

✓ 2223

REPORT NO. MGA-95-N011

NEW CAR ASSESSMENT PROGRAM (NCAP)

FRONTAL BARRIER IMPACT TEST

General Motors Corporation
1995 Chevrolet S-10 Pickup
NHTSA NO. MS0105

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: December 19, 1994

Report Date: January 31, 1995

FINAL REPORT

Prepared For:

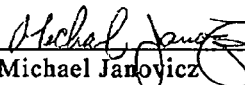
U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF MARKET INCENTIVES
400 SEVENTH STREET, S.W.
Room No. 5313 (NRM-22)
400 Seventh Street, S.W.
Washington, D.C. 20590

TECHNICAL REPORT STANDARD TITLE PAGE

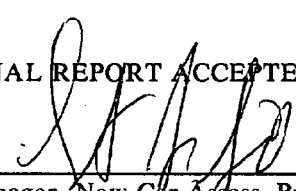
1. Report No. MGA-95-N011	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle NHTSA New Car Assessment Program (NCAP) Frontal Barrier Impact Test of a 1995 Chevrolet S-10 Pickup NHTSA No. MS0105 to the requirements of FMVSS No. 208, 212, 219 (partial) and 301.		5. Report Date January 31, 1995	
		6. Performing Organization Code MGA	
7. Author(s) Mike Janovicz		8. Performing Organization Report No. MGA-OMI-011	
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105		10. Work Unit No. MGA-95-DOT-11	
		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 November 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 Chevrolet S-10 Pickup at the MGA Proving Grounds and Crash Test Center in Burlington, WI. on December 19, 1994. The barrier impact velocity was 56.8 kph (35.3 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 1065 and the 3 msec. Clip (Chest g's) was 56 g's. The left and right femur loads for the driver were 5198 and 5167 Newtons, respectively. The passenger's HIC was 1359 and the 3 msec Clip was 49 g's. The left and right femur maximum loads were 1666 and 1025 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 204	22. Price

This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

This Final Test Report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTNH22-90-D-12121. This document is disseminated under the sponsorship of the U.S. Dept. of Transportation in the interest of information exchange. The United States Government assumes no liability for its contents or use thereof.

APPROVED BY: 
Michael Janovicz
MGA Research Corporation

FINAL REPORT ACCEPTED BY:


Manager, New Car Assess. Program (NCAP)

APR 17 1995

Date of Report Acceptance

Contracting Officer's Tech. Rep. (COTR)

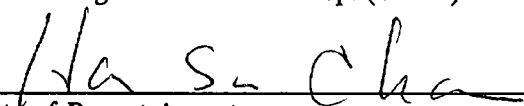

Date of Report Acceptance

TABLE OF CONTENTS

<u>SECTION</u>	<u>DESCRIPTION</u>	<u>PAGE NO.</u>
1	Purpose and Test Procedure	1-1
2	Summary of Frontal Barrier Impact Test	2-1
3	Summary of Results for FMVSS Nos. 212, 219, & 301-75	3-1
4	Occupant and Vehicle Information	4-1
APPENDIX A	Photographs	
APPENDIX B	Vehicle, Load Cell Barrier and Dummy Response Data	
APPENDIX C	Dummy Configuration & Performance Verification Data	
APPENDIX D	Dummy, Vehicle and Laboratory Calibration Data	
APPENDIX E	Vehicle Owner's Occupant Restraint System Instructions	

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 Chevrolet S-10 Pickup Truck at a velocity of 56.8 kph (35.3 mph). The test was performed at the MGA Proving Grounds and Crash Test Center on December 19, 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 primary and redundant triaxial accelerometers, pelvis 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 shoulder and lap belts to measure dummy torso and pelvic section loading. The driver ATD (Serial No. 66) and the right-front passenger ATD (Serial No. 65) were calibrated prior to this test. Certification details, along with instrumentation calibration data, are found in Appendix C and D.

The 79 channels of data were recorded on 8 computers. Appendix B contains the vehicle, load cell barrier and dummy response data traces.

The driver's head struck the inflated airbag. The driver HIC was 1065. The maximum chest deceleration over 3 milliseconds was 56 g's. The left and right femur loads were 5198 and 5167 Newtons respectively.

The right front passenger's HIC was 1359 and maximum chest deceleration over 3 milliseconds was 49 g's. The left and right femur loads were 1666 and 1025 Newtons respectively.

GENERAL TEST AND VEHICLE PARAMETER DATA

Vehicle Yr/Make/Model/Body Style: 1995/Chevrolet/S-10 Pickup Truck

NHTSA No.: MS0105 VIN.: 1GCCS1445S8133951

Body color: Blue Date of Manufacture: 9/94

Engine: 4 Cylinders; C.I.D.; 2.2 Liters;
X Gas; Diesel; Turbocharged
X Longitudinal; Transverse

Transmission: 4 Speed; Manual; X Automatic; X Overdrive

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

Odometer Reading: 134 miles

 A/C; X P/S; X P/B; P/wdo;
 P/seats; Tilt Wheel; Cruise Control;

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

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 2.5 kg/cm² (35 Psi) Rear 2.5 kg/cm² (35 Psi)

Recommended Tire Size: P205/75R15

Recommended Cold Tire Pressure: Front 2.5 kg/cm² (35 Psi) Rear 2.5 kg/cm² (35 Psi)

Tires on Vehicle: P205/75R15; Manufacturer: Uniroyal

Number of Occupants: 3 Front; 0 Rear; 3rd Seat; 3 TOTAL

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

Type of Front Seat Back: X Fixed; Adj. With; Power; Lever

Vehicle Capacity Weight (VCW) = 678.0 kg. (A)

No. of Occupants x 68.0 kg. = 204.0 kg. (B)

Rated Cargo Weight (RCW) A-B = 474.0 kg.

GVWR 2087 kg. GAWR: Front 1134 kg.; Rear 1225 kg.

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

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

Right Front = 398 kg Right Rear = 291 kg
Left Front = 402 kg Left Rear = 311 kg
TOTAL FRONT WEIGHT = 800 kg (57.1% of Total Vehicle Weight)
TOTAL REAR WEIGHT = 602 kg (42.9% of Total Vehicle Weight)
TOTAL UNLOADED DELIVERED WEIGHT (UDW) = 1402 kg

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight 1402 kg
VCW = Vehicle Capacity Weight 678 kg DSC = Designated Seating Capacity 3
RCW = VCW - 68 (DSC) = 136 *kg
Target Test Weight = UDW + RCW + (2 dummies x 75.8 kg/dummy)
Target Test Weight = 1690 kg

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND CARGO:

Right Front = 478 kg Right Rear = 371 kg
Left Front = 445 kg Left Rear = 395 kg
TOTAL FRONT WEIGHT = 923 kg (54.6% of Total Vehicle Weight)
TOTAL REAR WEIGHT = 766 kg (45.4% of Total Vehicle Weight)
TOTAL TEST WEIGHT = 1689 kg
Weight of ballast secured in vehicle trunk area = 8 kg
Vehicle components removed to meet target weight: Driver side mirror

VEHICLE ATTITUDE (all dimensions in mm):

Delivered Attitude: RF 790 LF 782 RR 825 LR 814
Test Attitude: RF 775 LF 773 RR 802 LR 795
Wheel Base: 1995 mm; C.G. = 905 mm rearward of front wheel C/L
Remarks: None noted

*light trucks and MPVs RCW is 136 kgs or manufacturer's value, whichever is less

1. *What is the purpose of this study?*

2. *What are the research objectives?*

3. *What is the research methodology?*

4. *What are the research findings?*

5. *What are the conclusions?*

6. *What are the limitations of the study?*

7. *What are the implications of the study?*

8. *What are the future research directions?*

9. *What are the contributions of the study?*

10. *What are the key words?*

11. *What is the structure of the study?*

12. *What is the significance of the study?*

13. *What is the scope of the study?*

14. *What is the background of the study?*

15. *What is the problem statement?*

16. *What is the research gap?*

17. *What is the research hypothesis?*

18. *What is the research design?*

19. *What is the research instrument?*

20. *What is the data collection method?*

21. *What is the data analysis method?*

22. *What is the research results?*

23. *What is the research conclusion?*

24. *What is the research implication?*

25. *What is the research contribution?*

26. *What is the research limitation?*

27. *What is the research future?*

28. *What is the research key word?*

29. *What is the research structure?*

30. *What is the research significance?*

31. *What is the research scope?*

32. *What is the research background?*

33. *What is the research problem statement?*

34. *What is the research gap?*

35. *What is the research hypothesis?*

36. *What is the research design?*

37. *What is the research instrument?*

38. *What is the data collection method?*

39. *What is the data analysis method?*

40. *What is the research results?*

41. *What is the research conclusion?*

42. *What is the research implication?*

43. *What is the research contribution?*

44. *What is the research limitation?*

45. *What is the research future?*

46. *What is the research key word?*

47. *What is the research structure?*

48. *What is the research significance?*

49. *What is the research scope?*

50. *What is the research background?*

51. *What is the research problem statement?*

52. *What is the research gap?*

53. *What is the research hypothesis?*

54. *What is the research design?*

55. *What is the research instrument?*

56. *What is the data collection method?*

57. *What is the data analysis method?*

58. *What is the research results?*

59. *What is the research conclusion?*

60. *What is the research implication?*

61. *What is the research contribution?*

62. *What is the research limitation?*

63. *What is the research future?*

64. *What is the research key word?*

65. *What is the research structure?*

66. *What is the research significance?*

67. *What is the research scope?*

68. *What is the research background?*

69. *What is the research problem statement?*

70. *What is the research gap?*

71. *What is the research hypothesis?*

72. *What is the research design?*

73. *What is the research instrument?*

74. *What is the data collection method?*

75. *What is the data analysis method?*

76. *What is the research results?*

77. *What is the research conclusion?*

78. *What is the research implication?*

79. *What is the research contribution?*

80. *What is the research limitation?*

81. *What is the research future?*

82. *What is the research key word?*

83. *What is the research structure?*

84. *What is the research significance?*

85. *What is the research scope?*

86. *What is the research background?*

87. *What is the research problem statement?*

88. *What is the research gap?*

89. *What is the research hypothesis?*

90. *What is the research design?*

91. *What is the research instrument?*

92. *What is the data collection method?*

93. *What is the data analysis method?*

94. *What is the research results?*

95. *What is the research conclusion?*

96. *What is the research implication?*

97. *What is the research contribution?*

98. *What is the research limitation?*

99. *What is the research future?*

100. *What is the research key word?*

POST-IMPACT DATA:

Type of Test: 35 mph Frontal Impact Impact Angle: 90°

Date of Test: December 19, 1994 Time of Test: 3:45 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 = 56.8 kph; secondary = 56.8 kph

Distance From Front Bumper to Barrier Face When

Entering Speed Trap: 1200 mm

Exiting Speed Trap: 200 mm

VEHICLE REBOUND AND CRUSH (mm):

Vehicle Length: Pre-test = R 4954 C_L 5201 L 5010
Post-test = R 4510 C_L 4579 L 4546
Crush = R 444 C_L 622 L 464

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

R 599 mm C_L 542 mm L 559 mm

VISIBLE DUMMY CONTACT POINTS:

	<u>Driver</u>	<u>Passenger</u>
Head	<u>To airbag</u>	<u>To dash</u>
Chest	<u>No visible contact</u>	<u>No visible contact</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>Door Opening</u>	<u>Front</u>		<u>Rear</u>	
	<u>Left</u>	<u>Right</u>	<u>Left</u>	<u>Right</u>
(without use of tools)	<u>No</u>	<u>No</u>	<u>N/A</u>	<u>N/A</u>

<u>Seat Movement</u>	<u>Front</u>		<u>Rear</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 Windshield cracked along entire bottom edge

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.:

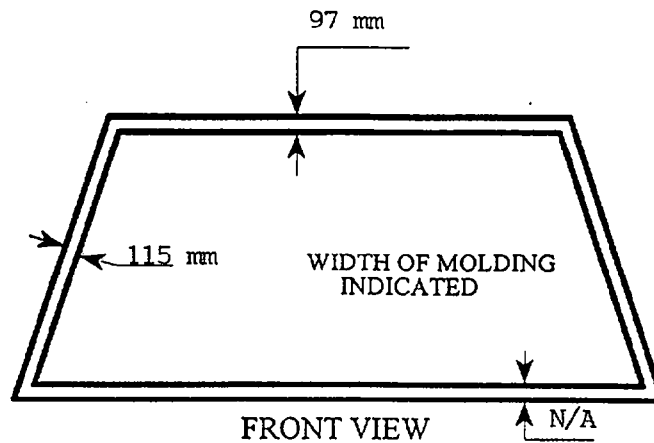
Windshield set in rubber molding within windshield frame

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	2119	2102	99%
LEFT SIDE	2119	2118	100%
TOTAL	4238	4220	99%

AREA OF RETENTION FAILURE: None



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 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= 1266 mm

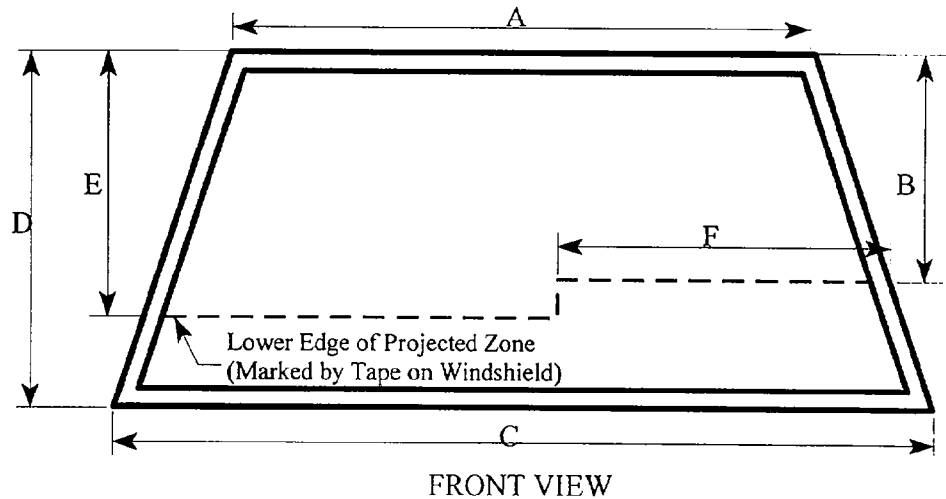
B= 350 mm

C= 1630 mm

D= 671 mm

E= 416 mm

F= 560 mm



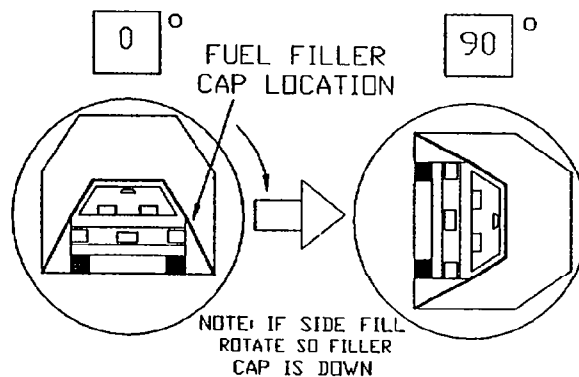
DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 1/4":
(Show location of penetration)

NONE

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 0° - 90°

Vehicle NHTSA ID No.: MS0105



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 40 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds
TOTAL 7 minutes 40 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
---	---	---	---

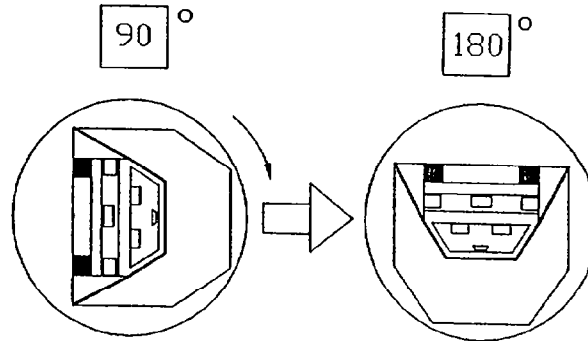
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 90° - 180°

Vehicle NHTSA ID No.: MS0105



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 30 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 30 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
---	---	---	---

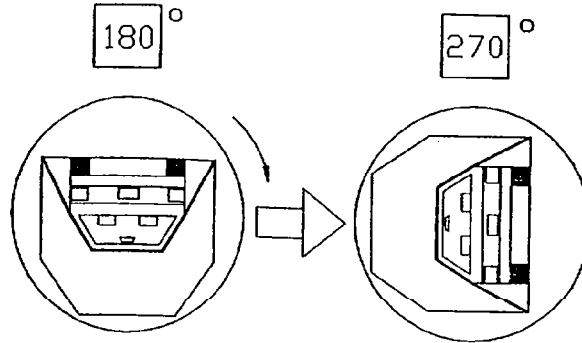
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 180° - 270°

Vehicle NHTSA ID No.: MS0105



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 25 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 25 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
---	---	---	---

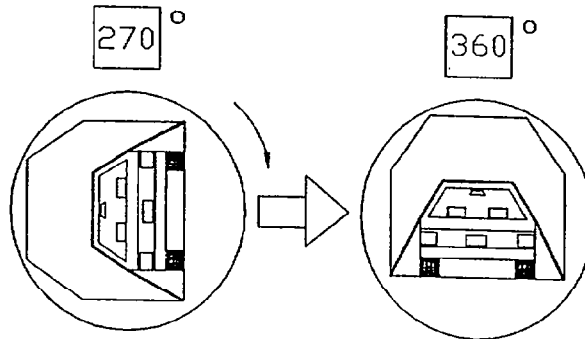
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 270° - 360°

Vehicle NHTSA ID No.: MS0105



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 50 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 50 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/Chevrolet/S-10 Pickup Truck

VEH. NHTSA NO.: MS0105 TEST DATE: December 19, 1994

MAX. ACCELERATION VALUES: (g's)	DRIVER # <u>66</u>	PASSENGER # <u>65</u>
Head Channel X	-81.4	-79.9
Head Channel Y	-53.1	10.9
Head Channel Z	27.9	79.3
HEAD RESULTANT	90.8	105.3
Chest Channel X	-55.0	-47.1
Chest Channel Y	-6.6	9.8
Chest Channel Z	14.9	21.0
CHEST RESULTANT (CLIP)	56.1	49.0
TIME INTERVAL (msec) [0.003 seconds minimum]	$t_1 = 70.8$ $t_2 = 73.7$	$t_1 = 69.6$ $t_2 = 72.6$

HEAD INJURY CRITERIA (HIC) VALUES:

HIC	1065	1359
$t_1 =$ (msec)	62.4	72.4
$t_2 =$ (msec)	89.8	108.4
Avg. Accel. t_1 to t_2 (g's)	68.5	67.7

[The maximum time interval from t_1 to t_2 is 36 milliseconds.]

MAX. COMPRESSIVE FEMUR FORCES:

Left Side (N)	5198	1666
Right Side (N)	5167	1312

MAXIMUM SEAT BELT FORCES:

Lap Belt (N)	1155	1953
Shoulder Belt (N)	1593	1025

NOTE: All values listed must occur during primary impact event.
(Head X,Y,Z and R listed must be during t_1 to t_2 HIC interval)

HYBRID III NECK, CHEST AND PELVIS DATA SHEET

VEHICLE YR./MAKE/MODEL/BODY STYLE: 1995/Chevrolet/S-10 Pickup Truck

VEHICLE NHTSA NO.: MS0105 TEST DATE: December 19, 1994

MAXIMUM VALUES	DRIVER DUMMY #66	PASSENGER DUMMY #65
Neck Load X (N)	-797.4	1499
Neck Load Y (N)	-627.8	-497
Neck Load Z (N)	-2463.1	-3272
Neck Moment X (N.M)	37.5	-25.7
Neck Moment Y (N.M)	-46.1	-84.3
Neck Moment Z (N.M)	-36.7	6.0
Chest Deflection X (mm)	35.8	37.0
Time of Max. Occurrence	78 msec.	95 msec.
Pelvis X Acceleration (g's)	-64.6	-54.3
Pelvis Y Acceleration (g's)	9.2	-12.5
Pelvis Z Acceleration (g's)	16.2	24.3
Pelvis Resultant (g's)	66.0	55.7

PART 572 DUMMY IN-VEHICLE POSITION

Vehicle NHTSA No.: MS0105 Vehicle: 1995/Chevrolet/S-10 Pickup Truck

SEAT TYPE:

X Bench
___ Bucket
___ Split Bench

ADJUSTER TYPE:

Driver: X Manual
___ Power

BUCKET SEAT BACK TYPE:

X Fixed
___ Adjustable Reclining

Passenger: X Manual

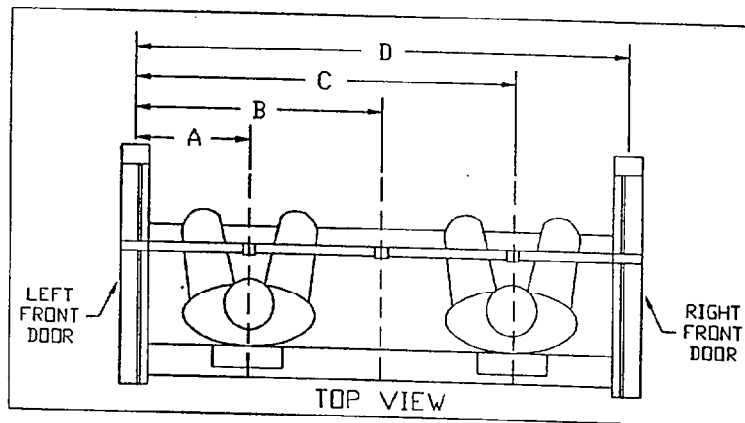
___ Power

Driver Seat Position

11th of 21 Notches

Passenger Seat Position

11th of 21 Notches



66 DUMMY ID 65

A = Left Door to Driver Centerline	<u>430</u> mm
B = Left Door to Center Passenger Centerline	<u>787</u> mm
C = Left Door to Right Passenger Centerline	<u>1124</u> mm
D = Left Door to Right Door	<u>1574</u> mm

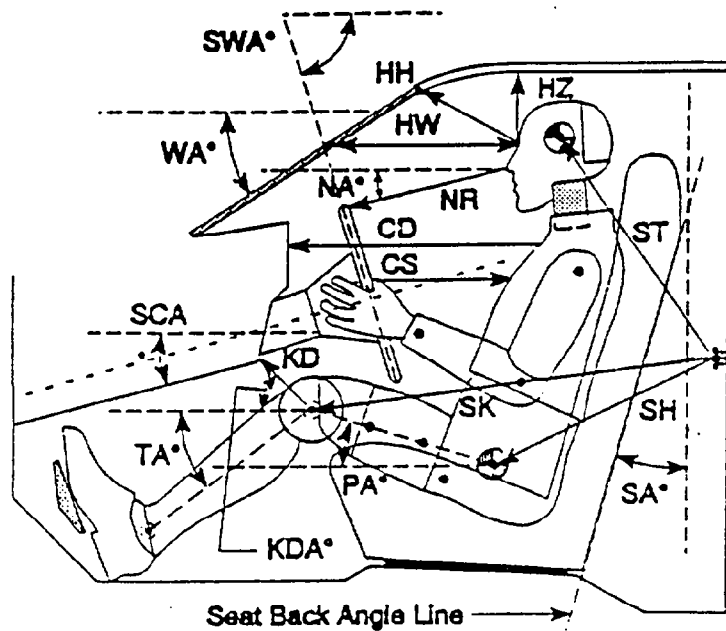
FRONT SEAT MEASUREMENT TABLE

Units (mm)

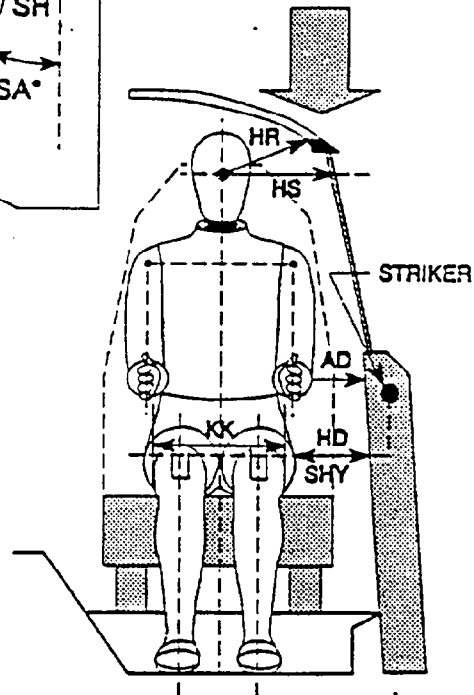
	DRIVER (Serial #66)	PASSENGER (Serial #65)
WA°	36.2°	
SWA°	22.0°	N/A
SCA°	68.0°	N/A
SA°	23.0°	23.0°
HZ	190	194
HH	444	445
HW	575	582
HR	250	258
NR	362 Angle 15°	N/A
CD	515	558
CS	324	N/A
RA	178	N/A
KDL	168 Angle 22.9°	190
KDR	164	218 Angle 47.0°
PA°	23.0°	21.5°
TA°	37.8°	38.2°
KK	264	254
ST	623 Angle 17.6°	614 Angle 19.3°
SK	714 Angle 88.8°	697 Angle 87.8°
SH	329 Angle 98.9°	312 Angle 88.3°
SHY	250	254
HS	354	354
HD	128	134
AD	120	138

N/A = Not Applicable

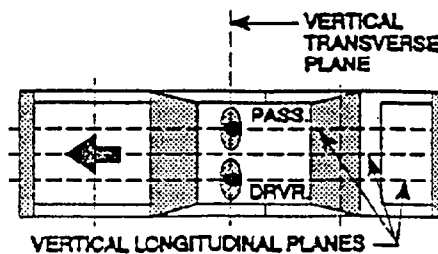
FRONT SEAT MEASUREMENTS



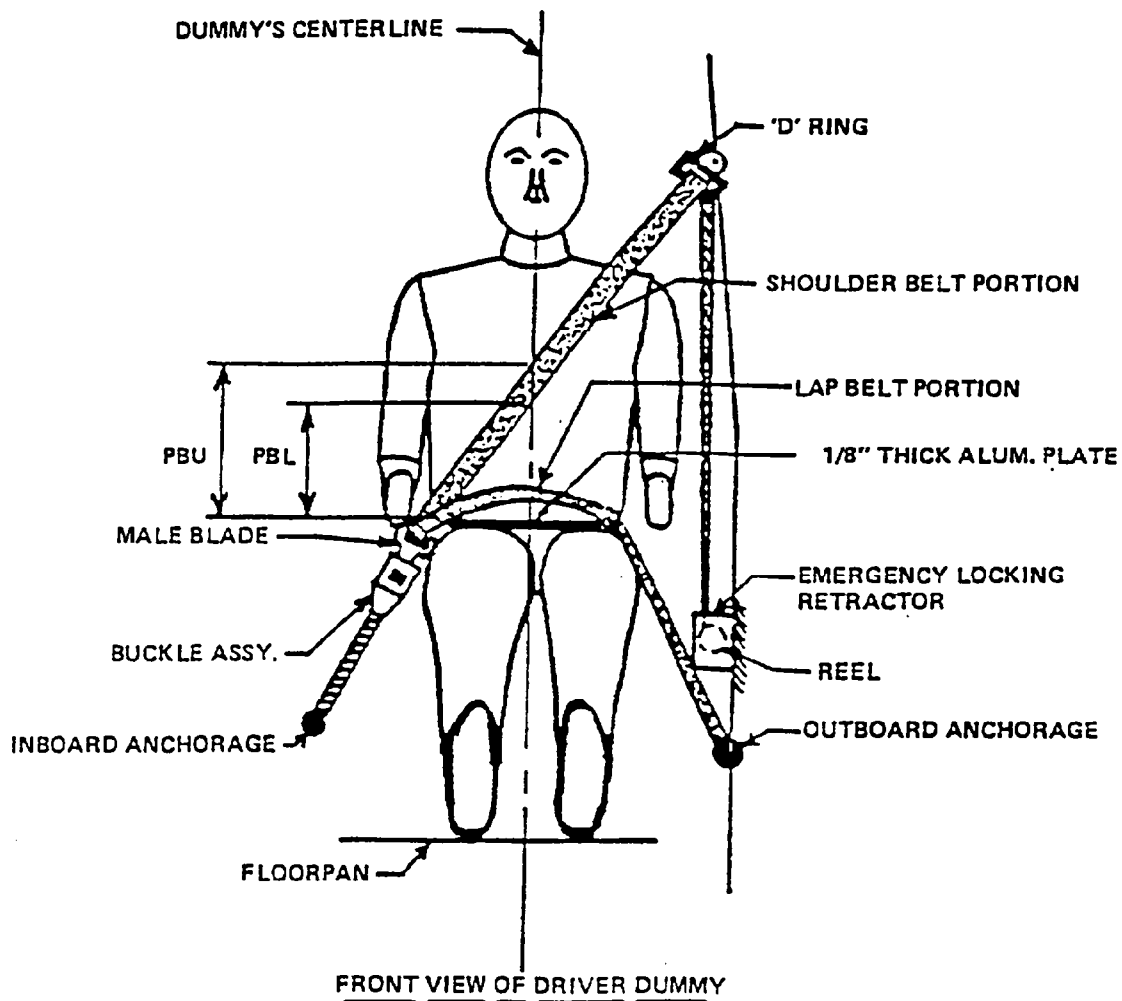
AD - Arm to Door
 HD - H-Point to Door
 HR - Head to Side Header
 HS - Head to Side Window
 KK - Knee to Knee
 SHY- Striker to H-Point (Y Direction)



CD - Chest to Dash
 CS - Steering Wheel to Chest
 HH - Head to Header
 HW - Head to Windshield
 HZ - Head to Roof
 KDA - Knee to Dash Angle
 KDL - Left Knee to Dash
 KDR - Right Knee to Dash
 NA - Nose to Rim Angle
 NR - Nose to Rim
 PA - Pelvic Angle
 RA - Rim to Abdomen
 SA - Seat Back Angle
 SCA - Steering Column Angle
 SH - Striker to H-Point
 SK - Striker to Knee
 ST - Striker to Head
 SWA - Steering Wheel Angle
 TA - Tibial Angle
 WA - Windshield Angle



SEAT BELT POSITIONING DATA



(illustration)

		Dimension = mm	
		DRIVER DUMMY	PASSENGER DUMMY
<u>PBU</u> --	Top surface of alum. plate to upper edge	345	340
<u>PBL</u> --	Top surface of alum. plate to belt lower edge	270	265

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>304 mm</u>	<u>314 mm</u>
Shoulder belt length as measured on Part 572 Dummy.	<u>870 mm</u>	<u>872 mm</u>
Lap belt length as measured on Part 572 Dummy.	<u>835 mm</u>	<u>828 mm</u>

SHOULDER BELT SPOOL-OFF DATA:

As determined by film analysis	<u>89 mm</u>	<u>102 mm</u>
As determined mechanically	<u>N/A</u>	<u>N/A</u> at retractor
	<u>116 mm</u>	<u>150 mm</u> at D-ring
As determined electronically	<u>92 mm</u>	<u>104 mm</u>

BELT STRETCH DATA:

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

RETRACTOR LOCK-UP TIME:

As determined by shoulder belt spool-off observed in on-board cameras	<u>34 msec</u>	<u>36 msec</u>
---	----------------	----------------

NR = Not Recorded

** The belt strain thread was not used in this test.

CAMERA LOCATIONS

VEH. NHTSA NO.: MS0105 ; TEST DATE: December 19, 1994; TIME: 5:45 p.m.

VEH. YEAR/MAKE/MODEL/BODY STYLE: 1995/Chevrolet/S-10 Pickup Truck

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	-	-	-	-	-		
2	Left Front View	900	7770	1280	90°	7370	25	1075
3	Steering Column Top	1800	8250	1560	90°	7850	25	1000
4	Steering Column Bottom	1800	8250	1030	90°	7850	25	1000
5	Left Driver Close- up	1400	7200	1255	90°	6800	50	952
6	Left Angle	4160	5000	2105	50°		35	1117
7	Driver Onboard						35	909
8	Passenger Onboard						35	702
9	Right Overall	2500	8260	1270	90°	7860	13	971
10	Right Front	1300	6200	1380	90°	5800	25	855
11	Right Passenger Close-up	1550	6680	1380	90°	6280	50	971
12	Right Angle	4150	5230	2100	50°		35	816
13	Top View Wide	370	0	4340			13	1081
14	Top Driver	-250	380	2350			13	1015
15	Top Passenger	-250	380	2470			13	no timing
16	Pit Engine	1170	0	-3155			13	1010
17	Fuel Tank	2200	3300	-3165			13	877

* COORDINATES:

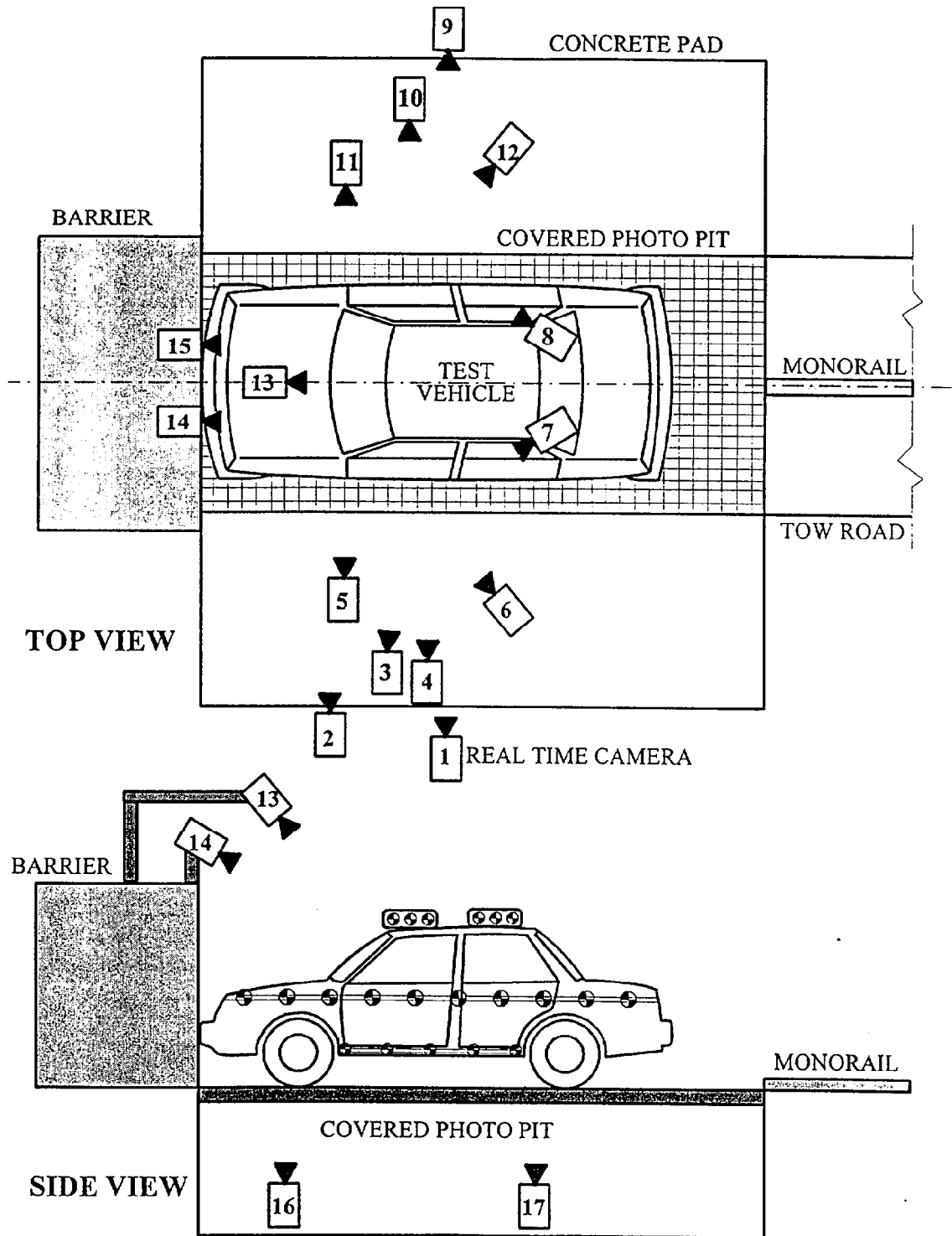
+X = film plane rearward of barrier

+Y = film plane to left of monorail centerline

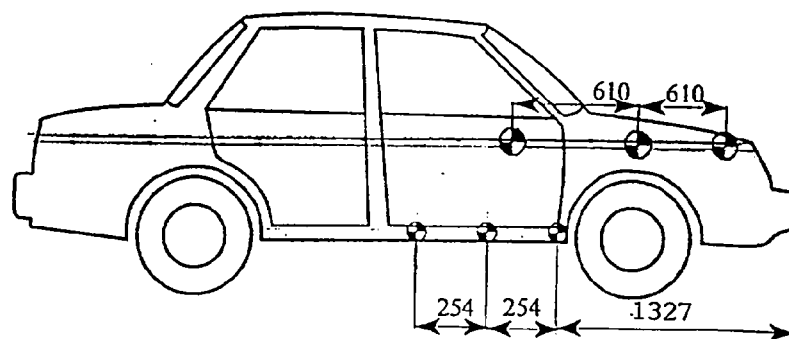
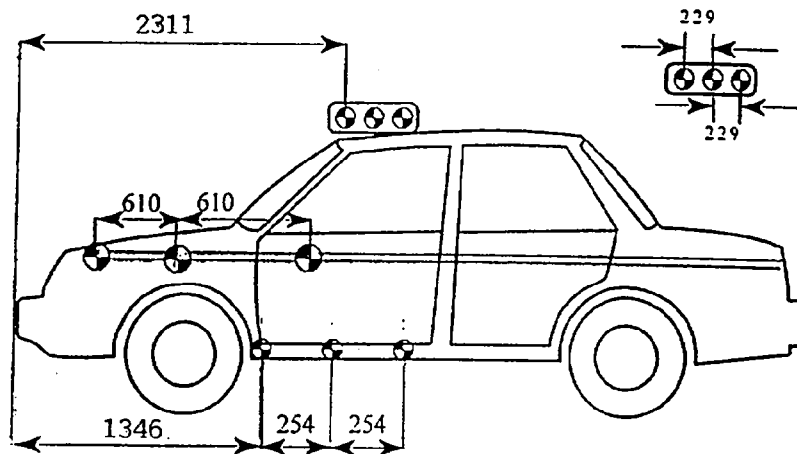
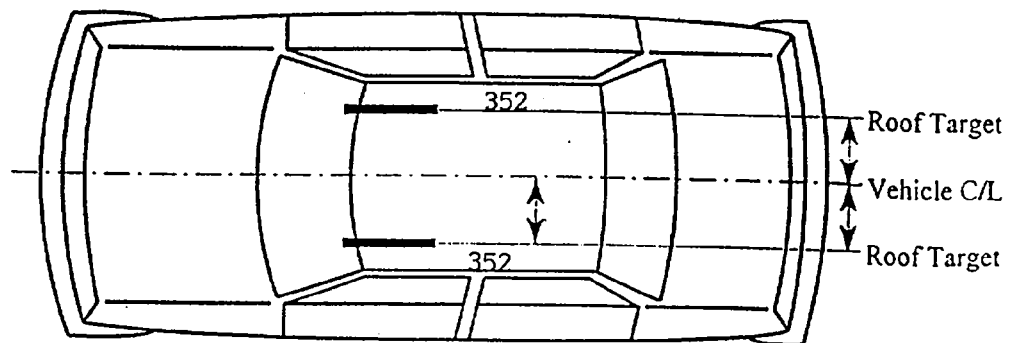
+Z = film plane to above ground level

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)

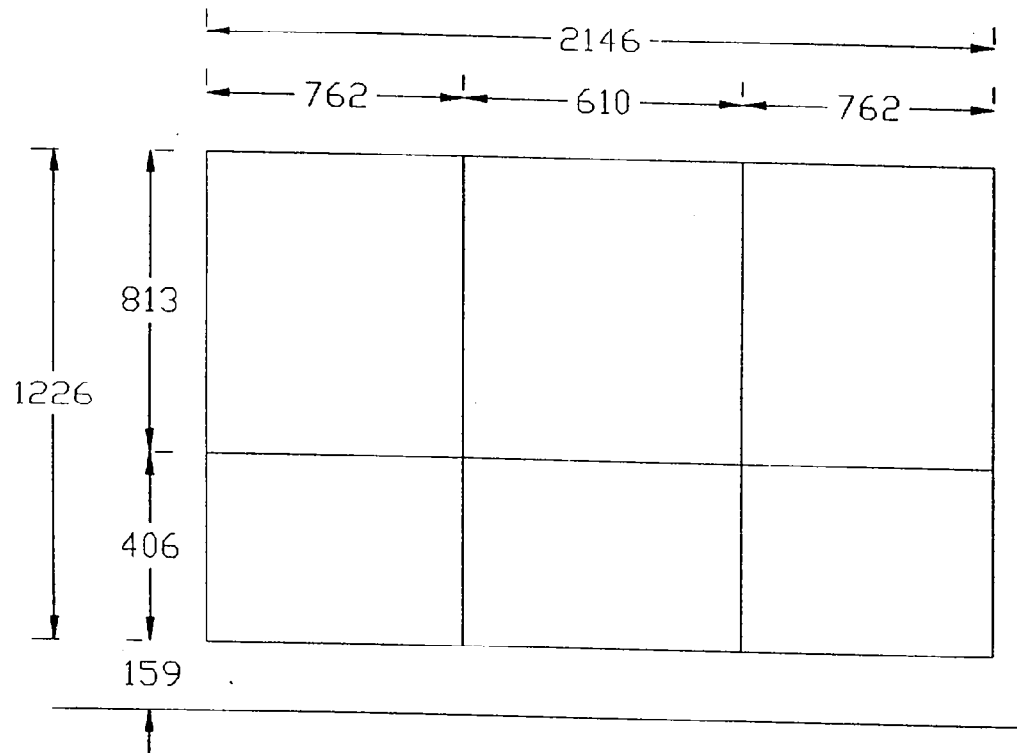
LOAD CELL LOCATIONS ON FIXED BARRIER

30 Load Cells

6 Rows

9 Columns

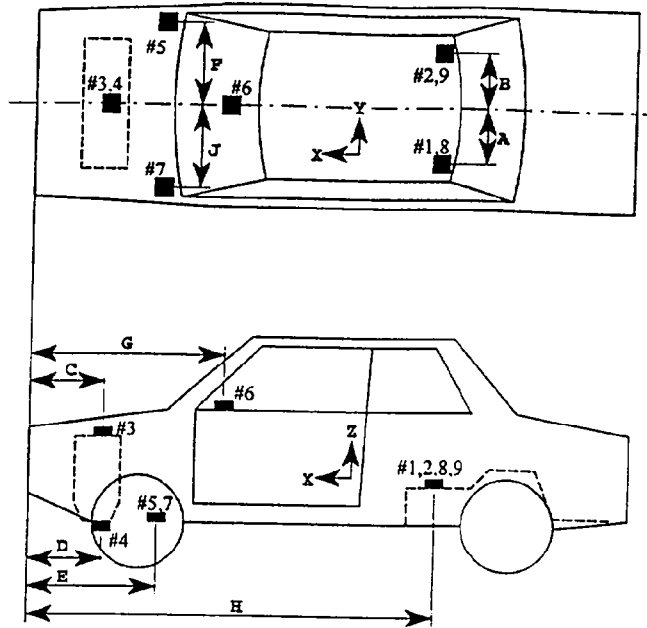
6 Groupings (5 cells/group)



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	595
B	565
C	891
D	1205
E	986
F	685
G	1455
H	2586
J	685

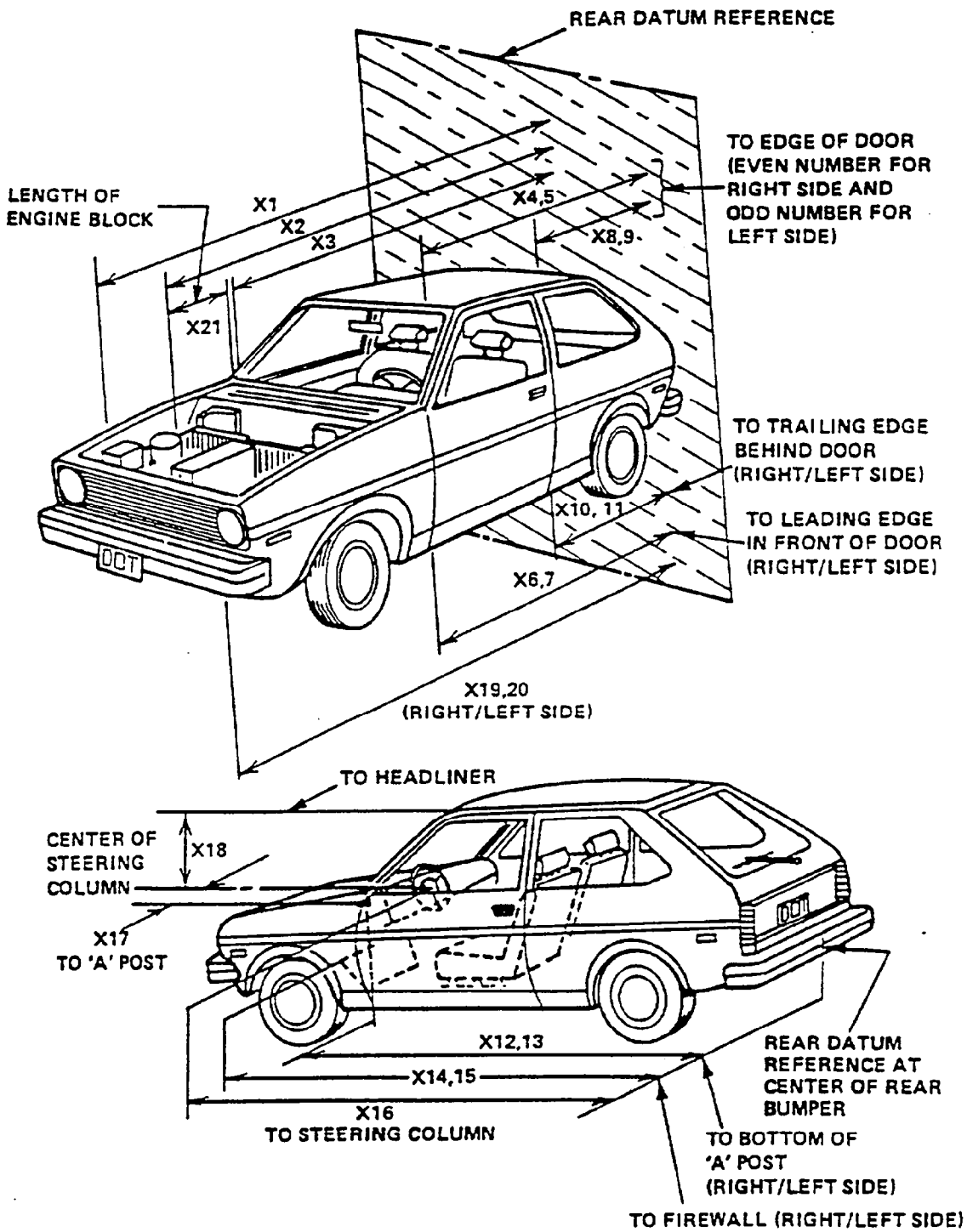
ACCEL. NO.	ACCELEROMETER	DIRECTION
1 and 8	Left Rear Seat Crossmember	X
2 and 9	Right Rear Seat Crossmember	X
3	Top of Engine	X
4	Bottom of Engine	X
5	Right Side Brake Caliper	X
6	Instrument Panel	X
7	Left Disc Brake Caliper	X

* 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	5201	4579	622
X2	Rear Surface of Vehicle to Front of Engine	4526	4254	272
X3	Rear Surface of Vehicle to Firewall	4110	3948	162
X4	Rear Surface to Upr. Leading Edge of Rt. Door	3815	3750	65
X5	Rear Surface to Upr. Leading Edge of Left Door	3798	3749	49
X6	Rear Surface to Lwr. Leading Edge of Rt. Door	3766	3721	45
X7	Rear Surface to Lwr. Leading Edge of Left Door	3786	3731	55
X8	Rear Surface to Upr. Trailing Edge of Rt. Door	2656	2615	41
X9	Rear Surface to Upr. Trailing Edge of Left Door	2660	2640	20
X10	Rear Surface to Lwr. Trailing Edge of Rt. Door	2659	2602	57
X11	Rear Surface to Lwr. Trailing Edge of Left Door	2664	2602	62
X12	Rear Surface to Bottom of 'A' Post on Rt. Side	3680	3670	10
X13	Rear Surface to Bottom of 'A' Post on Left Side	3715	3661	54
X14	Rear Surface to Firewall on Right Side	4035	3852	186
X15	Rear Surface to Firewall on Left Side	4038	3891	147
X16	Rear Surface to Steering Column	3432	3330	102
X17	Center of Steering Column to 'A' Post	445	416	29
X18	Center of Steering Column to Headlining	545	515	30
X19	Rear Surface to Right Side of Front Bumper	4954	4510	444
X20	Rear Surface to Left Side of Front Bumper	5010	4546	464
X21	Length of Engine Block	472	472	0

TEST VEHICLE MEASUREMENTS



ACCIDENT INVESTIGATION DIVISION DATA
FOR 35 MPH FRONTAL BARRIER IMPACT

VEHICLE MAKE/MODEL/BODY STYLE: 1995/Chevrolet/S-10 Pickup Truck

VEH. NHTSA NO.: MS0105 ; VIN: 1GCCS144538133951

MODEL YEAR: 1995 ; BUILD DATE: 9/94 ; TEST DATE: December 19, 1994

VEH. SIZE CATEGORY: Compact Pickup ; TEST WEIGHT: 1689 kg

VEH. WHEELBASE: 1995 mm ; FRONT OVERHANG: 899 mm ; OVERALL WIDTH: 1596 mm

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: 56.8 kph ; TIME OF SEPARATION: 100 msec

VELOCITY CHANGE: 65.5 kph

COLLISION DEFORMATION CLASSIFICATION (CDC) CODE:

F (Frontal)

CRUSH DEPTH
DIMENSIONS:

C1 = 464 mm

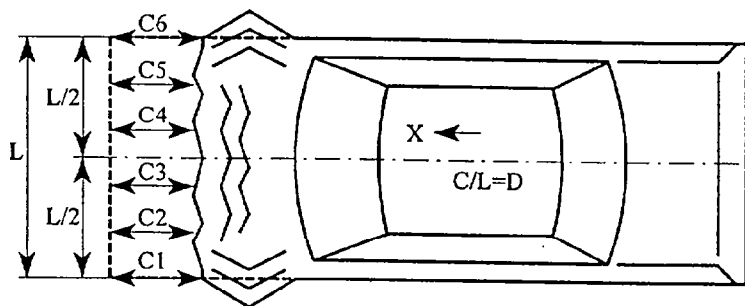
C2 = 558 mm

C3 = 608 mm

C4 = 615 mm

C5 = 550 mm

C6 = 444 mm



MIDPOINT OF
DAMAGE:

D = Vehicle Centerline
(Longitude)

LENGTH OF
DAMAGED REGION:

L = 1382 mm

APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

	<u>Page No.</u>
Photo No. A-1 - Pre-Test Front View of Test Vehicle	A-1
Photo No. A-2 - Post-Test Front View of Test Vehicle	A-2
Photo No. A-3 - Pre-Test Rear View of Test Vehicle	A-3
Photo No. A-4 - Post-Test Rear View of Test Vehicle	A-4
Photo No. A-5 - Pre-Test Left Side View of Test Vehicle	A-5
Photo No. A-6 - Post-Test Left Side View of Test Vehicle	A-6
Photo No. A-7 - Pre-Test Left Rear Three-Quarter View of Test Vehicle	A-7
Photo No. A-8 - Post-Test Left Rear Three-Quarter View of Test Vehicle	A-8
Photo No. A-9 - Pre-Test Right Side View of Test Vehicle	A-9
Photo No. A-10 - Post-Test Right Side View of Test Vehicle	A-10
Photo No. A-11 - Pre-Test Right Front Three-Quarter View of Test Vehicle	A-11
Photo No. A-12 - Post-Test Right Front Three-Quarter View of Test Vehicle	A-12
Photo No. A-13 - Pre-Test Fuel Filler Cap View	A-13
Photo No. A-14 - Pre-Test Engine Compartment View	A-14
Photo No. A-15 - Post-Test Engine Compartment View	A-15
Photo No. A-16 - Pre-Test Front Underbody View	A-16
Photo No. A-17 - Post-Test Front Underbody View	A-17
Photo No. A-18 - Pre-Test Rear Underbody View	A-18
Photo No. A-19 - Post-Test Rear Underbody View	A-19
Photo No. A-20 - Pre-Test Windshield View	A-20
Photo No. A-21 - Post-Test Windshield View	A-21
Photo No. A-22 - Pre-Test Driver Dummy Position Left Side View	A-22
Photo No. A-23 - Post-Test Driver Dummy Position Left Side View	A-23
Photo No. A-24 - Pre-Test Driver Dummy Position Left Side View (Door Open)	A-24
Photo No. A-25 - Post-Test Driver Dummy Position Left Side View (Door Open)	A-25
Photo No. A-26 - Pre-Test Driver Seat Position View	A-26
Photo No. A-27 - Post-Test Driver Seat Position View	A-27
Photo No. A-28 - Pre-Test Driver Dummy Knee Position	A-28
Photo No. A-29 - Post-Test Driver Dummy Knee Position	A-29
Photo No. A-30 - Post-Test Driver Knee Contact	A-30
Photo No. A-31 - Post-Test Driver Airbag Contact	A-31

TABLE OF PHOTOGRAPHS (Cont'd)

	<u>Page No.</u>
Photo No. A-32 - Pre-Test Passenger Dummy Position Right Side View	A-32
Photo No. A-33 - Post-Test Passenger Dummy Position Right Side View	A-33
Photo No. A-34 - Pre-Test Passenger Dummy Position Right Side View (Door Open)	A-34
Photo No. A-35 - Post-Test Passenger Dummy Position Right Side View (Door Open)	A-35
Photo No. A-36 - Pre-Test Passenger Seat Position View	A-36
Photo No. A-37 - Post-Test Passenger Seat Position View	A-37
Photo No. A-38 - Pre-Test Passenger Dummy Knee Position	A-38
Photo No. A-39 - Post-Test Passenger Dummy Knee Position	A-39
Photo No. A-40 - Post-Test Passenger Knee Contact	A-40
Photo No. A-41 - Vehicle Certification Label and Tire Placard	A-41
Photo No. A-42 - Rollover 90°	A-42
Photo No. A-43 - Rollover 180°	A-43
Photo No. A-44 - Rollover 270°	A-44
Photo No. A-45 - Rollover 360°	A-45

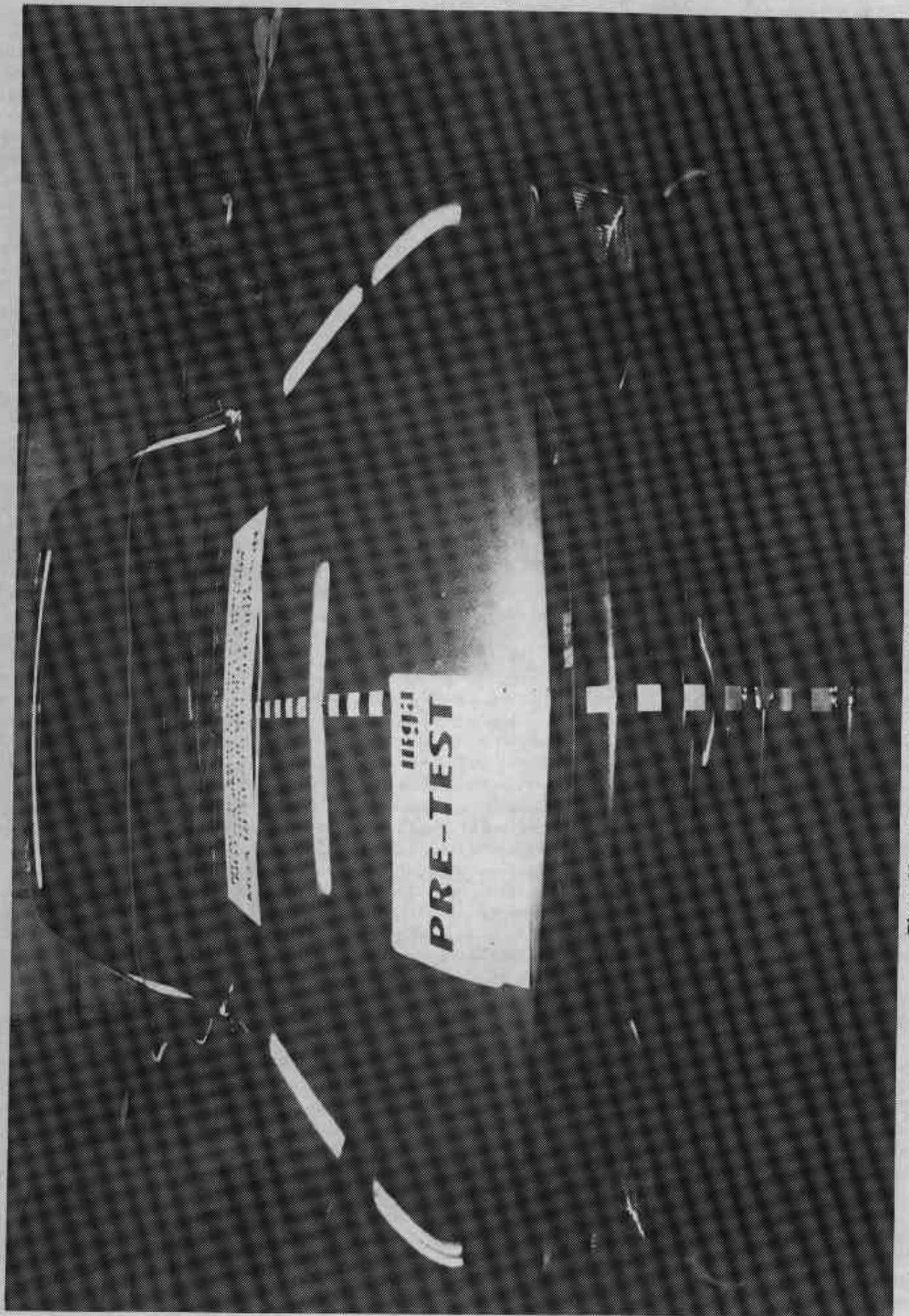


Photo No. A-1 - Pre-Test Front View of Test Vehicle

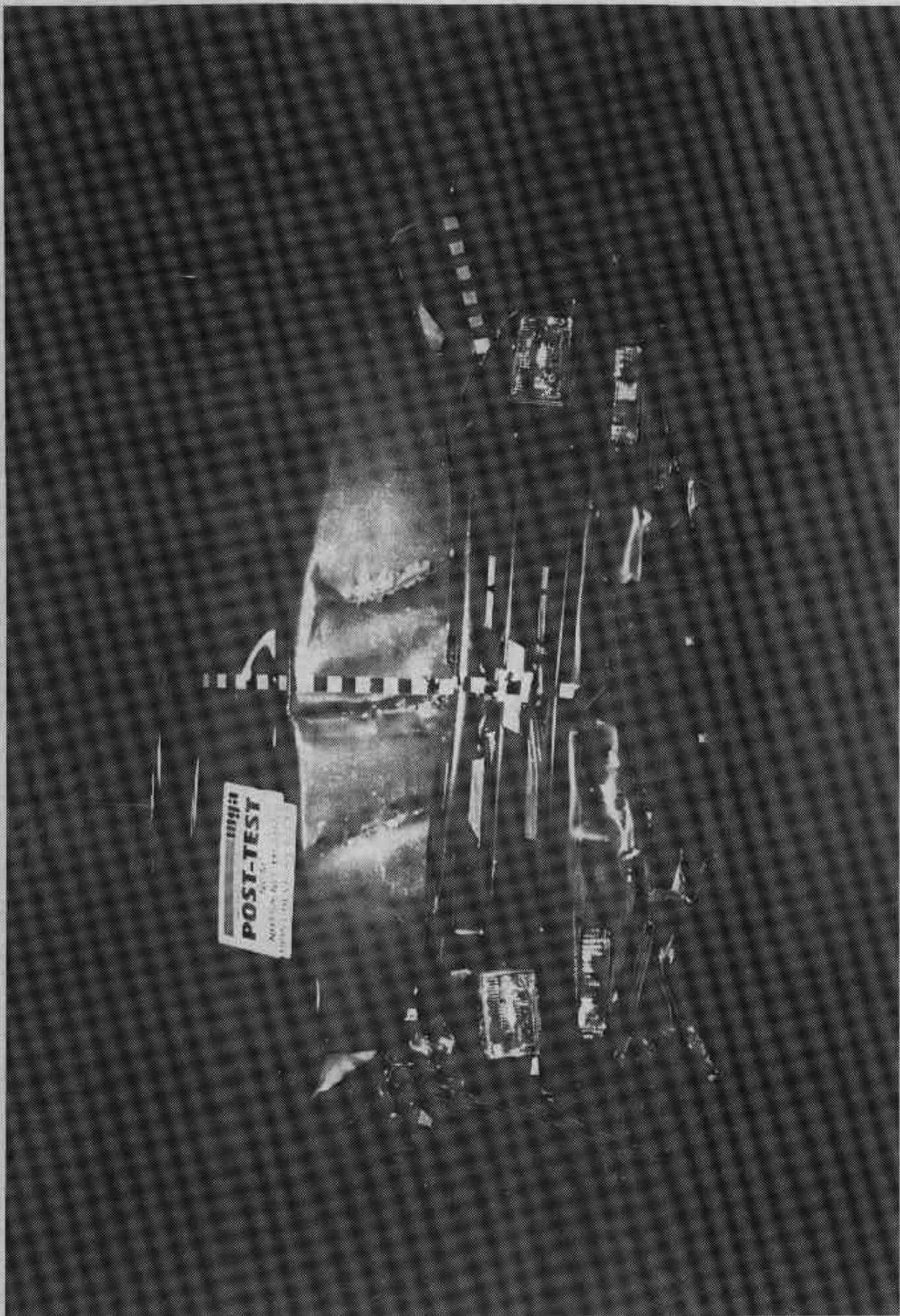


Photo No. A-2 - Post-Test Front View of Test Vehicle

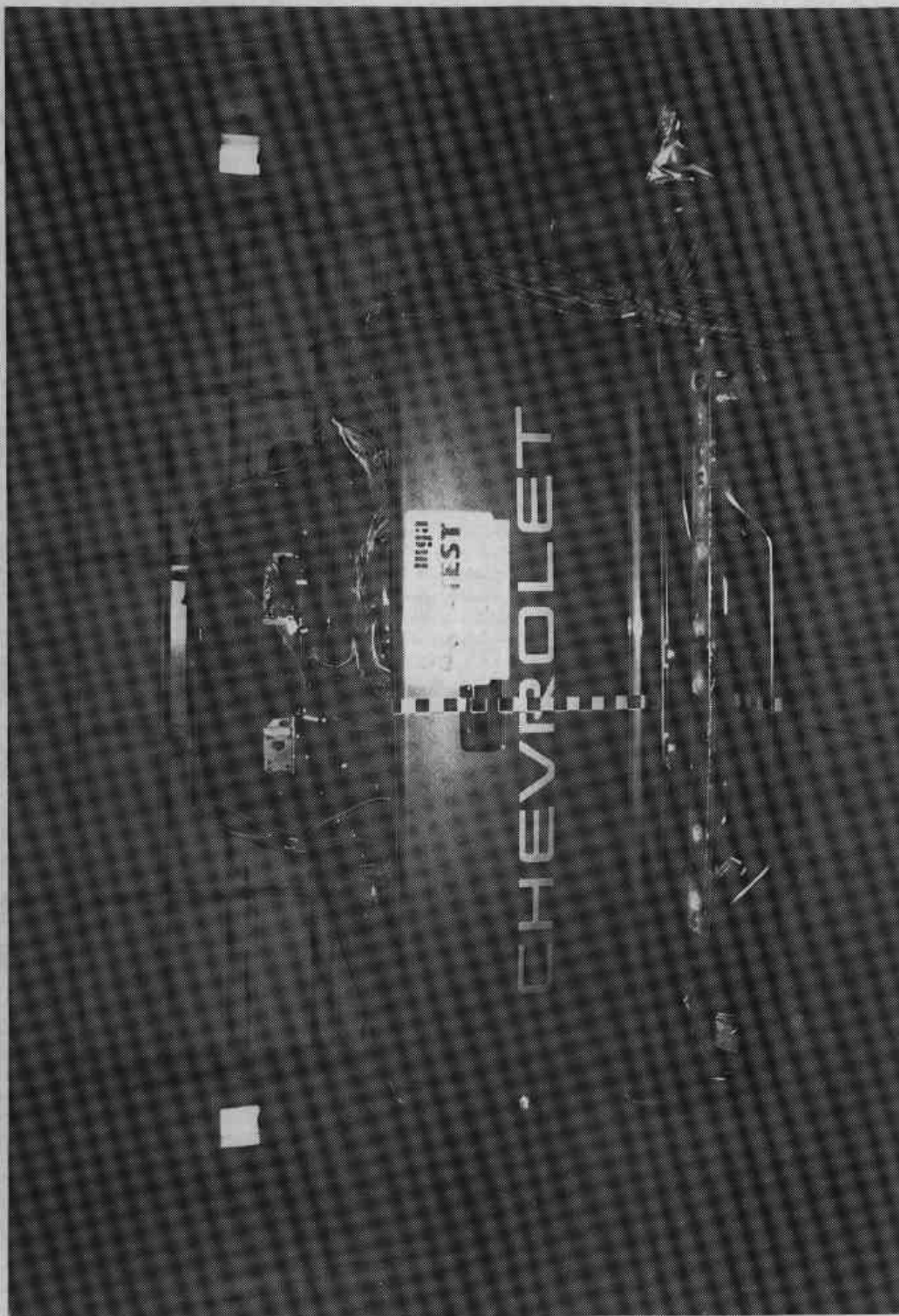
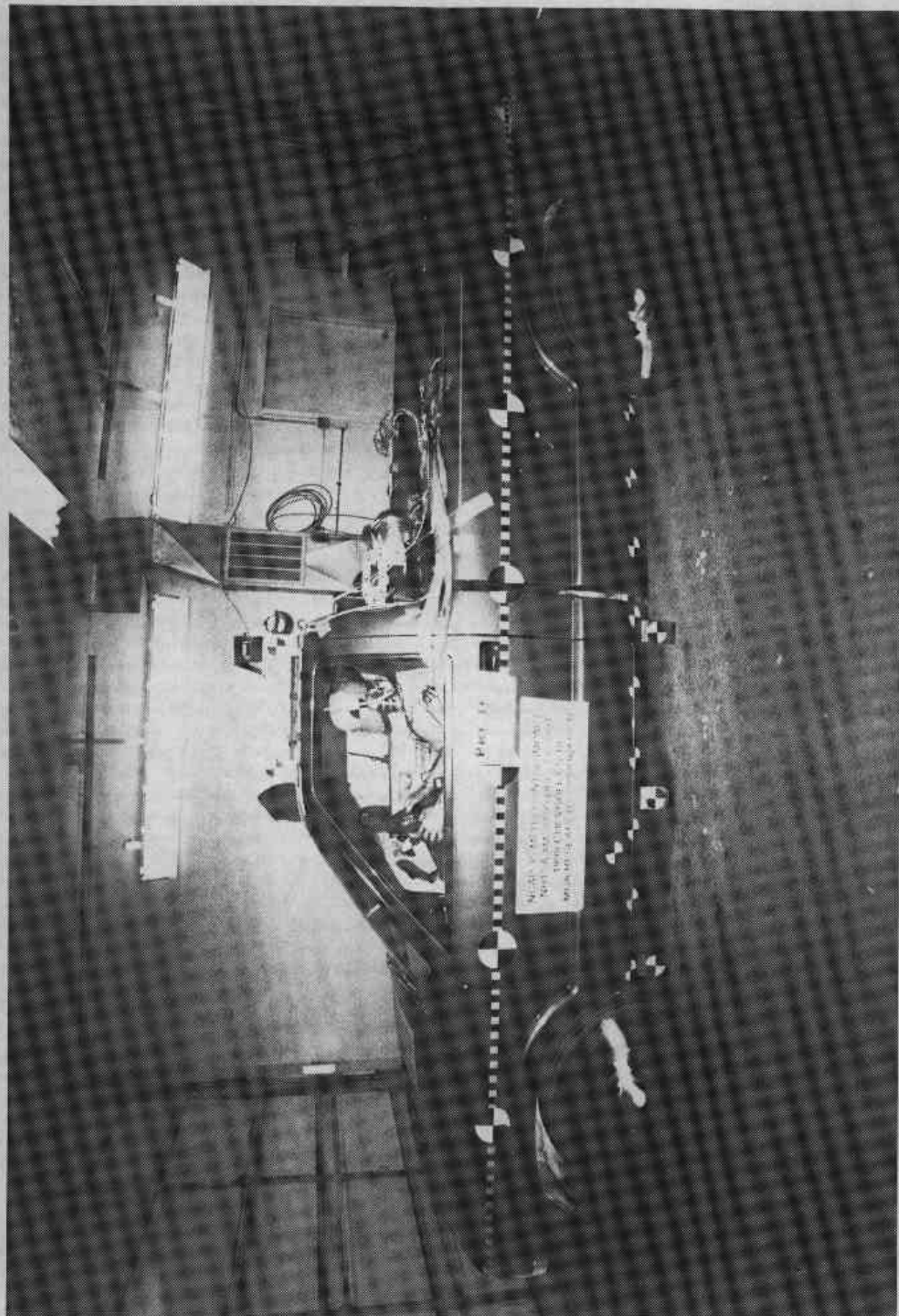


Photo No. A-3 - Pre-Test Rear View of Test Vehicle

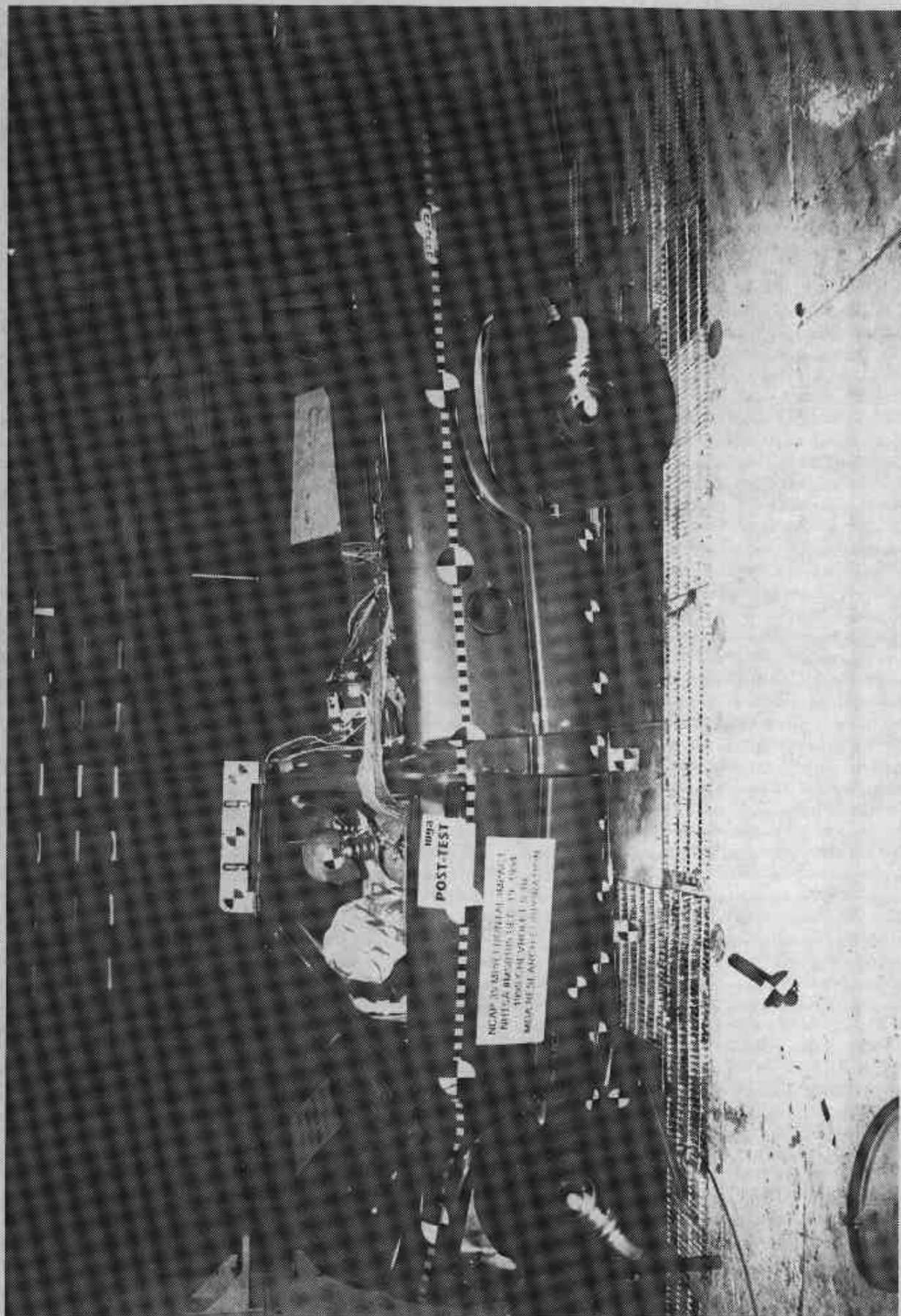


Photo No. A-4 - Post-Test Rear View of Test Vehicle



A-5

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

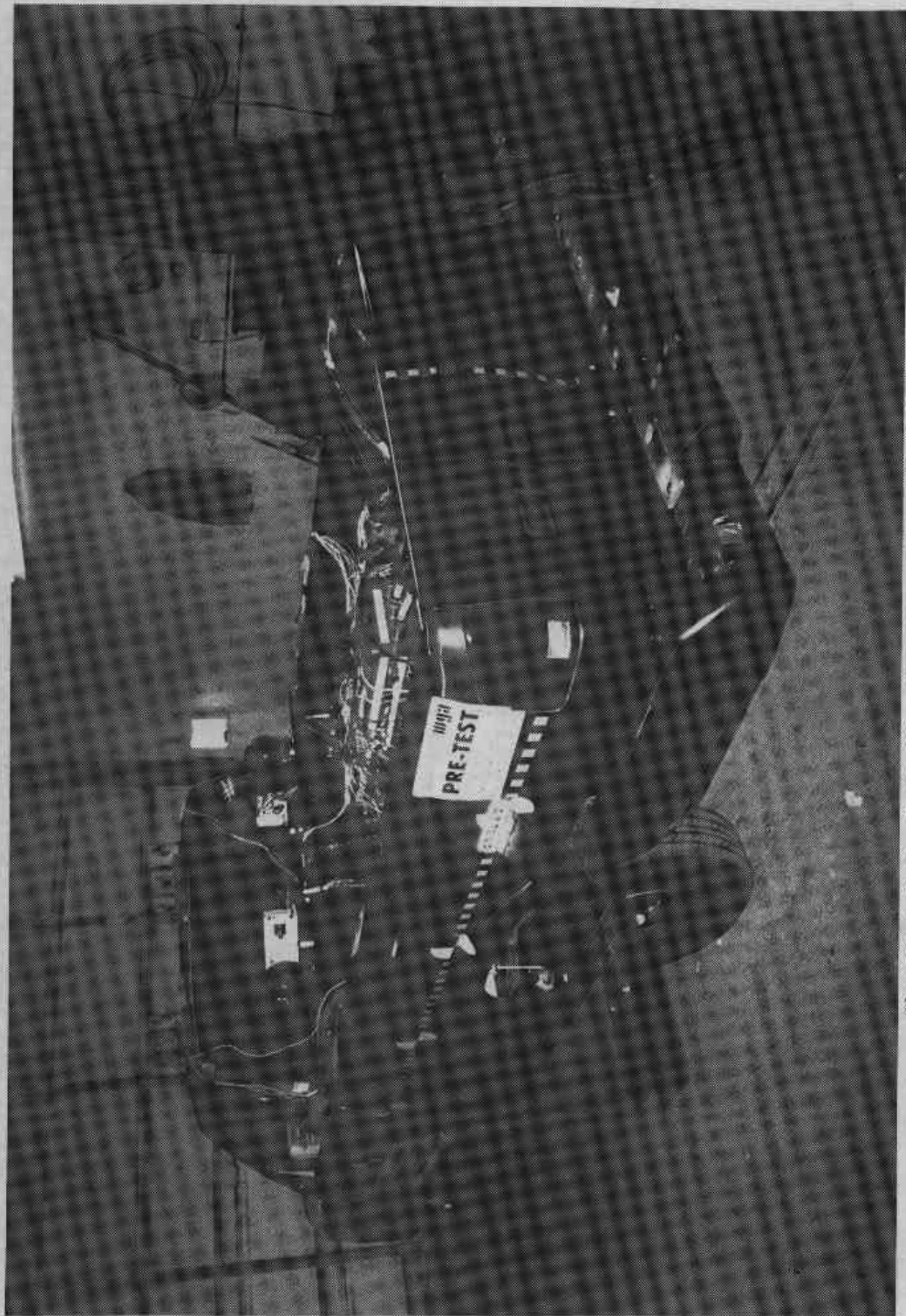
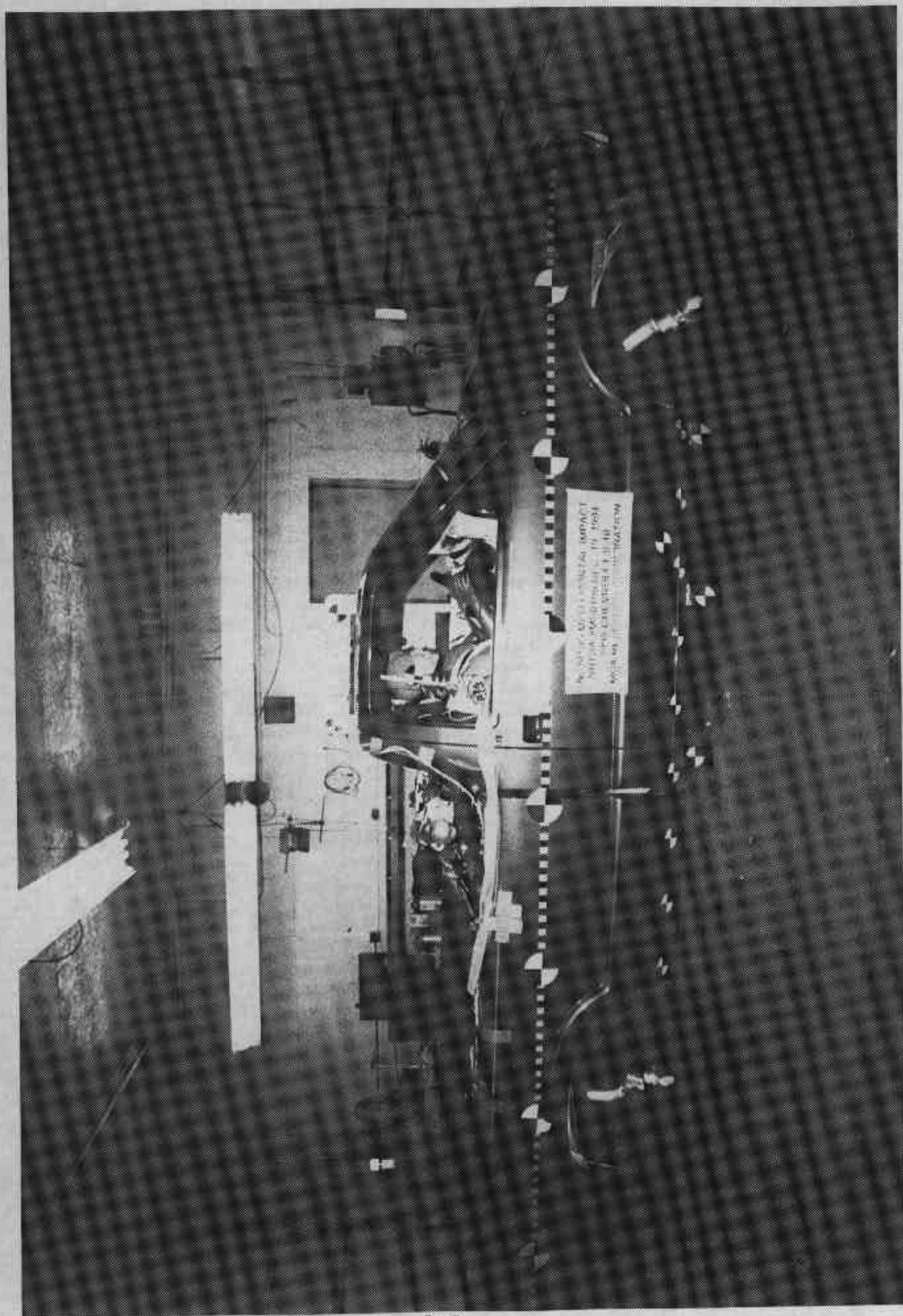


Photo No. A-7 - Pre-Test Left Rear Three-Quarter View of Test Vehicle



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

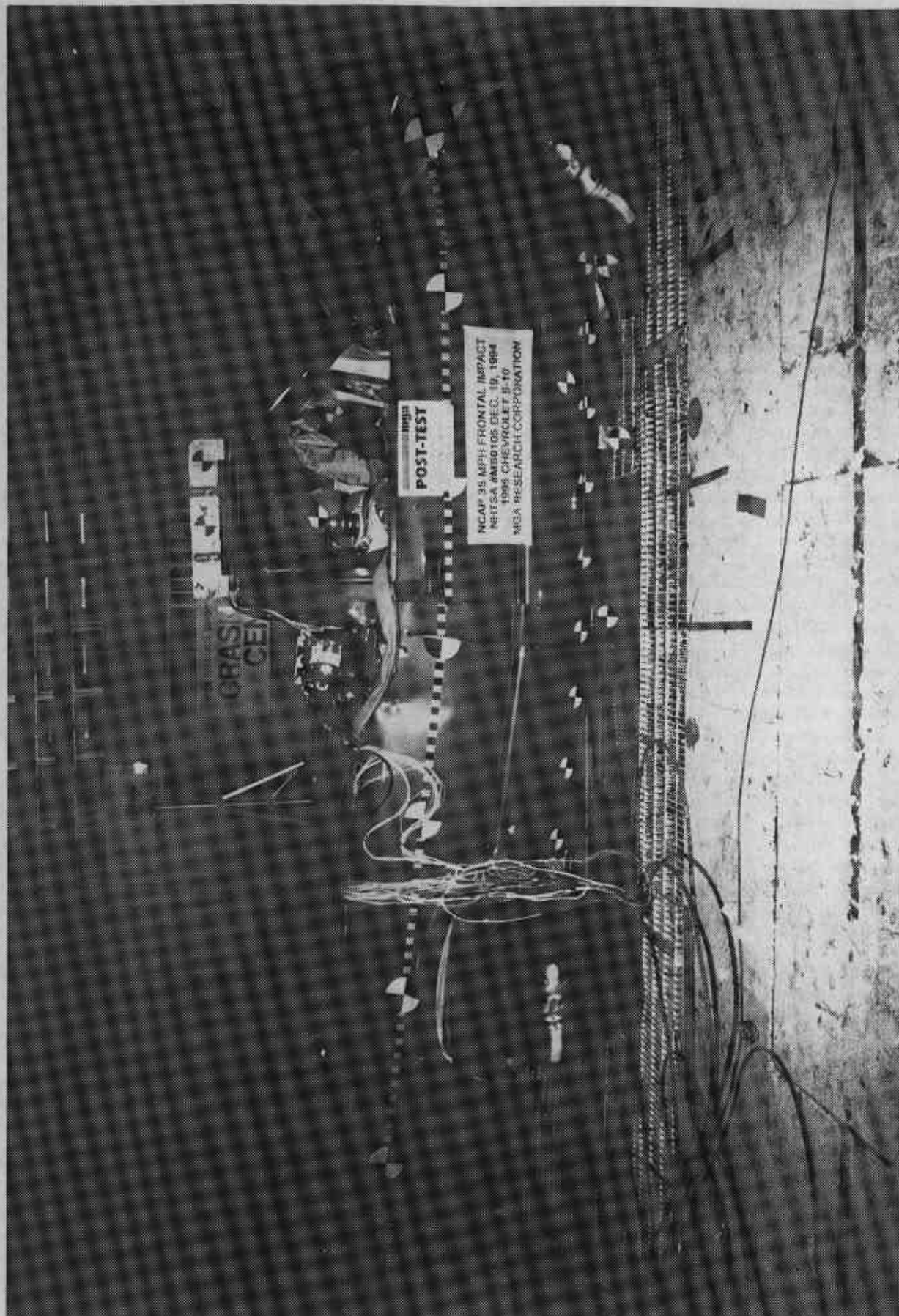
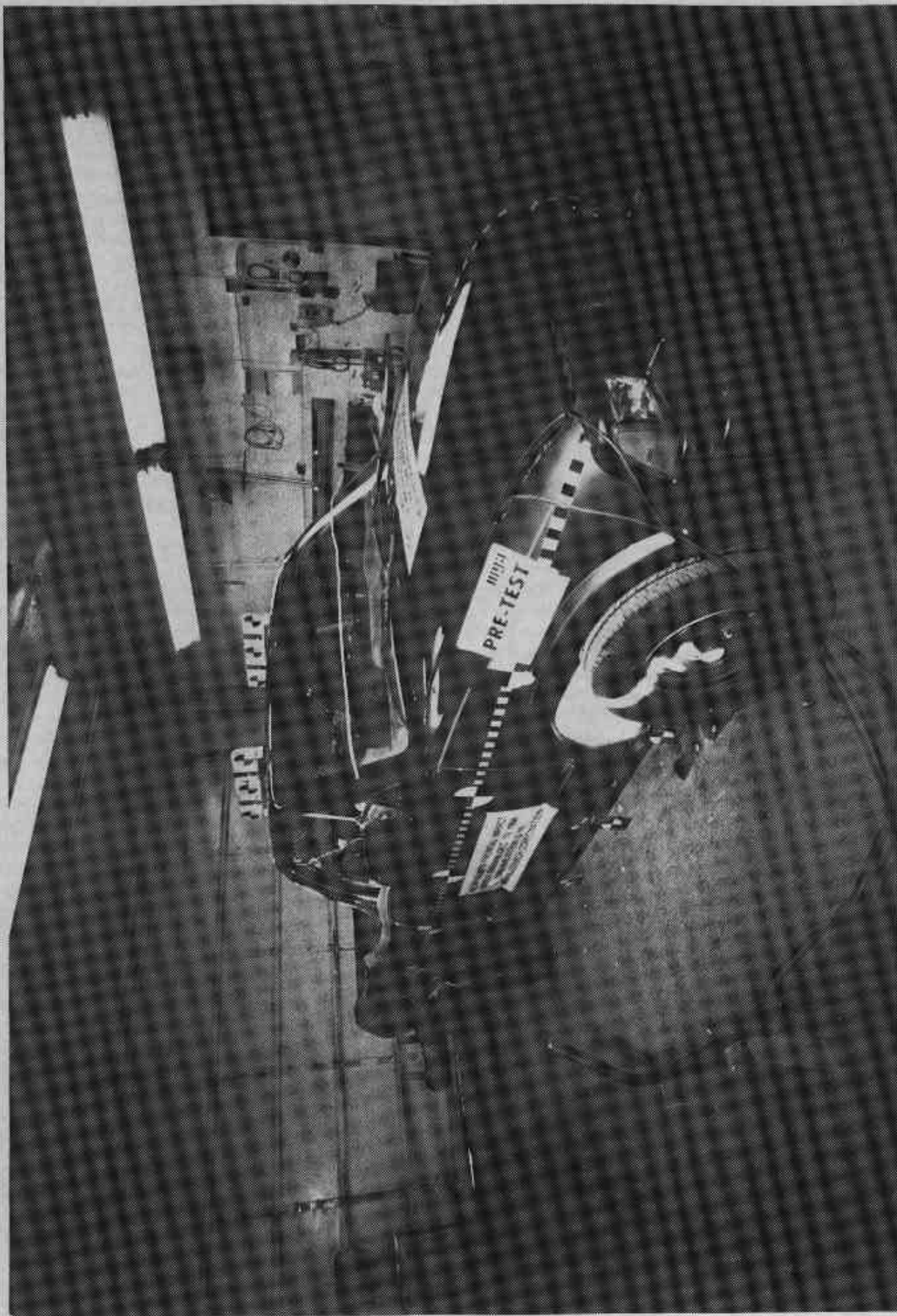


Photo No. A-18 - Post-Test Right Side View of Test Vehicle



A-11

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

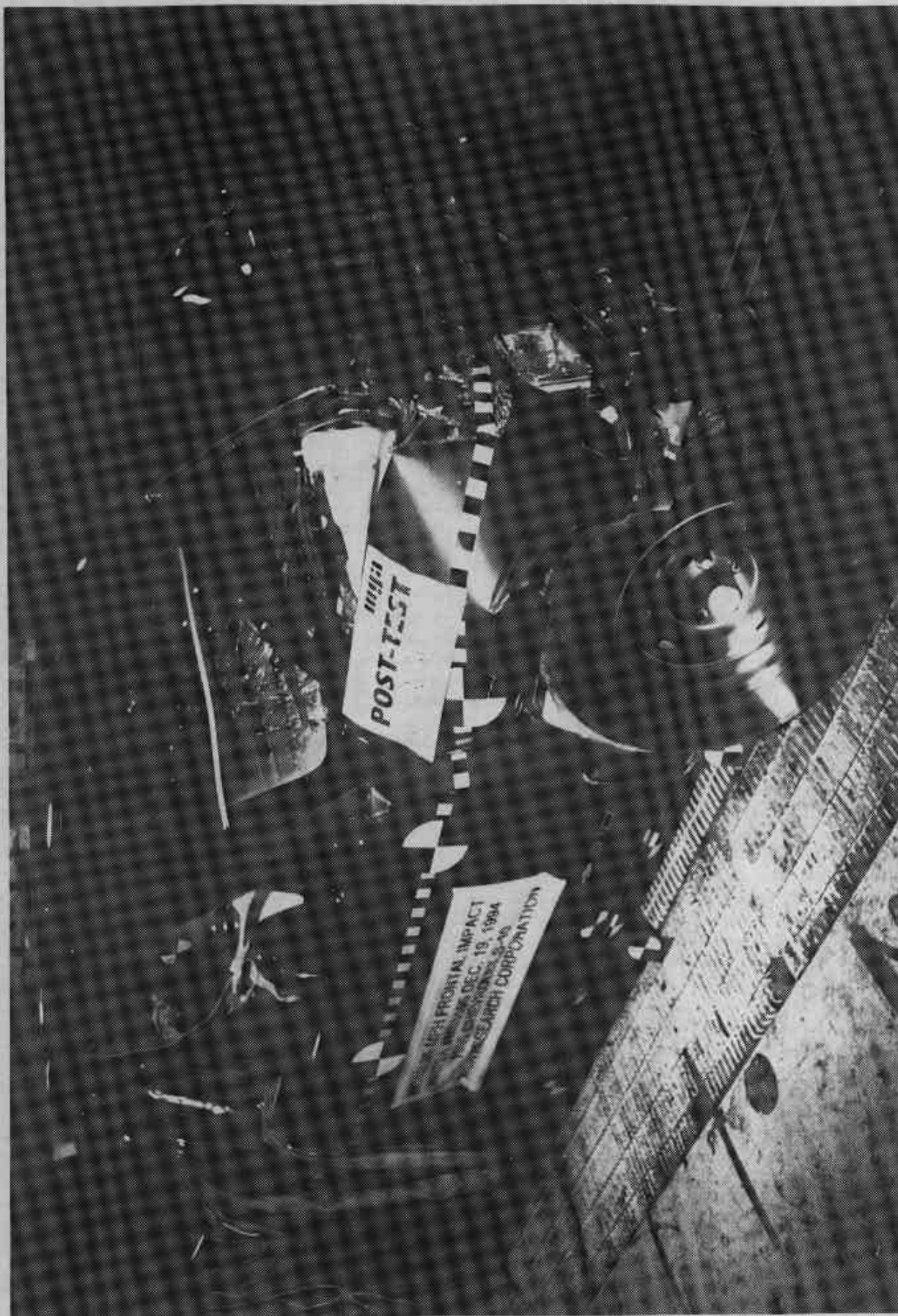
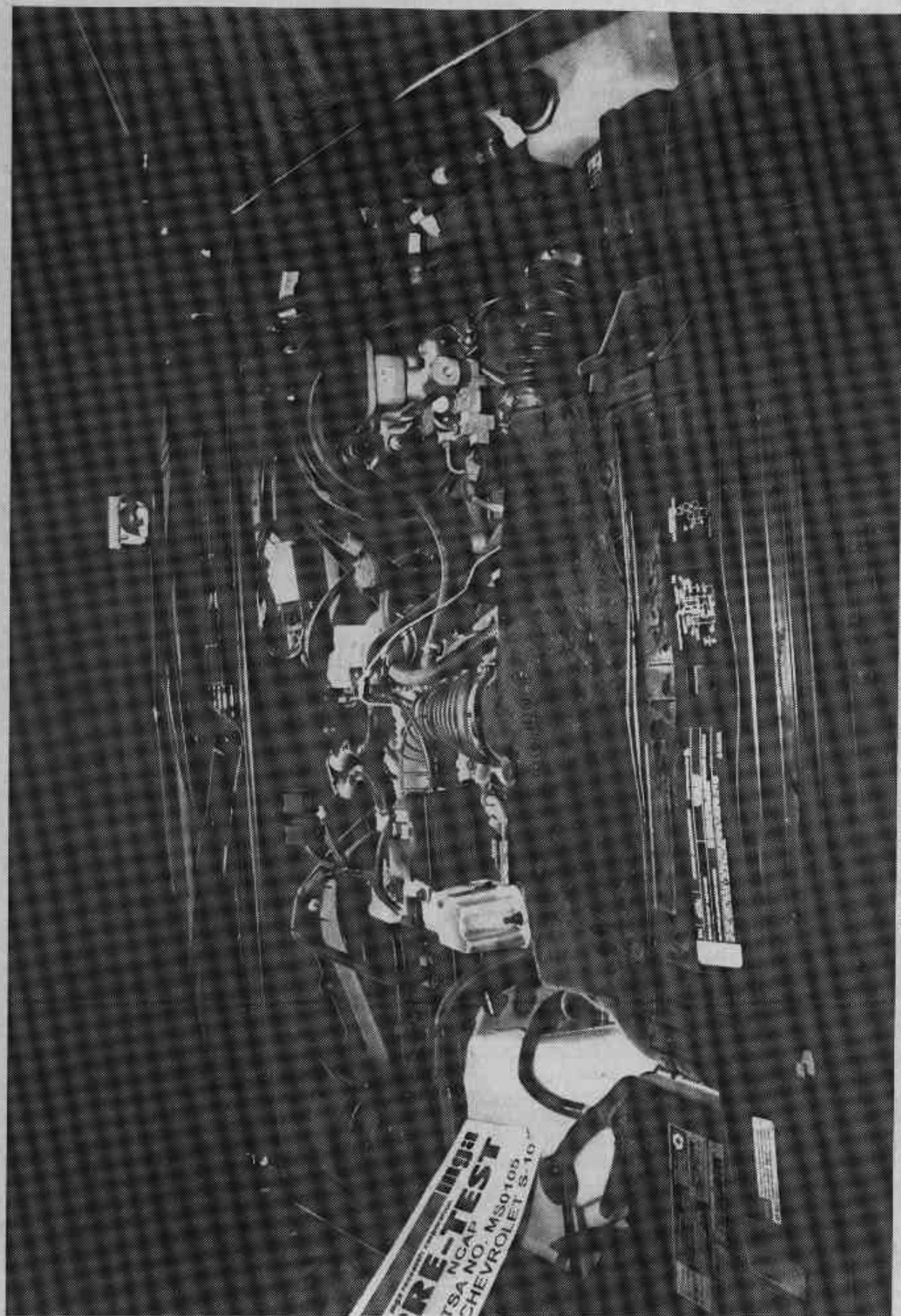


Photo No. A-12 - Post-Test Right Front Three-Quarter View of Test Vehicle

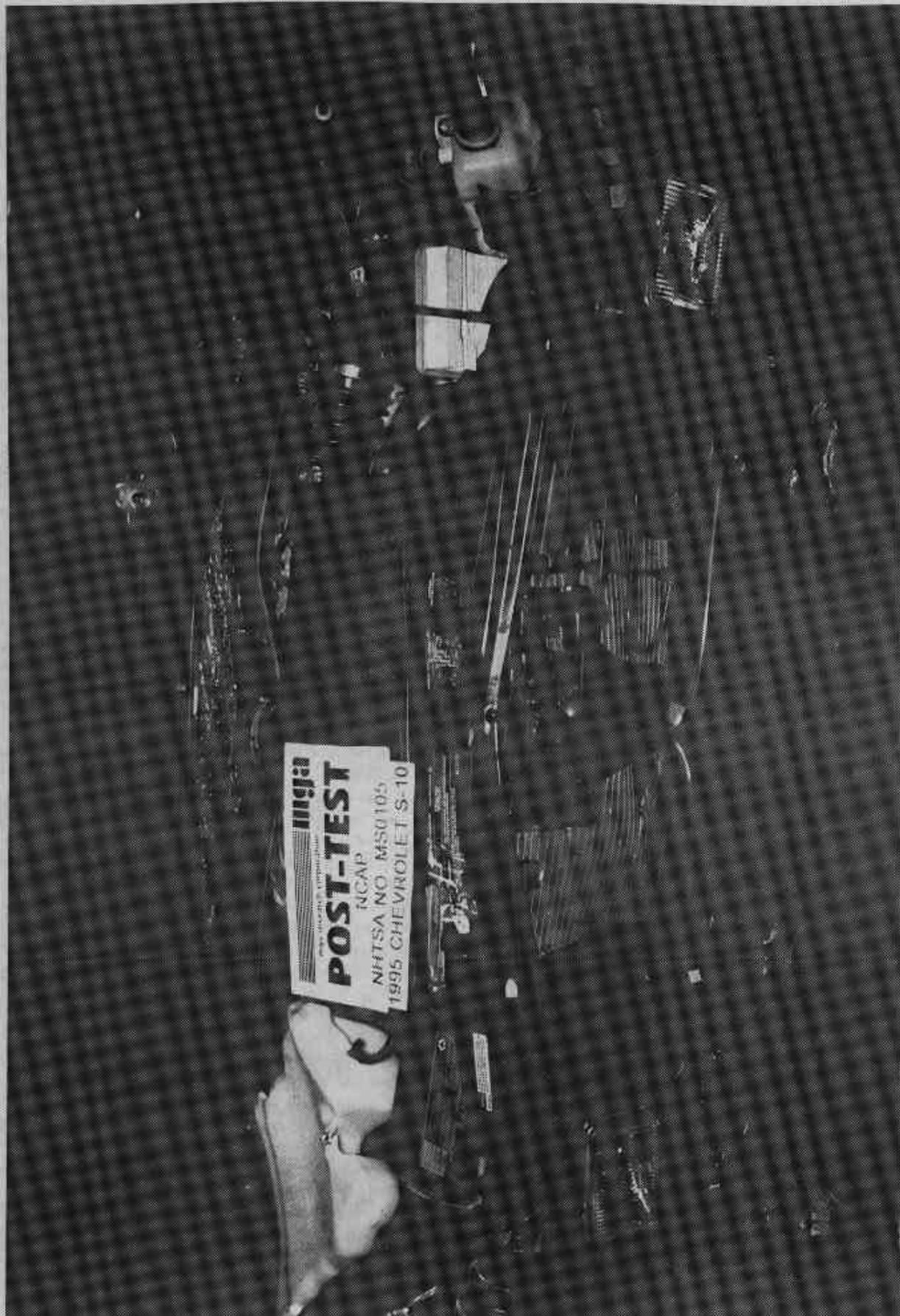


Photo No. A-13 - Pre-Test Fuel Filler Cap View



A-14

Photo No. A-14 - Pre-Test Engine Compartment View



A-15

Photo No. A-15 - Post-Test Engine Compartment View

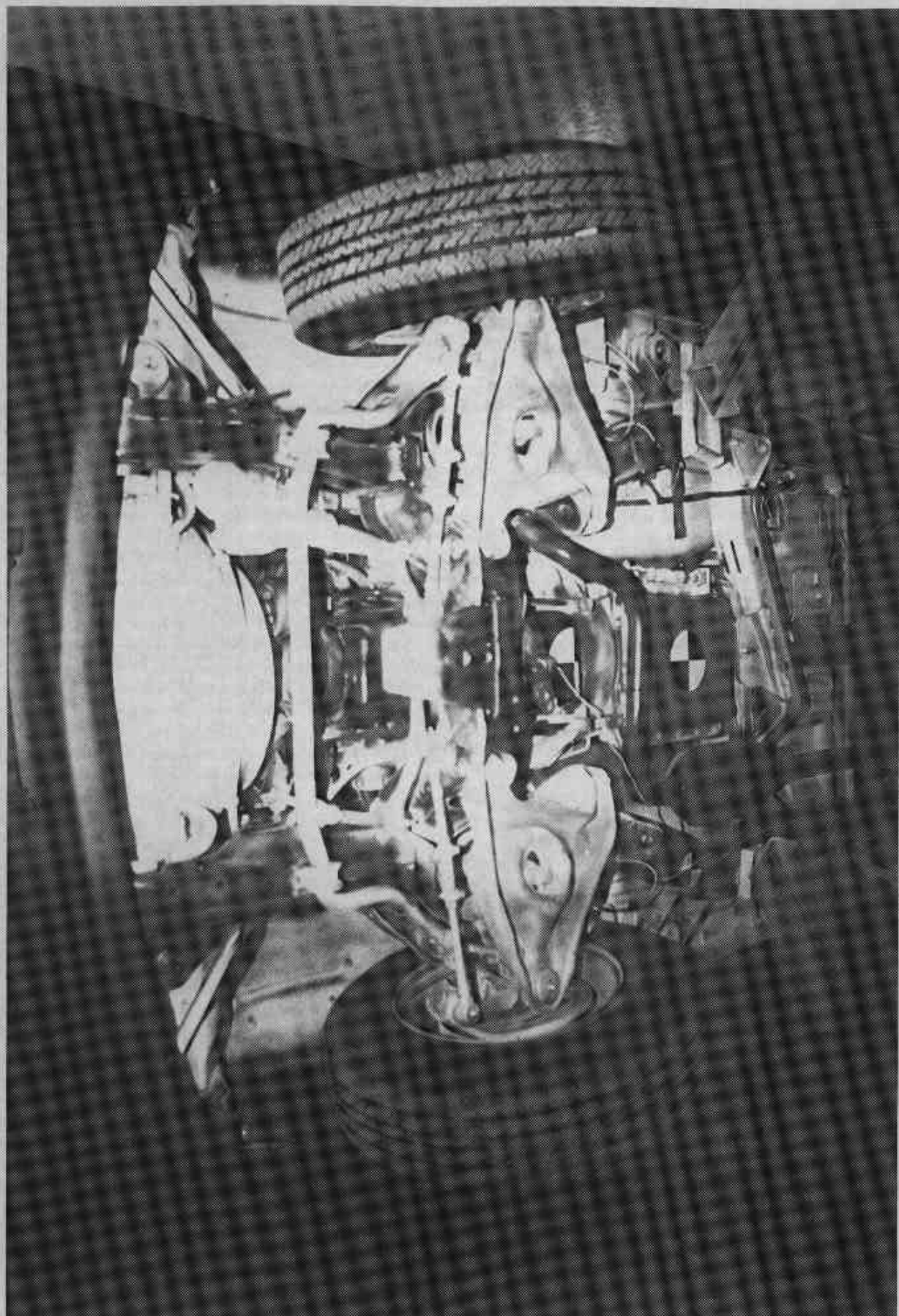


Photo No. A-16 - Pre-Test Front Underbody View

A-16



Photo No. A-17 - Post-Test Front Underbody View

A-17

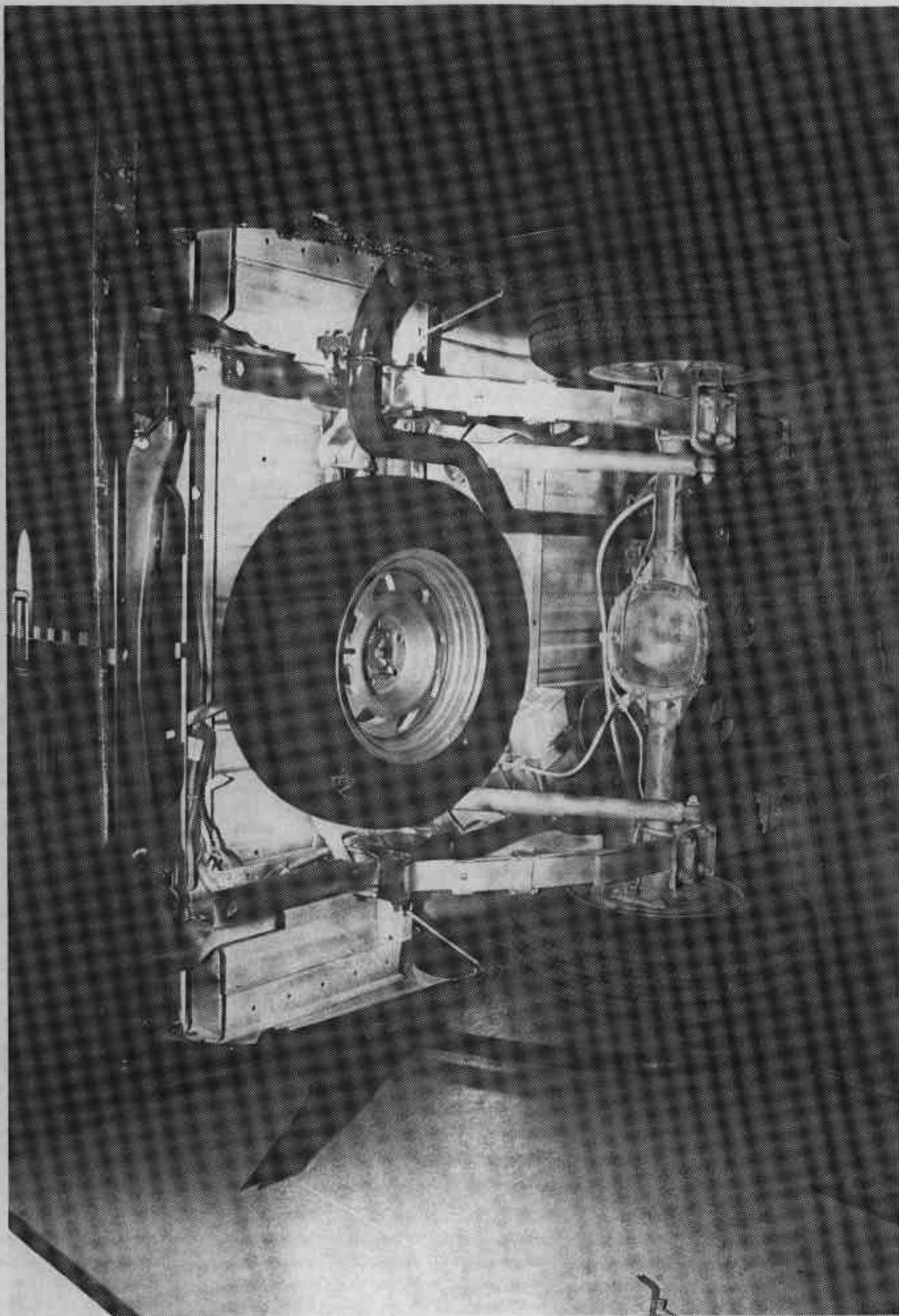


Photo No. A-18 - Pre-Test Rear Underbody View

A-18



Photo No. A-19 - Post-Test Rear Underbody View

A-19



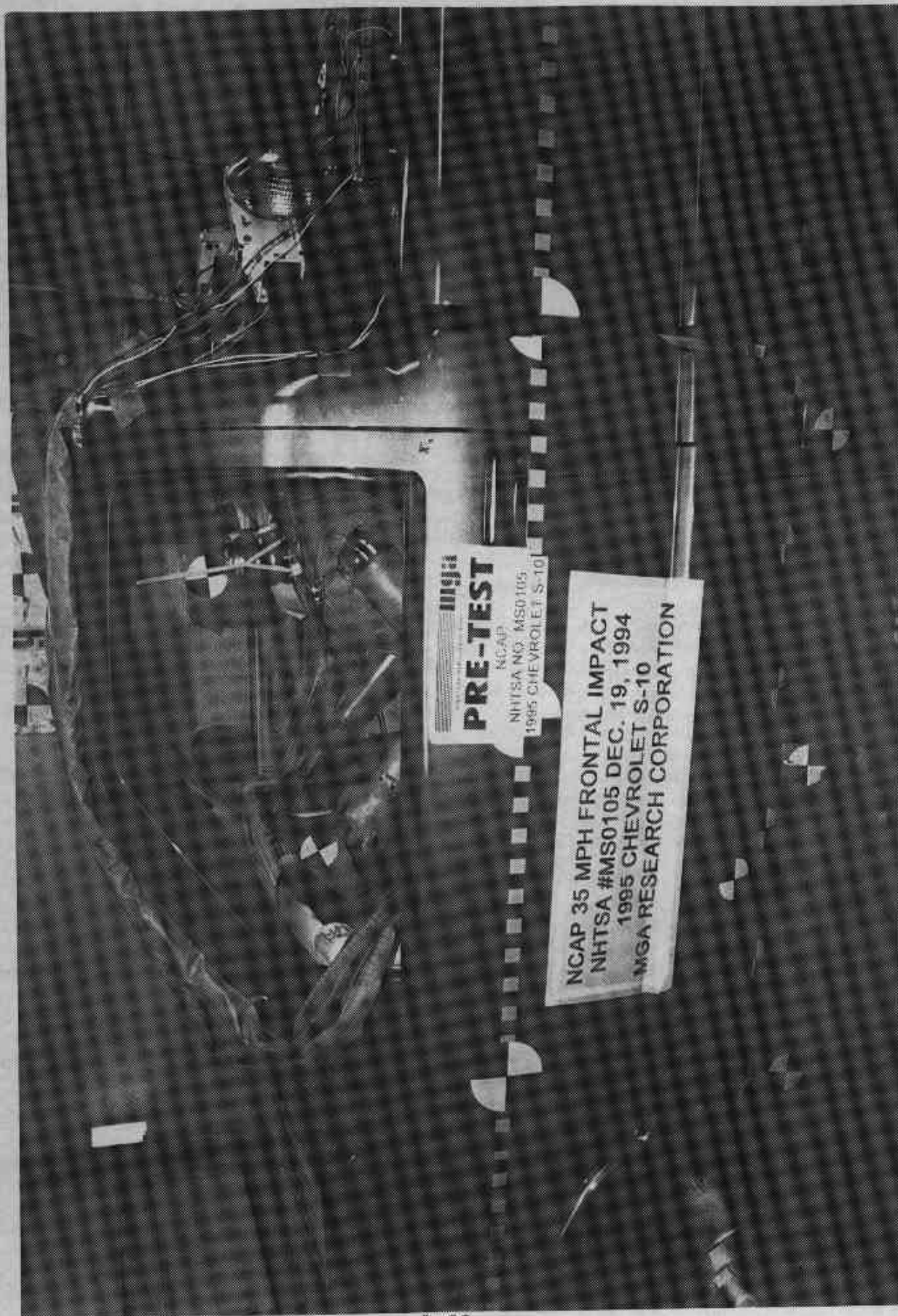
NCAP 35 MPH FRONTAL IMPACT
NHTSA #MS0105 DEC. 19, 1994
1995 CHEVROLET S-10

Photo No. A-28 - Pre-Test Windshield View



Photo No. A-21 - Post-Test Windshield View

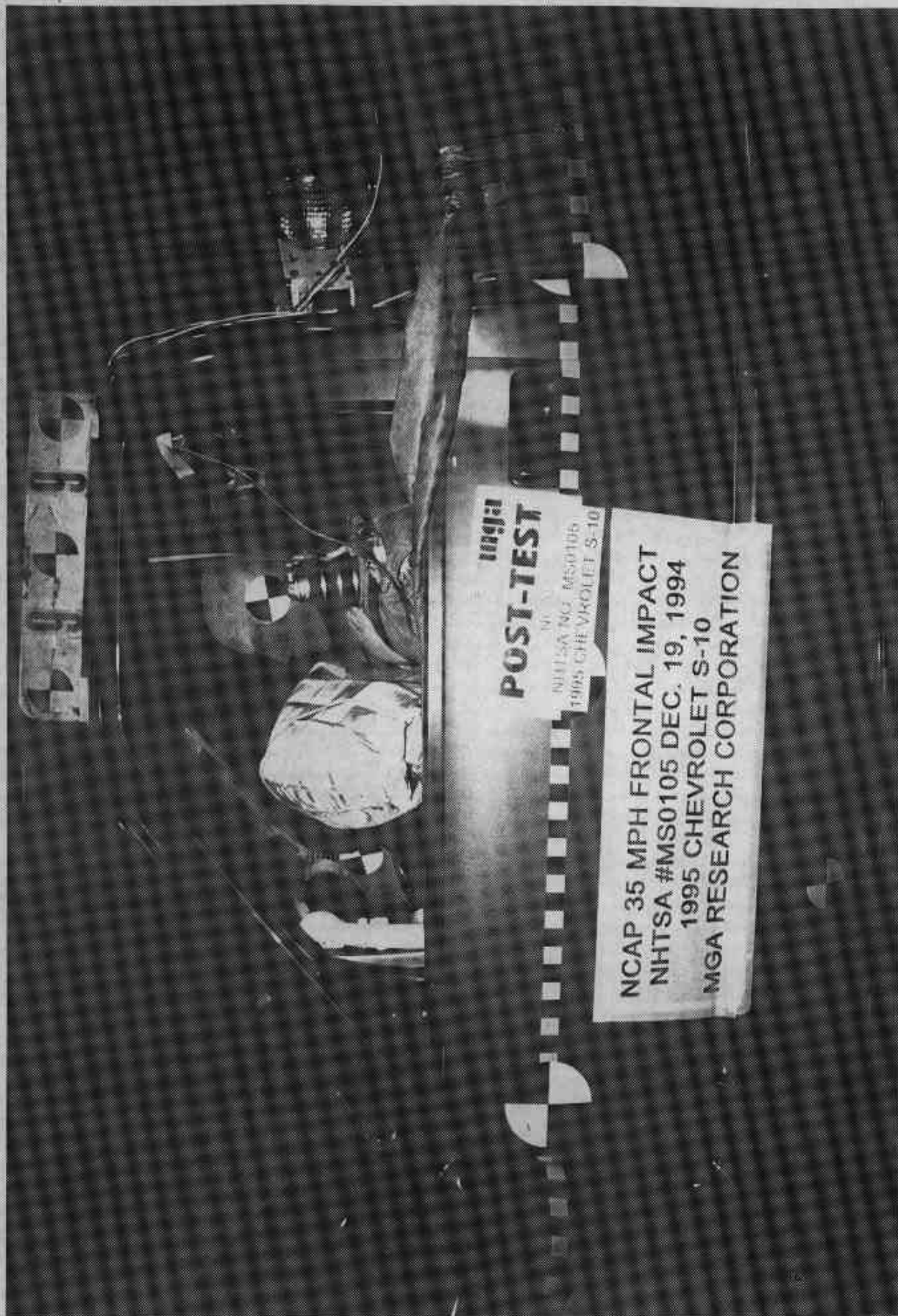
A-21



PRE-TEST
NCAP
NHTSA NO. MS0105
1995 CHEVROLET S-10

NCAP 35 MPH FRONTAL IMPACT
NHTSA #MS0105 DEC. 19, 1994
1995 CHEVROLET S-10
MGA RESEARCH CORPORATION

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



A-23

Photo No. A-23 - Post-Test Driver Dummy Position Left Side View



A-24

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



Photo No. A-25 - Post-Test Driver Dummy Position Left Side View (Door Open)

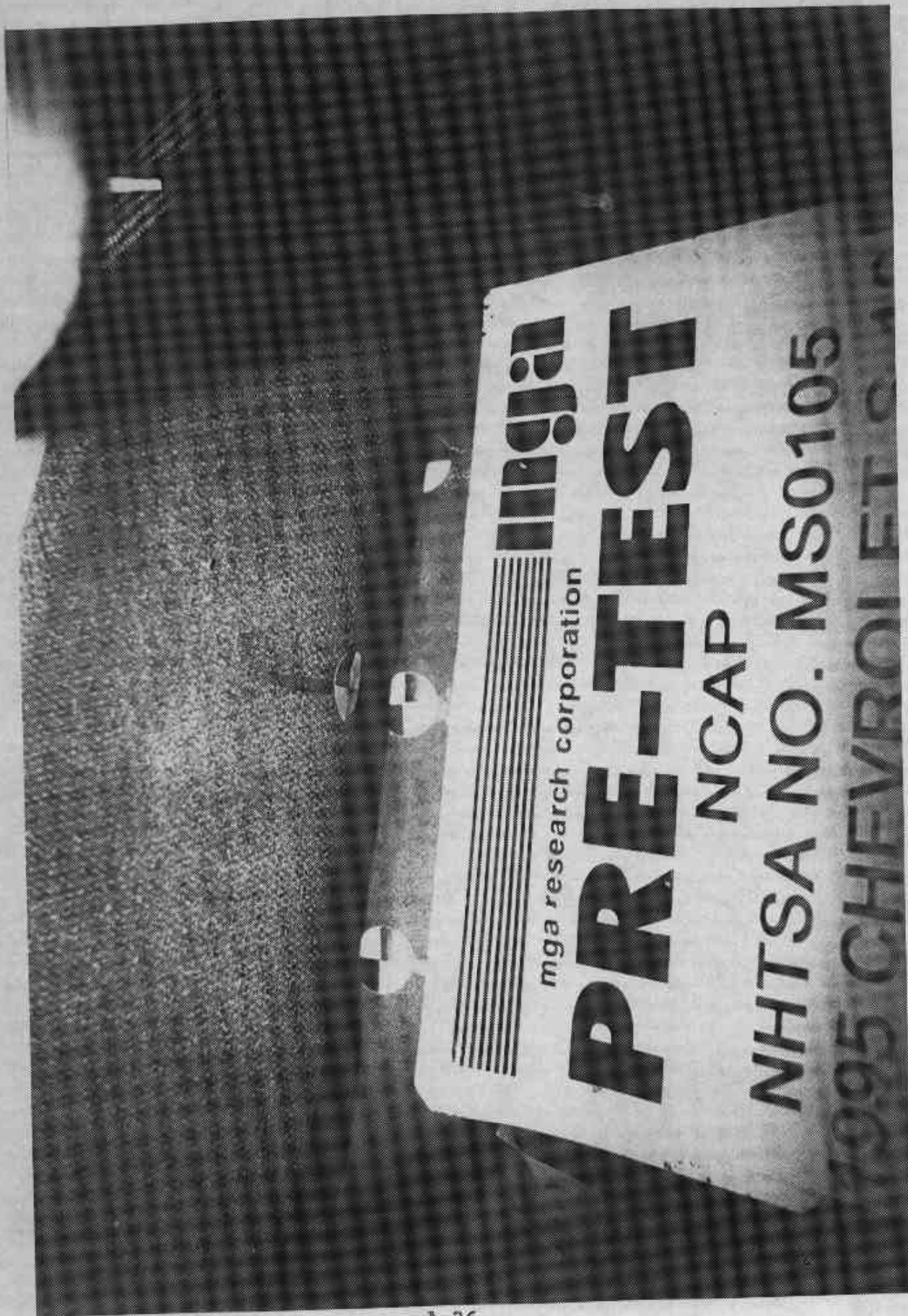


Photo No. A-26 - Pre-Test Driver Seat Position View



Photo No. A-27 - Post-Test Driver Seat Position View



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



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

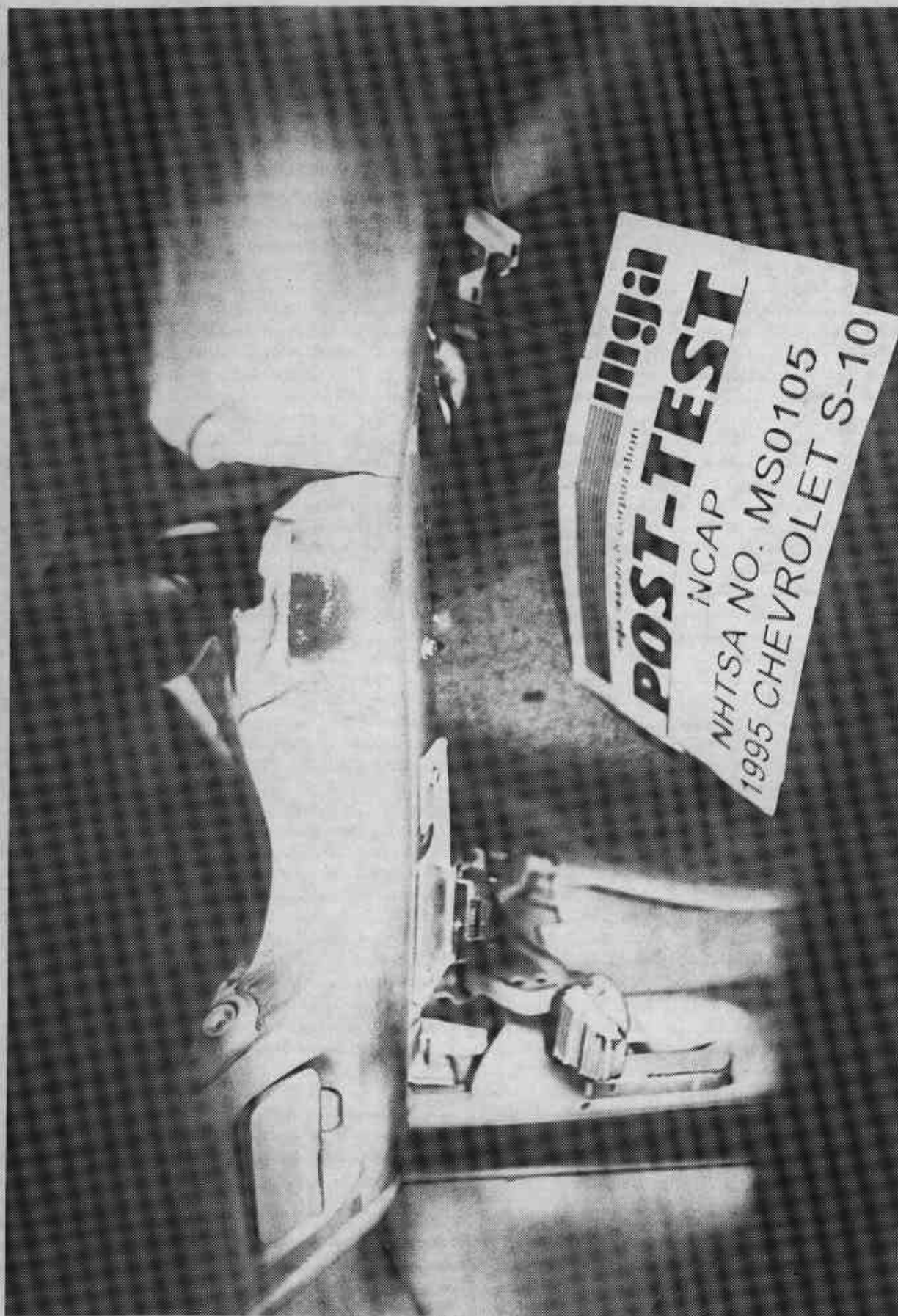


Photo No. A-30 - Post-Test Driver Knee Contact



Photo No. A-31 - Post-Test Driver Airbag Contact

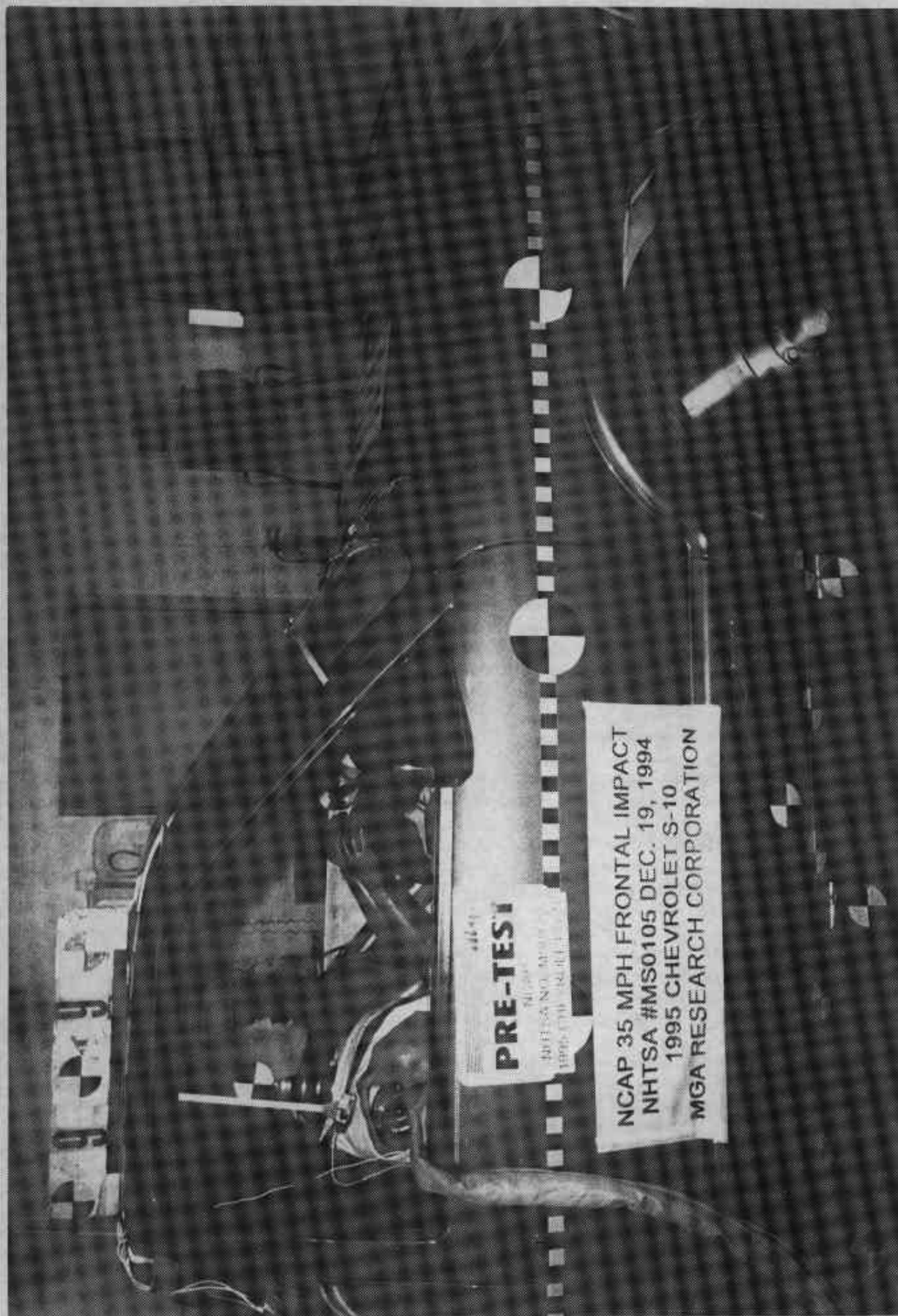
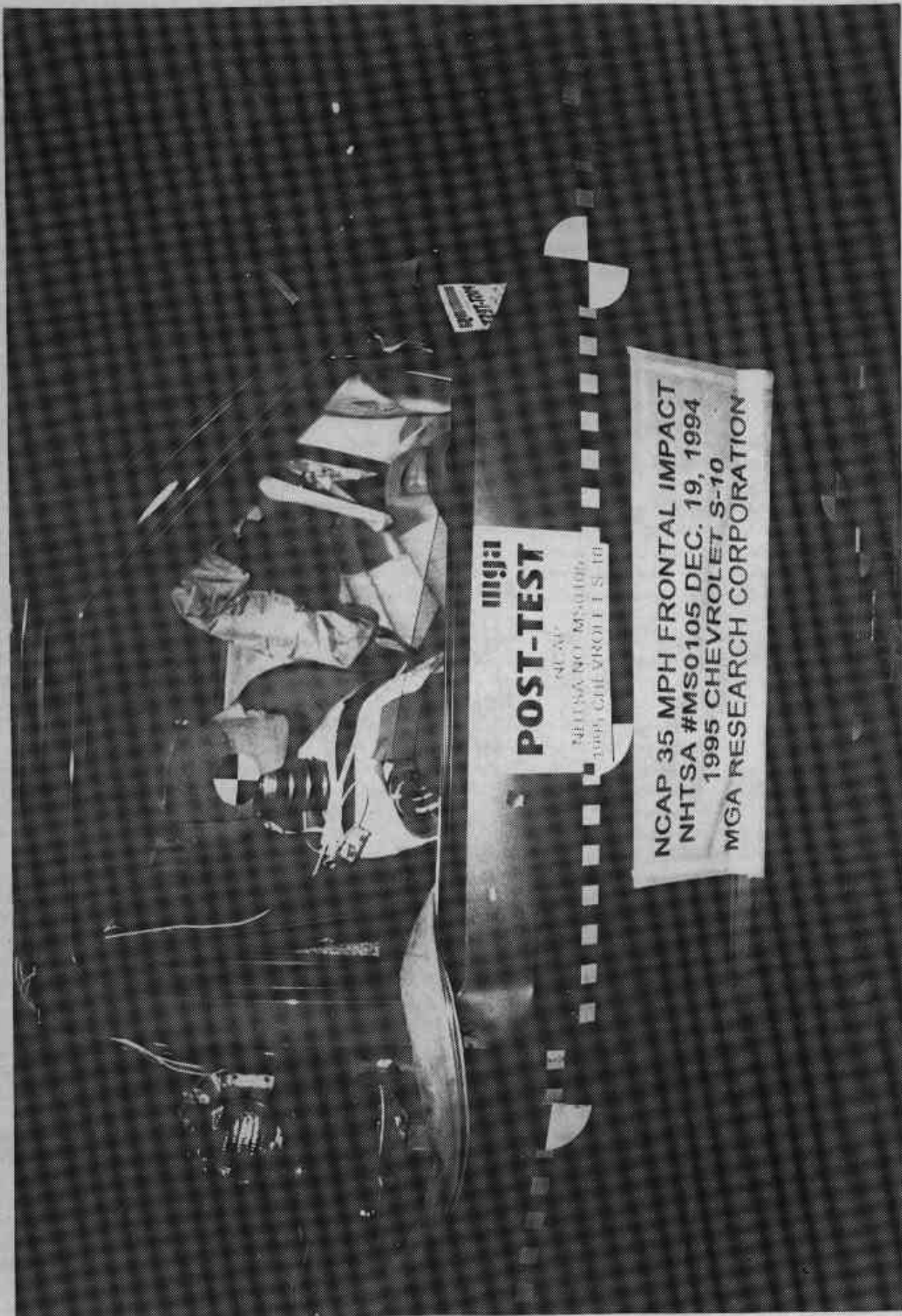


Photo No. A-32 - Pre-Test Passenger Dummy Position Right Side View



A-33

Photo No. A-33 - Post-Test Passenger Dummy Position Right Side View



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

A-34



A-35

Photo No. A-35 - Post-Test Passenger Dummy Position Right Side View (Door Open)



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



A-37

Photo No. A-37 - Post-Test Passenger Seat Position View



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



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



A-40

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

09/94

10100175

MFD BY GENERAL MOTORS CORP		GAWR RR	2700/1225 LB/KG
GVWR		GAWR FRT	2500/1134
4500/2087		VEHICLE CONFORMS TO ALL APPLICABLE U.S.	
FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT			
ON THE DATE OF MANUFACTURE SHOWN ABOVE			
10CCS144598133951		TRUCK	
MODEL: S10B03	SPEED	PAYLOAD=1494/678	
SPAG TIRE SIZE	RTG RIM	PSI/KPA (COLD)	
FRT P205/75R15	S 15X7J	35/240	
RR P205/75R15	S 15X7J	35/240	
SPA P205/75R15	S 15X7J	35/240	
SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION			

Photo No. A-41 - Vehicle Certification Label and Tire Placard



Photo No. A-42 - Rollover 98°

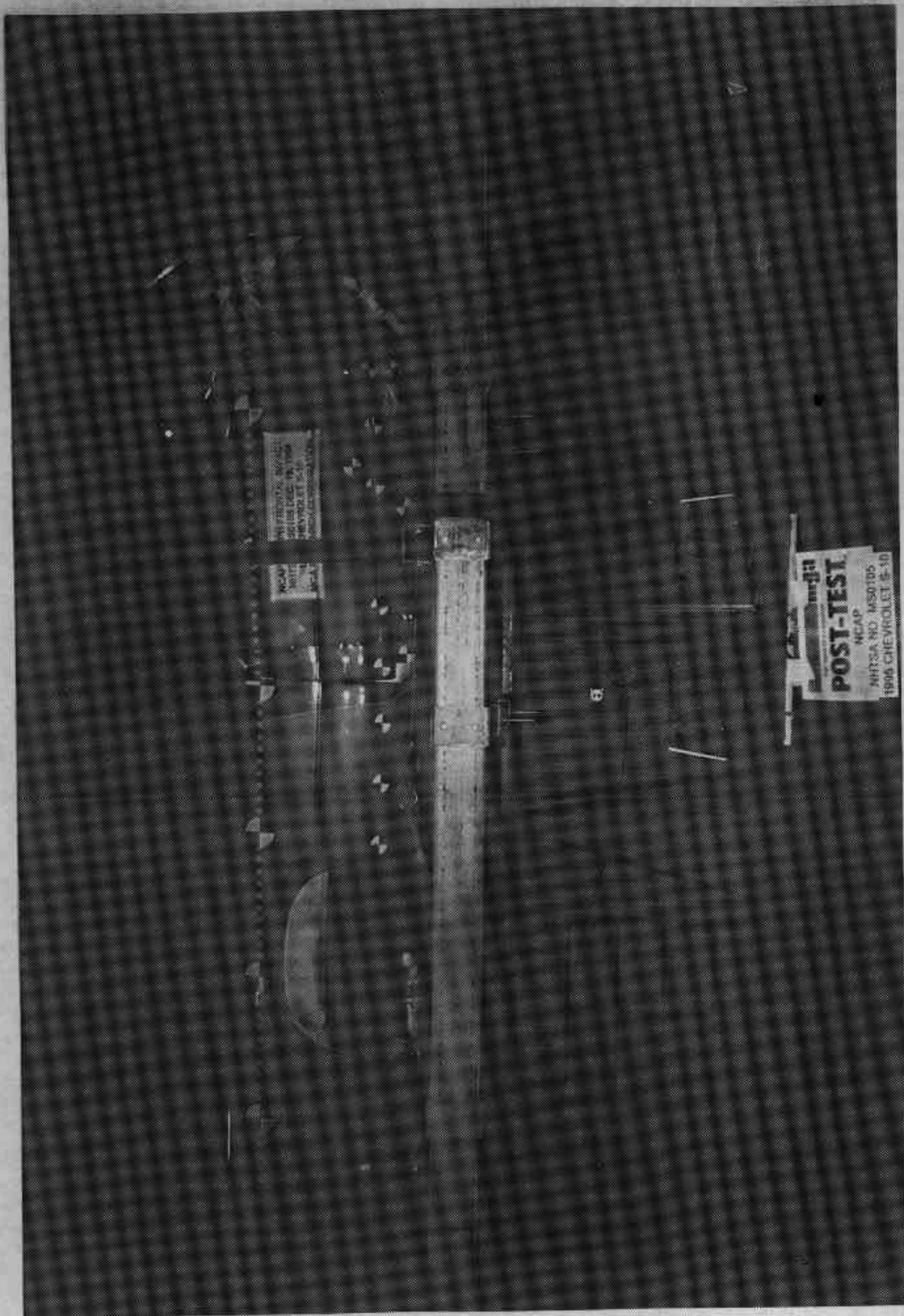


A-43

Photo No. A-43 - Rollover 180°



Photo No. A-44 - Rollover 270°



A-45

Photo No. A-45 - Rollover 360°

APPENDIX B

Vehicle, Load Cell Barrier and Dummy Response Data

1995 Chevrolet S-10 Pickup Truck

NHTSA NO.: MS0105

<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)

Data Plot

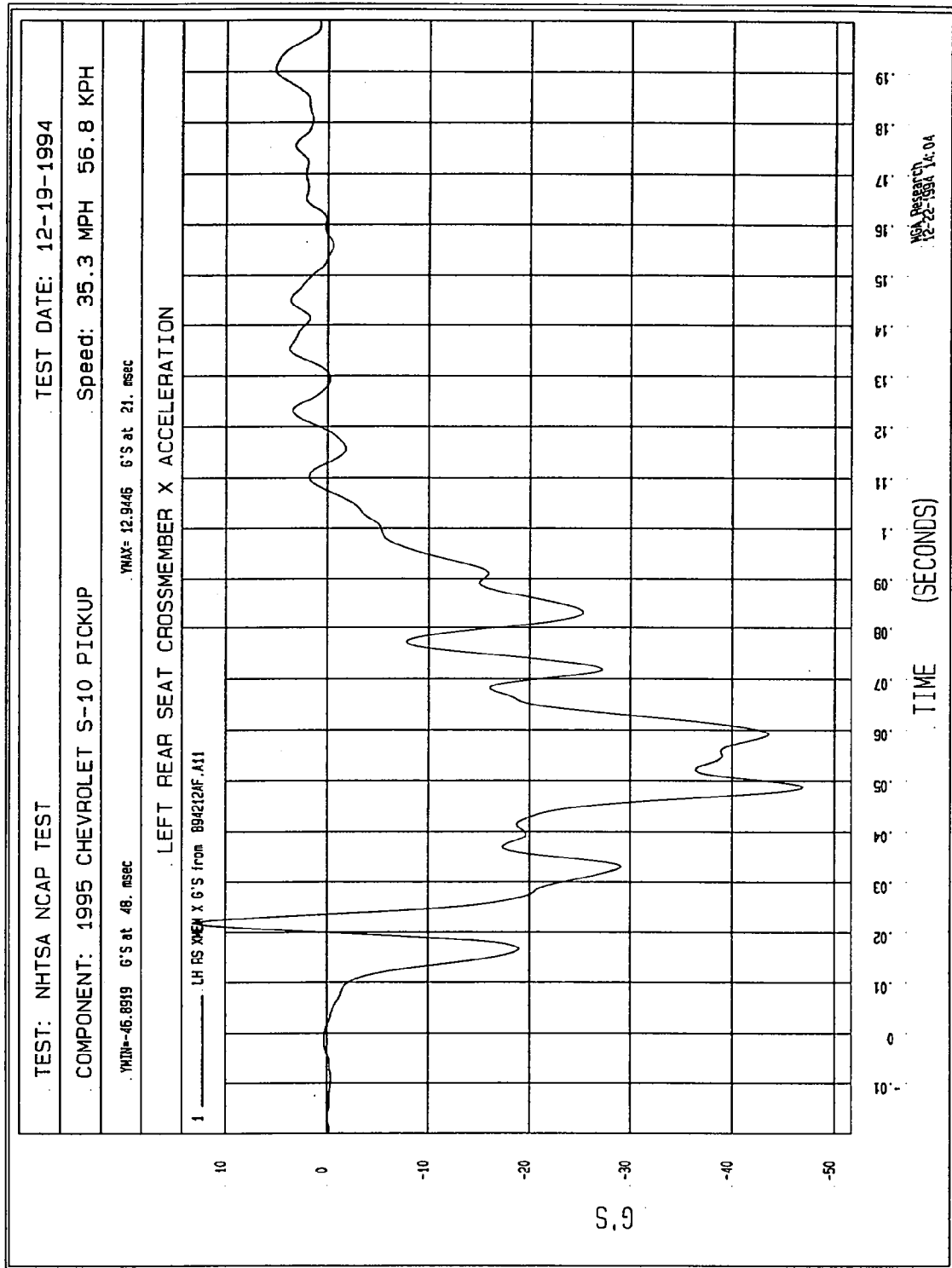
Page No.

Figure B-1 - Left Rear Seat Crossmember X Acceleration vs. Time	B-1
Figure B-2 - Left Rear Seat Crossmember X Velocity vs. Time	B-2
Figure B-3 - Left Rear Seat Crossmember X Displacement vs. Time	B-3
Figure B-4 - Left Rear Seat Crossmember X Redundant Acceleration vs. Time	B-4
Figure B-5 - Left Rear Seat Crossmember X Redundant Velocity vs. Time	B-5
Figure B-6 - Left Rear Seat Crossmember X Redundant Displacement vs. Time	B-6
Figure B-7 - Right Rear Seat Crossmember X Acceleration vs. Time	B-7
Figure B-8 - Right Rear Seat Crossmember X Velocity vs. Time	B-8
Figure B-9 - Right Rear Seat Crossmember X Displacement vs. Time	B-9
Figure B-10 - Right Rear Seat Crossmember X Redundant Acceleration vs. Time	B-10
Figure B-11 - Right Rear Seat Crossmember X Redundant Velocity vs. Time	B-11
Figure B-12 - Right Rear Seat Crossmember X Redundant Displacement vs. Time	B-12
Figure B-13 - Top of Engine Block X Acceleration vs. Time	B-13
Figure B-14 - Top of Engine Block X Velocity vs. Time	B-14
Figure B-15 - Bottom of Engine X Acceleration vs. Time	B-15
Figure B-16 - Bottom of Engine X Velocity vs. Time	B-16
Figure B-17 - Instrument Panel X Acceleration vs. Time	B-17
Figure B-18 - Instrument Panel X Velocity vs. Time	B-18
Figure B-19 - Left Brake Caliper X Acceleration vs. Time	B-19
Figure B-20 - Left Brake Caliper X Velocity vs. Time	B-20

<u>Data Plot</u>	<u>Page No.</u>
Figure B-21 - Right Brake Caliper X Acceleration vs. Time	B-21
Figure B-22 - Right Brake Caliper X Velocity vs. Time	B-22
Figure B-23 - Upper Left Barrier Force vs. Time	B-23
Figure B-24 - Upper Center Barrier Force vs. Time	B-24
Figure B-25 - Upper Right Barrier Force vs. Time	B-25
Figure B-26 - Lower Left Barrier Force vs. Time	B-26
Figure B-27 - Lower Center Barrier Force vs. Time	B-27
Figure B-28 - Lower Right Barrier Force vs. Time	B-28
Figure B-29 - Sum of Left Barrier Forces vs. Time	B-29
Figure B-30 - Sum of Center Barrier Forces vs. Time	B-30
Figure B-31 - Sum of Right Barrier Forces vs. Time	B-31
Figure B-32 - Sum of Barrier Forces vs. Time	B-32
Figure B-33 - Driver Head X Acceleration vs. Time	B-33
Figure B-34 - Driver Head Y Acceleration vs. Time	B-34
Figure B-35 - Driver Head Z Acceleration vs. Time	B-35
Figure B-36 - Driver Head Resultant Acceleration vs. Time	B-36
Figure B-37 - Driver Head X Velocity vs. Time	B-37
Figure B-38 - Driver Head X Redundant Acceleration vs. Time	B-38
Figure B-39 - Driver Head Y Redundant Acceleration vs. Time	B-39
Figure B-40 - Driver Head Z Redundant Acceleration vs. Time	B-40
Figure B-41 - Driver Head Redundant Resultant Accel. vs. Time	B-41
Figure B-42 - Driver Head X Redundant Velocity vs. Time	B-42
Figure B-43 - Driver Chest X Acceleration vs. Time	B-43
Figure B-44 - Driver Chest Y Acceleration vs. Time	B-44
Figure B-45 - Driver Chest Z Acceleration vs. Time	B-45
Figure B-46 - Driver Chest Resultant Accel. vs. Time	B-46
Figure B-47 - Driver Chest X Velocity vs. Time	B-47
Figure B-48 - Driver Chest X Redundant Acceleration vs. Time	B-48
Figure B-49 - Driver Chest Y Redundant Acceleration vs. Time	B-49
Figure B-50 - Driver Chest Z Redundant Acceleration vs. Time	B-50
Figure B-51 - Driver Chest Redundant Resultant Accel. vs. Time	B-51
Figure B-52 - Driver Chest X Redundant Velocity vs. Time	B-52
Figure B-53 - Driver Chest Compression vs. Time	B-53
Figure B-54 - Driver Left Femur Force vs. Time	B-54
Figure B-55 - Driver Right Femur Force vs. Time	B-55

<u>Data Plot</u>	<u>Page No.</u>
Figure B-56 - Driver Pelvis X Acceleration vs. Time	B-56
Figure B-57 - Driver Pelvis Y Acceleration vs. Time	B-57
Figure B-58 - Driver Pelvis Z Acceleration vs. Time	B-58
Figure B-59 - Driver Pelvis Resultant Acceleration vs. Time	B-59
Figure B-60 - Driver Pelvis X Velocity vs. Time	B-60
Figure B-61 - Driver Lap Belt Force vs. Time	B-61
Figure B-62 - Driver Shoulder Belt Force vs. Time	B-62
Figure B-63 - Driver Neck Force X vs. Time	B-63
Figure B-64 - Driver Neck Force Y vs. Time	B-64
Figure B-65 - Driver Neck Force Z vs. Time	B-65
Figure B-66 - Driver Neck Force Resultant vs. Time	B-66
Figure B-67 - Driver Neck Moment X vs. Time	B-67
Figure B-68 - Driver Neck Moment Y vs. Time	B-68
Figure B-69 - Driver Neck Moment Z vs. Time	B-69
Figure B-70 - Driver Neck Moment Resultant vs. Time	B-70
Figure B-71 - Driver Left Upper Tibia Moment X vs. Time	B-71
Figure B-72 - Driver Left Upper Tibia Moment Y vs. Time	B-72
Figure B-73 - Driver Left Lower Tibia Force X vs. Time	B-73
Figure B-74 - Driver Left Lower Tibia Moment Y vs. Time	B-74
Figure B-75 - Driver Left Lower Tibia Force Z vs. Time	B-75
Figure B-76 - Driver Right Upper Tibia Moment X vs. Time	B-76
Figure B-77 - Driver Right Upper Tibia Moment Y vs. Time	B-77
Figure B-78 - Driver Right Lower Tibia Force X vs. Time	B-78
Figure B-79 - Driver Right Lower Tibia Moment Y vs. Time	B-79
Figure B-80 - Driver Right Lower Tibia Force Z vs. Time	B-80
Figure B-81 - Passenger Head X Acceleration vs. Time	B-81
Figure B-82 - Passenger Head Y Acceleration vs. Time	B-82
Figure B-83 - Passenger Head Z Acceleration vs. Time	B-83
Figure B-84 - Passenger Head Resultant Acceleration vs. Time	B-84
Figure B-85 - Passenger Head X Velocity vs. Time	B-85
Figure B-86 - Passenger Head X Redundant Acceleration vs. Time	B-86
Figure B-87 - Passenger Head Y Redundant Acceleration vs. Time	B-87
Figure B-88 - Passenger Head Z Redundant Acceleration vs. Time	B-88
Figure B-89 - Passenger Head Redundant Resultant Accel. vs. Time	B-89
Figure B-90 - Passenger Head X Redundant Velocity vs. Time	B-90

<u>Data Plot</u>	<u>Page No.</u>
Figure B-91 - Passenger Chest X Acceleration vs. Time	B-91
Figure B-92 - Passenger Chest Y Acceleration vs. Time	B-92
Figure B-93 - Passenger Chest Z Acceleration vs. Time	B-93
Figure B-94 - Passenger Chest Resultant Accel. vs. Time	B-94
Figure B-95 - Passenger Chest X Velocity vs. Time	B-95
Figure B-96 - Passenger Chest X Redundant Acceleration vs. Time	B-96
Figure B-97 - Passenger Chest Y Redundant Acceleration vs. Time	B-97
Figure B-98 - Passenger Chest Z Redundant Acceleration vs. Time	B-98
Figure B-99 - Passenger Chest Redundant Resultant Accel. vs. Time	B-99
Figure B-100 - Passenger Chest X Redundant Velocity vs. Time	B-100
Figure B-101 - Passenger Chest Compression vs. Time	B-101
Figure B-102 - Passenger Left Femur Force vs. Time	B-102
Figure B-103 - Passenger Right Femur Force vs. Time	B-103
Figure B-104 - Passenger Pelvis X Acceleration vs. Time	B-104
Figure B-105 - Passenger Pelvis Y Acceleration vs. Time	B-105
Figure B-106 - Passenger Pelvis Z Acceleration vs. Time	B-106
Figure B-107 - Passenger Pelvis Z Resultant Acceleration vs. Time	B-107
Figure B-108 - Passenger Pelvis X Velocity vs. Time	B-108
Figure B-109 - Passenger Lap Belt Force vs. Time	B-109
Figure B-110 - Passenger Shoulder Belt Force vs. Time	B-110
Figure B-111 - Passenger Neck Force X vs. Time	B-111
Figure B-112 - Passenger Neck Force Y vs. Time	B-112
Figure B-113 - Passenger Neck Force Z vs. Time	B-113
Figure B-114 - Passenger Neck Force Resultant Acceleration vs. Time	B-114
Figure B-115 - Passenger Neck Moment X vs. Time	B-115
Figure B-116 - Passenger Neck Moment Y vs. Time	B-116
Figure B-117 - Passenger Neck Moment Z vs. Time	B-117
Figure B-118 - Passenger Neck Moment Resultant Acceleration vs. Time	B-118



B-1

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

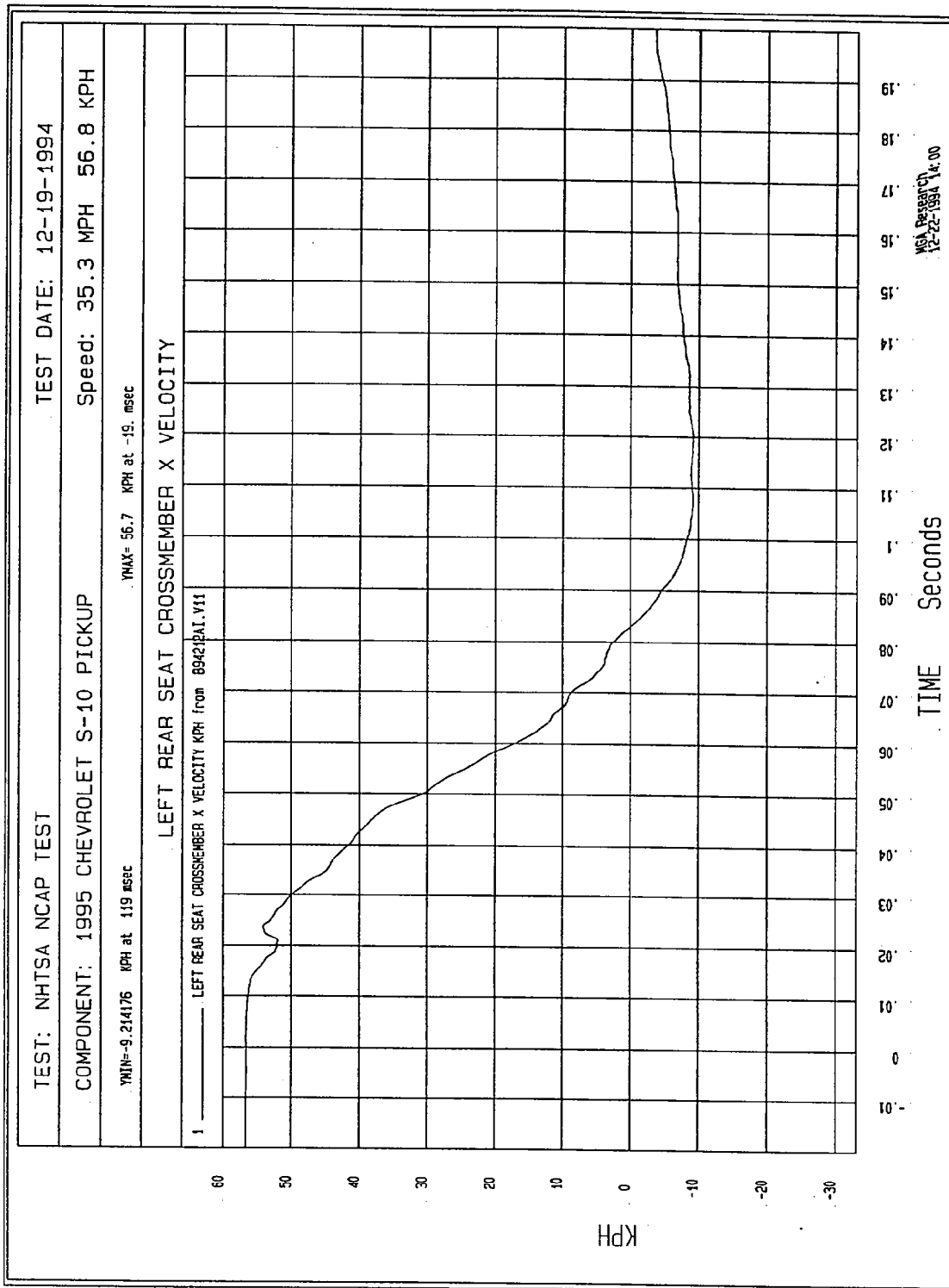


Figure B-2 - Left Rear Seat Crossmember X Velocity vs. Time

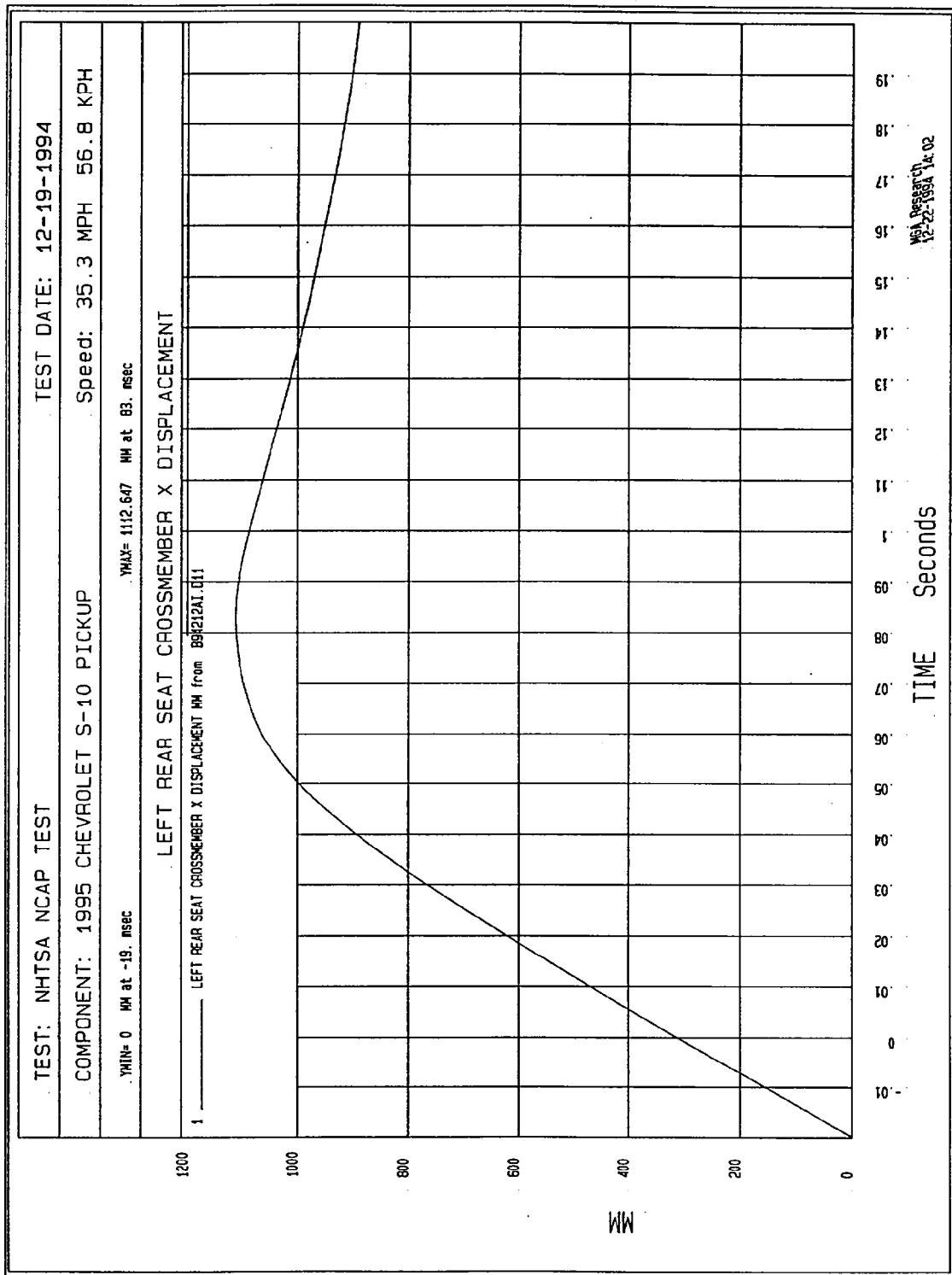


Figure B-3 - Left Rear Seat Crossmember X Displacement vs. Time

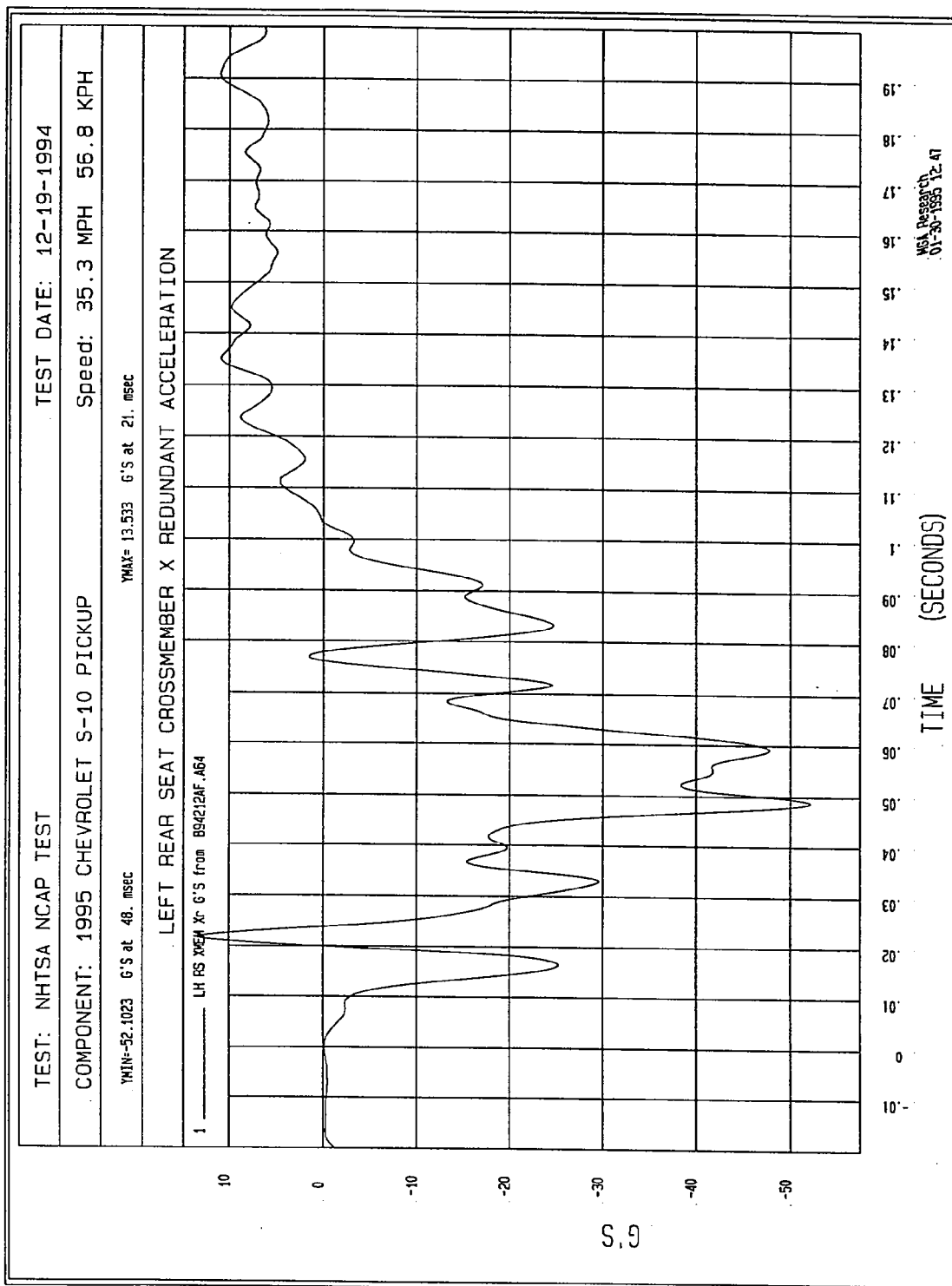


Figure B-4 - Left Rear Seat Crossmember X Redundant Acceleration vs. Time

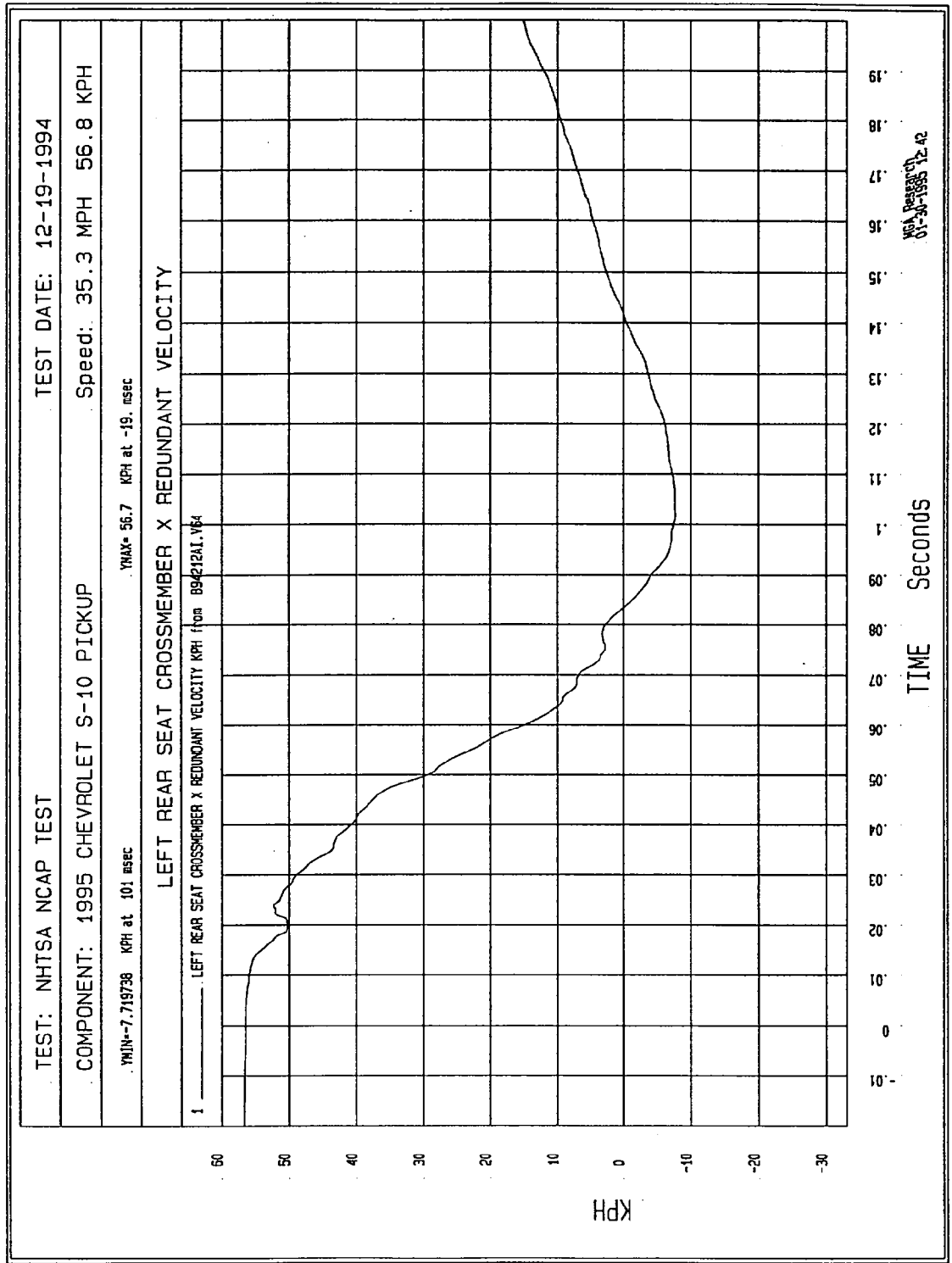


Figure B-5 - Left Rear Seat Crossmember X Redundant Velocity vs. Time

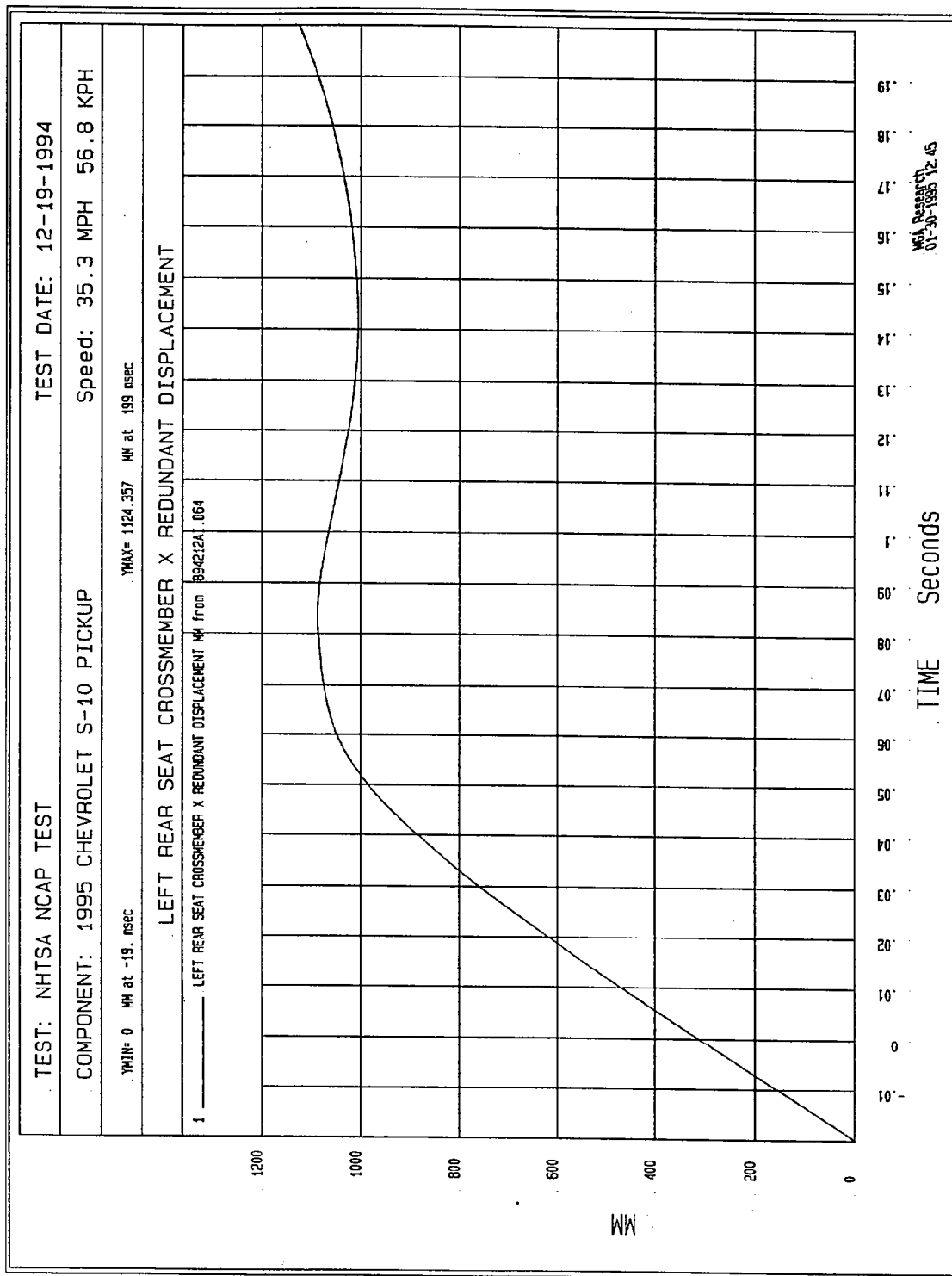


Figure B-6 - Left Rear Seat Crossmember X Redundant Displacement vs. Time

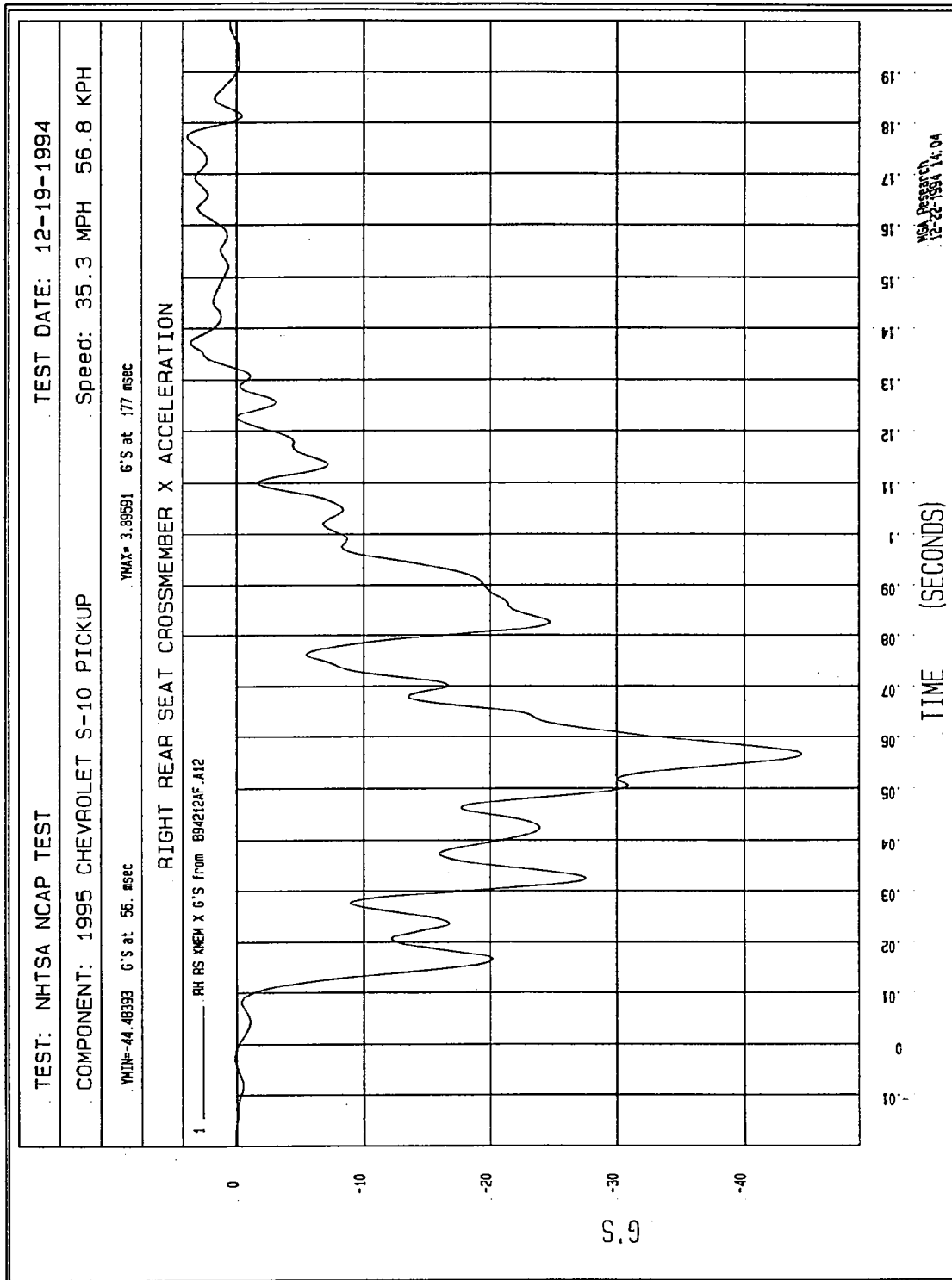


Figure B-7 - Right Rear Seat Crossmember X Acceleration vs. Time

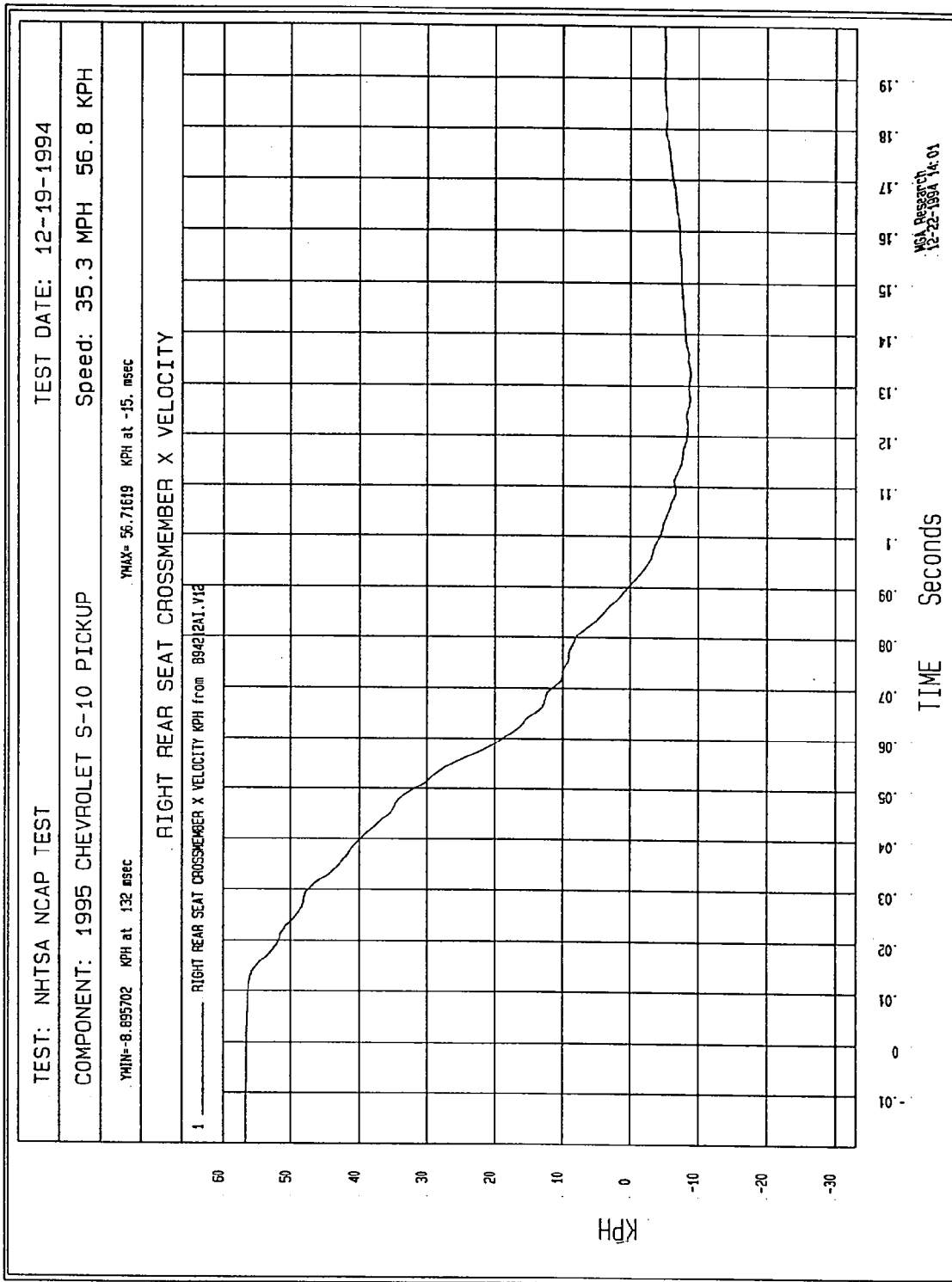


Figure B-8 - Right Rear Seat Crossmember X Velocity vs. Time

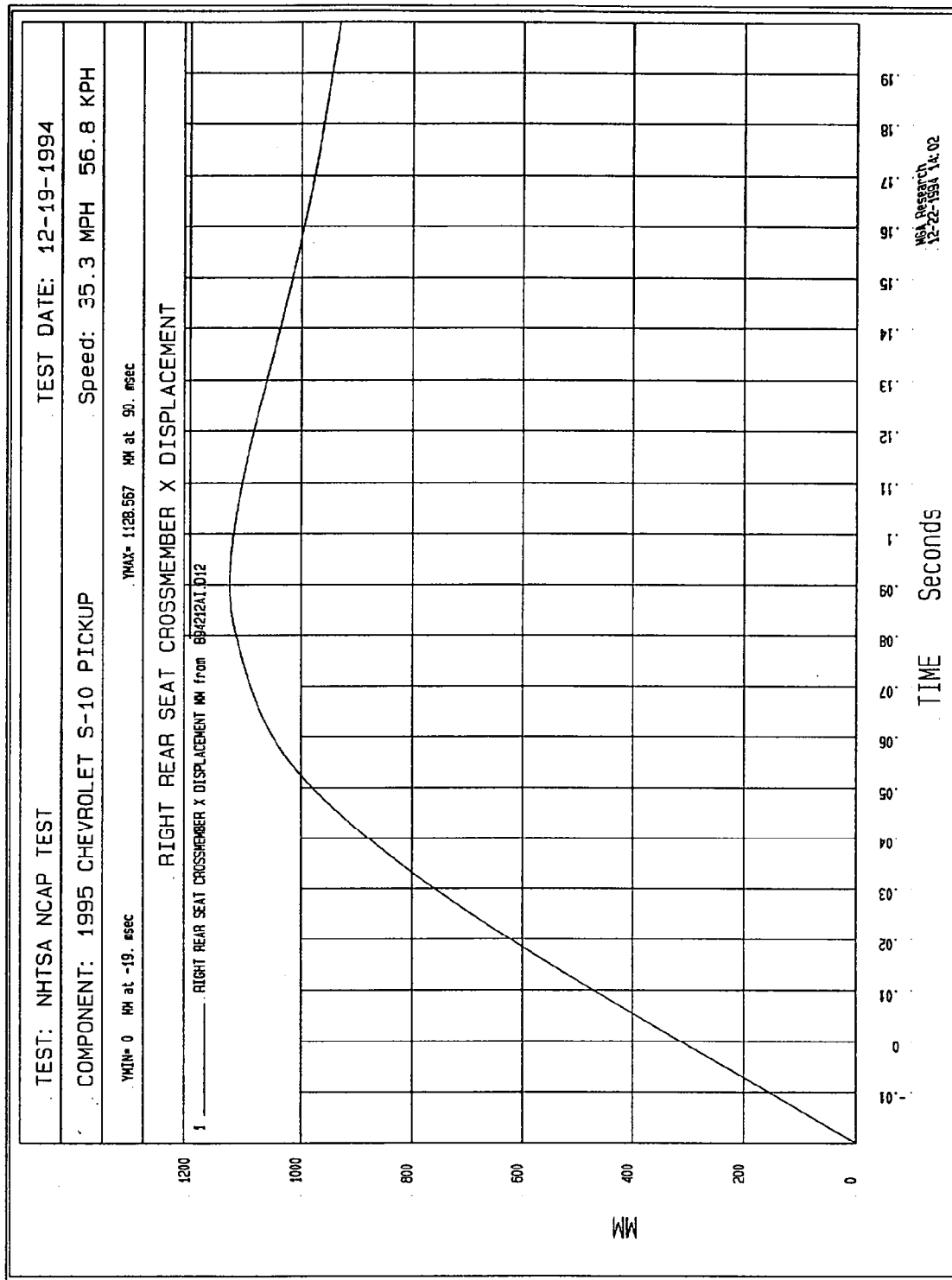


Figure B-9 - Right Rear Seat Crossmember X Displacement vs. Time

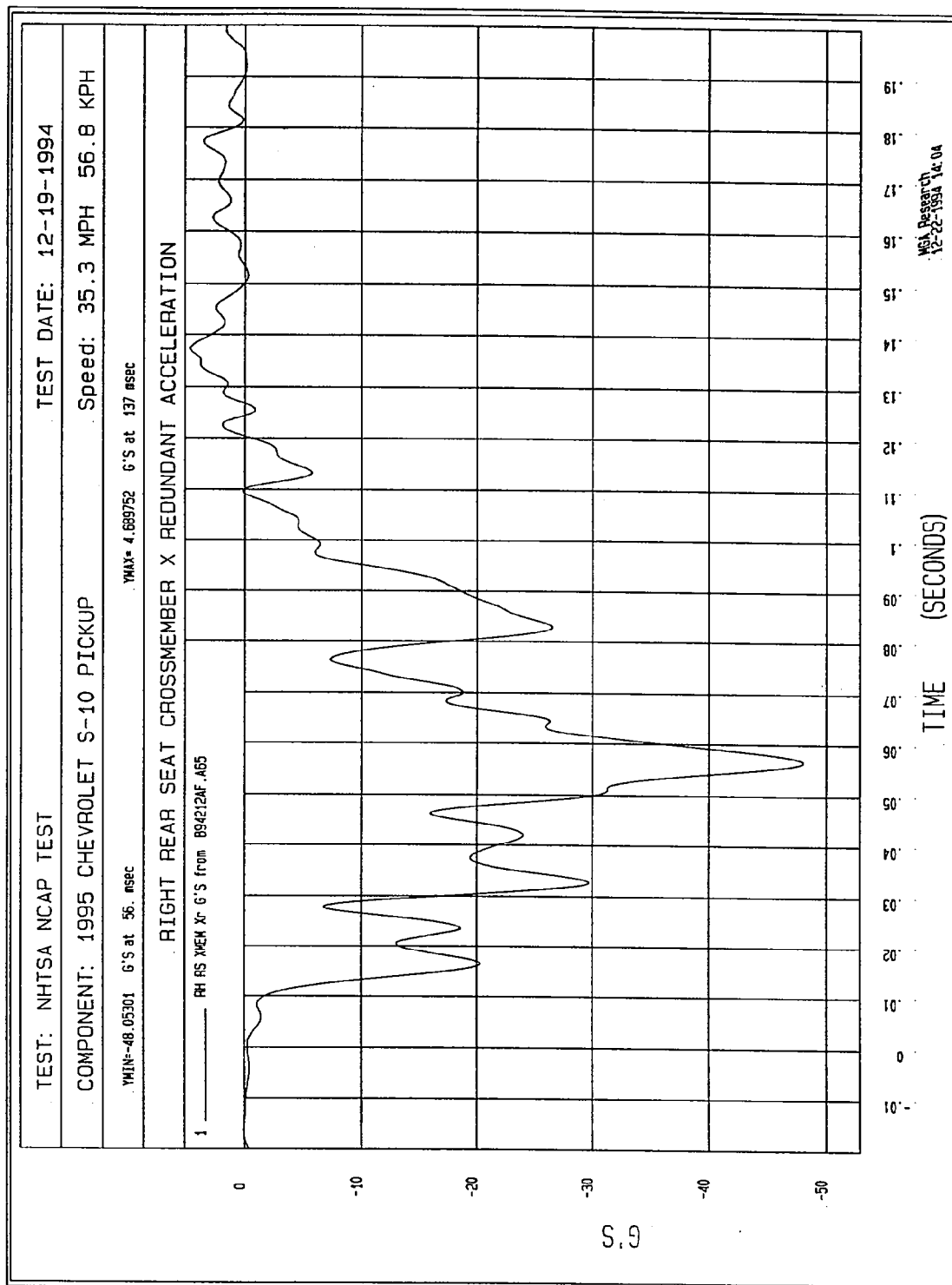


Figure B-10 - Right Rear Seat Crossmember X Redundant Acceleration vs. Time

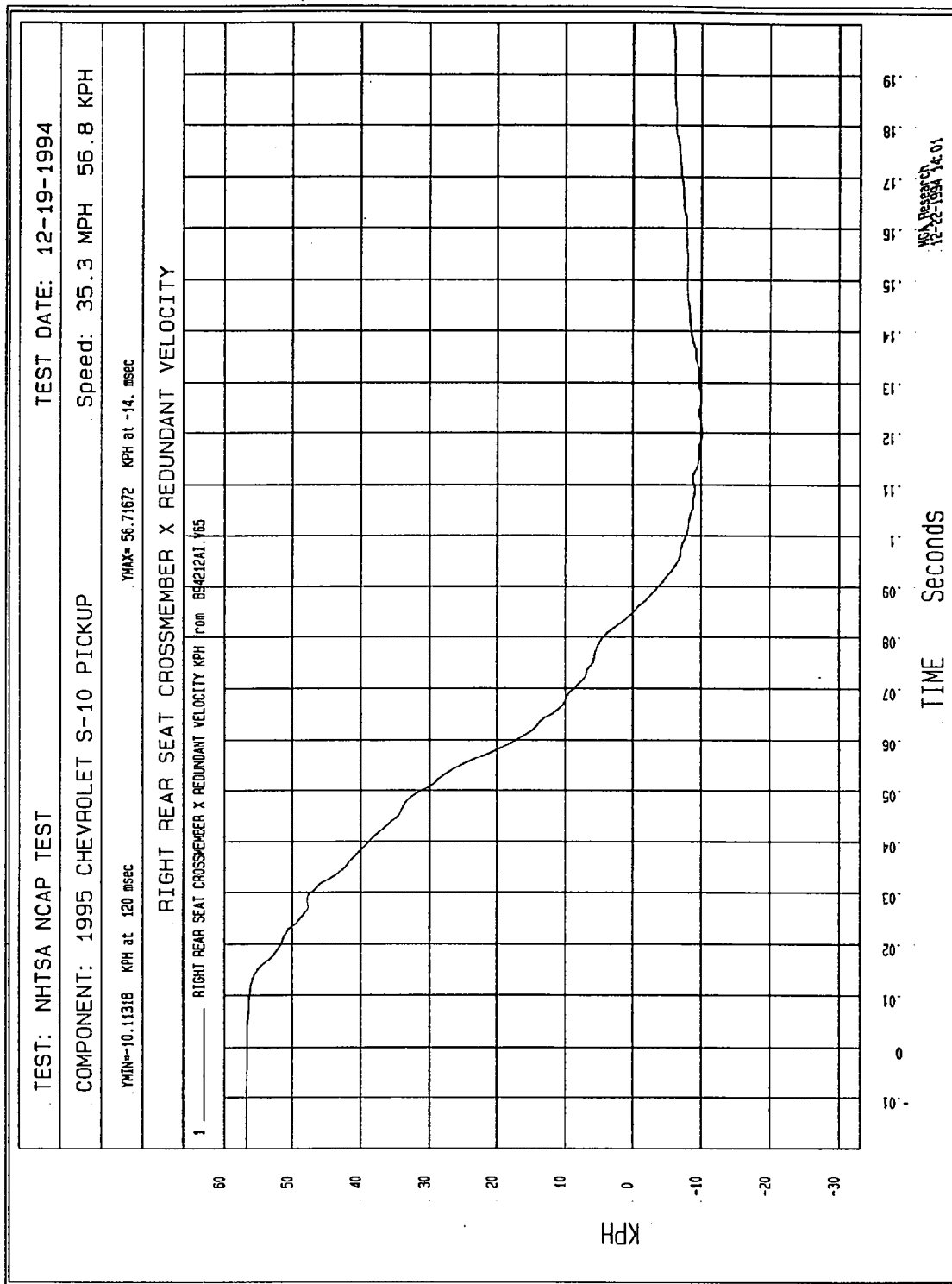


Figure B-11 - Right Rear Seat Crossmember X Redundant Velocity vs. Time

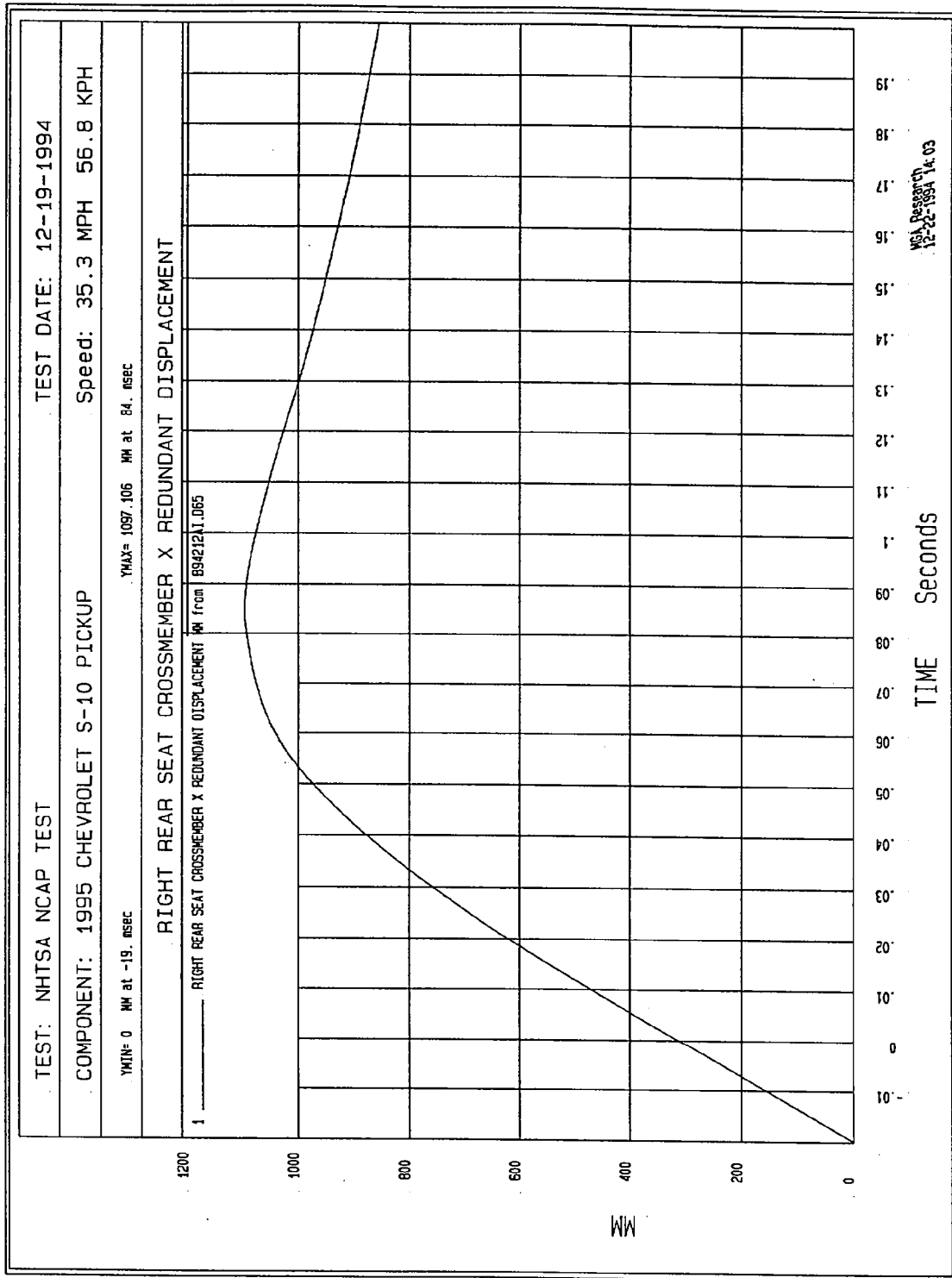


Figure B-12 - Right Rear Seat Crossmember X Redundant Displacement vs. Time

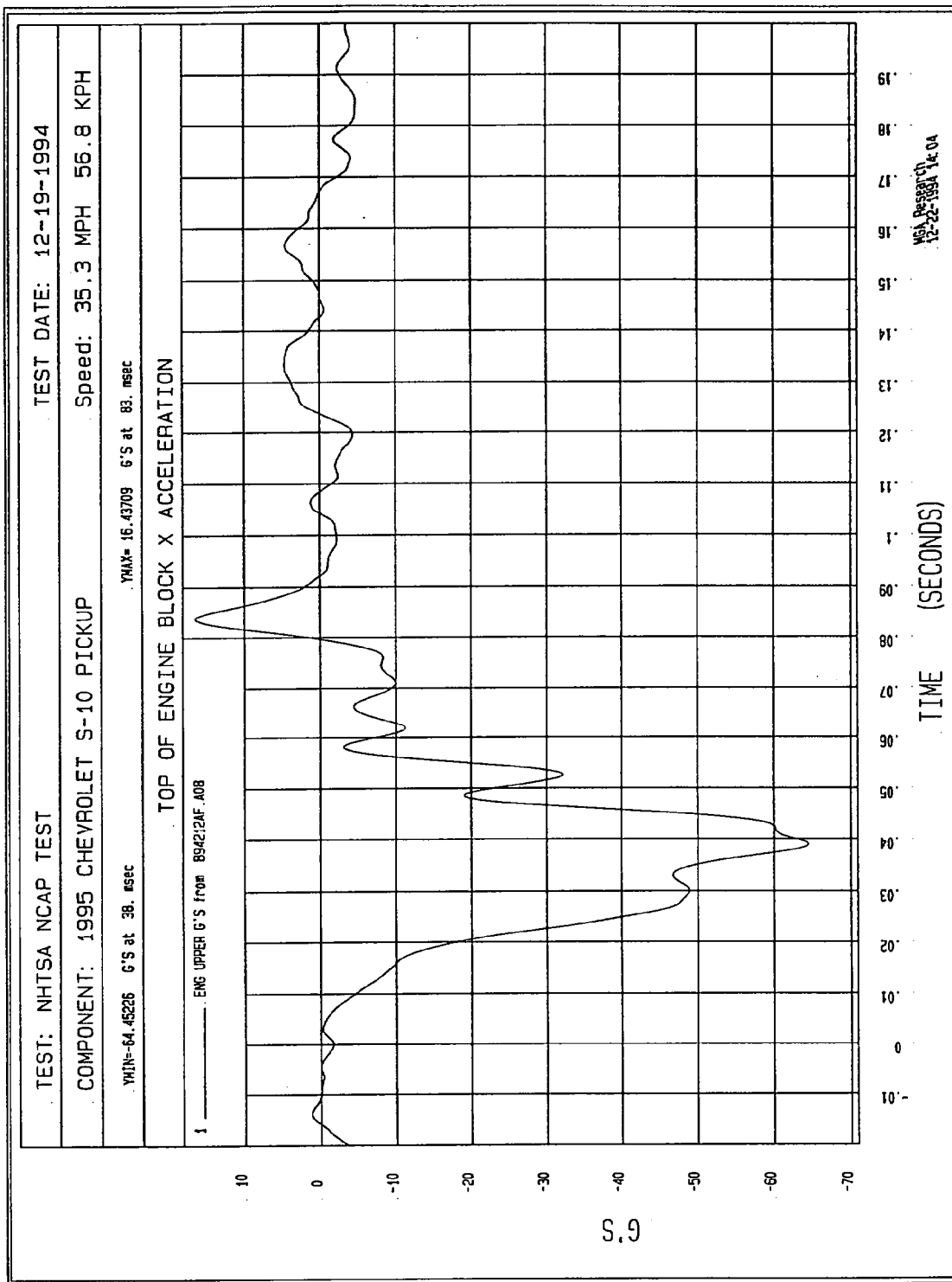


Figure B-13 - Top of Engine Block X Acceleration vs. Time

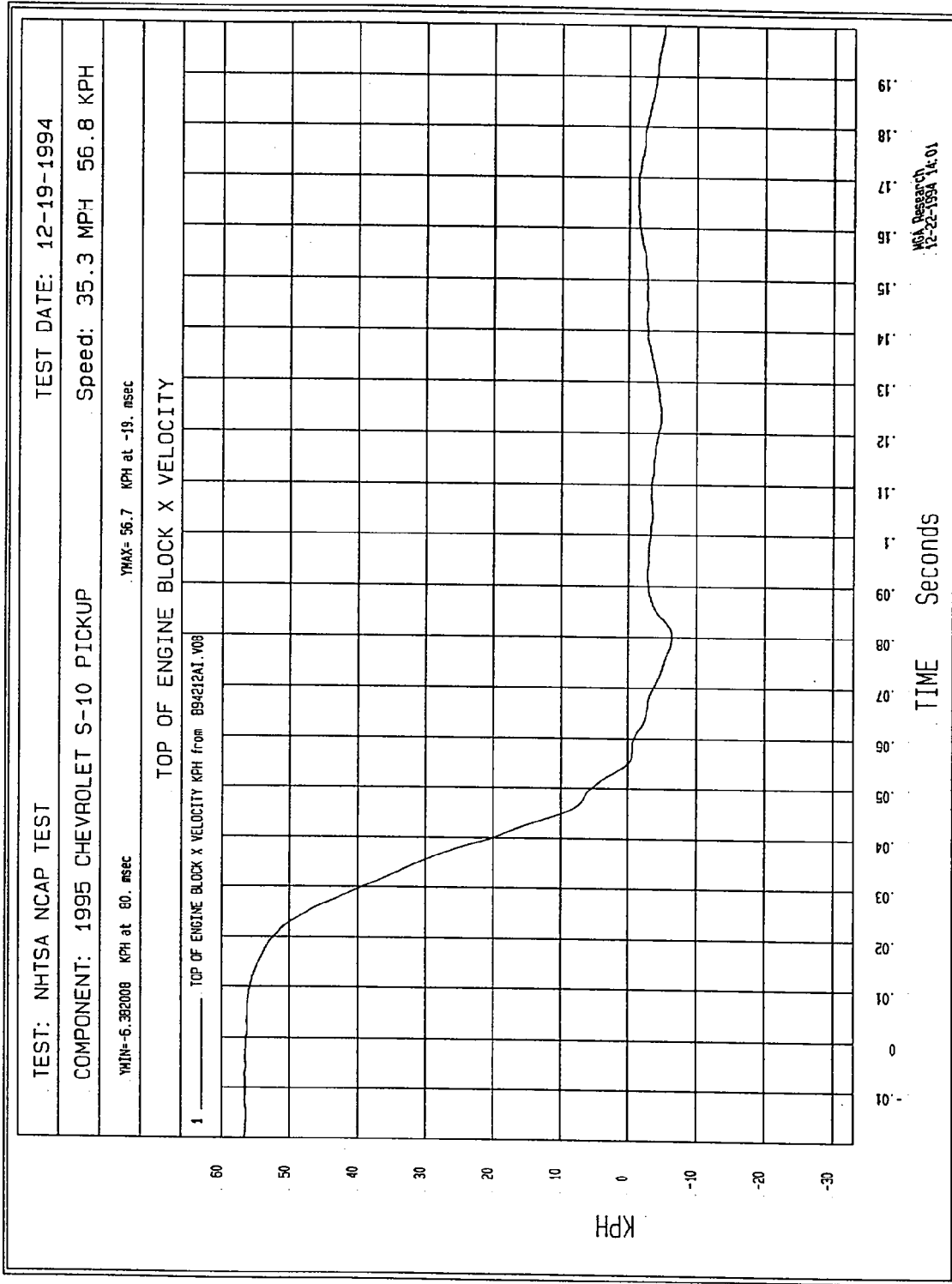


Figure B-14 - Top of Engine Block X Velocity vs. Time

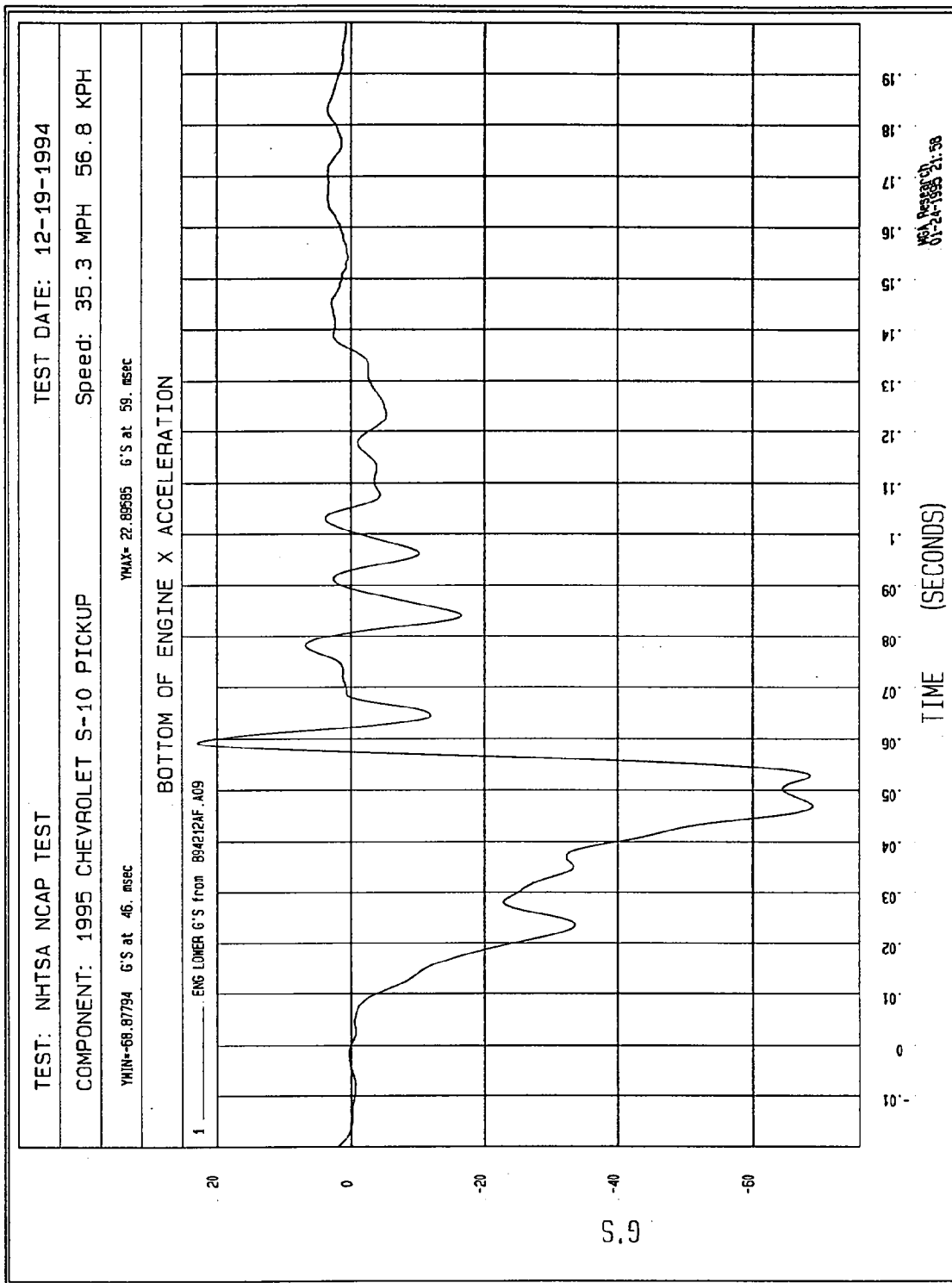


Figure B-15 - Bottom of Engine X Acceleration vs. Time

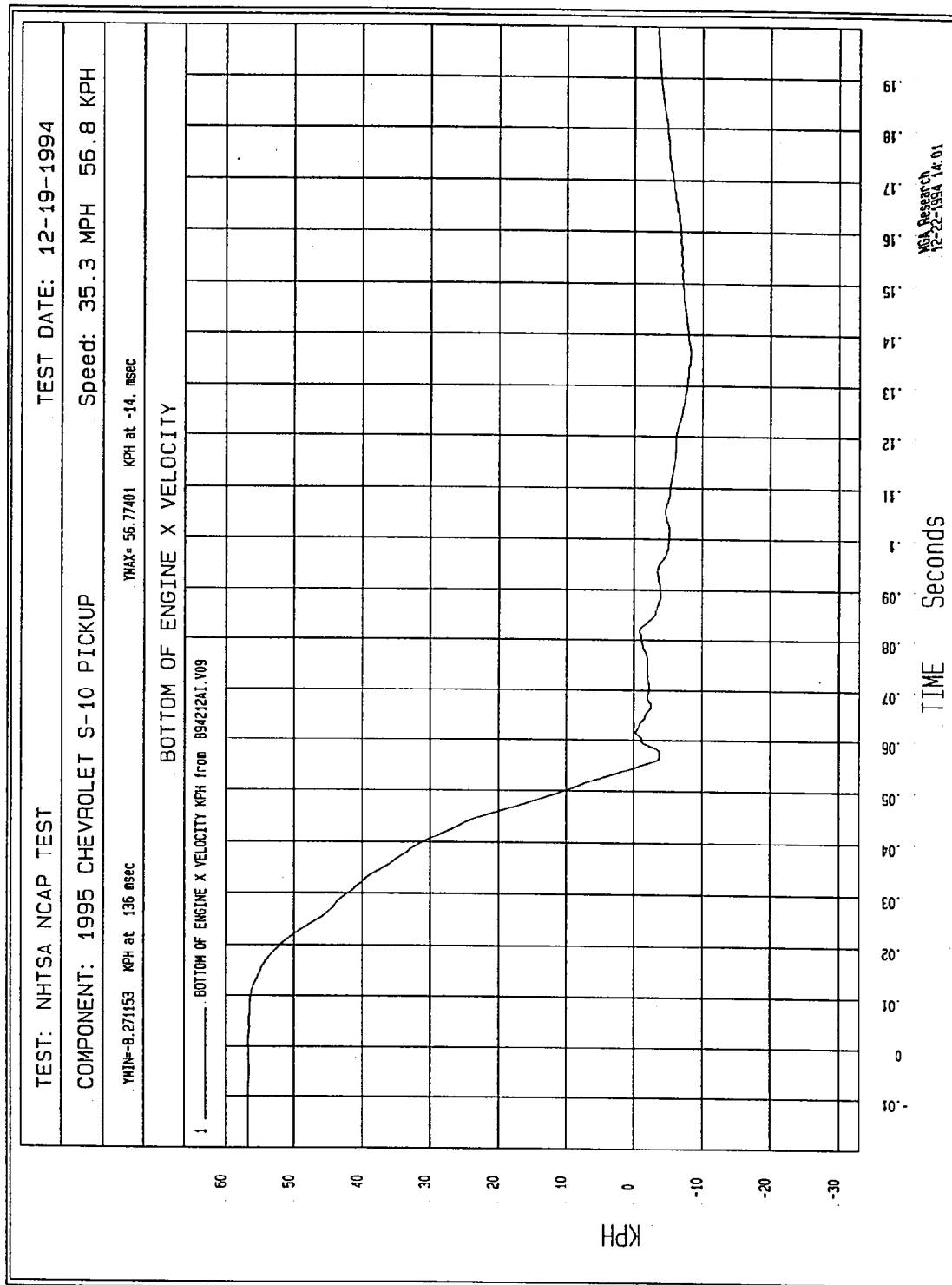


Figure B-16 - Bottom of Engine X Velocity vs. Time

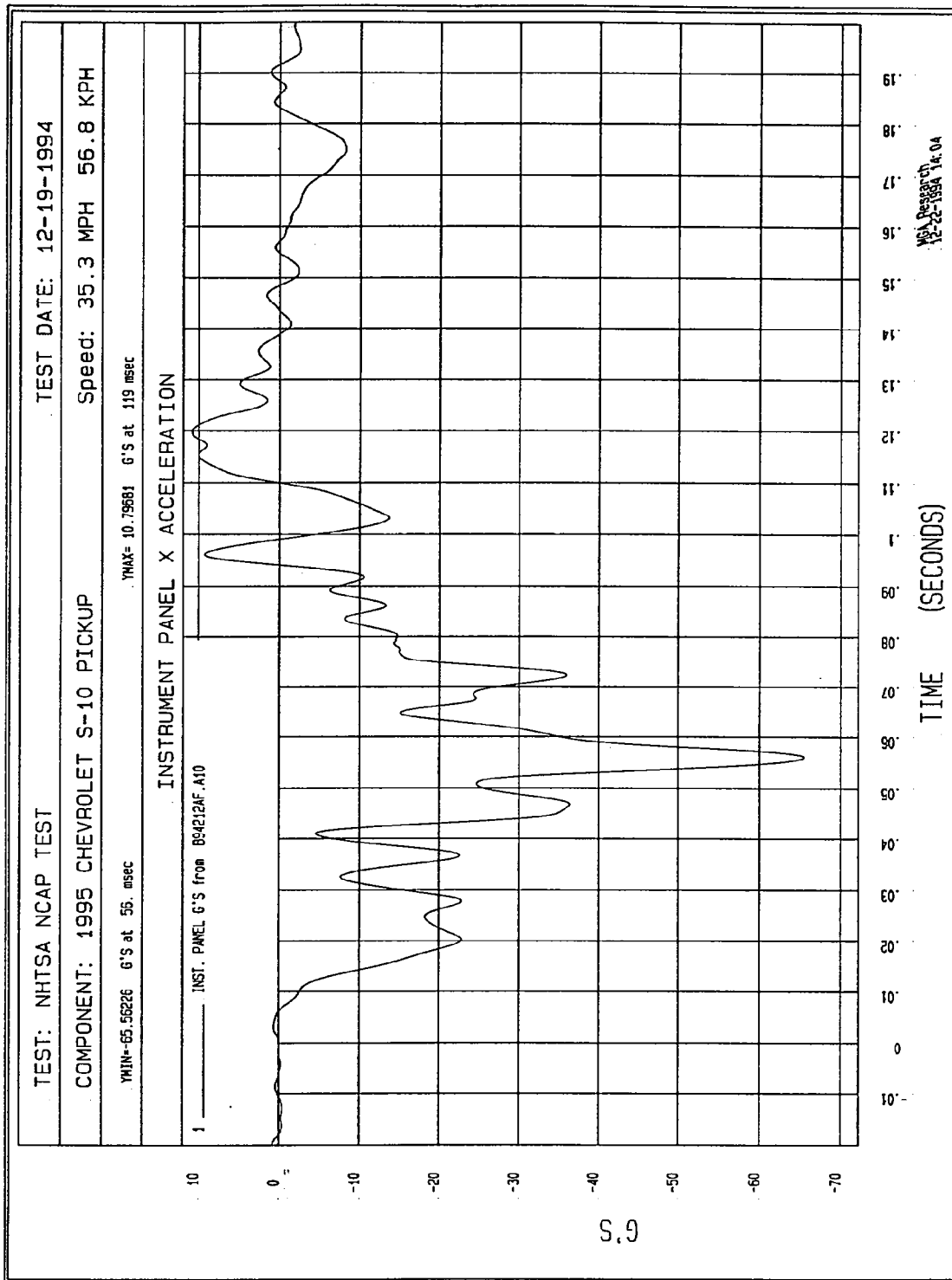


Figure B-17 - Instrument Panel X Acceleration vs. Time

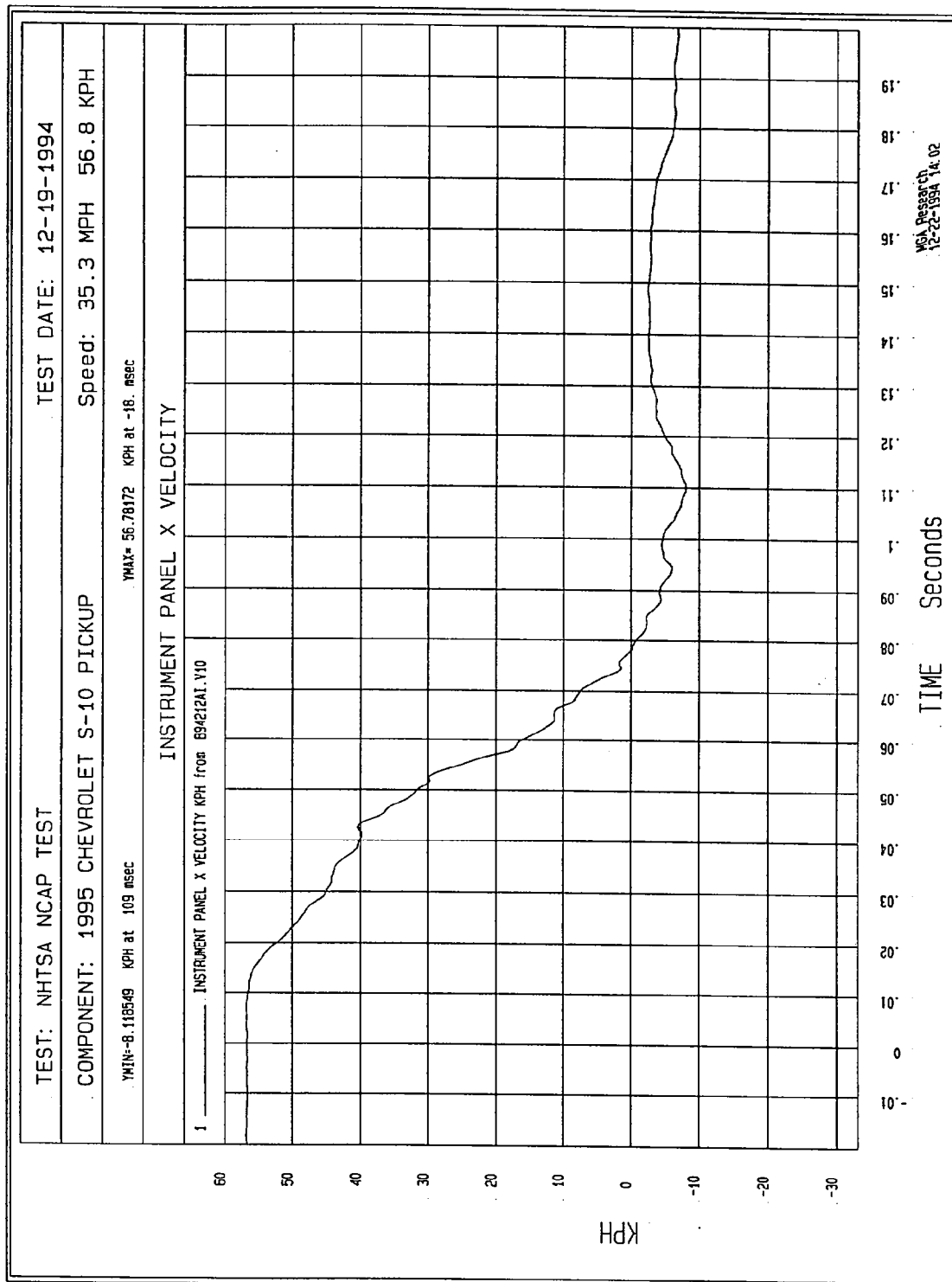


Figure B-18 - Instrument Panel X Velocity vs. Time

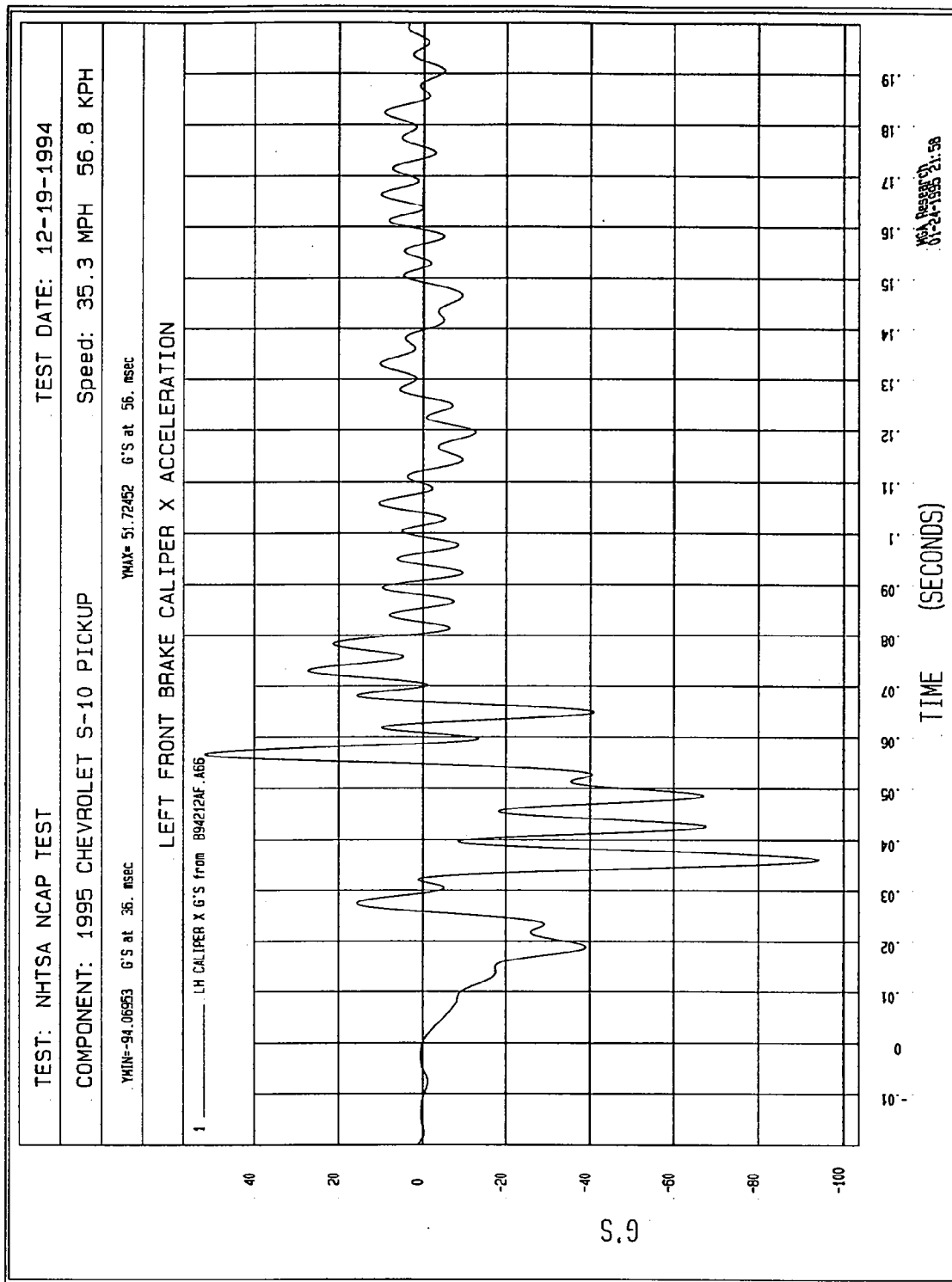


Figure B-19 - Left Brake Caliper X Acceleration vs. Time

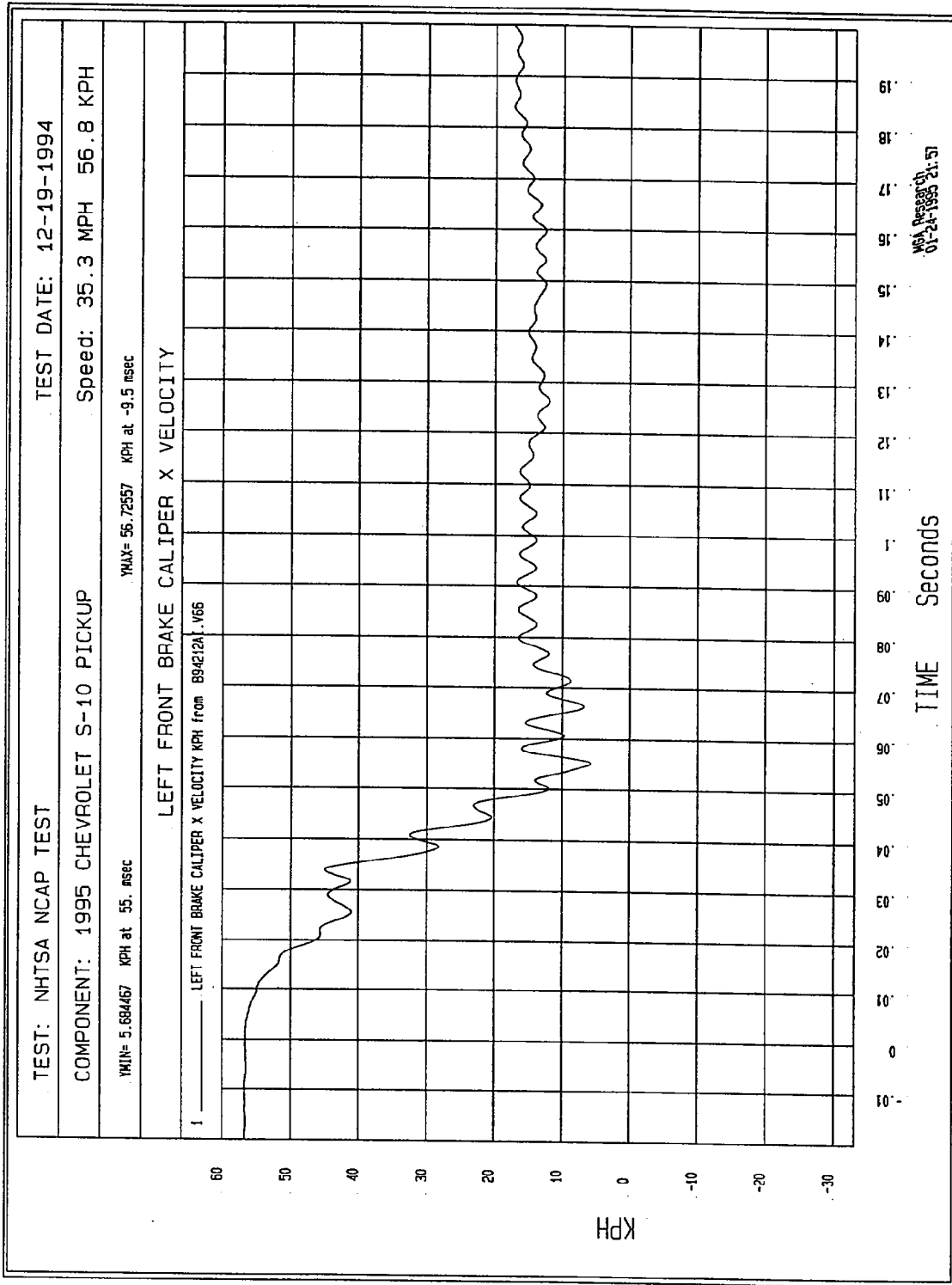


Figure B-20 - Left Brake Caliper X Velocity vs. Time

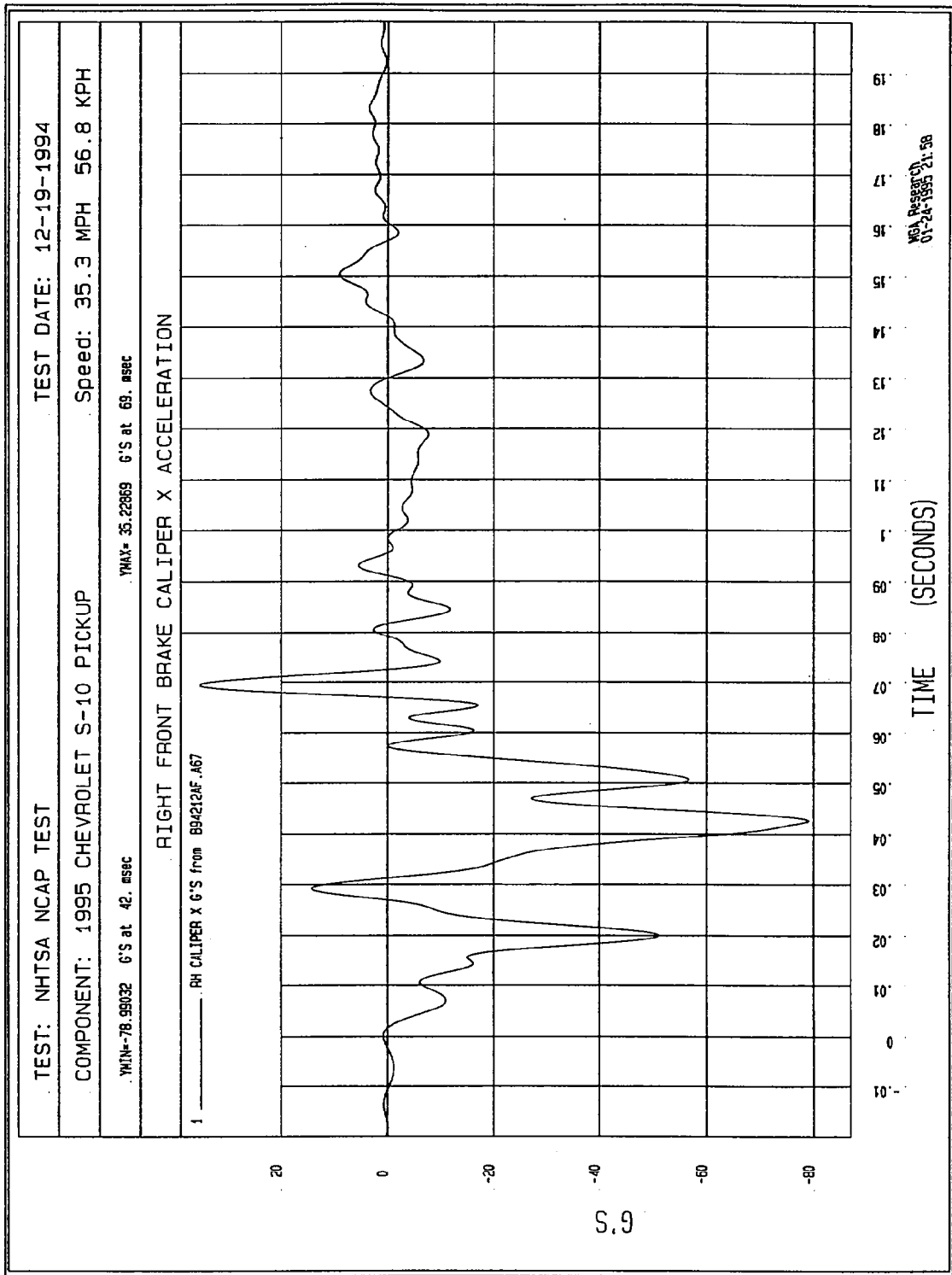


Figure B-21 - Right Brake Caliper X Acceleration vs. Time

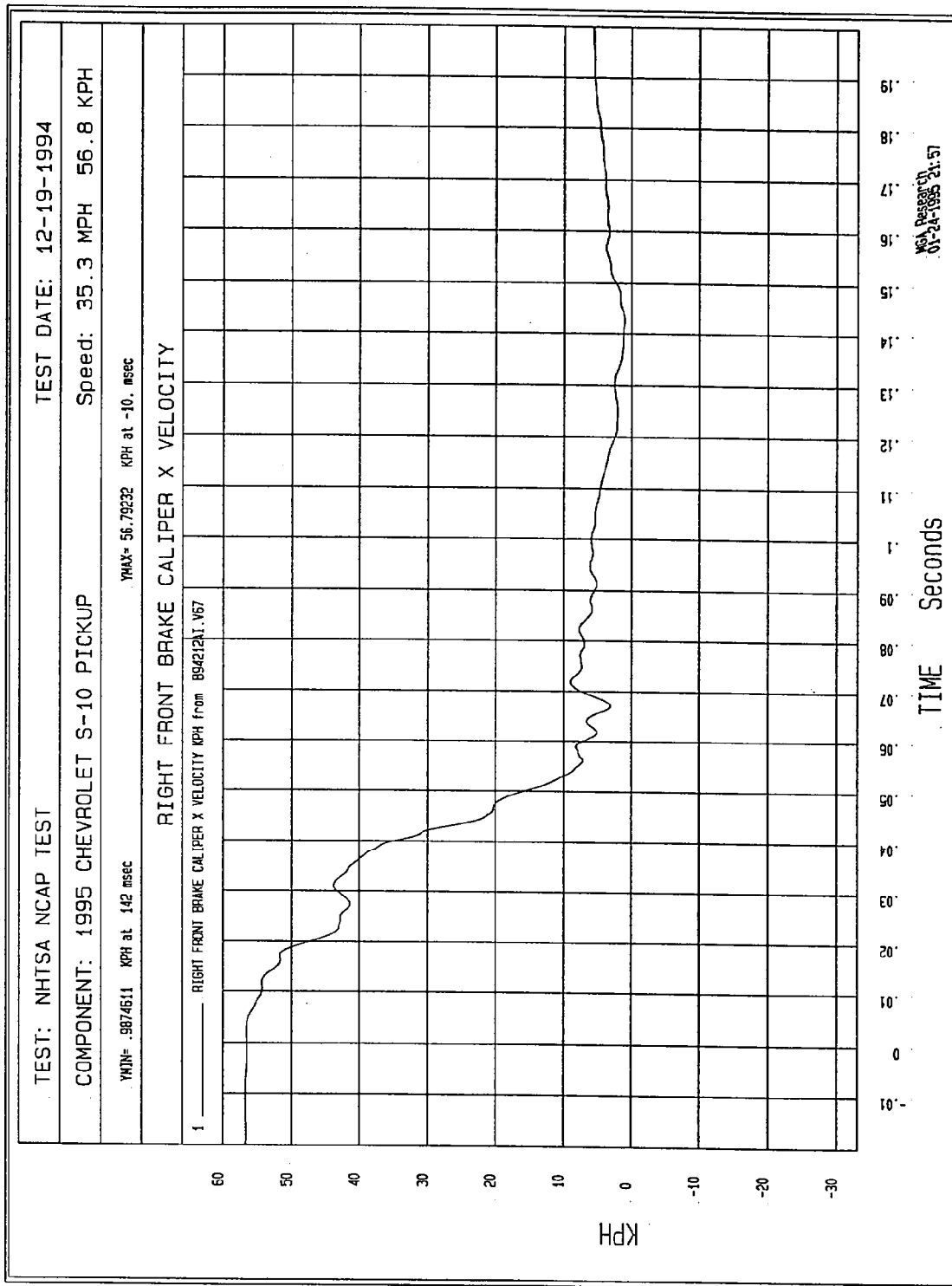


Figure B-22 - Right Brake Caliper X Velocity vs. Time

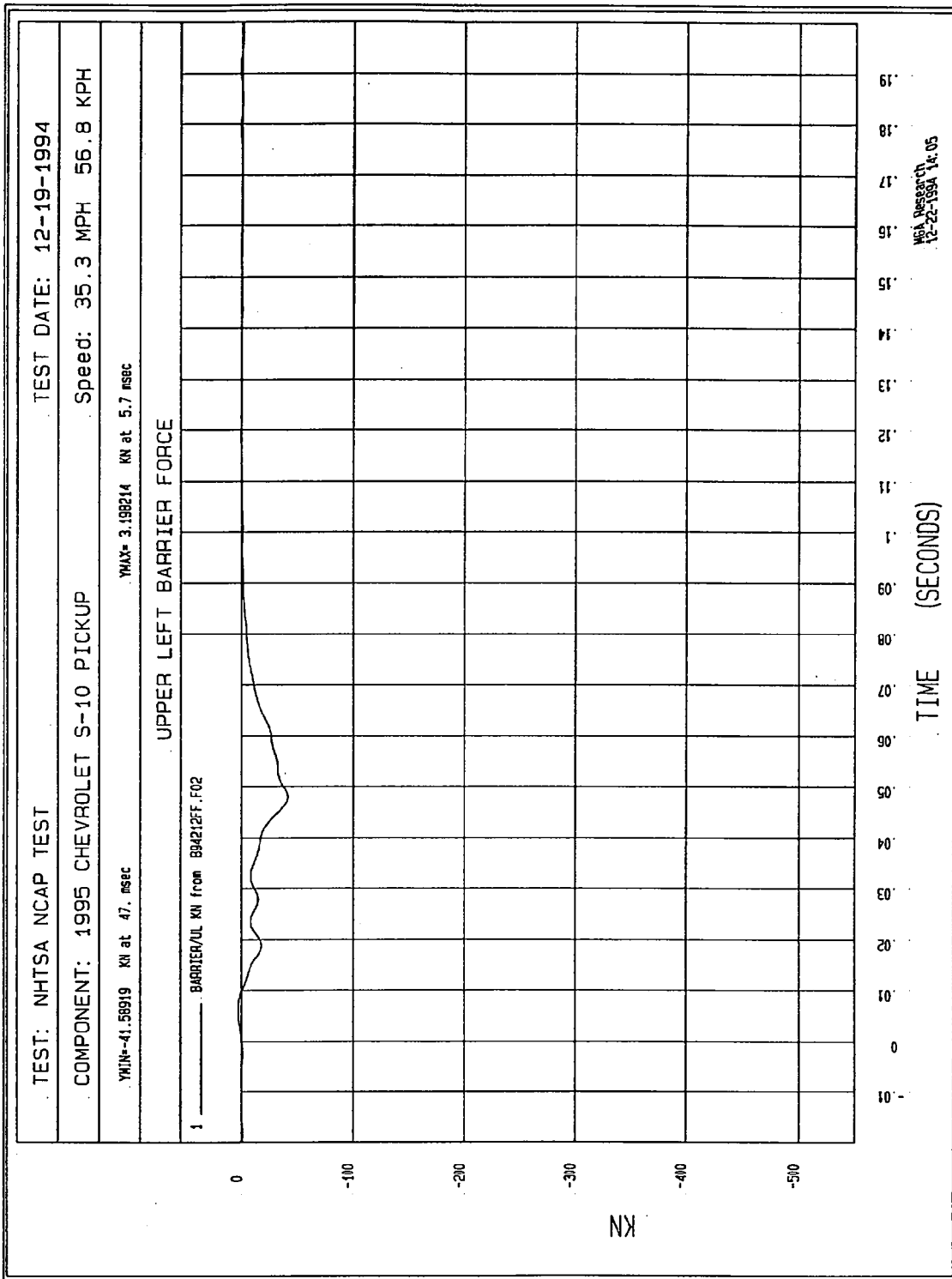


Figure B-23 - Upper Left Barrier Force vs. Time

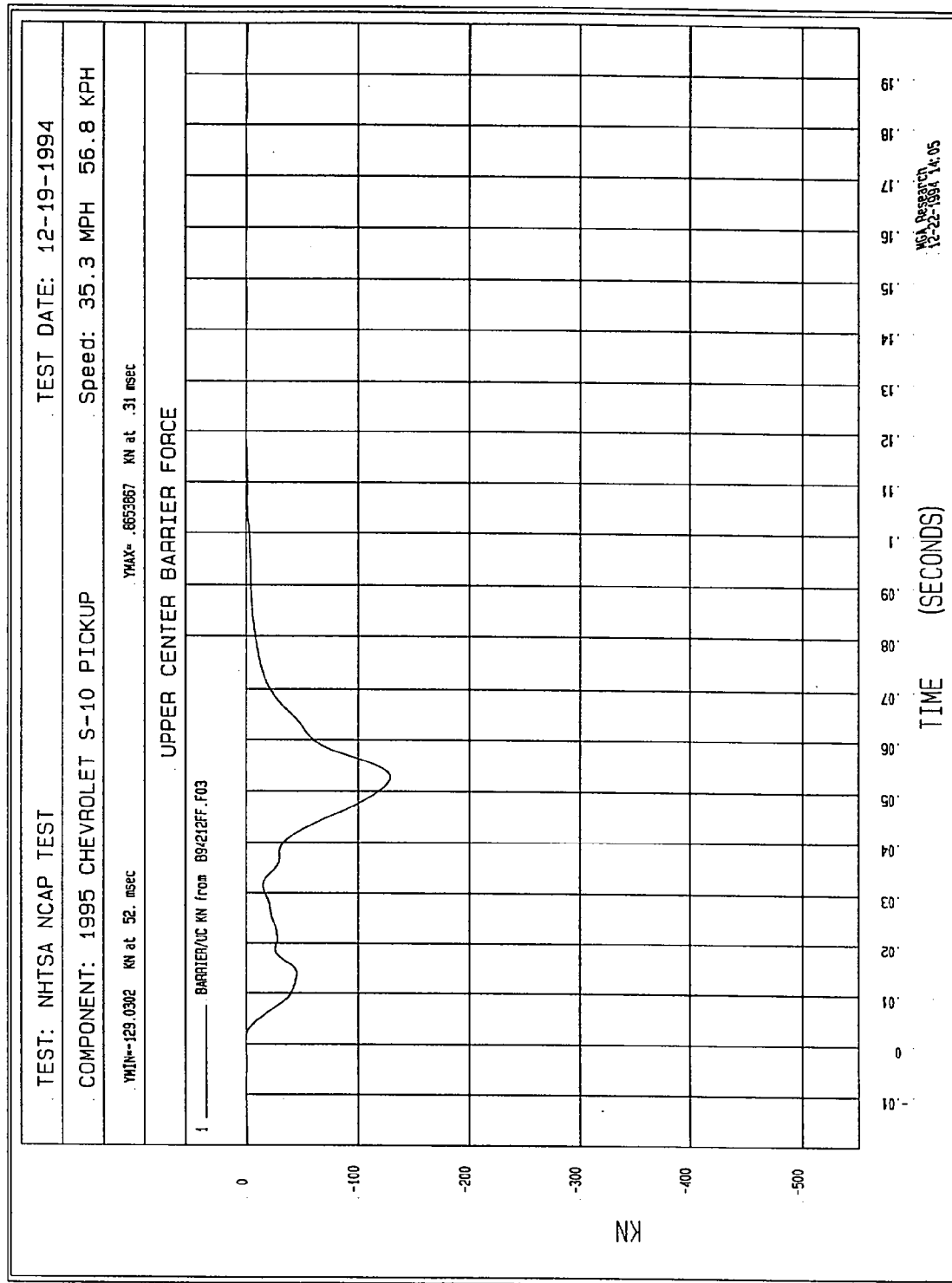


Figure B-24 - Upper Center Barrier Force vs. Time

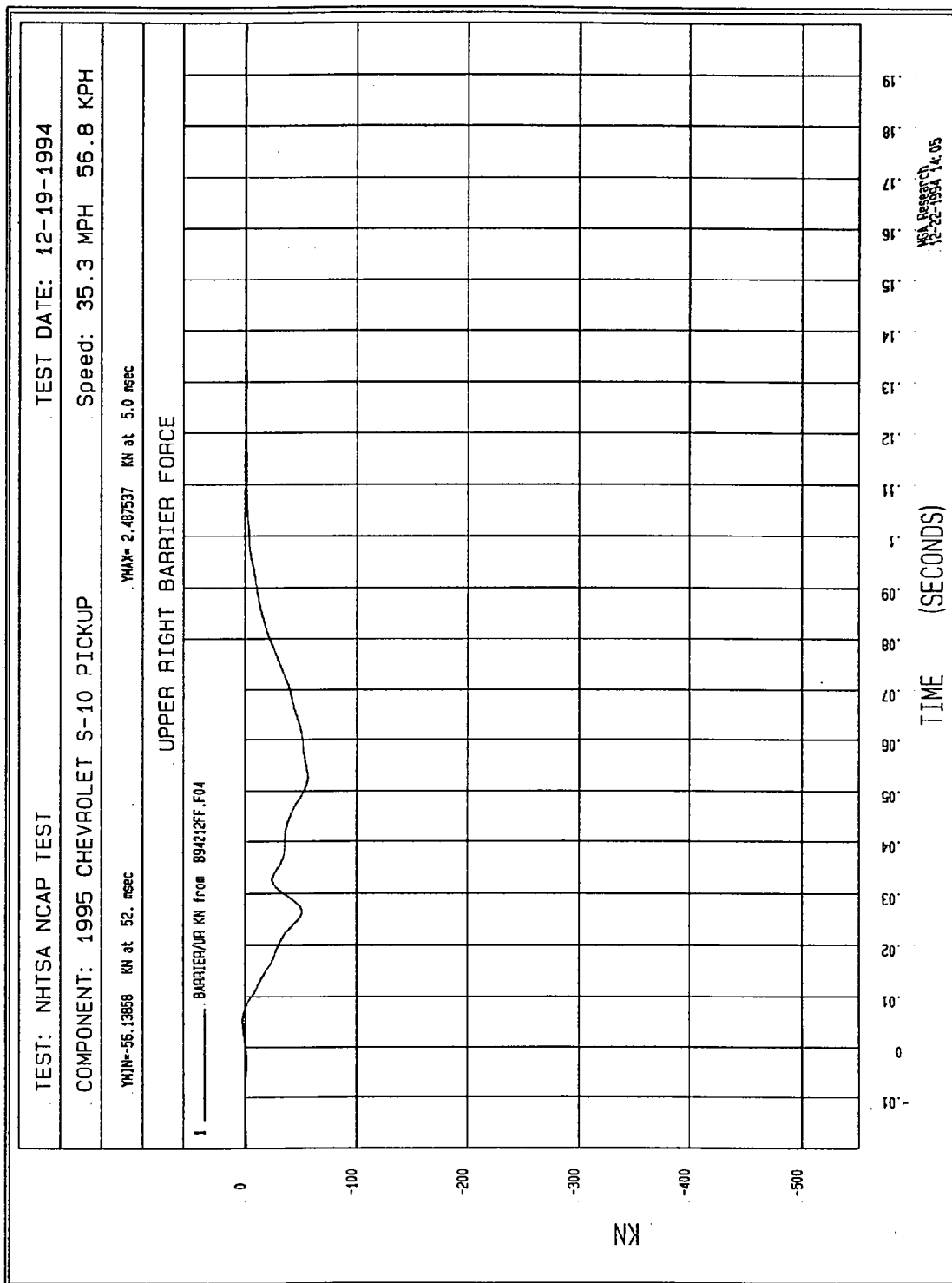


Figure B-25 - Upper Right Barrier Force vs. Time

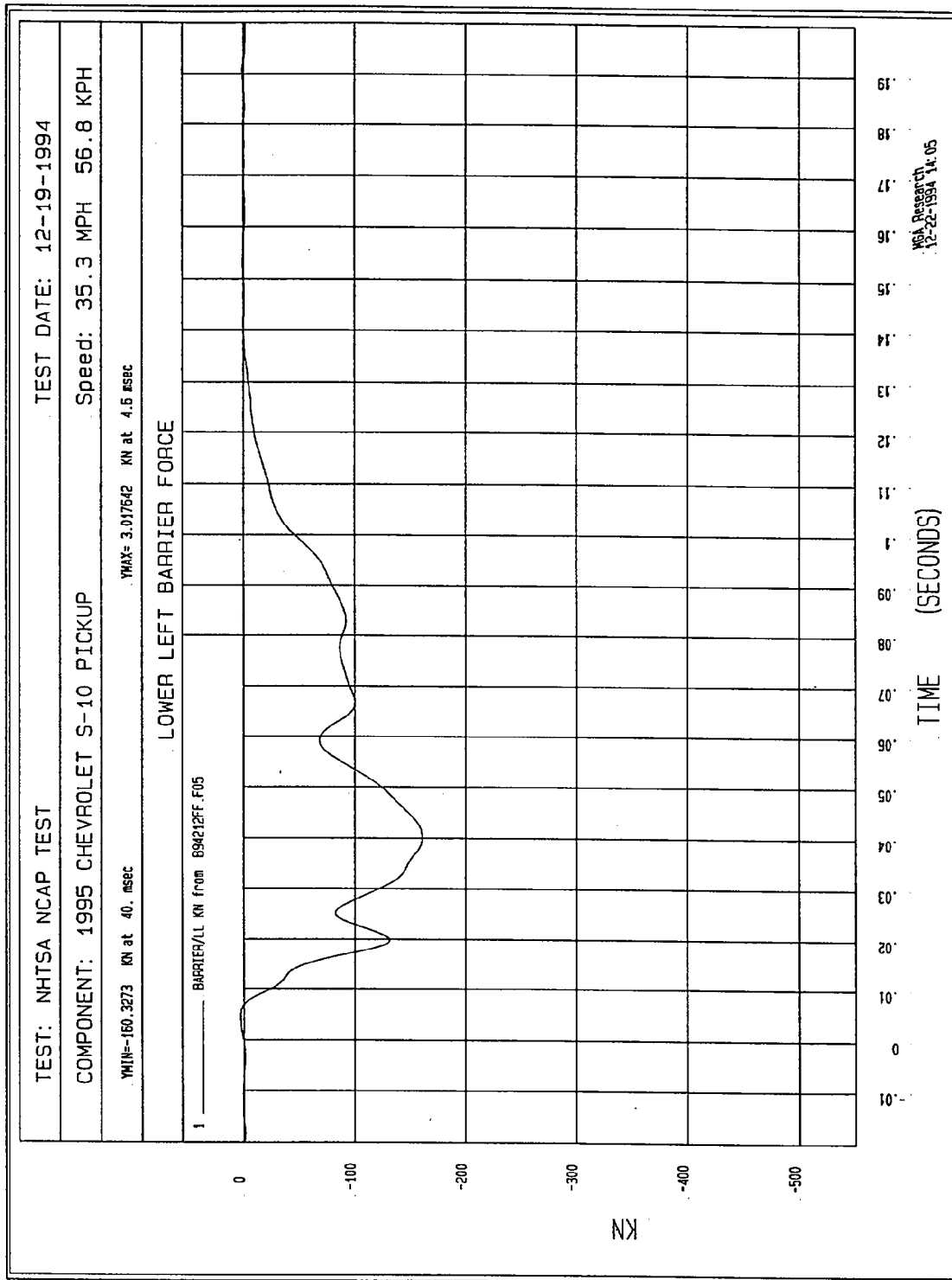


Figure B-26 - Lower Left Barrier Force vs. Time

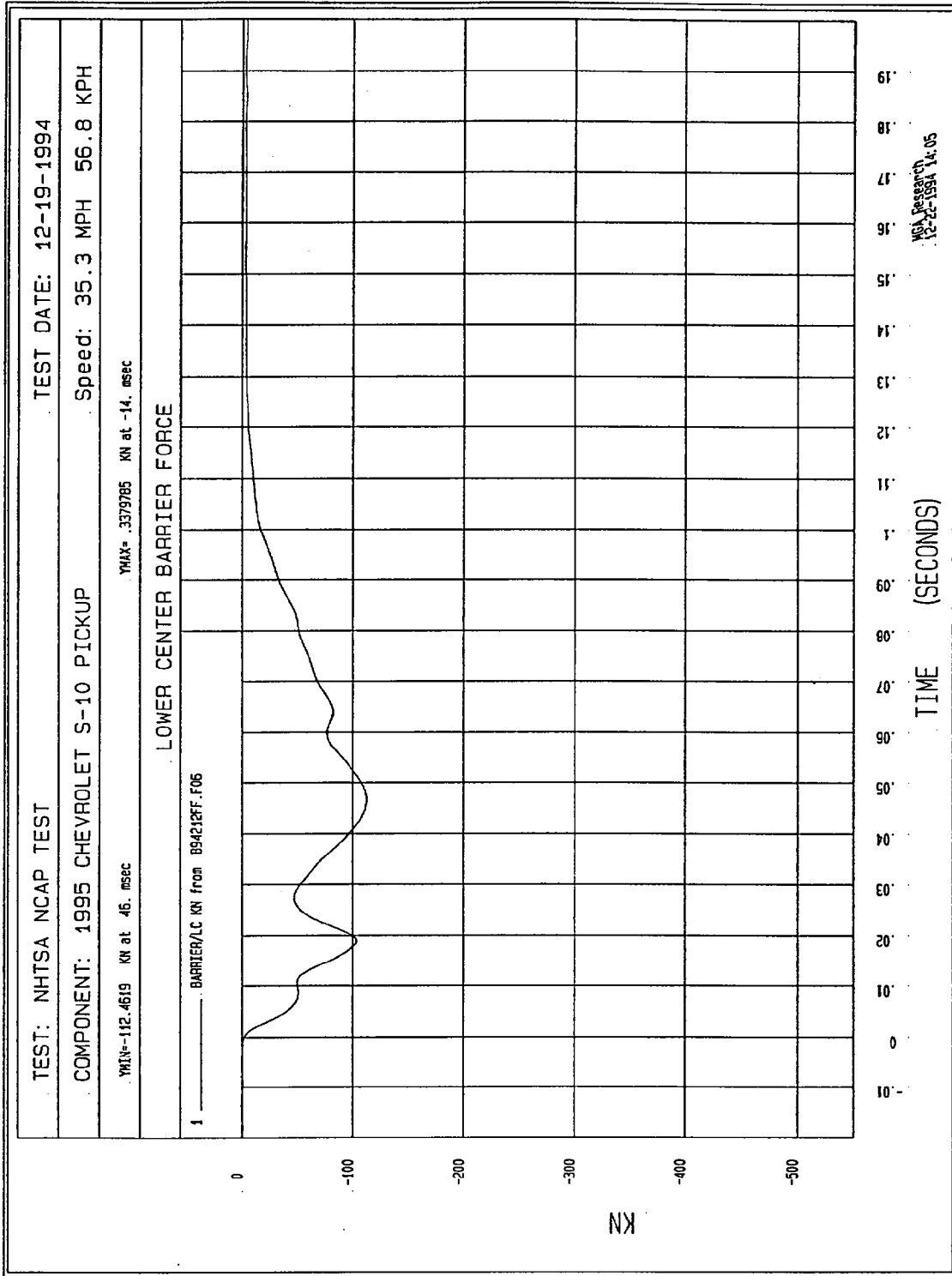


Figure B-27 - Lower Center Barrier Force vs. Time

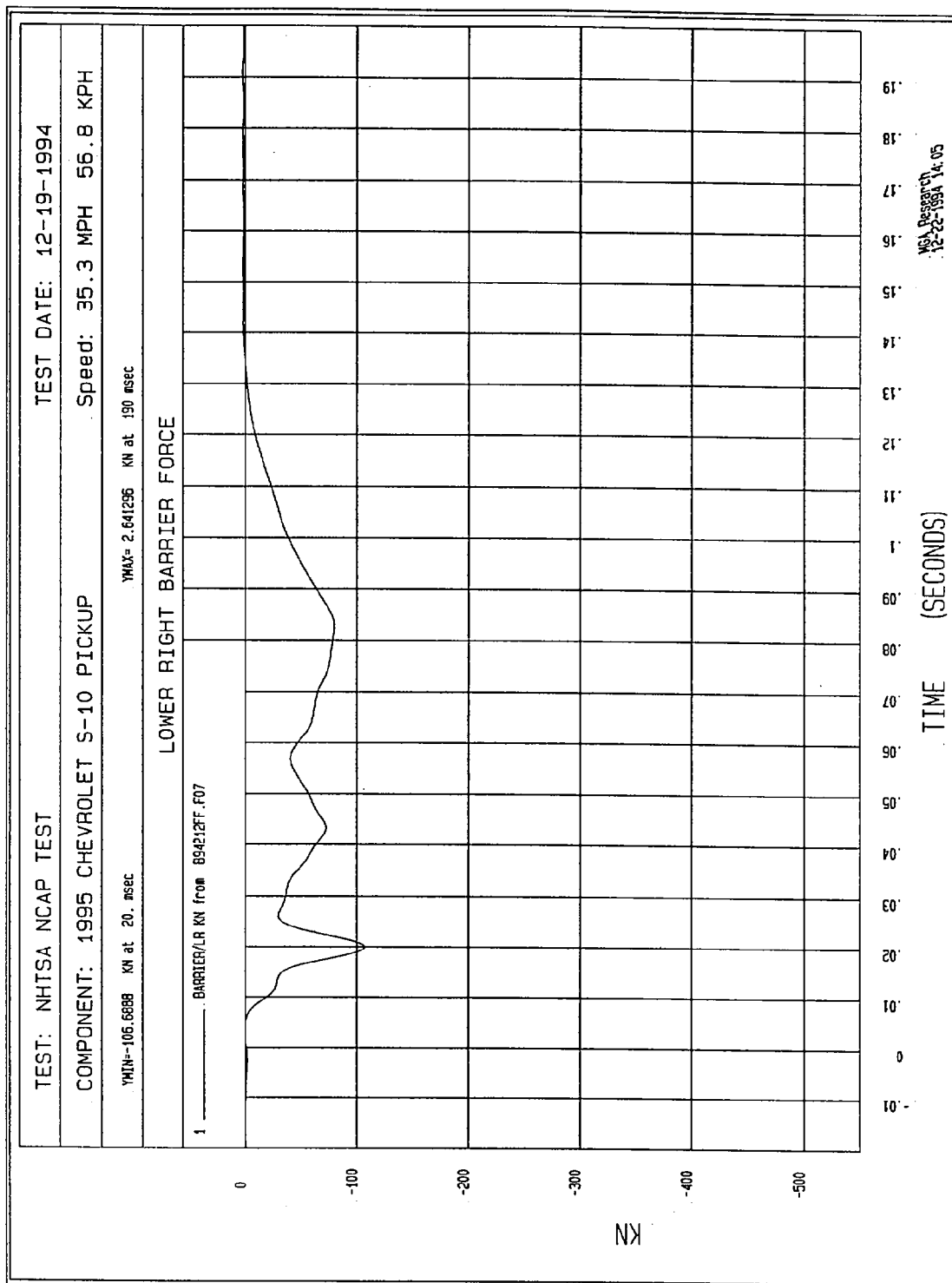


Figure B-28 - Lower Right Barrier Force vs. Time

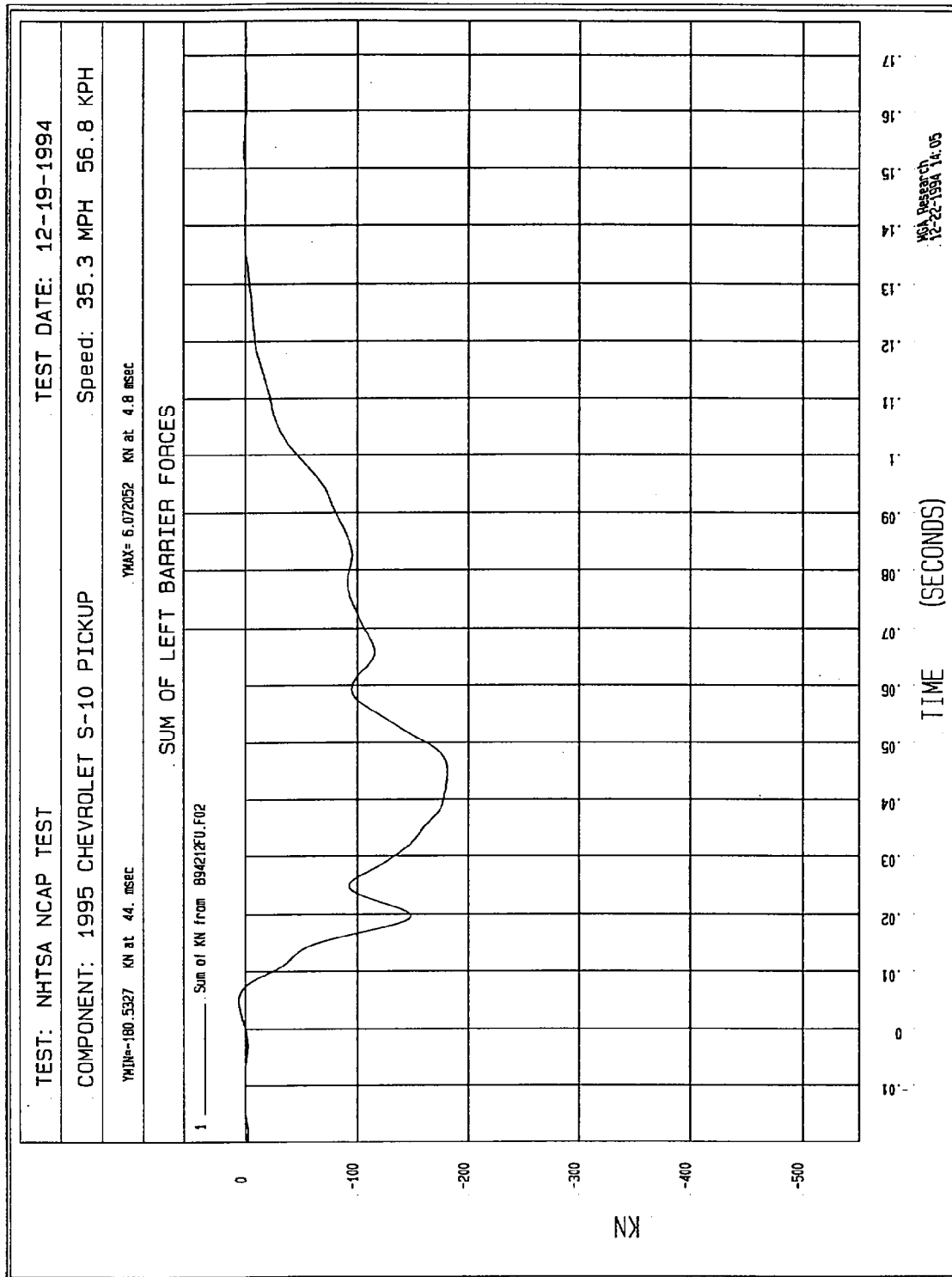


Figure B-29 - Sum of Left Barrier Forces vs. Time

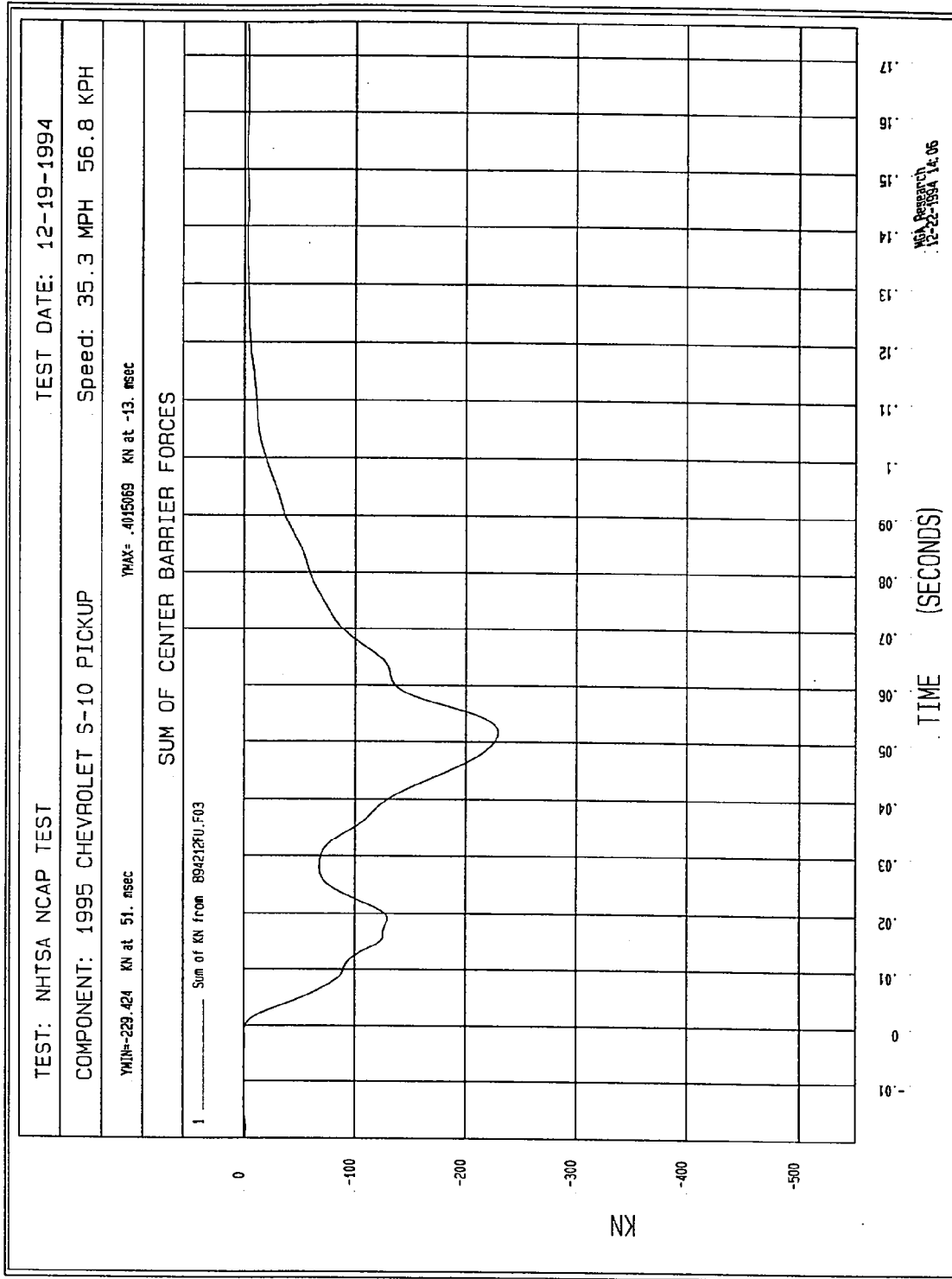


Figure B-30 - Sum of Center Barrier Forces vs. Time

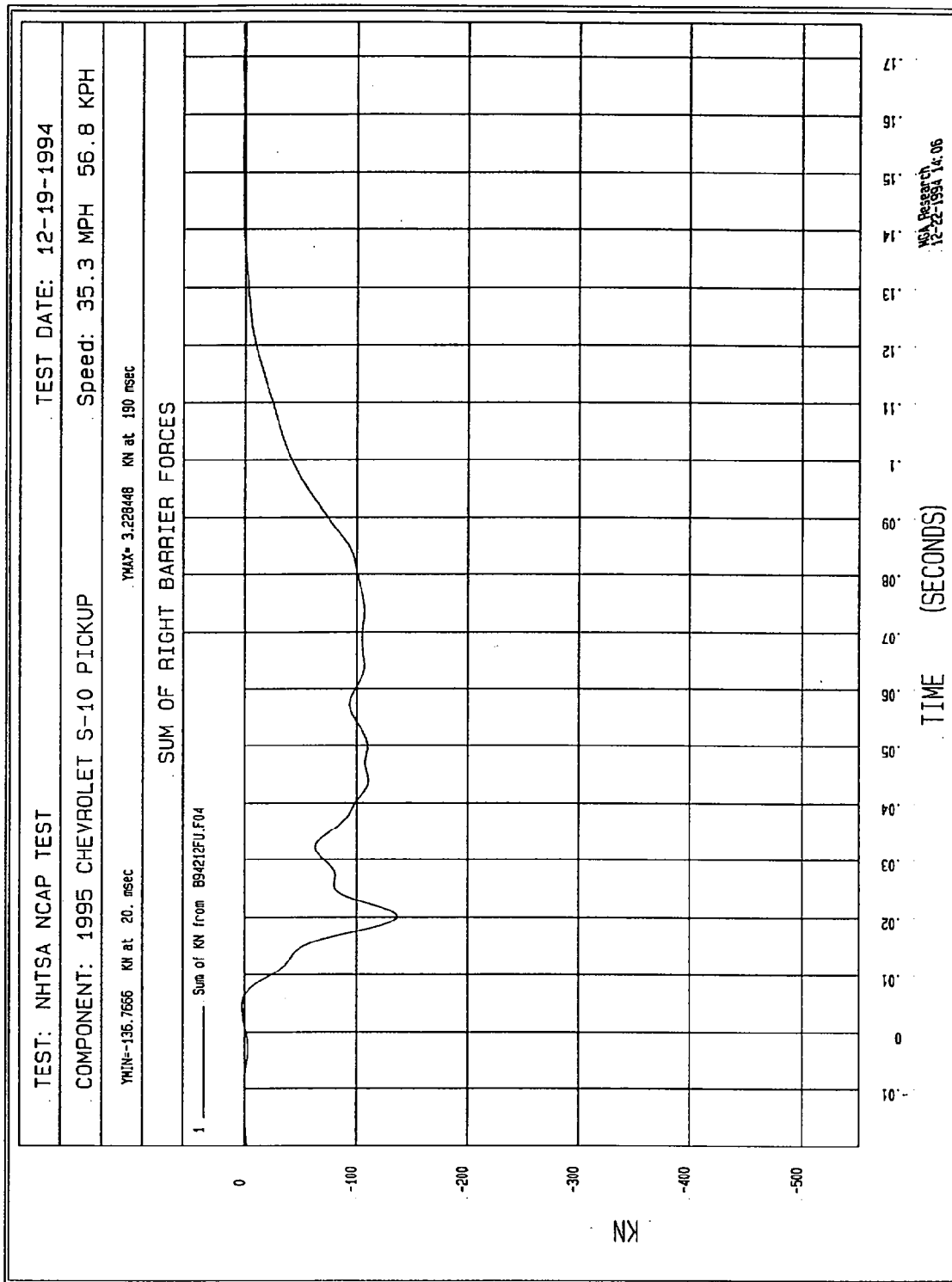


Figure B-31 - Sum of Right Barrier Forces vs. Time

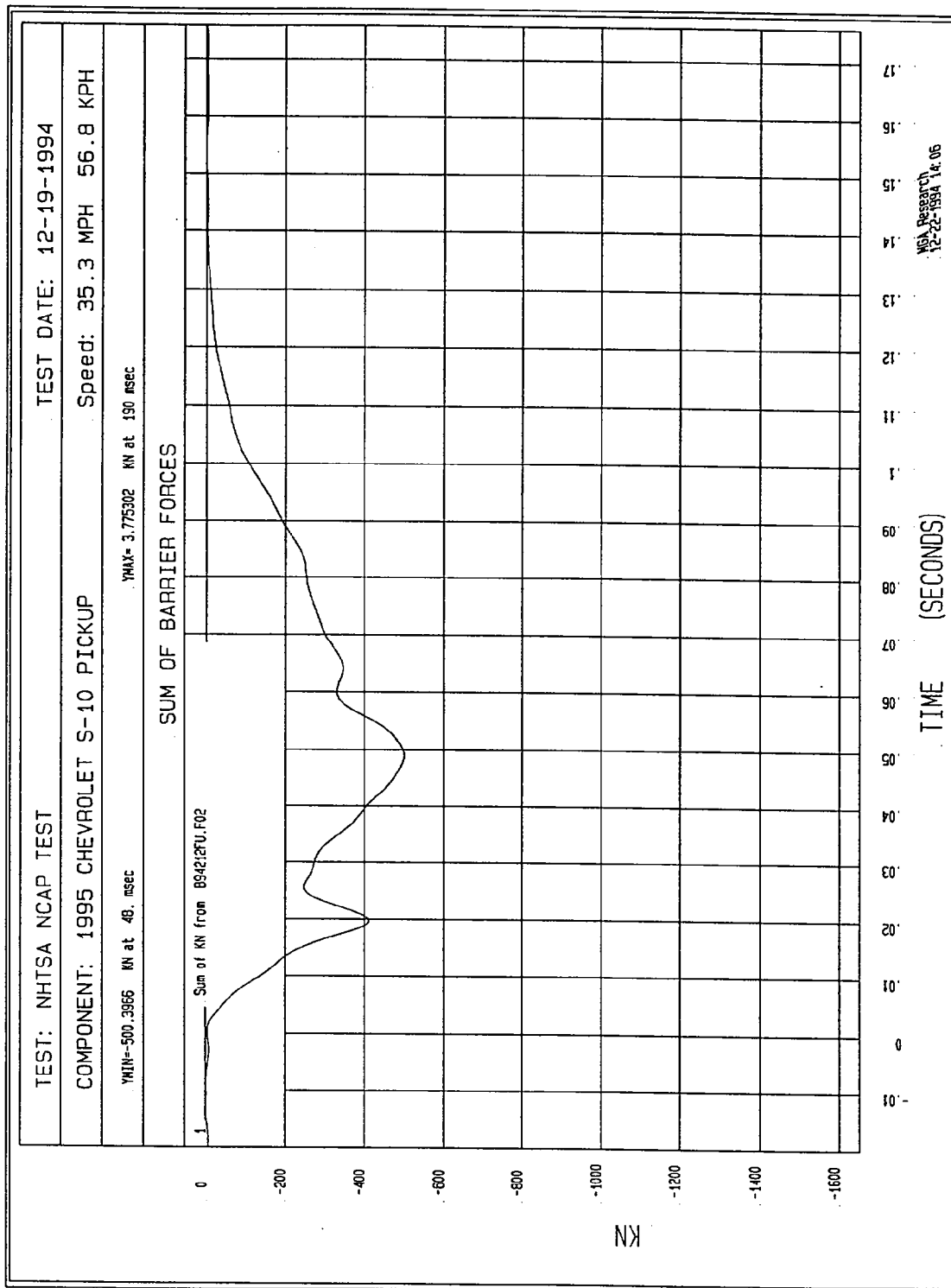


Figure B-32 - Sum of Barrier Forces vs. Time

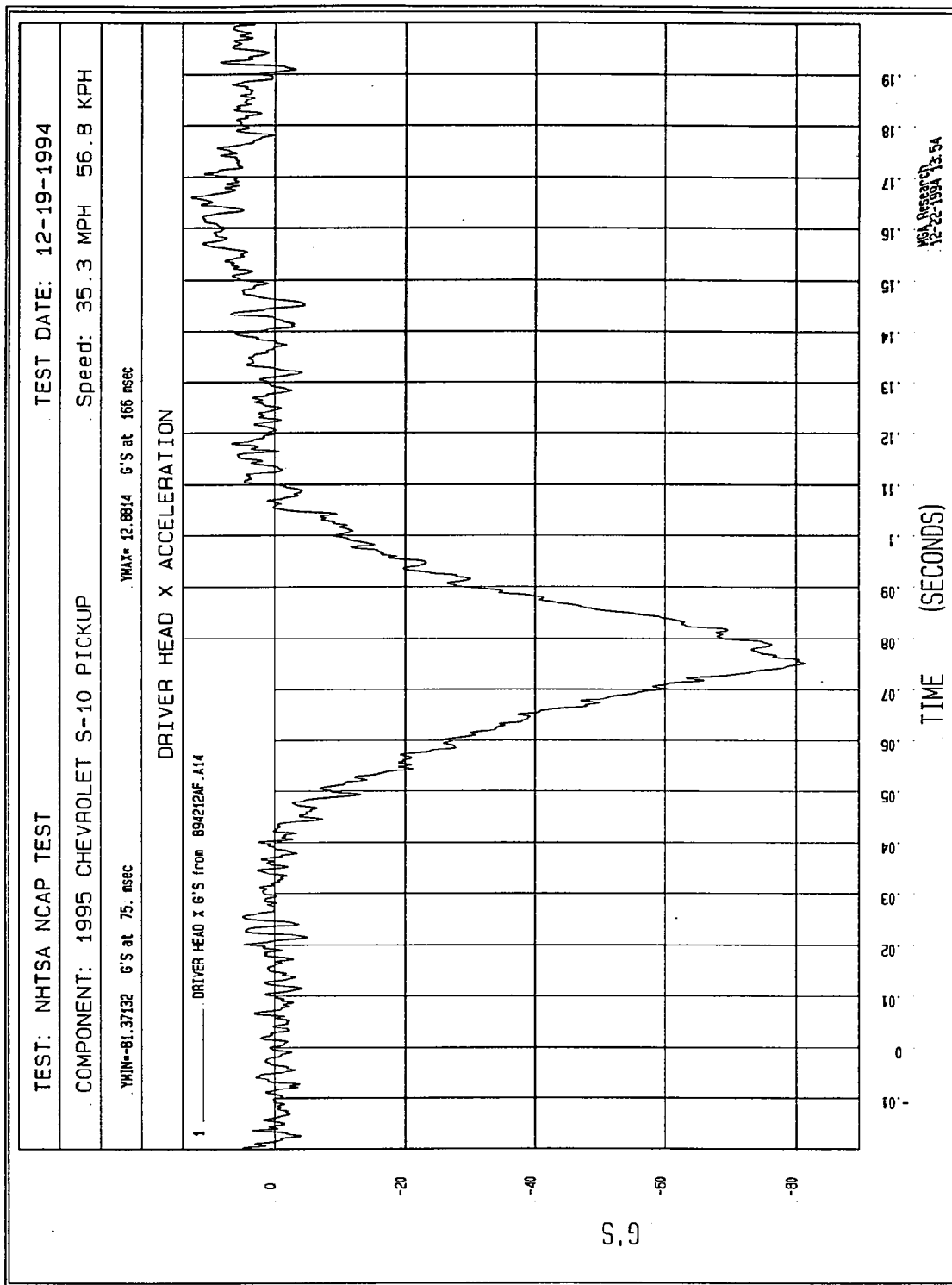


Figure B-83 - Driver Head X Acceleration vs. Time

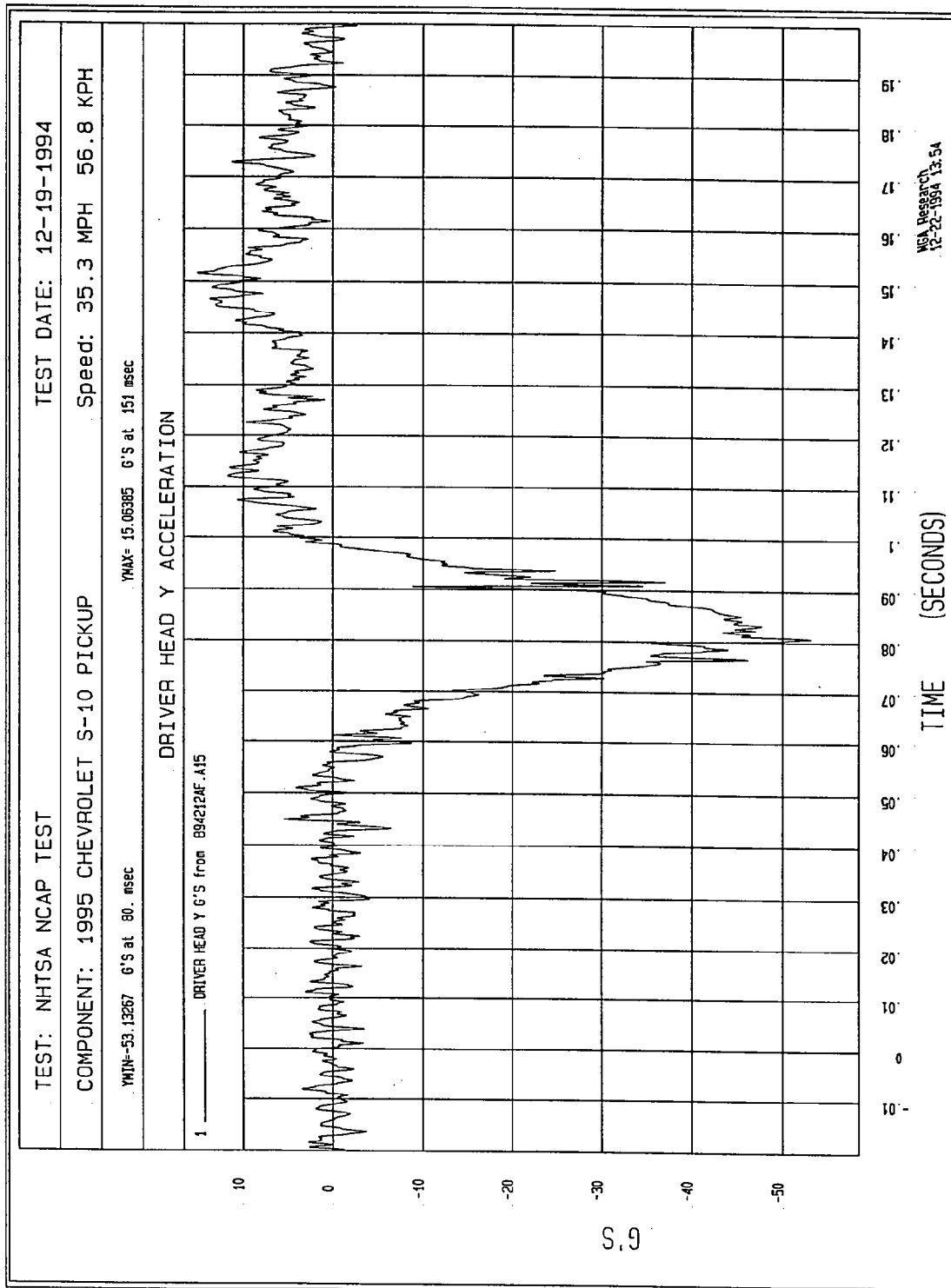


Figure B-34 - Driver Head Y Acceleration vs. Time

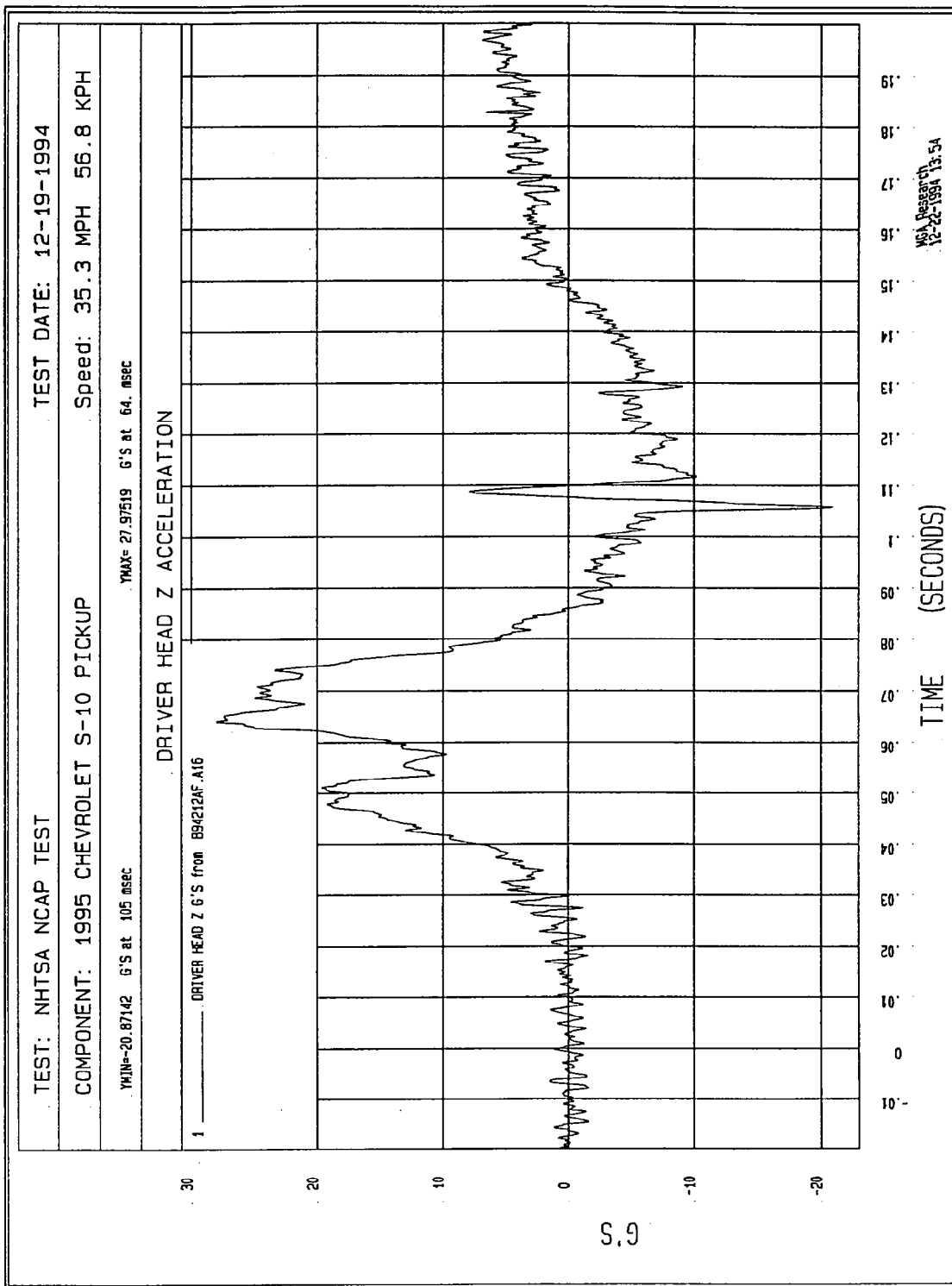


Figure B-35 - Driver Head Z Acceleration vs. Time

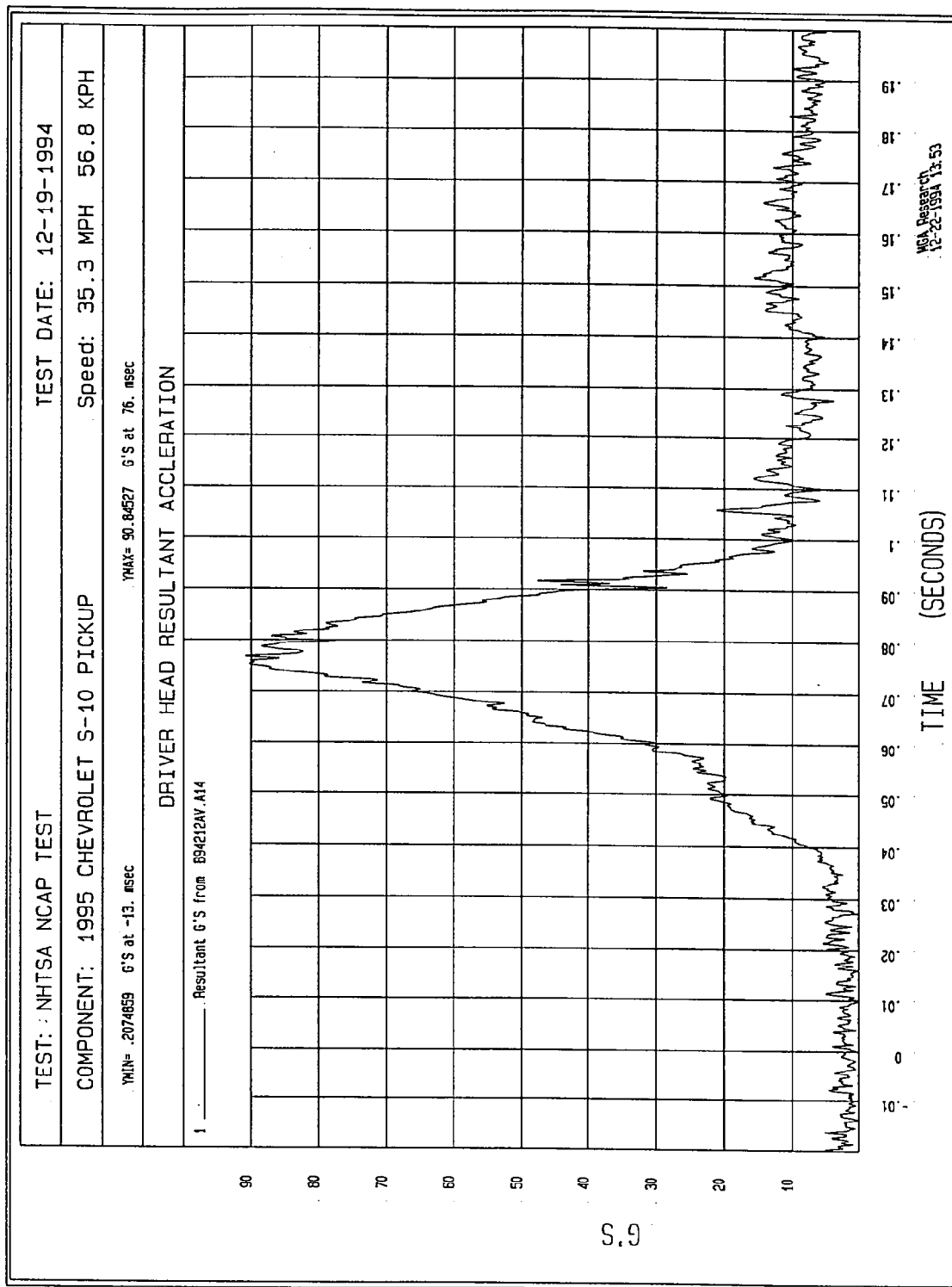


Figure B-36 - Driver Head Resultant Acceleration vs. Time

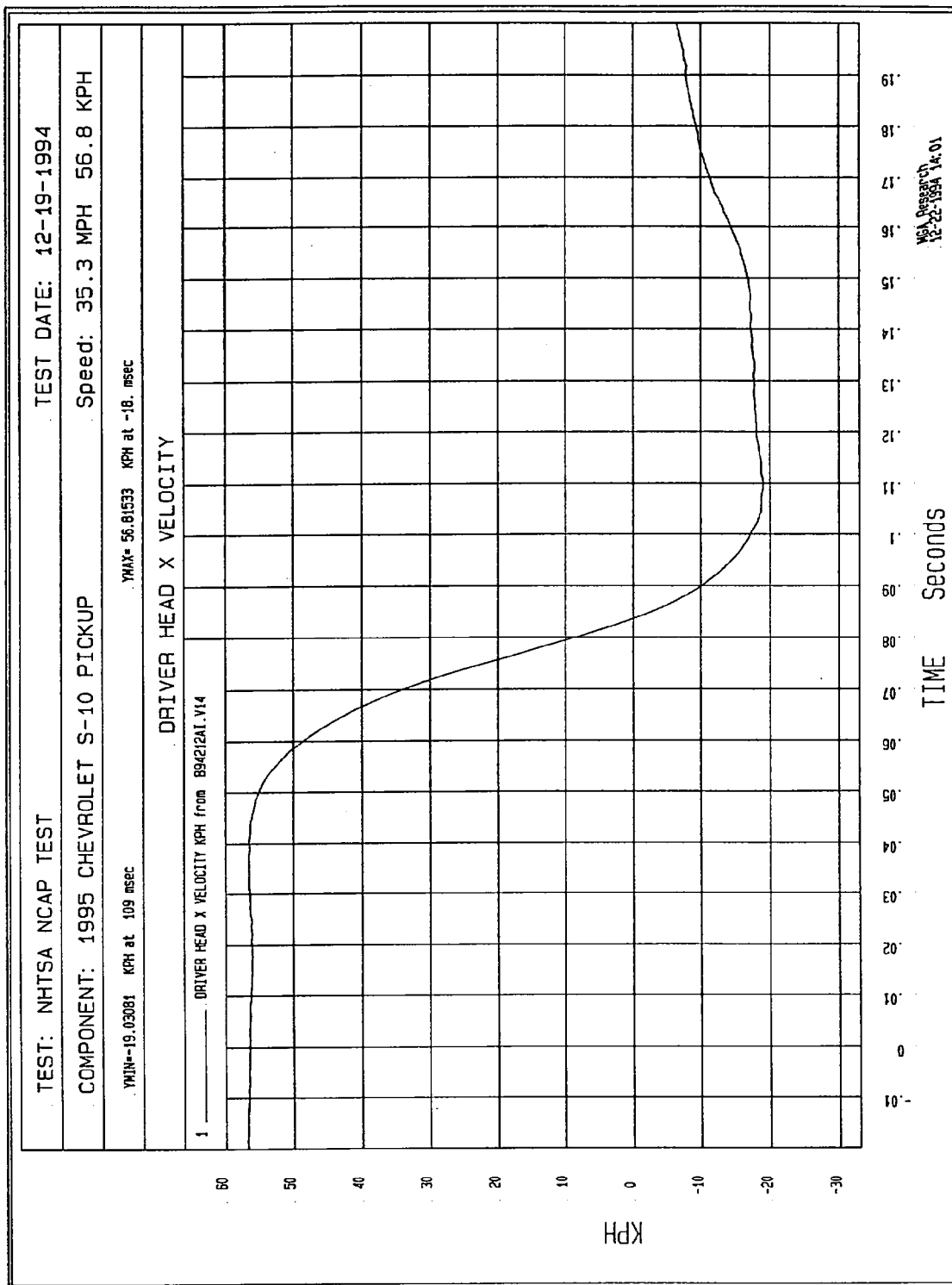


Figure B-37 - Driver Head X Velocity vs. Time

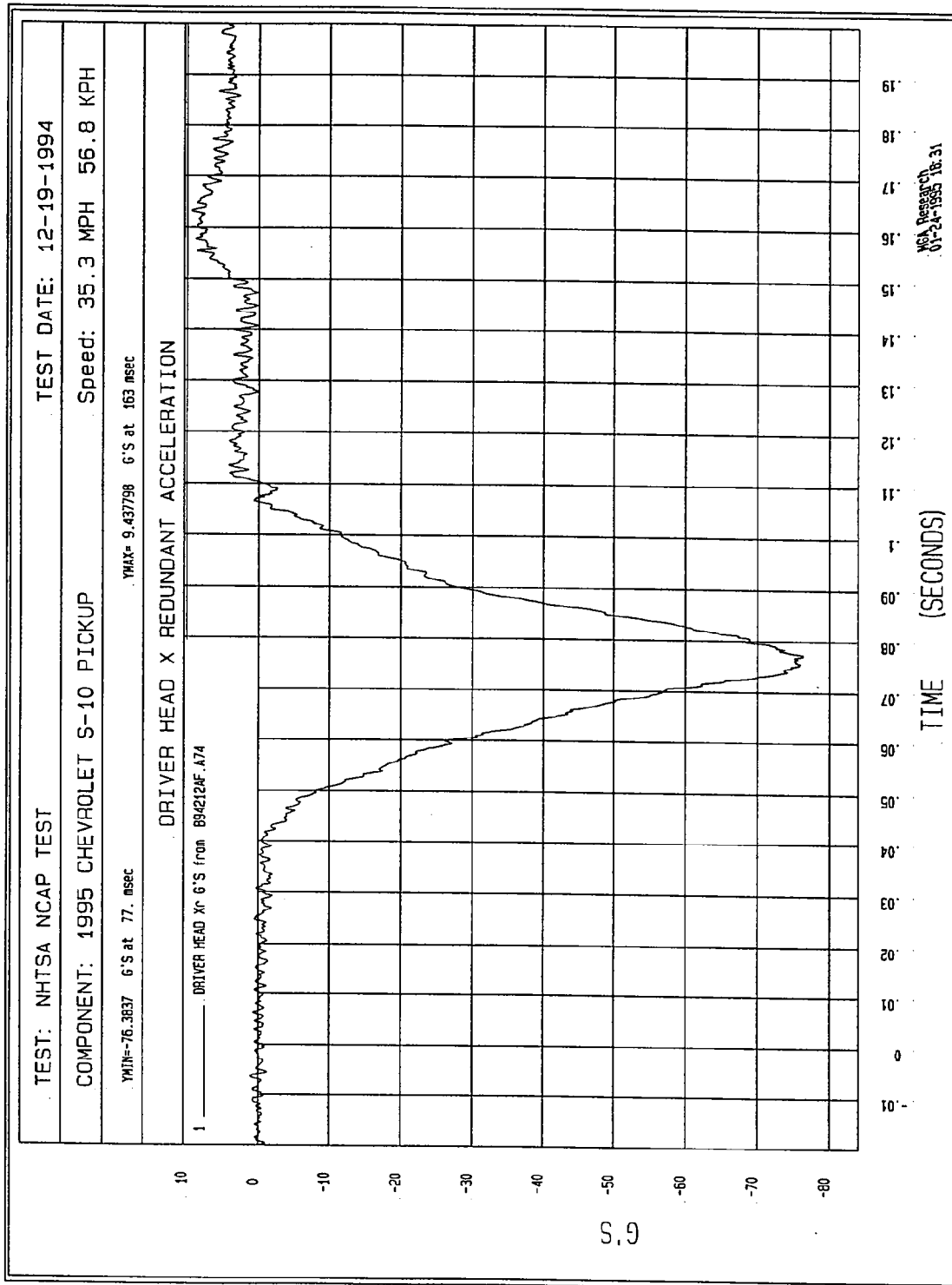


Figure B-38 - Driver Head X Redundant Acceleration vs. Time

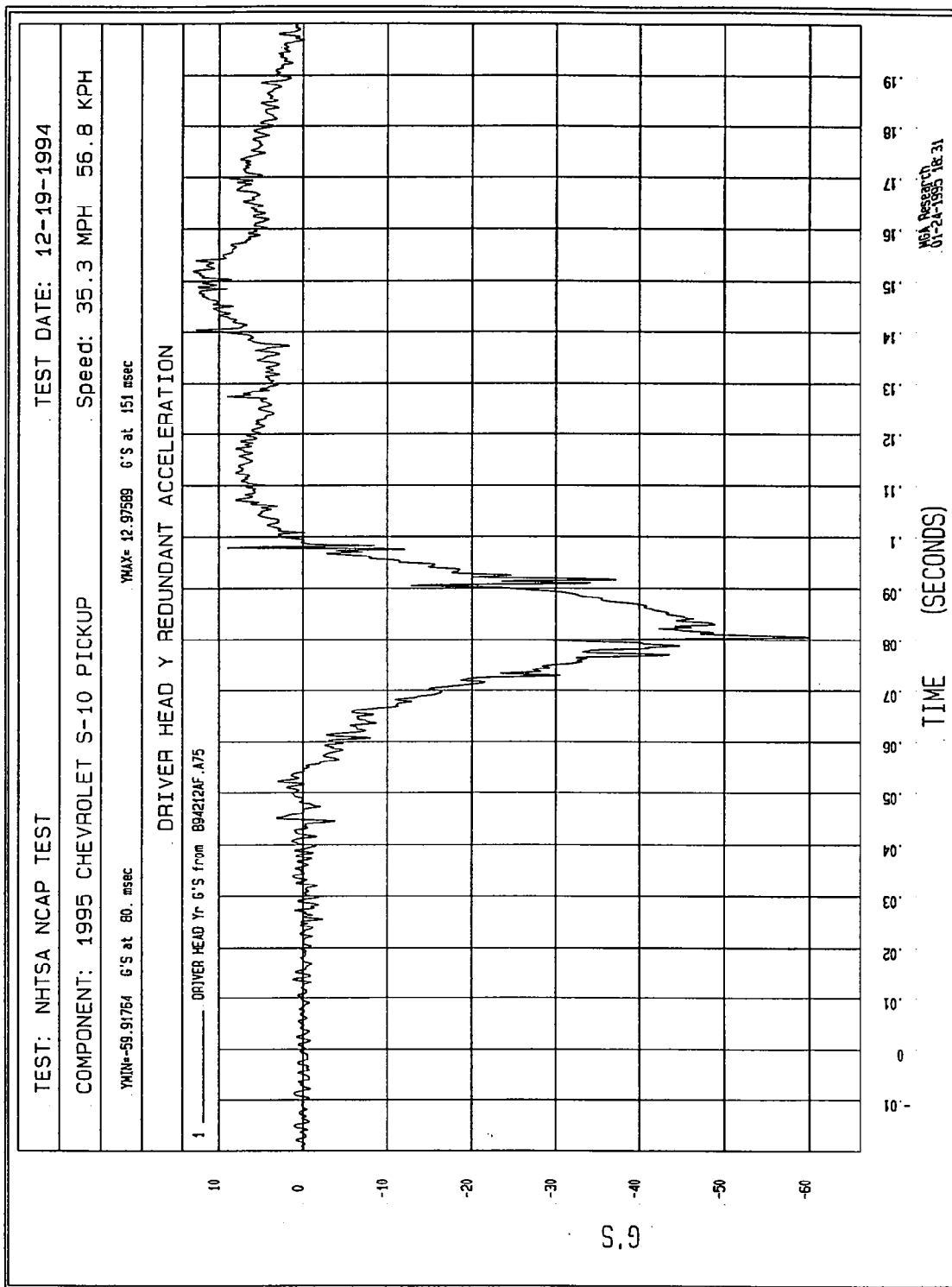


Figure B-39 - Driver Head Y Redundant Acceleration vs. Time

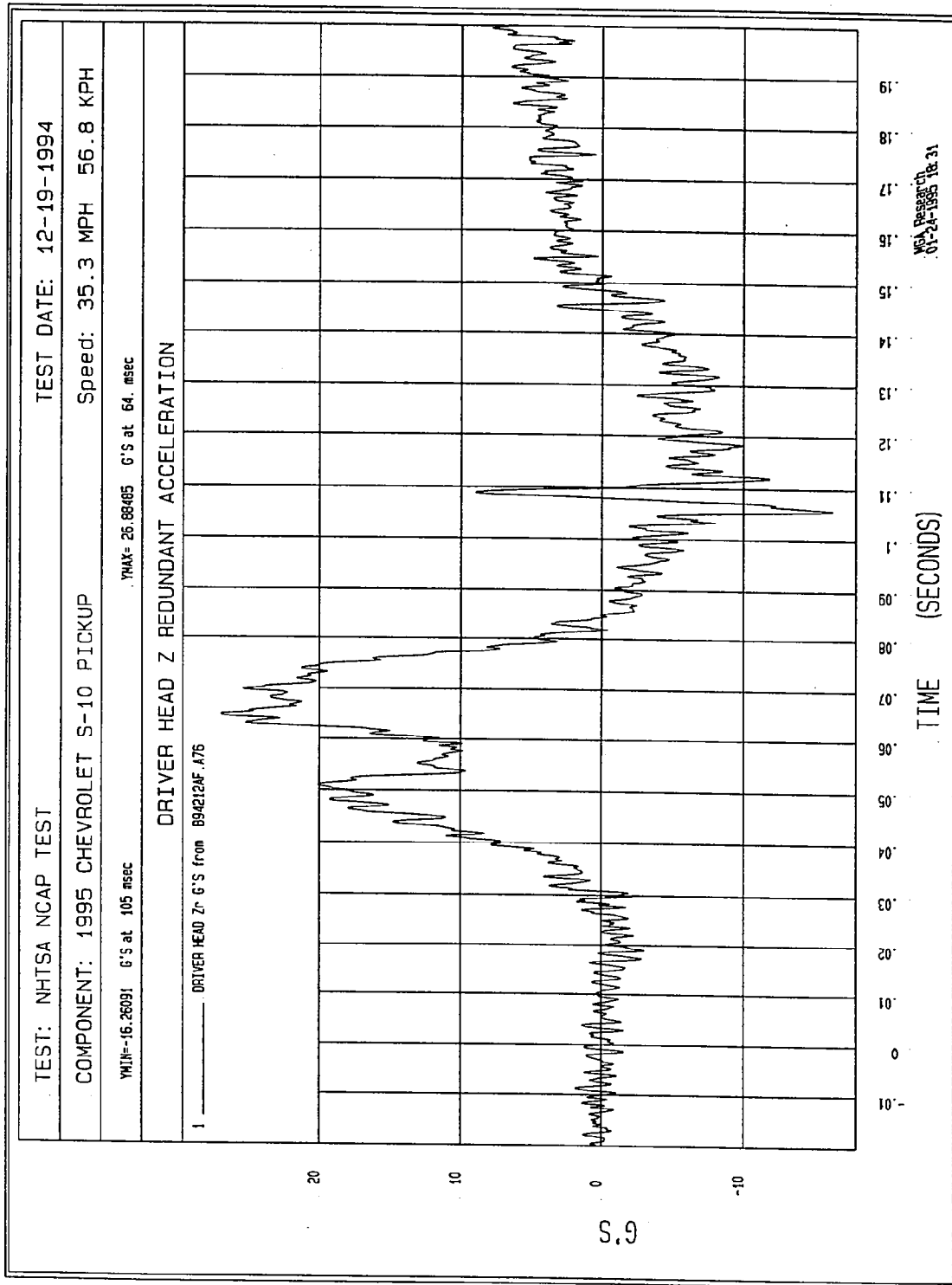


Figure B-40 - Driver Head Z Redundant Acceleration vs. Time

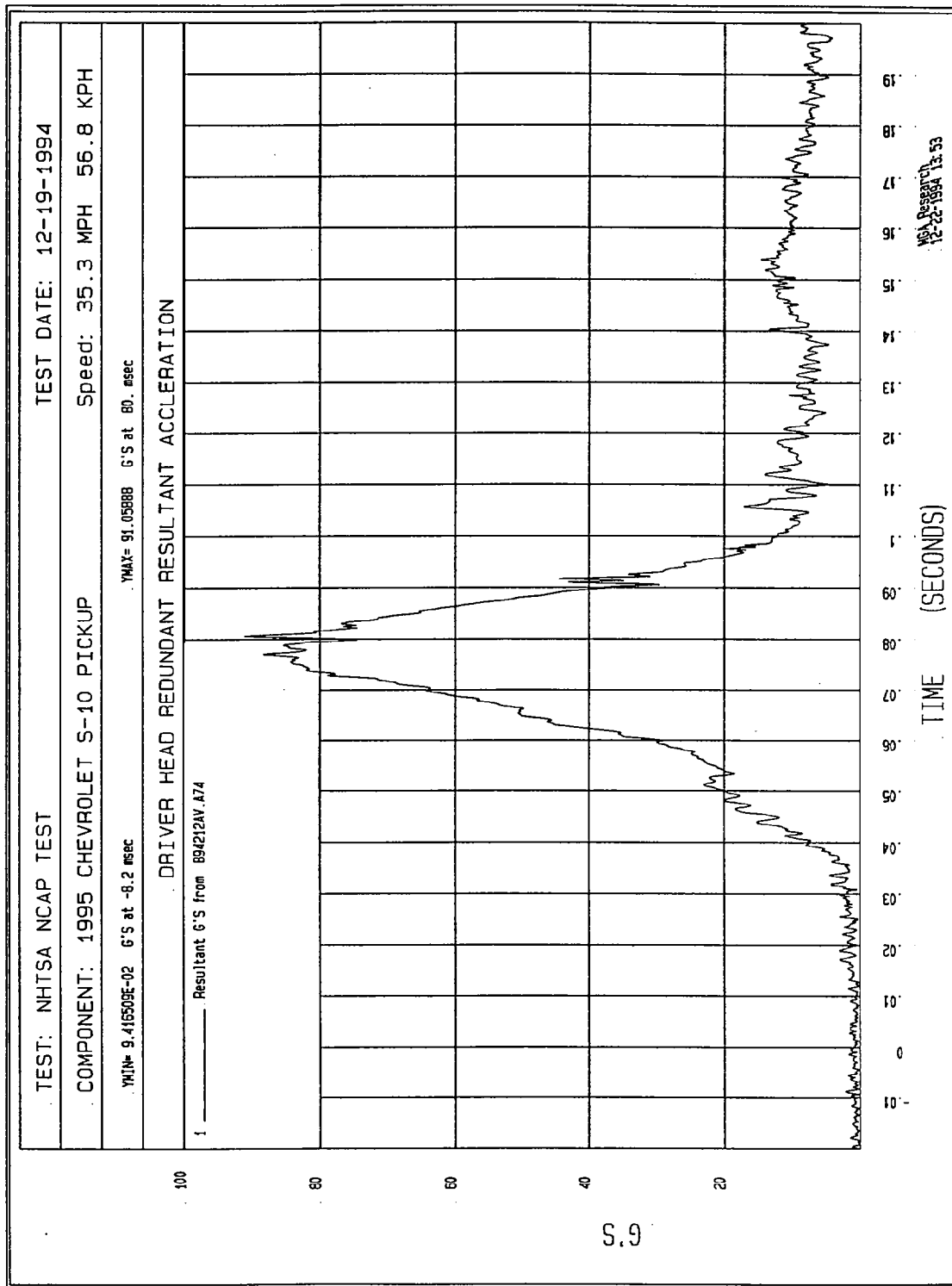


Figure B-41 - Driver Head Redundant Resultant Accel. vs. Time

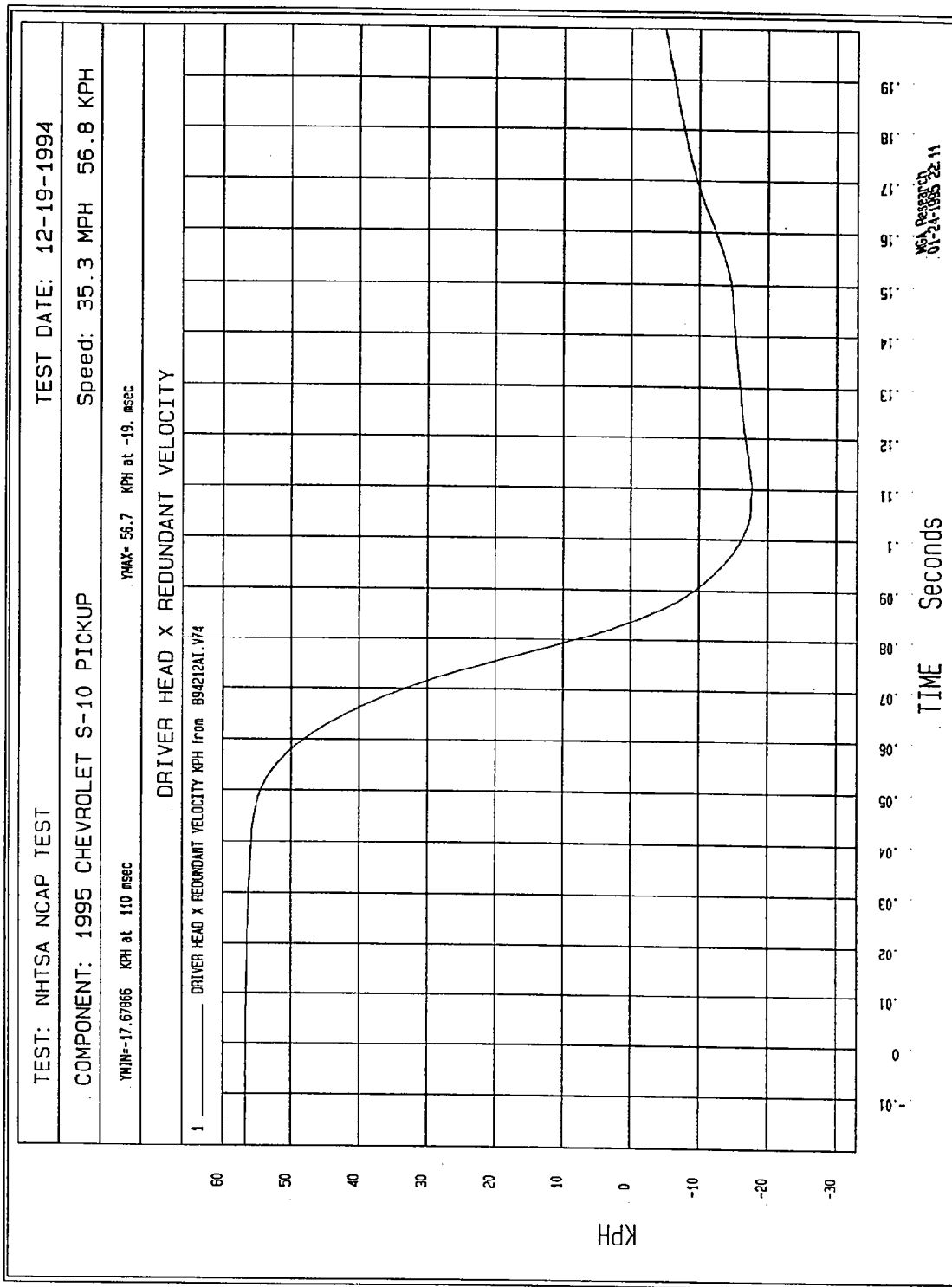


Figure B-42 - Driver Head X Redundant Velocity vs. Time

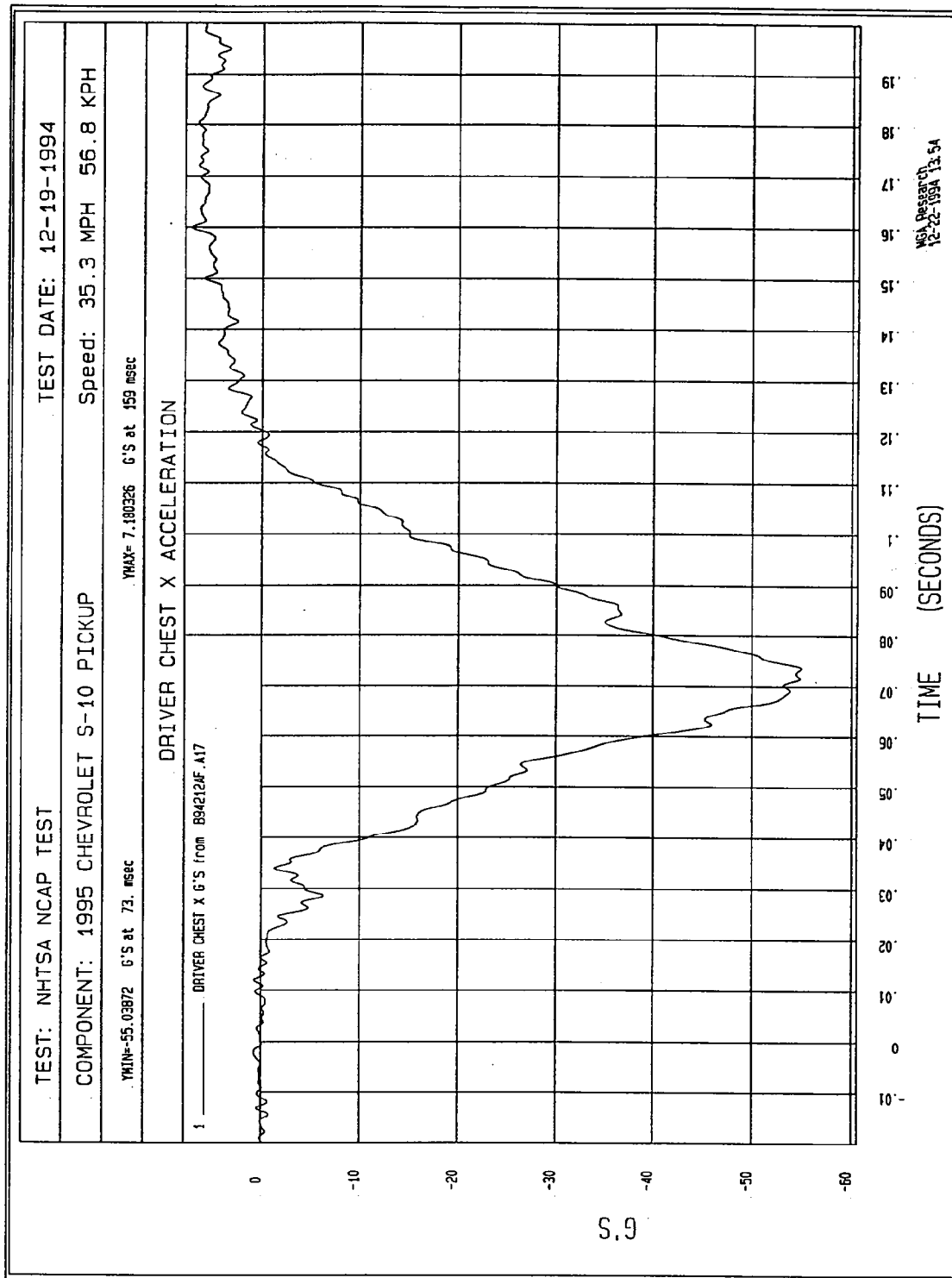


Figure B-43 - Driver Chest X Acceleration vs. Time

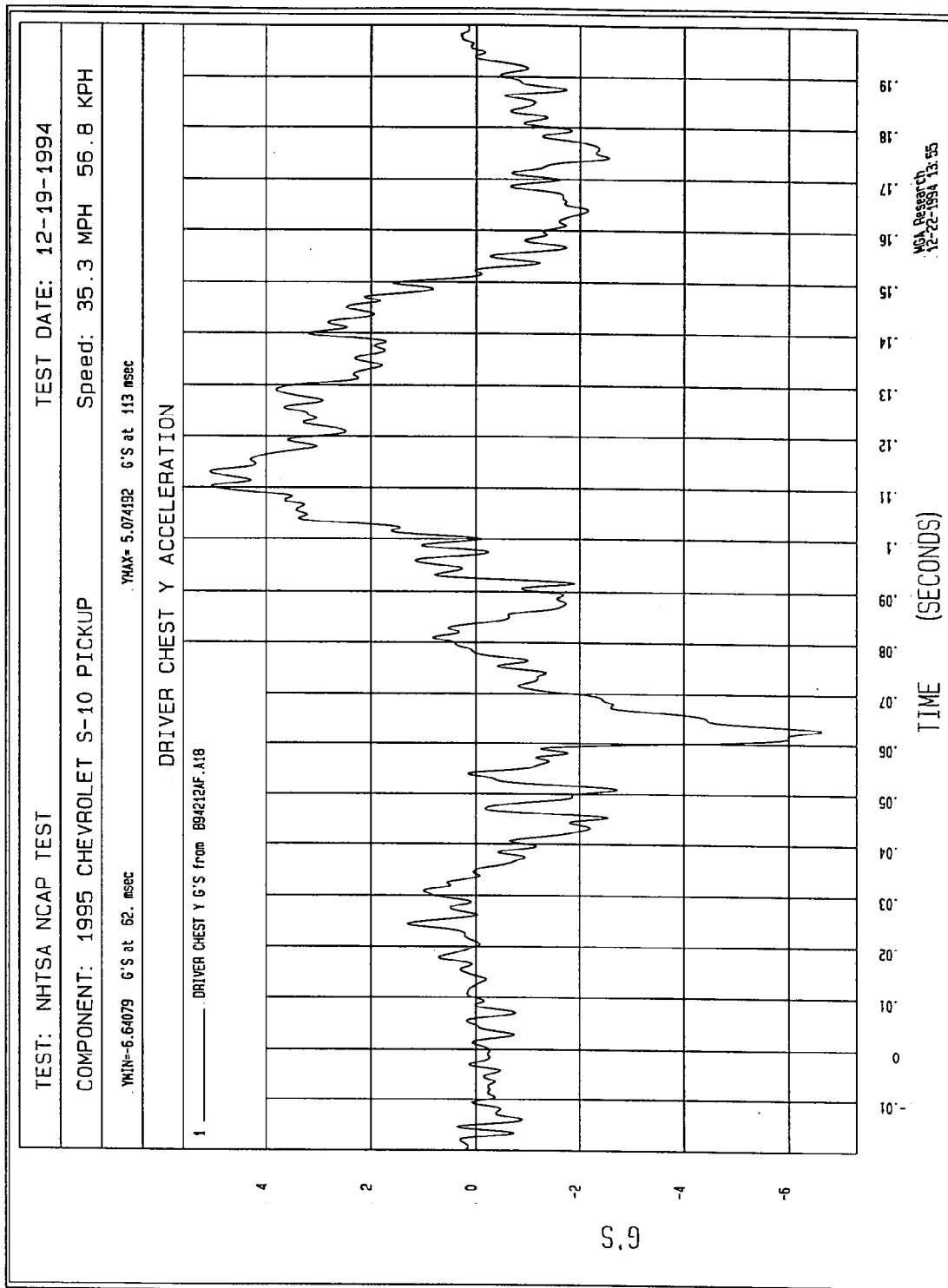


Figure B-44 - Driver Chest Y Acceleration vs. Time

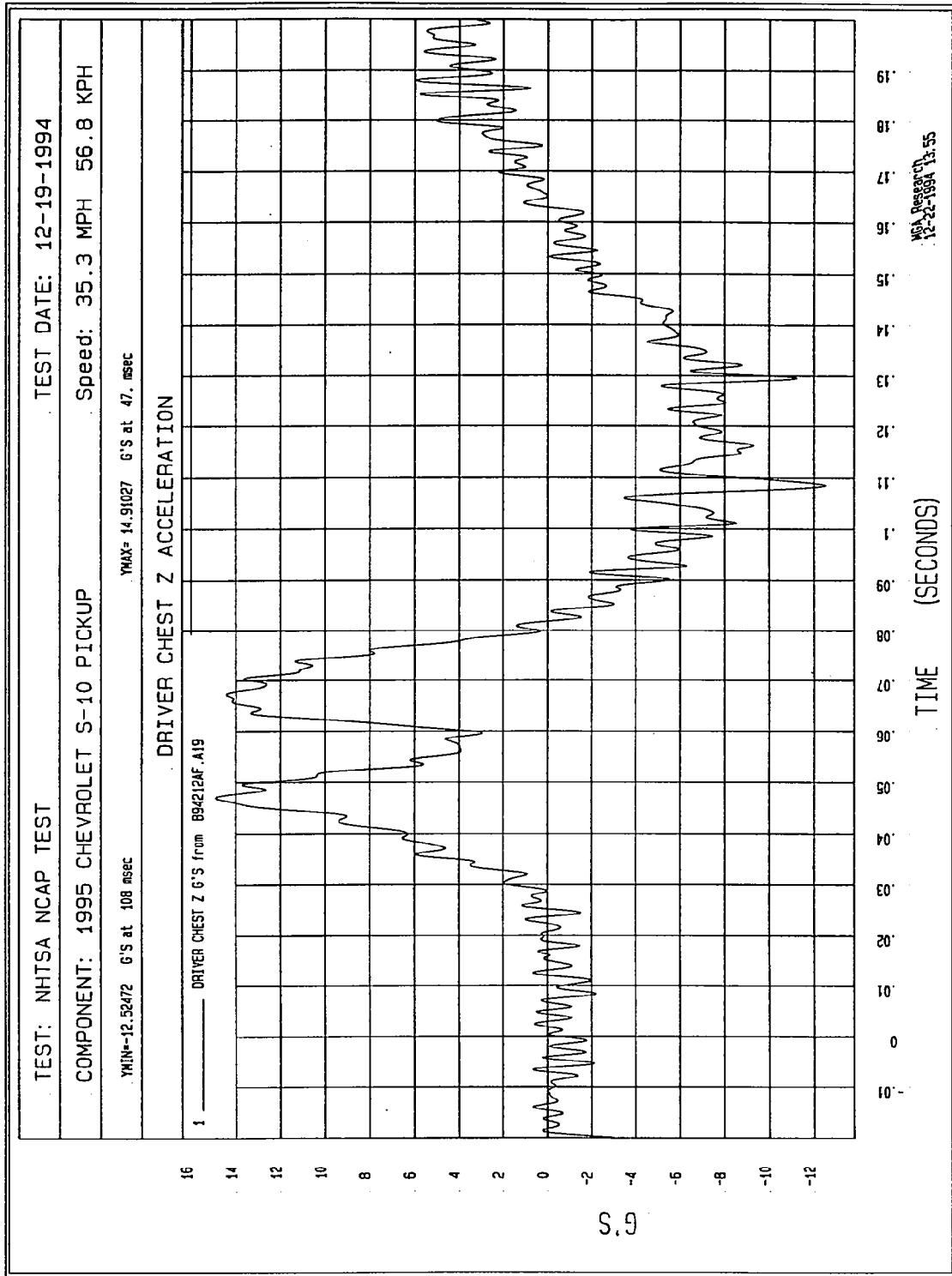


Figure B-45 - Driver Chest Z Acceleration vs. Time

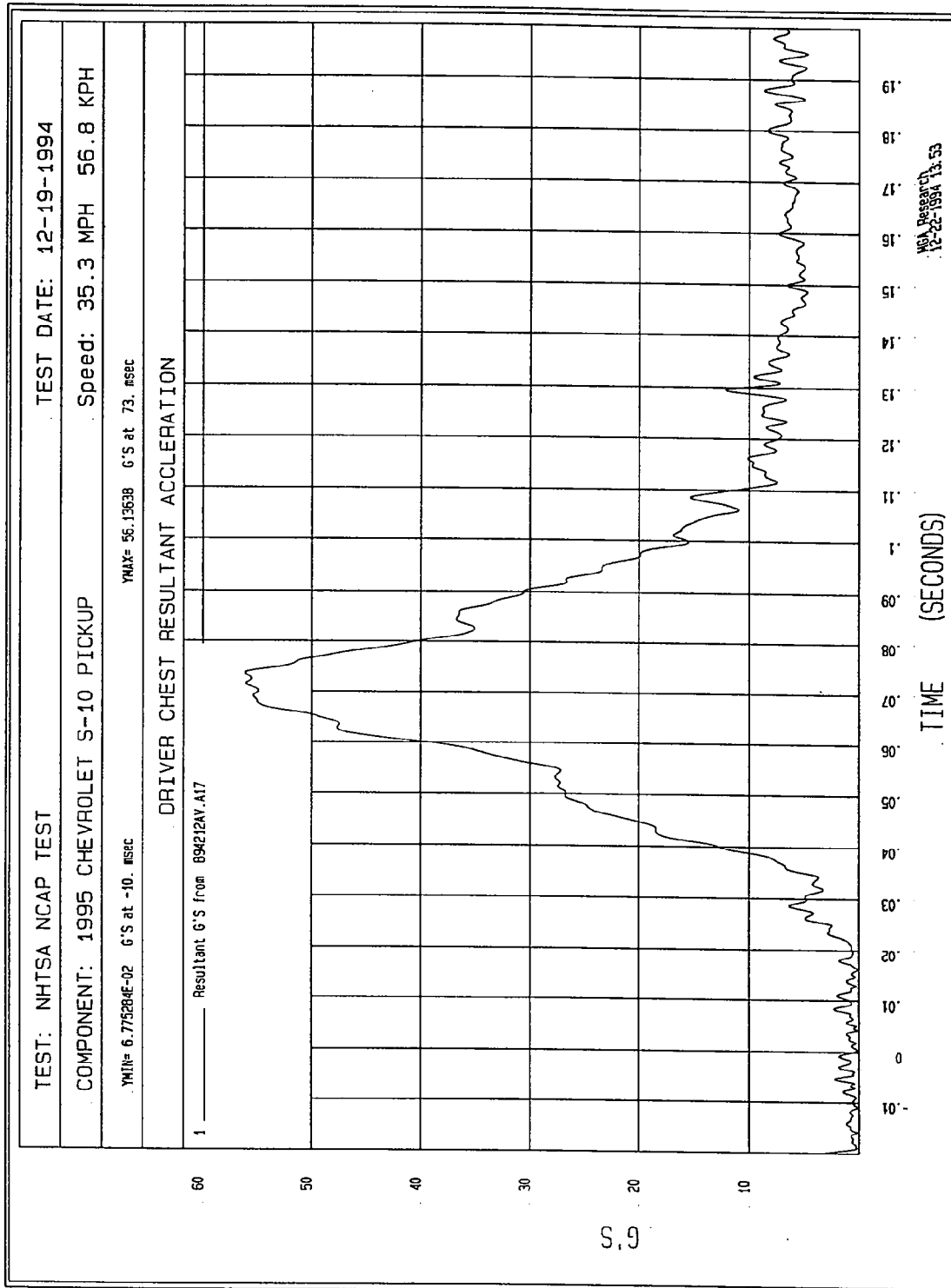


Figure B-46 - Driver Chest Resultant Accel. vs. Time

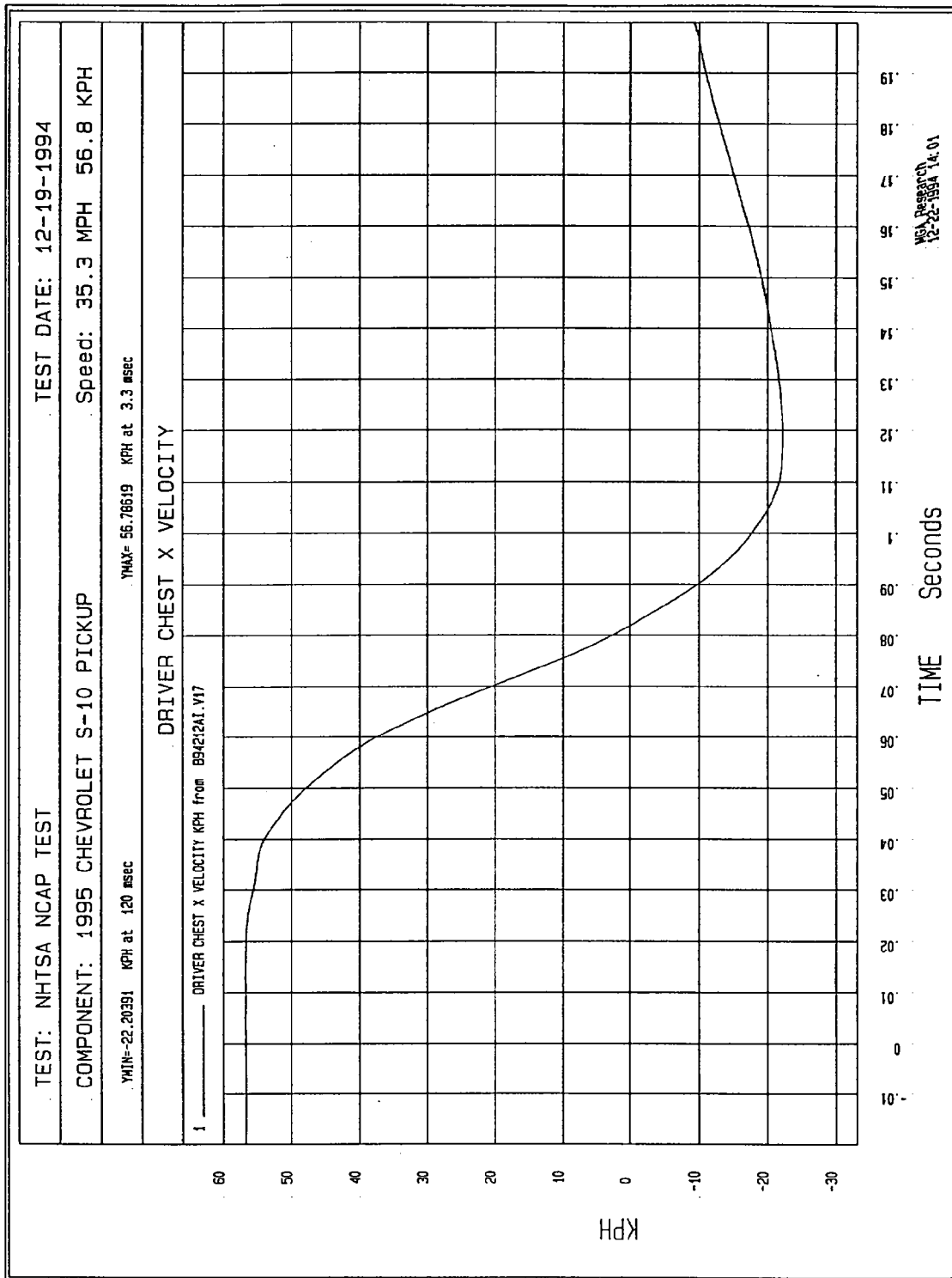


Figure B-47 - Driver Chest X Velocity vs. Time

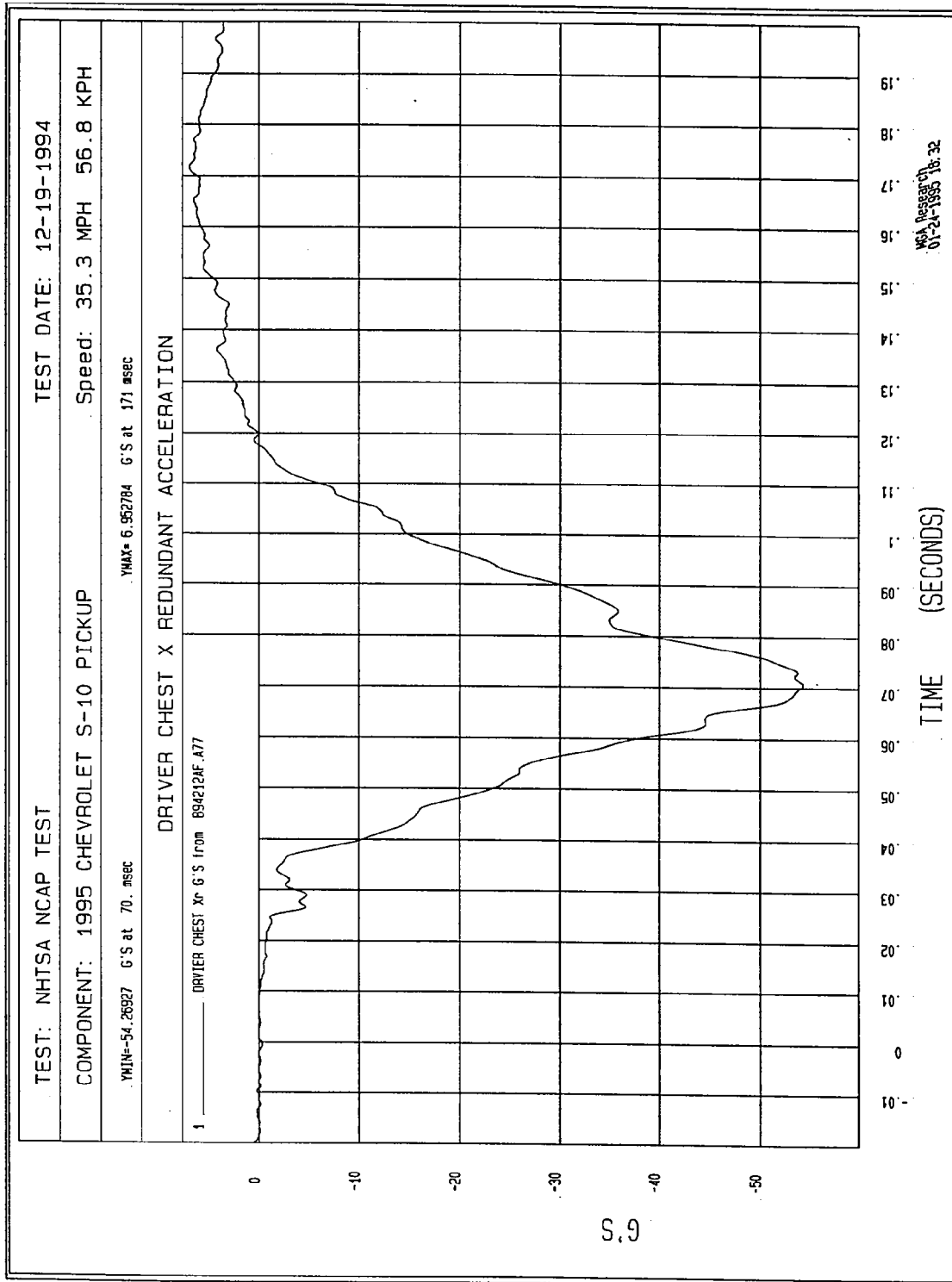


Figure B-48 - Driver Chest X Redundant Acceleration vs. Time

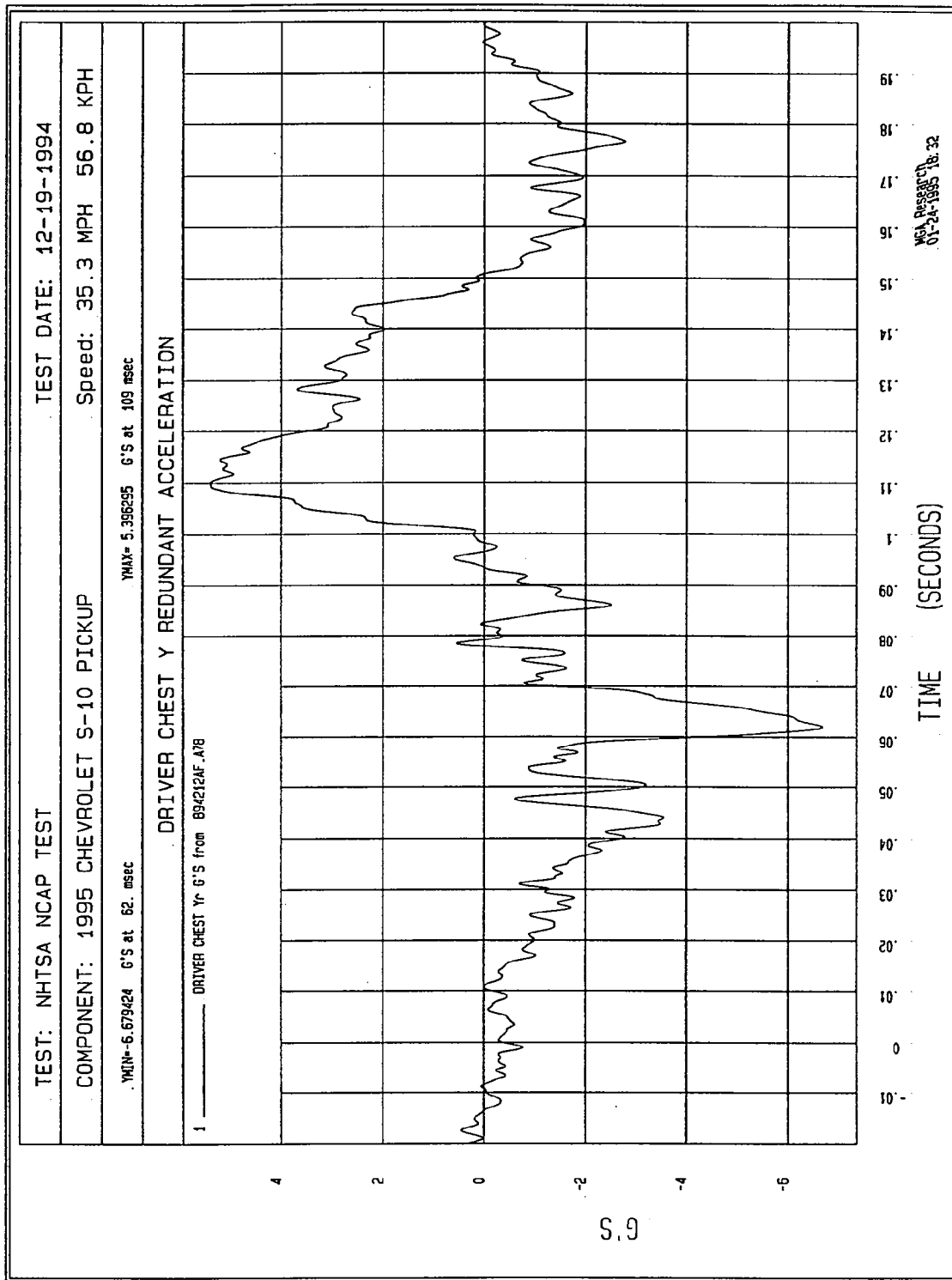


Figure B-49 - Driver Chest Y Redundant Acceleration vs. Time

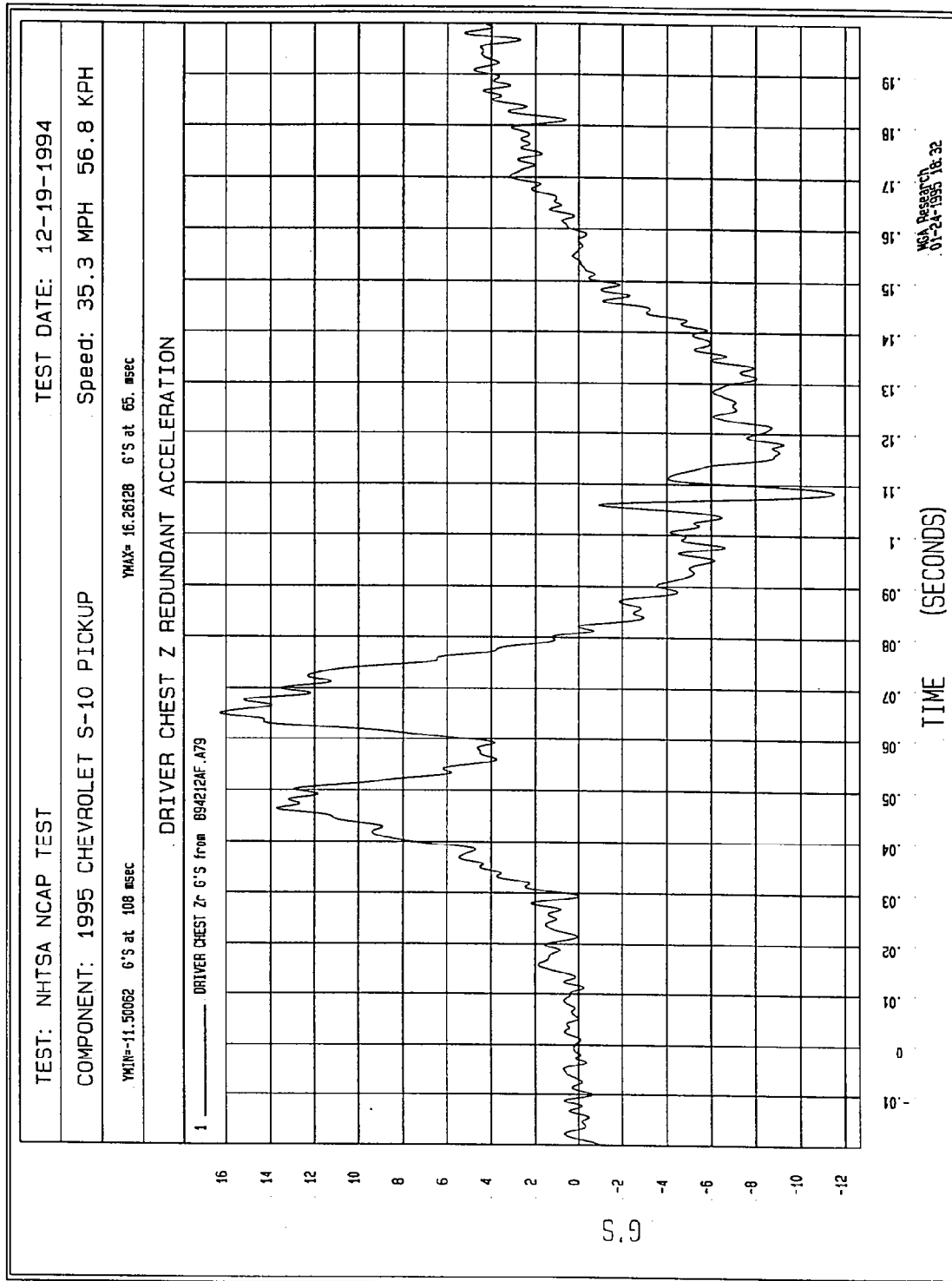


Figure B-50 - Driver Chest Z Redundant Acceleration vs. Time

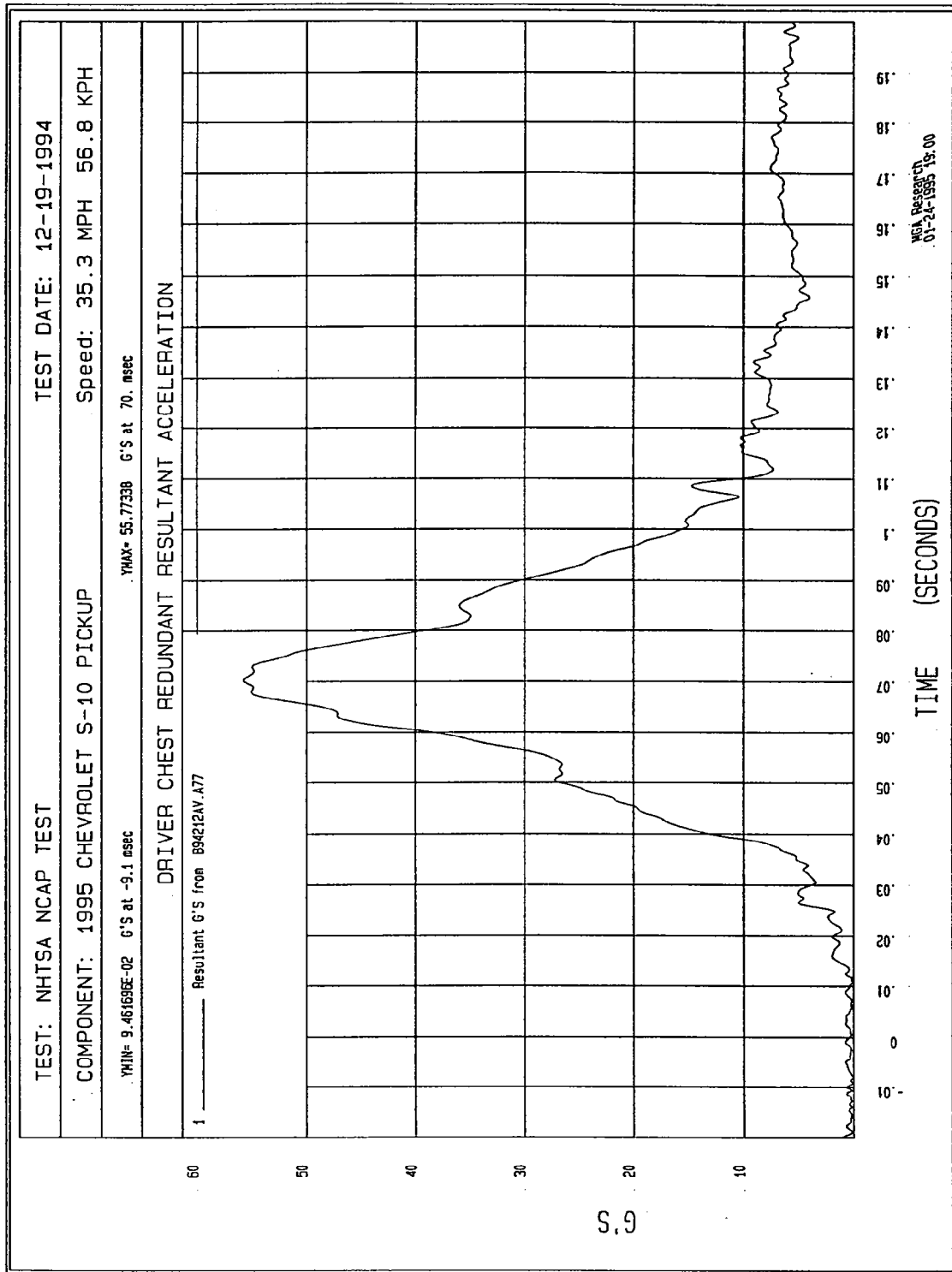


Figure B-51 - Driver Chest Redundant Resultant Accel. vs. Time

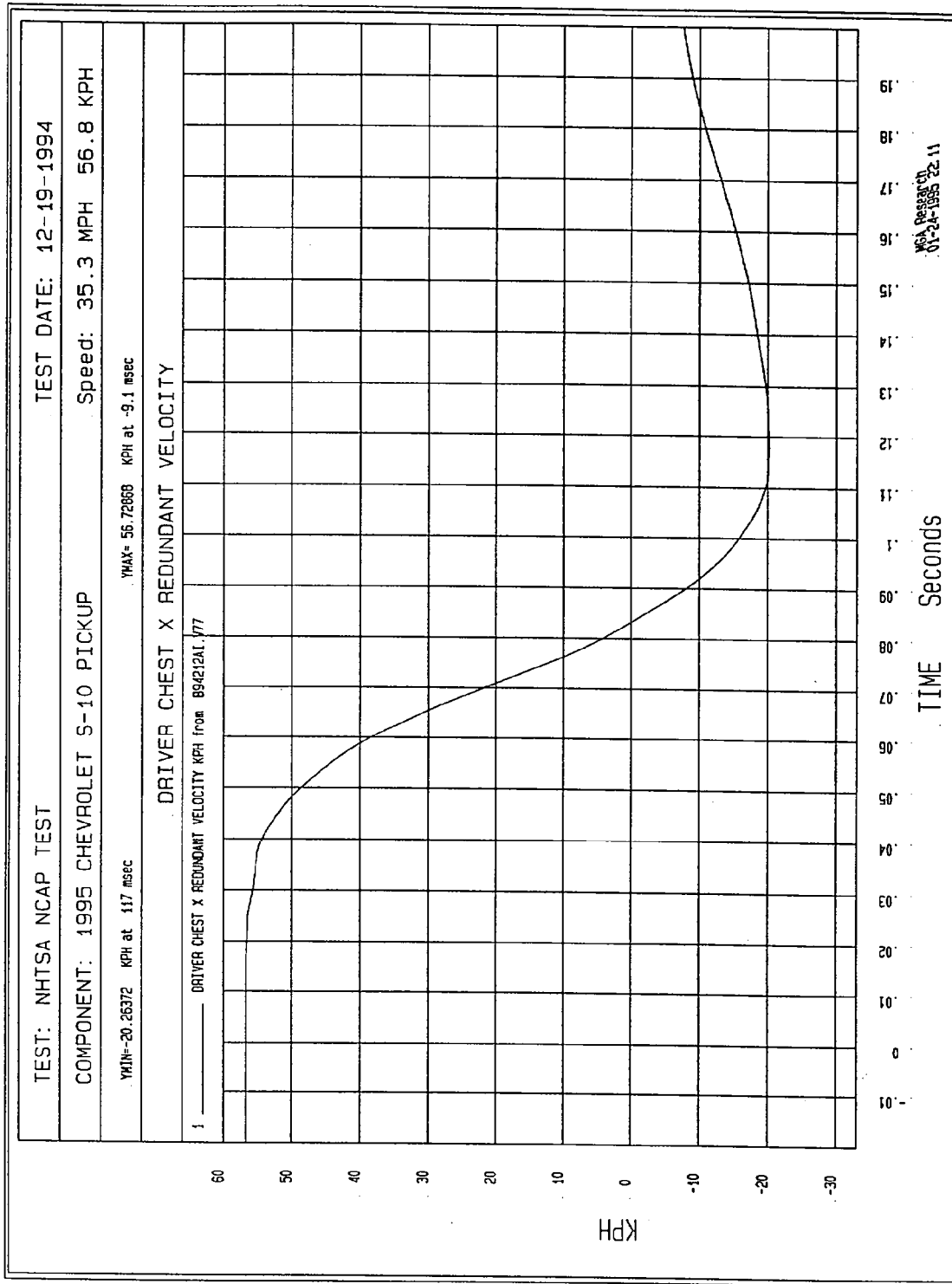


Figure B-52 - Driver Chest X Redundant Velocity vs. Time

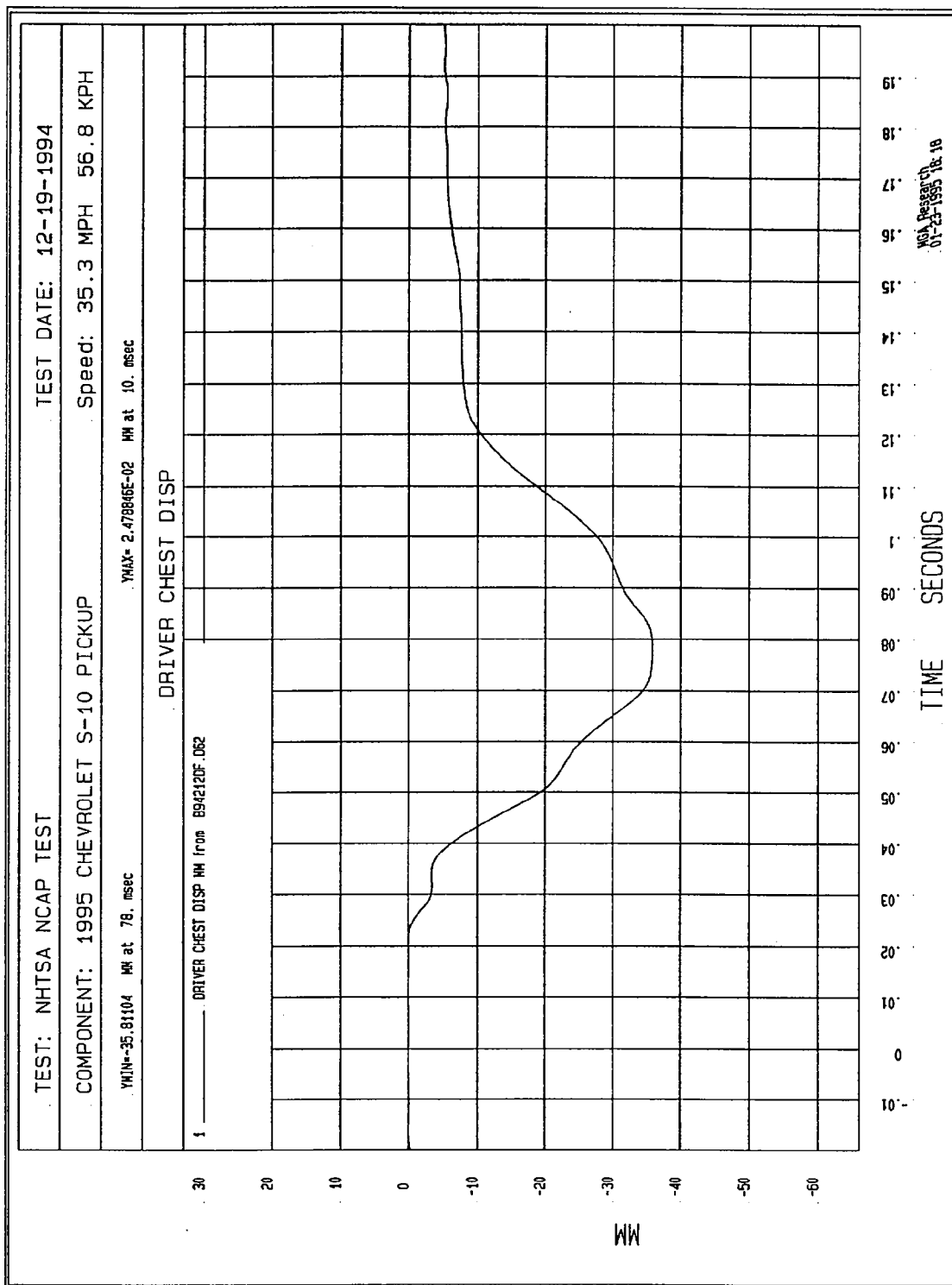


Figure B-53 - Driver Chest Compression vs. Time

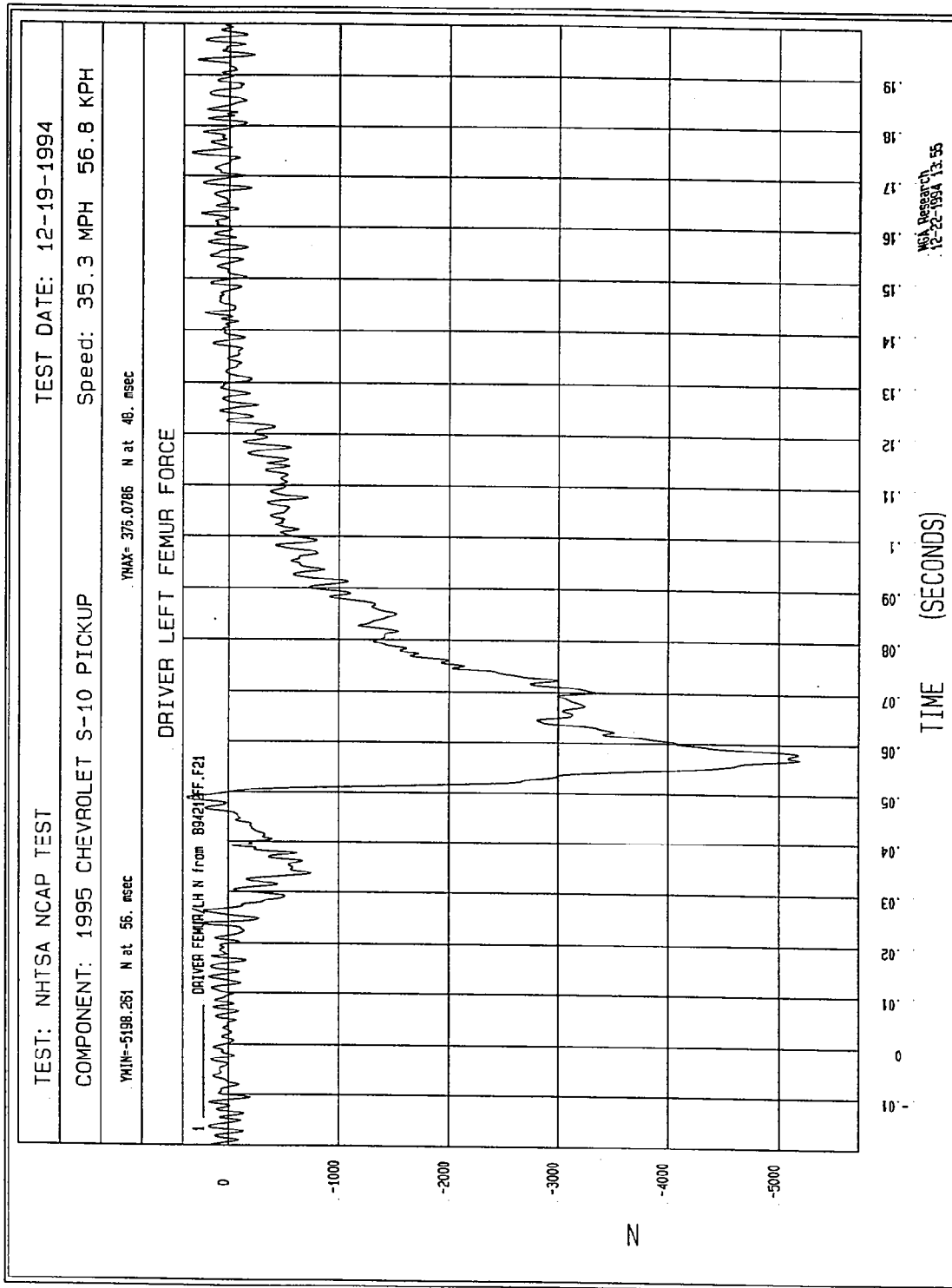


Figure B-54 - Driver Left Femur Force vs. Time

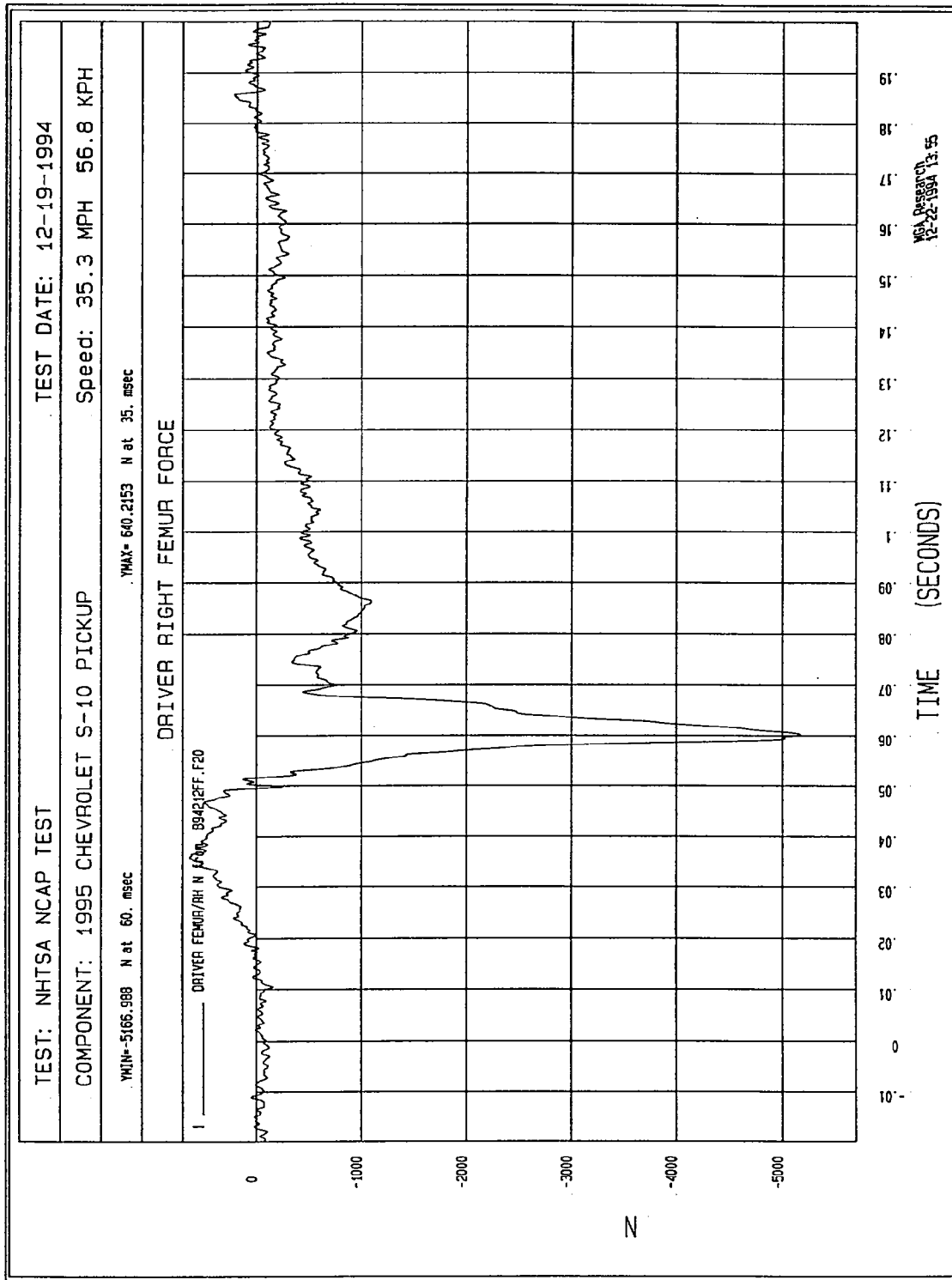


Figure B-55 - Driver Right Femur Force vs. Time

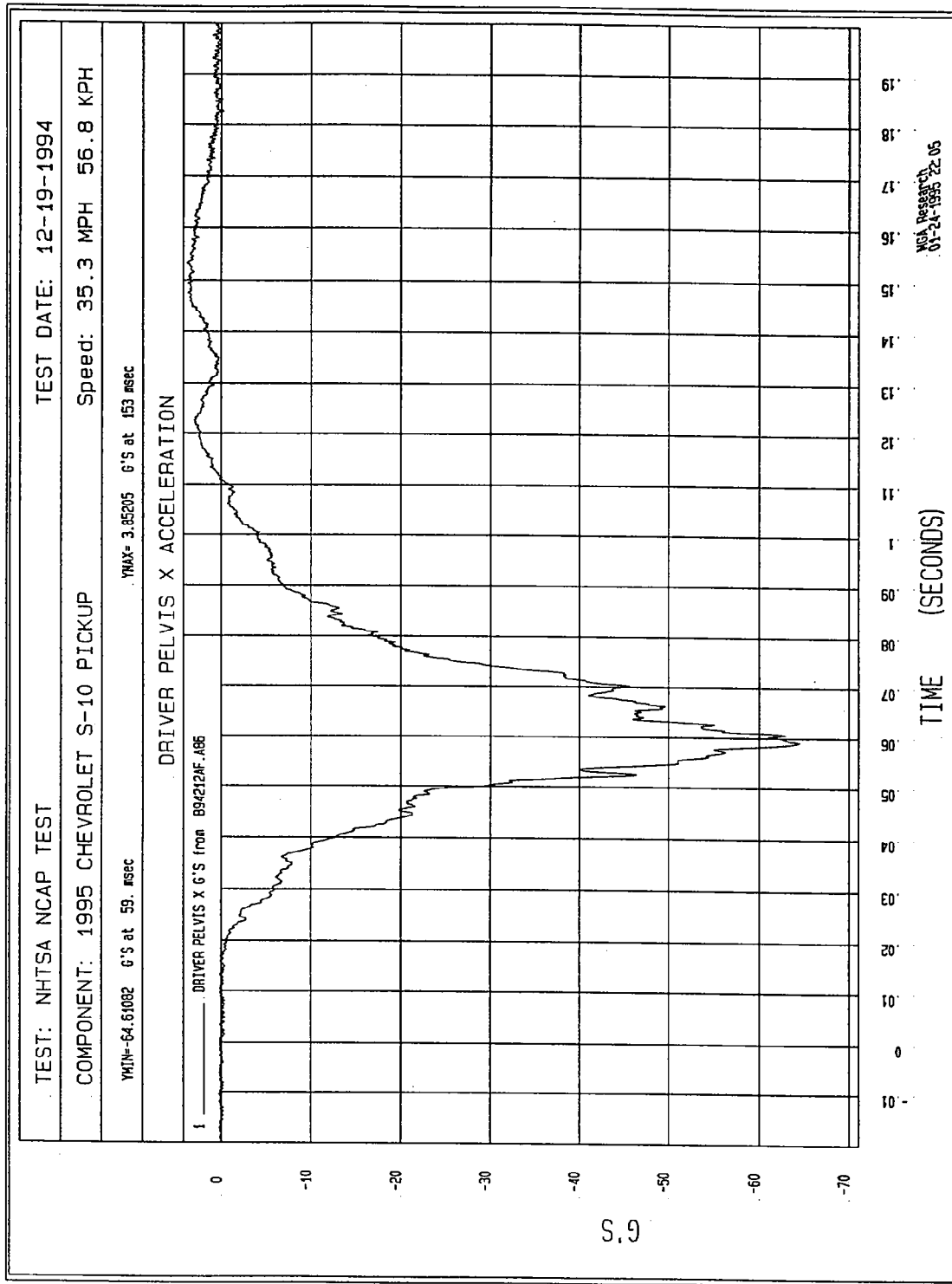


Figure B-56 - Driver Pelvis X Acceleration vs. Time

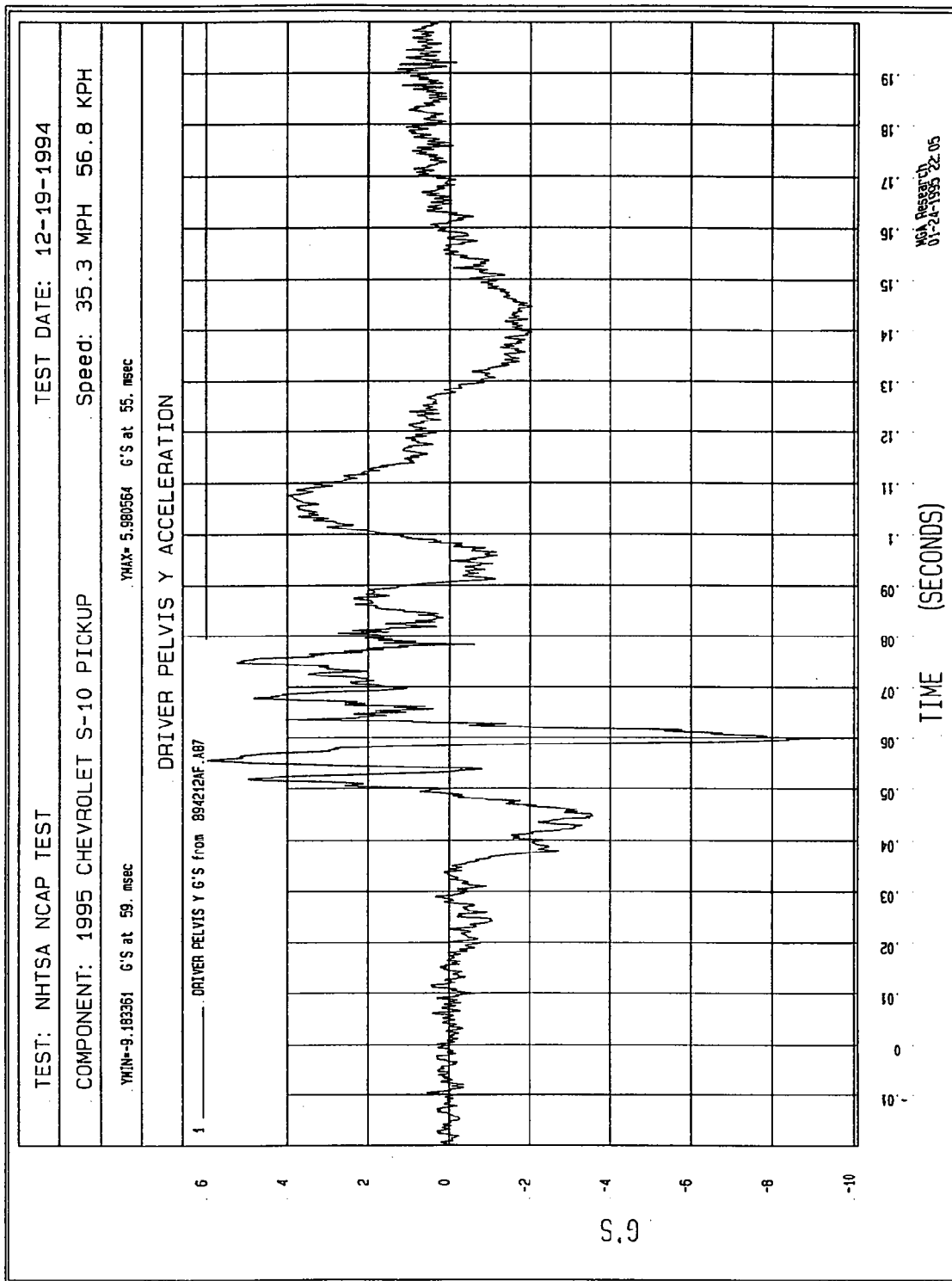


Figure B-57 - Driver Pelvis Y Acceleration vs. Time

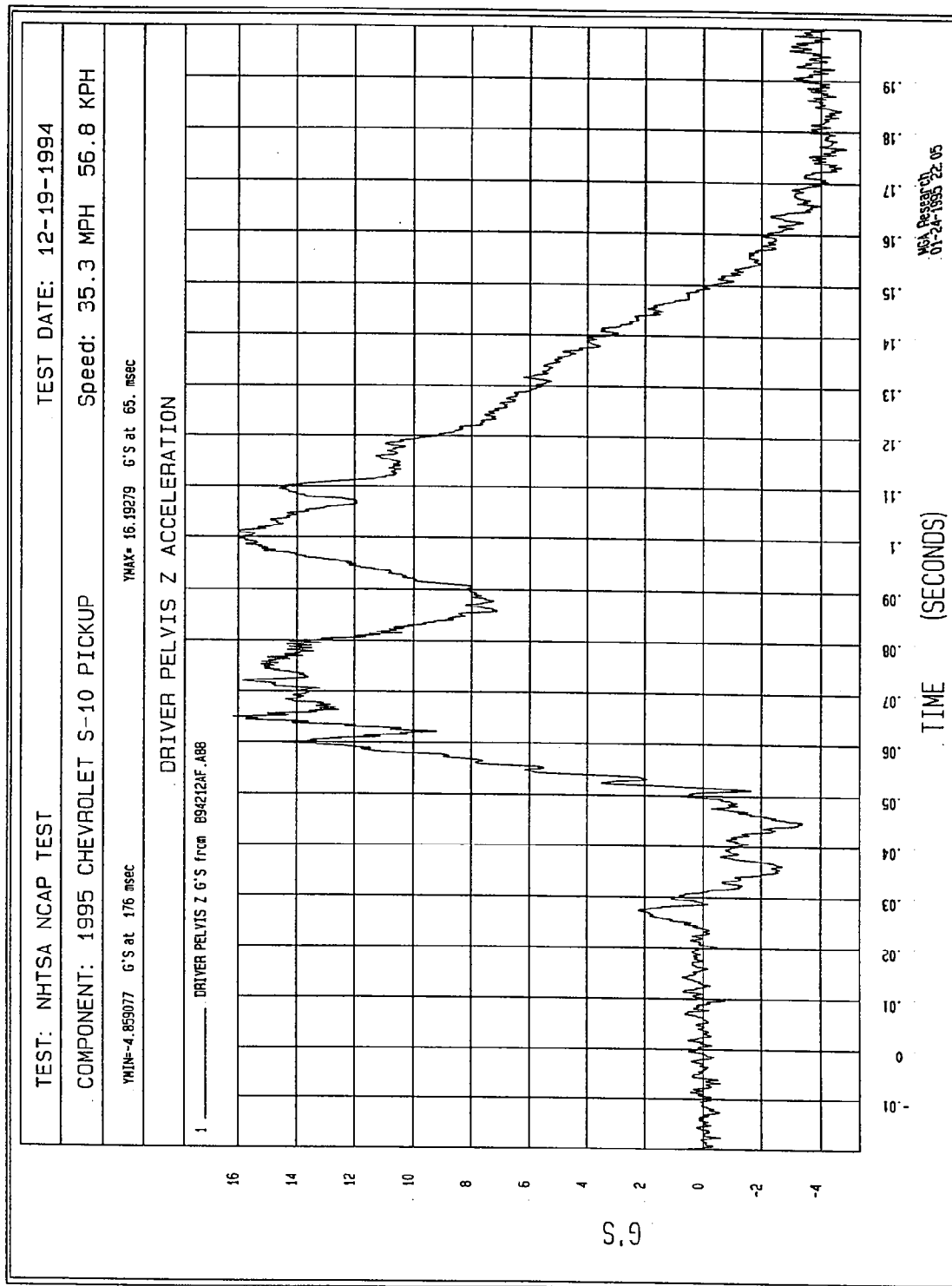


Figure B-58 - Driver Pelvis Z Acceleration vs. Time

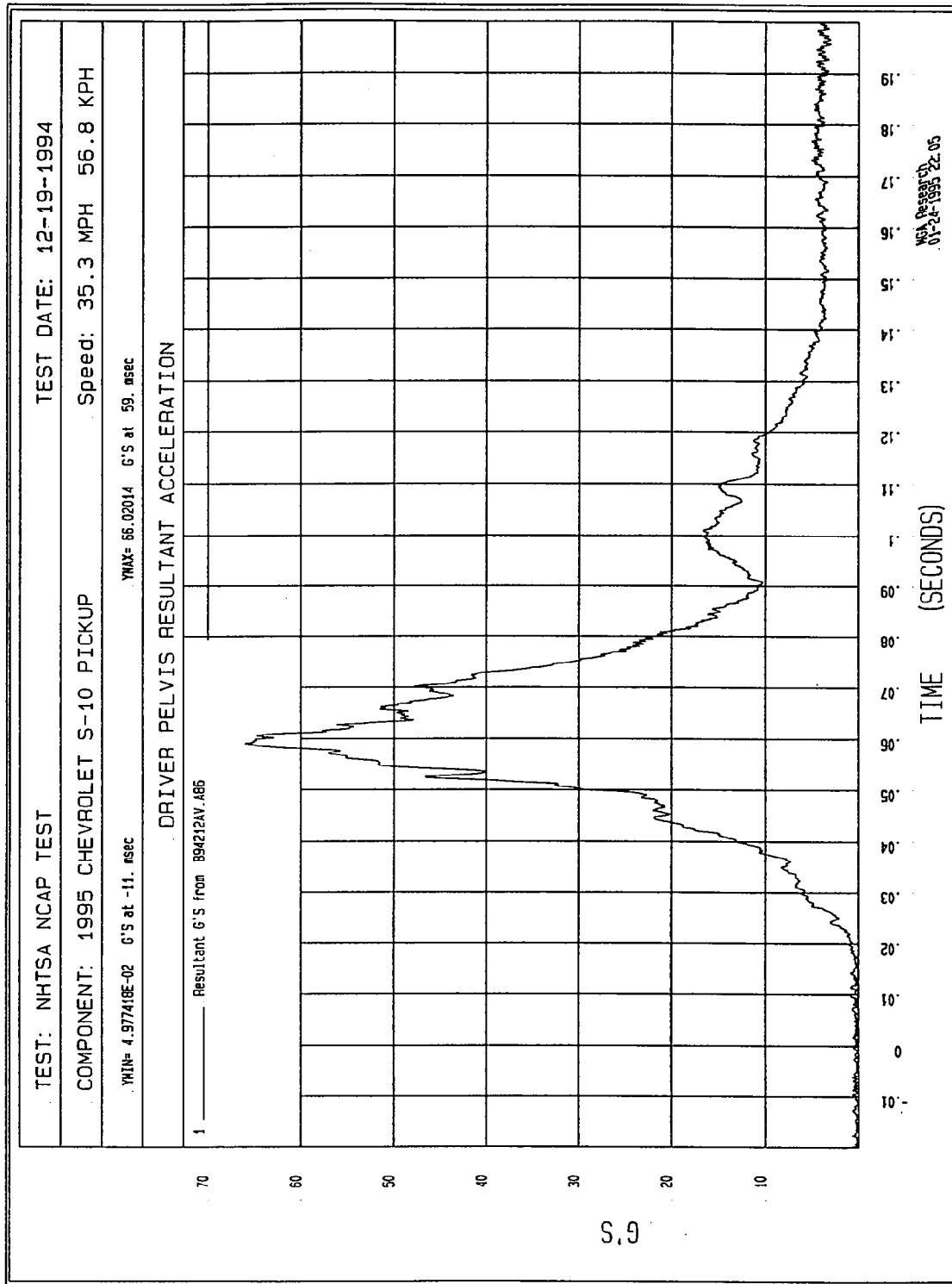


Figure B-59 - Driver Pelvis Resultant Acceleration vs. Time

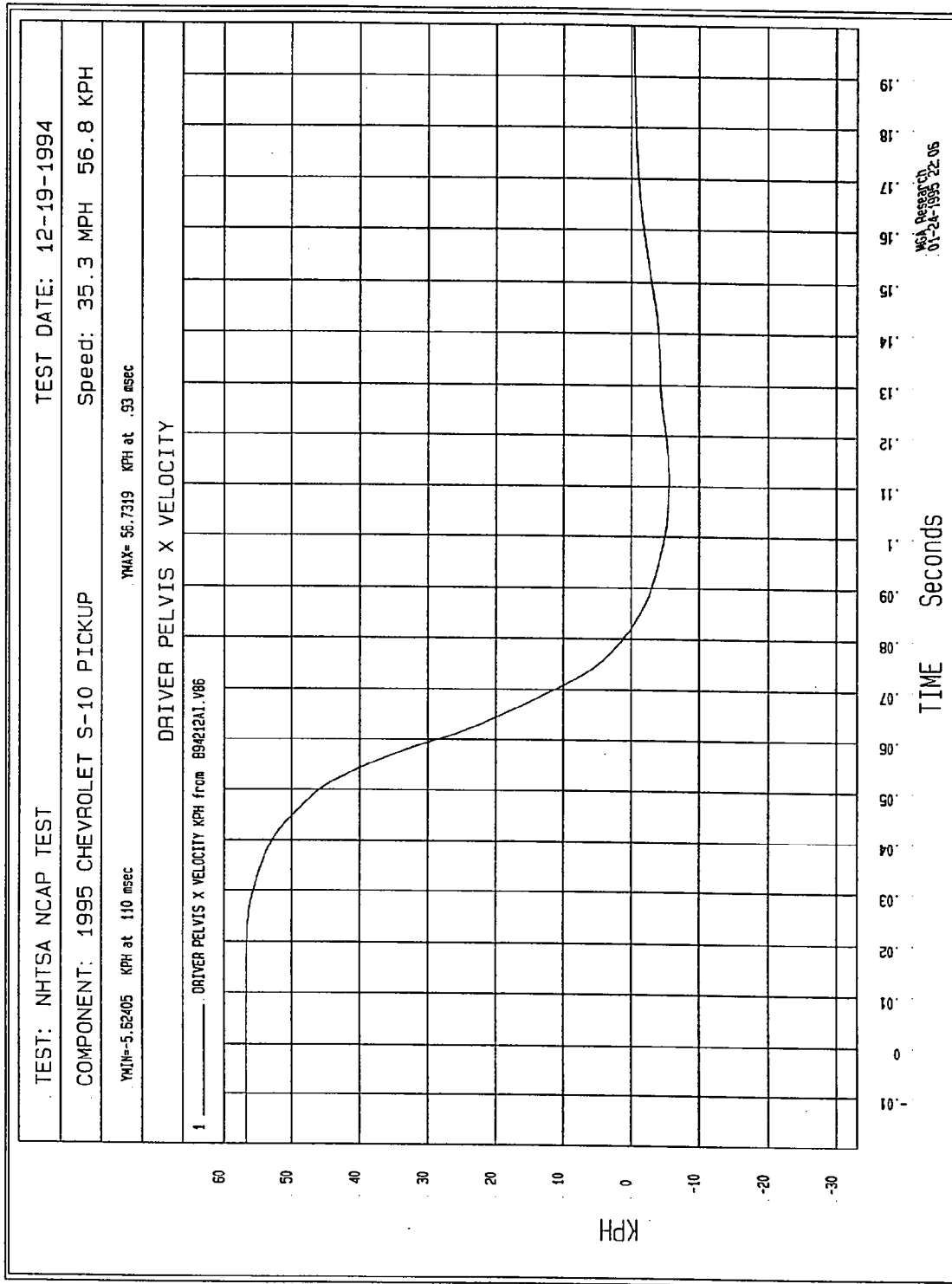


Figure B-60 - Driver Pelvis X Velocity vs. Time

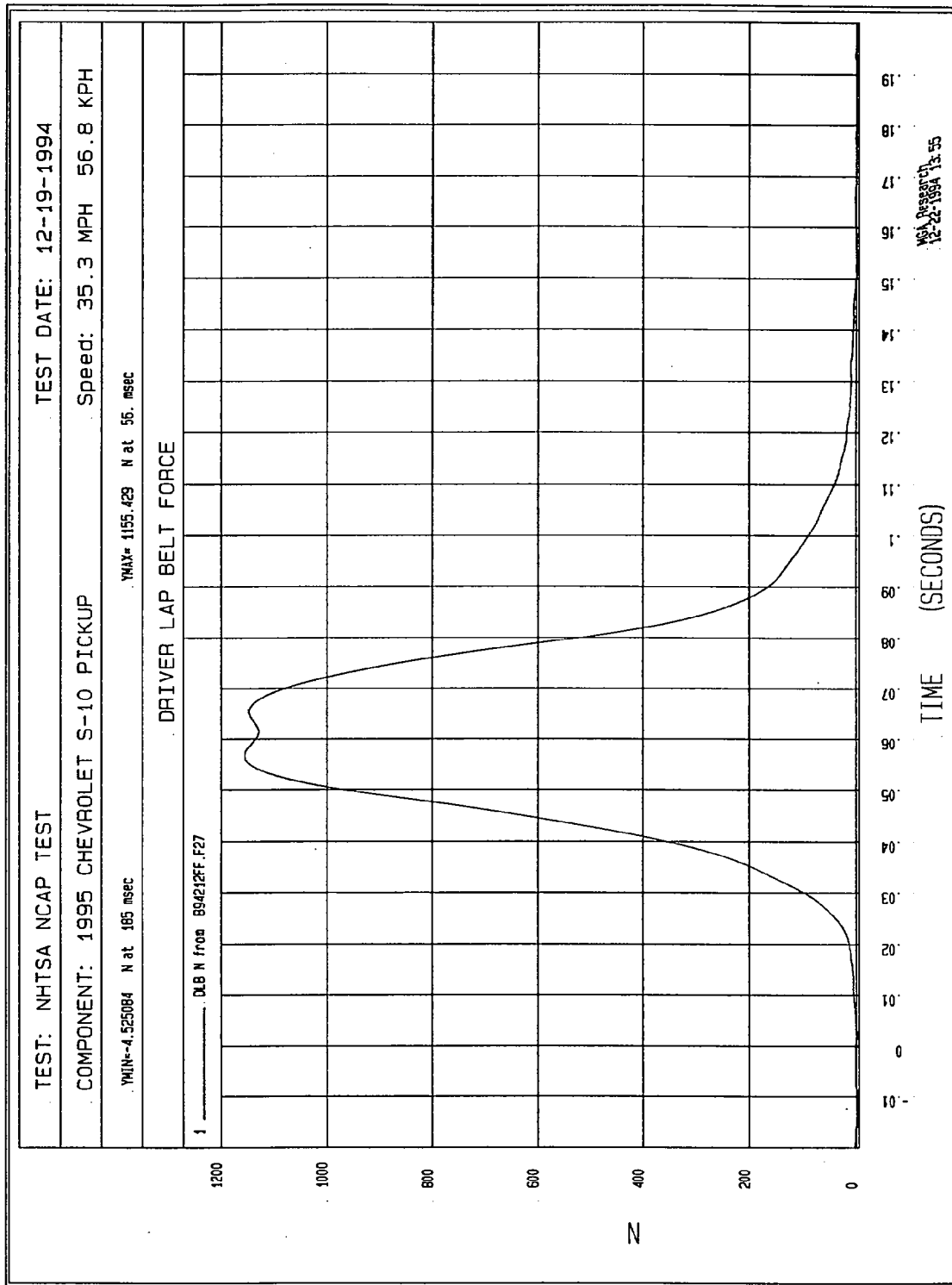
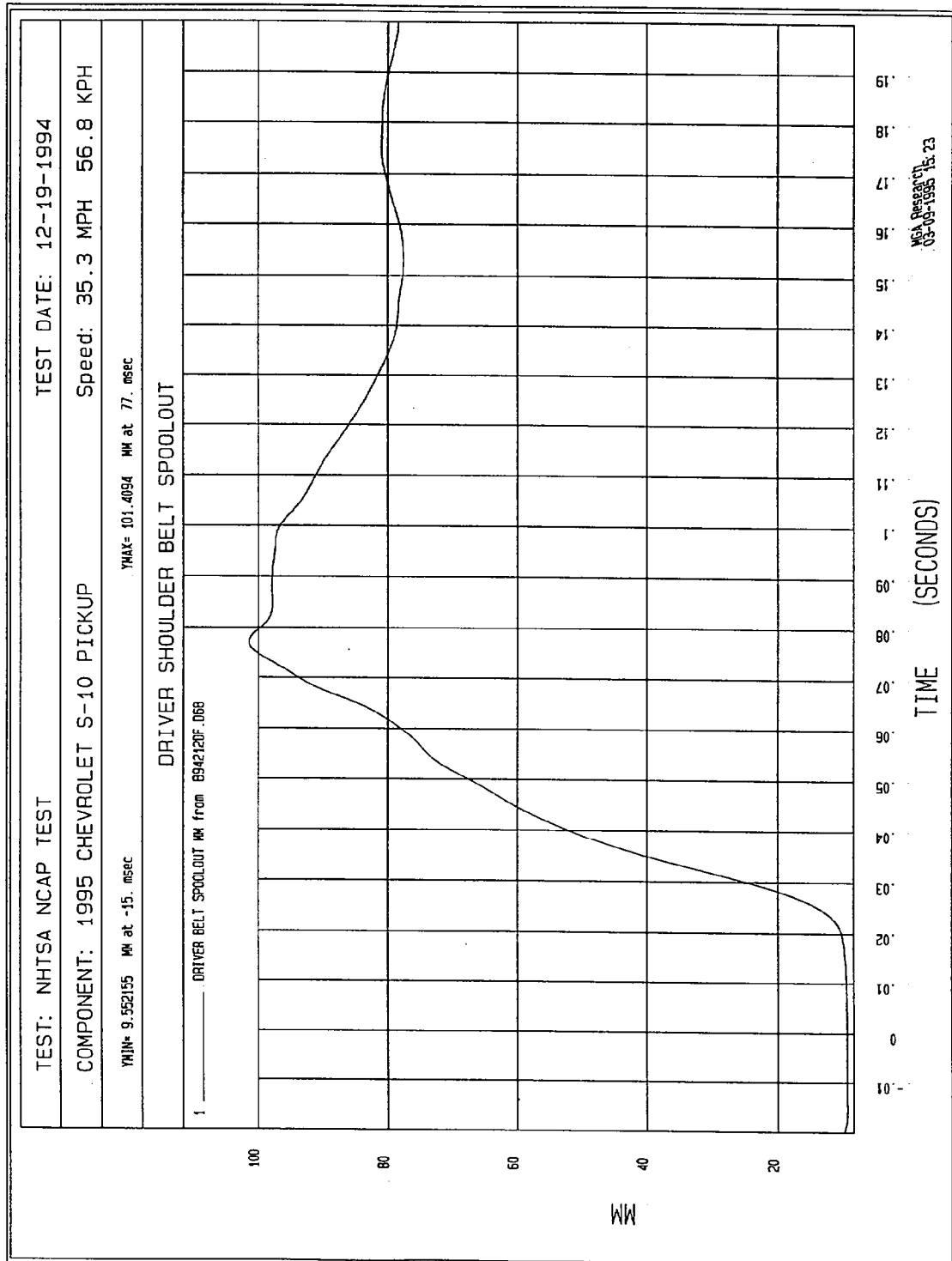


Figure B-61 - Driver Lap Belt Force vs. Time



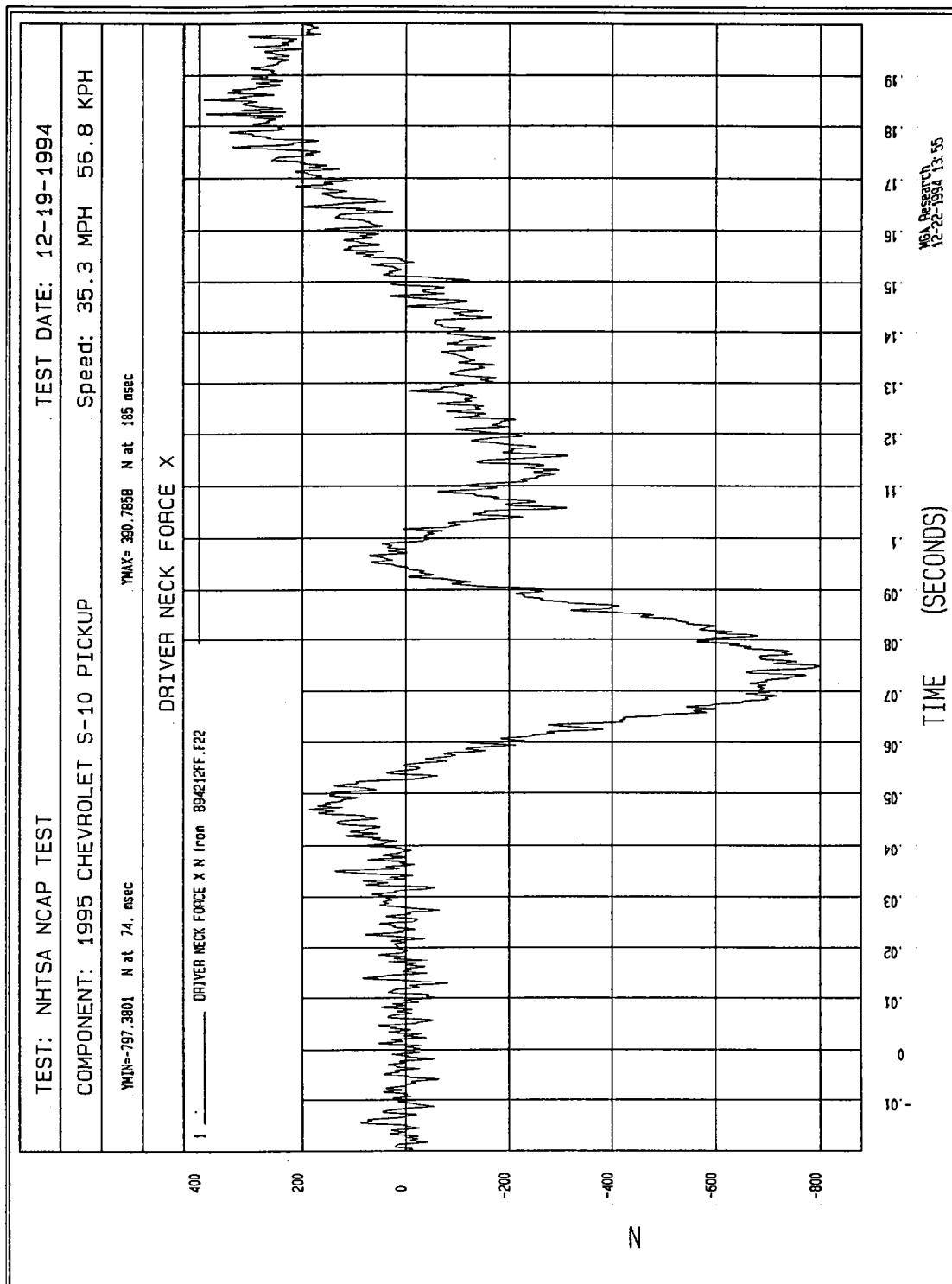


Figure B-63 - Driver Neck Force X vs. Time

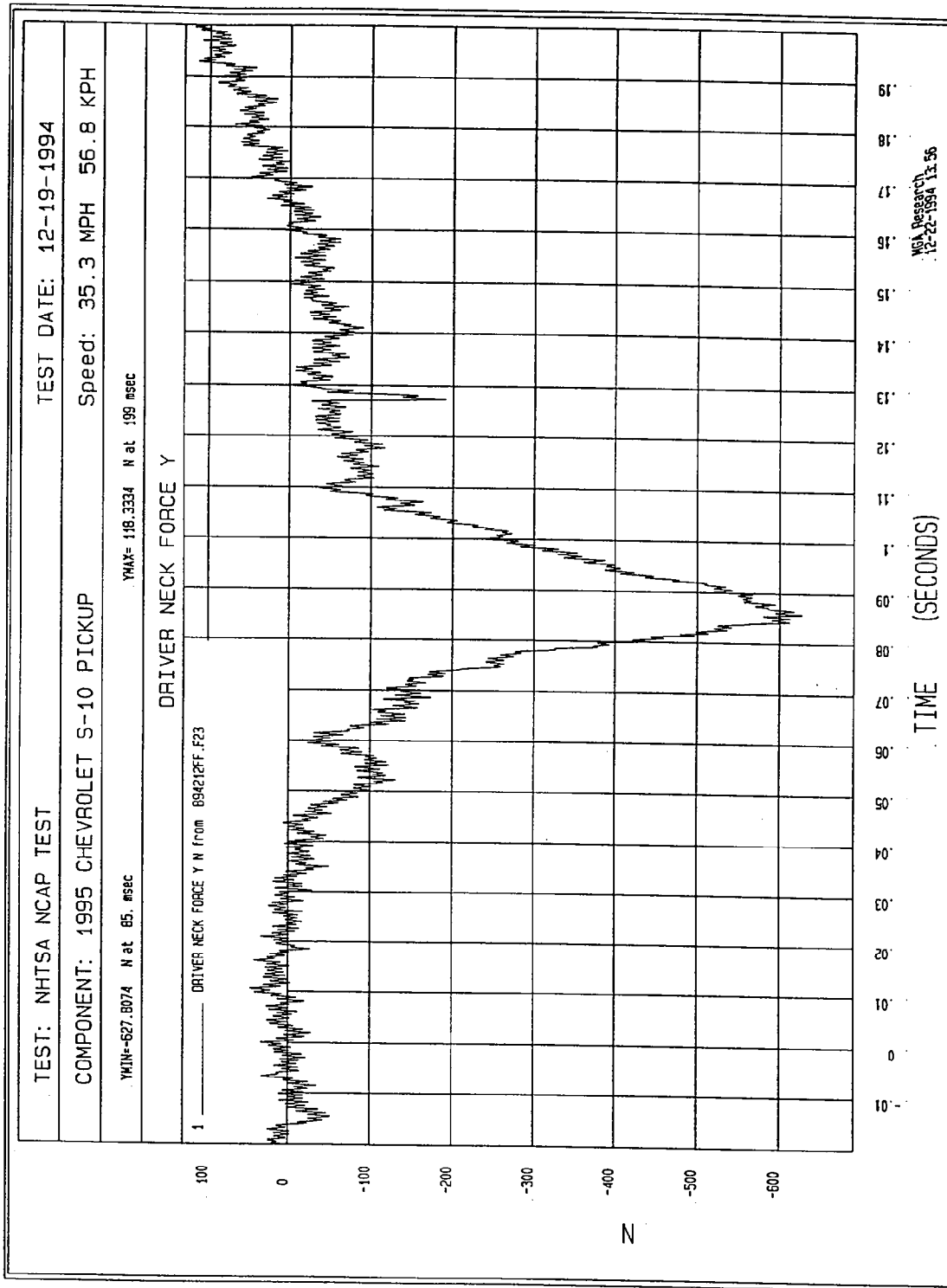


Figure B-64 - Driver Neck Force Y vs. Time

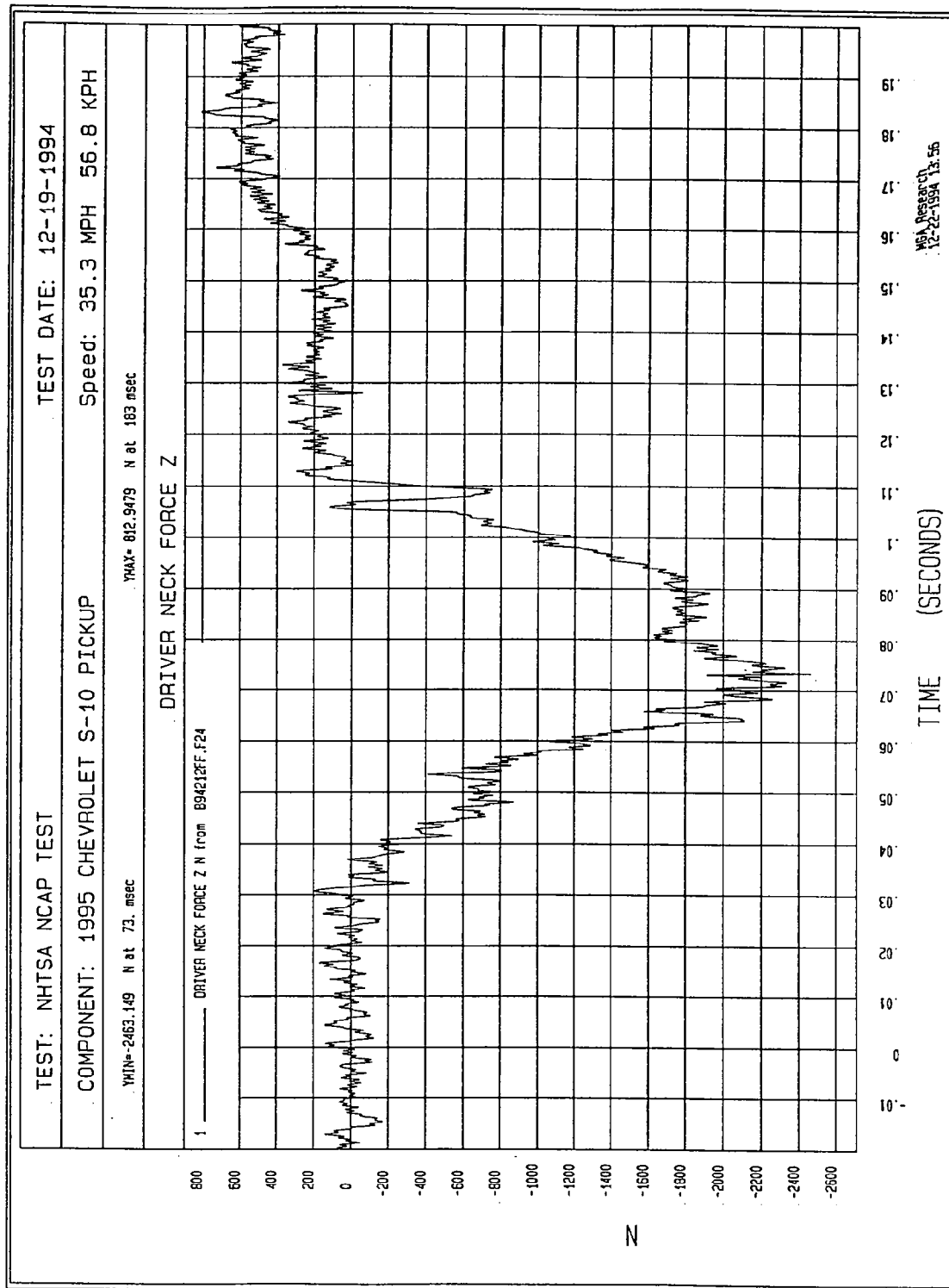


Figure B-65 - Driver Neck Force Z vs. Time

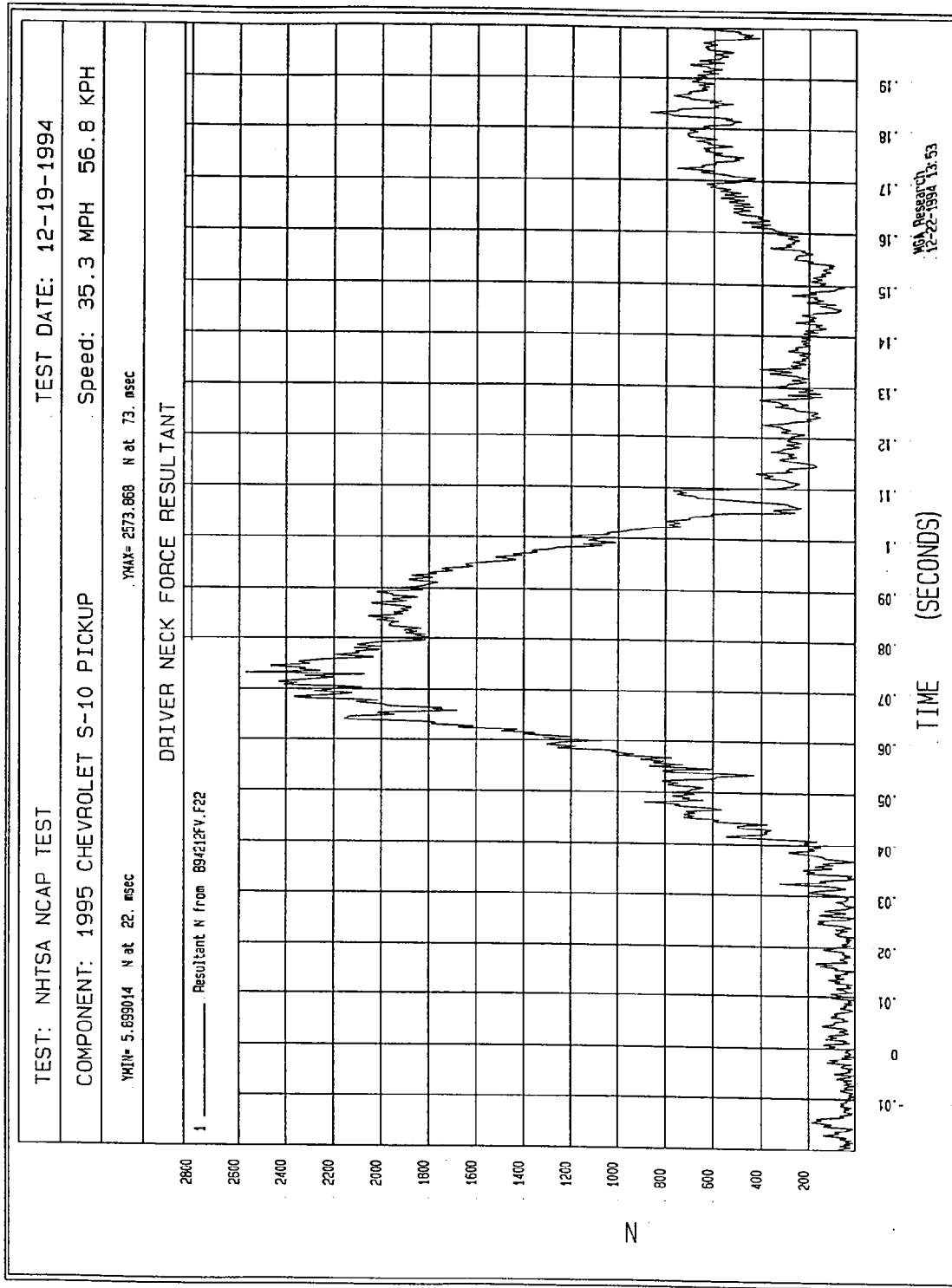


Figure B-66 - Driver Neck Force Resultant vs. Time

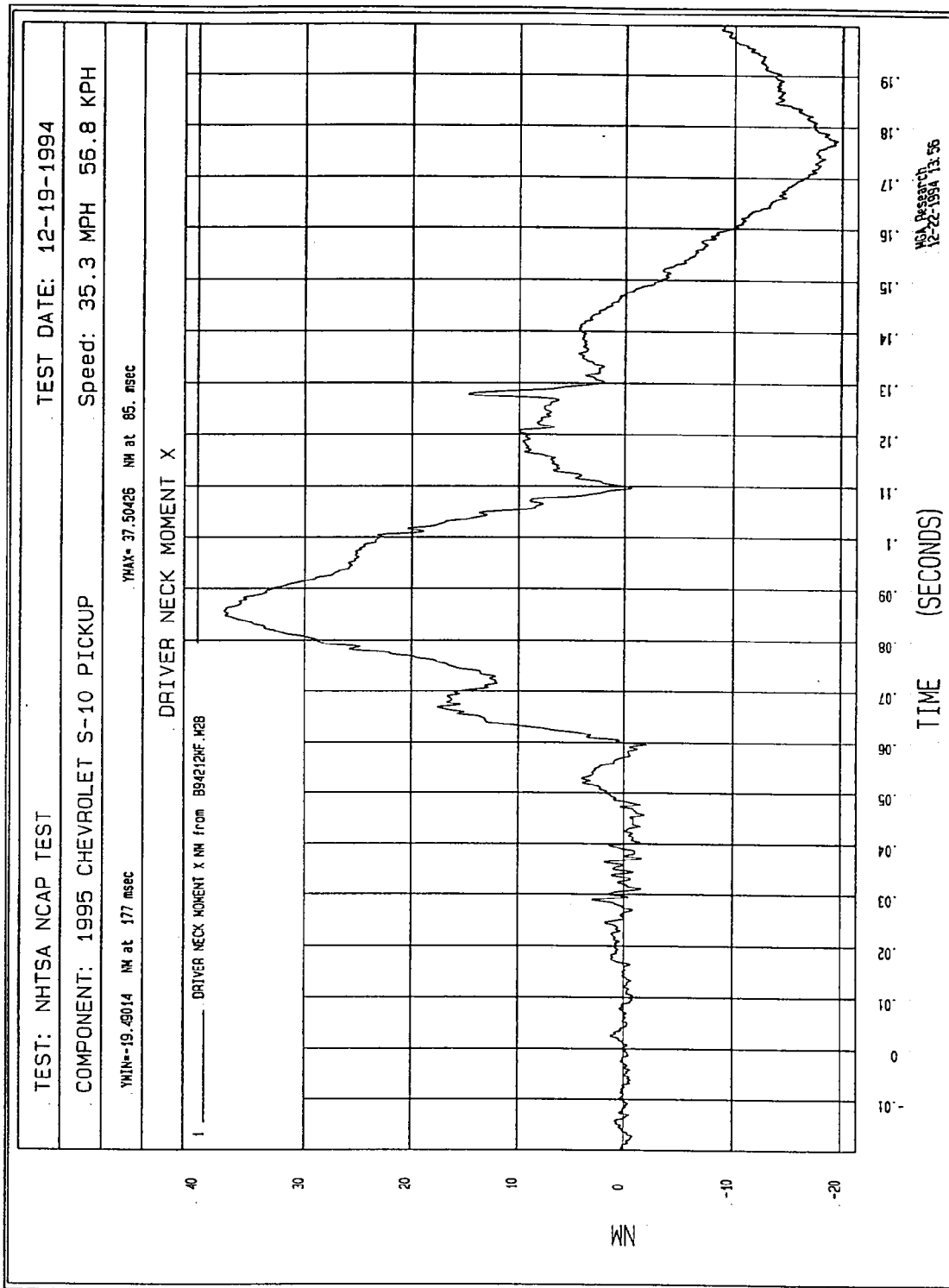


Figure B-67 - Driver Neck Moment X vs. Time

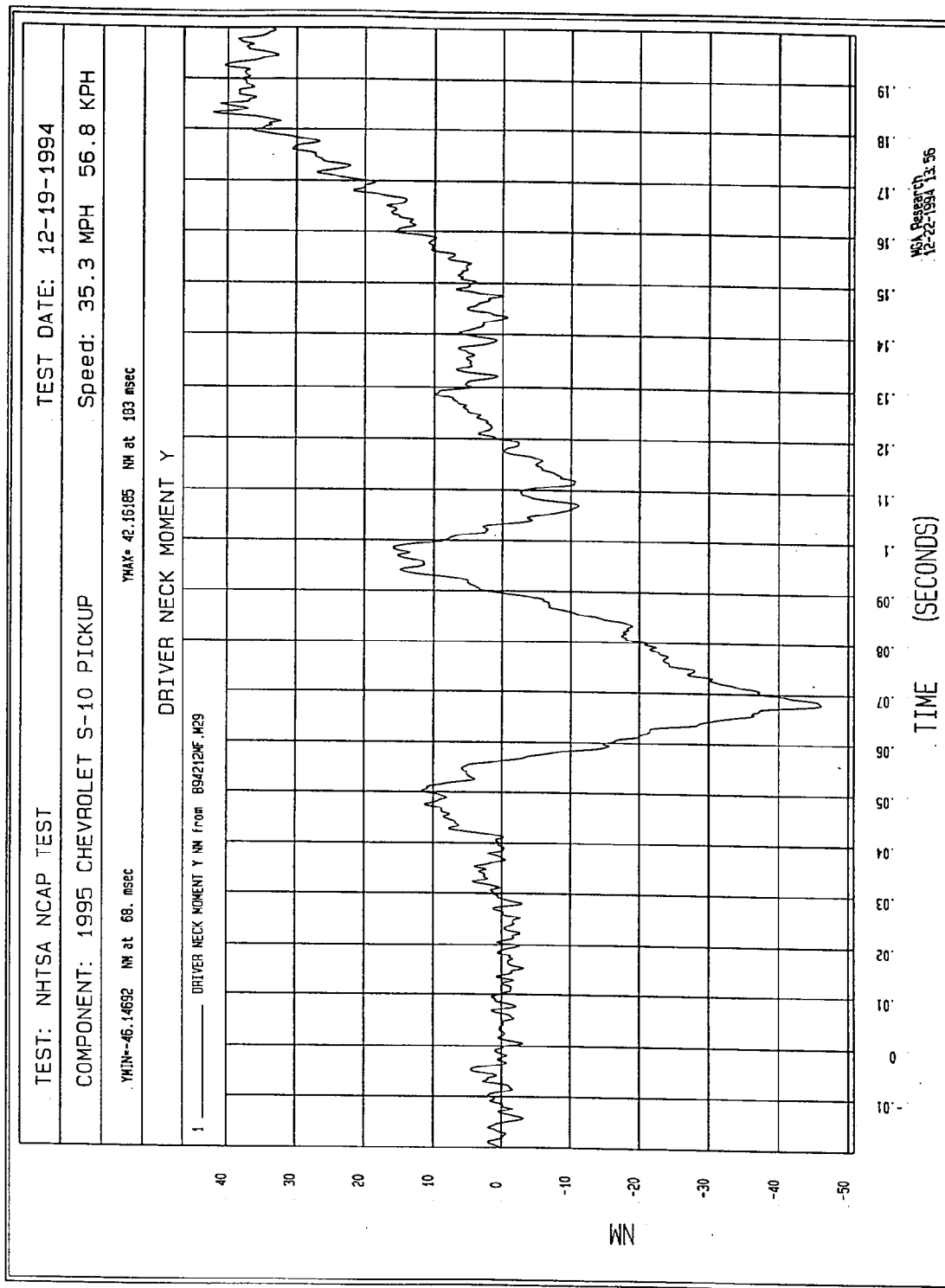


Figure B-68 - Driver Neck Moment Y vs. Time

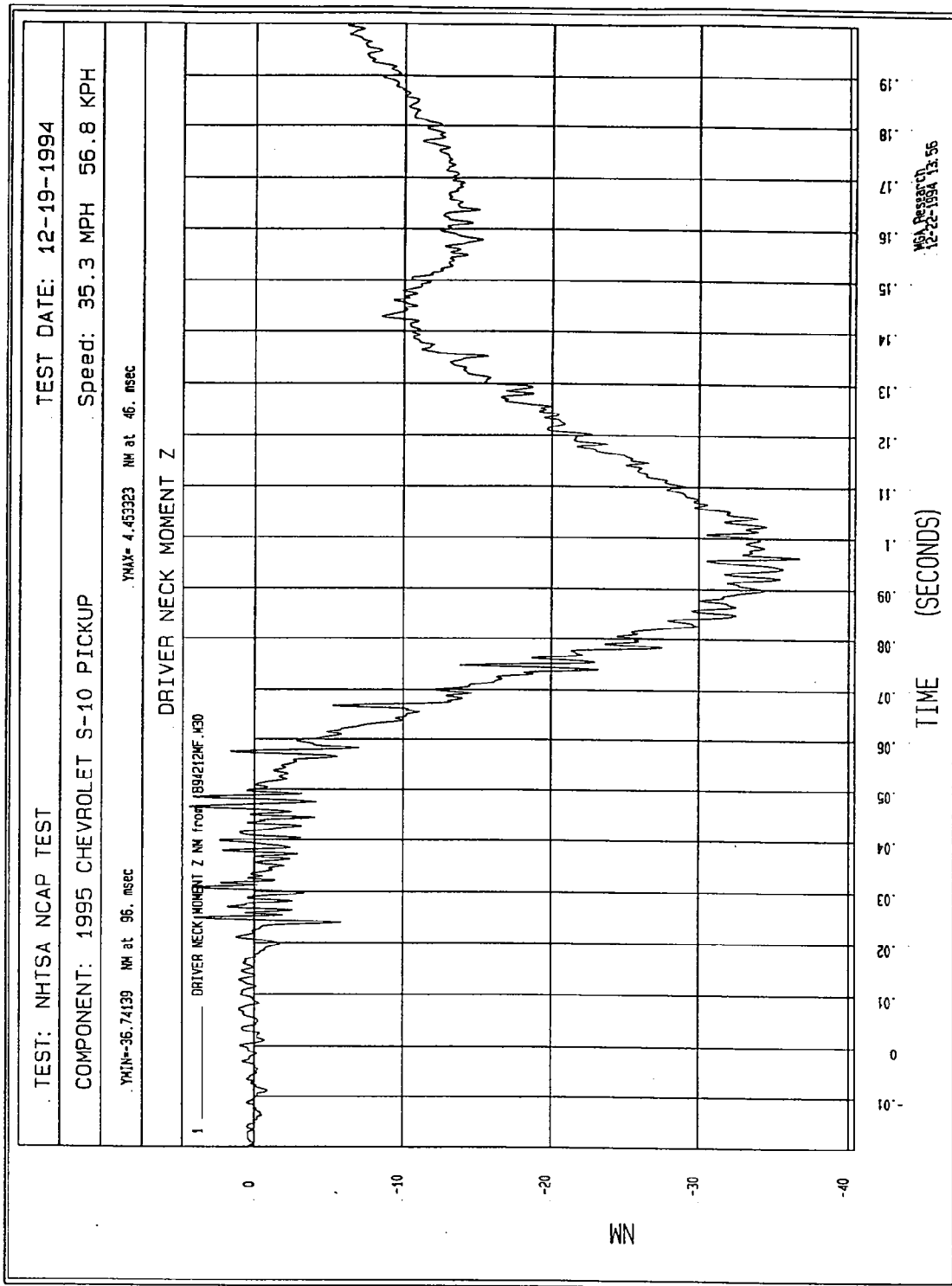


Figure B-69 - Driver Neck Moment Z vs. Time

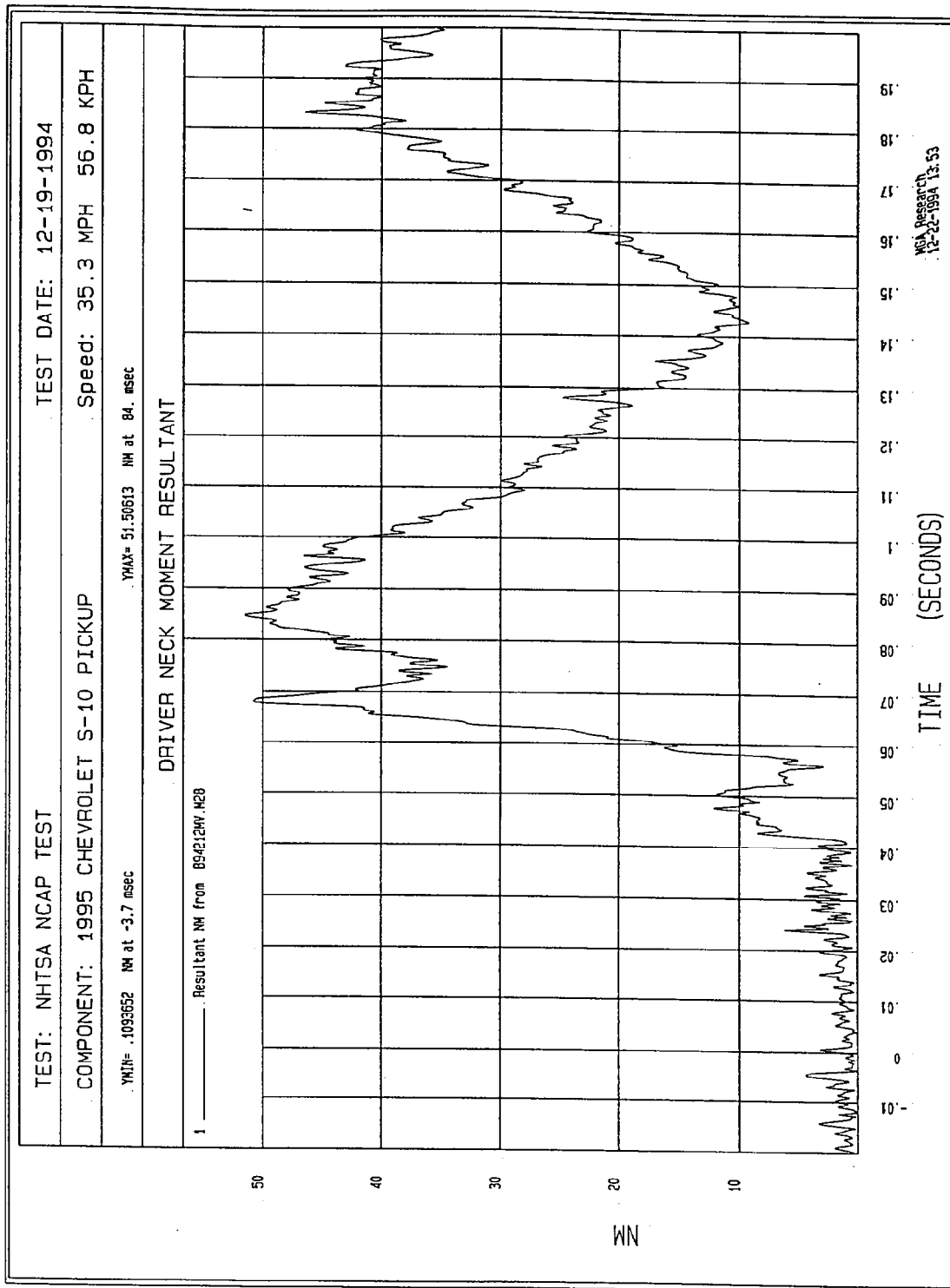


Figure B-70 - Driver Neck Moment Resultant vs. Time

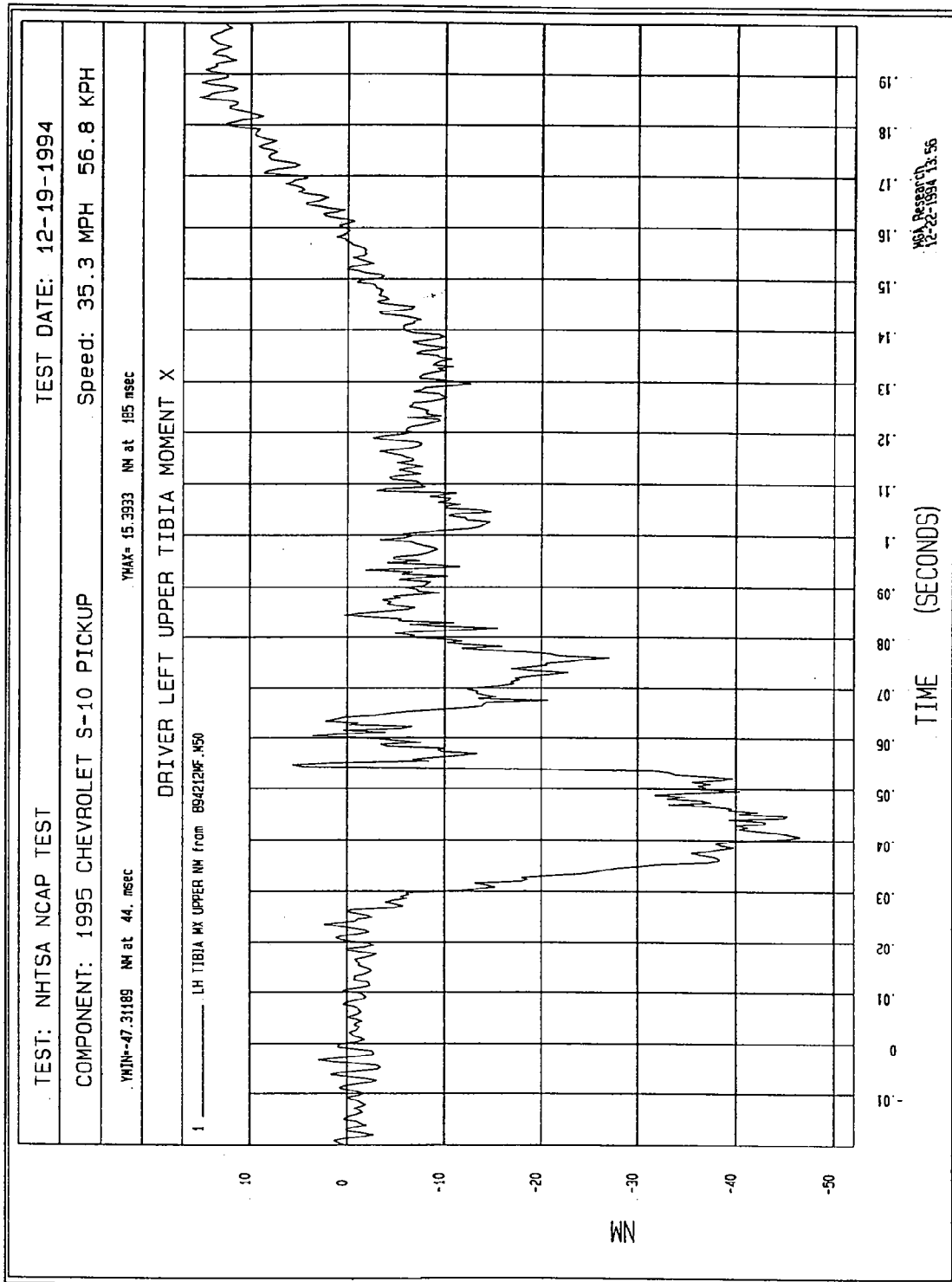


Figure B-71 - Driver Left Upper Tibia Moment X vs. Time

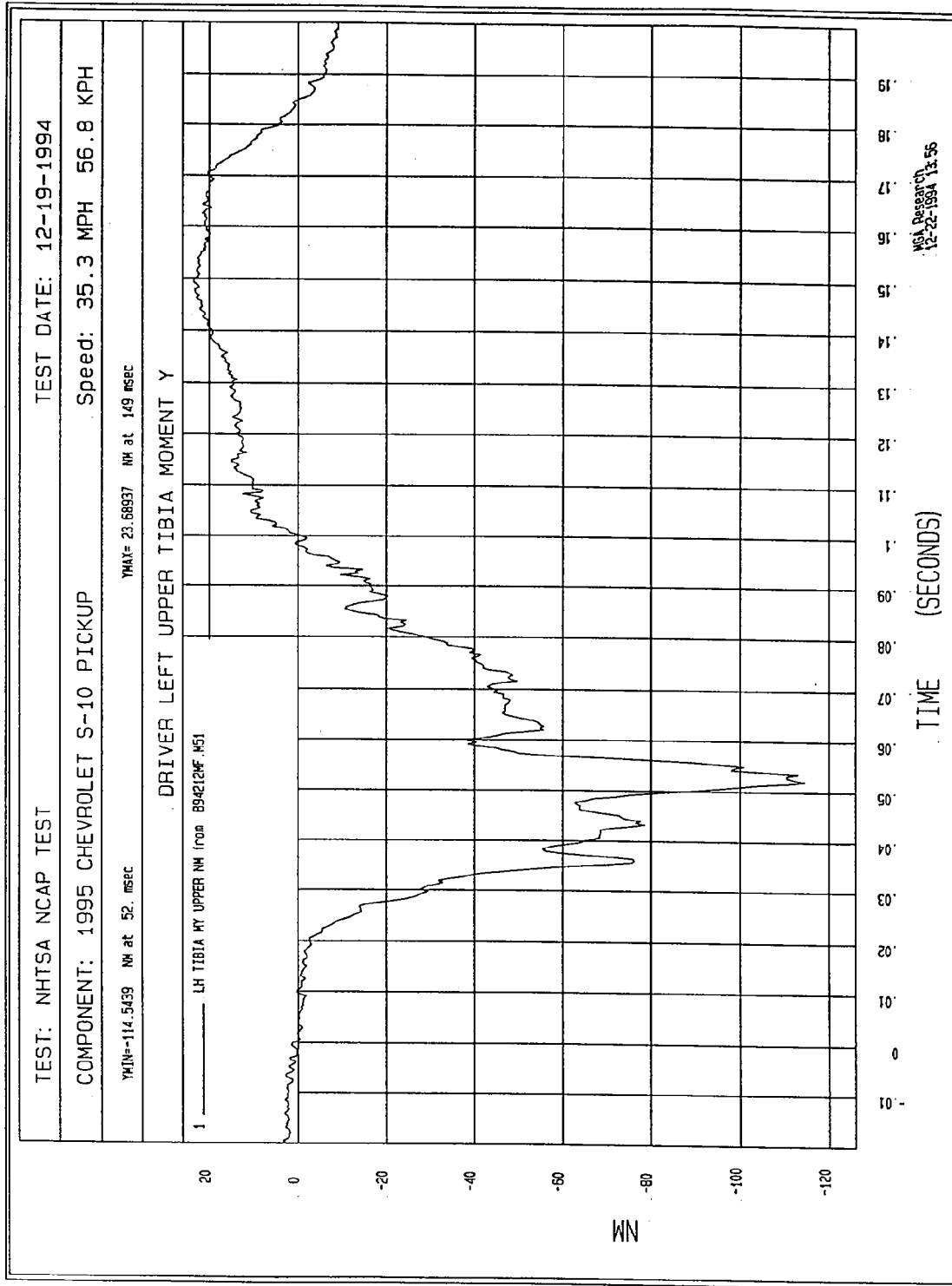


Figure B-72 - Driver Left Upper Tibia Moment Y vs. Time

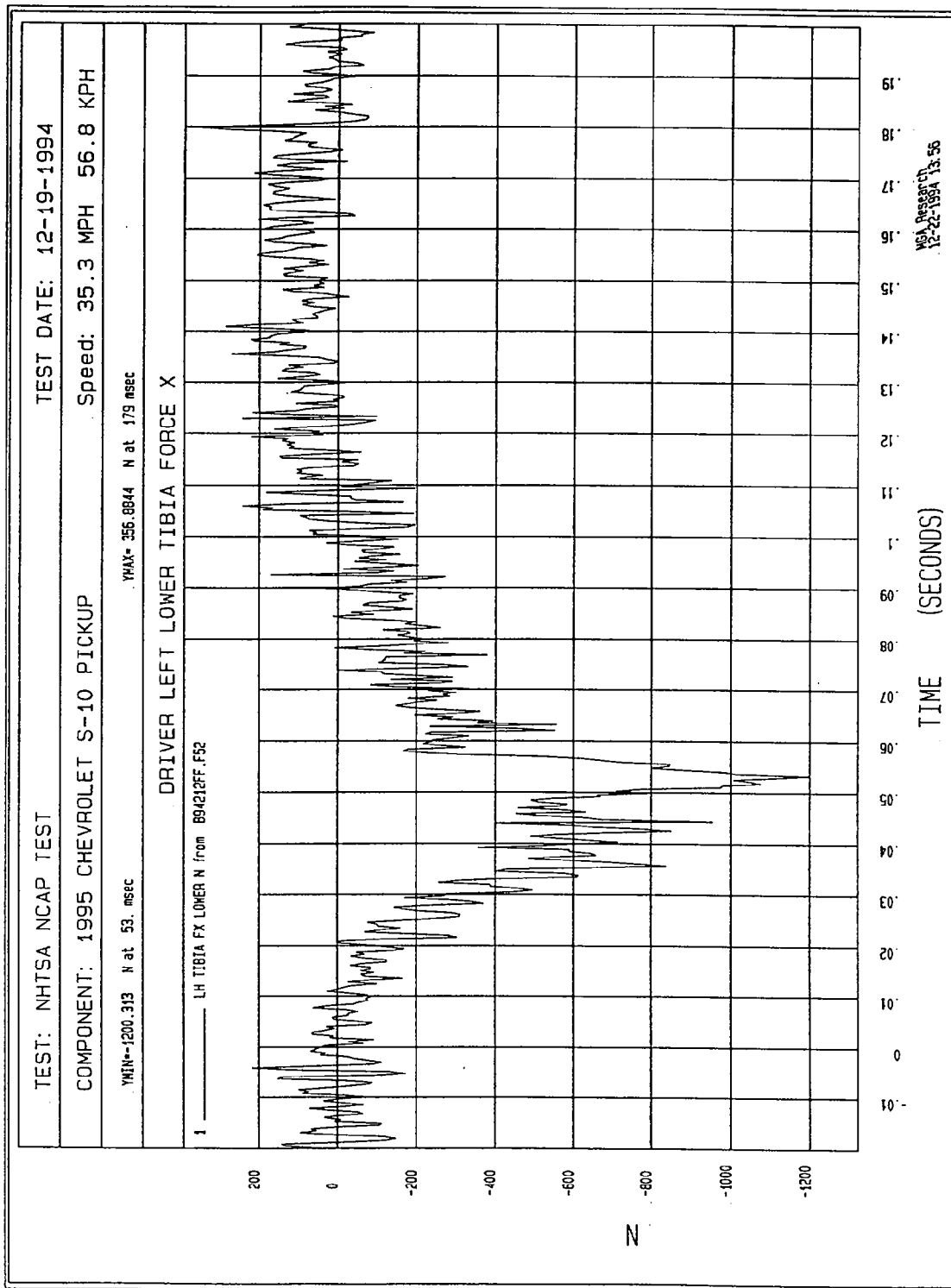


Figure B-73 - Driver Left Lower Tibia Force X vs. Time

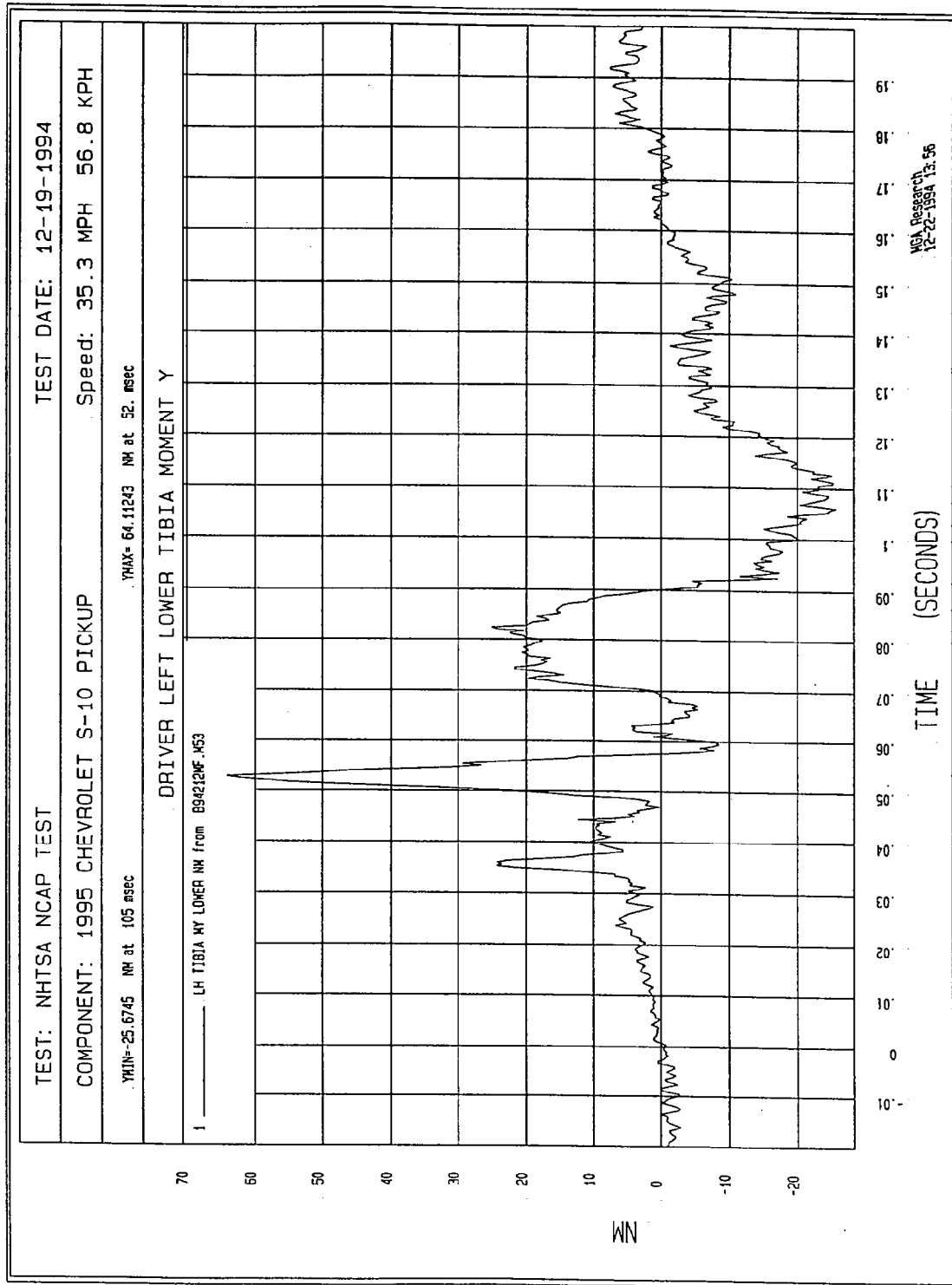


Figure B-74 - Driver Left Lower Tibia Moment Y vs. Time

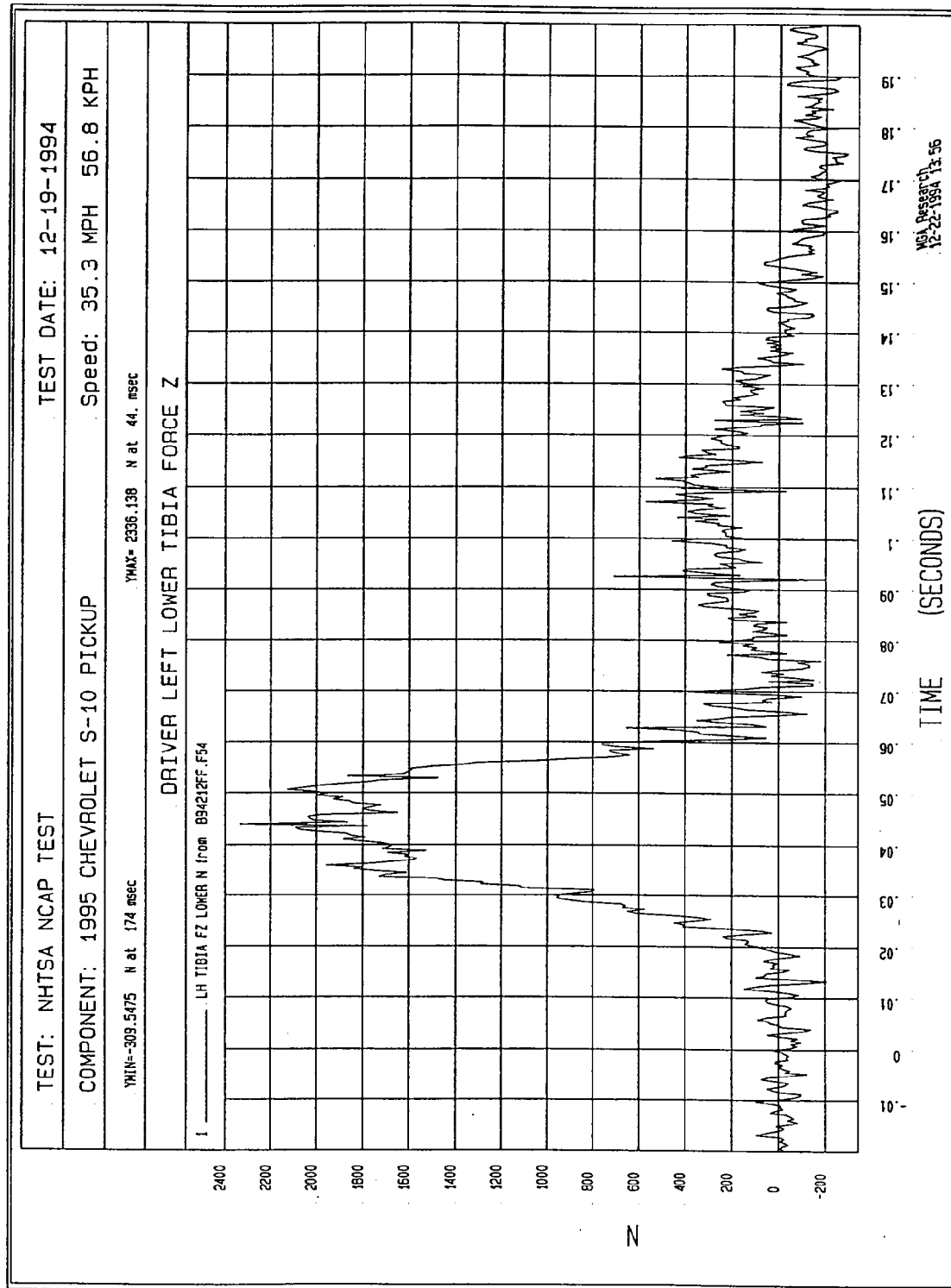


Figure B-75 - Driver Left Lower Tibia Force Z vs. Time

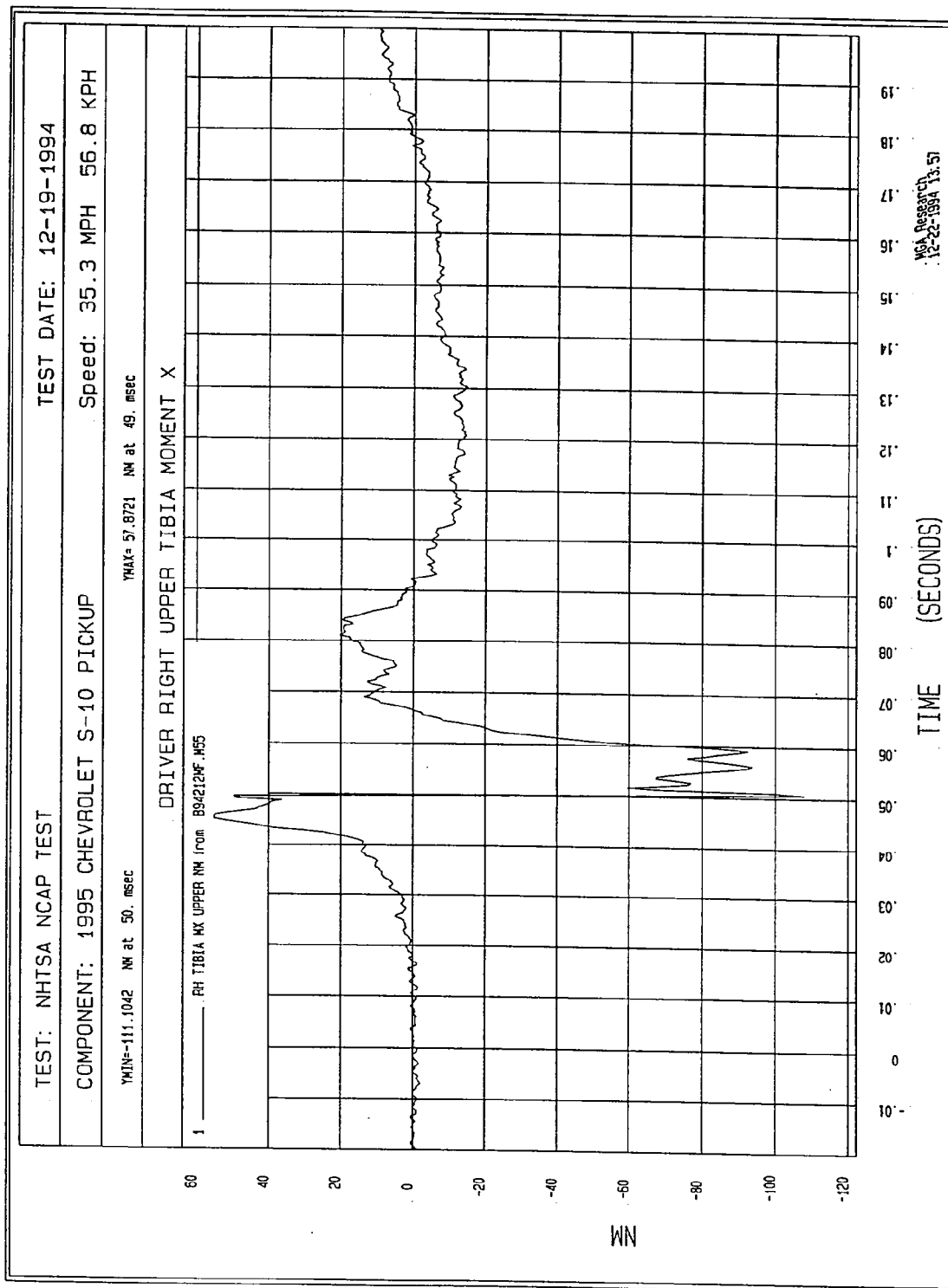


Figure B-76 - Driver Right Upper Tibia Moment X vs. Time

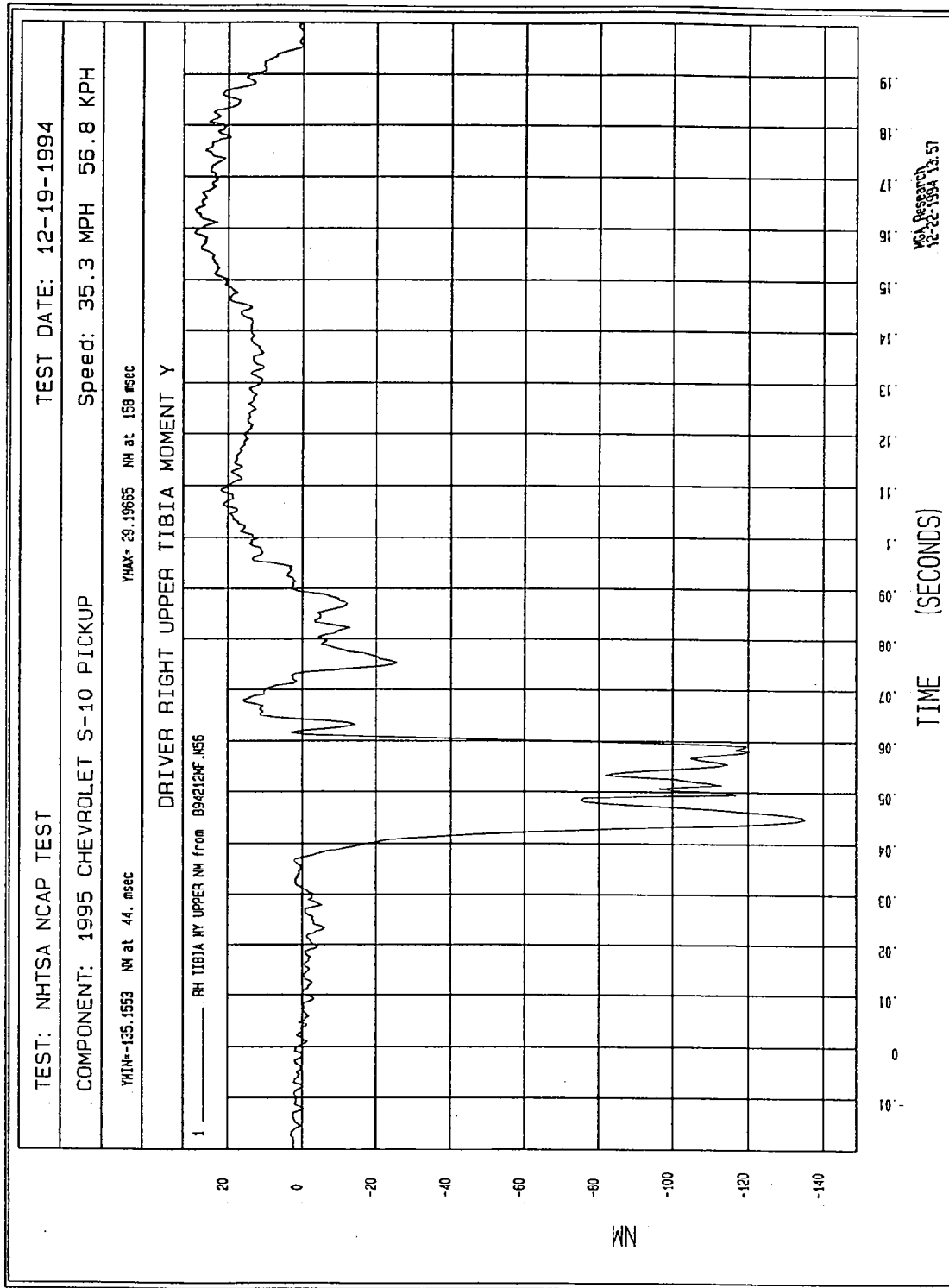


Figure B-77 - Driver Right Upper Tibia Moment Y vs. Time

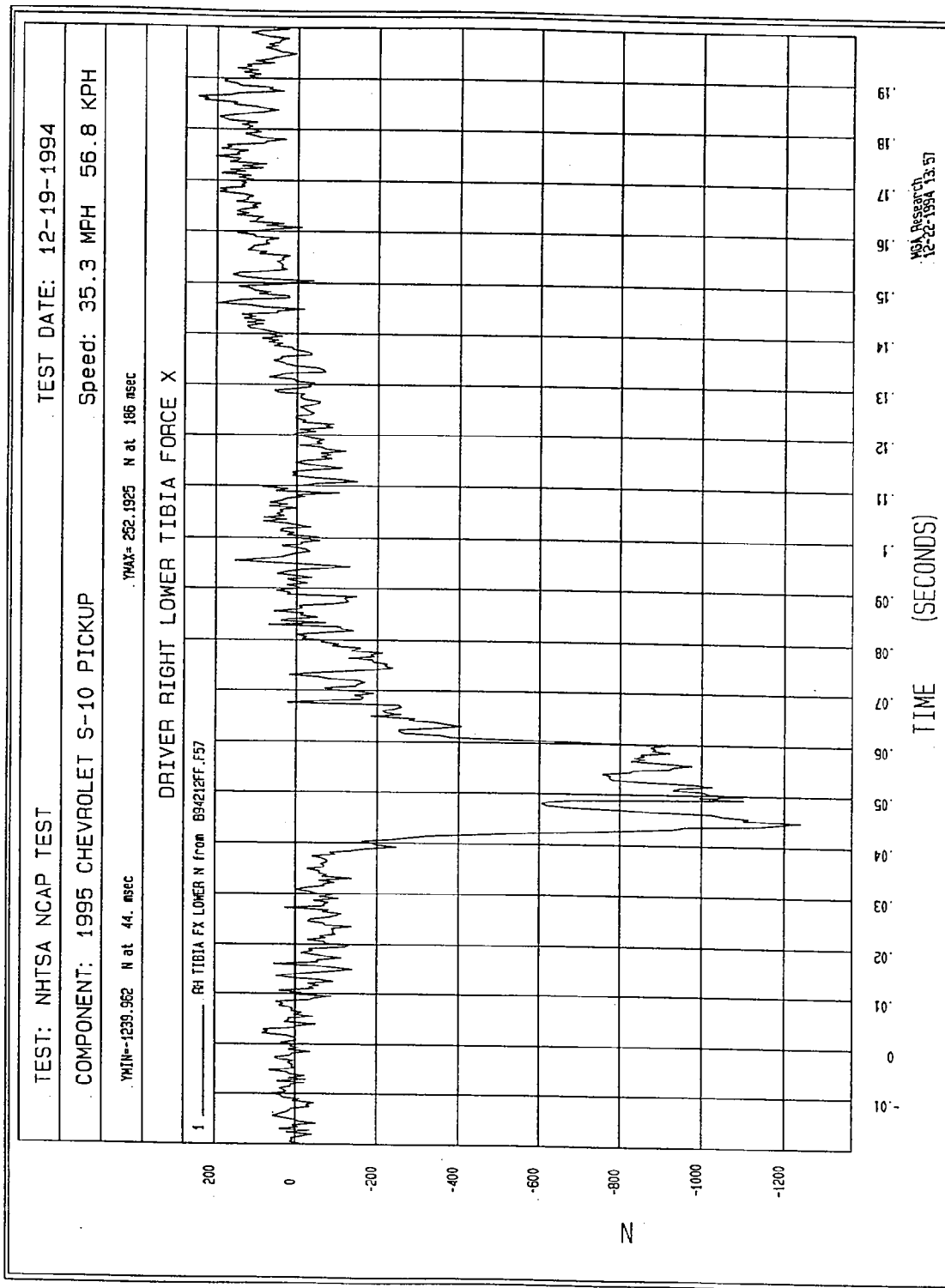
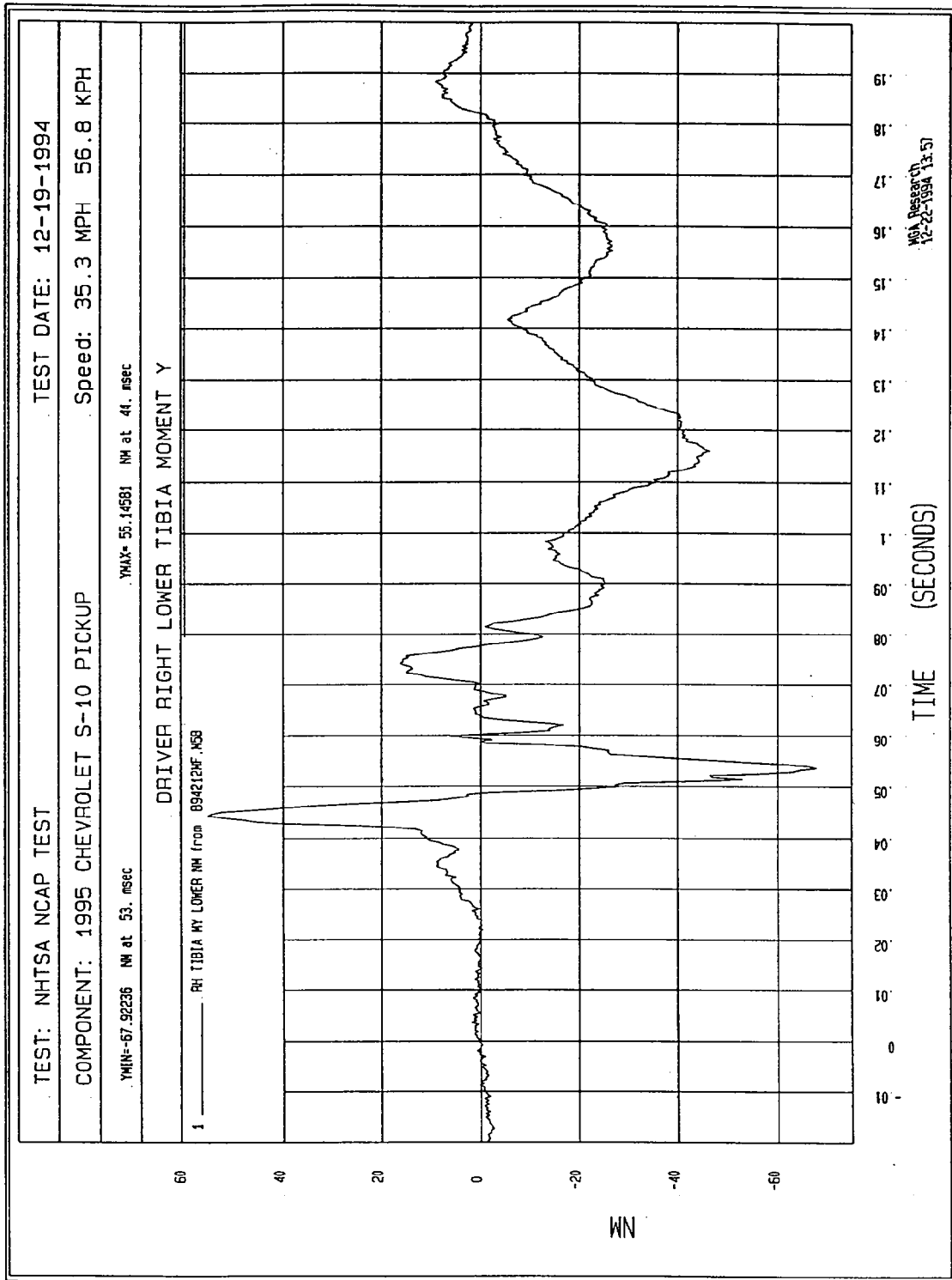


Figure B-78 - Driver Right Lower Tibia Force X vs. Time



B-79

Figure B-79 - Driver Right Lower Tibia Moment Y vs. Time

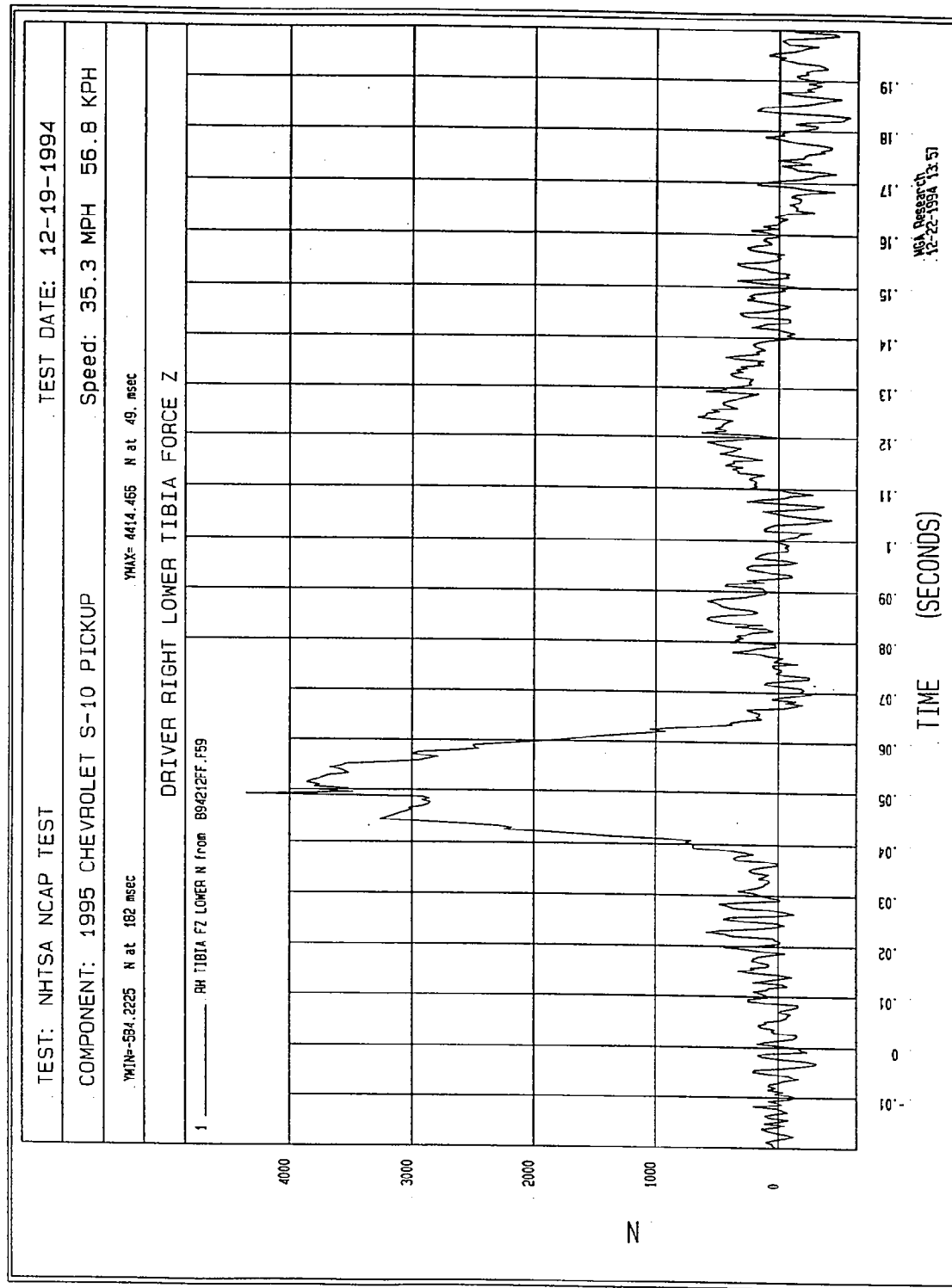


Figure B-80 - Driver Right Lower Tibia Force Z vs. Time

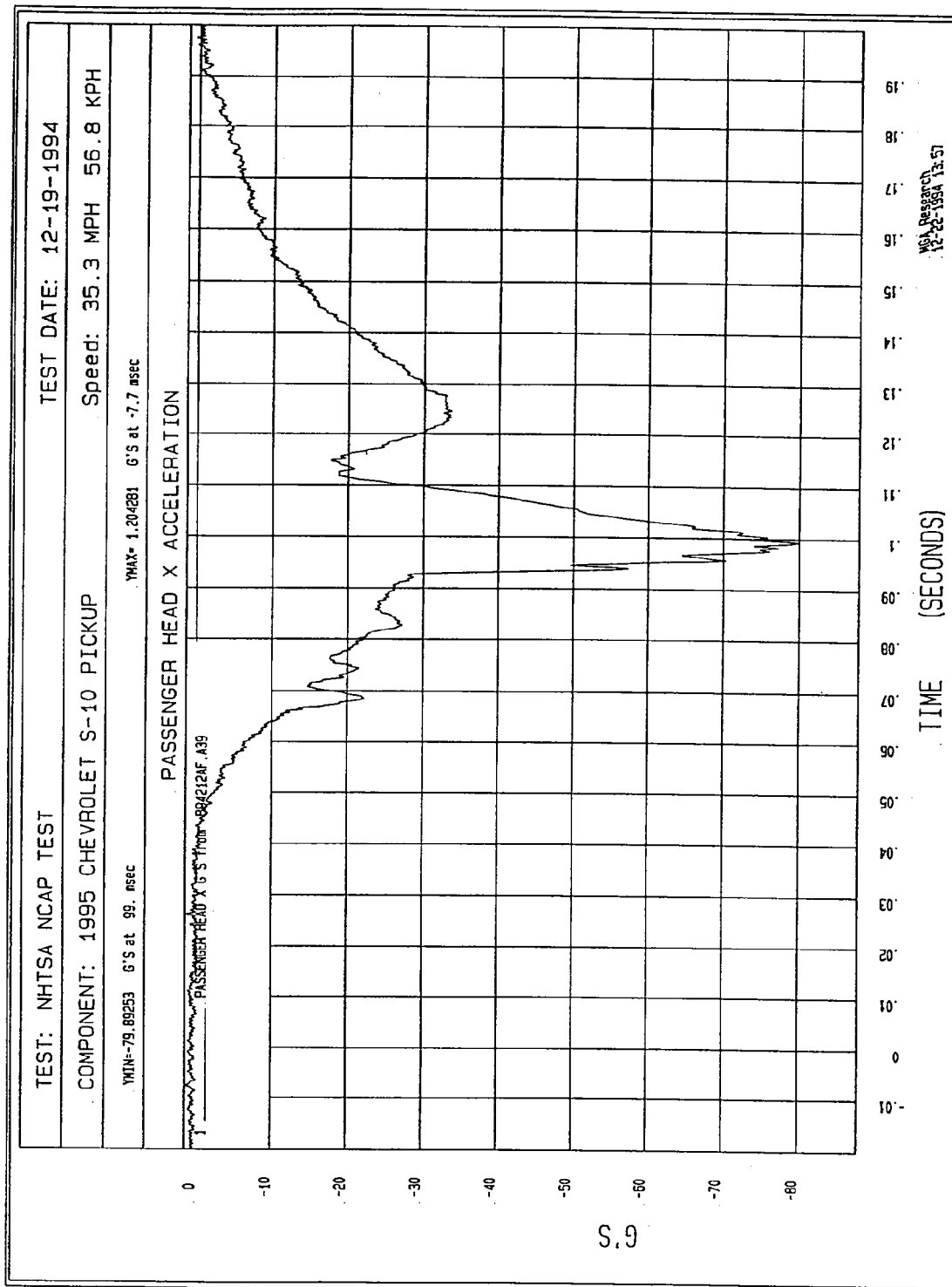


Figure B-81 - Passenger Head X Acceleration vs. Time

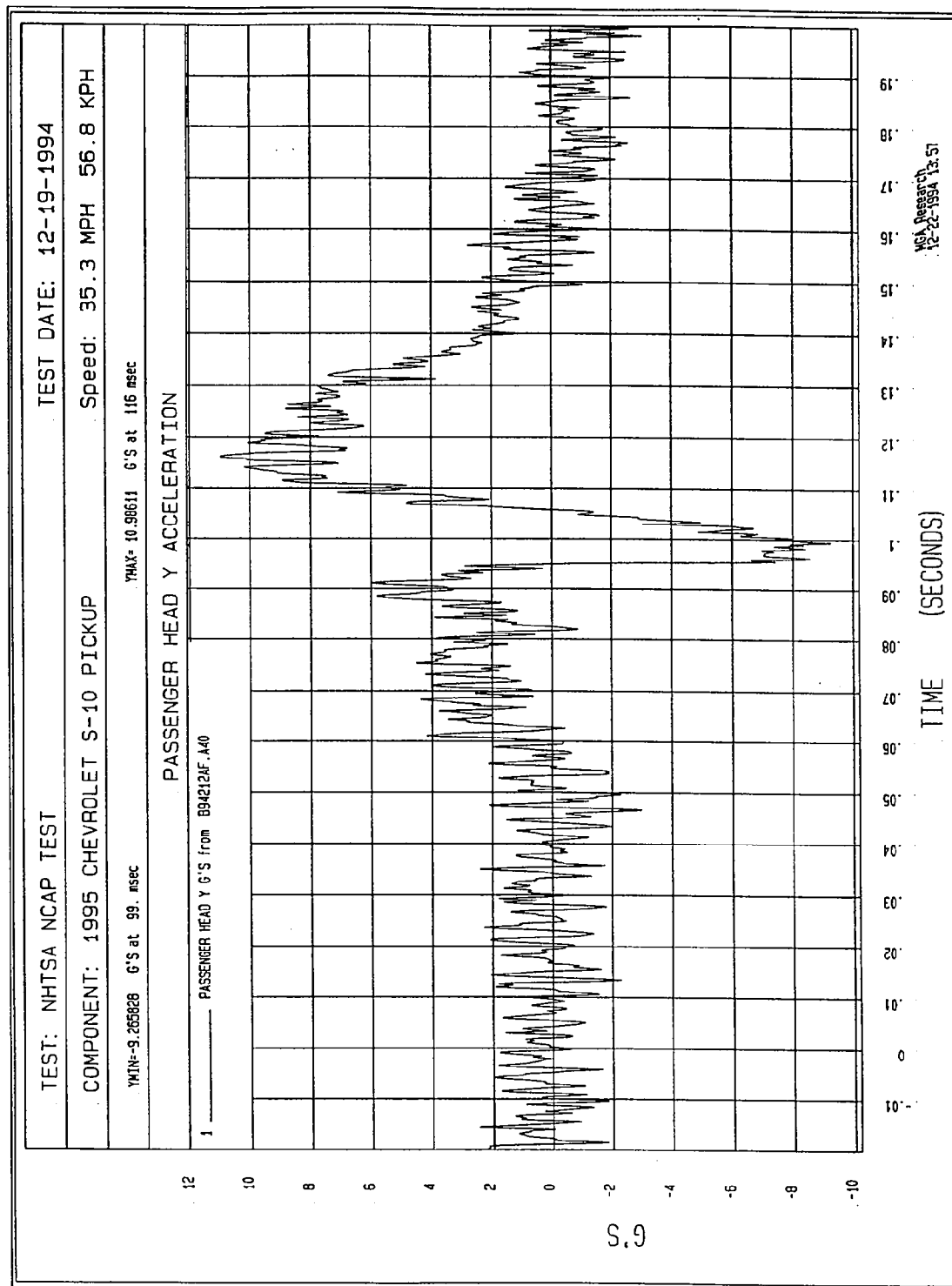


Figure B-82 - Passenger Head Y Acceleration vs. Time

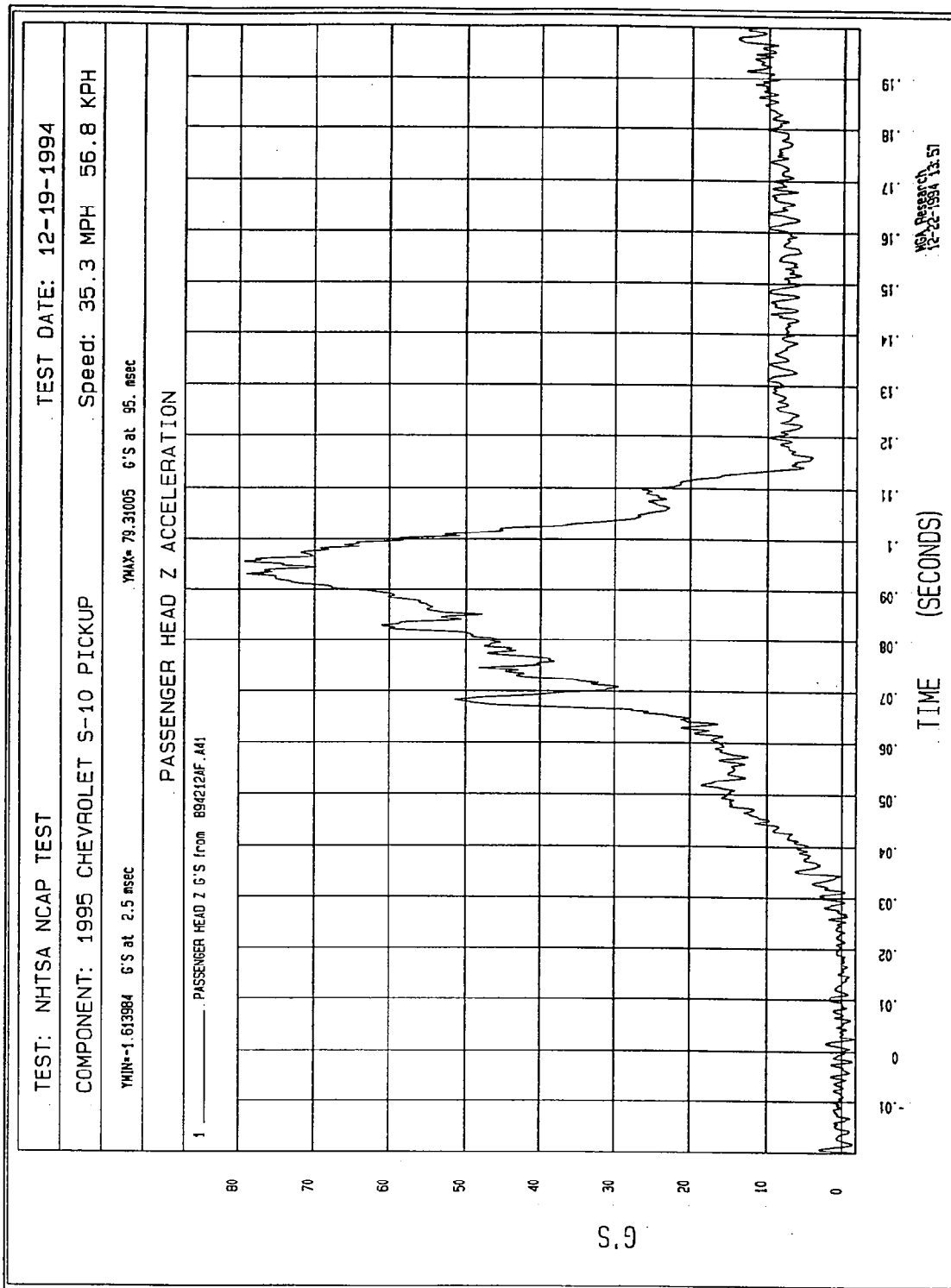


Figure B-83 - Passenger Head Z Acceleration vs. Time

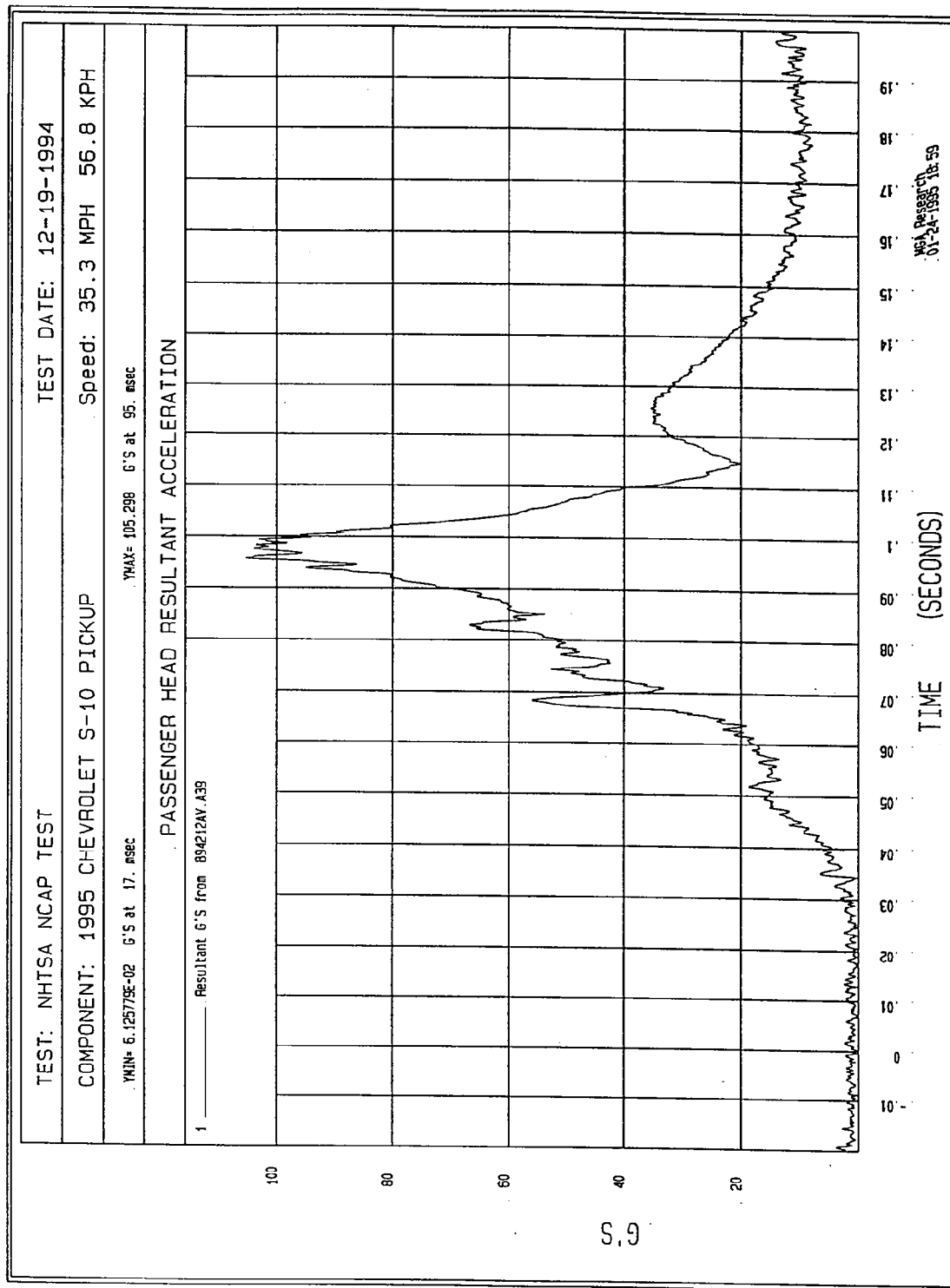


Figure B-84 - Passenger Head Resultant Acceleration vs. Time

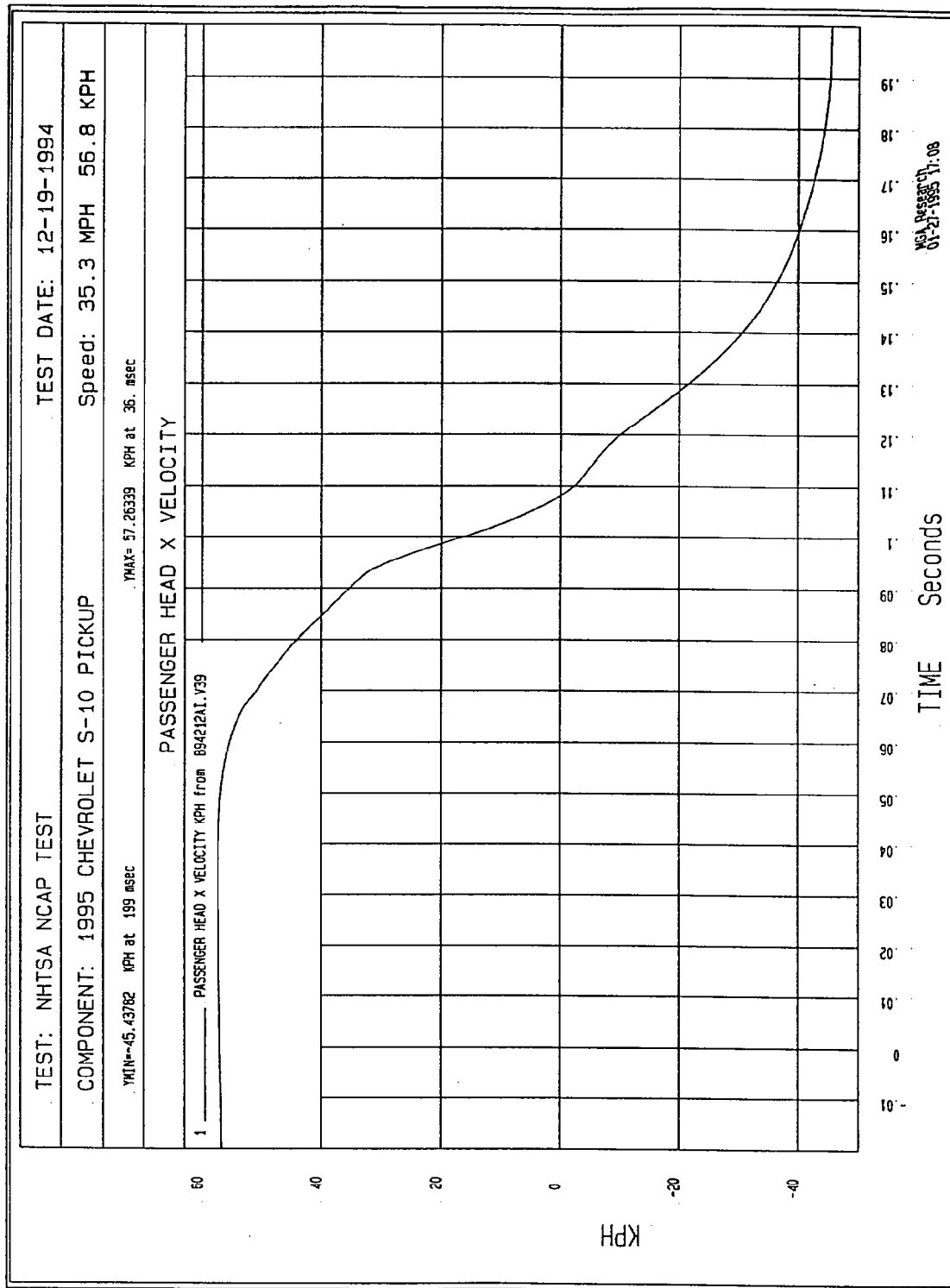


Figure B-85 - Passenger Head X Velocity vs. Time

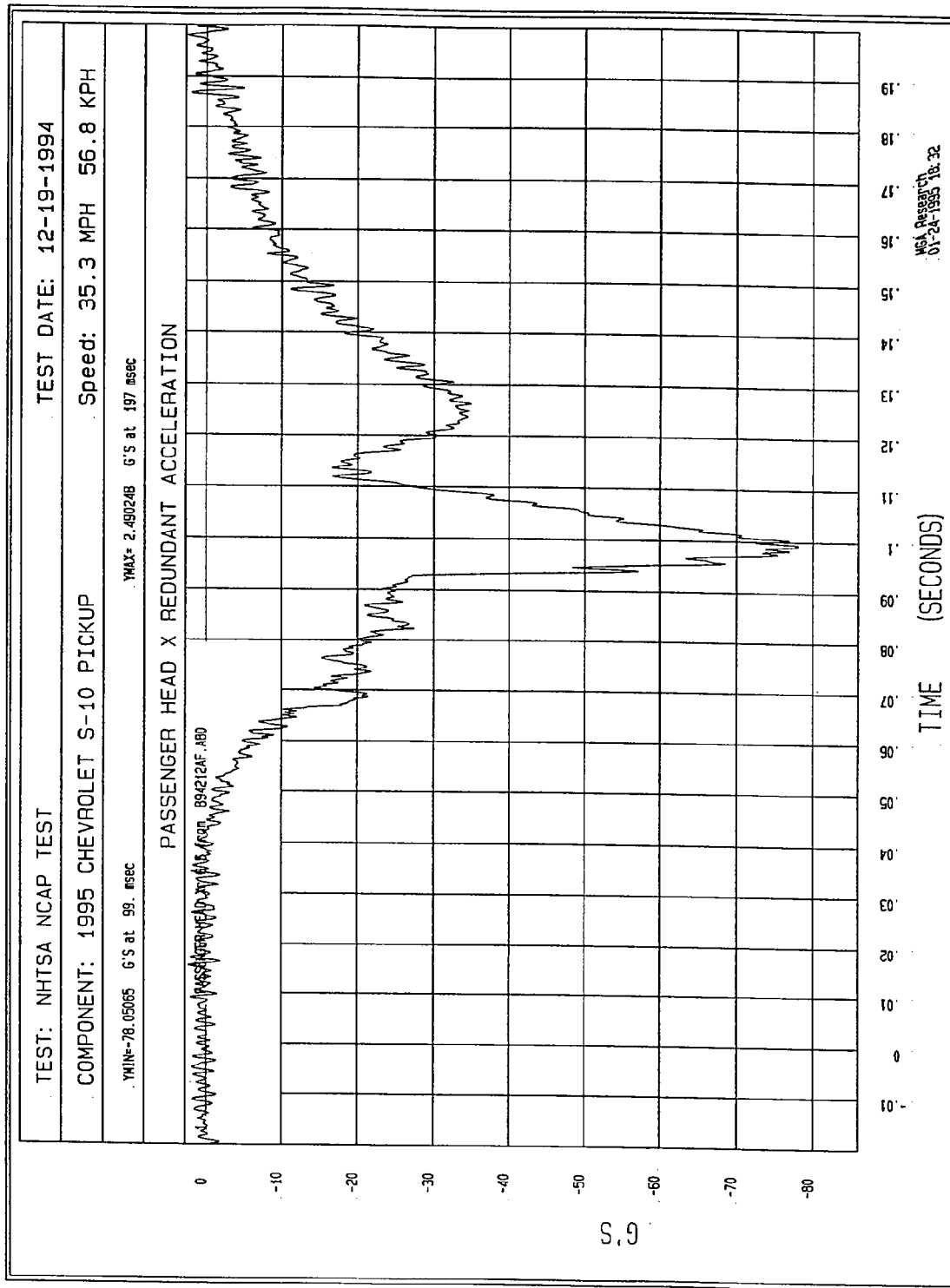


Figure B-86 - Passenger Head X Redundant Acceleration vs. Time

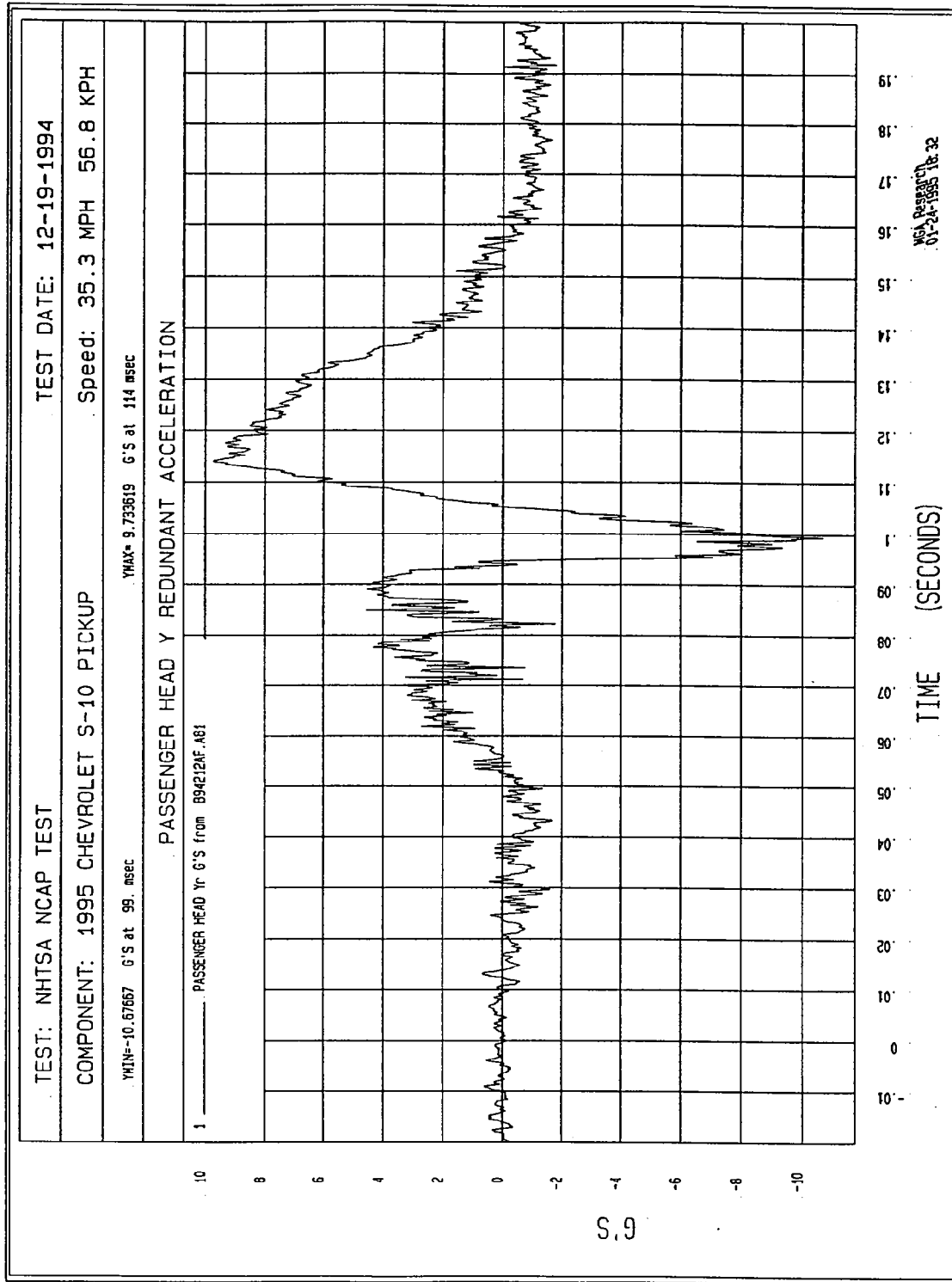


Figure B-87 - Passenger Head Y Redundant Acceleration vs. Time

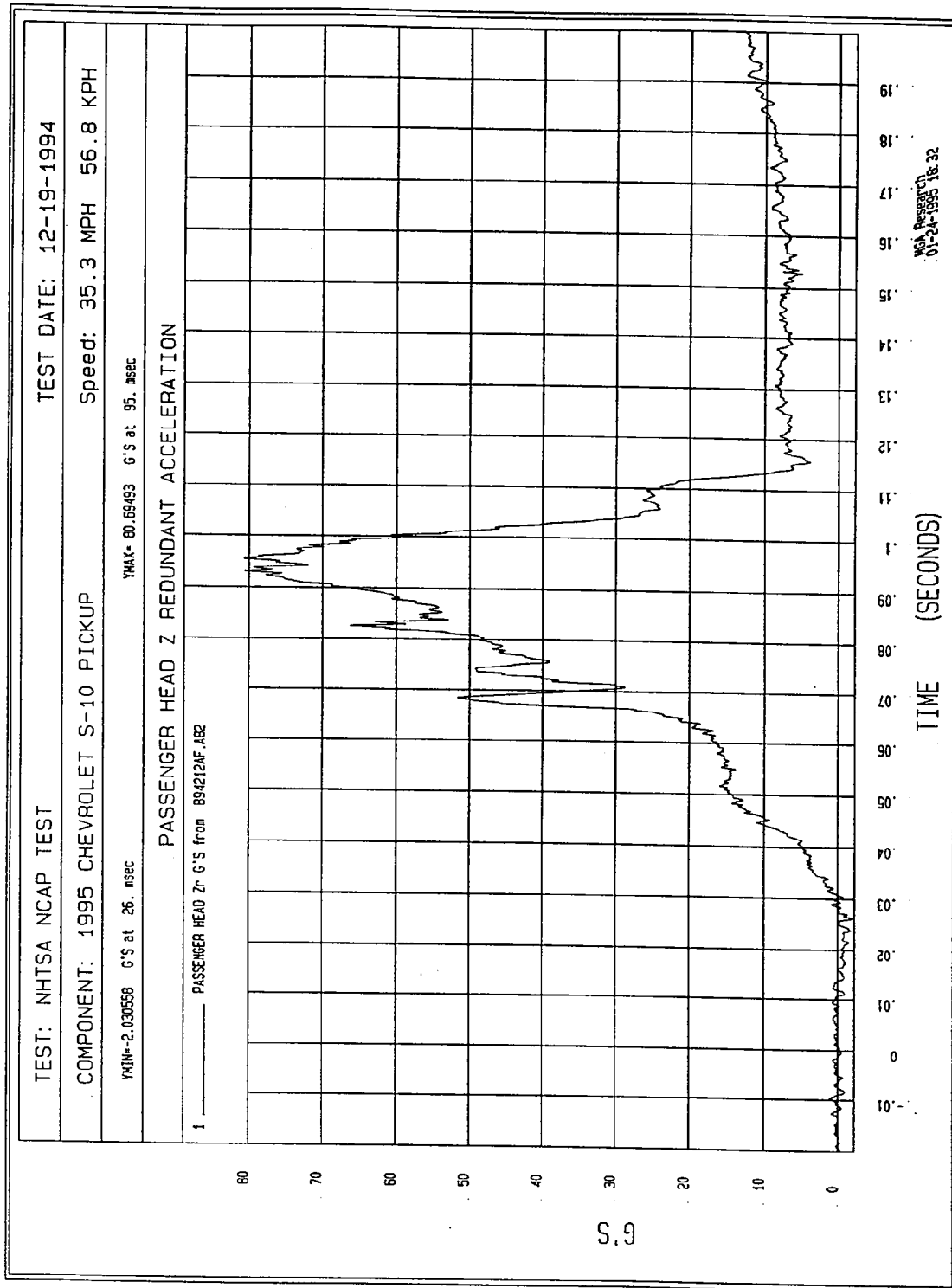


Figure B-88 - Passenger Head Z Redundant Acceleration vs. Time

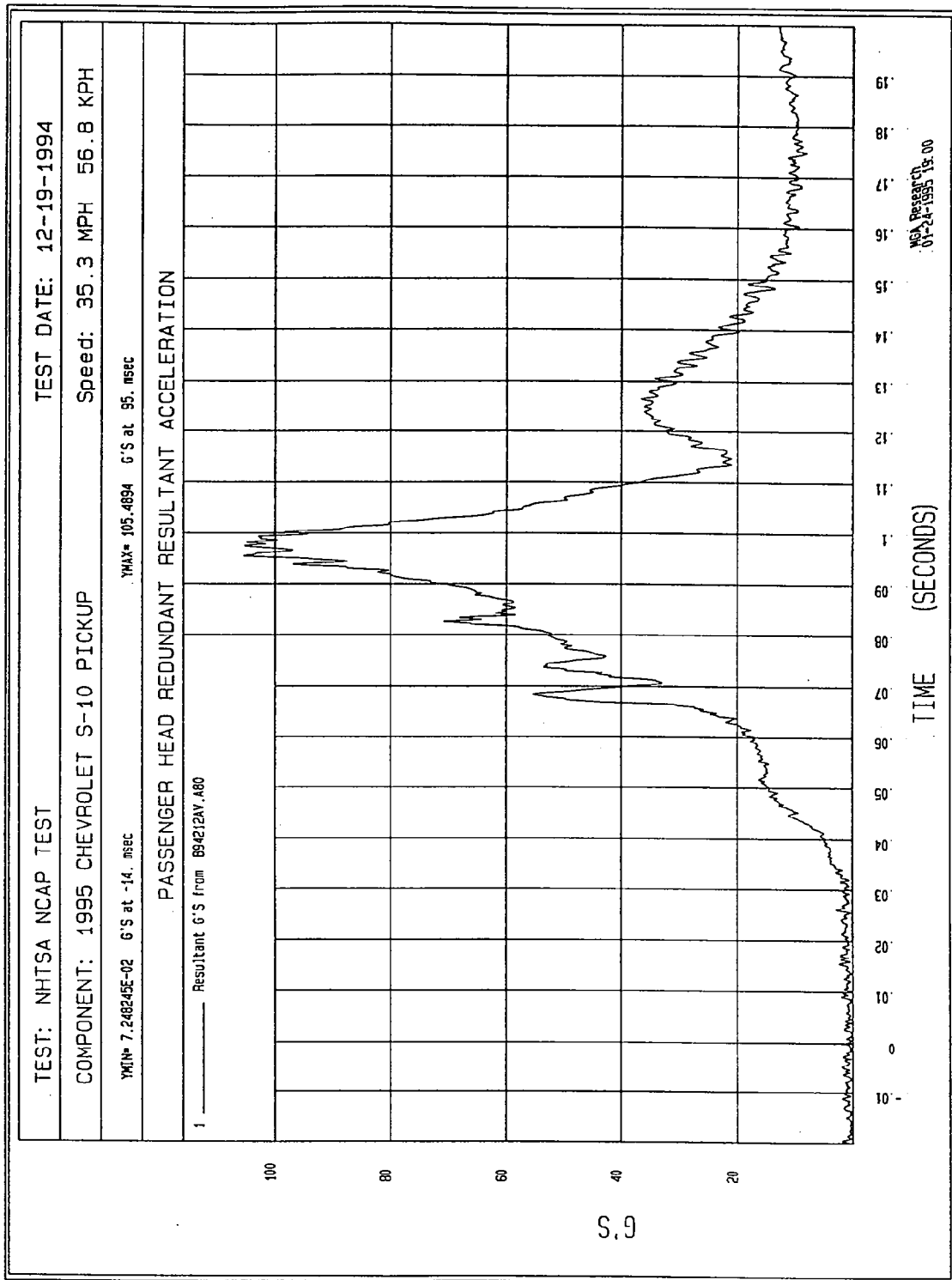


Figure B-89 - Passenger Head Redundant Resultant Accel. vs. Time

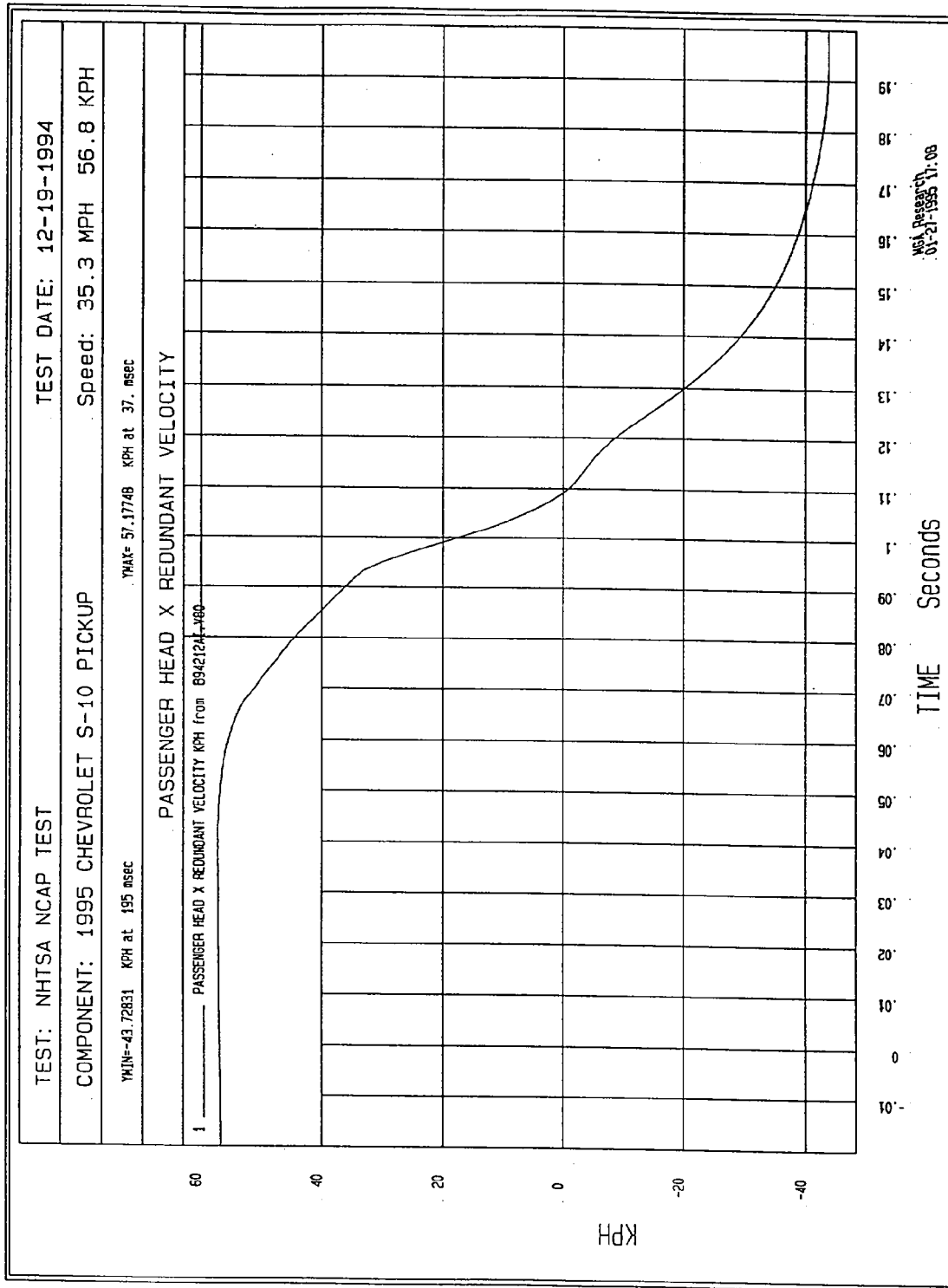


Figure B-90 - Passenger Head X Redundant Velocity vs. Time

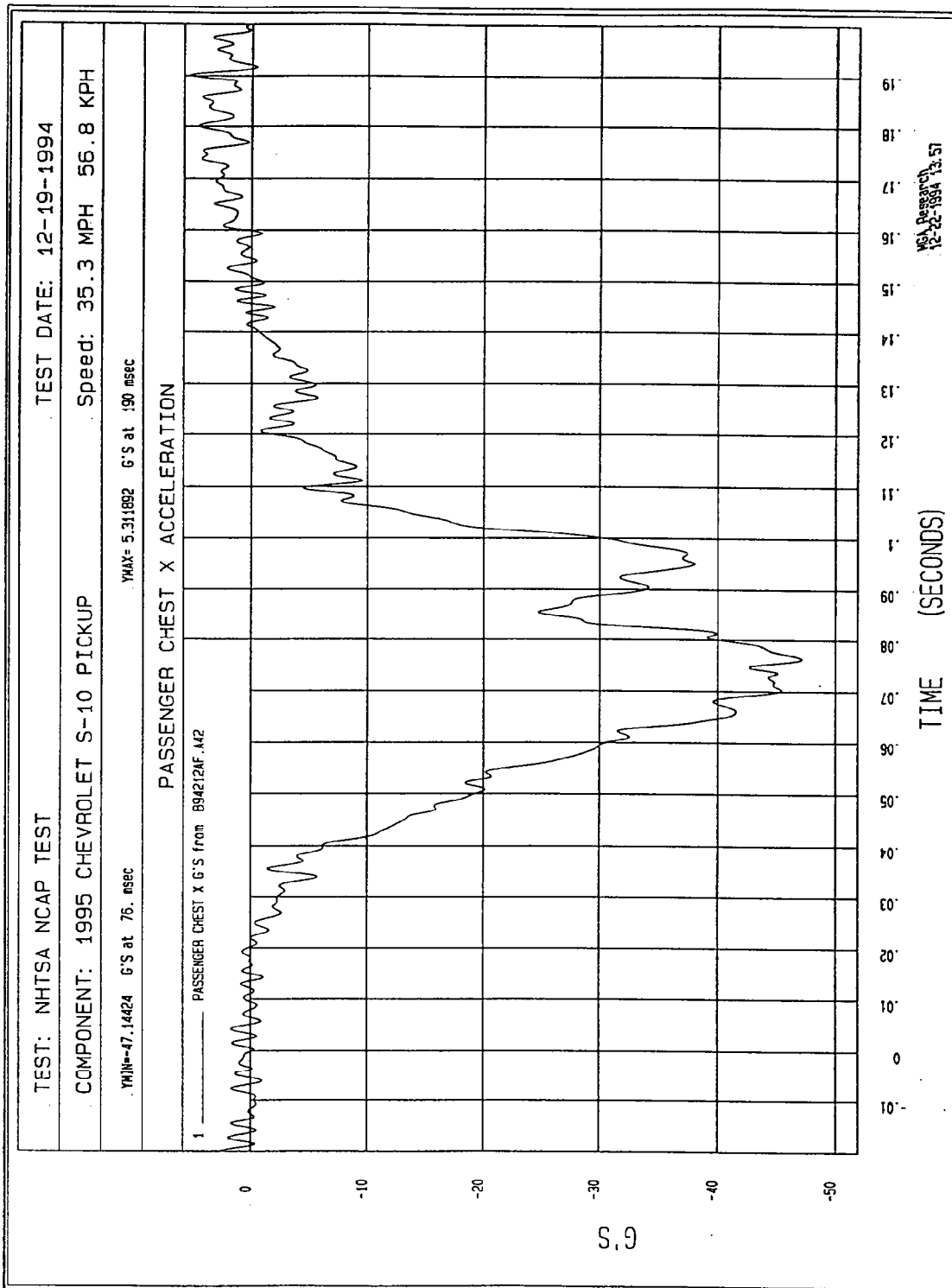


Figure B-91 - Passenger Chest X Acceleration vs. Time

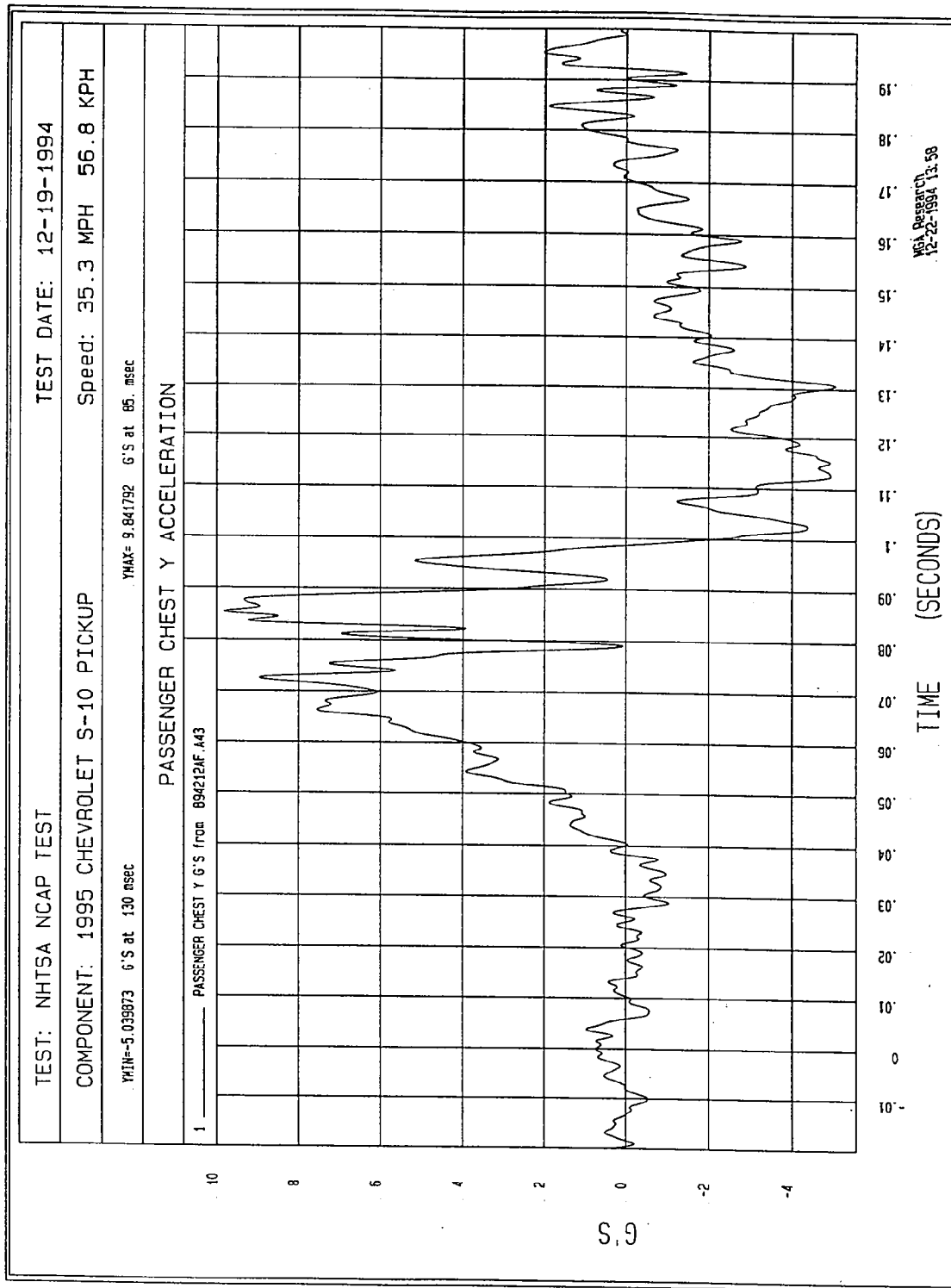


Figure B-92 - Passenger Chest Y Acceleration vs. Time

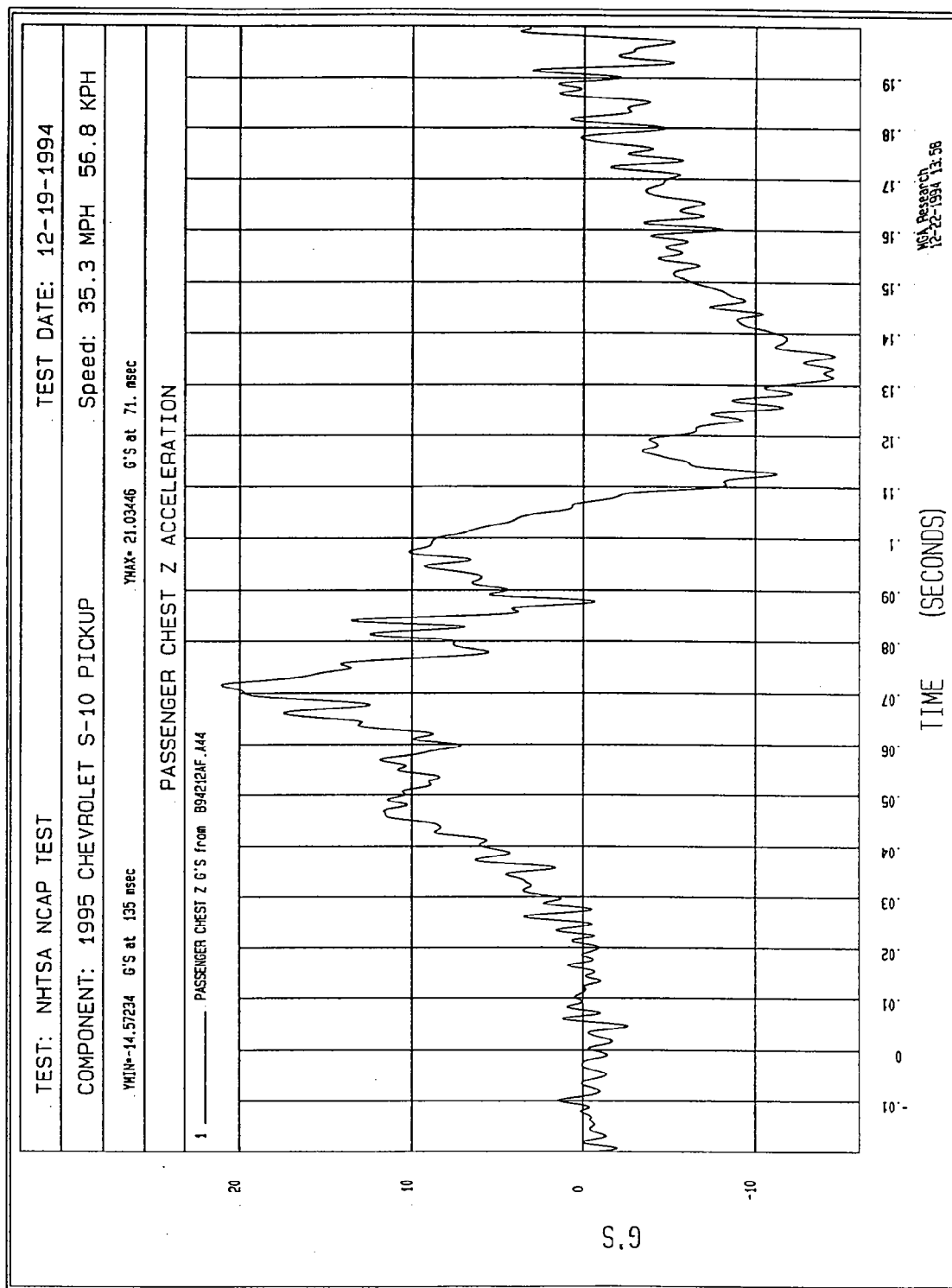


Figure B-93 - Passenger Chest Z Acceleration vs. Time

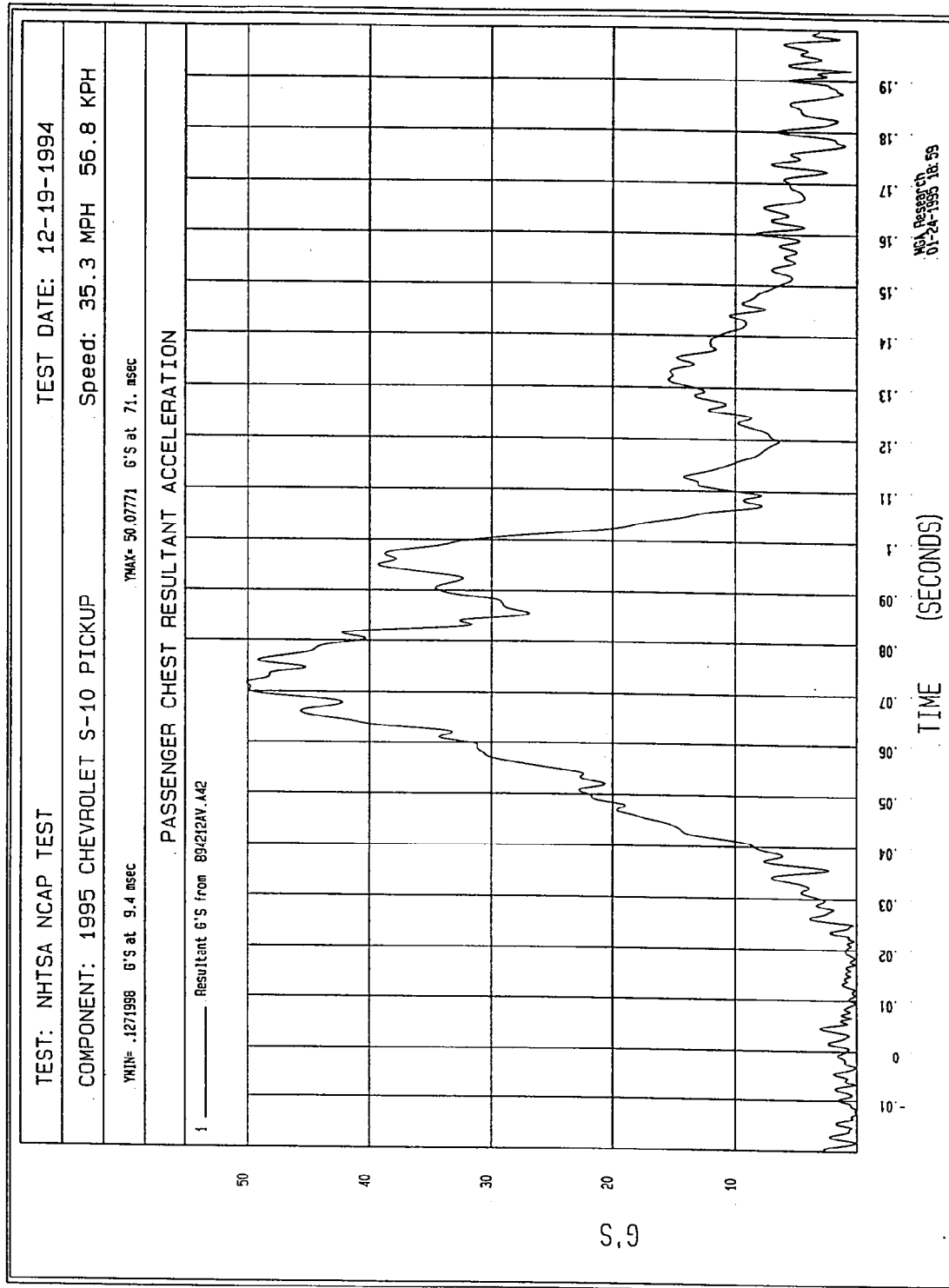


Figure B-94 - Passenger Chest Resultant Accel. vs. Time

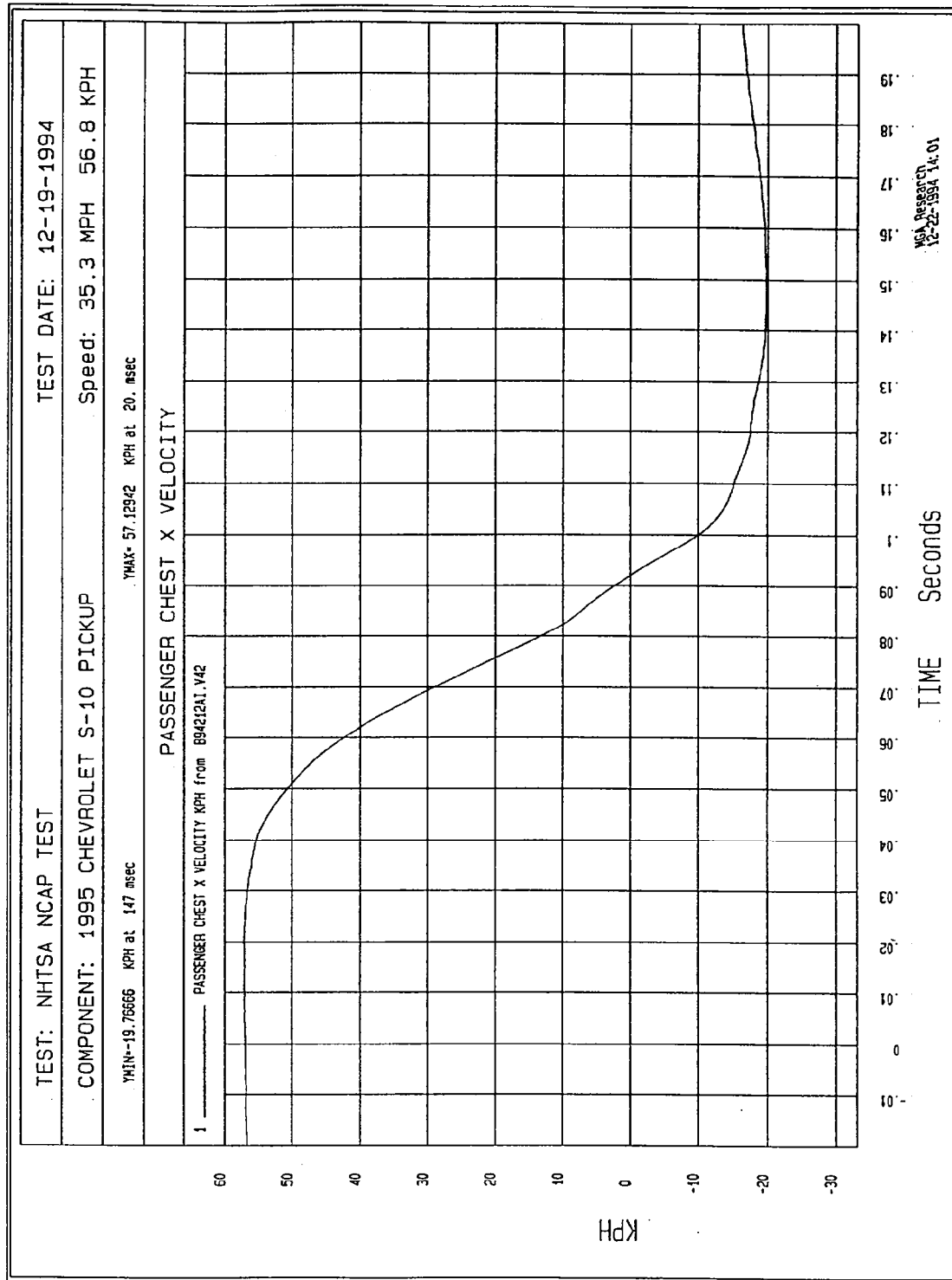


Figure B-95 - Passenger Chest X Velocity vs. Time

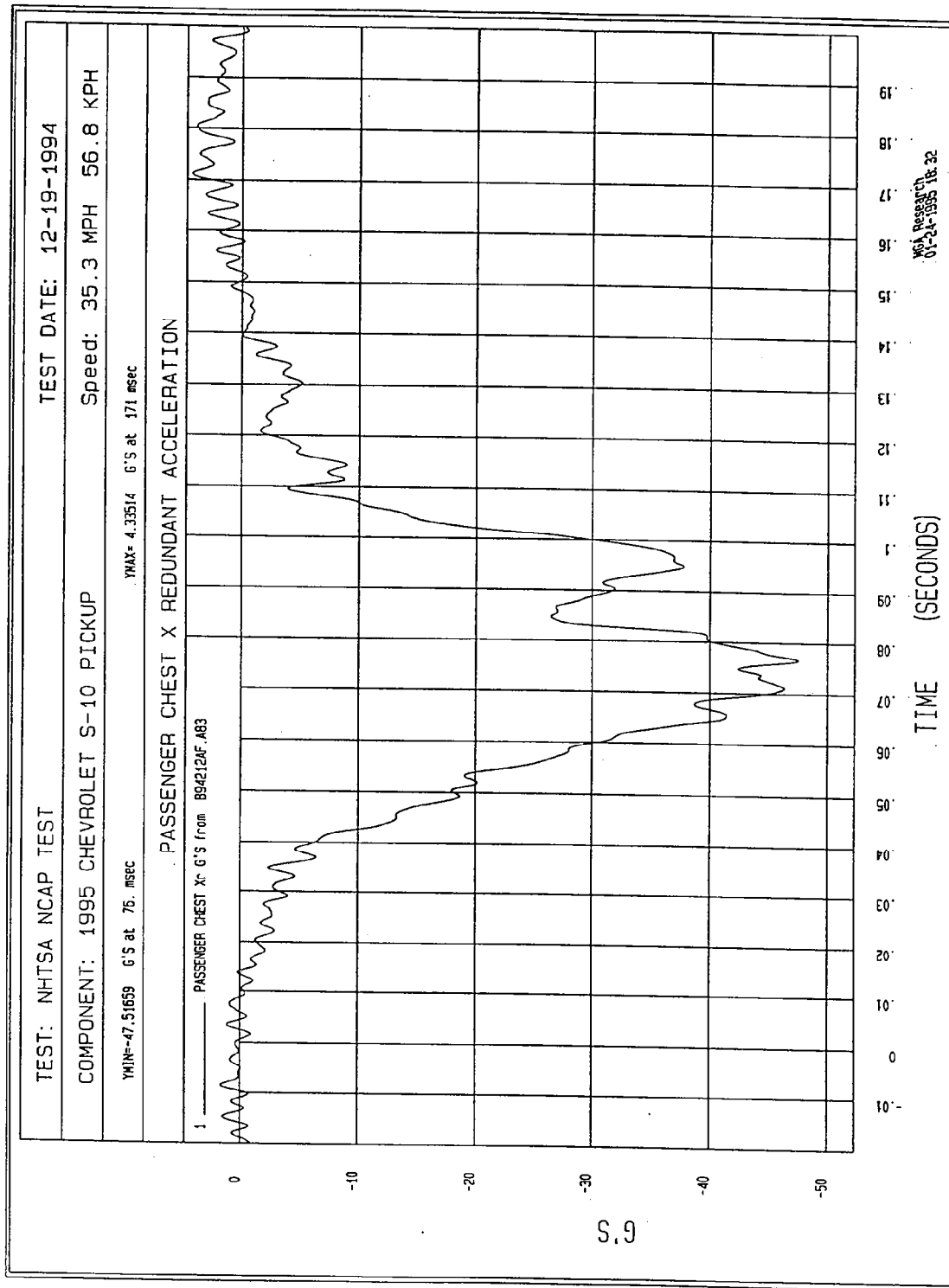


Figure B-96 - Passenger Chest X Redundant Acceleration vs. Time

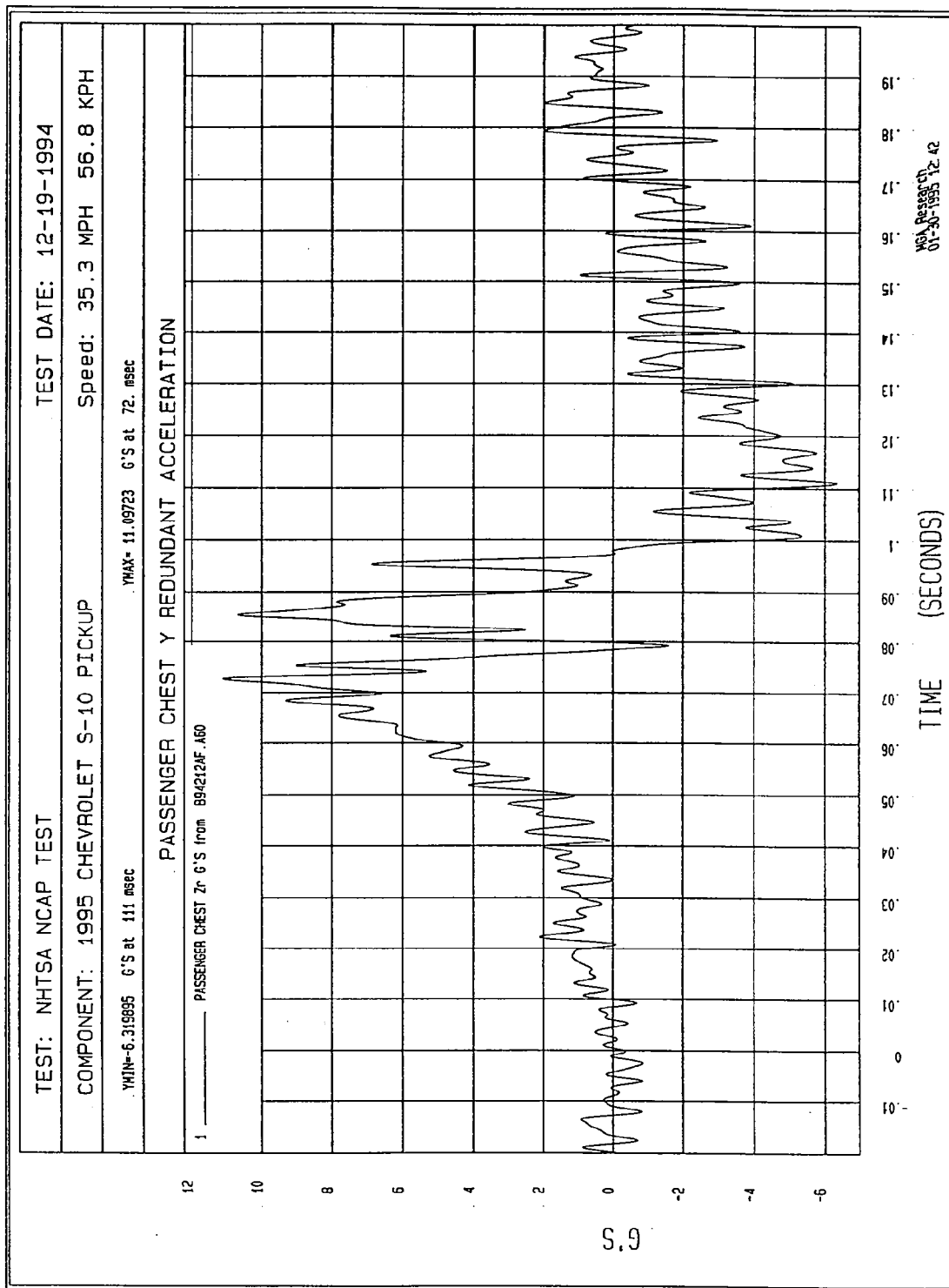


Figure B-97 - Passenger Chest Y Redundant Acceleration vs. Time

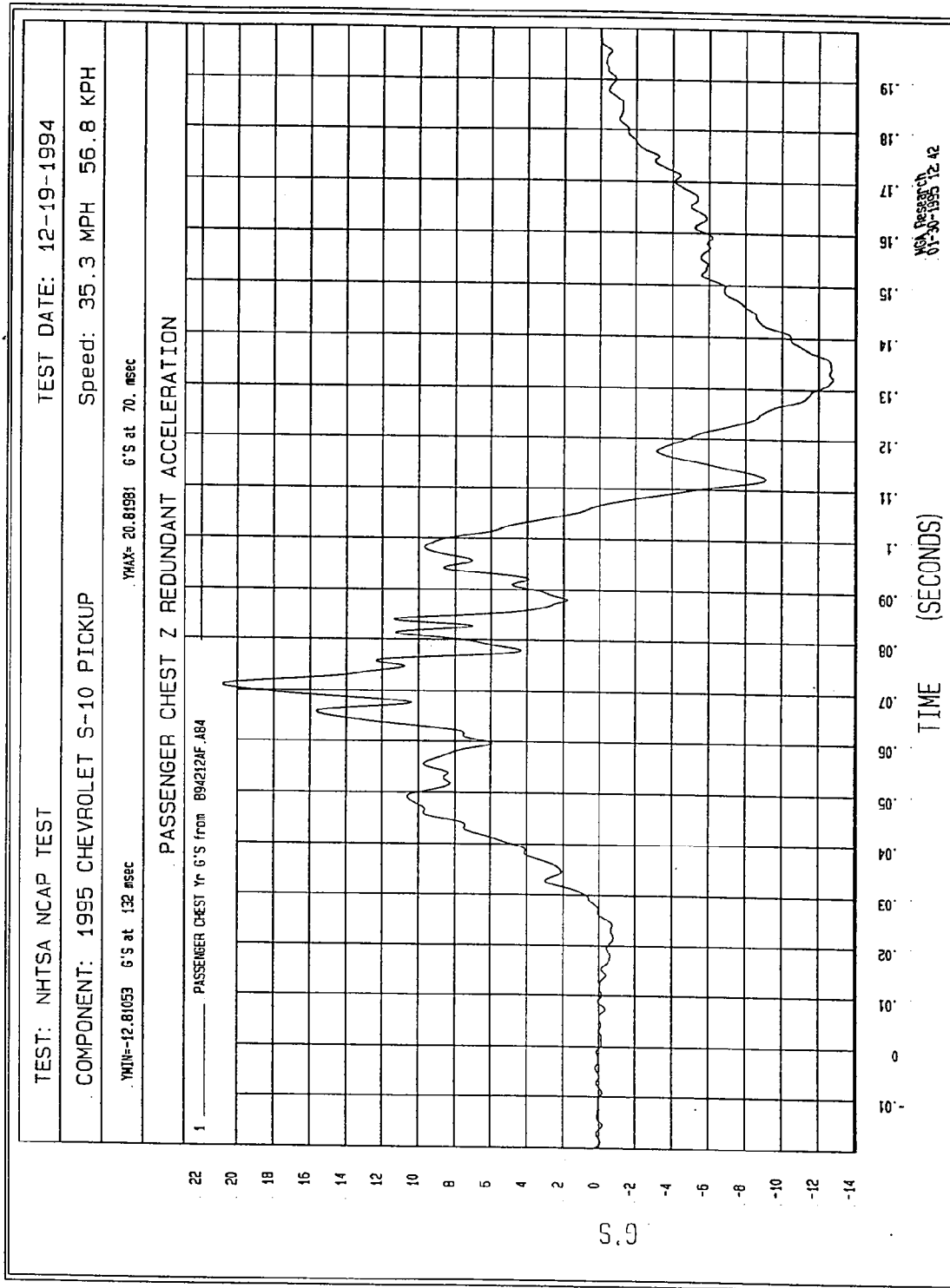


Figure B-98 - Passenger Chest Z Redundant Acceleration vs. Time

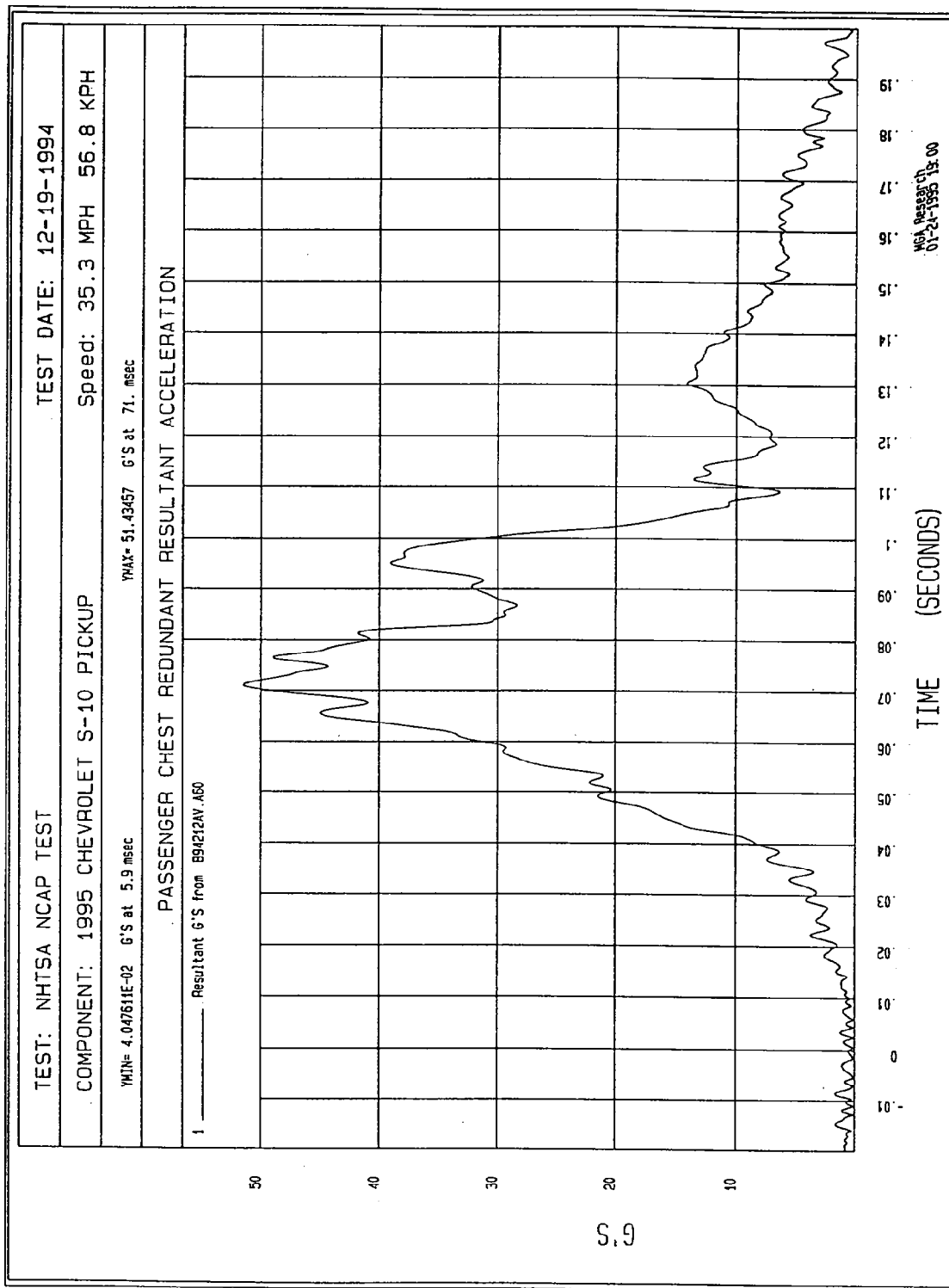


Figure B-99 - Passenger Chest Redundant Resultant Accel. vs. Time

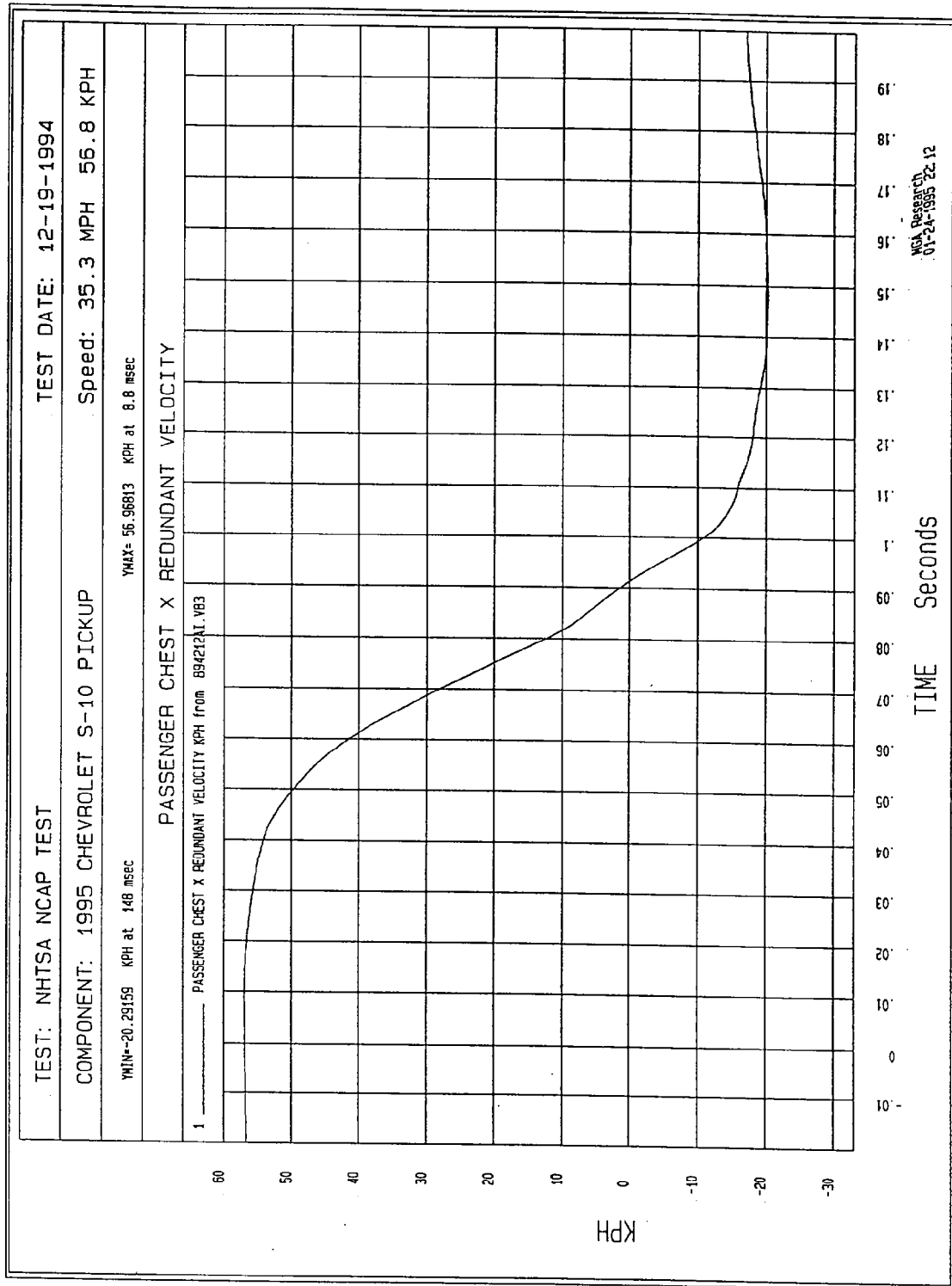


Figure B-100 - Passenger Chest X Redundant Velocity vs. Time

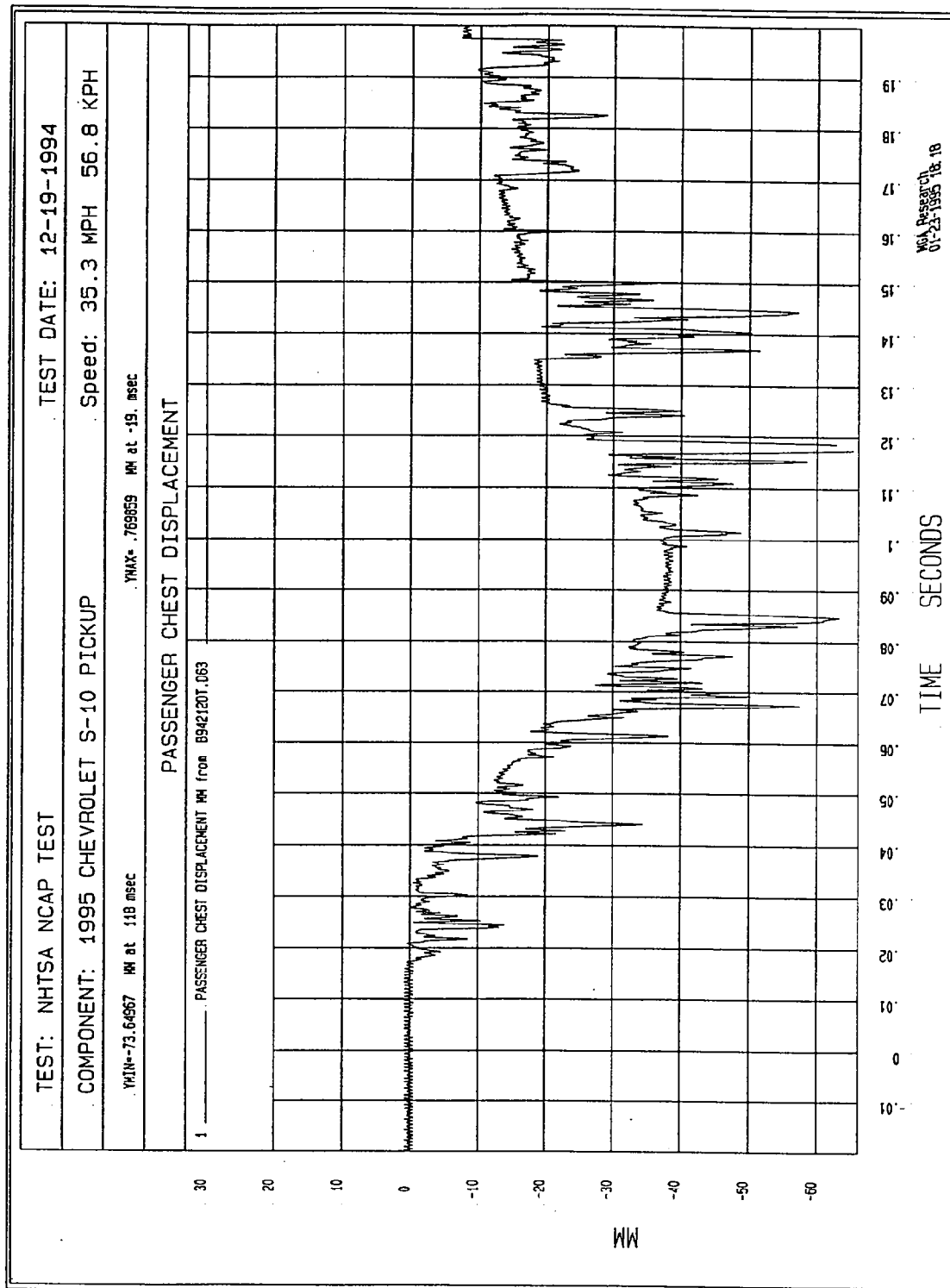


Figure B-101 - Passenger Chest Compression vs. Time

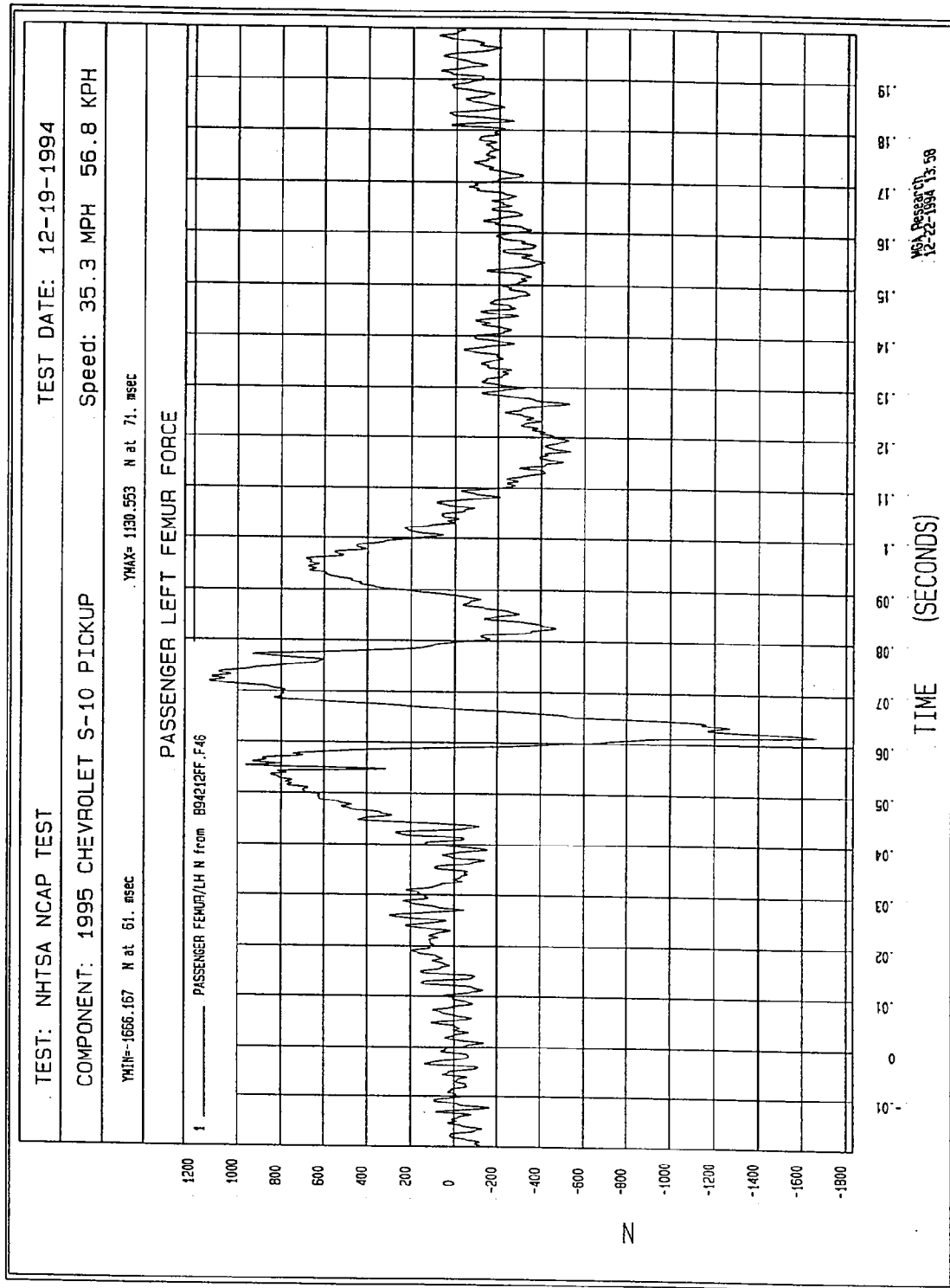


Figure B-102 - Passenger Left Femur Force vs. Time

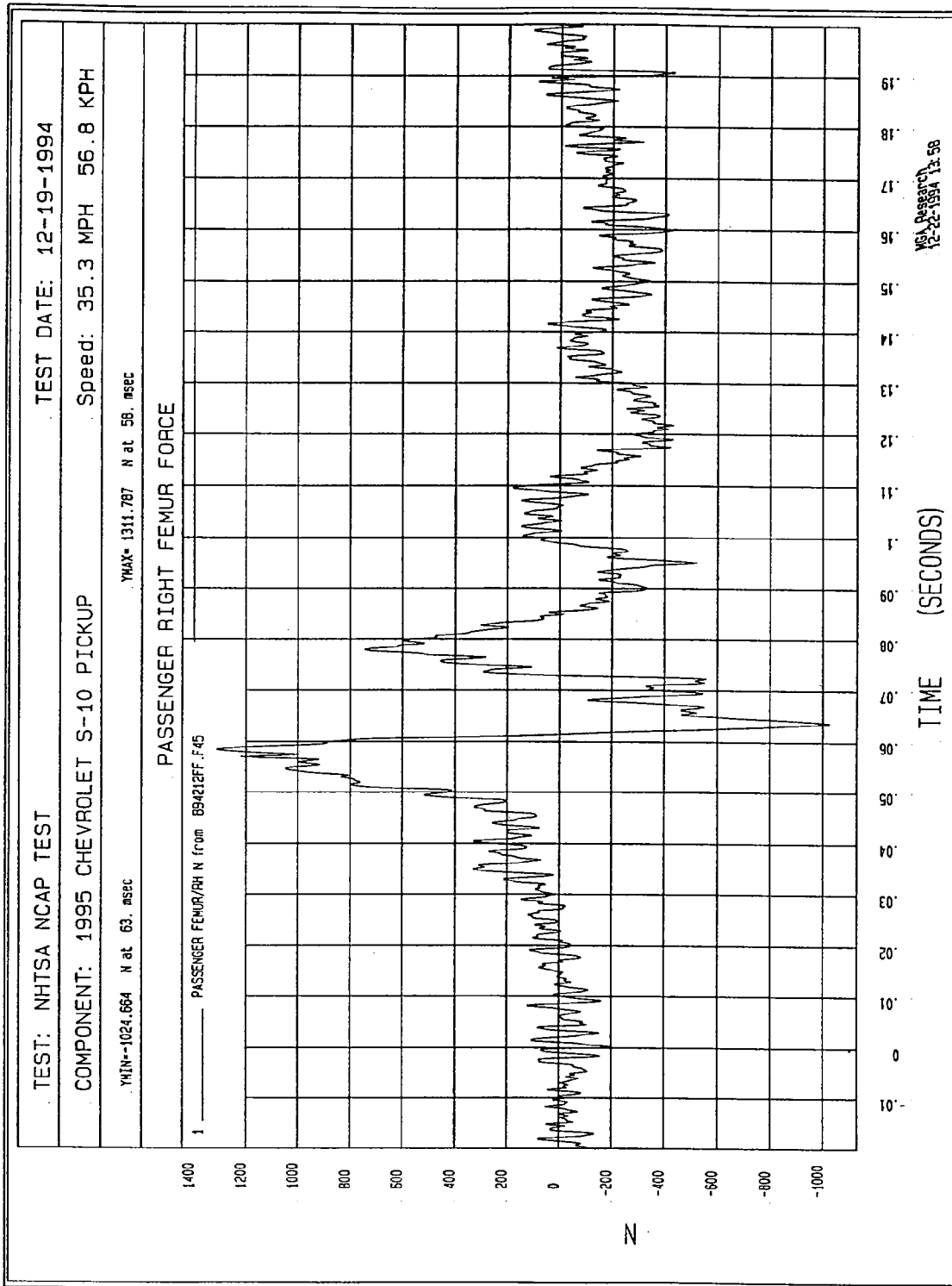


Figure B-103 - Passenger Right Femur Force vs. Time

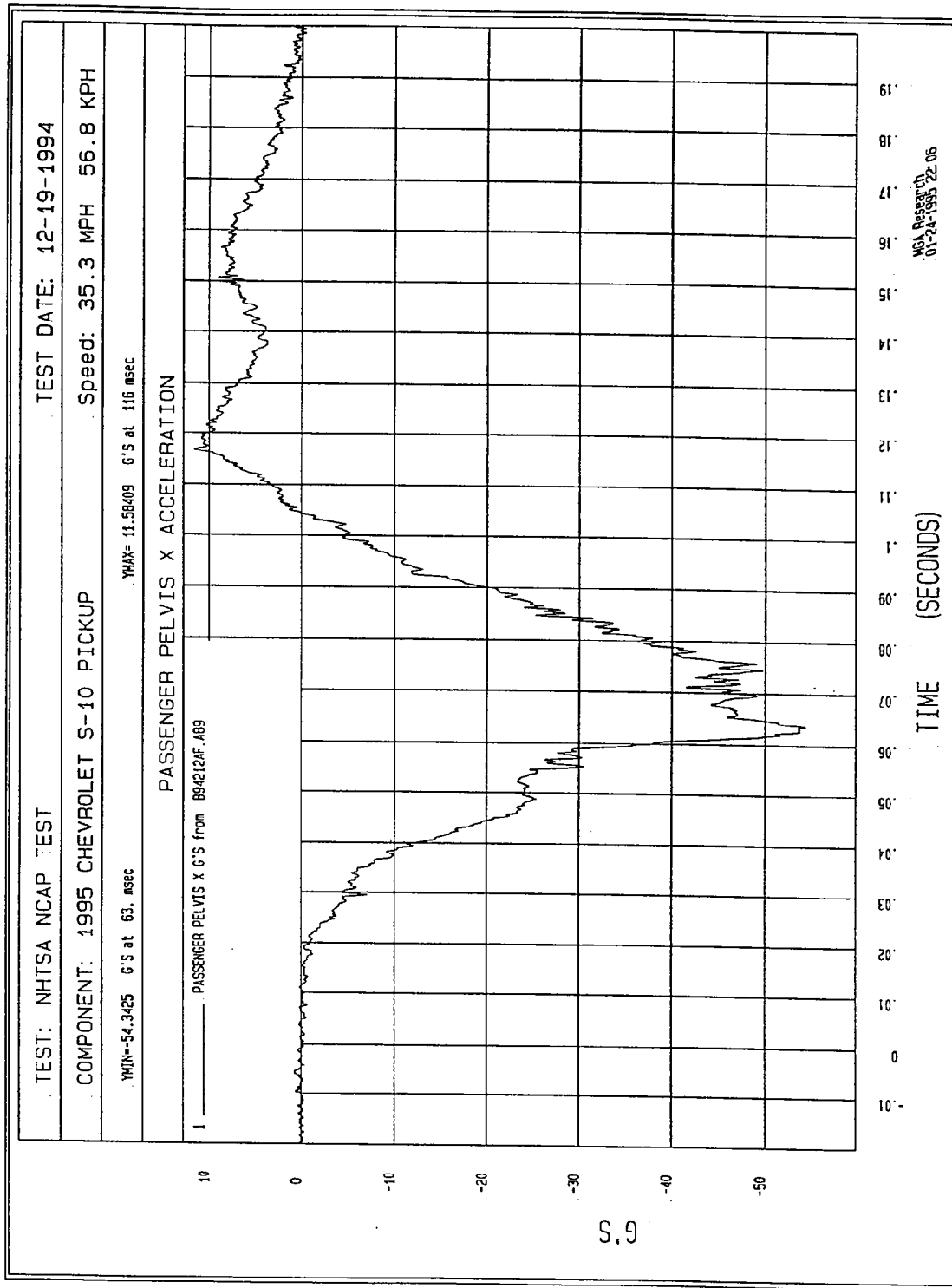


Figure B-104 - Passenger Pelvis X Acceleration vs. Time

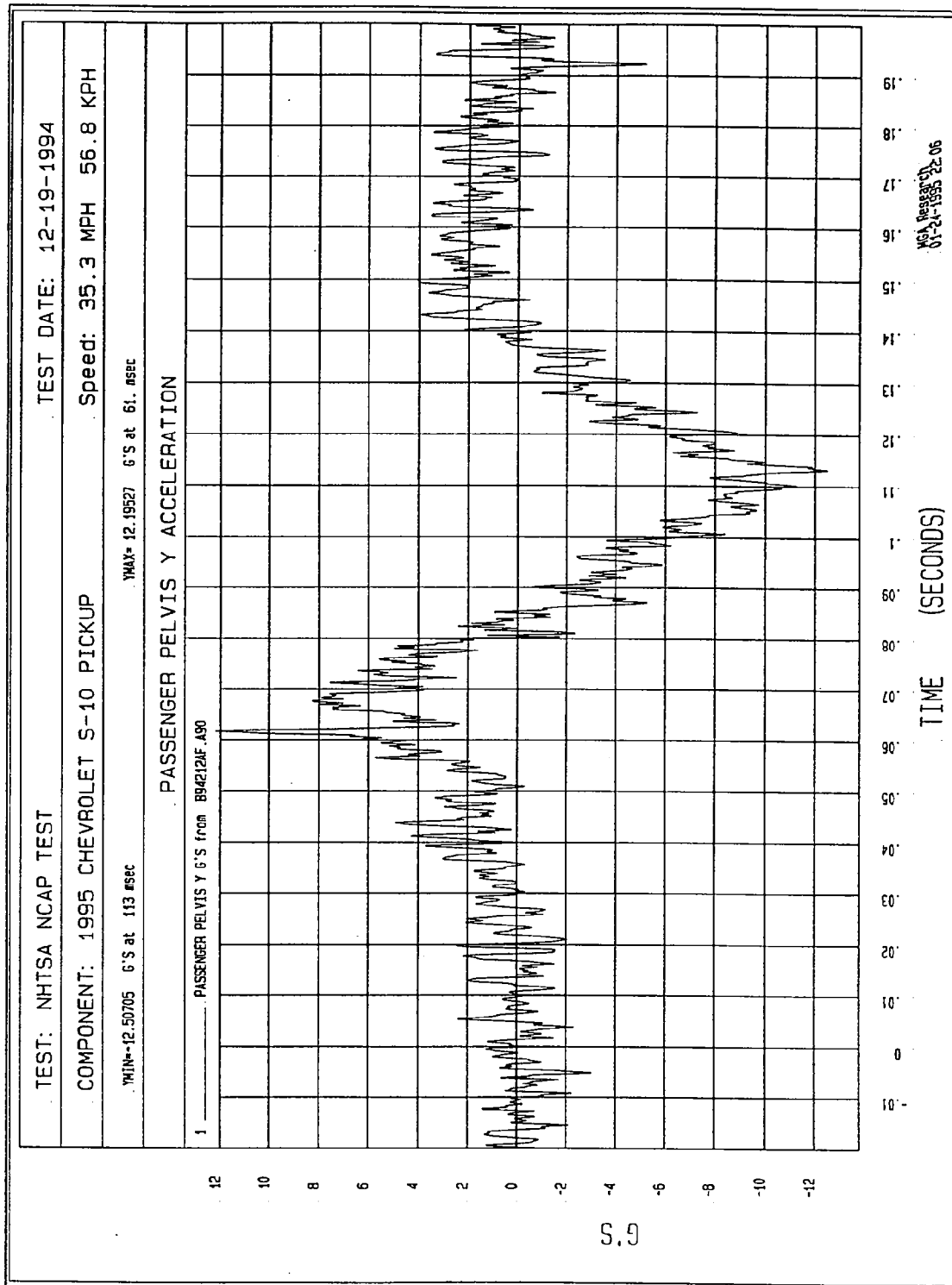


Figure B-105 - Passenger Pelvis Y Acceleration vs. Time

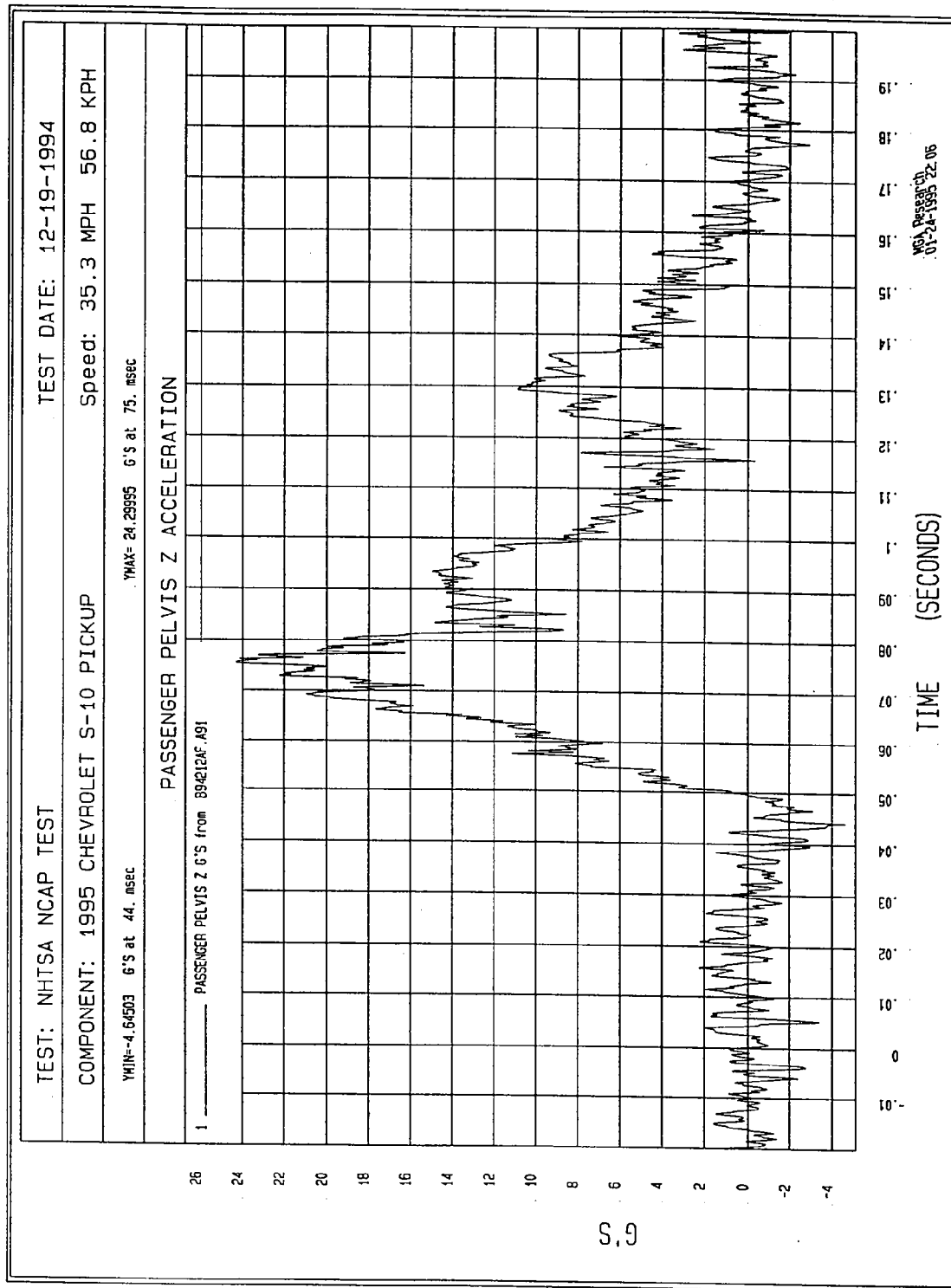


Figure B-106 - Passenger Pelvis Z Acceleration vs. Time

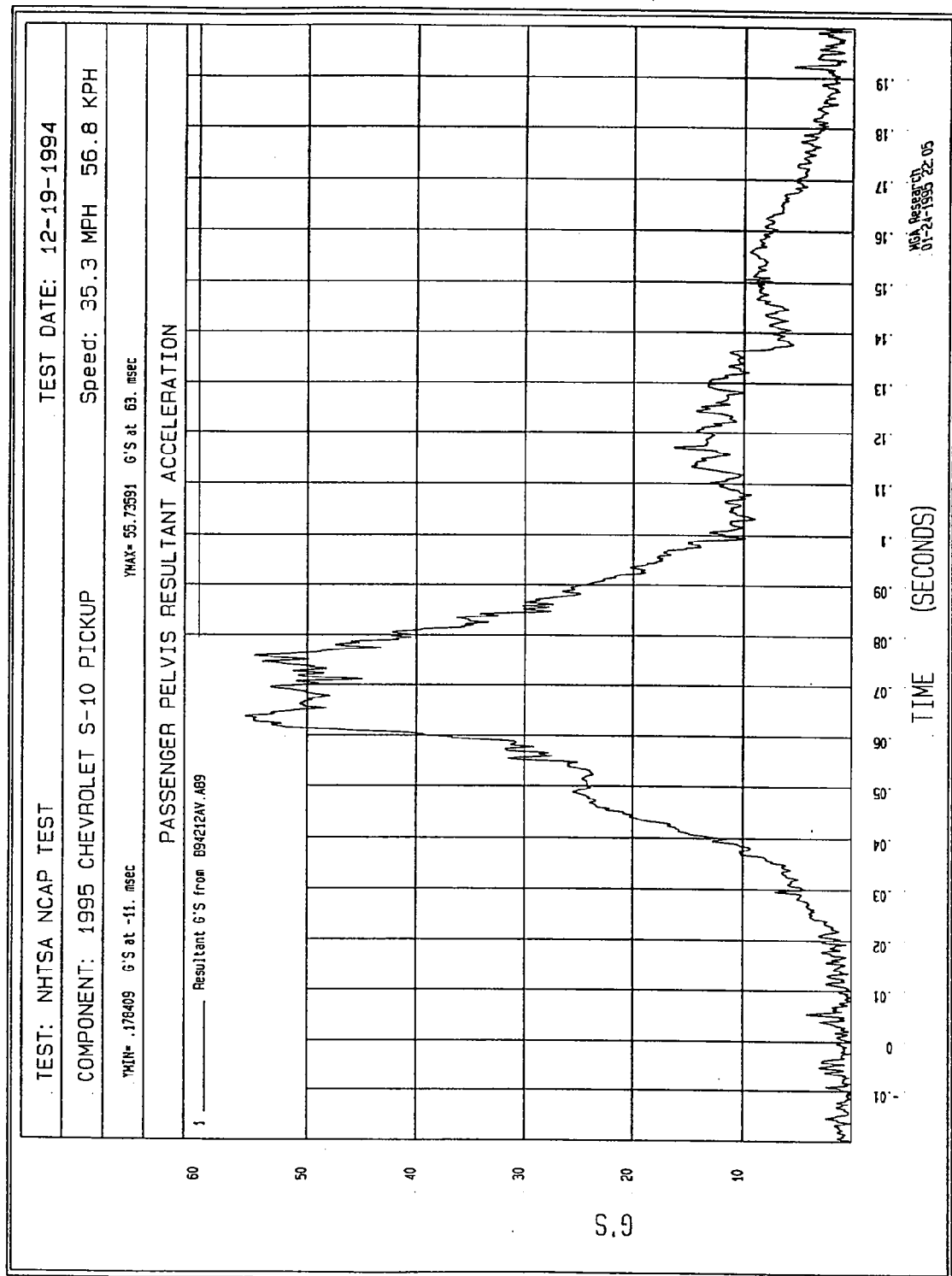


Figure B-107 - Passenger Pelvis Z Resultant Acceleration vs. Time

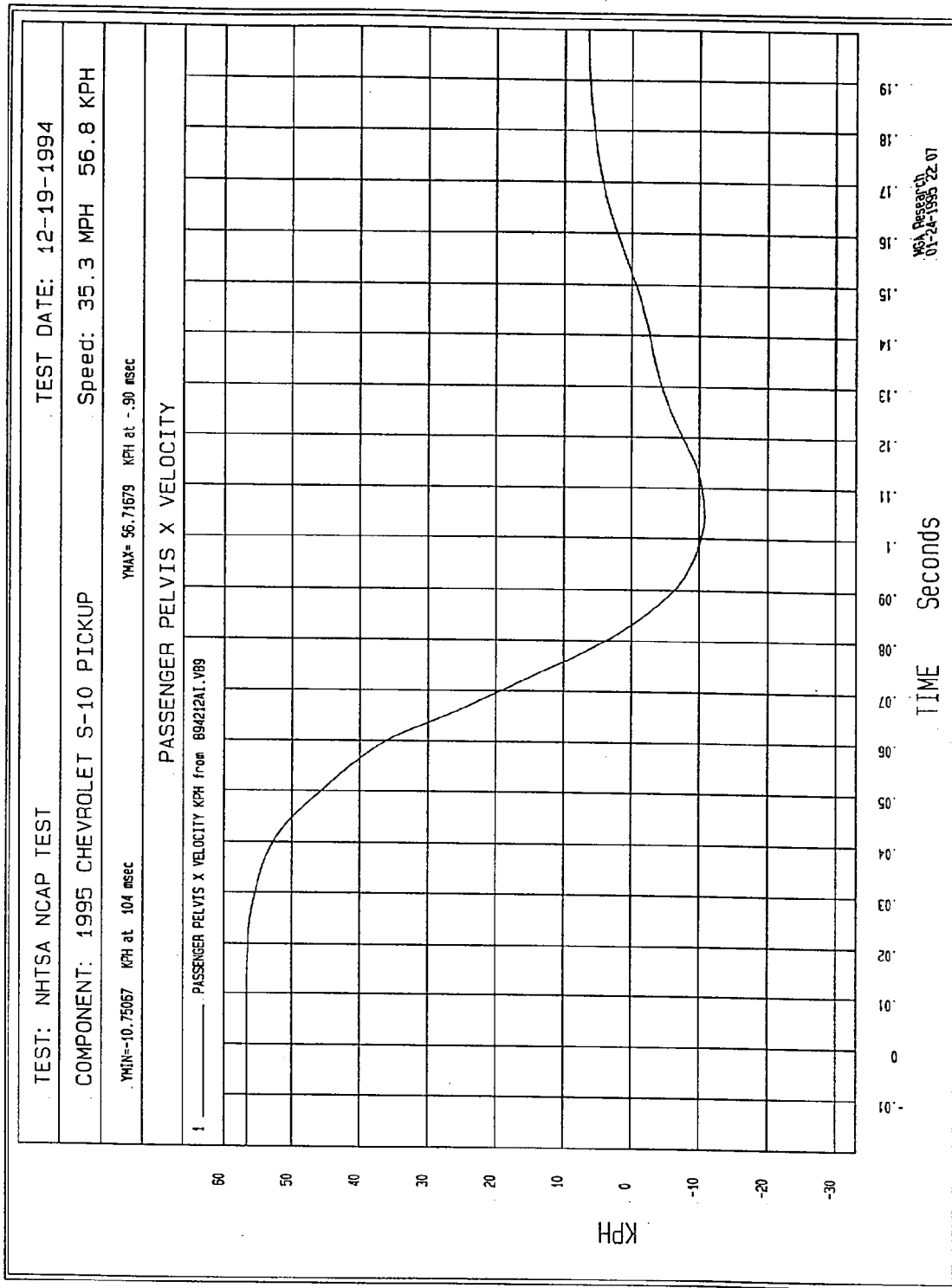


Figure B-108 - Passenger Pelvis X Velocity vs. Time

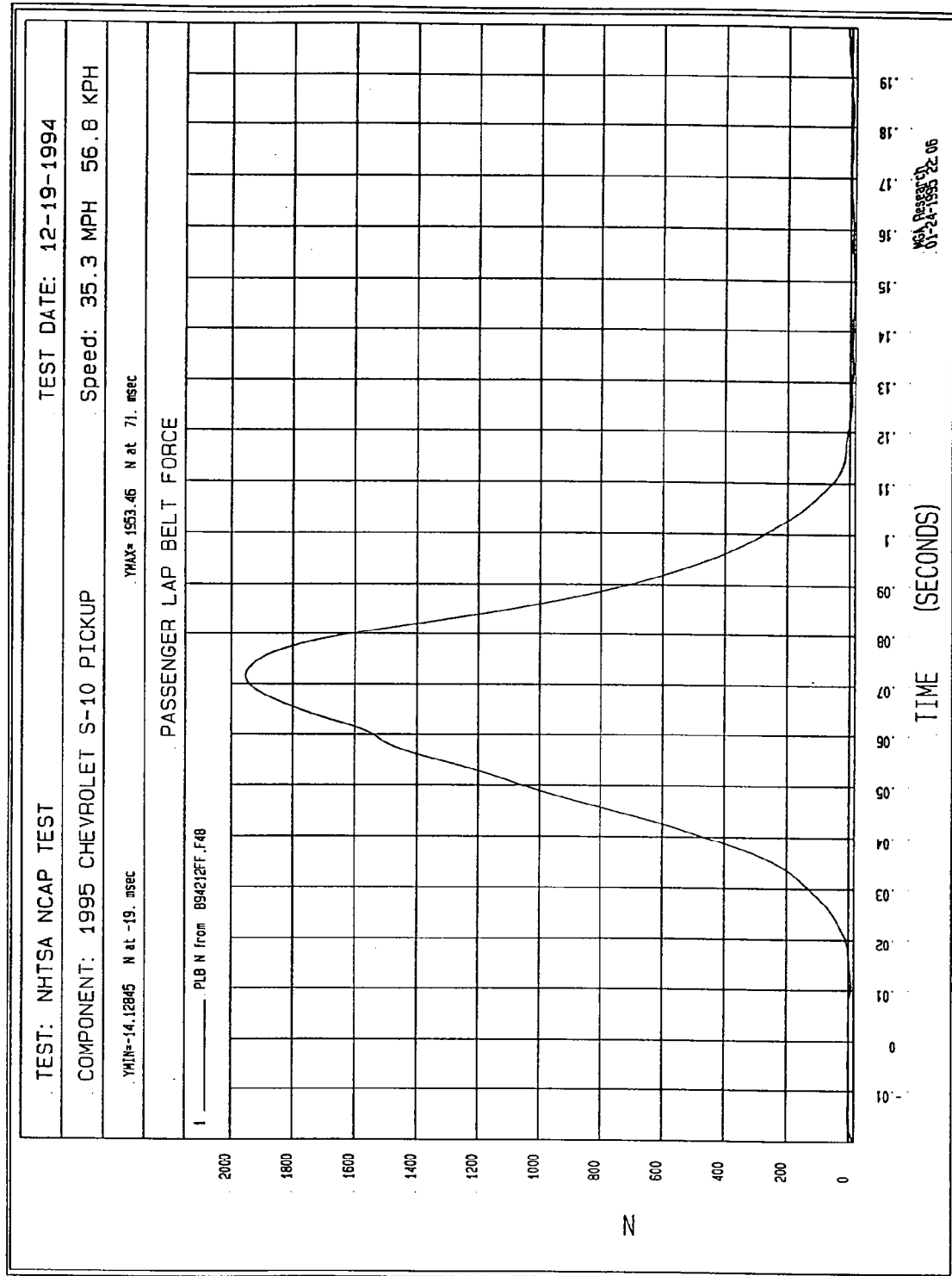


Figure B-109 - Passenger Lap Belt Force vs. Time

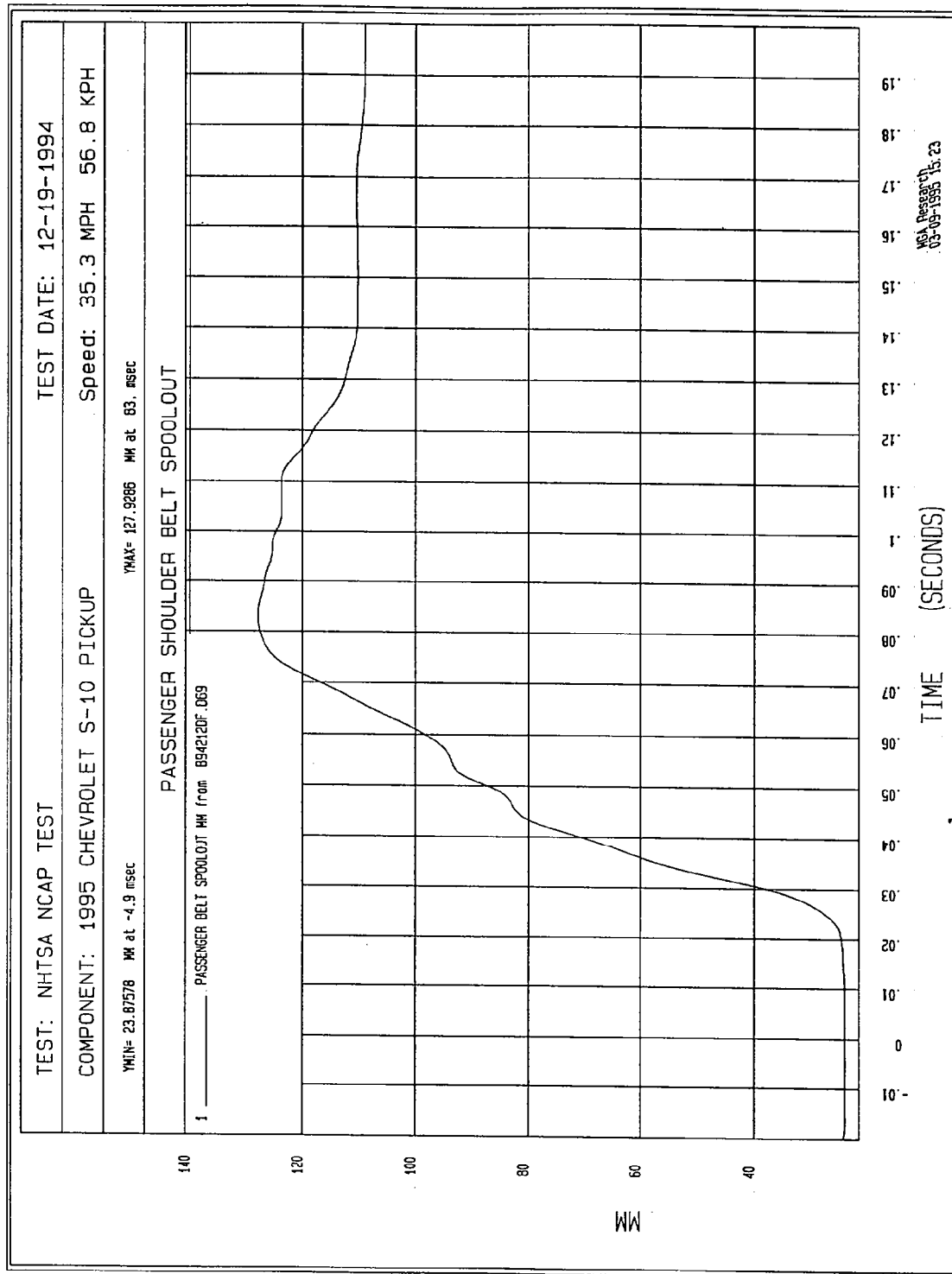


Figure B-110 - Passenger Shoulder Belt Force vs. Time

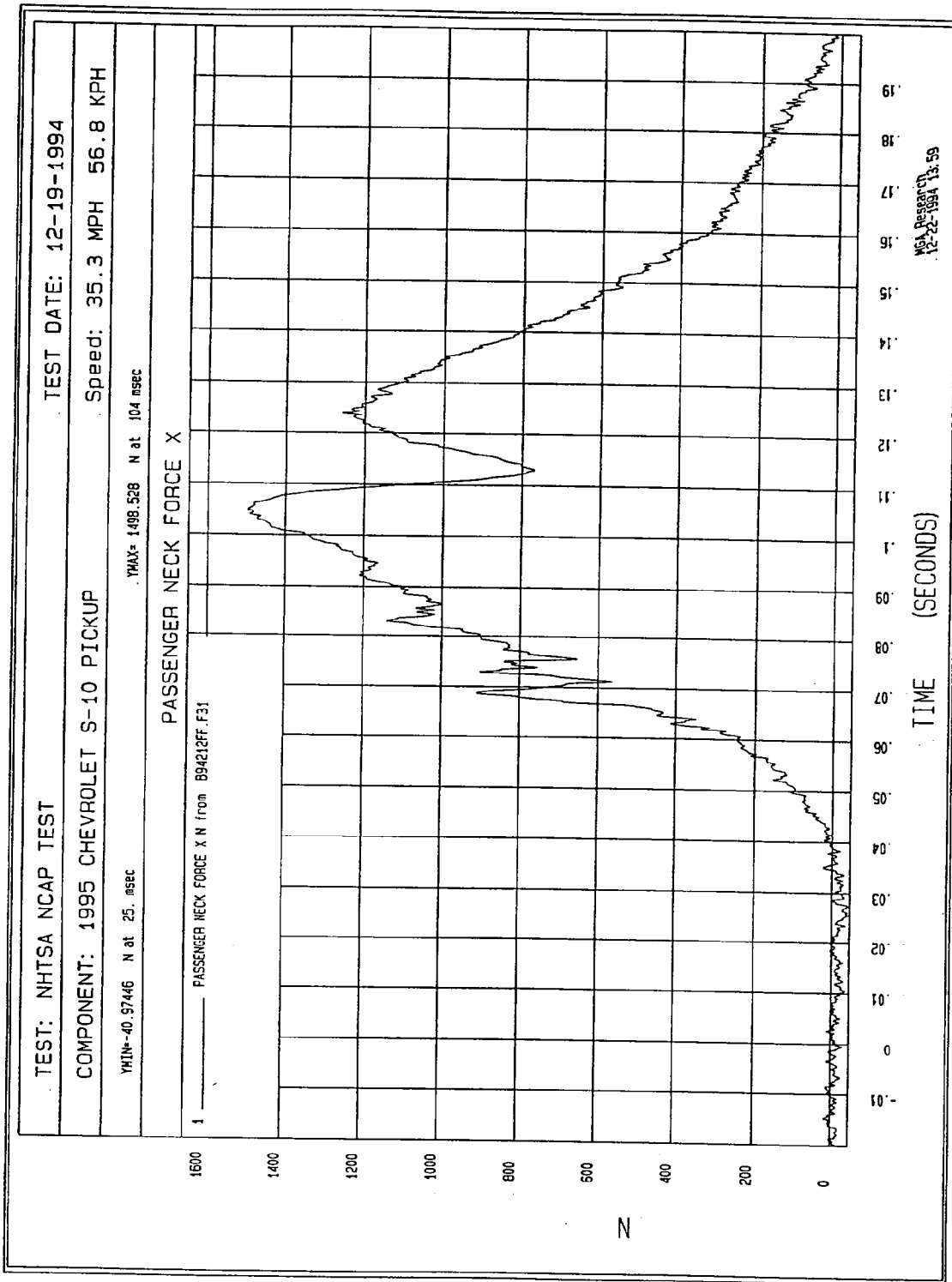


Figure B-111 - Passenger Neck Force X vs. Time

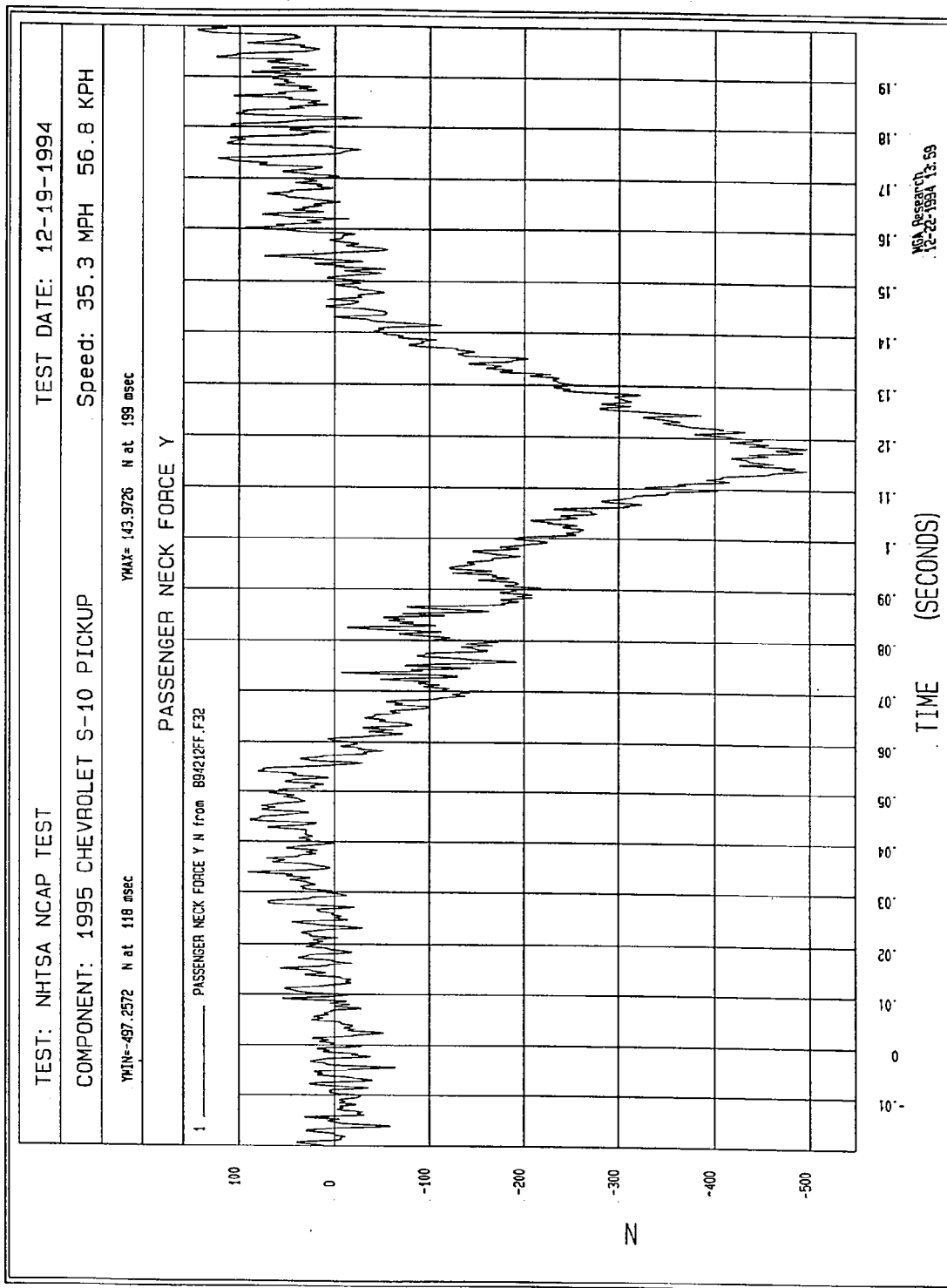


Figure B-112 - Passenger Neck Force Y vs. Time

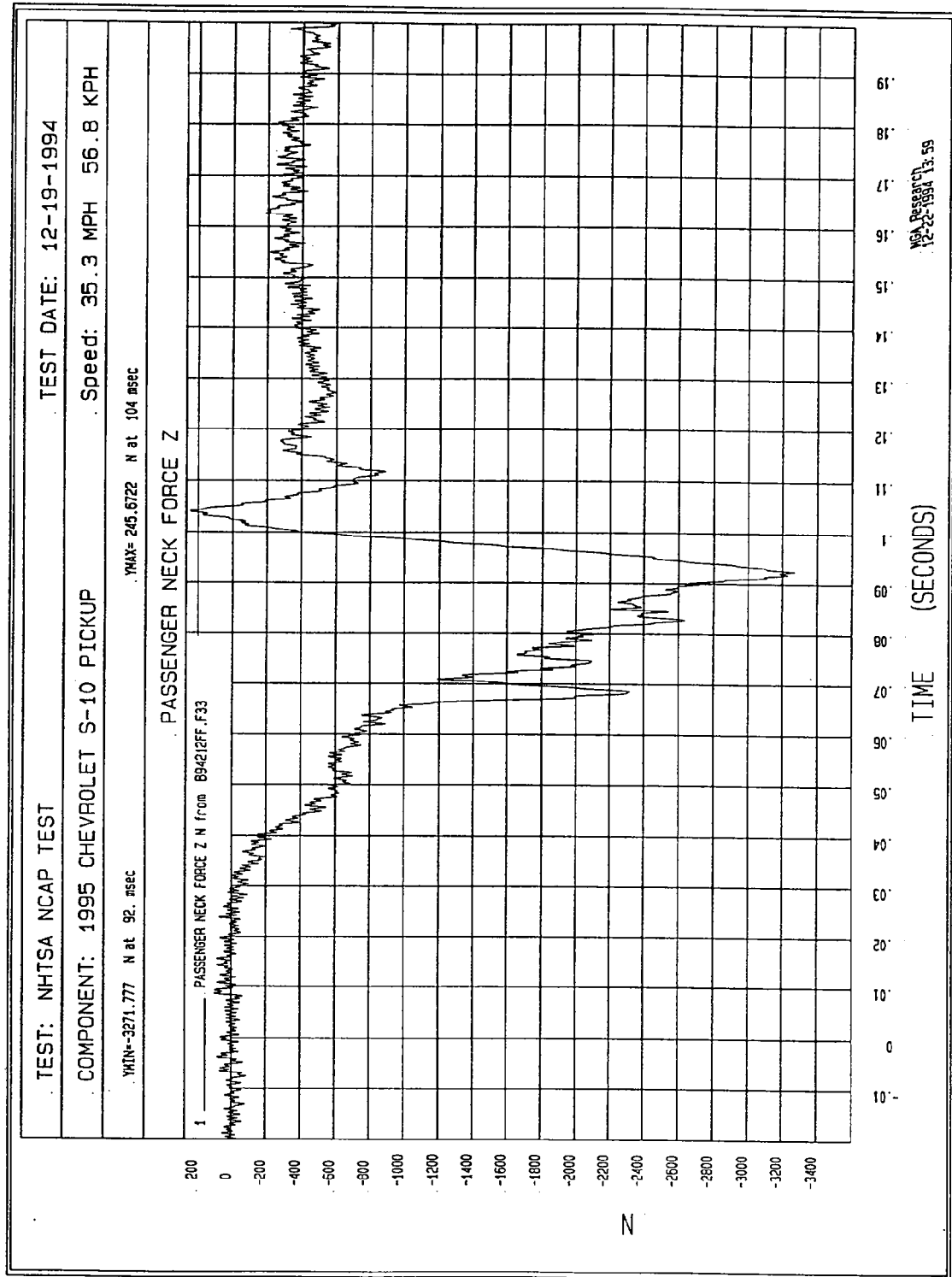
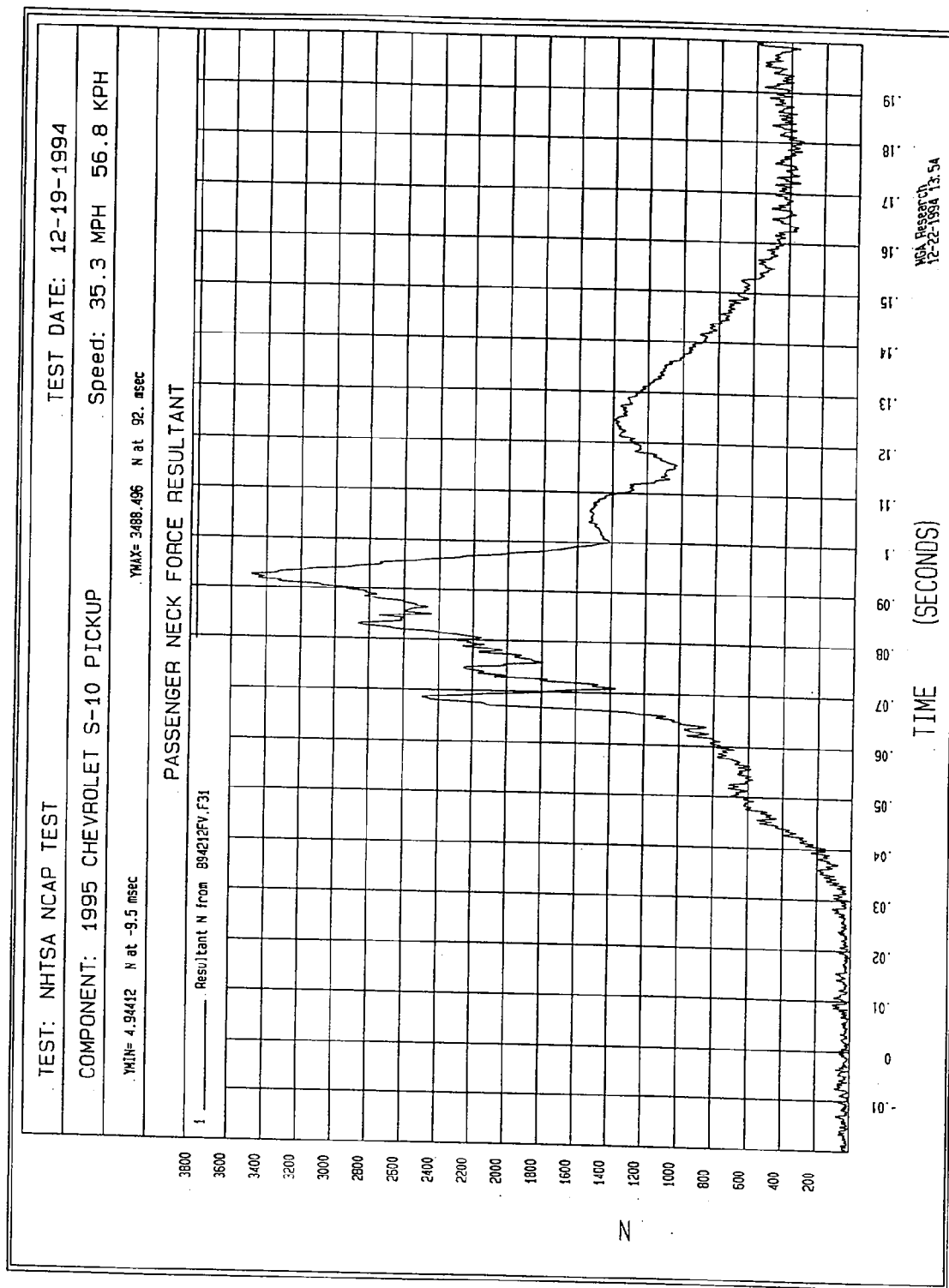


Figure B-113- Passenger Neck Force Z vs. Time



B-114

Figure B-114 - Passenger Neck Force Resultant Acceleration vs. Time

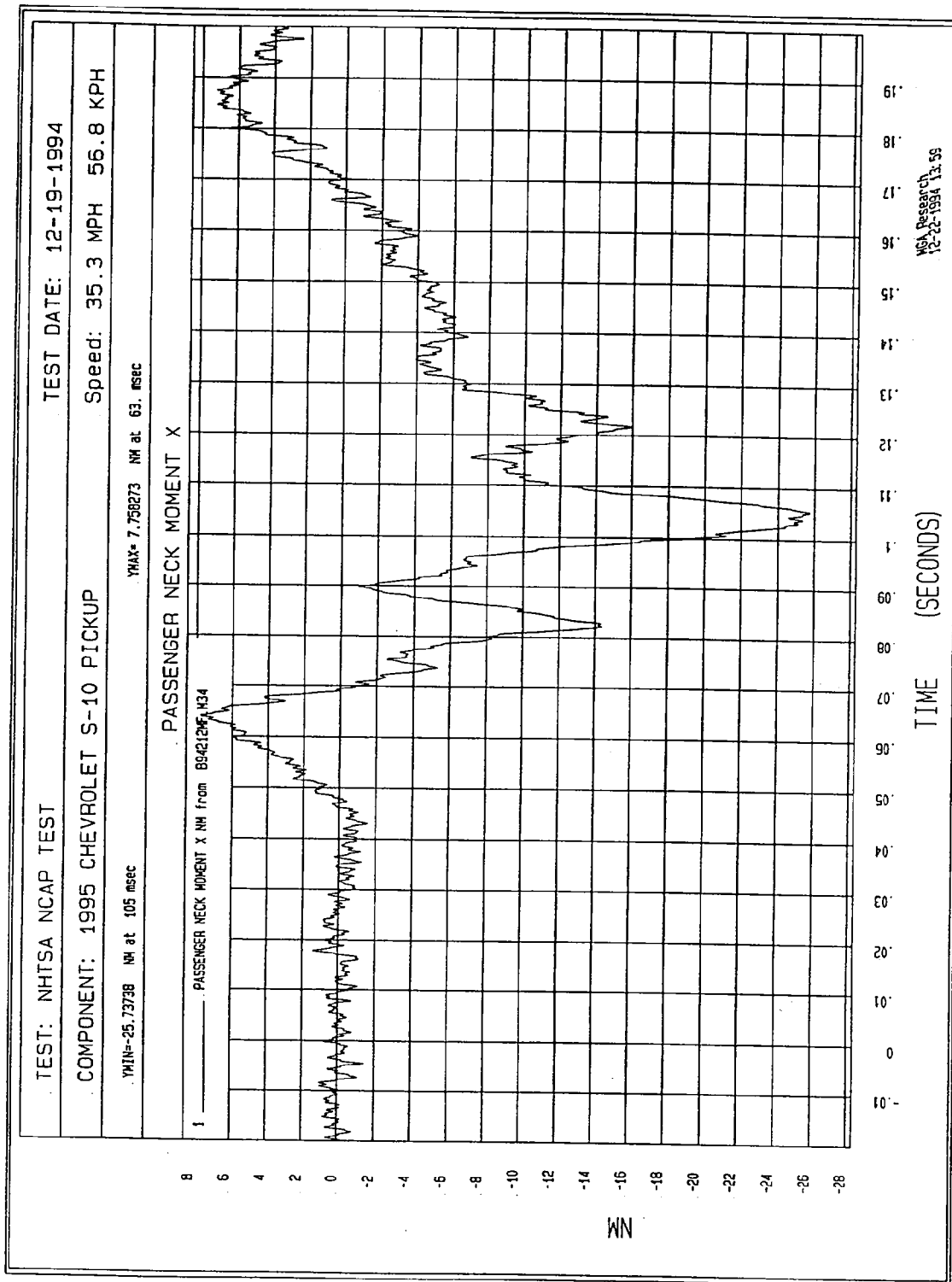


Figure B-115 - Passenger Neck Moment X vs. Time

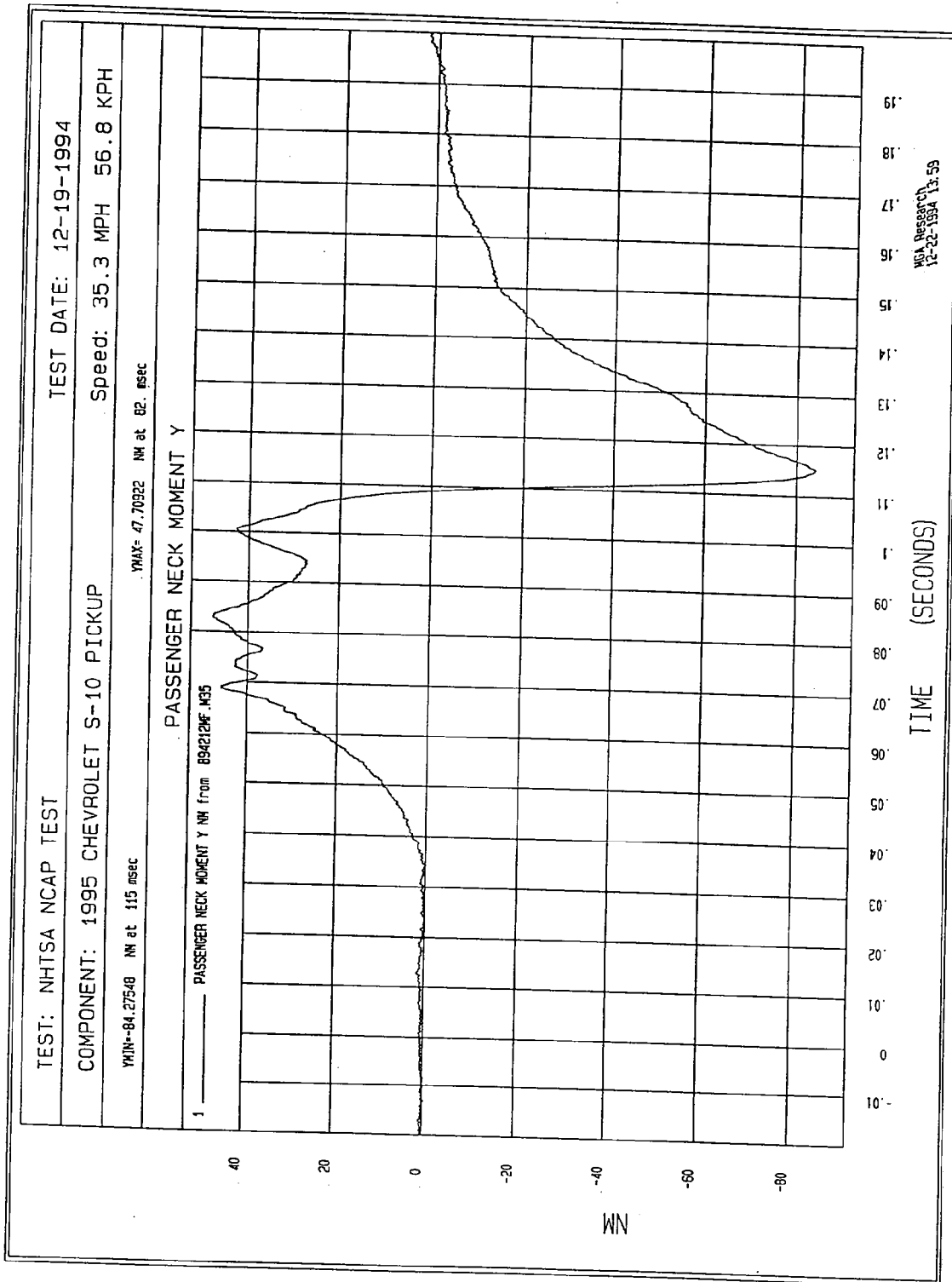


Figure B-116 - Passenger Neck Moment Y vs. Time

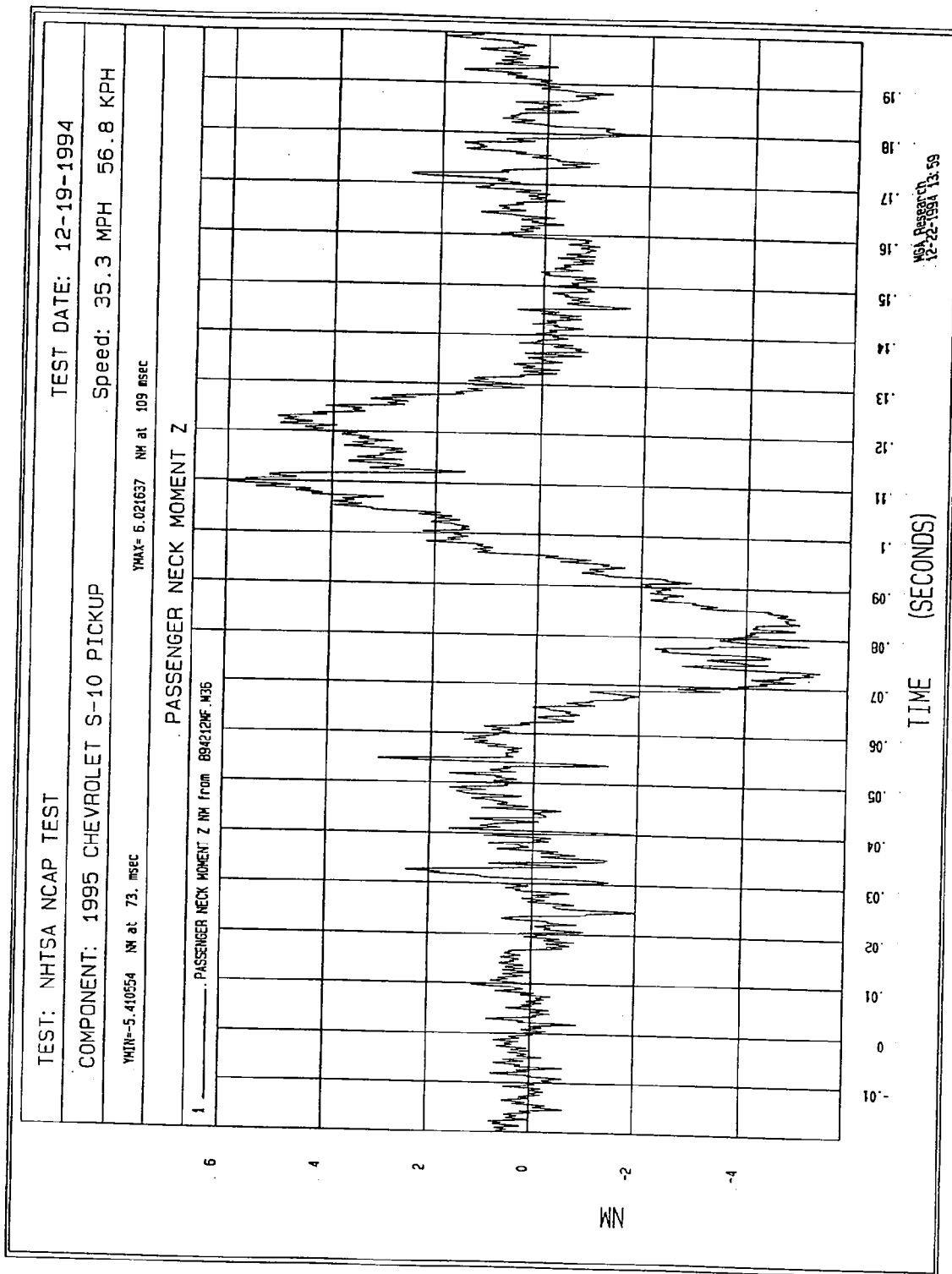
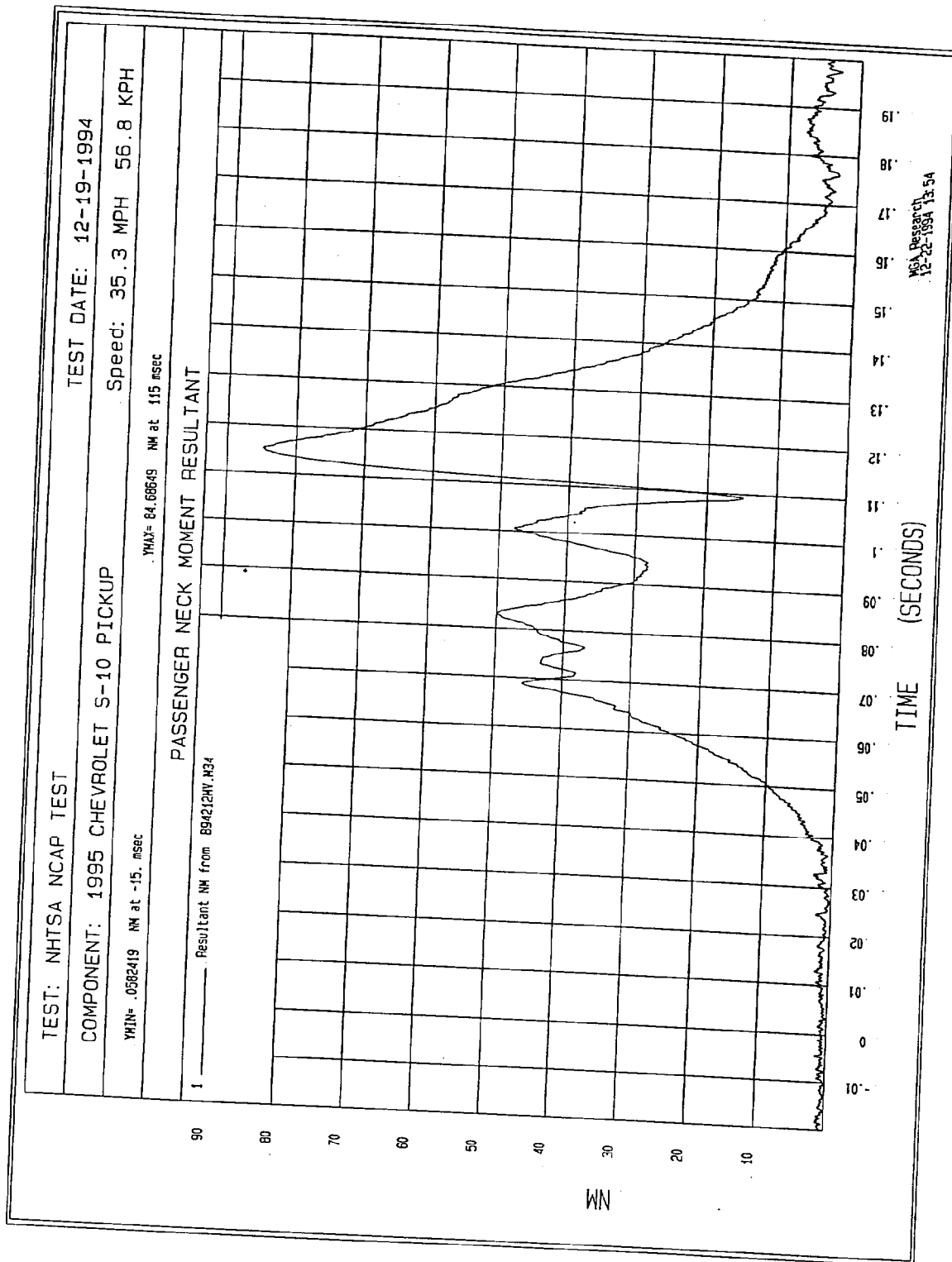


Figure B-117 - Passenger Neck Moment Z vs. Time



B-118

Figure B-118 - Passenger Neck Moment Resultant Acceleration vs. Time

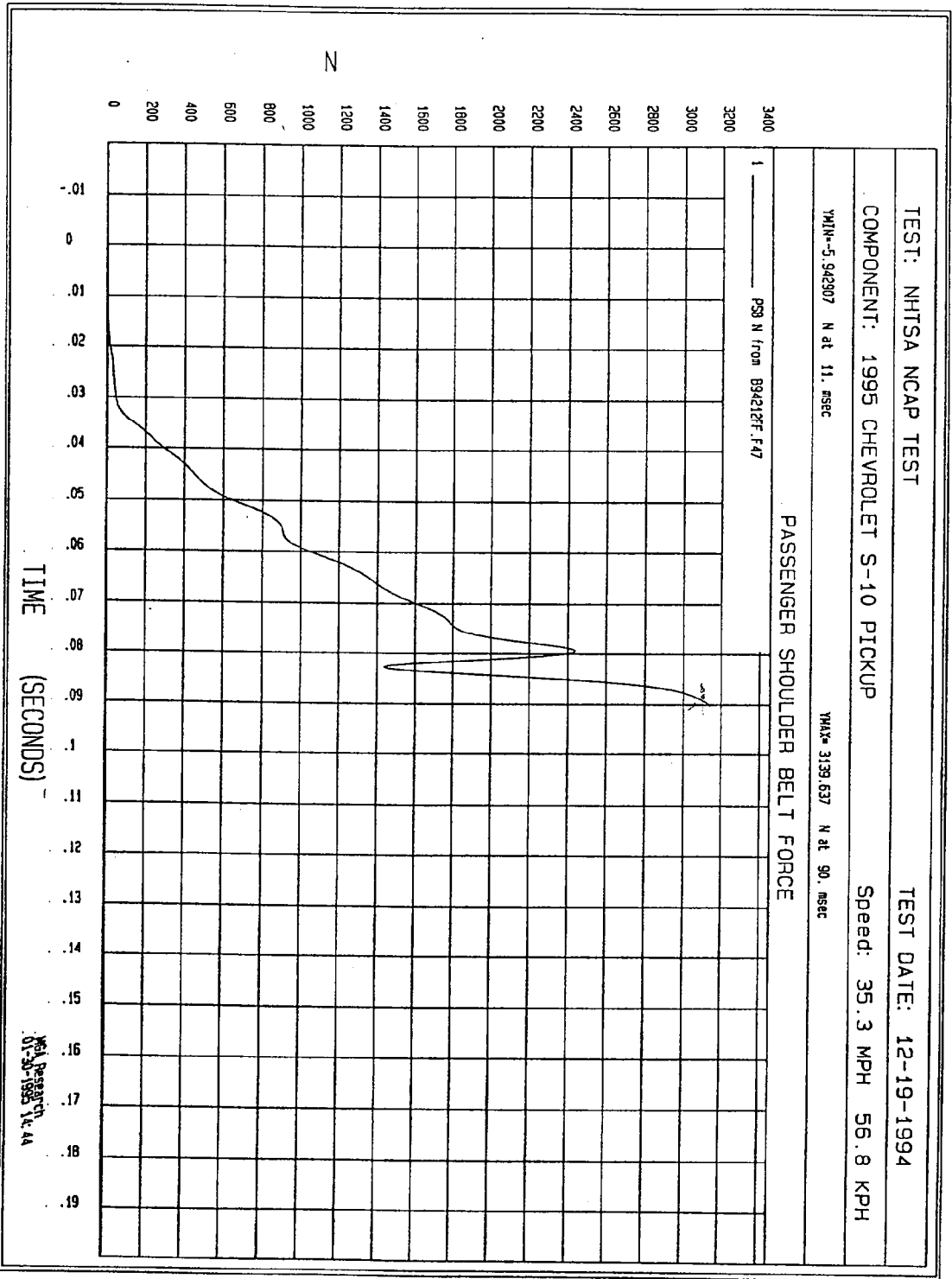


Figure 1 - Passenger Shoulder Belt Force vs. Time

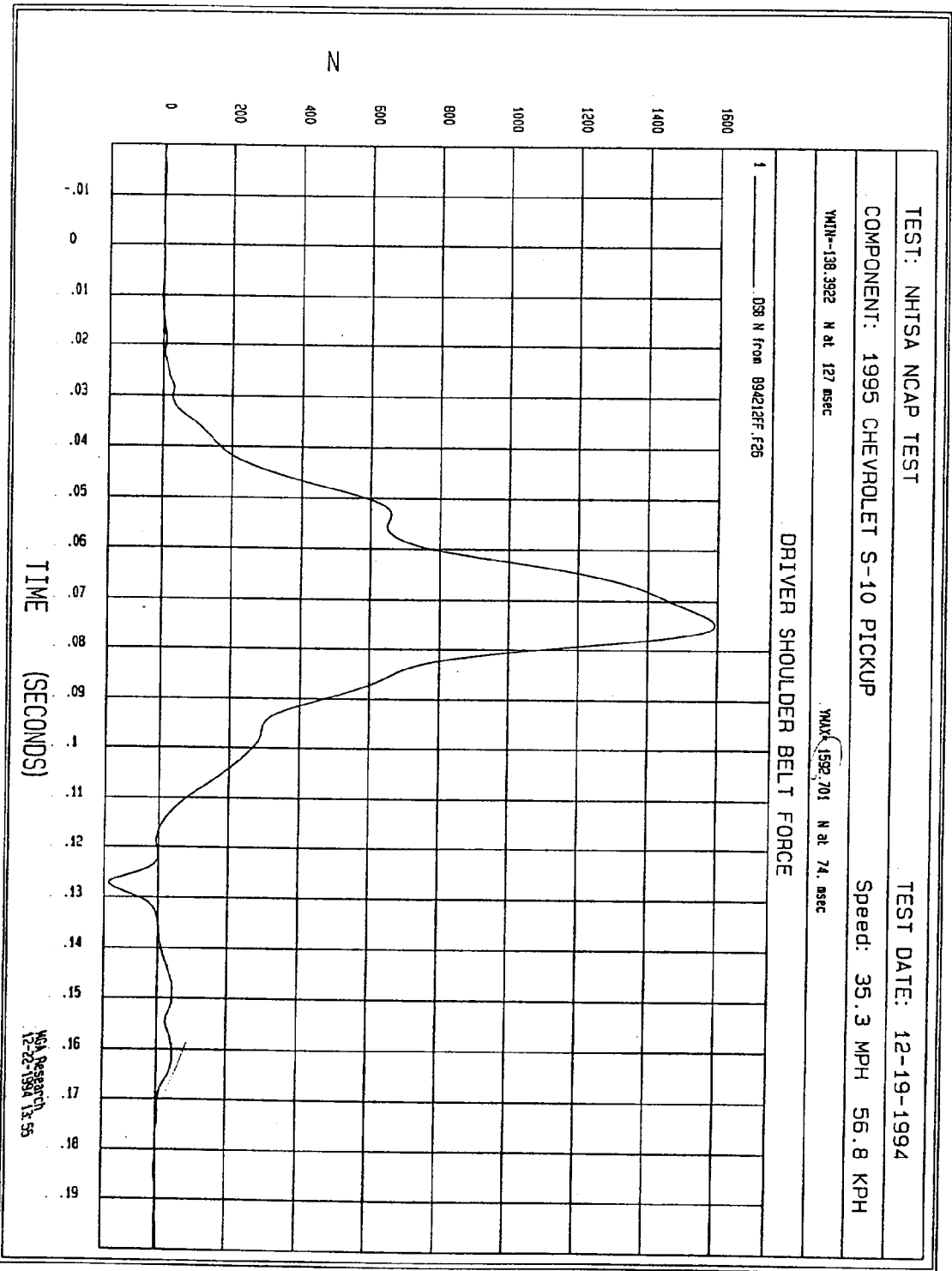


Figure 14 - Driver Shoulder Belt Force vs. Time

APPENDIX C

Dummy Configuration & Performance Verification Data

HYBRID III DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 066 DUMMY CALIBRATION BY: Al Chalmers

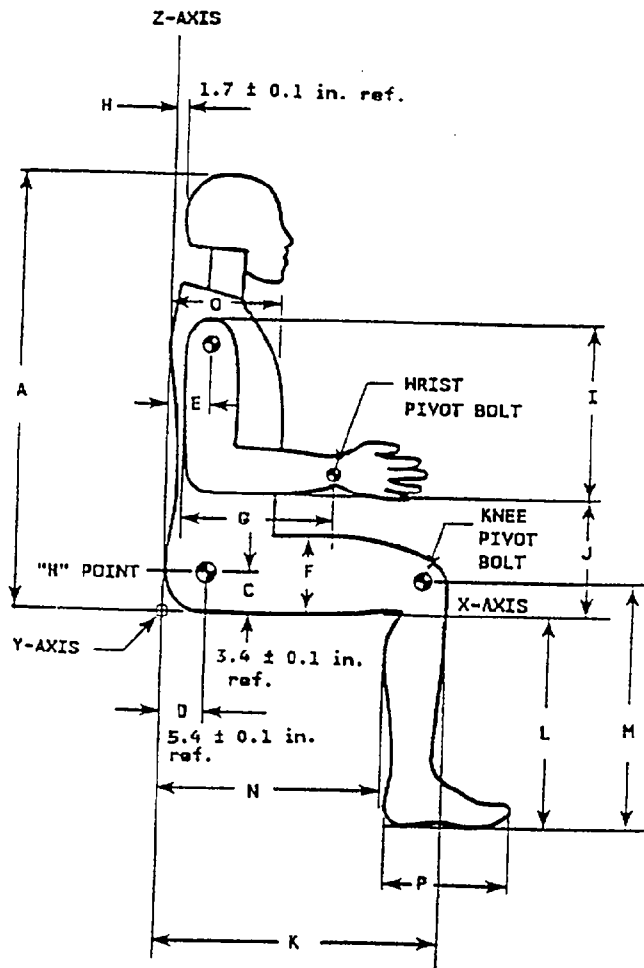
I. CONFIGURATION VERIFICATION DATA

DATE OF VERIFICATION: 08-31-94

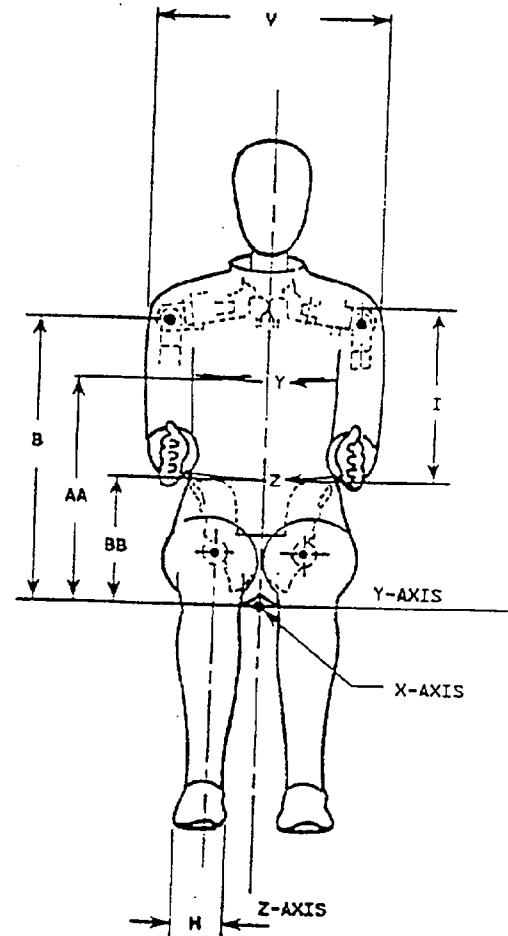
DESCRIPTION	SPECIFICATION (inches)	ACTUAL MEASUREMENT (inches)
A - Total Sitting Height	34.6 - 35.0	34.9
B - Shoulder Pivot Height	19.9 - 20.5	20.5
C - "H" Point Height	3.3 - 3.5	3.5
D - "H" Point from Seat Back	5.3 - 5.5	5.5
E - Shoulder Pivot From Backline	3.3 - 3.7	3.5
F - Thigh Clearance	5.5 - 6.1	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.: 66 DUMMY CALIBRATION BY: Al Chalmers

VERIFICATION DATE: 08-31-94

VERIFICATION LABORATORY TEMPERATURE (66° - 78°): 69°

1.0 HEAD DROP TEST

	SPECIFICATION	MEASUREMENT
Peak Resultant Acceleration	225 - 275 G	227
Peak Lateral Acceleration	15 G. MAX	8
Is Acceleration Curve Unimodal	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	24.28
	20 MS	17.60 - 22.60 G	19.65
	30 MS	12.50 - 18.50 G	13.69
Max. Pendulum G Above 30 MS		29.0 G MAX	15.2
Deceleration - Time Curve Decay Time to 5 G		34 - 42 MS	39
D Plane Rotation	MAX	64 - 78 DEG.	77
	TIME	57 - 64 MS	59
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 MS	118
Moment About Occipital Condyle	MIN.	65 - 80 FT.LBS	71
	TIME	47 - 58 MS	52
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	20.06
Pendulum Deceleration	10 MS	17.20 - 21.20 G	18.36
	20 MS	14.00 - 19.00 G	15.54
	30 MS	11.00 - 16.00 G	13.33
Max. Pendulum G Above 30 MS		22 G Max	13
Deceleration - Time Curve Decay Time to 5 G		38 - 46 MS	44
D Plane Rotation	MAX	81 - 106 DEG.	101
	TIME	72 - 82 MS	77
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 MS	161
Moment About Occipital Condyle	MIN.	-59.0/-39.0 FT LBS	-49.7
	TIME	65 - 79 MS	72
Positive Moment - Time Curve Decay Time to Zero		120 - 148 MS	146

4.0 CHEST IMPACT TESTS

	SPECIFICATION	MEASUREMENT
Probe Speed	21.6 to 22.4 F/S	21.6
Peak Deflection	2.50 to 2.86 IN.	2.57
Peak Resistive Force	1160 to 1325 LBS.	1283
Internal Hysteresis	69 to 85%	71

5.0 KNEE IMPACT TESTS

LEFT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	7.0
Maximum Force	1060 - 1300 LBS.	1194

RIGHT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	7.0
Maximum Force	1060 - 1300 LBS.	1184

HYBRID III DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 065 DUMMY CALIBRATION BY: Al Chalmers

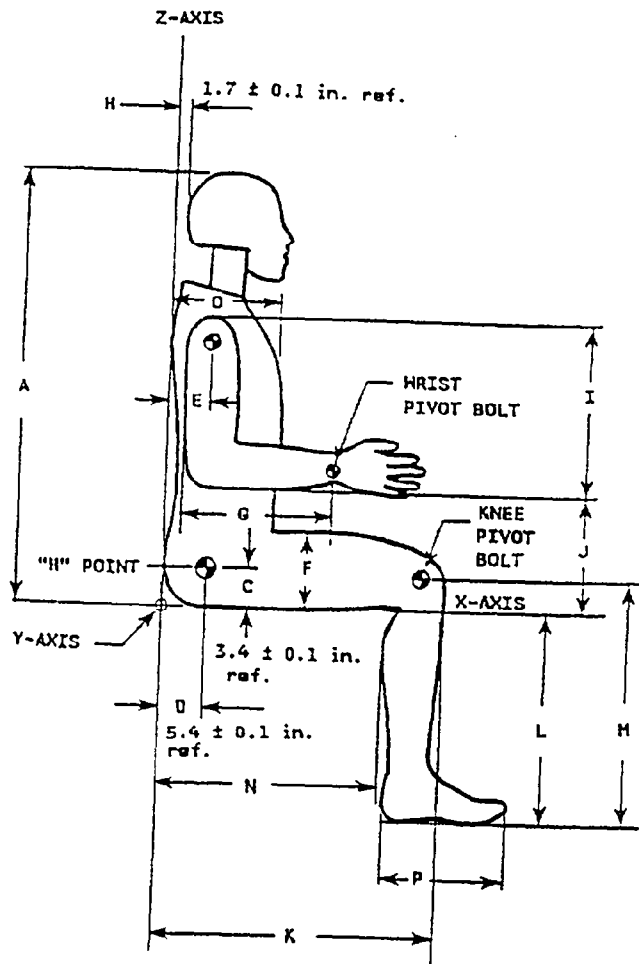
I. CONFIGURATION VERIFICATION DATA

DATE OF VERIFICATION: 08-31-94

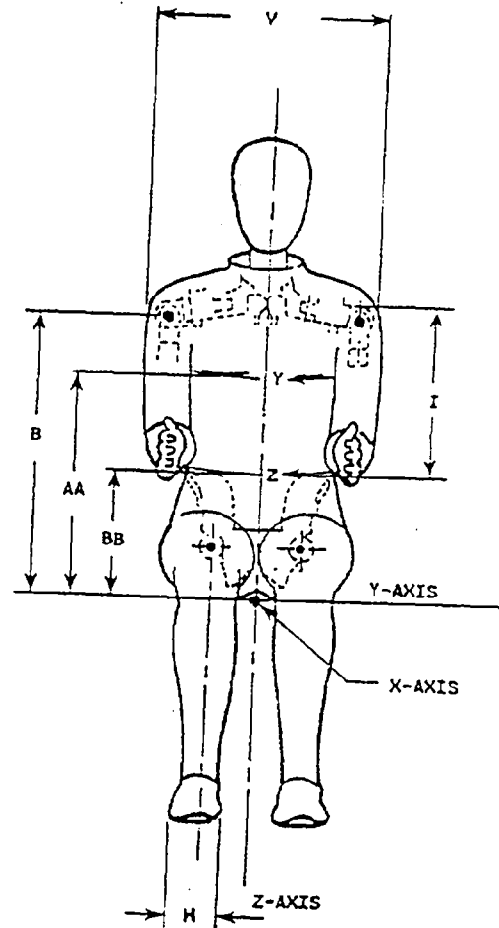
DESCRIPTION	SPECIFICATION (Inches)	ACTUAL MEASUREMENT (inches)
A - Total Sitting Height	34.6 - 35.0	34.8
B - Shoulder Pivot Height	19.9 - 20.5	20.5
C - "H" Point Height	3.3 - 3.5	3.5
D - "H" Point from Seat Back	5.3 - 5.5	5.5
E - Shoulder Pivot From Backline	3.3 - 3.7	3.5
F - Thigh Clearance	5.5 - 6.1	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



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 (CONT.)

DUMMY NO.: 65 DUMMY CALIBRATION BY: Al Chalmers

VERIFICATION DATE: 08-31-94

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

1.0 HEAD DROP TEST

	SPECIFICATION	MEASUREMENT
Peak Resultant Acceleration	225 - 275 G	254
Peak Lateral Acceleration	15 G. MAX	2
Is Acceleration Curve Unimodal	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	22.57
	20 MS	17.60 - 22.60 G	20.95
	30 MS	12.50 - 18.50 G	15.85
Max. Pendulum G Above 30 MS		29.0 G MAX	15.8
Deceleration - Time Curve Decay Time to 5 G		34 - 42 MS	40
D Plane Rotation	MAX	64 - 78 DEG.	72
	TIME	57 - 64 MS	59
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 MS	114
Moment About Occipital Condyle	MIN.	65 - 80 FT.LBS	73
	TIME	47 - 58 MS	51
Positive Moment - Time Curve Decay Time to Zero		97 - 107 MS	103

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	18.69
	20 MS	14.00 - 19.00 G	16.10
	30 MS	11.00 - 16.00 G	11.53
Max. Pendulum G Above 30 MS		22 G Max	12
Deceleration - Time Curve Decay Time to 5 G		38 - 46 MS	45
D Plane Rotation	MAX	81 - 106 DEG.	100
	TIME	72 - 82 MS	76
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 MS	161
Moment About Occipital Condyle	MIN.	-59.0/-39.0 FT LBS	-46.6
	TIME	65 - 79 MS	72
Positive Moment - Time Curve Decay Time to Zero		120 - 148 MS	146

4.0 CHEST IMPACT TESTS

	SPECIFICATION	MEASUREMENT
Probe Speed	21.6 to 22.4 F/S	21.7
Peak Deflection	2.50 to 2.86 IN.	2.85
Peak Resistive Force	1160 to 1325 LBS.	1312
Internal Hysteresis	69 to 85%	72

5.0 KNEE IMPACT TESTS

LEFT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	7.0
Maximum Force	1060 - 1300 LBS.	1231

RIGHT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	7.0
Maximum Force	1060 - 1300 LBS.	1161

APPENDIX D

Dummy, Vehicle and Laboratory Calibration Data

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 66

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	ACCY6	Endevco	07/28/94
Head Y	ACCH1	Endevco	07/28/94
Head Z	AAMW5	Endevco	07/28/94
Head X Redundant	AJ9D2	Endevco	10/19/94
Head Y Redundant	AH1E2	Endevco	07/07/94
Head Z Redundant	AJ7K3	Endevco	09/12/94
Chest X	ACCY1	Endevco	07/28/94
Chest Y	ACCC8	Endevco	07/28/94
Chest Z	ACCT7	Endevco	07/28/94
Chest X Redundant	AJ9D4	Endevco	10/18/94
Chest Y Redundant	AJ9F3	Endevco	10/18/94
Chest Z Redundant	AJ9D9	Endevco	10/18/94
Right Femur Load Cell	261	Denton	08/01/94
Left Femur Load Cell	262	Denton	11/11/94
Pelvis X	AJ9L3	Endevco	10/17/94
Pelvis Y	AJ9E0	Endevco	10/18/94
Pelvis Z	AJ821	Endevco	10/14/94

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 66

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Neck Load Cell X	443	Denton	07/14/94
Neck Load Cell Y	443	Denton	07/14/94
Neck Load Cell Z	443	Denton	07/14/94
Neck Moment X	443	Denton	07/14/94
Neck Moment Y	443	Denton	07/14/94
Neck Moment Z	443	Denton	07/14/94
Chest Deflection Gauge	066	Servo	08/31/94
Lap Belt Load Cell	211	GSE	10/26/94
Torso Belt Load Cell	663	Lebow	12/05/94

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 66

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Right Tibia Moment X	040	Denton	10/18/94
Upper Right Tibia Moment Y	040	Denton	10/18/94
Lower Right Tibia Moment Y	034	Denton	10/18/94
Lower Right Tibia Force X	034	Denton	10/18/94
Lower Right Tibia Force Z	034	Denton	10/18/94
Upper Left Tibia Moment X	023	Denton	10/18/94
Upper Left Tibia Moment Y	023	Denton	10/18/94
Lower Left Tibia Moment Y	019	Denton	10/18/94
Lower Left Tibia Force X	019	Denton	10/18/94
Lower Left Tibia Force Z	019	Denton	10/18/94

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 65

	PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	AAMN8	Endevco	10/25/94
Head Y	AJ9C4	Endevco	10/18/94
Head Z	ACCW9	Endevco	07/28/94
Head X Redundant	AJ621	Endevco	11/07/94
Head Y Redundant	AJ619	Endevco	11/07/94
Head Z Redundant	AHY54	Endevco	11/07/94
Chest X	ACC78	Endevco	07/12/94
Chest Y	ACCE6	Endevco	07/12/94
Chest Z	ACCY3	Endevco	07/12/94
Chest X Redundant	AJ9J7	Endevco	10/19/94
Chest Y Redundant	AJ7A2	Endevco	10/17/94
Chest Z Redundant	AJ819	Endevco	10/13/94
Right Femur Load Cell	259	Denton	08/01/94
Left Femur Load Cell	260	Denton	08/01/94
Pelvis X	AJ629	Endevco	11/07/94
Pelvis Y	AJ623	Endevco	11/07/94
Pelvis Z	AH0G5	Endevco	11/07/94

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 65

	PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Neck Load Cell X	442	Denton	07/14/94
Neck Load Cell Y	442	Denton	07/14/94
Neck Load Cell Z	442	Denton	07/14/94
Neck Moment X	442	Denton	07/14/94
Neck Moment Y	442	Denton	07/14/94
Neck Moment Z	442	Denton	07/14/94
Chest Deflection Gauge	065	Servo	08/31/94
Lap Belt Load Cell	211	GSE	10/26/94
Torso Belt Load Cell	691	Lebow	10/26/94

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Rear Seat Crossmember X	94J03-A03	Entran	11/07/94
Right Rear Seat Crossmember X	94J03-A02	Entran	10/30/94
Top of Engine Block X	94J03-A18	Entran	11/07/94
Bottom of Engine X	AJ4R1	Endevco	10/14/94
Left Brake Caliper X	MGA035	Entran	11/04/94
Right Brake Caliper X	MGA073	Entran	05/24/94
Instrument Panel X	AHYY5	Endevco	10/14/94
Redundant Left Rear Seat Crossmember X	94J07-X07	Entran	11/07/94
Redundant Right Rear Seat Crossmember X	94J03-A06	Entran	11/30/94

	LABORATORY INSTRUMENTS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Neck Bending Pendulum Accelerometer	AGH90	Endevco	09/01/94
Neck Bending Rotary Potentiometer	019	Lebow	08/29/94
Neck Bending Rotary Potentiometer	018	Lebow	08/29/94
Femur/Chest/Thorax Probe Accelerometer	403069	Sensotec	10/24/94
Abdomen Compression Force Gauge	N/A	Transducers Inc.	N/A

APPENDIX E

Vehicle Owner's Occupant Restraint System Instructions

Seats & Restraint Systems

Section

1

Here you'll find information about the seats in your vehicle and how to use your safety belts properly. You can also learn about some things you should *not* do with air bags and safety belts.

Seats and Seat Controls

This section tells you about the seats—how to adjust them, and fold them up and down.

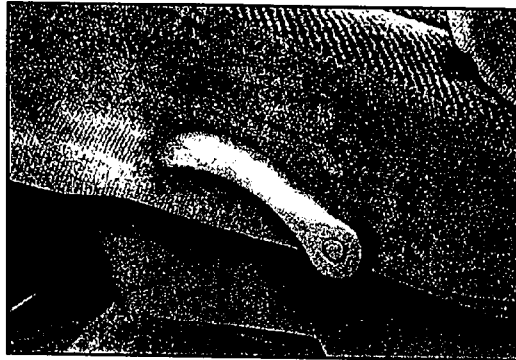
Front Seat (Except Easy Entry)



CAUTION:

You can lose control of the vehicle if you try to adjust a manual driver's seat while the vehicle is moving. The sudden movement could startle and confuse you or make you push a pedal when you don't want to. Adjust the driver's seat only when the vehicle is not moving.

Reclining Front Seatbacks (Bucket Seats or 60/40 Bench)



To adjust the seatback, lift the lever on the outer side of the seat. Release the lever to lock the seatback where you want it. Pull up on the lever and the seat will go to an upright position.



But don't have a seatback reclined if your vehicle is moving.



CAUTION:

Sitting in a reclined position when your vehicle is in motion can be dangerous. Even if you buckle up, your safety belts can't do their job when you're reclined like this.

The shoulder belt can't do its job because it won't be against your body. Instead, it will be in front of you. In a crash you could go into it, receiving neck or other injuries.

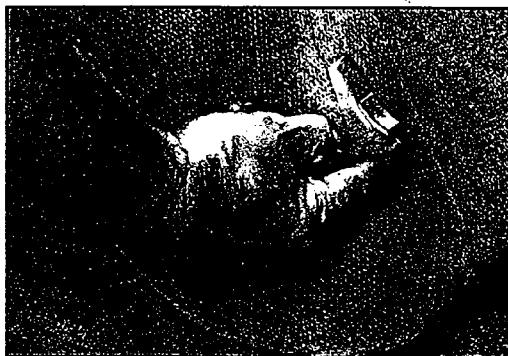
The lap belt can't do its job either. In a crash the belt could go up over your abdomen. The belt forces would be there, not at your pelvic bones. This could cause serious internal injuries.

For proper protection when the vehicle is in motion, have the seatback upright. Then sit well back in the seat and wear your safety belt properly.

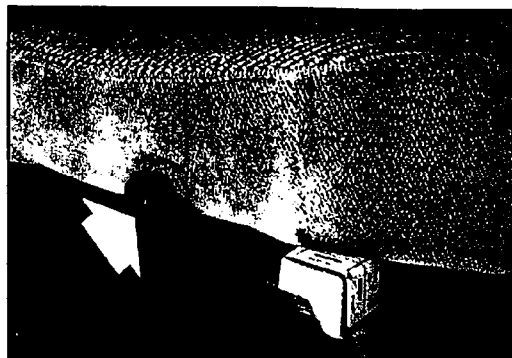
Front Seatback Latches

The front seatback folds forward to let people get into the back seat or reach the storage area behind the seat. Your seatback will move back and forth freely, unless you come to a sudden stop. Then it will lock in place.

There's one time the seatback may not fold without some help from you. That's if your vehicle is parked going down a fairly steep hill.

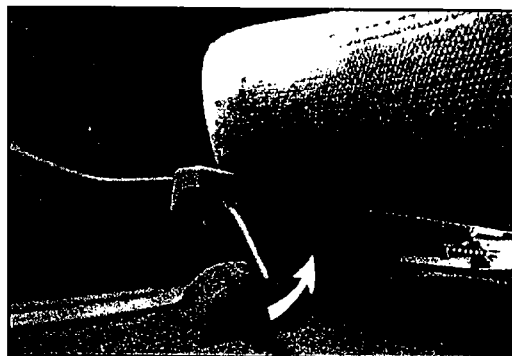


To fold a front seatback forward, push the seatback toward the rear as you lift this latch. Then the seatback will fold forward. The latch must be down for the seat to work properly.



Move the lever under the front of the seat towards the driver's door to unlock it. Slide the seat to where you want it. Then release the lever and try to move the seat with your body to make sure the seat is locked into place.

Front Seat (Easy Entry Only)



Move the lever under the front of the seat up to unlock it. Slide the seat to where you want it. Then release the lever and try to move the seat with your body to make sure the seat is locked into place.

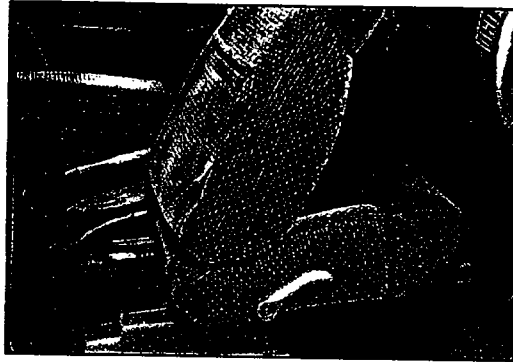
Lumbar Adjustment



If you have this feature, there will be a knob with six settings on the outside of the driver and passenger bucket seats.

Turn the knob counterclockwise to increase lumbar support and clockwise to decrease lumbar support.

Easy Entry Seat (Extended Cab)



The outside front passenger bucket or split-bench seat of your vehicle makes it easy to get in and out of the rear vehicle area.

- When you tilt the outside front passenger seatback fully forward, the whole seat will slide forward.
- After someone gets into the rear seat area, move the seatback to its original position. Then move the seat rearward until it locks.

**CAUTION:**
If an easy entry right front seat isn't locked, it can move. In a sudden stop or crash, the person sitting there could be injured. After you've used it, be sure to push rearward on an easy entry seat to be sure it's locked.

- To get out, again tilt the seatback fully forward.

Jump Seat (Extended Cab Models)

Stored Position



Folded-Down Position



Your extended cab pickup has jump seats in the rear area. To fold the jump seat down, pull down on the handle on the bottom of the seat until the seat is in place, then move the seatback to a vertical position. To store the seat, fold the seatback down on the cushion, then push the entire seat up until it is flush with the trim panels.

Don't let the safety belts be damaged by the hinges or the latches. Safety belts should be folded and stored between the seat cushion and seatback.

Safety Belts: They're for Everyone

This part of the manual tells you how to use safety belts properly. It also tells you some things you should not do with safety belts.

And it explains the Supplemental Inflatable Restraint, or "air bag" system.



CAUTION:

Don't let anyone ride where he or she can't wear a safety belt properly. If you are in a crash and you're not wearing a safety belt, your injuries can be much worse. You can hit things inside the vehicle or be ejected from it. You can be seriously injured or killed. In the same crash, you might not be if you are buckled up. Always fasten your safety belt, and check that your passengers' belts are fastened properly too.



Your vehicle has a light that comes on as a reminder to buckle up. (See "Safety Belt Reminder Light" in the Index.)

In many states and Canadian provinces, the law says to wear safety belts. Here's why: *They work.*

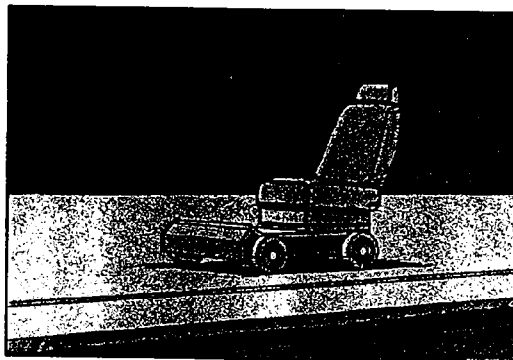
You never know if you'll be in a crash. If you do have a crash, you don't know if it will be a bad one.

A few crashes are mild, and some crashes can be so serious that even buckled up a person wouldn't survive. But most crashes are in between. In many of them, people who buckle up can survive and sometimes walk away. Without belts they could have been badly hurt or killed.

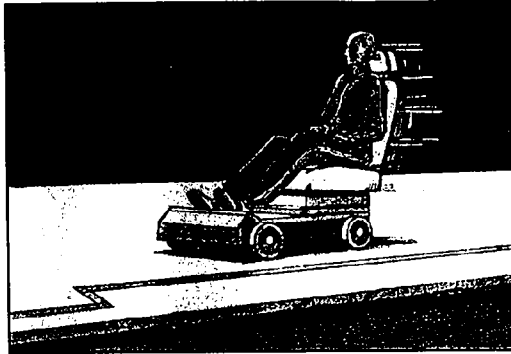
After more than 25 years of safety belts in vehicles, the facts are clear. In most crashes buckling up does matter ... a lot!

Why Safety Belts Work

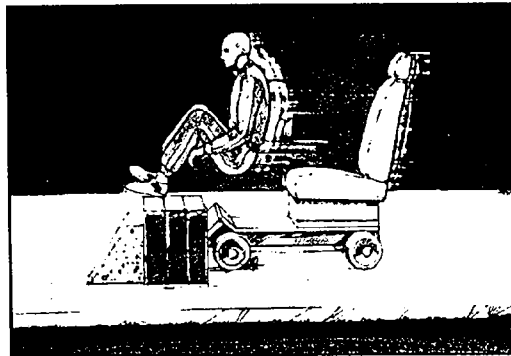
When you ride in or on anything, you go as fast as it goes.



Take the simplest vehicle. Suppose it's just a seat on wheels.



Put someone on it.

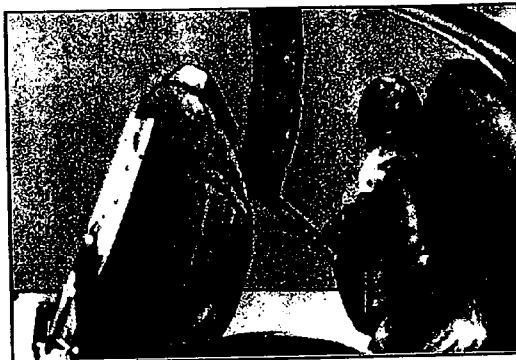


Get it up to speed.
Then stop the vehicle.
The rider doesn't stop.

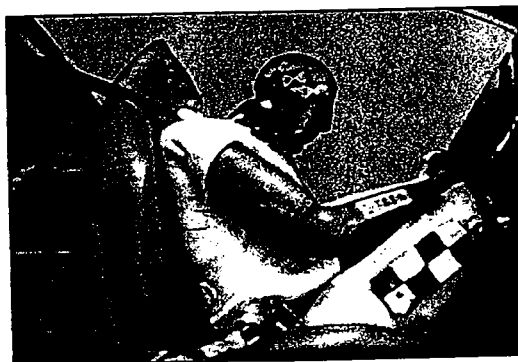


The person keeps
going until stopped by
something.

In a real vehicle, it
could be the
windshield ...



or the instrument
panel ...



or the safety belts!

With safety belts, you slow down as the vehicle does. You get more time to stop. You stop over more distance, and your strongest bones take the forces. That's why safety belts make such good sense.

Here Are Questions Many People Ask About Safety Belts — and the Answers

Q: *Won't I be trapped in the vehicle after an accident if I'm wearing a safety belt?*

A: You *could* be — whether you're wearing a safety belt or not. But you can unbuckle a safety belt, even if you're upside down. And your chance of being conscious during and after an accident, so you *can* unbuckle and get out, is *much* greater if you are belted.

Q: *Why don't they just put in air bags so people won't have to wear safety belts?*

A: Air bags are in many vehicles today and will be in more of them in the future. But they are supplemental systems only; so they work *with* safety belts — not instead of them. Every air bag system ever offered for sale has required the use of safety belts. Even if you're in a vehicle that has air bags, you still have to buckle up to get the most protection. That's true not only in frontal collisions, but especially in side and other collisions.

Q: *If I'm a good driver, and I never drive far from home, why should I wear safety belts?*

A: You may be an excellent driver, but if you're in an accident — even one that isn't your fault — you and your passengers can be hurt. Being a good driver doesn't protect you from things beyond your control, such as bad drivers.

Most accidents occur within 25 miles (40 km) of home. And the greatest number of serious injuries and deaths occur at speeds of less than 40 mph (65 km/h).

Safety belts are for everyone.

How to Wear Safety Belts Properly

Adults

This part is only for people of adult size.

Be aware that there are special things to know about safety belts and children. And there are different rules for smaller children and babies. If a child will be riding in your vehicle, see the part of this manual called "Children." Follow those rules for everyone's protection.

First, you'll want to know which restraint systems your vehicle has.

We'll start with the driver position.

Driver Position

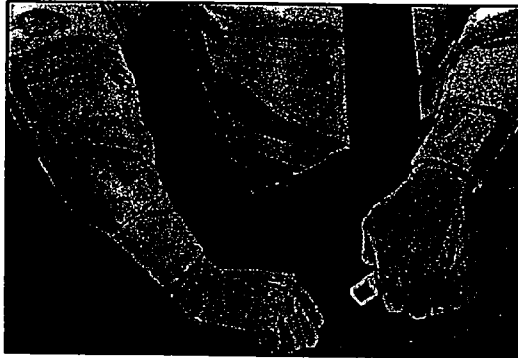
This part describes the driver's restraint system.

Lap-Shoulder Belt

The driver has a lap-shoulder belt. Here's how to wear it properly.

1. Close and lock the door.

2. Adjust the seat (to see how, see "Seats" in the Index) so you can sit up straight.



3. Pick up the latch plate and pull the belt across you. Don't let it get twisted.

4. Push the latch plate into the buckle until it clicks.

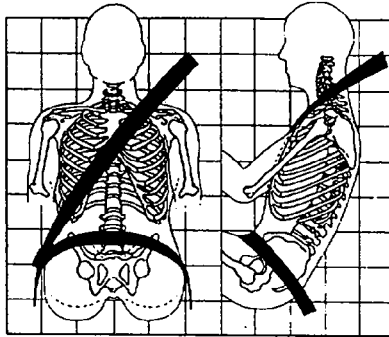
Pull up on the latch plate to make sure it is secure.

If the belt isn't long enough, see "Safety Belt Extender" at the end of this section.

Make sure the release button on the buckle is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.



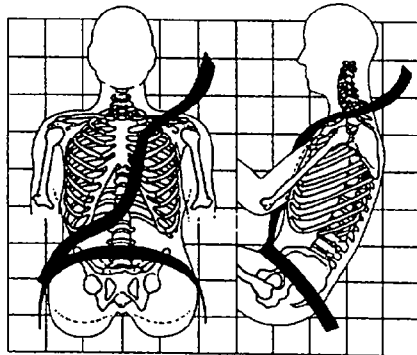
5. To make the lap part tight, pull down on the buckle end of the belt as you pull up on the shoulder belt.



The lap part of the belt should be worn low and snug on the hips, just touching the thighs. In a crash, this applies force to the strong pelvic bones. And you'd be less likely to slide under the lap belt. If you slid under it, the belt would apply force at your abdomen. This could cause serious or even fatal injuries. The shoulder belt should go over the shoulder and across the chest. These parts of the body are best able to take belt restraining forces.

The safety belt locks if there's a sudden stop or a crash.

Q: What's wrong with this?



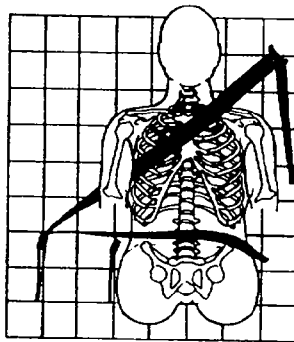
A: The shoulder belt is too loose. It won't give nearly as much protection this way.



CAUTION:

You can be seriously hurt if your shoulder belt is too loose. In a crash you would move forward too much, which could increase injury. The shoulder belt should fit against your body.

Q: What's wrong with this?



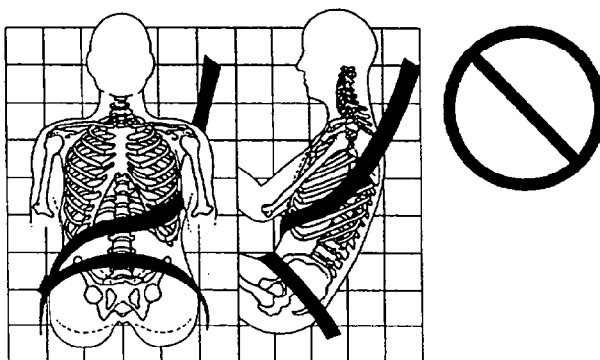
A: The belt is buckled in the wrong place.



CAUTION:

You can be seriously injured if your belt is buckled in the wrong place like this. In a crash, the belt would go up over your abdomen. The belt forces would be there, not at the pelvic bones. This could cause serious internal injuries. Always buckle your belt into the buckle nearest you.

Q: What's wrong with this?



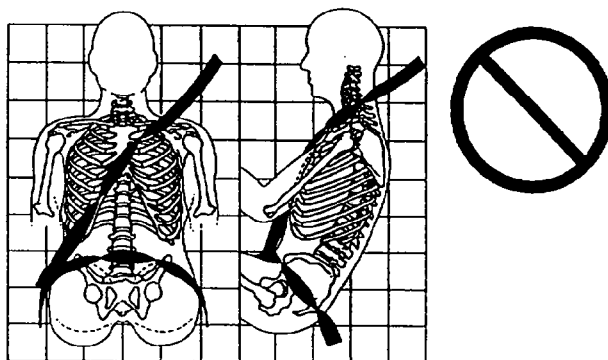
A: The shoulder belt is worn under the arm. It should be worn over the shoulder at all times.



CAUTION:

You can be seriously injured if you wear the shoulder belt under your arm. In a crash, your body would move too far forward, which would increase the chance of head and neck injury. Also, the belt would apply too much force to the ribs, which aren't as strong as shoulder bones. You could also severely injure internal organs like your liver or spleen.

Q: What's wrong with this?



A: The belt is twisted across the body.



CAUTION:

You can be seriously injured by a twisted belt. In a crash, you wouldn't have the full width of the belt to spread impact forces. If a belt is twisted, make it straight so it can work properly, or ask your dealer to fix it.



To unlatch the belt, just push the button on the buckle. The belt should go back out of the way.

Before you close the door, be sure the belt is out of the way. If you slam the door on it, you can damage both the belt and your vehicle.

Supplemental Inflatable Restraint System (SIR)

This part explains the Supplemental Inflatable Restraint (SIR) system, or air bag.

Your vehicle has an air bag for the driver.

Here are the most important things to know about the air bag system:



CAUTION:

You can be severely injured or killed in a crash if you aren't wearing your safety belt — even if you have an air bag. Wearing your safety belt during a crash helps reduce your chance of hitting things inside the vehicle or being ejected from it. The air bag is only a “supplemental restraint.” That is, it works with safety belts but doesn't replace them. Air bags are designed to work only in moderate to severe crashes where the front of your vehicle hits something. They aren't designed to inflate at all in rollover, rear, side, or low-speed frontal crashes. Everyone in your vehicle, including the driver, should wear a safety belt properly — whether or not there's an air bag for that person.



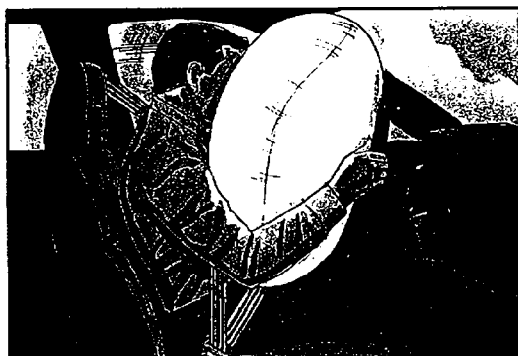
CAUTION:

Air bags inflate with great force, faster than the blink of an eye. If you're too close to an inflating air bag, it could seriously injure you. Safety belts help keep you in position for an air bag inflation in a crash. Always wear your safety belt, even with an air bag, and sit as far back as you can while still maintaining control of your vehicle.

AIR BAG

There is an air bag readiness light on the instrument panel, which shows AIR BAG. The system checks the air bag's electrical system for malfunctions. The light tells you if there is an electrical problem. See "Air Bag Readiness Light" in the Index for more information.

How the Air Bag System Works



Where is the air bag?

The driver's air bag is in the middle of the steering wheel.



CAUTION:

Don't put anything on, or attach anything to, the steering wheel. Also, don't put anything (such as pets or objects) between the driver and the steering wheel. If something is between an occupant and an air bag, it could affect the performance of the air bag — or worse, it could cause injury.

When should an air bag inflate?

The air bag is designed to inflate in moderate to severe frontal or near-frontal crashes. The air bag will inflate only if the impact speed is above the system's designed "threshold level." If your vehicle goes straight into a wall that doesn't move or deform, the threshold level is about 14 to 18 mph (23 to 29 km/h). The threshold level can vary, however, with specific vehicle design, so that it can be somewhat above or below this range. If your vehicle strikes something that will move or deform, such as a parked car, the threshold level will be higher. The air bag is not designed to inflate in rollovers, side impacts, or rear impacts, because inflation would not help the occupant.

In any particular crash, no one can say whether an air bag should have inflated simply because of the damage to a vehicle or because of what the repair costs were. Inflation is determined by the angle of the impact and the vehicle's deceleration. Vehicle damage is only one indication of this.

The air bag system is designed to work properly under a wide range of conditions, including off-road usage. Observe safe driving speeds, especially on rough terrain. As always, wear your safety belt. See "Off-Road Driving" in the Index for more tips on off-road driving.

What makes an air bag inflate?

In a frontal impact of sufficient severity, the air bag sensing system detects that the vehicle is suddenly stopping as a result of a crash. The sensing system triggers a chemical reaction of the sodium azide sealed in the inflator. The reaction produces nitrogen gas, which inflates the air bag. The inflator, air bag, and related hardware are all part of the air bag module packed inside the steering wheel.

How does an air bag restrain?

In moderate to severe frontal or near-frontal collisions, even belted occupants can contact the steering wheel. The air bag supplements the protection provided by safety belts. Air bags distribute the force of the impact more evenly over the occupant's upper body, stopping the occupant more gradually. But air bags would not help you in many types of collisions, including rollovers and rear and side impacts, primarily because an occupant's motion is not toward the air bag. Air bags should never be regarded as anything more than a supplement to safety belts, and then only in moderate to severe frontal or near-frontal collisions.

What will you see after an air bag inflates?

After the air bag inflates, it quickly deflates. This occurs so quickly that some people may not even realize the air bag inflated. Some components of the air bag module in the steering wheel hub will be hot for a short time, but the part of the bag that comes into contact with you will not be hot to the touch. There will be some smoke and dust coming from vents in the deflated air bag. Air bag inflation will not prevent the driver from seeing or from being able to steer the vehicle, nor will it stop people from leaving the vehicle.



CAUTION:

When an air bag inflates, there is dust in the air. This dust could cause breathing problems for people with a history of asthma or other breathing trouble. To avoid this, everyone in the vehicle should get out as soon as it is safe to do so. If you have breathing problems but can't get out of the vehicle after an air bag inflates, then get fresh air by opening a window or door.

- The air bag is designed to inflate only once. After it inflates, you'll need some new parts for your air bag system. If you don't get them, the air bag system won't be there to help protect you in another crash. A new system will include the air bag module and possibly other parts. The service manual for your vehicle covers the need to replace other parts.

- Your vehicle is equipped with a diagnostic module, which records information about the air bag system. The module records information about the readiness of the system, when the sensors are activated and driver's safety belt usage at deployment.
- Let only qualified technicians work on your air bag system. Improper service can mean that your air bag system won't work properly. See your dealer for service.

NOTICE:

If you damage the cover for the driver's air bag, it may not work properly. You may have to replace the air bag module. Do not open or break the air bag cover.

Servicing Your Air Bag-Equipped Vehicle

The air bag affects how your vehicle should be serviced. There are parts of the air bag system in several places around your vehicle. You don't want the system to inflate while someone is working on your vehicle. Your GM dealer and the 1995 GM Service Manual have information about servicing your vehicle and the air bag system. To purchase a service manual, see "Service Publications" in the Index. The air bag system does not need regular maintenance.



CAUTION:

For up to 2 minutes after the ignition key is turned off and the battery is disconnected, an air bag can still inflate during improper service. You can be injured if you are close to an air bag when it inflates. Avoid wires wrapped with yellow tape or yellow connectors. They are probably part of the air bag system. Be sure to follow proper service procedures, and make sure the person performing work for you is qualified to do so.

Adding Equipment to Your Air Bag–Equipped Vehicle

Q: *If I add a push bumper or a bicycle rack to the front of my vehicle, will it keep the air bag from working properly?*

A: As long as the push bumper or bicycle rack is attached to your vehicle so that the vehicle's basic structure isn't changed, it's not likely to keep the air bags from working properly in a crash.

Q: *Is there anything I might add to the front of the vehicle that could keep the air bag from working properly?*

A: Yes. If you add things that change your vehicle's frame, bumper system, front end sheet metal or height, they may keep the air bag system from working properly. Also, the air bag system may not work properly if you relocate any of the air bag sensors. If you have any question about this, you should contact Customer Assistance before you modify your vehicle. (The phone numbers and addresses for Customer Assistance are in Step Two of the Customer Satisfaction Procedure in this manual. See "Customer Satisfaction Procedure" in the Index.)

Safety Belt Use During Pregnancy

Safety belts work for everyone, including pregnant women. Like all occupants, they are more likely to be seriously injured if they don't wear safety belts.

A pregnant woman should wear a lap–shoulder belt, and the lap portion should be worn as low as possible throughout the pregnancy.



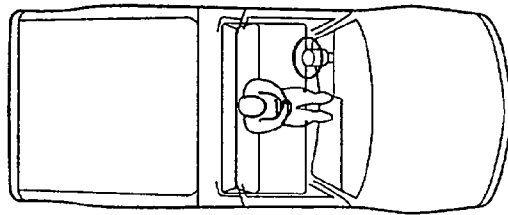
The best way to protect the fetus is to protect the mother. When a safety belt is worn properly, it's more likely that the fetus won't be hurt in a crash. For pregnant women, as for anyone, the key to making safety belts effective is wearing them properly.

Right Front Passenger Position

The right front passenger's safety belt works the same way as the driver's safety belt. See "Driver Position," earlier in this section.

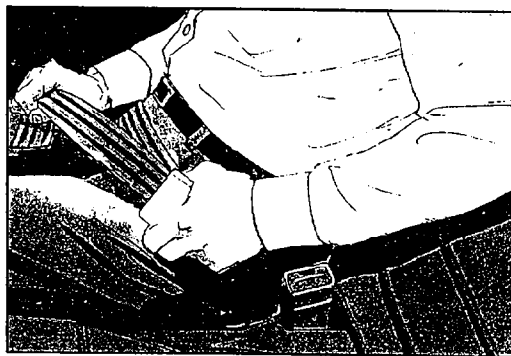
When the shoulder belt is pulled out all the way, it will lock. If it does, let it go back all the way and start again.

Center Passenger Position



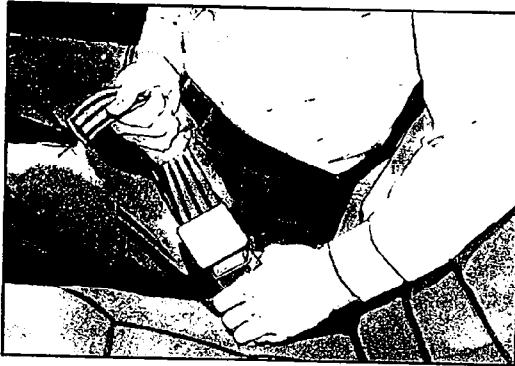
Lap Belt

If your vehicle has a bench seat, someone can sit in the center position.



When you sit in a center seating position, you have a lap safety belt, which has no retractor. To make the belt longer, tilt the latch plate and pull it along the belt.

To make the belt shorter, pull its free end as shown until the belt is snug.



Buckle, position and release it the same way as the lap part of a lap-shoulder belt. If the belt isn't long enough, see "Safety Belt Extender" at the end of this section.

Make sure the release button on the buckle is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.

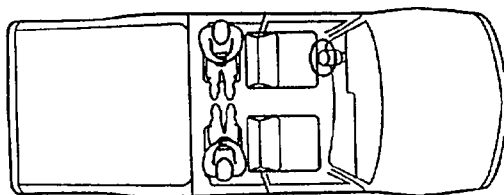
Rear Seat Passengers (Extended Cab Jump Seats)

Lap Belt

These are reserve seating positions equipped with lap belts only.

It's very important for rear seat passengers to buckle up! Accident statistics show that unbelted people in the rear seat are hurt more often in crashes than those who are wearing safety belts.

Rear passengers who aren't safety belted can be thrown out of the vehicle in a crash. And they can strike others in the vehicle who are wearing safety belts.



Each jump seat has a lap belt with no retractor. To make the belt longer, tilt the latch plate a little and pull the belt.



To make it shorter, pull the belt as shown until it is snug. Buckle and position it the same way as the lap part of the driver's safety belt (see "Driver Position" in the Index). Make sure the release button on the buckle is positioned so you would be able to unbuckle the safety belt quickly if you ever had to. To unlatch the belt, just push the button on the buckle.

Don't use child restraints on these seats. They won't work properly.

Children

Everyone in a vehicle needs protection! That includes infants and all children smaller than adult size. In fact, the law in every state in the United States and in every Canadian province says children up to some age must be restrained while in a vehicle.

Smaller Children and Babies



CAUTION:

Smaller children and babies should always be restrained in a child or infant restraint. The instructions for the restraint will say whether it is the right type and size for your child. A very young child's hip bones are so small that a regular belt might not stay low on the hips, as it should. Instead, the belt will likely be over the child's abdomen. In a crash the belt would apply force right on the child's abdomen, which could cause serious or fatal injuries. So, be sure that any child small enough for one is always properly restrained in a child or infant restraint.



CAUTION:

Never hold a baby in your arms while riding in a vehicle. A baby doesn't weigh much — until a crash. During a crash a baby will become so heavy you can't hold it. For example, in a crash at only 25 mph (40 km/h), a 12-pound (5.5 kg) baby will suddenly become a 240-pound (110 kg) force on your arms. The baby would be almost impossible to hold.

Secure the baby in an infant restraint.