

REPORT NO. MGA-96N001

NEW CAR ASSESSMENT PROGRAM (NCAP)

FRONTAL BARRIER IMPACT TEST

TOYOTA MOTOR CORPORATION
1995 TOYOTA CAMRY 2 DOOR
NHTSA NO. MS5103

MGA RESEARCH CORPORATION
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: May 31, 1995

Report Date: June 30, 1995

Final Report

Prepared For:

**U.S DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
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16. Abstract A 56 kph (35 mph) frontal barrier impact using a 30 load cell barrier was conducted on a 1995 Toyota Camry 2 Door at the MGA Proving Grounds and Crash Test Center in Burlington, WI. on May 31, 1995. The barrier impact velocity was 56.6 kph (35.2 mph), and the ambient temperature at the time of impact was 21 °C. The post-test maximum static crush was 541 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 627 and the 3 msec. Clip (Chest g's) was 47 g's. The left and right femur loads for the driver were 2270 and 2923 Newtons, respectively. The passenger's HIC was 475 and the 3 msec Clip was 43 g's. The left and right femur maximum loads were 2230 and 3128 Newtons respectively.					
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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 Toyota Camry 2 Door Coupe at a velocity of 56.6 kph (35.2 mph). The test was performed at the MGA Proving Grounds and Crash Test Center on May 31, 1995. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The frontal barrier impact event was documented by one real-time camera and 16 high speed cameras. Camera locations and other pertinent camera information can be found in this report.

Two Part 572E, 50th percentile male anthropomorphic test devices (ATDs) were placed in the driver and right-front passenger seating positions according to dummy placement instructions specified in the Laboratory Indicant Test Procedure.

Both ATDs were fully instrumented with head and chest primary and redundant triaxial accelerometers, pelvis triaxial accelerometers, chest displacement transducer, neck load cell, and right/left femur load cells. The driver dummy was instrumented with 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 77 channels of data were recorded on 8 computers. Appendix B contains the vehicle, load cell barrier and dummy response data traces.

The driver's head struck the inflated airbag. The driver HIC was 627. The maximum chest (CLIP) deceleration over 3 milliseconds was 47 g's. The maximum chest displacement is 29 mm. The left and right femur loads were 2270 and 2923 Newtons respectively.

The right front passenger's head struck the inflated airbag. The passenger HIC was 475 and maximum chest (CLIP) deceleration over 3 milliseconds was 43 g's. The maximum chest displacement is 34 mm. The left and right femur loads were 2230 and 3128 Newtons respectively.

GENERAL TEST AND VEHICLE PARAMETER DATA

Vehicle Yr/Make/Model/Body Style: 1995/Toyota/Camry/2 Door Coupe

NHTSA No.: MS5103 VIN.: 4T1SK11C7SU578279

Body color: Green Date of Manufacture: 4/95

Engine: 4 Cylinders; C.I.D.; 2.2 Liters;

 Gas; Diesel; Turbocharged

 Longitudinal; X Transverse

Transmission: 5 Speed; X Manual; Automatic; Overdrive

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

Odometer Reading: 59 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 belts with driver & passenger airbags

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 207 kPa (30 Psi) Rear 207 kPa (30 Psi)

Recommended Tire Size: P195/70R14

Recommended Cold Tire Pressure: Front 207 kPa (30 Psi) Rear 207 kPa (30 Psi)

Tires on Vehicle: P195/70R14 ; Manufacturer: Goodyear

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

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

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

Vehicle Capacity Weight (VCW) = 408 kg. (A)

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

Rated Cargo Weight (RCW) A-B = 68 kg.

GVWR 1882 kg. GAWR: Front 1089 kg.; Rear 1089 kg.

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

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

Right Front = 415 kg Right Rear = 264 kg

Left Front = 418 kg Left Rear = 260 kg

TOTAL FRONT WEIGHT = 833 kg (61.4% of Total Vehicle Weight)

TOTAL REAR WEIGHT = 524 kg (38.6% of Total Vehicle Weight)

TOTAL UNLOADED DELIVERED WEIGHT (UDW) = 1357 kg

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight 1357 kg

VCW = Vehicle Capacity Weight 408 kg DSC = Designated Seating Capacity 5

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

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

Target Test Weight = 1577 kg

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND CARGO:

Right Front = 451 kg Right Rear = 340 kg

Left Front = 455 kg Left Rear = 331 kg

TOTAL FRONT WEIGHT = 906 kg (57.5% of Total Vehicle Weight)

TOTAL REAR WEIGHT = 671 kg (42.5% of Total Vehicle Weight)

TOTAL TEST WEIGHT = 1577 kg

Weight of ballast secured in vehicle trunk area = 0 kg

Vehicle components removed to meet target weight: Muffler, rear bumper, rear seat, and
spare tire

VEHICLE ATTITUDE (all dimensions in mm):

Delivered Attitude: RF 698 LF 696 RR 701 LR 700

Test Attitude: RF 684 LF 684 RR 662 LR 662

Wheel Base: 2615 mm; C.G. = 1113 mm rearward of front wheel C/L

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

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

POST-IMPACT DATA:

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

Date of Test: May 31, 1995 Time of Test: 2:18 p.m.

Ambient Temperature: 22 °C (Spec. Range = 18.8 to 25.6°C)

Temperature in Occupant Compartment: 22° C

Windshield Molding Temperature: 22° C

Required Impact Velocity Range: 55.5 to 57.1 kph

Impact Velocity: primary = 56.6 kph; secondary = 56.6 kph

Distance From Front Bumper to Barrier Face When

Entering Speed Trap: 1305 mm

Exiting Speed Trap: 305 mm

VEHICLE REBOUND AND CRUSH (mm):

Vehicle Length:	Pre-test	= R <u>4422</u> C _L <u>4585</u> L <u>4410</u>
	Post-test	= R <u>4040</u> C _L <u>4044</u> L <u>3946</u>
	Crush	= R <u>382</u> C _L <u>541</u> L <u>464</u>

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

R 1008 mm C_L 1052 mm L 1086 mm

VISIBLE DUMMY CONTACT POINTS:

	<u>Driver</u>	<u>Passenger</u>
Head	<u>to airbag</u>	<u>to airbag</u>
Chest	<u>to airbag</u>	<u>to airbag</u>
Abdomen	<u>no contact</u>	<u>no contact</u>
Left Knee	<u>to steering column</u>	<u>to dash</u>
Right Knee	<u>to dash</u>	<u>to dash</u>

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

<u>Door Opening</u>	<u>Front</u>		<u>Rear</u>	
	<u>Left</u>	<u>Right</u>	<u>Left</u>	<u>Right</u>
(without use of tools)	<u>opened</u>	<u>opened</u>	<u>N/A</u>	<u>N/A</u>

<u>Seat Movement</u>	<u>Front</u>		<u>Rear</u>	
	<u>Left</u>	<u>Right</u>	<u>Left</u>	<u>Right</u>
Seat Back Movement	<u>none</u>	<u>none</u>	<u>N/A</u>	<u>N/A</u>
Seat Shift (mm)	<u>0</u>	<u>0</u>	<u>N/A</u>	<u>N/A</u>

Glazing Damage

Backlight/Windshield Windshield cracked

Other Notable Impact Effects: None noted

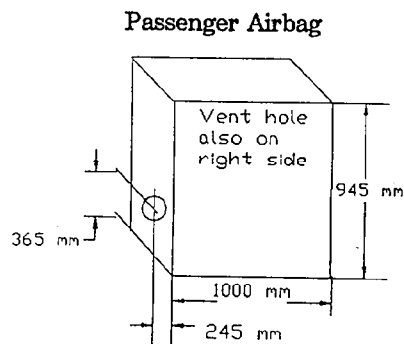
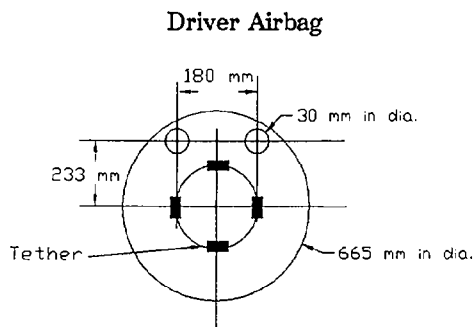
GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

POST TEST AIRBAG DATA

Vehicle Year/Make/Model/Body Style: 1995/Toyota/Camry/2 Door Coupe

NHTSA: MS5103; Test Date: 5-31-95;

- A. Number of Vent Holes: Driver 2; Passenger 2
- B. Size of Vent Holes: Driver 30 mm; Passenger 40 mm dia.
- C. Total Vent Area; Driver 707 mm; Passenger 1257 mm²
- D. Deflated Airbag Length and Width Dimensions or, if Round, Diameter
- Driver; Length , Width , Diameter 665 mm
- Passenger; Length 945 mm, Width 1000 mm, Diameter mm
- E. Is the Airbag Tethered?
- Driver; X Yes; No; If yes, record length of tether 230 mm
- Passenger; Yes; X No; If yes, record length of tether mm



- F. Part Numbers and Manufacture Name of Airbag and Gas Generator
- Driver; Mfr ; Airbag JJ50G2904; Gen TDAF3R3YDHA
- Passenger; Mfr ; Airbag 71011229512P; Gen C08904795MF1

* Not available

SECTION 3

SUMMARY OF RESULTS FOR-----

FMVSS 212, "Windshield Mounting"

FMVSS 219 (Partial), "Windshield Zone Intrusion"

FMVSS 301-75, "Fuel System Integrity"

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

Details of windshield mounting such as retention method, trim type, etc.:

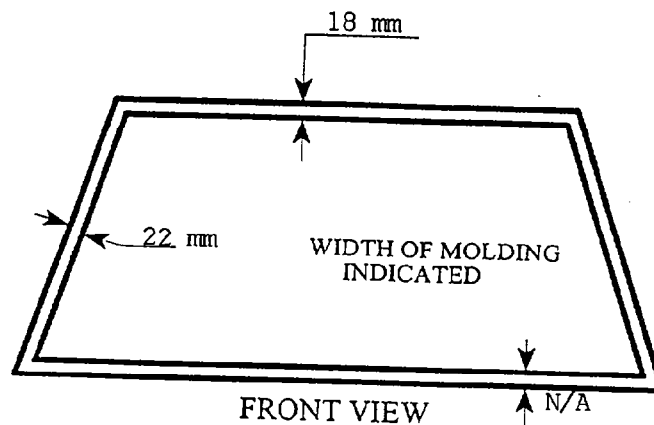
Windshield set in rubber molding within windshield frame

FMVSS 212 Requirements: The Post-Test periphery retention amount must be at least 75% of the Pre-Test periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of windshield for vehicles equipped with automatic restraint systems for front occupants.

FMVSS 212 TEST DATA:

	WINDSHIELD PERIPHERY		
	PRE-TEST (mm)	POST-TEST (mm)	PERCENT RETENTION
RIGHT SIDE	2055	2055	100%
LEFT SIDE	2035	2035	100%
TOTAL	4090	4090	100%

AREA OF RETENTION FAILURE: None



FAILURE DETAILS: None

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

PROTECTED ZONE LOWER EDGE REQUIREMENT:

The lower edge of the protected zone is determined by placing a 6.5" dia. rigid sphere weighing 15 pounds in a position such that it simultaneously contacts the inner surface of the windshield and the surface of the instrument panel, including padding, and drawing the locus of points on the inner surface of the windshield contactable by the sphere across the width of the instrument panel. From the outermost contact points, extend the locus line horizontally to the edges of the windshield, and then draw a line on the inner surface of the windshield below and 1/2" distant from the locus line. The LOWER EDGE OF THE PROTECTED ZONE is the longitudinal projection onto the outer surface of the windshield of this line.

FMVSS 219 TEST DATA:

A = 1176 mm

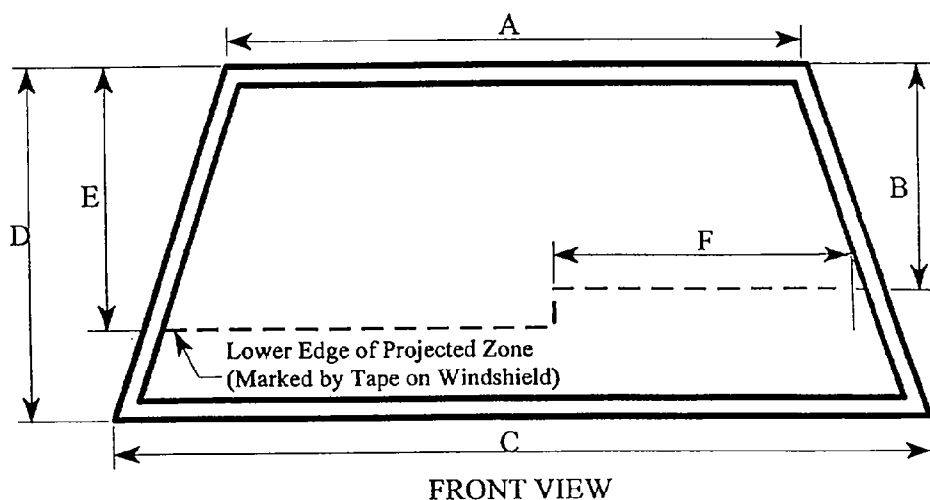
B = 429 mm

C = 1517 mm

D = 715 mm

E = 465 mm

F = 789 mm



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

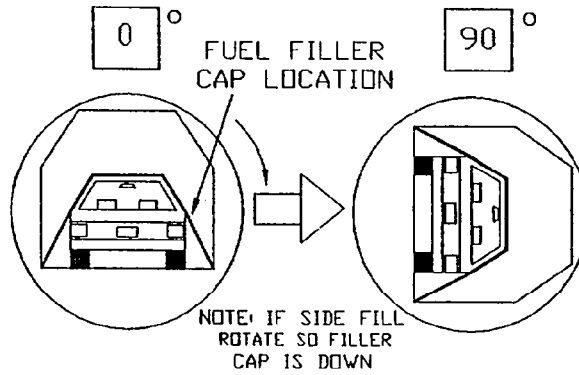
(Show location of penetration)

NONE

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 0° - 90°

Vehicle NHTSA ID No.: MS5103



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

FMVSS 301 Position Hold Time + 5 minutes 0 seconds
TOTAL 7 minutes 50 seconds
Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

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

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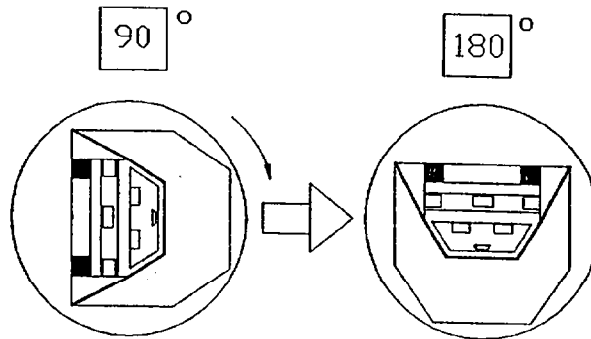
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 90° - 180°

Vehicle NHTSA ID No.: MS5103



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 28 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 28 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
---	---	---	---

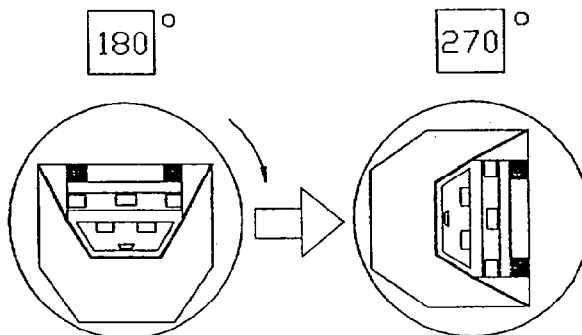
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 180° - 270°

Vehicle NHTSA ID No.: MS5103



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 25 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

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

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

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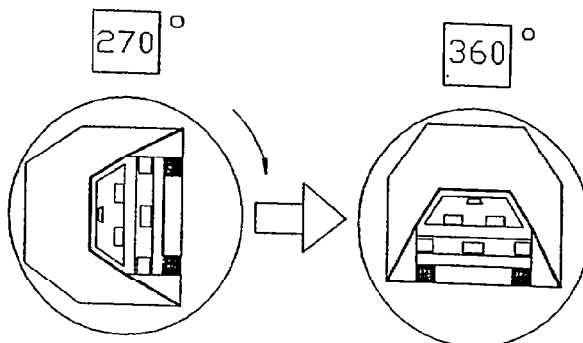
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S):

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 270° - 360°

Vehicle NHTSA ID No.: MS5103



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 43 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

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

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

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

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

IV. SOLVENT SPILLAGE LOCATIONS(S):

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/Toyota/Camry/2 Door Coupe

VEH. NHTSA NO.: MS5103 TEST DATE: May 31, 1995

MAX. ACCELERATION VALUES: (g's)	DRIVER #065	PASSENGER #066
Head Channel X	-64.2 @ 71 msec.	-57.5 @ 68 msec.
Head Channel Y	-4.4 @ 88 msec.	-16.0 @ 60 msec.
Head Channel Z	14.2 @ 63 msec.	19.4 @ 32 msec.
HEAD RESULTANT	65.0 @ 71 msec.	57.6 @ 68 msec.
Chest Channel X	-48.1 @ 65 msec.	-44.9 @ 69 msec.
Chest Channel Y	4.9 @ 101 msec.	10.3 @ 86 msec.
Chest Channel Z	-13.5 @ 91 msec.	-3.7 @ 92 msec.
CHEST RESULTANT (CLIP)	46.9	43.4
TIME INTERVAL (msec) [0.003 seconds minimum]	$t_1 = 64.3$ $t_2 = 67.4$	$t_1 = 68.5$ $t_2 = 71.6$

HEAD INJURY CRITERIA (HIC) VALUES:

HIC	626.6	475.2
$t_1 =$ (msec)	52.6	52.4
$t_2 =$ (msec)	86.8	88.4
Avg. Accel. t_1 to t_2 (g's)	50.7	44.5

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

MAX. COMPRESSIVE FEMUR FORCES:

Left Side (N)	2270	2230
Right Side (N)	2923	3128

MAXIMUM SEAT BELT FORCES:

Lap Belt (N)	6263	5118
Shoulder Belt (N)	4890	6019

HYBRID III NECK, CHEST AND PELVIS DATA SHEET

VEHICLE YR./MAKE/MODEL/BODY STYLE: 1995/Toyota/Camry/2 Door Coupe

VEHICLE NHTSA NO.: MS5103 TEST DATE: May 31, 1995

MAXIMUM VALUES	DRIVER DUMMY #065	PASSENGER DUMMY #066
Neck Load X (N)	331 @ 49 msec.	1153 @ 60 msec.
Neck Load Y (N)	162 @ 113 msec.	233 @ 65 msec.
Neck Load Z (N)	-2071 @ 64 msec.	2314 @ 66 msec.
Neck Moment X (NM)	13.3 @ 101 msec.	21.5 @ 65 msec.
Neck Moment Y (NM)	-23.4 @ 64 msec.	73.7 @ 60 msec.
Neck Moment Z (NM)	-10.2 @ 30 msec.	7.9 @ 112 msec.
Chest Deflection X (mm)	-29.2	-33.5
Time of Max. Occurrence	75 msec.	69 msec.
Pelvis X Acceleration (g's)	-50.4 @ 58 msec.	-58.4 @ 60 msec.
Pelvis Y Acceleration (g's)	-8.4 @ 65 msec.	-8.7 @ 62 msec.
Pelvis Z Acceleration (g's)	-24.6 @ 65 msec.	-24.4 @ 85 msec.
Pelvis Resultant (g's)	54.8 @ 58 msec.	62.2 @ 60 msec.

PART 572 DUMMY IN-VEHICLE POSITION

Vehicle NHTSA No.: MS5103 Vehicle: 1995 Toyota Camry 2 Door Coupe

SEAT TYPE:

 Bench
 X Bucket
 Split Bench

ADJUSTER TYPE:

Driver: X Manual
 Power

BUCKET SEAT BACK TYPE:

 Fixed
 X Adjustable Reclining

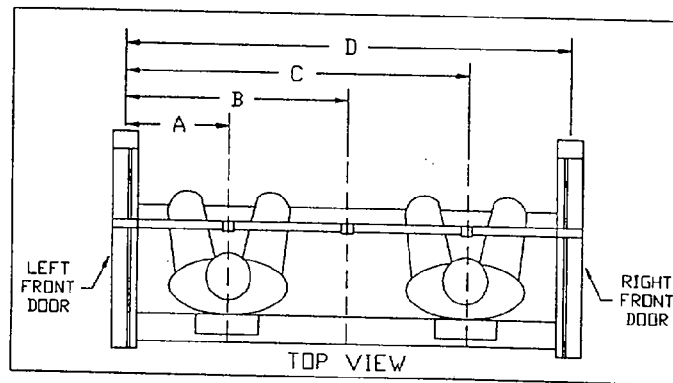
Passenger: X Manual
 Power

Driver Seat Position

9th notch rearward
of 16 total

Passenger Seat Position

9th notch rearward
of 16 total



065 DUMMY ID 066

A = Left Door to Driver Centerline	<u>408</u> mm
B = Left Door to Center Passenger Centerline	<u>765</u> mm
C = Left Door to Right Passenger Centerline	<u>1134</u> mm
D = Left Door to Right Door	<u>1530</u> mm

FRONT SEAT MEASUREMENT TABLE

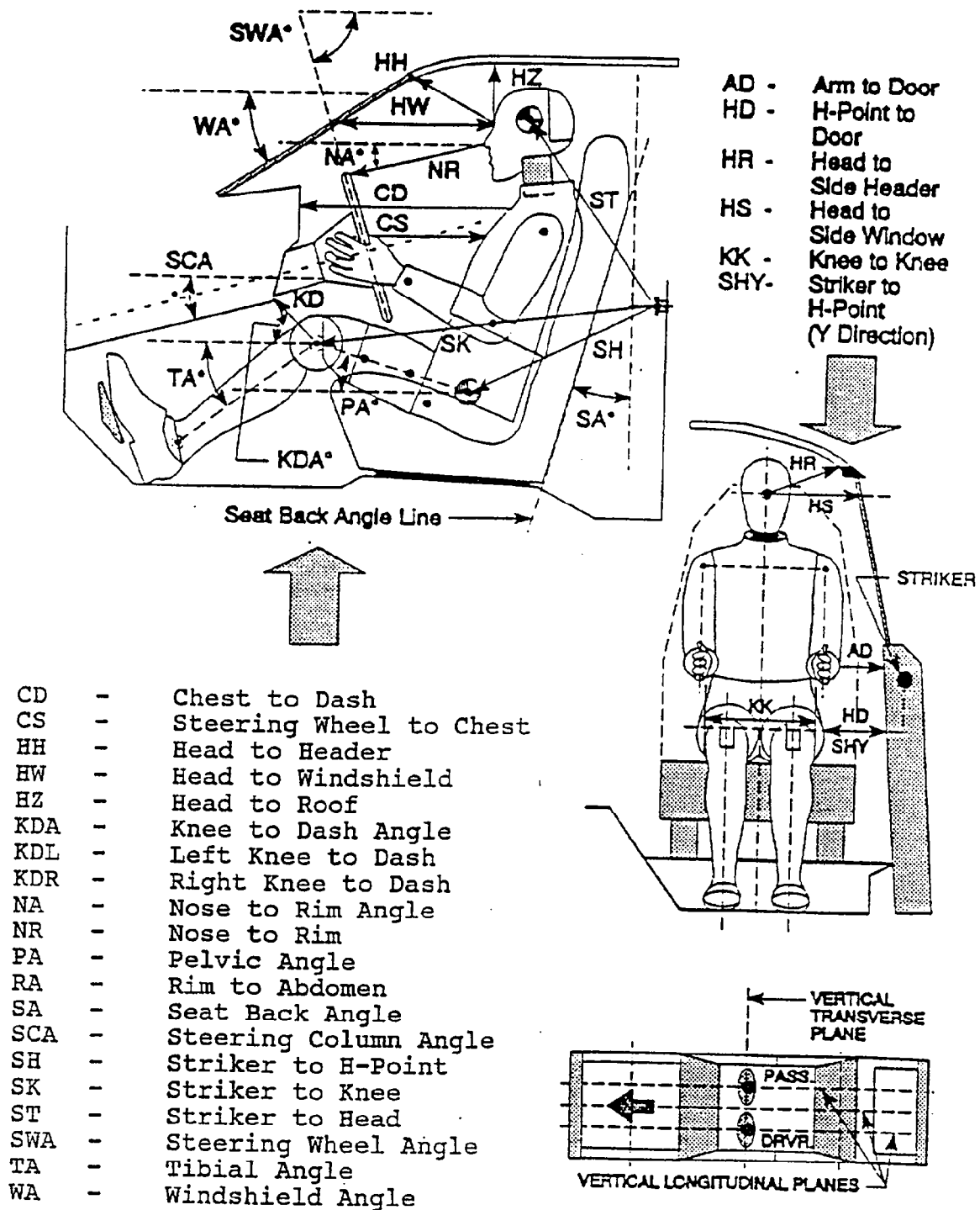
Units (mm)

	DRIVER (Serial #065)	PASSENGER (Serial #066)
WA°	31.4°	
SWA°	66°	N/A
SCA°	24°	N/A
SA°	21°	21°
HZ	171	164
HH	314	340
HW	515	520
HR	240	234
NR	388 Angle 10.8°	N/A
CD	552	540
CS	309	N/A
RA	188	N/A
KDL	192 Angle 14.9°	172
KDR	180	184 Angle 16.4°
PA°	21.4°	24.0°
TA°	42.2°	37.8°
KK	348	284
ST*	619 Angle 50.8°	597 Angle 50.8°
SK*	862 Angle -4.4°	883 Angle -5.6°
SH*	511 Angle -19.9°	523 Angle -110.2°
SHY	258	262
HS	298	280
HD	212	208
AD	138	140

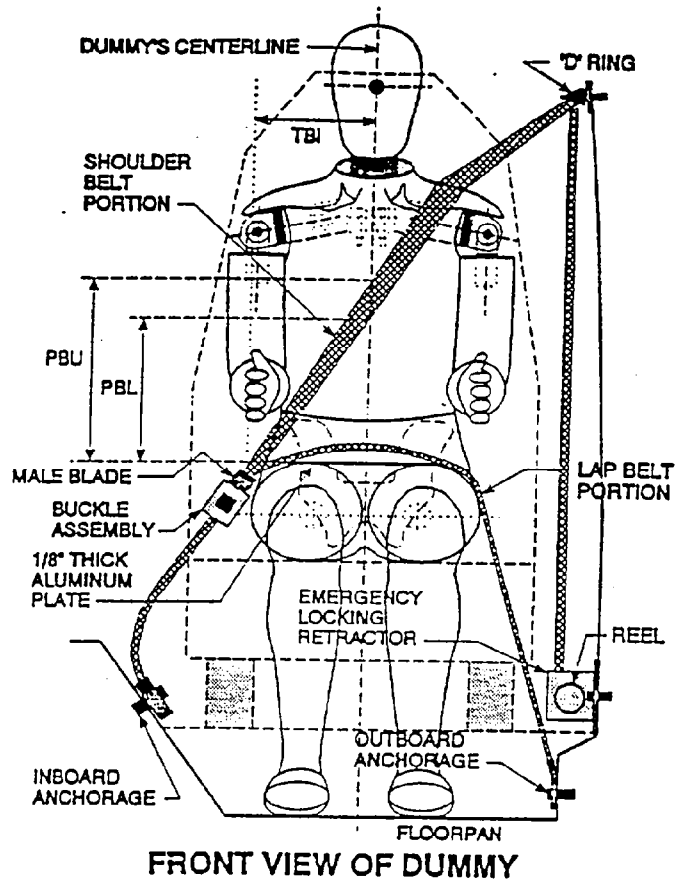
N/A = Not Applicable

* Angles measured from horizontal

FRONT SEAT MEASUREMENTS



SEAT BELT POSITIONING DATA



(illustration)

Dimension = mm

	DRIVER DUMMY	PASSENGER DUMMY
<u>PBU</u> -- Top surface of alum. plate to upper edge	350	324
<u>PBL</u> -- Top surface of alum. plate to belt lower edge	284	248

SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

BELT LENGTH DATA:

	<u>Driver</u>	<u>Passenger</u>
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems.	<u>220 mm</u>	<u>218 mm</u>
Shoulder belt length as measured on Part 572 Dummy.	<u>1053 mm</u>	<u>1054 mm</u>
Lap belt length as measured on Part 572 Dummy.	<u>850 mm</u>	<u>851 mm</u>

SHOULDER BELT SPOOL-OFF DATA:

As determined by film analysis	<u>76 mm</u>	<u>61 mm</u>
As determined mechanically	<u>66 mm</u>	<u>55 mm</u> at retractor
	<u>83 mm</u>	<u>47 mm</u> at D-ring

BELT STRETCH DATA:

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

RETRACTOR LOCK-UP TIME:

As determined by shoulder belt spool-off observed in on-board cameras	<u>70 msec</u> after contact	<u>71 msec</u>
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CAMERA LOCATIONS

VEH. NHTSA NO.: MS5103 ; TEST DATE: May 31, 1995 ; TIME: 2:18 p.m.

VEH. YEAR/MAKE/MODEL/BODY STYLE: 1995/Toyota/Camry/2 Door Coupe

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	1030	9010	1095	90°	8575	25	1000
3	Steering Column Top	1870	7900	1550	90°	7465	25	1020
4	Steering Column Bottom	1850	7850	1020	90°	7415	25	1020
5	Left Driver Close-up	1480	9150	1115	90°	8715	50	952
6	Left Angle	4700	4780	1910			35	690
7	Driver Onboard						35	1000
8	Passenger Onboard						35	1000
9	Right Overall	2400	-8610	1065	90°	8175	13	1111
10	Right Front	1060	-8440	1260	90°	8005	25	1000
11	Right Passenger Close-up	1420	-7920	1240	90°	7485	50	1005
12	Right Angle	6370	-8440	2025			35	NR
13	Top View Wide	1700	0	5050			8	1117
14	Top Driver	-380	320	2500			13	1000
15	Top Passenger	-390	-410	2475			13	1000
16	Pit Engine	1200	0	2545			13	816
17	Fuel Tank	2680	0	2475			13	1031

* COORDINATES:

+X = film plane rearward of barrier

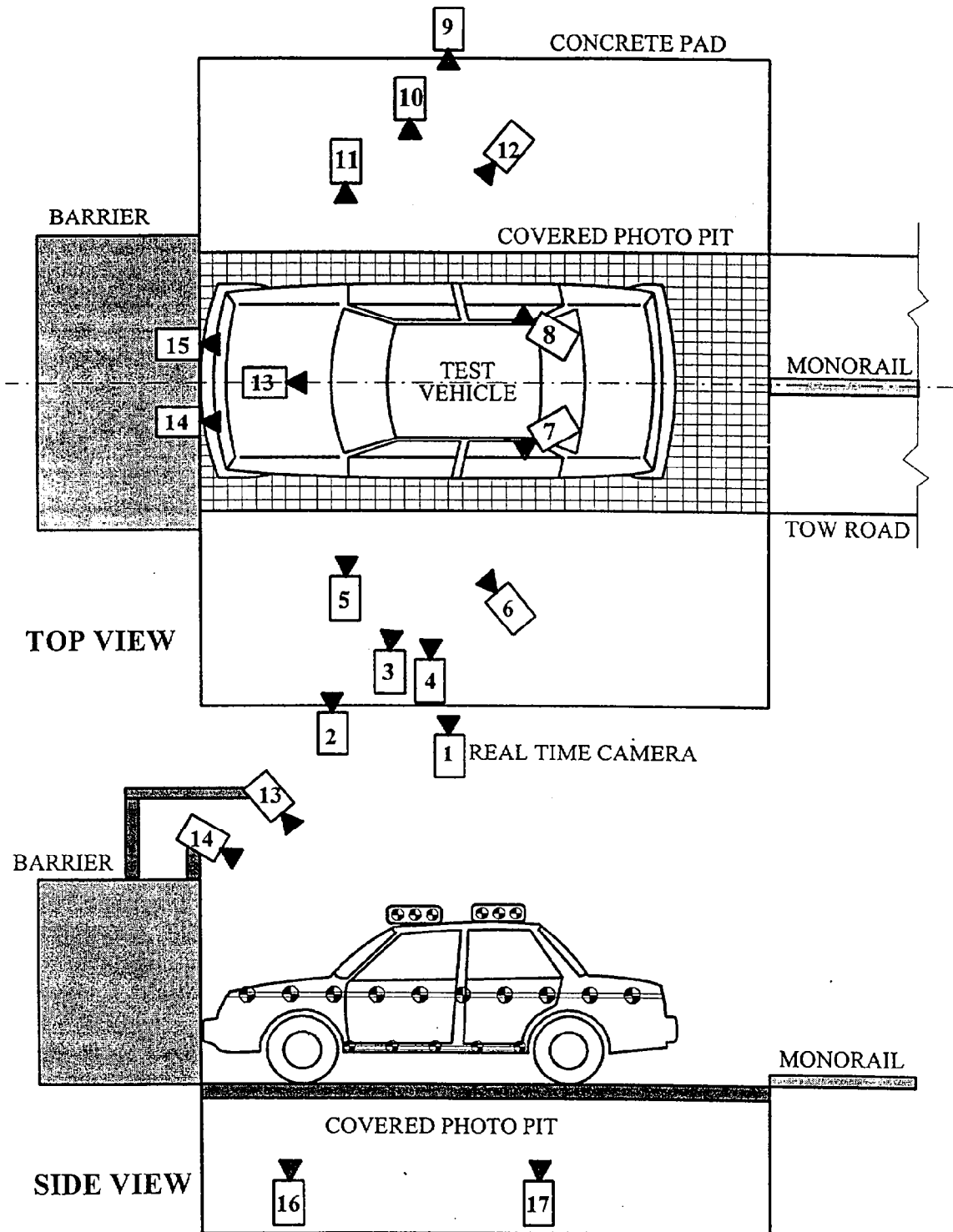
+Y = film plane to left of monorail centerline

+Z = film plane to above ground level

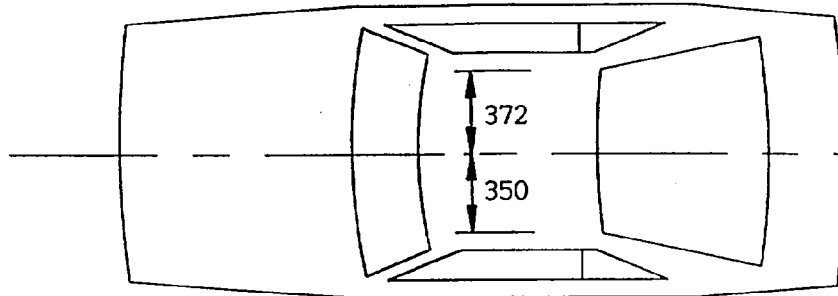
ORIGIN: For X and Y it is the Impact Point. For Z it is the Floor.

NR = Not Recorded

CAMERA LOCATIONS (Cont'd)

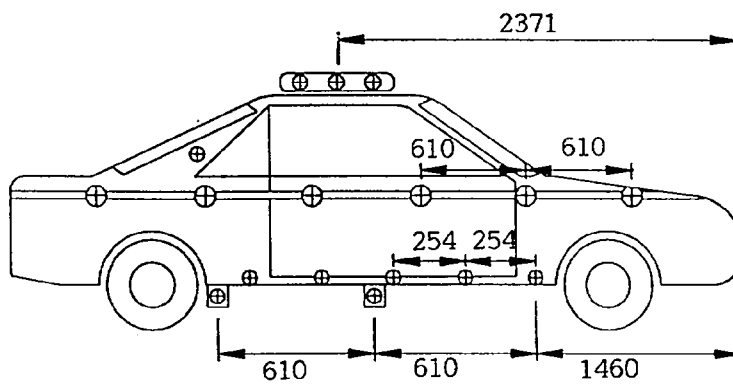
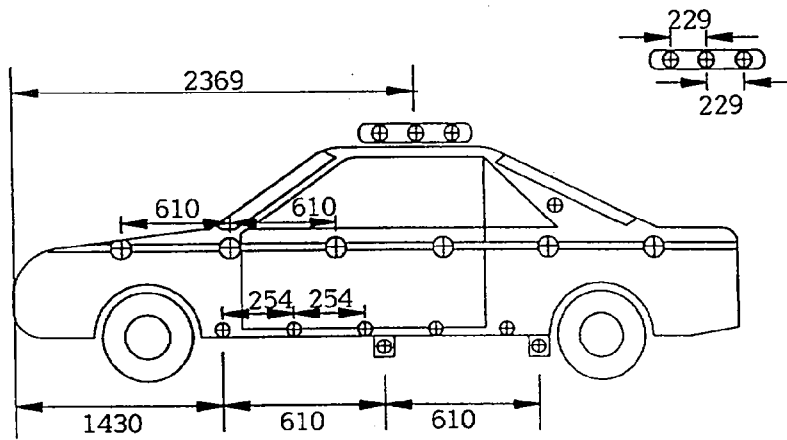


VEHICLE TARGET LOCATIONS



Steering Column
Target

X = 2724 (from rear)
Y = 354 (from centerline)
Z = 912 (from ground)



(DIMENSIONS IN MM)

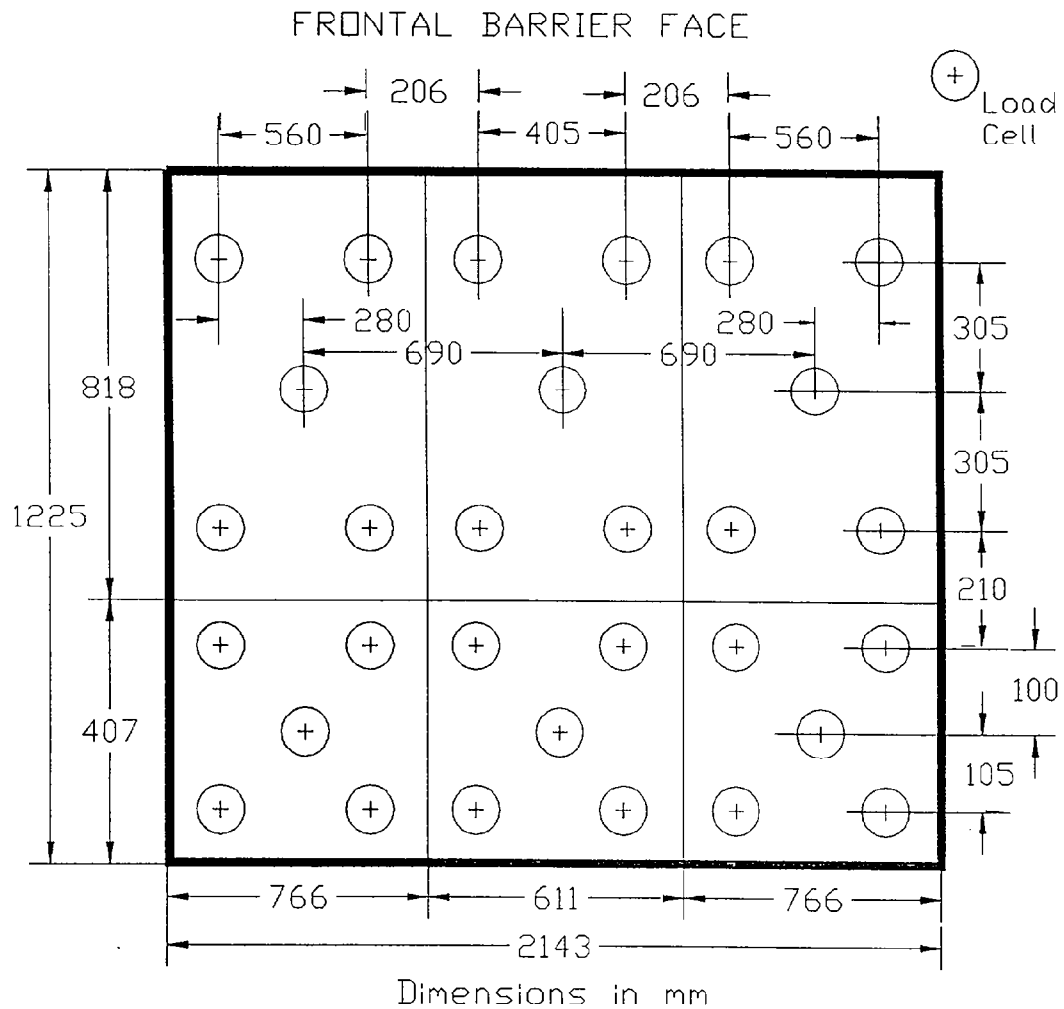
LOAD CELL LOCATIONS ON FIXED BARRIER

30 Load Cells

6 Rows

9 Columns

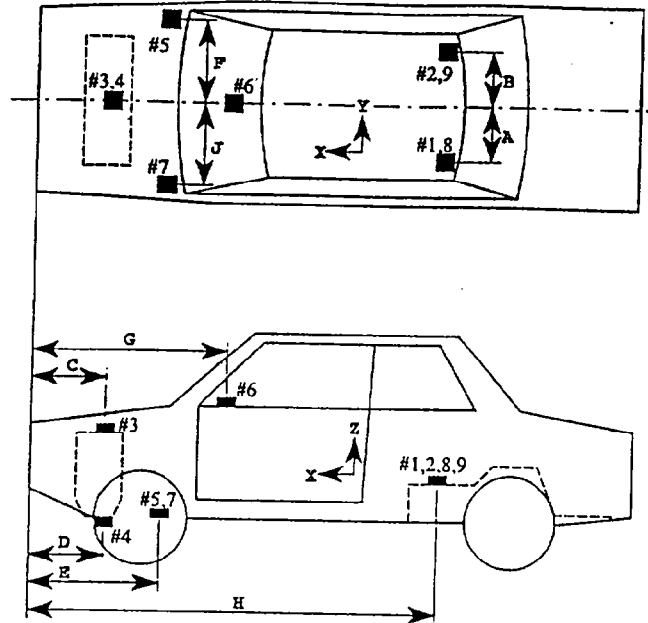
6 Groupings (5 cells/group)



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)

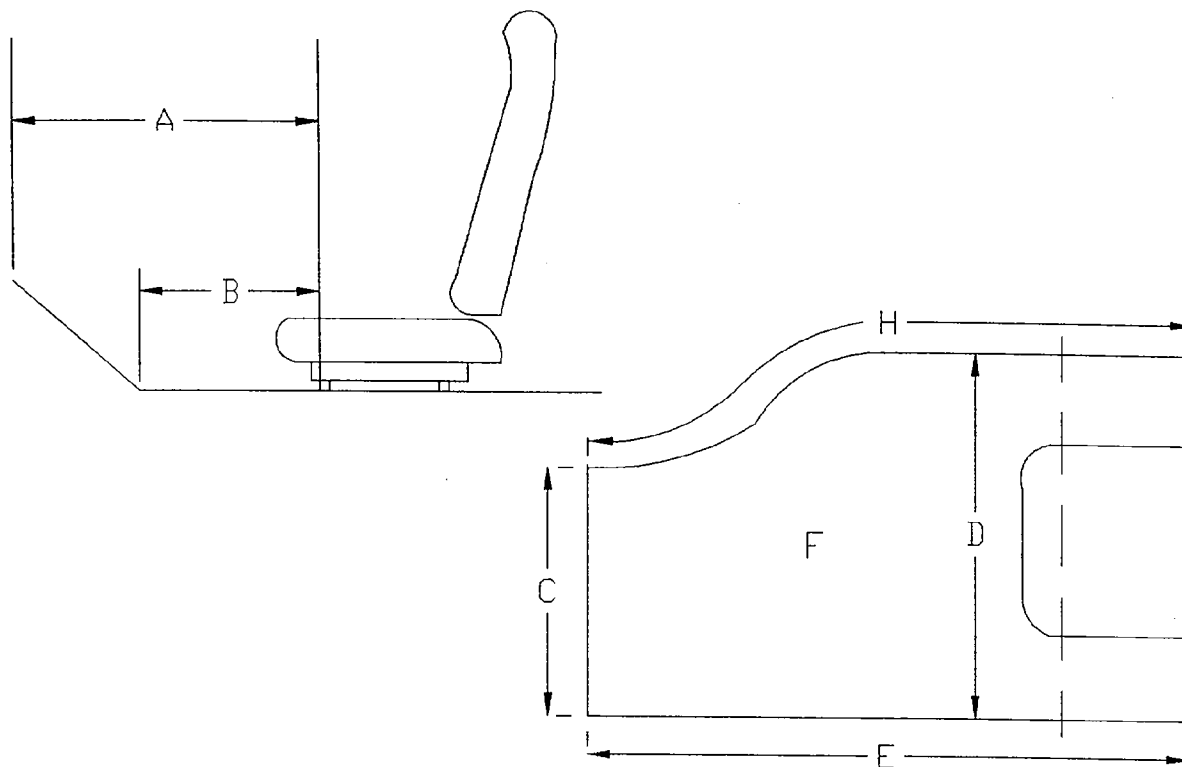
Dimension	Length
A	376
B	377
C	916
D	796
E	727
F	667
G	1594
H	2718
J	667

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

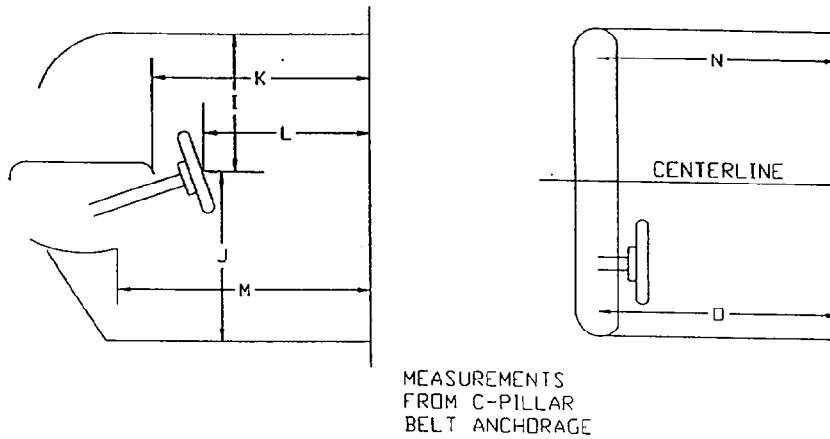
Driver's Side



Units = mm

MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
A	774	607	167
B	543	525	18
C	657	535	122
D	857	550	307
E	590	480	110
H	531	524	7
F (cm ²)	4466	2604	1862

TEST VEHICLE MEASUREMENTS (Cont'd)
STATIC PASSENGER COMPARTMENT INTRUSION



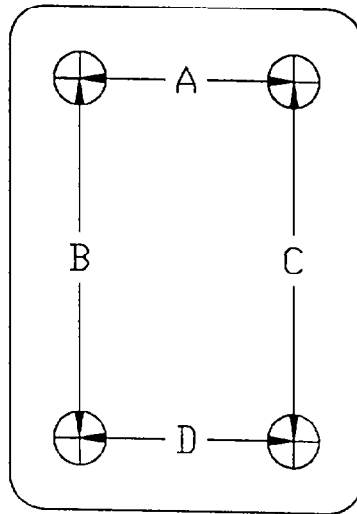
Units = mm

MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
I	453	430	23
J	665	738	-73
K	1521	1484	37
L	1264	1254	10
M	1621	1582	39
N	1593	1672	-79
O	1686	1646	40

TEST VEHICLE MEASUREMENTS (Cont'd)

UNDERBODY FLOORBOARD DEFORMATION

DRIVER'S SIDE



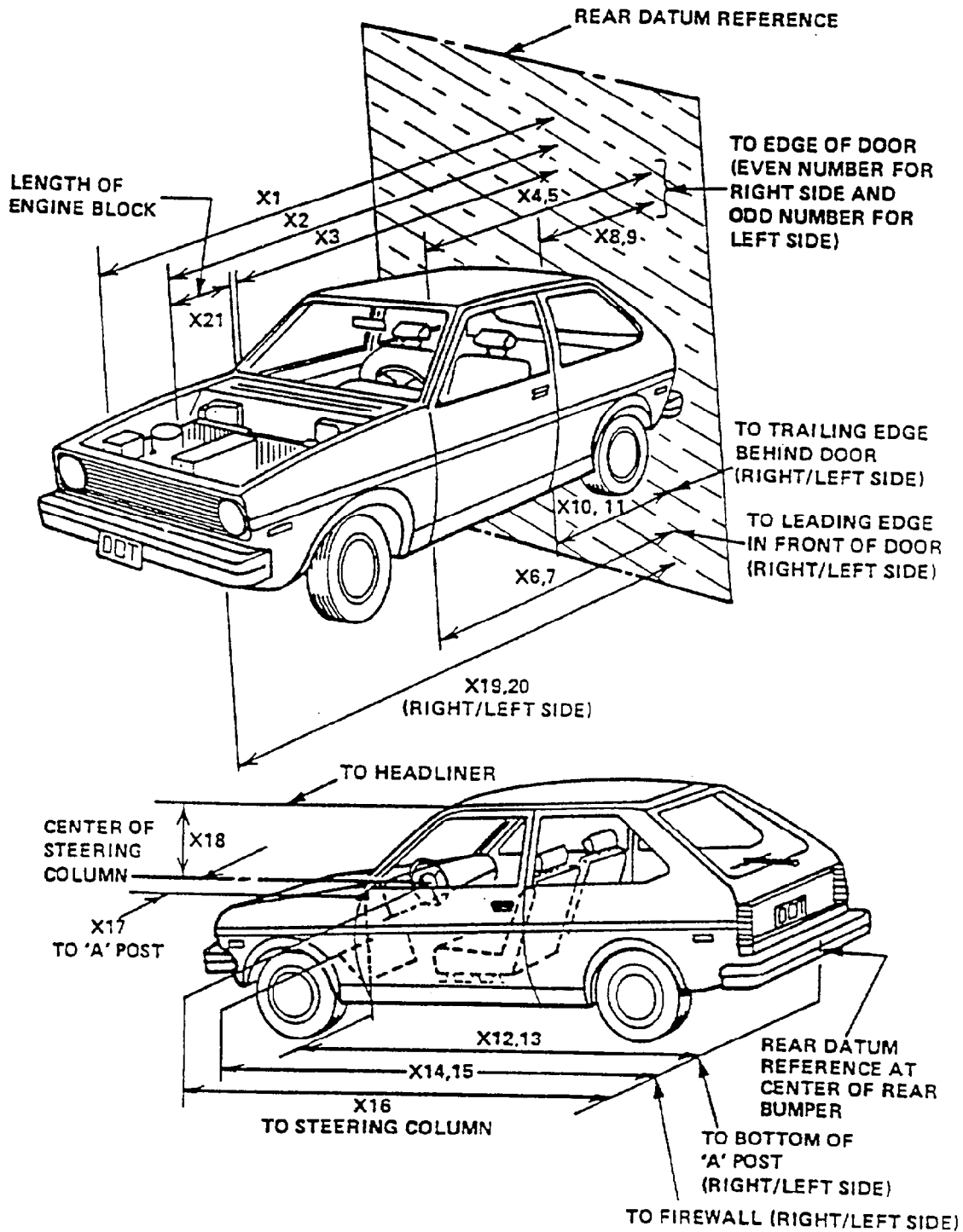
MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
A	320	*	*
B	515	*	*
C	433	*	*
D	383	*	*

* Targets fell off during impact so no post-test measurements could be taken

TEST VEHICLE MEASUREMENTS (Cont'd)

No.	MEASUREMENT DESCRIPTION:	Pre-Test (mm)	Post-Test (mm)	Diff. (mm)
X1	Total Length of Test Vehicle at Centerline	4585	4044	541
X2	Rear Surface of Vehicle to Front of Engine	3749	3594	155
X3	Rear Surface of Vehicle to Firewall	3353	3324	29
X4	Rear Surface to Upr. Leading Edge of Rt. Door	3031	3019	12
X5	Rear Surface to Upr. Leading Edge of Left Door	3041	3016	25
X6	Rear Surface to Lwr. Leading Edge of Rt. Door	3049	3053	-4
X7	Rear Surface to Lwr. Leading Edge of Left Door	3049	3047	2
X8	Rear Surface to Upr. Trailing Edge of Rt. Door	1766	1756	-10
X9	Rear Surface to Upr. Trailing Edge of Left Door	1774	1743	31
X10	Rear Surface to Lwr. Trailing Edge of Rt. Door	1764	1768	-4
X11	Rear Surface to Lwr. Trailing Edge of Left Door	1768	1764	4
X12	Rear Surface to Bottom of `A' Post on Rt. Side	3073	3058	15
X13	Rear Surface to Bottom of `A' Post on Left Side	3067	3051	16
X14	Rear Surface to Firewall on Right Side	3302	3258	44
X15	Rear Surface to Firewall on Left Side	3302	3247	55
X16	Rear Surface to Steering Column	2604	2558	46
X17	Center of Steering Column to `A' Post	376	356	20
X18	Center of Steering Column to Headlining	427	421	6
X19	Rear Surface to Right Side of Front Bumper	4422	4040	382
X20	Rear Surface to Left Side of Front Bumper	4410	3946	464
X21	Length of Engine Block	449	449	0

TEST VEHICLE MEASUREMENTS (Cont'd)



ACCIDENT INVESTIGATION DIVISION DATA
FOR 35 MPH FRONTAL BARRIER IMPACT

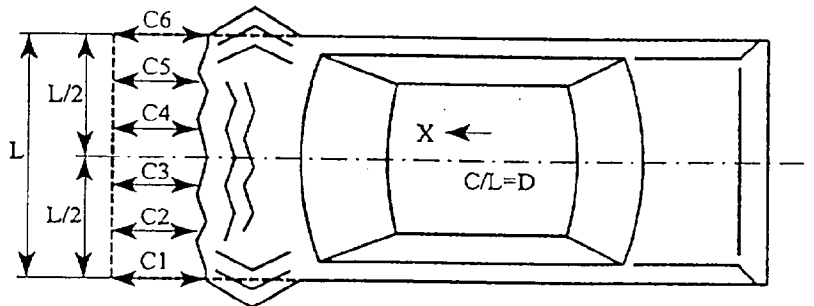
VEHICLE MAKE/MODEL/BODY STYLE: Toyota/Camry/2 Door Coupe
VEH. NHTSA NO.: MS5103 ; VIN: 4T1SK11C7SU578279
MODEL YEAR: 1995 ; BUILD DATE: 4/95 ; TEST DATE: May 31, 1995
VEH. SIZE CATEGORY: Mid-Size ; TEST WEIGHT: 1577
VEH. WHEELBASE: 2615 mm ; FRONT OVERHANG: 979 mm ; OVERALL WIDTH: 1781 mm

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: 56.6 kph ; TIME OF SEPARATION: 120 msec
VELOCITY CHANGE: 67.4 kph
COLLISION DEFORMATION CLASSIFICATION (CDC) CODE: F (Frontal)

CRUSH DEPTH
DIMENSIONS:

C1 = 464 mm
C2 = 550 mm
C3 = 550 mm
C4 = 504 mm
C5 = 445 mm
C6 = 382 mm



MIDPOINT OF
DAMAGE:

D = Vehicle Centerline
(Longitude)

LENGTH OF
DAMAGED REGION:

L = 1443 mm

APPENDIX A
PHOTOGRAPHS

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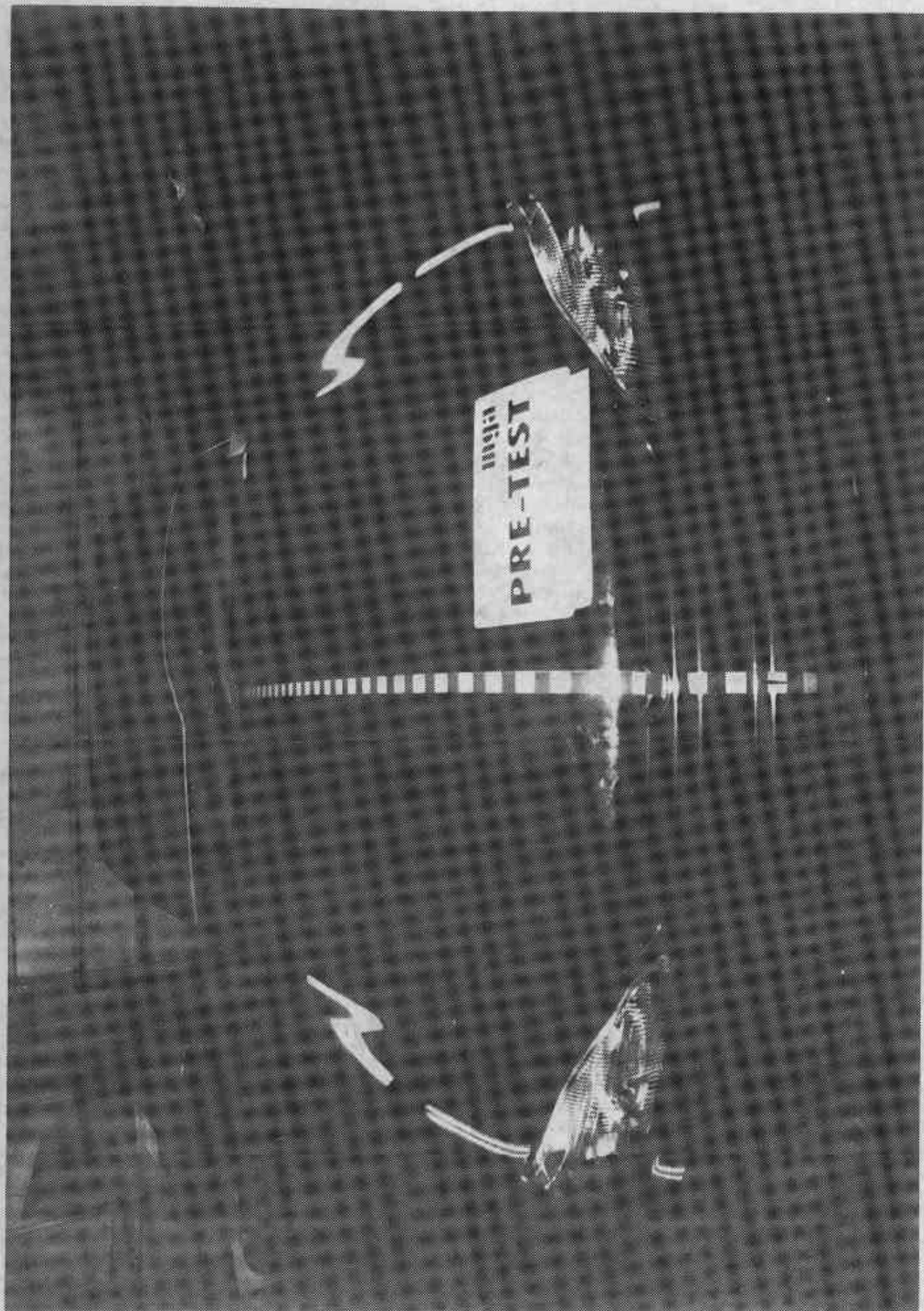


Photo No. A-1 - Pre-Test Front View of Test Vehicle

A-1

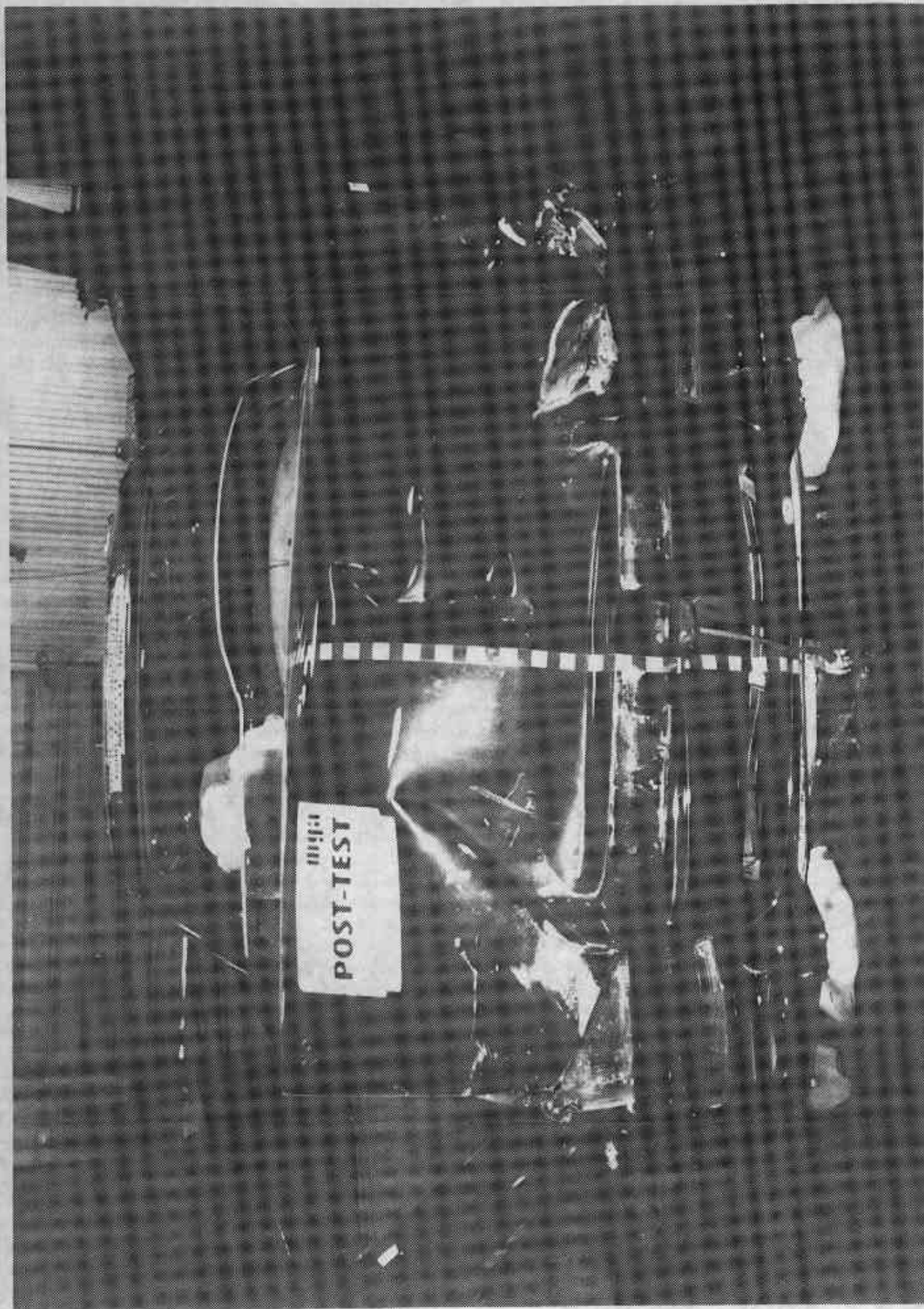


Photo No. A-2 - Post-Test Front View of Test Vehicle

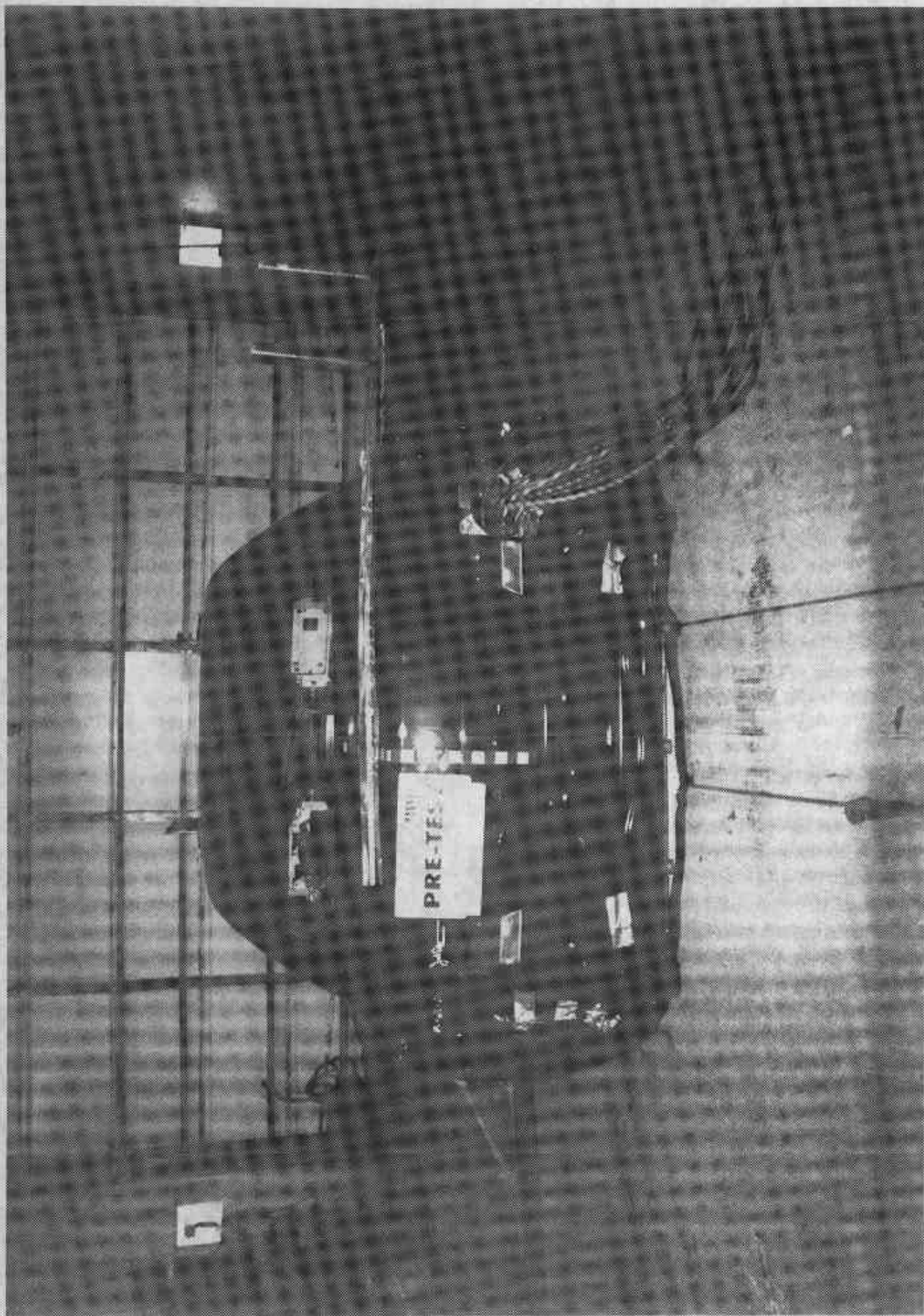


Photo No. A-3 - Pre-Test Rear View of Test Vehicle

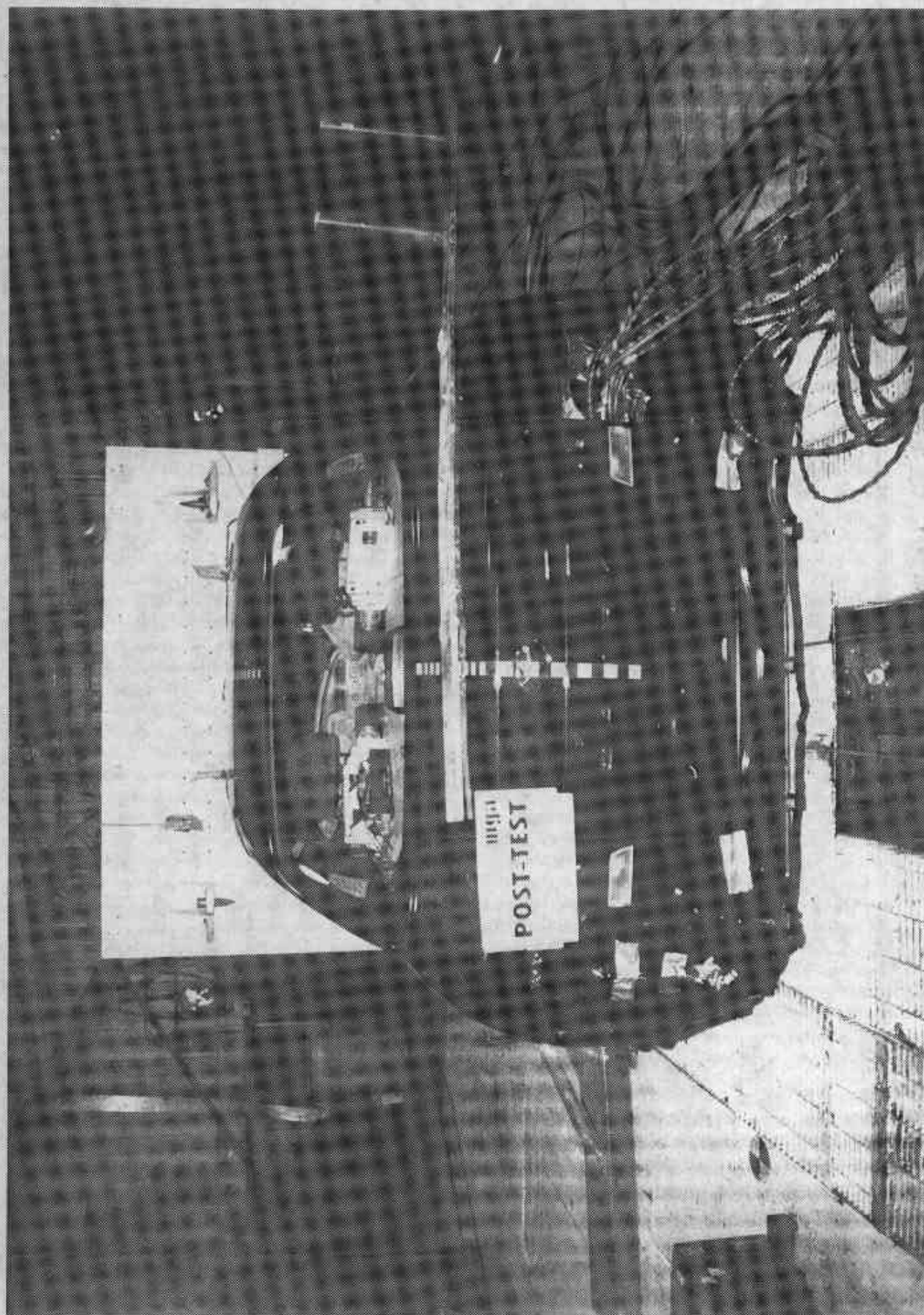


Photo No. A-4 - Post-Test Rear View of Test Vehicle

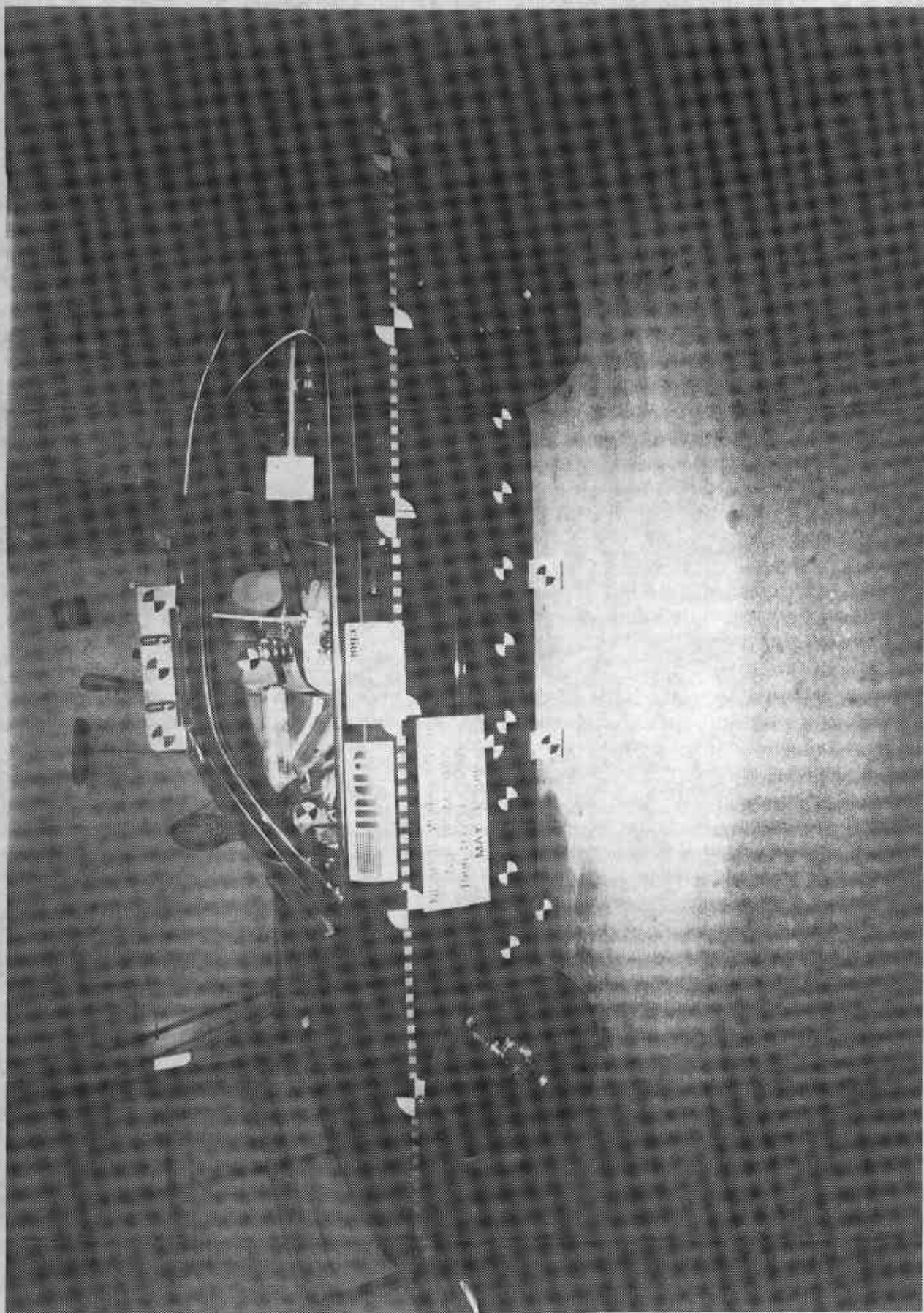


Photo No. A-5 • Pre-Test Left Side View of Test Vehicle

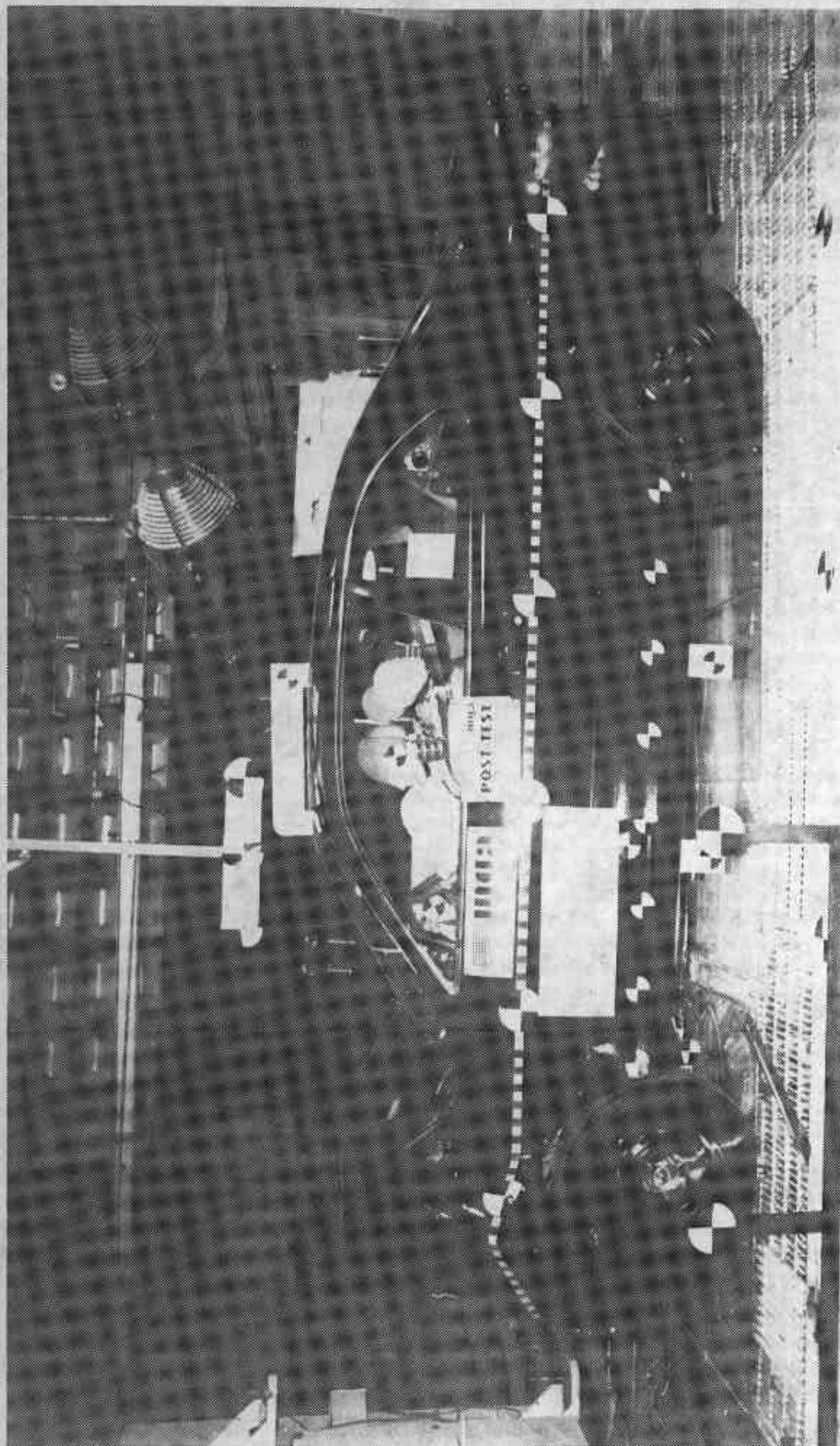


Photo No. A-6 - Post-Test Left Side View of Test Vehicle



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



A-8

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

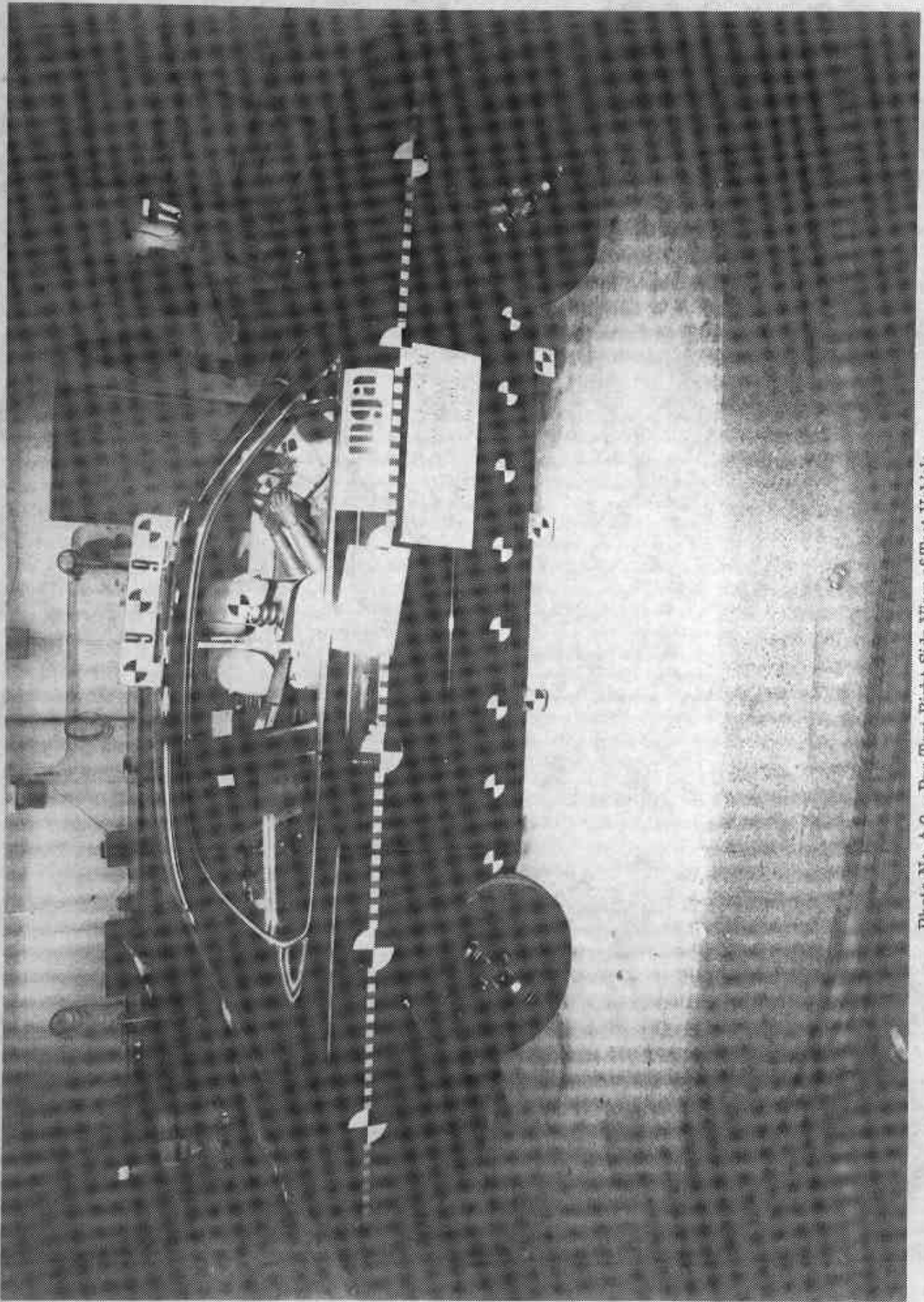


Photo No. A-9 - Pre-Test Right Side View of Test Vehicle

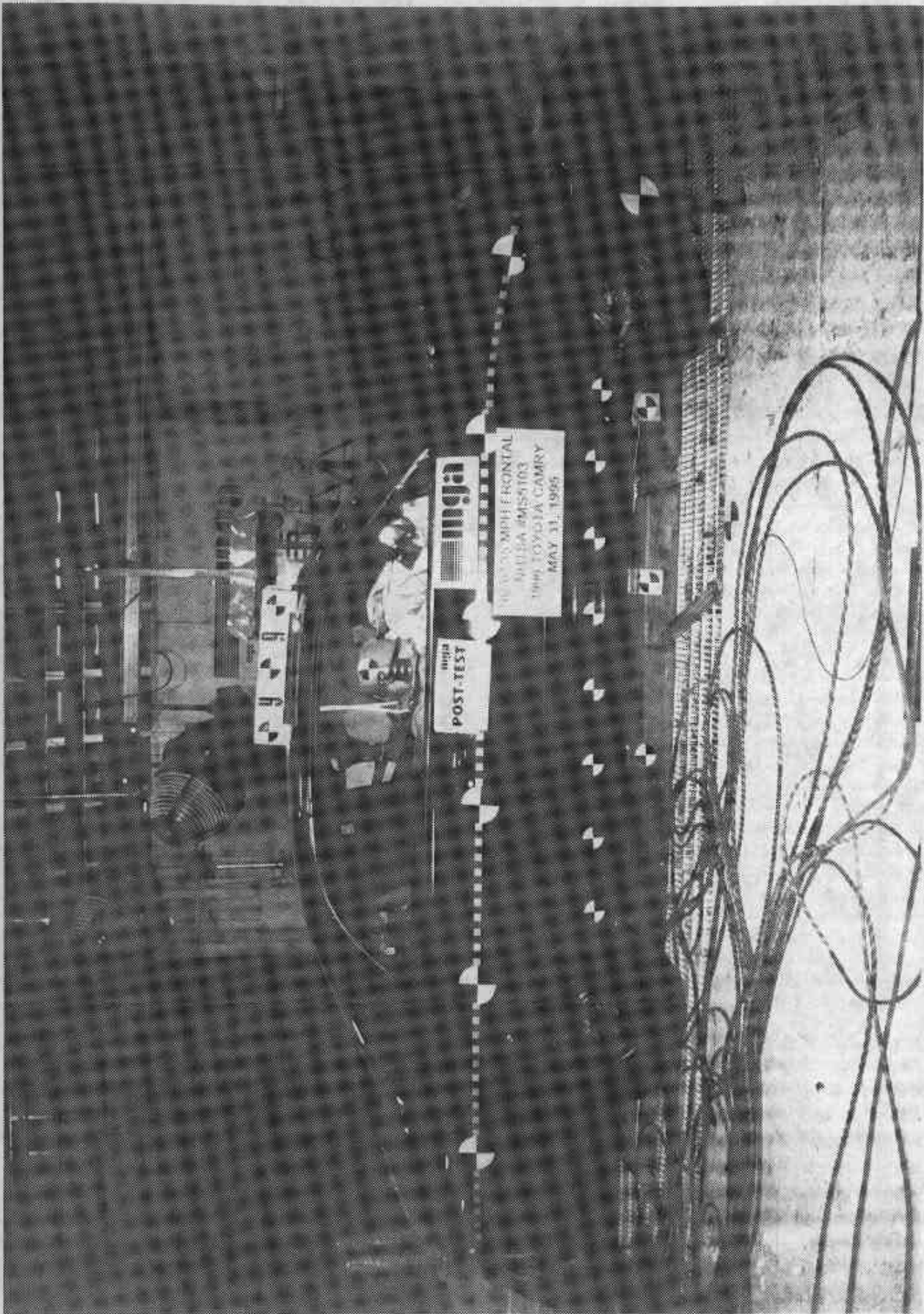


Photo No. A-10 - Post-Test Right Side View of Test Vehicle



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

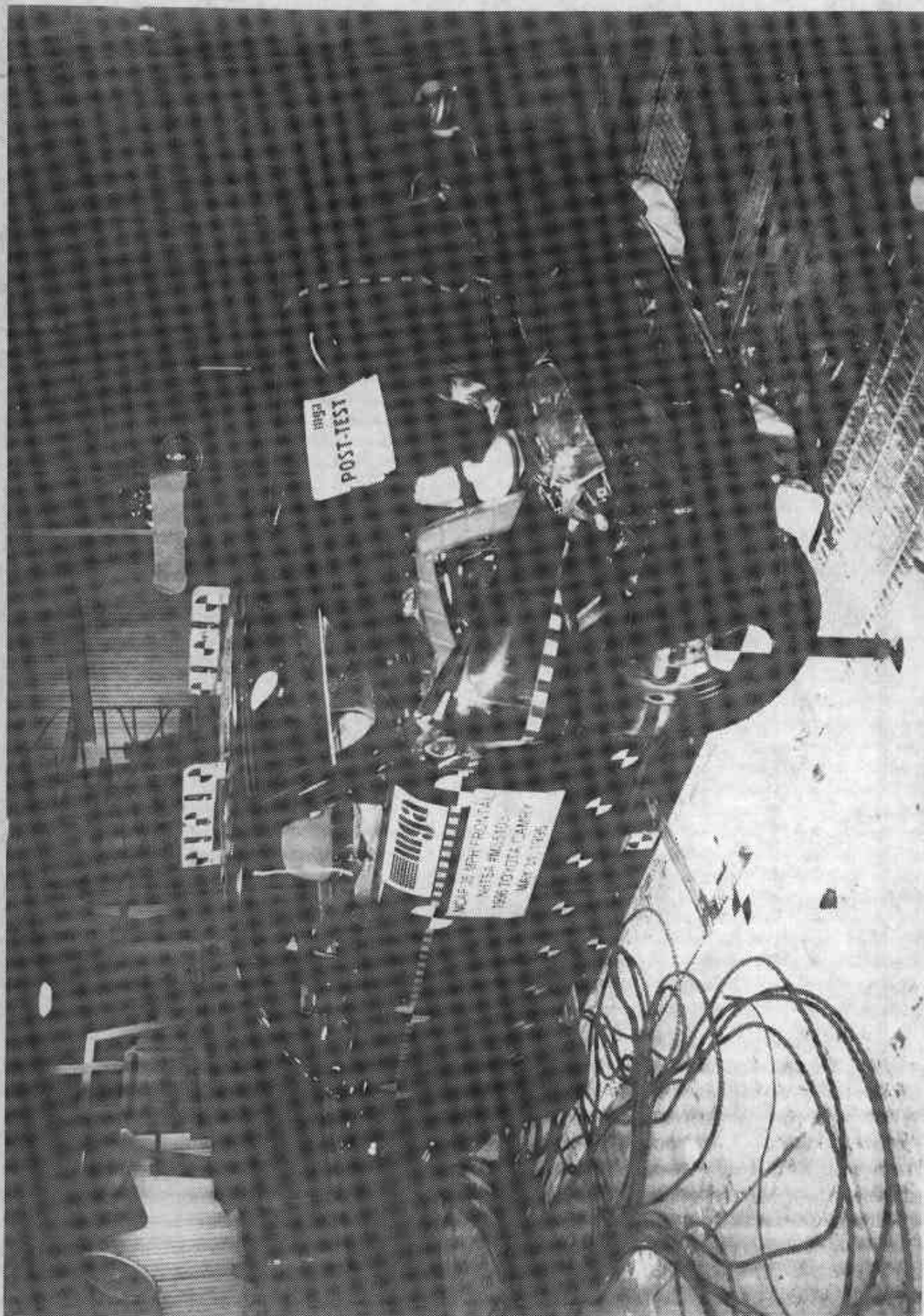


Photo No. A-12 - Post-Test Right Front Three-Quarter View of Test Vehicle



A-13

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

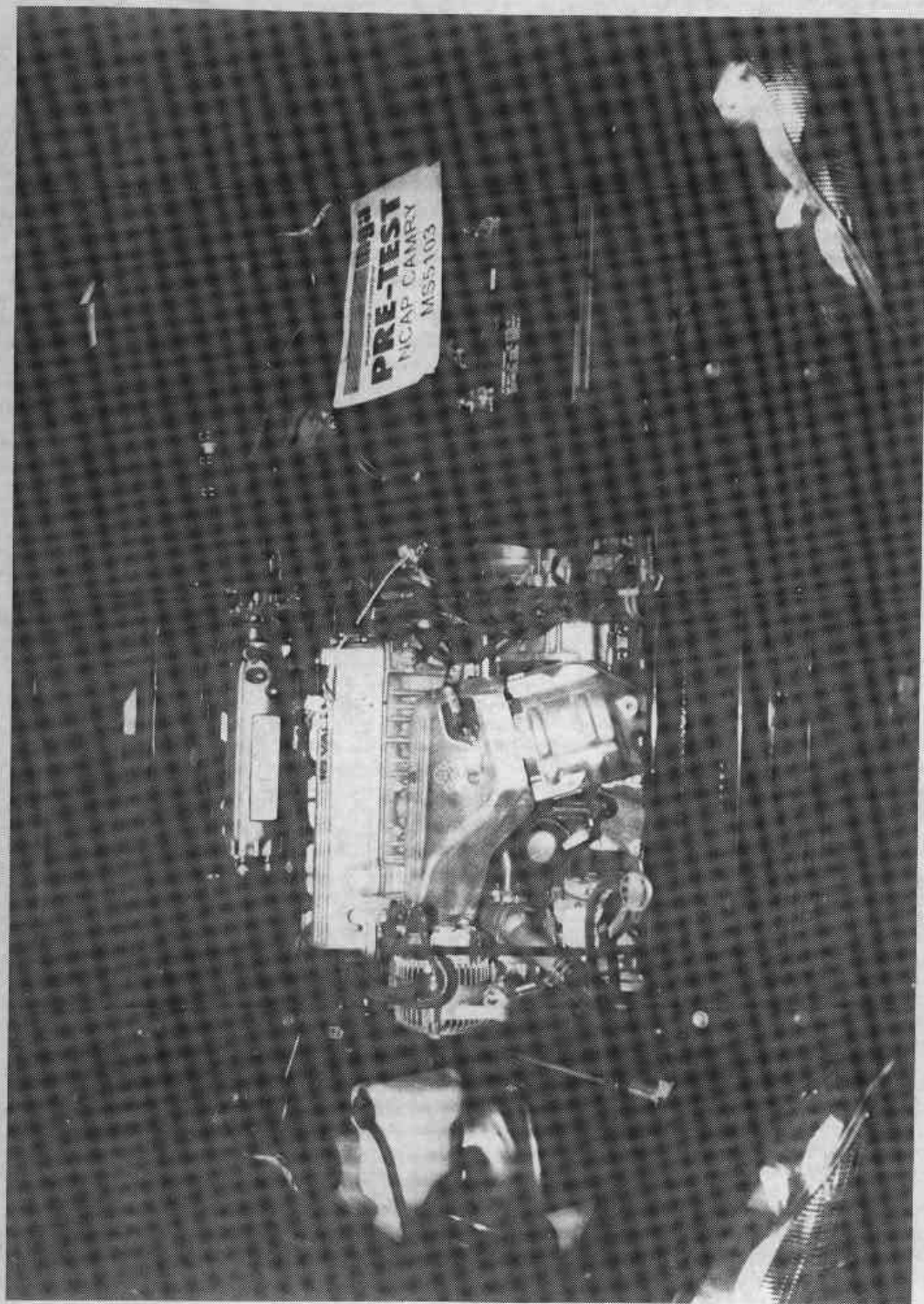


Photo No. A-14 - Pre-Test Engine Compartment View

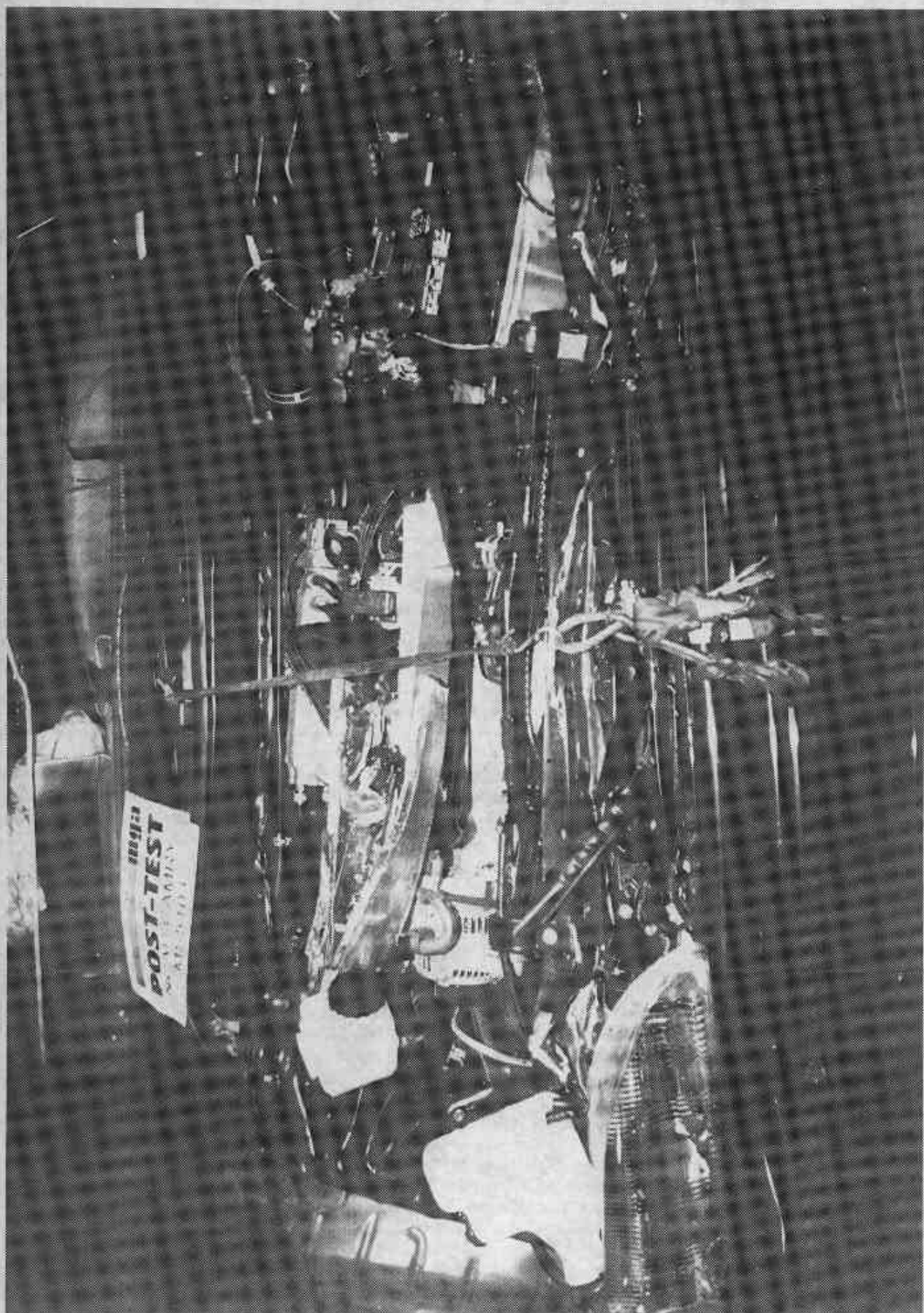
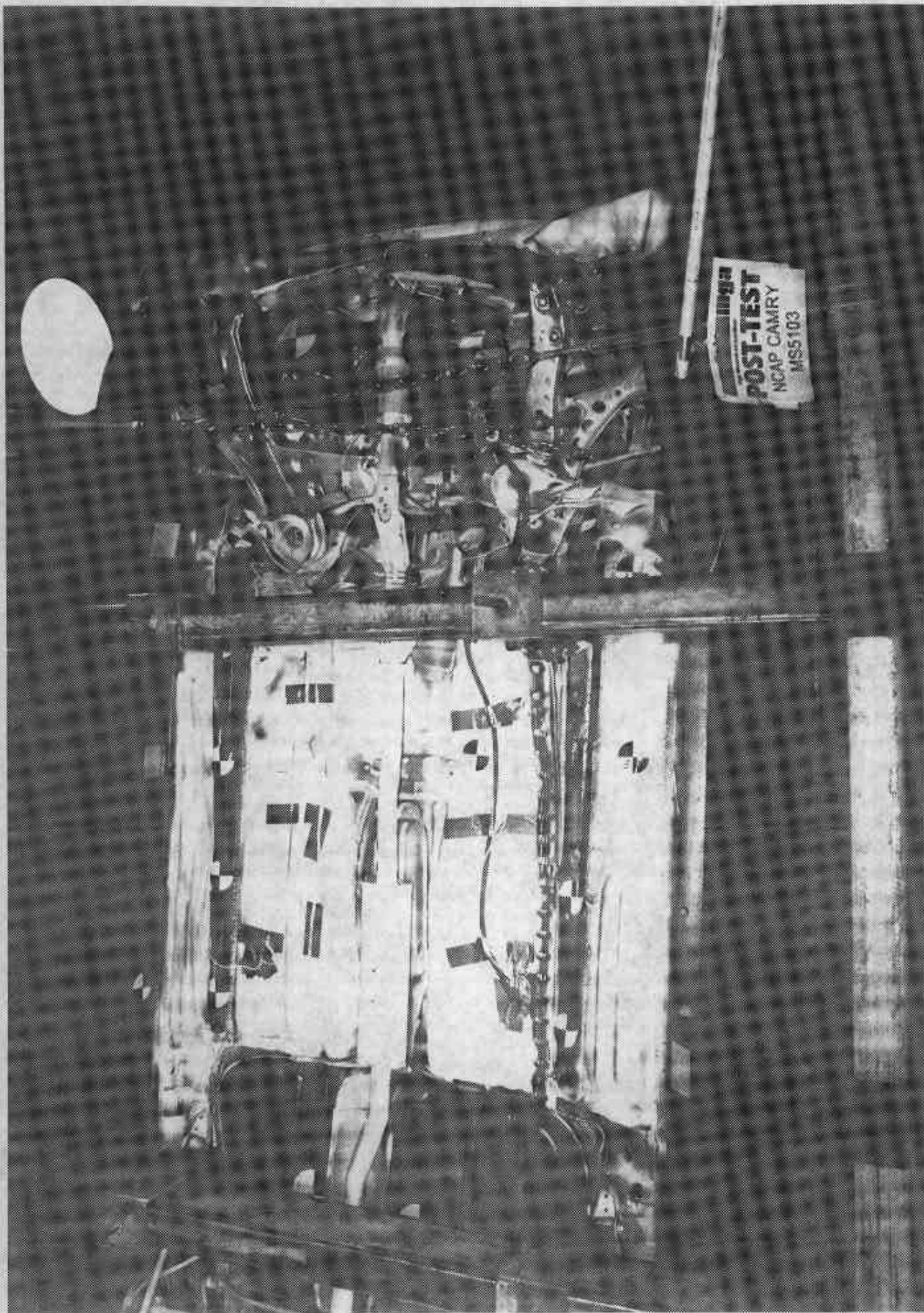


Photo No. A-15 - Post-Test Engine Compartment View

A-15



A-16

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

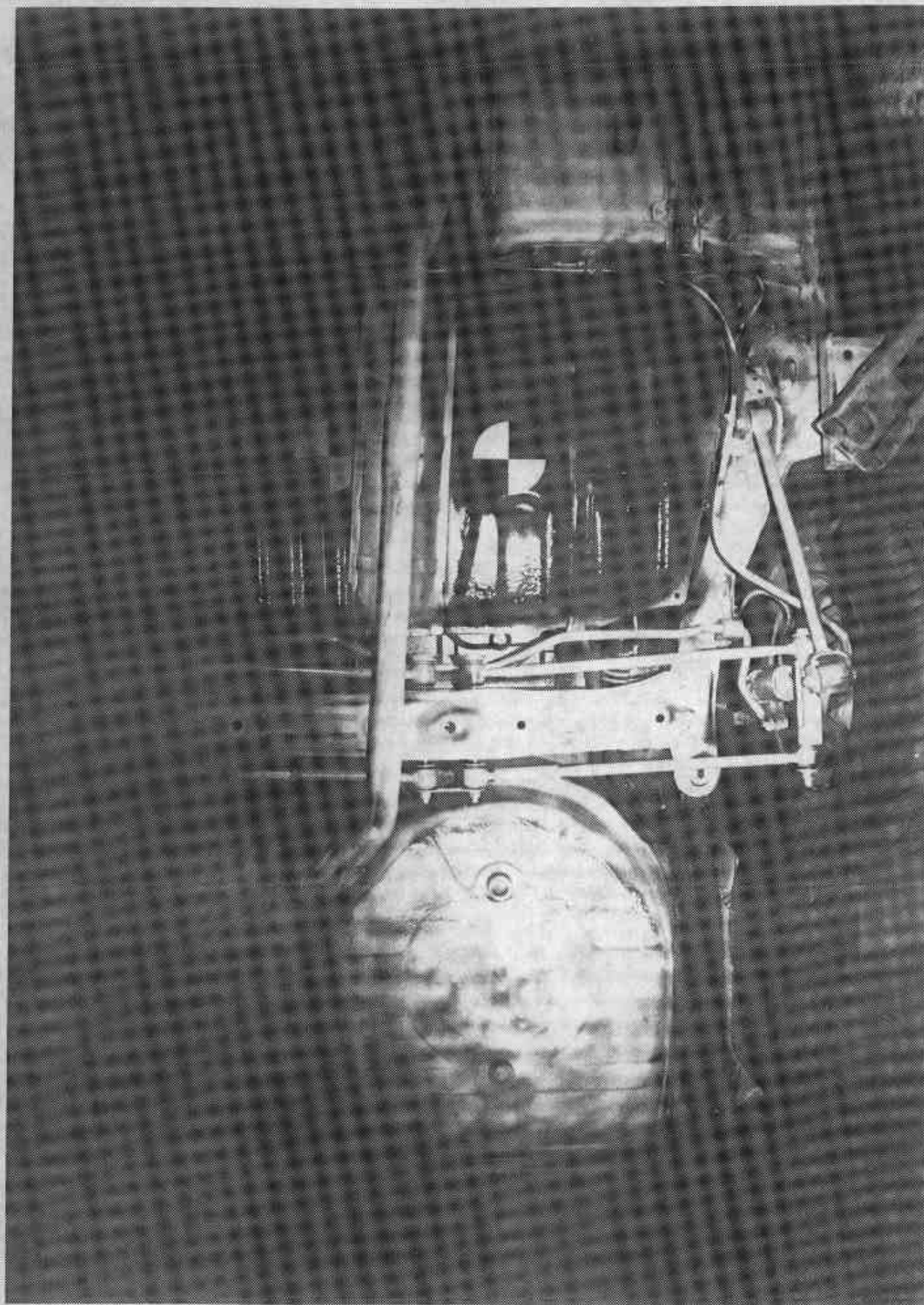


Photo No. A-17 - Pre-Test Rear Underbody View

A-17

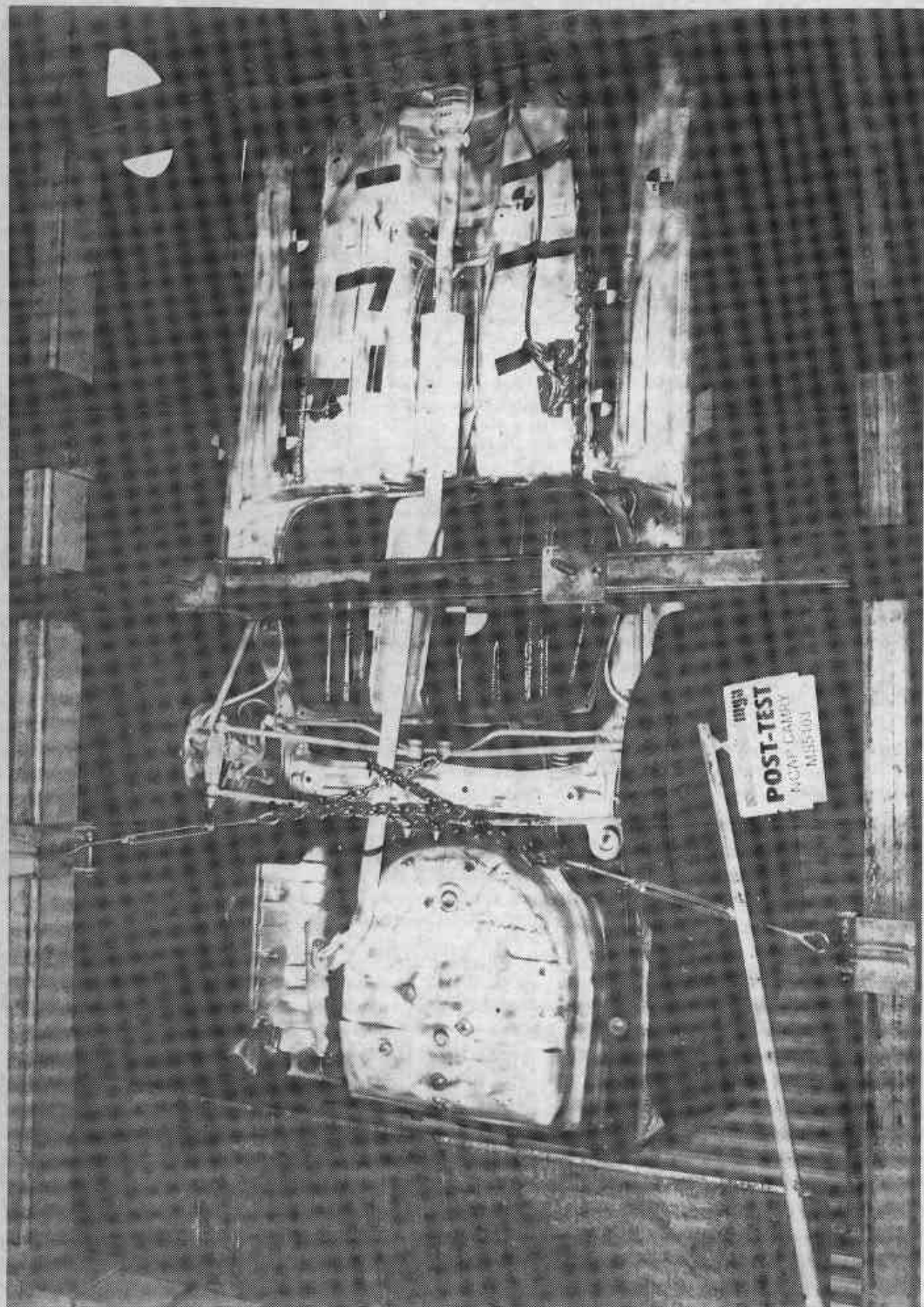
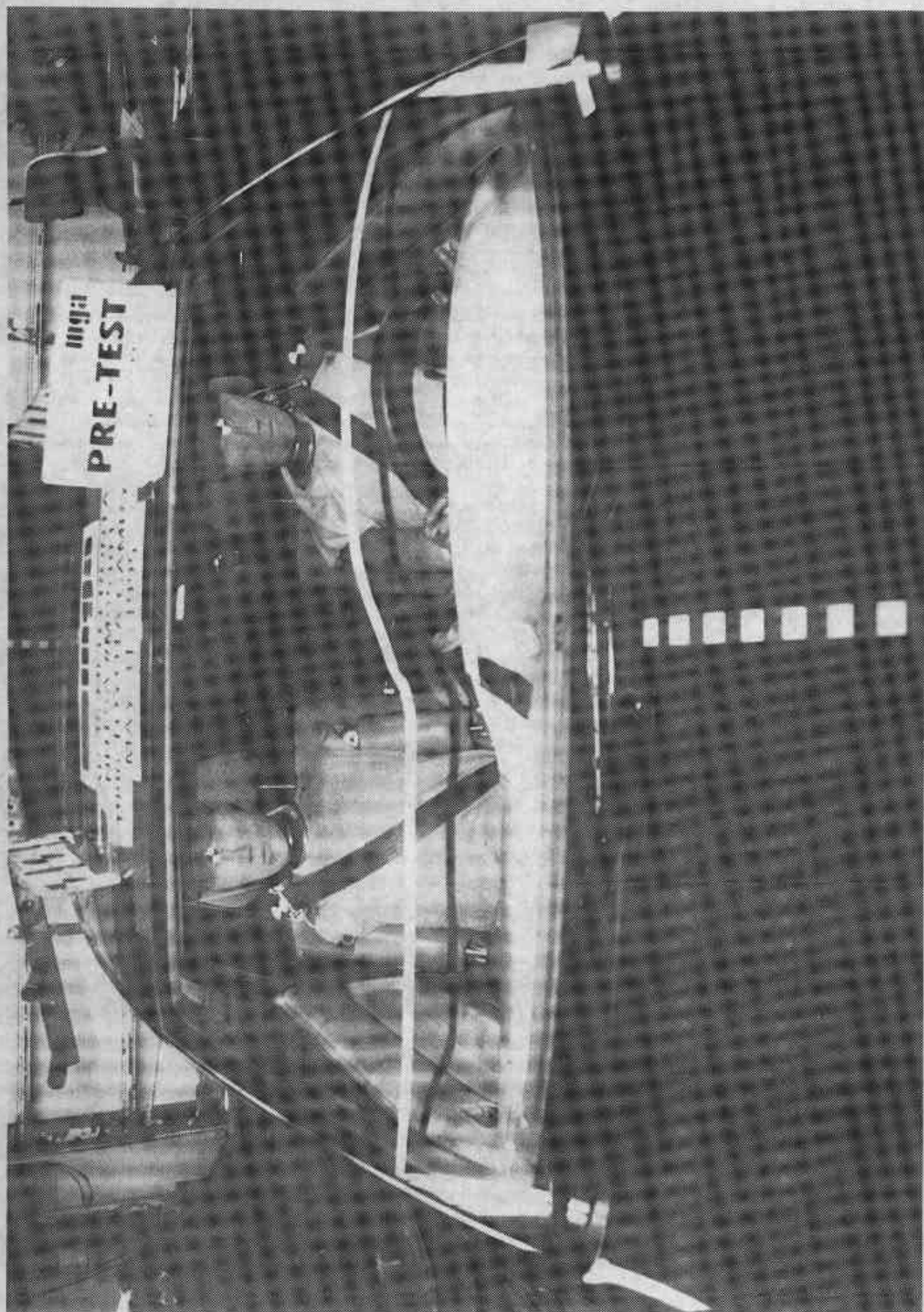


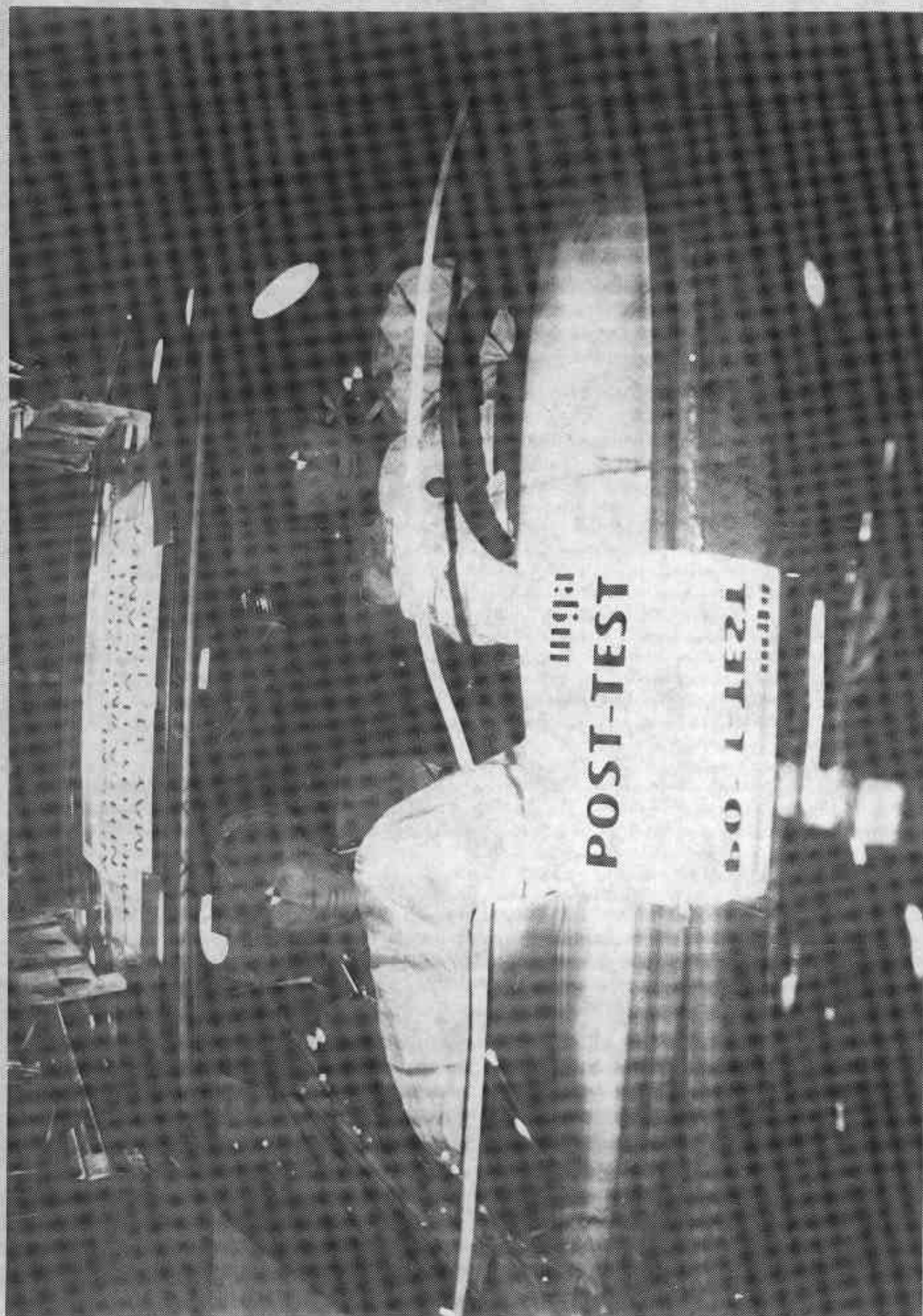
Photo No. A-18 - Post-Test Rear Underbody View

A-18



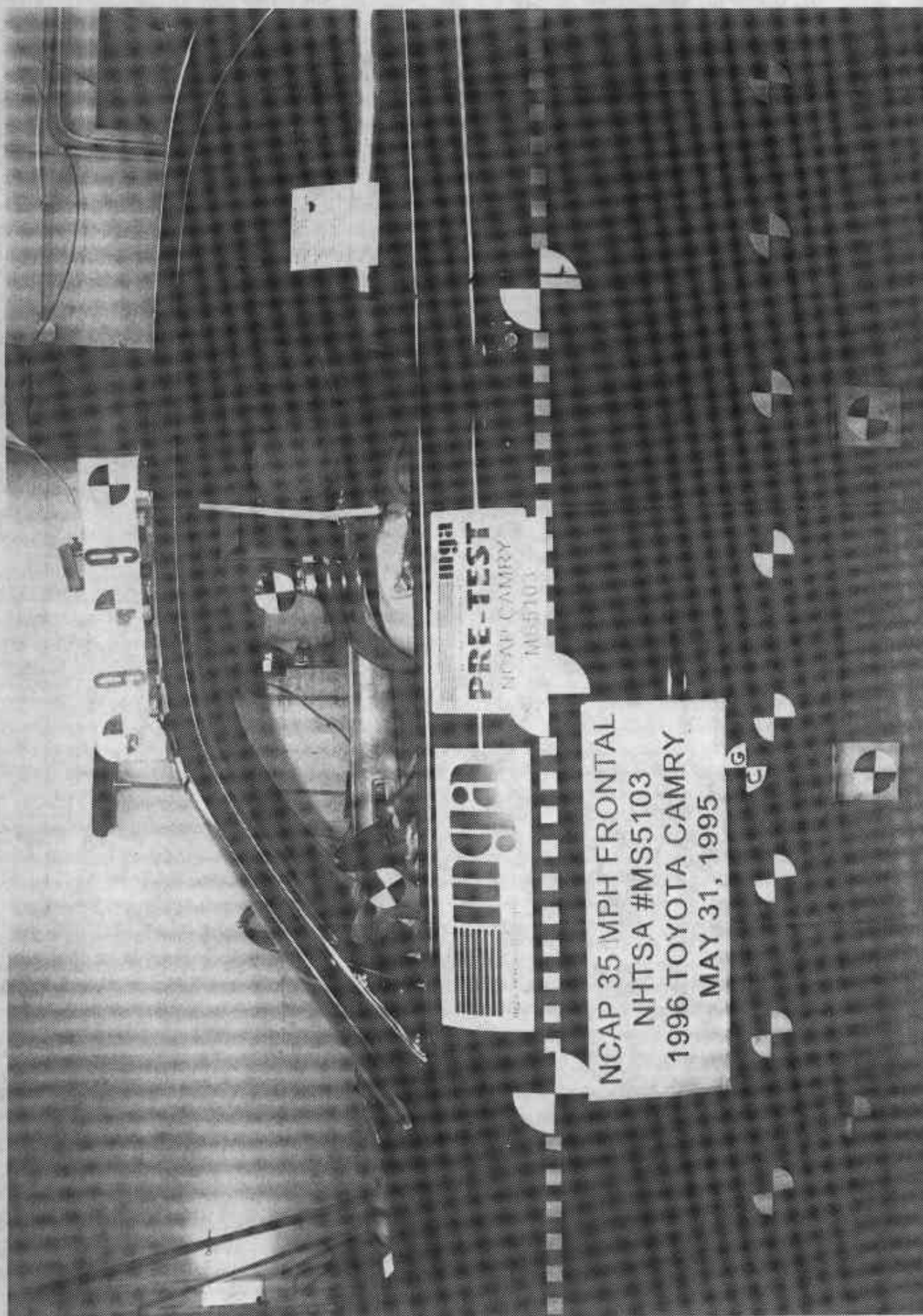
A-19

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



A-20

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



A-21

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

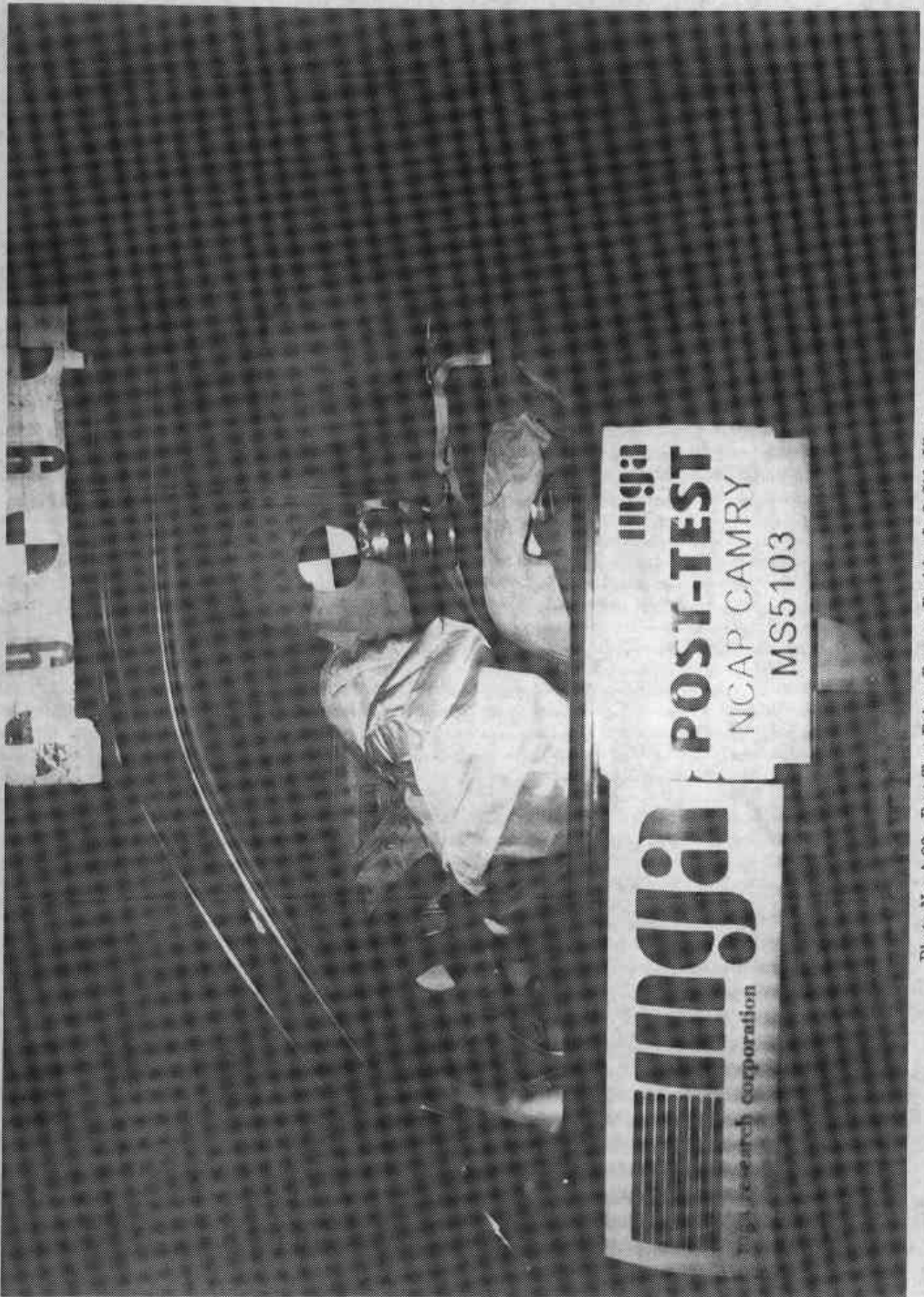


Photo No. A-22 - Post-Test Driver Dummy Position Left Side View



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

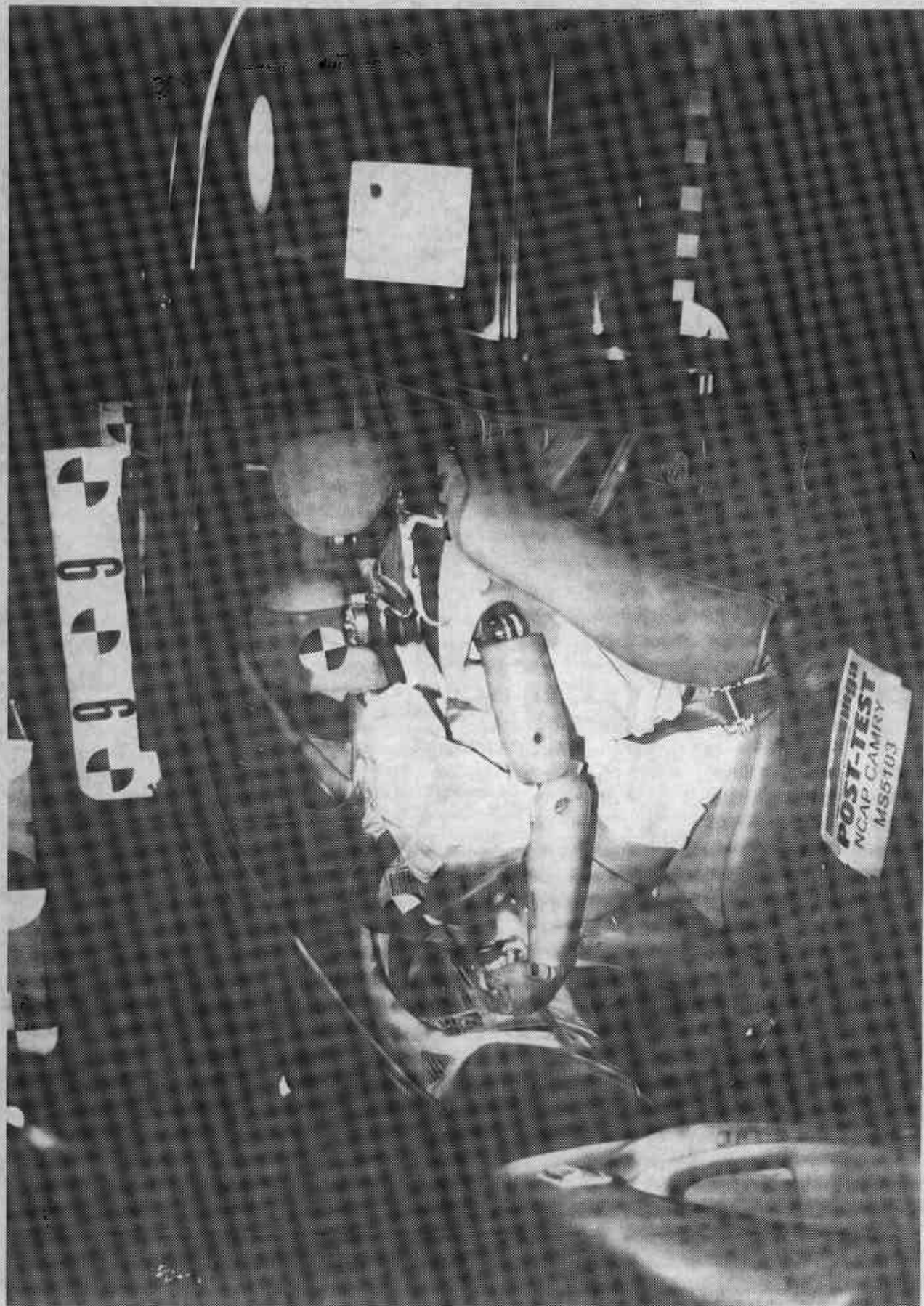


Photo No. A-24 - Post-Test Driver Dummy Position Left Side View (Door Open)



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



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



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

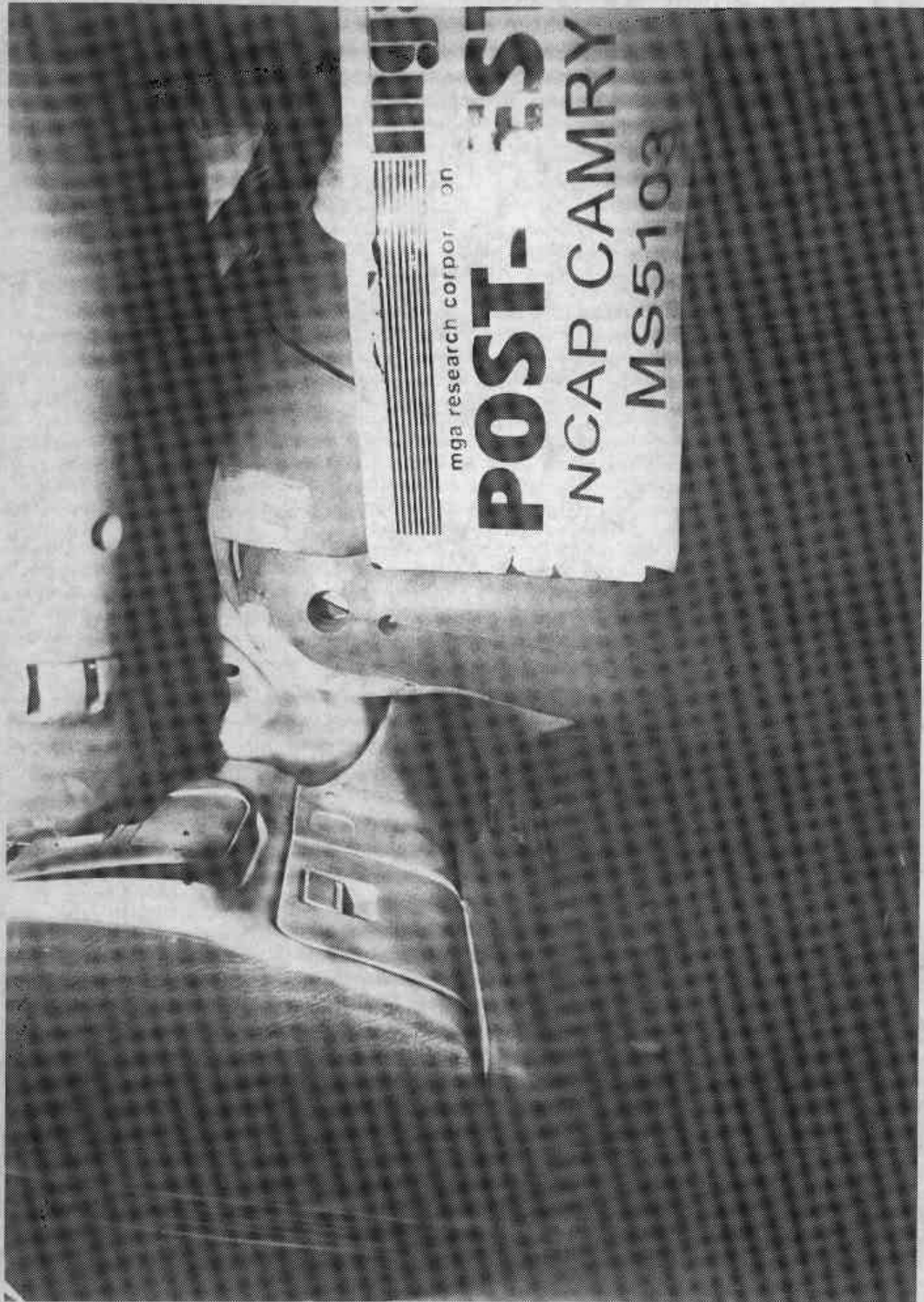


Photo No. A-28 - Post-Test Driver Dummy Knee Position



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



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

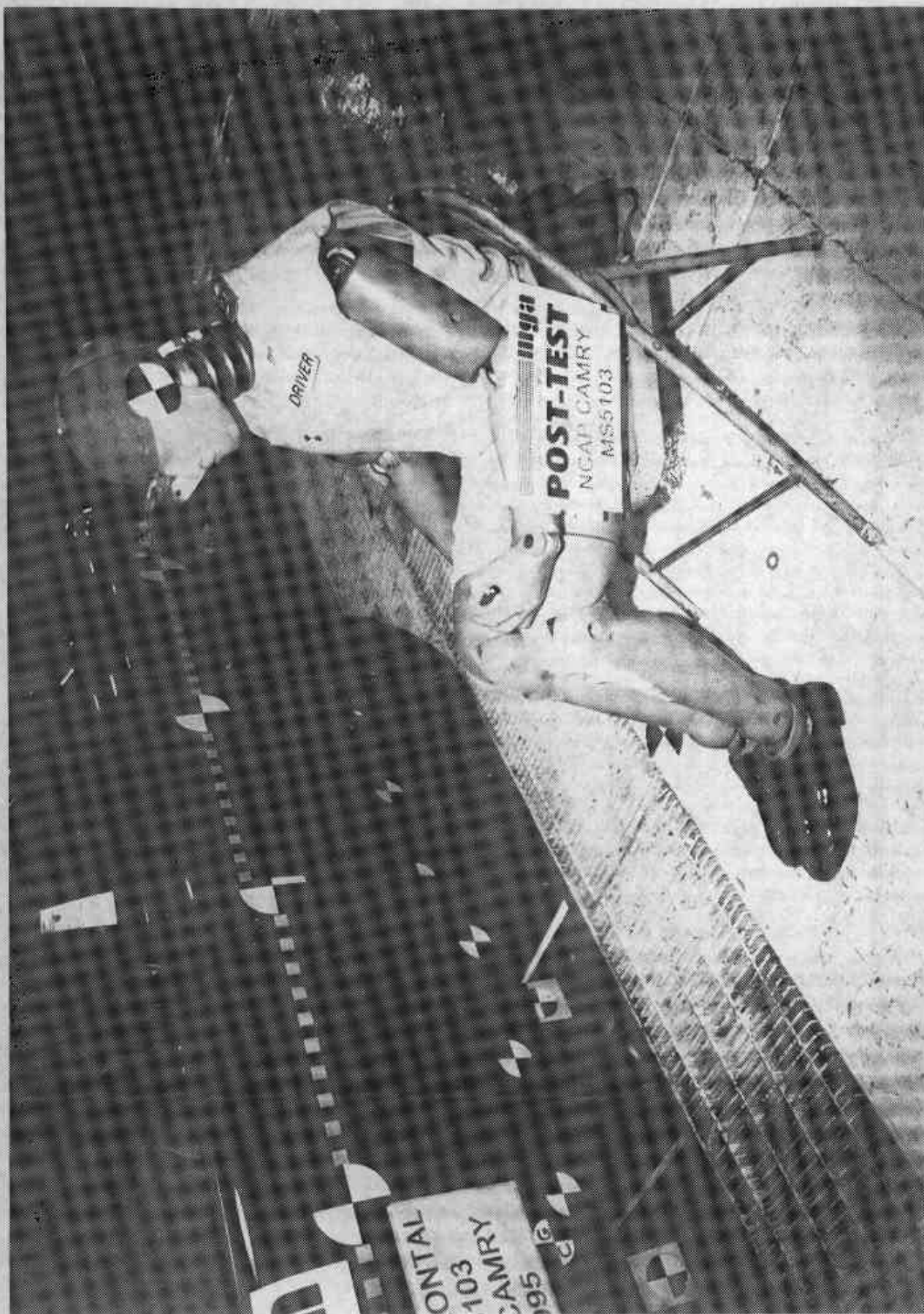


Photo No. A-31 - Post-Test Driver Dummy View

A-31



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

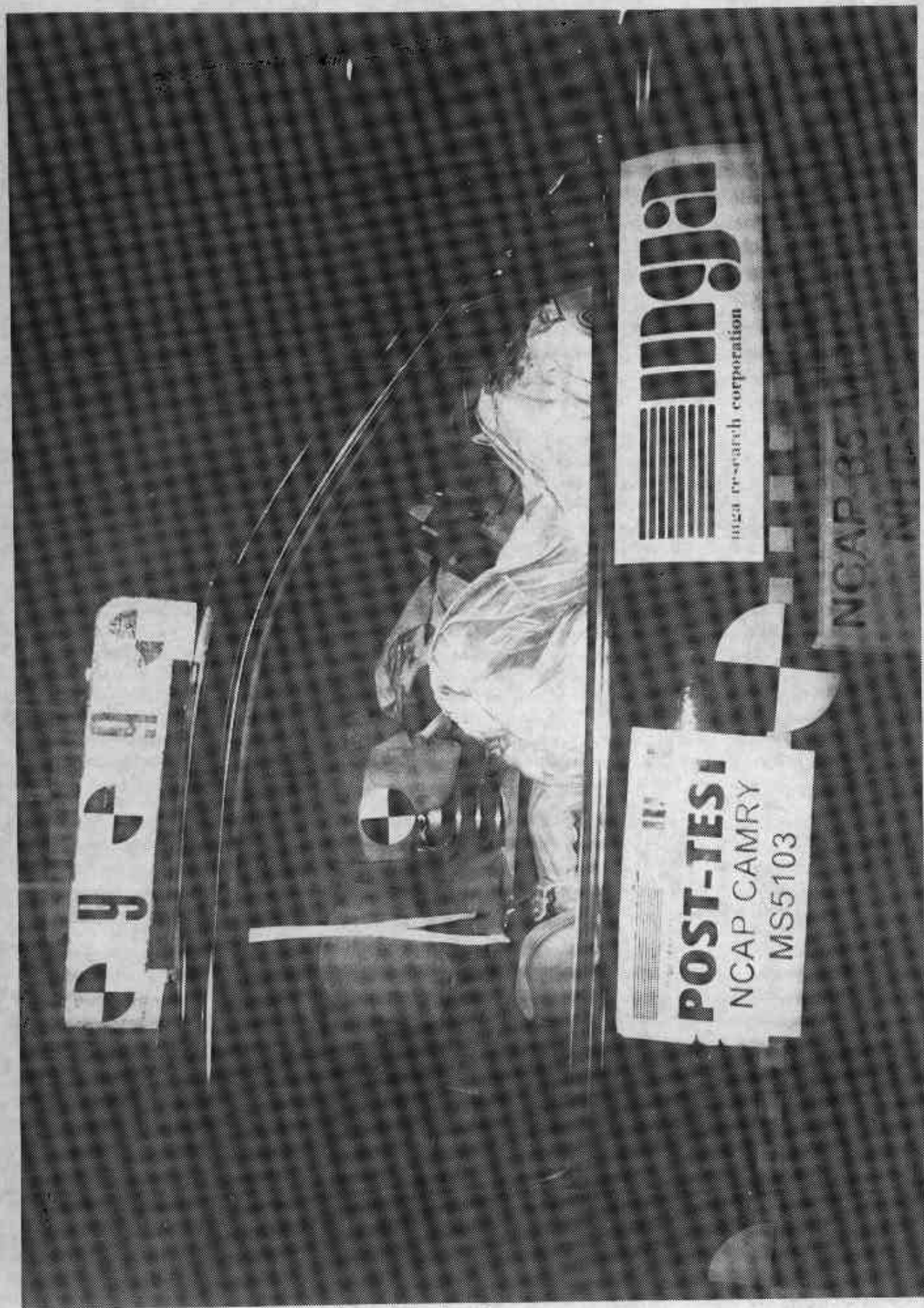
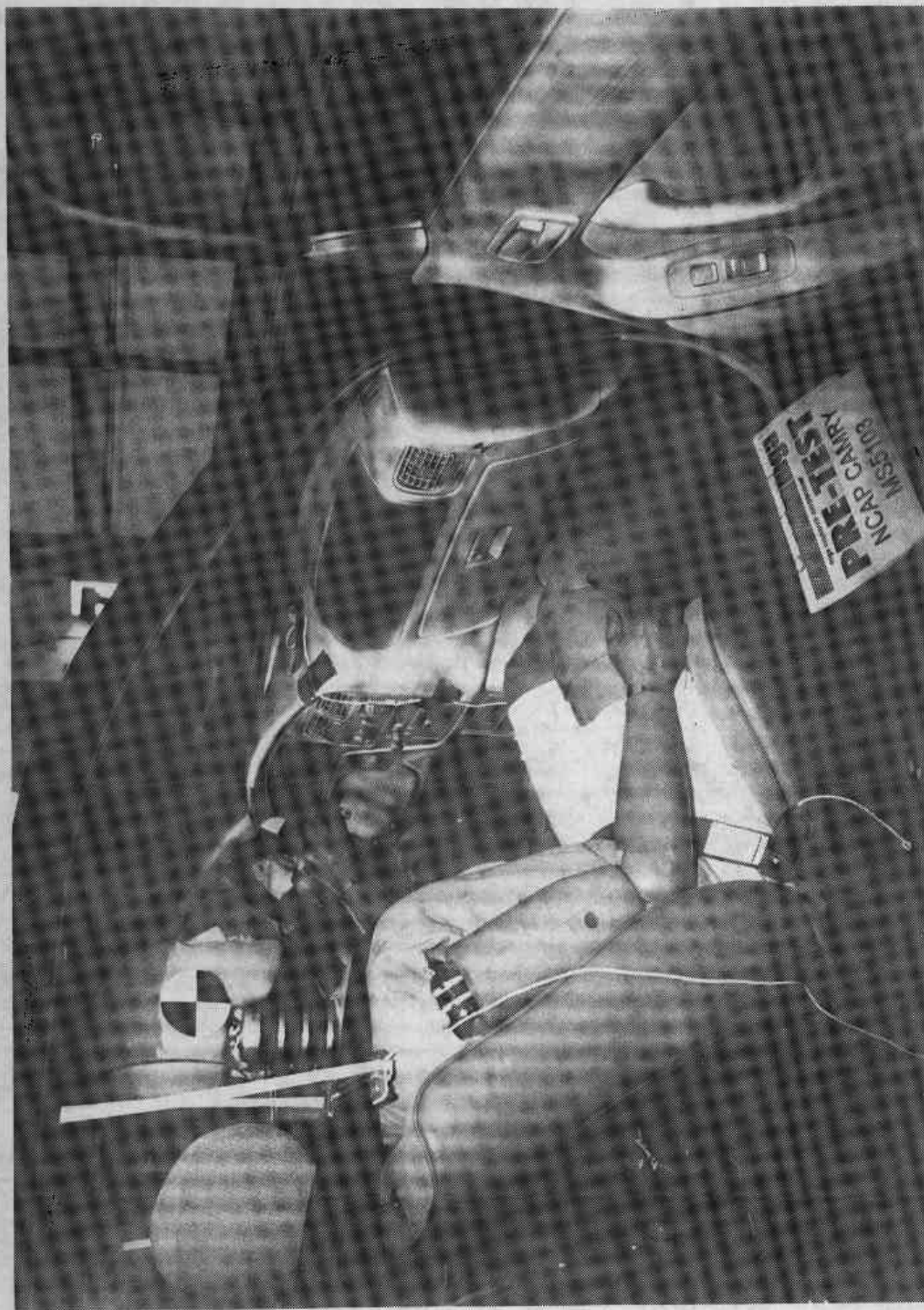


Photo No. A-33 - Post-Test Passenger Dummy Position Right Side View



A-34

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



A-35

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



A-36

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



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



Photo No. A-98 - Pre-Test Passenger Dummy Knee Position

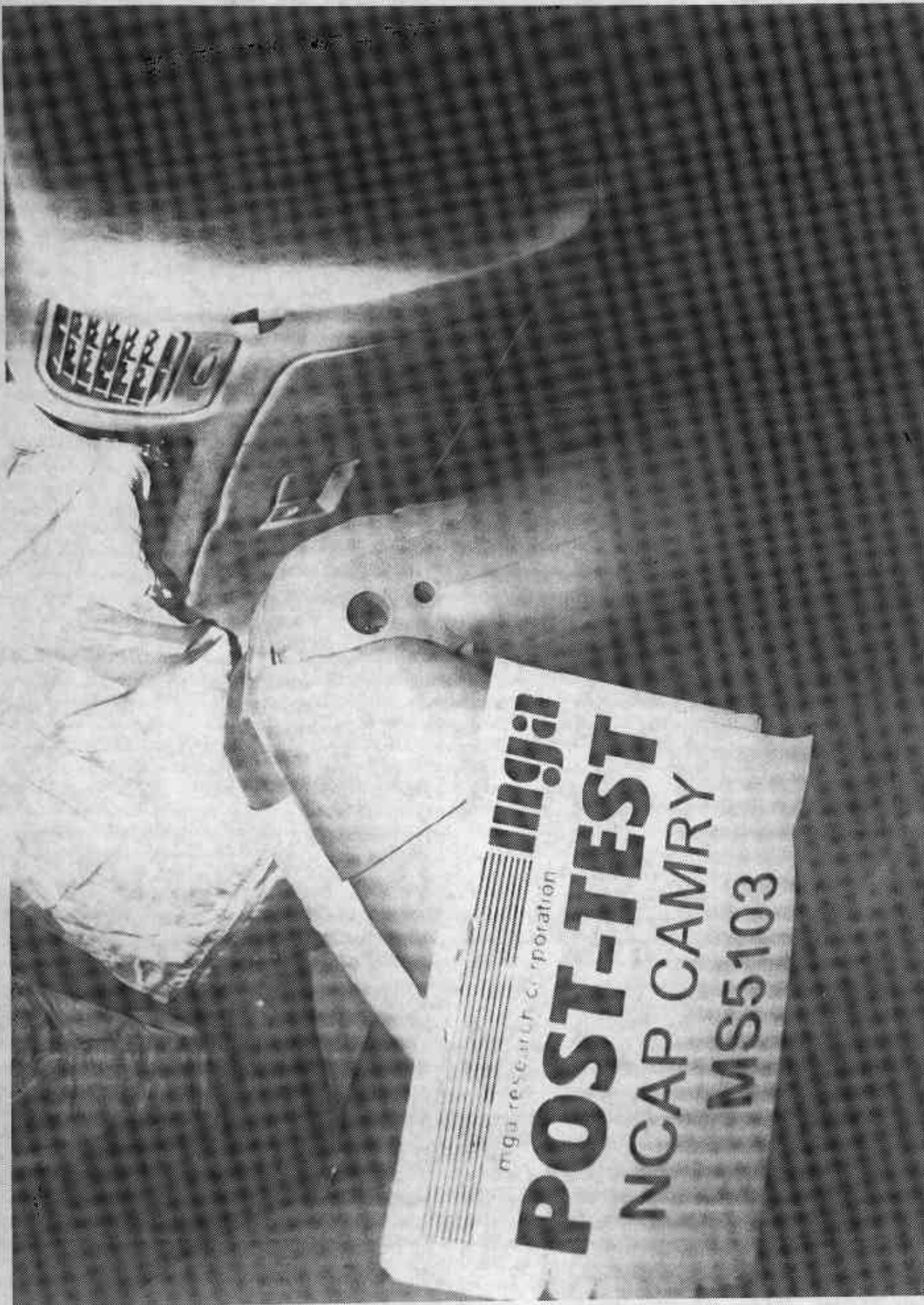


Photo No. A-39 - Post-Test Passenger Dummy Knee Position



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

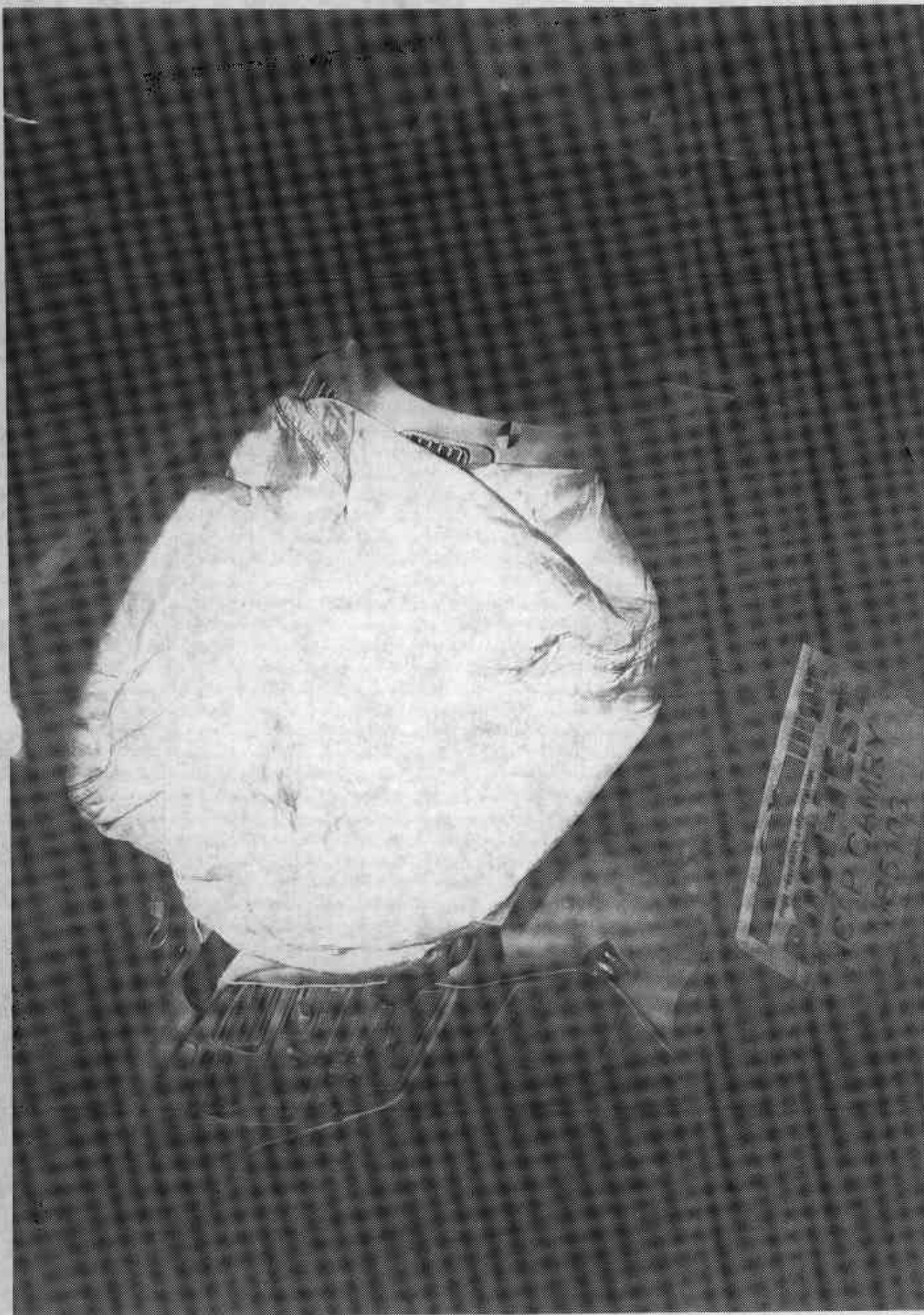


Photo No. A-41 - Post-Test Passenger Airbag Contact

A-41

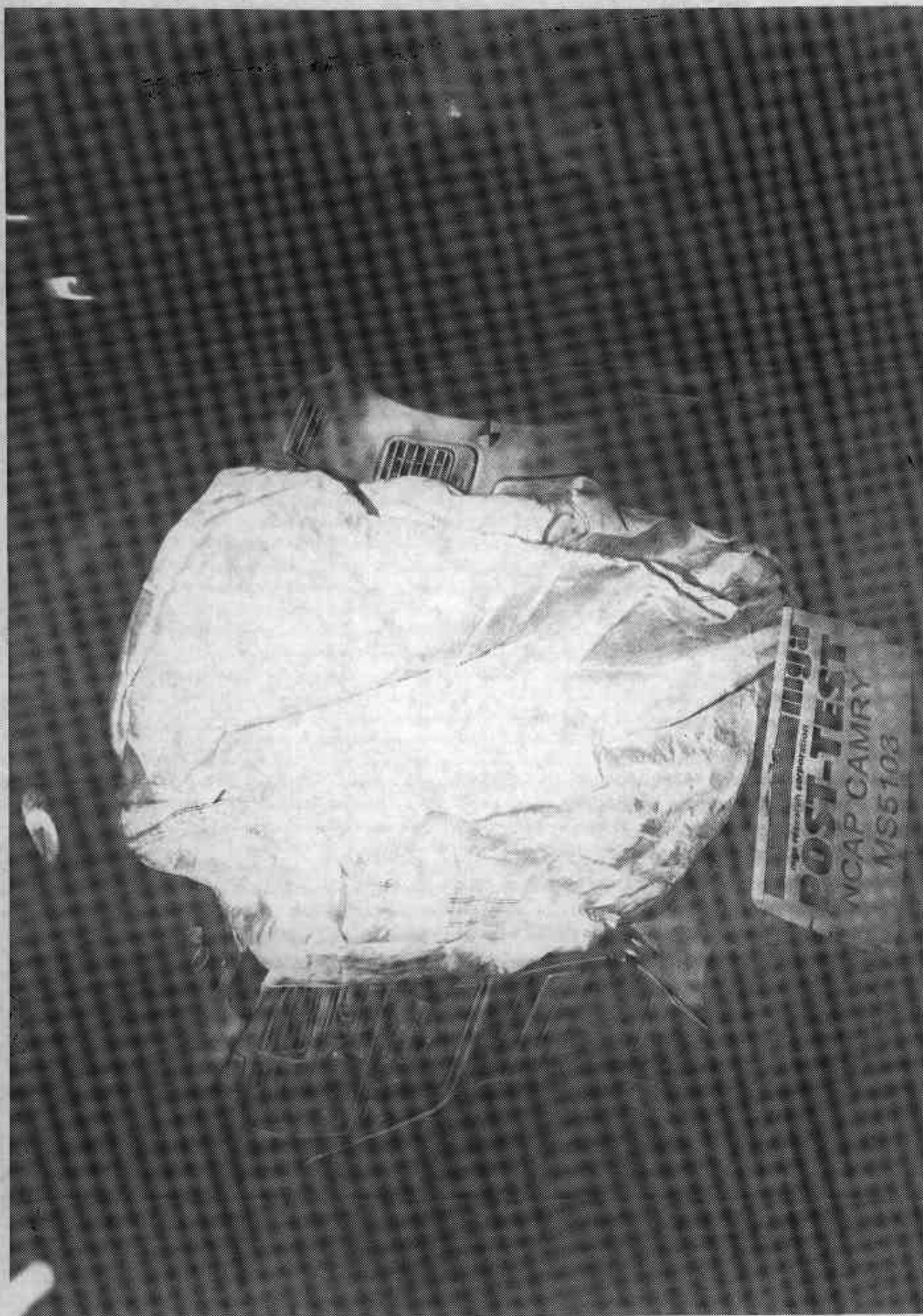


Photo No. A-42 - Post-Test Passenger Airing Contact



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

A-43

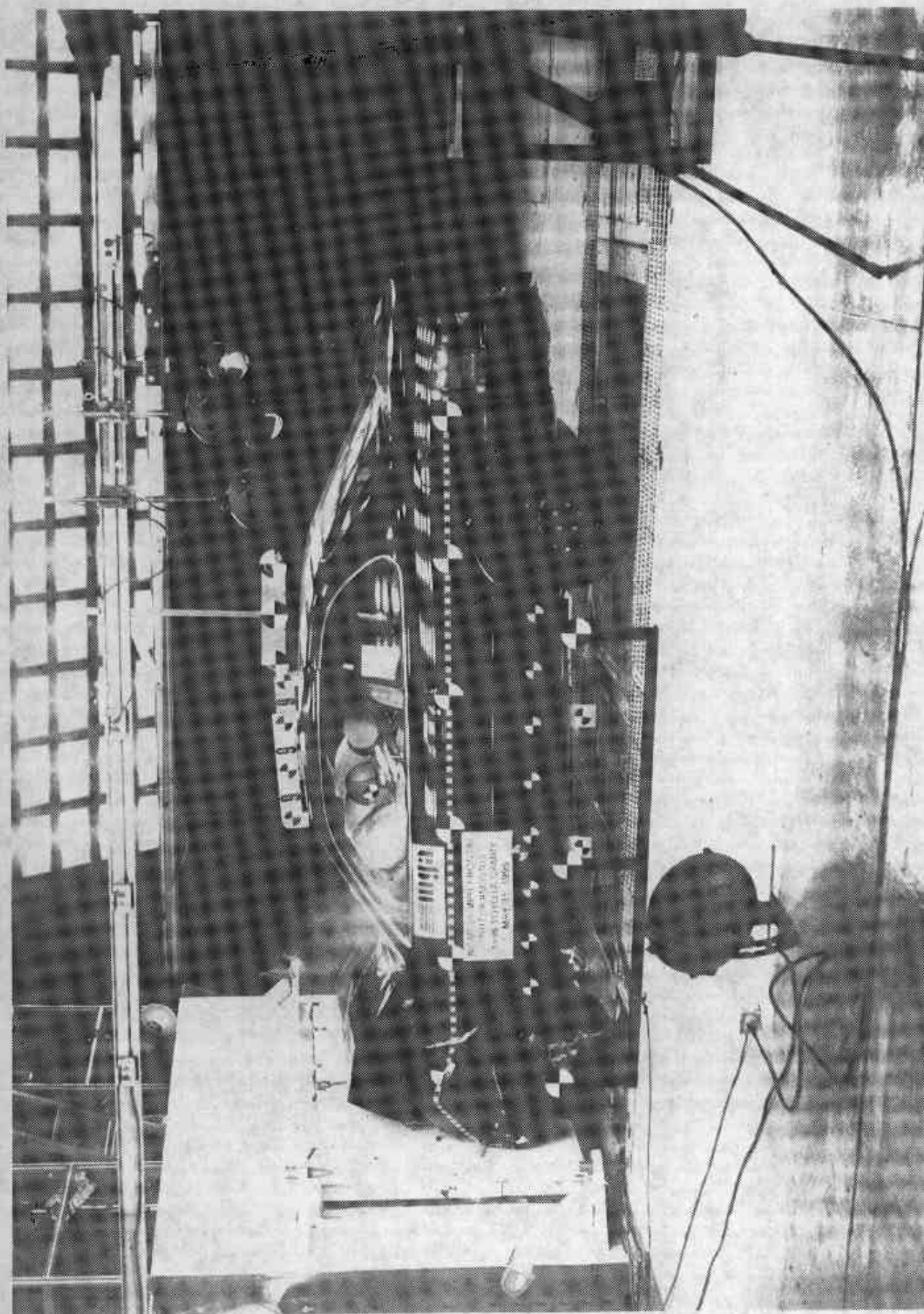


Photo No. A-44 - Vehicle Impact

A-44

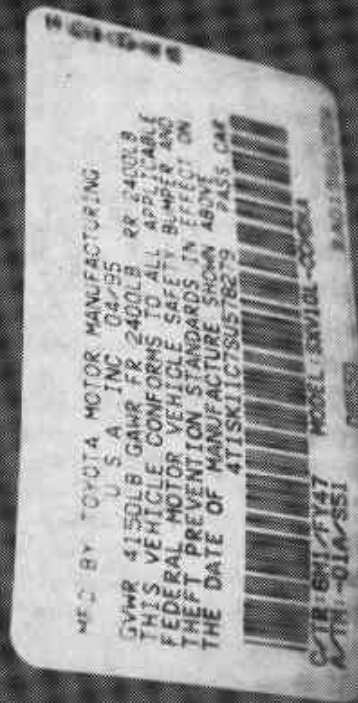
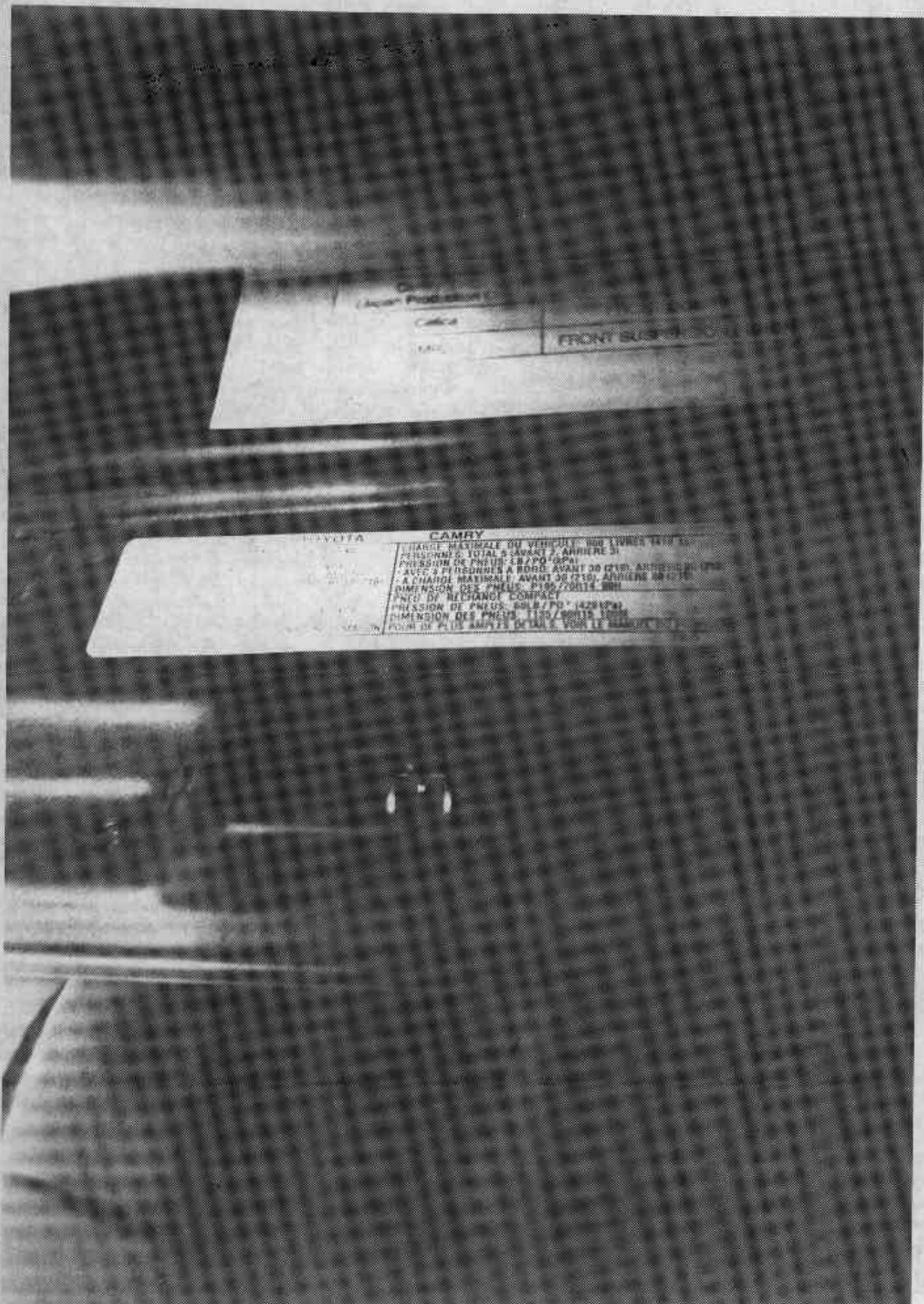


Photo No. A-45 - Vehicle Certification Label



FRONT SUSPENSION

CAMRY

CHARGE MAXIMALE DU VEHICULE: 1000 LIBRES (450 KG)
PESSEMENTS TOTALS AVANT 2 ARRIERE 31
PRESSION DE PNEUS: 32 PSI (2.2 BAR)
Avec 2 personnes a bord avant 30 (2.1), ARRIERE 30 (2.1)
A CHARGE MAXIMALE AVANT 30 (2.1), ARRIERE 30 (2.1)
DIMENSION DES PNEUS: P195/70R14 80H
PNEU DE RECHANGE COMPACT
PRESSION DE PNEUS: 32 PSI (2.2 BAR)
DIMENSION DES PNEUS: P195/70R14 80H
POUR DE PLUS AMPLIS DETAIL A VOIR LE MANUEL D'UTILISATION

Photo No. A-46 - Tire Placard

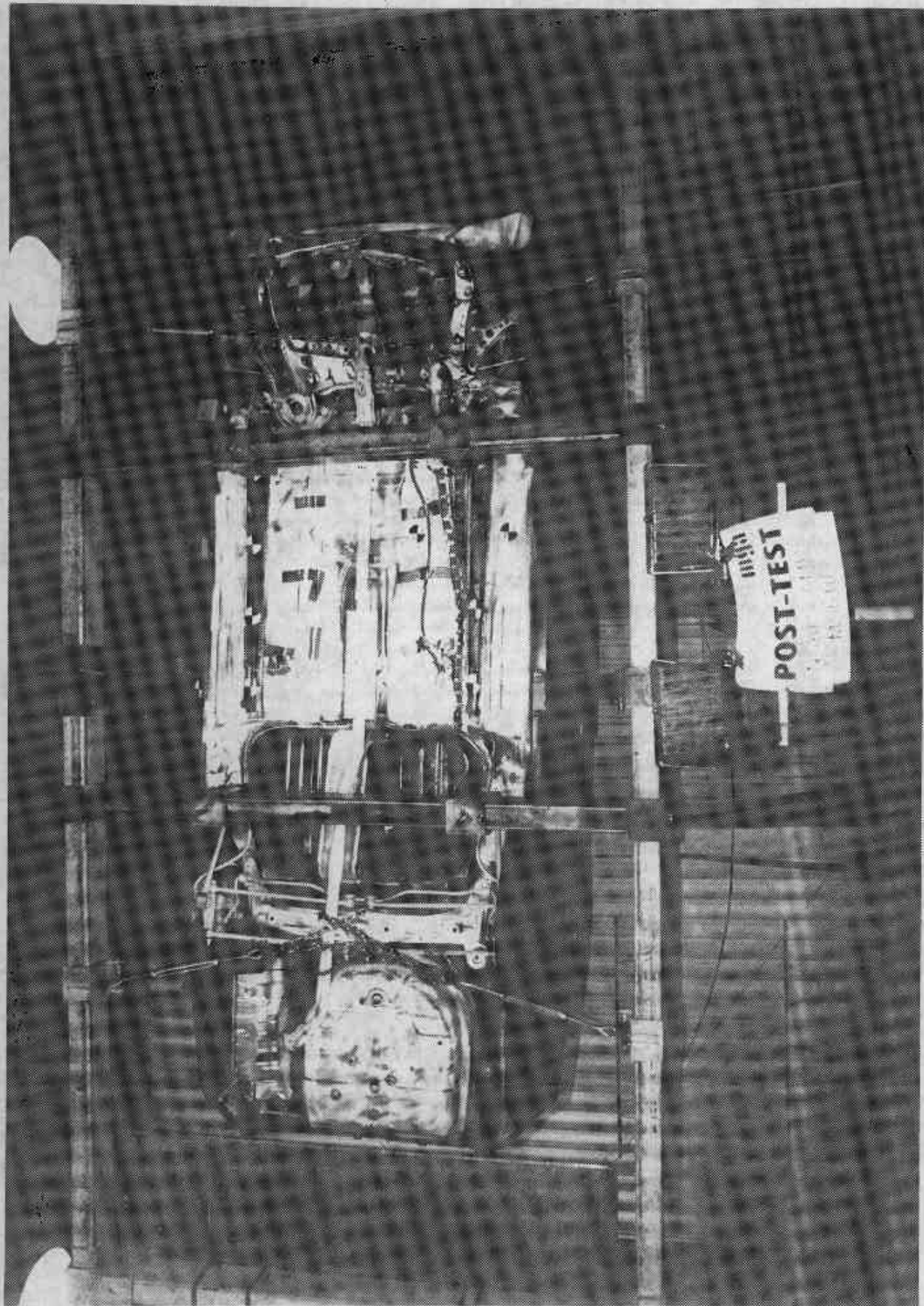


Photo No. A-47 - Rollover 99.

A-47

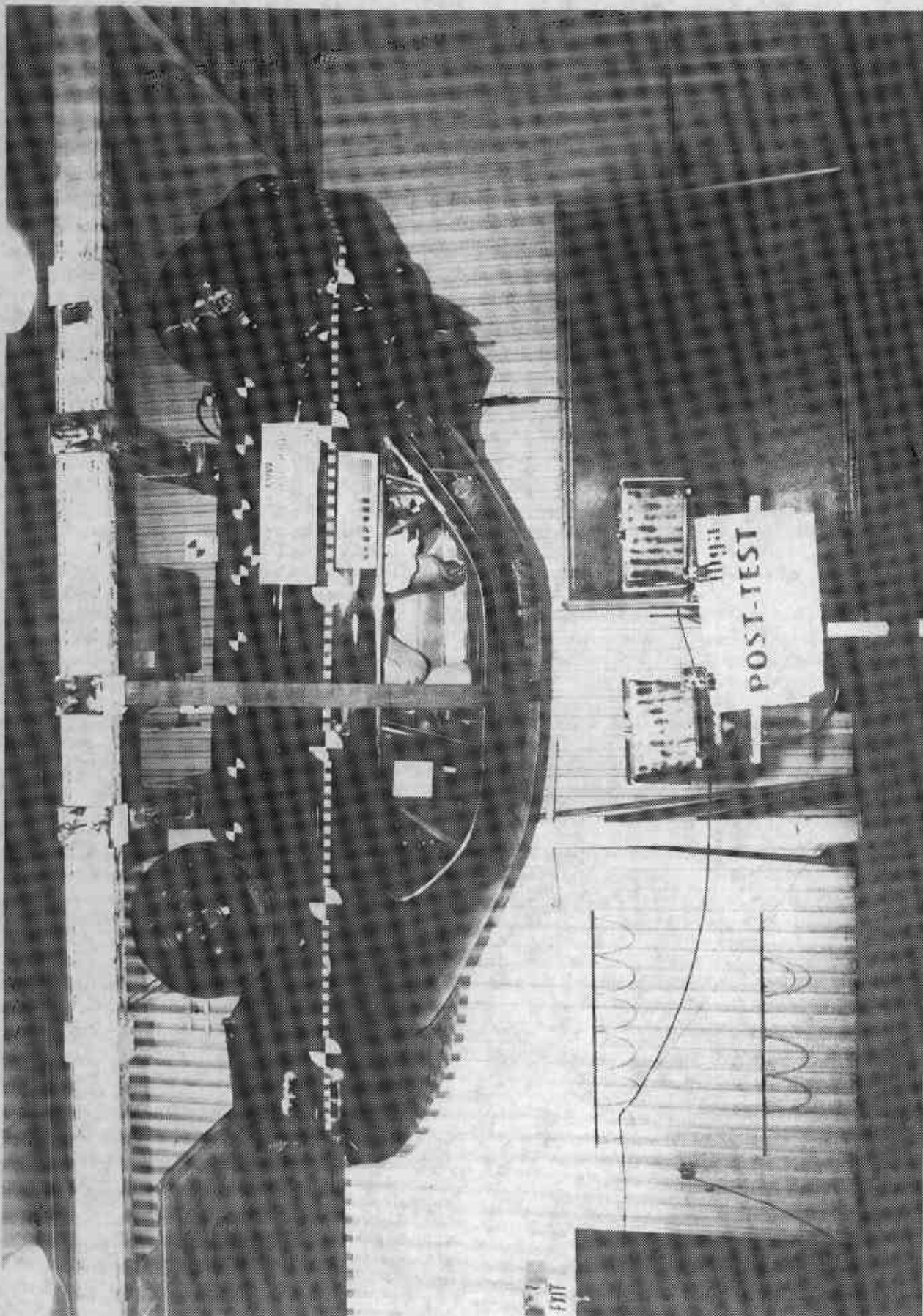


Photo No. A-48 - Rollover 189°

A-48

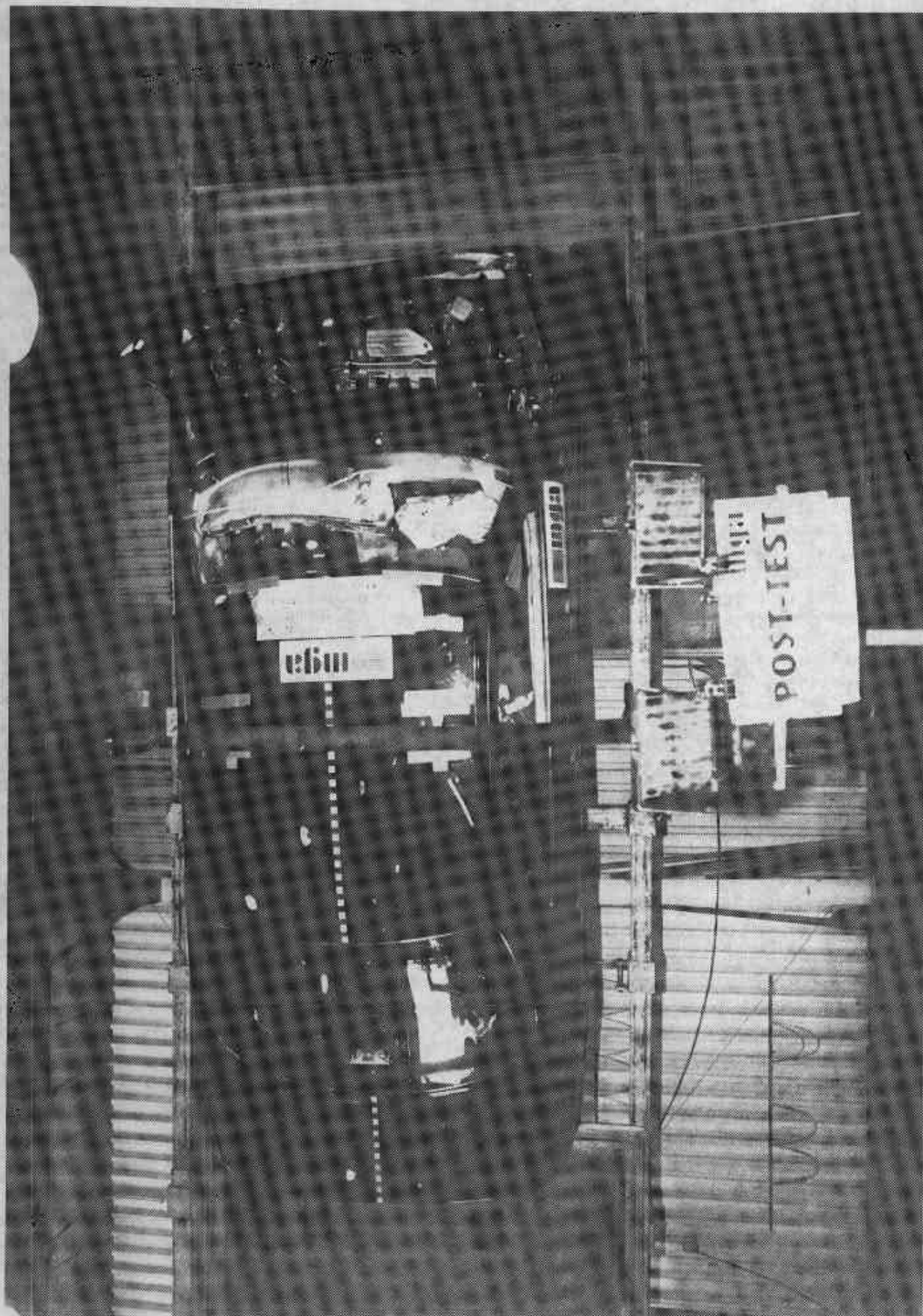
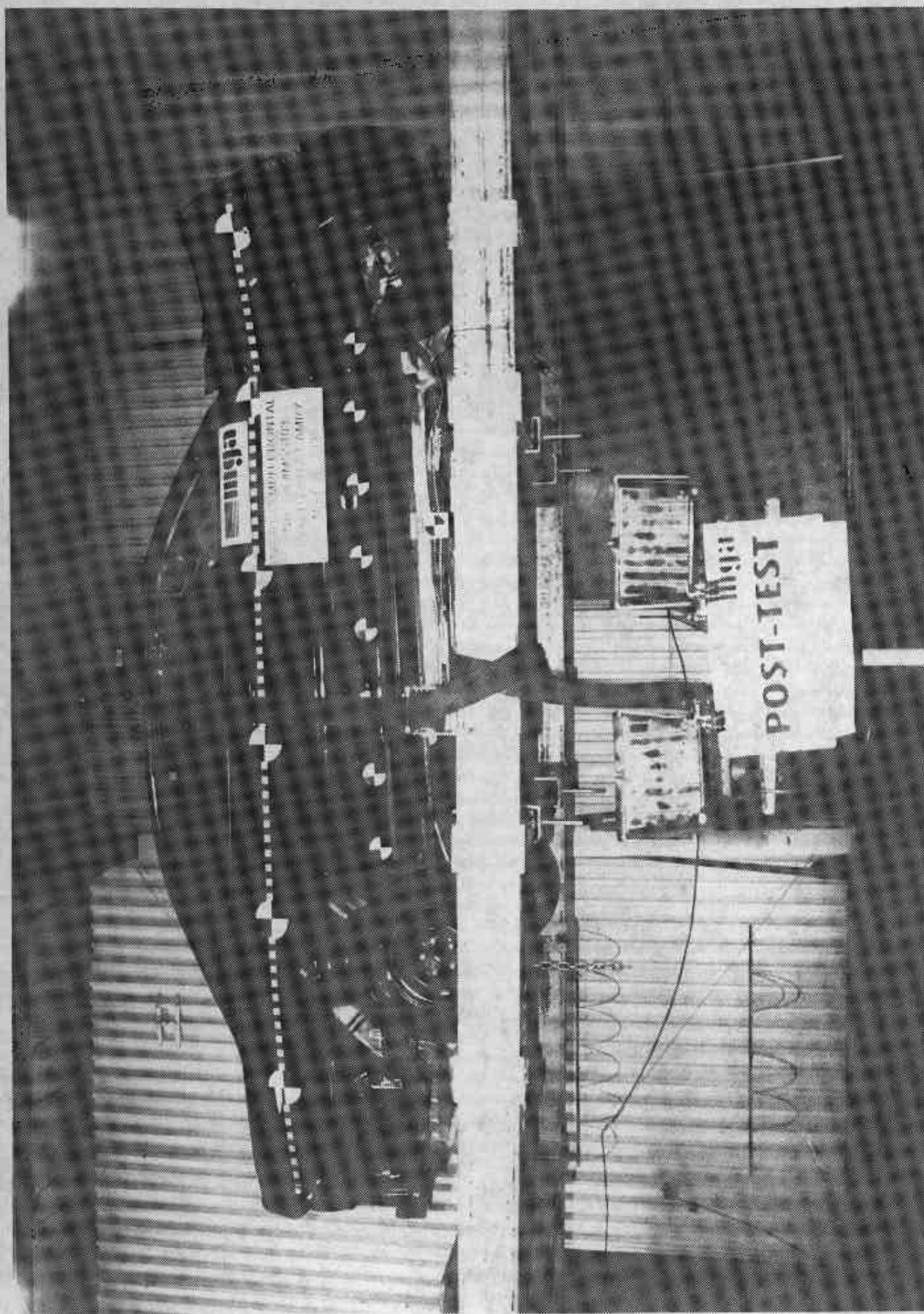


Photo No. A-49 - Rollover 270°



A-50

Photo No. A-50 - Rollover 360°

APPENDIX B

Vehicle, Load Cell Barrier and Dummy Response Data

1995 Toyota Camry
NHTSA NO.: MS5103

VEHICLE DATA FILTER CHANNEL CLASS

Head Accelerations 1000(1650 Hz)

Chest Accelerometers 180(300 Hz)

Vehicle Accelerometers 60(100 Hz)

Barrier Load Cells 60(100 Hz)

Femur Load Cells 600(1000 Hz)

Lap and Torso Belts 60(100 Hz)

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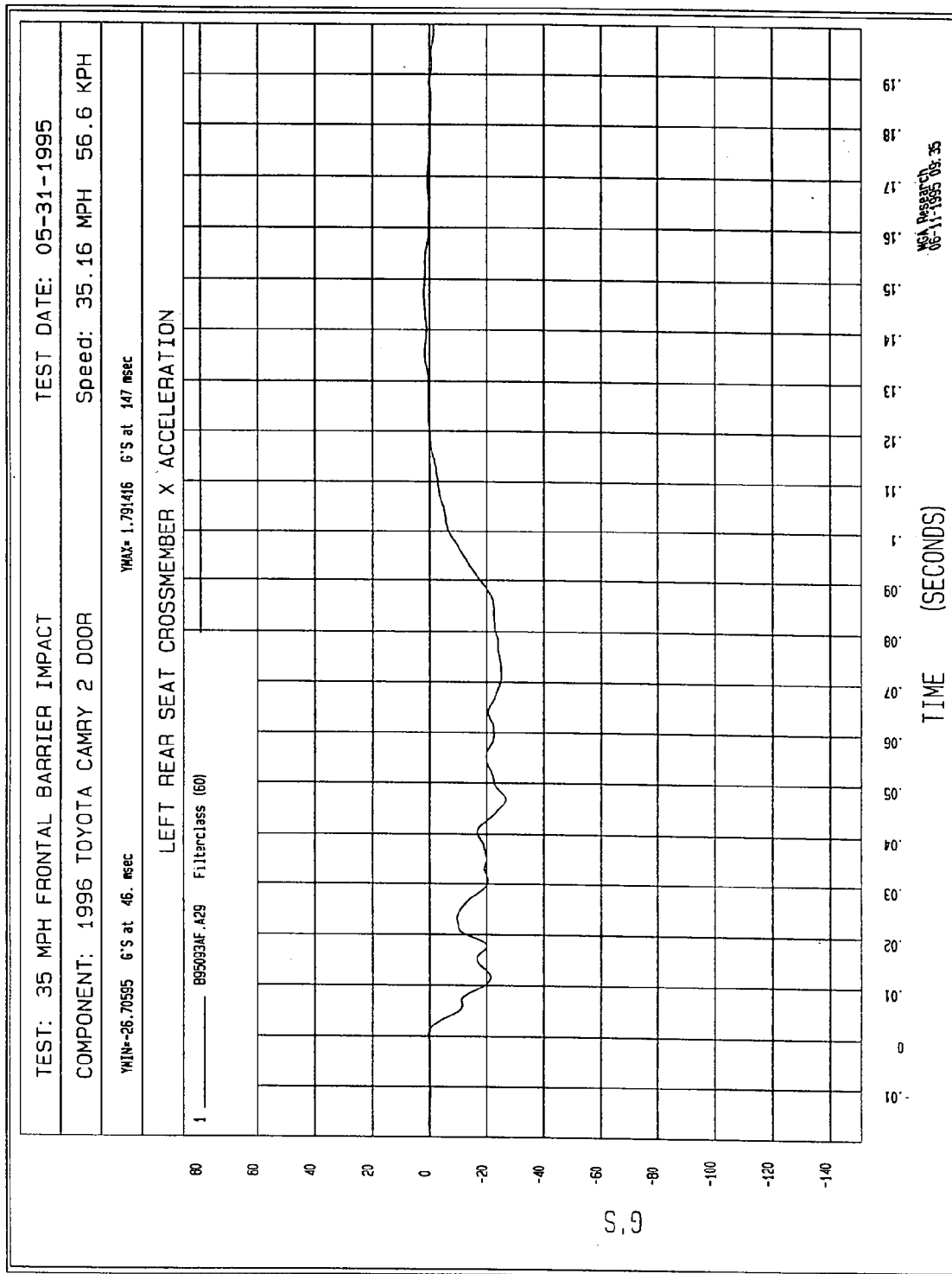


Figure B-1 - Left Rear Seat Crossmember X Acceleration vs. Time

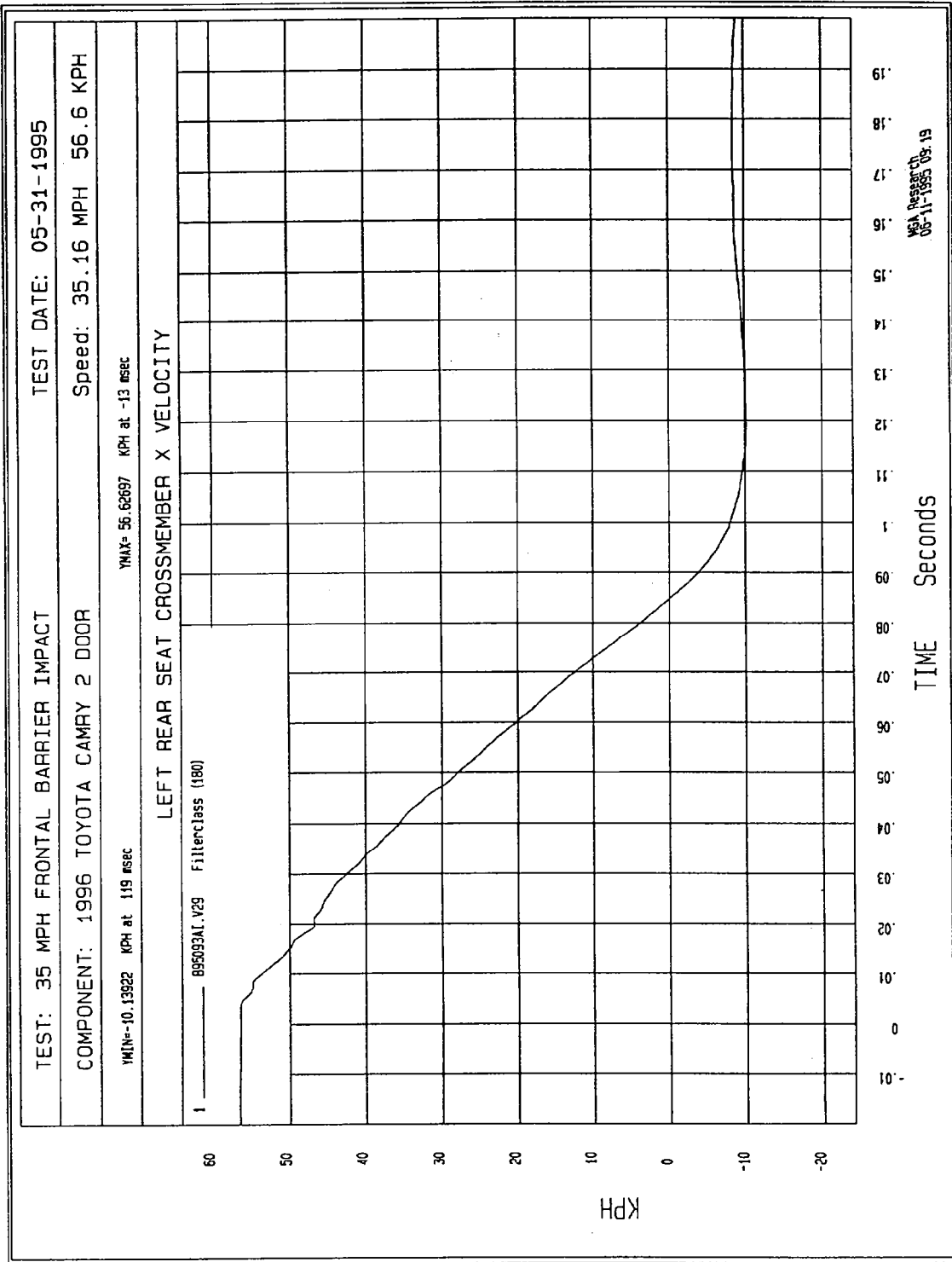


Figure B-2 - Left Rear Seat Crossmember X Velocity vs. Time

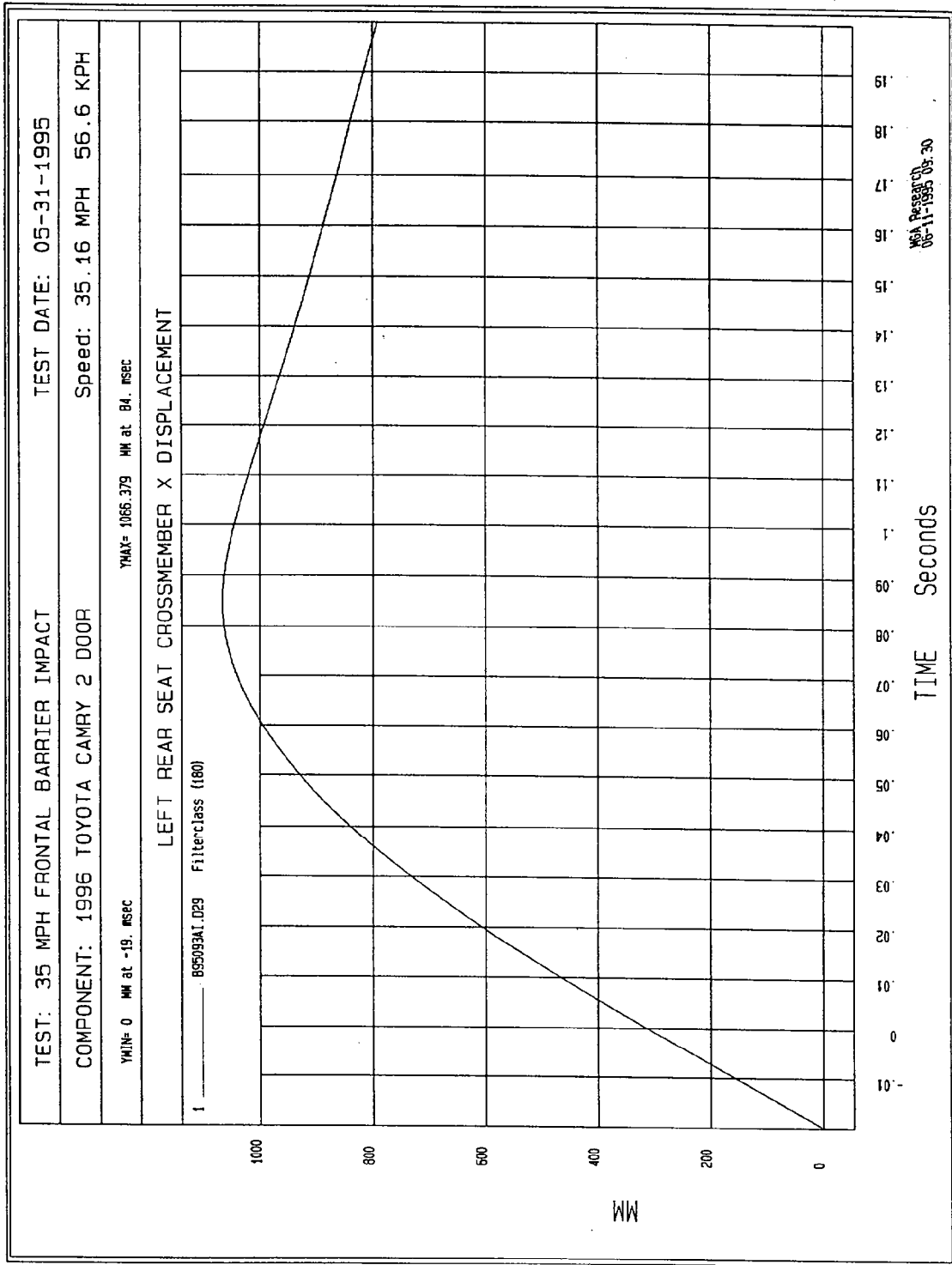


Figure B-3 - Left Rear Seat Crossmember X Displacement vs. Time

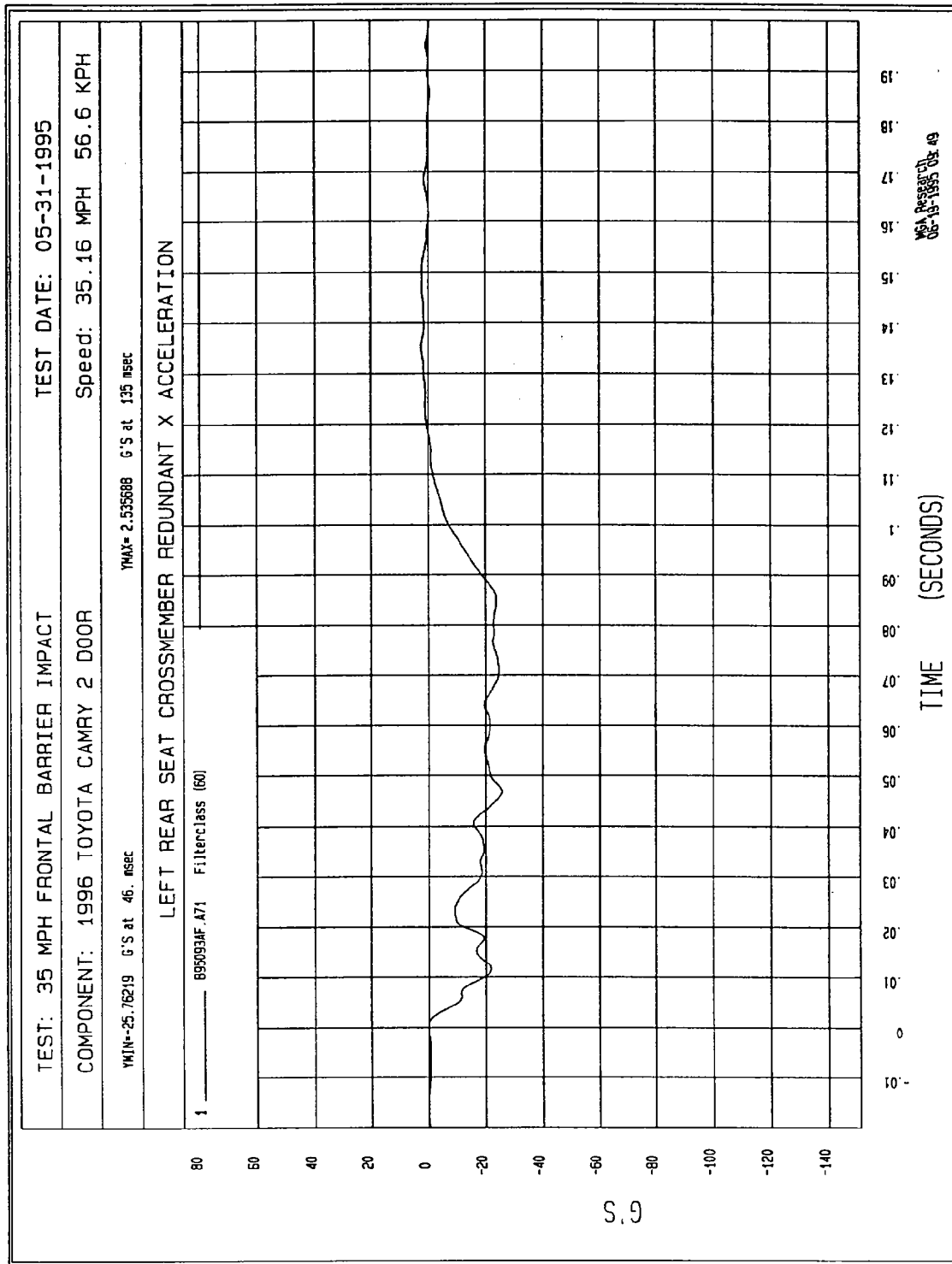


Figure B-4 - Left Rear Seat Crossmember Redundant X Acceleration vs. Time

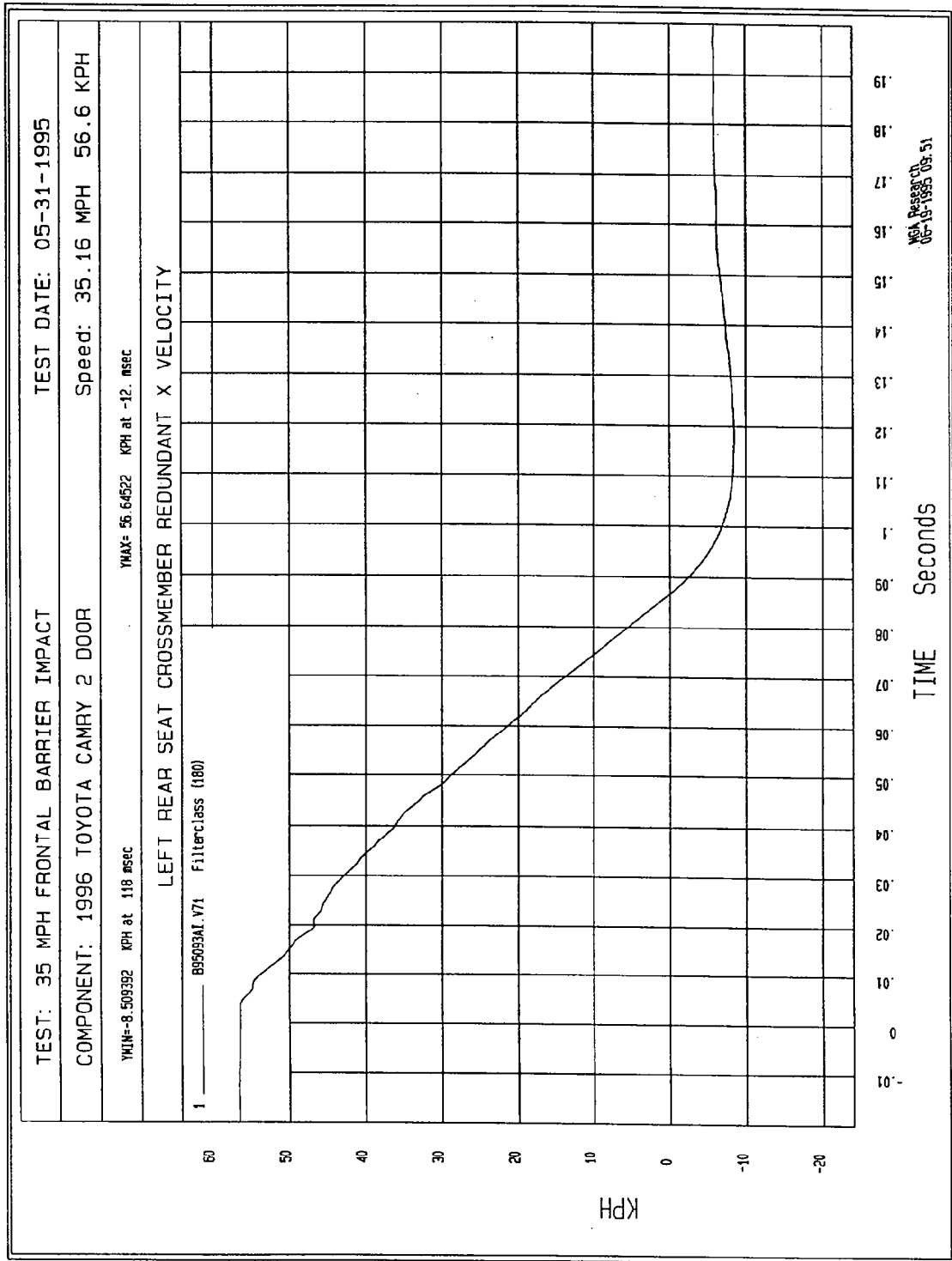


Figure B-5 - Left Rear Seat Crossmember Redundant X Velocity vs. Time

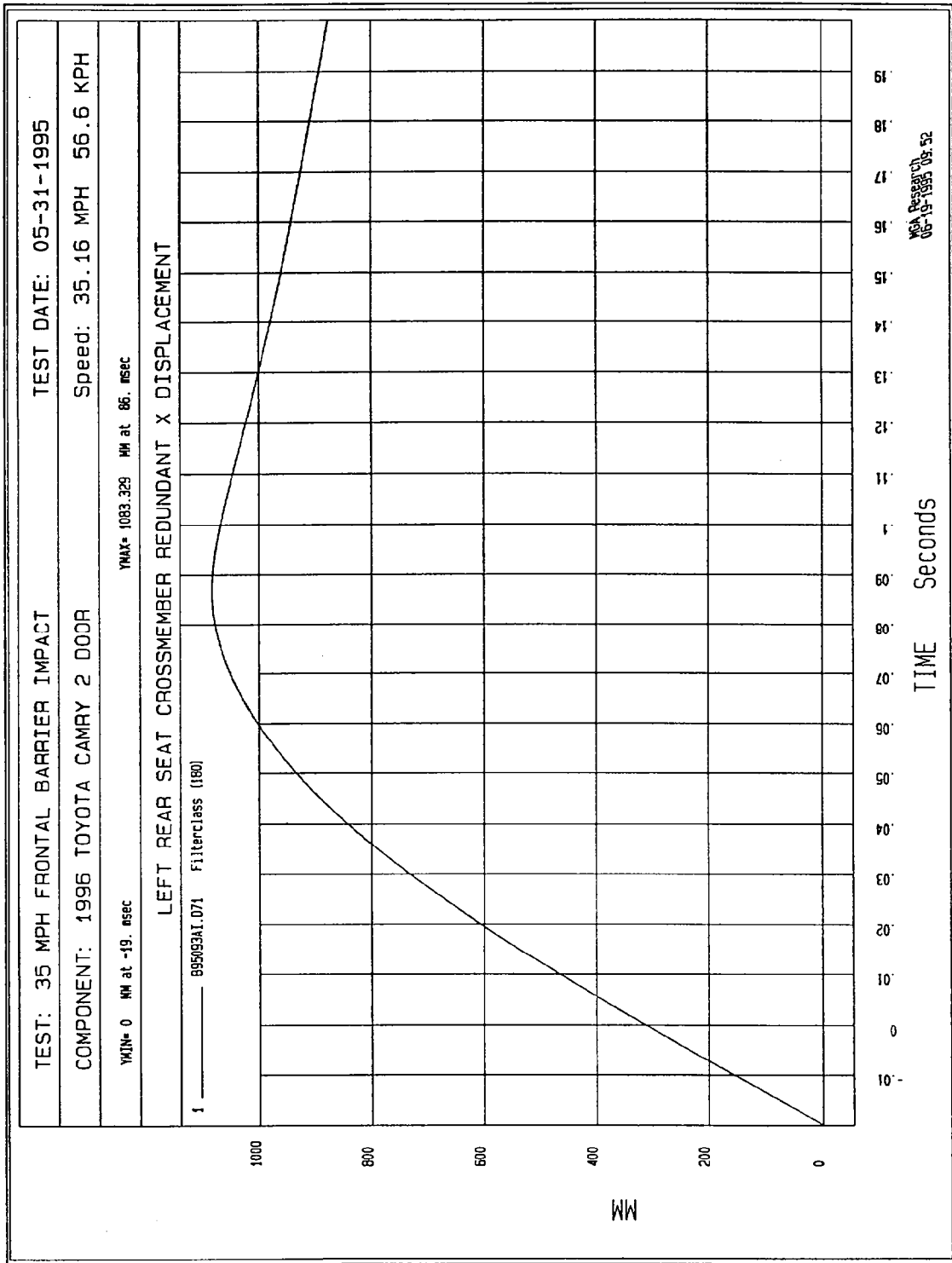


Figure B-6 - Left Rear Seat Crossmember Redundant X Displacement vs. Time

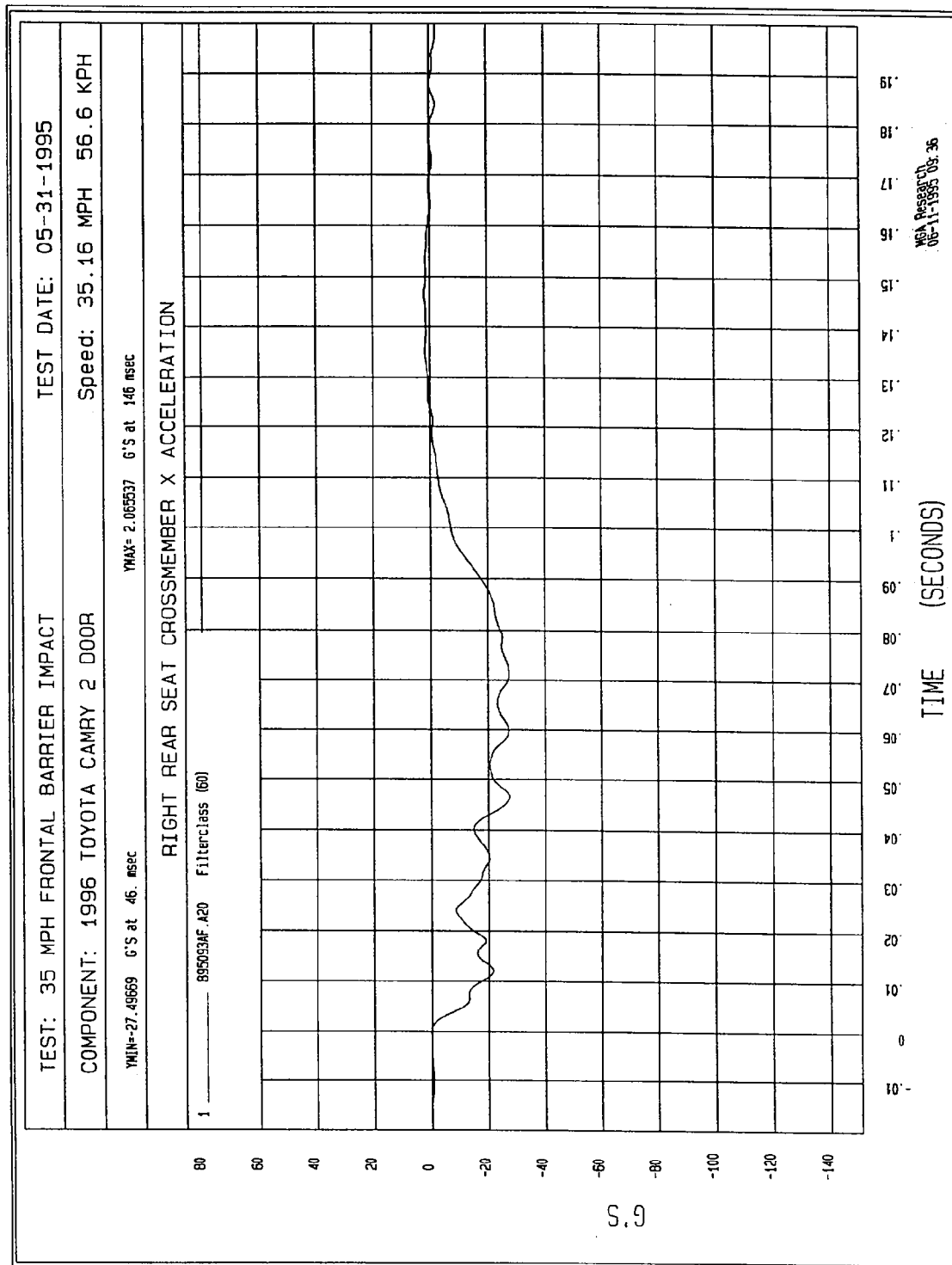


Figure B-7 - Right Rear Seat Crossmember X Acceleration vs. Time

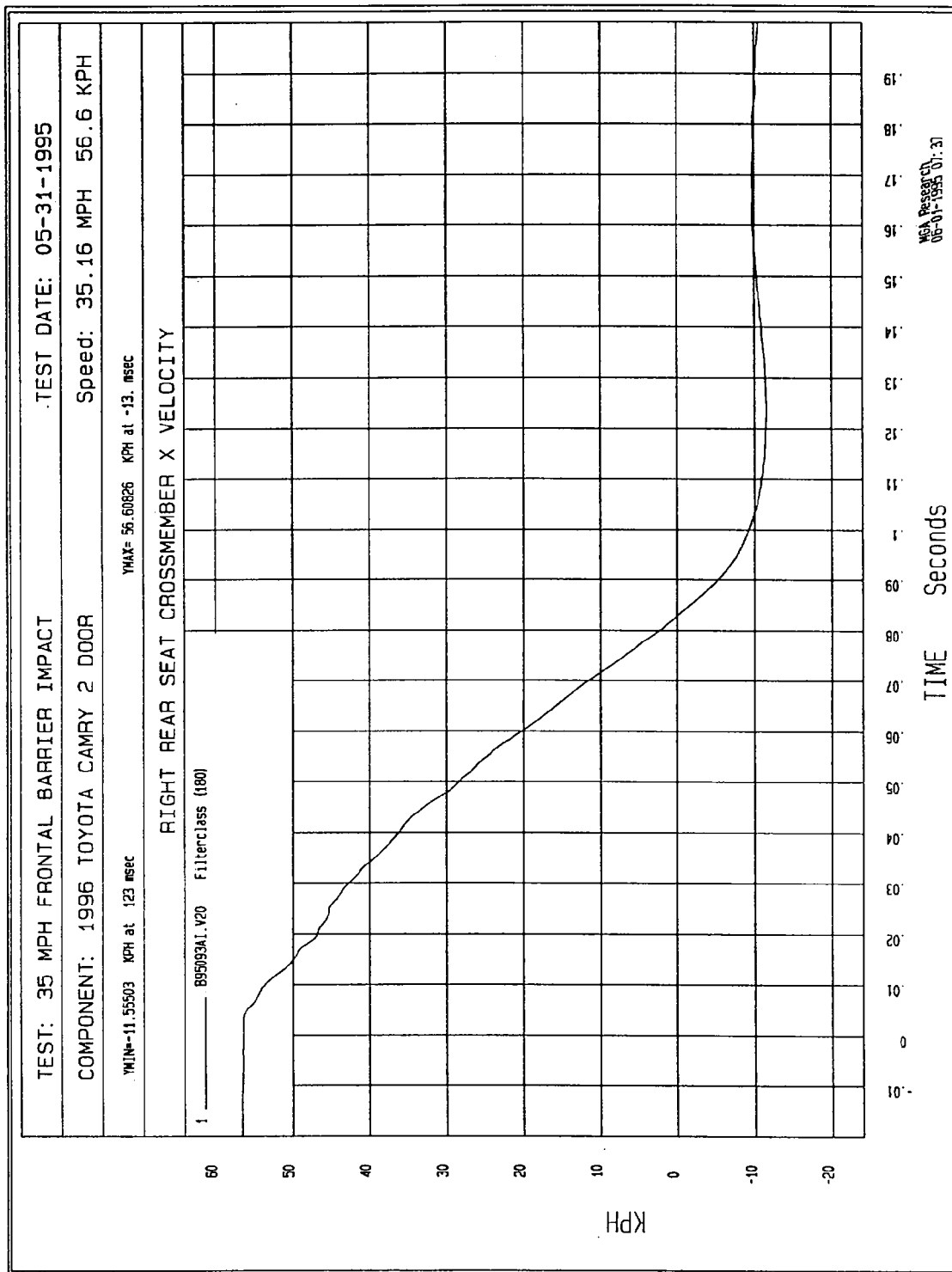


Figure B-8 - Right Rear Seat Crossmember X Velocity vs. Time

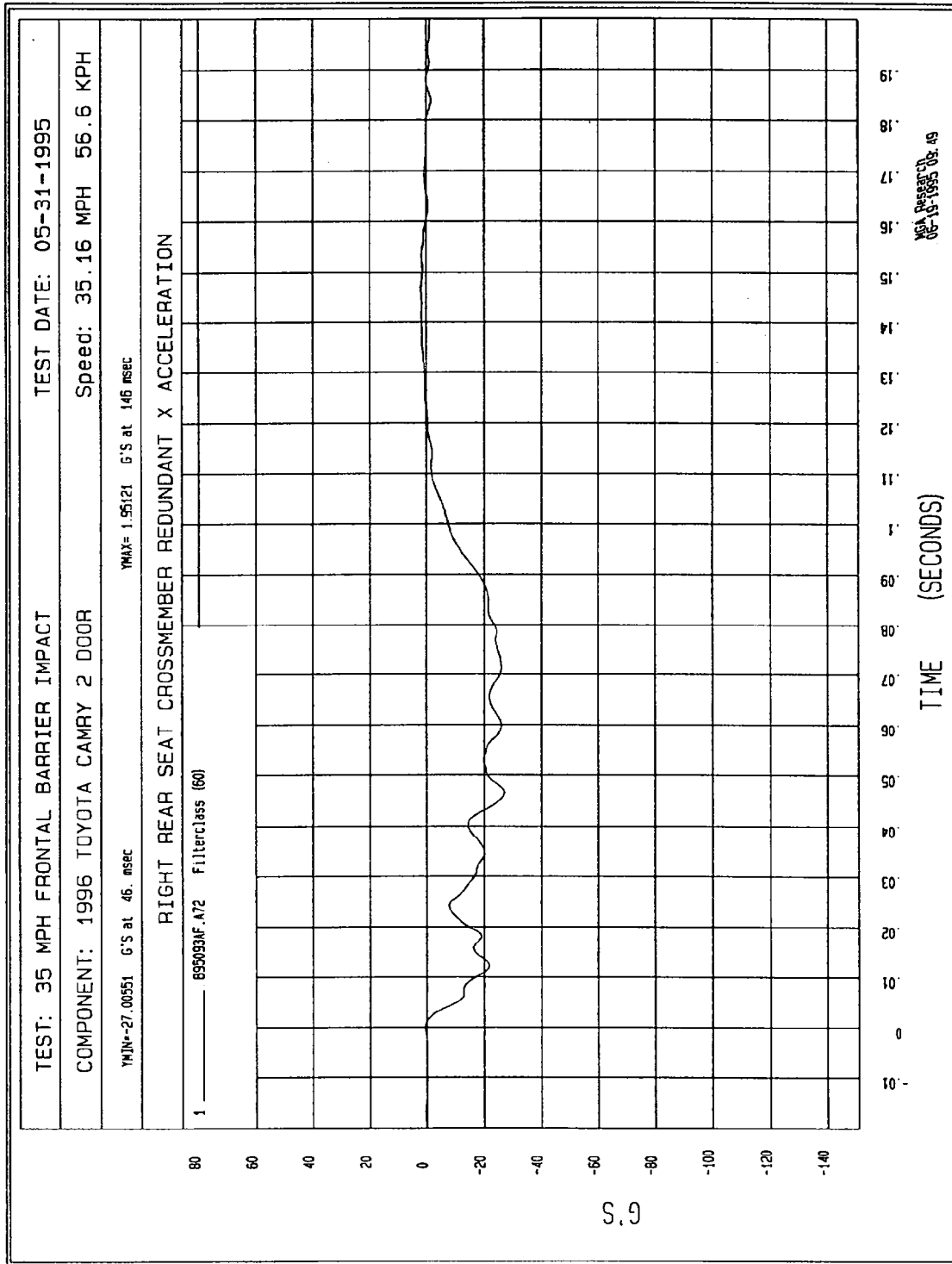
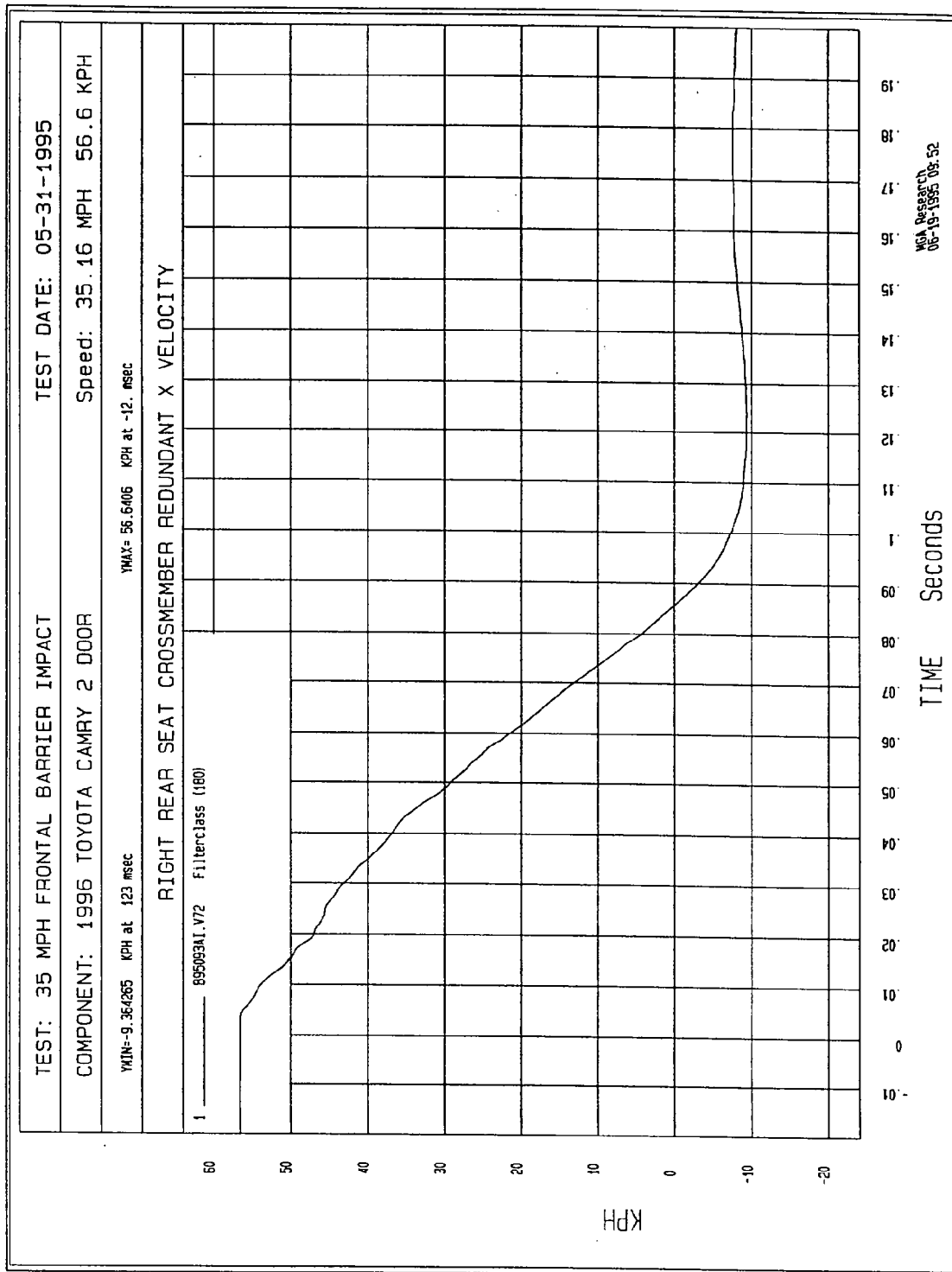


Figure B-10 - Right Rear Seat Crossmember Redundant X Acceleration vs. Time



B-11

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

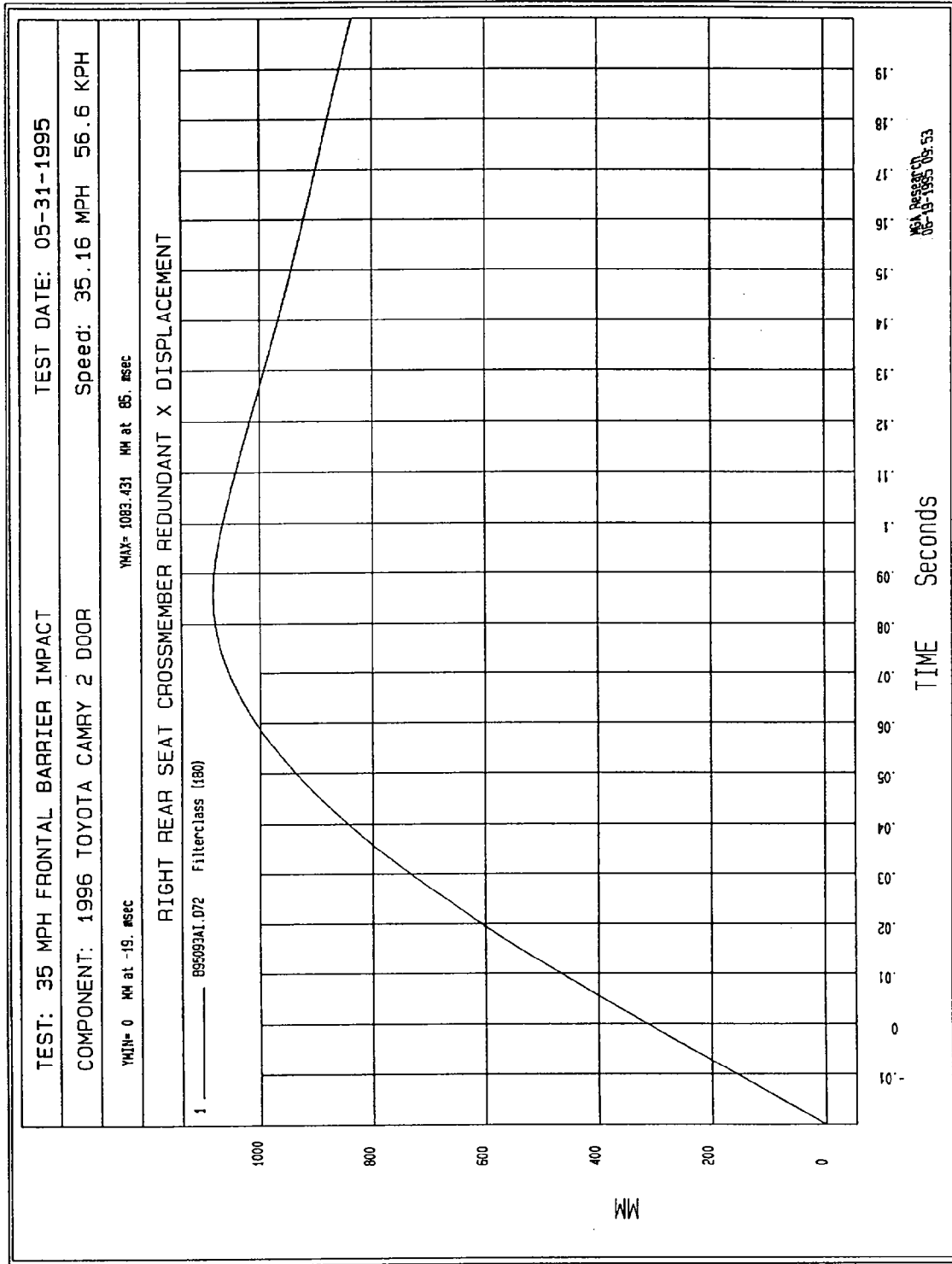


Figure B-12 - Right Rear Seat Crossmember Redundant X Displacement vs. Time

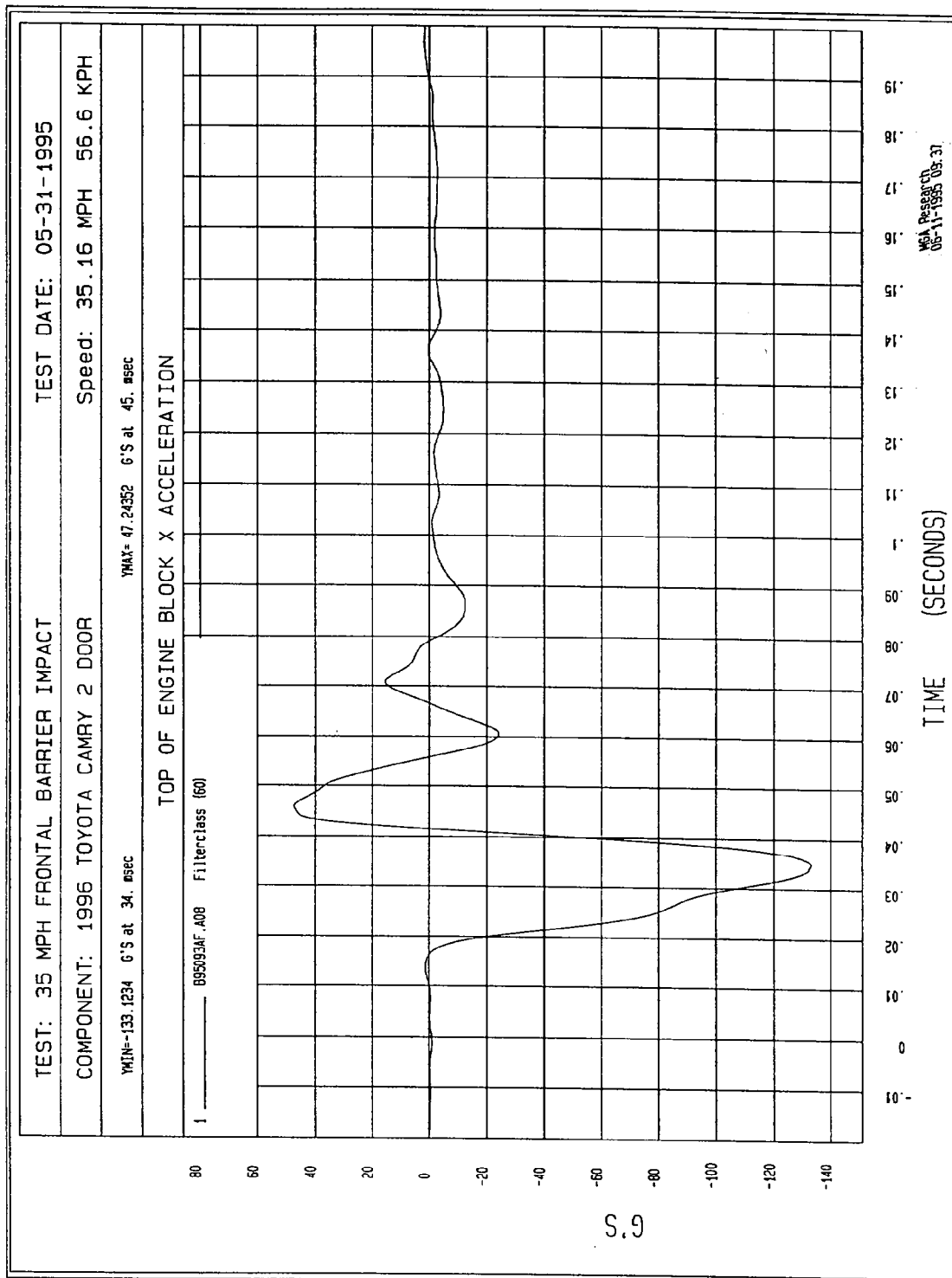


Figure B-13 - Top of Engine Block X Acceleration vs. Time

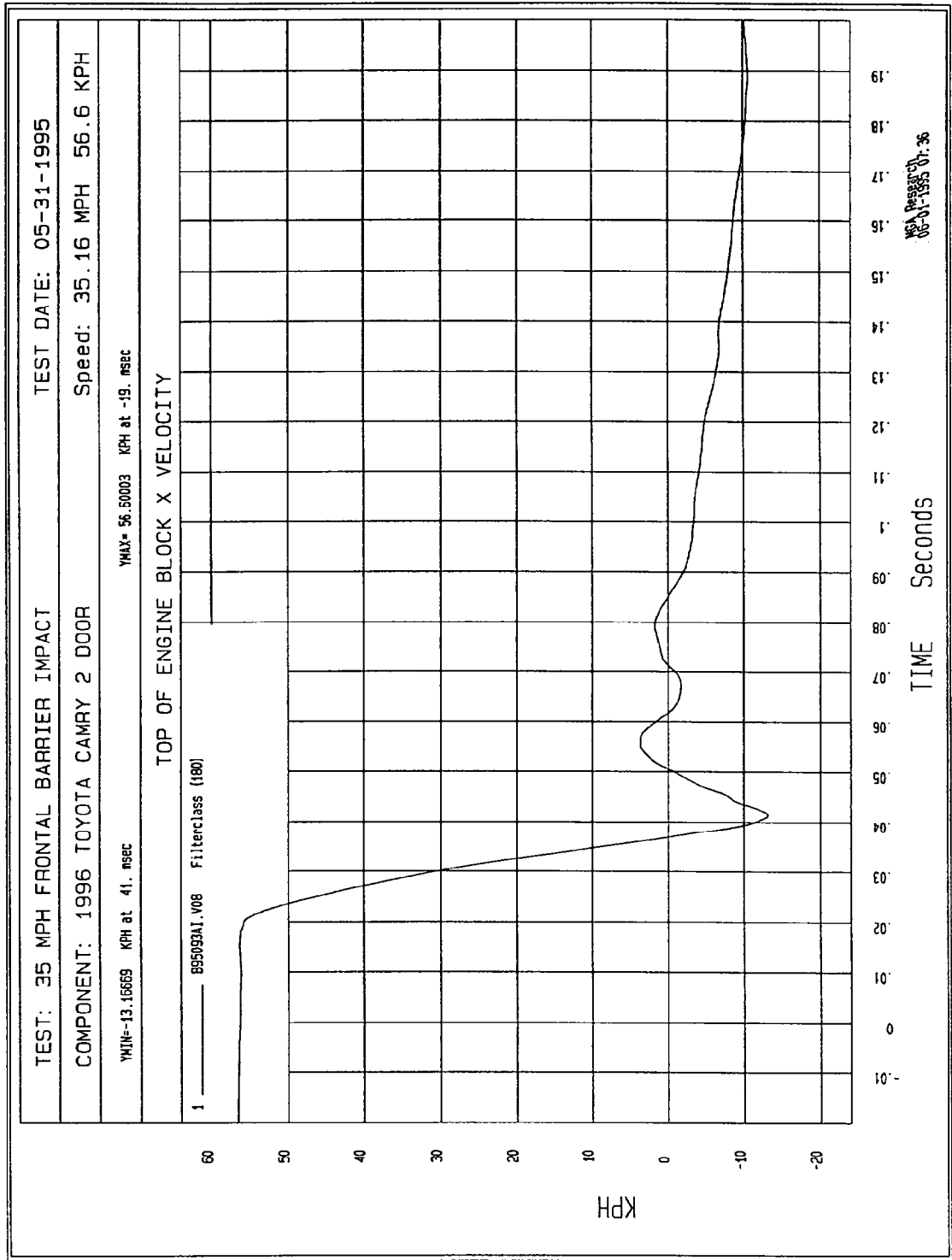


Figure B-14 - Top of Engine Block X Velocity vs. Time

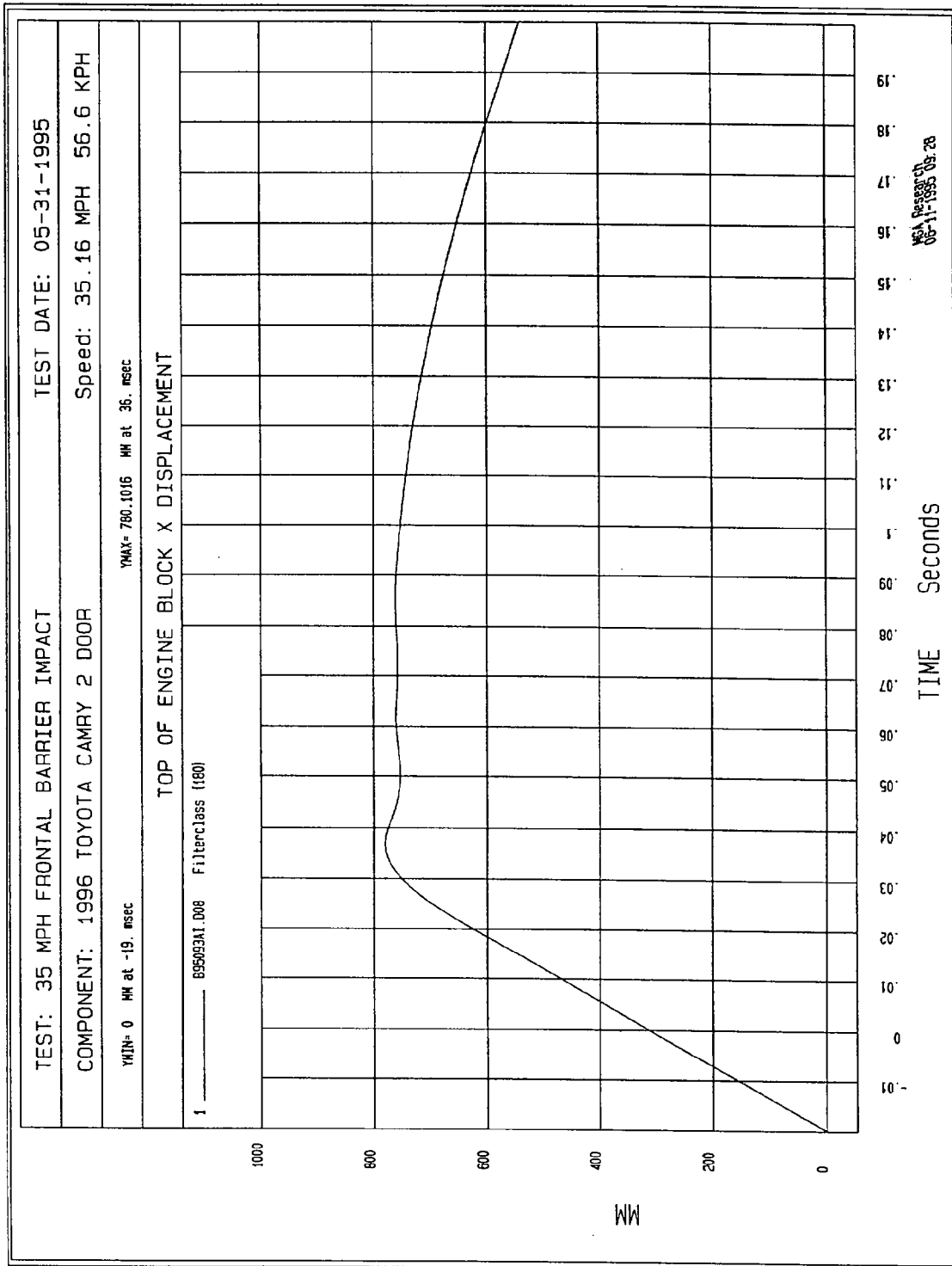


Figure B-15 - Top of Engine Block X Displacement vs. Time

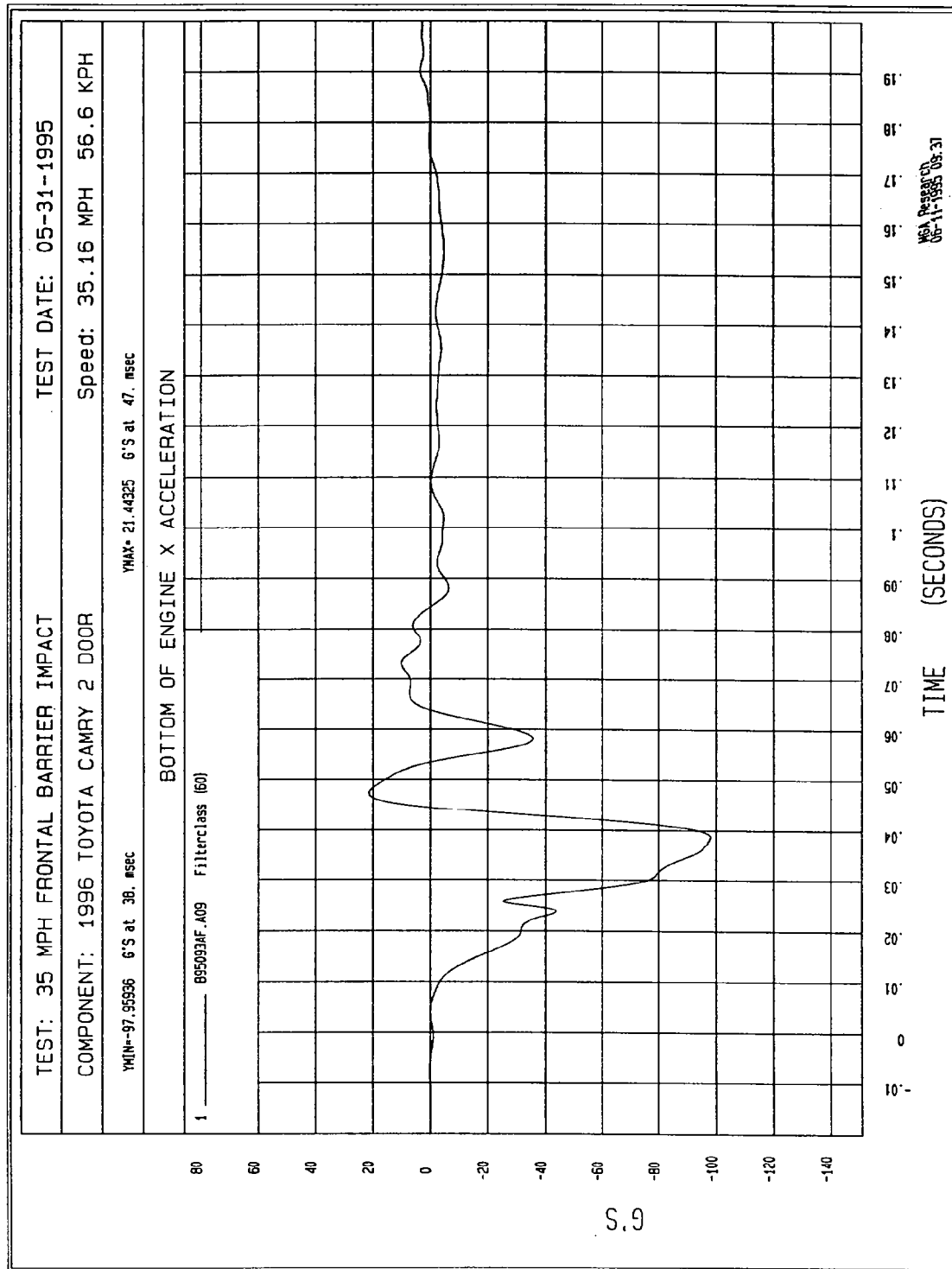


Figure B-16 - Bottom of Engine X Acceleration vs. Time

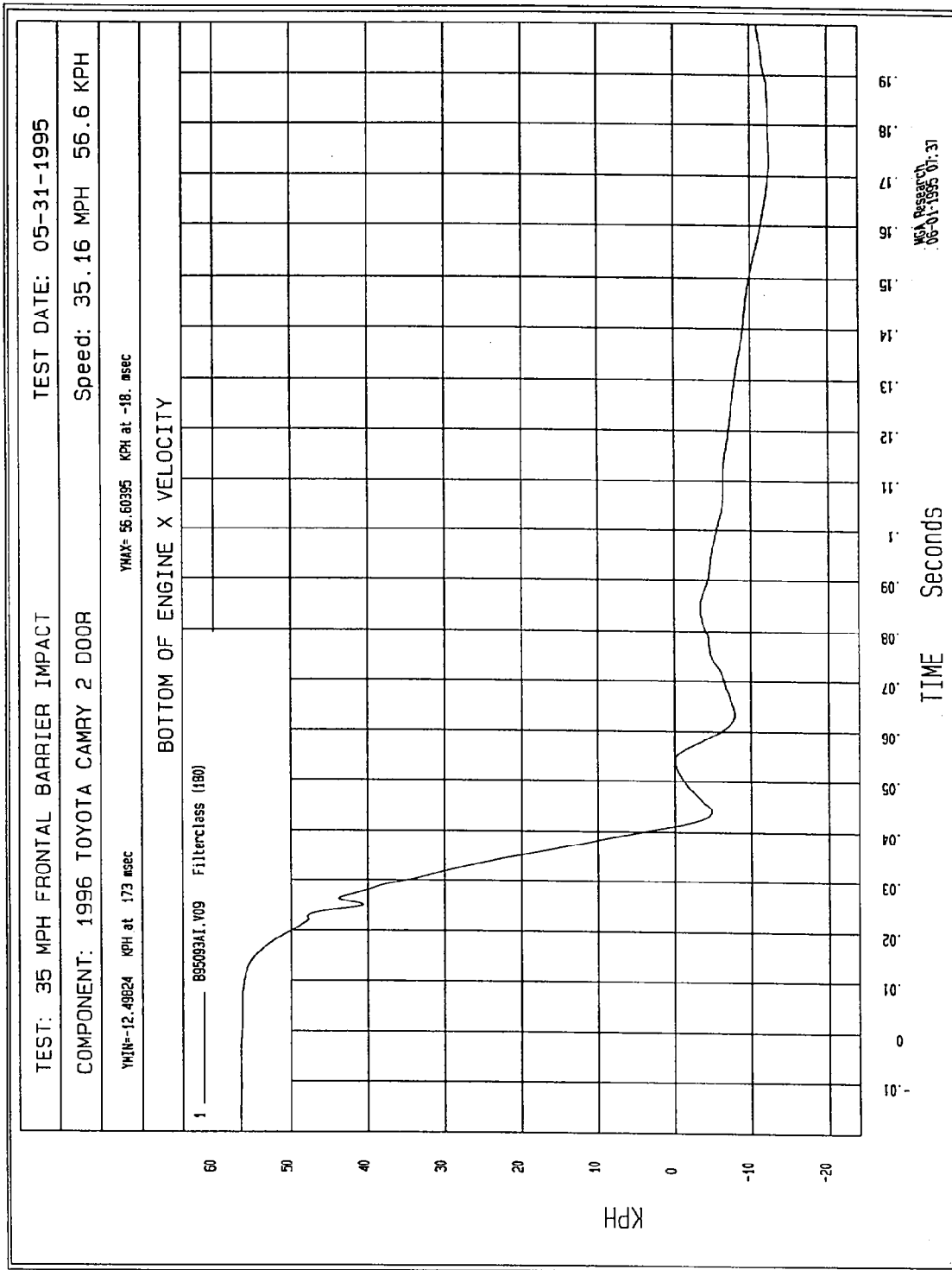


Figure B-17 - Bottom of Engine X Velocity vs. Time

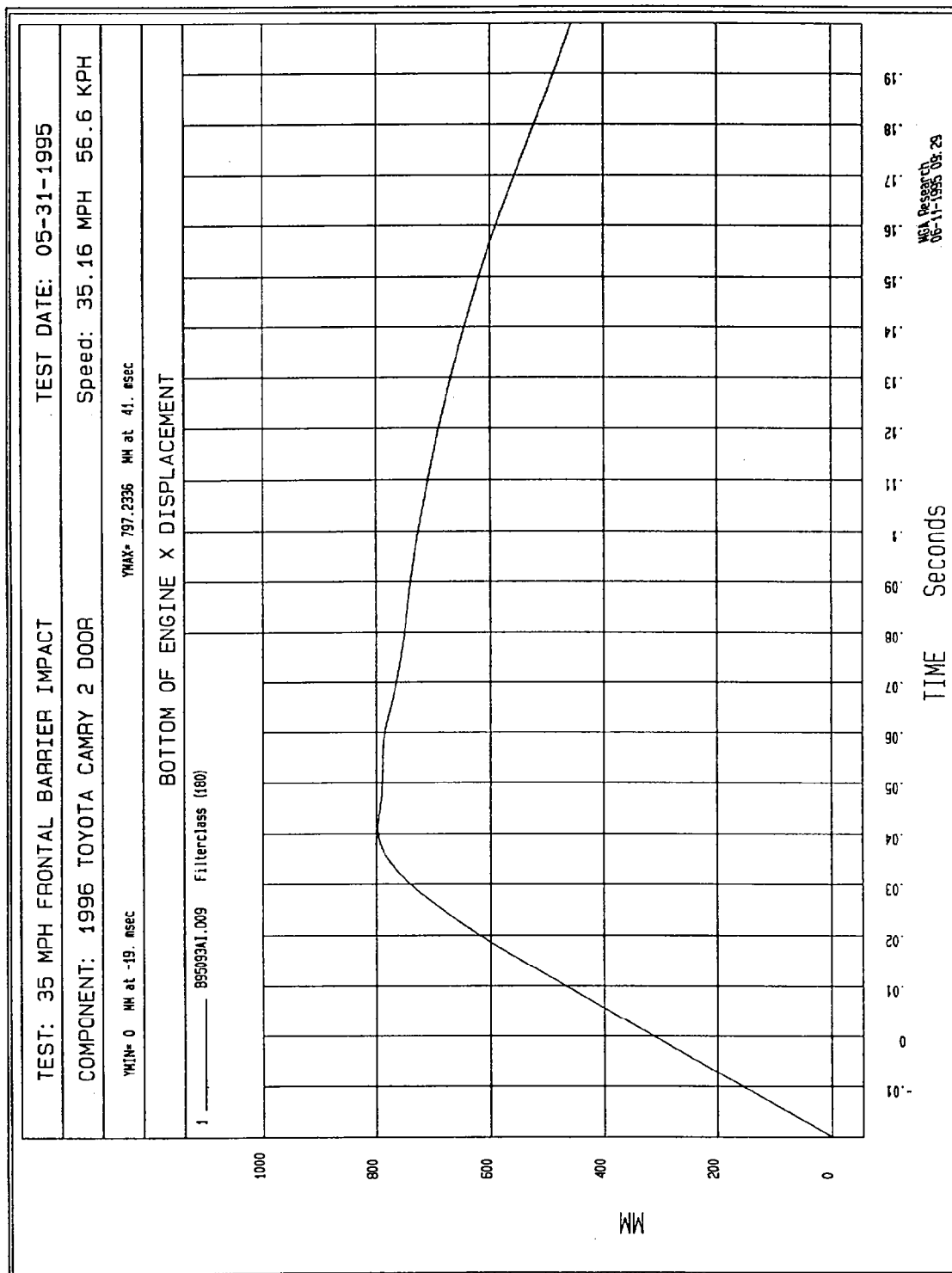


Figure B-18 - Bottom of Engine X Displacement vs. Time

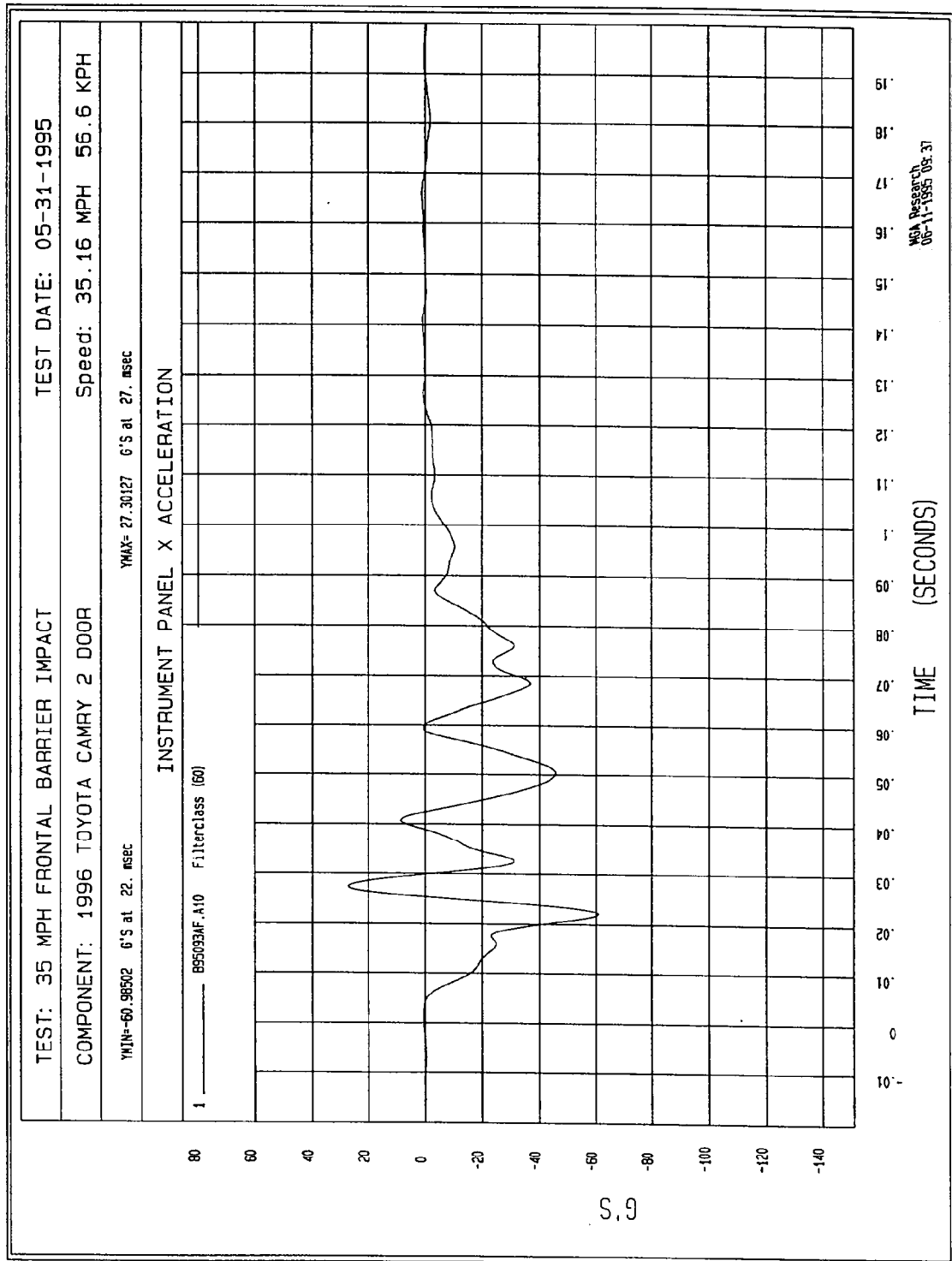


Figure B-19 - Instrument Panel X Acceleration vs. Time

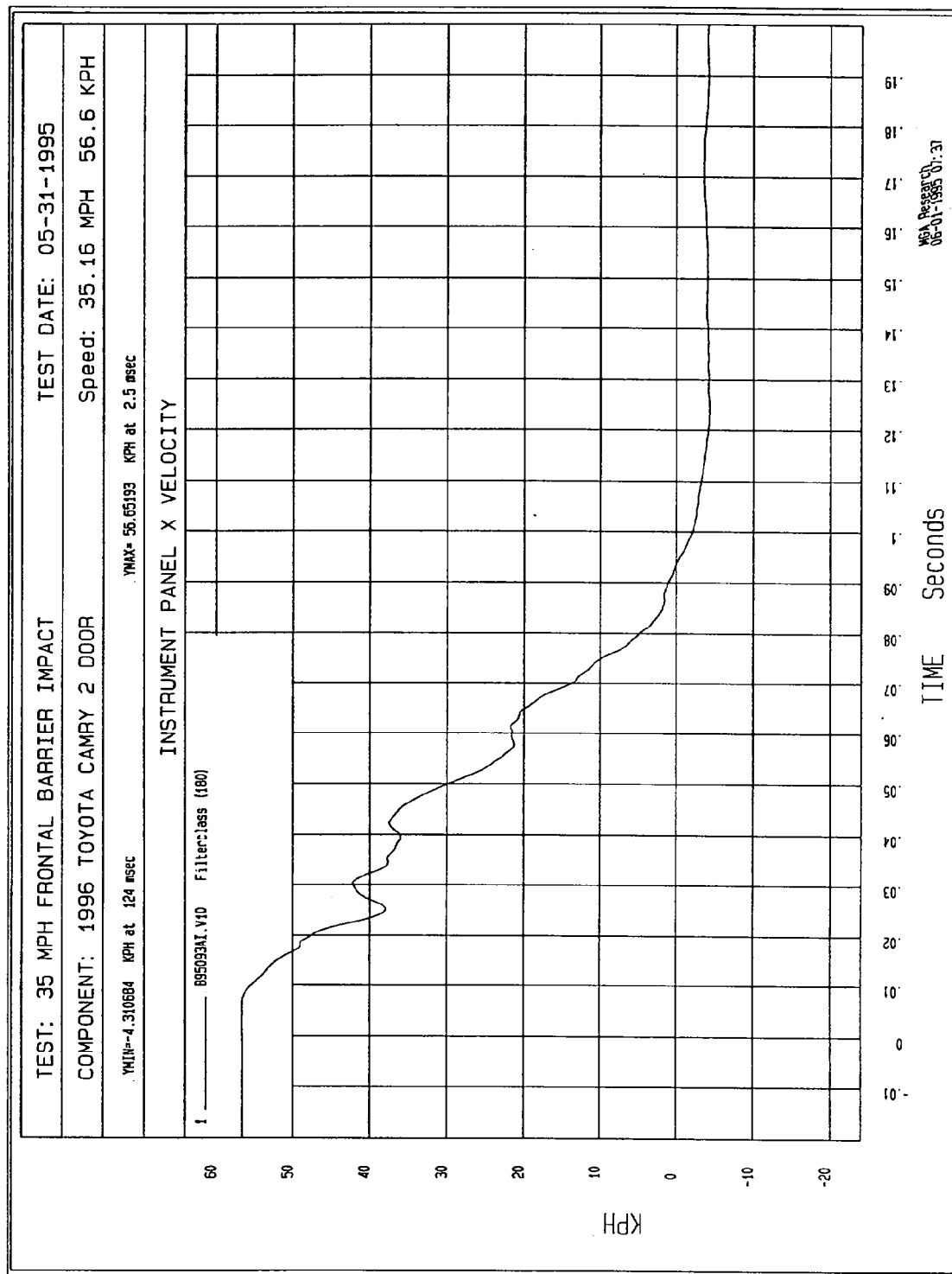


Figure B-20 - Instrument Panel X Velocity vs. Time

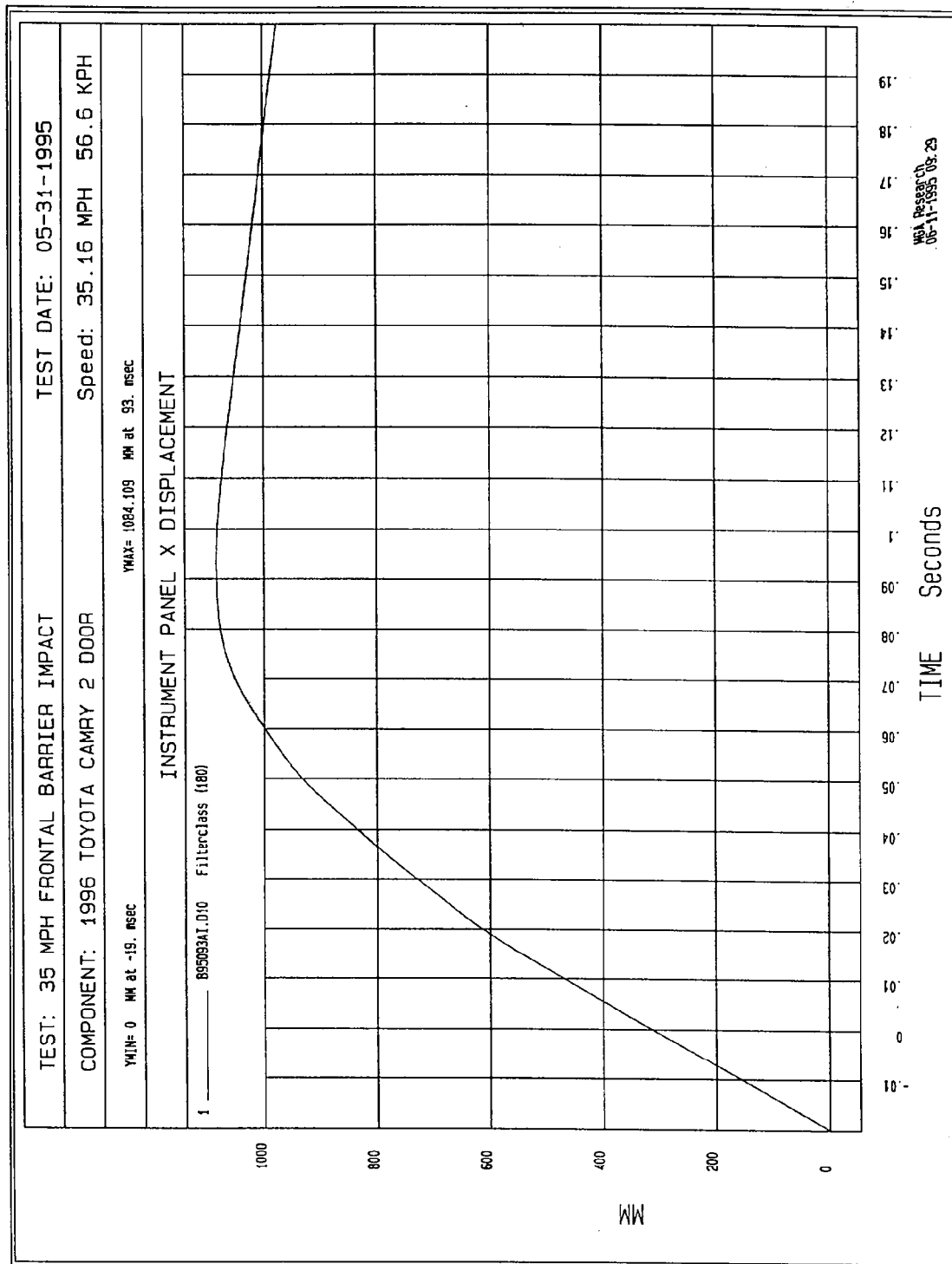


Figure B-21 - Instrument Panel X Displacement vs. Time

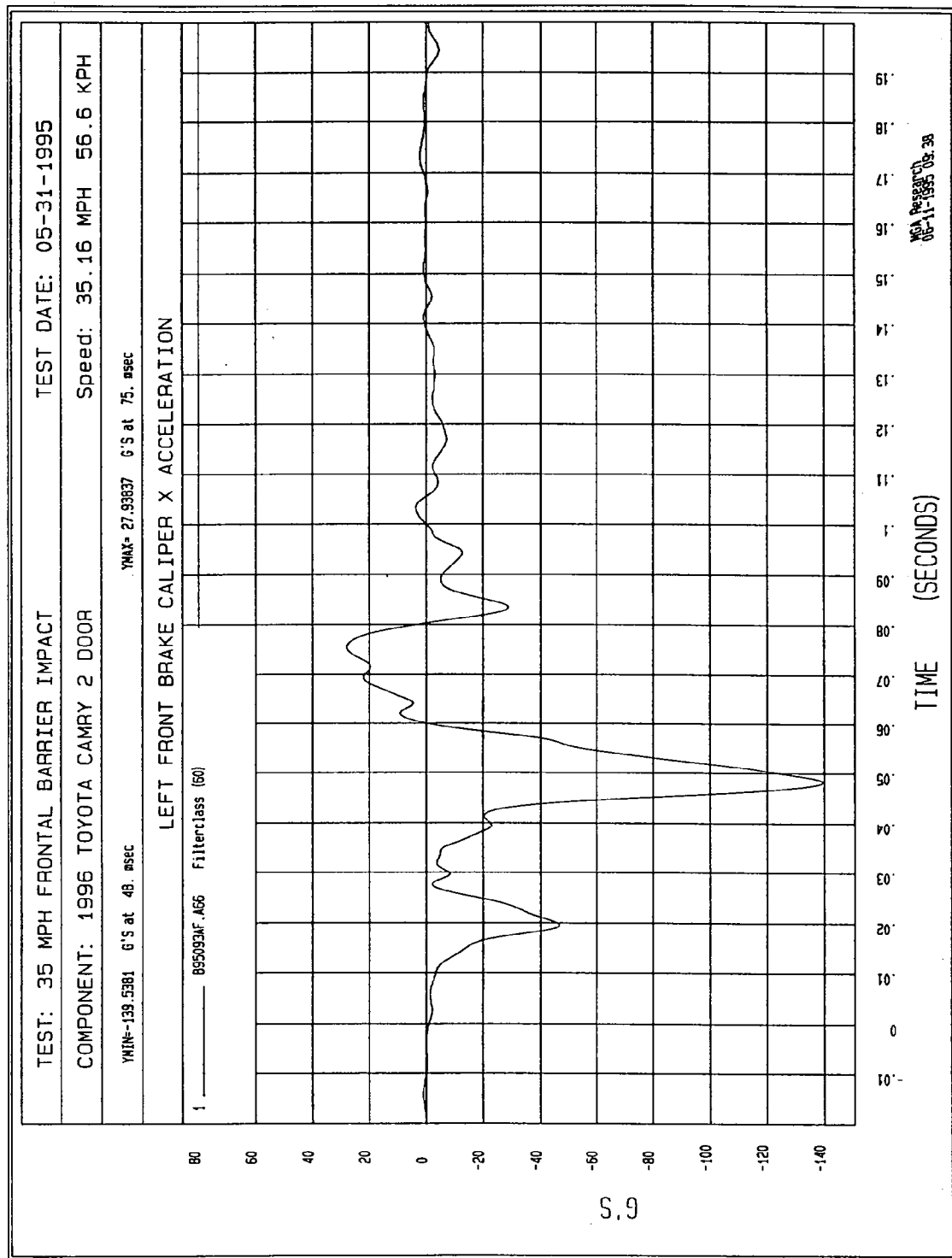


Figure B-22 - Left Brake Caliper X Acceleration vs. Time

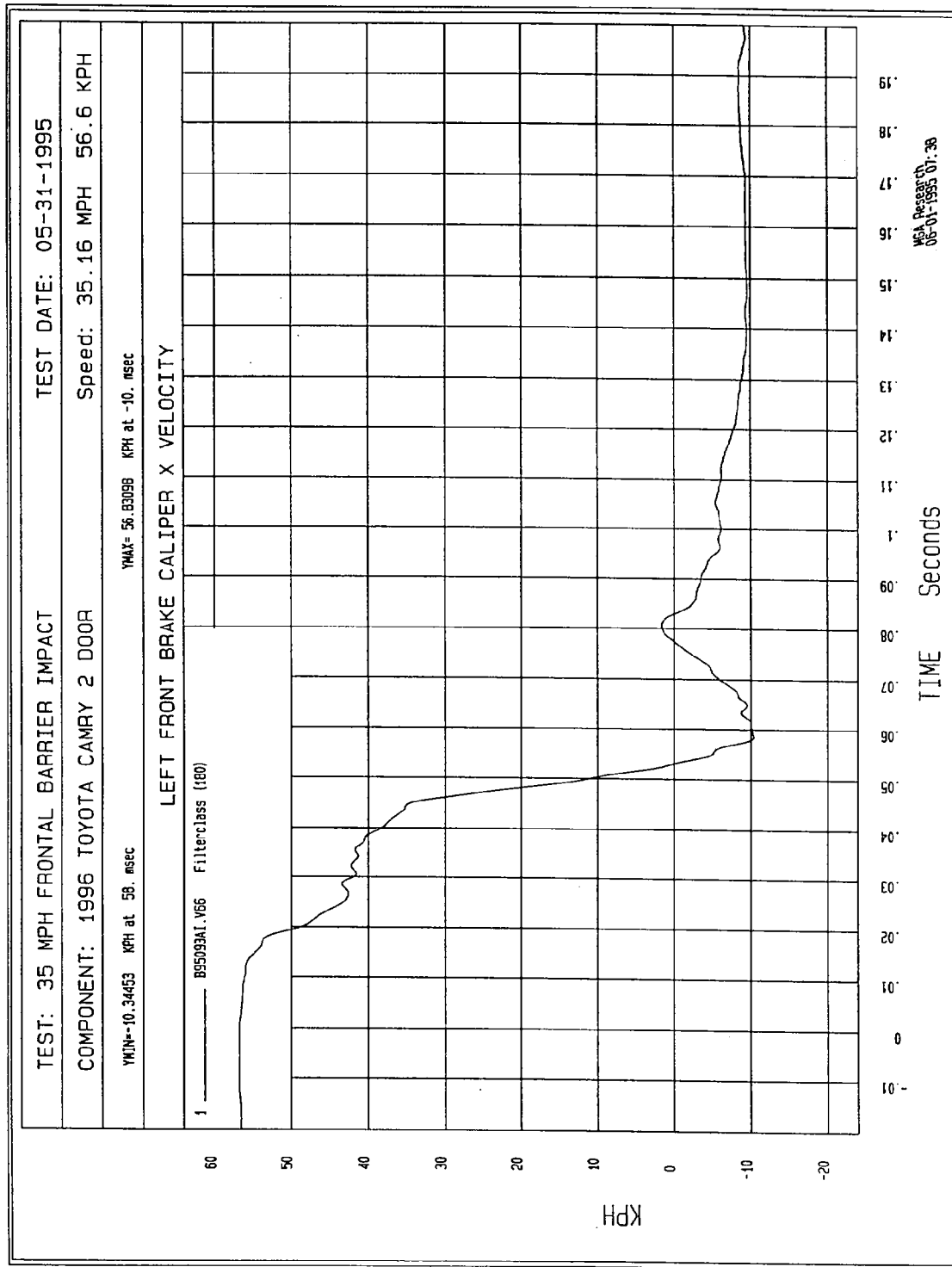


Figure B-23 - Left Brake Caliper X Velocity vs. Time

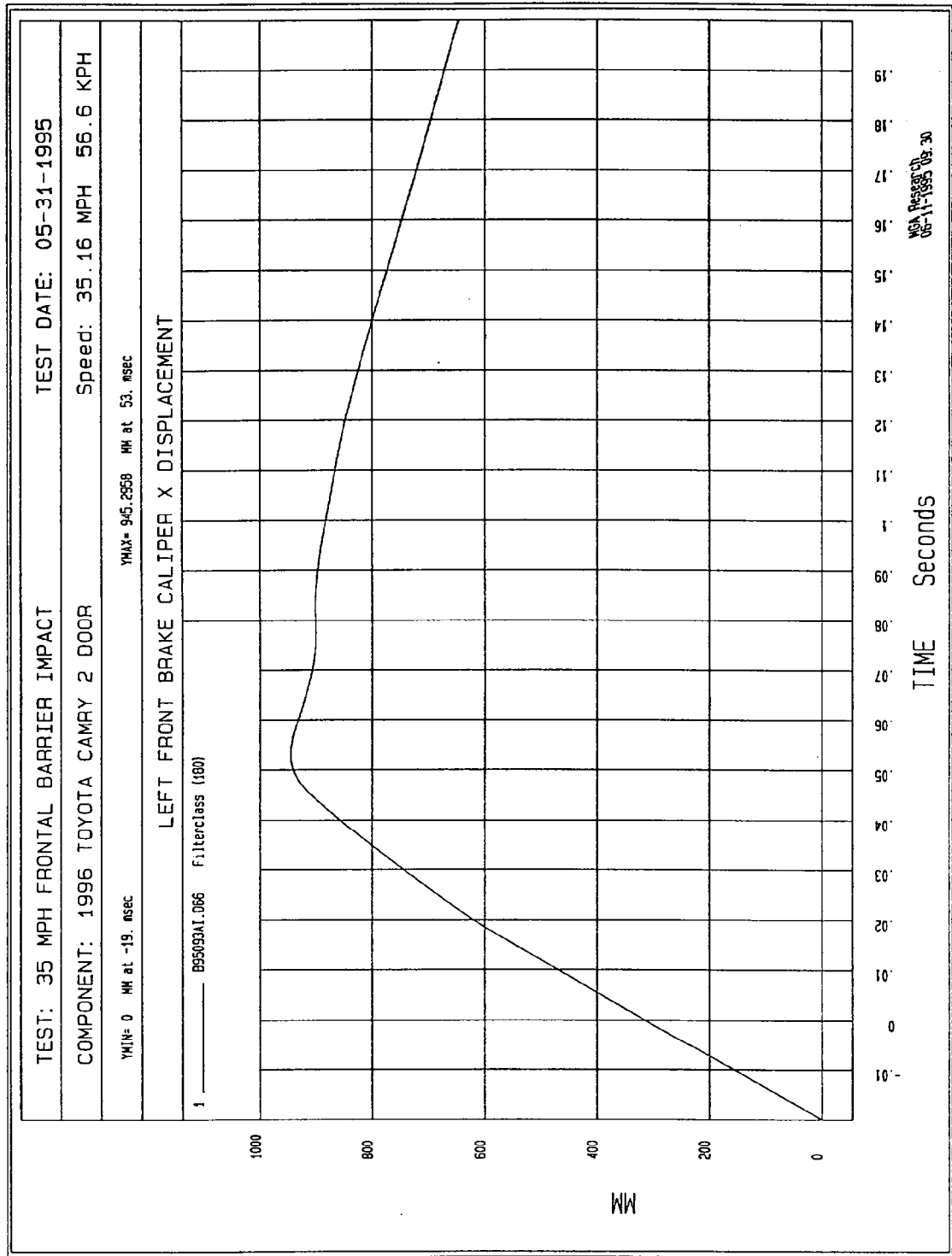


Figure B-24 - Left Brake Caliper X Displacement vs. Time

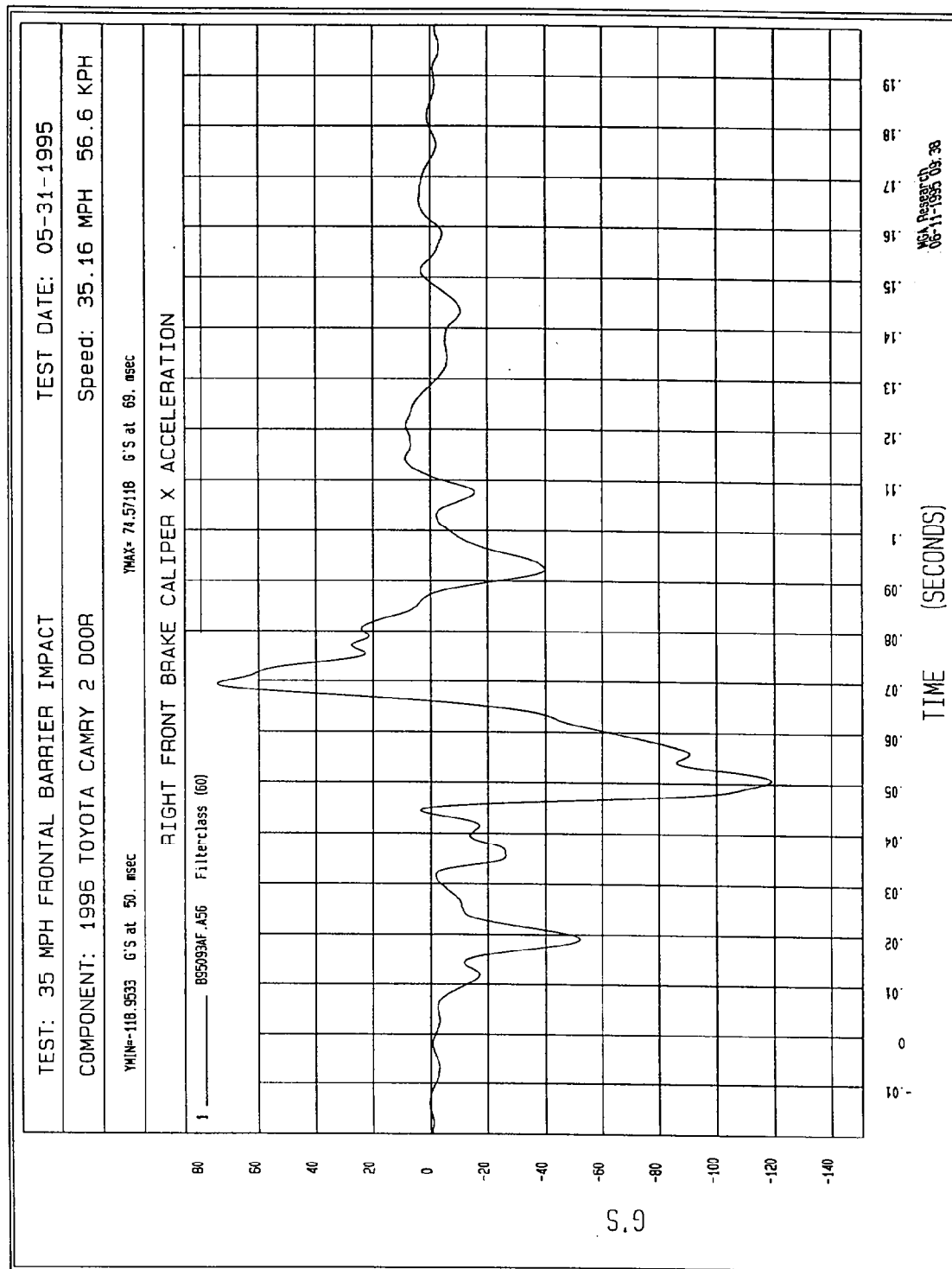


Figure B-25 - Right Brake Caliper X Acceleration vs. Time

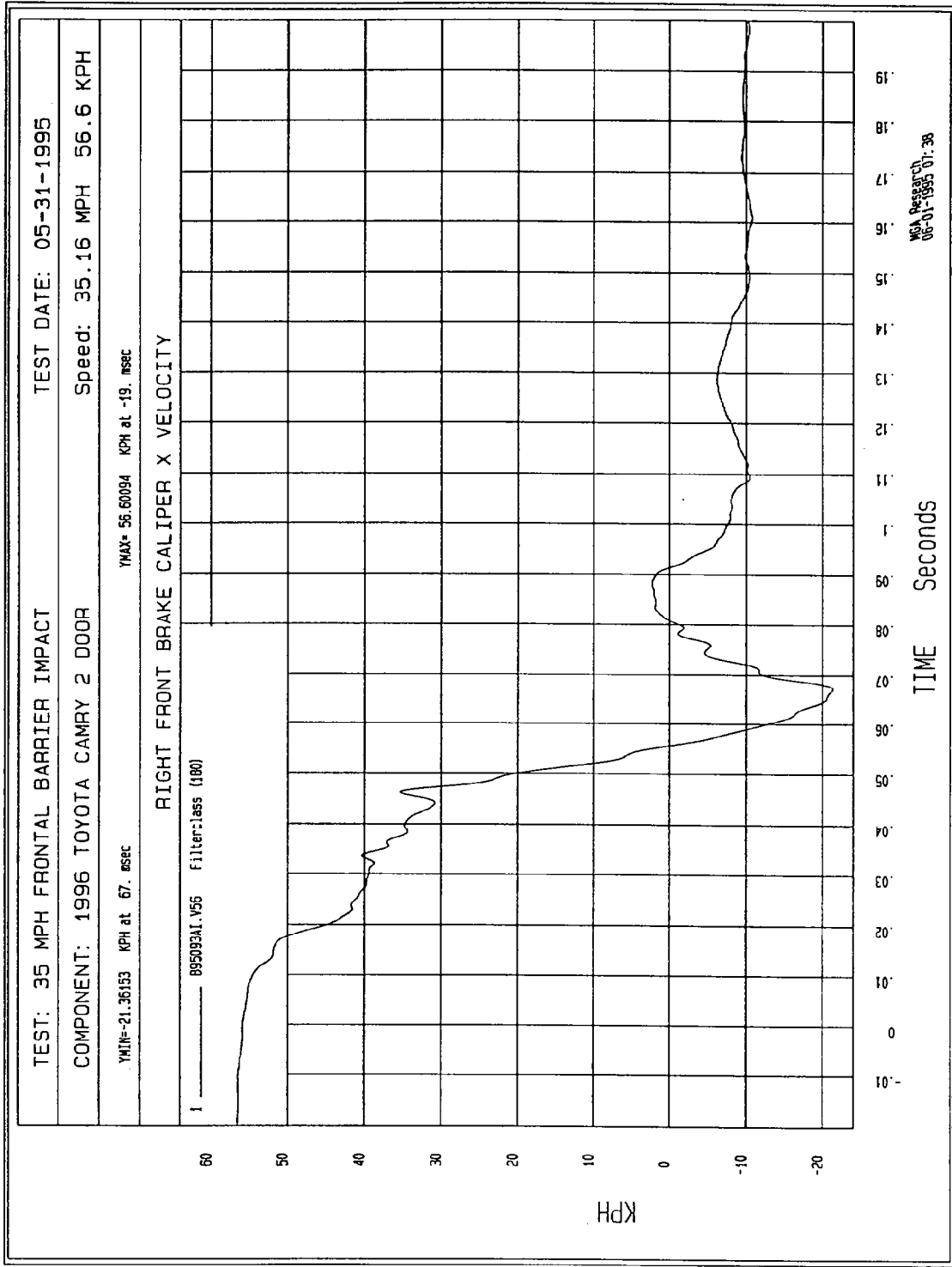


Figure B-26 - Right Brake Caliper X Velocity vs. Time

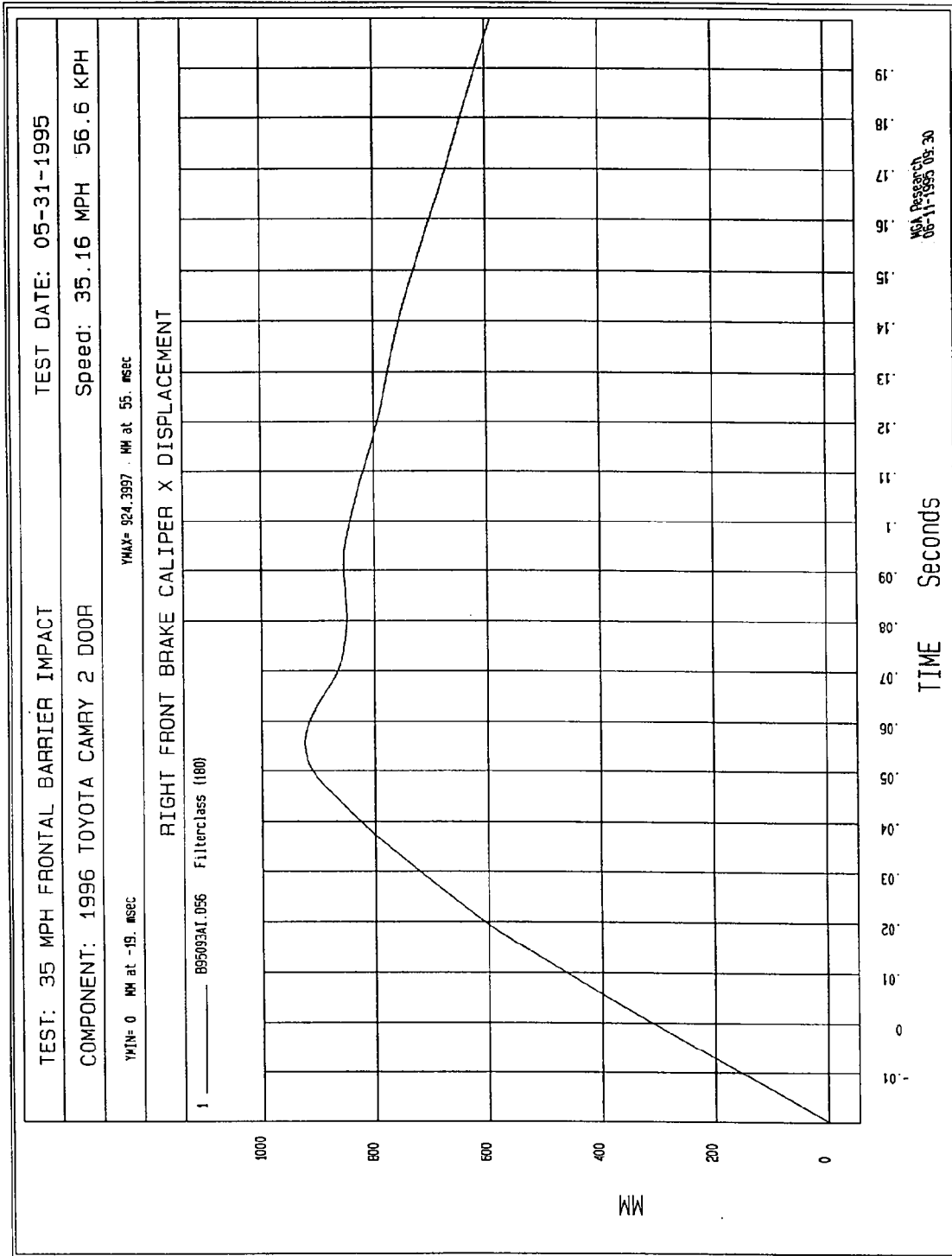


Figure B-27 - Right Brake Caliper X Displacement vs. Time

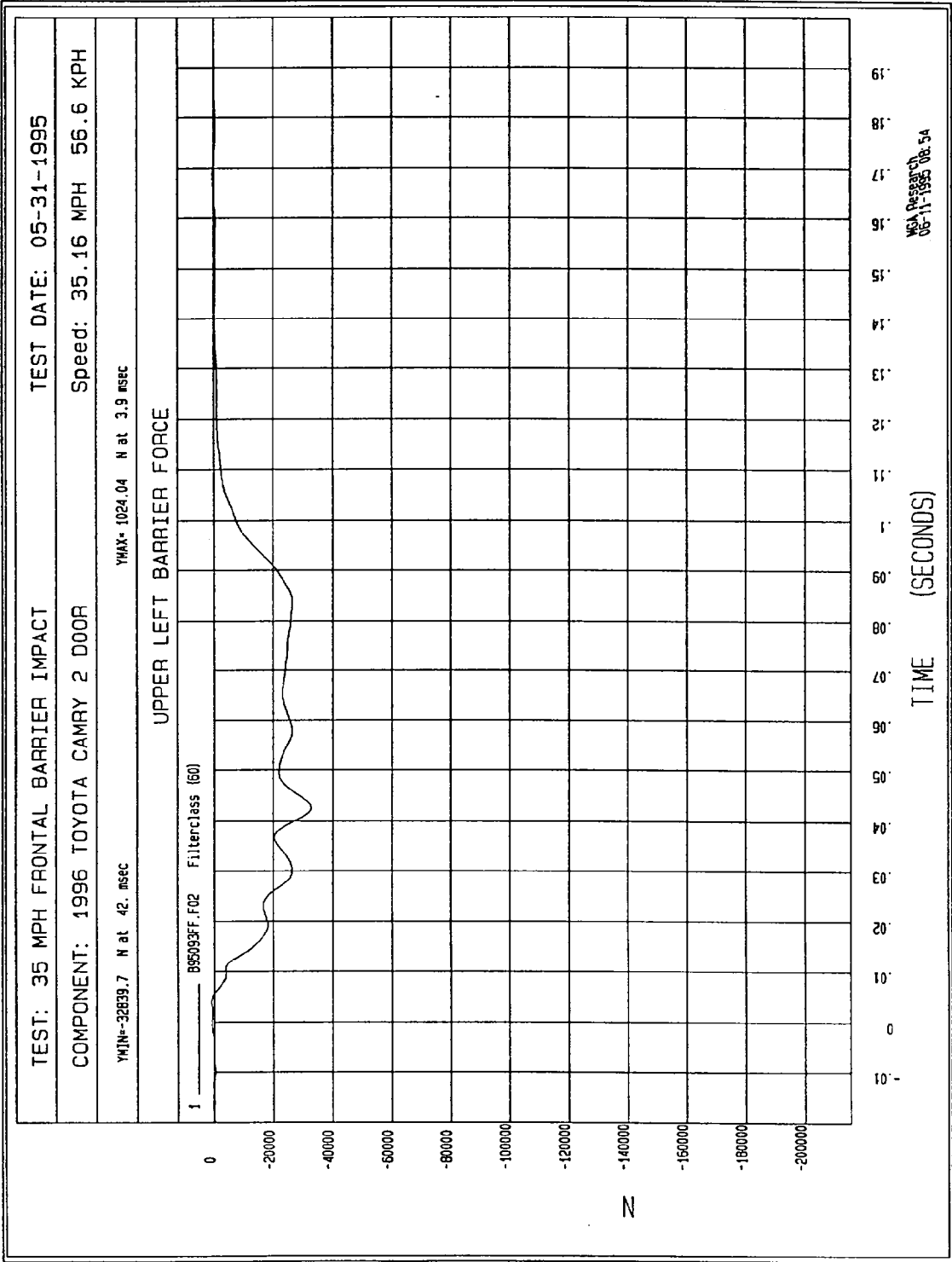


Figure B-28 - Upper Left Barrier Force vs. Time

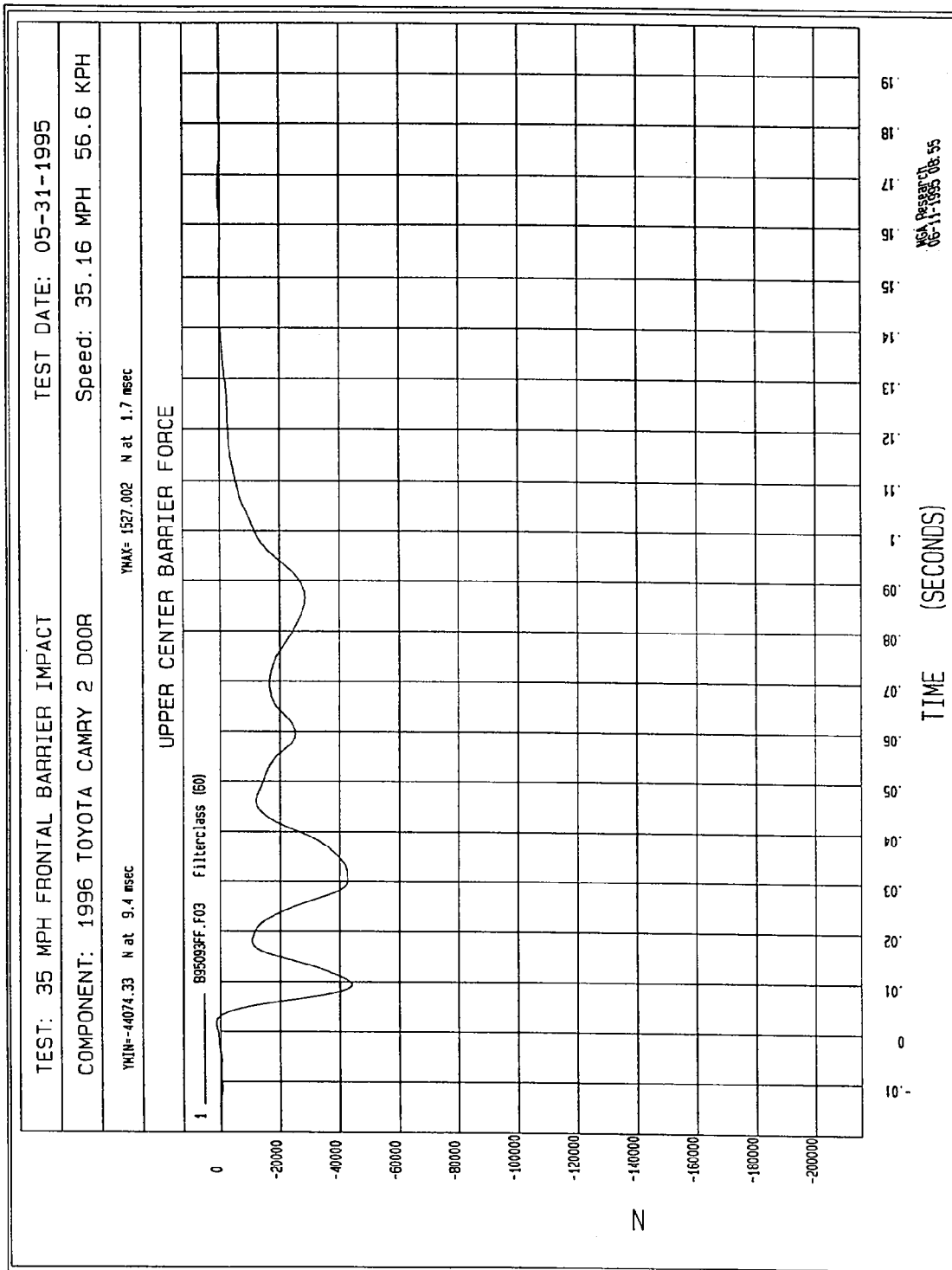


Figure B-29 - Upper Center Barrier Force vs. Time

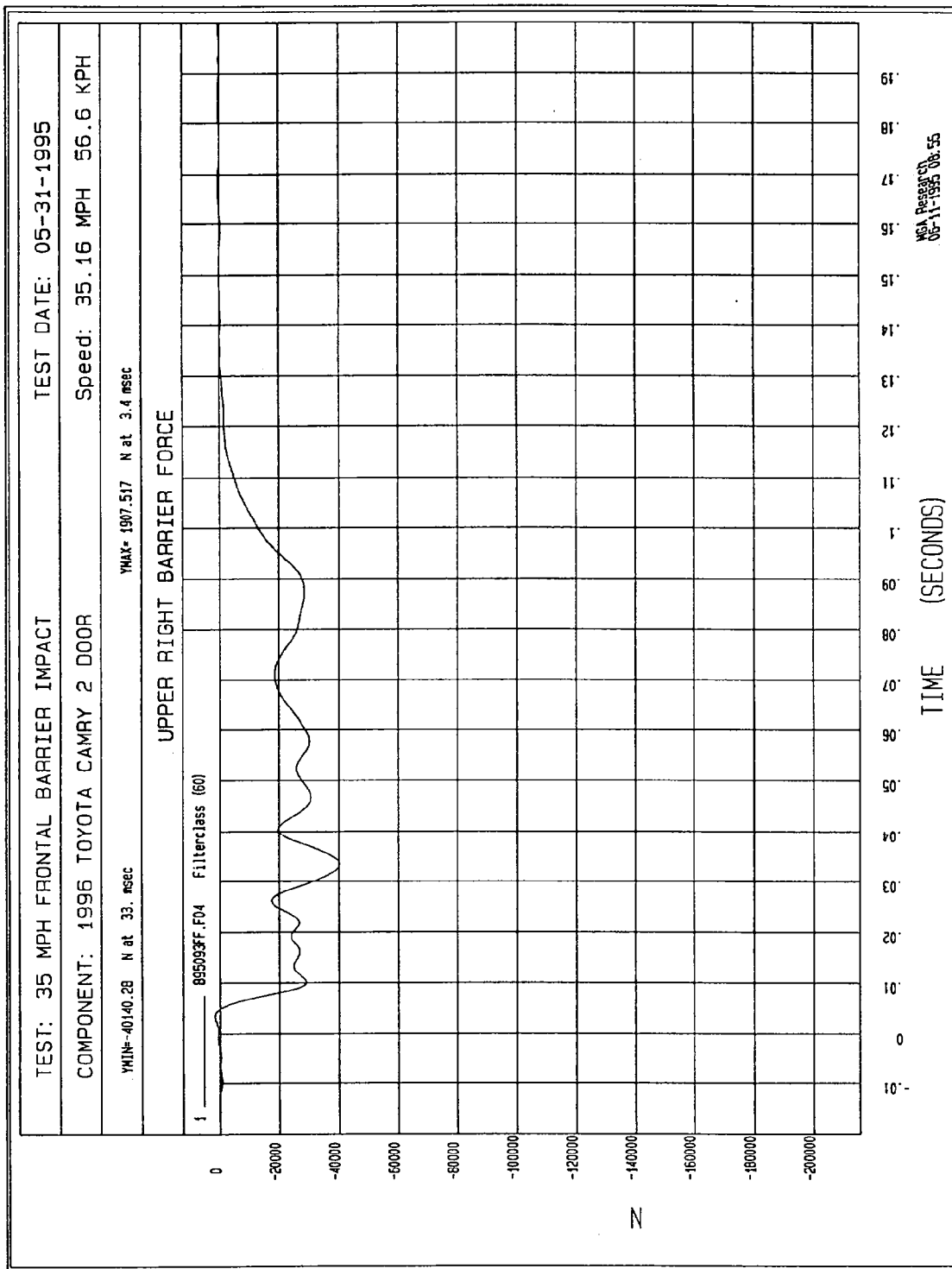


Figure B-30 - Upper Right Barrier Force vs. Time

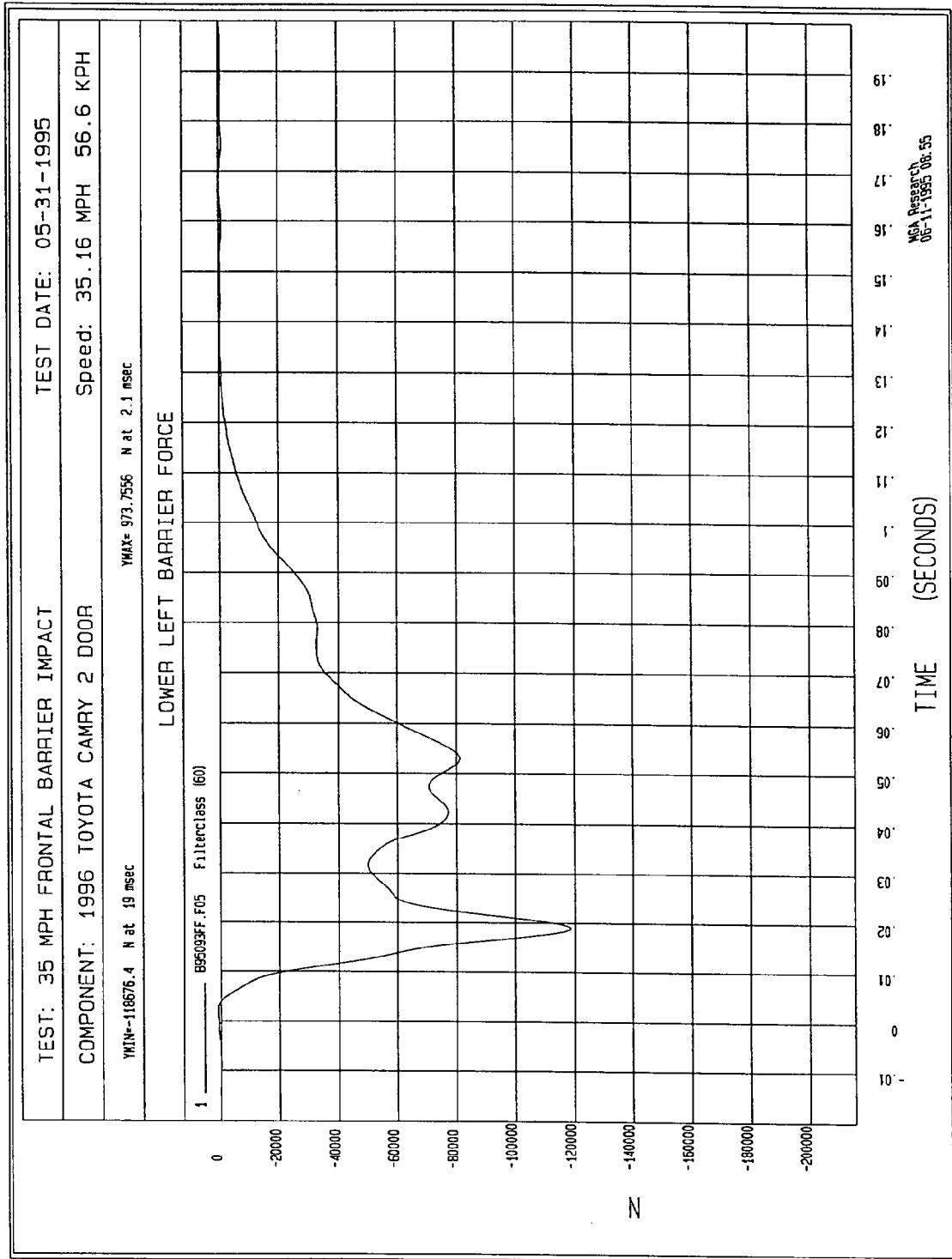


Figure B-31 - Lower Left Barrier Force vs. Time

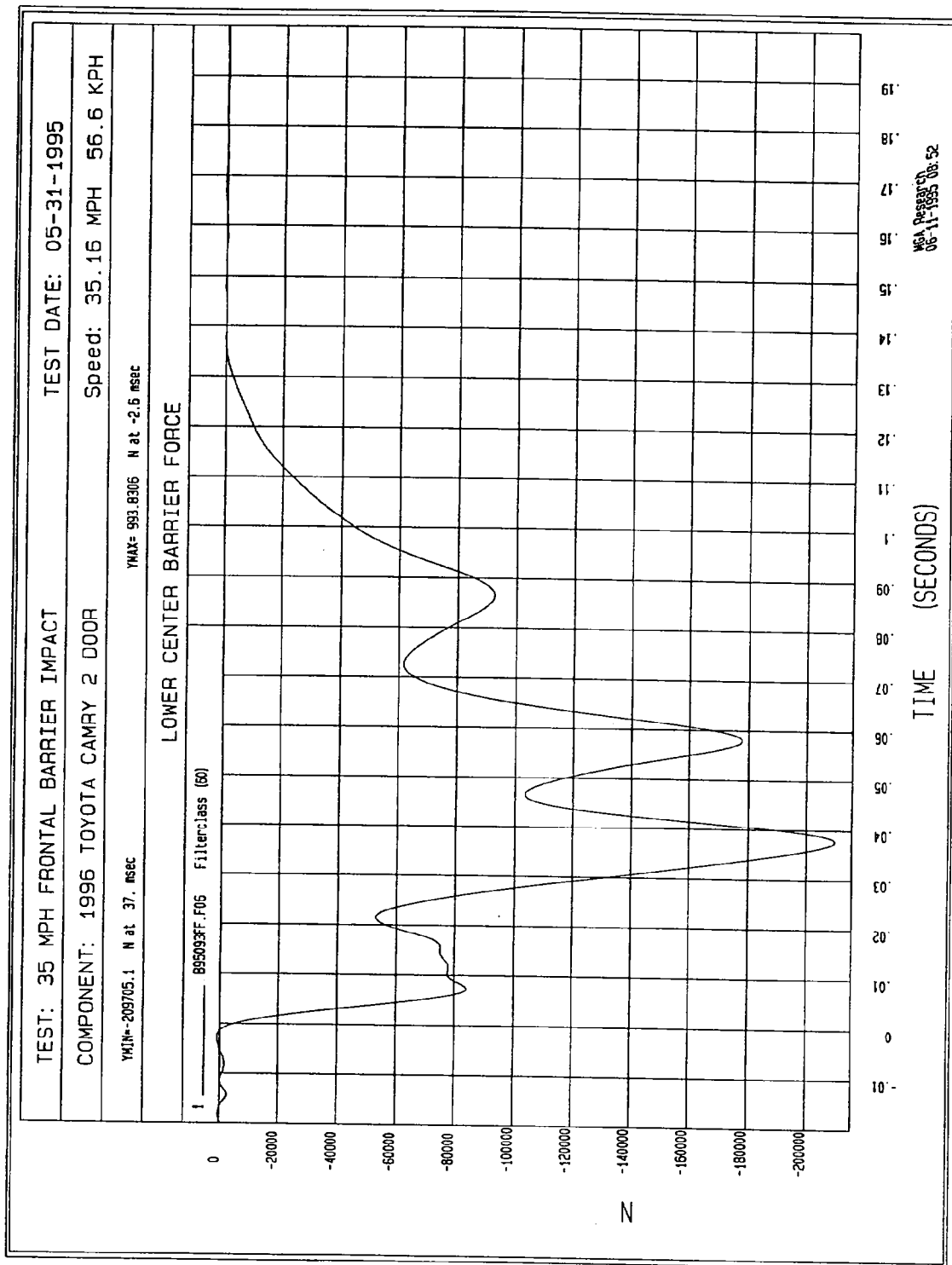


Figure B-32 - Lower Center Barrier Force vs. Time

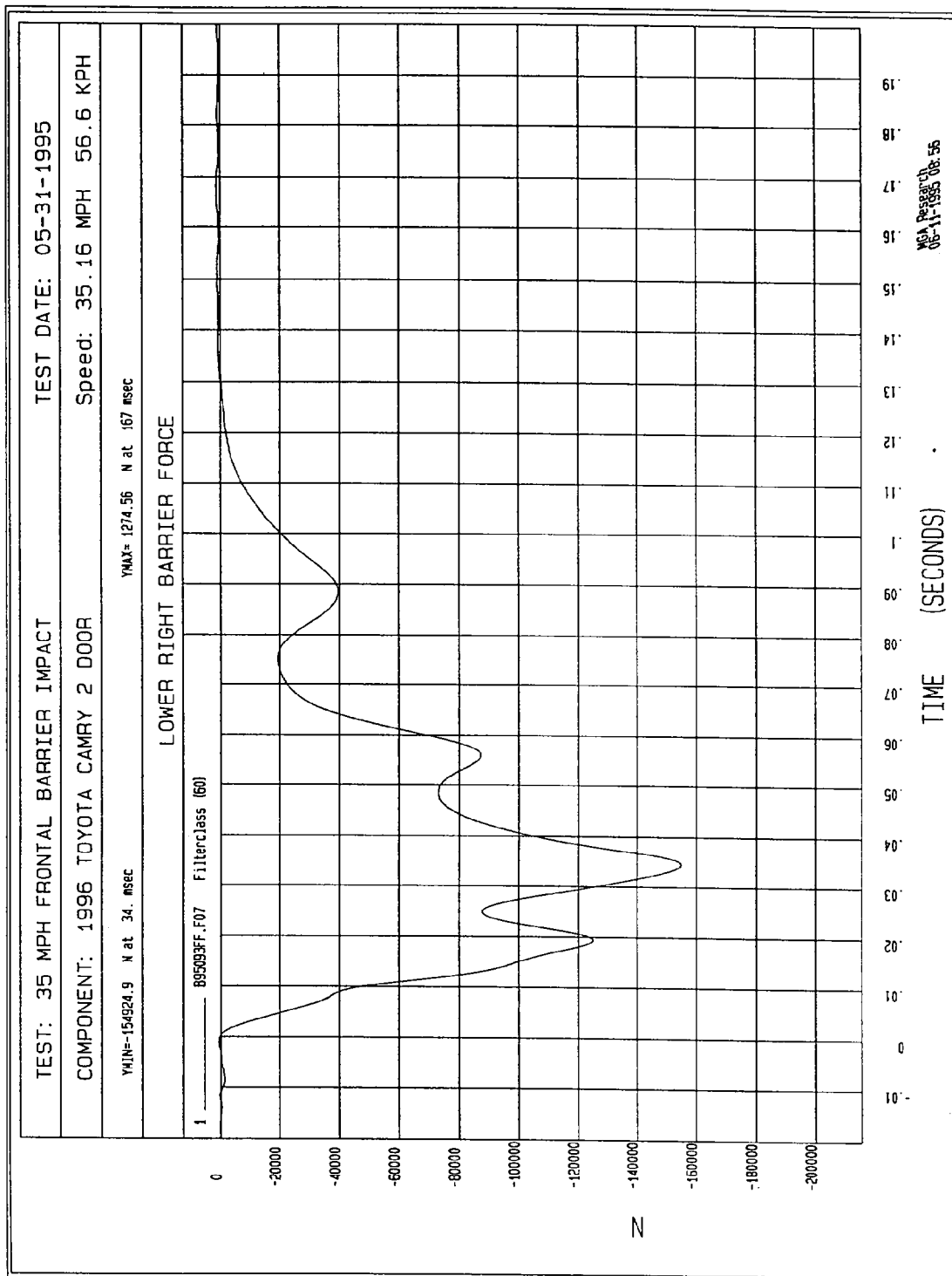


Figure B-33 - Lower Right Barrier Force vs. Time

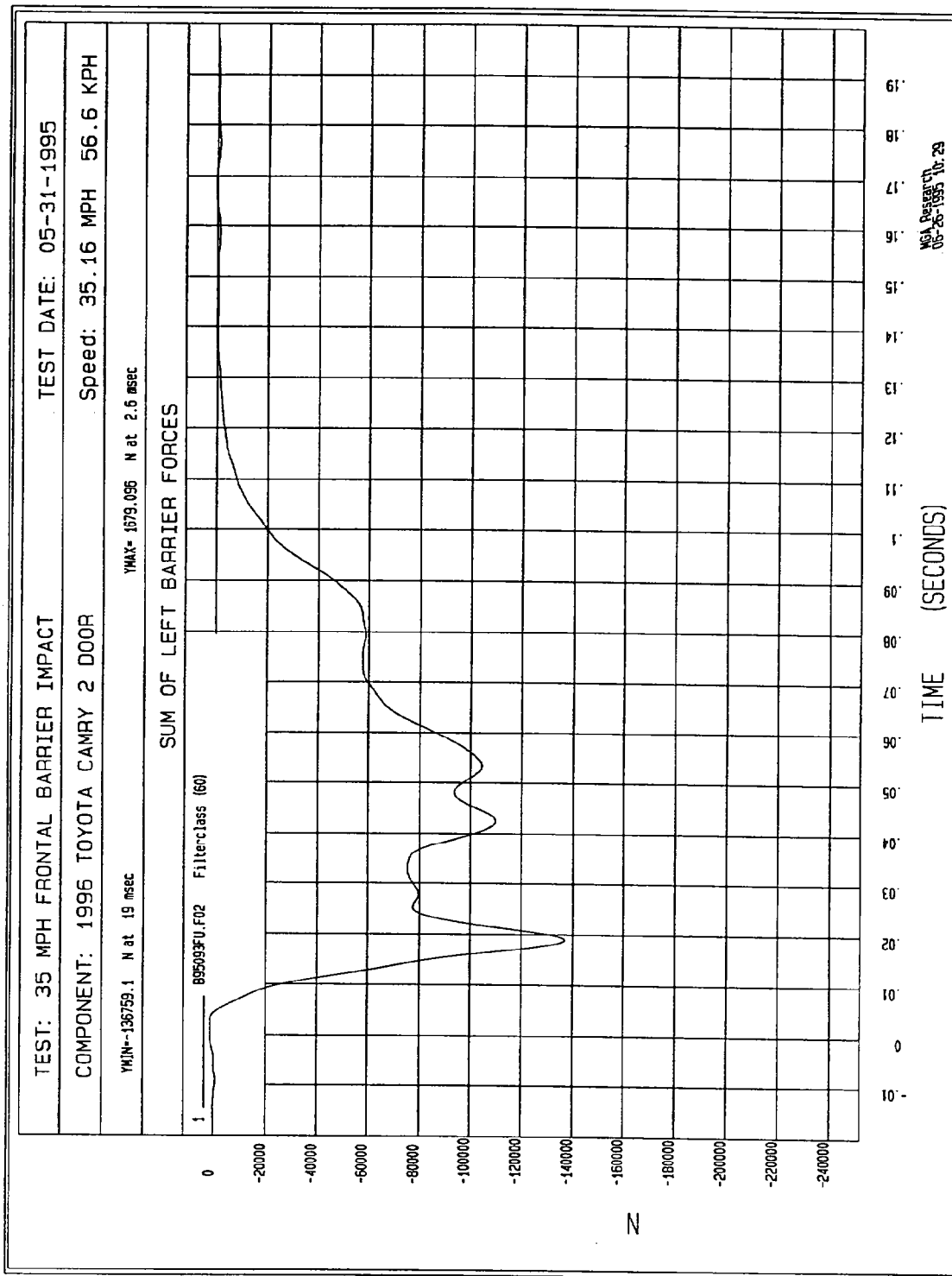


Figure B-34 - Sum of Left Barrier Forces vs. Time

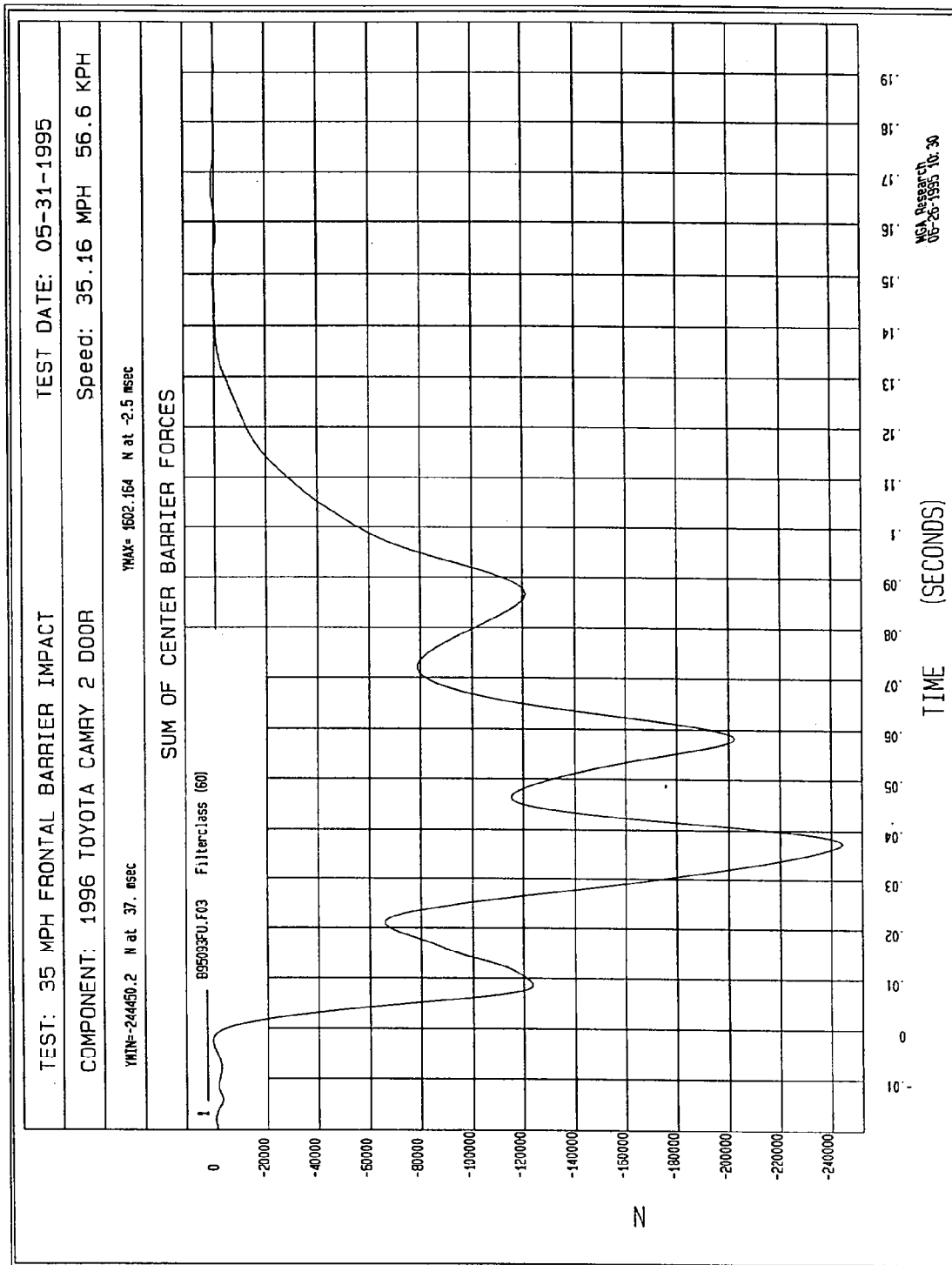


Figure B-35 - Sum of Center Barrier Forces vs. Time

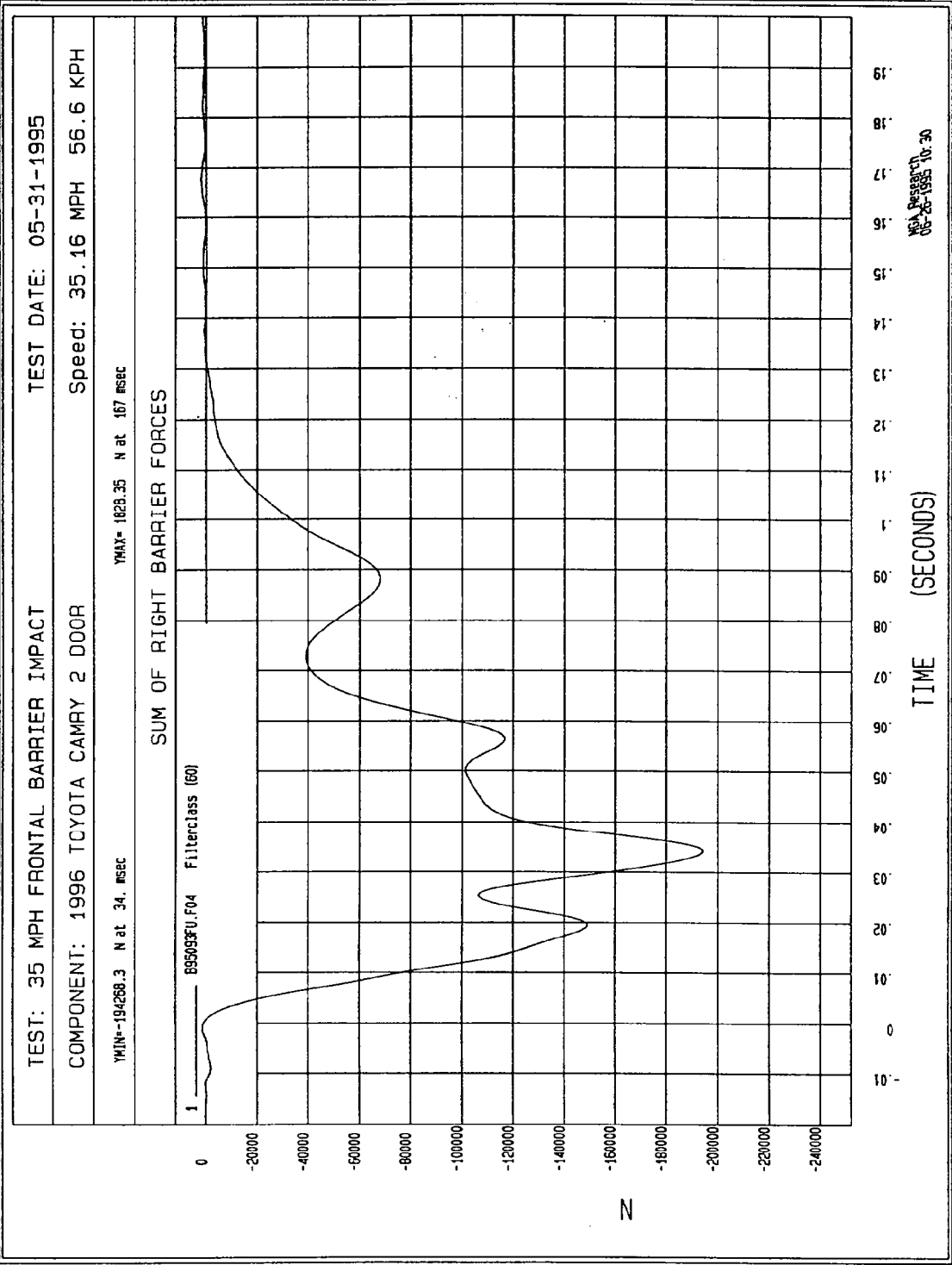


Figure B-36 - Sum of Right Barrier Forces vs. Time

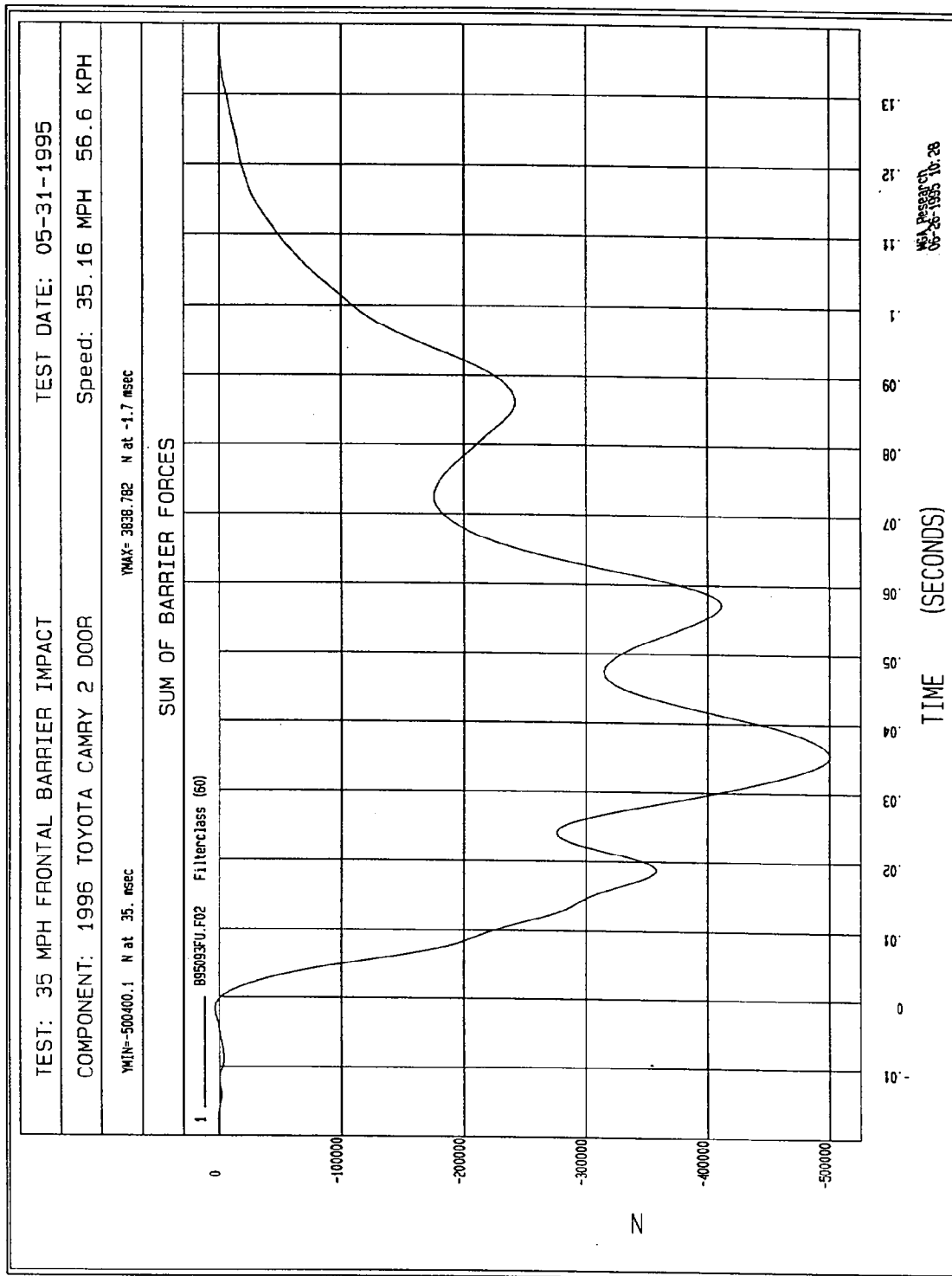


Figure B-37 - Sum of Barrier Forces vs. Time

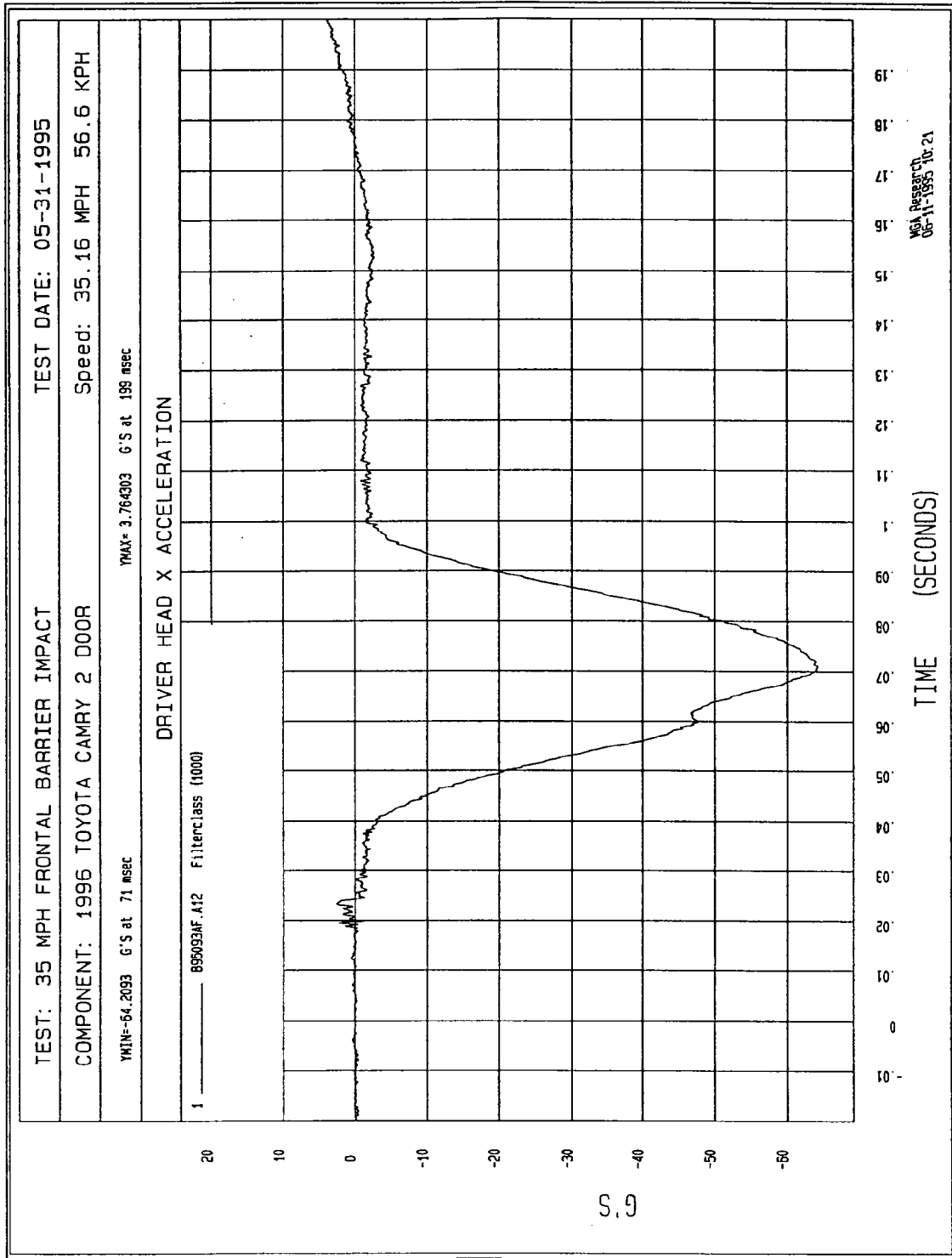


Figure B-38 - Driver Head X Acceleration vs. Time

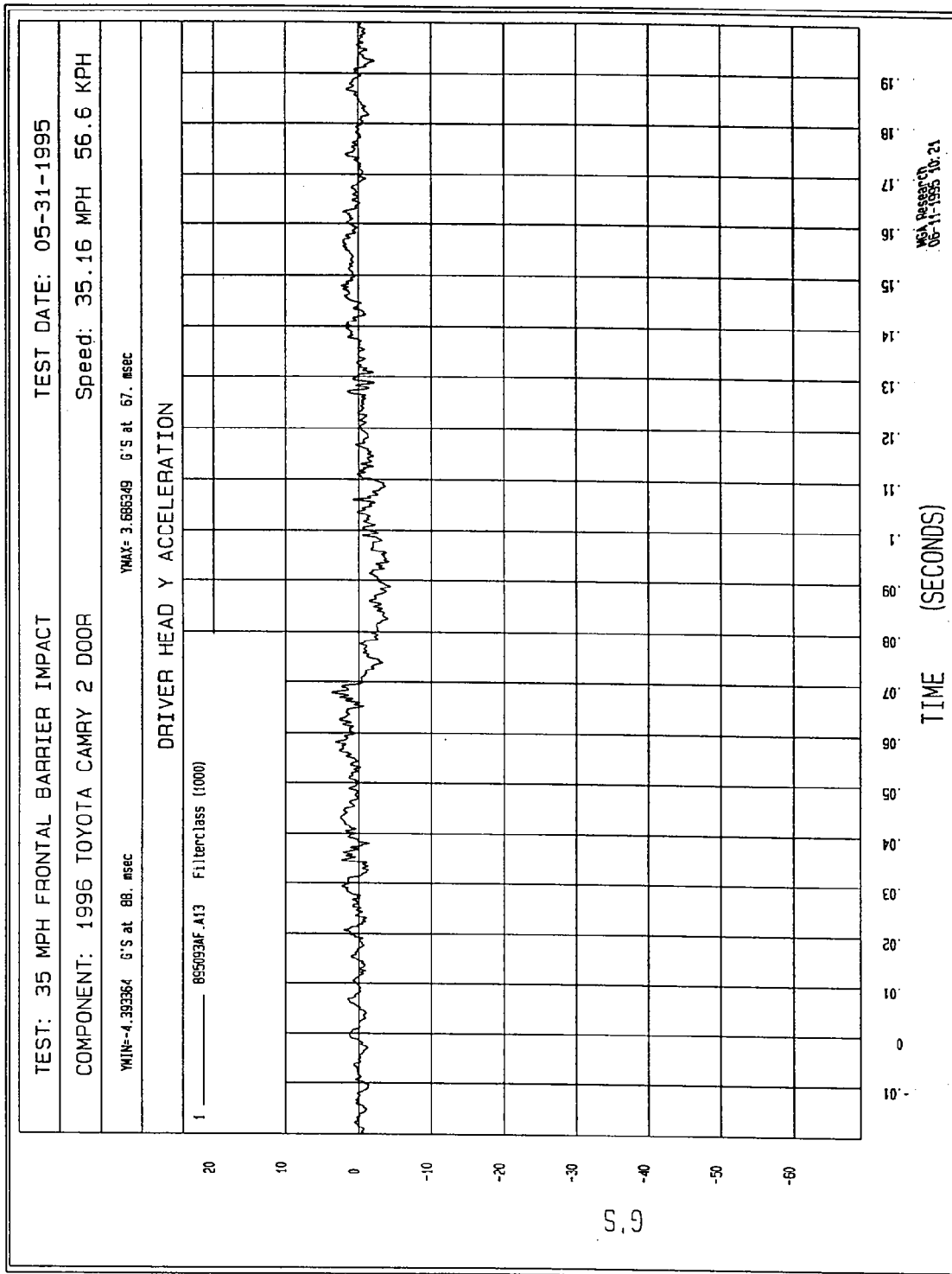


Figure B-39 - Driver Head Y Acceleration vs. Time

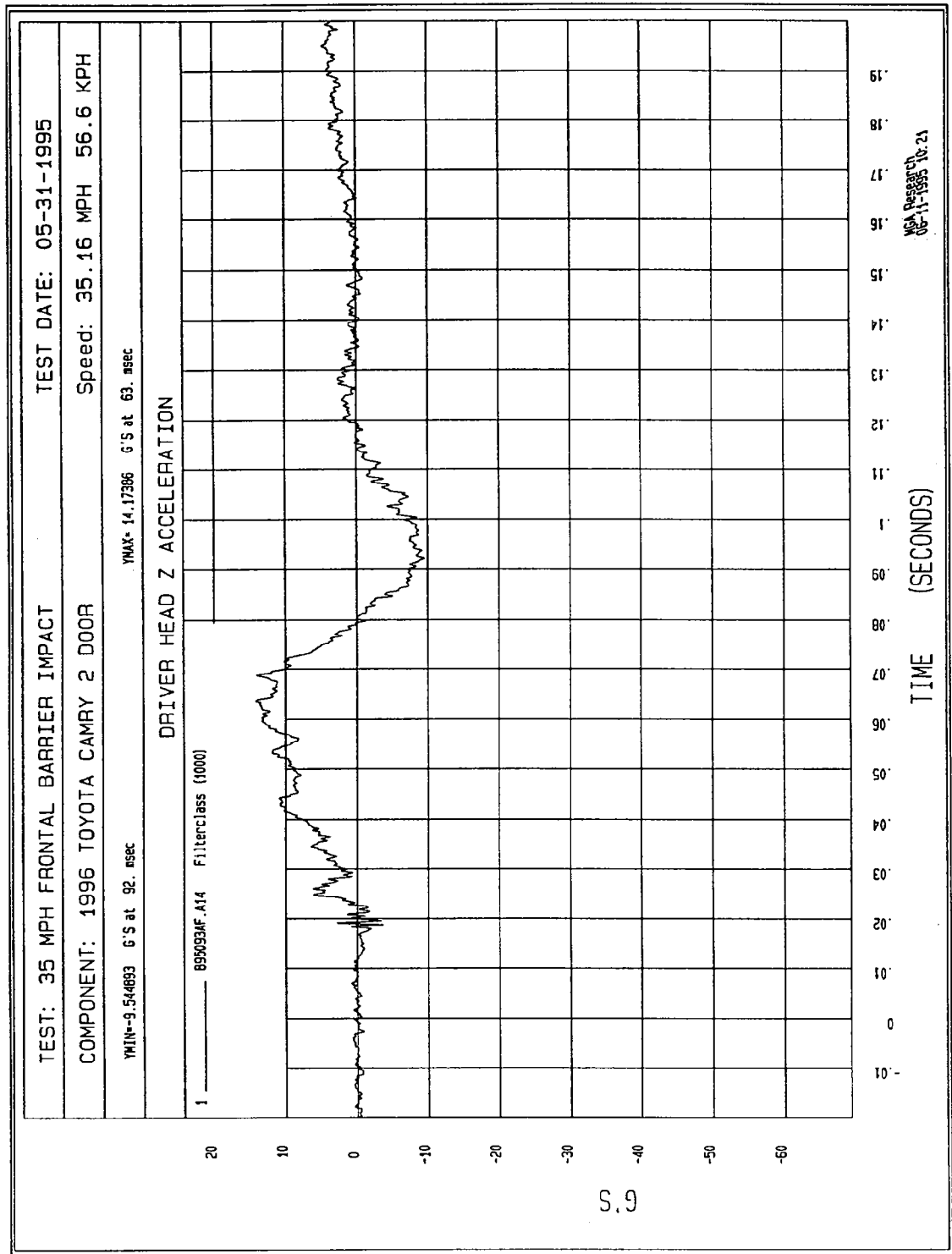
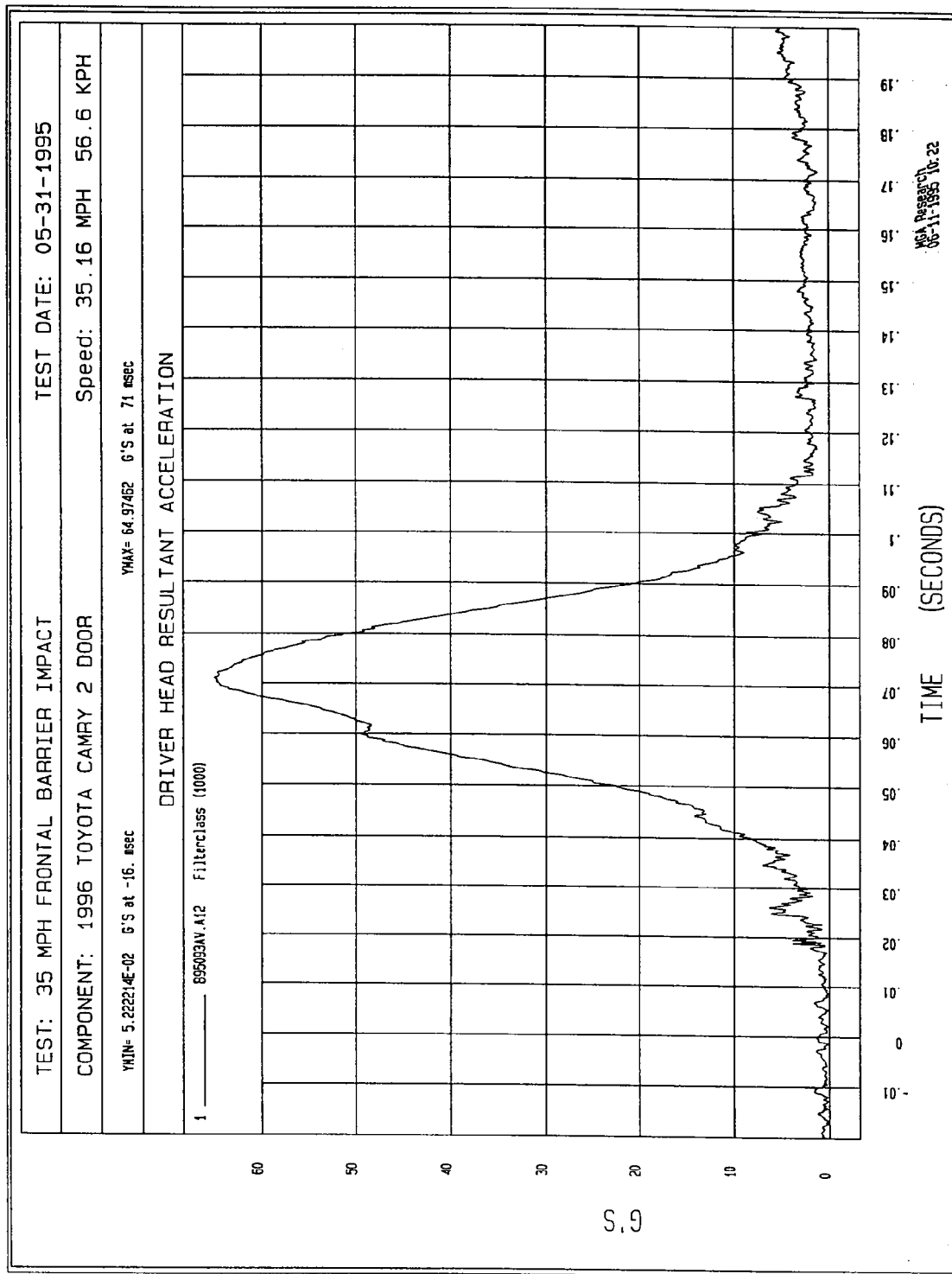


Figure B-40 - Driver Head Z Acceleration vs. Time



B-41

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

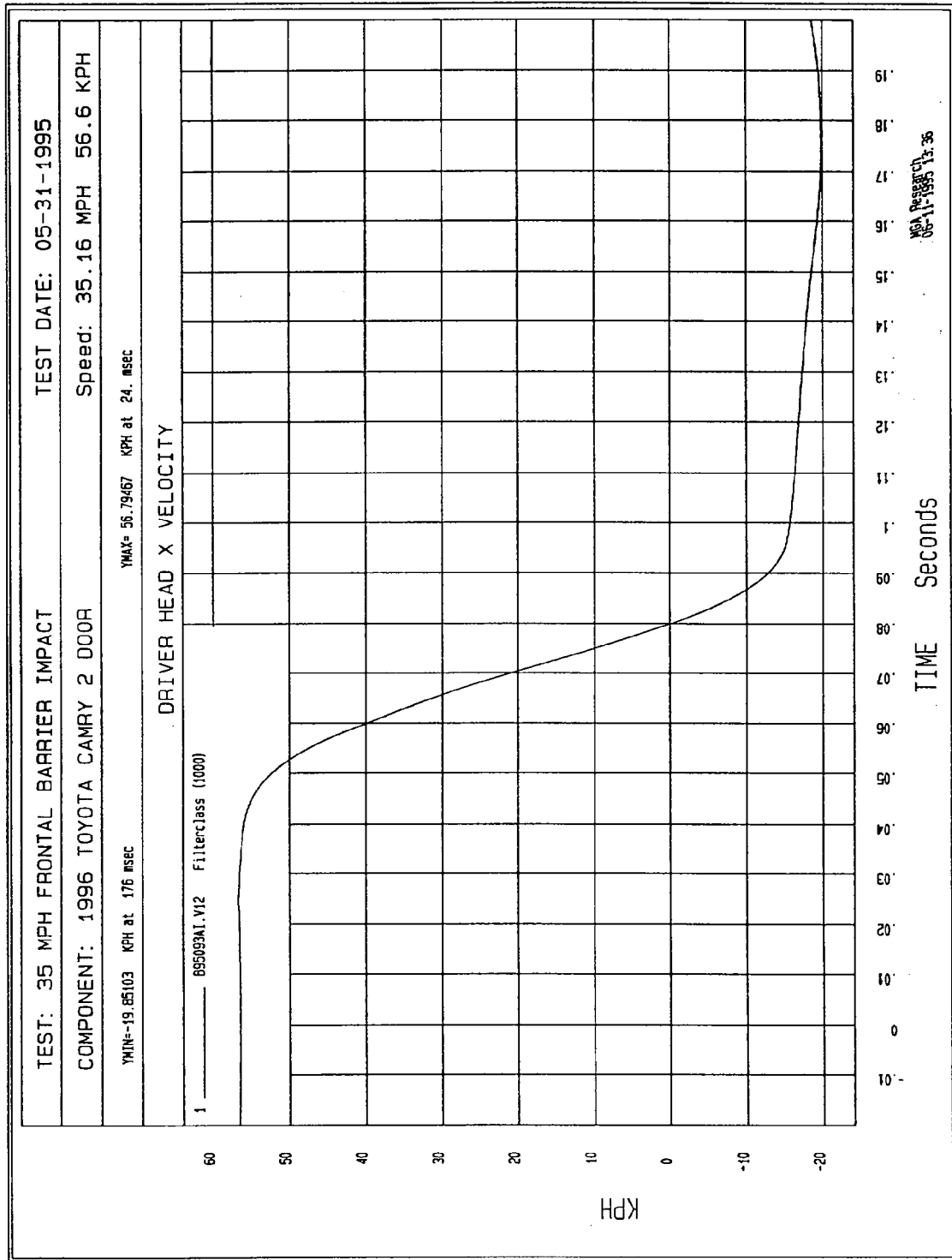


Figure B-42 - Driver Head X Velocity vs. Time

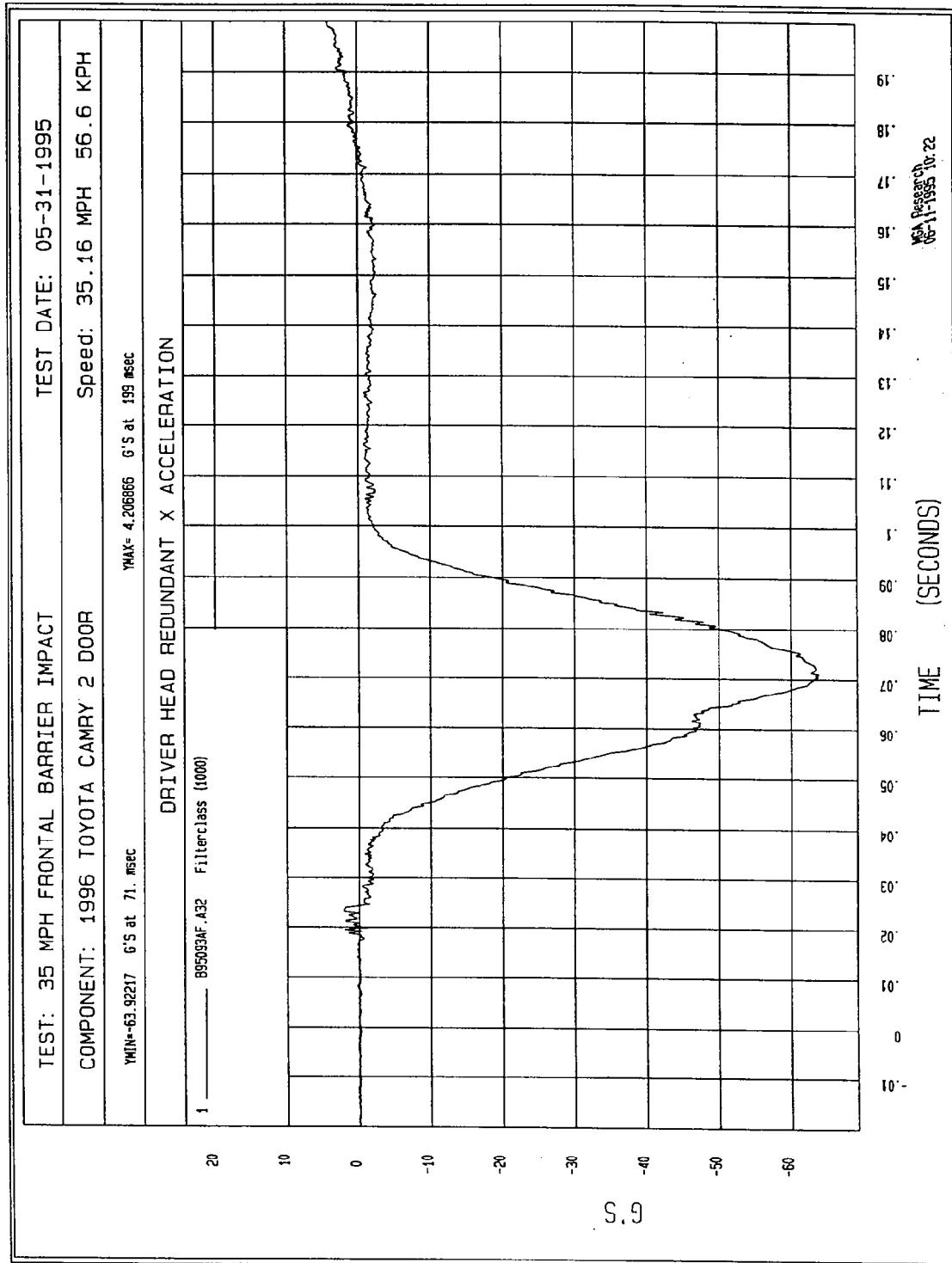


Figure B-43 - Driver Head Redundant X Acceleration vs. Time

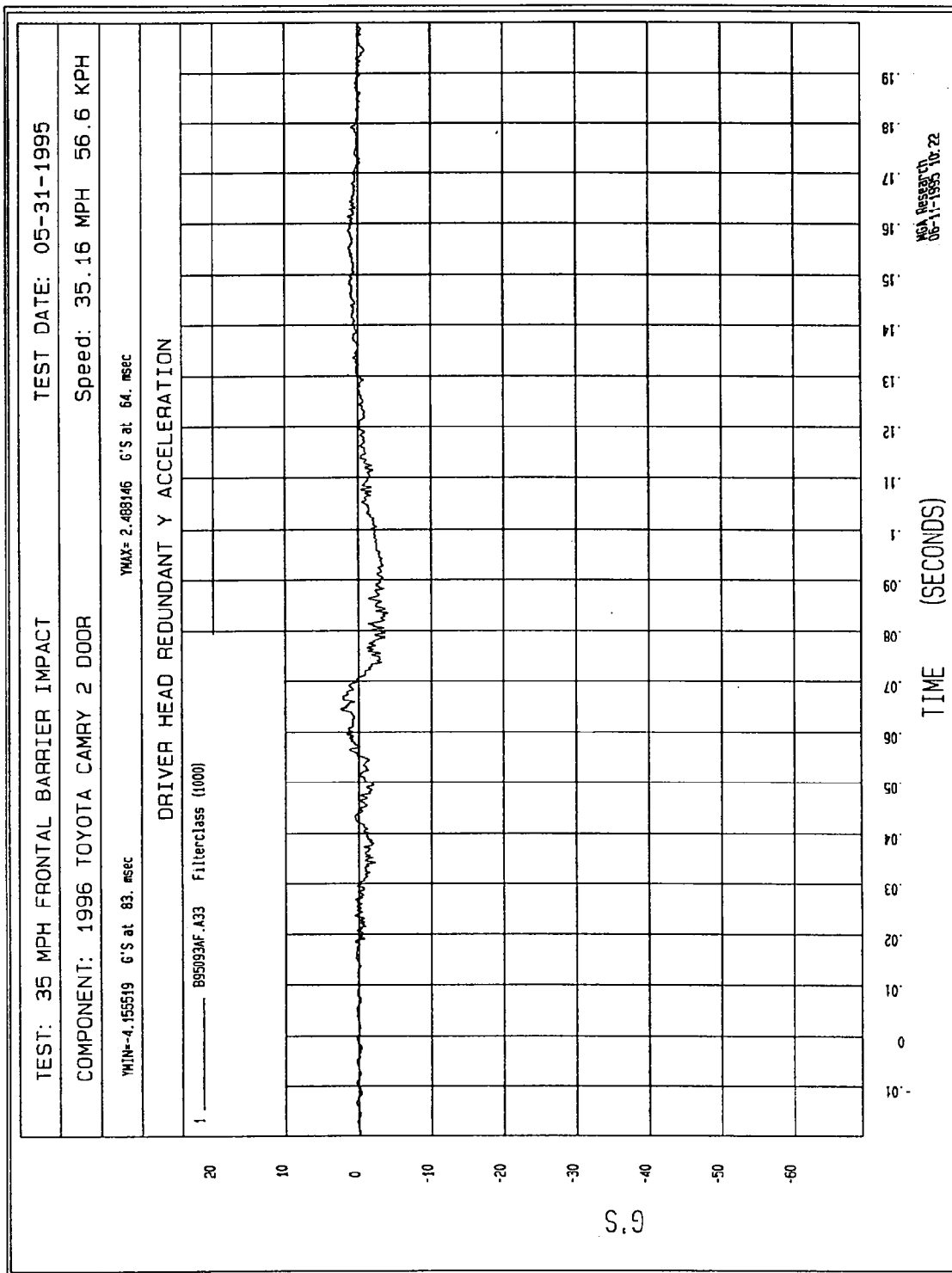


Figure B-44 - Driver Head Redundant Y Acceleration vs. Time

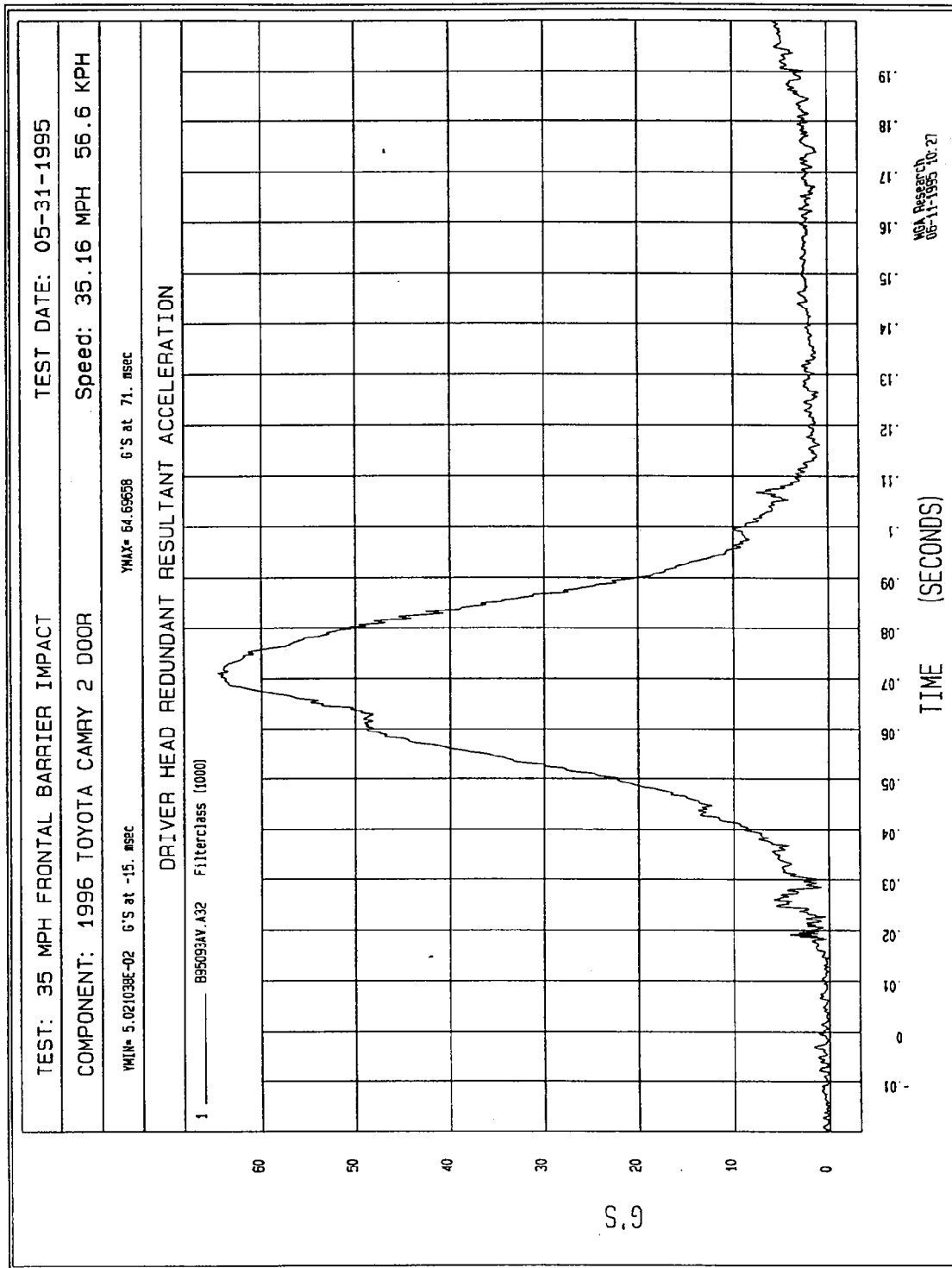


Figure B-46 - Driver Head Redundant Resultant Acceleration vs. Time

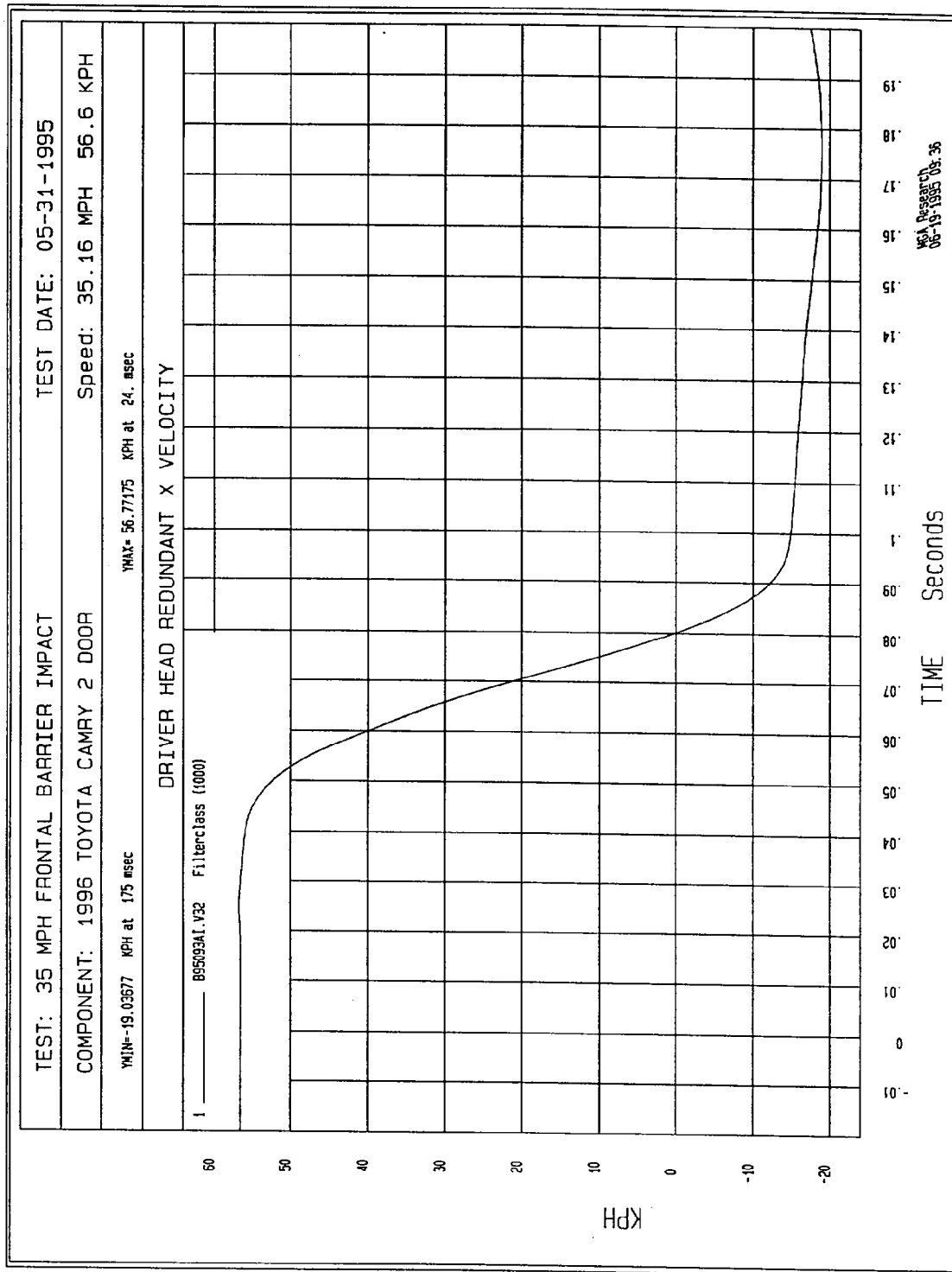


Figure B-47 - Driver Head Redundant X Velocity vs. Time

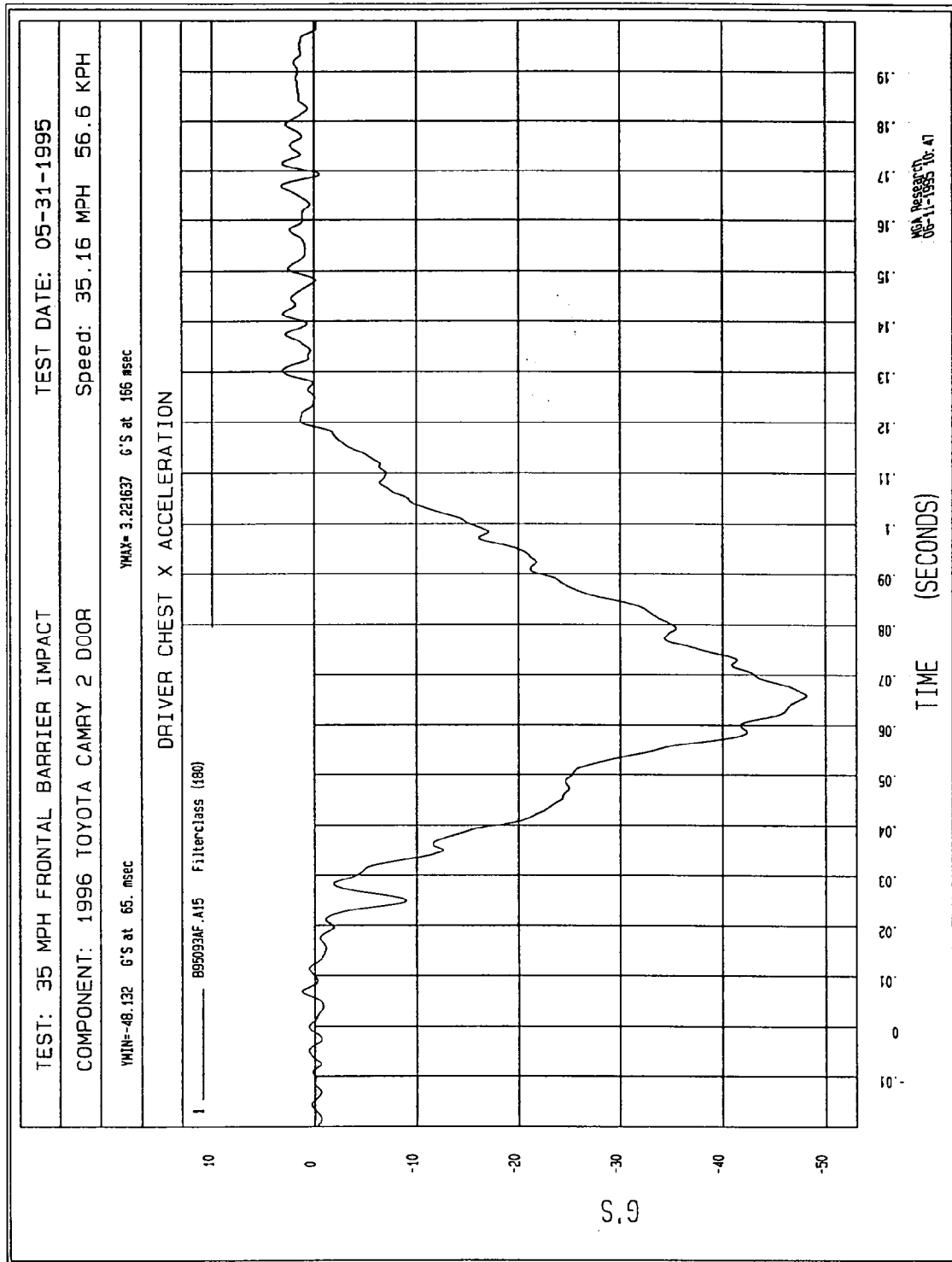


Figure B-48 - Driver Chest X Acceleration vs. Time

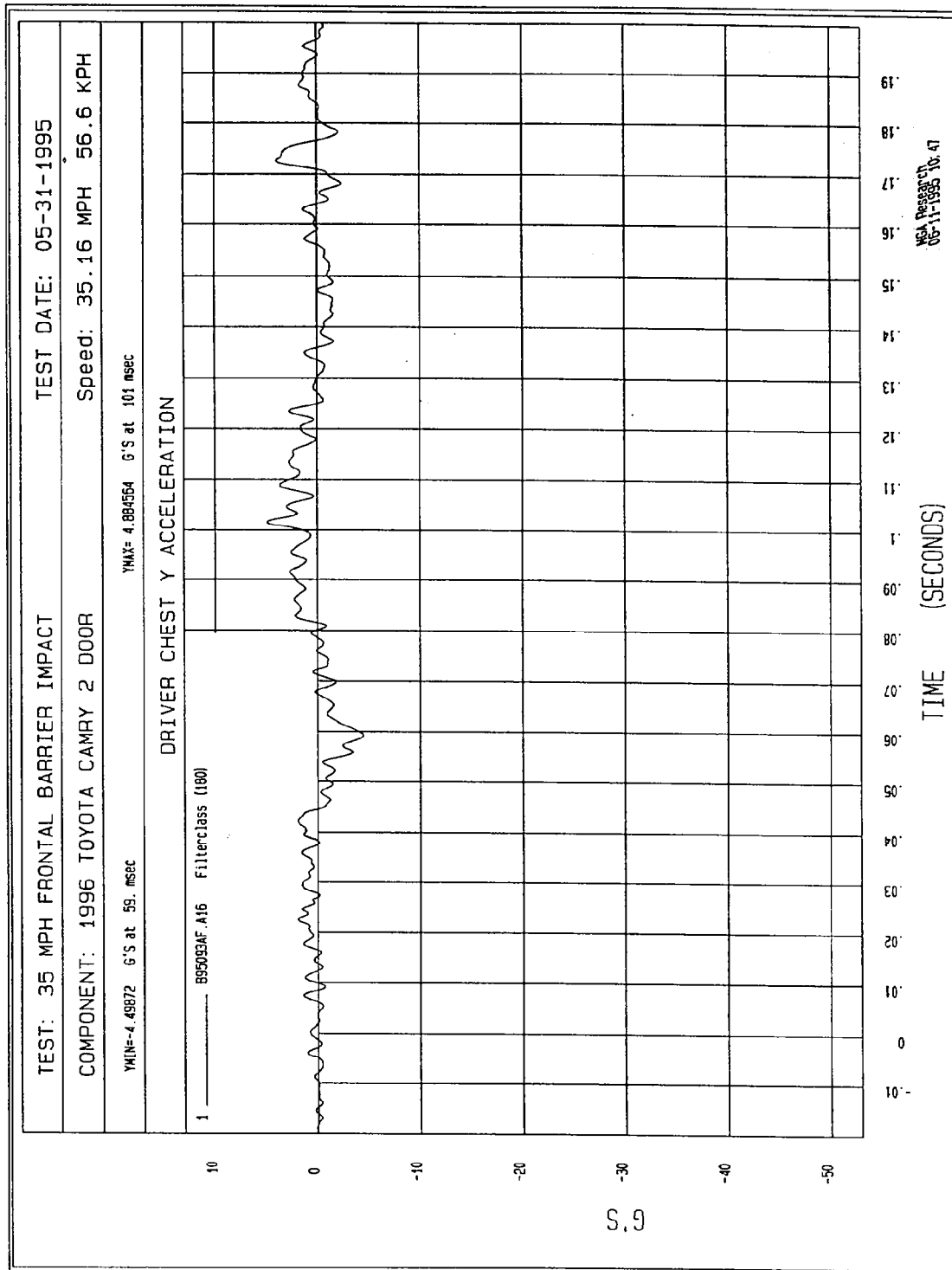


Figure B-49 - Driver Chest Y Acceleration vs. Time

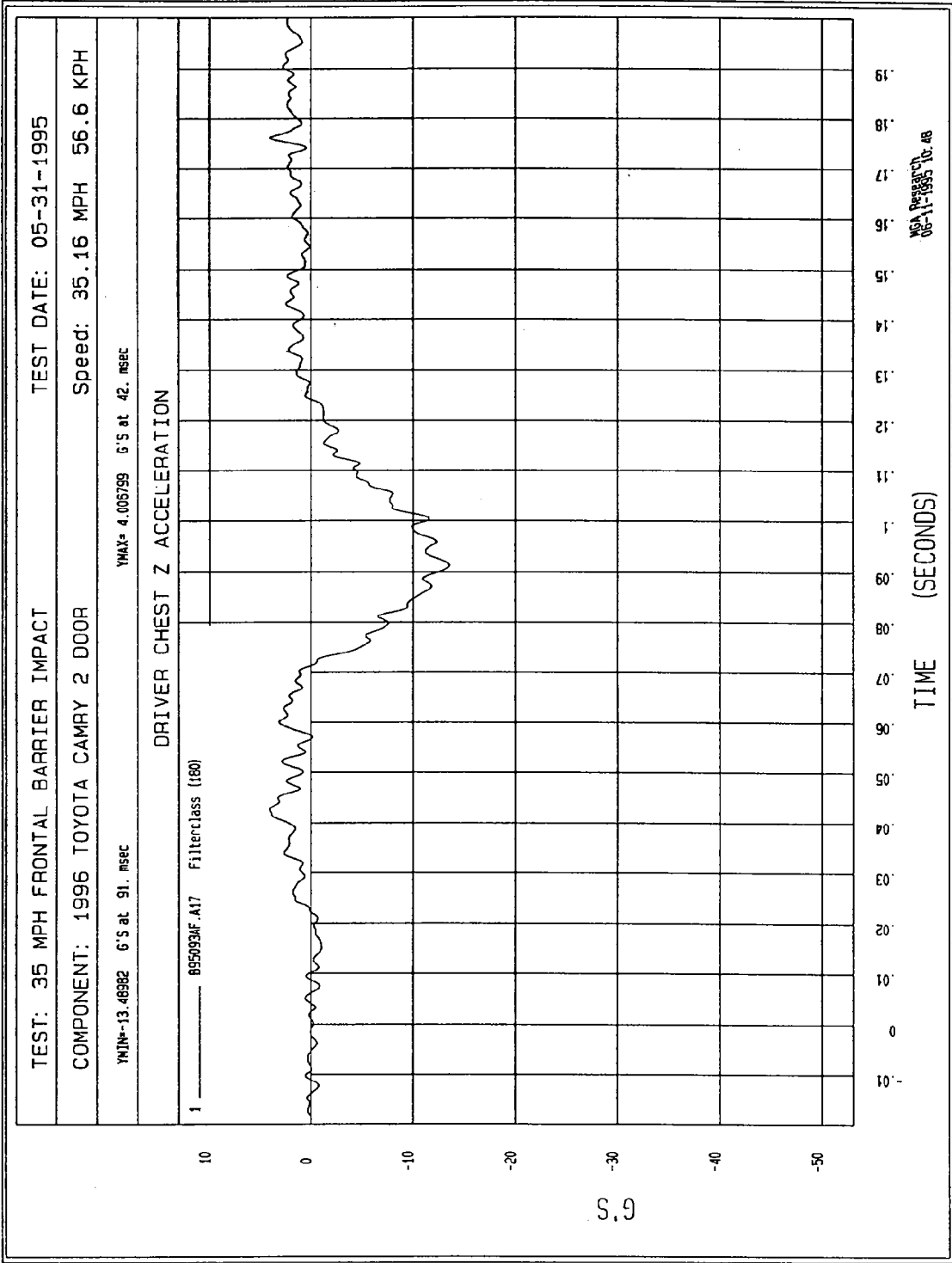


Figure B-50 - Driver Chest Z Acceleration vs. Time

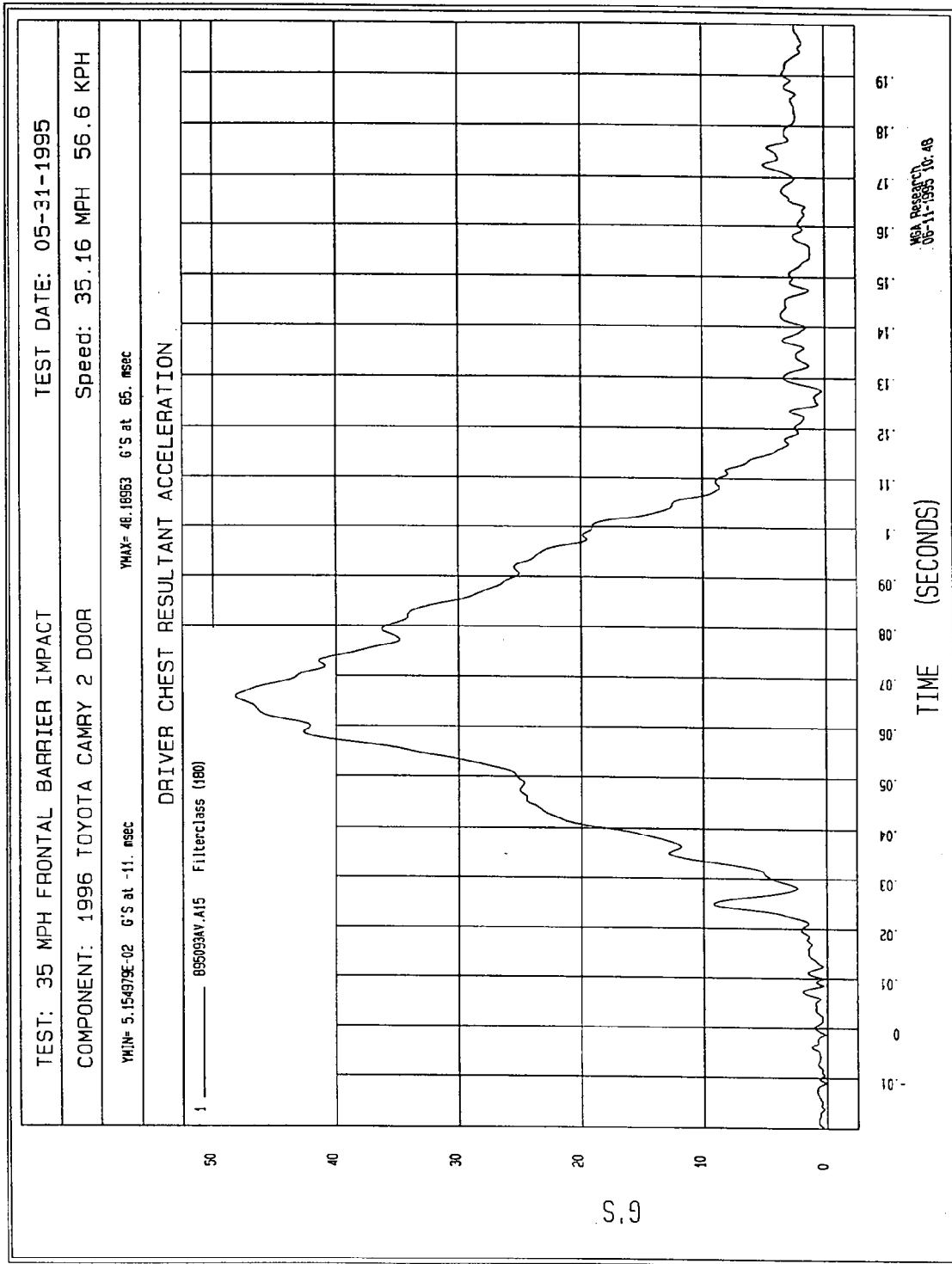


Figure B-51 - Driver Chest Resultant Acceleration vs. Time

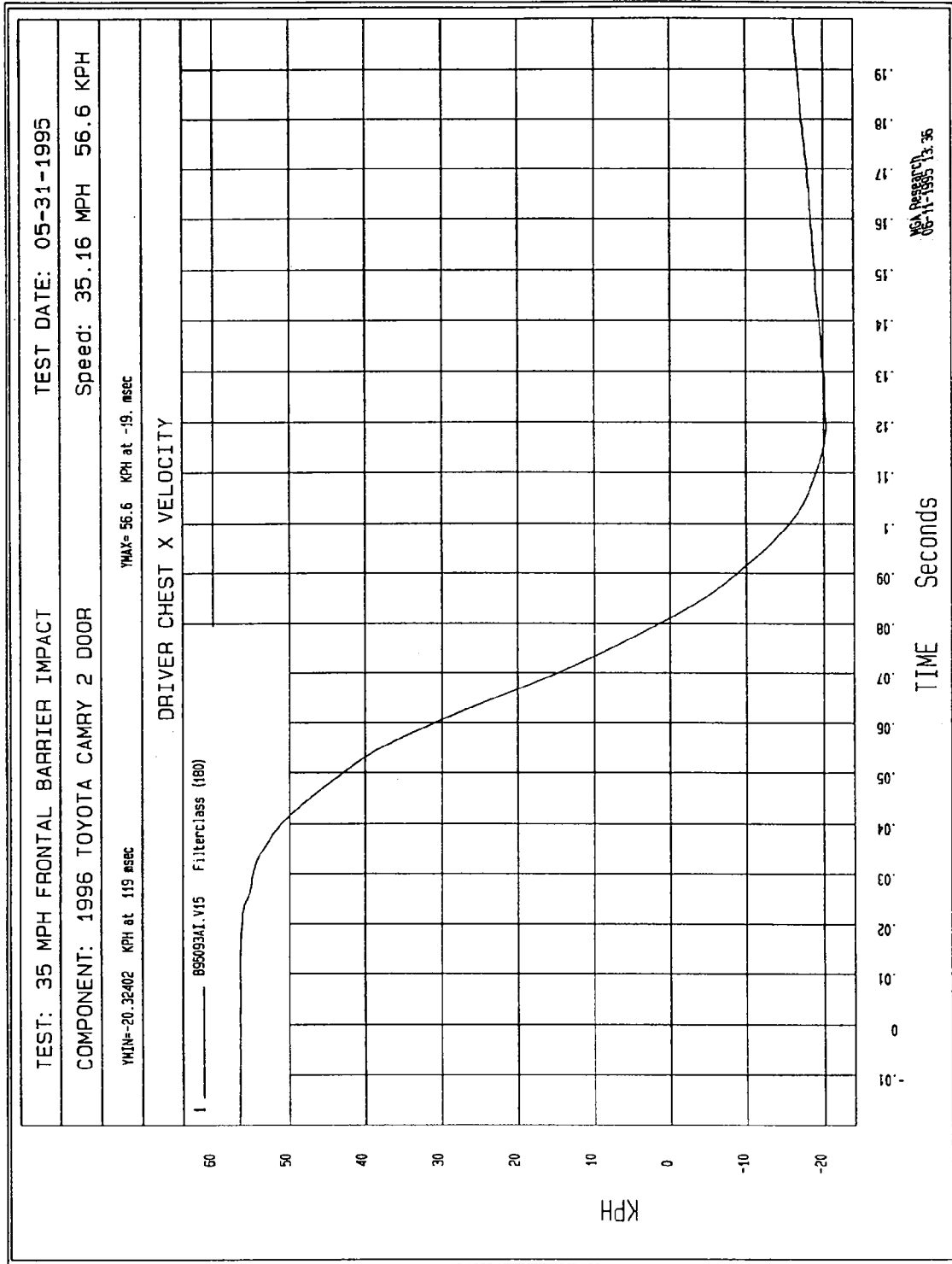


Figure B-52 - Driver Chest X Velocity vs. Time

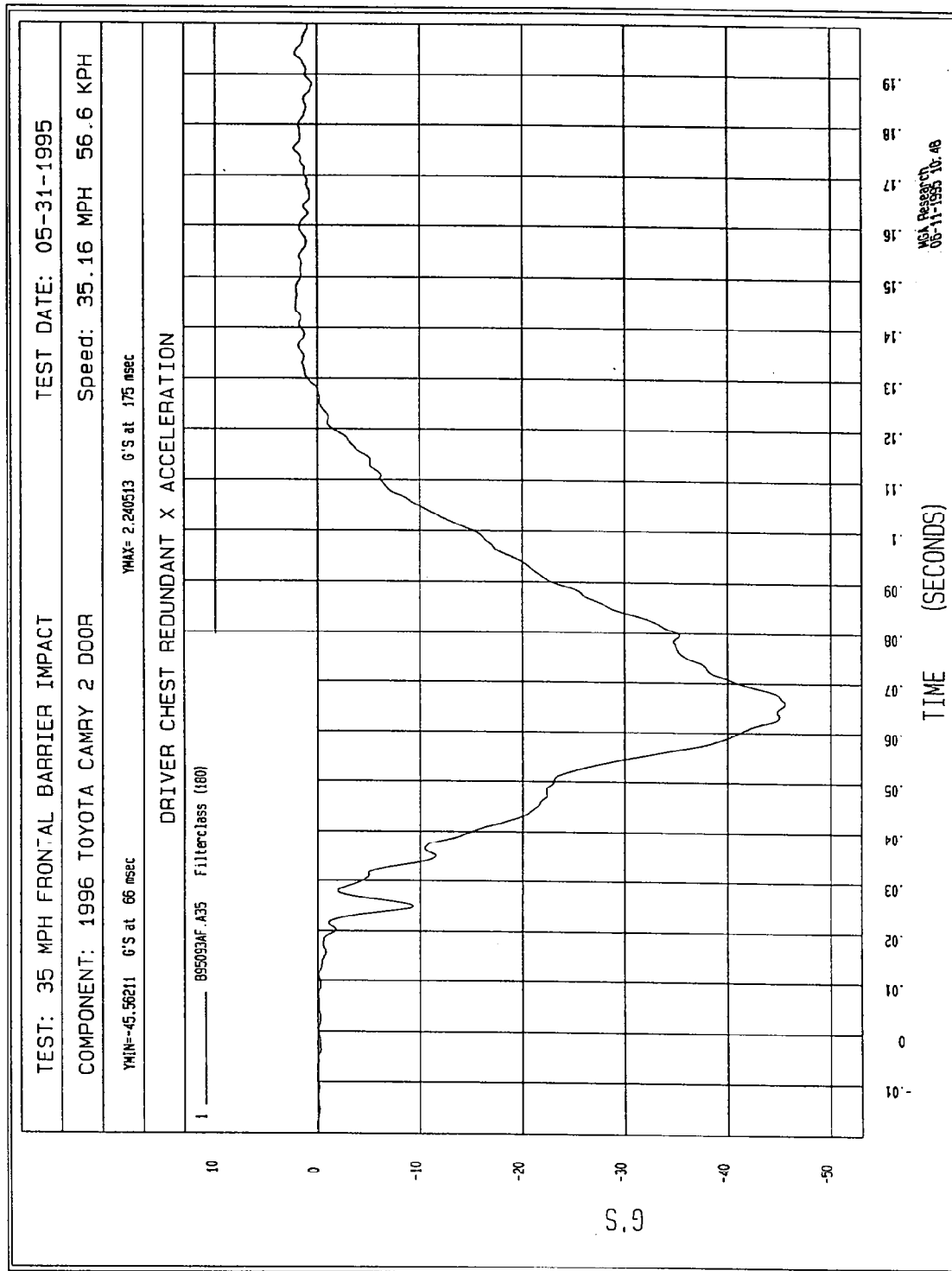


Figure B-53 - Driver Chest Redundant X Acceleration vs. Time

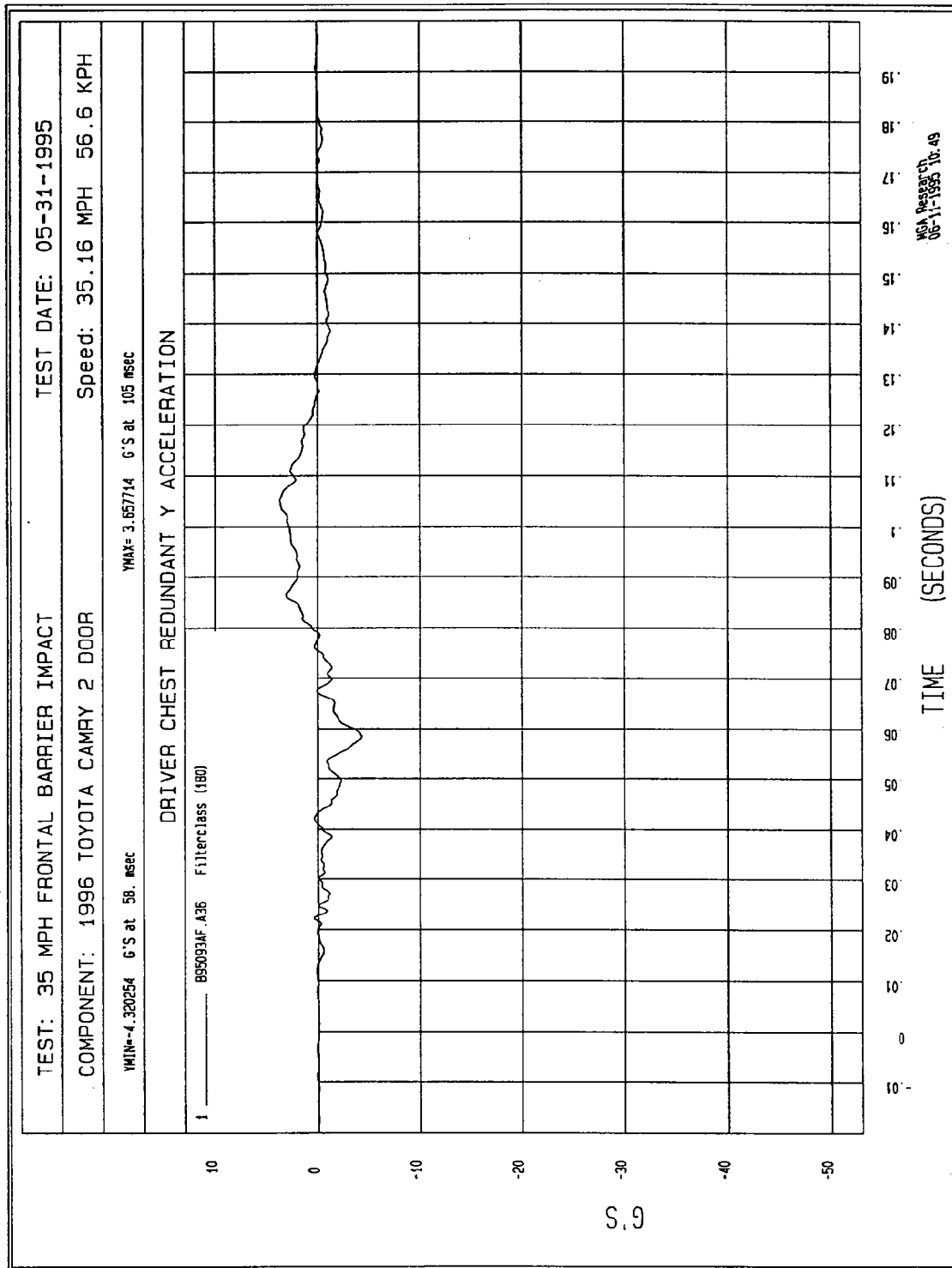


Figure B-54 - Driver Chest Redundant Y Acceleration vs. Time

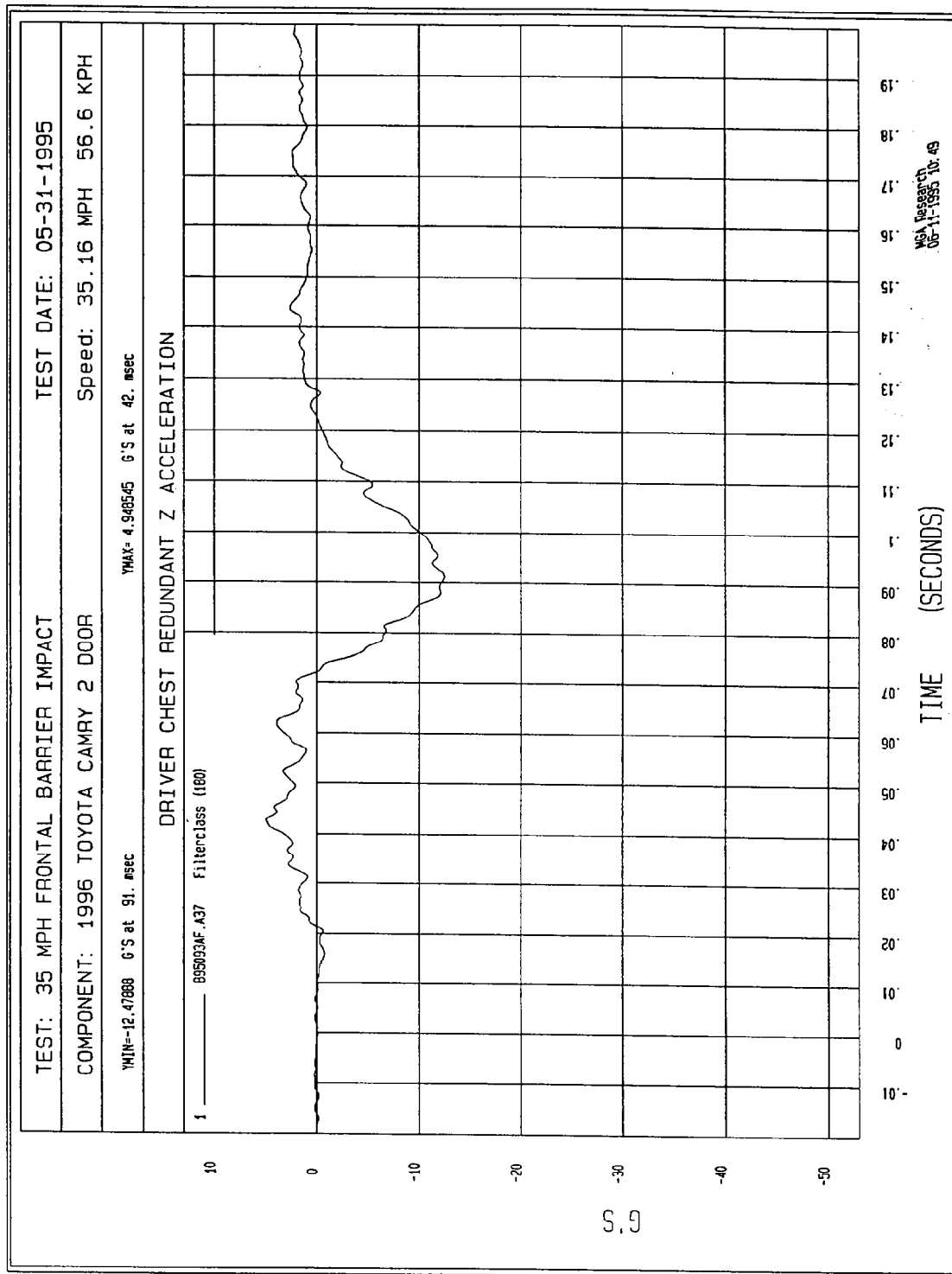


Figure B-55 - Driver Chest Redundant Z Acceleration vs. Time

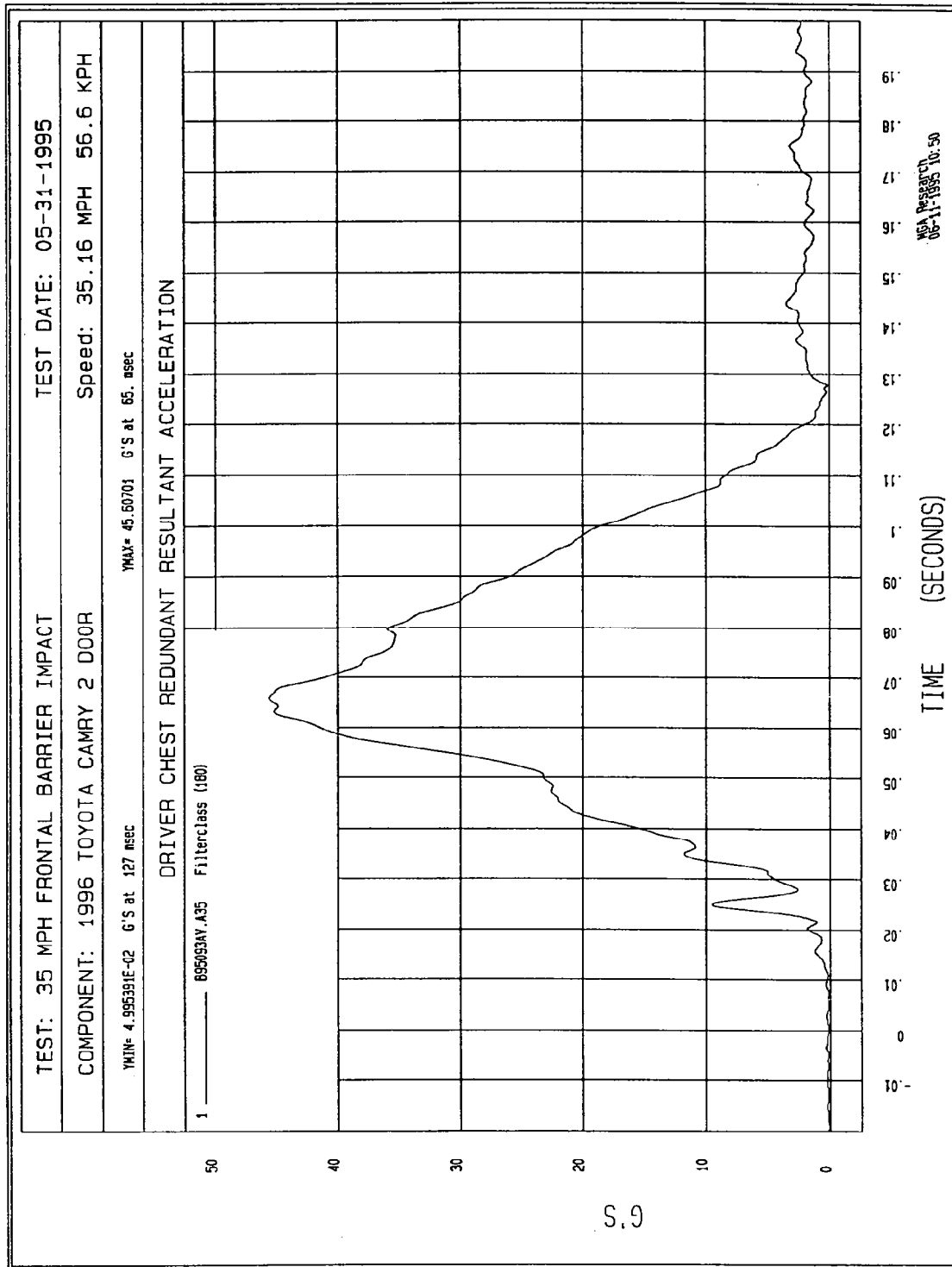


Figure B-56 - Driver Chest Redundant Resultant Accel. vs. Time

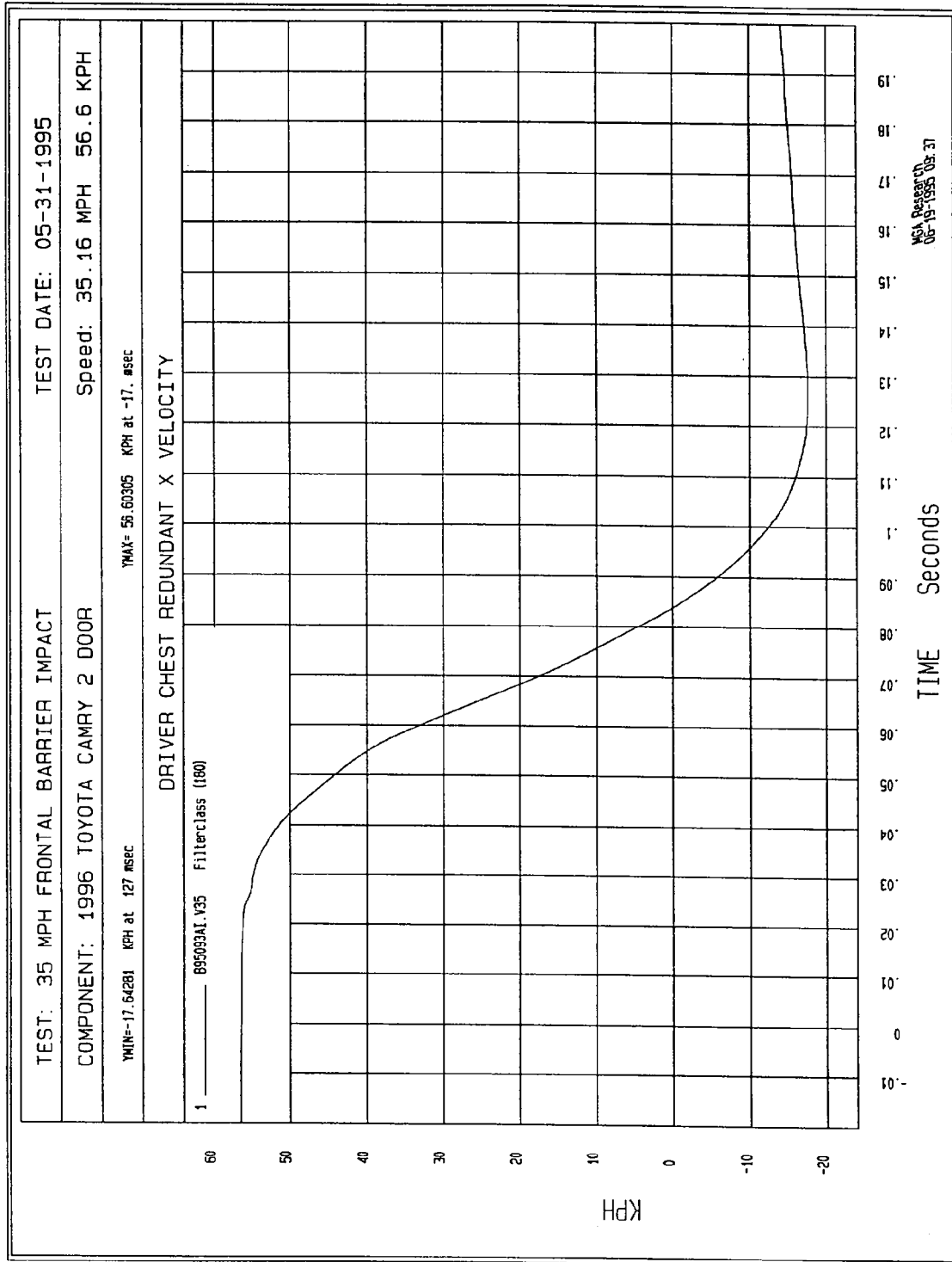


Figure B-57 - Driver Chest Redundant X Velocity vs. Time

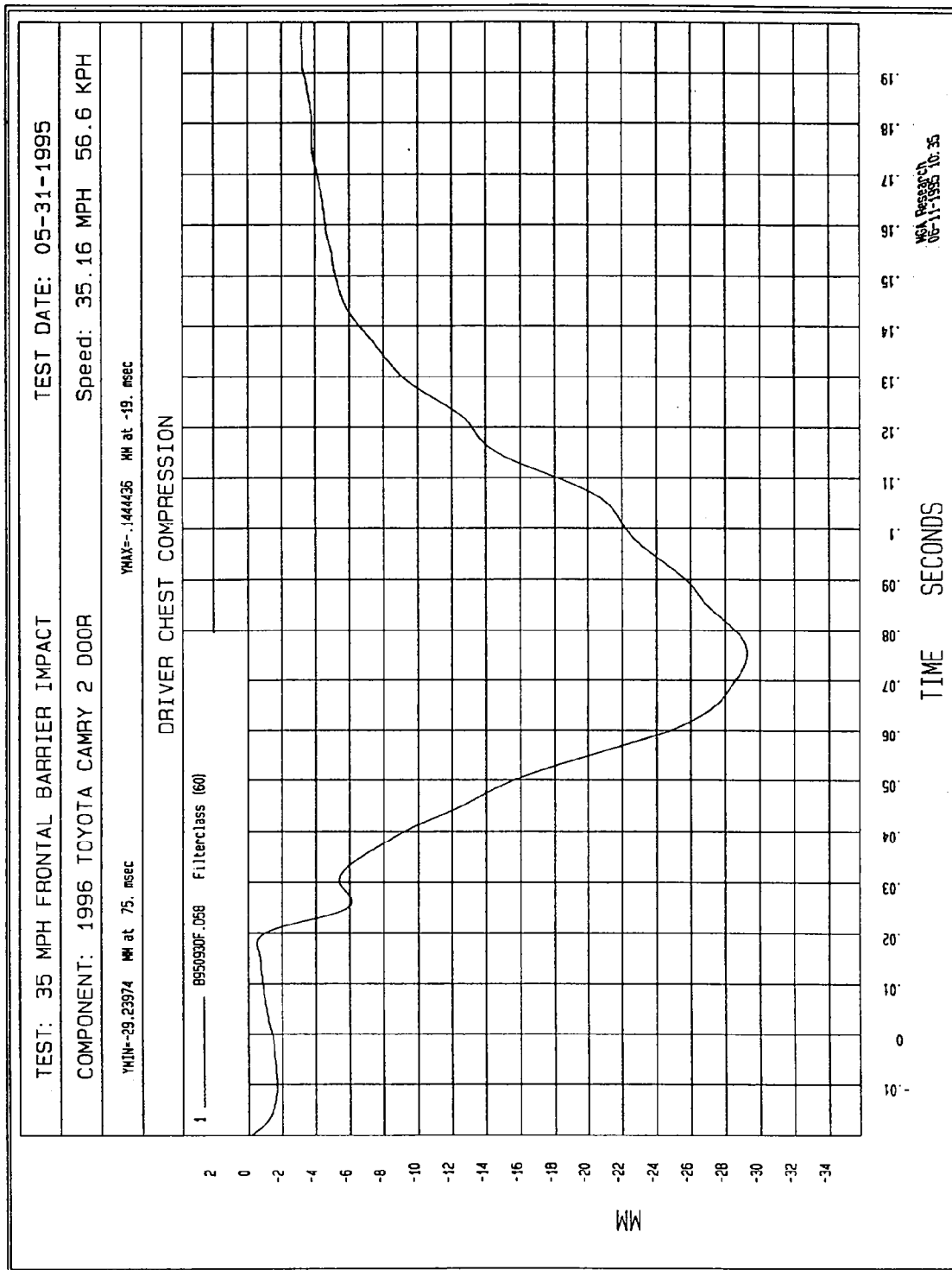


Figure B-58 • Driver Chest Compression vs. Time

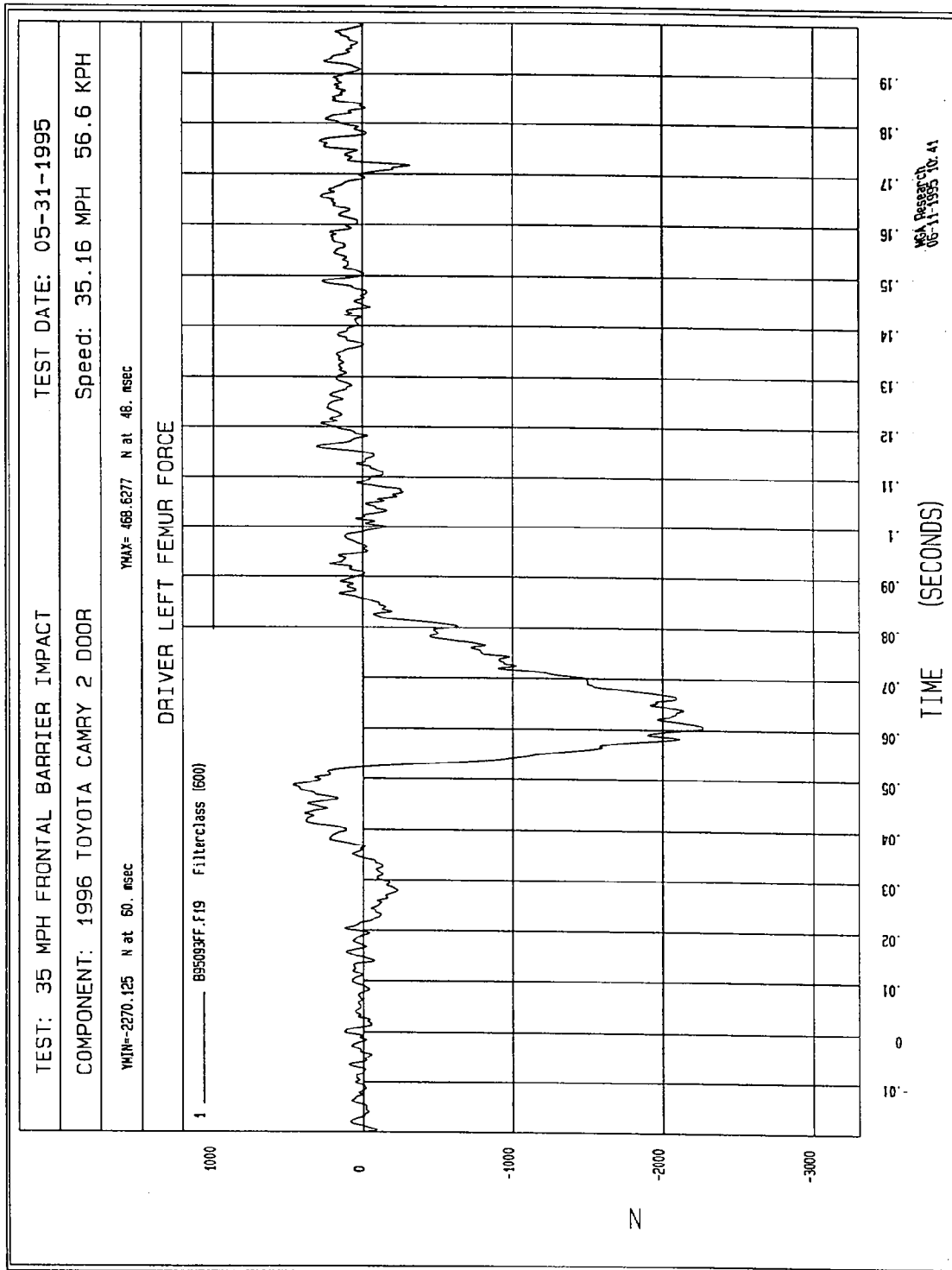


Figure B-59 - Driver Left Femur Force vs. Time

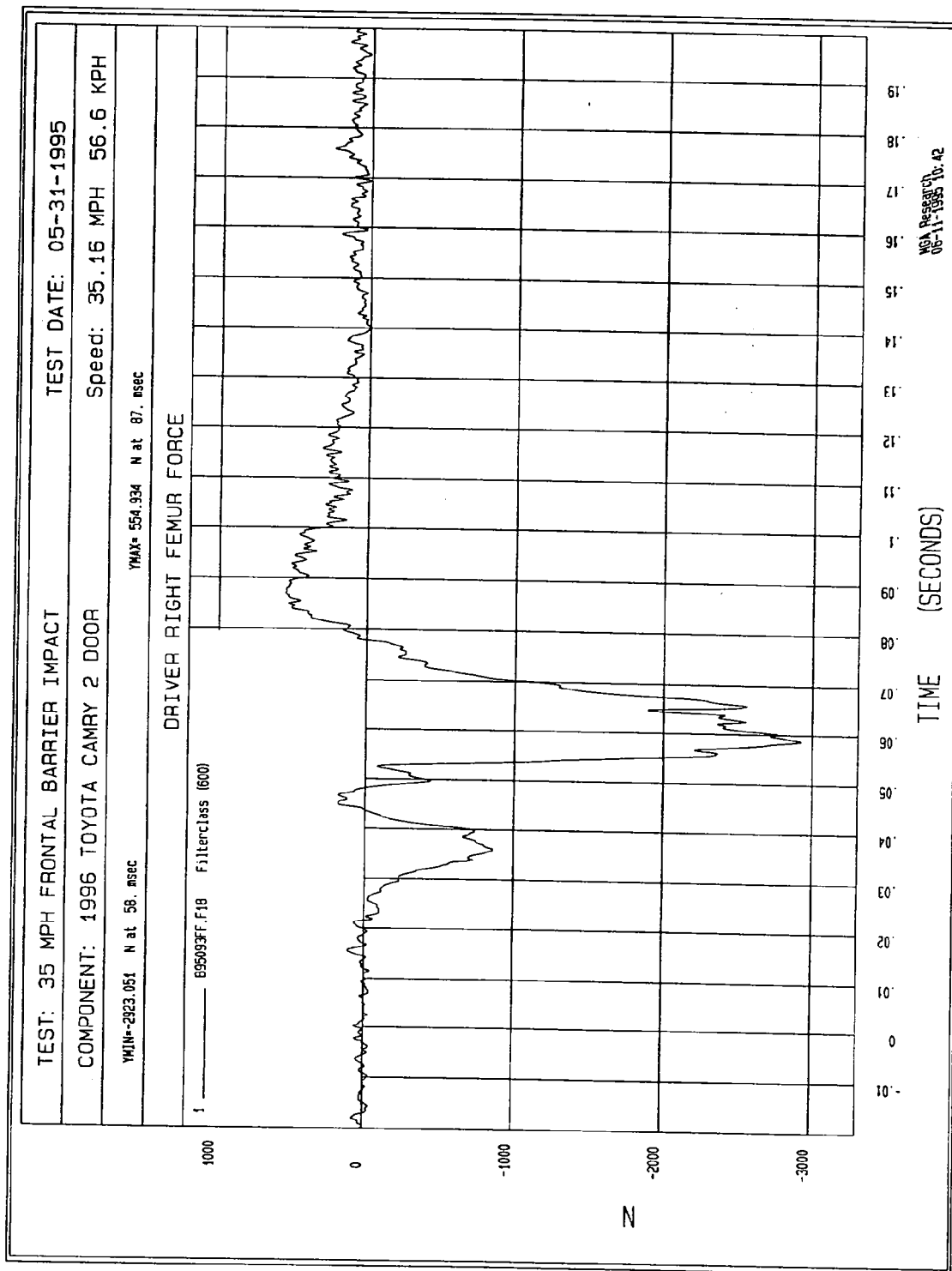


Figure B-60 - Driver Right Femur Force vs. Time

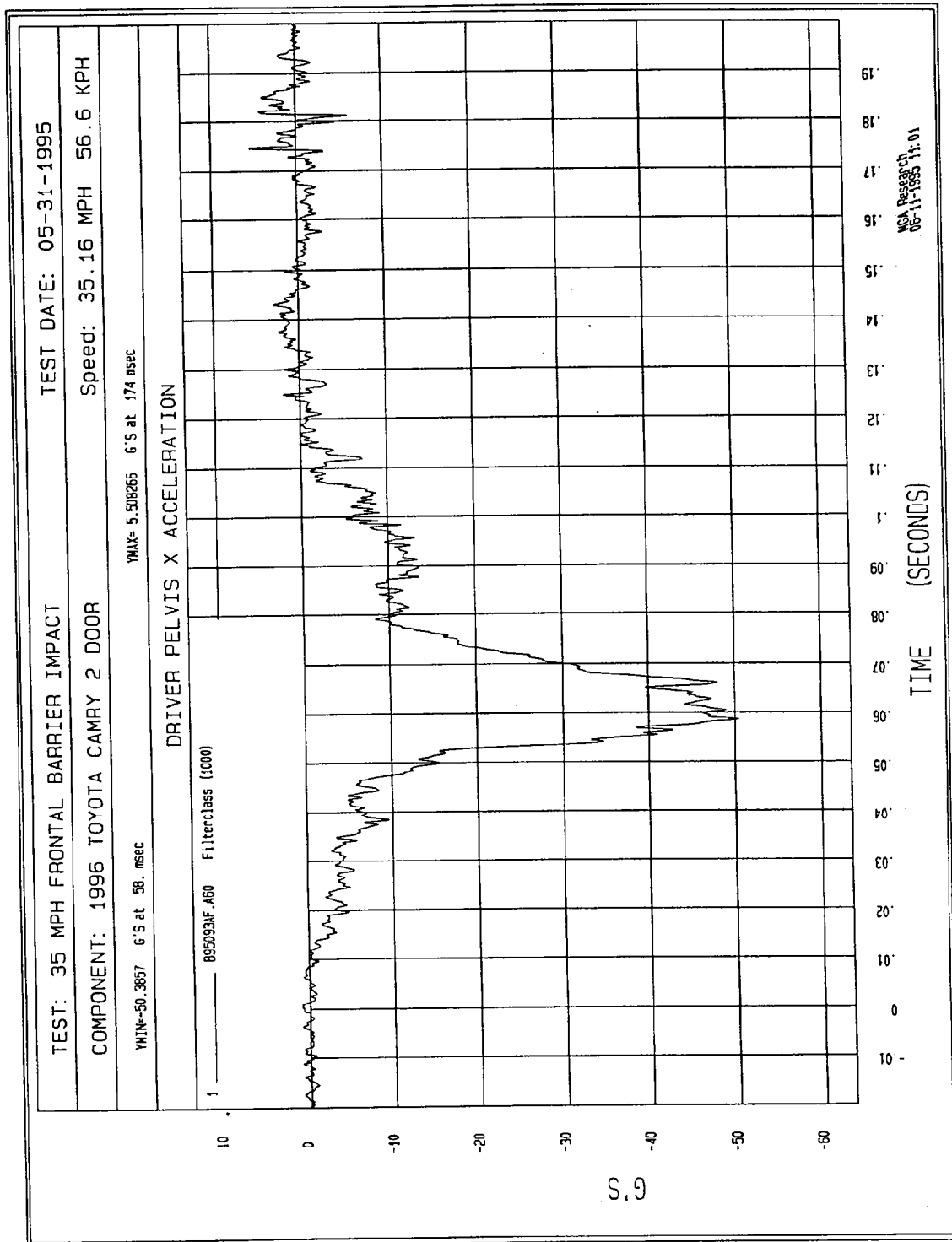


Figure B-61 - Driver Pelvis X Acceleration vs. Time

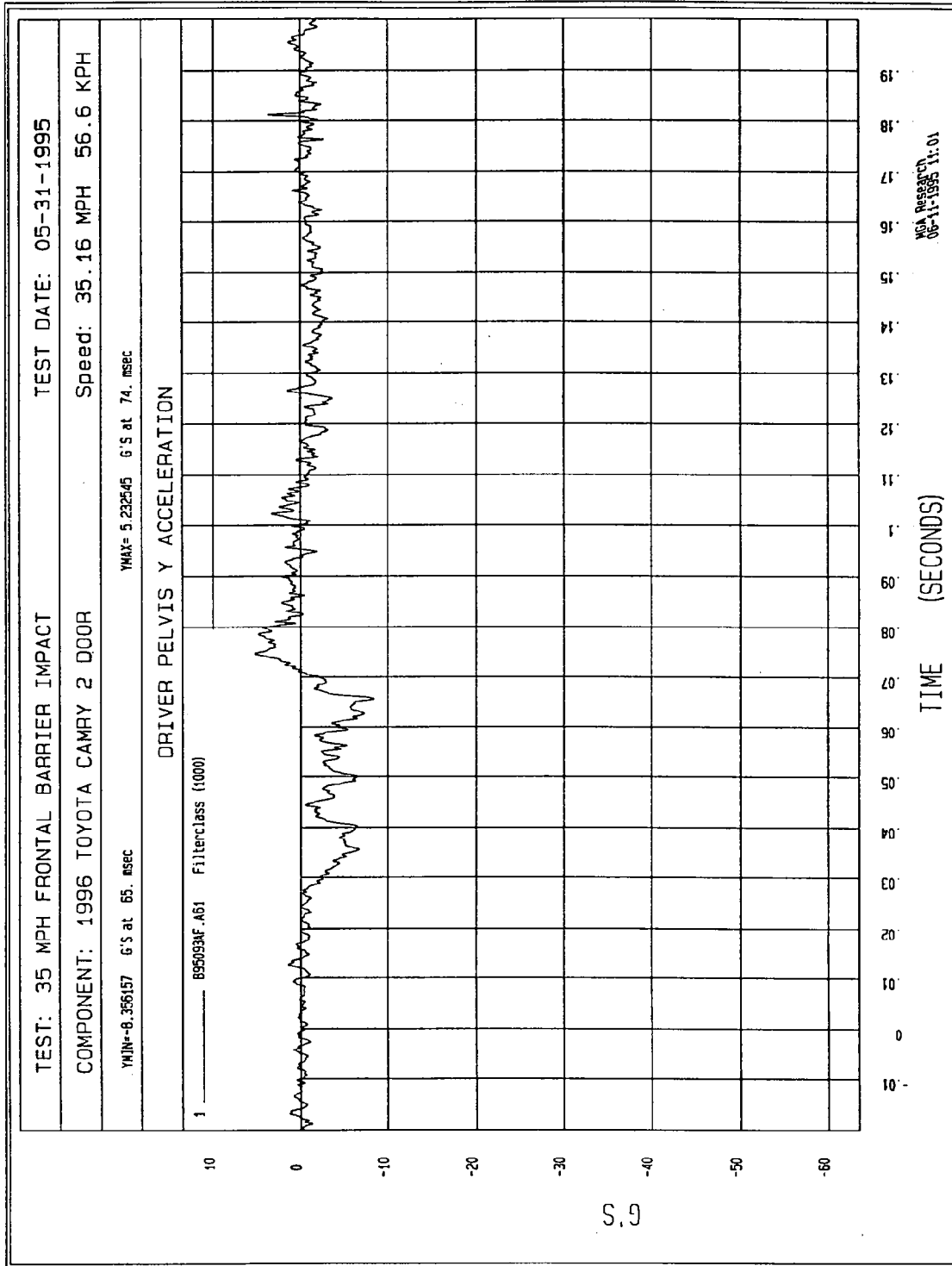


Figure B-62 - Driver Pelvis Y Acceleration vs. Time

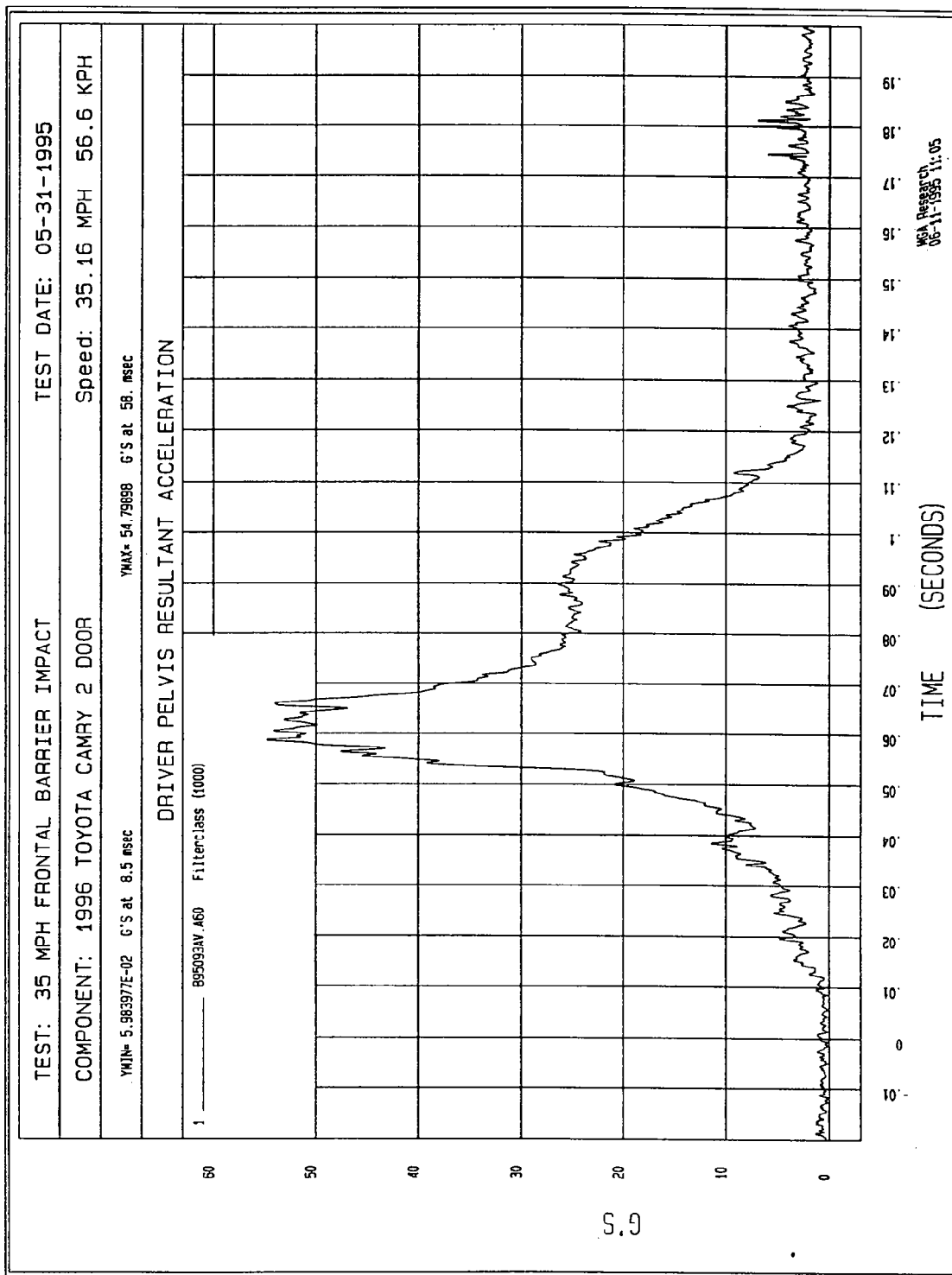


Figure B-64 - Driver Pelvis Resultant Acceleration vs. Time

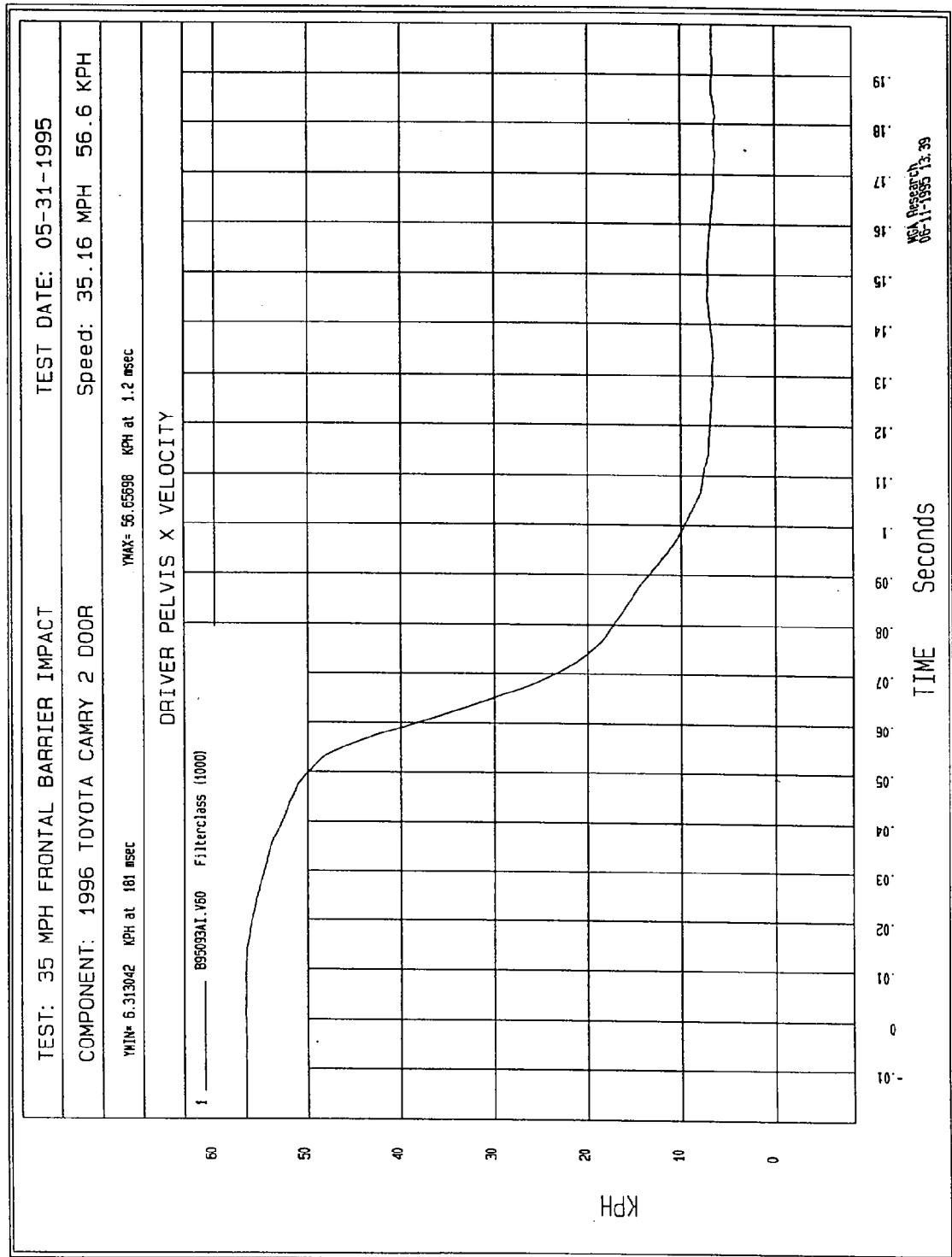


Figure B-65 - Driver Pelvis X Velocity vs. Time

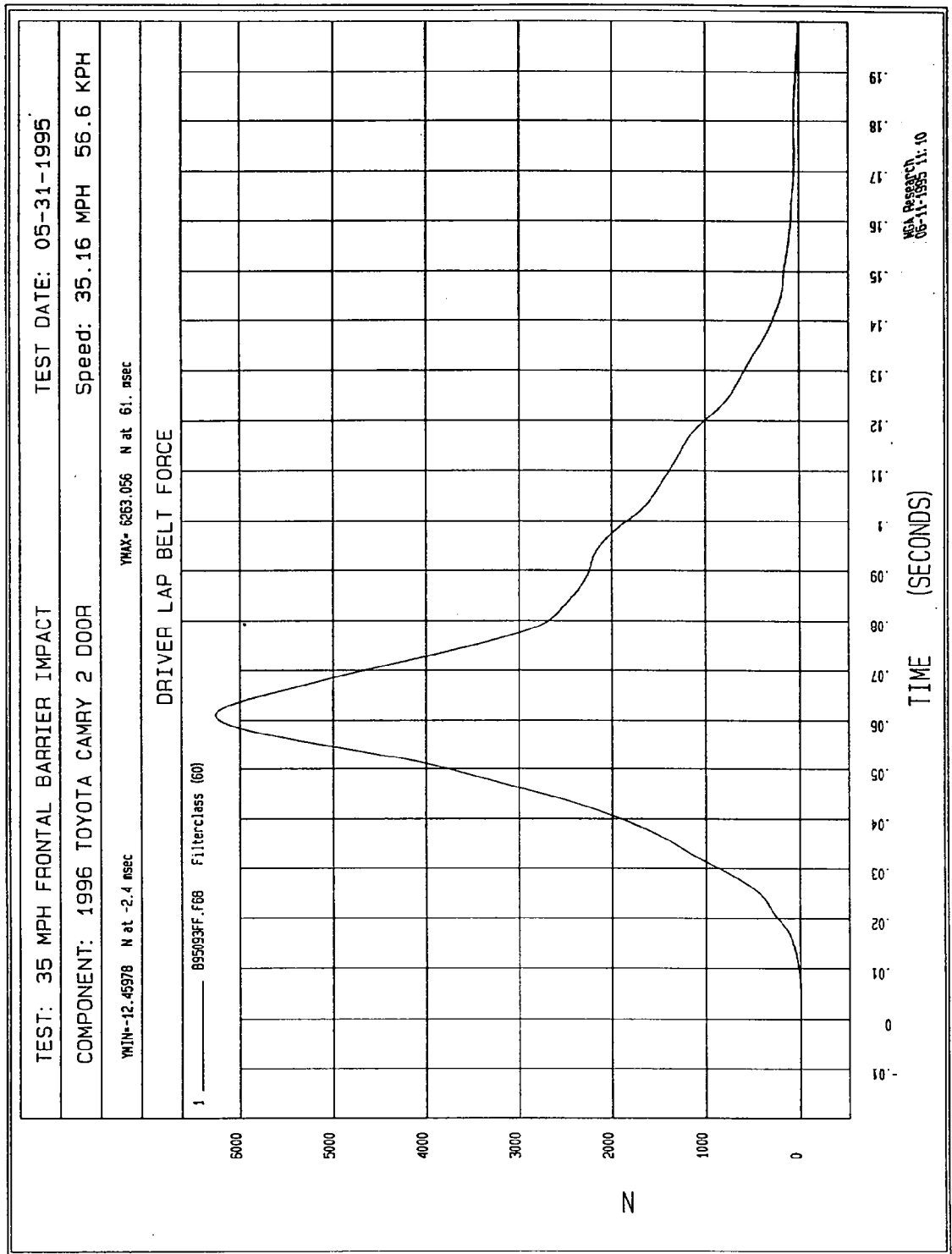


Figure B-66 - Driver Lap Belt Force vs. Time

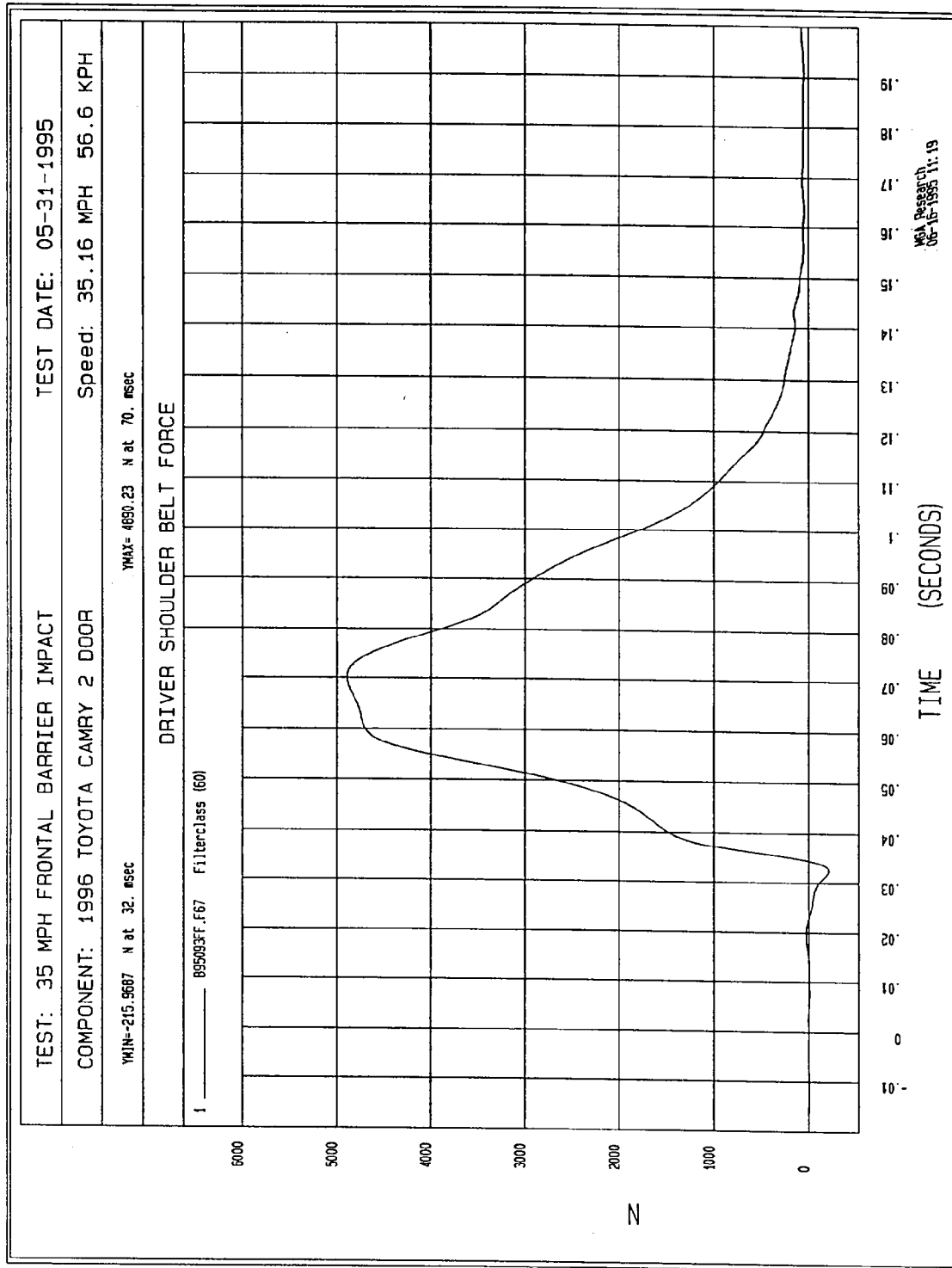


Figure B-67 - Driver Shoulder Belt Force vs. Time

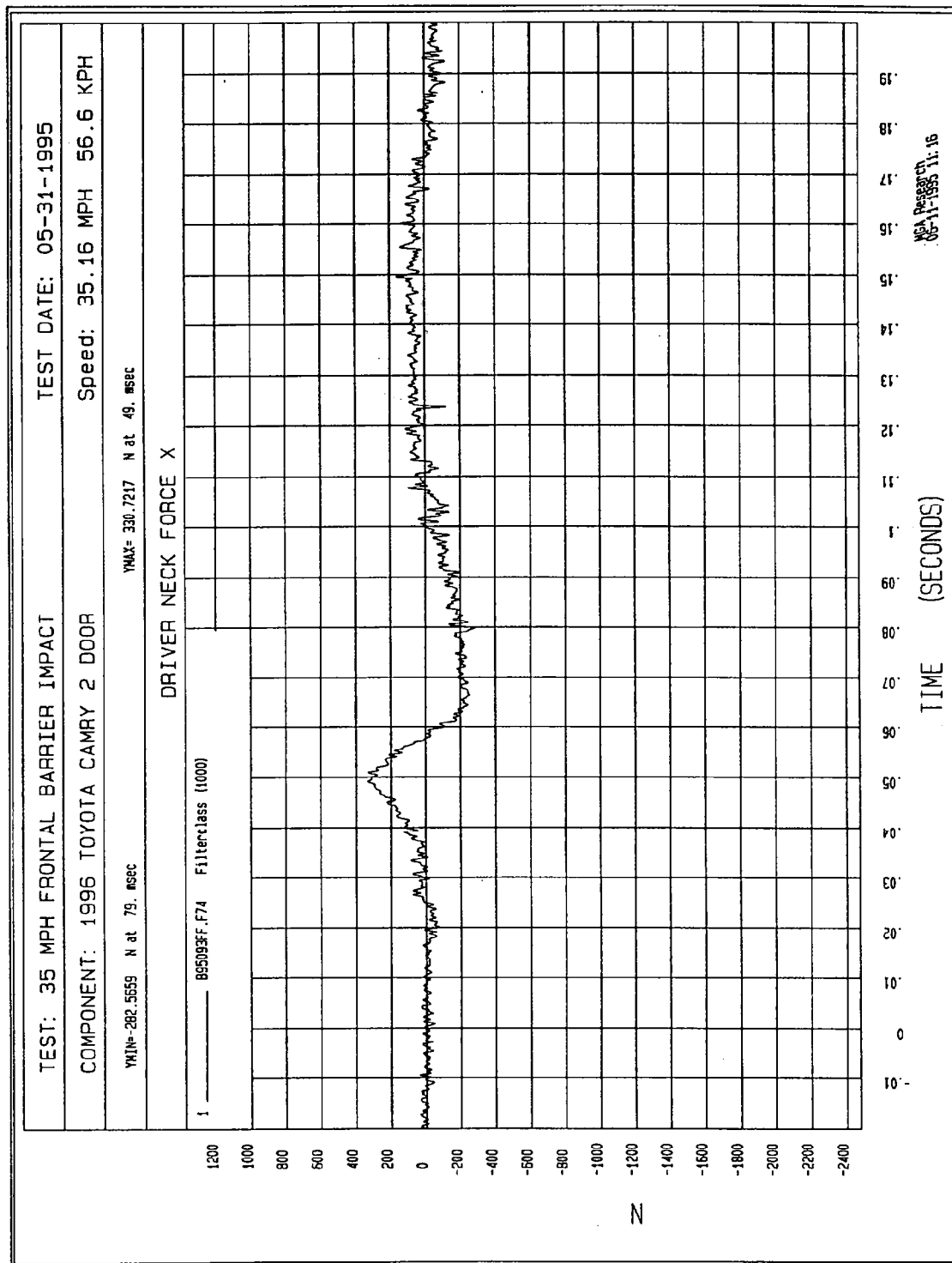


Figure B-68 - Driver Neck Force X vs. Time

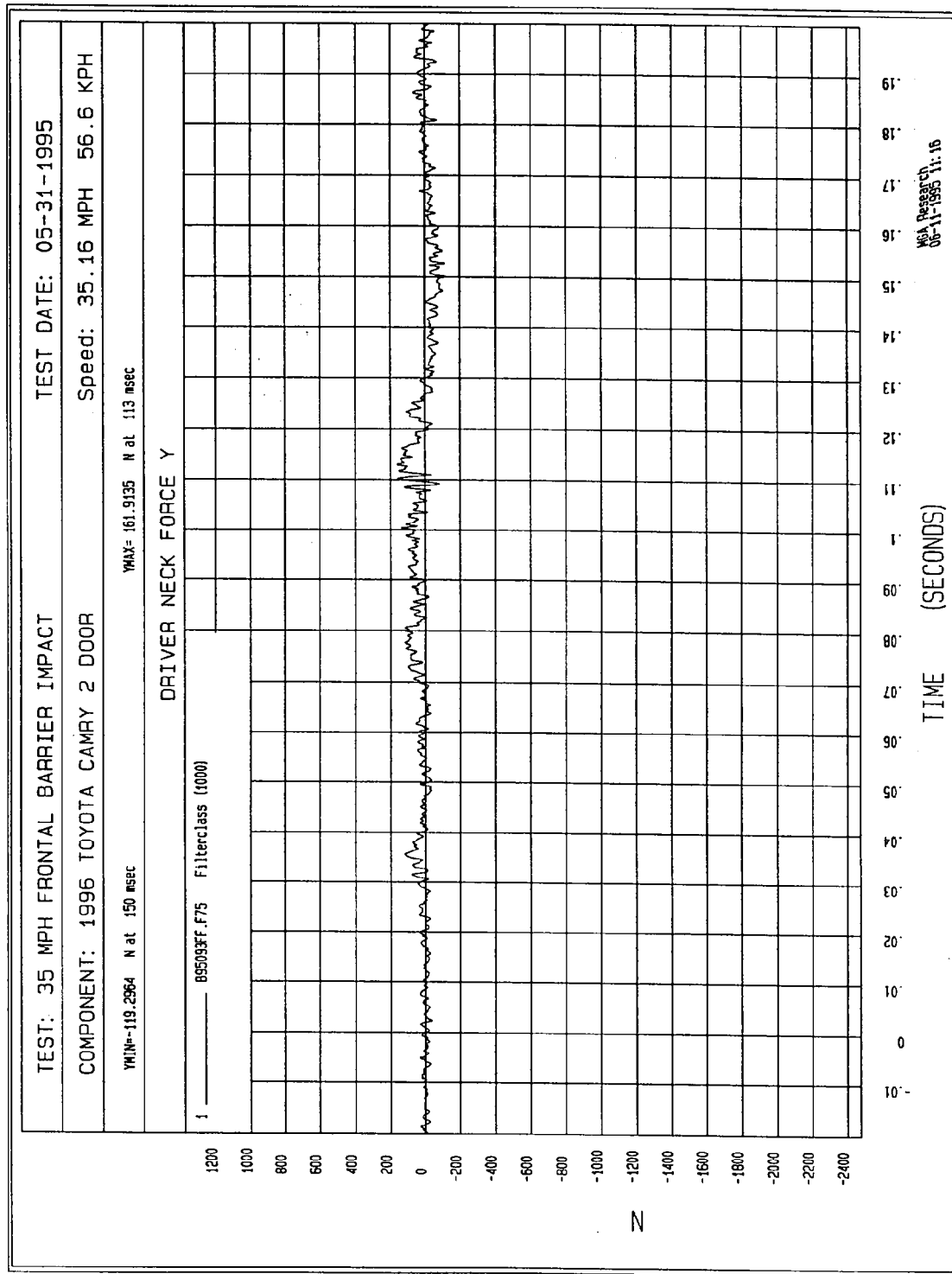


Figure B-69 - Driver Neck Force Y vs. Time

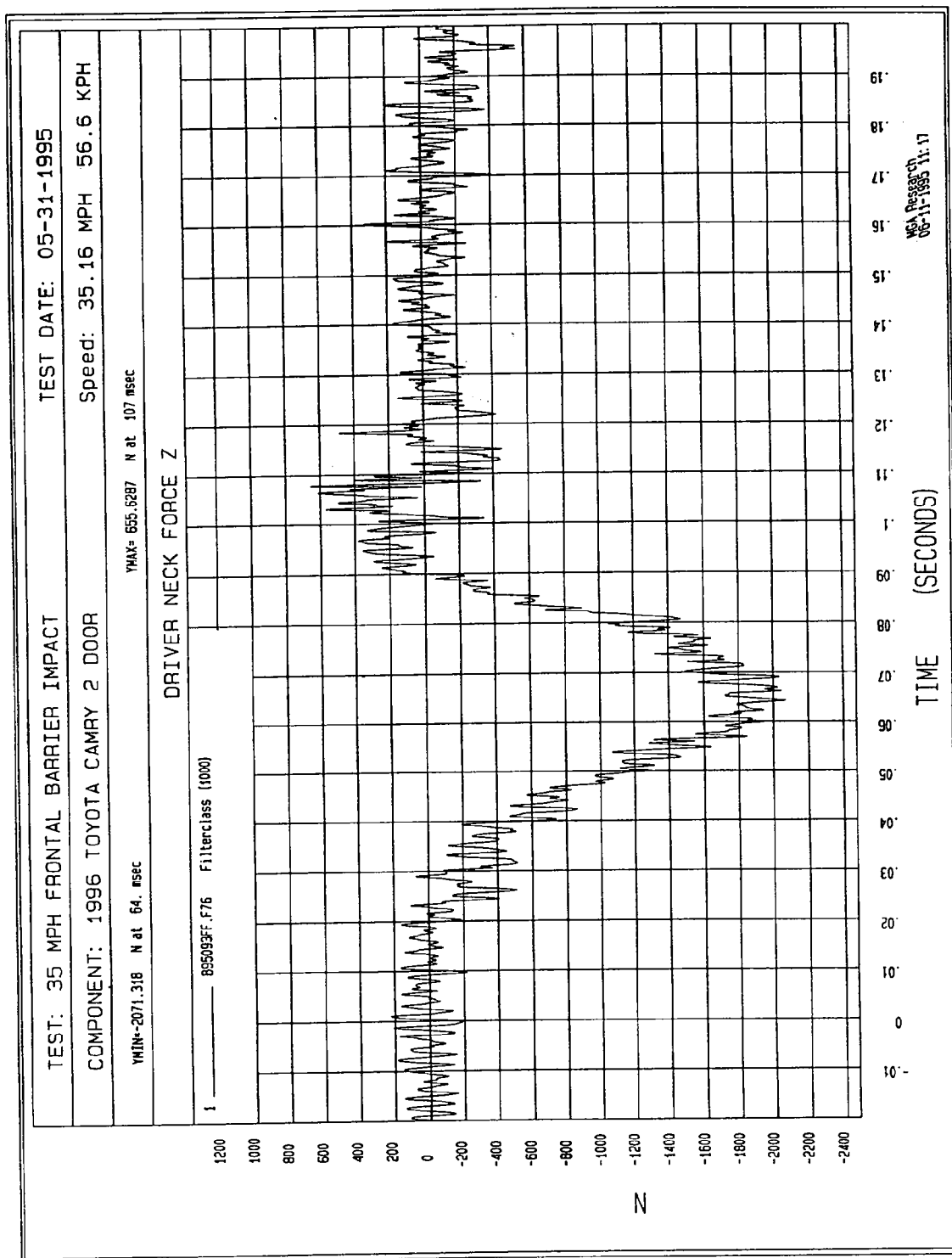


Figure B-70 - Driver Neck Force Z vs. Time

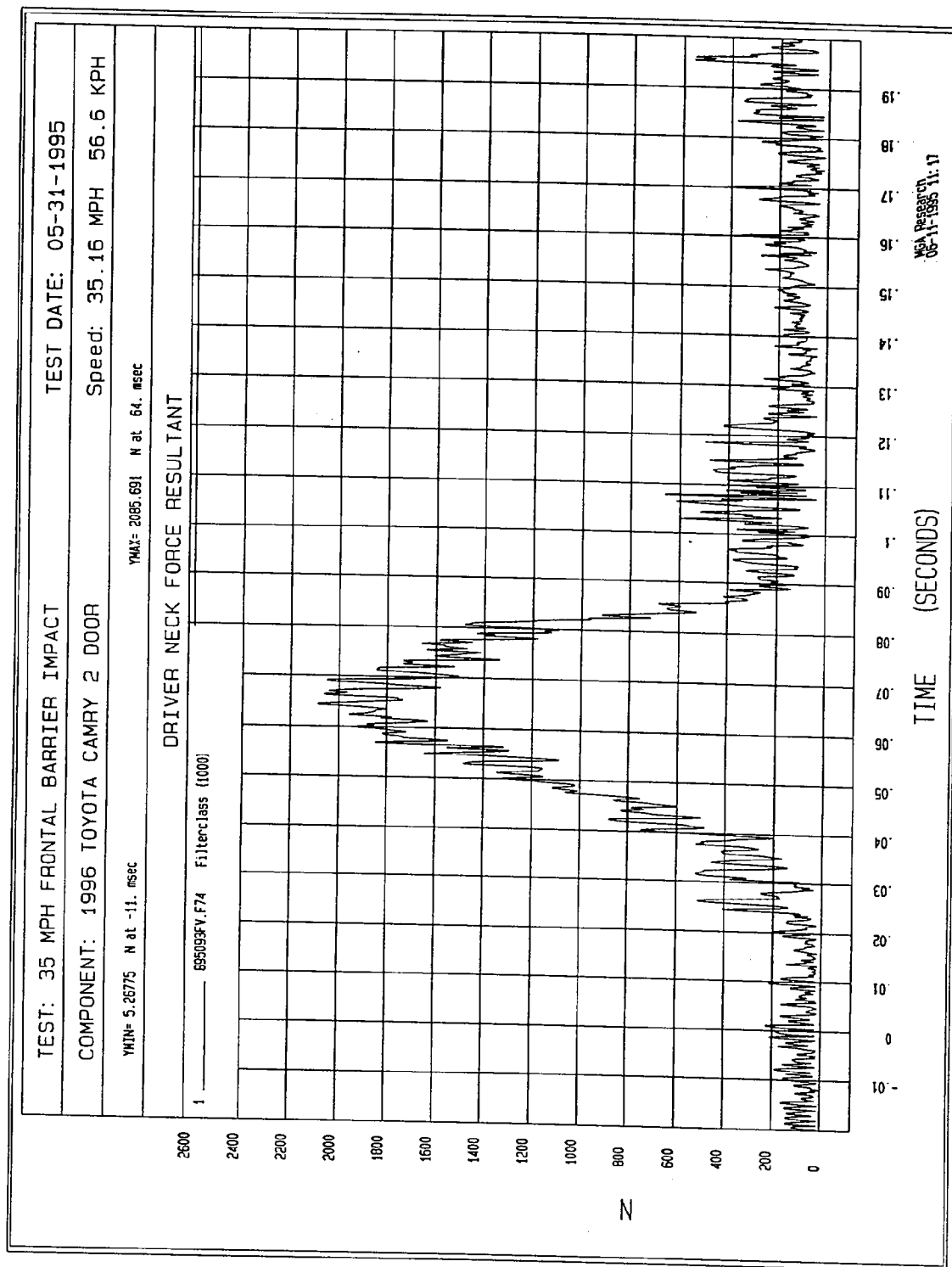


Figure B-71 - Driver Neck Force Resultant vs. Time

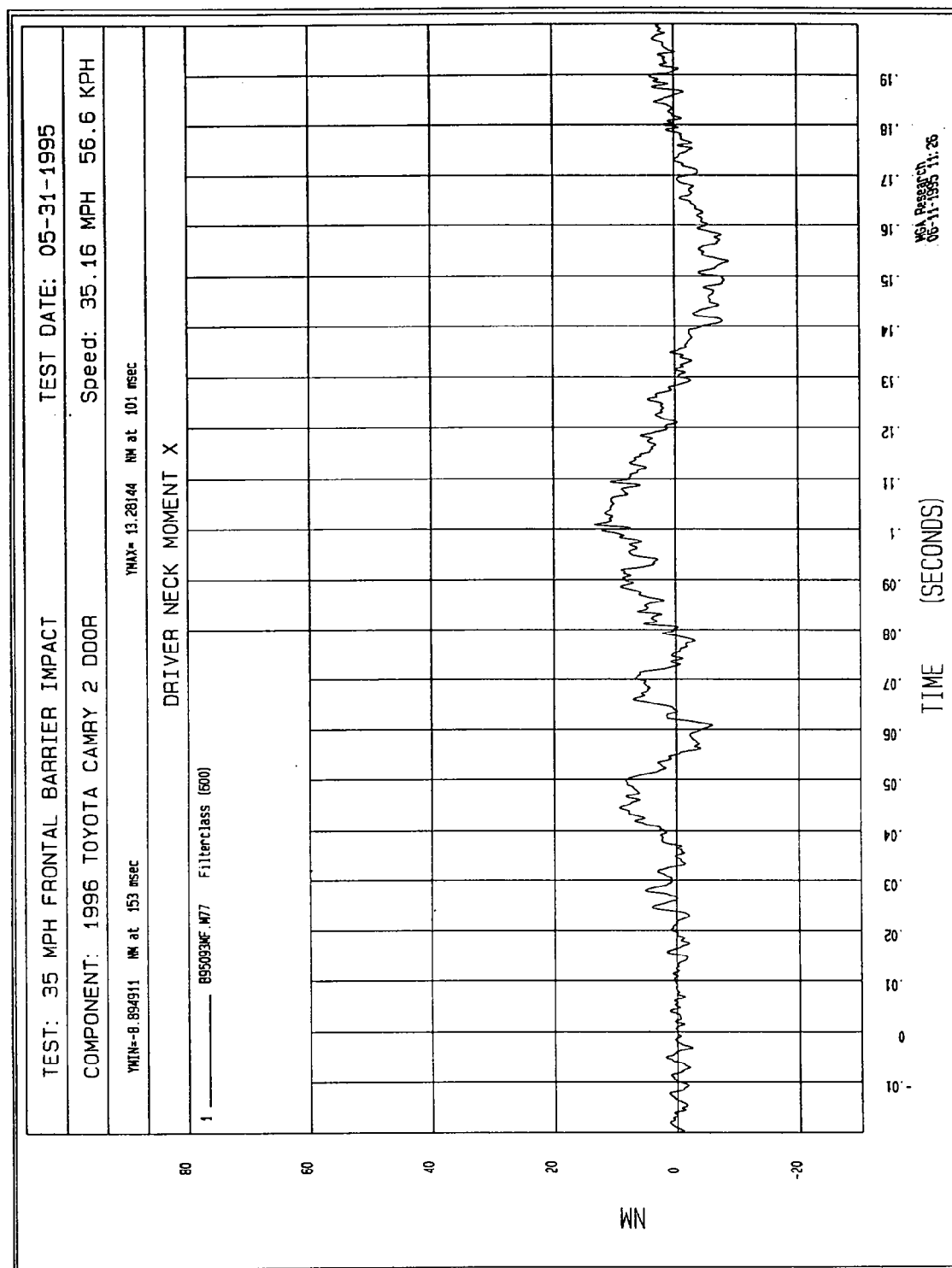


Figure B-72 - Driver Neck Moment X vs. Time

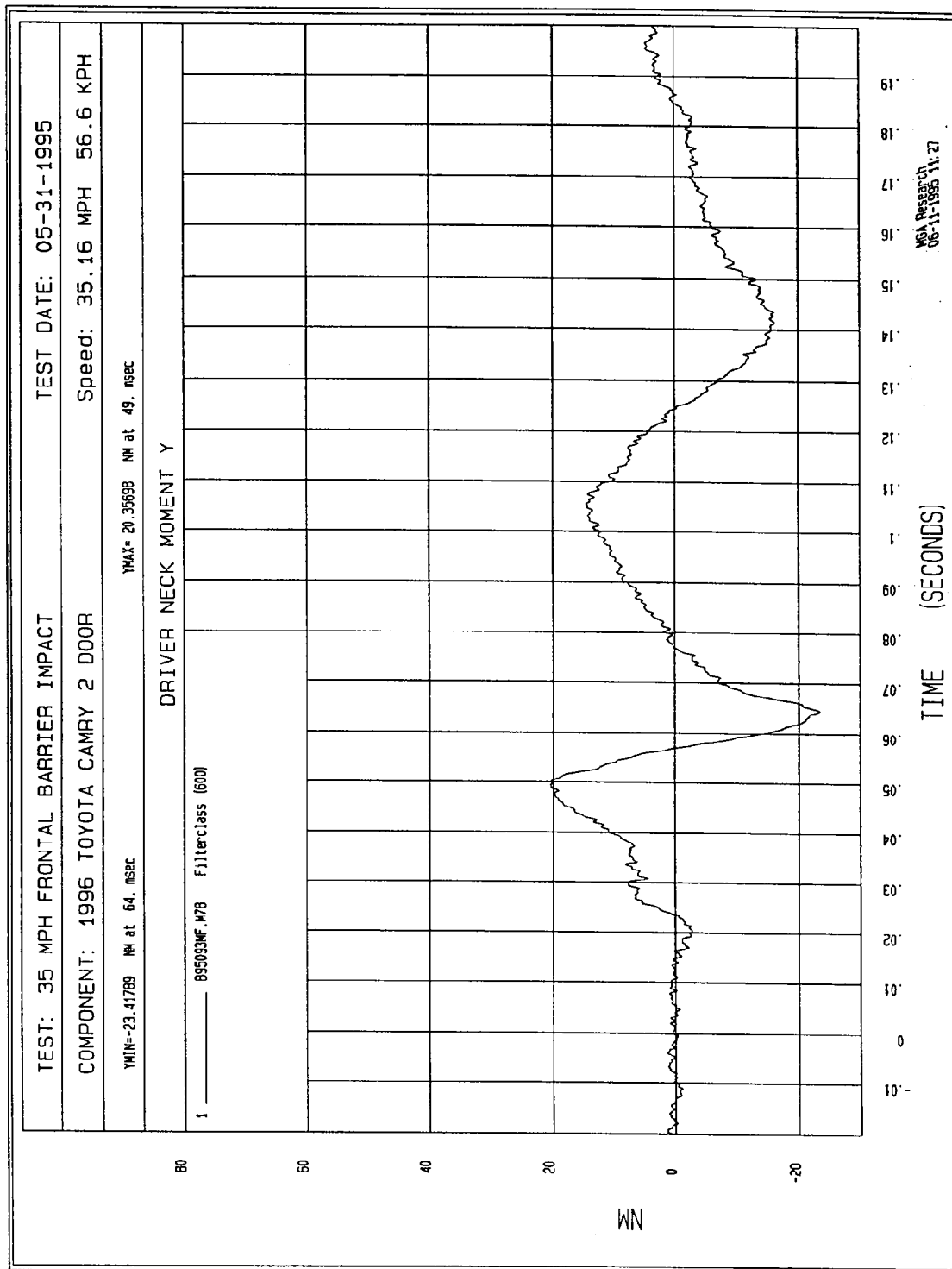


Figure B-73 - Driver Neck Moment Y vs. Time

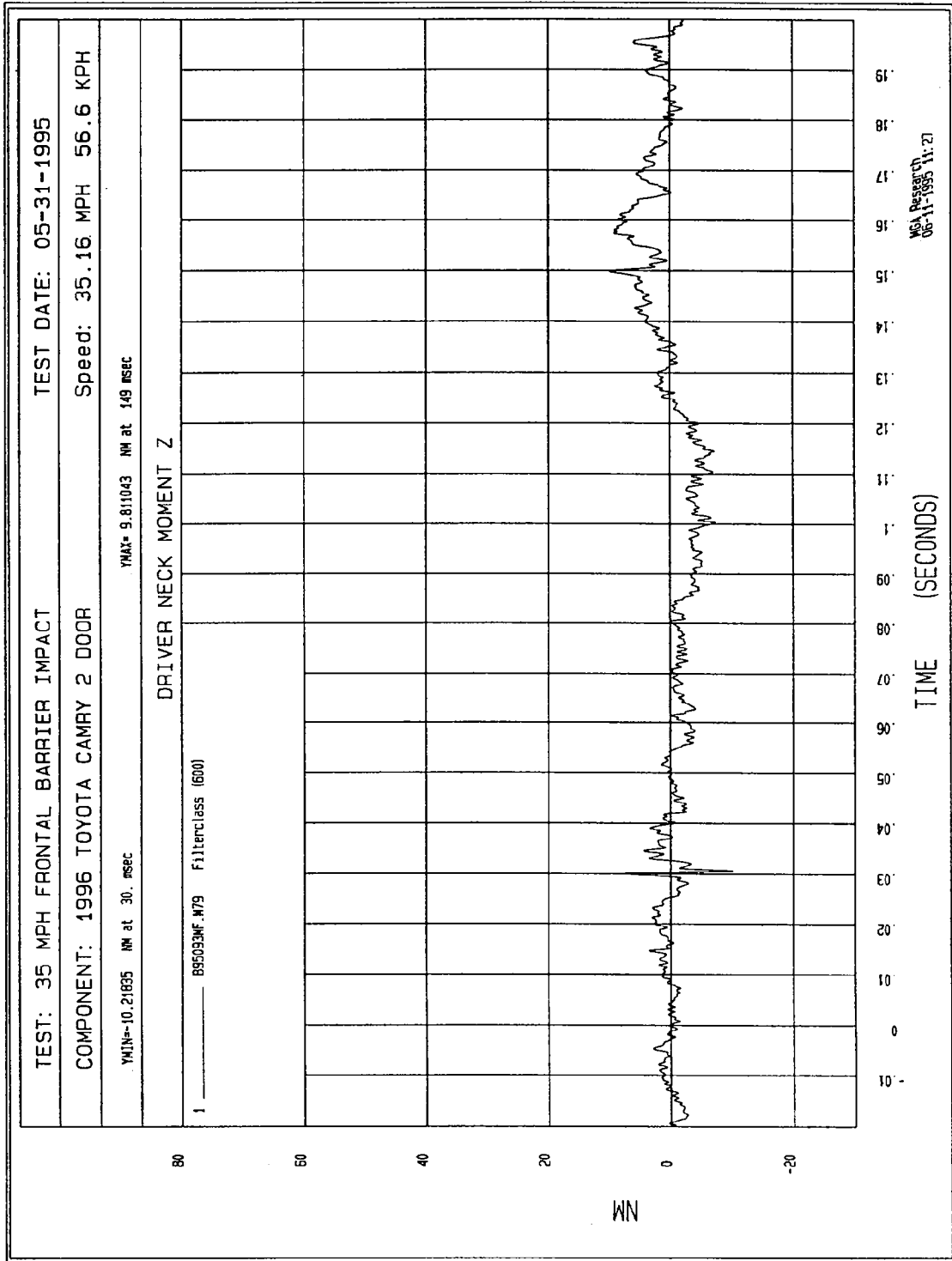


Figure B-74 - Driver Neck Moment Z vs. Time

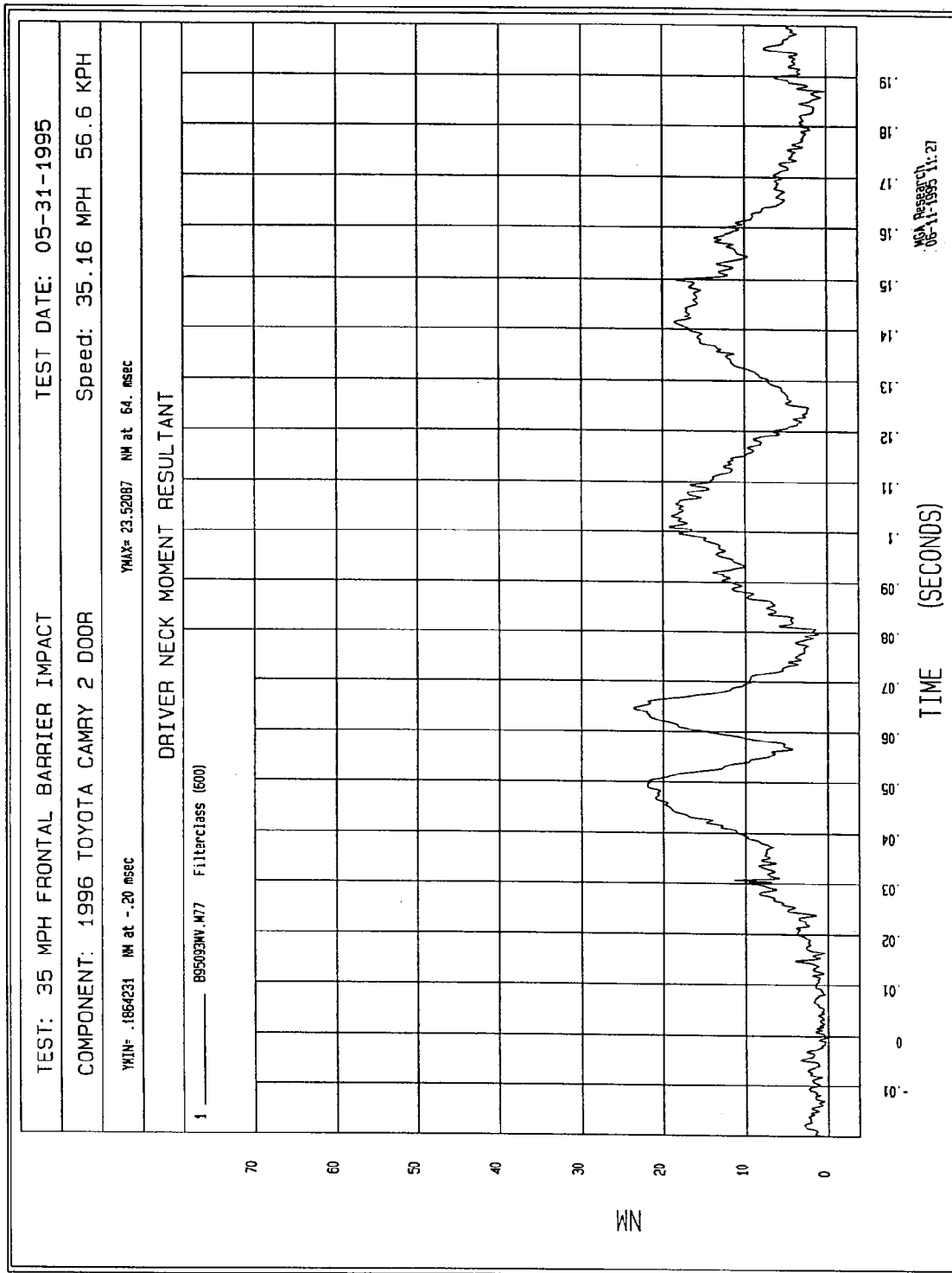


Figure B-75 - Driver Neck Moment Resultant vs. Time

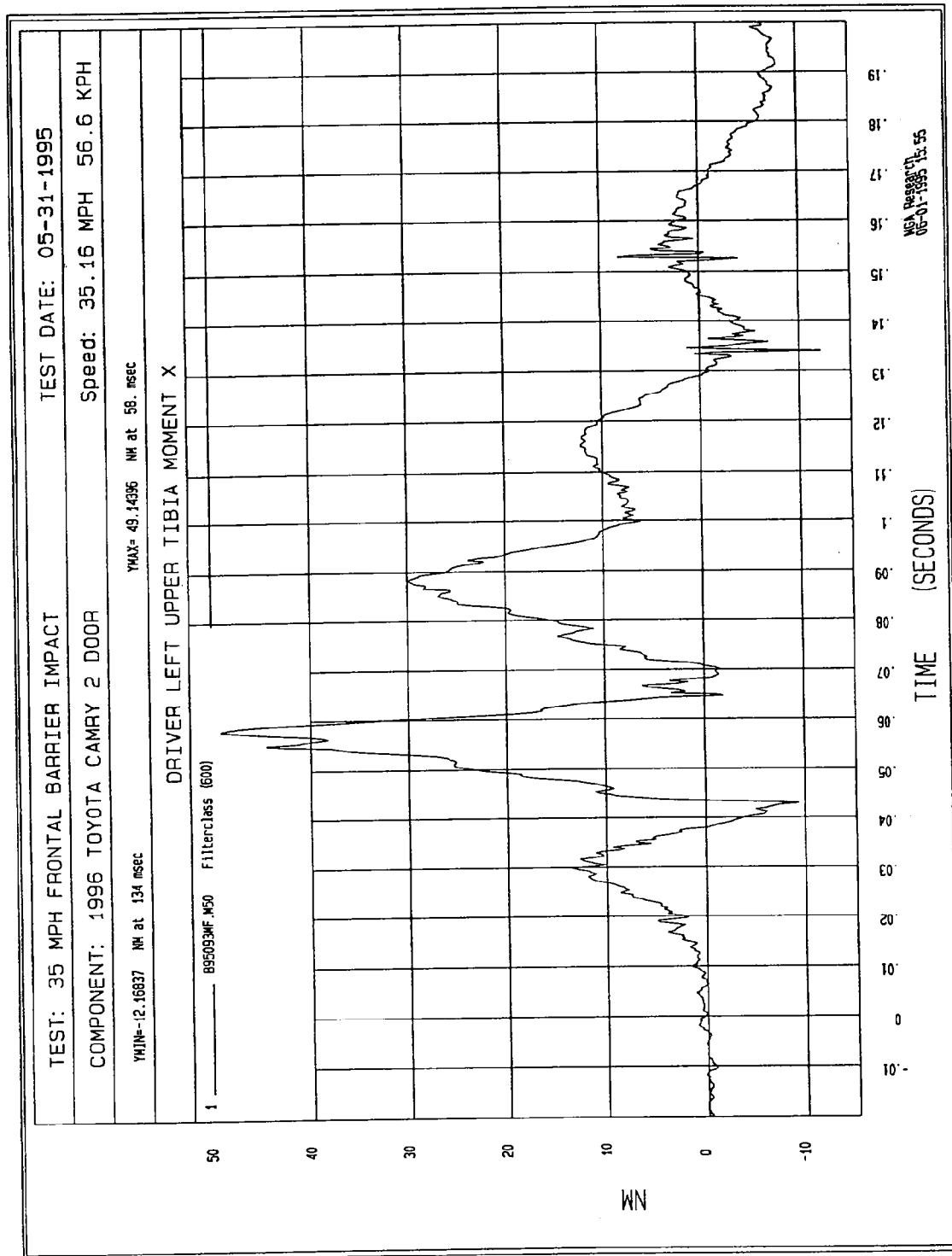


Figure B-76 - Driver Left Upper Tibia Moment X vs. Time

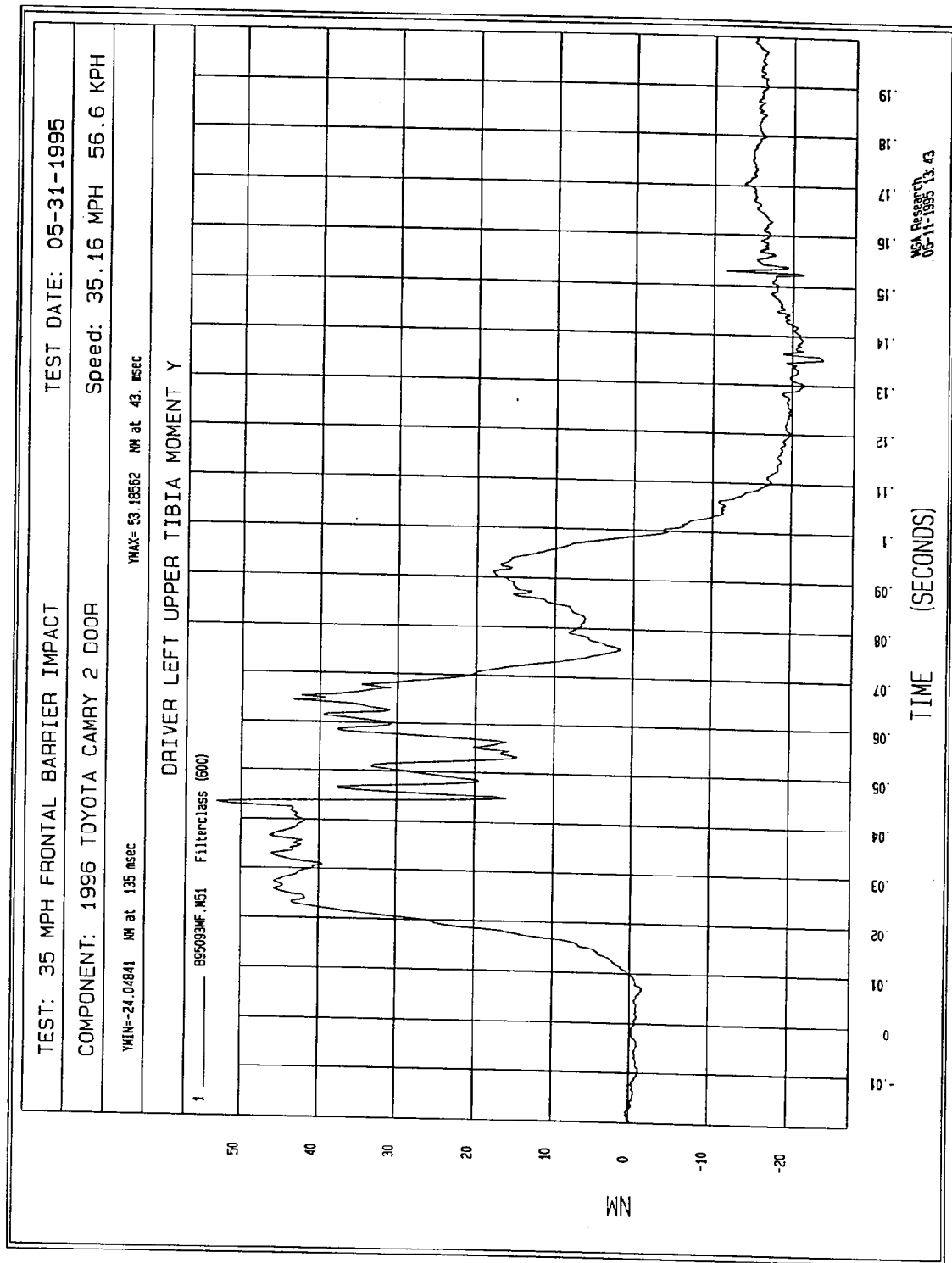


Figure B-77 - Driver Left Upper Tibia Moment Y vs. Time

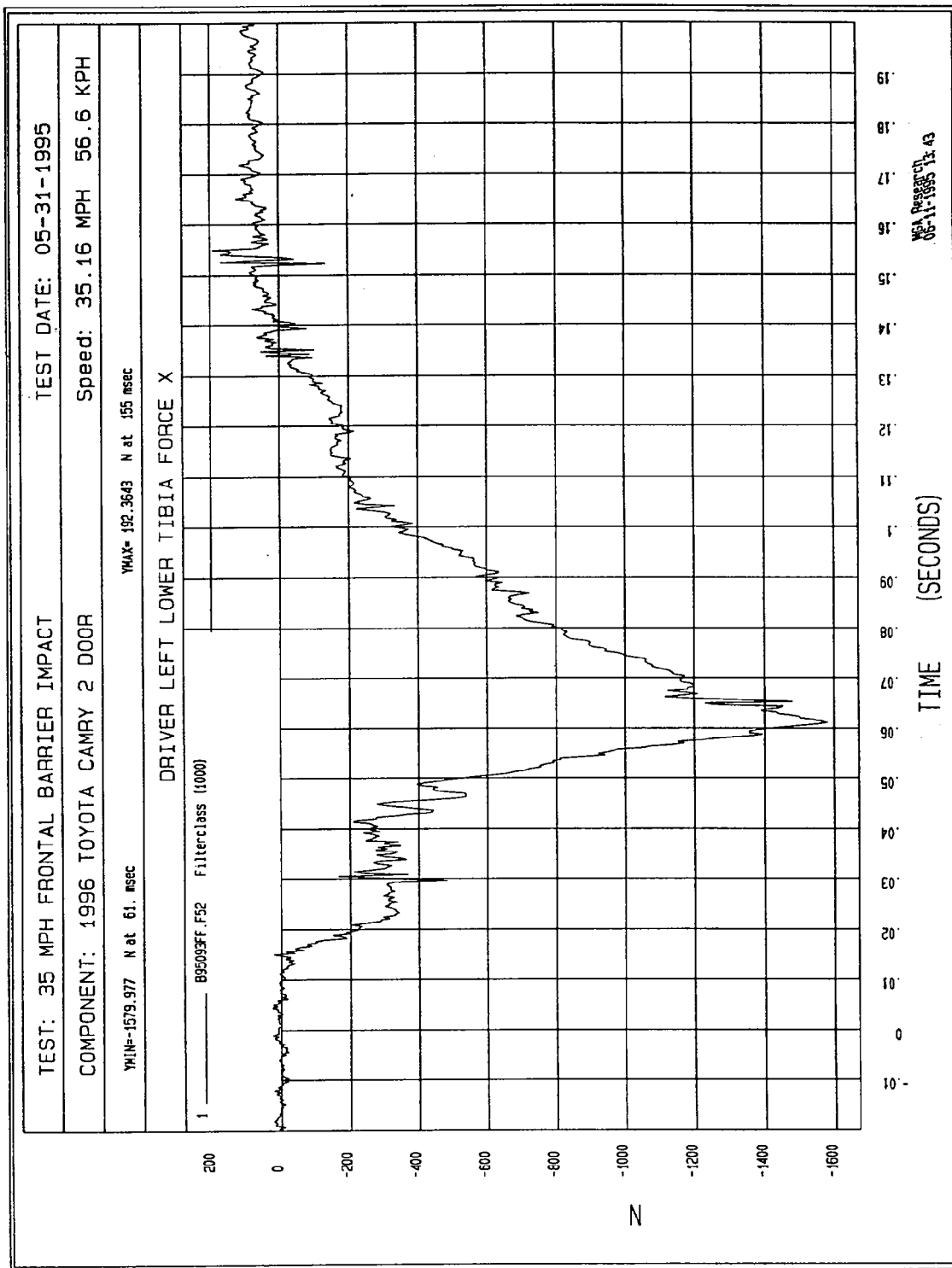


Figure B-78 - Driver Left Lower Tibia Force X vs. Time

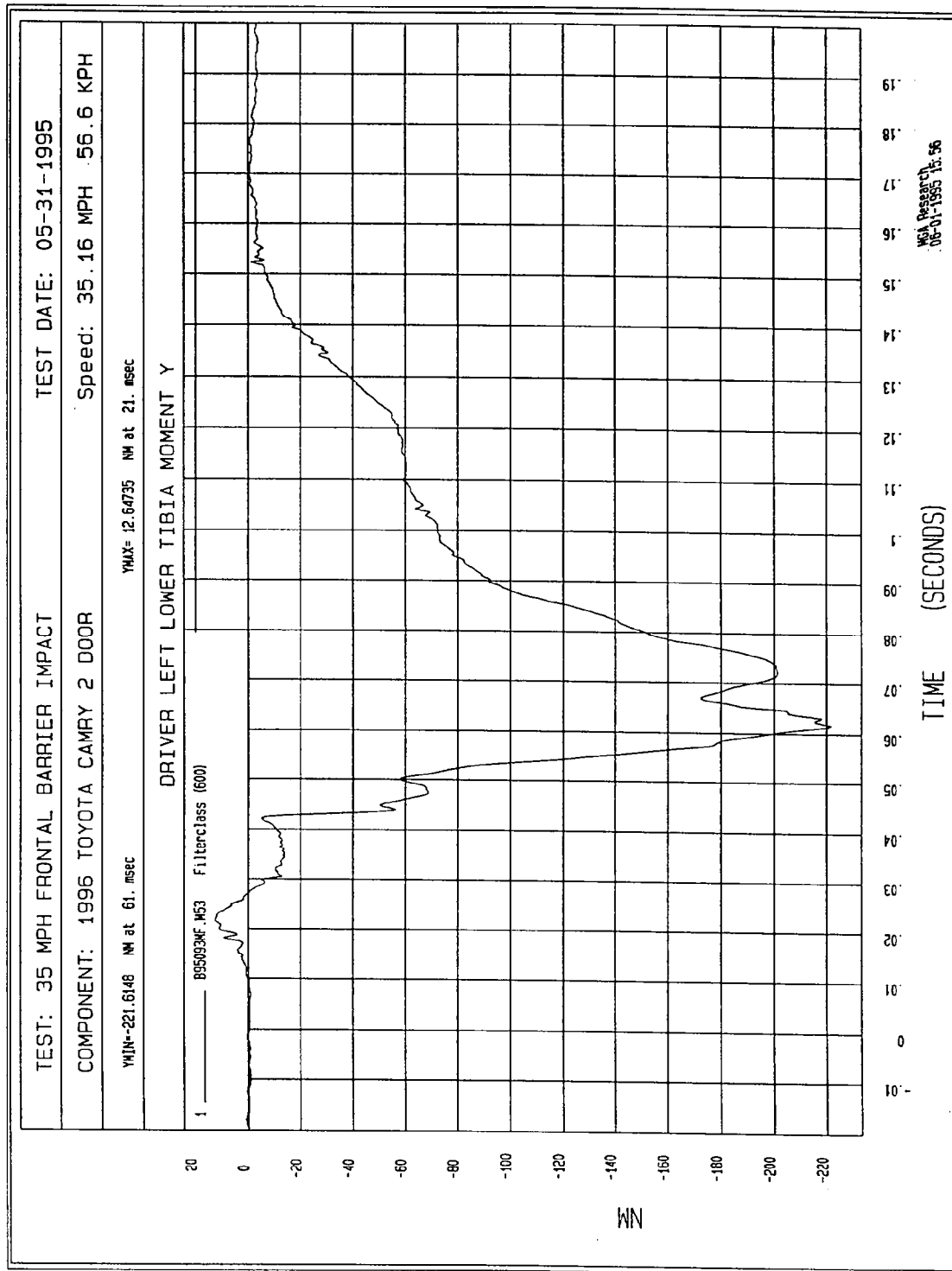


Figure B-79 - Driver Left Lower Tibia Moment Y vs. Time

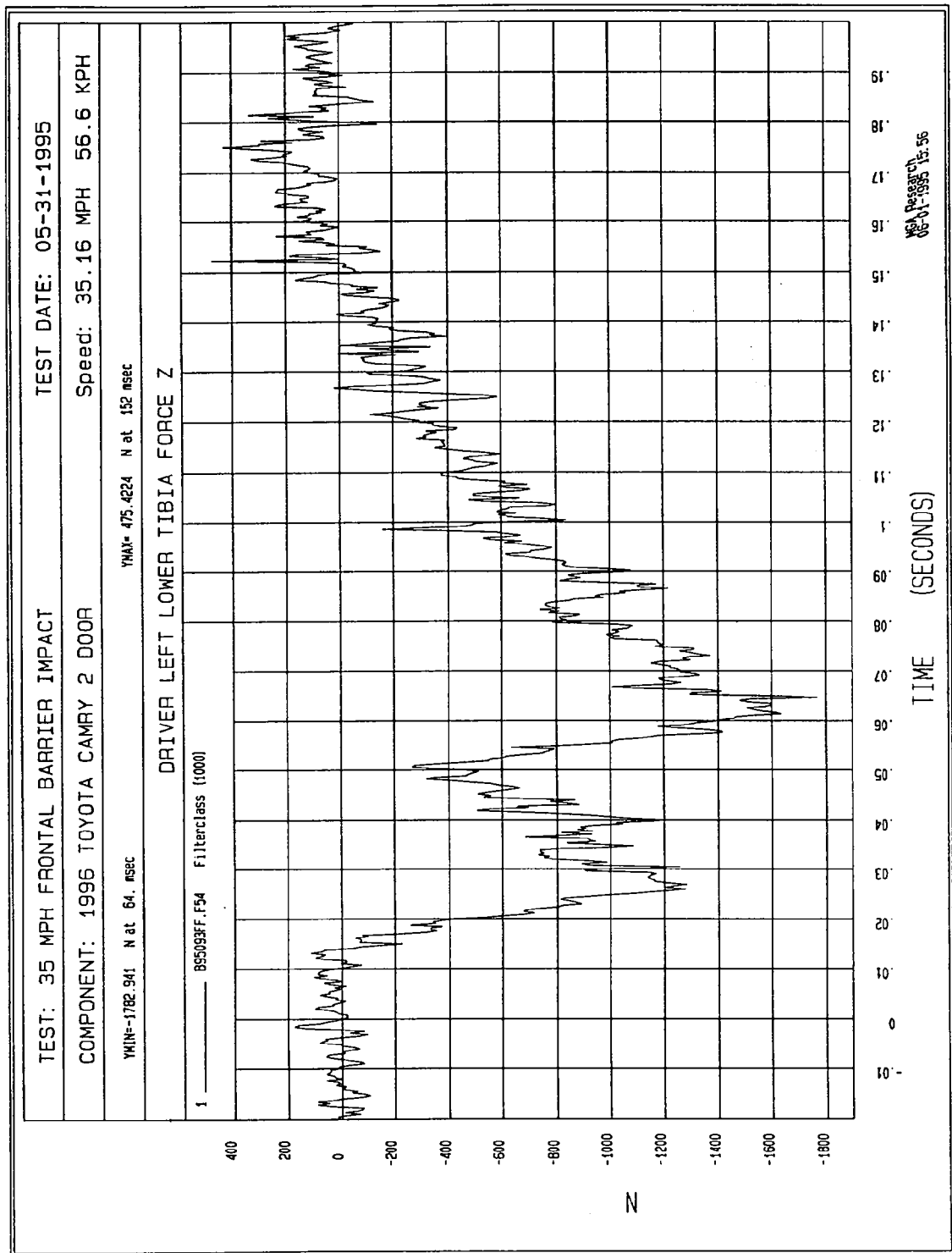


Figure B-80 - Driver Left Lower Tibia Force Z vs. Time

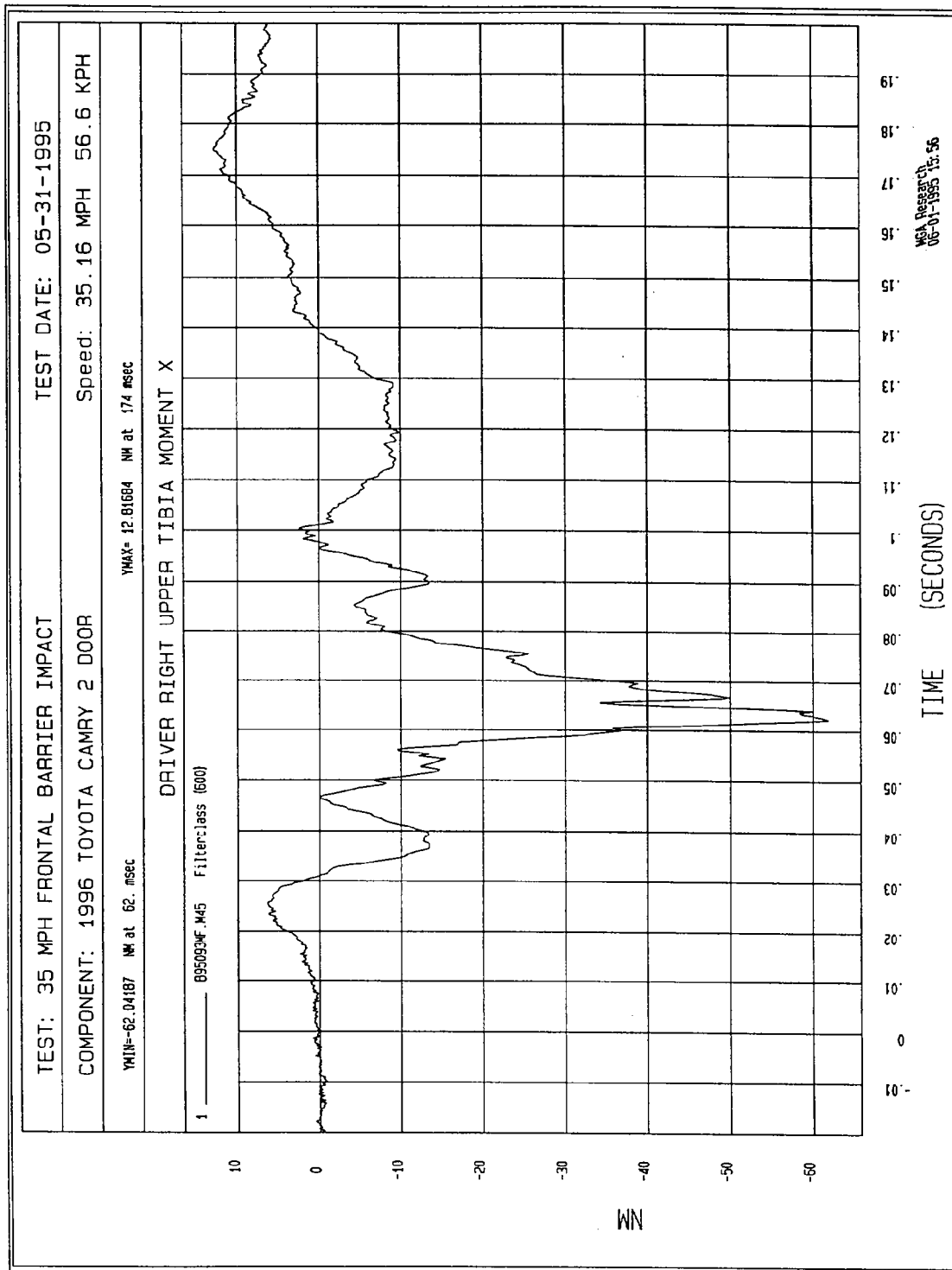


Figure B-81 - Driver Right Upper Tibia Moment X vs. Time

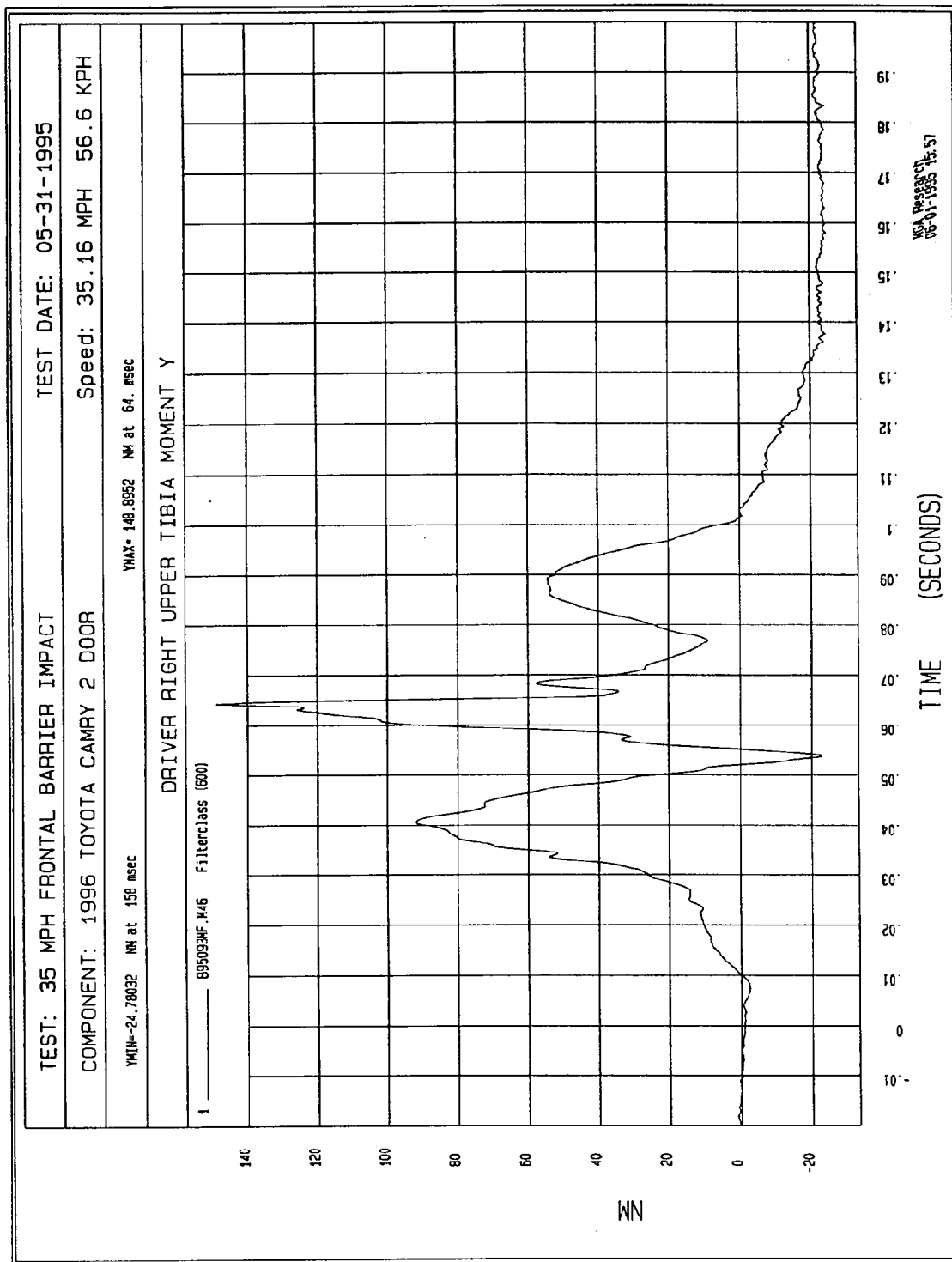


Figure B-82 - Driver Right Upper Tibia Moment Y vs. Time

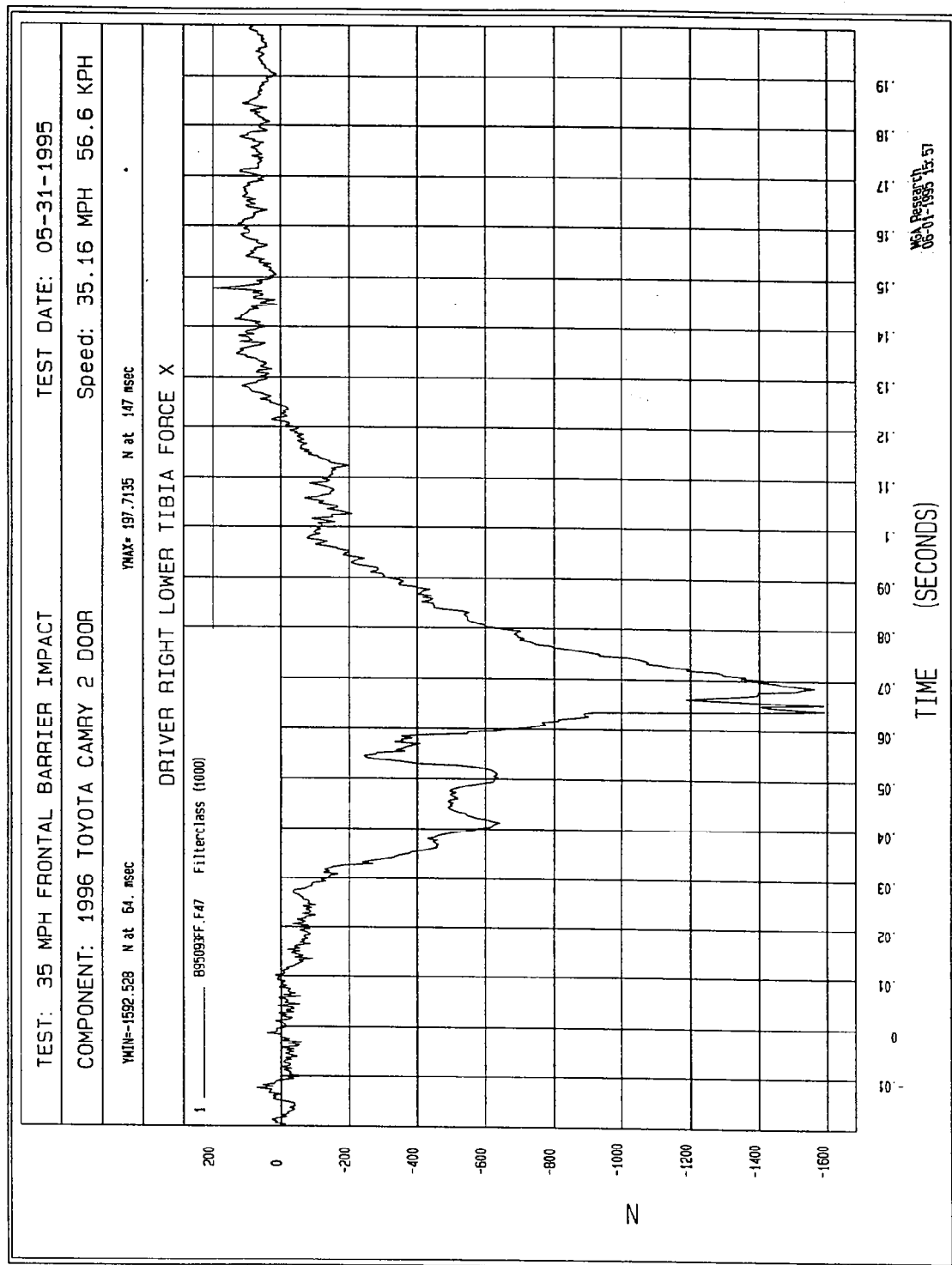


Figure B-83 - Driver Right Lower Tibia Force X vs. Time

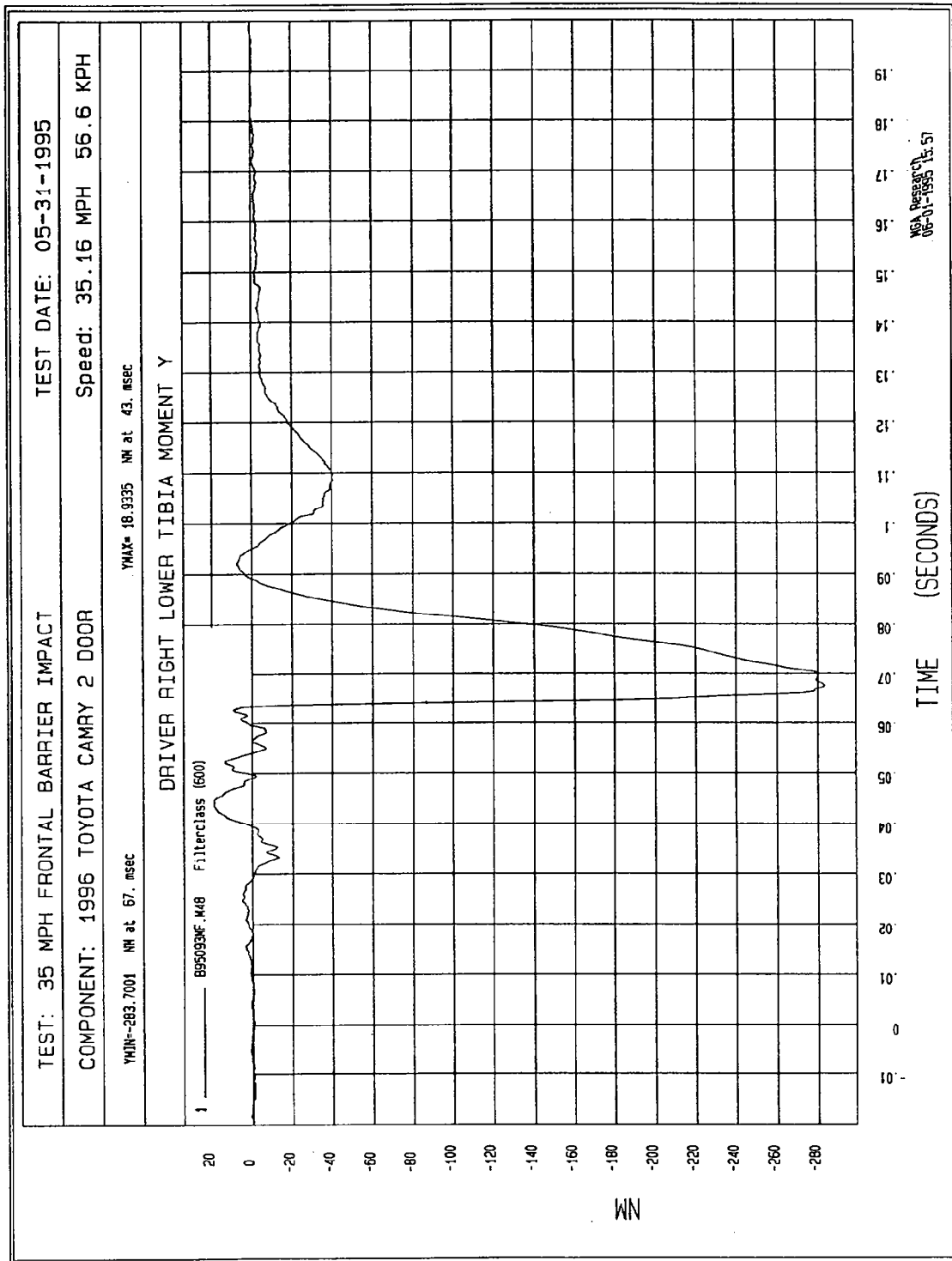


Figure B-84 - Driver Right Lower Tibia Moment Y vs. Time

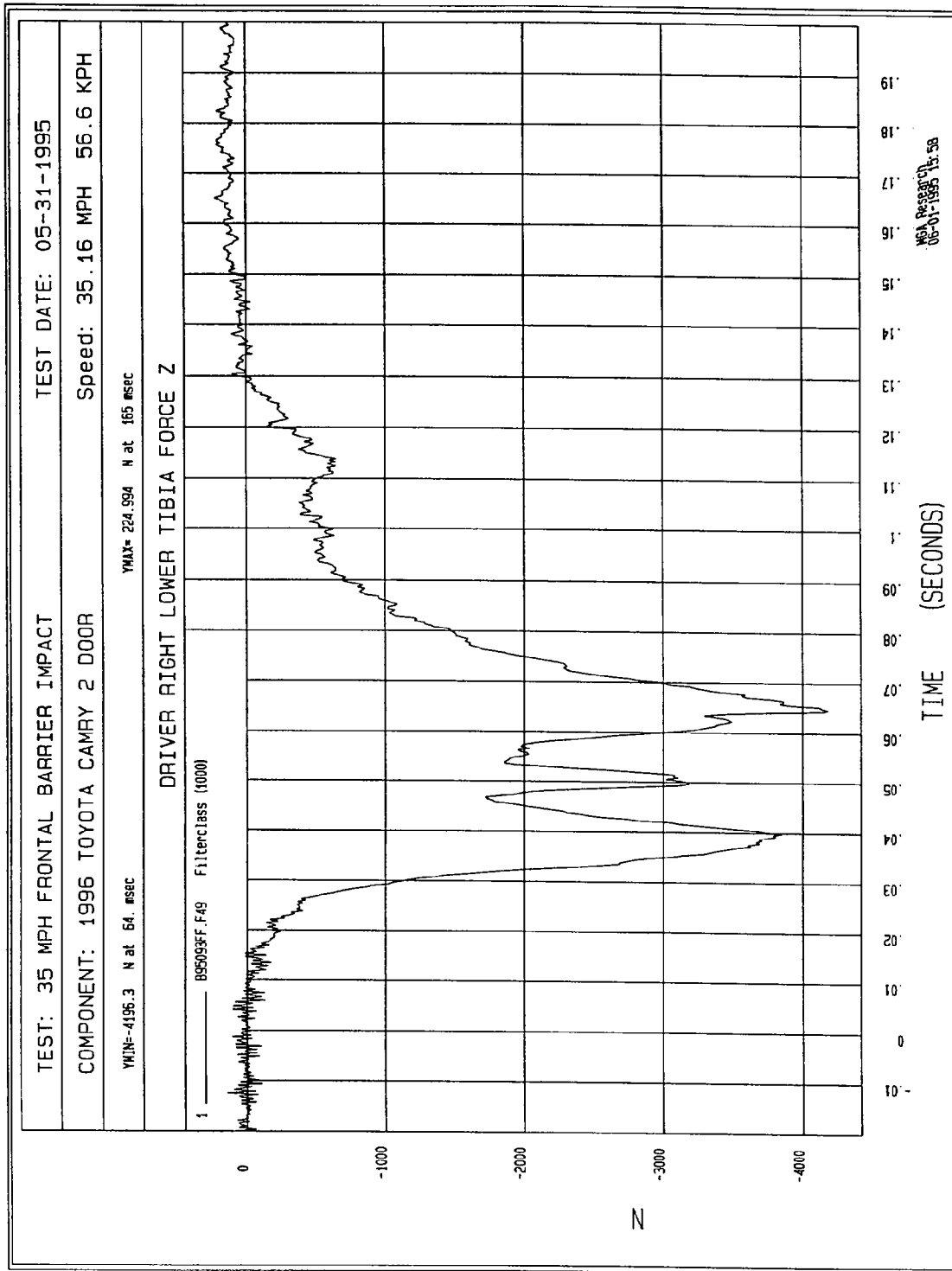


Figure B-85 - Driver Right Lower Tibia Force Z vs. Time

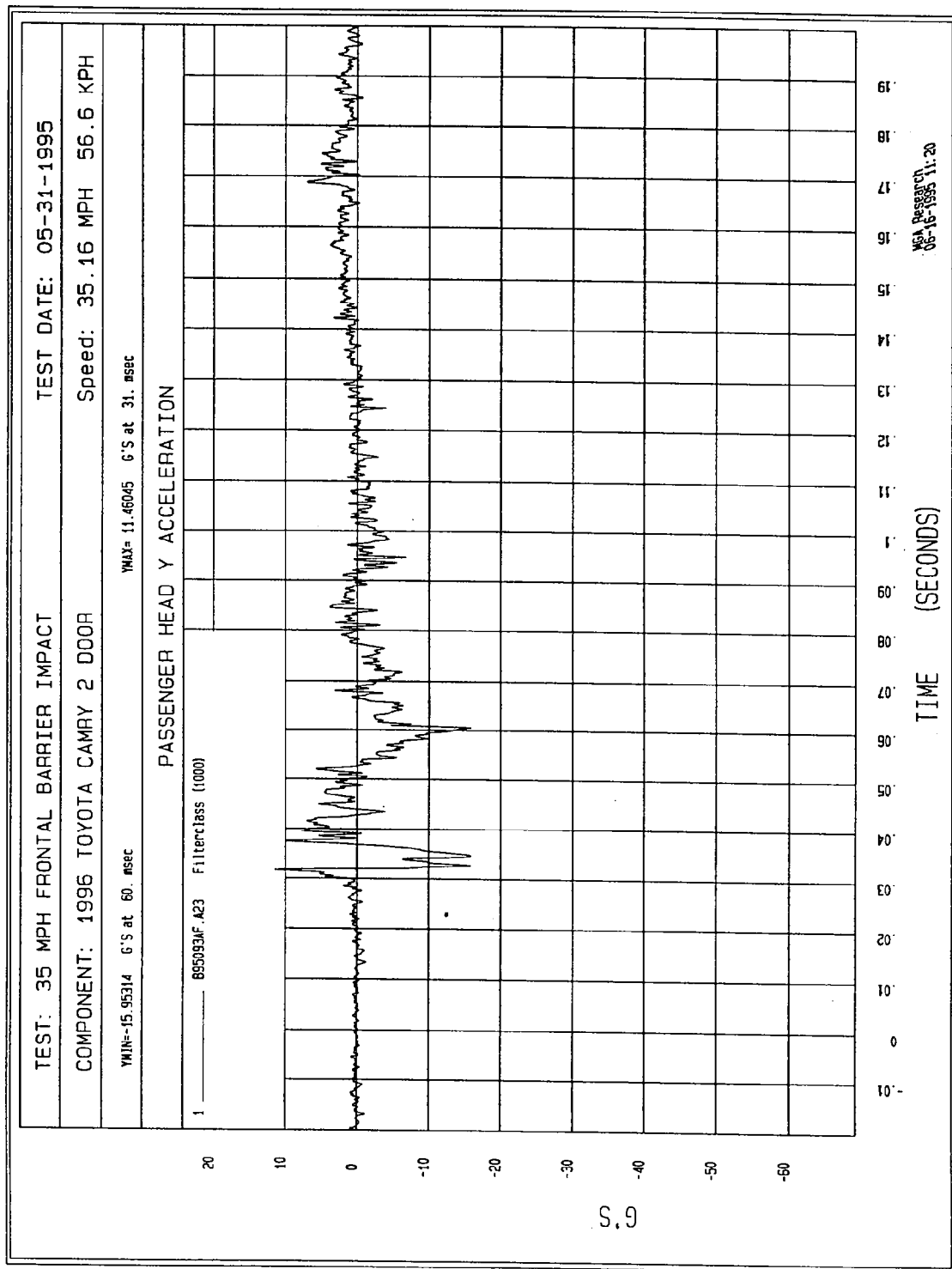


Figure B-87 - Passenger Head Y Acceleration vs. Time

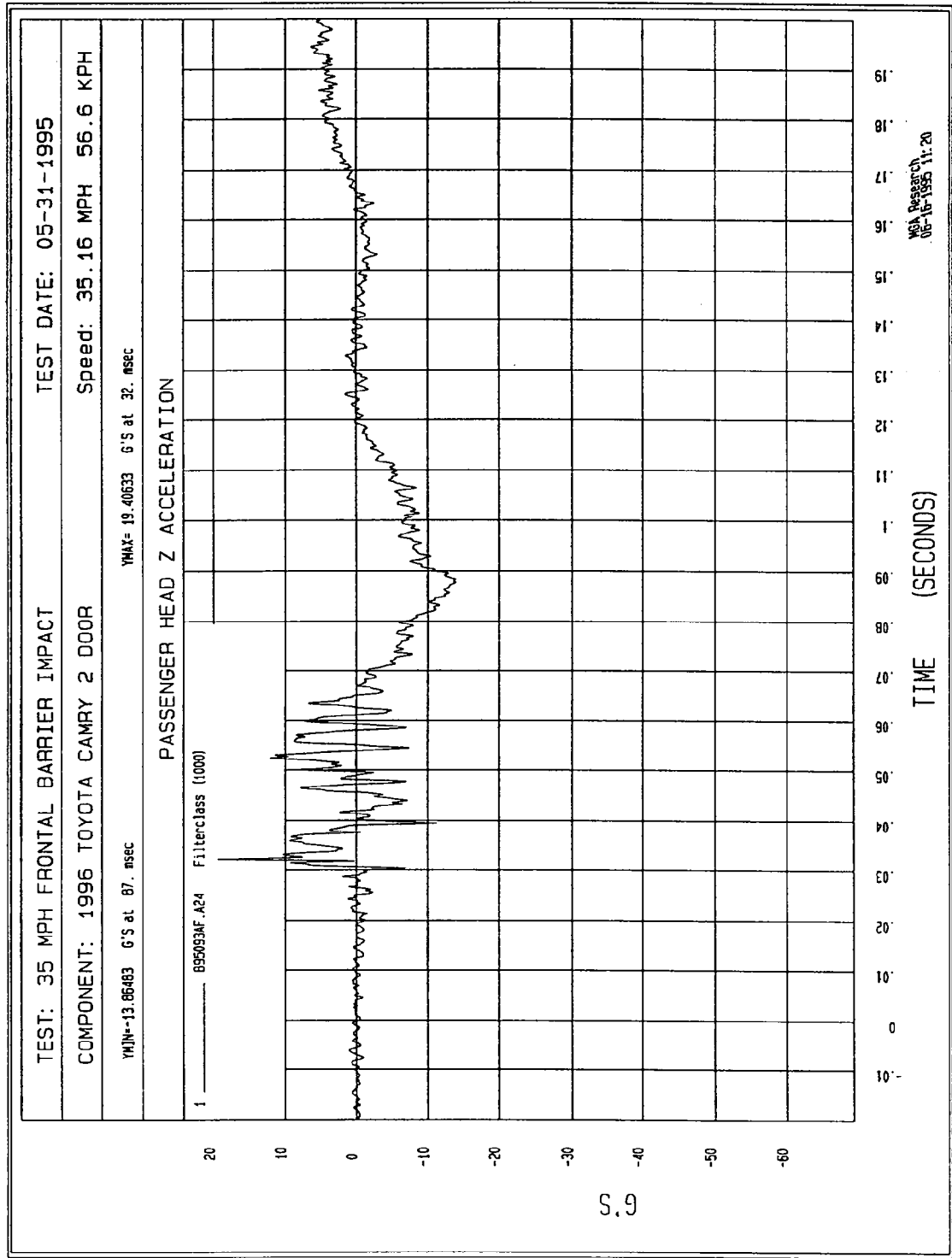


Figure B-88 - Passenger Head Z Acceleration vs. Time

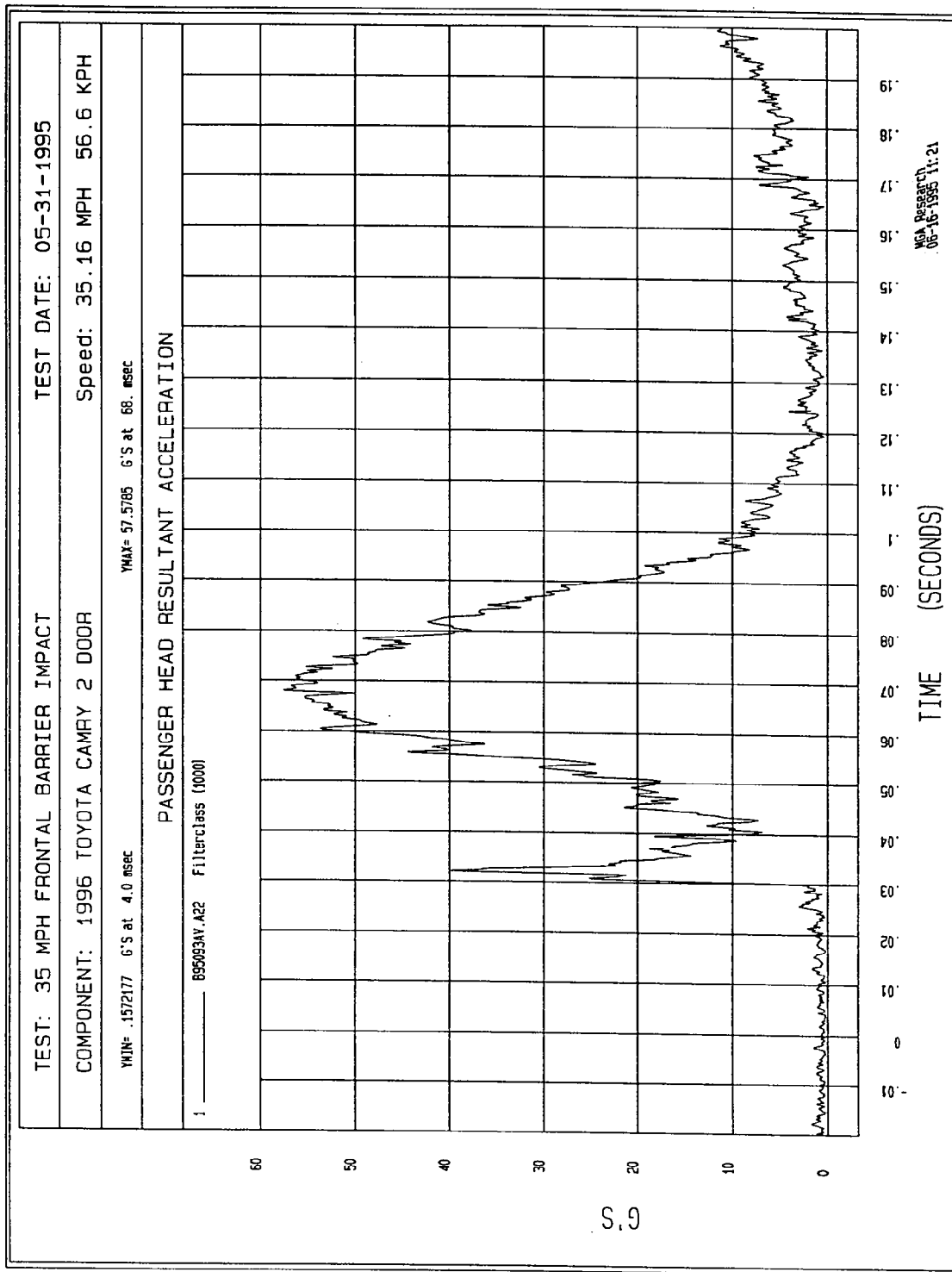


Figure B-89 - Passenger Head Resultant Acceleration vs. Time

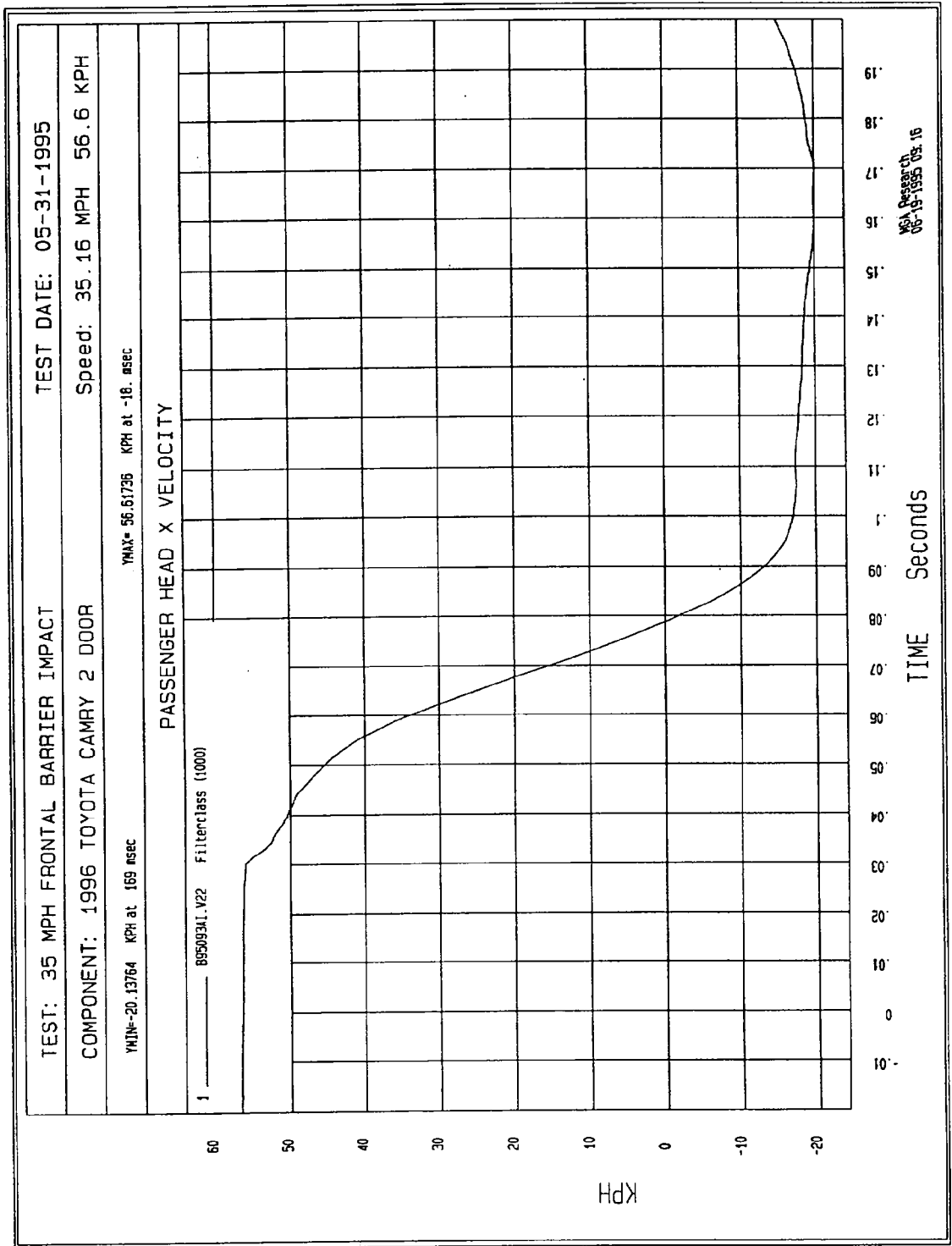


Figure B-90 - Passenger Head X Velocity vs. Time

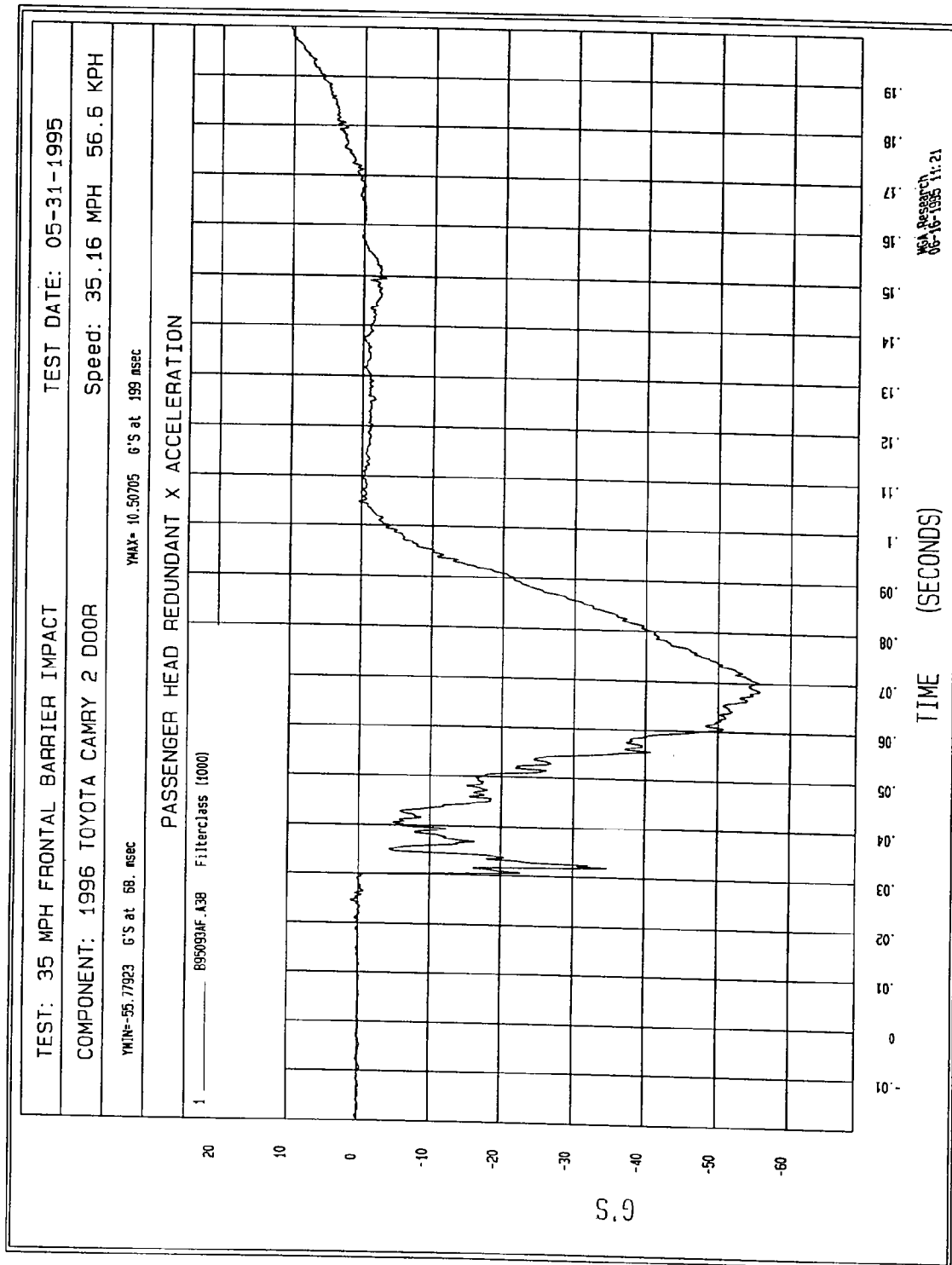


Figure B-91 - Passenger Head Redundant X Acceleration vs. Time

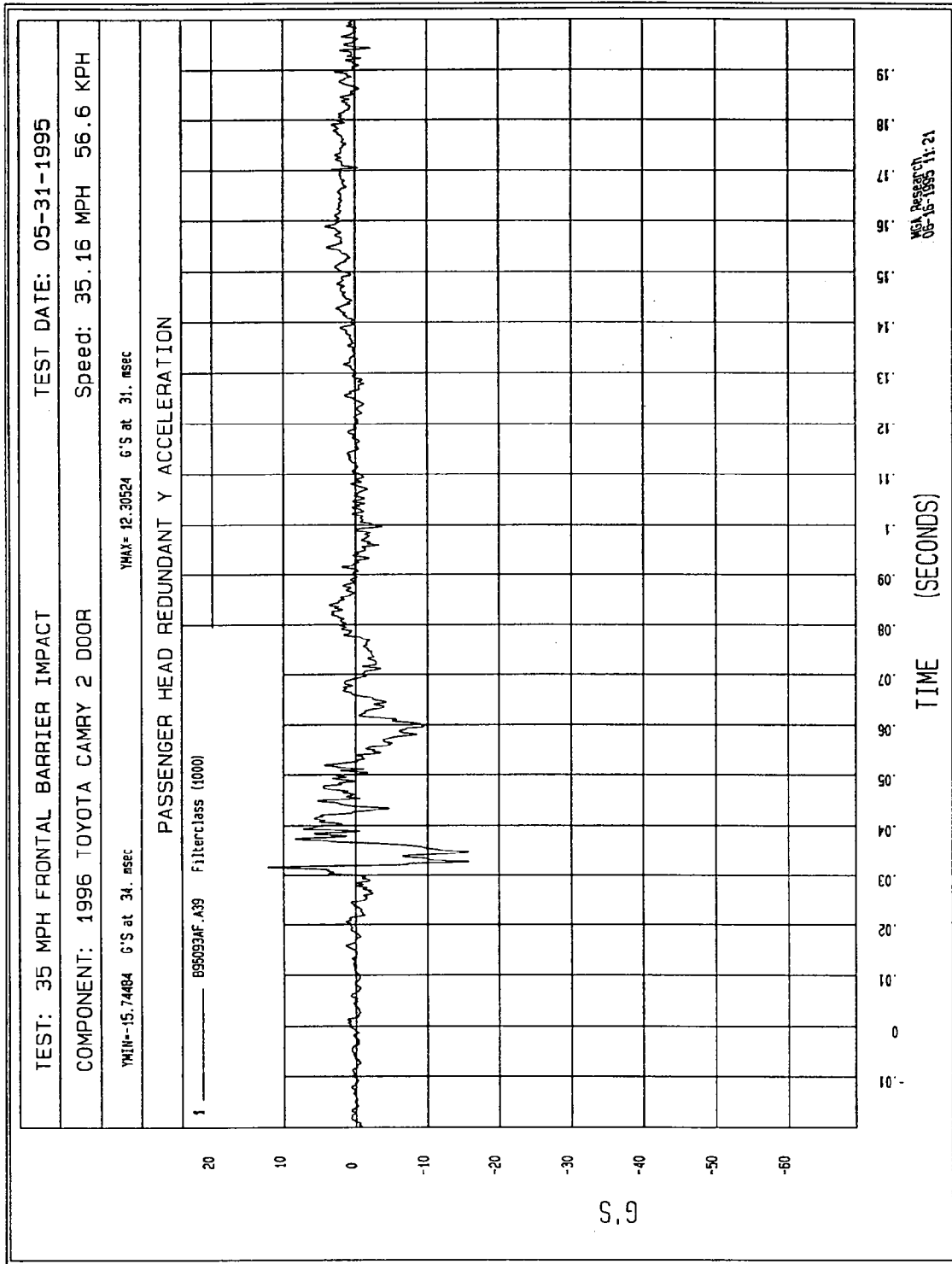


Figure B-92 - Passenger Head Redundant Y Acceleration vs. Time

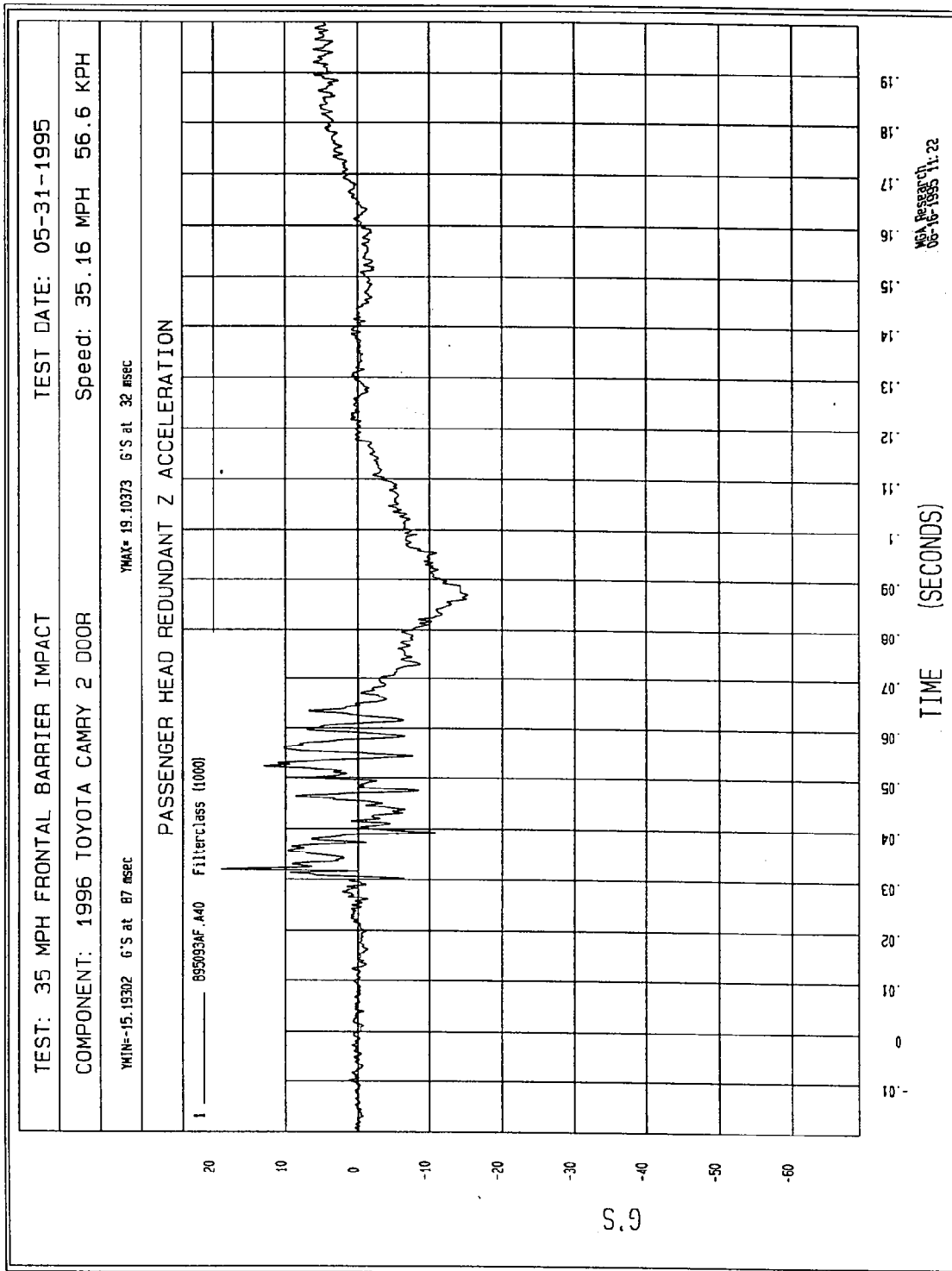


Figure B-93 - Passenger Head Redundant Z Acceleration vs. Time

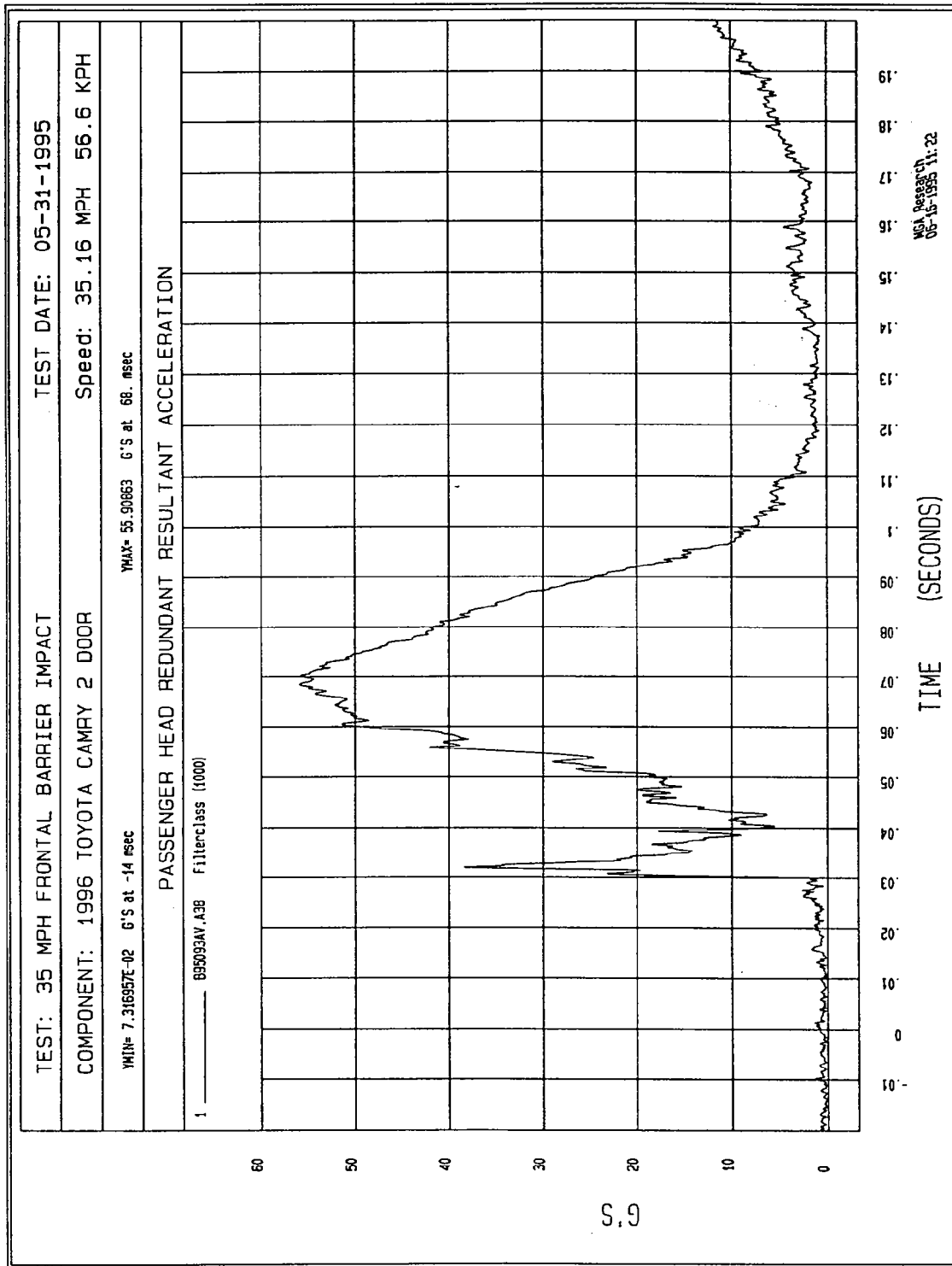


Figure B-94 - Passenger Head Redundant Resultant Accel. vs. Time

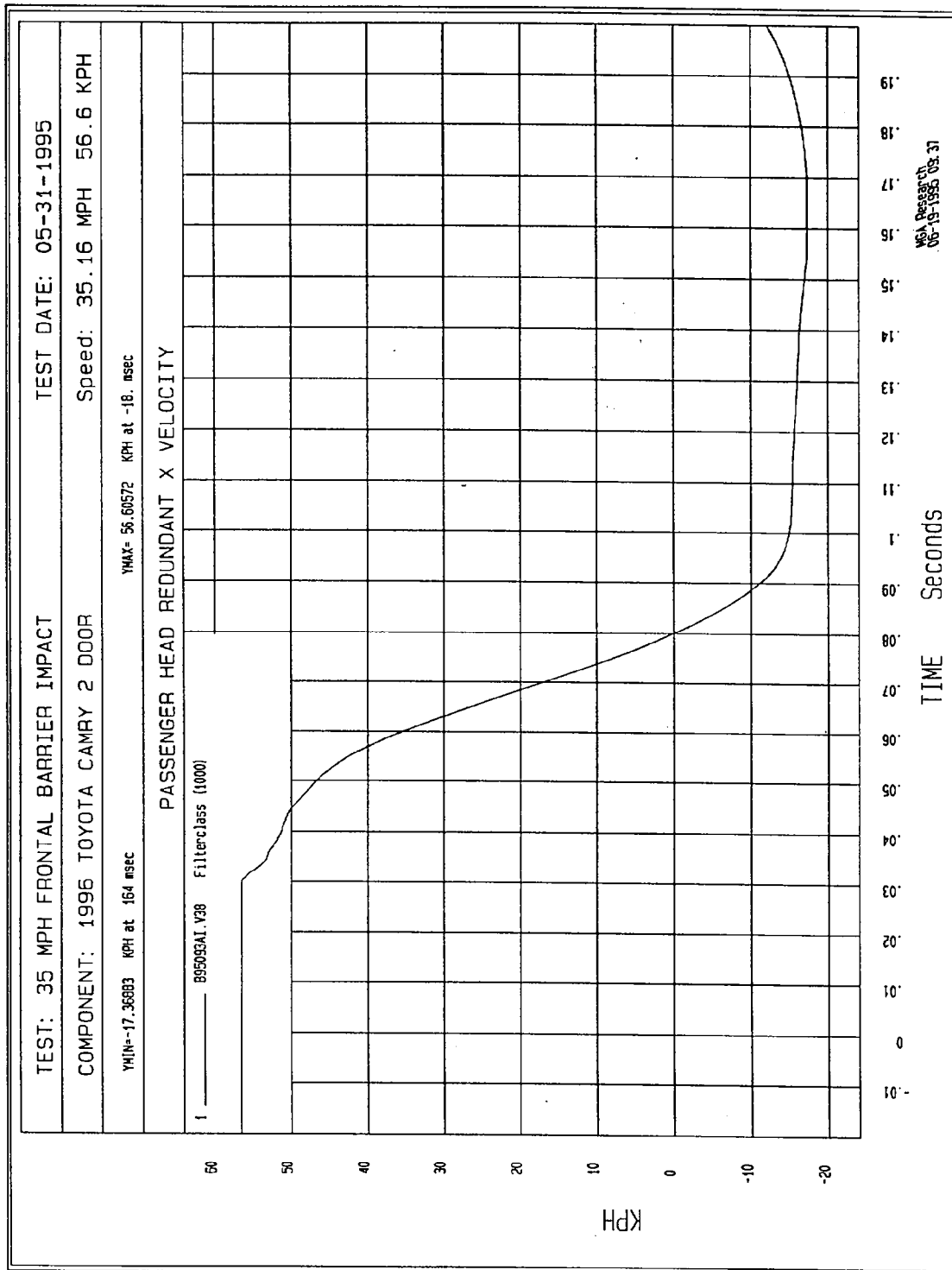


Figure B-95 - Passenger Head Redundant X Velocity vs. Time

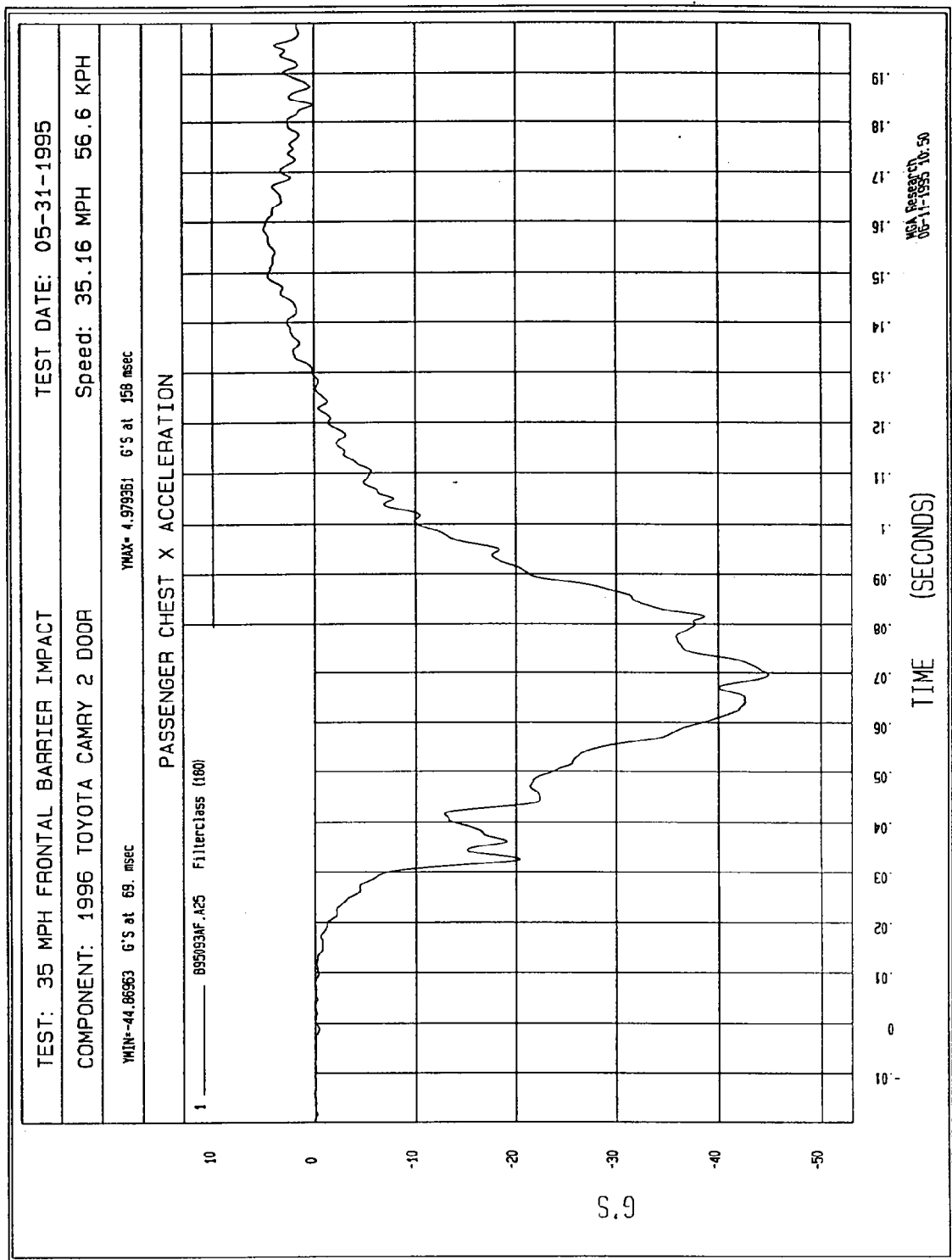


Figure B-96 - Passenger Chest X Acceleration vs. Time

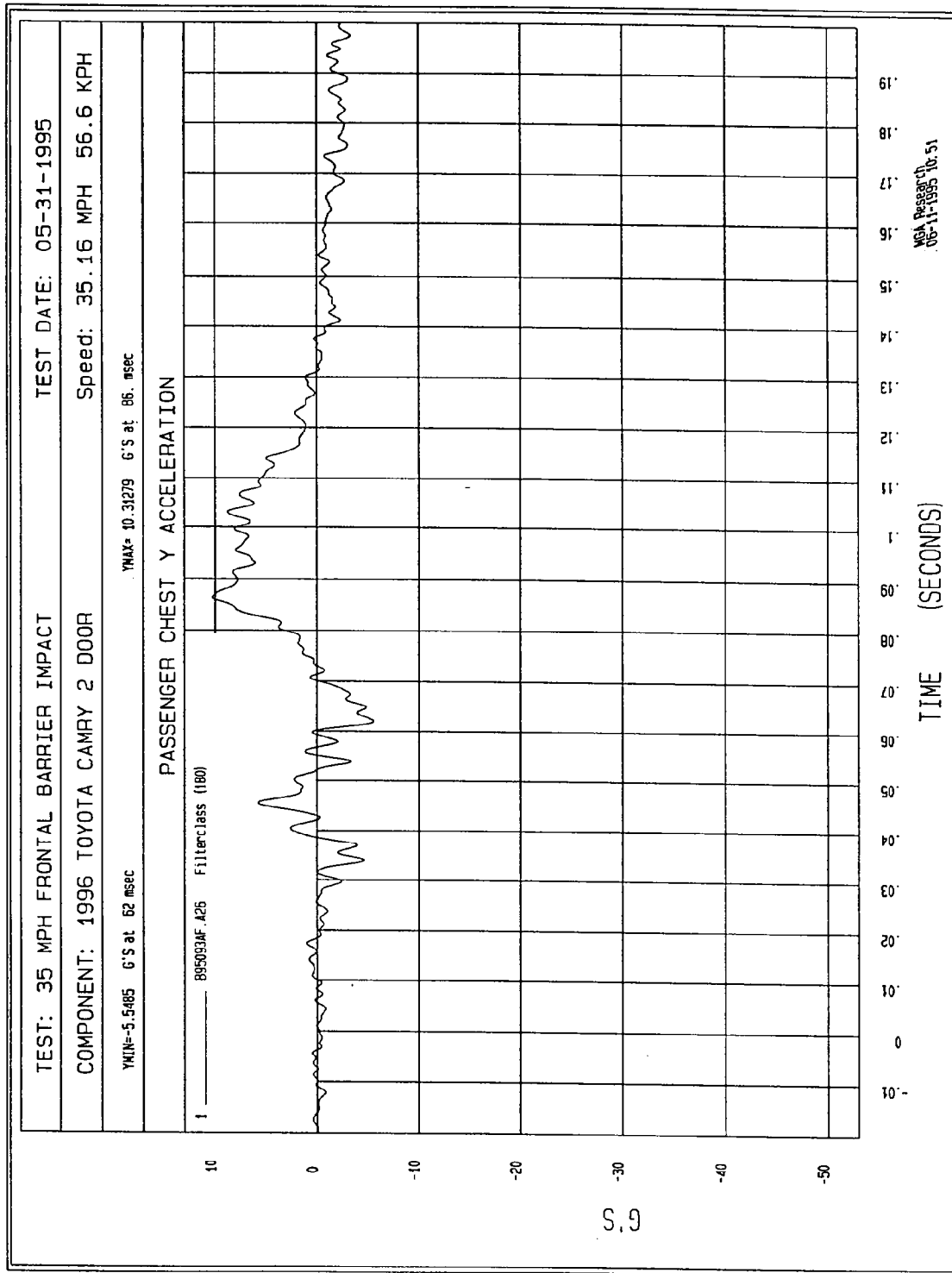


Figure B-97 - Passenger Chest Y Acceleration vs. Time

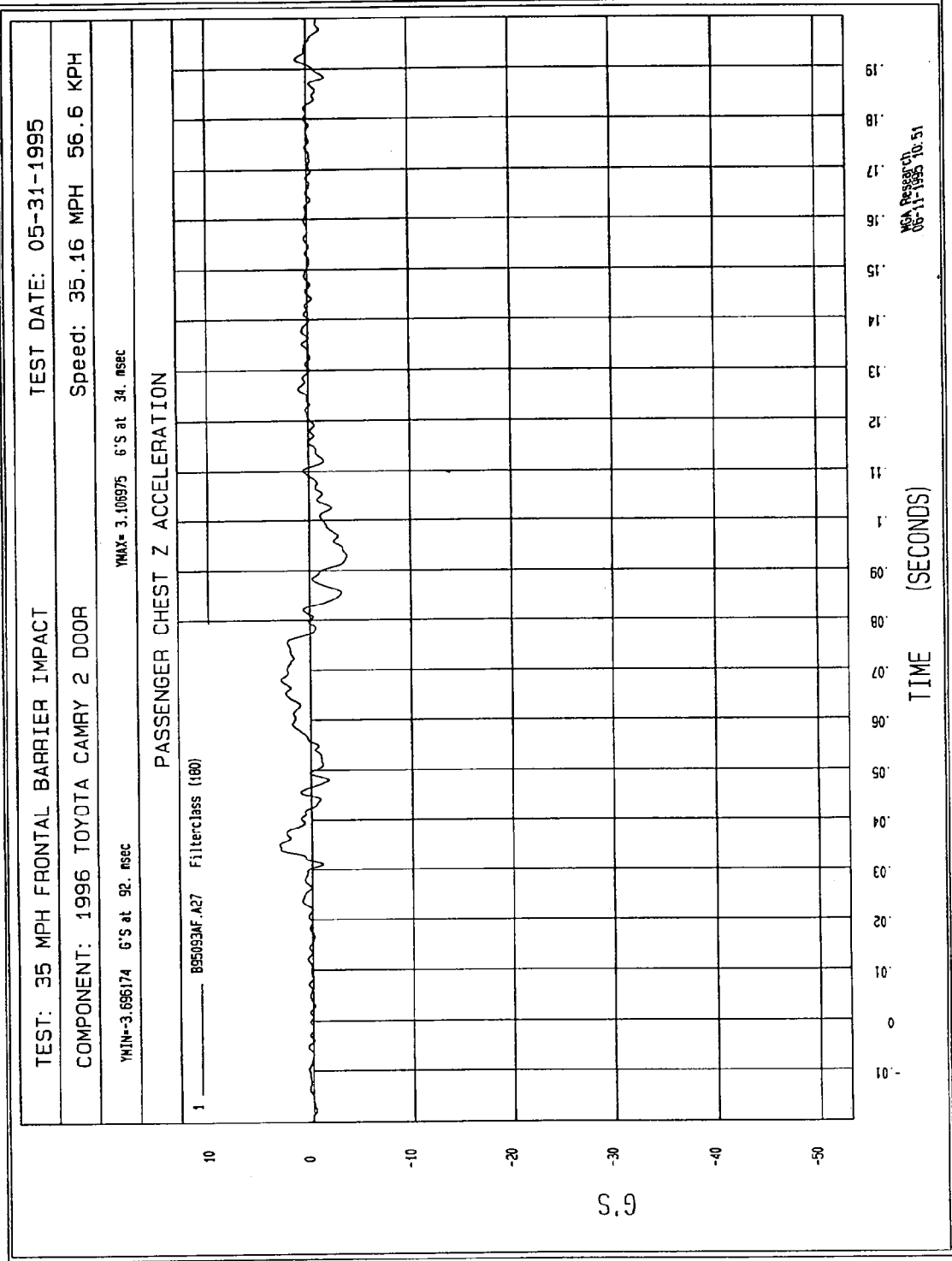


Figure B-98 - Passenger Chest Z Acceleration vs. Time

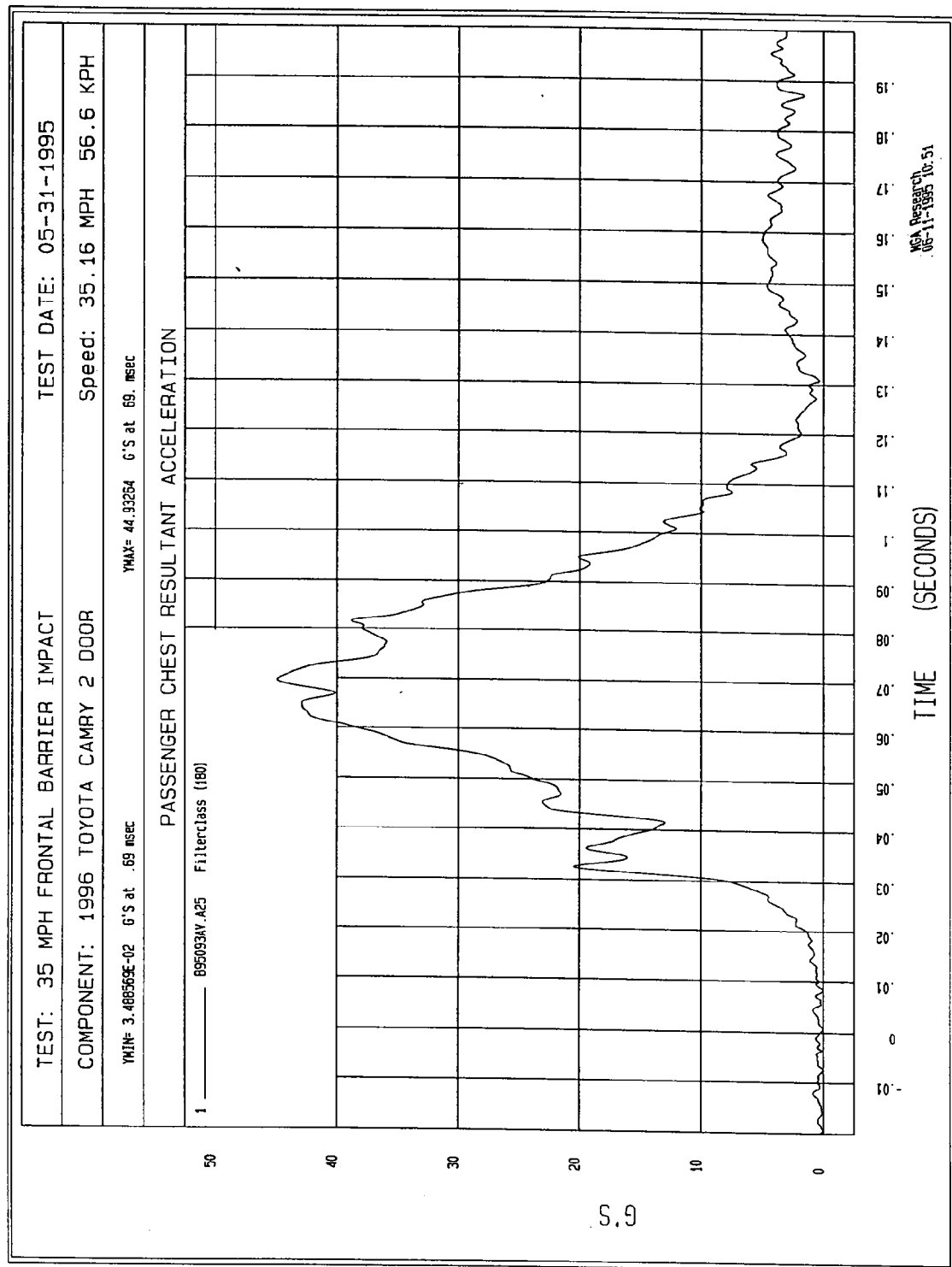


Figure B-99 - Passenger Chest Resultant Accel. vs. Time

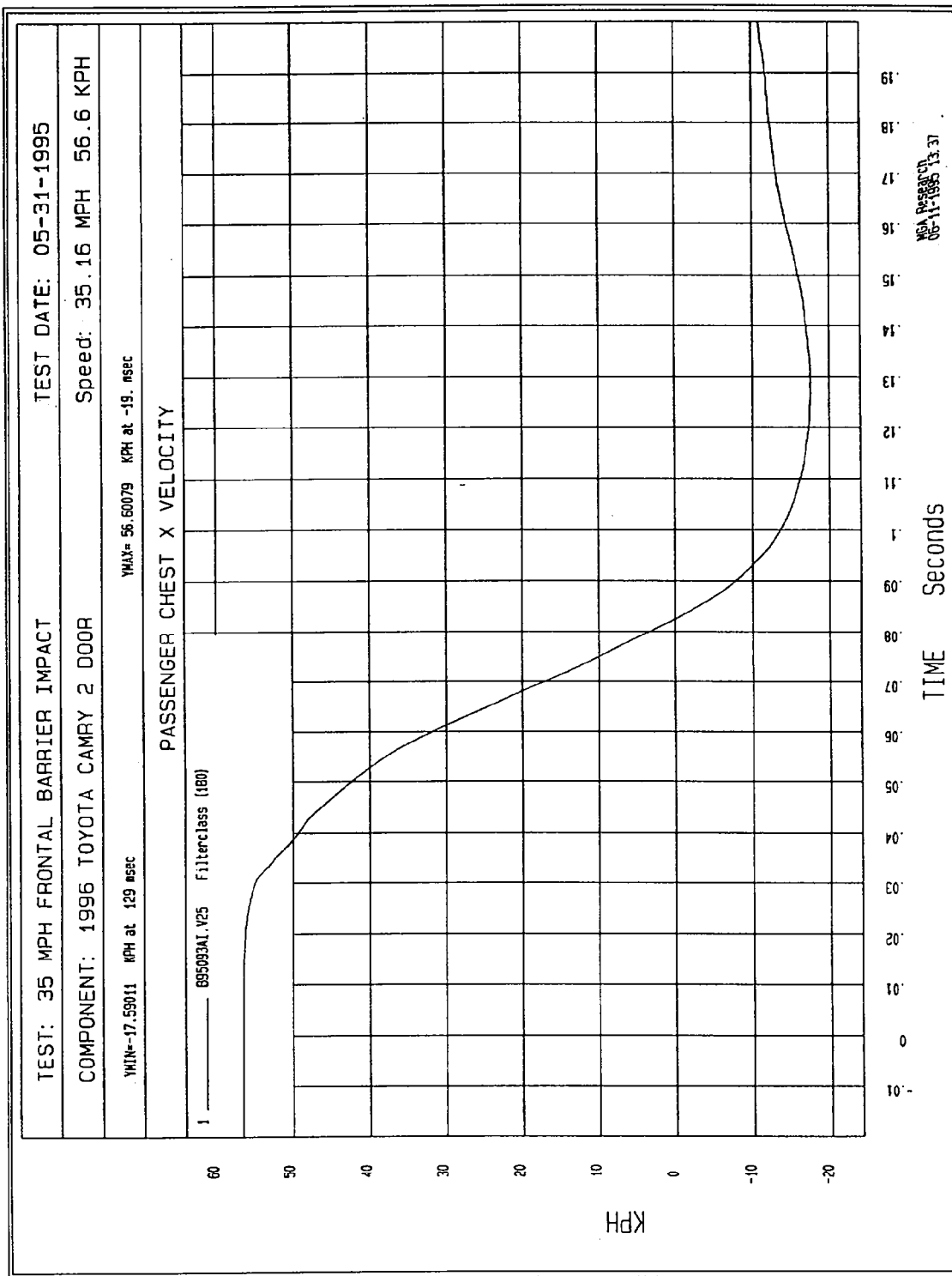
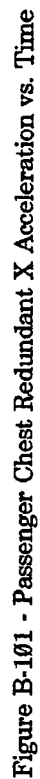


Figure B-100 - Passenger Chest X Velocity vs. Time



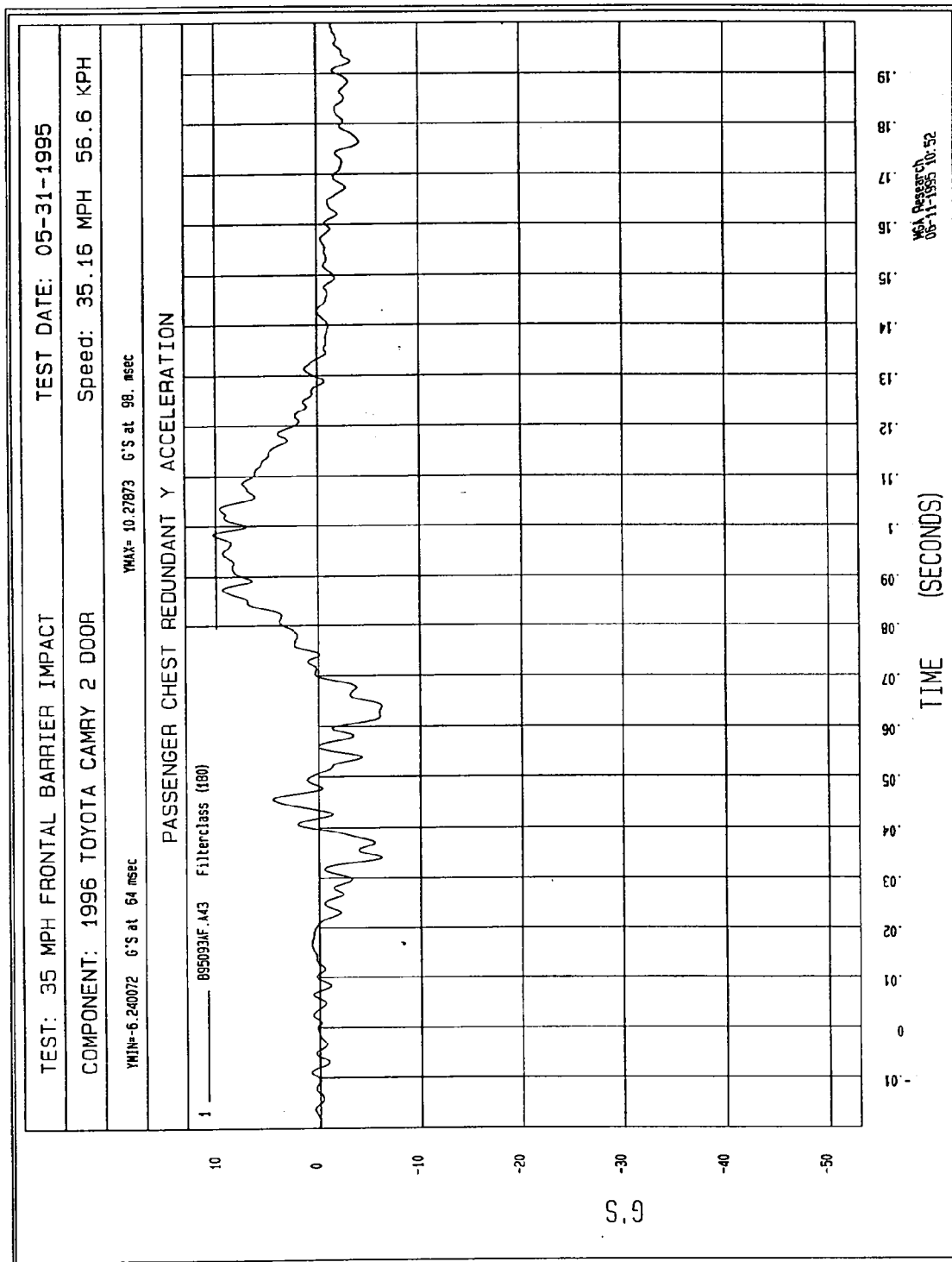


Figure B-102 - Passenger Chest Redundant Y Acceleration vs. Time

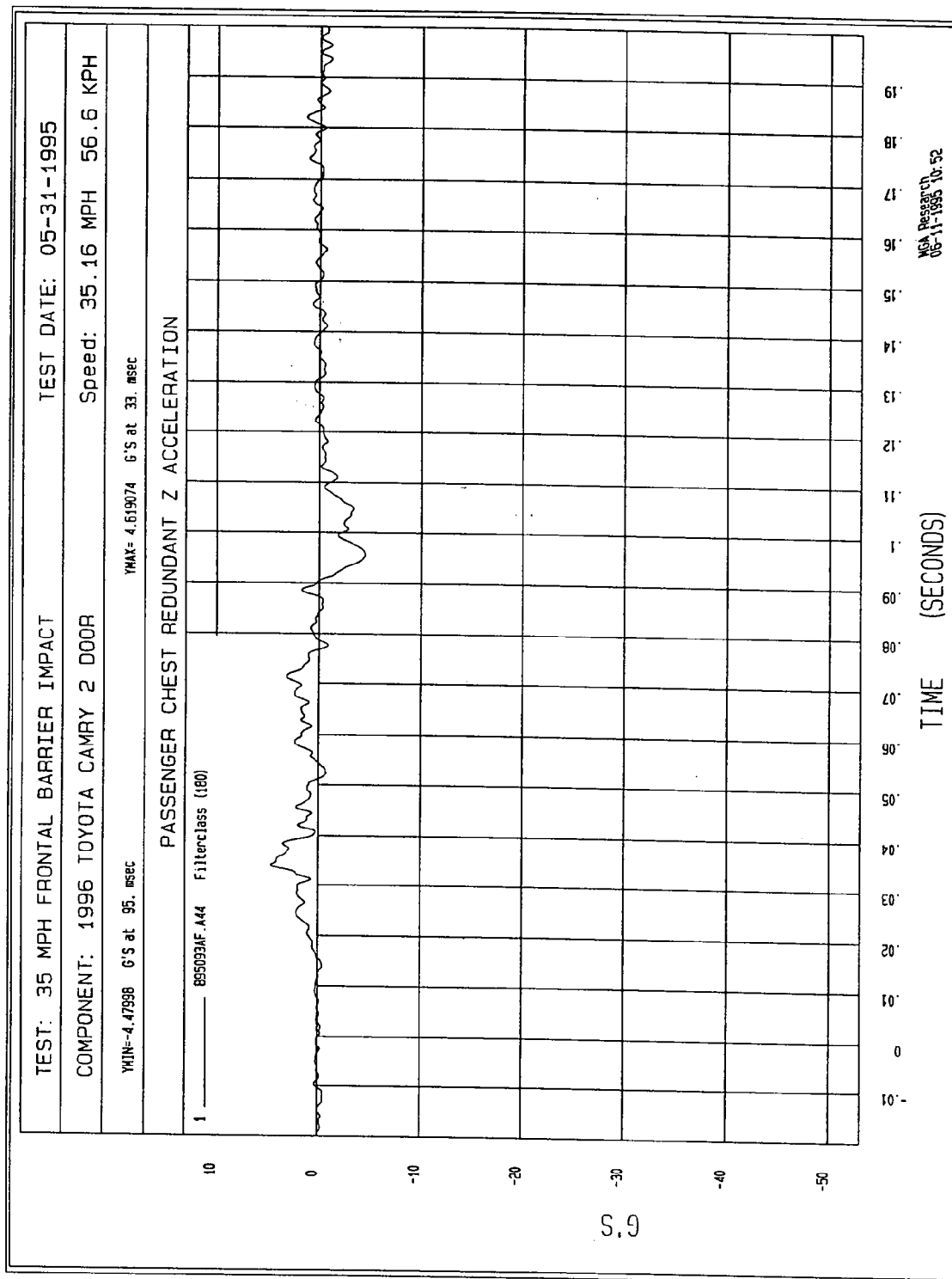


Figure B-103 - Passenger Chest Redundant Z Acceleration vs. Time

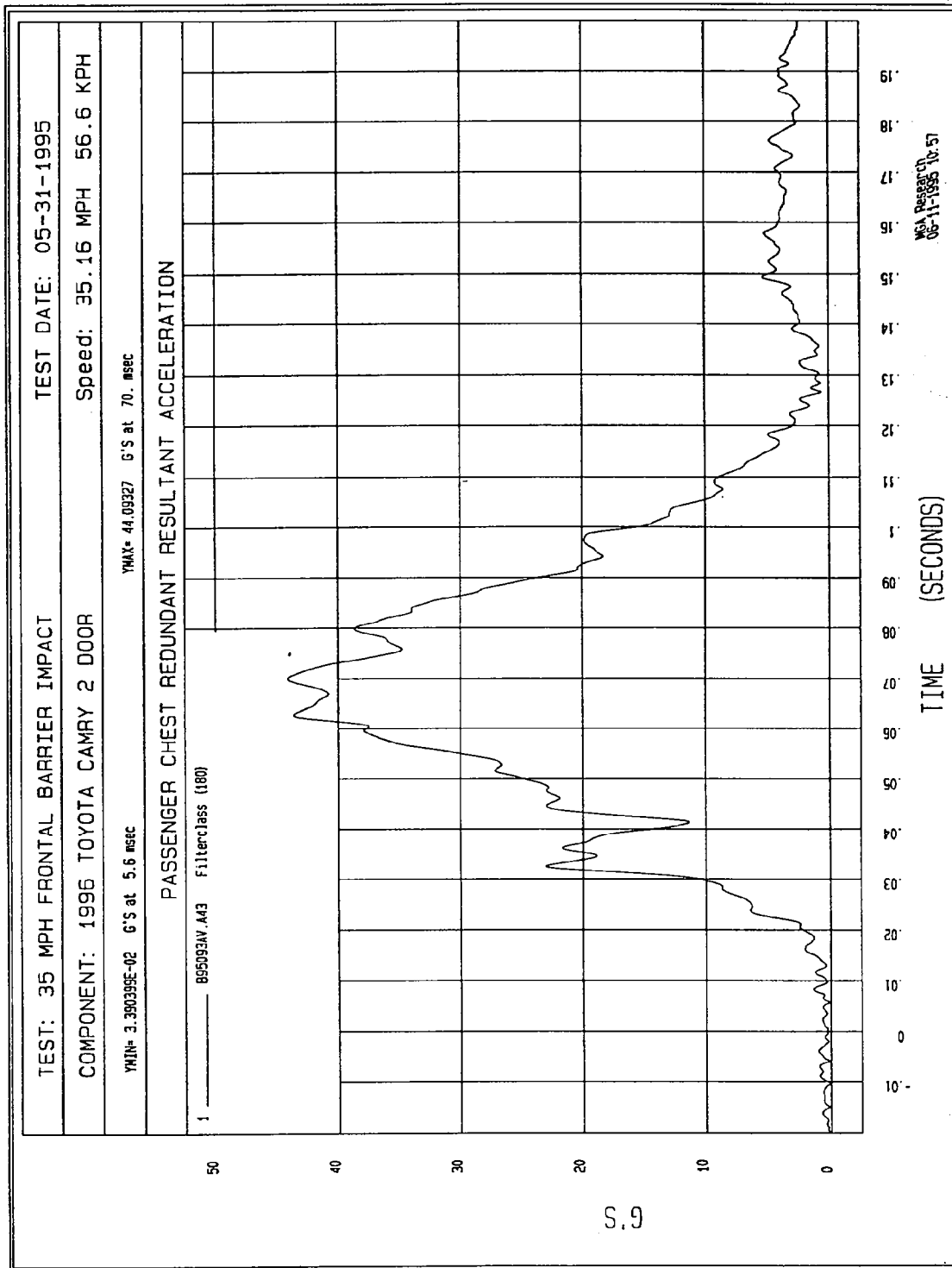


Figure B-104 - Passenger Chest Redundant Resultant Accel. vs. Time

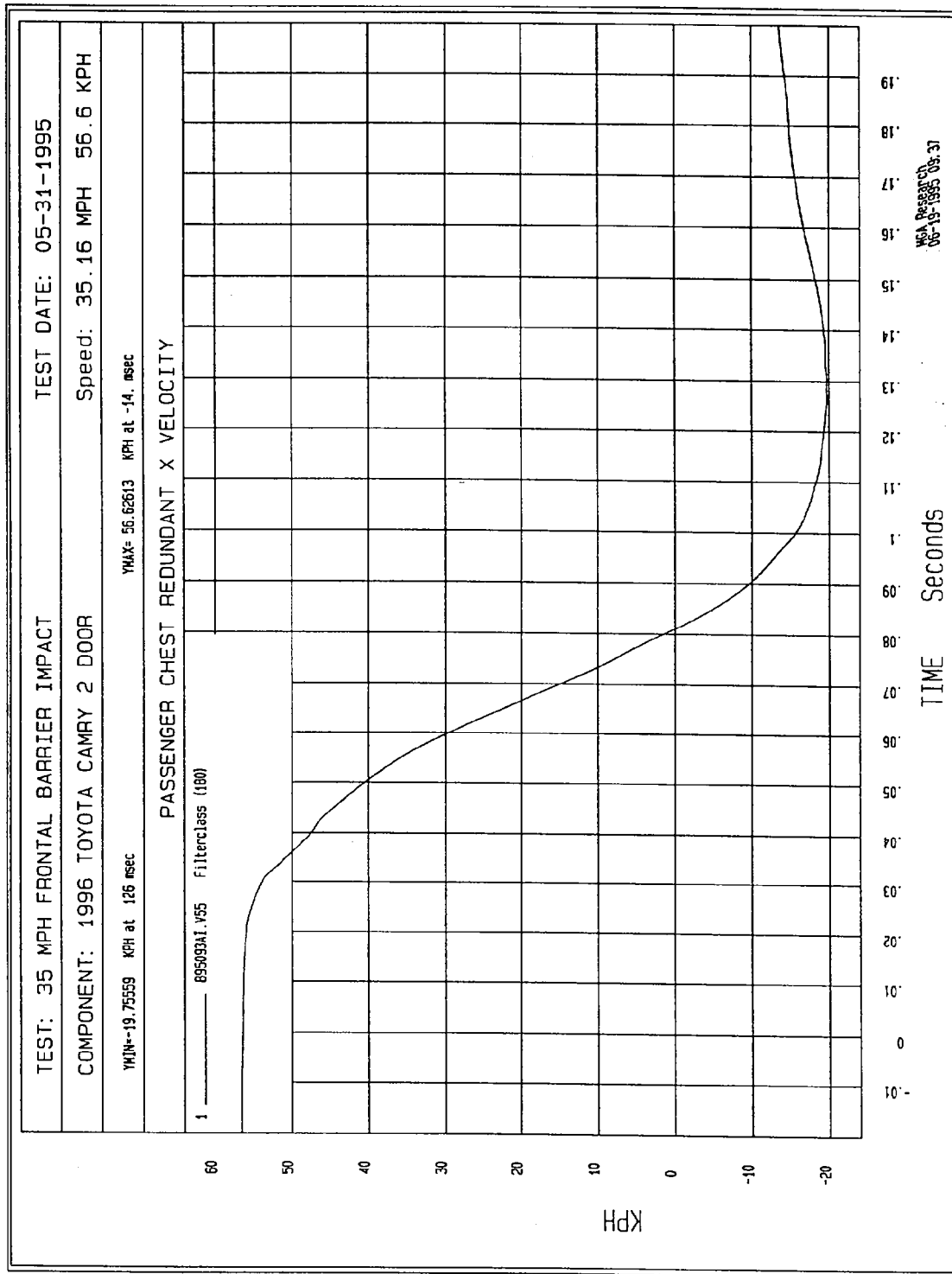


Figure B-105 - Passenger Chest Redundant X Velocity vs. Time

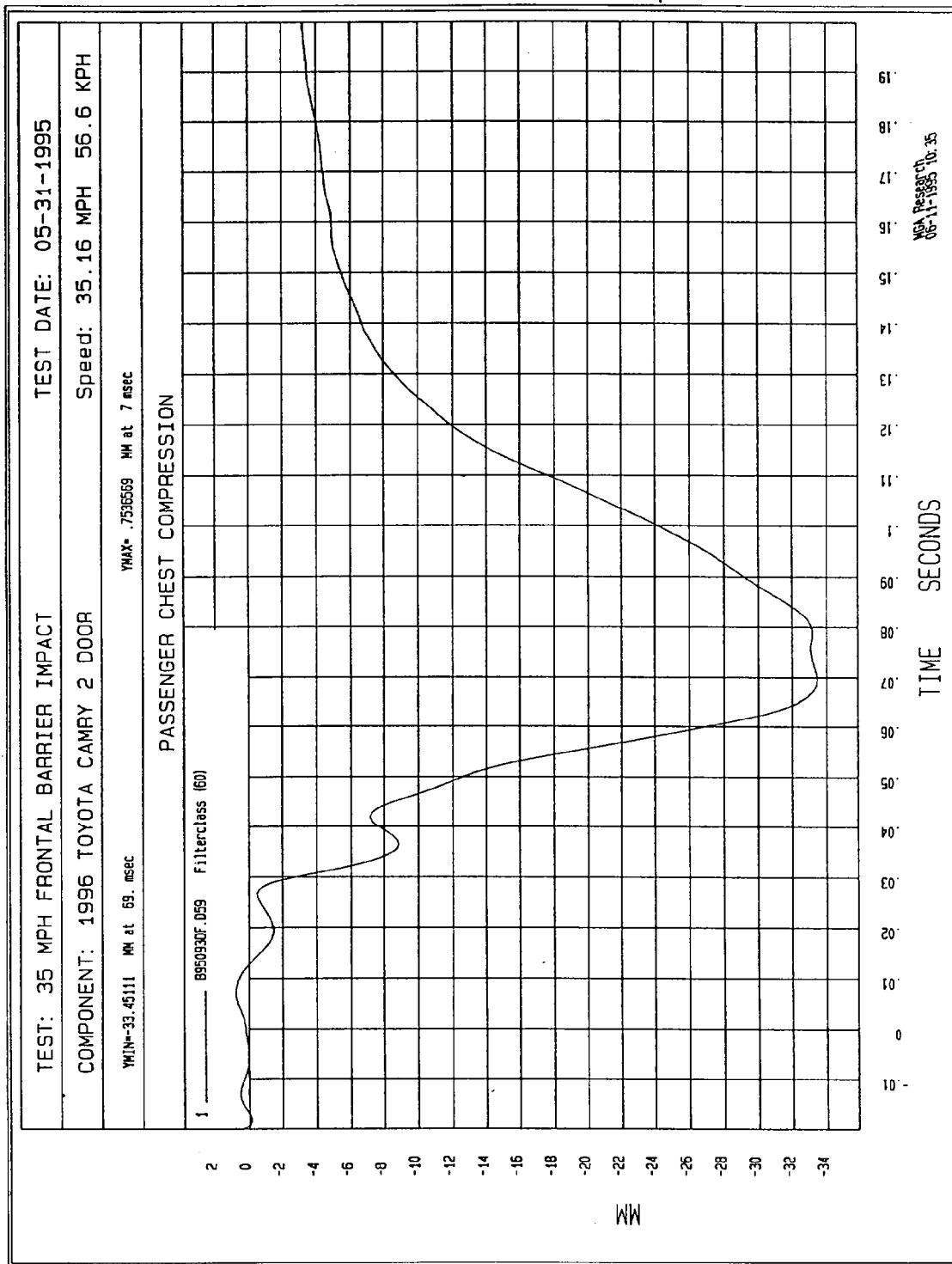


Figure B-106 - Passenger Chest Compression vs. Time

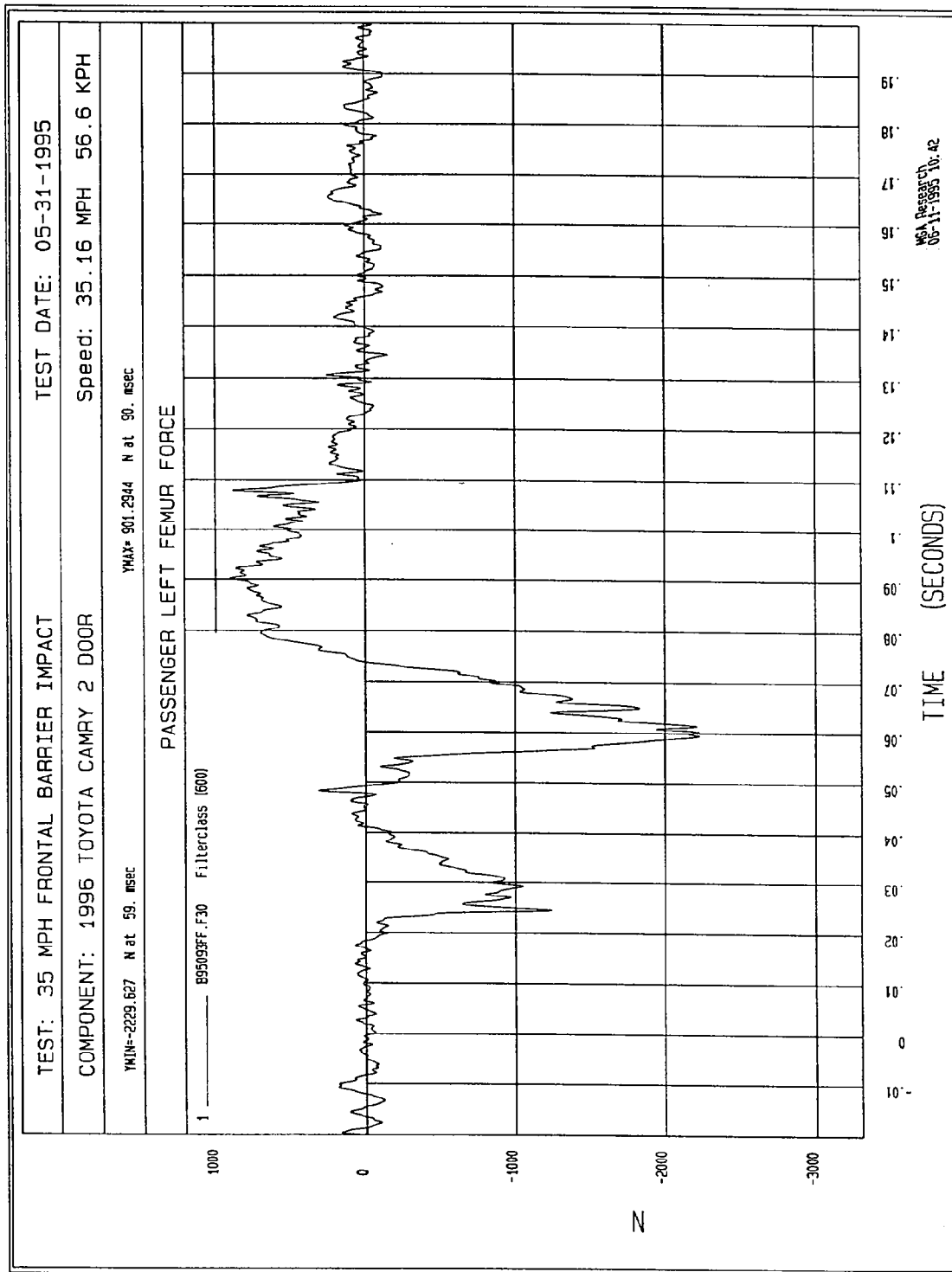


Figure B-107 - Passenger Left Femur Force vs. Time

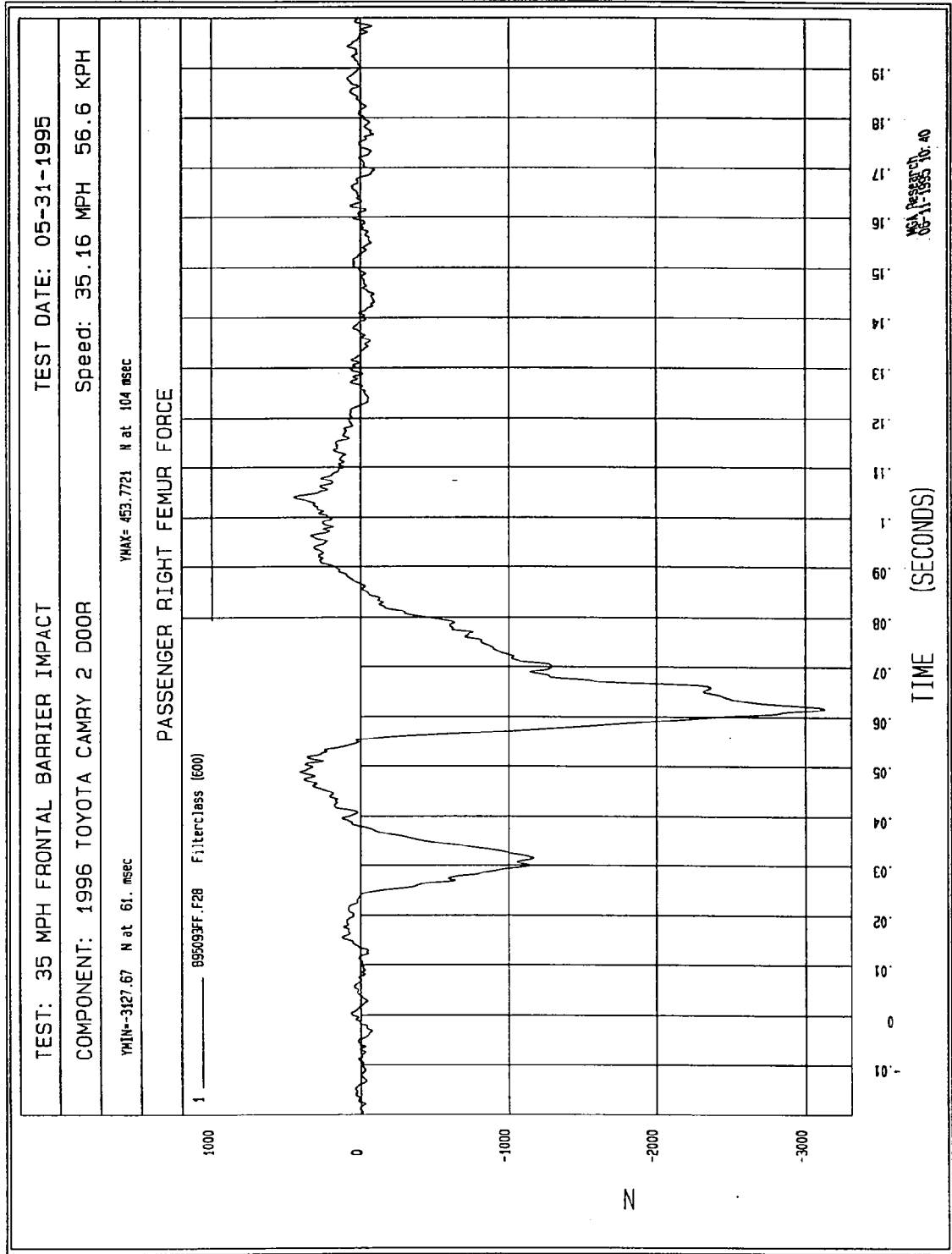


Figure B-108 - Passenger Right Femur Force vs. Time

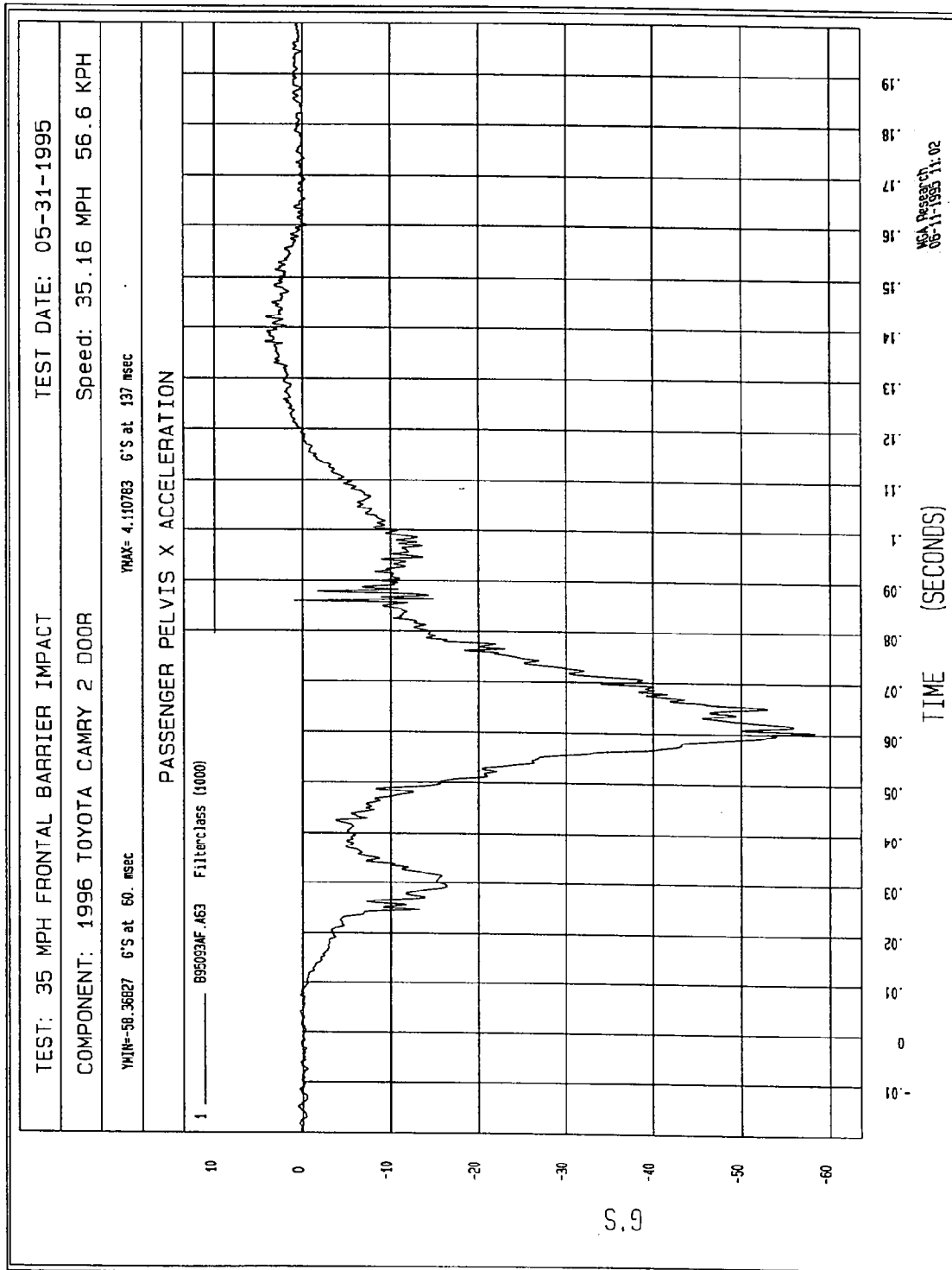


Figure B-109 - Passenger Pelvis X Acceleration vs. Time

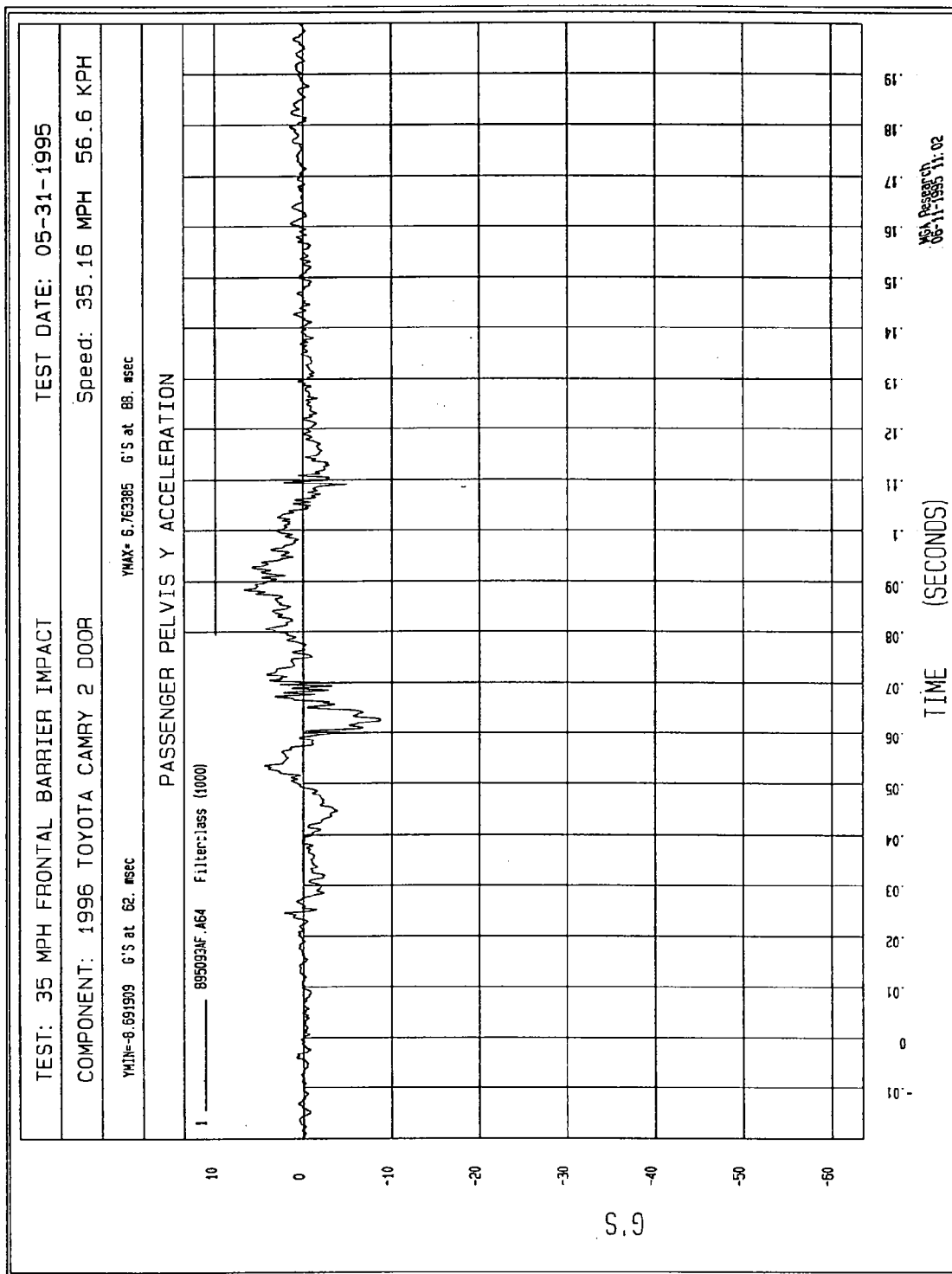


Figure B-110 - Passenger Pelvis Y Acceleration vs. Time

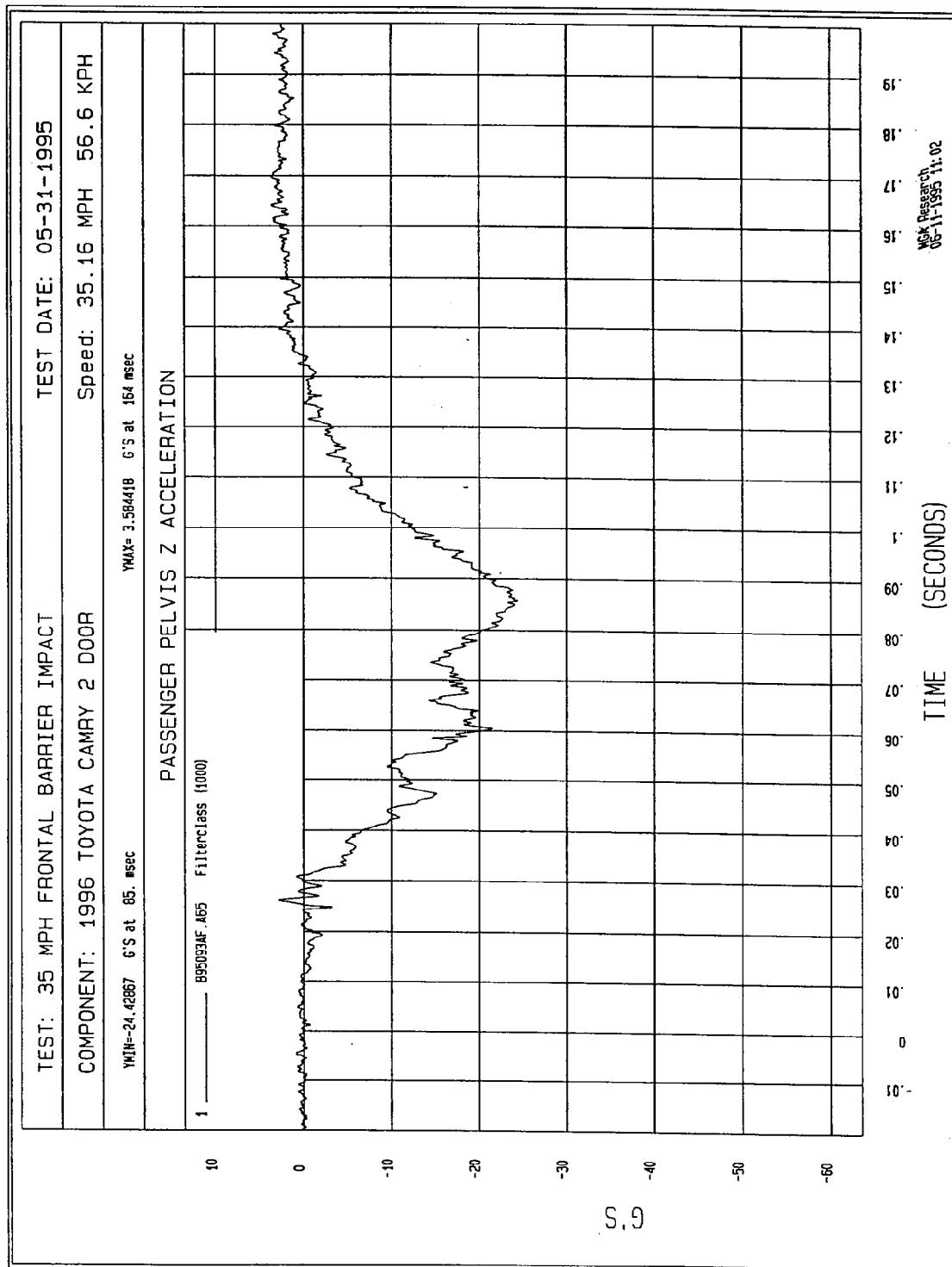


Figure B-111 - Passenger Pelvis Z Acceleration vs. Time

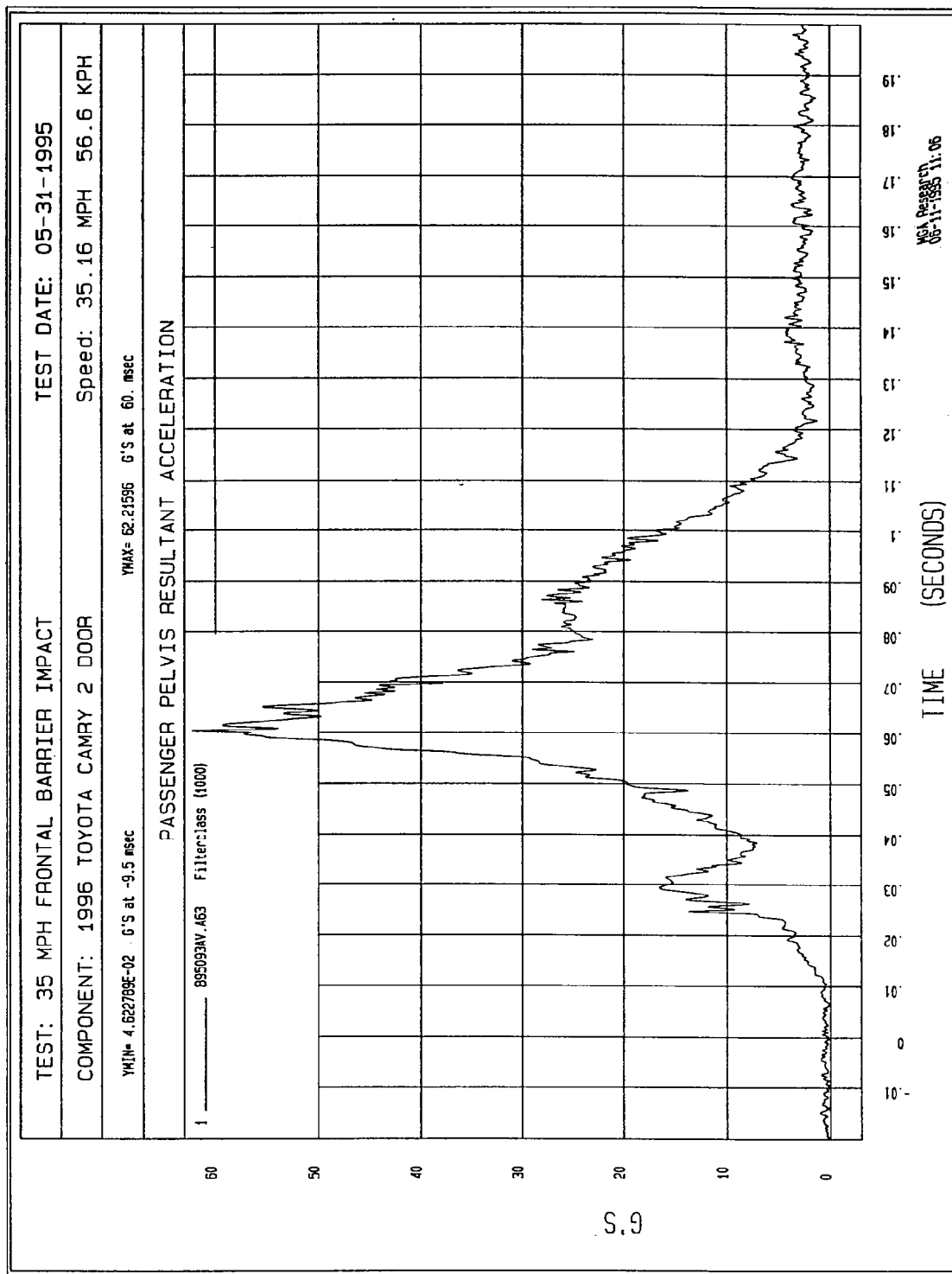


Figure B-112 - Passenger Pelvis Z Resultant Acceleration vs. Time

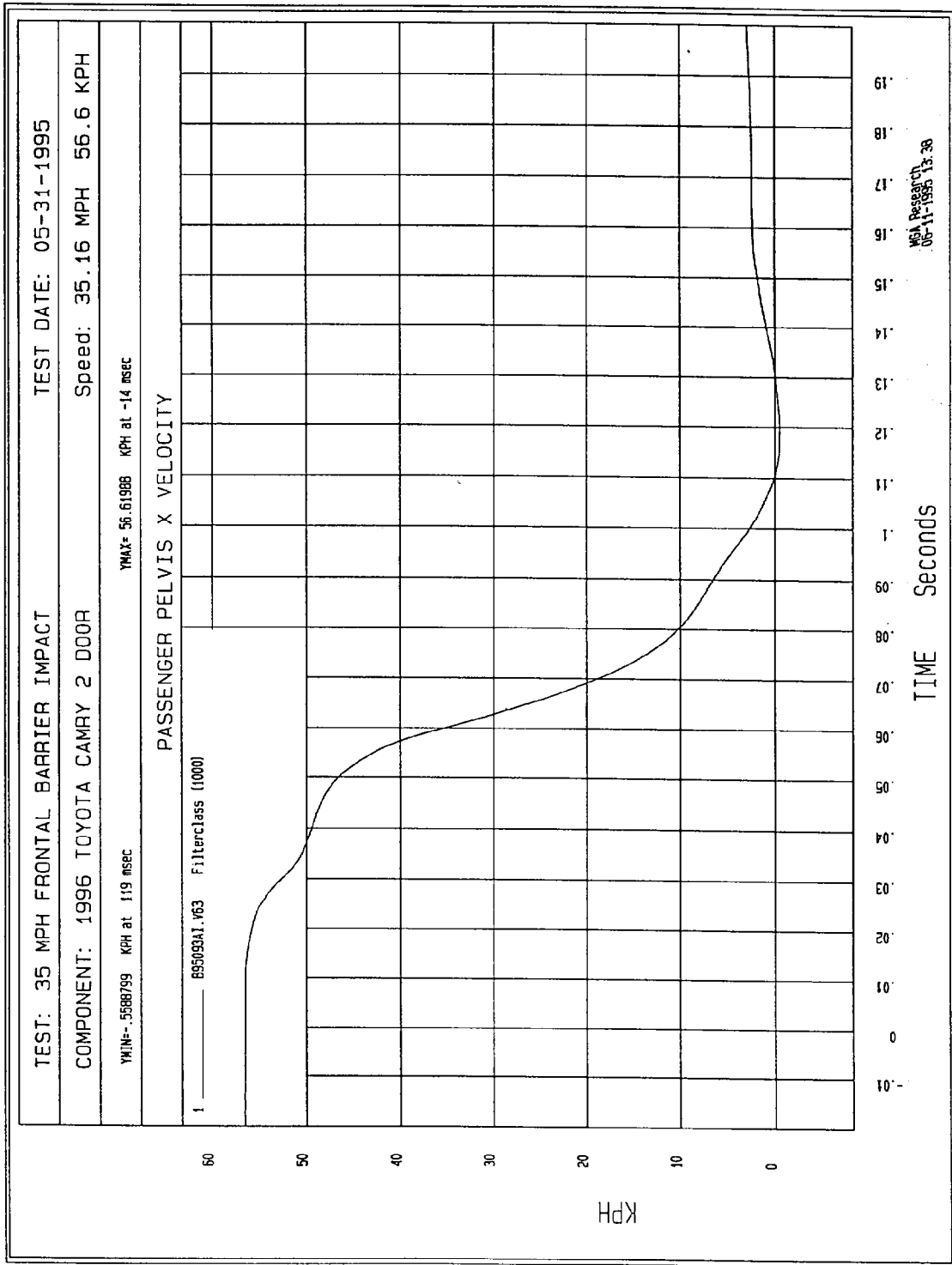


Figure B-113 - Passenger Pelvis X Velocity vs. Time

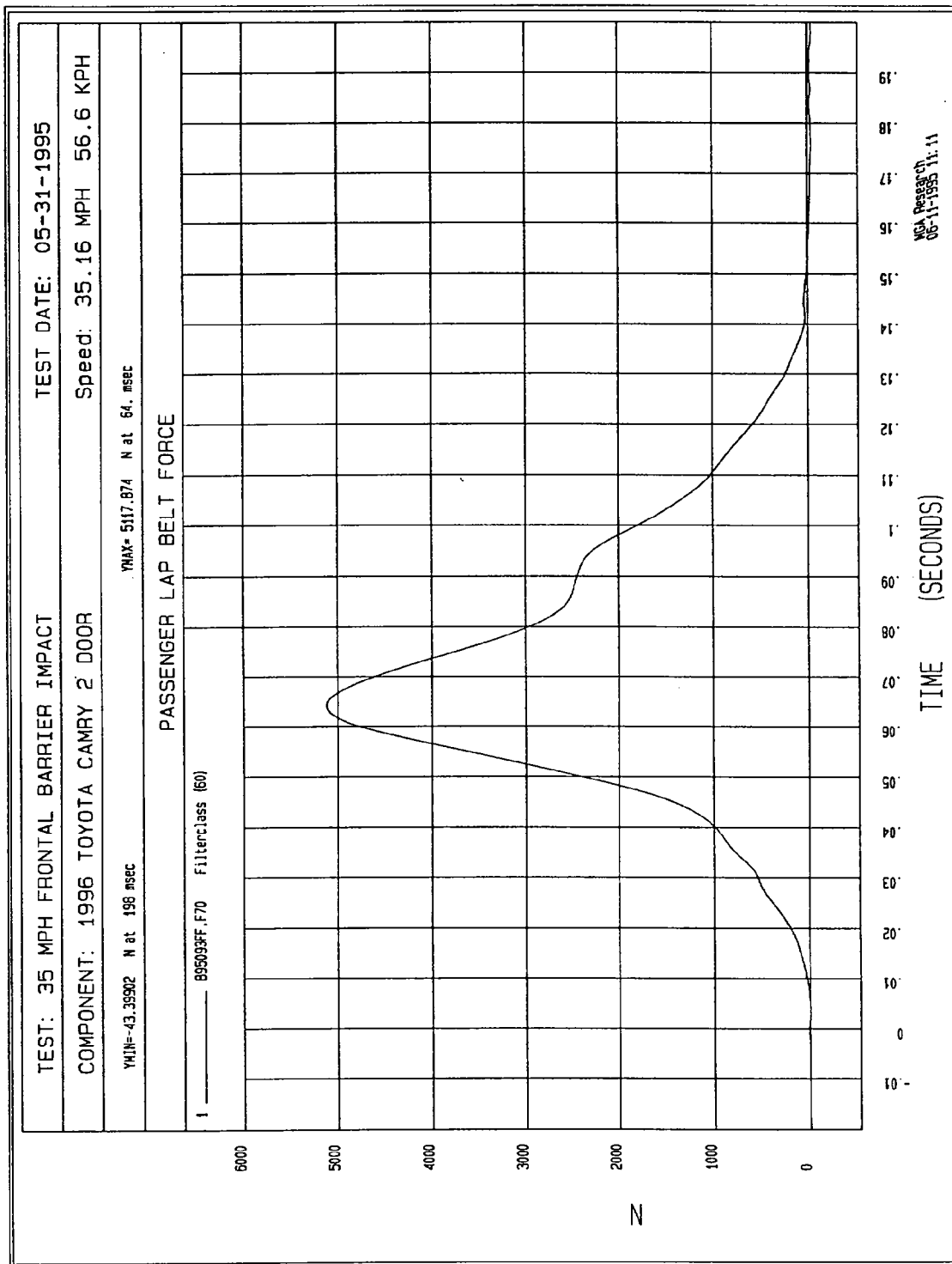


Figure B-114 - Passenger Lap Belt Force vs. Time

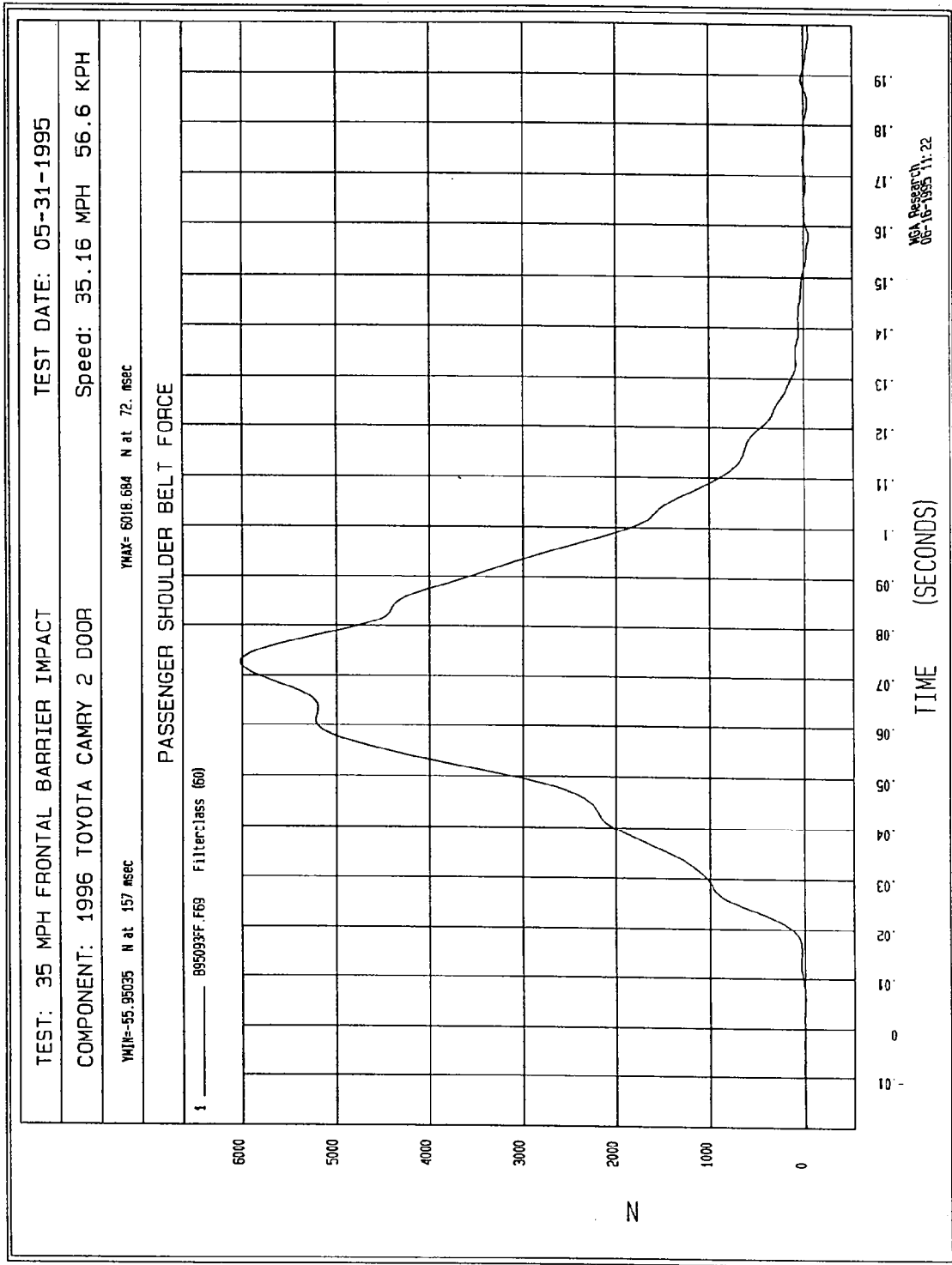


Figure B-115 - Passenger Shoulder Belt Force vs. Time

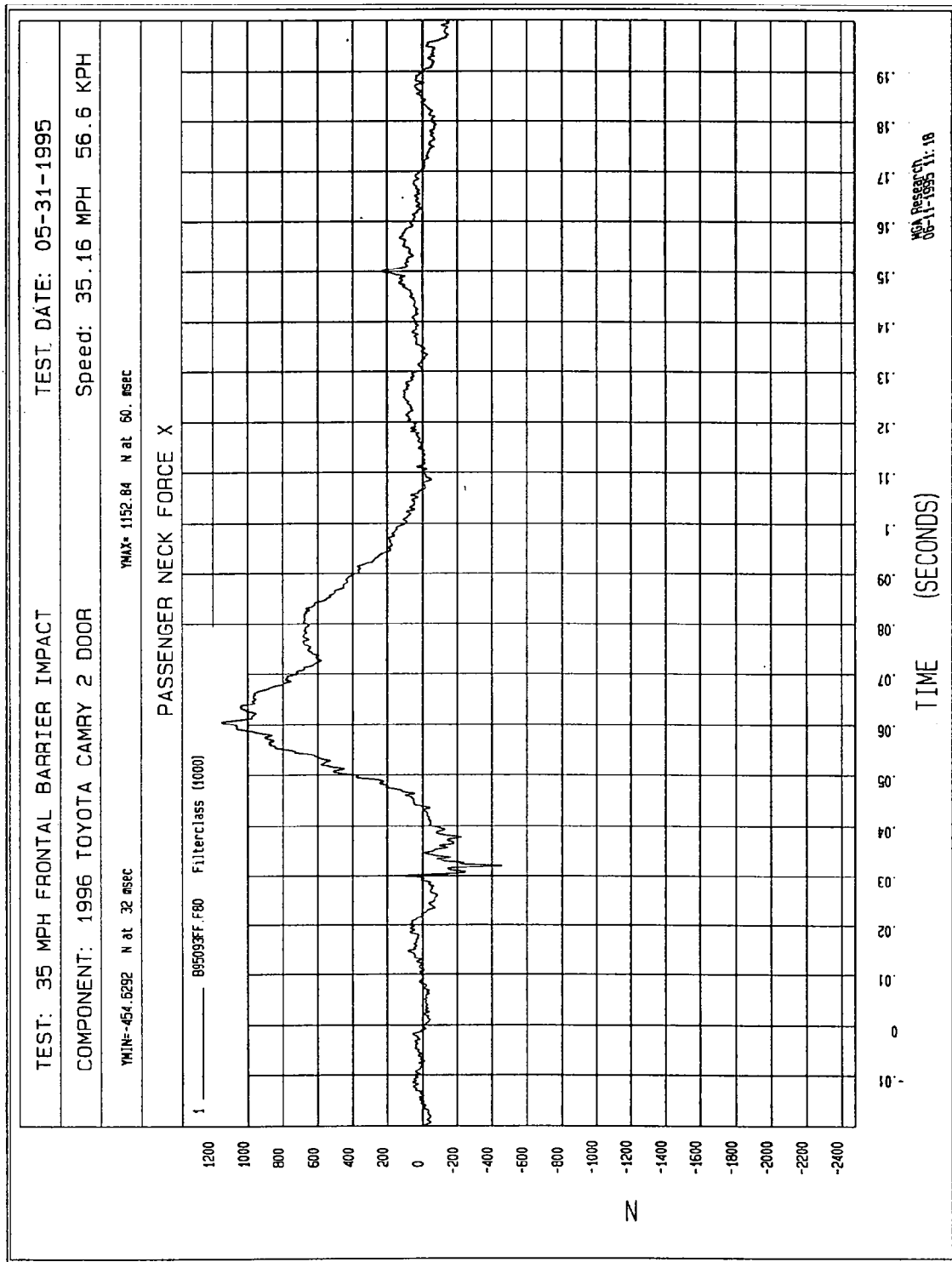


Figure B-116 - Passenger Neck Force X vs. Time

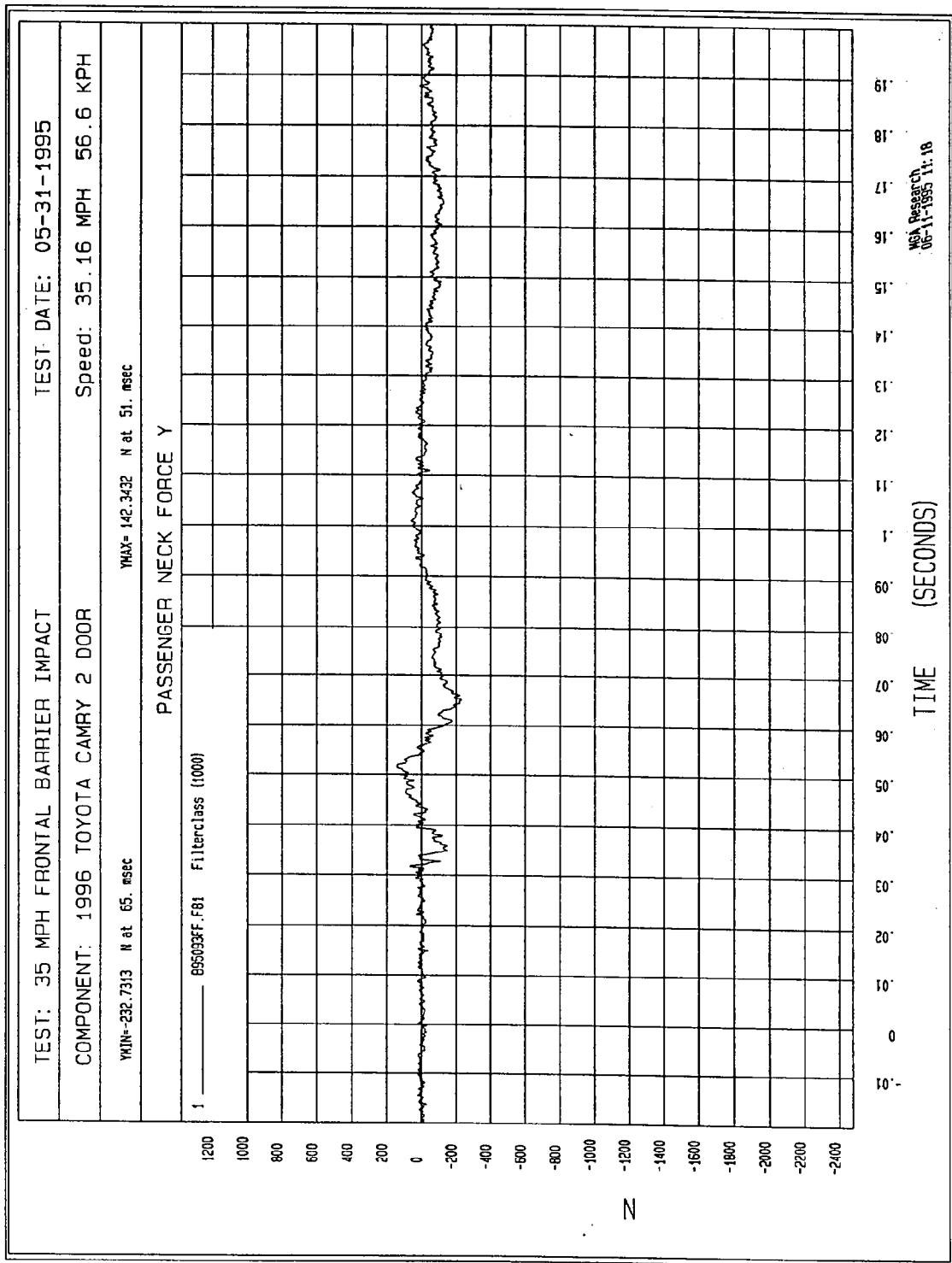
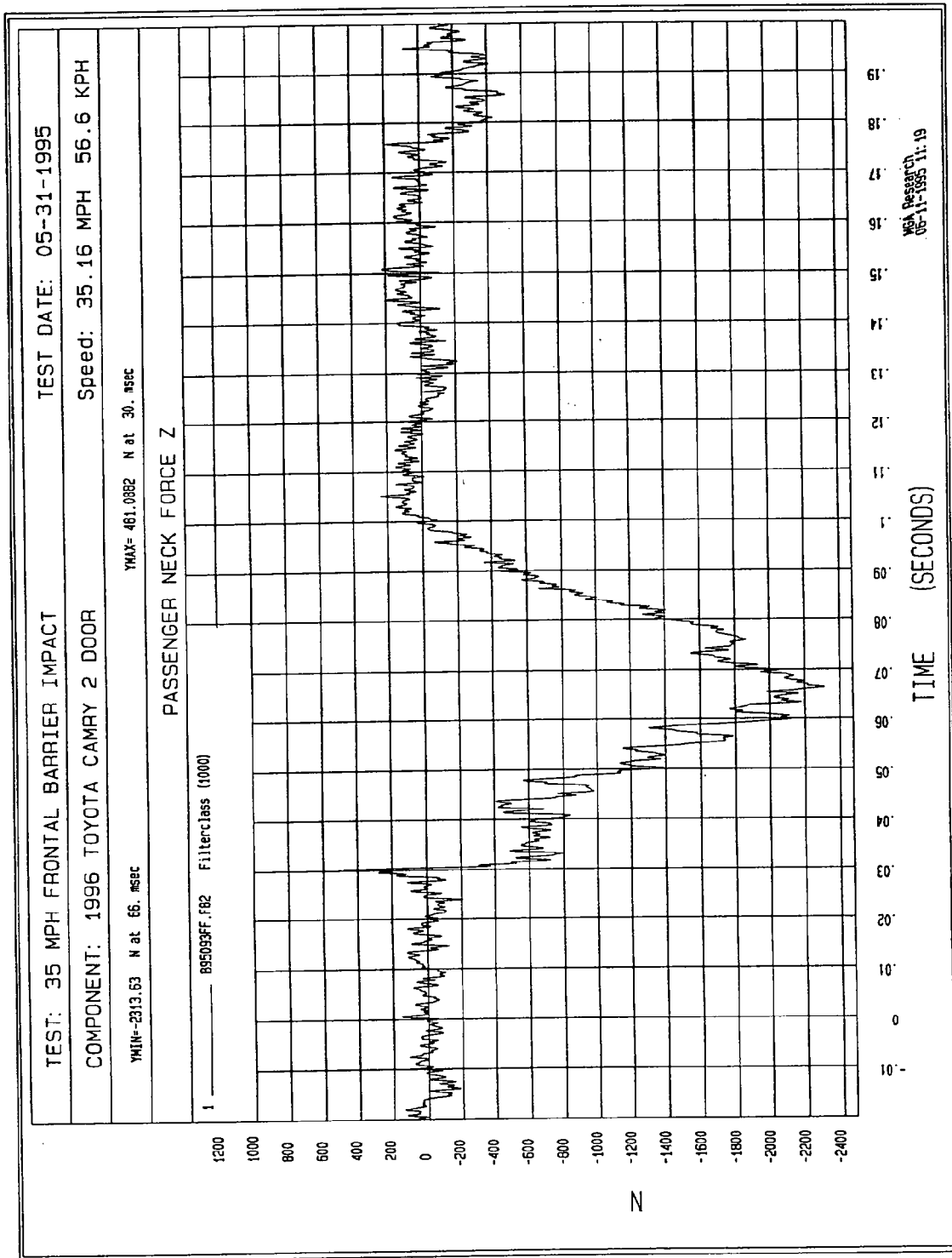


Figure B-117 - Passenger Neck Force Y vs. Time



B-118

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

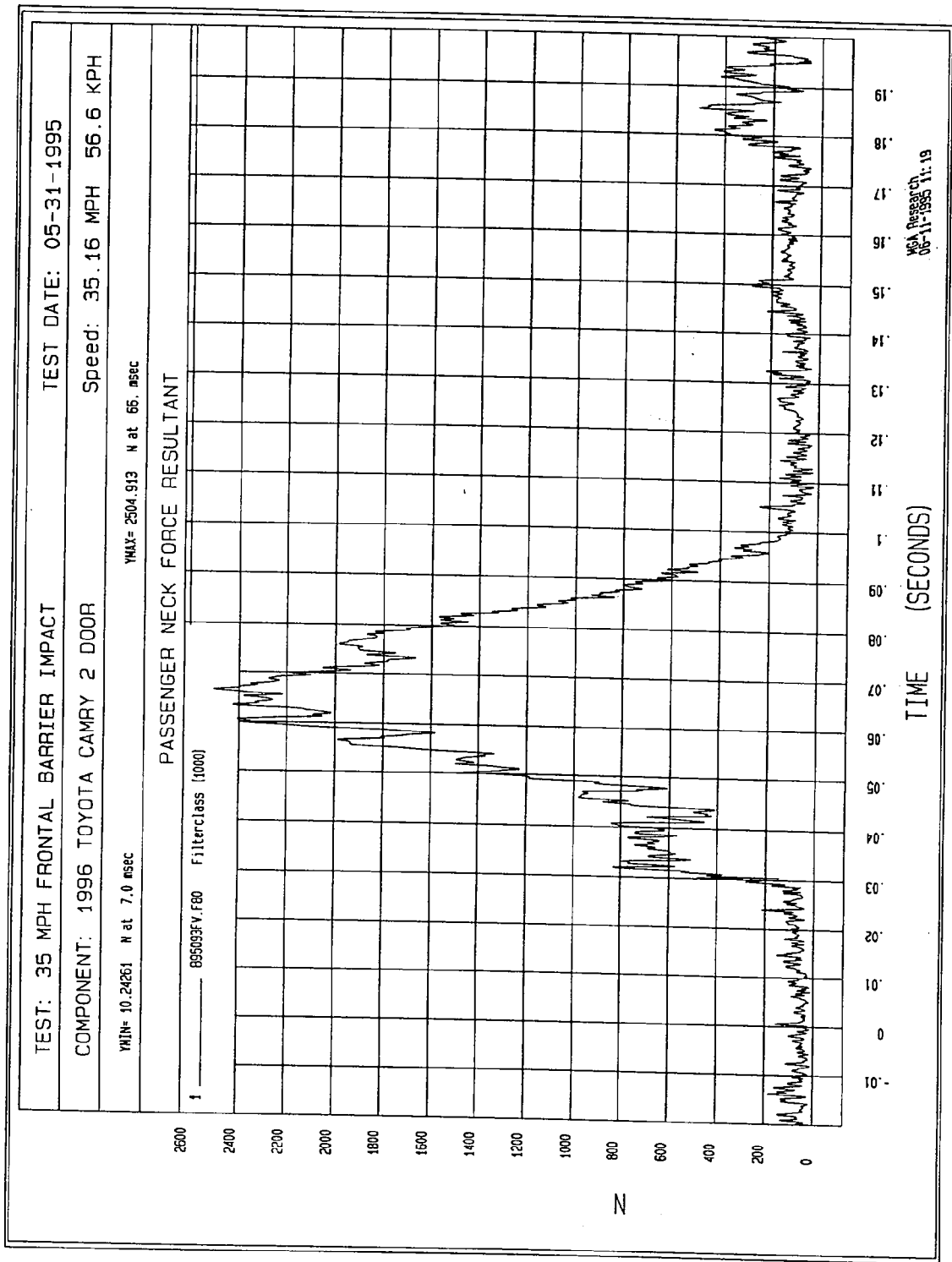


Figure B-119 - Passenger Neck Force Resultant Acceleration vs. Time

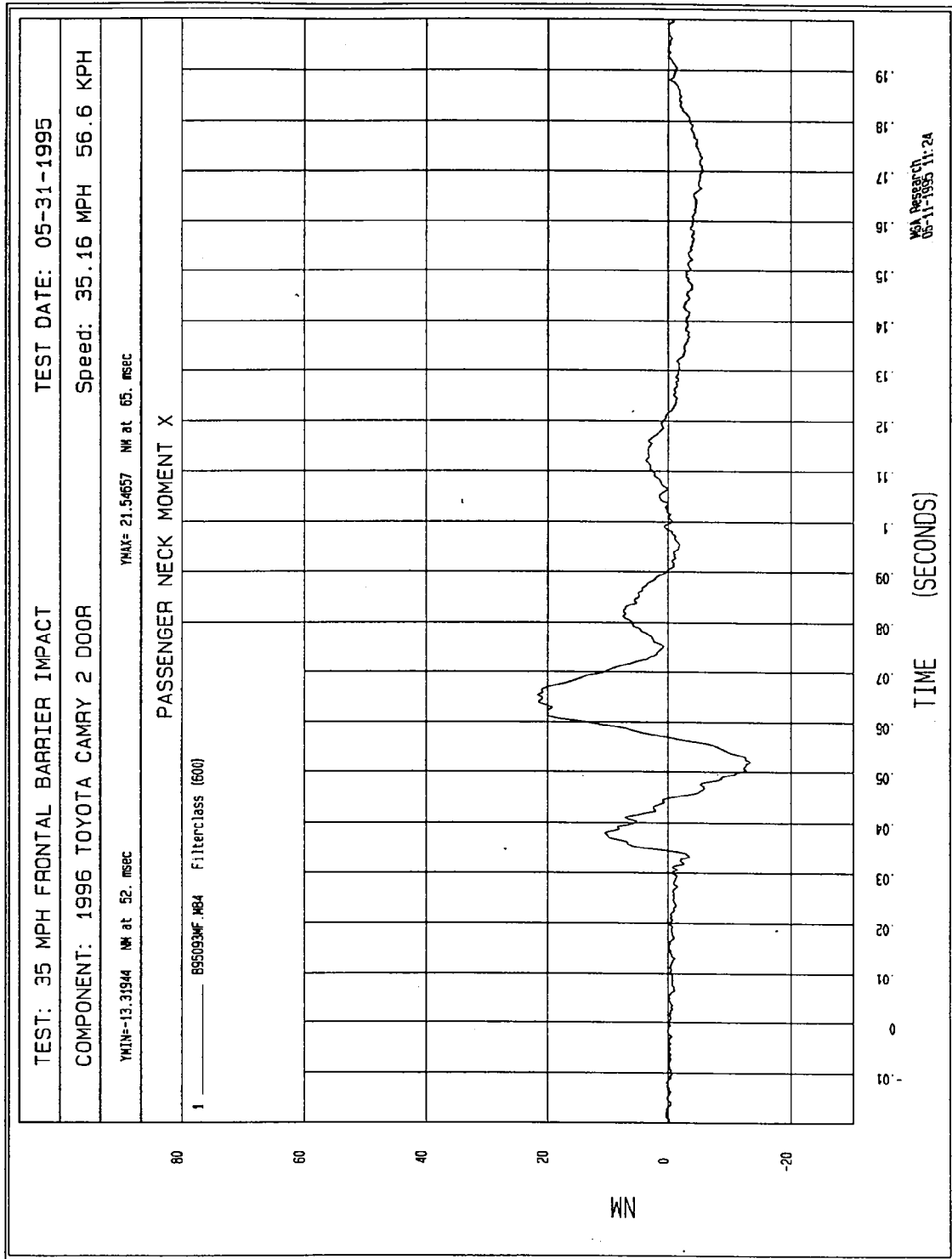


Figure B-120 - Passenger Neck Moment X vs. Time

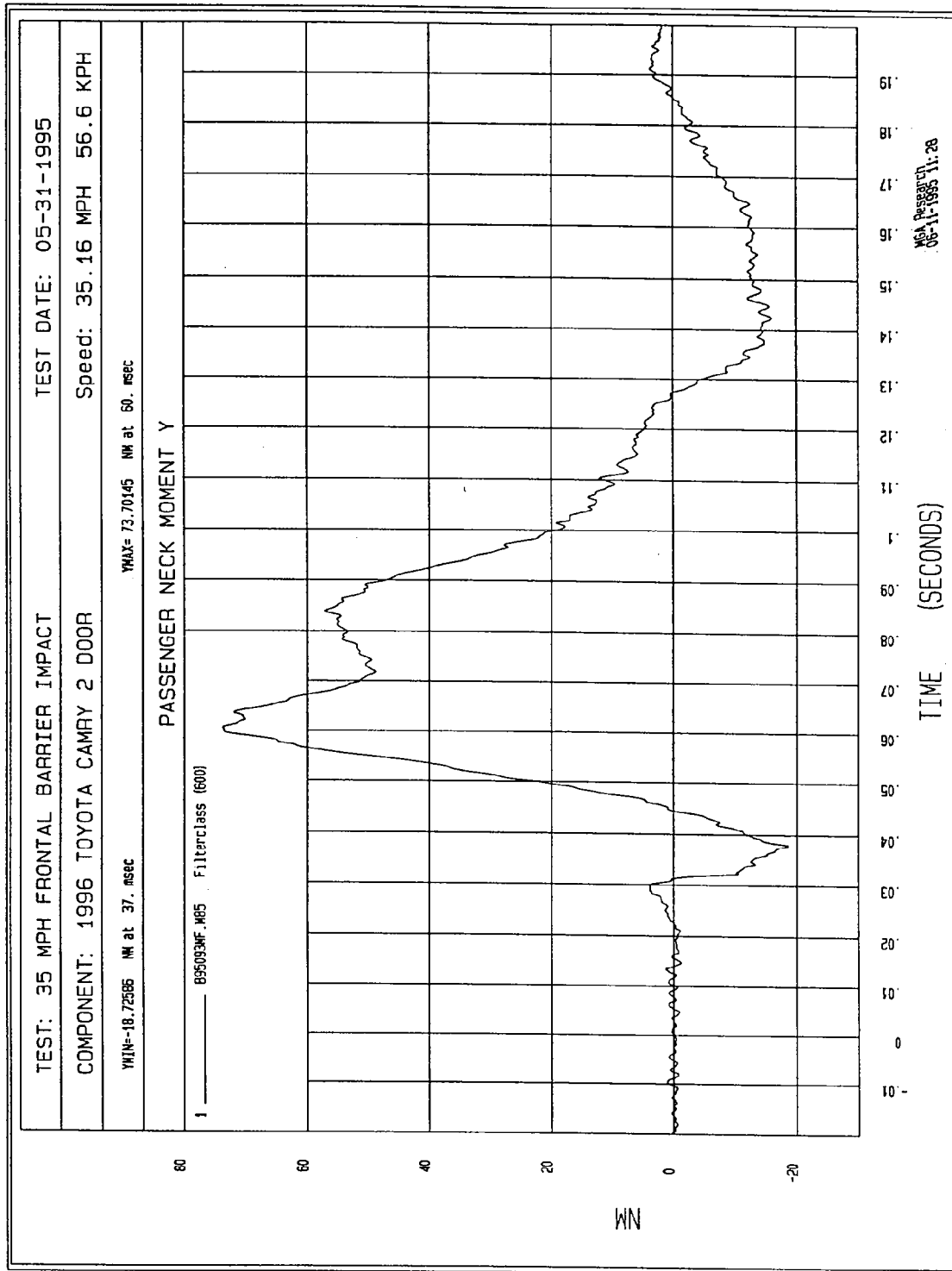


Figure B-121 - Passenger Neck Moment Y vs. Time

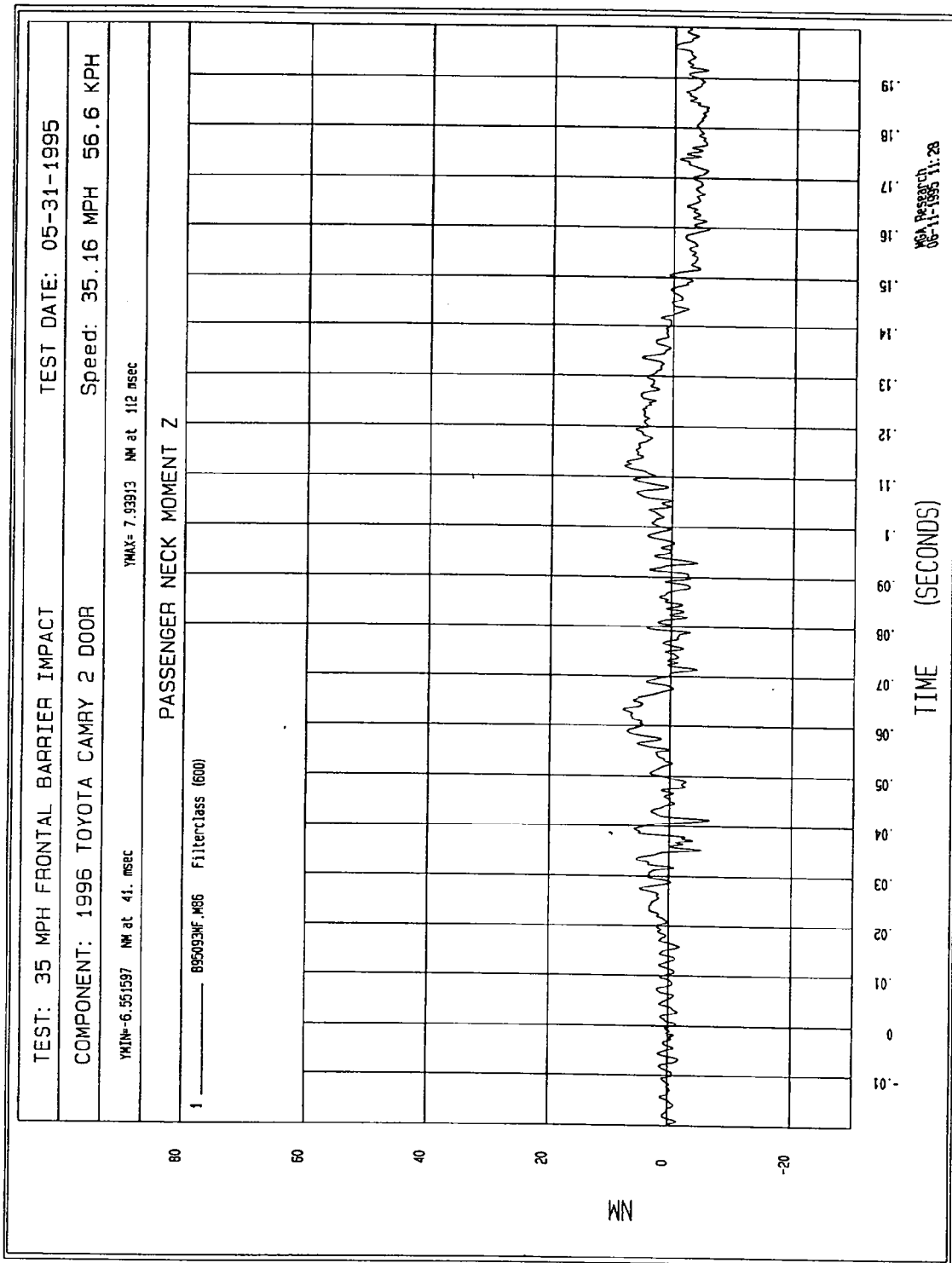


Figure B-122 - Passenger Neck Moment Z vs. Time

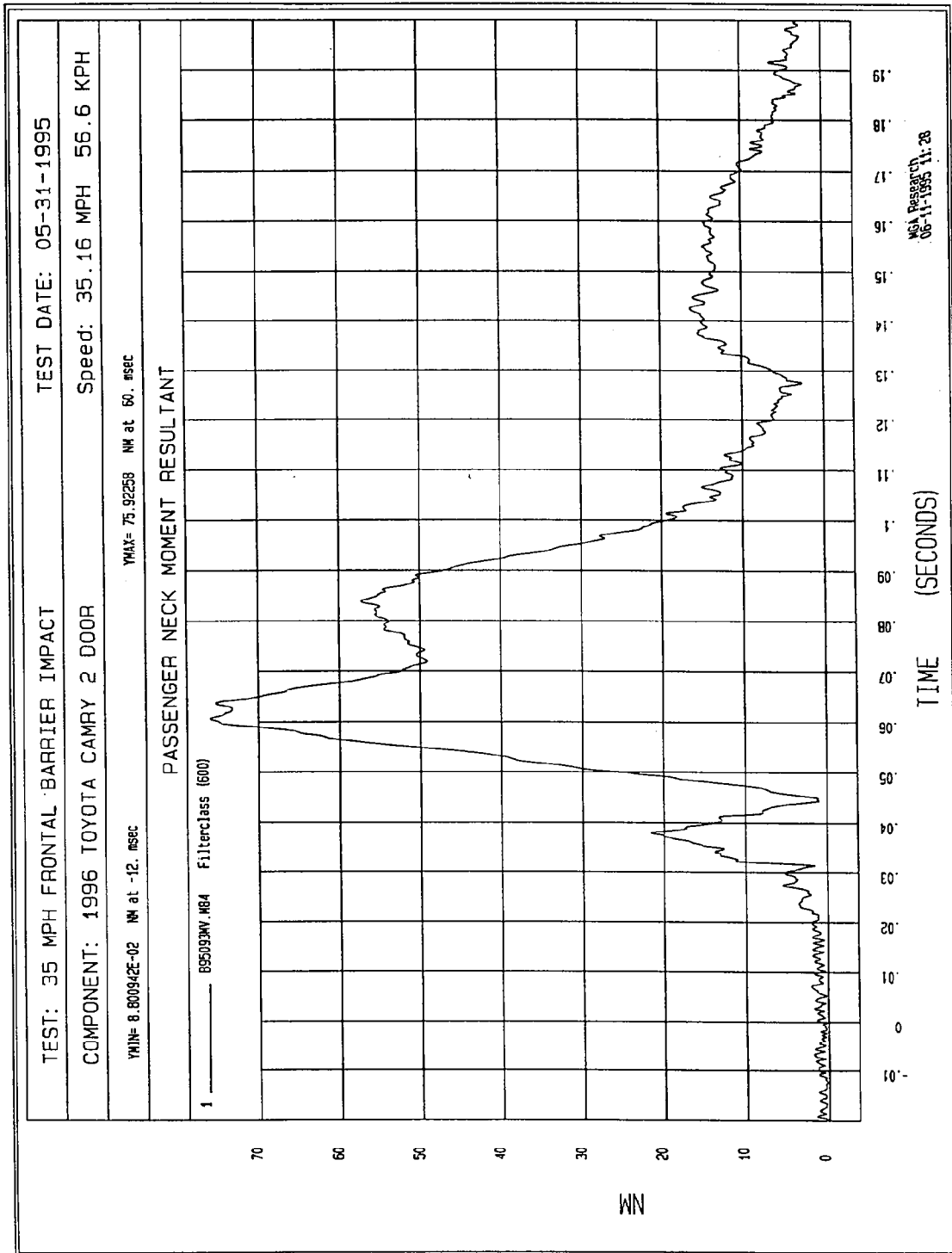


Figure B-123 - Passenger Neck Moment Resultant Accel. vs. Time

APPENDIX C

Dummy Configuration & Performance Verification Data

HYBRID III DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 065 DUMMY CALIBRATION BY: Al Chalmers

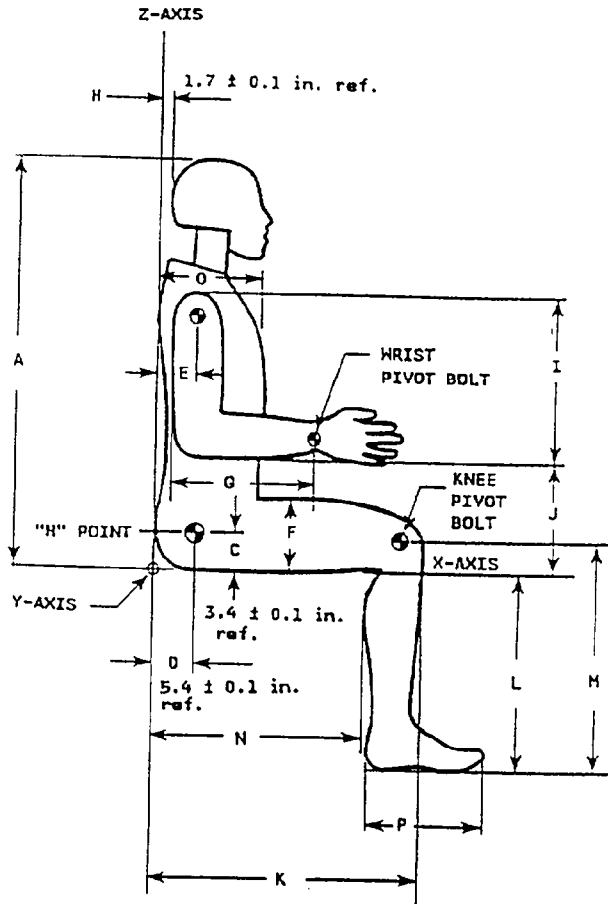
I.CONFIGURATION VERIFICATION DATA

DATE OF VERIFICATION: 03-15-95

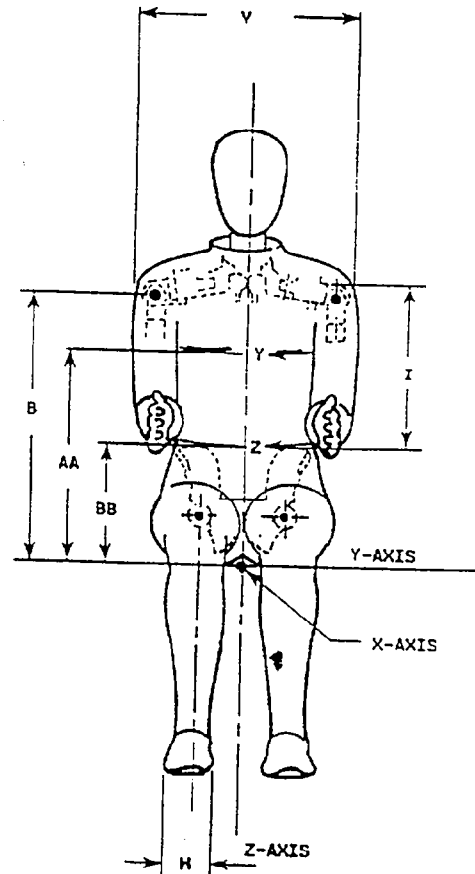
DESCRIPTION	SPECIFICATION (inches)	ACTUAL MEASUREMENT (inches)
A - Total Sitting Height	34.6 - 35.0	34.9
B - Shoulder Pivot Height	19.9 - 20.5	20.5
C - "H" Point Height	3.3 - 3.5	3.5
D - "H" Point from Seat Back	5.3 - 5.5	5.5
E - Shoulder Pivot From Backline	3.3 - 3.7	3.5
F - Thigh Clearance	5.5 - 6.1	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: 03-15-95

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

1.0 HEAD DROP TEST

	SPECIFICATION	MEASUREMENT
Peak Resultant Acceleration	225 - 275 G	260
Peak Lateral Acceleration	15 G. MAX	10
Is Acceleration Curve Unimodal	within 10% of peak	Yes

2.0 NECK FLEXION TEST

		SPECIFICATION	MEASUREMENT
Pendulum Speed		22.6 - 23.4 FT/SEC	23.0
Pendulum Deceleration	10 MS	22.50 - 27.50 G	23.93
	20 MS	17.60 - 22.60 G	21.51
	30 MS	12.50 - 18.50 G	18.19
Max. Pendulum G Above 30 MS		29.0 G MAX	18.2
Deceleration - Time Curve Decay Time to 5 G		34 - 42 MS	39
D Plane Rotation	MAX	64 - 78 DEG.	71
	TIME	57 - 64 MS	57
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 MS	113
Moment About Occipital Condyle	MIN.	65 - 80 FT.LBS	68
	TIME	47 - 58 MS	51
Positive Moment - Time Curve Decay Time to Zero		97 - 107 MS	102

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

3.0 NECK EXTENSION TEST

		SPECIFICATION	MEASUREMENT
Pendulum Speed		19.50 - 20.30 F/S	20.00
Pendulum Deceleration	10 MS	17.20 - 21.20 G	19.71
	20 MS	14.00 - 19.00 G	16.65
	30 MS	11.00 - 16.00 G	14.22
Max. Pendulum G Above 30 MS		22 G Max	14
Deceleration - Time Curve Decay Time to 5 G		38 - 46 MS	41
D Plane Rotation	MAX	81 - 106 DEG.	99
	TIME	72 - 82 MS	76
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 MS	154
Moment About Occipital Condyle	MIN.	-59.0/-39.0 FT LBS	-46.3
	TIME	65 - 79 MS	71
Positive Moment - Time Curve Decay Time to Zero		120 - 148 MS	143

4.0 CHEST IMPACT TESTS

	SPECIFICATION	MEASUREMENT
Probe Speed	21.6 to 22.4 F/S	26.7
Peak Deflection	2.50 to 2.86 IN.	2.55
Peak Resistive Force	1160 to 1325 LBS.	1304
Internal Hysteresis	69 to 85%	69

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.	1206

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

HYBRID III DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 066 DUMMY CALIBRATION BY: Al Chalmers

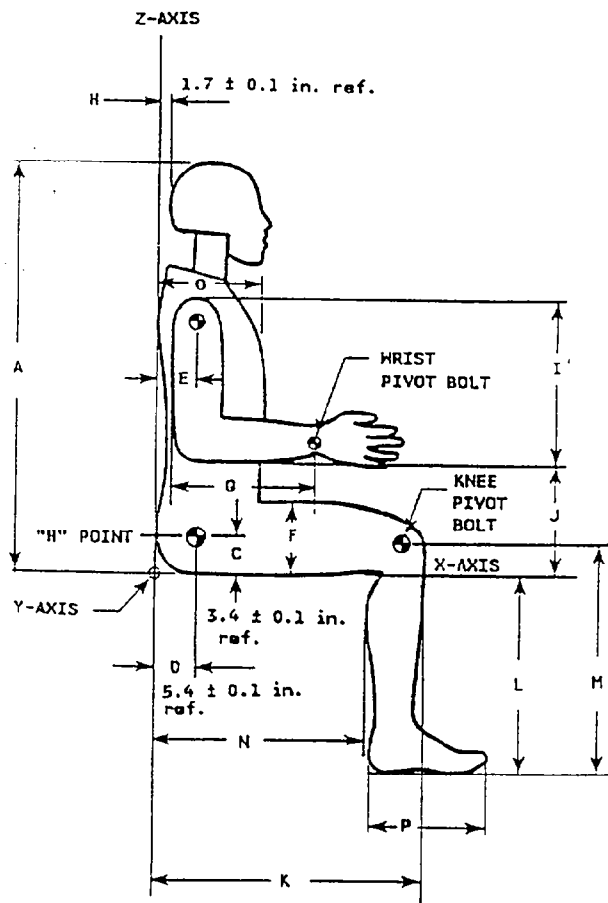
I. CONFIGURATION VERIFICATION DATA

DATE OF VERIFICATION: 03-14-95

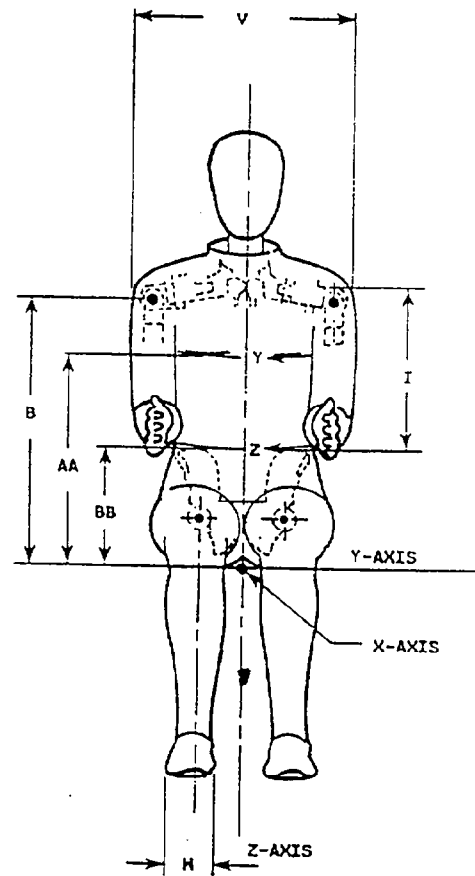
DESCRIPTION	SPECIFICATION (Inches)	ACTUAL MEASUREMENT (inches)
A - Total Sitting Height	34.6 - 35.0	34.8
B - Shoulder Pivot Height	19.9 - 20.5	20.5
C - "H" Point Height	3.3 - 3.5	3.5
D - "H" Point from Seat Back	5.3 - 5.5	5.5
E - Shoulder Pivot From Backline	3.3 - 3.7	3.5
F - Thigh Clearance	5.5 - 6.1	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: 03-14-94

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

1.0 HEAD DROP TEST

	SPECIFICATION	MEASUREMENT
Peak Resultant Acceleration	225 - 275 G	242
Peak Lateral Acceleration	15 G. MAX	2
Is Acceleration Curve Unimodal	within 10% of peak	Yes

2.0 NECK FLEXION TEST

		SPECIFICATION	MEASUREMENT
Pendulum Speed		22.6 - 23.4 FT/SEC	23.0
Pendulum Deceleration	10 MS	22.50 - 27.50 G	24.24
	20 MS	17.60 - 22.60 G	21.95
	30 MS	12.50 - 18.50 G	16.19
Max. Pendulum G Above 30 MS		29.0 G MAX	16.1
Deceleration - Time Curve Decay Time to 5 G		34 - 42 MS	39
D Plane Rotation	MAX	64 - 78 DEG.	73
	TIME	57 - 64 MS	58
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 MS	113
Moment About Occipital Condyle	MIN.	65 - 80 FT.LBS	68
	TIME	47 - 58 MS	52
Positive Moment - Time Curve Decay Time to Zero		97 - 107 MS	103

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

3.0 NECK EXTENSION TEST

		SPECIFICATION	MEASUREMENT
Pendulum Speed		19.50 - 20.30 F/S	20.17
Pendulum Deceleration	10 MS	17.20 - 21.20 G	17.39
	20 MS	14.00 - 19.00 G	14.65
	30 MS	11.00 - 16.00 G	11.75
Max. Pendulum G Above 30 MS		22 G Max	12
Deceleration - Time Curve Decay Time to 5 G		38 - 46 MS	38
D Plane Rotation	MAX	81 - 106 DEG.	99
	TIME	72 - 82 MS	74
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 MS	151
Moment About Occipital Condyle	MIN.	-59.0/-39.0 FT LBS	-50.2
	TIME	65 - 79 MS	70
Positive Moment - Time Curve Decay Time to Zero		120 - 148 MS	140

4.0 CHEST IMPACT TESTS

	SPECIFICATION	MEASUREMENT
Probe Speed	21.6 to 22.4 F/S	21.8
Peak Deflection	2.50 to 2.86 IN.	2.72
Peak Resistive Force	1160 to 1325 LBS.	1254
Internal Hysteresis	69 to 85%	73

5.0 KNEE IMPACT TESTS

LEFT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	7.0
Maximum Force	1060 - 1300 LBS.	1107

RIGHT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	7.0
Maximum Force	1060 - 1300 LBS.	1133

APPENDIX D

Dummy, Vehicle and Laboratory Calibration Data

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 065

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	AAMN8	Endevco	02/05/95
Head Y	ACC61	Endevco	01/11/95
Head Z	ACCW9	Endevco	02/02/95
Head X Redundant	AJ621	Endevco	02/02/95
Head Y Redundant	AJ619	Endevco	02/02/95
Head Z Redundant	AHY54	Endevco	02/02/95
Chest X	ACC78	Endevco	02/07/95
Chest Y	ACCE6	Endevco	02/07/95
Chest Z	ACCY3	Endevco	02/07/95
Chest X Redundant	AJ9J7	Endevco	02/07/95
Chest Y Redundant	AJ7A2	Endevco	02/07/95
Chest Z Redundant	AJ819	Endevco	02/07/95
Right Femur Load Cell	260	Servo	02/13/95
Left Femur Load Cell	259	Servo	02/13/95
Pelvis X	ALB87	Endevco	02/10/95
Pelvis Y	AGNB3	Endevco	02/10/95
Pelvis Z	AJ834	Endevco	02/10/95

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 065

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Neck Load Cell X	442	Denton	01/14/95
Neck Load Cell Y	442	Denton	01/14/95
Neck Load Cell Z	442	Denton	01/14/95
Neck Moment X	442	Denton	01/14/95
Neck Moment Y	442	Denton	01/14/95
Neck Moment Z	442	Denton	01/14/95
Chest Deflection Gauge	065	Servo	03/13/95
Lap Belt Load Cell	690	Lebow	04/12/95
Torso Belt Load Cell	624	Lebow	04/13/95

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 065

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

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 066

	PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	ACCY6	Endevco	03/17/95
Head Y	ACCH1	Endevco	03/17/95
Head Z	AAMW5	Endevco	03/17/95
Head X Redundant	AJ902	Endevco	03/17/95
Head Y Redundant	AH1E2	Endevco	03/17/95
Head Z Redundant	AJ7K3	Endevco	03/17/95
Chest X	ACCY1	Endevco	02/02/95
Chest Y	ACCC8	Endevco	02/02/95
Chest Z	ACCT7	Endevco	02/02/95
Chest X Redundant	AJ9D4	Endevco	02/06/95
Chest Y Redundant	AJ9F3	Endevco	02/02/95
Chest Z Redundant	AJ9D9	Endevco	02/06/95
Right Femur Load Cell	261	Denton	02/13/95
Left Femur Load Cell	262	Denton	02/13/95
Pelvis X	ALDY8	Endevco	02/10/95
Pelvis Y	ALEK9	Endevco	02/10/95
Pelvis Z	ALE80	Endevco	02/10/95

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 066

	PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Neck Load Cell X	443	Denton	01/14/95
Neck Load Cell Y	443	Denton	01/14/95
Neck Load Cell Z	443	Denton	01/14/95
Neck Moment X	443	Denton	01/14/95
Neck Moment Y	443	Denton	01/14/95
Neck Moment Z	443	Denton	01/14/95
Chest Deflection Gauge	066	Servo	01/31/95
Lap Belt Load Cell	211	GSE	04/12/95
Torso Belt Load Cell	661	Lebow	04/13/95

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

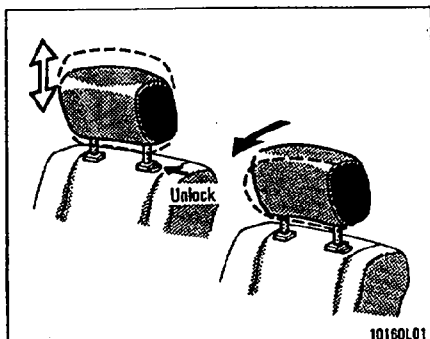
VEHICLE ACCELEROMETERS			
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Rear Seat Crossmember X	B12-G14	Entran	04/16/95
Right Rear Seat Crossmember X	C06-G08	Entran	05/02/95
Top of Engine Block X	C06-G01	Entran	04/26/95
Bottom of Engine X	L22-G08	Entran	02/02/95
Left Brake Caliper X	D06-A03	Entran	05/09/95
Right Brake Caliper X	B02-G07	Entran	02/23/95
Instrument Panel X	D06-A01	Entran	05/09/95
Redundant Left Rear Seat Crossmember X	AJ418	Endevco	05/09/95
Redundant Right Rear Seat Crossmember X	L15-G01	Entran	03/23/95

LABORATORY INSTRUMENTS			
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Neck Bending Pendulum Accelerometer	AGH90	Endevco	03/23/95
Neck Bending Head Rotary Potentiometer	018	Spectrol	03/13/95
Neck Bending Pendulum Rotary Potentiometer	019	Spectrol	03/13/95
Chest Probe Accelerometer	403071	Sensotec	01/11/95
Knee Impact Accelerometer	MGA001	Entran	04/21/95

APPENDIX E

Vehicle Owner's Occupant Restraint System Instructions

Head restraints (vertically and rotationally adjustable type)



To raise the head restraint, pull it up. To lower it, press the lock release button and push the head restraint down. To move the head restraint forward, pull on the top.

Pulling the top of the head restraint as far as it can go will return it to the upright position.

The head restraint is most effective when it is close to your head. Therefore, using a cushion on the seatback is not recommended.

CAUTION:

- Adjust the top of the head restraint so that it is closest to the top of your ears.
- After adjusting the head restraint, make sure it is locked in position.
- Do not drive with the head restraints removed.

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Seat belts—

—Seat belt precautions

Toyota recommends that the driver and passengers in the vehicle be properly restrained at all times with the seat belts provided. Failure to do so could increase the chance of injury and/or the severity of injury in accidents.

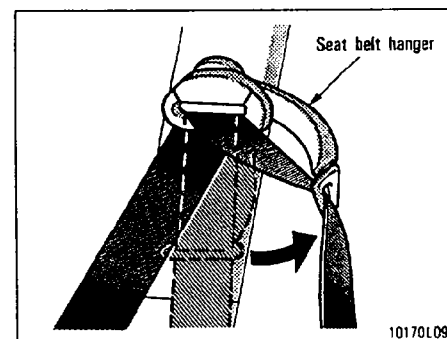
Baby or small child. Use a child restraint system which fits your vehicle. See "Child restraint" for details.

Child. If a child is too large for a child restraint system, the child should sit in the rear seat and must be restrained using the vehicle's seat belt. According to accident statistics, the child is safer when properly restrained in the rear seat than in the front seat. Do not allow the child to stand up or kneel both on rear and front seats. If the shoulder belt falls across the child's neck or face, move the child to the center position and use the center lap belt.

Pregnant woman. Toyota recommends the use of a seat belt. Ask your doctor for specific recommendations. The lap belt should be worn securely and as low as possible over the hips and not on the waist.

Injured person. Toyota recommends the use of a seat belt. Depending on the injury, however, first check with your doctor.

—Front seat belts and rear outside seat belts



Seat belts with a seat belt hanger—

Make sure that the seat belt hanger is secured in raised position. If it is not, be sure to raise the seat belt hanger until it locks in position.

You will hear a click when the seat belt hanger locks in position.

CAUTION:

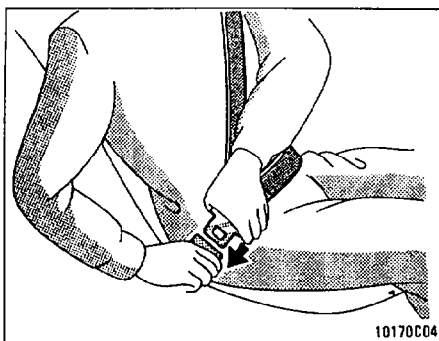
Persons should ride in their seats properly wearing their seat belts whenever the vehicle is moving. Otherwise, they are much more likely to suffer serious bodily injury in the event of sudden braking or a collision.

When using the seat belts, observe the following:

- Use the belt for only one person at a time. Do not use a single belt for two or more people—even children.
- Avoid reclining the seatbacks too much. The seat belts provide maximum protection when the seatbacks are in the upright position. (See the seat adjustment instructions.)
- Be careful not to damage the belt webbing or hardware. Take care that they do not get caught or pinched in the seat or doors.
- Inspect the belt system periodically. Check for cuts, fraying, and loose parts. Damaged parts should be replaced. Do not disassemble or modify the system.

- Keep the belts clean and dry. If they need cleaning, use a mild soap solution or lukewarm water. Never use bleach, dye, or abrasive cleaners—they may severely weaken the belts.
- Replace the belt assembly if it has been used in a severe impact. The entire assembly should be replaced even if damage is not obvious.

.....



Adjust the seat as needed (front seats only) and sit up straight and well back in the seat. To fasten your belt, pull it out of the retractor and insert the tab into the buckle.

You will hear a click when the tab locks into the buckle.

The seat belt length automatically adjusts to your size and the seat position.

The retractor will lock the belt during a sudden stop or on impact. It also may lock if you lean forward too quickly. A slow, easy motion will allow the belt to extend, and you can move around freely.

If the seat belt cannot be pulled out of the retractor, firmly pull the belt and release it. You will then be able to smoothly pull the belt out of the retractor.

CAUTION:

Always be sure that the belt is positioned across your shoulder, as close to your neck as possible; not on your upper arm or on your neck. Failure to do so could reduce the amount of protection in an accident and increase the chance of injury.

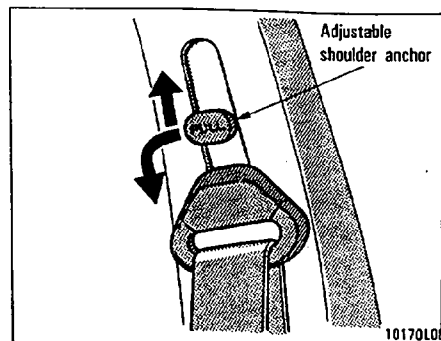
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When a passenger's shoulder belt is completely extended and is then retracted even slightly, the belt is locked in that position and cannot be extended. This feature is used to hold the child restraint system securely. (For details, see "Child restraint" in this chapter.) To free the belt again, fully retract the belt and then pull the belt out once more.

CAUTION:

After inserting the tab, make sure the tab and buckle are locked and that the belt is not twisted.

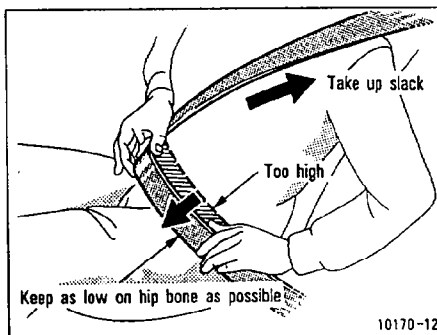
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Seat belts with an adjustable shoulder anchor—

Adjust the shoulder anchor position to your size.

To raise the anchor position, push the anchor up. To lower the anchor position, pull the knob and slide the anchor down. After adjustment, make sure the anchor is locked in position.



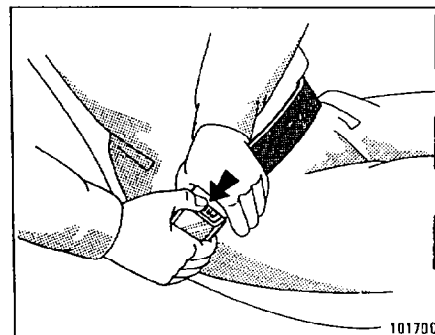
Adjust the position of the lap and shoulder belts.

Position the lap belt as low as possible on your hips—not on your waist, then adjust it to a snug fit by pulling the shoulder portion upward through the latch plate.

CAUTION:

- High-positioned lap belts and loose-fitting shoulder belts both could increase the chance of injury due to sliding under the lap belt during an accident.
- For your safety, do not place the shoulder belt under your arm.

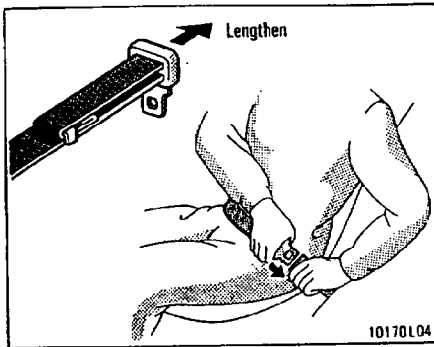
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To release the belt, press the buckle-release button and allow the belt to retract.

If the belt does not retract smoothly, pull out and check for kinks or twists. Then make sure it remains untwisted as it retracts.

—Rear center seat belt



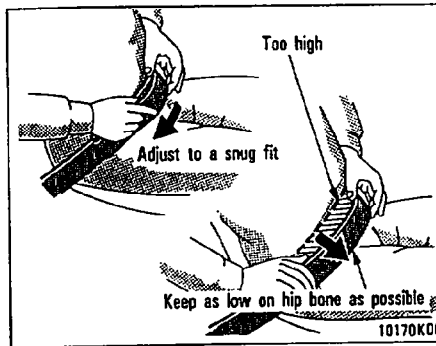
Sit up straight and well back in the seat. To fasten your belt, insert the tab into the buckle.

You will hear a click when the tab locks into the buckle.

If the belt is not long enough for you, hold the tab at a right angle to the belt and pull on the tab.

CAUTION: After inserting the tab, make sure the tab and buckle are locked and that the belt is not twisted.

After inserting the tab, make sure the tab and buckle are locked and that the belt is not twisted.



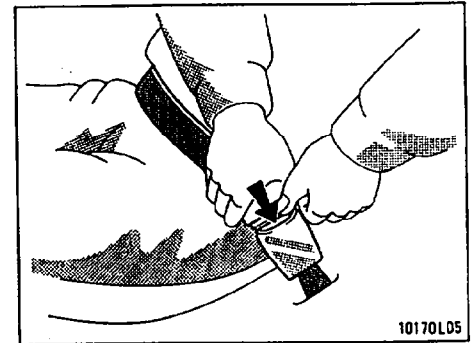
Remove excess length of the belt and adjust the belt position.

To shorten the belt, pull the free end of the belt.

Position the lap belt as low as possible on your hips—not on your waist, then adjust it to a snug fit.

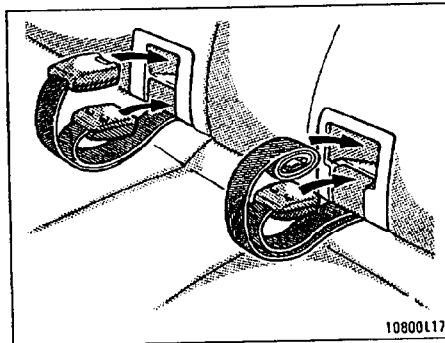
CAUTION: High-positioned lap belt could increase the chance of injury due to sliding under the lap belt during an accident.

High-positioned lap belt could increase the chance of injury due to sliding under the lap belt during an accident.



To release the belt, press the buckle-release button.

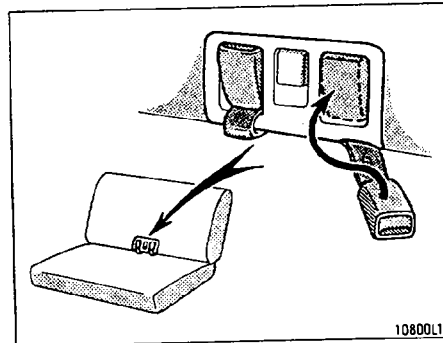
—Stowing the rear seat belts (wagon)



The rear seat belts can be stowed when not in use.

Seat belts must be stowed before you fold the seatback. (See "Rear seats—Fold-down rear seat" in this chapter.)

—Stowing the third seat belts (wagon)



The third seat belts can be stowed when not in use.

Seat belts must be stowed before you fold the seatback. (See "Rear seats—Take-down third seat" in this chapter.)

—Seat belt extender

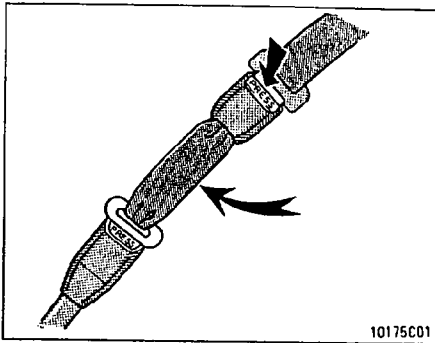
If your seat belt cannot be fastened securely because it is not long enough, a personalized seat belt extender is available from your Toyota dealer free of charge.

Please contact your local Toyota dealer so that the dealer can order the proper required length for the extender. Bring the heaviest coat you expect to wear for proper measurement and selection of length. Additional ordering information is available at your Toyota dealer.

CAUTION: When using the seat belt extender, observe the following. Failure to follow these instructions could result in less effectiveness of the seat belt restraint system in case of vehicle accident, increasing the chance of personal injury.

When using the seat belt extender, observe the following. Failure to follow these instructions could result in less effectiveness of the seat belt restraint system in case of vehicle accident, increasing the chance of personal injury.

- Never use the seat belt extender if you can fasten the seat belt without it.
- Remember that the extender provided for you may not be safe when used on a different vehicle, or for another person or at a different seating position than the one originally intended for.



To connect the extender to the seat belt, insert the tab into the seat belt buckle so that the "PRESS" signs on the buckle-release buttons of the extender and the seat belt are both facing outward as shown.

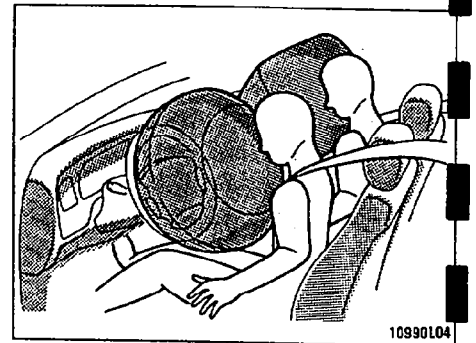
You will hear a click when the tab locks into the buckle.

When releasing the seat belt, press on the buckle-release button on the extender, not on the seat belt. This helps prevent damage to the vehicle interior and extender itself.

When not in use, remove the extender and store in the vehicle for future use.

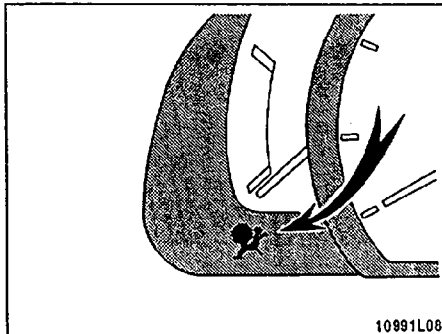
CAUTION: After inserting the tab, make sure the tab and buckle are locked and that the seat belt extender is not twisted.

SRS airbags



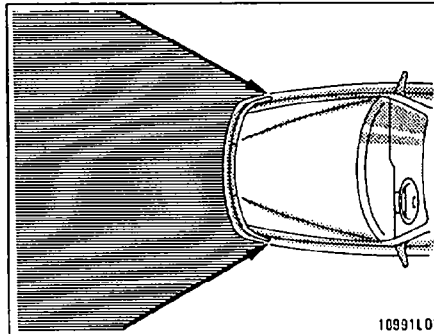
The SRS (Supplemental Restraint System) airbags are designed to provide further protection to the driver and front passenger when added to the primary protection provided by the seat belts.

In response to a severe frontal impact, the SRS airbags work together with the seat belts to prevent or reduce injury by inflating in order to decrease the likelihood of the driver's or front passenger's head or face directly hitting the steering wheel or dashboard. The passenger airbag is activated even with no passenger in the front seat.



This indicator comes on when the ignition key is turned to the "ACC" or "ON" position. It goes off after about 6 seconds. This means the SRS airbags are operating properly.

The SRS airbag warning light system monitors the front airbag sensors, center airbag sensor assembly, inflators, warning light, interconnecting wiring and power sources.



The SRS airbag system is designed to activate in response to a severe frontal impact within the shaded area between the arrows in the illustration.

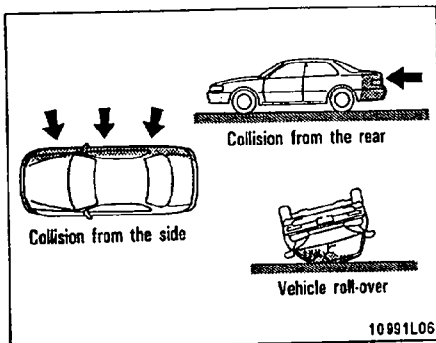
The SRS airbags will deploy if the severity of the impact is above the designed threshold level, comparable to an approximate 20 km/h (14 mph) collision when impacting straight into a fixed barrier that does not move or deform.

If the severity of the impact is below the above threshold level, the SRS airbags may not deploy.

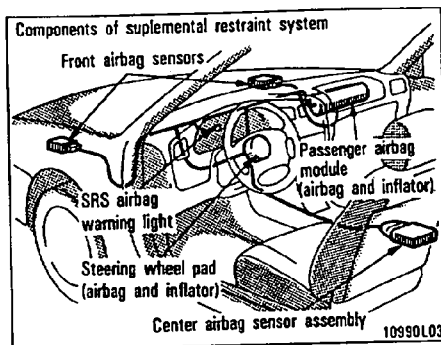
However, this threshold velocity will be considerably higher if the vehicle strikes an object, such as a parked vehicle or sign post which can move or deform on impact, or if it is involved in an underride collision (a collision in which the nose of the vehicle "under-rides", or goes under, the bed of a truck).

It is possible with collision severity at the marginal level of airbag sensor detection and activation that only one of your vehicle's two airbags will deploy.

For your safety, be sure to always wear your seat belts.



The SRS airbags are not designed to inflate if the vehicle is subjected to a side or rear impact, if it rolls over, or if it is involved in a low-speed frontal collision.



The center airbag sensor assembly consists of a safing sensor and center airbag sensor.

In a severe frontal impact, sensors detect deceleration and the system triggers the airbag inflators. Then a chemical reaction in the inflators momentarily fills the airbags with non-toxic nitrogen gas to help restrain the forward motion of the occupants.

When the airbags inflate, they produce a fairly loud noise and release some smoke along with the nitrogen gas. This is not harmful and does not indicate a fire. Be sure to wash off any residue as soon as possible to prevent minor skin irritation.

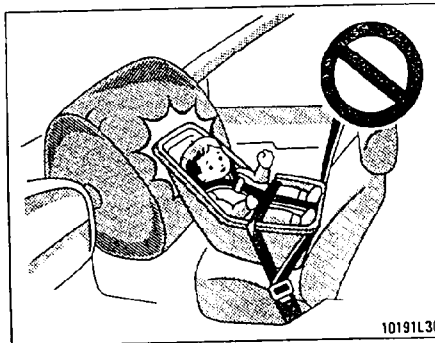
Deployment of the airbags happen in a fraction of a second, so the airbags must inflate with considerable force. While the system is designed to reduce serious injuries, it may also cause minor burns or abrasions and swellings.

Parts of the airbag module (steering wheel hub, dashboard) may be hot for several minutes, but the airbags themselves will not be hot. The airbags are designed to inflate only once.

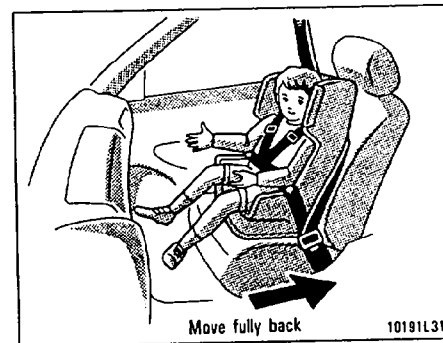
A crash severe enough to inflate the airbags may break the windshield as the vehicle buckles. In vehicles with a passenger airbag the windshield may also be damaged by absorbing some of the force of the inflating airbag.

CAUTION:

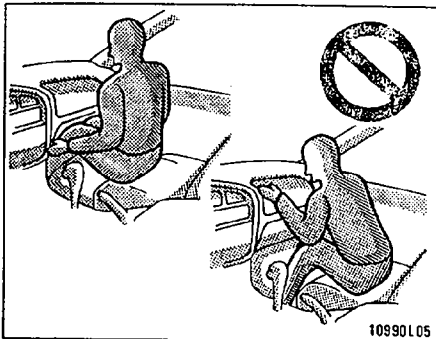
- The SRS airbag system is designed only as a supplement to the primary protection of the seat belt systems of the driver and front passenger. The front seat occupants are particularly susceptible to injury if they do not wear their seat belts; when sudden braking or a collision occurs, they may be thrown forward. To obtain further protection in an accident, the driver and all passengers in the vehicle should always wear their seat belts when driving. For instructions and precautions concerning the seat belt system, see "Seat belts" in this chapter.
- A baby or small child who is too small to use a seat belt should be properly secured in a rear seat using a child restraint system.



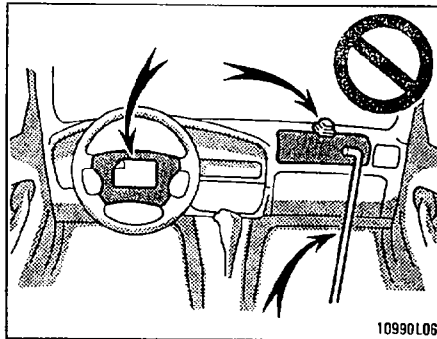
- Do not use a rear-facing child restraint system in the front seat because the force of the rapid inflation of the passenger airbag may cause severe injury to the child.



- When using a forward-facing child restraint system in the front seat, the seat must be moved as far back as possible. For instructions concerning the installation of a child restraint system, see "Child restraint" in this chapter.



- Do not sit on the edge of the seat or lean over the dashboard when the vehicle is in use. The airbags inflate with considerable speed and force; you may be severely injured. Sit up straight and well back in the seat, and always use your seat belt.



- Do not put objects on or in front of the dashboard or steering wheel pad that houses the airbag system. They might restrict inflation or cause personal injury as they are projected rearward.
- Do not modify, remove or open any component or wiring, such as the steering wheel, column cover, front passenger airbag cover, front passenger airbag, center airbag sensor assembly or front airbag sensors. Doing any of these may cause sudden SRS airbag inflation or disable the system, which could result in personal injury.

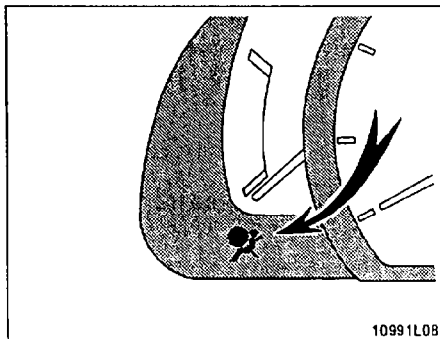
Failure to follow these instructions can result in severe injuries.

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NOTICE:

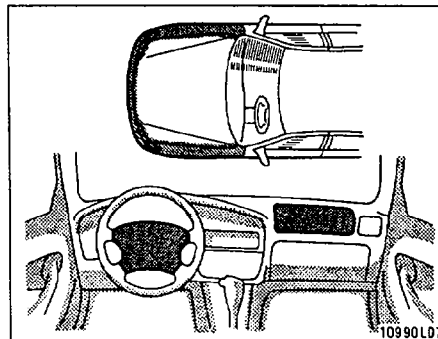
Do not perform any of the following changes without consulting your Toyota dealer. Such changes can interfere with proper operation of the SRS airbag system in some cases.

- ◆ Installation of electronic items such as a mobile two-way radio, cassette tape player or compact disc player
- ◆ Modification of the suspension system
- ◆ Repairs made on or near the front fenders, front and rear console, steering column, steering wheel or dashboard near the front passenger's airbag
- ◆ Modification of the front end structure
- ◆ Attachment of a grille guard (bull bar, kangaroo bar, etc.), snowplow, winches or any other equipment to the front end



This SRS airbag system has a service reminder indicator to inform the driver of operating problems. If either of the following conditions occurs, this indicates a malfunction of the airbags. Contact your Toyota dealer as soon as possible to service the vehicle.

- The light does not come on when the ignition key is turned to the "ACC" or "ON" position, or remains on.
- The light comes on while driving.



In the following cases, contact your Toyota dealer as soon as possible:

- The SRS airbags have been inflated.
- The front part of the vehicle (shaded in the illustration) was involved in an accident not of the extent to cause the SRS airbags to inflate.
- The pad section of the steering wheel or front passenger airbag cover (shaded in the illustration) is scratched, cracked, or otherwise damaged.