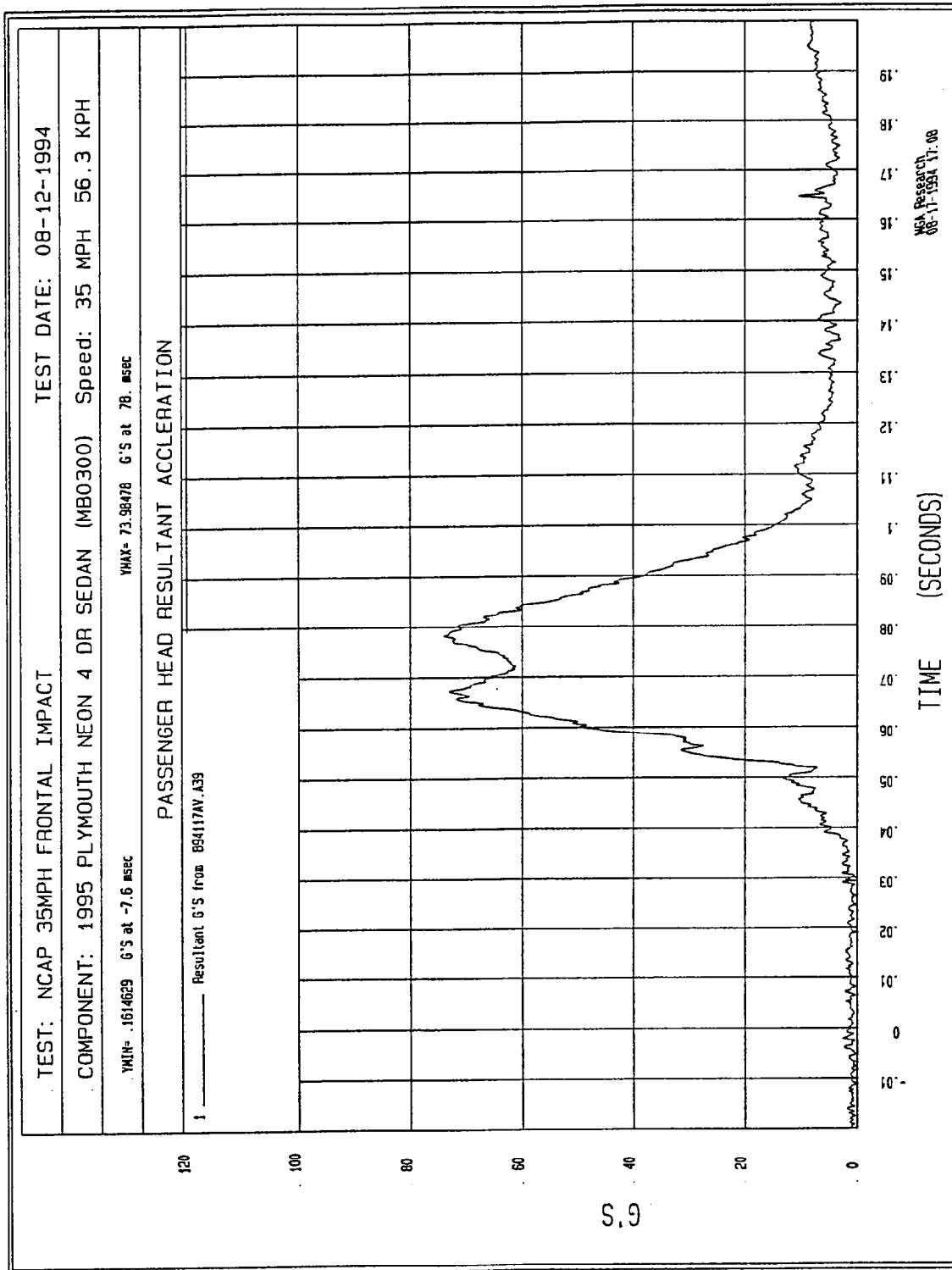


Figure B-70 - Passenger Head Resultant Acceleration vs. Time

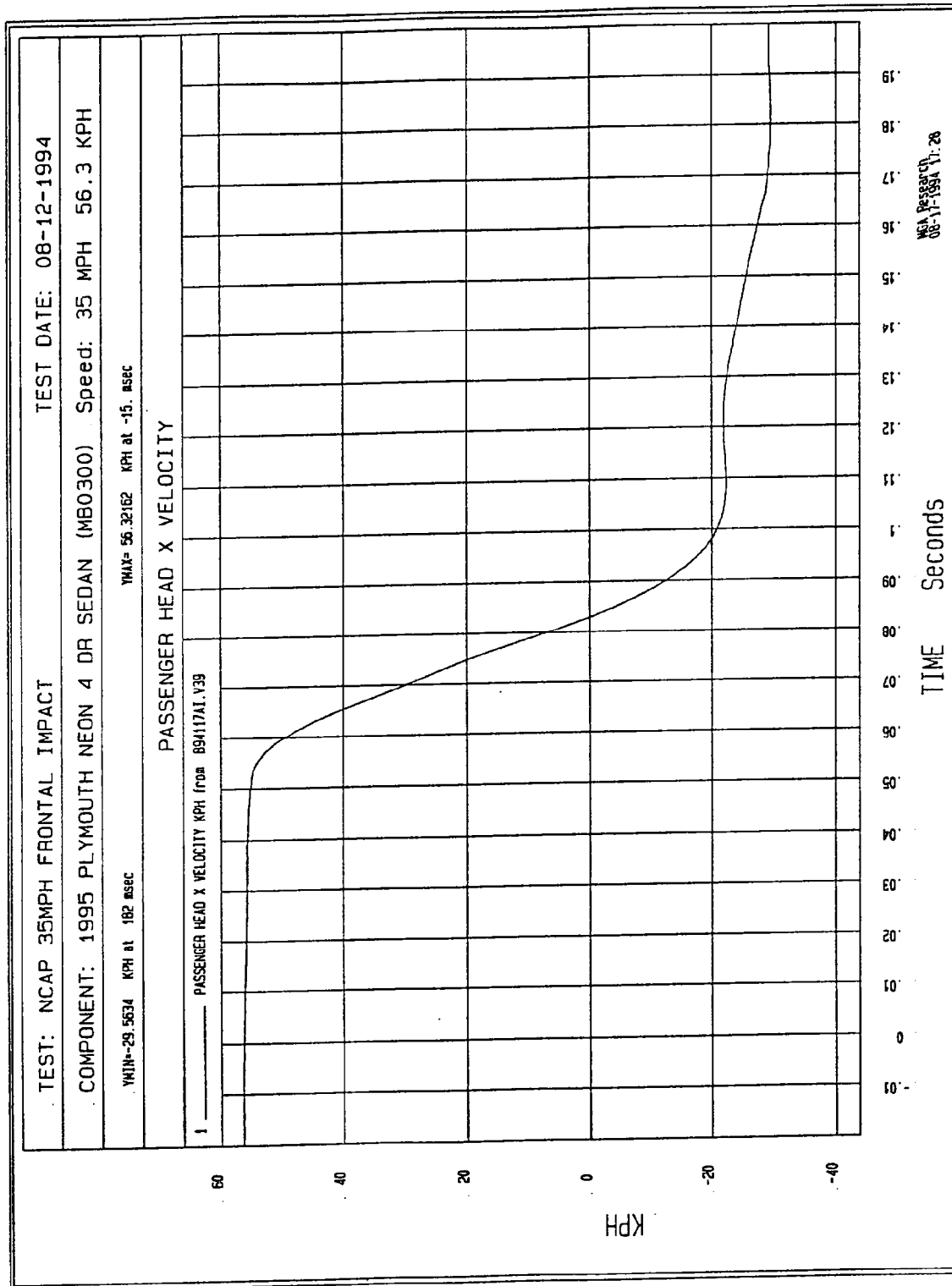


Figure B-71 - Passenger Head X Velocity vs. Time

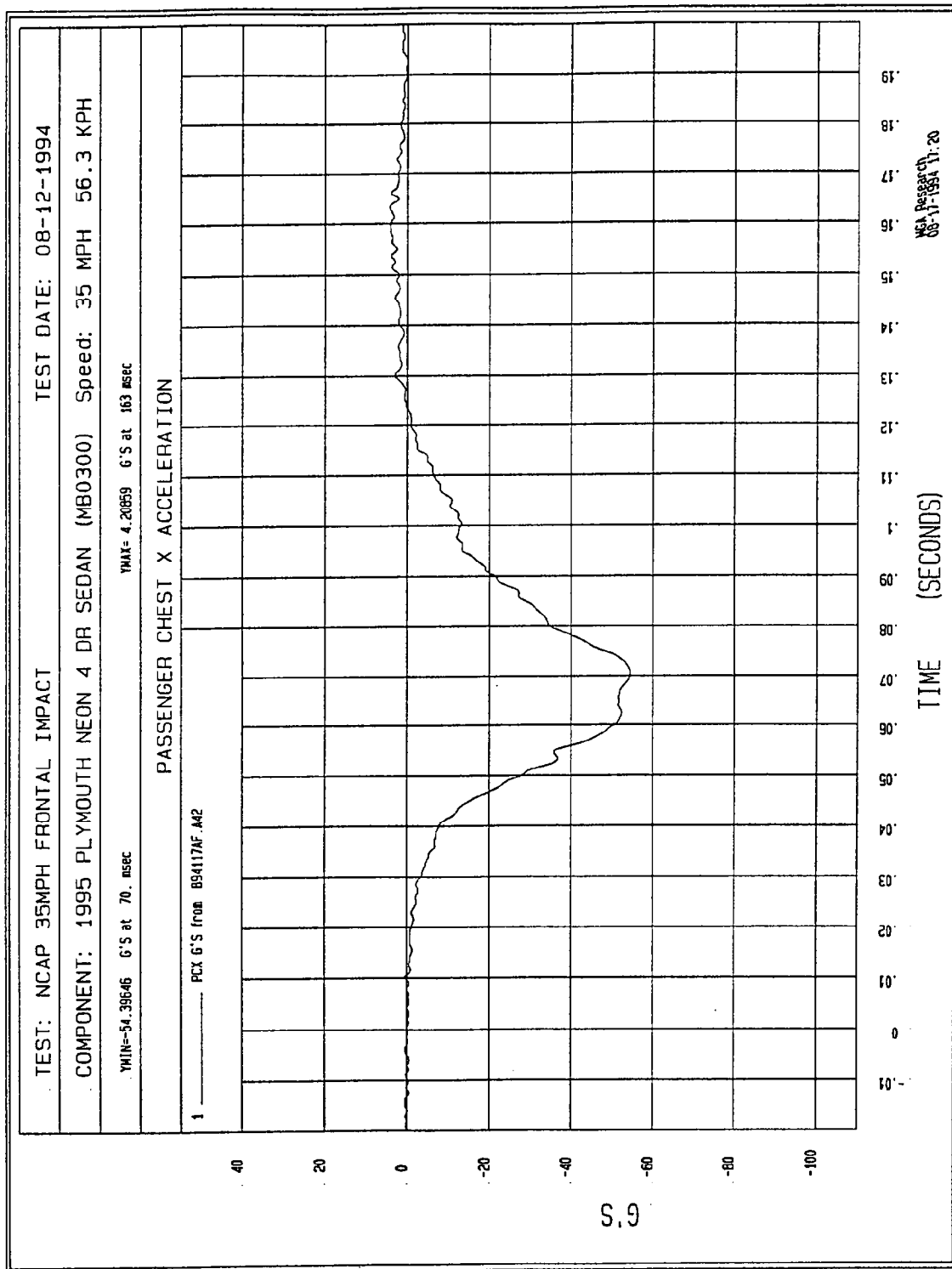


Figure B-72 - Passenger Chest X Acceleration vs. Time

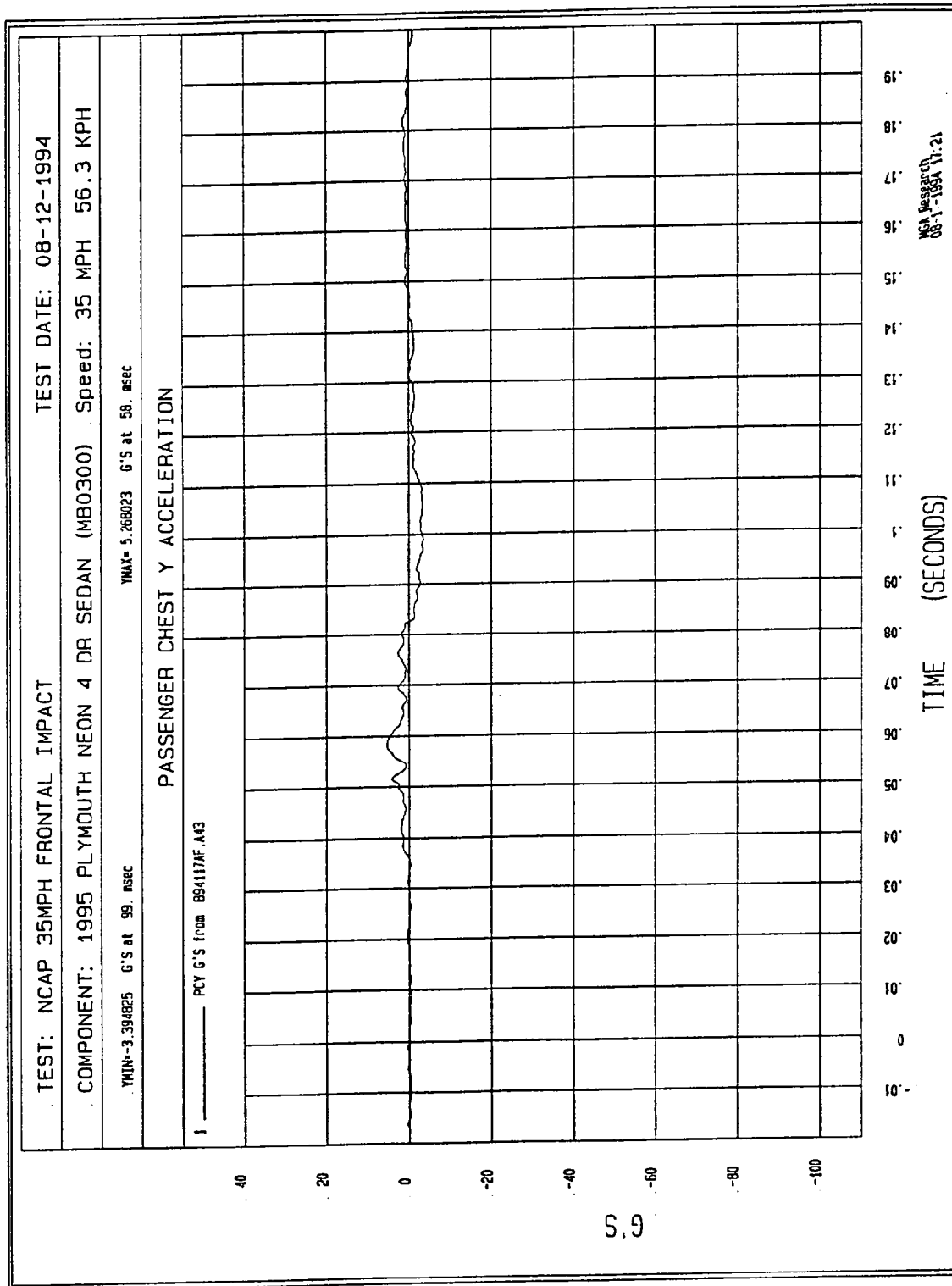


Figure B-73 - Passenger Chest Y Acceleration vs. Time

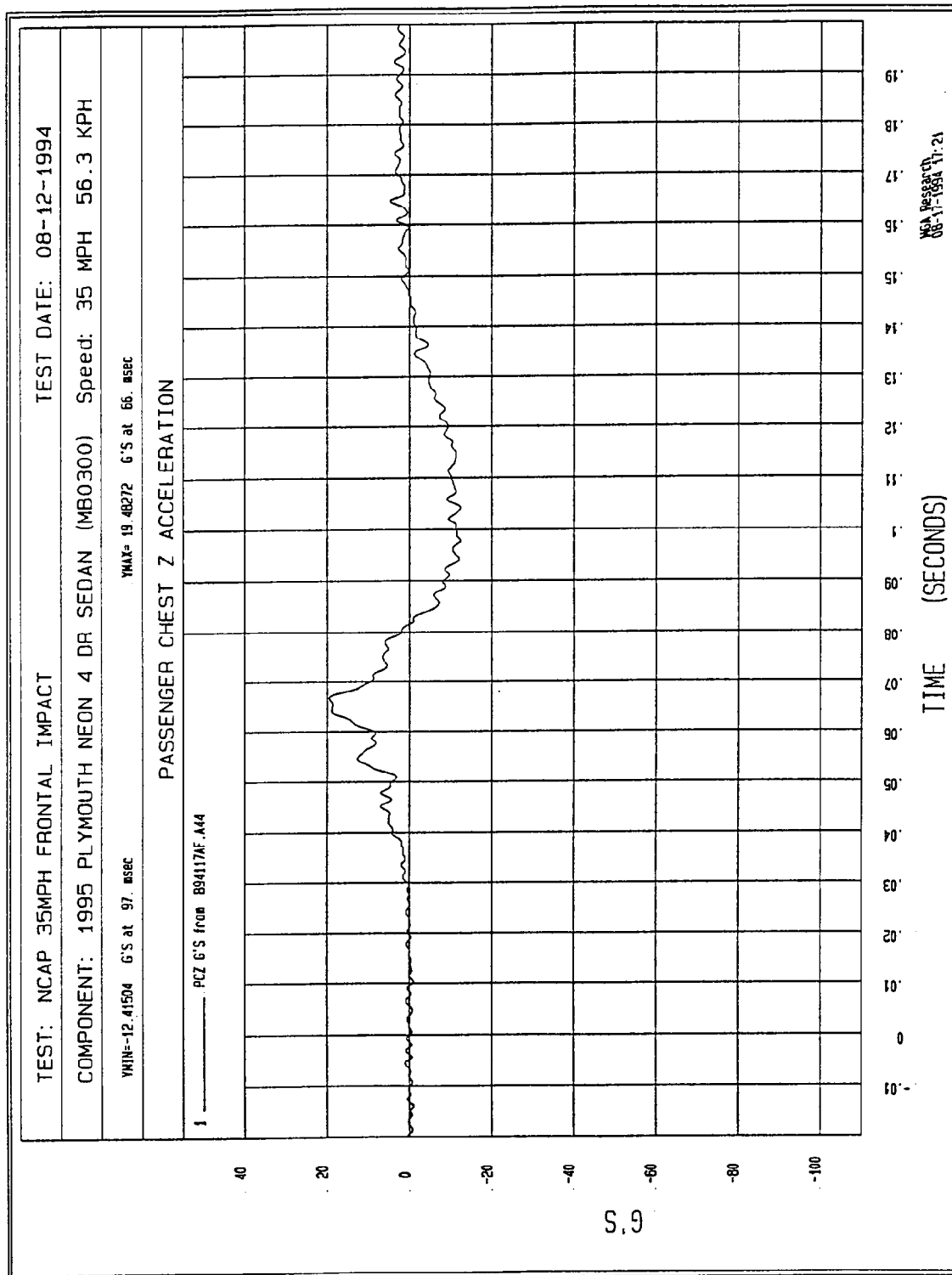


Figure B-74 - Passenger Chest Z Acceleration vs. Time

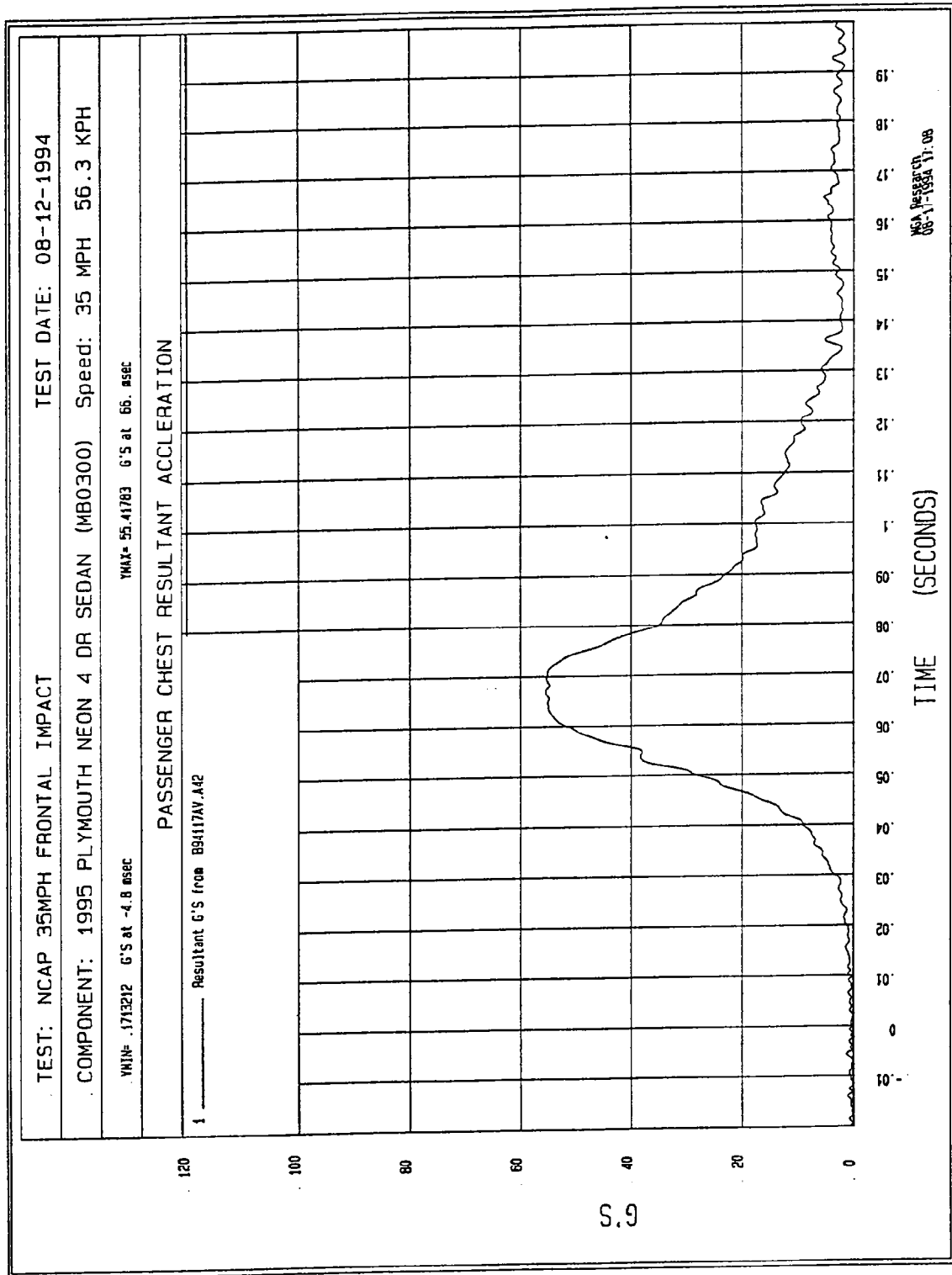
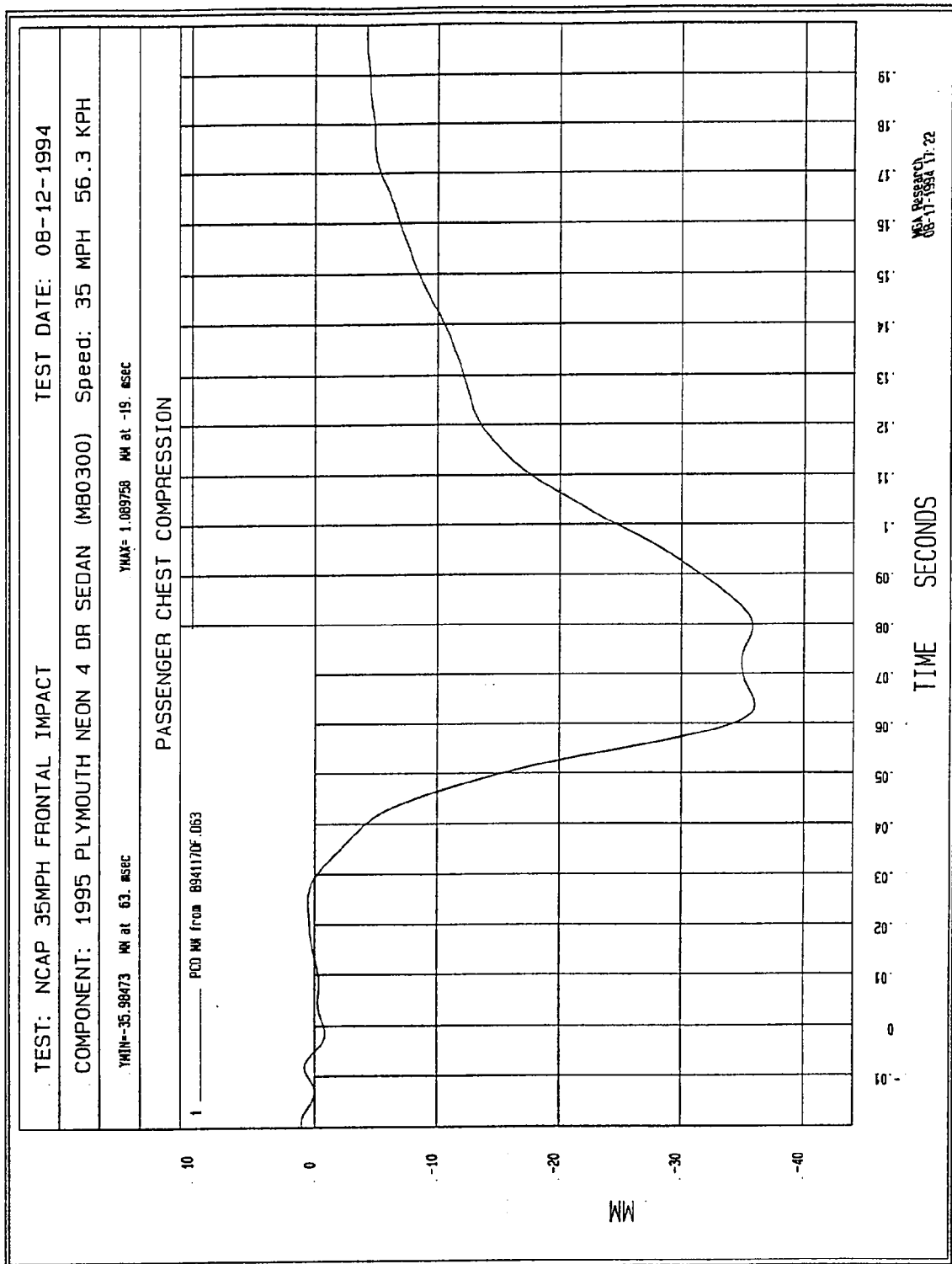


Figure B-75 - Passenger Chest Resultant vs. Time



B-76

Figure B-76 - Passenger Chest Compression vs. Time

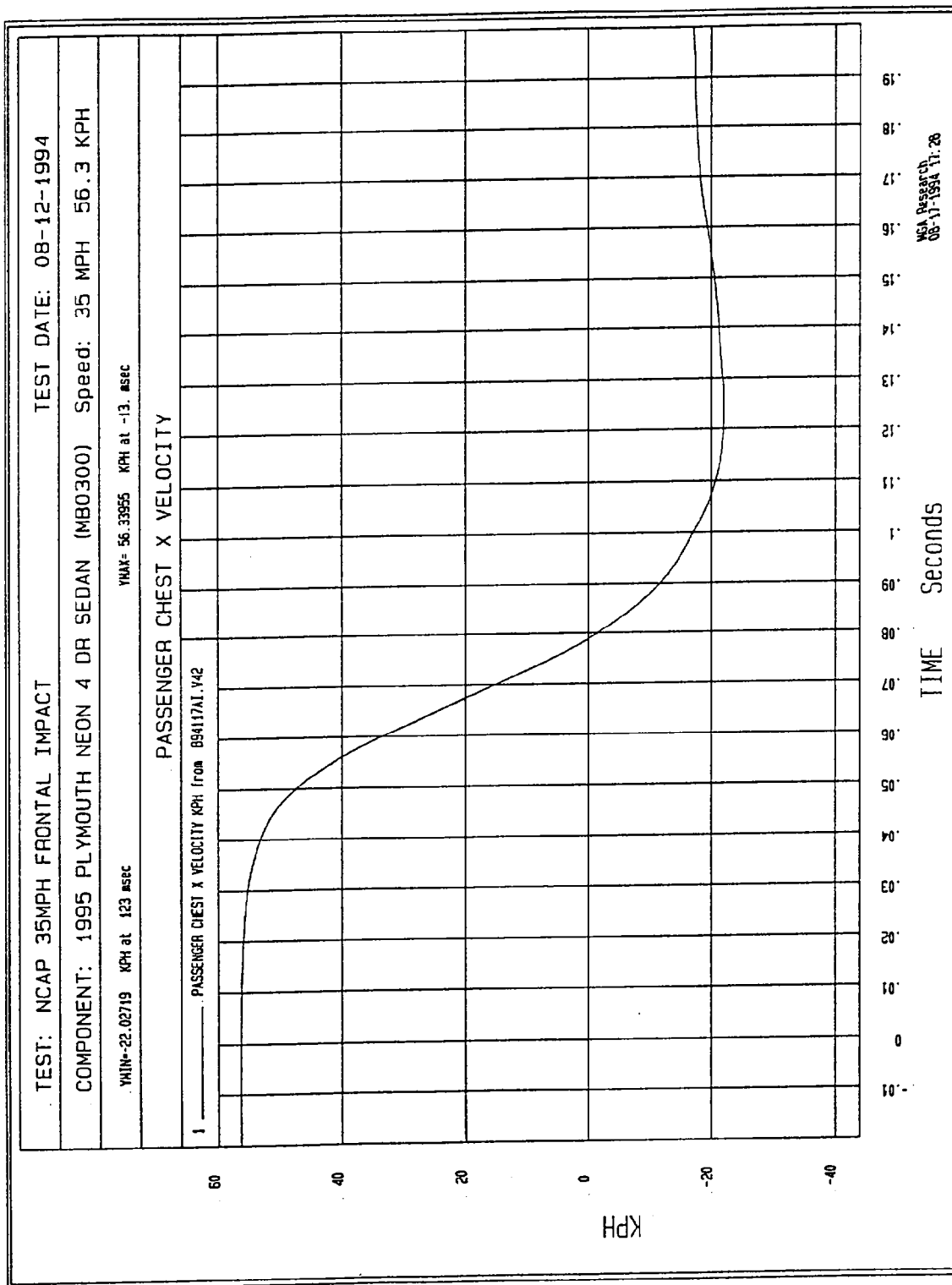
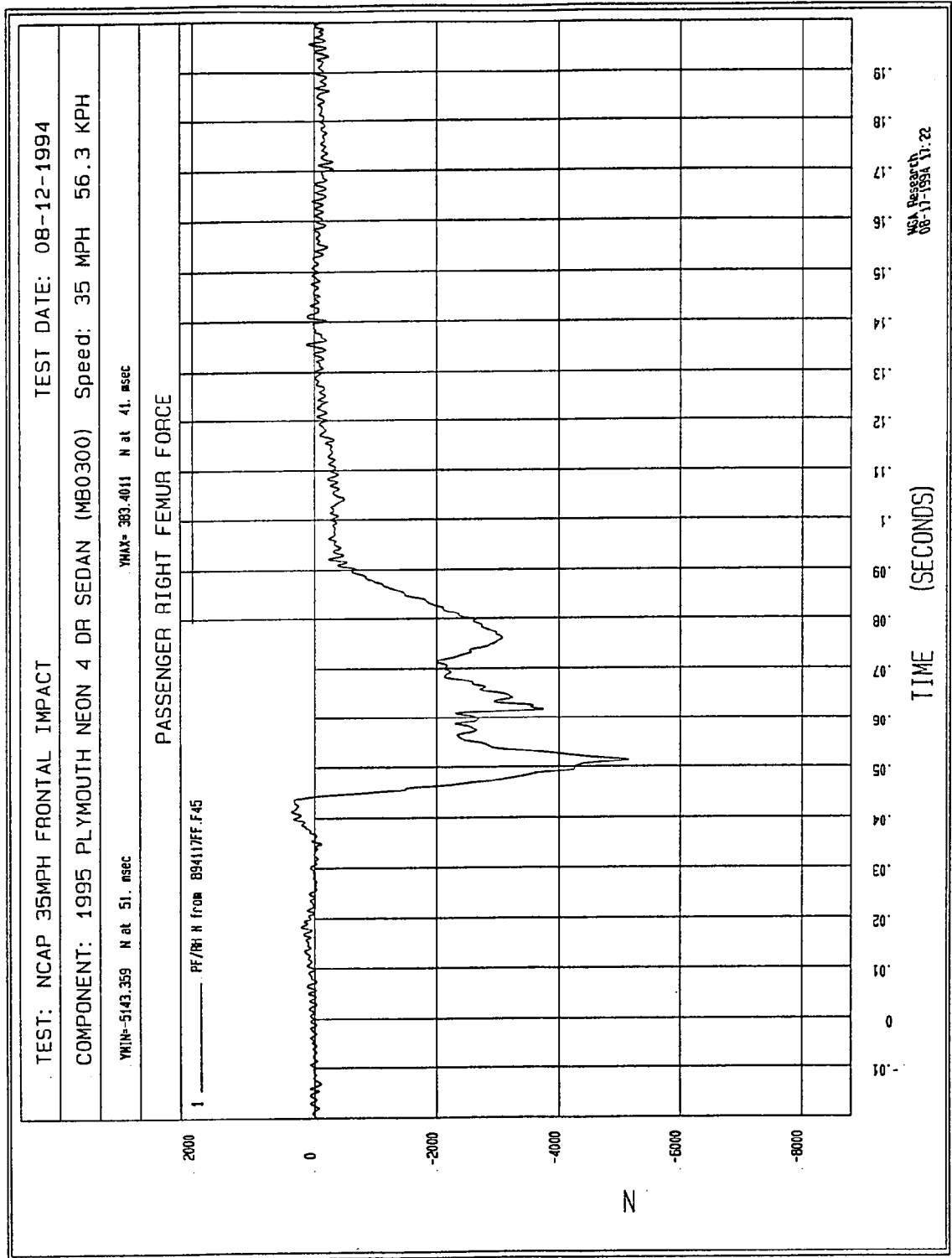


Figure B-77 - Passenger Chest X Velocity vs. Time



B-78

Figure B-78 - Passenger Right Femur Force vs. Time

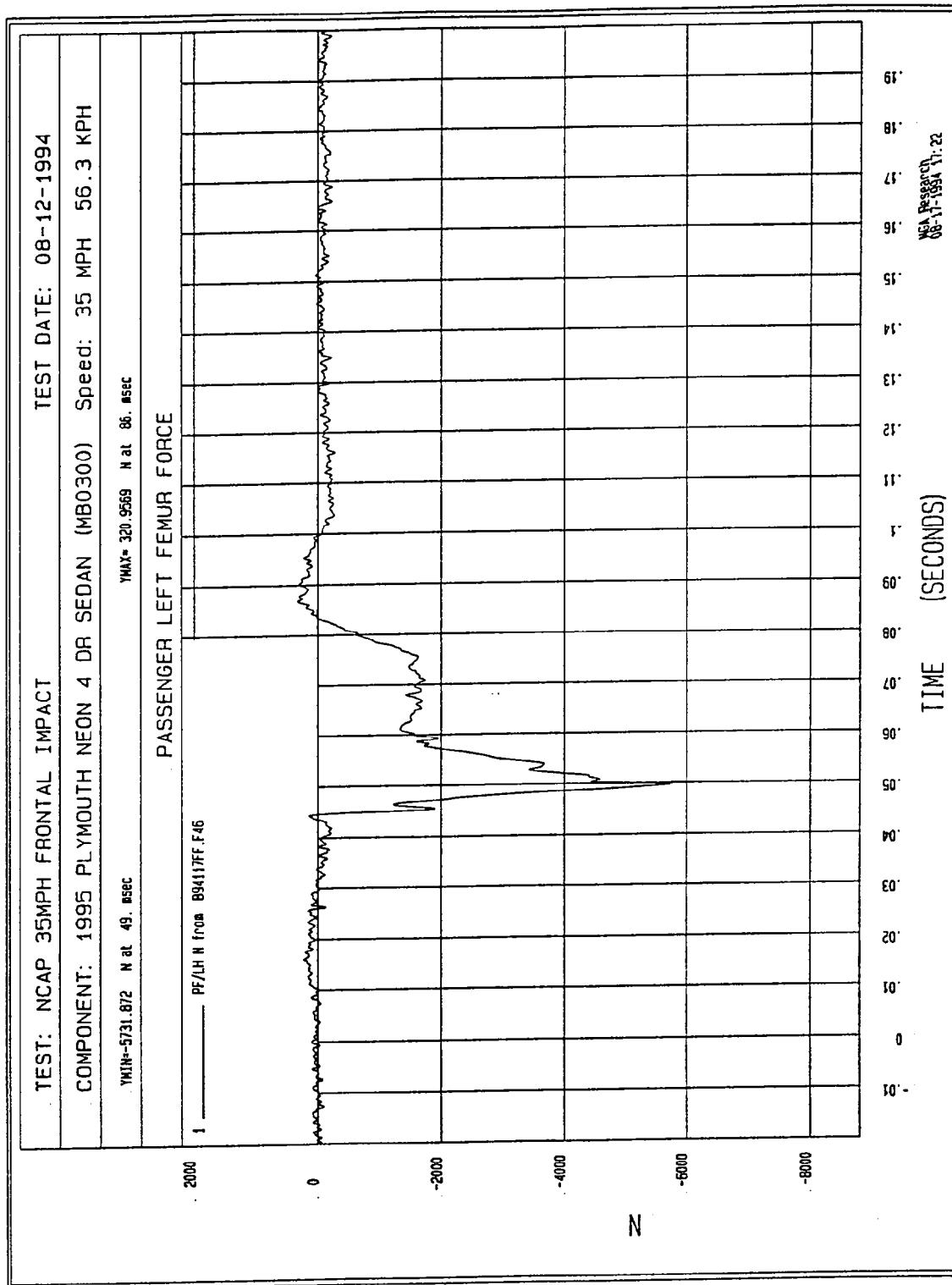
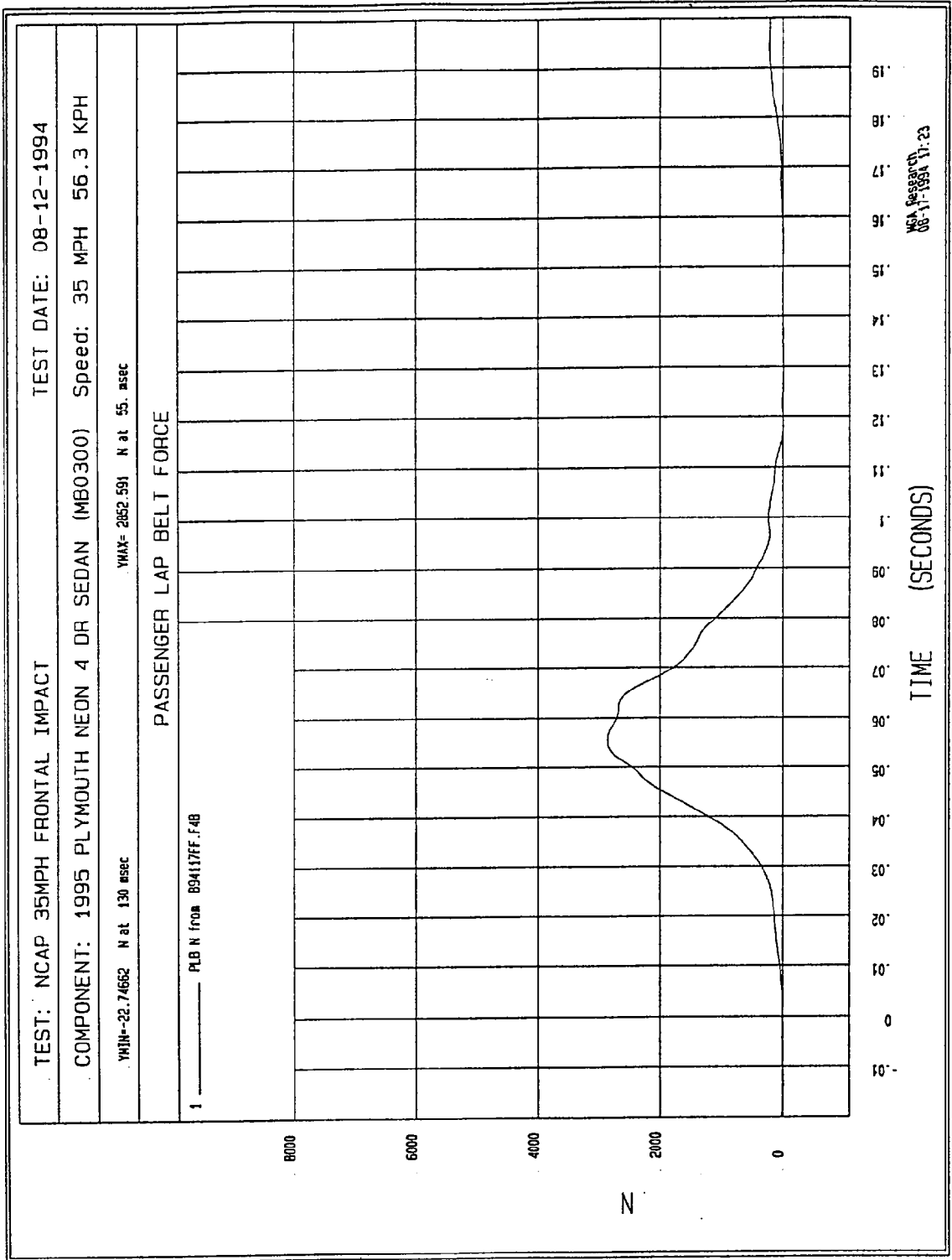


Figure B-79 - Passenger Left Femur Force vs. Time



B-80

Figure B-80 - Passenger Lap Belt Force vs. Time

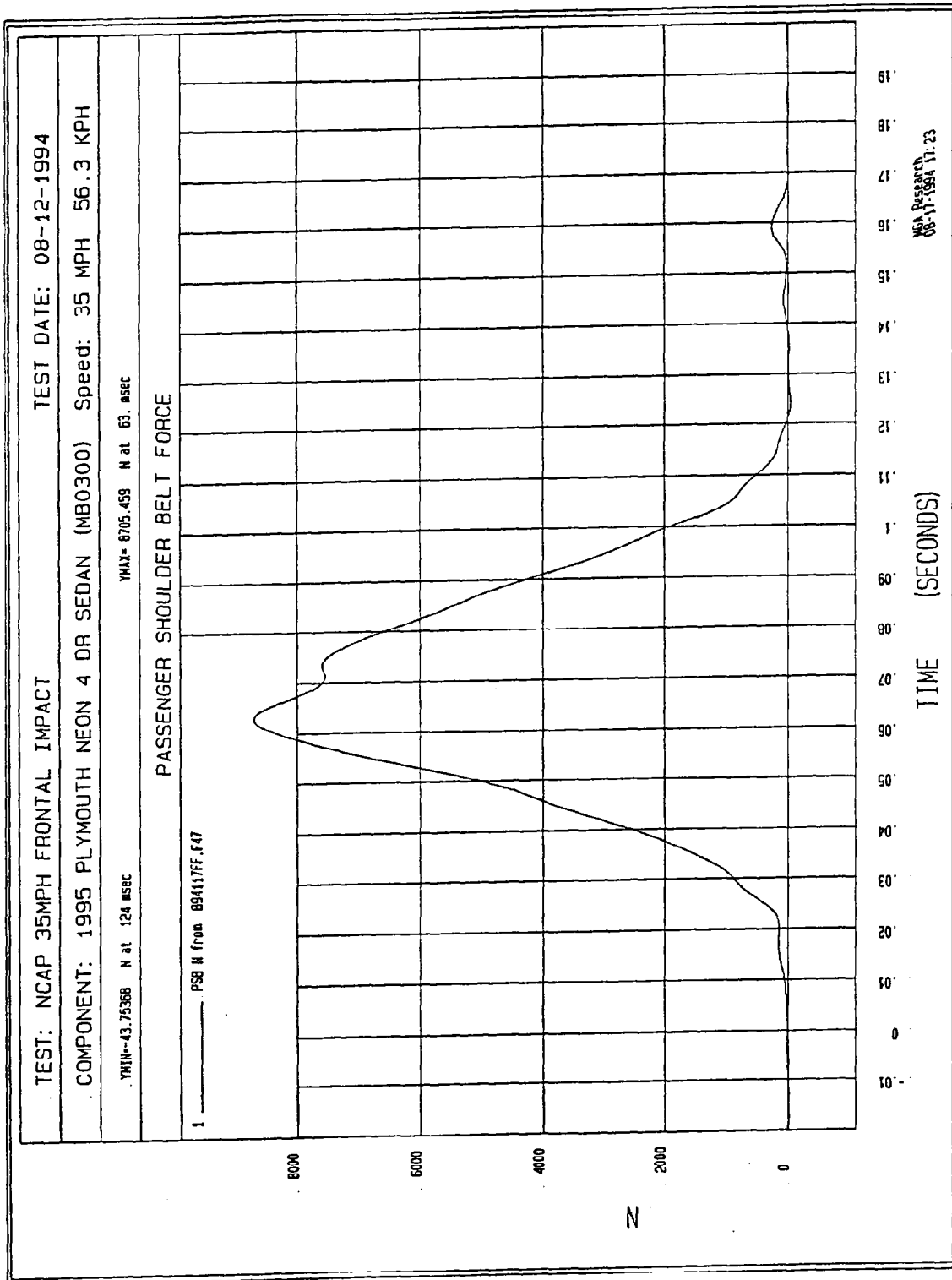


Figure B-81 - Passenger Shoulder Belt Force vs. Time

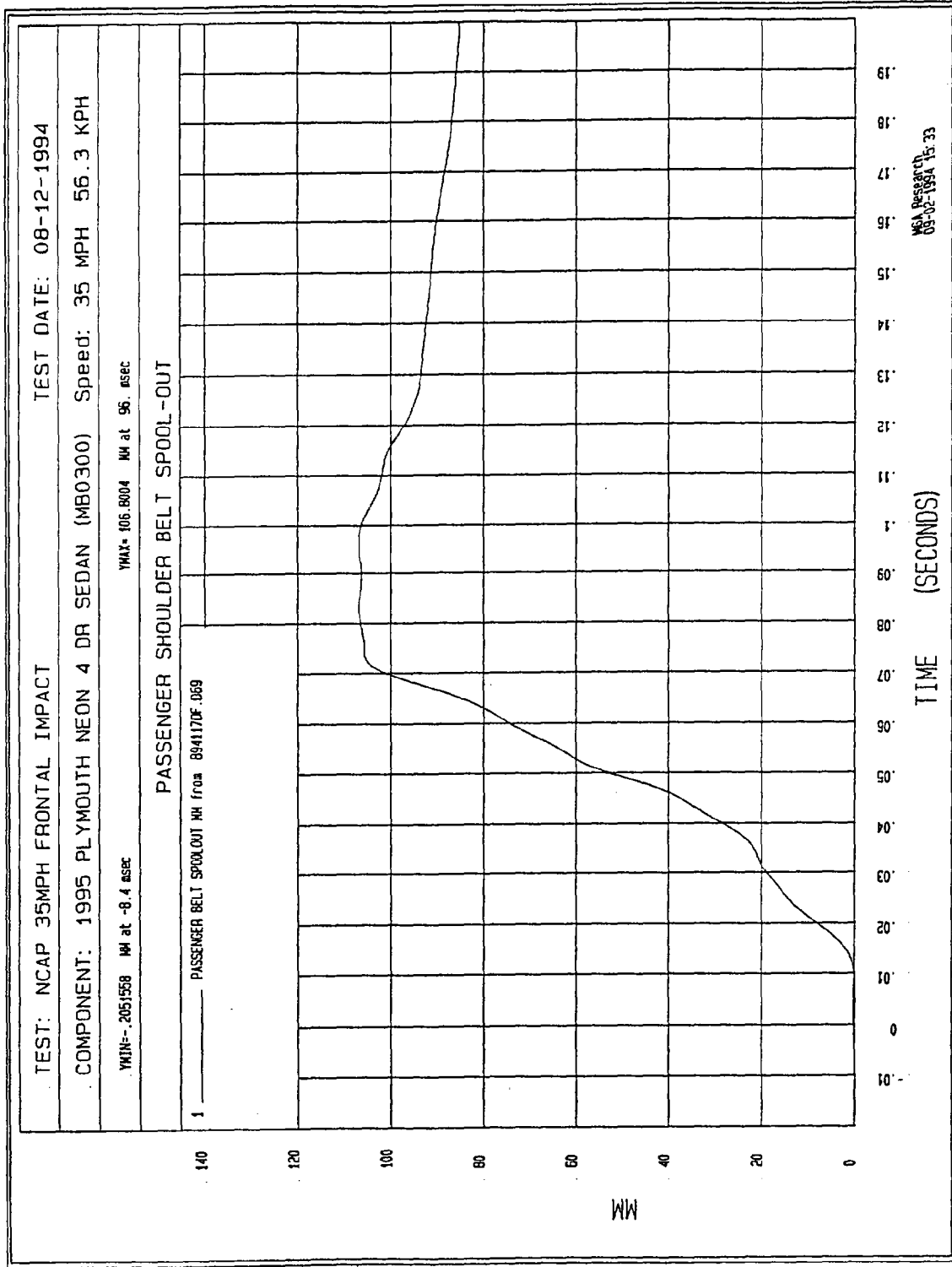


Figure B-82 - Passenger Shoulder Belt Spool-out vs. Time

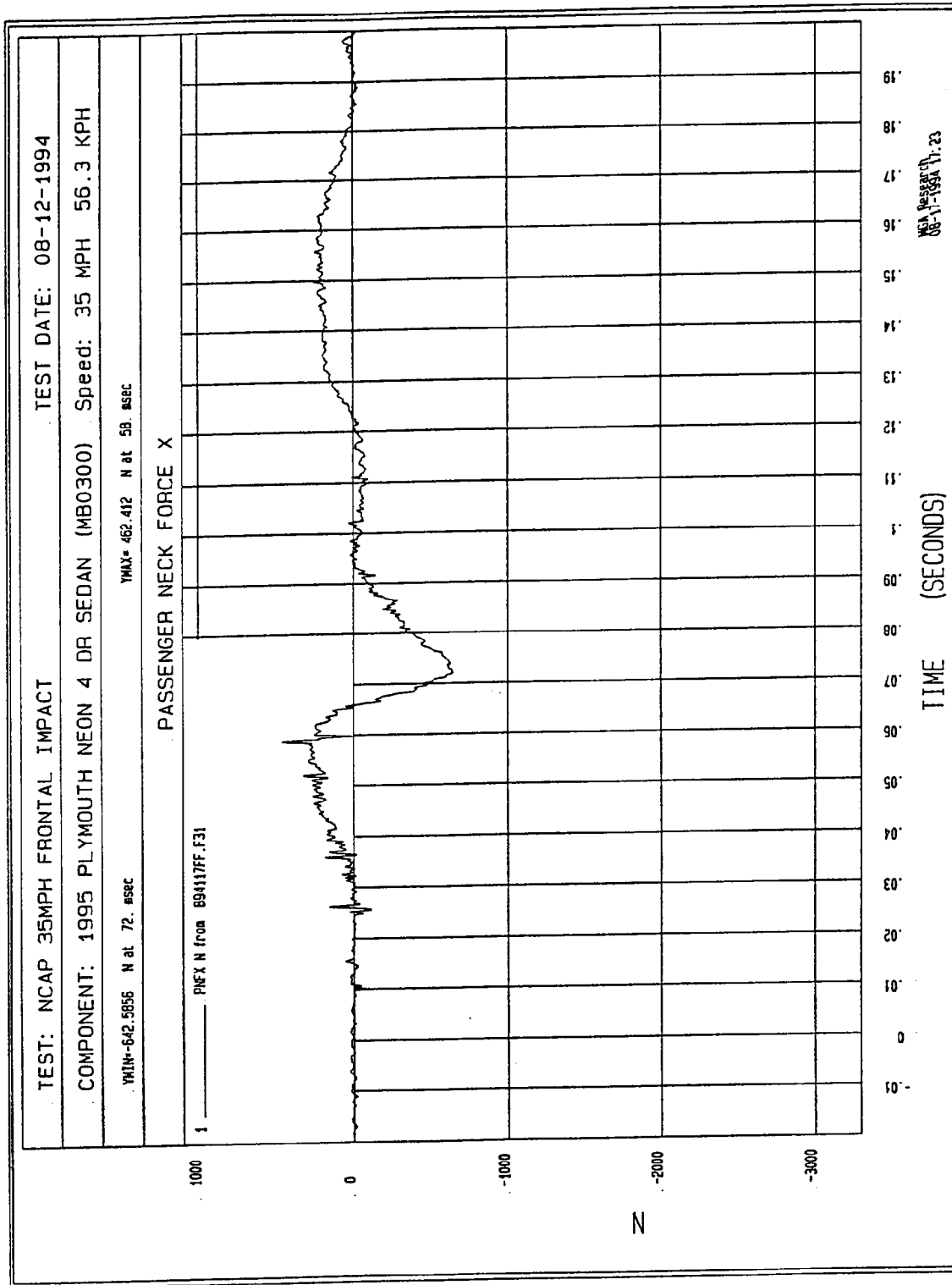


Figure B-83 - Passenger Neck Force X vs. Time

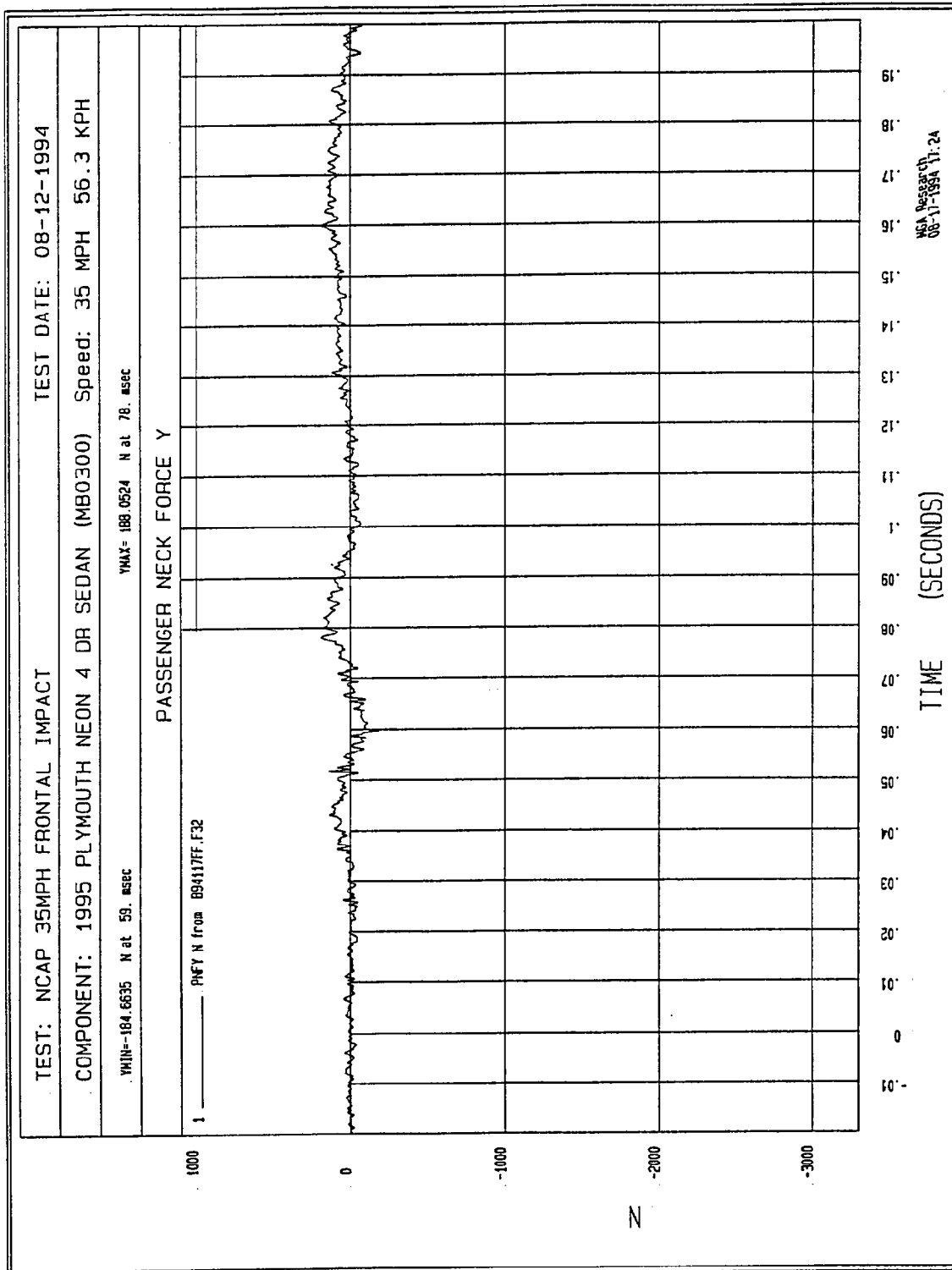


Figure B-84 - Passenger Neck Force Y vs. Time

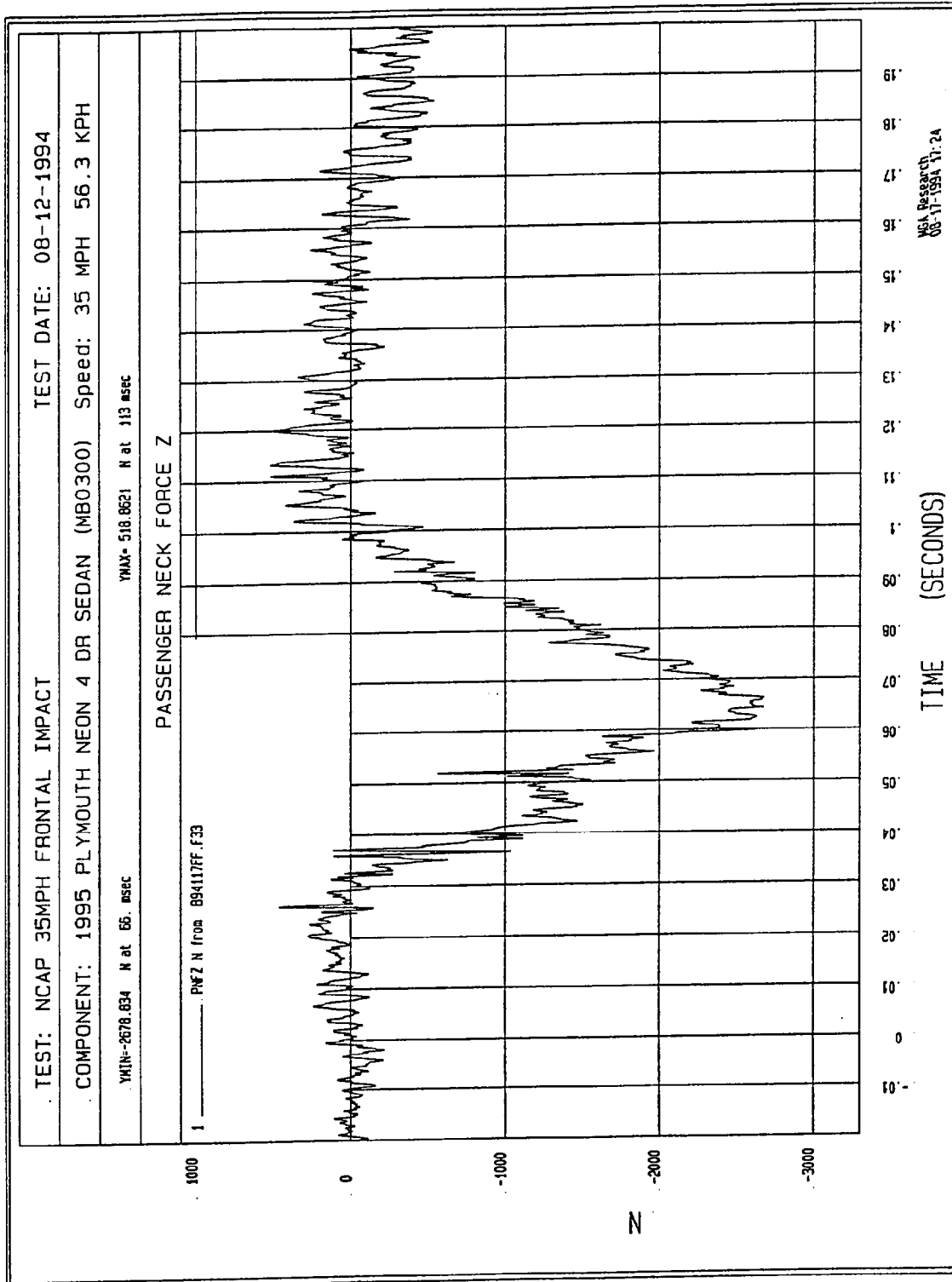


Figure B-85 - Passenger Neck Force Z vs. Time

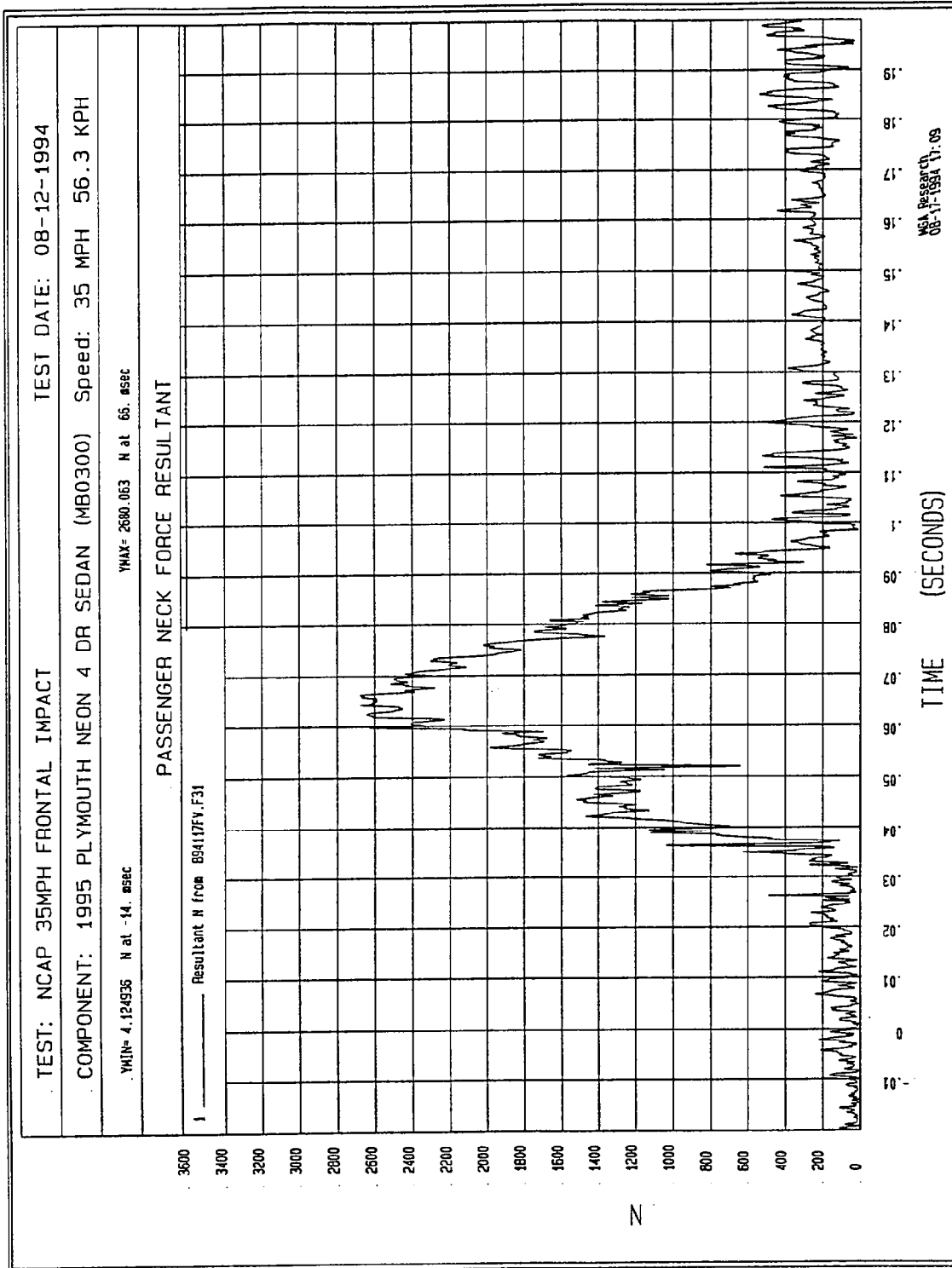


Figure B-86 - Passenger Neck Force Resultant vs. Time

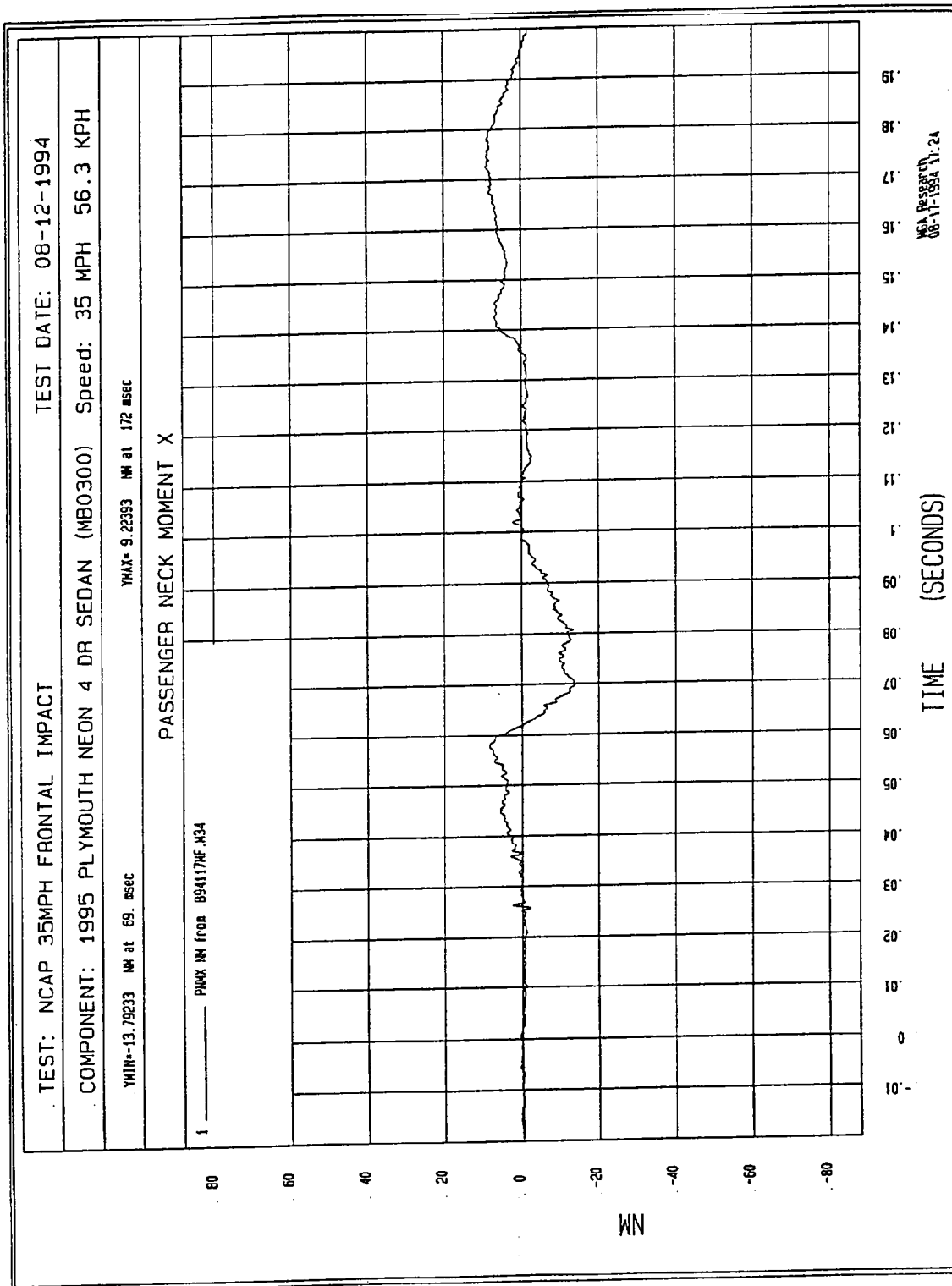
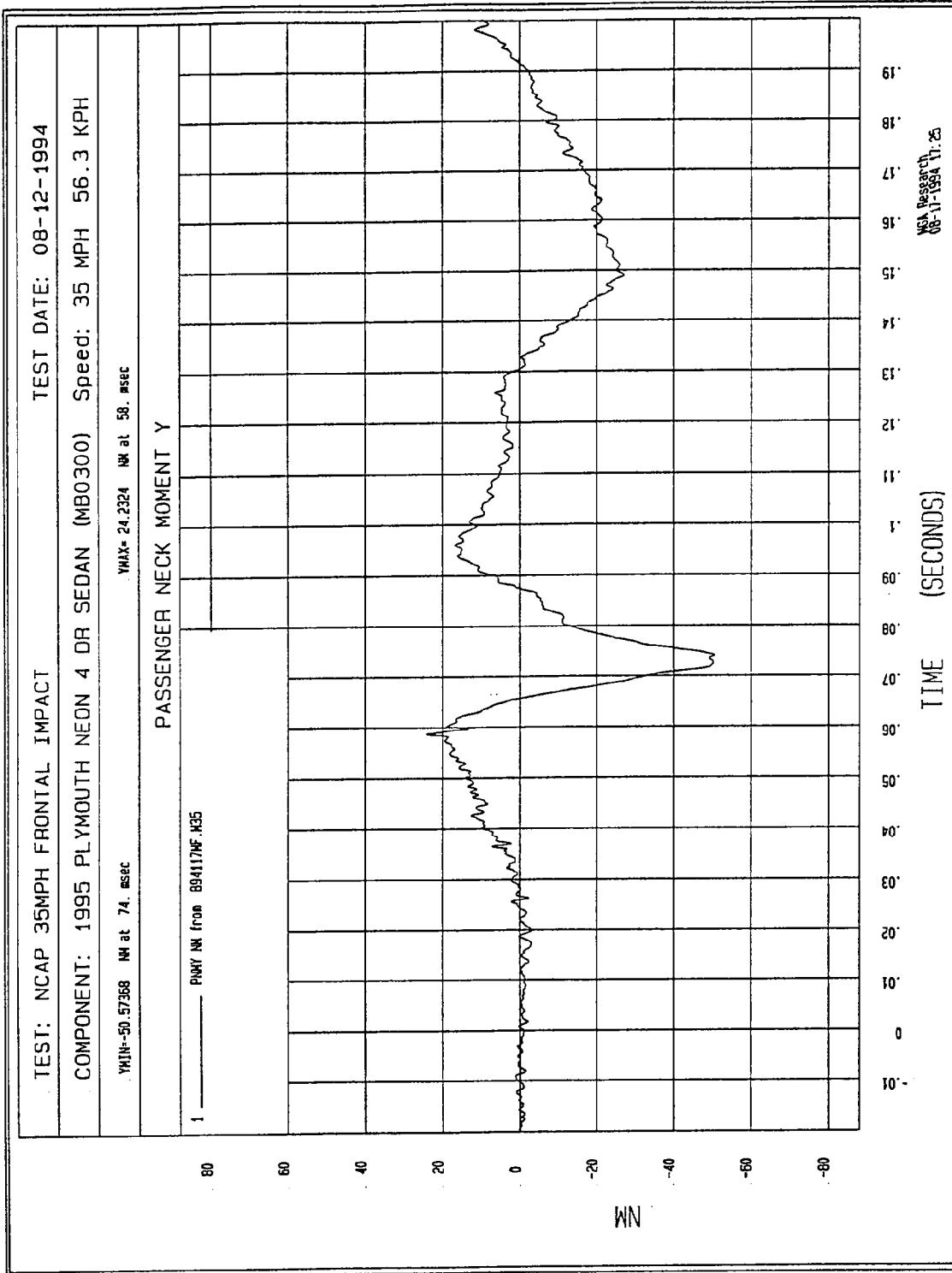


Figure B-87 - Passenger Neck Moment X vs. Time



B-88

Figure B-88 - Passenger Neck Moment Y vs. Time

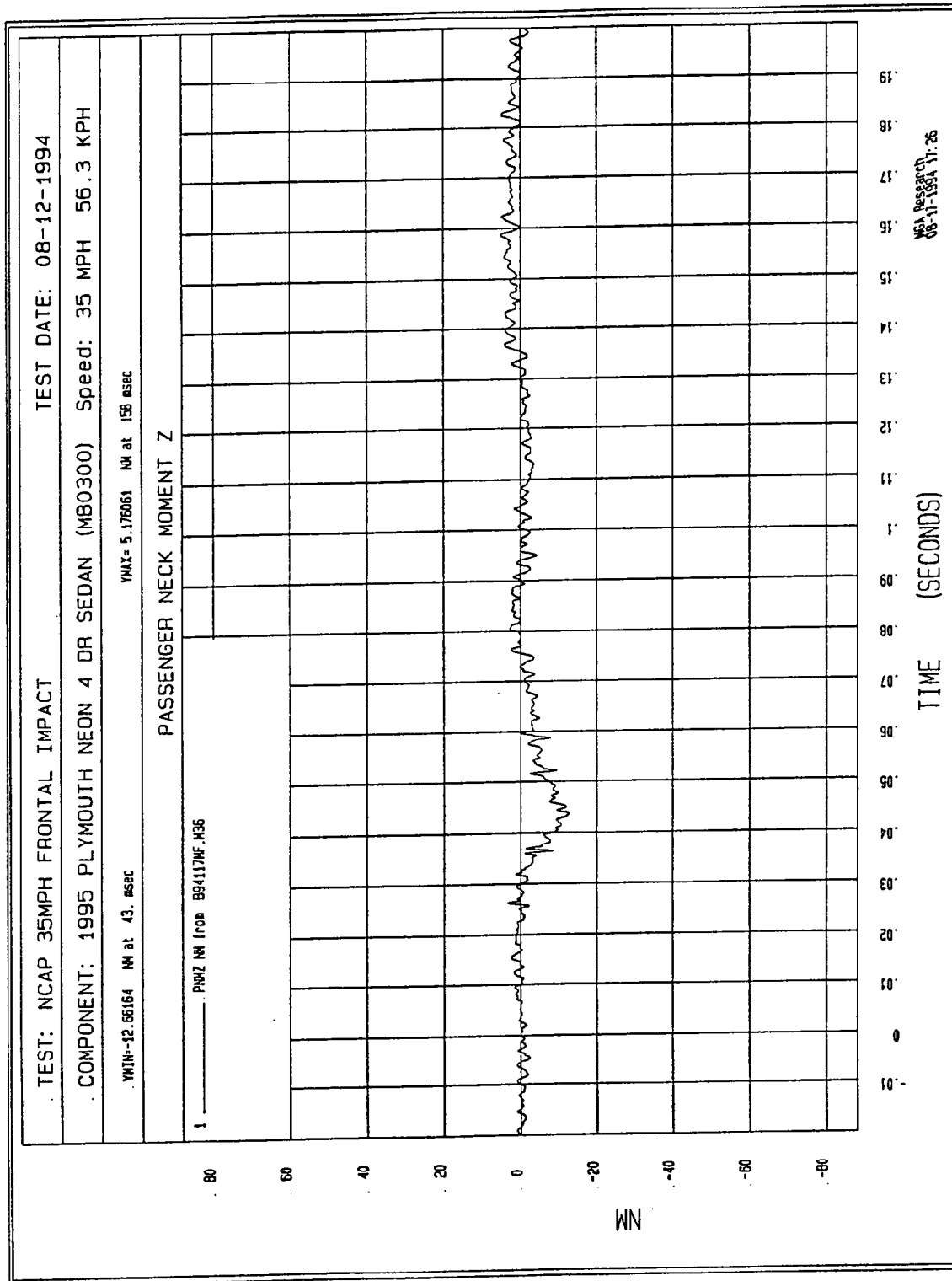
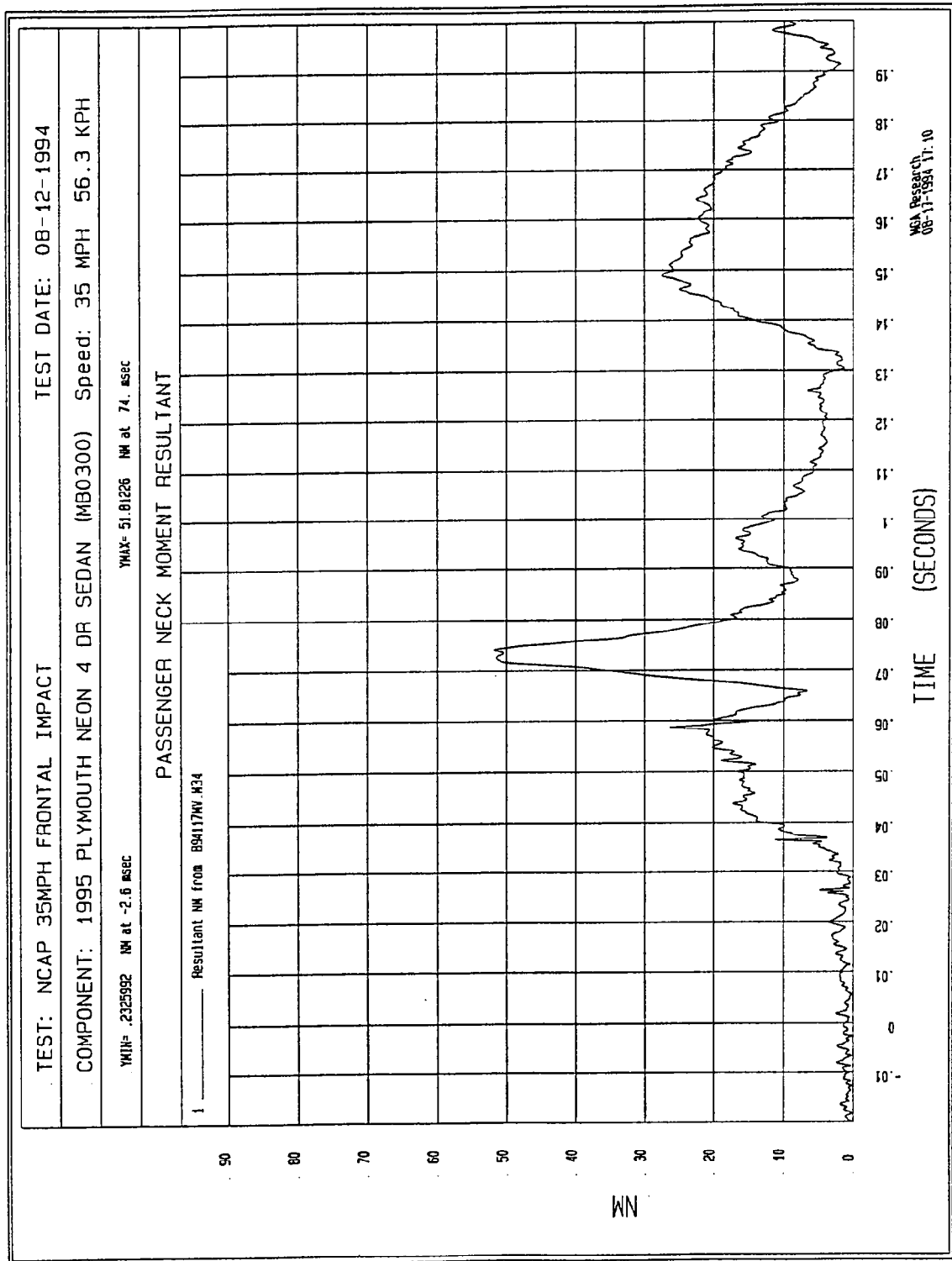


Figure B-89 - Passenger Neck Moment Z vs. Time



B-90

Figure B-90 - Passenger Neck Moment Resultant vs. Time

APPENDIX C

Dummy Configuration & Performance Verification Data

HYBRID III DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 37

DUMMY CALIBRATION BY: Rod McClelland

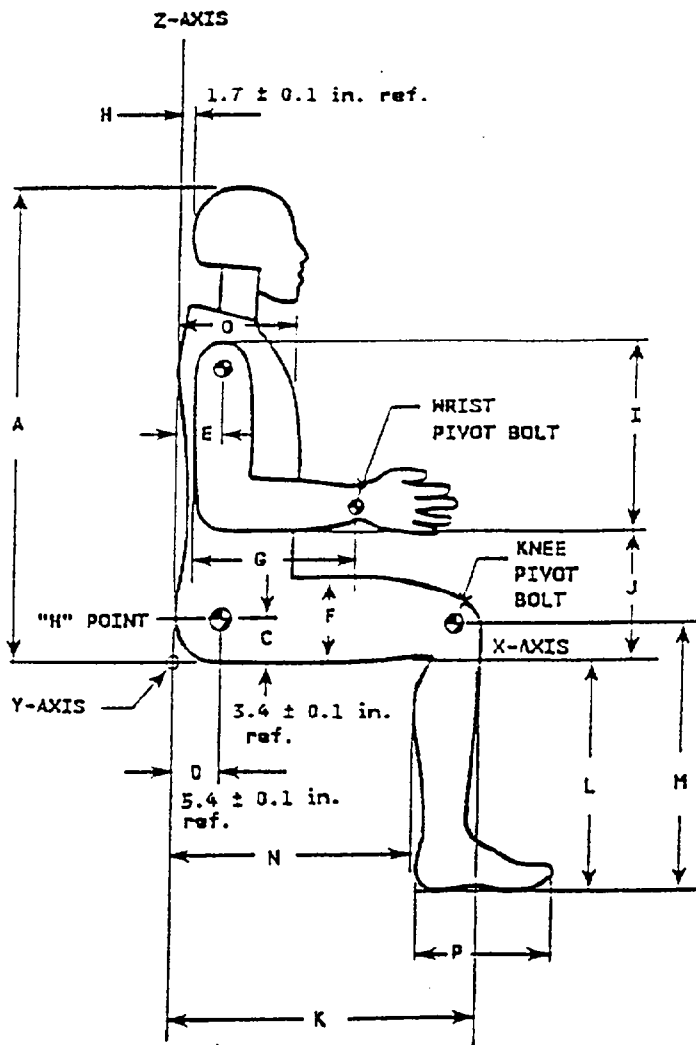
I. CONFIGURATION VERIFICATION DATA

DATE OF VERIFICATION: 08-03-94

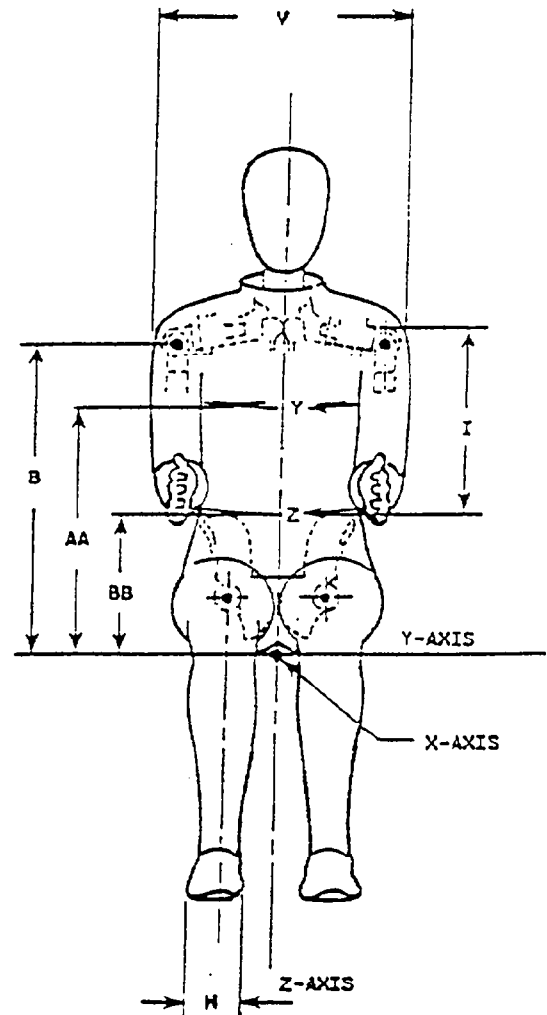
DESCRIPTION	SPECIFICATION (inches)	ACTUAL MEASUREMENT (inches)
A - Total Sitting Height	34.6 - 35.0	34.9
B - Shoulder Pivot Height	19.9 - 20.5	20.5
C - "H" Point Height	3.3 - 3.5	3.5
D - "H" Point from Seat Back	5.3 - 5.5	5.5
E - Shoulder Pivot From Backline	3.3 - 3.7	3.5
F - Thigh Clearance	5.5 - 6.1	6.1
G - Back of Elbow to Wrist Pivot	11.4 - 12.0	11.5
H - Skull Cap Skin to Backline	1.6 - 1.8	1.7
I - Shoulder - Elbow Length	13.0 - 13.6	13.0
J - Elbow Rest Height	7.5 - 8.3	8.0
K - Buttock to Knee Length	22.8 - 23.8	23.5
L - Popliteal Height	16.9 - 17.9	17.0
M - Knee Pivot Height	19.1 - 19.9	19.5
N - Buttock Popliteal Length	17.8 - 18.8	18.5
O - Chest Depth at 3rd Rib	8.4 - 9.0	8.8
P - Foot Length	9.9 - 10.5	10.3
V - Shoulder Breadth	16.6 - 17.2	16.8
W - Foot Breadth	3.6 - 4.2	4.0
Y - Chest Circumference	38.2 - 39.4	39.0
Z - Waist Circumference	32.9 - 34.1	33.5

Note: (See next page for external dimensions)

HYBRID III EXTERNAL DIMENSIONS



SIDE VIEW



FRONT VIEW

Note: Figure is referenced to the erect seated position. The curved lumbar does not allow the hybrid III to be positioned in a perfect erect attitude.

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET

DUMMY NO.: 37 DUMMY CALIBRATION BY: Rod McClelland

VERIFICATION DATE: 08-01-94

VERIFICATION LABORATORY TEMPERATURE (66° - 78°): 70°

1.0 HEAD DROP TEST

	SPECIFICATION	MEASUREMENT
Peak Resultant Acceleration	225 - 275 G	236
Peak Lateral Acceleration	15 G. MAX	8
Time above 100 g.	within 10% of peak	Yes

2.0 NECK FLEXION TEST

		SPECIFICATION	MEASUREMENT
Pendulum Speed		22.6 - 23.4 FT/SEC	22.9
Pendulum Deceleration	10 MS	22.50 - 27.50 G	23.83
	20 MS	17.60 - 22.60 G	19.55
	30 MS	12.50 - 18.50 G	14.06
Max. Pendulum G Above 30 MS		29.0 G MAX	14.6
Deceleration - Time Curve Decay Time to 5 G		34 - 42 MS	38
D Plane Rotation	MAX	64 - 78 DEG.	78
	TIME	57 - 64 MS	59
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 MS	119
Moment About Occipital Condyle	MIN.	65 - 80 FT.LBS	66
	TIME	47 - 58 MS	51
Positive Moment - Time Curve Decay Time to Zero		97 - 107 MS	105

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

3.0 NECK EXTENSION TEST

		SPECIFICATION	MEASUREMENT
Pendulum Speed		19.50 - 20.30 F/S	20.08
Pendulum Deceleration	10 MS	17.20 - 21.20 G	19.27
	20 MS	14.00 - 19.00 G	16.07
	30 MS	11.00 - 16.00 G	12.31
Max. Pendulum G Above 30 MS		22 G Max	12
Deceleration - Time Curve Decay Time to 5 G		38 - 46 MS	43
D Plane Rotation	MAX	81 - 106 DEG.	99
	TIME	72 - 82 MS	79
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 MS	159
Moment About Occipital Condyle	MIN.	-59.0/-39.0 FT LBS	-49.9
	TIME	65 - 79 MS	70
Positive Moment - Time Curve Decay Time to Zero		120 - 148 MS	140

4.0 CHEST IMPACT TESTS

	SPECIFICATION	MEASUREMENT
Probe Speed	21.6 to 22.4 F/S	21.9
Peak Deflection	2.50 to 2.86 IN.	2.66
Peak Resistive Force	1160 to 1325 LBS.	1305
Internal Hysteresis	69 to 85%	69

5.0 KNEE IMPACT TESTS

LEFT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	6.9
Maximum Force	1060 - 1300 LBS.	1297

RIGHT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	6.9
Maximum Force	1060 - 1300 LBS.	1245

HYBRID III DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 36 DUMMY CALIBRATION BY: Rod McClelland

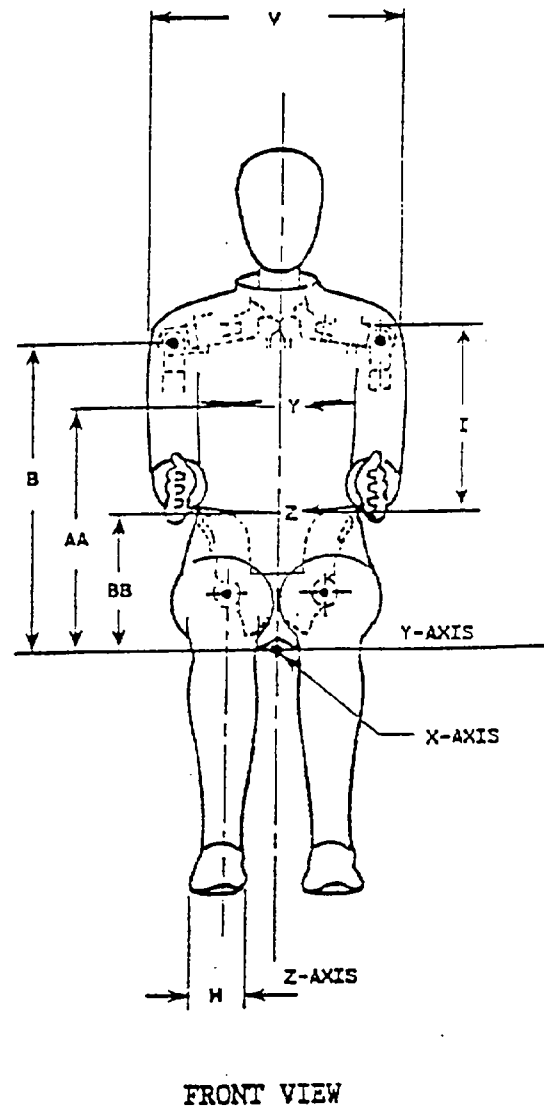
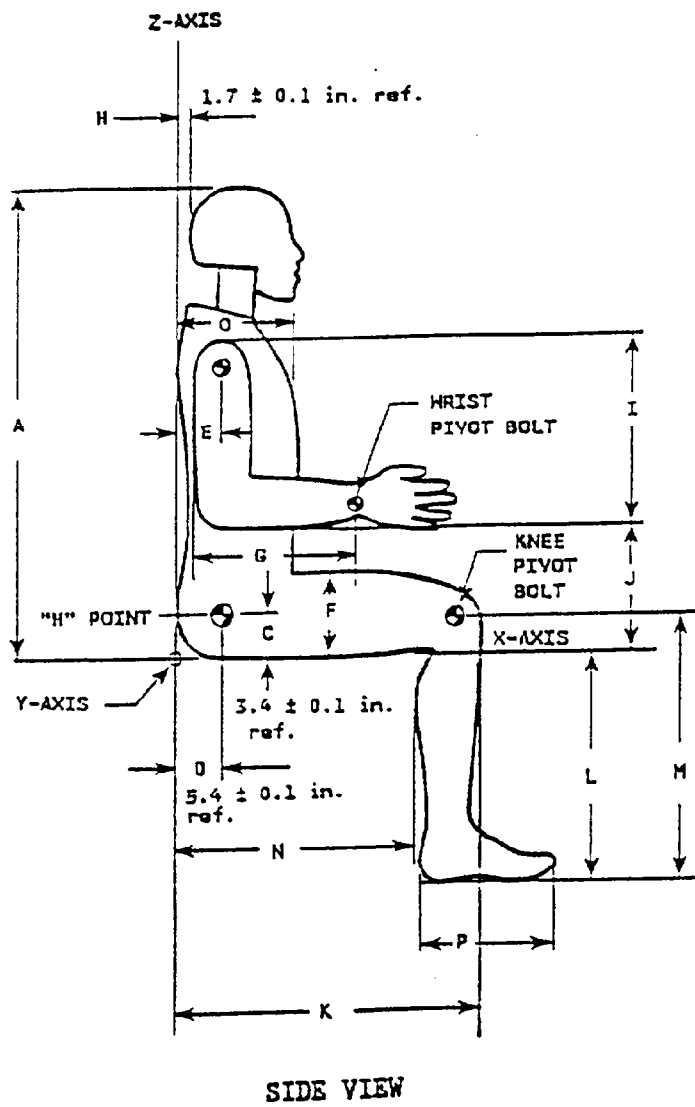
I. CONFIGURATION VERIFICATION DATA

DATE OF VERIFICATION: 08-03-94

DESCRIPTION	SPECIFICATION (Inches)	ACTUAL MEASUREMENT (inches)
A - Total Sitting Height	34.6 - 35.0	34.8
B - Shoulder Pivot Height	19.9 - 20.5	20.5
C - "H" Point Height	3.3 - 3.5	3.5
D - "H" Point from Seat Back	5.3 - 5.5	5.5
E - Shoulder Pivot From Backline	3.3 - 3.7	3.5
F - Thigh Clearance	5.5 - 6.1	6.1
G - Back of Elbow to Wrist Pivot	11.4 - 12.0	11.5
H - Skull Cap Skin to Backline	1.6 - 1.8	1.7
I - Shoulder Elbow Length	13.0 - 13.6	13.0
J - Elbow Rest Height	7.5 - 8.3	8.0
K - Buttock Knee Length	22.8 - 23.8	23.5
L - Popliteal Height	16.9 - 17.9	17.0
M - Knee Pivot Height	19.1 - 19.9	19.5
N - Buttock Popliteal Length	17.8 - 18.8	18.5
O - Chest Depth at 3rd Rib	8.4 - 9.0	8.8
P - Foot Length	9.9 - 10.5	10.3
V - Shoulder Breadth	16.6 - 17.2	16.8
W - Foot Breadth	3.5 - 4.2	4.0
Y - Chest Circumference	38.2 - 39.4	39.0
Z - Waist Circumference	32.9 - 34.1	33.5

Note: (See next page for external dimensions)

HYBRID III EXTERNAL DIMENSIONS



Note: Figure is referenced to the erect seated position. The curved lumbar does not allow the hybrid III to be positioned in a perfect erect attitude.

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

DUMMY NO.: 36 DUMMY CALIBRATION BY: Rod McClelland

VERIFICATION DATE: 07-27-93

VERIFICATION LABORATORY TEMPERATURE (66° - 78°): 70°

1.0 HEAD DROP TEST

	SPECIFICATION	MEASUREMENT
Peak Resultant Acceleration	225 - 275 G	264
Peak Lateral Acceleration	-15 G. MAX	10
Time above 100 g.	within 10% of peak	Yes

2.0 NECK FLEXION TEST

		SPECIFICATION	MEASUREMENT
Pendulum Speed		22.6 - 23.4 FT/SEC	23.1
Pendulum Deceleration	10 MS	22.50 - 27.50 G	24.90
	20 MS	17.60 - 22.60 G	20.87
	30 MS	12.50 - 18.50 G	14.50
Max. Pendulum G Above 30 MS		29.0 G MAX	14.7
Deceleration - Time Curve Decay Time to 5 G		34 - 42 MS	39
D Plane Rotation	MAX	64 - 78 DEG.	77
	TIME	57 - 64 MS	60
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 MS	113
Moment About Occipital Condyle	MIN.	65 - 80 FT.LBS	75
	TIME	47 - 58 MS	52
Positive Moment - Time Curve Decay Time to Zero		97 - 107 MS	102

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

3.0 NECK EXTENSION TEST

		SPECIFICATION	MEASUREMENT
Pendulum Speed		19.50 - 20.30 F/S	20.10
Pendulum Deceleration	10 MS	17.20 - 21.20 G	19.52
	20 MS	14.00 - 19.00 G	17.27
	30 MS	11.00 - 16.00 G	11.35
Max. Pendulum G Above 30 MS		22 G Max	11
Deceleration - Time Curve Decay Time to 5 G		38 - 46 MS	43
D Plane Rotation	MAX	81 - 106 DEG.	98
	TIME	72 - 82 MS	75
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 MS	153
Moment About Occipital Condyle	MIN.	-59.0/-39.0 FT LBS	-51.3
	TIME	65 - 79 MS	69
Positive Moment - Time Curve Decay Time to Zero		120 - 148 MS	140

4.0 CHEST IMPACT TESTS

	SPECIFICATION	MEASUREMENT
Probe Speed	21.6 to 22.4 F/S	22.1
Peak Deflection	2.50 to 2.86 IN.	2.69
Peak Resistive Force	1160 to 1325 LBS.	1263
Internal Hysteresis	69 to 85%	73

5.0 KNEE IMPACT TESTS

LEFT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	6.9
Maximum Force	1060 - 1300 LBS.	1200

RIGHT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	6.9
Maximum Force	1060 - 1300 LBS.	1245

APPENDIX D

Dummy, Vehicle and Laboratory Calibration Data

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 37

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	ACCY6	Endevco	7/28/94
Head Y	ACCH1	Endevco	7/28/94
Head Z	AAMW5	Endevco	7/28/94
Chest X	ACCY1	Endevco	7/28/94
Chest Y	ACCC8	Endevco	7/28/94
Chest Z	ACCT7	Endevco	7/28/94
Right Femur Load Cell	261	Denton	8/01/94
Left Femur Load Cell	262	Denton	8/01/94
Neck Load Cell X	443	Denton	7/14/94
Neck Load Cell Y	443	Denton	7/14/94
Neck Load Cell Z	443	Denton	7/14/94
Neck Moment X	443	Denton	7/14/94
Neck Moment Y	443	Denton	7/14/94
Neck Moment Z	443	Denton	7/14/94
Chest Deflection Gauge	37G	Bourns	8/03/94
Lap Belt Load Cell	625	Lebow	5/31/94
Torso Belt Load Cell	657	Lebow	5/31/94

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 37

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Right Tibia Moment X	439	Denton	5/09/94
Upper Right Tibia Moment Y	439	Denton	5/09/94
Lower Right tibia Moment Y	427	Denton	5/09/94
Lower Right Tibia Force X	427	Denton	5/09/94
Lower Right Tibia Force Z	427	Denton	5/09/94
Upper Left Tibia Moment X	437	Denton	5/09/94
Upper Left Tibia Moment Y	437	Denton	5/09/94
Lower Left Tibia Moment Y	425	Denton	5/09/94
Lower Left Tibia Force X	425	Denton	5/09/94
Lower Left Tibia Force Z	425	Denton	5/09/94

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 36

	PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	ACDE7	Endevco	7/28/94
Head Y	ACC7Ø	Endevco	7/28/94
Head Z	ACCW9	Endevco	7/28/94
Chest X	ACC78	Endevco	7/12/94
Chest Y	ACCE6	Endevco	7/12/94
Chest Z	ACC93	Endevco	7/12/94
Right Femur Load Cell	259	Denton	8/Ø1/94
Left Femur Load Cell	26Ø	Denton	8/Ø1/94
Neck Load Cell X	442	Denton	7/14/94
Neck Load Cell Y	442	Denton	7/14/94
Neck Load Cell Z	442	Denton	7/14/94
Neck Moment X	442	Denton	7/14/94
Neck Moment Y	442	Denton	7/14/94
Neck Moment Z	442	Denton	7/14/94
Chest Deflection Gauge	36G	Bourns	8/Ø3/94
Lap Belt Load Cell	662	Lebow	4/28/94
Torso Belt Load Cell	69Ø	Lebow	4/26/94

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

VEHICLE ACCELEROMETERS			
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Rear Seat Crossmember X	MGA014	Entran	6/02/94
Right Rear Seat Crossmember X	MGA84	Entran	8/04/94
Top of Engine Block X	MGA060	Entran	8/04/94
Bottom of Engine X	AHY57	Endevco	7/12/94
Left Brake Caliper X	MGA159	Entran	6/02/94
Right Brake Caliper X	BC49	Endevco	6/23/94
Instrument Panel X	MGA098	Entran	6/02/94
Redundant Left Rear Seat Crossmember X	MGA129	Entran	8/04/94
Redundant Right Rear Seat Crossmember X	AY90	Endevco	8/04/94

LABORATORY INSTRUMENTS		
	SERIAL NO.	CALIBRATION DATE
Neck Bending Pendulum Accelerometer	AGH90	Endevco
Neck Bending Rotary Potentiometer	N/A	Bourns
Neck Bending Linear Potentiometer	N/A	Bourns
Femur/Chest/Thorax Probe Accelerometer	403069	Sensotec
Abdomen Compression Force Gauge	N/A	Transducers Inc.
		N/A

APPENDIX E

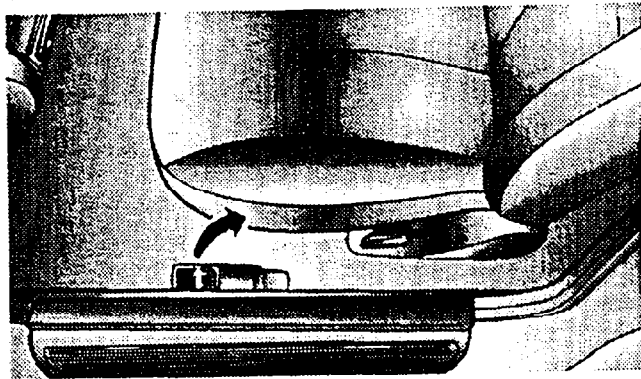
Vehicle Owner's Occupant Restraint System Instructions

BEFORE STARTING YOUR VEHICLE

NOTE: For emergency exit with the system engaged, move the lock plunger up (unlocked position), roll down window and open the door with the outside door handle.

TRUNK LOCK AND RELEASE—Optional

Use the key to open the trunk from outside the vehicle. From inside the car the trunk lid can be released by lifting the remote cable release lever. The lever is just outboard of the driver's seat riser, next to the sill trim.



OCCUPANT RESTRAINTS

One of the most important safety features in your vehicle is the restraint system. This system includes the front and rear seat belts, and airbags for the driver and right front passenger. Your seat belts also can be used to hold infant and child restraint systems if you will be carrying children too small for adult-size belts.

Please pay careful attention to the information in this section. It tells you how to use your restraint system properly to keep you and your passengers as safe as possible.

WARNING!

In a collision, you and your passengers can suffer much greater injuries if you are not properly buckled up. You can strike the interior of your vehicle or other passengers, or you can be thrown out of the vehicle. Always be sure you and others in your vehicle are buckled up properly.

BEFORE STARTING YOUR VEHICLE

Buckle up even though you are an excellent driver. Even on short trips. Someone on the road may be a poor driver and cause a collision which includes you. And this can happen far away from home or on your own street.

Research has shown that seat belts save lives. And they can reduce the seriousness of injuries in a collision. Some of the worst injuries happen when people are thrown from the vehicle. Seat belts provide protection from that, and they reduce the risk of injury caused by striking the inside of the vehicle. **Everyone in a motor vehicle needs to be buckled up all the time.**

Unibelts

The seats next to the front and rear doors of your vehicle are equipped with Unibelts.

Each unibelt is a combined lap/shoulder belt system. The belt webbing retractor will lock only during very sudden stops or impacts. This feature allows the shoulder part of the belt to move freely with you under normal

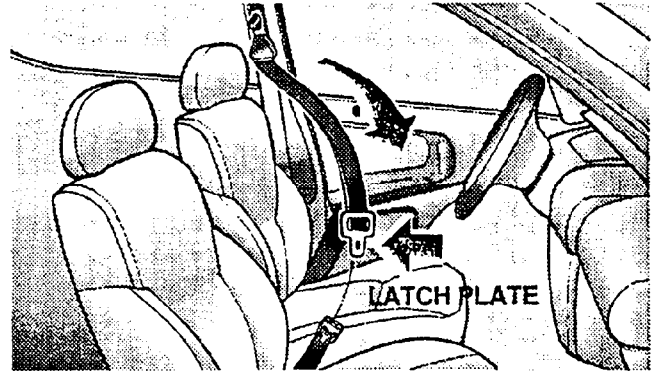
conditions. But in a collision, the belt will lock and reduce the risk of your striking the inside of the vehicle or being thrown out.

WARNING!

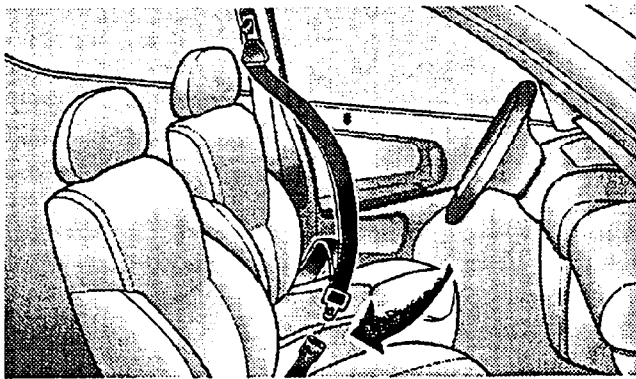
- Wearing a seat belt incorrectly is dangerous. Seat belts are designed to go around the large bones of your body. These are the strongest parts of your body and can take the forces of a collision the best.
- Wearing your belt in the wrong place could make your injuries in a collision much worse. You might suffer internal injuries, or you could even slide out of part of the belt. Follow these instructions to wear your seat belt safely and to keep your passengers safe, too.
- Belting two people into one seat belt can lead to greater injury. People belted together can crash into one another in an accident, hurting one another badly. Never use a unbelt or a lap belt for more than one person, no matter what their size.

Unibelt Operating Instructions

1. Enter the vehicle and close the door. Sit back and adjust the seat.
2. The seat belt latch plate is above the back of your seat. Grasp the latch plate and pull out the belt. Slide the latch plate up the webbing as far as necessary to make the belt go around your lap.



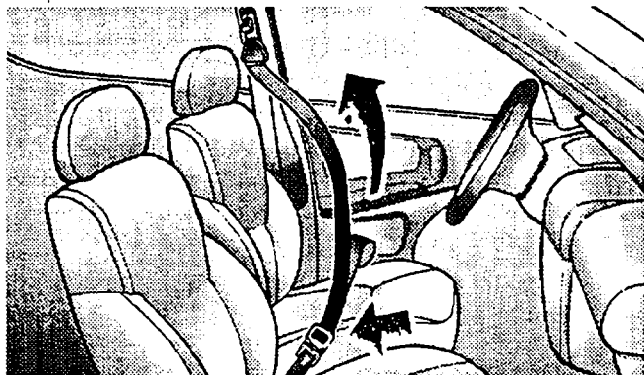
3. When the belt is long enough to fit, insert the latch plate into the buckle until you hear a "click."

**WARNING!**

- A belt that is buckled into the wrong buckle will not protect you properly. The lap portion could ride too high on your body, possibly causing internal injuries. Always buckle your belt into the buckle nearest you.
- A belt that is too loose will not protect you as well. In a sudden stop you could move too far forward, increasing the possibility of injury. Wear your seat belt snugly.
- A belt that is worn under your arm is very dangerous. Your body could fall into the inside surfaces of the vehicle in a collision, increasing head and neck injury. And a belt worn under the arm can cause internal injuries. Ribs aren't as strong as shoulder bones. Wear the belt over your shoulder so that your strongest bones will take the force in a collision.

BEFORE STARTING YOUR VEHICLE

4. Position the lap belt across your thighs, below your abdomen. To remove slack in the lap belt portion, pull up a bit on the shoulder belt, as shown. To loosen the lap belt if it is too tight, tilt the latch plate and pull on the lap belt. A snug belt reduces the risk of sliding under the belt in a collision.



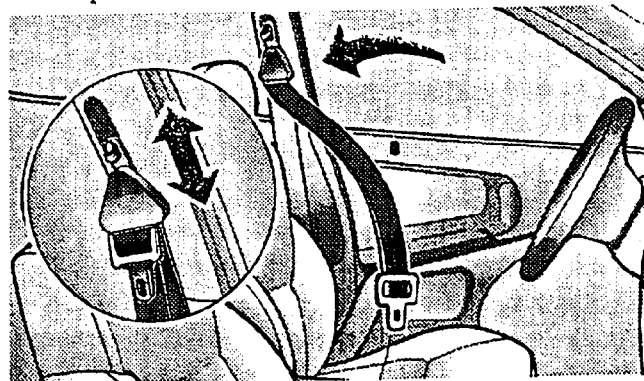
WARNING!

- A lap belt worn too high can increase the risk of internal injury in a collision. The belt forces won't be at the strong hip and pelvic bones, but across your abdomen. Always wear the lap belt as low as possible and keep it snug.
- A twisted belt can't do its job as well. In a collision it could even cut into you. Be sure the belt is straight. If you can't straighten a belt in your vehicle, take it to your dealer and have it fixed.

5. Position the shoulder belt on your chest so that it is comfortable and not resting on your neck. The retractor will withdraw any slack in the belt.

BEFORE STARTING YOUR VEHICLE

6. Adjustable Upper Shoulder Belt Anchorage
In the front seat, the shoulder belt can be adjusted upward or downward to position the belt away from your neck. Push up or down on the anchorage control to release the anchorage, and move it up or down to the position that serves you best.



As a guide, if you are shorter than average, you will prefer a lower position, and if you are taller than average,

you'll prefer a higher position. When you release the anchorage, try to move it up or down to make sure that it is locked in position.

In the rear seat, move toward the center of the seat to position the belt away from your neck.

7. To release the belt, push the red button marked PRESS on the buckle. The belt will automatically retract to its stowed position. If necessary, slide the latch plate down the webbing to allow it to retract fully.

Seat Belts and Pregnant Women

We recommend that pregnant women use the seat belts throughout their pregnancy. Keeping the mother safe is the best way to keep the baby safe.

Pregnant women should wear the lap part of the belt across the thighs and as snug across the hips as possible. Keep the belt low so that it does not come across the abdomen. That way the strong bones of the hips will take the force if there is a collision.

BEFORE STARTING YOUR VEHICLE

Rear Center Lap Belts

The center rear seating position has a lap belt only. To fasten a lap belt, slip the latch plate into the buckle.

To lengthen a lap belt, tilt the latch plate and pull. To remove slack, pull the loose end of the webbing. Wear the belt snug against the hips. Sit back and erect in the seat, then adjust the belt as tightly as is comfortable.

WARNING!

- A lap belt worn too loose or too high is dangerous.
- A belt worn too loose can allow you to slip down and under the belt in a collision.
- A belt that is too high will apply crash forces to the abdomen, not to the stronger hip bones.
- In either case, the risk of internal injuries is greater. Wear the lap belt low and snug.

WARNING!

A frayed or torn belt could rip apart in a collision and leave you with no protection. Inspect the belt system periodically, checking for cuts, frays, or loose parts. Damaged parts must be replaced immediately. Do not disassemble or modify the system. Seat belt assemblies must be replaced after an accident if they have been damaged (bent retractor, torn webbing, etc).

Seat Belt Extender

If a seat belt is too short, even when fully extended, your dealer can provide you with a seat belt extender. This extender should be used only if the existing belt is not long enough. When it is not required, it must be removed and stored in a secure place.

Driver and Right Front Passenger Supplemental Restraint System (SRS) - Airbag

This vehicle has airbags for the driver and right front passenger as a supplement to the seat belt restraint systems. The driver's airbag is mounted in the steering wheel. The passenger side airbag is mounted in the instrument panel, above the glove compartment, under a cover marked SRS/AIRBAG. These airbags inflate in higher speed impacts. They work with the instrument panel knee bolsters and the seat belts to provide improved protection for the driver and right front passenger.

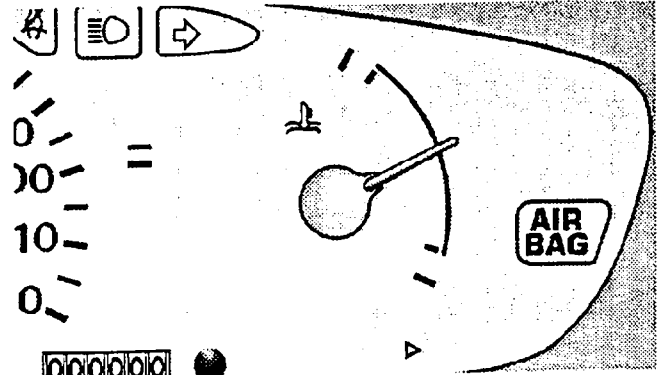
WARNING!

- Relying on the airbags alone could lead to more severe injuries in a collision. The airbags work with your seat belt to restrain you properly. In some collisions the airbags won't deploy at all. Wear your seat belts even though you have airbags.
- Being too close to the steering wheel or instrument panel during airbag deployment could cause serious injury. Airbags need room to inflate. Sit back, comfortably extending your arms to reach the steering wheel or instrument panel.

The seat belts are designed to protect you in many types of collisions. The airbags deploy only in frontal collisions and will not deploy in collisions at slow speed. But even in collisions where the airbags work, you need the seat belts to keep you in the right position for the airbags to protect you properly.

The airbag system consists of the following:

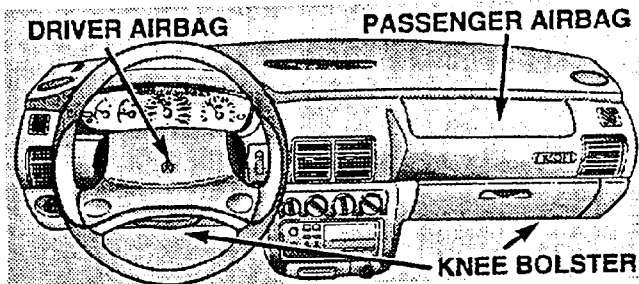
- Crash Sensors
- Diagnostic Unit
- AIRBAG Readiness Light



- Driver and Passenger Airbag/Inflator Units
- Unique Steering Wheel and Column
- Unique Instrument Panel

BEFORE STARTING YOUR VEHICLE

- Interconnecting Wiring
- Knee Impact Bolster

**How The Airbag System Works**

- Crash Sensors in the front of the vehicle and in the occupant compartment determine if a frontal impact is severe enough to require the airbag. The sensors will not detect side, rollover, or rear impacts. Switches in the sensors are connected to the diagnostic unit and to the airbag/inflator unit.

- The Diagnostic Unit monitors the readiness of the electronic parts of the system whenever the ignition switch is in the START or RUN positions. These include all of the items listed previously except the knee bolster, instrument panel, and steering column. The Diagnostic Unit also turns on the AIRBAG light in the instrument panel for 6 to 8 seconds when the ignition is first turned on, then turns the light off. If it detects a malfunction in any part of the system, it turns on the light either momentarily or continuously.

WARNING!

Ignoring the AIRBAG light in your instrument panel could mean you won't have the airbags to protect you in a collision. If the light does not come on, stays on after you start the vehicle, or if it comes on as you drive, have the airbag system checked right away.

- The Airbag/Inflator Units are in the center of the steering wheel and in the instrument panel. The words SRS/AIRBAG are embossed on the airbag covers.

WARNING!

Do not put anything on or around the airbag covers or attempt to manually open them. You may damage the airbags and you could be injured because the airbags are not there to protect you. These protective covers for the airbag cushions are designed to open only when the airbags are inflating.

- When the crash sensors detect an impact requiring the airbags, they signal the inflator units. A large quantity of non-toxic nitrogen gas is generated to inflate the airbags. The airbag covers separate and fold out of the way as the airbags inflate to their full size. The airbags fully inflate in about 50 milliseconds. This is only about half of the time it takes you to blink your eyes. The airbags then quickly deflate while helping to restrain the driver and right front passenger. The airbag gas is vented through the airbag material towards the instrument panel. In this way the airbags do not interfere with your control of the vehicle.

- The Knee Impact Bolsters help protect the knees and position you for the best interaction with the airbags.

If A Deployment Occurs

The airbag system is designed to deploy when the impact sensors detect a moderate-to-severe frontal collision, to help restrain the driver and right front passenger, and then to immediately deflate.

BEFORE STARTING YOUR VEHICLE

NOTE: A frontal collision that is not severe enough to need airbag protection will not activate the system. This does not mean something is wrong with the airbag system.

If you do have a collision which deploys the airbags, any or all of the following may occur:

- The nylon airbag material may sometimes cause abrasions and/or skin reddening to the driver and right front passenger as the airbags deploy and unfold.

The abrasions are similar to friction rope burns or those you might get sliding along a carpet or gymnasium floor. They are not caused by contact with chemicals. They are not permanent and normally heal quickly. However, if you haven't healed significantly within a few days, or if you have any blistering, see your doctor immediately.

- As the airbags deflate you may see some smoke-like particles. The particles are a normal by-product of the process that generates the non-toxic nitrogen gas used for airbag inflation. These airborne particles may irri-

tate the skin, eyes, nose, or throat. If you have skin or eye irritation, rinse the area with cool water. For nose or throat irritation, move to fresh air. If the irritation continues, see your doctor.

If these particles settle on your clothing, follow the garment manufacturer's instructions for cleaning.

- Your vehicle may be safely driveable after the airbags deploy. If so, you can tuck the deployed airbags inside the opening in the steering wheel hub and instrument panel trim covers to make driving somewhat easier.

WARNING!

Deployed airbags can't protect you in another collision. Have the airbags replaced by an authorized dealer as soon as possible.