

REPORT NO. MGA-96-N004
NEW CAR ASSESSMENT PROGRAM (NCAP)

FRONTAL BARRIER IMPACT TEST

NISSAN MOTORS
1995 NISSAN ALTIMA 4 DOOR
NHTSA NO. MS5202

MGA RESEARCH CORPORATION
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: June 12, 1995

Report Date: June 22, 1995

Final Report

Prepared For:

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16. Abstract A 56 kph (35 mph) frontal barrier impact using a 30 load cell barrier was conducted on a 1995 Nissan Altima 4 Door at the MGA Proving Grounds and Crash Test Center in Burlington, WI. on June 12, 1995. The barrier impact velocity was 56.4 kph (35.07 mph), and the ambient temperature at the time of impact was 21°C. The post-test maximum static crush was 524 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 710 and the 3 msec. Clip (Chest g's) was 51 g's. The left and right femur loads for the driver were 3236 and 2125 Newtons, respectively. The passenger's HIC was 777 and the 3 msec Clip was 52 g's. The left and right femur maximum loads were 4367 and 2083 Newtons respectively.					
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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 Nissan Altima 4 Door at a velocity of 56.4 kph (35.07 mph). The test was performed at the MGA Proving Grounds and Crash Test Center on June 12, 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, chest displacement transducer, neck load cell, and right/left femur load cells, and right/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. Calibrated ATDs, driver (serial No. 065), and the right front passenger (Serial No. 066), were used for this test. Certification details, along with instrumentation calibration data, are found in Appendix C and D.

The 96 channels of data were recorded on 9 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 710. The maximum chest (CLIP) deceleration over 3 milliseconds was 51 g's. The maximum chest displacement was 31 mm. The left and right femur loads were 3236 and 2125 Newtons respectively.

The right front passenger's head struck the inflated airbag. The passenger HIC was 777 and maximum chest (CLIP) deceleration over 3 milliseconds was 52 g's. The maximum chest displacement was 33 mm. The left and right femur loads were 4367 and 2083 Newtons respectively.

NOTE

Bottom of engine accelerometer had no valid data collected after 47 msec. Passenger right lower tibia force Z had no valid data collected after 70 msec.

GENERAL TEST AND VEHICLE PARAMETER DATA

Vehicle Yr/Make/Model/Body Style: 1995/Nissan/Altima/4 Door

NHTSA No.: MS5202 VIN.: 1N4BU31D2SC223616

Body color: Granite Date of Manufacture: 4/95

Engine: 4 Cylinders; C.I.D.; 2.4 Liters;
X Gas; Diesel; Turbocharged

 Longitudinal; X Transverse

Transmission: 4 Speed; Manual; X Automatic; Overdrive

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

Odometer Reading: 57 miles

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

 P/seats; X Tilt Wheel; X Cruise Control;

Type of Occupant Restraint: Type II with driver and passenger airbag

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 303 kPa (44 Psi) Rear 303 kPa (44 Psi)

Recommended Tire Size: P205/60R15

Recommended Cold Tire Pressure: Front 200 kPa (29 Psi) Rear 200 kPa (29 Psi)

Tires on Vehicle: P205/60R15 ; Manufacturer: Goodyear

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

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

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

Vehicle Capacity Weight (VCW) = 408.2 kg. (A) 900 lbs

No. of Occupants x 68.0 kg. = 340.0 kg. (B) 750 lbs

Rated Cargo Weight (RCW) A-B = 68.2 kg. 150 lbs

GVWR 1835.7 kg. GAWR: Front 1029.7 kg.; Rear 844.6 kg.

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

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

Right Front = 426.8 kg Right Rear = 239.0 kg
Left Front = 421.8 kg Left Rear = 246.3 kg
TOTAL FRONT WEIGHT = 848.6 kg (63.6% of Total Vehicle Weight)
TOTAL REAR WEIGHT = 485.3 kg (36.4% of Total Vehicle Weight)
TOTAL UNLOADED DELIVERED WEIGHT (UDW) = 1333.9 kg

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight 1333.9 kg
VCW = Vehicle Capacity Weight 408.2 kg DSC = Designated Seating Capacity 5
RCW = VCW · 68 (DSC) = 68.2 *kg
Target Test Weight = UDW + RCW + (2 dummies x 75.8 kg/dummy)
Target Test Weight = 1553.7 kg

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND CARGO:

Right Front = 473.6 kg Right Rear = 294.8 kg
Left Front = 477.2 kg Left Rear = 303.0 kg
TOTAL FRONT WEIGHT = 950.8 kg (61.4% of Total Vehicle Weight)
TOTAL REAR WEIGHT = 597.8 kg (38.6% of Total Vehicle Weight)
TOTAL TEST WEIGHT = 1548.6 kg
Weight of ballast secured in vehicle trunk area = 0 kg
Vehicle components removed to meet target weight: Rear deck lid, rear bumper, muffler, tail
pipe, rear seat, rear windows, rear inside door panels, rear seat belts, and all rear seat area trim

VEHICLE ATTITUDE (all dimensions in mm):

Delivered Attitude: RF 714 LF 713 RR 704 LR 706
Test Attitude: RF 691 LF 687 RR 681 LR 679
Wheel Base: 2620 mm; C.G. = 1011 mm rearward of front wheel C/L

*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: June 12, 1995 Time of Test: 4:00 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 = 56.4 kph; secondary = 56.5 kph
Distance From Front Bumper to Barrier Face When
Entering Speed Trap: 1200 mm
Exiting Speed Trap: 200 mm

VEHICLE REBOUND AND CRUSH (mm):

Vehicle Length: Pre-test = R 4412 C_L 4572 L 4411
Post-test = R 3885 C_L 4048 L 3938
Crush = R 527 C_L 524 L 473

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

R 546 mm C_L 513 mm L 553 mm

VISIBLE DUMMY CONTACT POINTS:

	<u>Driver</u>	<u>Passenger</u>
Head	<u>to airbag</u>	<u>to airbag</u>
Chest	<u>to airbag</u>	<u>to airbag</u>
Abdomen	<u>no contact</u>	<u>no contact</u>
Left Knee	<u>to steering column & dashboard</u>	<u>to glovebox</u>
Right Knee	<u>to steering column & dashboard</u>	<u>to glovebox</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>opened</u>	<u>opened</u>	<u>opened</u>	<u>opened</u>

<u>Seat Movement</u>	<u>Front</u>	
	<u>Left</u>	<u>Right</u>
Seat Back Movement	<u>0</u>	<u>0</u>
Seat Shift (mm)	<u>0</u>	<u>0</u>

Glazing Damage

Backlight/Windshield Windshield cracked

Other Notable Impact Effects: Both airbags deployed, driver left hand came out the window

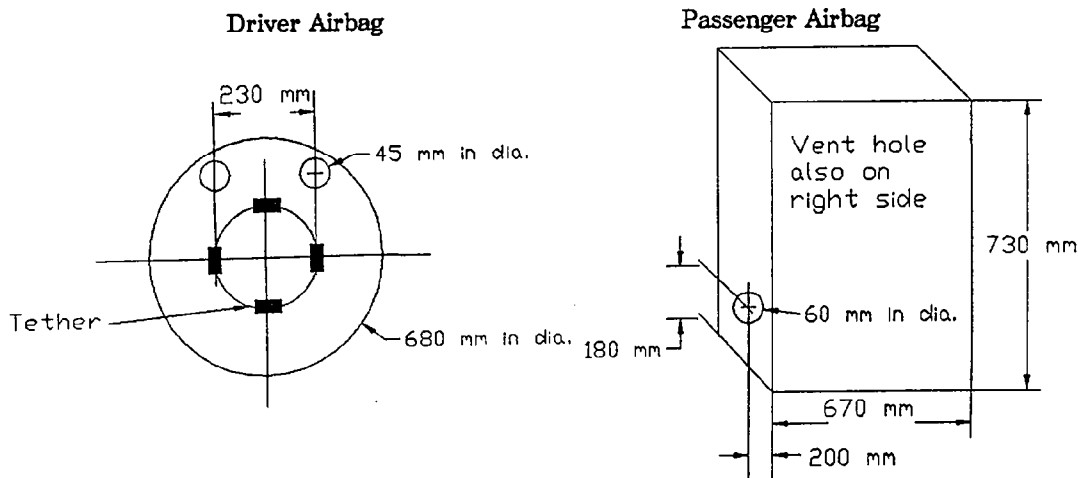
GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

POST TEST AIRBAG DATA

Vehicle Year/Make/Model/Body Style: 1995/Nissan/Altima/4 Door

NHTSA No.: MS5202 ; Test Date: 6-12-95 ;

- A. Number of Vent Holes: Driver 2 ; Passenger 2
- B. Size of Vent Holes: Driver 45 mm dia. ; Passenger 60 mm dia.
- C. Total Vent Area; Driver 1590 mm² ; Passenger 2827 mm²
- D. Deflated Airbag Length and Width Dimensions or, if Round, Diameter
- Driver; Length N/A , Width N/A , Diameter 680 mm
- Passenger; Length 730 mm , Width 670 mm , Diameter N/A mm
- E. Is the Airbag Tethered?
- Driver; Yes; No; If yes, record length of tether 200 mm
- Passenger; Yes; No; If yes, record length of tether mm



- F. Part Numbers and Manufacture Name of Airbag and Gas Generator
- Driver; Mfr N/A; Airbag ANF12U222 ; Gen KM1E4953305233
- Passenger; Mfr N/A; Airbag N/A ; Gen KP4E8953276268

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.:

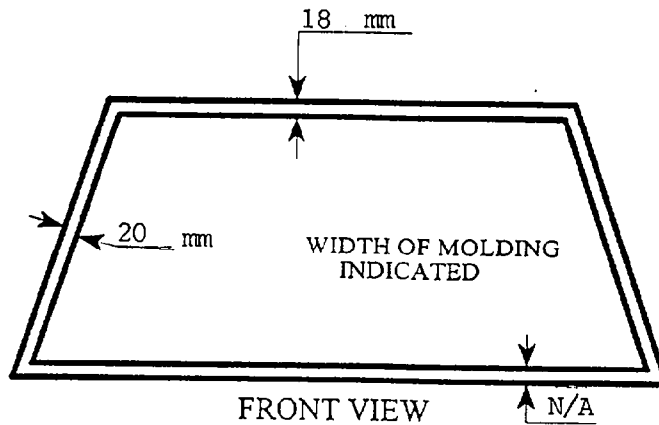
Rubber trim and glue

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	2139	2139	100%
LEFT SIDE	2087	2087	100%
TOTAL	4226	4226	100%

AREA OF RETENTION FAILURE: None



FAILURE DETAILS: None

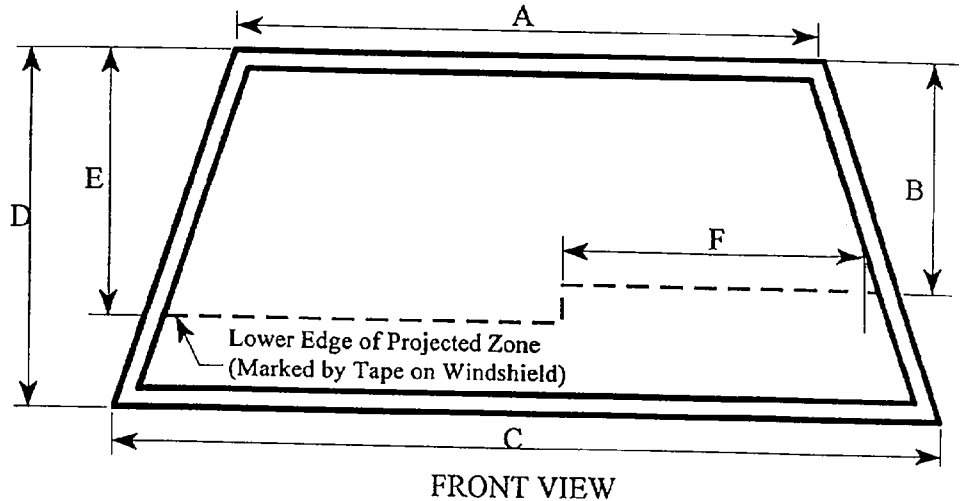
FMVSS NO. 219, "WINDSHIELD ZONE INTRUSION", DATA SHEET

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 surface of the instrument panel, including padding, and drawing the locus of points on the inner surface of the windshield contactable by the sphere across the width of the instrument panel. From the outermost 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= 1169 mm
B= 480 mm
C= 1463 mm
D= 840 mm
E= 595 mm
F= 860 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.: MS5202 Test Date: June 12, 1995

Vehicle Year./Make/Model: 1995/Nissan/Altima/2 Door

Usable Capacity of Vehicle's Fuel Tank: 57.9 Liters
(figure furnished by vehicle manufacturer)

TEST REQUIREMENTS:

Drain the test vehicle's fuel system and operate the engine until the fuel system is dry. Add Stoddard solvent, which has been dyed purple, until 92-94% of the stated usable capacity is reached. Operate the engine to assure the Stoddard solvent is present throughout the entire fuel system.

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

53.7 Liters which is 92.7% of the stated USABLE CAPACITY.

TEST VEHICLE IMPACT TYPE:

- Frontal (35 mph)
 Oblique (30 mph) with ___ ° barrier face first
contacting (driver/passenger) side
 Rear Moving Barrier (30 mph)
 Side Impact MDB (33.2 mph)

FUEL SPILLAGE MEASUREMENT:

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

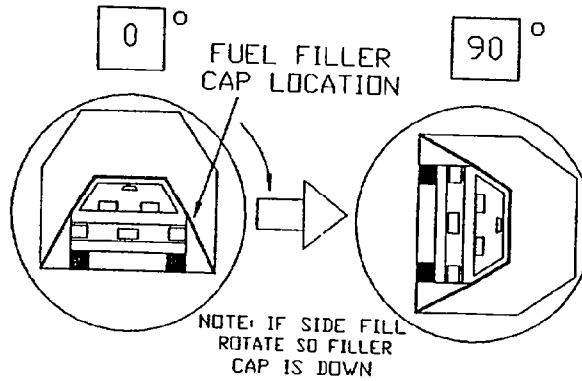
ACTUAL	MAX ALLOWED
0	1 OZ
0	5 OZ
0	1 oz./1 MIN

SOLVENT SPILLAGE DETAILS: None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 0° - 90°

Vehicle NHTSA ID No.: MS5202



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 48 seconds
 (Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 48 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

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

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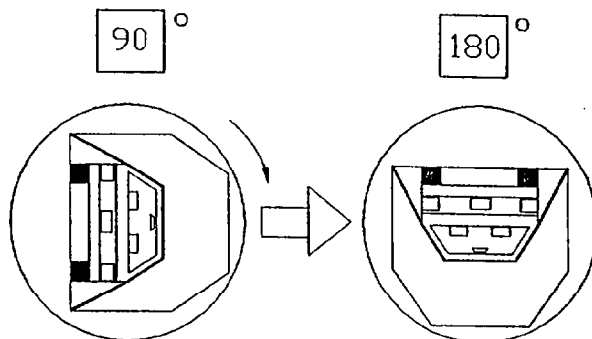
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 90° - 180°

Vehicle NHTSA ID No.: MS5202



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 32 seconds
 (Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 32 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

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

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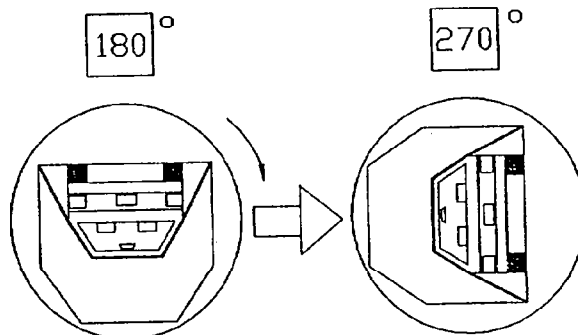
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 180° - 270°

Vehicle NHTSA ID No.: MS5202



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 17 seconds
 (Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 17 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

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

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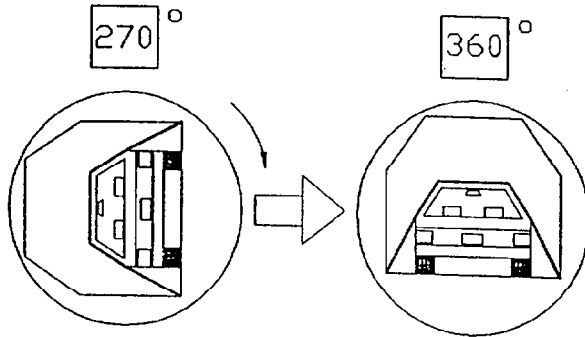
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 270° - 360°

Vehicle NHTSA ID No.: MS5202



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 40 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

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

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

IV. SOLVENT SPILLAGE LOCATIONS(S): None

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/Nissan/Altima/4 Door

VEH. NHTSA NO.: MS5202 TEST DATE: June 12, 1995

MAX. ACCELERATION VALUES: (g's)	DRIVER #065	PASSENGER #066
Head Channel X	-65.9 @ 78 msec.	-63.2 @ 80 msec.
Head Channel Y	-4.3 @ 54 msec.	9.9 @ 76 msec.
Head Channel Z	25.8 @ 62 msec.	32.7 @ 61 msec.
HEAD RESULTANT	66.1 @ 78 msec.	67.7 @ 80 msec.
Chest Channel X	-51.6 @ 64 msec.	-51.5 @ 64 msec.
Chest Channel Y	-5.7 @ 82 msec.	-15.8 @ 59 msec.
Chest Channel Z	-13.4 @ 88 msec.	-6.7 @ 49 msec.
CHEST RESULTANT (CLIP)	51.0	51.7
TIME INTERVAL (msec) [0.003 seconds minimum]	t ₁ = 62.7 t ₂ = 65.8	t ₁ = 62.7 t ₂ = 65.8

HEAD INJURY CRITERIA (HIC) VALUES:

HIC	709.9	777.1
t ₁ = (msec)	52.3	59.3
t ₂ = (msec)	85.1	94.6
Avg. Accel. t ₁ to t ₂ (g's)	54.2	54.6

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

MAX. COMPRESSIVE FEMUR FORCES:

Left Side (N)	3236.2	4366.7
Right Side (N)	2125.0	2082.7

MAXIMUM SEAT BELT FORCES:

Lap Belt (N)	7526.9	6021.8
Shoulder Belt (N)	6313.3	7584.0

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

HYBRID III NECK, CHEST AND PELVIS DATA SHEET

VEHICLE YR./MAKE/MODEL/BODY STYLE: 1995/Nissan/Altima/4 Door

VEHICLE NHTSA NO.: MS5202 TEST DATE: June 12, 1995

MAXIMUM VALUES	DRIVER DUMMY #065	PASSENGER DUMMY #066
Neck Load X (N)	-540.4 @ 66 msec.	447.9 @ 111 msec.
Neck Load Y (N)	88.7 @ 65 msec.	-216.3 @ 75 msec.
Neck Load Z (N)	-2068.1 @ 63 msec.	-2082.1 @ 70 msec.
Neck Moment X (NM)	12.3 @ 82 msec.	-9.5 @ 69 msec.
Neck Moment Y (NM)	-43.1 @ 66 msec.	-25.7 @ 130 msec.
Neck Moment Z (NM)	-10.9 @ 102 msec.	-5.1 @ 47 msec.
Chest Deflection X (mm)	-30.6	-33.0
Time of Max. Occurrence	73 msec.	80 msec.
Pelvis X Acceleration (g's)	-38.7 @ 61 msec.	-53.6 @ 56 msec.
Pelvis Y Acceleration (g's)	-13.3 @ 49 msec.	-7.9 @ 70 msec.
Pelvis Z Acceleration (g's)	-28.5 @ 80 msec.	-25.1 @ 77 msec.
Pelvis Resultant (g's)	45.9 @ 61 msec.	54.7 @ 56 msec.

PART 572 DUMMY IN-VEHICLE POSITION

Vehicle NHTSA No.: MS5202 Vehicle: 1995 Nissan Altima 4 Door

SEAT TYPE:

 Bench
 X Bucket
 Split Bench

ADJUSTER TYPE:

Driver: X Manual
 Power

BUCKET SEAT BACK TYPE:

 Fixed
 X Adjustable Reclining

Passenger: X Manual

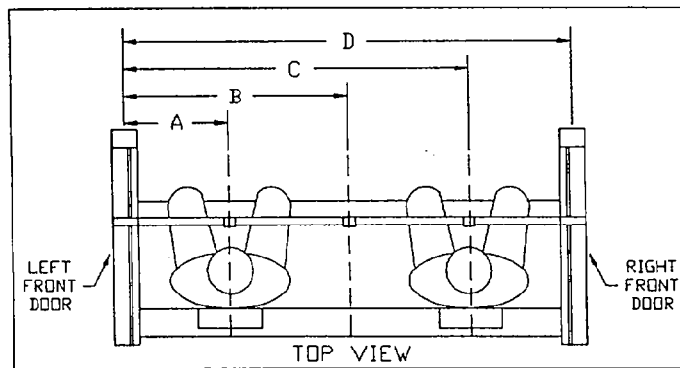
 Power

Driver Seat Position

11th notch from front
out of 20 total

Passenger Seat Position

11th notch from front
out of 20 total



065 DUMMY ID 066

A = Left Door to Driver Centerline	<u>407</u> mm
B = Left Door to Center Passenger Centerline	<u>755</u> mm
C = Left Door to Right Passenger Centerline	<u>1116</u> mm
D = Left Door to Right Door	<u>1510</u> mm

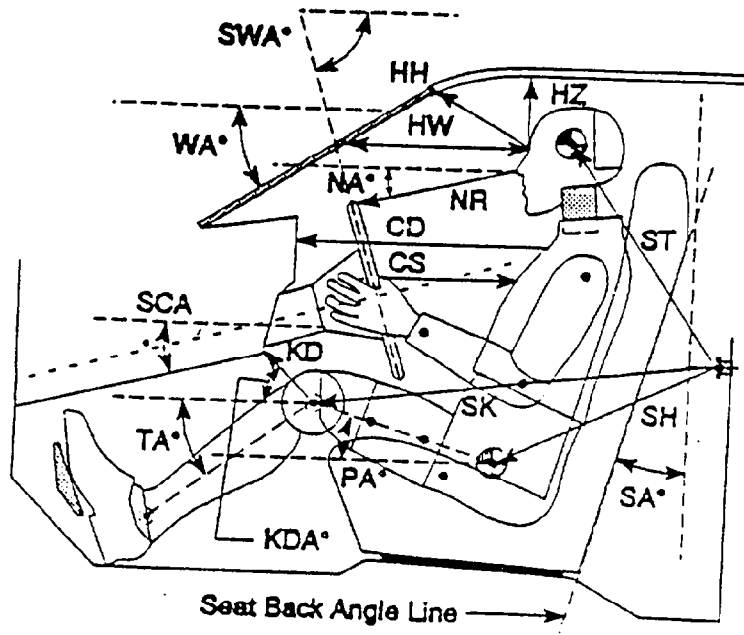
FRONT SEAT MEASUREMENT TABLE

Units (mm)

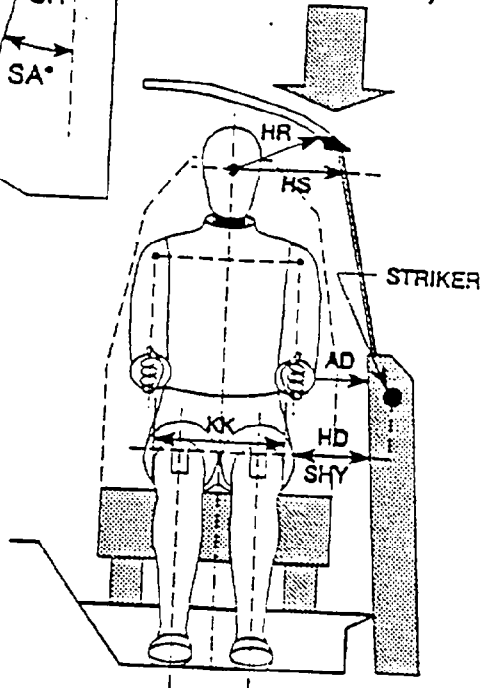
	DRIVER (Serial #065)	PASSENGER (Serial #066)
WA°	28.3°	
SWA°	25.3°	N/A
SCA°	24.4°	N/A
SA°	20.0°	19.1°
HZ	166	154
HH	304	287
HW	549	535
HR	237	215
NR	420 Angle 13.8°	N/A
CD	535	583
CS	329	N/A
RA	192	N/A
KDL	163 Angle 23.4°	168
KDR	156	168 Angle 27.5°
PA°	24.2°	21.3°
TA°	42.1°	37.8°
KK	312	241
ST	526 Angle 4.4°	547 Angle 8.2°
SK	593 Angle 87.2°	597 Angle 91.0°
SH	235 Angle 115.2°	237 Angle 120.9°
SHY	234	227
HS	309	280
HD	166	161
AD	95	96

N/A = Not Applicable

FRONT SEAT MEASUREMENTS

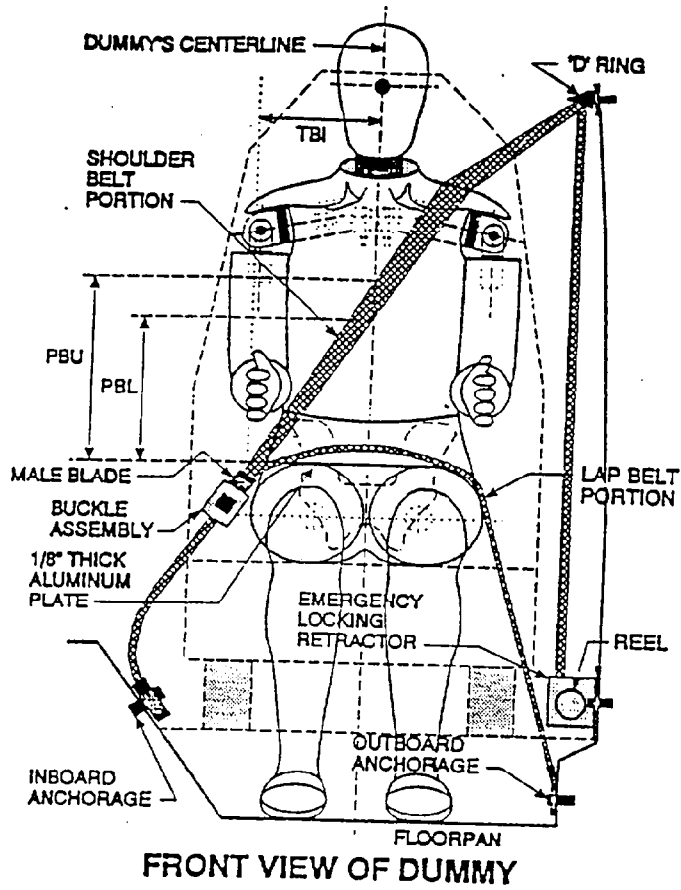


- AD - Arm to Door
- HD - H-Point to Door
- HR - Head to Side Header
- HS - Head to Side Window
- KK - Knee to Knee
- SHY - Striker to H-Point (Y Direction)



- CD - Chest to Dash
- CS - Steering Column Angle
- 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	343	330
<u>PBL</u> -- Top surface of alum. plate to belt lower edge	270	245

Note: Adjustable "D" ring set in the second position from 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>169 mm</u>	<u>175 mm</u>
Shoulder belt length as measured on Part 572 Dummy.	<u>837 mm</u>	<u>880 mm</u>
Lap belt length as measured on Part 572 Dummy.	<u>808 mm</u>	<u>792 mm</u>

SHOULDER BELT SPOOL-OFF DATA:

As determined by film analysis	<u>53 mm</u>	<u>40 mm</u>	
As determined mechanically	<u>62 mm</u>	<u>48 mm</u>	at retractor
	<u>60 mm</u>	<u>59 mm</u>	at D-ring

BELT STRETCH DATA:

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

RETRACTOR LOCK-UP TIME:

As determined by shoulder belt spool-off observed in on-board cameras	<u>78 msec</u>	<u>96 msec</u>
---	----------------	----------------

N/R = Not Recorded

CAMERA LOCATIONS

VEH. NHTSA NO.: MS5202 ; TEST DATE: June 12, 1995 ; TIME: 4:00 p.m.

VEH. YEAR/MAKE/MODEL/BODY STYLE: 1995/Nissan/Altima/4 Door

CAMERA NO.		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	35.8	323.2	3.9	90°		25	1015
3	Steering Column Top	70.0	312.6	61.2	90°		25	1010
4	Steering Column Bottom	68.7	312.2	40.7	90°		25	1015
5	Left Driver Close-up	49.8	359.4	42.5	90°		50	909
6	Left Angle	185.8	206.0	77.8			35	901
7	Driver Onboard						35	1015
8	Passenger Onboard						35	1000
9	Right Overall	99.2	339.4	38.4	90°		13	1099
10	Right Passenger	66.5	320.7	42.7	90°		25	1020
11	Right Passenger Close-up	58.3	327.6	40.3	90°		50	1020
12	Right Angle	310.2	300.0	77.8			75	1000
13	Top View Wide	54.3	0	198.8			8	1026
14	Top Driver	15.4	325	98.6			13	909
15	Top Passenger	14.2	12.8	98.4			13	952
16	Pit Engine	37.8	0	124.0			13	1010
17	Fuel Tank	112.8	0	124.0			13	966

* COORDINATES:

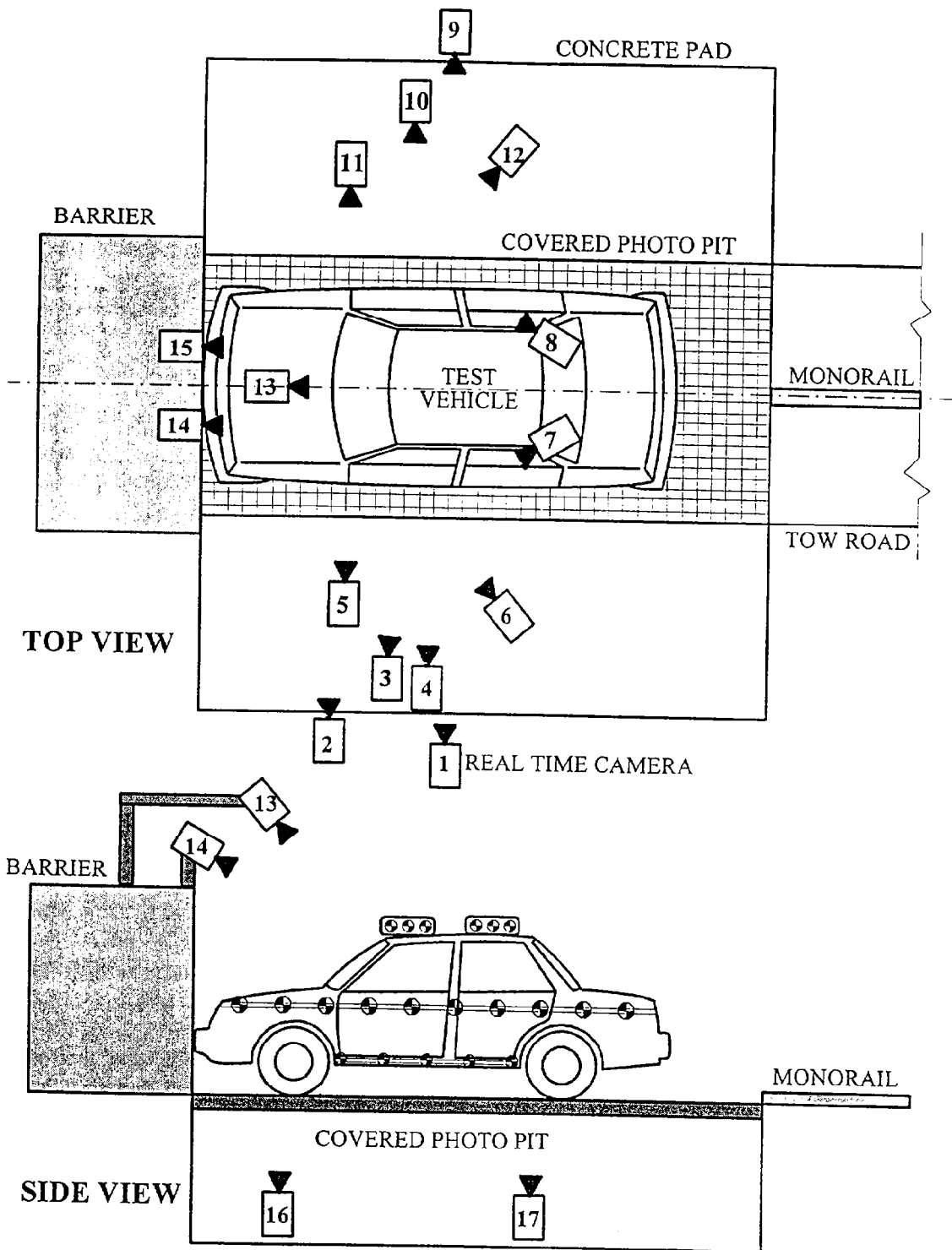
+X = film plane rearward of barrier

+Y = film plane to left of monorail centerline

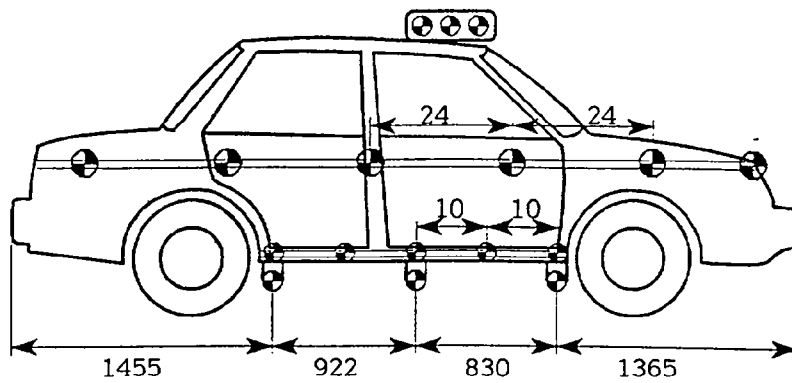
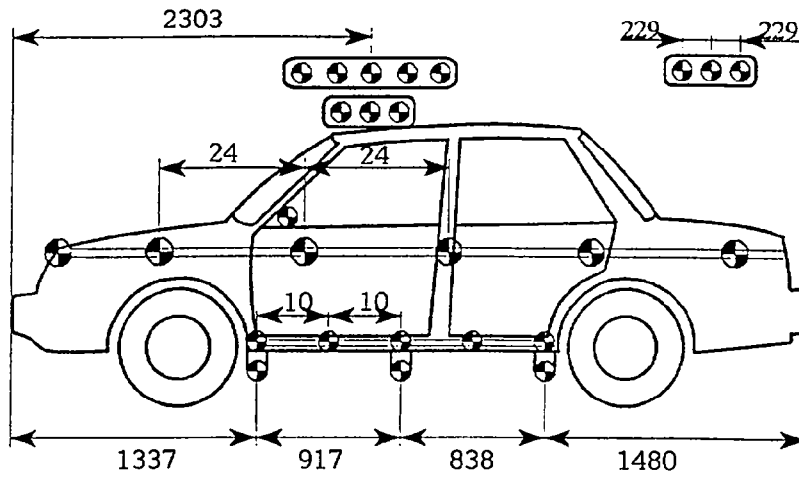
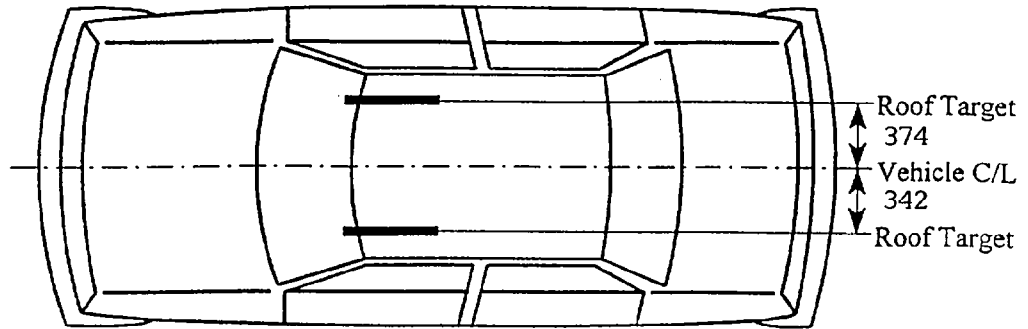
+Z = film plane to above ground level

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

CAMERA LOCATIONS (Cont'd)



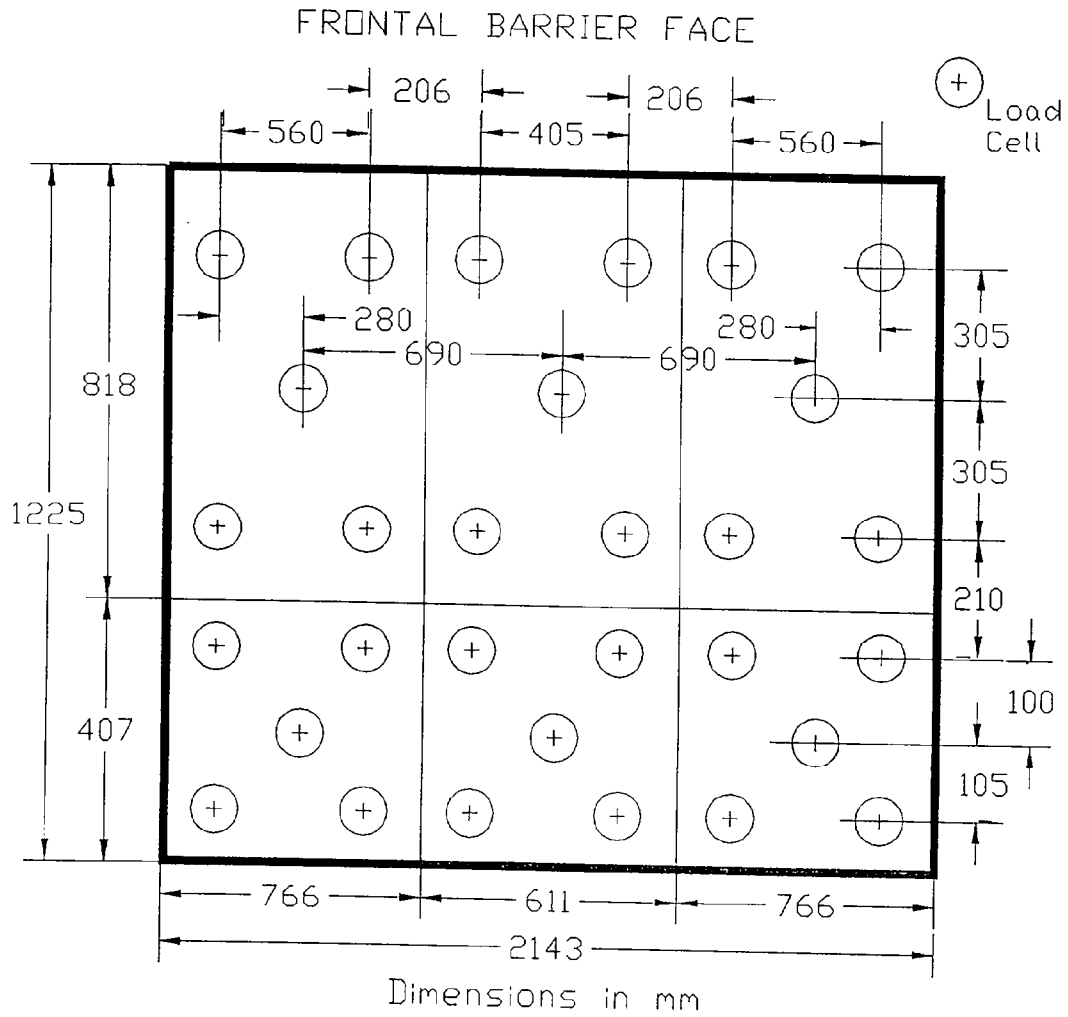
VEHICLE TARGET LOCATIONS



(DIMENSIONS IN MM)

LOAD CELL LOCATIONS ON FIXED BARRIER

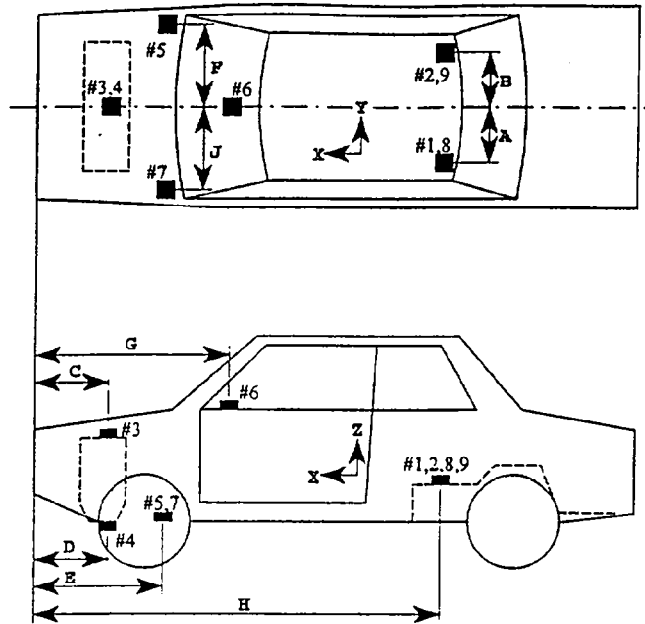
- 30 Load Cells
- 6 Rows
- 9 Columns
- 6 Groupings (5 cells/group)



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)

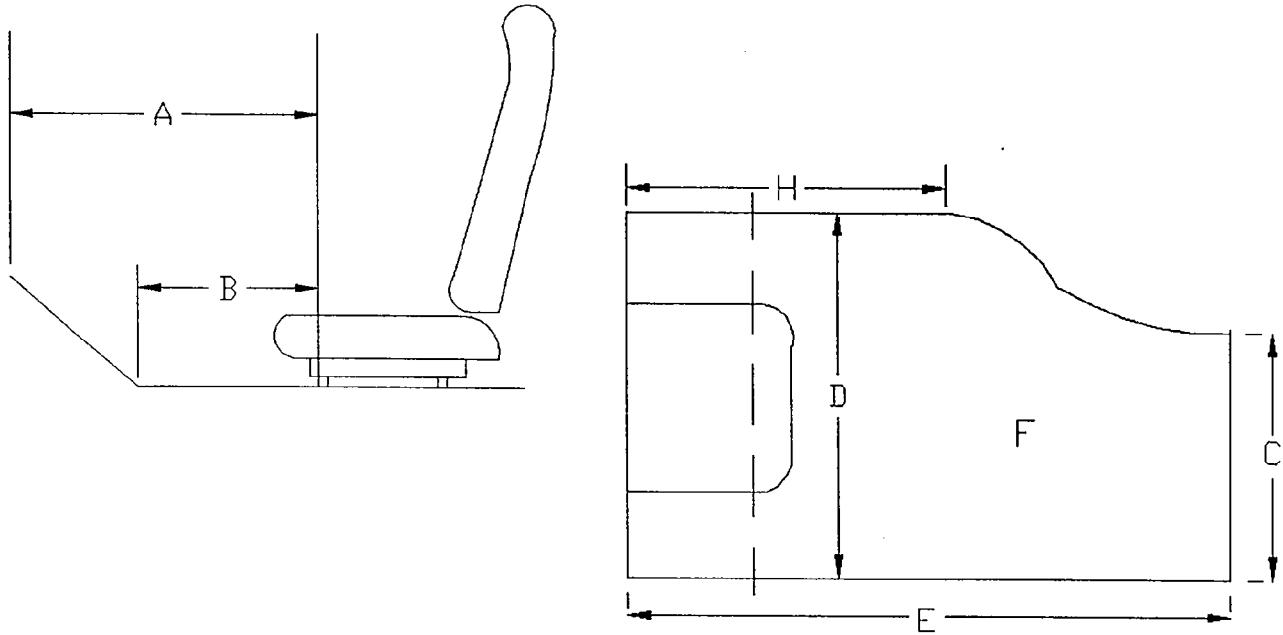
Dimension	Length
A	380
B	375
C	700
D	704
E	779
F	655
G	1424
H	2815
J	655

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

TEST VEHICLE MEASUREMENTS

STATIC FOOTWELL DEFORMATION

Driver's Side



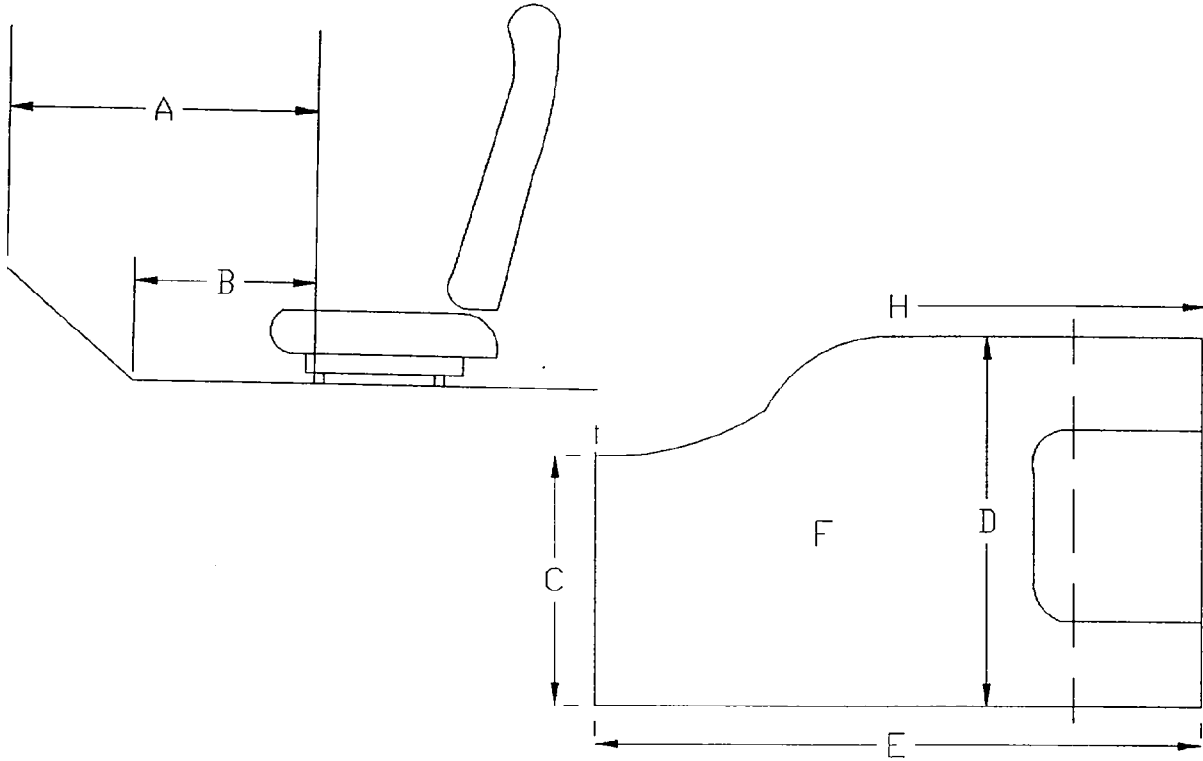
Units = mm

MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
A	710	527	183
B	598	451	147
C	558	574	16
D	570	569	1
E	565	449	116
H	445	445	0
F (cm ²)	3206.1	2630.7	575.4

TEST VEHICLE MEASUREMENTS

STATIC FOOTWELL DEFORMATION

Passenger's Side

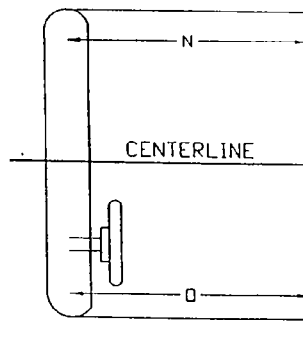
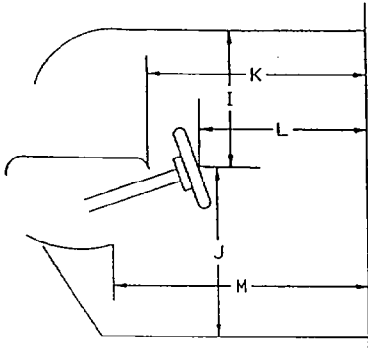


Units = mm

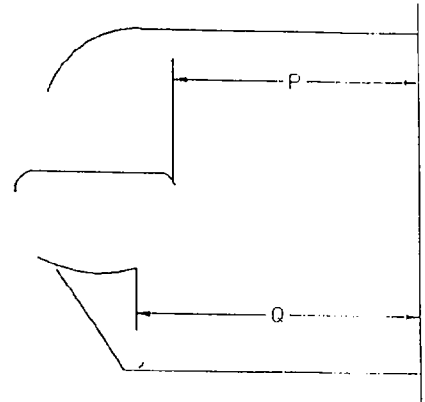
MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
A	777	553	224
B	504	422	82
C	548	499	49
D	568	583	15
E	684	422	262
H	475	398	77
F (cm ²)	3843.3	2440.1	1403.2

TEST VEHICLE MEASUREMENTS (Cont'd)

STATIC PASSENGER COMPARTMENT INTRUSION



MEASUREMENTS
FROM C-PILLAR
BELT ANCHORAGE

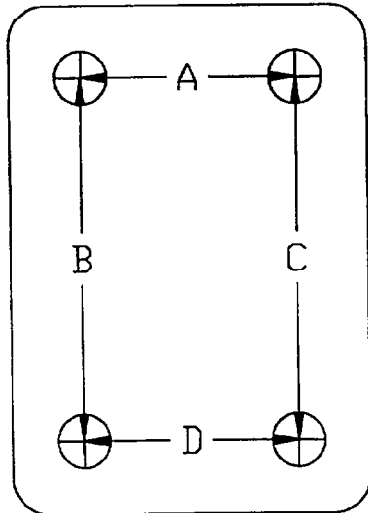


Units = mm

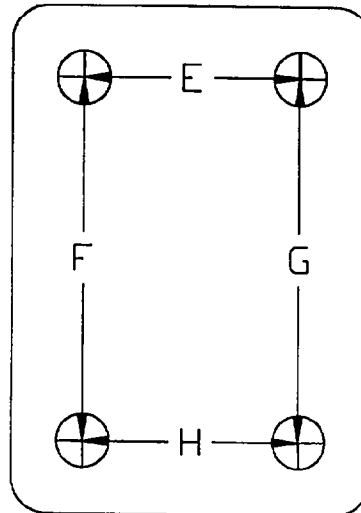
MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
I	458	389	69
J	630	725	95
K	1604	1594	10
L	1395	1393	2
M	1613	1570	43
N	1876	1873	3
O	1876	1864	12
P	1640	1636	4
Q	1655	1640	15

TEST VEHICLE MEASUREMENTS (Cont'd)
UNDERBODY FLOORBOARD DEFORMATION

Driver's Side



Passenger Side

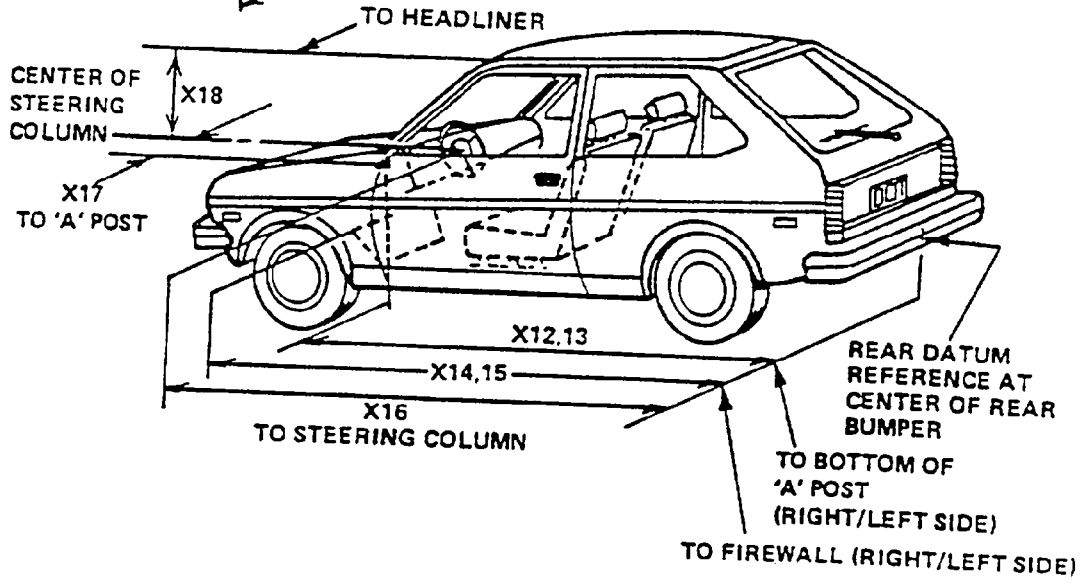
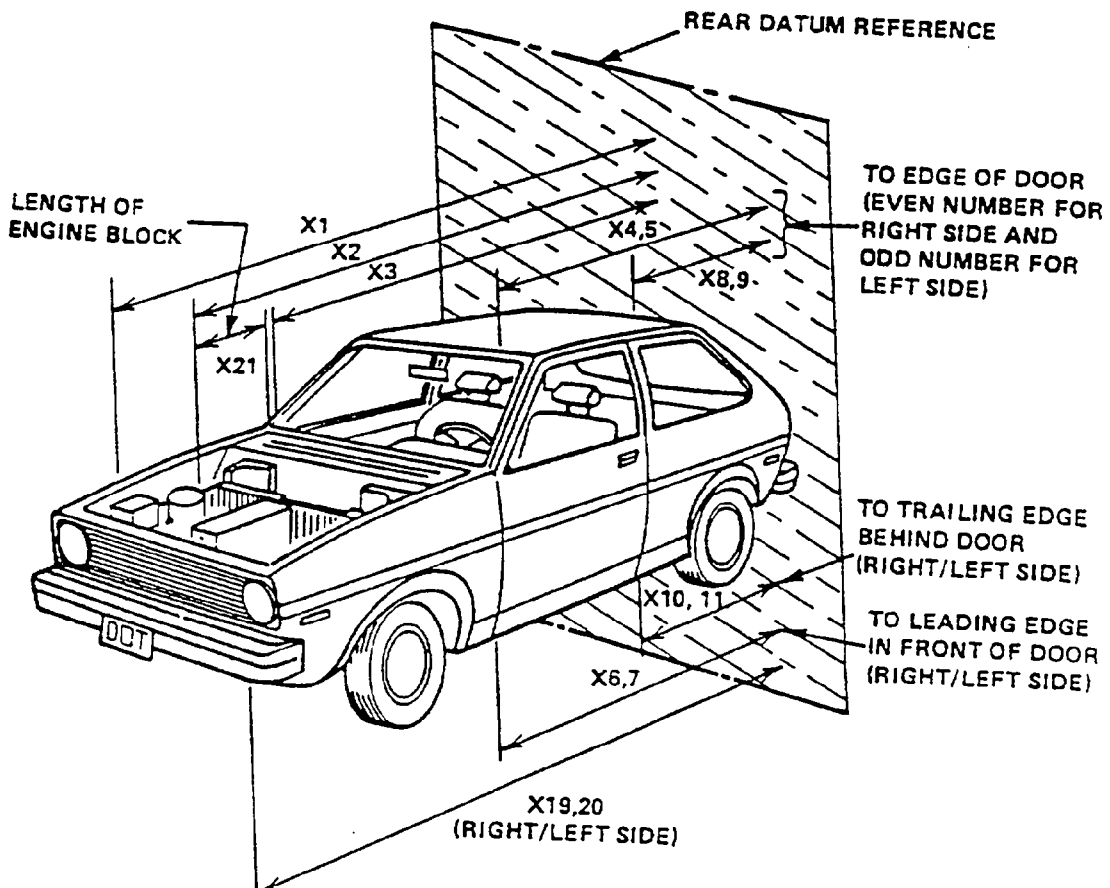


MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
A	488	474	14
B	571	565	6
C	630	480	150
D	449	448	1
E	481	472	9
F	688	594	94
G	599	532	67
H	452	440	12

TEST VEHICLE MEASUREMENTS (Cont'd)

No.	MEASUREMENT DESCRIPTION:	Pre-Test (mm)	Post-Test (mm)	Diff. (mm)
X1	Total Length of Test Vehicle at Centerline	4572	4048	524
X2	Rear Surface of Vehicle to Front of Engine	3942	3648	294
X3	Rear Surface of Vehicle to Firewall	3472	3356	116
X4	Rear Surface to Upr. Leading Edge of Rt. Door	3155	3142	13
X5	Rear Surface to Upr. Leading Edge of Left Door	3153	3146	7
X6	Rear Surface to Lwr. Leading Edge of Rt. Door	3138	3116	22
X7	Rear Surface to Lwr. Leading Edge of Left Door	3142	3120	22
X8	Rear Surface to Upr. Trailing Edge of Rt. Door	2077	2071	6
X9	Rear Surface to Upr. Trailing Edge of Left Door	2082	2072	10
X10	Rear Surface to Lwr. Trailing Edge of Rt. Door	2067	2046	21
X11	Rear Surface to Lwr. Trailing Edge of Left Door	2073	2048	25
X12	Rear Surface to Bottom of A Post on Rt. Side	3137	3117	20
X13	Rear Surface to Bottom of A Post on Left Side	3143	3100	43
X14	Rear Surface to Firewall on Right Side	3456	3371	85
X15	Rear Surface to Firewall on Left Side	3418	3357	61
X16	Rear Surface to Steering Column	2668	2668	0
X17	Center of Steering Column to A Post	368	321	47
X18	Center of Steering Column to Headlining	444	376	68
X19	Rear Surface to Right Side of Front Bumper	4412	3885	527
X20	Rear Surface to Left Side of Front Bumper	4411	3938	473
X21	Length of Engine Block	520	520	0

TEST VEHICLE MEASUREMENTS (Cont'd)



ACCIDENT INVESTIGATION DIVISION DATA
FOR 35 MPH FRONTAL BARRIER IMPACT

VEHICLE MAKE/MODEL/BODY STYLE: Nissan/Altima/4 Door

VEH. NHTSA NO.: MS5202 ; VIN: 1N4BU31D2SC223616

MODEL YEAR: 1995 ; BUILD DATE: 4/95 ; TEST DATE: June 12, 1995

VEH. SIZE CATEGORY: Mid-Size ; TEST WEIGHT: 1548.6 kg

VEH. WHEELBASE: 2620 mm ; FRONT OVERHANG: 892 mm ; OVERALL WIDTH: 1605 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: 56.4 kph ; TIME OF SEPARATION: 127 msec

VELOCITY CHANGE: 65.6 kph

COLLISION DEFORMATION CLASSIFICATION (CDC) CODE: F (Frontal)

CRUSH DEPTH DIMENSIONS:

C1 = 473 mm

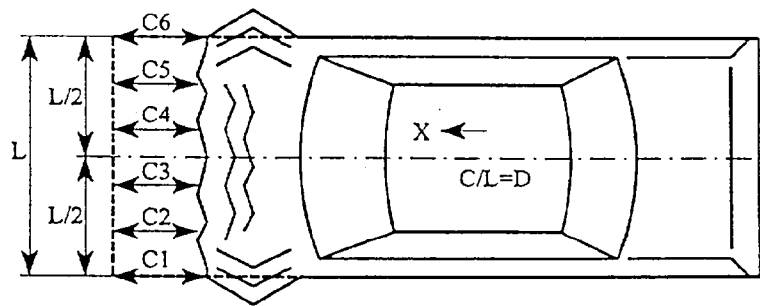
C2 = 518 mm

C3 = 523 mm

C4 = 510 mm

C5 = 484 mm

C6 = 527 mm



MIDPOINT OF DAMAGE: D = Vehicle Centerline (Longitude)

LENGTH OF DAMAGED REGION: L = 50 mm

APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

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

TABLE OF PHOTOGRAPHS (Cont'd)

	<u>Page No.</u>
Photo No. A-32 - Pre-Test Passenger Dummy Position Right Side View	A-32
Photo No. A-33 - Post-Test Passenger Dummy Position Right Side View	A-33
Photo No. A-34 - Pre-Test Passenger Dummy Position Right Side View (Door Open)	A-34
Photo No. A-35 - Post-Test Passenger Dummy Position Right Side View (Door Open)	A-35
Photo No. A-36 - Pre-Test Passenger Seat Position View	A-36
Photo No. A-37 - Post-Test Passenger Seat Position View	A-37
Photo No. A-38 - Pre-Test Passenger Dummy Knee Position	A-38
Photo No. A-39 - Post-Test Passenger Dummy Knee Position	A-39
Photo No. A-40 - Post-Test Passenger Knee Contact	A-40
Photo No. A-41 - Post-Test Passenger Airbag	A-41
Photo No. A-42 - Vehicle Certification Label	A-42
Photo No. A-43 - Tire Placard	A-43
Photo No. A-44 - Rollover 90°	A-44
Photo No. A-45 - Rollover 180°	A-45
Photo No. A-46 - Rollover 270°	A-46
Photo No. A-47 - Rollover 360°	A-47

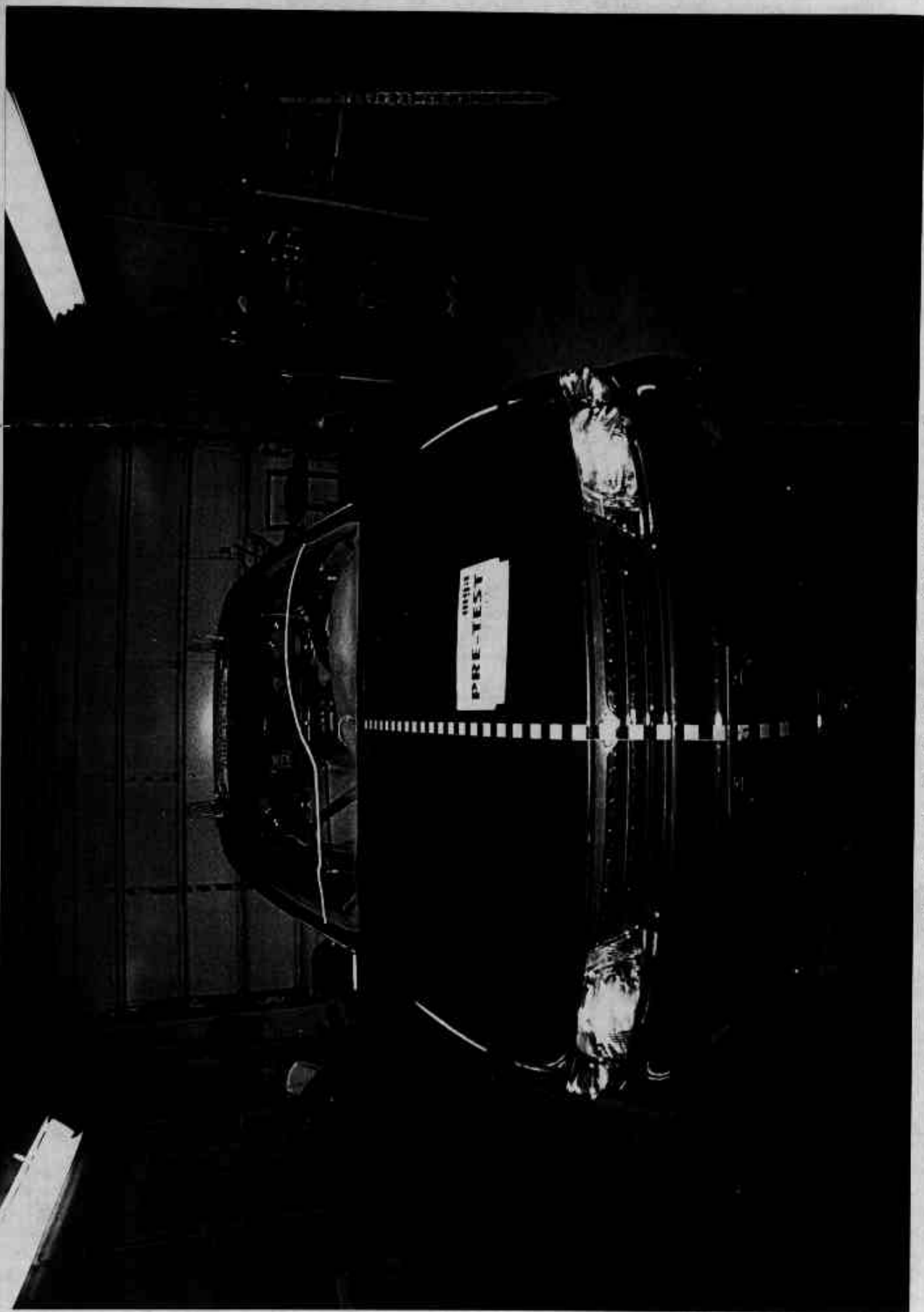


Photo No. A-1 - Pre-Test Front View of Test Vehicle

A-1

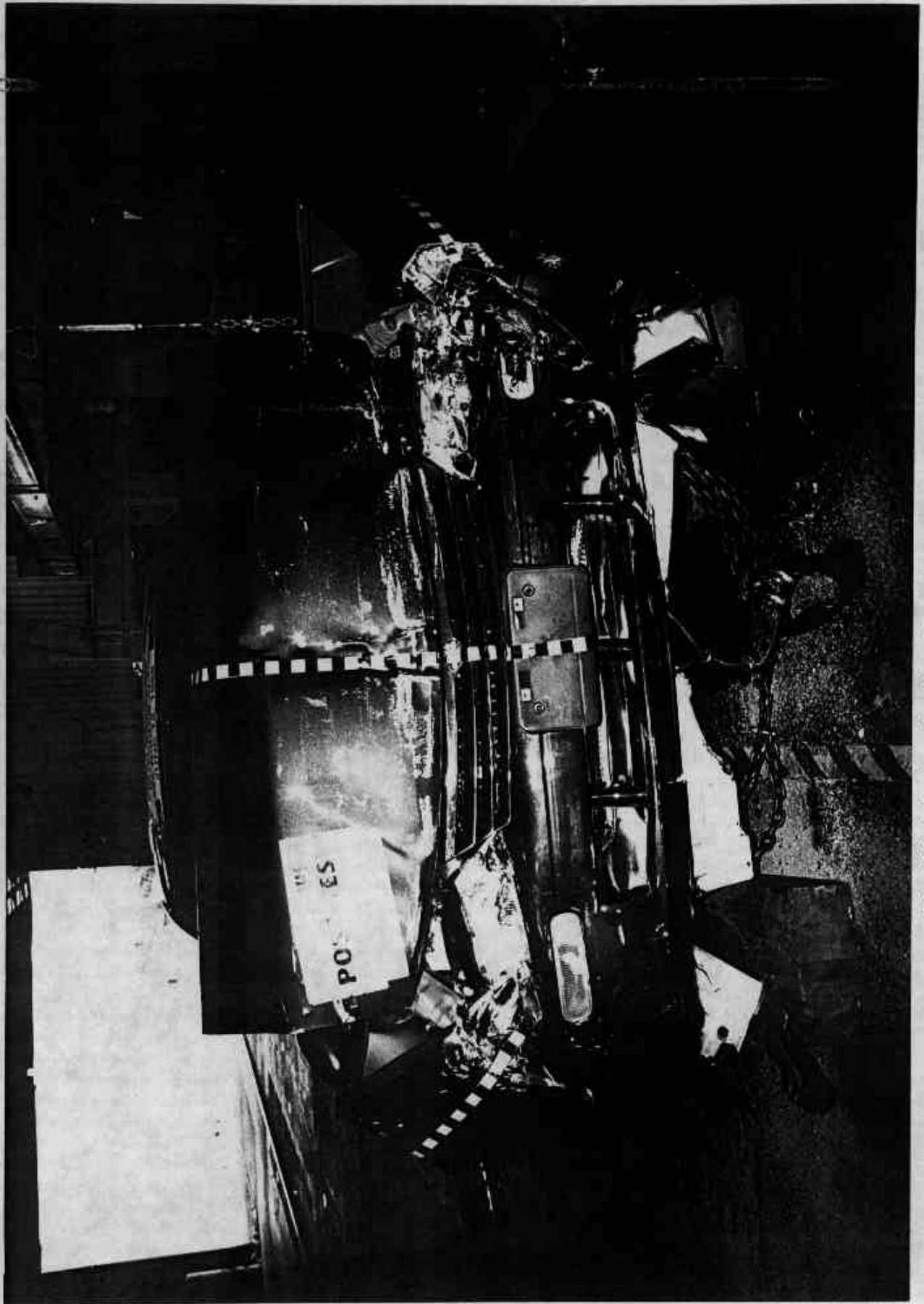


Photo No. A-2 - Post-Test Front View of Test Vehicle

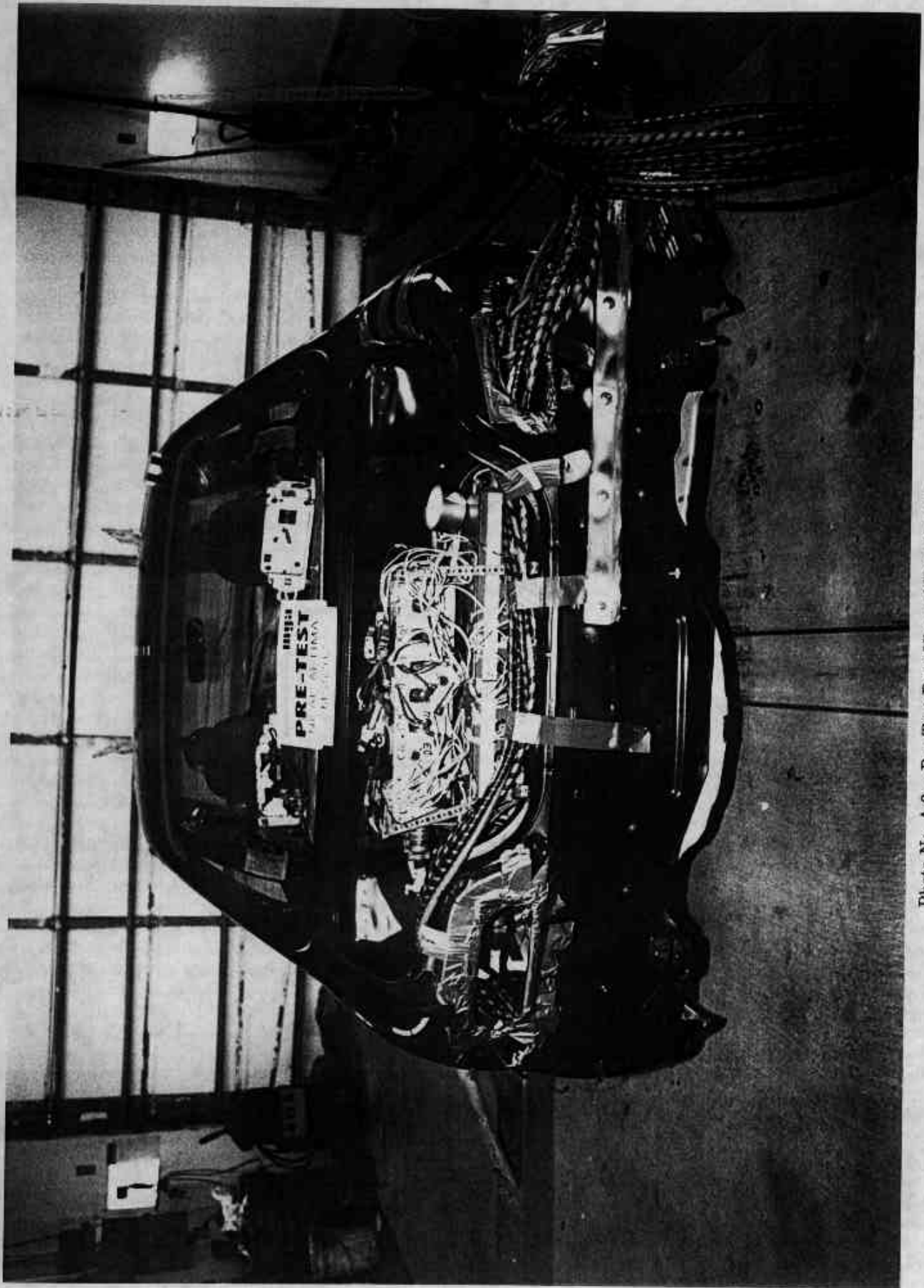


Photo No. A-3 - Pre-Test Rear View of Test Vehicle

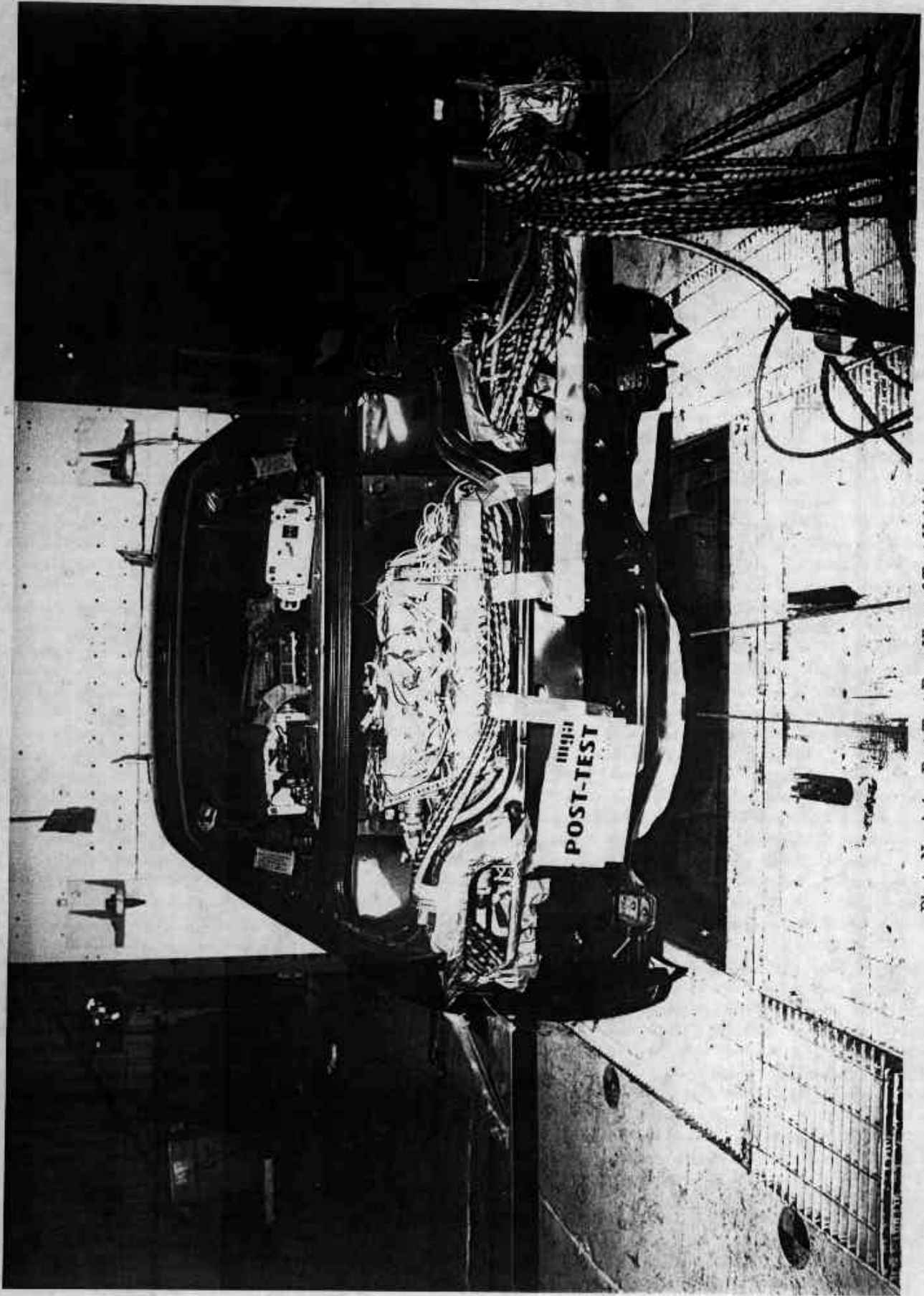


Photo No. A-4 - Post-Test Rear View of Test Vehicle

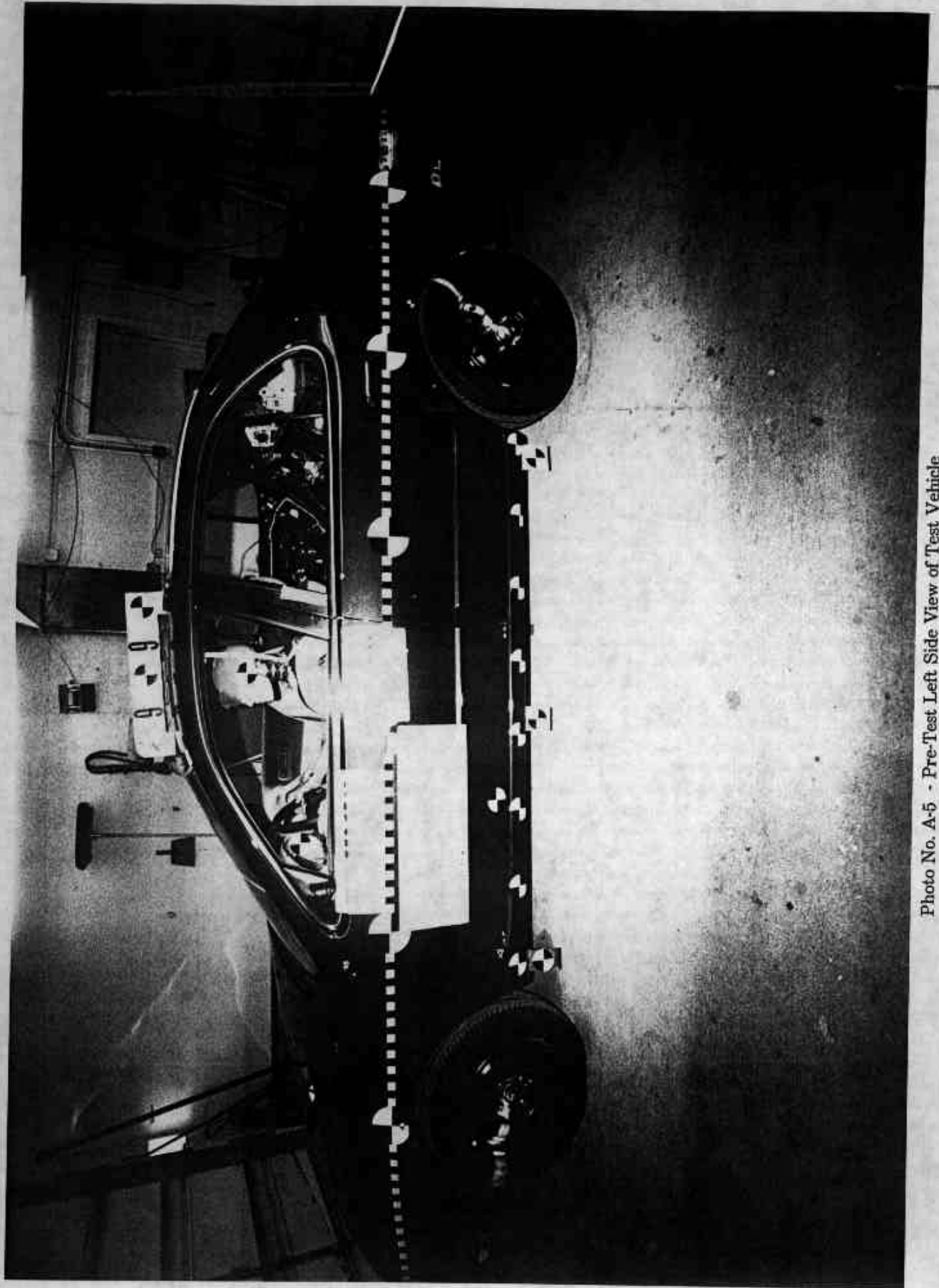


Photo No. A-5 - Pre-Test Left Side View of Test Vehicle

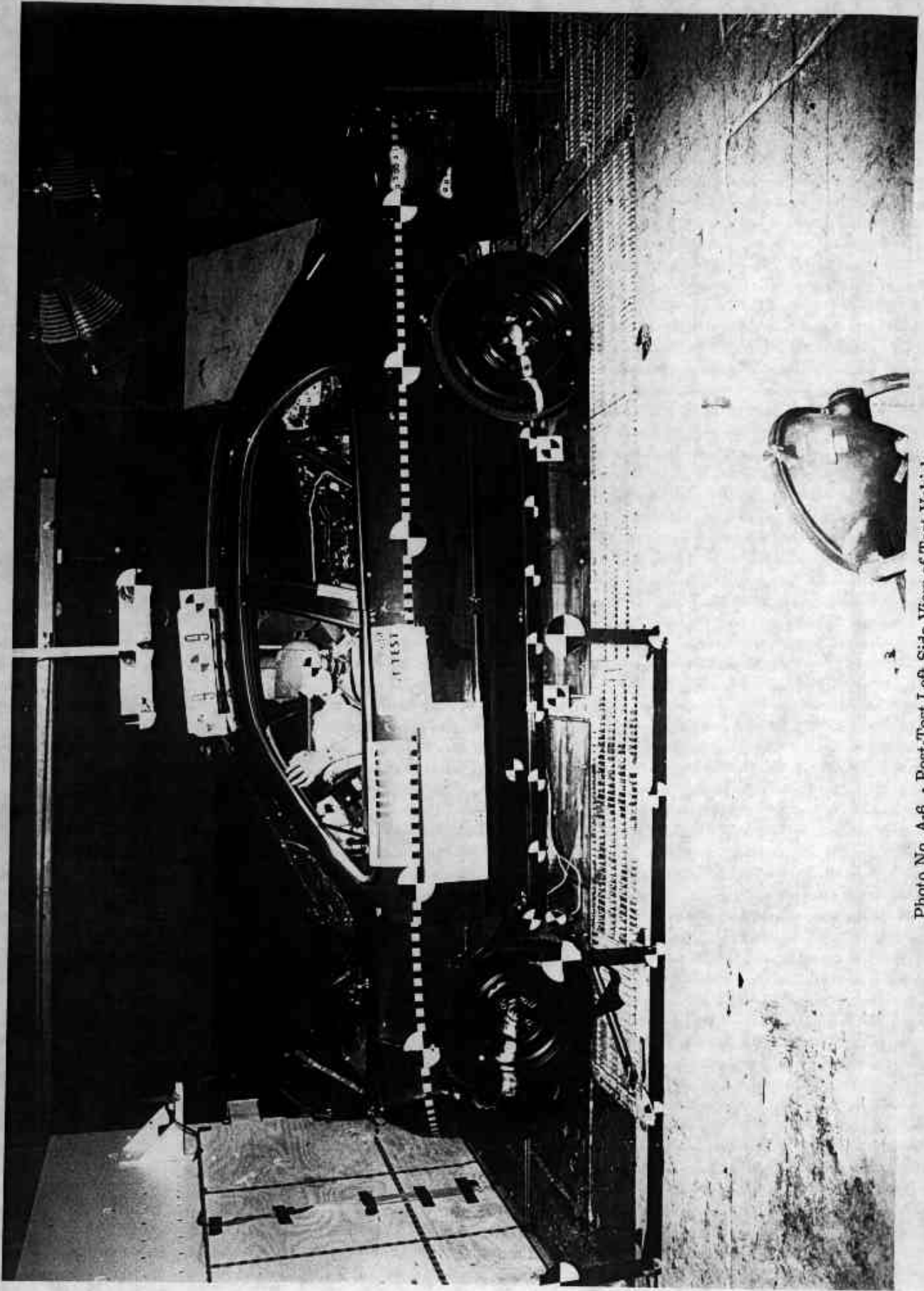


Photo No. A-6 - Post-Test Left Side View of Test Vehicle



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

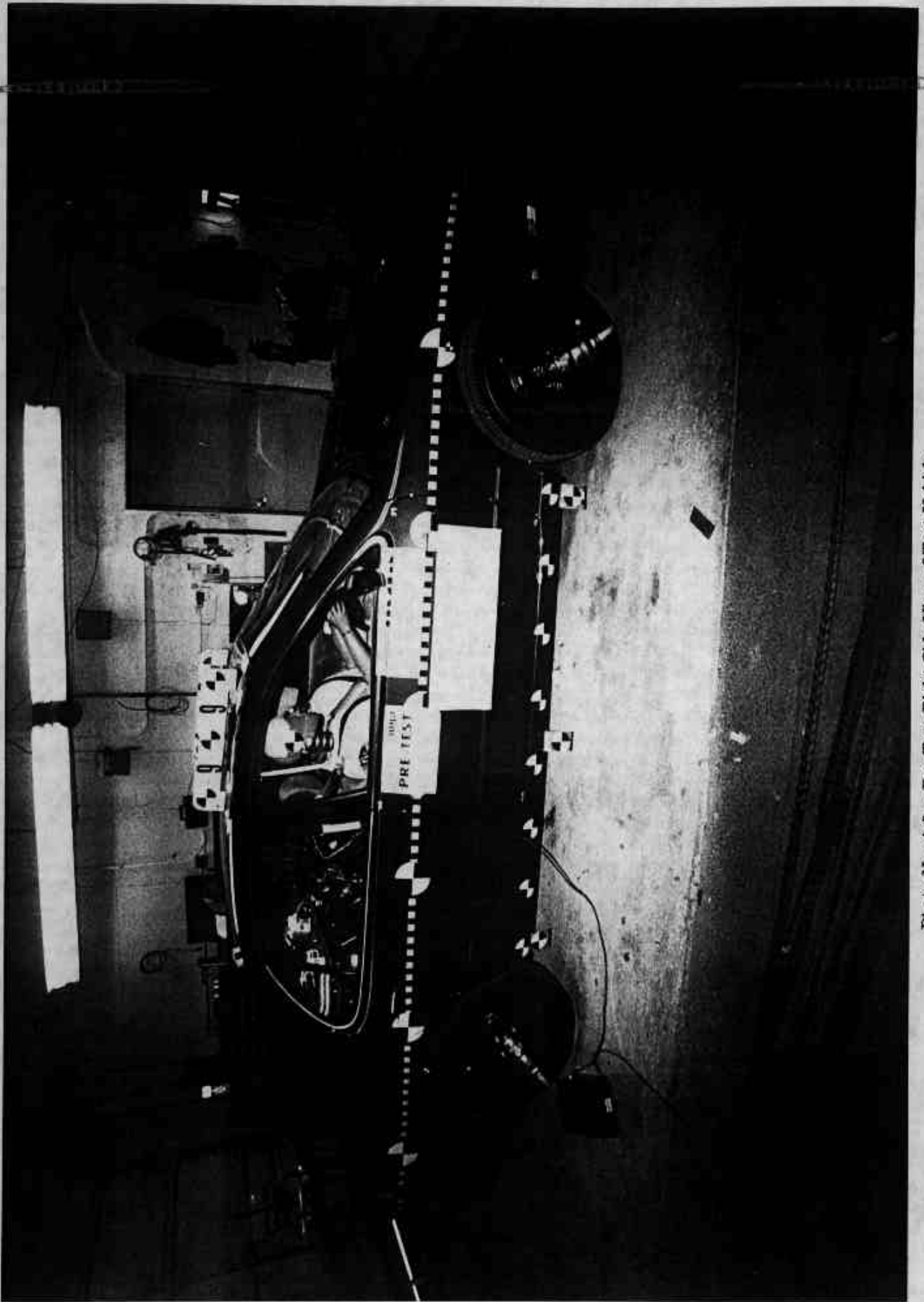
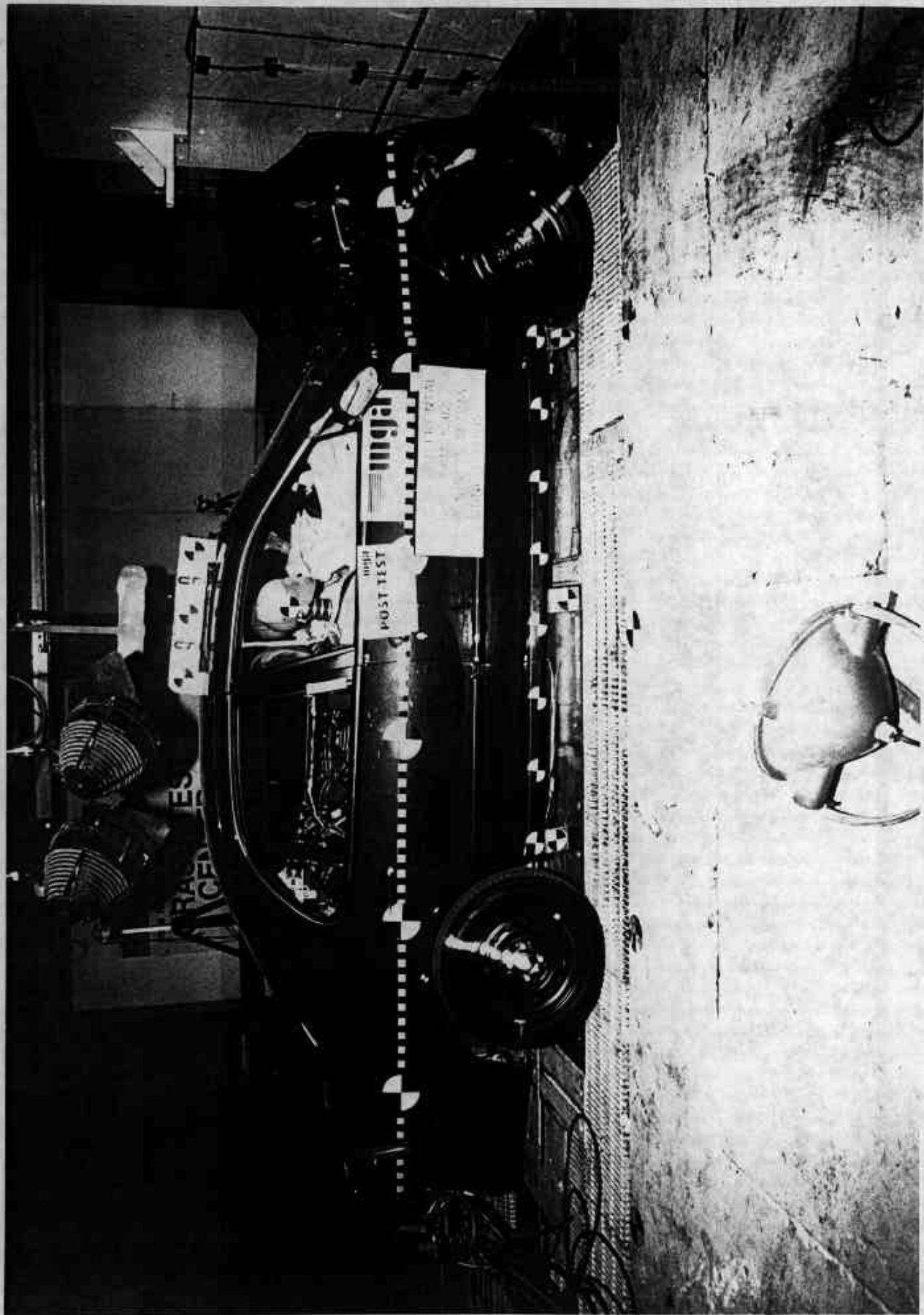


Photo No. A-9 - Pre-Test Right Side View of Test Vehicle



A-10

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



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

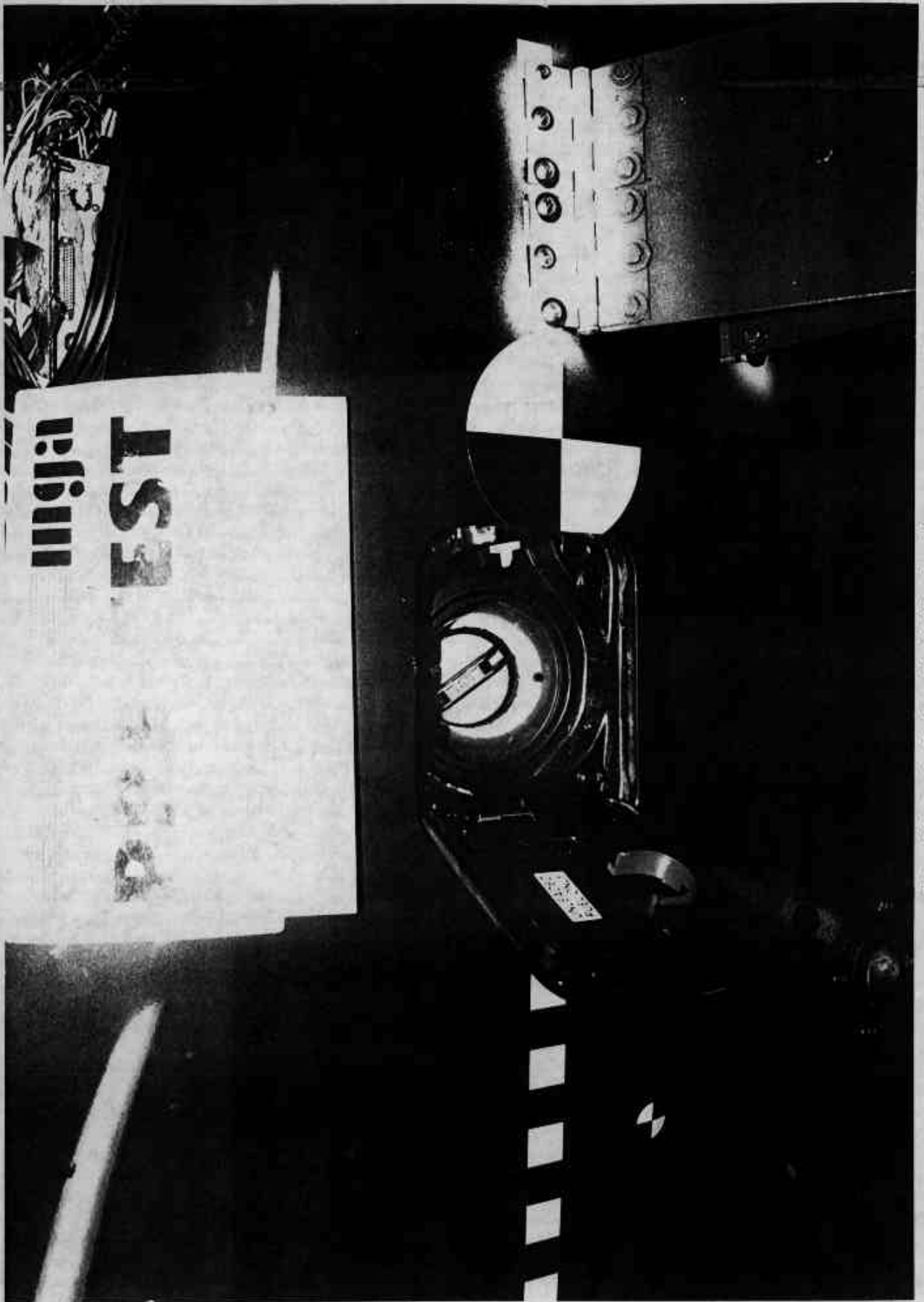


Photo No. A-13 - Pre-Test Fuel Filler Cap View

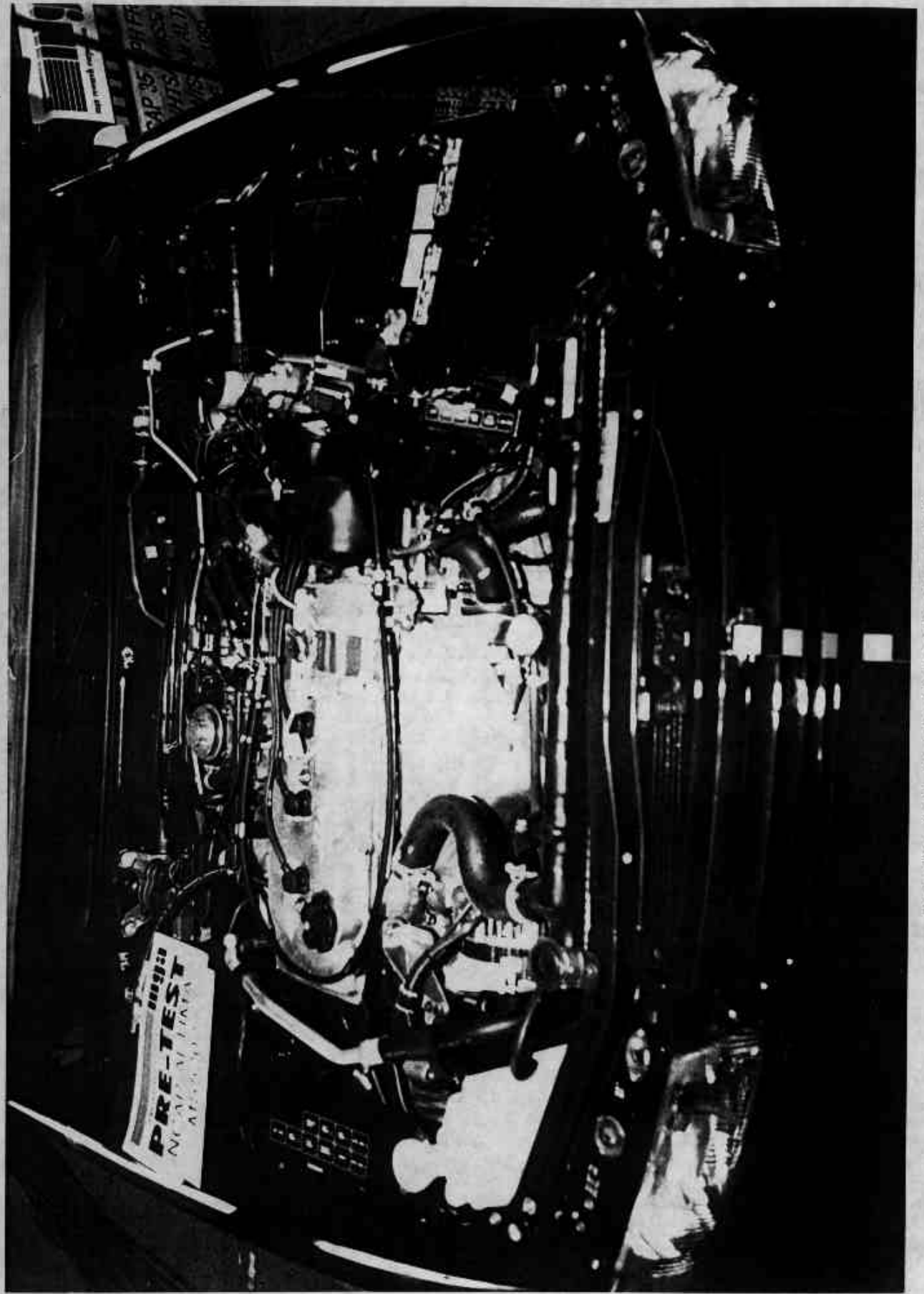


Photo No. A-14 - Pre-Test Engine Compartment View

A-14

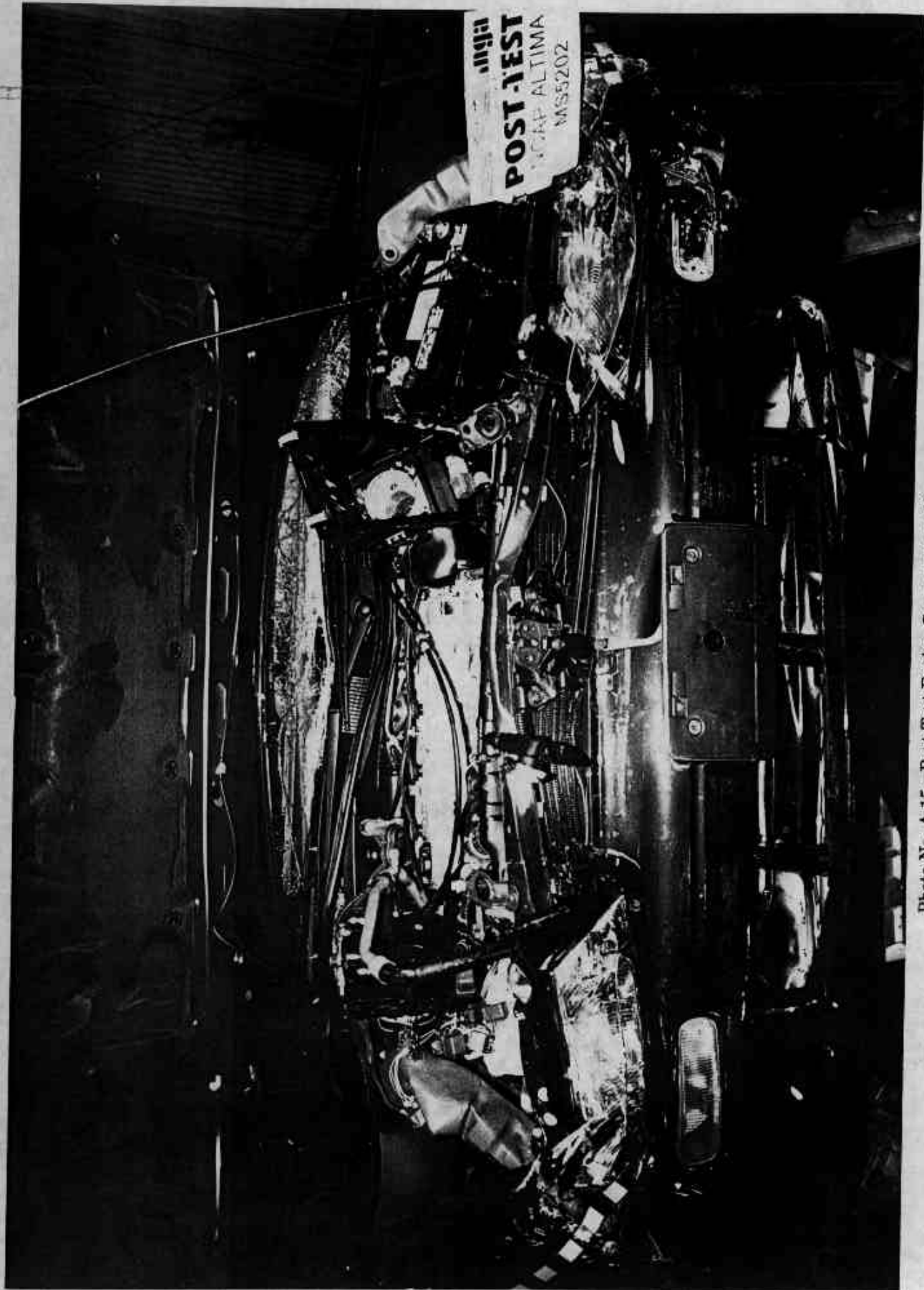


Photo No. A-15 - Post-Test Engine Compartment View

A-15

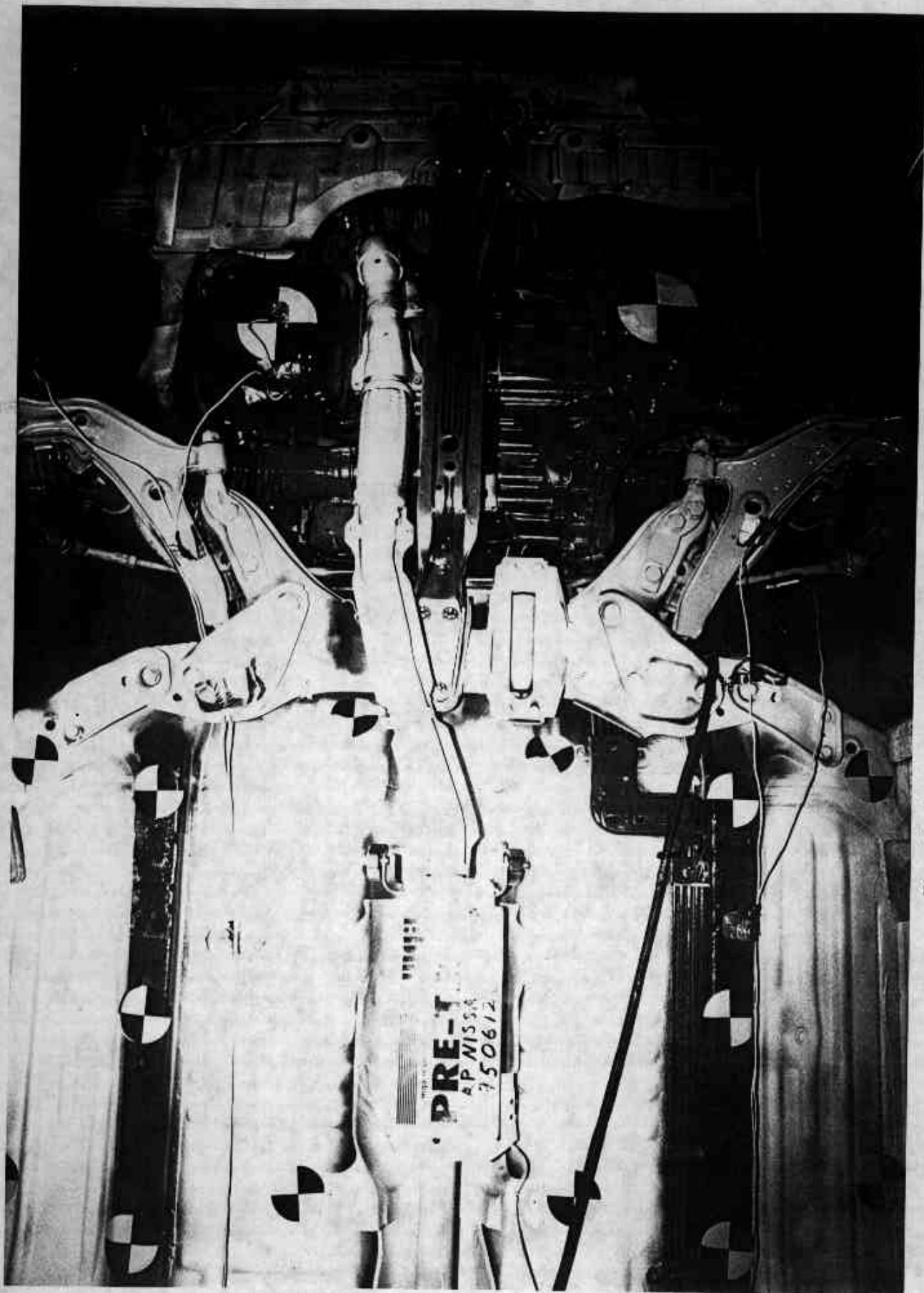


Photo No. A-16 - Pre-Test Front Underbody View

A-16



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

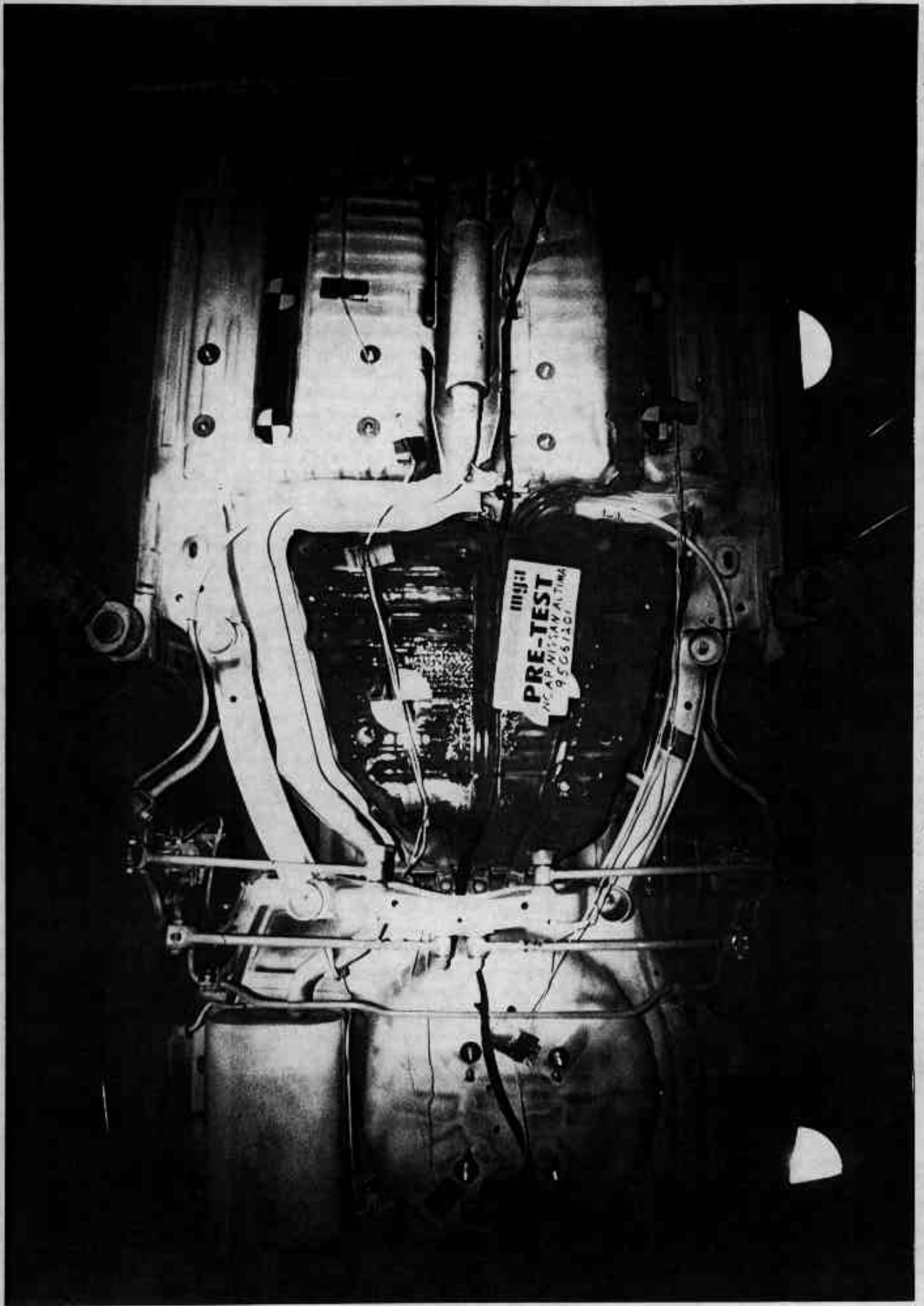
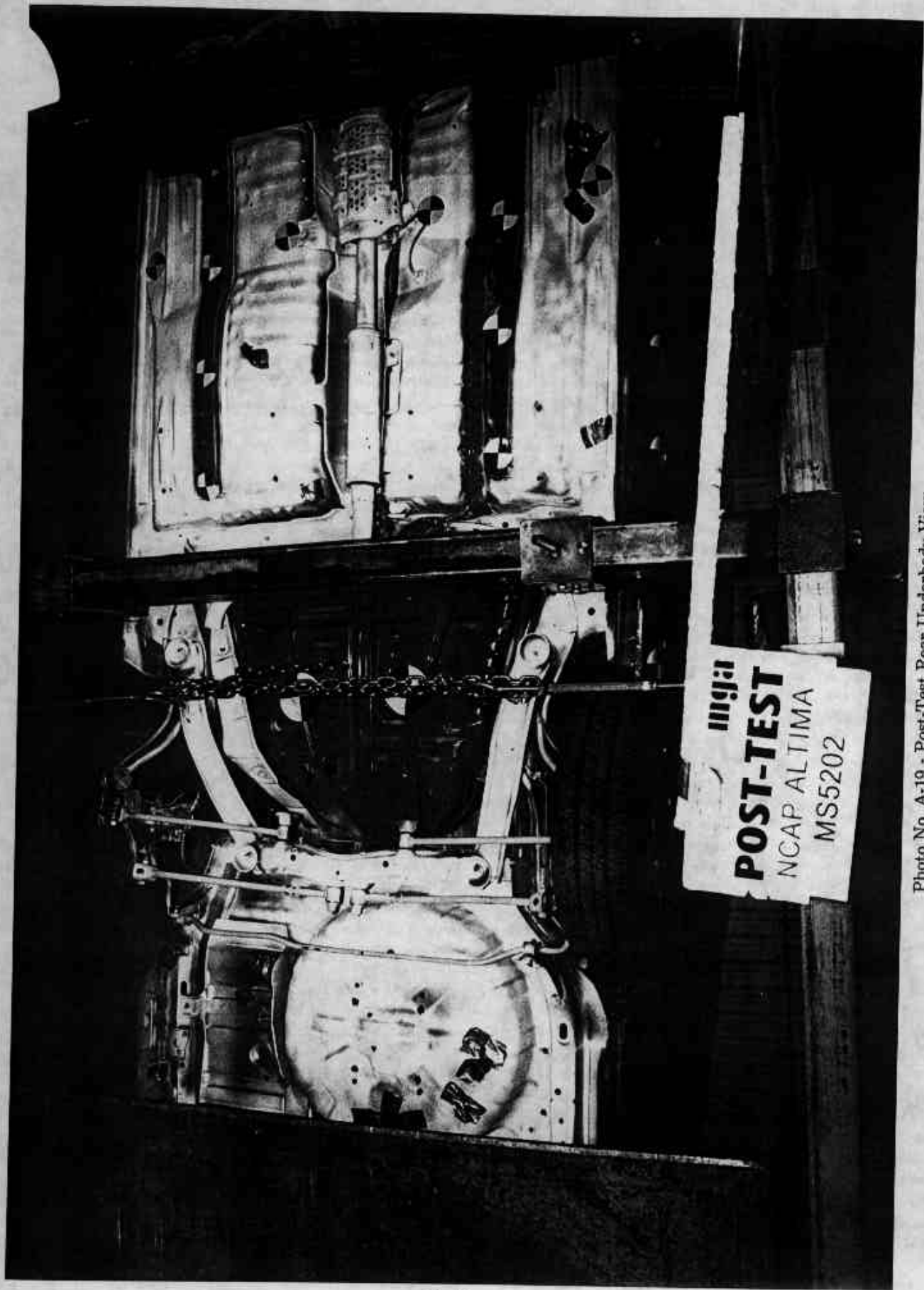
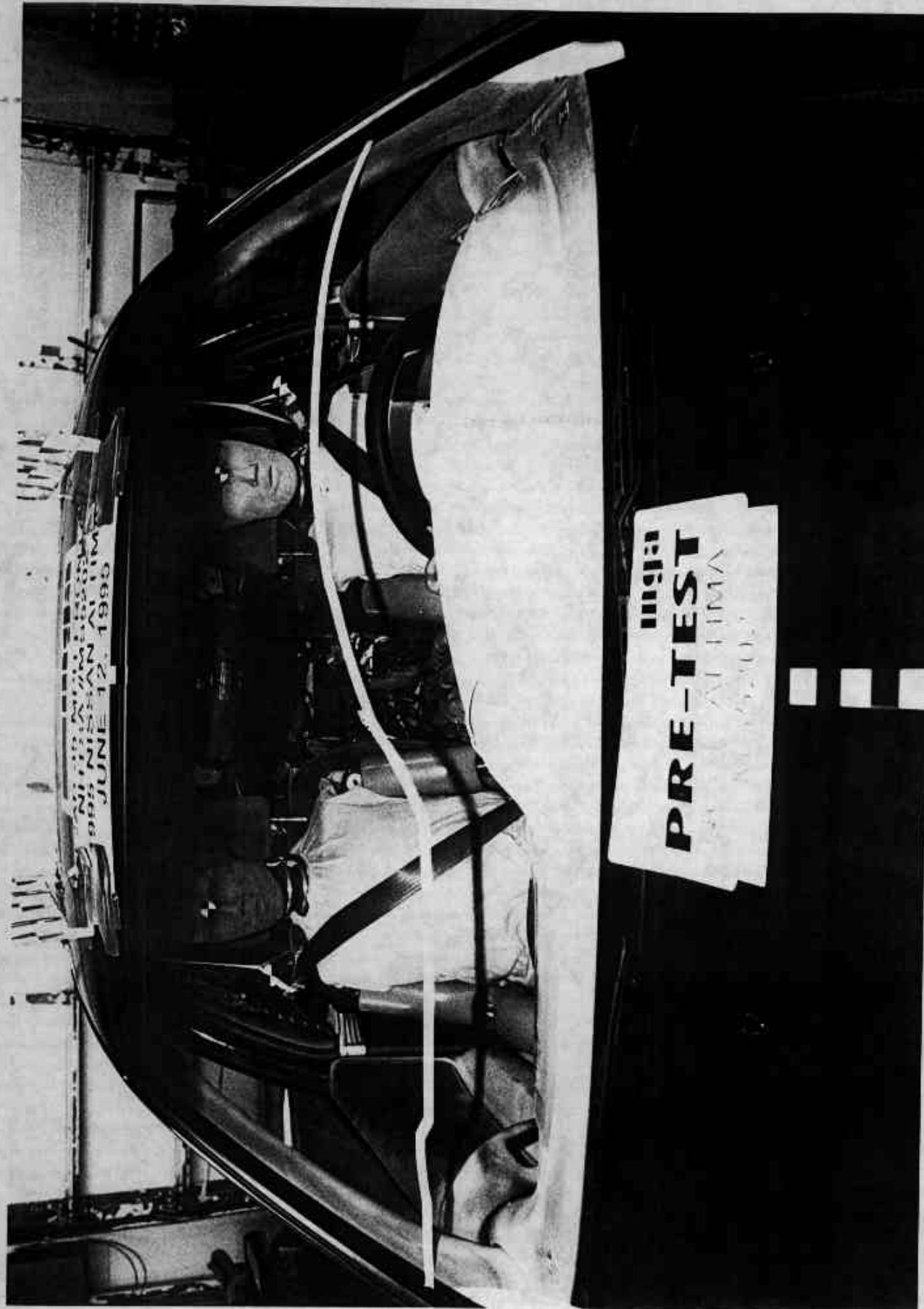


Photo No. A-18 - Pre-Test Rear Underbody View



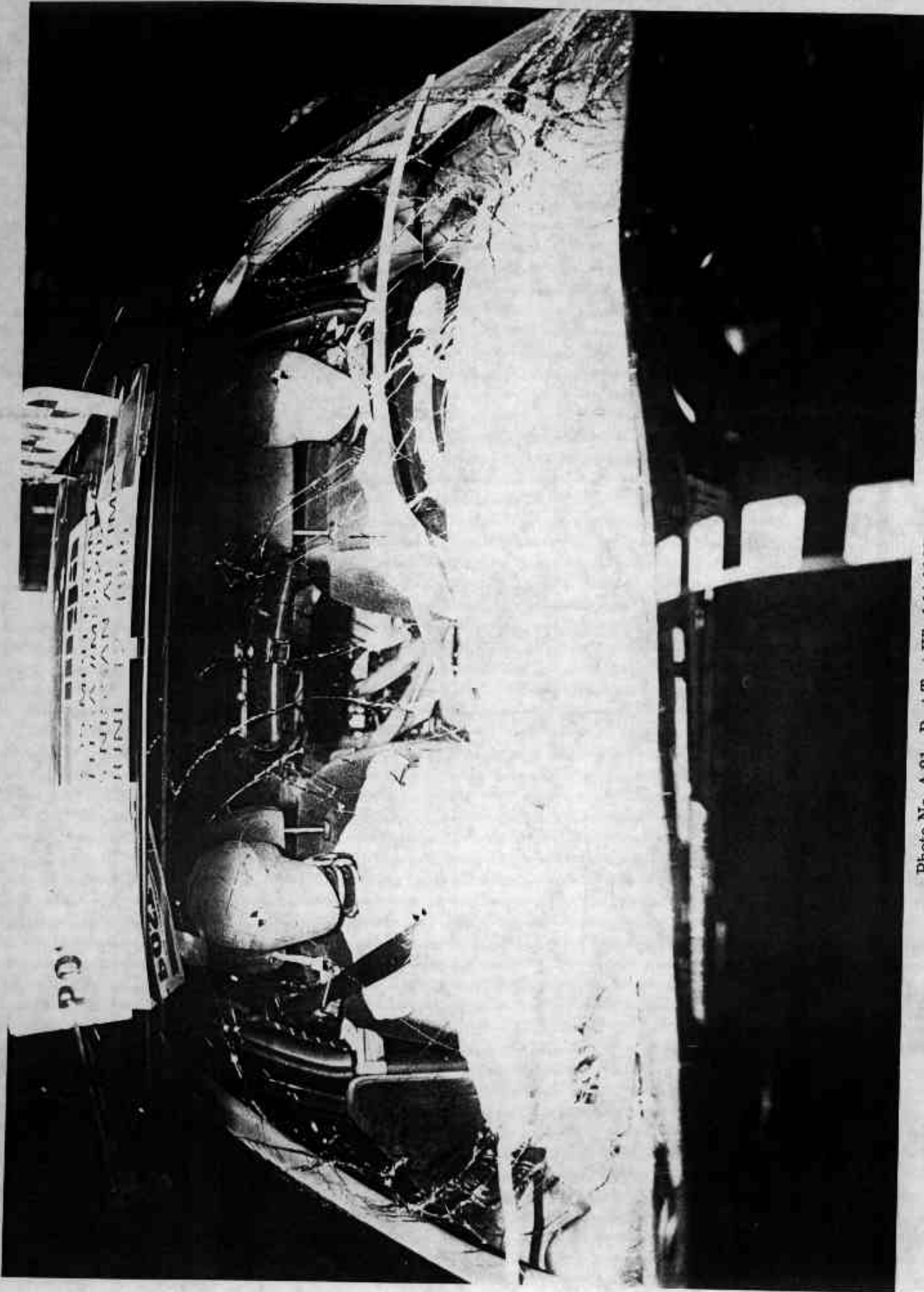
POST-TEST
NCAP ALTIMA
MS5202

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



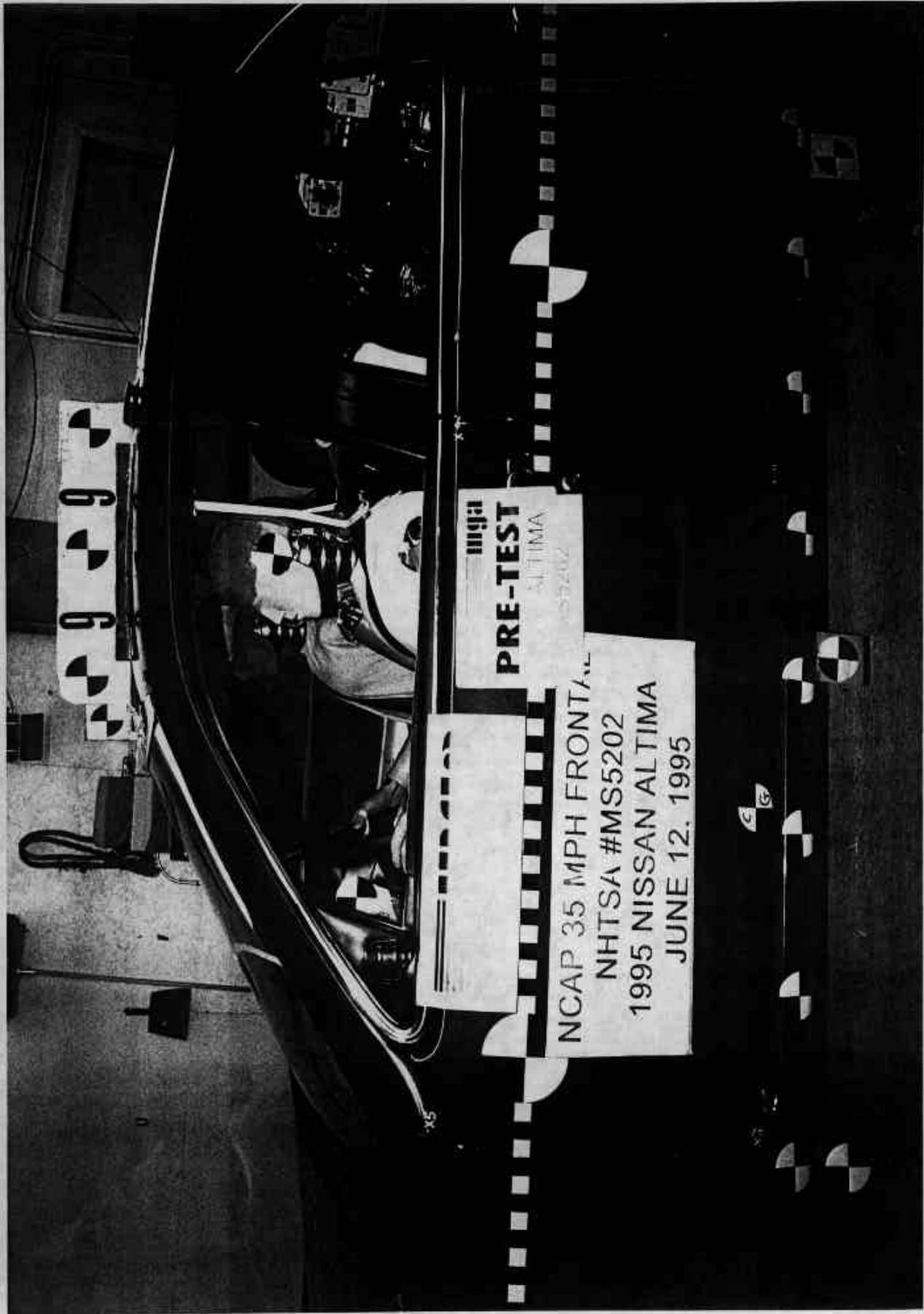
PRE-TEST
WILLYS

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

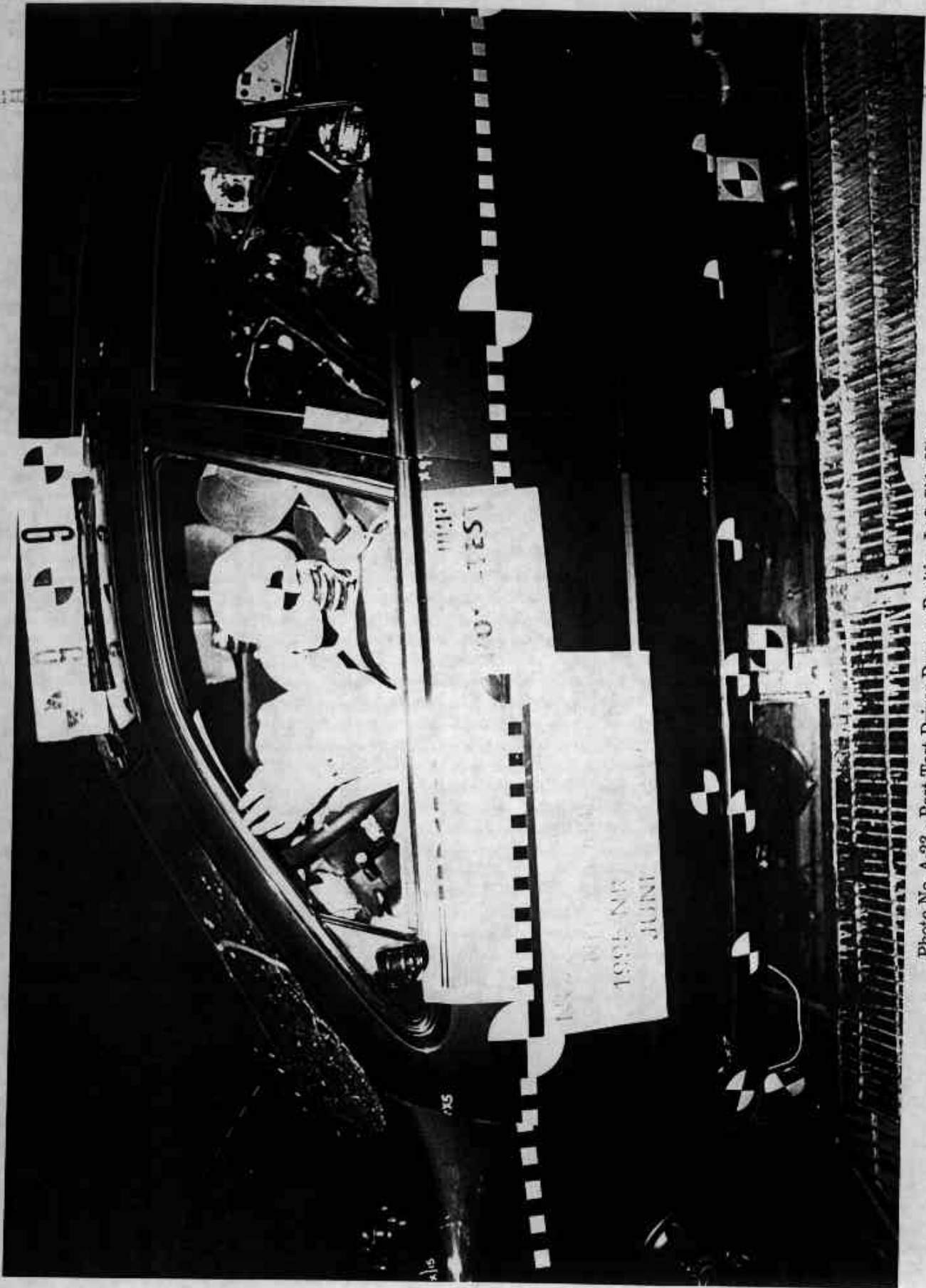


Photo No. A-23 - Post-Test Driver Dummy Position Left Side View

A-23

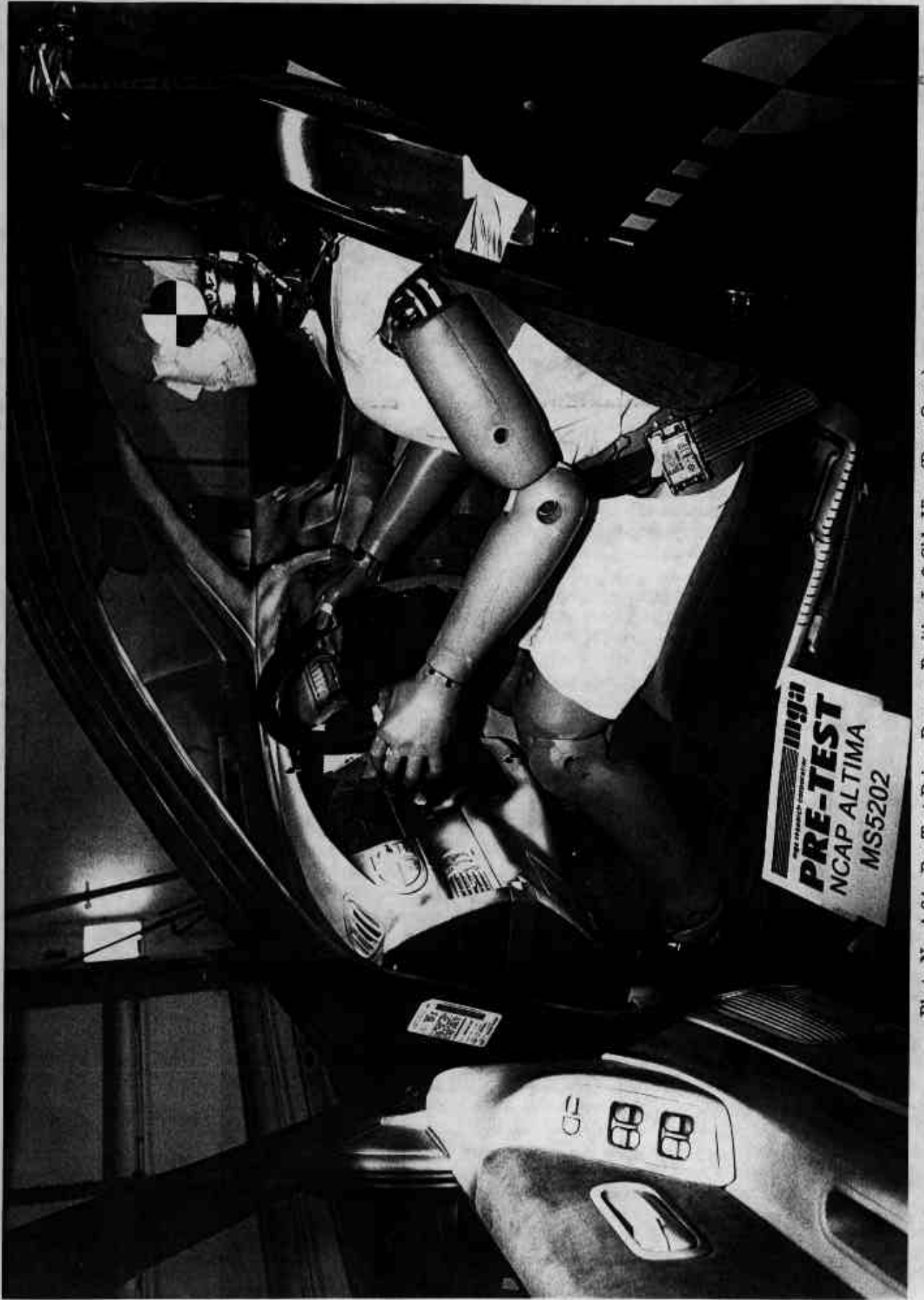


Photo No. A-24 - Pre-Test Driver Dummy Position Left Side View (Door Open)

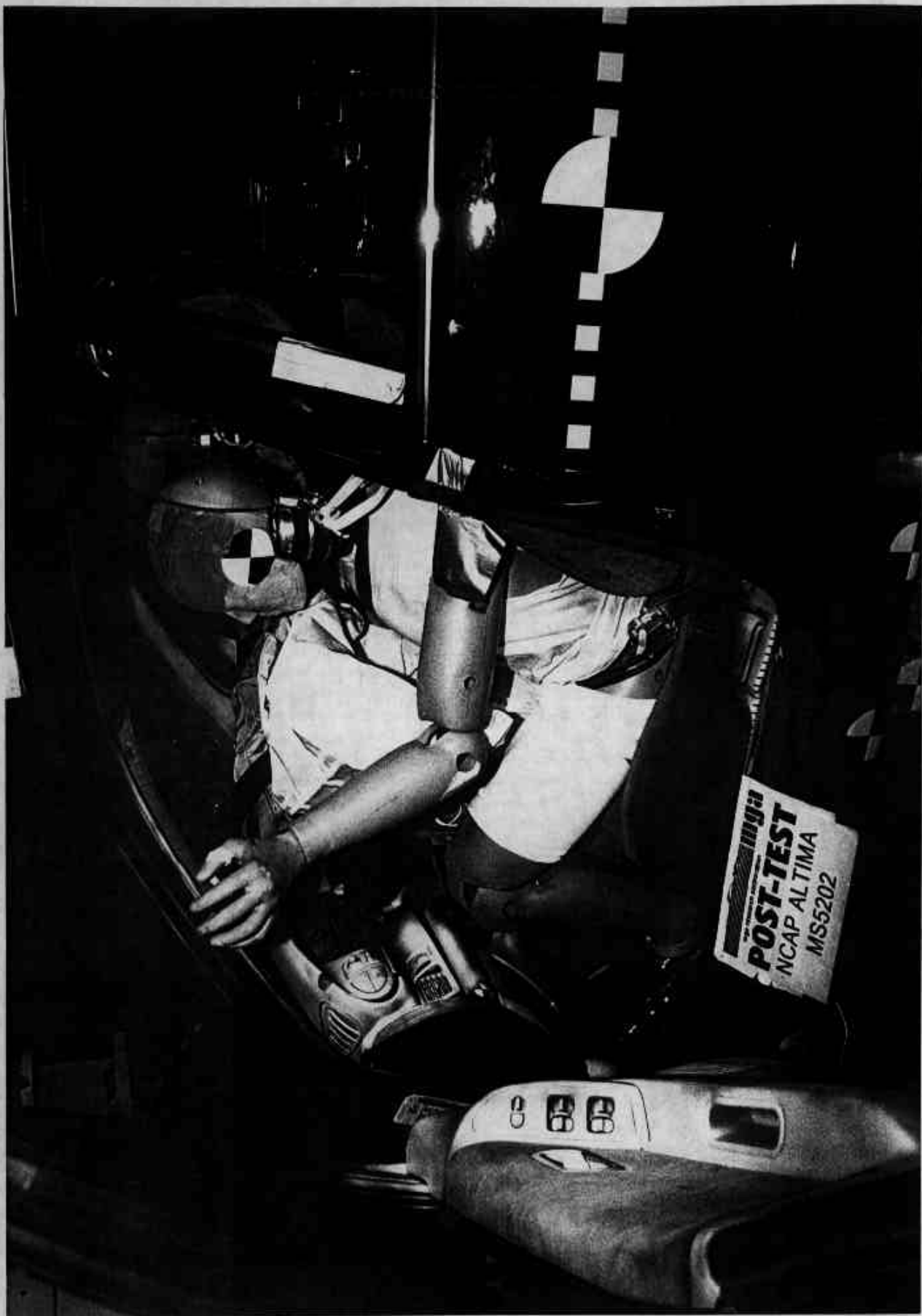
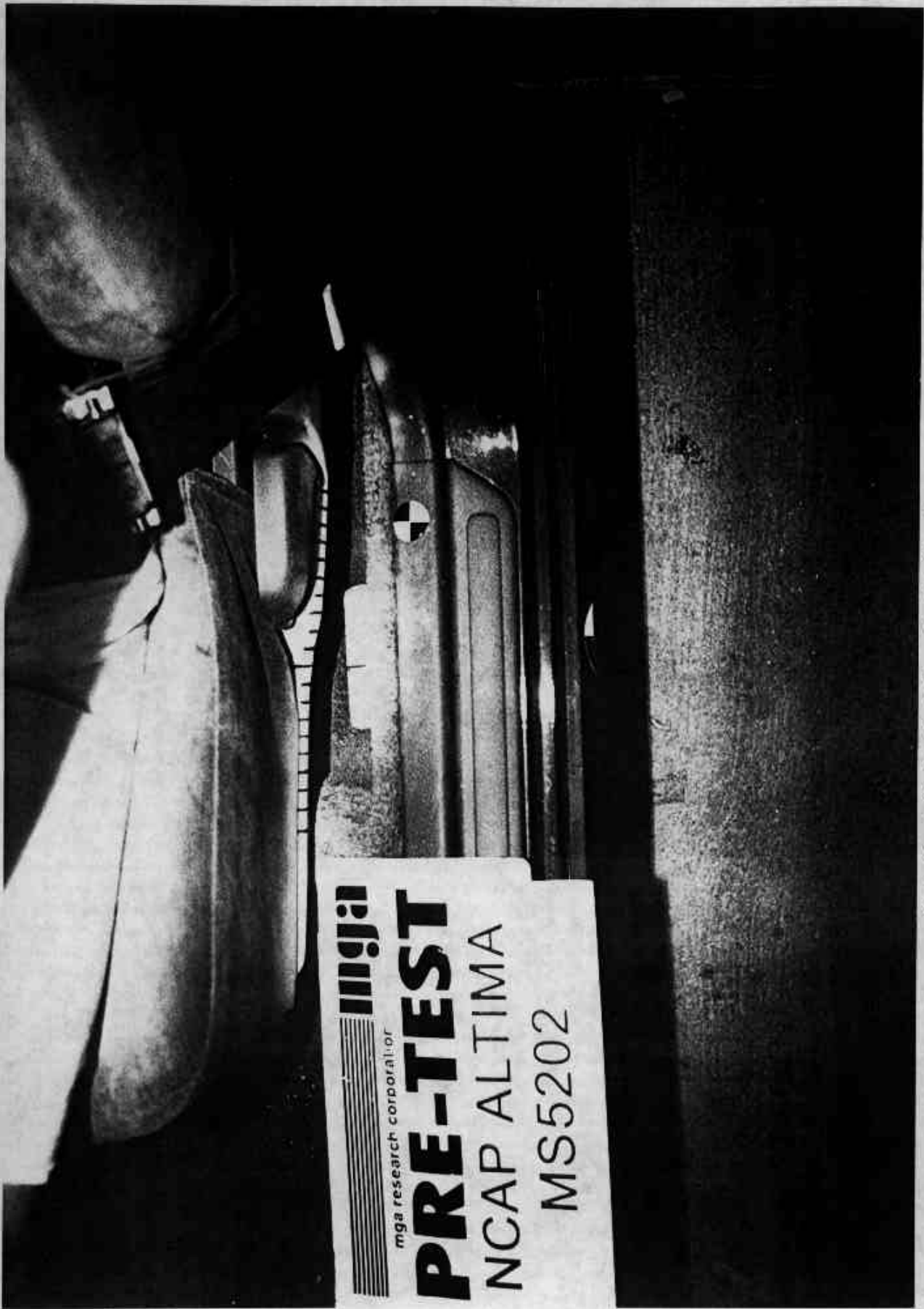


Photo No. A-25 - Post-Test Driver Dummy Position Left Side View (Door Open)



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MS5202

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



A-27

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



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



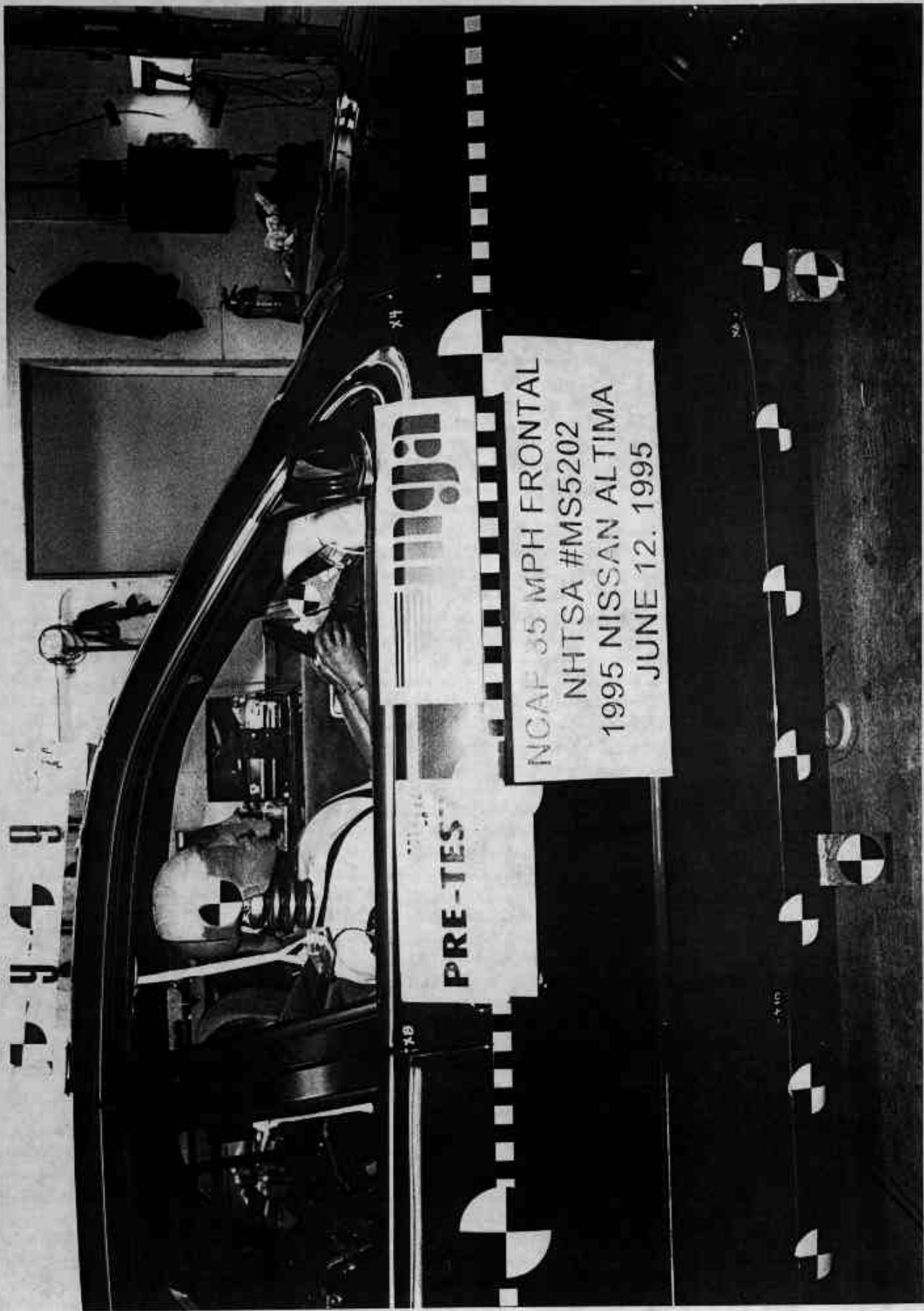
Photo No. A-29 - Post-Test Driver Dummy Knee Position



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

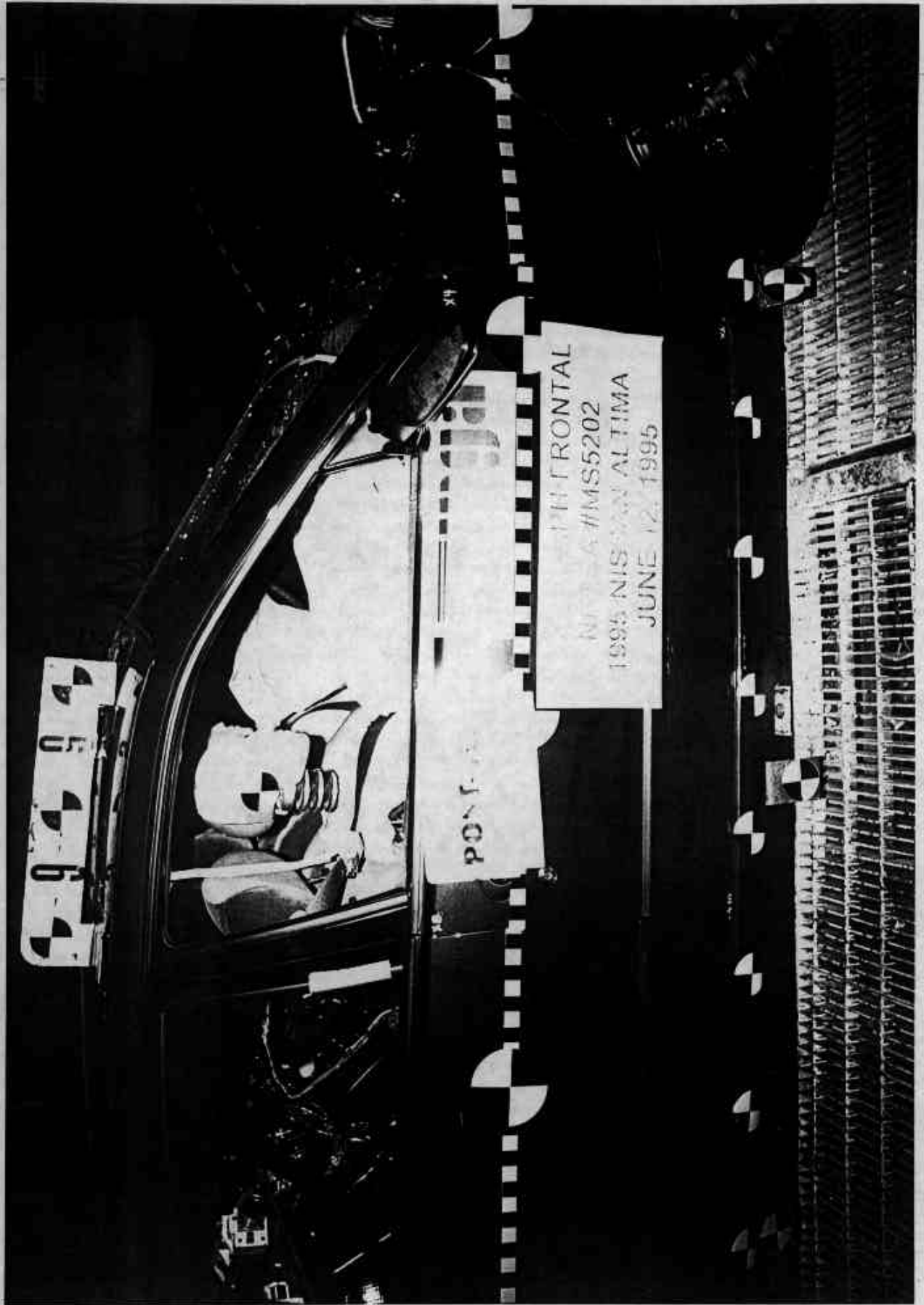


Photo No. A-31 - Post-Test Driver Airbag Contact



A-32

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



A-33

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

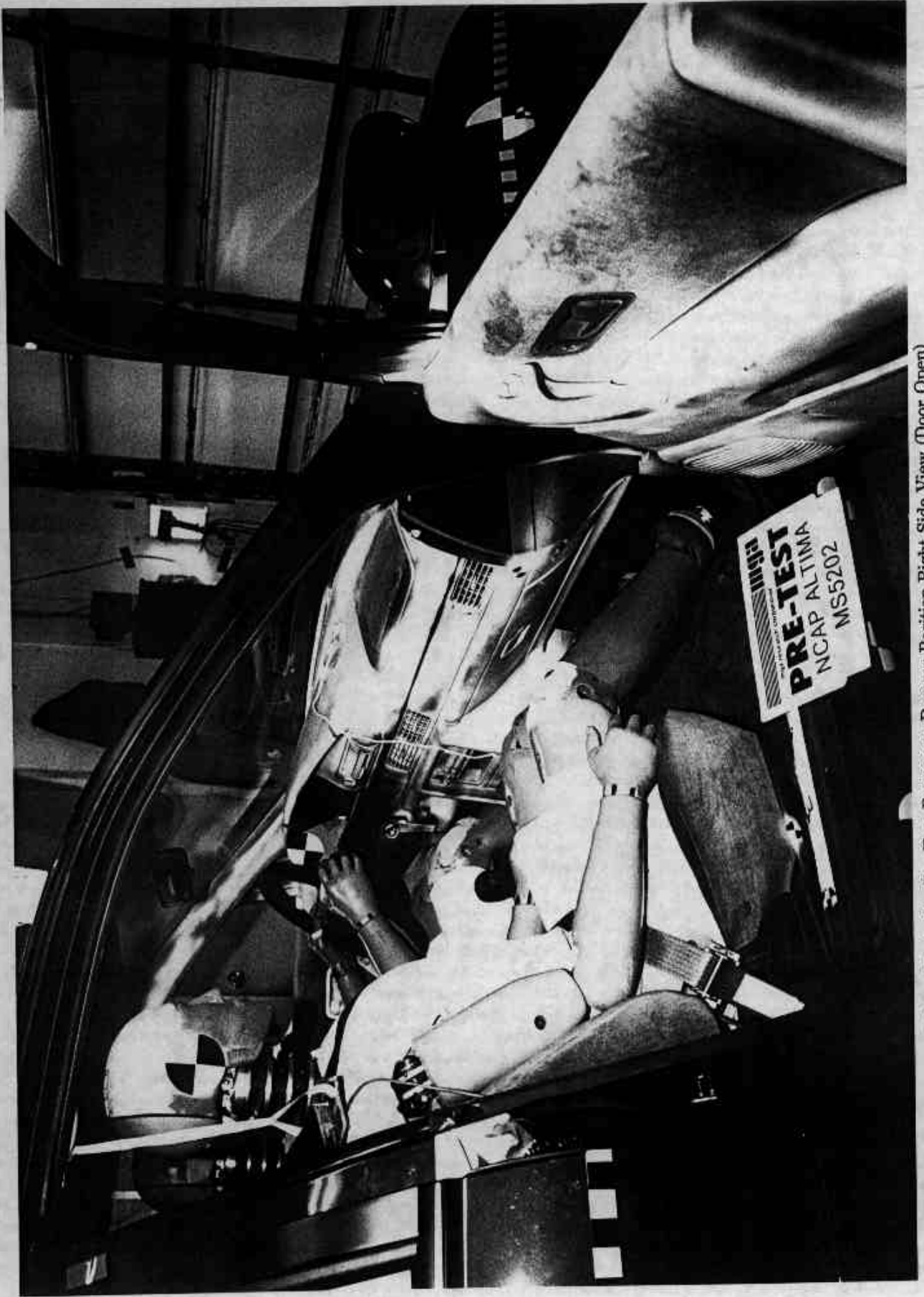


Photo No. A-34 - Pre-Test Passenger Dummy Position Right Side View (Door Open)

A-34



A-35

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



A-36

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



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

A-37



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



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

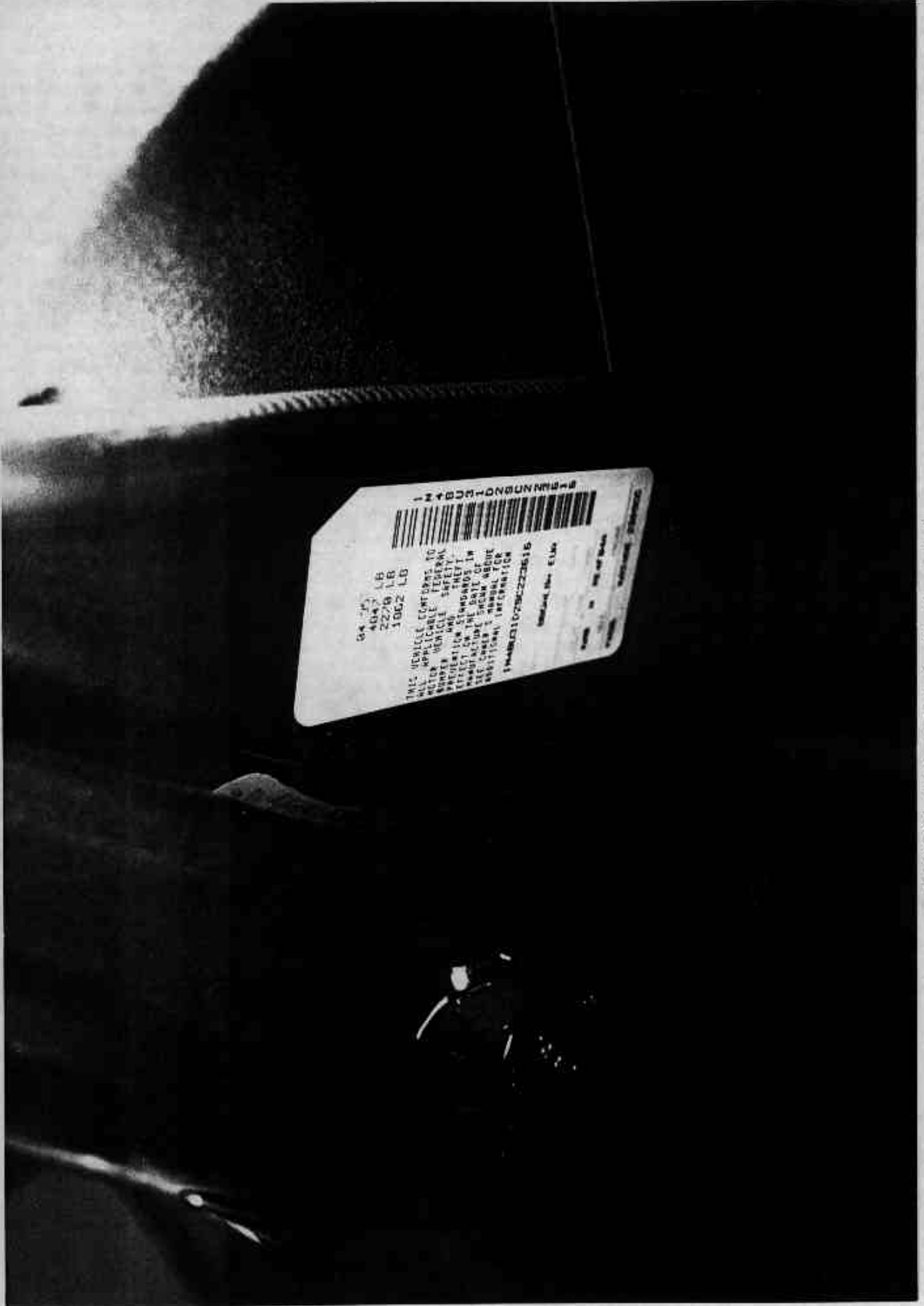


Photo No. A-40 - Post-Test Passenger Knee Contact

A-40



Photo No. A-41 - Post-Test Passenger Airbag



04-15
4047 LB
2226 LB
1862 LB



THIS VEHICLE CONFORMS TO
MOTOR VEHICLE FEDERAL
SAFETY STANDARDS AND
CERTIFICATION REQUIREMENTS
AS APPLICABLE TO THE
VEHICLE IDENTIFICATION
NUMBER (VIN) AND THE
VEHICLE WEIGHT. SEE
OWNER'S MANUAL FOR
ADDITIONAL INFORMATION.
1MABD31D729C222616

Model Year: 2016
E136

Photo No. A-42 - Vehicle Certification Label

TIRE SIZE DIMENSIONS		FRONT AVANT	REAR ARRIERE	TOTAL TOTAL	
P225 60R15 90H		29 (200)	29 (200)	5	5
<p>LES PNEUS DOIVENT ÊTRE INFLATION PRESSEURÉ. USE SUITABLE GAZOILAGE RECOMMANDEE DES PNEUS FROIDS.</p>					
TIRE SIZE DIMENSIONS		FRONT AVANT	REAR ARRIERE	TOTAL TOTAL	
P225 60R15 90H		29 (200)	29 (200)	5	5
<p>DO NOT USE IN EXCESS OF 50 mph, 80 km/h. SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION. UTILISATION A UNE VITESSE MAX 50 mph, 80 km/h. POUR LES DETAILS SE REFERER AU MANUEL DU CONDUCTEUR.</p>					

1E400

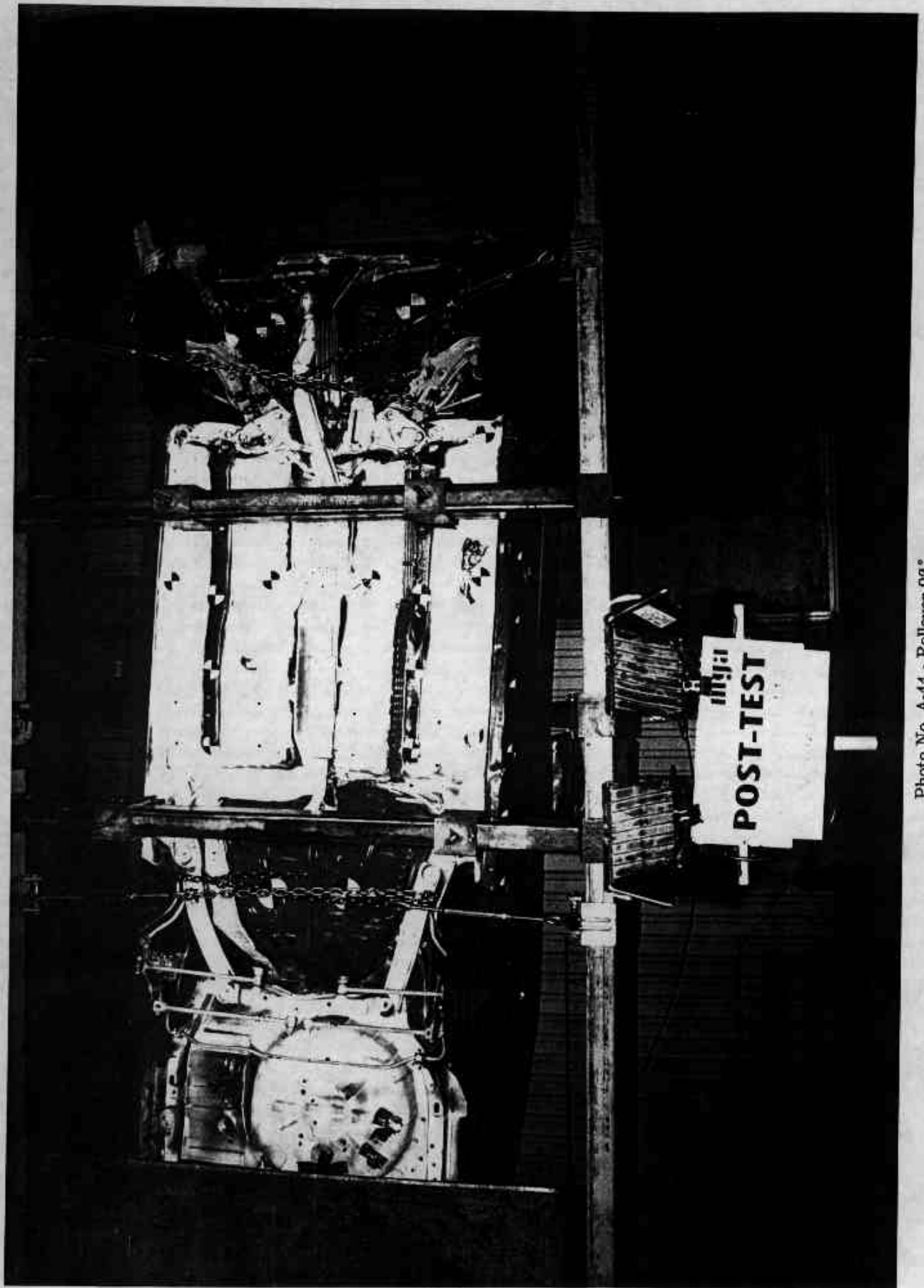


Photo No. A-44 - Rollover 98°

A-44

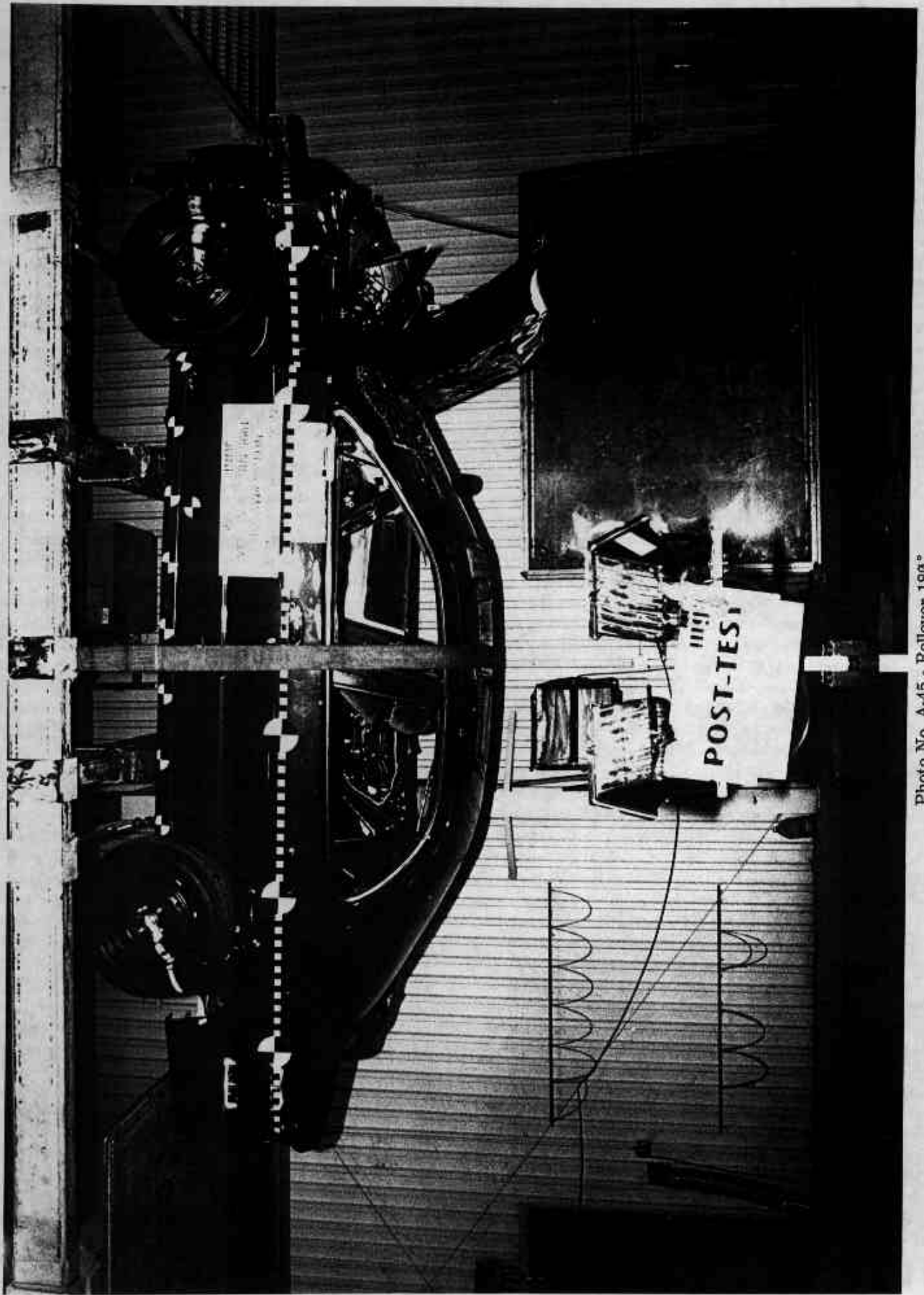


Photo No. A-45 - Rollover 180°

A-45

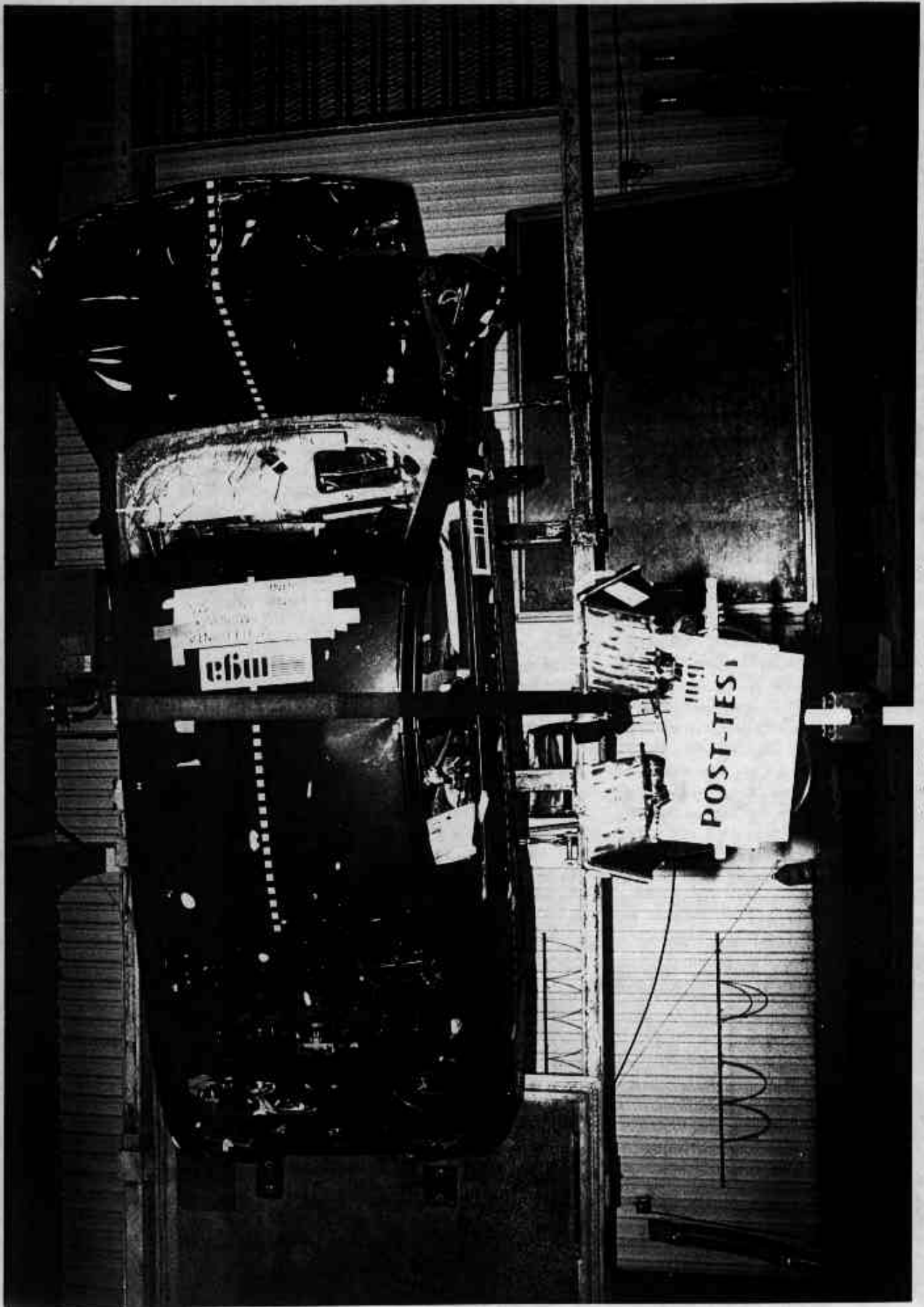


Photo No. A-46 - Rollover 278°

A-46

APPENDIX B

Vehicle, Load Cell Barrier and Dummy Response Data

1995 Nissan Altima
NHTSA NO.: MS5202

VEHICLE DATA FILTER CHANNEL CLASS

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 Redundant X Acceleration vs. Time	B-4
Figure B-5 - Left Rear Seat Crossmember Redundant X Velocity vs. Time	B-5
Figure B-6 - Left Rear Seat Crossmember Redundant X 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 Redundant X Acceleration vs. Time	B-10
Figure B-11 - Right Rear Seat Crossmember Redundant X Velocity vs. Time	B-11
Figure B-12 - Right Rear Seat Crossmember Redundant X 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-15 - 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 Front Brake Caliper X Acceleration vs. Time	B-19
Figure B-20 - Left Front Brake Caliper X Velocity vs. Time	B-20

Data Plot

Page No.

Figure B-21 - Right Front Brake Caliper X Acceleration vs. Time	B-21
Figure B-22 - Right Front 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-32
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 Redundant X Acceleration vs. Time	B-38
Figure B-39 - Driver Head Redundant Y Acceleration vs. Time	B-39
Figure B-40 - Driver Head Redundant Z Acceleration vs. Time	B-40
Figure B-41 - Driver Head Redundant Resultant Acceleration vs. Time	B-41
Figure B-42 - Driver Head Redundant X 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 Acceleration vs. Time	B-46
Figure B-47 - Driver Chest X Velocity vs. Time	B-47
Figure B-48 - Driver Chest Redundant X Acceleration vs. Time	B-48
Figure B-49 - Driver Chest Redundant Y Acceleration vs. Time	B-49
Figure B-50 - Driver Chest Redundant Z Acceleration vs. Time	B-50
Figure B-51 - Driver Chest Redundant Resultant Acceleration vs. Time	B-51
Figure B-52 - Driver Chest Redundant X 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

<u>Data Plot</u>	<u>Page No.</u>
Figure B-55 - Driver Right Femur Force vs. Time	B-55
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 Redundant X Acceleration vs. Time	B-86
Figure B-87 - Passenger Head Redundant Y Acceleration vs. Time	B-87
Figure B-88 - Passenger Head Redundant Z Acceleration vs. Time	B-88
Figure B-89 - Passenger Head Redundant Resultant Accel. vs. Time	B-89

Data PlotPage No.

Figure B-90 - Passenger Head Redundant X Velocity vs. Time	B-90
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 Acceleration vs. Time	B-94
Figure B-95 - Passenger Chest X Velocity vs. Time	B-95
Figure B-96 - Passenger Chest Redundant X Acceleration vs. Time	B-96
Figure B-97 - Passenger Chest Redundant Y Acceleration vs. Time	B-97
Figure B-98 - Passenger Chest Redundant Z Acceleration vs. Time	B-98
Figure B-99 - Passenger Chest Redundant Resultant Accel. vs. Time	B-99
Figure B-100 - Passenger Chest Redundant X 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 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 vs. Time	B-118
Figure B-119 - Passenger Left Upper Tibia Moment X vs. Time	B-119
Figure B-120 - Passenger Left Upper Tibia Moment Y vs. Time	B-120
Figure B-121 - Passenger Left Lower Tibia Force X vs. Time	B-121
Figure B-122 - Passenger Left Lower Tibia Moment Y vs. Time	B-122
Figure B-123 - Passenger Left Lower Tibia Force Z vs. Time	B-123
Figure B-124 - Passenger Right Upper Tibia Moment X vs. Time	B-124
Figure B-125 - Passenger Right Upper Tibia Moment Y vs. Time	B-125
Figure B-126 - Passenger Right Lower Tibia Force X vs. Time	B-126
Figure B-127 - Passenger Right Lower Tibia Moment Y vs. Time	B-127
Figure B-128 - Passenger Right Lower Tibia Force Z vs. Time	B-128

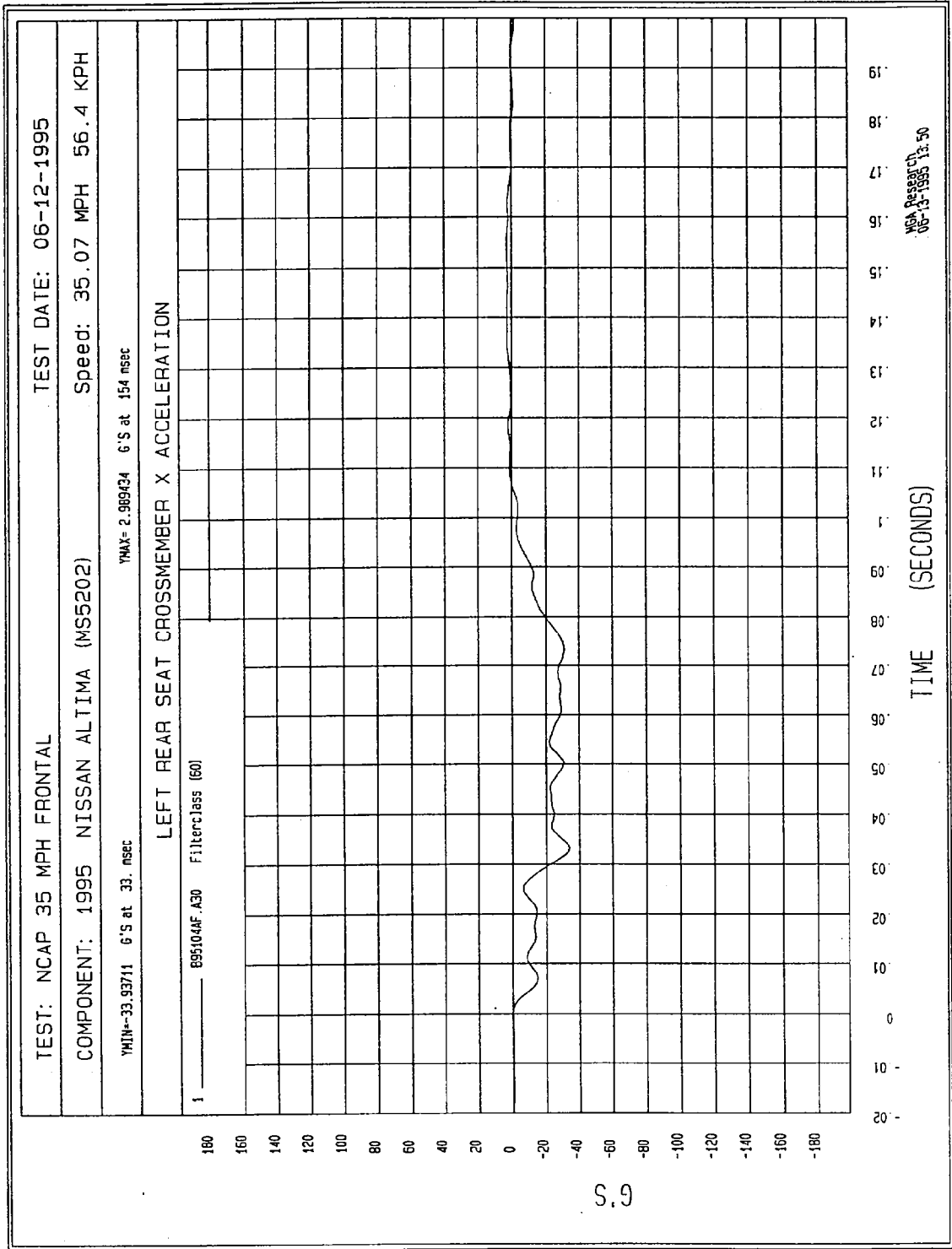


Figure B-1 - Left Rear Seat Crossmember X Acceleration vs. Time

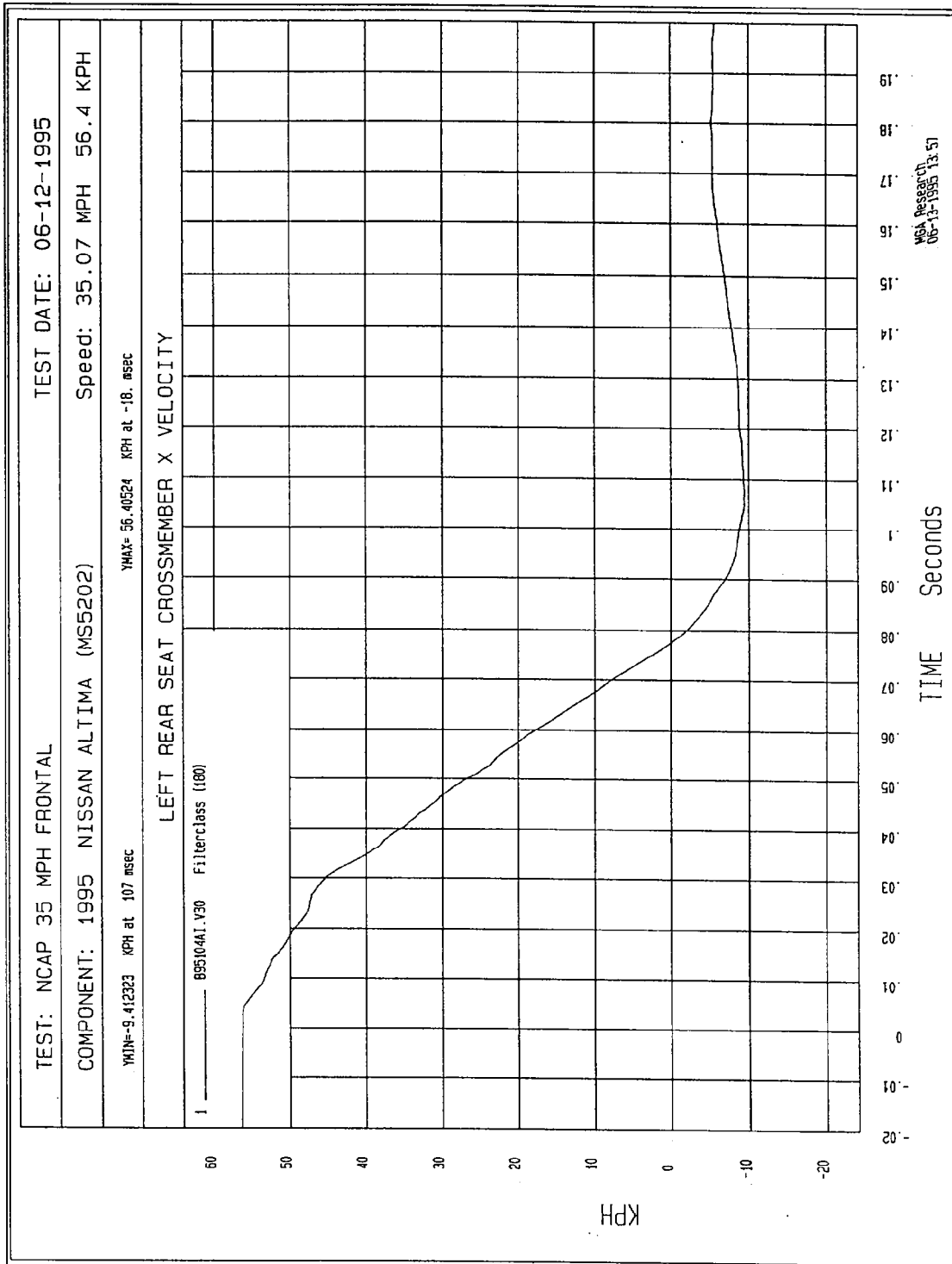


Figure B-2 - Left Rear Seat Crossmember X Velocity vs. Time

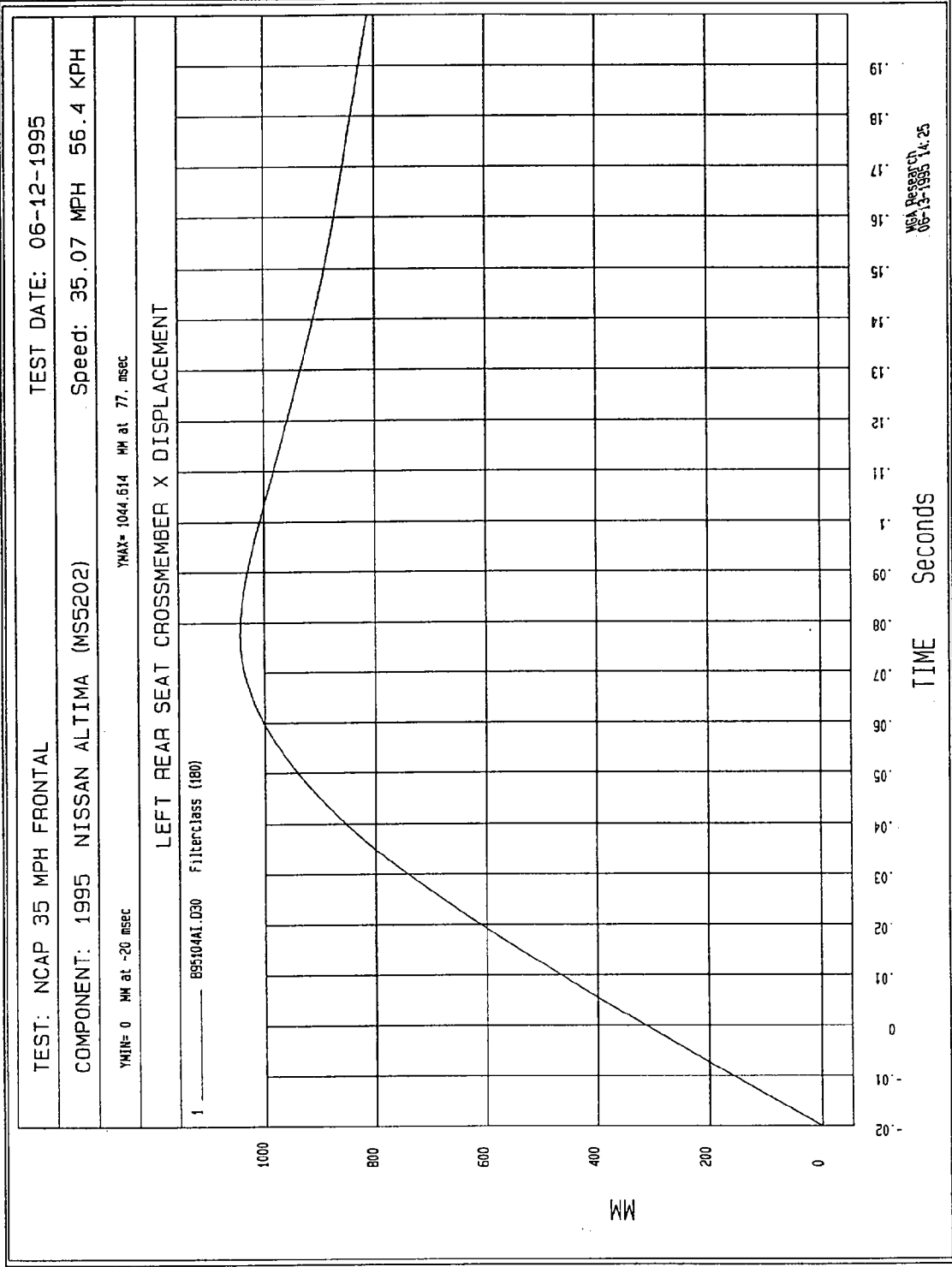


Figure B-3 - Left Rear Seat Crossmember X Displacement vs. Time

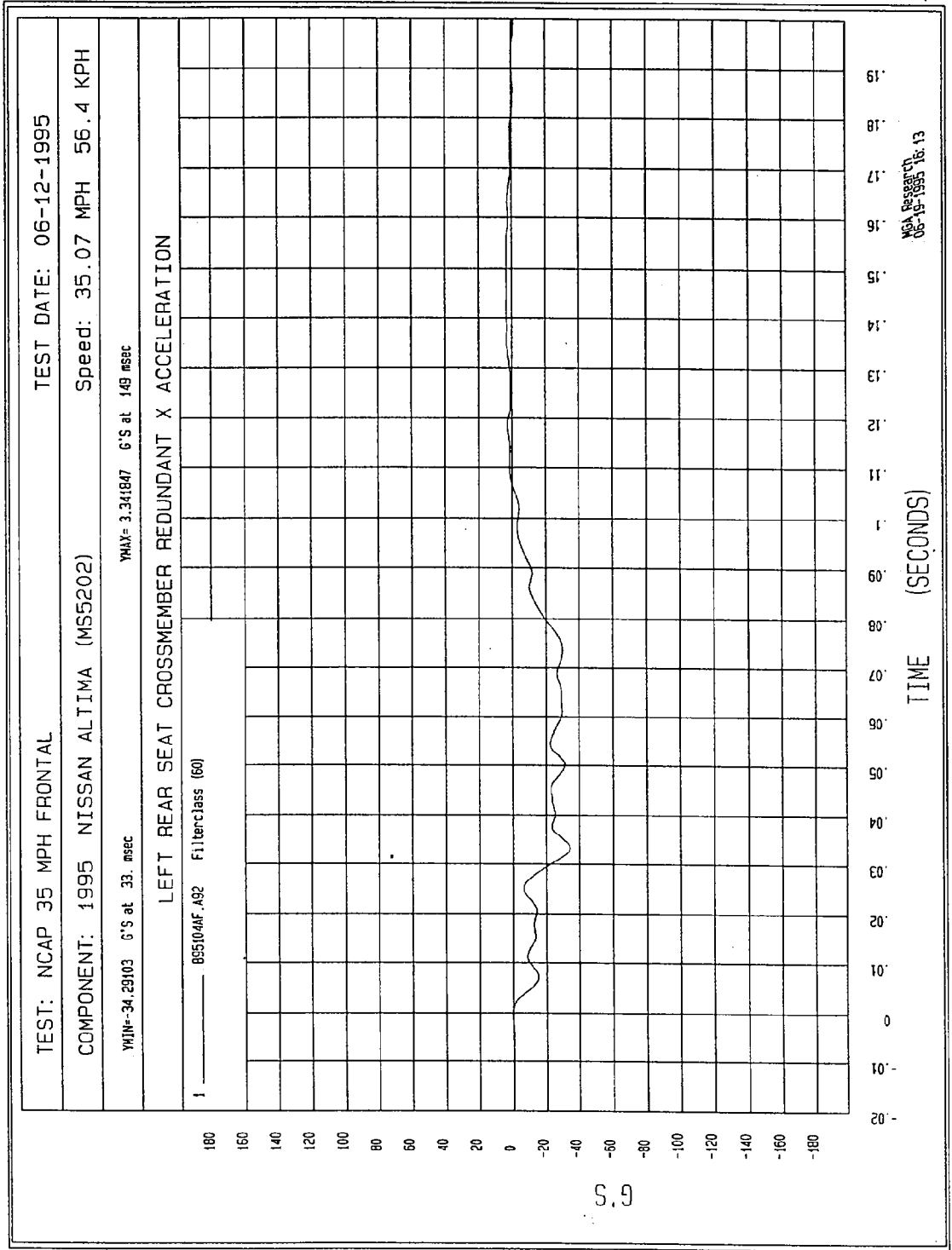


Figure B-4 - Left Rear Seat Crossmember Redundant X Acceleration vs. Time

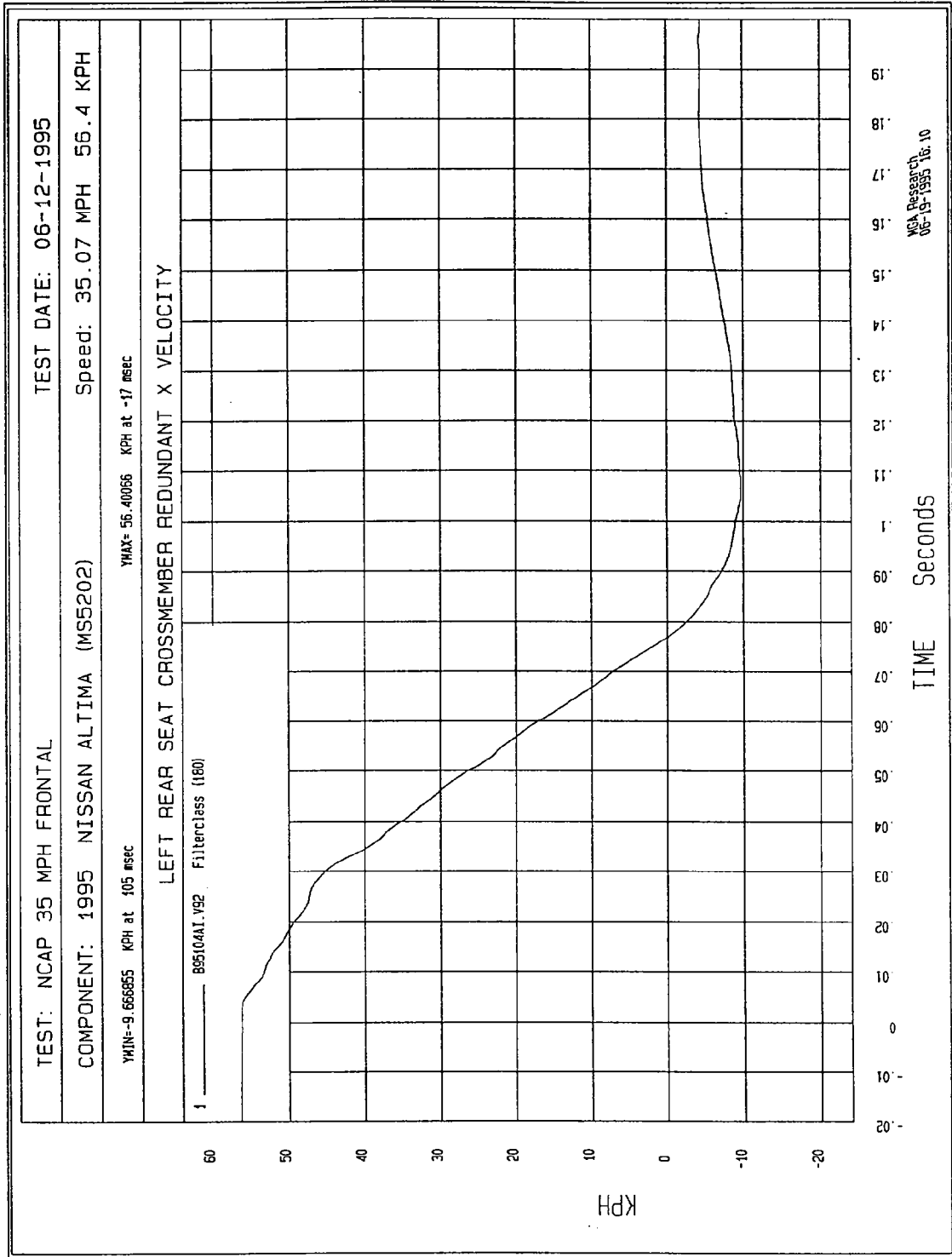


Figure B-5 - Left Rear Seat Crossmember Redundant X Velocity vs. Time

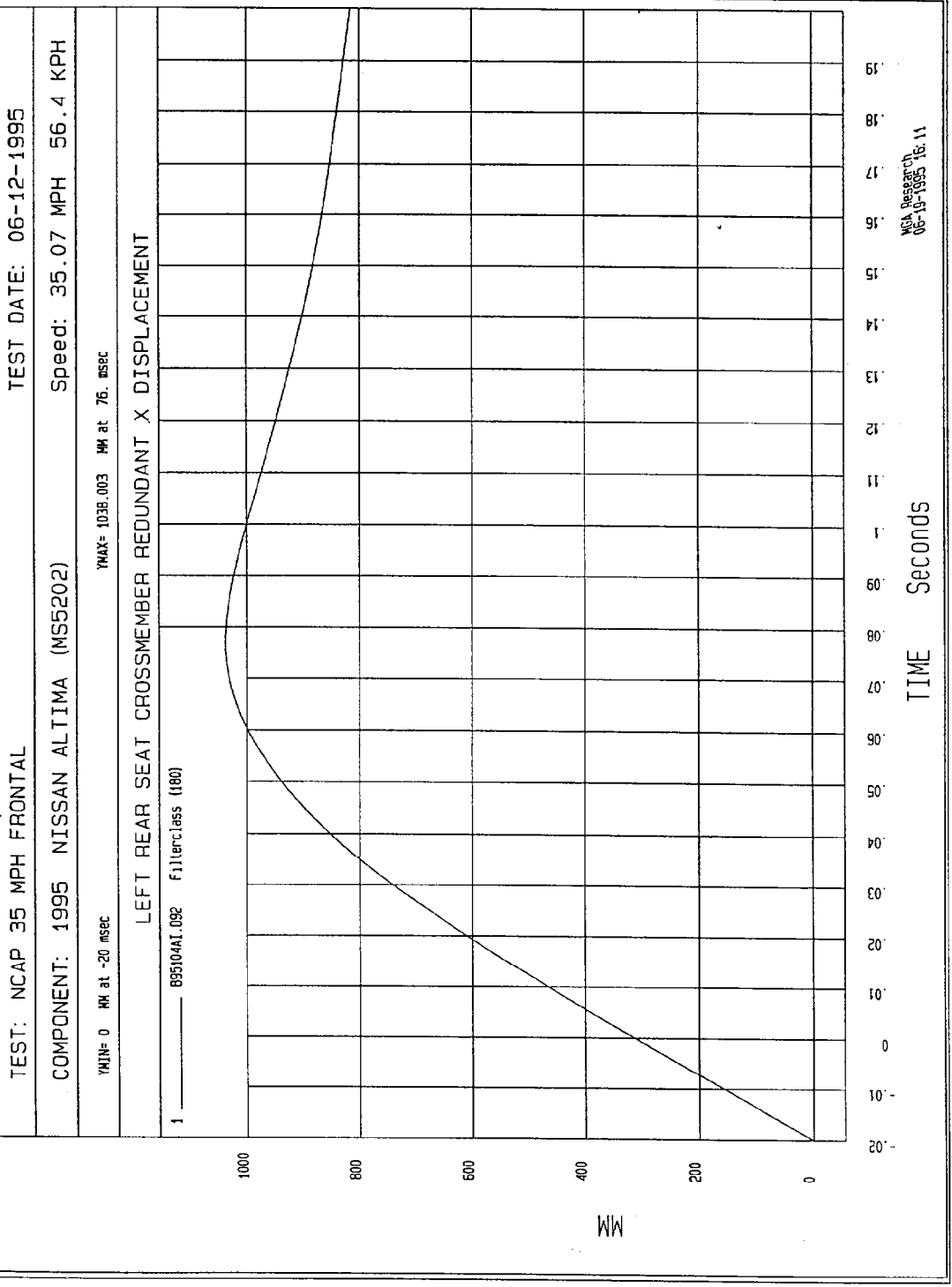


Figure B-6 - Left Rear Seat Crossmember Redundant X Displacement vs. Time

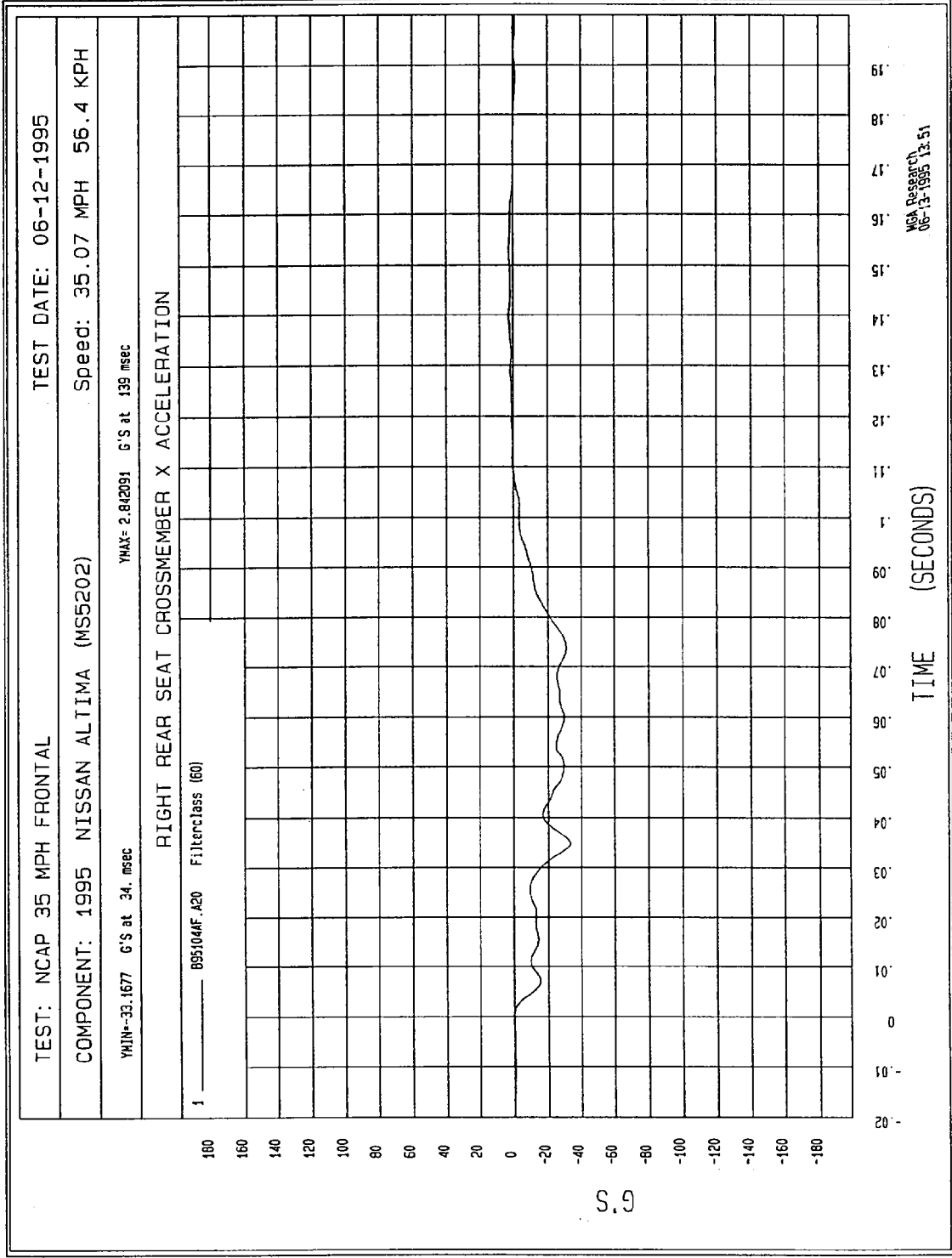


Figure B-7 - Right Rear Seat Crossmember X Acceleration vs. Time

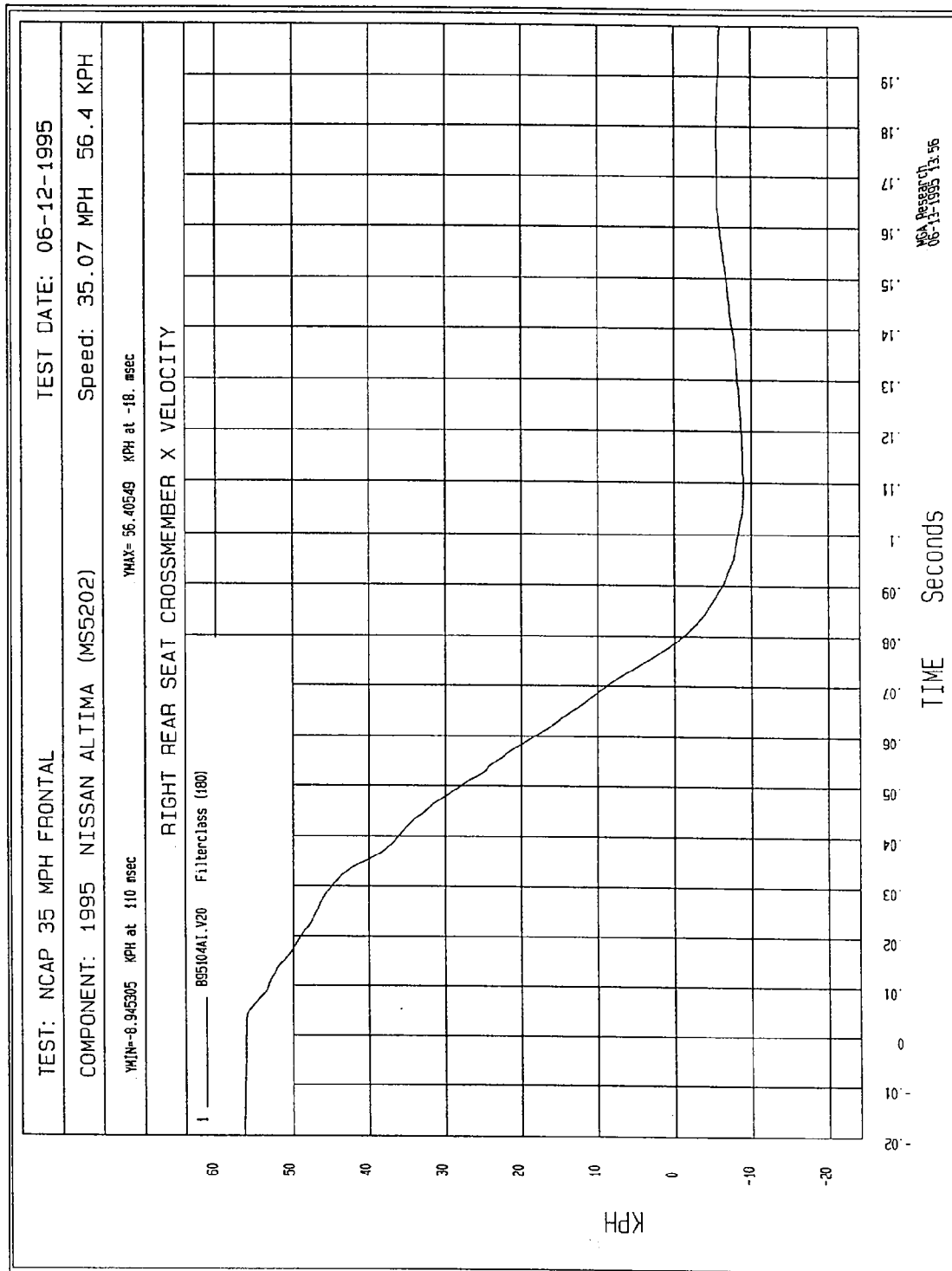


Figure B-8 - Right Rear Seat Crossmember X Velocity vs. Time

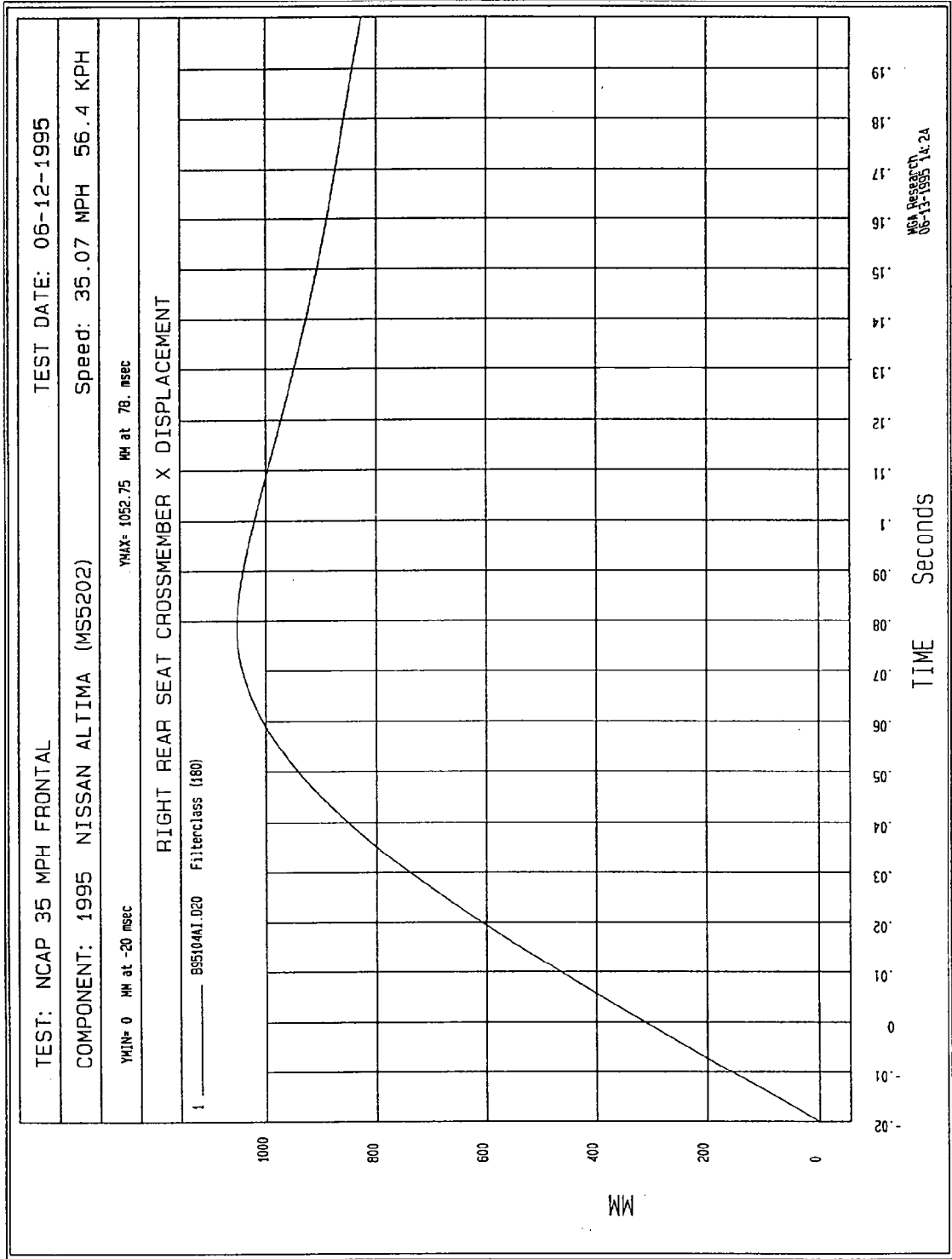
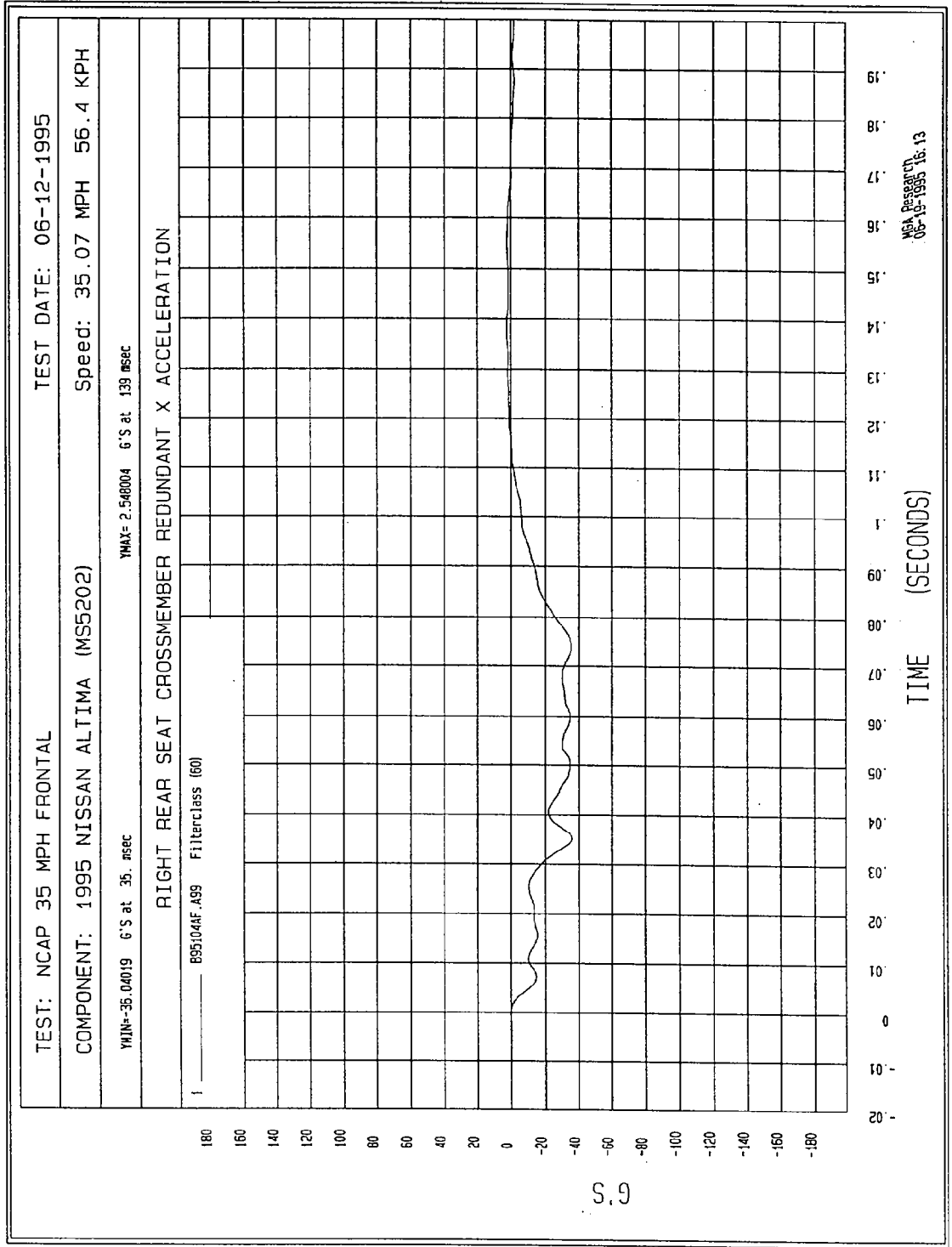
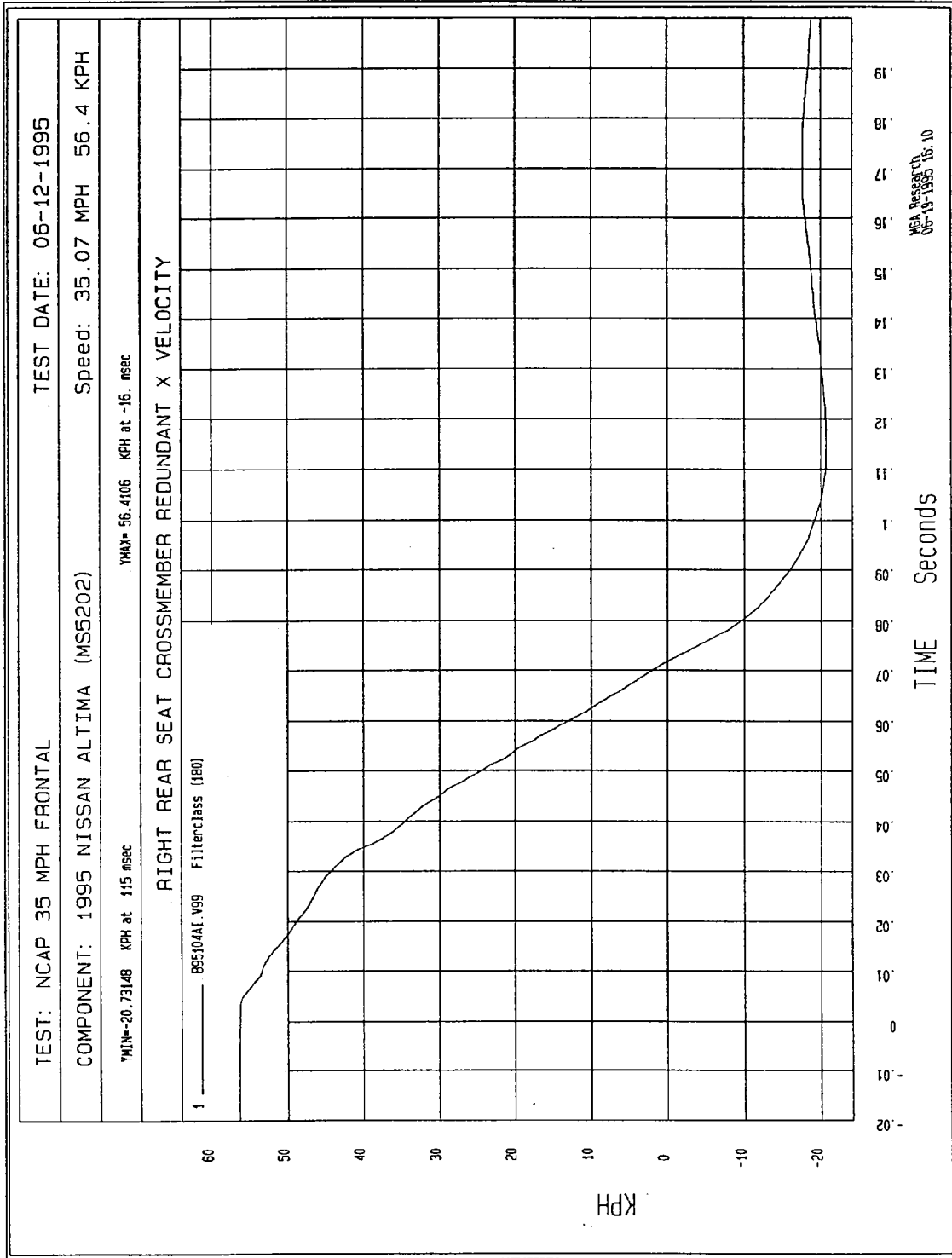


Figure B-9 - Right Rear Seat Crossmember X Displacement vs. Time



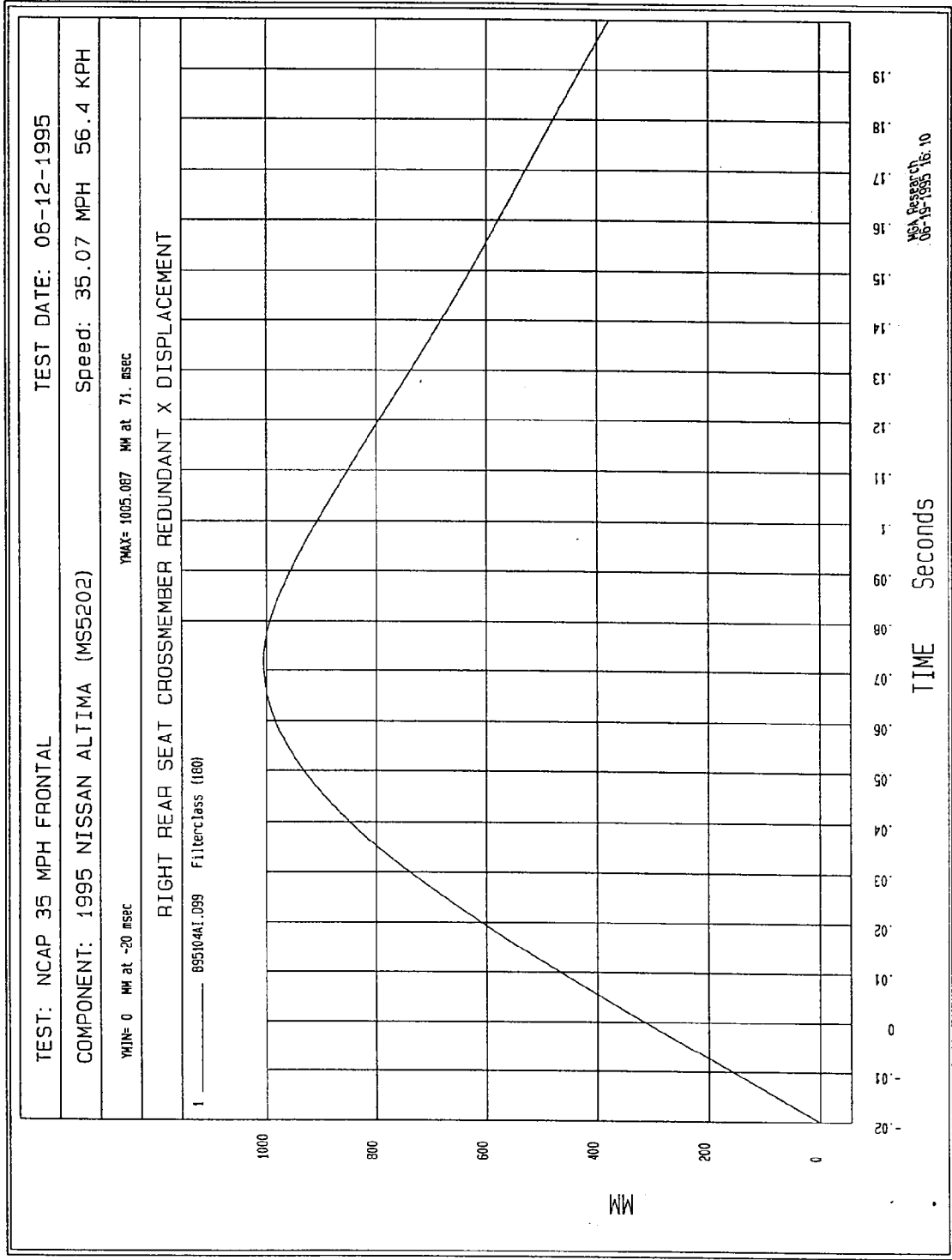
B-10

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



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



B-12

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

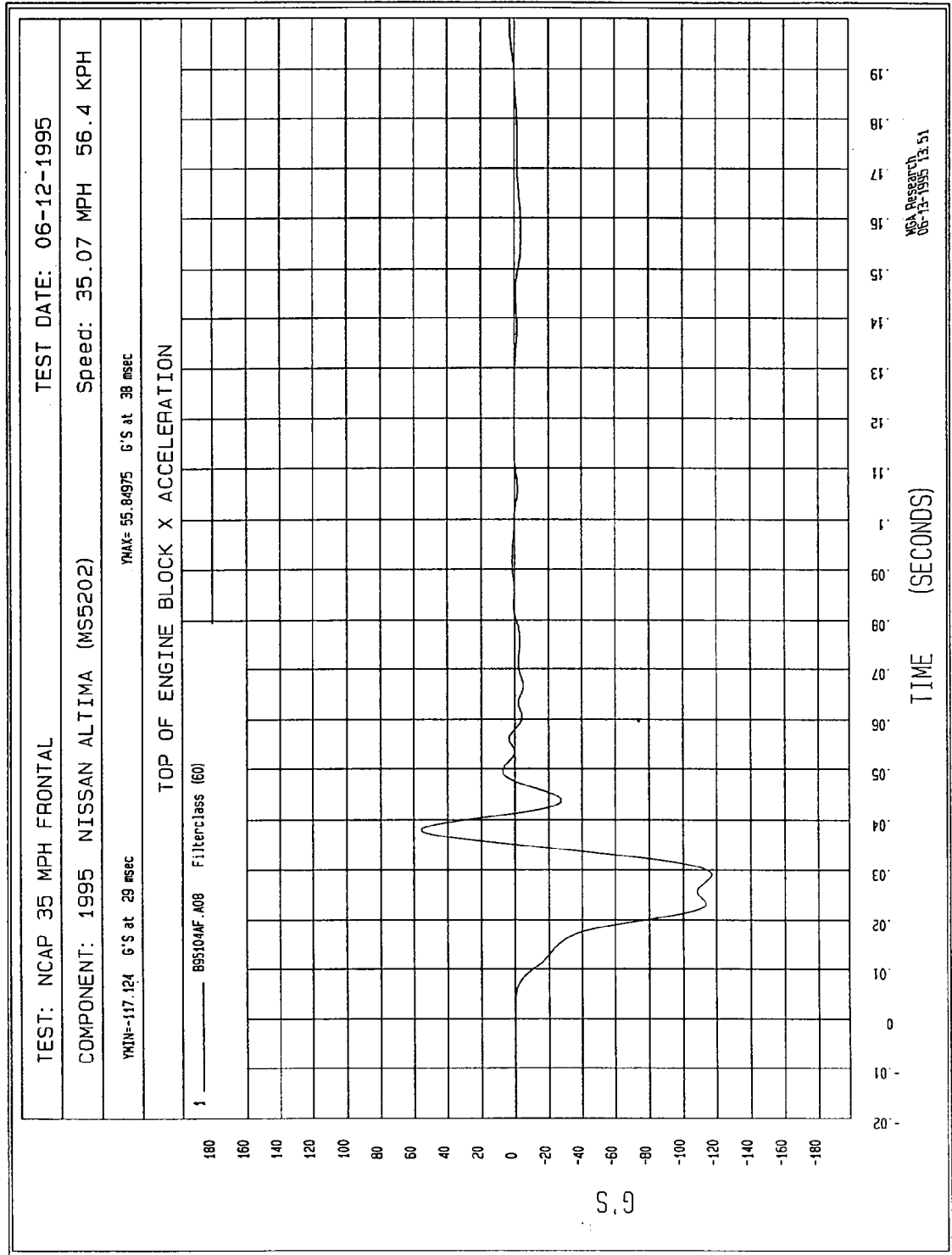


Figure B-13 - Top of Engine Block X Acceleration vs. Time

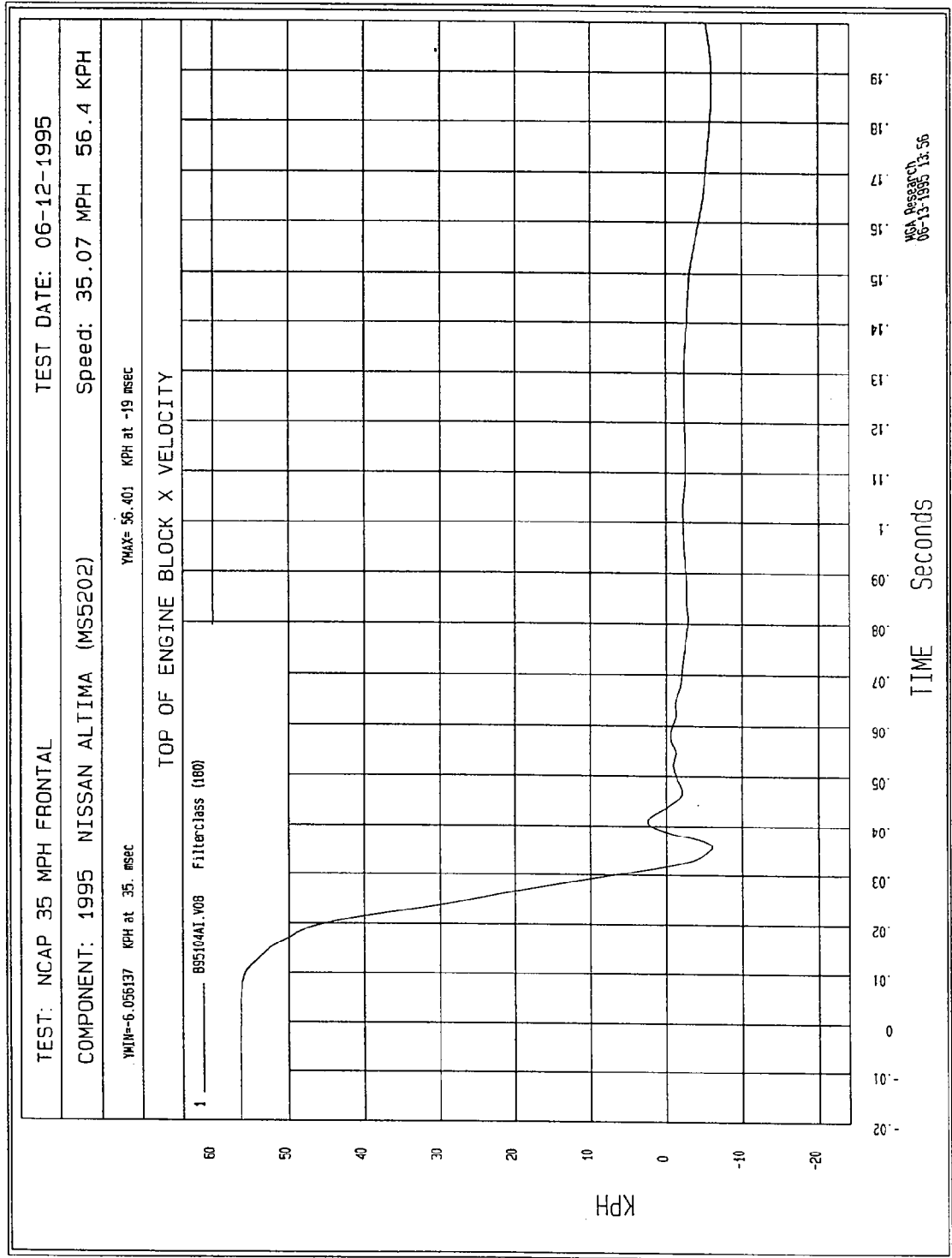


Figure B-14 - Top of Engine Block X Velocity vs. Time

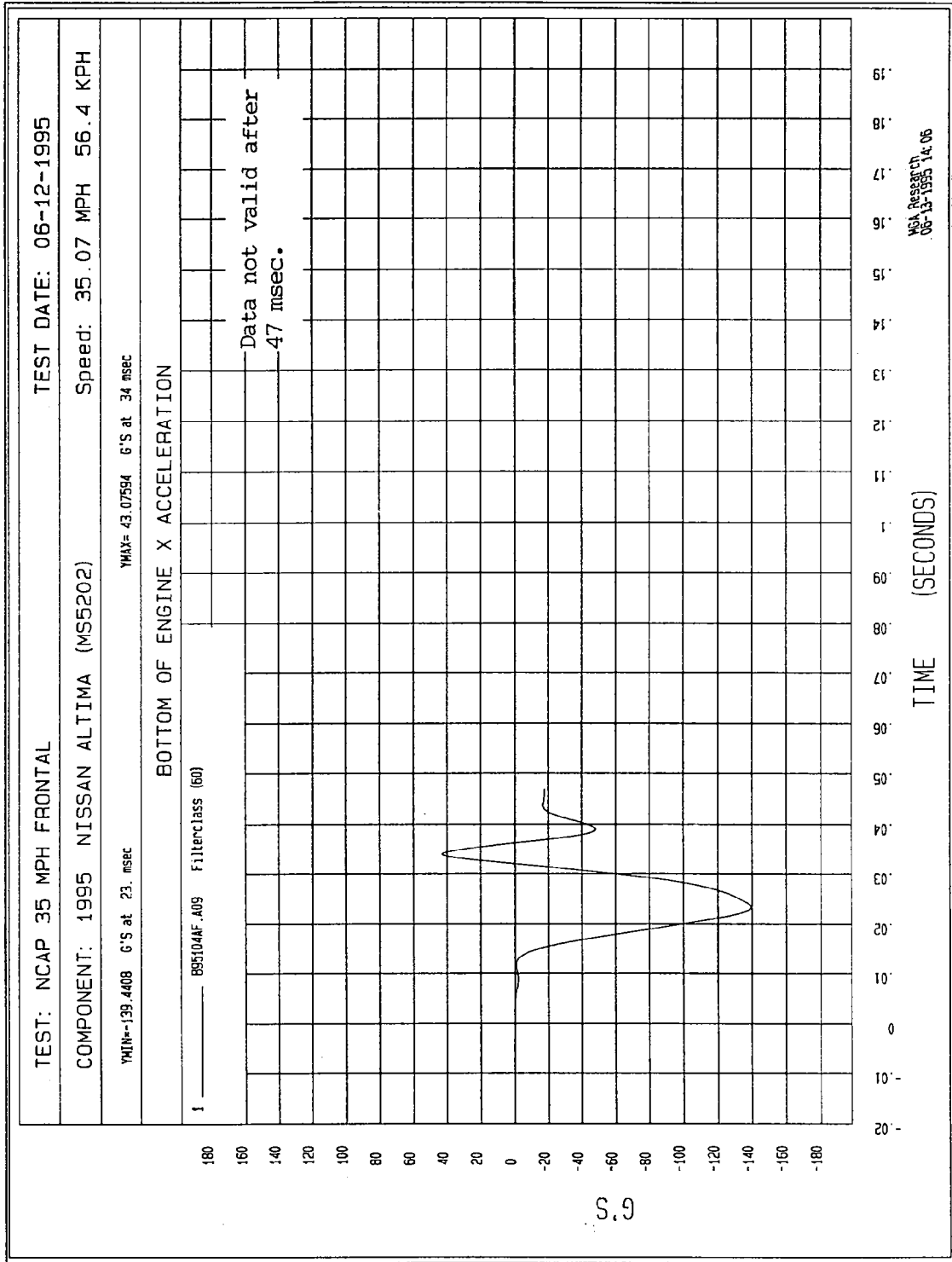


Figure B-15 - Bottom of Engine X Acceleration vs. Time

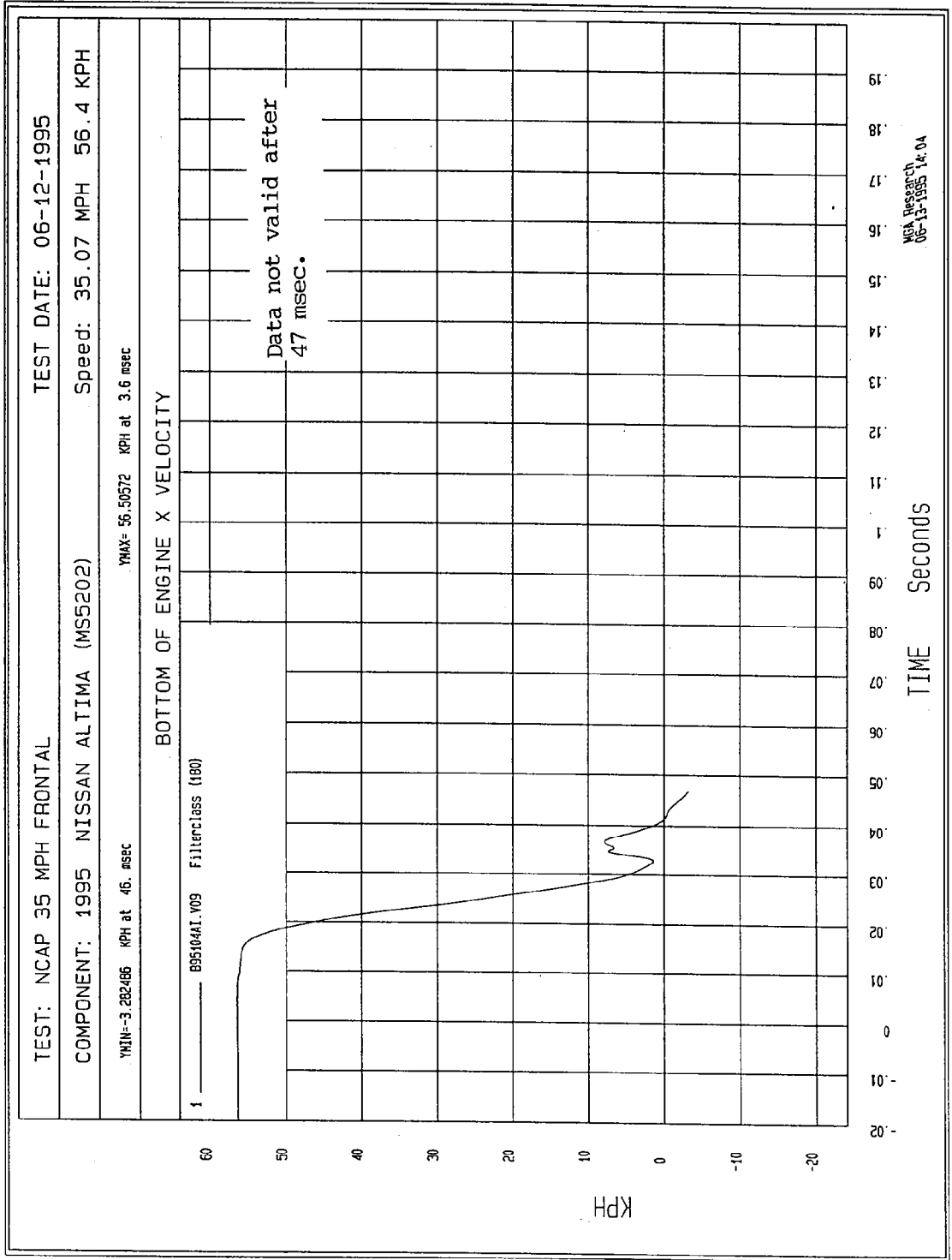


Figure B-16 - Bottom of Engine X Velocity vs. Time

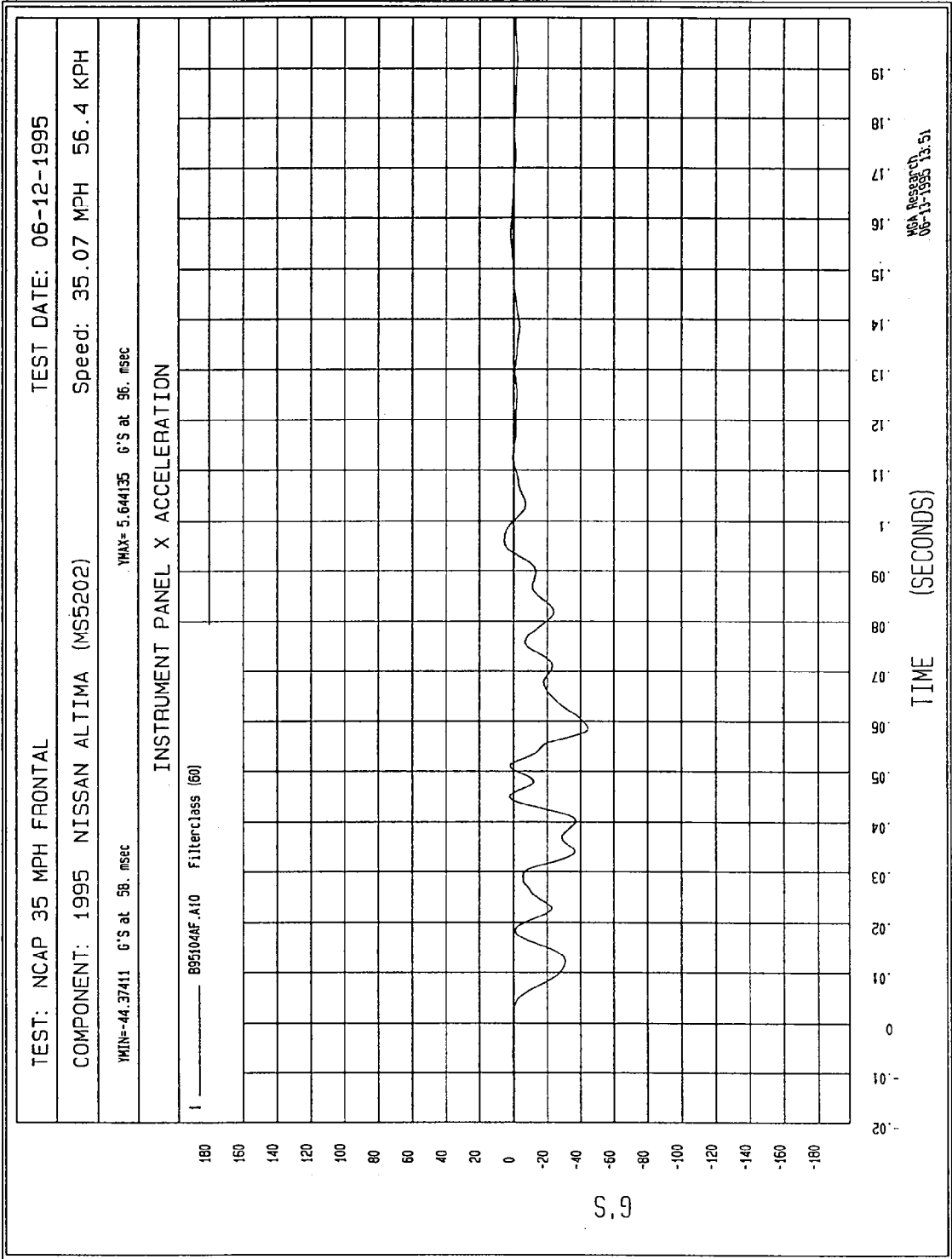
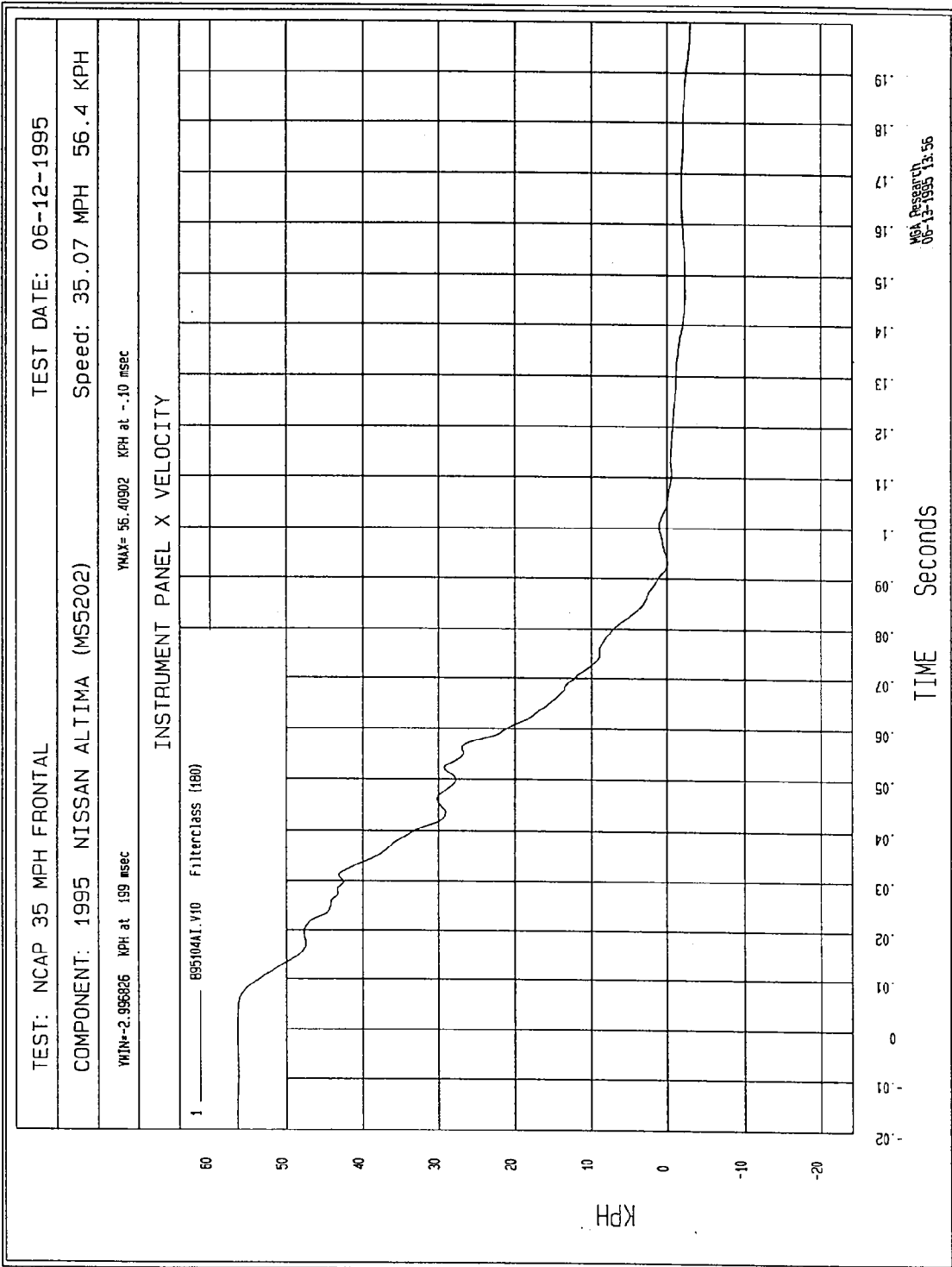


Figure B-17 - Instrument Panel X Acceleration vs. Time



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

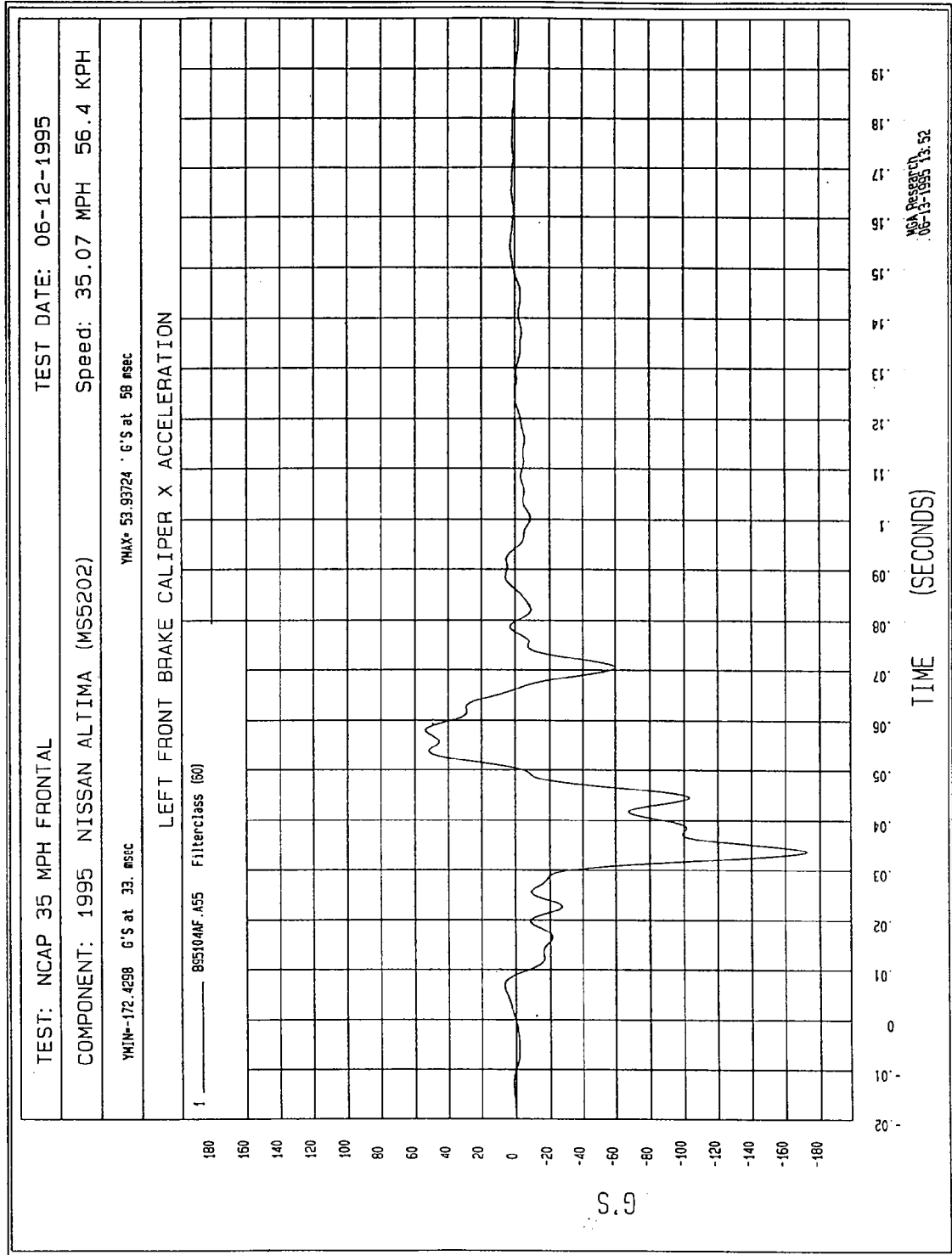


Figure B-19 - Left Front Brake Caliper X Acceleration vs. Time

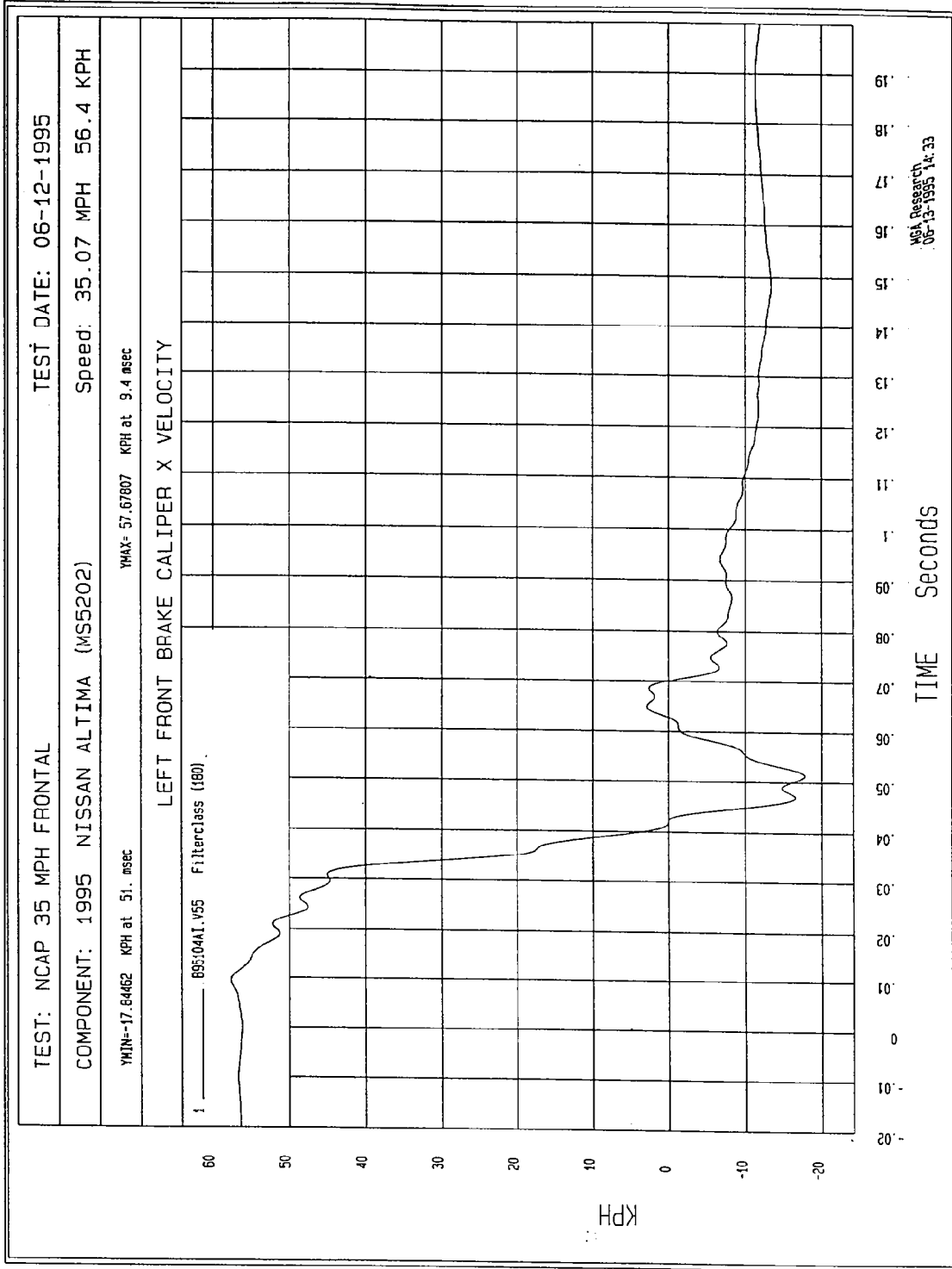


Figure B-20 - Left Front Brake Caliper X Velocity vs. Time

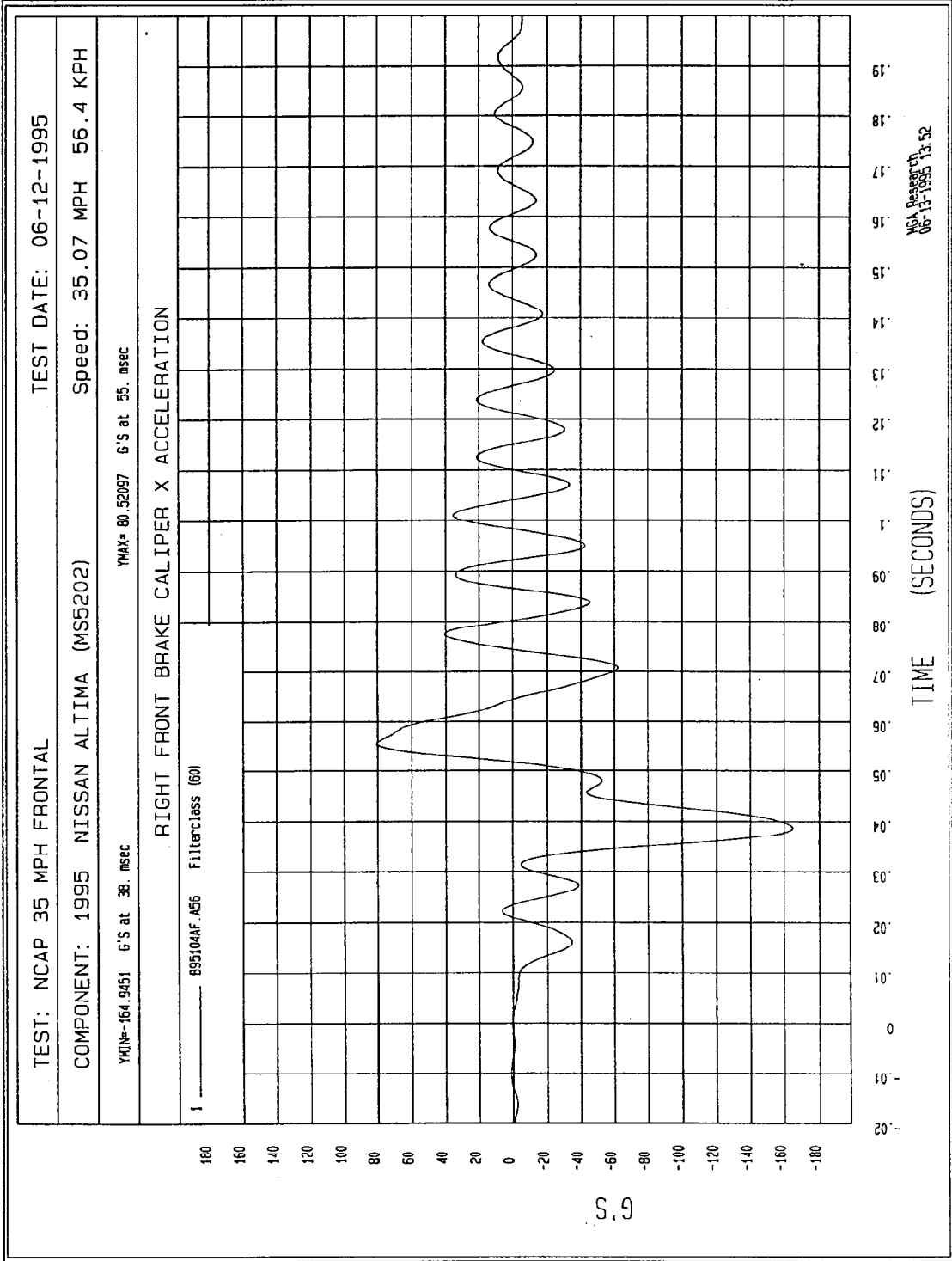
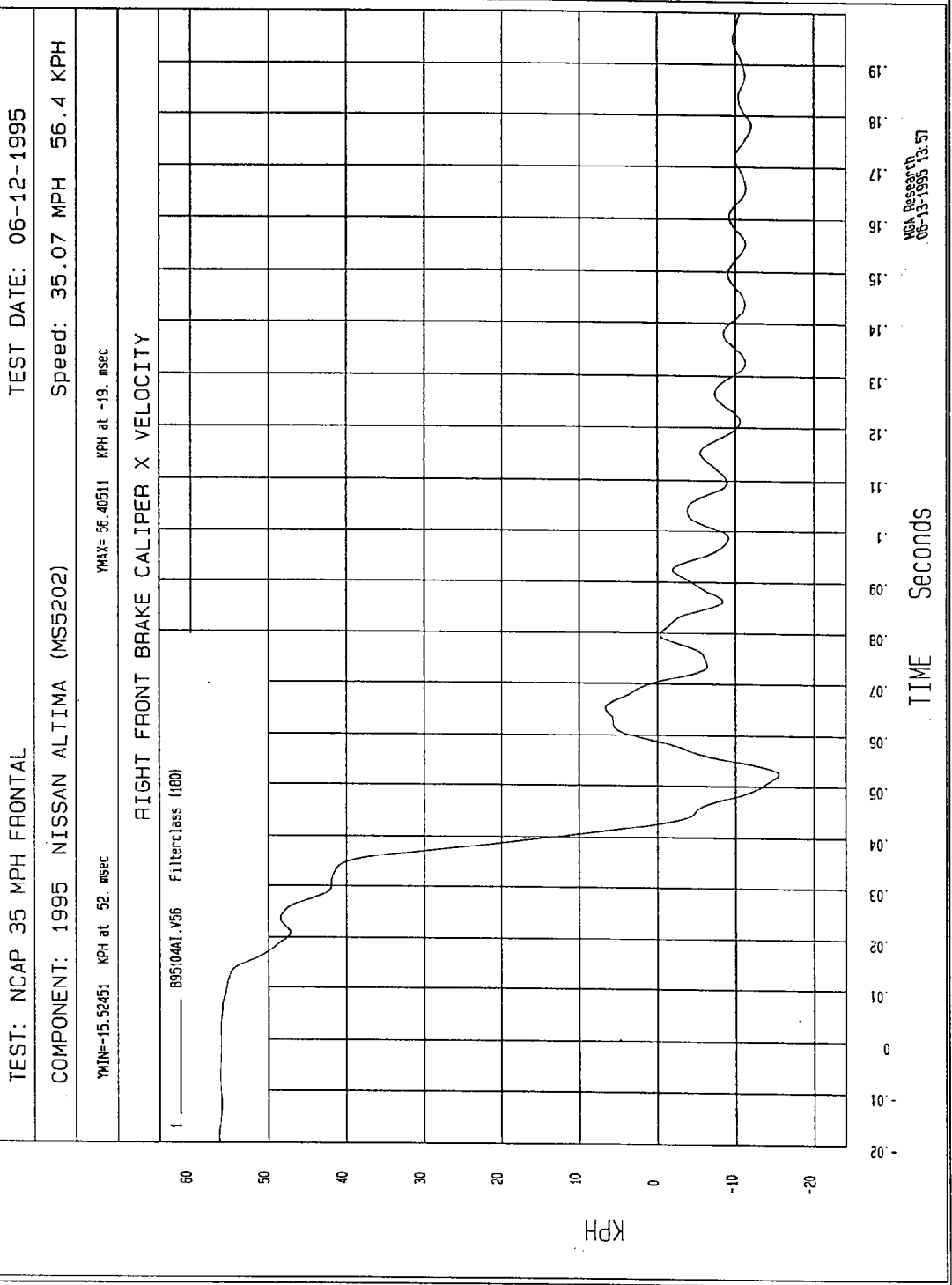


Figure B-21 - Right Front Brake Caliper X Acceleration vs. Time



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

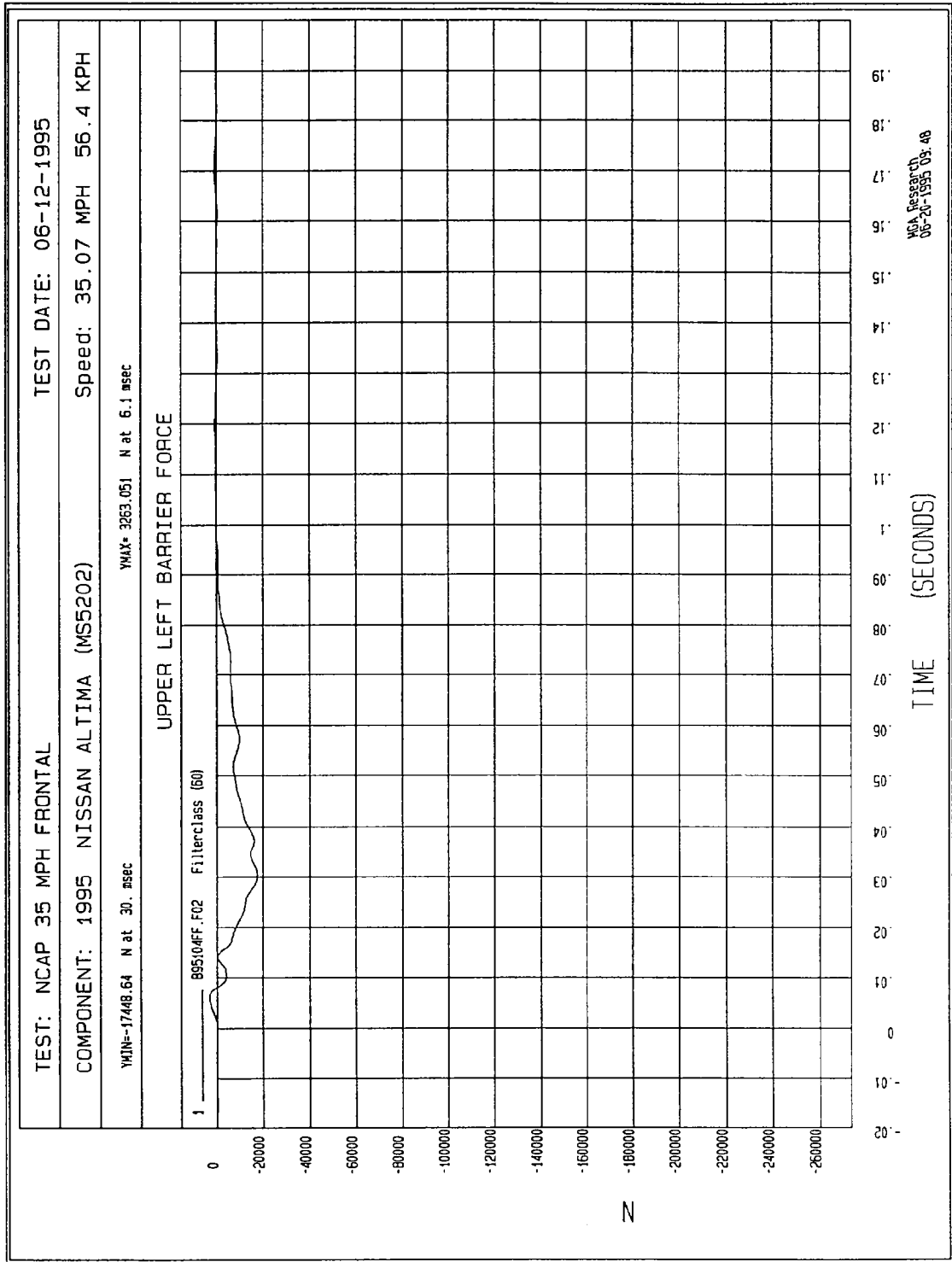


Figure B-23 - Upper Left Barrier Force vs. Time

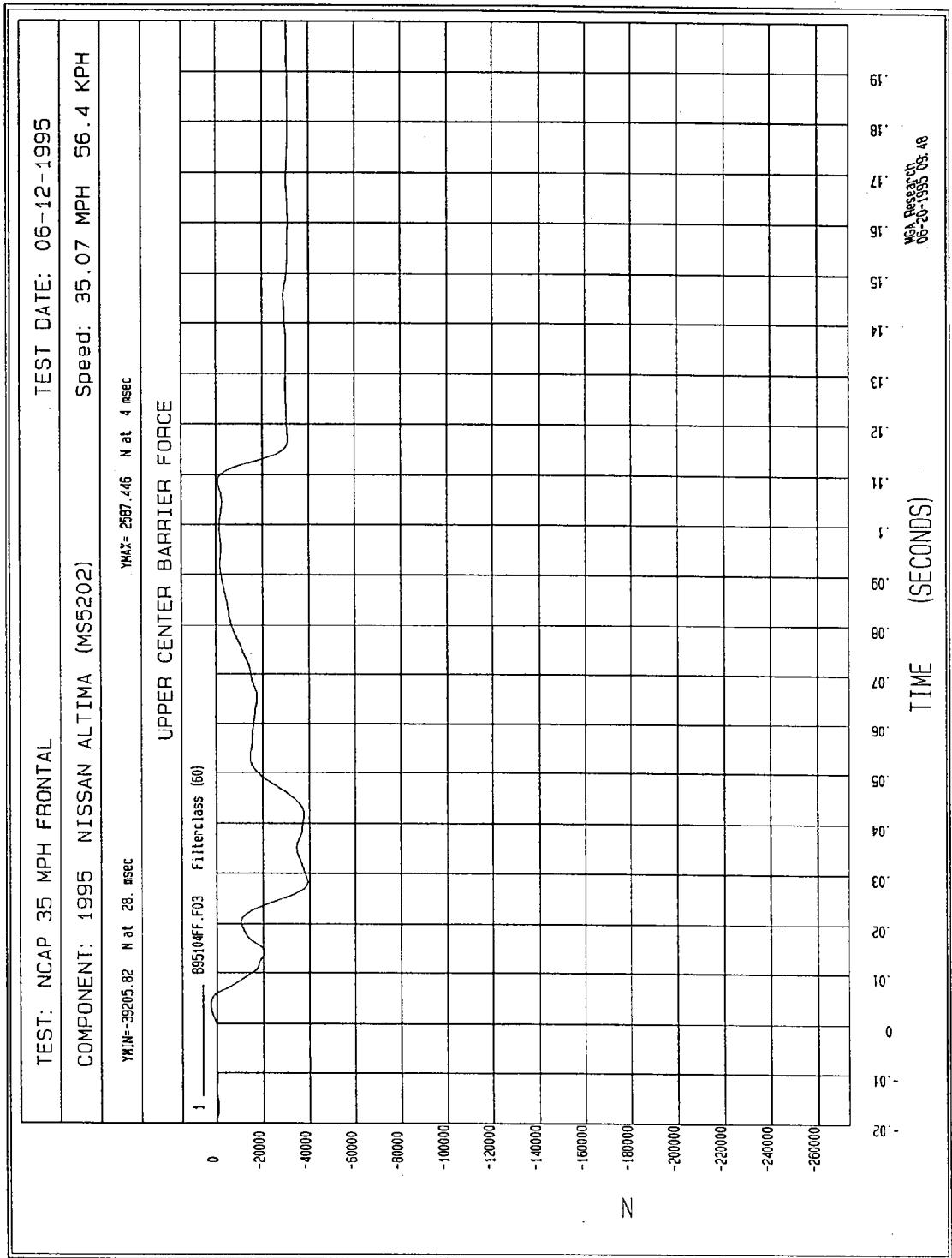


Figure B-24 - Upper Center Barrier Force vs. Time

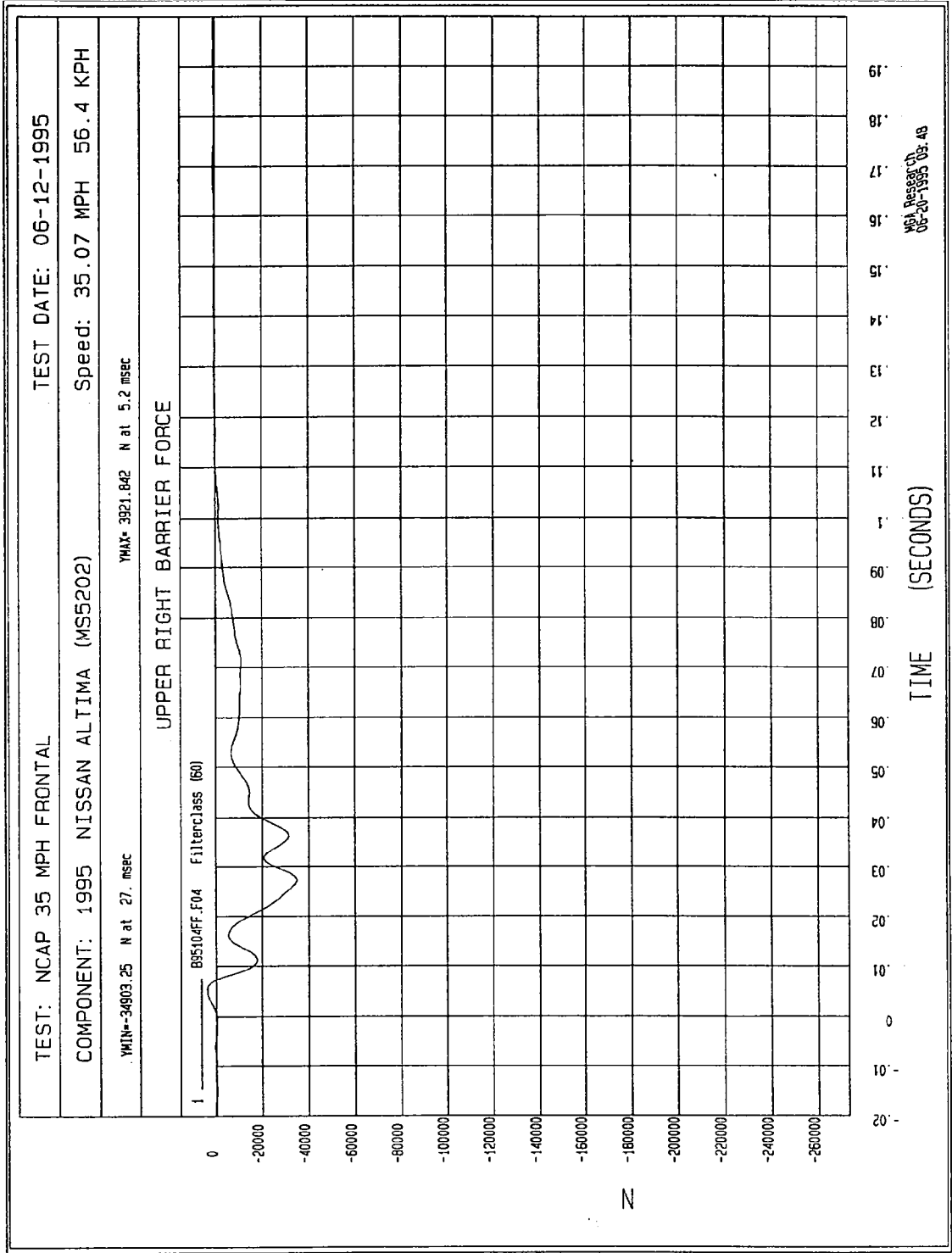


Figure B-25 - Upper Right Barrier Force vs. Time

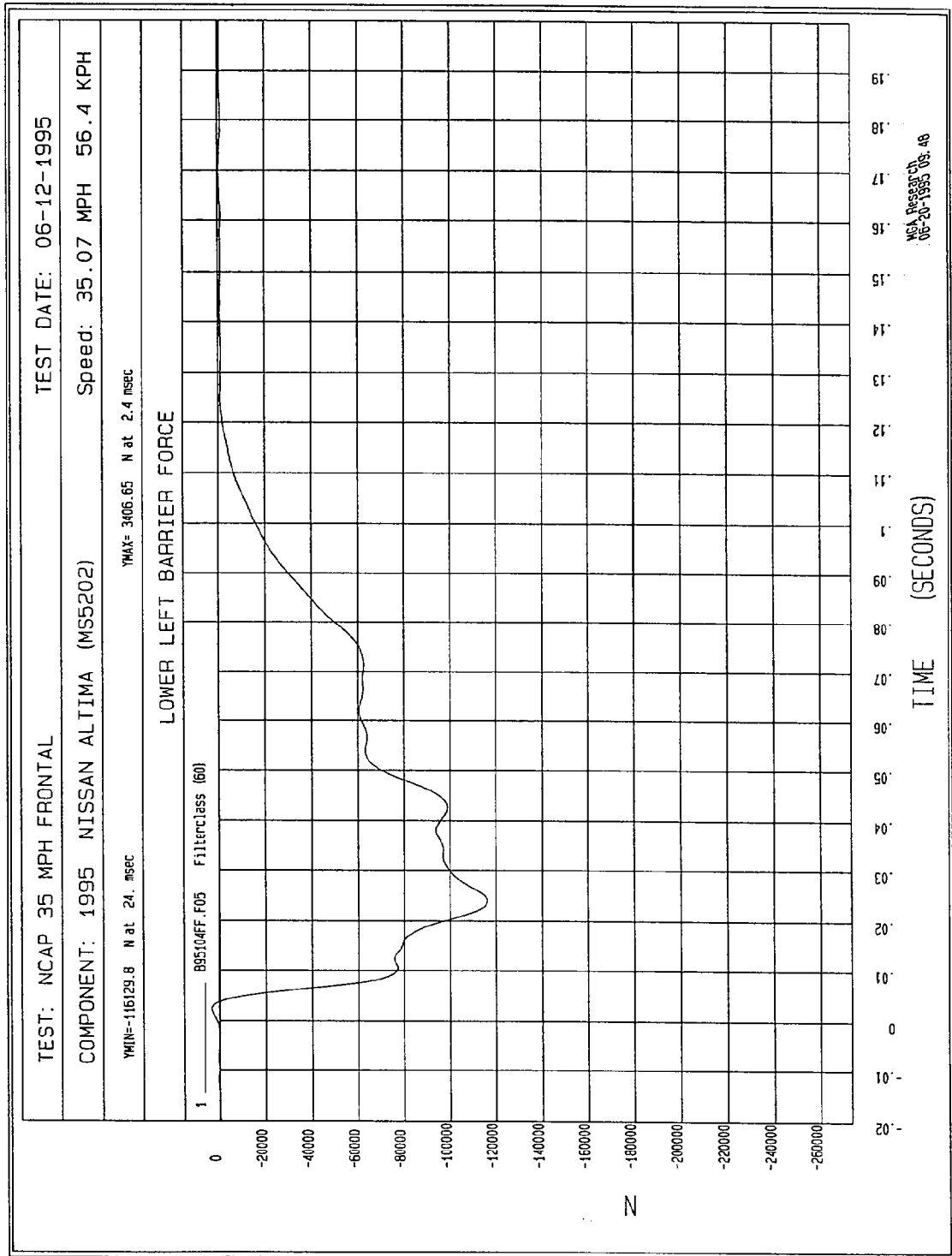


Figure B-26 - Lower Left Barrier Force vs. Time

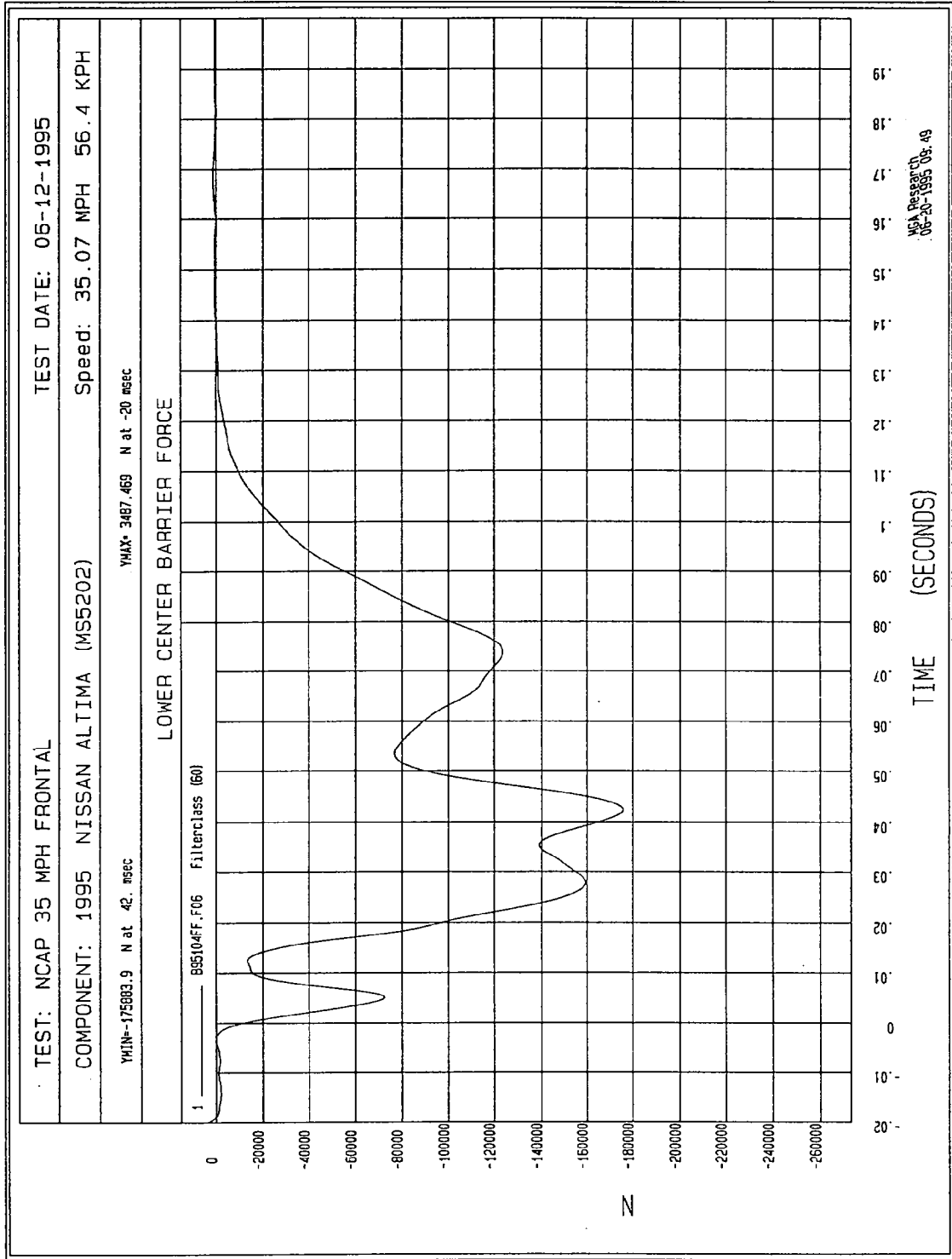
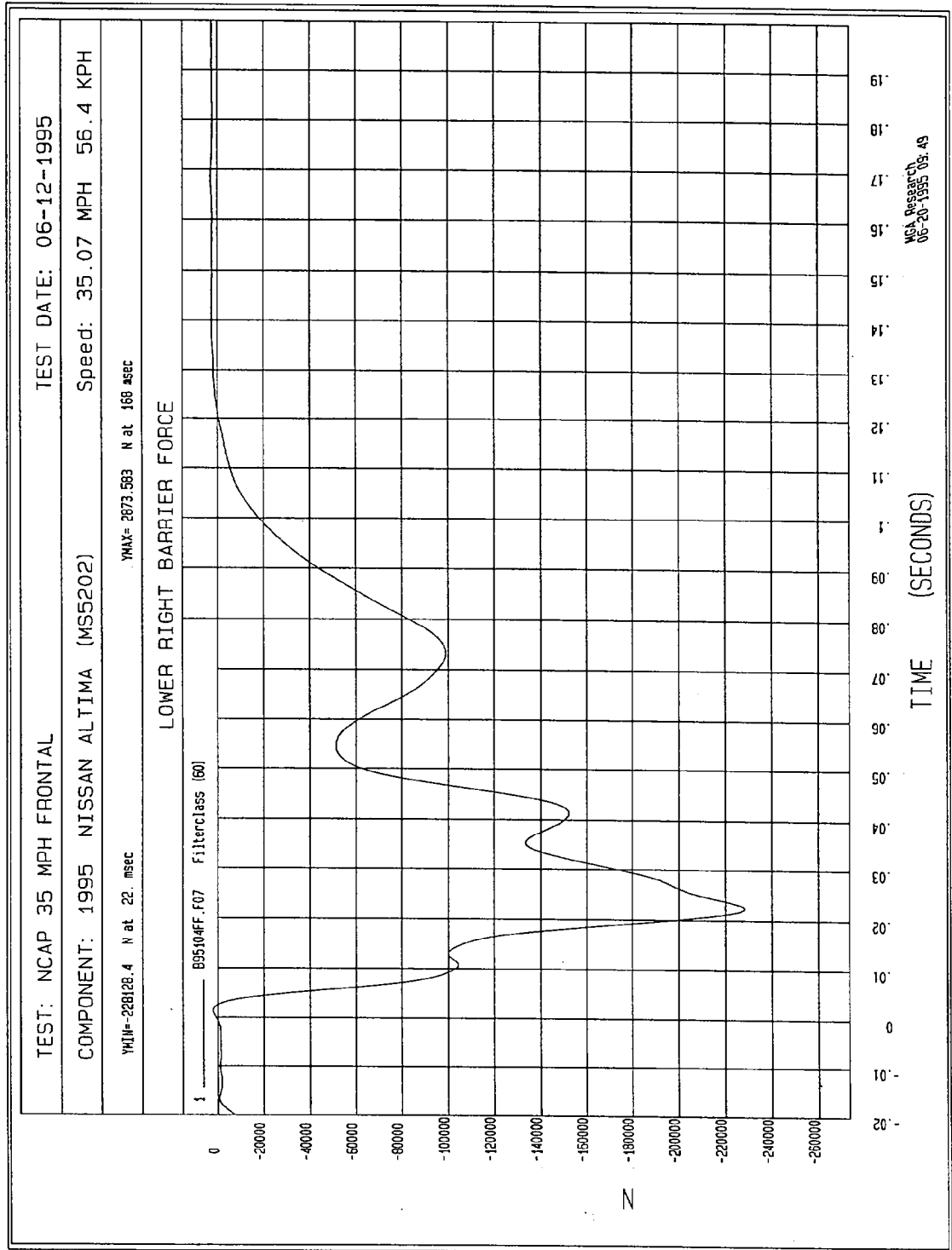


Figure B-27 - Lower Center Barrier Force vs. Time



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

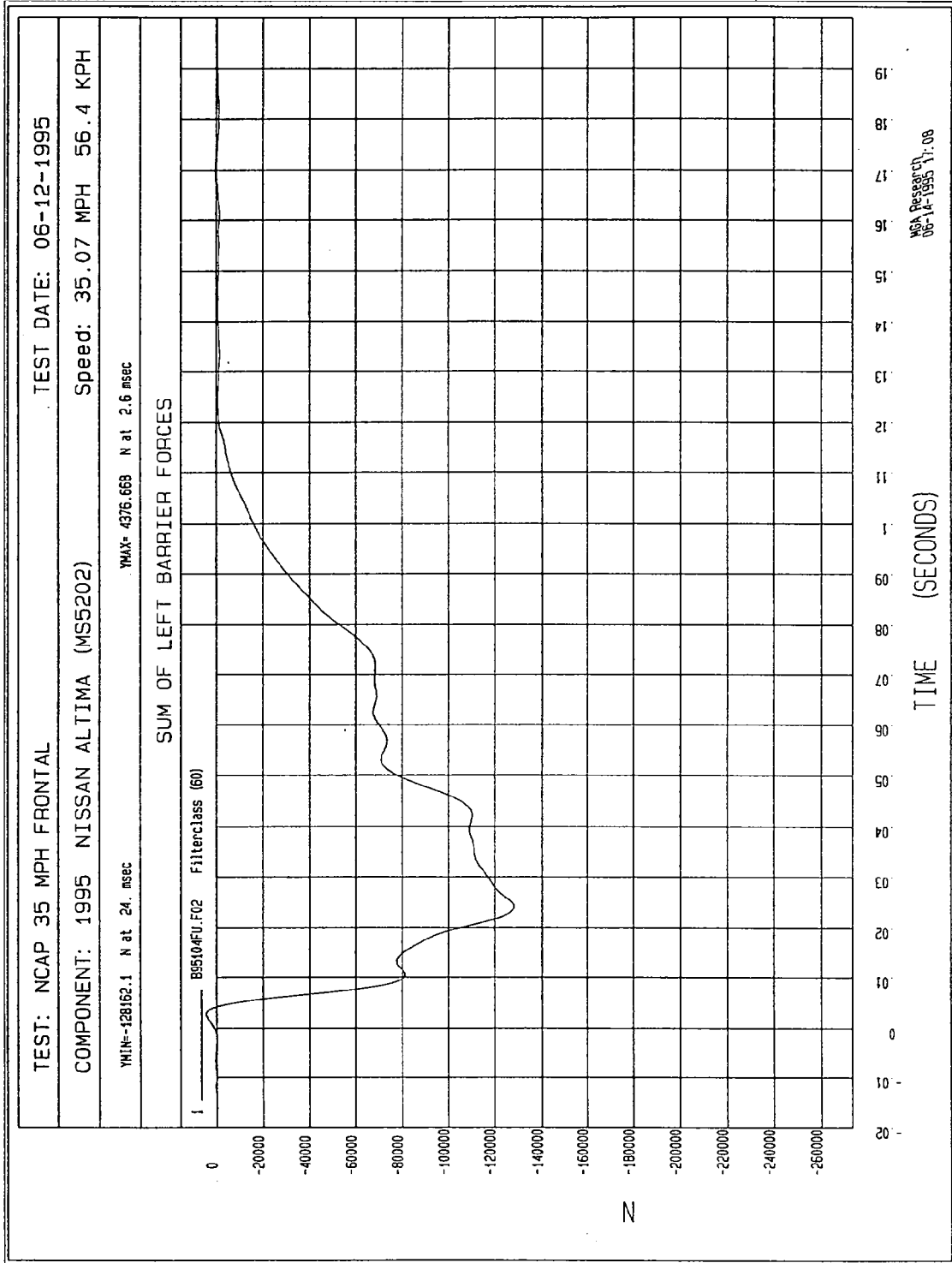


Figure B-29 - Sum of Left Barrier Forces vs. Time

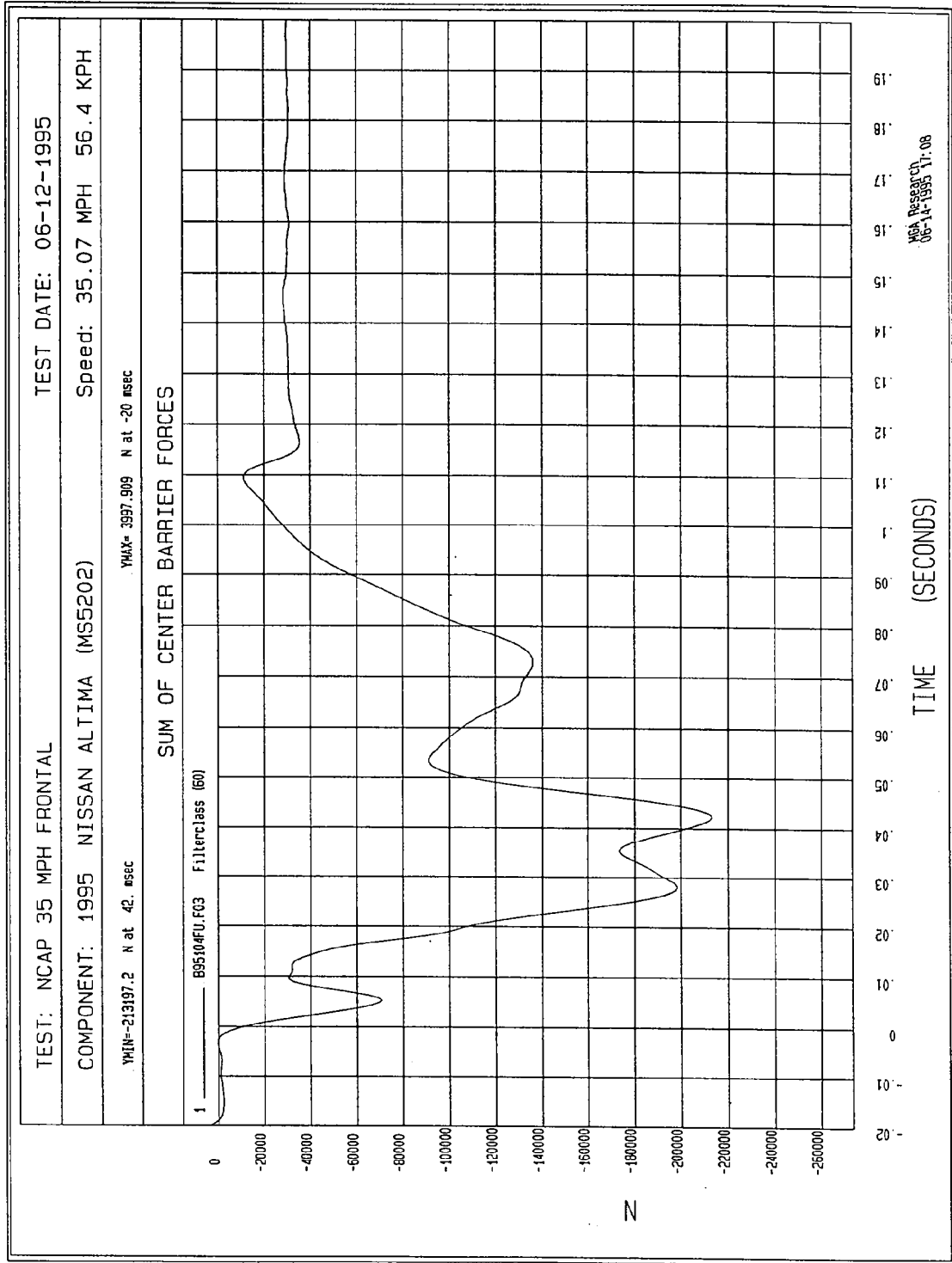


Figure B-30 - Sum of Center Barrier Forces vs. Time

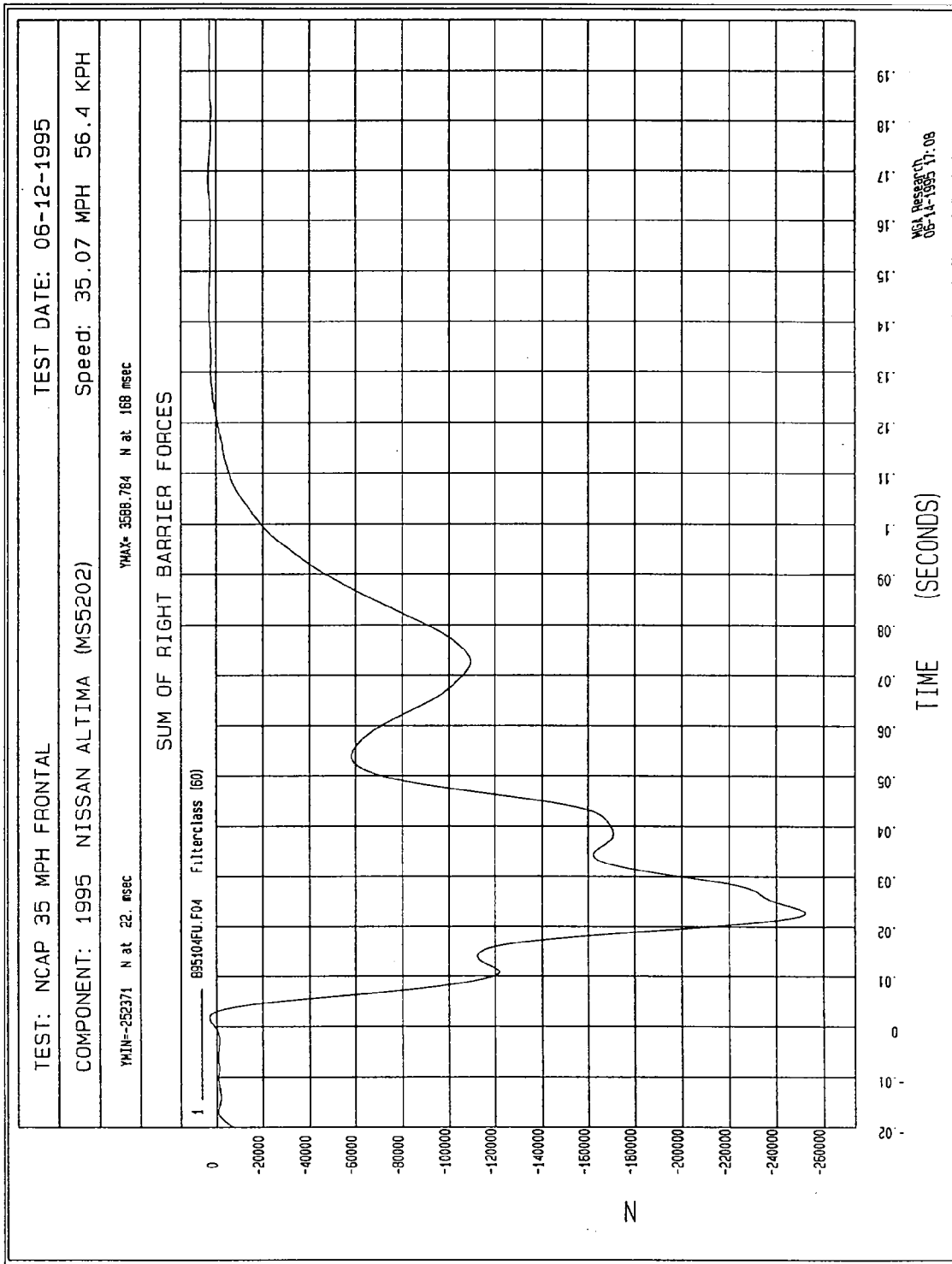


Figure B-31 - Sum of Right Barrier Forces vs. Time

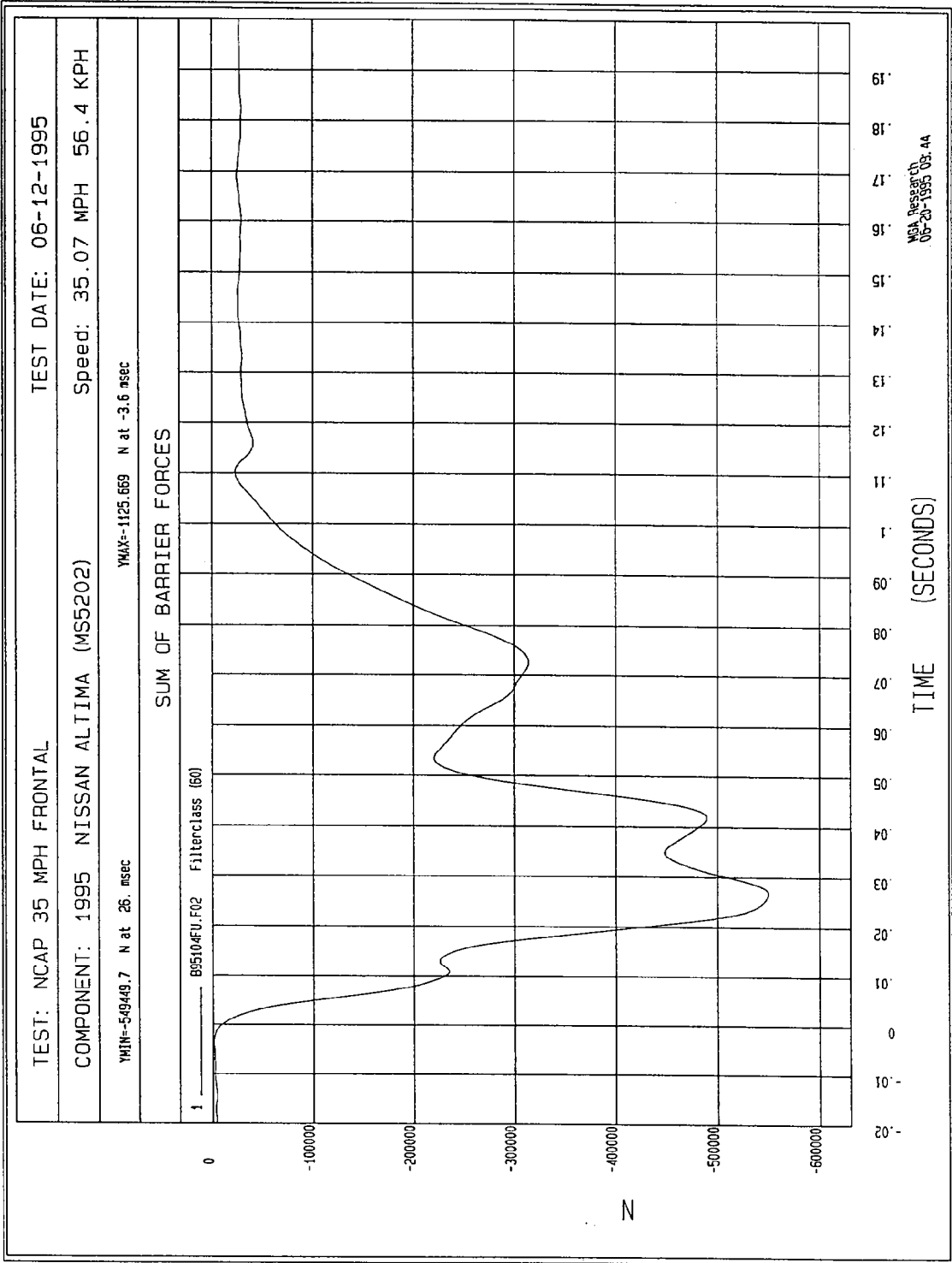


Figure B-32 - Sum of Barrier Forces vs. Time

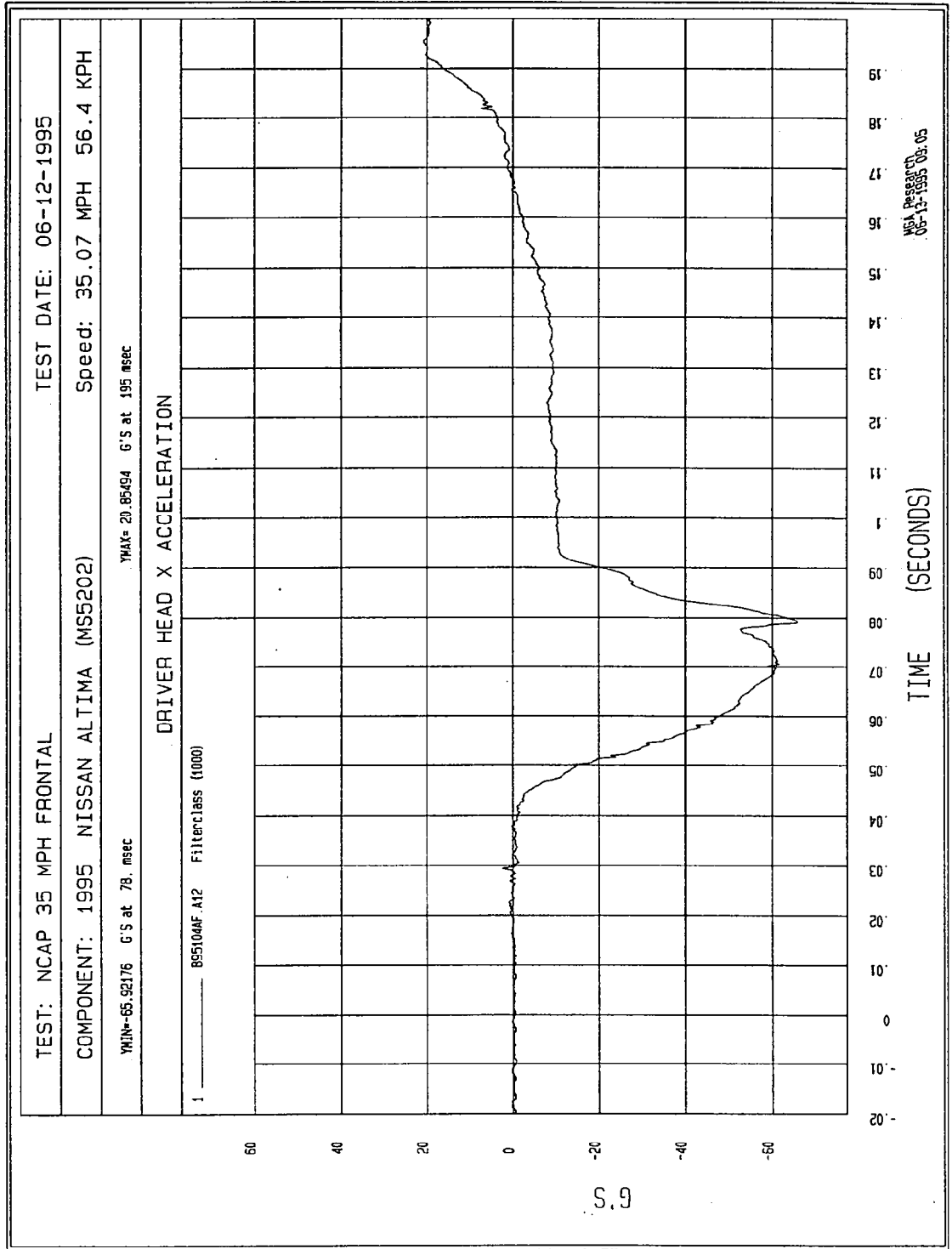


Figure B-88 - Driver Head X Acceleration vs. Time

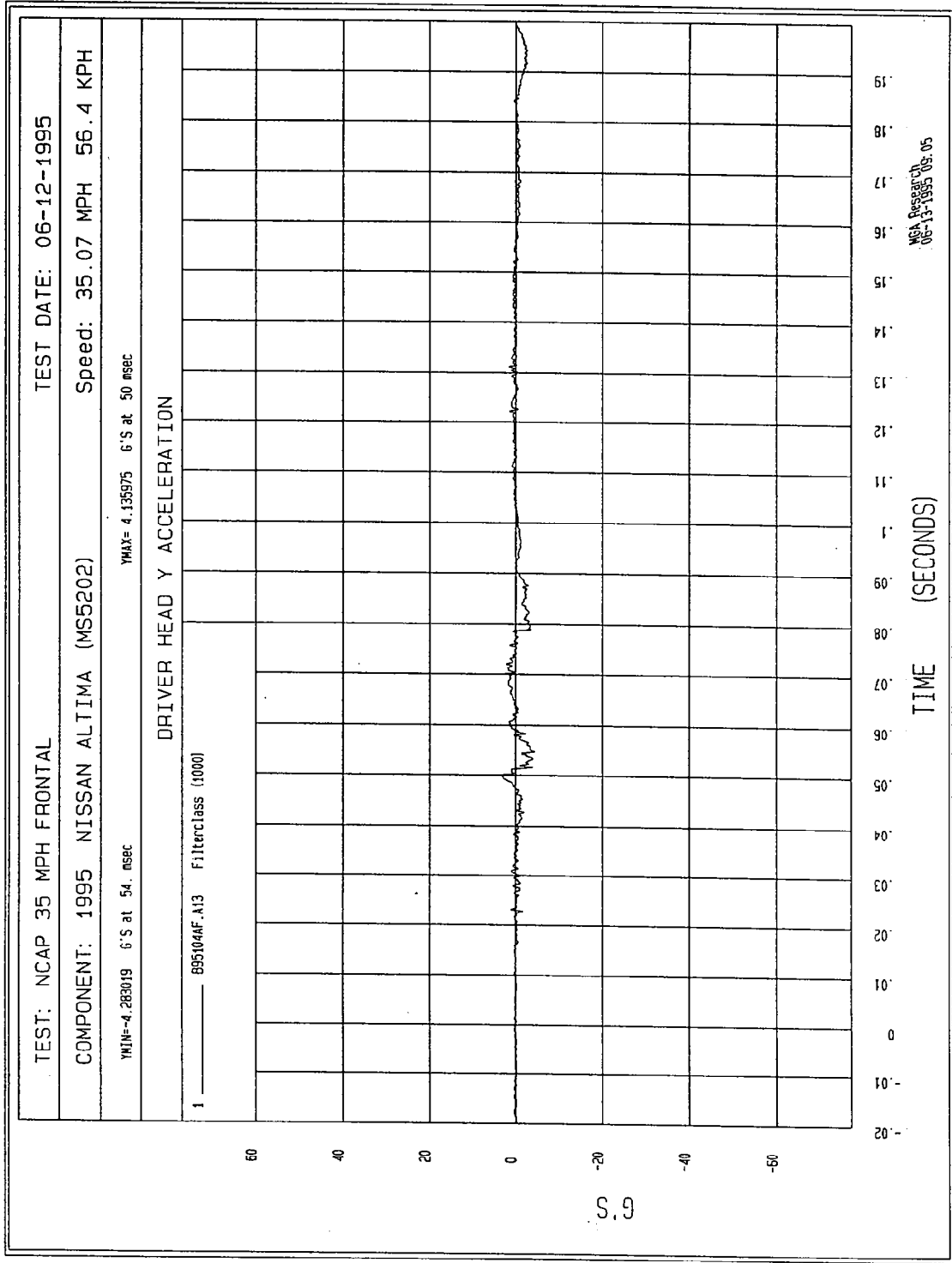


Figure B-34 - Driver Head Y Acceleration vs. Time

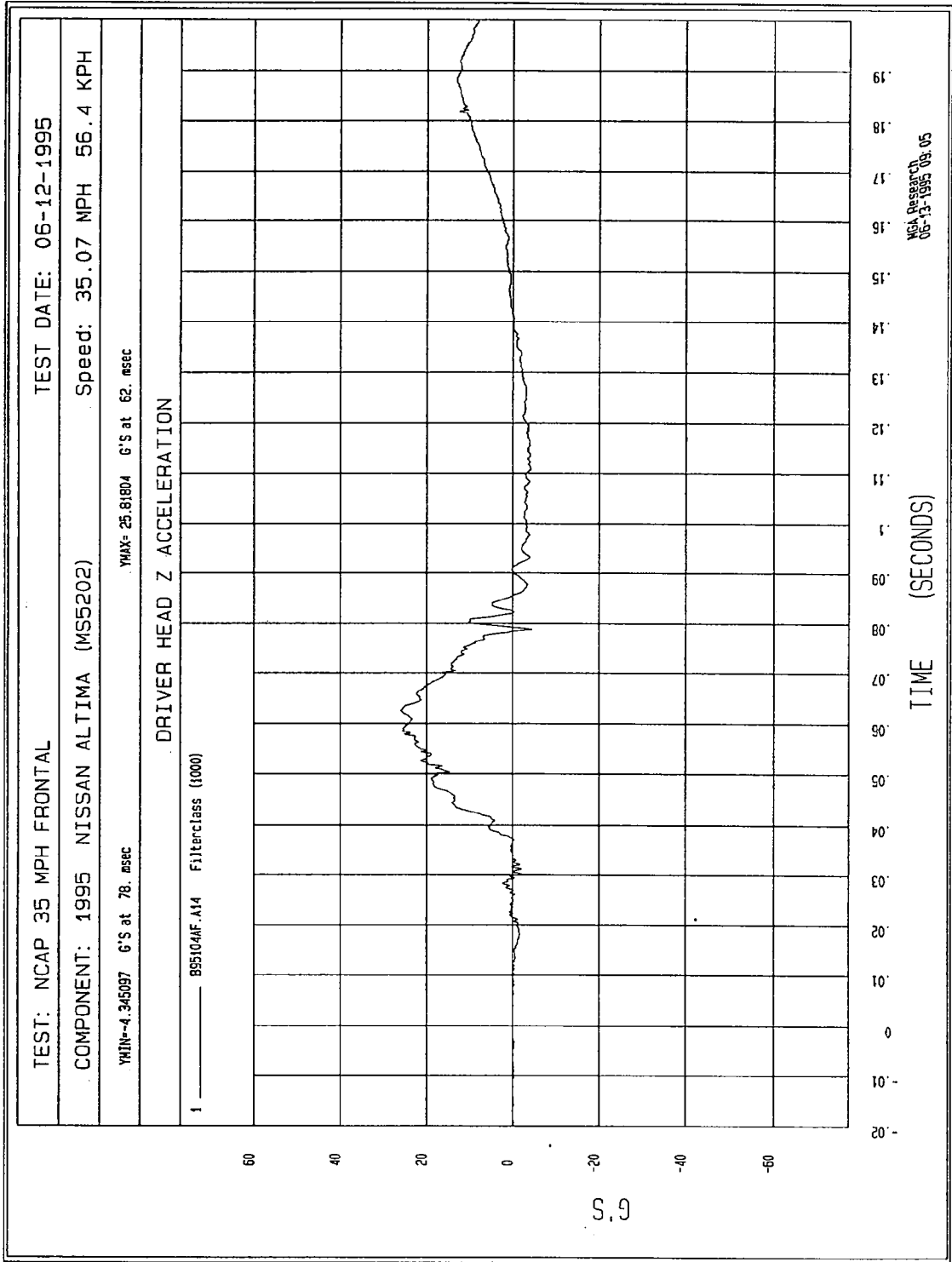


Figure B-35 - Driver Head Z Acceleration vs. Time

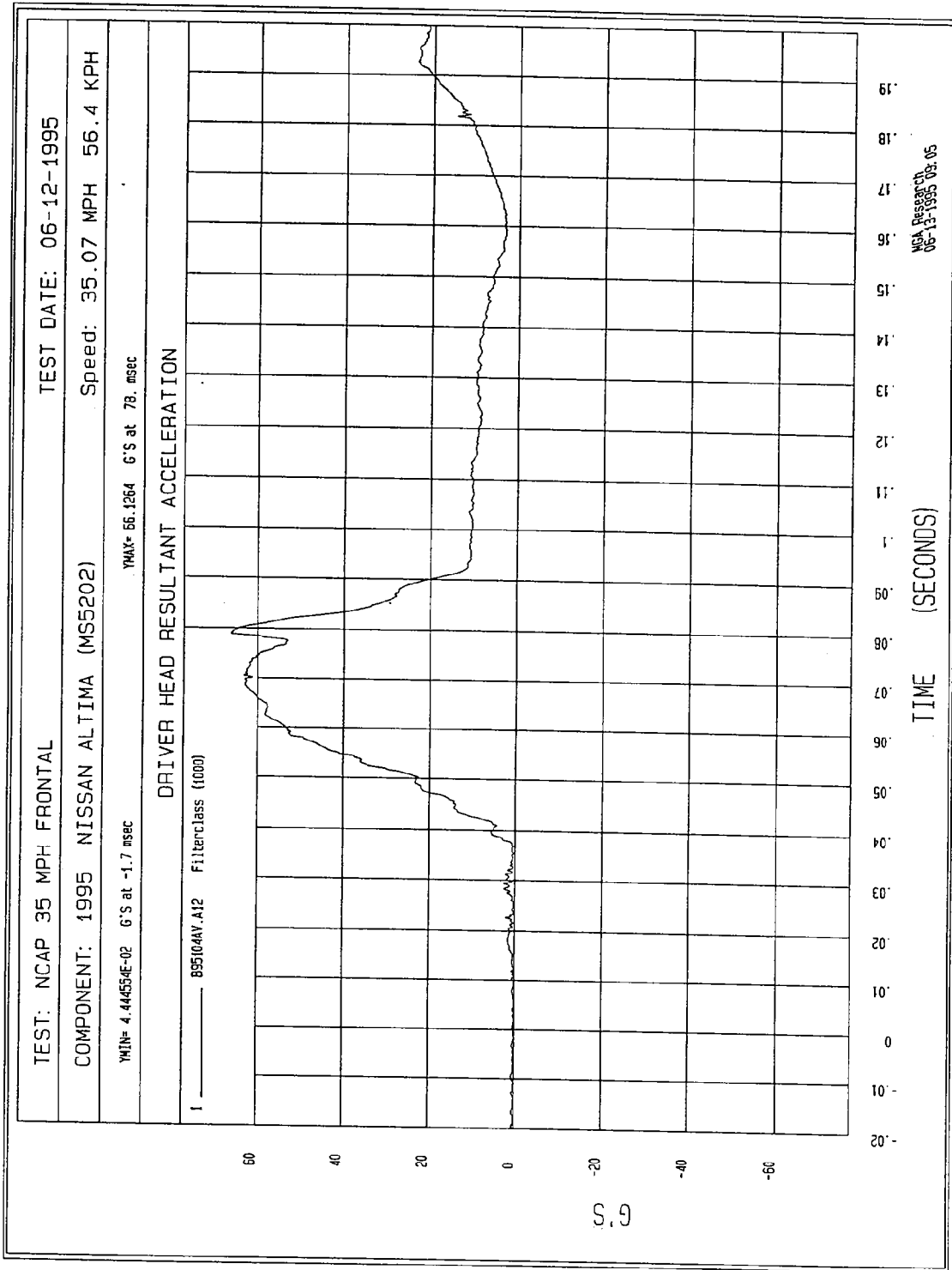
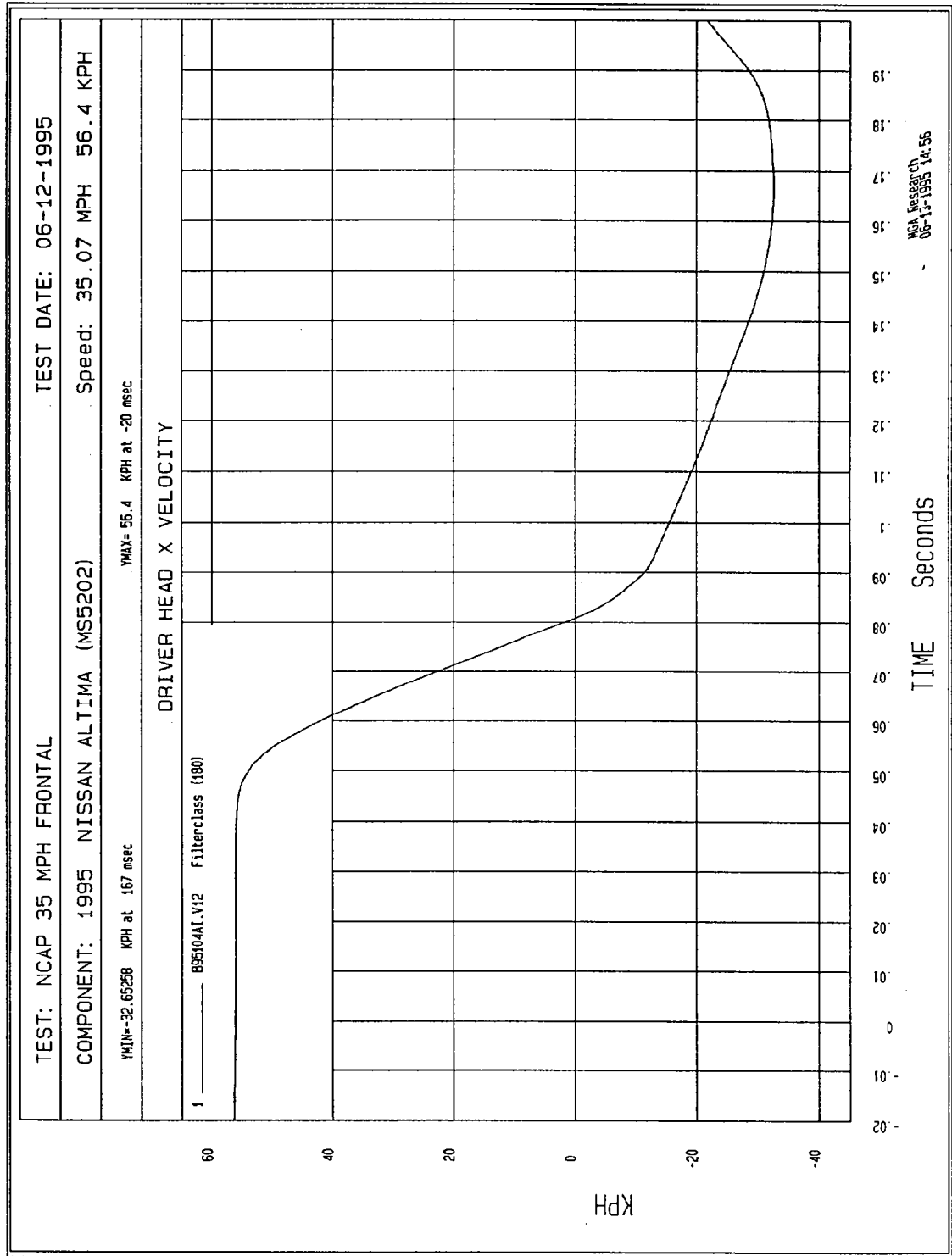


Figure B-36 - Driver Head Resultant Acceleration vs. Time



MCA Research
06-13-1995 14:56

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

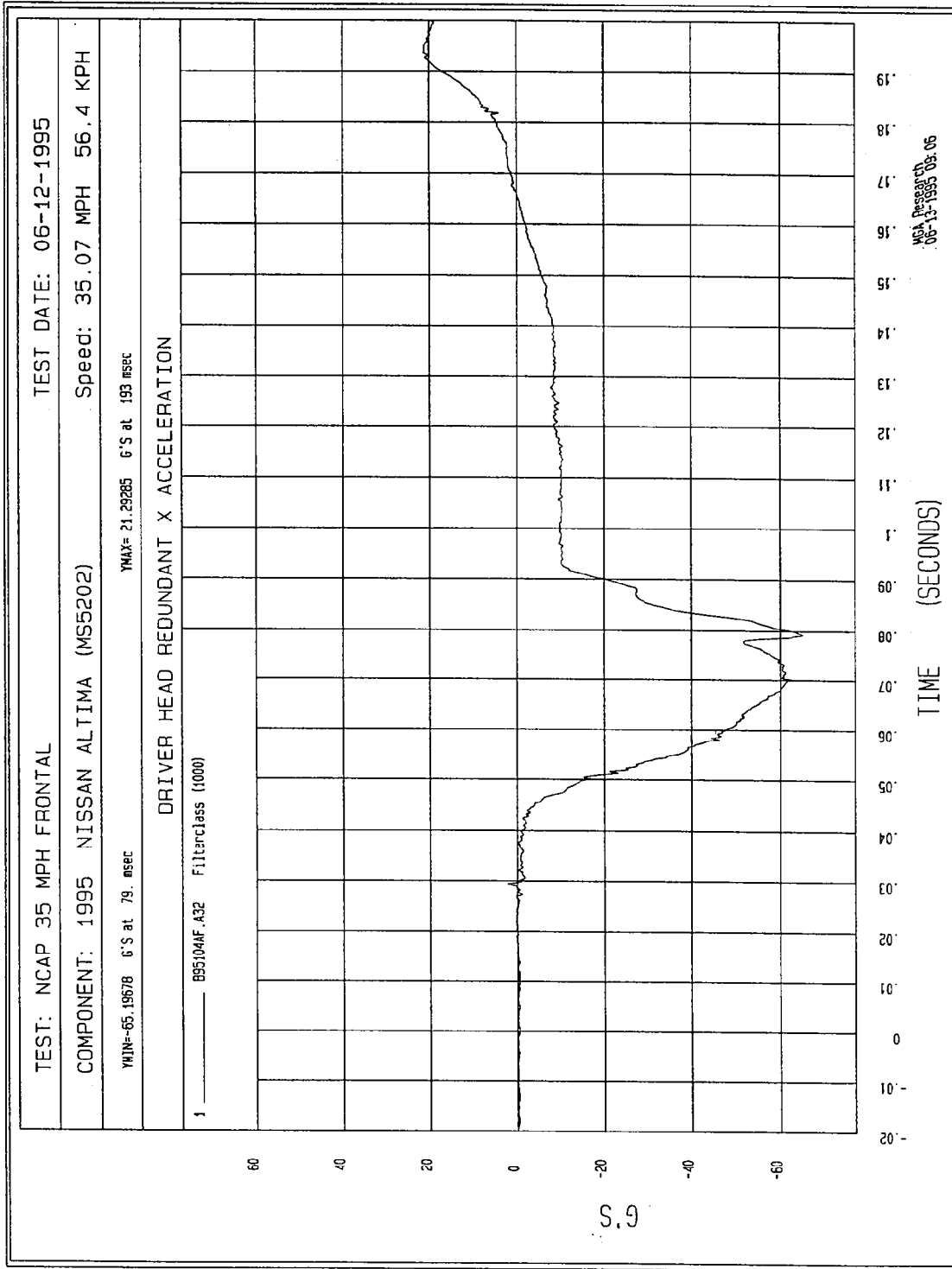


Figure B-38 - Driver Head Redundant X Acceleration vs. Time

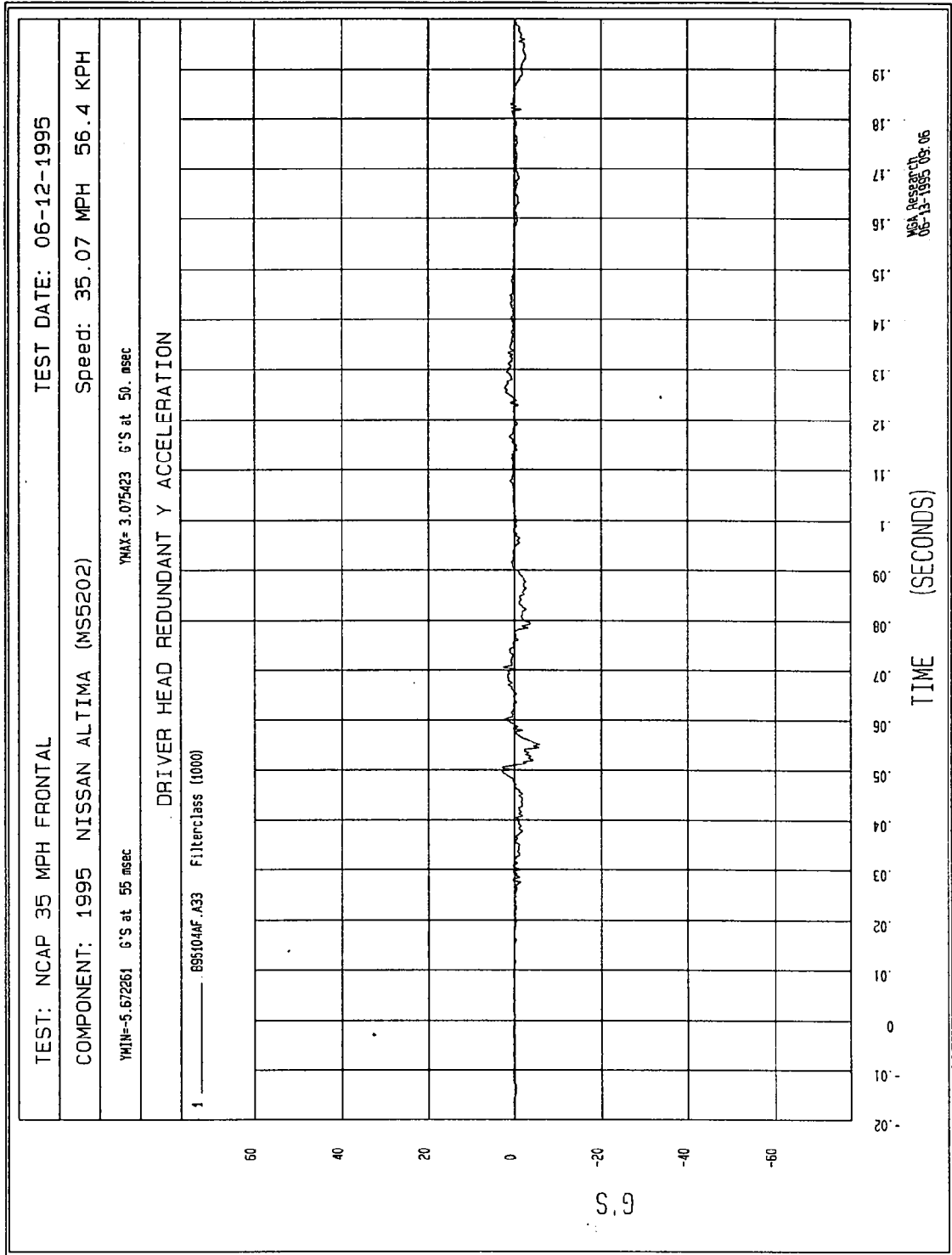


Figure B-89 - Driver Head Redundant Y Acceleration vs. Time

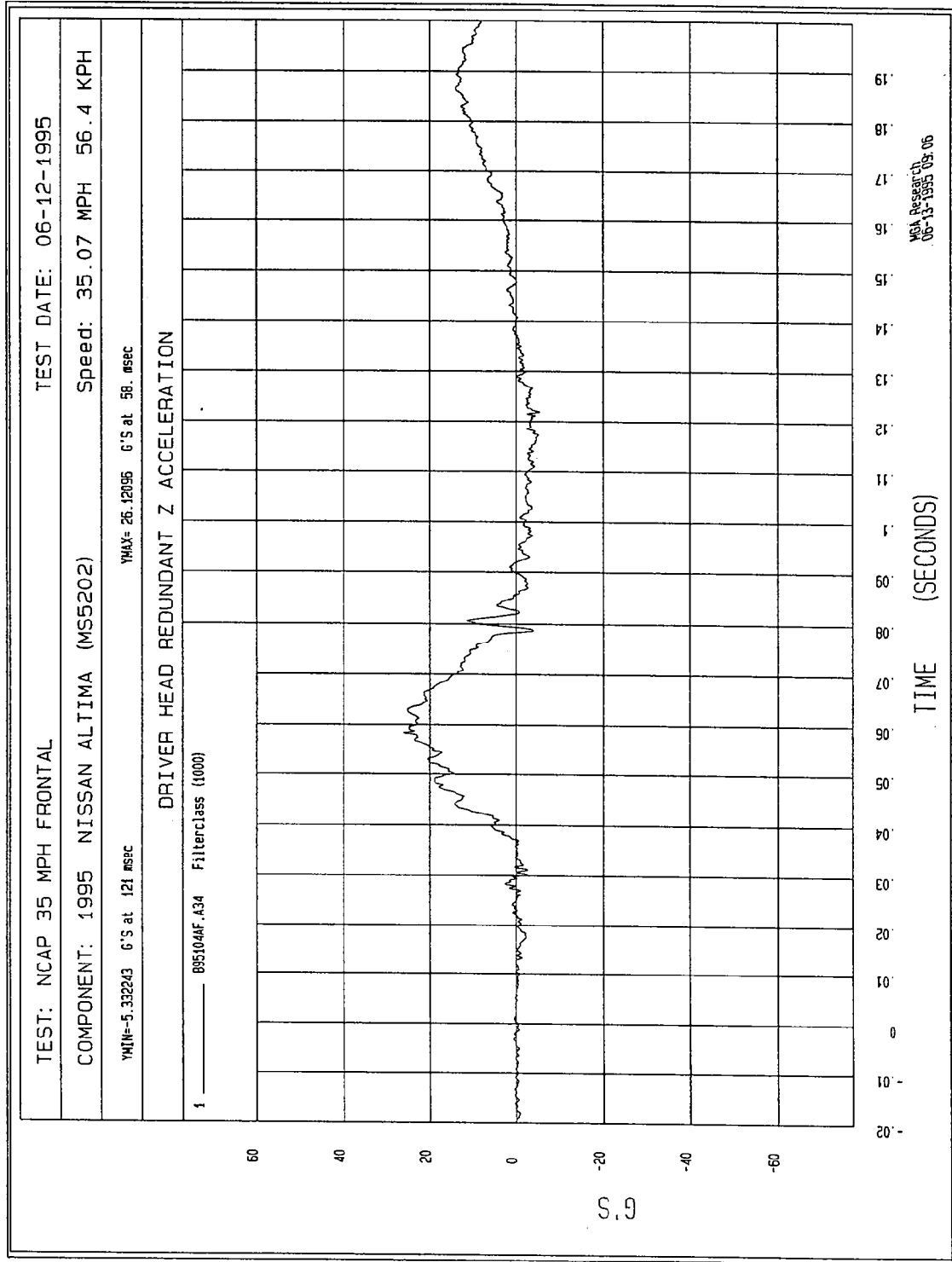


Figure B-40 - Driver Head Redundant Z Acceleration vs. Time

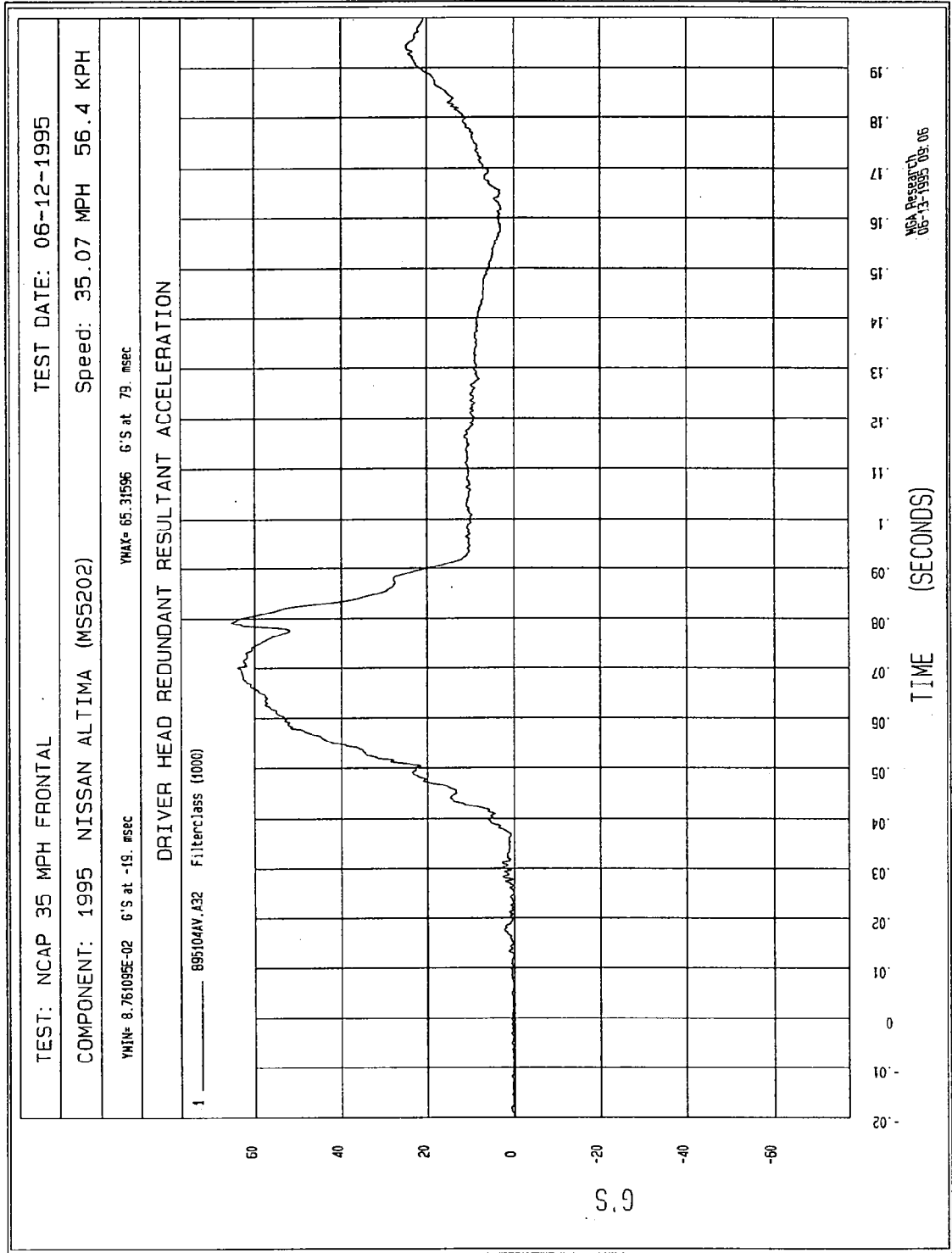
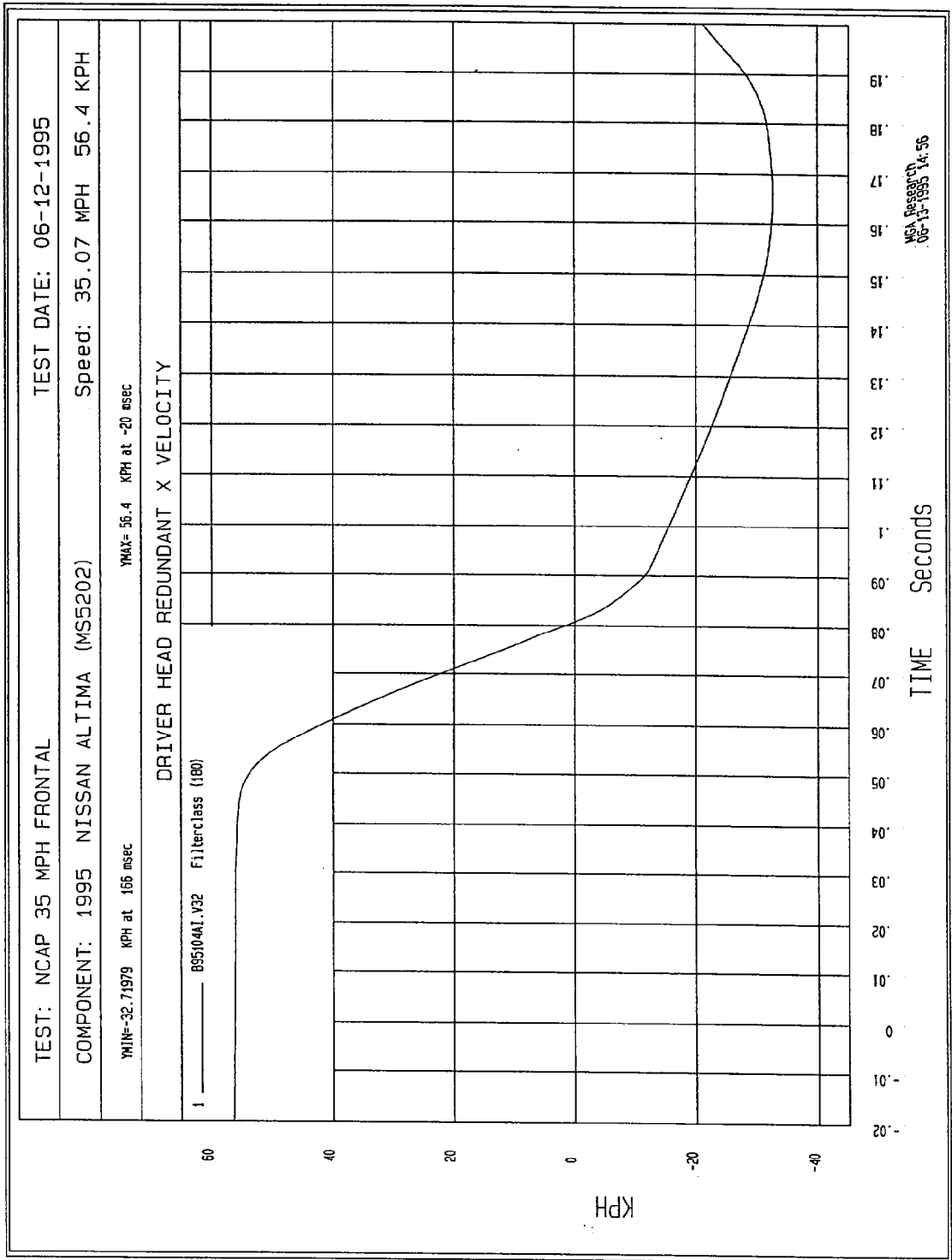
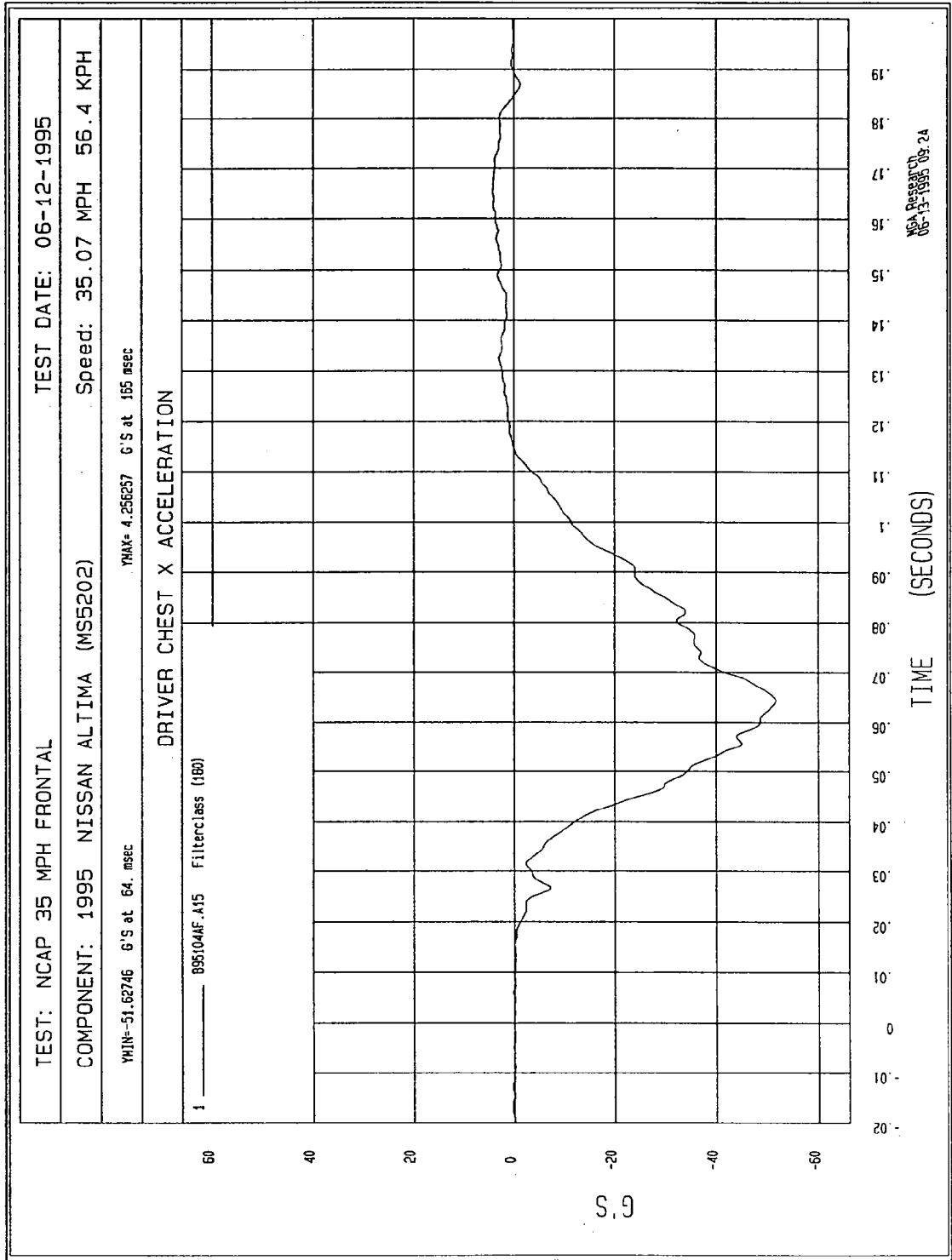


Figure B-41 - Driver Head Redundant Resultant Acceleration vs. Time



B-42

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



MGA Research
06-13-1995 09:24

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

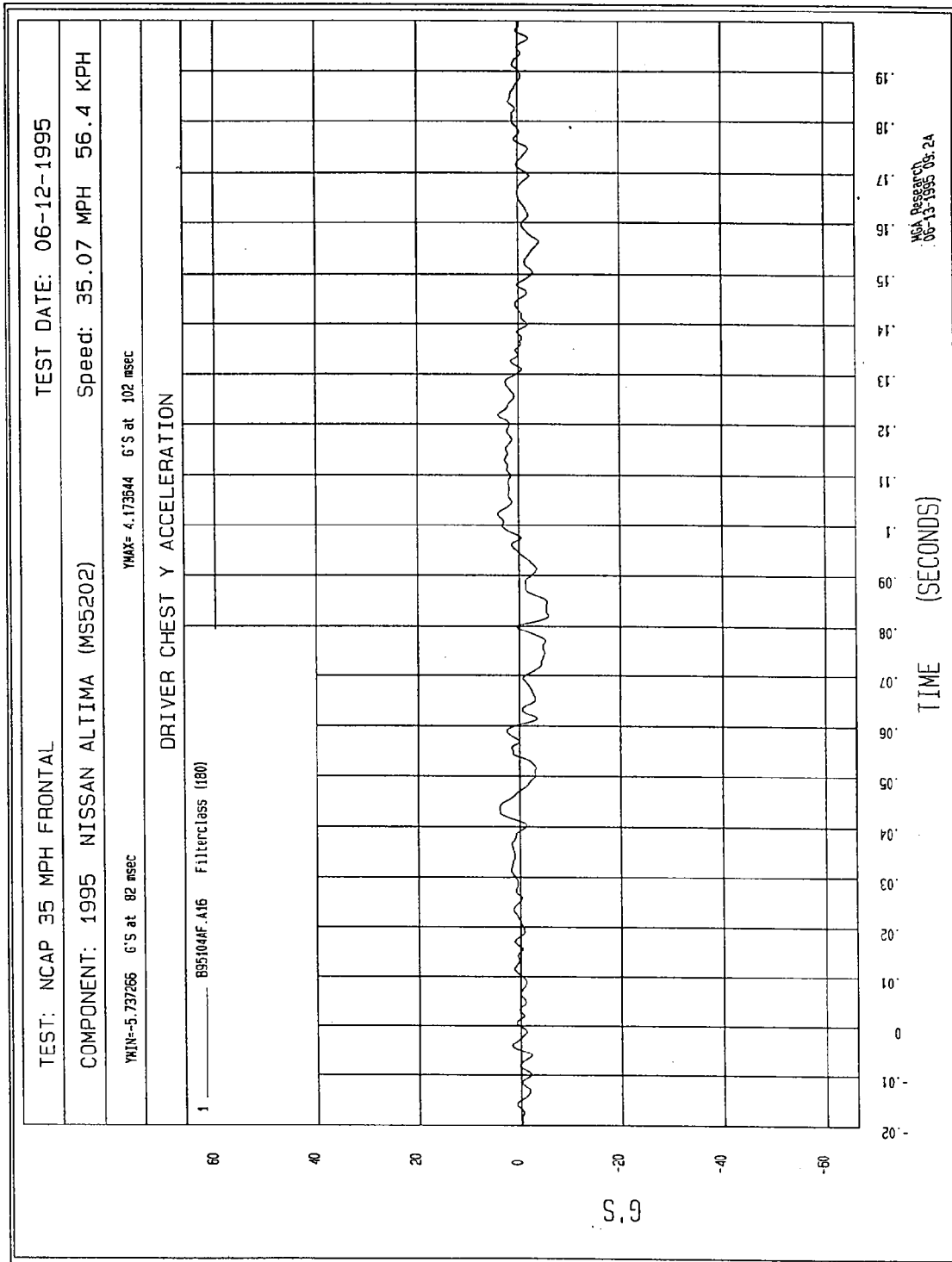


Figure B-44 • Driver Chest Y Acceleration vs. Time

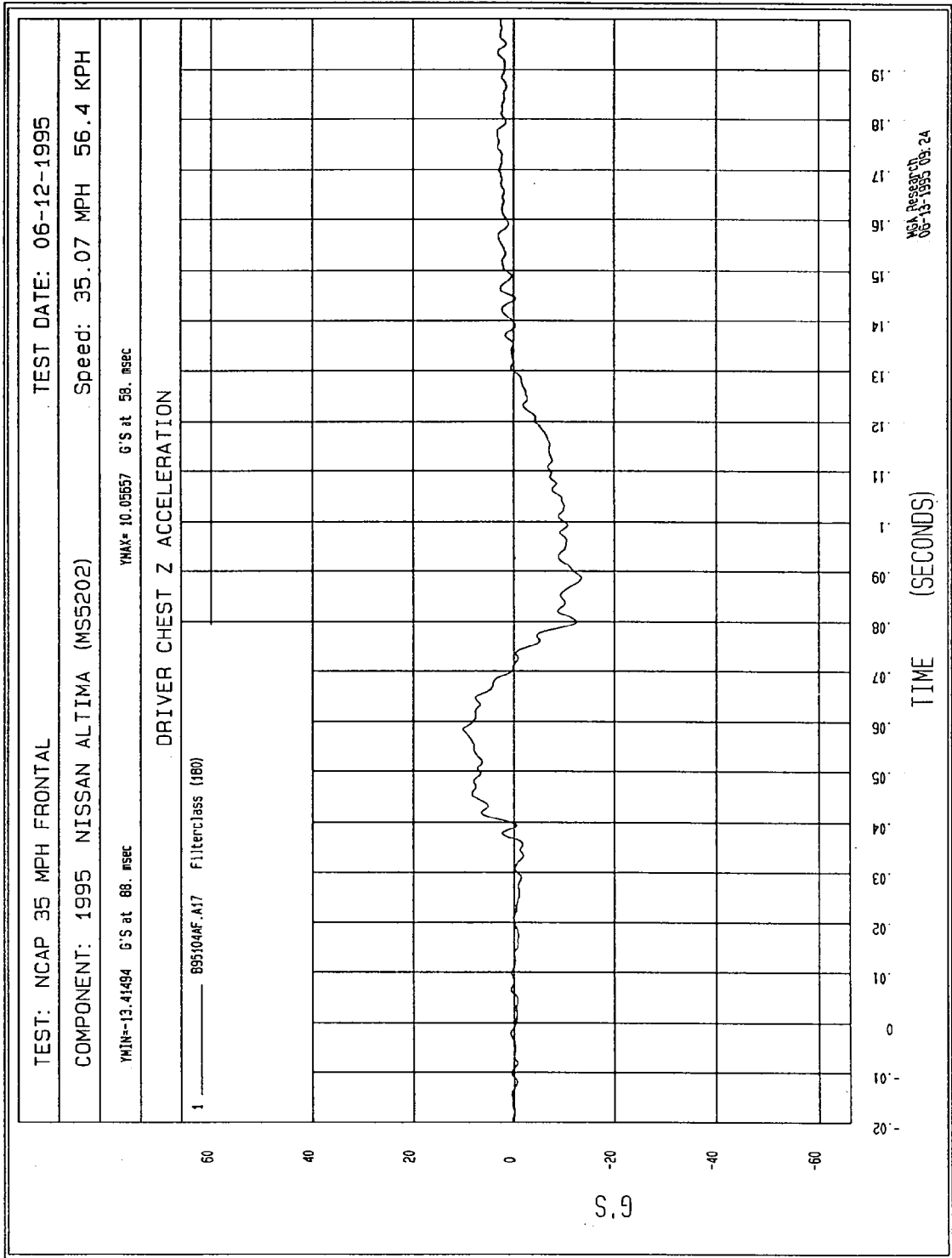


Figure B-45 - Driver Chest Z Acceleration vs. Time

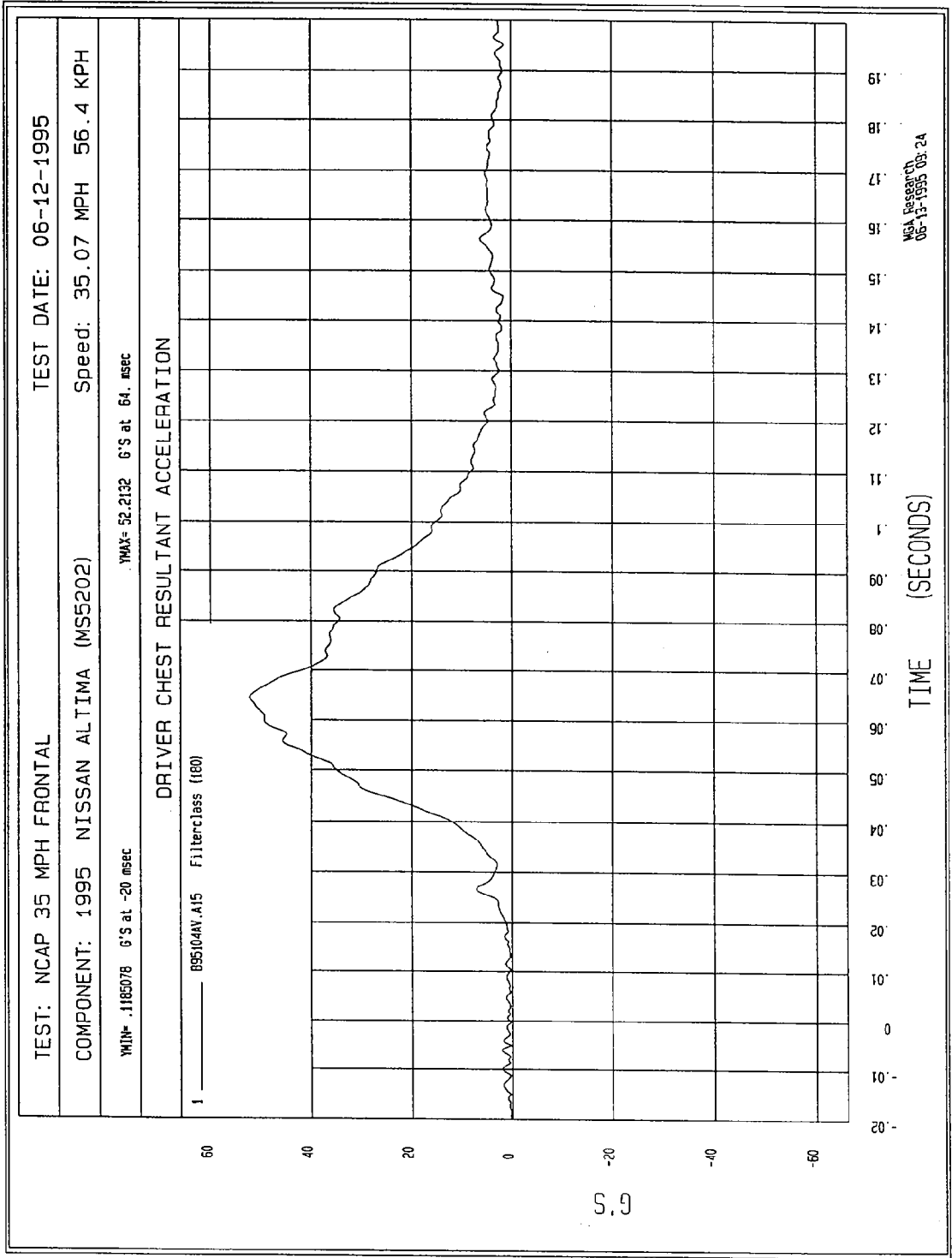
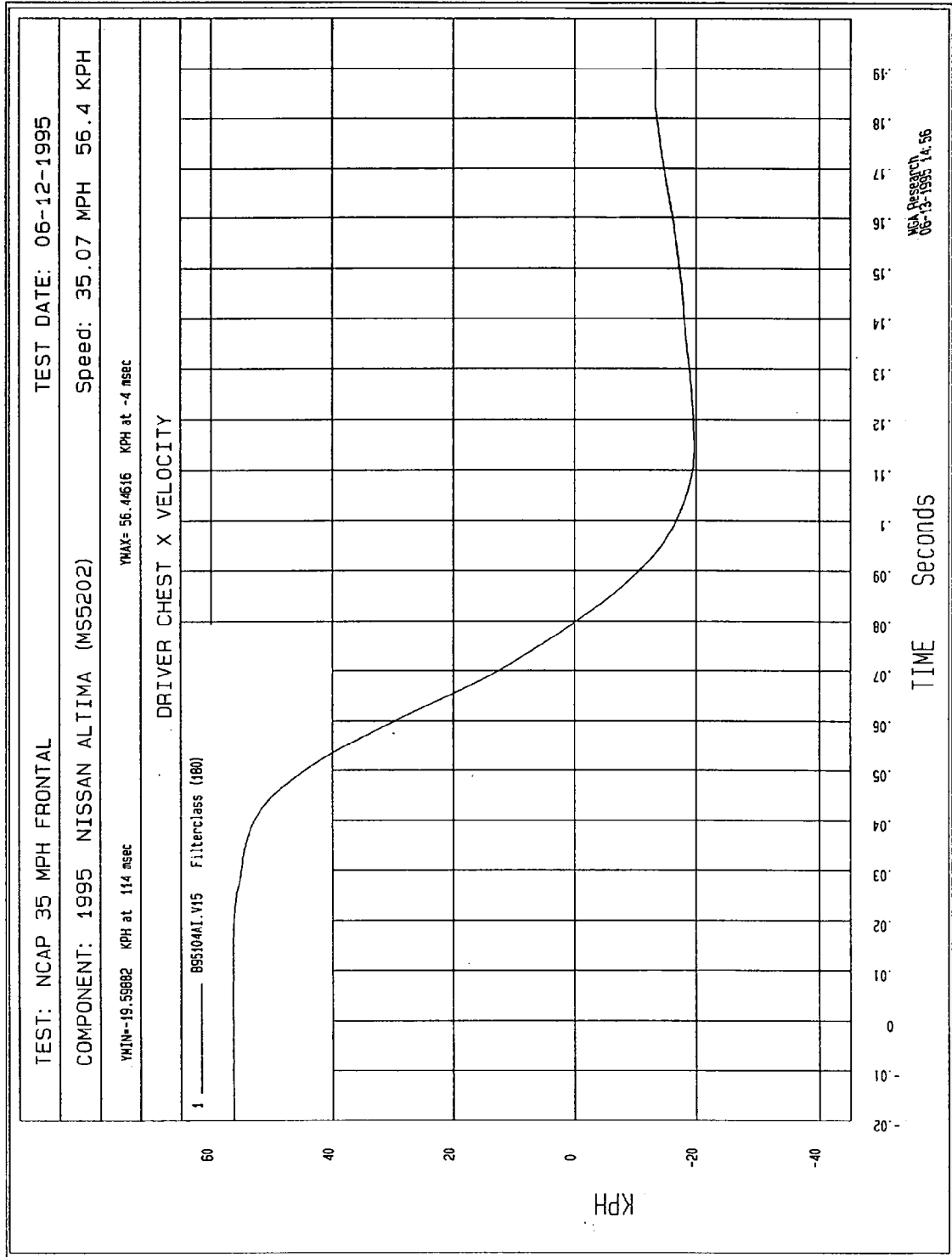


Figure B-46 - Driver Chest Resultant Acceleration vs. Time



NCA Research
 06-12-1995 14:56

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

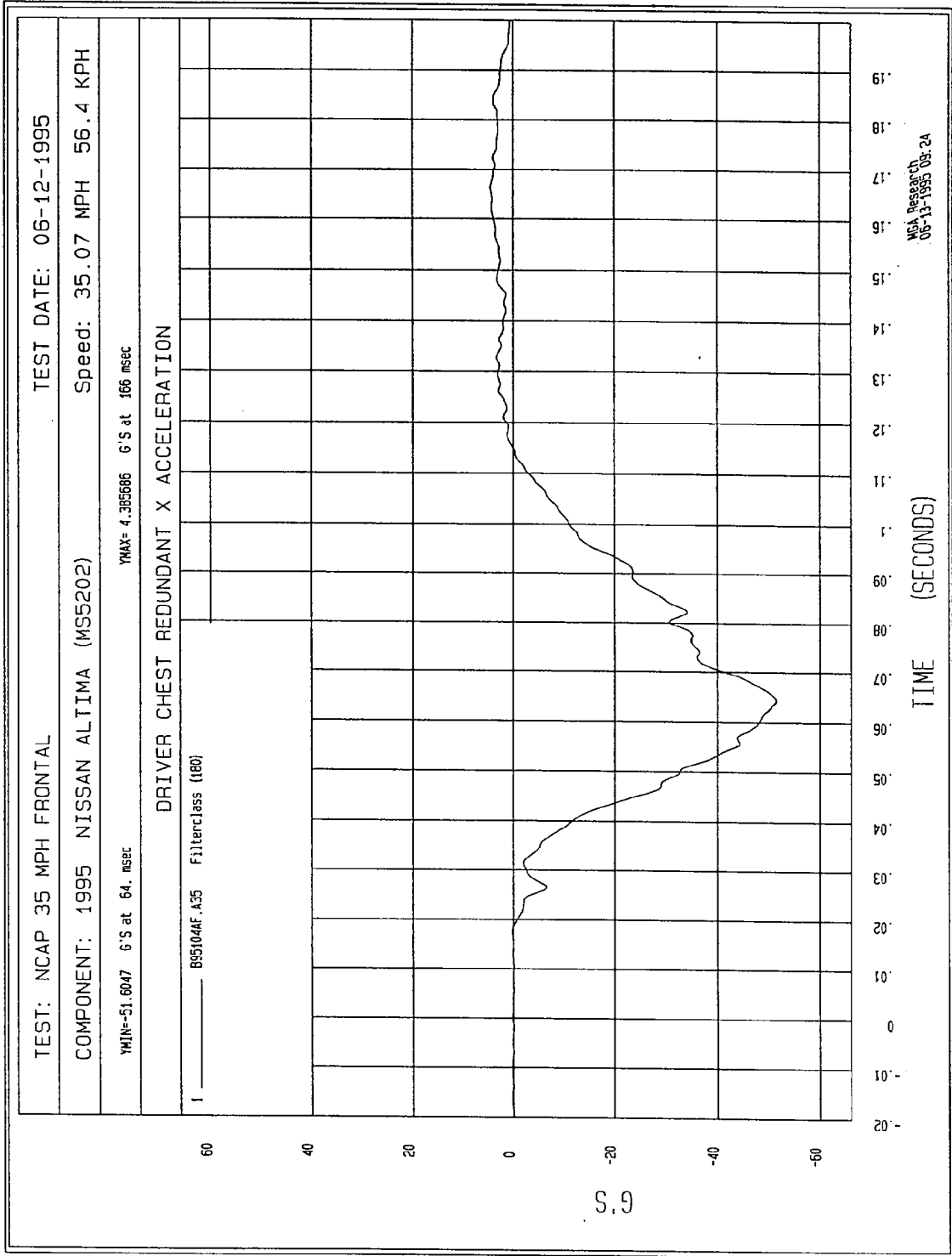


Figure B-48 - Driver Chest Redundant X Acceleration vs. Time

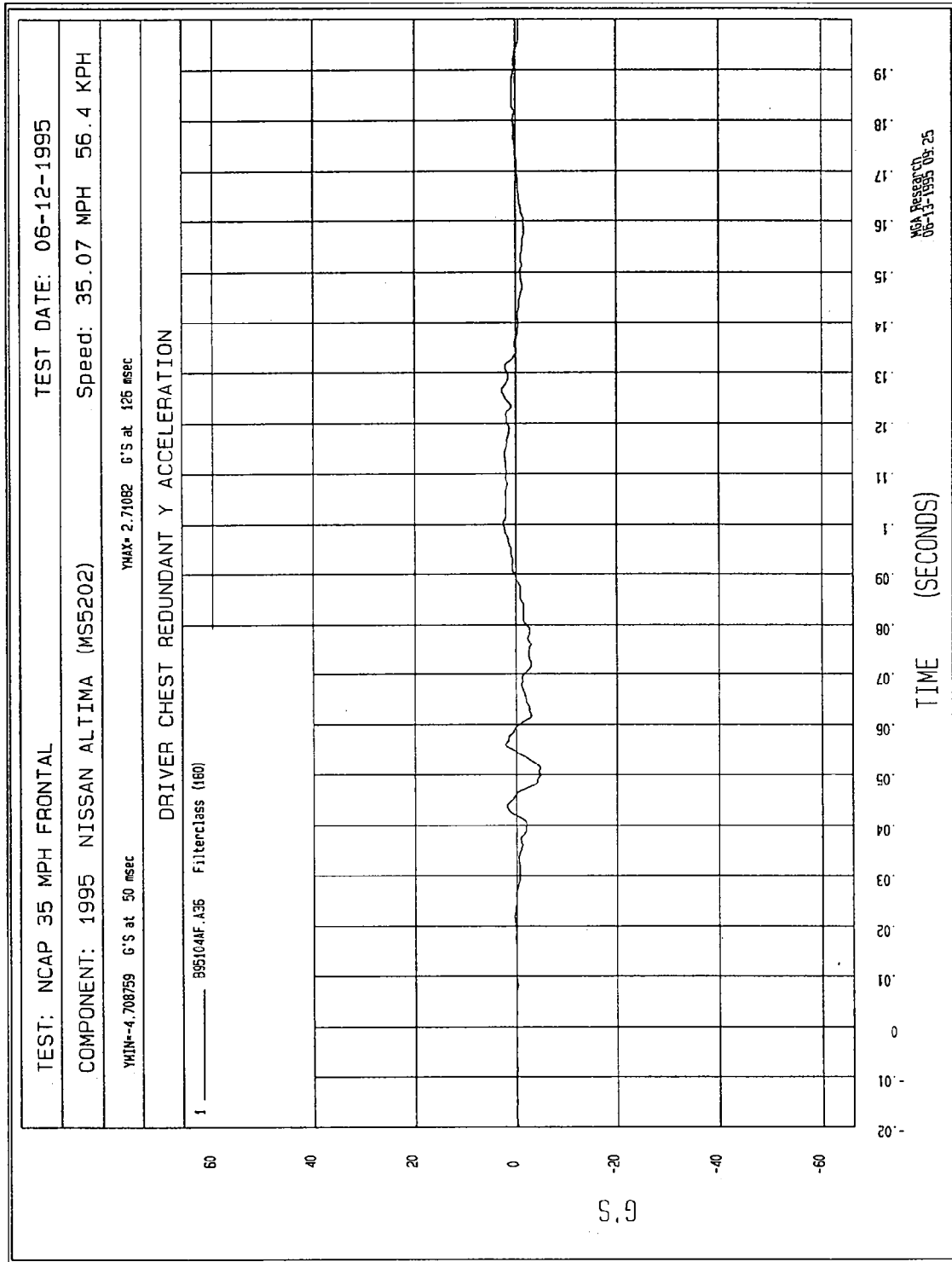


Figure B-49 - Driver Chest Redundant Y Acceleration vs. Time

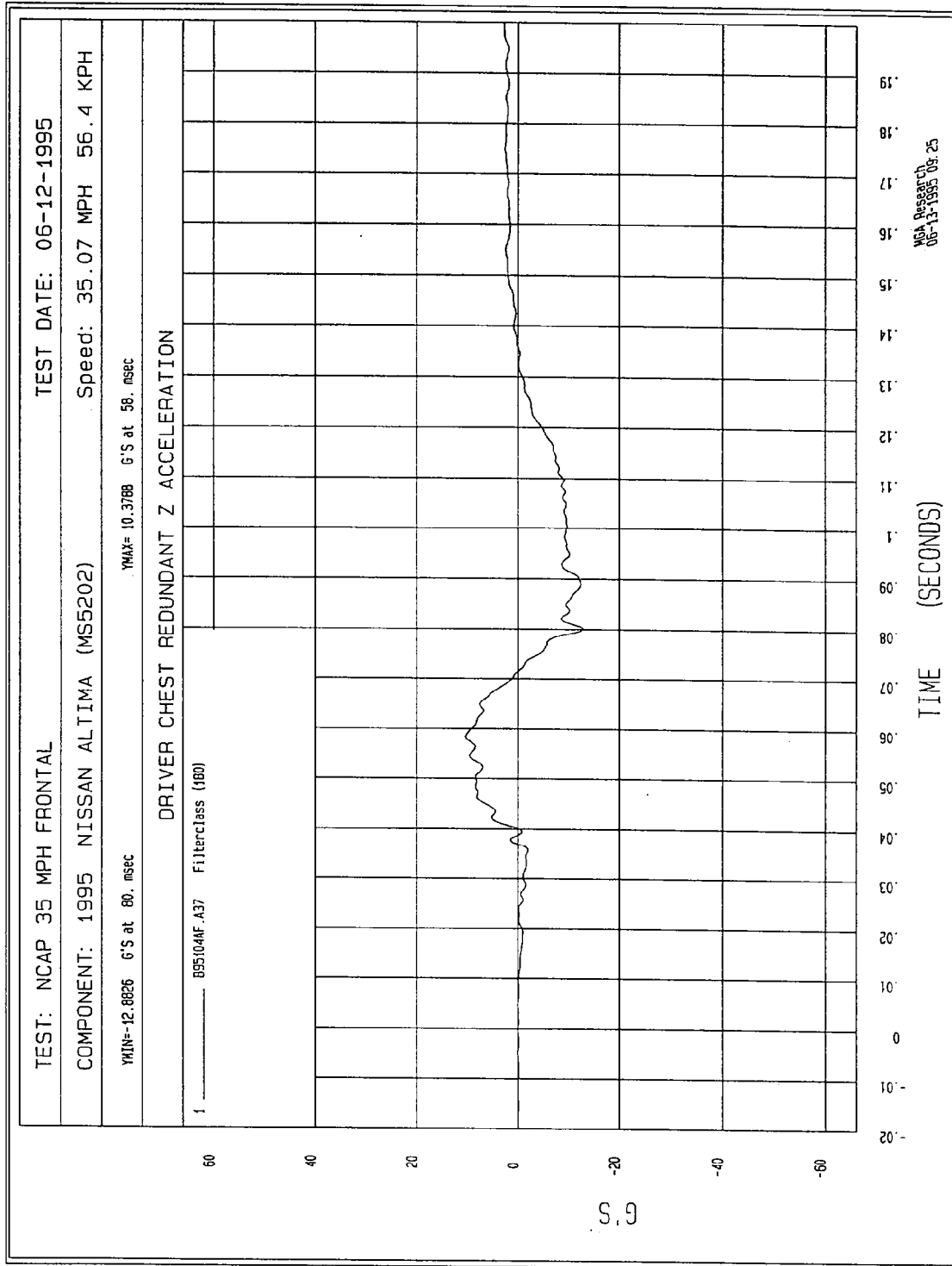


Figure B-50 - Driver Chest Redundant Z Acceleration vs. Time

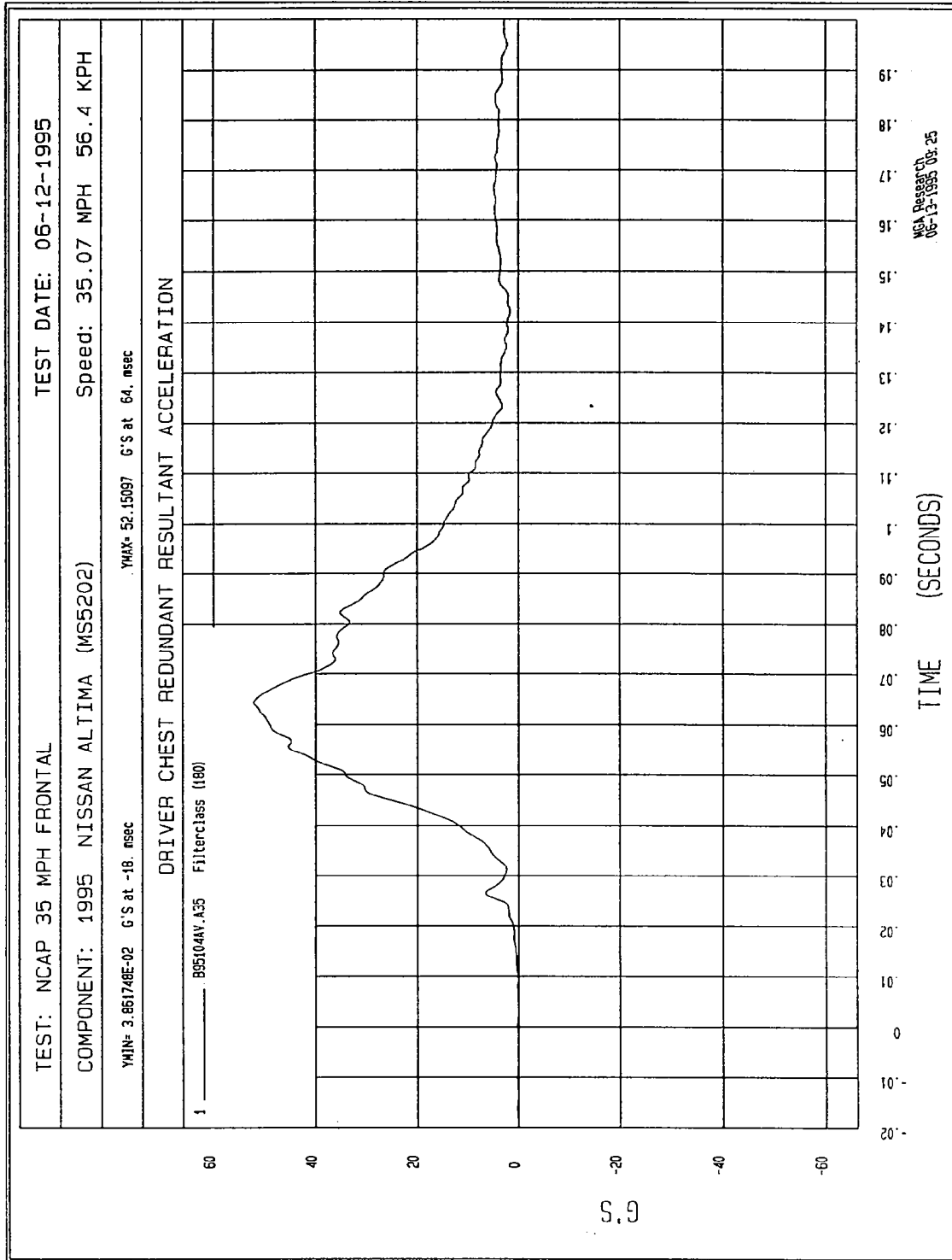


Figure B-51 - Driver Chest Redundant Resultant Acceleration vs. Time

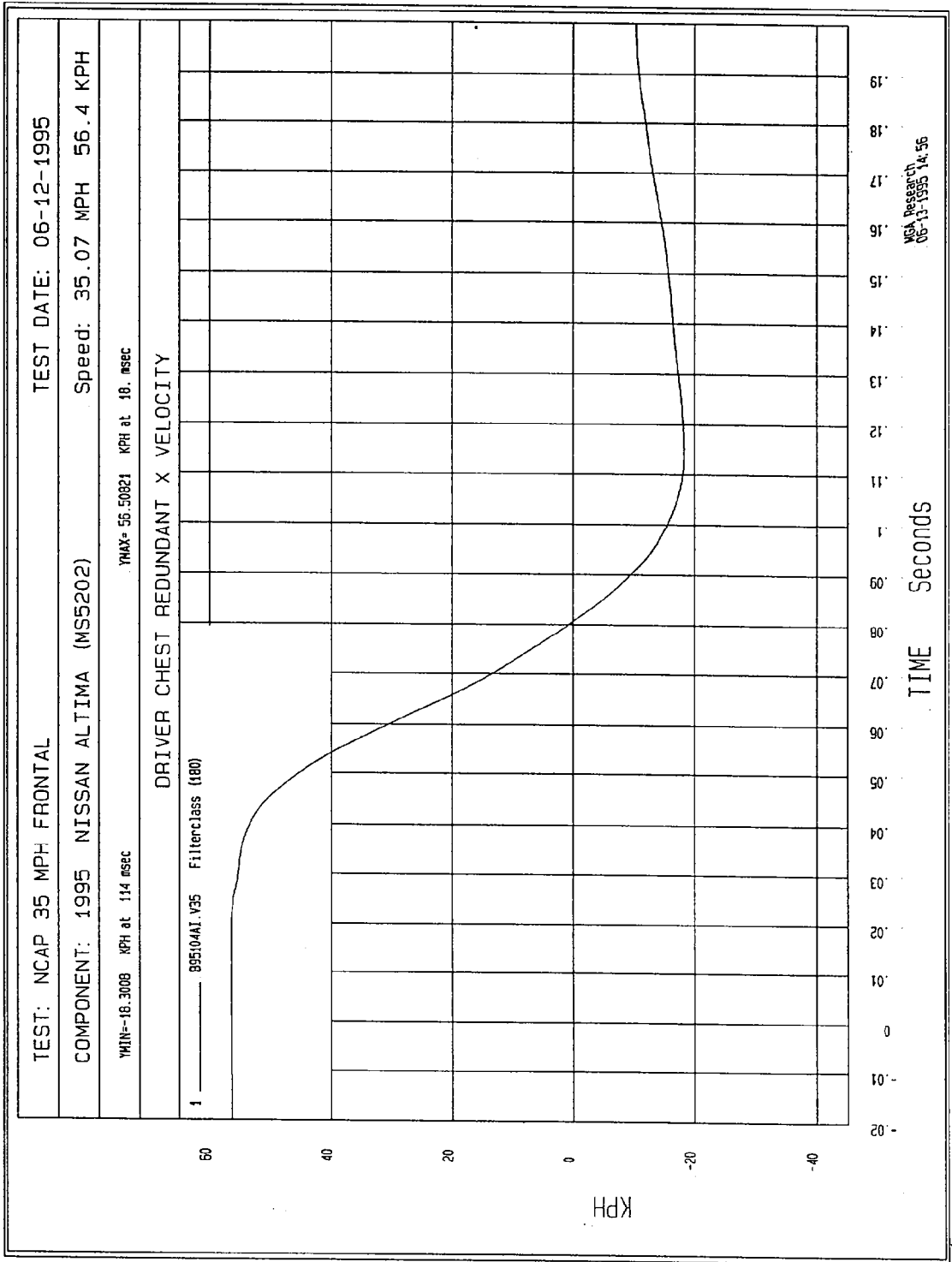


Figure B-52 - Driver Chest Redundant X Velocity vs. Time

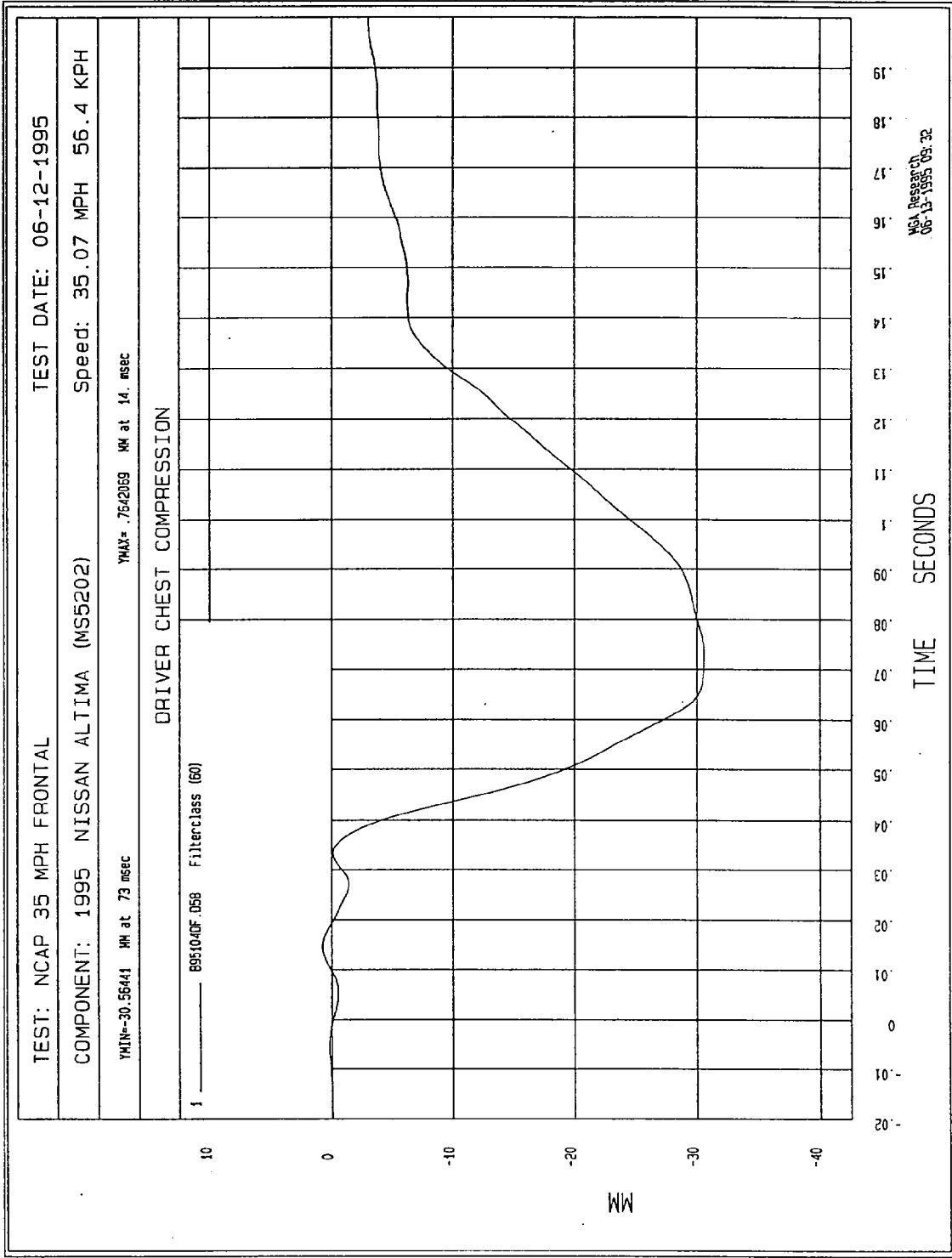


Figure B-53 - Driver Chest Compression vs. Time

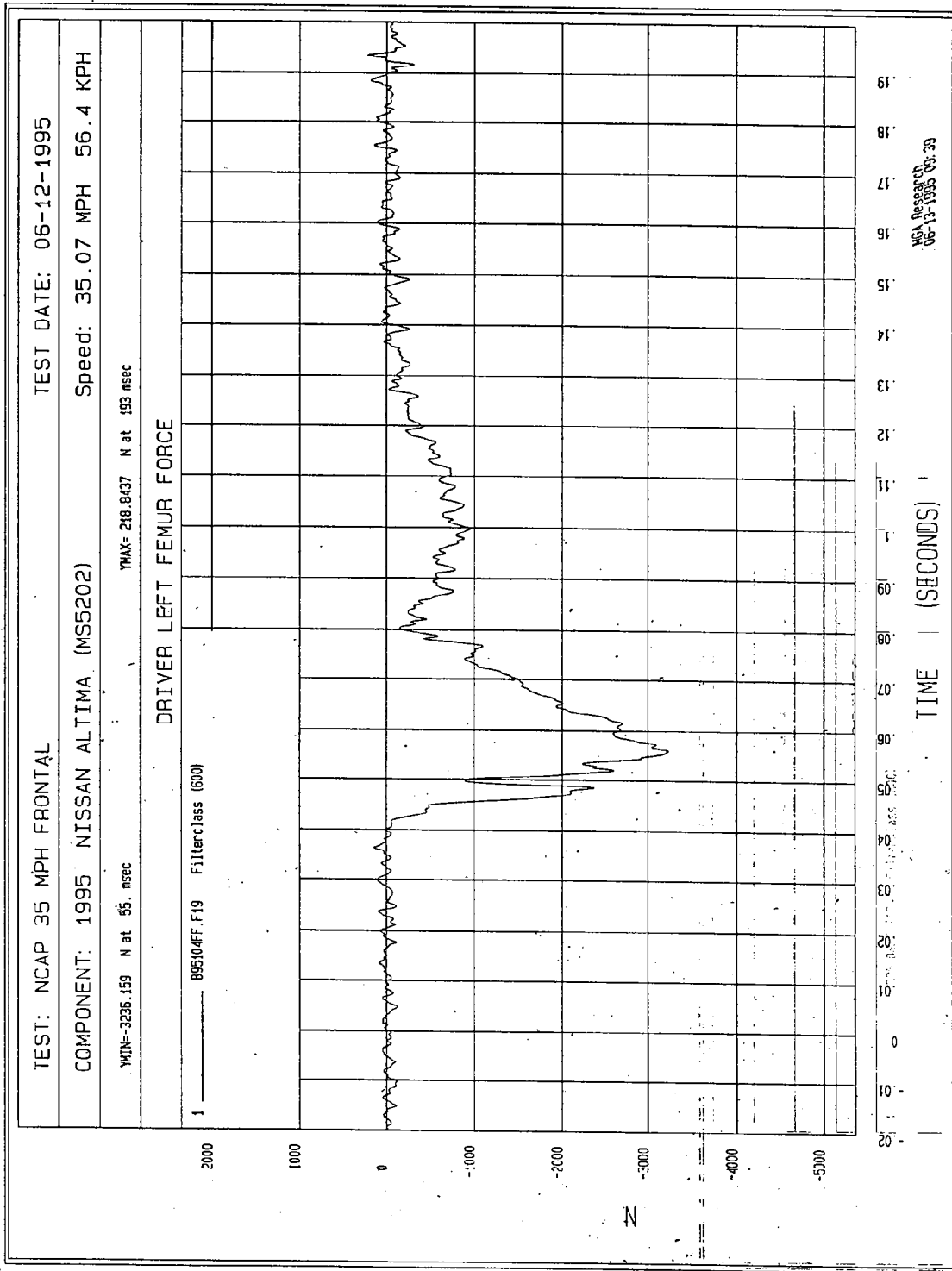


Figure B-54 - Driver Left Femur Force vs. Time

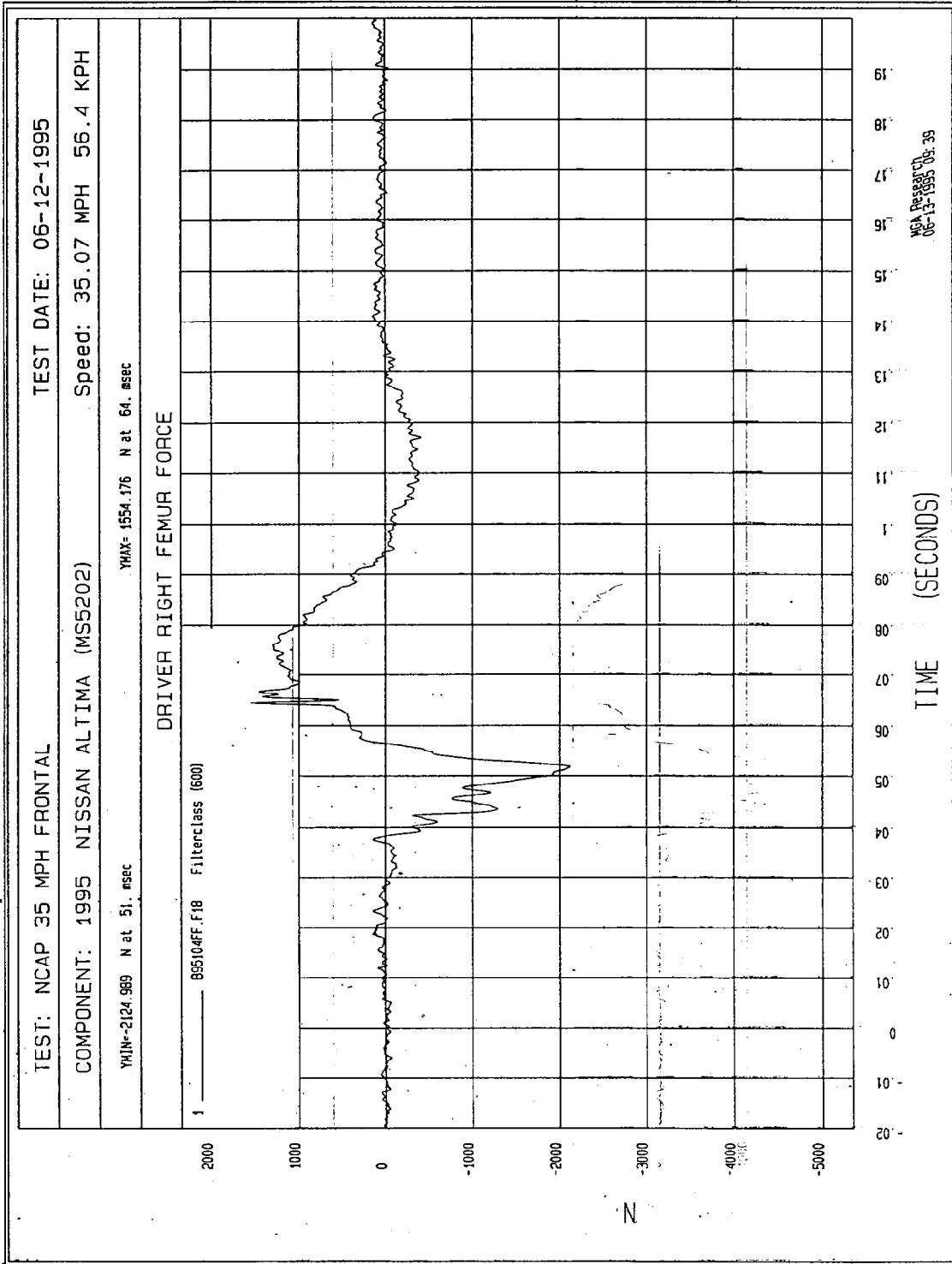


Figure B-55 - Driver Right Femur Force vs. Time

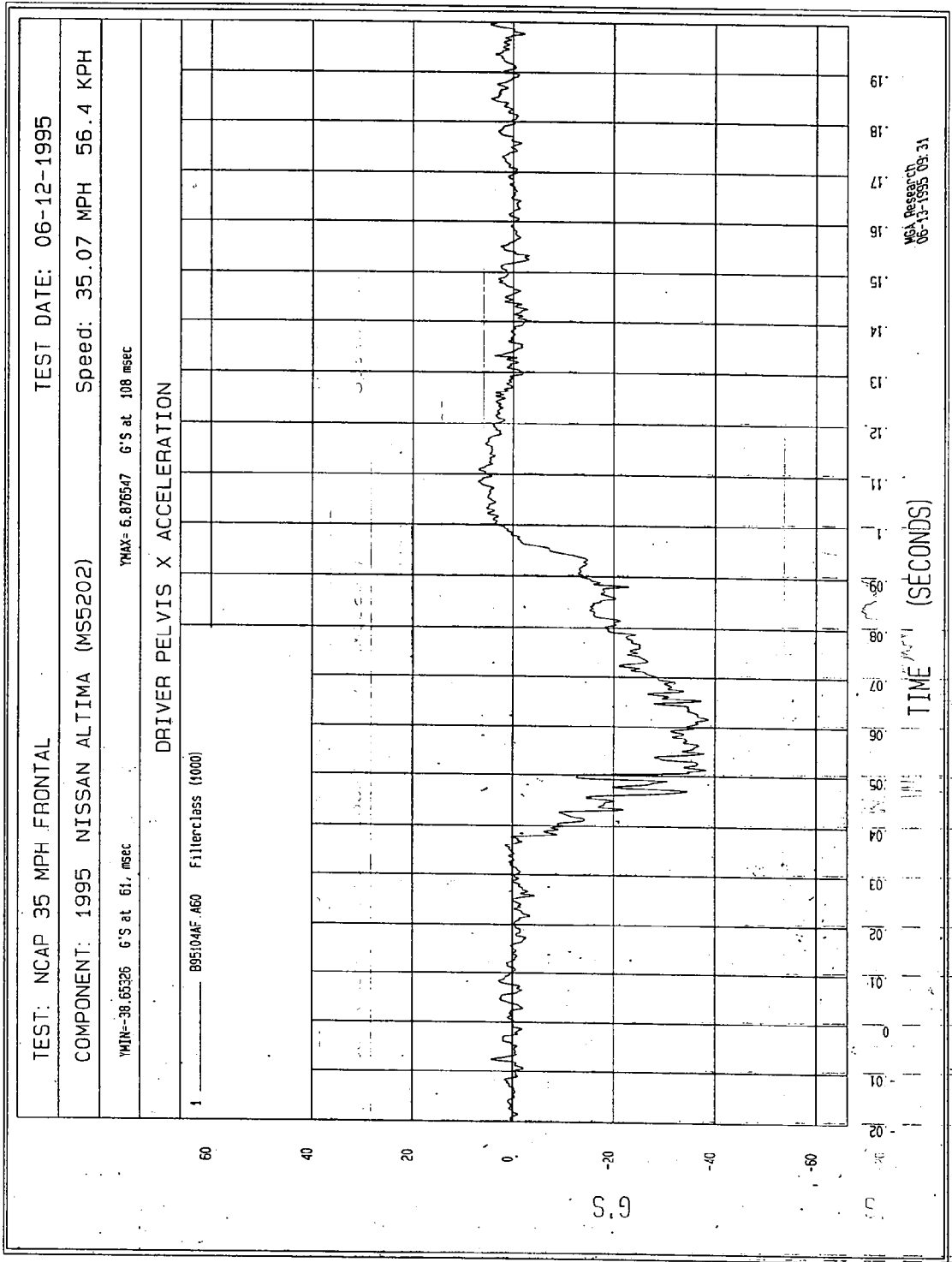


Figure B-56 - Driver Pelvis X Acceleration vs. Time

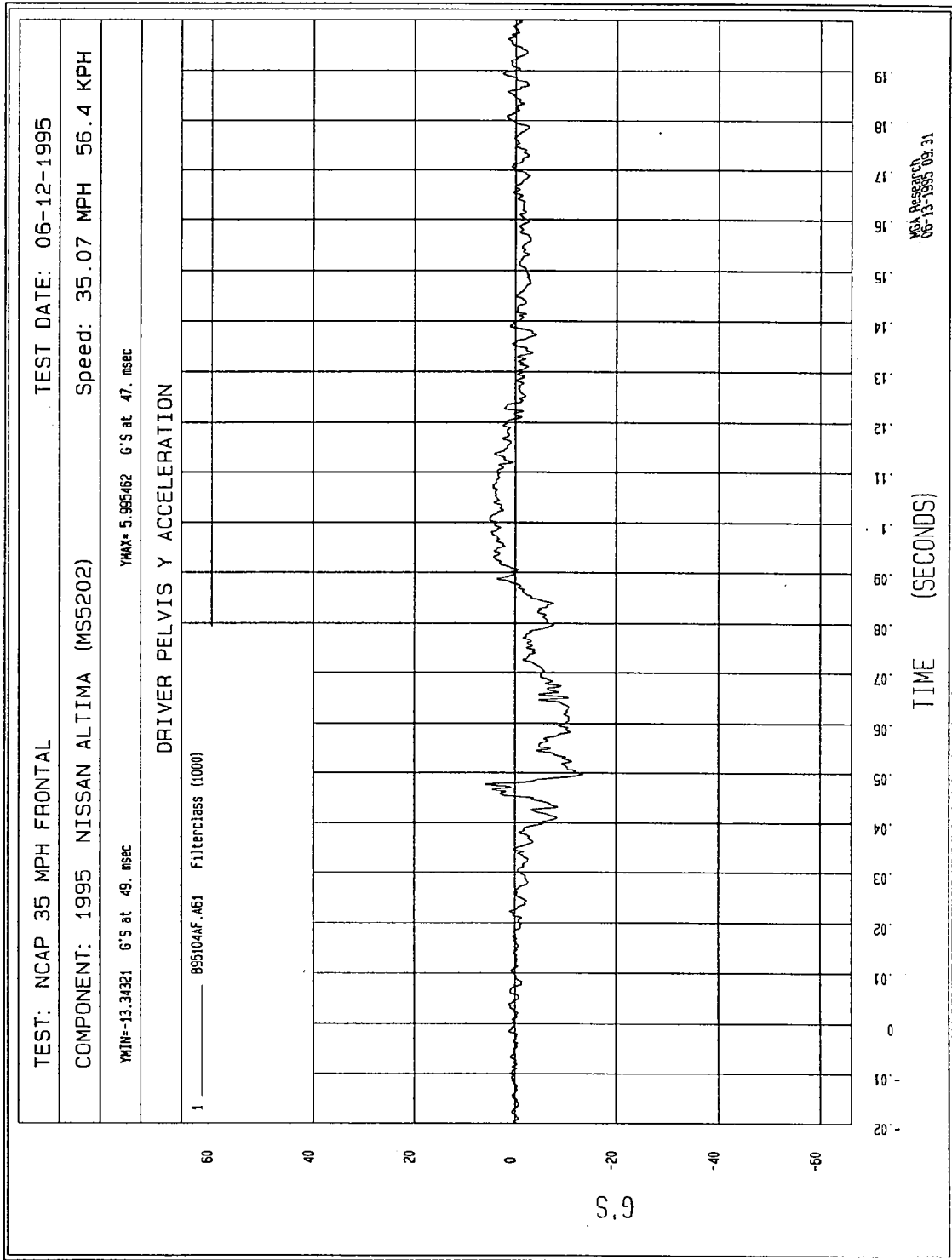


Figure B-57 - Driver Pelvis Y Acceleration vs. Time

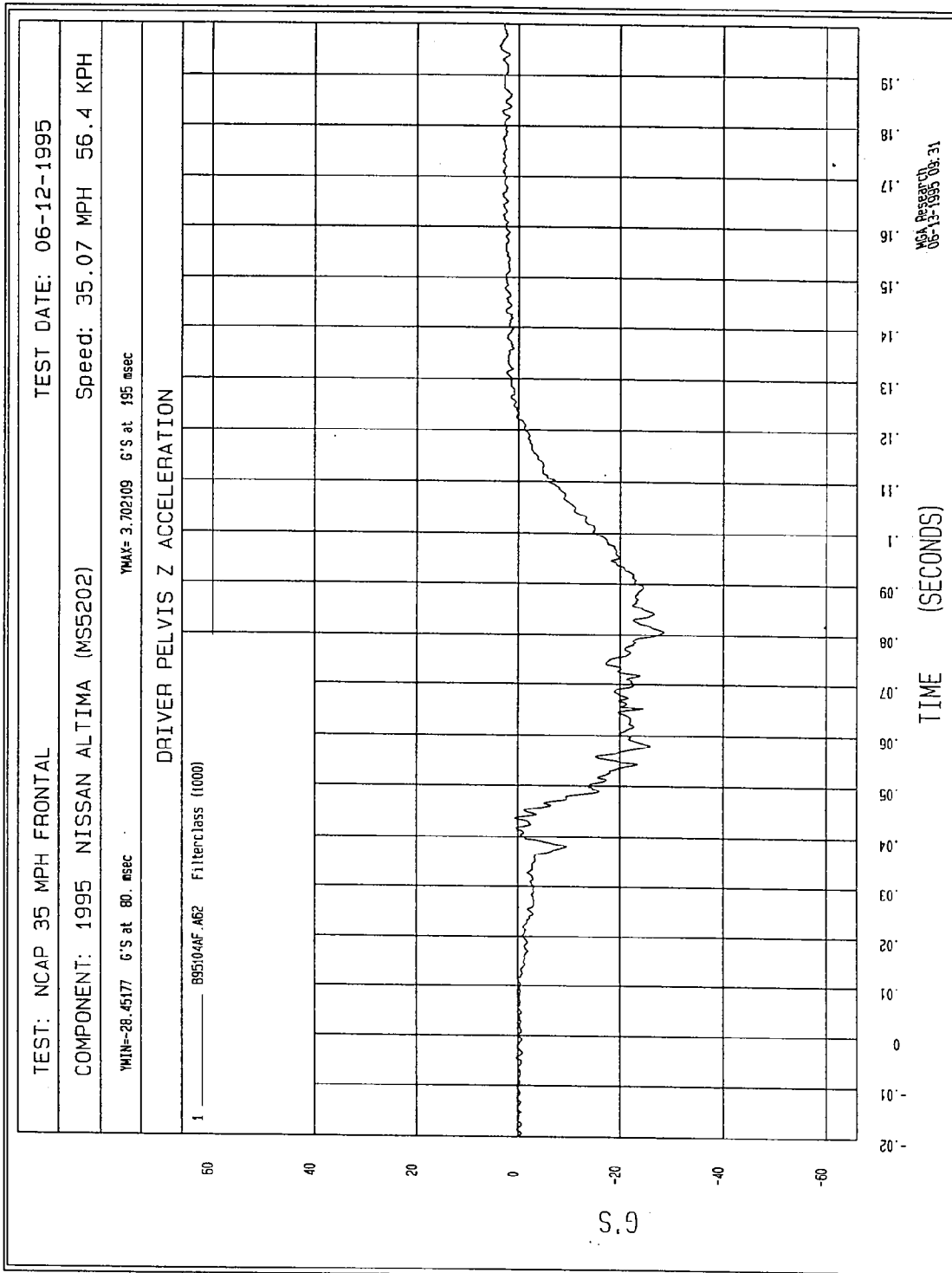


Figure B-58 - Driver Pelvis Z Acceleration vs. Time

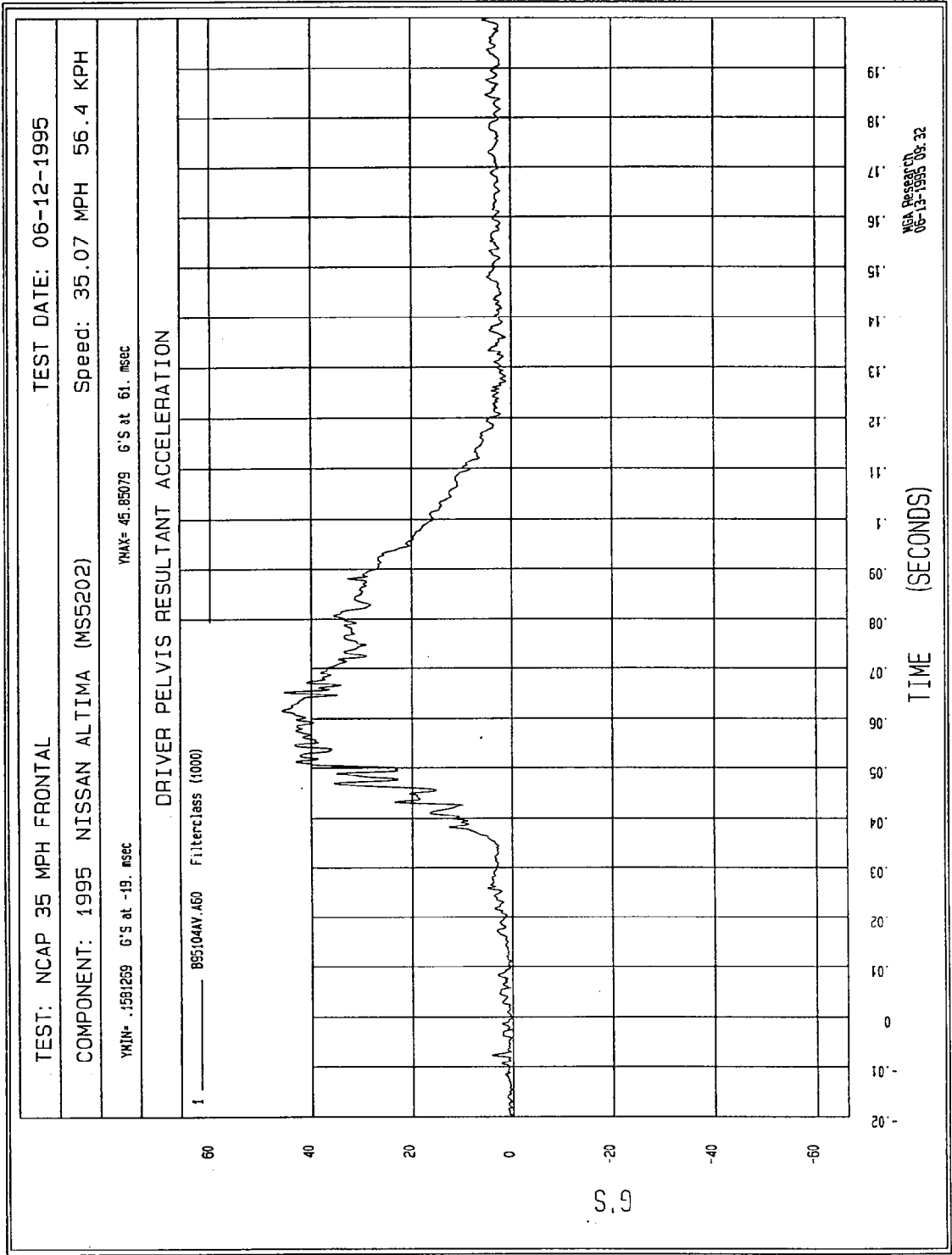


Figure B-59 - Driver Pelvis Resultant Acceleration vs. Time

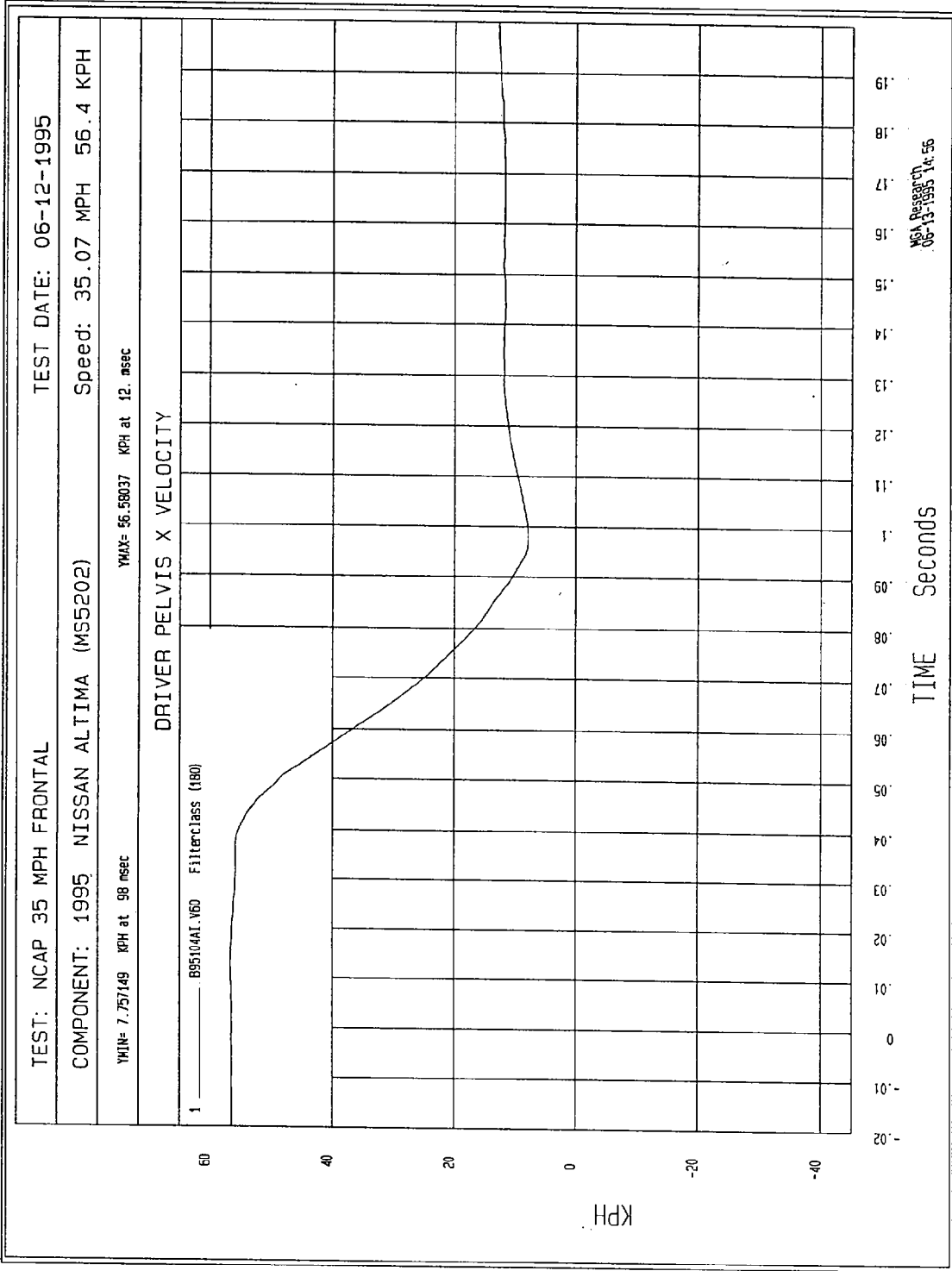


Figure B-60 - Driver Pelvis X Velocity vs. Time

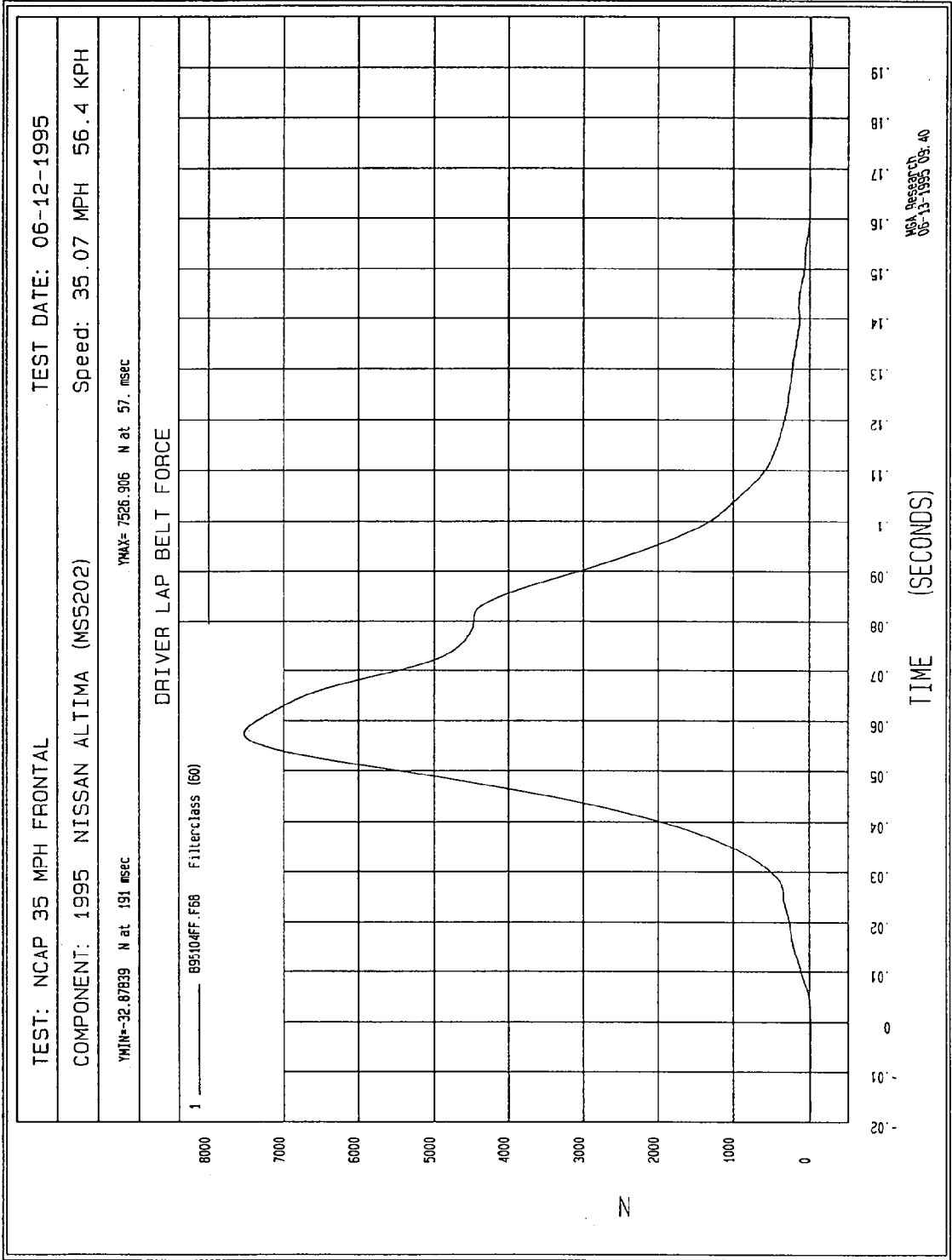
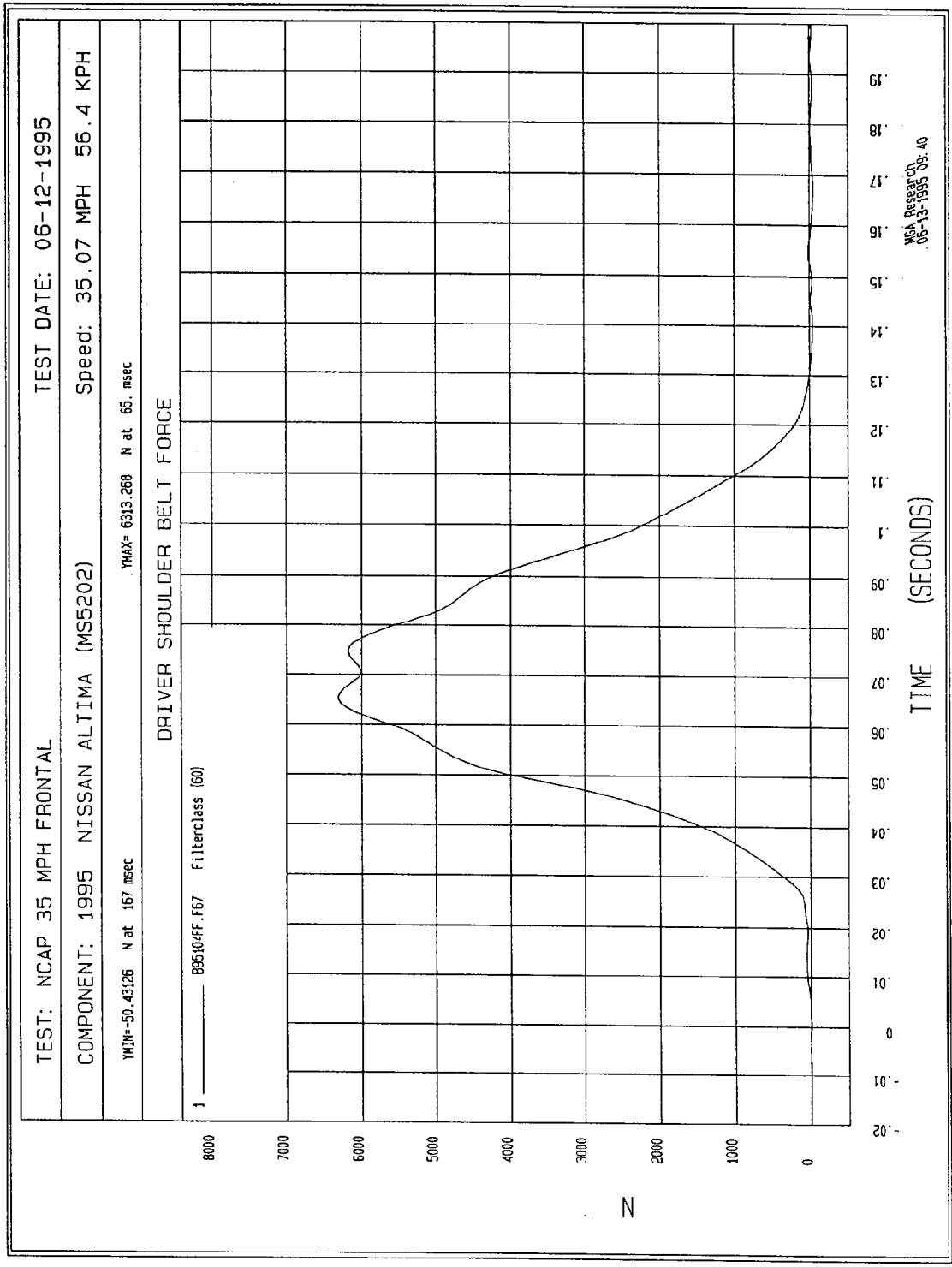


Figure B-61 - Driver Lap Belt Force vs. Time



NVA Report C0
 06-13-1995 09:40

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

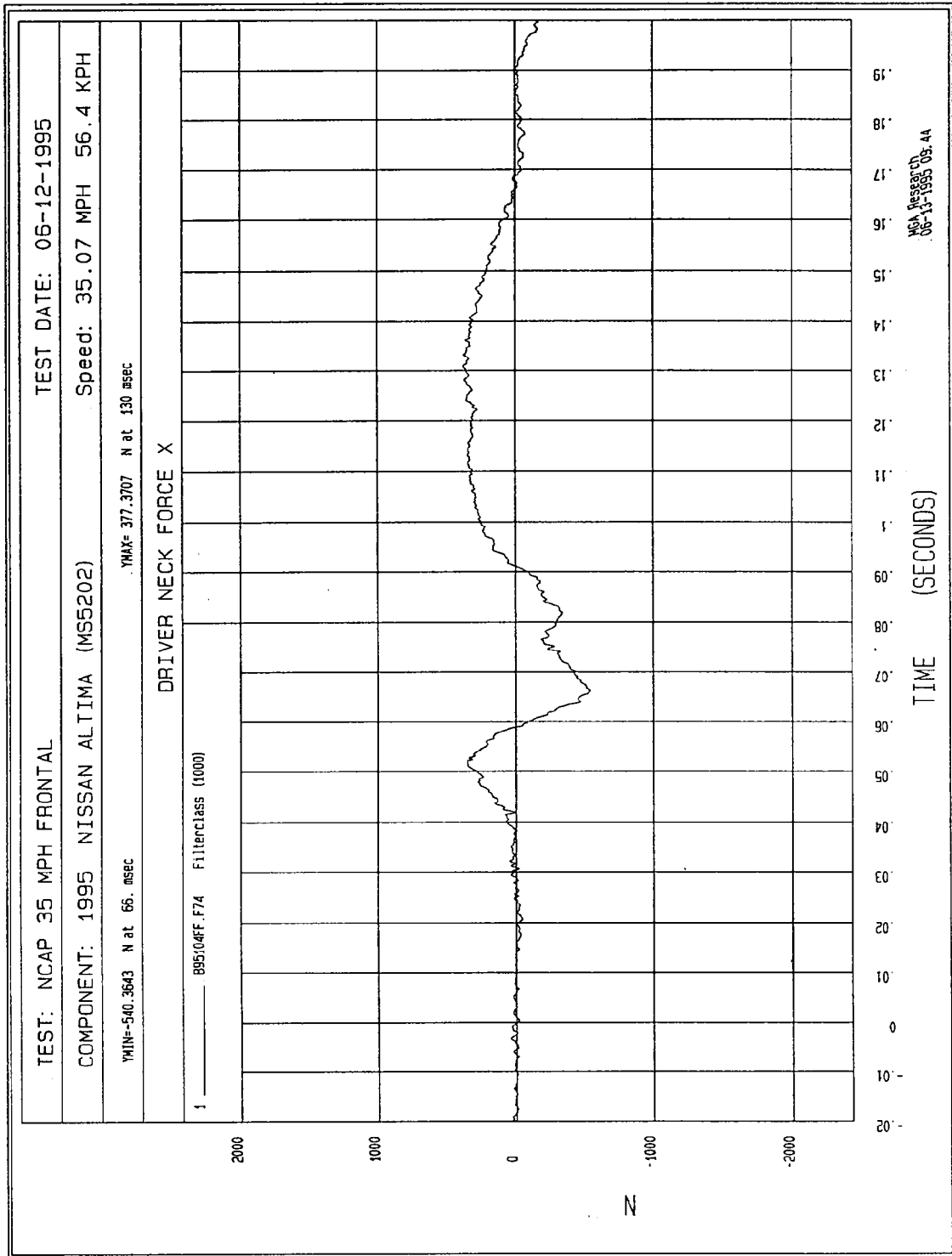


Figure B-63 - Driver Neck Force X vs. Time

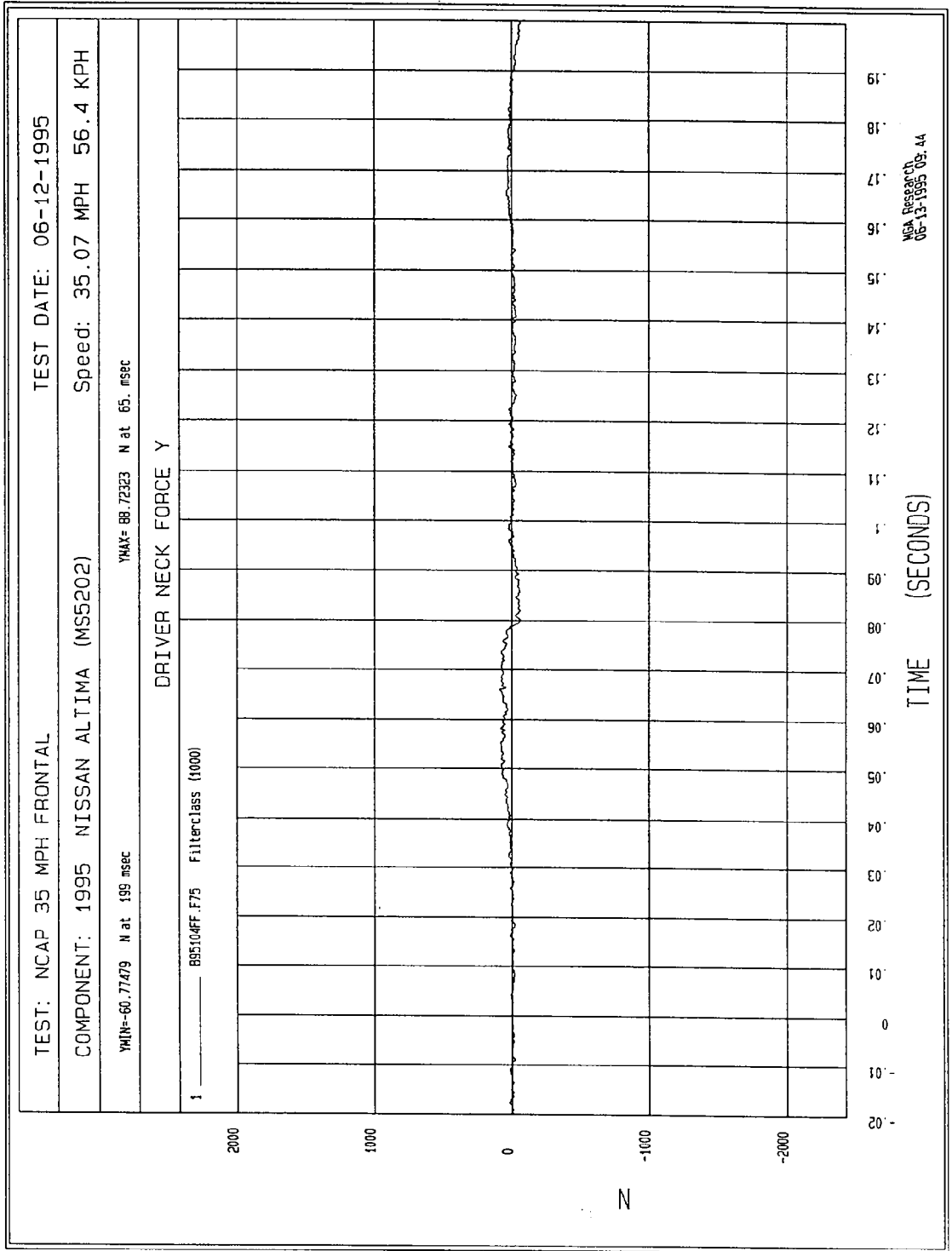


Figure B-64 - Driver Neck Force Y vs. Time

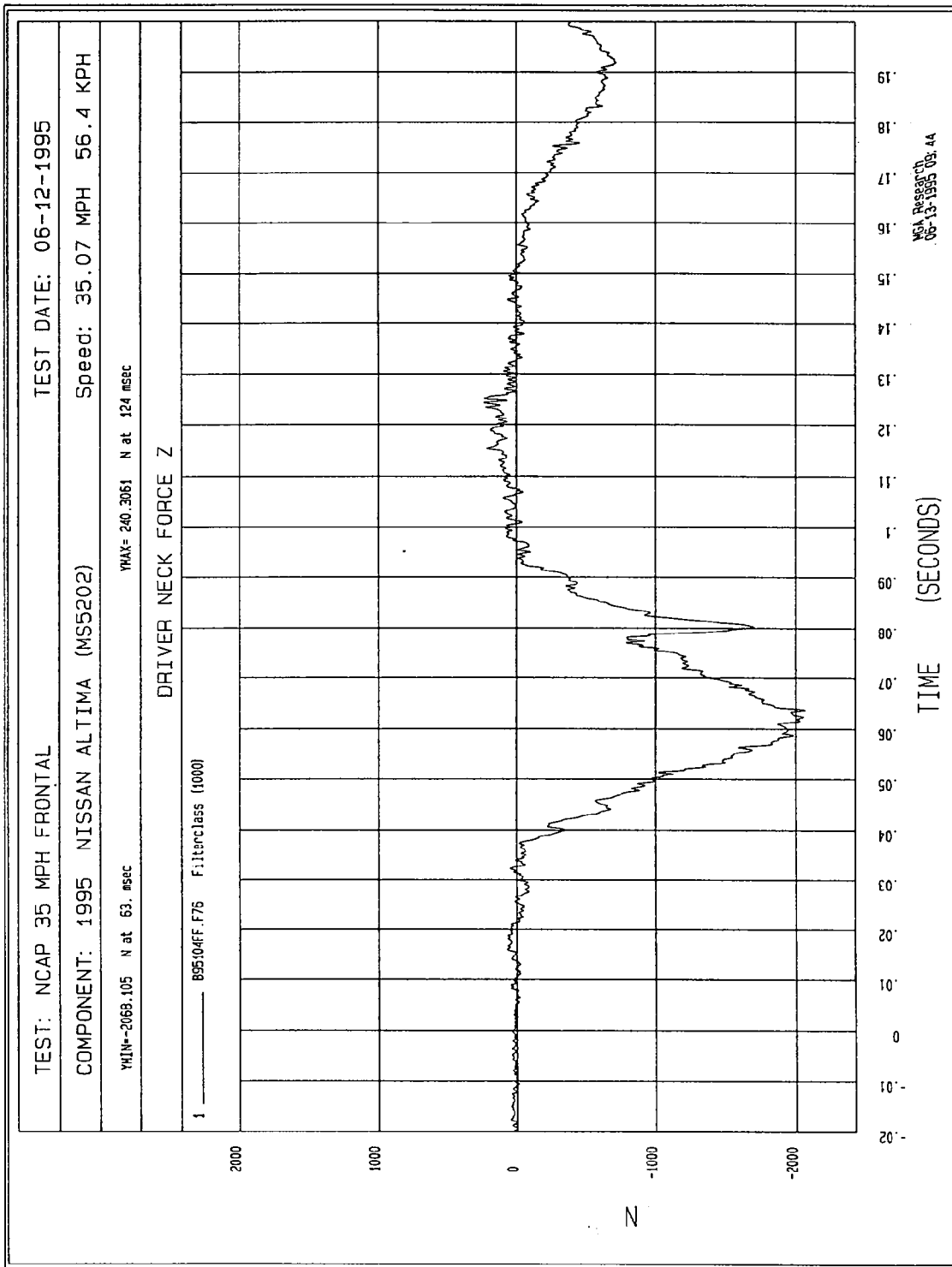


Figure B-65 - Driver Neck Force Z vs. Time

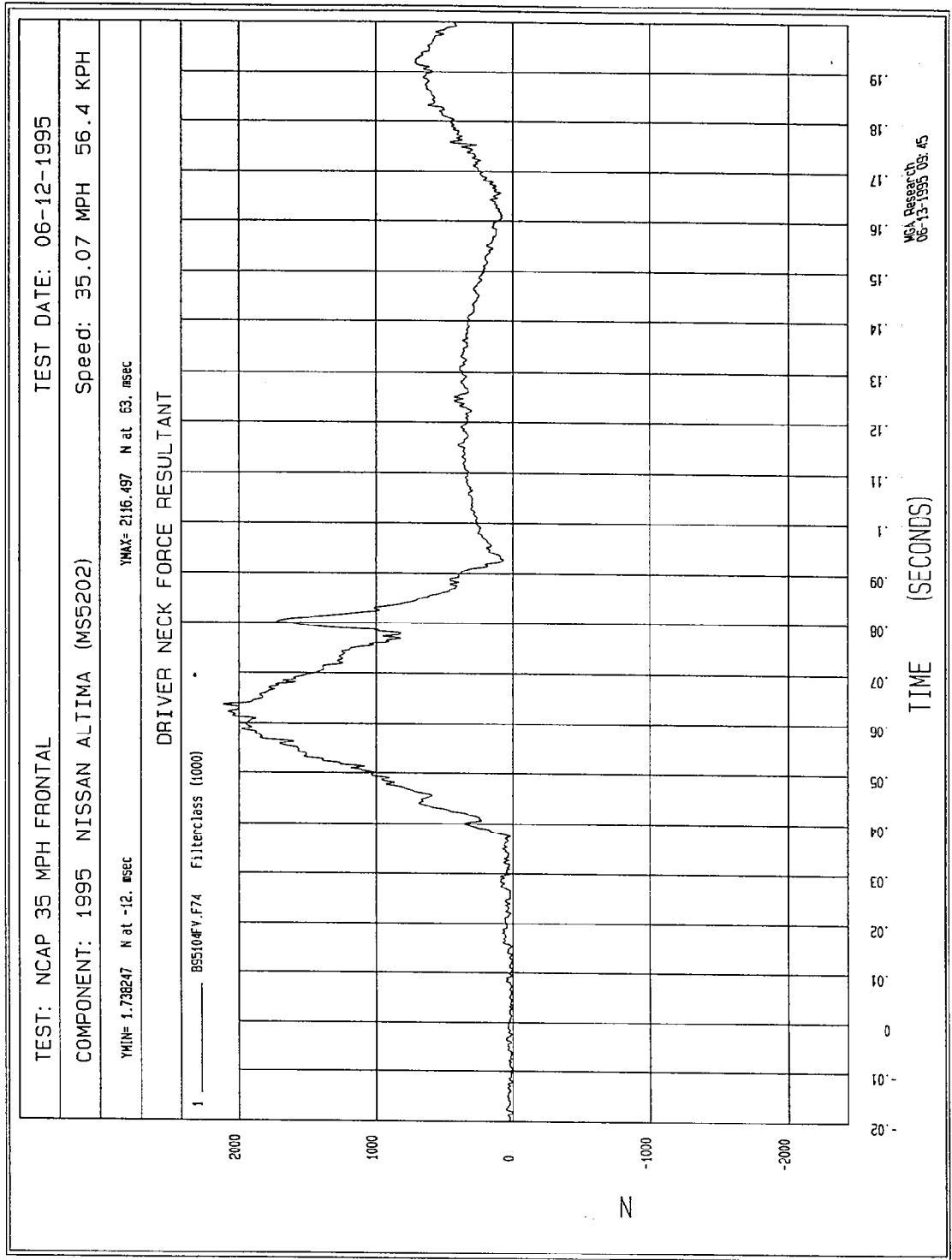


Figure B-66 - Driver Neck Force Resultant vs. Time

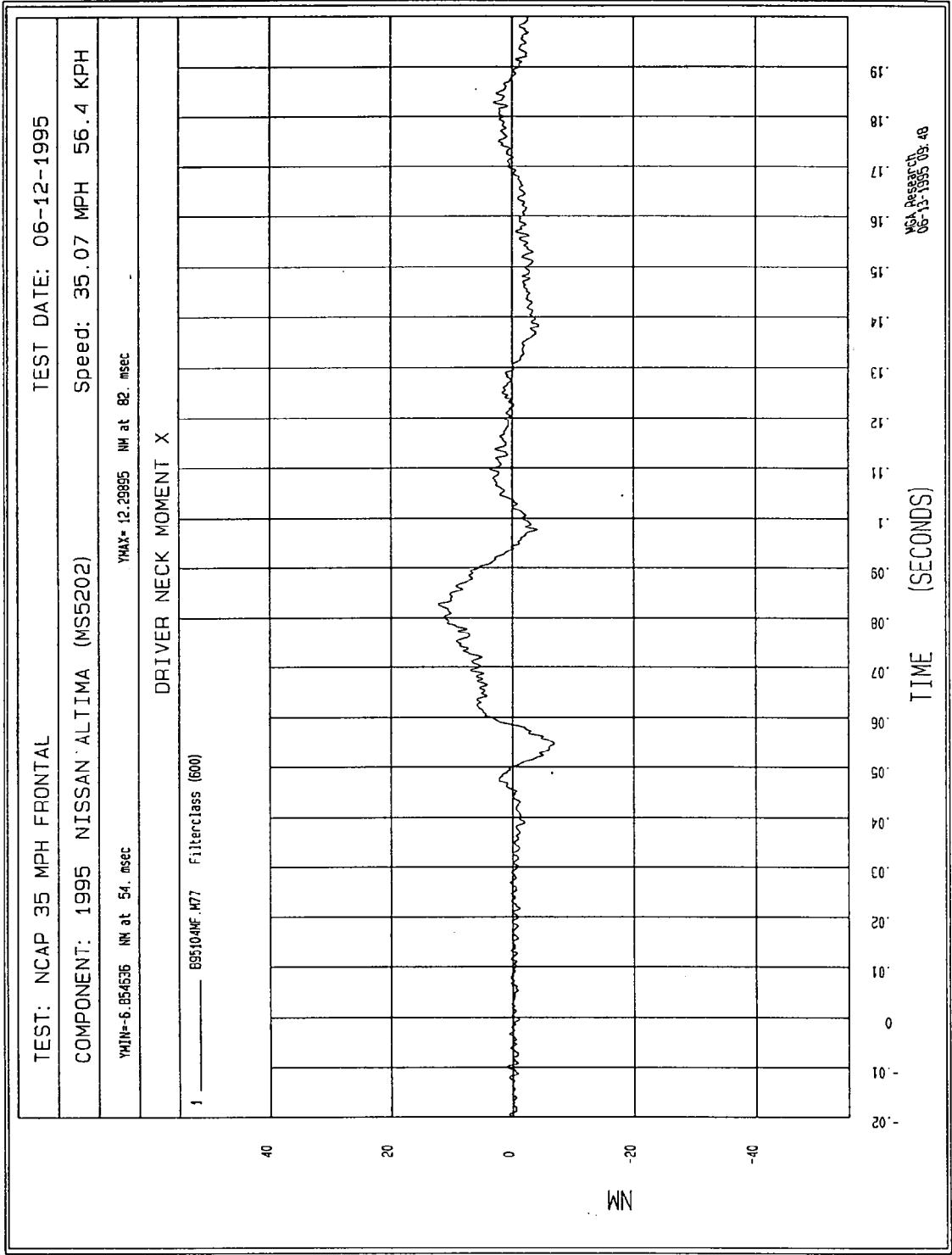


Figure B-67 - Driver Neck Moment X vs. Time

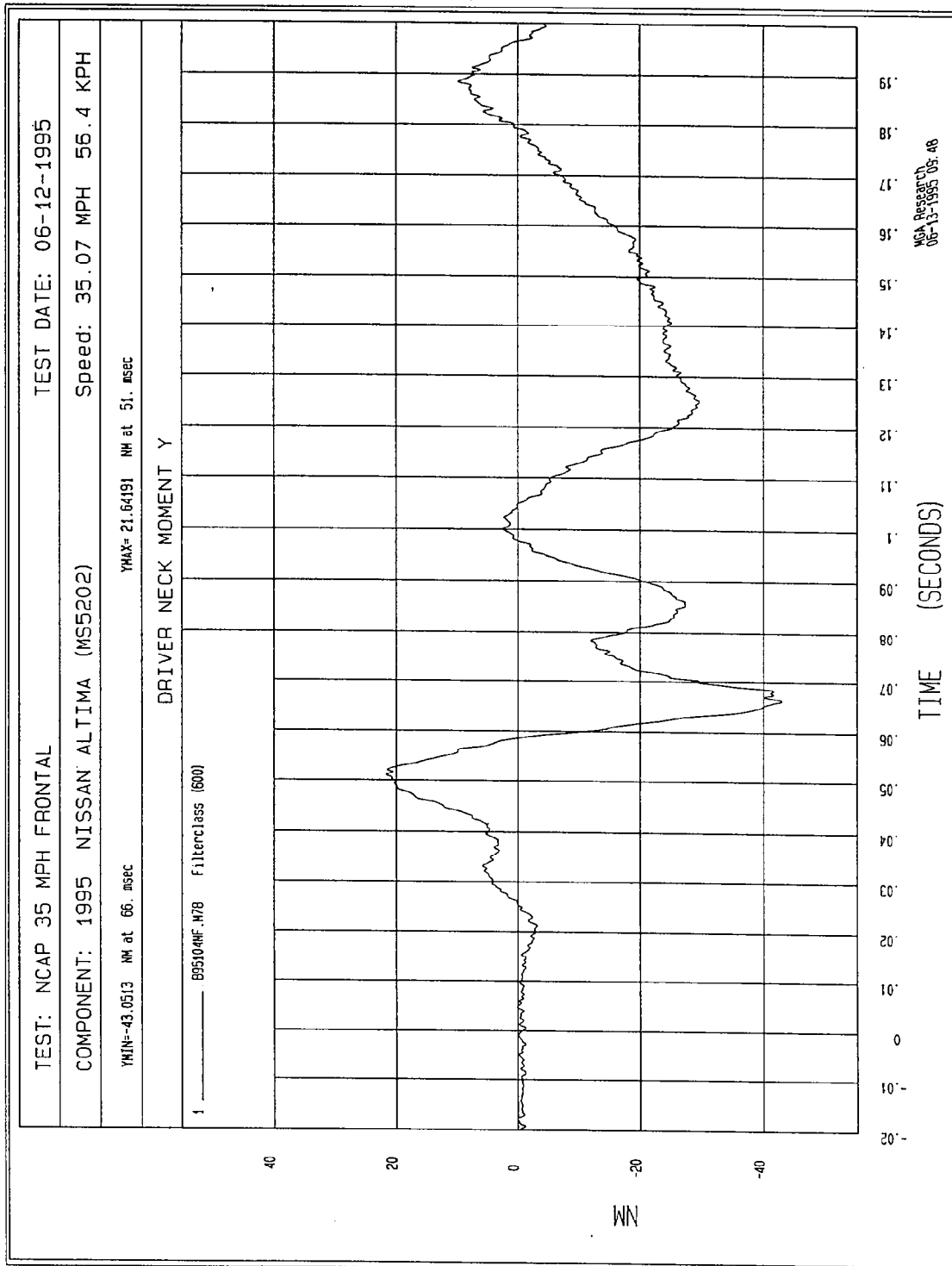


Figure B-68 - Driver Neck Moment Y vs. Time

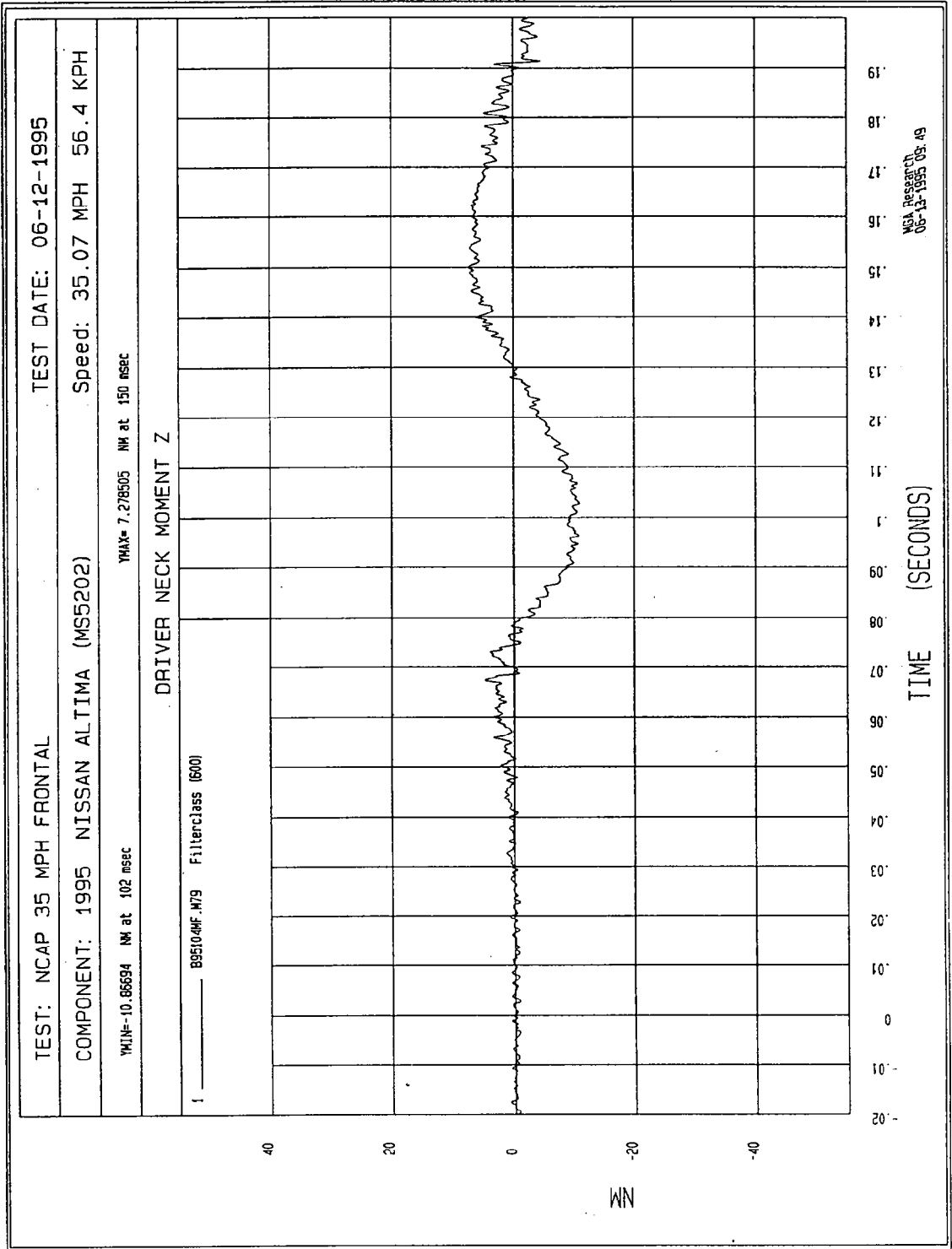


Figure B-69 - Driver Neck Moment Z vs. Time

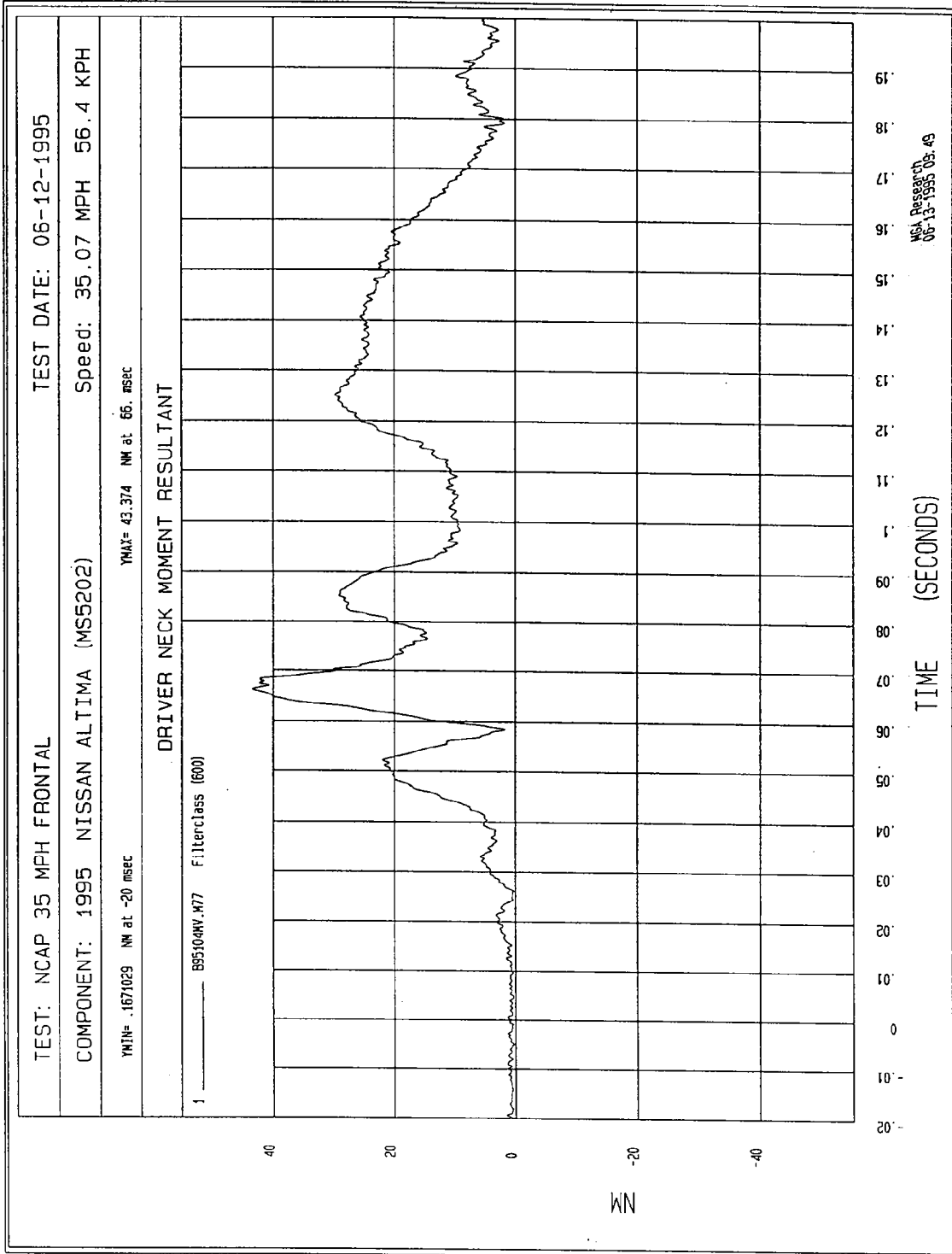


Figure B-70 - Driver Neck Moment Resultant vs. Time

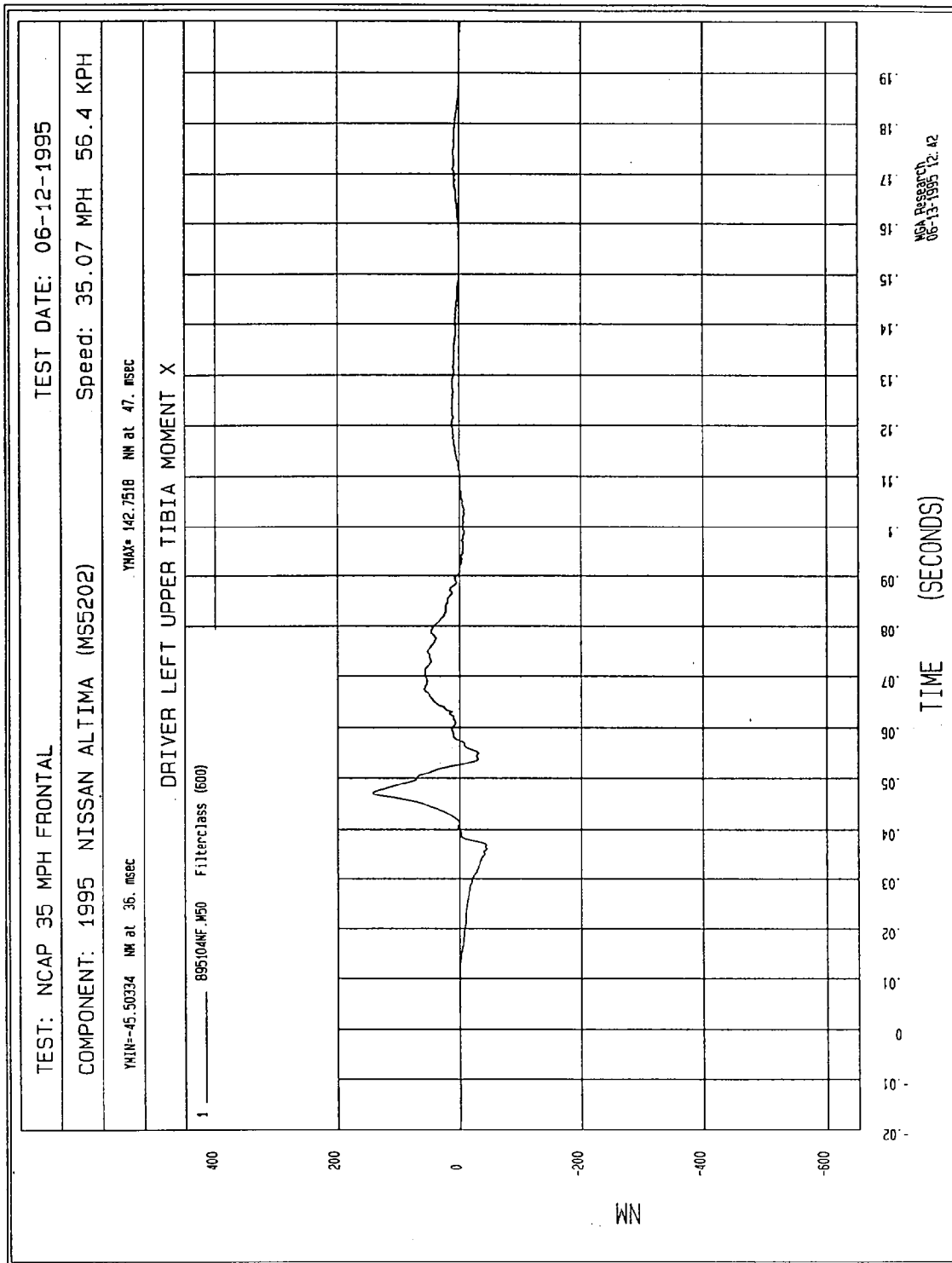
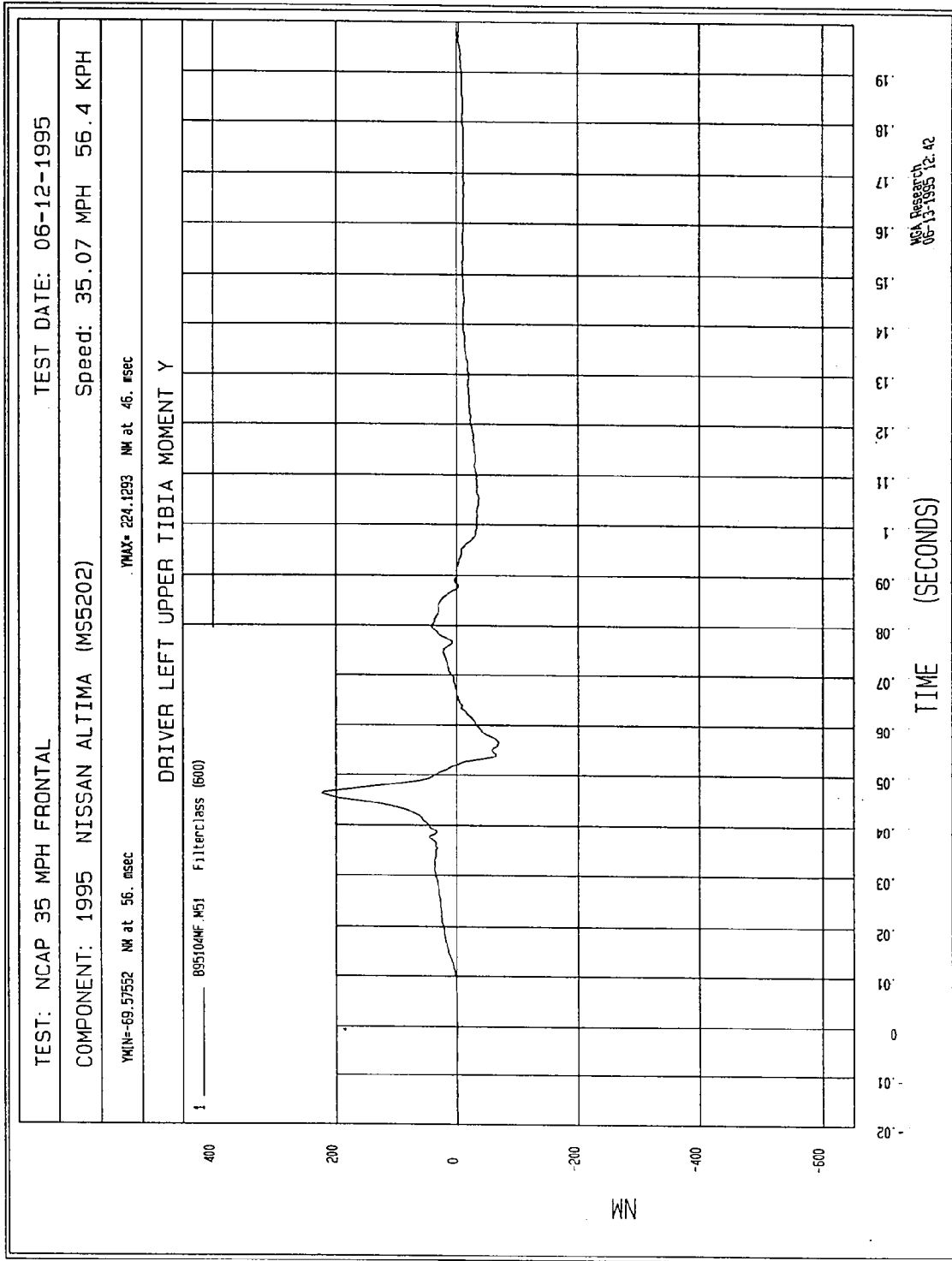
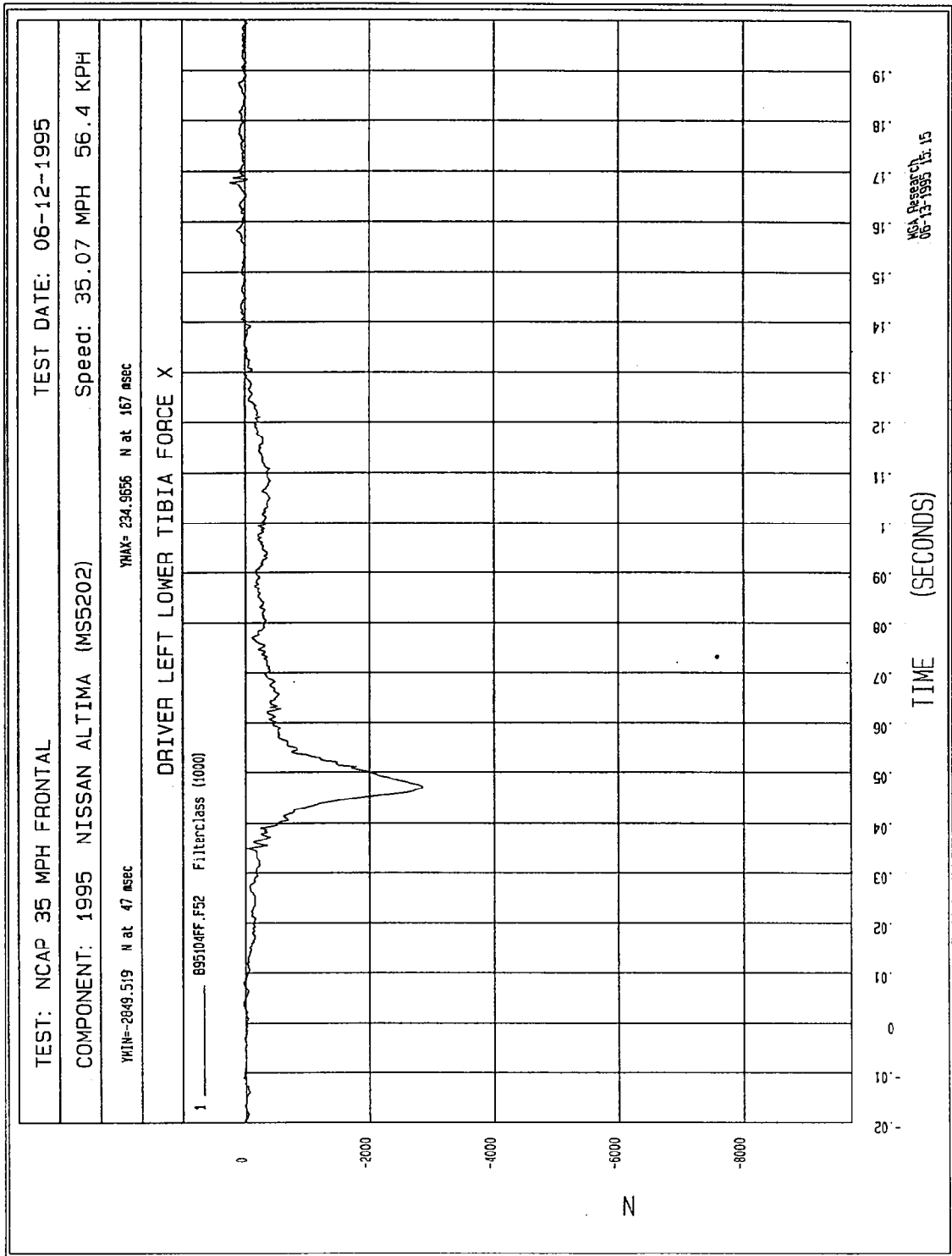


Figure B-71 - Driver Left Upper Tibia Moment X vs. Time



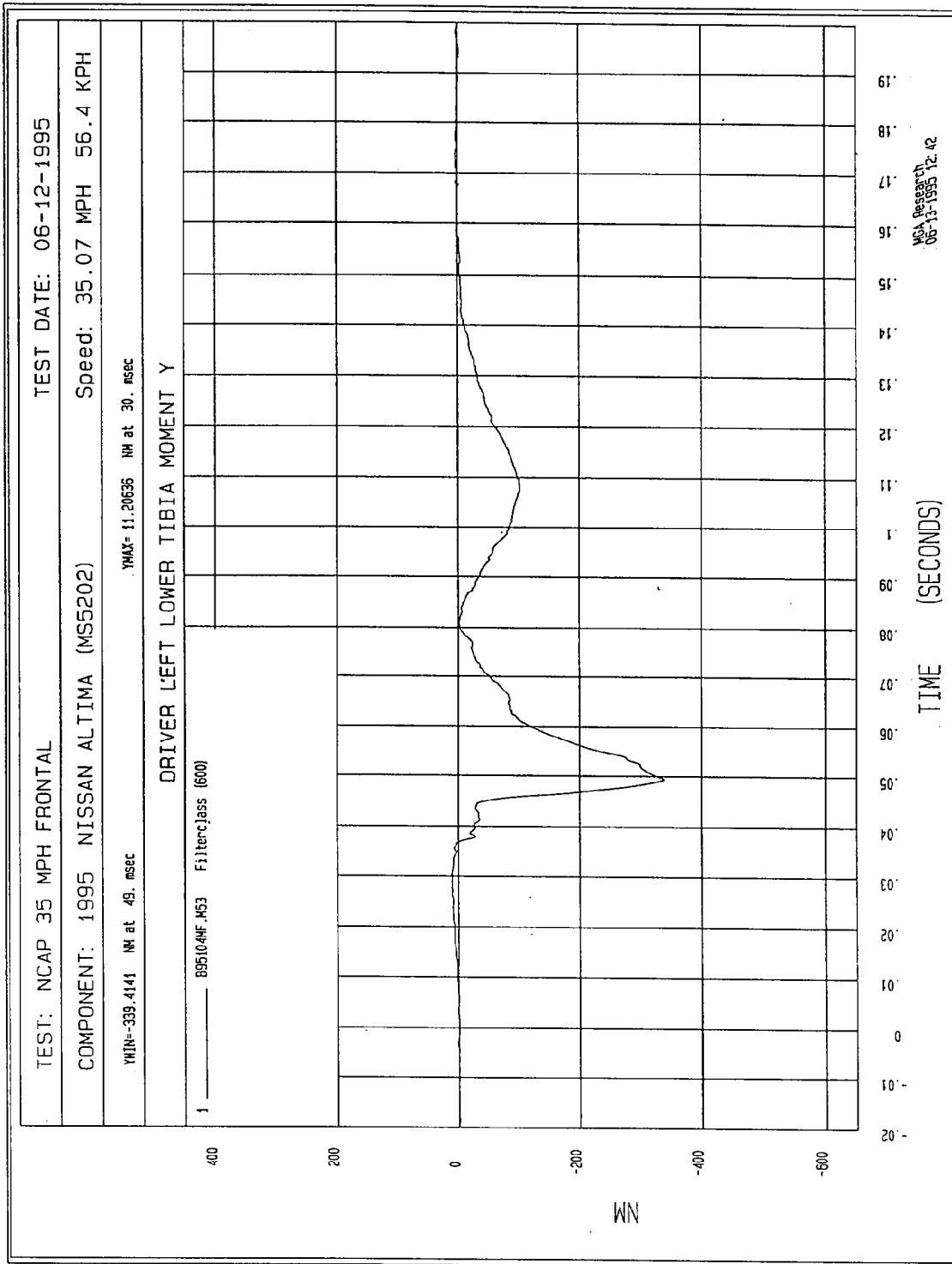
B-72

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



MSA Research
06-13-1995 13.15

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



B-74

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

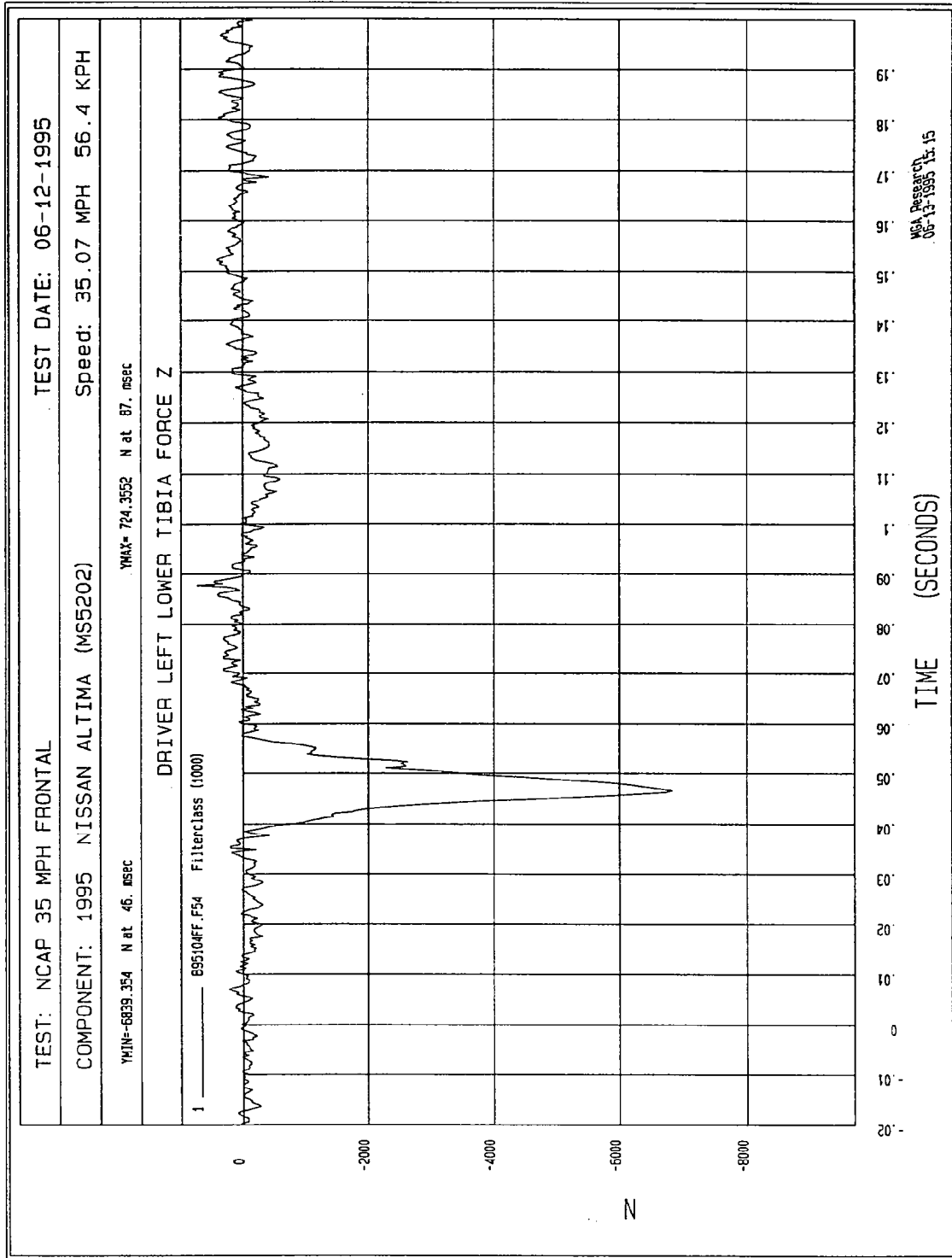


Figure B-75 - Driver Left Lower Tibia Force Z vs. Time

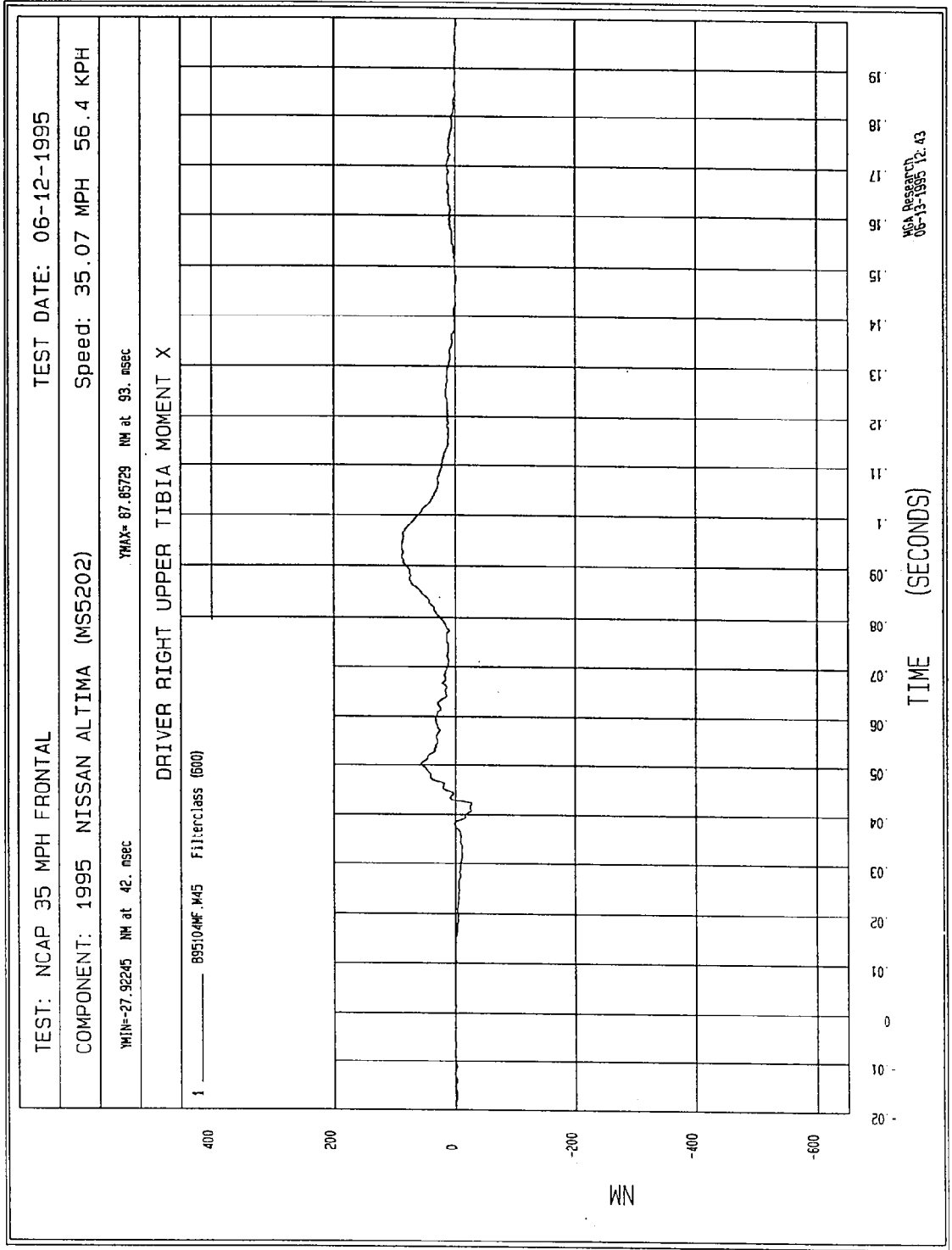


Figure B-76 - Driver Right Upper Tibia Moment X vs. Time

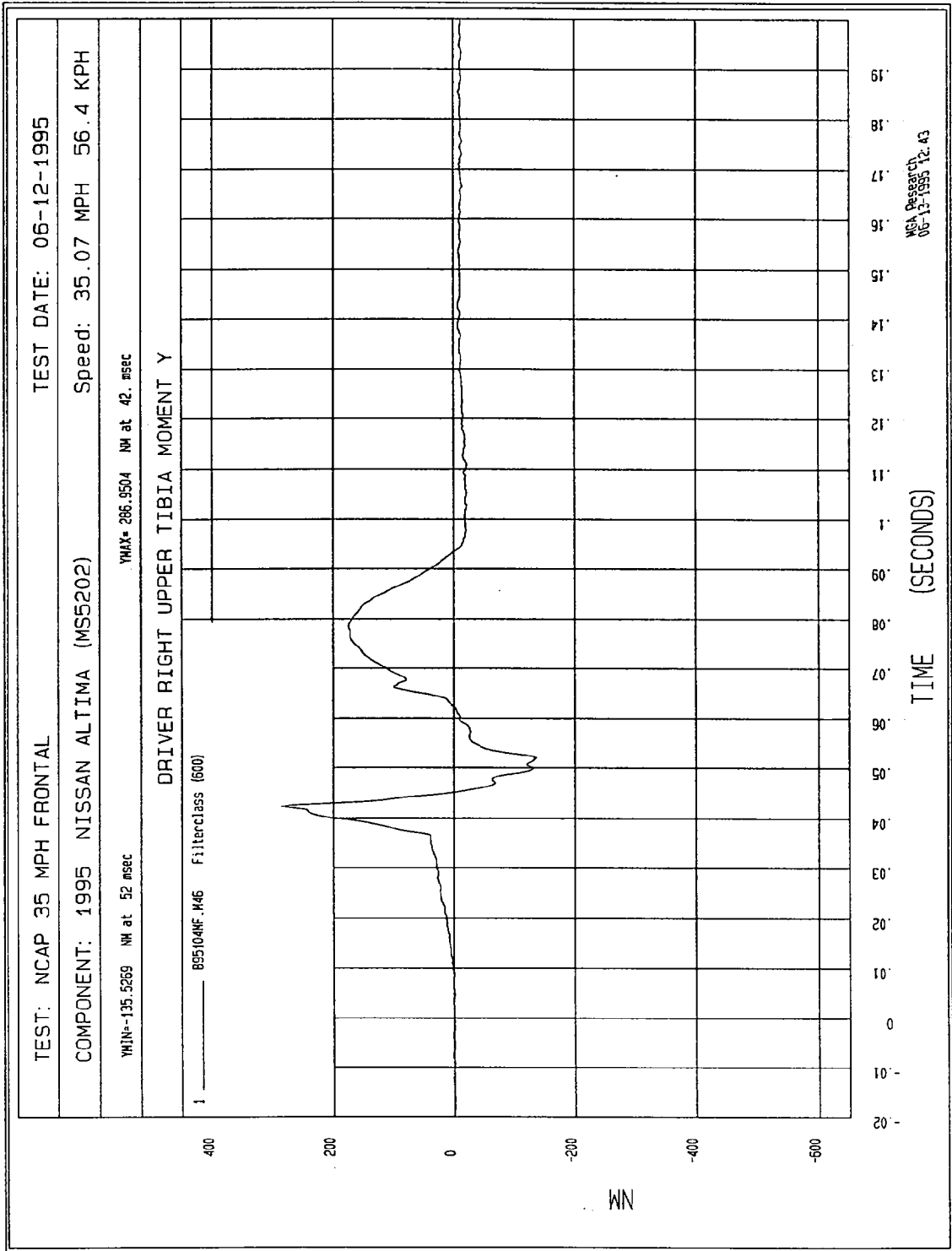


Figure B-77 - Driver Right Upper Tibia Moment Y vs. Time

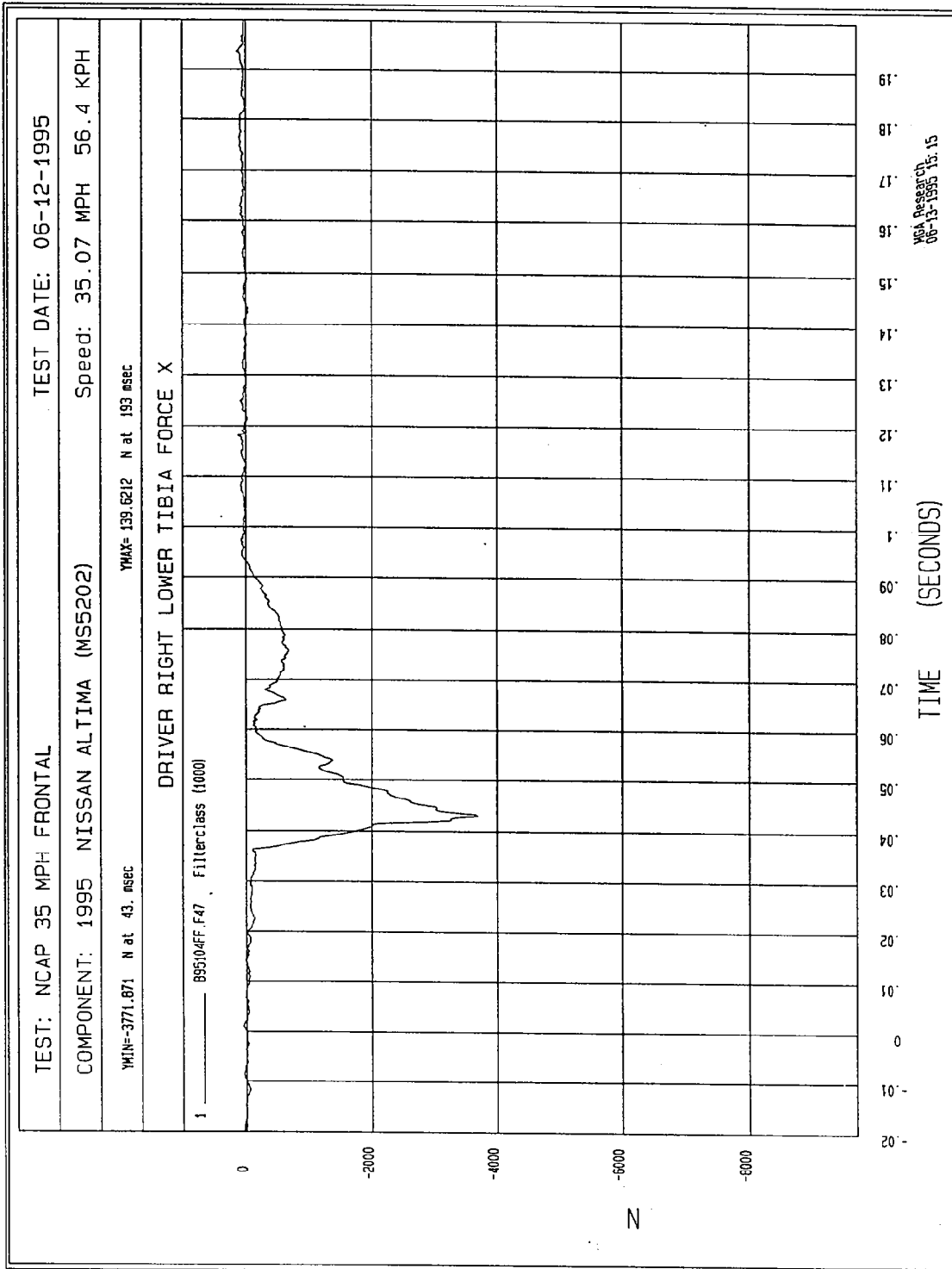


Figure B-78 - Driver Right Lower Tibia Force X vs. Time

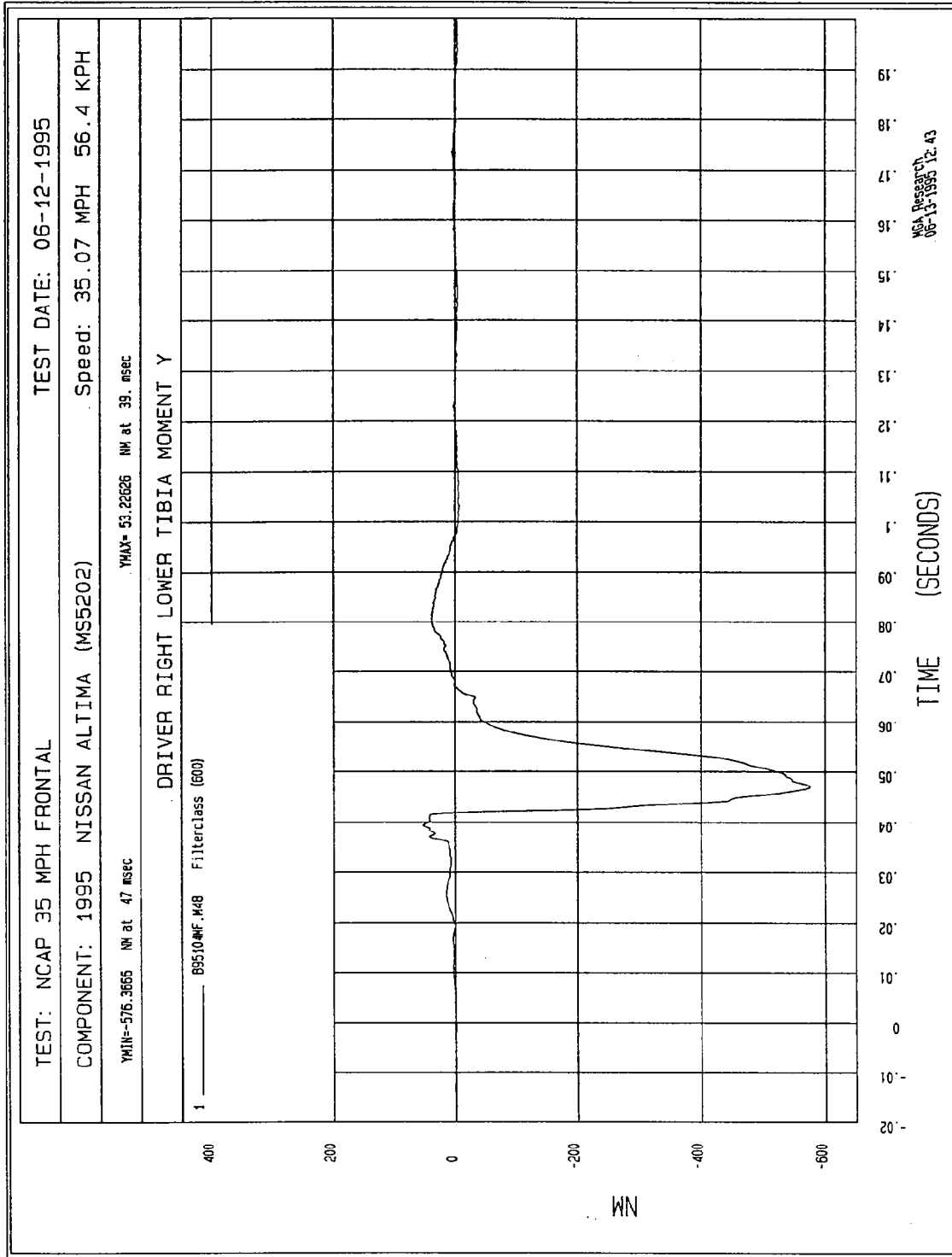


Figure B-79 - Driver Right Lower Tibia Moment Y vs. Time

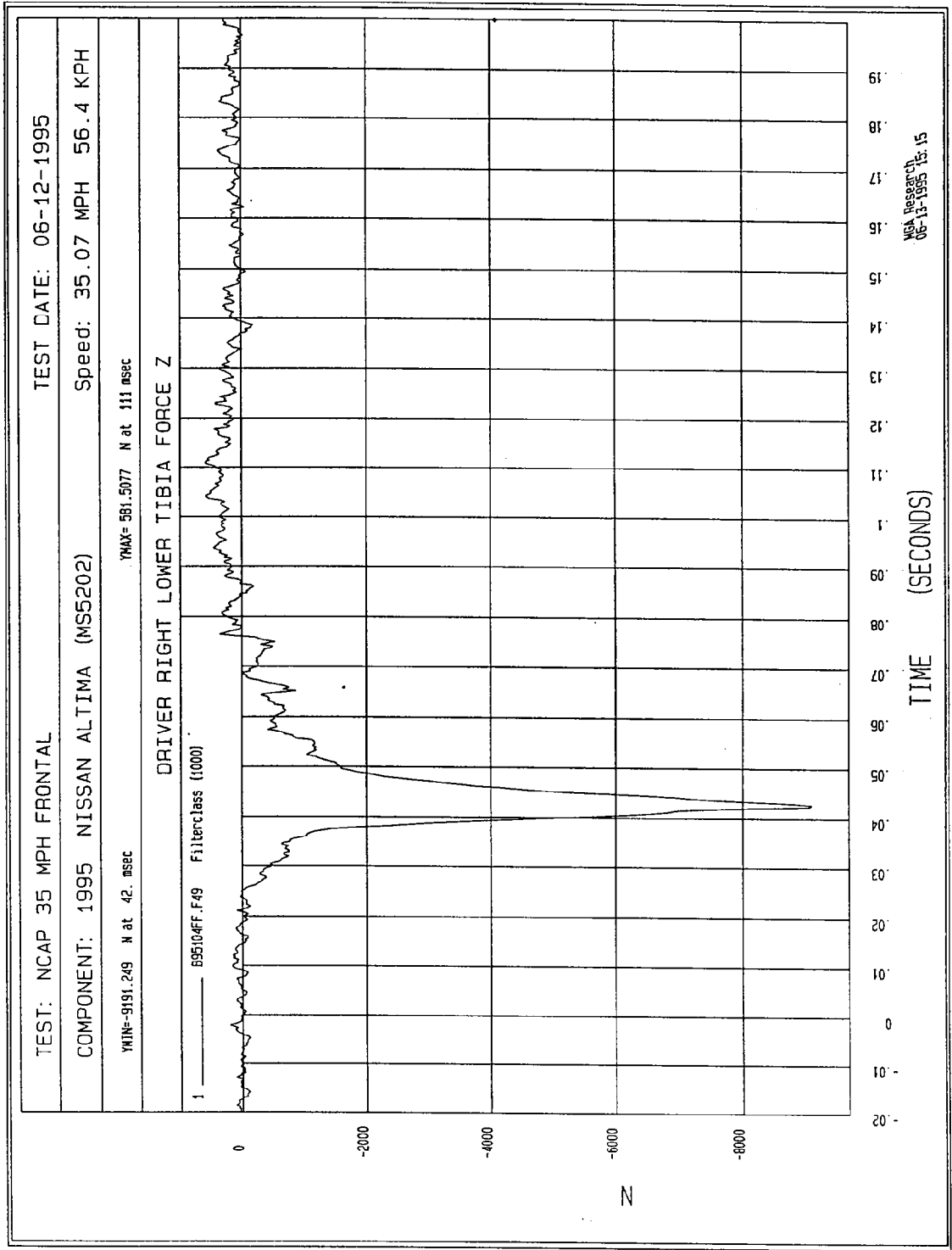


Figure B-80 - Driver Right Lower Tibia Force Z vs. Time

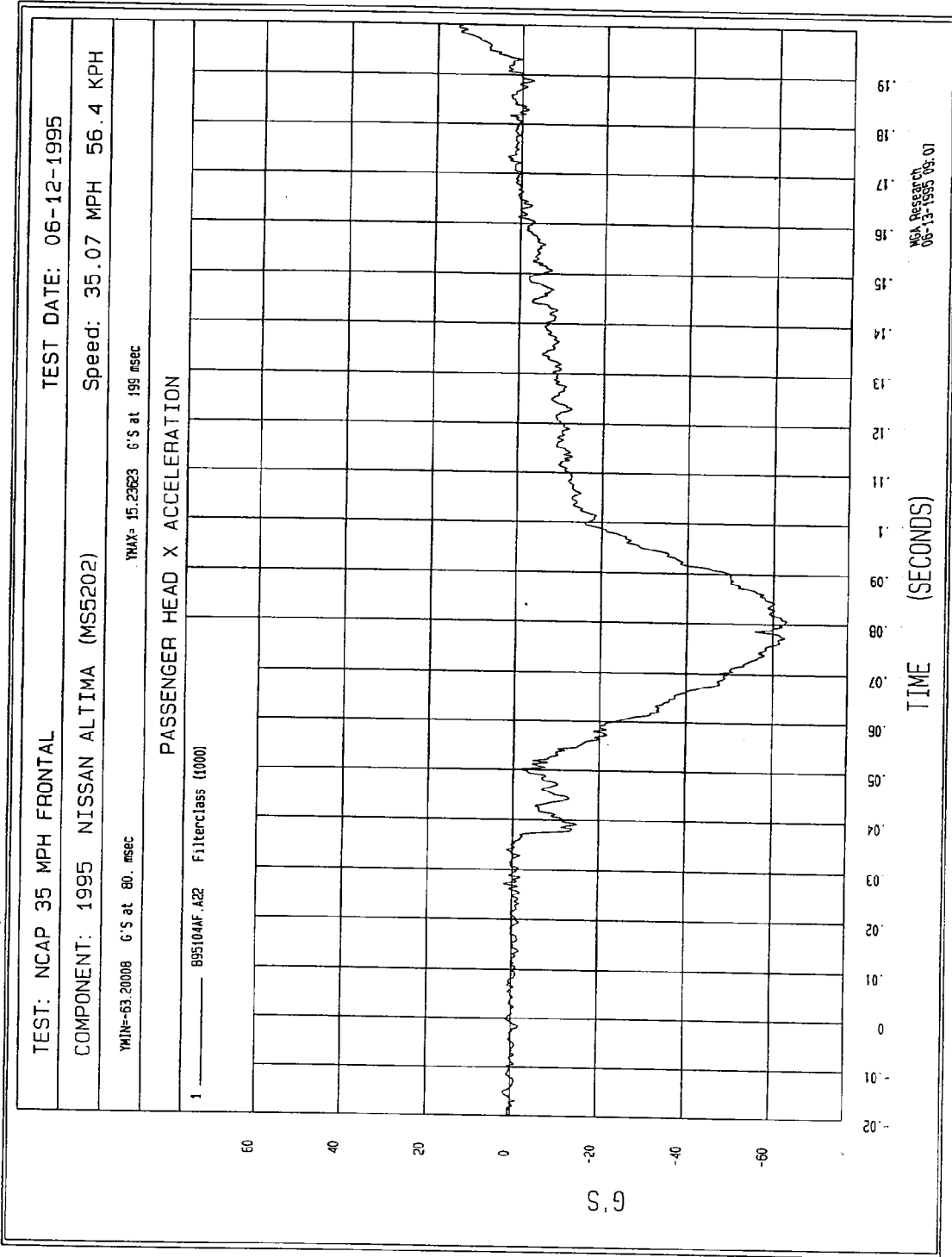


Figure B-81 - Passenger Head X Acceleration vs. Time

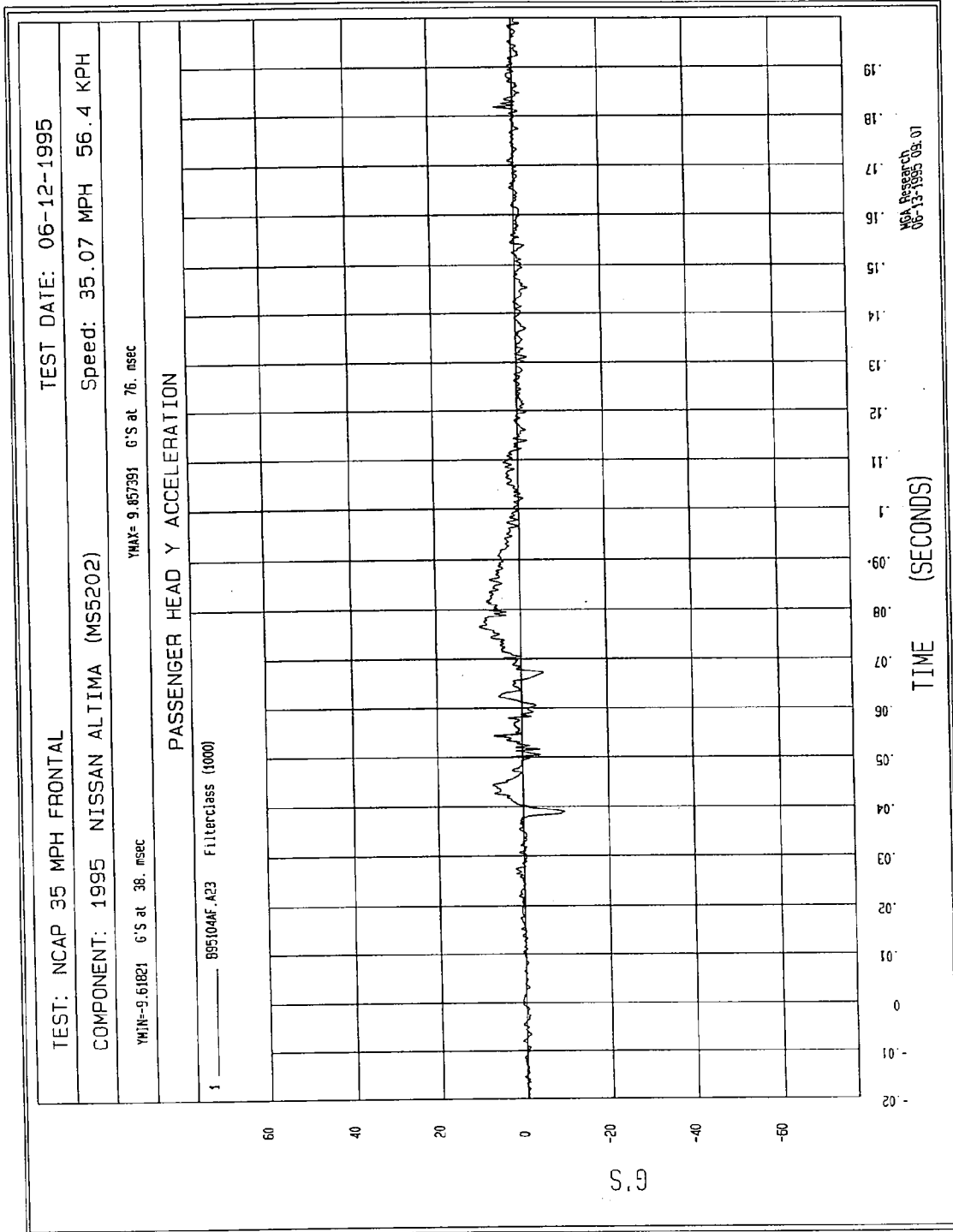


Figure B-82 - Passenger Head Y Acceleration vs. Time

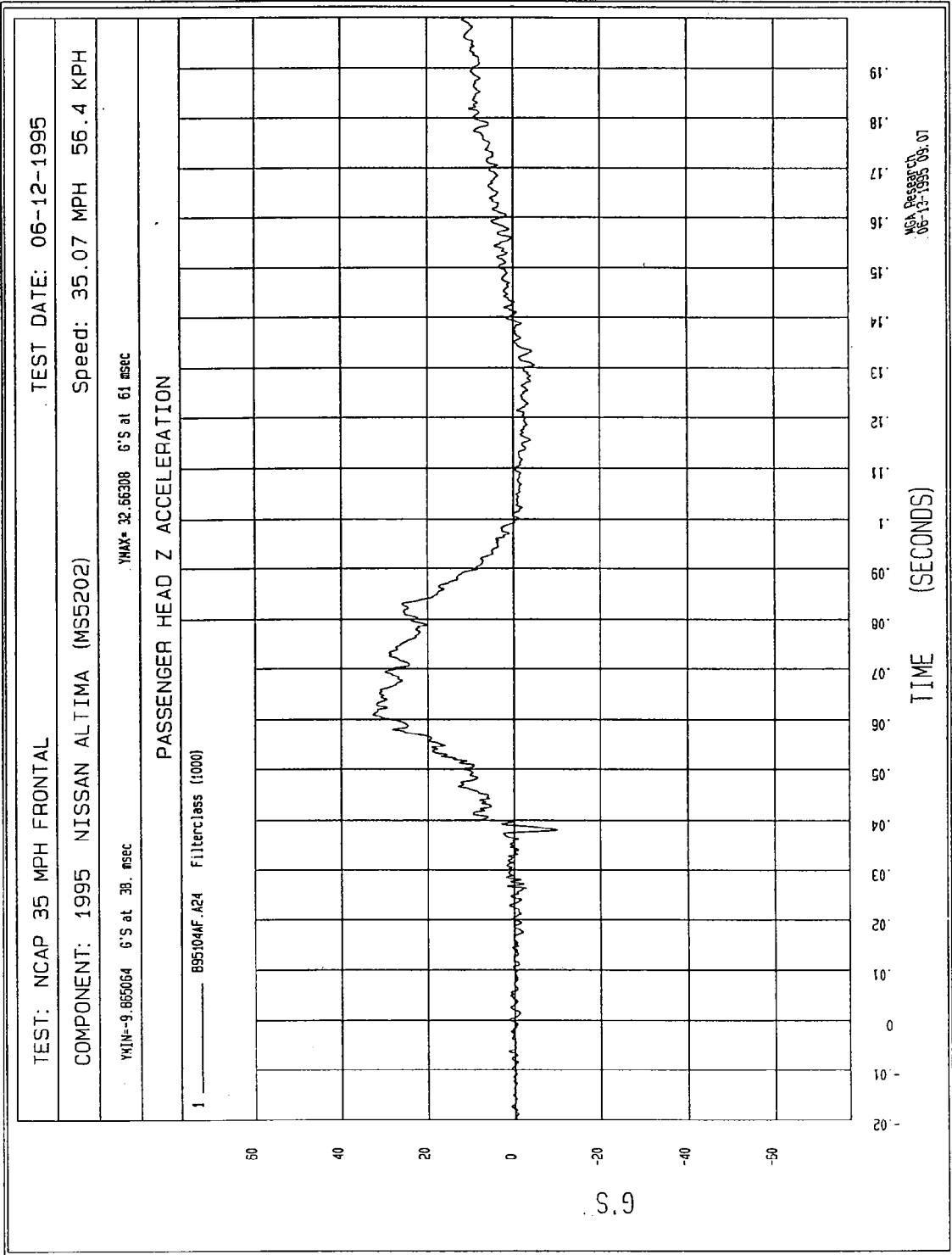


Figure B-83 - Passenger Head Z Acceleration vs. Time

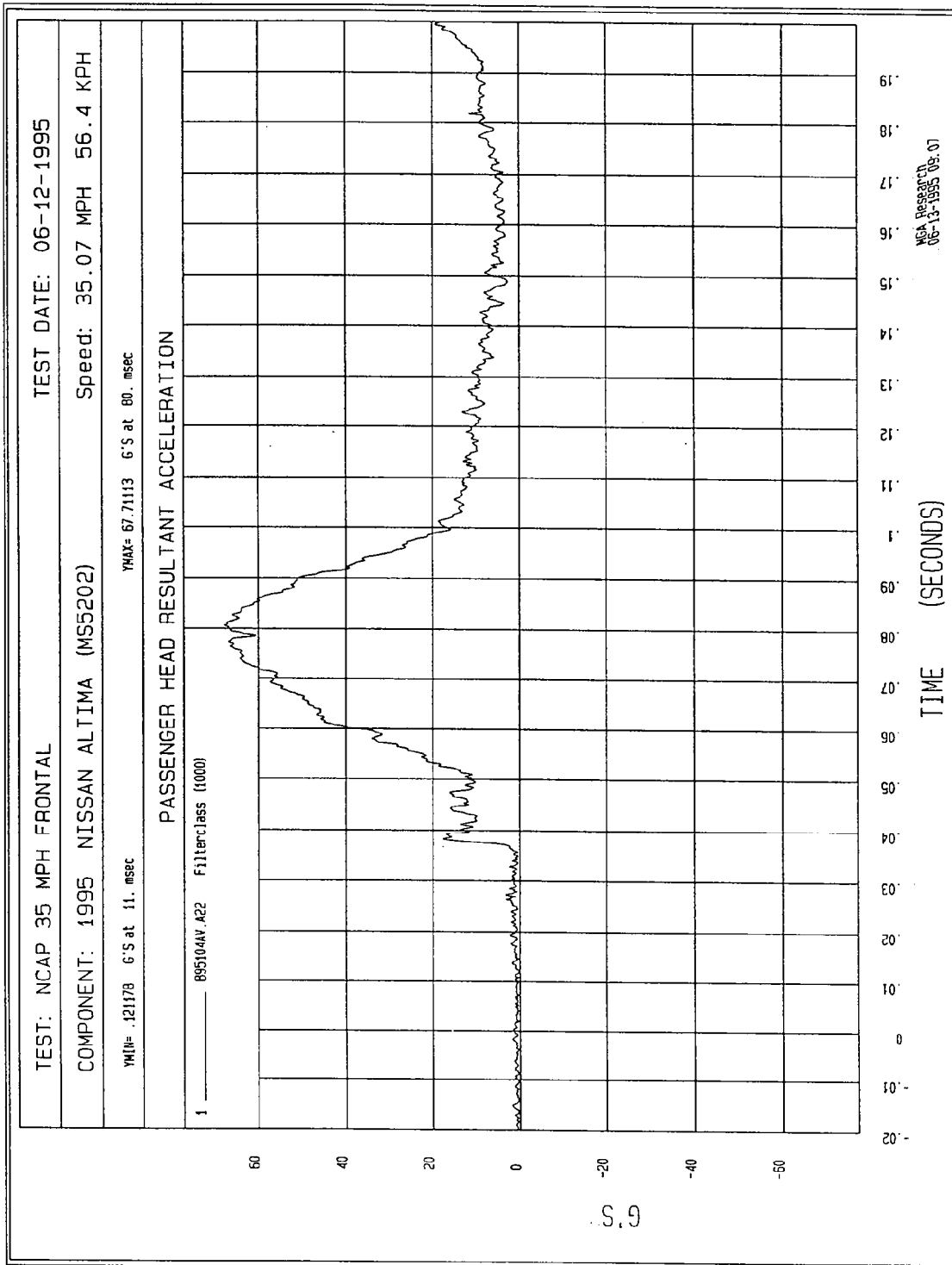


Figure B-84 - Passenger Head Resultant Acceleration vs. Time

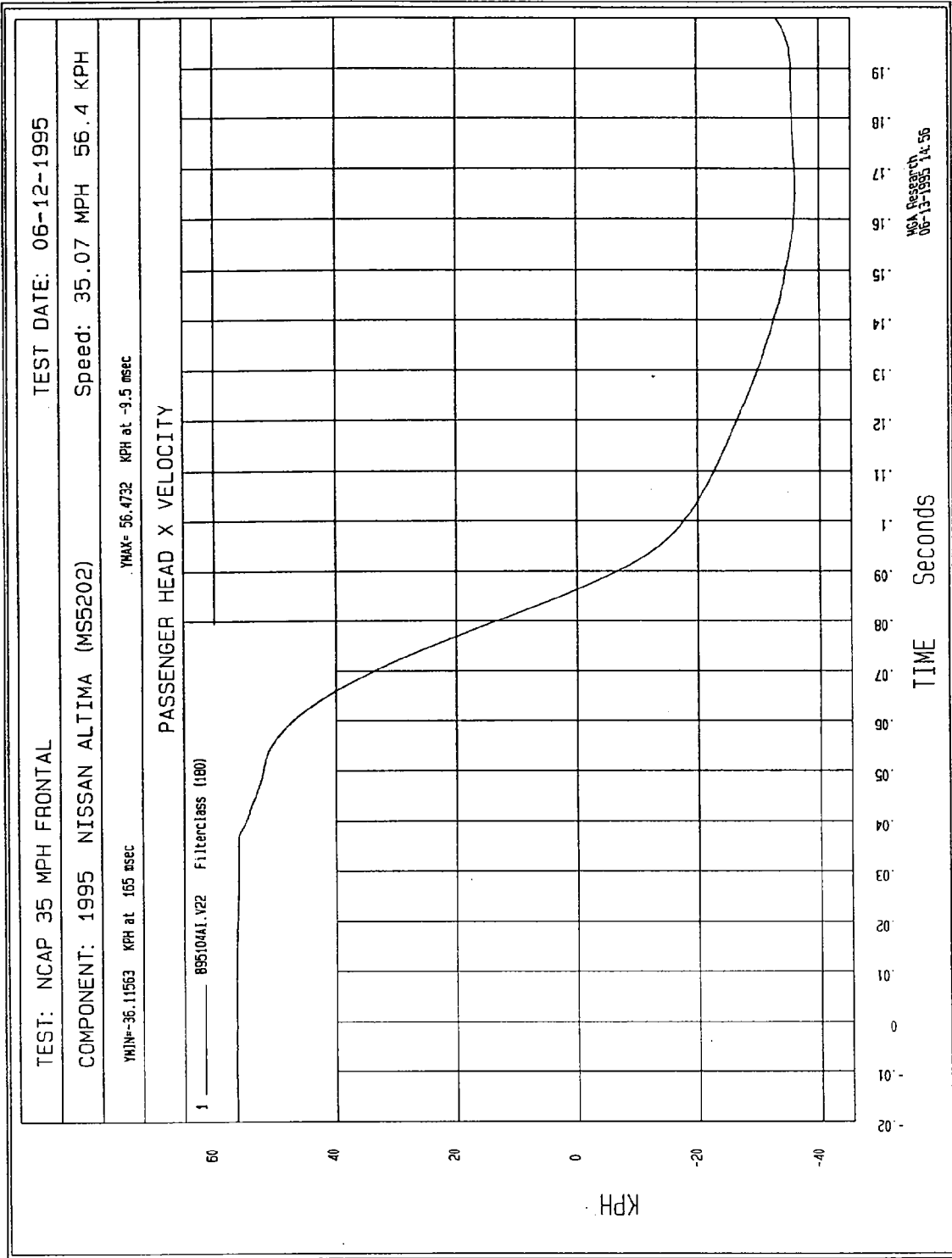


Figure B-85 - Passenger Head X Velocity vs. Time

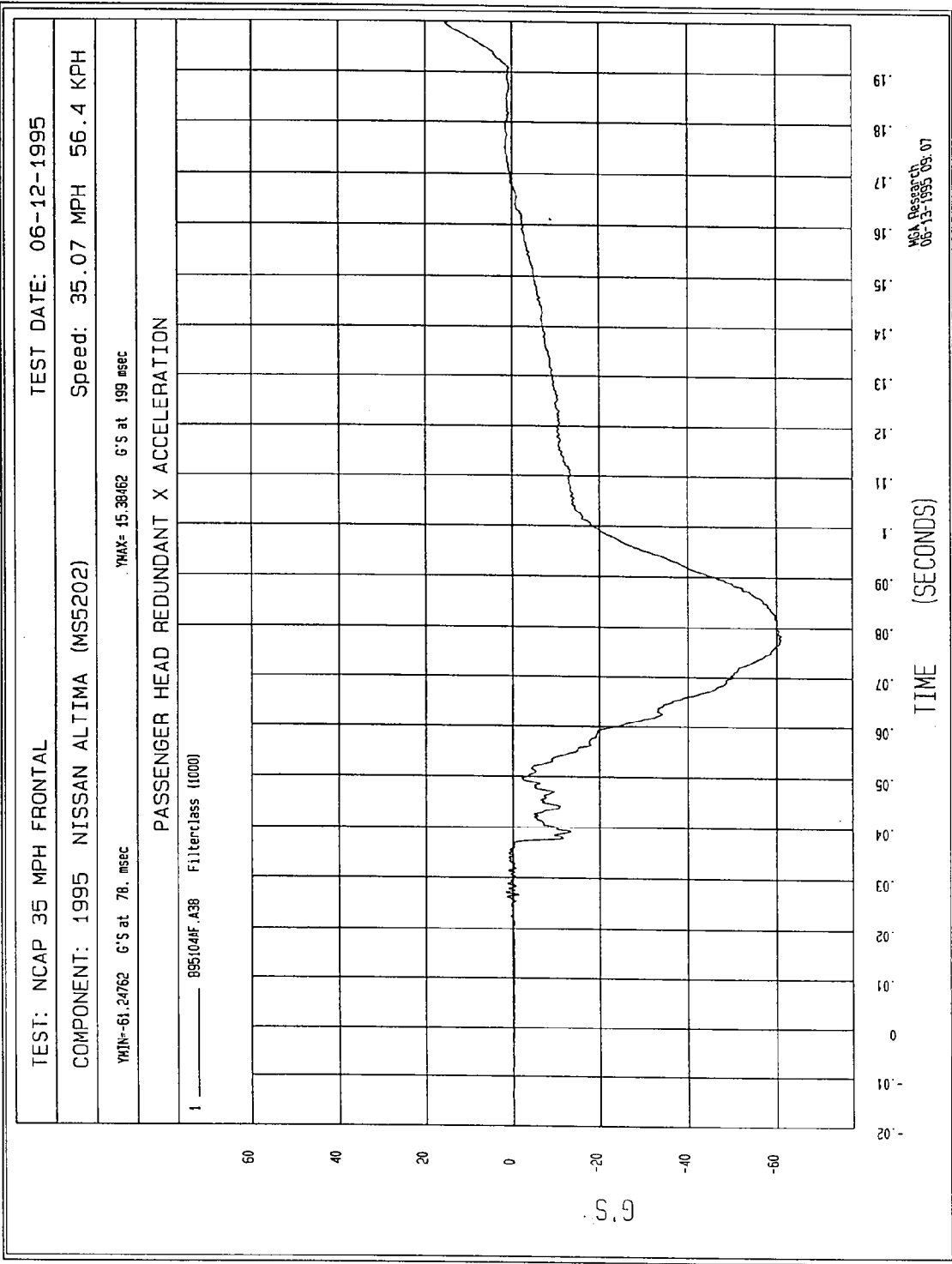


Figure B-86 - Passenger Head Redundant X Acceleration vs. Time

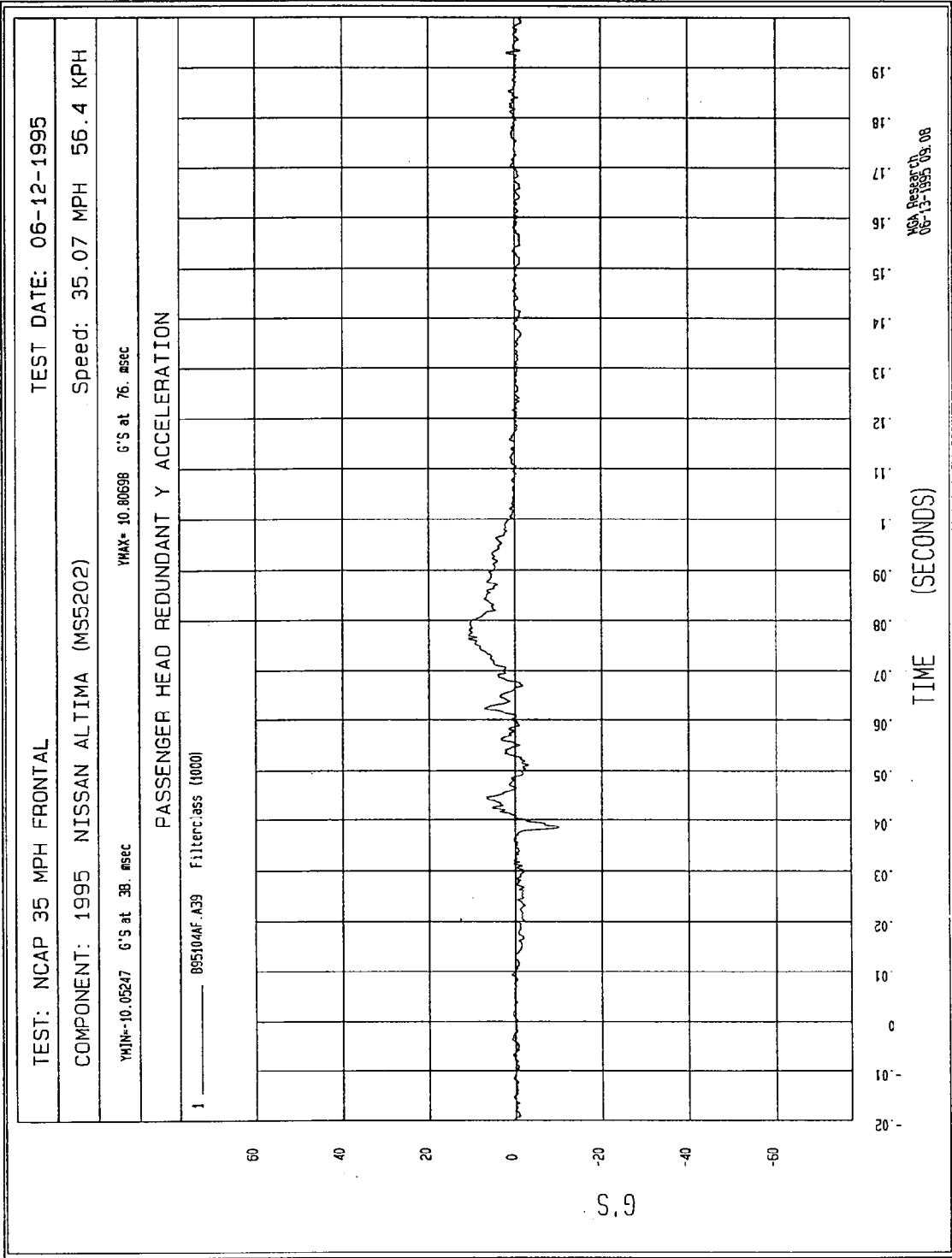


Figure B-87 - Passenger Head Redundant Y Acceleration vs. Time

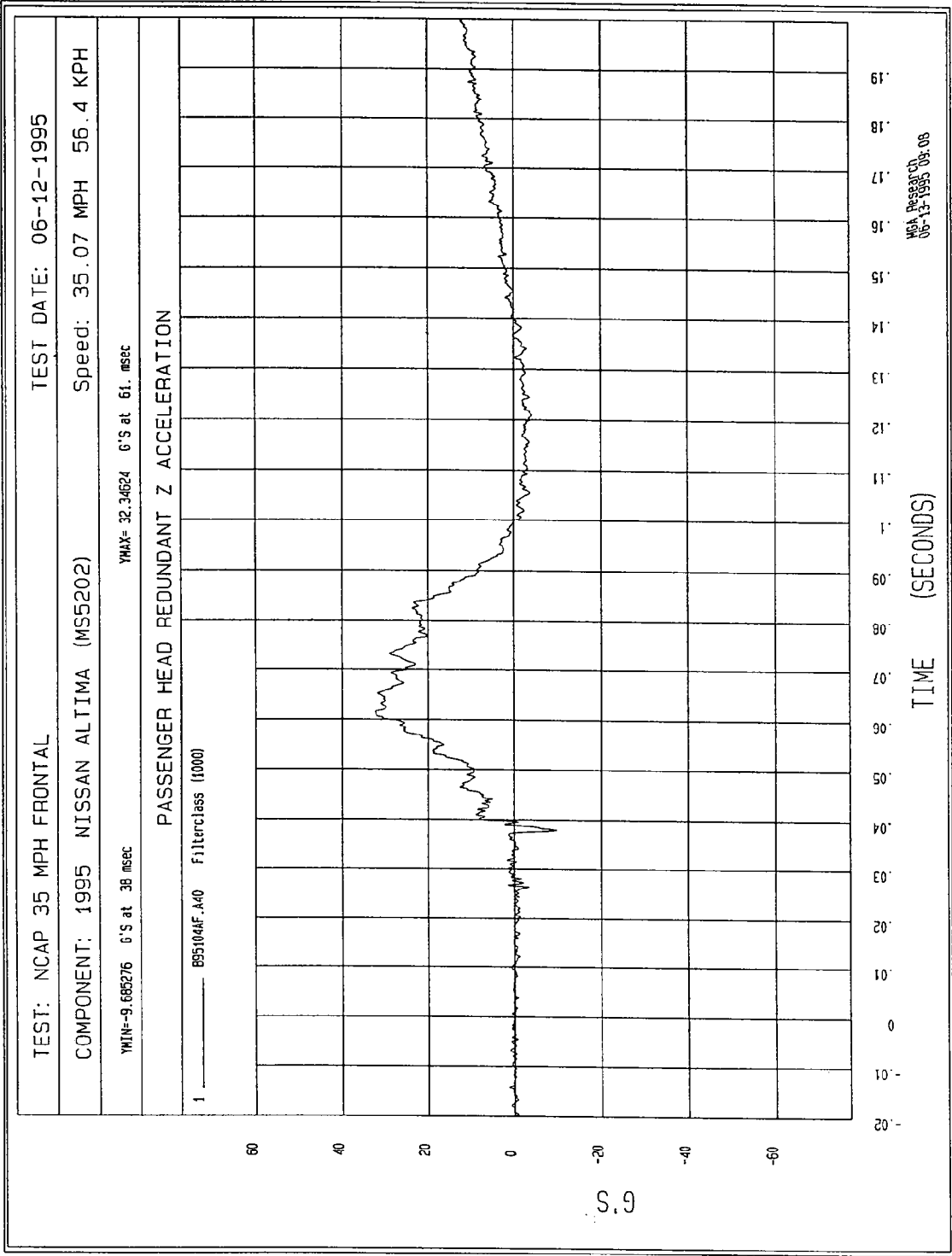


Figure B-88 - Passenger Head Redundant Z Acceleration vs. Time

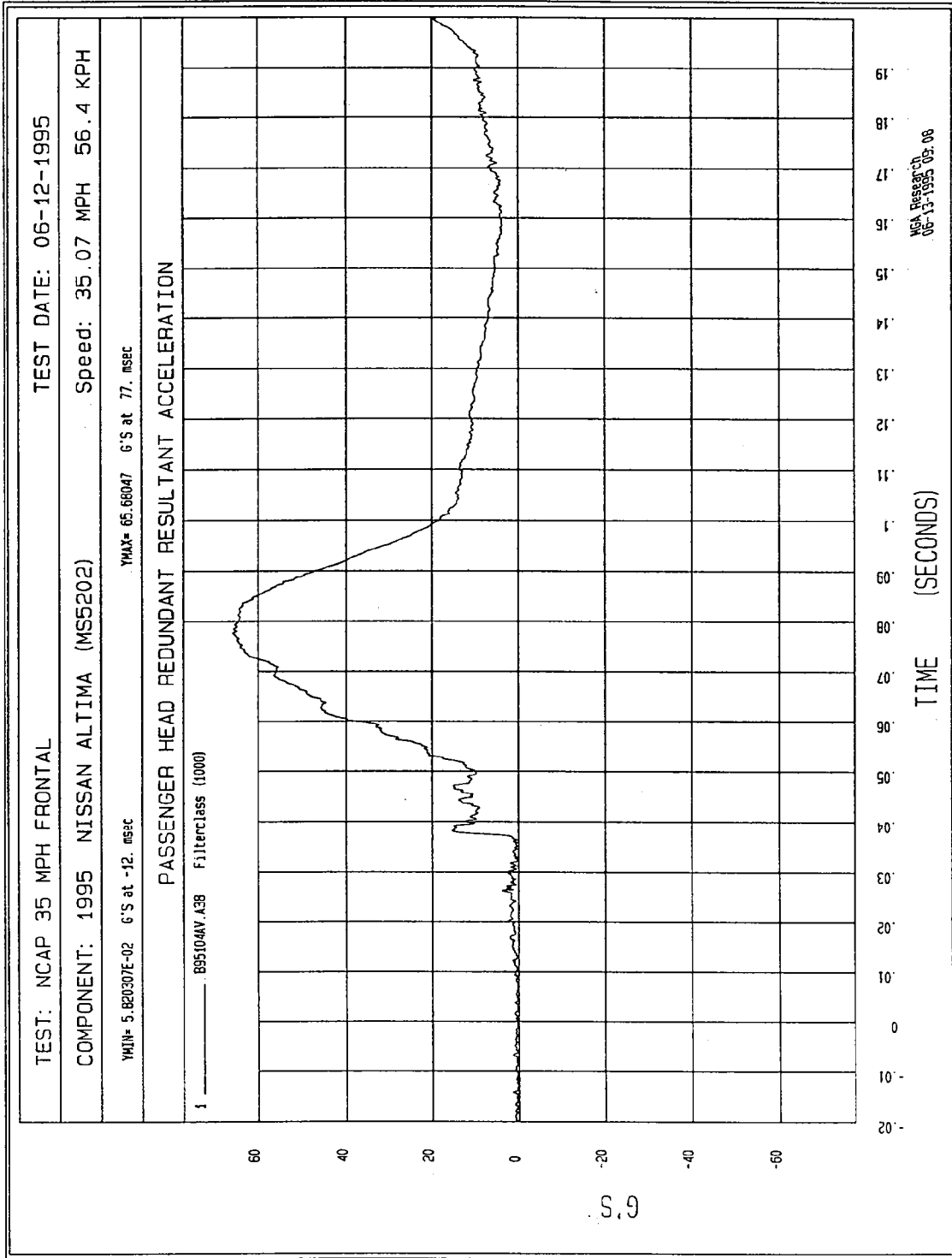


Figure B-89 - Passenger Head Redundant Resultant Accel. vs. Time

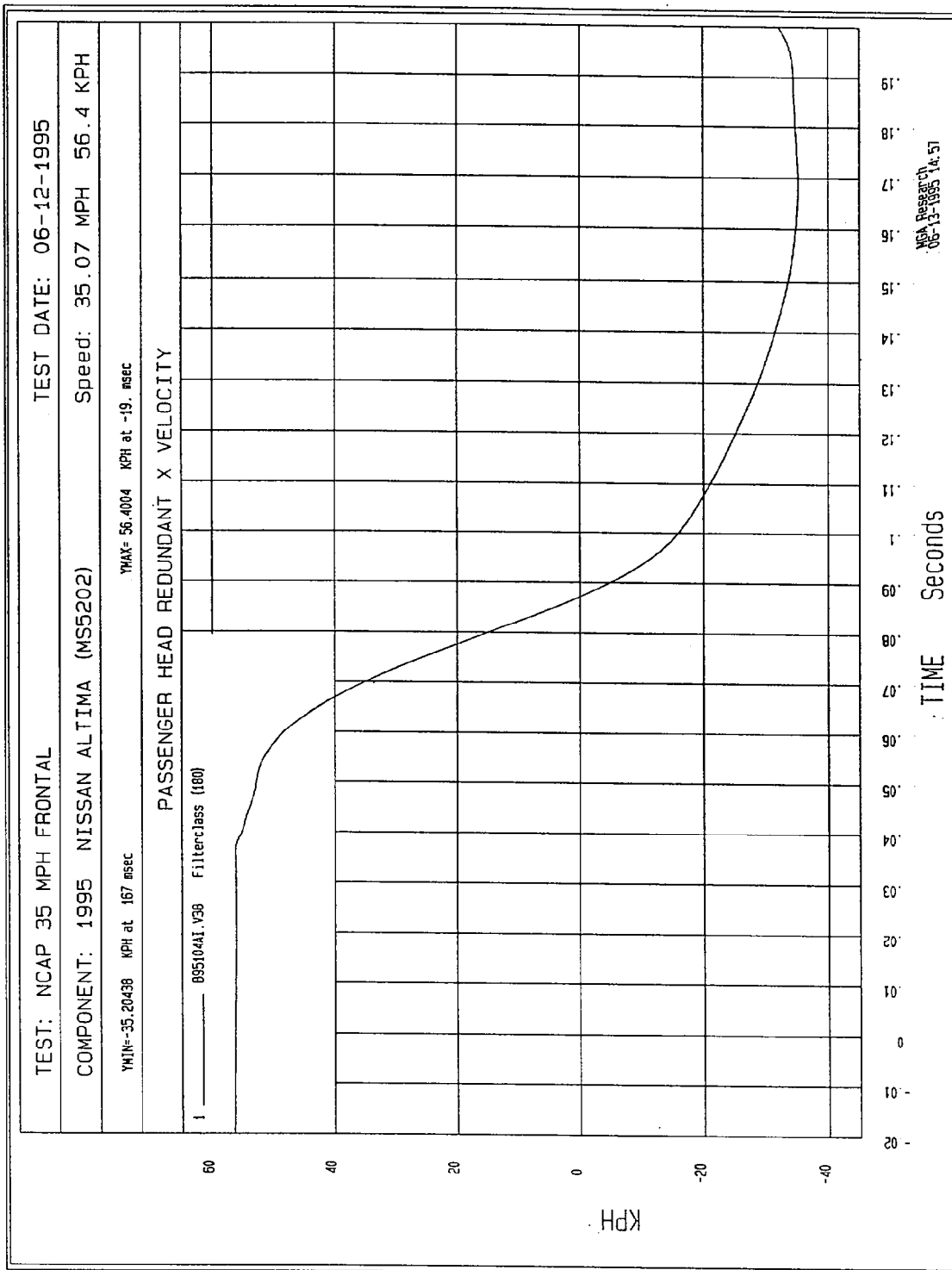


Figure B-90 - Passenger Head Redundant X Velocity vs. Time

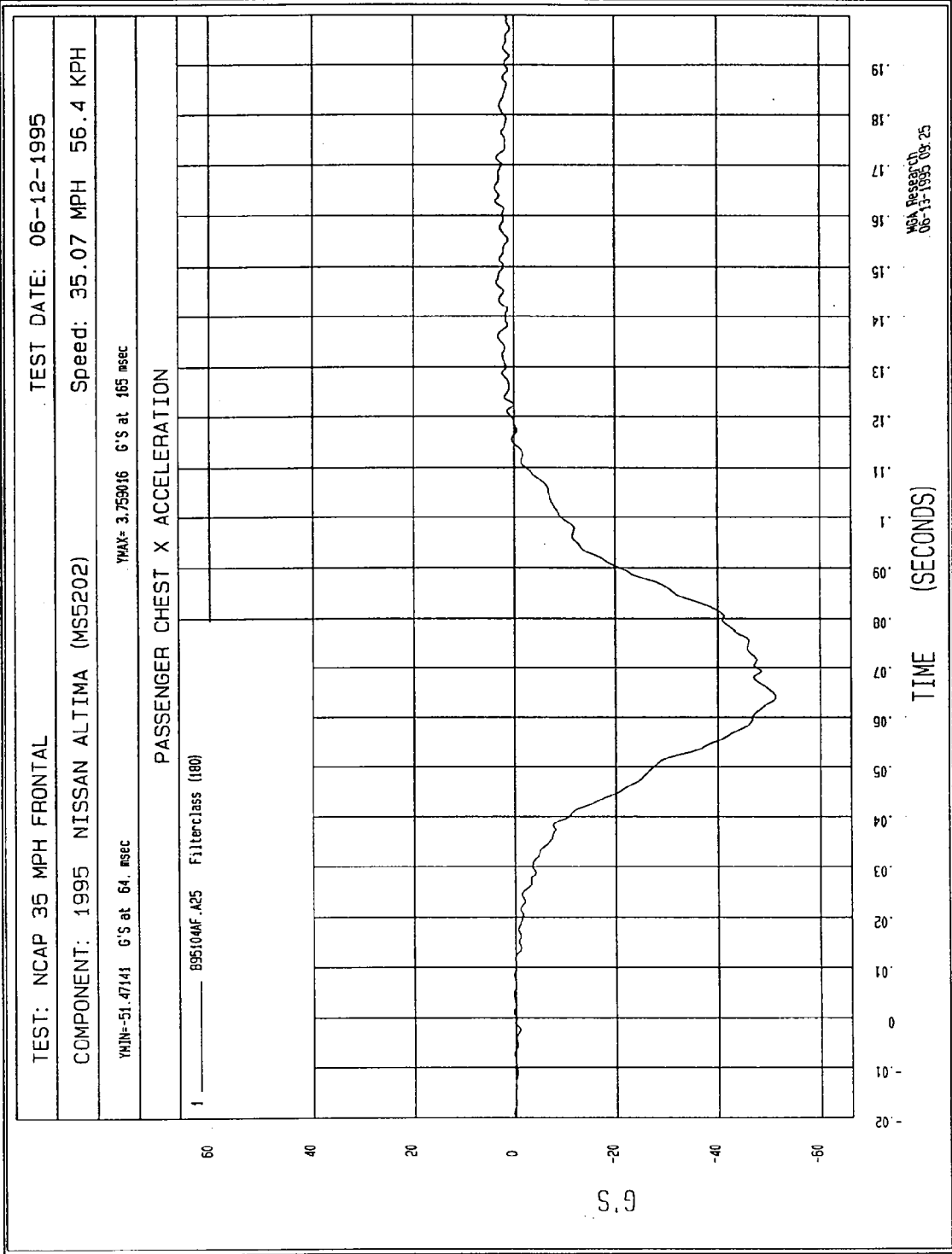


Figure B-91 - Passenger Chest X Acceleration vs. Time

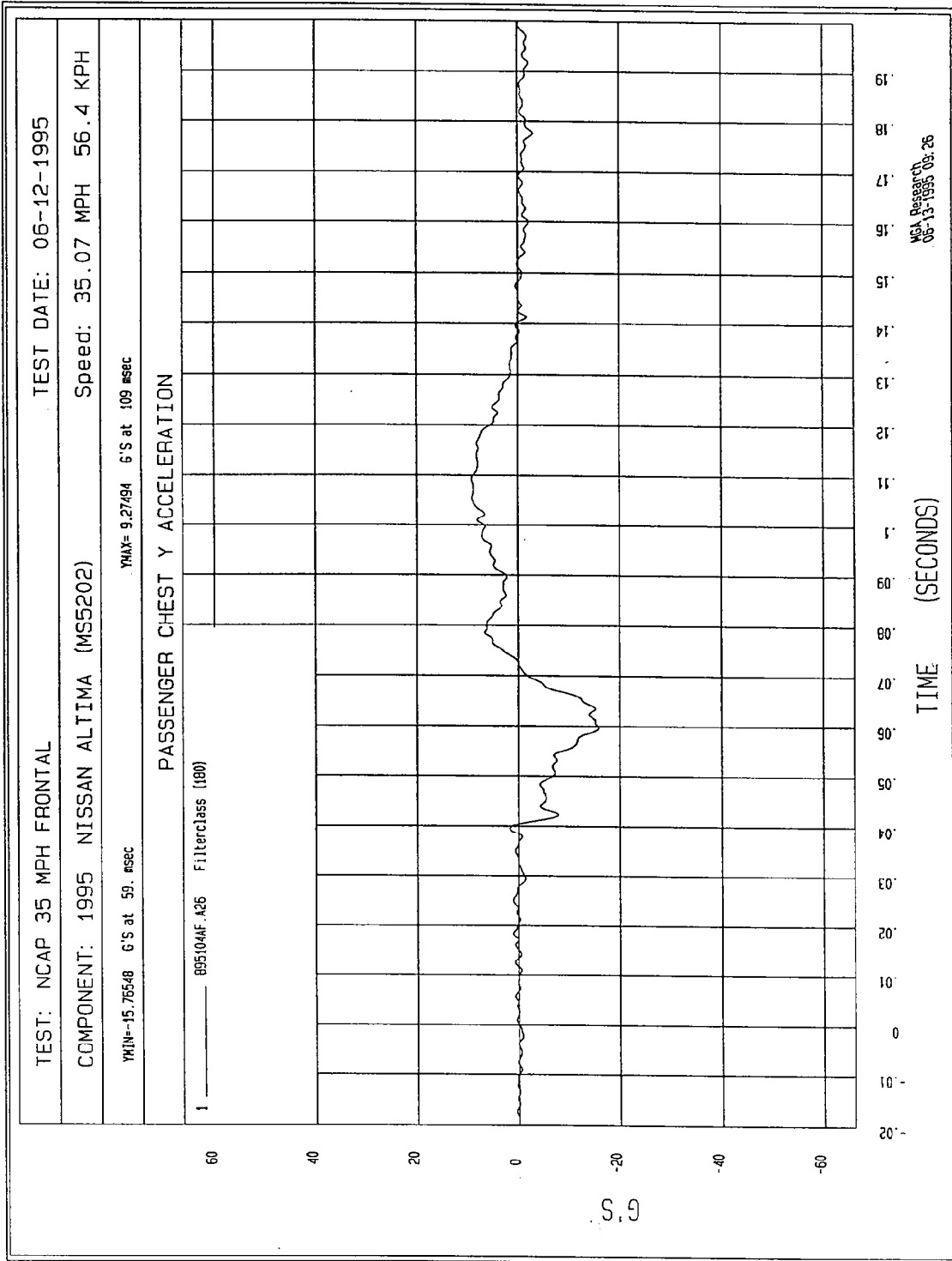


Figure B-92 - Passenger Chest Y Acceleration vs. Time

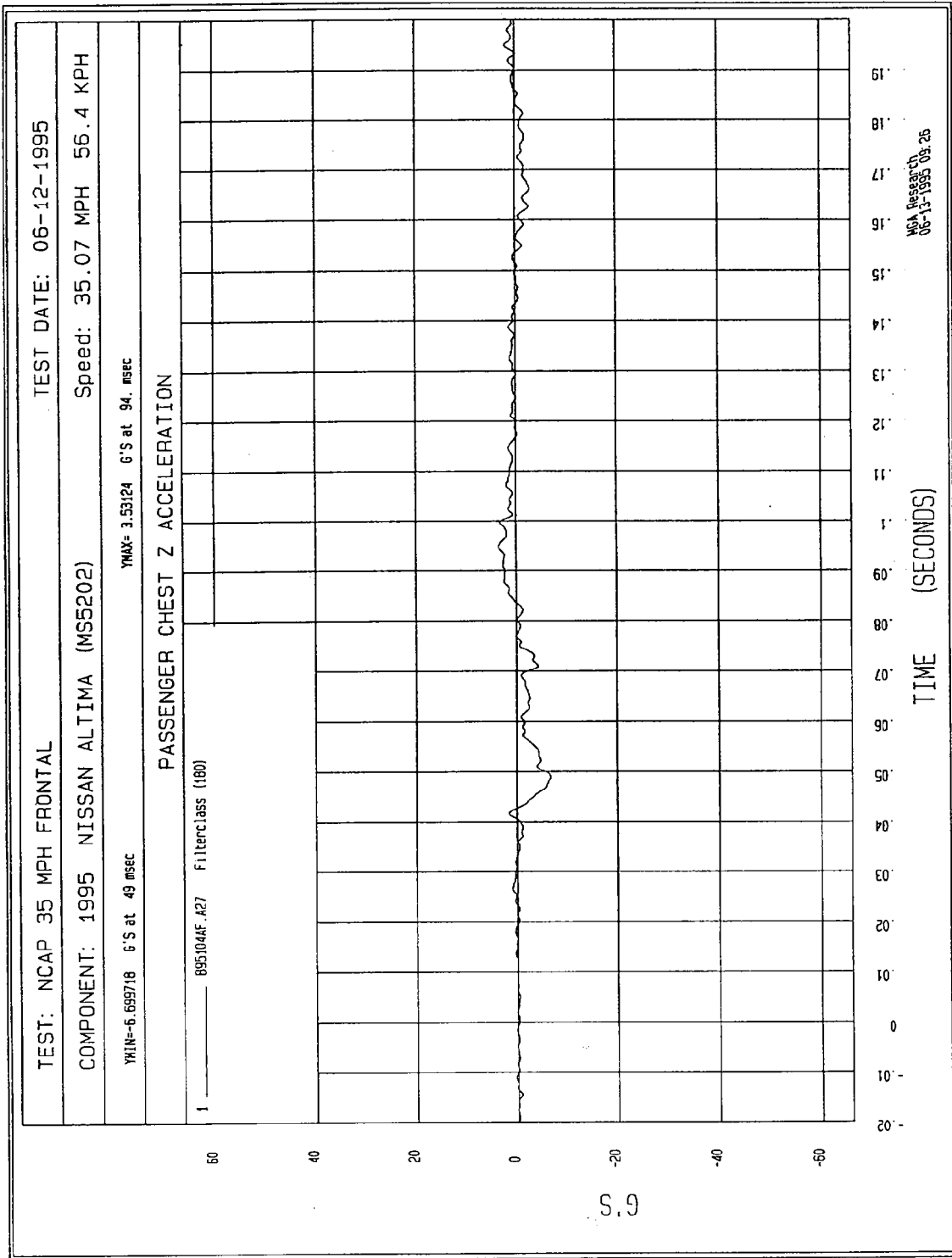


Figure B-93 - Passenger Chest Z Acceleration vs. Time

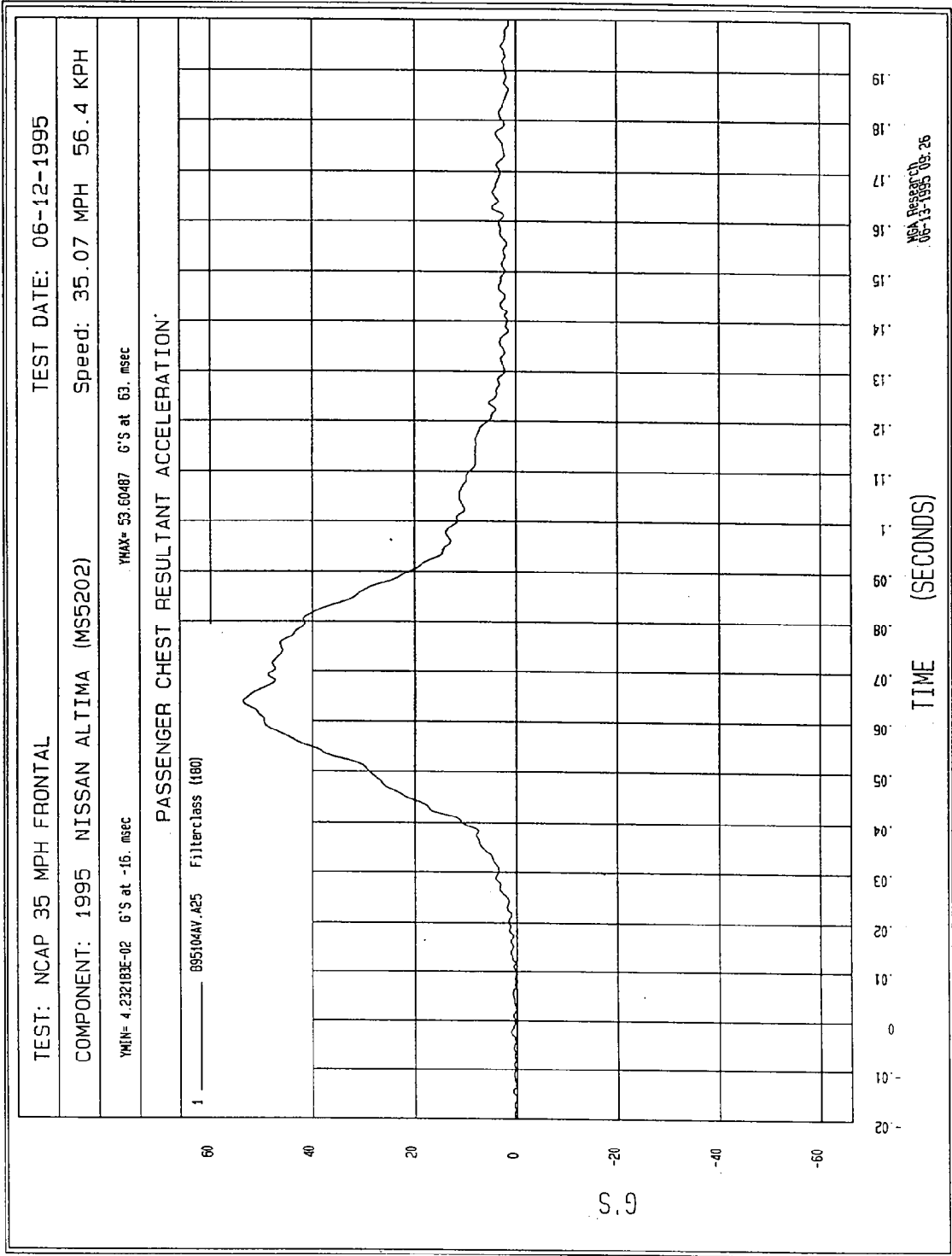


Figure B-94 - Passenger Chest Resultant Acceleration vs. Time

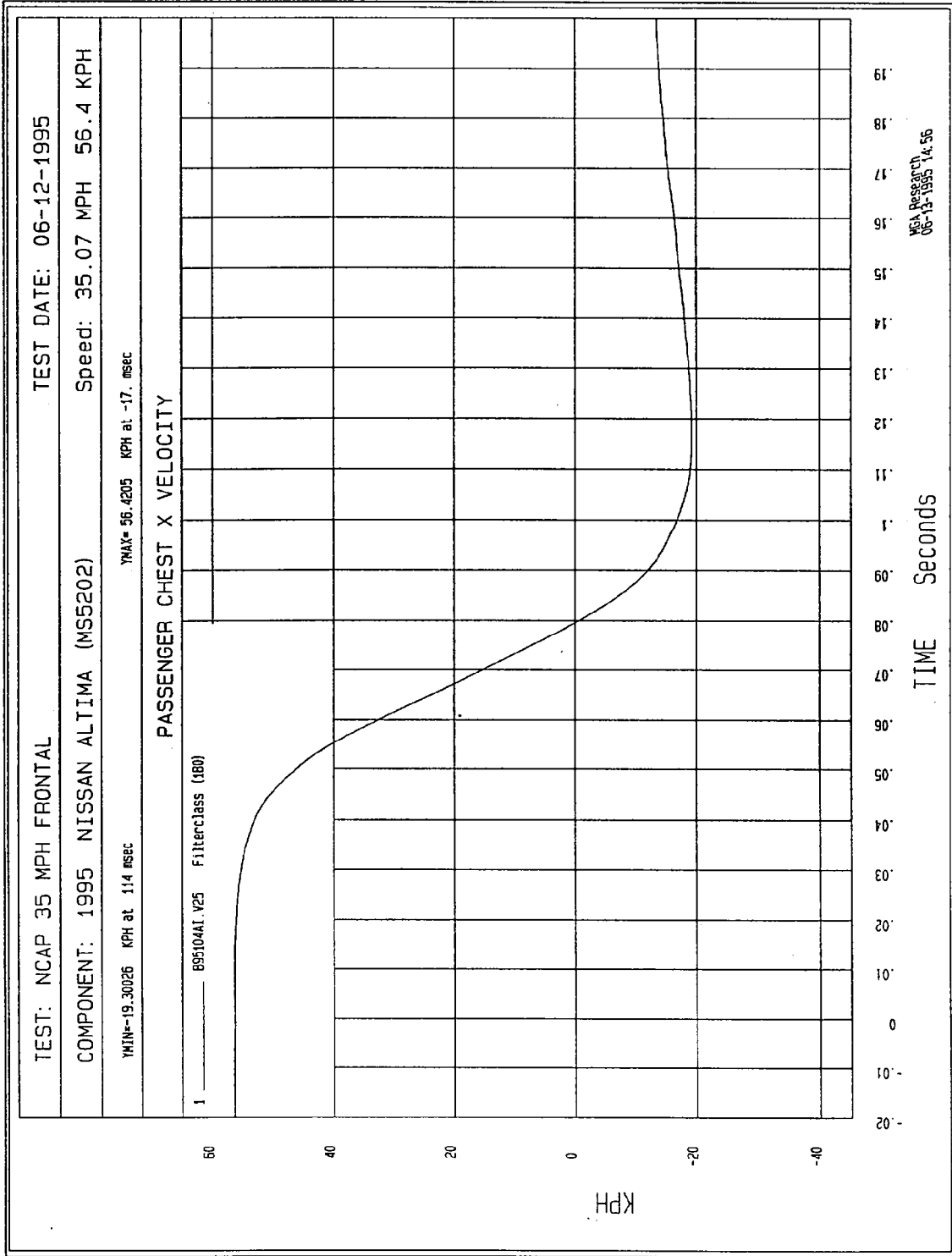


Figure B-95 - Passenger Chest X Velocity vs. Time

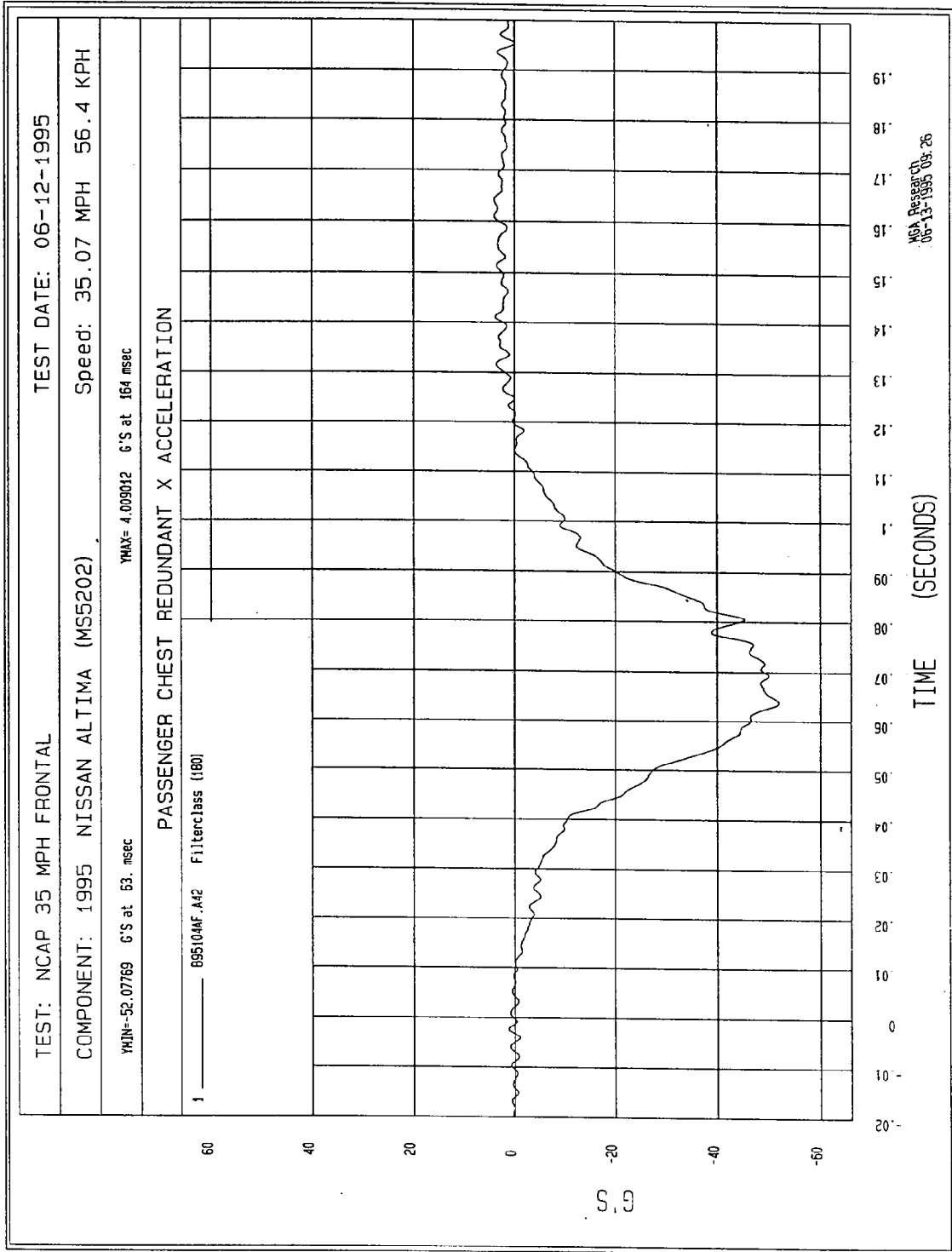


Figure B-96 - Passenger Chest Redundant X Acceleration vs. Time

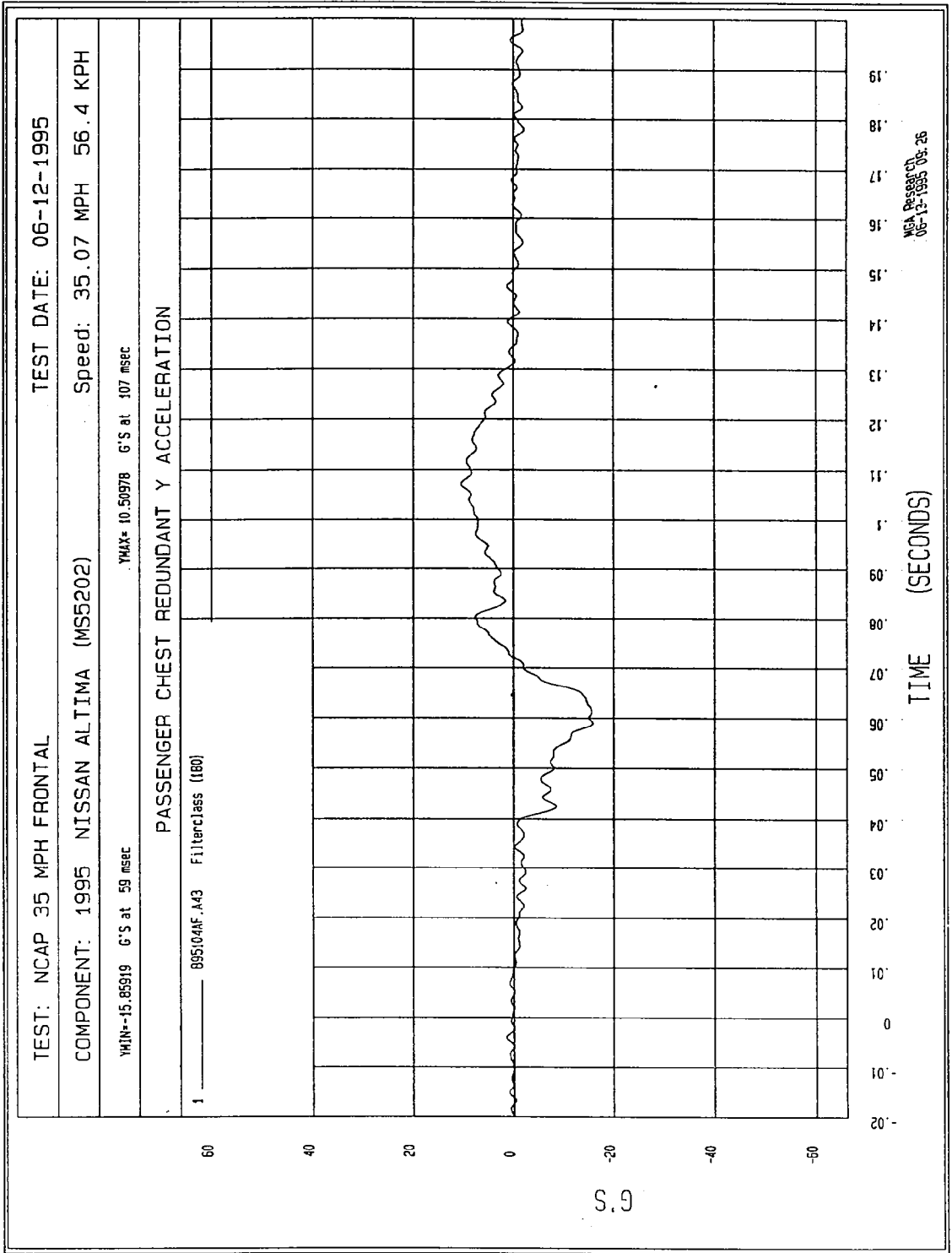
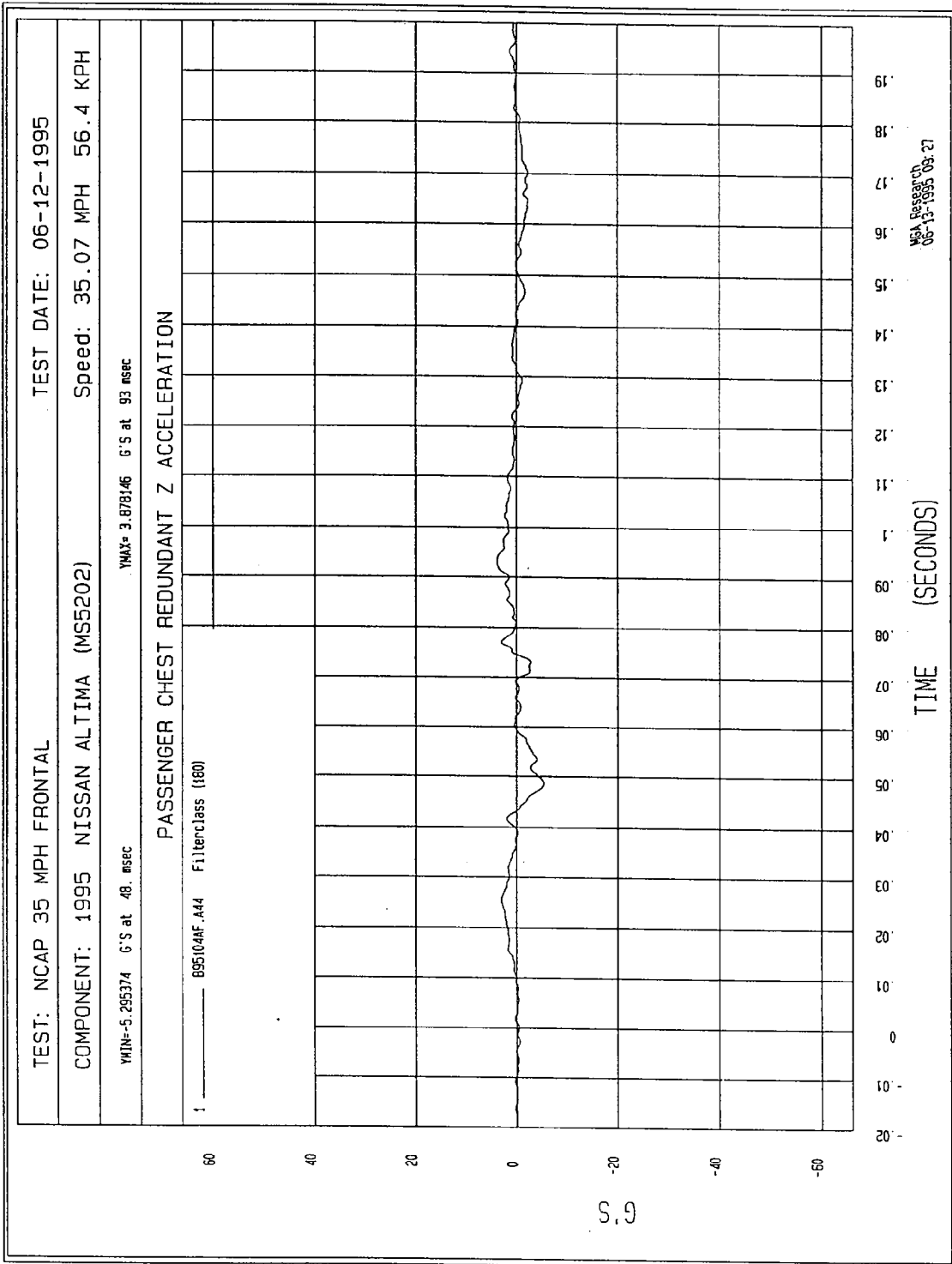


Figure B-97 - Passenger Chest Redundant Y Acceleration vs. Time



B-98

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

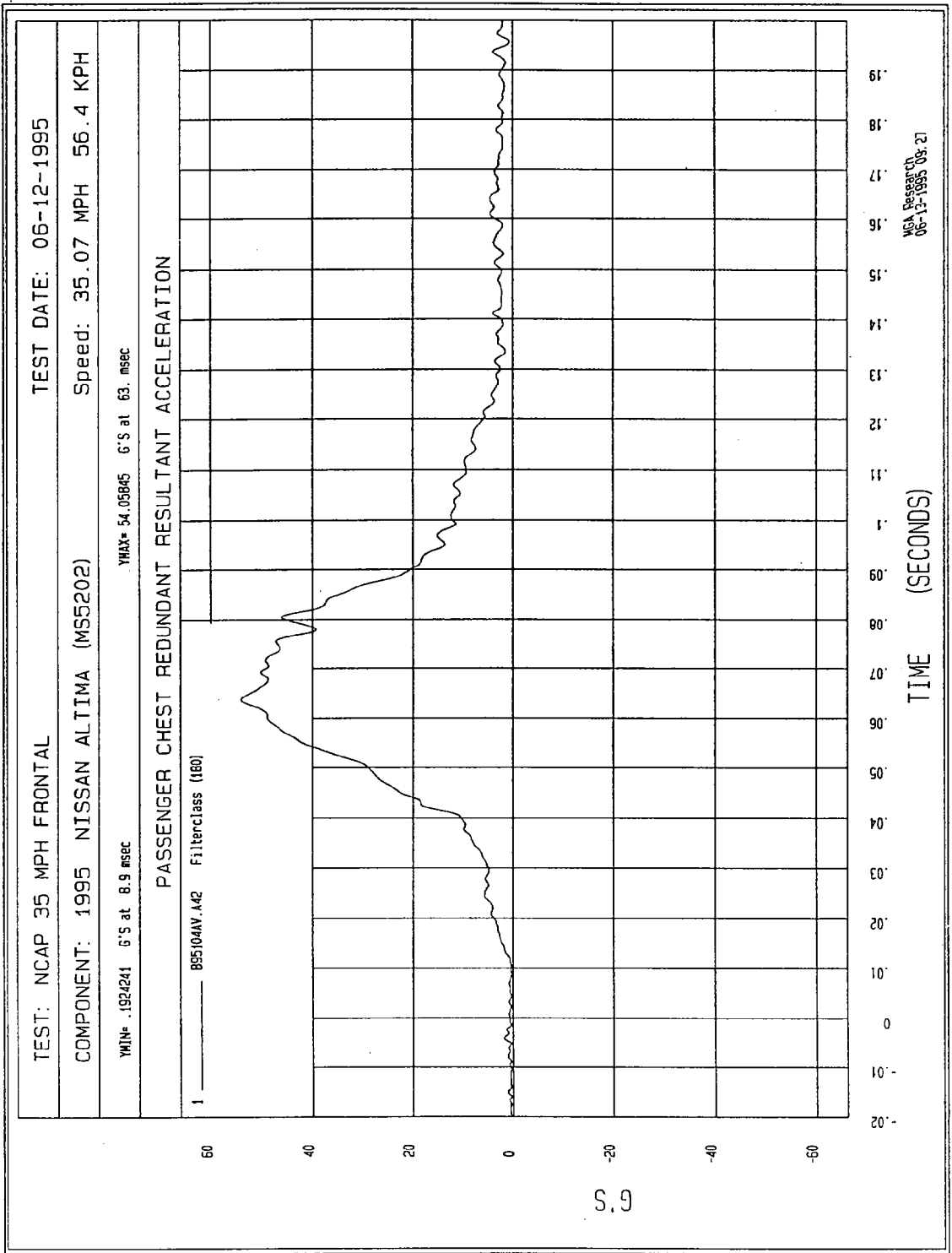


Figure B-99 - Passenger Chest Redundant Resultant Accel. vs. Time

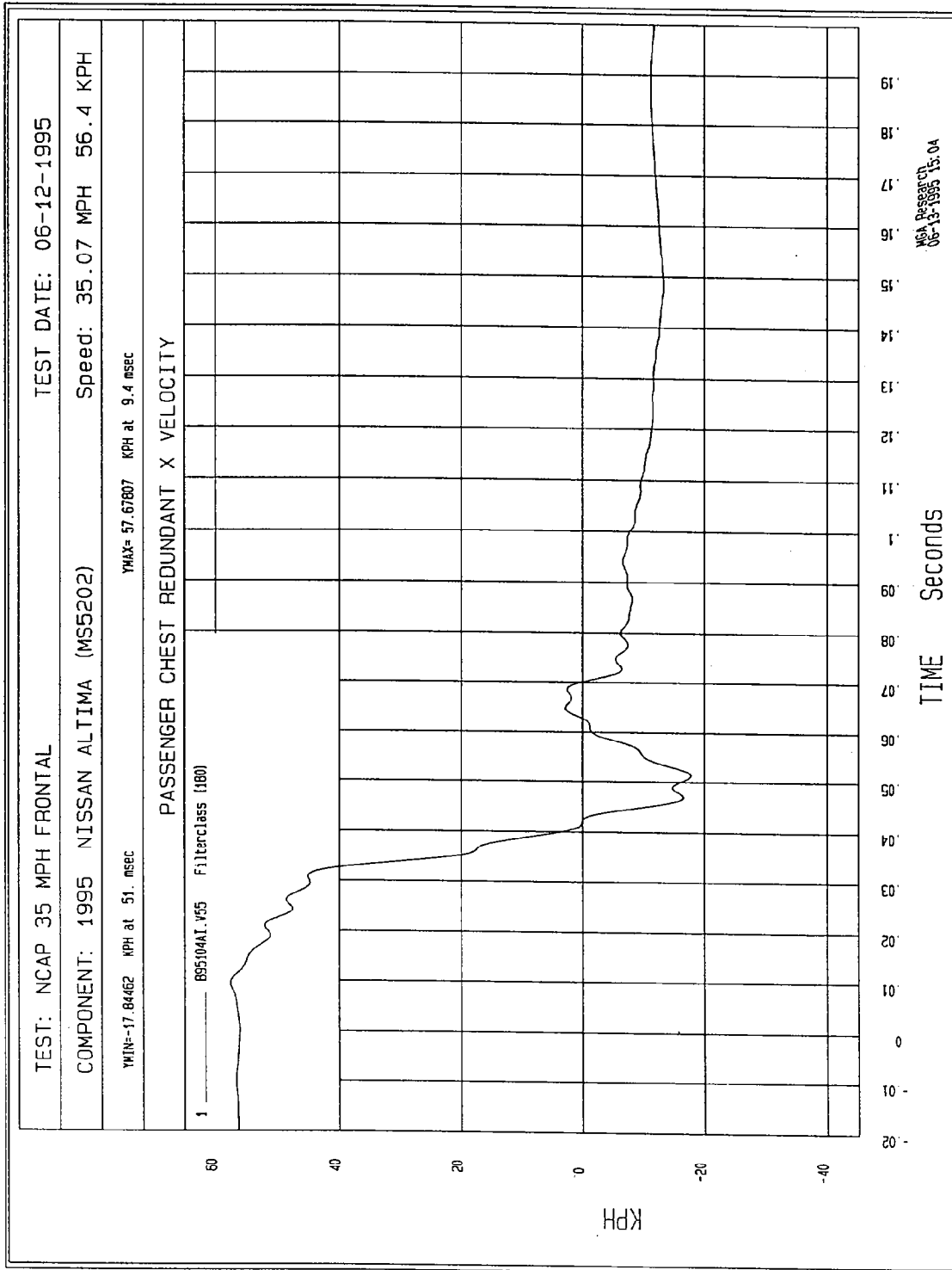


Figure B-100 - Passenger Chest Redundant X Velocity vs. Time

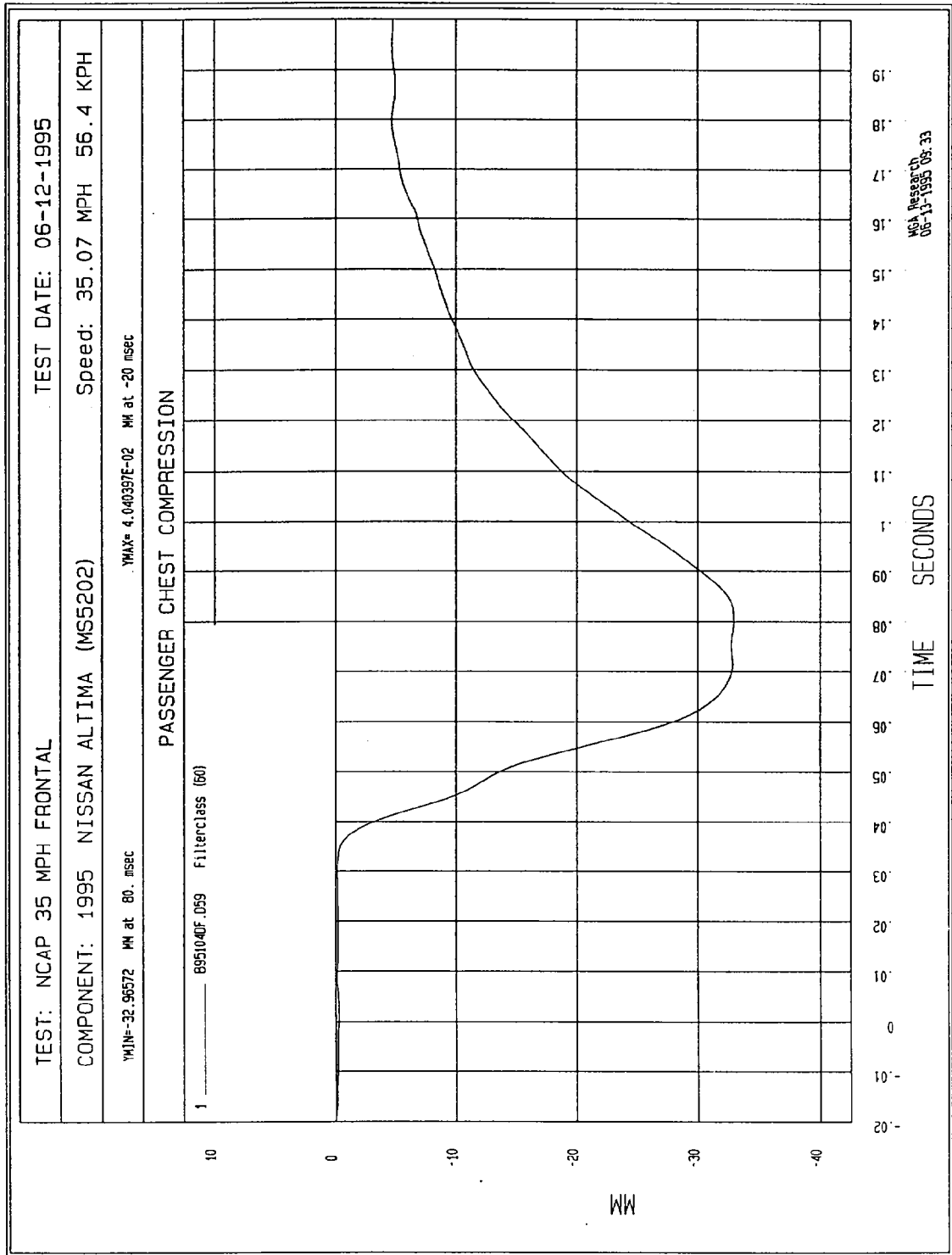


Figure B-101 - Passenger Chest Compression vs. Time

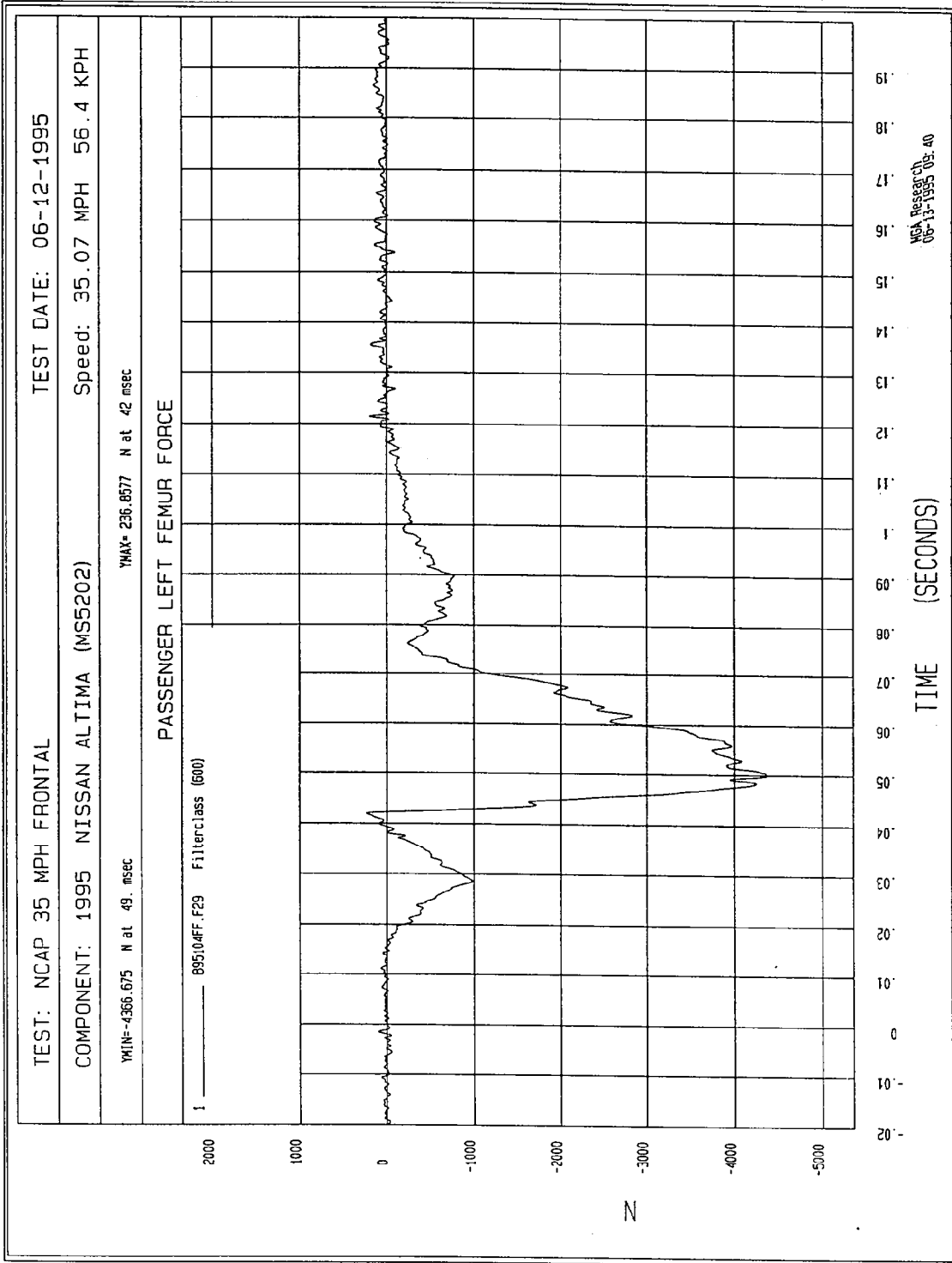


Figure B-102 - Passenger Left Femur Force vs. Time

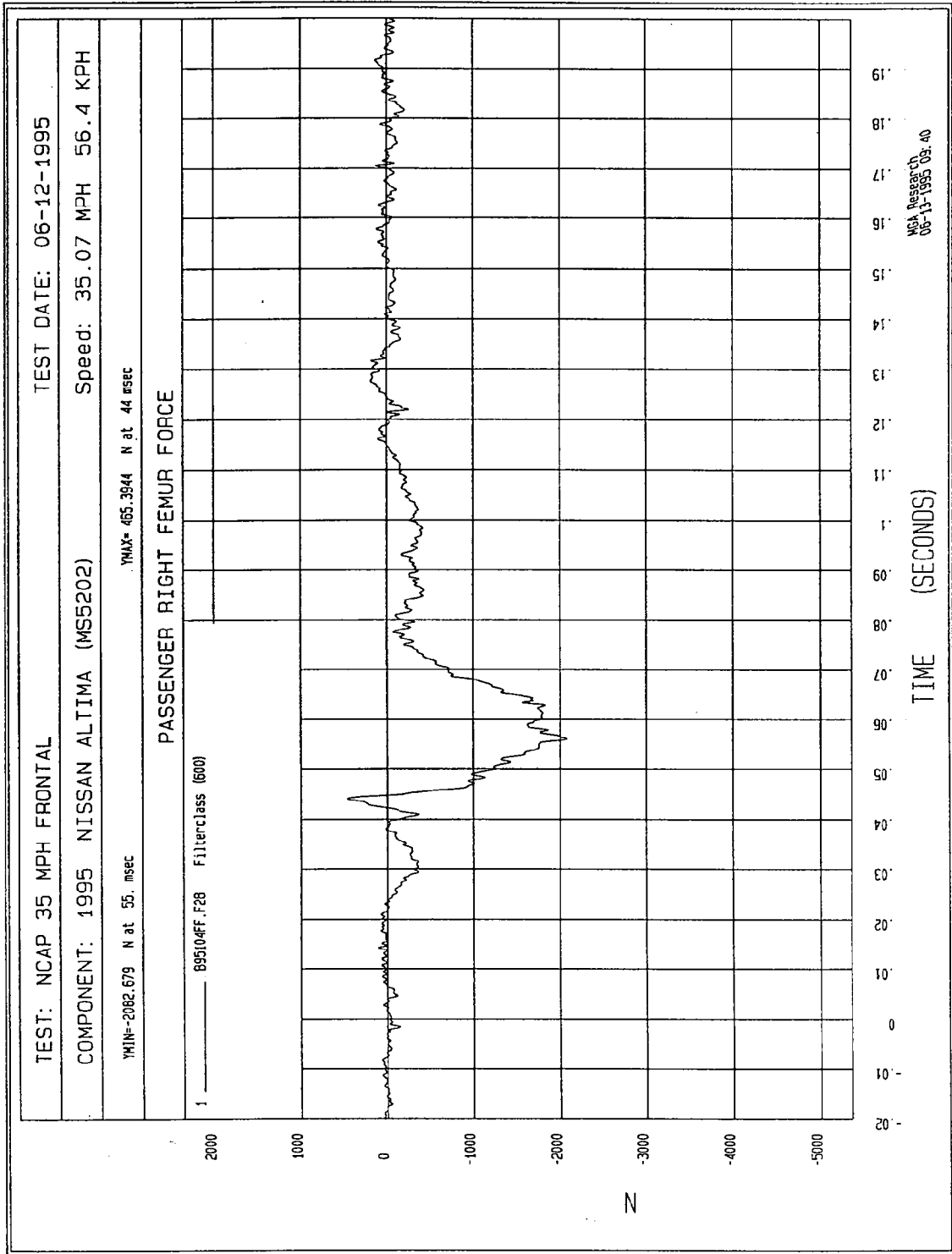


Figure B-103 - Passenger Right Femur Force vs. Time

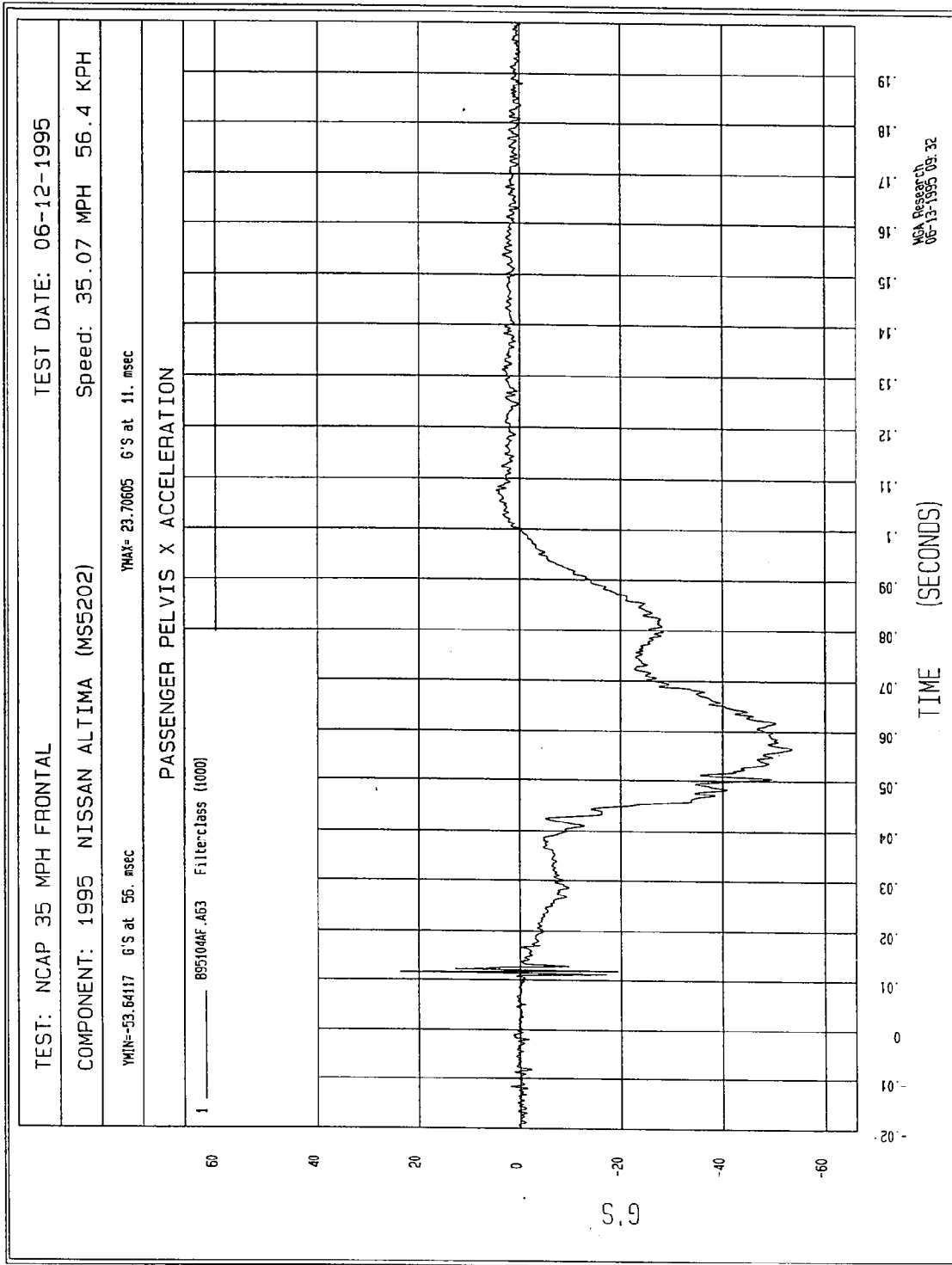


Figure B-104 - Passenger Pelvis X Acceleration vs. Time

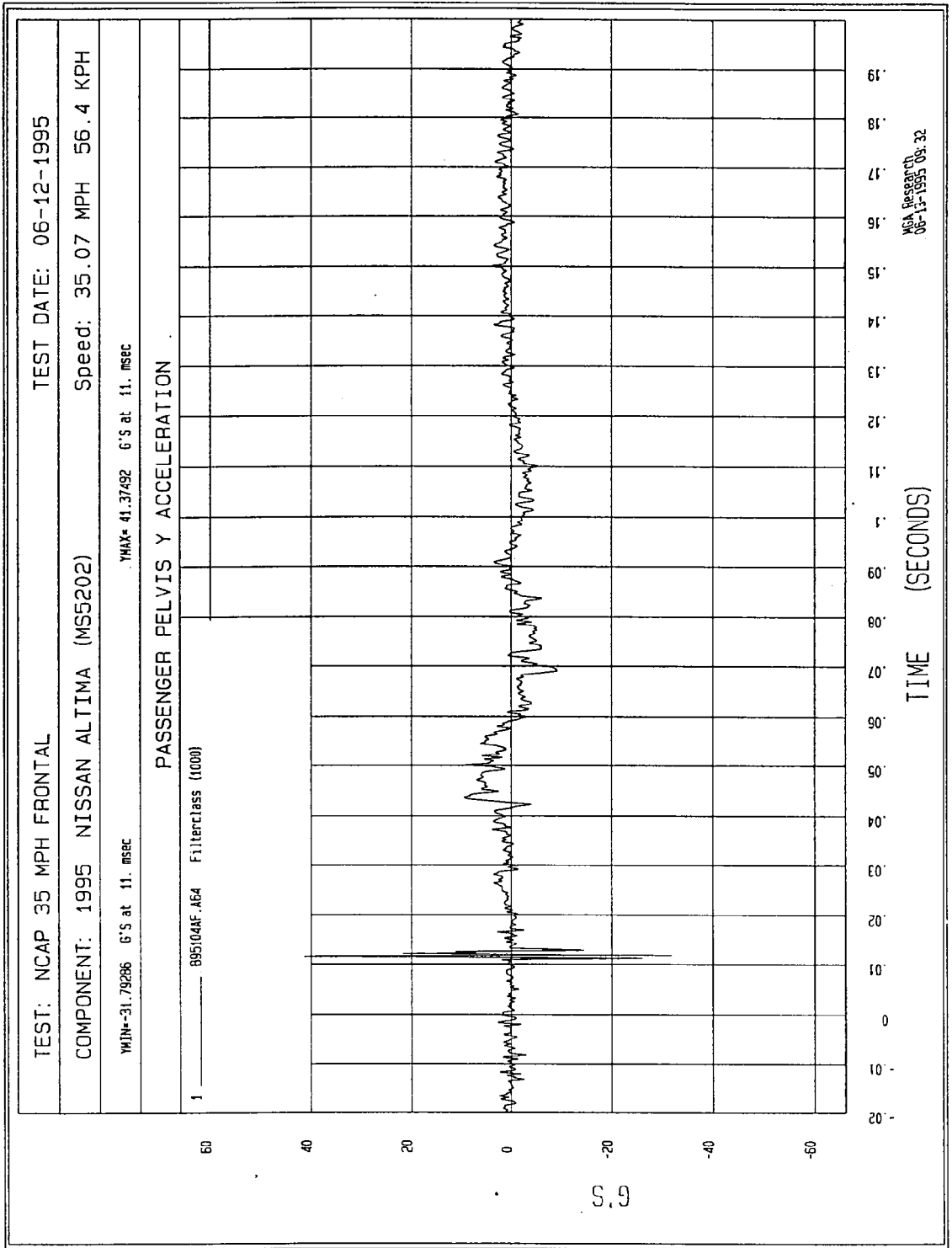


Figure B-105 - Passenger Pelvis Y Acceleration vs. Time

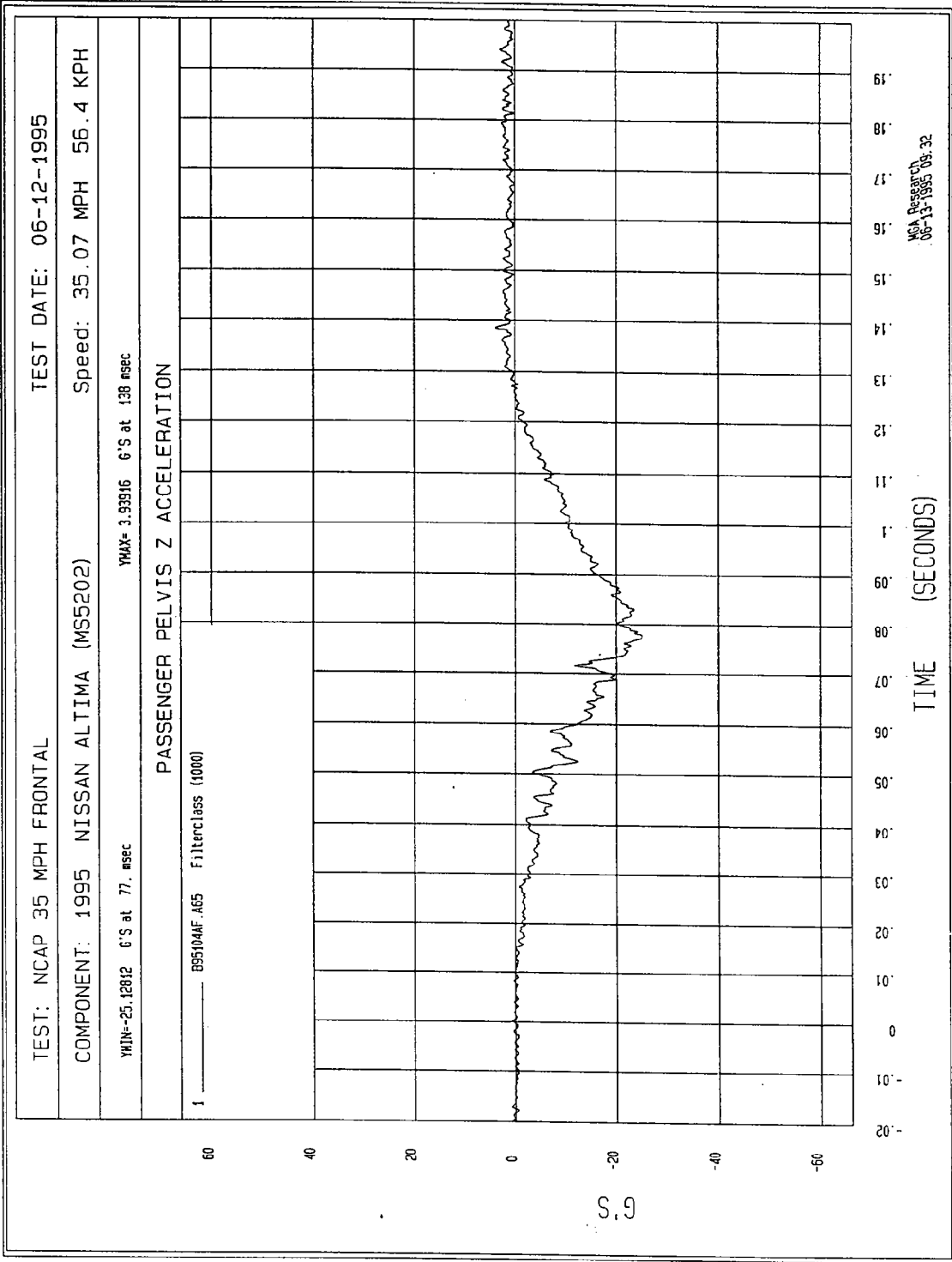


Figure B-106 - Passenger Pelvis Z Acceleration vs. Time

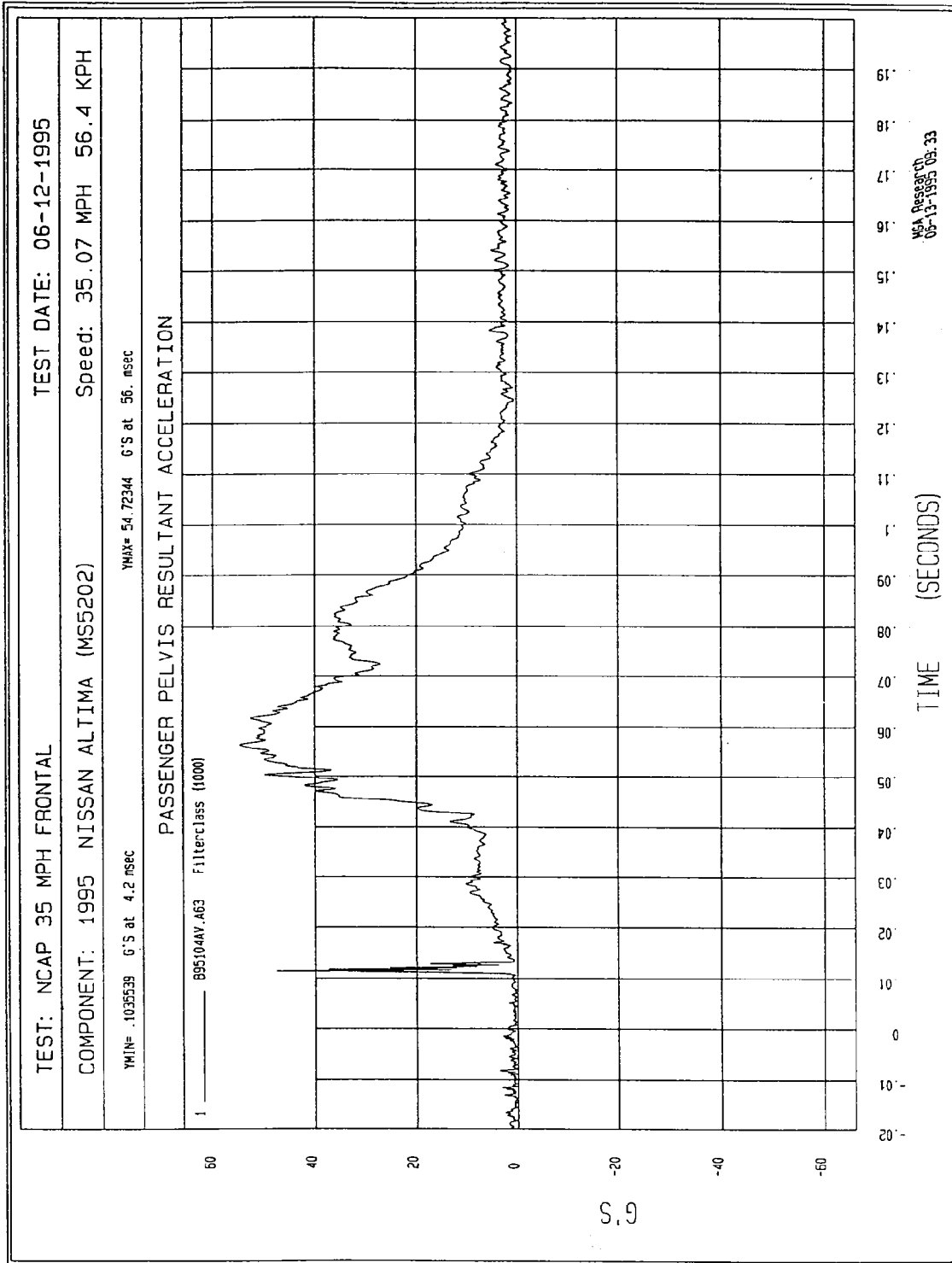
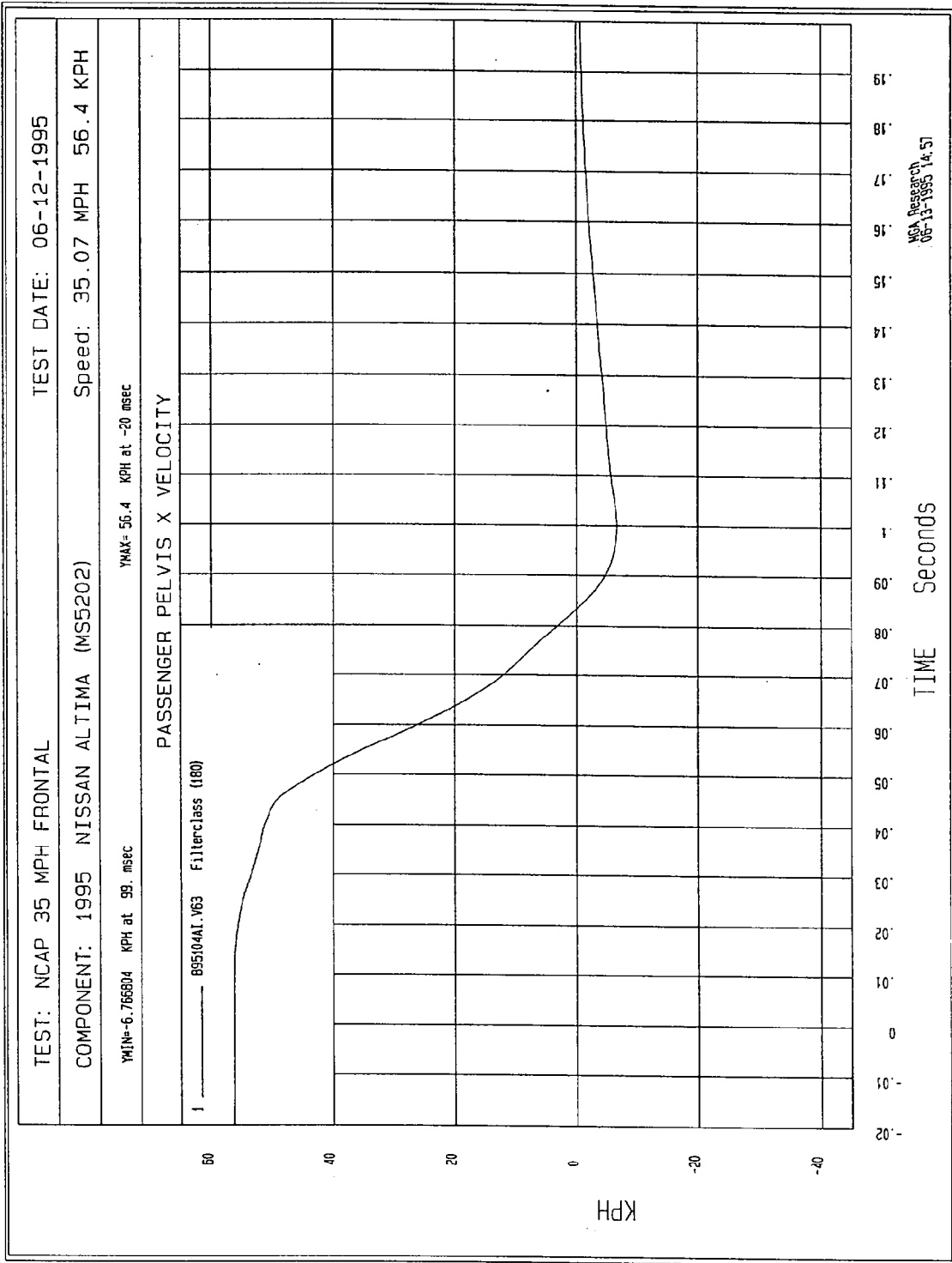


Figure B-107 - Passenger Pelvis Resultant Acceleration vs. Time



B-108

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

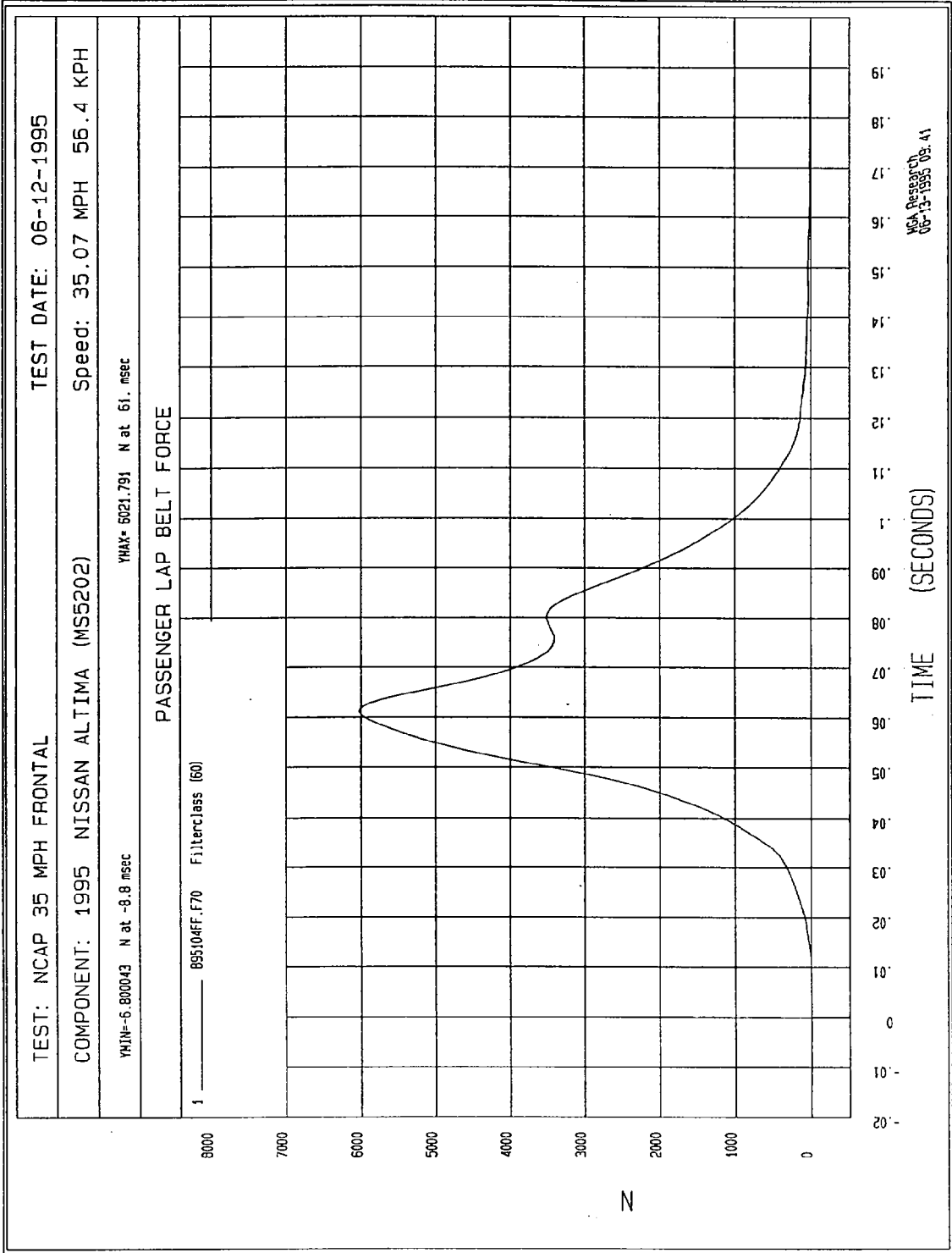
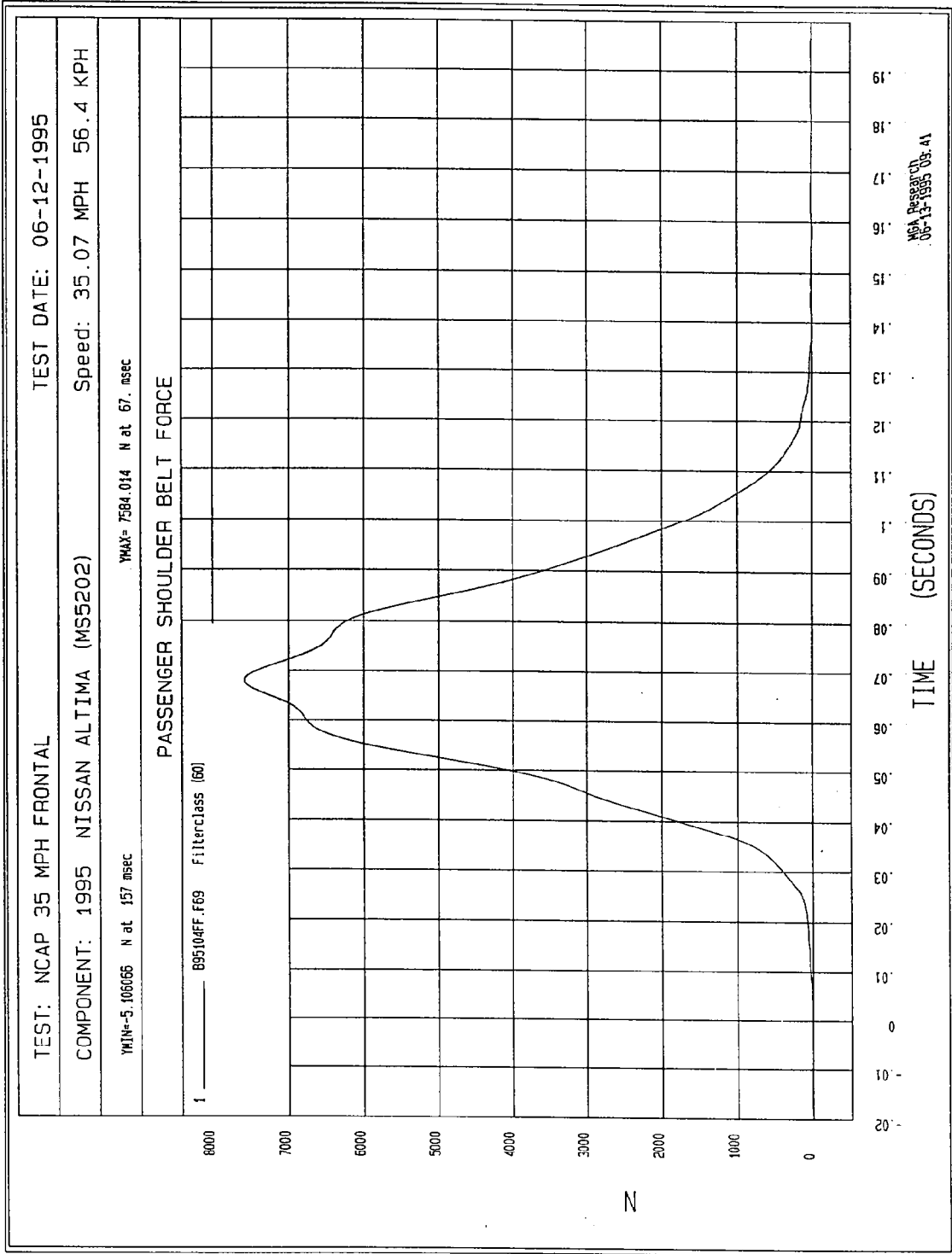


Figure B-109 - Passenger Lap Belt Force vs. Time



B-110

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

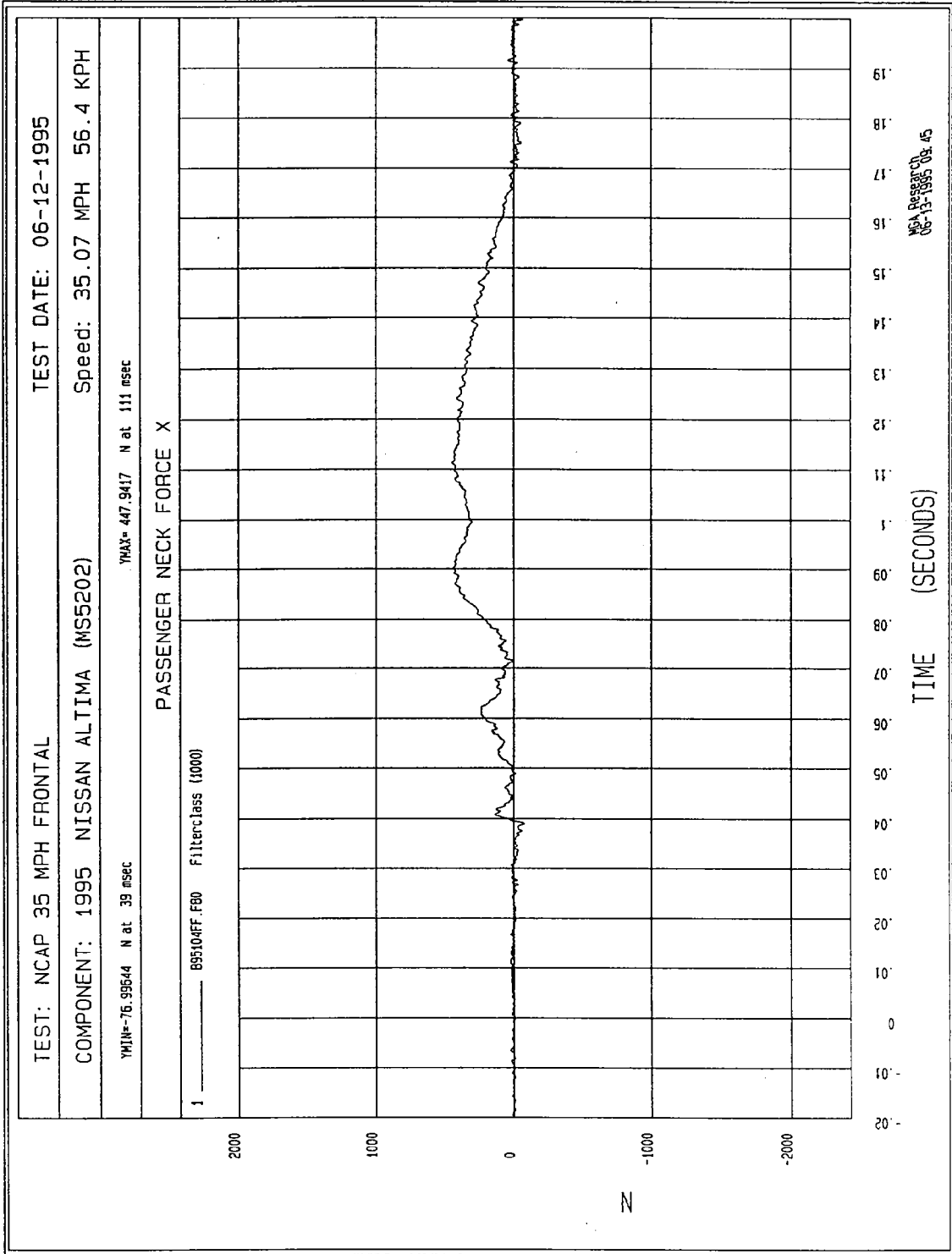


Figure B-111 • Passenger Neck Force X vs. Time

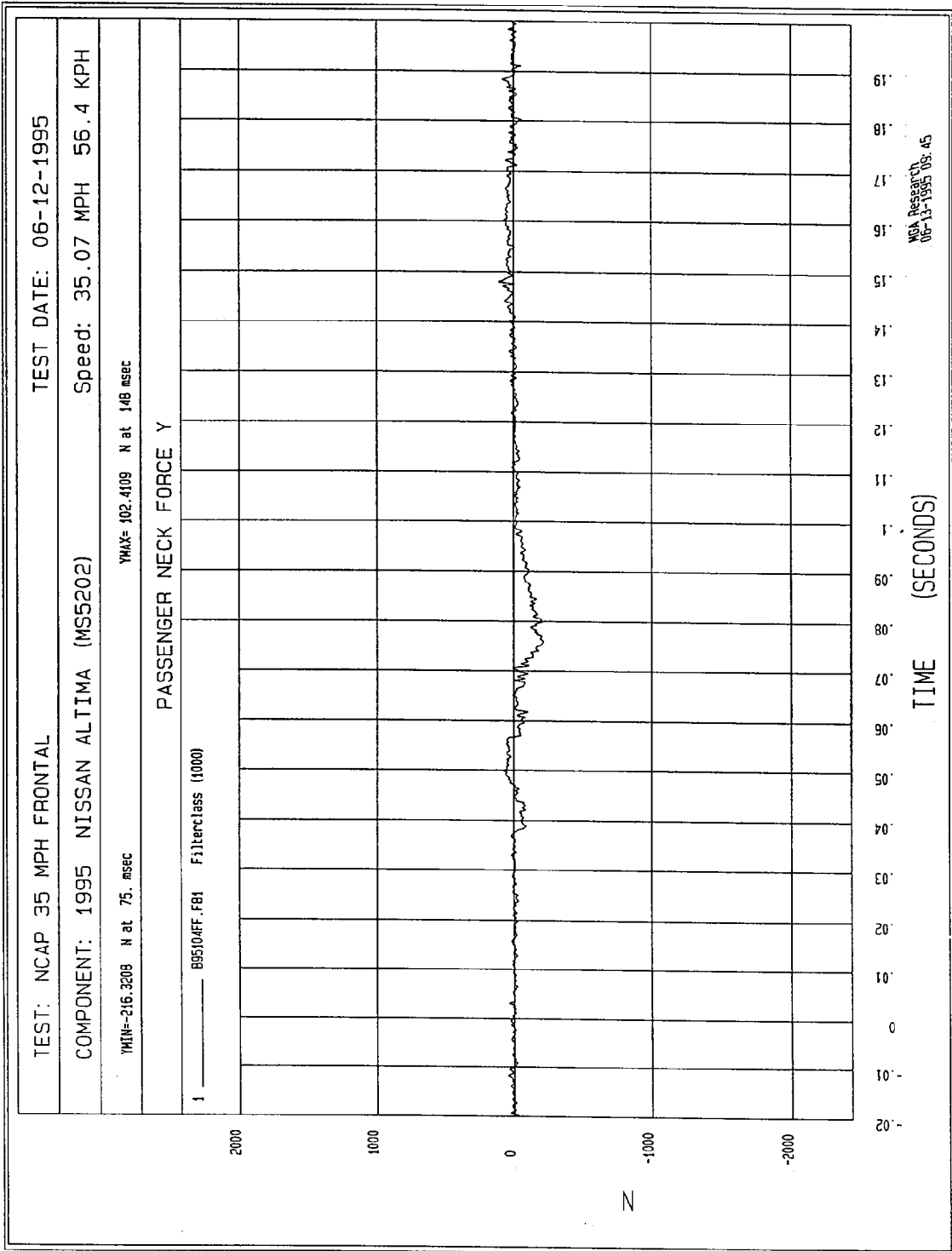


Figure B-112 - Passenger Neck Force Y vs. Time

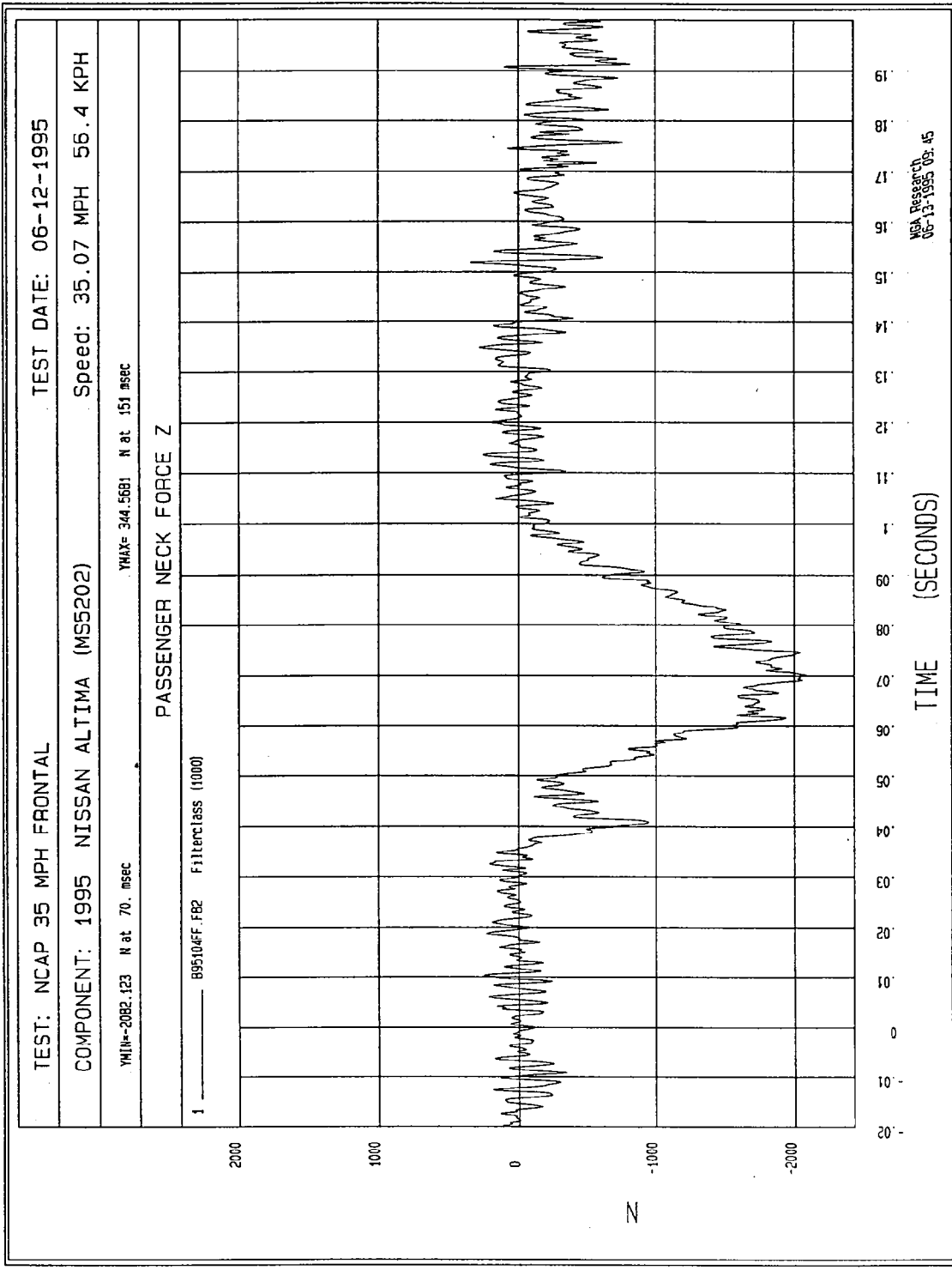
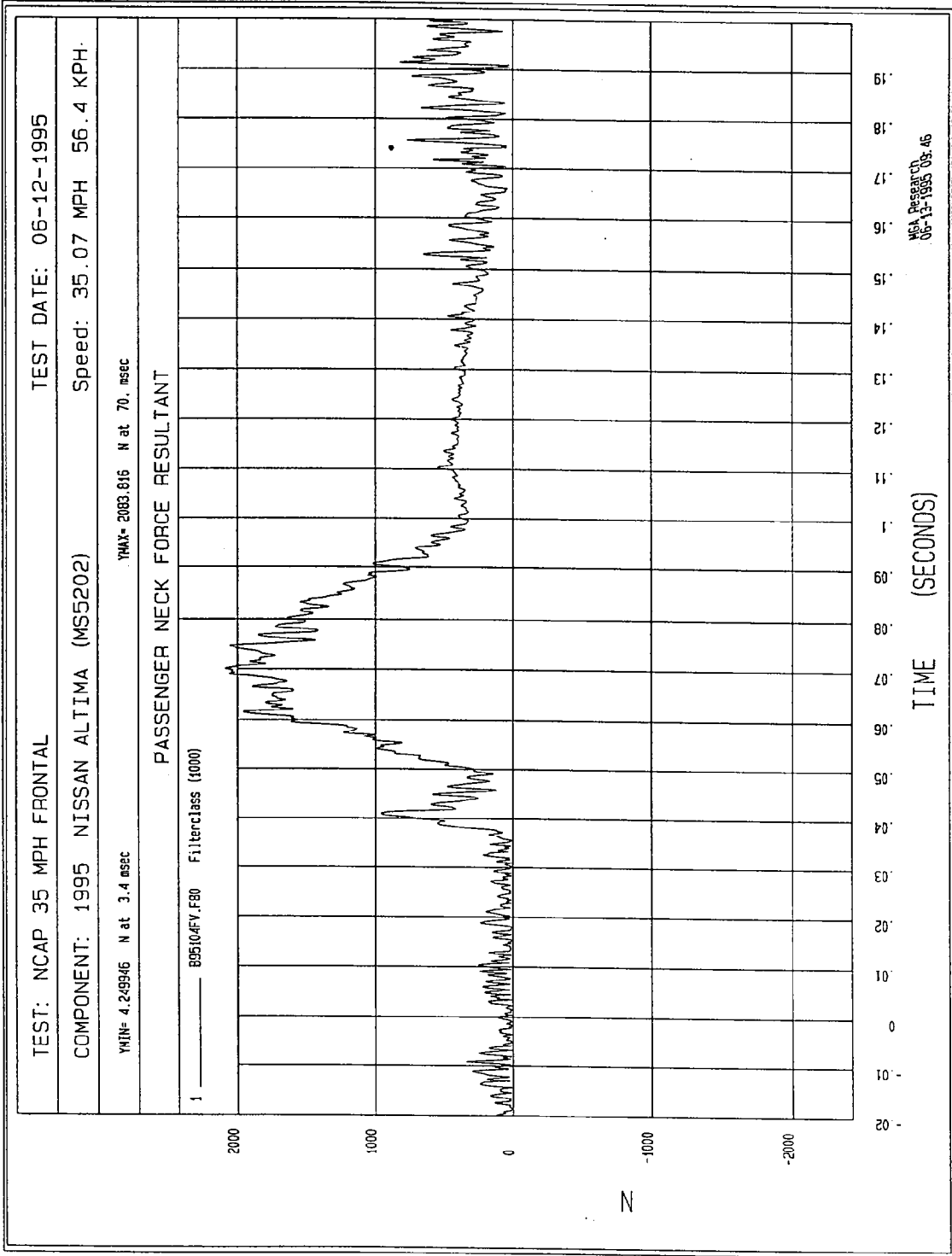


Figure B-113 - Passenger Neck Force Z vs. Time



B-114

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

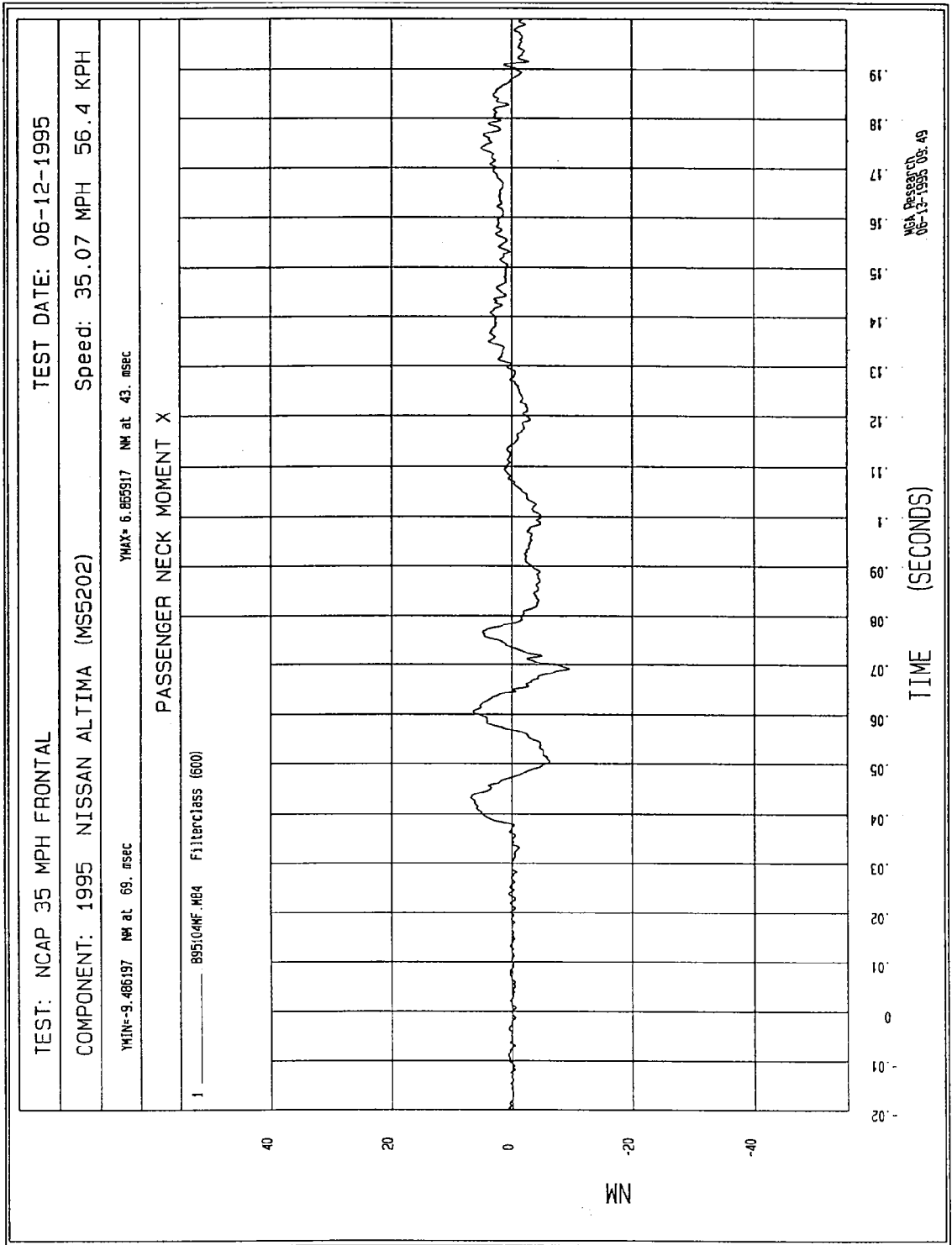


Figure B-115 - Passenger Neck Moment X vs. Time

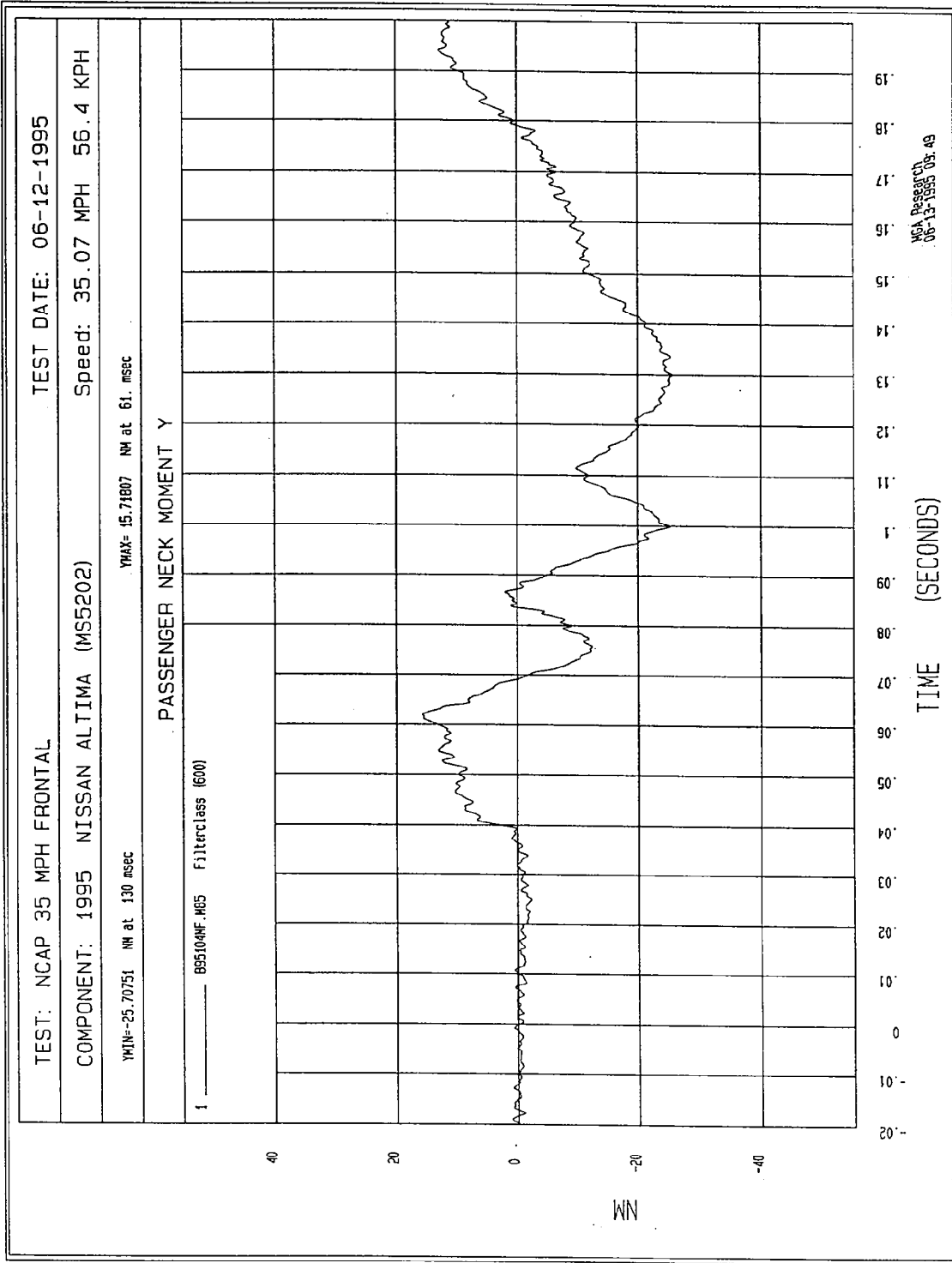


Figure B-116 - Passenger Neck Moment Y vs. Time

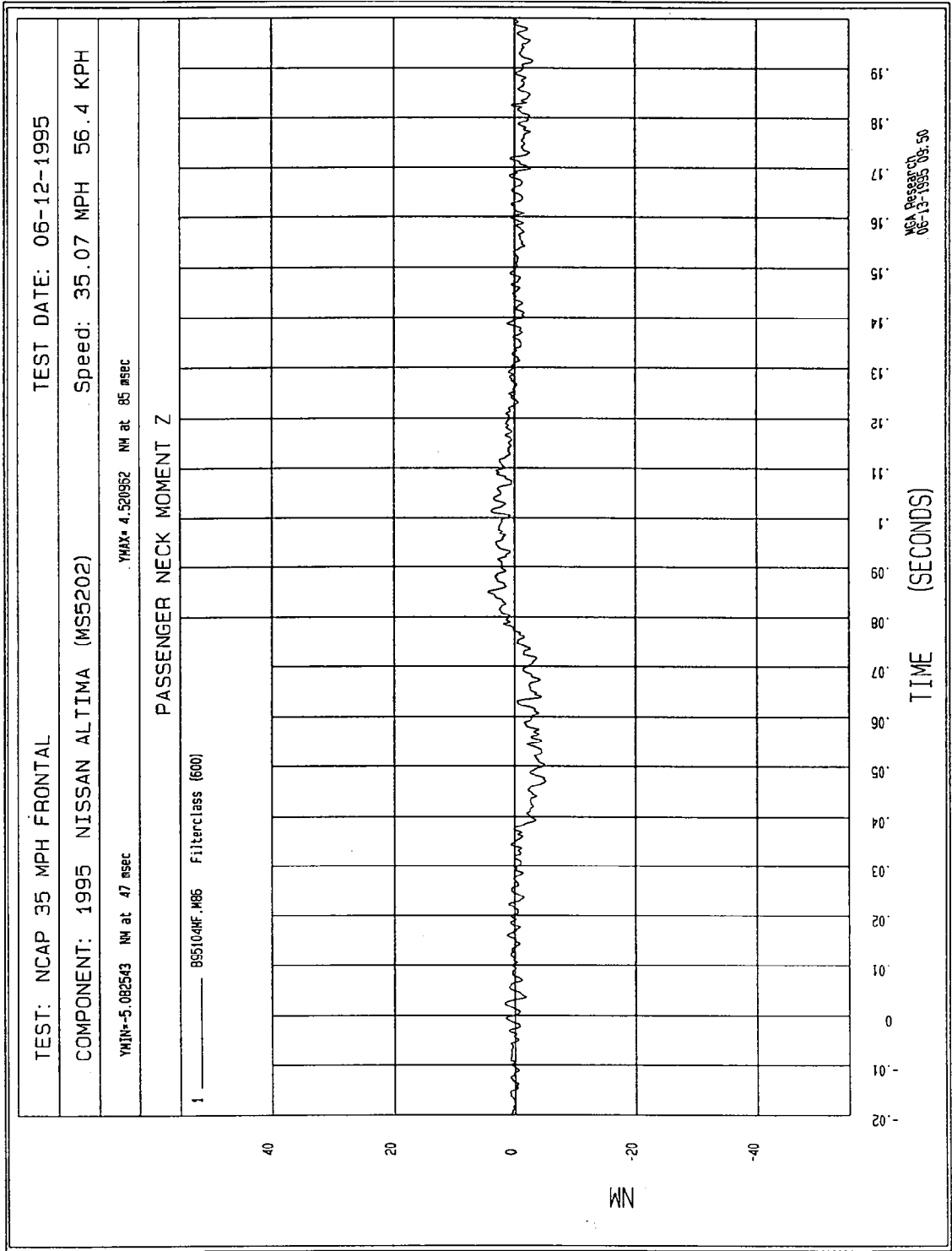


Figure B-117 - Passenger Neck Moment Z vs. Time

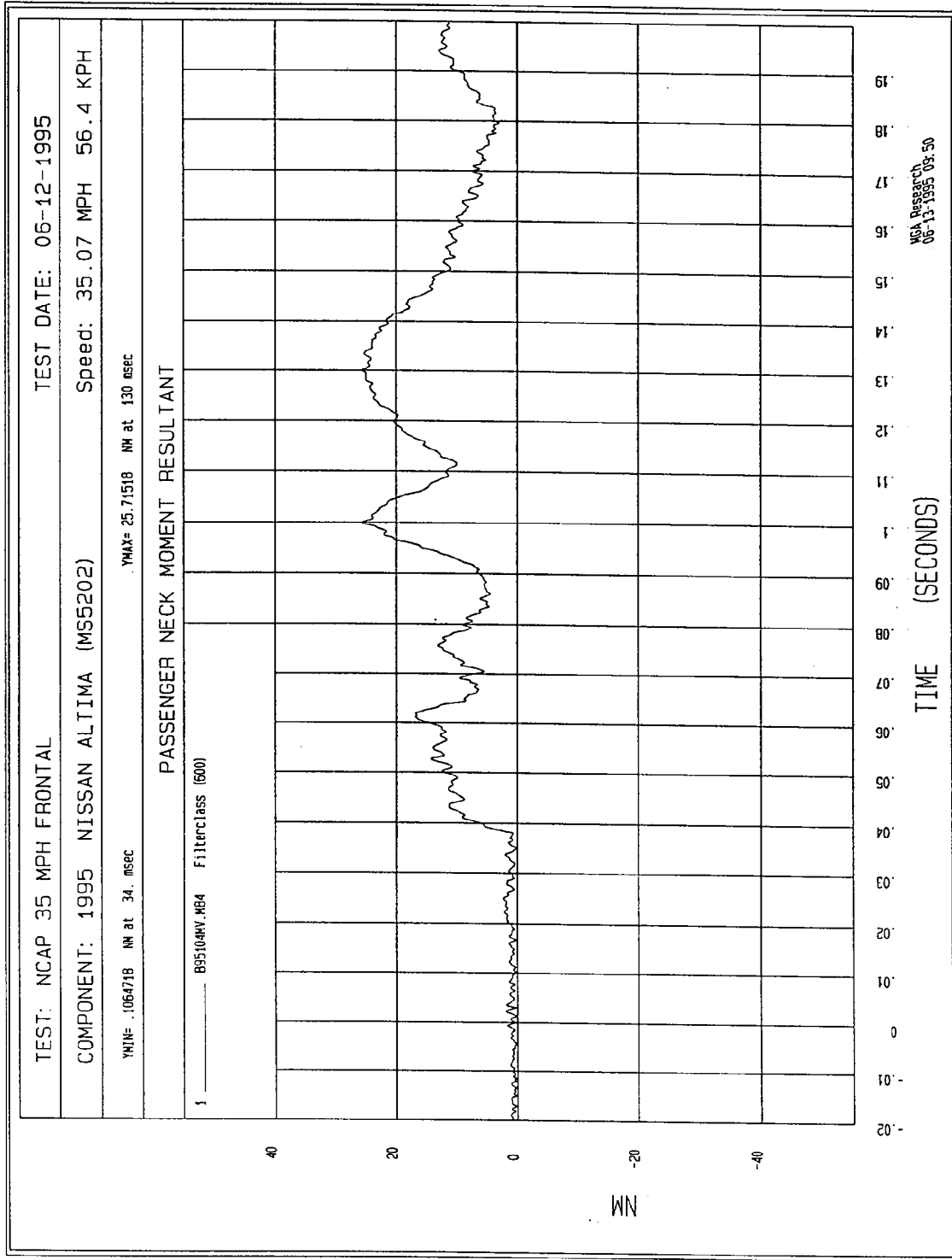
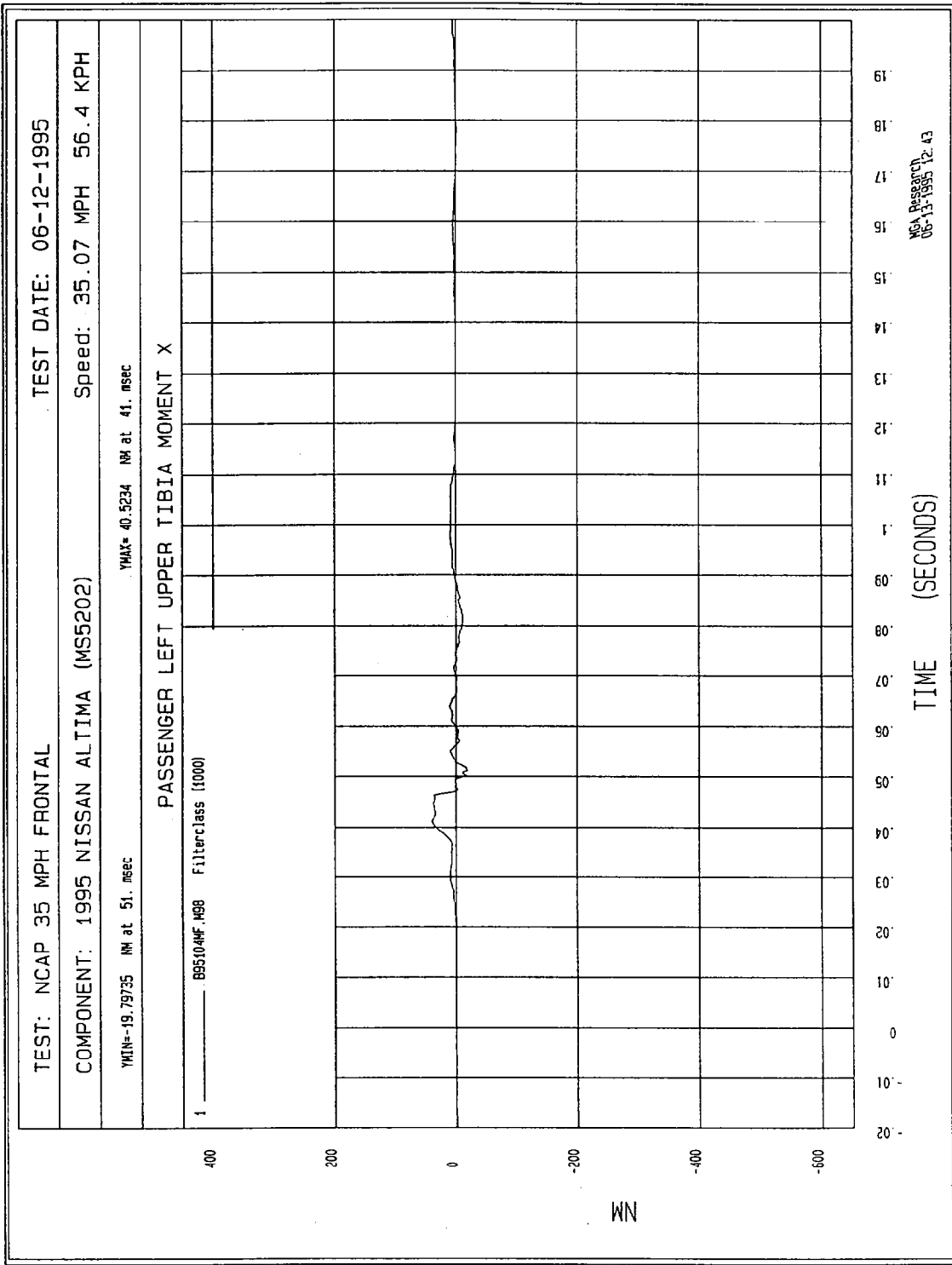


Figure B-118 - Passenger Neck Moment Resultant vs. Time



B-119

Figure B-119 - Passenger Left Upper Tibia Moment X vs. Time

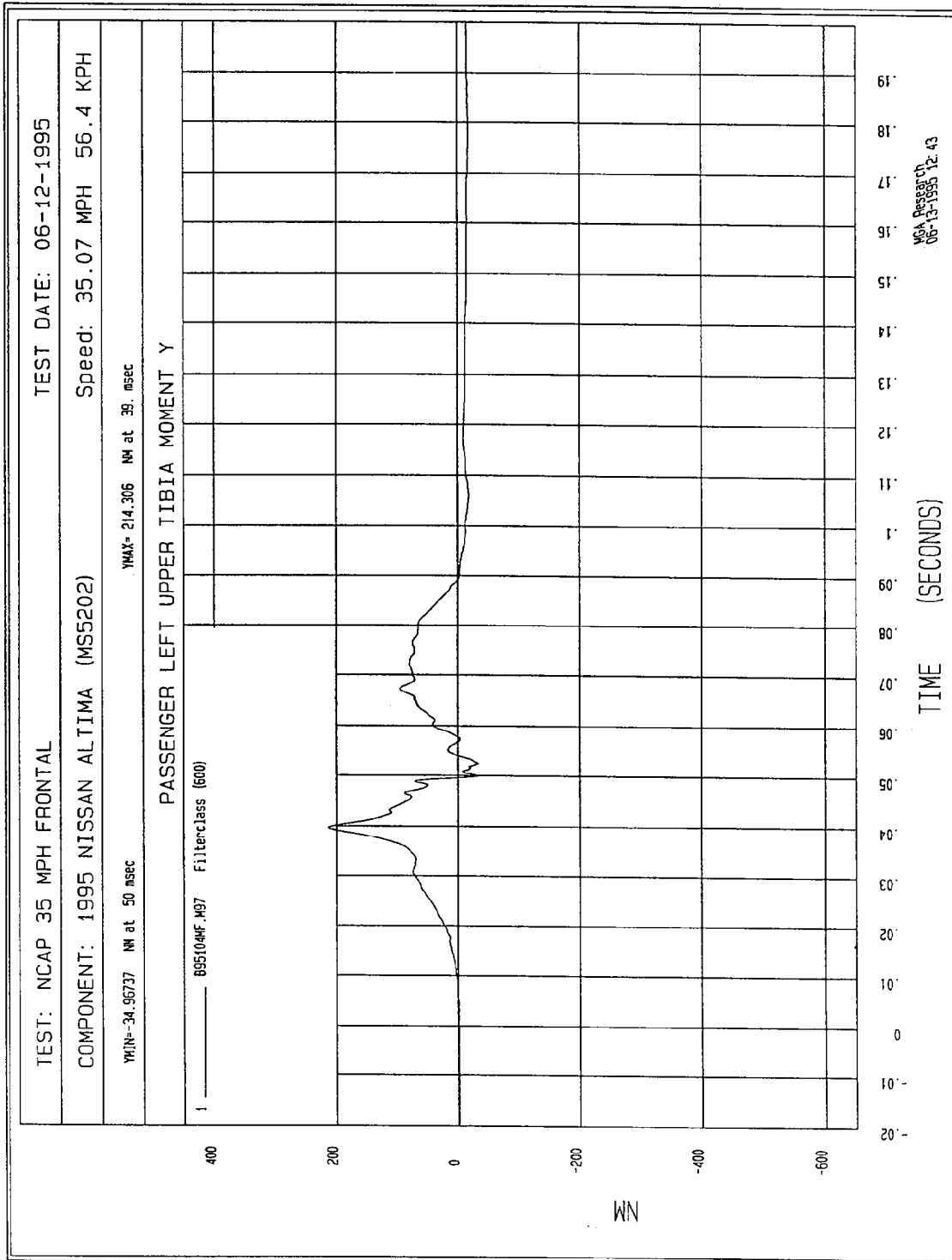


Figure B-120 - Passenger Left Upper Tibia Moment Y vs. Time

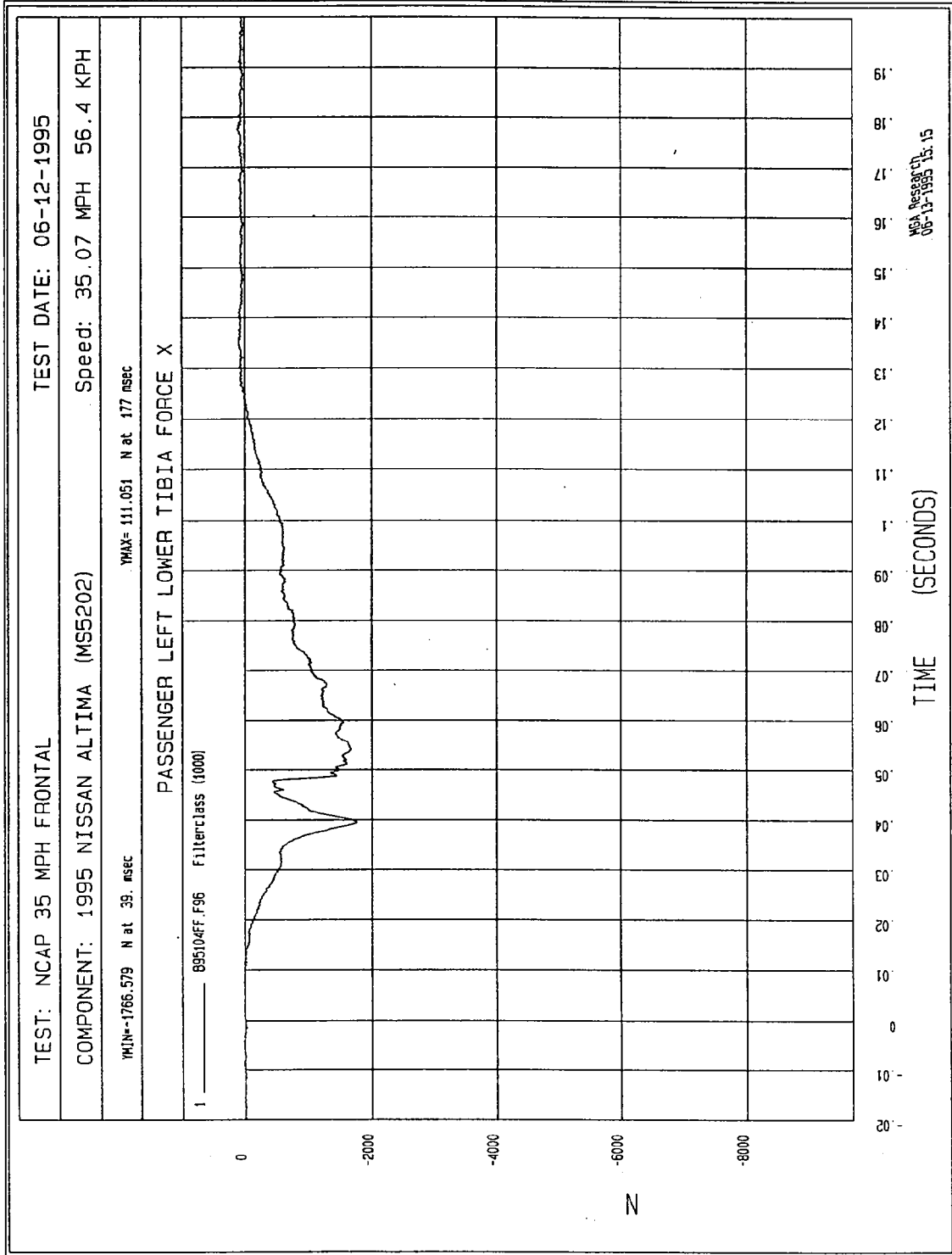


Figure B-121 - Passenger Left Lower Tibia Force X vs. Time

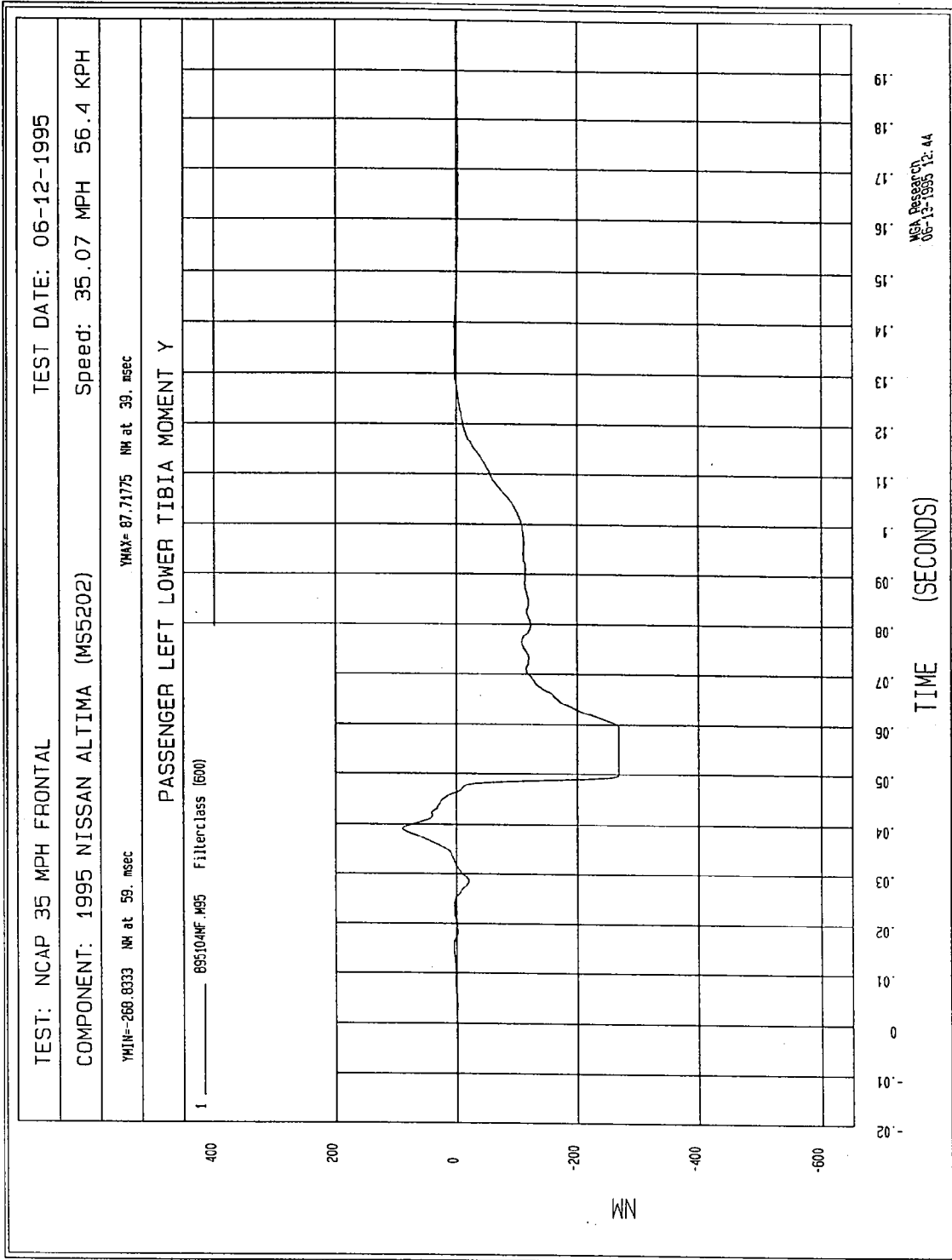


Figure B-122 - Passenger Left Lower Tibia Moment Y vs. Time

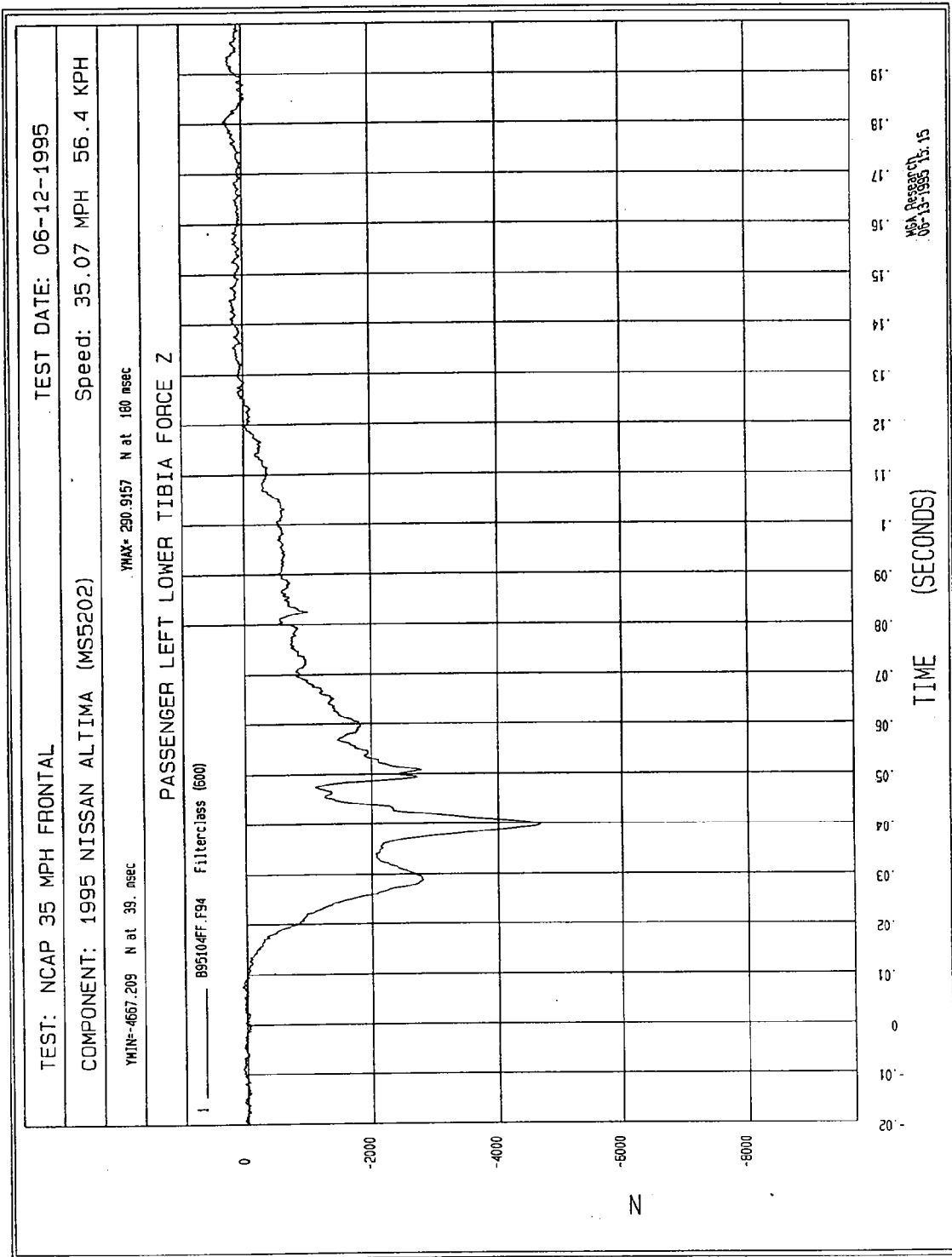


Figure B-123 - Passenger Left Lower Tibia Force Z vs. Time

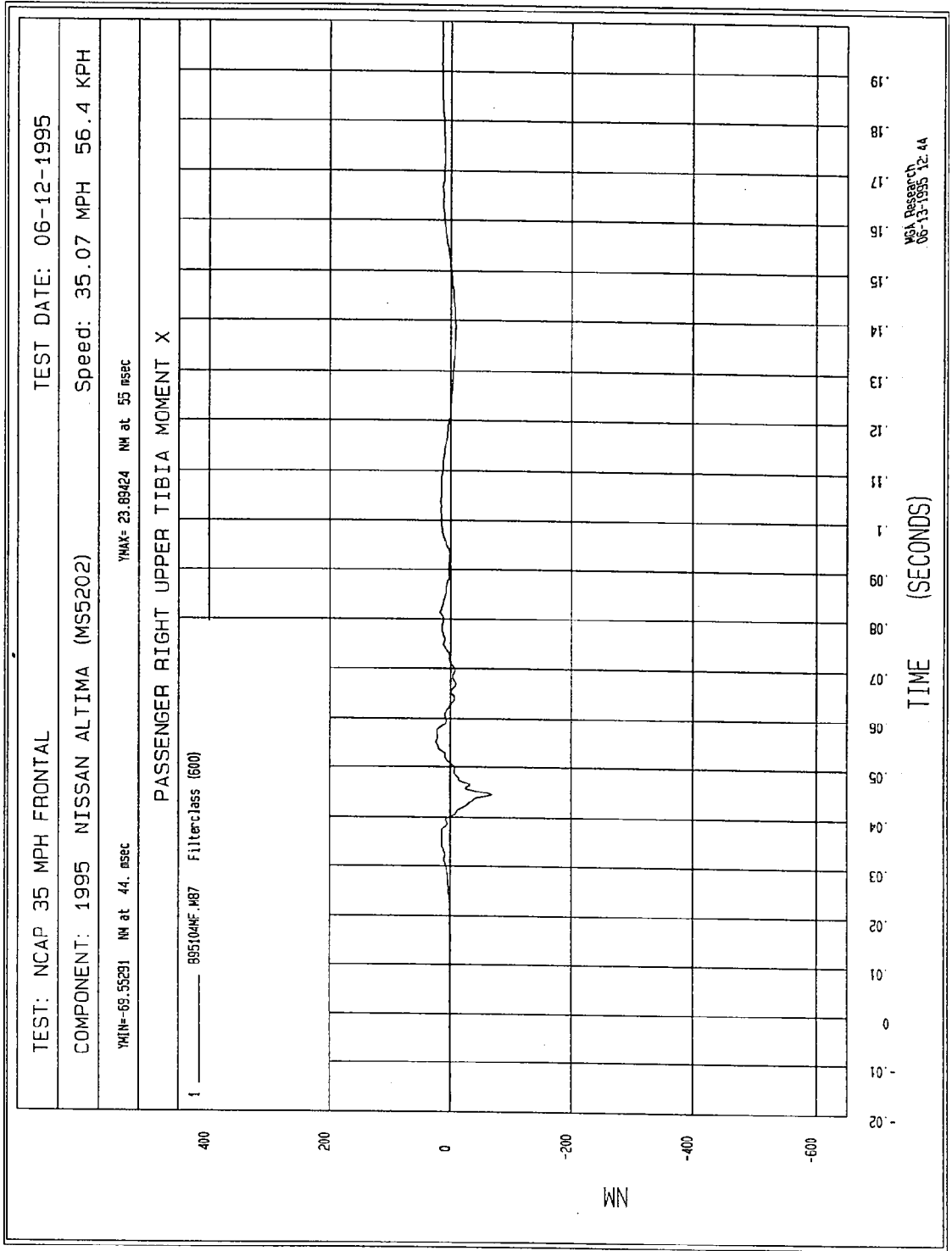


Figure B-124 - Passenger Right Upper Tibia Moment X vs. Time

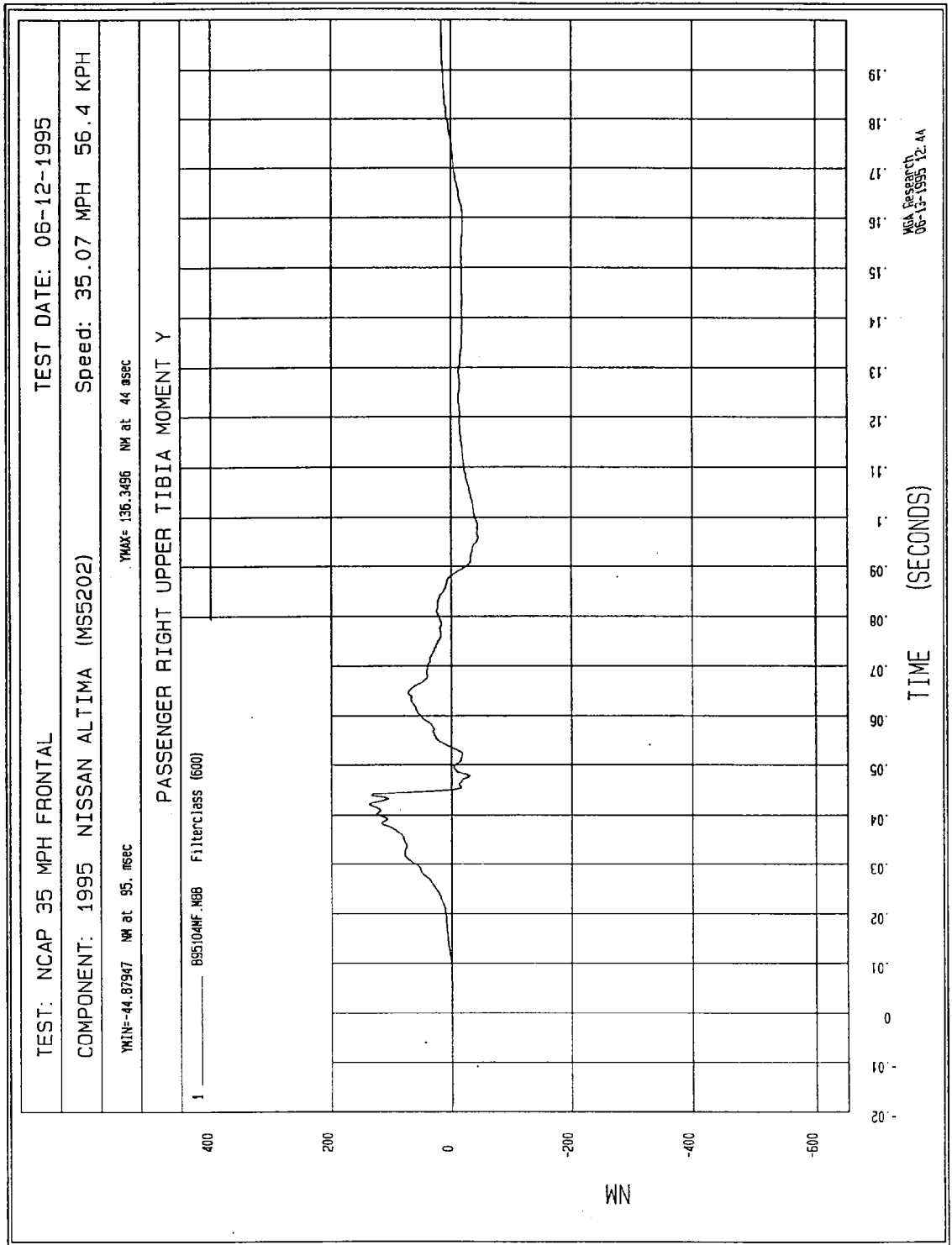
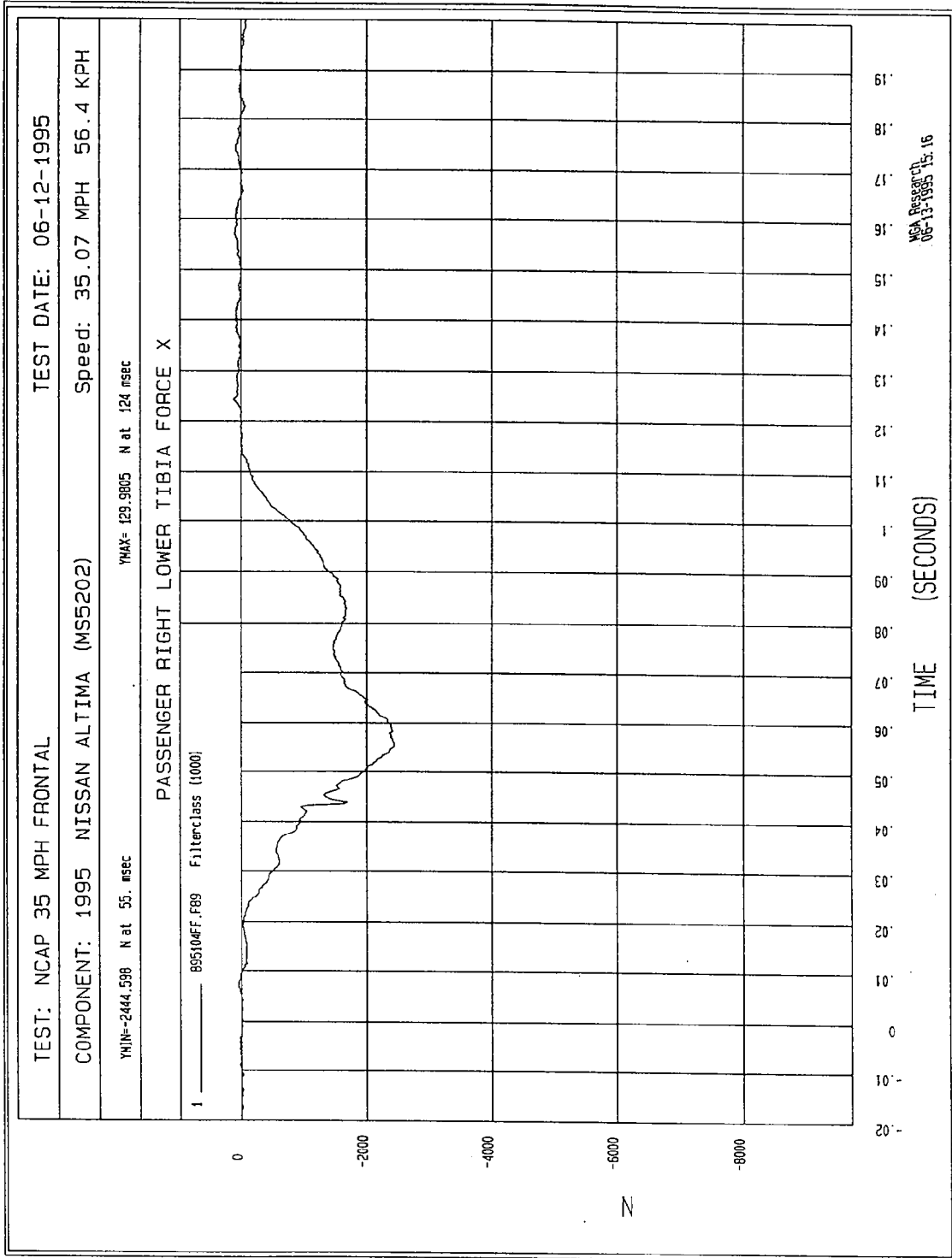


Figure B-125 - Passenger Right Upper Tibia Moment Y vs. Time



WCA Research
06-13-1995 15.16

Figure B-126 - Passenger Right Lower Tibia Force X vs. Time

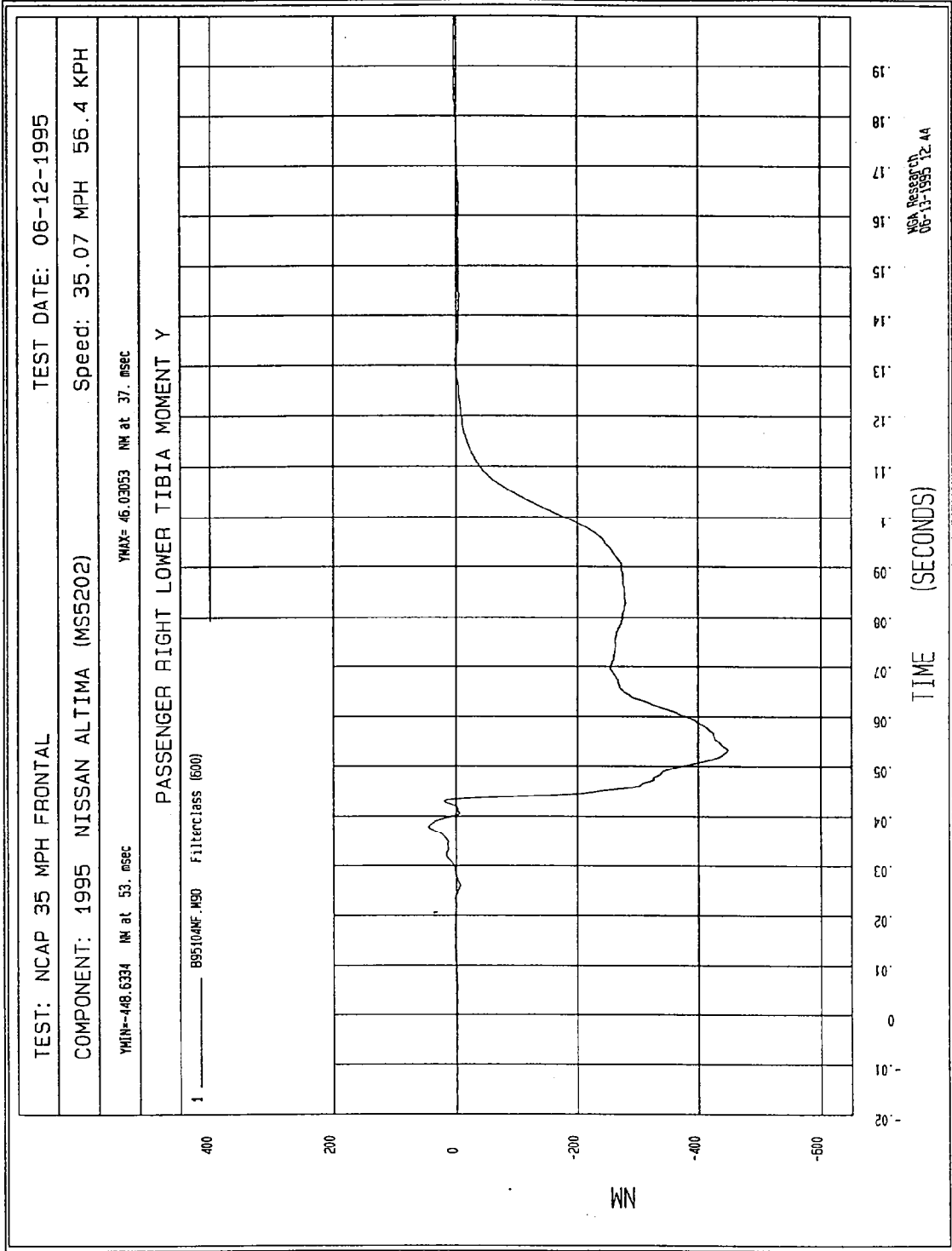
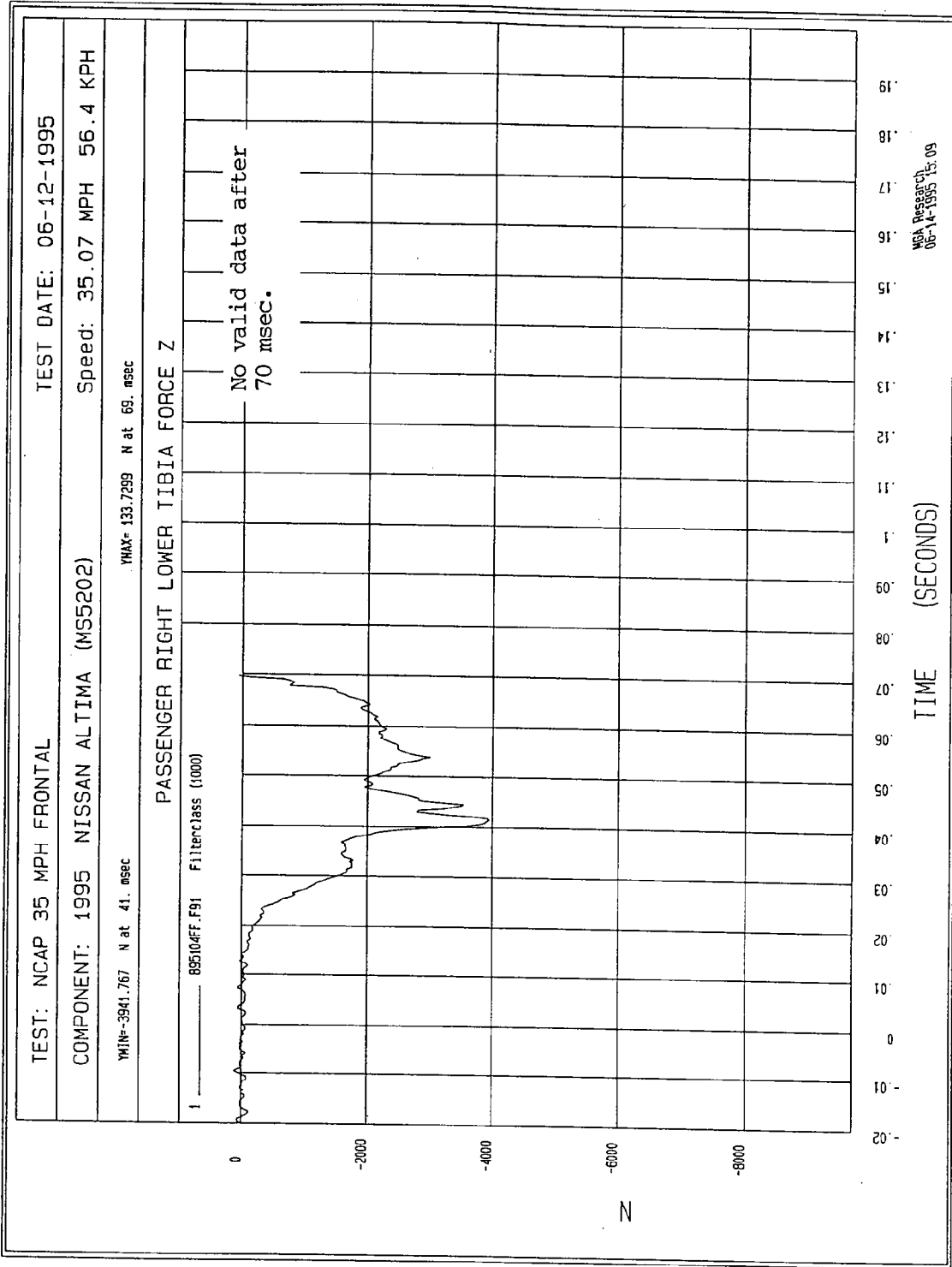


Figure B-127 - Passenger Right Lower Tibia Moment Y vs. Time



B-128

Figure B-128 - Passenger Right Lower Tibia Force Z vs. Time

APPENDIX C

Dummy Configuration & Performance Verification Data

HYBRID III DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 065 DUMMY CALIBRATION BY: Al Chalmers

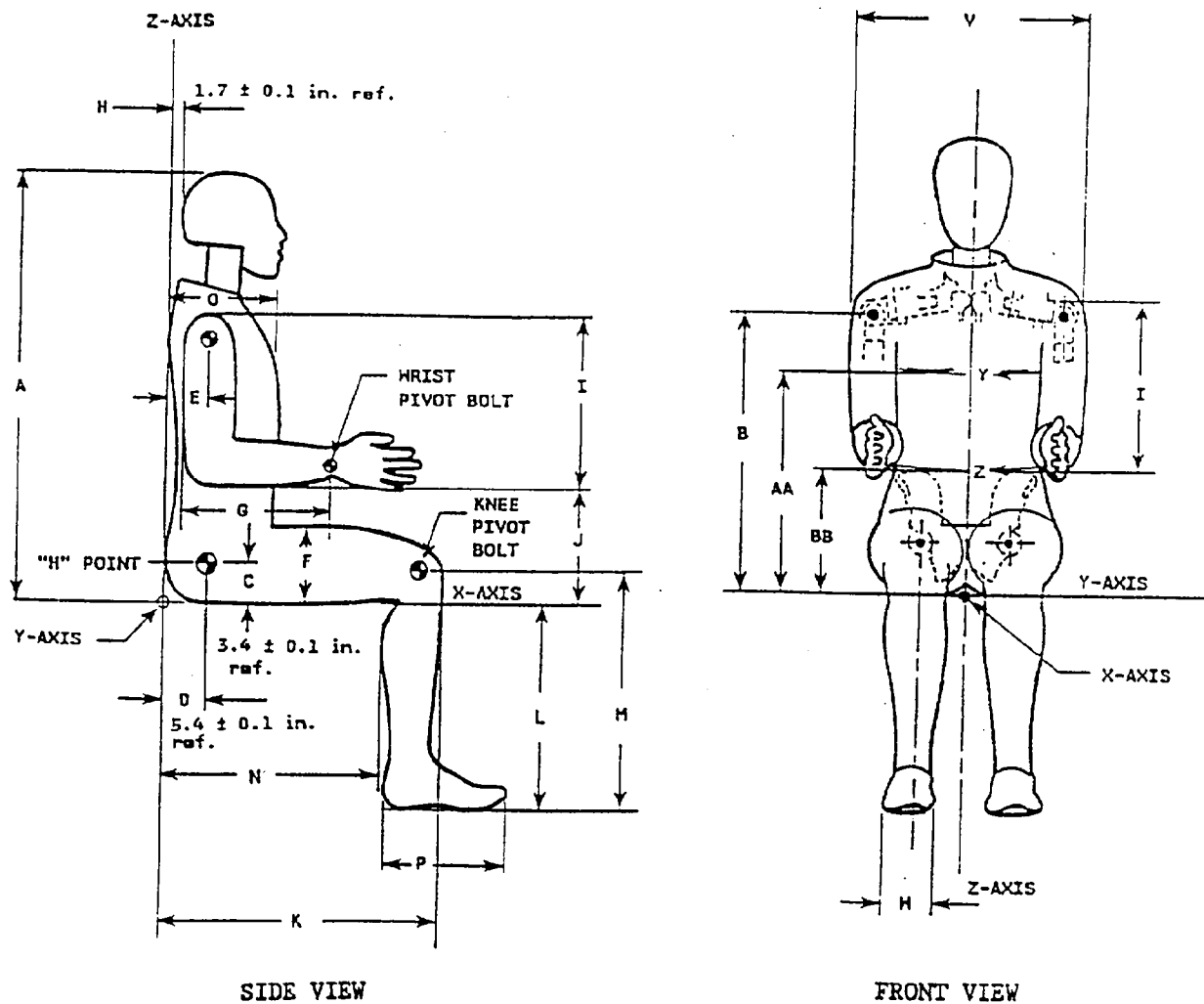
I.CONFIGURATION VERIFICATION DATA

DATE OF VERIFICATION: 06-09-95

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



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.: 065 DUMMY CALIBRATION BY: Al Chalmers

VERIFICATION DATE: 06-09-95

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

1.0 HEAD DROP TEST

	SPECIFICATION	MEASUREMENT
Peak Resultant Acceleration	225 - 275 G	231
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	23.0
Pendulum Deceleration	10 MS	22.50 - 27.50 G	22.71
	20 MS	17.60 - 22.60 G	21.00
	30 MS	12.50 - 18.50 G	15.92
Max. Pendulum G Above 30 MS		29.0 G MAX	15.9
Deceleration - Time Curve Decay Time to 5 G		34 - 42 MS	39
D Plane Rotation	MAX	64 - 78 DEG.	73
	TIME	57 - 64 MS	62
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 MS	115
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	103

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

3.0 NECK EXTENSION TEST

		SPECIFICATION	MEASUREMENT
Pendulum Speed		19.50 - 20.30 F/S	19.94
Pendulum Deceleration	10 MS	17.20 - 21.20 G	18.79
	20 MS	14.00 - 19.00 G	17.49
	30 MS	11.00 - 16.00 G	13.39
Max. Pendulum G Above 30 MS		22 G Max	13
Deceleration - Time Curve Decay Time to 5 G		38 - 46 MS	42
D Plane Rotation	MAX	81 - 106 DEG.	100
	TIME	72 - 82 MS	77
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 MS	157
Moment About Occipital Condyle	MIN.	-59.0/-39.0 FT LBS	-49.5
	TIME	65 - 79 MS	72
Positive Moment - Time Curve Decay Time to Zero		120 - 148 MS	142

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.	2.53
Peak Resistive Force	1100 to 1325 LBS.	1292
Internal Hysteresis	69 to 85%	70

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.	1064

RIGHT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	6.9
Maximum Force	1060 - 1300 LBS.	1104

HYBRID III DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 066 DUMMY CALIBRATION BY: Al Chalmers

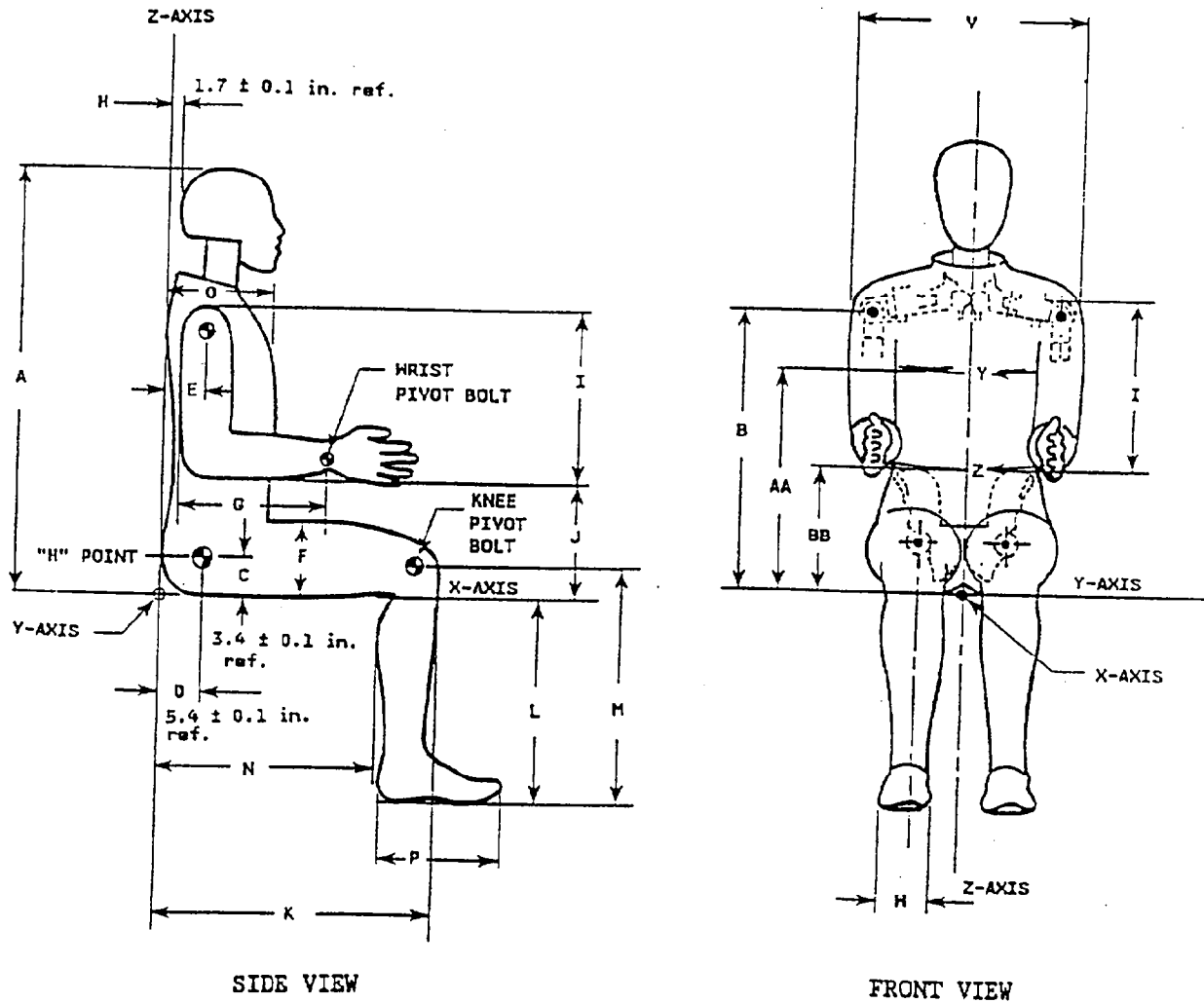
I. CONFIGURATION VERIFICATION DATA

DATE OF VERIFICATION: 06-09-95

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

Note: (See next page for external dimensions)

HYBRID III EXTERNAL DIMENSIONS



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

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

DUMMY NO.: 066 DUMMY CALIBRATION BY: Al Chalmers

VERIFICATION DATE: 06-09-95

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

1.0 HEAD DROP TEST

	SPECIFICATION	MEASUREMENT
Peak Resultant Acceleration	225 - 275 G	261
Peak Lateral Acceleration	15 G. MAX	6
Is Acceleration Curve Unimodal	within 10% of peak	Yes

2.0 NECK FLEXION TEST

		SPECIFICATION	MEASUREMENT
Pendulum Speed		22.6 - 23.4 FT/SEC	23.0
Pendulum Deceleration	10 MS	22.50 - 27.50 G	22.95
	20 MS	17.60 - 22.60 G	20.72
	30 MS	12.50 - 18.50 G	14.13
Max. Pendulum G Above 30 MS		29.0 G MAX	14.1
Deceleration - Time Curve Decay Time to 5 G		34 - 42 MS	39
D Plane Rotation	MAX	64 - 78 DEG.	74
	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	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	19.97
Pendulum Deceleration	10 MS	17.20 - 21.20 G	18.23
	20 MS	14.00 - 19.00 G	16.09
	30 MS	11.00 - 16.00 G	12.74
Max. Pendulum G Above 30 MS		22 G Max	13
Deceleration - Time Curve Decay Time to 5 G		38 - 46 MS	45
D Plane Rotation	MAX	81 - 106 DEG.	101
	TIME	72 - 82 MS	78
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 MS	158
Moment About Occipital Condyle	MIN.	-59.0/-39.0 FT LBS	-48.3
	TIME	65 - 79 MS	72
Positive Moment - Time Curve Decay Time to Zero		120 - 148 MS	145

4.0 CHEST IMPACT TESTS

	SPECIFICATION	MEASUREMENT
Probe Speed	21.6 to 22.4 F/S	21.9
Peak Deflection	2.50 to 2.86 IN.	2.52
Peak Resistive Force	1160 to 1325 LBS.	1318
Internal Hysteresis	69 to 85%	73

5.0 KNEE IMPACT TESTS

LEFT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	7.0
Maximum Force	1000 - 1300 LBS.	1073

RIGHT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	7.0
Maximum Force	1000 - 1300 LBS.	1079

APPENDIX D

Dummy, Vehicle and Laboratory Calibration Data

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 065

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	AAMN8	Endevco	02/05/95
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	ACC66	Endevco	02/07/95
Chest Z	ACCY3	Endevco	02/07/95
Chest X Redundant	AJ9J7	Endevco	02/07/95
Chest Y Redundant	AJ7A2	Endevco	02/07/95
Chest Z Redundant	AJ819	Endevco	02/07/95
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	AJ834	Endevco	02/10/95

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 065

	DRIVER		
	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	065	Servo	03/13/95
Lap Belt Load Cell	690	Lebow	04/12/95
Torso Belt Load Cell	624	Lebow	04/13/95

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 065

		DRIVER	
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Right Tibia Moment X	040	Denton	04/14/95
Upper Right Tibia Moment Y	040	Denton	04/14/95
Lower Right Tibia Moment Y	034	Denton	04/13/95
Lower Right Tibia Force X	034	Denton	04/13/95
Lower Right Tibia Force Z	034	Denton	04/13/95
Upper Left Tibia Moment X	023	Denton	04/14/95
Upper Left Tibia Moment Y	023	Denton	04/14/95
Lower Left Tibia Moment Y	019	Denton	04/13/95
Lower Left Tibia Force X	019	Denton	04/13/95
Lower Left Tibia Force Z	019	Denton	04/13/95

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 066

	PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	ACCY6	Endevco	03/17/95
Head Y	ACCH1	Endevco	03/17/95
Head Z	AAMW5	Endevco	03/17/95
Head X Redundant	AJ9D2	Endevco	03/17/95
Head Y Redundant	AH1E2	Endevco	03/17/95
Head Z Redundant	AJ7K3	Endevco	03/17/95
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	02/10/95
Pelvis Y	ALEK9	Endevco	02/10/95
Pelvis Z	ALE80	Endevco	02/10/95

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 068

PASSENGER			
	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	657	Denton	04/12/95
Torso Belt Load Cell	691	Denton	04/12/95

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 066

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Right Tibia Moment X	439	Denton	04/17/95
Upper Right Tibia Moment Y	439	Denton	04/17/95
Lower Right Tibia Moment Y	427	Denton	04/14/95
Lower Right Tibia Force X	427	Denton	04/14/95
Lower Right Tibia Force Z	427	Denton	04/14/95
Upper Left Tibia Moment X	437	Denton	04/17/95
Upper Left Tibia Moment Y	437	Denton	04/17/95
Lower Left Tibia Moment Y	425	Denton	04/17/95
Lower Left Tibia Force X	425	Denton	04/17/95
Lower Left Tibia Force Z	425	Denton	04/17/95

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

VEHICLE ACCELEROMETERS		
SERIAL NO.	MANUFACTURER	CALIBRATION DATE
D06-A10	Entran	06/09/95
D06-A13	Entran	06/09/95
C25-A21	Entran	04/24/95
C25-A01	Entran	04/27/95
C27-B05	Entran	04/27/95
C13-F01	Entran	04/24/95
E13-D14	Entran	06/09/95
D06-A02	Entran	06/09/95
D06-A19	Entran	06/09/95

LABORATORY INSTRUMENTS		
SERIAL NO.	MANUFACTURER	CALIBRATION DATE
AH5N9	Endevco	05/08/95
018	Spectrol	03/13/95
019	Spectrol	03/13/95
403071	Sensotec	01/11/95
MGA001	Entran	04/21/95

APPENDIX E

Vehicle Owner's Occupant Restraint System Instructions

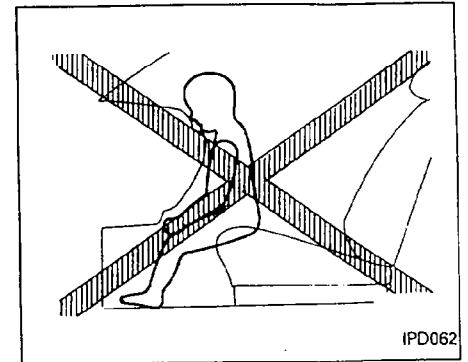
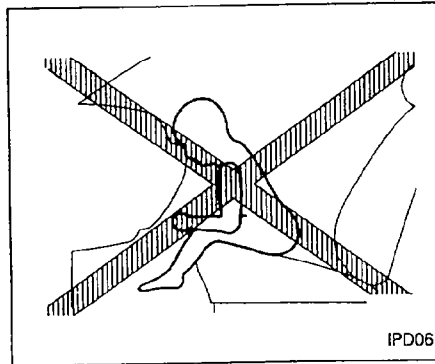
SUPPLEMENTAL RESTRAINT SYSTEM (AIR BAG SYSTEM)

This Supplemental Restraint System section contains important information concerning the driver and passenger air bags. The Supplemental Restraint System Air Bag can help reduce impact force to the driver and to the front passenger in certain frontal collisions. The air bags are designed to **supplement** the crash protection provided by the driver and front passenger seat belts and are **not a substitute** for them. The seat belts should always be correctly worn and the driver and front passenger seated a suitable distance from the steering wheel and instrument panel. (See "Seat belts" for instructions and precautions on seat belt usage.)

The air bags will operate only when the ignition switch is in the "ON" or "START" position.

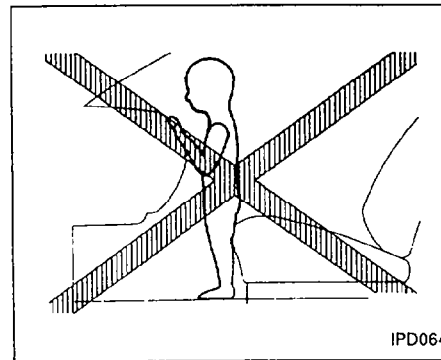
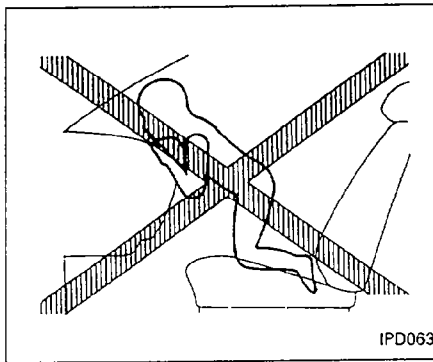
WARNING:

The air bags ordinarily will not inflate in the event of a side impact, rear impact, roll over, or lower severity frontal collision; so always wear your seat belts to help reduce the risk or severity of injury in various kinds of accidents.



WARNING:

The seat belts and the air bags are most effective when you are sitting back and upright in the seat. Air bags inflate with great force. If you are unrestrained, leaning forward, sitting sideways or out of position in any way, you are at greater risk of injury or death in a crash and may also receive serious or fatal injuries from the air bag if you are up against it when it inflates.

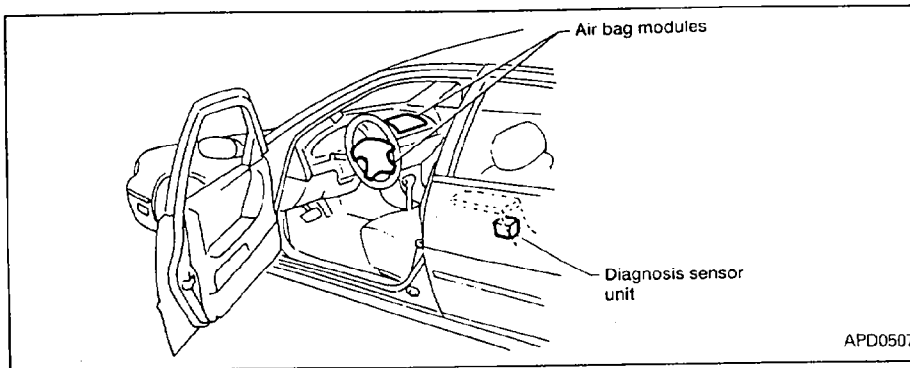


WARNING:

Never let children ride unrestrained as shown in the previous illustrations.

Children may be severely injured or killed when the air bag inflates if they are not properly restrained.

Also, never install a rear-facing child restraint in the front seat. See "Child restraints for infants and small children" for details.



APD0507

Air bag system

The driver air bag is located in the center of the steering wheel; the front passenger air bag is mounted in the dashboard above the glove box. The air bag system is designed to inflate in higher severity frontal collisions, although it may inflate if the forces in another type of collision are similar to those of a higher severity frontal impact. When the air bag inflates, a fairly loud noise may be heard, followed by release of smoke. This smoke is not harmful and does not indicate a fire, but care should be taken not to intentionally inhale it, as it may cause irrita-

tion and choking. The air bags, along with the use of seat belts, help to cushion the impact force on the face and chest of the occupant.

The seat belts should be correctly worn and the driver and passenger seated upright as far as practical away from the steering wheel or dashboard. Since the air bag inflates quickly in order to help protect the occupant, the force of the air bag inflating can increase the risk of injury if the occupant is too close to or is against the air bag module during inflation. The air bag will deflate quickly after the collision is over.

The air bags will operate only when the ignition switch is in the "ON" or "START" position.

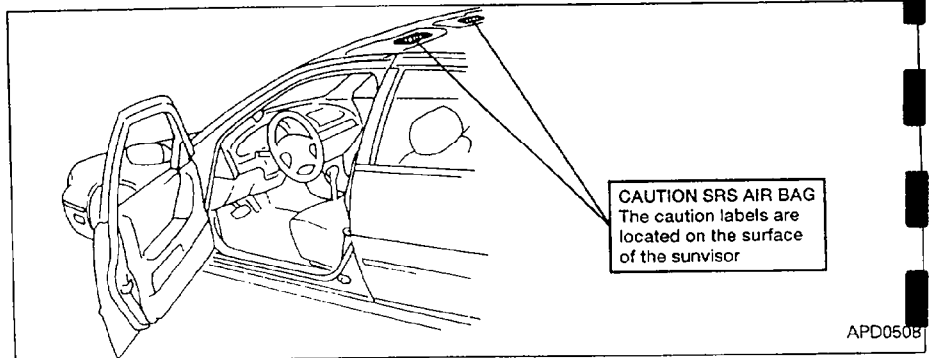
WARNING:

- Right after inflation, several air bag system components will be hot. Do not touch them; you may severely burn yourself.
- No unauthorized changes should be made to any components or wiring of the air bag system. This is to prevent accidental inflation of the air bag or damage to the air bag system.
- Tampering with the air bag system may result in serious personal injury. Tampering includes changes to the steering wheel and the instrument panel assembly by placing material over the steering wheel pad and above the dashboard, or by installing additional trim material around the air bag system.
- Do not place any objects on the steering wheel pad or on the instrument panel. Objects placed on the steering wheel pad and on the instrument panel may become dangerous projec-

CAUTION LABELS

tiles and cause injury if the air bag inflates.

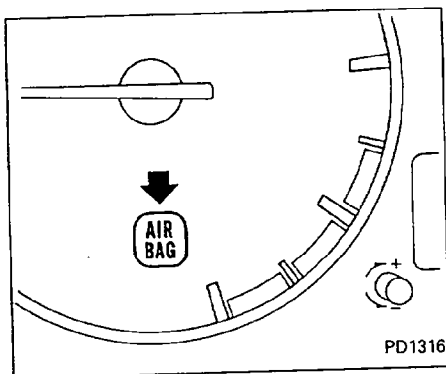
- Work around and on the air bag system should be done by an authorized NISSAN dealer. Installation of electrical equipment should also be done by an authorized NISSAN dealer. The yellow SRS wiring should not be modified or disconnected. Unauthorized electrical test equipment and probing devices should not be used on the air bag system.



APD0508

Caution labels about the air bag system are placed in the vehicle.

AIR BAG WARNING LIGHT



The air bag light, displaying "AIR BAG" in the instrument panel, monitors the circuits of the air bag. The circuits monitored by the air bag light are the diagnosis sensor unit, air bag modules and all related wiring.

When the ignition key is in the "ON" or "START" position, the air bag light will illuminate for about 7 seconds and then turn off. This means the system is operational.

If any of the following conditions occur, the air bag needs servicing:

1. The air bag light does not come on for 7 seconds and then goes off as described above.
2. The air bag light flashes intermittently or remains on.
3. The air bag light does not come on at all.

Under these conditions, the Supplemental Restraint System Air Bag will not operate properly. It must be checked and repaired. Take your vehicle to the nearest authorized NISSAN dealer.

Repair and replacement procedure

The air bag system is designed to inflate on a one-time-only basis. As a reminder, unless it is damaged, the air bag light will remain illuminated after inflation has occurred. Repair and replacement of the air bag system should be done only by authorized NISSAN dealers. To ensure long-term functioning, the system must be inspected 10 years after the date of manufacture as noted on the certification label located on the driver side front pillar.

When maintenance work is required on the vehicle, the air bag system and related parts should be pointed out to the person conducting the maintenance. The ignition key should always be in the "LOCK" position when working under the hood or inside the vehicle.

WARNING:

- Once the air bag inflates, the air bag module will not function again and must be replaced. The air bag module cannot be repaired.
- After an air bag inflates, the front instrument panel assembly should be replaced by your NISSAN dealer.
- The air bag system should be inspected by an authorized NISSAN dealer if there is any damage to the front end portion of the vehicle or replaced if the air bag has inflated.
- When selling your vehicle, we request that you inform the buyer about the air bag system and guide the buyer to the appropriate sections in this Owner's Manual.
- If you need to dispose of an air bag or

SEAT BELTS

scrap the vehicle, contact an authorized NISSAN dealer. Correct air bag disposal procedures are set forth in the appropriate NISSAN Service Manual. Incorrect disposal procedures could cause personal injury.

PRECAUTIONS ON SEAT BELT USAGE

Your chances of being injured or killed in an accident and/or the severity of injury may be greatly reduced if you are wearing your seat belt and it is properly adjusted. NISSAN strongly encourages you and all of your passengers to buckle up every time you drive, even if your seating position includes an air bag.

Some states, provinces or territories require that seat belts be worn at all times when a vehicle is being driven.

WARNING:

- Every person who drives or rides in this vehicle should wear a seat belt at all times. Children should be in appropriate child restraints.
- The belt should be adjusted to a snug fit. Failure to do so will reduce the effectiveness of the entire restraint system.
- Do not wear the belt inside out or twisted.
- Do not allow more than one person to use the same belt.

- All seat belt assemblies including retractors and attaching hardware should be inspected by your NISSAN dealer after any collision. NISSAN recommends that all seat belt assemblies in use during a collision be replaced unless the collision was minor and the belts show no damage and continue to operate properly. Seat belt assemblies not in use during a collision should also be inspected and replaced if either damage or improper operation is noted.
- Never carry more people in the vehicle than there are seat belts.

If the seat belt warning light glows continuously while the ignition is turned "ON" with all doors closed and all seat belts fastened, it may indicate a malfunction in the system. Have the system checked by your NISSAN dealer.

Be sure to observe the following cautions when using seat belts. Failure to do so could increase the chance and/or severity of injury in an accident.

- Always route the shoulder belt over your outer shoulder and across your

chest. Never run the belt under your arm. Serious injury can occur if the seat belt is not worn properly.

- Position the lap belt as low as possible AROUND THE HIPS, NOT THE WAIST.

Infant or small child

NISSAN recommends that infants or small children be placed in child restraint systems that comply with Federal Motor Vehicle Safety Standards or Canadian Motor Vehicle Safety Standards. You should choose a child restraint system that fits your vehicle and always follow the manufacturer's instructions for installation and use.

Children

Children who are too large for child restraint systems should be seated and restrained by the seat belts which are provided.

NISSAN recommends that children sit in the rear seat if possible. According to accident statistics, children are safer when properly restrained in the rear seat than in the front seat.

If the child's seating position has a shoulder belt that fits close to the face or neck, the

use of a booster seat (commercially available) may help overcome this. The booster seat should raise the child so that the shoulder belt is properly positioned across the top, middle portion of the shoulder and the lap belt is low on the hips. The booster seat should fit the vehicle seat and have a label certifying that it complies with Federal Motor Vehicle Safety Standards or Canadian Motor Vehicle Safety Standards. Once the child has grown so the shoulder belt is no longer on or near the face and neck, use the shoulder belt without the booster seat.

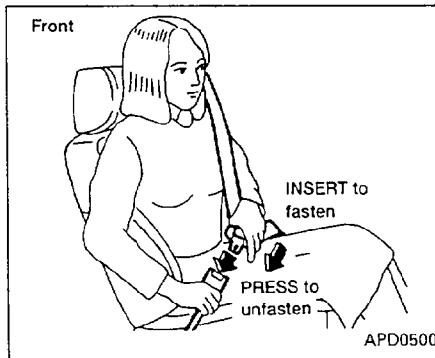
Never let a child stand or kneel on any seat and do not allow a child in the cargo areas while the vehicle is moving.

Pregnant women

NISSAN recommends that pregnant women use seat belts. Contact your doctor for specific recommendations. The lap belt should be worn snug and positioned as low as possible around the hips, not the waist.

Injured persons

NISSAN recommends that injured persons use seat belts, depending on the injury. Check with your doctor for specific recommendations.



3-POINT TYPE SEAT BELT WITH RETRACTOR

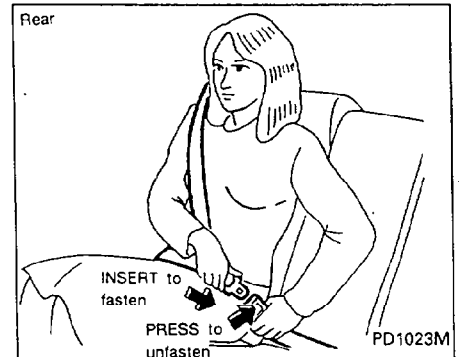
Every person who drives or rides in this vehicle should wear a seat belt at all times.

Fastening the belts

1. Adjust the seat.

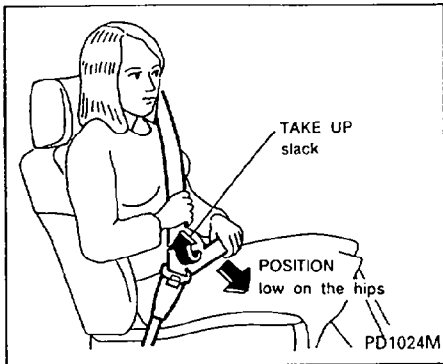
The seatback should not be reclined any more than needed for comfort when the vehicle is moving. Seat belts are most effective when the passenger sits well back and straight up in the seat. If the seat is reclined, the risk of sliding under

the lap belt and being injured is increased.



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

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



3. Position the lap belt portion **low on the hips** as shown.

4. Pull the shoulder belt portion toward the retractor to take up extra slack.

The front seat passenger side seat belt and rear 3-point seat belts have a cinching mechanism for child seat installation. It is referred to as the automatic locking mode.

When the cinching mechanism is activated the seat belt cannot be withdrawn again until the seat belt tongue is detached from the buckle and fully retracted. Refer to "Child Restraint Systems for Infants and

Small Children" later in this section for more information.

WARNING:

- The automatic locking mode should be used only for child seat installation. During normal seat belt use by a passenger, the locking mode should not be activated. If it is activated it may cause uncomfortable seat belt tension.

Unfastening the belts

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

Checking seat belt operation (3-point type with retractor)

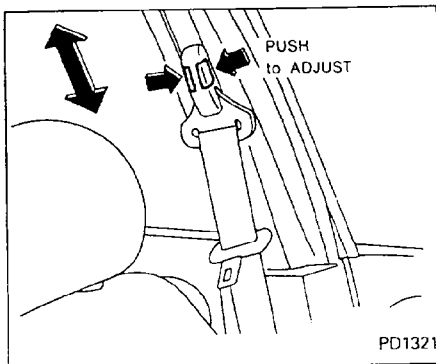
Your seat belt retractors are designed to lock belt movement using two separate methods:

- 1) When the belt is pulled quickly from the retractor.
- 2) When the vehicle slows down rapidly.

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

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

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

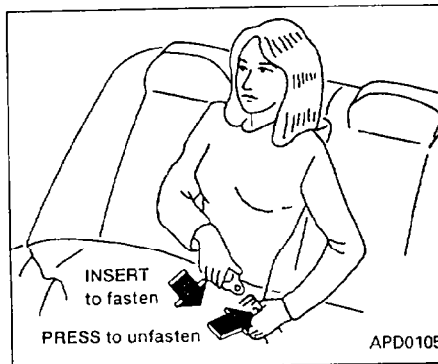


Shoulder belt height adjustment (For front seats)

The shoulder belt anchor height should be adjusted to the position best for you. (See "Precautions on Seat Belt Usage".) To adjust, push the release button, and then move it to the desired position, so that the belt passes over the shoulder.

CAUTION:

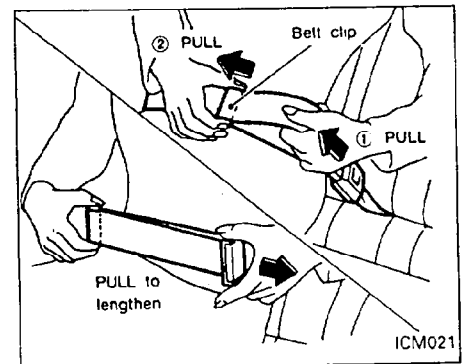
After adjustment, make sure the shoulder belt anchor is securely fixed.



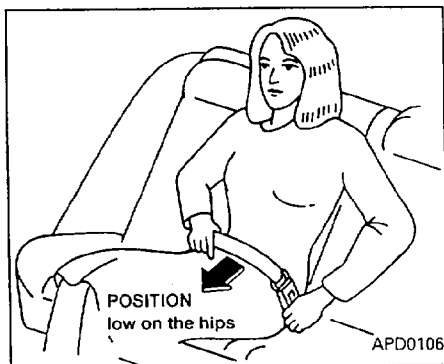
2-POINT TYPE WITHOUT RETRACTOR (center position of rear seat)

Fastening the belts

1. Insert the tongue into the buckle marked **CENTER** until it snaps.



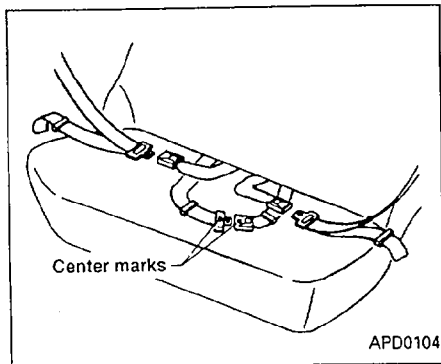
2. To lengthen, hold the tongue at a right angle to the belt and pull on the belt. To shorten, pull the end of the belt attached to the belt clip away from the tongue, and then pull the belt clip to take up the slack.



3. Position the lap belt **low on the hips** as illustrated.

Unfastening the belts

To unfasten the belt, press the button on the buckle.



Selecting correct set of belts

The center seat belt buckle and tongue are identified by the CENTER label. The center seat belt tongue can be fastened **only** into the center seat belt buckle.

SEAT BELT EXTENDERS

If, because of body size or driving position, it is not possible to properly fit the lap-shoulder belt and fasten it, an extender is available which is compatible with the installed seat belts. The extender adds approximately 8 inches (200 mm) of length and may be used for either the driver or front passenger seating position. See your NISSAN dealer for assistance if the extender is required.

WARNING:

- **Only NISSAN belt extenders, made by the same company which made the original equipment belts, should be used with NISSAN belts.**
- **Persons who can use the standard seat belt should not use an extender. Such unnecessary use could result in serious personal injury in the event of an accident.**

SEAT BELT MAINTENANCE

- **To clean the belt webbings**, apply a mild soap solution or any solution recommended for cleaning upholstery or carpets. Then brush the webbing, wipe it with a cloth and allow it to dry in the shade. Do not allow the belts to retract until they are completely dry.
- **Periodically check to see that the belt and the metal components** such as buckles, tongues, retractors, flexible wires and anchors work properly. If loose parts, deterioration, cuts or other damage on the webbing is found, the entire belt assembly should be replaced.