V 2313

REPORT NO. MGA-96-N009

NEW CAR ASSESSMENT PROGRAM (NCAP)

FRONTAL BARRIER IMPACT TEST

ISUZU MOTORS LIMITED
1995 ISUZU RODEO
NHTSA NO. MS5701

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105

Test Date: September 13, 1995

Report Date: September 20, 1995

FINAL REPORT

Prepared For:

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF MARKET INCENTIVES
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Room No. 5313 (NRM-22)
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15. Supplementary Notes		

16. Abstract

A 56 kph (35 mph) frontal barrier impact using a 30 load cell barrier was conducted on a 1995 Isuzu Rodeo at the MGA Proving Grounds and Crash Test Center in Burlington, WI. on September 13, 1995.

The barrier impact velocity was 56.4 kph (35.03 mph), and the ambient temperature at the time of impact was 21°C. The post-test maximum static crush was 456 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 528 and the 3 msec. Clip (Chest g's) was 57 g's. The left and right femur loads for the driver were 5560 and 5962 Newtons, respectively. The passenger's HIC was 782 and the 3 msec Clip was 59 g's. The left and right femur maximum loads were 3725 and 6725 Newtons respectively.

17. Key Words	18. Distribution Statement
35 mph Frontal Barrier Impact Test New Car Assessment Program (NCAP) FMVSS 212 Indicant Testing FMVSS 219 (partial) Indicant Testing FMVSS 301 Indicant Testing	Copies of this report are available from: Technical Ref. Division, NHTSA, NASSIF Building, Room 5108 400 Seventh Street, S.W. Washington, D.C. 20590

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APPROVED BY: David Winkelbauer

David Winkelbauer
MGA Research Corporation

FINAL REPORT ACCEPTED BY:

Manager, New Car Assess. Program (NCAP)

DEC 14 1995

Date of Report Acceptance

Contracting Officer's Tech. Rep. (COTR)

DEC 14 1995

Date of Report Acceptance

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SECTION 1

PURPOSE AND TEST PROCEDURE

This 35 mph frontal barrier impact test is part of the Composite FY'96 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 Isuzu Rodeo at a velocity of 56.4 kph (35.03 mph). The test was performed at the MGA Proving Grounds and Crash Test Center on September 13, 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, right/left femur load cells, and right/left lower leg sensors. Seat belt load cells were also on the driver and passenger 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 98 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 528 and the maximum chest (CLIP) deceleration over 3 milliseconds was 57 g's. The maximum chest displacement was 43 mm. The left and right femur loads were 5560 and 5962 Newtons respectively.

The right front passenger's head struck the inflated airbag. The passenger HIC was 782 and maximum chest (CLIP) deceleration over 3 milliseconds was 59 g's. The maximum chest displacement was 51 mm. The left and right femur loads were 3725 and 6725 Newtons respectively.

GENERAL TEST AND VEHICLE PARAMETER DATA

Vehicle Yr/Make/Model/Body Style: 1995/Isuzu/Rodeo/4 Door

NHTSA No.: MS5701 VIN.: 4S2CM58V8S4357408

Body color: Green Date of Manufacture: 6/95

Engine: 6 Cylinders; __C.I.D.; 3.2 Liters;

X Gas; __Diesel; __Turbocharged

X Longitudinal; __Transverse

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

Final Drive: __Front Wheel; __Rear Wheel; X Four Wheel

Odometer Reading: 109 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 179 kPa (26 Psi) Rear 179 kPa (26 Psi)

Recommended Tire Size: P225/75R15

Recommended Cold Tire Pressure: Front 179 kPa (26 Psi) Rear 179 kPa (26 Psi)

Tires on Vehicle: P225/75R15 ; Manufacturer: Dunlop

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) = 406.0 kg. (A)

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

Rated Cargo Weight (RCW) A-B = 66.0 kg.

GVWR 2268 kg. GAWR: Front 1066 kg.; Rear 1293 kg.

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

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

Right Front = 464.9 kg Right Rear = 460.0 kg

Left Front = 479.0 kg Left Rear = 458.1 kg

TOTAL FRONT WEIGHT = 943.9 kg (50.7% of Total Vehicle Weight)

TOTAL REAR WEIGHT = 918.1 kg (49.3% of Total Vehicle Weight)

TOTAL UNLOADED DELIVERED WEIGHT (UDW) = 1862.0 kg

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight 1862.0 kg

VCW = Vehicle Capacity Weight 406.0 kg DSC = Designated Seating Capacity 5

RCW = VCW - 68 (DSC) = 66.0 *kg

Target Test Weight = UDW + RCW + (2 dummies x 75.8 kg/dummy)

Target Test Weight = 2079.6 kg

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND CARGO:

Right Front = 523.5 kg Right Rear = 516.2 kg

Left Front = 527.5 kg Left Rear = 508.0 kg

TOTAL FRONT WEIGHT = 1051.0 kg (50.6% of Total Vehicle Weight)

TOTAL REAR WEIGHT = 1024.2 kg (49.4% of Total Vehicle Weight)

TOTAL TEST WEIGHT = 2075.2 kg

Weight of ballast secured in vehicle trunk area = 0 kg

Vehicle components removed to meet target weight: Rear seat, spare tire, and spare tire carrier

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

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

VEHICLE ATTITUDE (all dimensions in mm):

Delivered Attitude: RF 860 LF 857 RR 858 LR 860

Test Attitude: RF 846 LF 845 RR 841 LR 843

Wheel Base: 2760 mm; C.G. = 1362 mm rearward of front wheel C/L

POST-IMPACT DATA:

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

Date of Test: September 13, 1995 Time of Test: 1:49 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 4352 C_L 4448 L 4361

Post-test = R 3942 C_L 3992 L 3933

Crush = R 410 C_L 456 L 428

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

R 687 mm C_L 683 mm L 710 mm

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

VISIBLE DUMMY CONTACT POINTS:

	Driver	Passenger
Head	Airbag	Airbag
Chest	Airbag	Airbag
Abdomen	No contact	No contact
Left Knee	Dashboard, steering column	Dashboard, glovebox
Right Knee	Dashboard, steering column	Dashboard, glovebox

	Front		Rear	
Post-Test Door Opening	Left	Right	Left	Right
(without use of tools)	unable to open	unable to open	opened	opened

	Front	
Seat Movement	Left	Right
Seat Back Movement	0	0
Seat Shift (mm)	2 forward	0

Glazing Damage

Backlight/Windshield Windshield cracked

Other Notable Impact Effects: Body moved 1 1/4 in. forward on the frame, drive shaft fell off

SECTION 3

SUMMARY OF RESULTS FOR-------

FMVSS 212, "Windshield Mounting"

FMVSS 219 (Partial), "Windshield Zone Intrusion"

FMVSS 301-75, "Fuel System Integrity"

FMVSS NO. 212, "WINDSHIELD MOUNTING", DATA SHEET

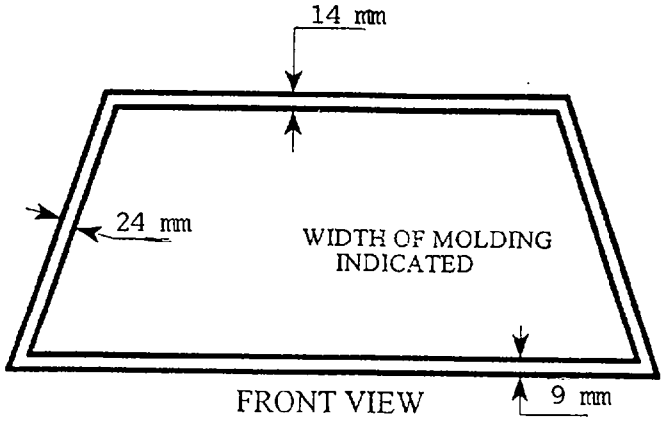
Details of windshield mounting such as retention method, trim type, etc.:
Windshield set in rubber molding with glue

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	1984	1984	100%
LEFT SIDE	1996	1996	100%
TOTAL	3980	3980	100%

AREA OF RETENTION FAILURE: None



FRONT VIEW

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 ½" 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= 1178 mm

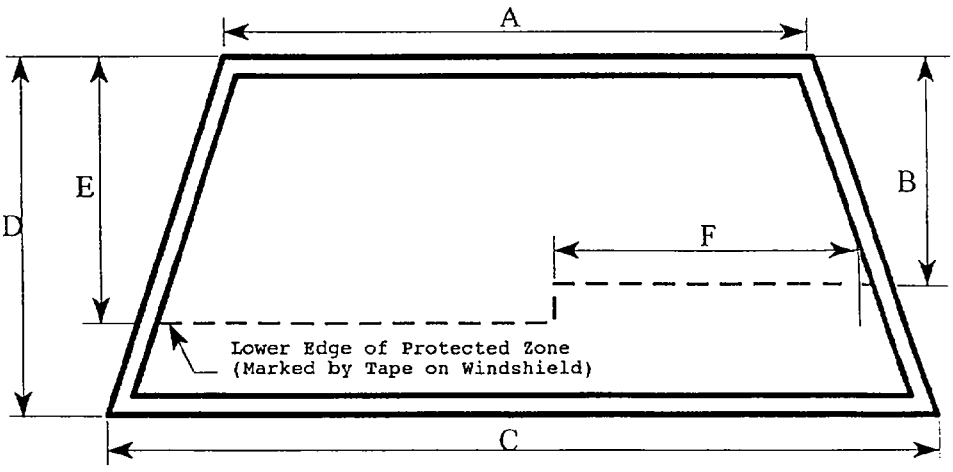
B= 380 mm

C= 1430 mm

D= 684 mm

E= 458 mm

F= 549 mm



FRONT VIEW

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.: MS5701 Test Date: September 13, 1995

Vehicle Mfgr./Make/Model: Isuzu/Rodeo

Usable Capacity of Vehicle's Fuel Tank: 80.3 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:

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

TEST VEHICLE IMPACT TYPE: _X_ Frontal (35 mph)

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

___ Rear Moving Barrier (30 mph)

___ Side Impact MDB (33.2 mph)

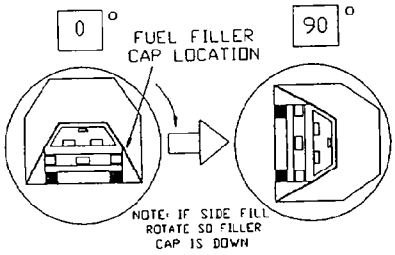
FUEL SPILLAGE MEASUREMENT:

	ACTUAL	MAX ALLOWED
1. From impact until vehicle motion ceases	0	1 OZ
2. For 5 minute period after vehicle motion ceases	0	5 OZ
3. For next 25 minutes	0	1 oz./1 MIN

SOLVENT SPILLAGE DETAILS: None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 0° - 90° Vehicle NHTSA ID No.: MS5701



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 35 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 35 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

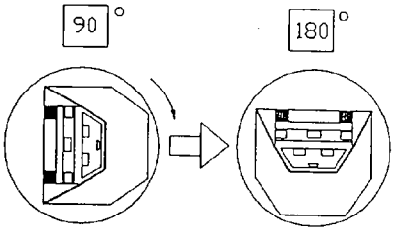
0	0	0	0

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

IV. SOLVENT SPILLAGE LOCATIONS(S): None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 90° - 180° Vehicle NHTSA ID No.: MS5701



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 30 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 30 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

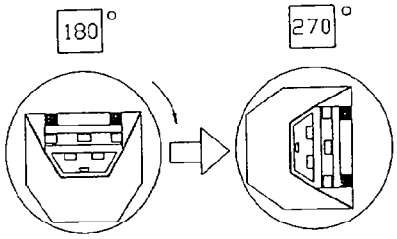
0	0	0	0

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

IV. SOLVENT SPILLAGE LOCATIONS(S): None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 180° - 270° Vehicle NHTSA ID No.: MS5701



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 15 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 15 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

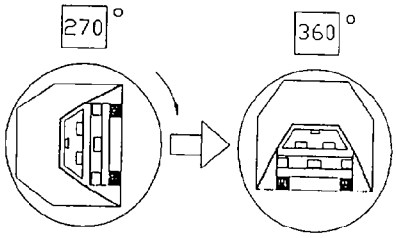
0	0	0	0

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

IV. SOLVENT SPILLAGE LOCATIONS(S): None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 270° - 360° Vehicle NHTSA ID No.: MS5701



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 20 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 20 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0

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

IV. SOLVENT SPILLAGE LOCATIONS(S): None

SECTION 4

OMI FINAL DATA

Occupant and Vehicle Information

I. OMI DATA

1. Dummy Injury Criteria Data Summary
2. Dummy Positioning Data
3. Seat Belt Positioning Data
4. Seat Belt Performance Assessment Data
5. Camera Locations
6. Vehicle Target Locations

II. OVR DATA

1. Load Cell Barrier Data
2. Vehicle Accelerometer Data
3. Test Vehicle Measurements

III. AID DATA

1. Accident Investigation Damage Data Summary

FMVSS NO. 208, "OCCUPANT CRASH PROTECTION", DATA SHEET

VEH. YR./MAKE/MODEL/BODY STYLE: 1995/Isuzu/Rodeo/4 Door

VEH. NHTSA NO.: MS5701 TEST DATE: September 13, 1995

MAX. ACCELERATION VALUES: (g's)	DRIVER #065	PASSENGER #066
Head Channel X	-63.0 @ 63 msec.	-67.2 @ 70 msec.
Head Channel Y	8.3 @ 61 msec.	17.9 @ 77 msec.
Head Channel Z	19.8 @ 62 msec.	25.8 @ 67 msec.
HEAD RESULTANT	65.9 @ 63 msec.	70.9 @ 67 msec.
Chest Channel X	-57.2 @ 69 msec.	-59.1 @ 65 msec.
Chest Channel Y	14.3 @ 72 msec.	-7.7 @ 70 msec.
Chest Channel Z	16.8 @ 61 msec.	12.6 @ 67 msec.
CHEST RESULTANT	58.8 @ 69 msec.	60.5 @ 65 msec.
CLIP	57	59
TIME INTERVAL (msec) [0.003 seconds minimum]	$t_1 = 66.3$ $t_2 = 69.3$	$t_1 = 64.3$ $t_2 = 67.4$

HEAD INJURY CRITERIA (HIC) VALUES:

HIC	528	782
t_1 = (msec)	47.0	51.6
t_2 = (msec)	80.9	83.1
Avg. Accel. t_1 to t_2 (g's)	47.5	57.3

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

MAX. COMPRESSIVE FEMUR FORCES:

Left Side (N)	5560	3725
Right Side (N)	5962	6725

MAXIMUM SEAT BELT FORCES:

Lap Belt (N)	2600	2624
Shoulder Belt (N)	7000	7272

HYBRID III NECK, CHEST AND PELVIS DATA SHEET

VEHICLE YR./MAKE/MODEL/BODY STYLE: 1995/Isuzu/Rodeo/4 Door

VEHICLE NHTSA NO.: MS5701 TEST DATE: September 13, 1995

MAXIMUM VALUES	DRIVER DUMMY #065	PASSENGER DUMMY #066
Neck Load X (N)	581 @ 122 msec.	-418 @ 67 msec.
Neck Load Y (N)	-188 @ 148 msec.	-282 @ 78 msec.
Neck Load Z (N)	-2270 @ 62 msec.	-2298 @ 65 msec.
Neck Moment X (NM)	-20 @ 62 msec.	23 @ 75 msec.
Neck Moment Y (NM)	-56 @ 133 msec.	-38 @ 144 msec.
Neck Moment Z (NM)	-7 @ 132 msec.	19 @ 95 msec.
Chest Deflection X (mm)	43	51
Time of Max. Occurrence	64 msec.	67 msec.
Pelvis X Acceleration (g's)	-63.7 @ 42 msec.	-56.4 @ 46 msec.
Pelvis Y Acceleration (g's)	21.3 @ 58 msec.	-12.9 @ 59 msec.
Pelvis Z Acceleration (g's)	-19.8 @ 63 msec.	-19.3 @ 49 msec.
Pelvis Resultant (g's)	64.7 @ 42 msec.	N/A

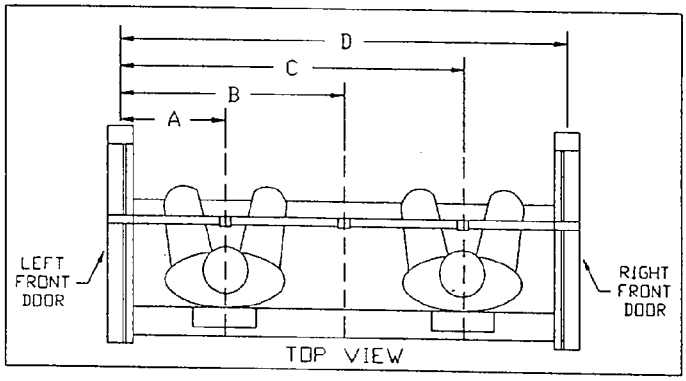
PART 572 DUMMY IN-VEHICLE POSITION

Vehicle NHTSA No.: MS5701 Vehicle: 1995 Isuzu Rodeo 4 Door

SEAT TYPE:	ADJUSTER TYPE:	BUCKET SEAT BACK TYPE:
____Bench	Driver: _X_Manual	____Fixed
_X_Bucket	____Power	_X_Adjustable Reclining
____Split Bench		
	Passenger: _X_Manual	
	____Power	

DRIVER SEAT POSITION
Mid Position 9th detent back of 17 total

PASSENGER SEAT POSITION
Mid Position 9th detent back of 17 total



065 DUMMY ID 066

A	= Left Door to Driver Centerline	392 mm
B	= Left Door to Center Passenger Centerline	755 mm
C	= Left Door to Right Passenger Centerline	1121 mm
D	= Left Door to Right Door	1510 mm

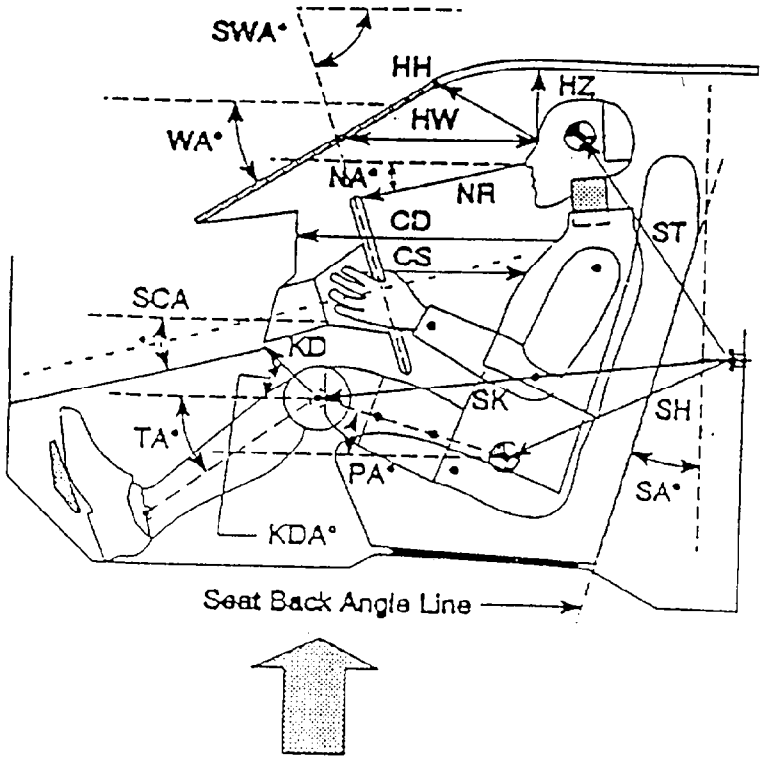
FRONT SEAT MEASUREMENT TABLE

Units (mm)

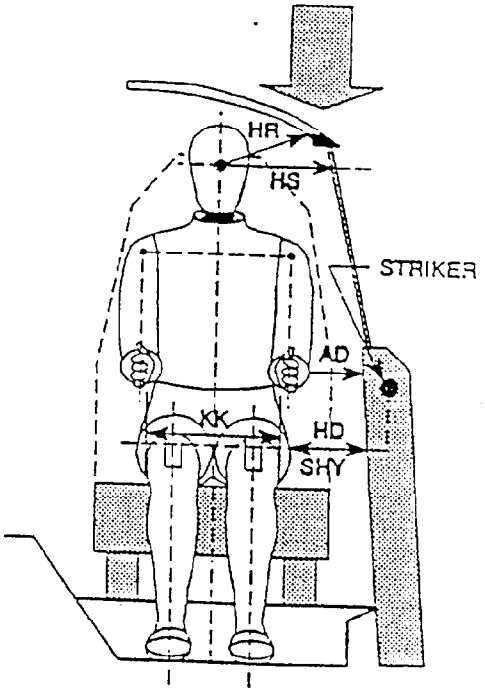
	DRIVER (Serial #065)	PASSENGER (Serial #066)
WA°	37.7°	
SWA°	64.8°	N/A
SCA°	25.2°	N/A
SA°	23.0°	23.0°
HZ	204	192
HH	391	400
HW	579	552
HR	272	262
NR	416 Angle (NA) 11.6°	N/A
CD	522	630
CS	318	N/A
RA	197	N/A
KDL	166 Angle (KDA) 20.9°	164
KDR	172	164 Angle 18.6°
PA°	21.2°	24.0°
TA°	41.2°	40.0°
KK	270	250
ST*	607 Angle 16.5°	634 Angle 14.0°
SK*	692 Angle 87.3°	706 Angle 90.6°
SH*	292 Angle 98.7°	300 Angle 97.9°
SHY	238	232
HS	309	304
HD	132	148
AD	89	108

N/A = Not Applicable
* Angles measured from vertical

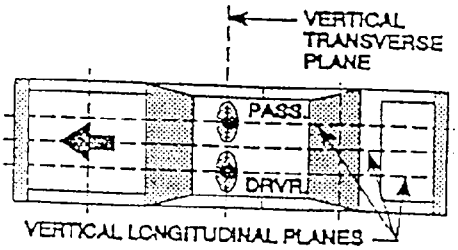
FRONT SEAT MEASUREMENTS



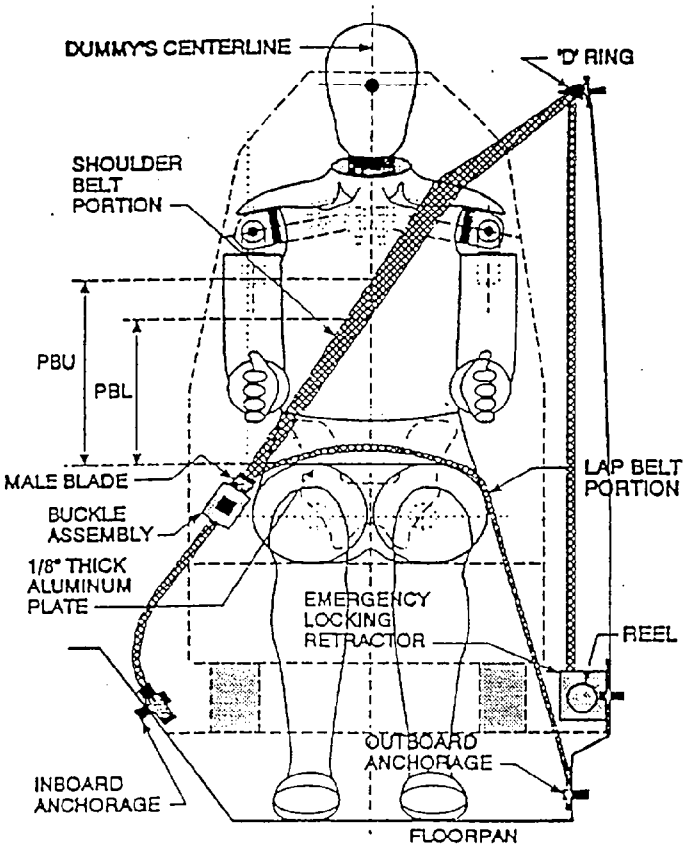
AD	-	Arm to Door
HD	-	H-Point to Door
HR	-	Head to Side Header
HS	-	Head to Side Window
KK	-	Knee to Knee
SHY	-	Striker to H-Point (Y-Direction)



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



SEAT BELT POSITIONING DATA



FRONT VIEW OF DUMMY

(illustration)

Dimension = mm

		DRIVER DUMMY	PASSENGER DUMMY
PBU --	Top surface of alum. plate to upper edge	335	344
PBL --	Top surface of alum. plate to belt lower edge	250	262

SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

BELT LENGTH DATA:	Driver	Passenger	
Length from trim above retractor reel to "D" ring as measured on dummy.	714 mm	720 mm	
Shoulder belt length as measured on Part 572 Dummy.	885 mm	880 mm	
Lap belt length as measured on Part 572 Dummy.	869 mm	860 mm	
SHOULDER BELT SPOOL-OFF DATA:			
As determined by film analysis	70 mm	75 mm	
As determined mechanically	NR	NR	at retractor
	131 mm	133 mm	at D-ring
As determined electronically	78 mm	92 mm	
BELT STRETCH DATA:			
Measured electronically between shoulder belt load cell and the "D" ring.	NR	NR	
Measured mechanically	NR	NR	
RETRACTOR LOCK-UP TIME:			
As determined by shoulder belt spool-off observed in on-board cameras	66 msec	65 msec	

NR Not Recorded

CAMERA LOCATIONS

VEH. NHTSA NO.: MS5701 ; TEST DATE: September 13, 1995 ; TIME: 1:49 p.m.

VEH. YEAR/MAKE/MODEL/BODY STYLE: 1995/Isuzu/Rodeo/4 Door

CAMERA POSITION NO.	VIEW	CAMERA POSITIONS (mm.)*			ANGLE (deg)	FILM PLANE TO HEAD TARGET (mm)	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Real-Time Left Side View	-	-	-	-	-		
2	Left Front View	960	8070	1490	90°	7645	25	1538
3	Steering Column Top	1900	8070	1560	90°	7645	25	952
4	Steering Column Bottom	1880	8060	1035	90°	7635	25	1000
5	Left Driver Close-up	1400	8475	1330	90°	8050	50	926
6	Left Angle	5000	6000	2010			50	1087
7	Driver Onboard						25	833
8	Passenger Onboard						25	1000
9	Right Overall	2150	-7830	1345	90°	7380	13	1176
10	Right Front	1340	-8060	1405	90°	7610	25	1429
11	Right Passenger Close-up	1340	-7660	1240	90°	7210	50	1000
12	Right Angle	5310	-5920	2040			50	844
13	Top View Wide	1650	0	5050			8	917
14	Top Driver	380	330	2600			13	833
15	Top Passenger	-310	-390	2565			13	971
16	Pit Engine	1090	0	-3180			13	1124
17	Fuel Tank	2960	0	-3155			13	1010

* COORDINATES:

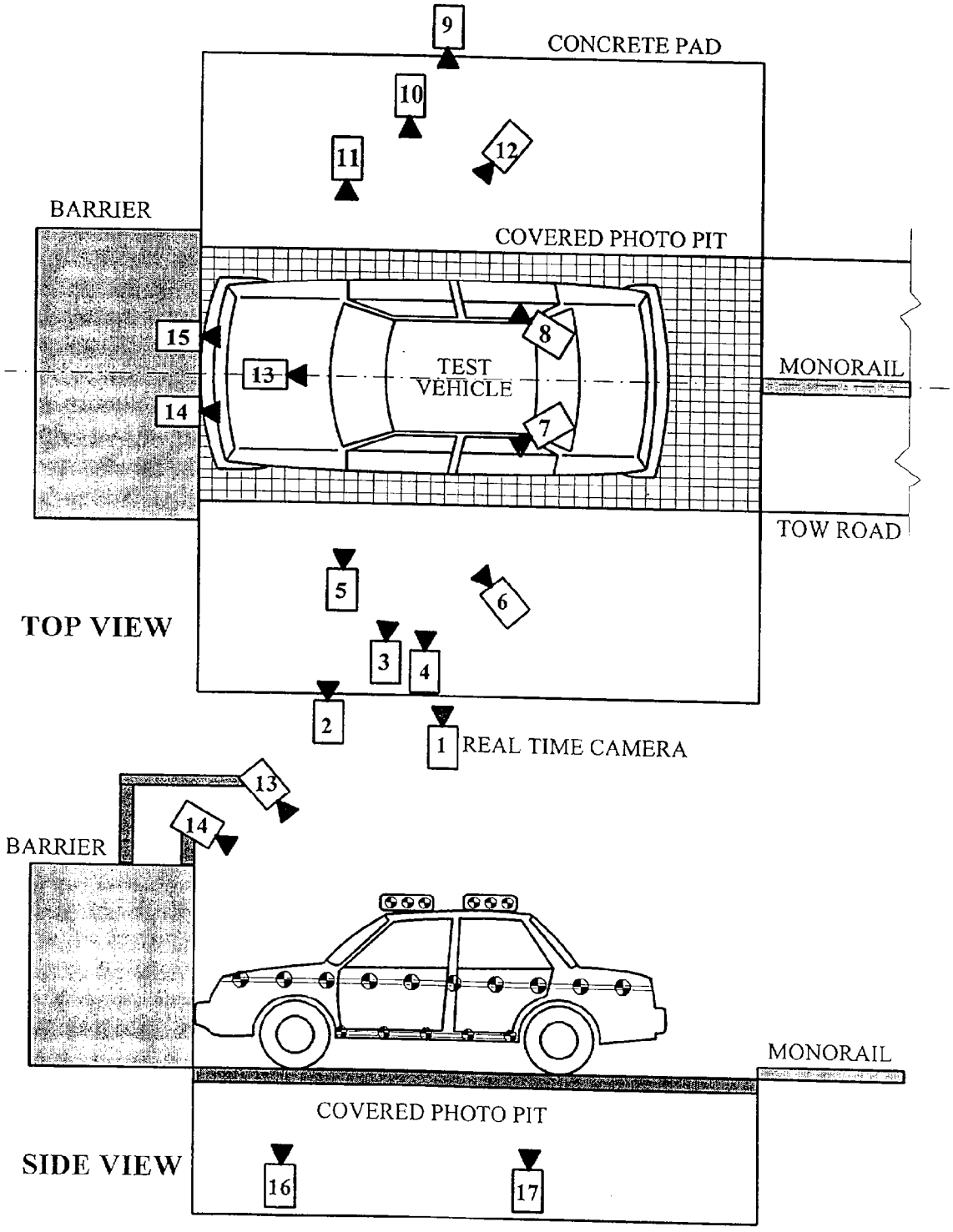
+X = film plane rearward of barrier

+Y = film plane to left of monorail centerline

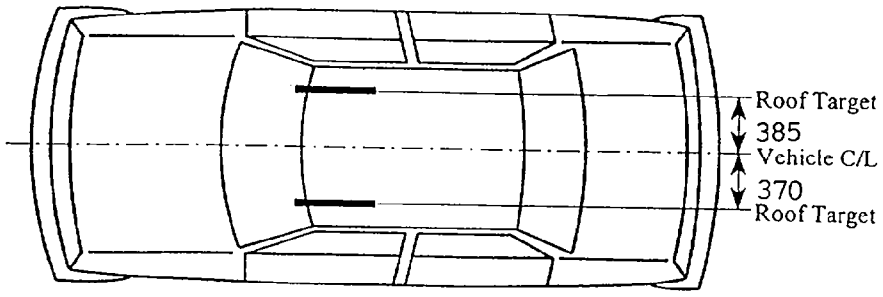
+Z = film plane to above ground level

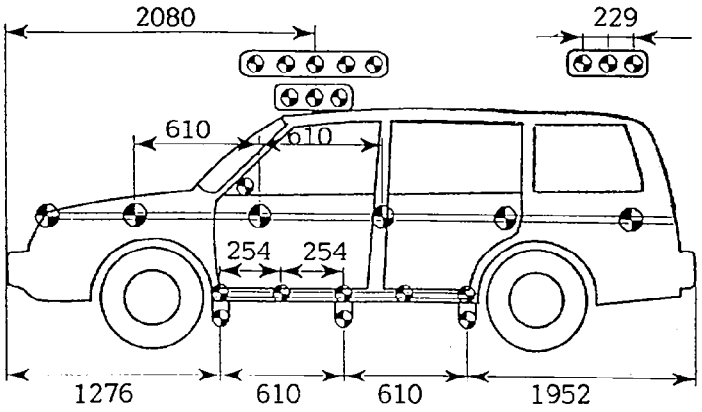
ORIGIN: For X and Y it is the Impact Point. For Z it is the Floor.

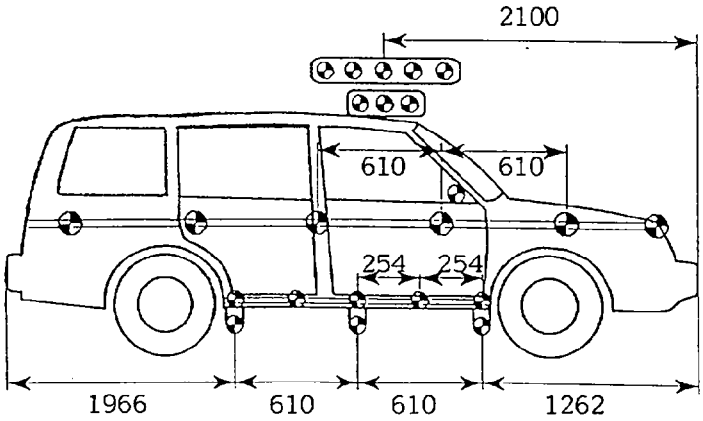
CAMERA LOCATIONS (Cont'd)



VEHICLE TARGET LOCATIONS







(DIMENSIONS IN MM)

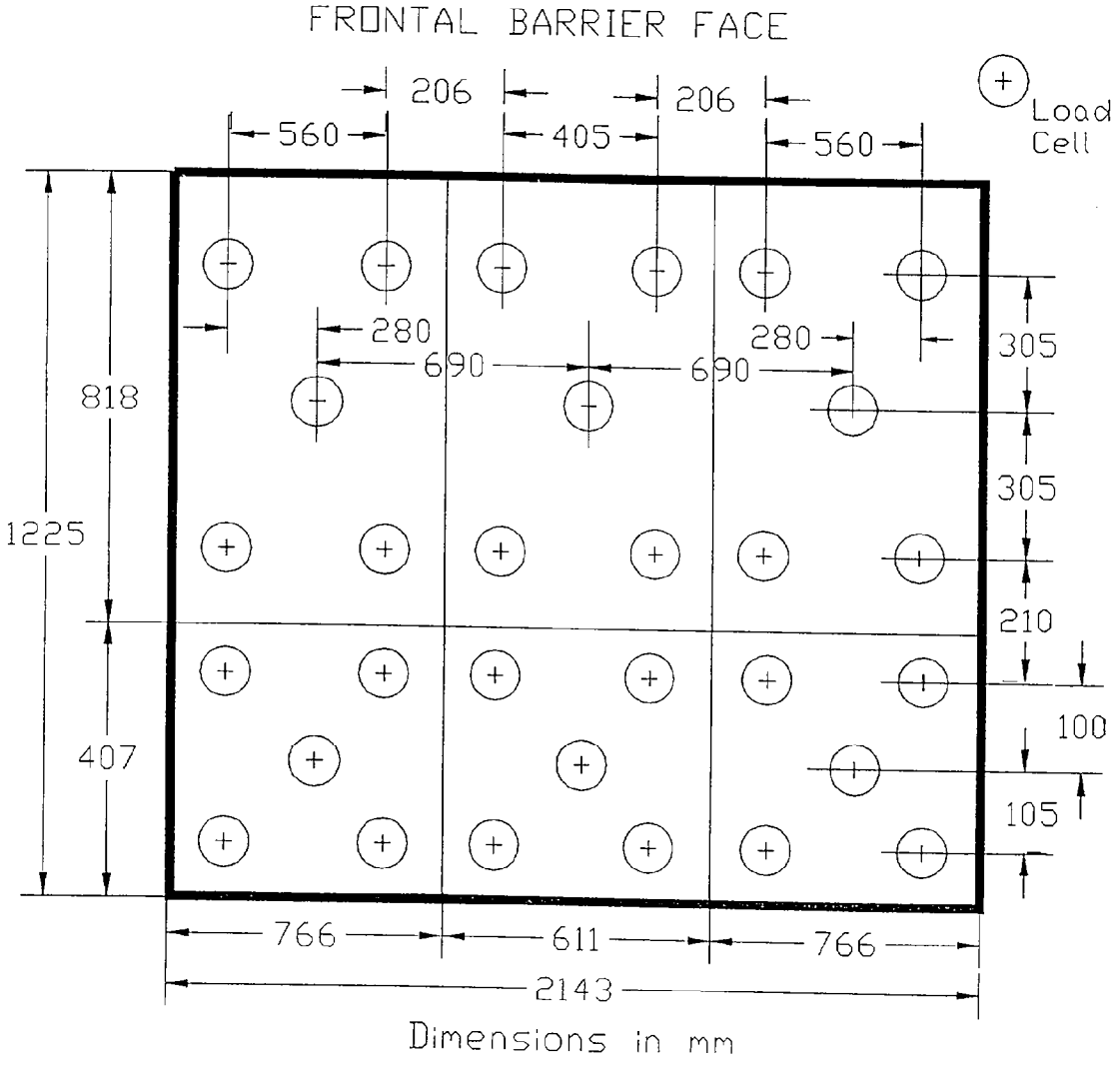
LOAD CELL LOCATIONS ON FIXED BARRIER

30 Load Cells

6 Rows

9 Columns

6 Groupings (5 cells/group)

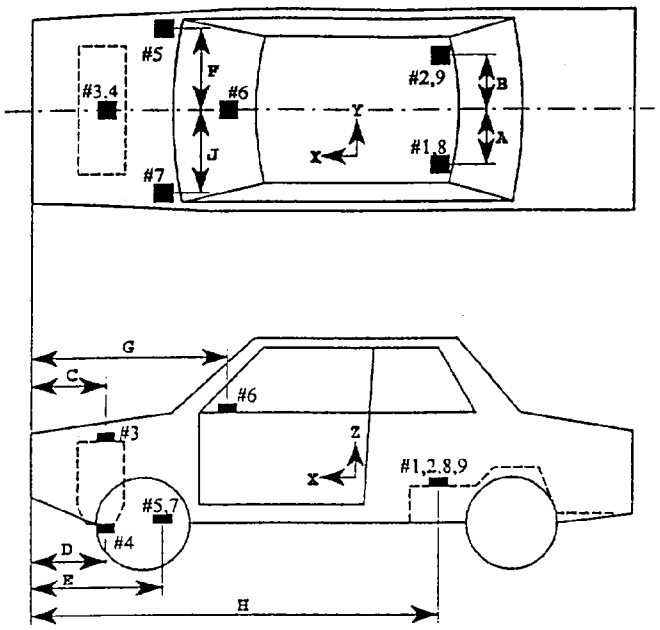


The following data is presented in Appendix B:

(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)

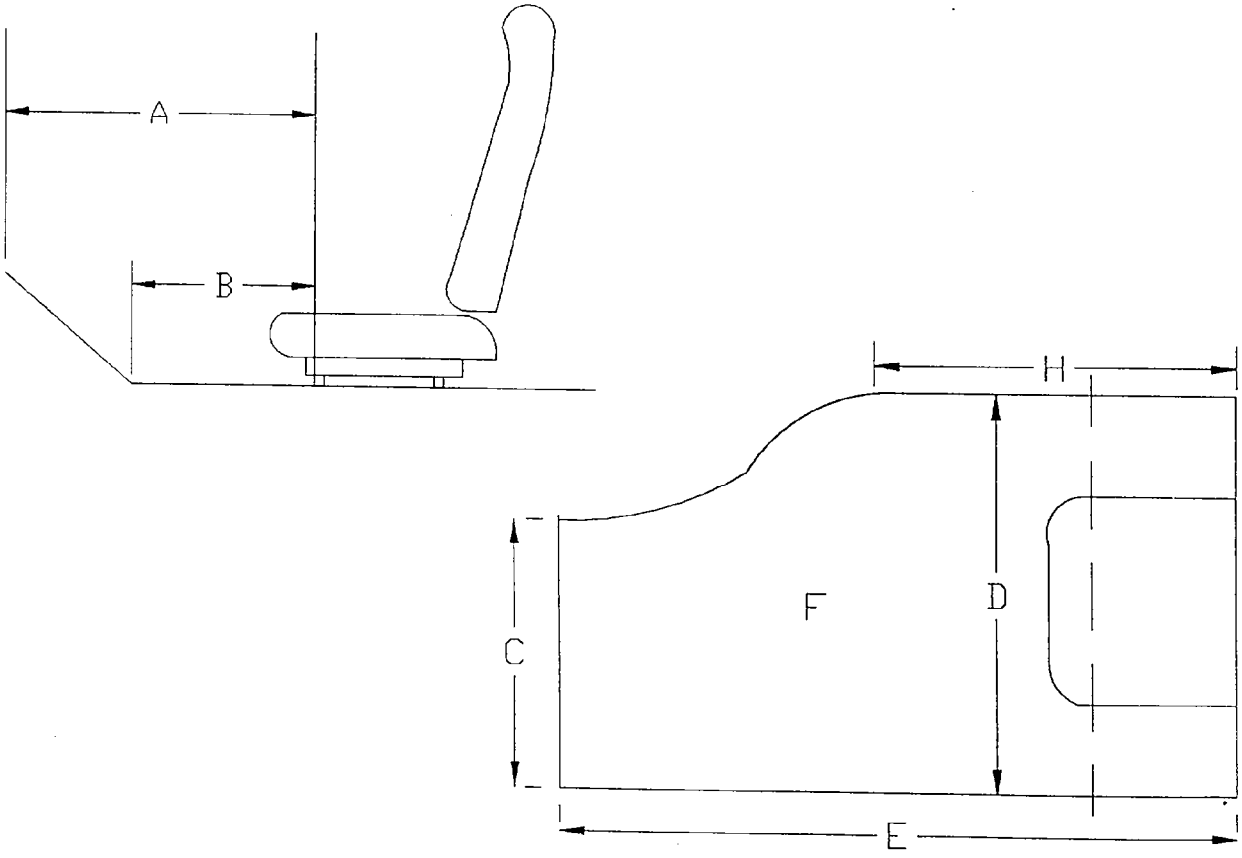
Dimension	Length
A	610
B	610
C	710
D	833
E	869
F	555
G	1443
H	2803
J	555

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



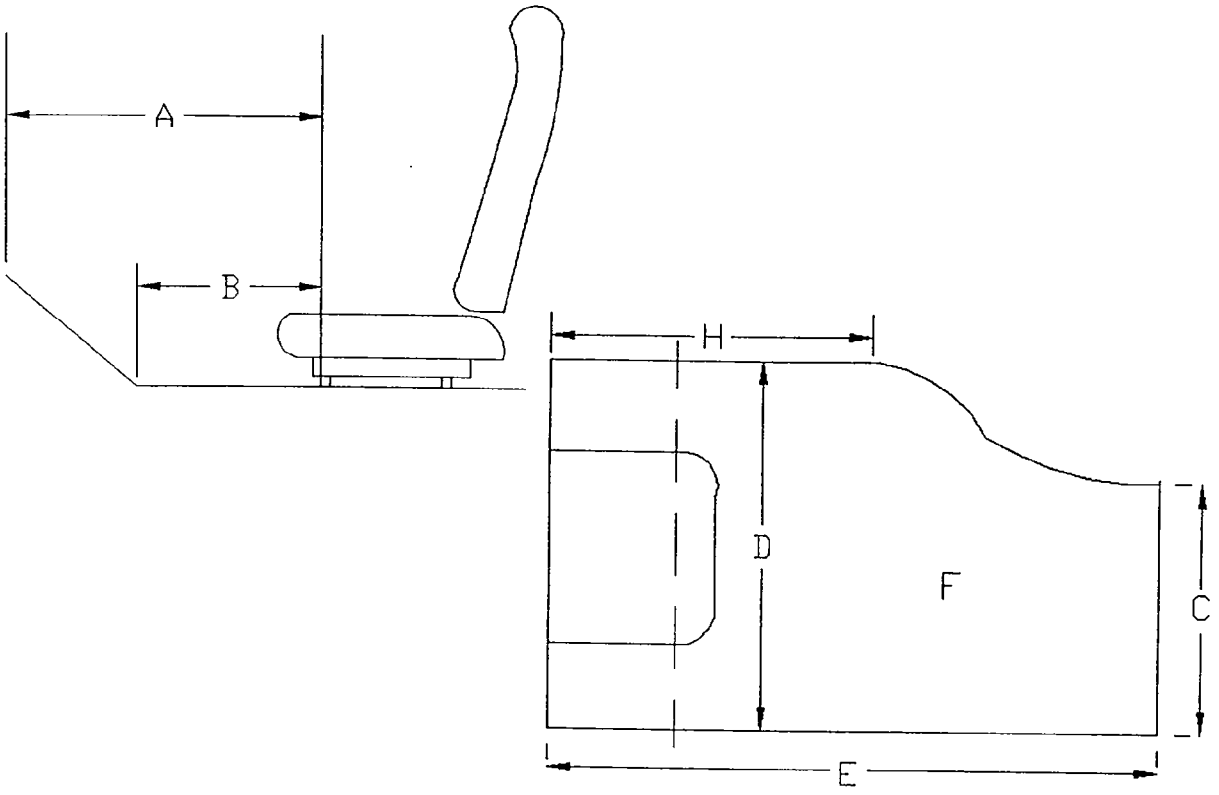
Units = mm

MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
A	769	695	74
B	675	634	41
C	355	422	-67
D	460	469	-9
E	2120	2113	7
H	2067	2002	65
F (cm^2)	9696	9862	166

TEST VEHICLE MEASUREMENTS (Cont'd)

STATIC FOOTWELL DEFORMATION

Passenger's Side

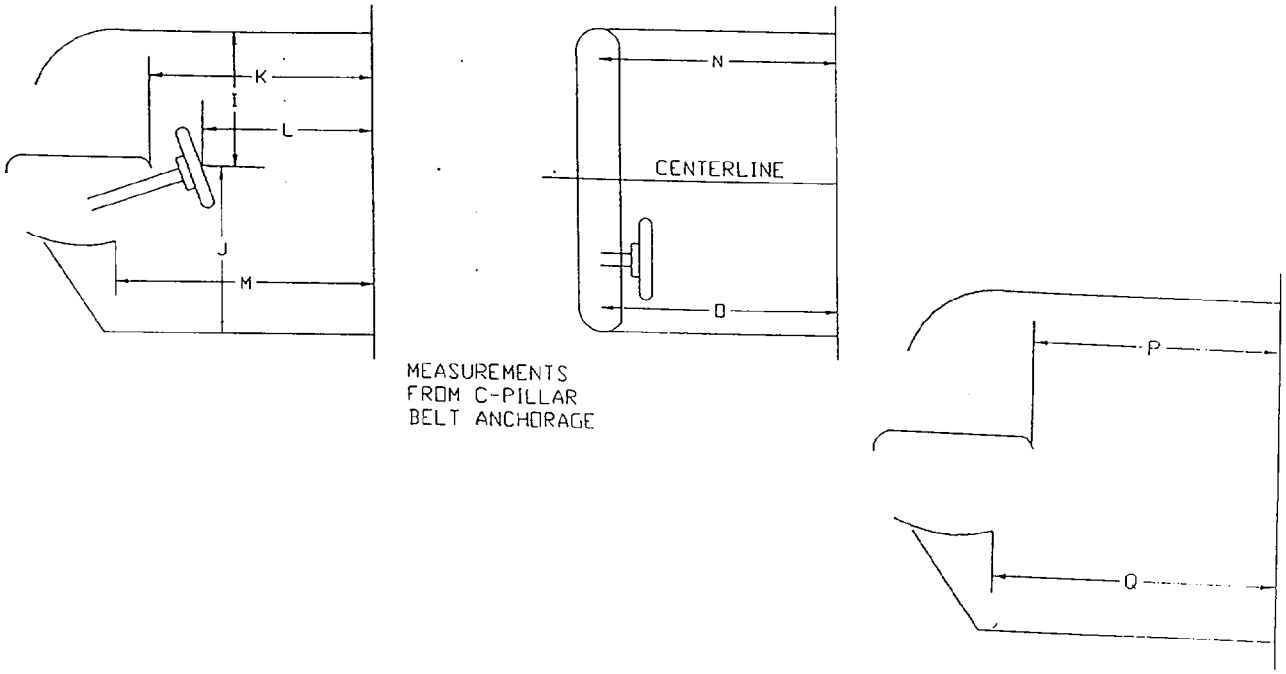


Units = mm

MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
A	770	722	48
B	655	654	1
C	362	362	0
D	474	468	6
E	2099	2060	39
H	1967	1959	8
F (cm^2)	9801	9534	267

TEST VEHICLE MEASUREMENTS (Cont'd)

STATIC PASSENGER COMPARTMENT INTRUSION



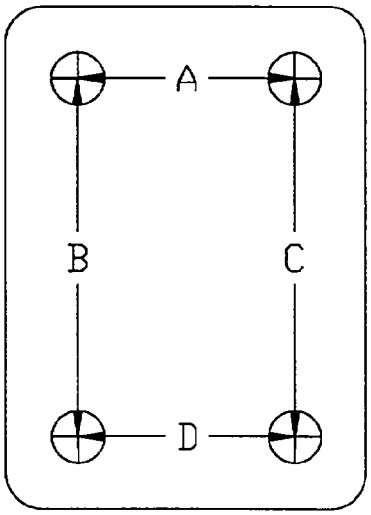
Units = mm

MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
I	447	453	-6
J	634	652	-18
K	1735	1679	56
L	1533	1498	35
M	1840	1815	25
N	1977	1939	38
O	1986	1923	63
P	1847	1784	63
Q	1902	1843	59

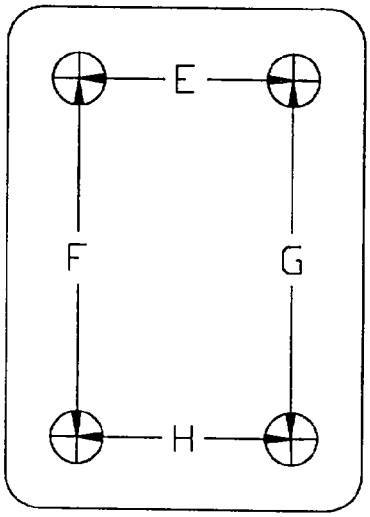
TEST VEHICLE MEASUREMENTS (Cont'd)

UNDERBODY FLOORBOARD DEFORMATION

DRIVER'S SIDE



PASSENGER'S SIDE

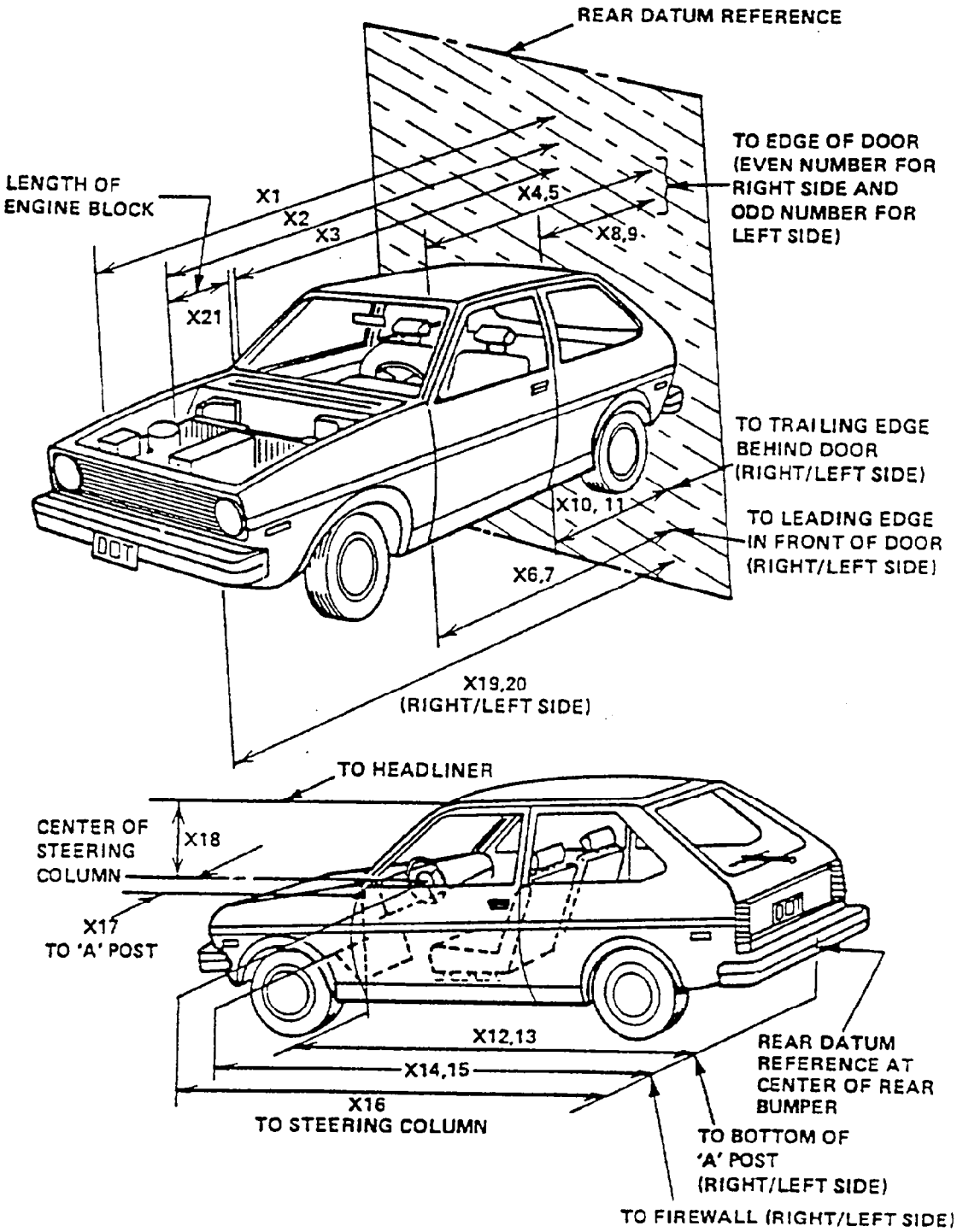


MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
A	353	353	0
B	502	502	0
C	473	447	26
D	365	370	-5
E	285	296	-11
F	515	492	23
G	521	522	-1
H	325	322	3

TEST VEHICLE MEASUREMENTS (Cont'd)

No.	MEASUREMENT DESCRIPTION:	Pre-Test (mm)	Post-Test (mm)	Diff. (mm)
X1	Total Length of Test Vehicle at Centerline	4448	3992	456
X2	Rear Surface of Vehicle to Front of Engine	3828	3617	211
X3	Rear Surface of Vehicle to Firewall	3463	3359	104
X4	Rear Surface to Upr. Leading Edge of Rt. Door	3222	3204	18
X5	Rear Surface to Upr. Leading Edge of Left Door	3217	3226	-9
X6	Rear Surface to Lwr. Leading Edge of Rt. Door	3217	3221	-4
X7	Rear Surface to Lwr. Leading Edge of Left Door	3208	3209	-1
X8	Rear Surface to Upr. Trailing Edge of Rt. Door	2076	2065	11
X9	Rear Surface to Upr. Trailing Edge of Left Door	2068	2098	-30
X10	Rear Surface to Lwr. Trailing Edge of Rt. Door	2068	2087	-19
X11	Rear Surface to Lwr. Trailing Edge of Left Door	2064	2074	-10
X12	Rear Surface to Bottom of `A' Post on Rt. Side	3212	3212	0
X13	Rear Surface to Bottom of `A' Post on Left Side	3208	3207	1
X14	Rear Surface to Firewall on Right Side	3456	3324	132
X15	Rear Surface to Firewall on Left Side	3459	3447	12
X16	Rear Surface to Steering Column	2726	2756	-30
X17	Center of Steering Column to A Post	409	400	9
X18	Center of Steering Column to Headlining	435	437	-2
X19	Rear Surface to Right Side of Front Bumper	4352	3942	410
X20	Rear Surface to Left Side of Front Bumper	4361	3933	428
X21	Length of Engine Block	410	410	0

TEST VEHICLE MEASUREMENTS (Cont'd)



ACCIDENT INVESTIGATION DIVISION DATA

FOR 35 MPH FRONTAL BARRIER IMPACT

VEHICLE MAKE/MODEL/BODY STYLE: 1995/Isuzu/Rodeo/4 Door

VEH. NHTSA NO.: MS5701 ; VIN: 4S2CM58V8S4357408

MODEL YEAR: 1995 ; BUILD DATE: 6/95 ; TEST DATE: September 13, 1995

VEH. SIZE CATEGORY: SUV ; TEST WEIGHT: 2075.2 kg

VEH. WHEELBASE: 2760 mm ; FRONT OVERHANG: 735 mm ; OVERALL WIDTH: 1672 mm

ACCELEROMETER DATA:

LOCATION: As per measurements on pages 4-13

CALIBRATION PROCEDURE: As per MGA Calibration Procedure

LINEARITY: >99.9% ; INTEGRATION ALGORITHM: Trapezoidal

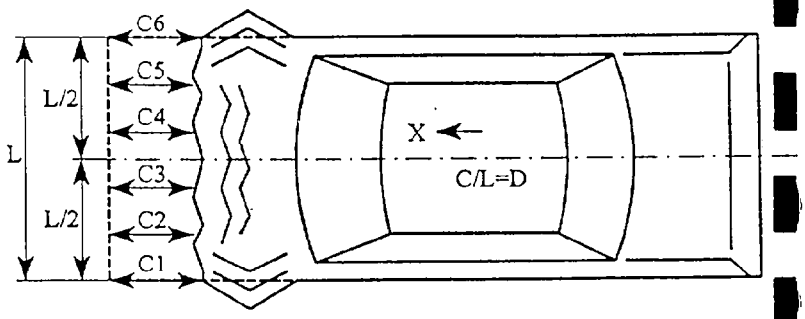
VEH: IMPACT SPEED: 56.4 kph ; TIME OF SEPARATION: 115 msec

VELOCITY CHANGE: 66.0 kph

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

CRUSH DEPTH DIMENSIONS:

C1 = 428 mm
C2 = 410 mm
C3 = 431 mm
C4 = 452 mm
C5 = 434 mm
C6 = 410 mm



MIDPOINT OF DAMAGE: D = Vehicle Centerline (Longitude)

LENGTH OF DAMAGED REGION: L = 1507 mm

APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS (Cont'd)

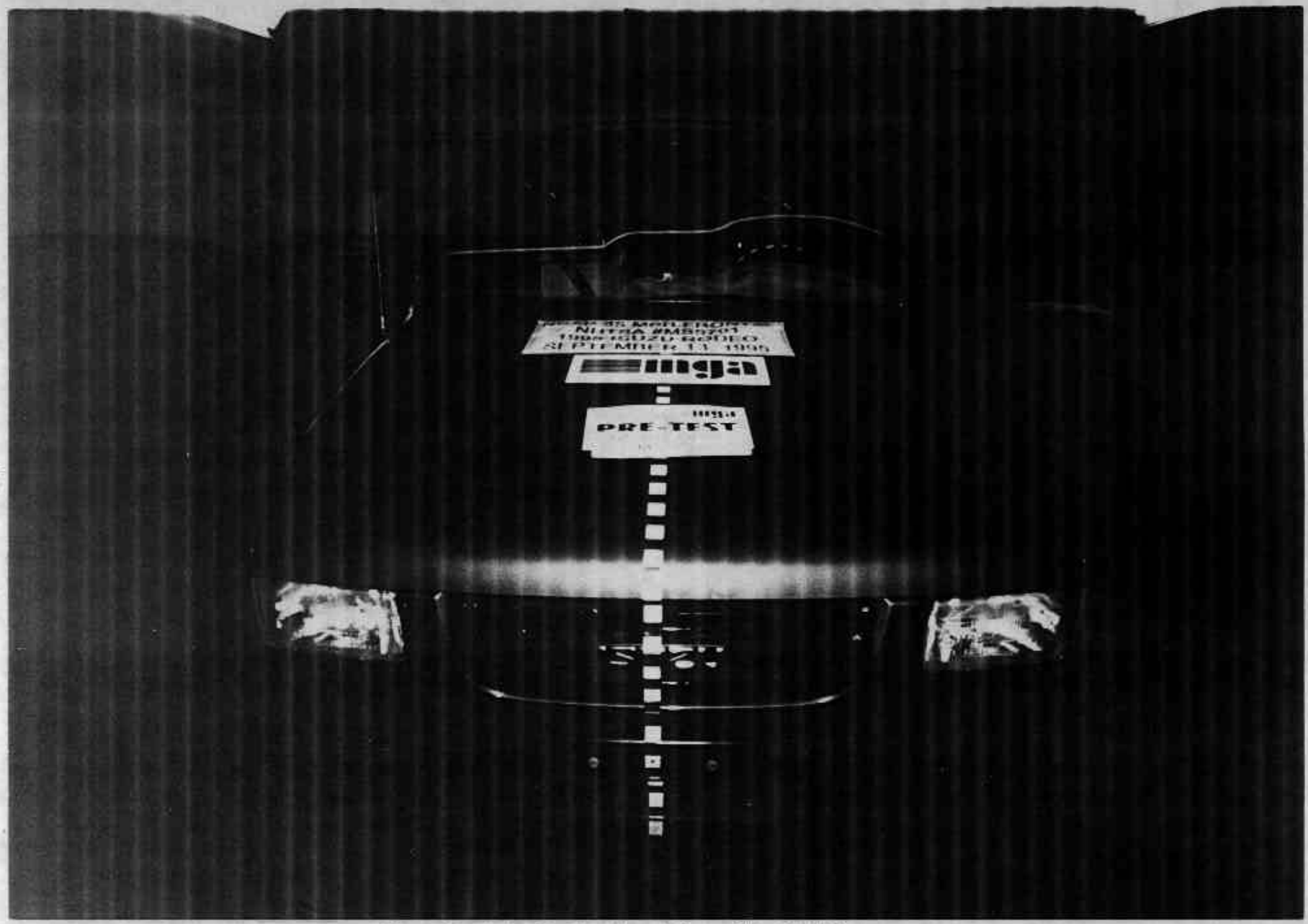


Photo No. A-1 - Pre-Test Front View of Test Vehicle

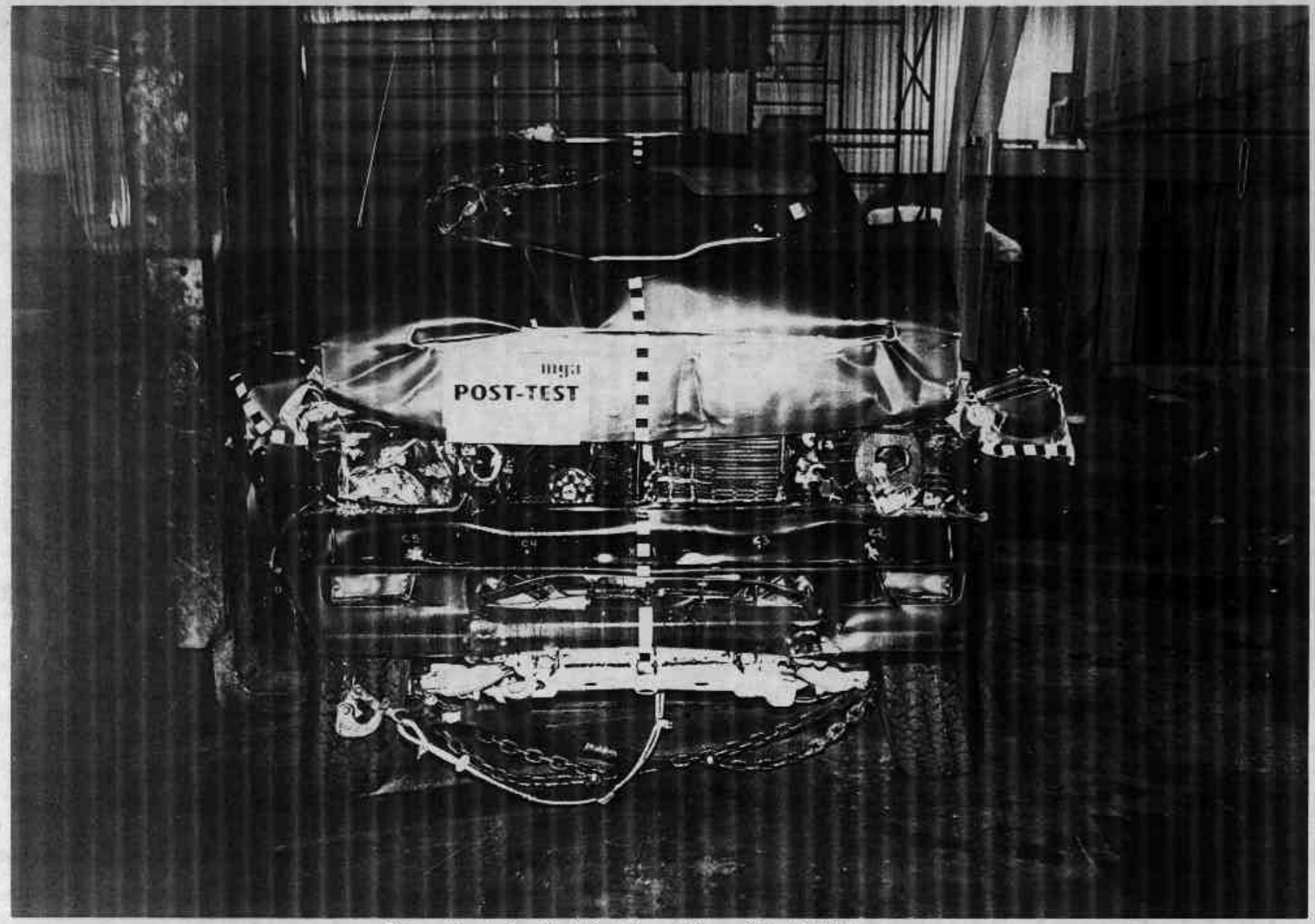


Photo No. A-2 - Post-Test Front View of Test Vehicle

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

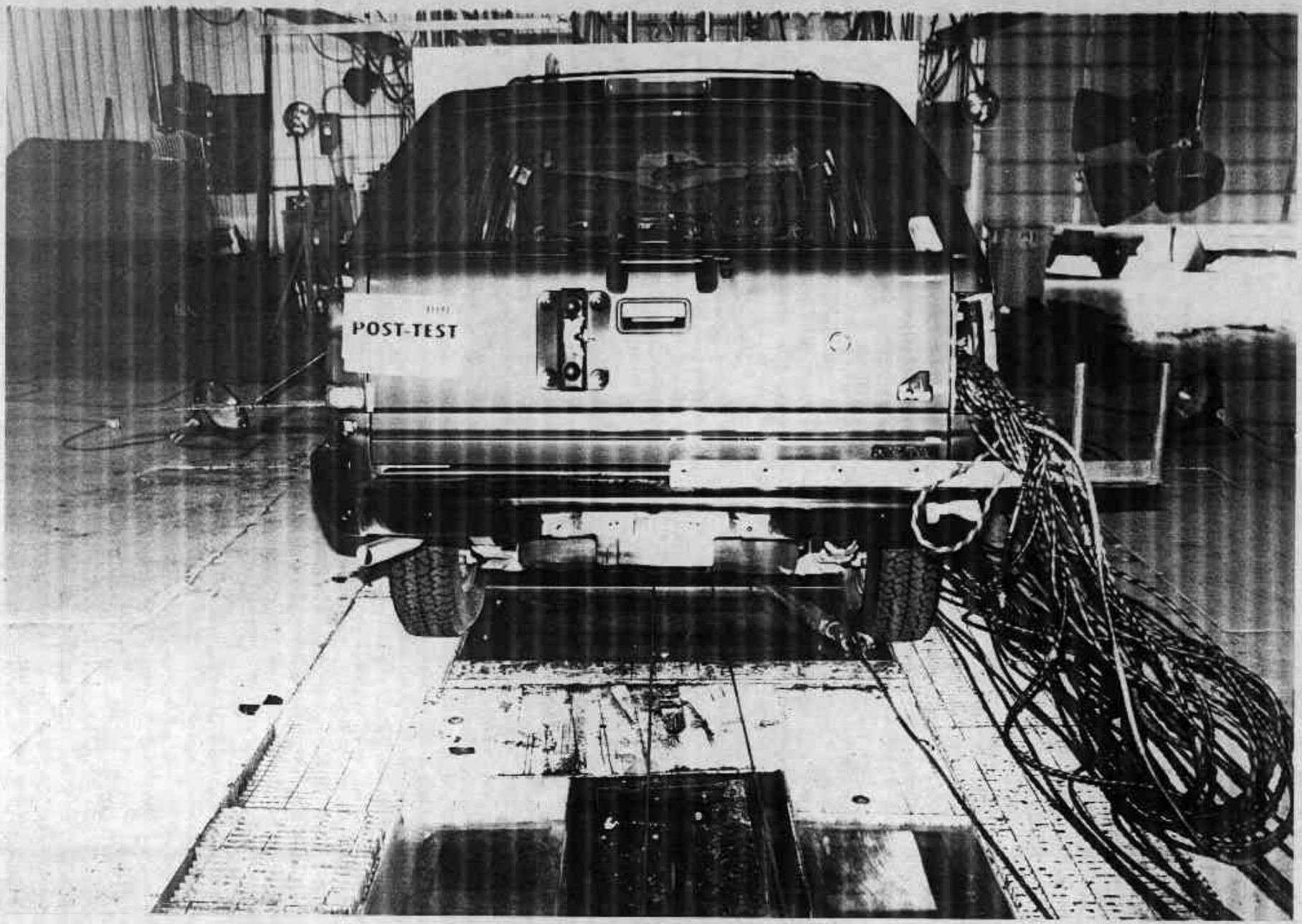


Photo No. A-4 - Post-Test Rear View of Test Vehicle

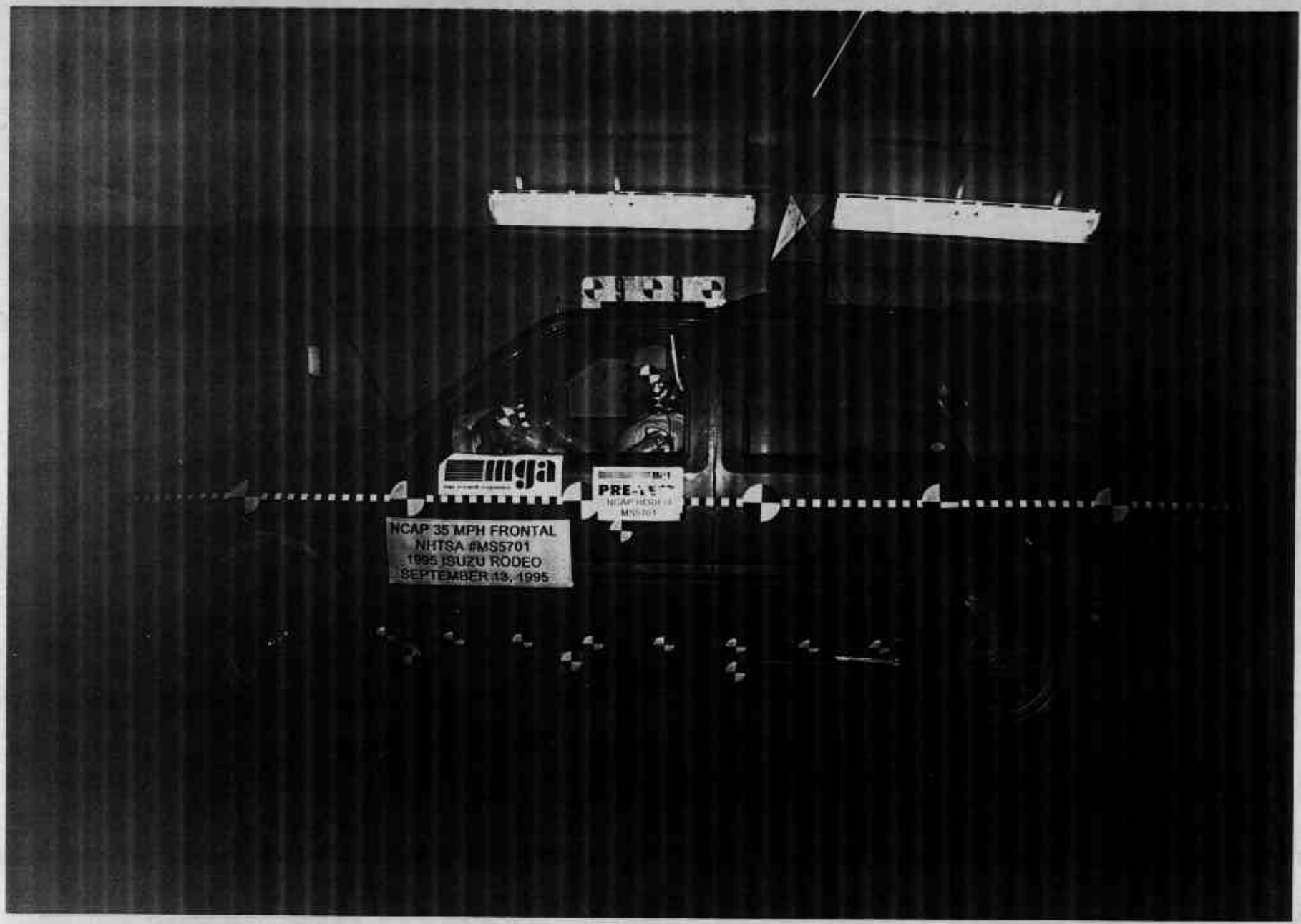
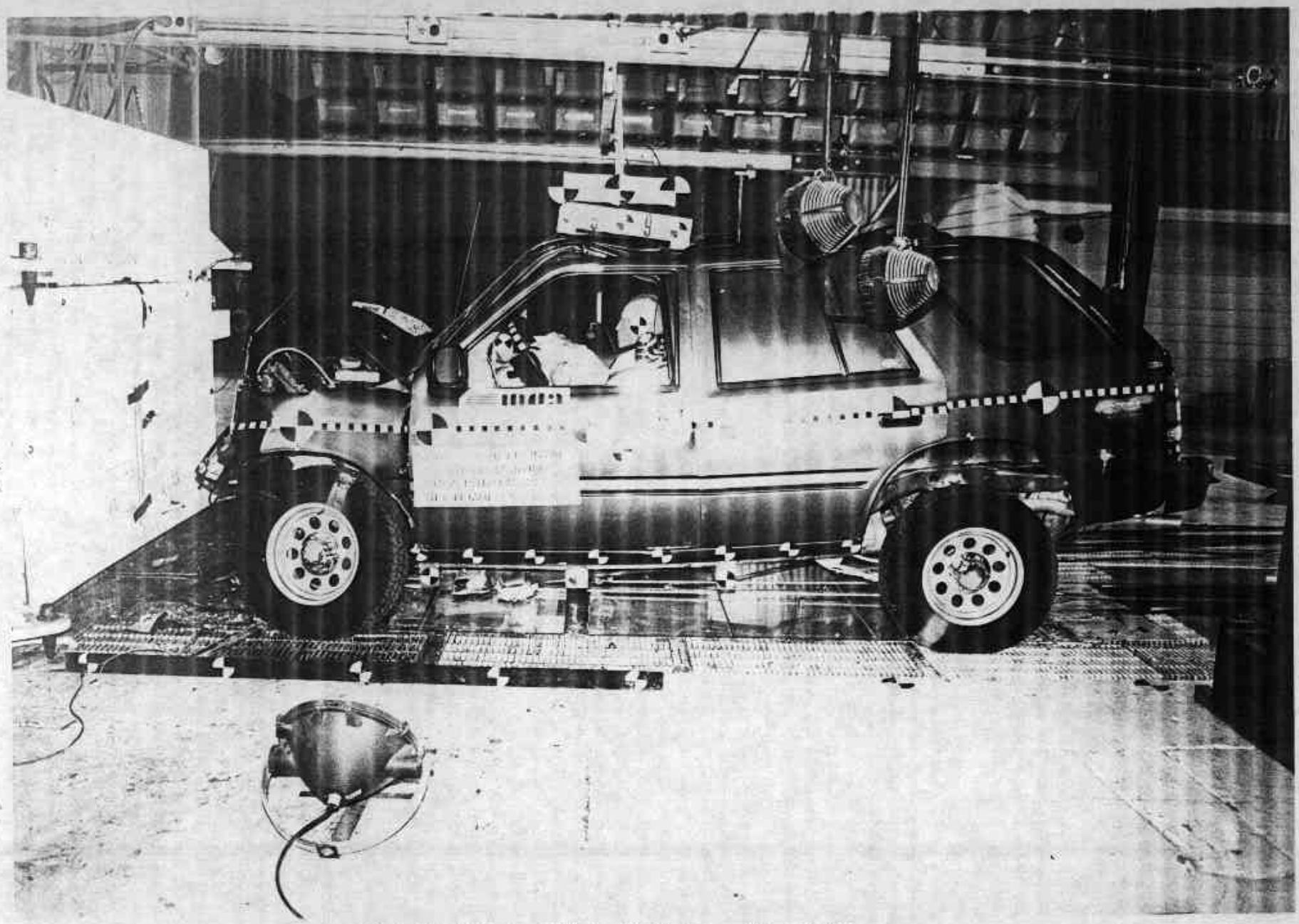


Photo No. A-5 - Pre-Test Left Side View of Test Vehicle



A-6

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

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

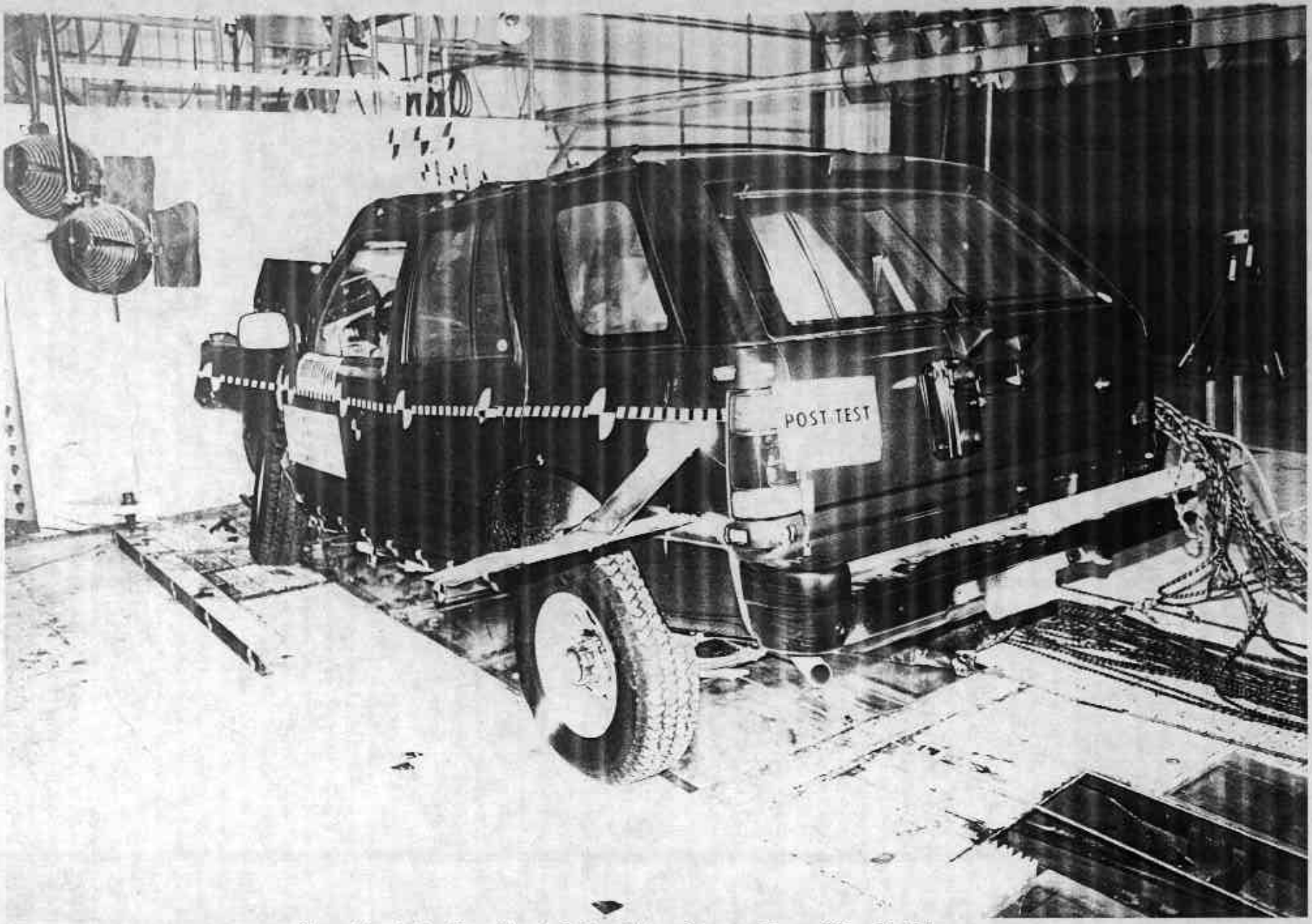


Photo No. A-8 - Post-Test Left Rear Three-Quarter View of Test Vehicle

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

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

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

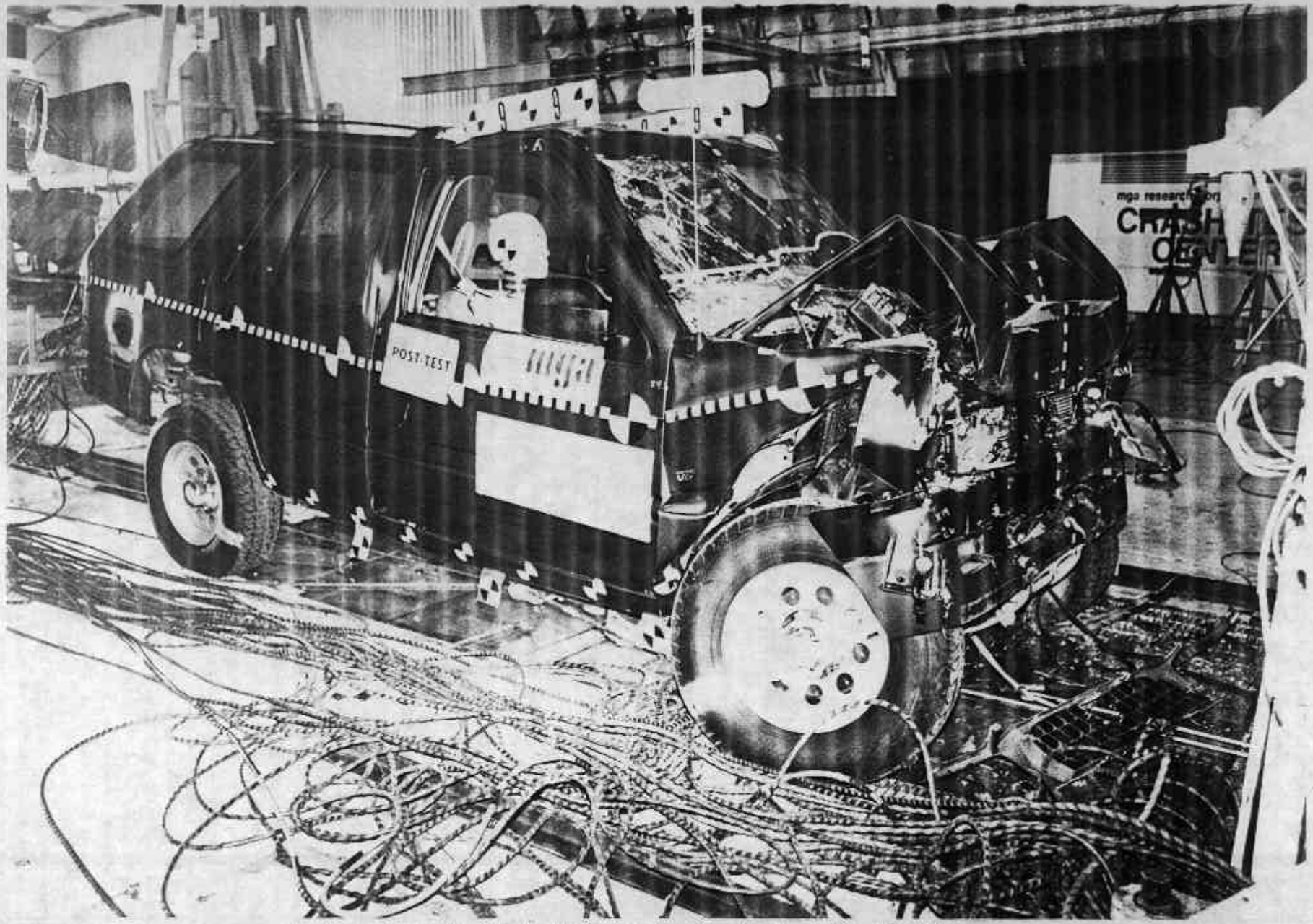
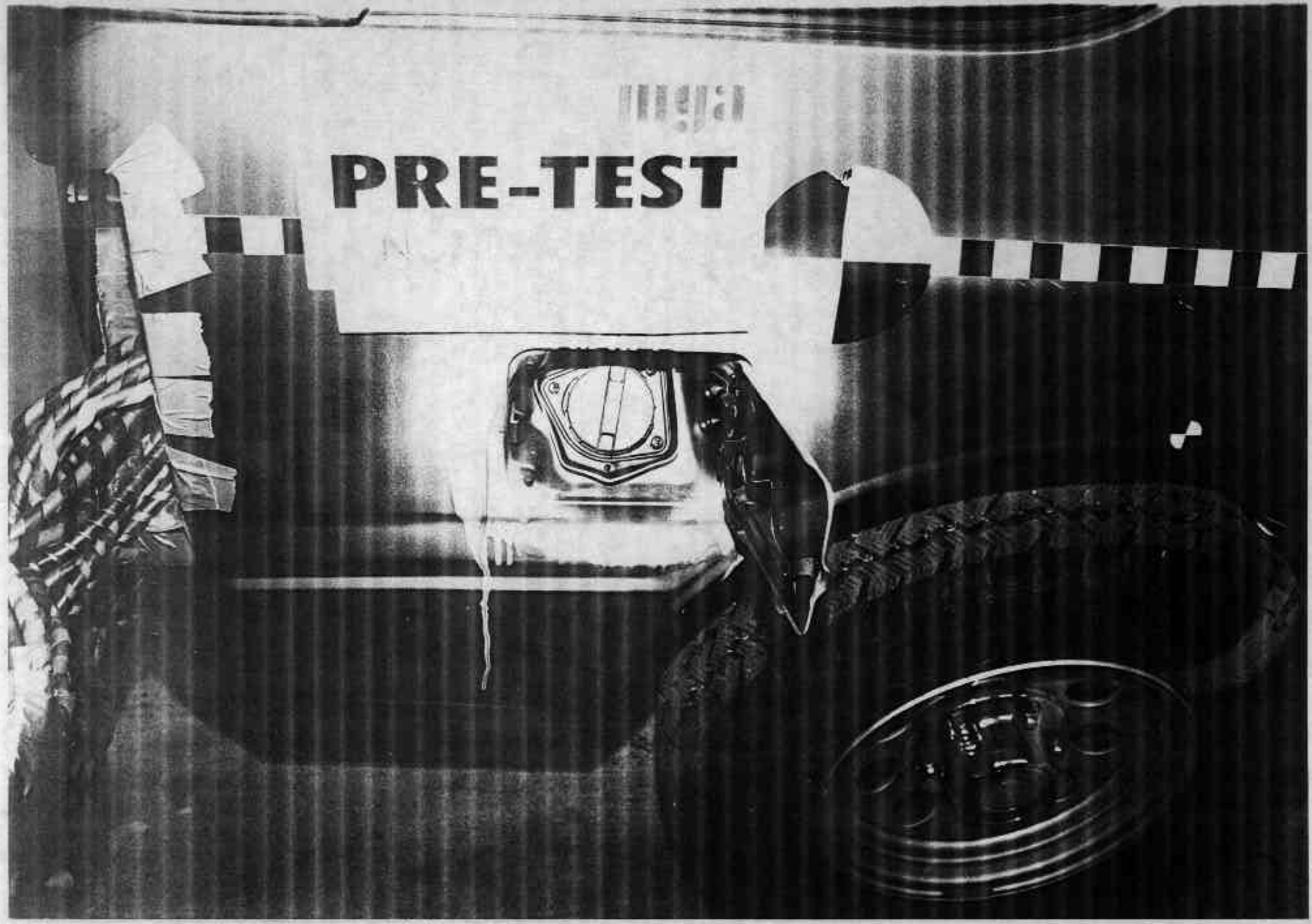
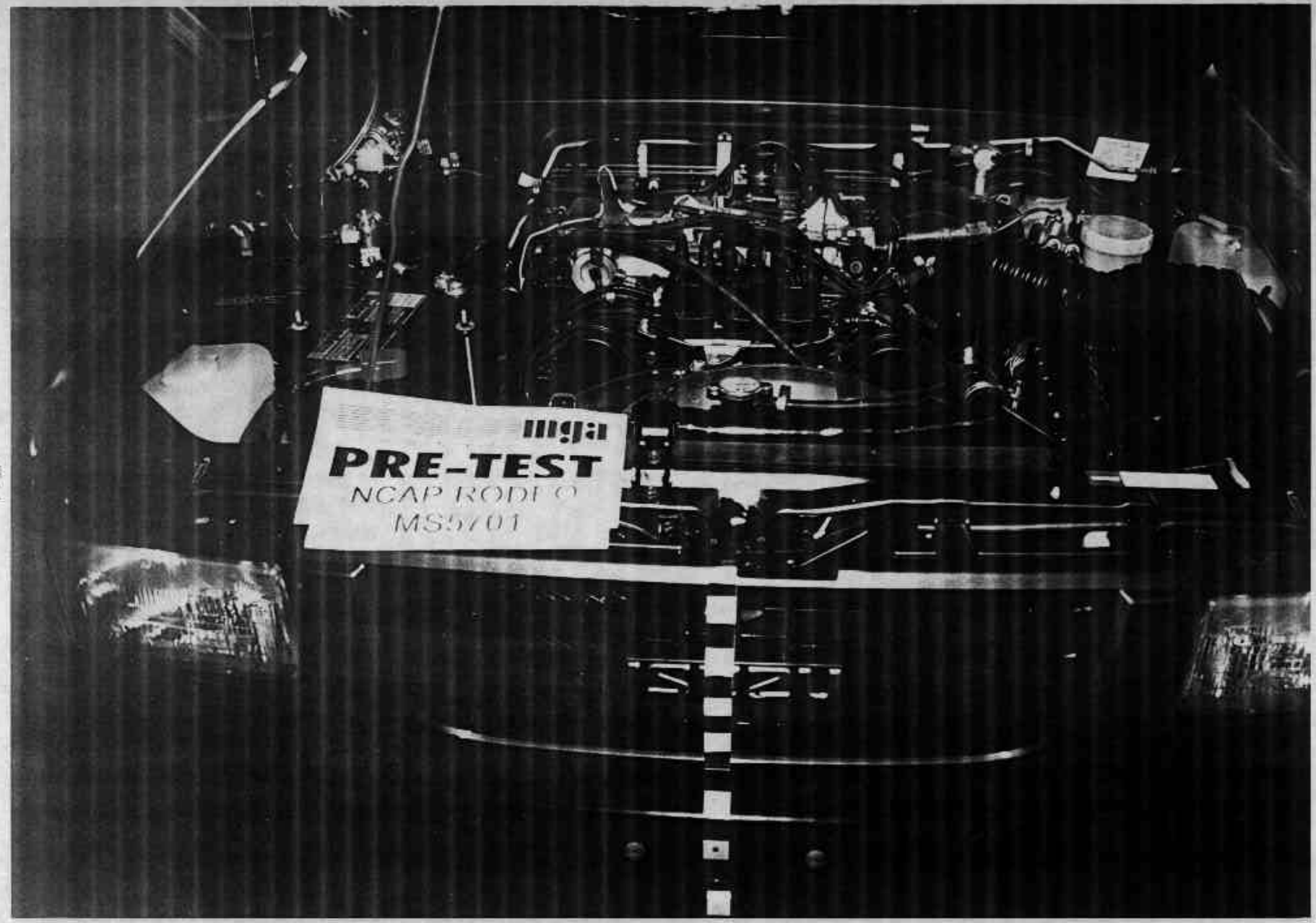


Photo No. A-12 - Post-Test Right Front Three-Quarter View of Test Vehicle



A-13

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



A-14

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

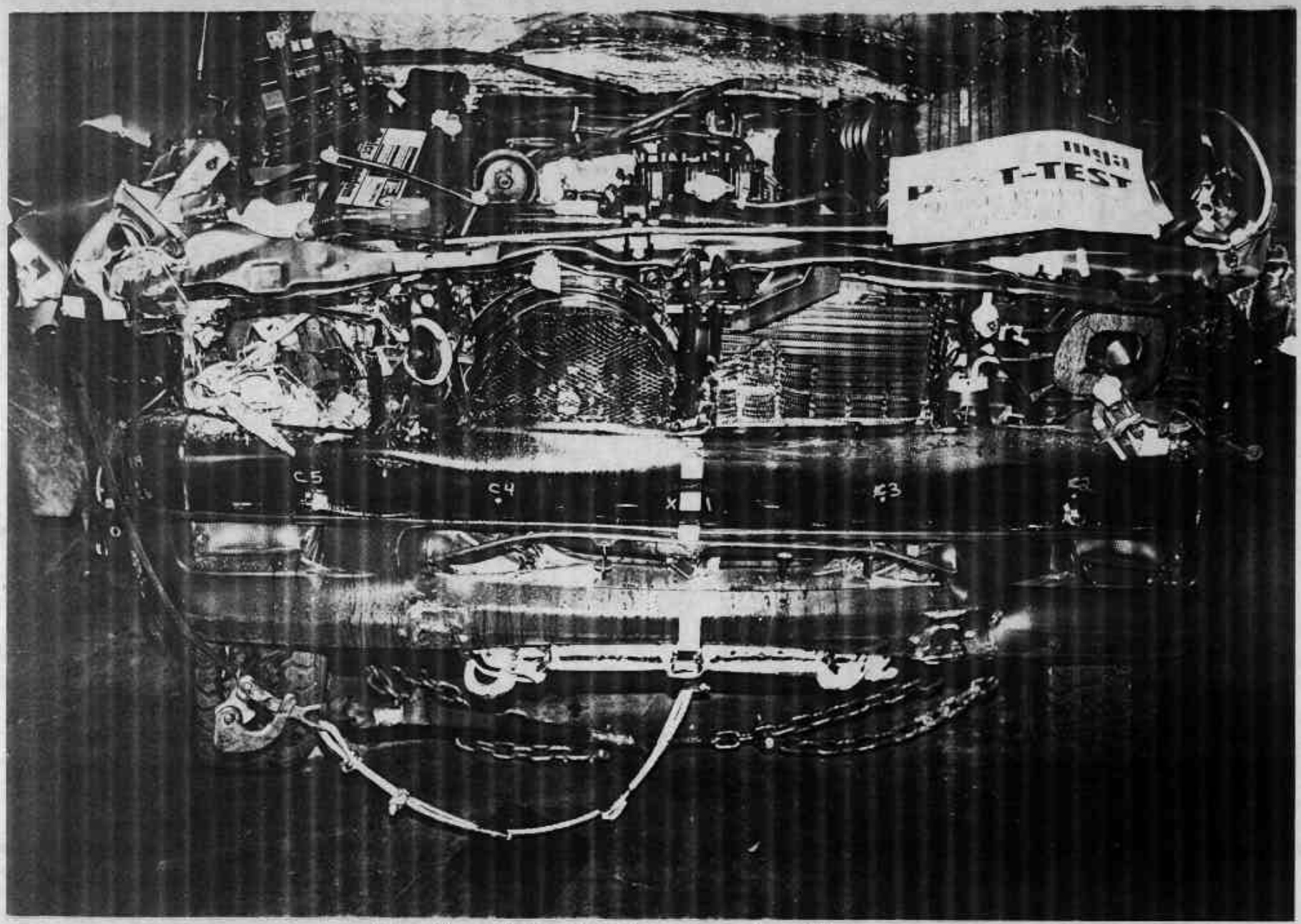


Photo No. A-15 - Post-Test Engine Compartment View

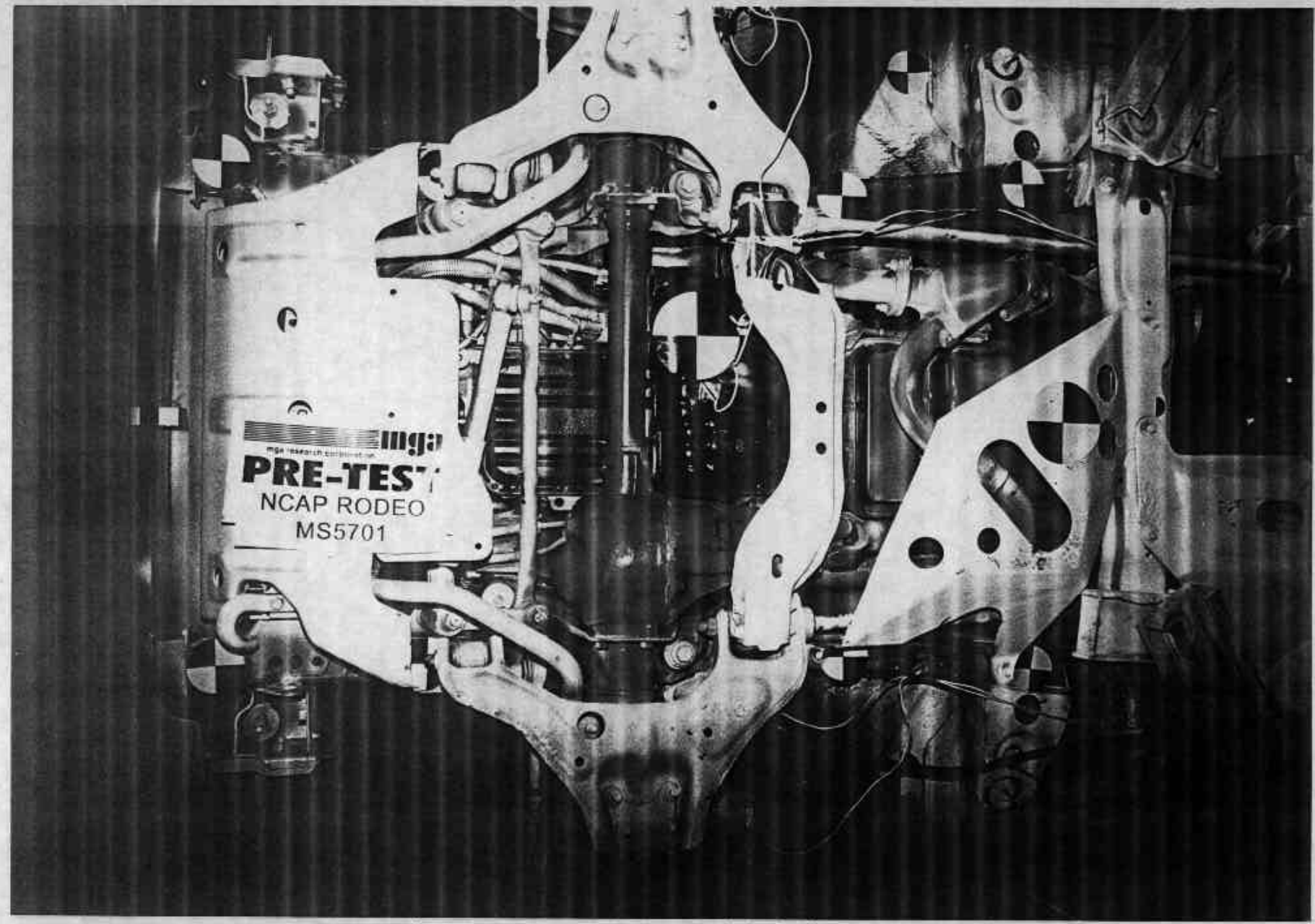


Photo No. A-16 - Pre-Test Front Underbody View

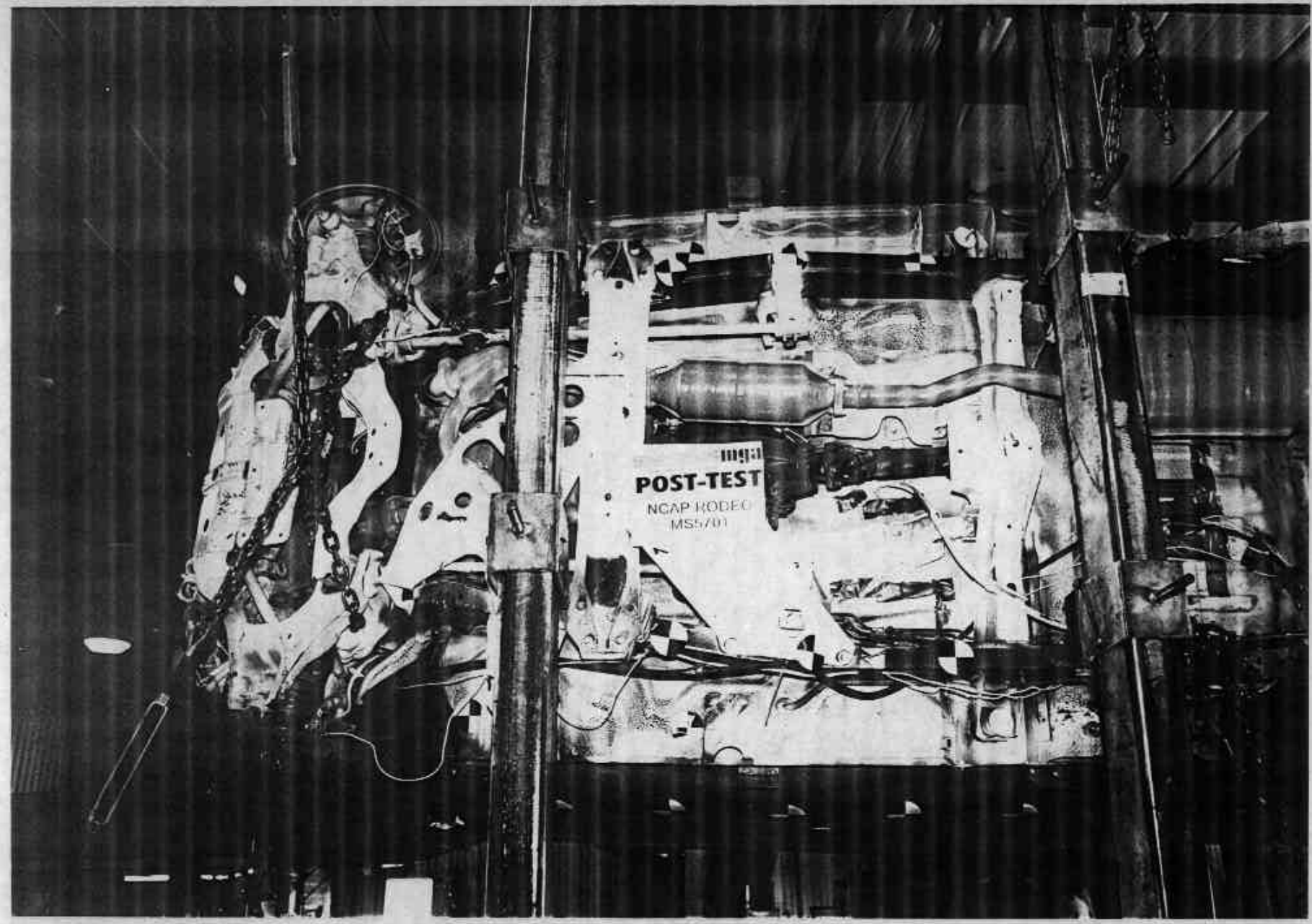


Photo No. A-17 - Post-Test Front Underbody View

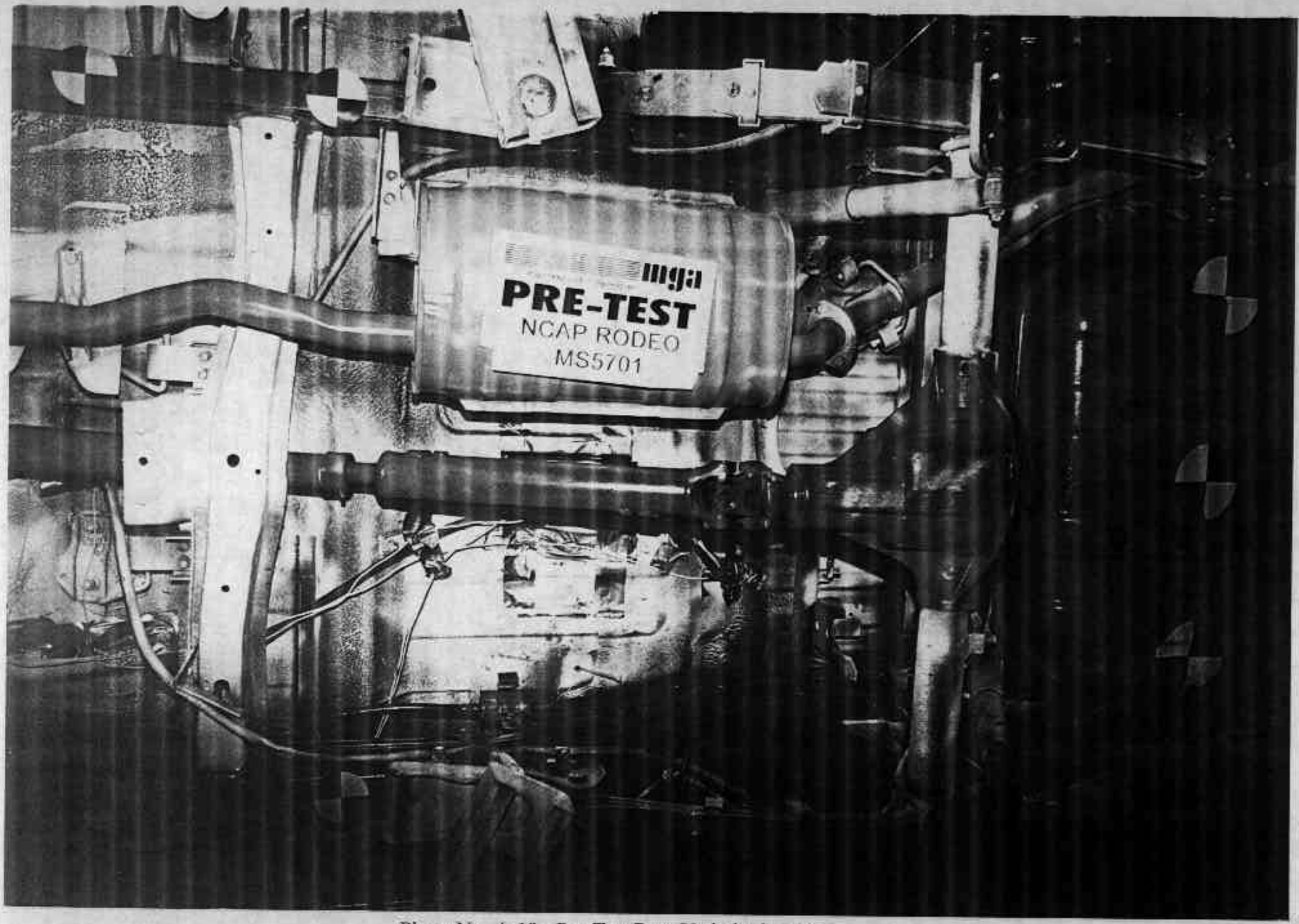


Photo No. A-18 - Pre-Test Rear Underbody View

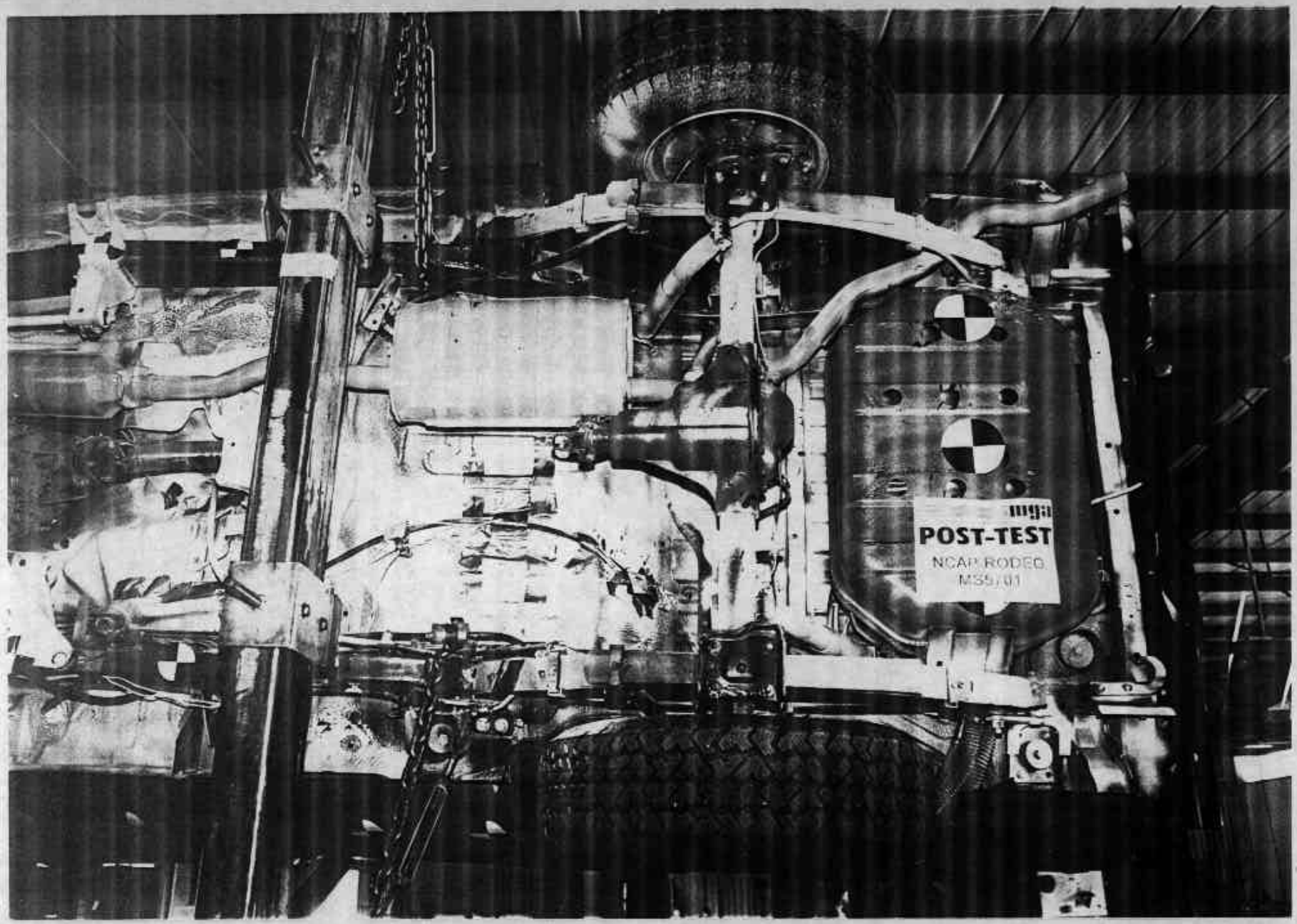


Photo No. A-19 - Post-Test Rear Underbody View

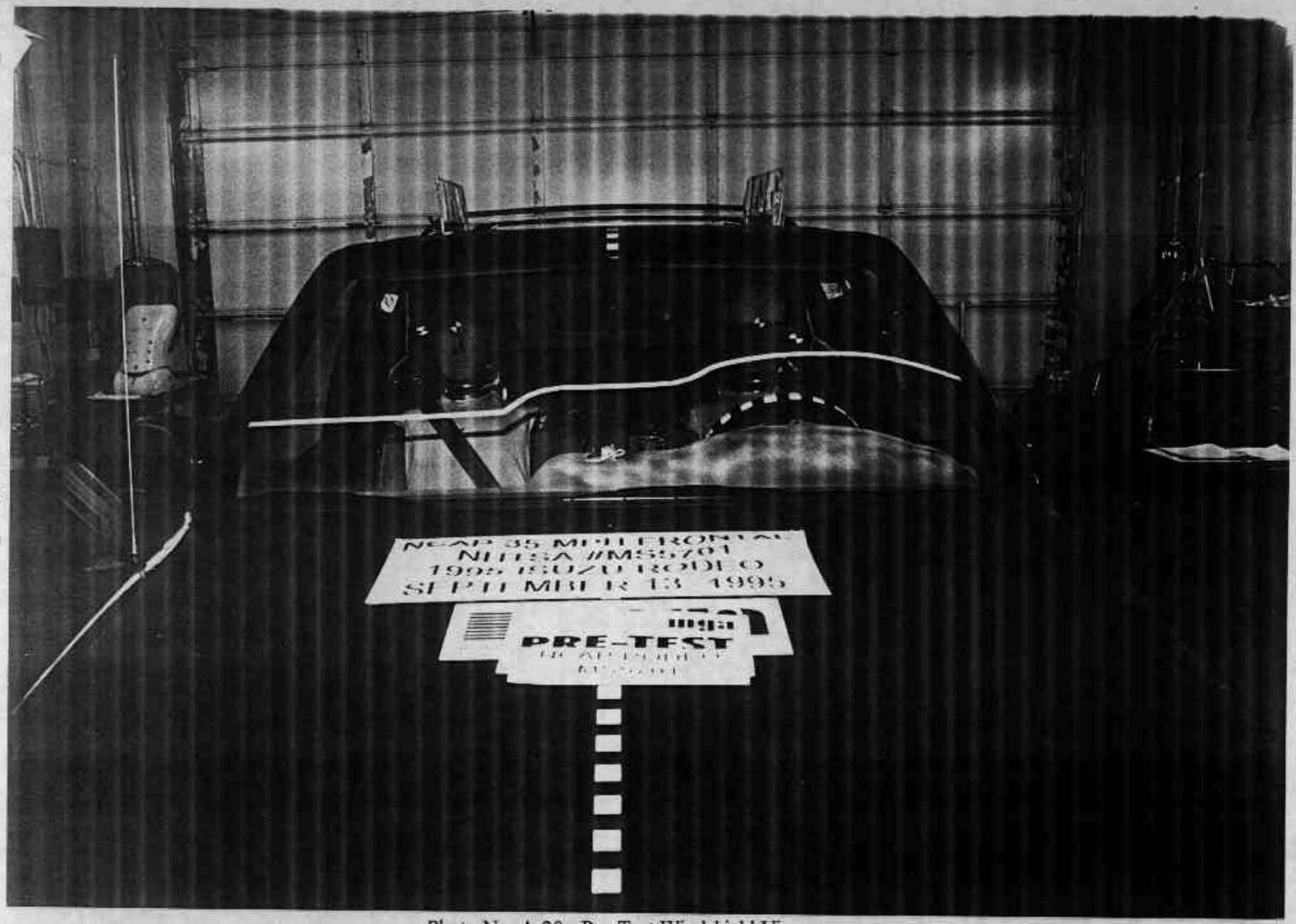


Photo No. A-20 - Pre-Test Windshield View

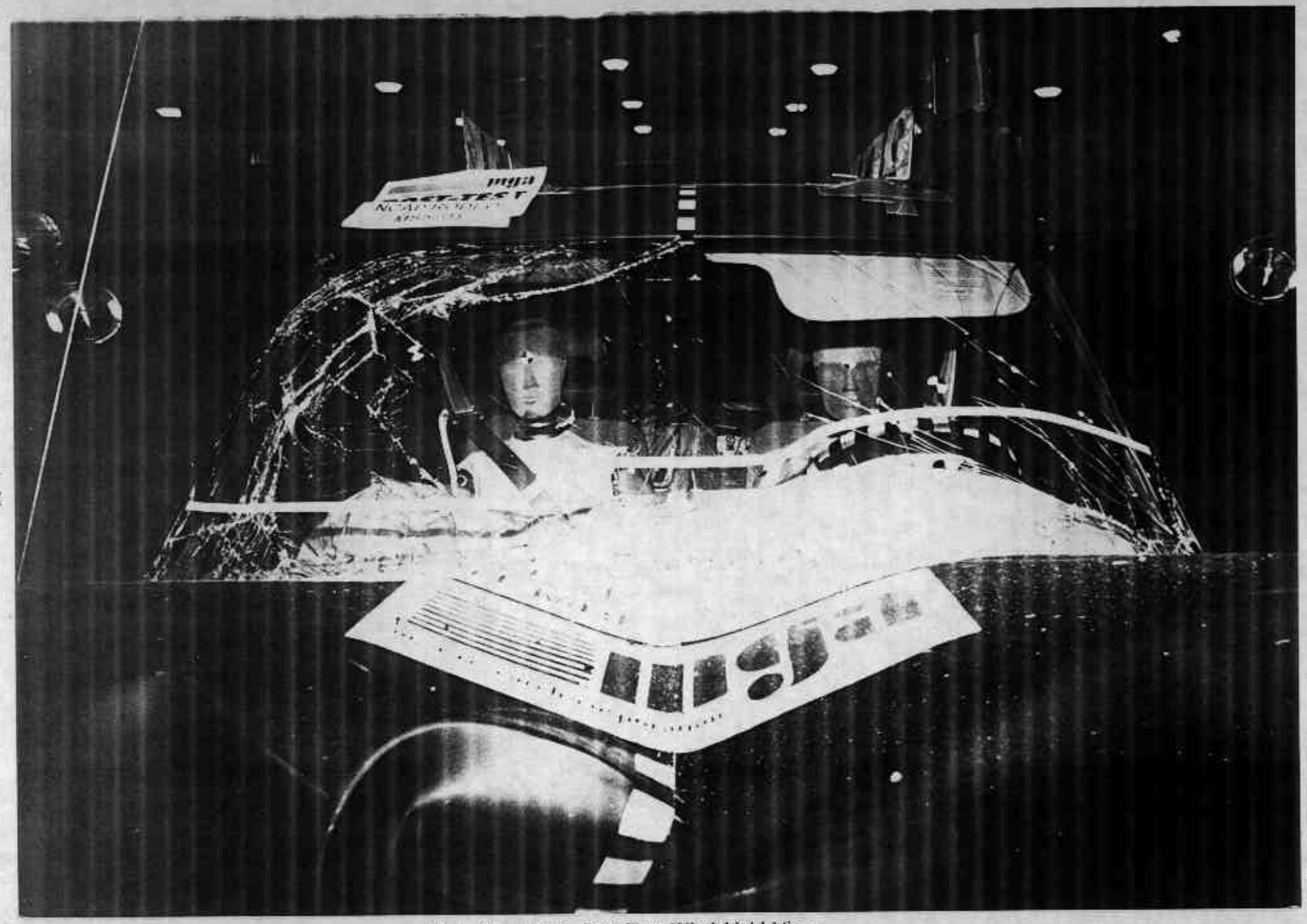


Photo No. A-21 – Post-Test Windshield View

A-22

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

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

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

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

A-26

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

A-27

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

A-28

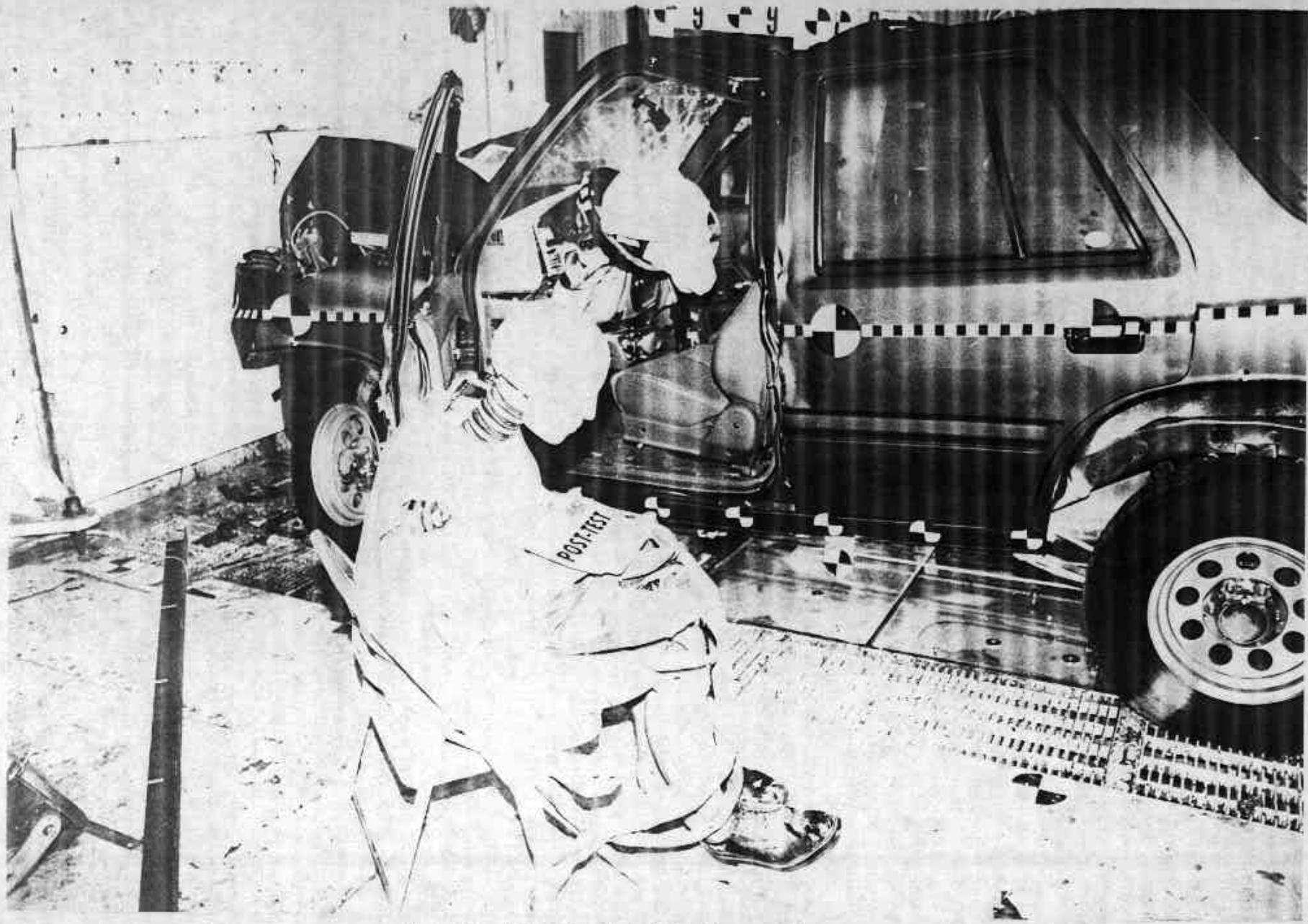
Photo No. A-28 - Pre-Test Driver Dummy Knee Position

A-29

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

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

Photo No. A-31 - Post-Test Driver Knee Contact View

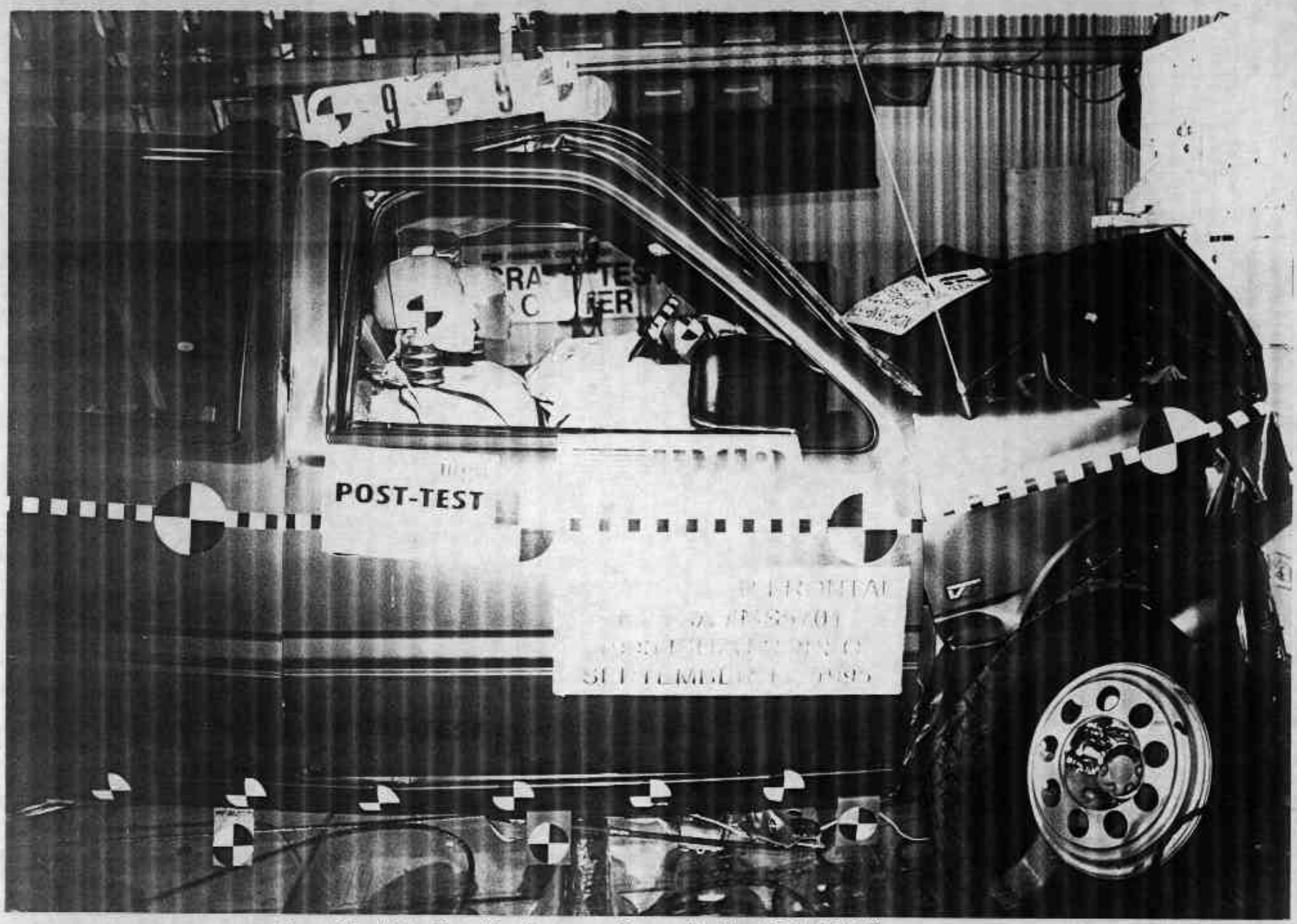


A-32

Photo No. A-32 - Post-Test Driver Dummy View

A-33

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



A-34

Photo No. A-34 - Post-Test Passenger Dummy Position Right Side View

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

A-36

Photo No. A-36 - Post-Test Passenger Dummy Position Right Side View (Door Open)

A-37

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

A-38

Photo No. A-38 - Post-Test Passenger Seat Position View

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

Photo No. A-40 - Post-Test Passenger Dummy Knee Position

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

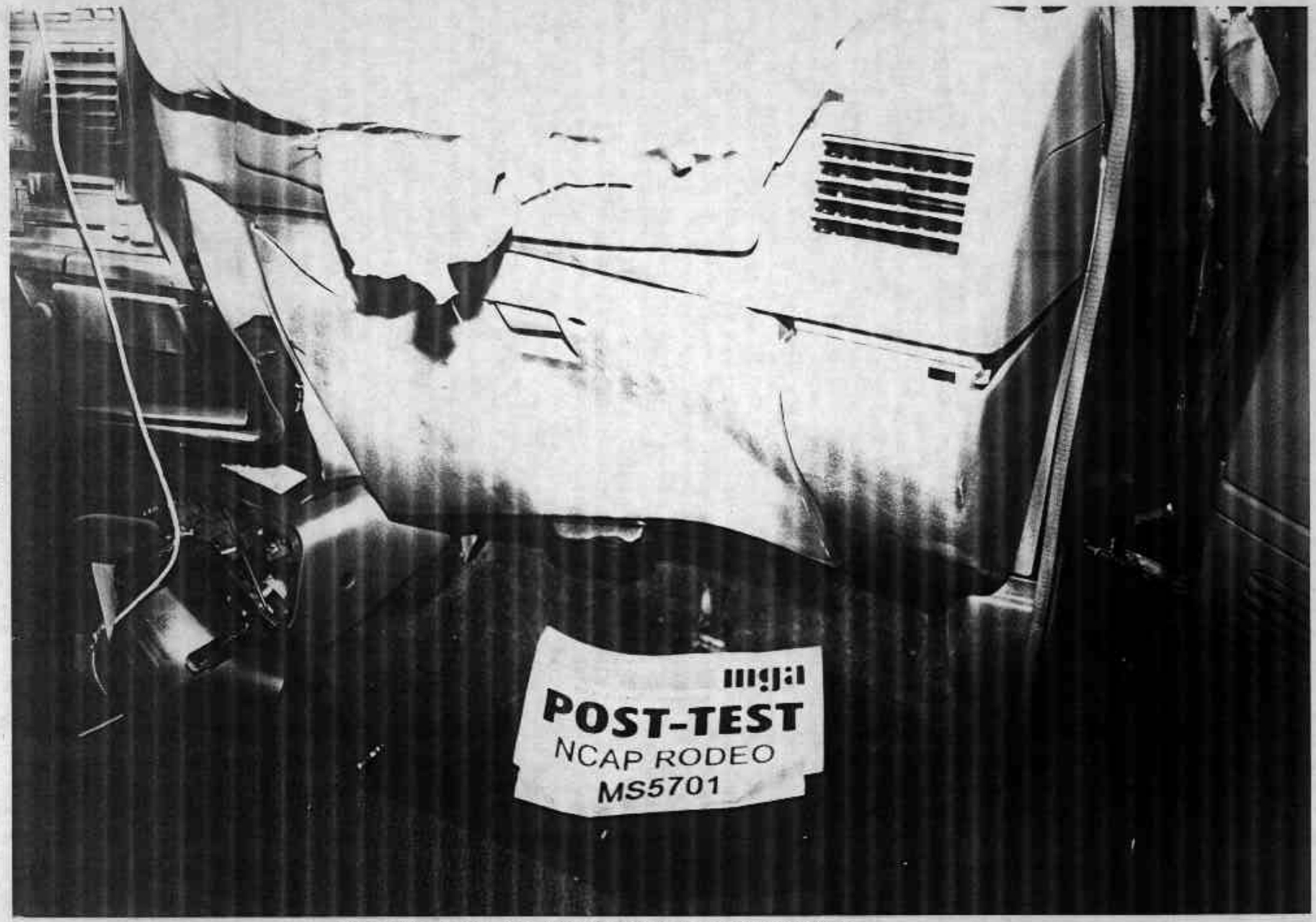
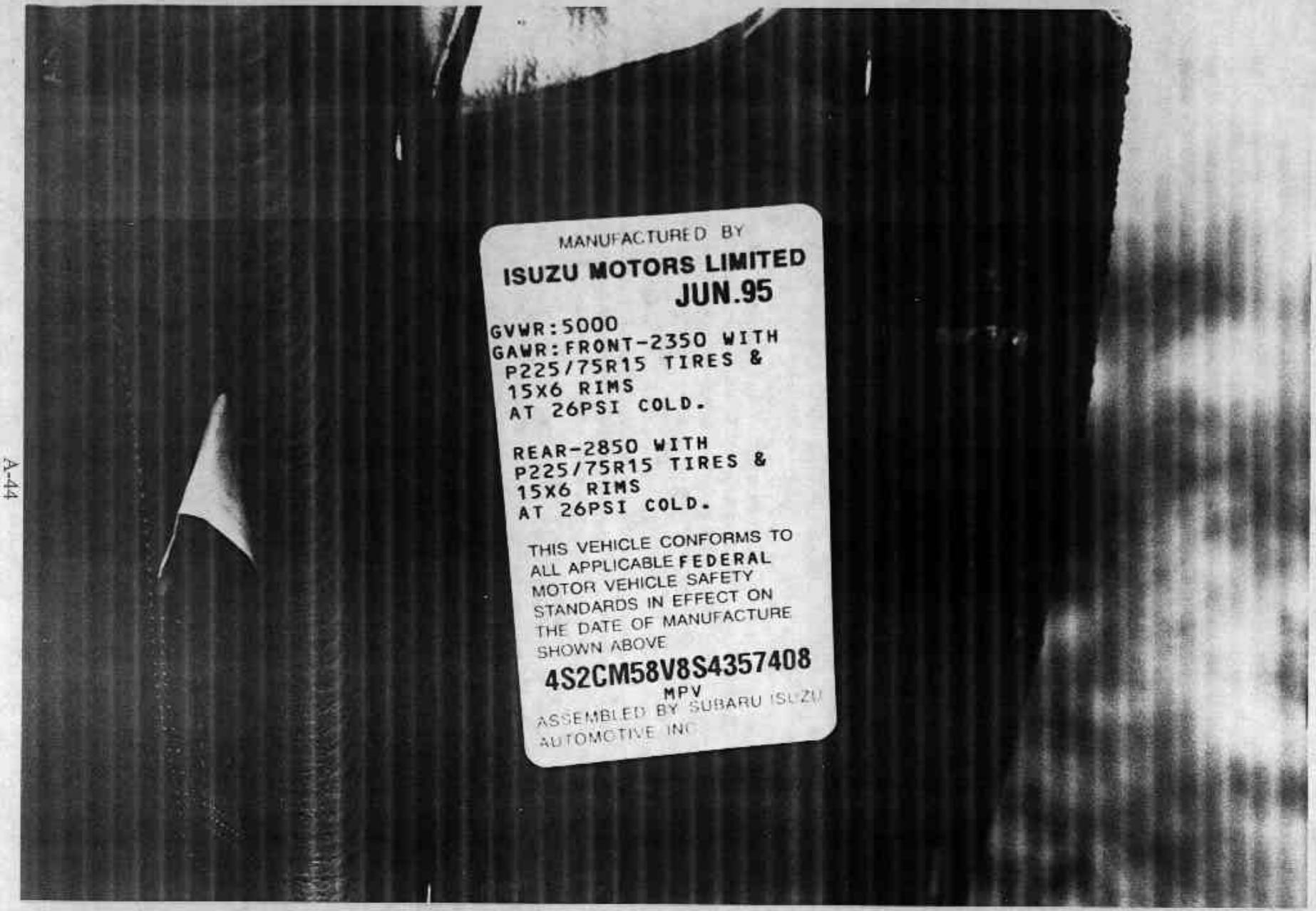


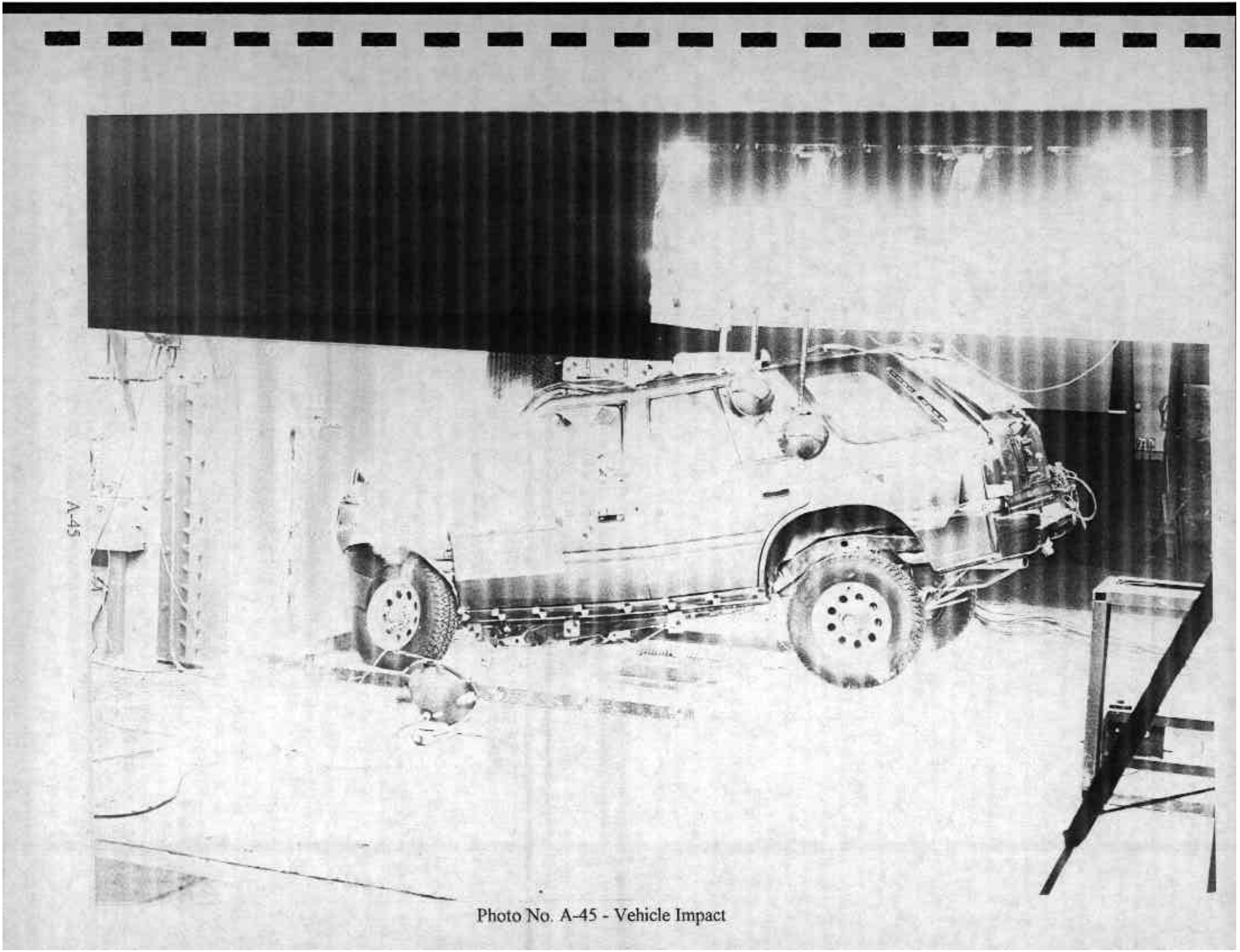
Photo No. A-42 - Post-Test Passenger Knee Contact View

Photo No. A-43 - Post-Test Passenger Dummy View



A-44

Photo No. A-44 - Vehicle Certification Label and Tire Placard



A-45

Photo No. A-45 - Vehicle Impact

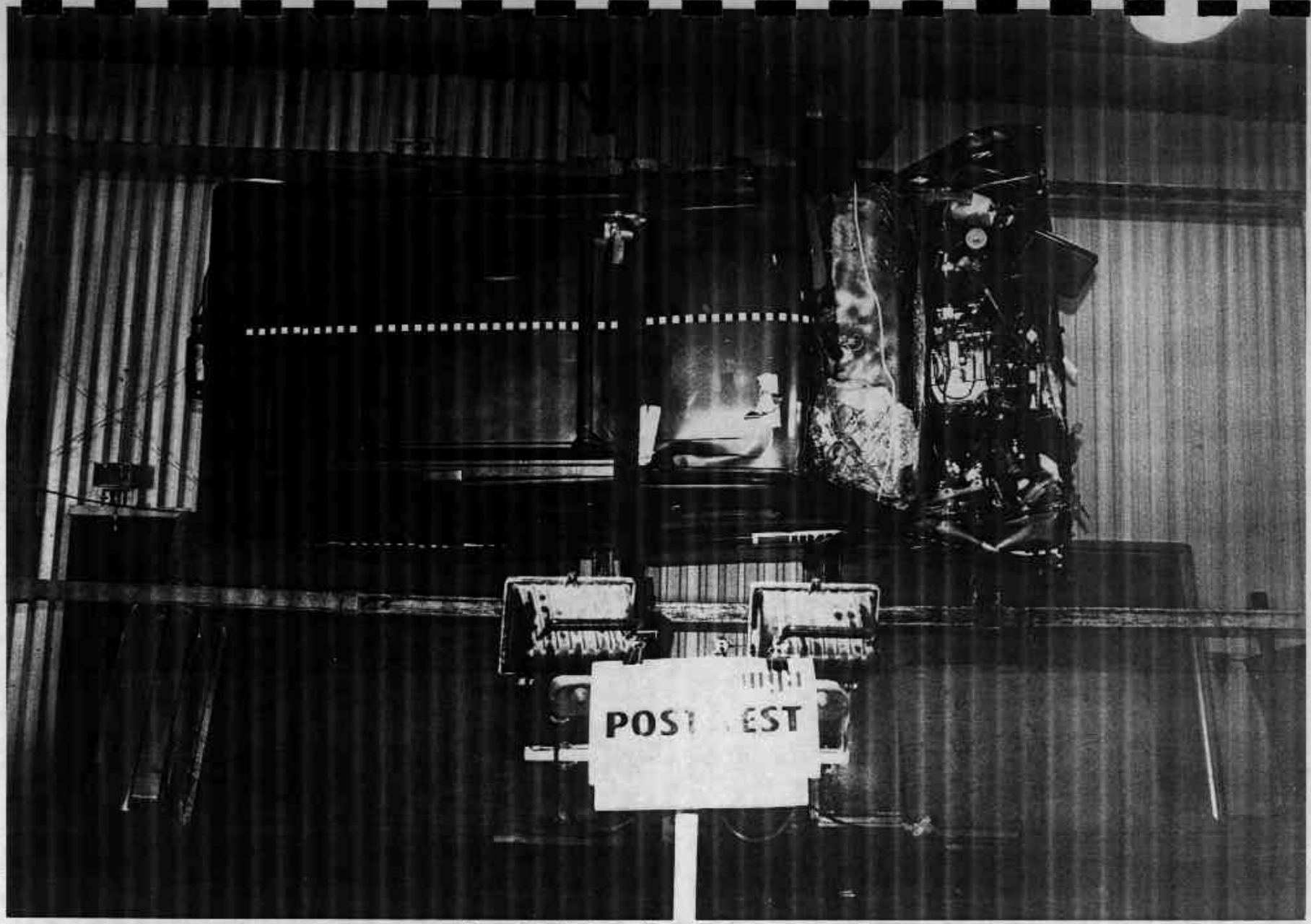


Photo No. A-46 - Rollover 90°

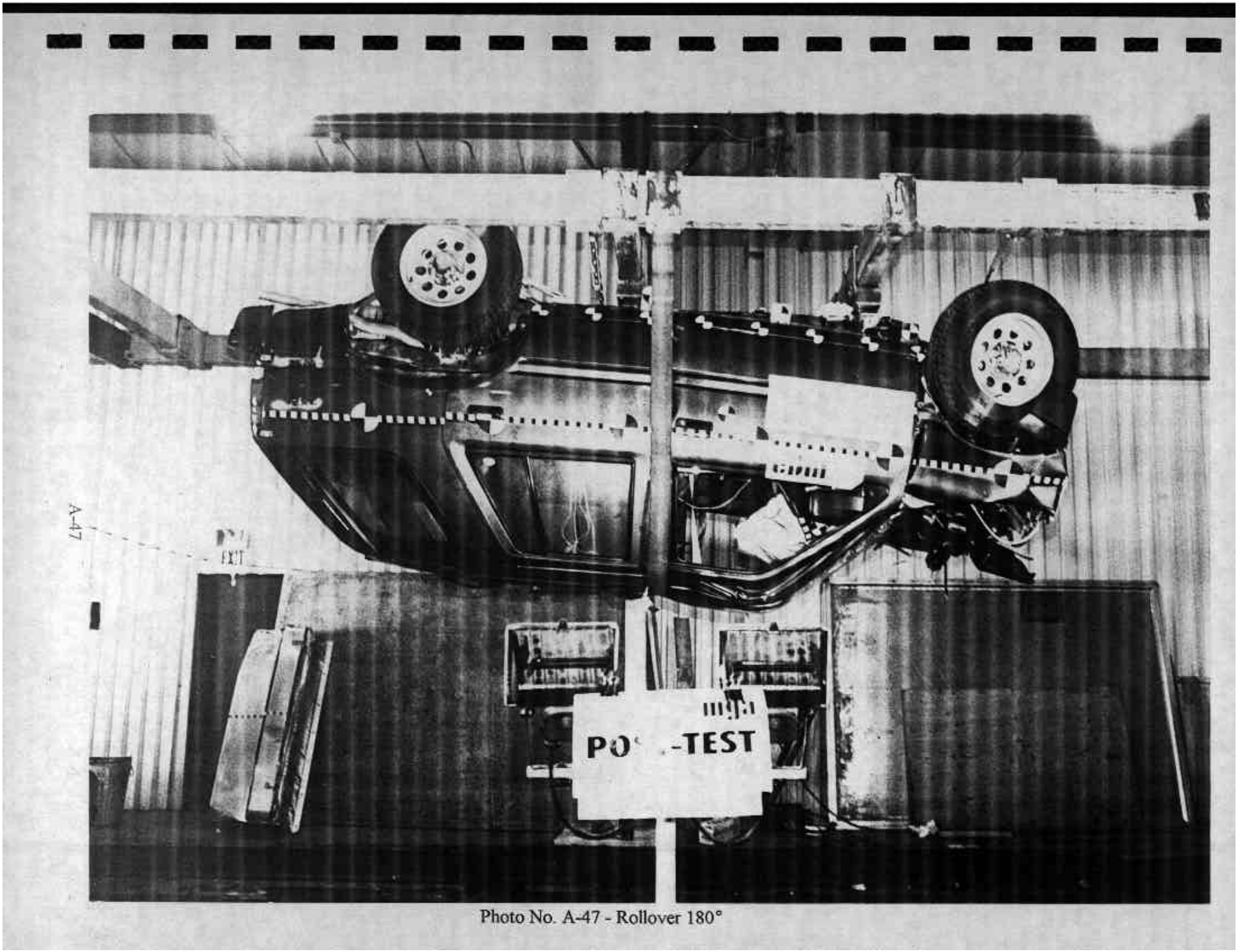


Photo No. A-47 - Rollover 180°

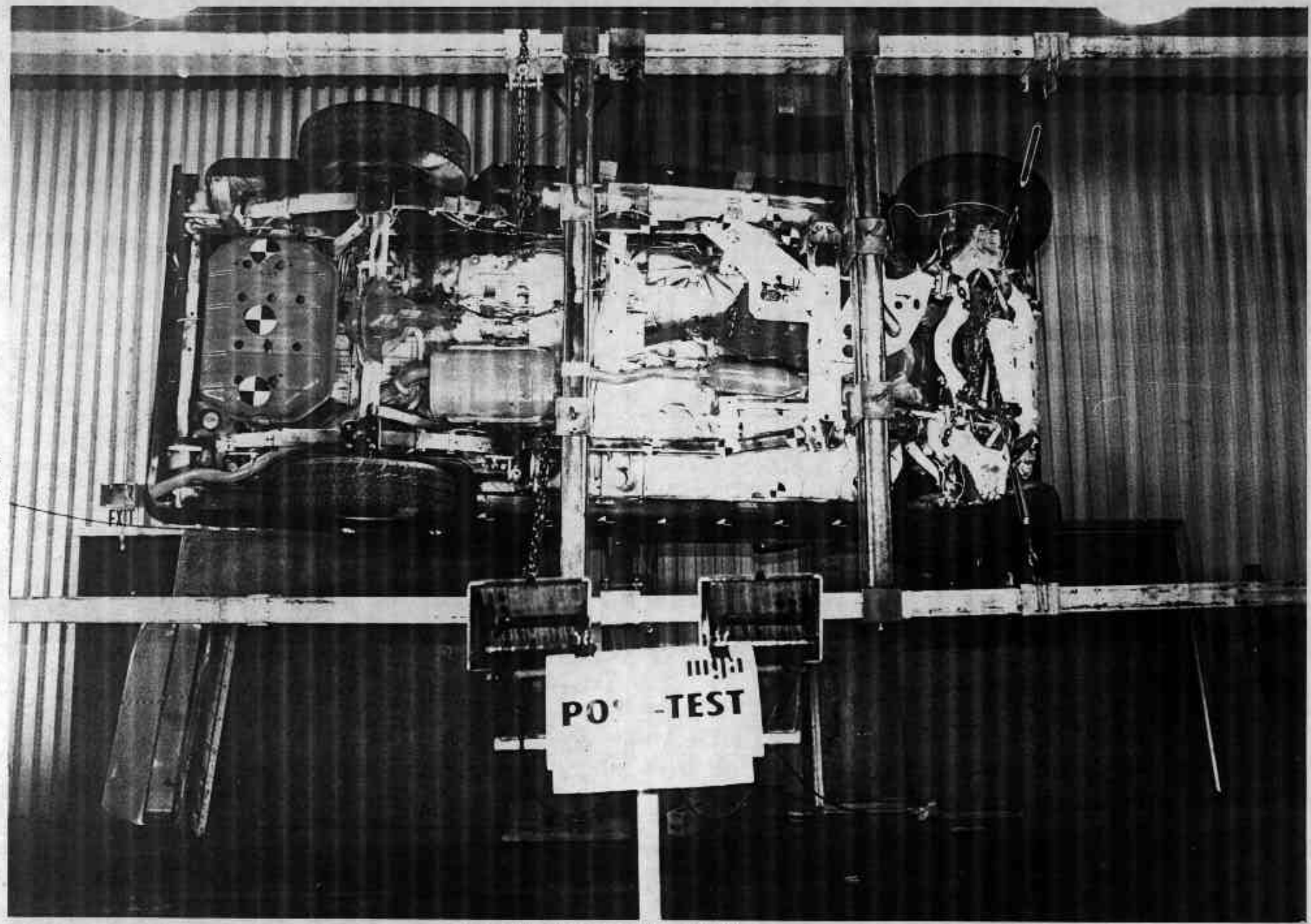
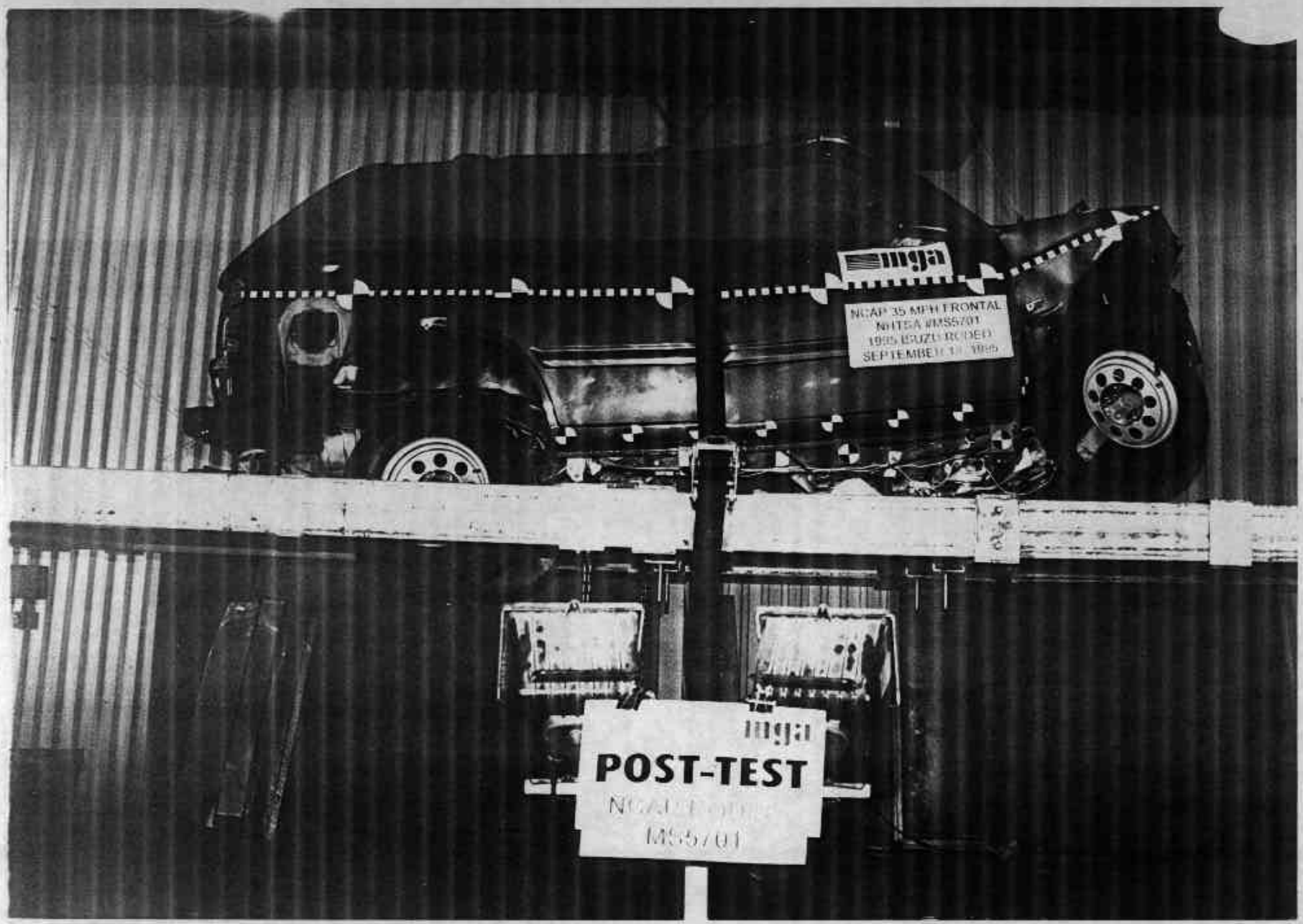


Photo No. A-48 - Rollover 270°



A-49

Photo No. A-49 - Rollover 360°

APPENDIX B

Vehicle, Load Cell Barrier and Dummy Response Data

1995 Isuzu Rodeo

NHTSA NO.: MS5701

VEHICLE DATA FILTER CHANNEL CLASS

Head Accelerations 1000 (1650 Hz)

Chest Accelerations 180 (300 Hz)

Vehicle Accelerations 60 (100 Hz)

Barrier Load Cells 60 (100 Hz)

Femur Load Cells 600 (1000 Hz)

Lap and Torso Belts 60 (100 Hz)

* No valid data collected

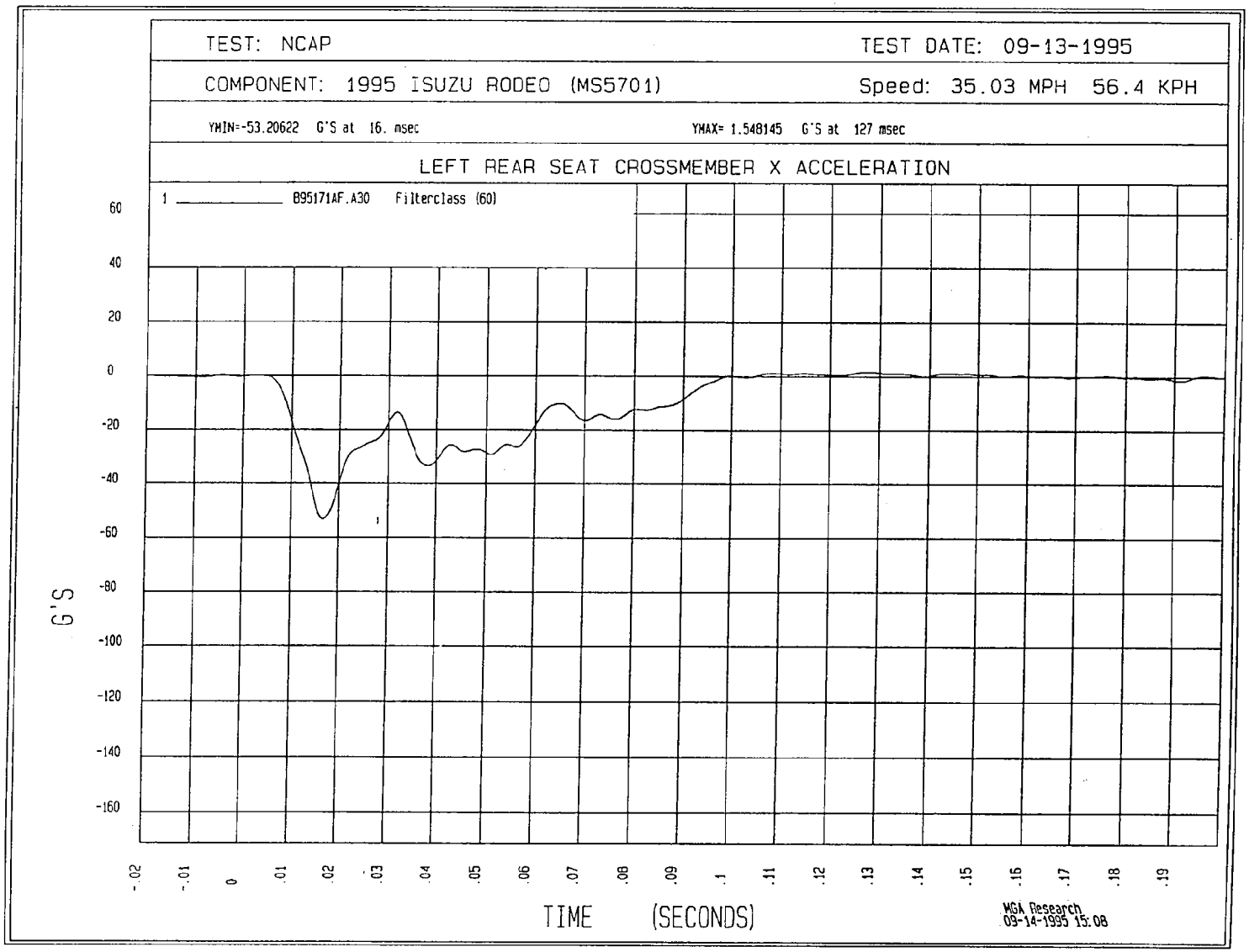


Figure B-1 - Left Rear Seat Crossmember X Acceleration vs. Time

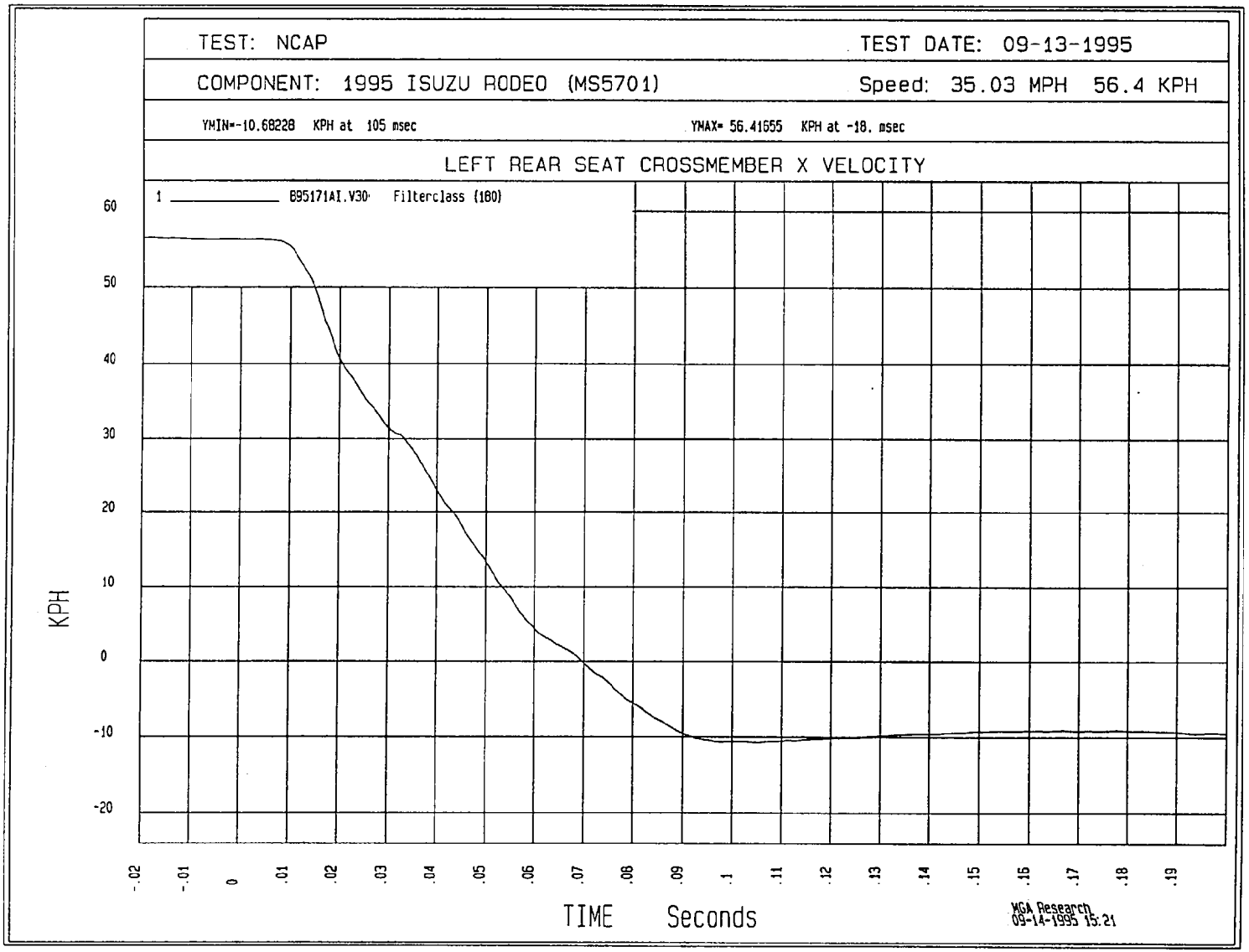


Figure B-2 - Left Rear Seat Crossmember X Velocity vs. Time

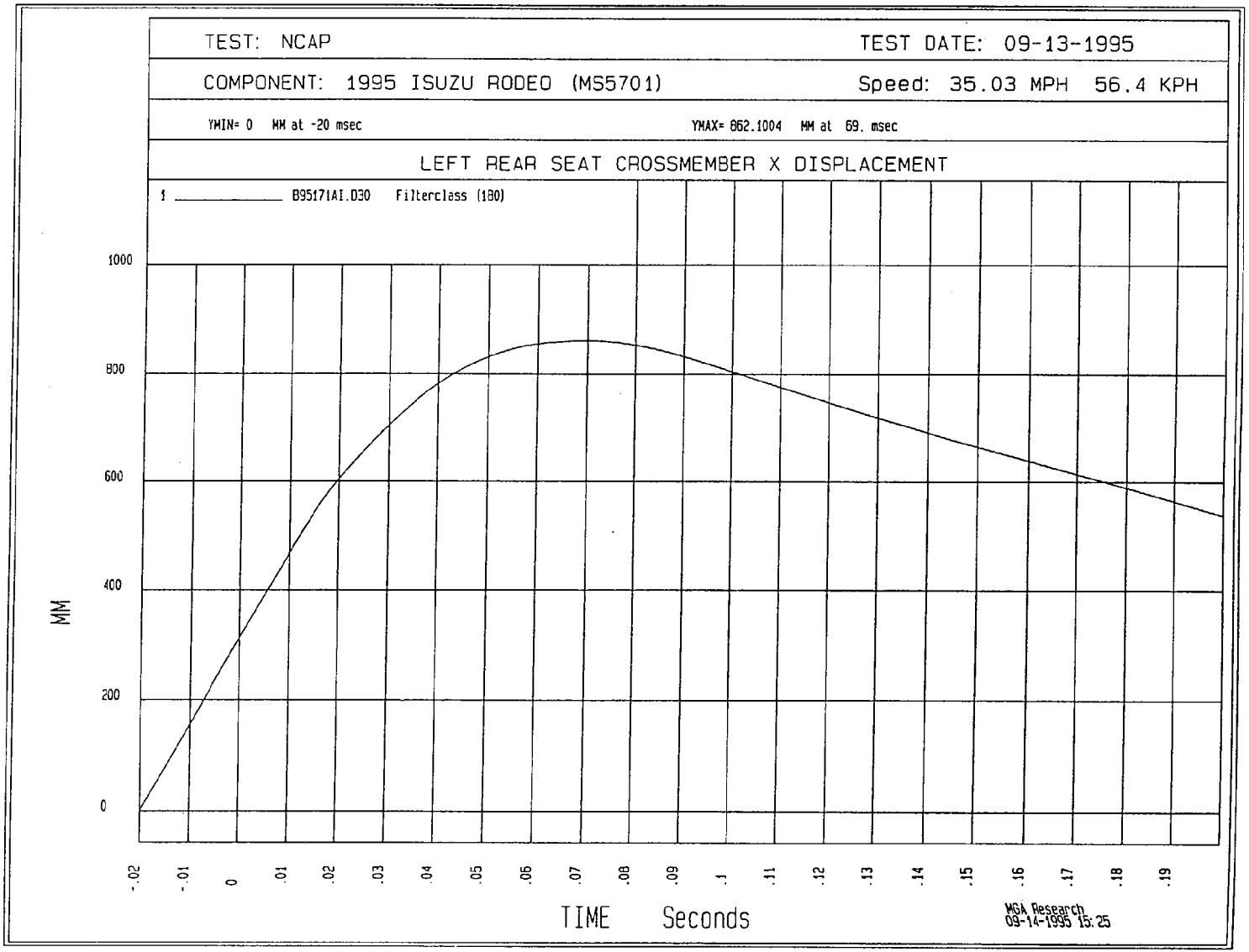


Figure B-3 - Left Rear Seat Crossmember X Displacement vs. Time

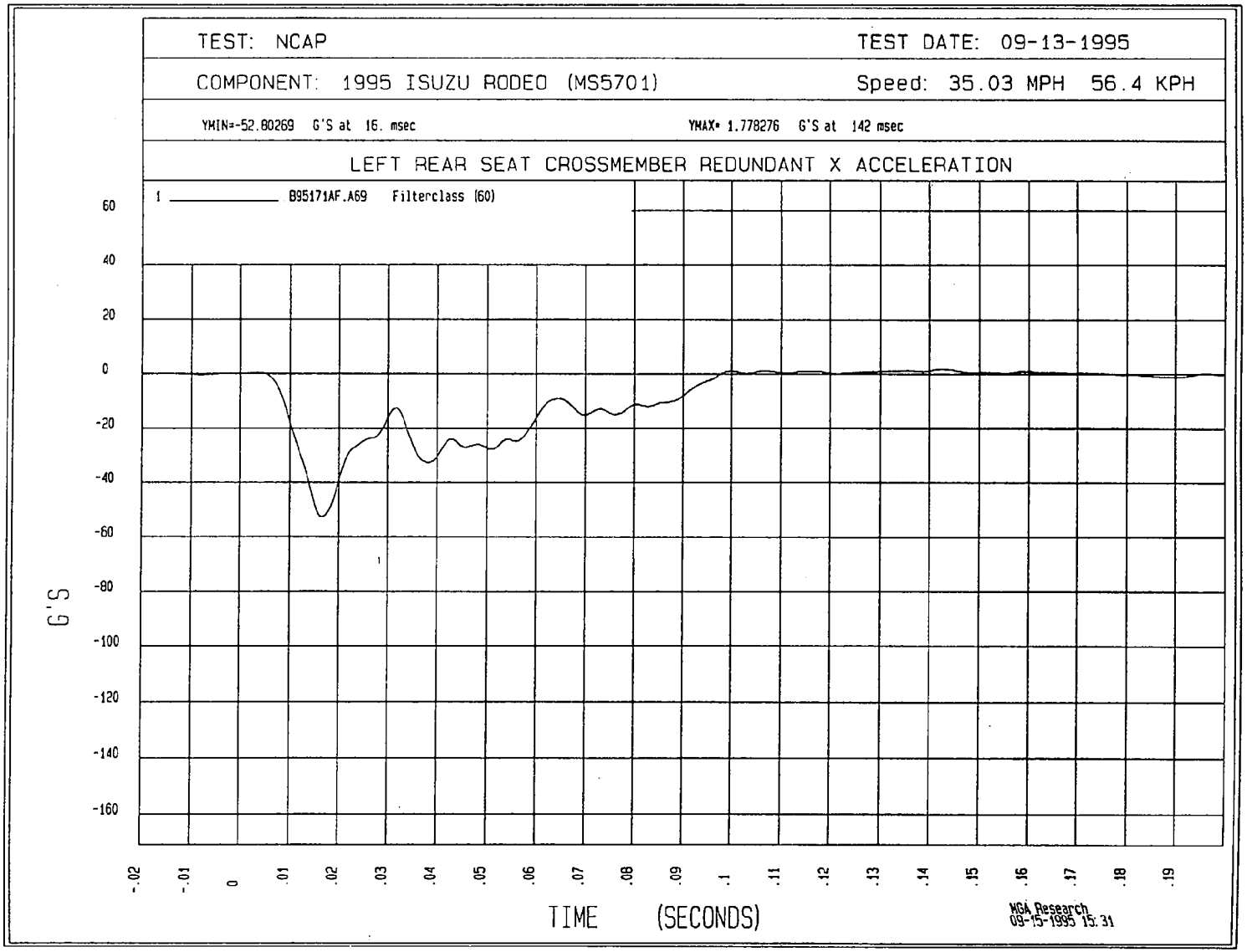


Figure B-4 - Left Rear Seat Crossmember Redundant X Acceleration vs. Time

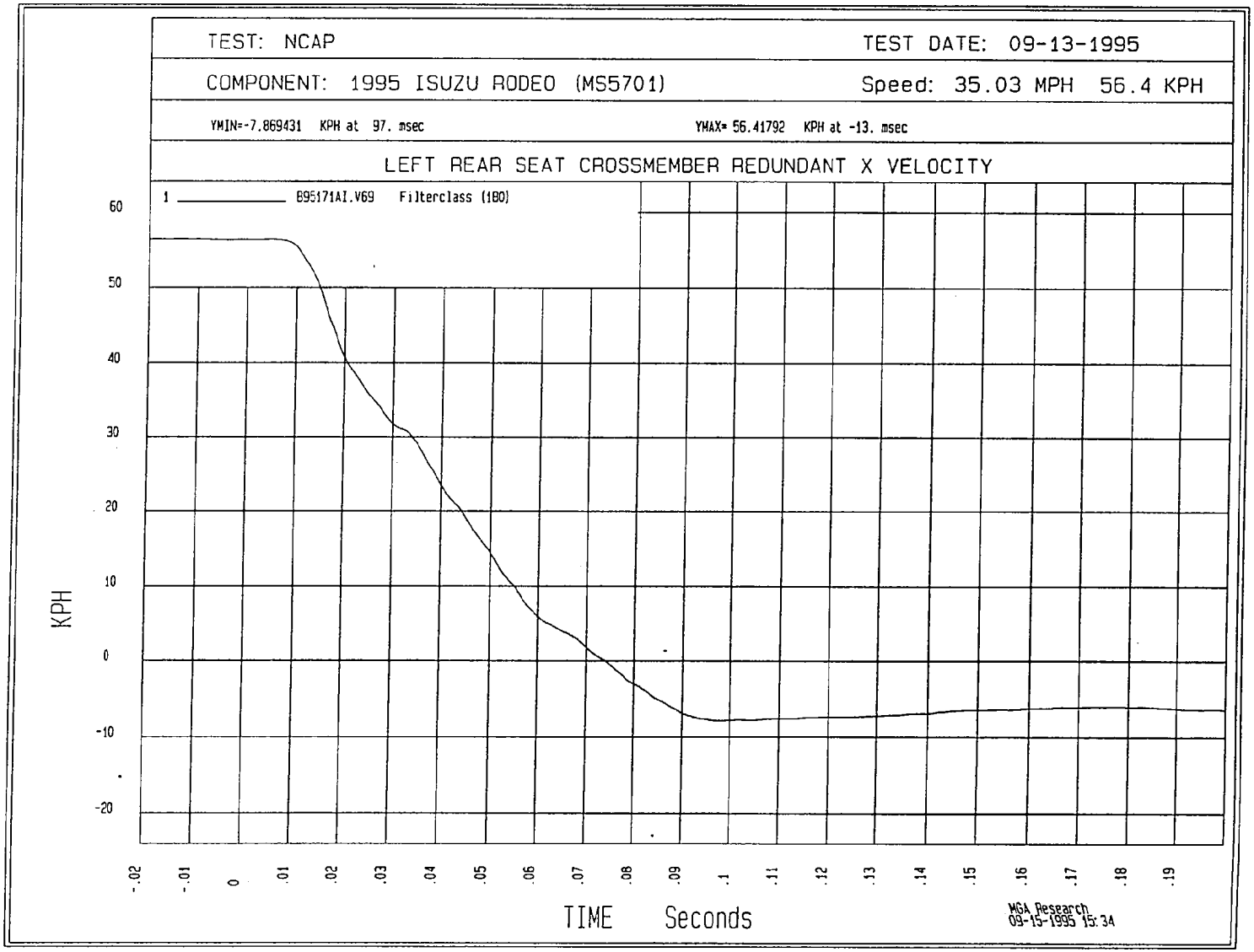


Figure B-5 - Left Rear Seat Crossmember Redundant X Velocity vs. Time

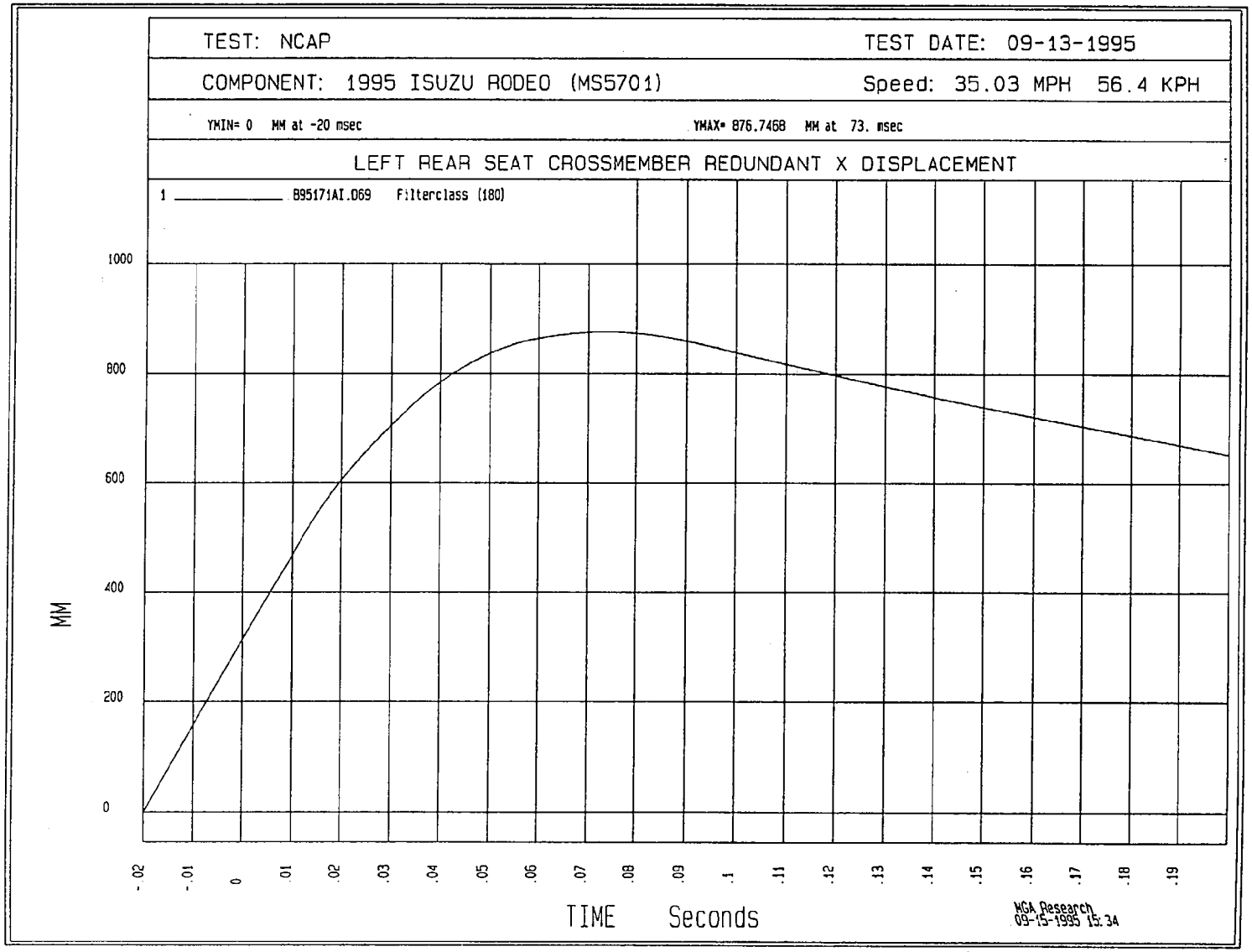


Figure B-6 - Left Rear Seat Crossmember Redundant X Displacement vs. Time

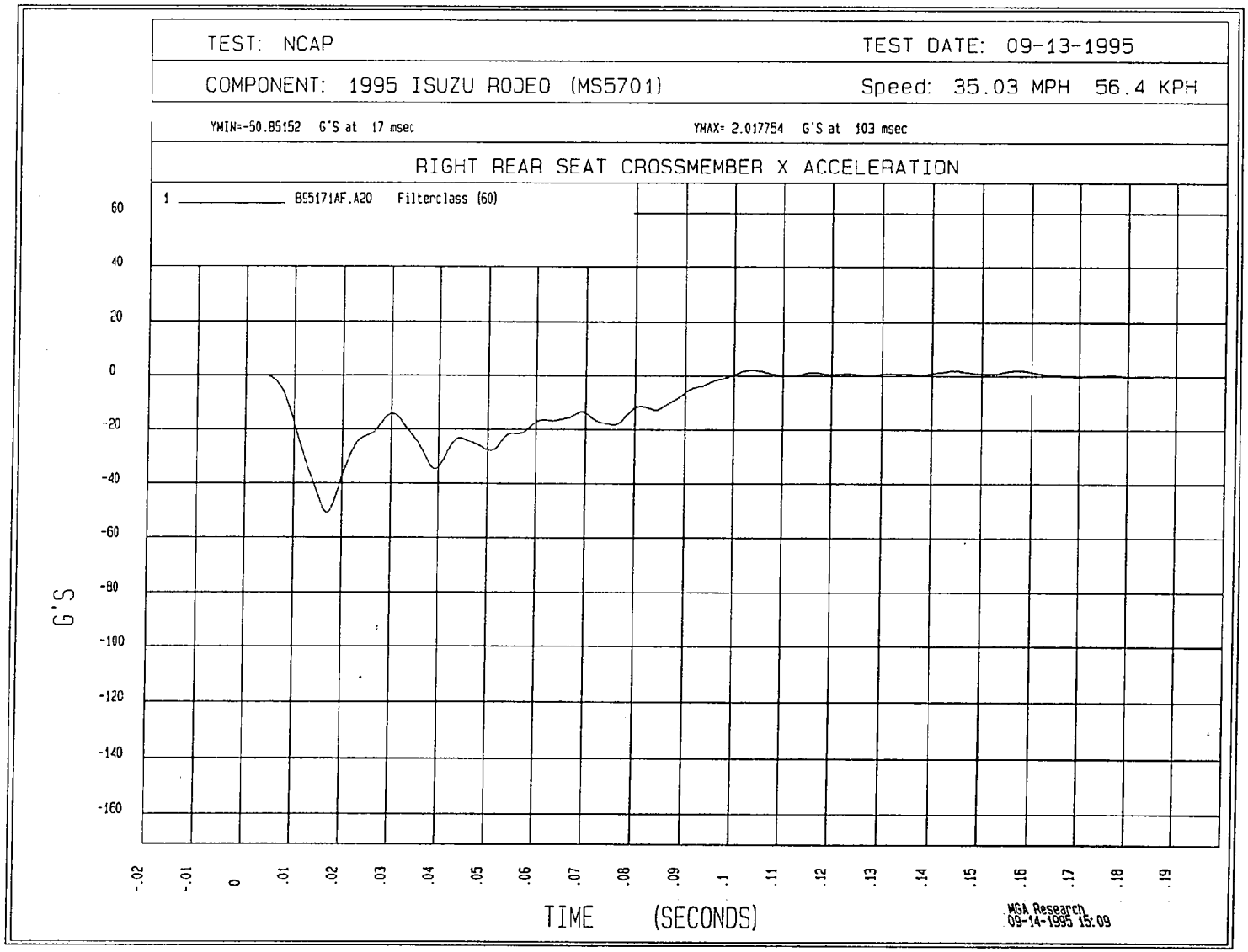


Figure B-7 - Right Rear Seat Crossmember X Acceleration vs. Time

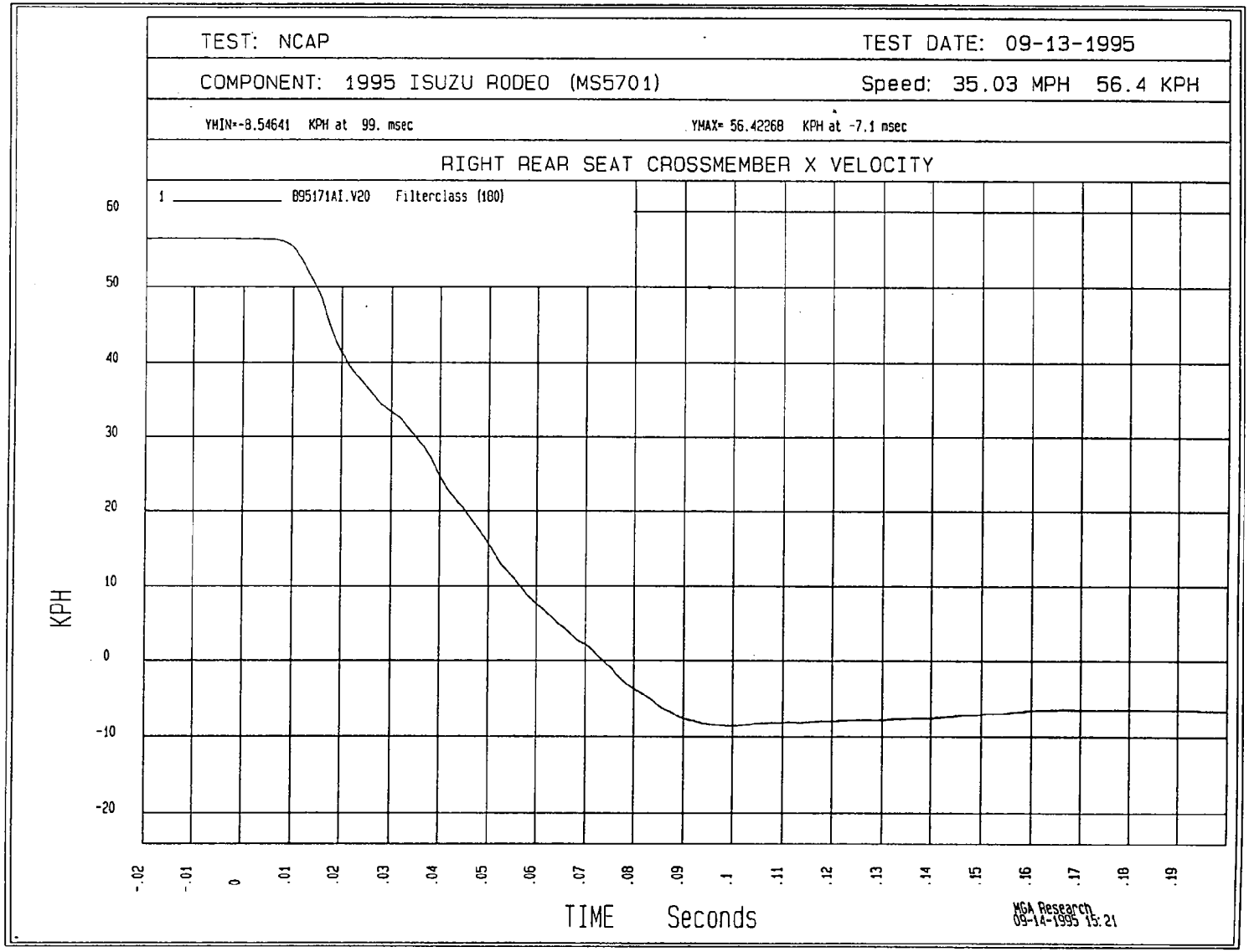


Figure B-8 - Right Rear Seat Crossmember X Velocity vs. Time

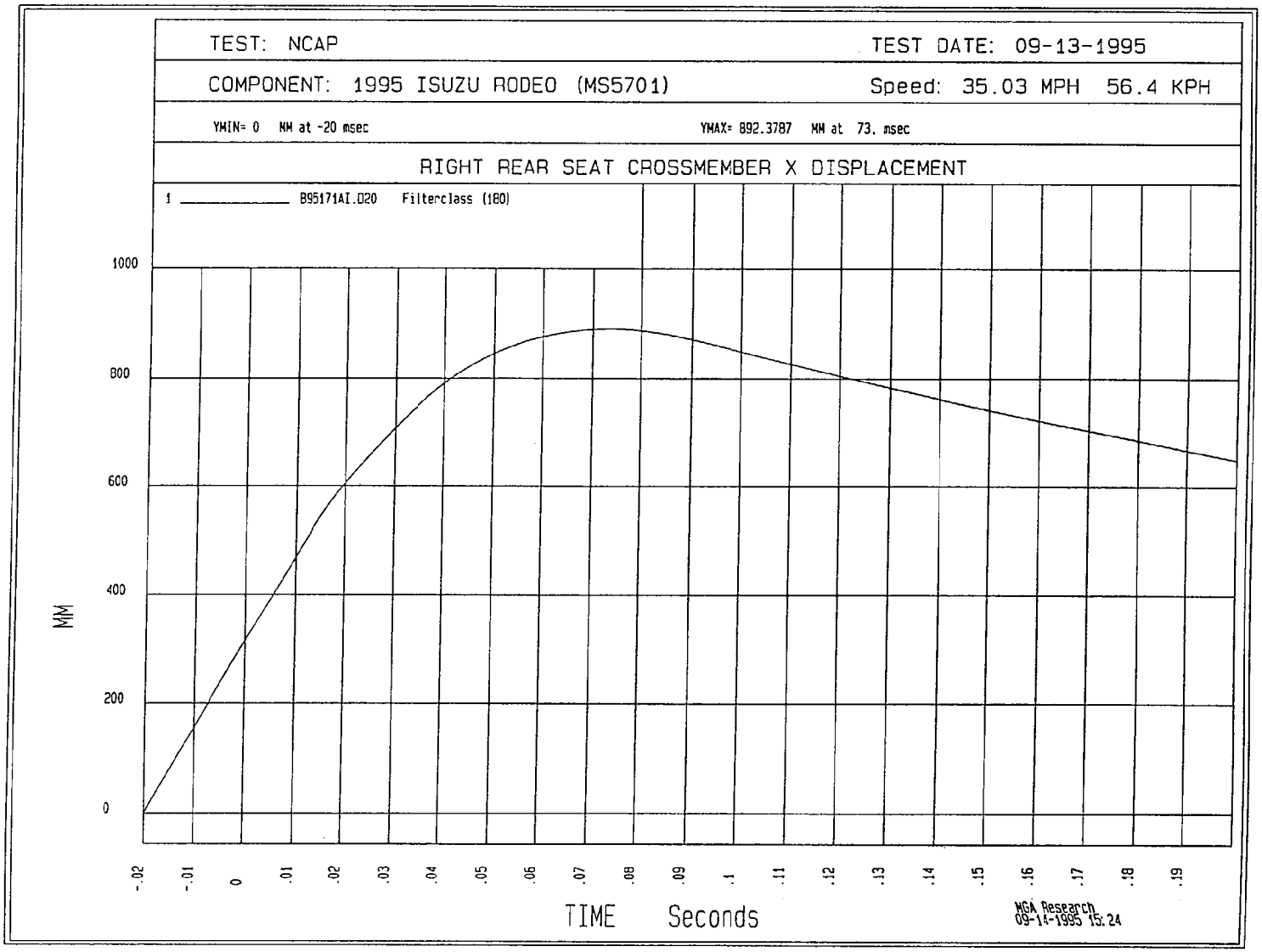


Figure B-9 - Right Rear Seat Crossmember X Displacement vs. Time

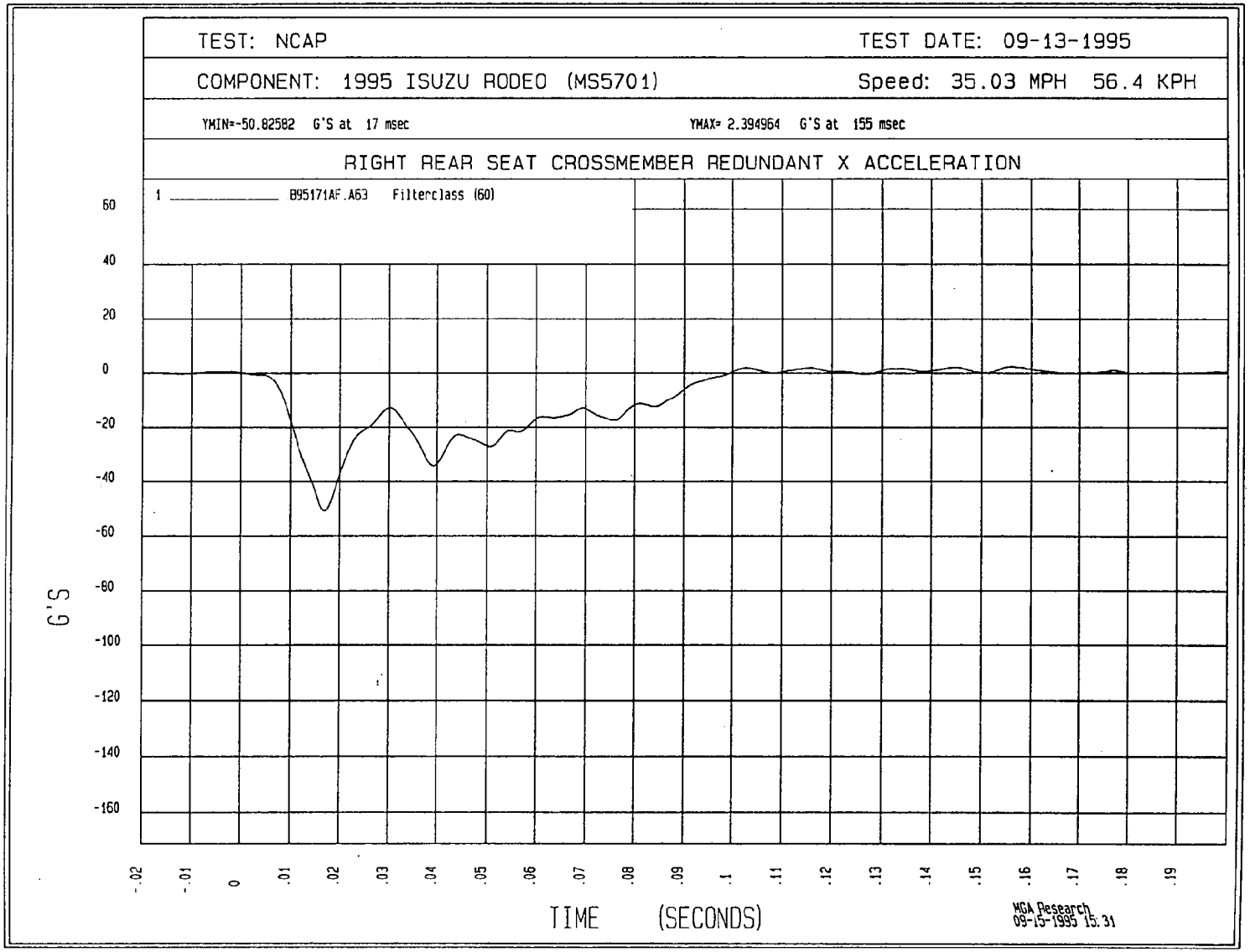


Figure B-10 - Right Rear Seat Crossmember Redundant X Acceleration vs. Time

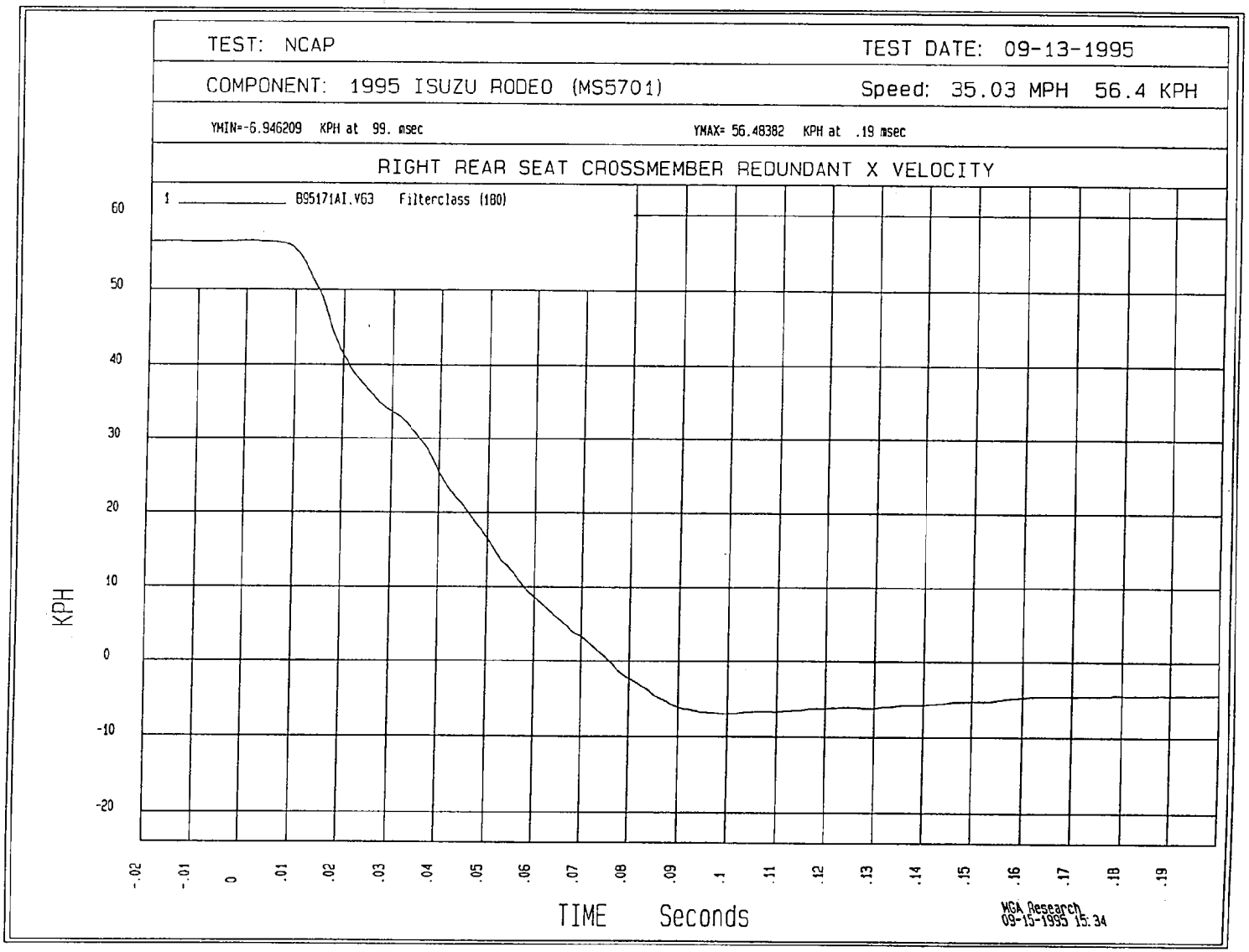


Figure B-11 - Right Rear Seat Crossmember Redundant X Velocity vs. Time

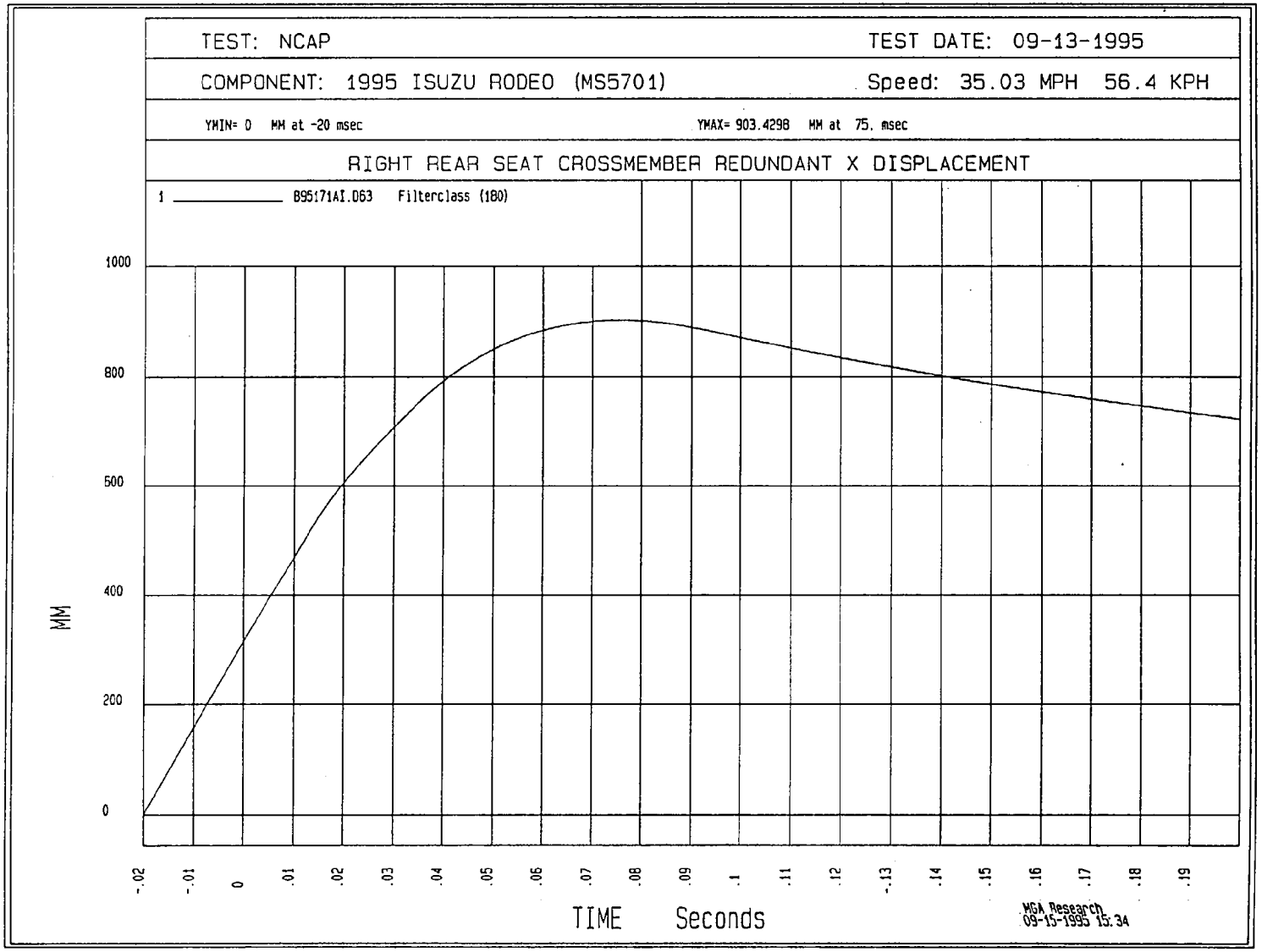


Figure B-12 - Right Rear Seat Crossmember Redundant X Displacement vs. Time

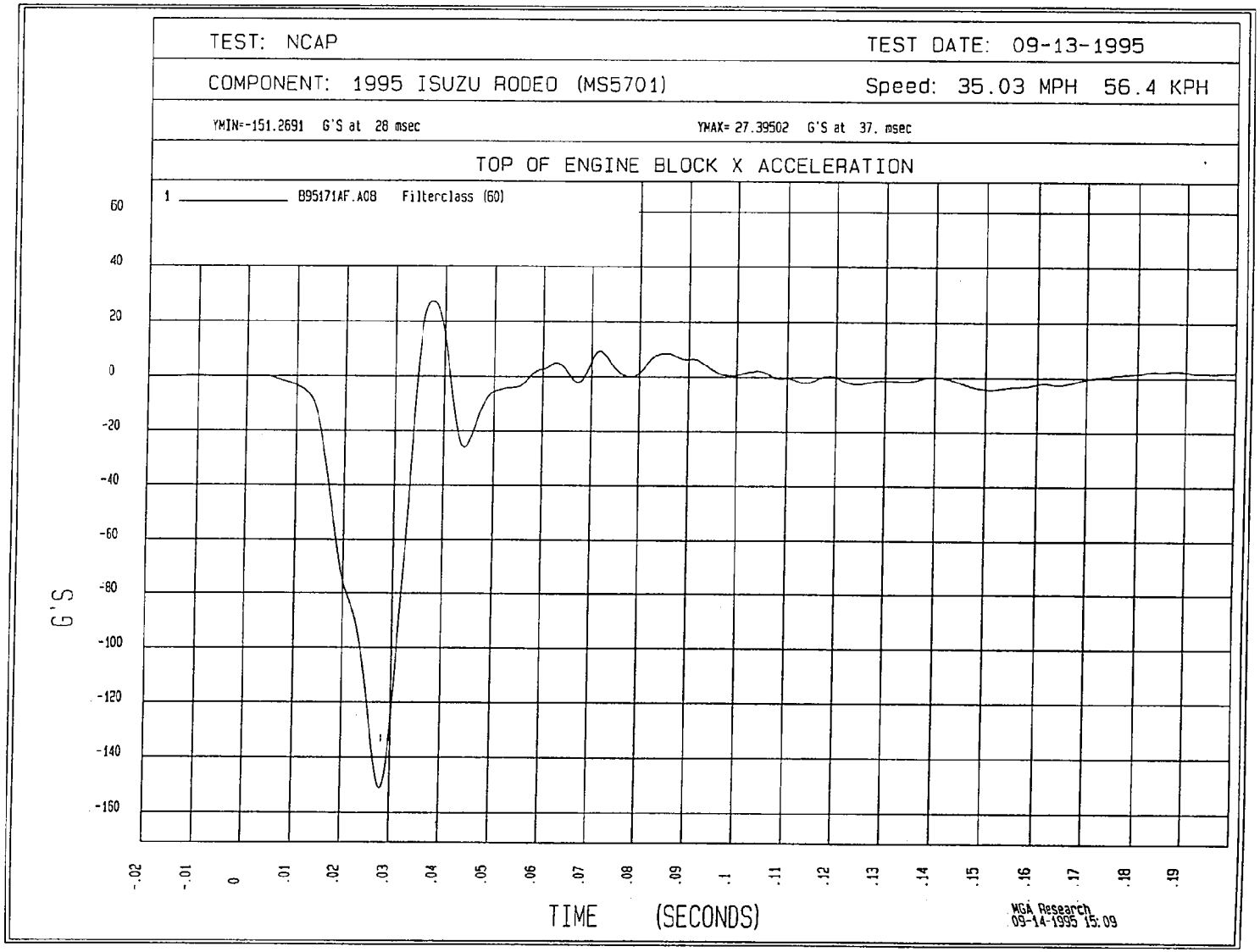


Figure B-13 - Top of Engine Block X Acceleration vs. Time

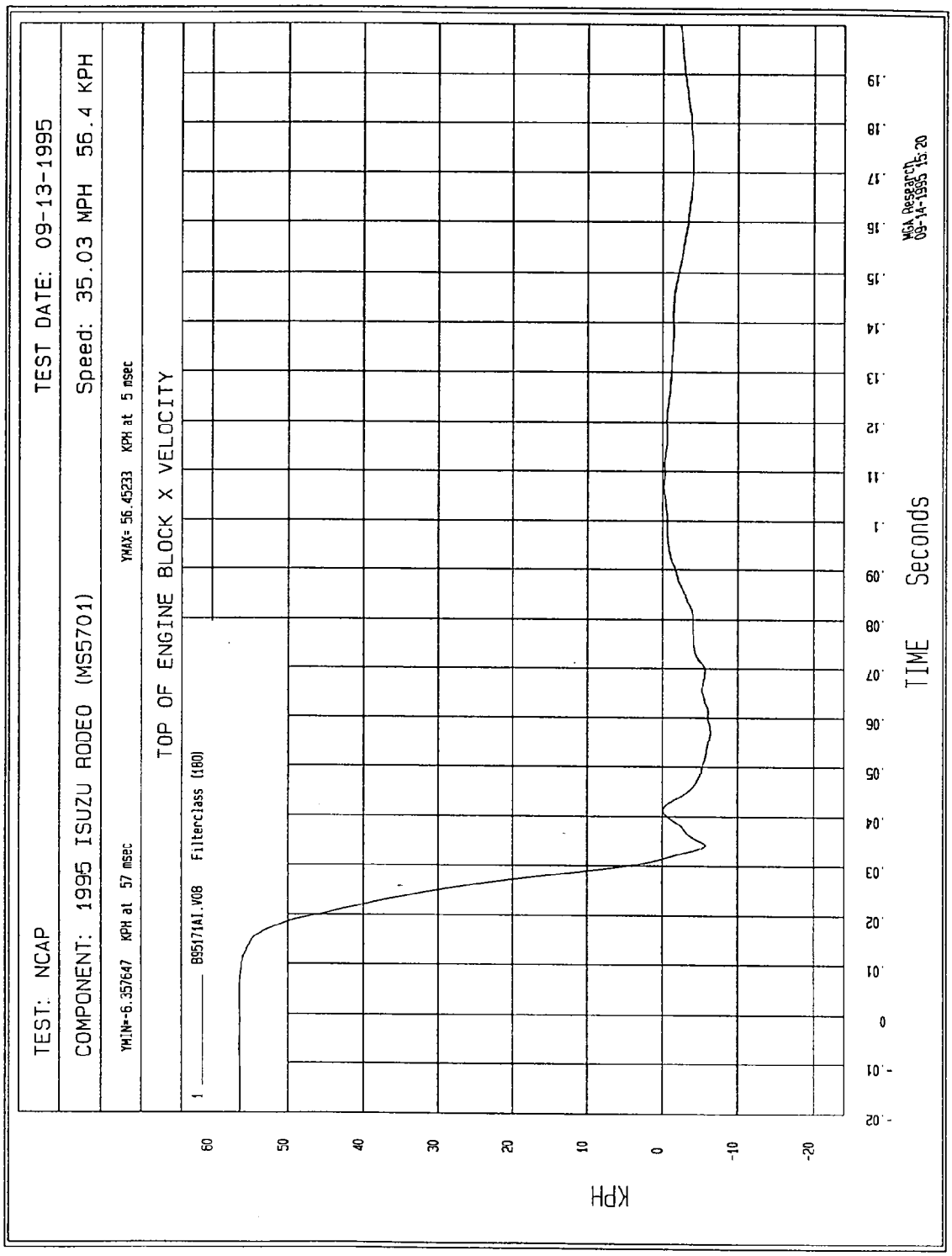


Figure B-14 - Top of Engine Block X Velocity vs. Time

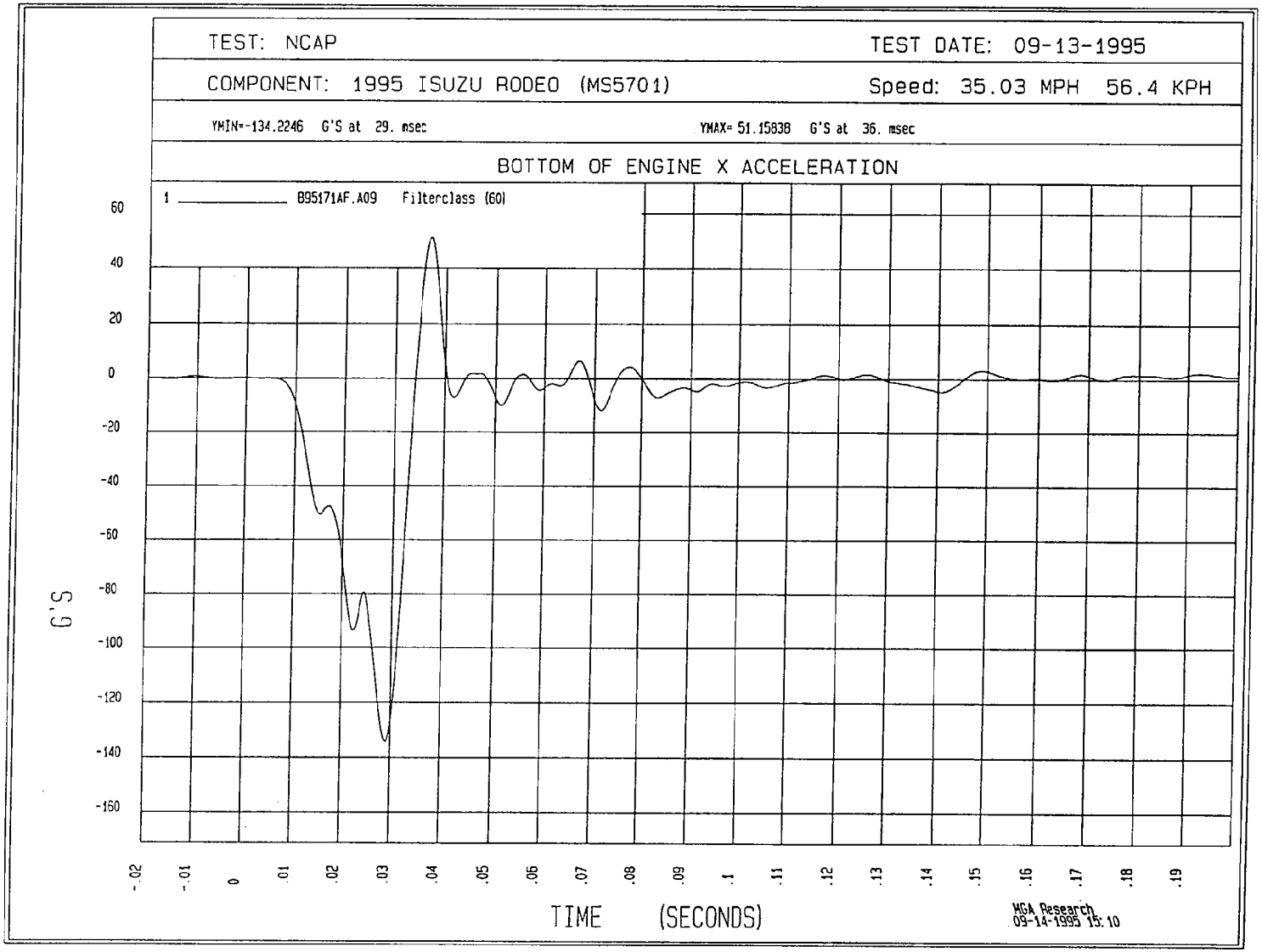


Figure B-15 - Bottom of Engine X Acceleration vs. Time

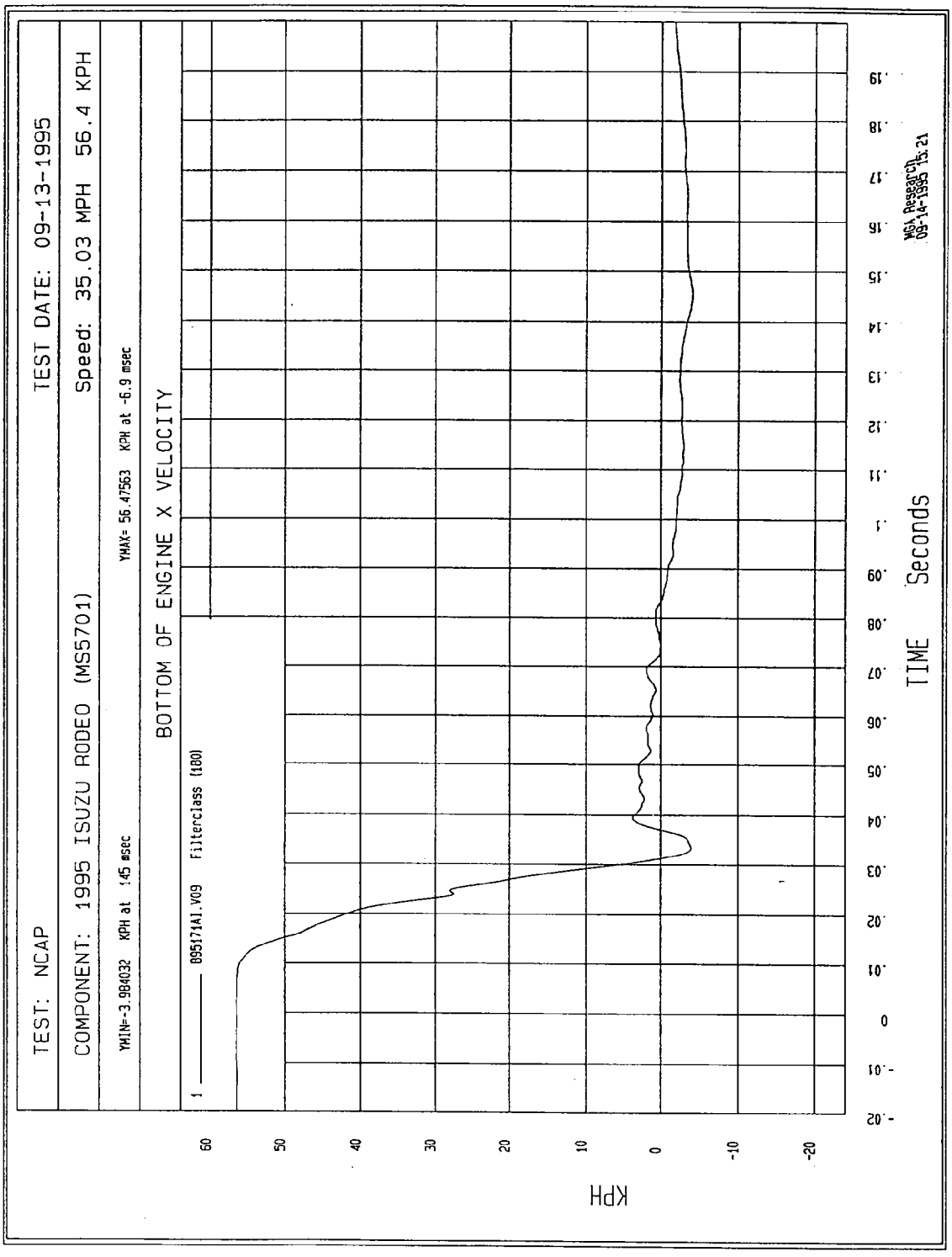


Figure B-16 - Bottom of Engine X Velocity vs. Time

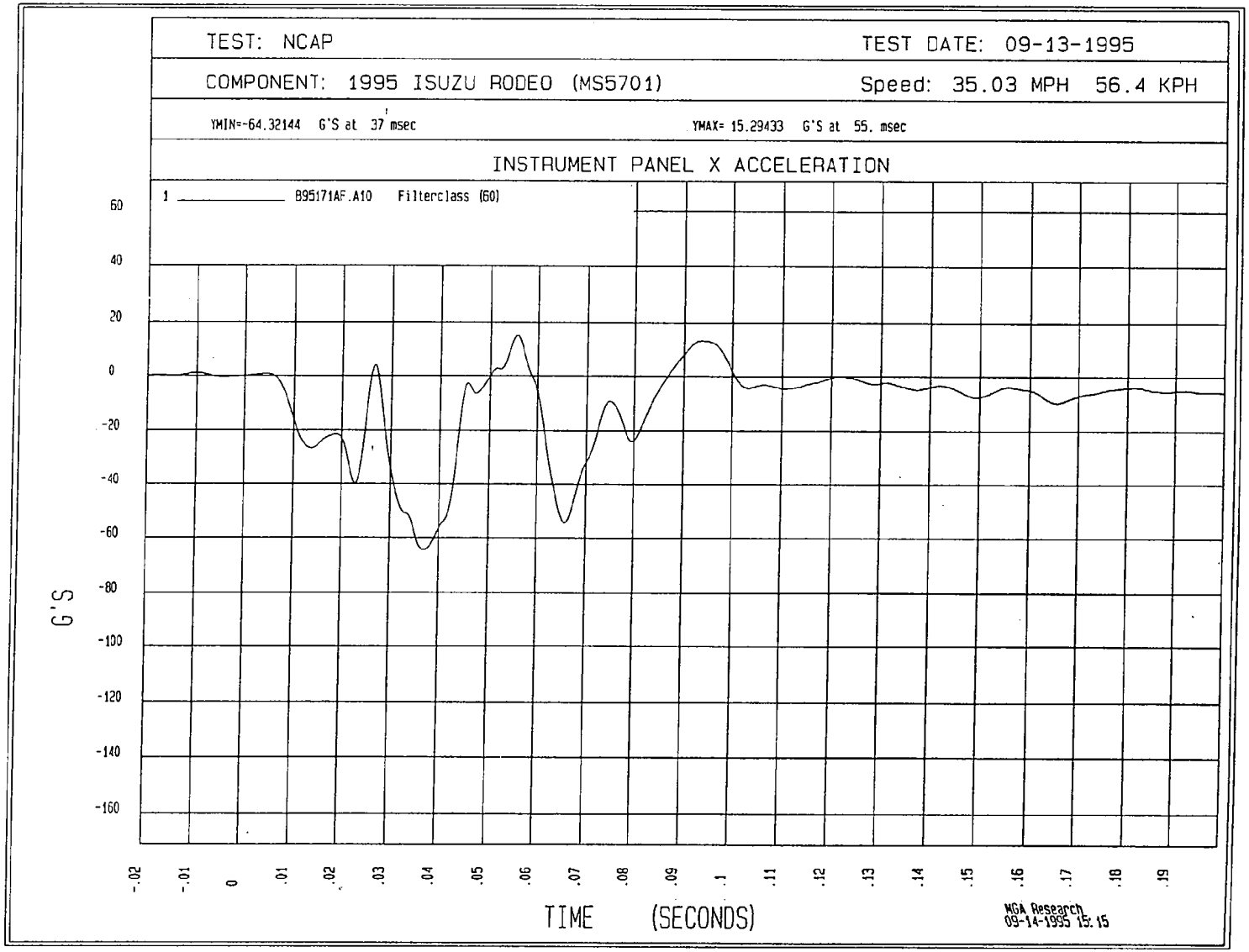


Figure B-17 - Instrument Panel X Acceleration vs. Time

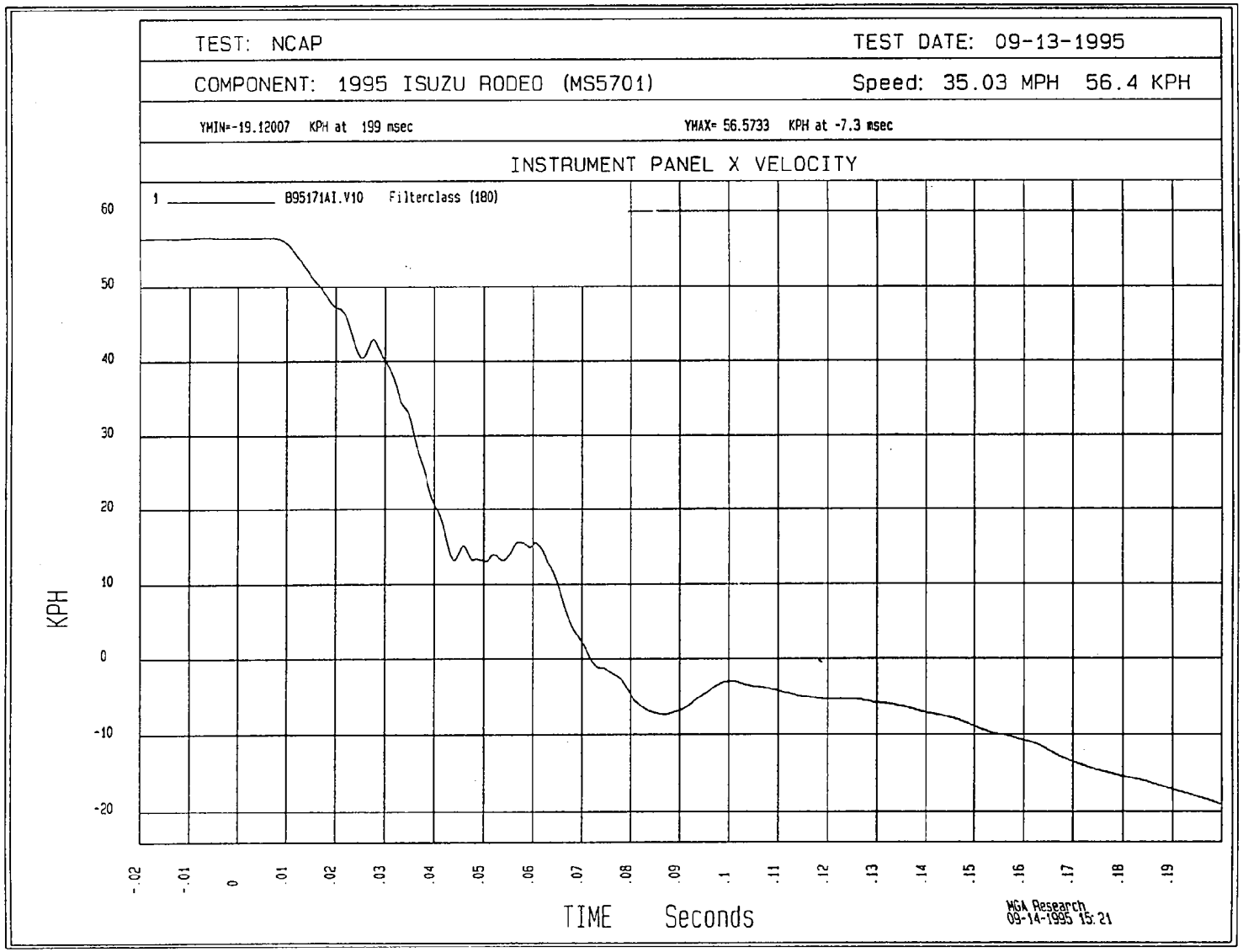


Figure B-18 - Instrument Panel X Velocity vs. Time

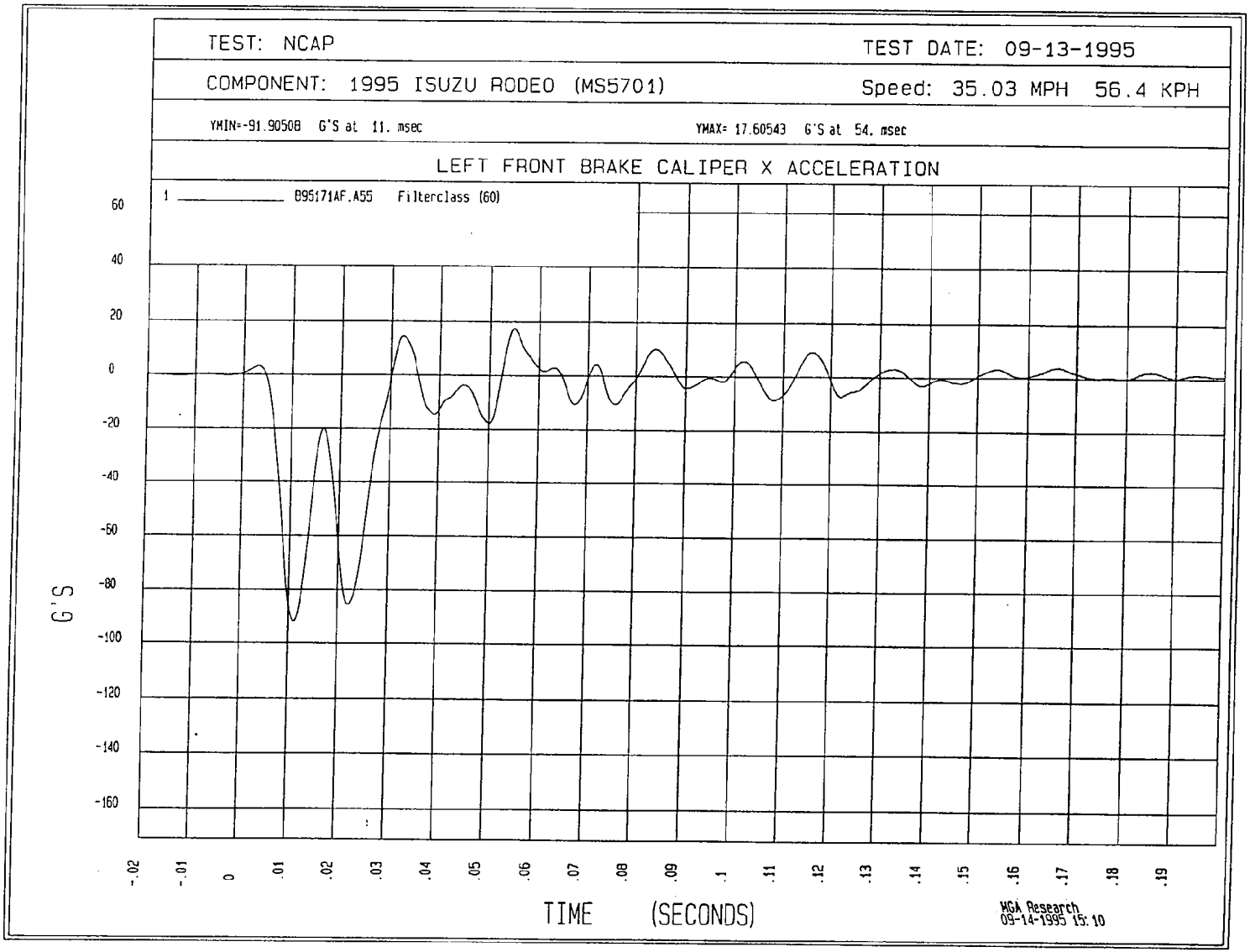


Figure B-19 - Left Brake Caliper X Acceleration vs. Time

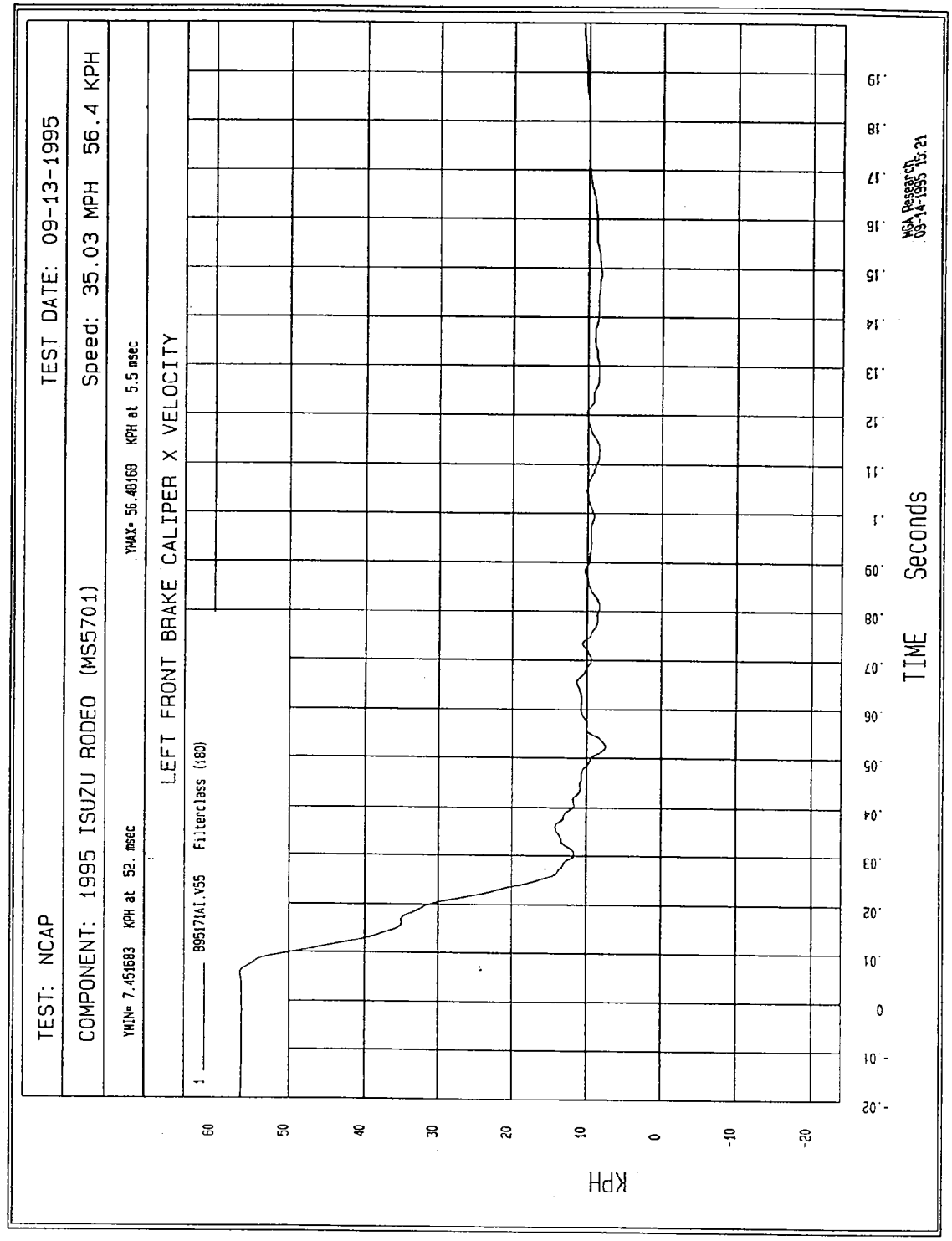


Figure B-20 - Left Brake Caliper X Velocity vs. Time

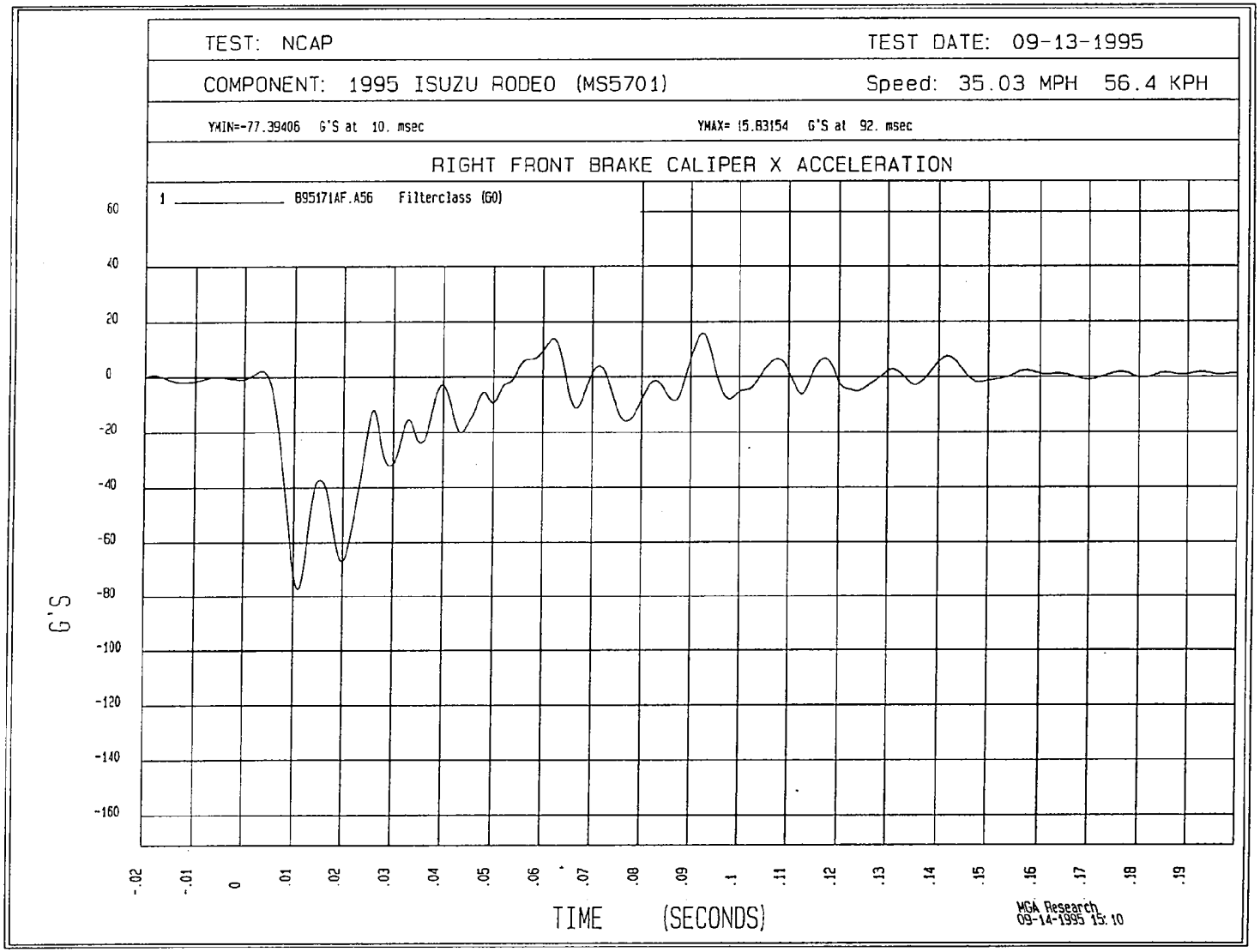


Figure B-21 - Right Brake Caliper X Acceleration vs. Time

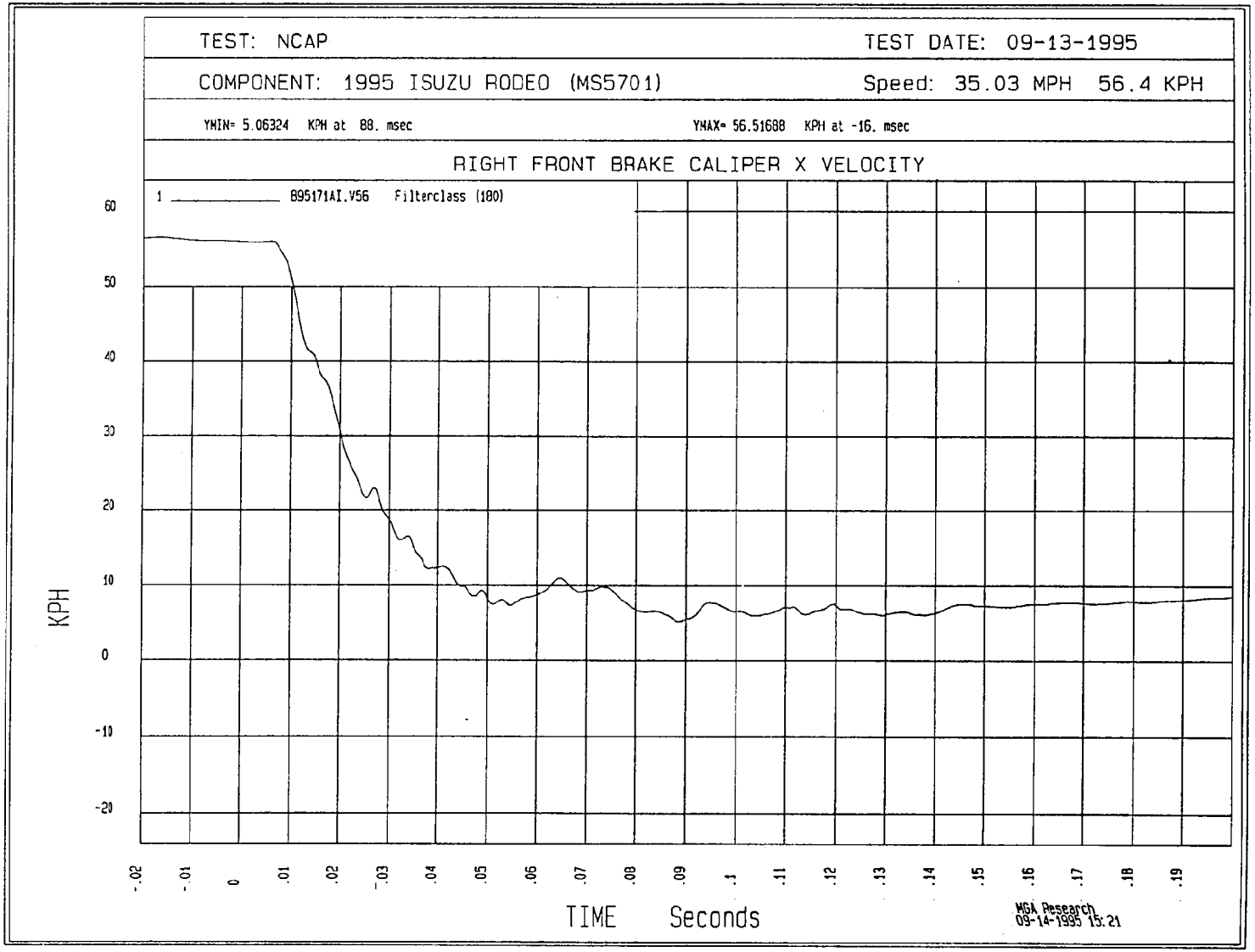


Figure B-22 - Right Brake Caliper X Velocity vs. Time

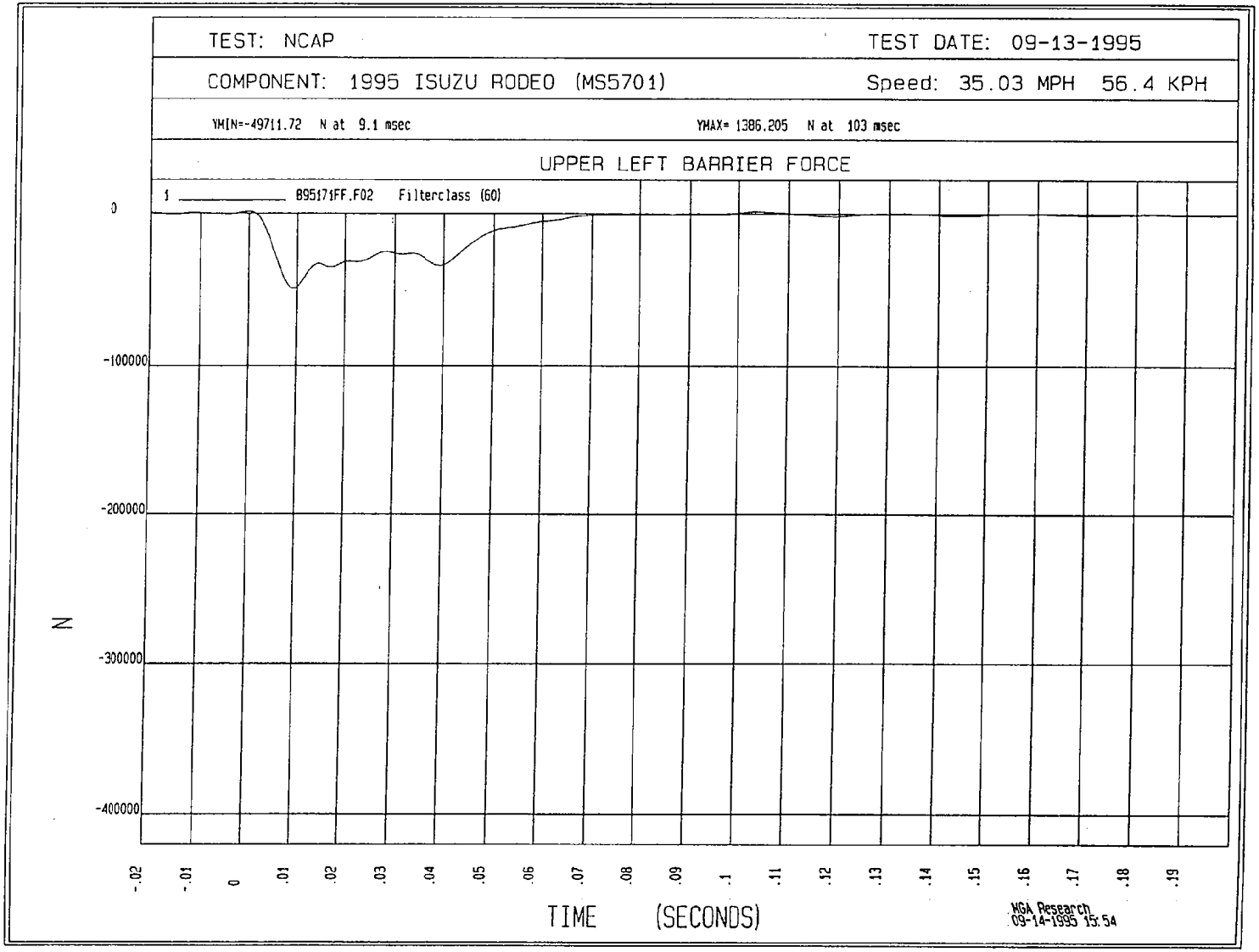


Figure B-23 - Upper Left Barrier Force vs. Time

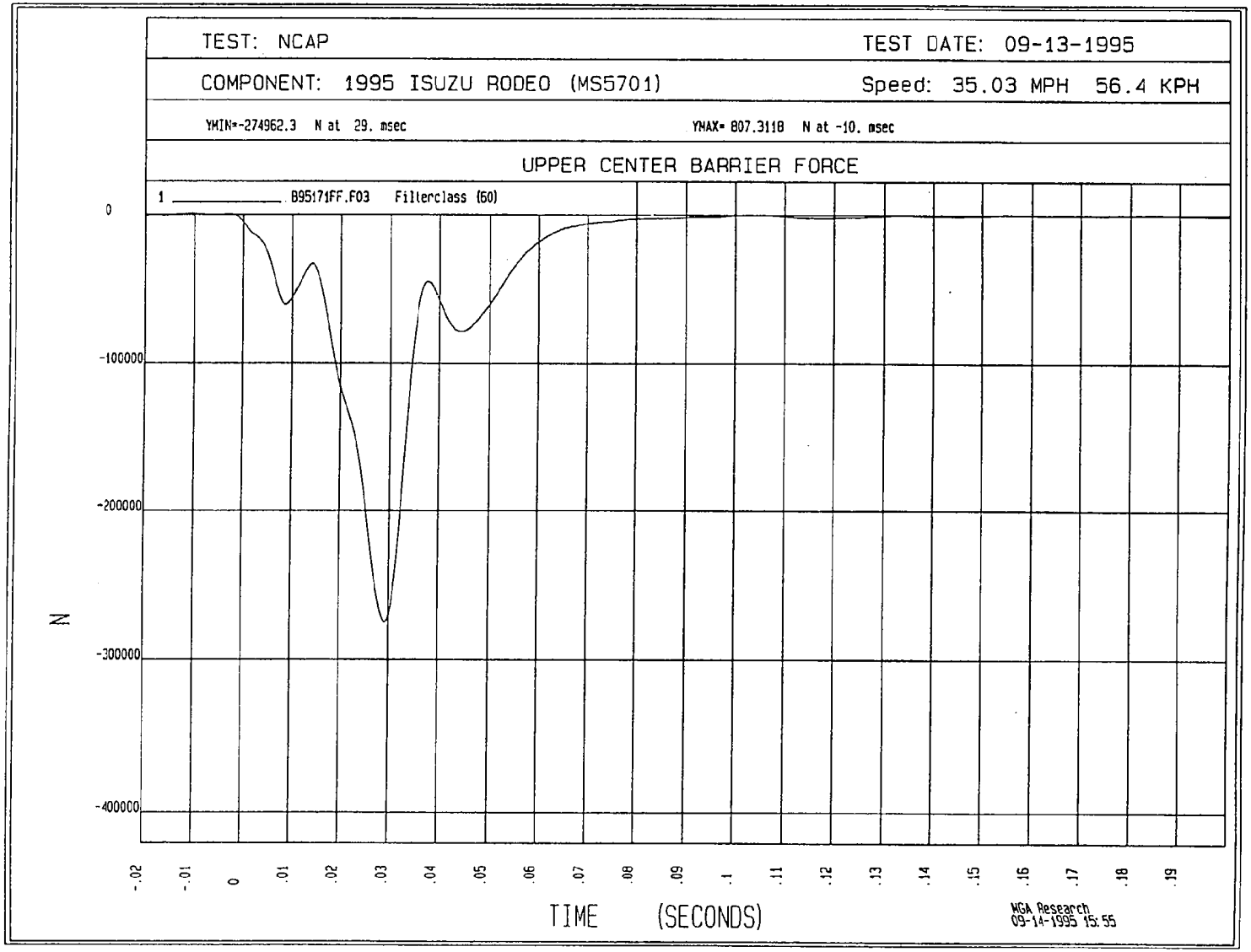


Figure B-24 - Upper Center Barrier Force vs. Time

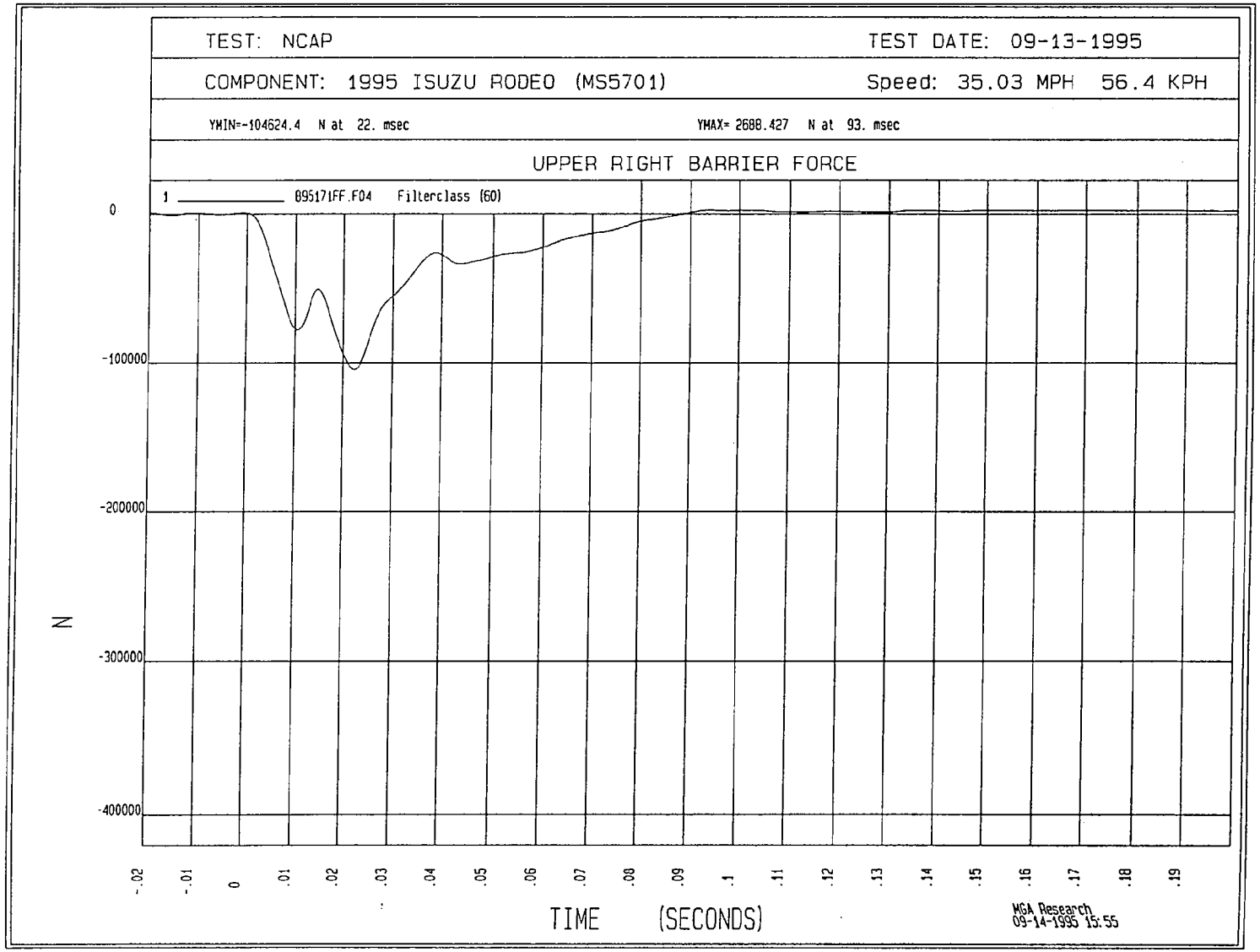


Figure B-25 - Upper Right Barrier Force vs. Time

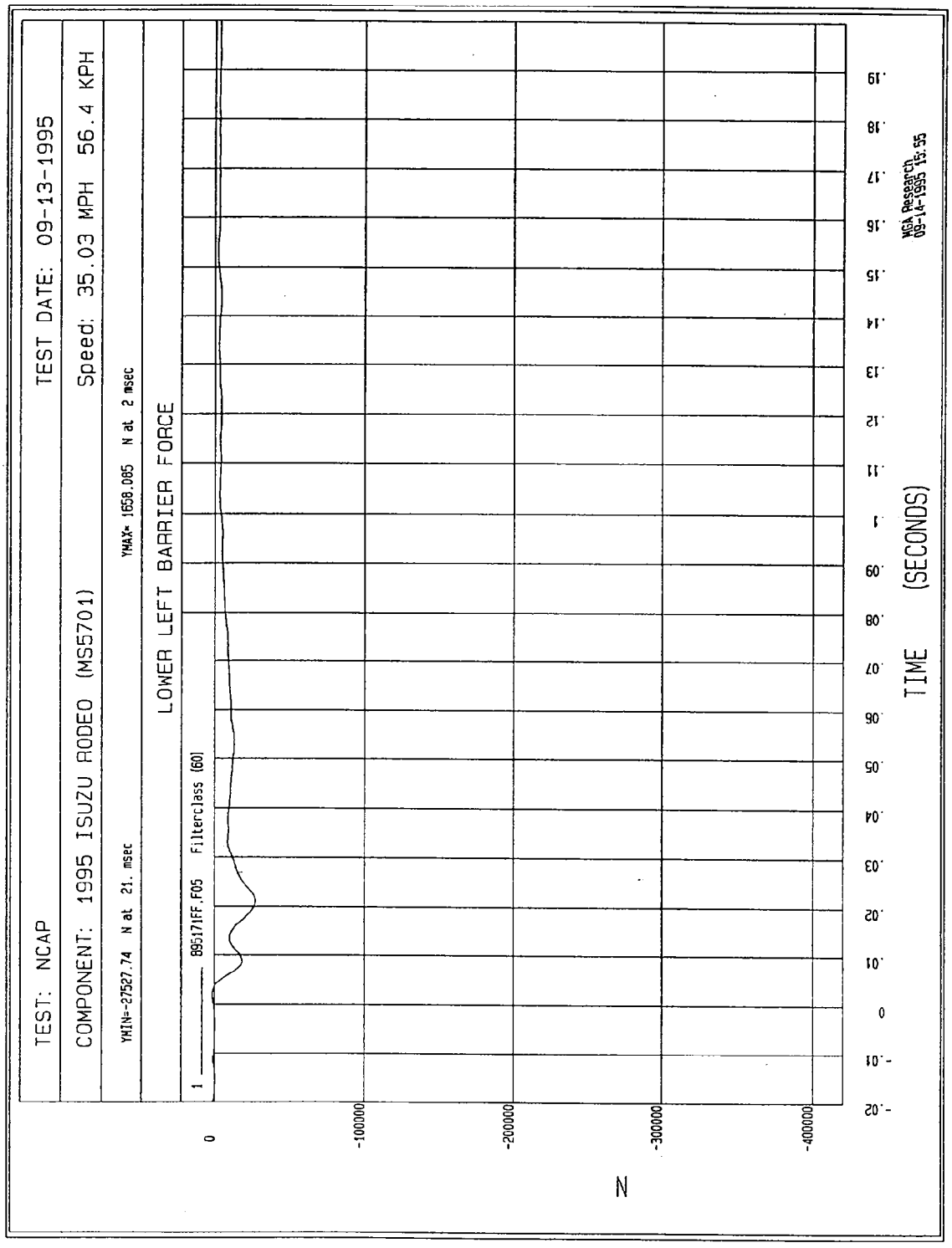


Figure B-26 - Lower Left Barrier Force vs. Time

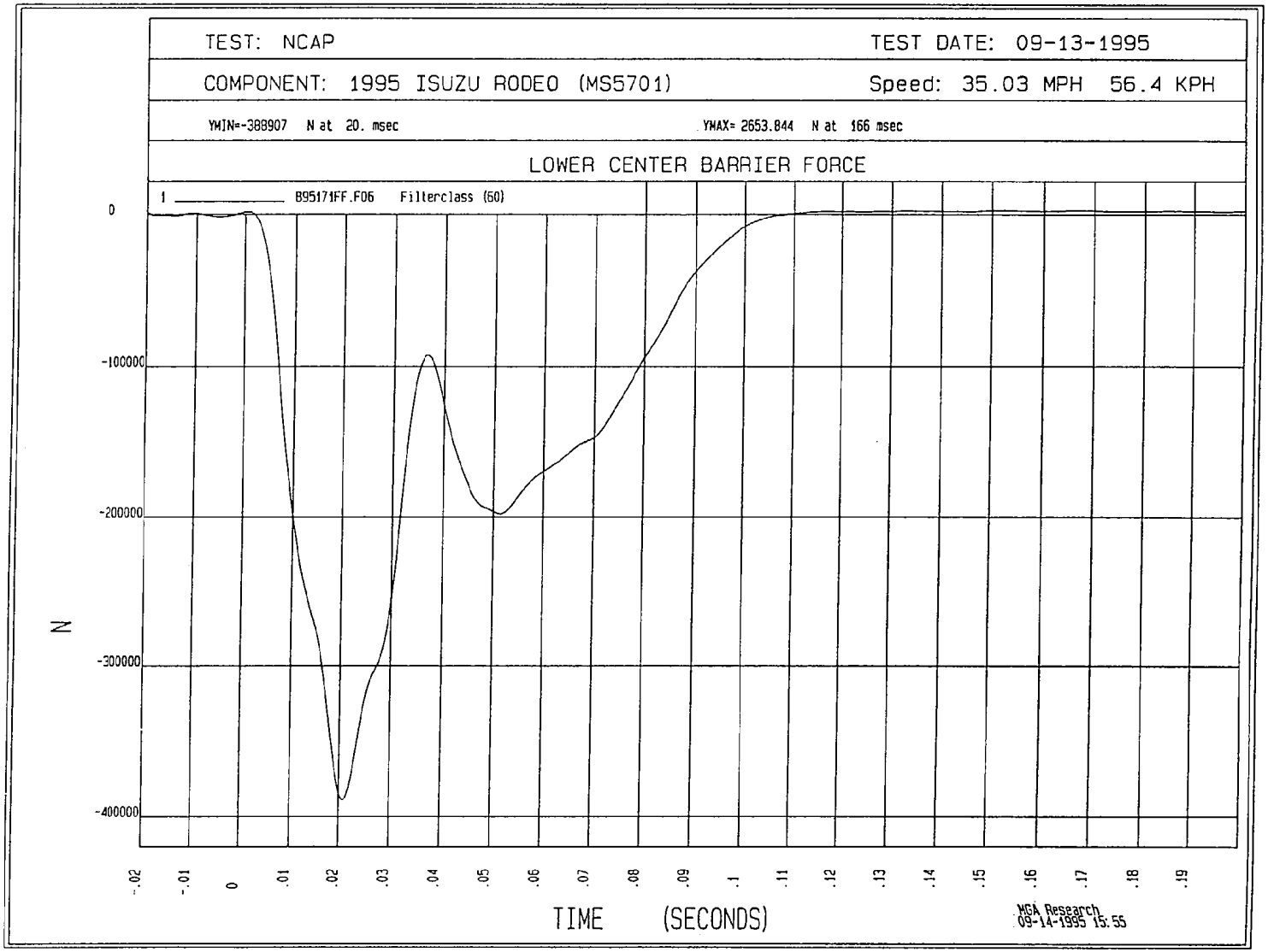


Figure B-27 - Lower Center Barrier Force vs. Time

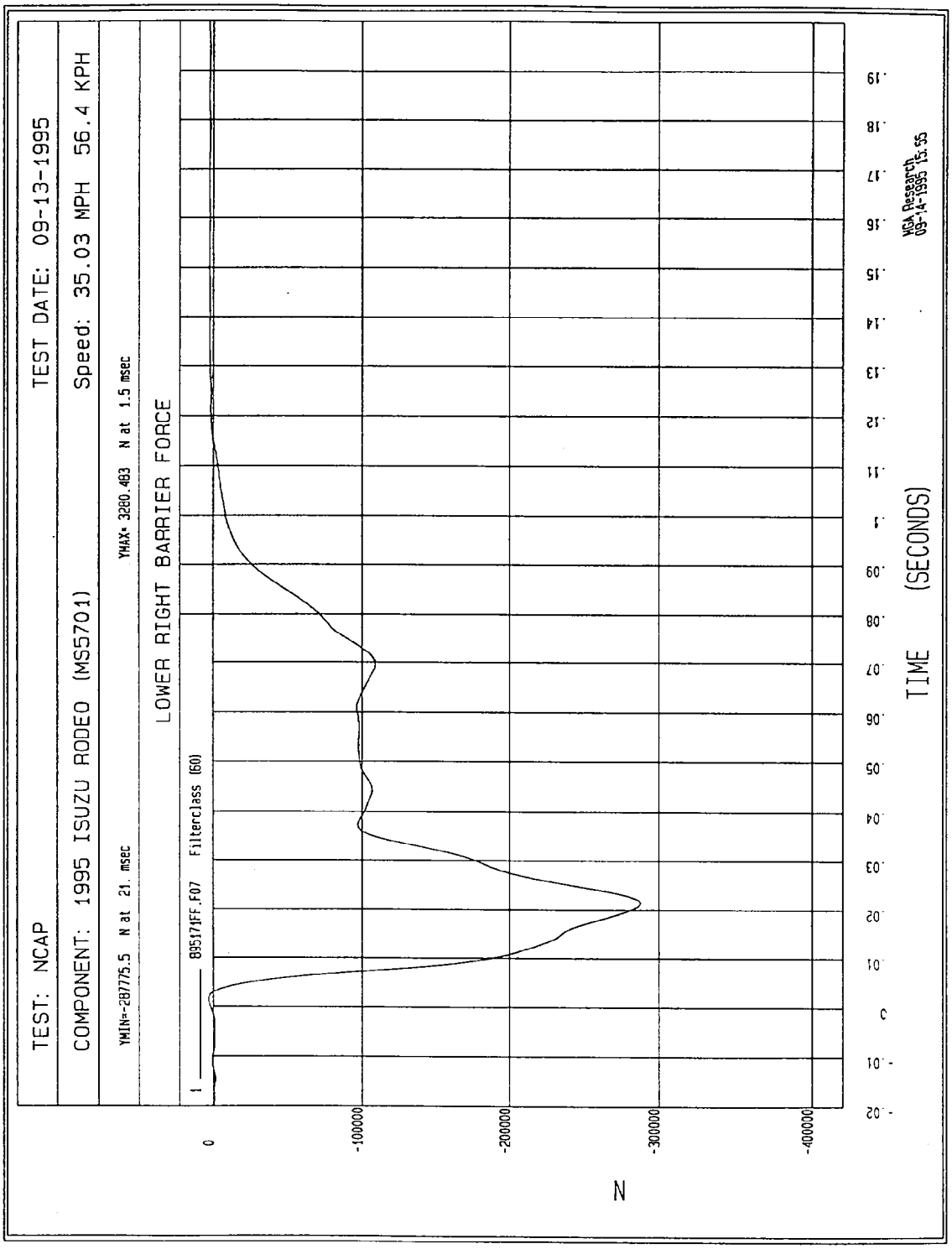


Figure B-28 - Lower Right Barrier Force vs. Time

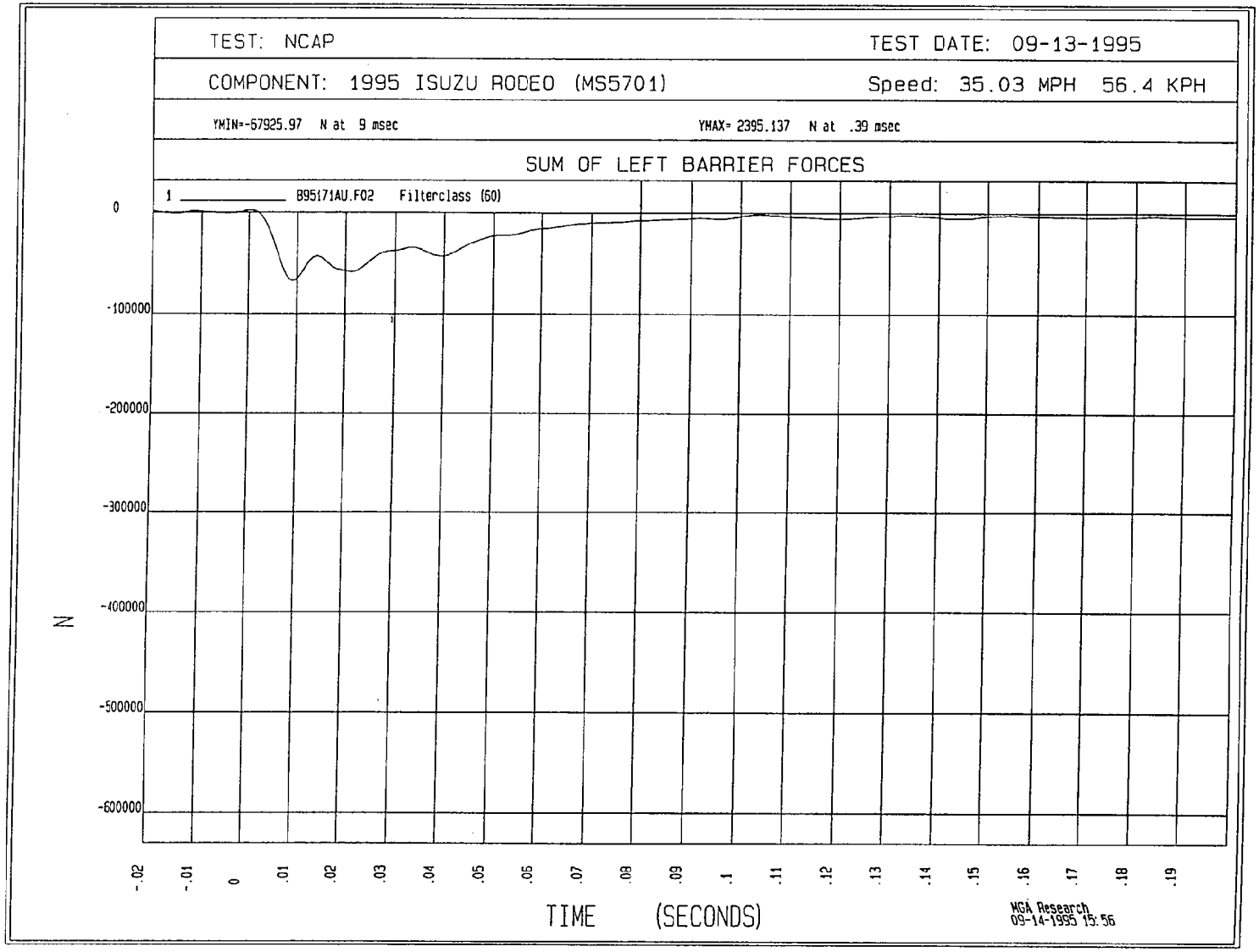


Figure B-29 - Sum of Left Barrier Forces vs. Time

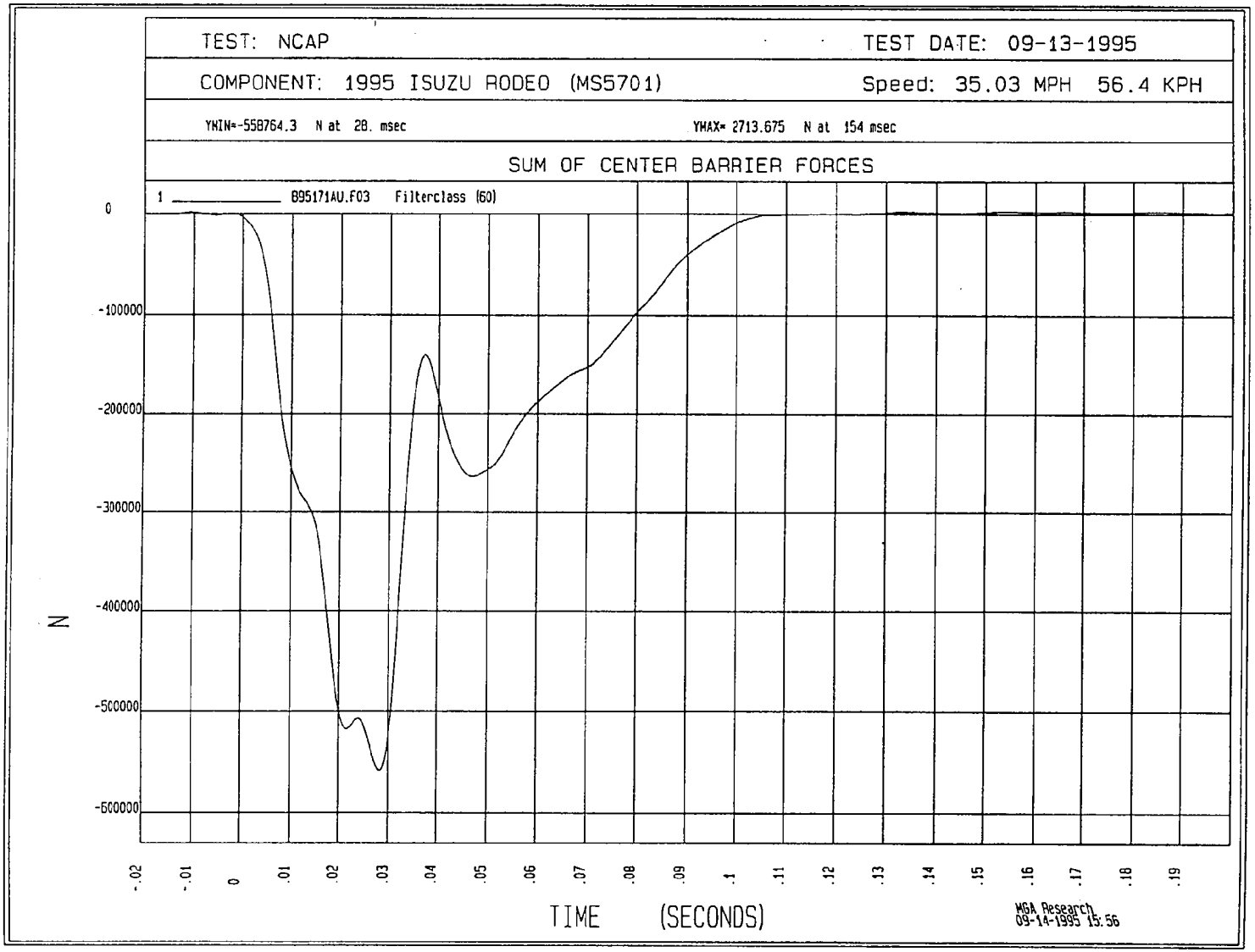


Figure B-30 - Sum of Center Barrier Forces vs. Time

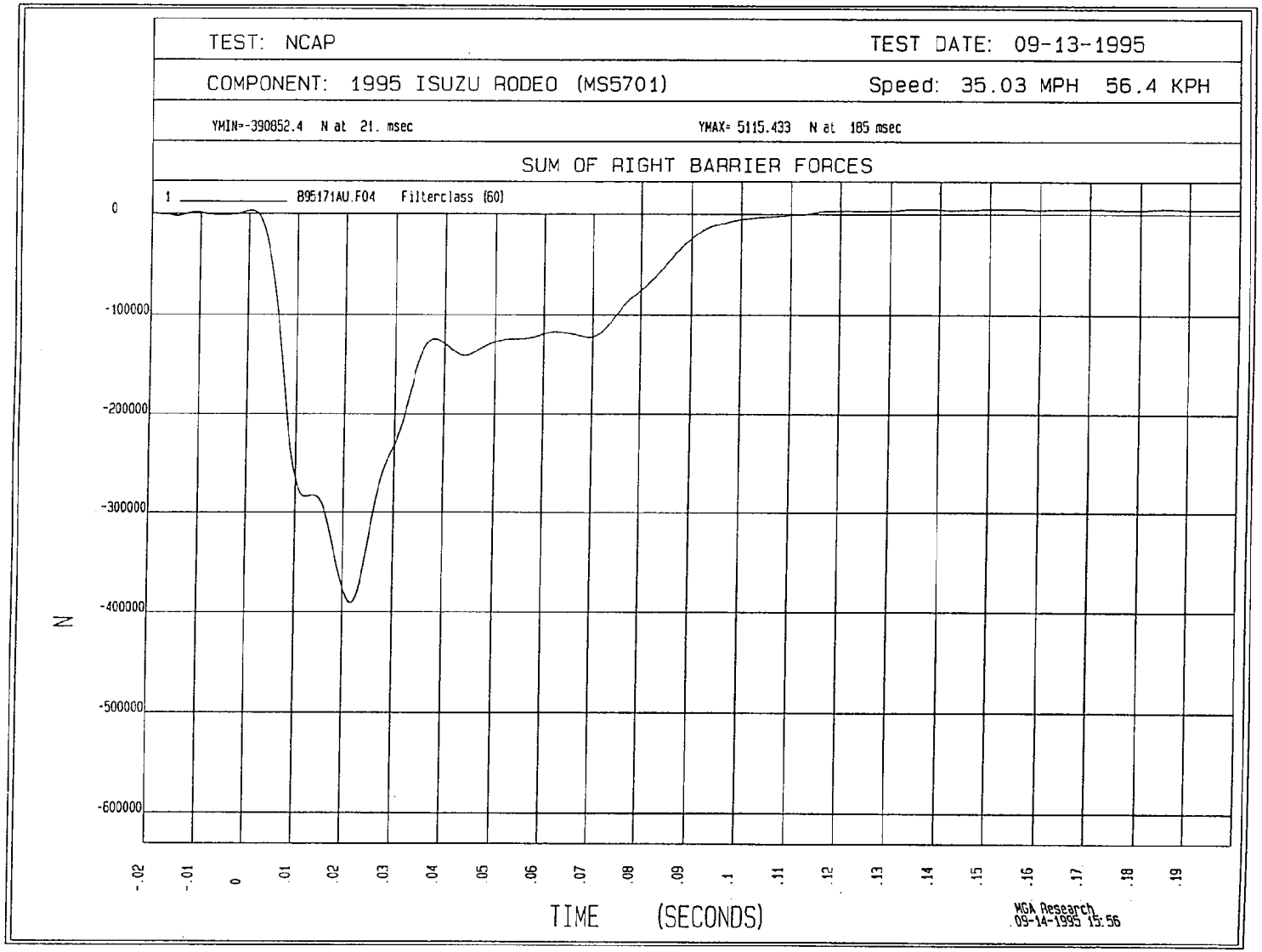


Figure B-31 - Sum of Right Barrier Forces vs. Time

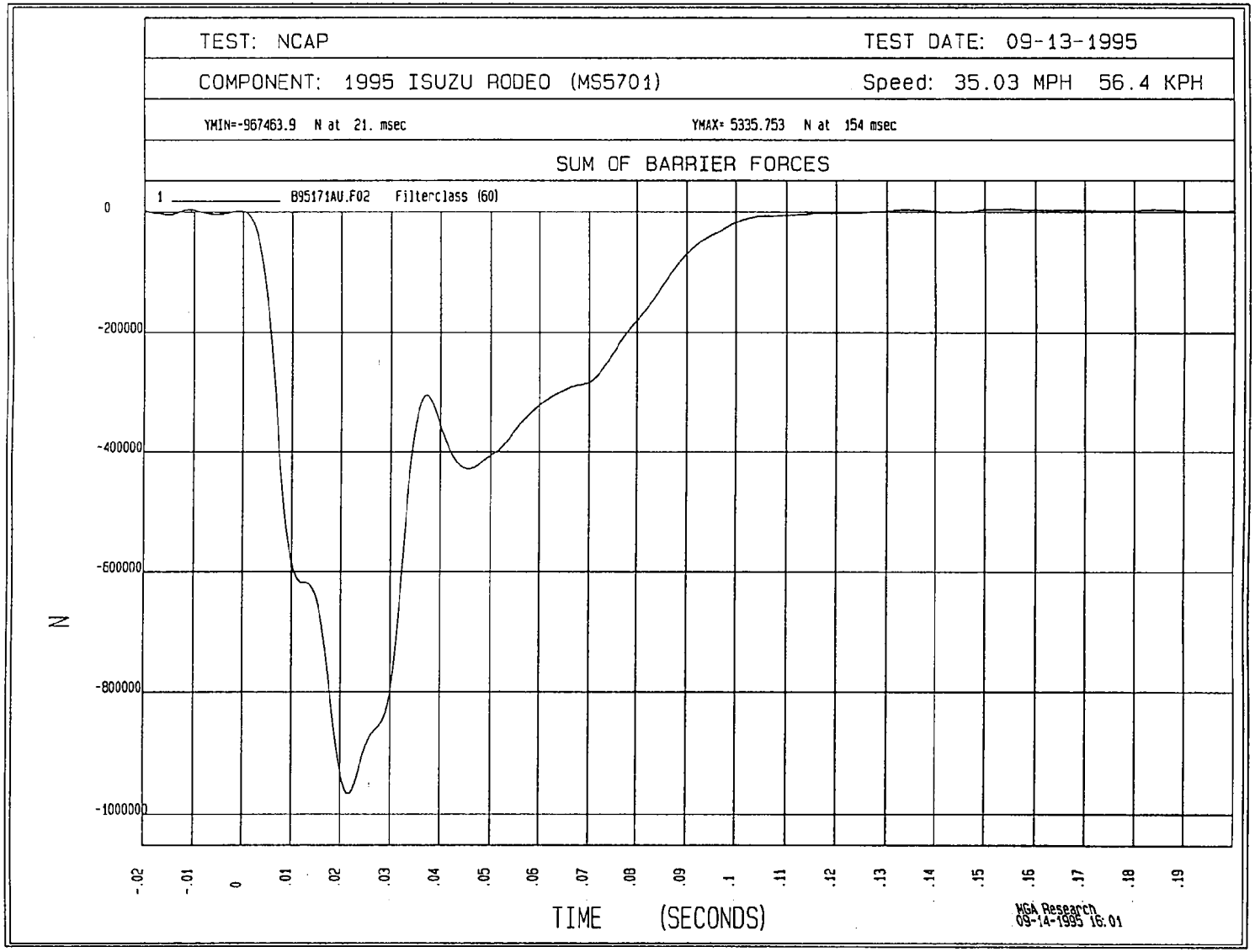


Figure B-32 - Sum of Barrier Forces vs. Time

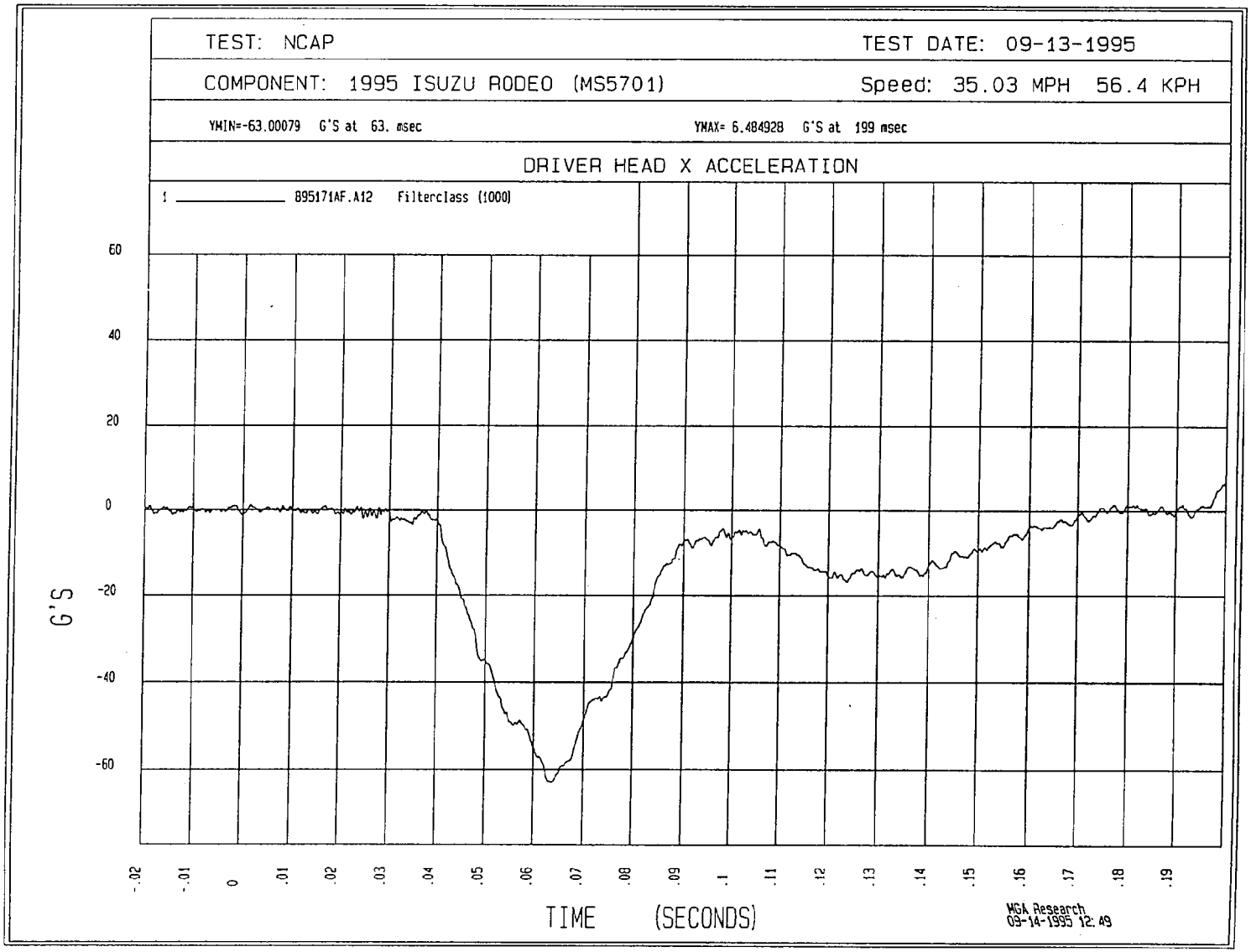


Figure B-33 - Driver Head X Acceleration vs. Time

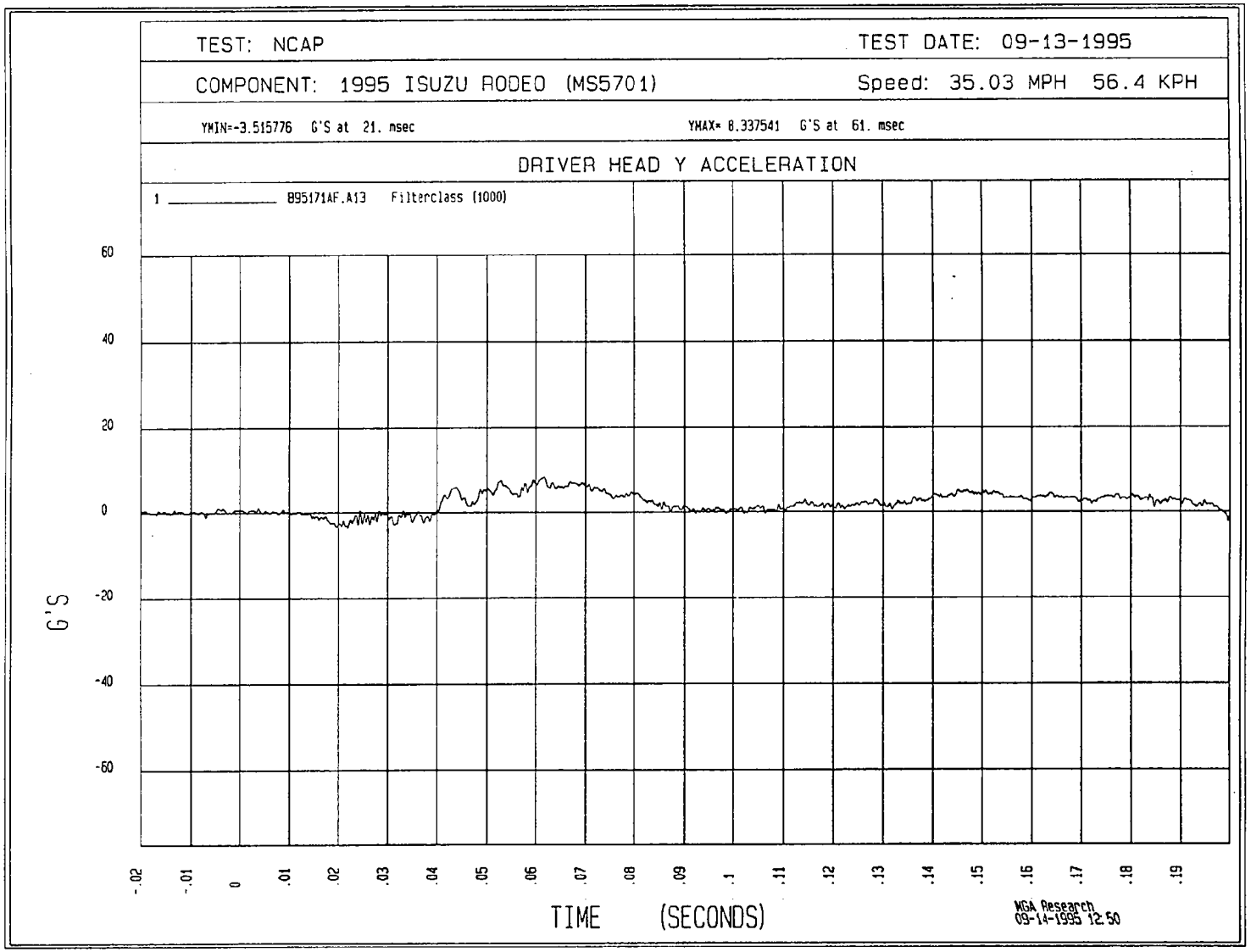


Figure B-34 - Driver Head Y Acceleration vs. Time

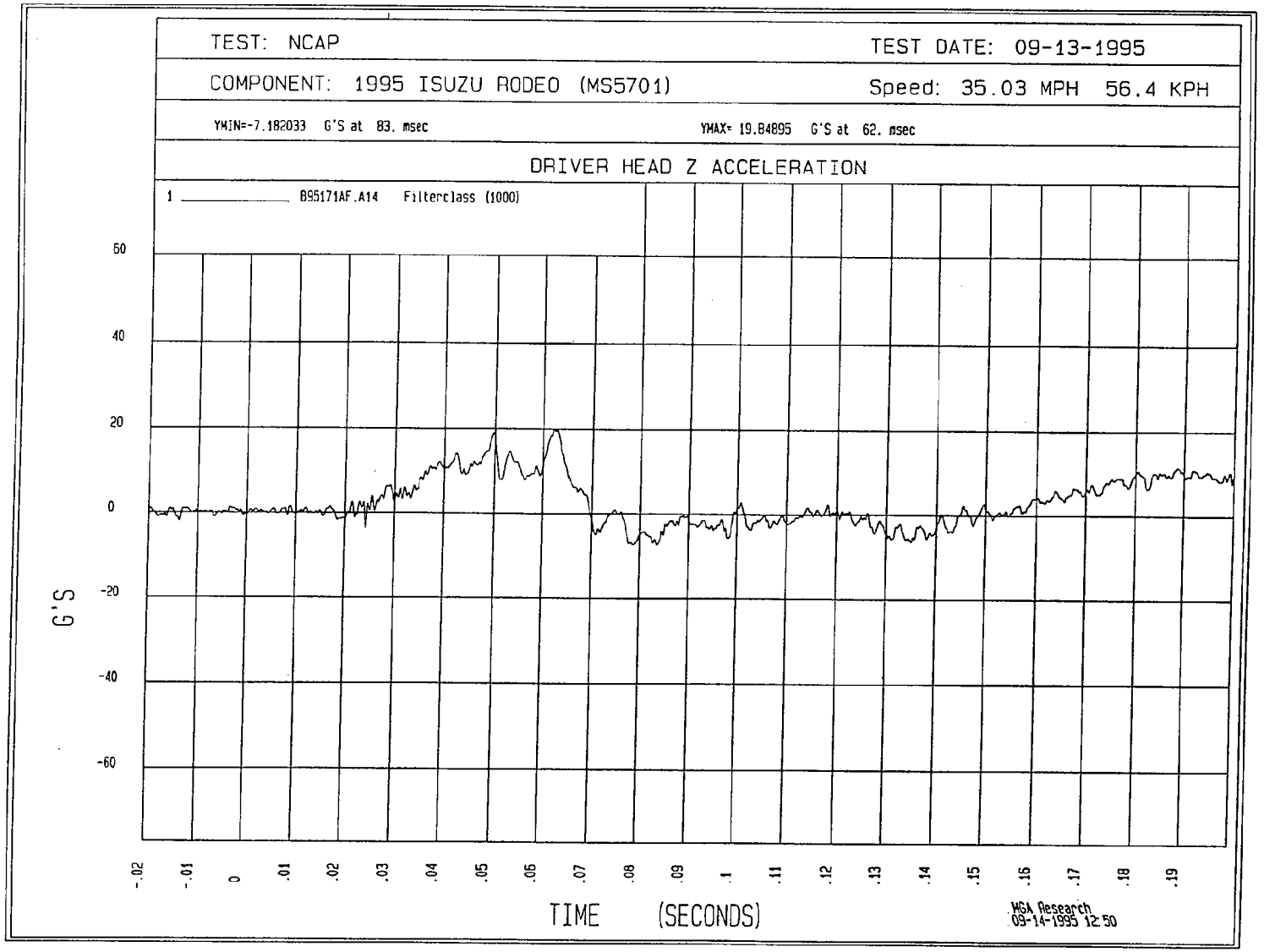


Figure B-35 - Driver Head Z Acceleration vs. Time

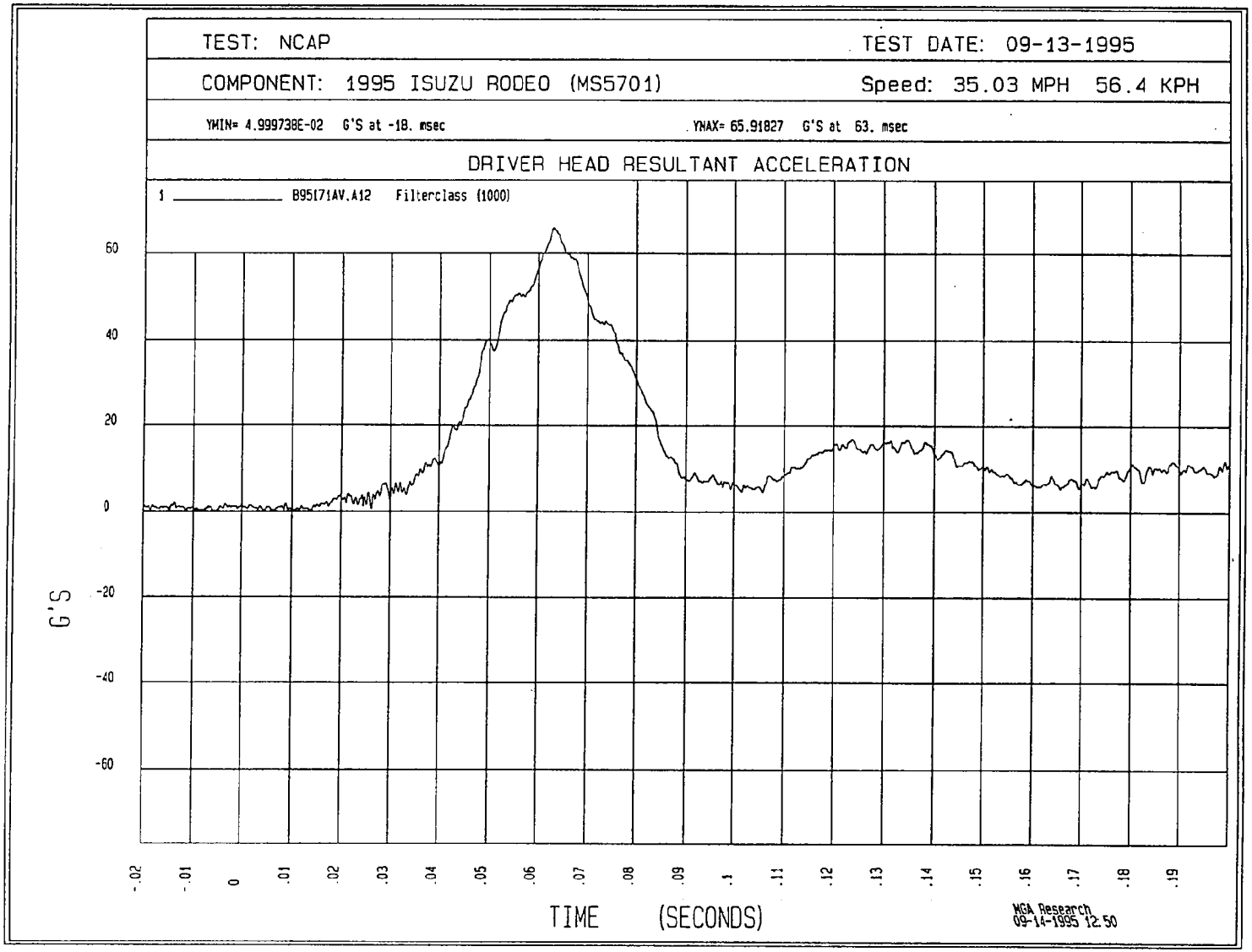


Figure B-36 - Driver Head Resultant Acceleration vs. Time

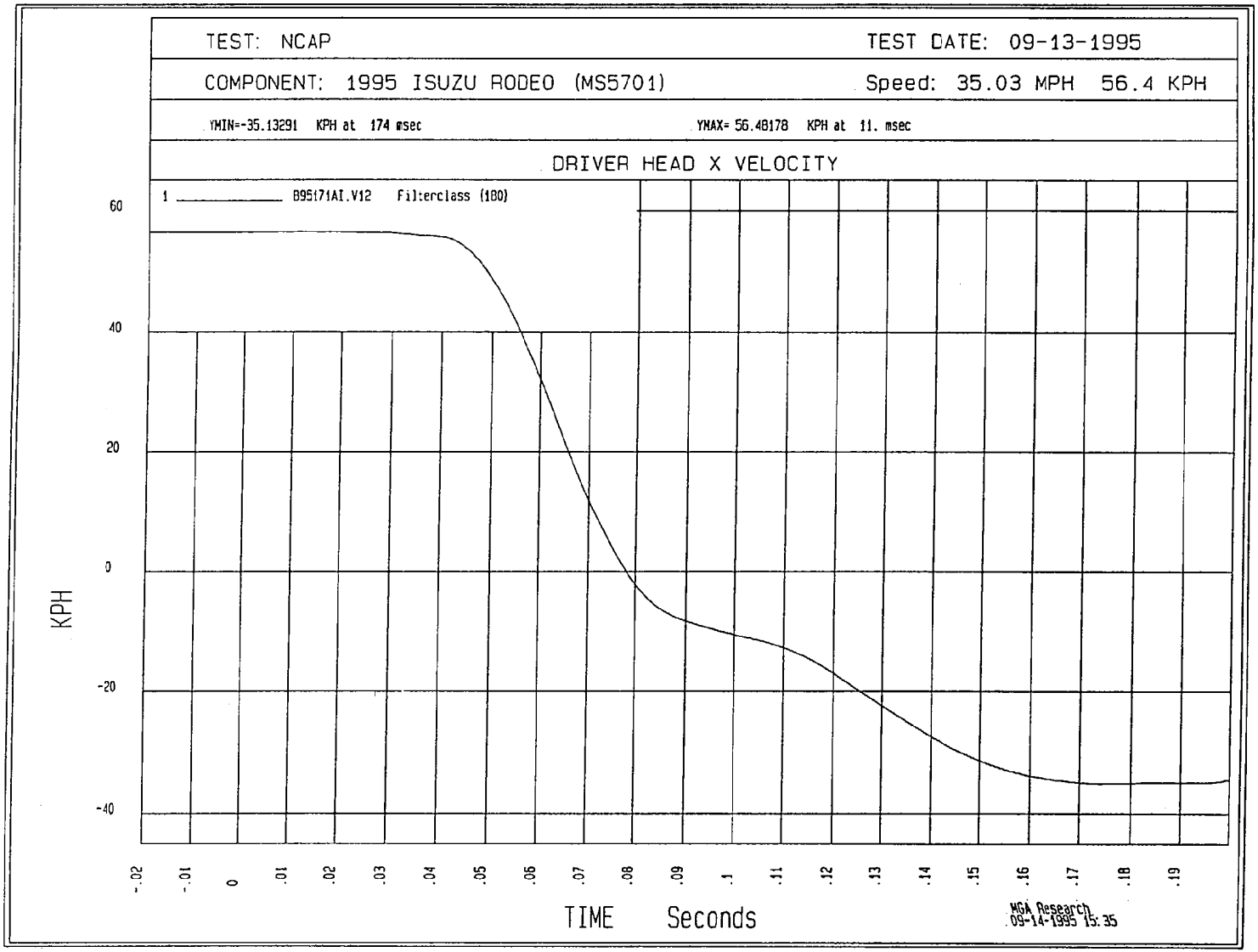


Figure B-37 - Driver Head X Velocity vs. Time

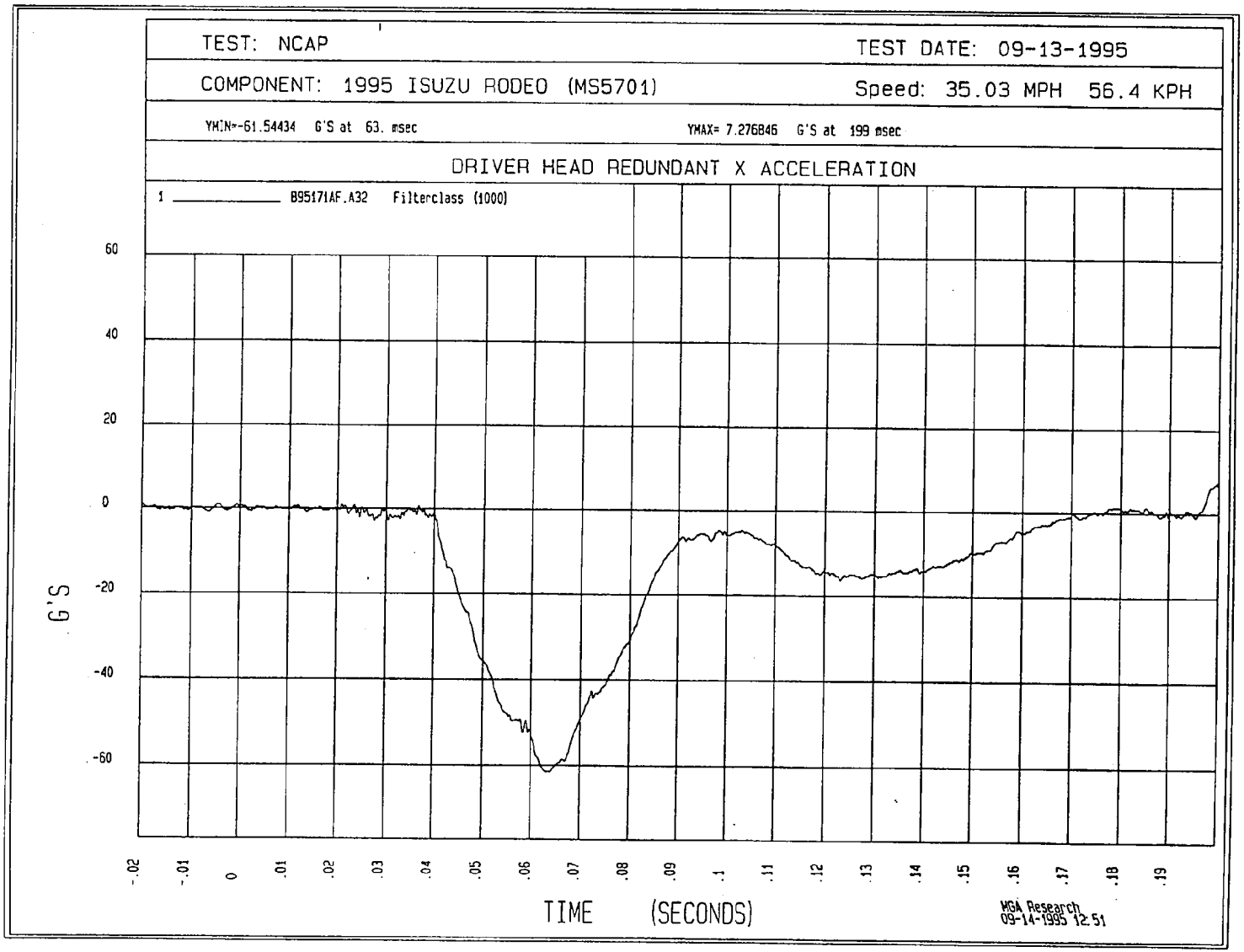


Figure B-38 - Driver Head Redundant X Acceleration vs. Time

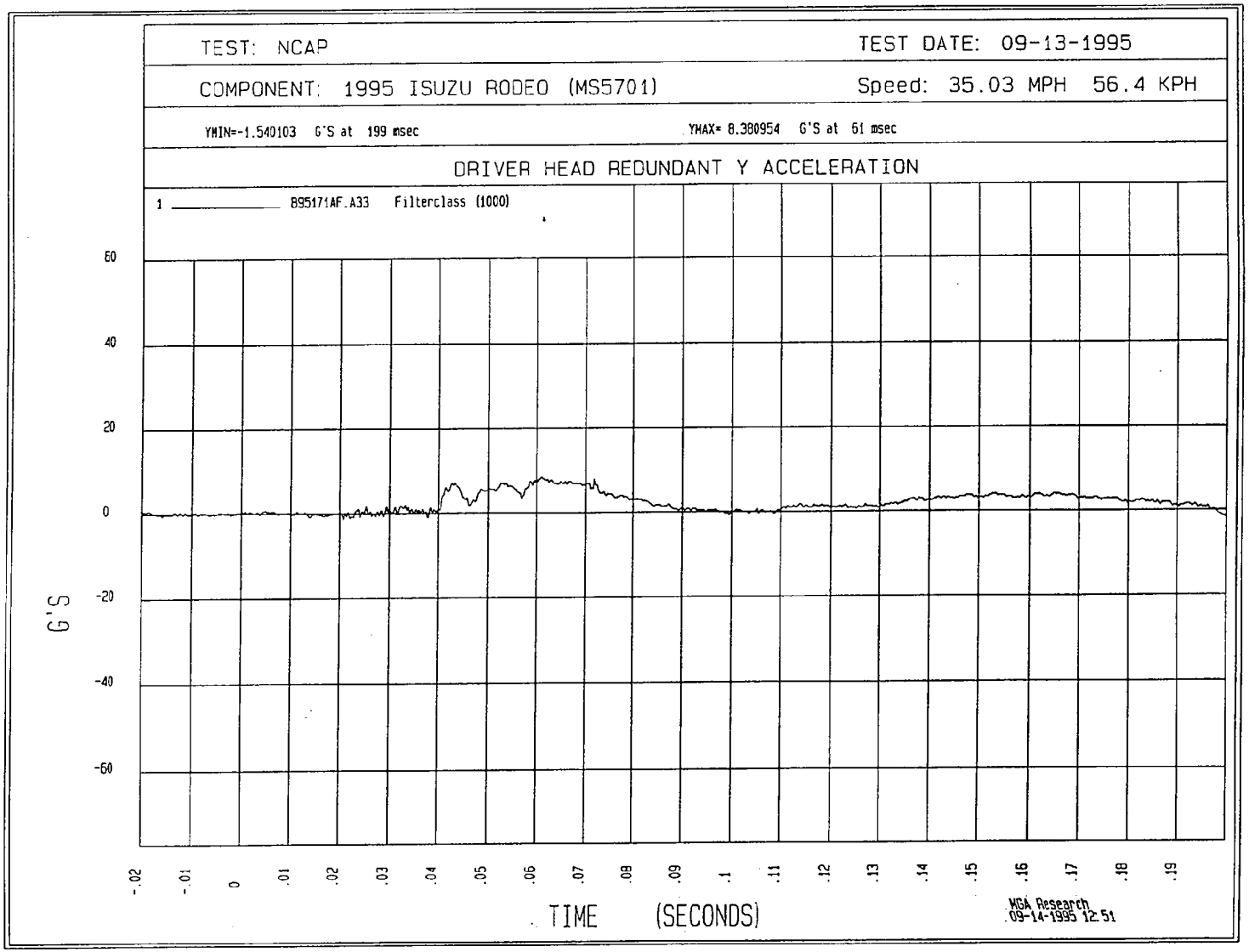


Figure B-39 - Driver Head Redundant Y Acceleration vs. Time

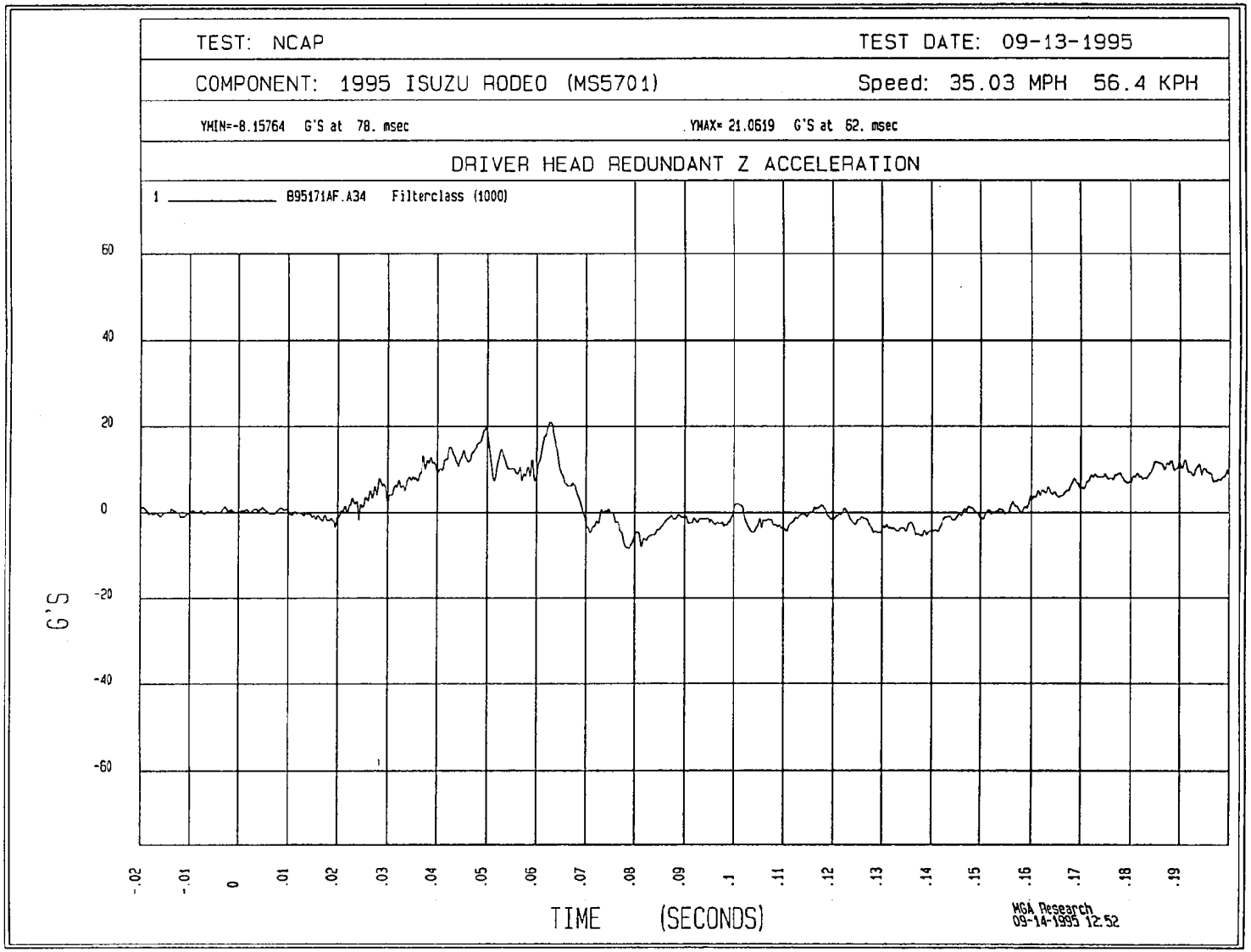


Figure B-40 - Driver Head Redundant Z Acceleration vs. Time

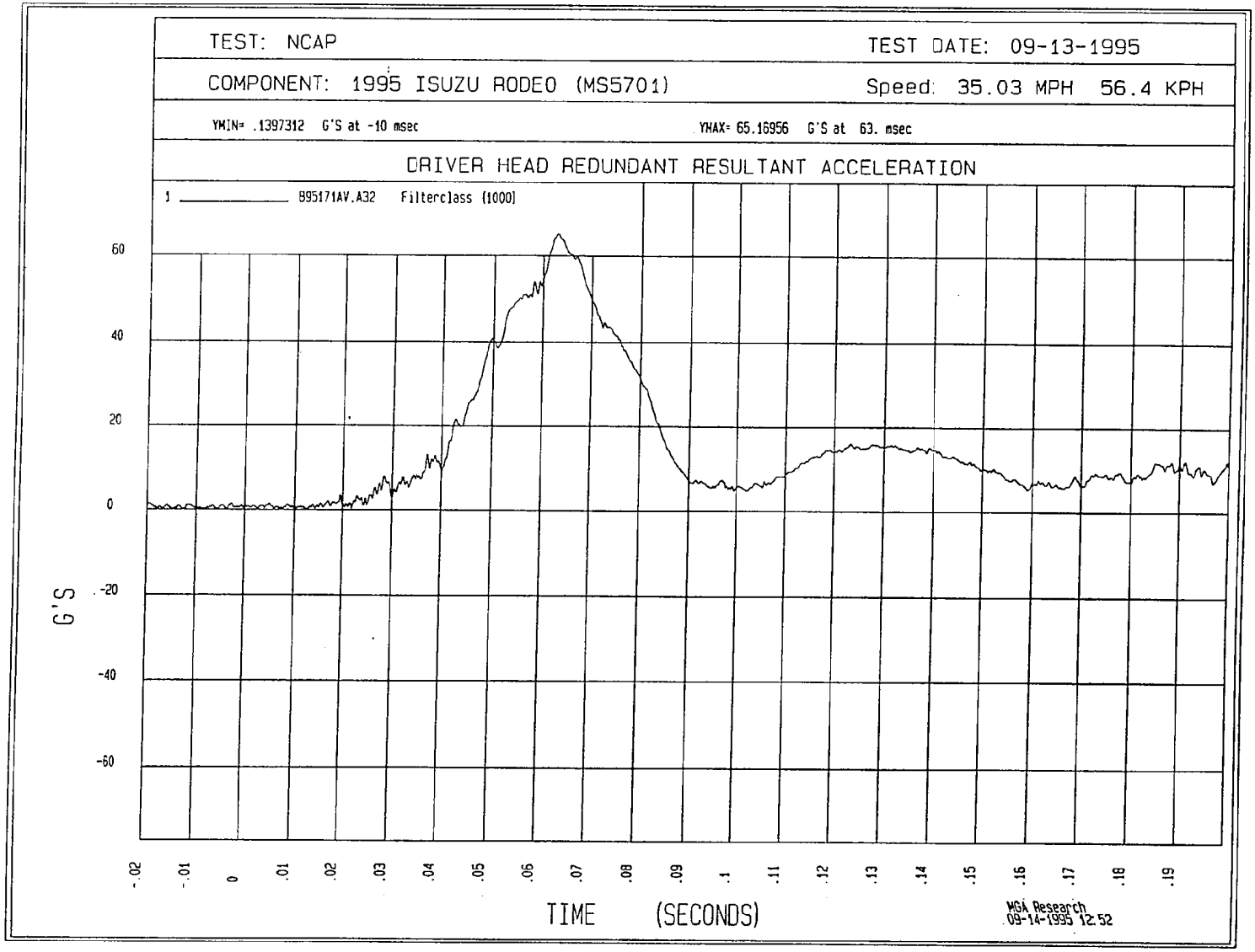


Figure B-41 - Driver Head Redundant Resultant Acceleration vs. Time

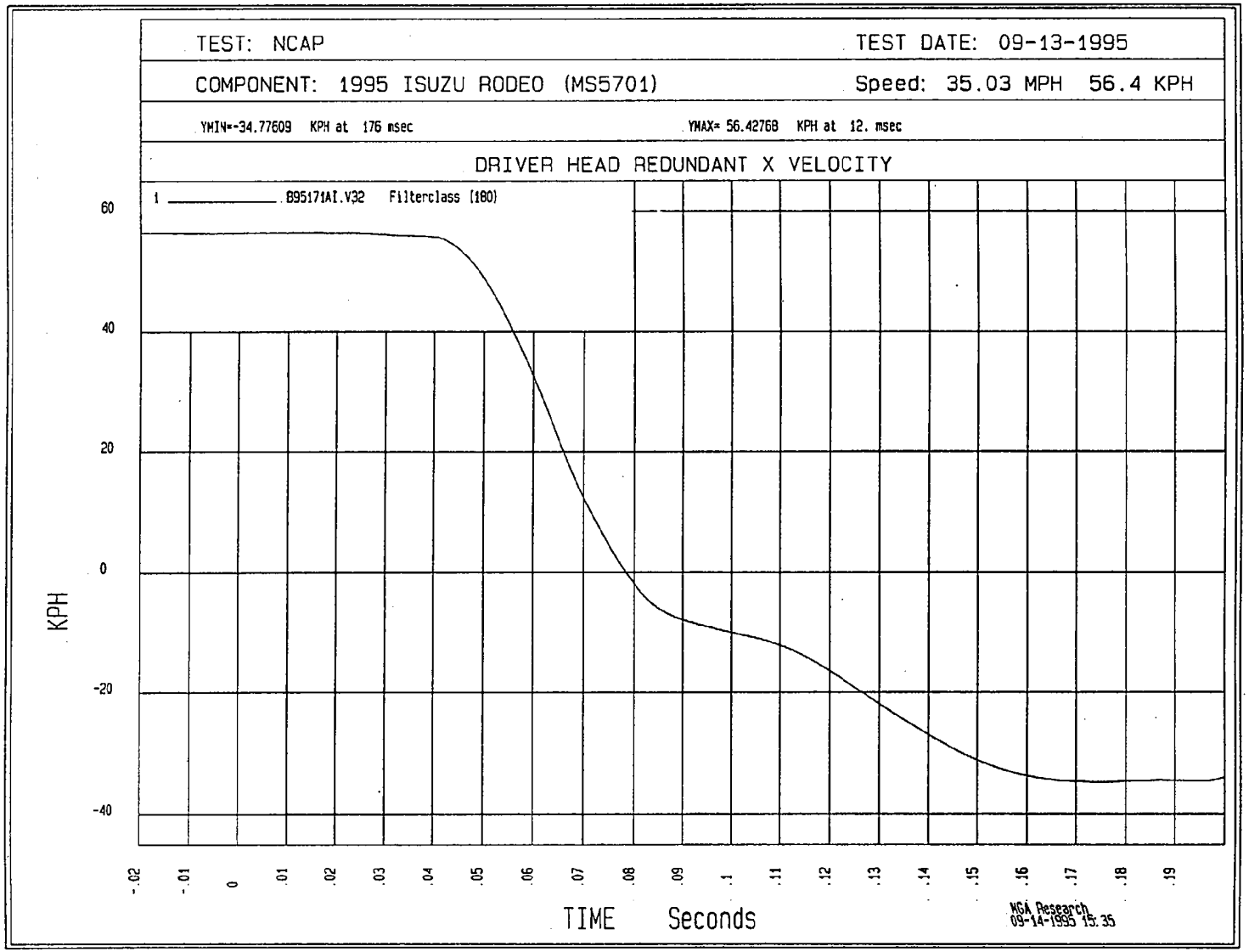


Figure B-42 - Driver Head Redundant X Velocity vs. Time

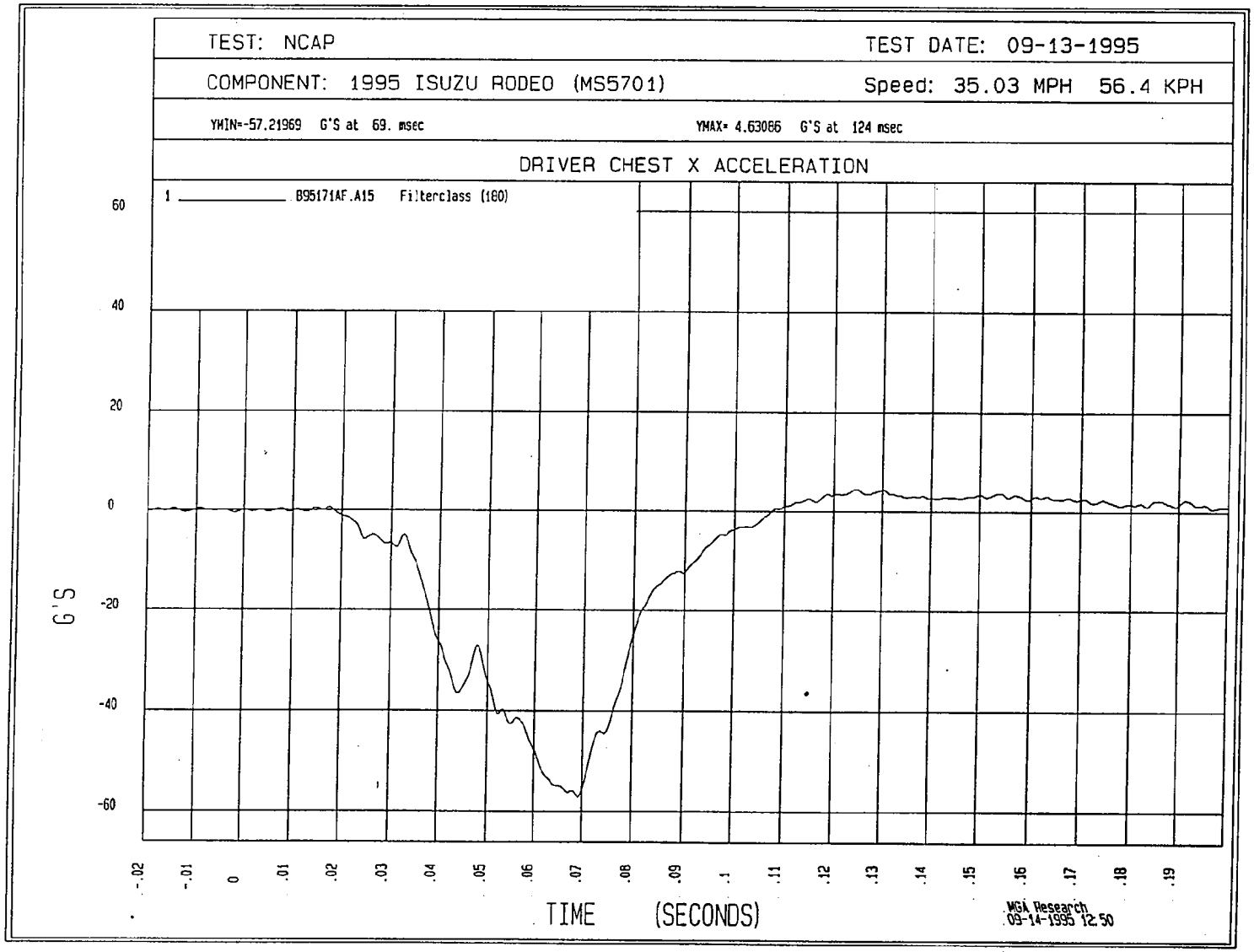


Figure B-43 - Driver Chest X Acceleration vs. Time

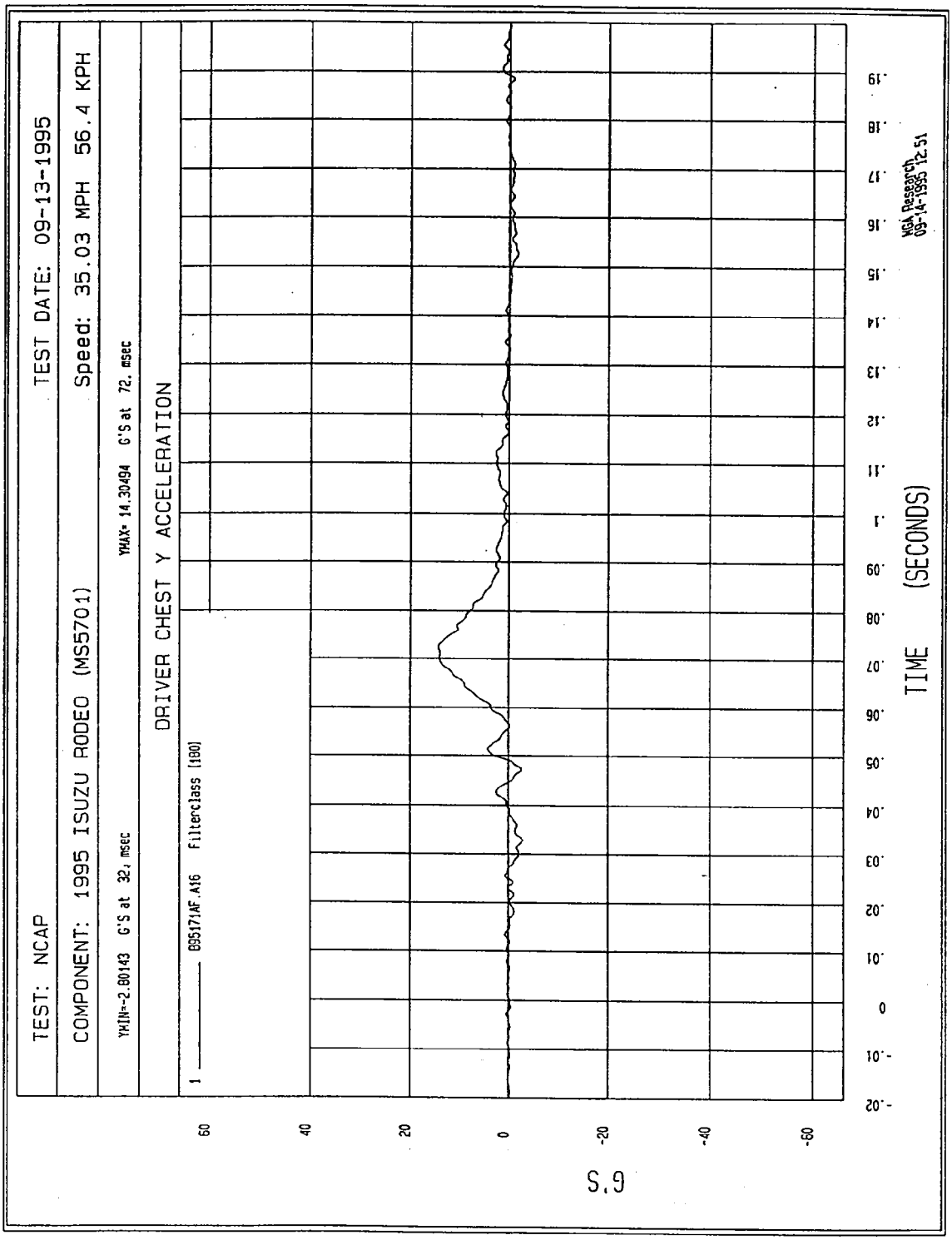


Figure B-44 - Driver Chest Y Acceleration vs. Time

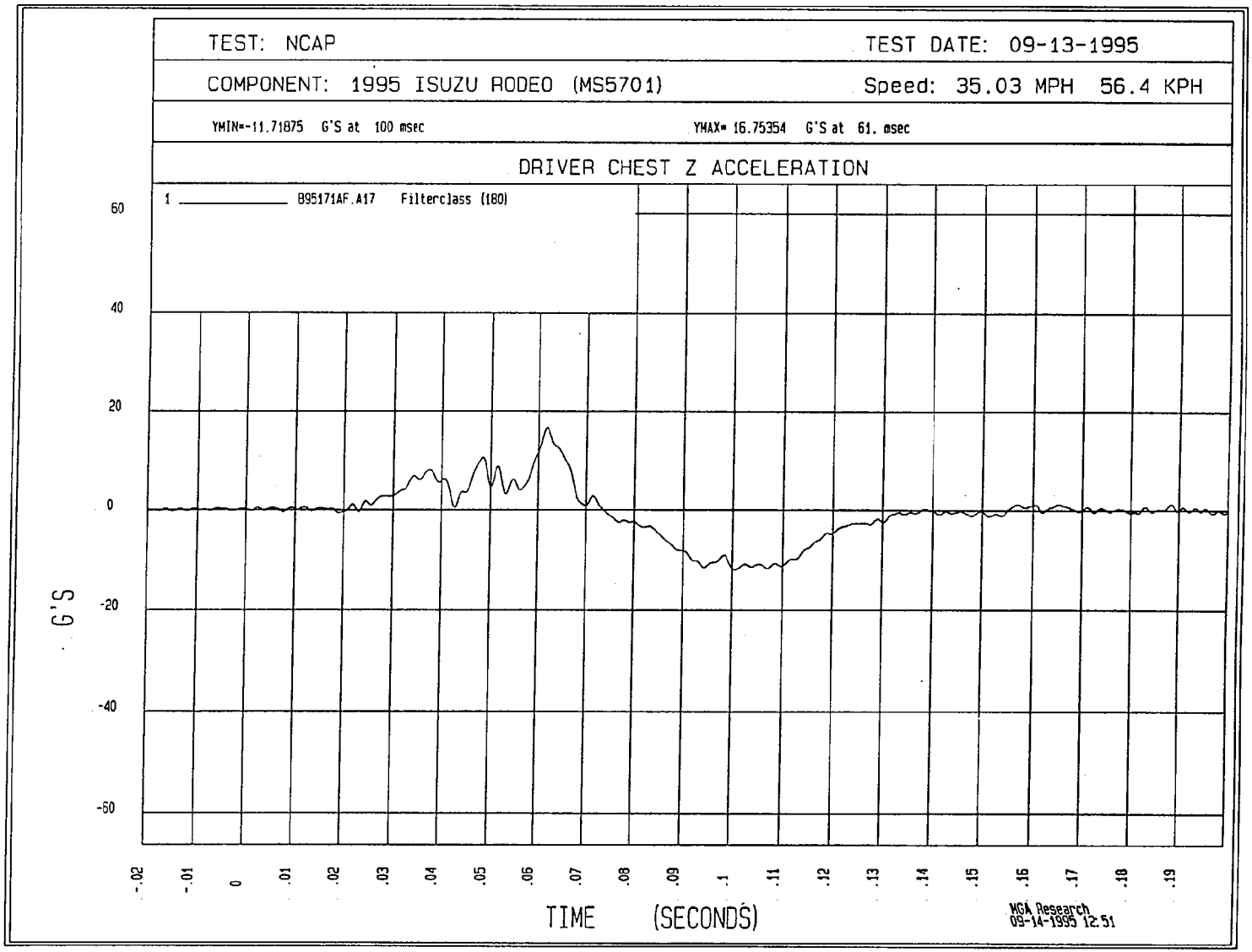


Figure B-45 - Driver Chest Z Acceleration vs. Time

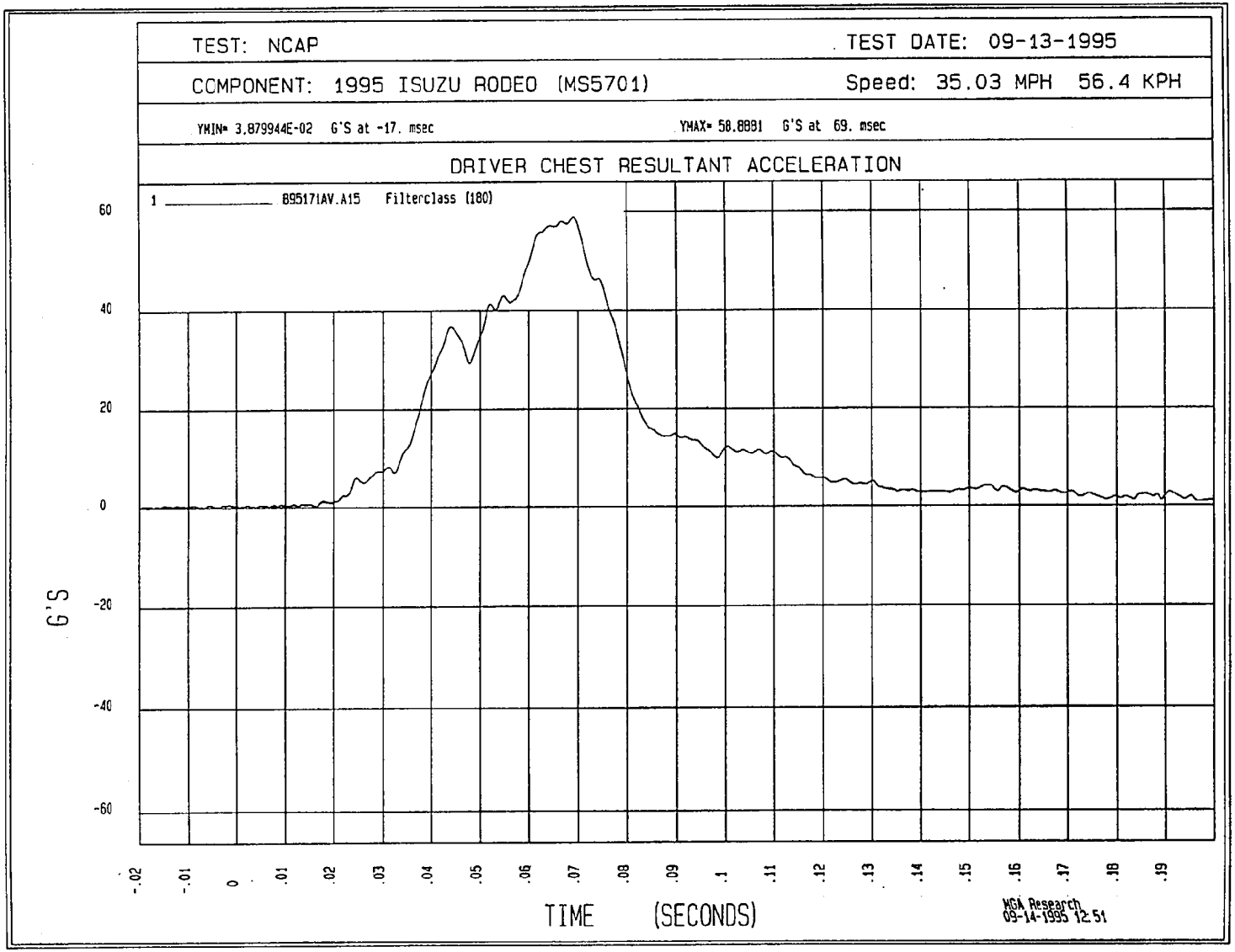


Figure B-46 - Driver Chest Resultant Acceleration vs. Time

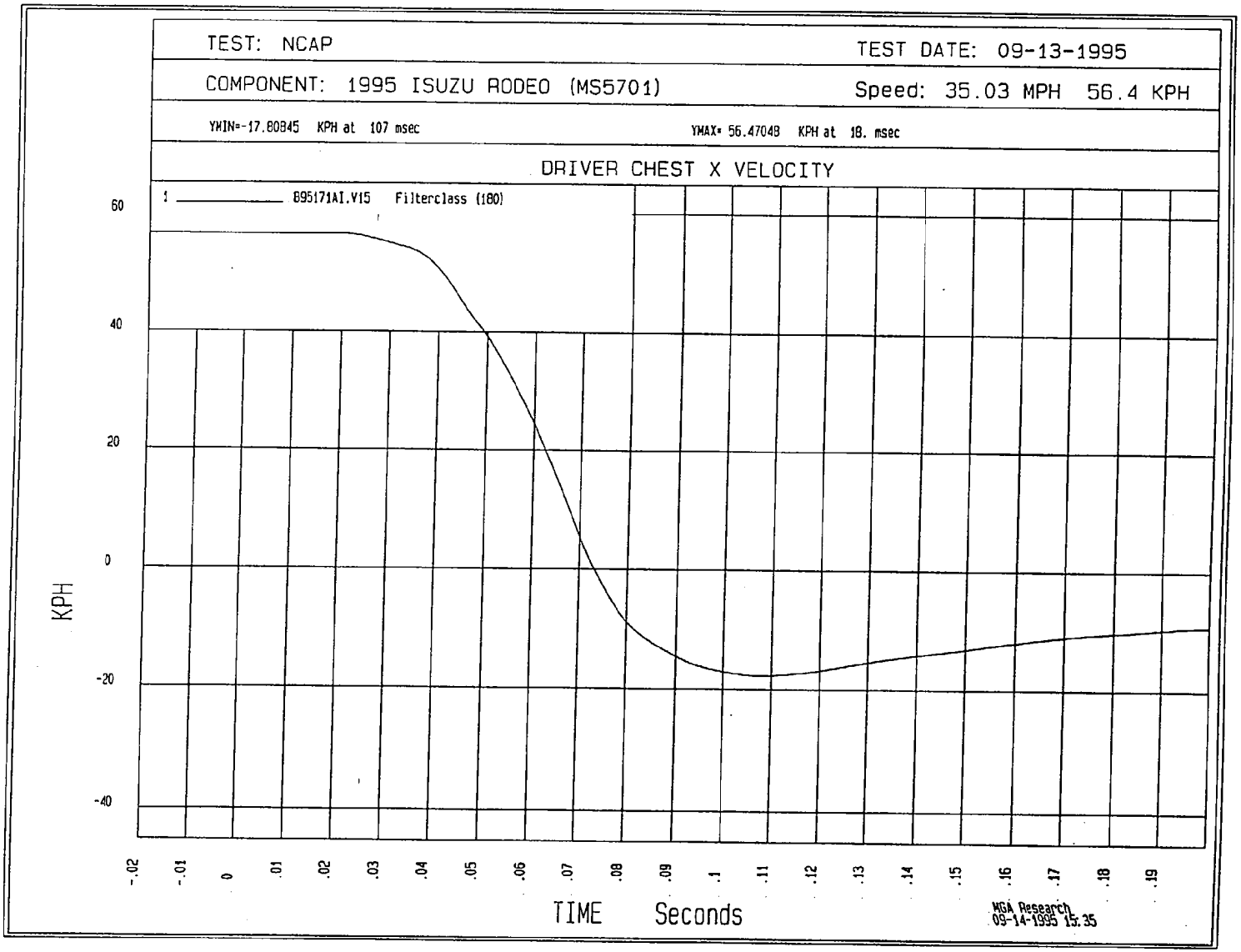


Figure B-47 - Driver Chest X Velocity vs. Time

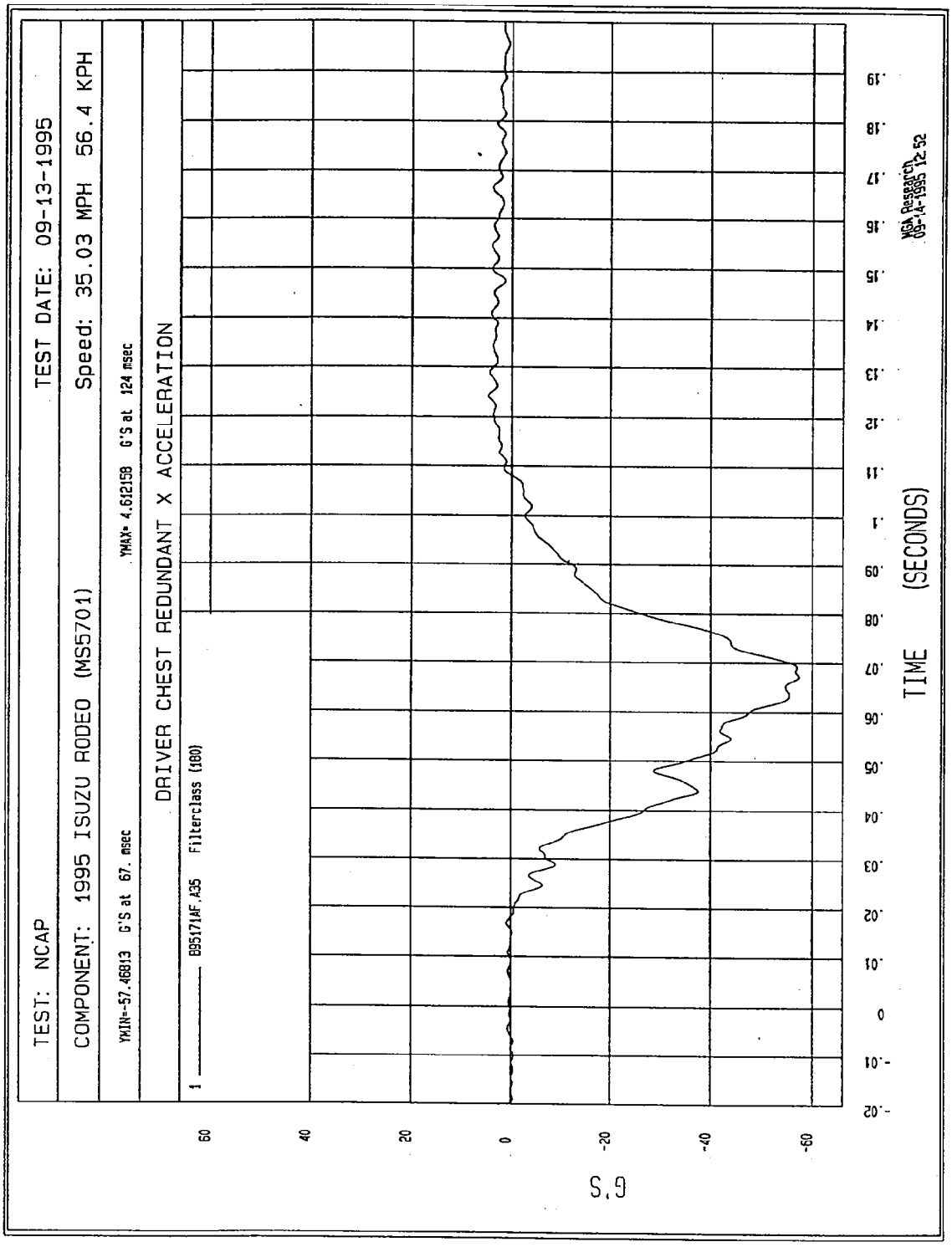


Figure B-48 - Driver Chest Redundant X Acceleration vs. Time

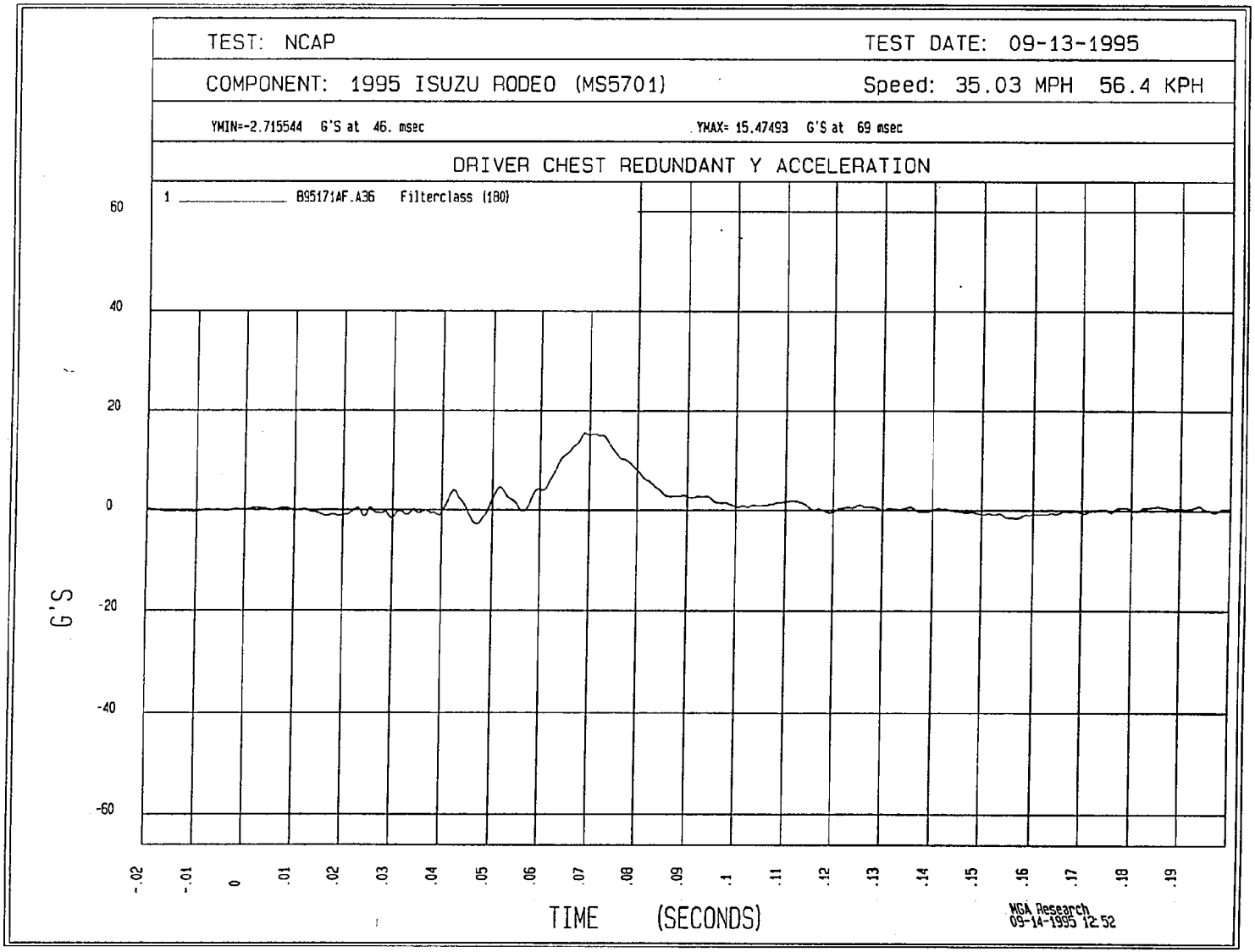


Figure B-49 - Driver Chest Redundant Y Acceleration vs. Time

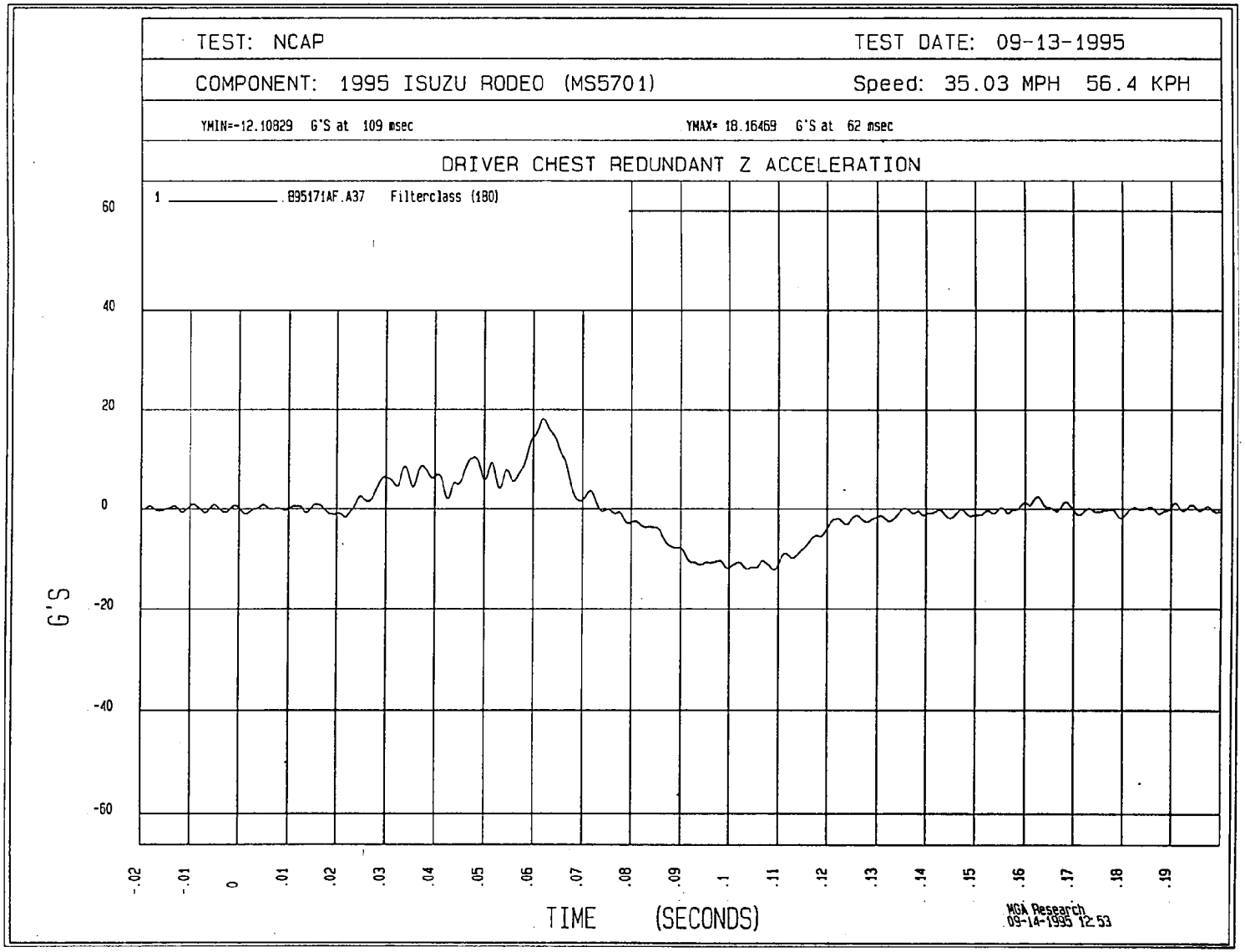


Figure B-50 - Driver Chest Redundant Z Acceleration vs. Time

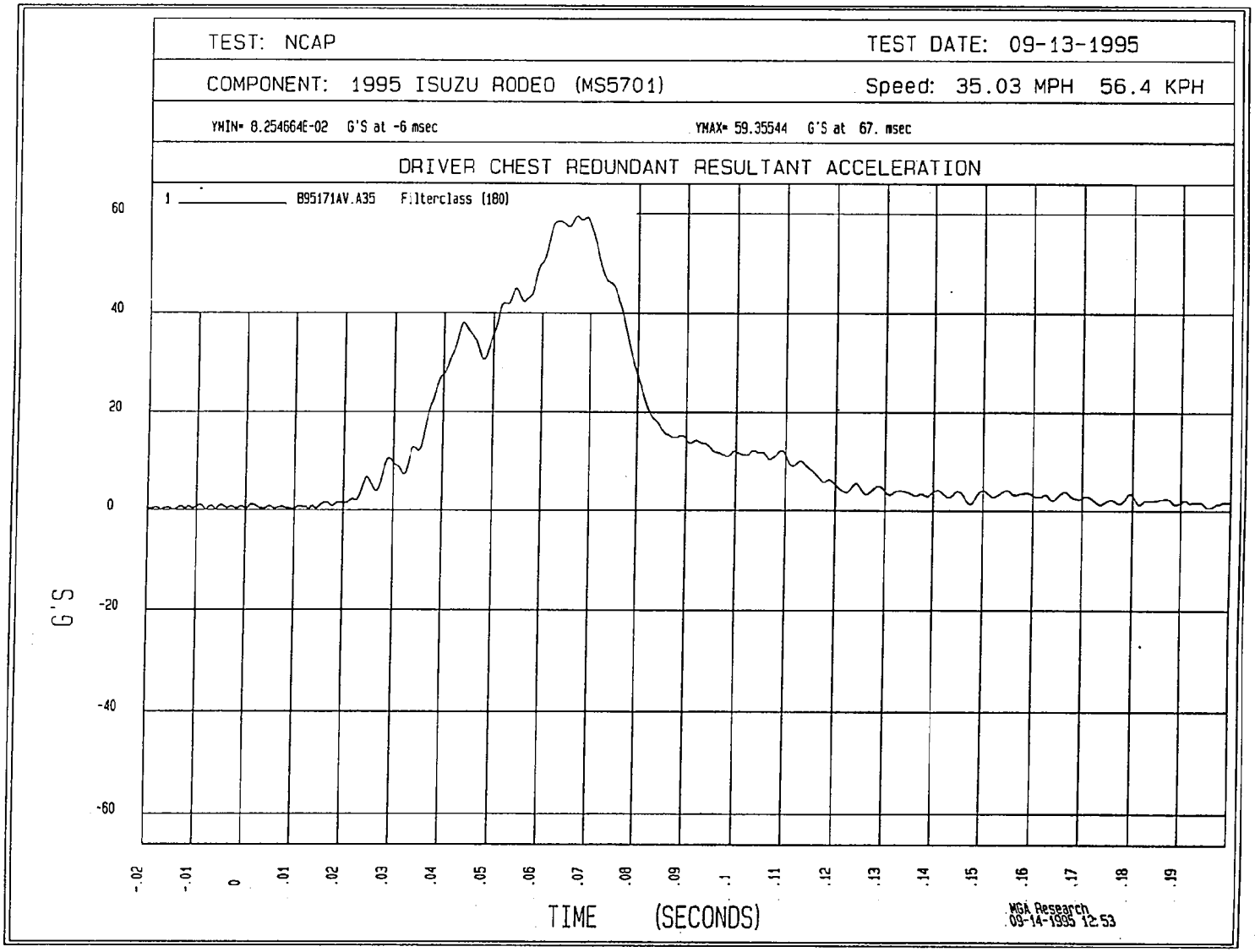


Figure B-51 - Driver Chest Redundant Resultant Acceleration vs. Time

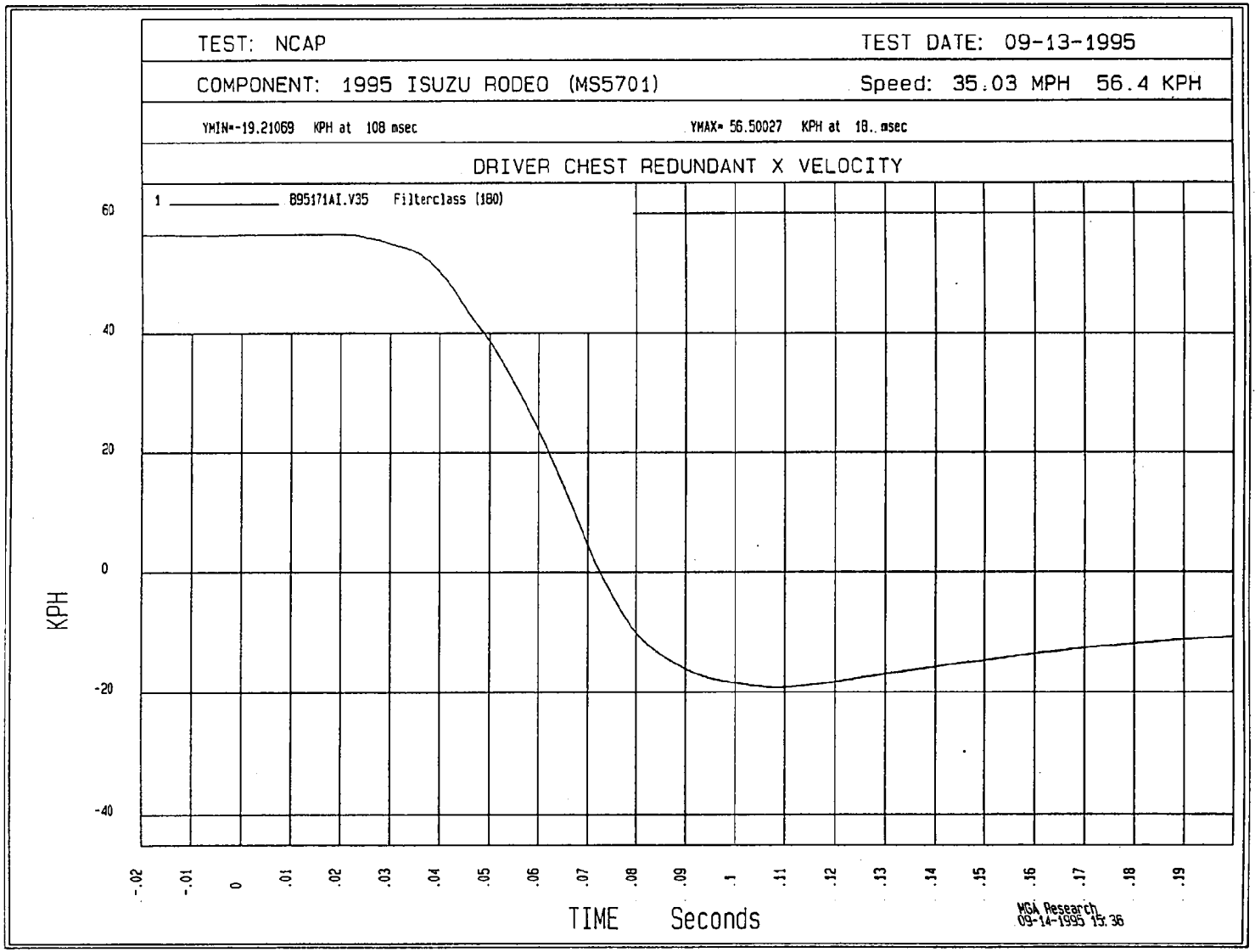


Figure B-52 - Driver Chest Redundant X Velocity vs. Time

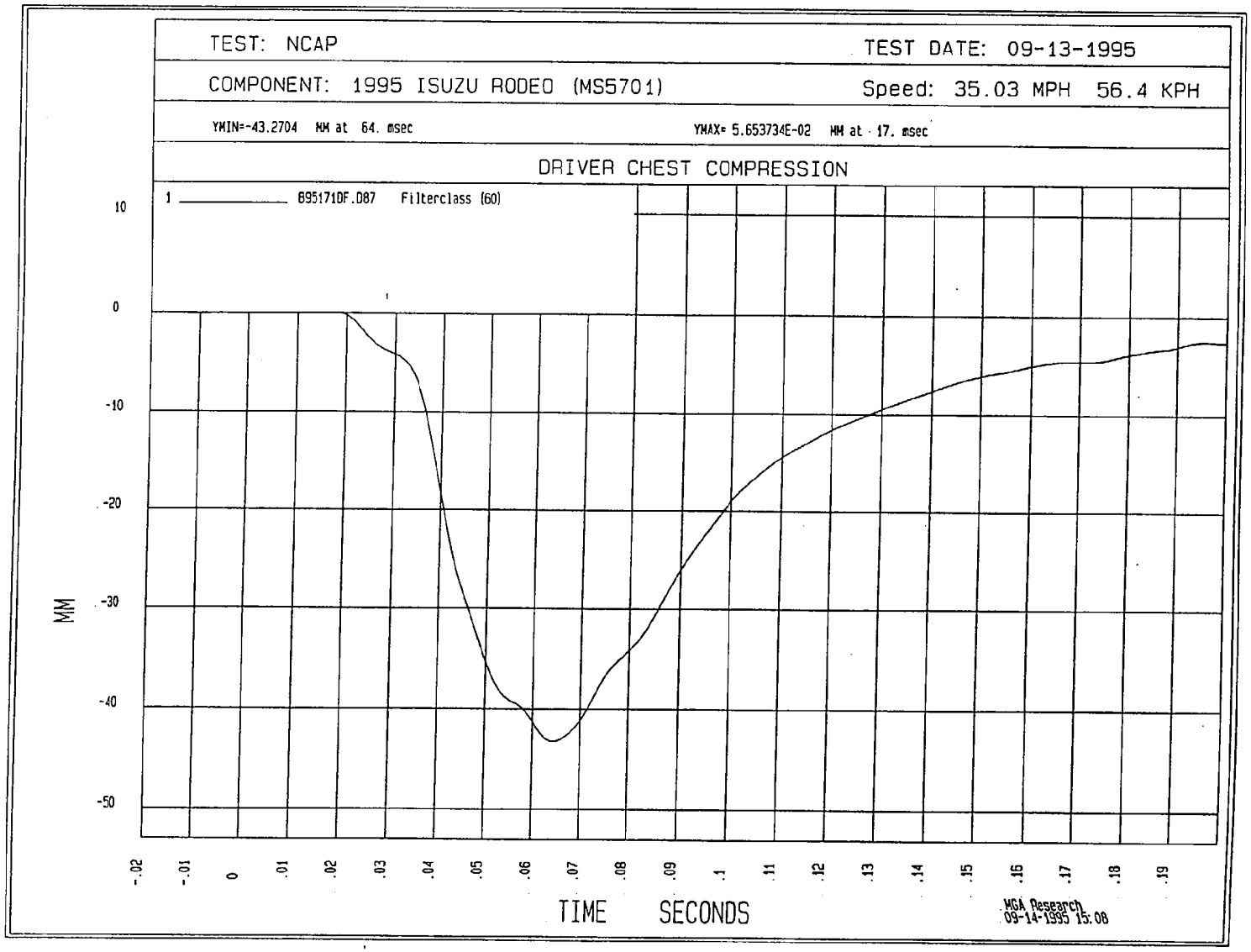


Figure B-53 - Driver Chest Compression vs. Time

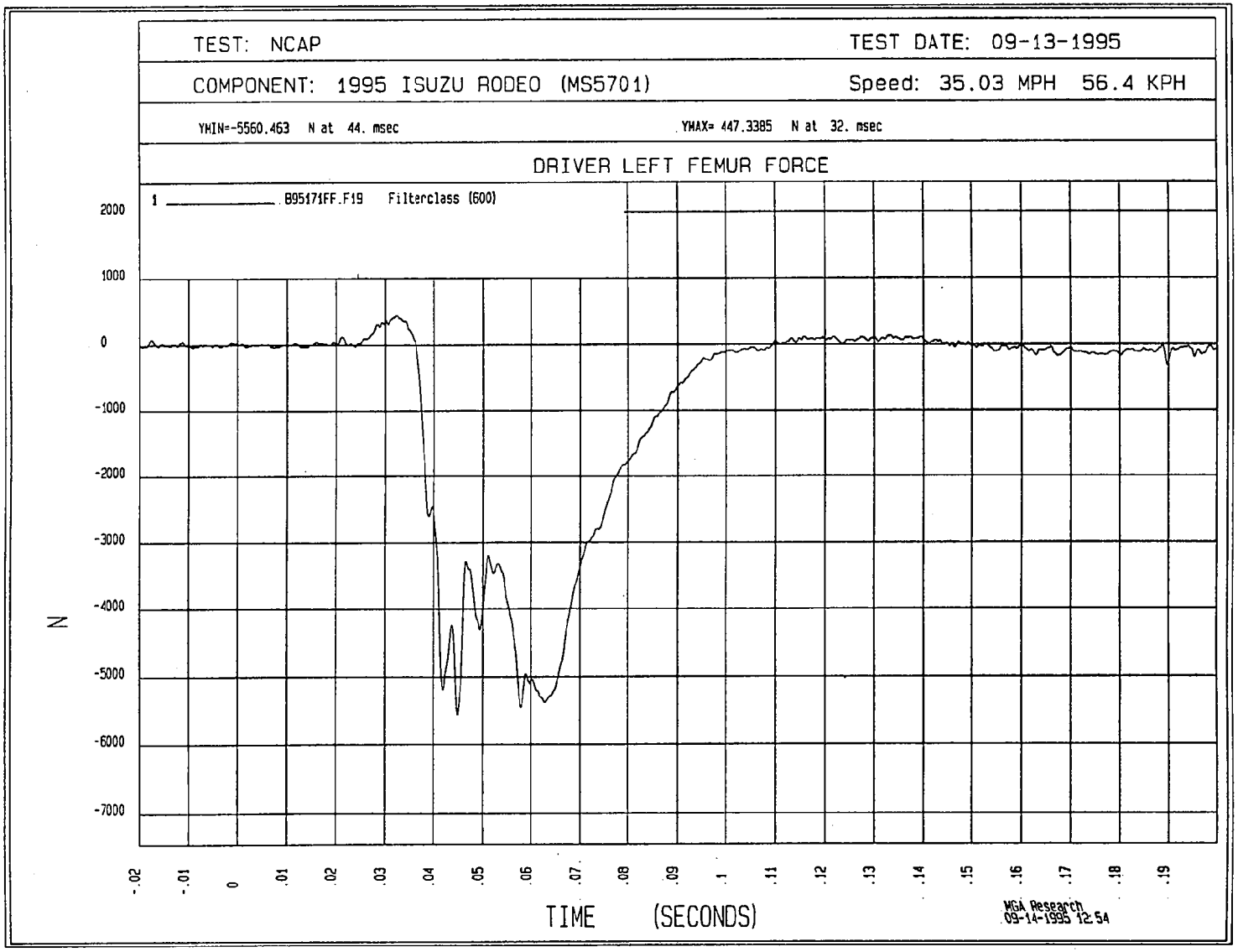


Figure B-54 - Driver Left Femur Force vs. Time

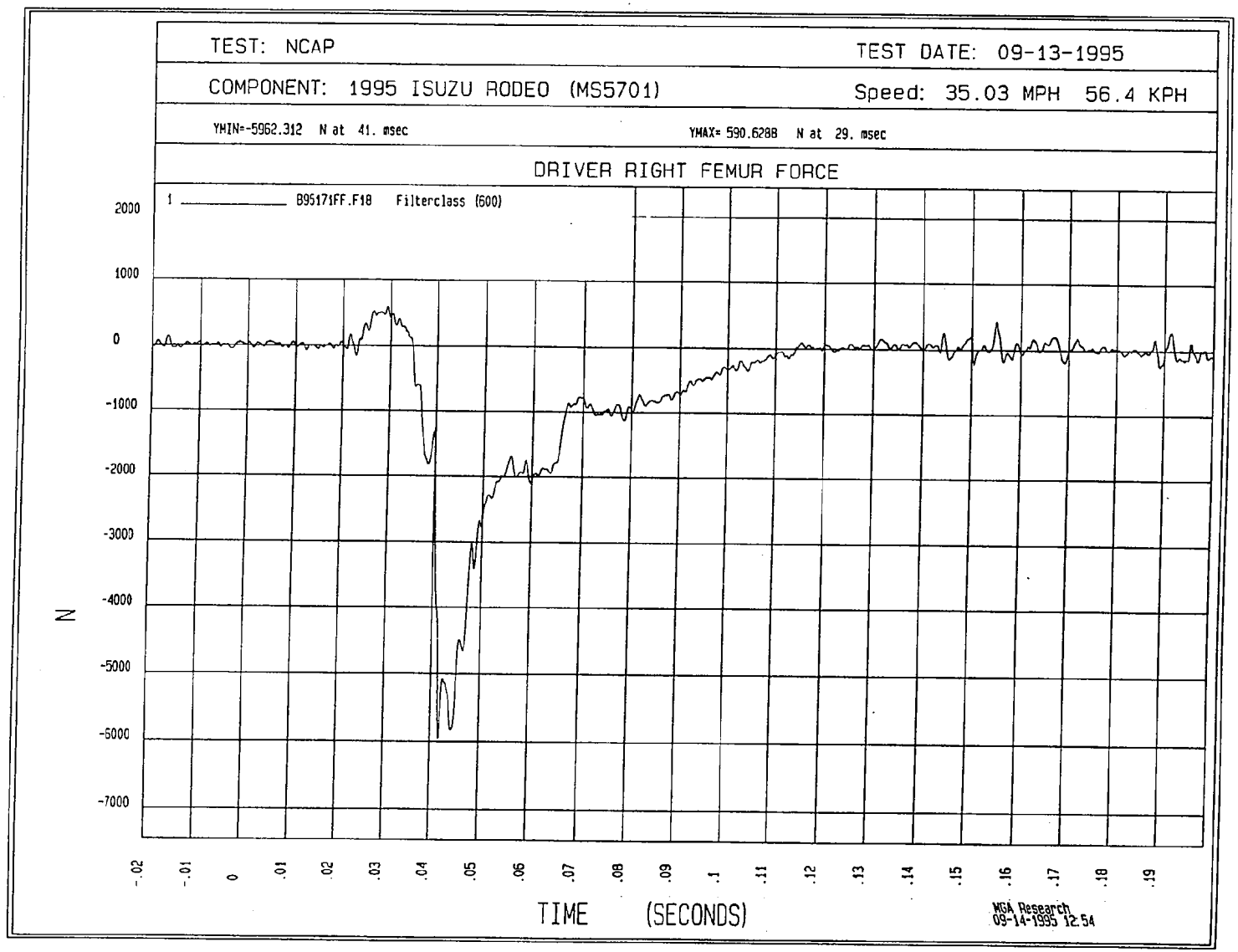


Figure B-55 - Driver Right Femur Force vs. Time

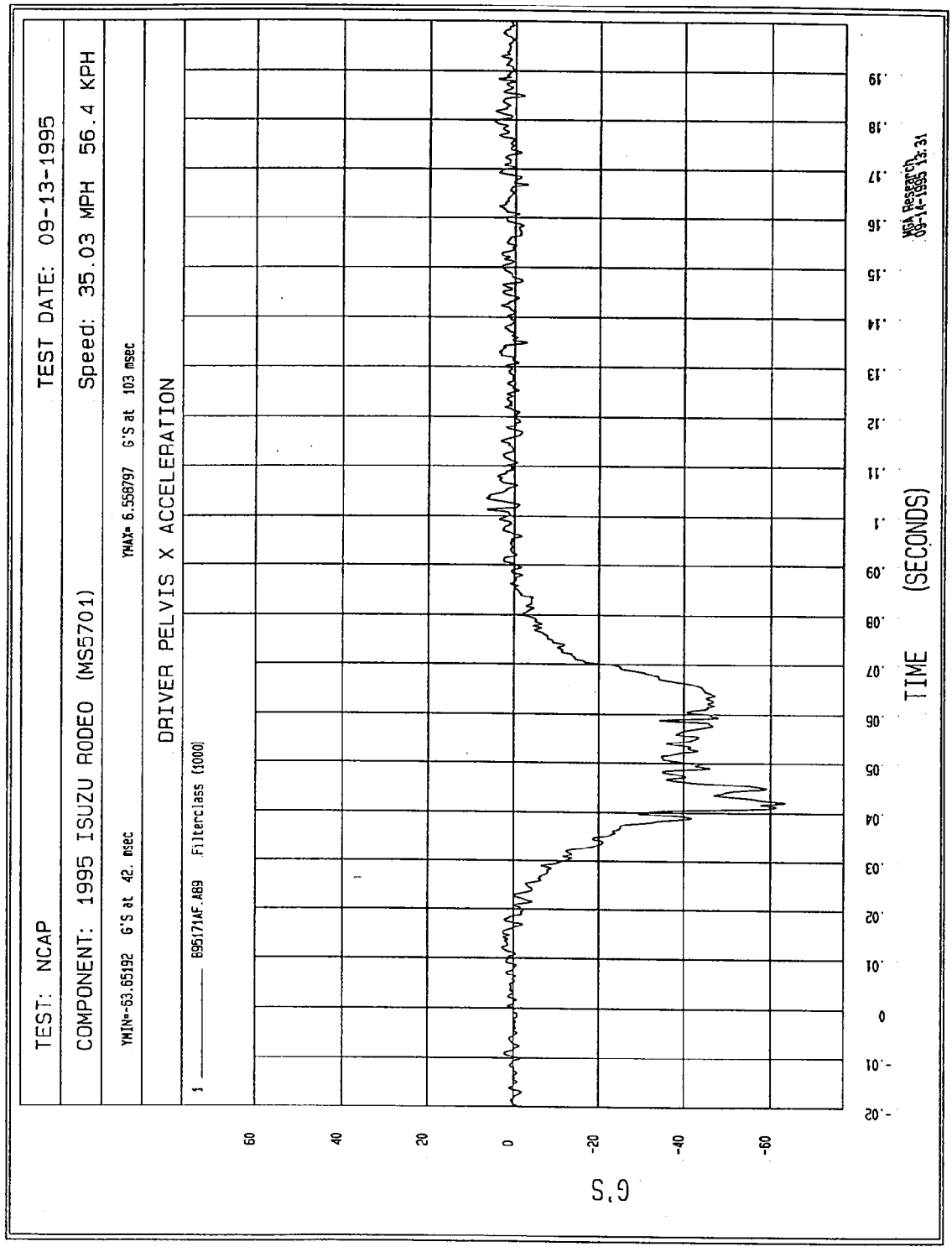


Figure B-56 - Driver Pelvis X Acceleration vs. Time

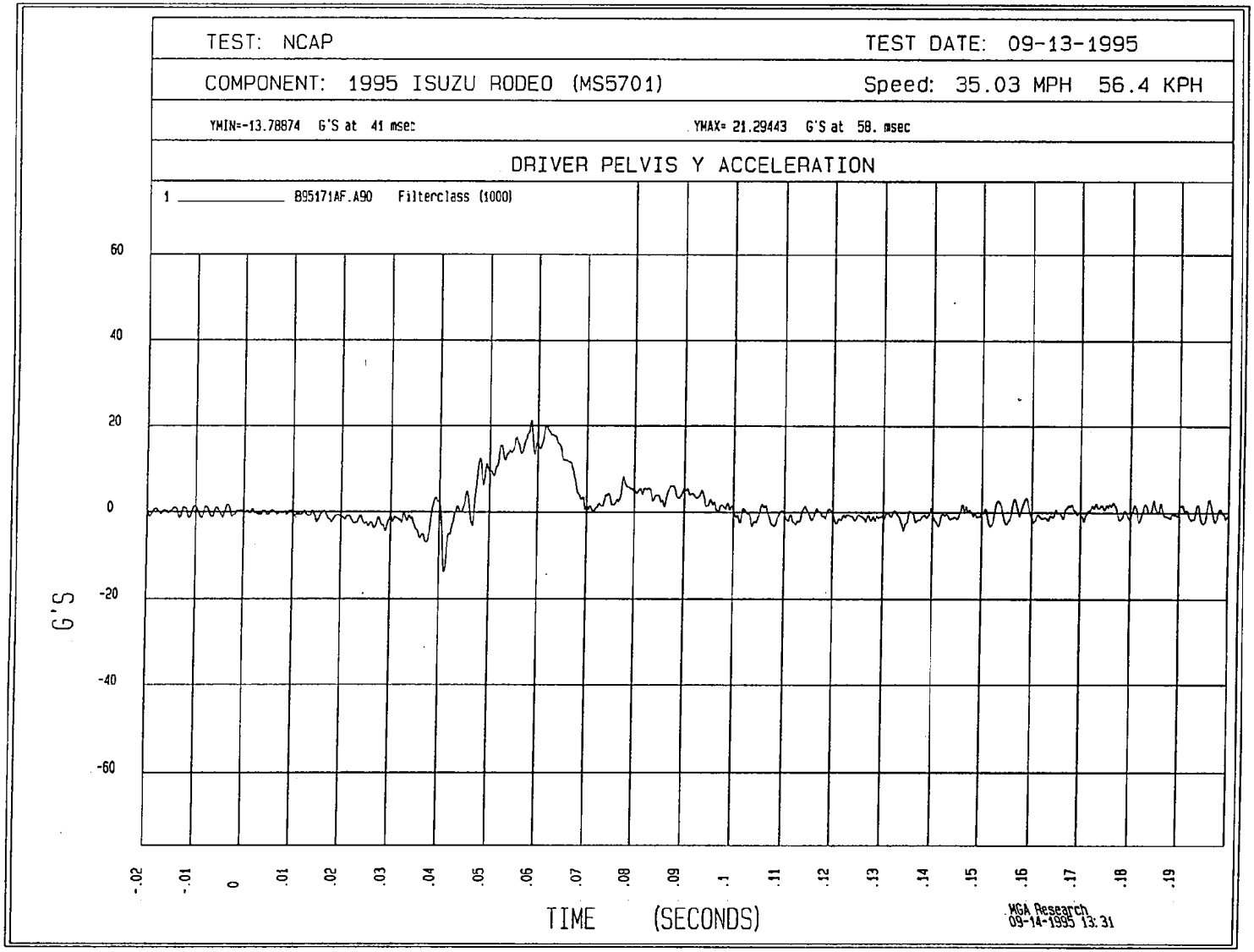


Figure B-57 - Driver Pelvis Y Acceleration vs. Time

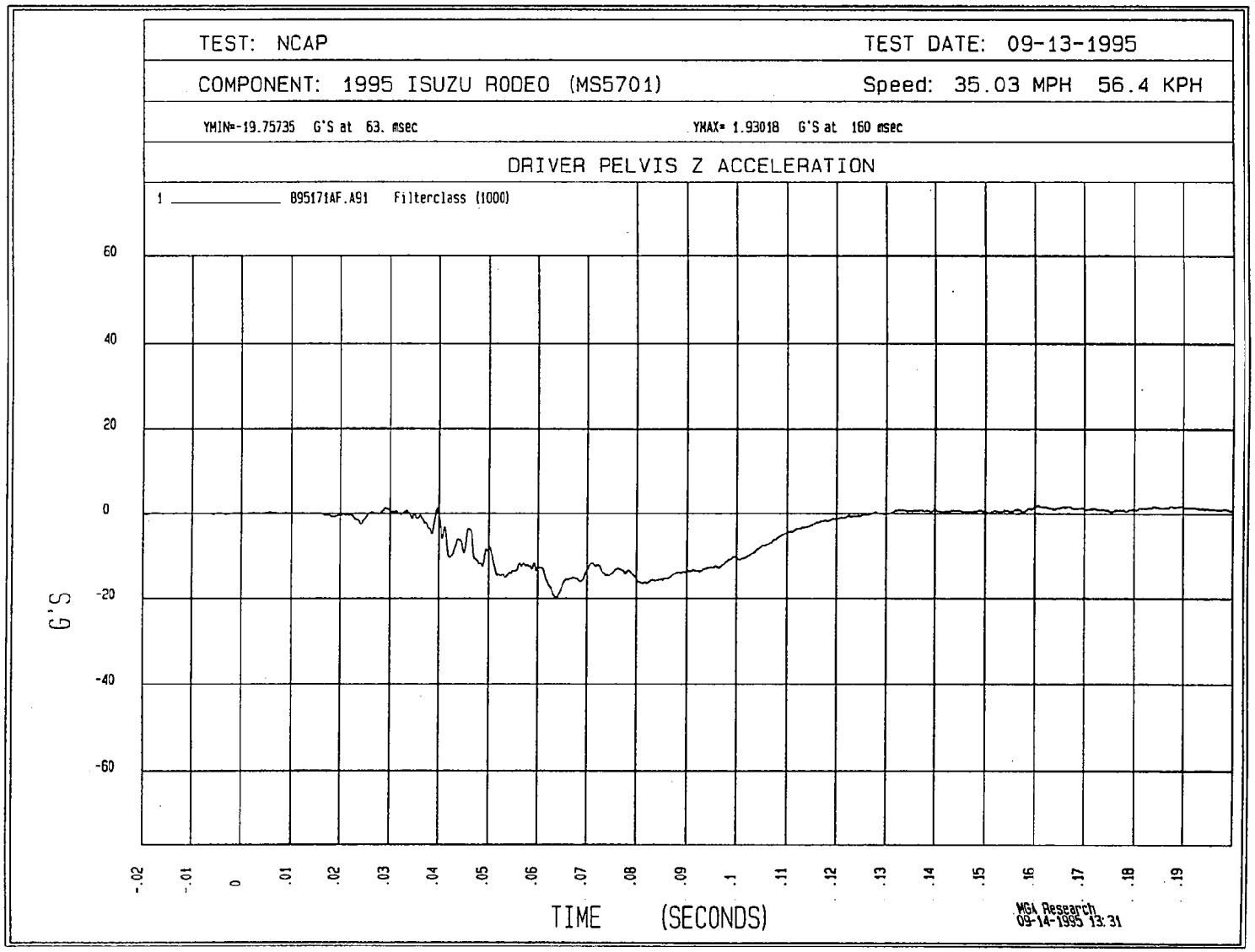


Figure B-58 - Driver Pelvis Z Acceleration vs. Time

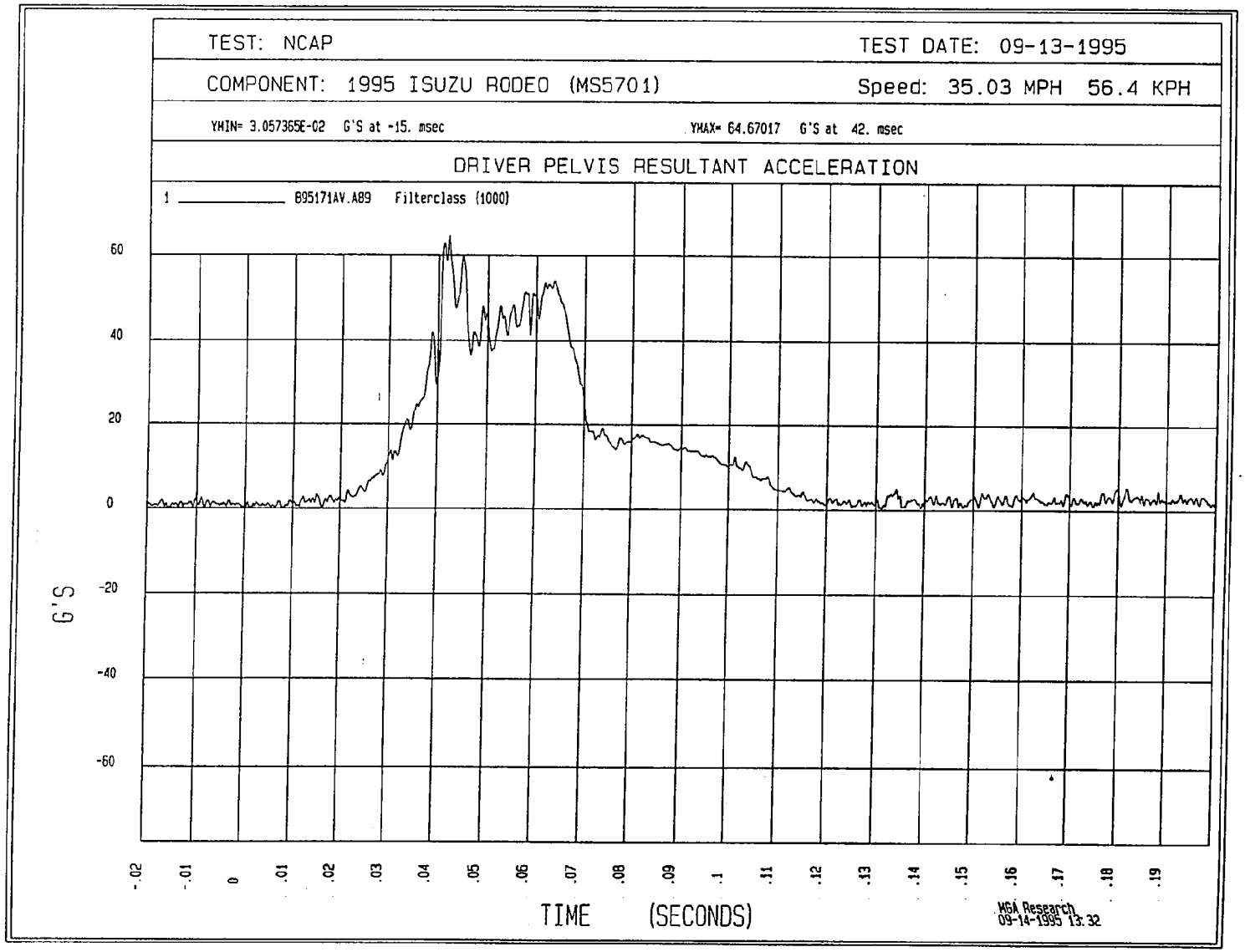


Figure B-59 - Driver Pelvis Resultant Acceleration vs. Time

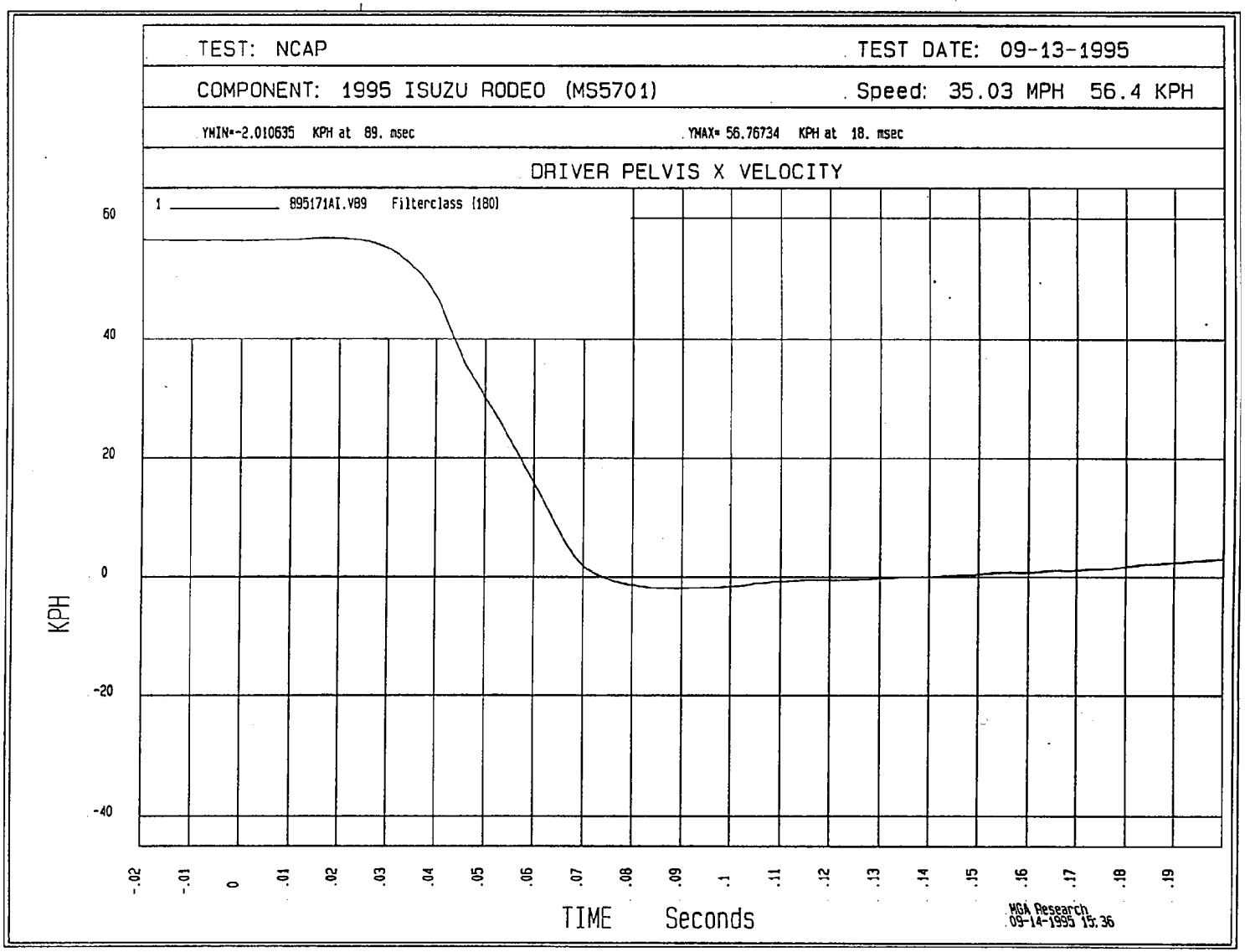


Figure B-60 - Driver Pelvis X Velocity vs. Time

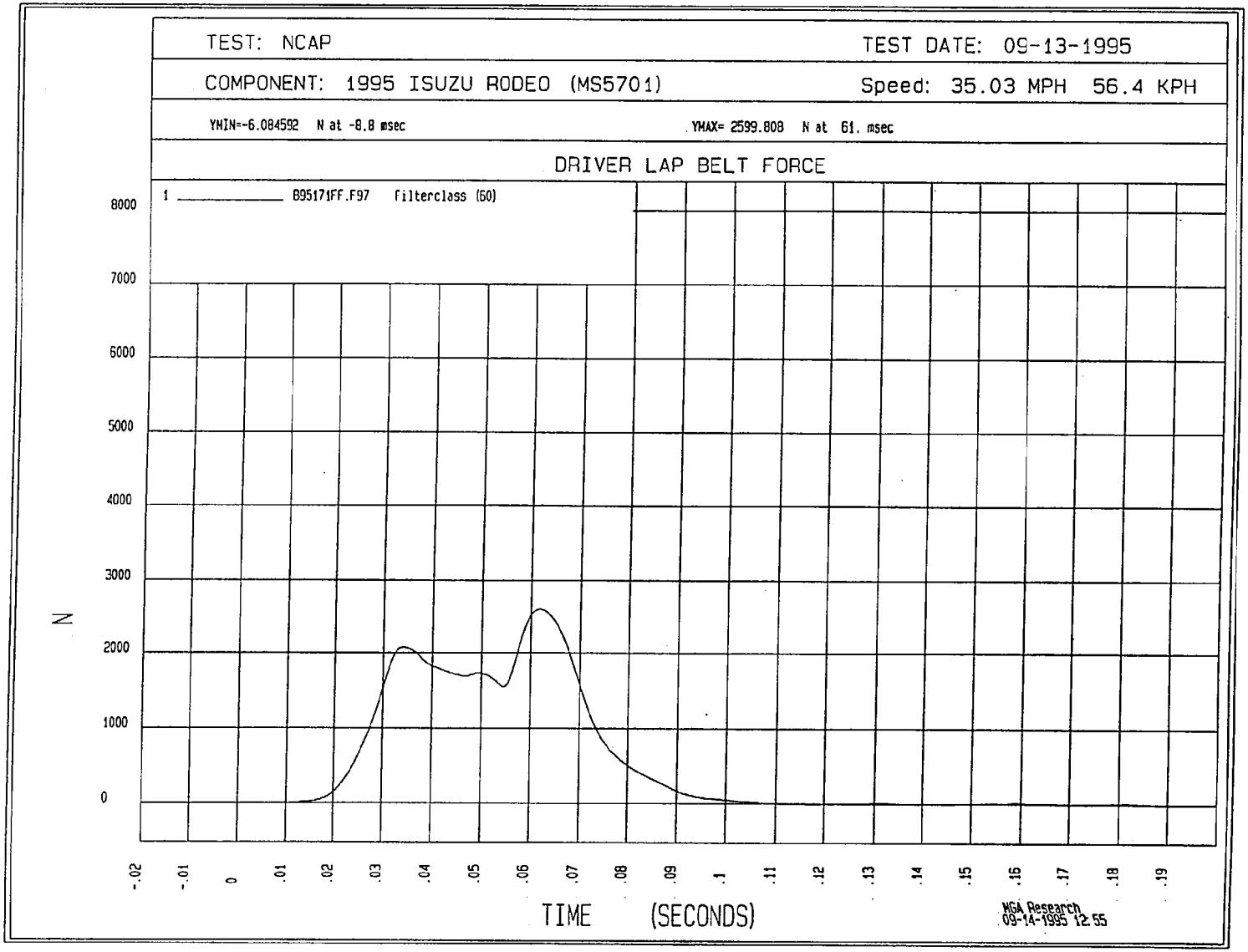


Figure B-61 - Driver Lap Belt Force vs. Time

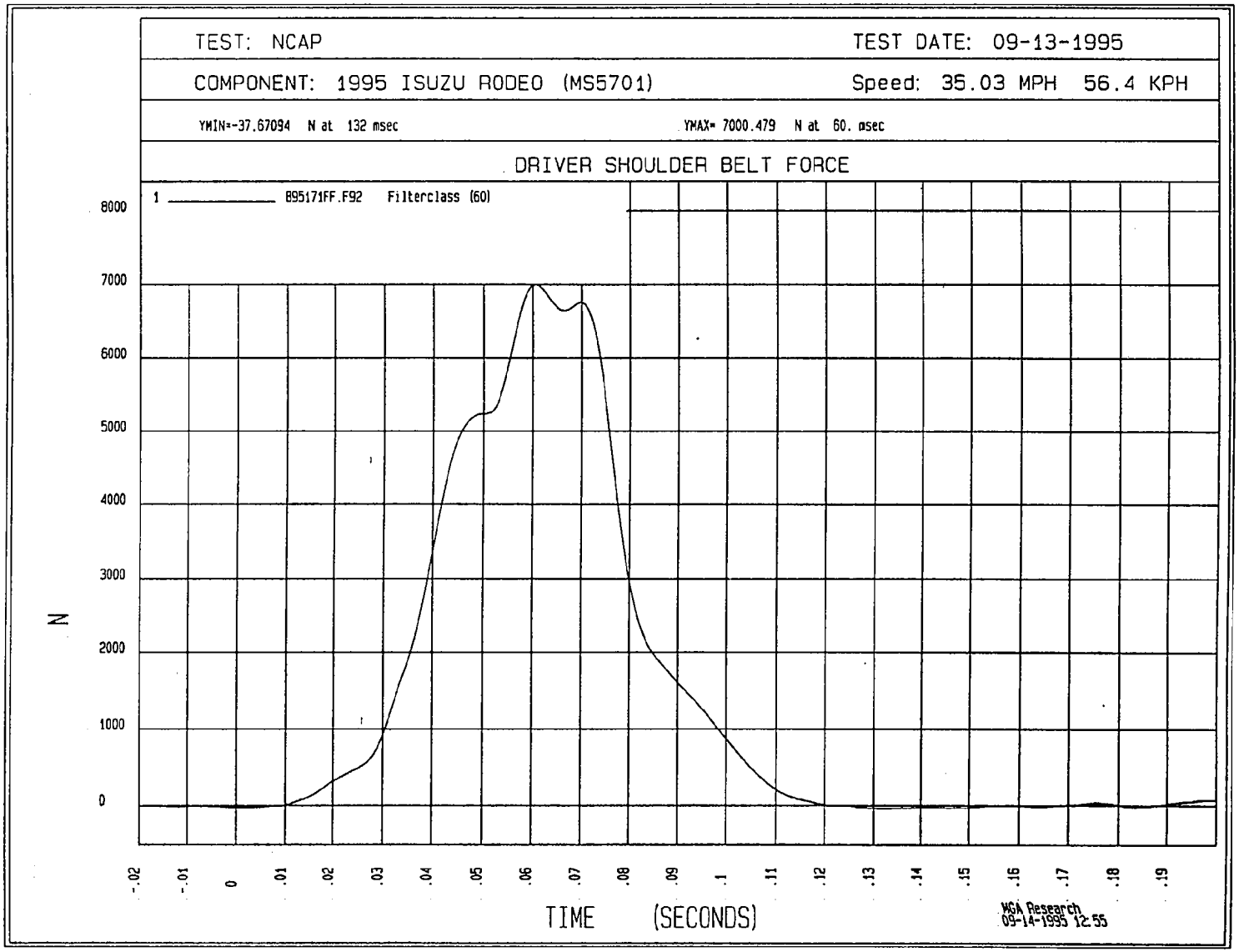


Figure B-62 - Driver Shoulder Belt Force vs. Time

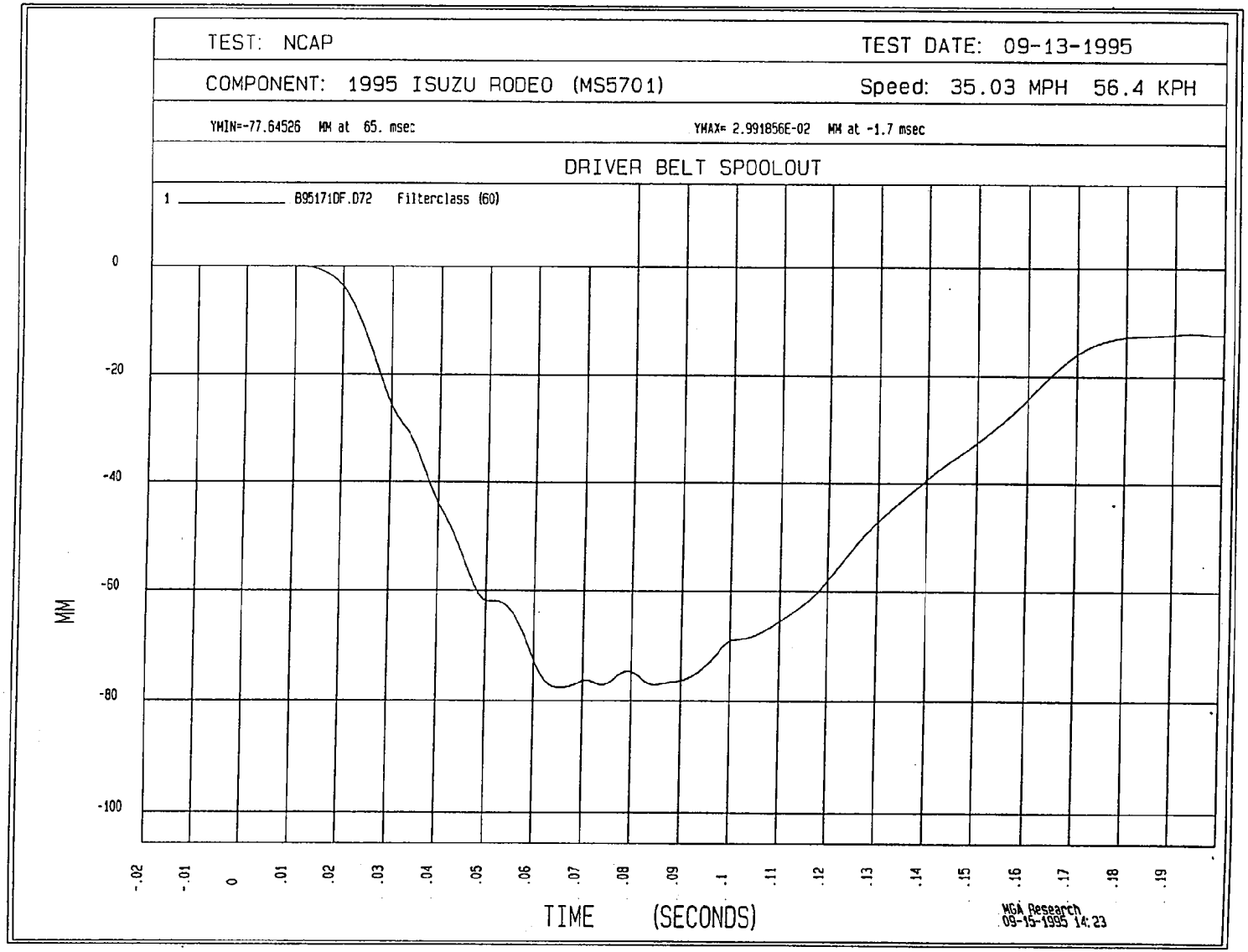


Figure B-63 - Driver Belt Spoolout vs. Time

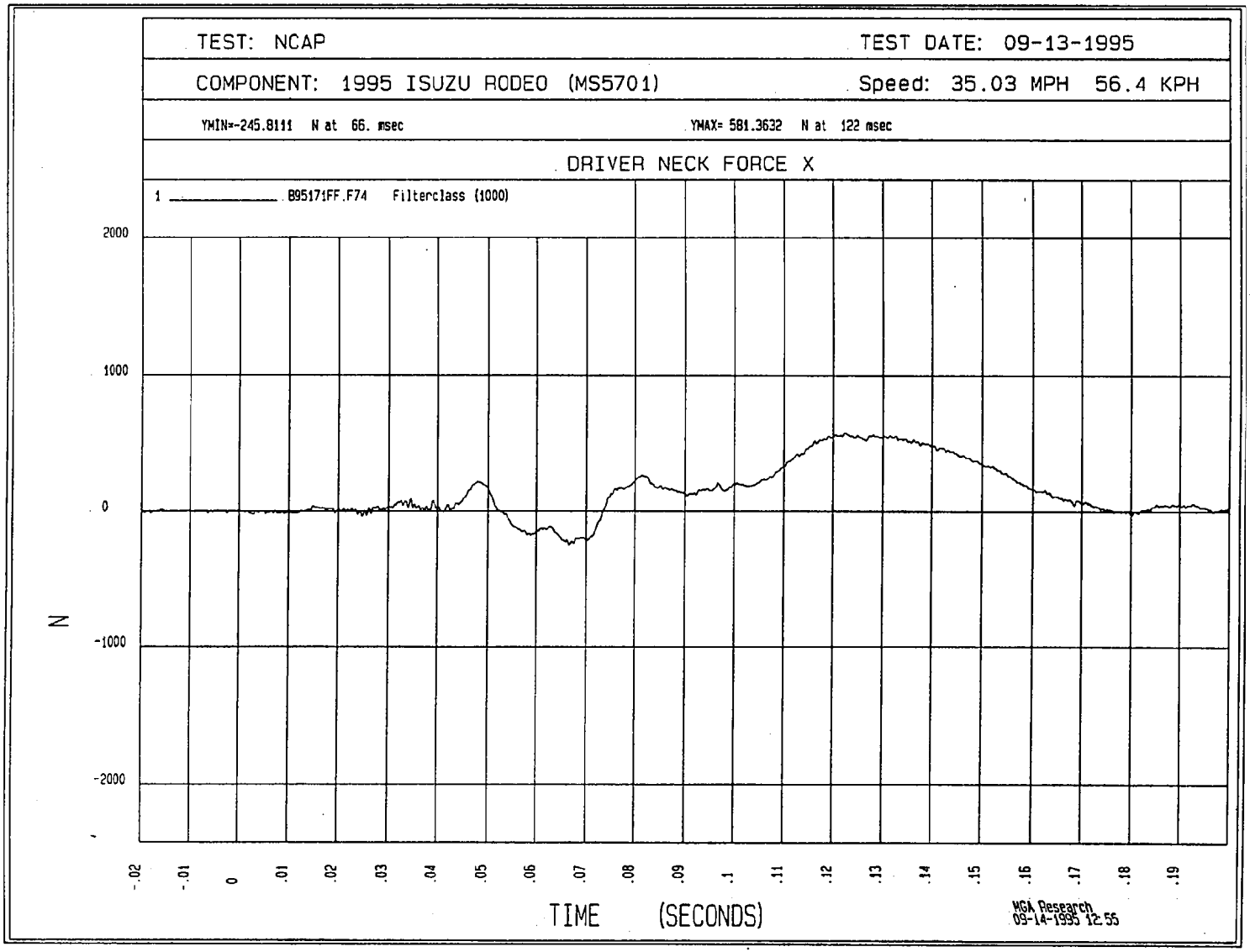


Figure B-64 - Driver Neck Force X vs. Time

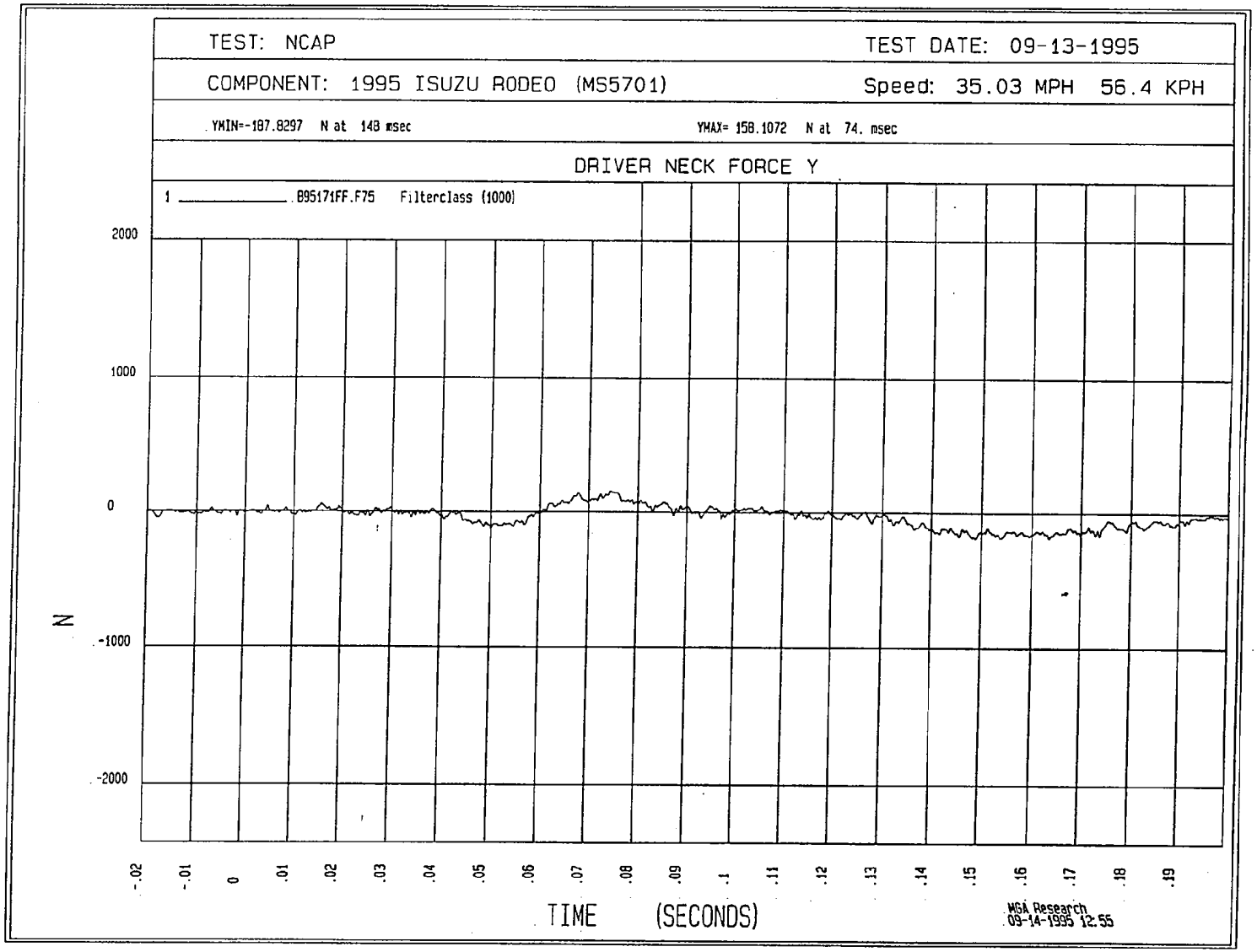


Figure B-65 - Driver Neck Force Y vs. Time

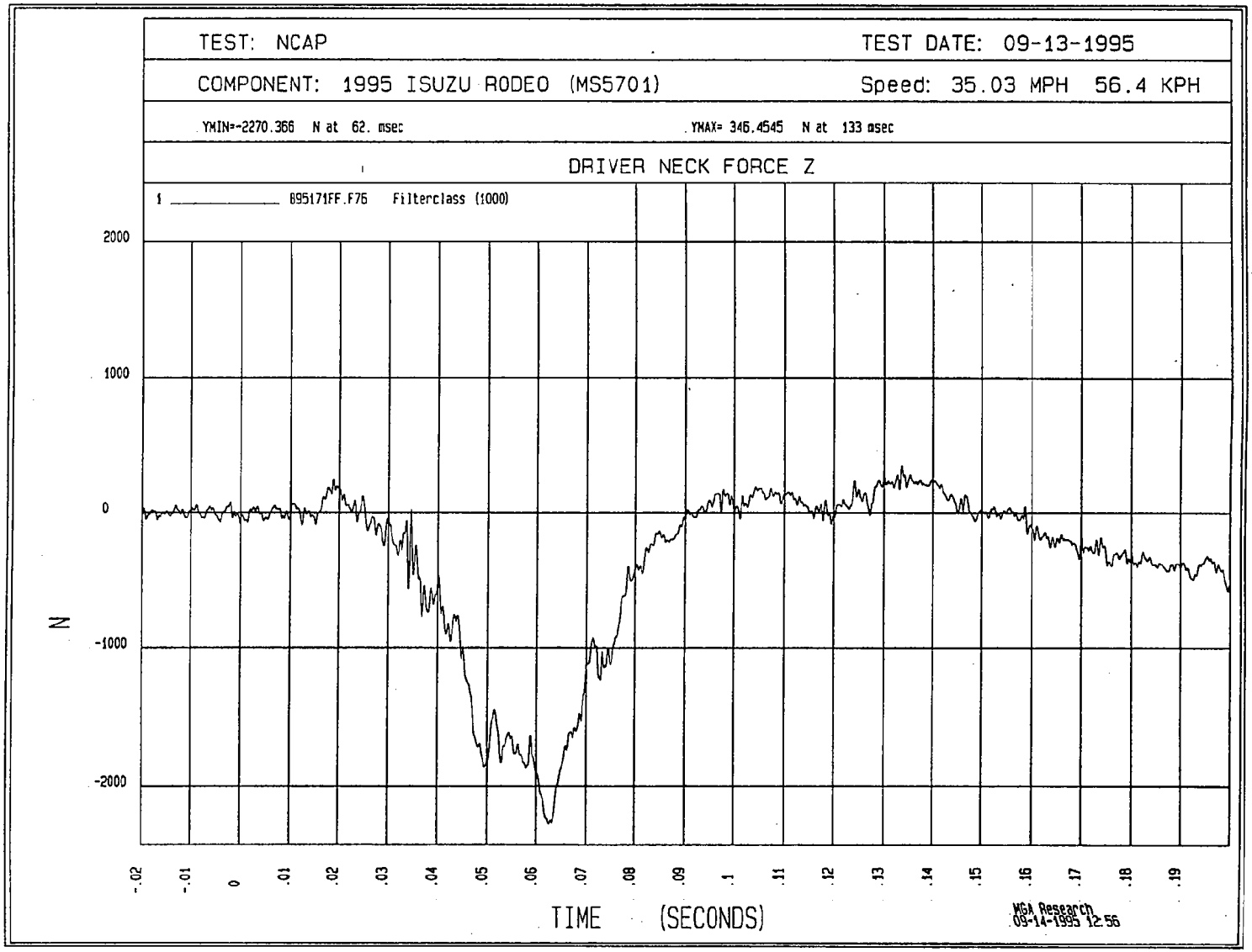


Figure B-66 - Driver Neck Force Z vs. Time

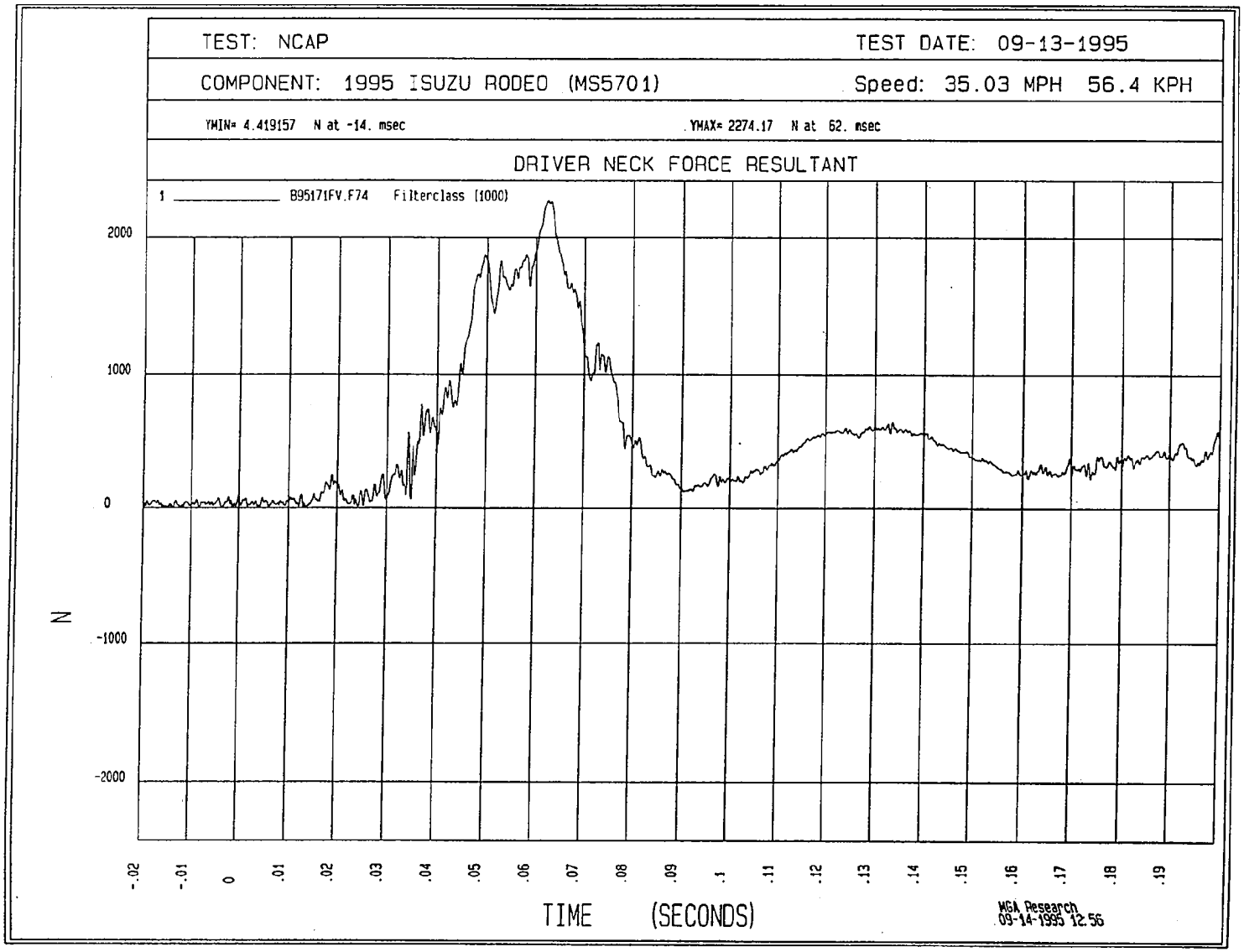


Figure B-67 - Driver Neck Force Resultant vs. Time

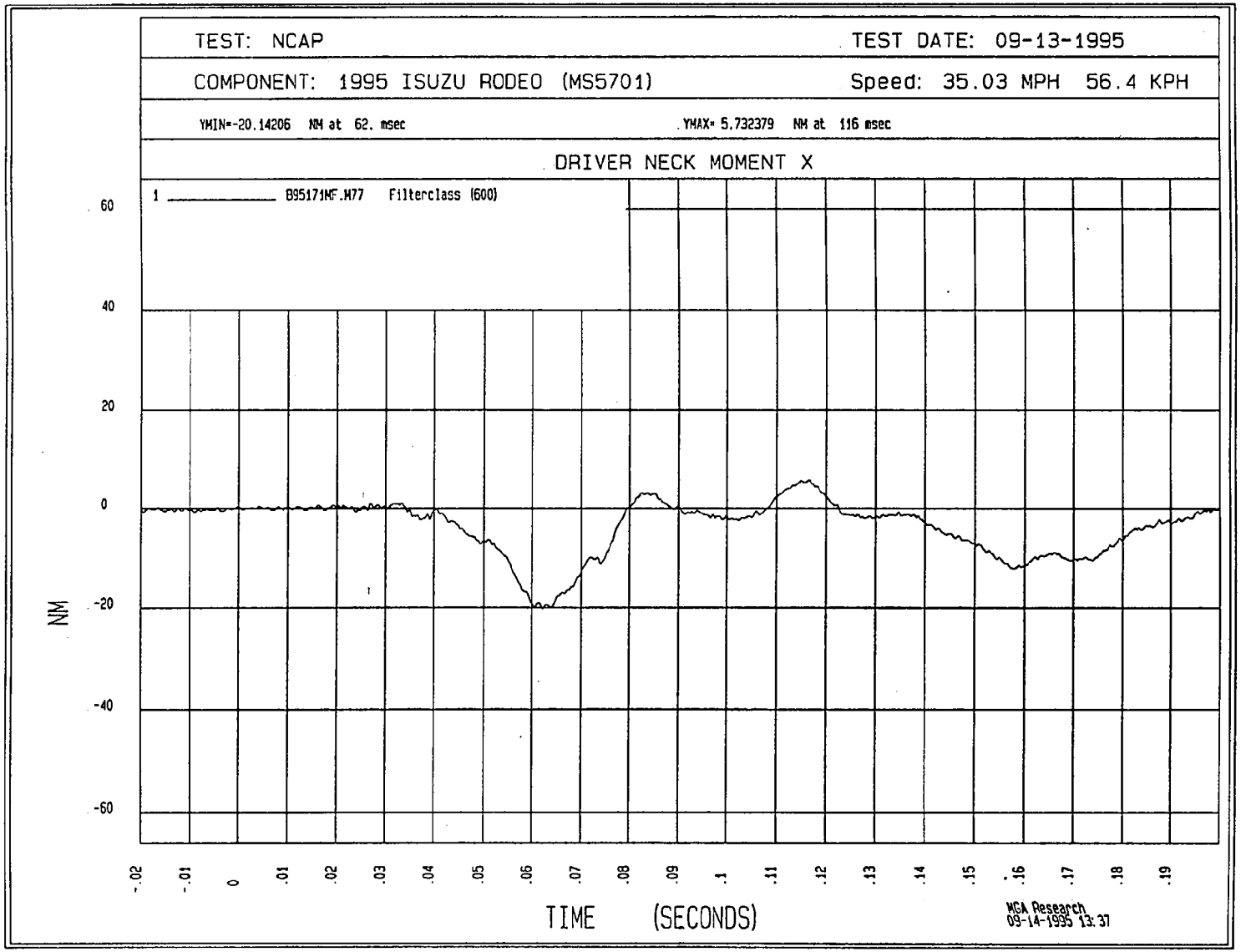


Figure B-68 - Driver Neck Moment X vs. Time

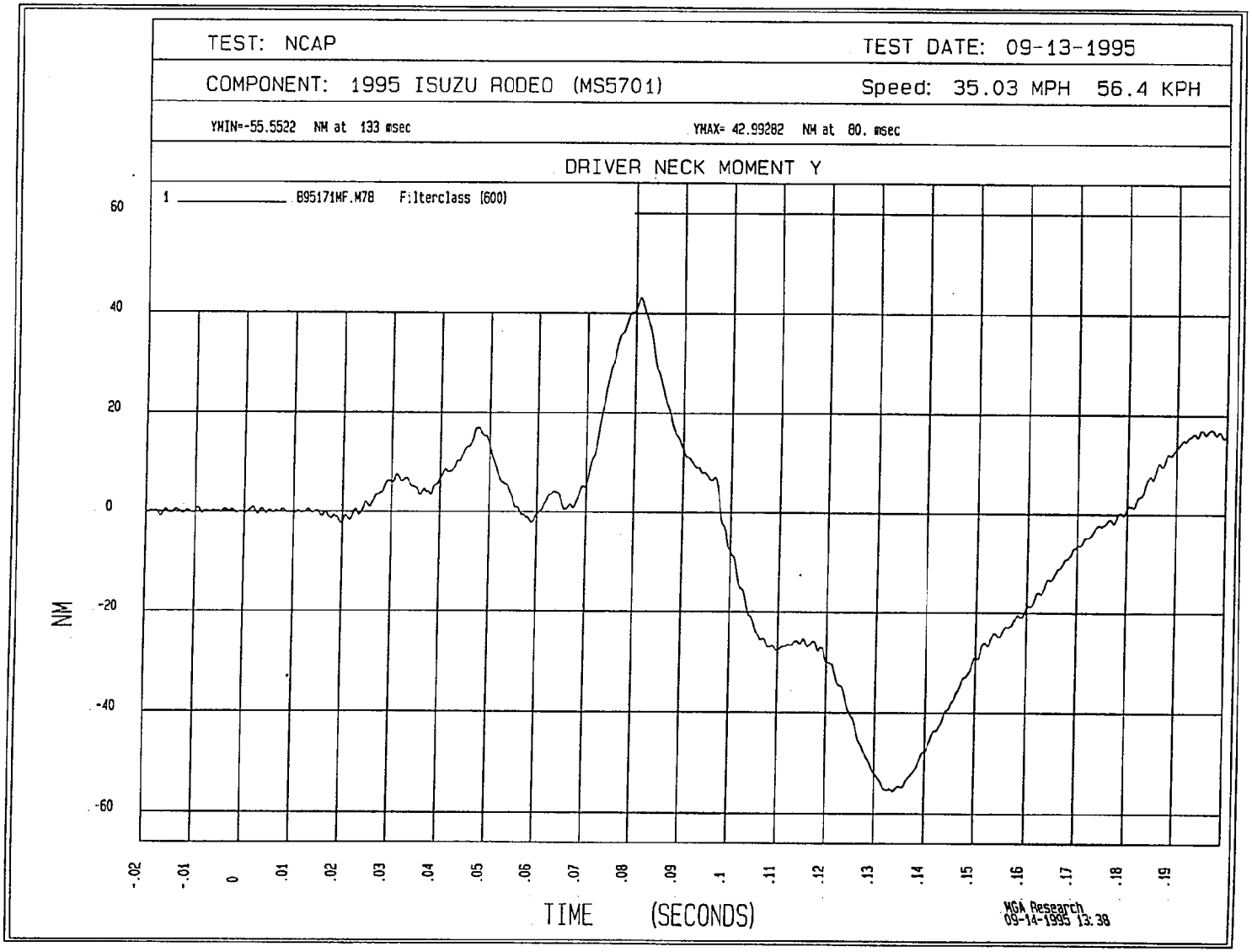


Figure B-69 - Driver Neck Moment Y vs. Time

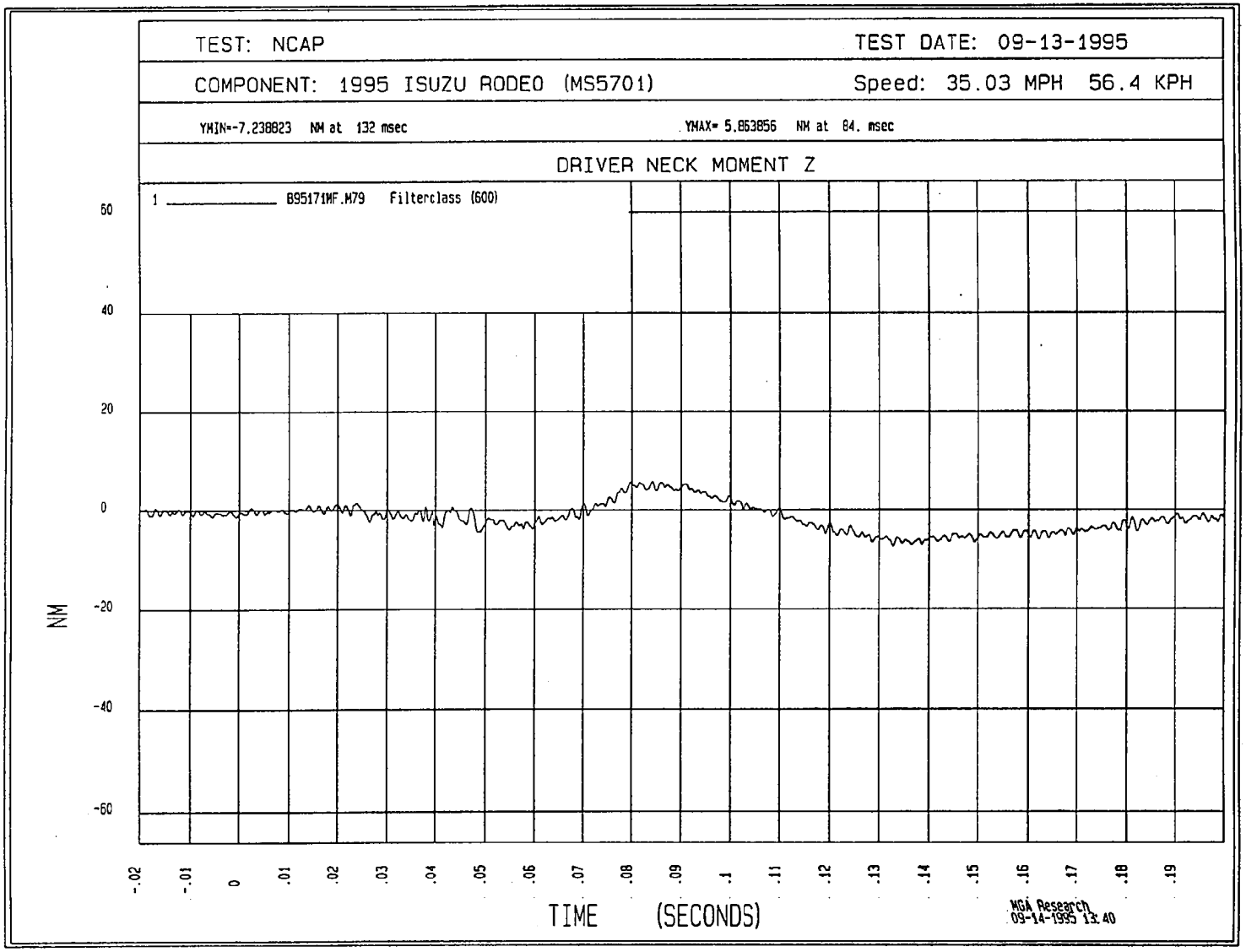


Figure B-70 - Driver Neck Moment Z vs. Time

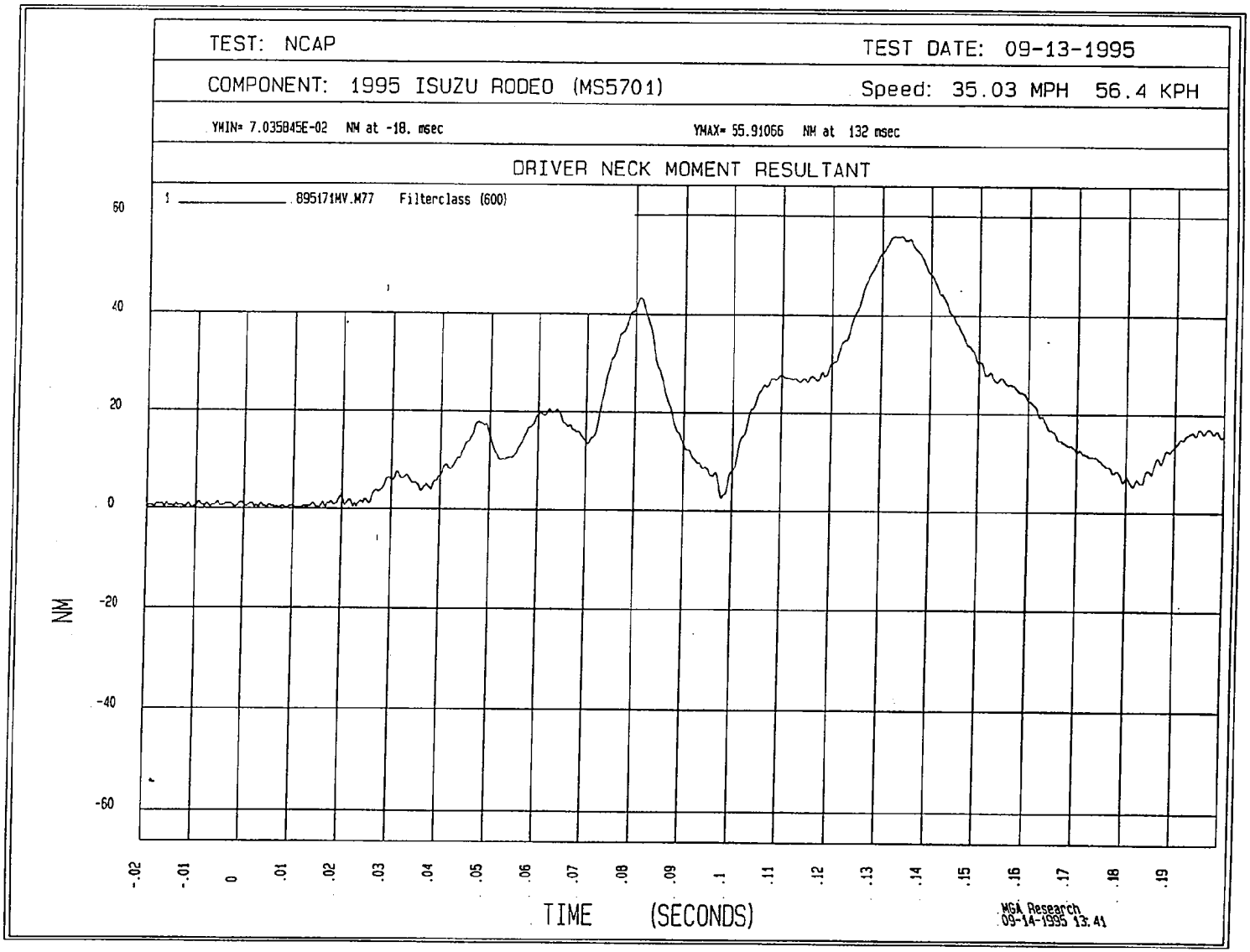


Figure B-71 - Driver Neck Moment Resultant vs. Time

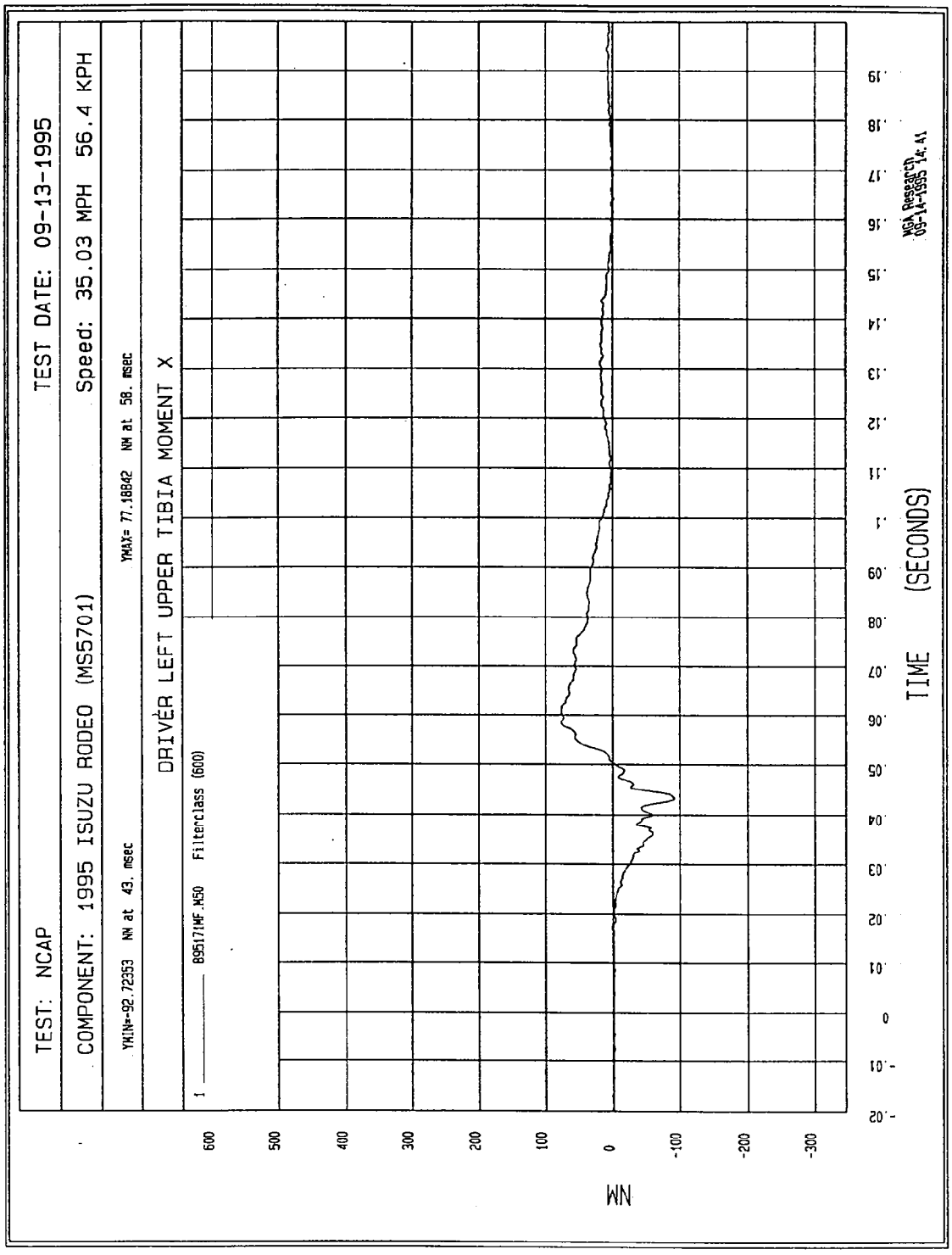


Figure B-72 - Driver Left Upper Tibia Moment X vs. Time

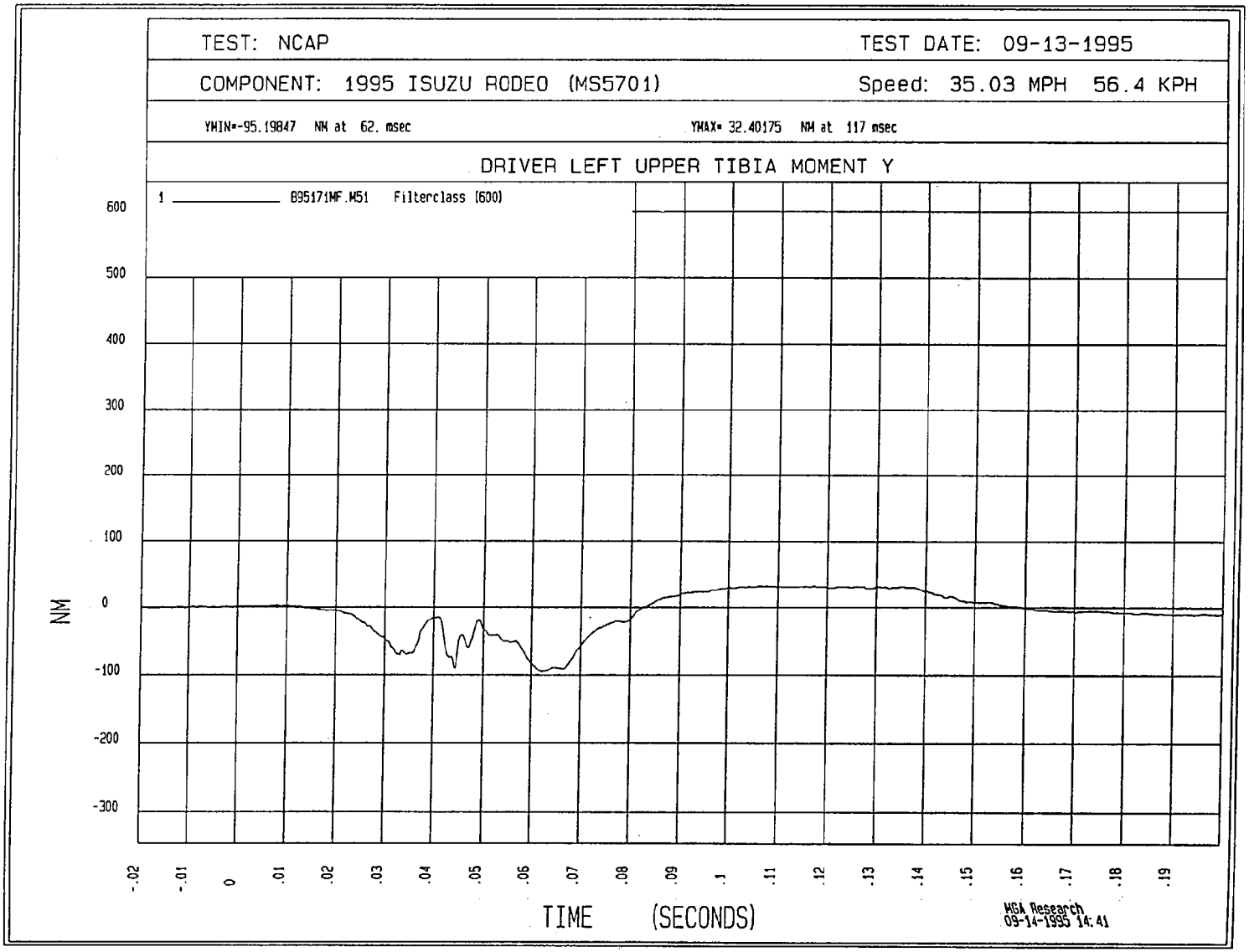


Figure B-73 - Driver Left Upper Tibia Moment Y vs. Time

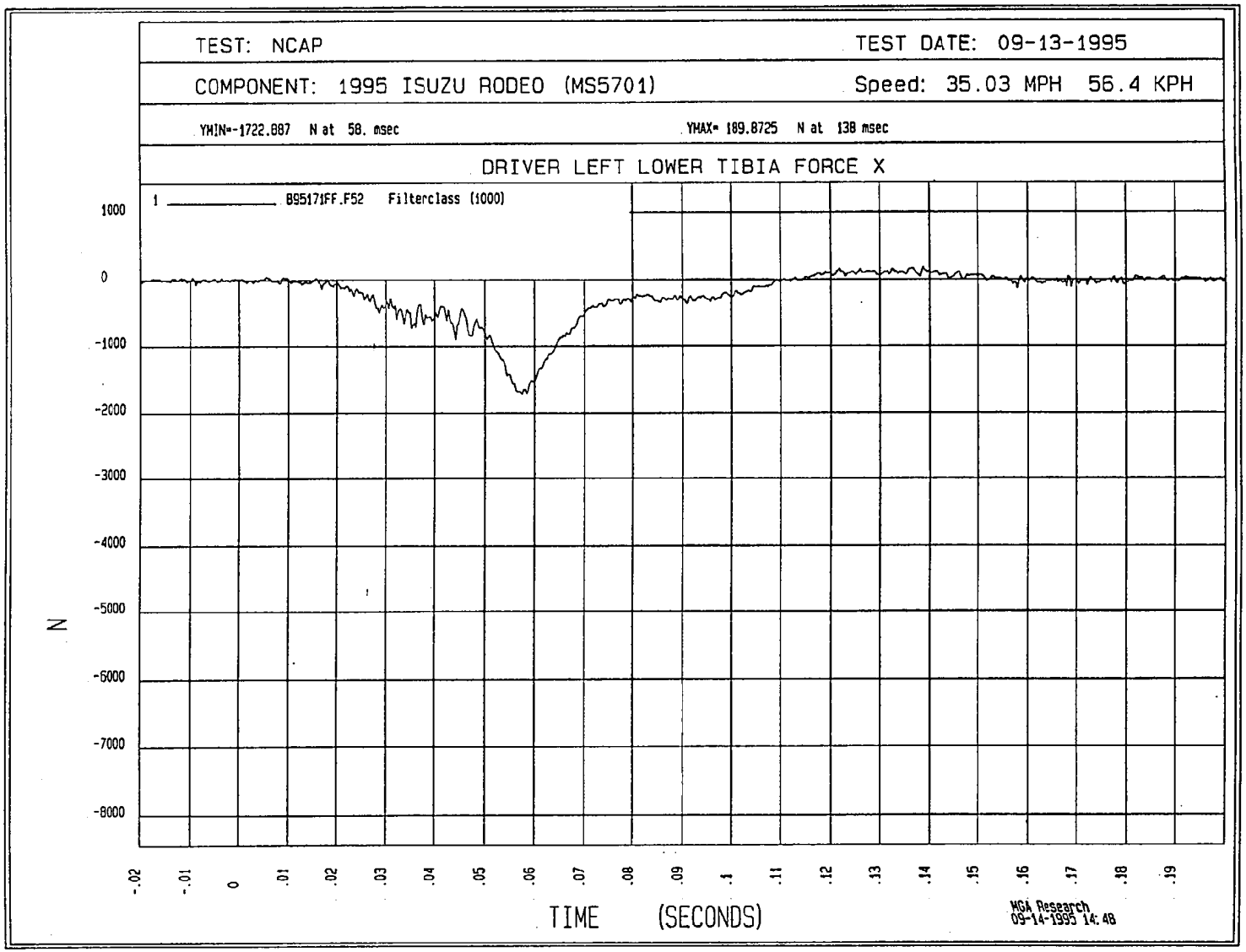


Figure B-74 - Driver Left Lower Tibia Force X vs. Time

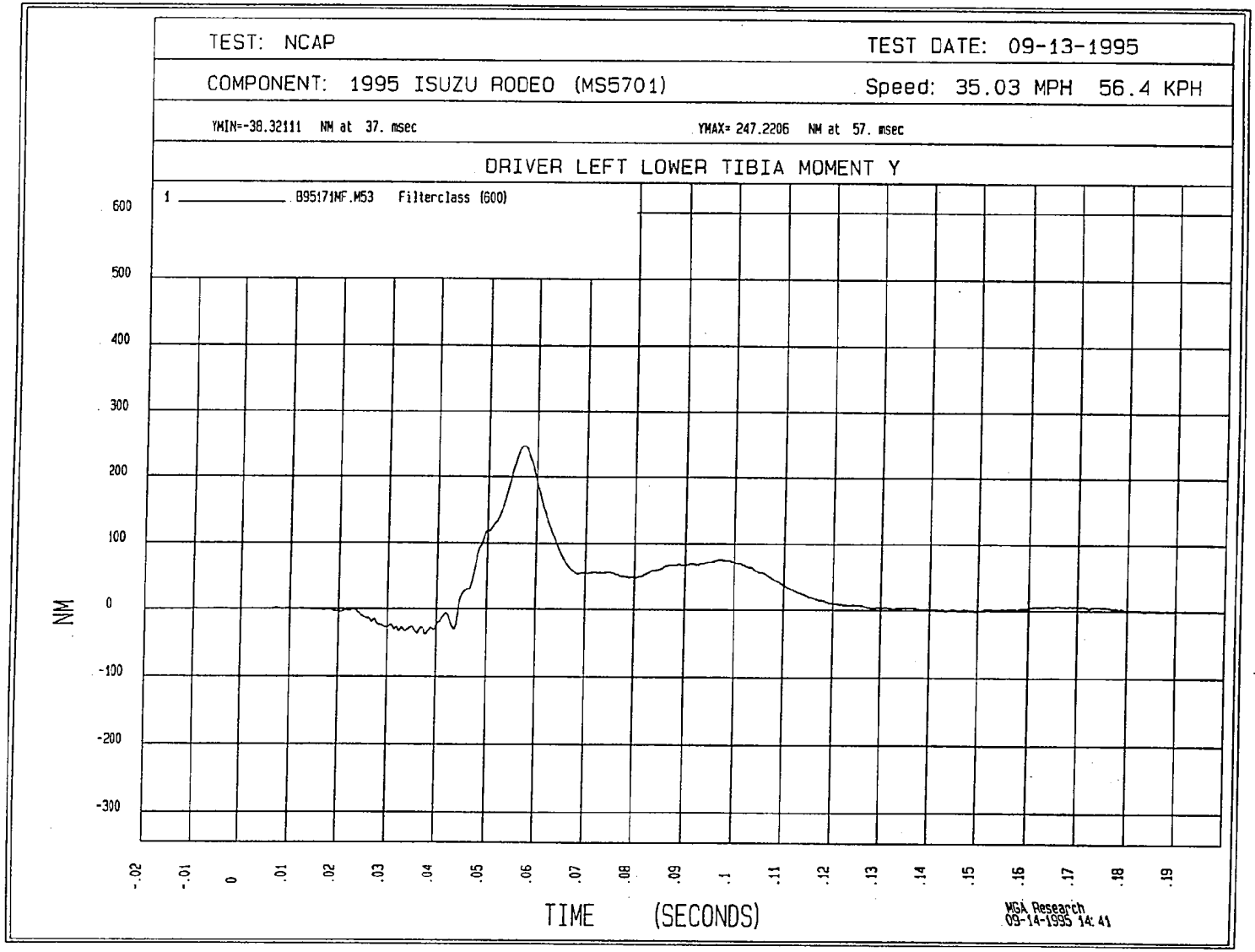


Figure B-75 - Driver Left Lower Tibia Moment Y vs. Time

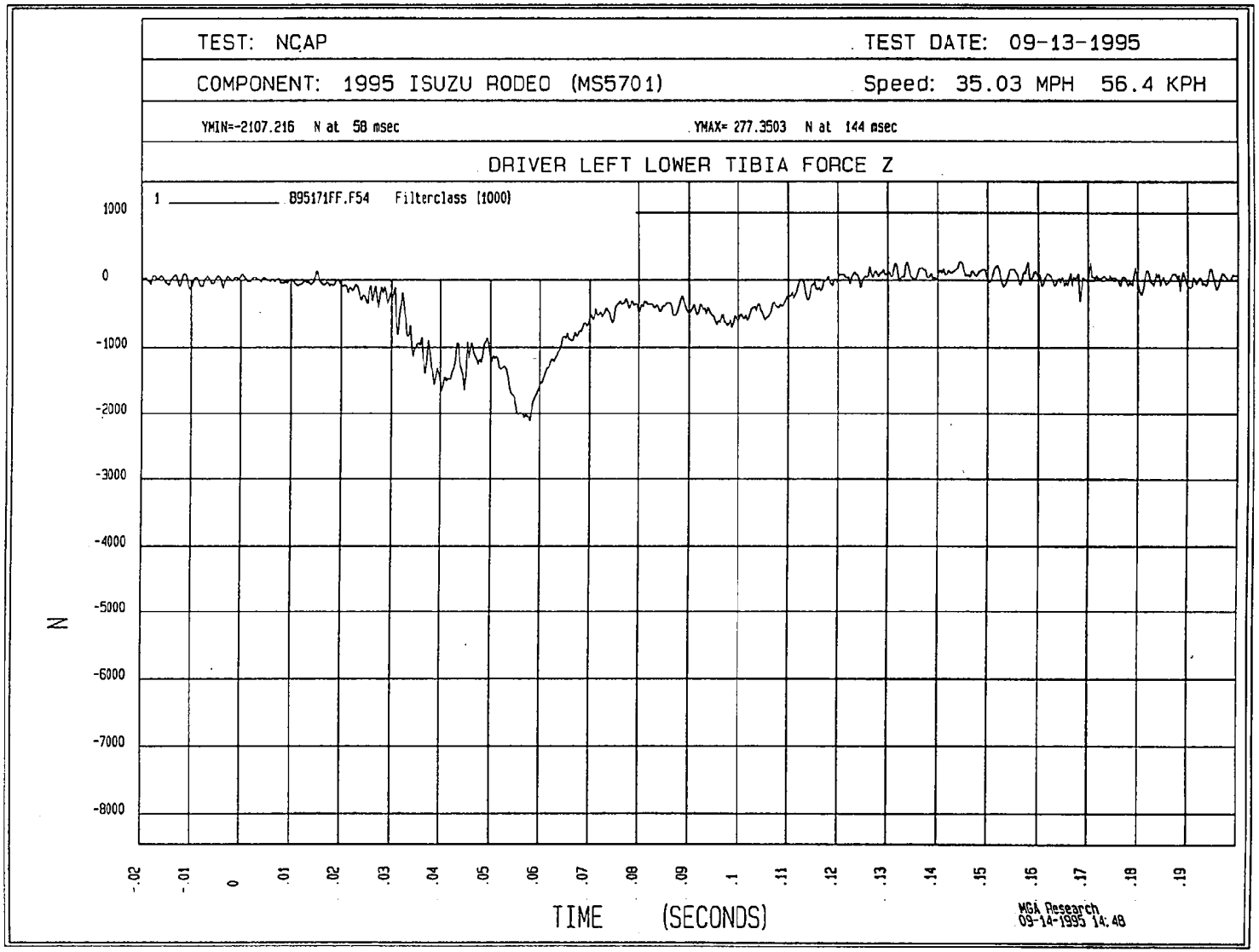


Figure B-76 - Driver Left Lower Tibia Force Z vs. Time

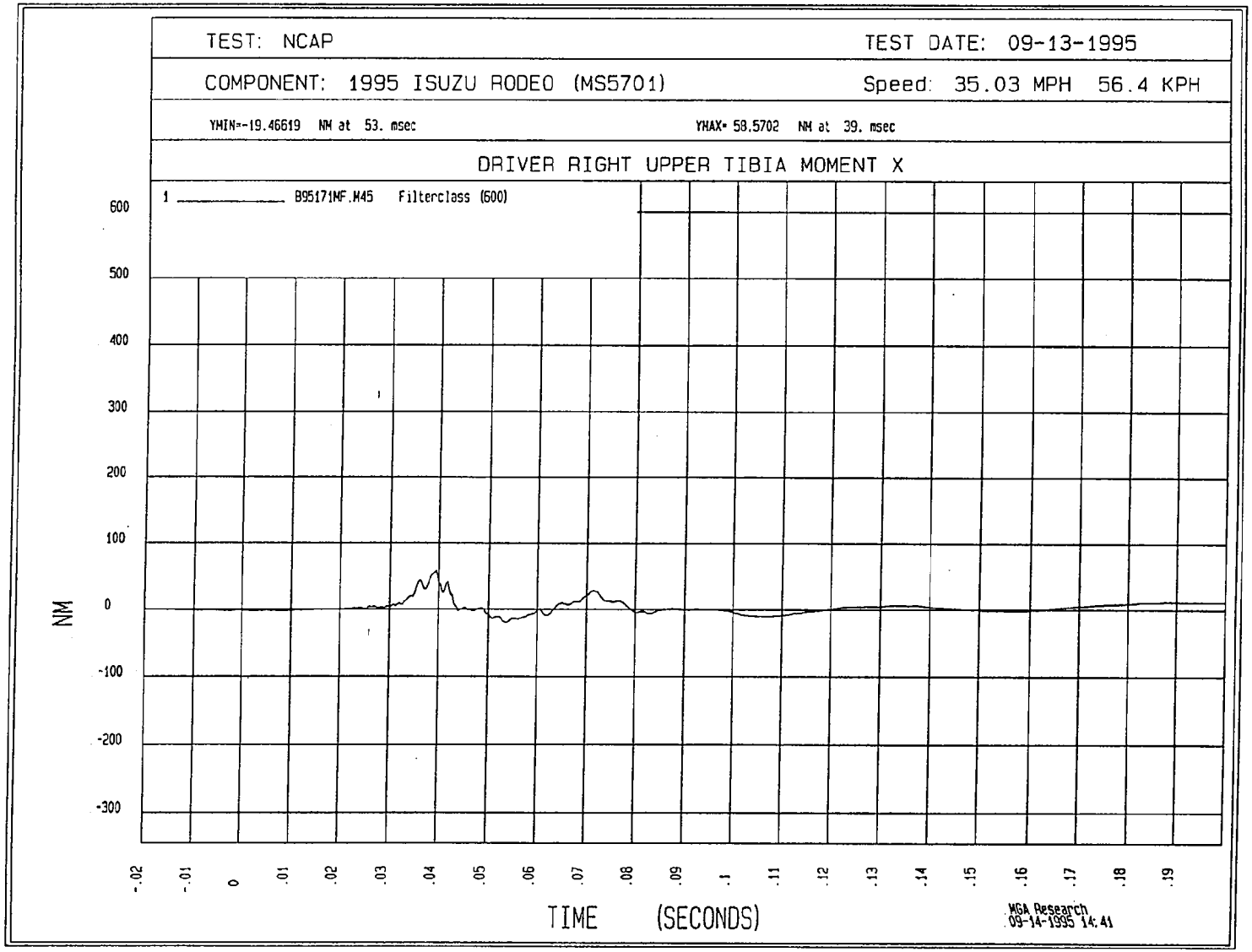


Figure B-77 - Driver Right Upper Tibia Moment X vs. Time

NO VALID DATA COLLECTED

Figure B-78 - Driver Right Upper Tibia Moment Y vs. Time

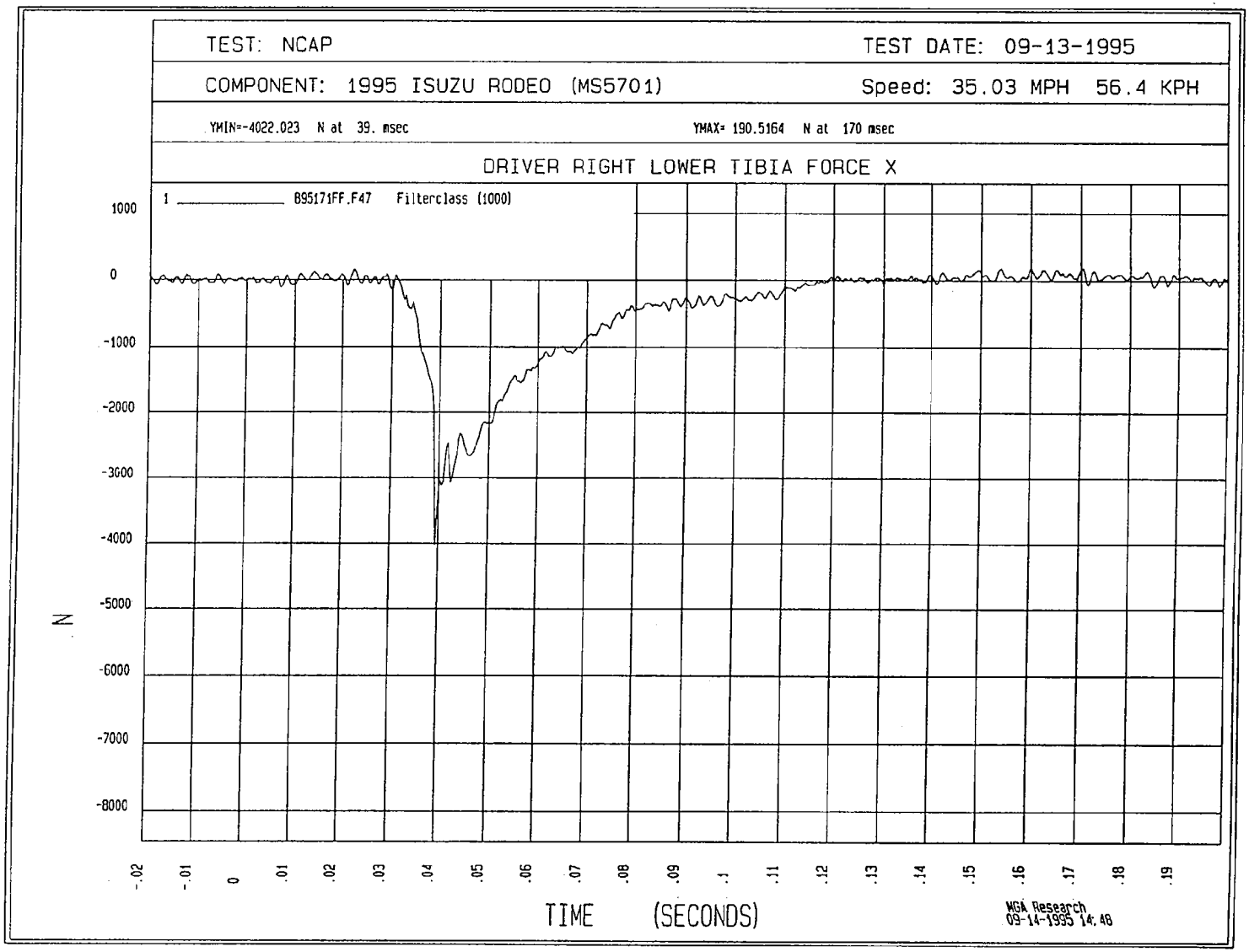


Figure B-79 - Driver Right Lower Tibia Force X vs. Time

NO VALID DATA COLLECTED

Figure B-80 - Driver Right Lower Tibia Moment Y vs. Time

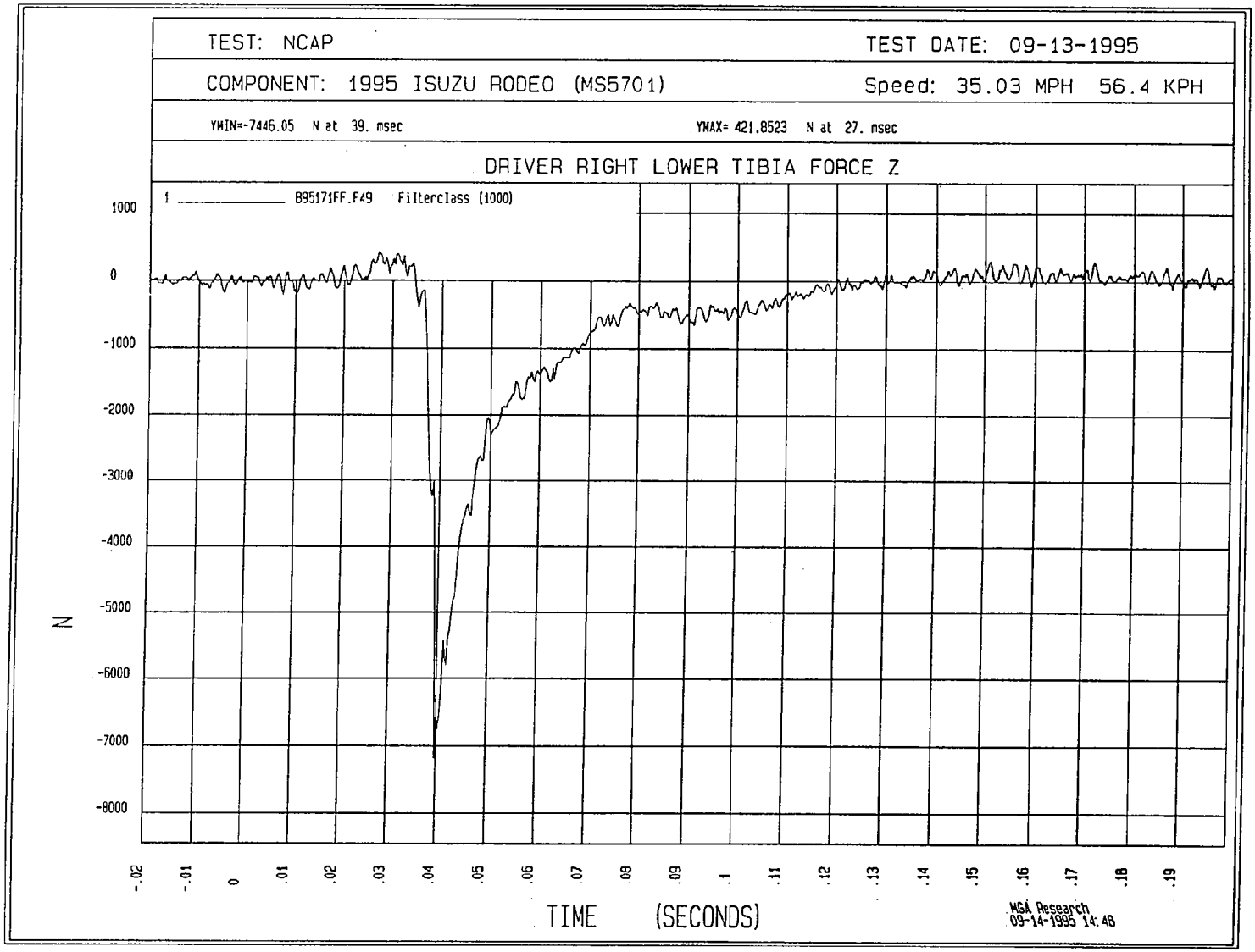


Figure B-81 - Driver Right Lower Tibia Force Z vs. Time

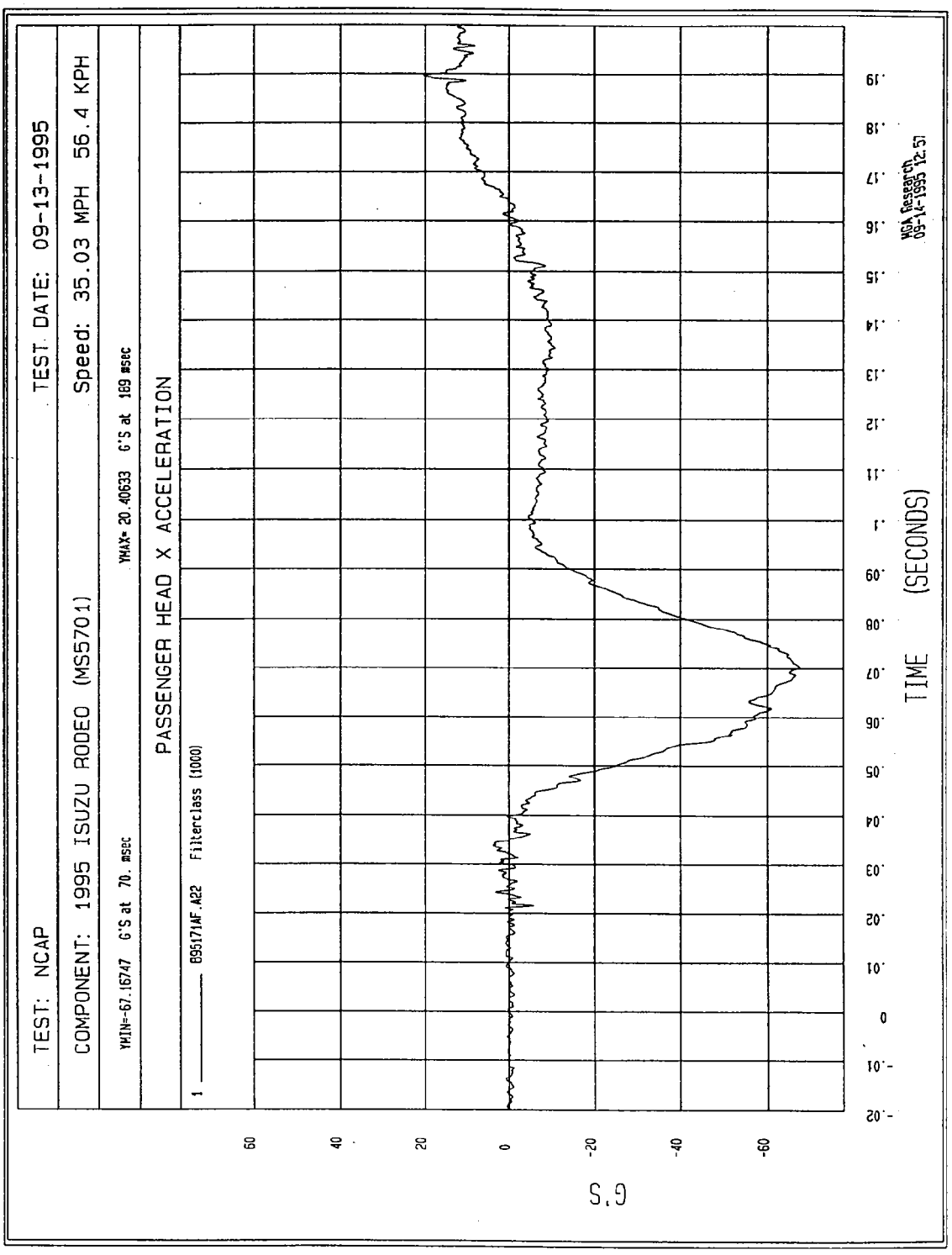


Figure B-82 - Passenger Head X Acceleration vs. Time

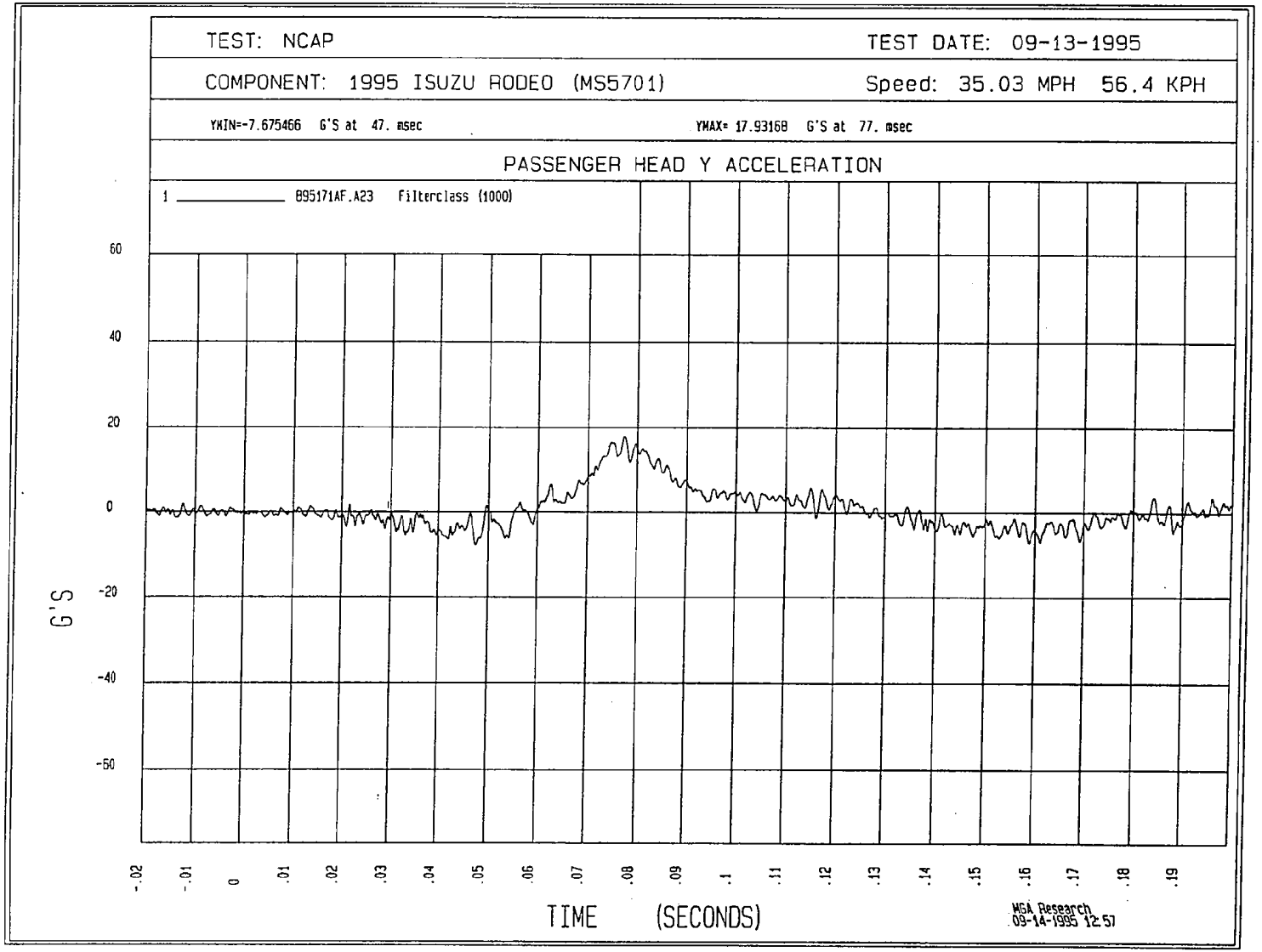


Figure B-83 - Passenger Head Y Acceleration vs. Time

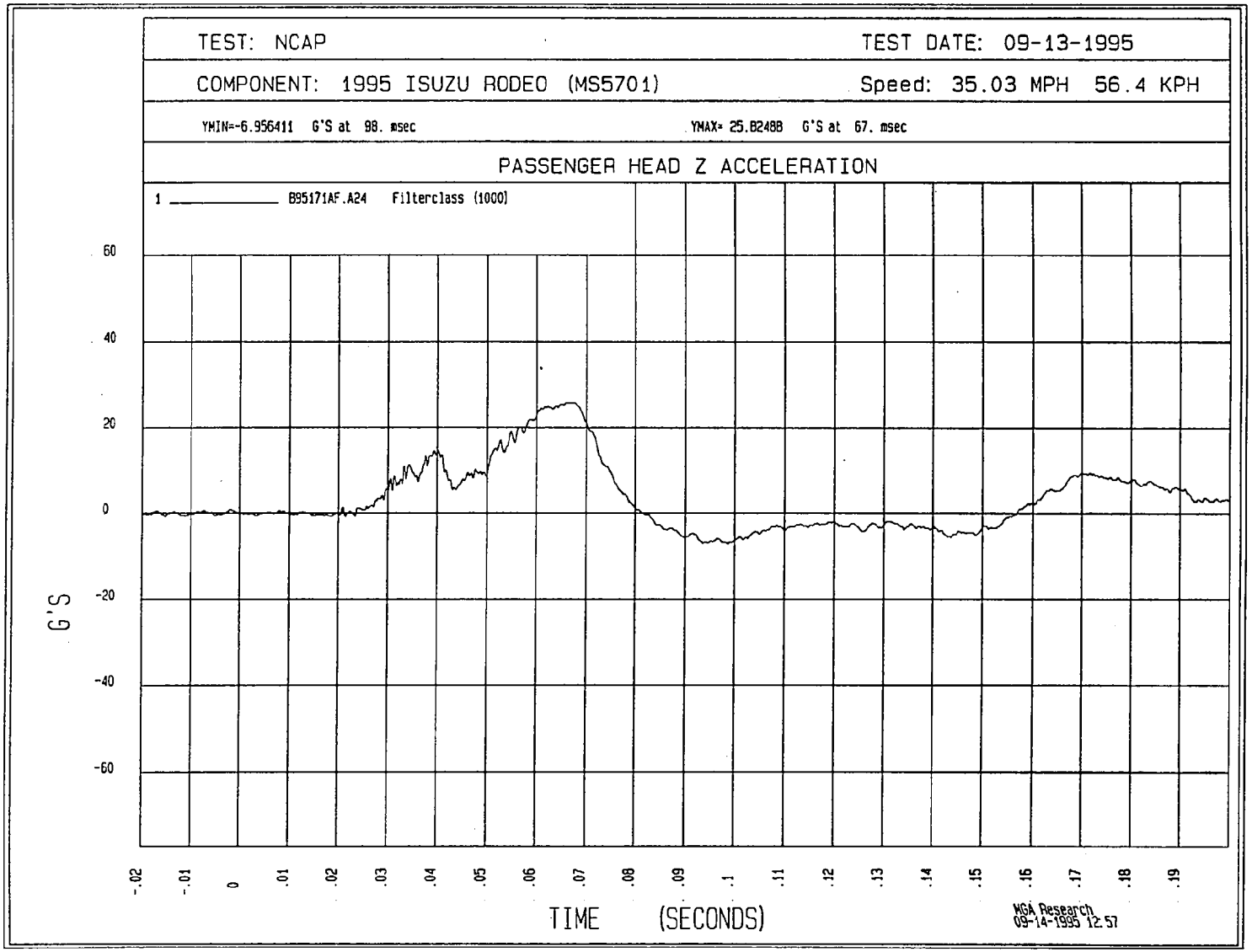


Figure B-84 - Passenger Head Z Acceleration vs. Time

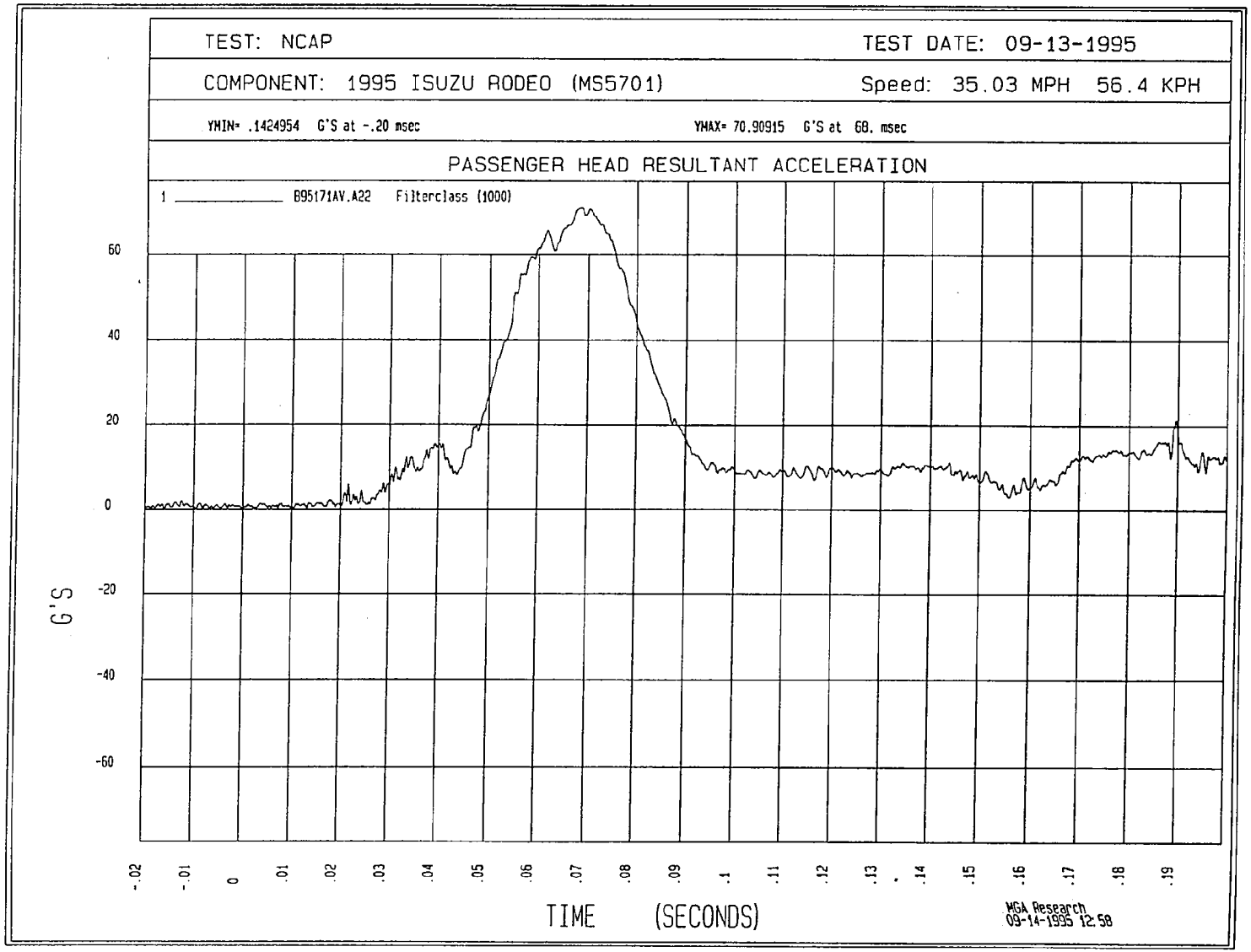


Figure B-85 - Passenger Head Resultant Acceleration vs. Time

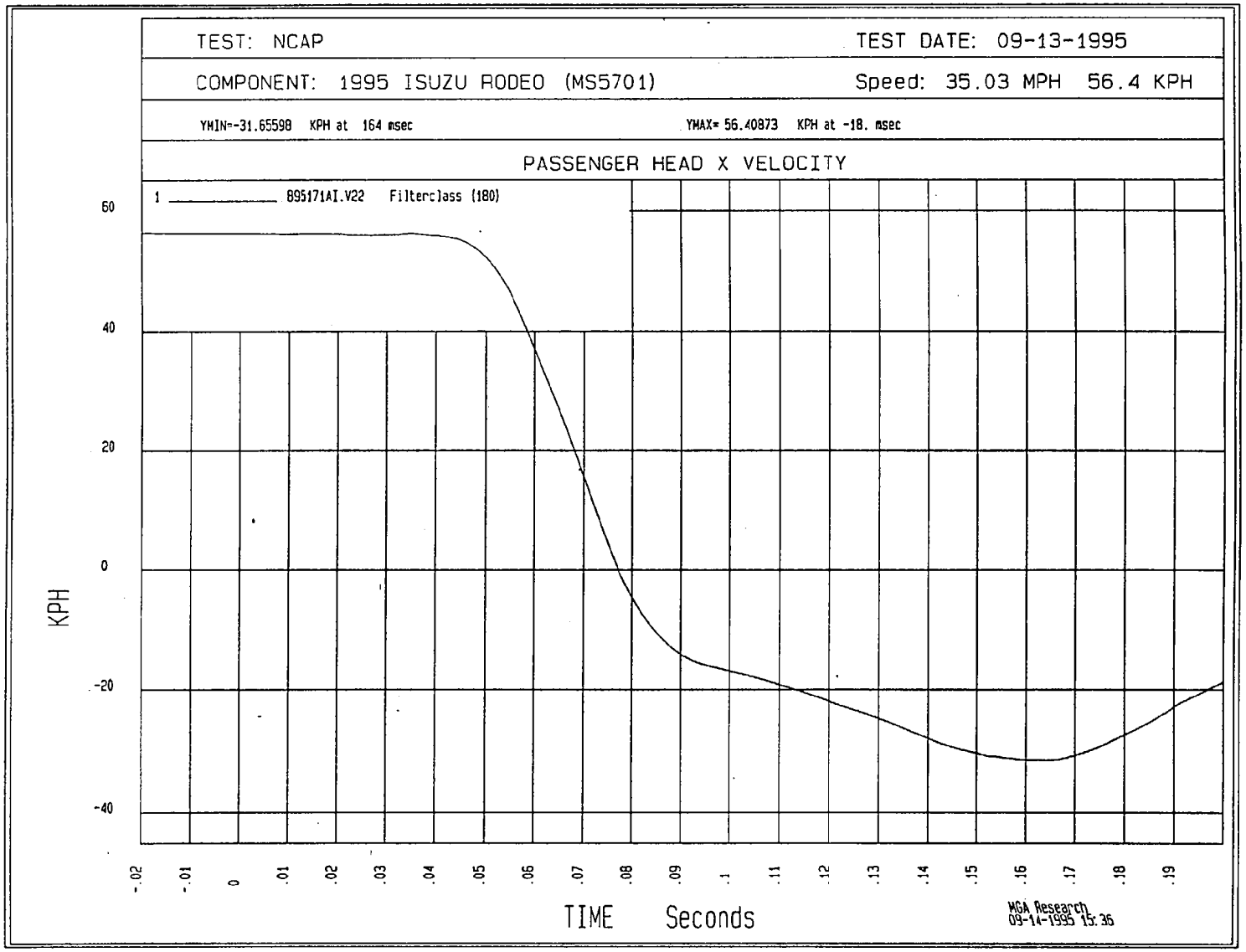


Figure B-86 - Passenger Head X Velocity vs. Time

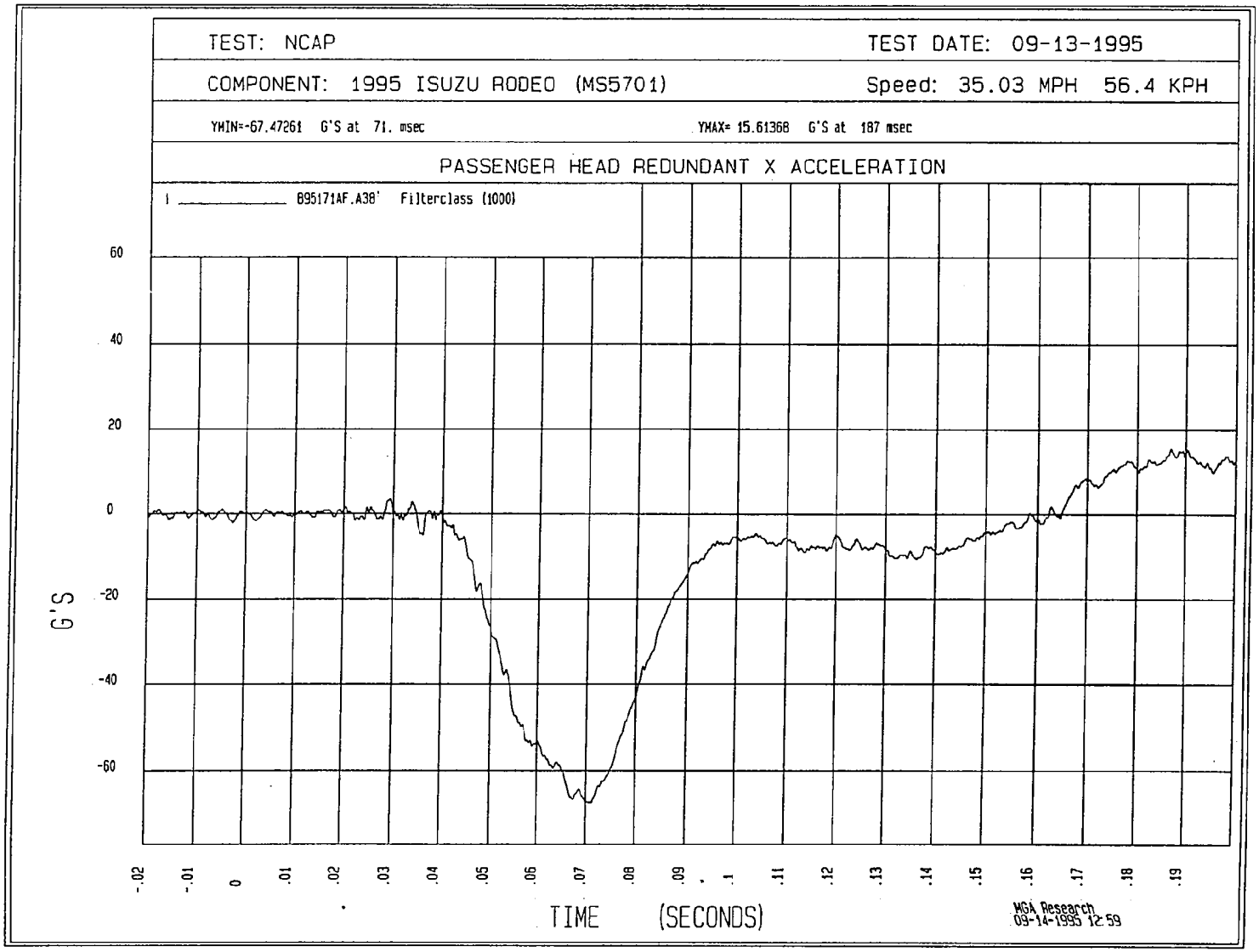


Figure B-87 - Passenger Head Redundant X Acceleration vs. Time

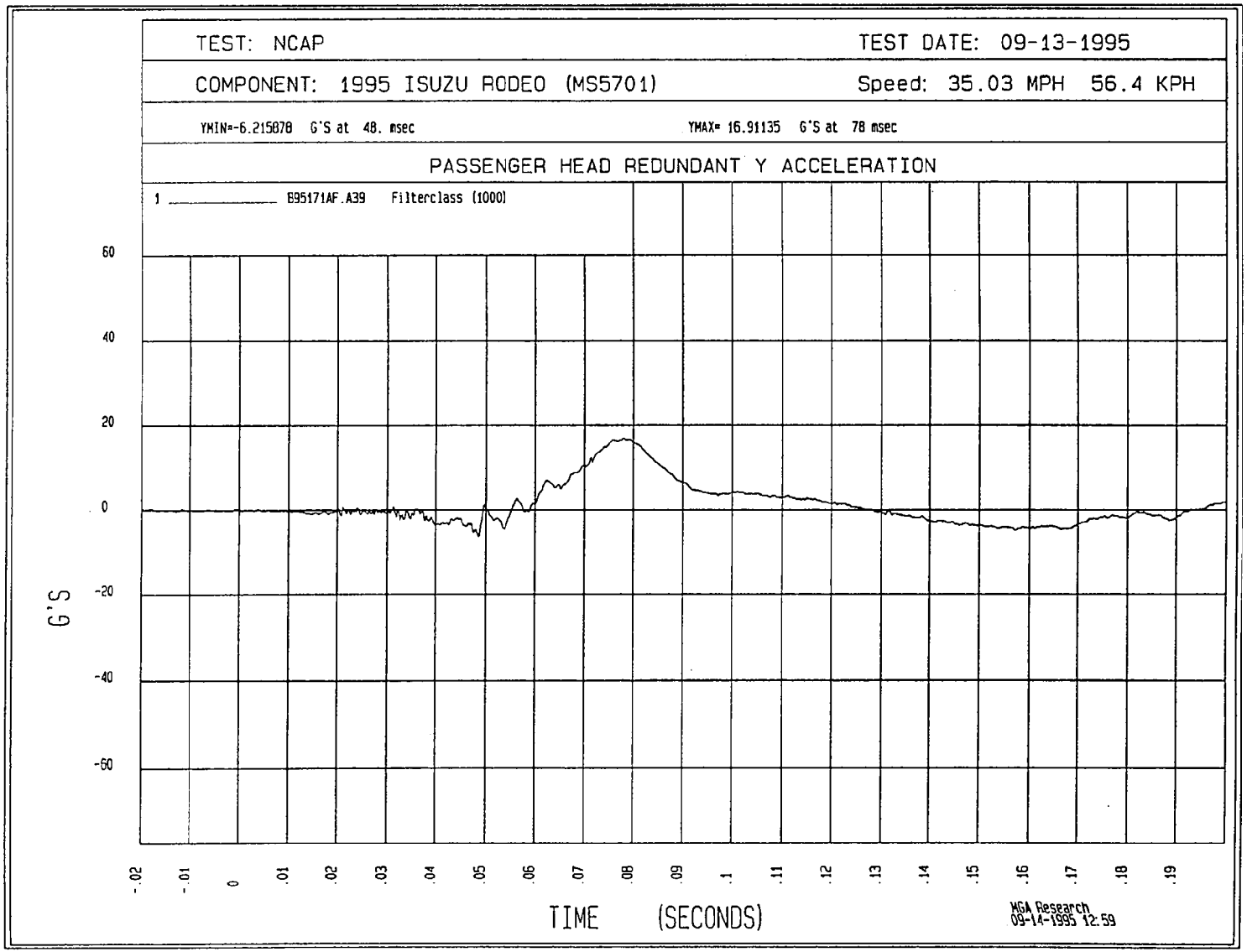


Figure B-88 - Passenger Head Redundant Y Acceleration vs. Time

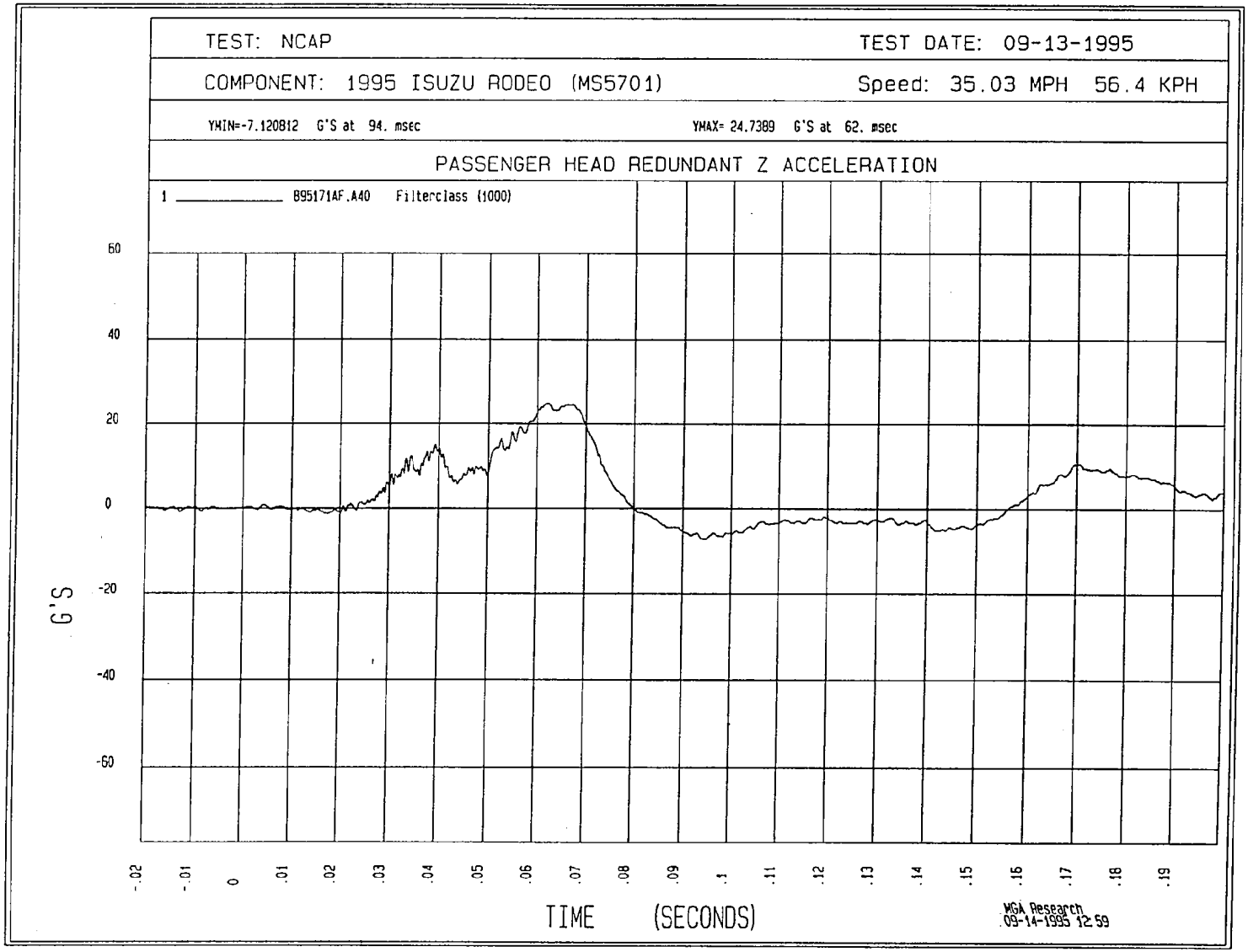


Figure B-89 - Passenger Head Redundant Z Acceleration vs. Time

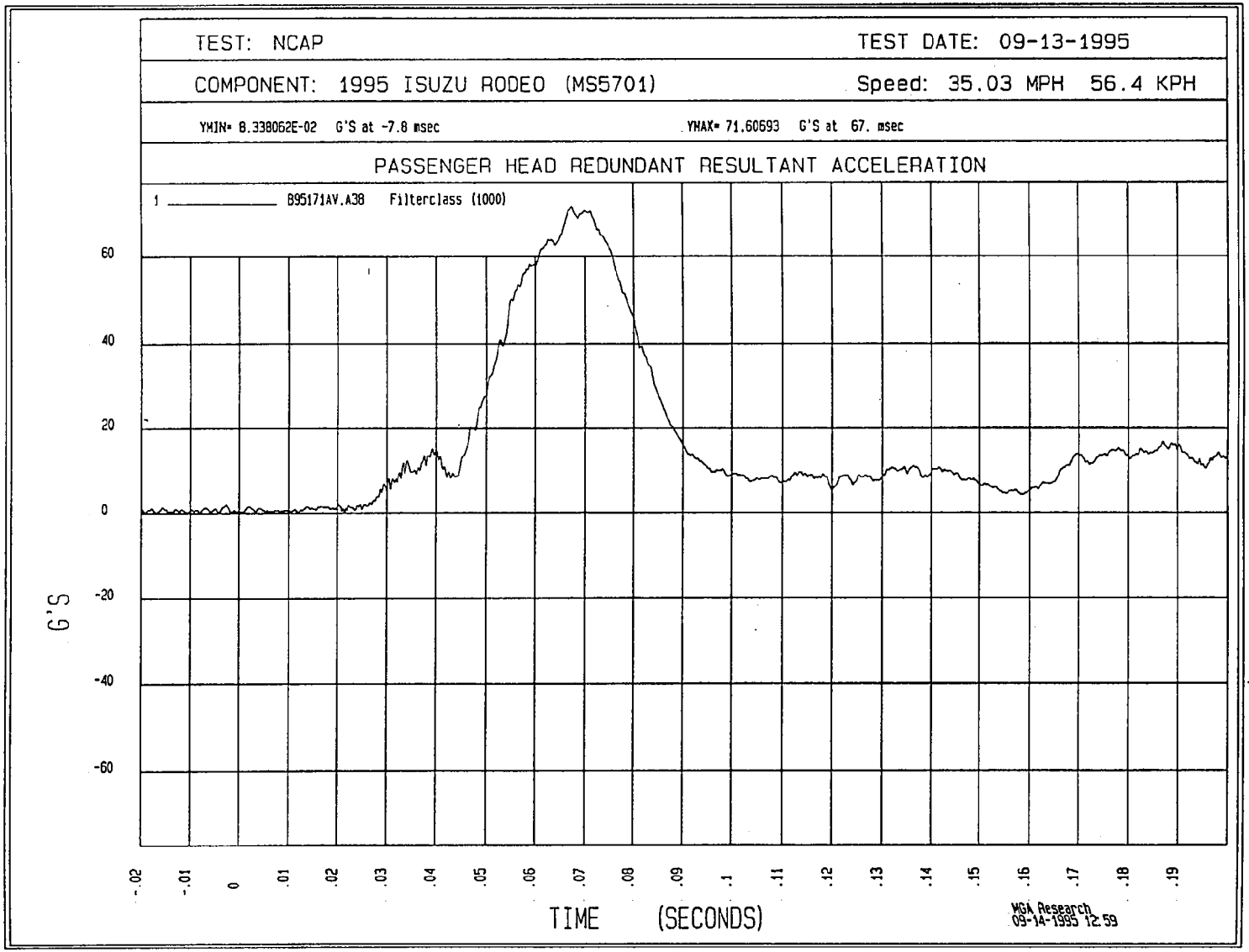


Figure B-90 - Passenger Head Redundant Resultant Acceleration vs. Time

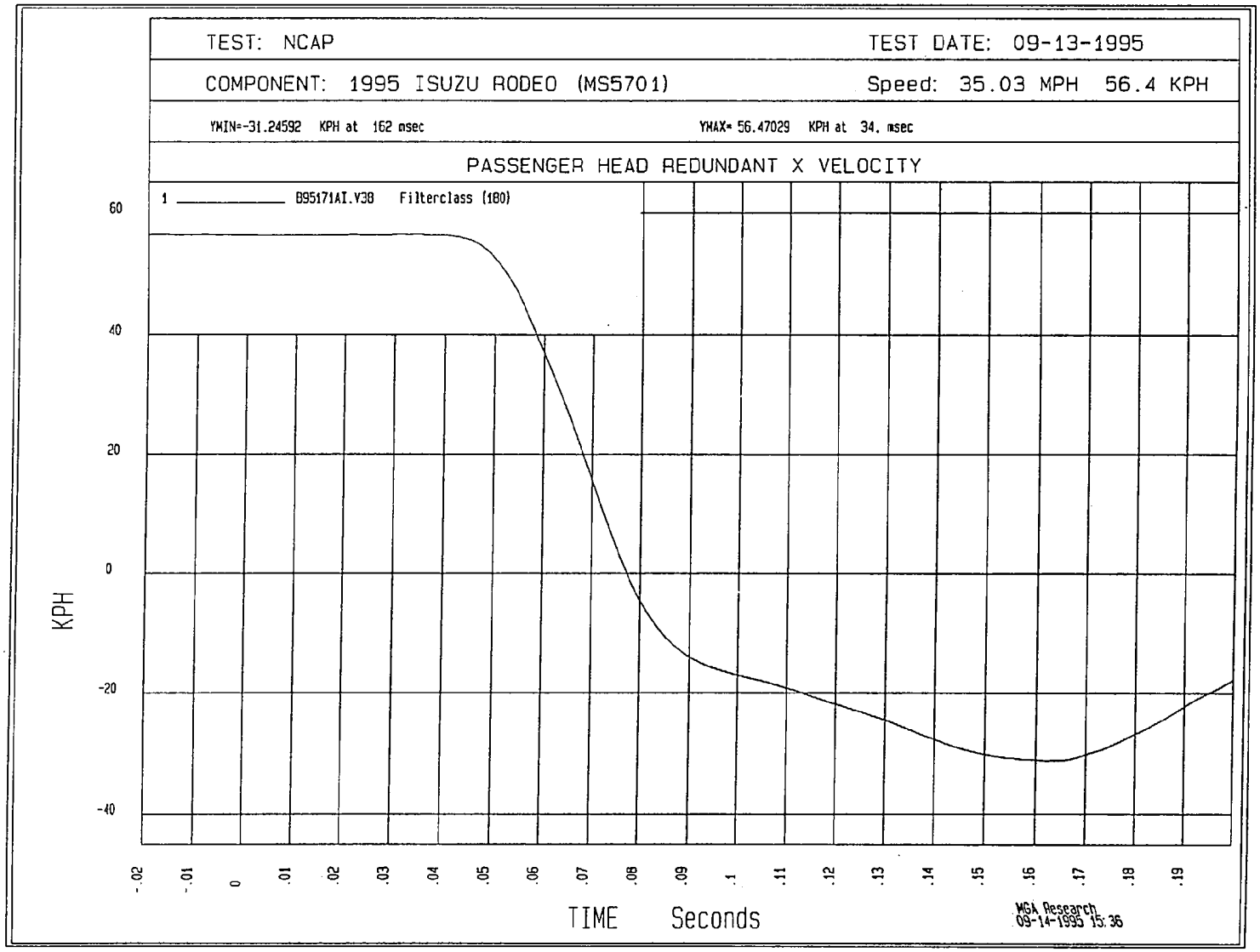


Figure B-91 - Passenger Head Redundant X Velocity vs. Time

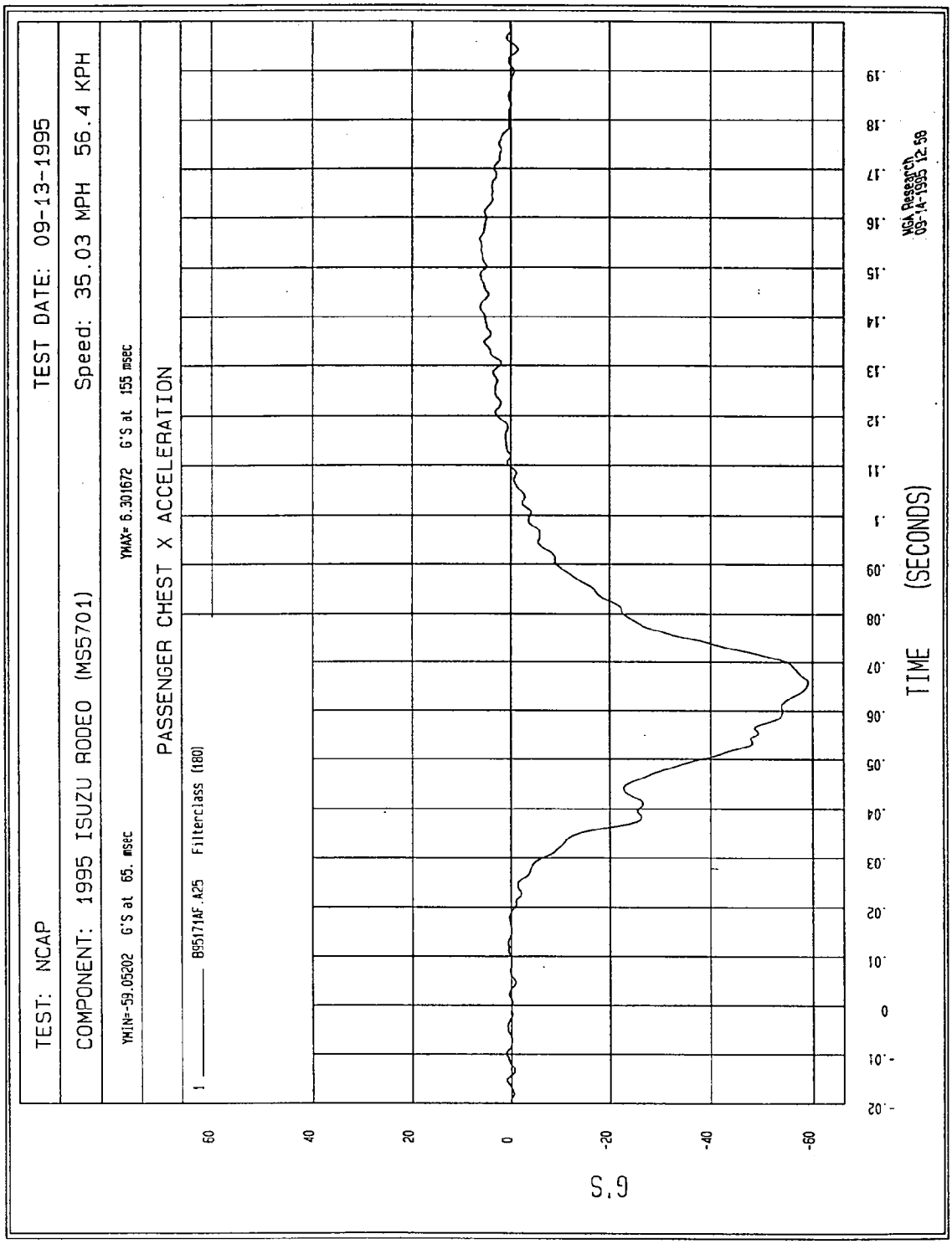


Figure B-92 - Passenger Chest X Acceleration vs. Time

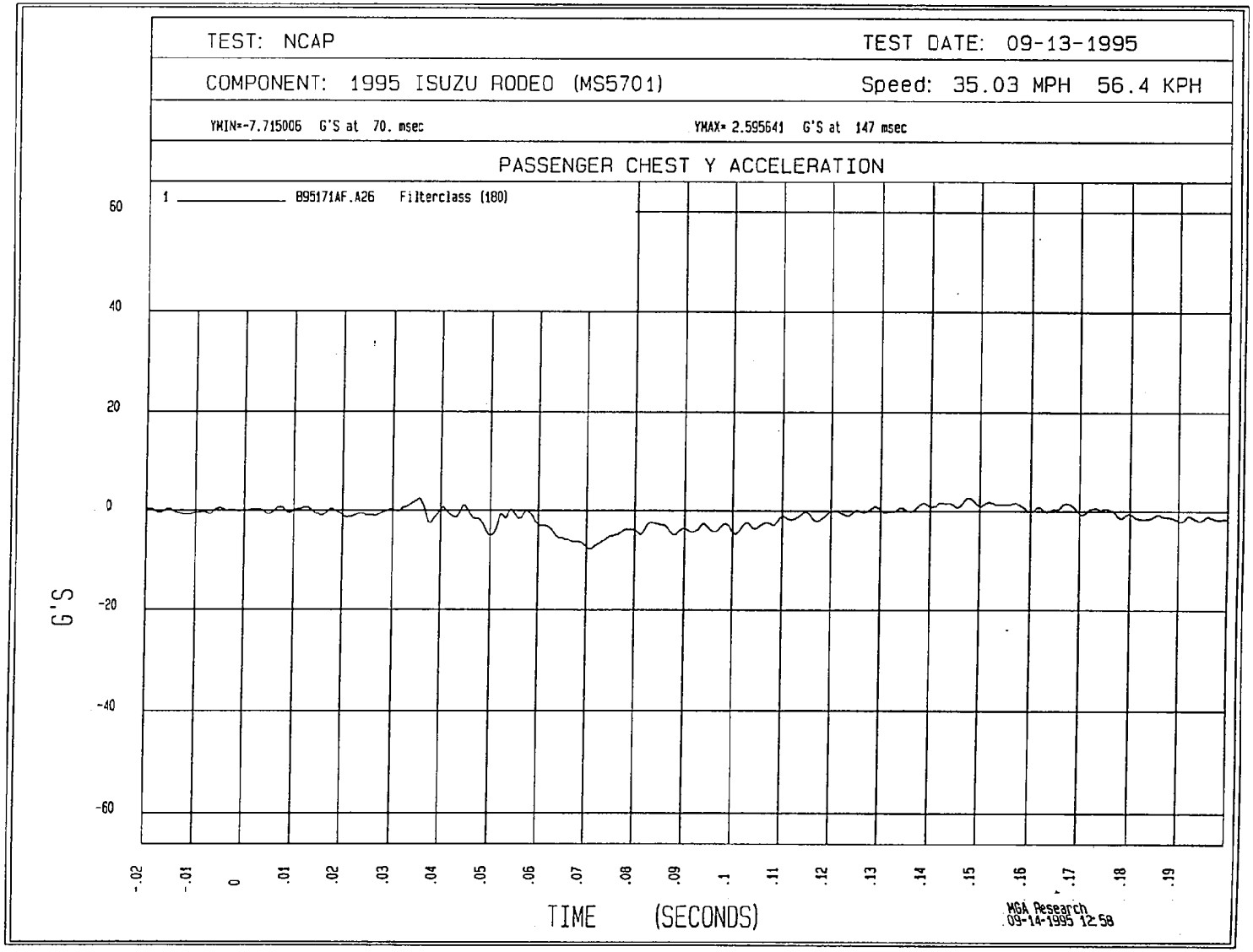


Figure B-93 - Passenger Chest Y Acceleration vs. Time

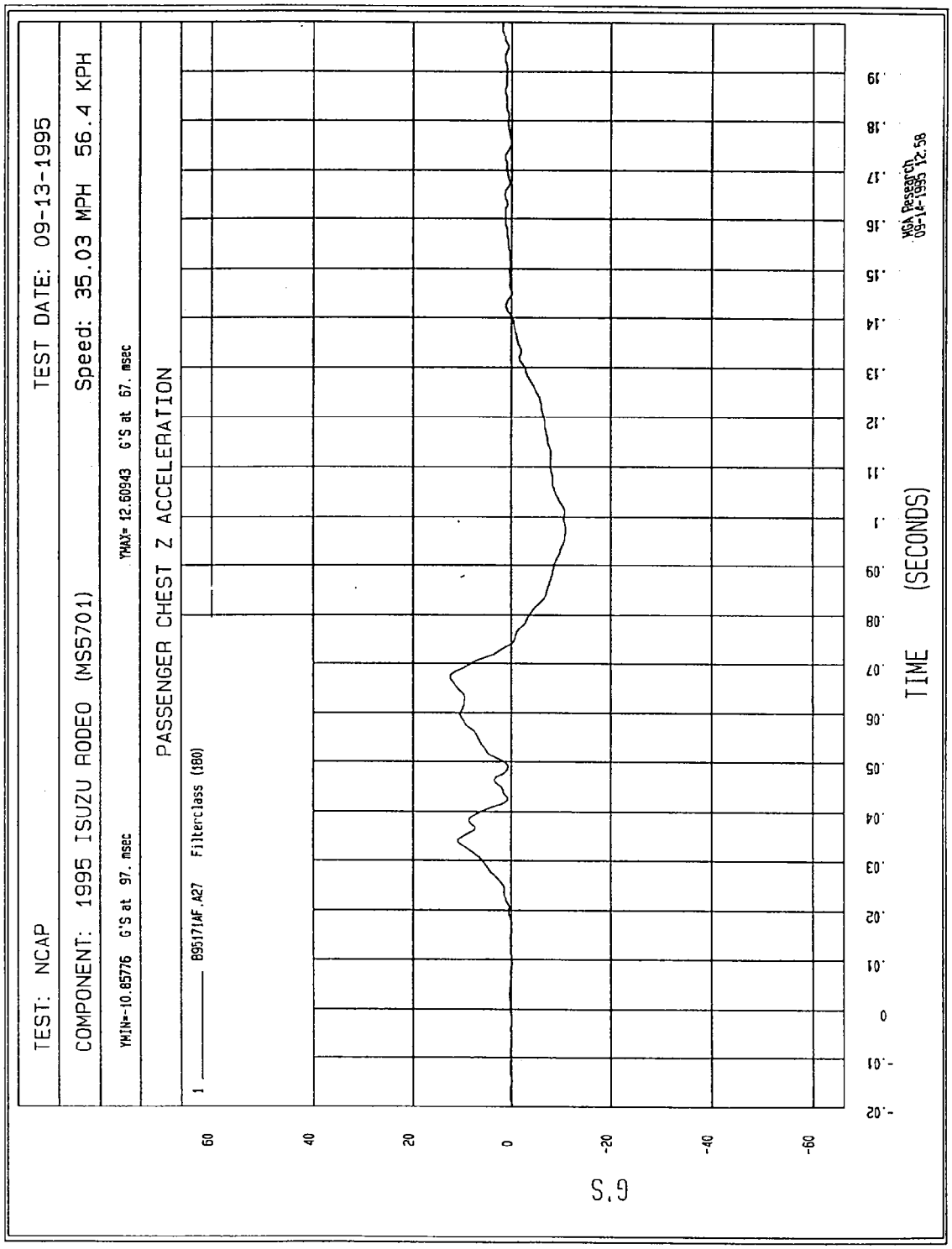


Figure B-94 - Passenger Chest Z Acceleration vs. Time

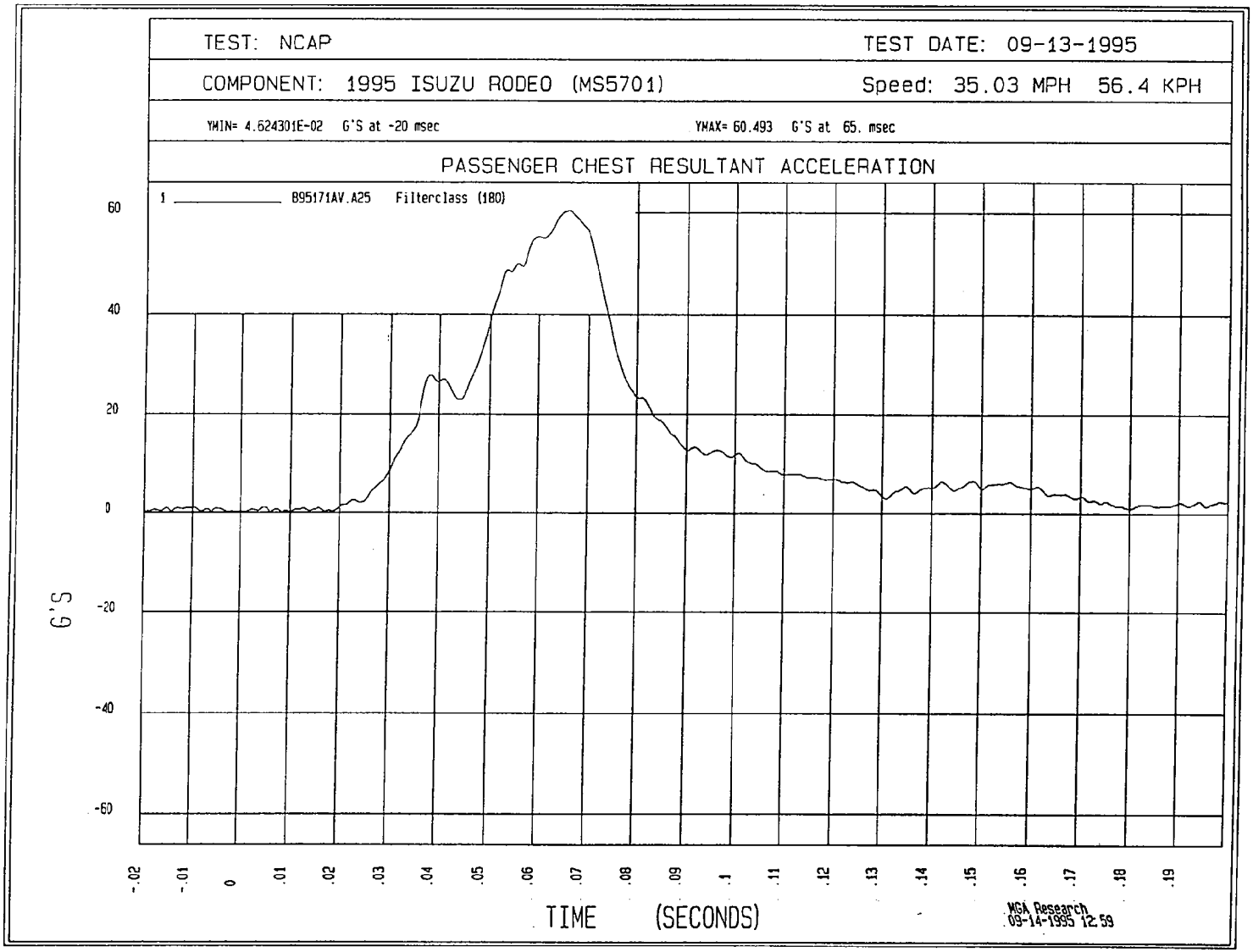


Figure B-95 - Passenger Chest Resultant Acceleration vs. Time

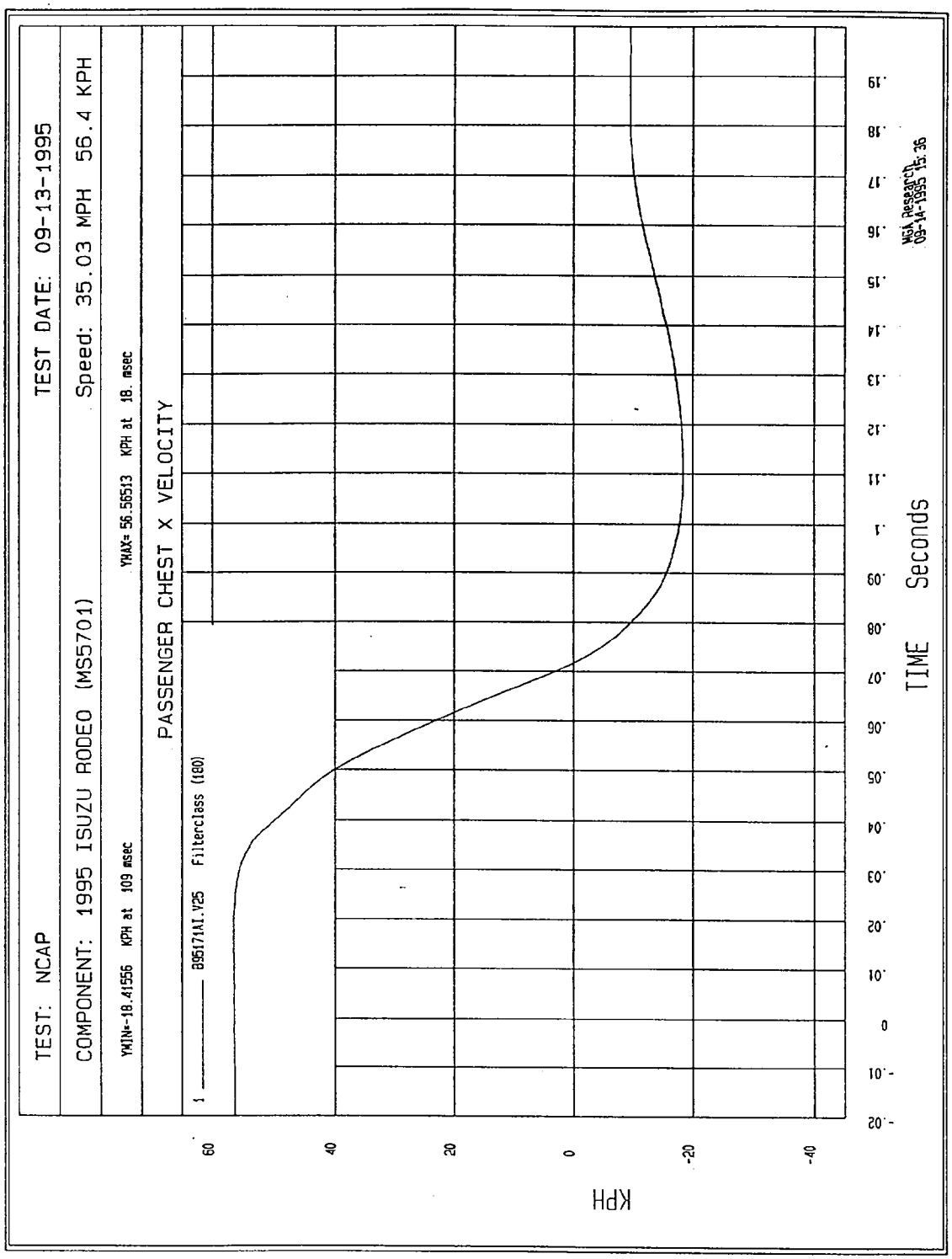


Figure B-96 - Passenger Chest X Velocity vs. Time

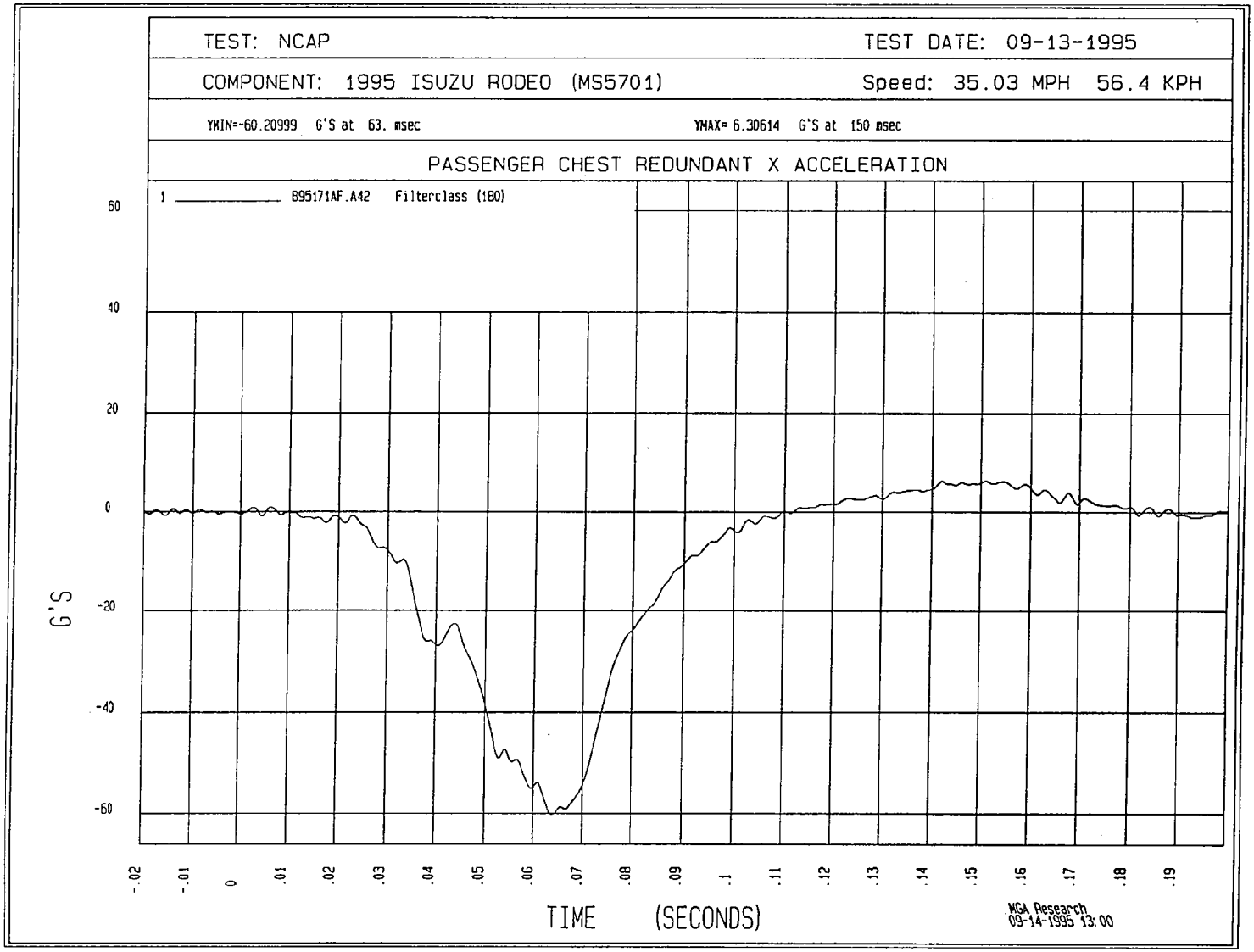


Figure B-97 - Passenger Chest Redundant X Acceleration vs. Time

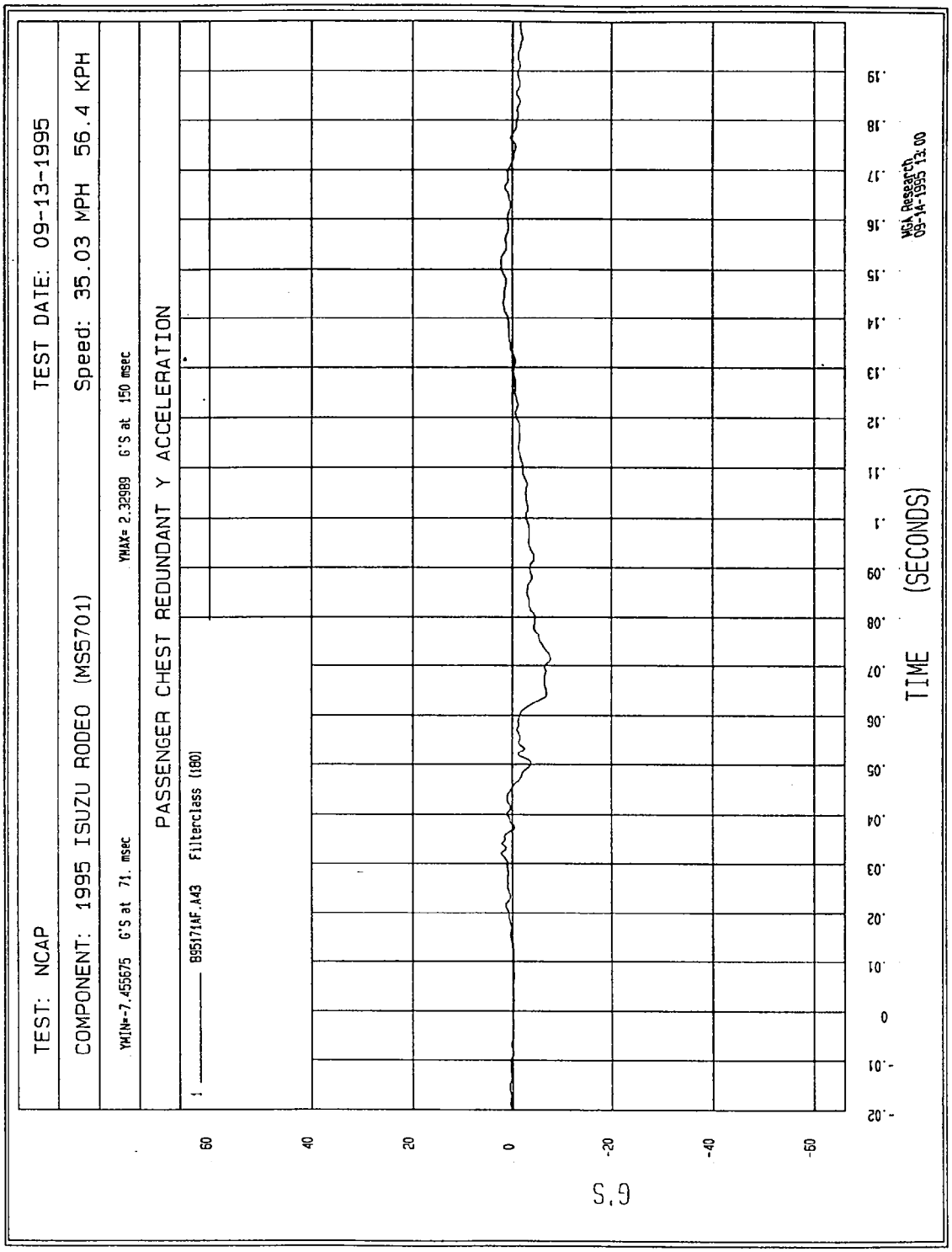


Figure B-98 - Passenger Chest Redundant Y Acceleration vs. Time

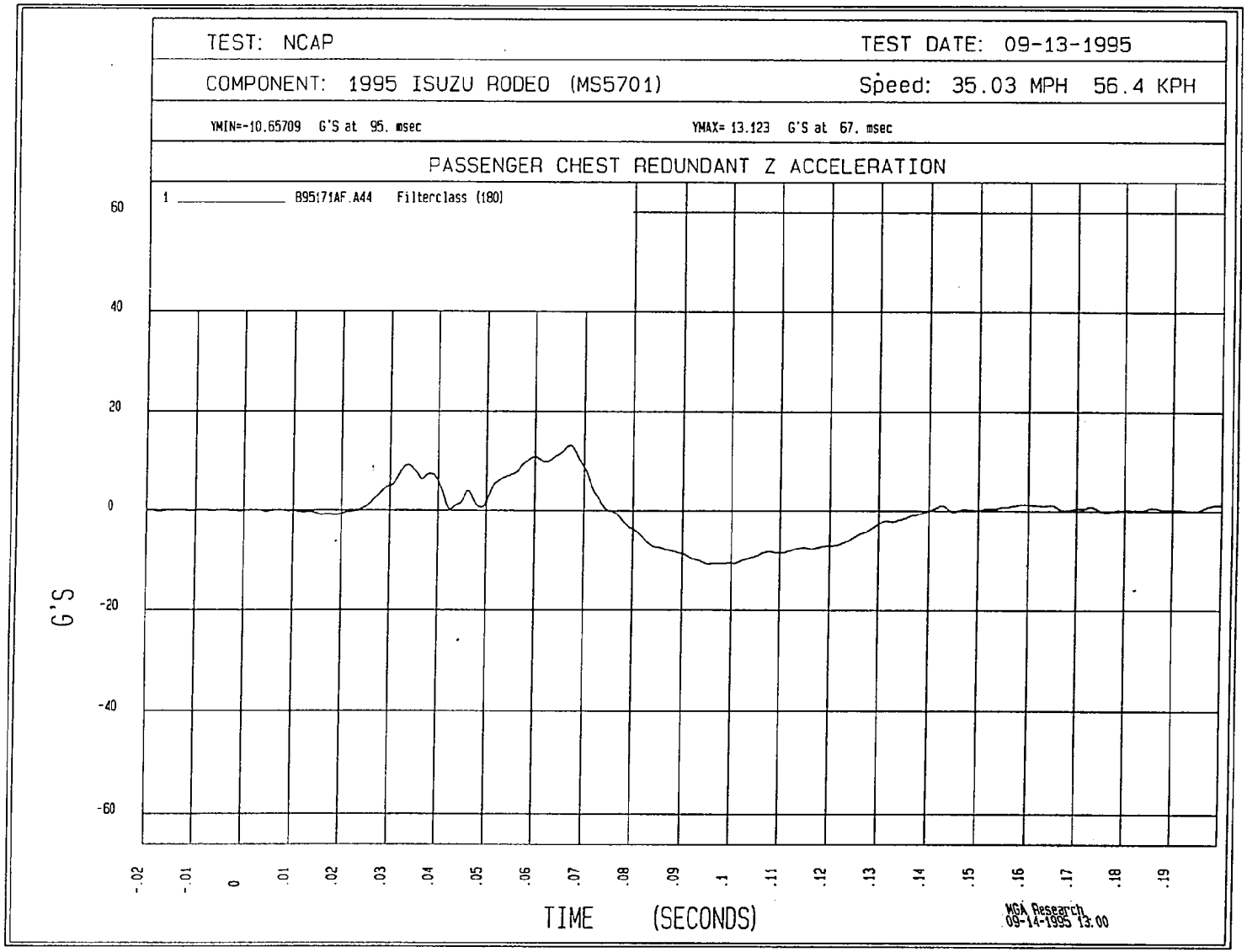


Figure B-99 - Passenger Chest Redundant Z Acceleration vs. Time

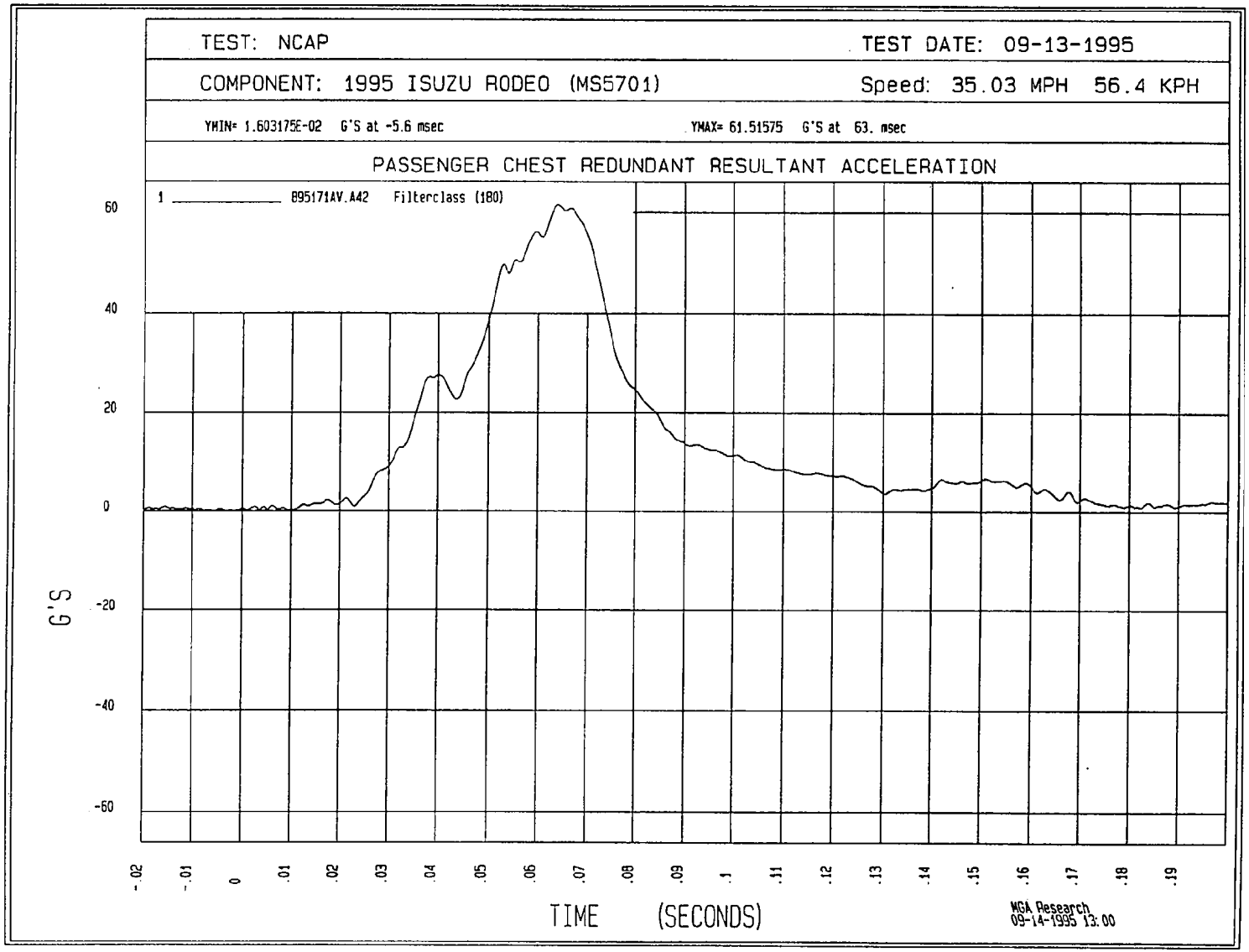


Figure B-100 - Passenger Chest Redundant Resultant Accel. vs. Time

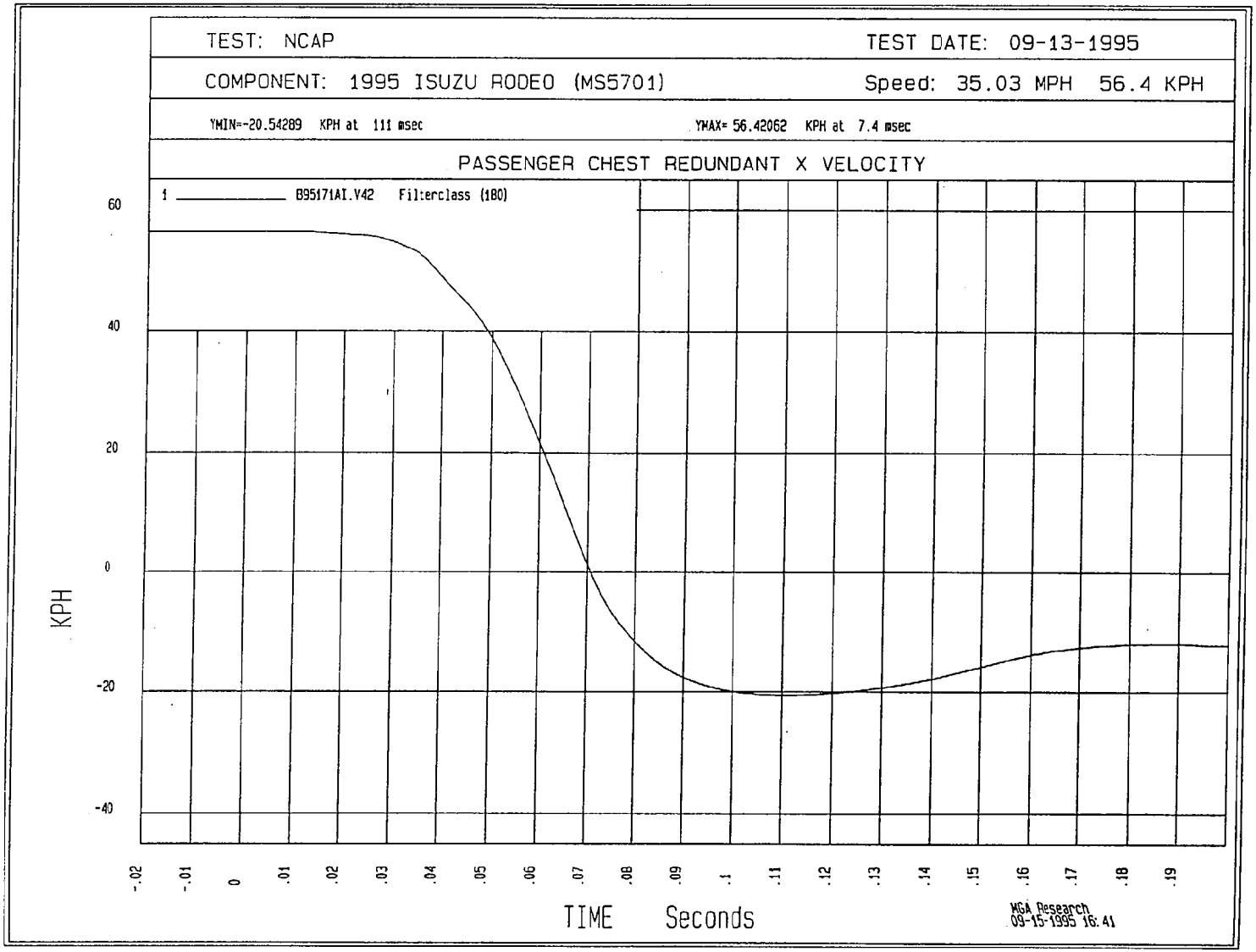


Figure B-101 - Passenger Chest Redundant X Velocity vs. Time

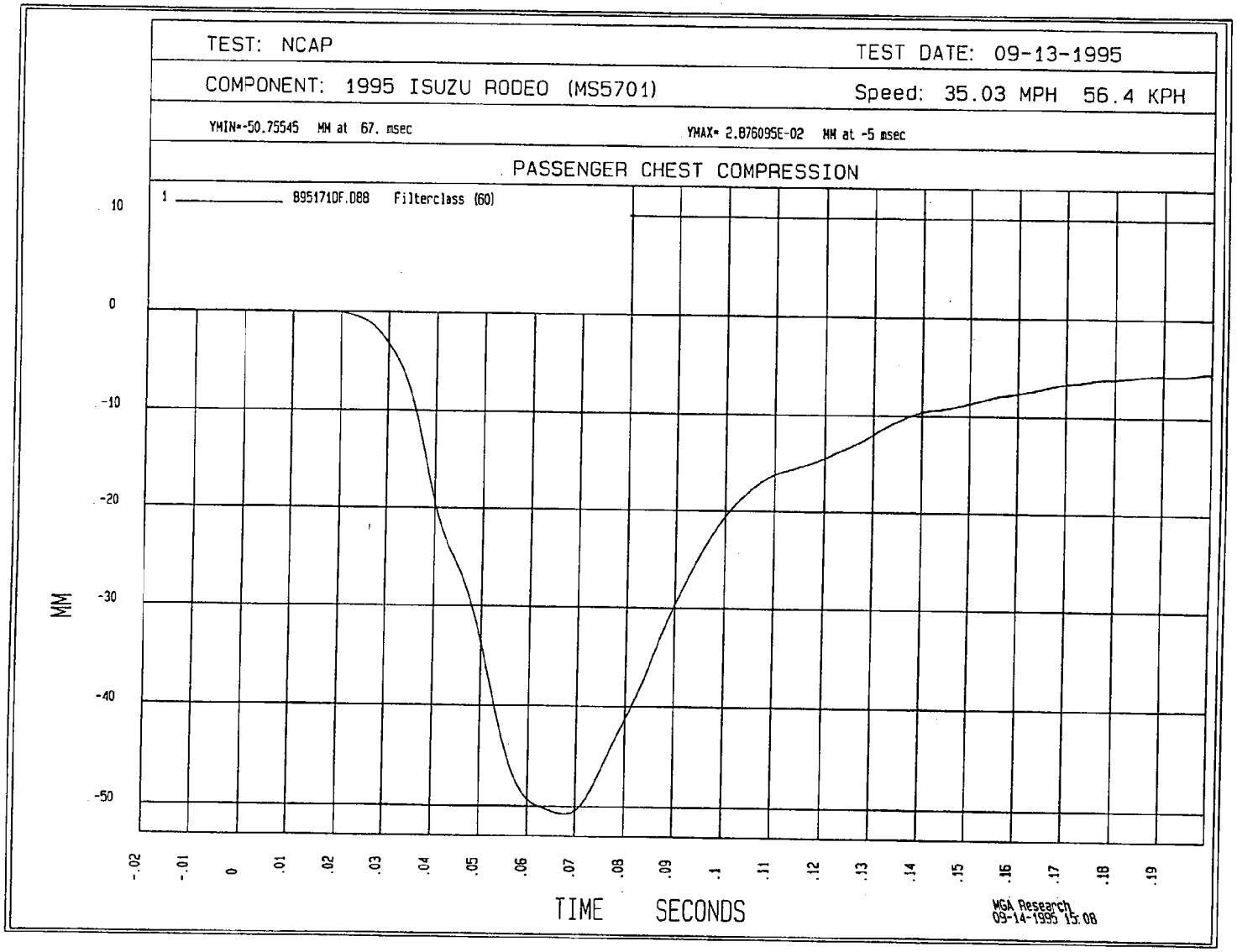


Figure B-102 - Passenger Chest Compression vs. Time

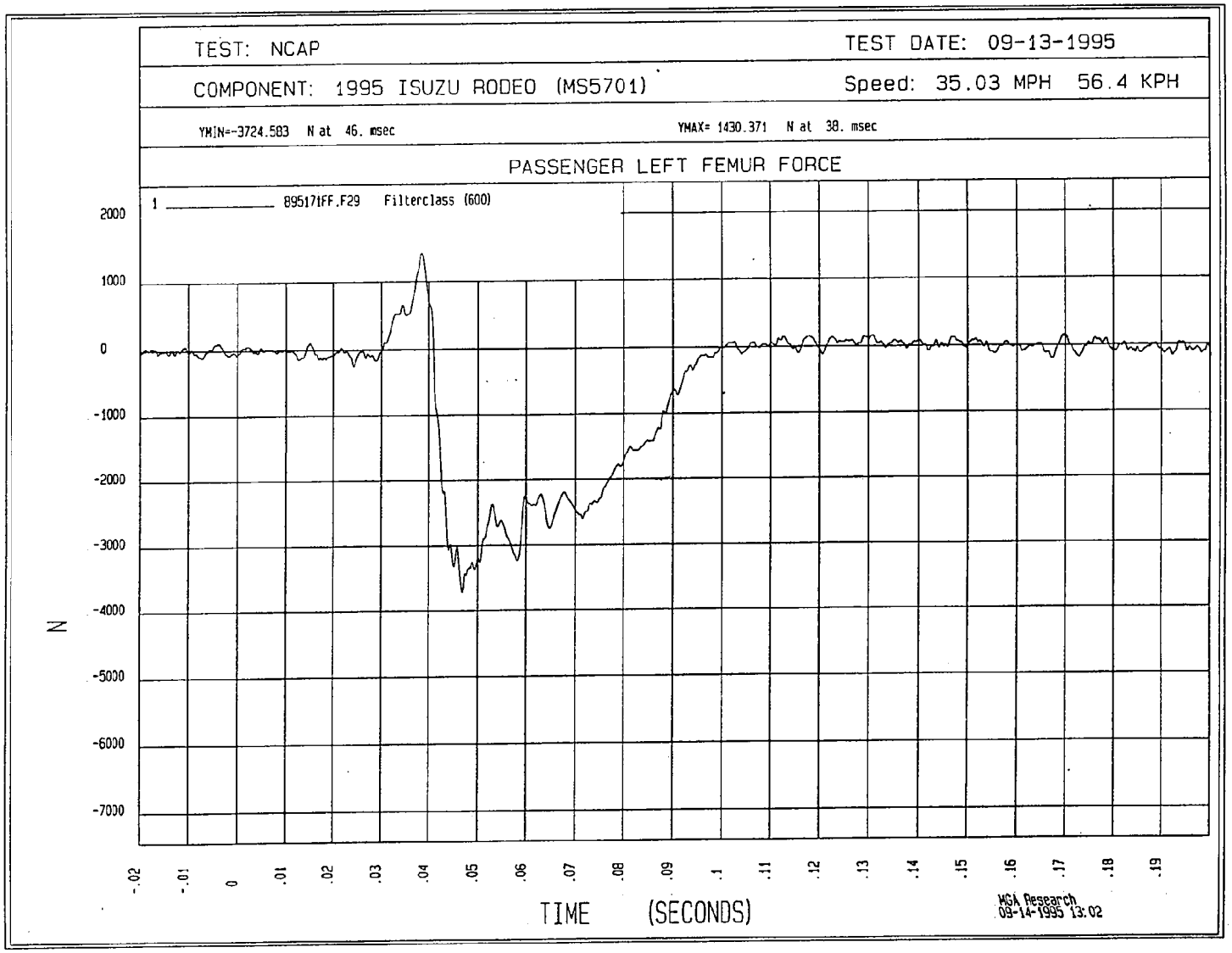


Figure B-103 - Passenger Left Femur Force vs. Time

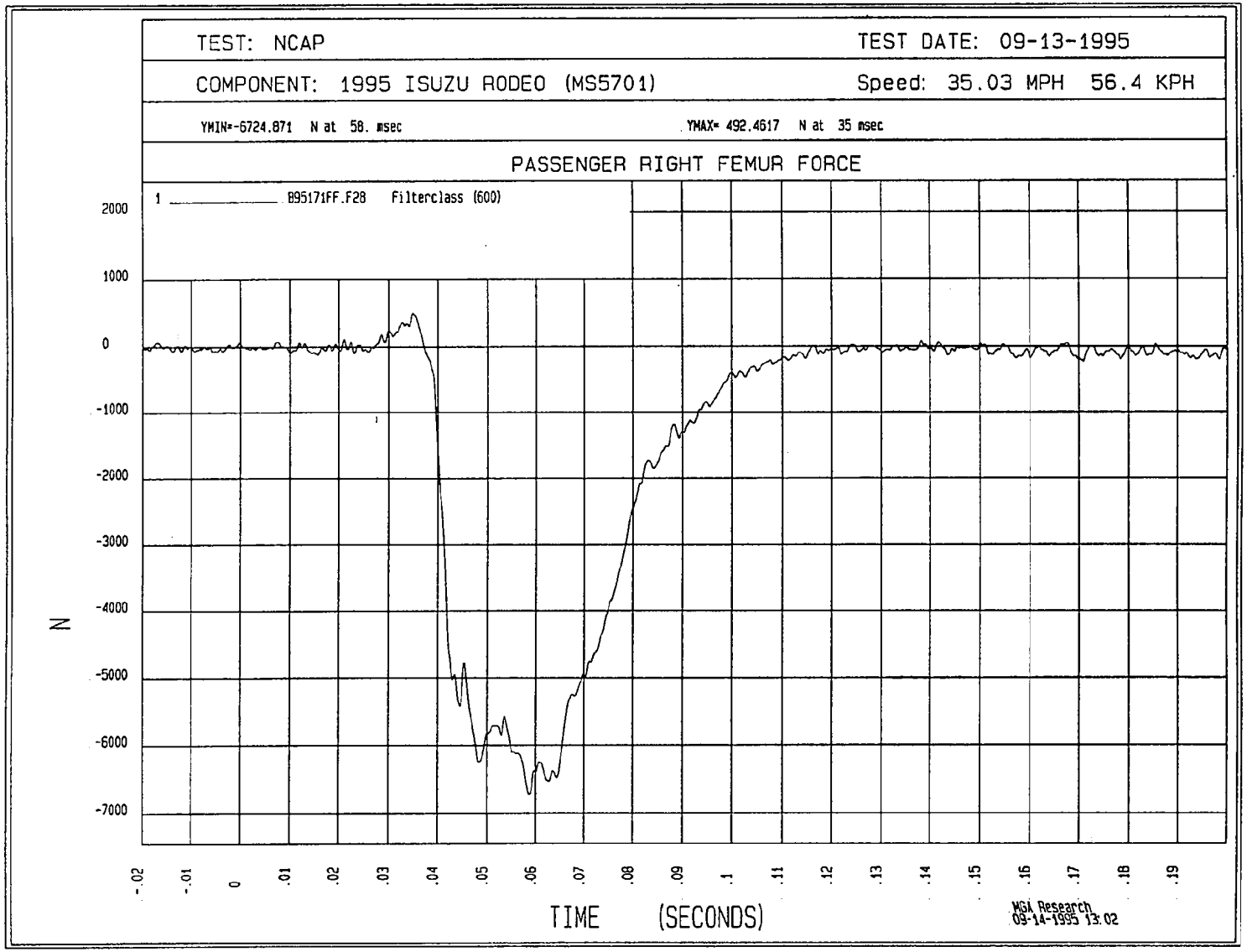


Figure B-104 - Passenger Right Femur Force vs. Time

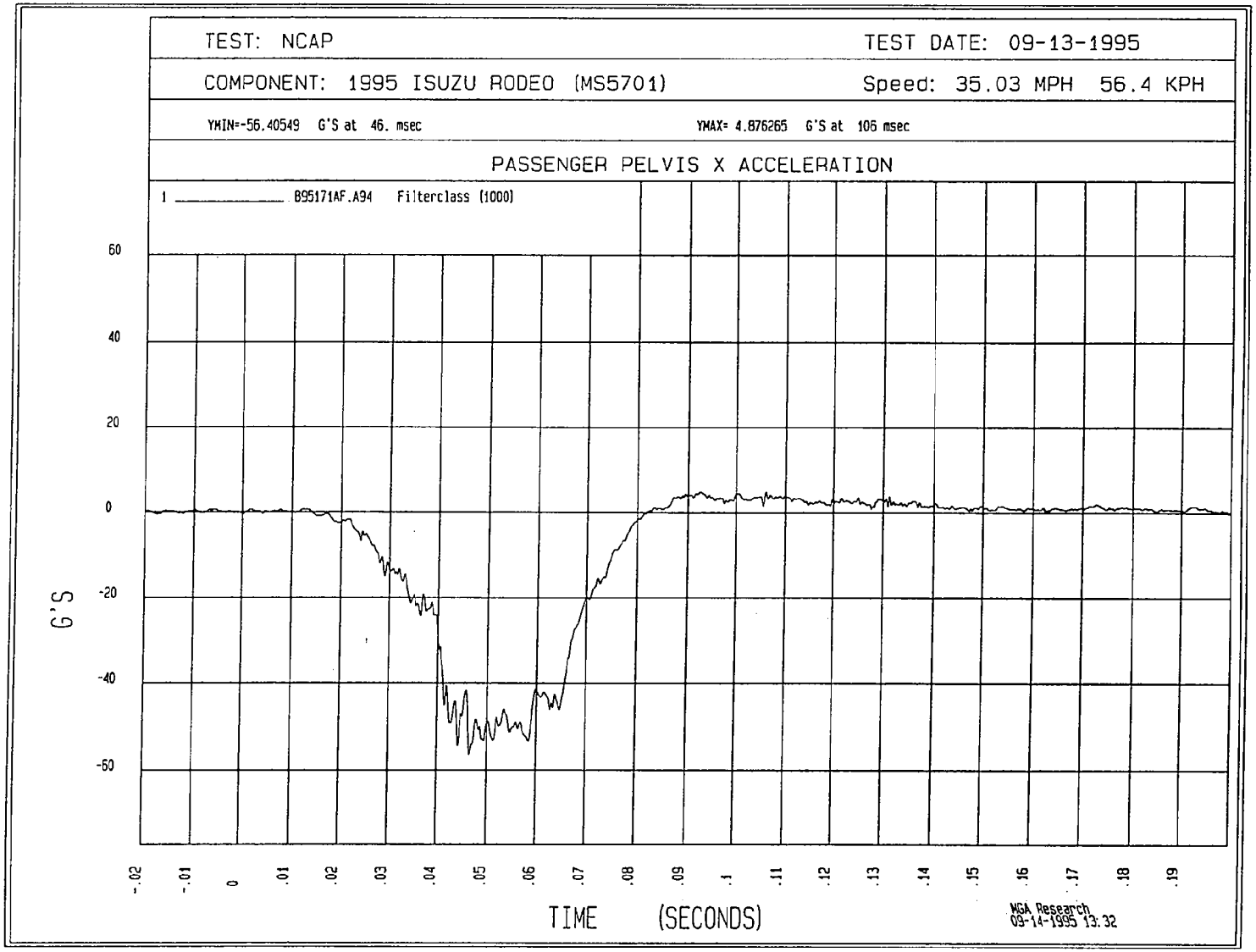


Figure B-105 - Passenger Pelvis X Acceleration vs. Time

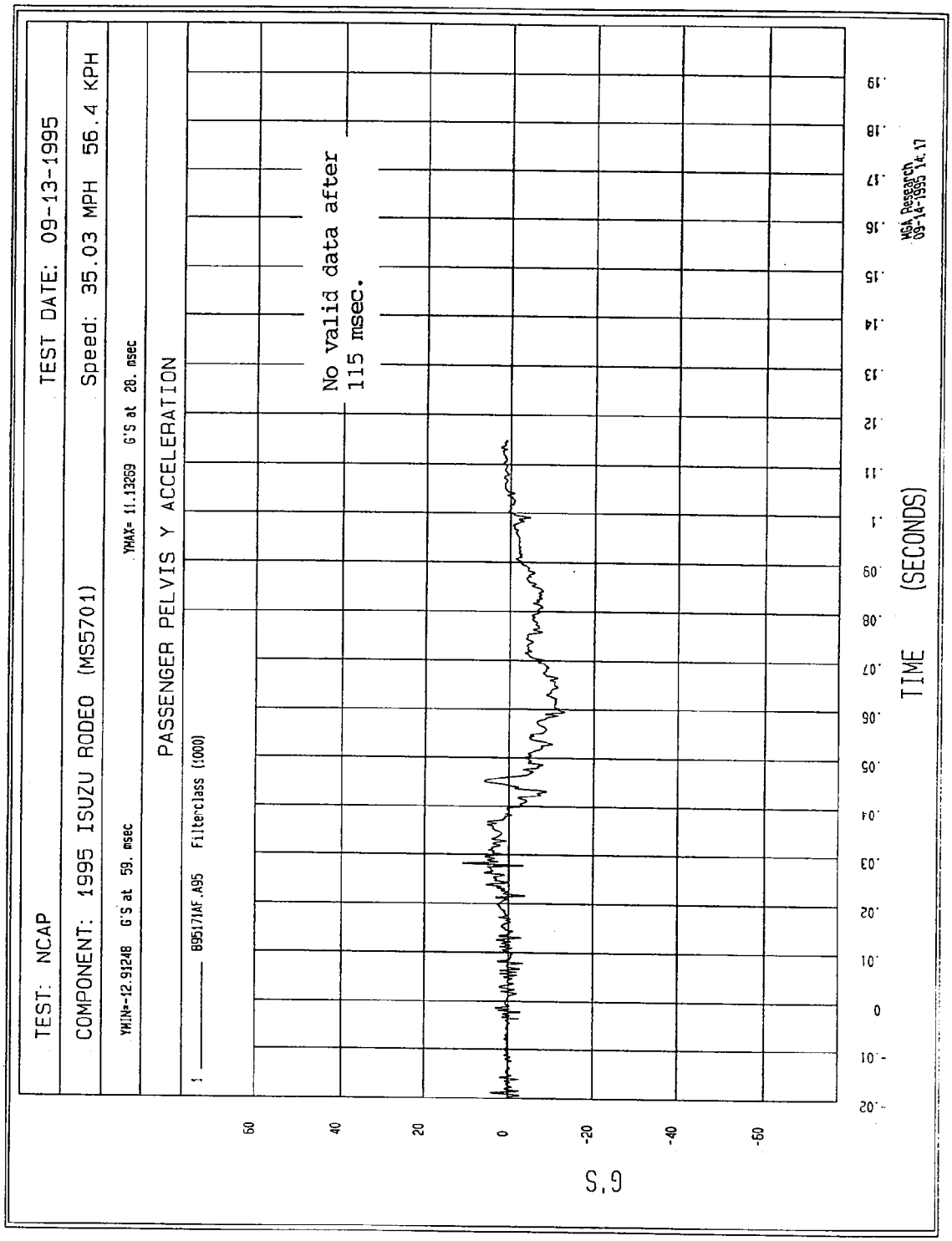


Figure B-106 - Passenger Pelvis Y Acceleration vs. Time

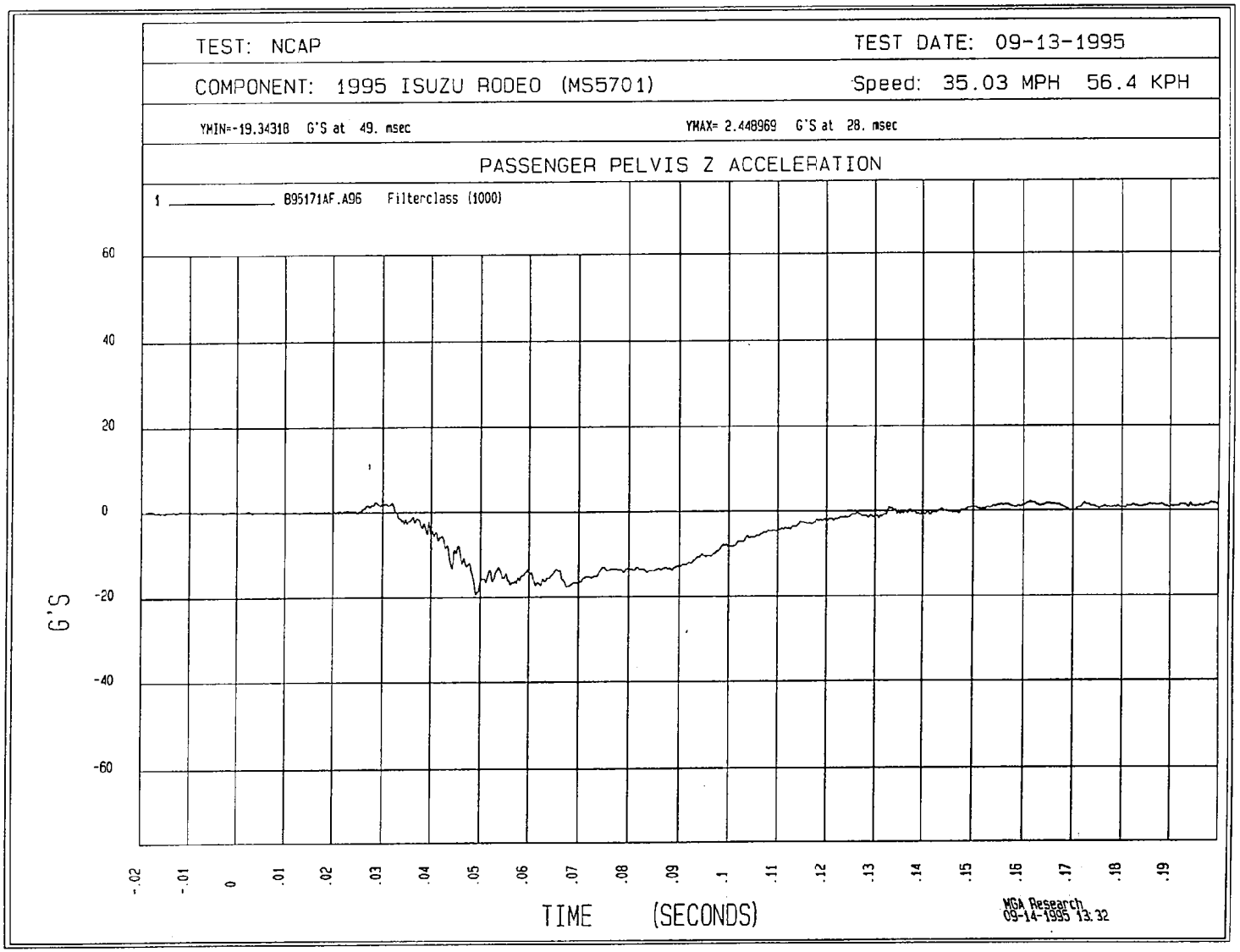


Figure B-107 - Passenger Pelvis Z Acceleration vs. Time

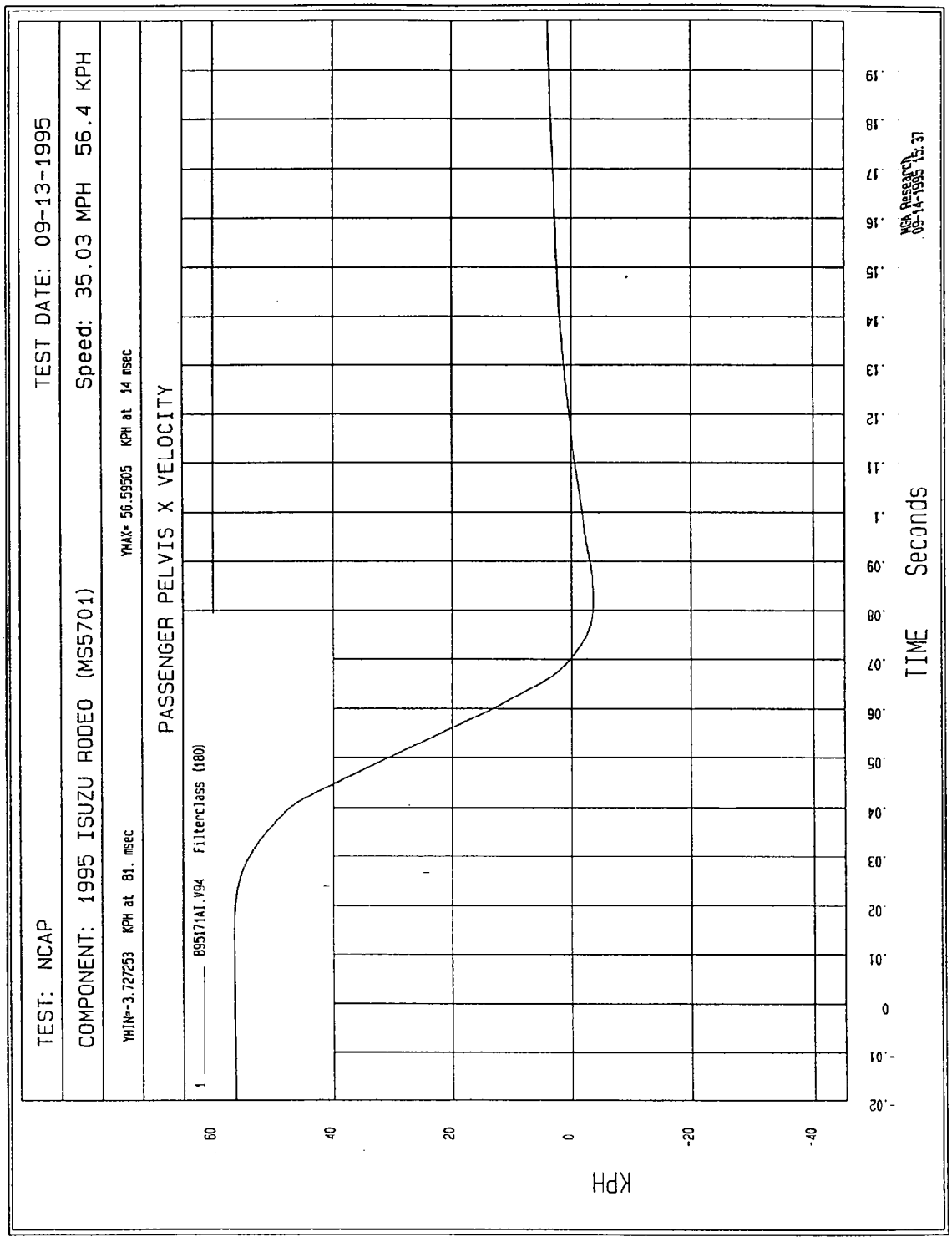


Figure B-108 - Passenger Pelvis X Velocity vs. Time

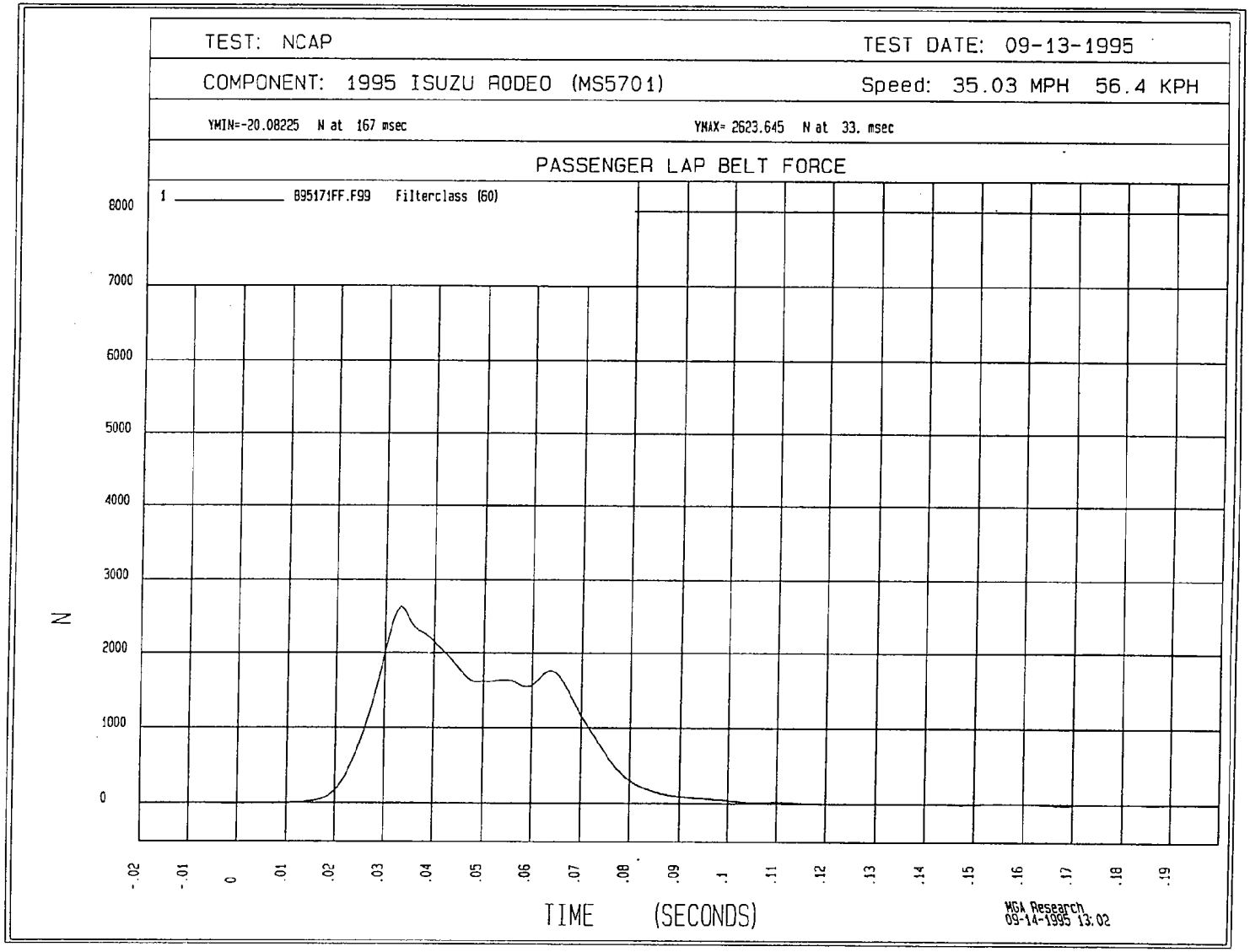


Figure B-109 - Passenger Lap Belt Force vs. Time

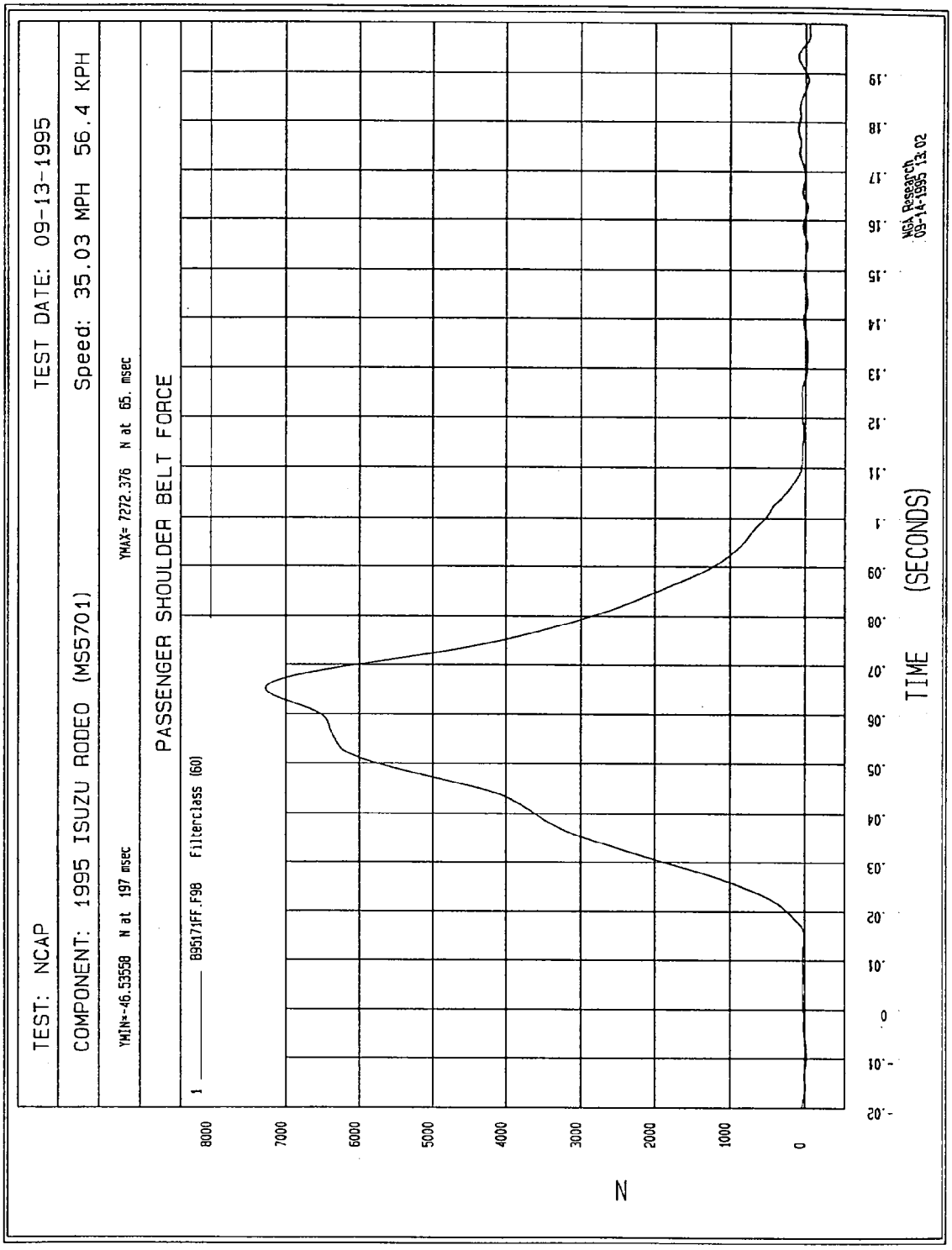


Figure B-110 - Passenger Shoulder Belt Force vs. Time

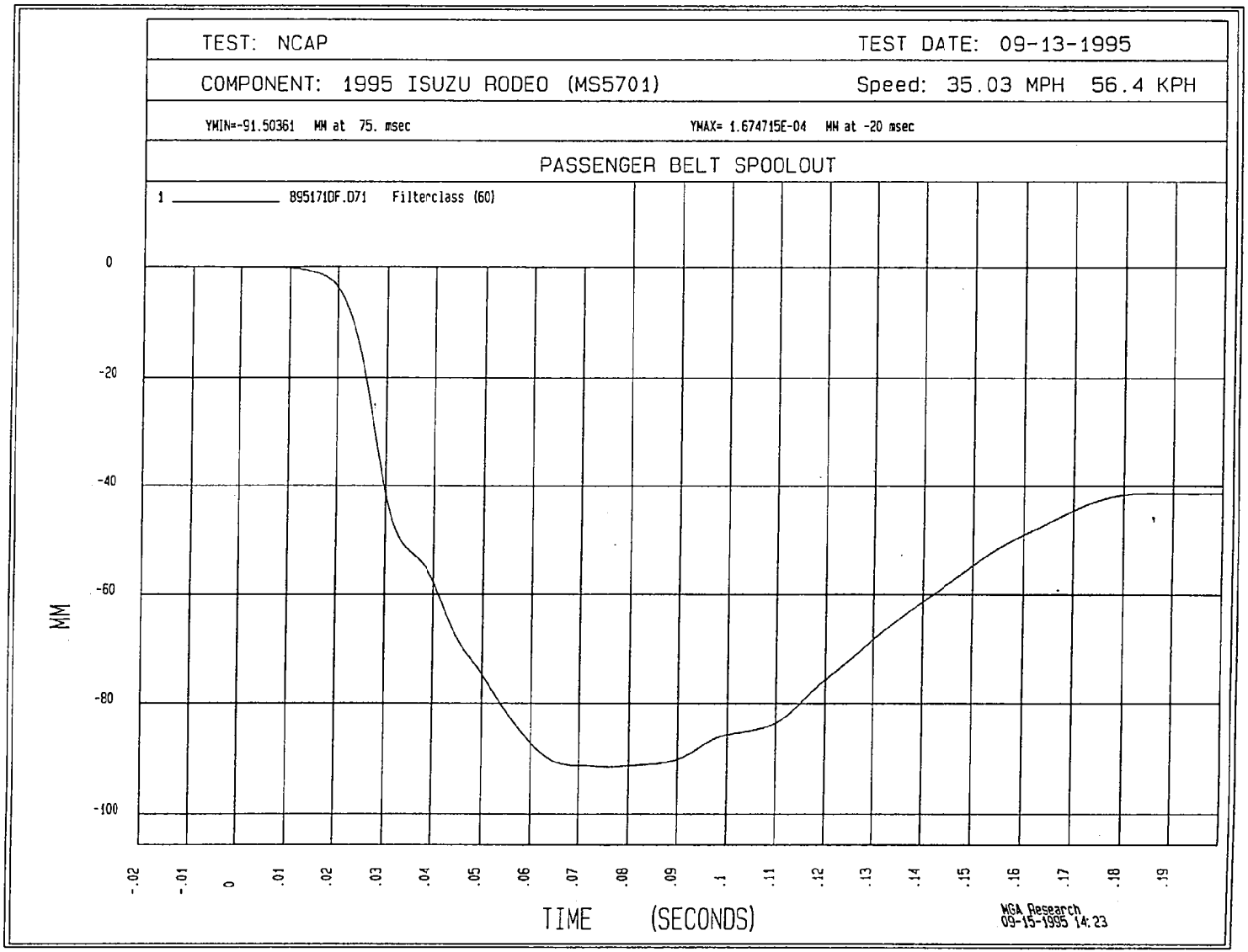


Figure B-111 - Passenger Belt Spoolout vs. Time

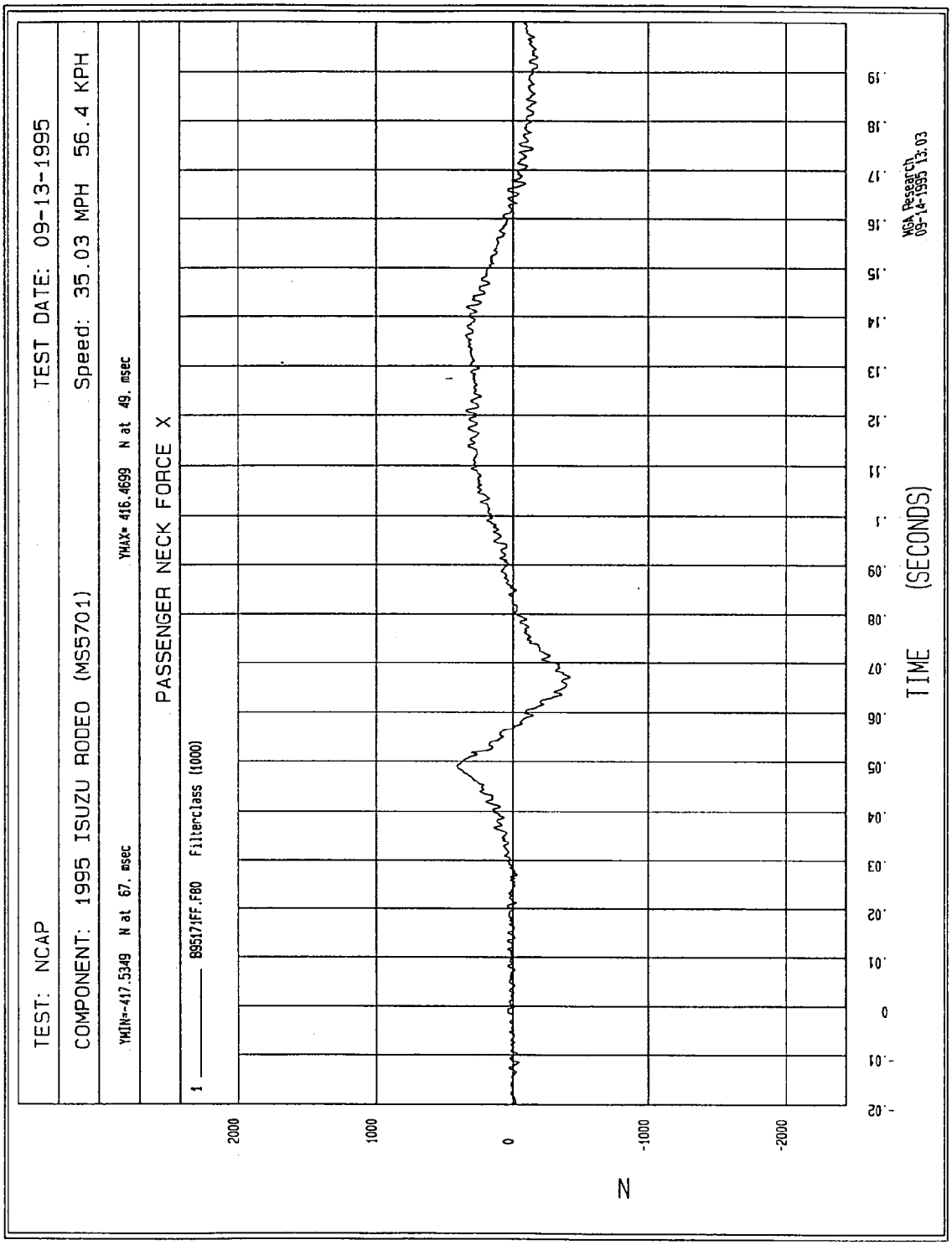


Figure B-112 - Passenger Neck Force X vs. Time

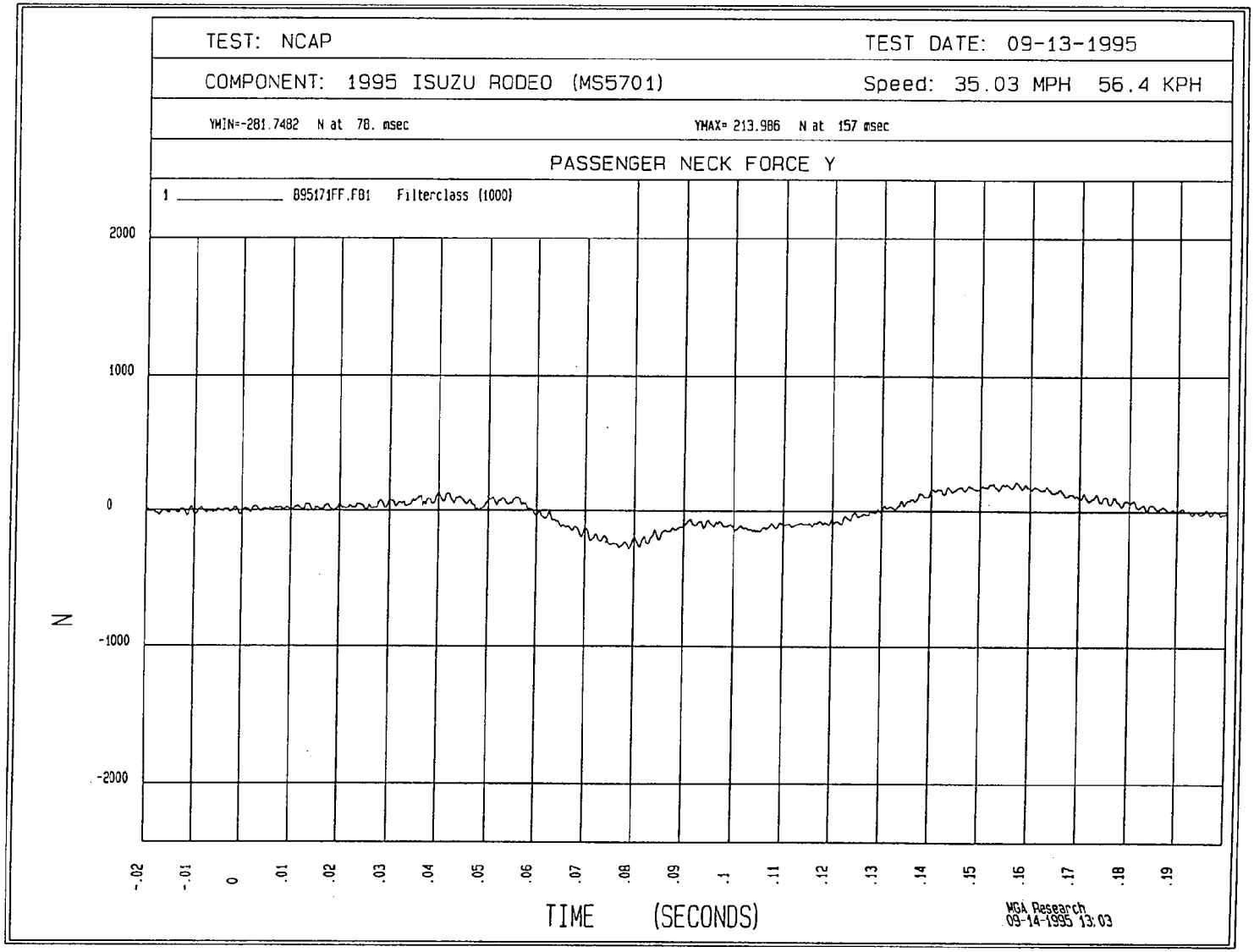


Figure B-113 - Passenger Neck Force Y vs. Time

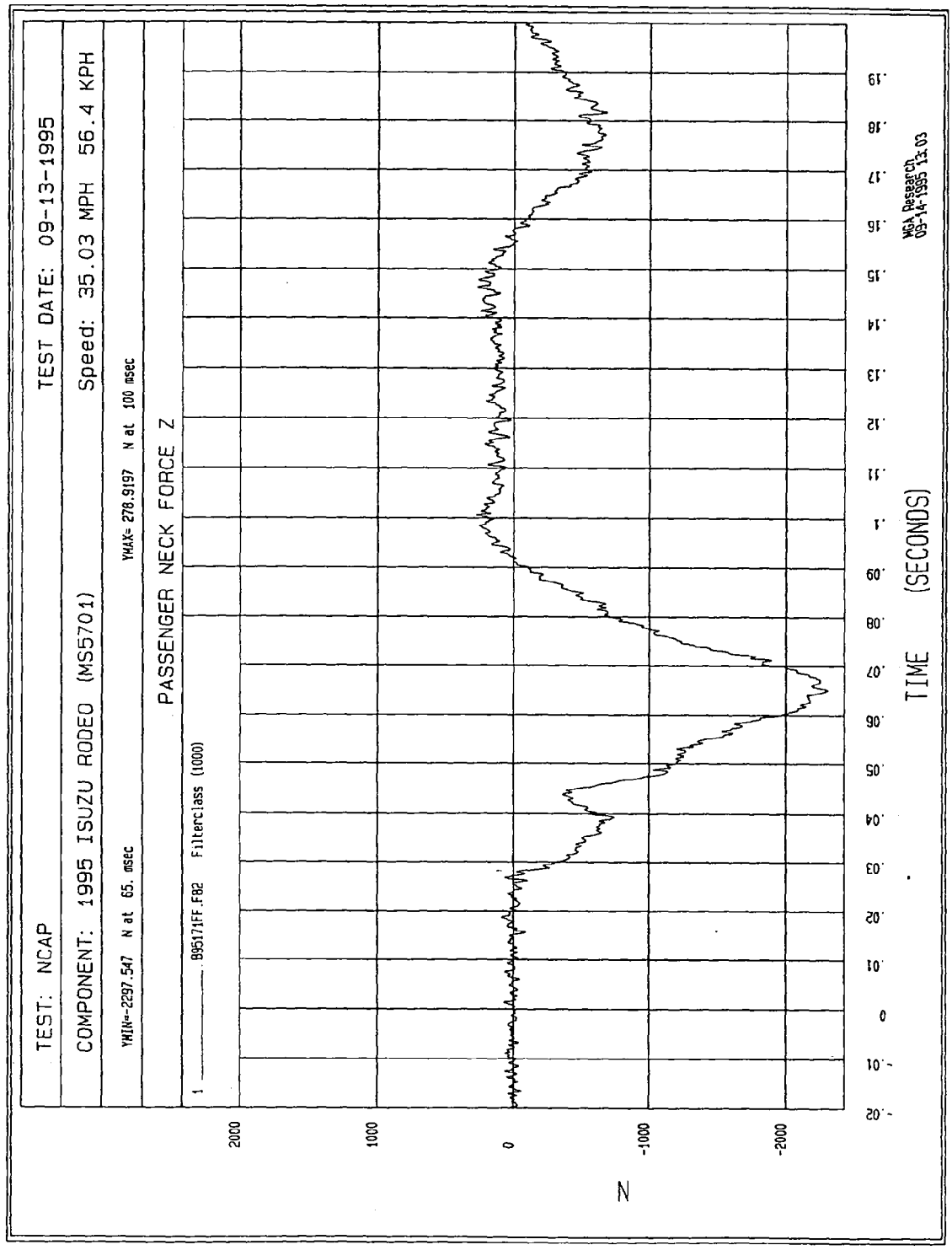


Figure B-114 - Passenger Neck Force Z vs. Time

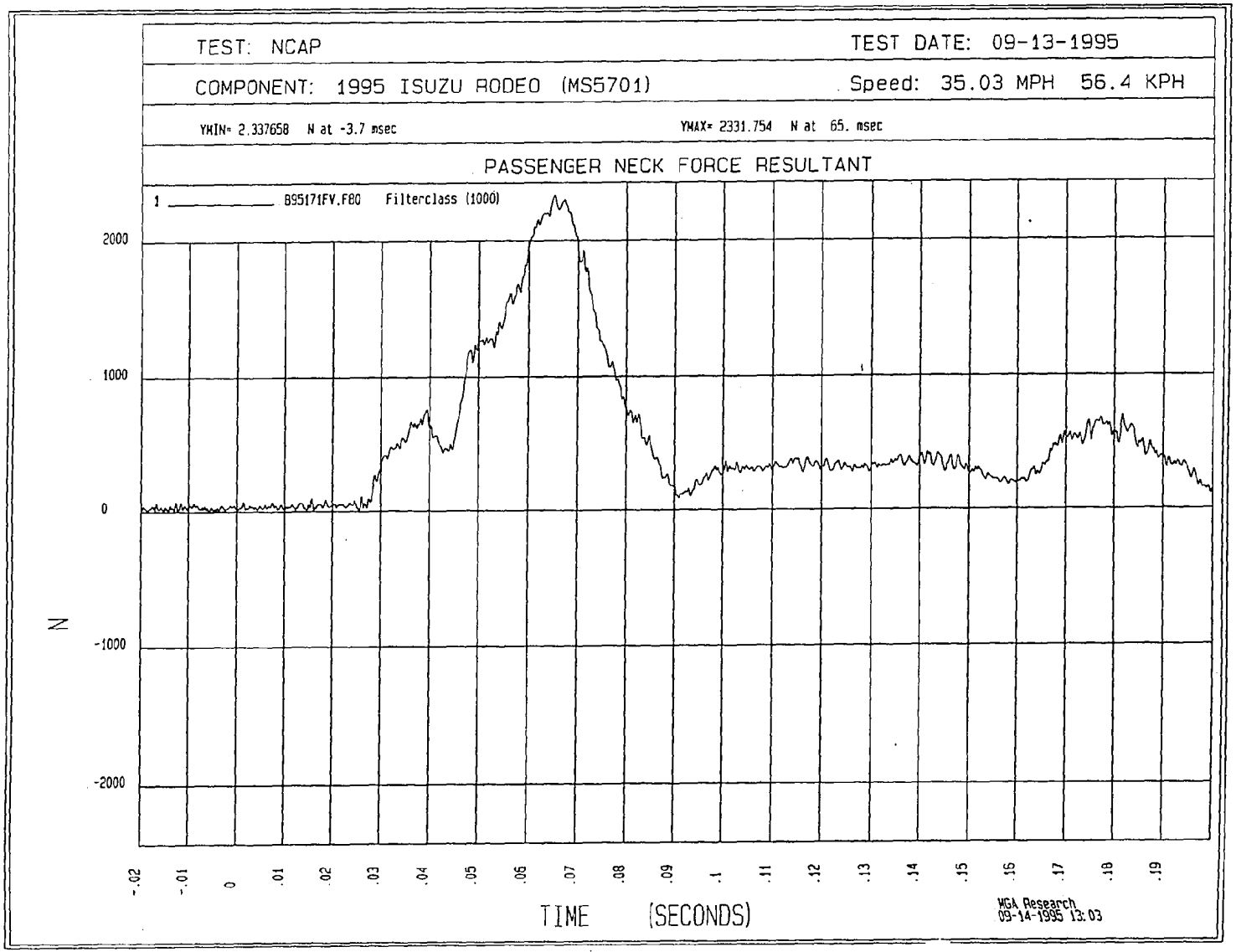


Figure B-115 - Passenger Neck Force Resultant vs. Time

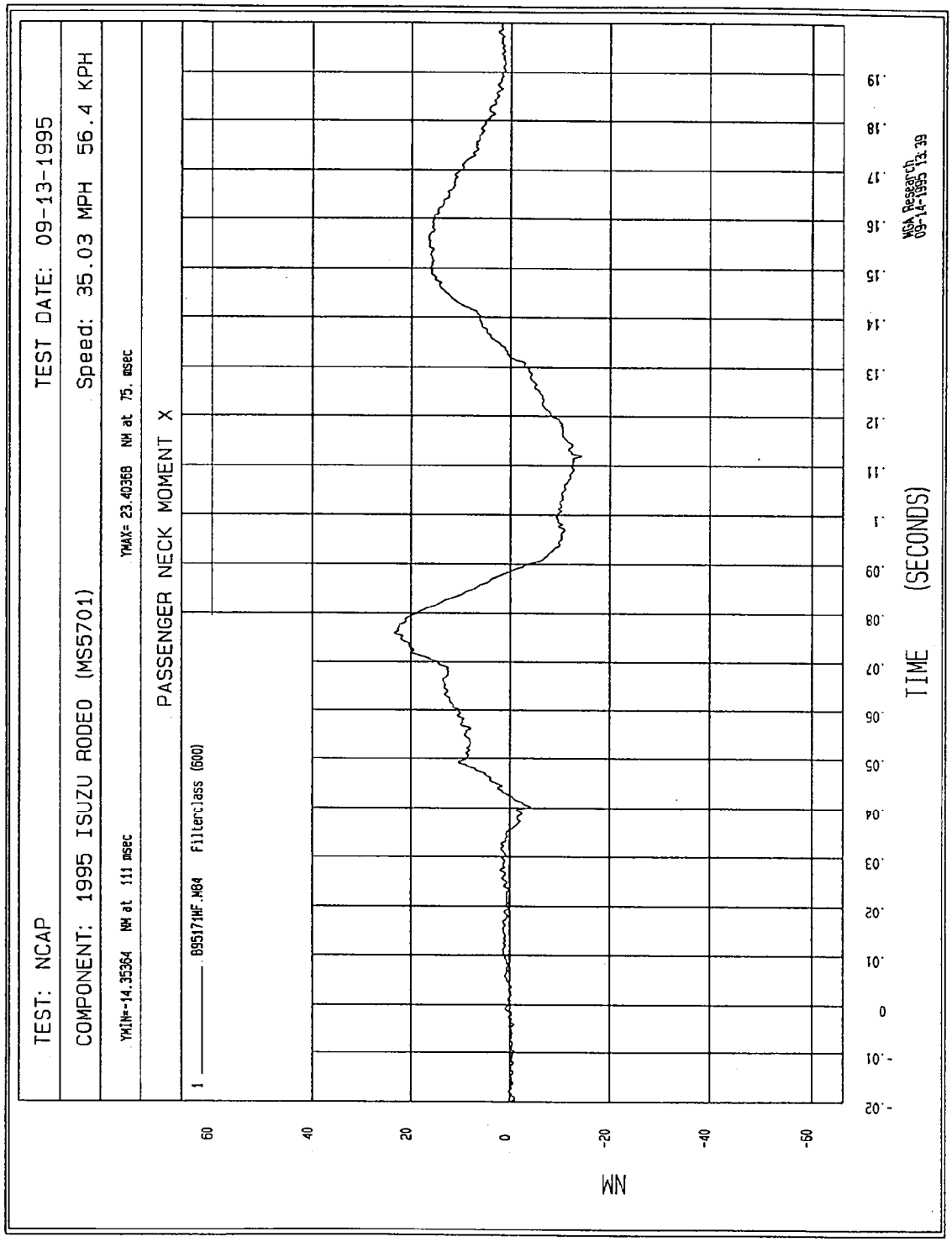


Figure B-116 - Passenger Neck Moment X vs. Time

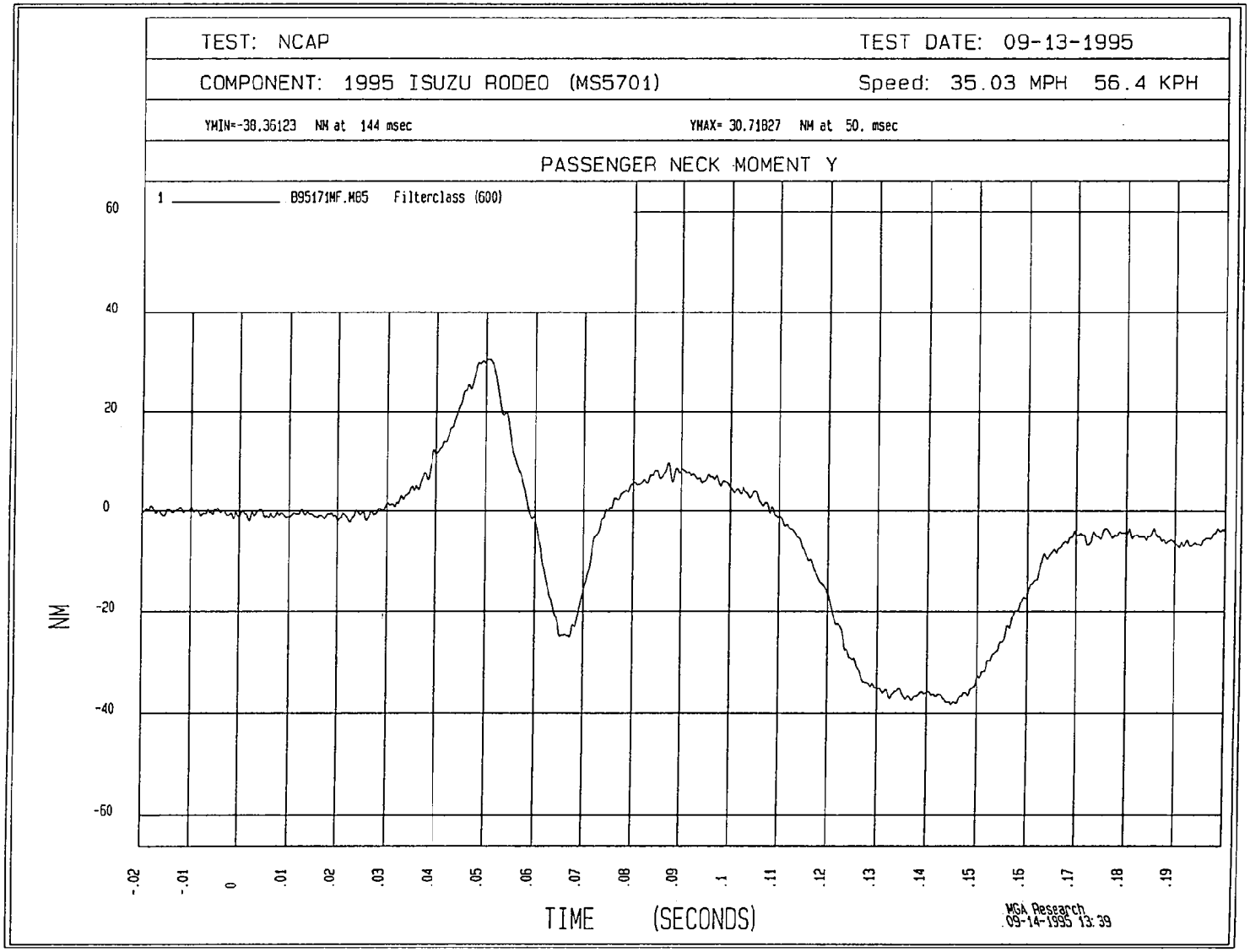


Figure B-117 - Passenger Neck Moment Y vs. Time

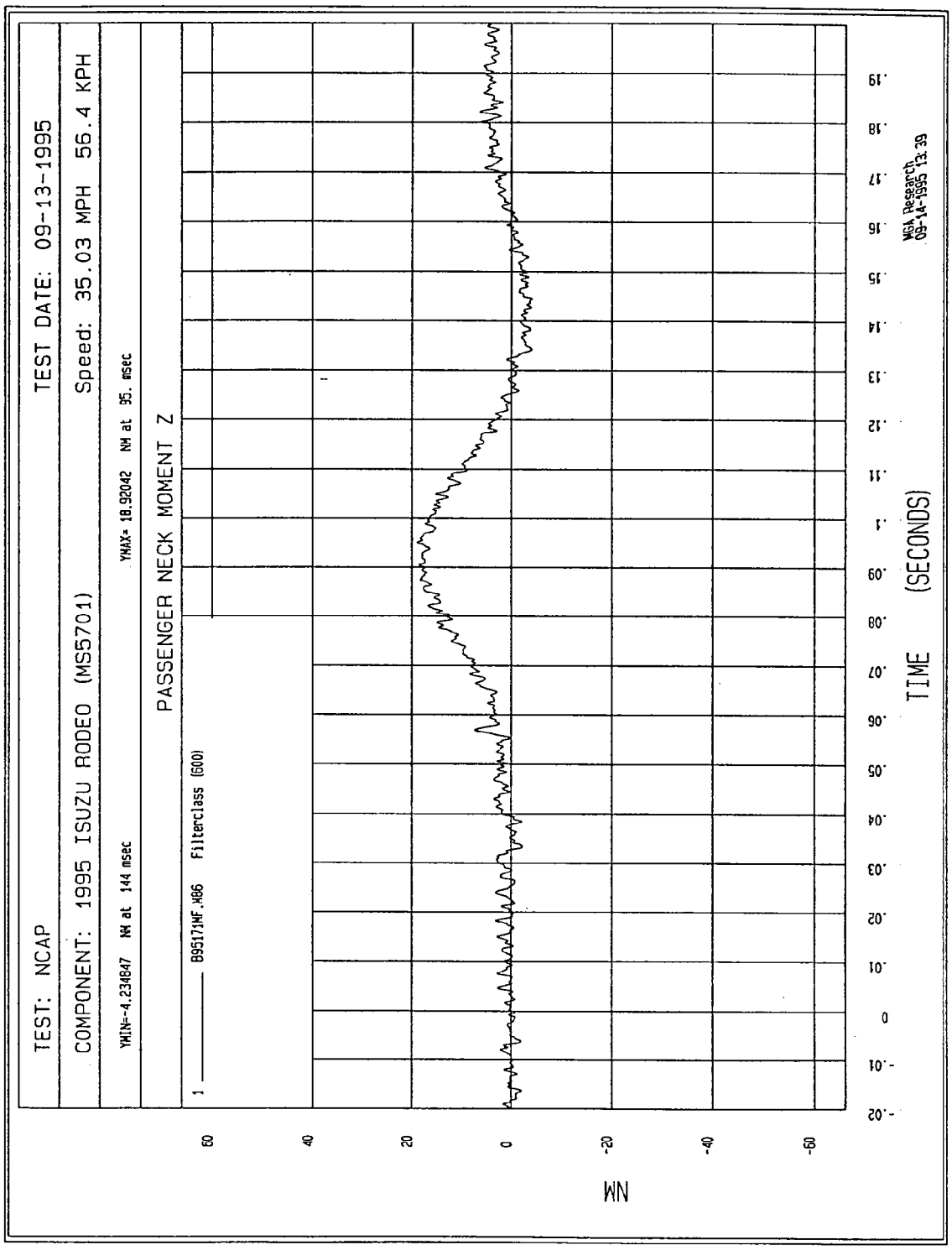


Figure B-118 - Passenger Neck Moment Z vs. Time

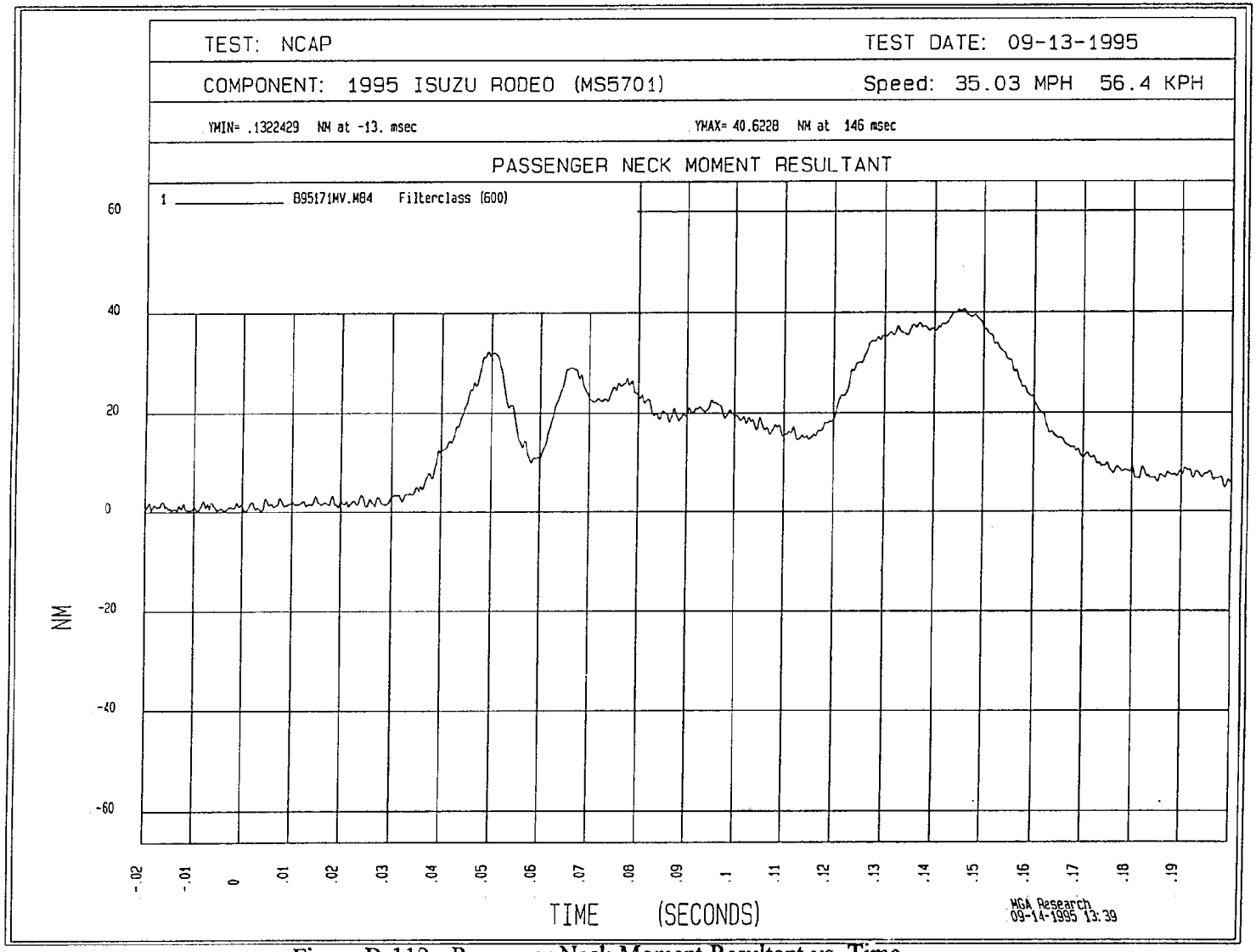


Figure B-119 - Passenger Neck Moment Resultant vs. Time

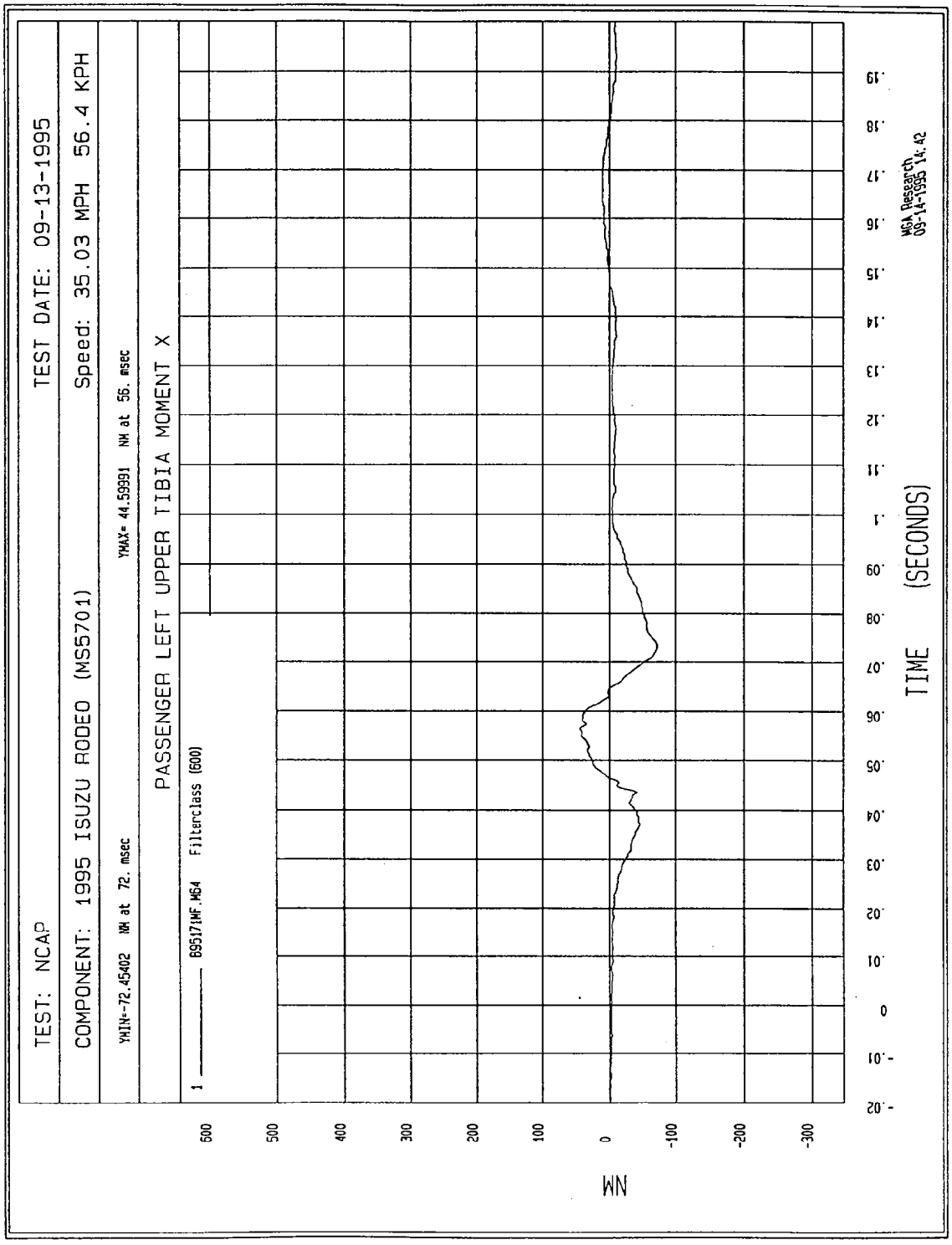


Figure B-120 - Passenger Left Upper Tibia Moment X vs. Time

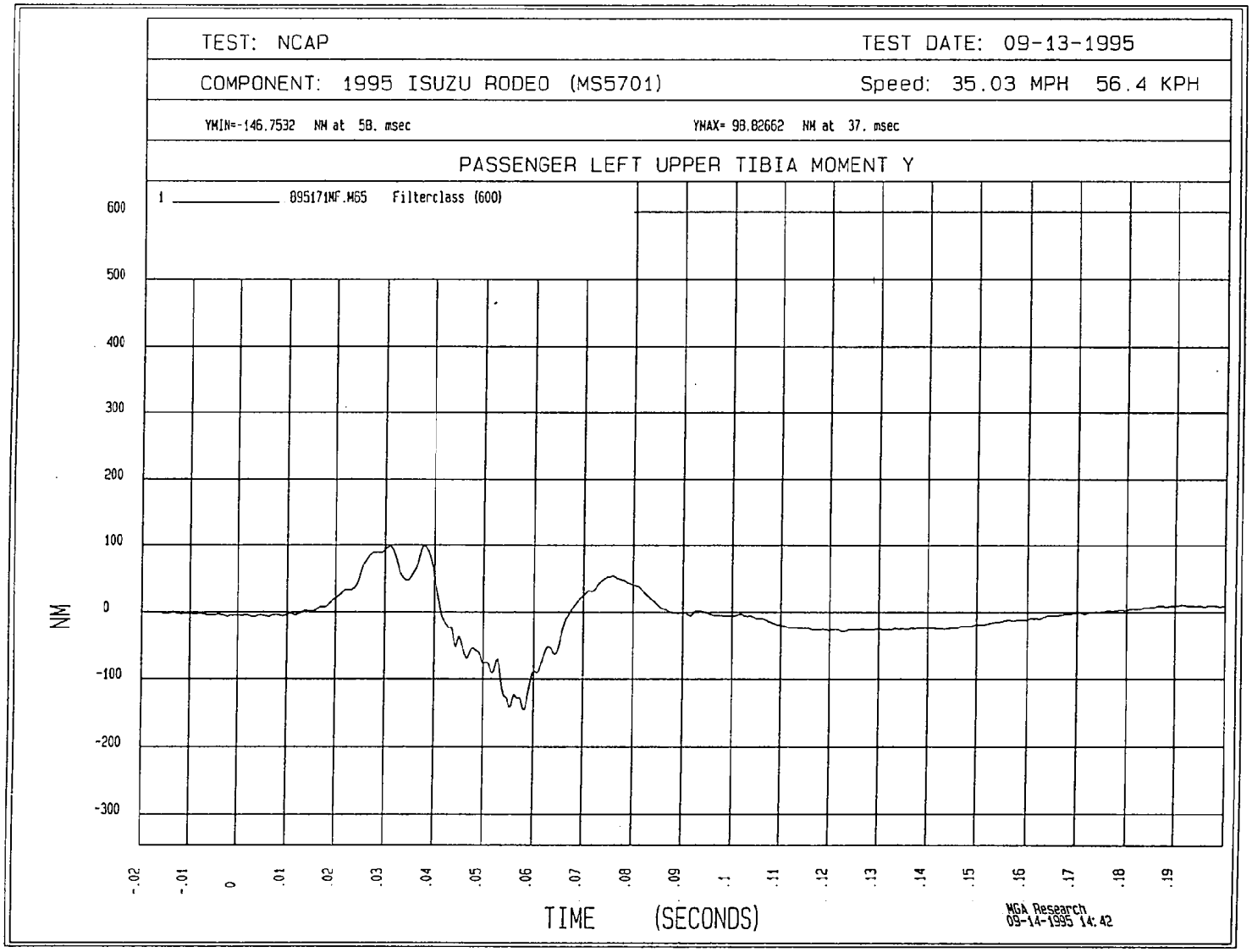


Figure B-121 - Passenger Left Upper Tibia Moment Y vs. Time

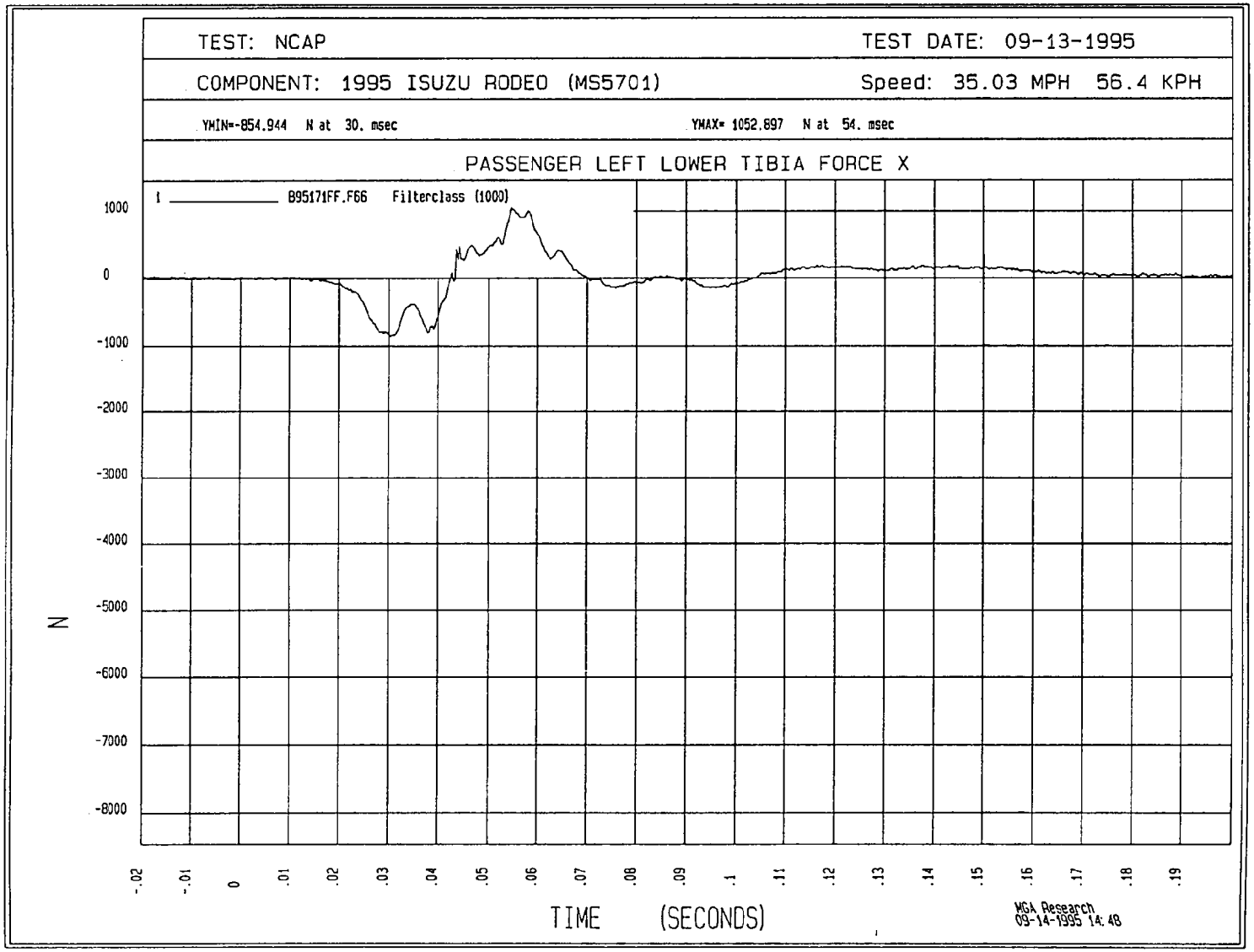


Figure B-122 - Passenger Left Lower Tibia Force X vs. Time

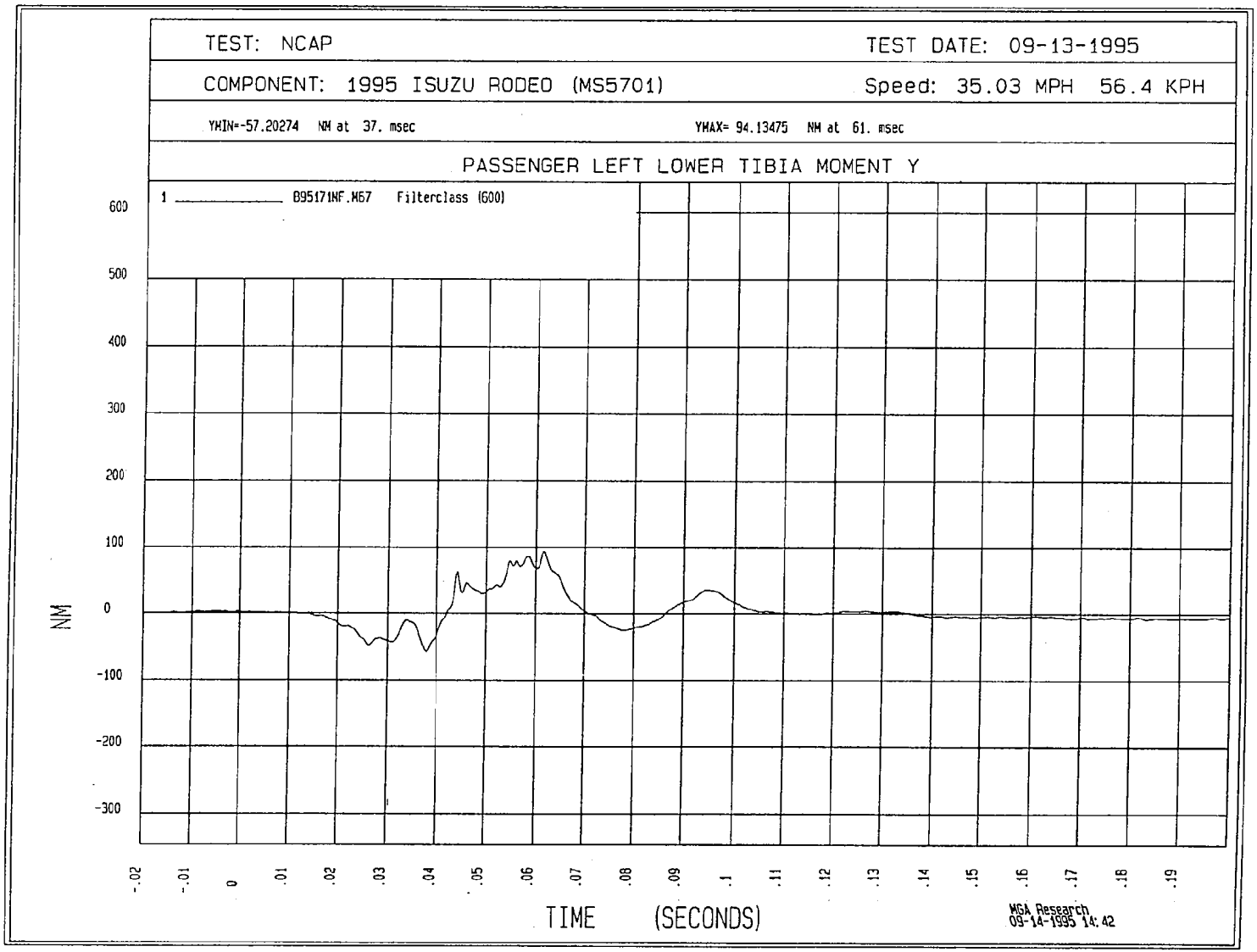


Figure B-123 - Passenger Left Lower Tibia Moment Y vs. Time

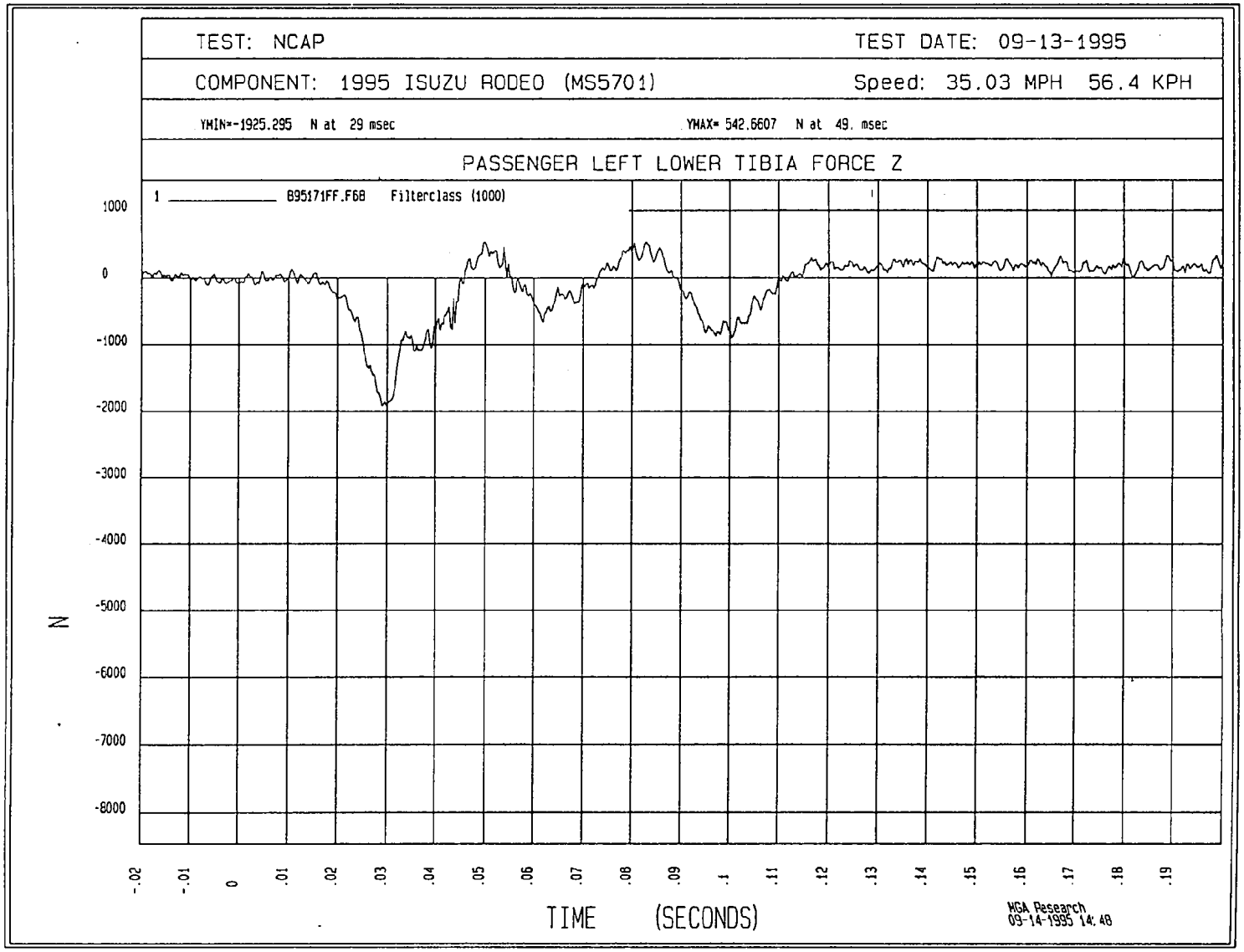


Figure B-124 - Passenger Left Lower Tibia Force Z vs. Time

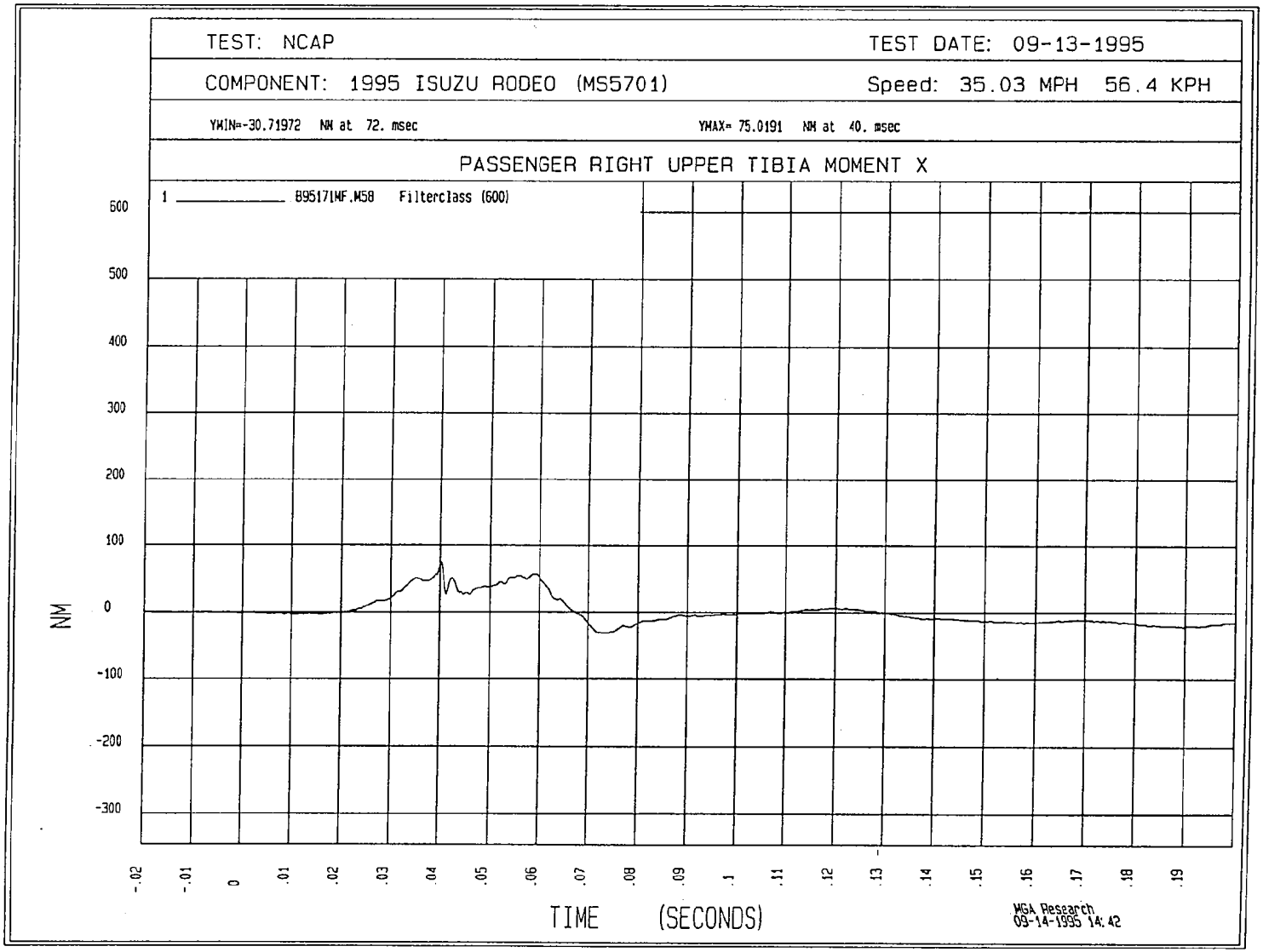


Figure B-125 - Passenger Right Upper Tibia Moment X vs. Time

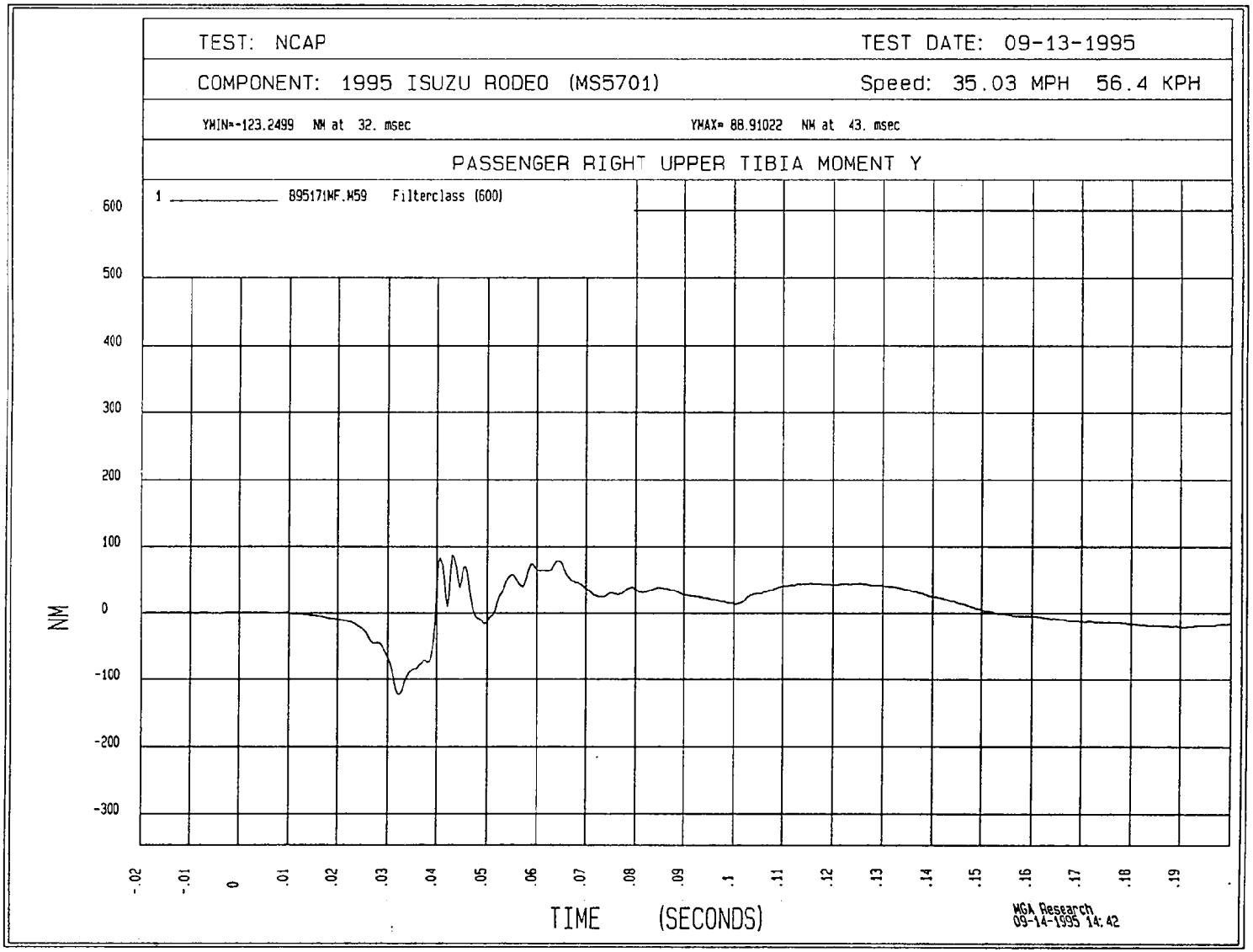


Figure B-126 - Passenger Right Upper Tibia Moment Y vs. Time

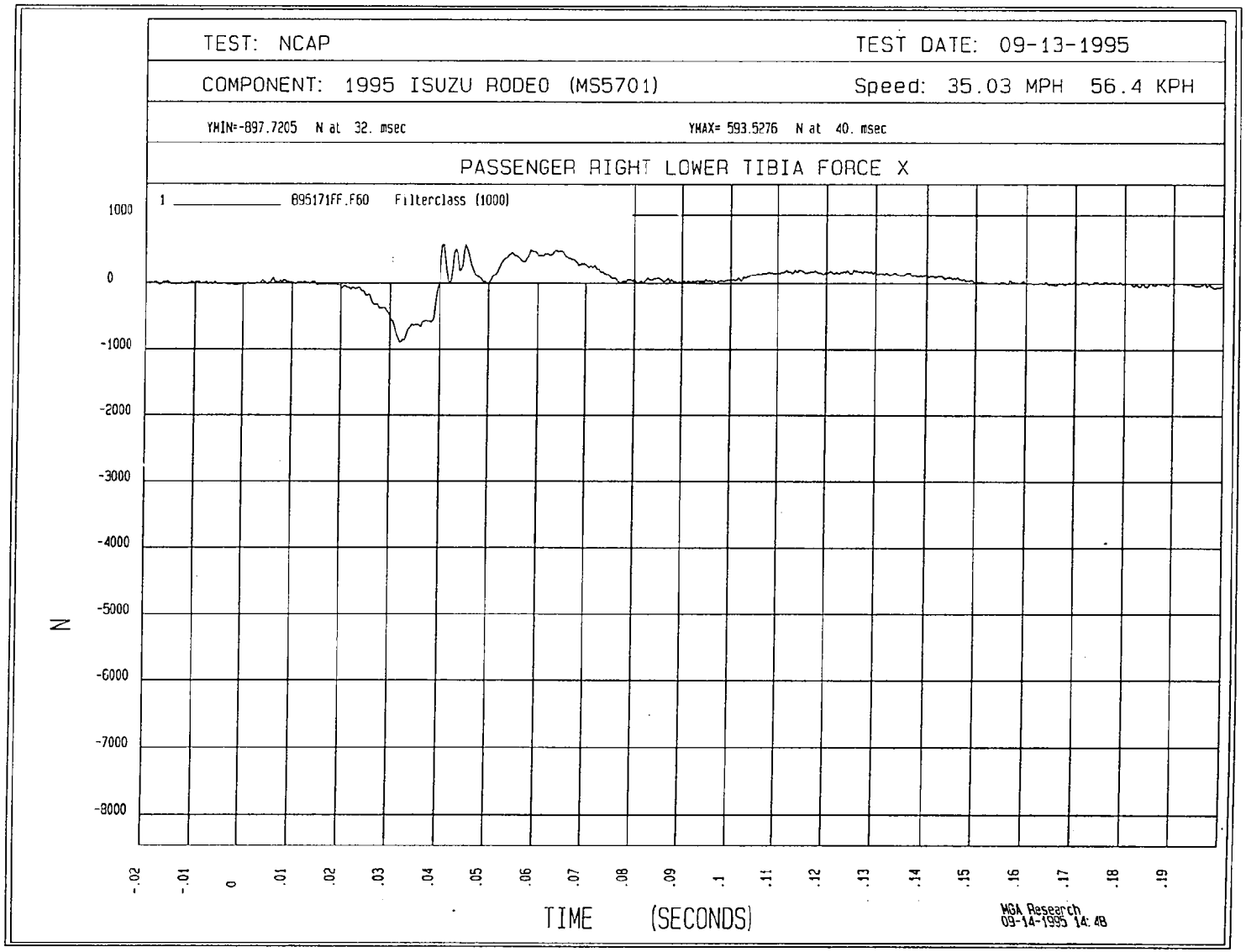


Figure B-127 - Passenger Right Lower Tibia Force X vs. Time

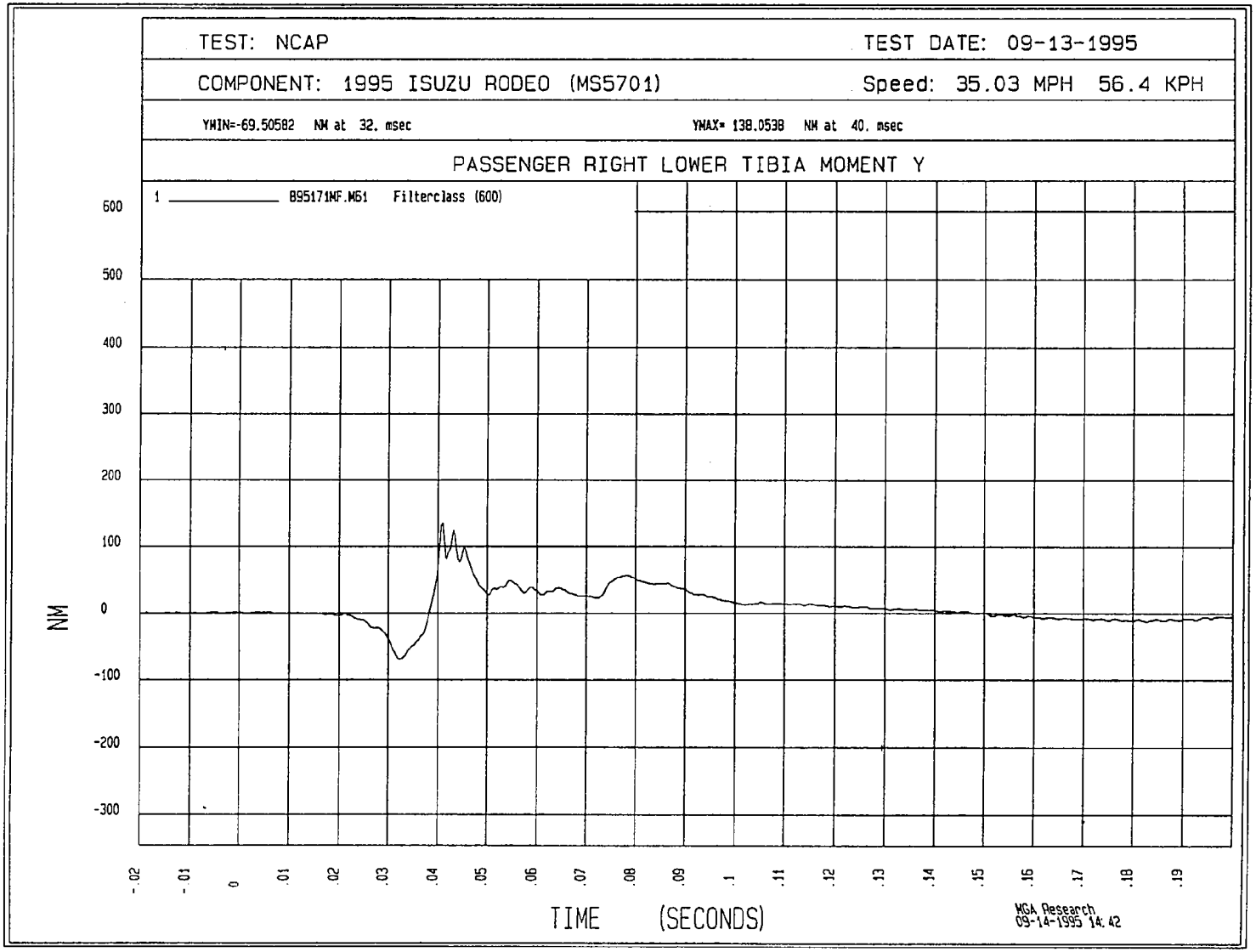


Figure B-128 - Passenger Right Lower Tibia Moment Y vs. Time

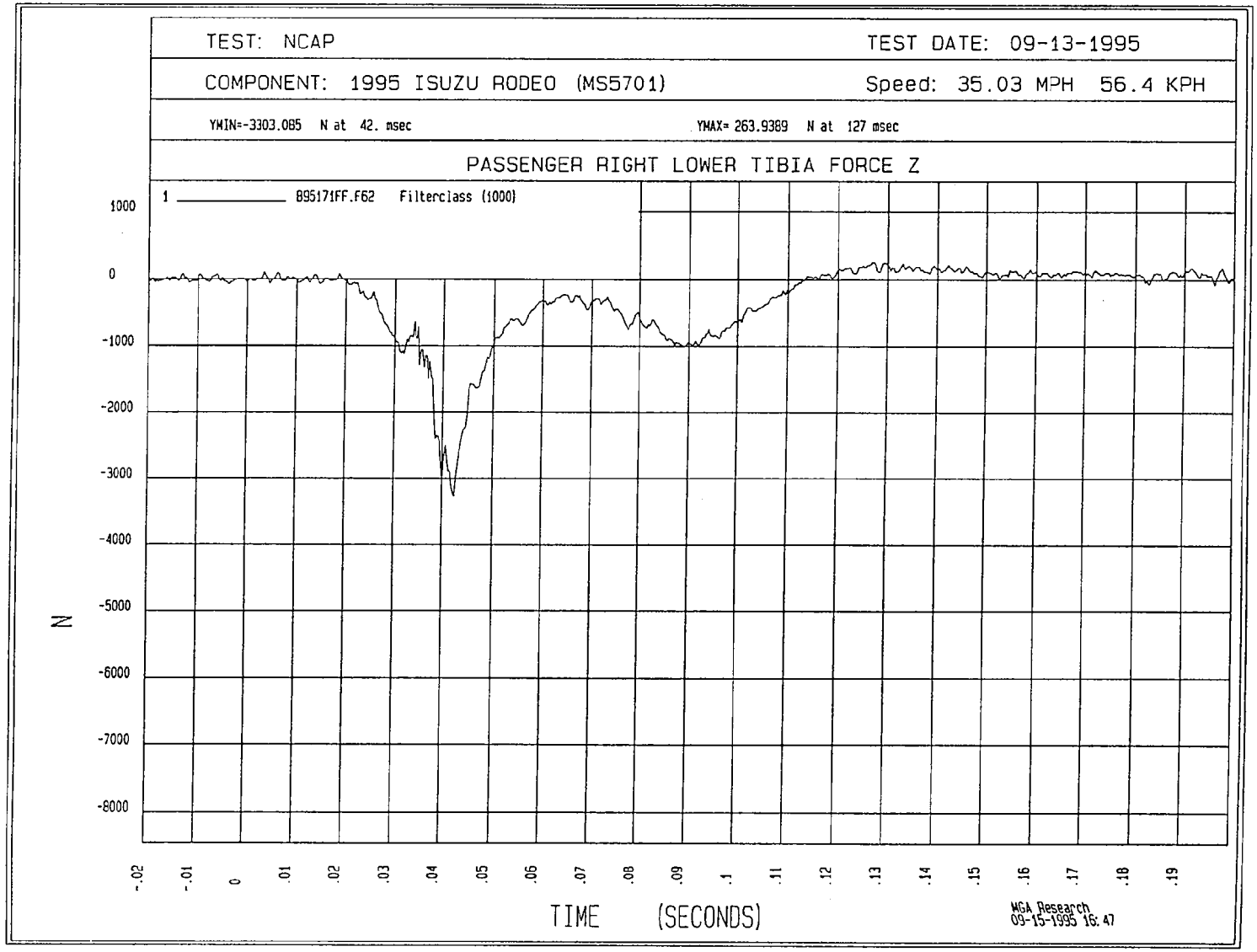


Figure B-129 - Passenger Right Lower Tibia Force Z vs. Time

APPENDIX C

Dummy Configuration & Performance Verification Data

HYBRID III DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 065 DUMMY CALIBRATION BY: Al Chalmers

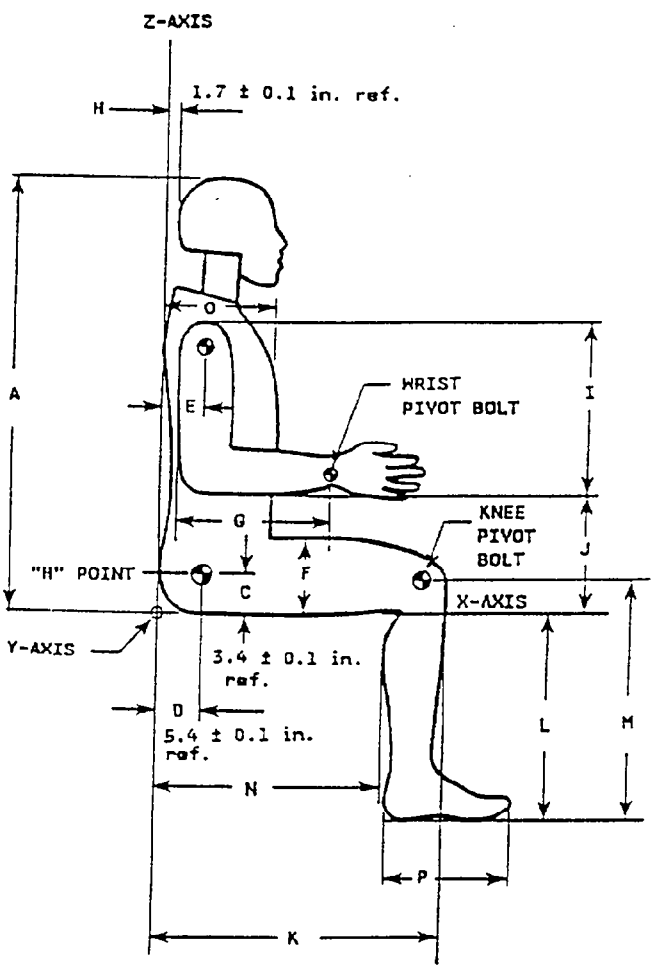
I. CONFIGURATION VERIFICATION DATA

DATE OF VERIFICATION: 07-13-95

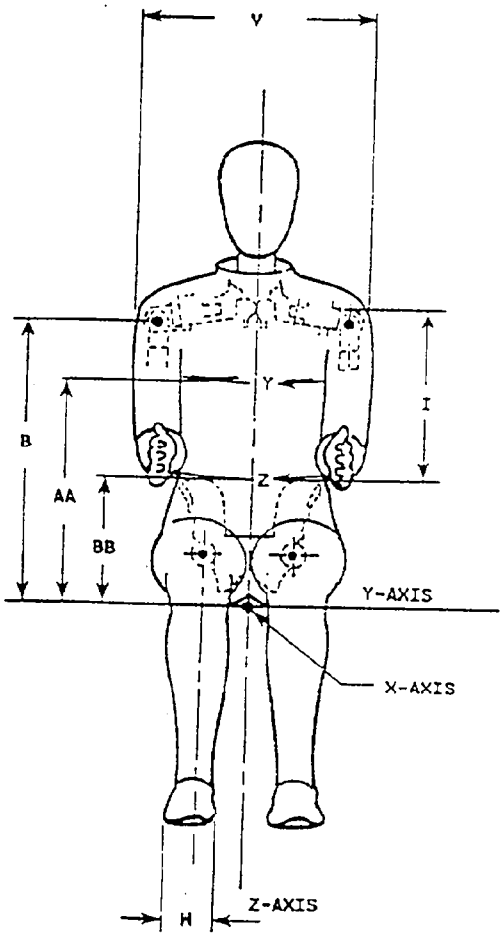
DESCRIPTION	SPECIFICATION (inches)	ACTUAL MEASUREMENT (inches)
A - Total Sitting Height	34.6 - 35.0	34.9
B - Shoulder Pivot Height	19.9 - 20.5	20.5
C - "H" Point Height	3.3 - 3.5	3.5
D - "H" Point from Seat Back	5.3 - 5.5	5.5
E - Shoulder Pivot From Backline	3.3 - 3.7	3.5
F - Thigh Clearance	5.5 - 6.1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



SIDE VIEW



FRONT VIEW

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

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET

DUMMY NO.: 065 DUMMY CALIBRATION BY: Al Chalmers

VERIFICATION DATE: 07-13-95

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

1.0 HEAD DROP TEST

	SPECIFICATION	MEASUREMENT
Peak Resultant Acceleration	225 - 275 G	234
Peak Lateral Acceleration	15 G. MAX	5
Is Acceleration Curve Unimodel	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	23.50
	20 MS	17.60 - 22.60 G	22.45
	30 MS	12.50 - 18.50 G	14.40
Max. Pendulum G Above 30 MS		29.0 G MAX	14.3
Deceleration - Time Curve Decay Time to 5 G		34 - 42 MS	39
D Plane Rotation	MAX	64 - 78 DEG.	75
	TIME	57 - 64 MS	58
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 MS	114
Moment About Occipital Condyle	MIN.	65 - 80 FT.LBS	73
	TIME	47 - 58 MS	51
Positive Moment - Time Curve Decay Time to Zero		97 - 107 MS	103

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

3.0 NECK EXTENSION TEST

		SPECIFICATION	MEASUREMENT
Pendulum Speed		19.50 - 20.30 F/S	20.05
Pendulum Deceleration	10 MS	17.20 - 21.20 G	19.00
	20 MS	14.00 - 19.00 G	17.20
	30 MS	11.00 - 16.00 G	13.00
Max. Pendulum G Above 30 MS		22 G Max	13
Deceleration - Time Curve Decay Time to 5 G		38 - 46 MS	44
D Plane Rotation	MAX	81 - 106 DEG.	103
	TIME	72 - 82 MS	76
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 MS	157
Moment About Occipital Condyle	MIN.	-59.0/-39.0 FT LBS	-49.8
	TIME	65 - 79 MS	72
Positive Moment - Time Curve Decay Time to Zero		120 - 148 MS	144

4.0 CHEST IMPACT TESTS

	SPECIFICATION	MEASUREMENT
Probe Speed	21.6 to 22.4 F/S	22.0
Peak Deflection	2.50 to 2.86 IN.	2.52
Peak Resistive Force	1160 to 1325 LBS.	1221
Internal Hysteresis	69 to 85%	70

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

5.0 KNEE IMPACT TESTS

LEFT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	6.8
Maximum Force	1060 - 1300 LBS.	1063

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

HYBRID III DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 066 DUMMY CALIBRATION BY: Al Chalmers

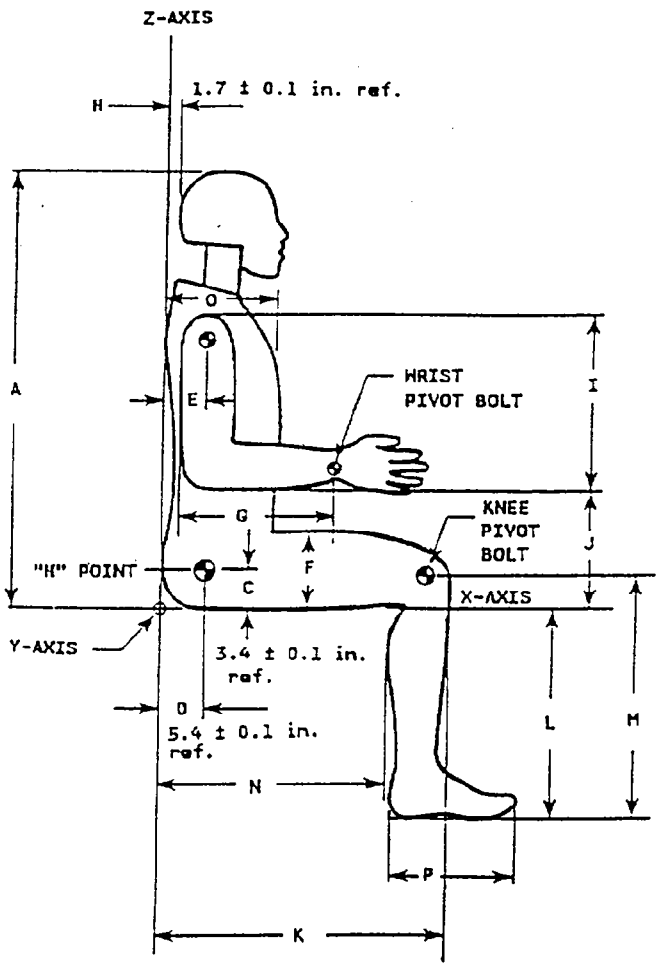
I. CONFIGURATION VERIFICATION DATA

DATE OF VERIFICATION: 07-13-95

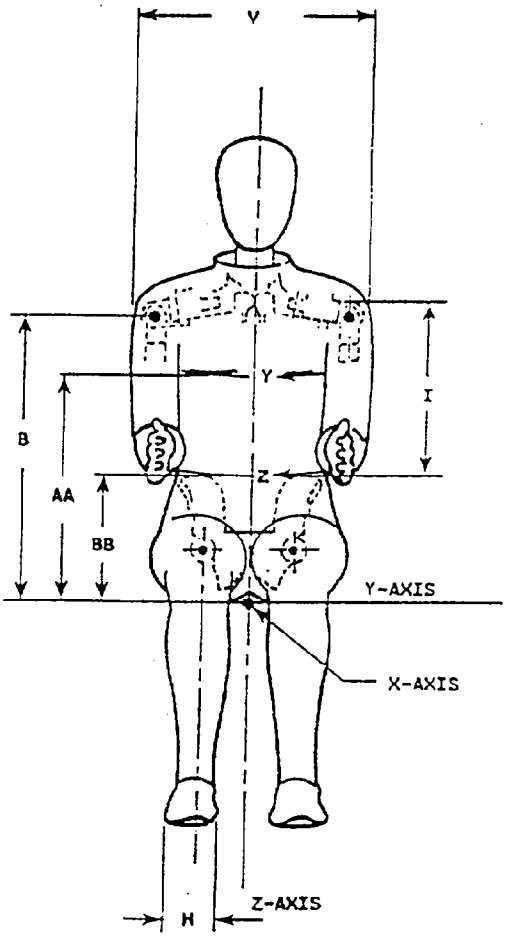
DESCRIPTION	SPECIFICATION (Inches)	ACTUAL MEASUREMENT (inches)
A - Total Sitting Height	34.6 - 35.0	34.8
B - Shoulder Pivot Height	19.9 - 20.5	20.5
C - "H" Point Height	3.3 - 3.5	3.5
D - "H" Point from Seat Back	5.3 - 5.5	5.5
E - Shoulder Pivot From Backline	3.3 - 3.7	3.5
F - Thigh Clearance	5.5 - 6.1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



SIDE VIEW



FRONT VIEW

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

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

DUMMY NO.: 066 DUMMY CALIBRATION BY: Al Chalmers

VERIFICATION DATE: 07-13-95

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

1.0 HEAD DROP TEST

	SPECIFICATION	MEASUREMENT
Peak Resultant Acceleration	225 - 275 G	233
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	22.9
Pendulum Deceleration	10 MS	22.50 - 27.50 G	23.48
	20 MS	17.60 - 22.60 G	20.57
	30 MS	12.50 - 18.50 G	15.30
Max. Pendulum G Above 30 MS		29.0 G MAX	15.3
Deceleration - Time Curve Decay Time to 5 G		34 - 42 MS	39
D Plane Rotation	MAX	64 - 78 DEG.	75
	TIME	57 - 64 MS	59
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 MS	115
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	18.48
	20 MS	14.00 - 19.00 G	17.18
	30 MS	11.00 - 16.00 G	13.09
Max. Pendulum G Above 30 MS		22 G Max	13
Deceleration - Time Curve Decay Time to 5 G		38 - 46 MS	44
D Plane Rotation	MAX	81 - 106 DEG.	102
	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	-49.6
	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	22.0
Peak Deflection	2.50 to 2.86 IN.	2.57
Peak Resistive Force	1160 to 1325 LBS.	1254
Internal Hysteresis	69 to 85%	71

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

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.	1078

RIGHT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	6.9
Maximum Force	1060 - 1300 LBS.	1127

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	AMMN8	Endevco	07/12/95
Head Y	ACC61	Endevco	07/12/95
Head Z	ACCW9	Endevco	07/12/95
Head X Redundant	AJ621	Endevco	07/12/95
Head Y Redundant	AJ619	Endevco	07/12/95
Head Z Redundant	AHY54	Endevco	07/12/95
Chest X	ACC78	Endevco	07/12/95
Chest Y	ACCE6	Endevco	07/12/95
Chest Z	ACCY3	Endevco	07/12/95
Chest X Redundant	AJ9J7	Endevco	07/12/95
Chest Y Redundant	AJ7A2	Endevco	07/12/95
Chest Z Redundant	AJ819	Endevco	07/12/95
Right Femur Load Cell	259	Denton	07/14/95
Left Femur Load Cell	260	Denton	07/14/95
Pelvis X	ALB87	Endevco	07/12/95
Pelvis Y	ABNB3	Endevco	07/12/95
Pelvis Z	AJ834	Endevco	07/12/95

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 065

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Neck Load Cell X	442	Denton	07/13/95
Neck Load Cell Y	442	Denton	07/13/95
Neck Load Cell Z	442	Denton	07/13/95
Neck Moment X	442	Denton	07/13/95
Neck Moment Y	442	Denton	07/13/95
Neck Moment Z	442	Denton	07/13/95
Chest Deflection Gauge	065	Servo	07/21/95
Lap Belt Load Cell	312	Lebow	05/23/95
Torso Belt Load Cell	690	Lebow	04/12/95

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	07/13/95
Head Y	ACCH1	Endevco	07/13/95
Head Z	AAMW5	Endevco	07/13/95
Head X Redundant	AJ9D2	Endevco	07/13/95
Head Y Redundant	AH1E2	Endevco	07/13/95
Head Z Redundant	AJ7K3	Endevco	07/13/95
Chest X	ACCY1	Endevco	07/12/95
Chest Y	ACCC8	Endevco	07/12/95
Chest Z	ACCT7	Endevco	07/12/95
Chest X Redundant	AJ9D4	Endevco	07/12/95
Chest Y Redundant	AJ9F3	Endevco	07/12/95
Chest Z Redundant	AJ9D9	Endevco	07/12/95
Right Femur Load Cell	261	Denton	07/14/95
Left Femur Load Cell	262	Denton	07/14/95
Pelvis X	ALDY8	Endevco	07/12/95
Pelvis Y	ALRK9	Endevco	07/12/95
Pelvis Z	ALE80	Endevco	07/12/95

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 066

	PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Neck Load Cell X	443	Denton	07/13/95
Neck Load Cell Y	443	Denton	07/13/95
Neck Load Cell Z	443	Denton	07/13/95
Neck Moment X	443	Denton	07/13/95
Neck Moment Y	443	Denton	07/13/95
Neck Momemt Z	443	Denton	07/13/95
Chest Deflection Gauge	066	Servo	07/21/95
Lap Belt Load Cell	212	Lebow	04/12/95
Torso Belt Load Cell	661	Lebow	04/13/95

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 066

	PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Right Tibia Moment X	036	Denton	06/05/95
Upper Right Tibia Moment Y	036	Denton	06/05/95
Lower Right Tibia Moment Y	040	Denton	06/05/95
Lower Right Tibia Force X	040	Denton	06/05/95
Lower Right Tibia Force Z	040	Denton	06/05/95
Upper Left Tibia Moment X	039	Denton	06/05/95
Upper Left Tibia Moment Y	039	Denton	06/05/95
Lower Left Tibia Moment Y	033	Denton	06/05/95
Lower Left Tibia Force X	033	Denton	06/05/95
Lower Left Tibia Force Z	033	Denton	06/05/95

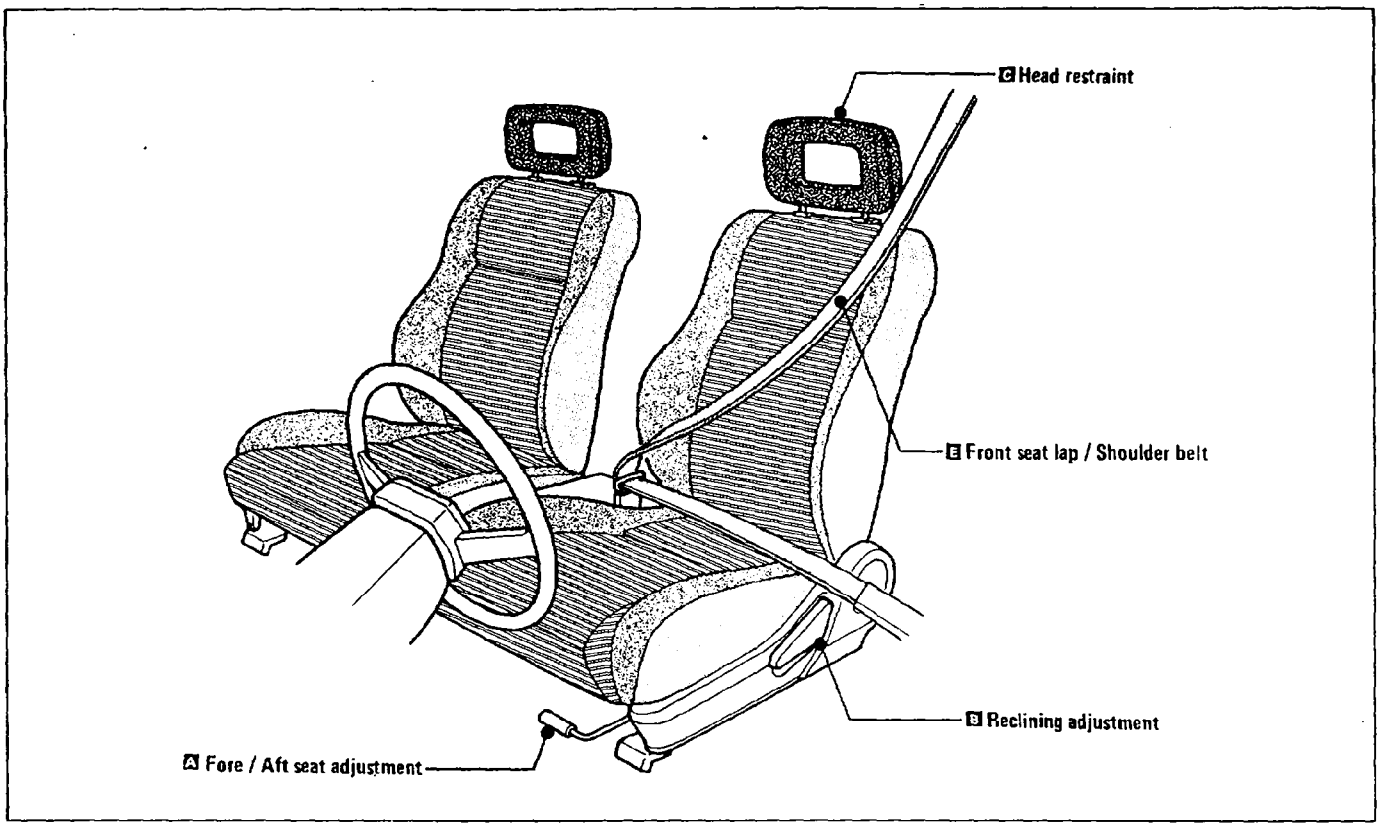
	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Rear Seat Crossmember X	H07-A15	Entran	09/05/95
Right Rear Seat Crossmember X	C27-B02	Entran	04/08/95
Top of Engine Block X	C27-B04	Entran	04/27/95
Bottom of Engine X	H07-A17	Entran	09/05/95
Left Brake Caliper X	F10-D02	Entran	08/02/95
Right Brake Caliper X	H07-A16	Entran	09/05/95
Instrument Panel X	H07-A25	Entran	09/05/95
Redundant Left Rear Seat Crossmember X	E13-D05	Entran	09/11/95
Redundant Right Rear Seat Crossmember X	B02-G02	Entran	09/05/95

	LABORATORY INSTRUMENTS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Neck Bending Pendulum Accelerometer	AH5N9	Endevco	05/08/95
Neck Bending Head Rotary Potentiometer	018	Spectrol	03/13/95
Neck Bending Pendulum Rotary Potentiometer	019	Spectrol	03/13/95
Chest Probe Accelerometer	AN8A4	Endevco	06/12/95
Knee Impact Accelerometer	MGA001	Entran	04/21/95

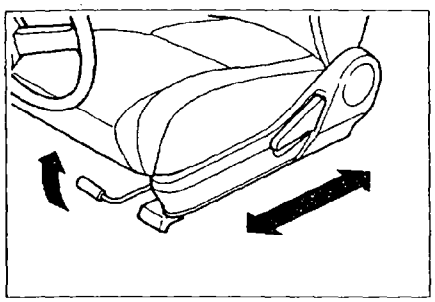
APPENDIX E

Vehicle Owner's Occupant Restraint System Instructions

3. *Seats, Seat Belts and Air Bags*



A FORE/AFT SEAT ADJUSTMENT



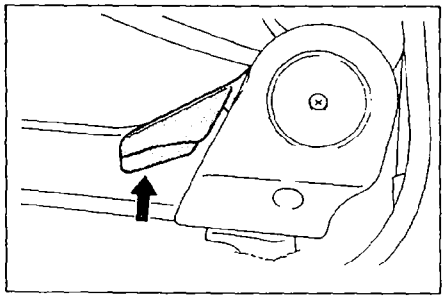
The front seats may be adjusted forward or backward by pulling up the lever at the front of the seat and then using body pressure to move the seat to the desired position. Let go of the lever and the seat will lock into the desired position.

WARNING

•After adjusting a manually operated seat, always use body weight to push forward and backward on the seat to be sure the seat adjusters have latched. Movement of the seat indicates that at least one latch did not engage. This could increase the chance of injury and/or the degree of injury in an accident. Take the vehicle to your Isuzu Dealer for service if you find that your seat adjusters do not latch.

•Do not attempt to adjust the driver's seat while the vehicle is in motion. The seat could move suddenly, causing you to lose control of your vehicle.

B RECLINING ADJUSTMENT



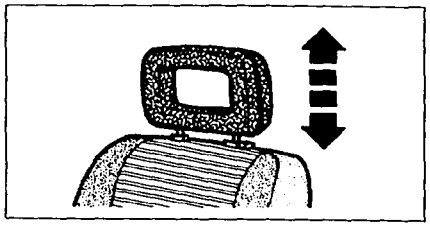
Front seatbacks can be tilted backward if so desired, using the lever on the door side of each front seat. Raise the lever and use body pressure to move the seatback to the desired position.
Let go of the lever and the seatback will lock into the desired position.
Keep seat belt webbing and latch clear of the seat parts when you tilt the folding seats forward or backward. This helps to prevent damage to the seat belt system.

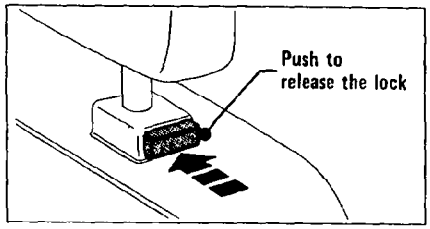
WARNING

⚠ **•To reduce the risk of injury and to ensure maximum seat belt effectiveness during a collision or a sudden stop, the seat should not be reclined any more than needed for comfort. The seatback and seat belts work best only when the occupant is sitting well back and straight up in the seat. If the seat is reclined, you may slide under the lap belt, causing force to be applied to your abdomen, or you may not be fully restrained, depending on the nature of the accident, increasing the likelihood of injuries.**

•Do not adjust the driver's seatback while the vehicle is in motion. The seatback could move unexpectedly and cause the driver to lose control of the vehicle.

C HEAD RESTRAINT





Head restraints are designed to help reduce the risk of neck injuries. Choose the position which places the top of the head restraint closest to the top of your ears. Push the lock knob to unlock the head restraint. Move the restraint up or down as required.

WARNING

⚠ **•Do not attempt to adjust the driver's head restraint while the vehicle is in motion, because it could cause a loss of control of the vehicle.**

•Do not operate the vehicle with the head restraint removed, since it will increase the risk of neck injury in the event of an accident.

D REAR SEAT

WARNING

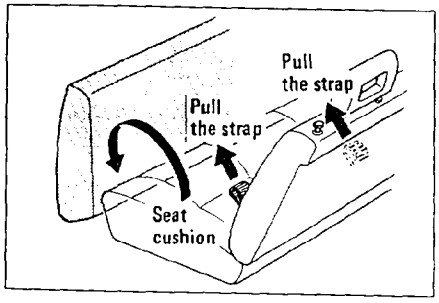
⚠ **•To avoid injury, keep your hands and feet clear of the rear seat when folding and unfolding the seat. Carefully follow the instructions below.**

The rear seat can be folded forward to provide additional cargo area.

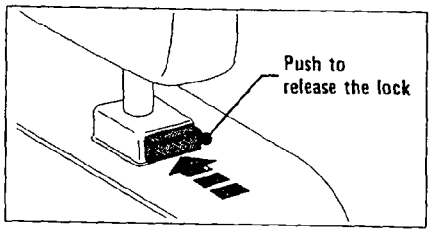
FOLDING

1. • Pull the strap forward and fold the seat cushion up. (split seat models)
   • Pull each of the straps up one at a time, toward the center of the vehicle, at a 45° angle. Fold the seat cushion up. (bench seat models)

   Pull the seat belts through the cushions to the rear so they do not interfere with folding operation of the rear seat.

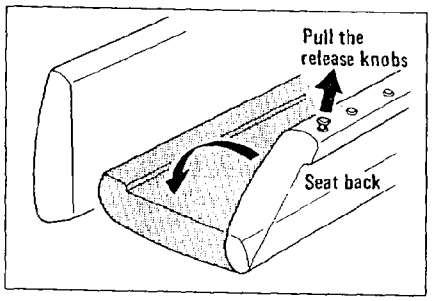


2. To remove the head restraints, press the release knob and pull up on the restraint.



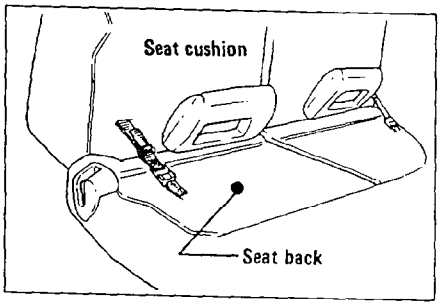
3. Pull the release knobs on both the right and left, and pull the seat back forward to fold it down (split seat models).

   Pull one of the release knobs and pull the seat back forward to fold it down (bench seat models).



4. Attach the band on the bottom of the cushion to the clasp on the back of the seat back.

5. Insert the head restraints between seat back and seat cushion.



WARNING

⚠ **•When the rear seats are folded in the down position, the head restraints should always be properly secured between the seat back and seat cushion to prevent them from becoming a hazard in the event of a sudden stop or an accident.**

•The rear seat center seat belt cannot be used if one side of the rear seat is folded forward (split seat model).

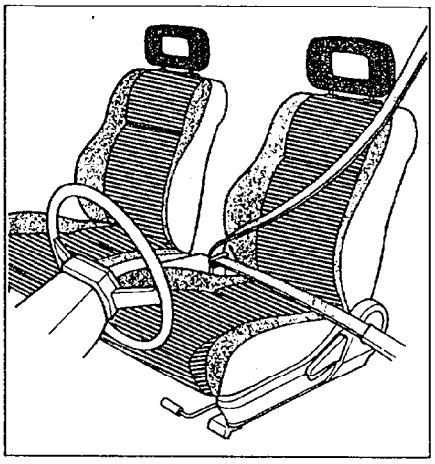
UNFOLDING

1. To raise the seatback, pull the seatback up to the locked upright position.
2. When latching the rear seat cushion to the floor, push the cushion with enough force to lock it.
   After this, confirm it is locked by pulling the seat belt buckle upward.
3. Make sure that the head restraints are properly reinstalled on the top of the seat back.

WARNING

⚠ **•Do not permit anyone to ride in the cargo area or on a rear seat while it is folded down during vehicle operation. Rear seat occupants should be seated in the seat only in its locked upright position and properly restrained at all the times.**
•Always check to see that both the seat back latches are engaged.
•Failure to lock the rear seat securely to the floor and engage the seat back latches could increase the risk of personal injury in an accident.
•Failure to properly route the seat belts could result in damage to belts, reducing their effectiveness in case of accident.

F FRONT AND REAR SEAT LAP/ SHOULDER BELTS



Safety Belt/Air Bag Relationship

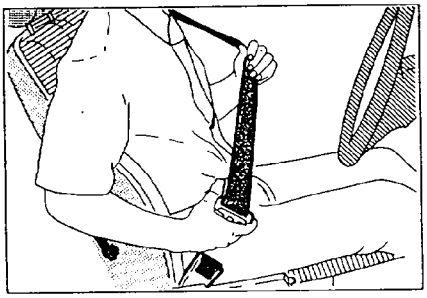
The Air Bag is formally called a Supplemental Restraint System (SRS). The SRS may not provide protection for an unbelted driver and an unbelted right front passenger. Both the driver and the right front passenger must always use the seat belts. That's true not only in frontal collisions, but especially in side and other collisions.

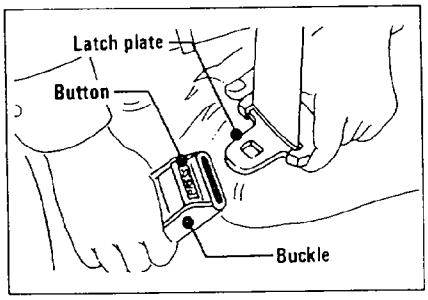
WARNING

⚠ **•To help lessen the chance of injury in accidents or sudden stops, we urge that people riding in the vehicle must be properly restrained at all times, using the seat belts provided. This includes children and pregnant women. See the following pages for use of restraints by children and pregnant women.**

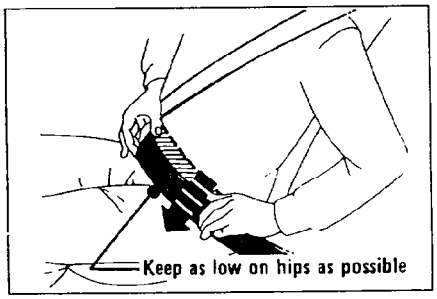
To Fasten the Seat Lap/Shoulder Belt

1. Adjust the front seat as needed. Sit up straight and well back in the seat.
2. Grasp the latch plate and:
- Pull the lap-shoulder belt webbing across the body.
- At the same time, slide the latch along the belt until it reaches the buckle.
- Push the latch plate into the buckle until it clicks.





3. Position the "lap" portion of the belt across the lap as LOW ON THE HIPS as possible.



Then, adjust to a SNUG FIT by holding the "shoulder" portion of the front seat belt and pulling it UPWARD through the latch plate until the lap portion is snug across the lap. This reduces the risk of sliding under the belt during an accident.

4. To unfasten the belt, push in the button on the buckle. The belt should retract when the buckle is unlatched but hold the latch plate as it does so, to keep it from hitting people or nearby objects. To help prevent damage to the safety belt and interior trim, before closing the door be sure the belt is fully retracted and the latch plate is out of the way.

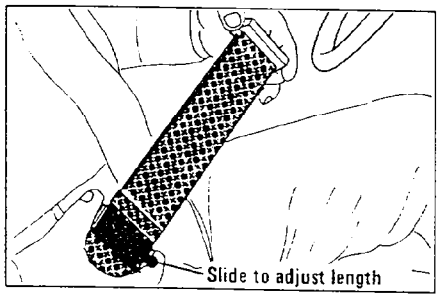
WARNING

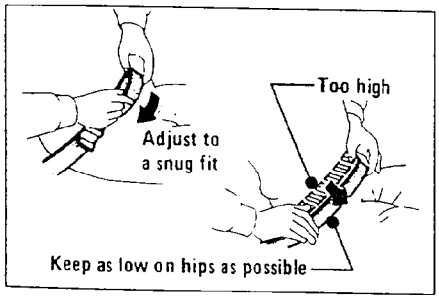
⚠ **•A snug fit with the lap belt positioned low on the hips is necessary to lessen the chance of injury and/or the degree of injury in an accident. This spreads the force of the lap belt over the hip bone instead of across the abdomen.**
•Never use the same seat belt for more than one person at a time. A seat belt worn by more than one person will not provide adequate protection in the event of a collision.
•Never wear twisted seat belts.
•Be very careful not to damage seat belts or seat belt buckles by pinching them in the seat or the door.
•Too much slack could increase the amount of injury because the belt would not be able to properly restrain you in an accident. DO NOT wear the shoulder belt under the arm or out of position. Such use could increase the chance of injury and/or the degree of injury in an accident.
•According to Federal accident statistics, children are safer when properly restrained in rear seating positions than in the front seating positions. It is advisable to have children seated in the rear center seat and restrained with the vehicle's safety belt. Children who have outgrown child restraint systems should use the vehicle's safety belts and sit in the rear seat.
•If the child's seating position has a shoulder belt which is on or very close to the face or neck, position the child so that the belt is properly positioned.

NOTE

•The retractor will lock the belt only during a sudden stop or on impact.
•At other times you can move around freely.
•The seat belts for the passenger seats have an additional locking mechanism designed for securing child restraint seats. When the belt is pulled all the way out, the locking mechanism will only permit the belt to retract. Do not pull the belt all the way out except when using it to secure a child restraint seat. If the belt is inadvertently pulled all the way out, let the belt fully retract before using it for normal passenger restraint.

G REAR CENTER SEAT LAP BELTS (Non-retractor type)





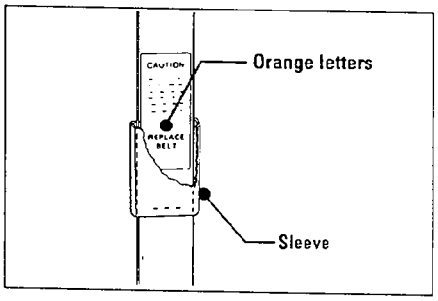
1. Sit up straight and well back in the seat.
2. Take hold of the latch plate at an angle to the webbing and slide it toward the front of vehicle.
   Then pull it slowly across your lap and push the latch plate into the buckle until it clicks.
3. Position the belt across the lap as LOW ON THE HIPS as possible.
   Then, adjust to SNUG FIT by holding the free end of the webbing and pulling it through the latch plate until the belt is snug across the lap. This reduces the risk of sliding under the belt during an accident.
4. To unfasten the belt, push in the button on the buckle.

H SEAT BELT REMINDER

When the key is turned to "ON" position, a light will come on for four to eight seconds to remind people to fasten their safety belts. Unless the driver's safety belt is buckled, a buzzer will sound at the same time.

I SEAT BELT REPLACEMENT LABEL

The front seat safety belts have a loop of webbing under the sleeve for effectiveness of the entire restraint system.



WARNING

•Torn, frayed or damaged seat belts may not protect you in the event of an accident or a sudden stop. If a belt is torn, frayed or damaged, have it replaced immediately. Also, replace the front seat safety belt when the loop has been pulled out and the orange letter words "REPLACE BELT" are visible at the top edge of the sleeve.

K SAFETY BELT EXTENDER

If the vehicle's safety belt will fasten around you. You should use it. But if a safety belt isn't long enough to fasten around you, your dealer will order you an extender, when you go in to order it, take the heaviest coat you will wear, so the extender will be just for you, and just for the seat in your vehicle that you choose. Don't let someone else use it, and use it only for the seat it is made to fit. To wear it, just attach it to the regular safety belt.

J SEAT BELT INSPECTION

- Occasionally check that the belts, buckles, latch plates, retractors, reminder systems, guide loops, and anchors work properly. Also check for damage that could keep the restraint system from doing its job.
- Keep sharp edges and damaging objects away from the belts and other parts of the restraint system.
- Replace belts if cut, weakened, or frayed. Also, have belts replaced if they have been worn in a collision.
- If there is any doubt, have all related parts including belts replaced.
- Keep belts clean and dry.

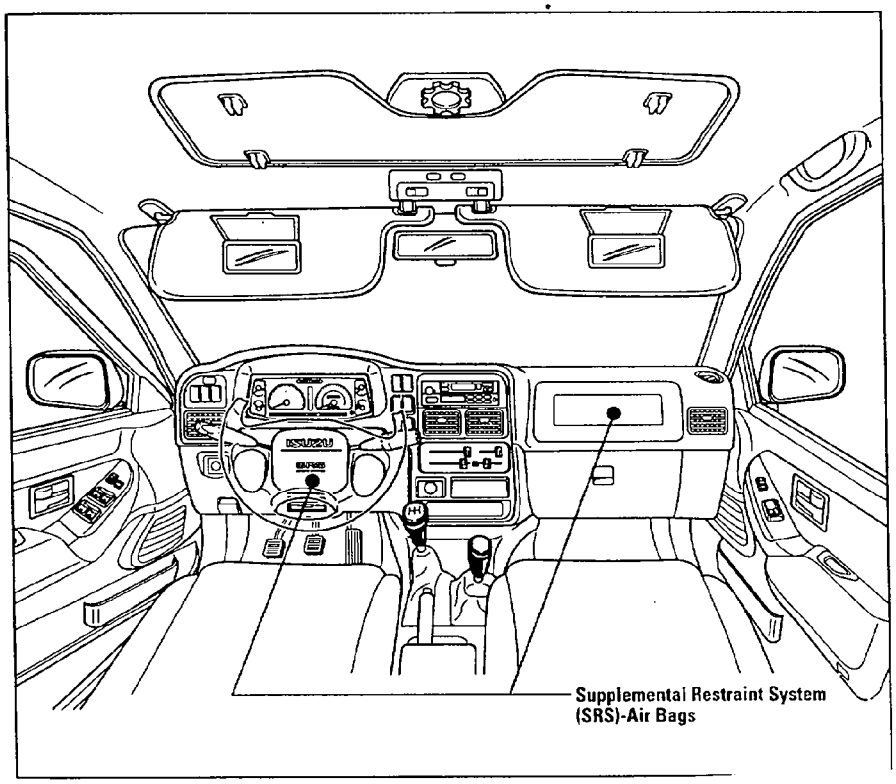
WARNING

•Do not bleach or dye the belts since it may severely weaken them. In the event of an accident or a sudden stop, the belts may not adequately restrain the occupants. Clean the safety belts only with mild soap and luke warm water.

L RESTRAINT OF PREGNANT WOMAN

It is recommended that pregnant women use seat belts. Check with your doctor for specific recommendations. The lap belt should be snug and positioned as low as possible around the hips. Do not position the lap belt around the waist. This can be very dangerous in the event of an accident or sudden stop.

3. *Seat, Seat belts and Air Bags* / E SUPPLEMENTAL RESTRAINT SYSTEM (SRS)-AIR BAGS



Supplemental Restraint System (SRS)-Air Bags

Supplemental Restraint System (SRS)-Air Bags

This section explains the Supplemental Restraint System (SRS) - Air Bags. Your vehicle has an air bag for both the driver and the right-front passenger.

Here's the most important thing to know:

WARNING

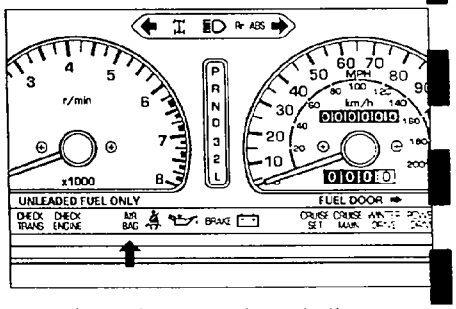
⚠ •The Supplemental Restraint System (SRS) - Air Bags may not provide protection for an unbelted driver and a right front passenger. Air bags are not designed to inflate in rollovers or in rear, side or low-speed frontal crashes. You must wear your seat belt to reduce the chance of hitting things inside the vehicle or being ejected from it. Always wear your seat belt, even with an air bag. Also refer to the supplement "Supplemental Restraint System (AIR BAG)".

WARNING

⚠ •If you're too close to an inflating air bag, it could seriously injure you, since if flates with great force, faster than the blink of an eye. Seat belts help keep you in position for an air bag inflation in a crash. Always wear your seat belt even with an air bag. The driver should sit as far as back possible while still maintaining control of the vehicle and the right passenger occupant should also sit as backwards as possible. Do not sit or learn unnecessarily close to the air bag.

• An inflating air bag can seriously injure small children. Always secure children properly in your vehicle. Do not install rearward-facing child seats in front passenger seat position. Because, a rear-facing child restraint in the front seat could be pushed into the seatback by the right front passenger's air bag if it inflates. A child in a rear-facing child restraint can be seriously injured if this happens. A child who is too small for safety belts should be properly secured in a child restraint. However, a child is safer when properly restrainted in the rear seat, rather than the front seat. Do not put a rear-facing child restraint in the front passenger seat. The child could be seriously injured if the air bag deploys. If it is absolutely necessary to put a child in a child restraint in the front passenger seat. The passenger seat should be moved as far back as possible.

AIR BAG READINESS INDICATOR LIGHT



There is an air bag readiness indicator light on the instrument panel, which has "AIR BAG" on it. The system checks itself and the light tells you if there is a problem. You will see this light blink 7 times when you turn your ignition to ON or START. Then the light should go out which means the system is ready.
If the air bag readiness indicator light illuminates at any other time, or the indicator fails to perform properly when you turn your ignition to ON or START the Air Bag System needs repair. Until it is serviced, the system may not inflate in the event of the type of collision that would normally activate it or may inflate in the unwanted event.

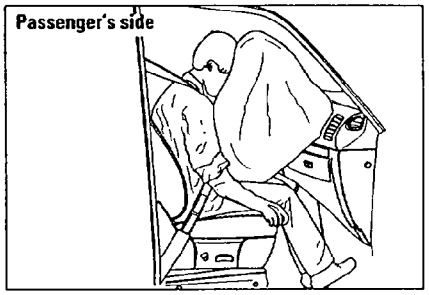
The air bag readiness indicator light monitors itself and the electrical system that connects the air bags and various electronic components and power sources. Your Isuzu Dealer is best qualified to check and repair the system if needed.

WARNING

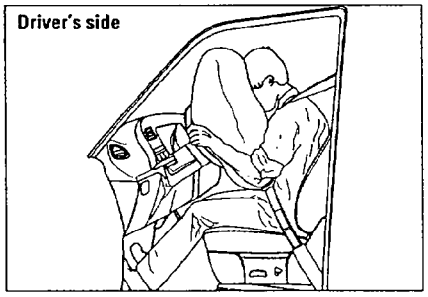
If the air bag readiness indicator light doesn't come on and blink 7 times when you turn your ignition to ON or START, your air bag system may not work properly. Have your vehicle serviced right away at your nearest Isuzu dealer.

HOW THE AIR BAG SYSTEM WORKS

Where are the air bags?
The driver's air bag is in the middle of the steering wheel.



The right-front passenger's air bag is located in the instrument panel on the passenger's side.



What will you see after an air bag inflation?

After the air bag has inflated, it will then quickly deflate. This occurs so quickly that some people may not even realize that the air bag inflated. The air bag will not impede the driver's vision or ability to steer the vehicle, nor will it hinder the occupants from exiting the vehicle. There will be small amounts of smoke coming from vents in the deflated air bags. Some components of the air bag module in the steering wheel hub for the driver's air bag or the instrument panel for the passenger's bag may be hot for a short time.
The nitrogen gas in both driver and front passenger sides used to inflate the air bag will have vented into the passenger compartment and the bag will be deflated within seconds after the collision.
As the nitrogen vent from the bag, small particles are also vented into the passenger compartment.
In many crashes severe enough to inflate an air bag, windshields are broken by vehicle deformation. Additional windshield breakage may occur in vehicles with passenger air bags because the windshield acts as a reaction surface for the inflating air bag.

WARNING

•Don't put anything on, or attach anything to, the steering wheel pad or the instrument panel. Also, don't put anything (such as objects or pets) between any occupant and the steering wheel pad or instrument panel. If anything is between the occupant and the air bag, it could affect the performance of the air bag, or, worse, it could cause injuries to the occupants.
•The air bags are designed to inflate only once. After they inflate, you'll need some new parts for your air bag system. If you don't get them, the air bag system won't be there to help protect you in another crash. A new system will include air bag modules, sensors and possibly other parts.
•Let only qualified technicians work on your air bag system. Improper service can mean that your air bag system won't work properly. See your Isuzu dealer for service.

SERVICING YOUR ISUZU WITH THE AIR BAG SYSTEM

Please tell or remind anyone who works on your Isuzu that it has air bag system. There are parts of the air bag system in several places around your vehicle. You don't want the system to inflate while someone is working on your vehicle. The air bag system does not need regular maintenance. Scrapping a damaged vehicle that has an undeployed air bag(s) can be dangerous. Ask your authorized Isuzu dealer for assistance it your involvement in the disposal or the repair of the vehicle is required.

WARNING

Do not attempt to repair or service the air bag system by your self. Tampering with it could cause it to activate, and this could result in serious injuries. For service and repairs, have an authorized Isuzu dealer do the work.

NOTE

If you damage the door for the right-front passenger's air bag, it may not work properly. You may have to replace the air bag. Don't open or break the air bag door.

WARNING

For up to 15 seconds after the ignition key is turned off and the battery disconnected, an air bag can still inflate during improper service. You can be injured if you are close to an air bag when it inflates. Be sure to follow proper service procedures, and make sure the person performing the work for you is qualified to do so.

When is an air bag expected to inflate?

The air bag is designed to inflate in moderate to severe frontal or near-frontal crashes. The air bag will only inflate if the velocity of the impact is above the designed threshold level. When impacting straight into a wall that does not move or deform, the threshold level is between 7 and 15 mph (11 and 24 km/h). However, this velocity threshold may be several miles-per-hour faster or slower. In addition, this threshold velocity will be considerably higher if the vehicle strikes an object such as a parked car which will move and deform on impact. The air bag is also not designed to inflate in rollovers, side impacts, or rear impacts where the inflation would provide no occupant protection benefit. In any particular crash, the determination of whether the air bag should have inflated cannot be based solely on the level of damage on the vehicle(s). Inflation is determined by the angle of the impact and the vehicle's deceleration of which vehicle damage is only one indication. Repair cost is not a good indicator of whether an air bag should have deployed.

What makes an air bag inflate?

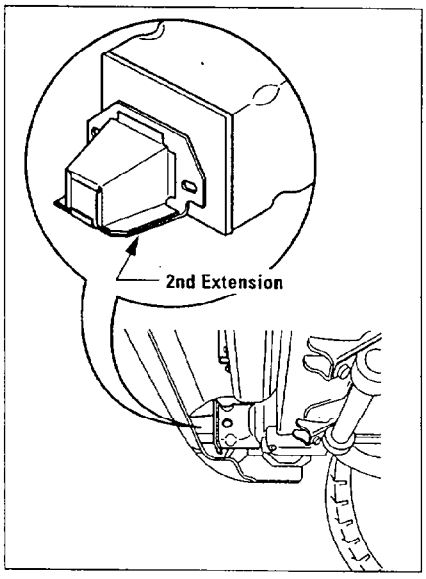
In a frontal or near-frontal impact of sufficient severity, sensors strategically located on the vehicle detect that the vehicle is suddenly stopping as a result of a crash. These sensors complete an electrical circuit, triggering a chemical reaction of the sodium azide sealed in the inflator.The reaction produces nitrogen gas in both driver and front passenger sides which inflates a cloth bag. The inflator, cloth bag, and related hardware are all part of the air bag inflator modules packed inside the steering wheel and in the instrument panel in front of the passenger.

How does an air bag restrain?

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

2ND EXTENSION

2nd Extension located at the 1st closs member



The 2nd Extension should be replaced when Air Bag deployed, and also 2nd extension is deformed, vended distorted if Air Bag don't deploy.