

V2263

REPORT NO. MGA-95N013

NEW CAR ASSESSMENT PROGRAM (NCAP)

FRONTAL BARRIER IMPACT TEST

HONDA

1995 HONDA ODYSSEY 4 DOOR
NHTSA NO. MS5300

MGA RESEARCH CORPORATION
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: March 6, 1995

Report Date: March 27, 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)
WASHINGTON, D.C. 20590

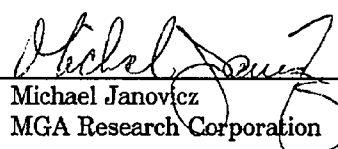
TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. MGA-95-N013		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 Honda Odyssey 4 Door NHTSA No. MS0204 to the requirements of FMVSS No. 208, 212, 219 (partial) and 301.				5. Report Date March 27, 1995	
				6. Performing Organization Code MGA	
7. Author(s) Michael Janovicz				8. Performing Organization Report No. MGA-OMI-013	
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105				10. Work Unit No. MGA-95-DOT-13	
				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 March 1995	
				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 Honda Odyssey 4 Door at the MGA Proving Grounds and Crash Test Center in Burlington, WI. on March 6, 1995. The barrier impact velocity was 56.2 kph (34.9 mph), and the ambient temperature at the time of impact was 21 °C. The post-test maximum static crush was 556 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 637 and the 3 msec. Clip (Chest g's) was 50 g's. The left and right femur loads for the driver were 5430 and 6027 Newtons, respectively. The passenger's HIC was 644 and the 3 msec Clip was 47 g's. The left and right femur maximum loads were 2191 and 2633 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 237	
				22. Price	

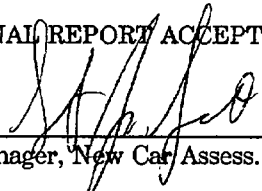
This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department 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)

MAY 31 1995

Date of Report Acceptance


Contracting Officer's Tech. Rep. (COTR)

MAY 31 1995

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 Honda Odyssey 4 Door at a velocity of 56.2 kph (34.9 mph). The test was performed at the MGA Proving Grounds and Crash Test Center on March 6, 1995. 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. This test was considered the second exposure for the driver ATD (Serial No. 66) and the right-front passenger ATD (Serial No. 65). Certification details, along with instrumentation calibration data, are found in Appendix C and D.

The 77 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 637. The maximum chest deceleration, (Clip), over 3 milliseconds was 50 g's. The left and right femur loads were 5430 and 6027 Newtons respectively.

The right front passenger's head struck the inflated airbag. The passenger HIC was 644 and maximum chest deceleration, (Clip), over 3 milliseconds was 47 g's. The left and right femur loads were 2191 and 2633 Newtons respectively.

GENERAL TEST AND VEHICLE PARAMETER DATA

Vehicle Yr/Make/Model/Body Style: 1995/Honda/Odyssey/Wagon

NHTSA No.: MS5300 VIN.: JHMRA1840SC000937

Body color: Blue Date of Manufacture: 11/94

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

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

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

Odometer Reading: 194 miles

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

Type of Occupant Restraint: Type II belts with driver and passenger side airbags

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

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

Recommended Tire Size: P205/65R15

Recommended Cold Tire Pressure: Front 2.2 kg/cm² (32 Psi) Rear 2.2 kg/cm² (32 Psi)

Tires on Vehicle: P205/65R15 ; Manufacturer: Goodyear

Number of Occupants: 2 Front; 2 Rear; 2 3rd Seat; 6 TOTAL

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

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

Vehicle Capacity Weight (VCW) = 522.0 kg. (A)

No. of Occupants x 68.0 kg. = 408.0 kg. (B)

Rated Cargo Weight (RCW) A-B = 114.0 kg.

¹GVWR N/A kg. GAWR: Front N/A kg.; Rear N/A kg.

¹ The gross vehicle weight ratings were not found on the vehicle or in the owners manual.

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

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

Right Front = 465 kg Right Rear = 323 kg
Left Front = 459 kg Left Rear = 322 kg
TOTAL FRONT WEIGHT = 924 kg (58.9% of Total Vehicle Weight)
TOTAL REAR WEIGHT = 645 kg (41.1% of Total Vehicle Weight)
TOTAL UNLOADED DELIVERED WEIGHT (UDW) = 1569 kg

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight 1569 kg
VCW = Vehicle Capacity Weight 522 kg DSC = Designated Seating Capacity 6
RCW = VCW - 68 (DSC) = 114 *kg
Target Test Weight = UDW + RCW + (2 dummies x 75.8 kg/dummy)
Target Test Weight = 1835 kg

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND CARGO:

Right Front = 517 kg Right Rear = 390 kg
Left Front = 520 kg Left Rear = 403 kg
TOTAL FRONT WEIGHT = 1037 kg (56.7% of Total Vehicle Weight)
TOTAL REAR WEIGHT = 793 kg (43.3% of Total Vehicle Weight)
TOTAL TEST WEIGHT = 1830 kg
Weight of ballast secured in vehicle trunk area = 91 kg
Vehicle components removed to meet target weight: Rear seats, third seat, all trim rear of front
seats, rear carpeting, right rear tail light, spare tire, and jack.

VEHICLE ATTITUDE (all dimensions in mm):

Delivered Attitude: RF 722 LF 714 RR 730 LR 729
Test Attitude: RF 701 LF 692 RR 702 LR 699
Wheel Base: 2830 mm; C.G. = 1226 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

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

POST-IMPACT DATA:

Type of Test: 35 mph Frontal Impact Impact Angle: 90°
Date of Test: March 6, 1995 Time of Test: 4:52 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 = 56.2 kph; secondary = 56.3 kph
Distance From Front Bumper to Barrier Face When
Entering Speed Trap: 1152 mm
Exiting Speed Trap: 152 mm

VEHICLE REBOUND AND CRUSH (mm):

Vehicle Length: Pre-test = R 4478 C_L 4717 L 4477
Post-test = R 4108 C_L 4161 L 4153
Crush = R 370 C_L 556 L 324

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

R 503 mm C_L 407 mm L 417 mm

VISIBLE DUMMY CONTACT POINTS:

	<u>Driver</u>	<u>Passenger</u>
Head	<u>To airbag</u>	<u>To airbag</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>Yes</u>	<u>Yes</u>	<u>Yes</u>	<u>Yes</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>4 forward</u>	<u>5 forward</u>	<u>N/A</u>	<u>N/A</u>

Glazing Damage

Backlight/Windshield Windshield cracked

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.:

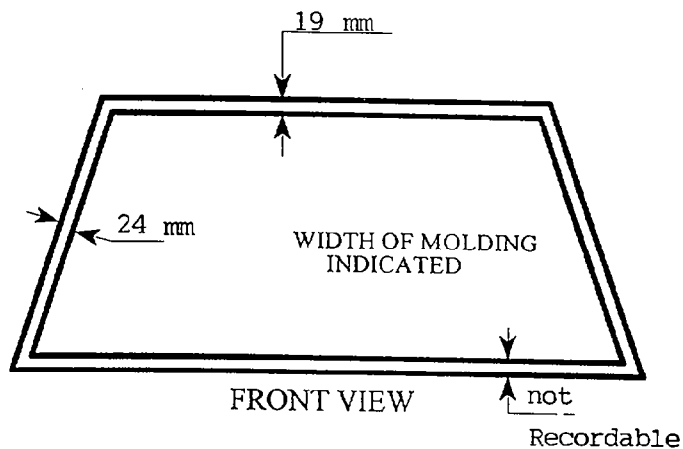
Windshield set in rubber molding within windshield frame

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		
	PRE-TEST (mm)	POST-TEST (mm)	PERCENT RETENTION
RIGHT SIDE	2259	2254	99.8%
LEFT SIDE	2278	2250	98.8%
TOTAL	4537	4504	99.3%

AREA OF RETENTION FAILURE: None



FAILURE DETAILS: None

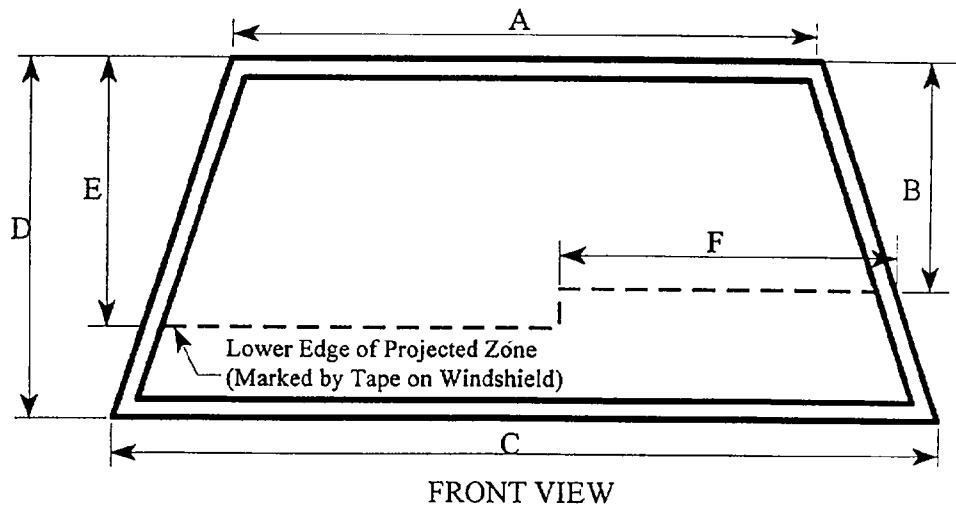
FMVSS NO. 219, "WINDSHIELD ZONE INTRUSION", DATA SHEET

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 = 1199 mm
B = 635 mm
C = 1533 mm
D = 935 mm
E = 615 mm
F = 738 mm



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

(Show location of penetration)

NONE

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

FMVSS NO. 301

TEST VEHICLE NHTSA NO.: MS5300 Test Date: March 6, 1995

Vehicle Mfg./Make/Model: 1995/Honda/Odyssey/Wagon

Usable Capacity of Vehicle's Fuel Tank: 65.1 Liters
(figure furnished by vehicle manufacturer)

TEST REQUIREMENTS:

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

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

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

TEST VEHICLE IMPACT TYPE:

X Frontal (35 mph)

 Oblique (30 mph) with ° barrier face first
 contacting (driver/passenger) side

 Rear Moving Barrier (30 mph)

 Side Impact MDB (33.2 mph)

FUEL SPILLAGE MEASUREMENT:

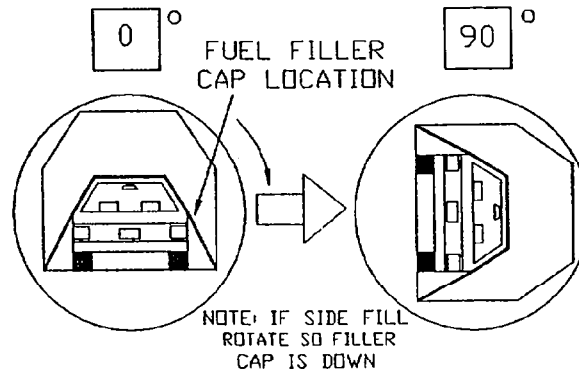
	ACTUAL	MAX ALLOWED
1. From impact until vehicle motion ceases	Ø	1 OZ
2. For 5 minute period after vehicle motion ceases	Ø	5 OZ
3. For next 25 minutes	Ø	1 oz./1 MIN

SOLVENT SPILLAGE DETAILS: None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 0° - 90°

Vehicle NHTSA ID No.: MS5300



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 45 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 45 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
---	---	---	---

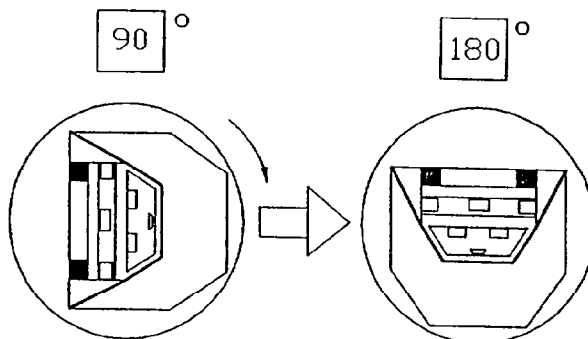
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 90° - 180°

Vehicle NHTSA ID No.: MS5300



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
---	---	---	---

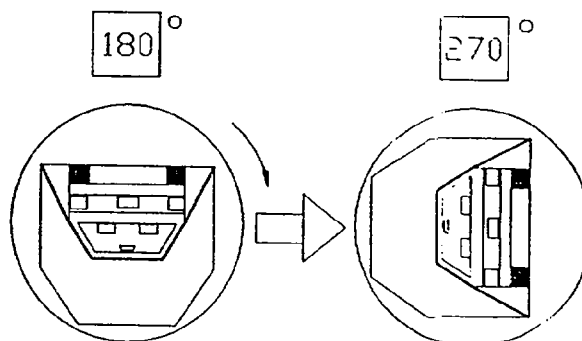
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 180° - 270°

Vehicle NHTSA ID No.: MS5300



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 38 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 38 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
---	---	---	---

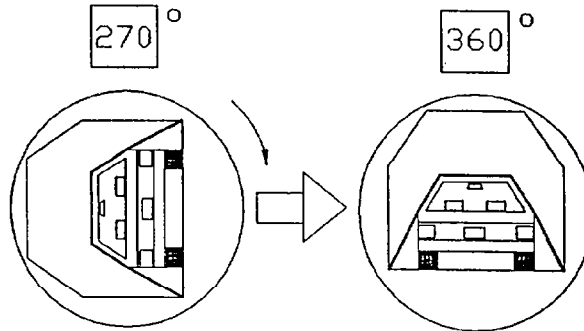
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 270° - 360°

Vehicle NHTSA ID No.: MS5300



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 43 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 43 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/Honda/Odyssey/Wagon

VEH. NHTSA NO.: MS5300 TEST DATE: March 6, 1995

MAX. ACCELERATION VALUES: (g's)	DRIVER #066	PASSENGER #065
Head Channel X	-67.0 @ 68 msec.	-64.5 @ 80 msec.
Head Channel Y	-5.9 @ 80 msec.	-13.6 @ 85 msec.
Head Channel Z	24.4 @ 53 msec.	34.6 @ 62 msec.
HEAD RESULTANT	69.0 @ 68 msec.	68.2 @ 80 msec.
Chest Channel X	-51.1 @ 64 msec.	-50.1 @ 68 msec.
Chest Channel Y	14.7 @ 85 msec.	4.5 @ 47 msec.
Chest Channel Z	-5.5 @ 79 msec.	-17.0 @ 77 msec.
CHEST RESULTANT	51.4 @ 64 msec.	50.2 @ 61 msec.
CLIP	49.92	47.24
TIME INTERVAL (msec) [0.003 seconds minimum]	$t_1 = 63.403$ $t_2 = 66.463$	$t_1 = 67.565$ $t_2 = 70.625$

HEAD INJURY CRITERIA (HIC) VALUES:

HIC	637	644
$t_1 =$ (msec)	52.51	58.14
$t_2 =$ (msec)	84.46	94.13
Avg. Accel. t_1 to t_2 (g's)	52.5	50.2

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

MAX. COMPRESSIVE FEMUR FORCES:

Left Side (N)	5430	2191
Right Side (N)	6027	2633

MAXIMUM SEAT BELT FORCES:

Lap Belt (N)	4611	5536
Shoulder Belt (N)	6871	7469

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/Honda/Odyssey/Wagon

VEHICLE NHTSA NO.: MS5300 TEST DATE: March 6, 1995

MAXIMUM VALUES	DRIVER DUMMY #066	PASSENGER DUMMY #065
Neck Load X (N)	392 @ 53 msec.	977 @ 83 msec.
Neck Load Y (N)	-139 @ 180 msec.	470 @ 90 msec.
Neck Load Z (N)	-2483 @ 67 msec.	-1615 @ 70 msec.
Neck Moment X (N.M)	-10.2 @ 80 msec.	15.2 @ 103 msec.
Neck Moment Y (N.M)	-30.7 @ 94 msec.	30.5 @ 81 msec.
Neck Moment Z (N.M)	-4.8 @ 186 msec.	-19.5 @ 87 msec.
Chest Deflection X (mm)	34.2	34.5
Time of Max. Occurrence	66 msec.	77 msec.
Pelvis X Acceleration (g's)	-72.4 @ 49 msec.	-57.5 @ 49 msec.
Pelvis Y Acceleration (g's)	10.3 @ 58 msec.	6.6 @ 55 msec.
Pelvis Z Acceleration (g's)	-21.9 @ 72 msec.	-30.4 @ 70 msec.
Pelvis Resultant (g's)	72.5 @ 49 msec.	58.1 @ 49 msec.

PART 572 DUMMY IN-VEHICLE POSITION

Vehicle NHTSA No.: MS5300 Vehicle: 1995/Honda/Odyssey/Wagon

SEAT TYPE:

 Bench
 X Bucket
 Split Bench

ADJUSTER TYPE:

Driver: X Manual
 Power

BUCKET SEAT BACK TYPE:

 Fixed
 X Adjustable Reclining

Passenger: X Manual
 Power

Driver Seat Position

Seat Track:

12th notch rearward from the foremost locking position

Seat Back:

5th latch position from the first locking position

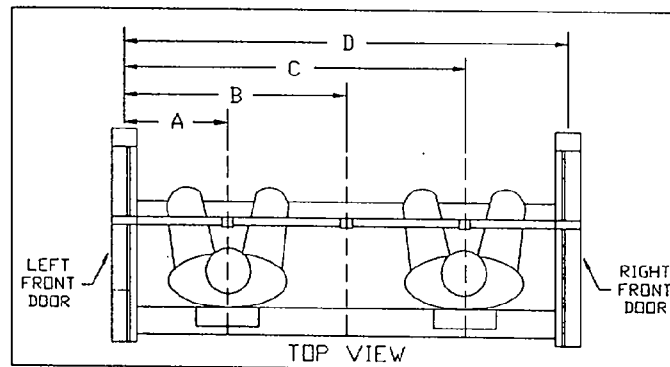
Passenger Seat Position

Seat Track:

12th notch rearward from the foremost locking position

Seat Back:

5th latch position from the first locking position



066 DUMMY ID 065

A = Left Door to Driver Centerline	<u>426</u> mm
B = Left Door to Center Passenger Centerline	<u>797</u> mm
C = Left Door to Right Passenger Centerline	<u>1183</u> mm
D = Left Door to Right Door	<u>1593</u> mm

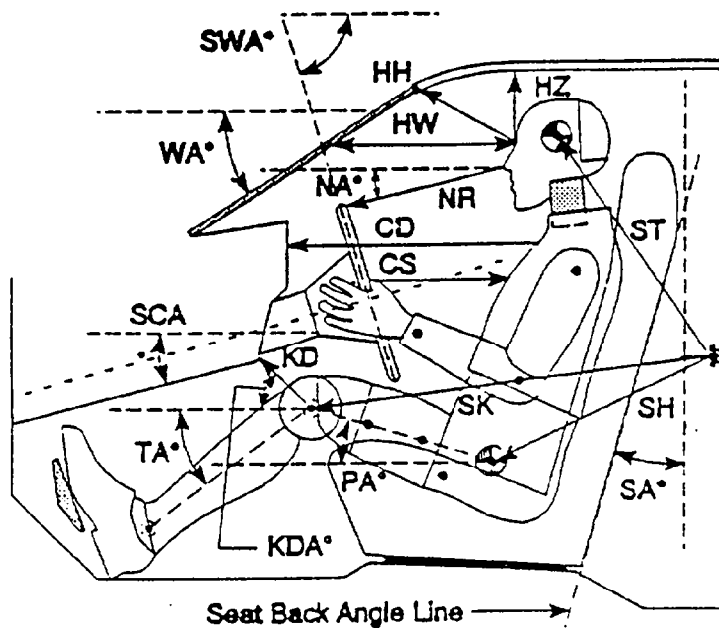
FRONT SEAT MEASUREMENT TABLE

Units (mm)

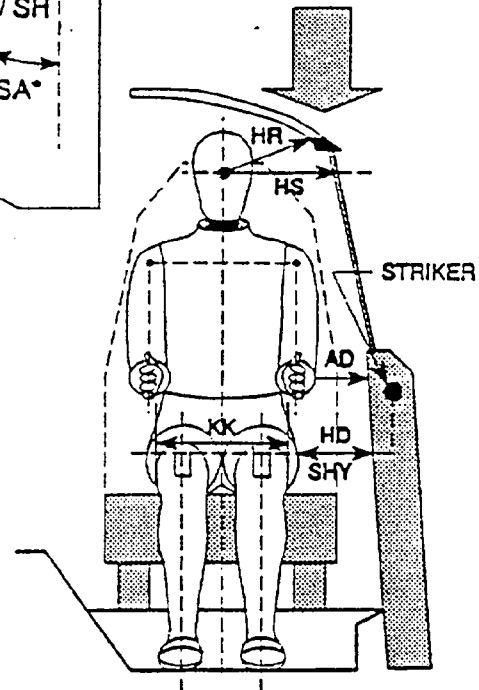
	DRIVER (Serial #066)	PASSENGER (Serial #065)
WA°	29.8°	
SWA°	33.3°	N/A
SCA°	Not Recordable	N/A
SA°	17.4°	17.4°
HZ	210	213
HH	445	425
HW	717	657
HR	266	270
NR	467 Angle 18.2°	N/A
CD	692	563
CS	348	N/A
RA	197	N/A
KDL	143 Angle 16.3°	137
KDR	138	140 Angle 22.1°
PA°	23.0°	22.9°
TA°	45.6°	50.8°
KK	294	265
ST	614 Angle 5.1°	600 Angle 5.9°
SK	577 Angle 87.3°	584 Angle 85.7°
SH	167 Angle 104.5°	188 Angle 105.6°
SHY	244	246
HS	312	308
HD	128	118
AD	107	95

N/A = Not Applicable

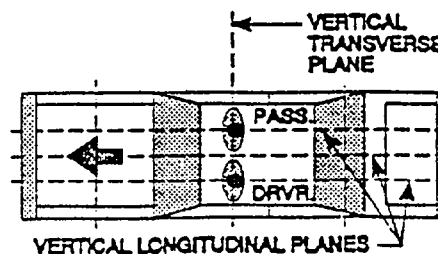
FRONT SEAT MEASUREMENTS



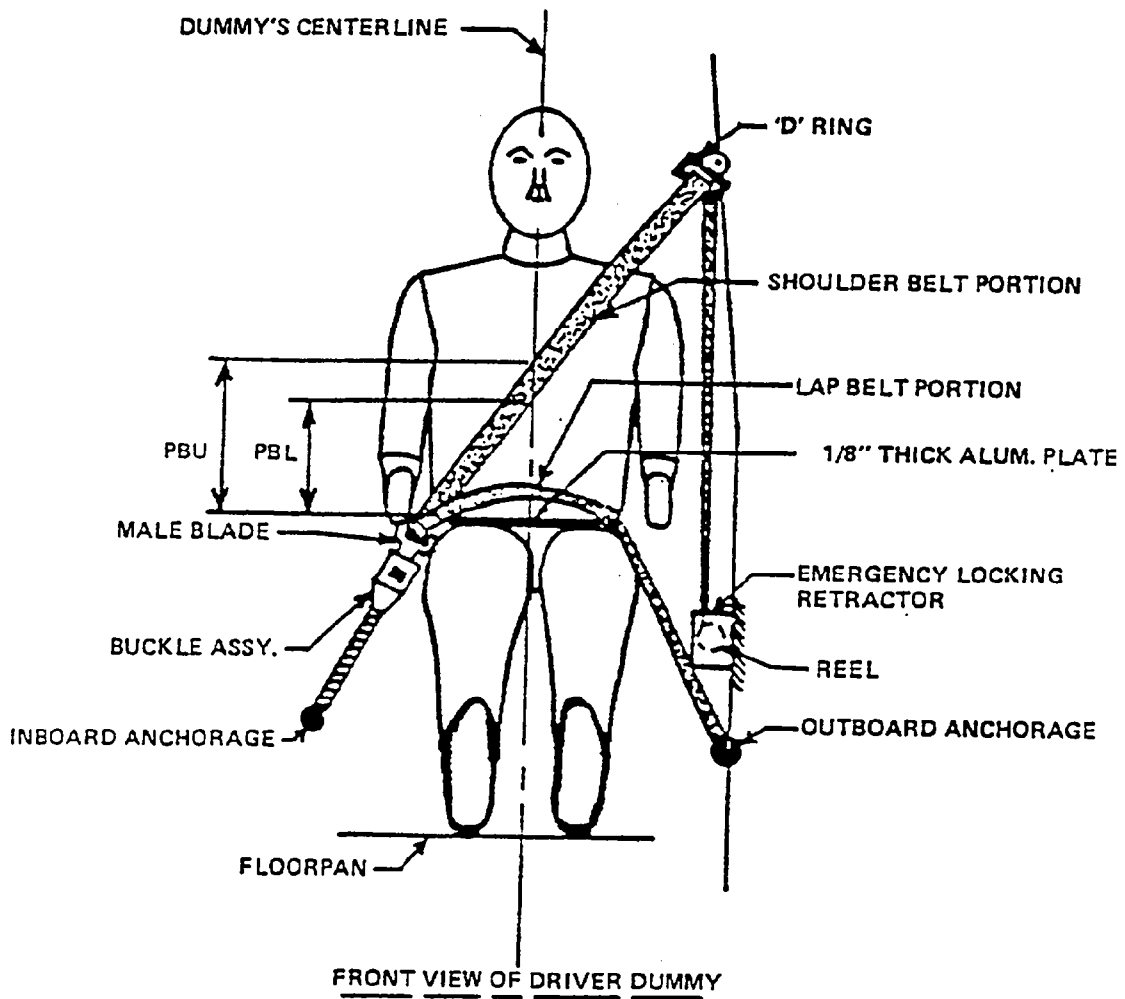
AD - Arm to Door
 HD - H-Point to Door
 HR - Head to Side Header
 HS - Head to Side Window
 KK - Knee to Knee
 SHY- Striker to H-Point (Y Direction)



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	328	330
<u>PBL</u> -- Top surface of alum. plate to belt lower edge	236	239

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>2097 mm</u>	<u>2096 mm</u>
Shoulder belt length as measured on Part 572 Dummy.	<u>875 mm</u>	<u>888 mm</u>
Lap belt length as measured on Part 572 Dummy.	<u>955 mm</u>	<u>937 mm</u>

SHOULDER BELT SPOOL-OFF DATA:

As determined by film analysis	<u>46 mm</u>	<u>46 mm</u>
As determined mechanically	<u>NR</u>	<u>NR</u> at retractor
	<u>70 mm</u>	<u>67 mm</u> at D-ring
As determined electronically (1)	<u>NR</u>	<u>NR</u>

BELT STRETCH DATA:

Measured electronically between shoulder belt load cell and the "D" ring.	<u>NR</u>	<u>NR</u>
Measured mechanically (2)	<u>NR</u>	<u>NR</u>

RETRACTOR LOCK-UP TIME:

As determined by shoulder belt spool-off observed in on-board cameras	<u>47 msec</u>	<u>48 msec</u>
---	----------------	----------------

NR = Not Recorded

- (1) The potentiometer was not installed in this due to limited space. Instead, one cube for each belt was mounted to measure the webbing spoolout.
- (2) The belt strain thread was not used in this test.

CAMERA LOCATIONS

VEH. NHTSA NO.: MS5300 ; TEST DATE: March 6, 1995; TIME: 4:52 p.m.

VEH. YEAR/MAKE/MODEL/BODY STYLE: 1995/Honda/Odyssey/Wagon

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	1020	8730	1040	90°	8363	25	820
3	Steering Column Top	1660	7740	1015	90°	7373	25	1000
4	Steering Column Bottom	1660	7740	1015	90°	7373	25	1000
5	Driver Close-up	1180	9120	1340	90°	8753	50	1000
6	Left Angle	4910	5100	2155	50°		35	893
7	Onboard Driver						35	1020
8	Onboard Passenger						35	1010
9	Right Overall	2320	7830	1170	90°	7463	13	1020
11	Right Passenger Close-up	1060	7910	1230	50°		50	1020
12	Right Angle	4020	5270	2090			35	858
13	Top View Wide	2250	0	5000			8	1053
14	Top Driver	-240	530	2300			13	1070
15	Top Passenger	-320	540	2320			13	181
16	Pit Engine	970	5012	-3155			13	901
17	Fuel Tank	3000	0	-3115			13	1130

* COORDINATES:

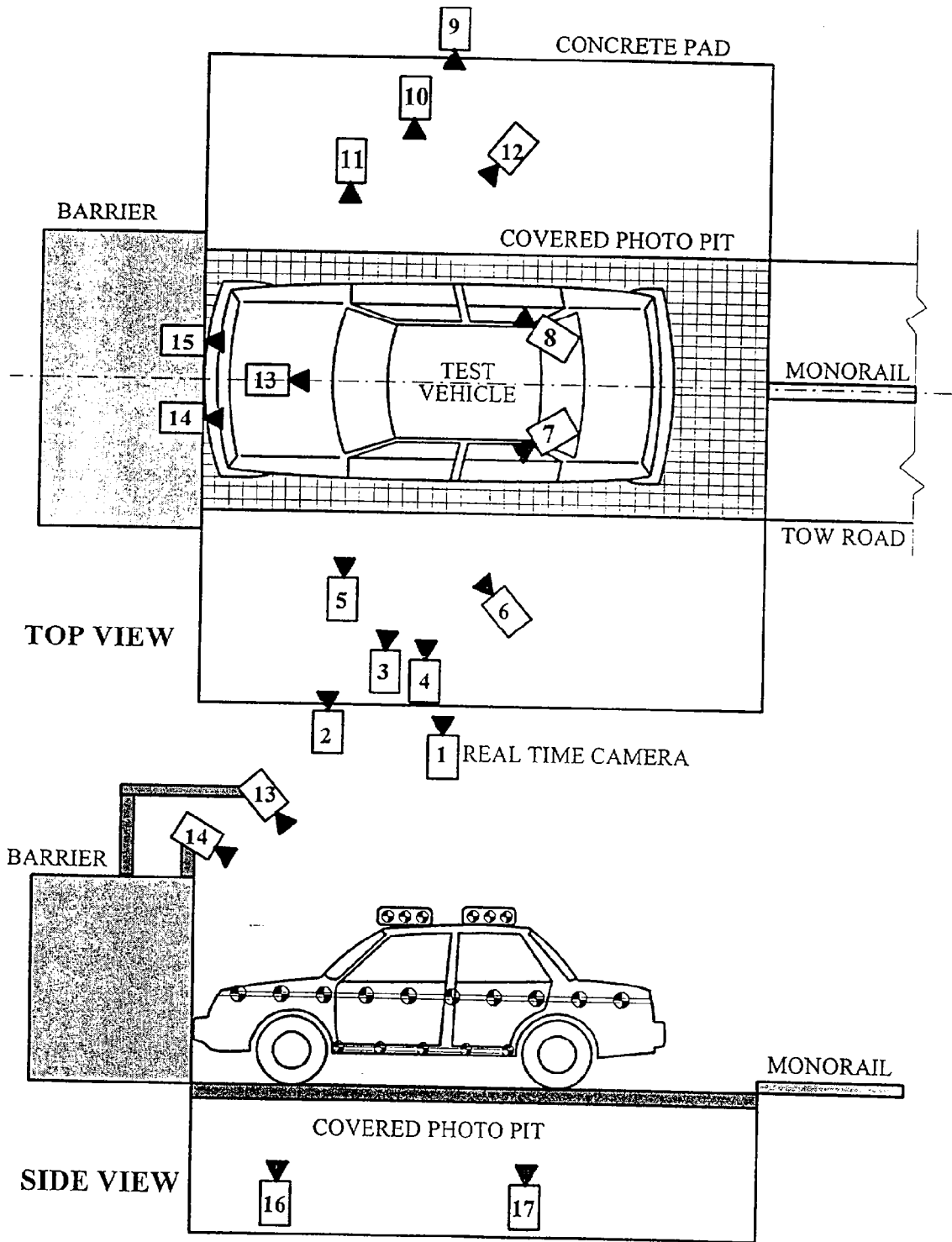
+X = film plane rearward of barrier

+Y = film plane to left of monorail centerline

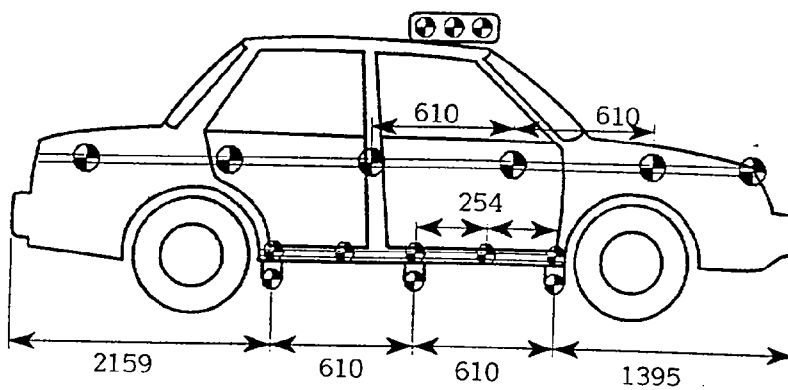
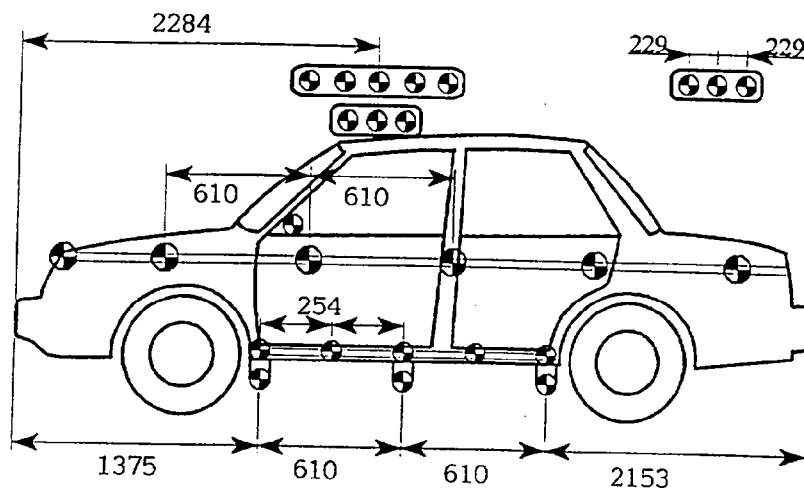
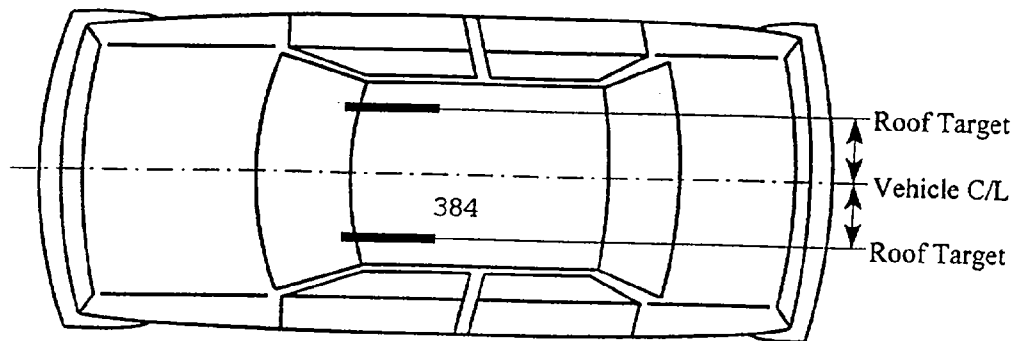
+Z = film plane to above ground level

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)

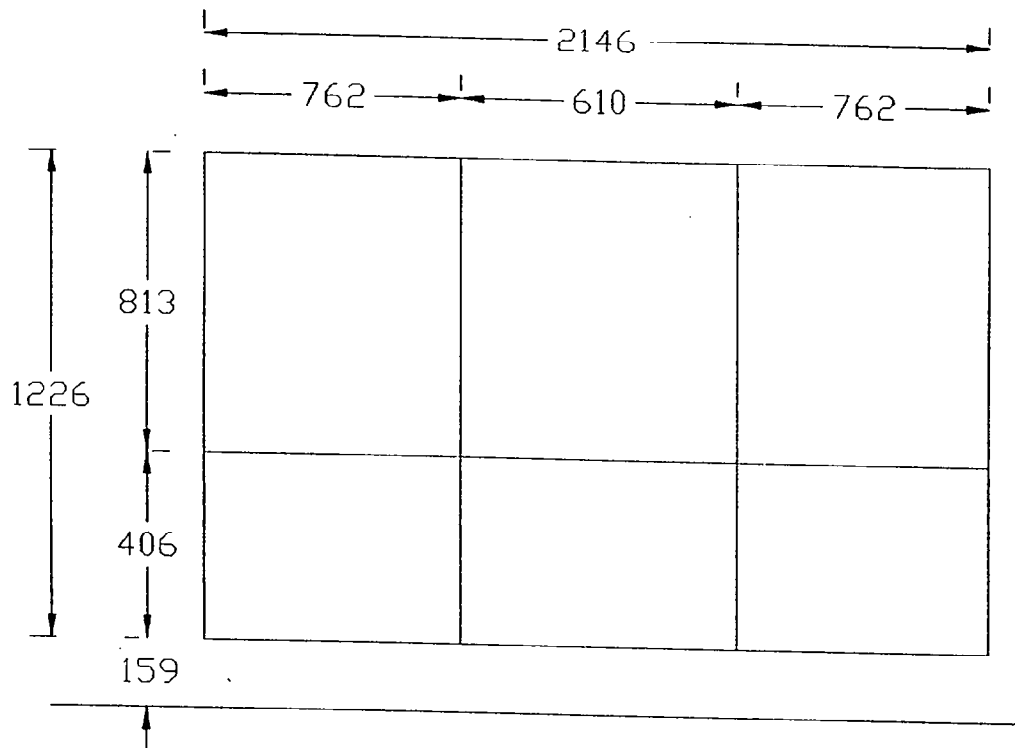
LOAD CELL LOCATIONS ON FIXED BARRIER

30 Load Cells

6 Rows

9 Columns

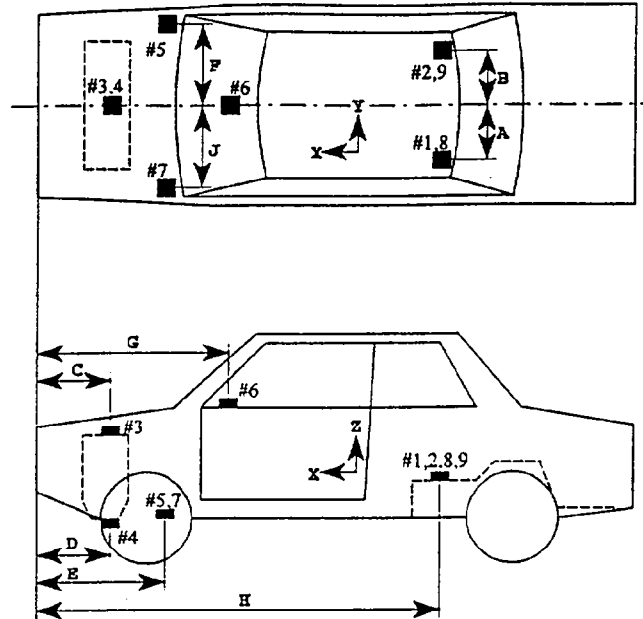
6 Groupings (5 cells/group)



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	575
B	575
C	699
D	639
E	760
F	658
G	1483
H	3027
J	658

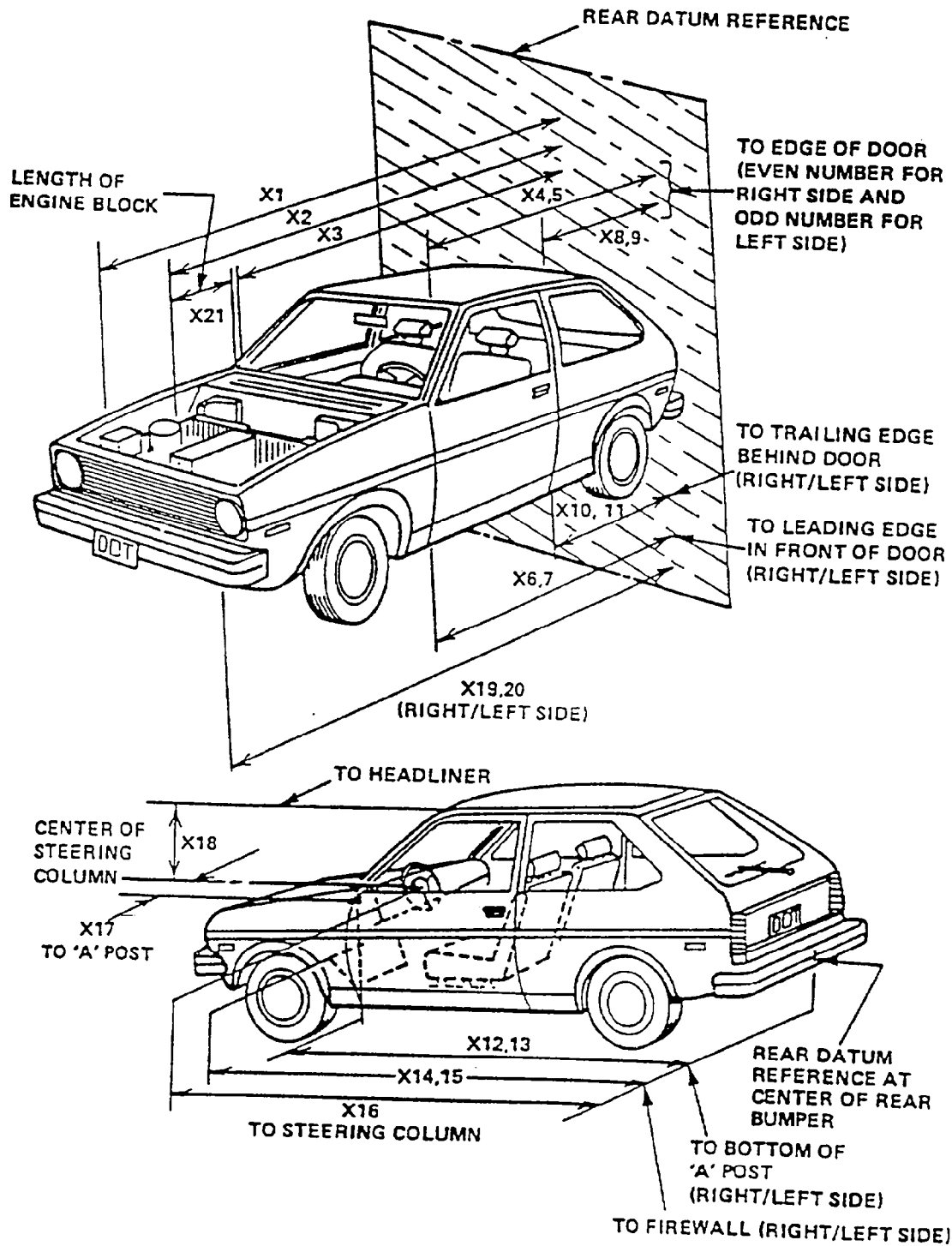
ACCEL. NO.	ACCELEROMETER	DIRECTION
1 and 8	Left Rear Seat Crossmember	X
2 and 9	Right Rear Seat Crossmember	X
3	Top of Engine	X
4	Bottom of Engine	X
5	Right Side Brake Caliper	X
6	Instrument Panel	X
7	Left Disc Brake Caliper	X

* 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	4717	4161	556
X2	Rear Surface of Vehicle to Front of Engine	4074	3796	278
X3	Rear Surface of Vehicle to Firewall	3520	3286	234
X4	Rear Surface to Upr. Leading Edge of Rt. Door	3273	3272	1
X5	Rear Surface to Upr. Leading Edge of Left Door	3276	3268	8
X6	Rear Surface to Lwr. Leading Edge of Rt. Door	3275	3269	6
X7	Rear Surface to Lwr. Leading Edge of Left Door	3278	3264	14
X8	Rear Surface to Upr. Trailing Edge of Rt. Door	2218	2216	2
X9	Rear Surface to Upr. Trailing Edge of Left Door	2222	2220	2
X10	Rear Surface to Lwr. Trailing Edge of Rt. Door	2241	2237	4
X11	Rear Surface to Lwr. Trailing Edge of Left Door	2240	2231	9
X12	Rear Surface to Bottom of `A' Post on Rt. Side	3291	3273	18
X13	Rear Surface to Bottom of `A' Post on Left Side	3289	3270	19
X14	Rear Surface to Firewall on Right Side	3538	3552	-14
X15	Rear Surface to Firewall on Left Side	3529	3505	24
X16	Rear Surface to Steering Column	2837	2809	28
X17	Center of Steering Column to `A' Post	456	430	26
X18	Center of Steering Column to Headlining	445	513	68
X19	Rear Surface to Right Side of Front Bumper	4478	4108	370
X20	Rear Surface to Left Side of Front Bumper	4477	4153	324
X21	Length of Engine Block	490	490	0

TEST VEHICLE MEASUREMENTS



ACCIDENT INVESTIGATION DIVISION DATA
FOR 35 MPH FRONTAL BARRIER IMPACT

VEHICLE MAKE/MODEL/BODY STYLE: 1995/Honda/Odyssey/Wagon

VEH. NHTSA NO.: MS5300 ; VIN: JHMRA1840SC000937

MODEL YEAR: 1995 ; BUILD DATE: 11/94 ; TEST DATE: March 6, 1995

VEH. SIZE CATEGORY: MPV ; TEST WEIGHT: 1830 kg

VEH. WHEELBASE: 2830 mm ; FRONT OVERHANG: 875 mm ; OVERALL WIDTH: 1791 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: 56.2 kph ; TIME OF SEPARATION: 116 msec

VELOCITY CHANGE: 67.0 kph

COLLISION DEFORMATION CLASSIFICATION (CDC) CODE:

F (Frontal)

CRUSH DEPTH
DIMENSIONS:

C1 = 324 mm

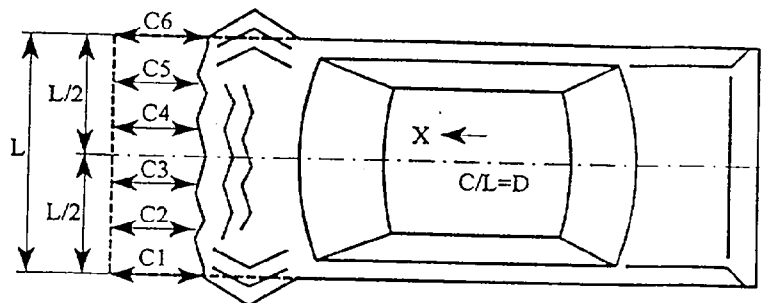
C2 = 470 mm

C3 = 536 mm

C4 = 540 mm

C5 = 478 mm

C6 = 370 mm



MIDPOINT OF
DAMAGE: D = Vehicle Centerline
(Longitude)

LENGTH OF
DAMAGED REGION: L = 1568 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 Airbag Contact	A-30

TABLE OF PHOTOGRAPHS (Cont'd)

	<u>Page No.</u>
Photo No. A-31 - Pre-Test Passenger Dummy Position Right Side View	A-31
Photo No. A-32 - Post-Test Passenger Dummy Position Right Side View	A-32
Photo No. A-33 - Pre-Test Passenger Dummy Position Right Side View (Door Open)	A-33
Photo No. A-34 - Post-Test Passenger Dummy Position Right Side View (Door Open)	A-34
Photo No. A-35 - Pre-Test Passenger Seat Position View	A-35
Photo No. A-36 - Post-Test Passenger Seat Position View	A-36
Photo No. A-37 - Pre-Test Passenger Dummy Knee Position	A-37
Photo No. A-38 - Post-Test Passenger Dummy Knee Position	A-38
Photo No. A-39 - Post-Test Passenger Dummy Knee Contact	A-39
Photo No. A-40 - Post-Test Passenger Airbag	A-40
Photo No. A-41 - Vehicle Certification Label	A-41
Photo No. A-42 - Tire Placard	A-42
Photo No. A-43 - Rollover 90°	A-43
Photo No. A-44 - Rollover 180°	A-44
Photo No. A-45 - Rollover 270°	A-45
Photo No. A-46 - Rollover 360°	A-46

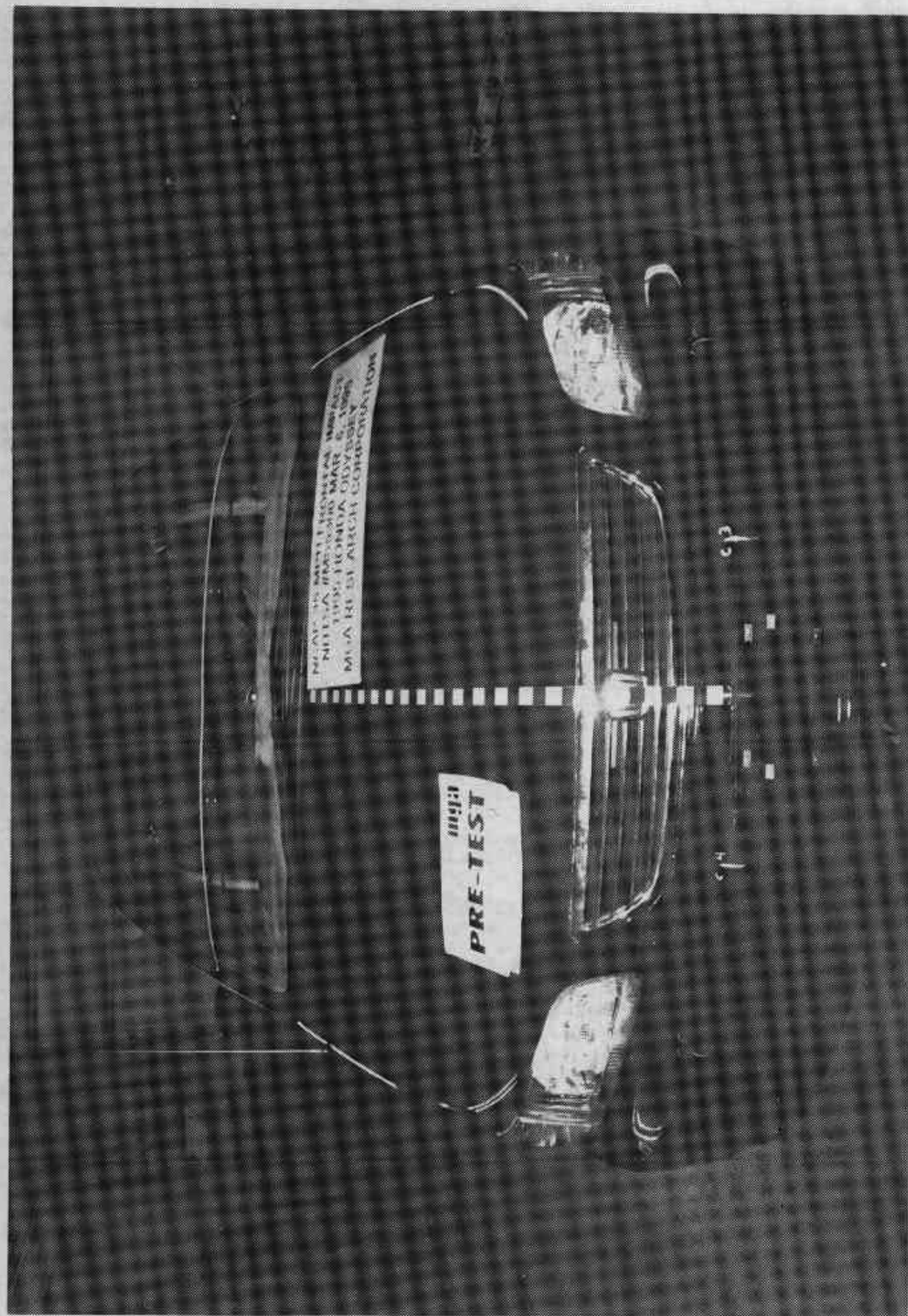


Photo No. A-1 - Pre-Test Front View of Test Vehicle

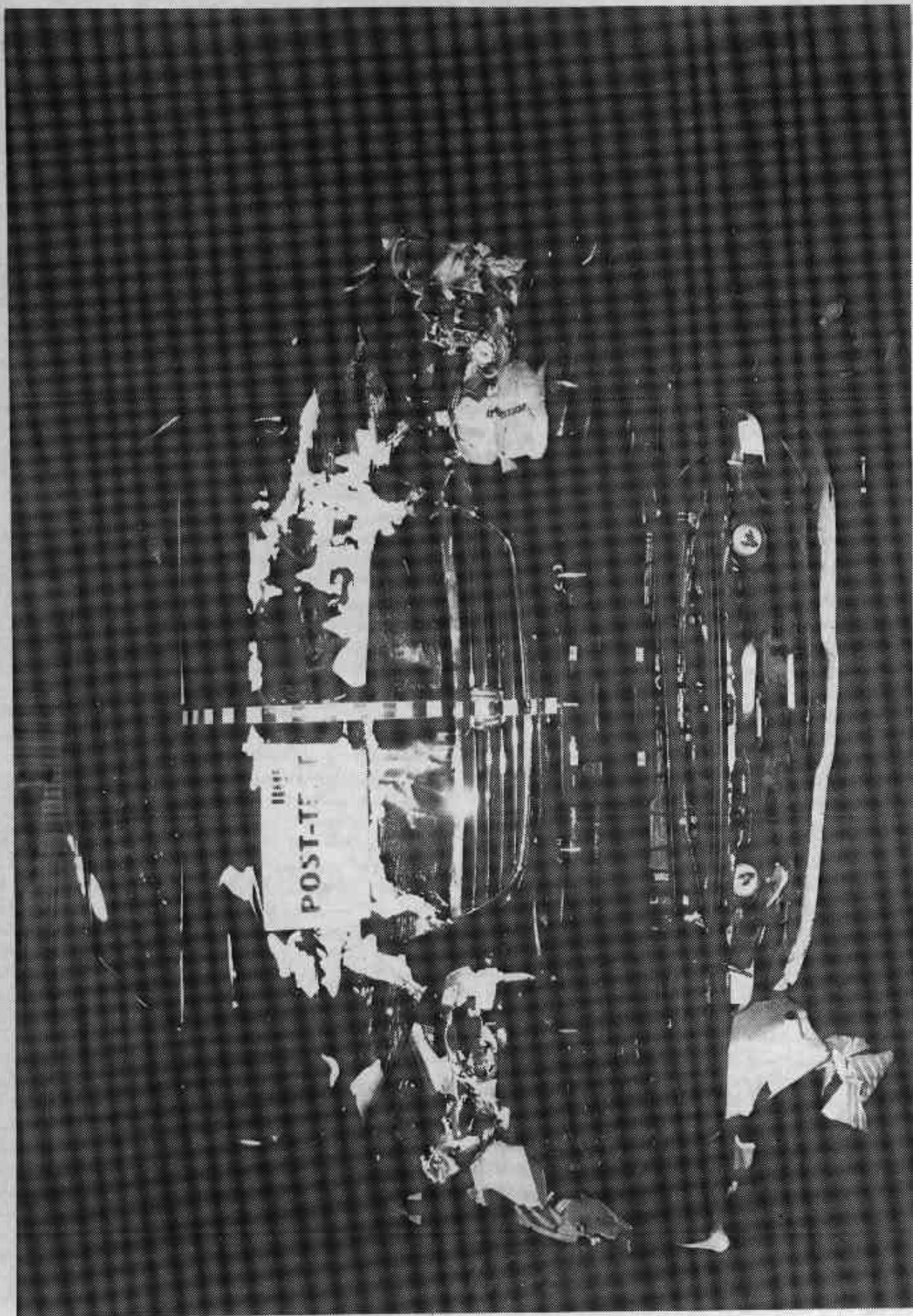


Photo No. A-2 - Post-Test Front View of Test Vehicle



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

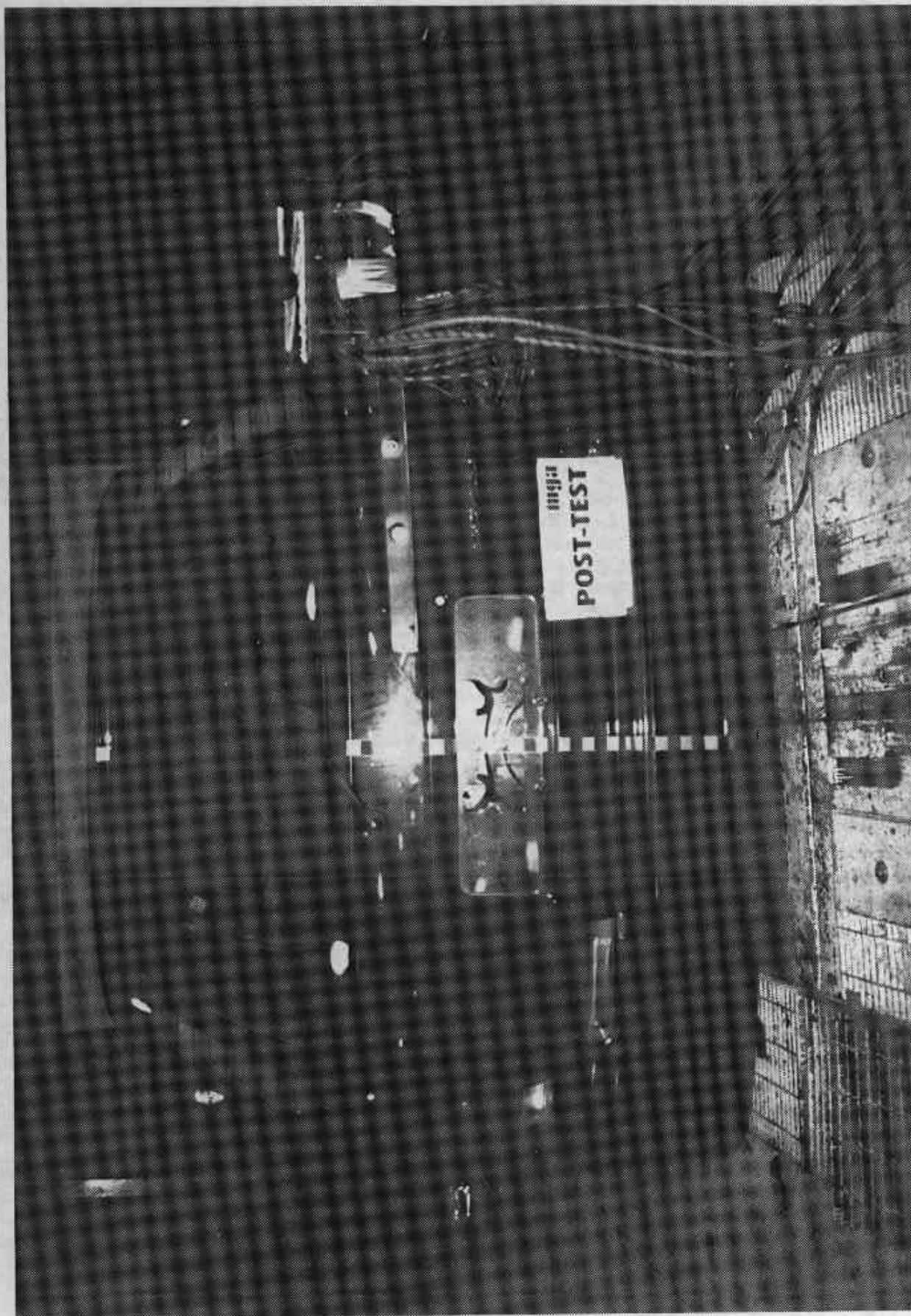


Photo No. A-4 - Post-Test Rear View of Test Vehicle



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

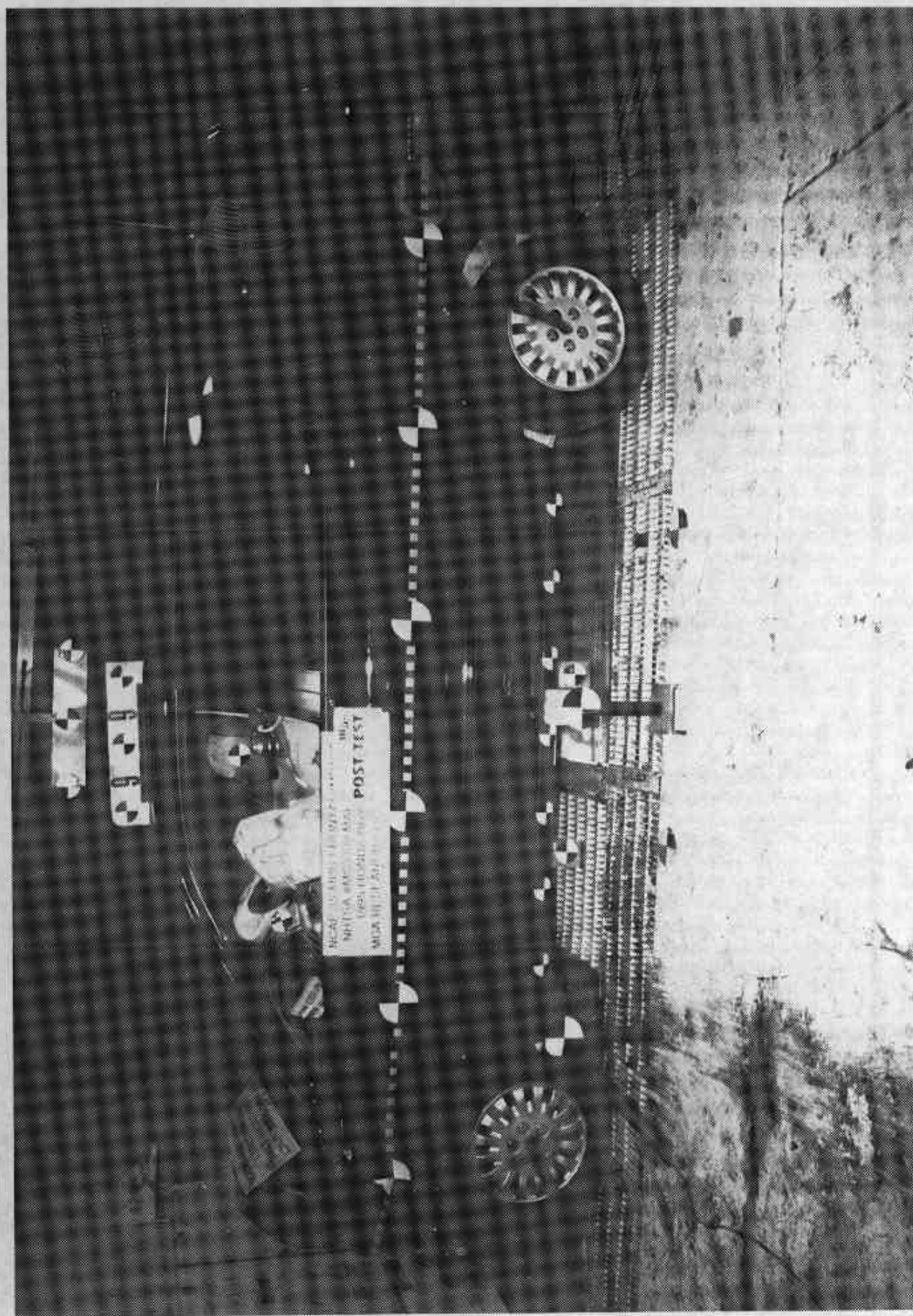


Photo No. A-6 - Post-Test Left Side View of Test Vehicle

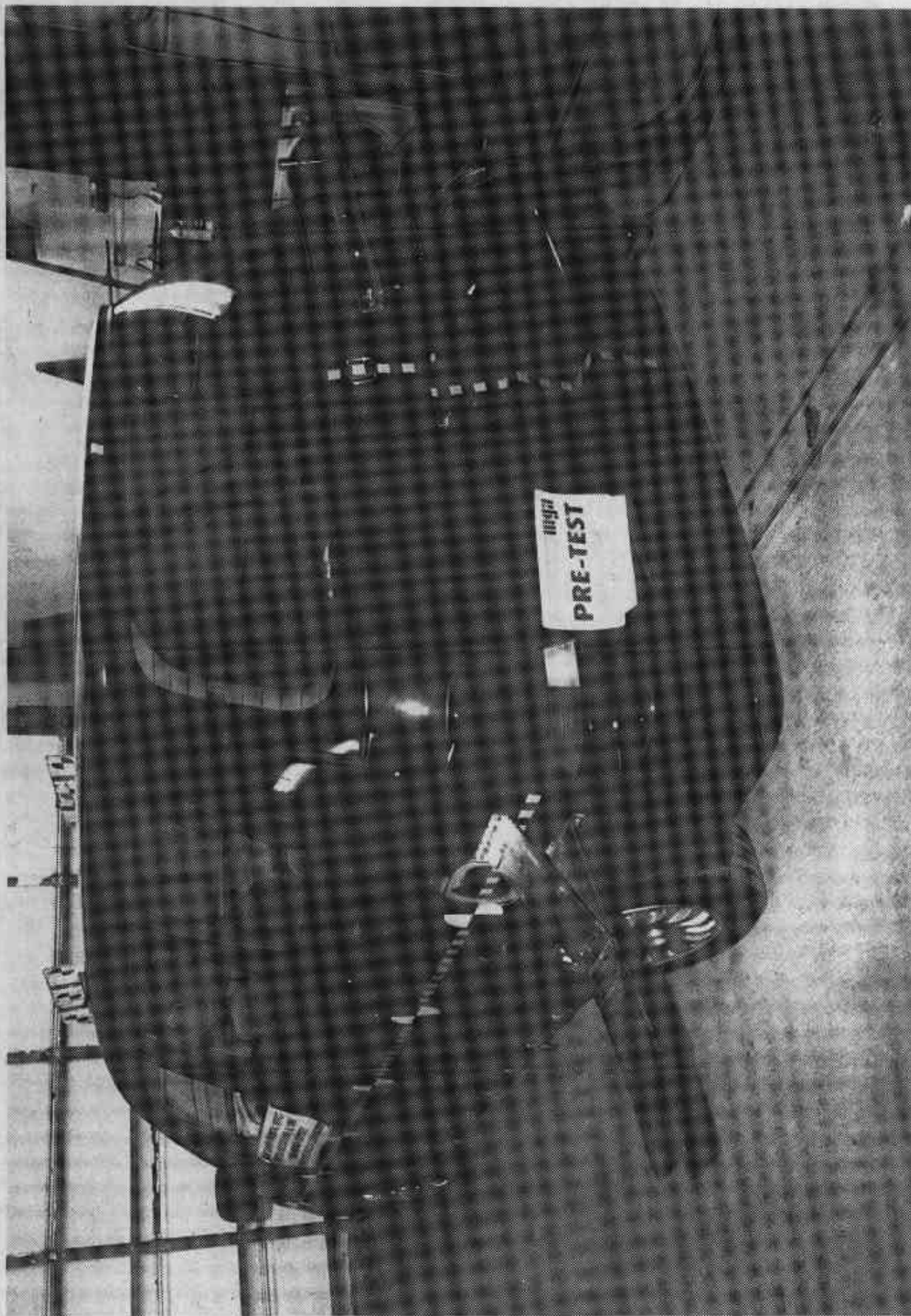


Photo No. A-7 - Pre-Test Left Rear Three-Quarter View of Test Vehicle

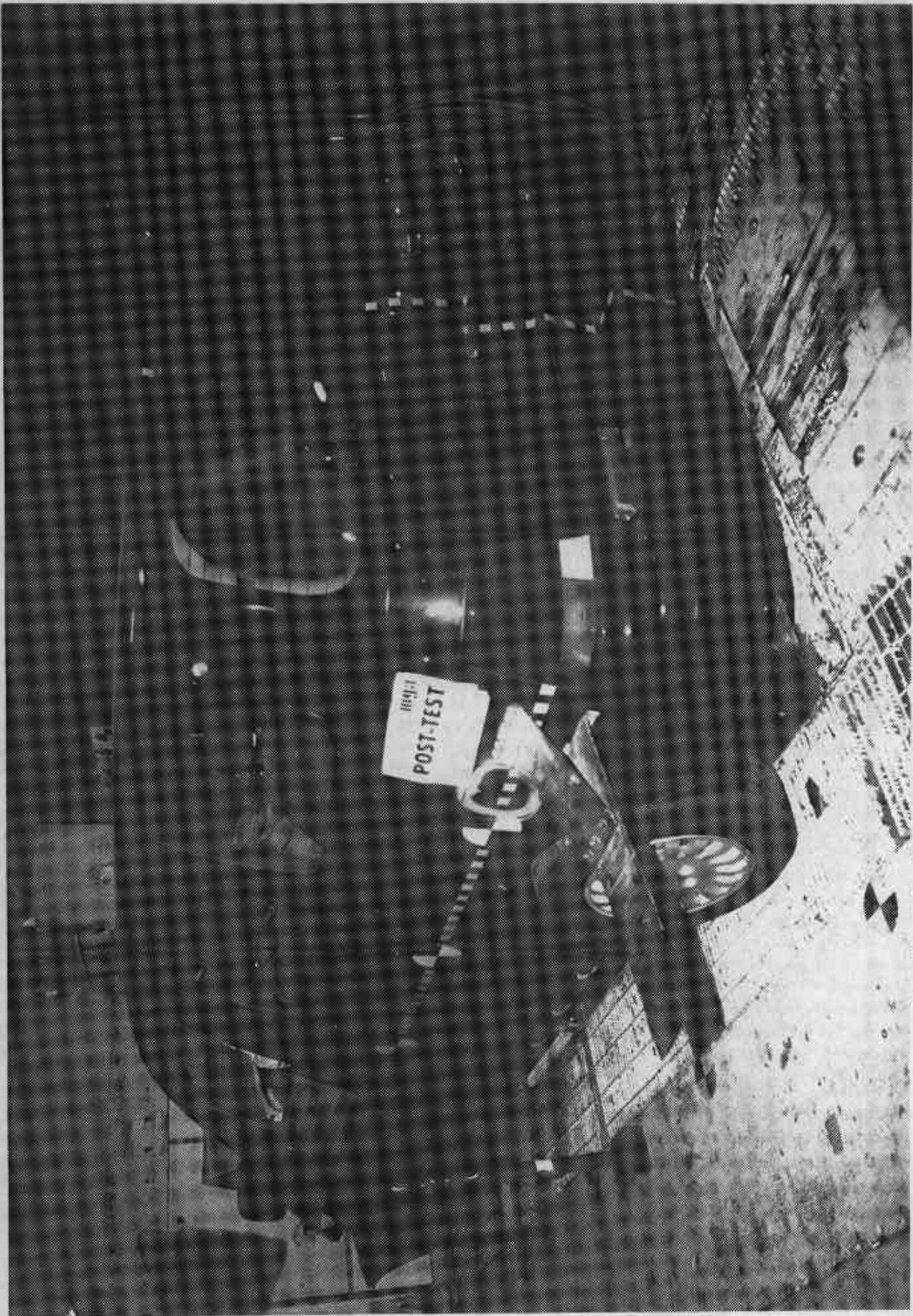


Photo No. A-8 - Post-Test Left Rear Three-Quarter View of Test Vehicle

A-8

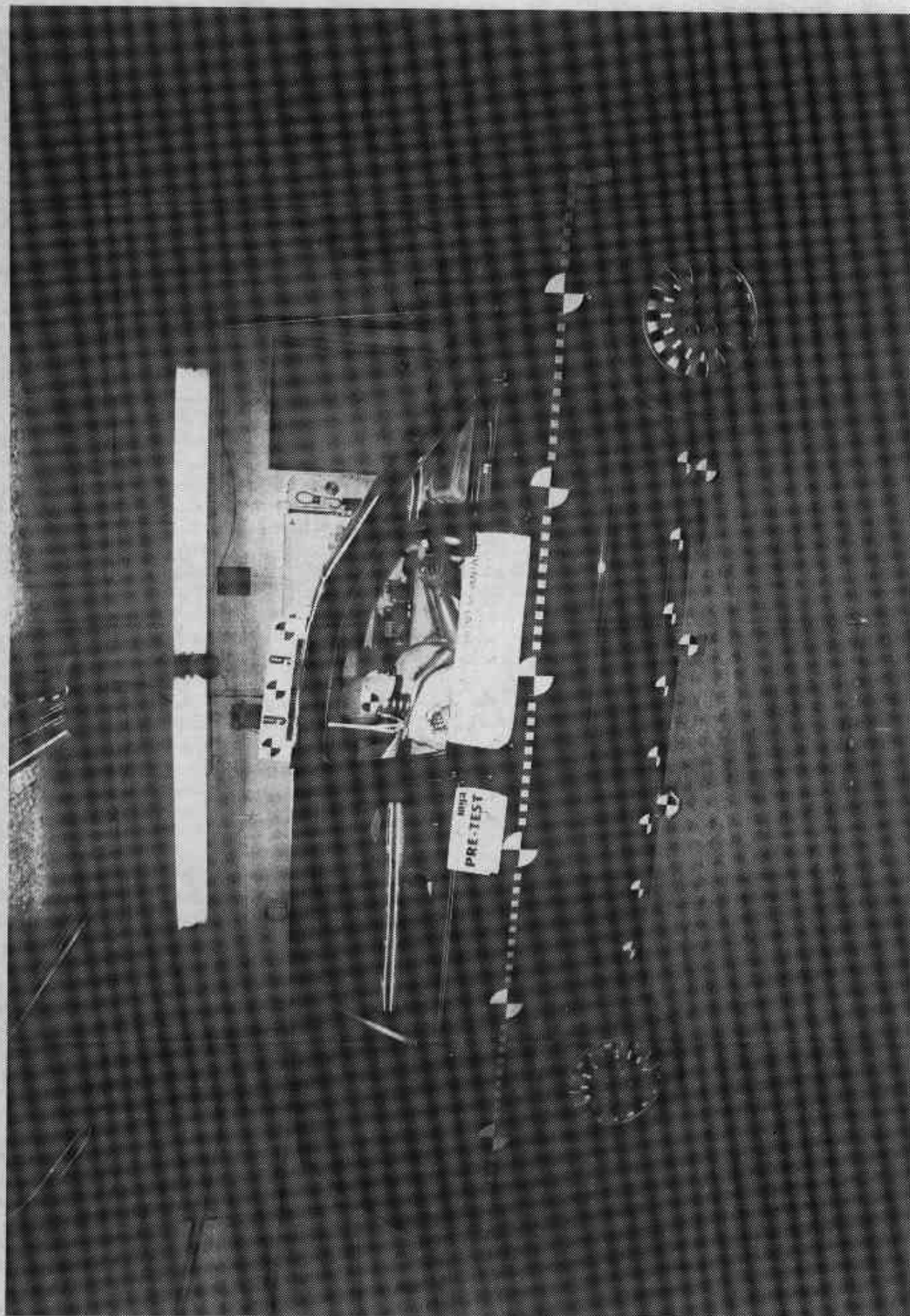


Photo No. A-9 - Pre-Test Right Side View of Test Vehicle



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



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

A-11

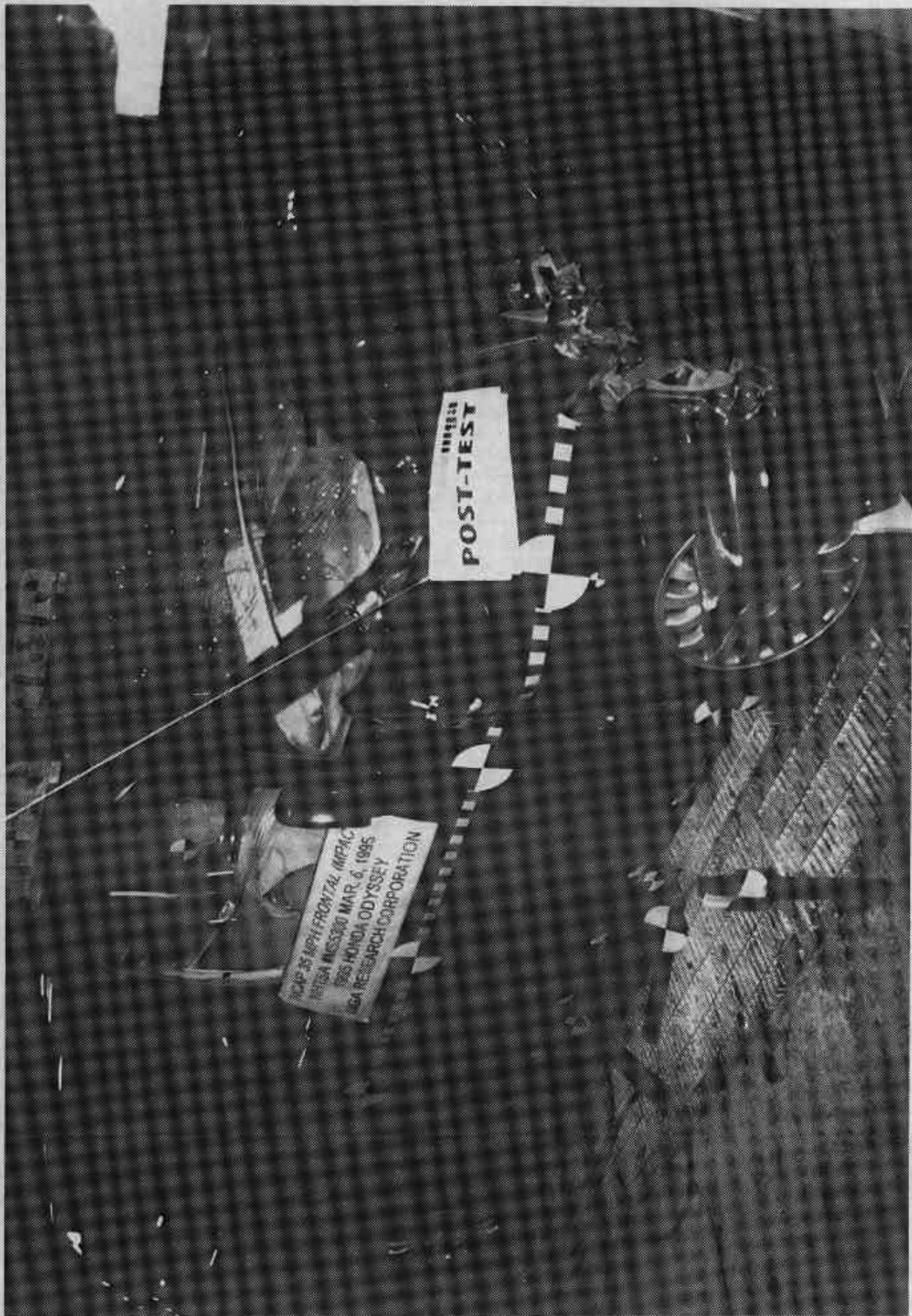


Photo No. A-12 - Post-Test Right Front Three-Quarter View of Test Vehicle

mga
mga research corporation
PRE-TEST
NCAP ODYSSEY
MS5300

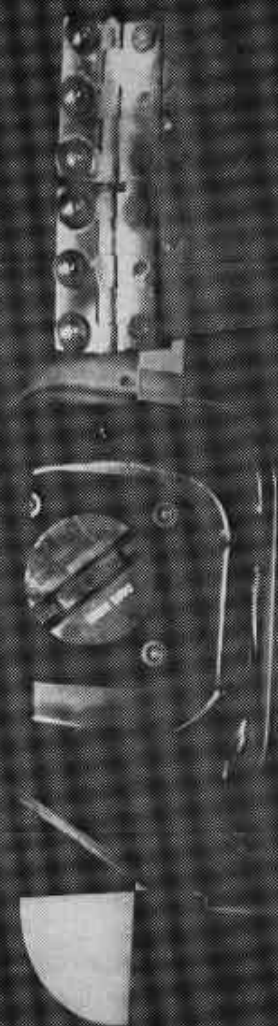


Photo No. A-13 - Pre-Test Fuel Filler Cap View

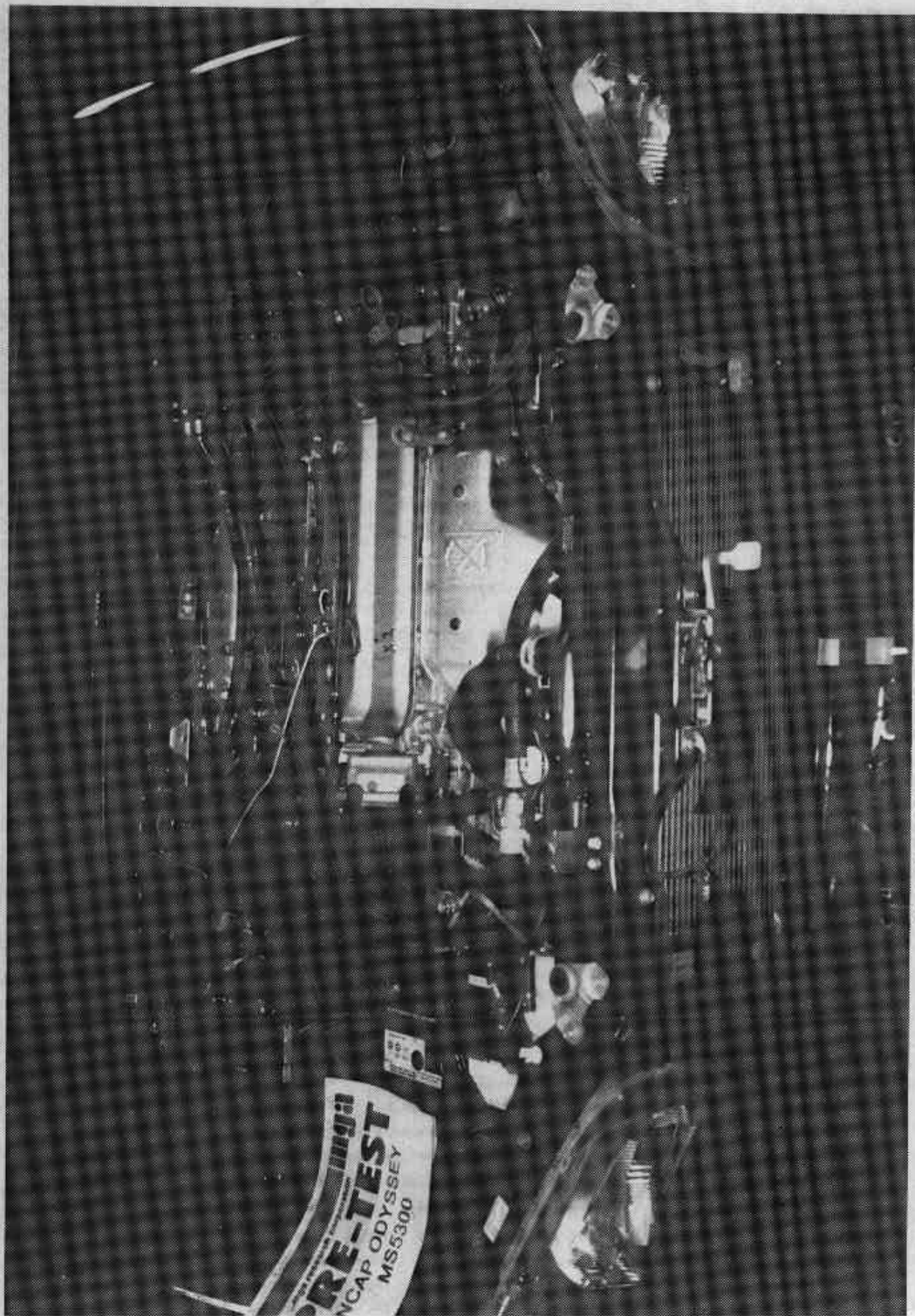
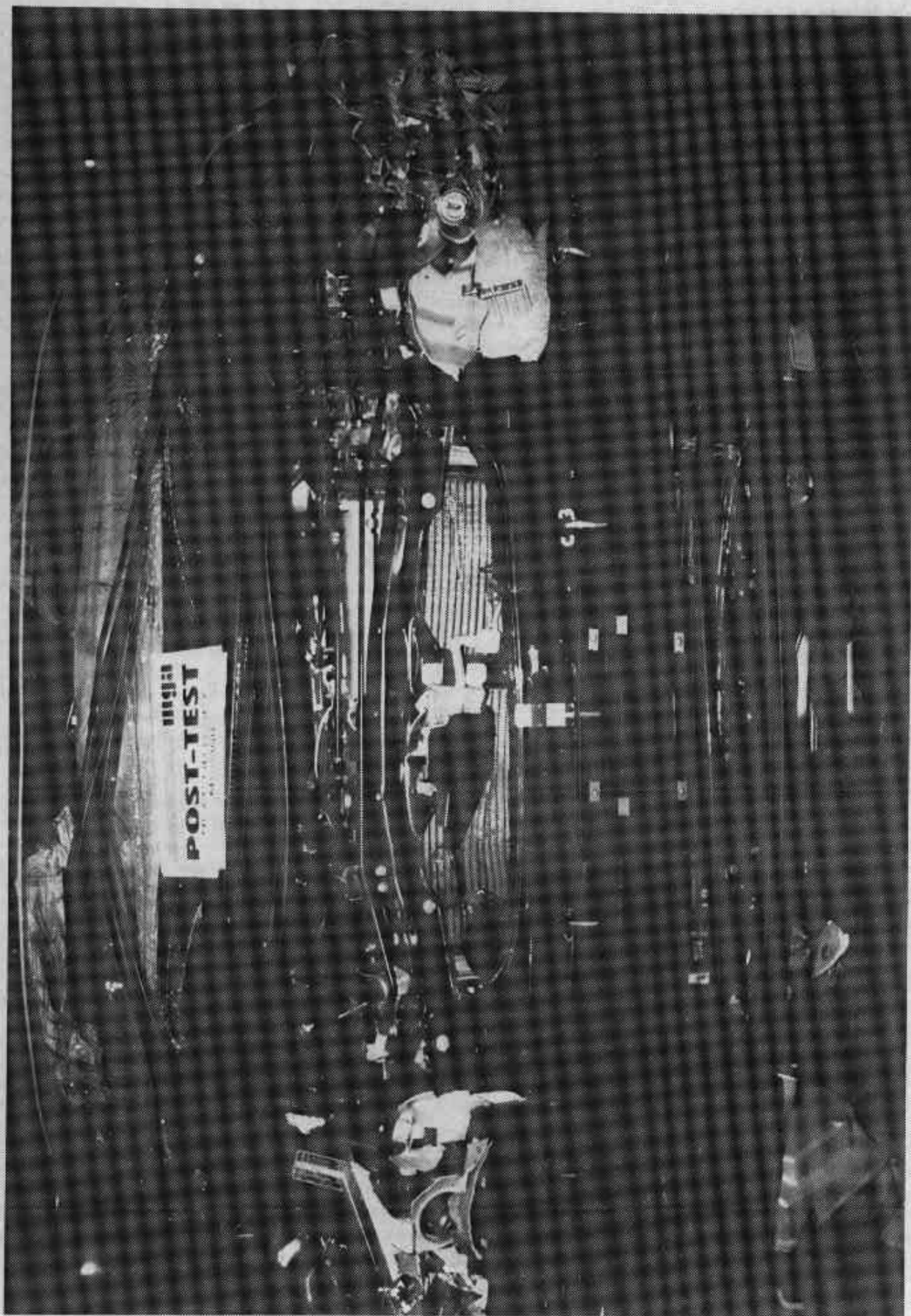


Photo No. A-14 - Pre-Test Engine Compartment View

A-14



A-15

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



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

A-16

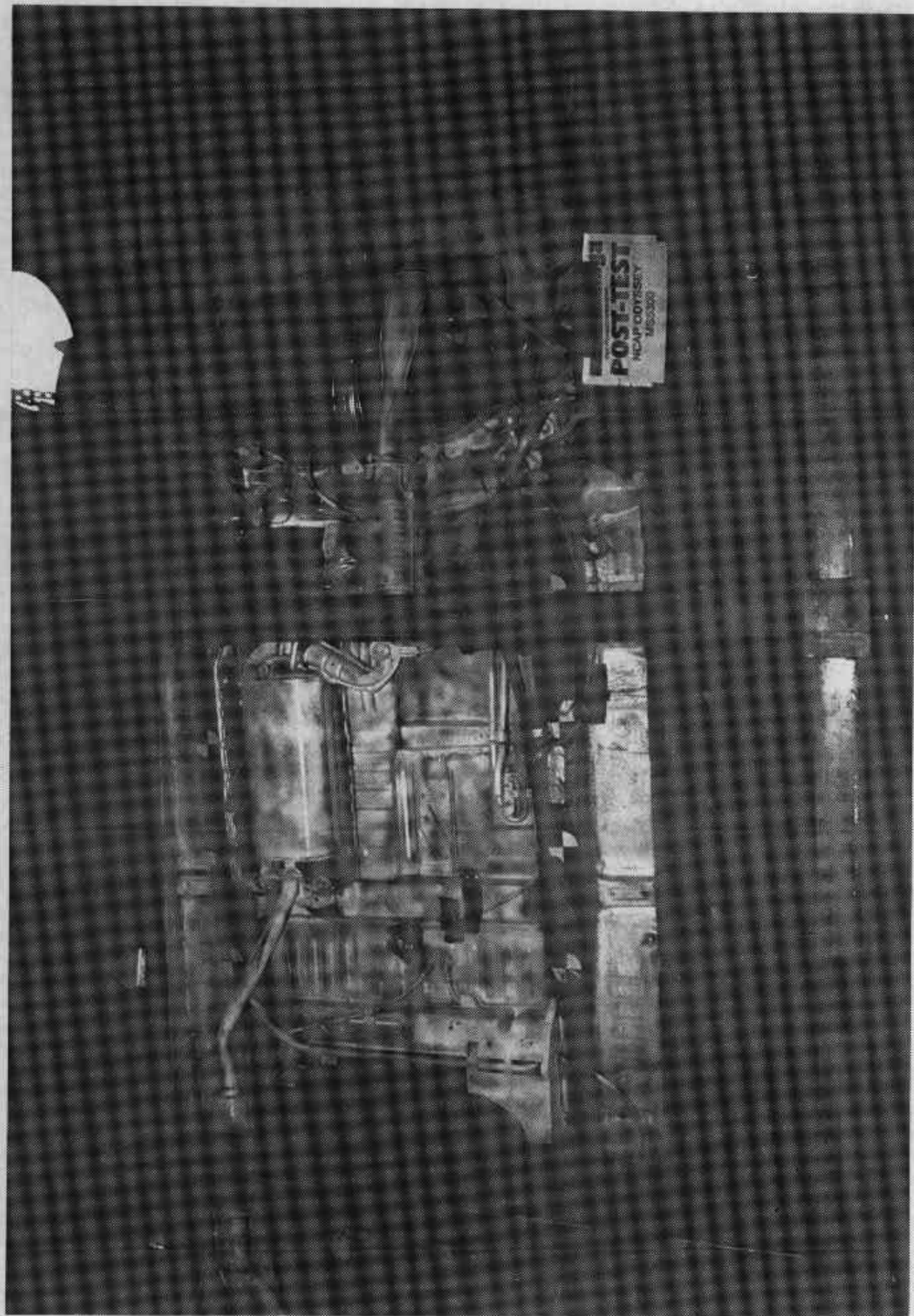
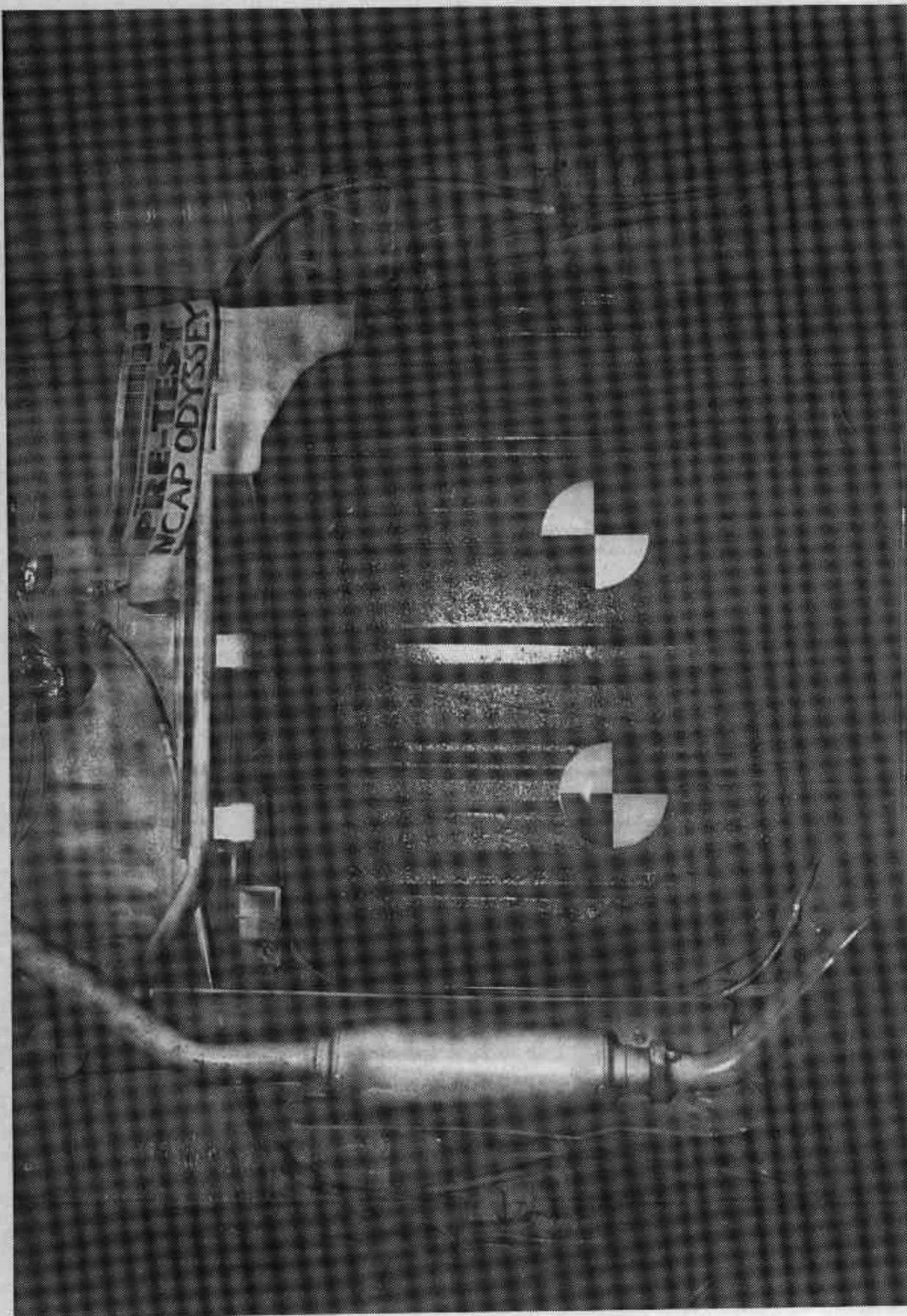


Photo No. A-17 - Post-Test Front Underbody View

A-17



A-18

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

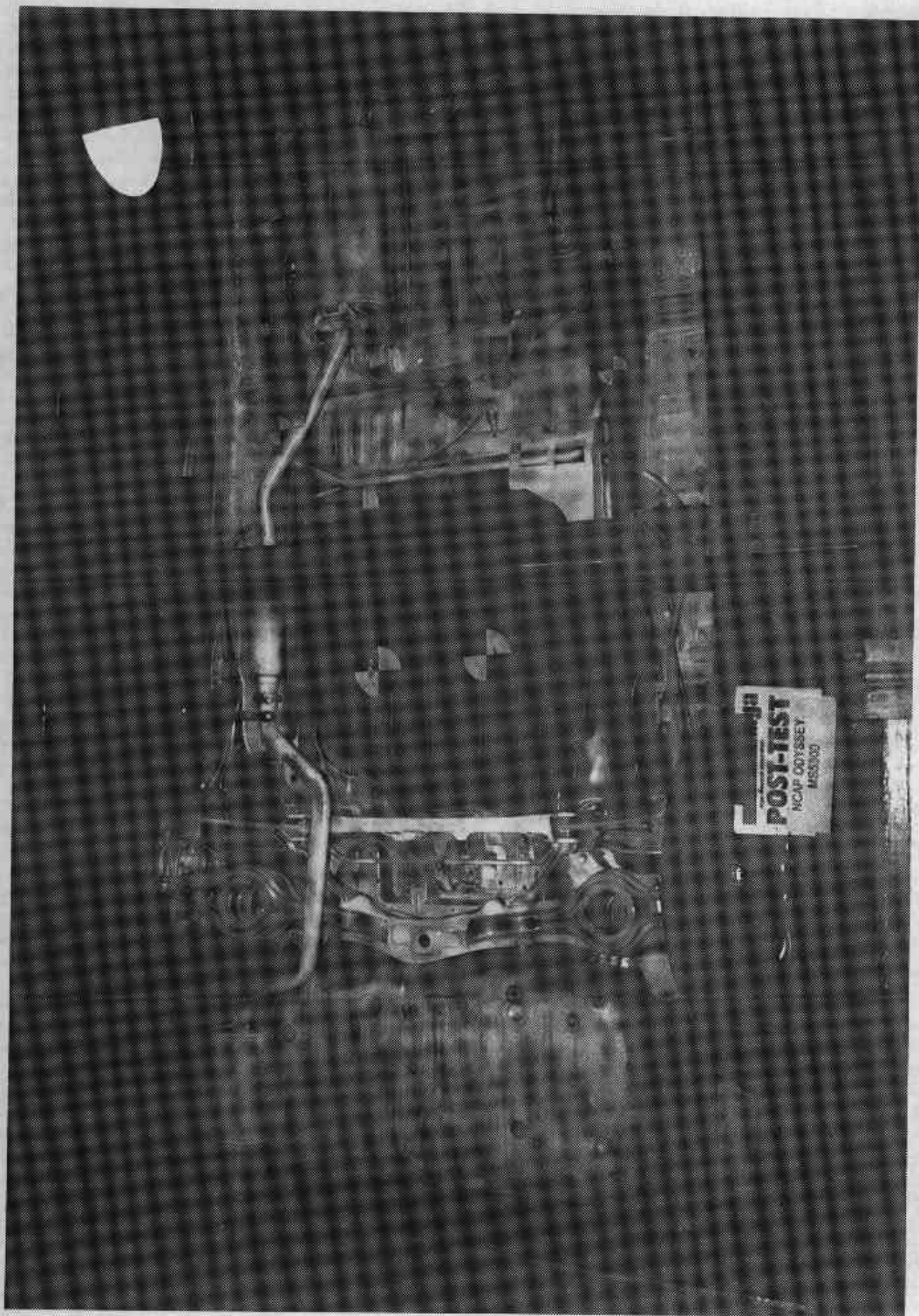


Photo No. A-19 - Post-Test Rear Underbody View



PRE-TEST

NCA/PCOPY 351 Y
MS5300

AP 35 MPH FRONT

ITSA #MS5300

1995 HONDA

MGA RESEARCH

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



A-21

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



A-22

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

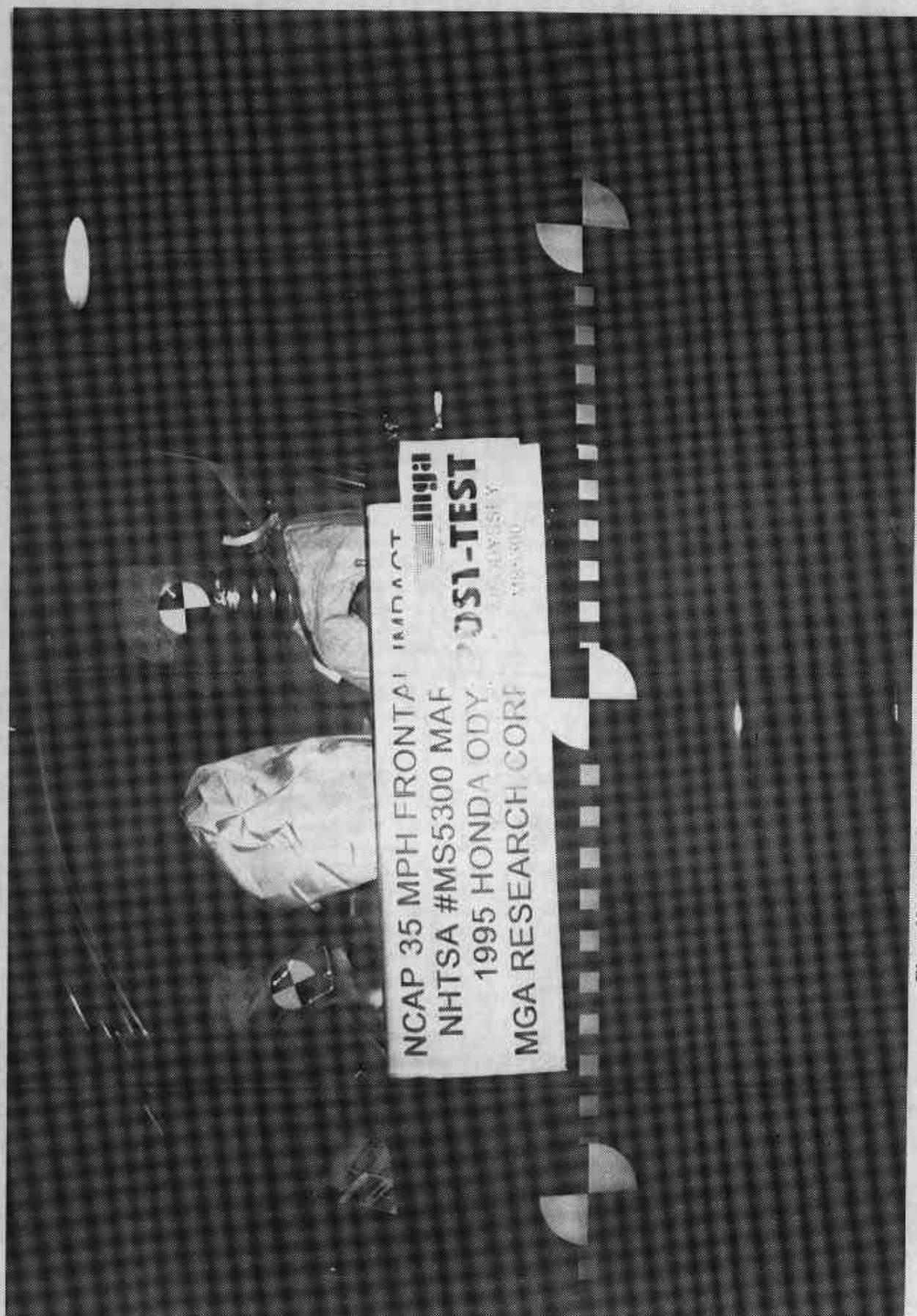


Photo No. A-23 - Post-Test Driver Dummy Position Left Side View

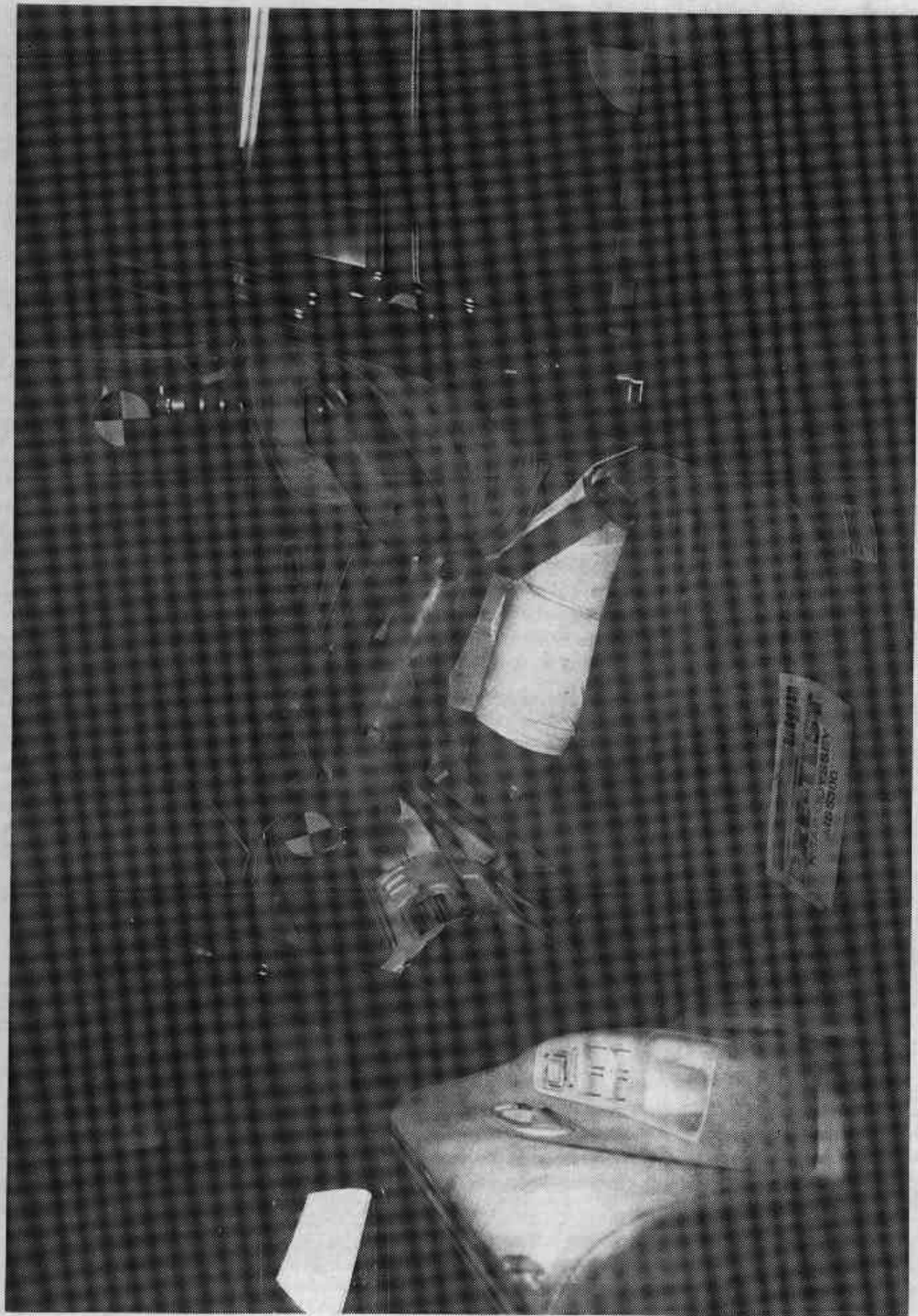


Photo No. A-24 - Pre-Test Driver Dummy Position Left Side View (Door Open)

A-24



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

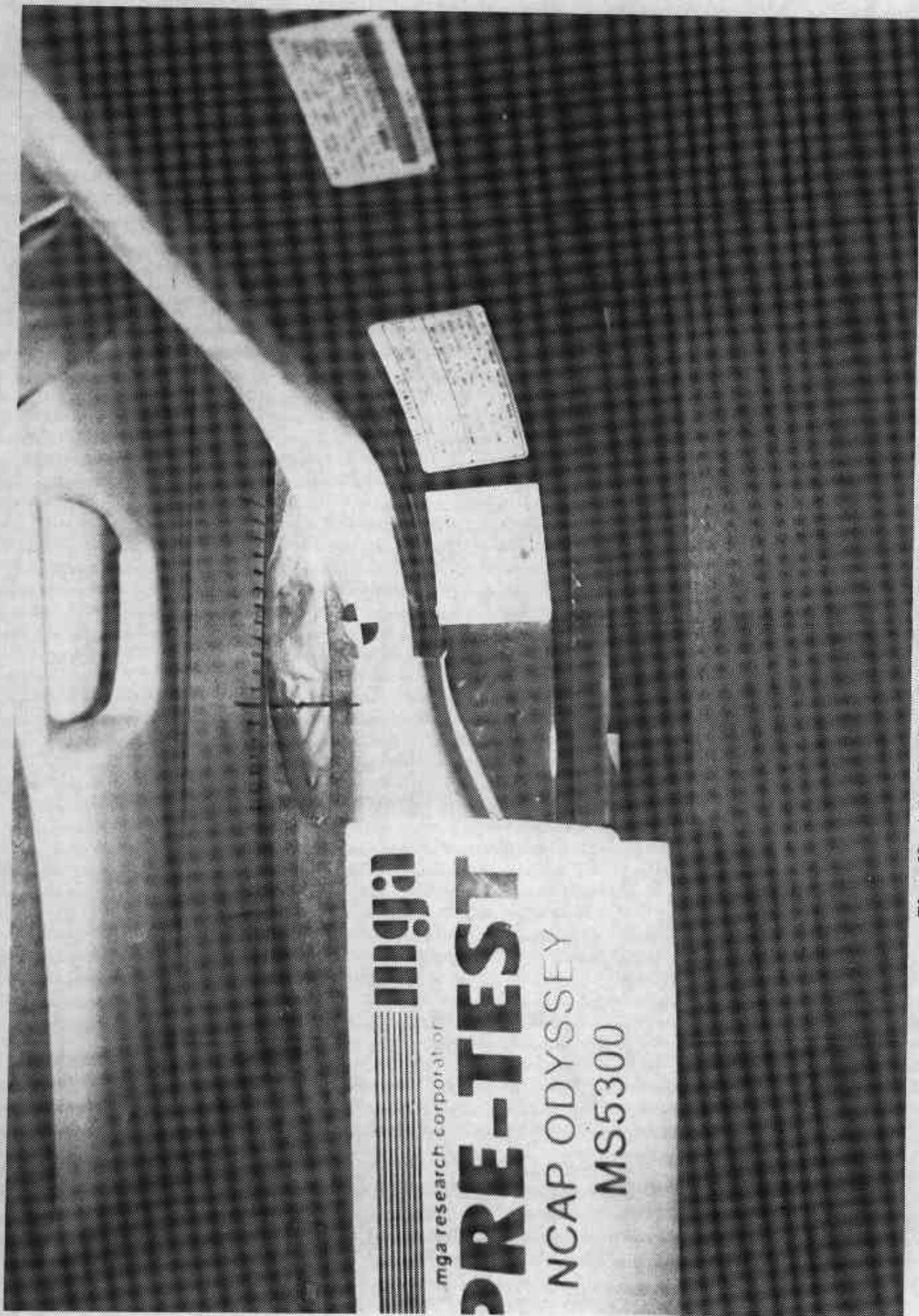


Photo No. A-26 - Pre-Test Driver Seat Position View

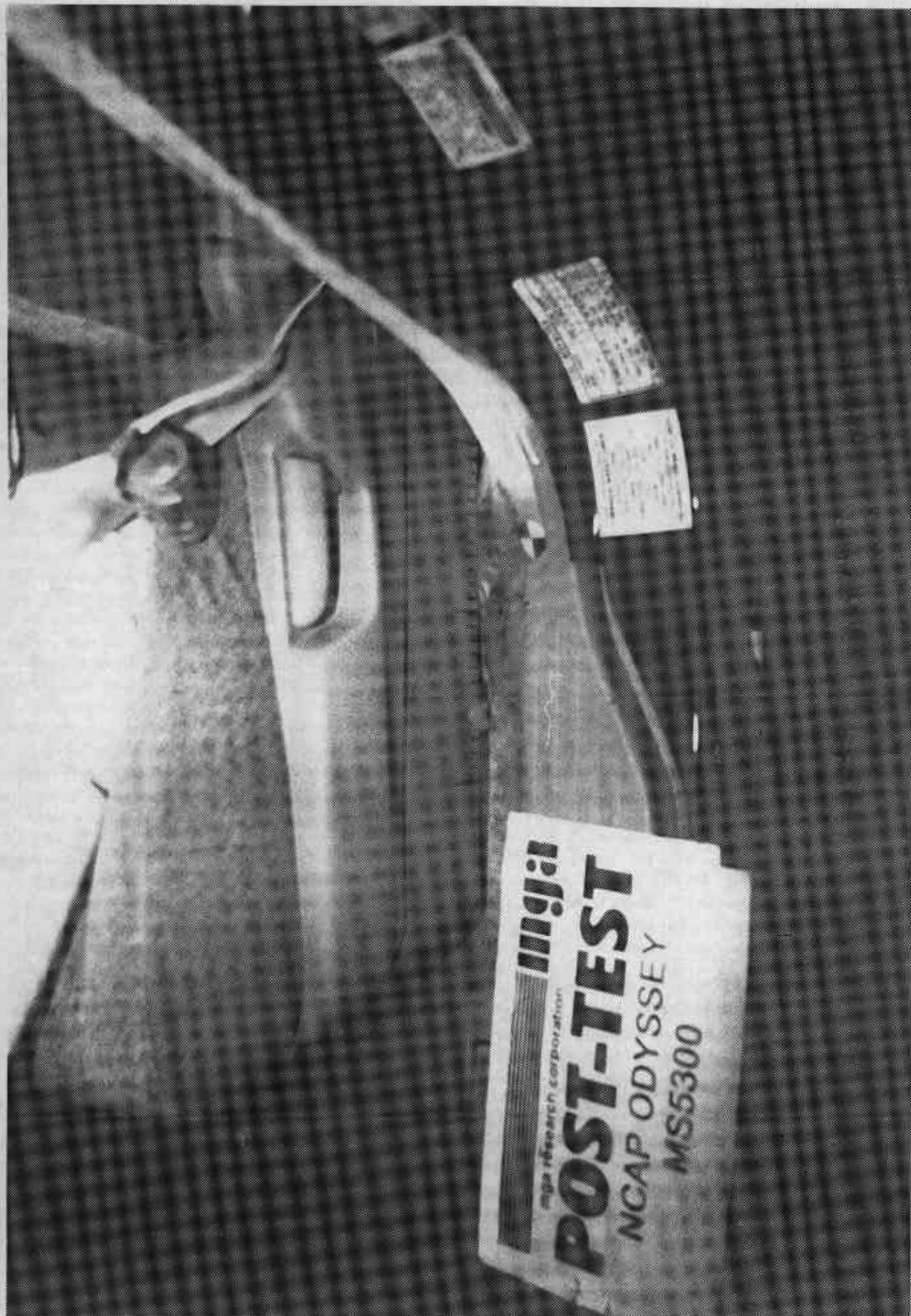


Photo No. A-27 - Post-Test Driver Seat Position View



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 Airbag Contact



A-31

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

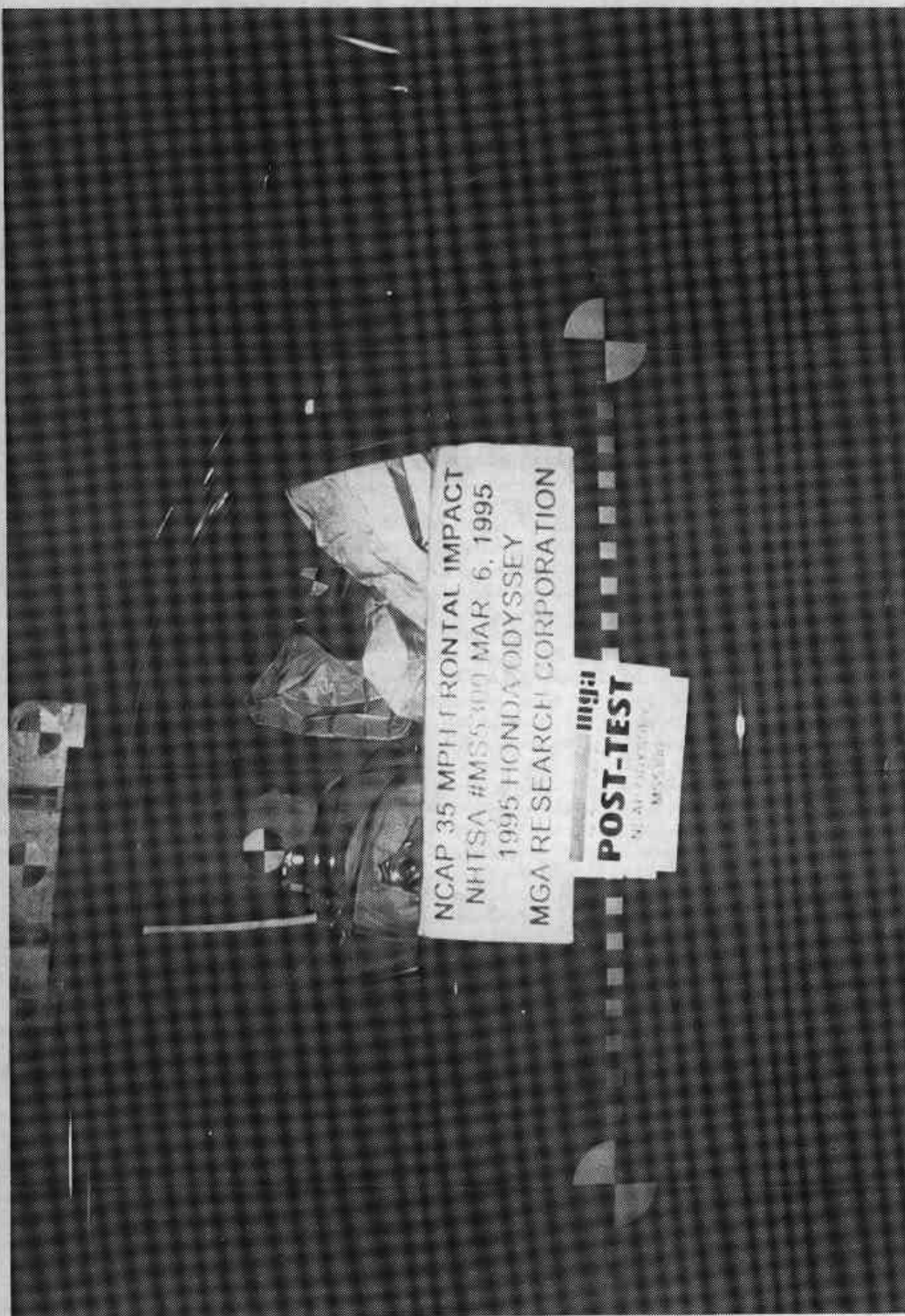


Photo No. A-32 - Post-Test Passenger Dummy Position Right Side View



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

A-33



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

A-34



A-35

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



A-36

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



A-37

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



A-38

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



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



Photo No. A-49 - Post-Test Passenger Airbag

A-40

INT. COLOR
TYPE L

JAPAN BY HONDA MOTOR CO., LTD. 11 '84
1740LBS GAWR F 2360LBS R 2470LBS
1740LBS GAWR F 2360LBS R 2470LBS
VEHICLE CONFORMS TO ALL APPLICABLE
FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT
ON THE DATE OF MANUFACTURE SHOWN ABOVE
V.I.N. JHMR 000937
PASSENGER CAR

Photo No. A-41 - Vehicle Certification Label

ECT LINES:

2550

41-1122

3344

829-1118

0078

2288

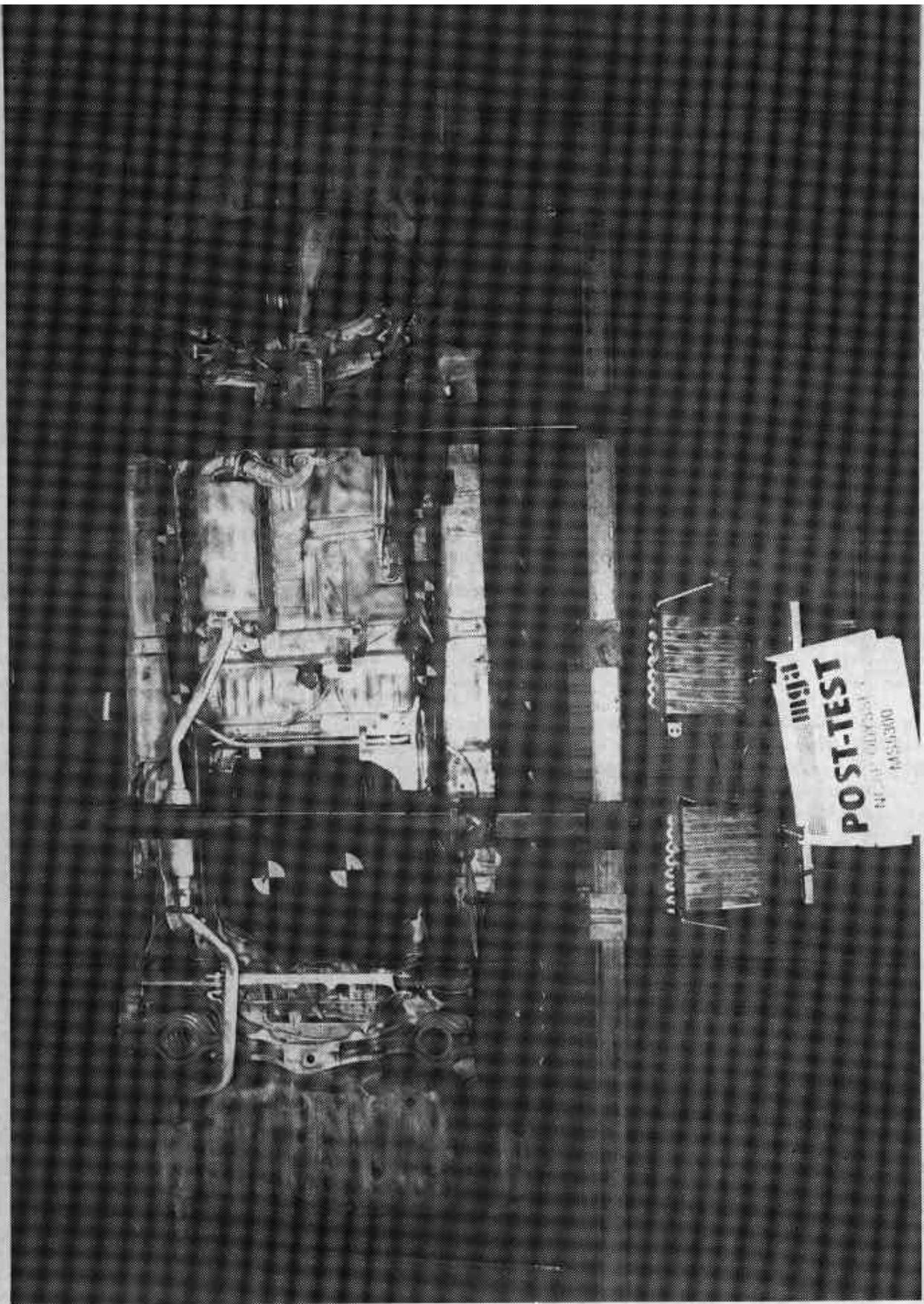
2550

2550

2550

VEHICLE CAPACITY		SEATING CAPACITY		
TOTAL	1st SEAT	2nd SEAT	3rd SEAT	
6	2	2	2	
7	2	3	2	
TIRE SIZE		COLD TIRE INFLATION PRESSURE		
FRONT/REAR		● UP TO VEHICLE CAPACITY WEIGHT		
INFLATION PRESSURE		● DO NOT INSTALL ON OTHER VEHICLES.		
TIRE		INFLATION PRESSURE		
SPARE TIRE		INFLATION PRESSURE		
T135/90D15		420kpa, 60psi		
SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION.				SX0 - AD

Photo No. A-42 - Tire Placard



A-43

Photo No. A-43 - Rollover 99"



Photo No. A-44 - Rollover 180°

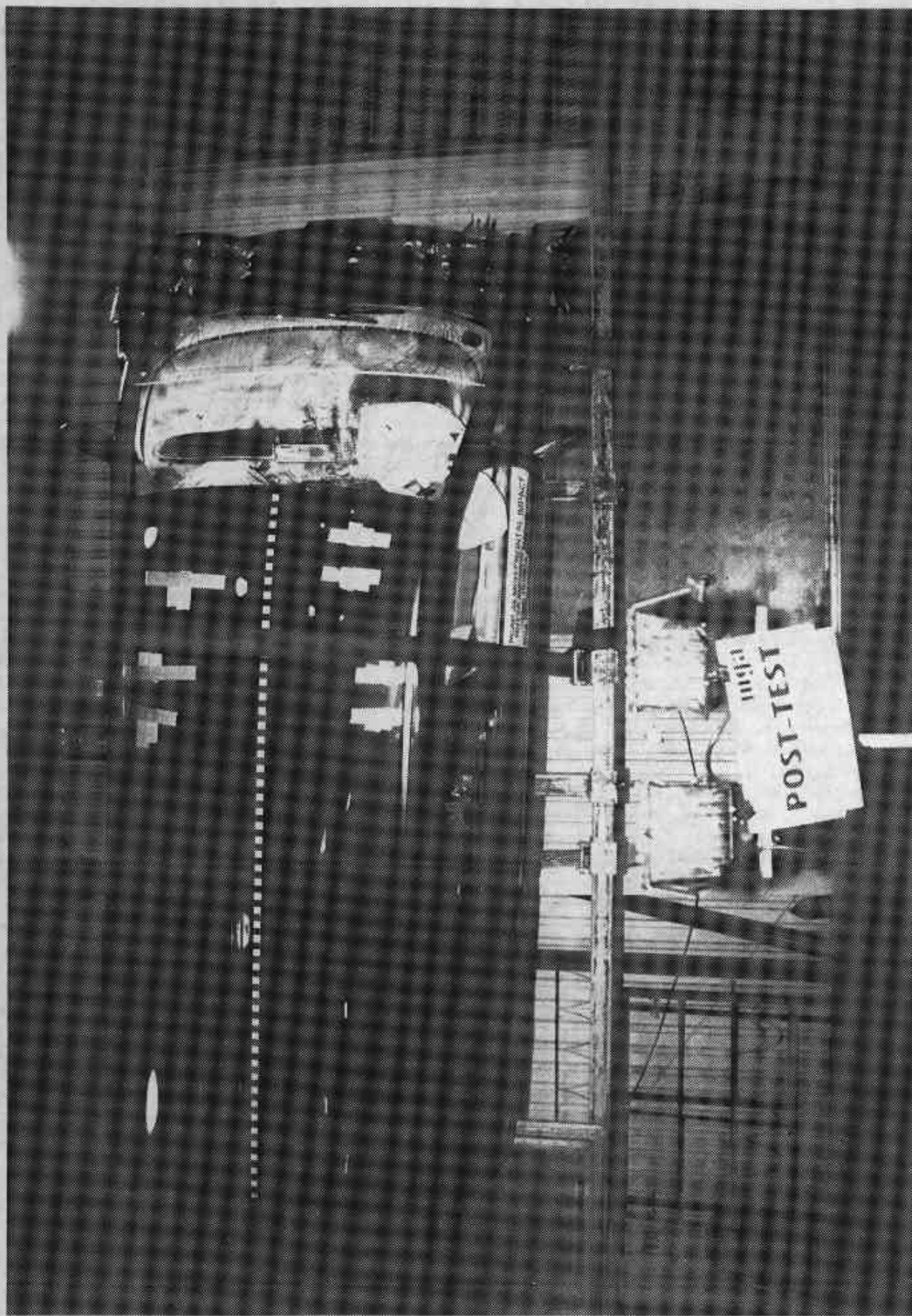
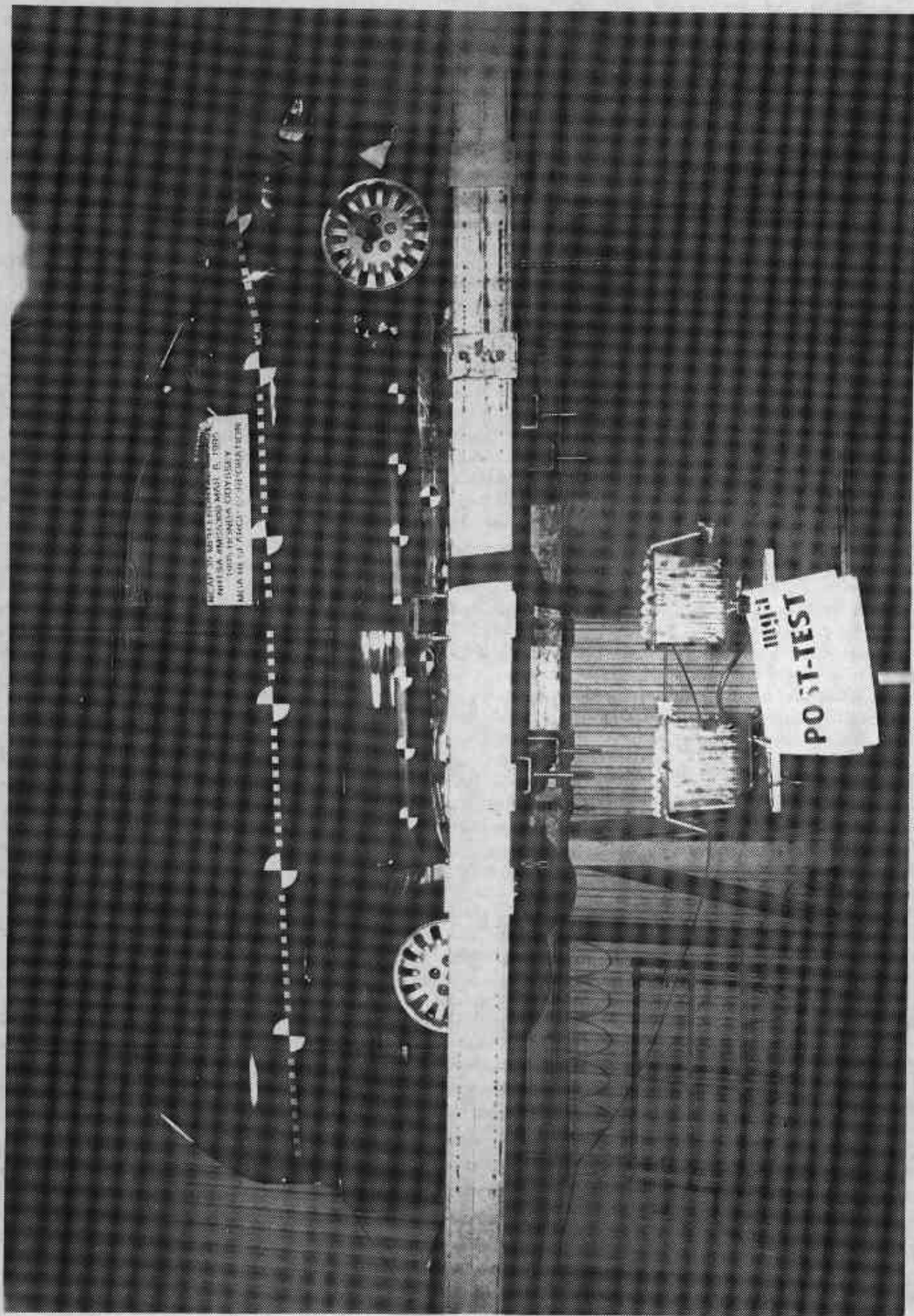


Photo No. A-45 - Rollover 270°



A-46

Photo No. A-46 - Rollover 360°

1995 Honda Odyssey Wagon

NHTSA NO.: MS5300

<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)

<u>Data Plot</u>	<u>Page No.</u>
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 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

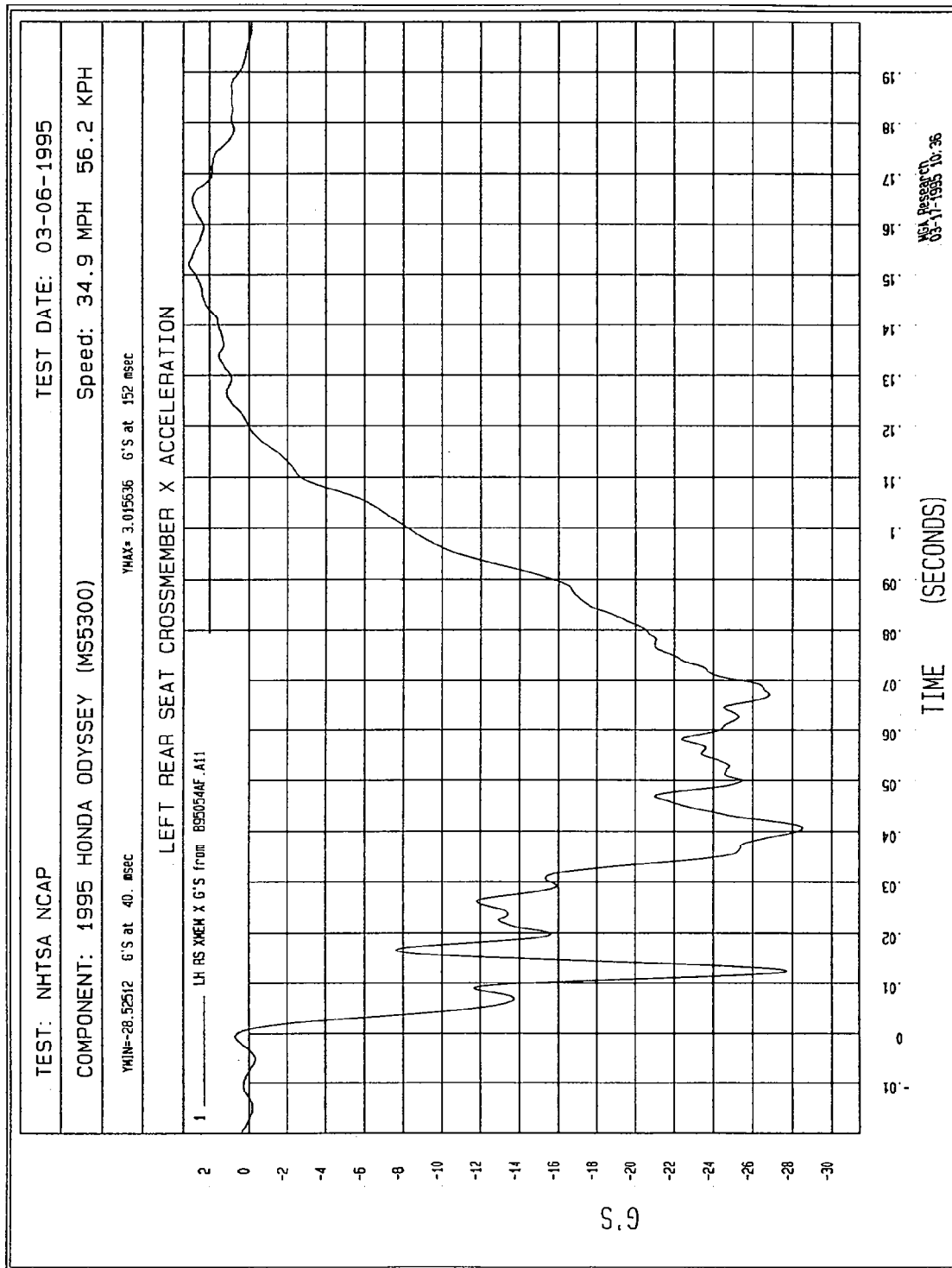


Figure B-1 - Left Rear Seat Crossmember X Acceleration vs. Time

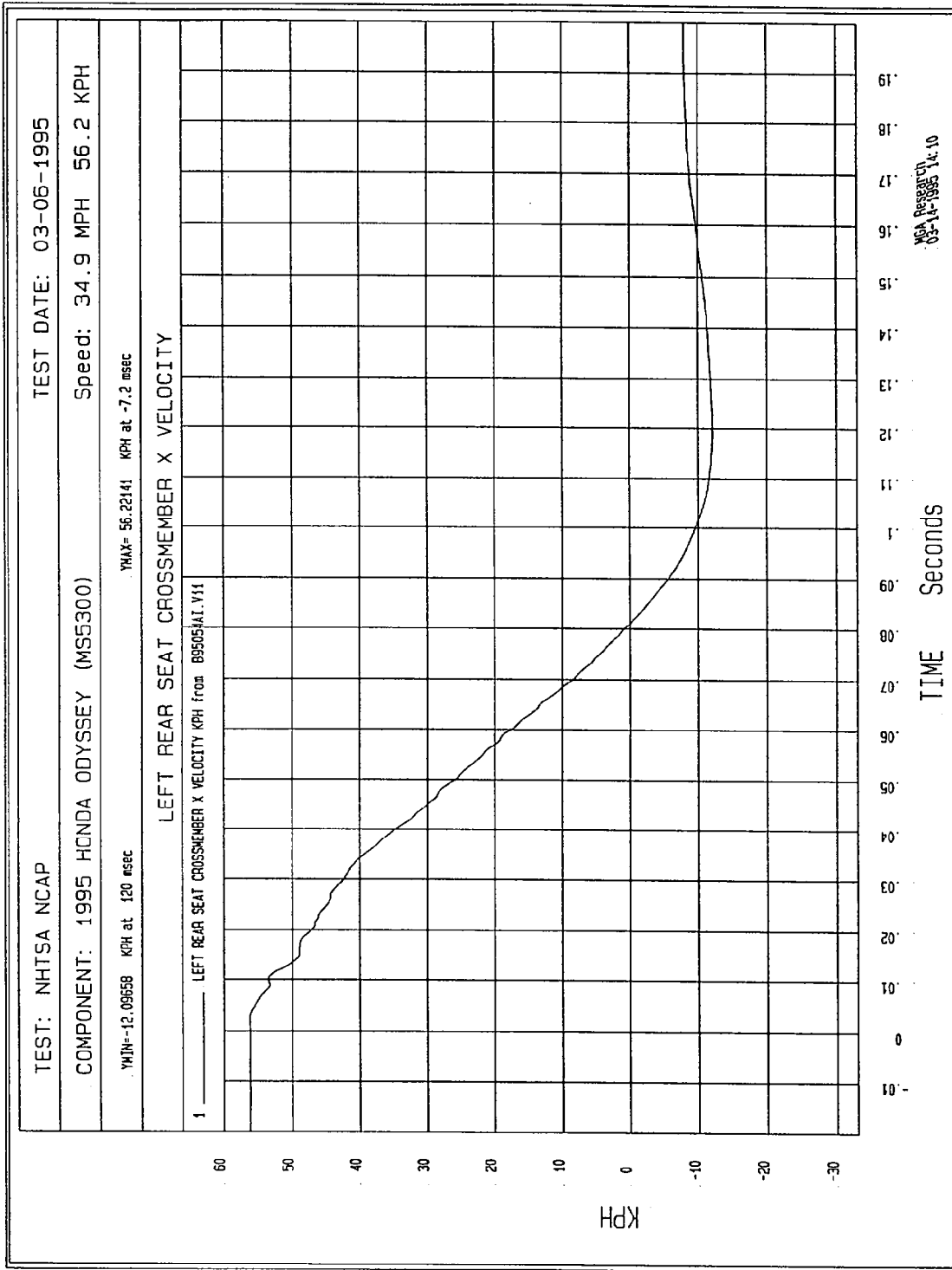


Figure B-2 - Left Rear Seat Crossmember X Velocity vs. Time

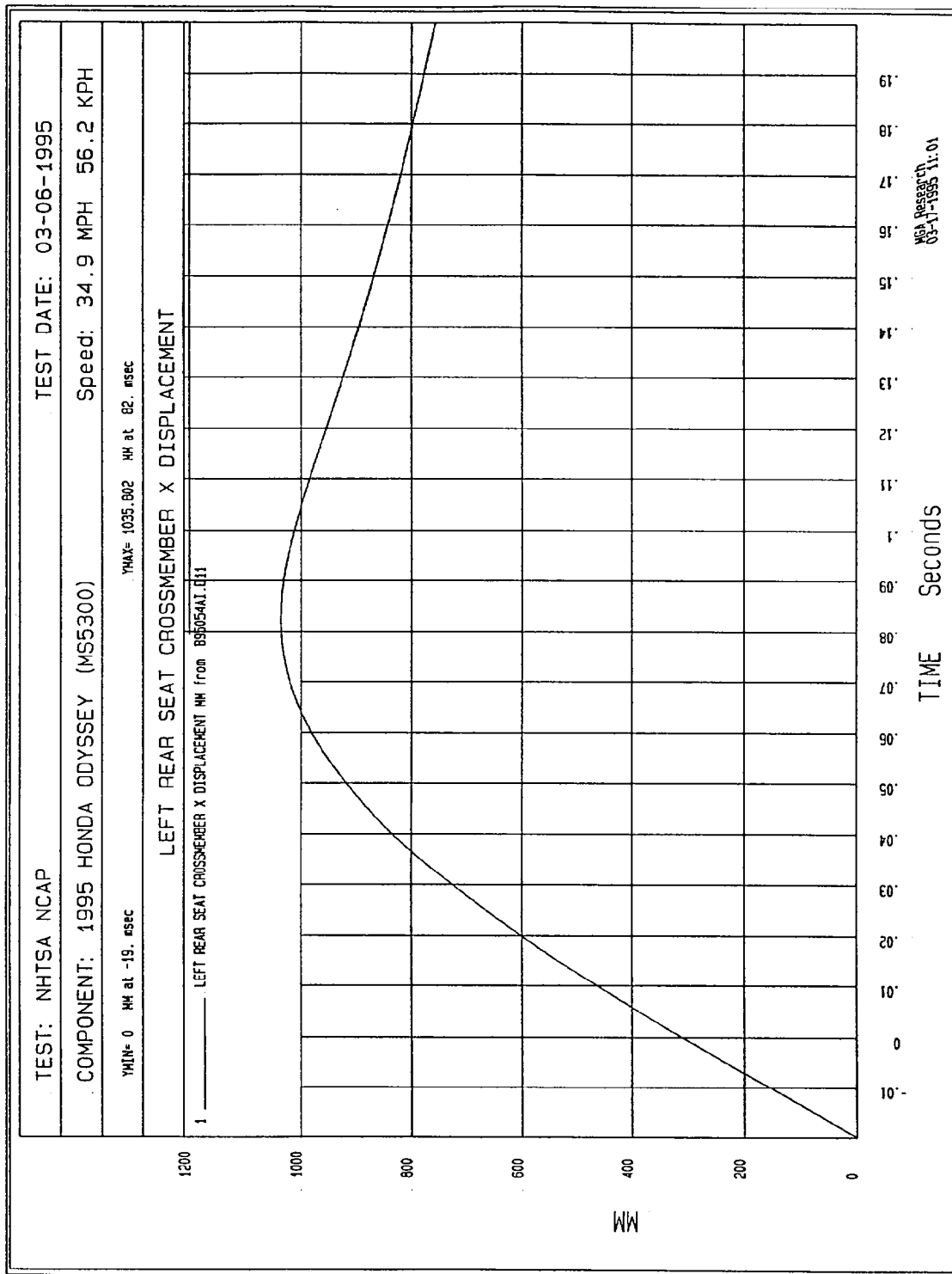


Figure B-3 - Left Rear Seat Crossmember X Displacement vs. Time

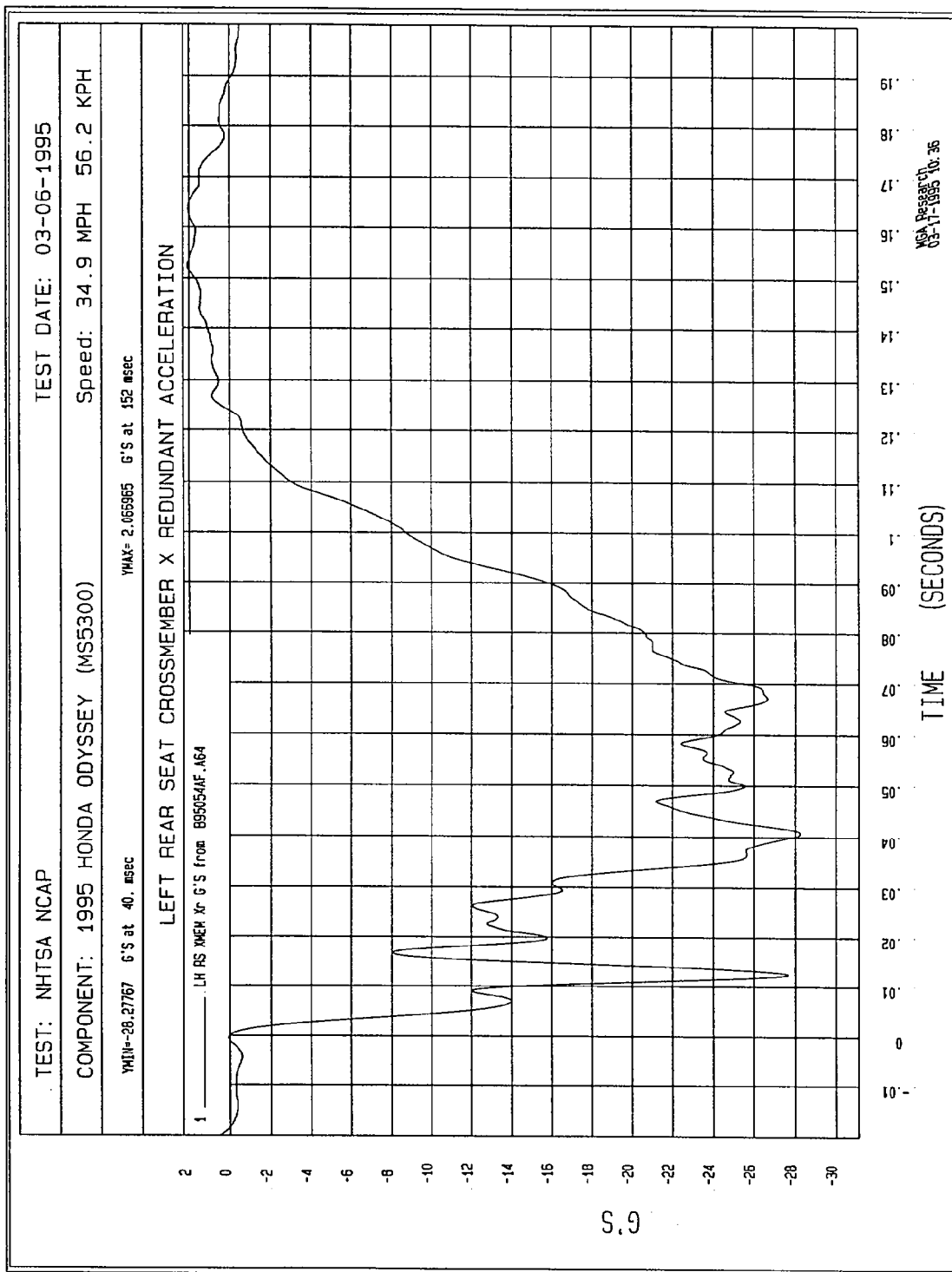


Figure B-4 - Left Rear Seat Crossmember X Redundant Acceleration vs. Time

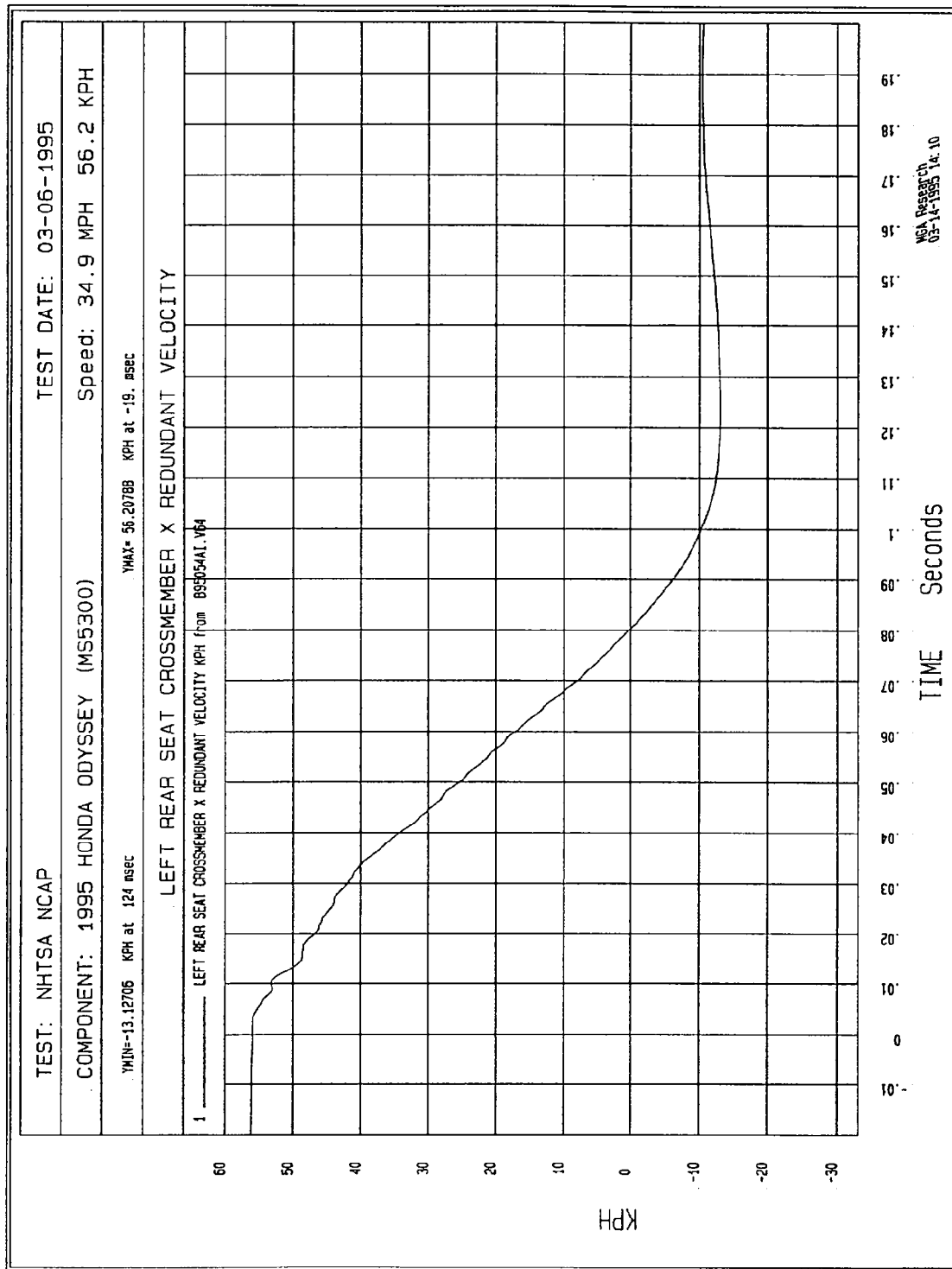


Figure B-5 - Left Rear Seat Crossmember X Redundant Velocity vs. Time

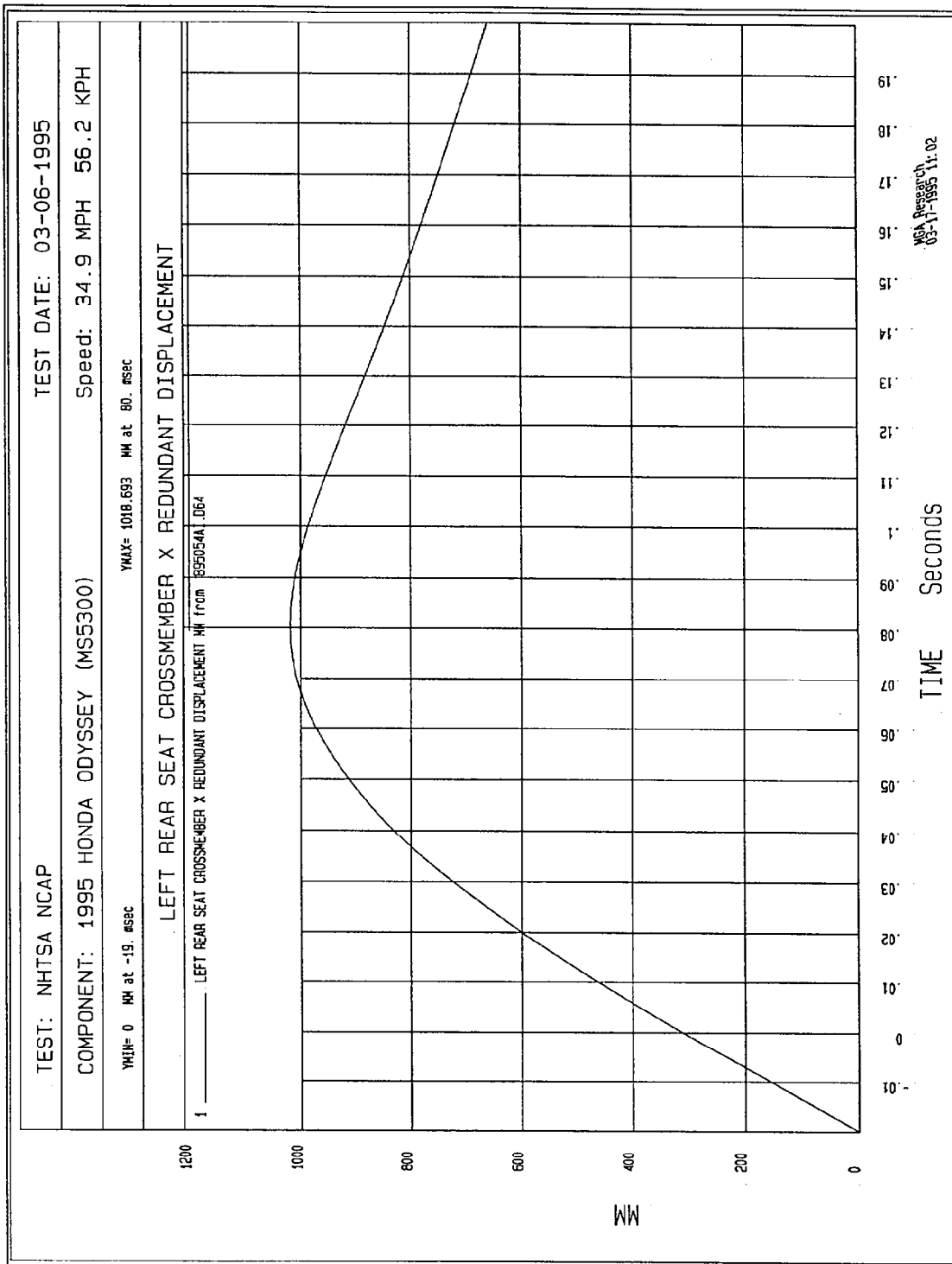


Figure B-6 - Left Rear Seat Crossmember X Redundant Displacement vs. Time

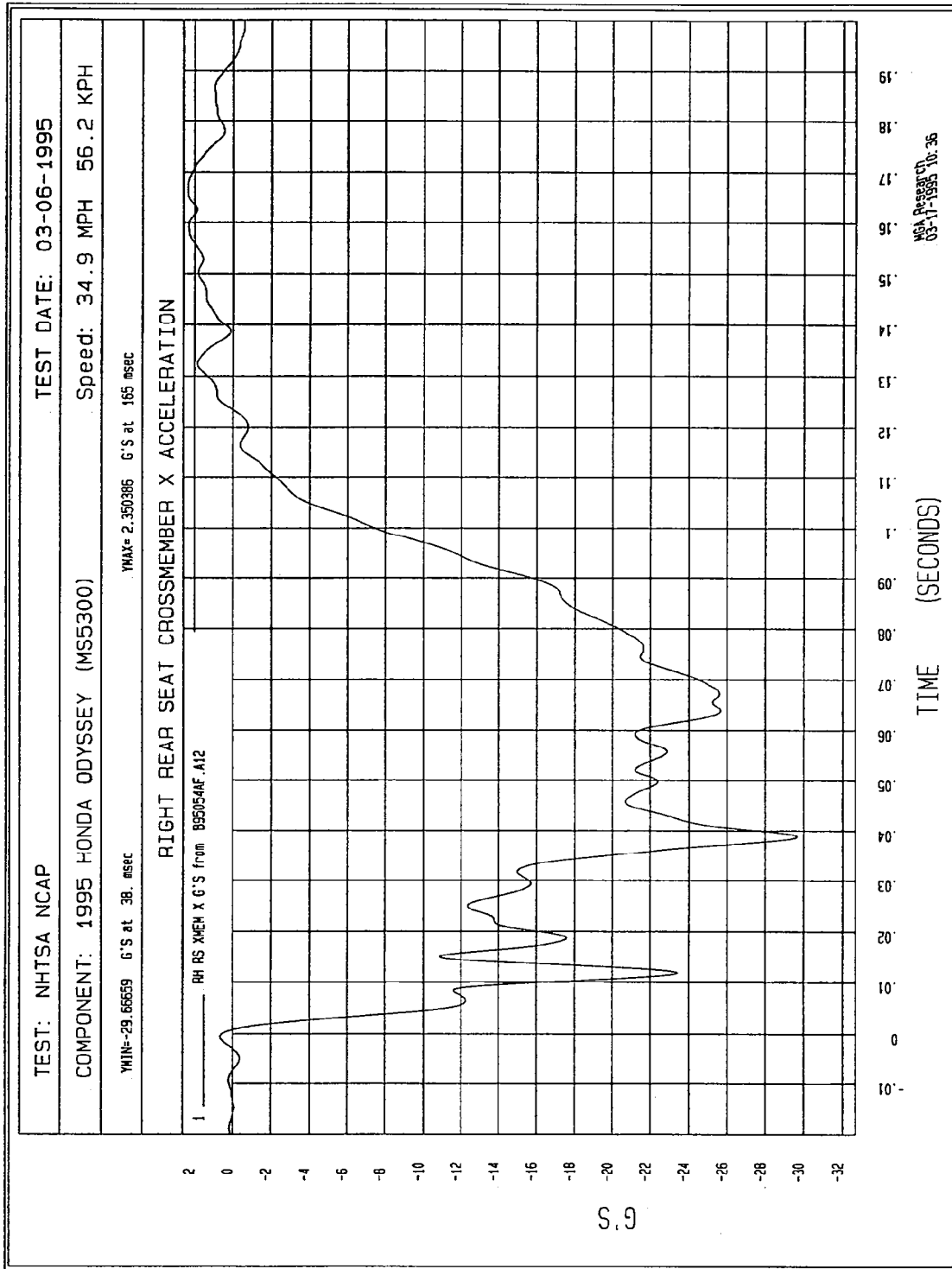


Figure B-7 - Right Rear Seat Crossmember X Acceleration vs. Time

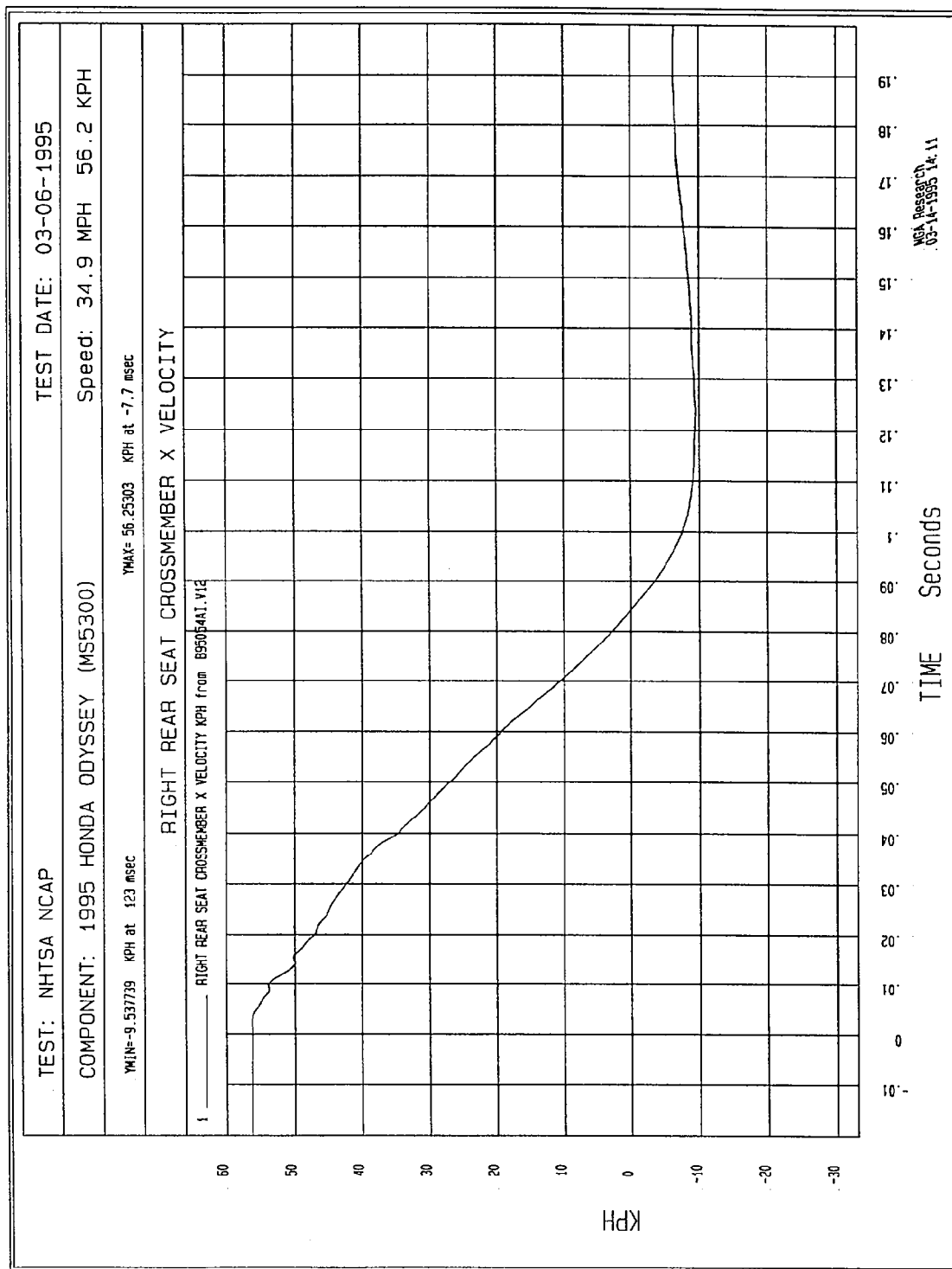


Figure B-8 - Right Rear Seat Crossmember X Velocity vs. Time

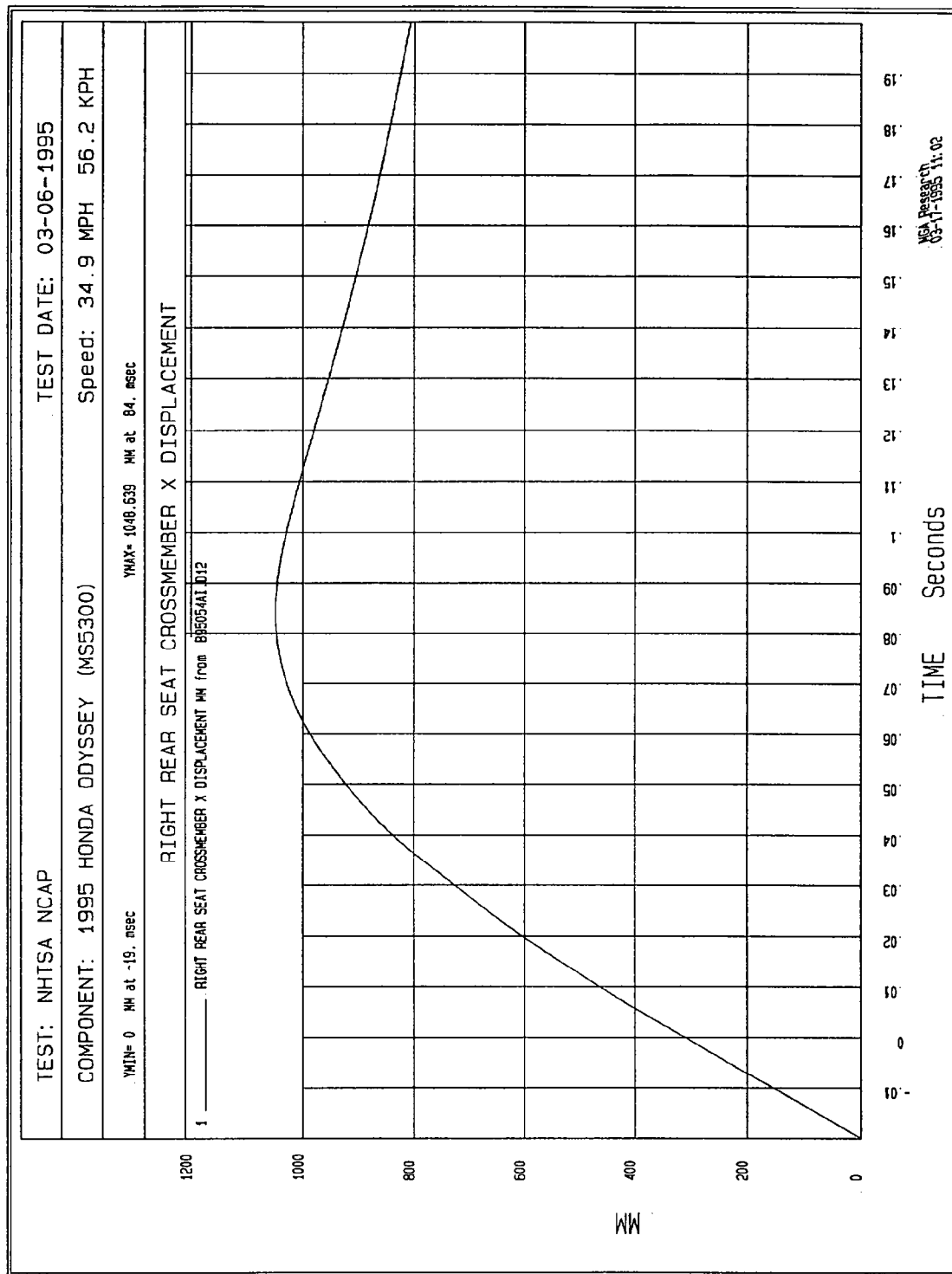


Figure B-9 - Right Rear Seat Crossmember X Displacement vs. Time

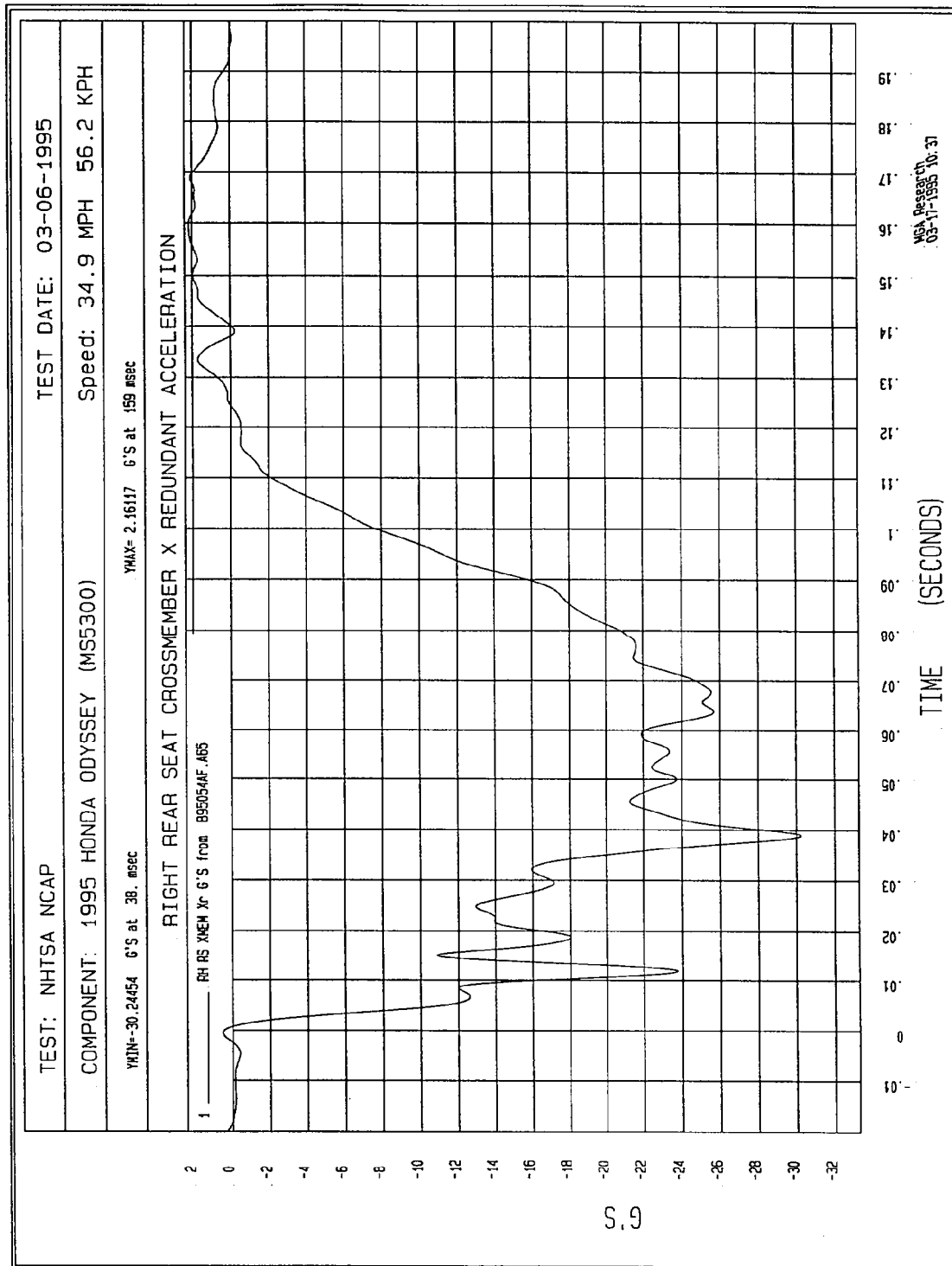


Figure B-10 - Right Rear Seat Crossmember X Redundant Acceleration vs. Time

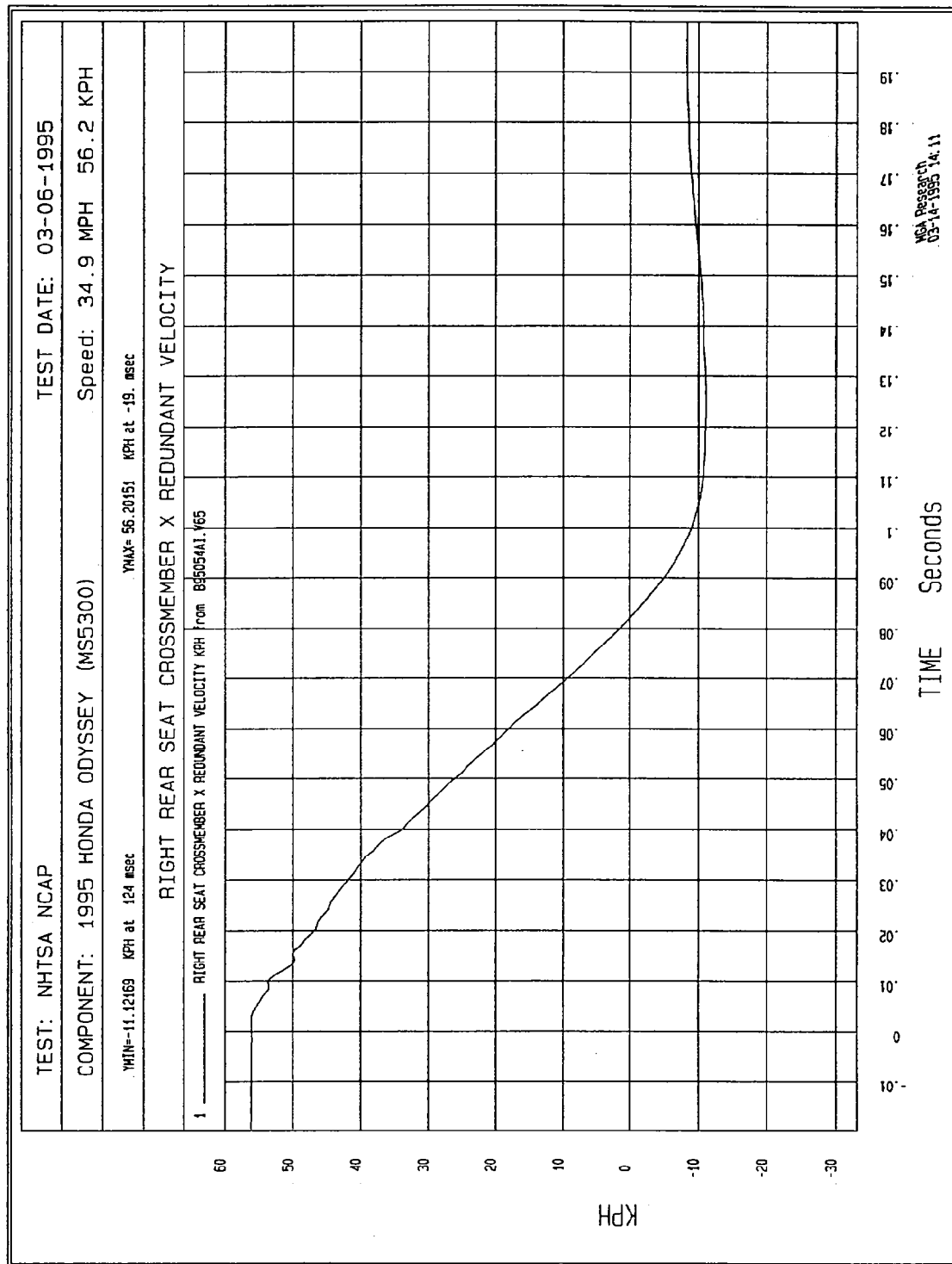


Figure B-11 - Right Rear Seat Crossmember X Redundant Velocity vs. Time

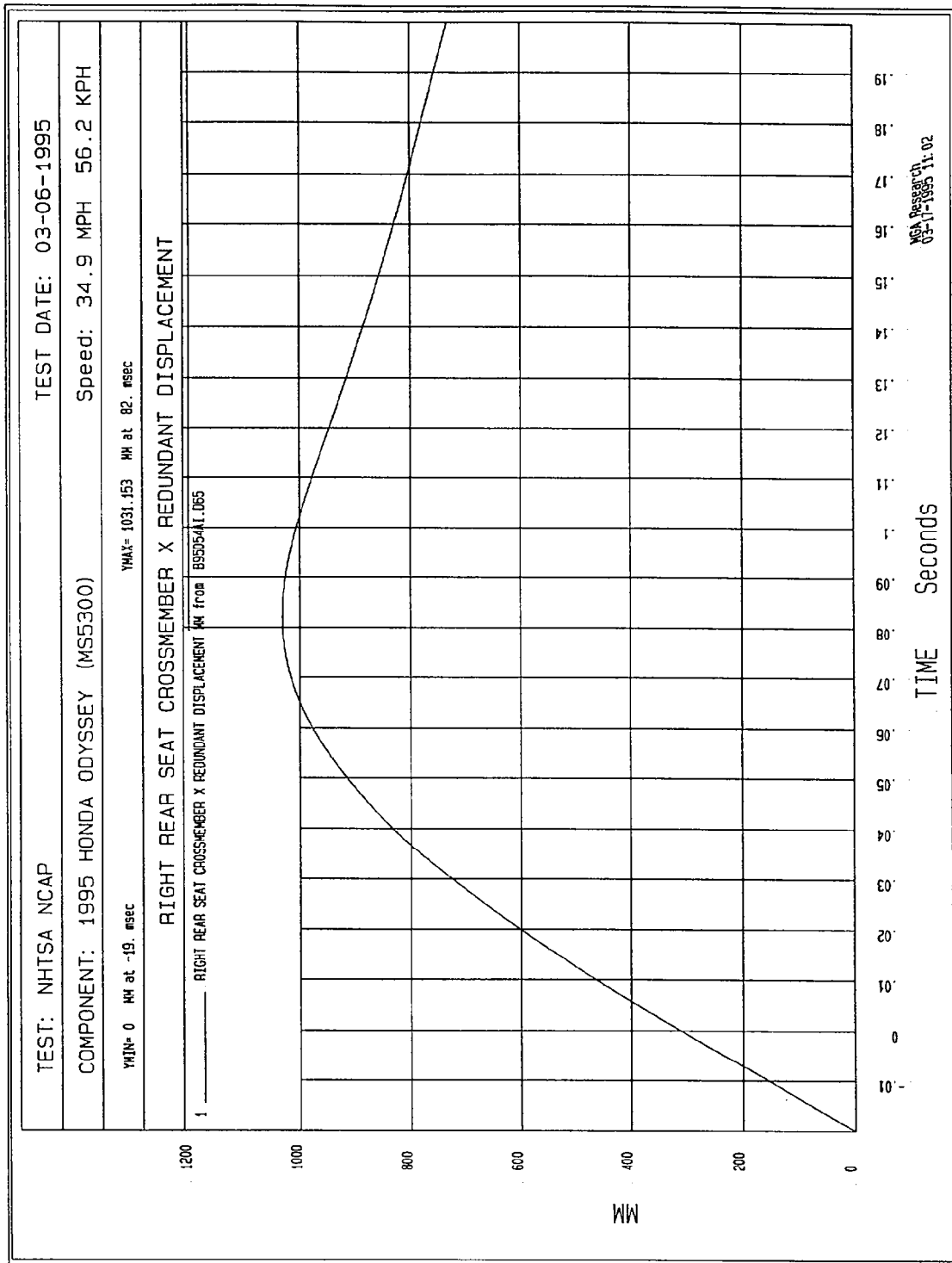


Figure B-12 - Right Rear Seat Crossmember X Redundant Displacement vs. Time

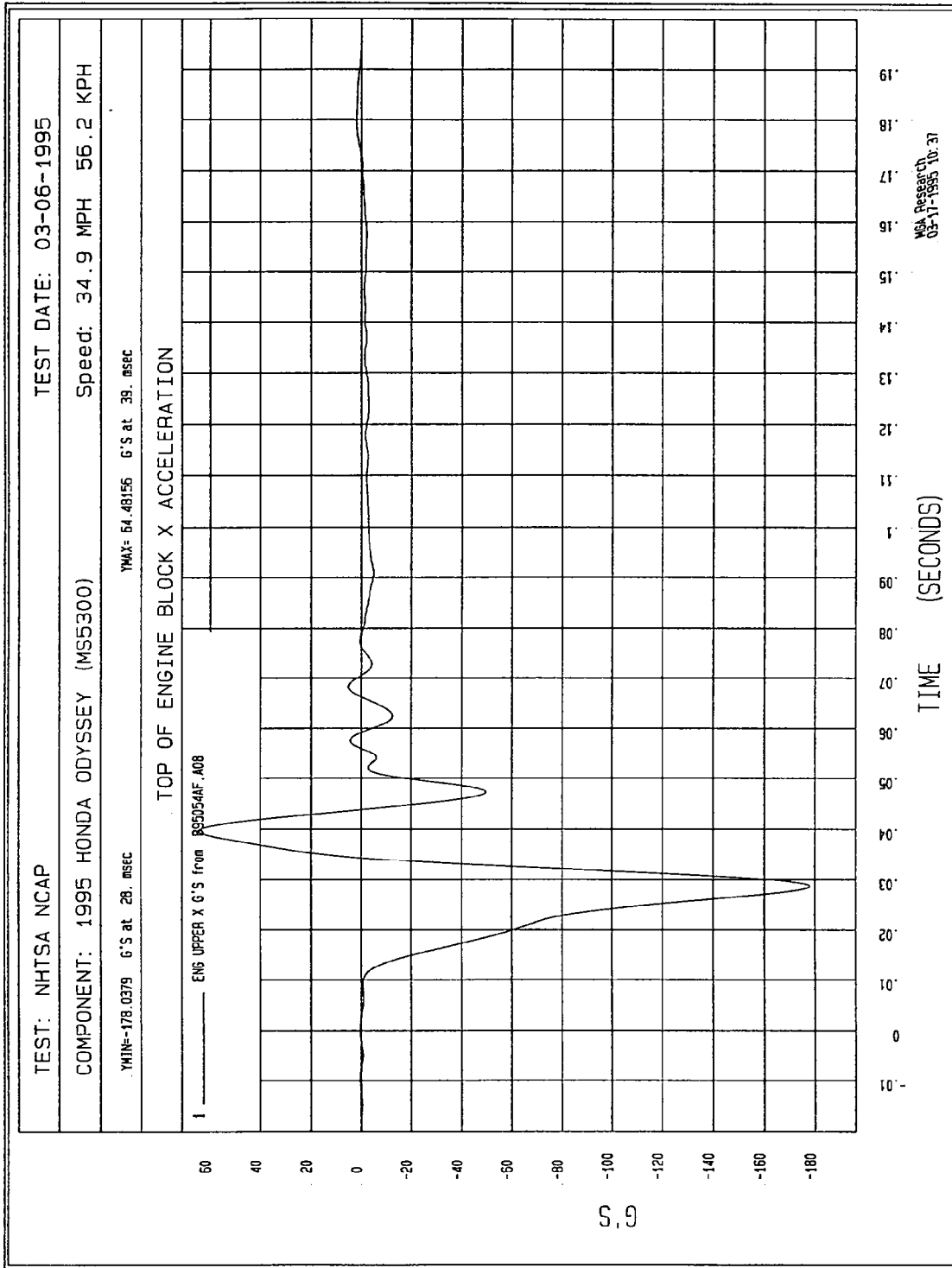


Figure B-13 - Top of Engine Block X Acceleration vs. Time

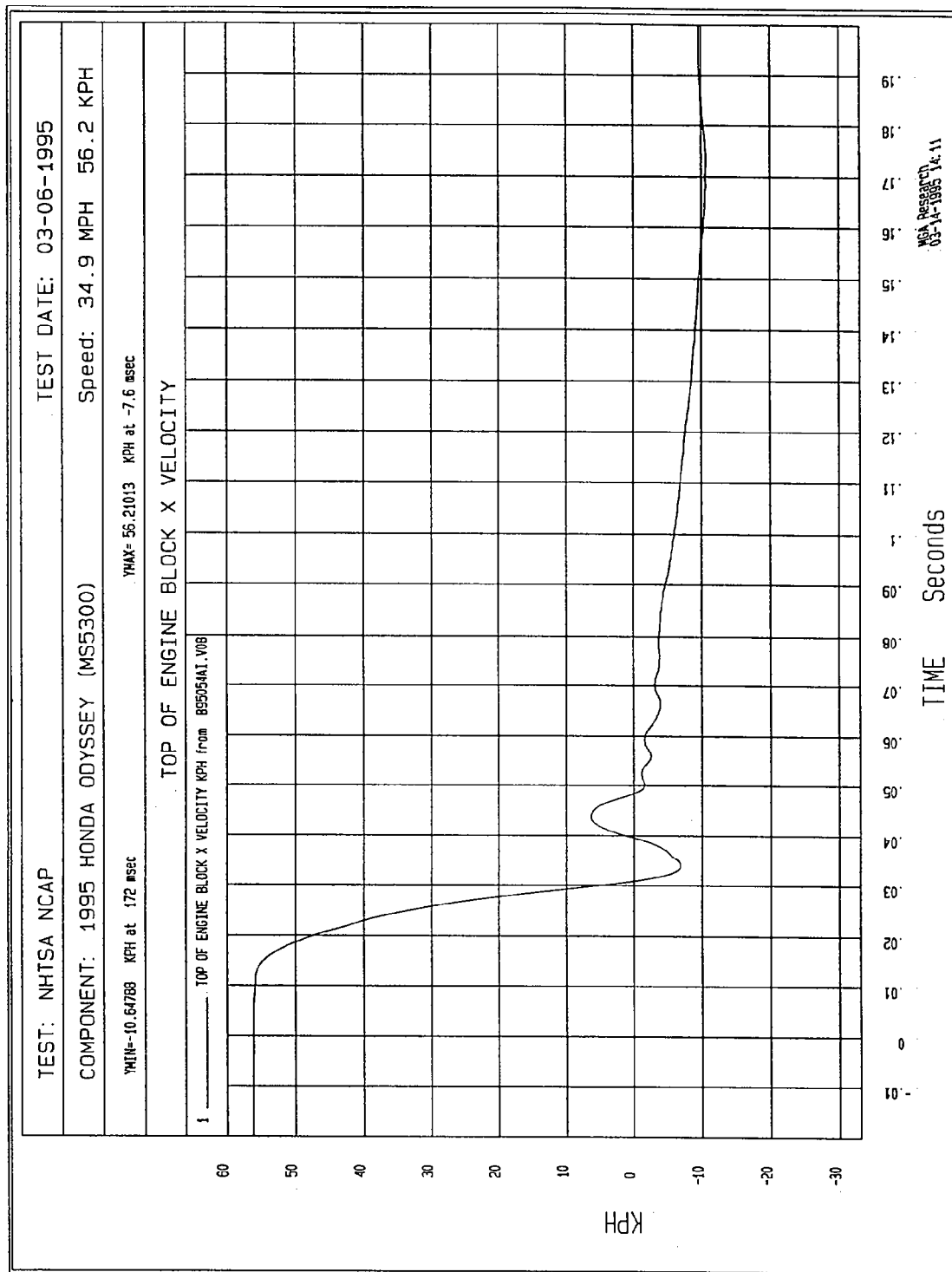


Figure B-14 - Top of Engine Block X Velocity vs. Time

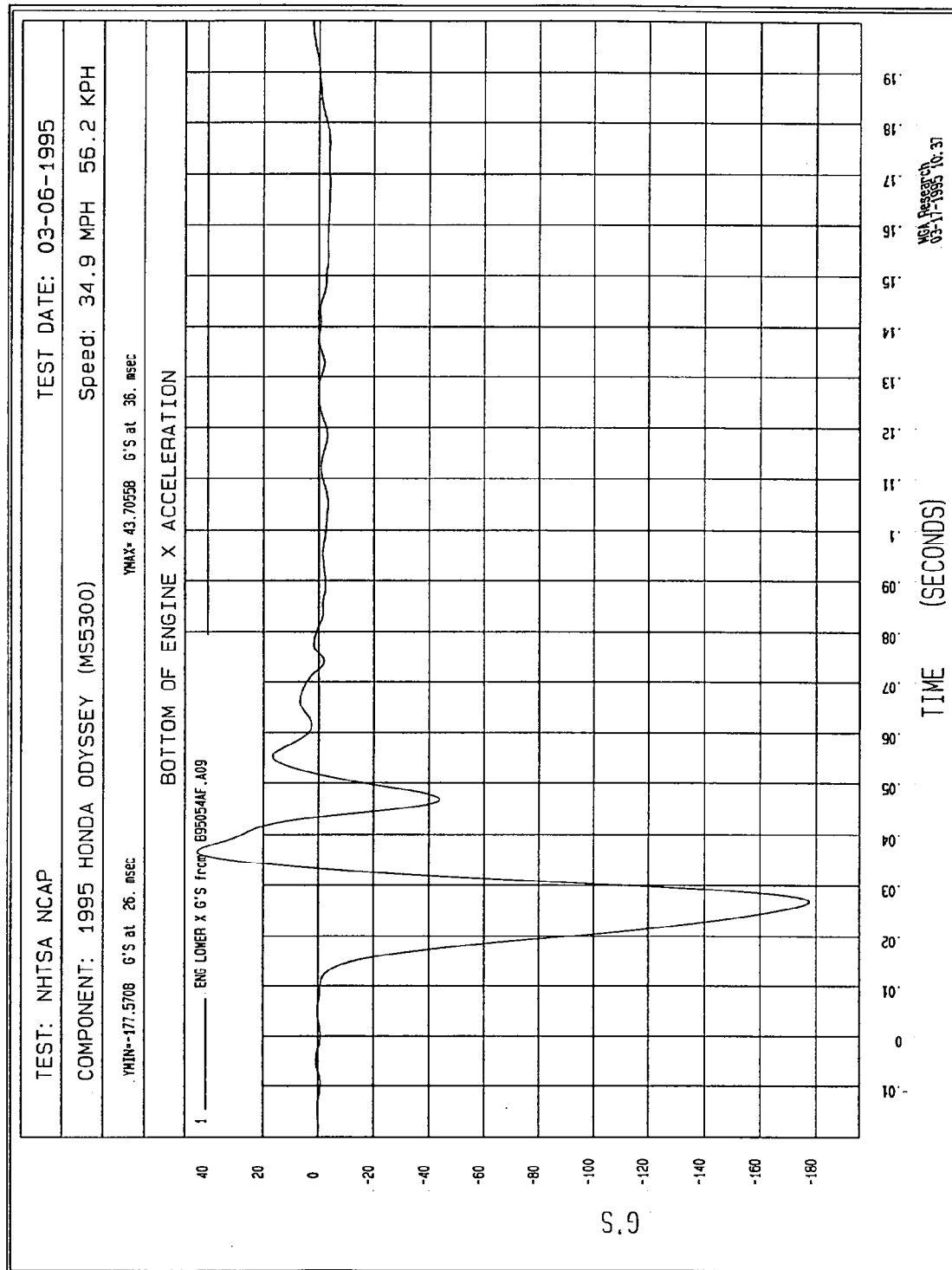


Figure B-15 - Bottom of Engine X Acceleration vs. Time

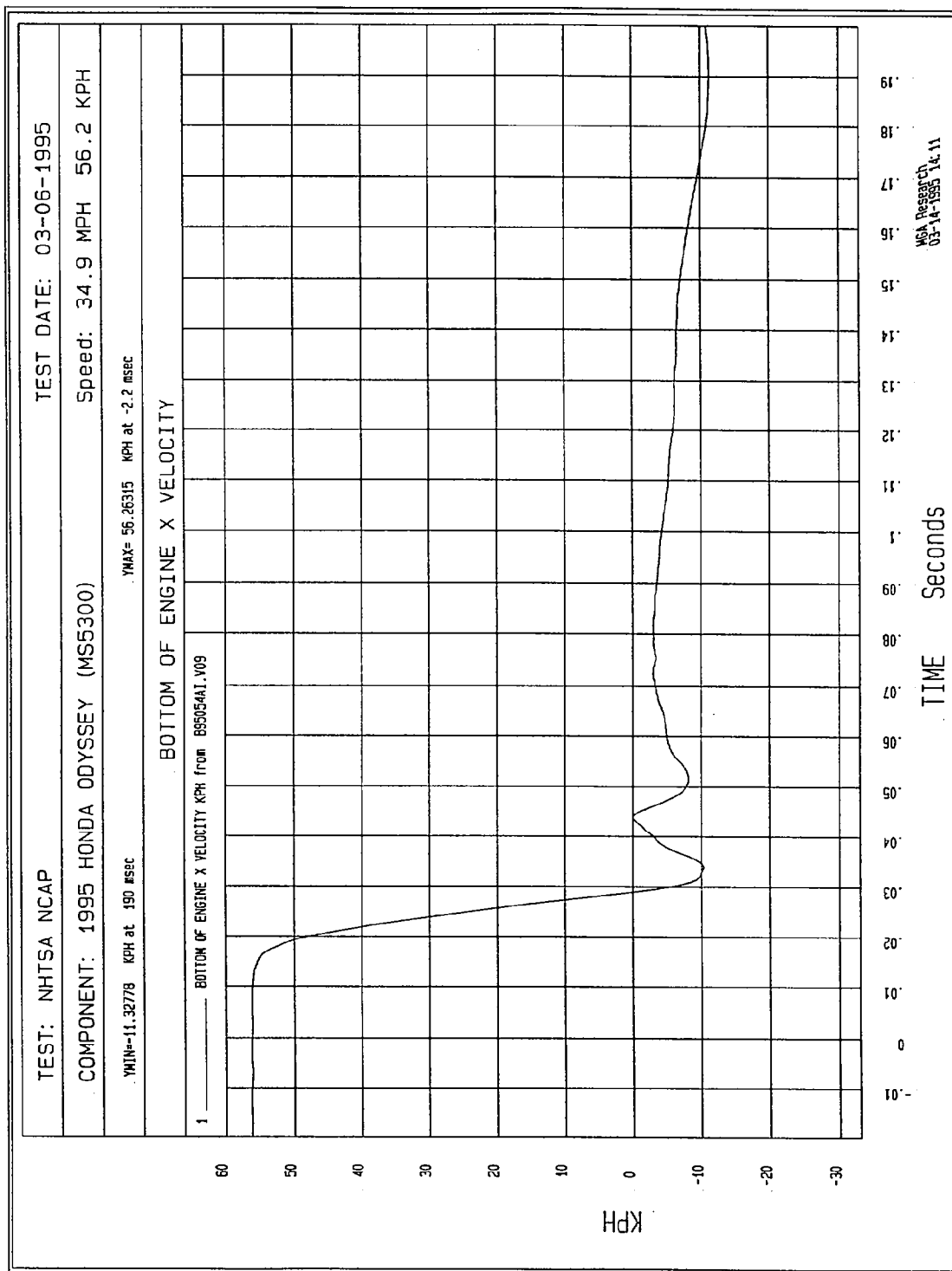


Figure B-16 - Bottom of Engine X Velocity vs. Time

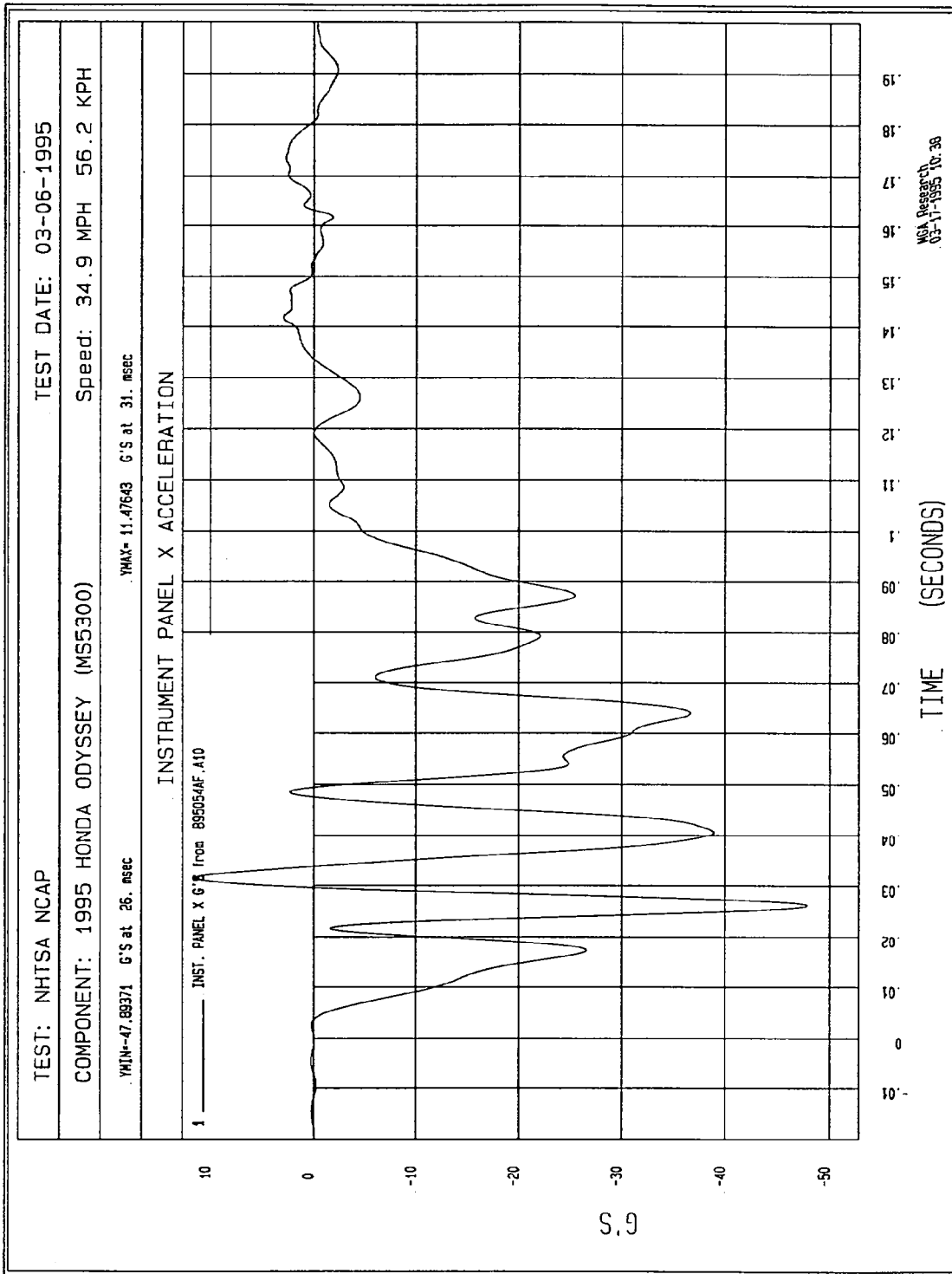


Figure B-17 - Instrument Panel X Acceleration vs. Time

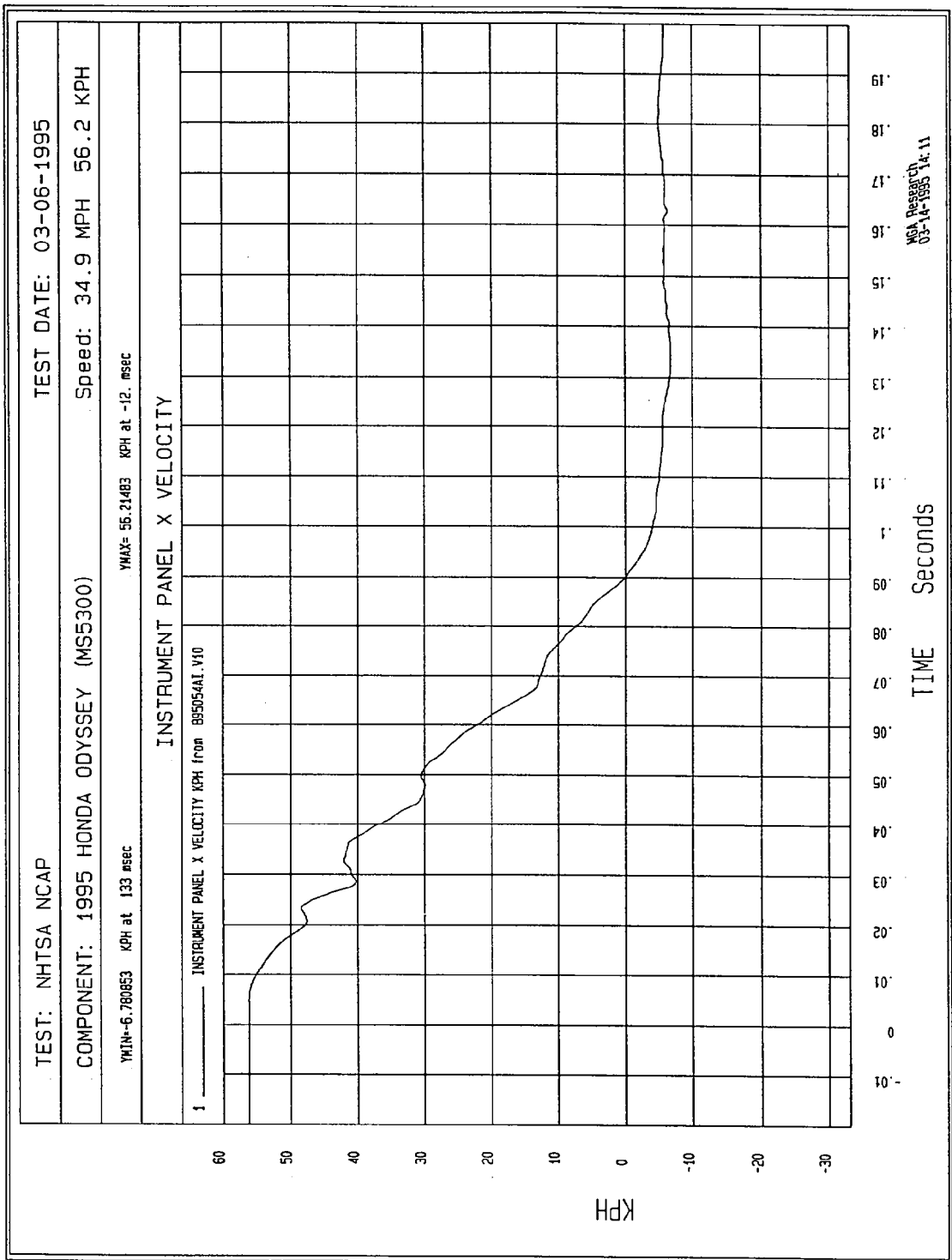


Figure B-18 - Instrument Panel X Velocity vs. Time

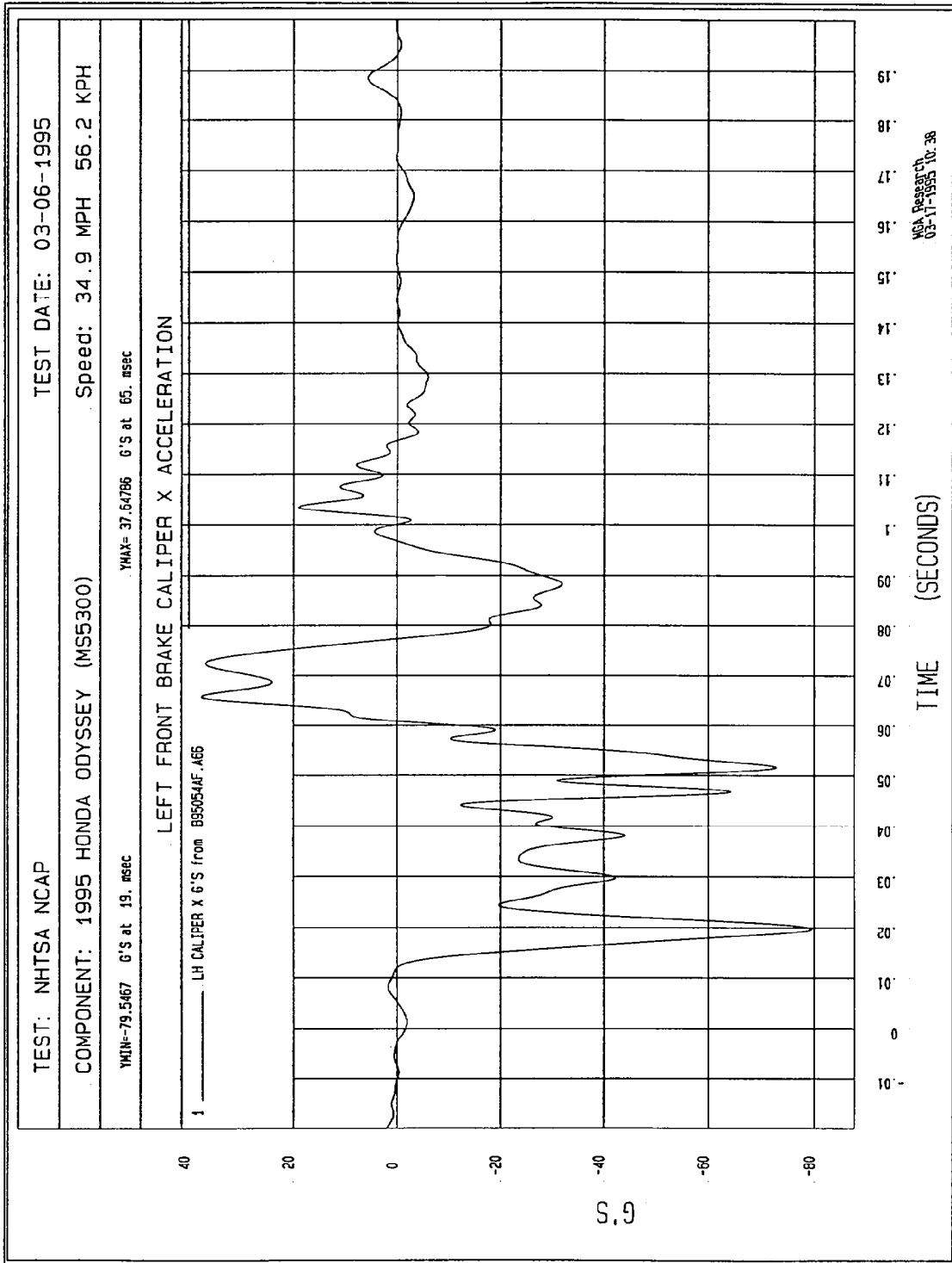


Figure B-19 - Left Brake Caliper X Acceleration vs. Time

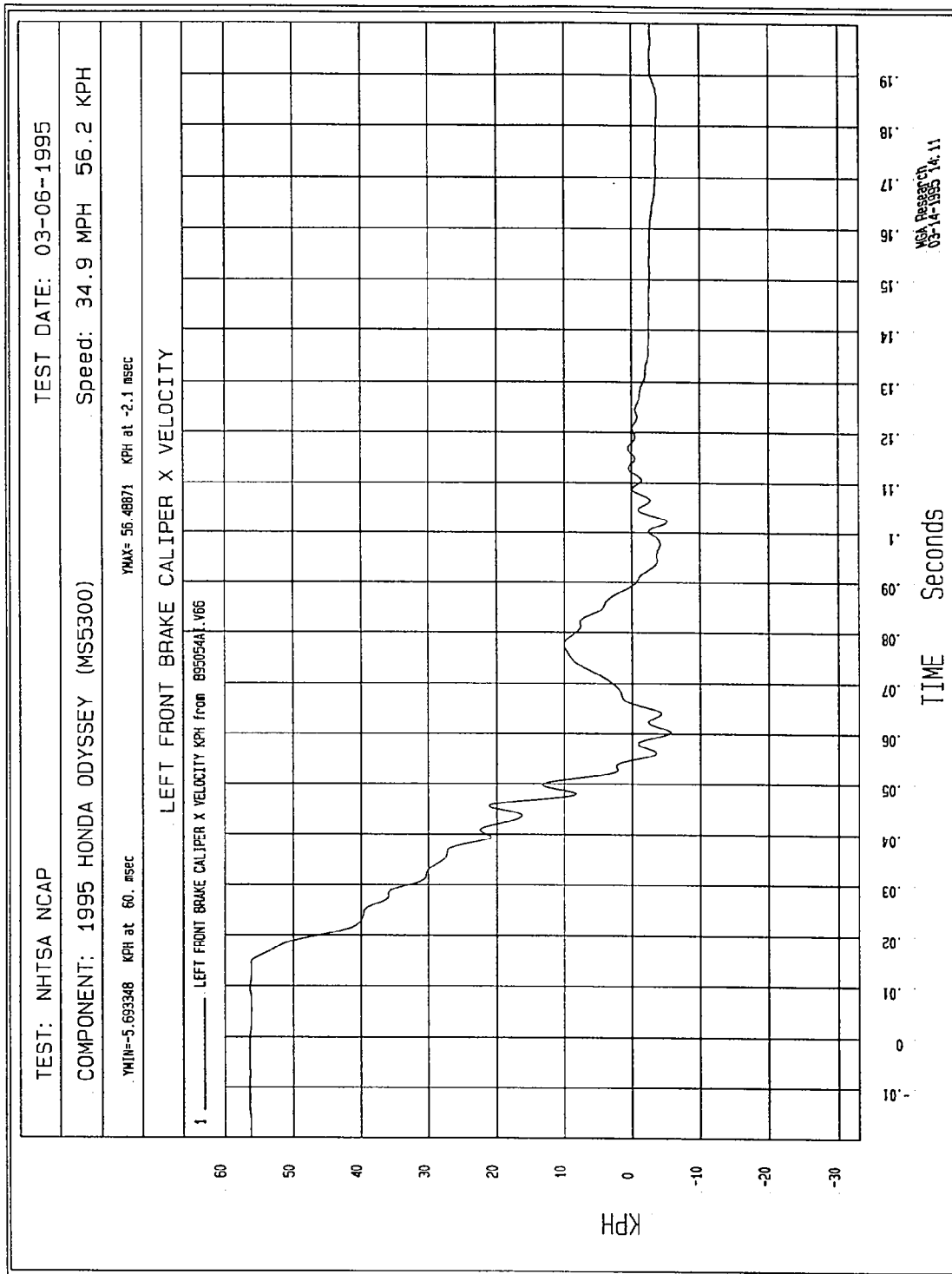


Figure B-20 - Left Brake Caliper X Velocity vs. Time

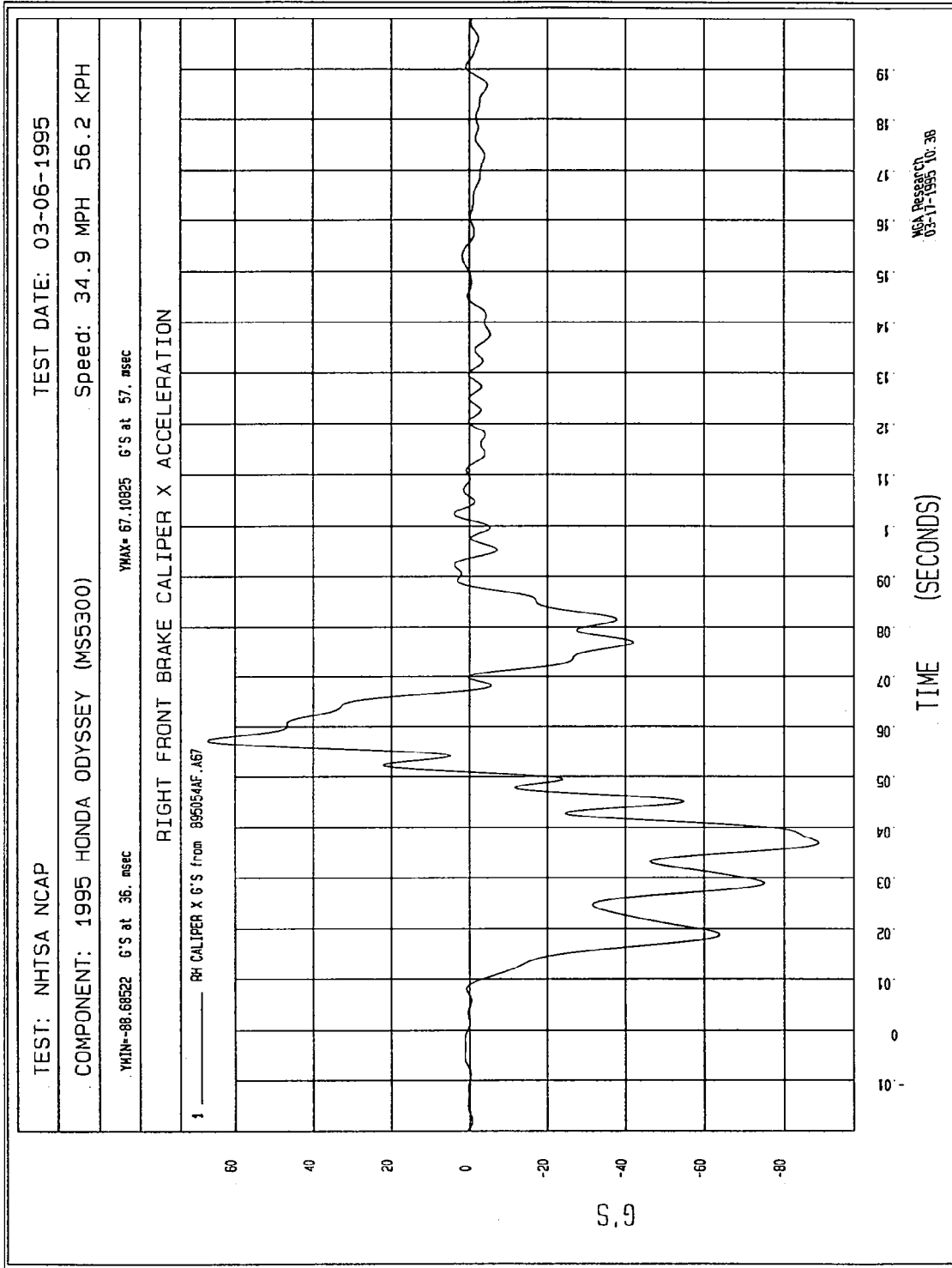


Figure B-21 - Right Brake Caliper X Acceleration vs. Time

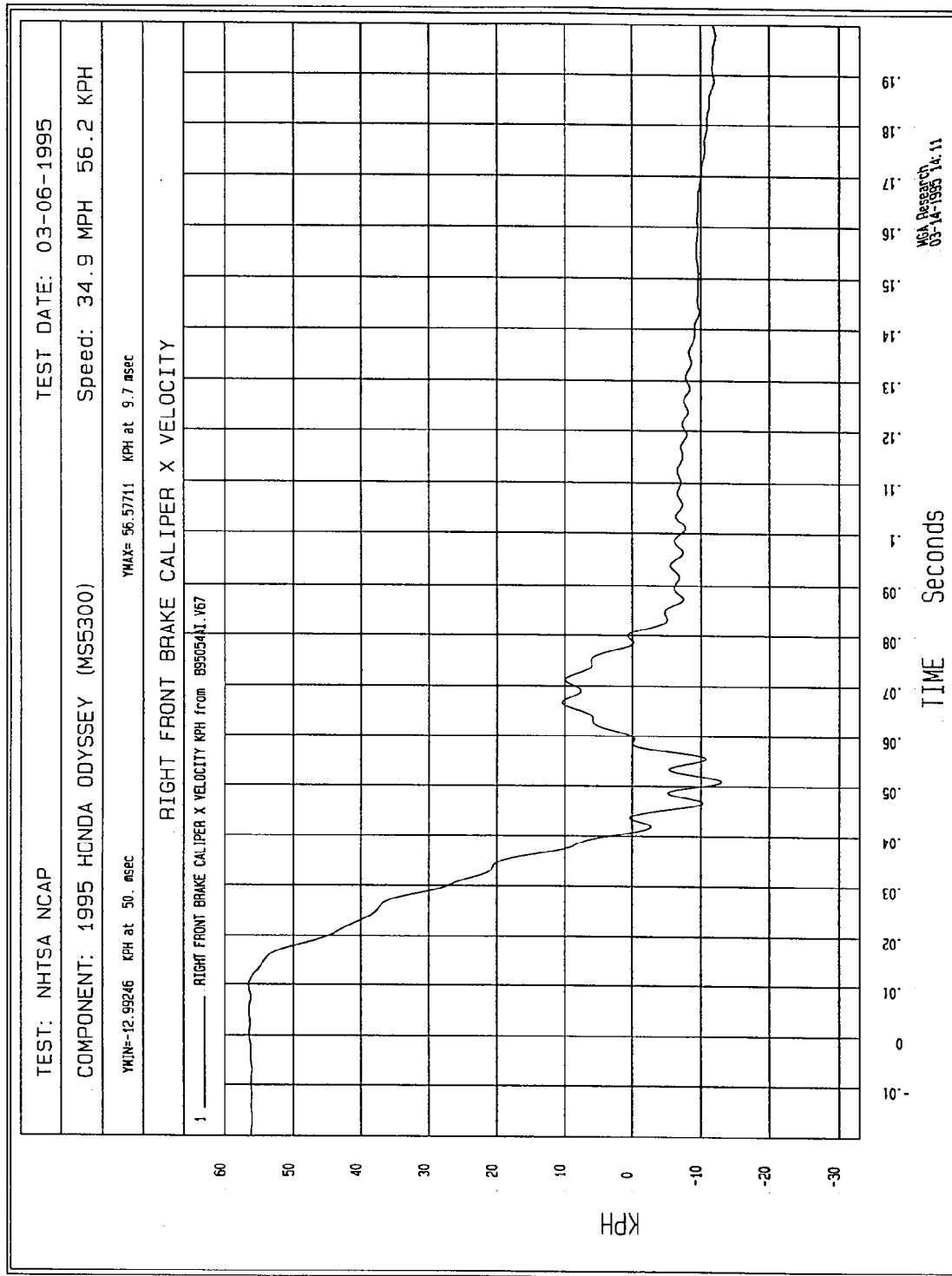


Figure B-22 - Right Brake Caliper X Velocity vs. Time

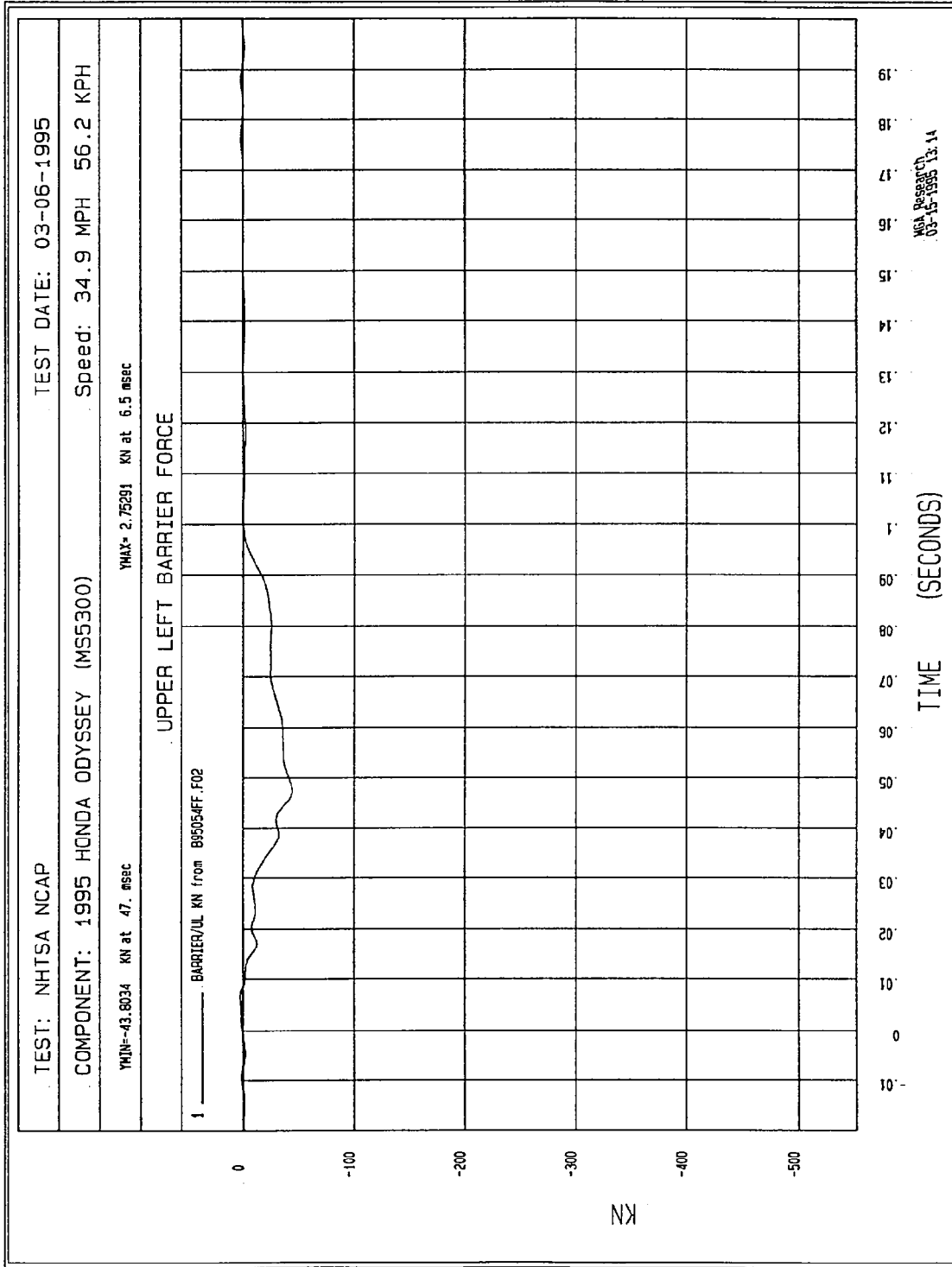


Figure B-23 - Upper Left Barrier Force vs. Time

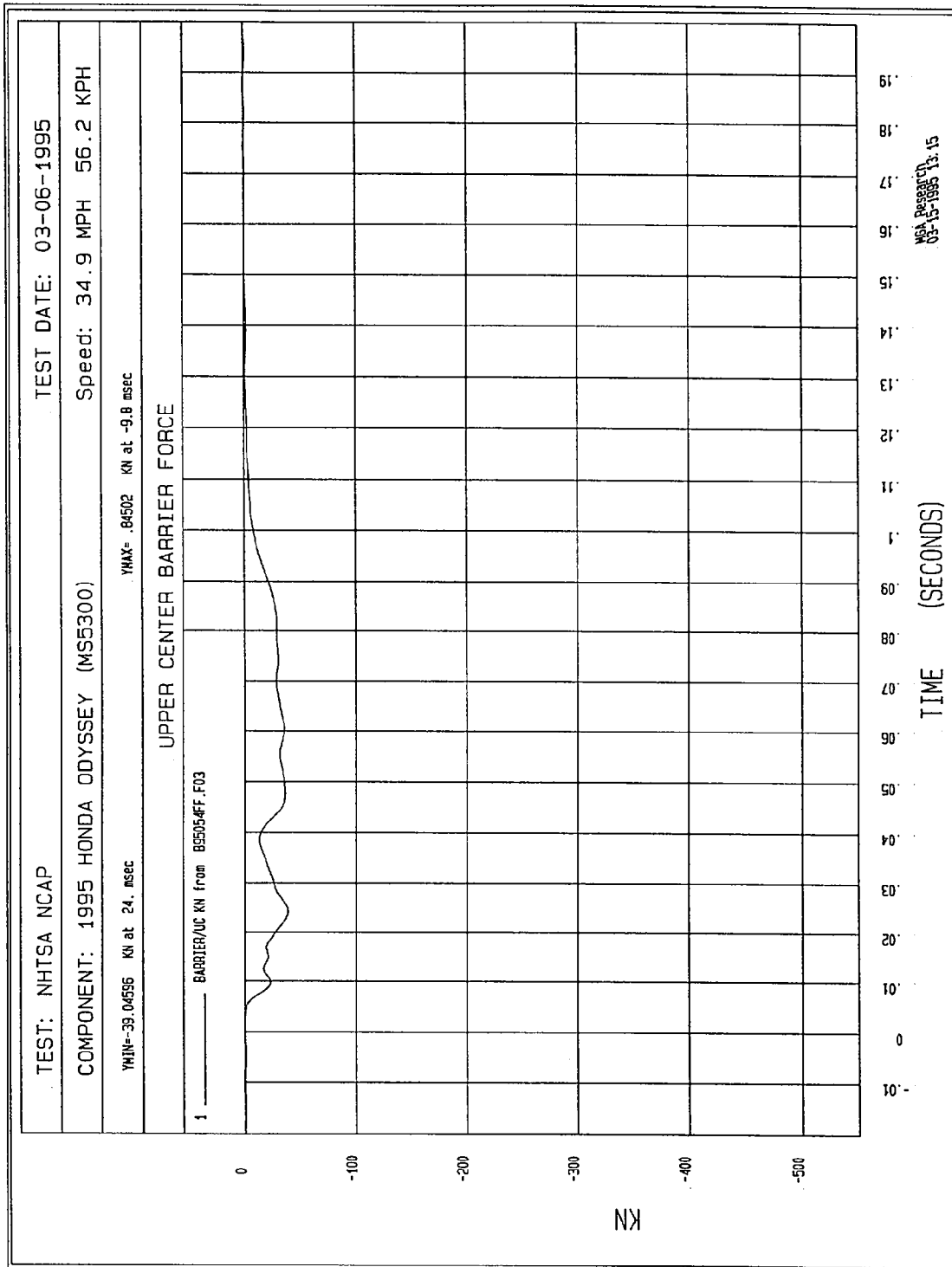


Figure B-24 - Upper Center Barrier Force vs. Time

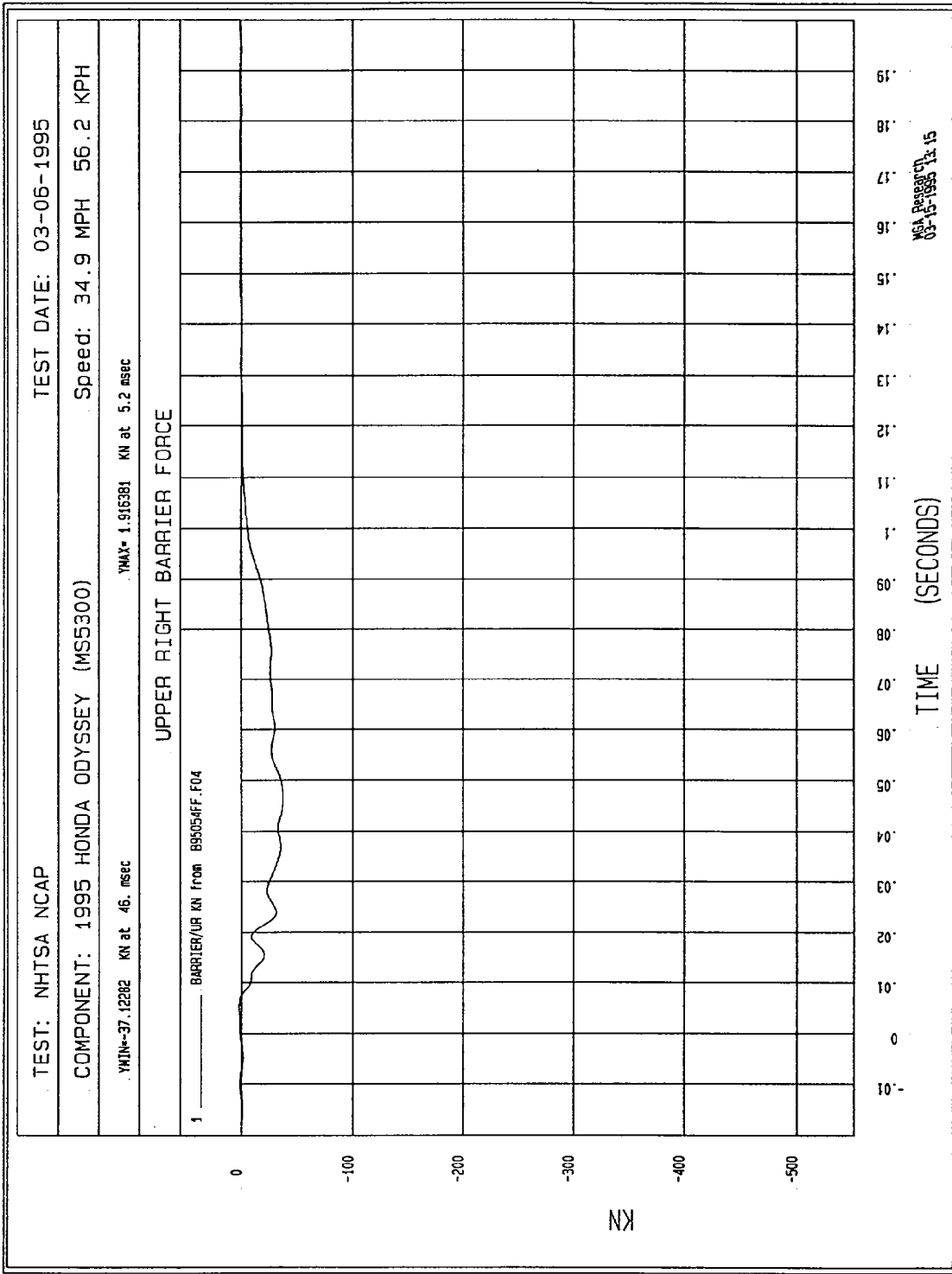


Figure B-25 - Upper Right Barrier Force vs. Time

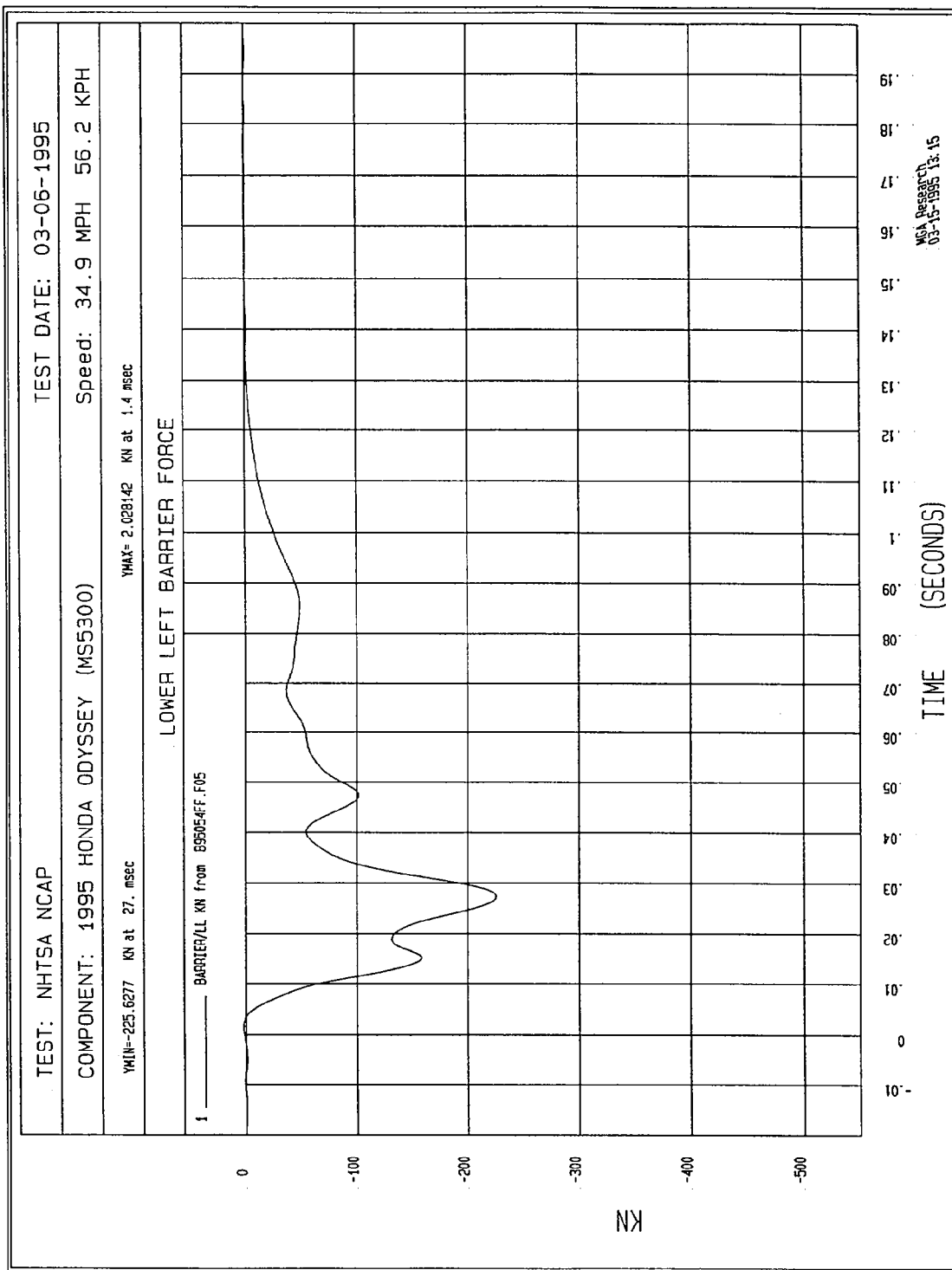


Figure B-26 - Lower Left Barrier Force vs. Time

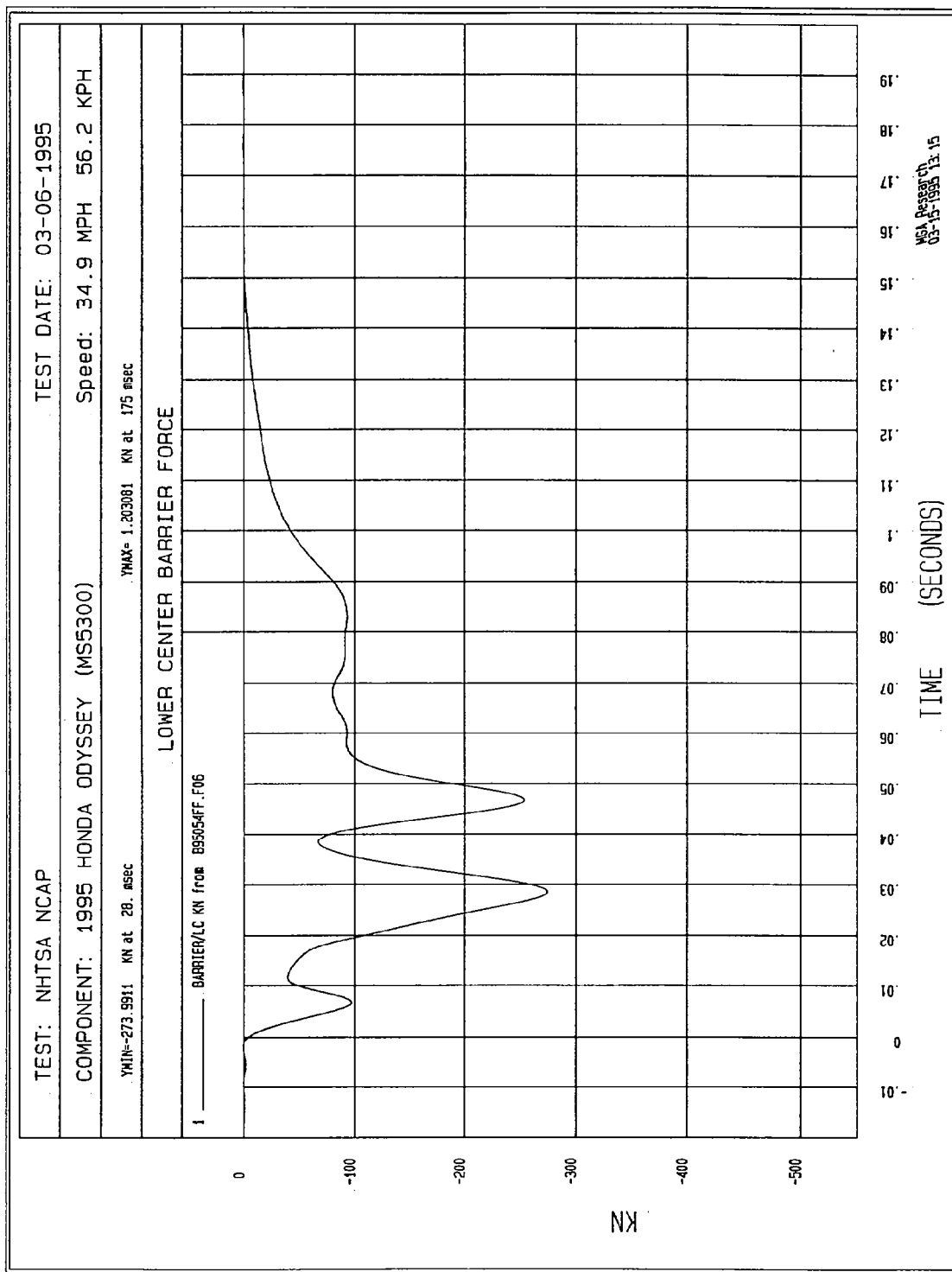


Figure B-27 - Lower Center Barrier Force vs. Time

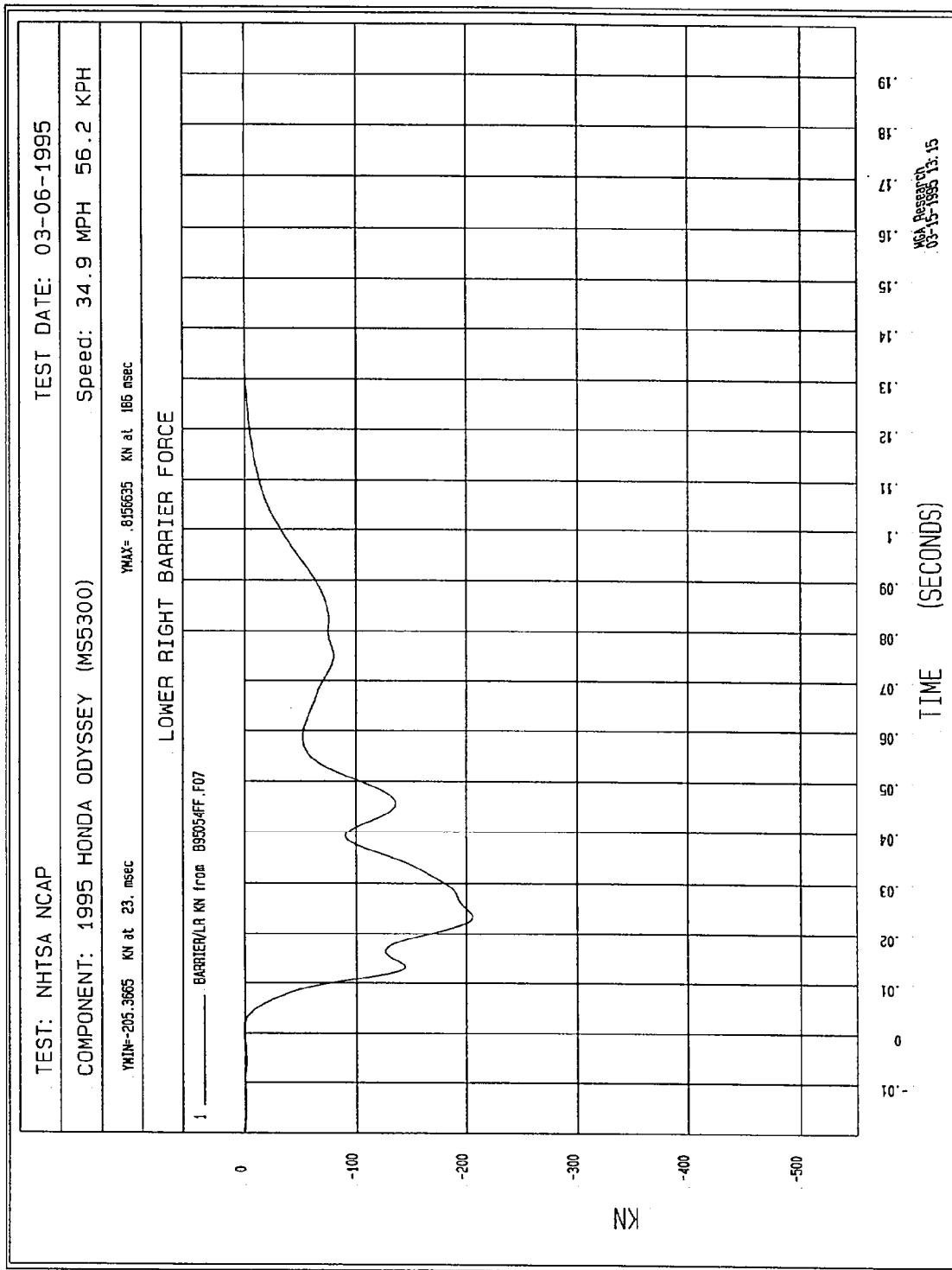


Figure B-28 - Lower Right Barrier Force vs. Time

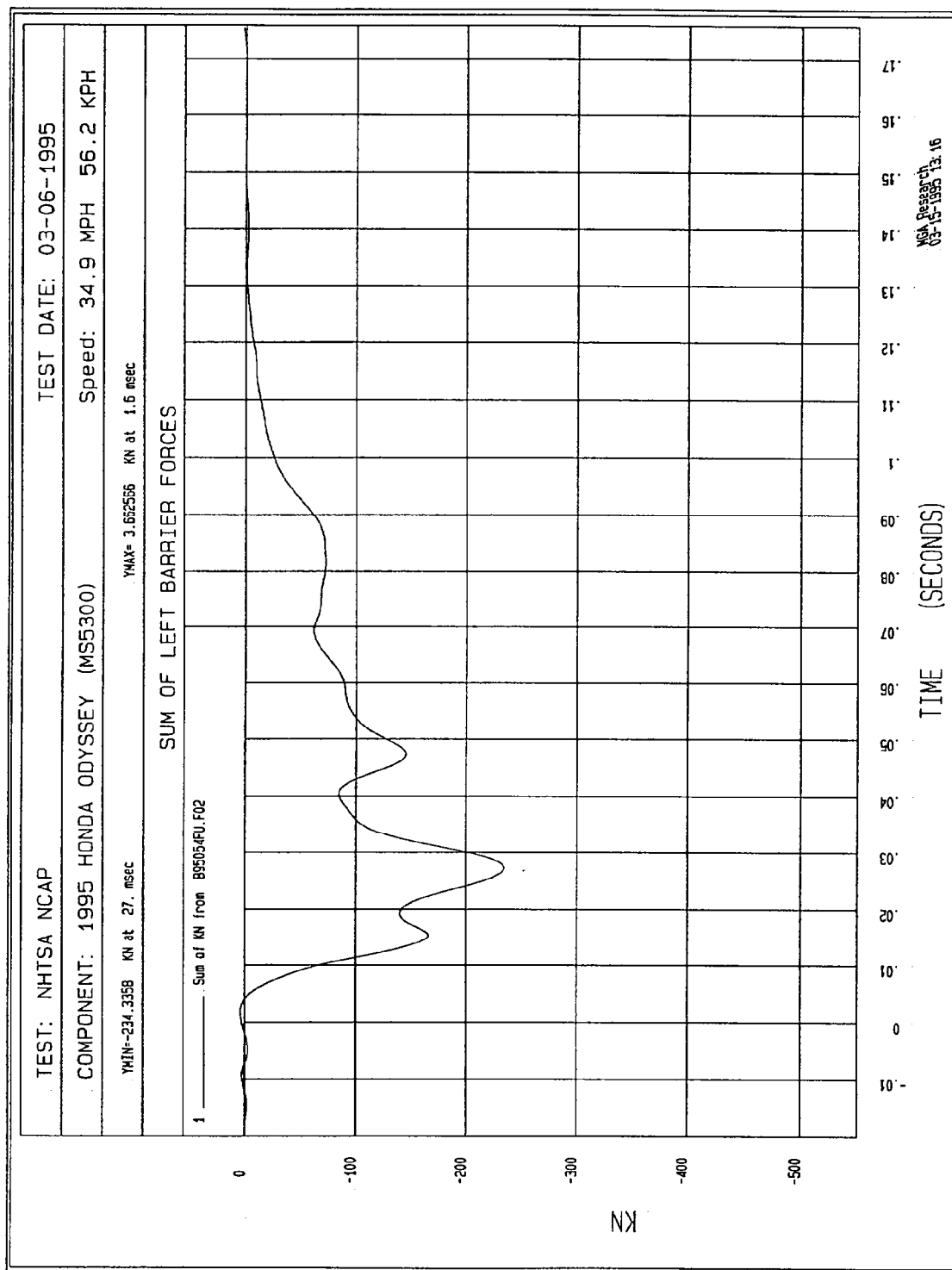


Figure B-29 - Sum of Left Barrier Forces vs. Time

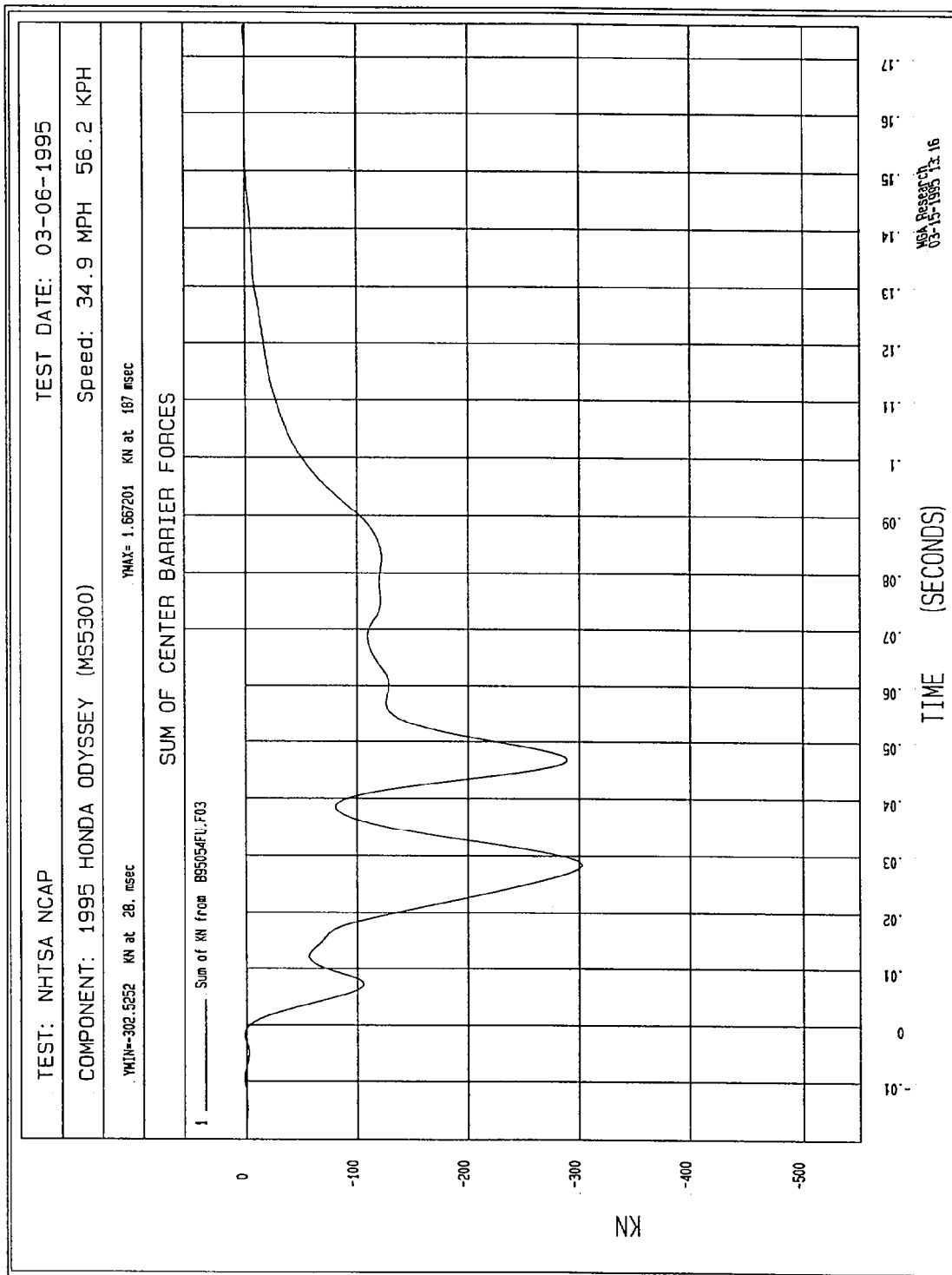


Figure B-30 - Sum of Center Barrier Forces vs. Time

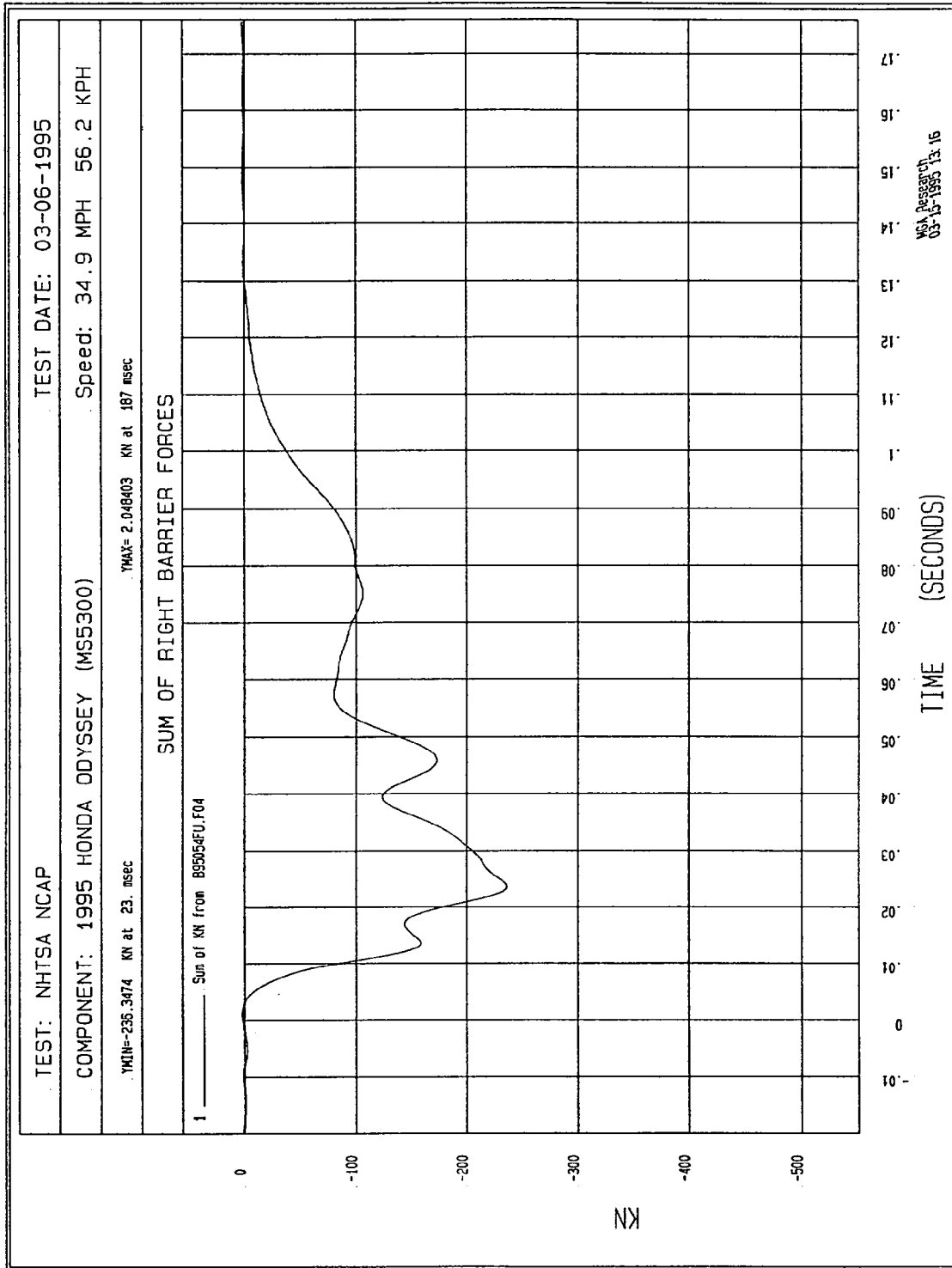


Figure B-31 - Sum of Right Barrier Forces vs. Time

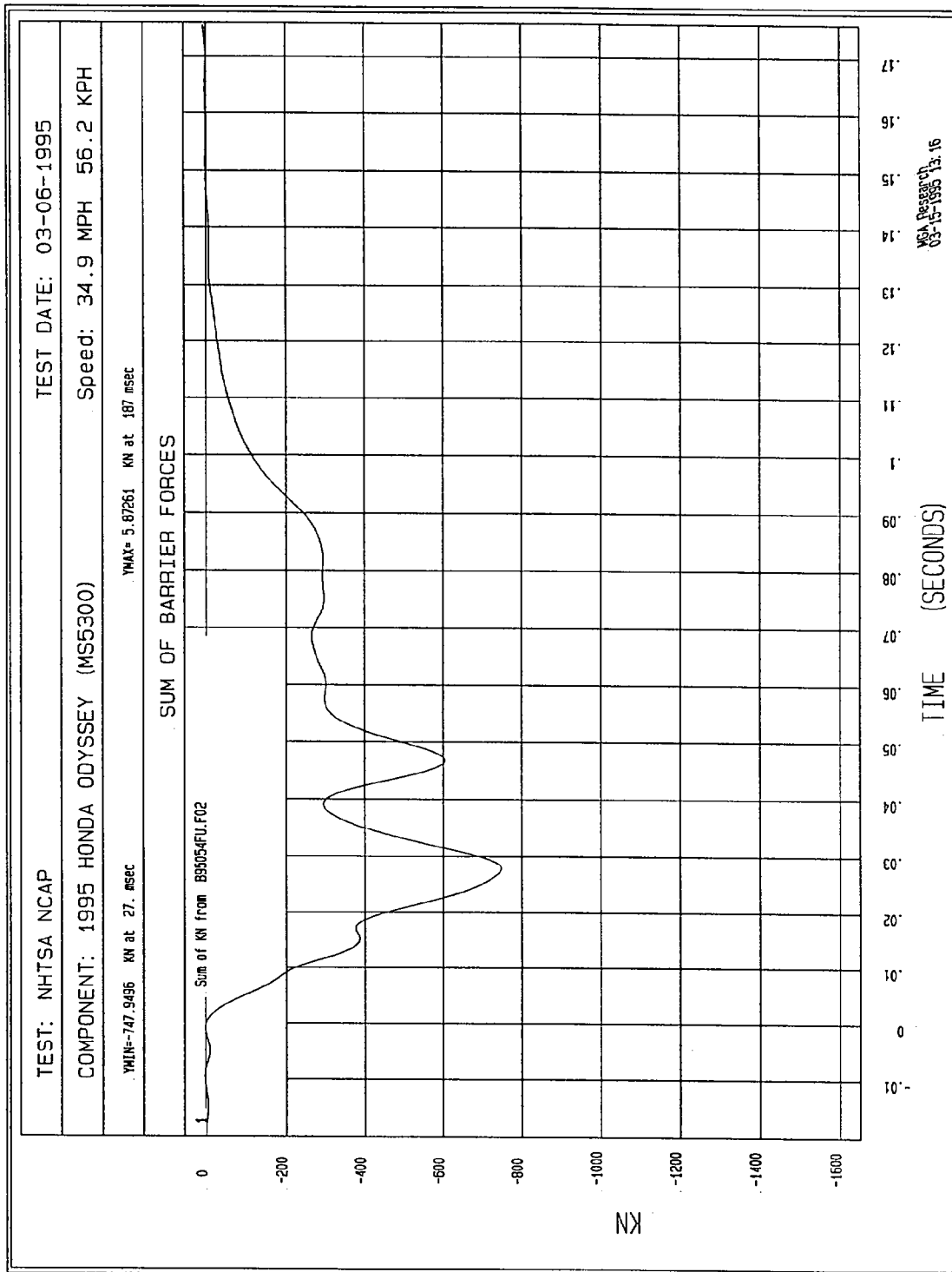


Figure B-32 - Sum of Barrier Forces vs. Time

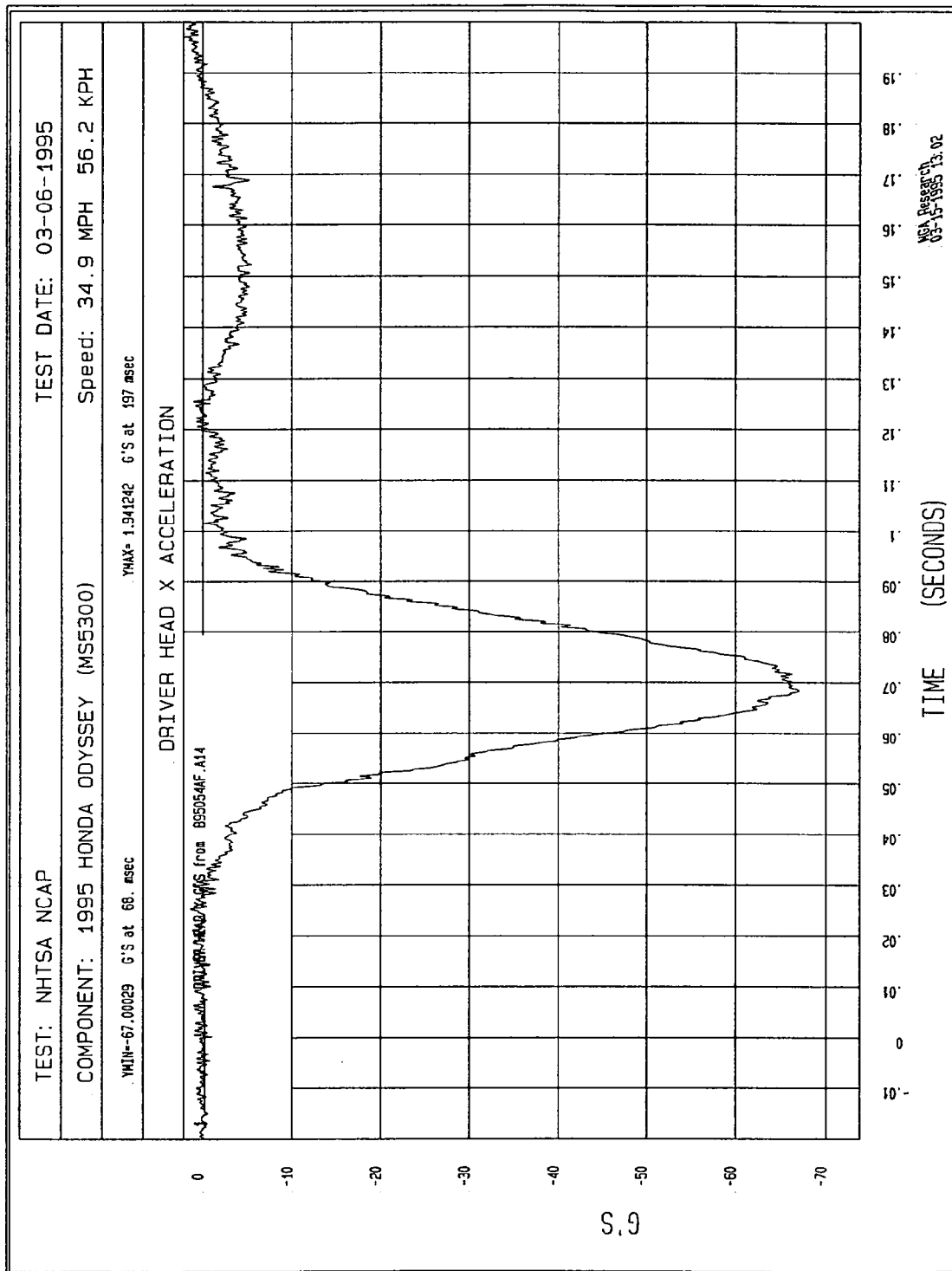


Figure B-33 - Driver Head X Acceleration vs. Time

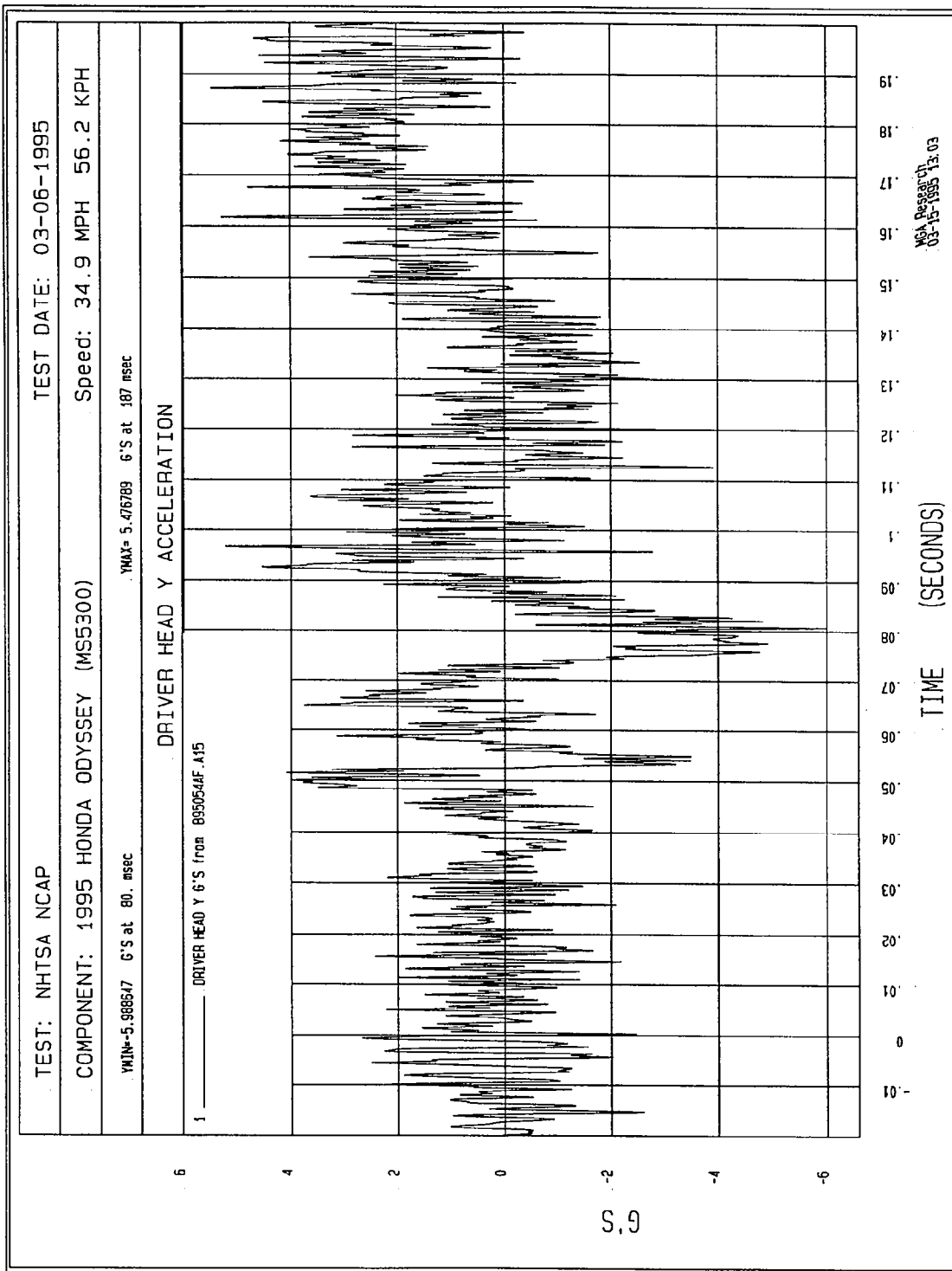


Figure B-34 - Driver Head Y Acceleration vs. Time

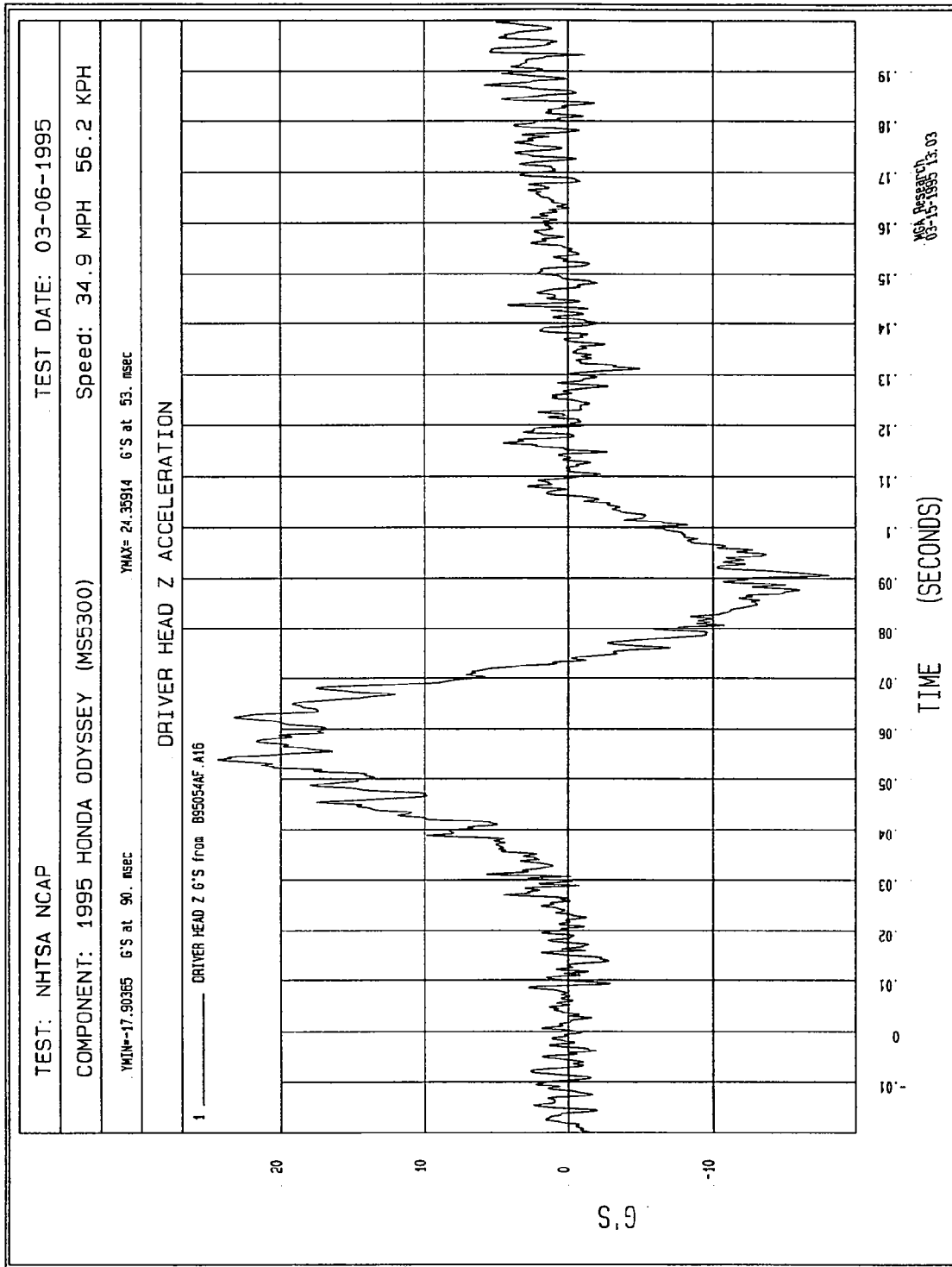


Figure B-35 - Driver Head Z Acceleration vs. Time

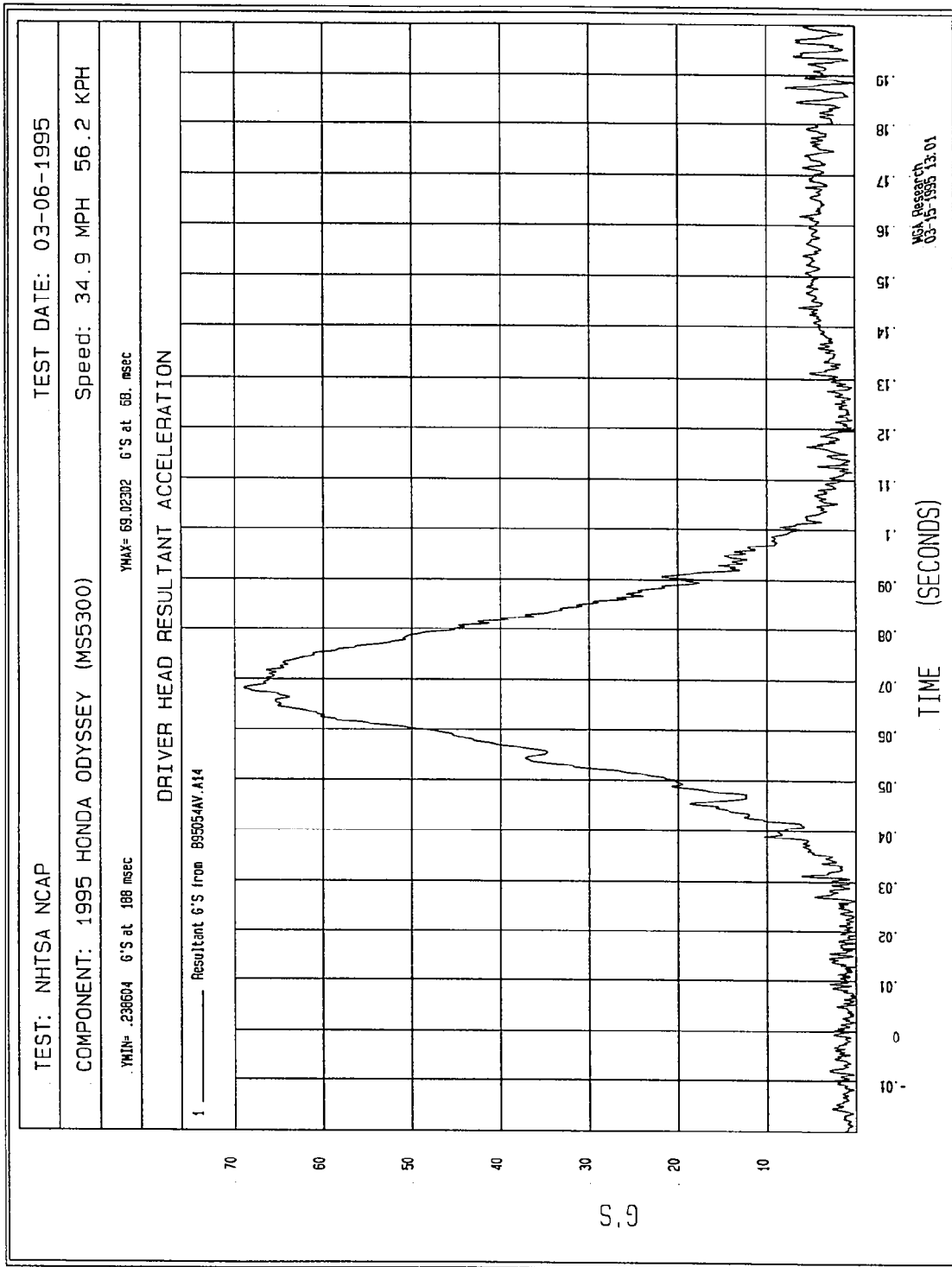


Figure B-36 - Driver Head Resultant Acceleration vs. Time

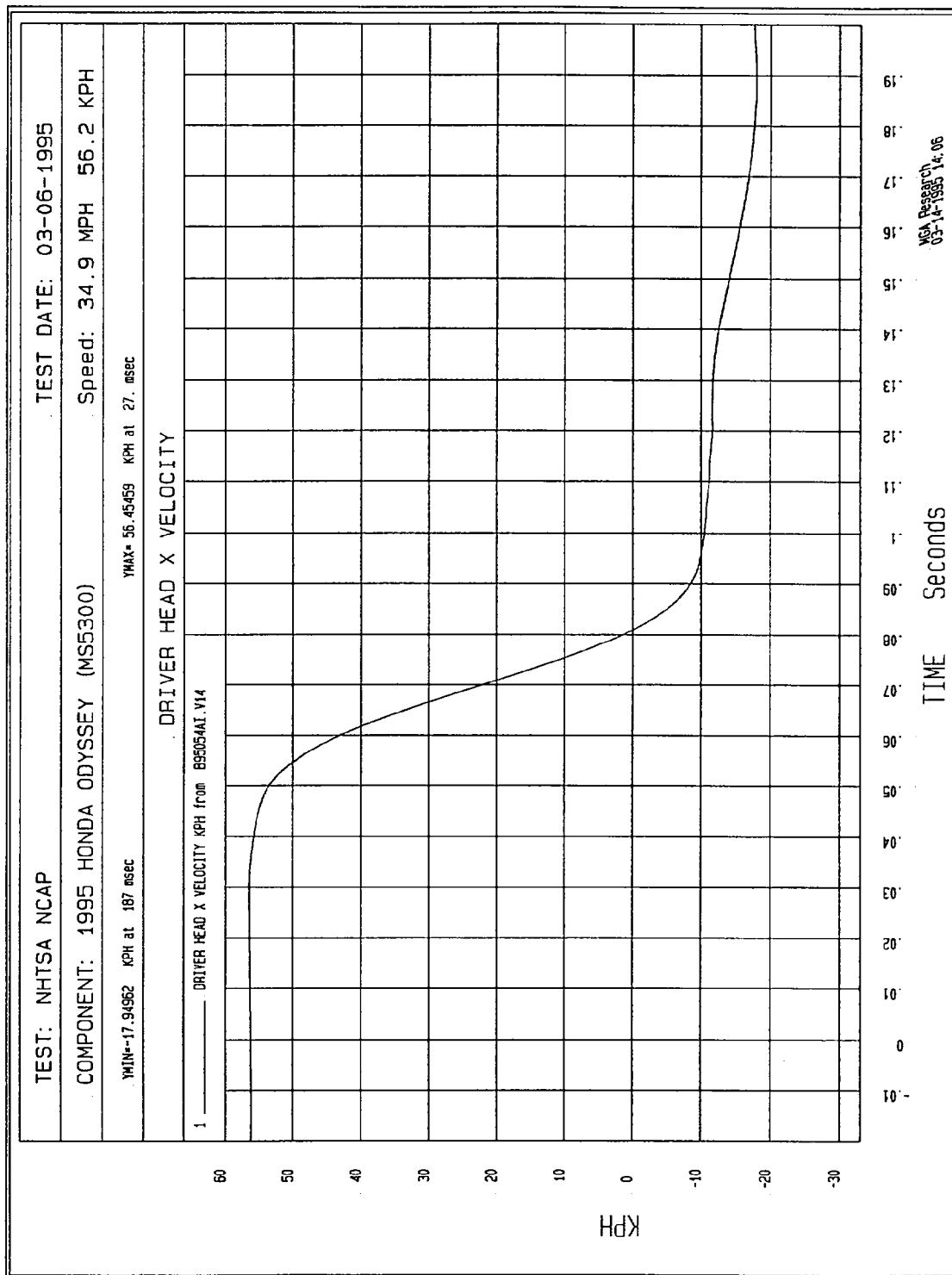


Figure B-37 - Driver Head X Velocity vs. Time

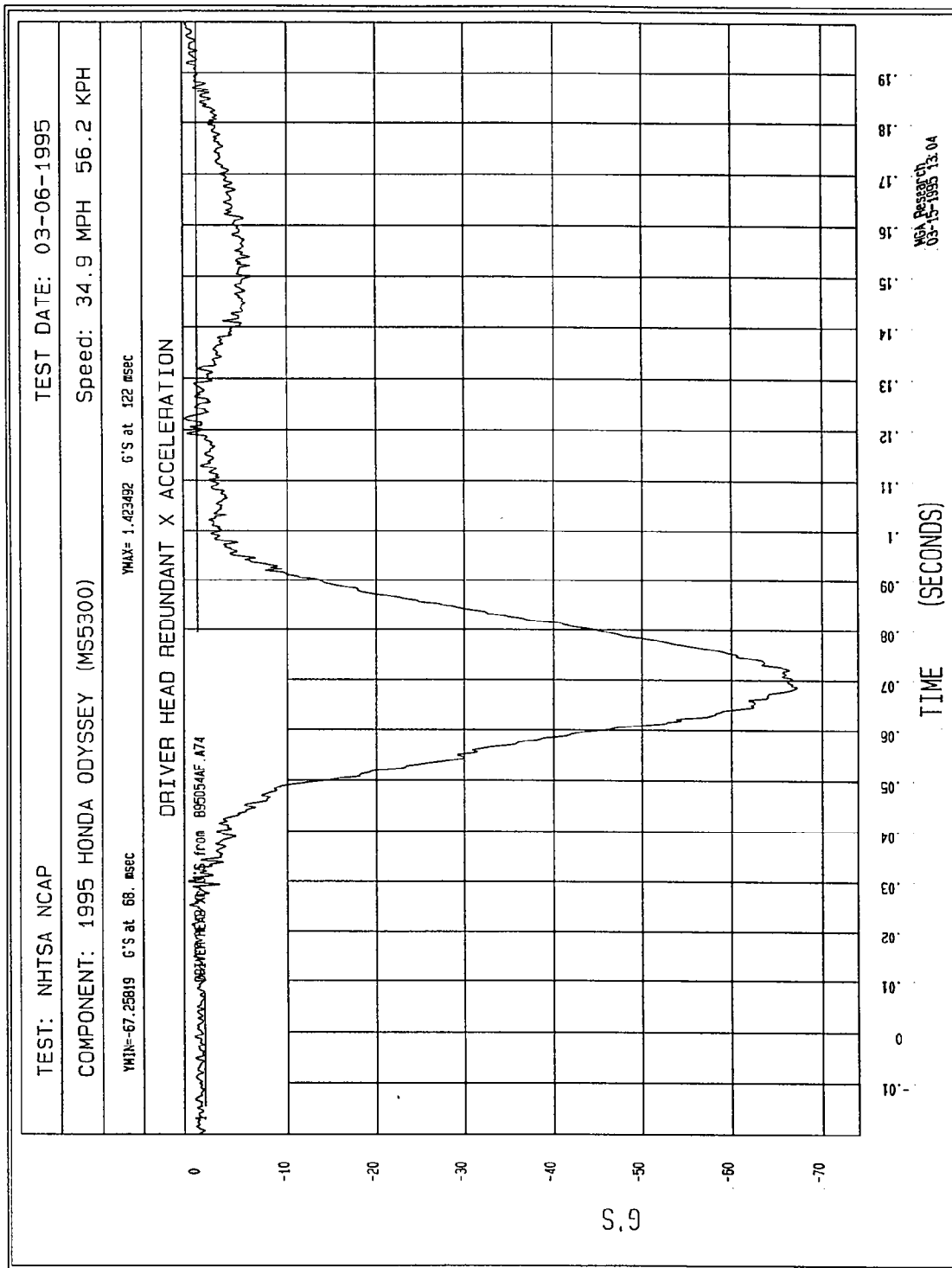


Figure B-38 - Driver Head X Redundant Acceleration vs. Time

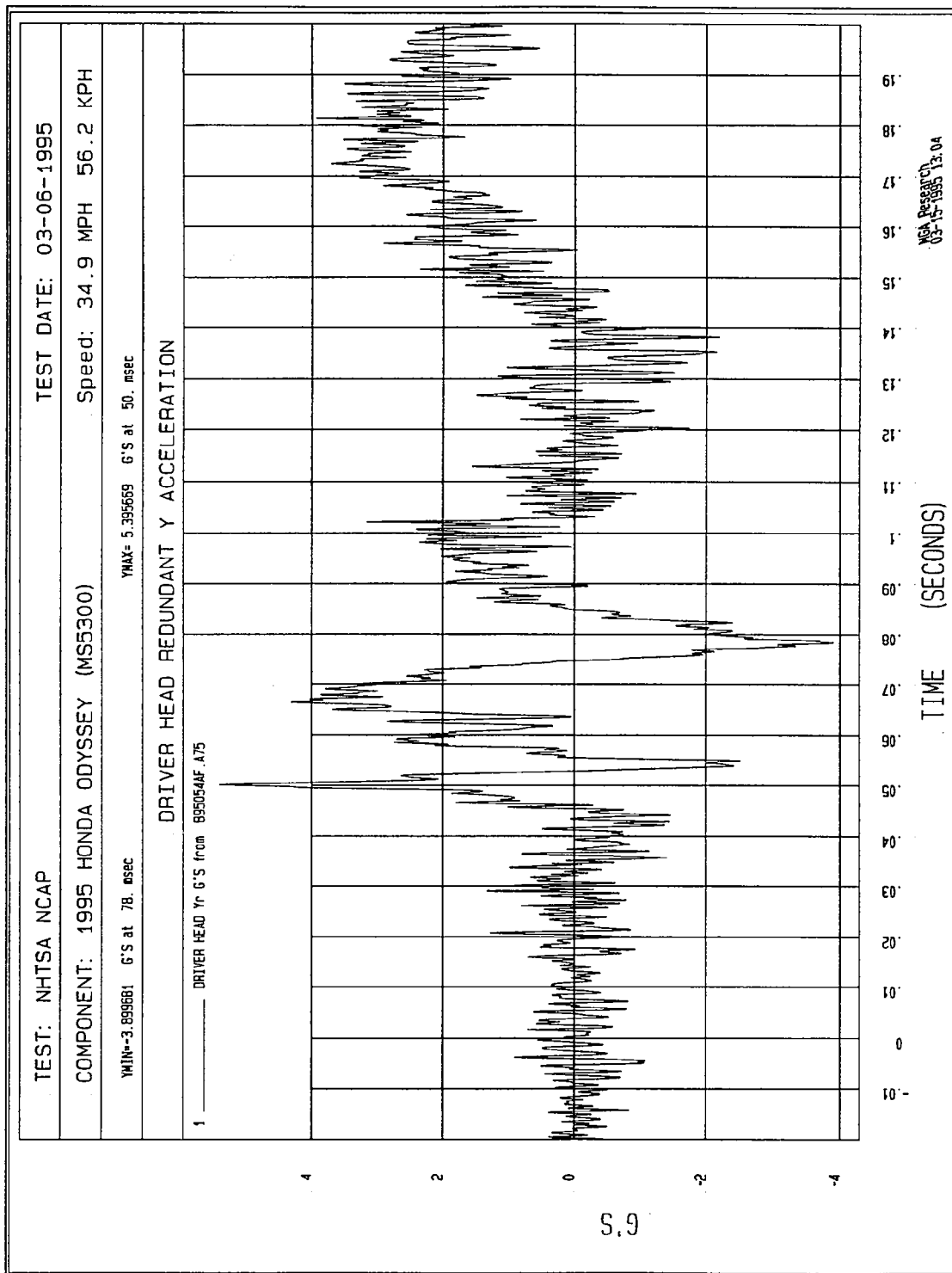


Figure B-39 - Driver Head Y Redundant Acceleration vs. Time

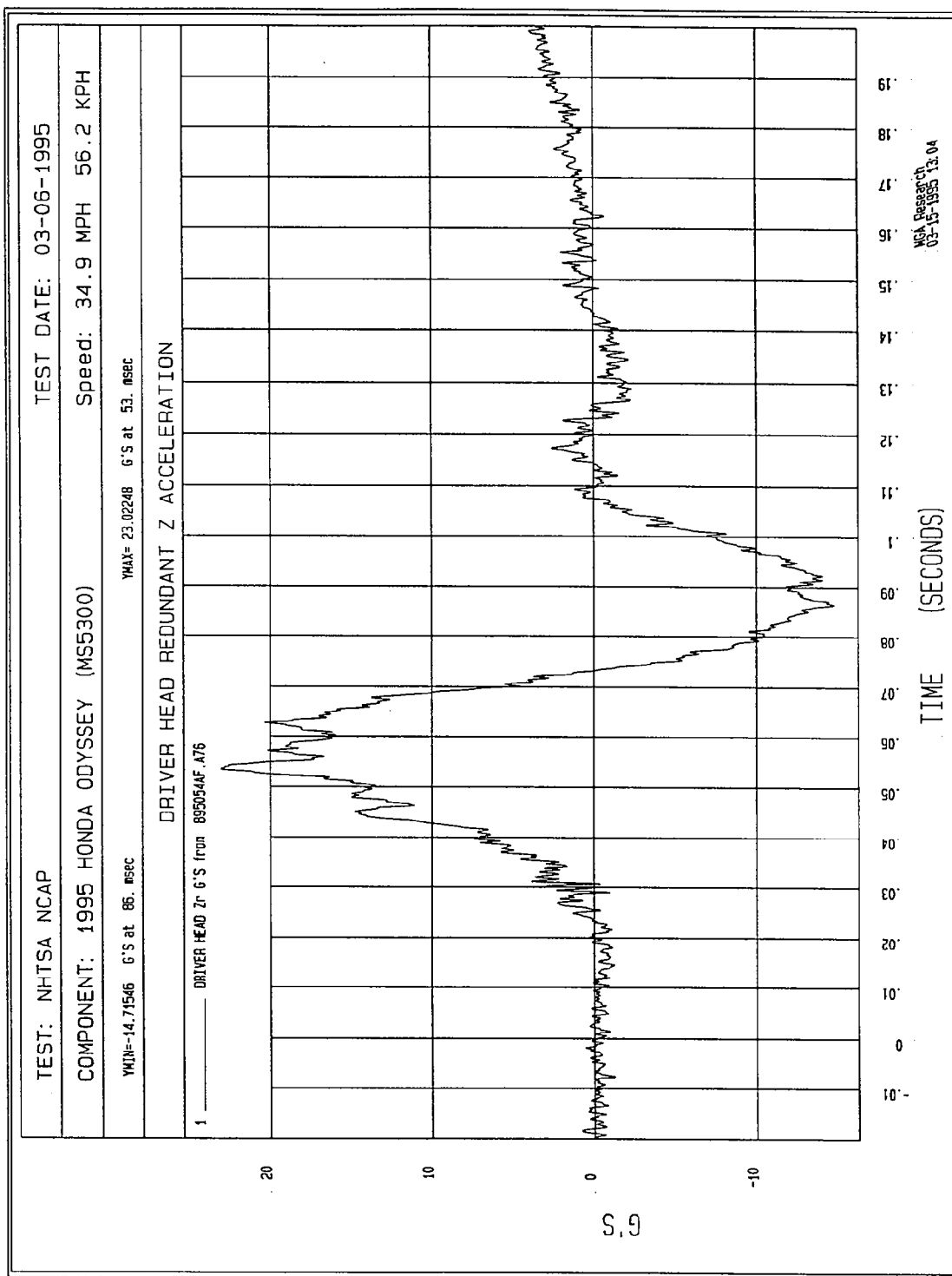


Figure B-40 - Driver Head Z Redundant Acceleration vs. Time

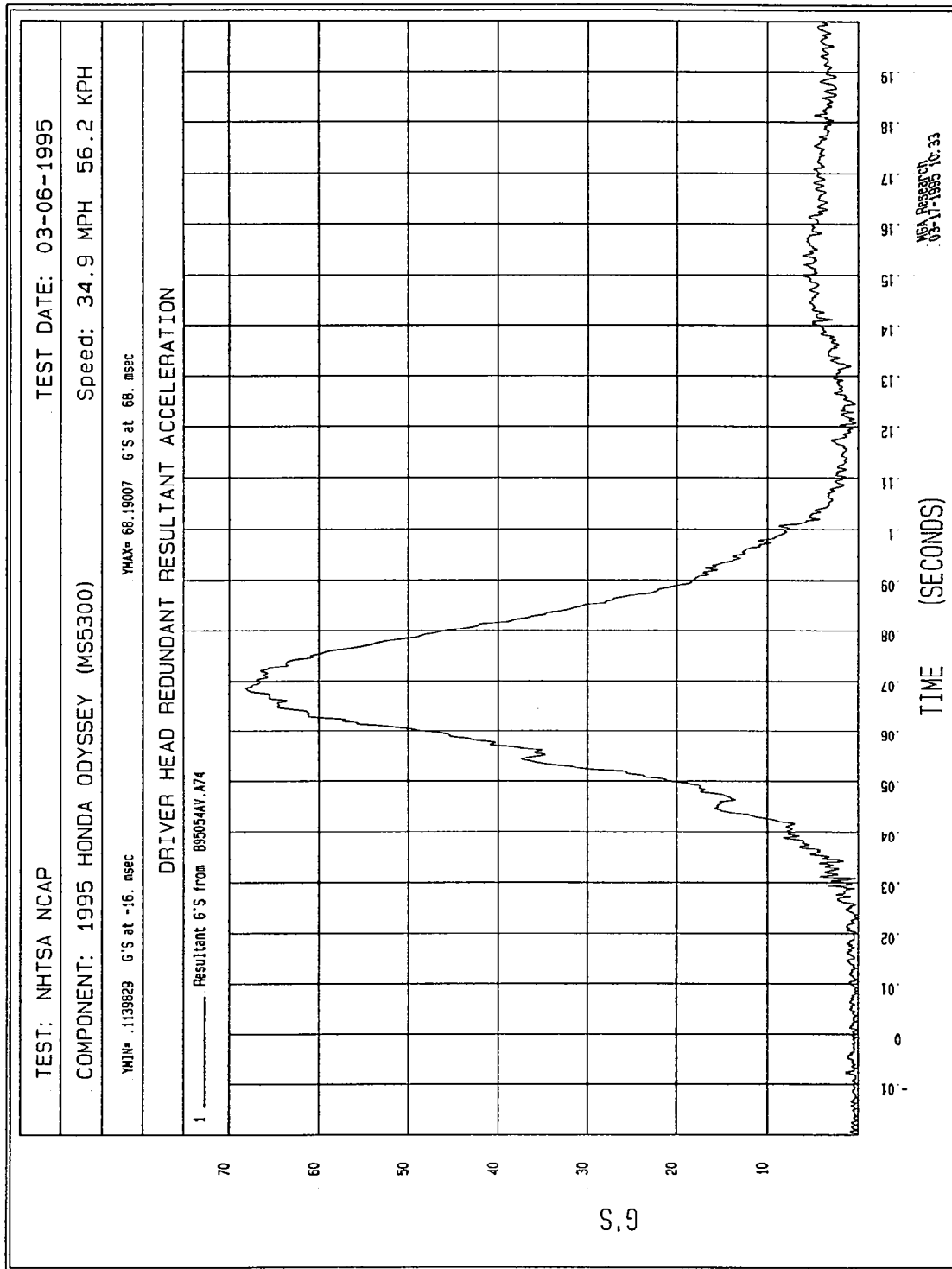


Figure B-41 - Driver Head Redundant Resultant Accel. vs. Time

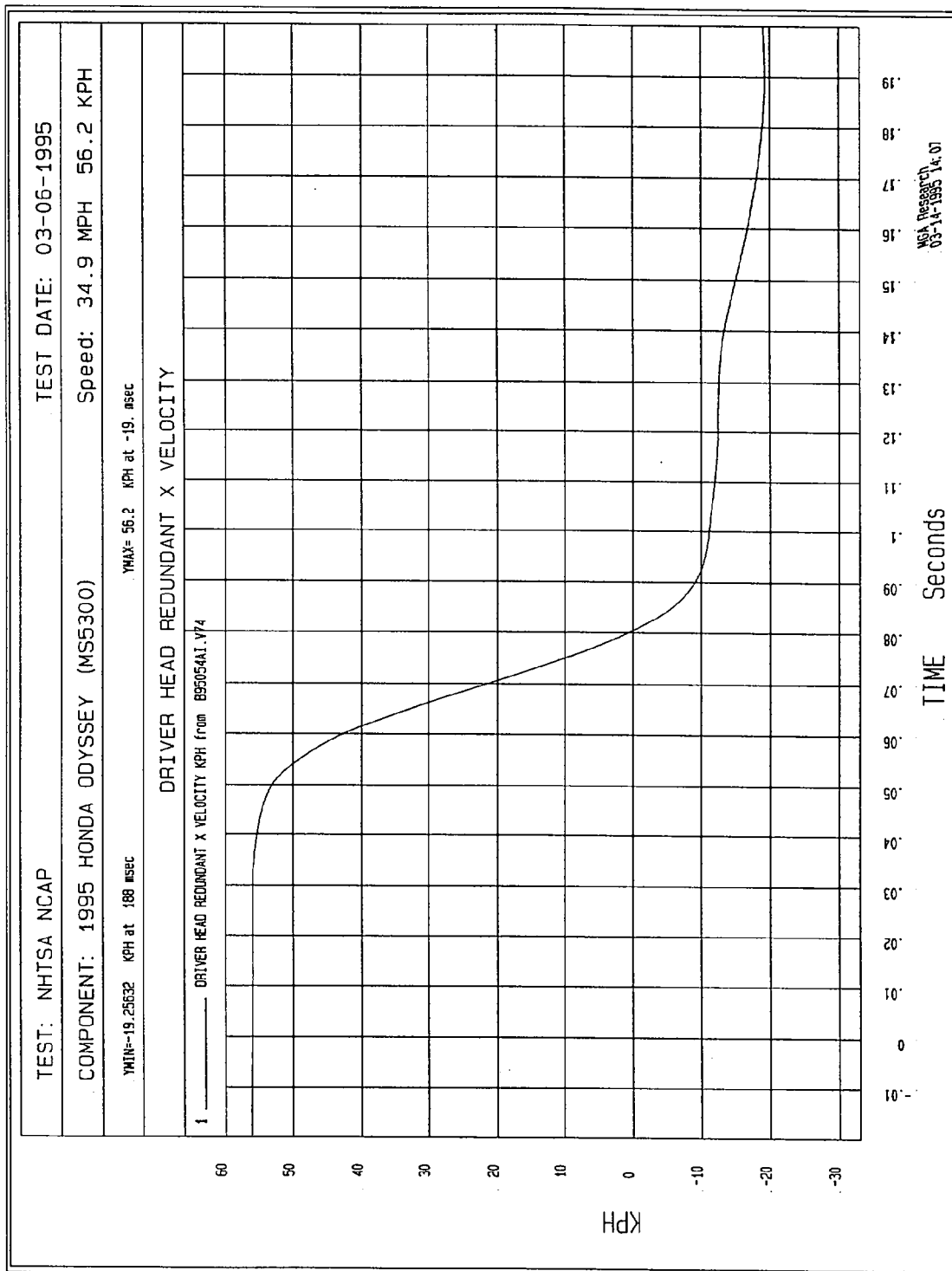


Figure B-42 - Driver Head X Redundant Velocity vs. Time

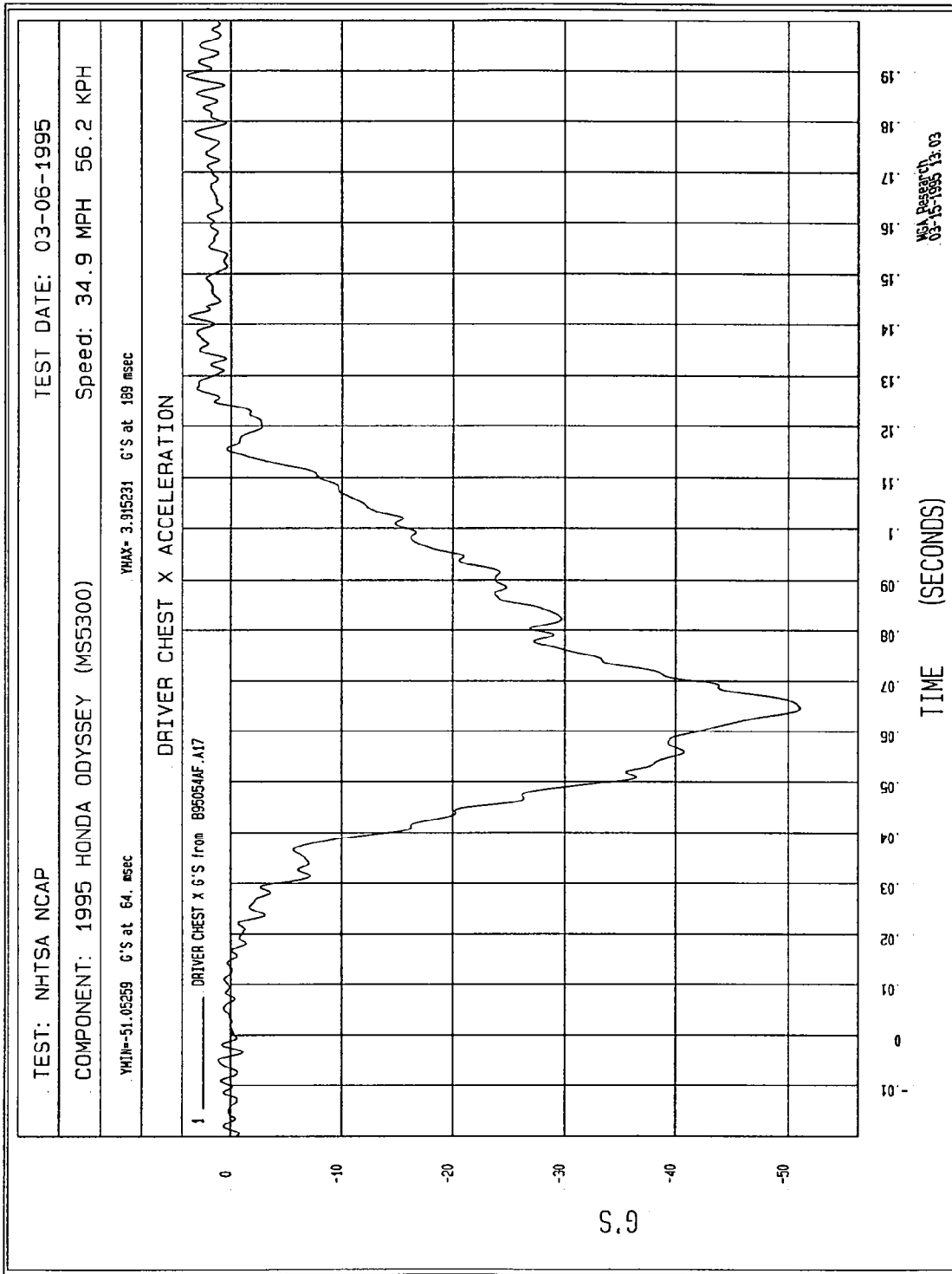


Figure B-43 - Driver Chest X Acceleration vs. Time

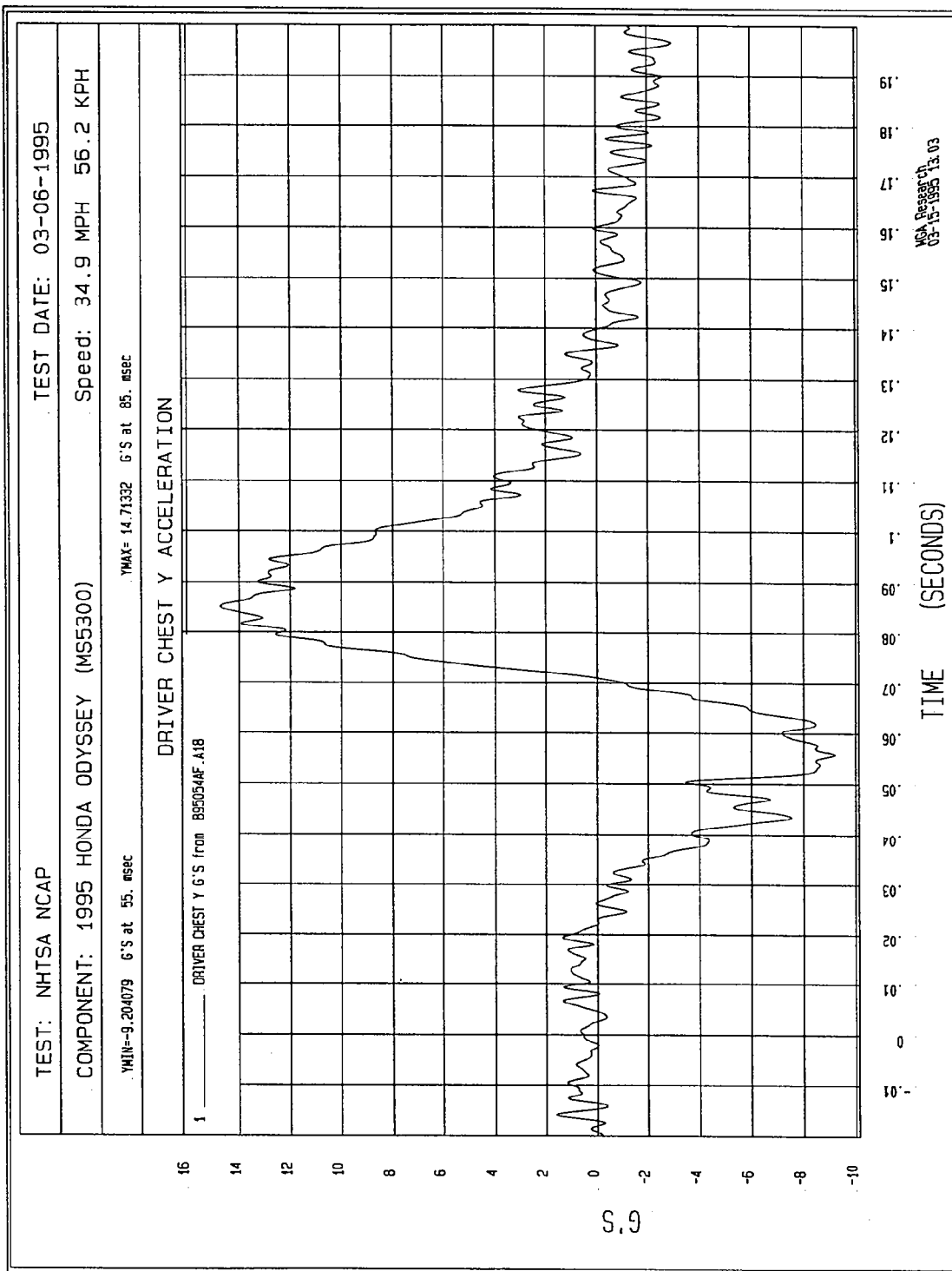
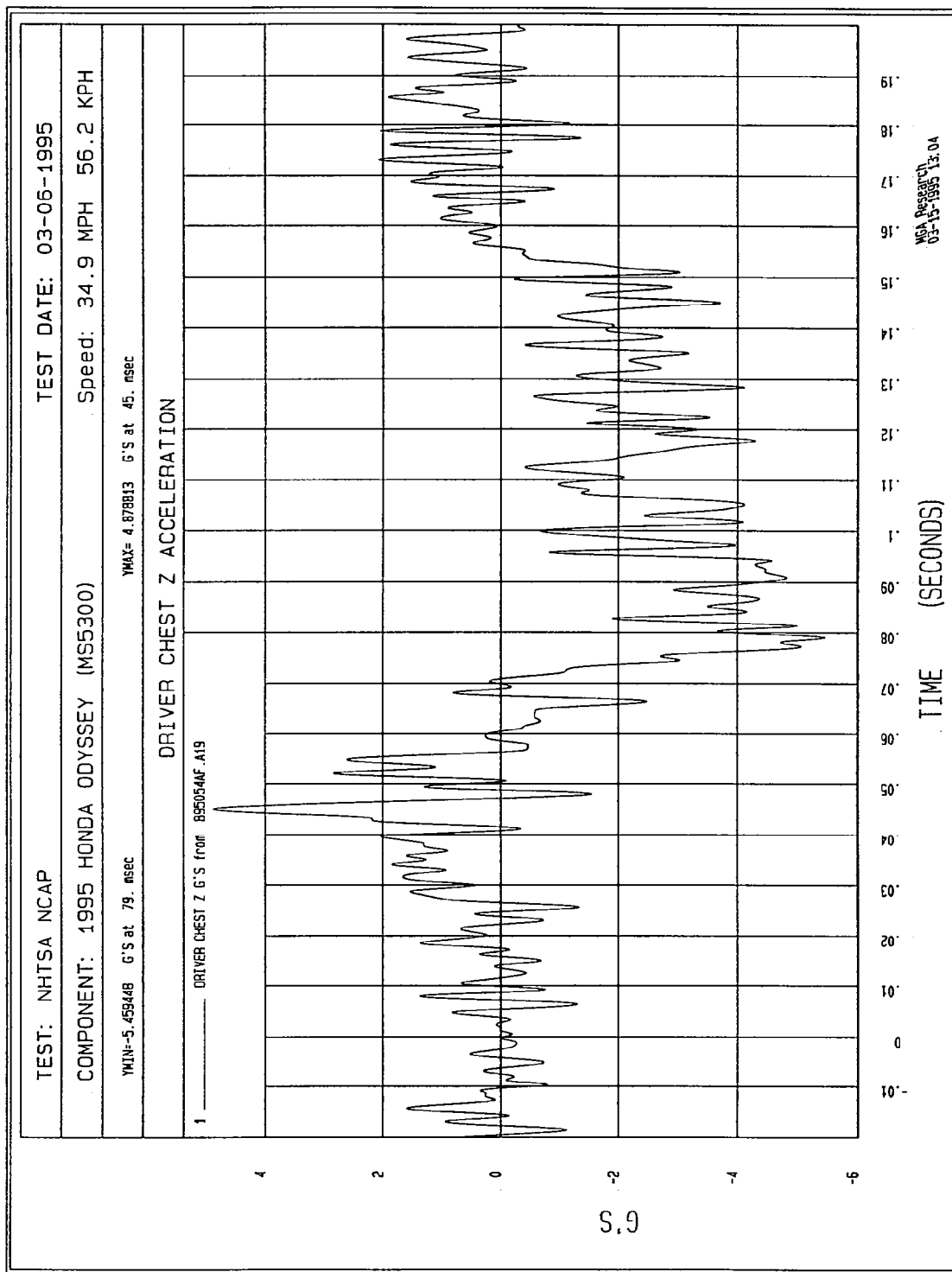


Figure B-44 - Driver Chest Y Acceleration vs. Time



B-45

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

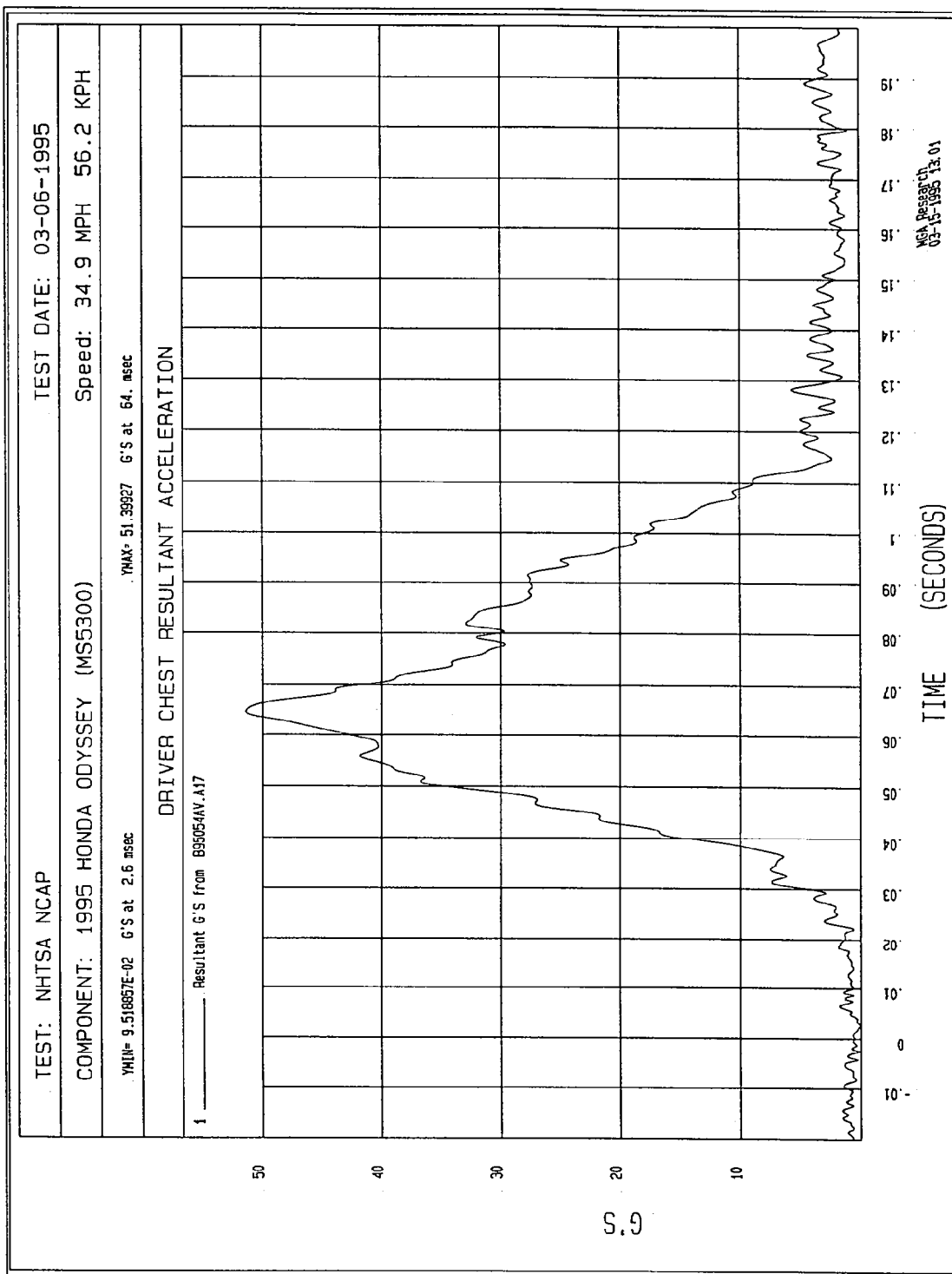


Figure B-46 - Driver Chest Resultant Accel. vs. Time

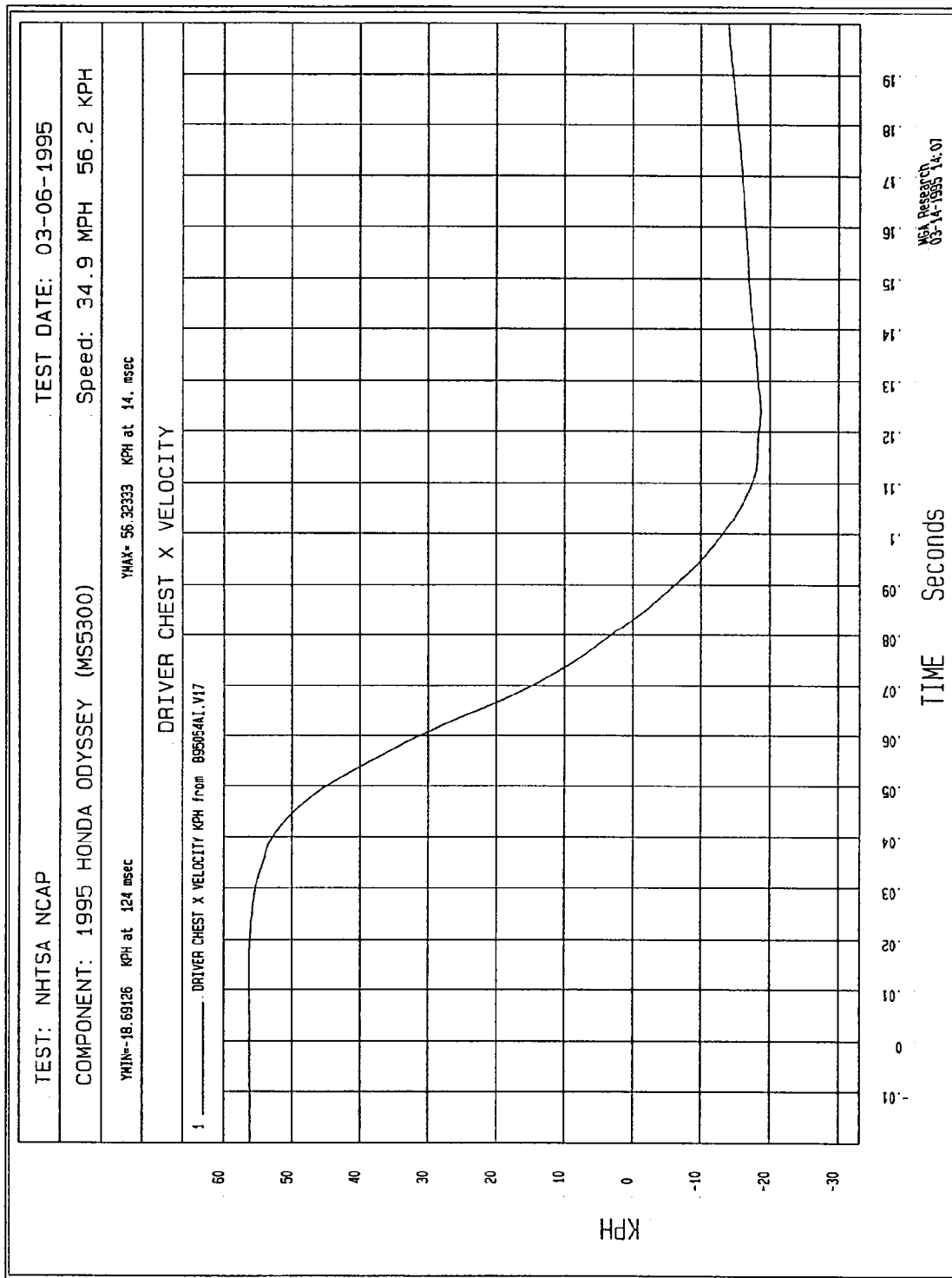


Figure B-47 - Driver Chest X Velocity vs. Time

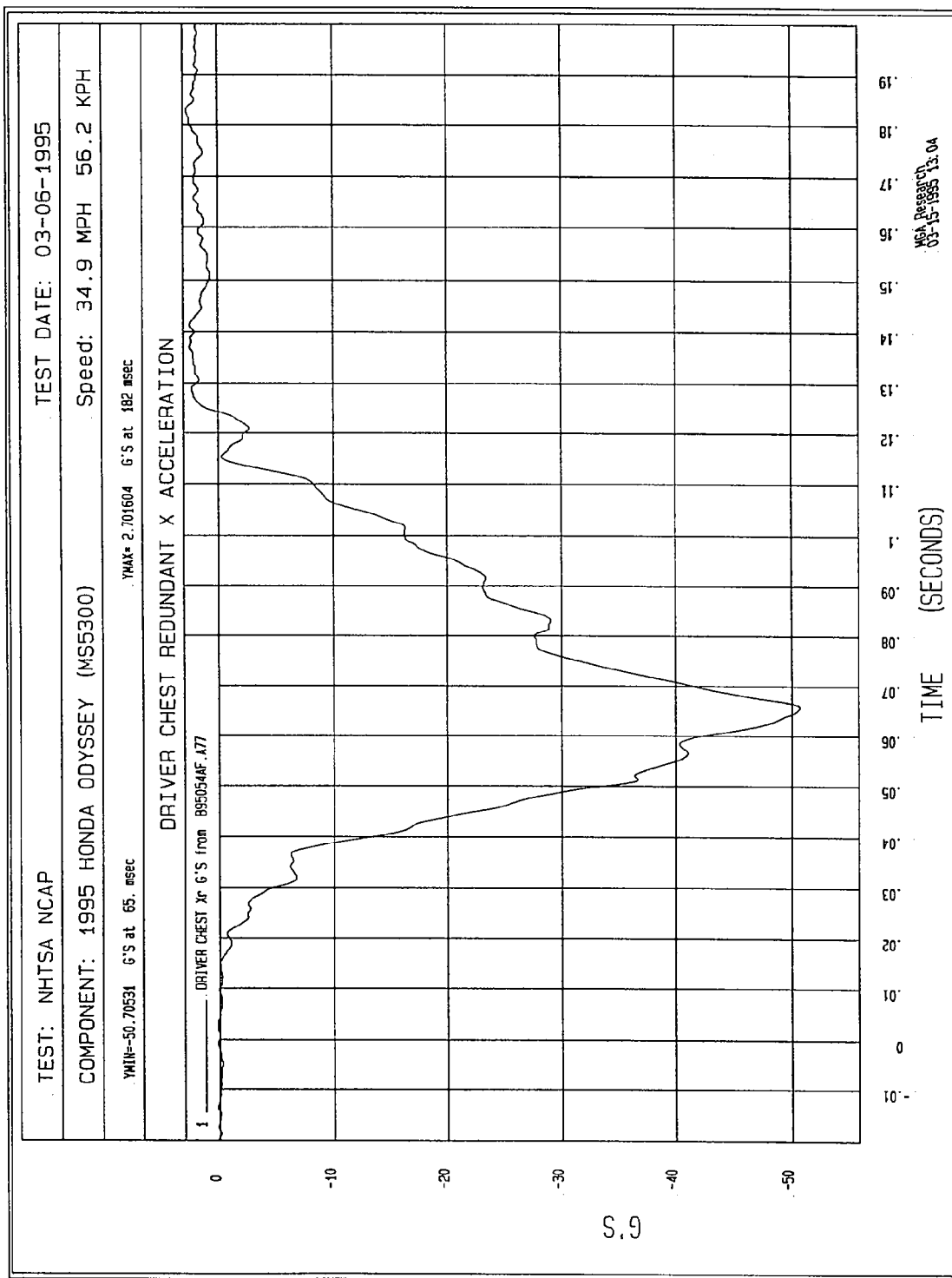


Figure B-48 - Driver Chest X Redundant Acceleration vs. Time

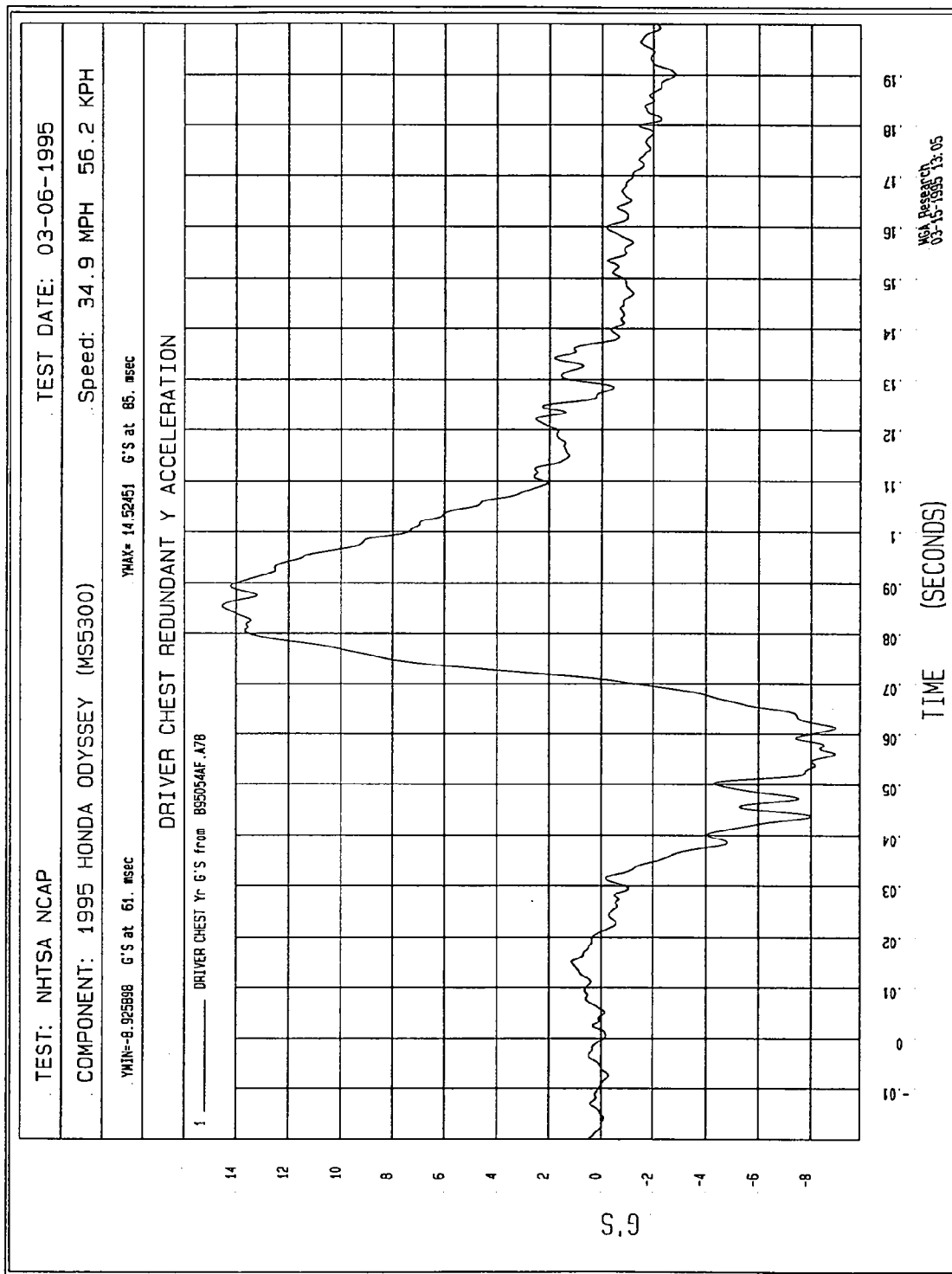


Figure B-49 - Driver Chest Y Redundant Acceleration vs. Time

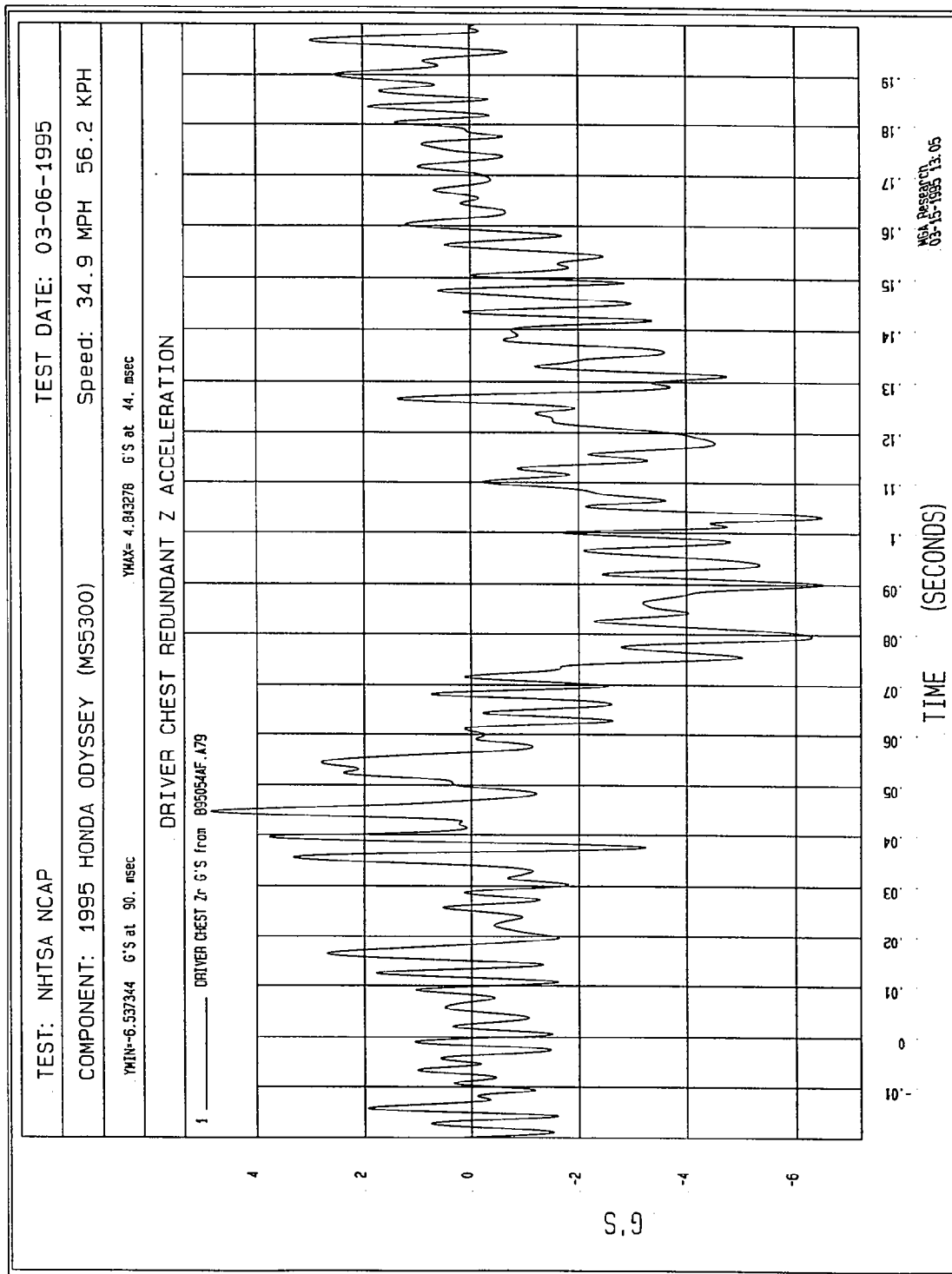


Figure B-50 - Driver Chest Z Redundant Acceleration vs. Time

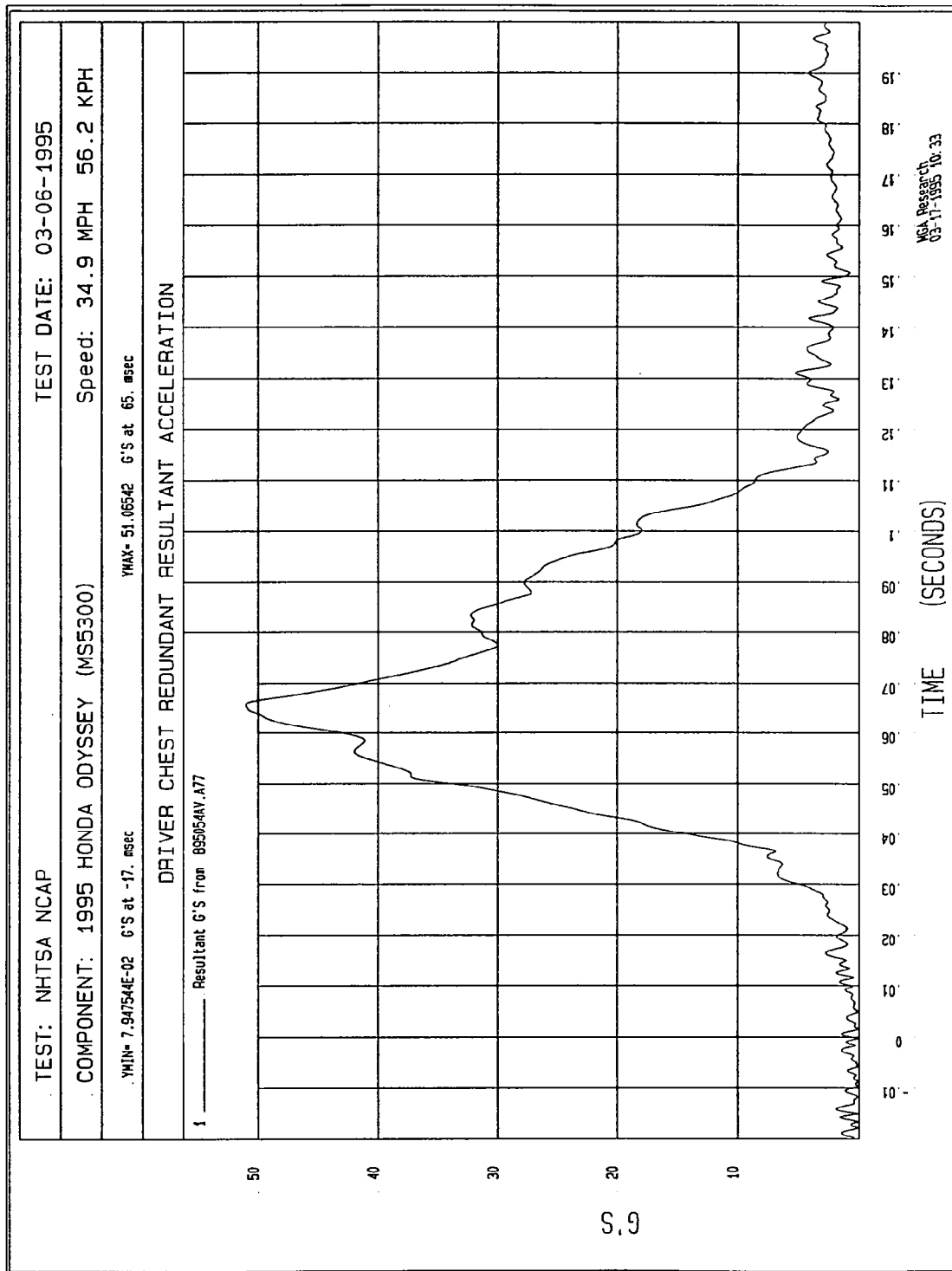


Figure B-51 - Driver Chest Redundant Resultant Accel. vs. Time

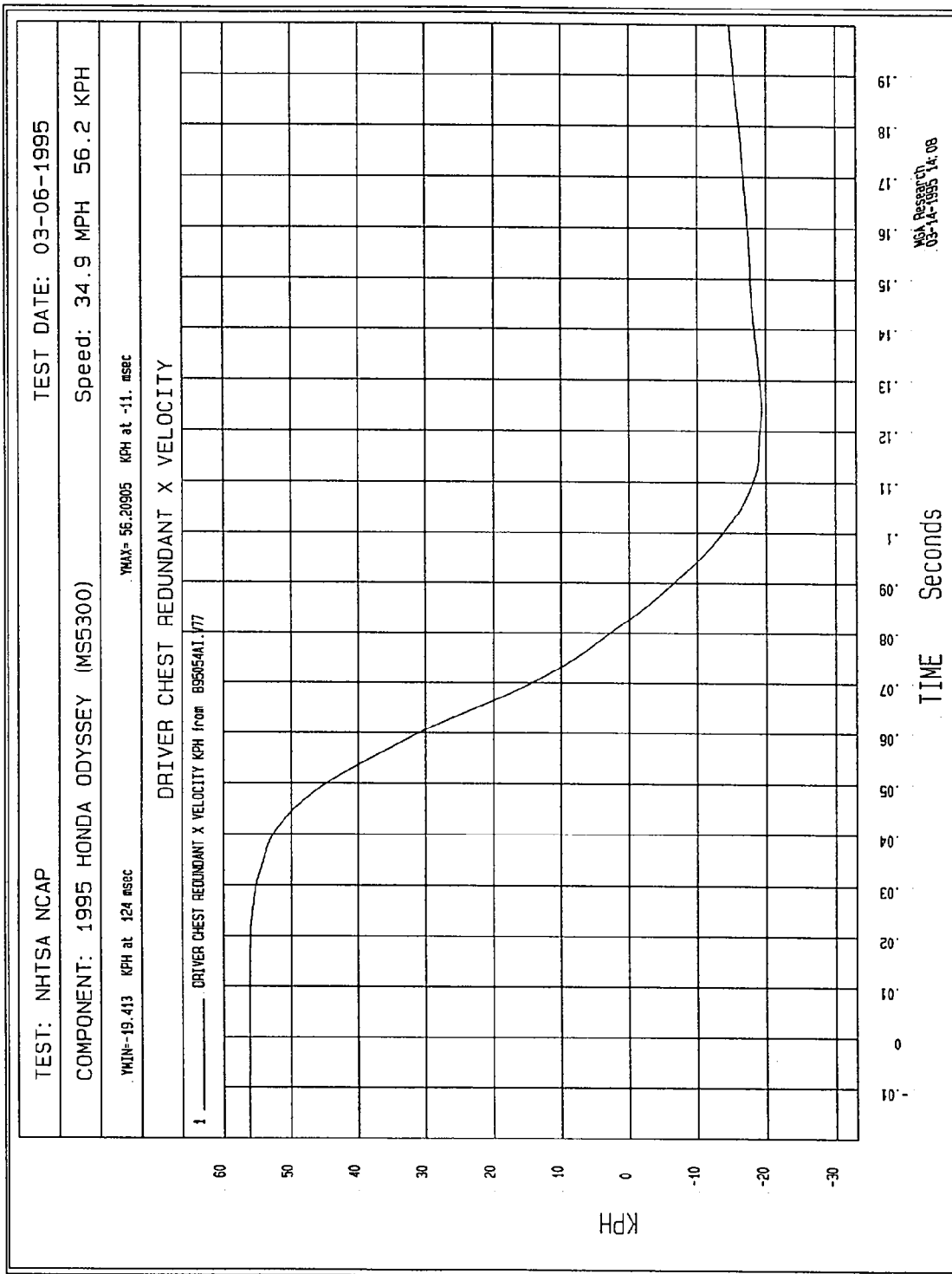


Figure B-52 - Driver Chest X Redundant Velocity vs. Time

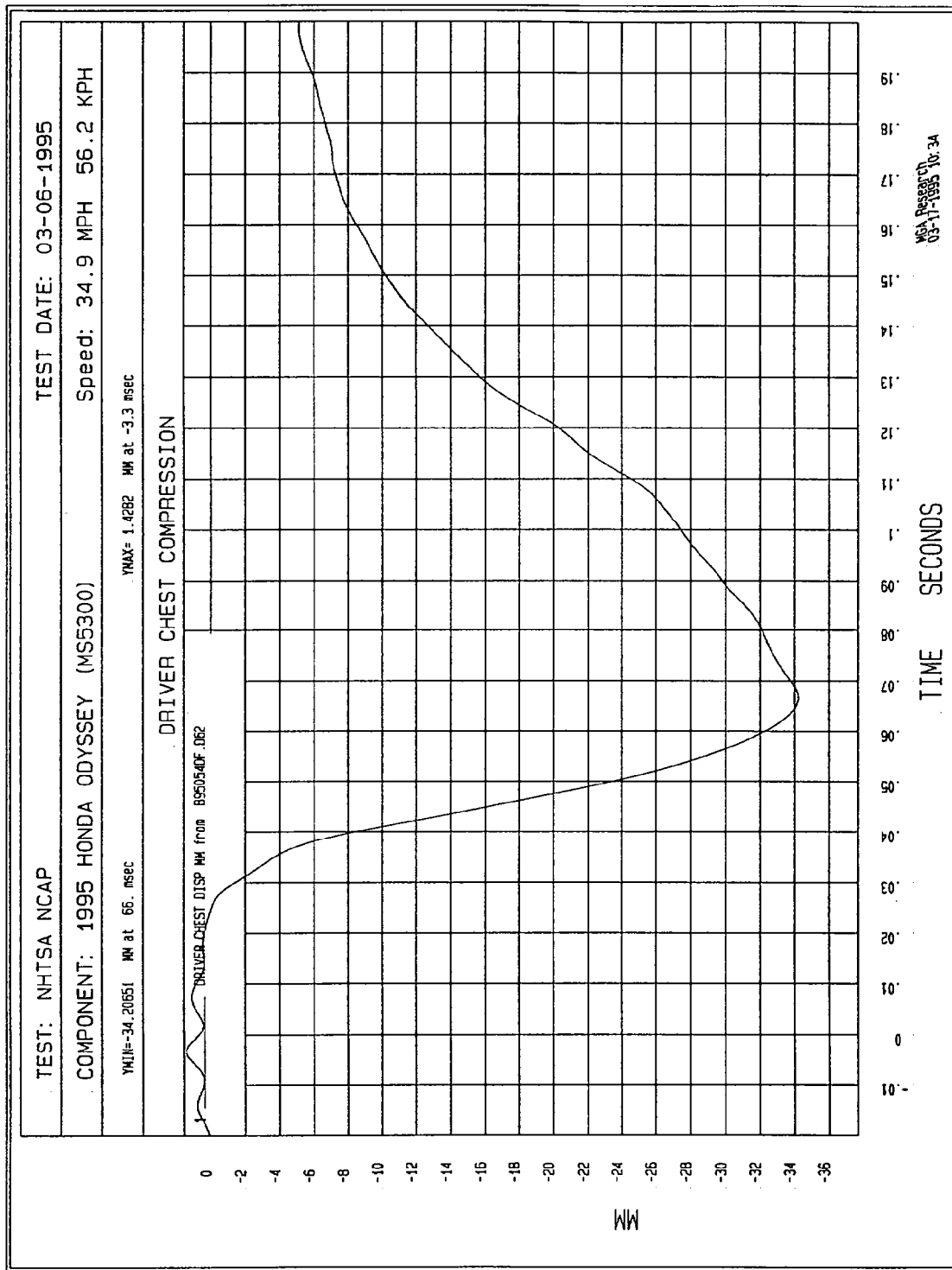


Figure B-53 - Driver Chest Compression vs. Time

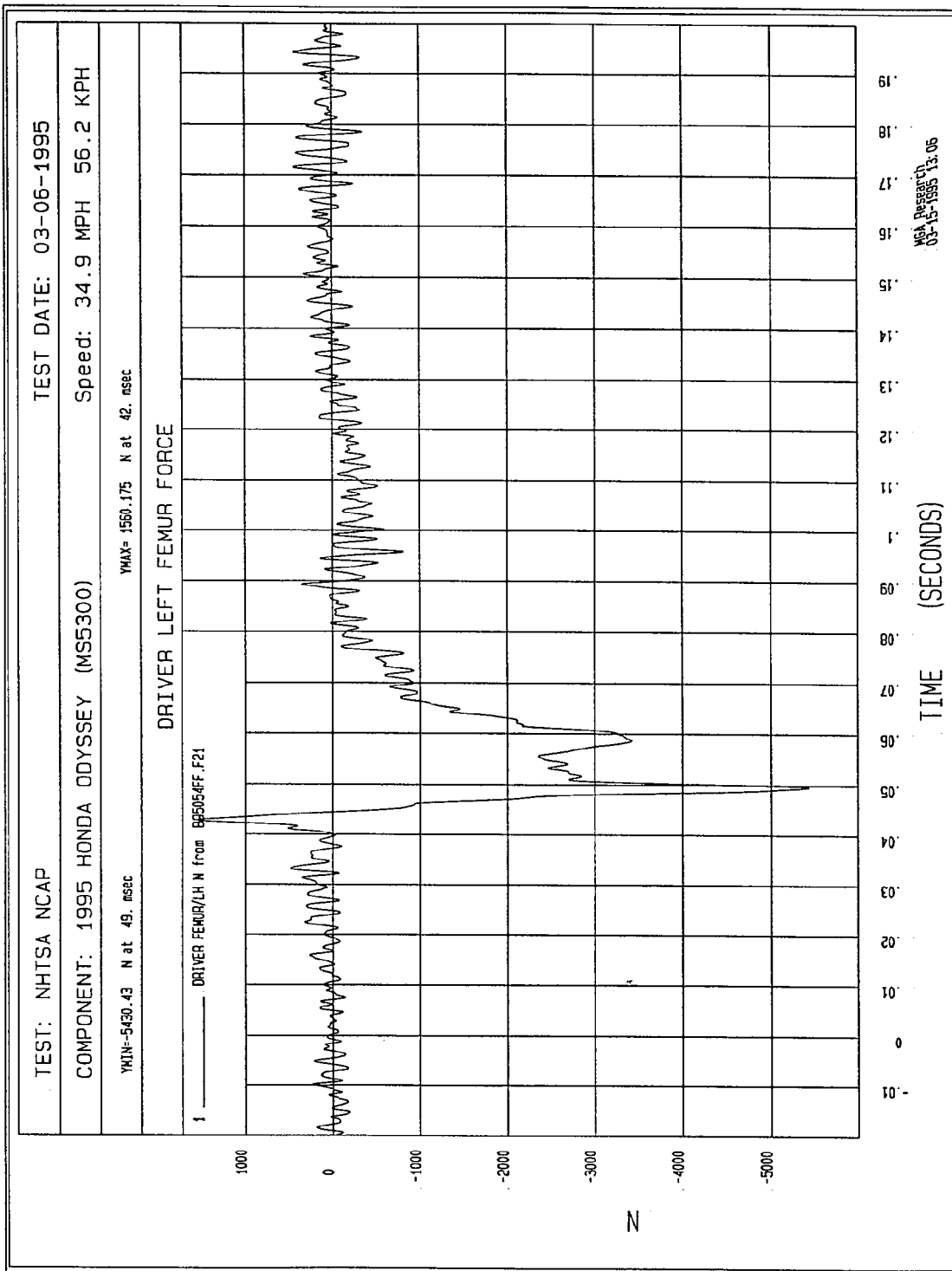


Figure B-54 - Driver Left Femur Force vs. Time

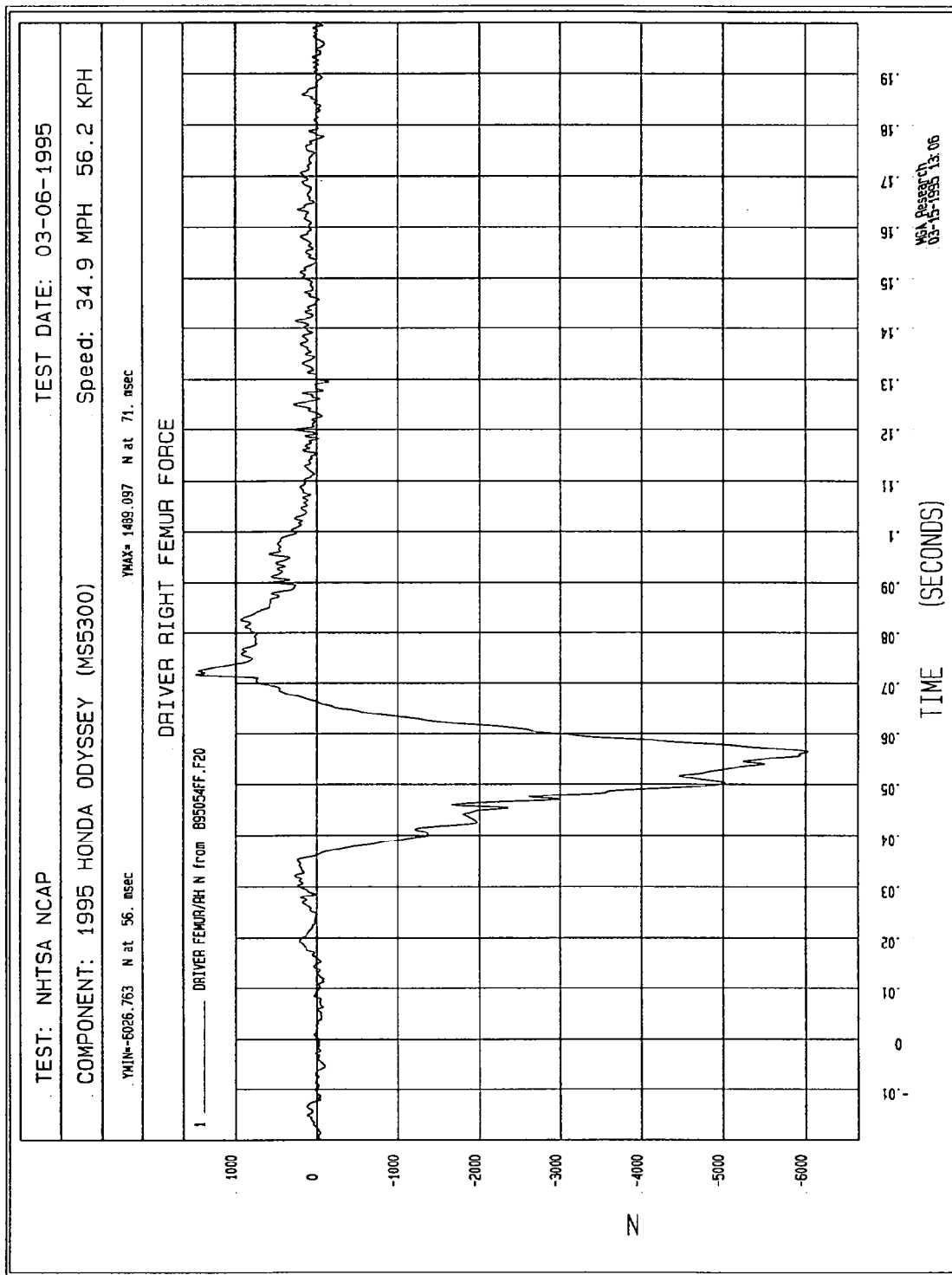


Figure B-55 - Driver Right Femur Force vs. Time

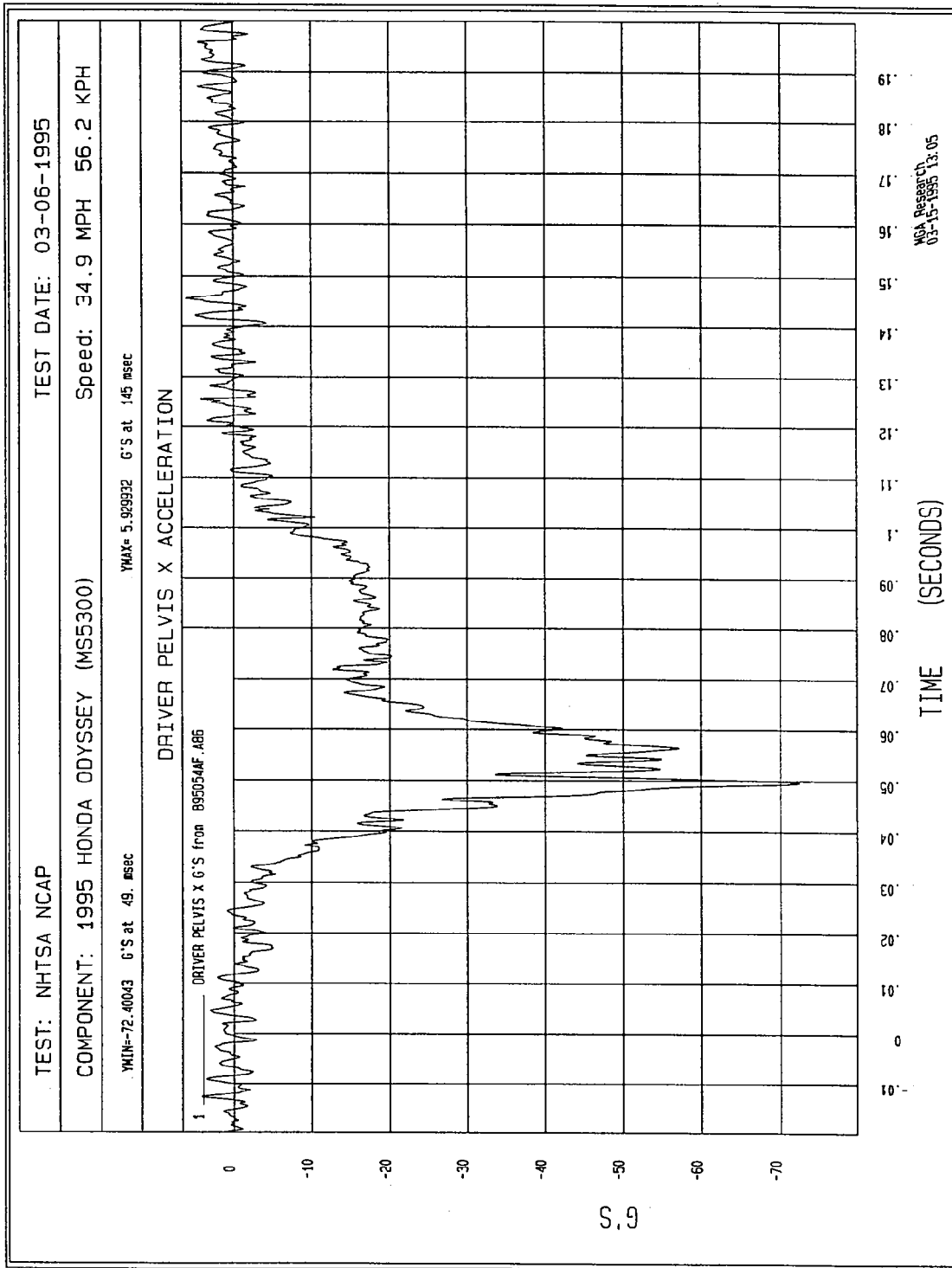


Figure B-56 - Driver Pelvis X Acceleration vs. Time

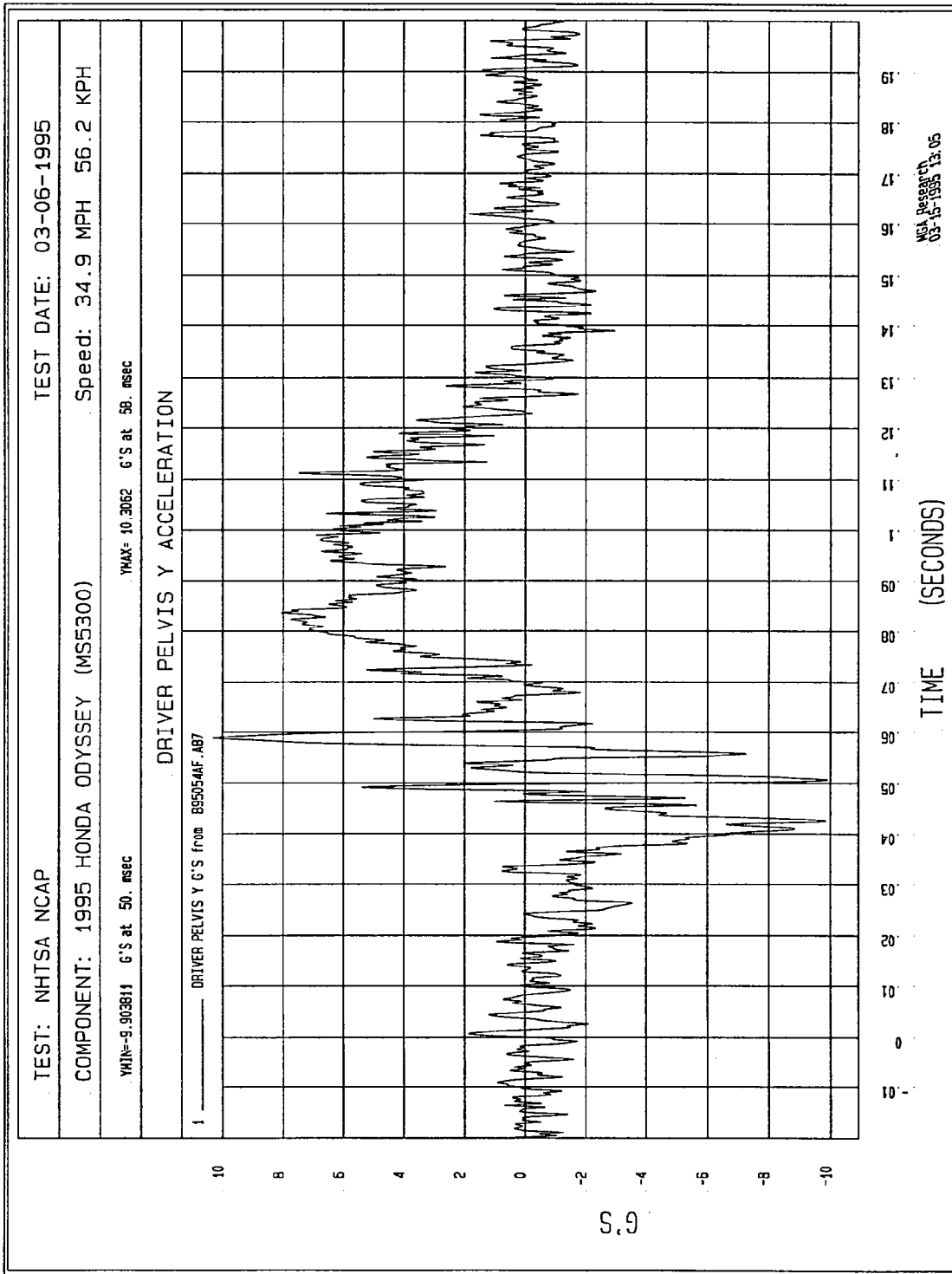


Figure B-57 - Driver Pelvis Y Acceleration vs. Time

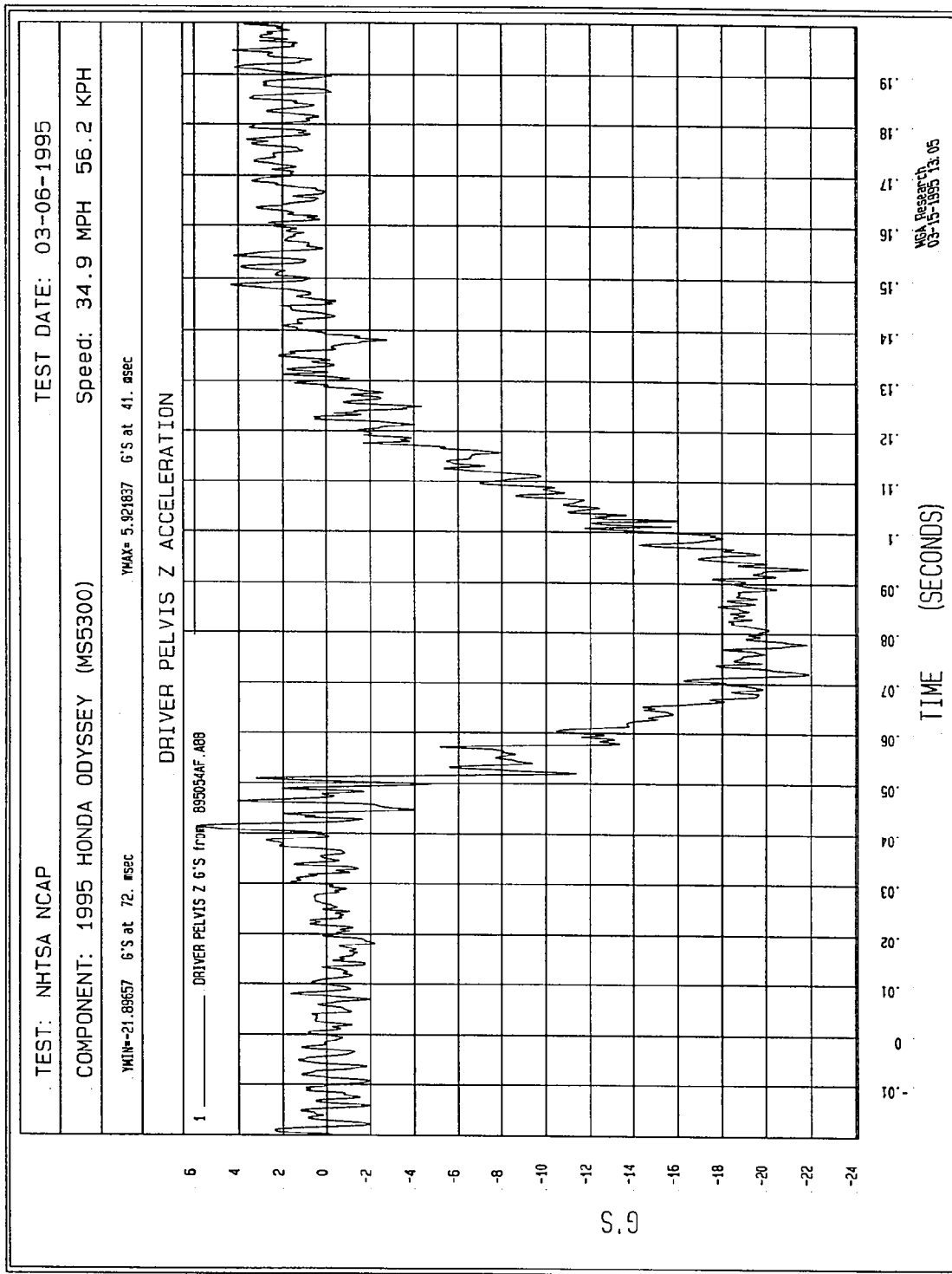


Figure B-58 - Driver Pelvis Z Acceleration vs. Time

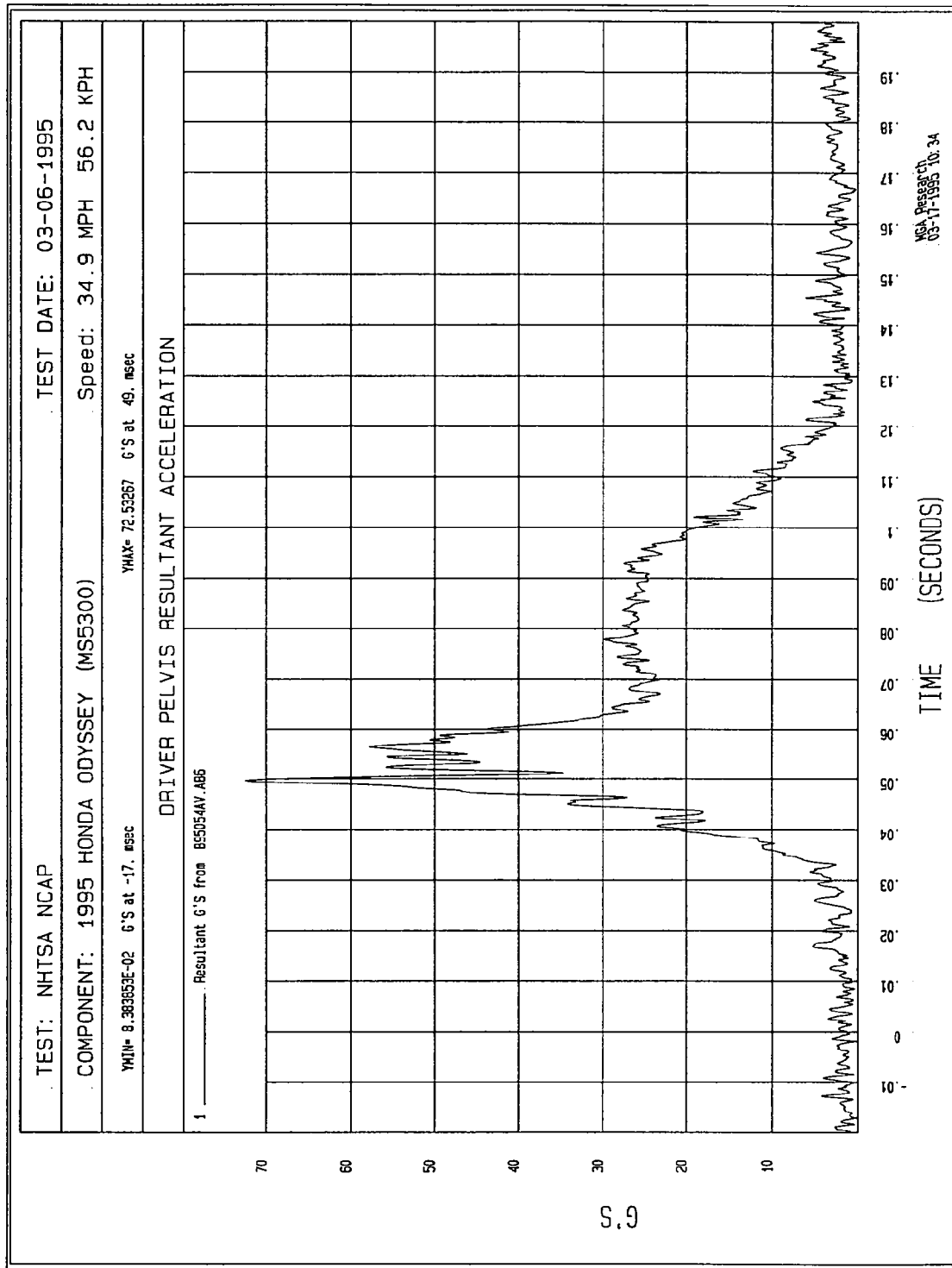
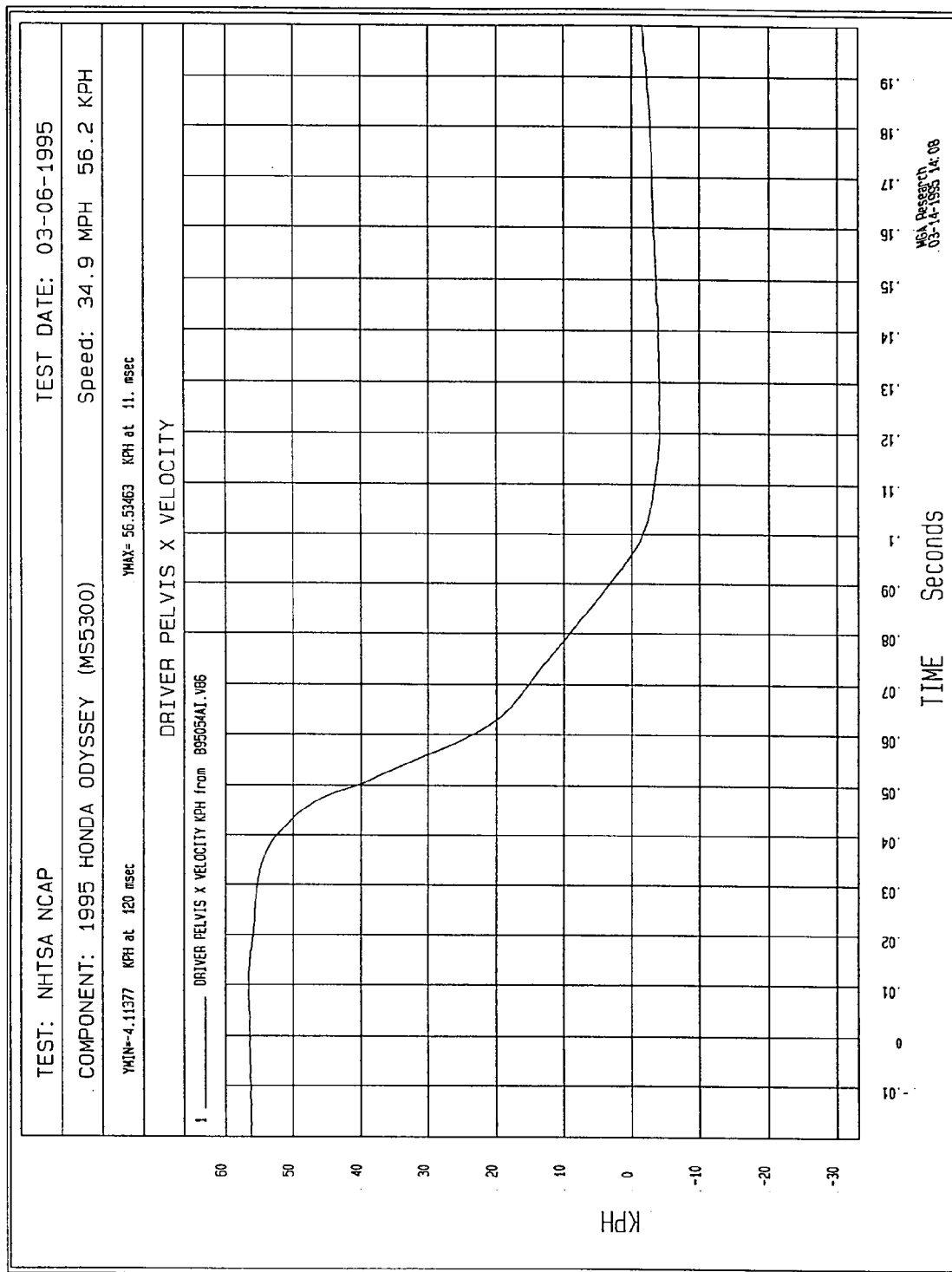


Figure B-59 - Driver Pelvis Resultant Acceleration vs. Time



B-60

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

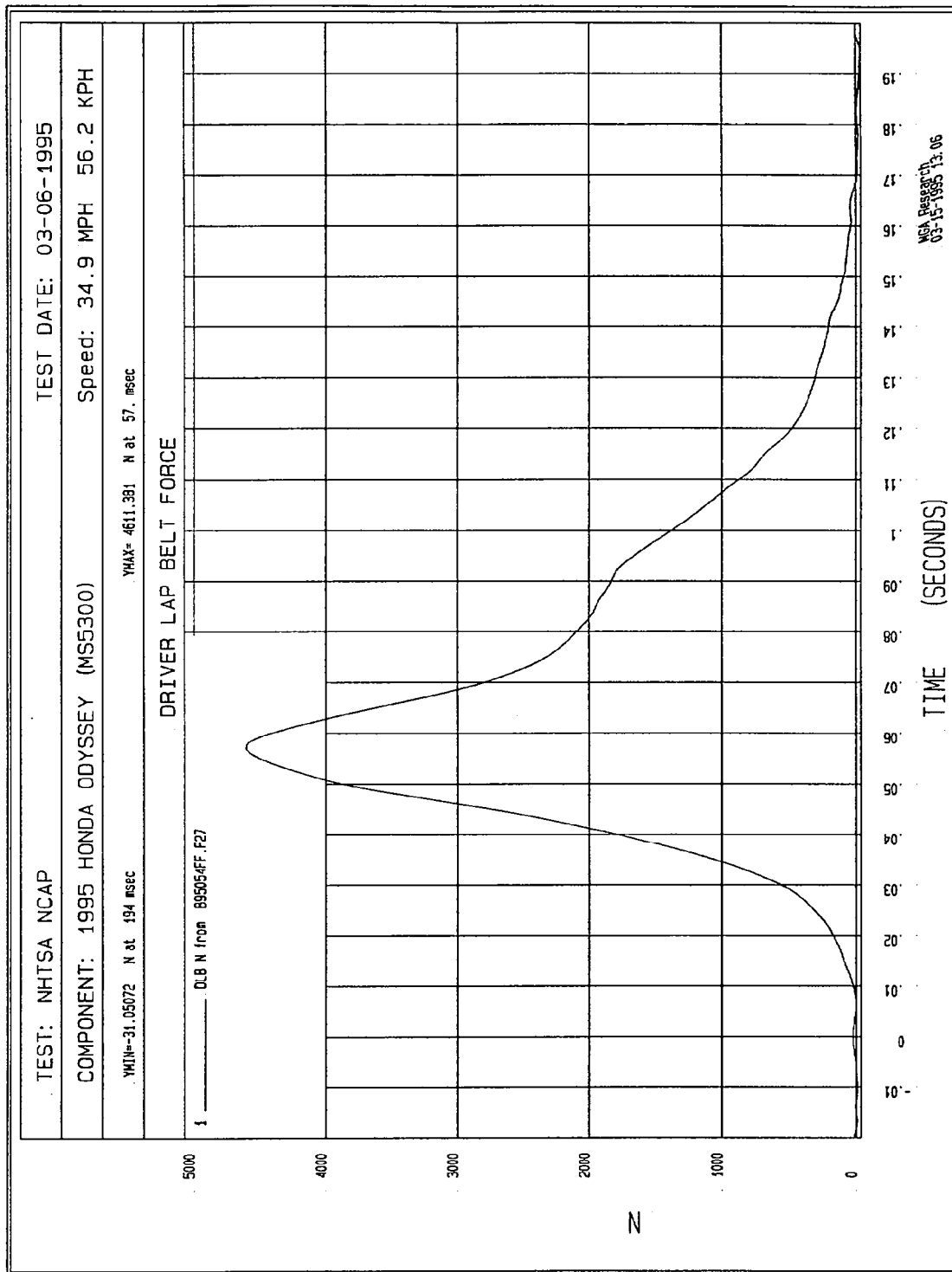
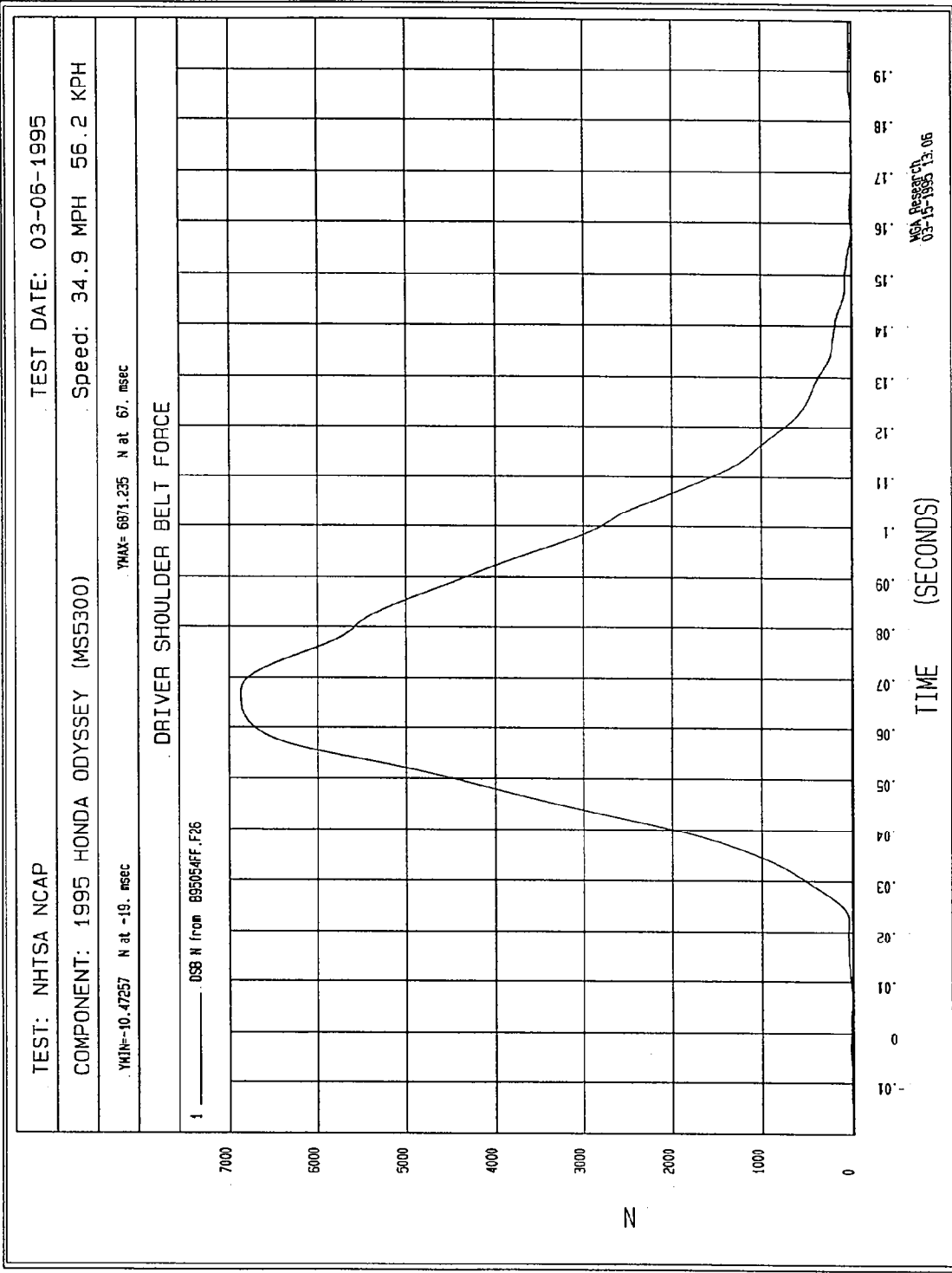


Figure B-61 - Driver Lap Belt Force vs. Time



B-62

Figure B-62 - Driver Shoulder Belt Force vs. Time

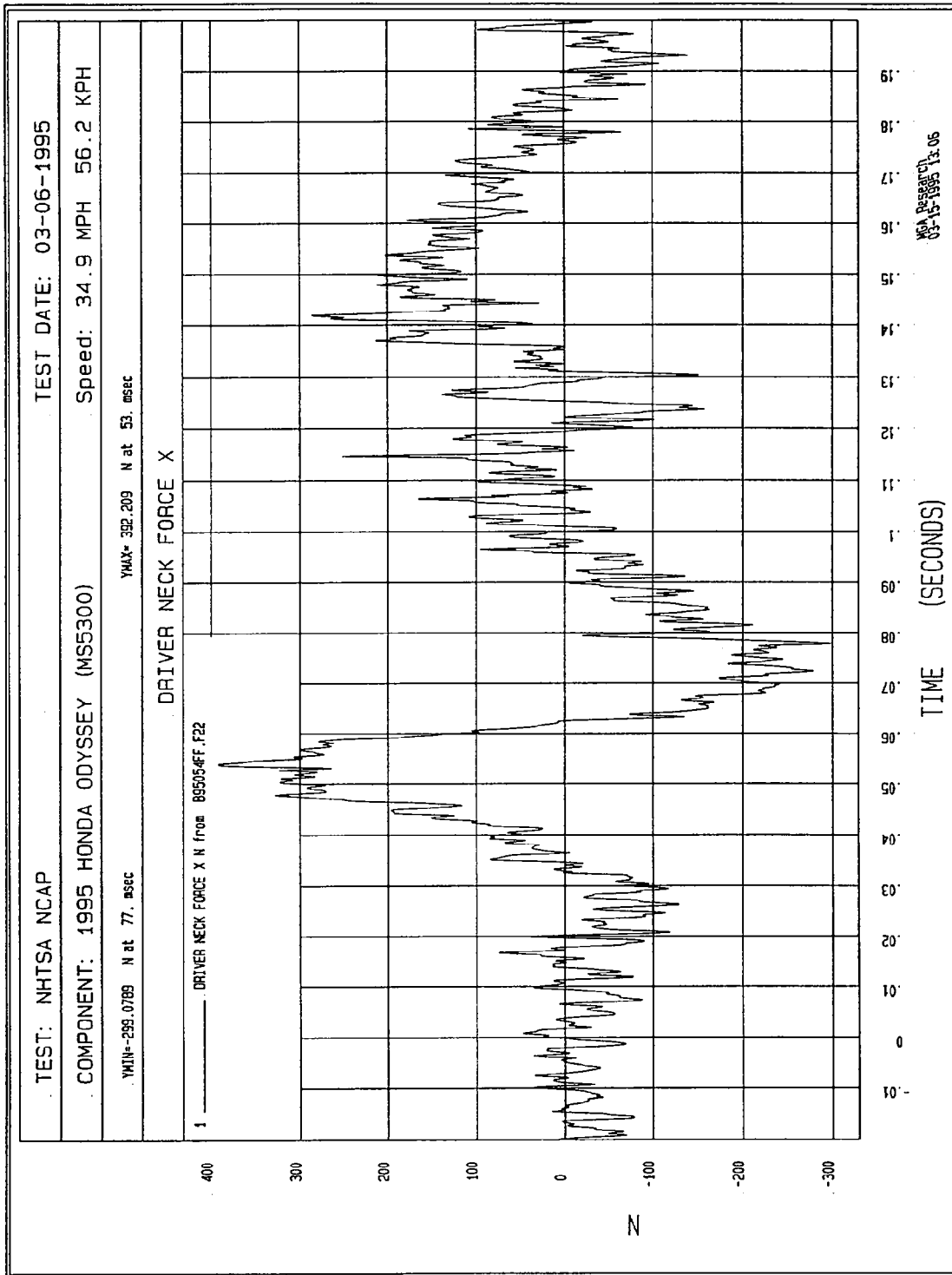


Figure B-63 - Driver Neck Force X vs. Time

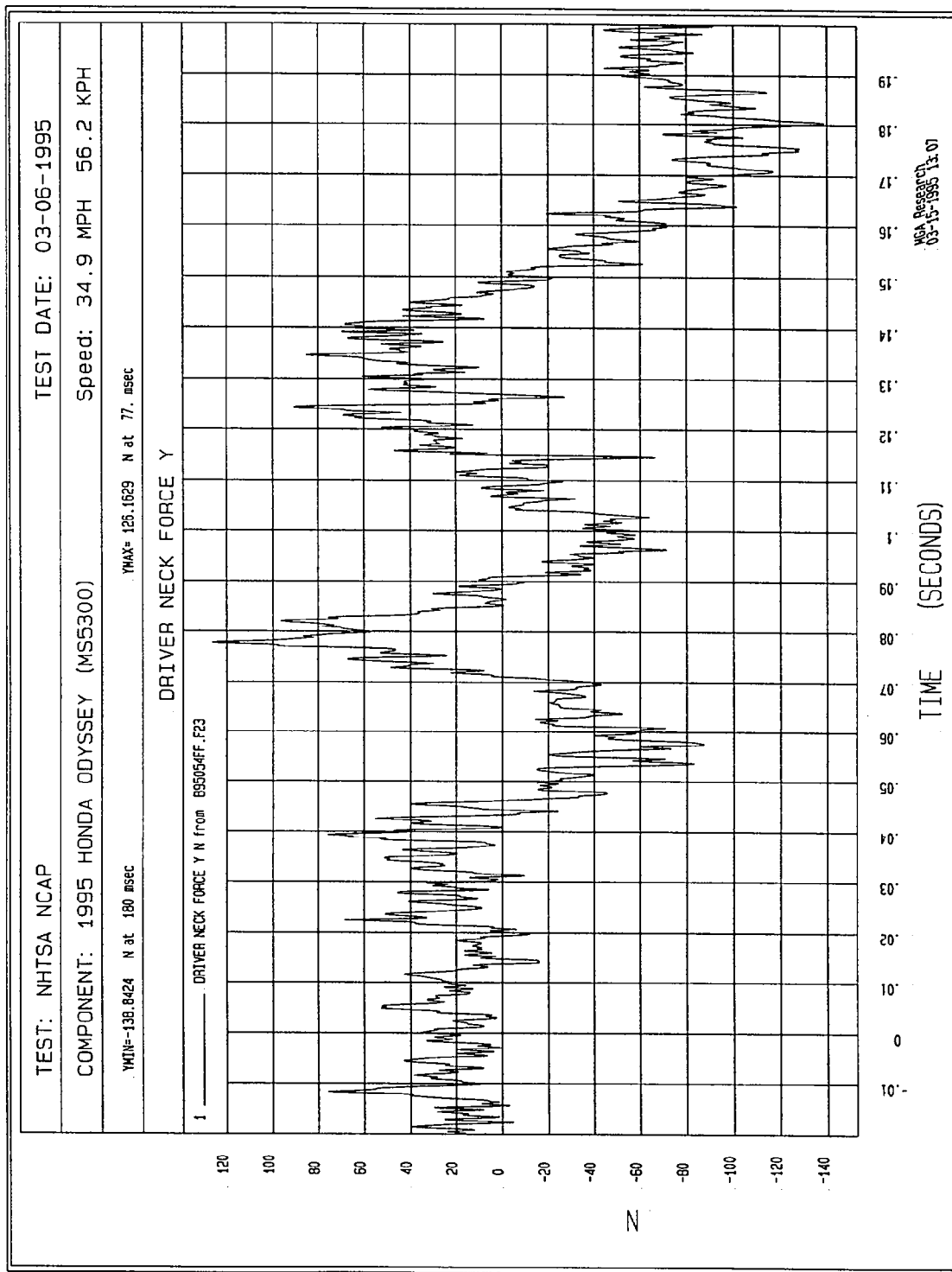


Figure B-64 - Driver Neck Force Y vs. Time

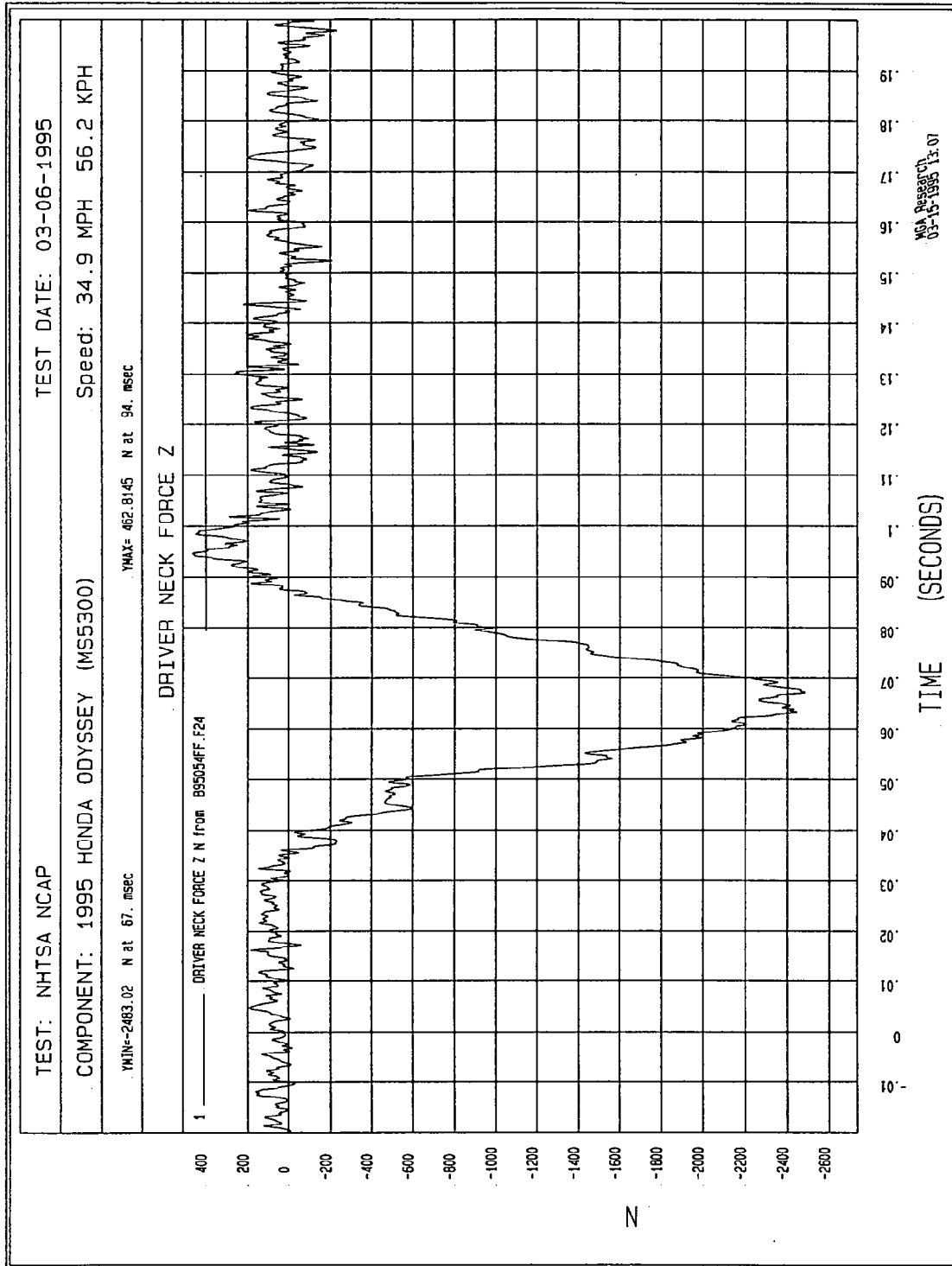


Figure B-65 - Driver Neck Force Z vs. Time

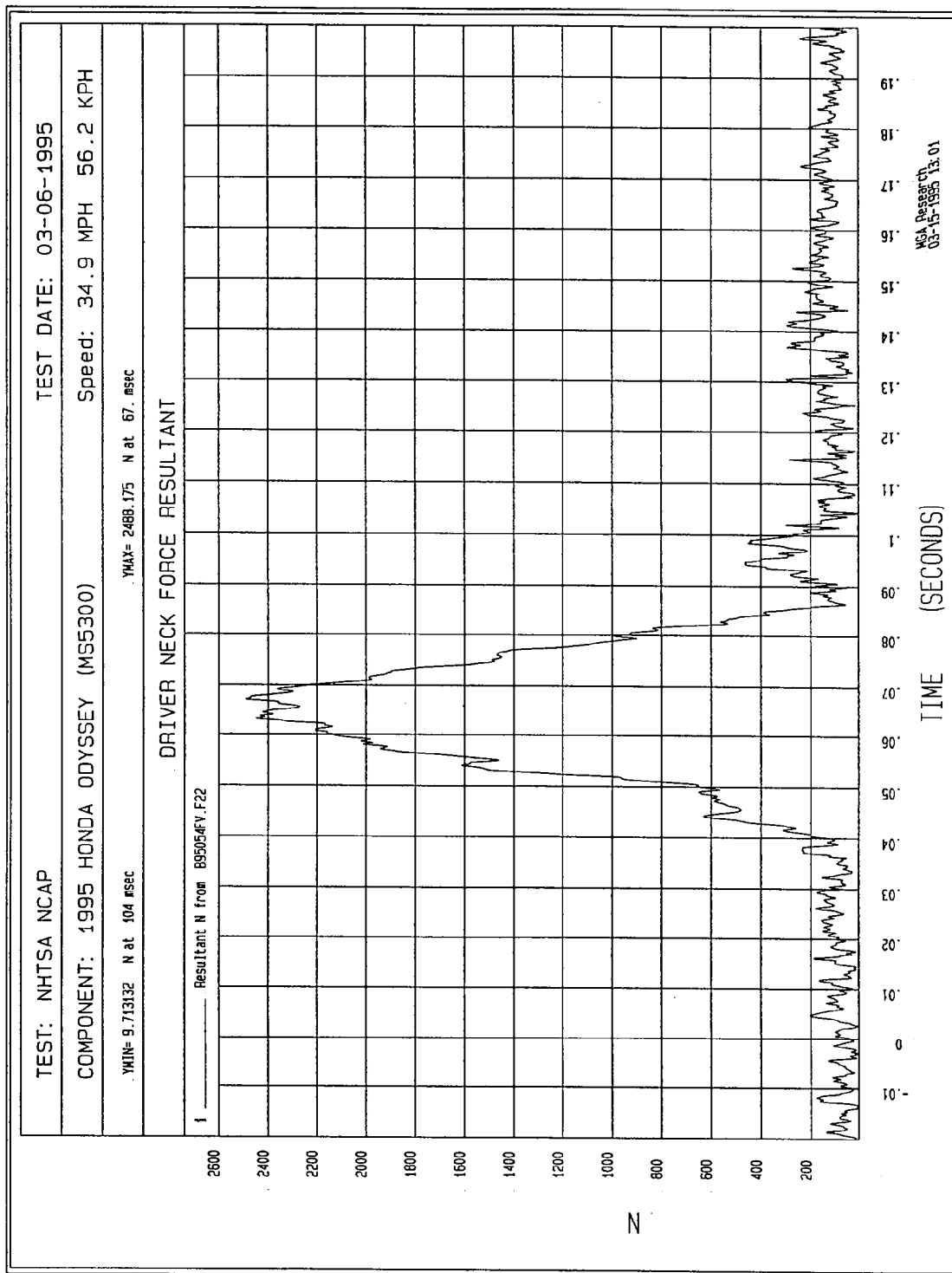


Figure B-66 - Driver Neck Force Resultant vs. Time

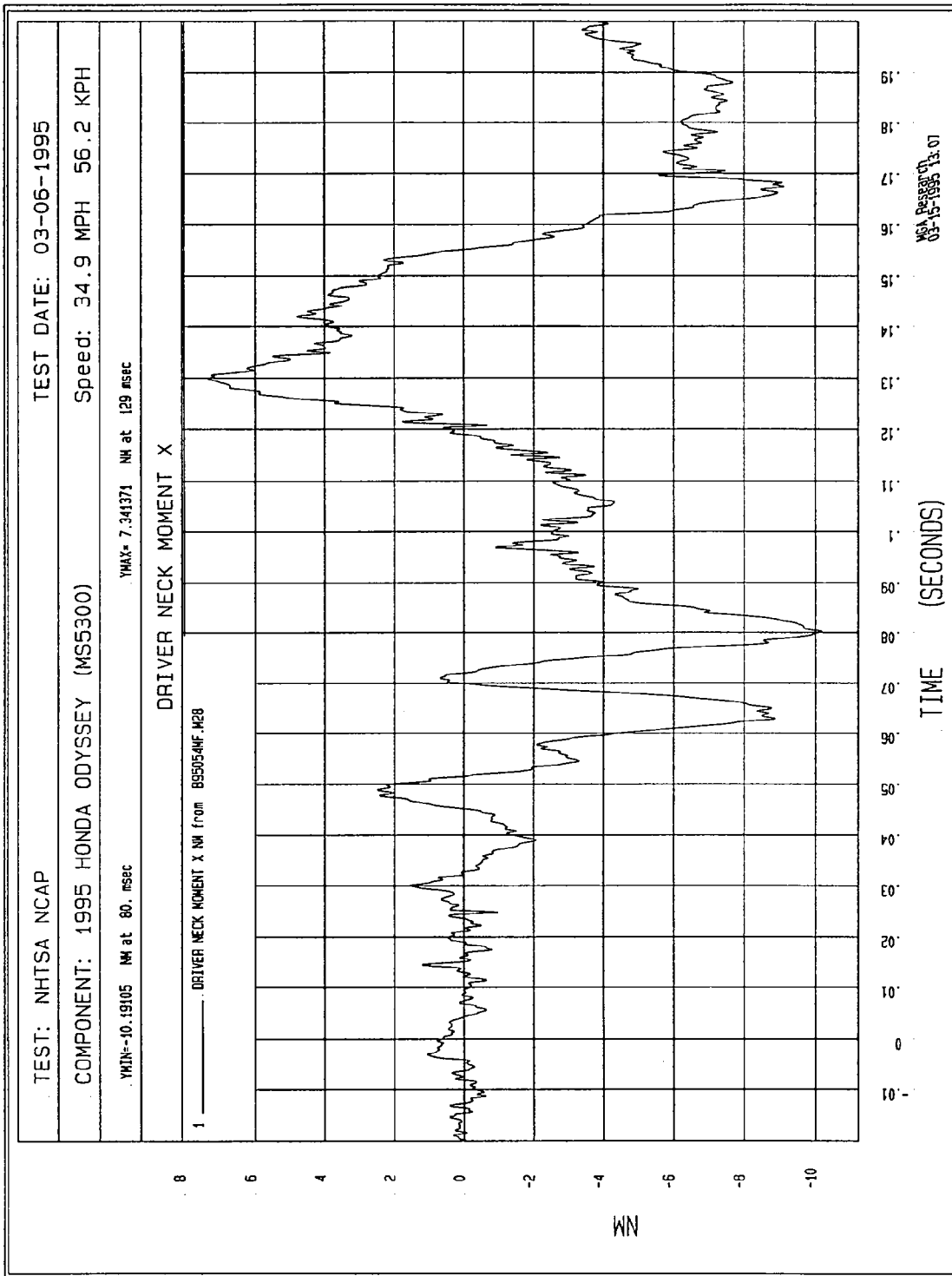


Figure B-67 - Driver Neck Moment X vs. Time

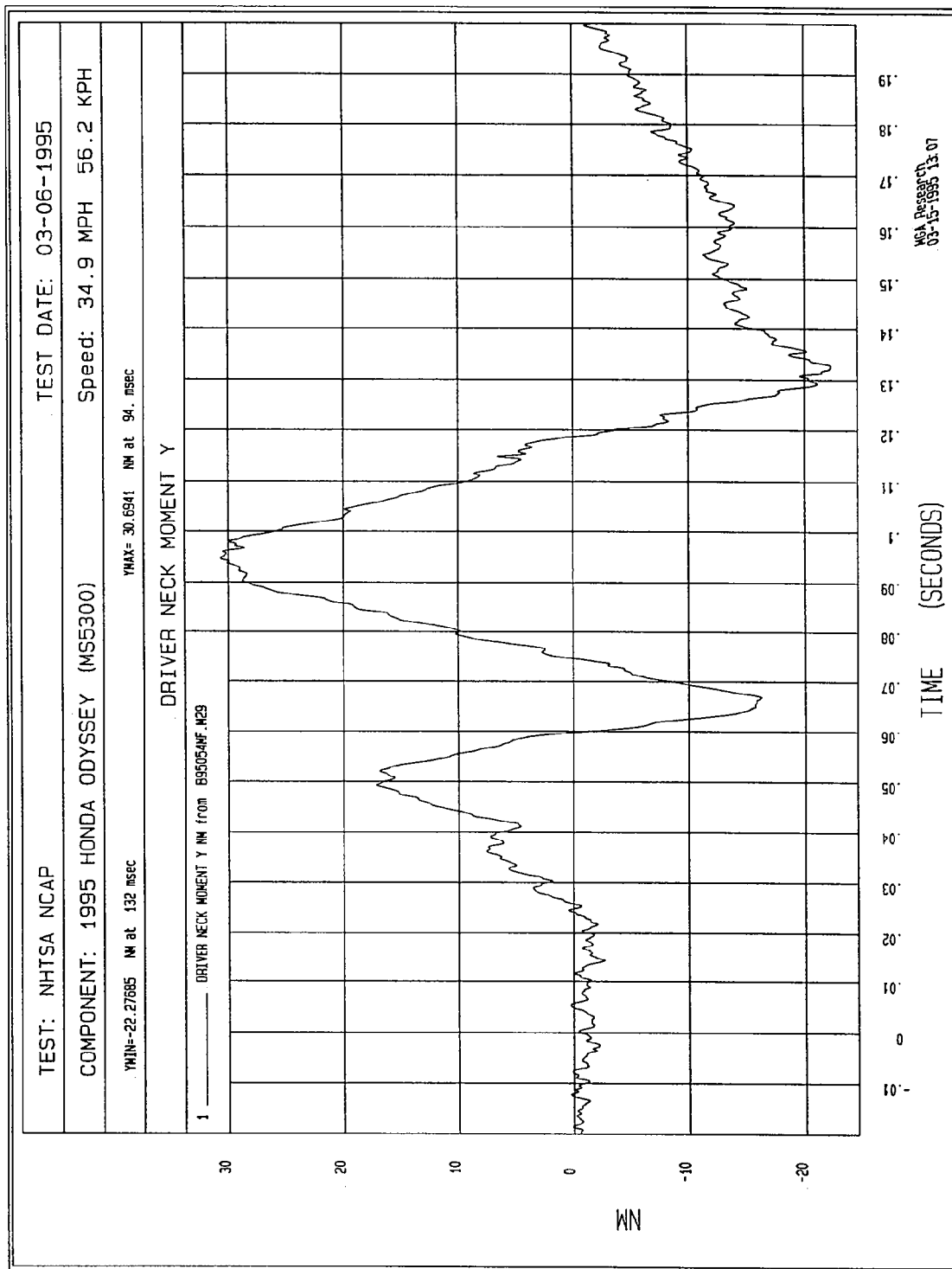
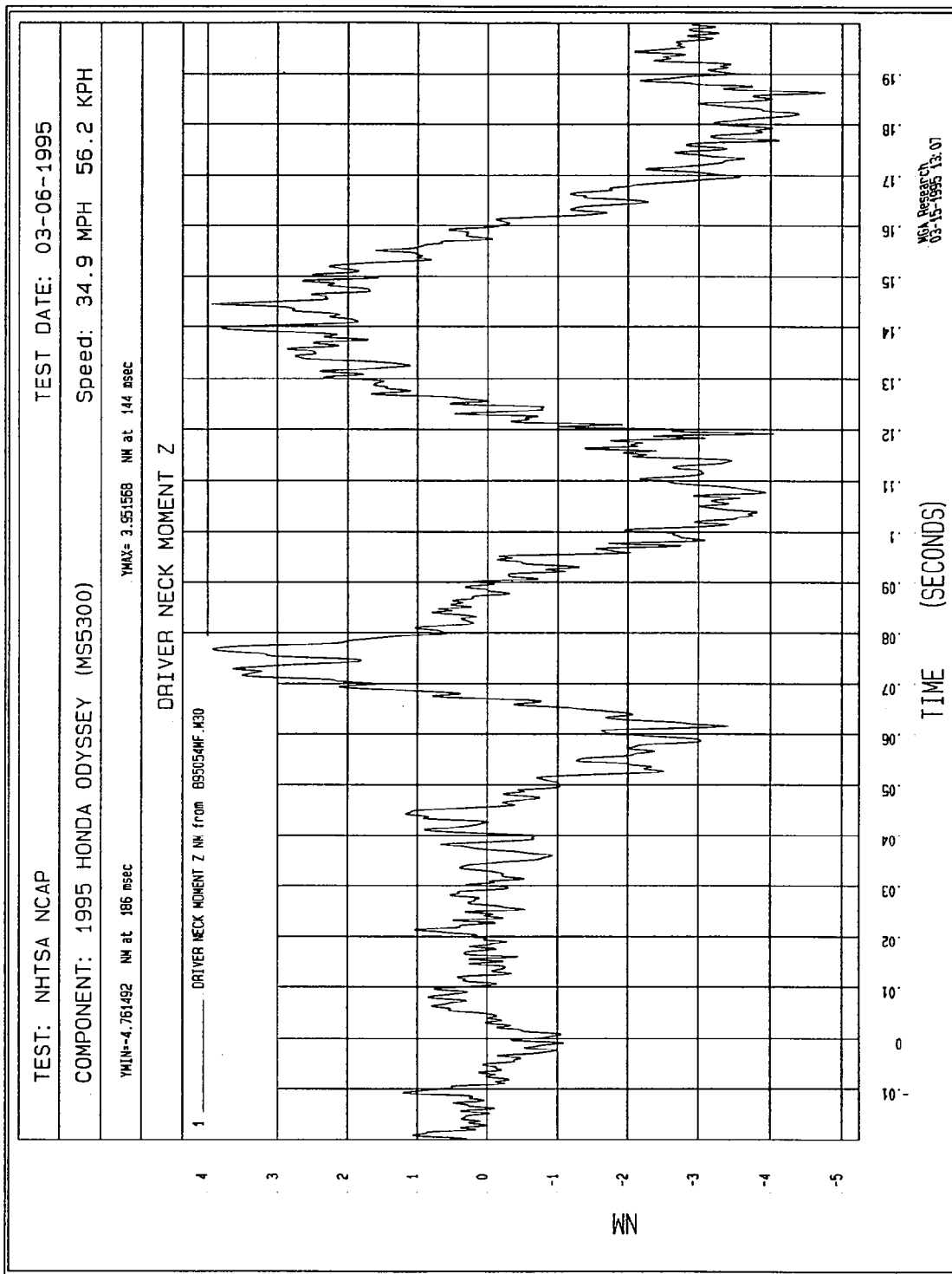


Figure B-68 - Driver Neck Moment Y vs. Time



B-69

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

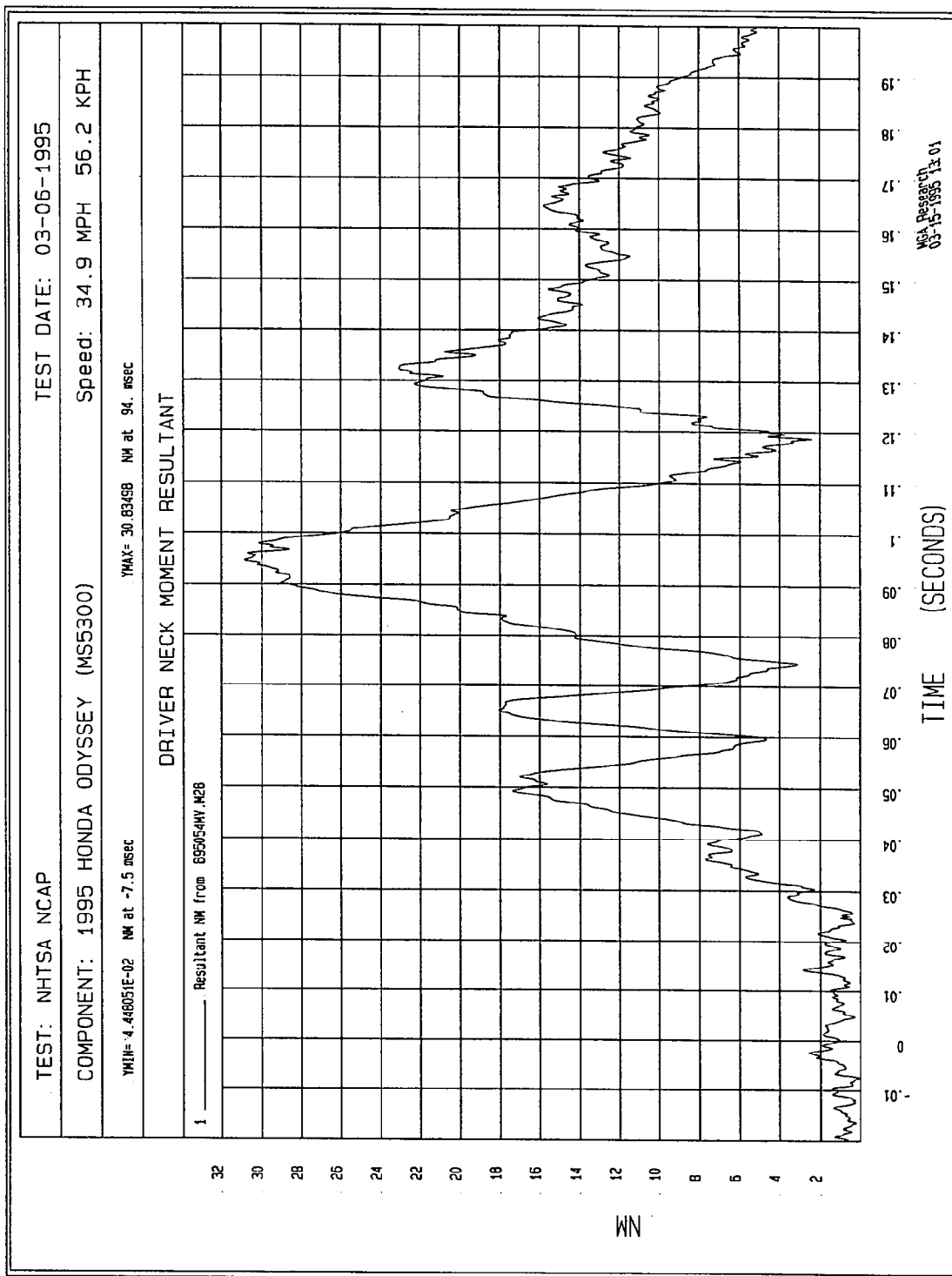


Figure B-70 - Driver Neck Moment Resultant vs. Time

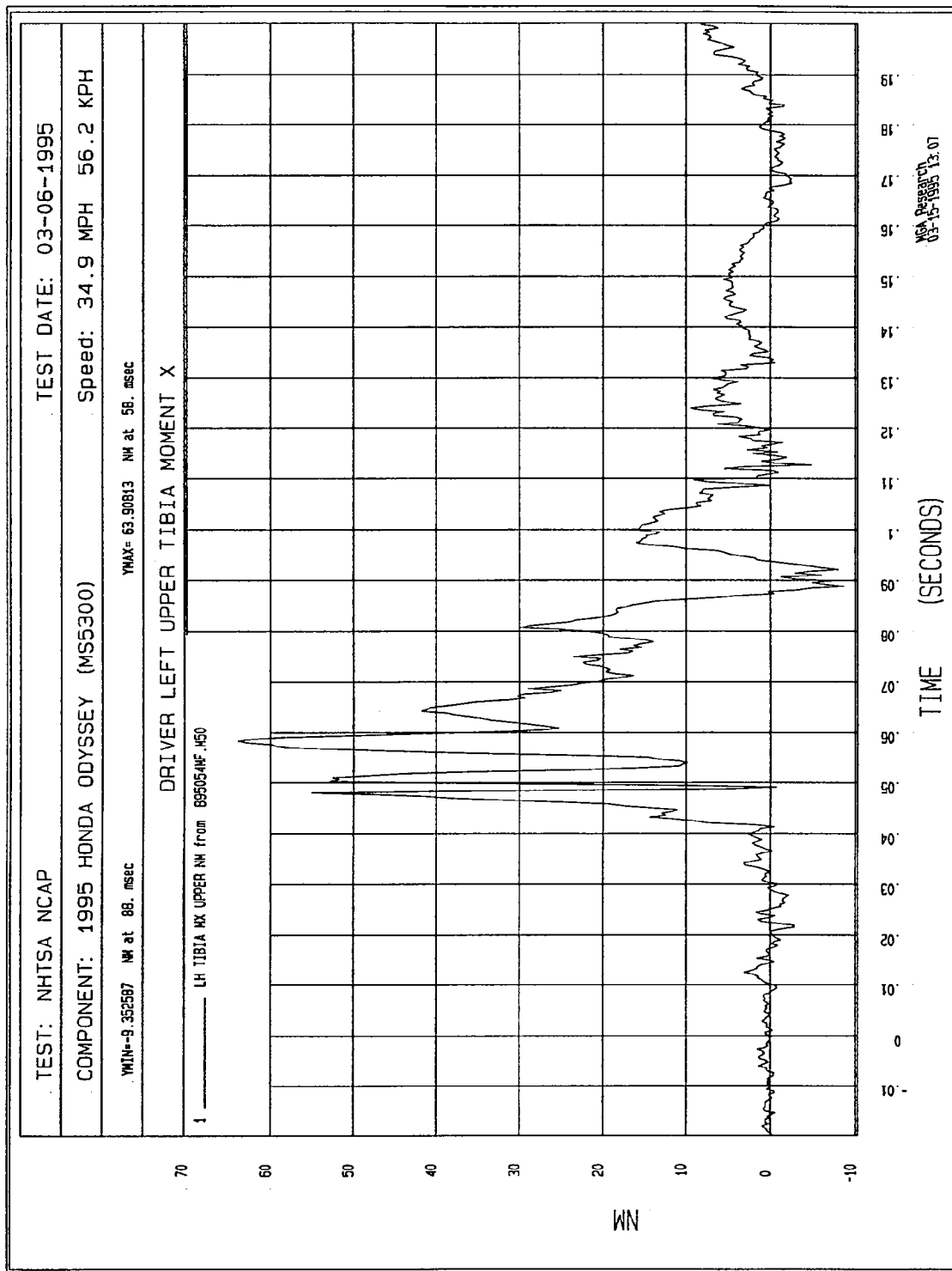
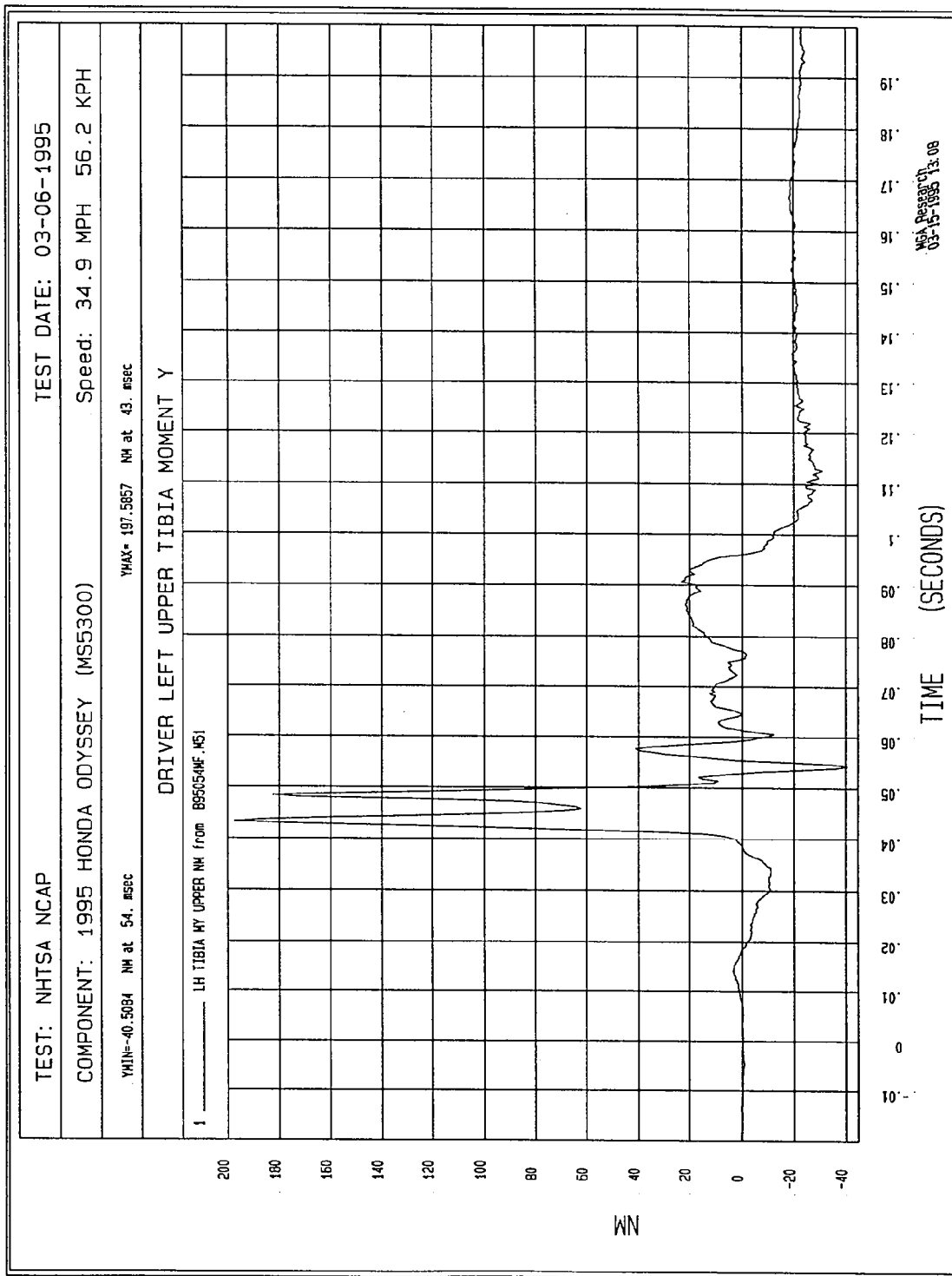


Figure B-71 - Driver Left Upper Tibia Moment X vs. Time



B-72

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

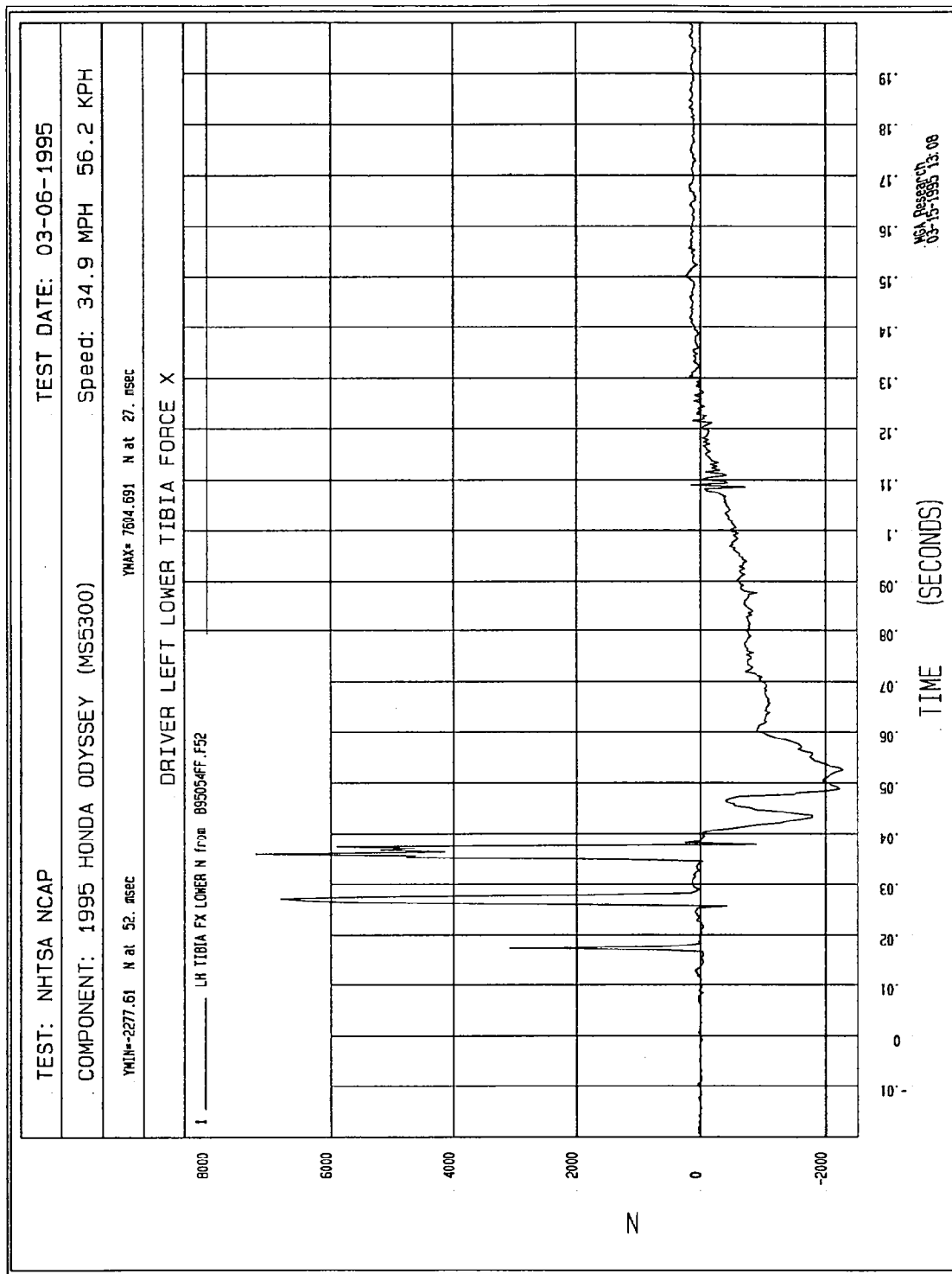


Figure B-73 - Driver Left Lower Tibia Force X vs. Time

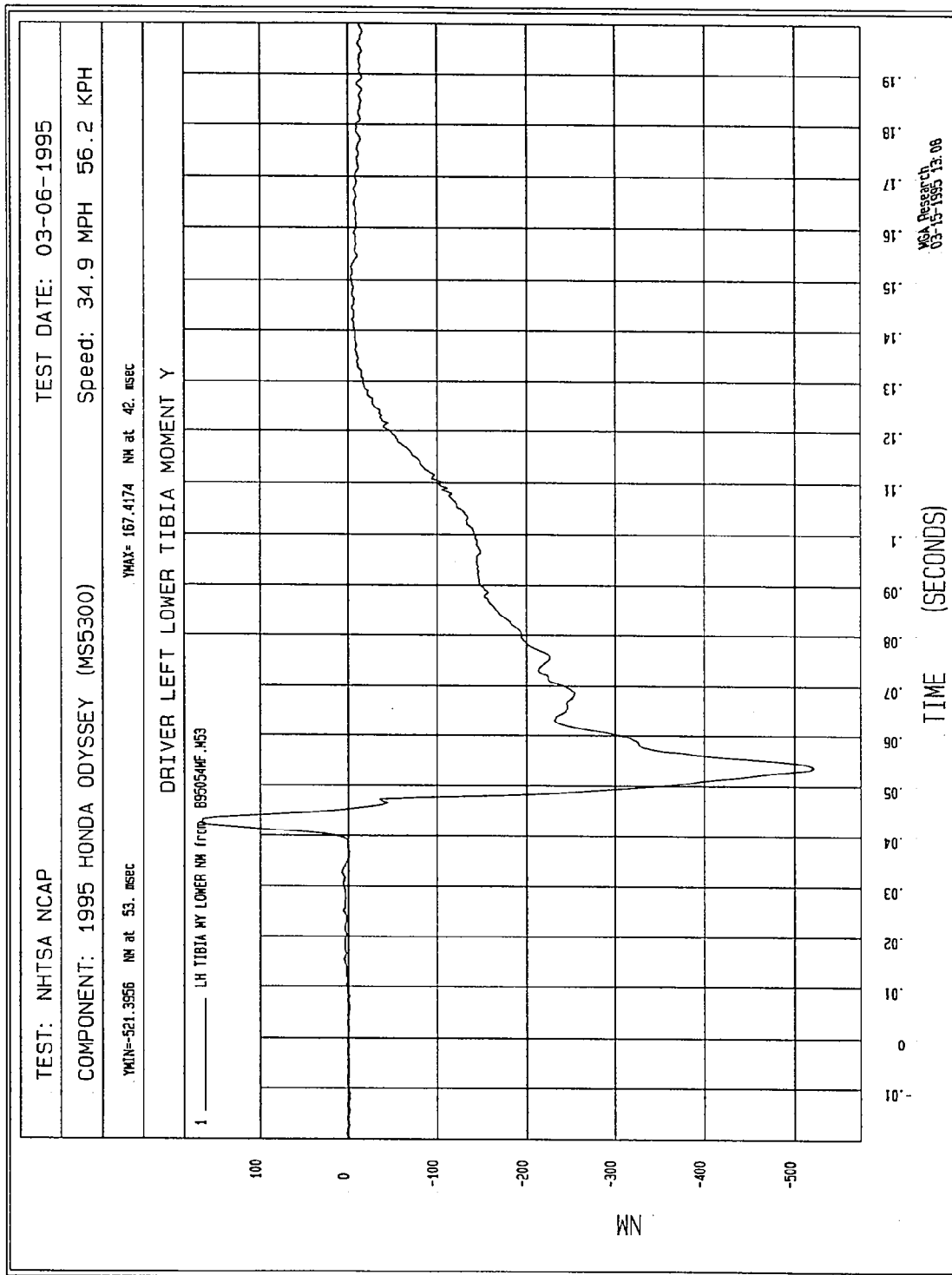


Figure B-74 - Driver Left Lower Tibia Moment Y vs. Time

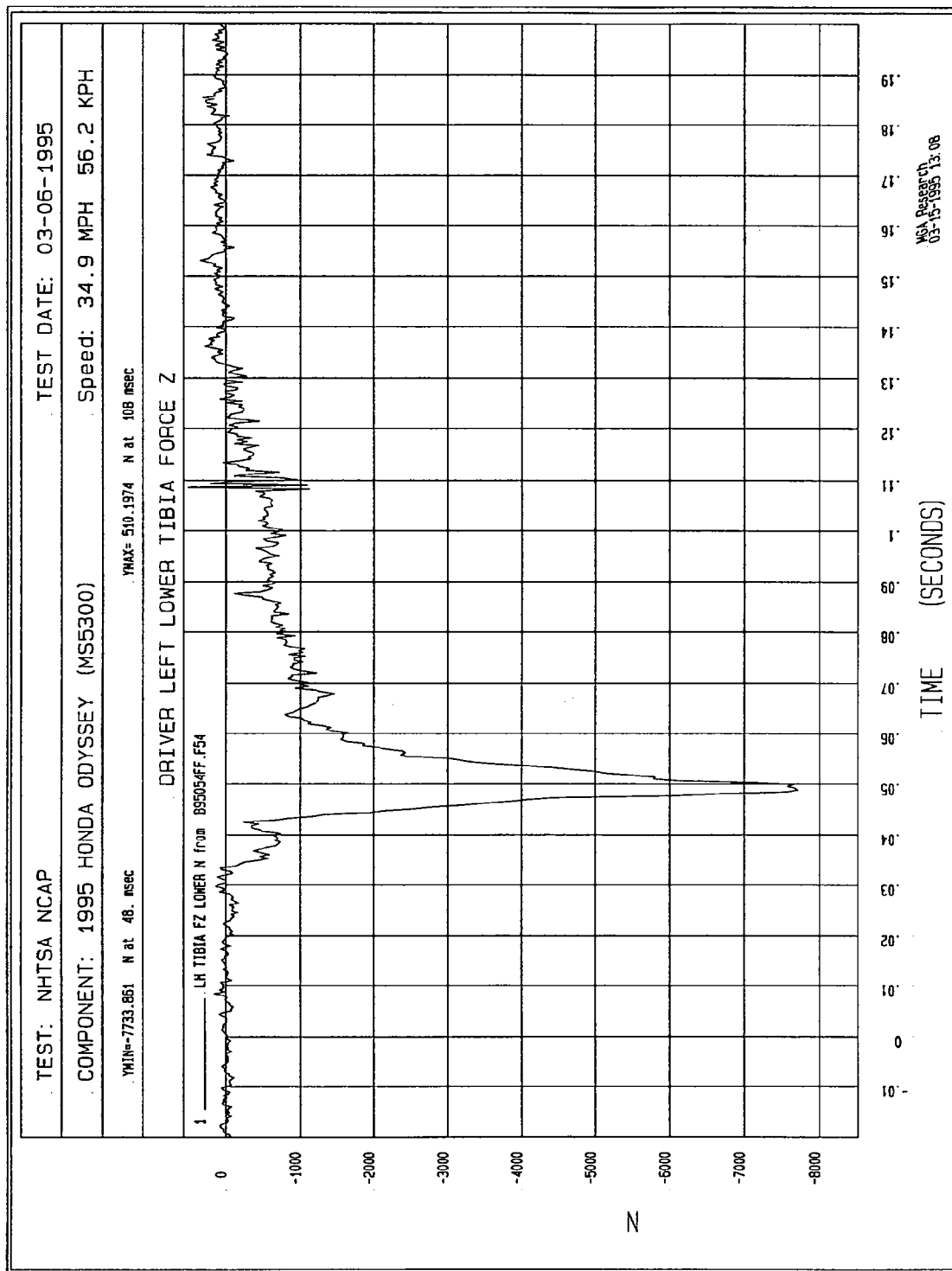
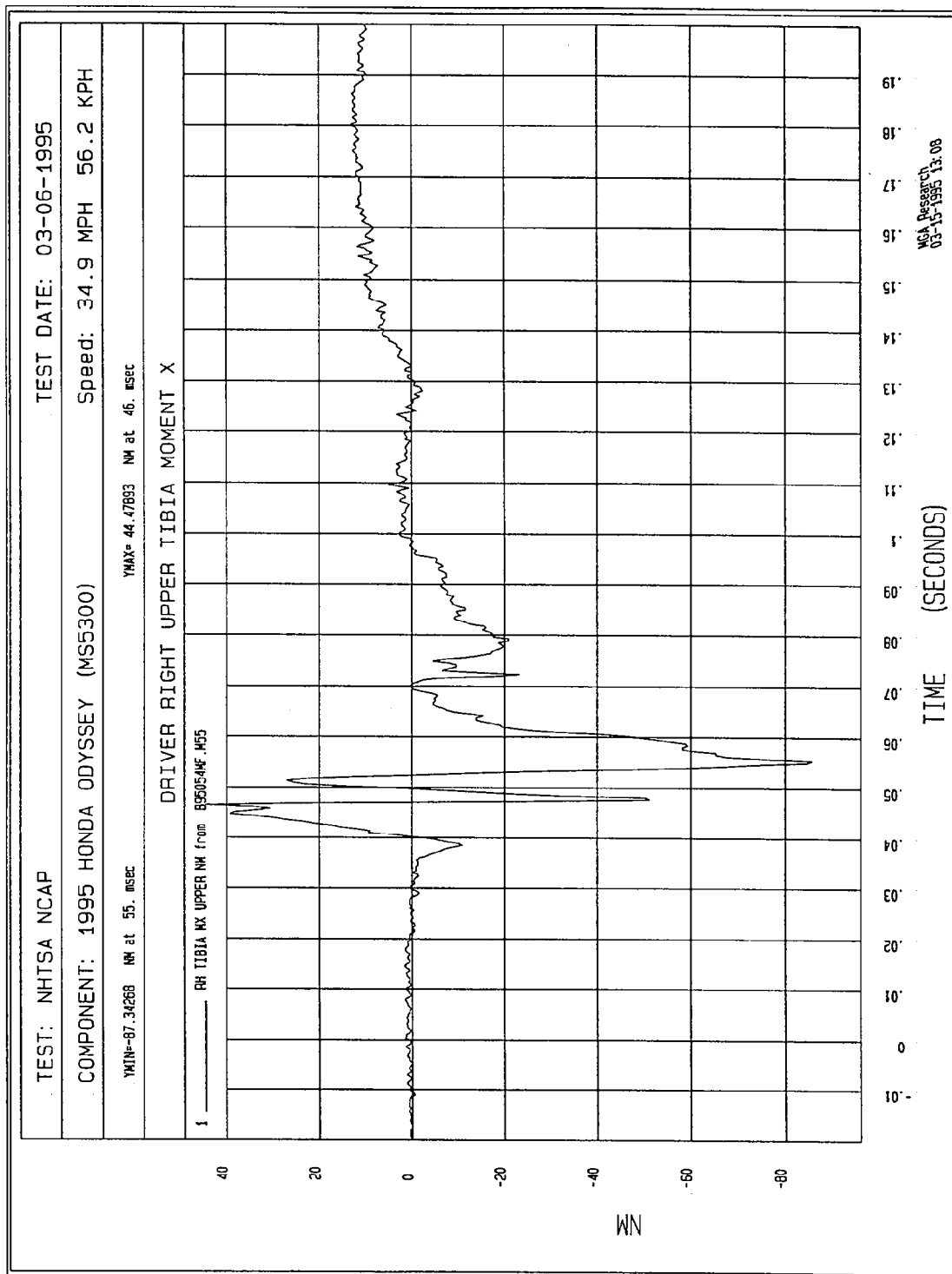


Figure B-75 - Driver Left Lower Tibia Force Z vs. Time



B-76

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

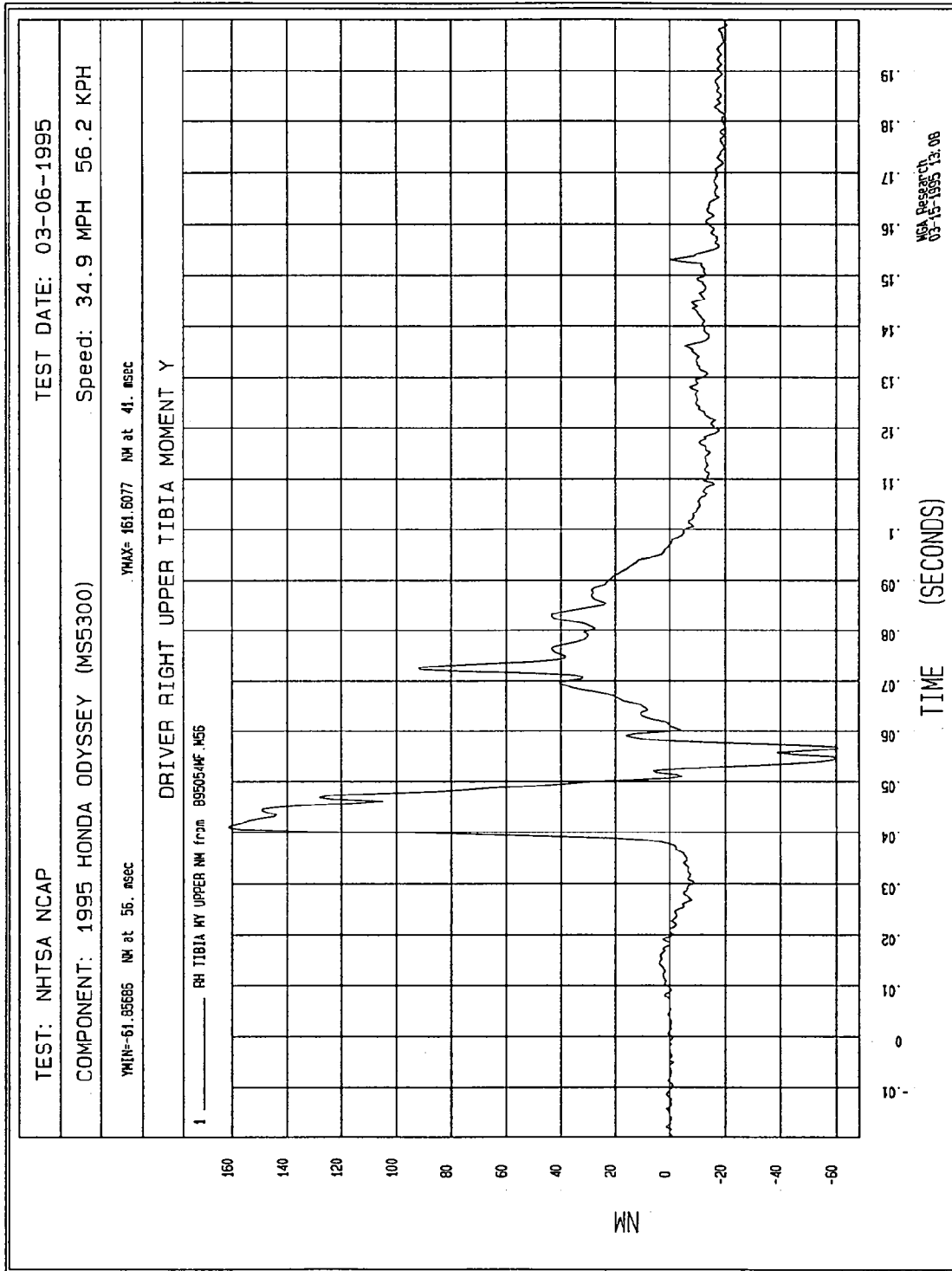


Figure B-77 - Driver Right Upper Tibia Moment Y vs. Time

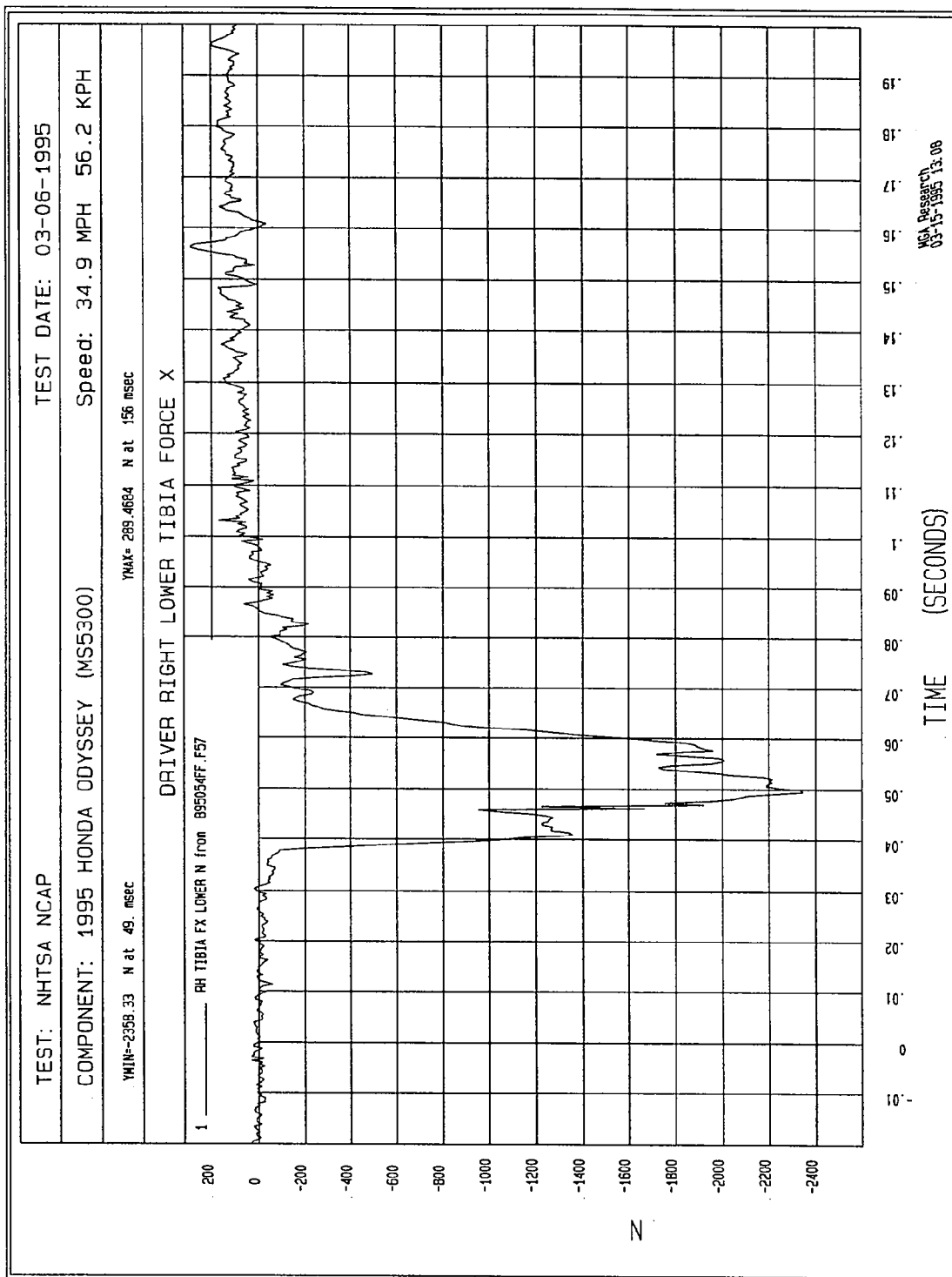


Figure B-78 - Driver Right Lower Tibia Force X vs. Time

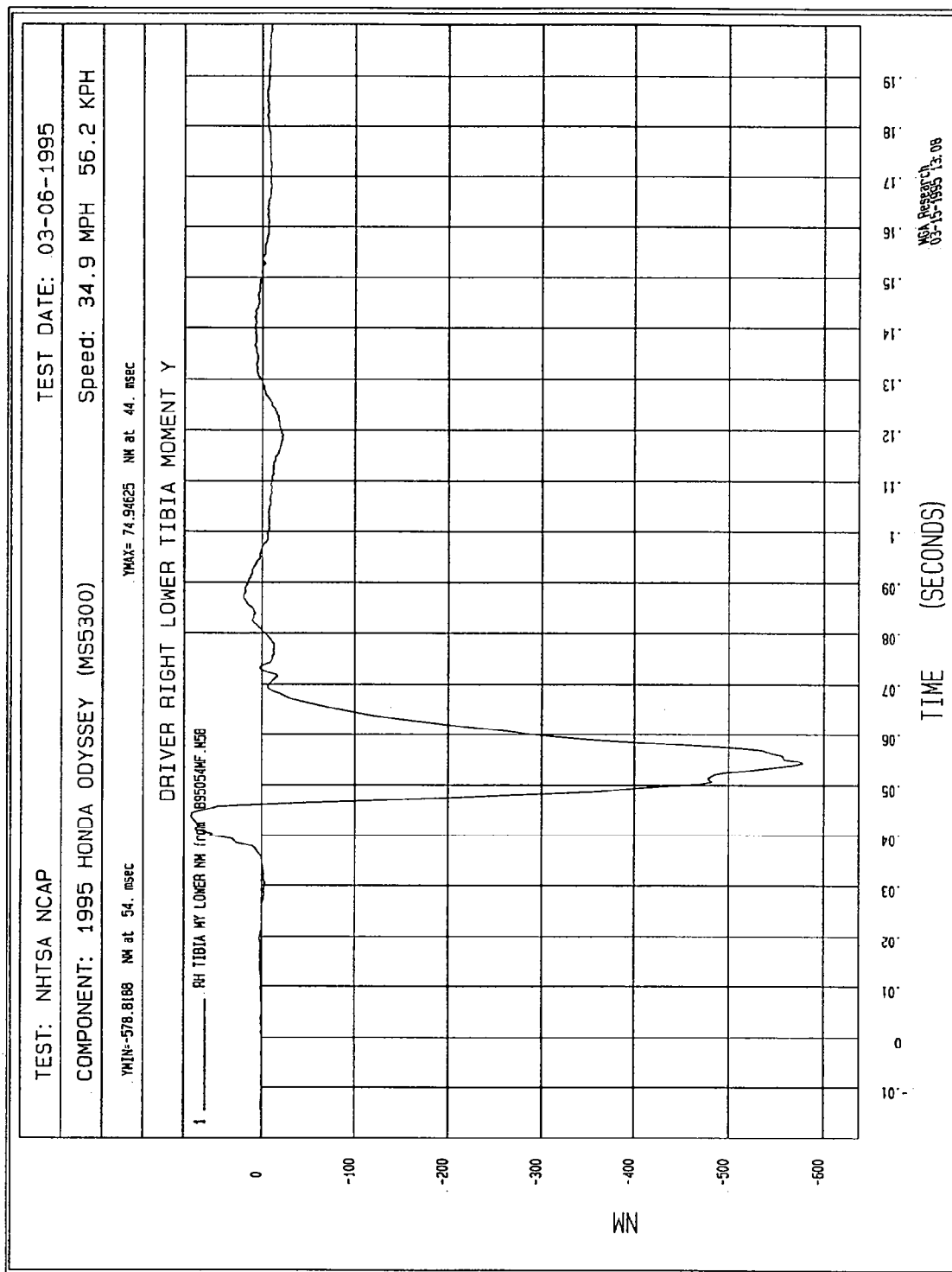


Figure B-79 - Driver Right Lower Tibia Moment Y vs. Time

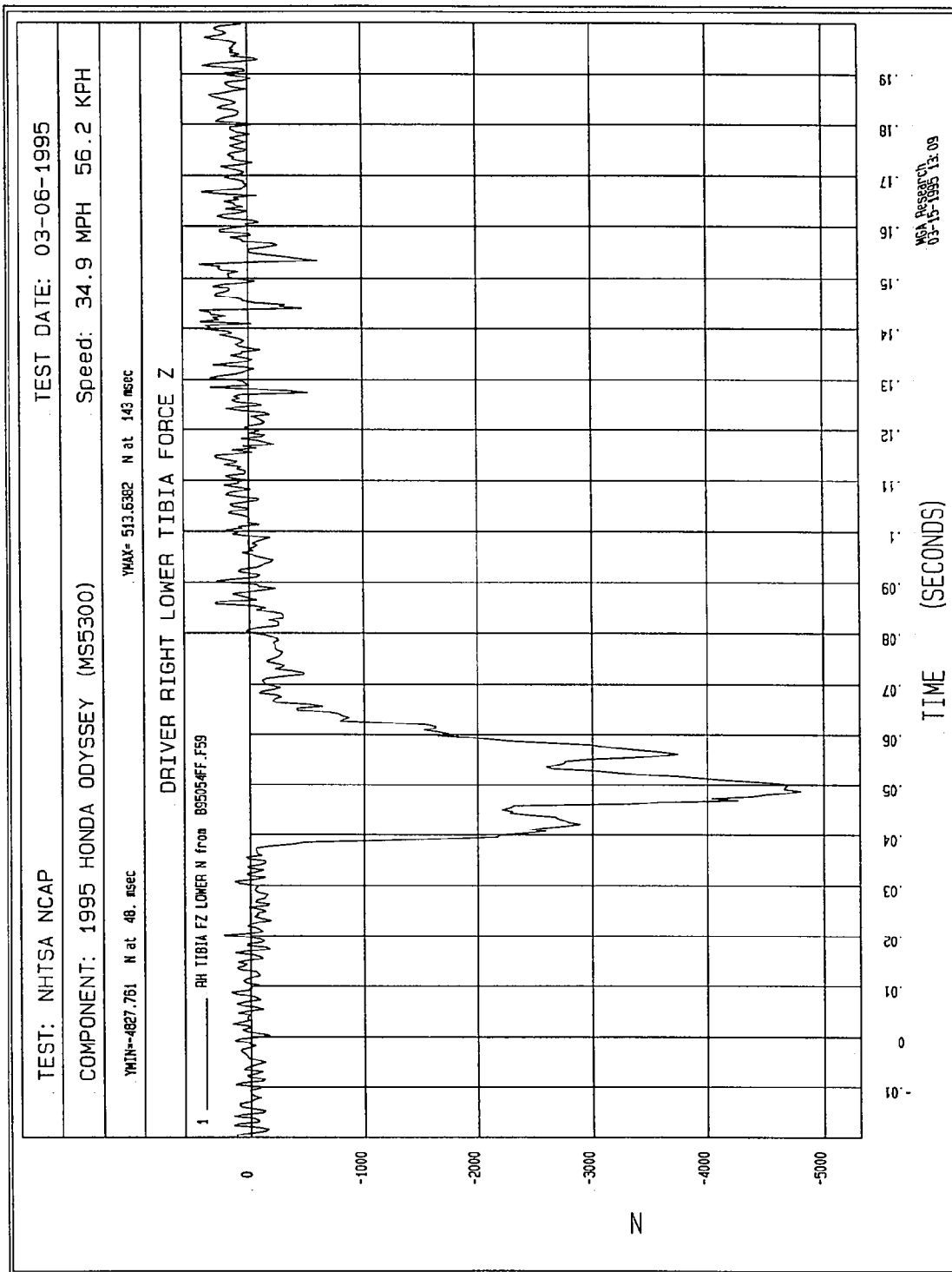


Figure B-80 - Driver Right Lower Tibia Force Z vs. Time

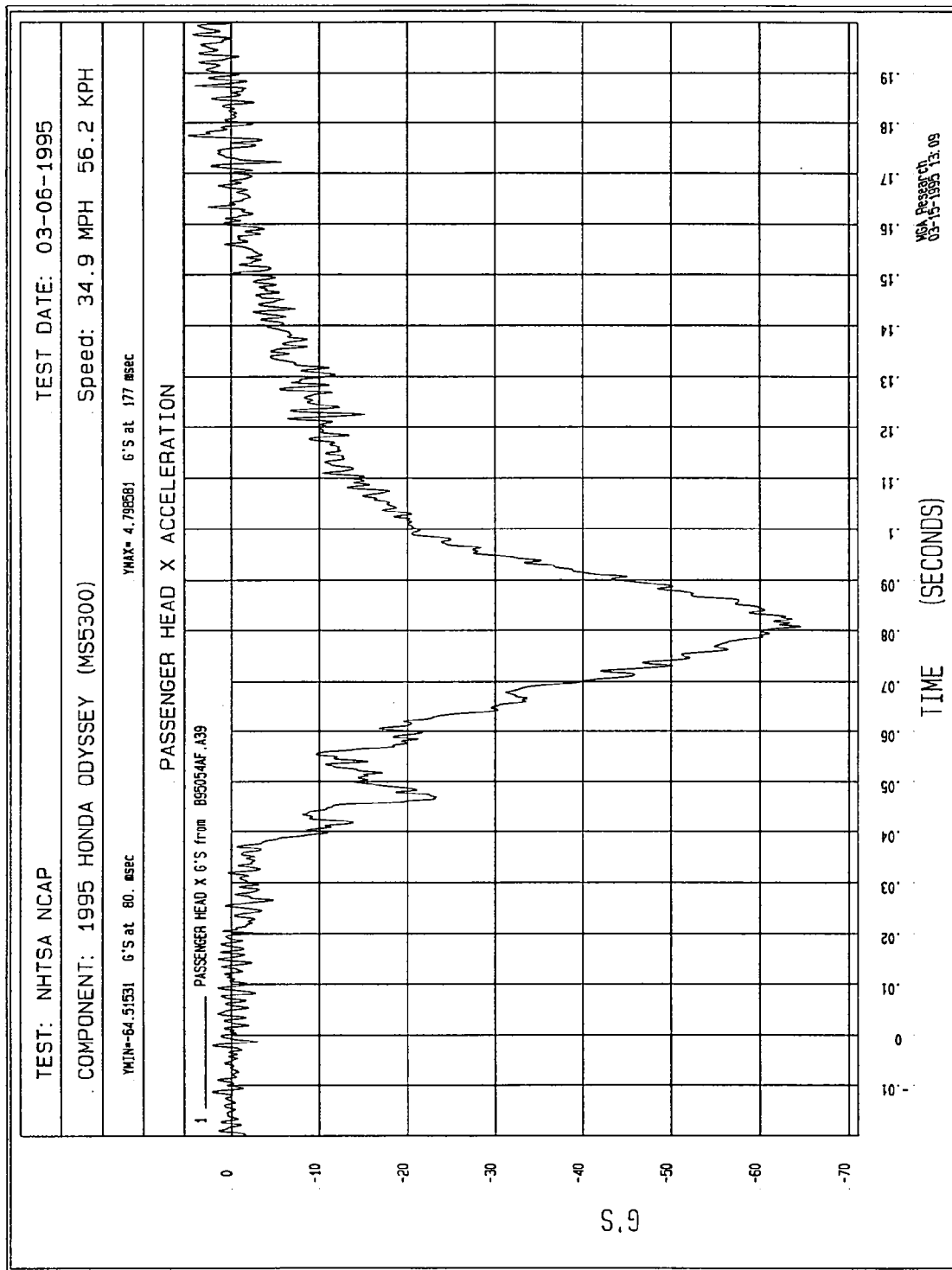


Figure B-81 - Passenger Head X Acceleration vs. Time

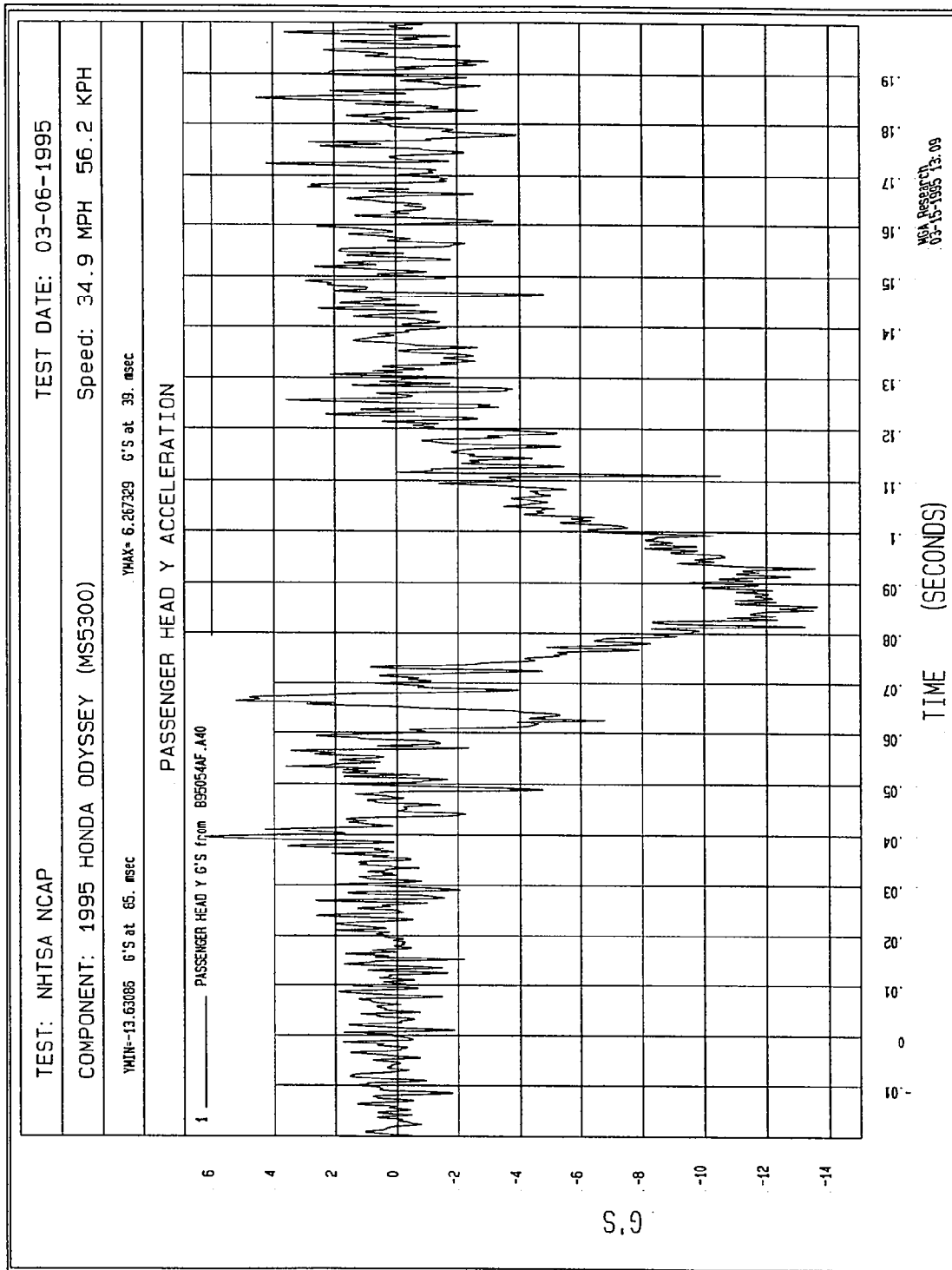


Figure B-82 - Passenger Head Y Acceleration vs. Time

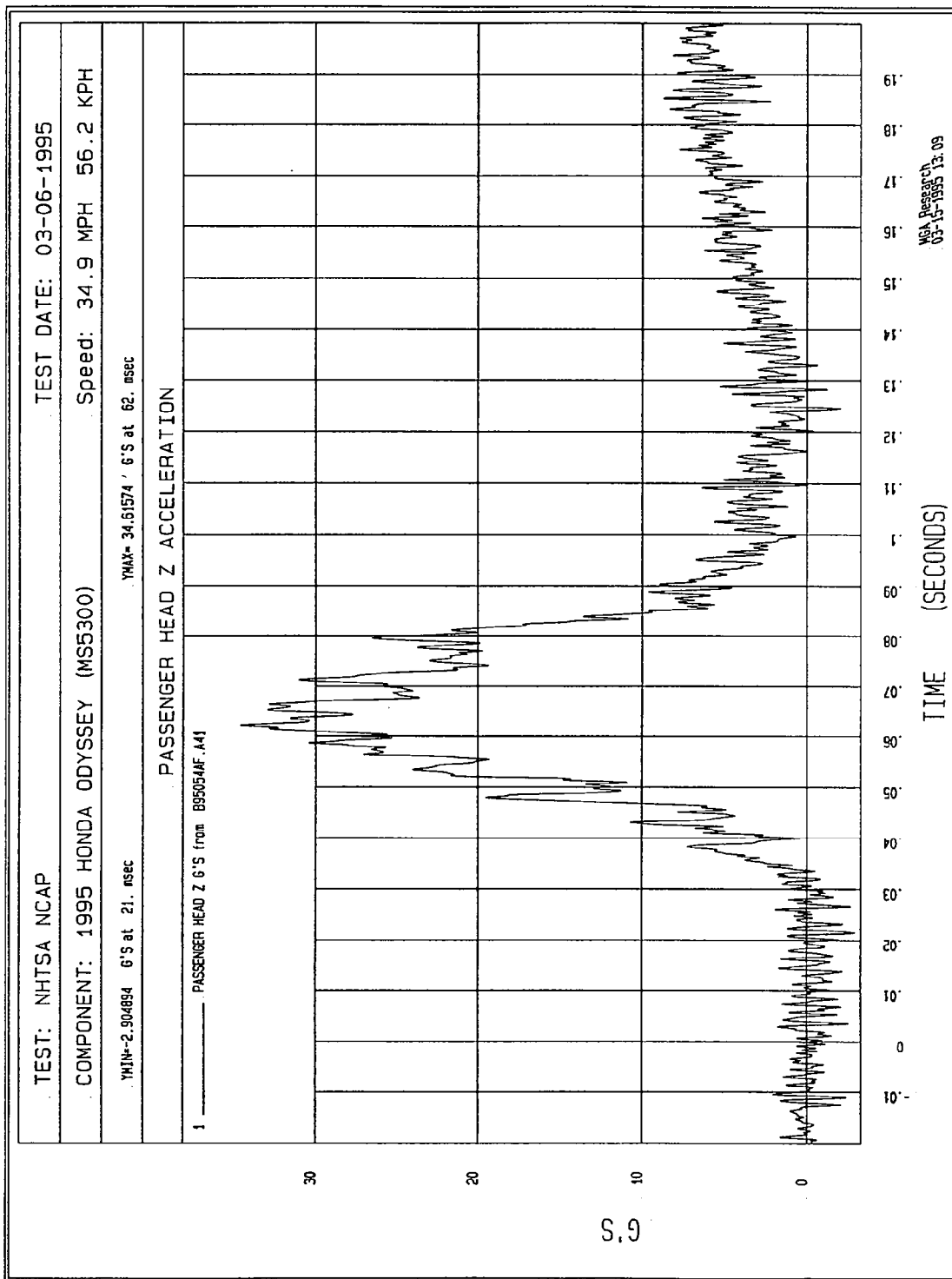


Figure B-83 - Passenger Head Z Acceleration vs. Time

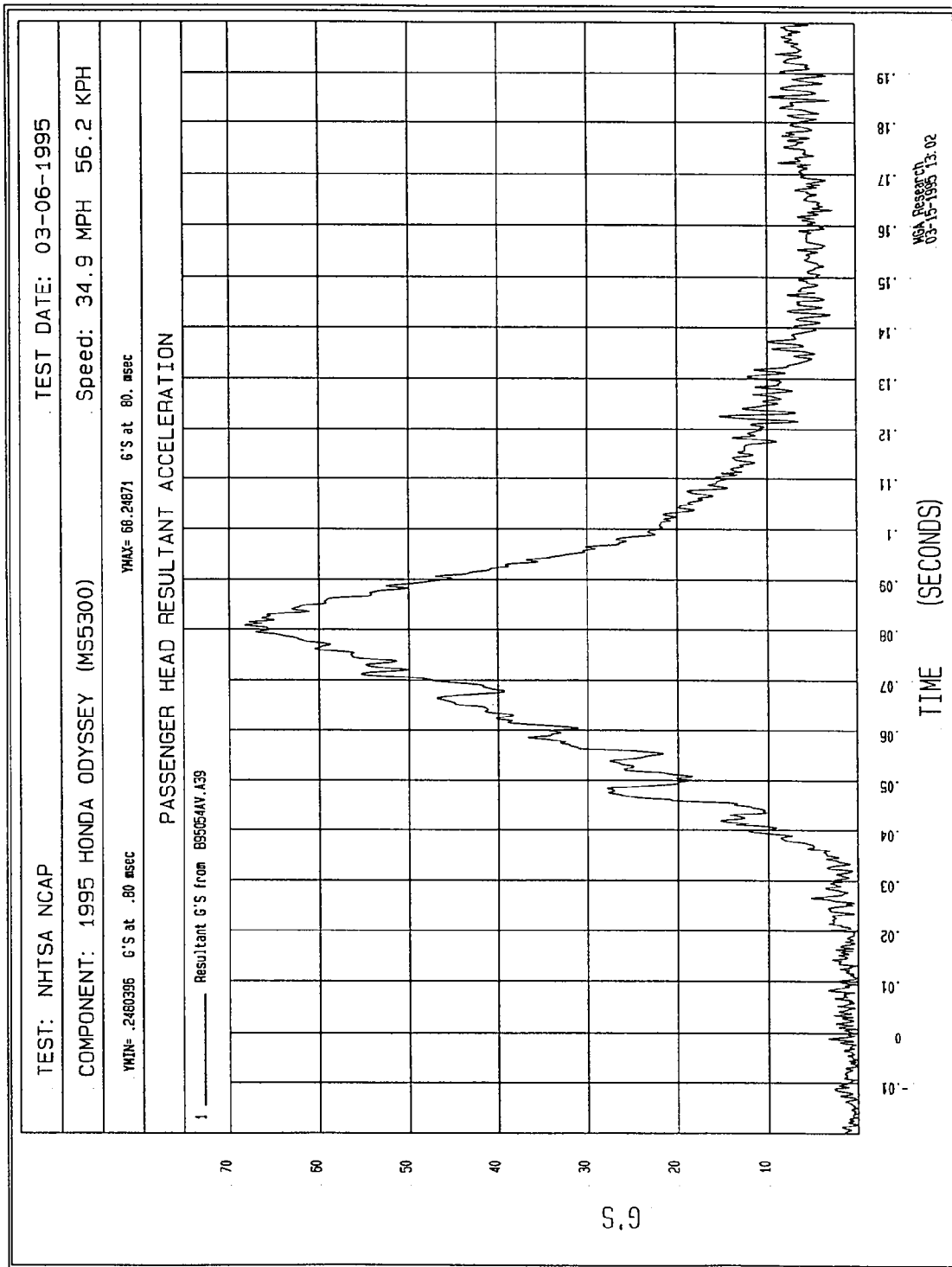
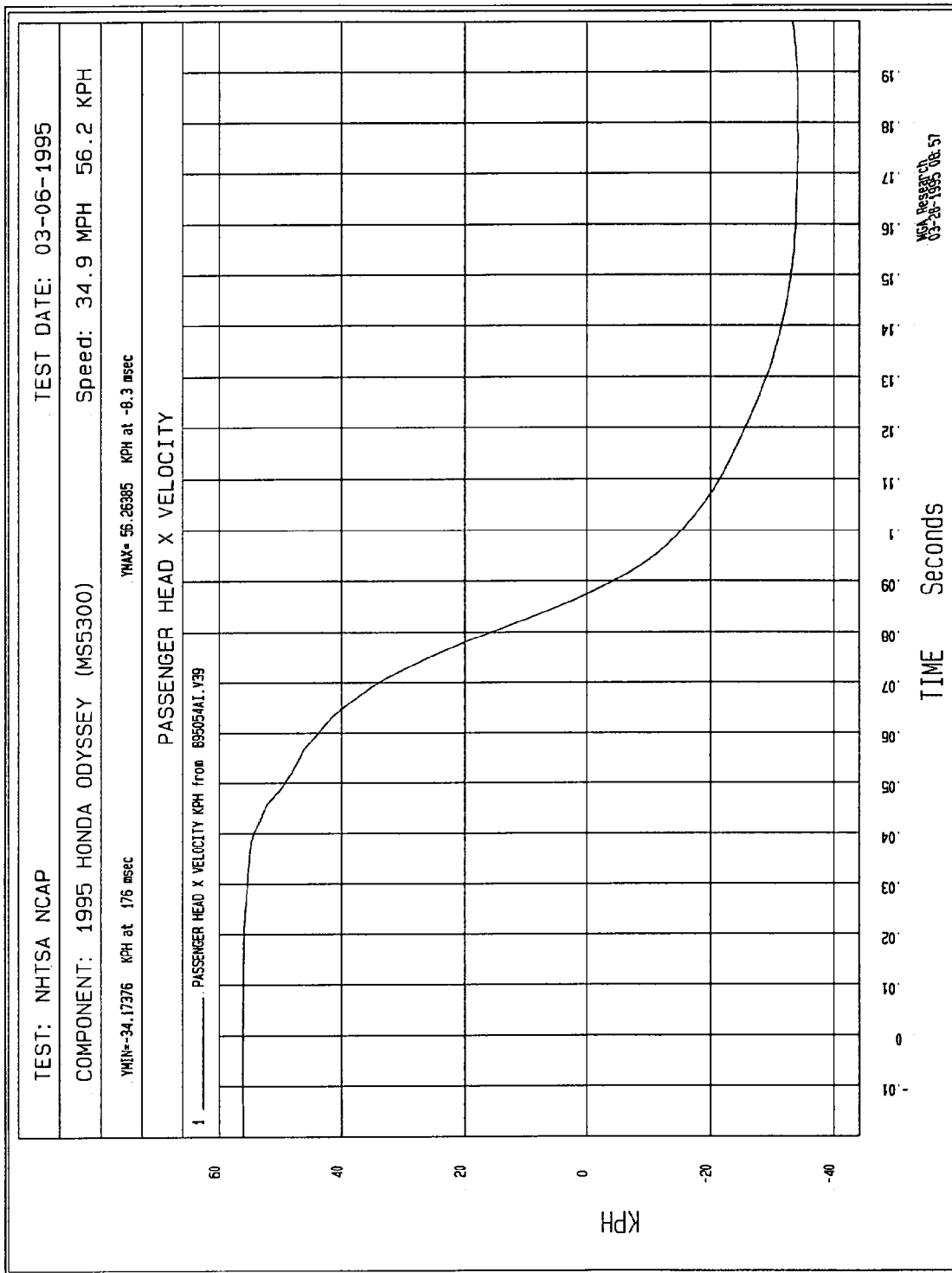


Figure B-84 - Passenger Head Resultant Acceleration vs. Time



B-85

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

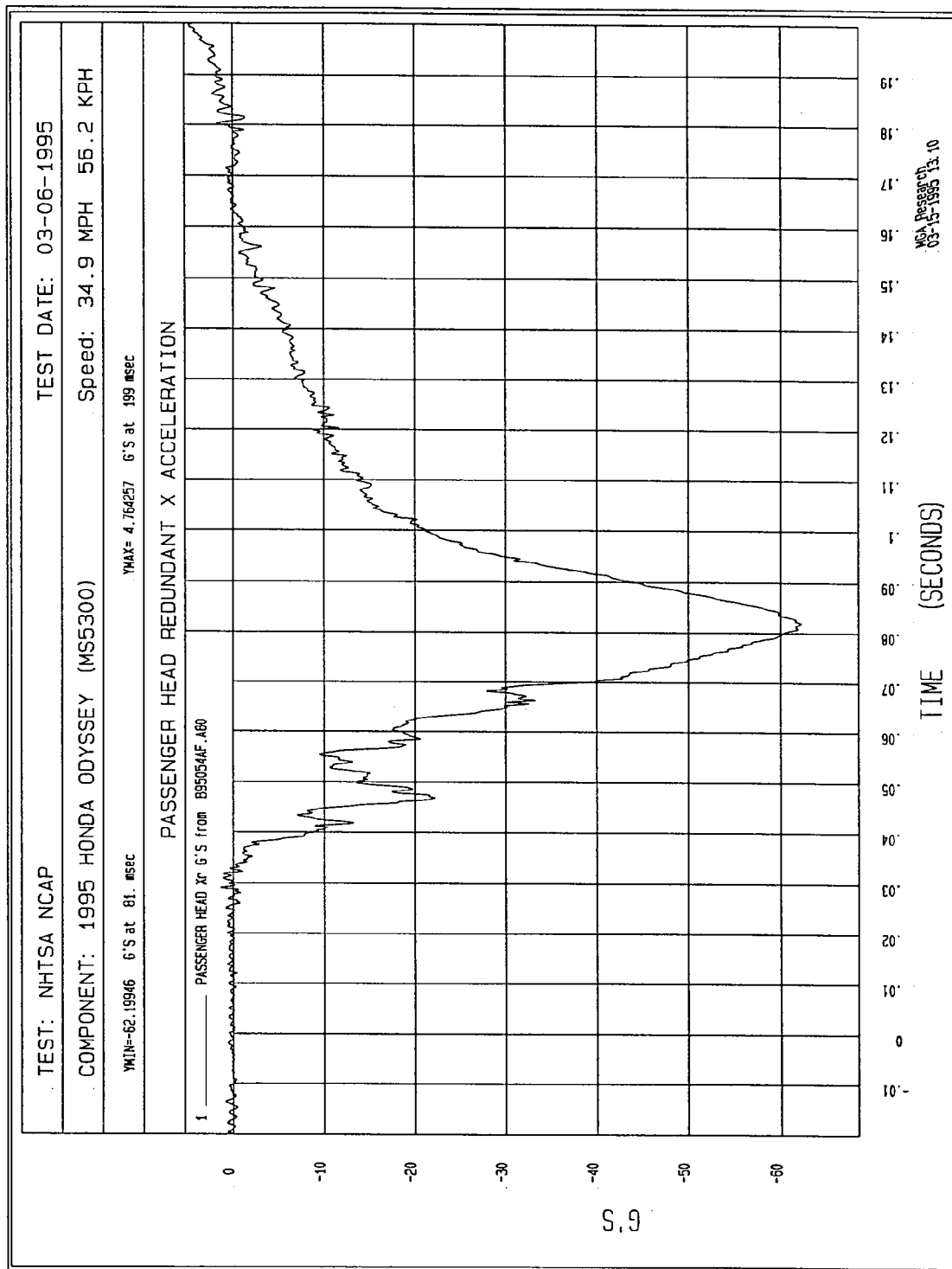


Figure B-86 - Passenger Head X Redundant Acceleration vs. Time

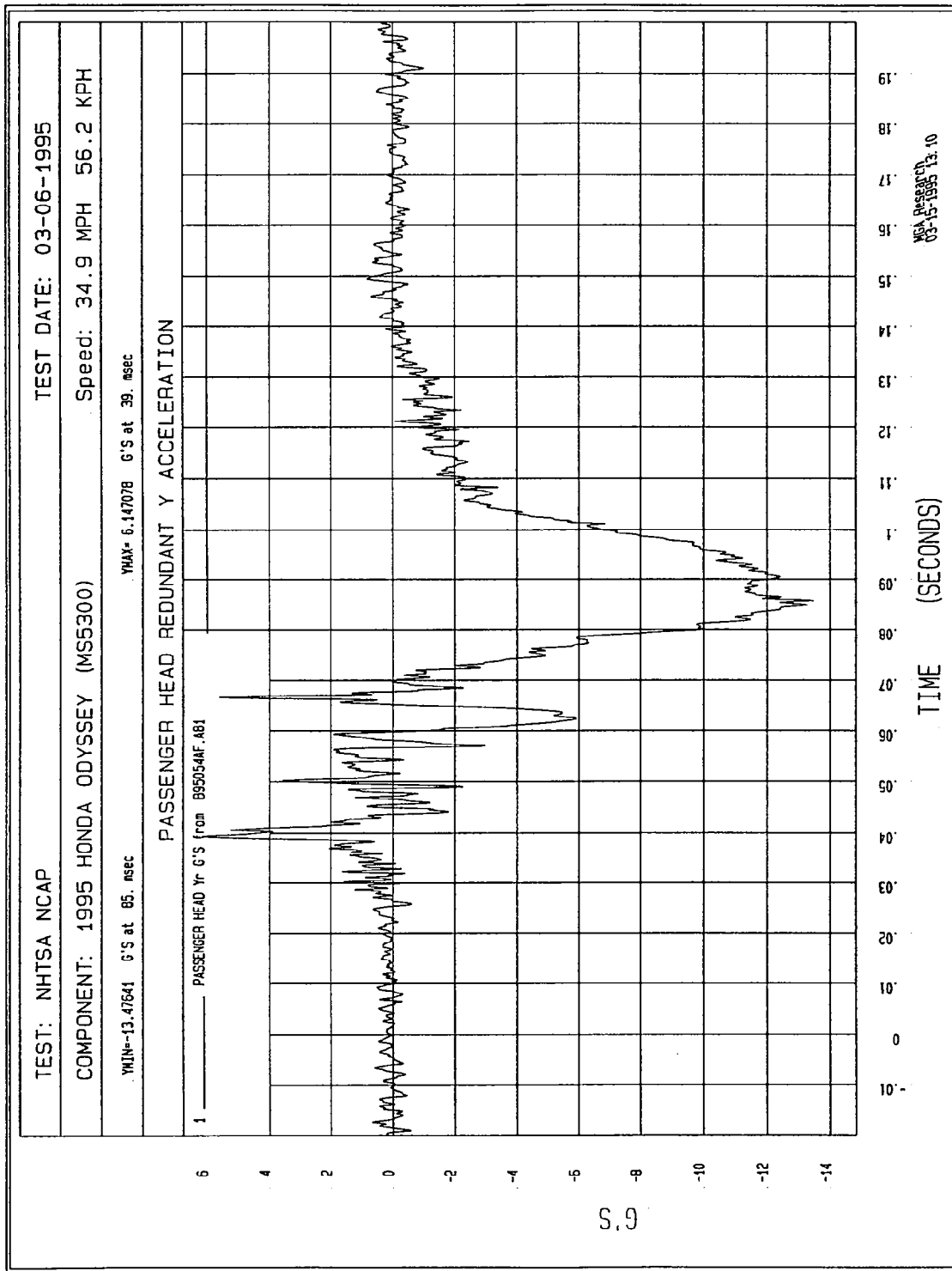


Figure B-87 - Passenger Head Y Redundant Acceleration vs. Time

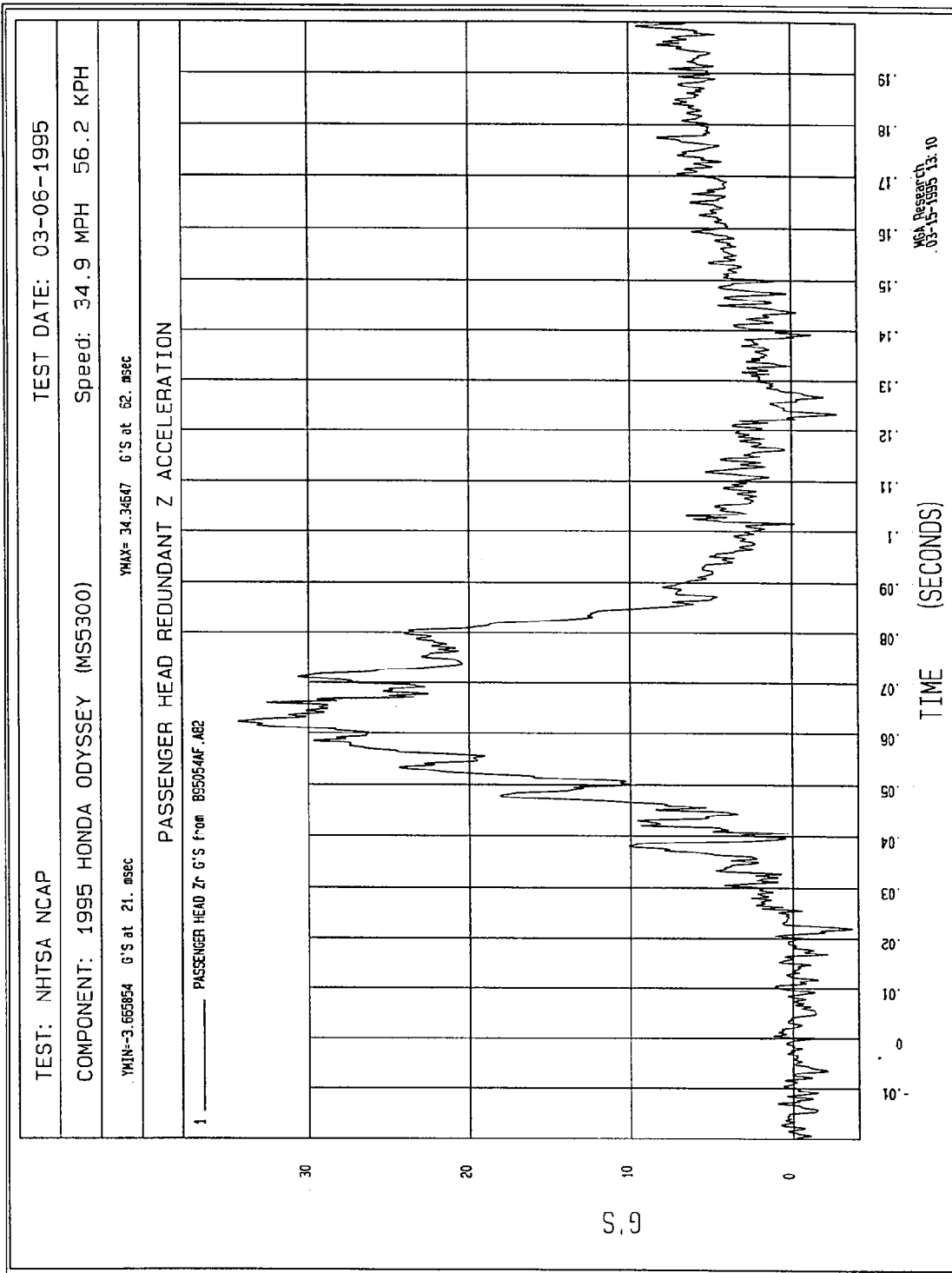


Figure B-88 - Passenger Head Z Redundant Acceleration vs. Time

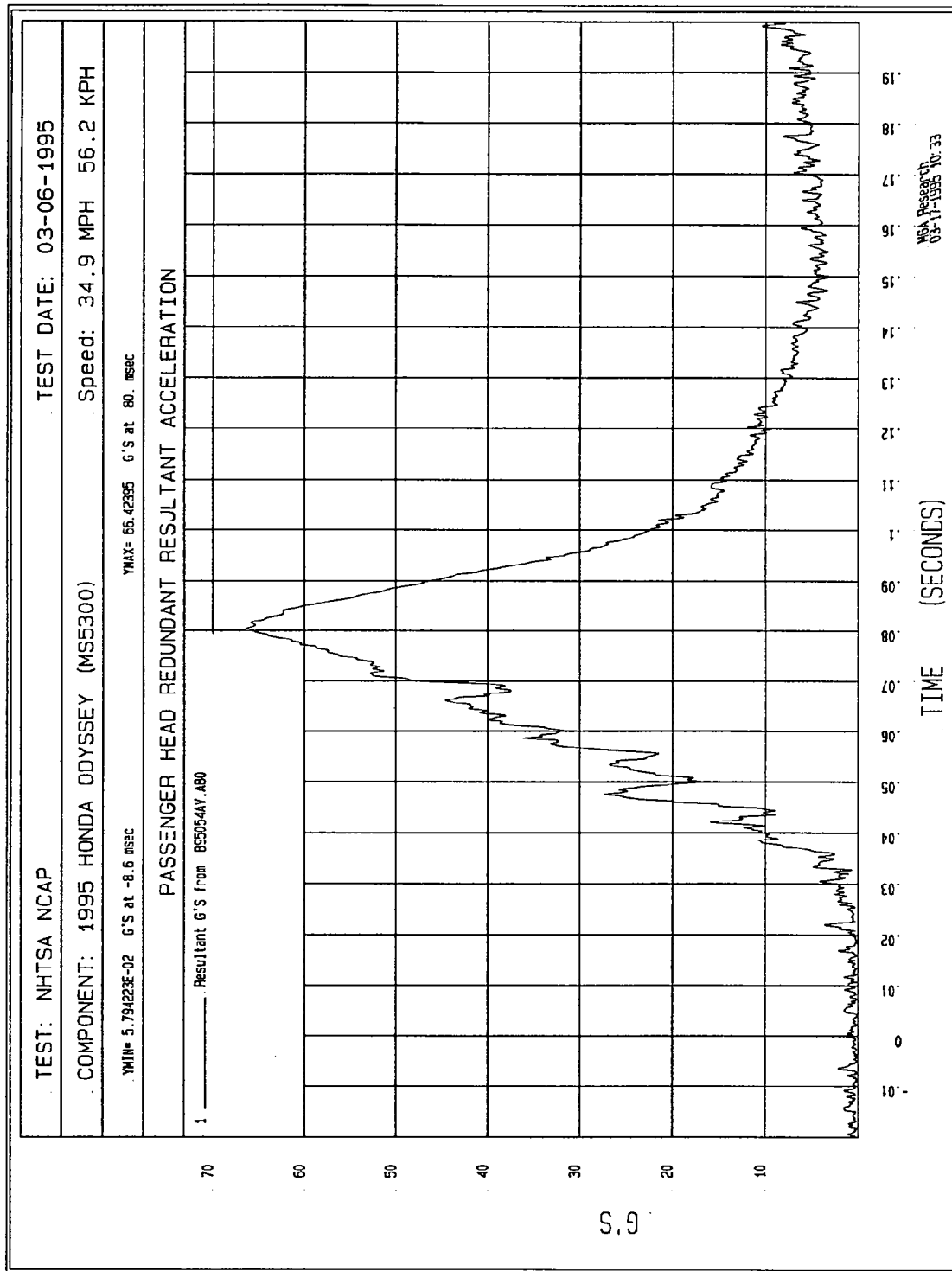


Figure B-89 - Passenger Head Redundant Resultant Accel. vs. Time

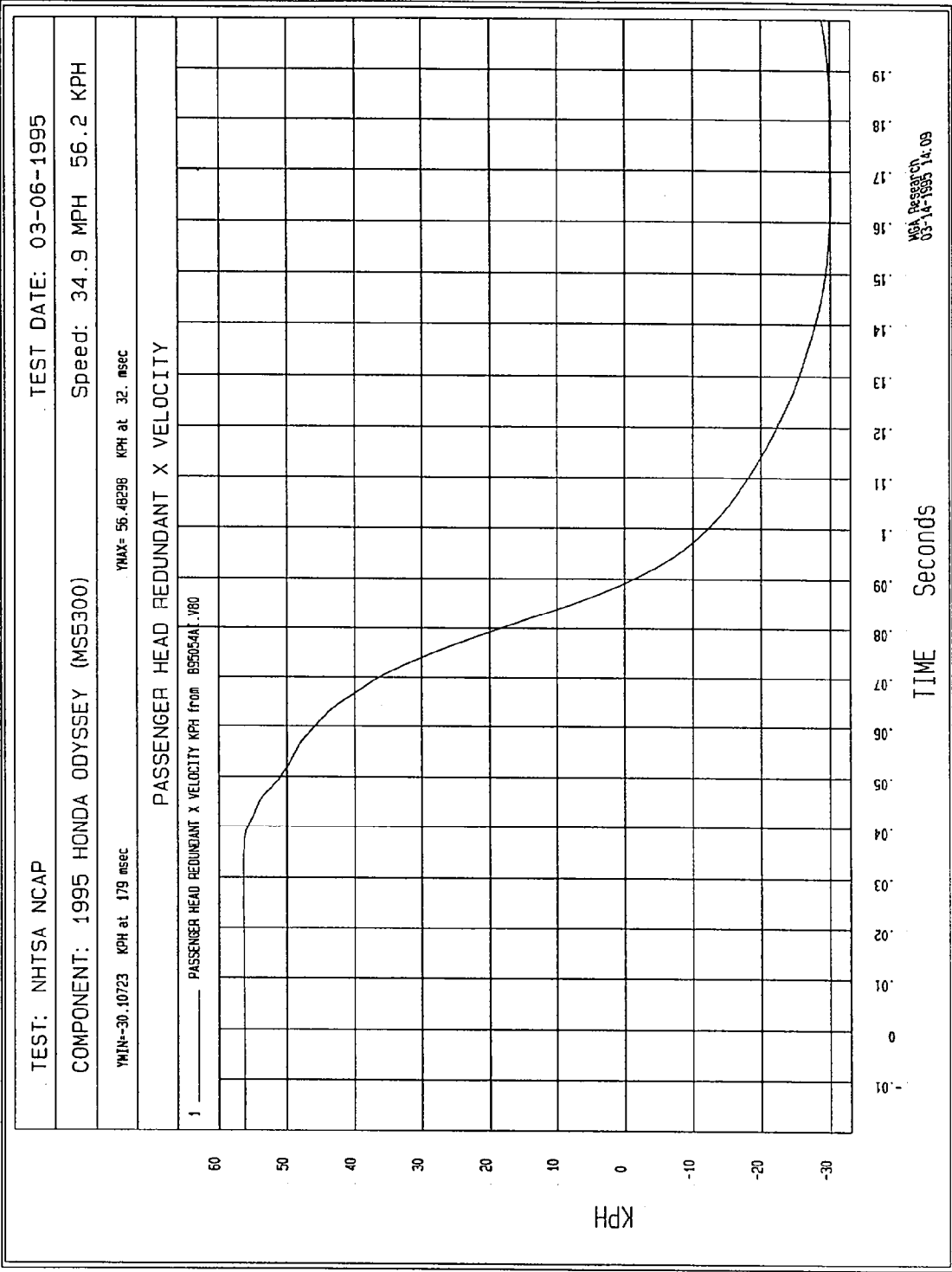


Figure B-90 - Passenger Head X Redundant Velocity vs. Time

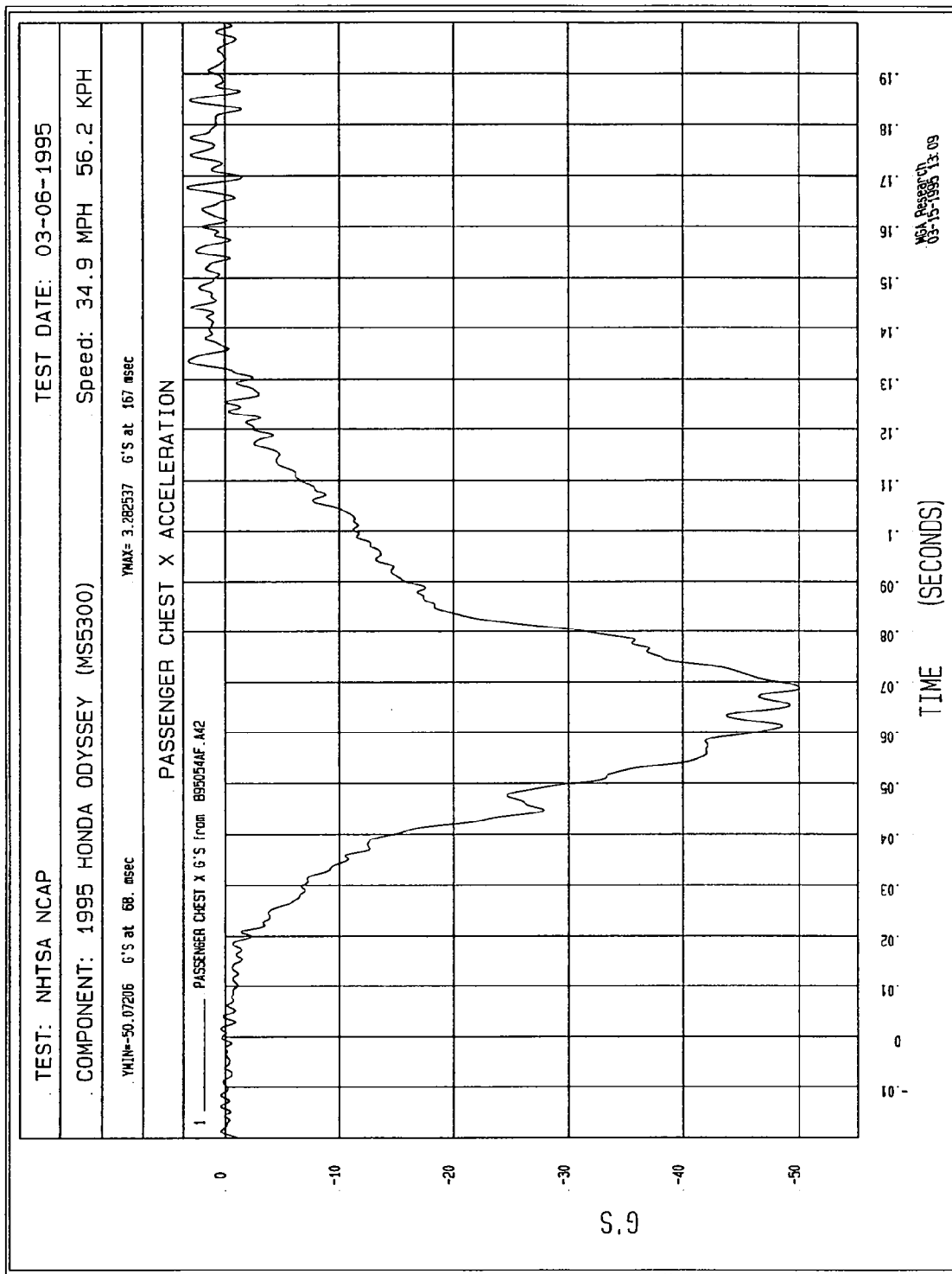


Figure B-91 - Passenger Chest X Acceleration vs. Time

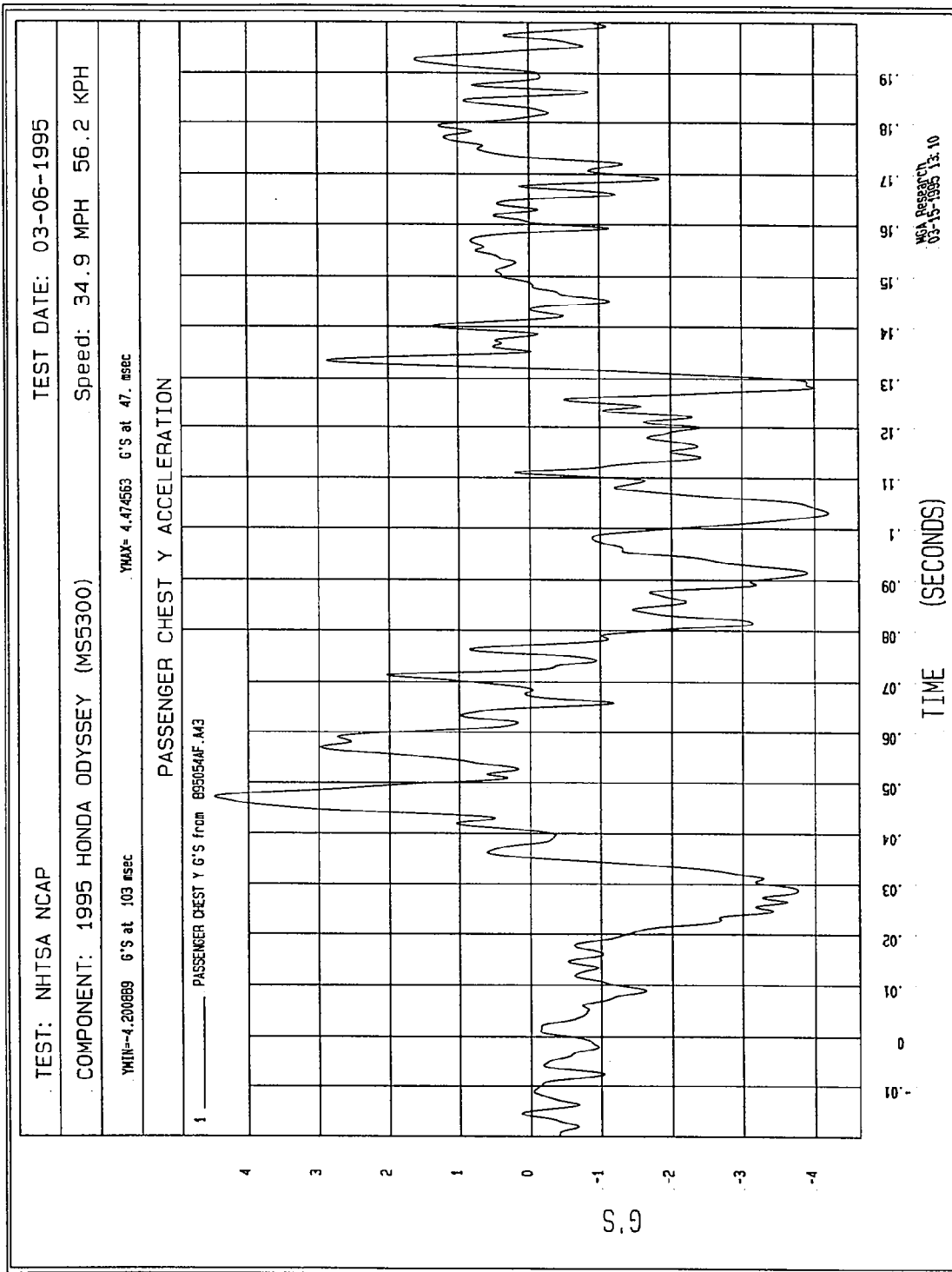


Figure B-92 - Passenger Chest Y Acceleration vs. Time

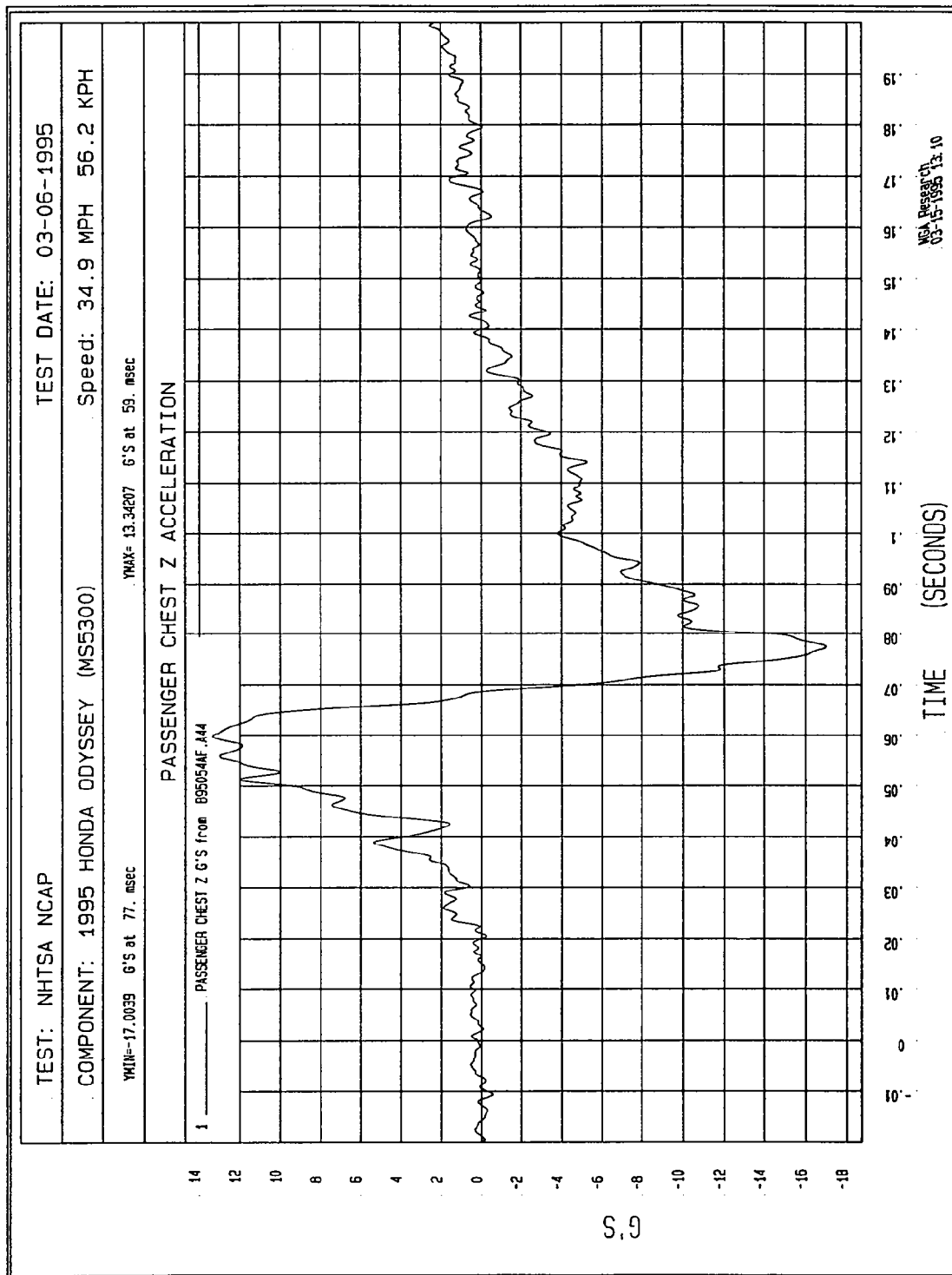


Figure B-93 - Passenger Chest Z Acceleration vs. Time

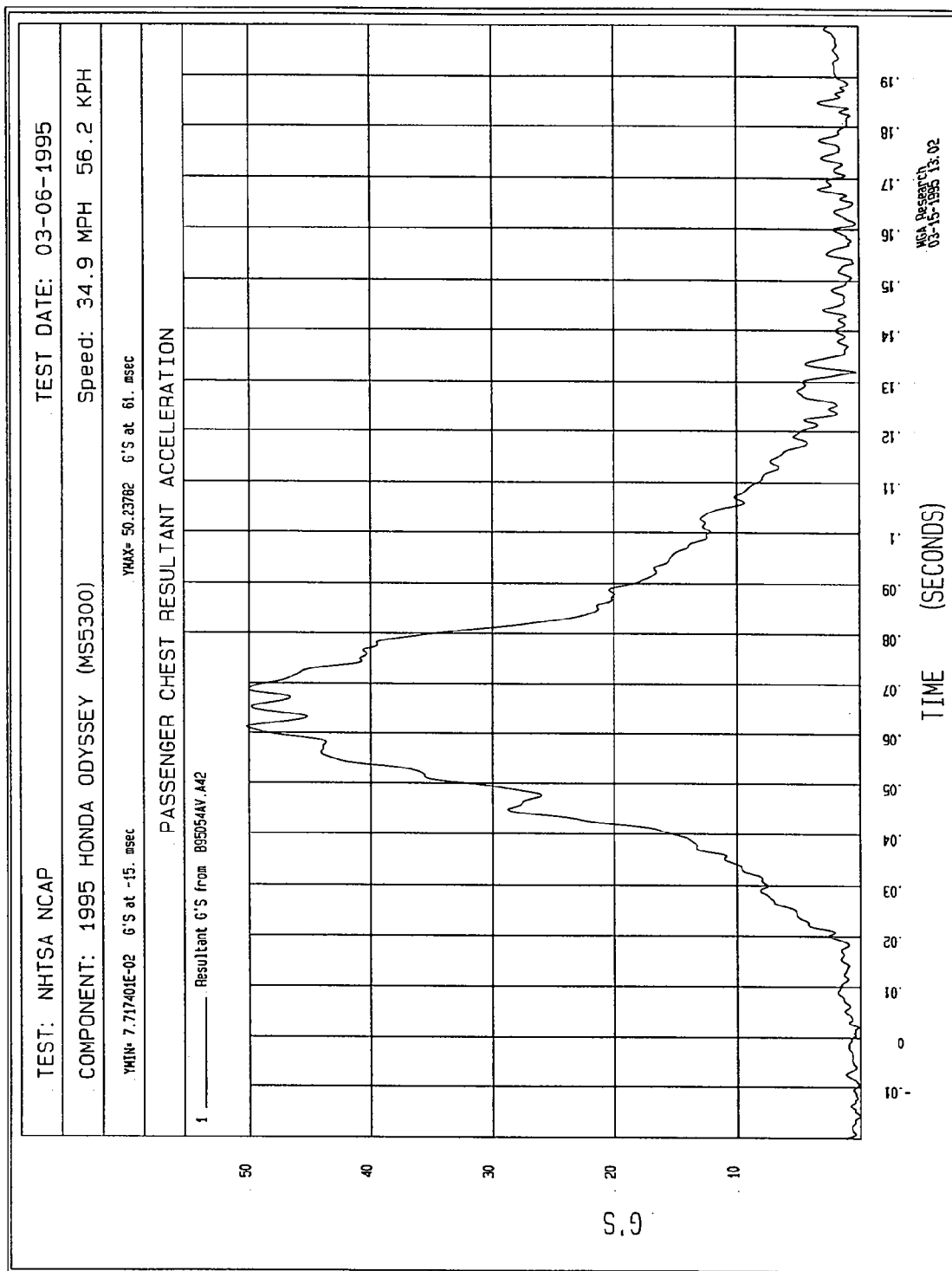


Figure B-94 - Passenger Chest Resultant Accel. vs. Time

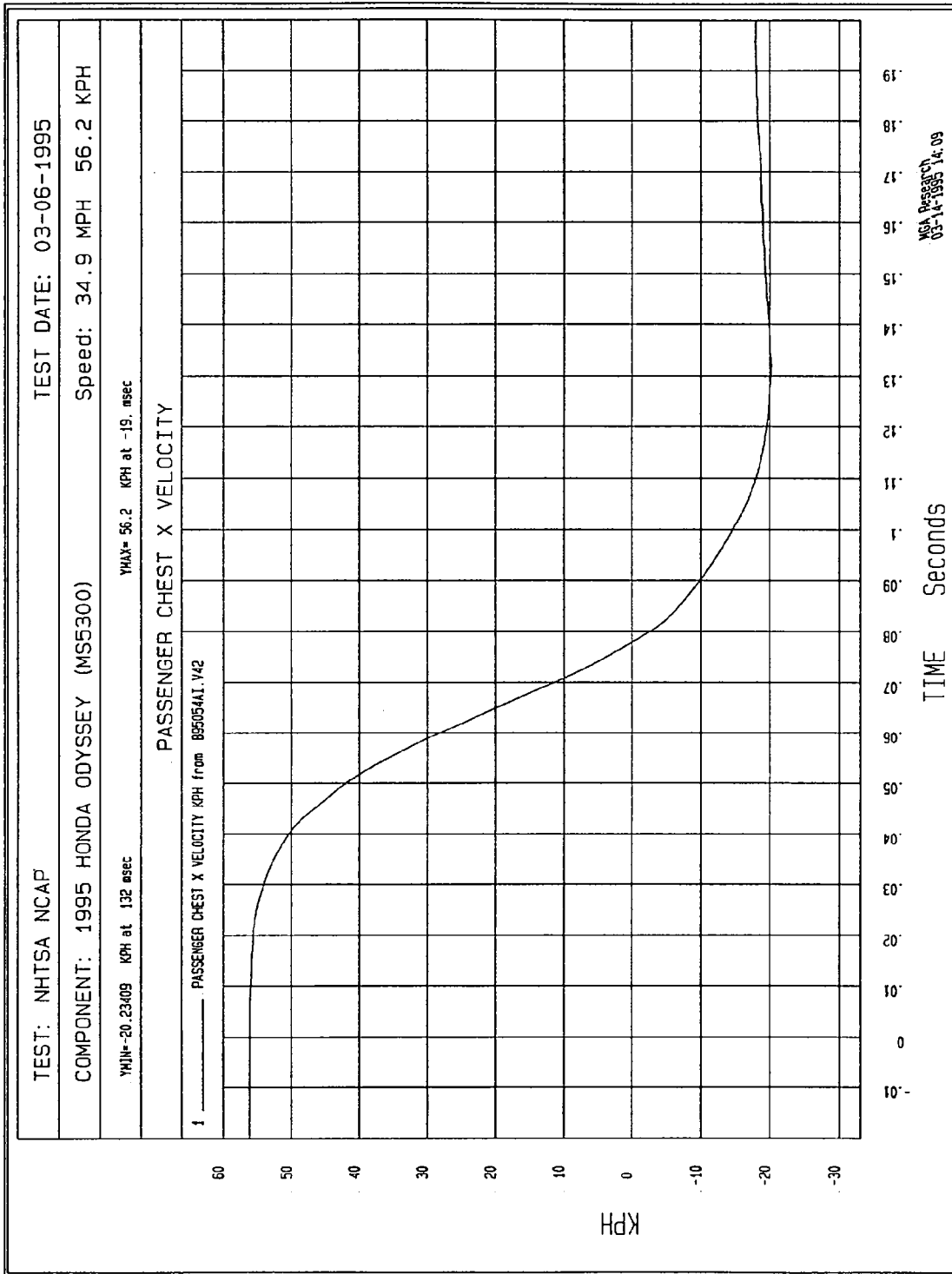


Figure B-95 - Passenger Chest X Velocity vs. Time

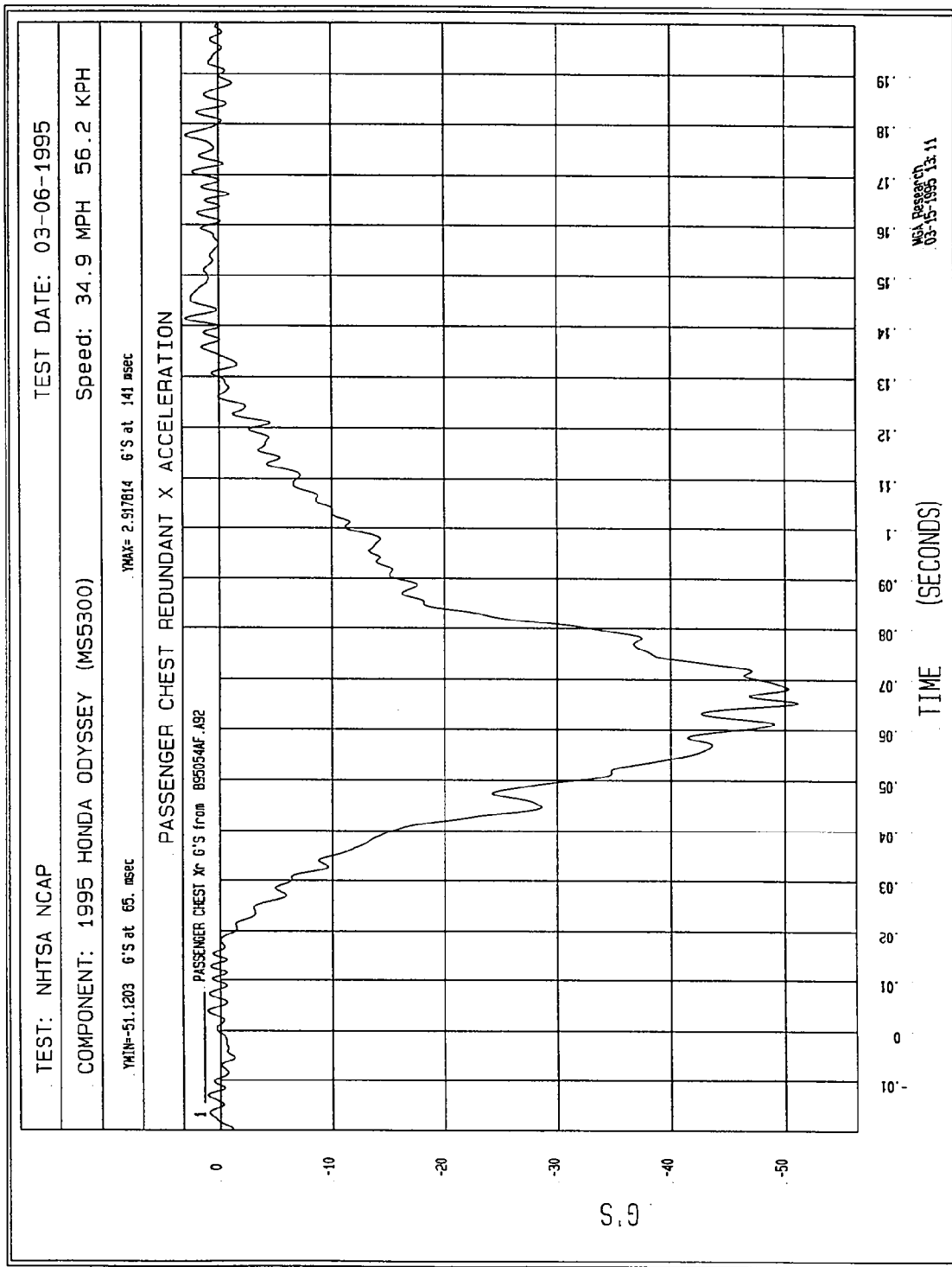


Figure B-96 - Passenger Chest X Redundant Acceleration vs. Time

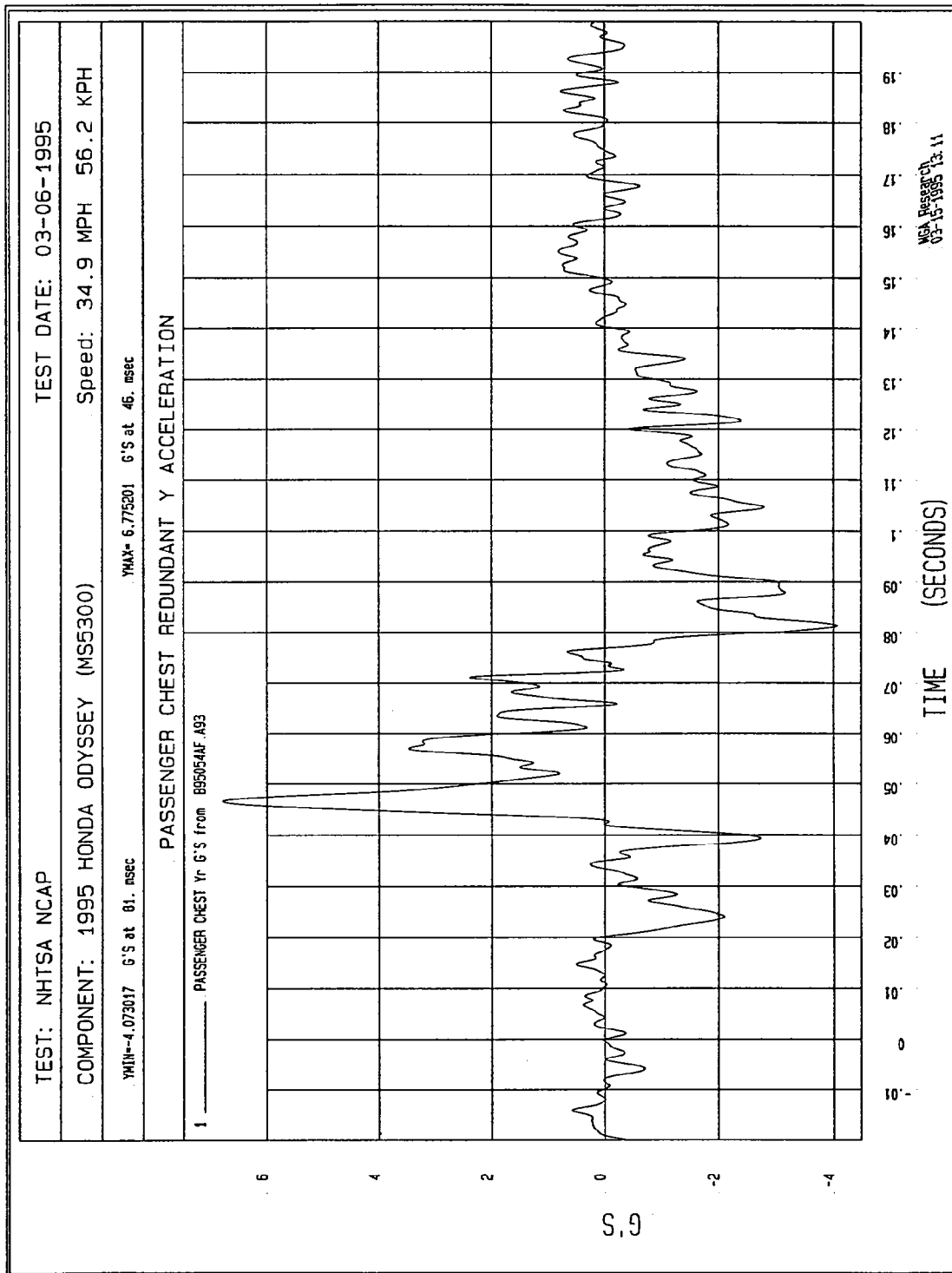


Figure B-97 - Passenger Chest Y Redundant Acceleration vs. Time

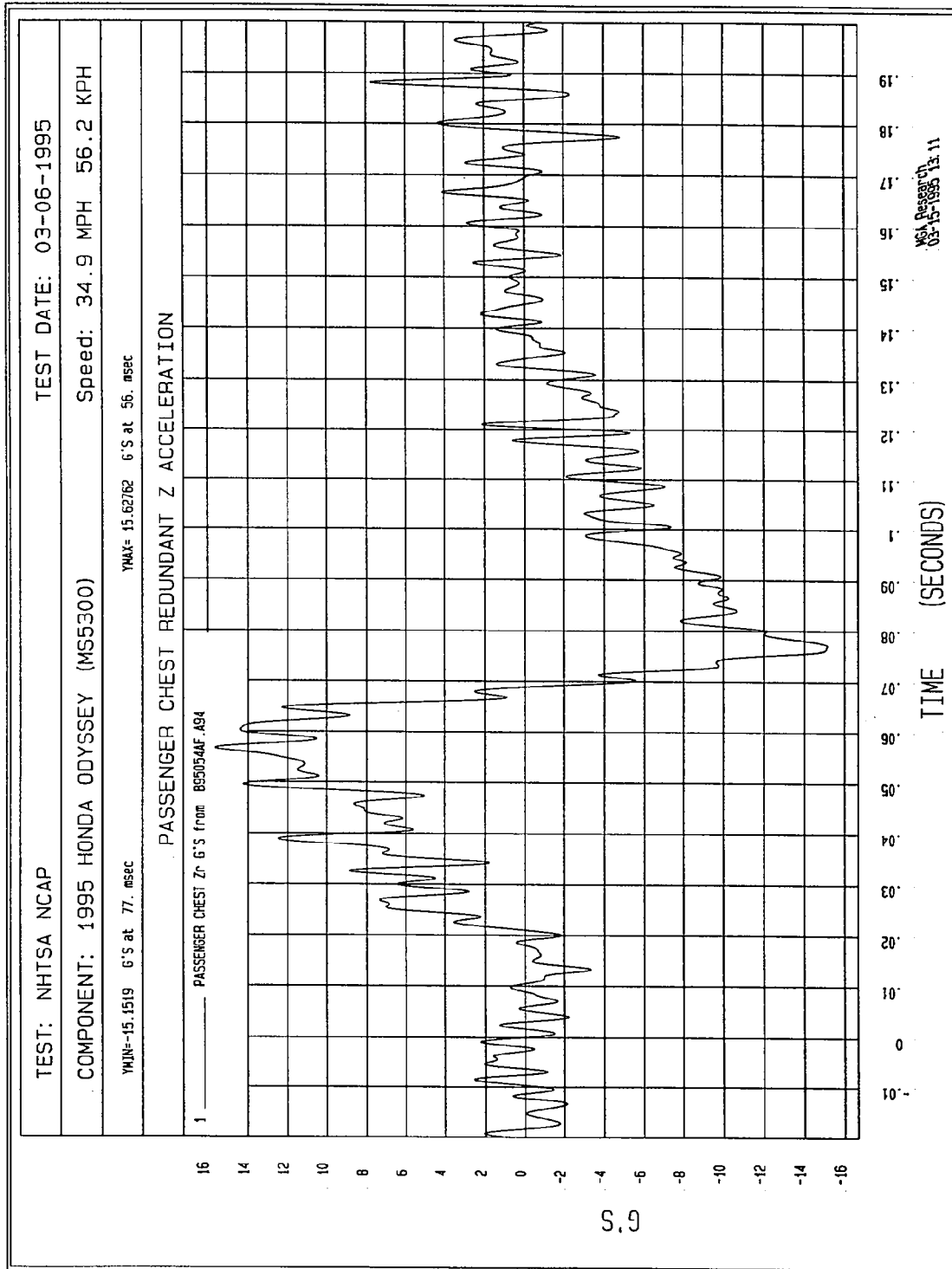


Figure B-98 - Passenger Chest Z Redundant Acceleration vs. Time

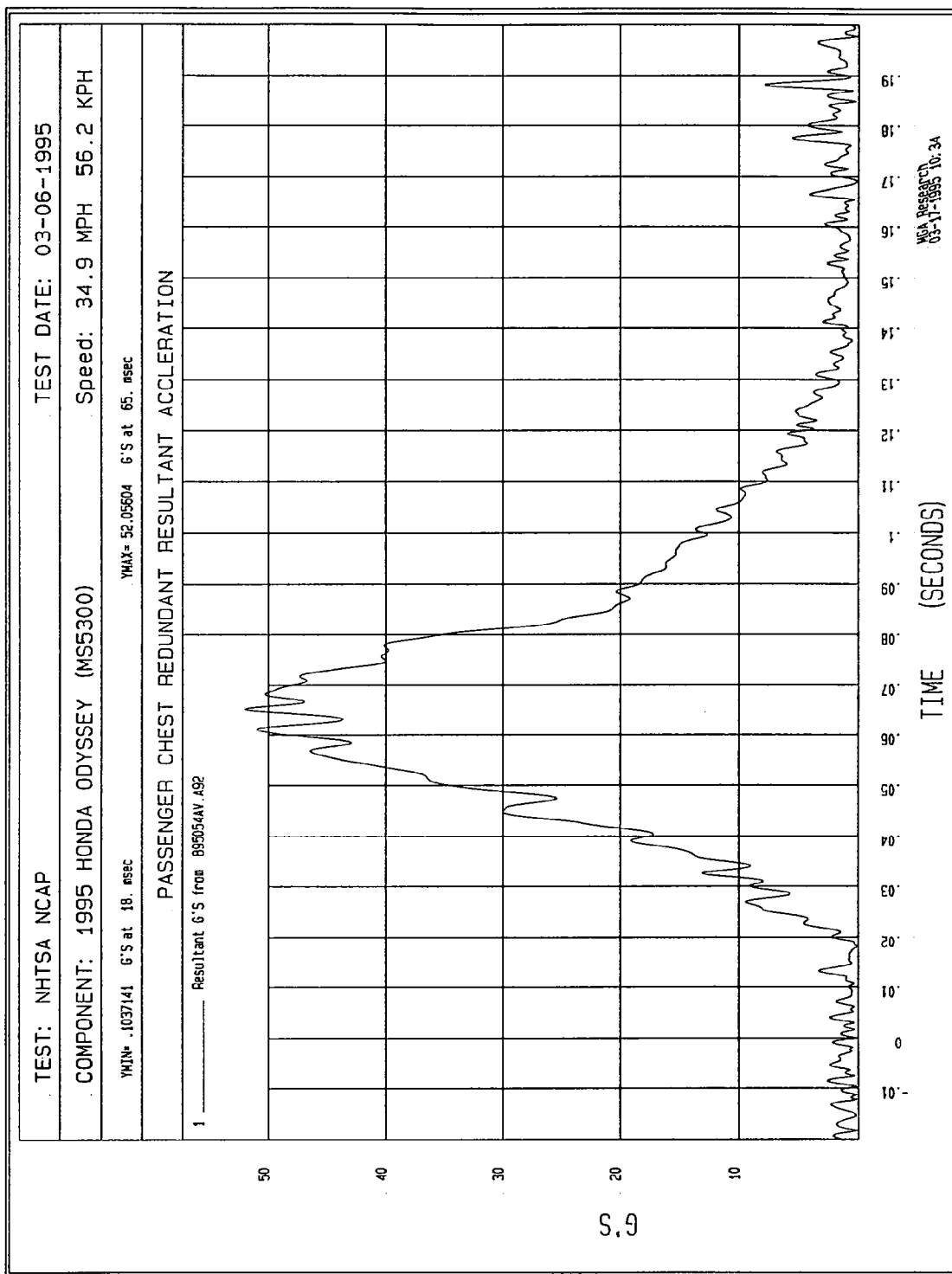


Figure B-99 - Passenger Chest Redundant Resultant Accel. vs. Time

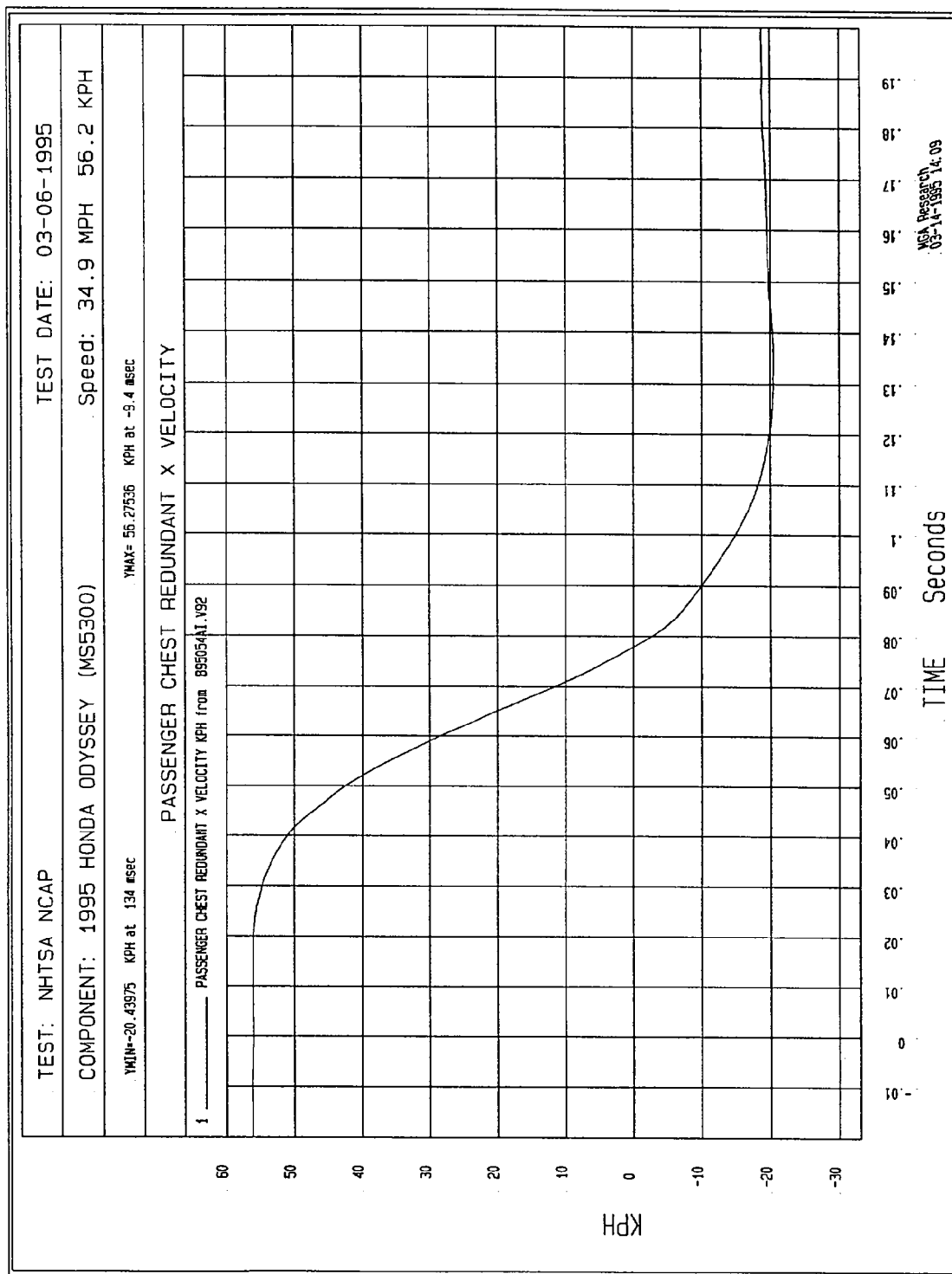


Figure B-100 - Passenger Chest X Redundant Velocity vs. Time

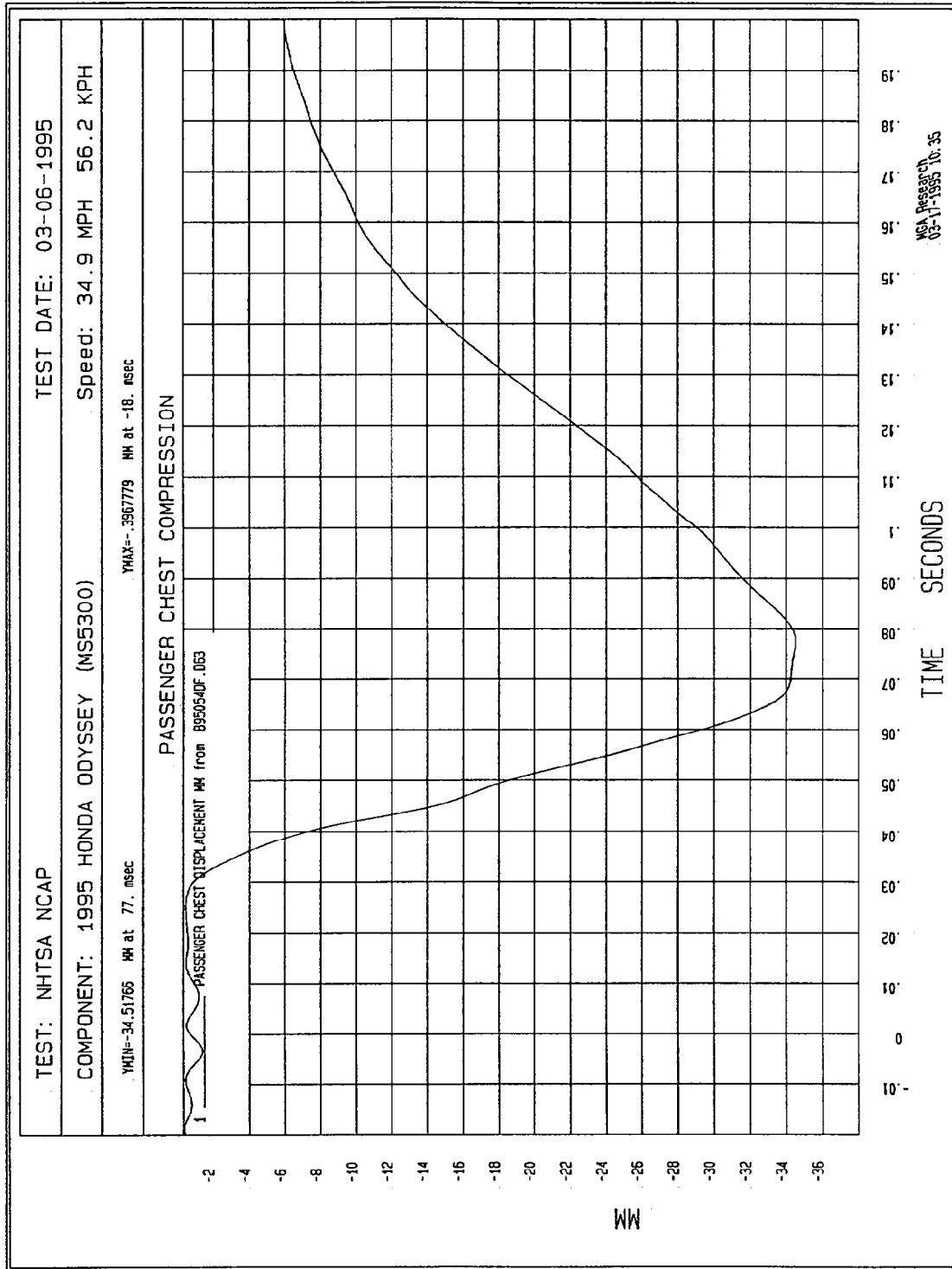


Figure B-101 - Passenger Chest Compression vs. Time

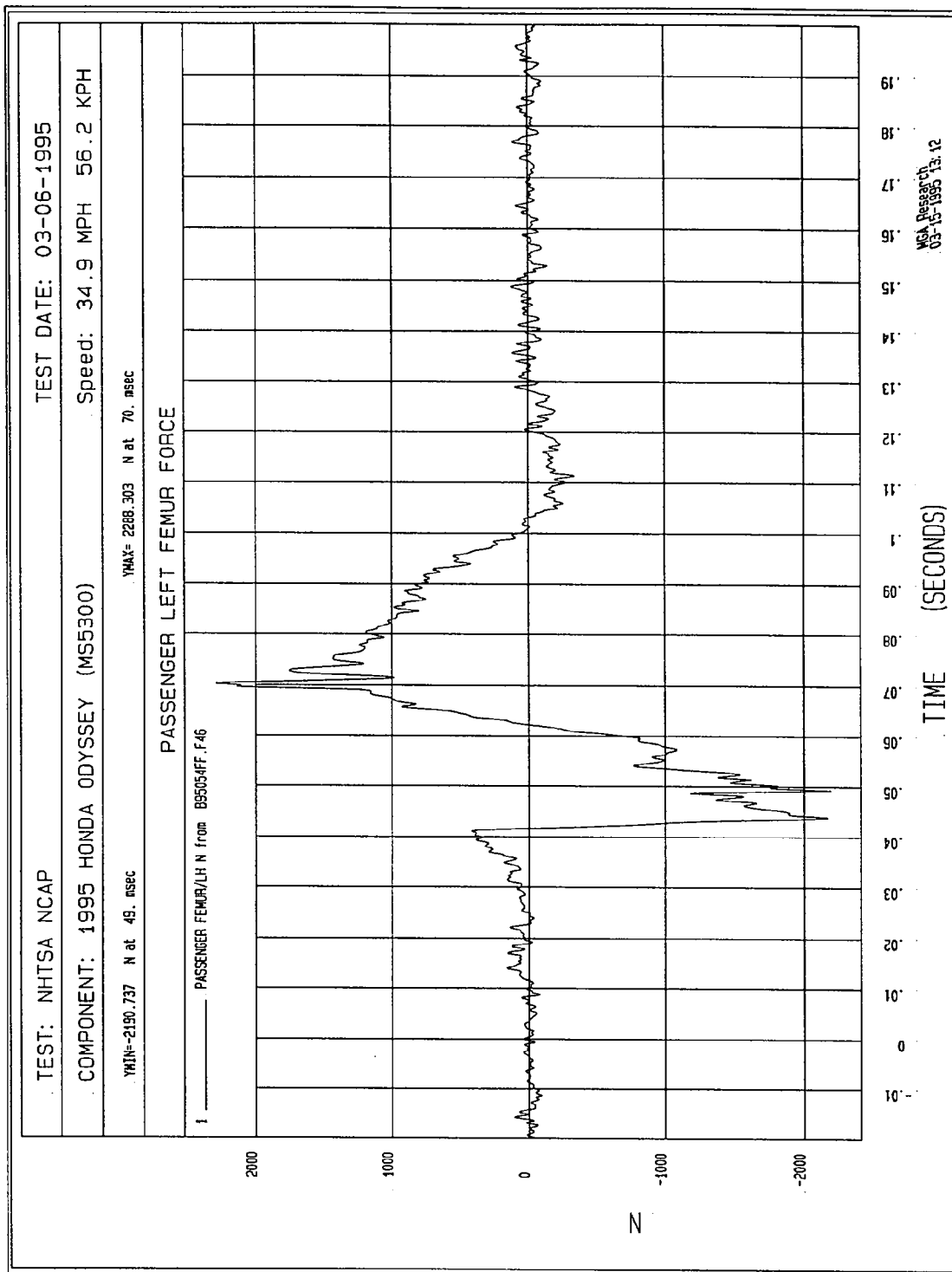


Figure B-102 - Passenger Left Femur Force vs. Time

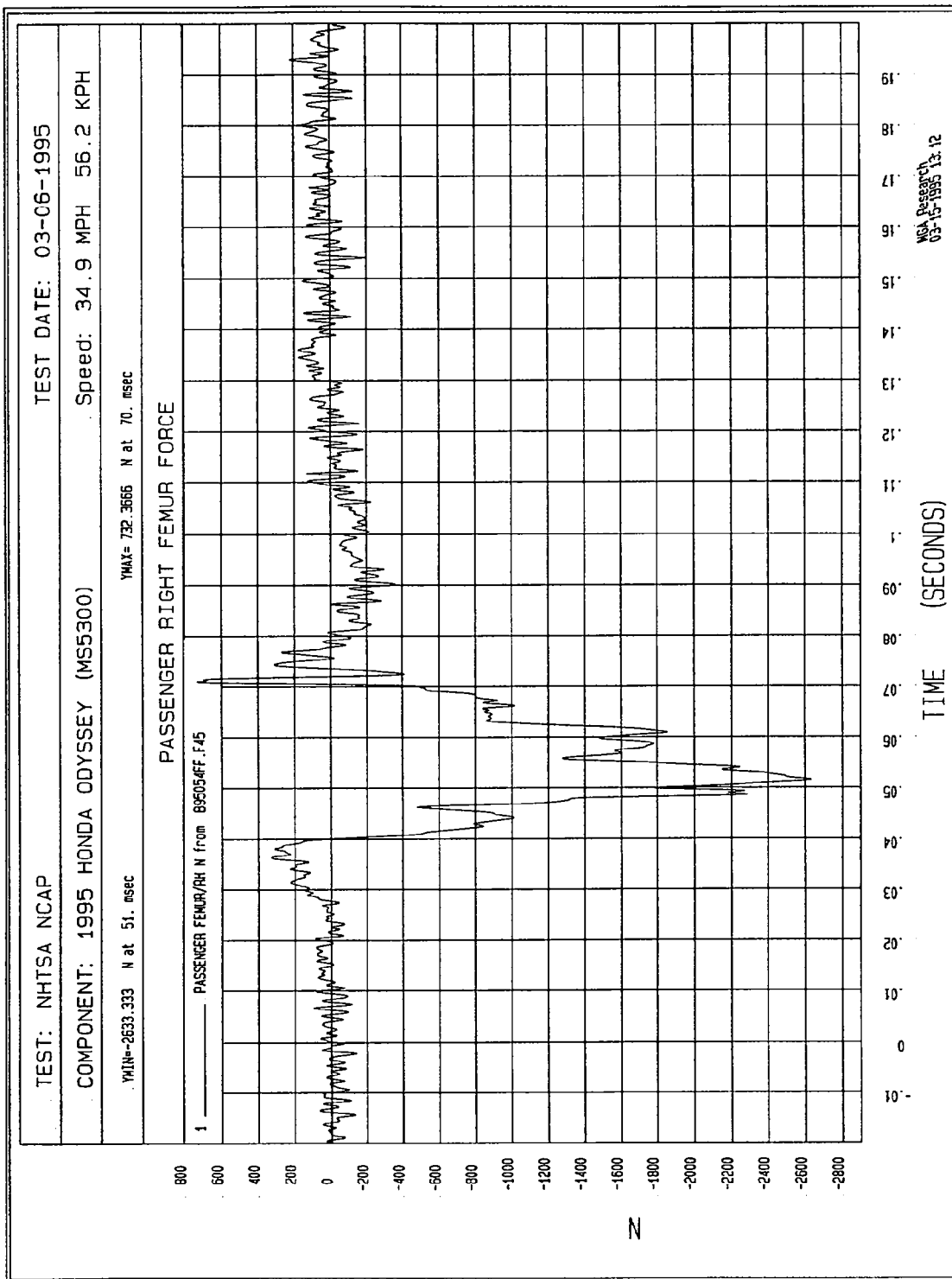


Figure B-103 - Passenger Right Femur Force vs. Time

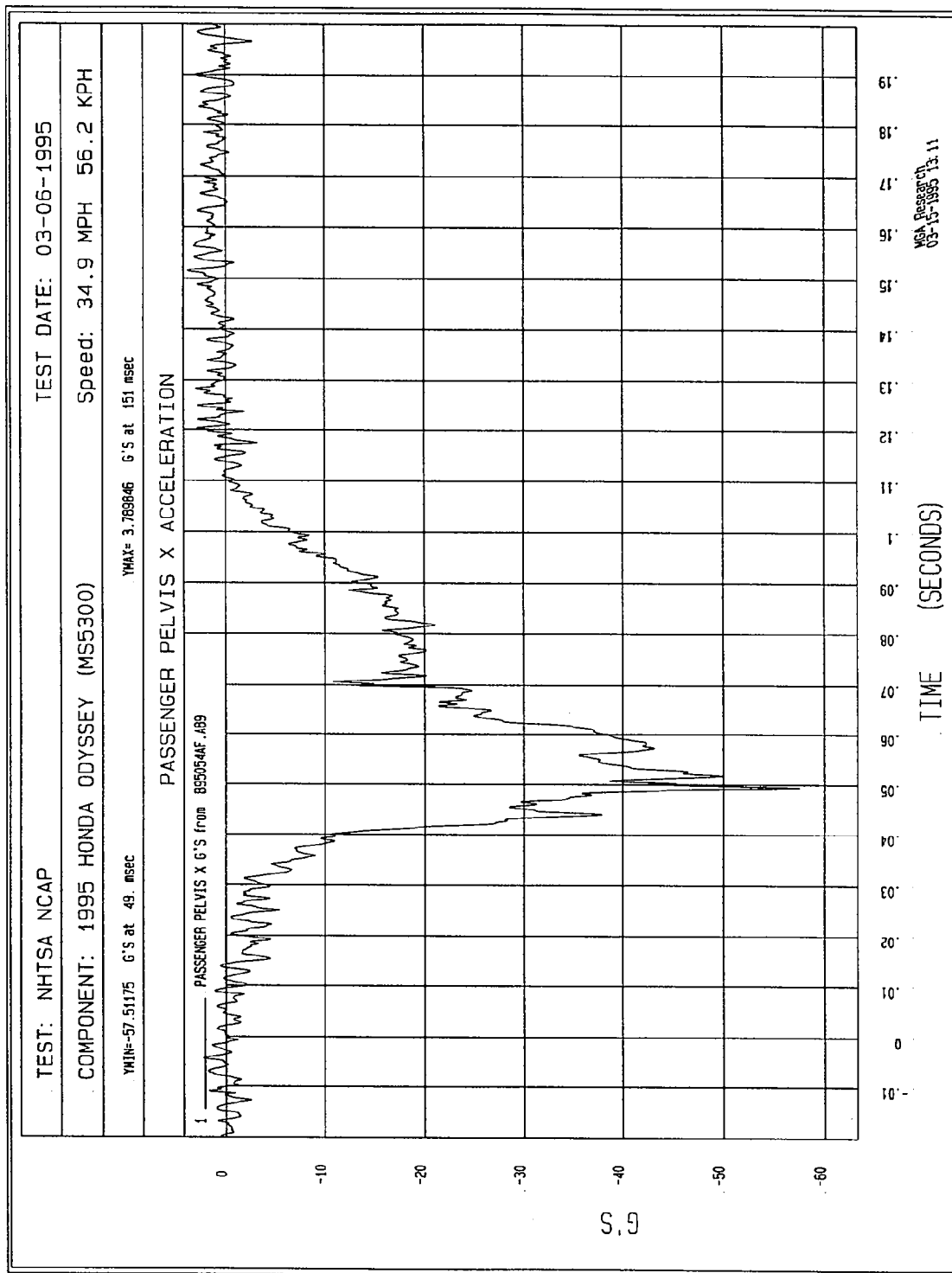


Figure B-104 - Passenger Pelvis X Acceleration vs. Time

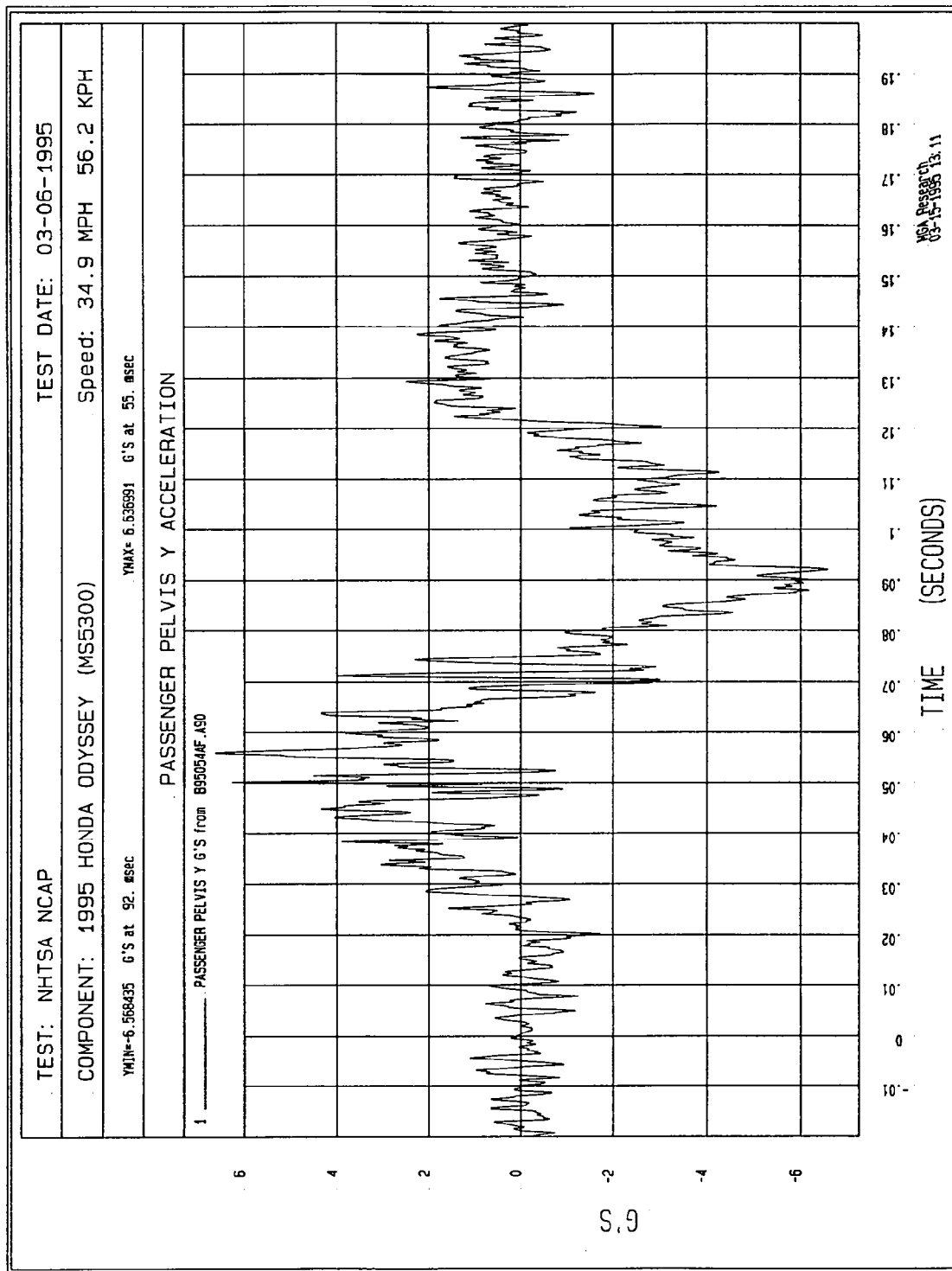


Figure B-105 - Passenger Pelvis Y Acceleration vs. Time

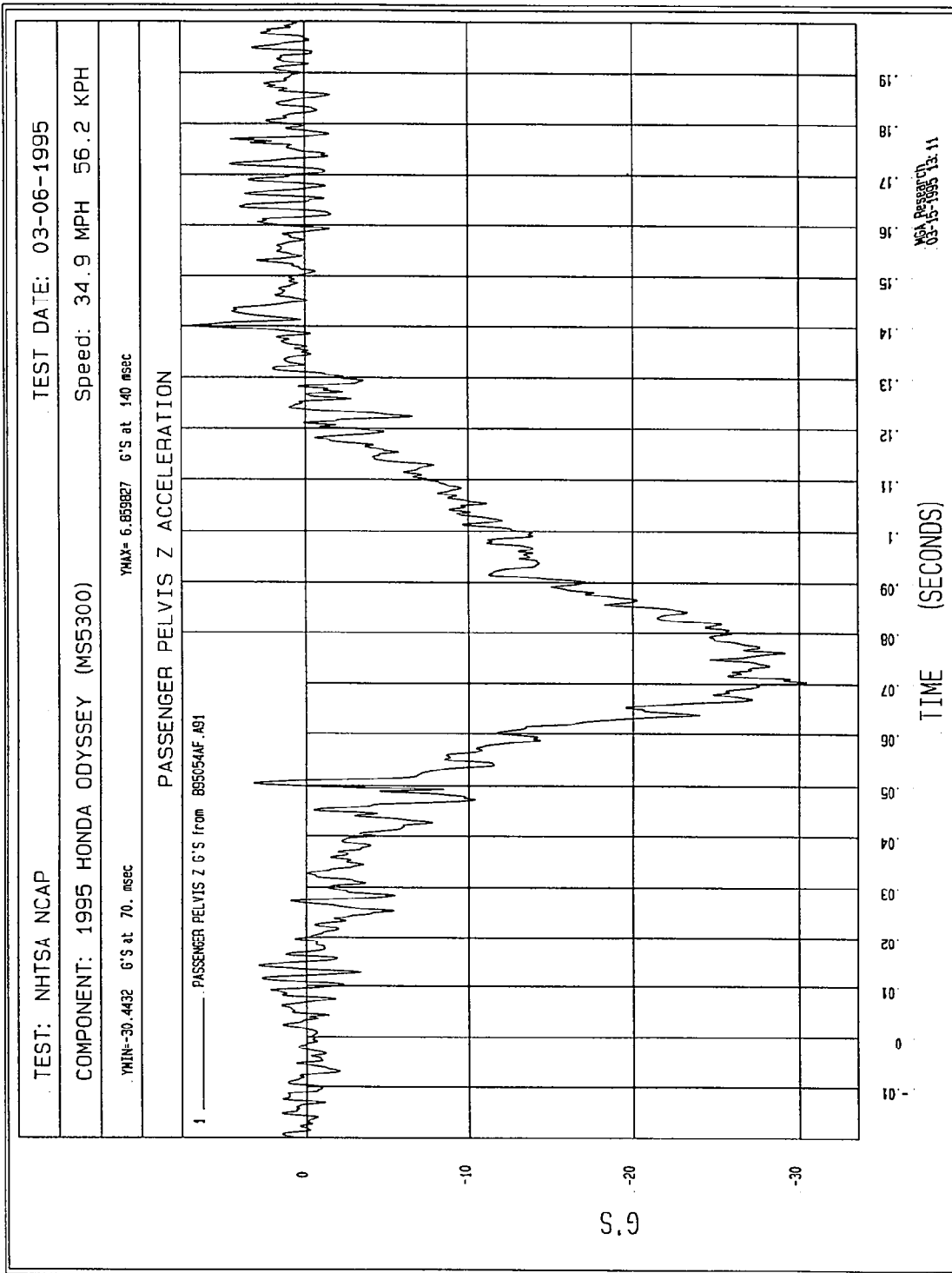


Figure B-106 - Passenger Pelvis Z Acceleration vs. Time

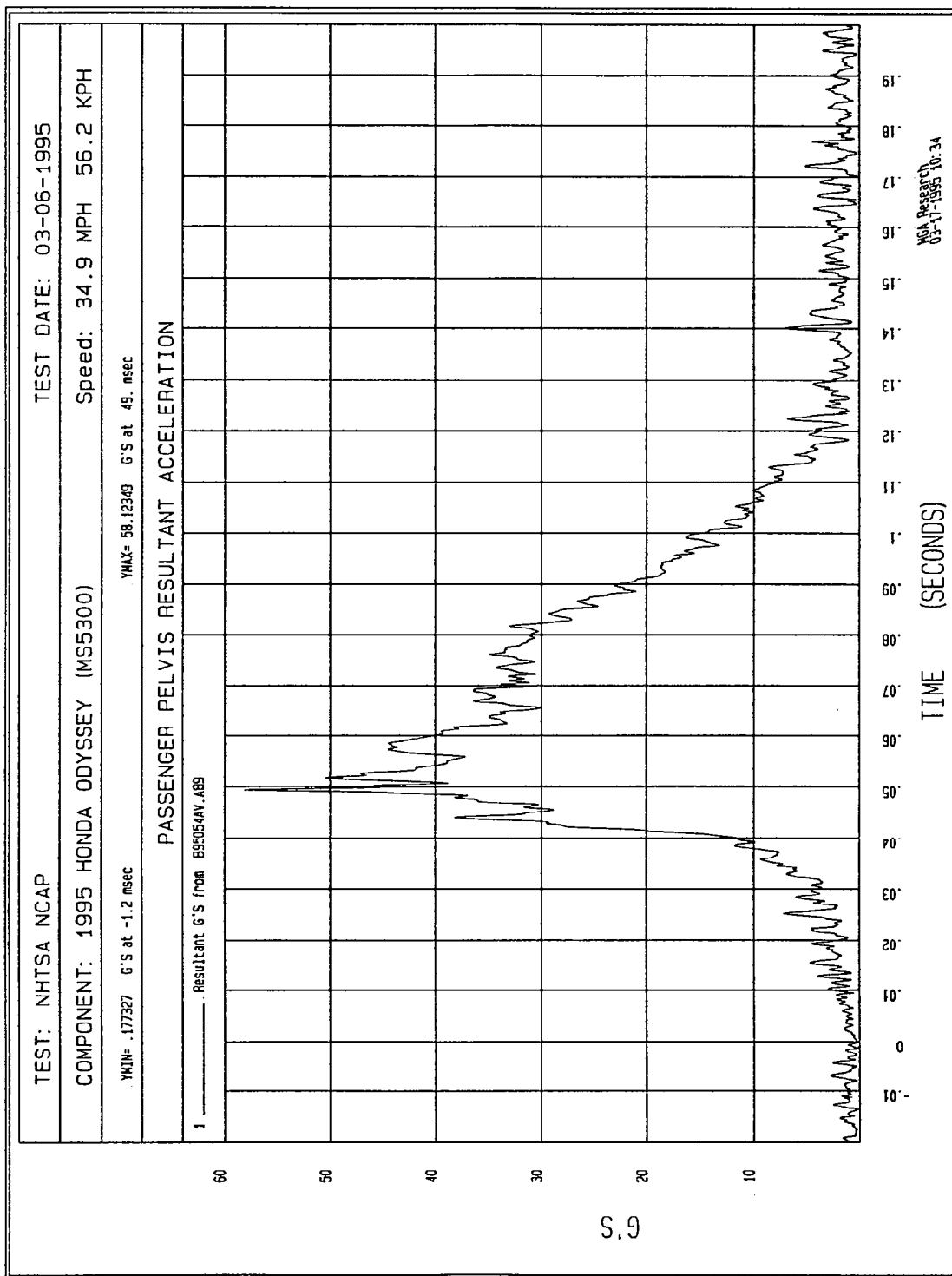
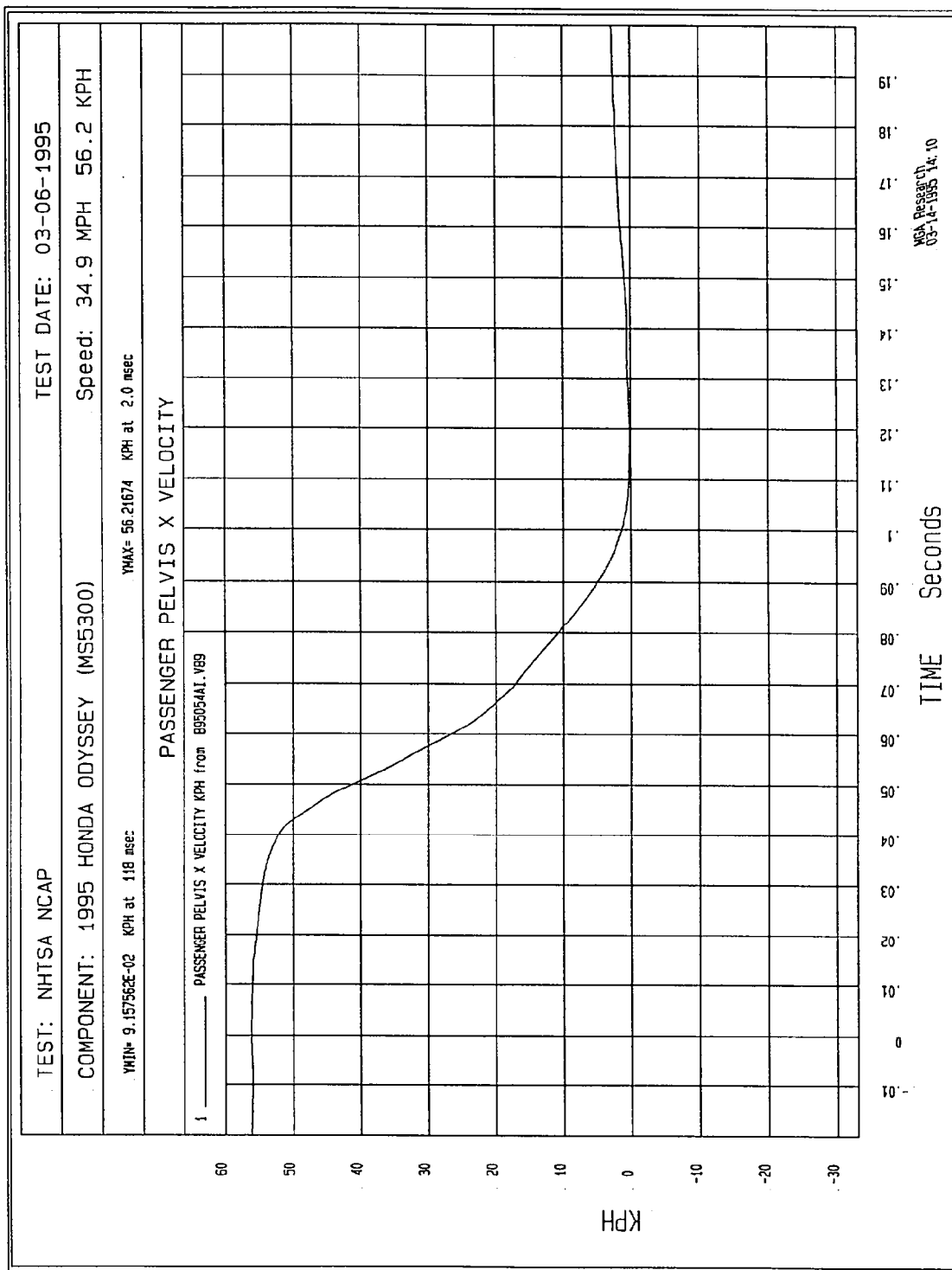


Figure B-107 - Passenger Pelvis Resultant Acceleration vs. Time



B-108

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

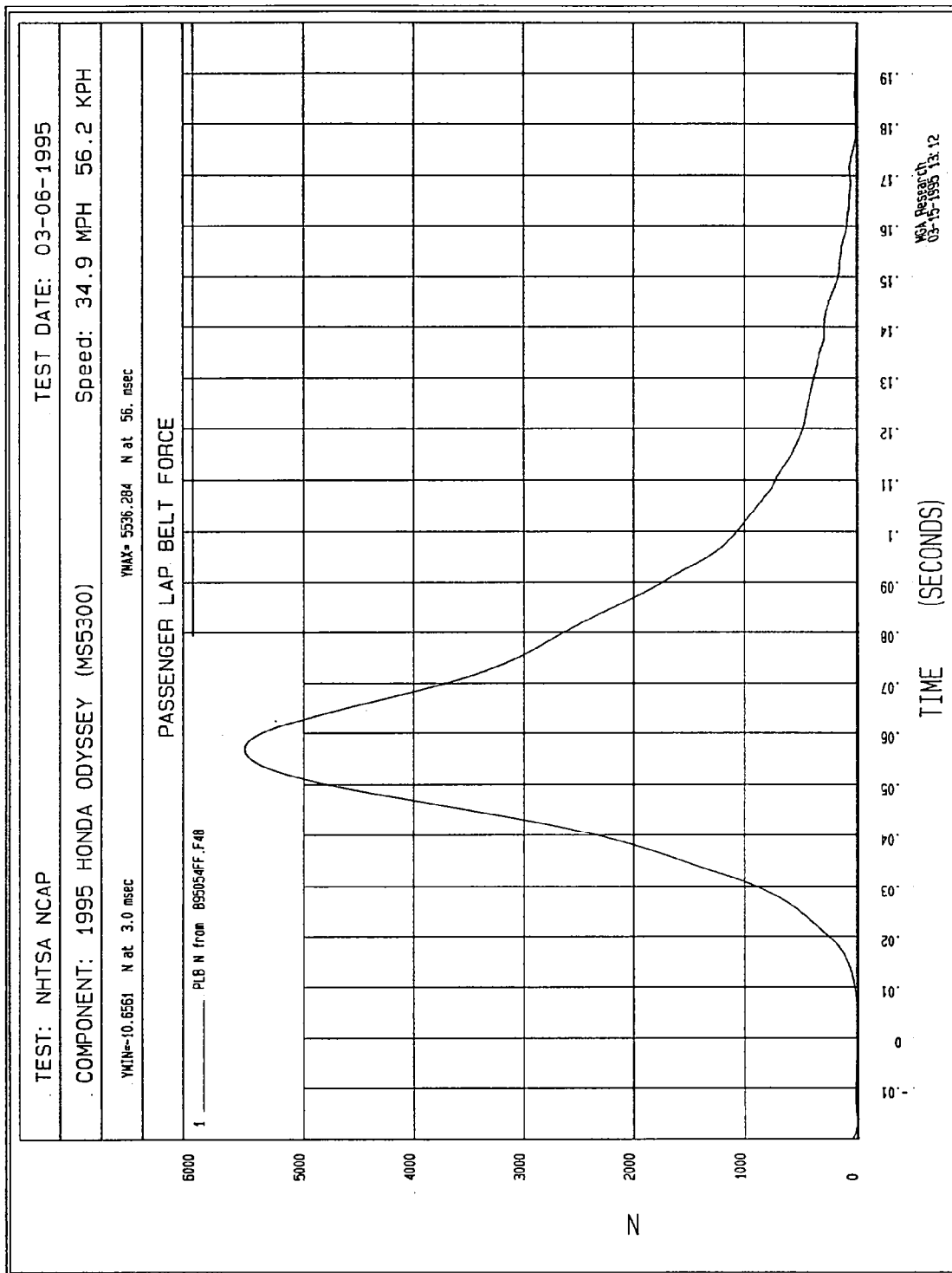


Figure B-109 - Passenger Lap Belt Force vs. Time

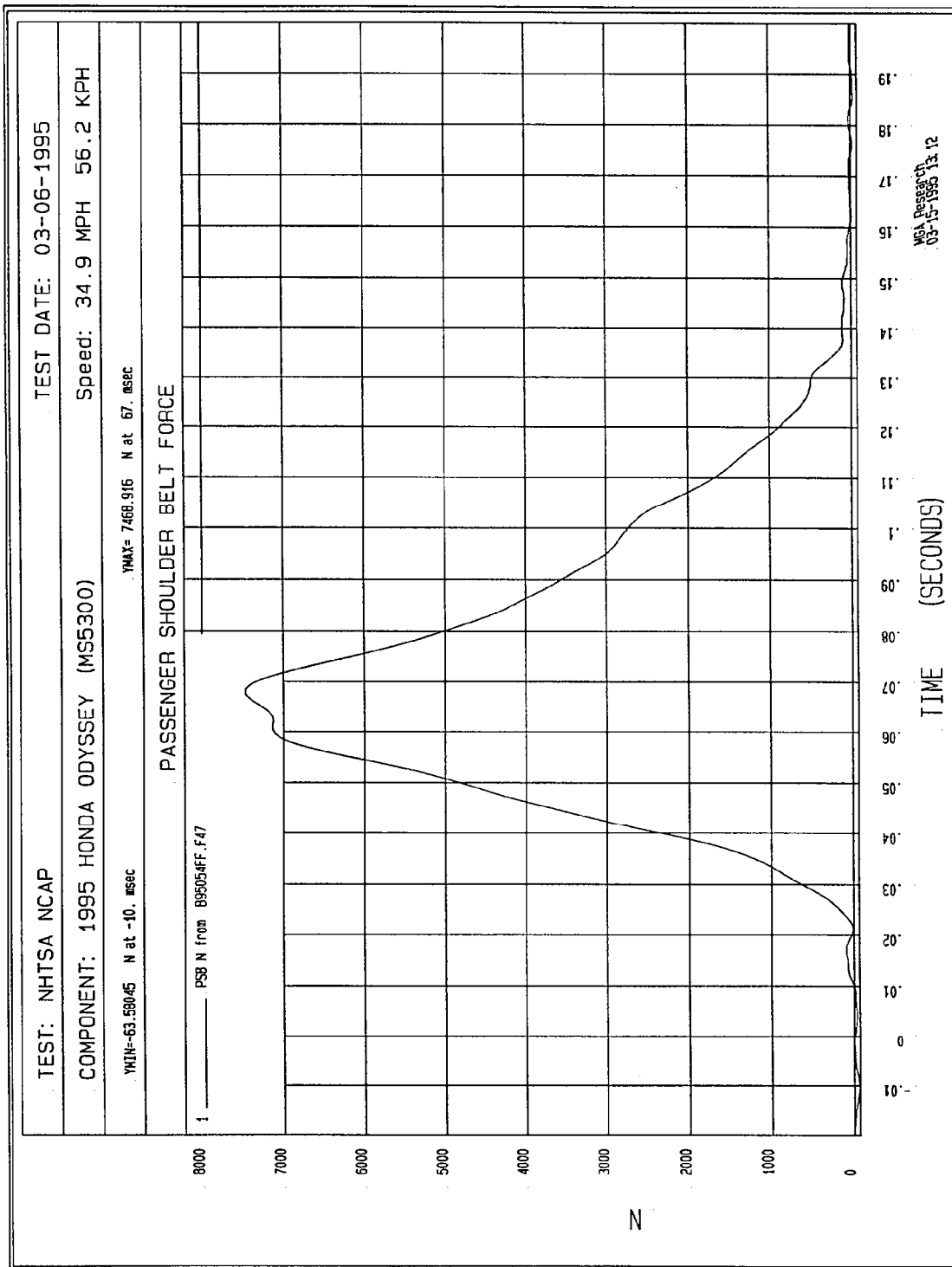


Figure B-110 - Passenger Shoulder Belt Force vs. Time

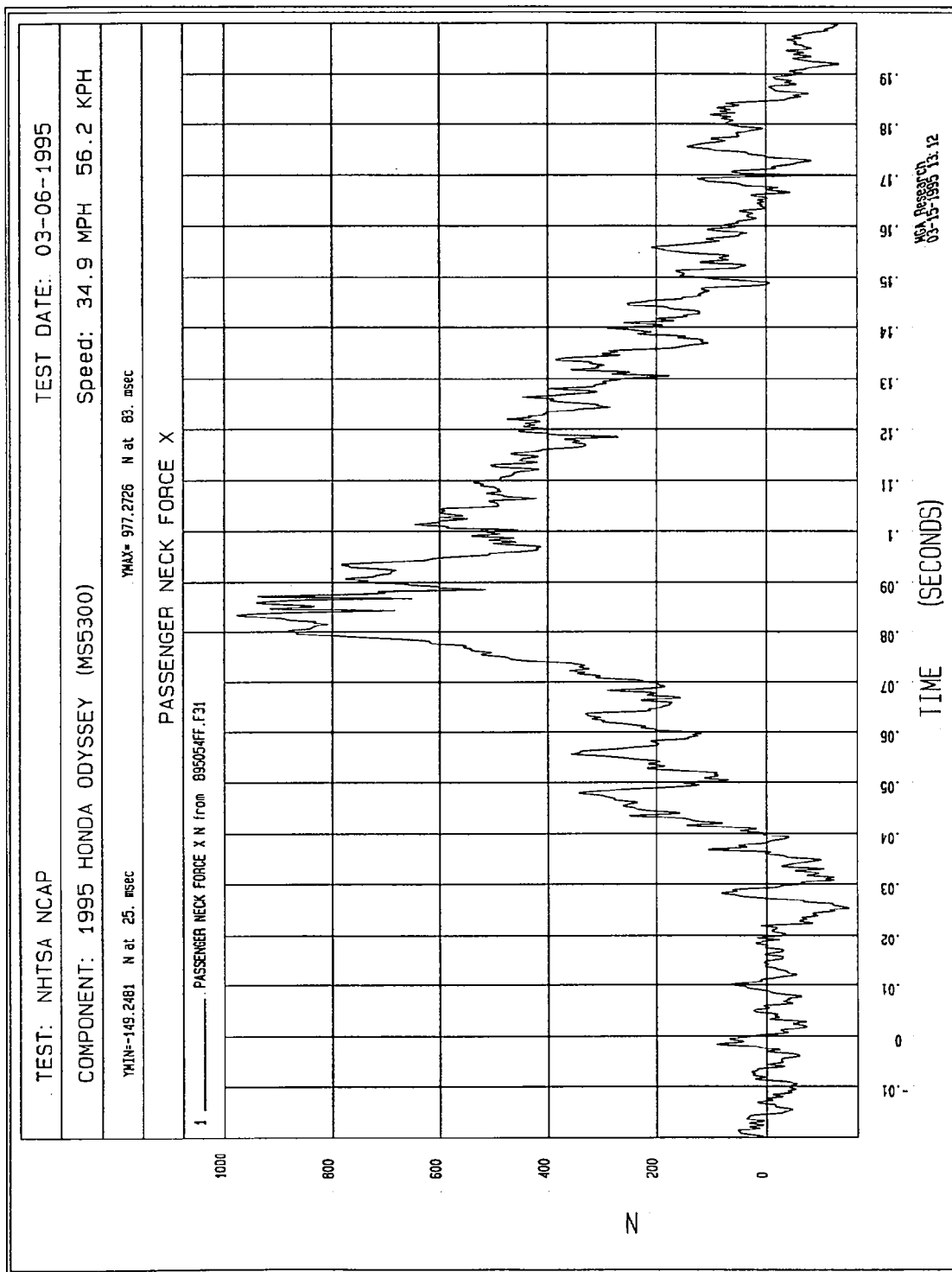


Figure B-111 - Passenger Neck Force X vs. Time

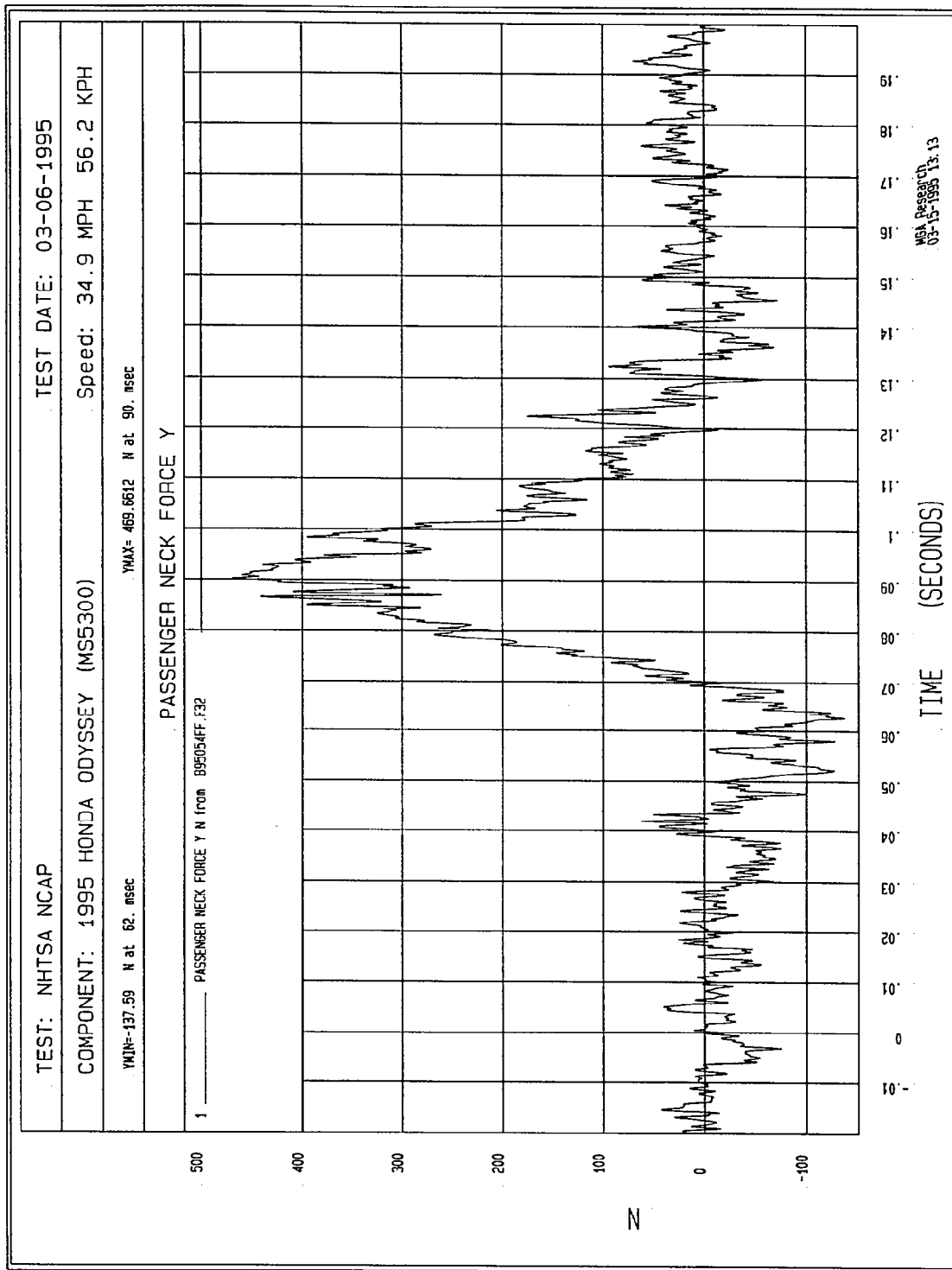


Figure B-112 - Passenger Neck Force Y vs. Time

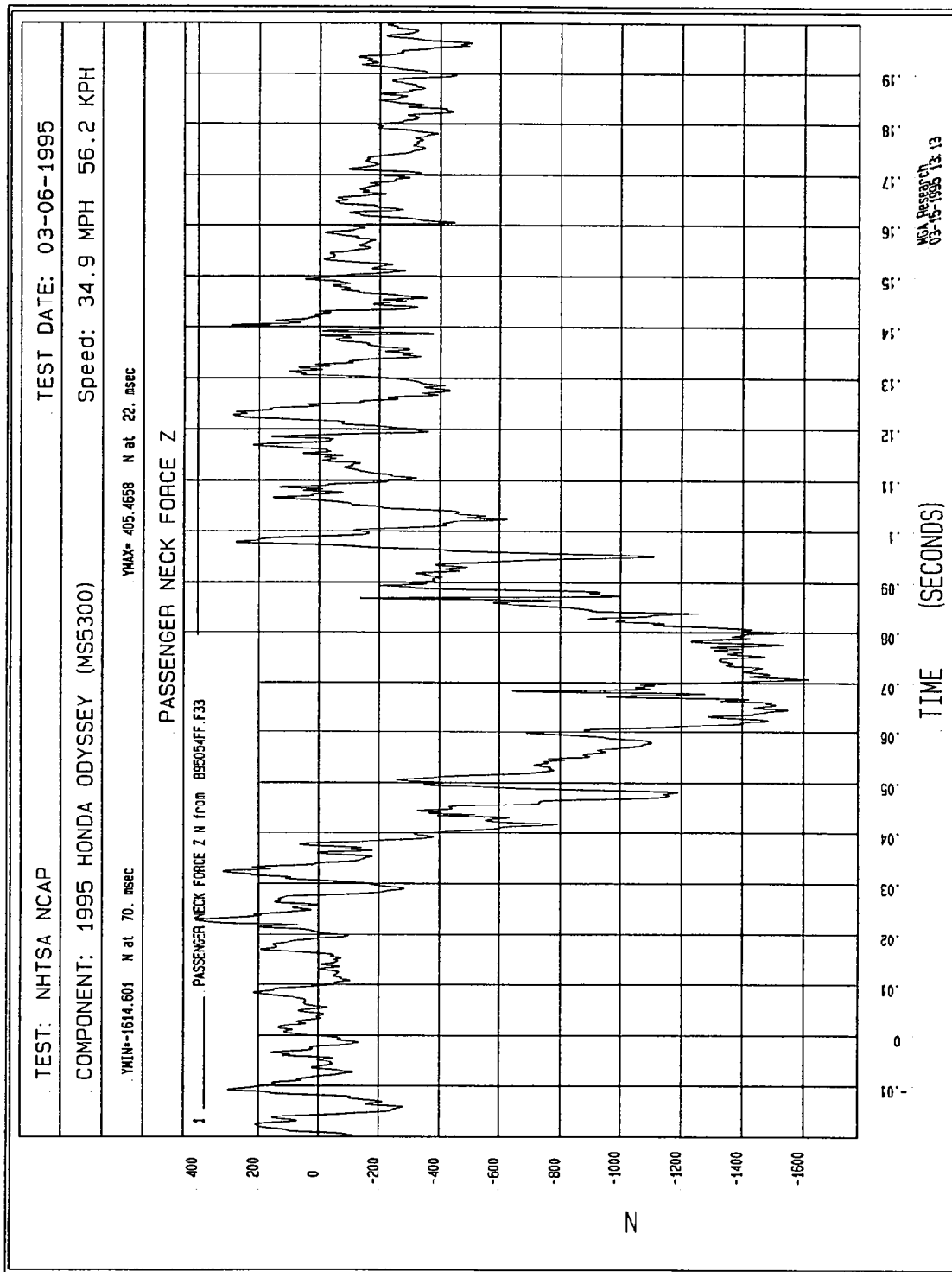
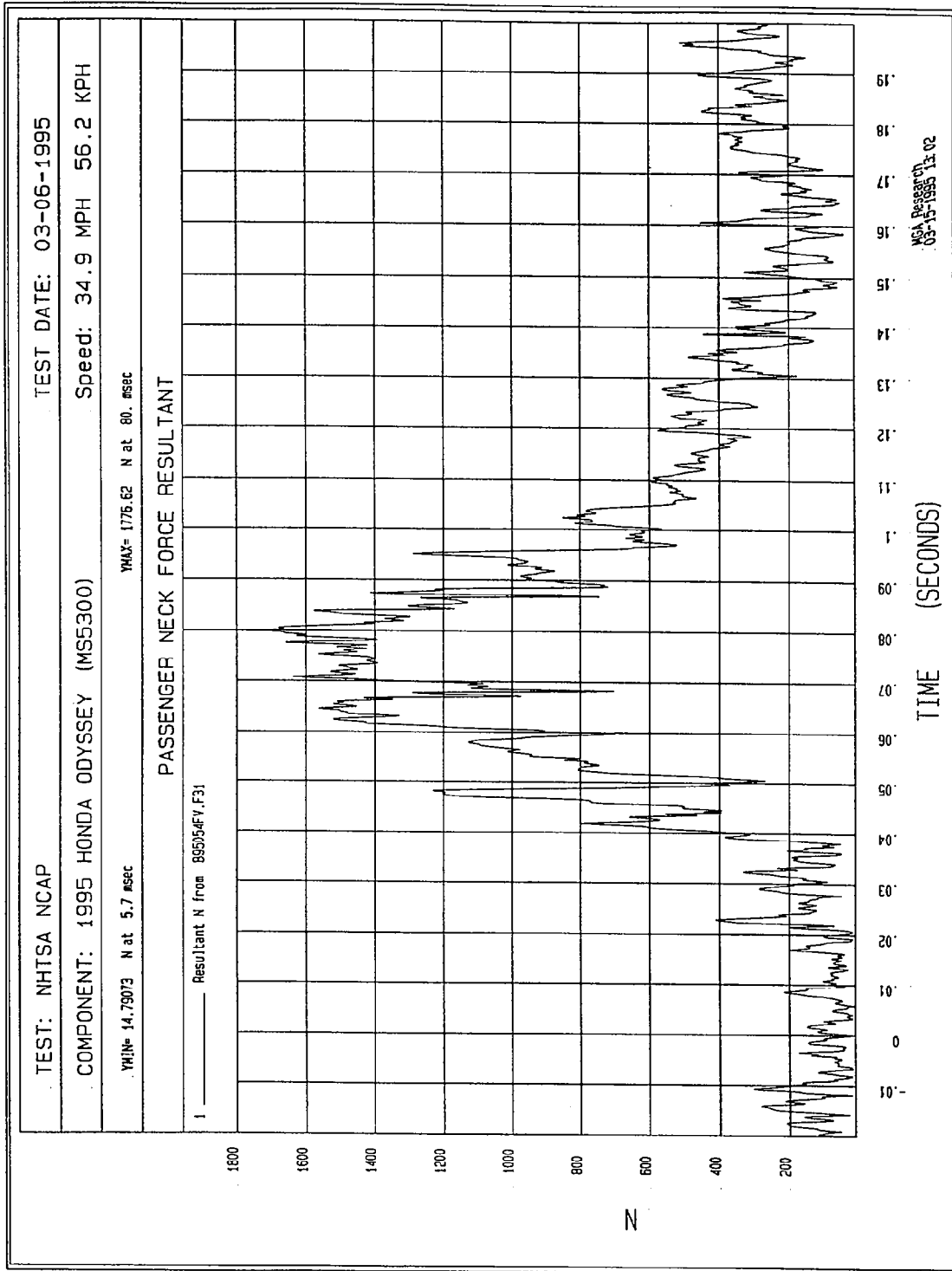


Figure B-113- Passenger Neck Force Z vs. Time



B-114

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

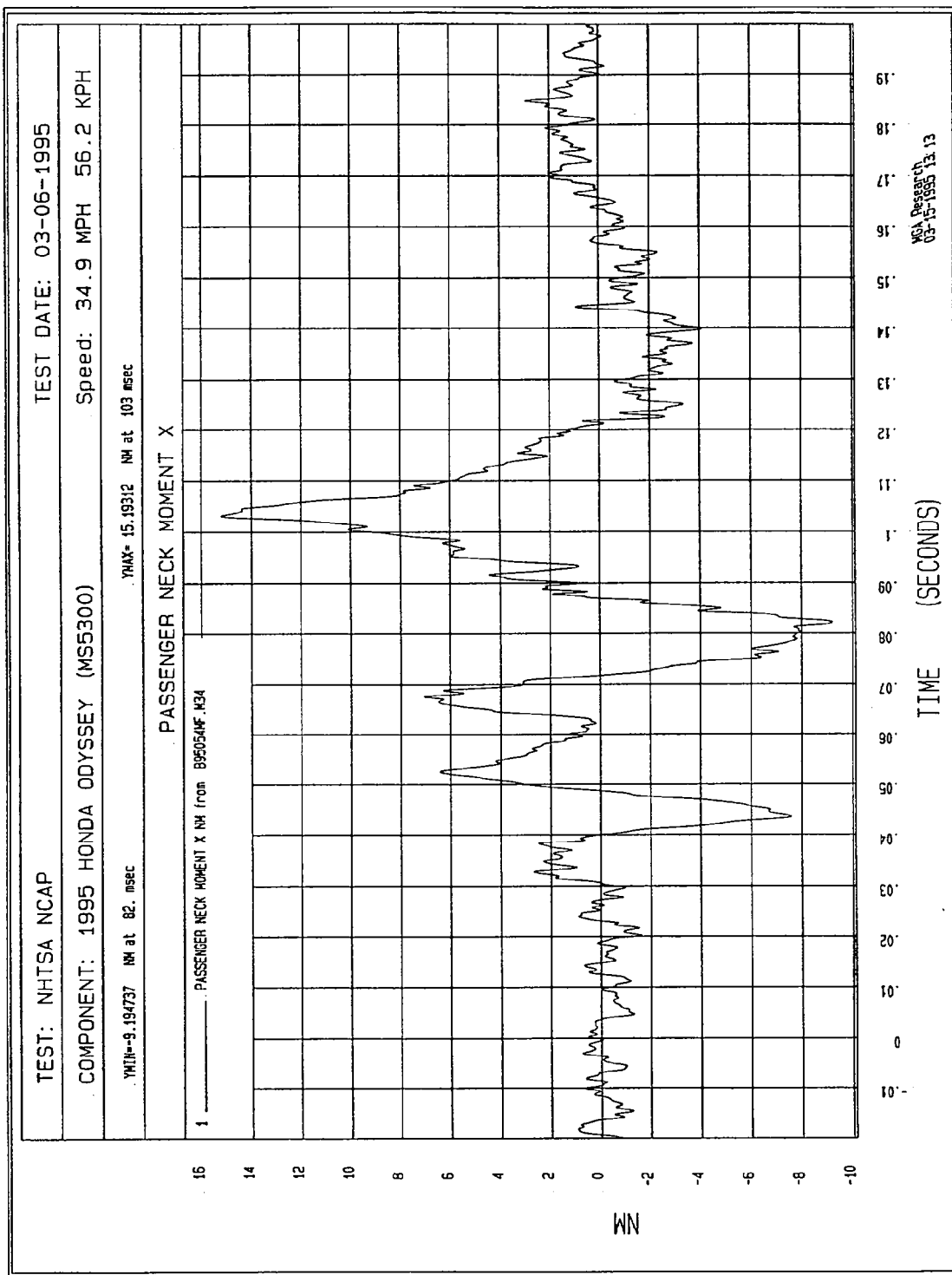


Figure B-115 - Passenger Neck Moment X vs. Time

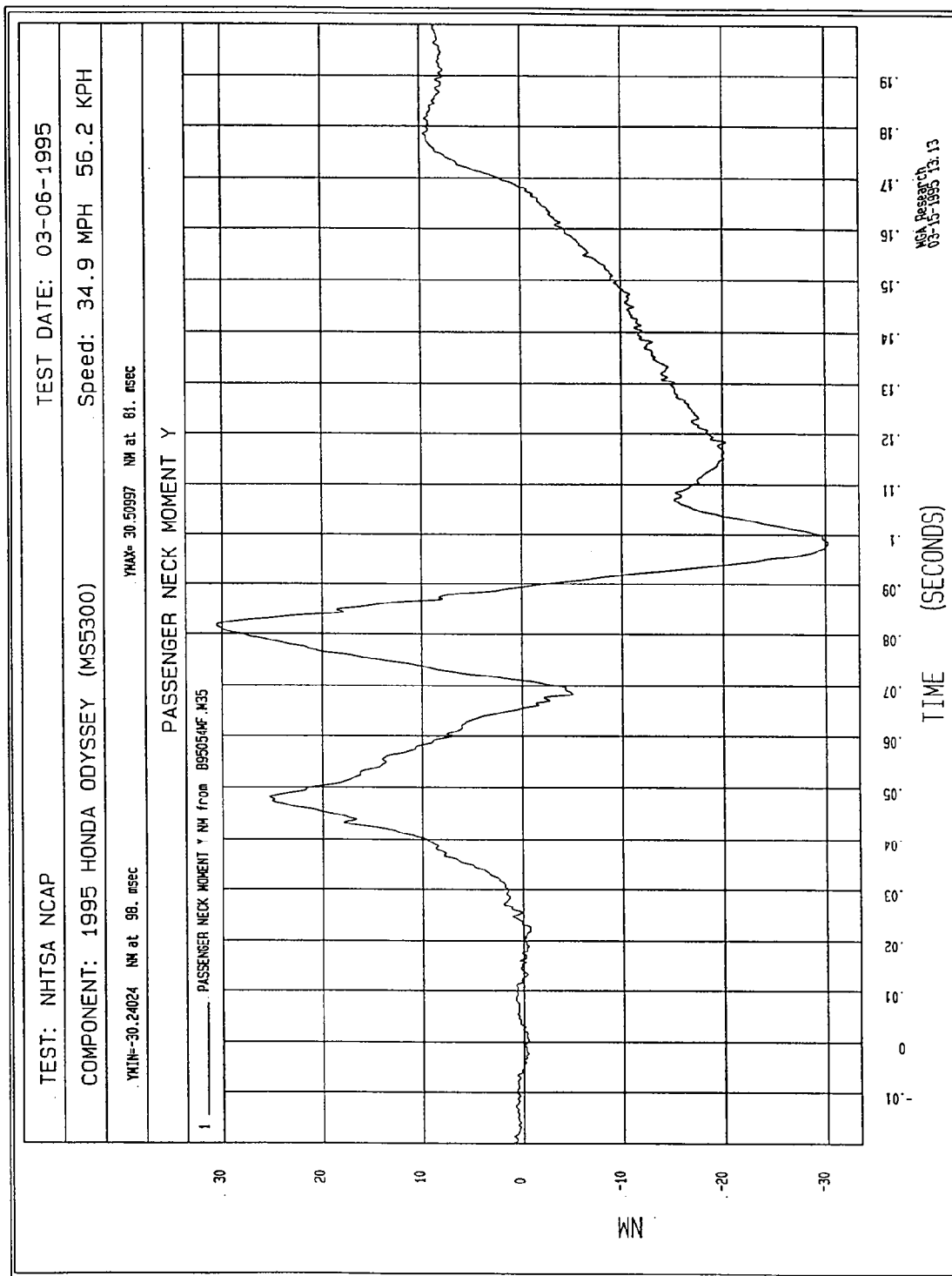


Figure B-116 - Passenger Neck Moment Y vs. Time

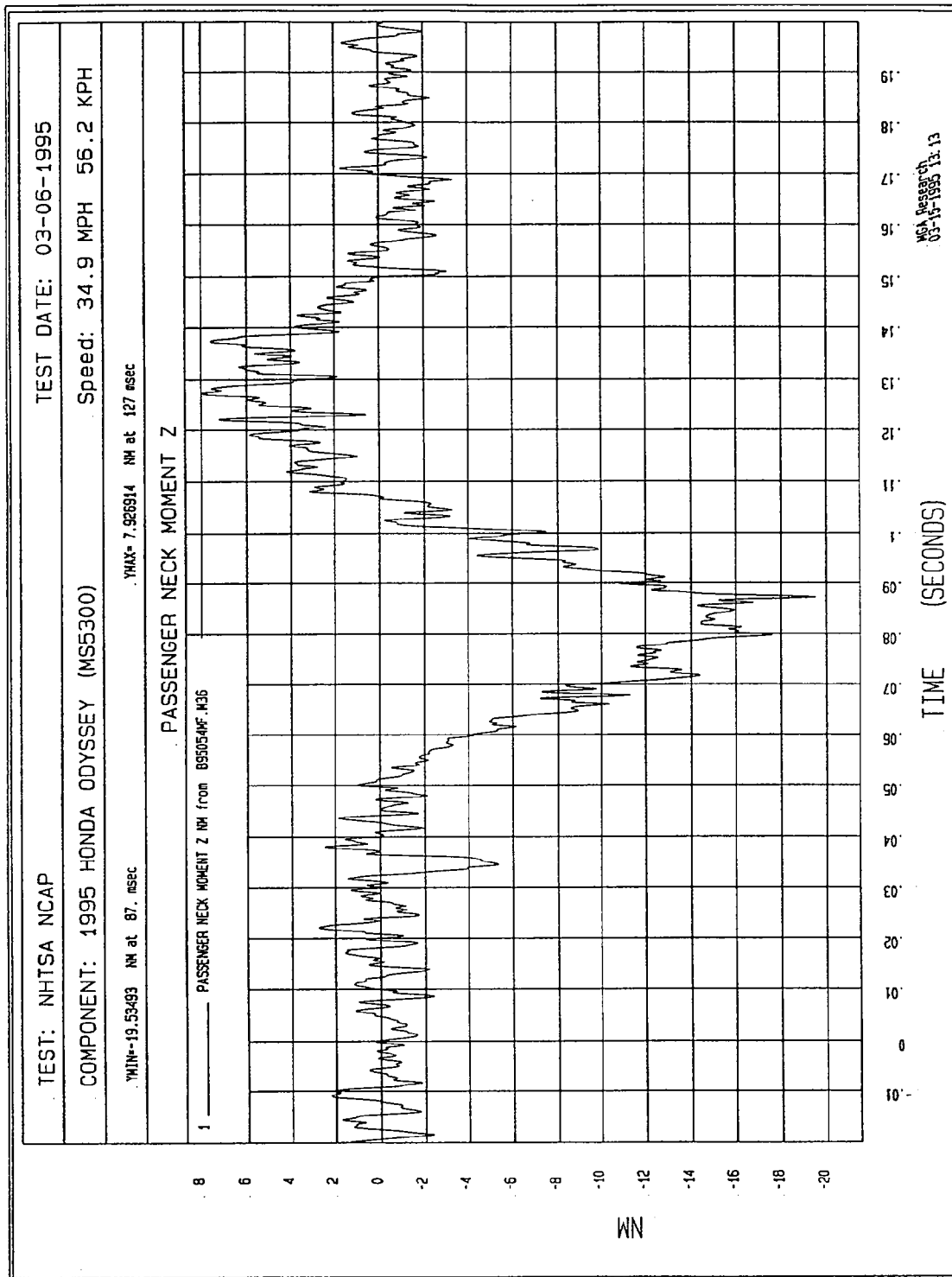
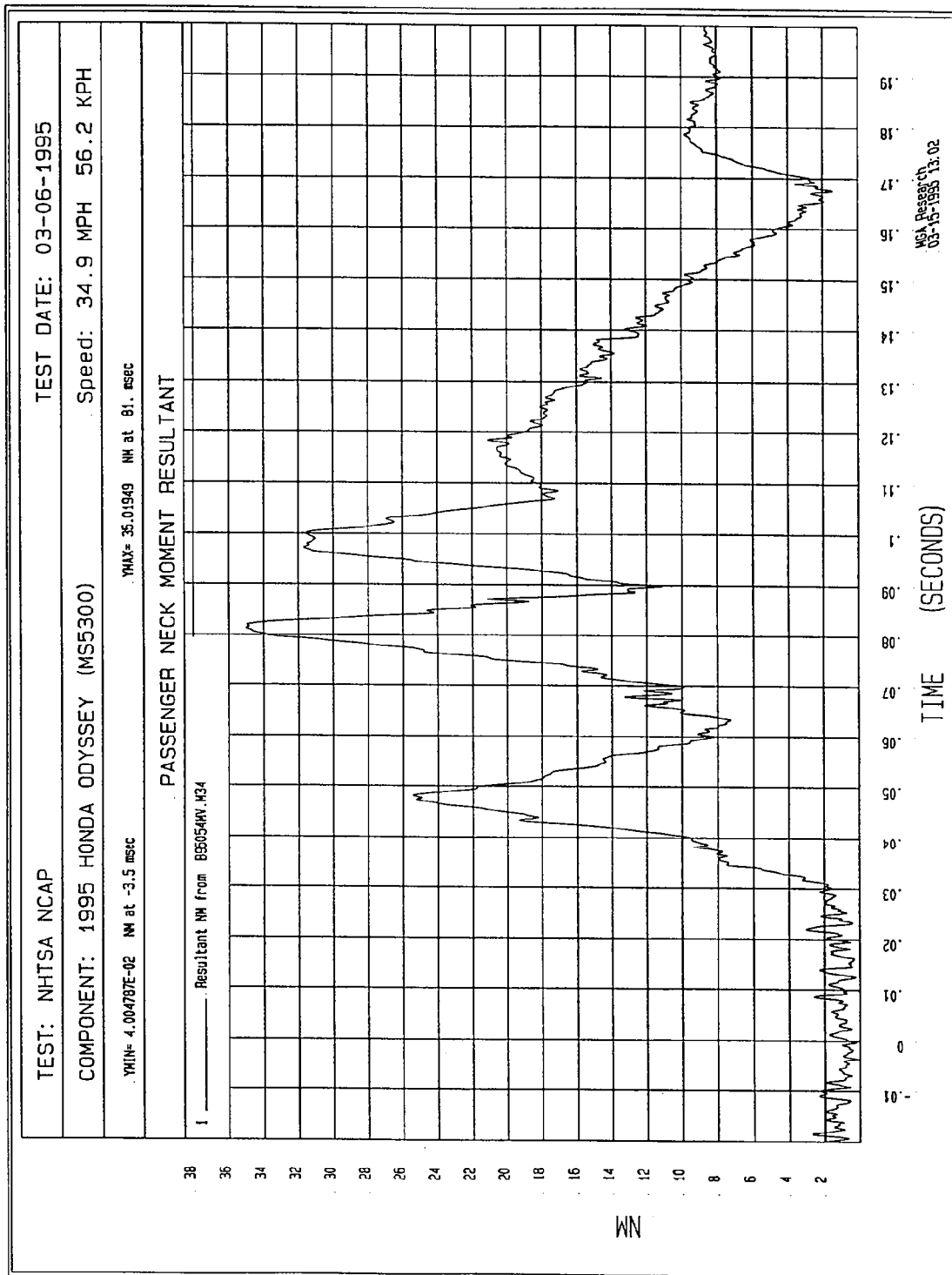


Figure B-117 - Passenger Neck Moment Z vs. Time



B-118

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

APPENDIX C

Dummy Configuration & Performance Verification Data

HYBRID III DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 066

DUMMY CALIBRATION BY: Al Chalmers

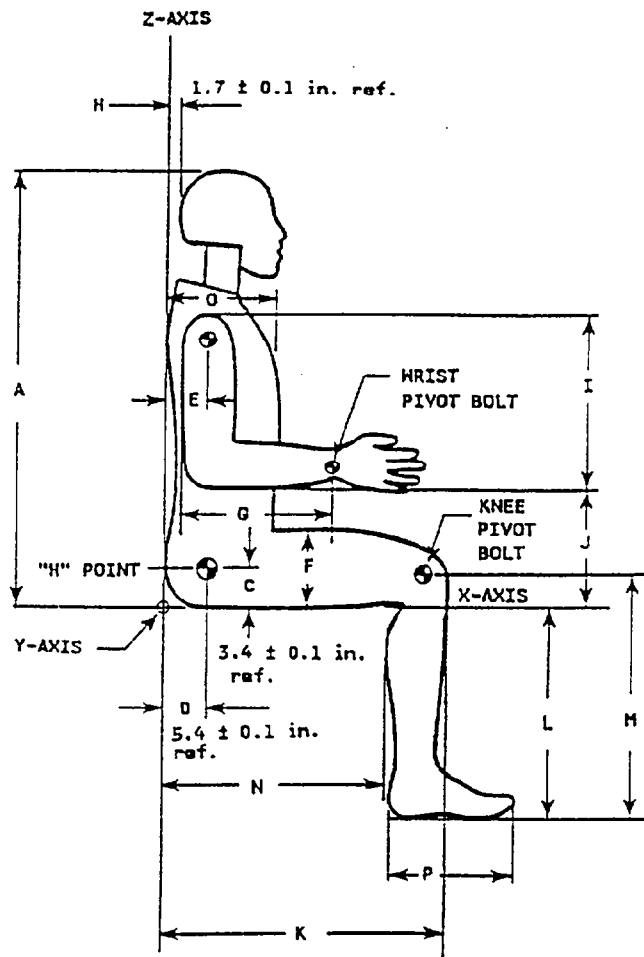
I. CONFIGURATION VERIFICATION DATA

DATE OF VERIFICATION: 12-23-94

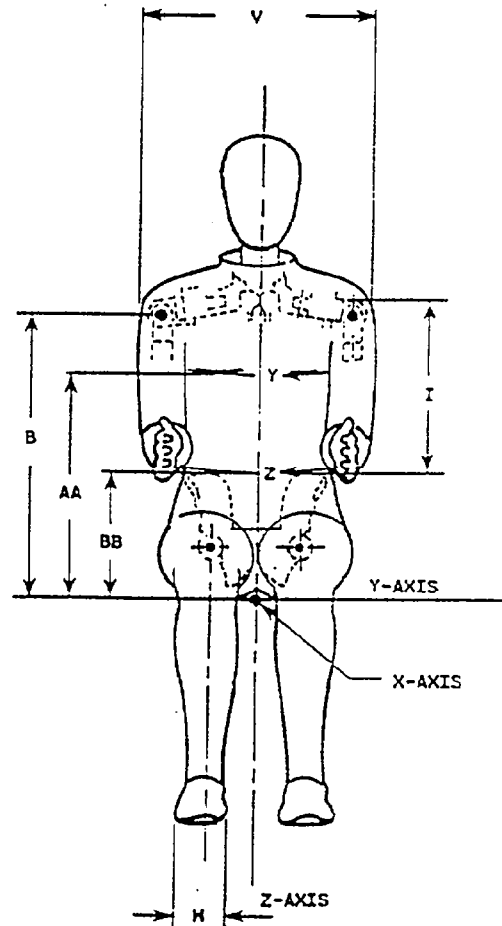
DESCRIPTION	SPECIFICATION (inches)	ACTUAL MEASUREMENT (inches)
A - Total Sitting Height	34.6 - 35.0	34.9
B - Shoulder Pivot Height	19.9 - 20.5	20.5
C - "H" Point Height	3.3 - 3.5	3.5
D - "H" Point from Seat Back	5.3 - 5.5	5.5
E - Shoulder Pivot From Backline	3.3 - 3.7	3.5
F - Thigh Clearance	5.5 - 6.1	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.: 066 DUMMY CALIBRATION BY: Al Chalmers

VERIFICATION DATE: 12-23-94

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

1.0 HEAD DROP TEST

	SPECIFICATION	MEASUREMENT
Peak Resultant Acceleration	225 - 275 G	270
Peak Lateral Acceleration	15 G. MAX	2.5
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	23.80
	20 MS	17.60 - 22.60 G	20.61
	30 MS	12.50 - 18.50 G	15.80
Max. Pendulum G Above 30 MS		29.0 G MAX	15.8
Deceleration - Time Curve Decay Time to 5 G		34 - 42 MS	39
D Plane Rotation	MAX	64 - 78 DEG.	77
	TIME	57 - 64 MS	60
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 MS	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	19.51
	20 MS	14.00 - 19.00 G	17.70
	30 MS	11.00 - 16.00 G	12.90
Max. Pendulum G Above 30 MS		22 G Max	13
Deceleration - Time Curve Decay Time to 5 G		38 - 46 MS	43
D Plane Rotation	MAX	81 - 106 DEG.	105
	TIME	72 - 82 MS	77
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 MS	158
Moment About Occipital Condyle	MIN.	-59.0/-39.0 FT LBS	-53.5
	TIME	65 - 79 MS	72
Positive Moment - Time Curve Decay Time to Zero		120 - 148 MS	147

4.0 CHEST IMPACT TESTS

	SPECIFICATION	MEASUREMENT
Probe Speed	21.6 to 22.4 F/S	21.8
Peak Deflection	2.50 to 2.86 IN.	2.77
Peak Resistive Force	1160 to 1325 LBS.	1169
Internal Hysteresis	69 to 85%	76

5.0 KNEE IMPACT TESTS

LEFT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	6.9
Maximum Force	1060 - 1300 LBS.	1206

RIGHT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	6.9
Maximum Force	1060 - 1300 LBS.	1138

HYBRID III DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 065 DUMMY CALIBRATION BY: Al Chalmers

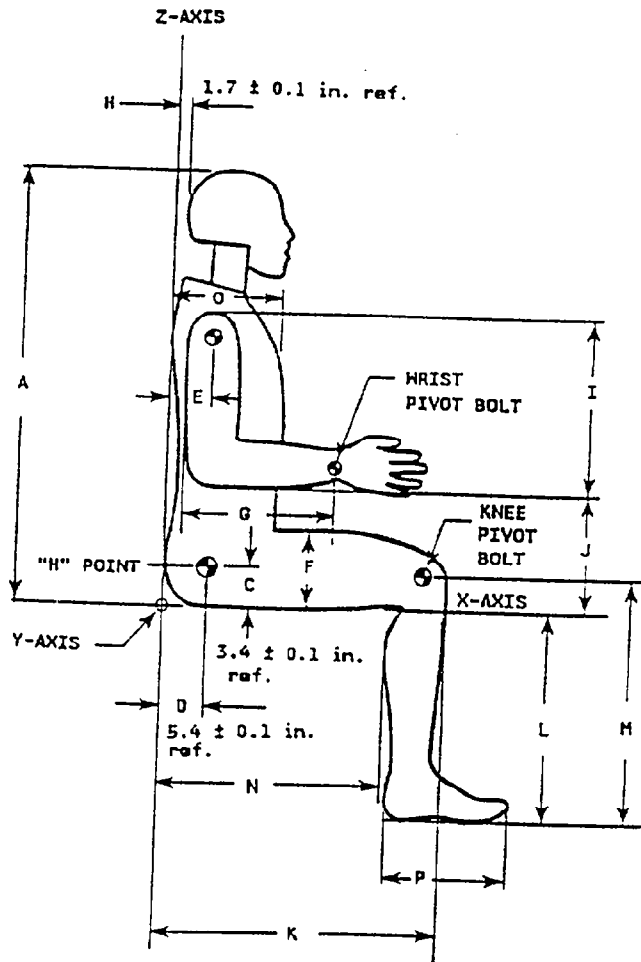
I. CONFIGURATION VERIFICATION DATA

DATE OF VERIFICATION: 12-23-94

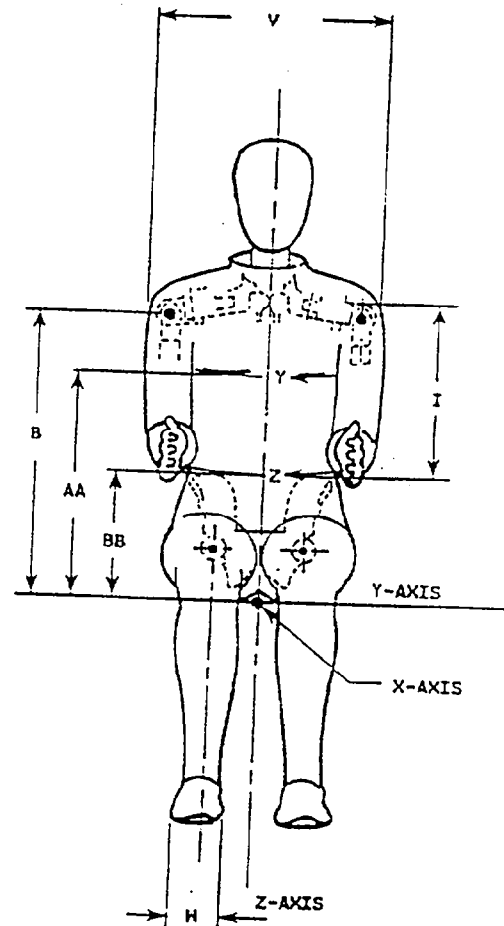
DESCRIPTION	SPECIFICATION (Inches)	ACTUAL MEASUREMENT (inches)
A - Total Sitting Height	34.6 - 35.0	34.8
B - Shoulder Pivot Height	19.9 - 20.5	20.5
C - "H" Point Height	3.3 - 3.5	3.5
D - "H" Point from Seat Back	5.3 - 5.5	5.5
E - Shoulder Pivot From Backline	3.3 - 3.7	3.5
F - Thigh Clearance	5.5 - 6.1	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.: 065 DUMMY CALIBRATION BY: Al Chalmers

VERIFICATION DATE: 12-23-94

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

1.0 HEAD DROP TEST

	SPECIFICATION	MEASUREMENT
Peak Resultant Acceleration	225 - 275 G	271
Peak Lateral Acceleration	15 G. MAX	7
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	25.10
	20 MS	17.60 - 22.60 G	21.71
	30 MS	12.50 - 18.50 G	14.90
Max. Pendulum G Above 30 MS		29.0 G MAX	14.8
Deceleration - Time Curve Decay Time to 5 G		34 - 42 MS	38
D Plane Rotation	MAX	64 - 78 DEG.	77
	TIME	57 - 64 MS	59
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 MS	116
Moment About Occipital Condyle	MIN.	65 - 80 FT.LBS	72
	TIME	47 - 58 MS	52
Positive Moment - Time Curve Decay Time to Zero		97 - 107 MS	102

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

3.0 NECK EXTENSION TEST

		SPECIFICATION	MEASUREMENT
Pendulum Speed		19.50 - 20.30 F/S	20.00
Pendulum Deceleration	10 MS	17.20 - 21.20 G	19.95
	20 MS	14.00 - 19.00 G	17.03
	30 MS	11.00 - 16.00 G	13.60
Max. Pendulum G Above 30 MS		22 G Max	14
Deceleration - Time Curve Decay Time to 5 G		38 - 46 MS	40
D Plane Rotation	MAX	81 - 106 DEG.	104
	TIME	72 - 82 MS	76
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 MS	159
Moment About Occipital Condyle	MIN.	-59.0/-39.0 FT LBS	-52.3
	TIME	65 - 79 MS	72
Positive Moment - Time Curve Decay Time to Zero		120 - 148 MS	147

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.	2.60
Peak Resistive Force	1160 to 1325 LBS.	1214
Internal Hysteresis	69 to 85%	80

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.	1214

RIGHT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	7.0
Maximum Force	1060 - 1300 LBS.	1113

APPENDIX D

Dummy, Vehicle and Laboratory Calibration Data

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 066

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	ACCY6	Endevco	02/08/95
Head Y	ACCH1	Endevco	02/08/95
Head Z	AAMW5	Endevco	02/08/95
Head X Redundant	AJ9D2	Endevco	02/08/95
Head Y Redundant	AH1E2	Endevco	02/08/95
Head Z Redundant	AJ7K3	Endevco	02/08/95
Chest X	ACCY1	Endevco	02/02/95
Chest Y	ACCC8	Endevco	02/02/95
Chest Z	ACCT7	Endevco	02/02/95
Chest X Redundant	AJ9D4	Endevco	02/06/95
Chest Y Redundant	AJ9F3	Endevco	02/02/95
Chest Z Redundant	AJ9D9	Endevco	02/06/95
Right Femur Load Cell	261	Denton	02/13/95
Left Femur Load Cell	262	Denton	02/13/95
Pelvis X	ALDY8	Endevco	02/13/95
Pelvis Y	ALEK9	Endevco	02/13/95
Pelvis Z	ALF80	Endevco	02/13/95

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 066

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Neck Load Cell X	443	Denton	01/14/95
Neck Load Cell Y	443	Denton	01/14/95
Neck Load Cell Z	443	Denton	01/14/95
Neck Moment X	443	Denton	01/14/95
Neck Moment Y	443	Denton	01/14/95
Neck Moment Z	443	Denton	01/14/95
Chest Deflection Gauge	066	Servo	01/31/95
Lap Belt Load Cell	212	GSE	12/05/94
Torso Belt Load Cell	661	Lebow	10/26/94

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 66

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Right Tibia Moment X	040	Denton	10/17/94
Upper Right Tibia Moment Y	040	Denton	10/17/94
Lower Right Tibia Moment Y	034	Denton	10/17/94
Lower Right Tibia Force X	034	Denton	10/17/94
Lower Right Tibia Force Z	034	Denton	10/17/94
Upper Left Tibia Moment X	023	Denton	10/17/94
Upper Left Tibia Moment Y	023	Denton	10/17/94
Lower Left Tibia Moment Y	019	Denton	10/17/94
Lower Left Tibia Force X	019	Denton	10/17/94
Lower Left Tibia Force Z	019	Denton	10/17/94

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 065

	PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	AAMN8	Endevco	02/02/95
Head Y	ACC61	Endevco	01/11/95
Head Z	ACCW9	Endevco	02/02/95
Head X Redundant	AJ621	Endevco	02/02/95
Head Y Redundant	AJ619	Endevco	02/02/95
Head Z Redundant	AHY54	Endevco	02/02/95
Chest X	ACC78	Endevco	02/07/95
Chest Y	ACCE6	Endevco	02/07/95
Chest Z	ACCY3	Endevco	02/07/95
Chest X Redundant	AJ9J7	Endevco	02/09/95
Chest Y Redundant	AJ7A2	Endevco	02/09/95
Chest Z Redundant	AJ9D9	Endevco	02/09/95
Right Femur Load Cell	259	Denton	02/13/95
Left Femur Load Cell	260	Denton	02/13/95
Pelvis X	ALB87	Endevco	02/10/95
Pelvis Y	AGNB3	Endevco	02/10/95
Pelvis Z	AJ884	Endevco	02/10/95

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 065

	PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Neck Load Cell X	442	Denton	01/14/95
Neck Load Cell Y	442	Denton	01/14/95
Neck Load Cell Z	442	Denton	01/14/95
Neck Moment X	442	Denton	01/14/95
Neck Moment Y	442	Denton	01/14/95
Neck Moment Z	442	Denton	01/14/95
Chest Deflection Gauge	340	Servo	10/31/94
Lap Belt Load Cell	211	GSE	08/04/94
Torso Belt Load Cell	663	Lebow	10/26/94

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Rear Seat Crossmember X	B02-G05	Entran	02/23/95
Right Rear Seat Crossmember X	AKAE8	Endevco	10/14/94
Top of Engine Block X	MGA141	Entran	11/02/94
Bottom of Engine X	MGA159	Entran	01/04/95
Left Brake Caliper X	X02	Endevco	02/07/94
Right Brake Caliper X	MGA122	Entran	02/24/95
Instrument Panel X	L15-G15	Entran	02/24/95
Redundant Left Rear Seat Crossmember X	B02-G07	Entran	02/23/95
Redundant Right Rear Seat Crossmember X	X08	Entran	01/17/95

D-6

	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

Your Occupant Protection System

Your Honda is equipped with seat belts and other features that work together to protect you and your passenger during a crash.

Seat belts are the most important part of your occupant protection system. When worn properly, seat belts can reduce the chance of serious injury or death in a crash.

For added protection during a severe frontal collision, your Odyssey has a Supplemental Restraint System (SRS) with airbags for the driver and a front seat passenger.

Two indicator lights are also part of your safety system. One reminds you to make sure you and your passengers wear seat belts. The other alerts you to a possible problem with your supplemental restraint system (see page 16).

The seats, head restraints, and door locks also play a role in occupant safety. For example, reclining the seat-back can decrease the effectiveness of your seat belt. Head restraints can help protect your neck and head, especially during rear-end impacts. Door locks help keep your doors from being accidentally opened during a crash.

To get the maximum protection from your occupant protection system, check the following before you drive away:

- Everyone in the car is wearing a seat belt properly (see page 7).
- Infants and small children are properly secured in child safety seats (see page 20).
- All doors and the tailgate are closed and locked (see page 19).
- Seat-backs are upright and head restraints are properly adjusted (see pages 18 and 56).
- There are no loose items that could be thrown around and hurt someone during a crash or sudden stop (see page 19).

By following these guidelines, you can reduce injuries to yourself and your passengers in many crash situations. Remember, however, that no safety system can prevent all injuries or deaths that can occur in severe crashes.

The Seat Belt System and How It Works

Why Wear Seat Belts

Wearing seat belts, and wearing them properly, is fundamental to your safety and the safety of your passengers.

During a crash or emergency stop, seat belts can help keep you from being thrown against the inside of the car, against other occupants, or out of the car.

Of course, seat belts cannot completely protect you in every crash. But, in most cases, seat belts reduce your chance of serious injury. They can even save your life. That is why many states and all Canadian provinces require you to wear seat belts.

⚠ WARNING

Not wearing a seat belt increases the chance of being killed or seriously hurt in a crash.

Be sure you and your passengers always wear seat belts and wear them properly.

Important Safety Reminders

Seat belts are designed for adults and larger children. All infants and small children must be properly restrained in child safety seats (see page 20).

Never let passengers ride in the cargo area or on top of a folded-down seat. Carry passengers in the rear only when they are sitting in a locked, upright seat, and are properly restrained by seat belts.

Passengers should not stand up or change seats while the vehicle is moving. If they are not wearing seat belts during a crash or emergency stop, they can be thrown against the inside of the vehicle, against other occupants, or out of the vehicle. A pregnant woman needs to wear a seat belt to protect herself and her unborn child (see page 10).

Two people should never use the same seat belt. If they do, they could be very seriously injured in a crash.

Do not place the shoulder portion of a lap/shoulder belt under your arm or behind your back. This could increase the chance of serious injuries in a crash.

Do not put shoulder belt pads or other accessories on seat belts. They can reduce the effectiveness of the belts and increase the chance of injury.

The Seat Belt System and How It Works

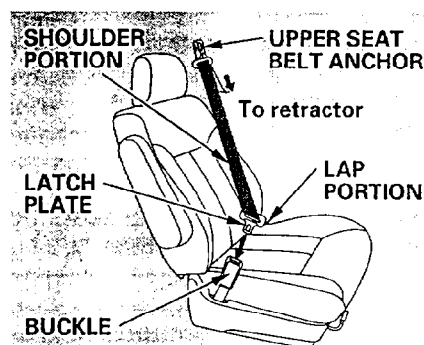
Seat Belt System Components

Your Honda has seat belts in all seating positions. All the seat belts in the six-passenger model are lap/shoulder belts. In the seven-passenger model, the center position of the bench-type second seat has a lap belt.

Your seat belt system also includes a light on the instrument panel to remind you to fasten your seat belt, and to make sure your passengers fasten theirs. This light comes on when you turn on the ignition if you have not fastened your seat belt. A beeper also sounds for several seconds (see page 36).

The following pages cover more about the seat belt components and how they work.

Lap/Shoulder Belt



This style of seat belt has a single belt that goes over your shoulder, across your chest, and across your hips.

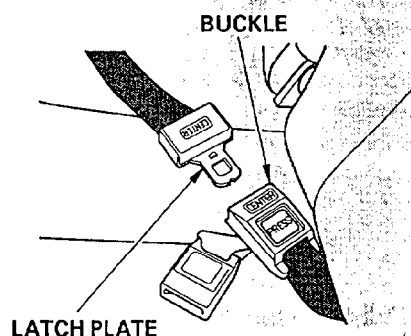
Each lap/shoulder belt has an emergency locking retractor. In normal driving, the retractor lets you move freely in your seat while it keeps some tension on the belt. During a collision or sudden stop, the retractor automatically locks the belt to help restrain your body.

The lap/shoulder belt retractor in each passenger seating position has an additional locking mechanism that is intended to secure a child seat (see page 25). If the shoulder part of the belt is pulled all the way out, this mechanism will engage. The belt will retract, but it will not allow the passenger to move freely. If the belt feels too tight, unlatch it, let it retract fully, then pull it out as far as needed.

The Seat Belt System and How It Works

Lap Belt

Seven-passenger model only



The lap belt has one manually-adjusted belt that fits across the hips. It is similar to safety belts used in airplanes.

Wearing Seat Belts Properly

You can increase the effectiveness of your seat belts if you take a little time to read the following pages and make sure you know how to wear seat belts properly.

⚠ WARNING

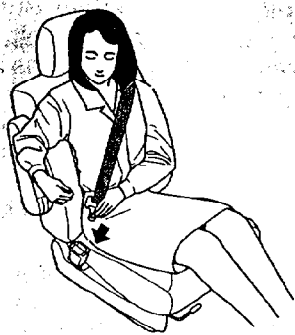
Not wearing a seat belt properly increases the chance of serious injury or death in a crash.

Be sure you and your passengers always wear seat belts and wear them properly.

Wearing a Lap/Shoulder Belt

Before putting on the seat belt, move the driver's seat as far back as is practical while still allowing you to maintain full control of the vehicle. Make sure the seat-back is upright (see page 18). The front seat passenger should move the seat as far back as possible.

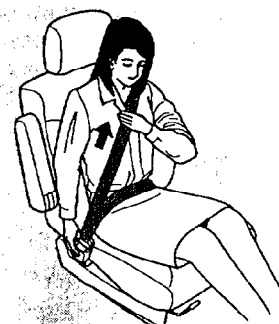
The Seat Belt System and How It Works



1. Pull the latch plate across your body and insert it into the buckle. Tug on the belt to make sure the latch is securely locked.

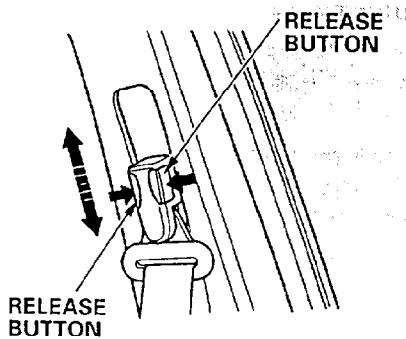


2. Check that the belt is not twisted.
3. Position the lap portion of the belt as low as possible across your hips, not across your stomach. This lets your strong pelvic bones take the force of a crash.

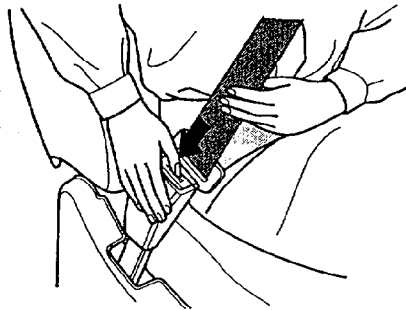


4. Pull up on the shoulder part of the belt to remove any slack. Make sure the belt goes over your collarbone and across your chest.

The Seat Belt System and How It Works

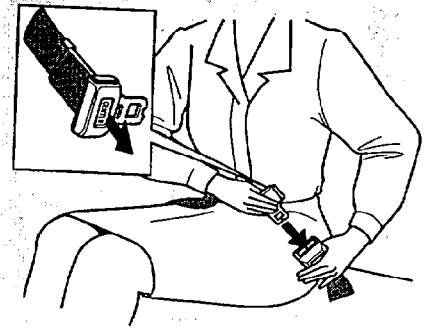


5. If you are sitting in one of the front seats and the shoulder belt crosses your neck, you should adjust the anchor height by squeezing the two buttons and sliding the anchor up or down.



To unlatch the seat belt, push the red PRESS button on the buckle. Guide the belt across your body to the door pillar. If the belt doesn't retract easily, pull it out and check for twists or kinks.

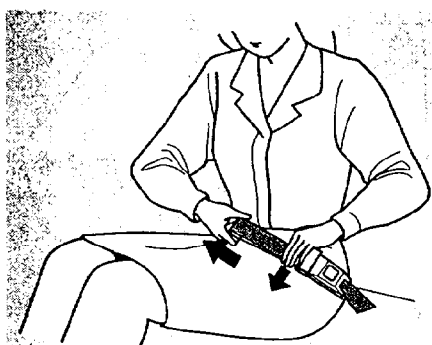
Wearing the Lap Belt



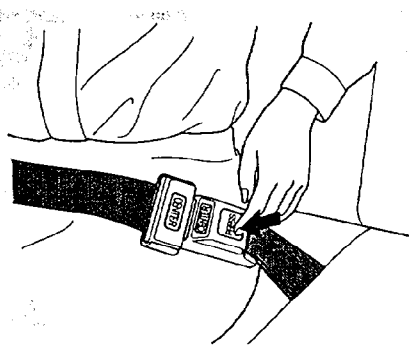
1. Pull the latch plate across your hips and insert it into the buckle marked CENTER.

If the belt is too short, hold the latch plate at a right angle and pull to extend the belt. Insert the latch plate into the buckle.

The Seat Belt System and How It Works

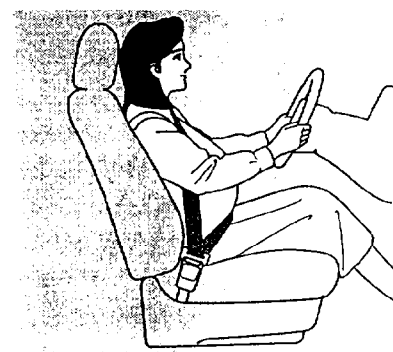


2. Position the belt as low as possible across your hips and pelvic bones, not across your stomach. Pull the loose end of the belt to adjust for a snug but comfortable fit.



To unlatch the belt, push the red PRESS button on the buckle.

Advice for Pregnant Women



Protecting the mother is the best way to protect her unborn child. Therefore, a pregnant woman should wear a properly-positioned seat belt whenever she drives or rides in a car.

The Seat Belt System and How It Works

If possible, use the lap/shoulder seat belt, remembering to keep the lap portion as low as possible (see page 7).

Each time you have a check-up, ask your doctor if it's okay for you to drive and how you should position a lap/shoulder seat belt.

Seat Belt Maintenance

For safety, you should check the condition of your seat belts regularly.

Pull out each belt fully and look for frays, cuts, burns, and wear. Check that the latches work smoothly and the lap/shoulder belts retract easily. Any belt not in good condition or not working properly should be replaced.

If a seat belt is worn during a crash, have your dealer replace the belt and inspect the anchors for damage.

For information on how to clean your seat belts, see page 188 .

Supplemental Restraint System

Your car is equipped with a Supplemental Restraint System (SRS) to help protect the head and chest of the driver and front seat passenger during a severe frontal collision.

This system does not replace your seat belts. It supplements, or adds to, the protection offered by seat belts and other occupant protection features.

⚠ WARNING

Not wearing a seat belt increases the chance of serious injury or death in a crash, even if you have airbags.

Be sure you and your passengers always wear seat belts and wear them properly.

SRS Components

Your supplemental restraint system includes:

- One airbag in the steering wheel for the driver and another in the dashboard for the passenger.
- Sensors that can detect a severe frontal collision.
- A sophisticated electronic system that continually monitors the sensors, control unit, airbag activators, and all related wiring when the ignition is ON (II).
- An indicator light on the instrument panel to alert you to a possible problem with the system.
- Emergency backup power in case your car's electrical system is disconnected in a crash.

What Happens In a Crash

If you ever have a severe frontal collision, the sensors will detect rapid deceleration and signal the control unit to instantly inflate the airbags.

During a crash, your seat belts will help to restrain your lower body and torso. The airbags will provide a cushion to absorb crash energy and help keep the head and chest of the driver and front passenger from striking the interior of the car.

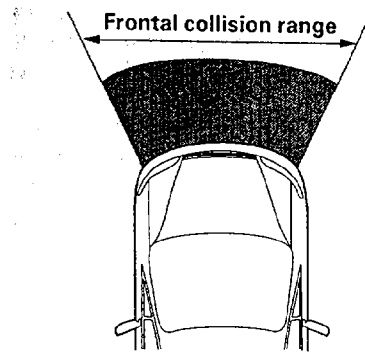
After inflating, the airbags will immediately deflate. The entire process, from detection to deflation, takes a fraction of a second. This process occurs so quickly that you may not hear the loud noise created by the airbag inflators, or realize what has happened.

Supplemental Restraint System

After the crash, you may see what looks like smoke. This is actually powder from the airbag's surface. People with respiratory problems may experience some temporary discomfort from the chemicals used by the airbag's activators.

Important Facts About Airbags

Airbags inflate only when needed; in a severe frontal collision. A severe collision would be similar to a crash into a parked car at 25 mph (40 km/h). Airbags will not inflate in a moderate frontal collision, or during a rear impact, side impact, or rollover — even if the impact is severe.



Airbags inflate and deflate only once. They cannot protect you during any additional impacts that can occur during a crash sequence.

Injuries, including fatal injuries, can occur in a severe collision, even if seat belts are worn properly and the airbags inflate. No safety system can provide complete protection in a severe crash.

Just from viewing the vehicle damage after a crash, it is very difficult to accurately determine if the airbags should or should not have inflated. In some cases where the airbag did not inflate, extensive visible damage indicated that the car absorbed much of the crash energy, and the airbags were not needed. In other cases, a severe jolt, such as an impact to the undercarriage, may not cause extensive body damage but cause the airbags to inflate.

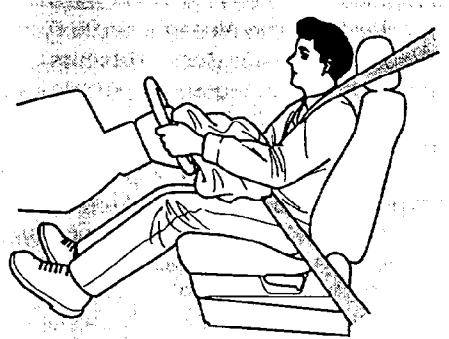
Supplemental Restraint System

How the Driver's Airbag Works



If you ever have a severe frontal collision, your airbag will instantly inflate to help protect your head and chest.

To do its job, the airbag inflates with considerable force. So, while it can reduce serious injuries and even save your life, the airbag might cause some facial abrasions or other injuries. To reduce the possibility of injury, you should always sit back as far from the steering wheel as is practical while still maintaining full vehicle control.

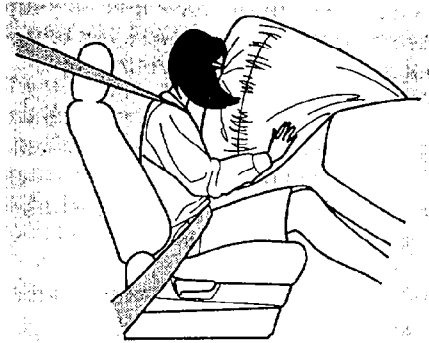


After the bag completely inflates, it immediately starts deflating so it won't interfere with your visibility, ability to steer, or ability to operate other controls. The total time for inflation and deflation takes a fraction of a second. You may not even be aware that the airbag has been fully inflated.

Supplemental Restraint System

The driver's airbag is stored in the center of the steering wheel. For our safety, do not attach any items to the steering wheel. They could interfere with the proper operation of the airbag. Or, if the airbag inflates, they could be propelled inside the car and hurt someone.

How the Passenger's Airbag Works



If you ever have a severe frontal collision, the passenger's airbag will inflate at the same time as the driver's airbag.

This airbag is quite large and inflates with considerable force. It can seriously hurt a front seat passenger who is not in the proper position and wearing the seat belt properly. Front seat passengers should move the seat as far back as practical and sit well back in the seat.

We strongly recommend that you do not put an infant seat in the front passenger's seat. If the airbag inflates, it can hit the infant seat with great force. The infant seat can be dislodged or struck with enough force to cause very serious injury to the infant.

If a toddler seat is used in the front passenger's seat, the vehicle seat should be moved as far back as possible. If the passenger's bag inflates, it could seriously hurt a toddler who is not in the proper position or properly restrained.

CONTINUED

Supplemental Restraint System

The passenger's airbag is stored near the top of the dashboard, under a lid marked SRS. Do not place any objects on top of this lid. If the airbag inflates, those objects can be propelled inside the car and possibly hurt someone.

SRS

How the SRS Indicator Light Works

The purpose of the SRS light on your instrument panel is to alert you of a potential problem with your supplemental restraint system.

Have the system checked if:

- The light does not come on when you turn the ignition ON (II).
- The light stays on after the engine starts.
- The light comes on or flashes while you are driving.

System Service

Your supplemental restraint system is virtually maintenance-free. There are no parts you can safely service. You must have the system serviced by an authorized Honda dealer:

- If your airbags ever inflate, the airbags and control unit must be replaced. Do not try to remove or discard the airbags by yourself. This must be done by a Honda dealer.
- If the SRS indicator light alerts you of a problem. Have the supplemental restraint system checked as soon as possible. Otherwise, your airbags might not inflate when you need them.
- When the car is ten years old. Have the dealer inspect the system. The production date is on the driver's doorjamb for your convenience.

Supplemental Restraint System

System Service Precautions

Do not modify your steering wheel or any other part of the supplemental restraint system. Modifications could make the system ineffective.

Do not tamper with the system's components or wiring. This could cause the airbags to inflate inadvertently, possibly injuring someone very seriously.

Tell anyone who works on your car that you have a supplemental restraint system. Failure to follow the procedures and precautions in the official Honda service manual could result in personal injury or damage to the system.

Scrapping an entire car that has an uninflated airbag can be dangerous. Get assistance from a Honda dealer if your car must be scrapped.

If you sell your car, please be sure to tell the new owner that the car has a supplemental restraint system. Alert them to the information and precautions in this part of the owner's manual.