

REPORT NO.: MGA-93-21402

SAFETY COMPLIANCE TESTING FOR FMVSS 214
"SIDE IMPACT PROTECTION STUDY - PASSENGER CARS"

VOLVO
1994 VOLVO 850 4 DOOR SEDAN
NHTSA NO: CR5901

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105



MGA Ref. No.: G93A-02

Test Date: May 12, 1994

Report Date: August 8, 1994

FINAL REPORT

Prepared For:

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
MAIL CODE: NEF-30
400 SEVENTH STREET, SW ROOM 6115

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. MGA-94-21402		2. Government Accession No.		3. Recipient's Catalog No.																			
4. Title and Subtitle Final Report for FMVSS 214 Compliance Testing of a 1994 Volvo 850 4 Door Sedan NHTSA NO. CR5901				5. Report Date August 8, 1994																			
				6. Performing Organization Code MGA																			
7. Author(s) John Fleck				8. Performing Organization Report No. MGA-DOT-214-02																			
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105				10. Work Unit No.																			
				11. Contract or Grant No. DTNH22-93-C-02047																			
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Vehicle Safety Compliance (Mail Code: NEF-30) 400 Seventh St., S.W., Room 6115 Washington, D.C. 20590				13. Type of Report and Period Covered Final Report June 1994																			
				14. Sponsoring Agency Code NEF-30																			
15. Supplementary Notes																							
16. Abstract Compliance tests were conducted on the subject 1994 Volvo 850 4 Door Sedan in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure for the determination of FMVSS 214 compliance. The test was conducted at the MGA Research Proving Grounds and crash Test Center in Burlington, Wisconsin on May 12, 1994. The impact velocity of the Moving Barrier (MDB) was 33.0 mph and the ambient temperature of the struck side (driver's) of the target vehicle at the time of impact was 73°F. The test or target vehicle's performance is given below: <table border="0"> <thead> <tr> <th></th> <th><u>Driver's SID</u></th> <th><u>Left Rear SID</u></th> </tr> </thead> <tbody> <tr> <td>Thoracic Trauma Index (TTI)</td> <td>60 g's</td> <td>63 g's</td> </tr> <tr> <td>Pelvis Acceleration</td> <td>67 g's</td> <td>53 g's</td> </tr> <tr> <td>Upper Rib Acceleration</td> <td>42.0 g's</td> <td>51.2 g's</td> </tr> <tr> <td>Lower Rib</td> <td>52.8 g's</td> <td>65.5 g's</td> </tr> <tr> <td>Lower Spine</td> <td>66.8 g's</td> <td>61.2 g's</td> </tr> </tbody> </table>							<u>Driver's SID</u>	<u>Left Rear SID</u>	Thoracic Trauma Index (TTI)	60 g's	63 g's	Pelvis Acceleration	67 g's	53 g's	Upper Rib Acceleration	42.0 g's	51.2 g's	Lower Rib	52.8 g's	65.5 g's	Lower Spine	66.8 g's	61.2 g's
	<u>Driver's SID</u>	<u>Left Rear SID</u>																					
Thoracic Trauma Index (TTI)	60 g's	63 g's																					
Pelvis Acceleration	67 g's	53 g's																					
Upper Rib Acceleration	42.0 g's	51.2 g's																					
Lower Rib	52.8 g's	65.5 g's																					
Lower Spine	66.8 g's	61.2 g's																					
17. Key Words Side Impact Dummy (SID) Compliance Test FMVSS 214 Side Impact Protection				18. Distribution Statement Copies of this report are available from: NHTSA Technical Reference Division, Room 5108 (NAD-52), 400 Seventh Street, S.W. Washington, D.C. 20590 Telephone No. (202) 366-4946 Attn: Robert Hornickle																			
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages 243																			
				22. Price																			

This Test Report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTNH22-93-C-02047.

This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, finding and conclusions expressed in this publication are those of author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its content or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Approved by:

John Fleck

Date: 9-24-94

John Fleck, Project Engineer

FINAL REPORT ACCEPTED BY:

Ally M. Hager
Contract Technical Manager

Date: 10/3/94

TABLE OF CONTENTS

<u>Section</u>		<u>Page No.</u>
1	PURPOSE AND TEST PROCEDURE	1-1
2	SUMMARY OF SIDE IMPACT TEST	2-1
3	SUMMARY OF TEST DATA	3-1
4	OCCUPANT AND VEHICLE INFORMATION	4-1
APPENDIX A	PHOTOGRAPHS	
APPENDIX B	DATA PLOTS	
APPENDIX C	SID CONFIGURATION AND PERFORMANCE VERIFICATION	
APPENDIX D	DUMMY AND VEHICLE CALIBRATION DATA	

LIST OF FIGURES

<u>Figure No.</u>		<u>Page No.</u>
1	PRE-TEST CONDITIONS	3-4
2	PRE- AND POST-TEST MEASUREMENTS	4-3
3	SIDE IMPACT DUMMY (SID) LONGITUDINAL CLEARANCE DIMENSIONS	4-4
4	SIDE IMPACT DUMMY (SID) LATERAL CLEARANCE DIMENSIONS	4-5
5	VEHICLE SIDE MEASUREMENT	4-6
6	VEHICLE EXTERIOR STATIC CRUSH	4-8
7	TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY	4-17
8	MDB FACE DIMENSIONS	4-18
9	MOVING DEFORMABLE BARRIER (MDB) ACCELEROMETER LOCATIONS	4-21
10	HIGH SPEED CAMERA LOCATIONS AND DATA	4-22

LIST OF TABLES

<u>Table No.</u>		<u>Page No.</u>
1	GENERAL TEST AND VEHICLE PARAMETER DATA	3-2
2	TEST VEHICLE DATA	3-3
3	CRASH TEST SUMMARY FOR TEST VEHICLE	3-5
4	CRASH TEST SUMMARY FOR SIDE IMPACTOR	3-6
5	POST-TEST OBSERVATIONS	3-7
6	SIDE IMPACT DUMMY (SID) TEST DATA SUMMARY	4-2
7	TEST VEHICLE EXTERIOR PROFILES FROM REFERENCE PLANE AND STATIC CRUSH	4-7
8	EXTERIOR STATIC CRUSH FOR SIDE IMPACTOR	4-19
9	TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY	4-20

Section 1

PURPOSE AND TEST PROCEDURE

This side impact test is part of the FY 94 FMVSS 214 "Dynamic" compliance test program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-93-C-02047. The purpose of this test was to evaluate side impact protection in a 1994 Volvo 850 4 Door Sedan.

This test was conducted using the Office of Vehicle Safety Compliance's FMVSS 214 test procedure (TP-214D-03, dated May 17, 1993).

MGA does not endorse or certify products. The manufacturer's name appears solely for identification purposes only.

SECTION 2

SUMMARY OF SIDE IMPACT TEST

A stationary 1994 Volvo 850 4 Door Sedan was impacted on the left or driver's side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the monorail at a velocity of 33.0 mph on May 12, 1994. The orientation angle of the striking vehicle was 90° counterclockwise with respect to the longitudinal axis of the struck vehicle. Pre- and post-test photographs of the test vehicle, the moving deformable barrier (MDB), and the side impact dummies (SIDs) are shown in Appendix A.

Two restrained Side Impact Dummies (SIDs) were placed in the driver (Pos. #1) and left rear (Pos. #4) designated seating positions according to instructions specified in the Laboratory Test Procedure which is dated May 17, 1993. The side impact event was documented by nine high speed cameras. Camera locations and other pertinent camera information can be found in this report. Appendix B contains the vehicle and dummy response data traces.

The SIDs were instrumented with the following accelerometers.

1. Left Upper Rib (LUR) uniaxial accelerometer (Y-direction)
2. Left Lower Rib (LLR) uniaxial accelerometer (Y-direction)
3. Lower Thoracic Spine (T₁₂) uniaxial accelerometer (Y-direction)
4. Pelvic (PEV) section uniaxial accelerometer (Y-direction)

The driver's Thoracic Trauma Index (TTI) was 60 g's. Maximum pelvic Y acceleration was 68 g's.

The left rear passenger's TTI was 63 g's. Maximum pelvic Y acceleration was 53 g's.

TEST NOTES

The Left "A" Post Lower accelerometer detached approximately 5 msec. after impact. Data after this time period is not valid.

During impact, the fuel tank moved upward and contacted the "centerline of the vehicle over rear axle" accelerometer mounting screws. This caused two small holes in the fuel tank. Due to this condition, the static rollover (FMVSS 301) portion of the test was not performed.

SECTION 3
SUMMARY OF TEST DATA

TABLE 1
GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 1994/Volvo/850/4 Door Sedan
 Vehicle NHTSA No.: CR5901 VIN: YV1LS5513R2120814
 Vehicle Body Color: Aqua Month & Year of Manufacture: 11-93
 Engine Data: 5 cylinders; CID; 2.4 Liter; cc
 Placement Longitudinal; or X Lateral
 Transmission: 5 speed; X Manual; Automatic; Overdrive
 Final Drive: Rear Wheel Drive; X Frt. Wheel Drive; Four
 Wheel Drive
 Odometer Reading 188 miles
 Options: X A/C; X Pwr. Steering.; X Pwr. Brakes; X Pwr. Windows
 Power Seats; X Tilt Wheel; Power Door Locks; Self Leveling System

DATA FROM TIRE PLACARD:

Tire Pressure (at capacity): 36 psi FRONT
 36 psi REAR
 Recommended Tire Size: P195/60VR15
 Tires on Test Vehicle: P195/60VR15 Manufacturer: Michelin

Vehicle Capacity Data:

Number of Occupants: 2 Front; 3 Rear; N/A 3rd Seat 5 Total
 Type of Front Seats: X Bucket; Bench; Split Bench
 Type of Front Seat Back: Fixed; X Adjustable with X Knob
 Vehicle Maximum Capacity Loading = 930 lbs (A)
 No. of Occupants x 150 lbs. = 750 lbs (B)
 Cargo Capacity (A-B) = 180 lbs

WEIGHT OF TEST VEHICLE WITH MAXIMUM FLUIDS:

Right Front	= <u>946</u> lbs	Right Rear	= <u>608</u> lbs
Left Front	= <u>970</u> lbs	Left Rear	= <u>604</u> lbs
TOTAL FRONT	= <u>1916</u> lbs	TOTAL REAR	= <u>1212</u> lbs
% of Total Vehicle Weight =	<u>61.3</u> %;	% of Total Weight	= <u>38.7</u> %
TOTAL WEIGHT	= <u>3128</u> lbs		

TABLE 2
TEST VEHICLE DATA

Year/Make/Model/Body Style: 1994/Volvo/850/4 Door Sedan
Vehicle NHTSA No.: CR5901 TEST DATE: May 12, 1994

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Test Vehicle Delivered Weight with Maximum Fluids = 3128 lbs
Maximum Cargo Carrying Capacity of Test Vehicle = 180 lbs
Weight of 2 Side Impact Dummies (2 x 168 lbs.) = 336 lbs
TEST VEHICLE TARGET WEIGHT: = 3644 lbs

ACTUAL WEIGHT OF TEST VEHICLE WITH 2 DUMMIES AND CARGO:

Right Front	= <u>978</u> lbs	Right Rear	= <u>764</u> lbs
Left Front	= <u>1058</u> lbs	Left Rear	= <u>837</u> lbs
TOTAL FRONT	= <u>2036</u> lbs	TOTAL REAR	= <u>1601</u> lbs
% of Total Weight	= <u>56.0</u> %	% of Total Weight	= <u>44.0</u> %
TOTAL TEST WEIGHT = <u>3637</u> lbs			

TEST VEHICLE ATTITUDE (all dimensions in inches):

CURB WEIGHT ATTITUDE: (in)

Right Front 26.3 Left Front 26.3 Right Rear 26.0 Left Rear 26.0

FULLY LOADED WEIGHT ATTITUDE: (in)

Right Front 25.6 Left Front 26.0 Right Rear 24.5 Left Rear 24.4

TEST ATTITUDE: (in)

Right Front 25.9 Left Front 25.2 Right Rear 25.1 Left Rear 23.9

Test Vehicle Wheelbase: 104.7 inches

C.G. = 46 inches rearward of front wheel centerline

TOTAL VEHICLE LENGTH:

Right Side = 178.2 in
Centerline = 183.1 in
Left Side = 178.2 in

FIGURE 1
PRE-TEST CONDITIONS

Year/Make/Model/Body Style: 1994/Volvo/850/4 Door Sedan
Vehicle NHTSA No.: CR5901 TEST DATE: May 12, 1994

FRONT SEAT CUSHION PLACEMENT:

Total Length of Adjustment Travel: 8.9 in
Total Number of Adjustment Positions or Detents: 17
Test Adjustment Position: 8th detent from front (mid position)

FRONT SEAT BACK ADJUSTMENT POSITION:

Seat Back Angle = 18° degrees

SECOND POSITION SEAT:

Total Length of Fore/Aft Adjustment Travel: Non Adjustable
Seat Back Adjustment Position: Non Adjustable

ADJUSTABLE STEERING COLUMN POSITION:

Adjusted to mid position

WINDOW POSITIONS:

Left Front closed Left Rear closed

Right Front removed Right Rear removed

Note: Windows will be in closed position on struck side of test vehicle
and in open position on opposite side.

AMOUNT OF STODDARD SOLVENT IN FUEL TANK: Fuel system usable capacity = 19.3 gallons

Test Volume: 17.8 gallons (92% of capacity)

LOCATIONS OF IMPACT POINT ON TEST VEHICLE SIDE TO BE IMPACTED:

Wheelbase: = 104.7 in
Impact Point is 15.4 in rearward of front axle centerline (which
is 37 inches forward of the wheelbase midpoint)

TABLE 3
CRASH TEST SUMMARY FOR TEST VEHICLE

Year/Make/Model/Body Style: 1994/Volvo/850/4 Door Sedan

Vehicle NHTSA No.: CR5901 TEST DATE: May 12, 1994

Overall Length = 183.1 in; Overall Width = 68.8 in

TEST WEIGHT:

Right Front	= <u>978</u> lbs	Right Rear	= <u>764</u> lbs
Left Front	= <u>1058</u> lbs	Left Rear	= <u>837</u> lbs
TOTAL FRONT	= <u>2036</u> lbs	TOTAL REAR	= <u>1601</u> lbs
TOTAL VEHICLE WEIGHT <u>3637</u> lbs			
Wheelbase = <u>104.7</u> in			
Longitudinal C.G. front Center of Front Axle		= <u>46</u> in	
Impact Angle with Respect to Impactor		= <u>90°</u> degrees	

MAXIMUM EXTERIOR STATIC CRUSH:

1.	LEVEL 1 (<u>10.0</u> in above ground)	= <u>3.1</u> in
2.	LEVEL 2 (<u>17.0</u> in above ground)	= <u>10.3</u> in
3.	LEVEL 3 (<u>22.5</u> in above ground)	= <u>11.1</u> in
4.	LEVEL 4 (<u>33.0</u> in above ground)	= <u>8.3</u> in
5.	LEVEL 5 (<u>52.0</u> in above ground)	= <u>1.9</u> in
Maximum Post-Test Intrusion		= <u>11.1</u> in

OCCUPANTS:

	<u>Front Passenger</u>	<u>Rear Passenger</u>
Type of Dummy	<u>SID</u>	<u>SID</u>
Restraints Used	<u>3 pt. lap & shoulder belt</u>	<u>3 pt. lap & shoulder belt</u>

INSTRUMENTATION:

Number of Vehicle Data Channels:	= <u>15</u>
Number of Cameras: Onboard Vehicle	= <u>3</u>
Offboard Vehicle	= <u>4</u>
Deformable Barrier	= <u>2</u>
TOTAL	= <u>9</u>

TABLE 4
CRASH TEST SUMMARY FOR SIDE IMPACTOR

Year/Make/Model/Body Style: 1994/Volvo/850/4 Door Sedan

Vehicle NHTSA No.: CR5901 TEST DATE: May 12, 1994

POSITION OF IMPACT (MDB) ON MONORAIL:

Crabbed 27° to left

MDB DETAILS:

Overall Width of Framework Carriage	=	<u>49.3</u> in
Overall Length of MDB (incl. honeycomb impact face)	=	<u>162</u> in
Wheelbase of Framework Carriage	=	<u>102</u> in
Tread of Framework Carriage (Front & Rear)	=	<u>74</u> in
C.G. Location Rearward of Front Axle	=	<u>43.4</u> in
C.G. Location From Center Line	=	<u>-.3</u> in
C.G. Location Above Ground Level	=	<u>19.2</u> in

MDB WEIGHT:

Left Front	=	<u>1095</u> lbs	Left Rear	=	<u>413</u> lbs
Right Front	=	<u>624</u> lbs	Right Rear	=	<u>858</u> lbs
TOTAL FRONT	=	<u>1719</u> lbs	TOTAL REAR	=	<u>1271</u> lbs
TOTAL MDB WEIGHT = <u>2990</u> lbs					

Impact Angle (MDB C/L to Target Vehicle C/L) = 90° degrees

Impact Speed = Primary: 33.0 mph Secondary: 33.1 mph

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE:

1.	Row A Top of Stack (33 in)	=	<u>5.5</u> in
2.	Row B Mid Stack (27 in)	=	<u>4.4</u> in
3.	Row C Top of Bumper (21 in)	=	<u>2.9</u> in
4.	Row D Center of Bumper (17 in)	=	<u>4.5</u> in

INSTRUMENTATION:

Number of MDB Data Channels = 7

TABLE 5
POST-TEST OBSERVATIONS

Year/Make/Model/Body Style: 1994/Volvo/850/4 Door Sedan

Vehicle NHTSA No.: CR5901 TEST DATE: May 12, 1994

VISIBLE DUMMY CONTACT POINTS:

	<u>LEFT FRONT SID</u>	<u>LEFT REAR SID</u>
Head	<u>to side glass</u>	<u>to side glass</u>
Arm	<u>to door trim panel</u>	<u>to door trim panel</u>
Pelvis	<u>to door trim panel</u>	<u>to door trim panel</u>
Left Knee	<u>to door trim panel</u>	<u>to door trim panel</u>
Right Knee	<u>to left knee</u>	<u>to left knee</u>

DOOR OPENING:

	<u>LEFT SIDE</u>	<u>RIGHT SIDE</u>
Front	<u>remained closed</u>	<u>remained closed</u>
Rear	<u>remained closed</u>	<u>remained closed</u>

MDB DISTANCE FROM TARGET IMPACT POINT:

Horizontal: 1.8 in rearward Vertical: 1.0 in high

ARM REST LOCATIONS:

Front: 7.5 inches below window opening

Rear: 8.4 inches below window opening

SEAT CRUSH:

Driver Seat Cushion: 2 inches Seat Back: 2 inches

Left Rear Seat Cushion: 6 inches Seat Back: 2 inches

GLAZING DAMAGE:

Left side windows broken, windshield cracked

PILLAR PERFORMANCE:

No "A" or "B" pillar separation evident

SILL SEPARATION:

No sill separation noted

OTHER NOTABLE IMPACT EFFECTS:

None noted

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

SIDE IMPACT DUMMY (SID) TEST DATA SUMMARY

Vehicle NHTSA No.: CR5901 TEST DATE: May 12, 1994

	Front Dummy ID # 270				Rear Dummy ID # 269				
	Pos. Direct.		Neg. Direct		Pos. Direct.		Neg. Direct		
	Max (g)	Time (msec)	Max (g)	Time (msec)	Max (g)	Time (msec)	Max (g)	Time (msec)	
RIB ACCELERATIONS:									
	Upper Rib Lateral.....Y	42.0	31	-15.5	80	51.2	36	-10.9	117
	Upper Rib Lateral.....Y(R)	43.3	31	-13.5	80	47.4	36	-10.4	117
	Lower Rib Lateral.....Y	52.8	39	-14.7	90	65.5	38	-11.2	66
Lower Rib Lateral.....Y(R)	52.5	39	-14.4	90	65.0	38	-8.6	66	
SPINE ACCELERATIONS:									
	Lower Lateral.....Y	66.8	38	-17.9	68	61.2	41	-16.5	66
	Lower Lateral.....Y(R)	66.1	38	-16.4	68	61.4	41	-17.1	66
PELVIC ACCELERATIONS:									
	Lateral.....Y	67.4	35	-9.3	99	53.2	38	-9.0	71
	Lateral.....Y(R)	67.7	36	-9.4	99	55.2	38	-9.5	71

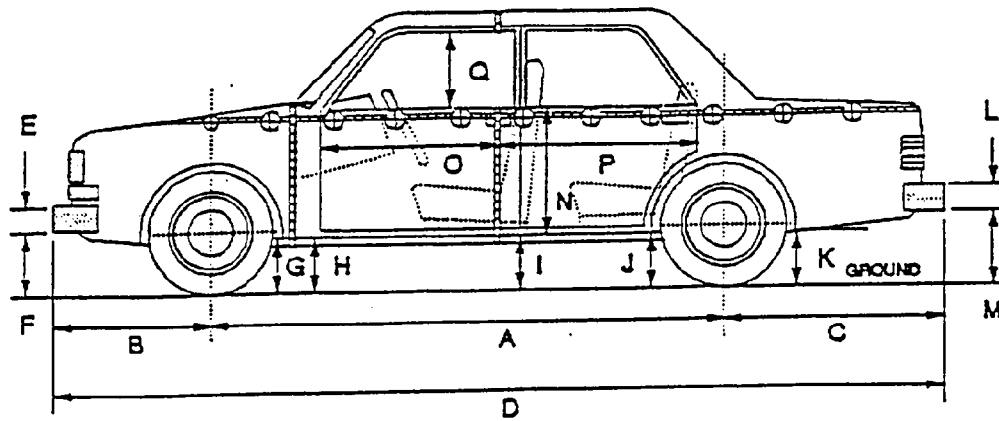
Positive Direction - Longitudinal (X) = forward
Negative Direction - Longitudinal (X) = rearward

Lateral (Y) = to left

Vertical (Z) = down

Note: Y(R) denotes redundant Y direction accelerometer.

FIGURE 2
PRE- AND POST-TEST MEASUREMENTS



D = Length at Centerline

R = Right Side Length

S = Left Side Length

T = Width at B Post

E & L = Bumper Thickness

J1 = To Pinch Weld

J2 = To Sill

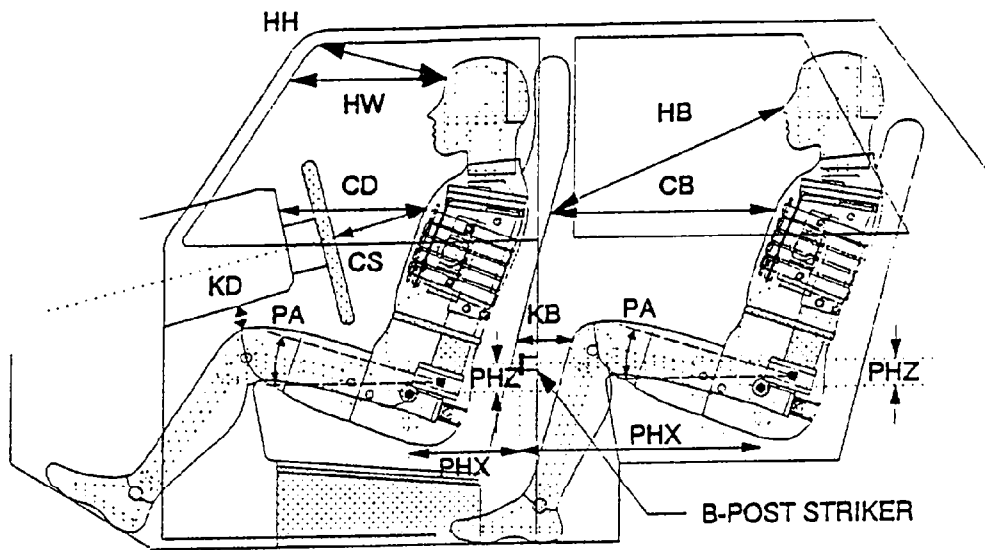
LEFT SIDE VIEW

Units: in

LOCATION	PRE-TEST	POST-TEST	Δ CHANGE
A	104.7	105.5	.8
B	37.9	38.4	.5
C	40.7	38.8	1.9
D	183.1	182.8	.3
E	6.6	6.6	0
F	13.3	13.9	.6
G	6.5	8.3	1.8
H	6.3	8.3	2.0
I	6.9	9.8	2.9
J1/J2	6.3/6.0	9.3/8.6	3.0/2.6
K	9.4	13.2	3.8
L	8.5	8.5	0
M	11.9	18.2	6.3
N	23.6	20.2	3.4
O	16.4	25.4	9.0
P	48.3	46.4	1.9
Q	18.8	17.8	1.0
R	178.2	178.3	.1
S	178.2	177.9	.3
T	68.8	59.1	9.7

FIGURE 3

SIDE IMPACT DUMMY (SID) LONGITUDINAL CLEARANCE DIMENSIONS



LEFT SIDE VIEW

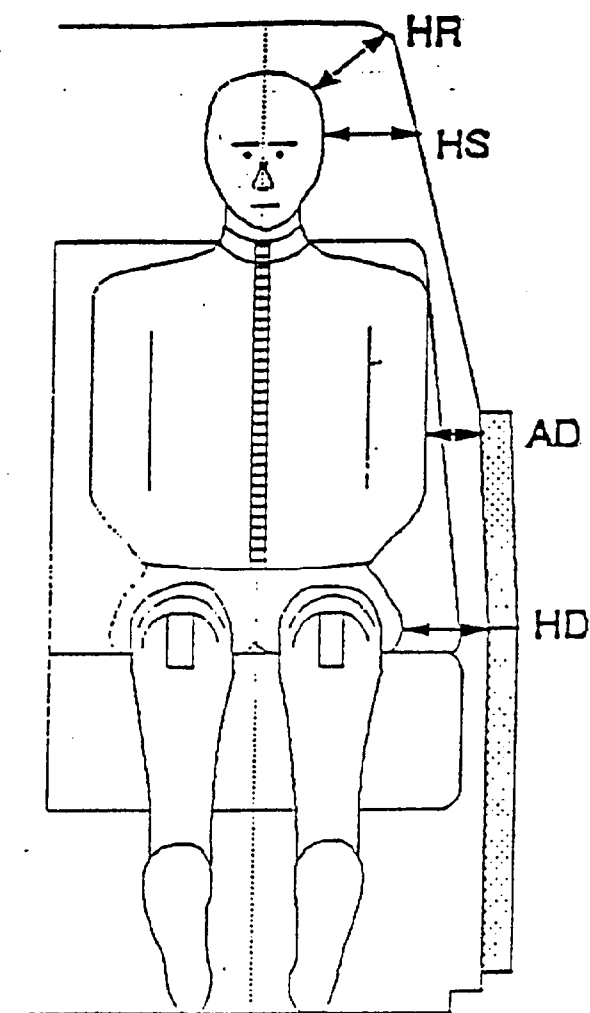
NOTE: 2-DOOR VEHICLE SHOWN.
REAR DUMMY PHX & PHZ
MEASUREMENTS FOR A 4-DOOR
VEHICLE WOULD USE THE C-POST
STRIKER AS A REFERENCE POINT

NOTE: All dimensions are in inches

	DRIVER ID #270	LEFT REAR PASSENGER ID #269	
HH	14.8	---	
HW	23.7	---	
HB	---	29.0	
CD	20.1	CB	23.5
CS	11.1	---	
KDL	6.4	KBL	8.8
KDR	6.4	KBR	9.0
PA°	23.4	24.6	
PHX	9.6	7.9	
PHZ	9.6	8.4	

NOTE: 2-door vehicle shown. Rear dummy PHX & PHZ measurements for 4-door vehicle would use the C-post striker as reference point.

FIGURE 4
SIDE IMPACT DUMMY (SID) LATERAL CLEARANCE DIMENSIONS

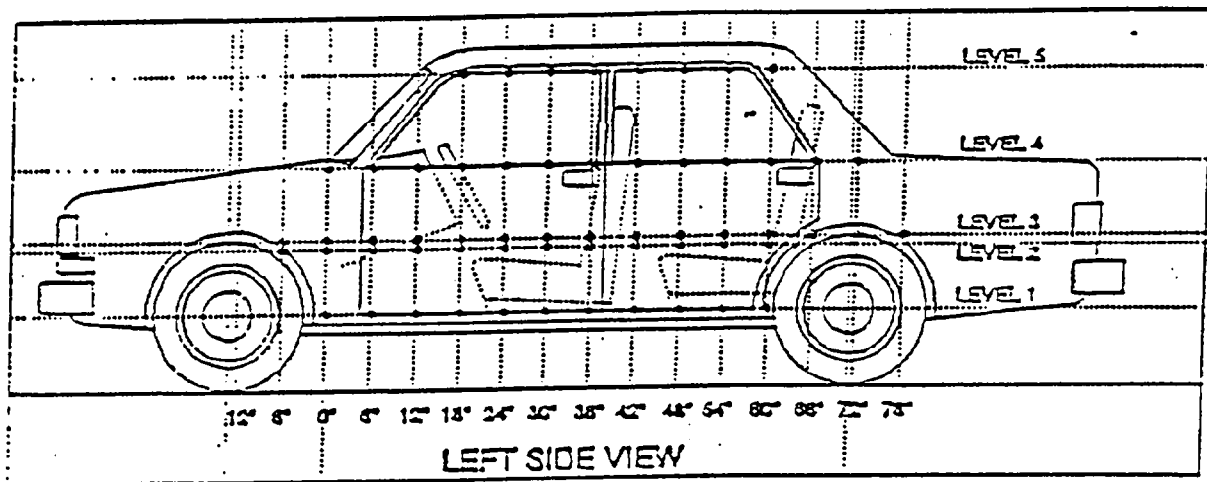


NOTE: All dimensions are in inches

	DRIVER ID #270	LEFT REAR PASSENGER ID #269
HR	6.6	6.3
HS	12.4	8.5
AD	4.5	3.0
HD	6.4	4.6

FIGURE 5
VEHICLE SIDE MEASUREMENTS

Year/Make/Model/Body Style: 1994/Volvo/850/4 Door Sedan
Vehicle NHTSA No.: CR5901 TEST DATE: May 12, 1994



As tested height measurements are with respect to ground along the vertical 30" line shown above:

<u>30" Side Profile</u>	
Level 5 @ Window Top	= <u>52.0</u> in
Level 4 @ Window Sill	= <u>33.0</u> in
Level 3 @ Mid Door	= <u>22.5</u> in
Level 2 @ Occupant H-Point	= <u>17.0</u> in
Level 1 @ Axle Centerline Height (or Sill Top Height)	= <u>10.0</u> in

TABLE 7

TEST VEHICLE EXTERIOR PROFILES FROM REFERENCE PLANE AND STATIC CRUSH

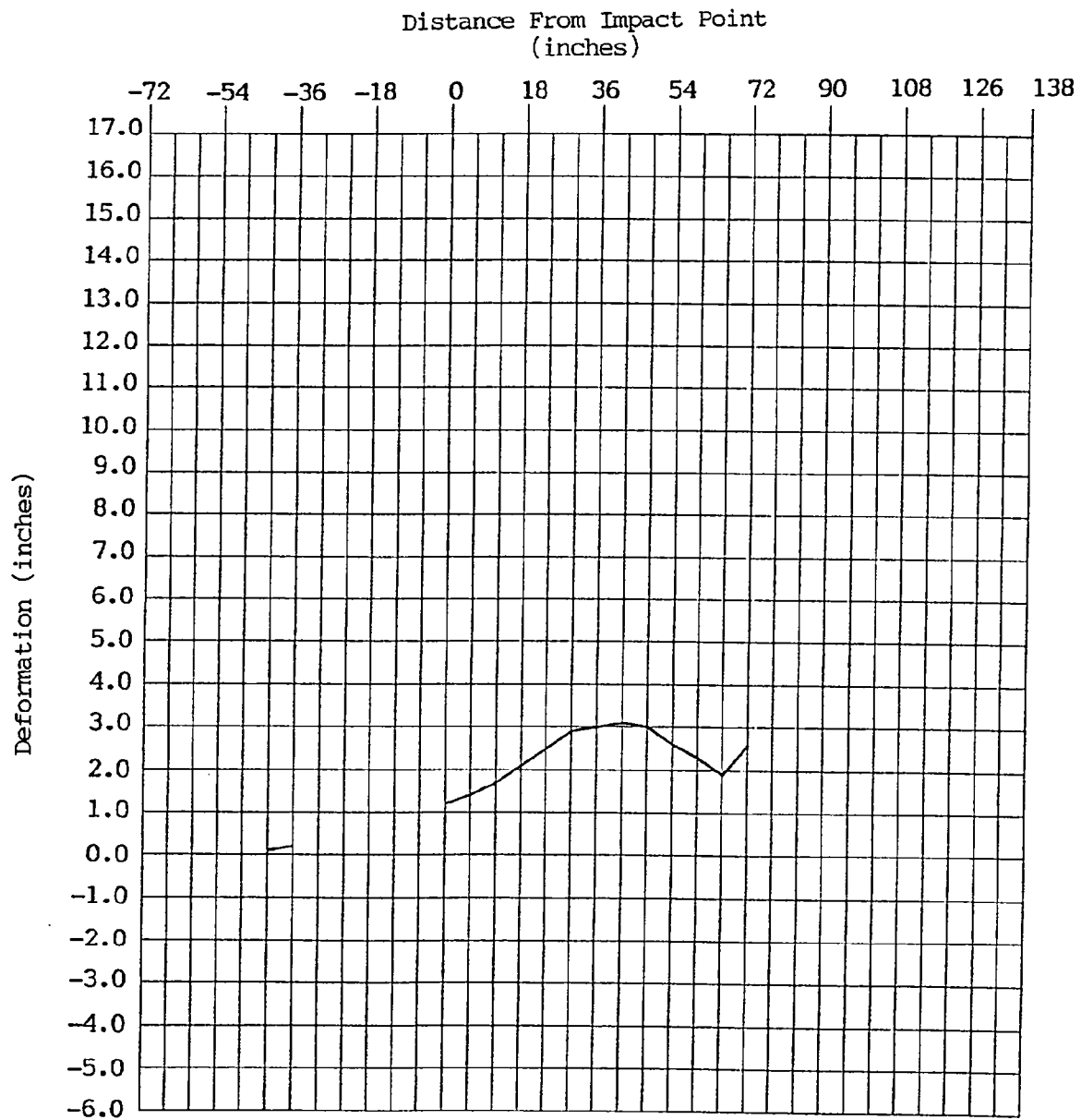
LEVEL 1 AT AXLE CENTER LINE

Year/Make/Model/Body Style: 1994/Volvo/850/4 Door SedanVehicle NHTSA No.: CR5901 TEST DATE: May 12, 1994

Longitudinal Distance (in)	PRE-TEST (in)	POST-TEST (in)	STATIC CRUSH (in)
-72	N/A	N/A	N/A
-66	N/A	N/A	N/A
-60	N/A	N/A	N/A
-54	N/A	N/A	N/A
-48	N/A	N/A	N/A
-42	31.9	32.0	0.1
-36	30.6	30.8	0.2
-30	---	---	---
-24	---	---	---
-18	---	---	---
-12	---	---	---
-6	---	---	---
0	29.1	30.3	1.2 (impact point)
6	29.1	30.5	1.4
12	29.1	30.8	1.7
18	28.9	31.0	2.1
24	29.0	31.5	2.5
30	28.9	31.8	2.9
36	28.9	31.9	3.0
42	28.9	32.0	3.1
48	28.9	31.9	3.0
54	29.0	31.6	2.6
60	29.1	31.4	2.3
66	29.1	31.0	1.9
72	29.2	31.8	2.6
78	---	---	---
84	---	---	---
90	---	---	---
96	---	---	---
102	---	---	---
108	---	---	---
114	---	---	---
120	---	---	---
126	---	---	---
132	---	---	---
138	---	---	---

Reference plane is parallel to test vehicle longitudinal centerline
 Given dimensions = reference plane to car body

FIGURE 6
VEHICLE EXTERIOR STATIC CRUSH



LEVEL 1 AT AXLE CENTER LINE

TABLE 7

TEST VEHICLE EXTERIOR PROFILES FROM REFERENCE PLANE AND STATIC CRUSH

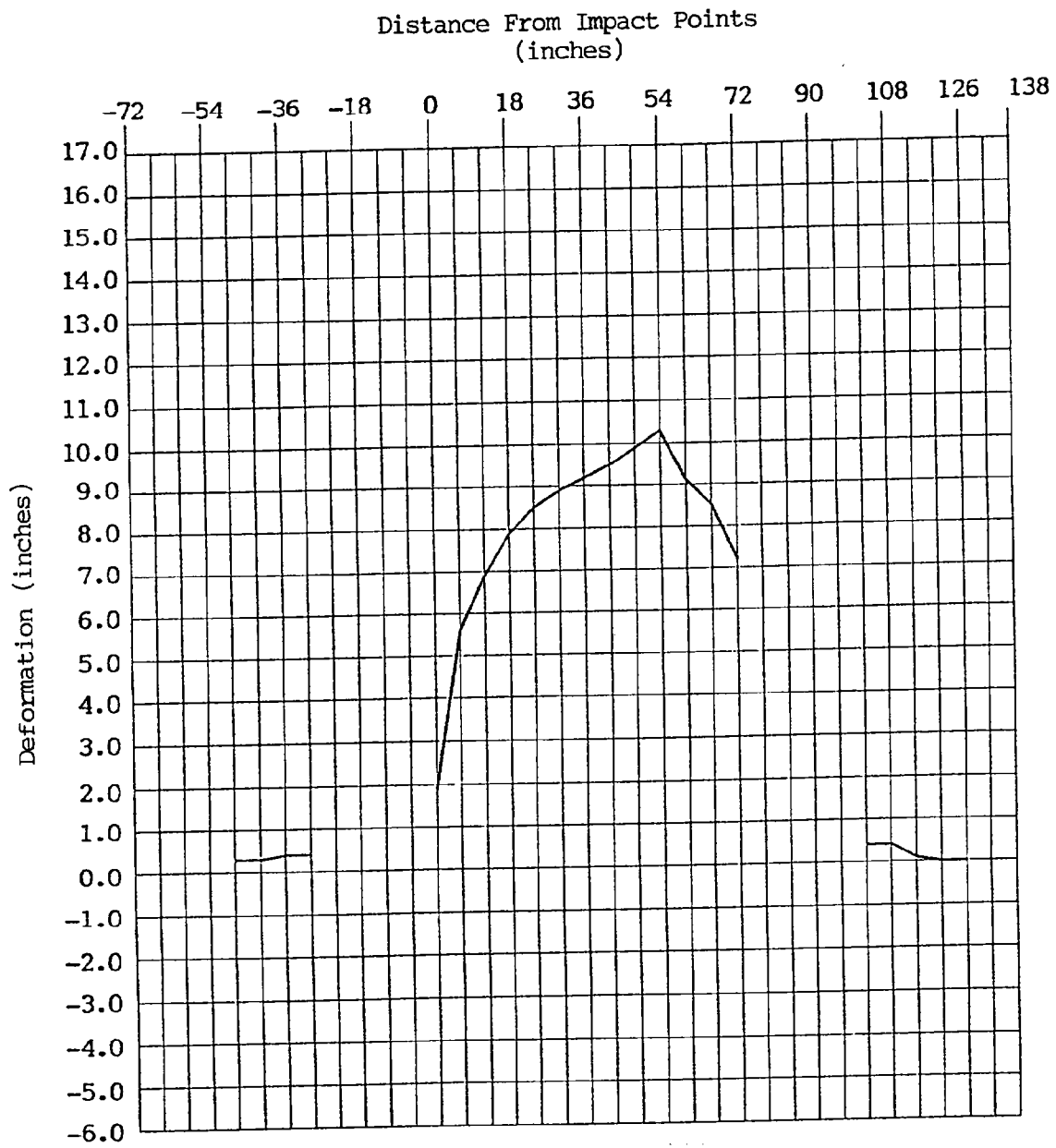
LEVEL 2 AT OCCUPANT H-POINT

Year/Make/Model/Body Style: 1994/Volvo/850/4 Door SedanVehicle NHTSA No.: CR5901 TEST DATE: May 12, 1994

Longitudinal Distance (in)	PRE-TEST (in)	POST-TEST (in)	STATIC CRUSH (in)
-72	_____	_____	_____
-66	_____	_____	_____
-60	_____	_____	_____
-54	_____	_____	_____
-48	<u>30.0</u>	<u>30.3</u>	<u>0.3</u>
-42	<u>29.2</u>	<u>29.5</u>	<u>0.3</u>
-36	<u>28.5</u>	<u>28.9</u>	<u>0.4</u>
-30	<u>28.1</u>	<u>28.5</u>	<u>0.4</u>
-24	_____	_____	_____
-18	_____	_____	_____
-12	_____	_____	_____
-6	_____	_____	_____
0	<u>27.9</u>	<u>29.8</u>	<u>1.9</u> (impact point)
6	<u>27.9</u>	<u>33.5</u>	<u>5.6</u>
12	<u>27.7</u>	<u>34.6</u>	<u>6.9</u>
18	<u>27.6</u>	<u>35.5</u>	<u>7.9</u>
24	<u>27.5</u>	<u>36.0</u>	<u>8.5</u>
30	<u>27.4</u>	<u>36.3</u>	<u>8.9</u>
36	<u>27.3</u>	<u>36.5</u>	<u>9.2</u>
42	<u>27.3</u>	<u>36.8</u>	<u>9.5</u>
48	<u>27.3</u>	<u>37.2</u>	<u>9.9</u>
54	<u>27.5</u>	<u>37.8</u>	<u>10.3</u>
60	<u>27.4</u>	<u>36.5</u>	<u>9.1</u>
66	<u>27.5</u>	<u>36.0</u>	<u>8.5</u>
72	<u>27.6</u>	<u>34.8</u>	<u>7.2</u>
78	_____	_____	_____
84	_____	_____	_____
90	_____	_____	_____
96	_____	_____	_____
102	<u>28.4</u>	<u>28.8</u>	<u>0.4</u>
108	<u>28.8</u>	<u>29.2</u>	<u>0.4</u>
114	<u>29.4</u>	<u>29.5</u>	<u>0.1</u>
120	<u>30.3</u>	<u>30.3</u>	<u>0</u>
126	<u>31.0</u>	<u>31.0</u>	<u>0</u>
132	_____	_____	_____
138	_____	_____	_____

Reference plane is parallel to test vehicle longitudinal centerline
 Given dimensions = reference plane to car body

FIGURE 6 (Cont'd)
VEHICLE EXTERIOR STATIC CRUSH



LEVEL 2 AT OCCUPANT H-POINT

TABLE 7

TEST VEHICLE EXTERIOR PROFILES FROM REFERENCE PLANE AND STATIC CRUSH

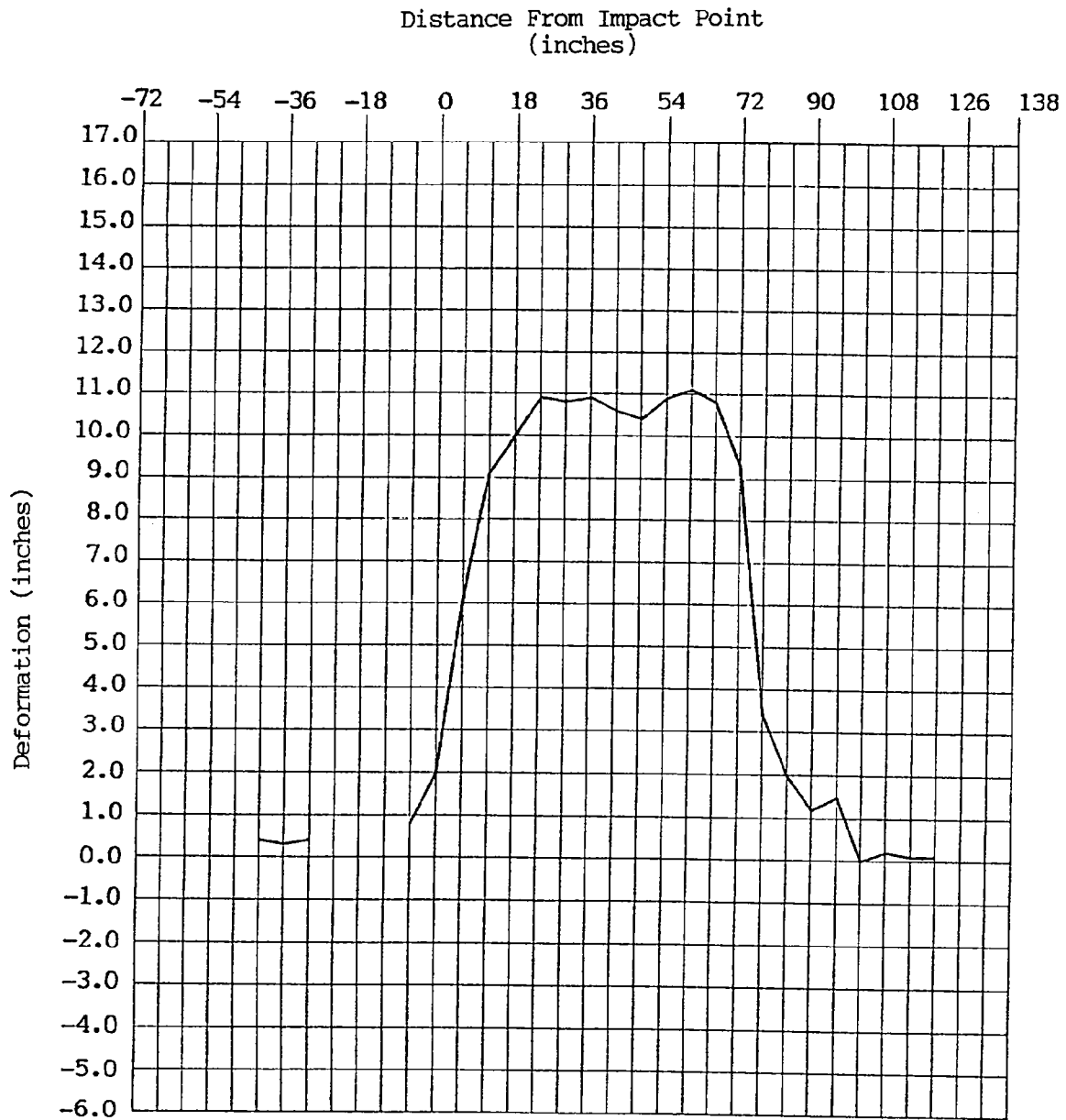
LEVEL 3 AT MID-DOOR

Year/Make/Model/Body Style: 1994/Volvo/850/4 Door SedanVehicle NHTSA No.: CR5901 TEST DATE: May 12, 1994

Longitudinal Distance (in)	PRE-TEST (in)	POST-TEST (in)	STATIC CRUSH (in)	
-72	_____	_____	_____	
-66	_____	_____	_____	
-60	_____	_____	_____	
-54	_____	_____	_____	
-48	_____	_____	_____	
-42	<u>30.4</u>	<u>30.8</u>	<u>0.4</u>	
-36	<u>29.6</u>	<u>29.9</u>	<u>0.3</u>	
-30	<u>28.6</u>	<u>29.0</u>	<u>0.4</u>	
-24	_____	_____	_____	
-18	_____	_____	_____	
-12	_____	_____	_____	
-6	<u>27.2</u>	<u>28.0</u>	<u>0.8</u>	
0	<u>27.5</u>	<u>29.5</u>	<u>2.0</u>	(impact point)
6	<u>27.5</u>	<u>33.6</u>	<u>6.1</u>	
12	<u>27.3</u>	<u>36.4</u>	<u>9.1</u>	
18	<u>27.1</u>	<u>37.1</u>	<u>10.0</u>	
24	<u>27.1</u>	<u>38.0</u>	<u>10.9</u>	
30	<u>27.0</u>	<u>37.8</u>	<u>10.8</u>	
36	<u>26.9</u>	<u>37.8</u>	<u>10.9</u>	
42	<u>26.9</u>	<u>37.5</u>	<u>10.6</u>	
48	<u>26.9</u>	<u>37.3</u>	<u>10.4</u>	
54	<u>26.9</u>	<u>37.8</u>	<u>10.9</u>	
60	<u>26.9</u>	<u>38.0</u>	<u>11.1</u>	
66	<u>27.1</u>	<u>37.9</u>	<u>10.8</u>	
72	<u>27.2</u>	<u>36.5</u>	<u>9.3</u>	
78	<u>27.4</u>	<u>30.8</u>	<u>3.4</u>	
84	<u>27.1</u>	<u>29.1</u>	<u>2.0</u>	
90	<u>27.3</u>	<u>28.5</u>	<u>1.2</u>	
96	<u>27.1</u>	<u>28.6</u>	<u>1.5</u>	
102	<u>28.3</u>	<u>28.3</u>	<u>0</u>	
108	<u>29.6</u>	<u>29.8</u>	<u>0.2</u>	
114	<u>30.4</u>	<u>30.3</u>	<u>0.1</u>	
120	<u>31.1</u>	<u>31.0</u>	<u>0.1</u>	
126	_____	_____	_____	
132	_____	_____	_____	
138	_____	_____	_____	

Reference plane is parallel to test vehicle longitudinal centerline
 Given dimensions = reference plane to car body

FIGURE 6
VEHICLE EXTERIOR STATIC CRUSH



LEVEL 3 AT MID-DOOR

TABLE 7

TEST VEHICLE EXTERIOR PROFILES FROM REFERENCE PLANE AND STATIC CRUSH

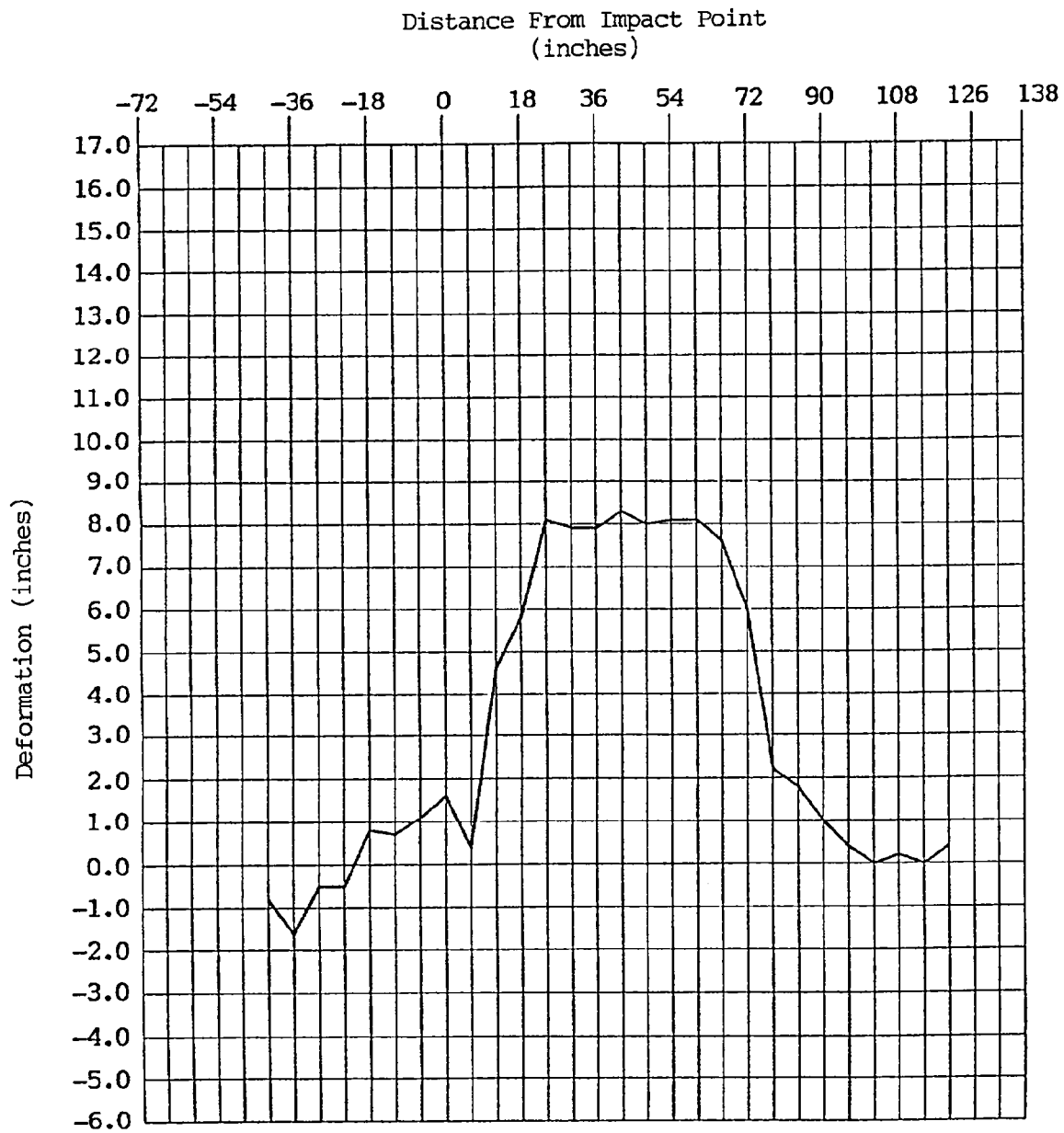
LEVEL 4 AT WINDOW SILL

Year/Make/Model/Body Style: 1994/Volvo/850/4 Door SedanVehicle NHTSA No.: CR5901 TEST DATE: May 12, 1994

Longitudinal Distance (in)	PRE-TEST (in)	POST-TEST (in)	STATIC CRUSH (in)
-72	_____	_____	_____
-66	_____	_____	_____
-60	_____	_____	_____
-54	_____	_____	_____
-48	_____	_____	_____
-42	<u>33.3</u>	<u>32.5</u>	<u>-0.8</u>
-36	<u>32.1</u>	<u>30.5</u>	<u>-1.6</u>
-30	<u>31.1</u>	<u>31.6</u>	<u>-0.5</u>
-24	<u>30.5</u>	<u>30.0</u>	<u>-0.5</u>
-18	<u>30.0</u>	<u>30.8</u>	<u>0.8</u>
-12	<u>29.6</u>	<u>30.3</u>	<u>0.7</u>
-6	<u>29.2</u>	<u>30.3</u>	<u>1.1</u>
0	<u>28.4</u>	<u>30.0</u>	<u>1.6</u> (impact point)
6	<u>29.6</u>	<u>30.0</u>	<u>0.4</u>
12	<u>28.4</u>	<u>33.0</u>	<u>4.6</u>
18	<u>28.2</u>	<u>34.0</u>	<u>5.8</u>
24	<u>28.2</u>	<u>36.3</u>	<u>8.1</u>
30	<u>28.1</u>	<u>36.0</u>	<u>7.9</u>
36	<u>28.1</u>	<u>36.0</u>	<u>7.9</u>
42	<u>28.0</u>	<u>36.3</u>	<u>8.3</u>
48	<u>28.1</u>	<u>36.1</u>	<u>8.0</u>
54	<u>28.1</u>	<u>36.2</u>	<u>8.1</u>
60	<u>28.2</u>	<u>36.3</u>	<u>8.1</u>
66	<u>28.4</u>	<u>36.0</u>	<u>7.6</u>
72	<u>28.6</u>	<u>34.6</u>	<u>6.0</u>
78	<u>28.8</u>	<u>31.0</u>	<u>2.2</u>
84	<u>29.0</u>	<u>30.8</u>	<u>1.8</u>
90	<u>29.3</u>	<u>30.3</u>	<u>1.0</u>
96	<u>29.8</u>	<u>30.2</u>	<u>0.4</u>
102	<u>30.5</u>	<u>30.5</u>	<u>0</u>
108	<u>30.8</u>	<u>31.0</u>	<u>0.2</u>
114	<u>31.3</u>	<u>31.3</u>	<u>0</u>
120	<u>31.6</u>	<u>32.0</u>	<u>0.4</u>
126	_____	_____	_____
132	_____	_____	_____
138	_____	_____	_____

Reference plane is parallel to test vehicle longitudinal centerline
 Given dimensions = reference plane to car body

FIGURE 6
VEHICLE EXTERIOR STATIC CRUSH



LEVEL 4 AT WINDOW SILL

TABLE 7

TEST VEHICLE EXTERIOR PROFILES FROM REFERENCE PLANE AND STATIC CRUSH

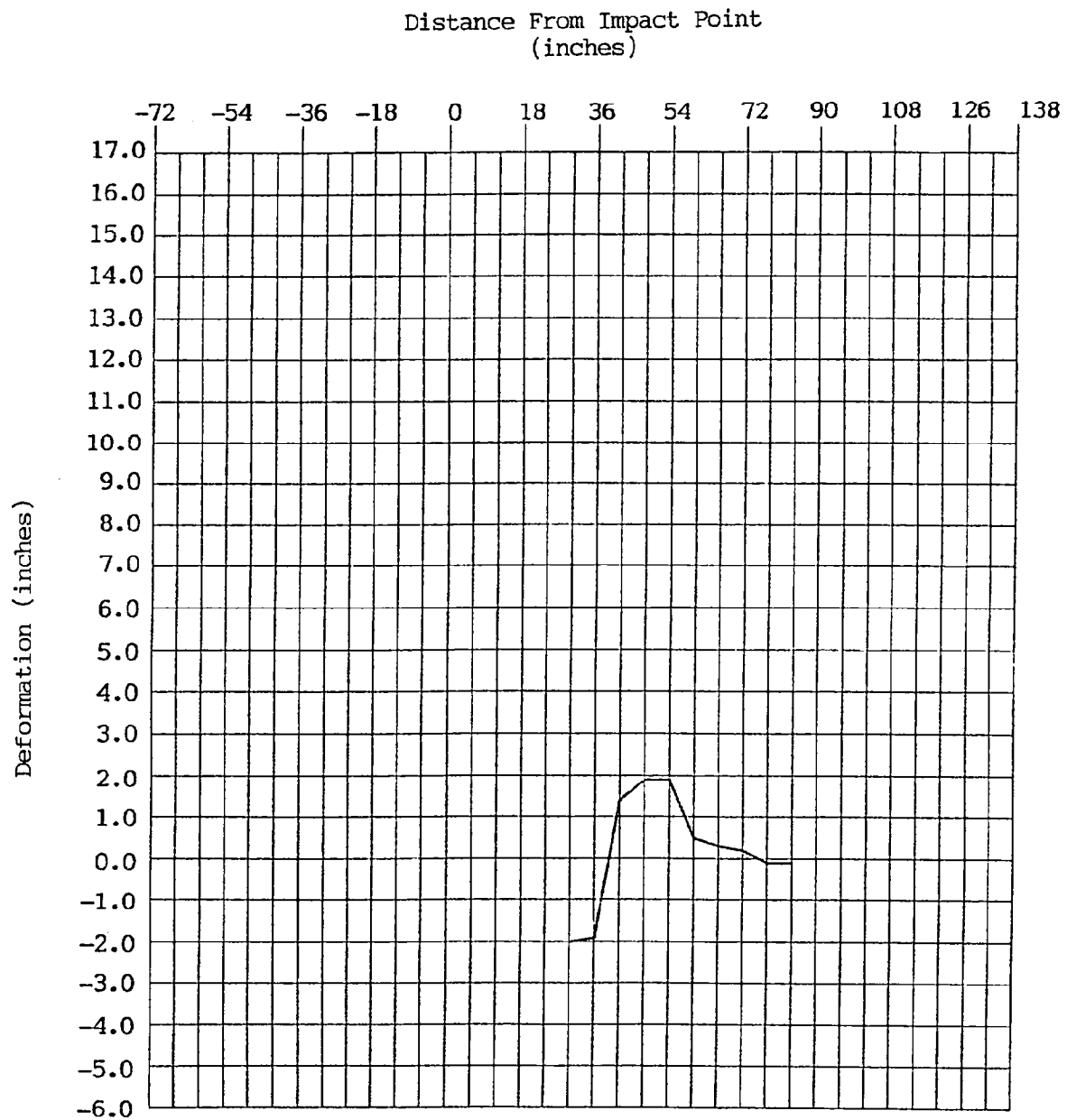
LEVEL 5 AT WINDOW TOP

Year/Make/Model/Body Style: 1994/Volvo/850/4 Door SedanVehicle NHTSA No.: CR5901 TEST DATE: May 12, 1994

Longitudinal Distance (in)	PRE-TEST (in)	POST-TEST (in)	STATIC CRUSH (in)
-72	_____	_____	_____
-66	_____	_____	_____
-60	_____	_____	_____
-54	_____	_____	_____
-48	_____	_____	_____
-42	_____	_____	_____
-36	_____	_____	_____
-30	_____	_____	_____
-24	_____	_____	_____
-18	_____	_____	_____
-12	_____	_____	_____
-6	_____	_____	_____
0	_____	_____	_____ (impact point)
6	_____	_____	_____
12	_____	_____	_____
18	_____	_____	_____
24	_____	_____	_____
30	<u>36.5</u>	<u>34.5</u>	<u>-2.0</u>
36	<u>36.5</u>	<u>34.6</u>	<u>-1.9</u>
42	<u>36.5</u>	<u>37.9</u>	<u>1.4</u>
48	<u>36.5</u>	<u>38.4</u>	<u>1.9</u>
54	<u>36.6</u>	<u>38.5</u>	<u>1.9</u>
60	<u>36.6</u>	<u>37.1</u>	<u>0.5</u>
66	<u>36.8</u>	<u>37.1</u>	<u>0.3</u>
72	<u>37.0</u>	<u>37.2</u>	<u>0.2</u>
78	<u>37.3</u>	<u>37.2</u>	<u>-0.1</u>
84	<u>38.0</u>	<u>38.1</u>	<u>-0.1</u>
90	_____	_____	_____
96	_____	_____	_____
102	_____	_____	_____
108	_____	_____	_____
114	_____	_____	_____
120	_____	_____	_____
126	_____	_____	_____
132	_____	_____	_____
138	_____	_____	_____

Reference plane is parallel to test vehicle longitudinal centerline
 Given dimensions = reference plane to car body

FIGURE 6
VEHICLE EXTERIOR STATIC CRUSH

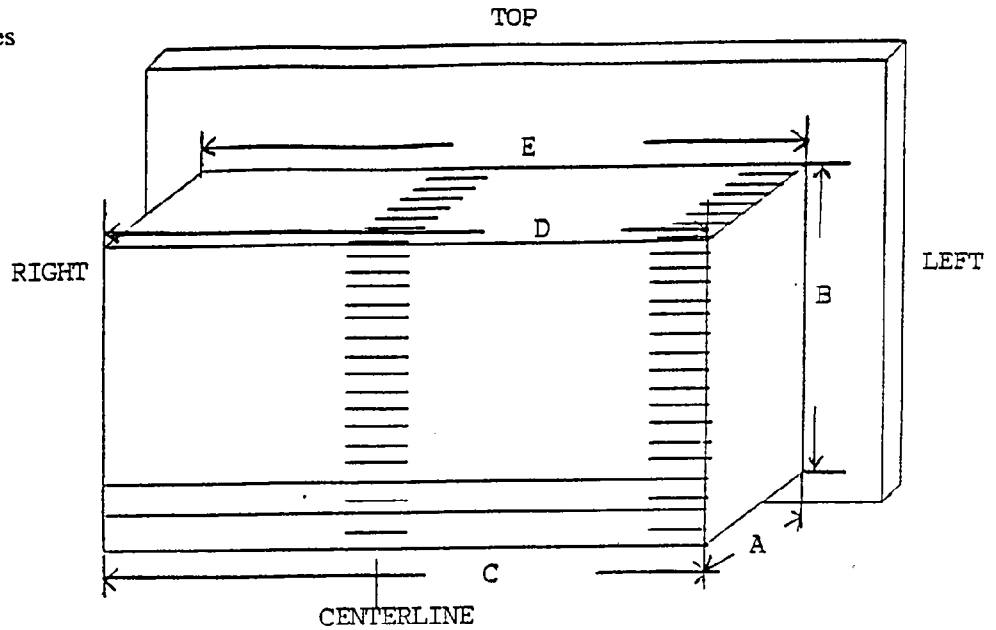


LEVEL 5 AT WINDOW TOP

FIGURE 8
MDB FACE DIMENSIONS

Measurements in inches

$$\begin{aligned} A &= 15 \\ B &= 22.1 \\ C &= 66.2 \\ D &= 66.0 \\ E &= 66.0 \end{aligned}$$



Measurements in inches

	Right	Left
A =	<u>11.1</u>	<u>11.1</u>
B =	<u>13.0</u>	<u>13.0</u>
C =	<u>21.0</u>	<u>21.1</u>
D =	<u>33.0</u>	<u>33.1</u>

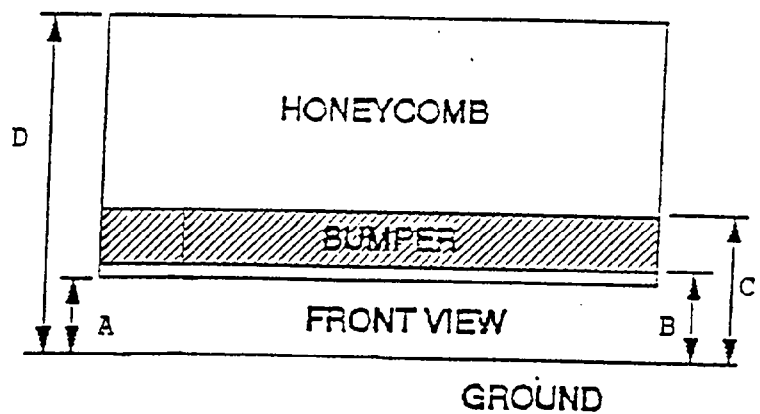


TABLE 8
EXTERIOR STATIC CRUSH FOR SIDE IMPACTOR
Year/Make/Model/Body Style: 1994/Volvo/850/4 Door Sedan
Vehicle NHTSA No.: CR5901 TEST DATE: May 12, 1994

Location	Top of Stack (33 inches)	Mid-Stack (27 inches)	Top of Bumper (21 inches)	Center of Bumper (17 inches)
Horizontal Distance From Center	Crush (inches)	Crush (inches)	Crush (inches)	Crush (inches)
32"	1.7	0.7	0.7	4.1
28"	0.4	-0.2	0.4	3.7
24"	-0.3	-0.2	0.2	3.3
20"	-0.1	0	0.2	3.7
16"	-0.1	0	0.1	2.5
12"	0	0	0.2	2.4
8"	0	0	0.2	2.4
4"	0	0.4	0.2	2.4
0"	0	0.4	0.3	2.4
4"	0.2	0.1	0.4	2.6
8"	0.3	0.1	0.6	2.6
12"	0.3	0.2	0.7	2.8
16"	0.6	0.3	0.9	2.9
20"	1.3	0.3	0.9	3.0
24"	3.2	0.9	1.3	2.4
28"	4.0	1.8	1.7	4.3
32"	5.5	4.4	2.9	4.5

Left Side

Right Side

FIGURE 7
TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 1994/Volvo/850/4 Door Sedan
 Vehicle NHTSA No.: CR5901 TEST DATE: May 12, 1994

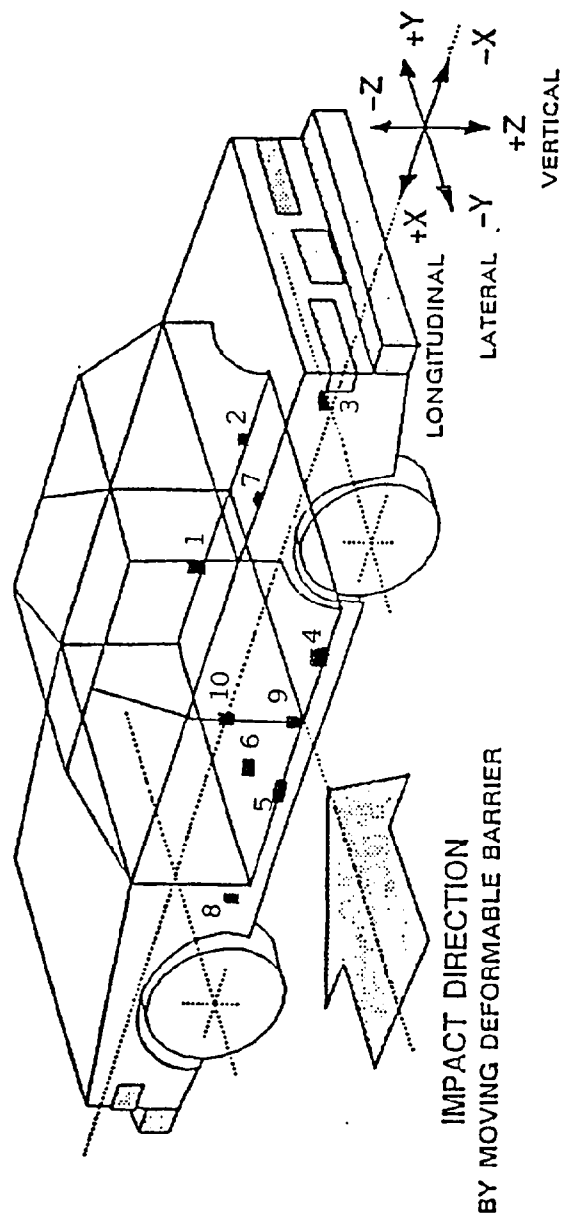


TABLE 9

TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARYYear/Make/Model/Body Style: 1994/Volvo/850/4 Door SedanVehicle NHTSA No.: CR5901 TEST DATE: May 12, 1994

Accel. No.	Description	Coordinates (in)			Long. (X) Maximums		Lat. (Y) Maximums		Vert. (Z) Maximums		Resultant
		X	Y	Z	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	
1	Rt. Side Sill @ Front Seat	109.4	25.7	10.3	4.0	-3.1	18.4	-2.4	4.5	-5.0	18.5
2	Rt. Side Sill @ Rear Seat	68.9	24.9	14.0	3.9	-4.8	20.0	-2.1	4.8	-5.9	20.6
3	Rr. Floorpan Above Axle	42.9	1.0	24.1	4.2	-6.9	5.9	-1.8	10.5	-11.4	24.6
4	Left Side Sill @ Rr. Seat	76.2	-28.1	8.3	---	---	62.0	-20.5	---	---	---
5	Left Side Sill @ Frt. Seat	102.9	-28.3	8.3	---	---	45.4	-5.0	---	---	---
6	Driver Left Seat Track*	91.6	-23.0	12.1	---	---	58.5	-12.8	---	---	---
7	Right Rear Occupant Compartment	72.4	14.6	9.3	---	---	22.4	-2.5	---	---	---
8	Left A Post Lower*	123.1	-28.5	17.4	---	---	34.0	-13.9	---	---	---
9	Left B Post Lower	84.1	-27.6	15.9	---	---	163.2	-48.4	---	---	---
10	Left B Post Mid	82.7	-27.7	28.6	---	---	137.5	-19.5	---	---	---

*Reference: X - Rear Bumper (+ Forward)

Y - Vehicle Centerline (+ To right)

Z - Ground Level (+ Up)

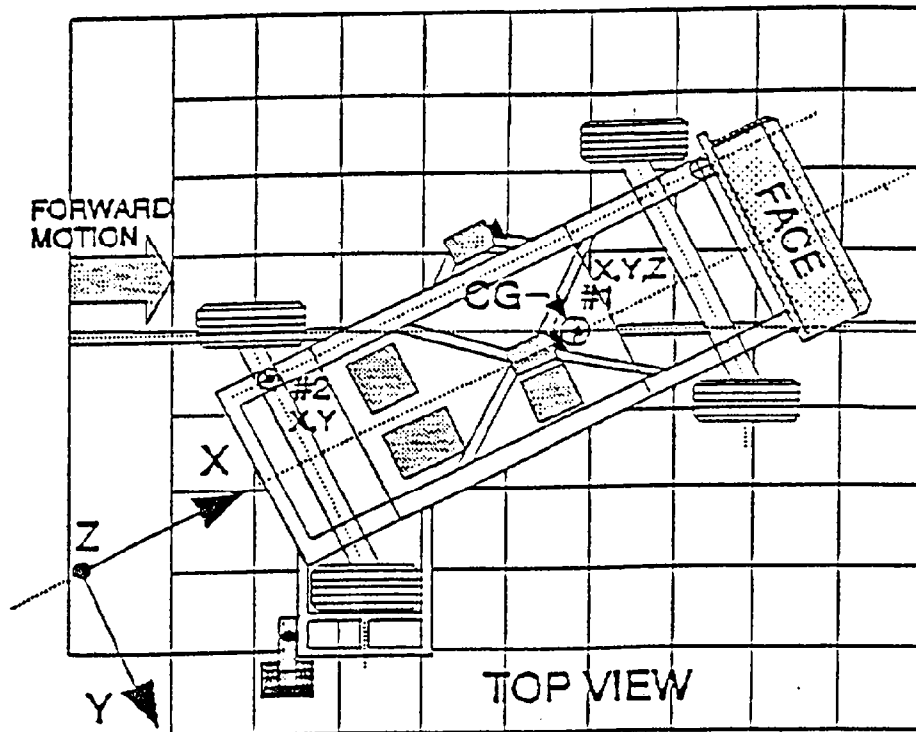
* Data shift during impact

FIGURE 9

MOVING DEFORMABLE BARRIER (MDB) ACCELEROMETER LOCATIONS

Year/Make/Model/Body Style: 1994/Volvo/850/4 Door Sedan

Vehicle NHTSA No.: CR5901 TEST DATE: May 12, 1994



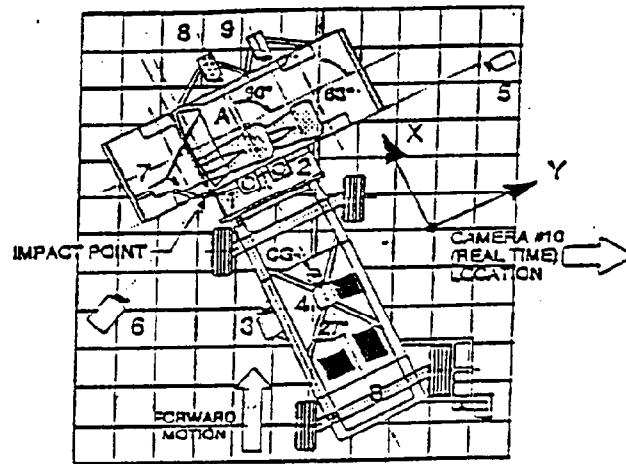
Accel. No.	Location	Coordinates (in)			Pos. Direct.		Neg. Direct.	
					Max (g)	Time (msec)	Max (g)	Time (msec)
1	MDB Center of Gravity							
	Longitudinal ... X				1.0	98	-16.0	40
	Lateral Y	-43	0	19.0	9.3	36	-1.2	57
	Vertical Z				10.8	35	-11.4	22
	Resultant R				27.1	35	---	---
2	Rear Frame Member							
	Longitudinal ... X	-102	-24.6	24.5	1.4	134	-20.9	34
	Lateral Y				5.9	37	-1.8	69

* Reference: X = Front Axle (+Forward)
Y = Vehicle Centerline (+ To Right)
Z = Ground Level (+ Up)

FIGURE 10
HIGH SPEED CAMERA LOCATIONS AND DATA

Year/Make/Model/Body Style: 1994/Volvo/850/4 Door Sedan

Vehicle NHTSA No.: CR5901 TEST DATE: May 12, 1994



Camera No.	View	Coordinates (in)			Angle	Lens (mm)	Film Speed (fps)
		X*	Y*	Z*			
	Real Time					10	24
6	Left Impact	-4020	4120	1985	45°	13	1087
8	Onboard Driver					7.5	1005
7	Onboard Hood					13	1000
9	Onboard Passenger					8	1000
5	Right Impact	2130	-9030	1020	45°	35	1000
2	Top Wide	400	0	5360		8	746
1	Top Pointer	0	380	4920		13	952
4	Cart					13	1000
3	Cart Pointer					35	985

* Reference: (from point of impact)

+X = Forward

+Y = To Right

+Z = Upward

APPENDIX A - PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

	<u>Page No.</u>
Photo No. A-1 - Pre-Test Front View of Test Vehicle	A-1
Photo No. A-2 - Post-Test Front View of Test Vehicle	A-2
Photo No. A-3 - Pre-Test Rear View of Test Vehicle	A-3
Photo No. A-4 - Post-Test Rear View of Test Vehicle	A-4
Photo No. A-5 - Pre-Test Left Side View of Test Vehicle	A-5
Photo No. A-6 - Post-Test Left Side View of Test Vehicle	A-6
Photo No. A-7 - Pre-Test MDB Positioned Against Vehicle (left side)	A-7
Photo No. A-8 - Pre-Test MDB Positioned Against Vehicle (right side)	A-8
Photo No. A-9 - Pre-Test MDB Position Against Vehicle Overhead View	A-9
Photo No. A-10 - Post-Test MDB and Vehicle Left Side Front View	A-10
Photo No. A-11 - Post-Test MDB and Vehicle Right Side Rear View	A-11
Photo No. A-12 - Pre-Test MDB Top View	A-12
Photo No. A-13 - Post-Test MDB Top View	A-13
Photo No. A-14 - Pre-Test MDB Front View	A-14
Photo No. A-15 - Post-Test MDB Front View	A-15
Photo No. A-16 - Pre-Test MDB Left Side View	A-16
Photo No. A-17 - Post-Test MDB Left Side View	A-17
Photo No. A-18 - Pre-Test MDB Right Side View	A-18
Photo No. A-19 - Post-Test MDB Right Side View	A-19
Photo No. A-20 - Post-Test MDB and Vehicle Overhead View	A-20
Photo No. A-21 - Pre-Test Driver Dummy Right Side View	A-21
Photo No. A-22 - Post-Test Driver Dummy Right Side View	A-22
Photo No. A-23 - Pre-Test Driver Dummy Left Side View	A-23
Photo No. A-24 - Post-Test Driver Dummy Left Side View	A-24
Photo No. A-25 - Post-Test Driver Dummy Front Oblique View	A-25
Photo No. A-26 - Pre-Test Driver Dummy Left Side View (Door Open)	A-26
Photo No. A-27 - Pre-Test Passenger Dummy Right Side View	A-27
Photo No. A-28 - Post-Test Passenger Dummy Right Side View	A-28
Photo No. A-29 - Pre-Test Passenger Dummy Left Side View	A-29
Photo No. A-30 - Post-Test Passenger Dummy Left Side View	A-30
Photo No. A-31 - Pre-Test Passenger Dummy Front Oblique View	A-31

TABLE OF PHOTOGRAPHS

	<u>Page No.</u>
Photo No. A-32 - Post-Test Passenger Dummy Front Oblique View	A-32
Photo No. A-33 - Pre-Test Passenger Dummy Left Side View (Door Open)	A-33
Photo No. A-34 - Pre-Test Driver Dummy Front View	A-34
Photo No. A-35 - Post-Test Driver Dummy Front View	A-35
Photo No. A-36 - Tire Placard and Vehicle Certification Label	A-36
Photo No. A-37 - Impact	A-37

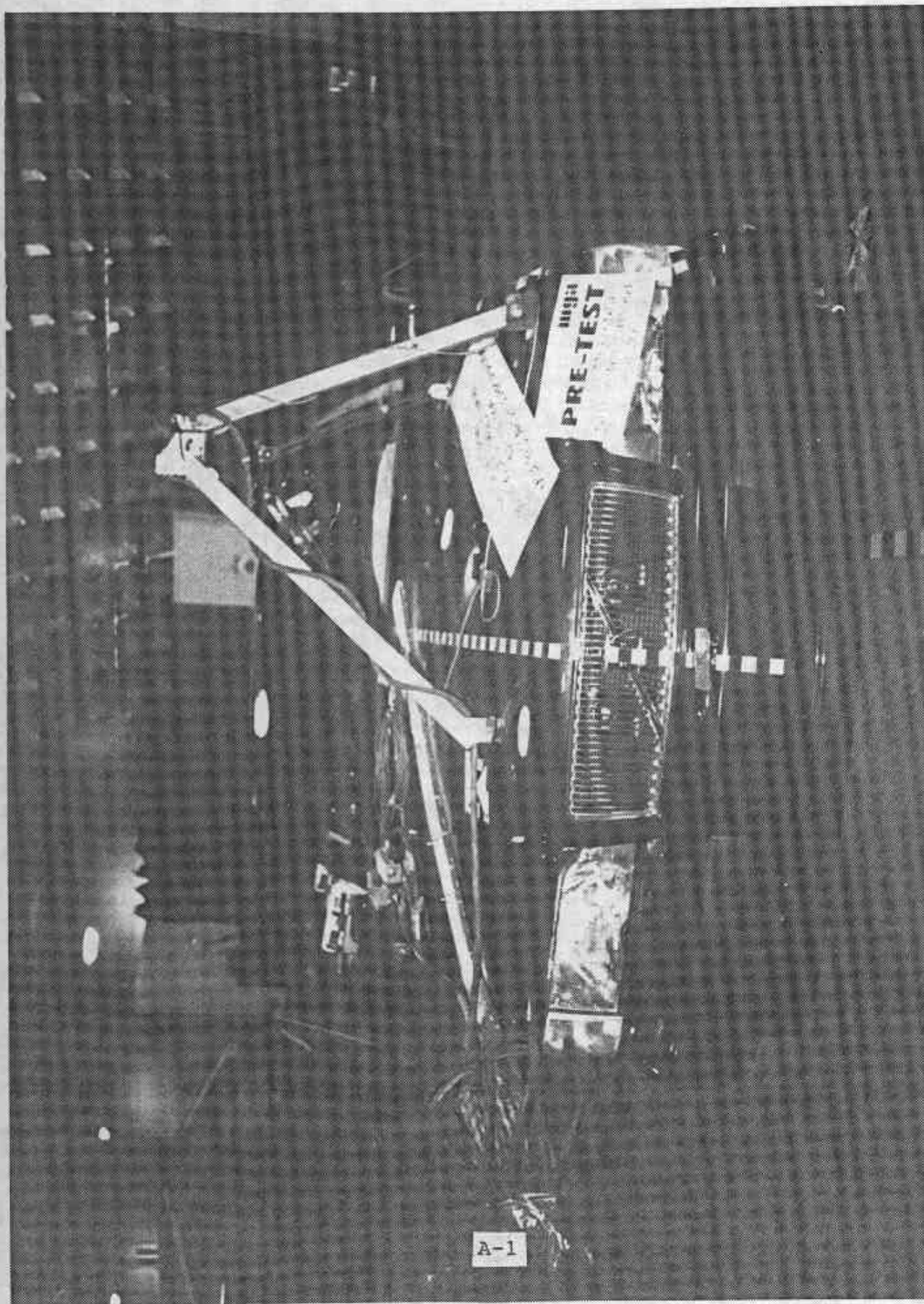


Photo No. A-1 - Pre-Test Front View of Test Vehicle

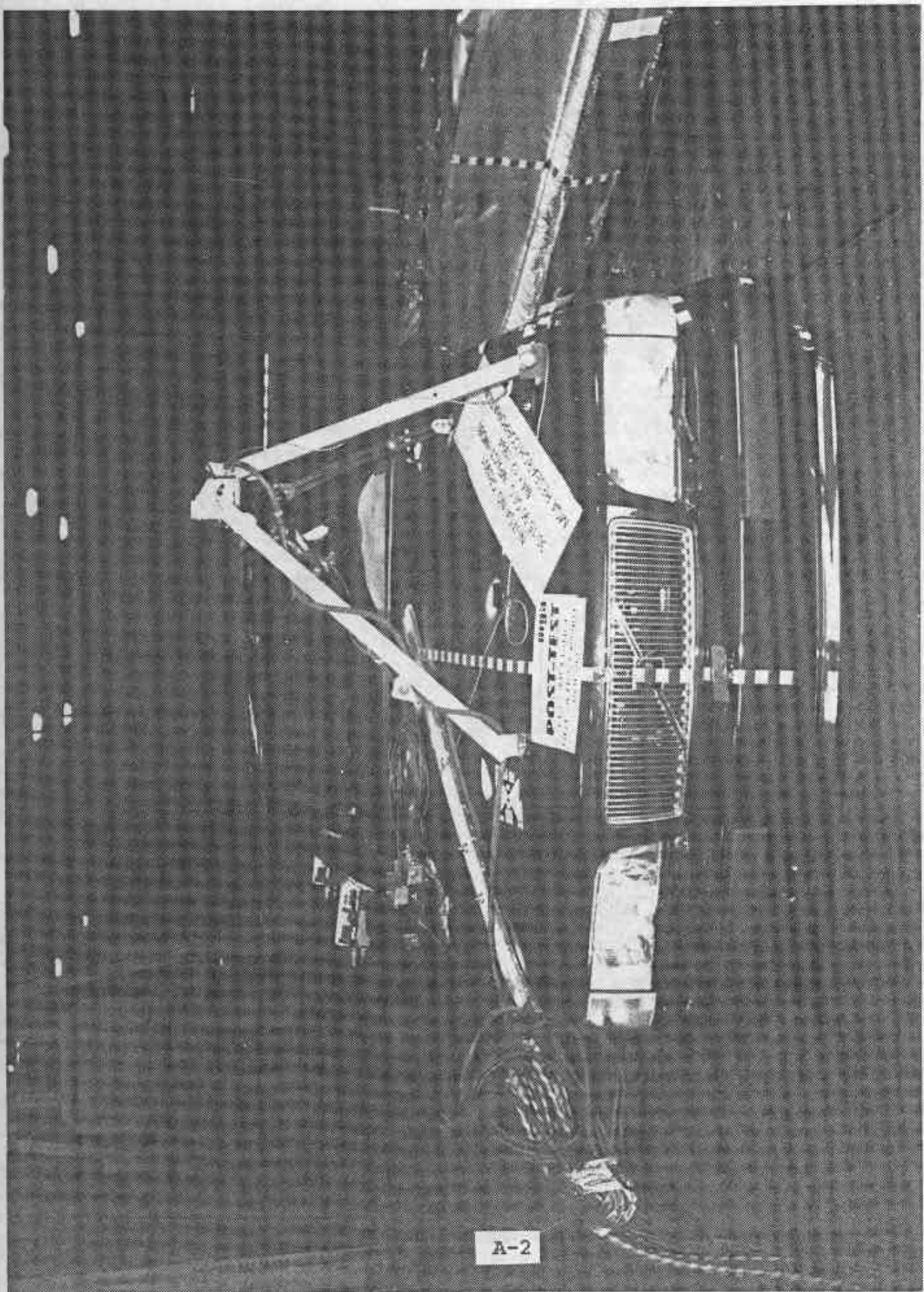


Photo No. A-2 - Post-Test Front View of Test Vehicle

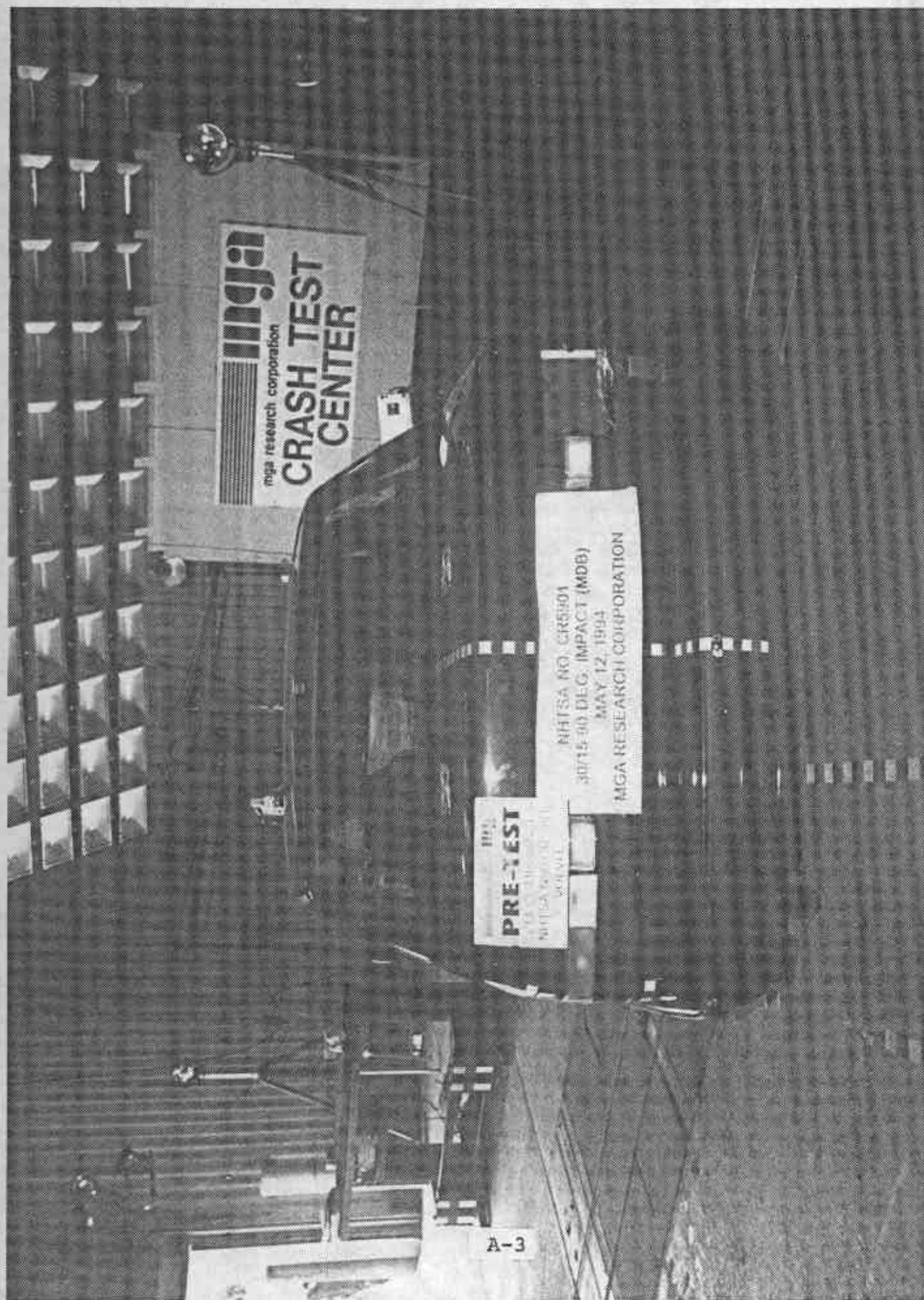


Photo No. A-3 - Pre-Test Rear View of Test Vehicle

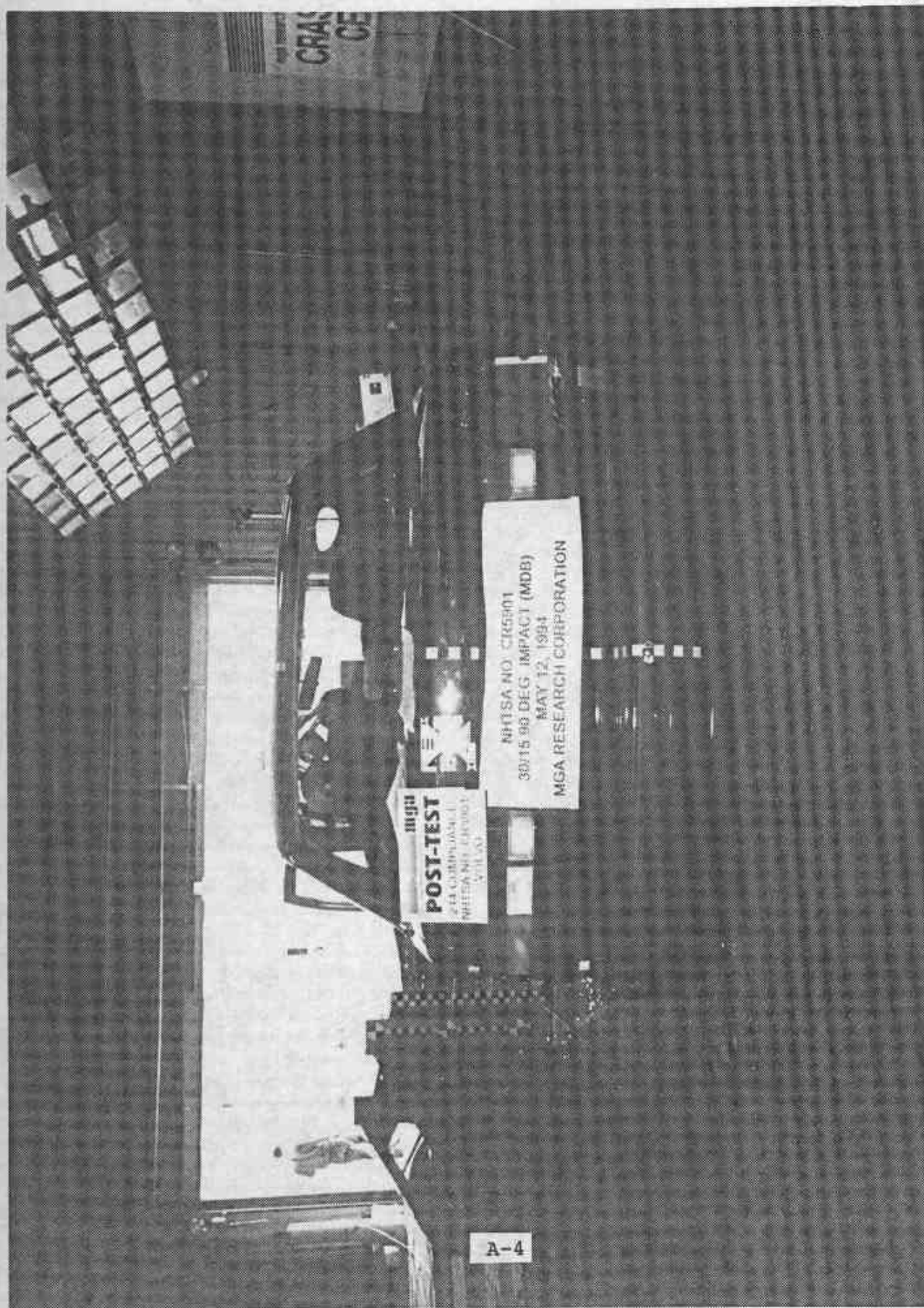


Photo No. A-4 - Post-Test Rear View of Test Vehicle

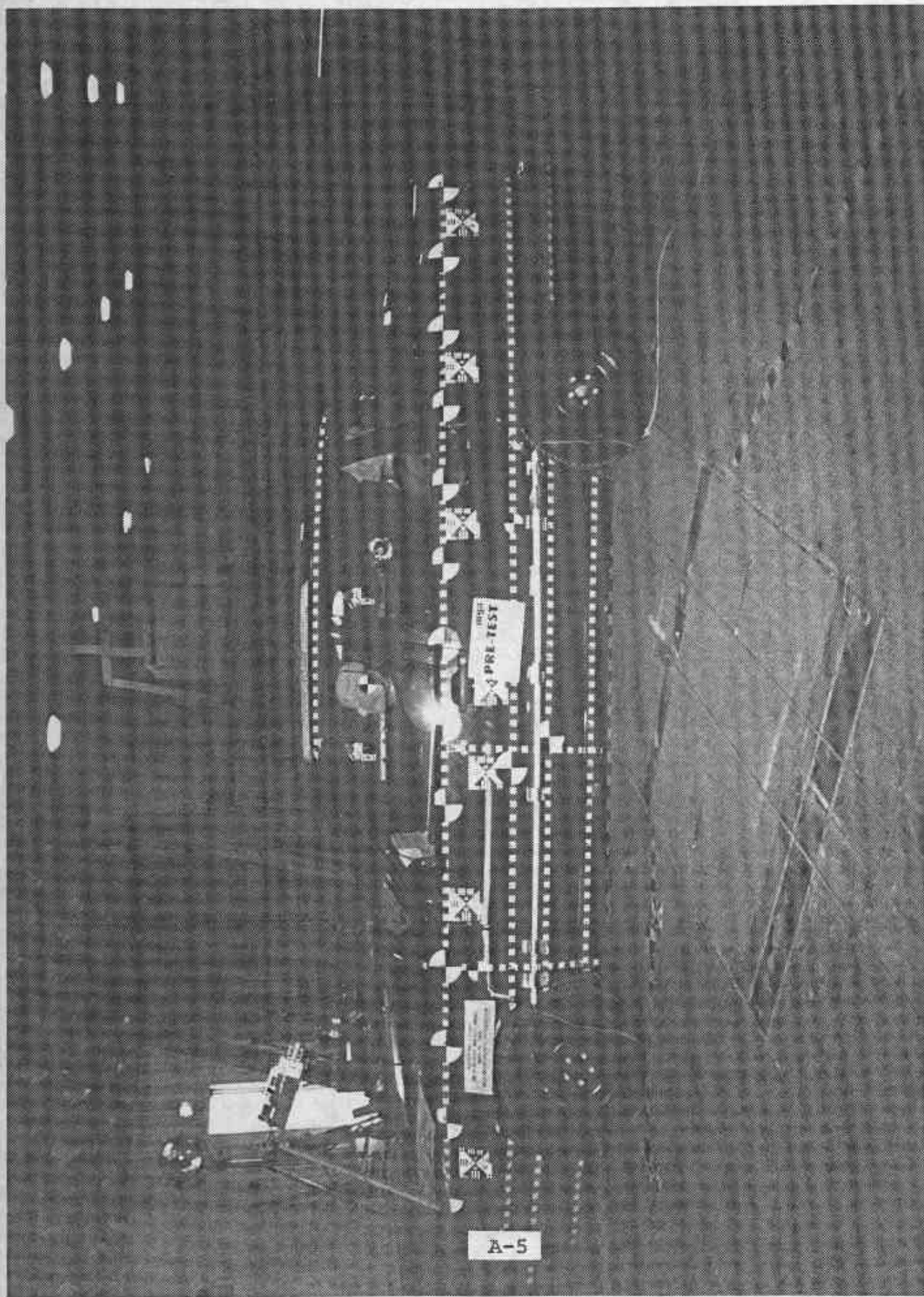


Photo No. A-5 - Pre-Test Left Side View of Test Vehicle

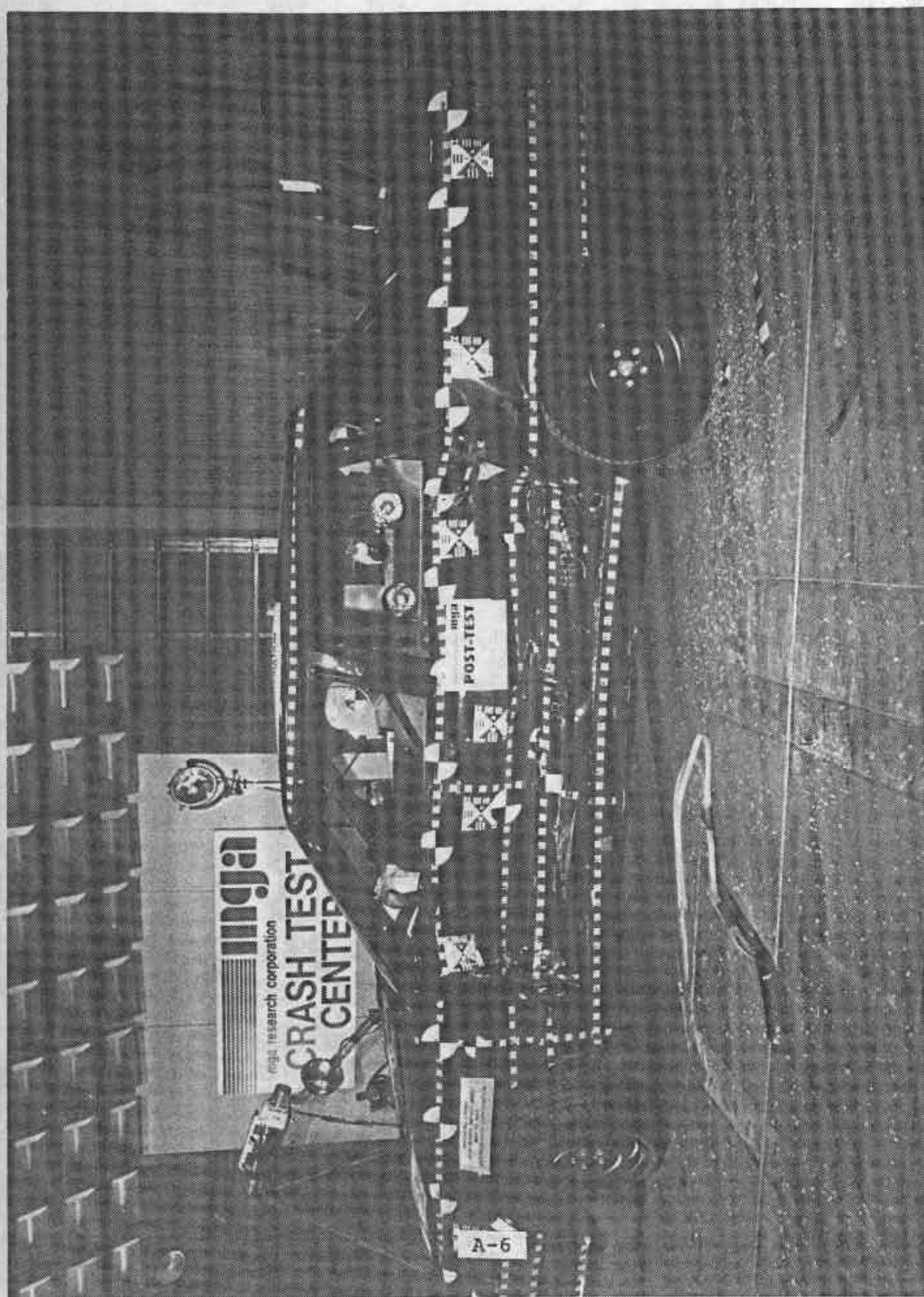


Photo No. A-6 - Post-Test Left Side View of Test Vehicle

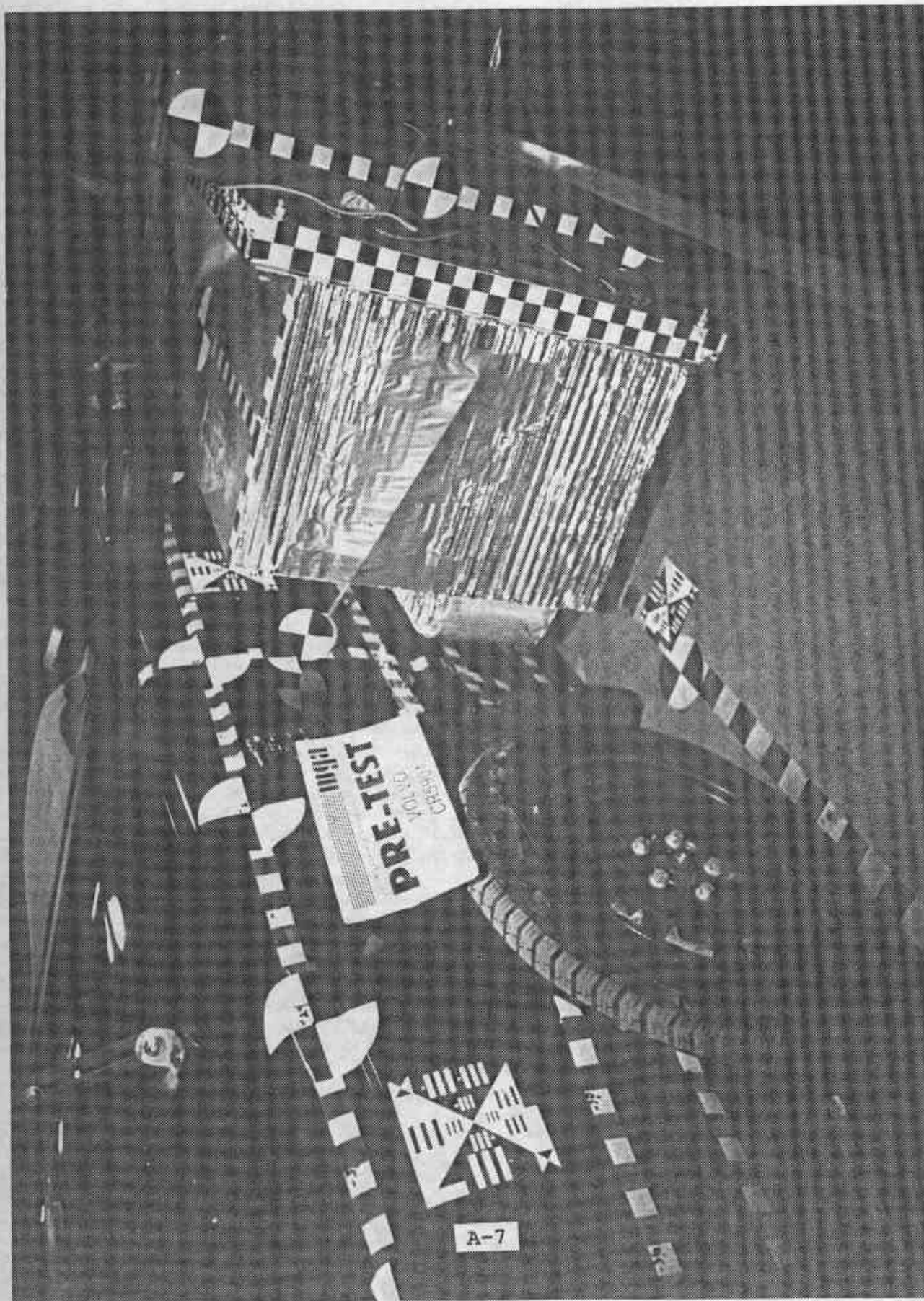


Photo No. A-7 - Pre-Test MDB Positioned Against Vehicle (left side)

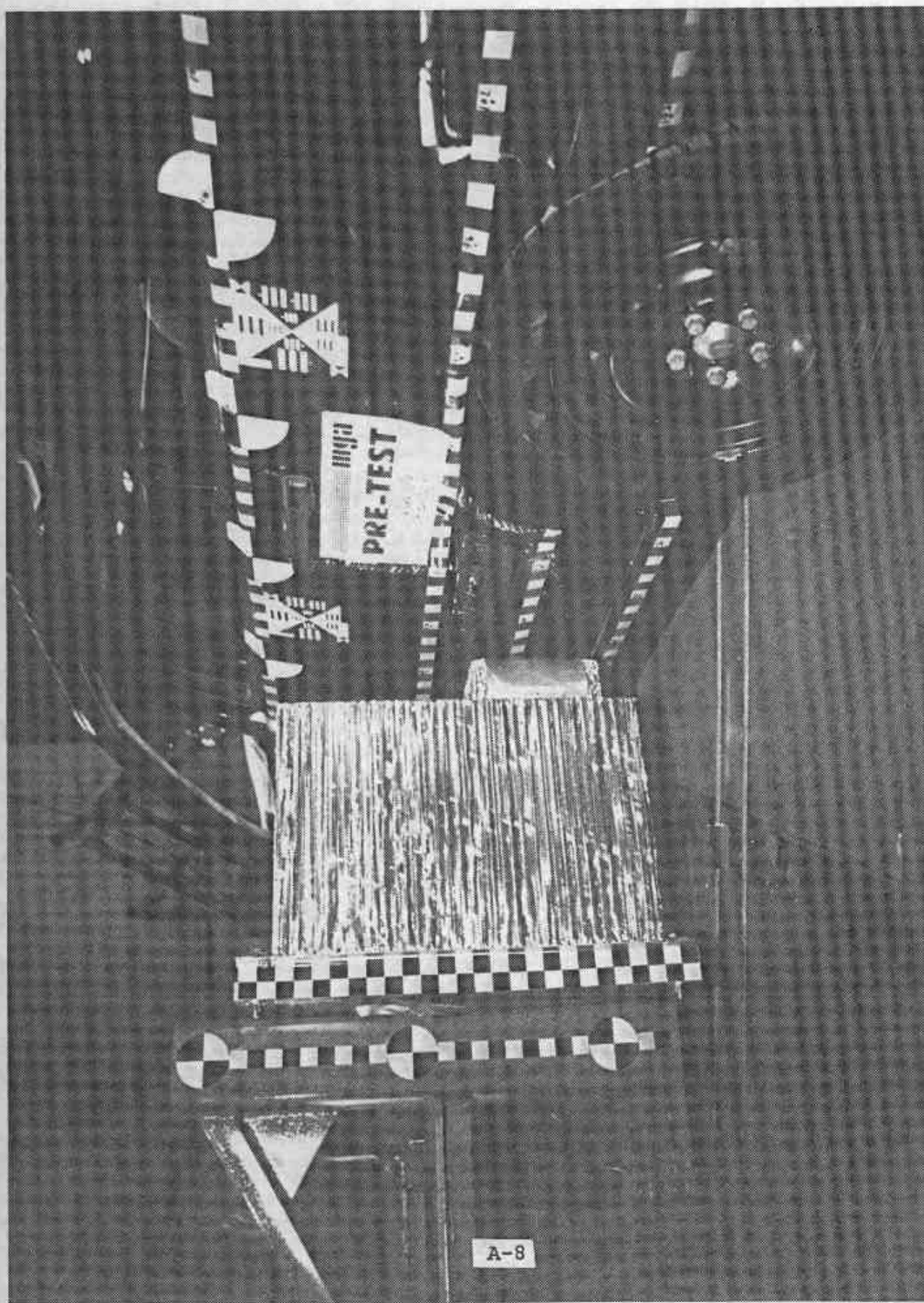


Photo No. A-8 - Pre-Test MDB Positioned Against Vehicle (right side)

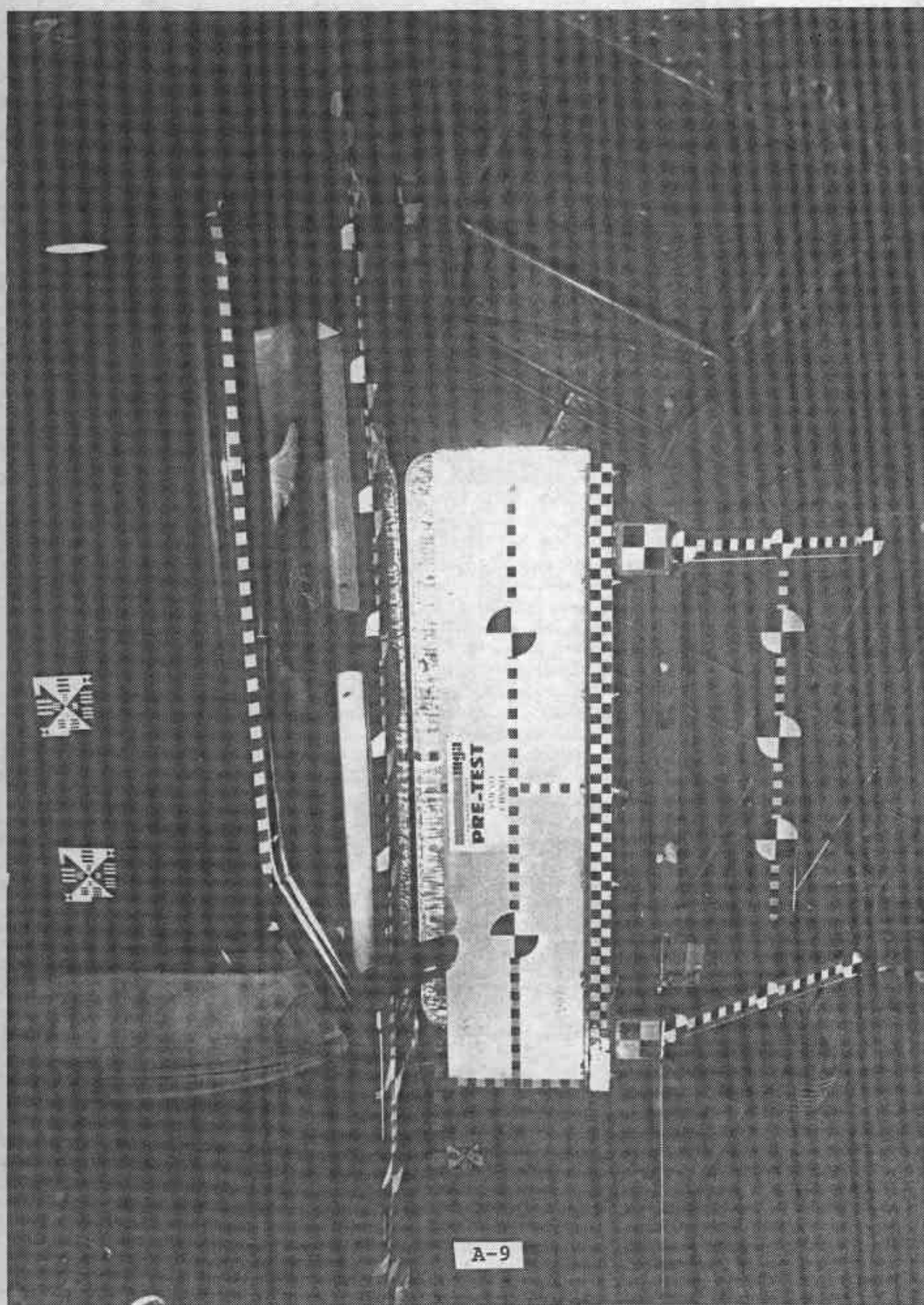


Photo No. A-9 - Pre-Test MDB Position Against Vehicle Overhead View



Photo No. A-10 - Post-Test MDB and Vehicle Left Side Front View

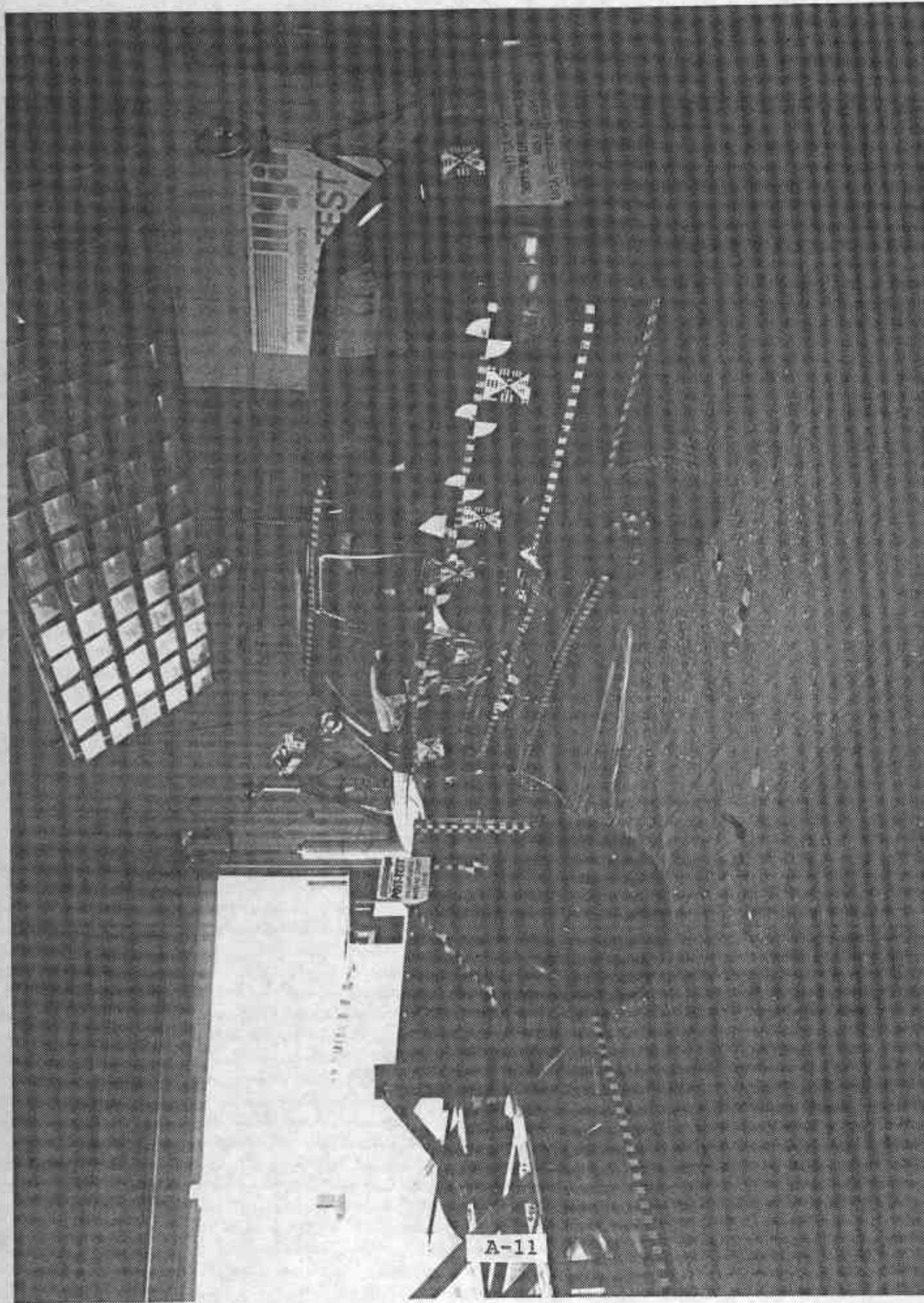


Photo No. A-11 - Post-Test MDB and Vehicle Right Side Rear View

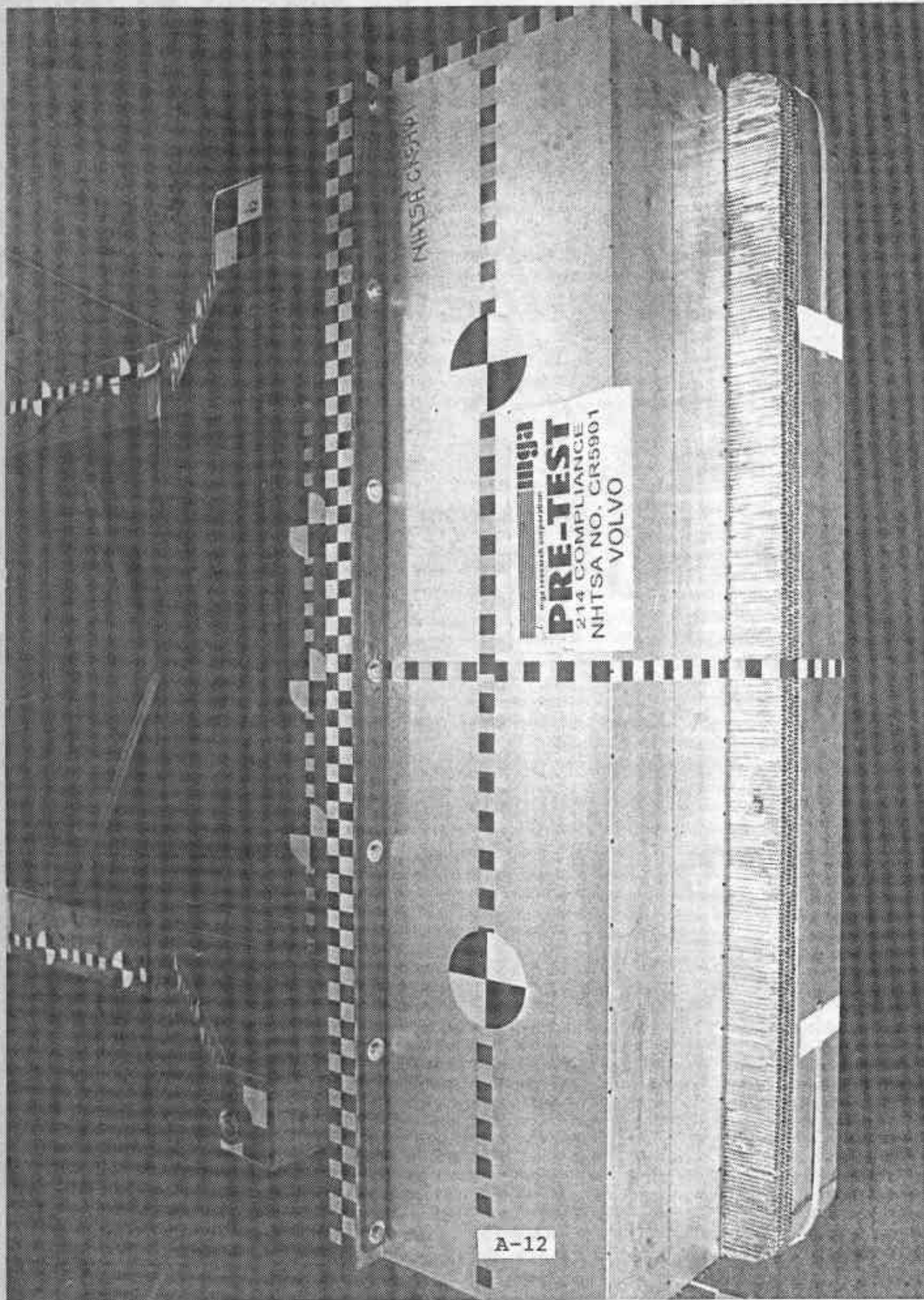


Photo No. A-12 - Pre-Test MDB Top View

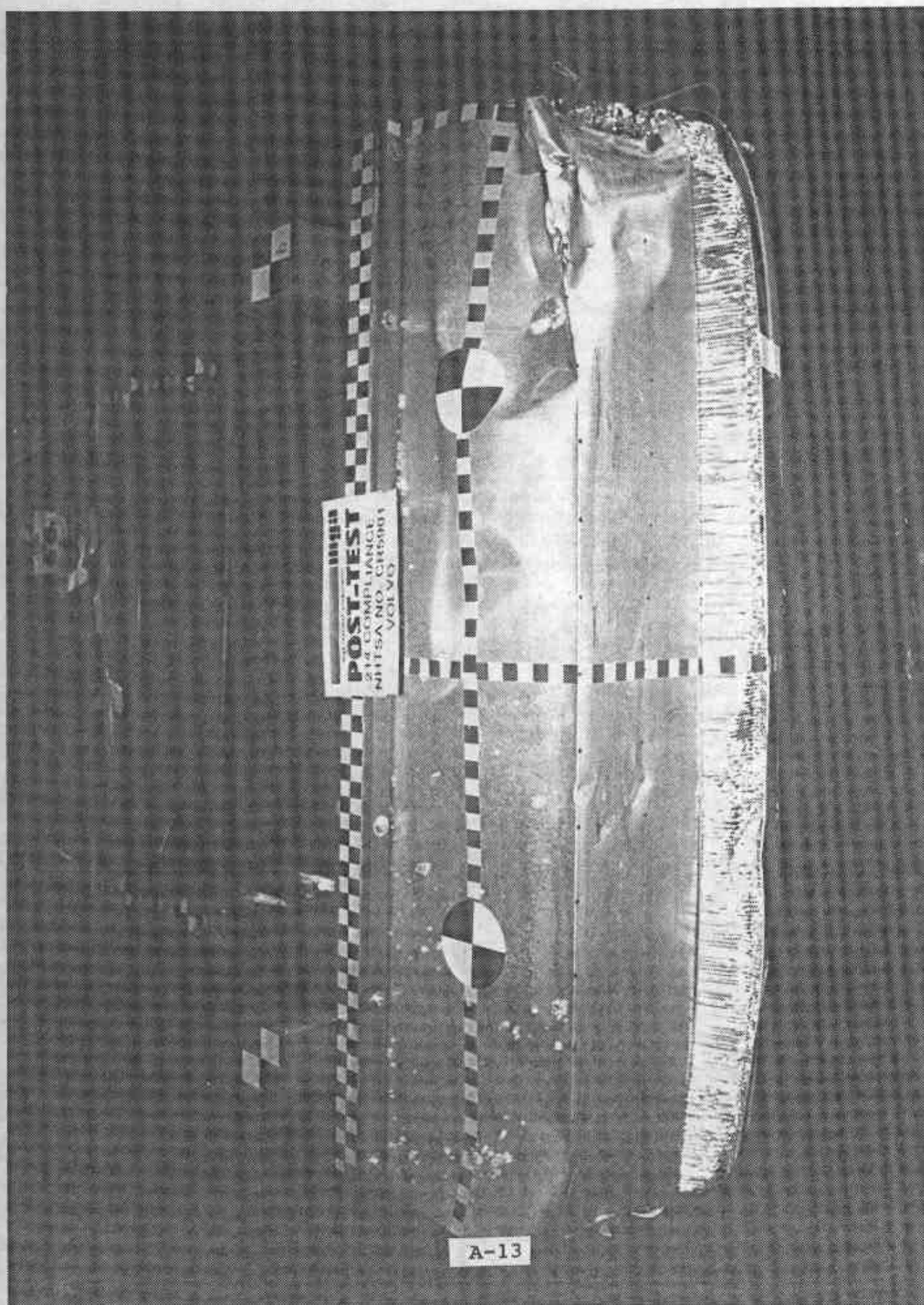


Photo No. A-13 - Post-Test MDB Top View

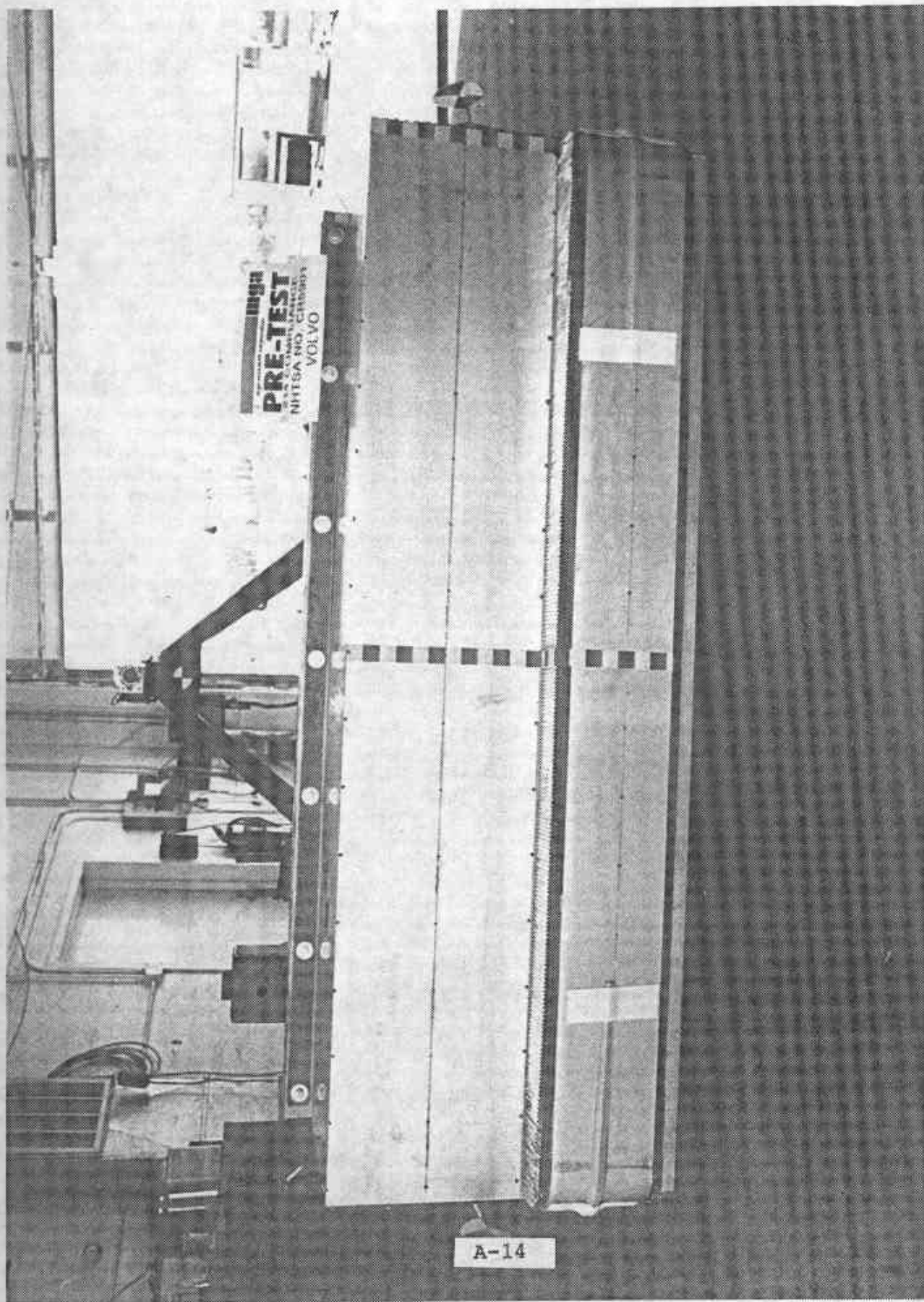
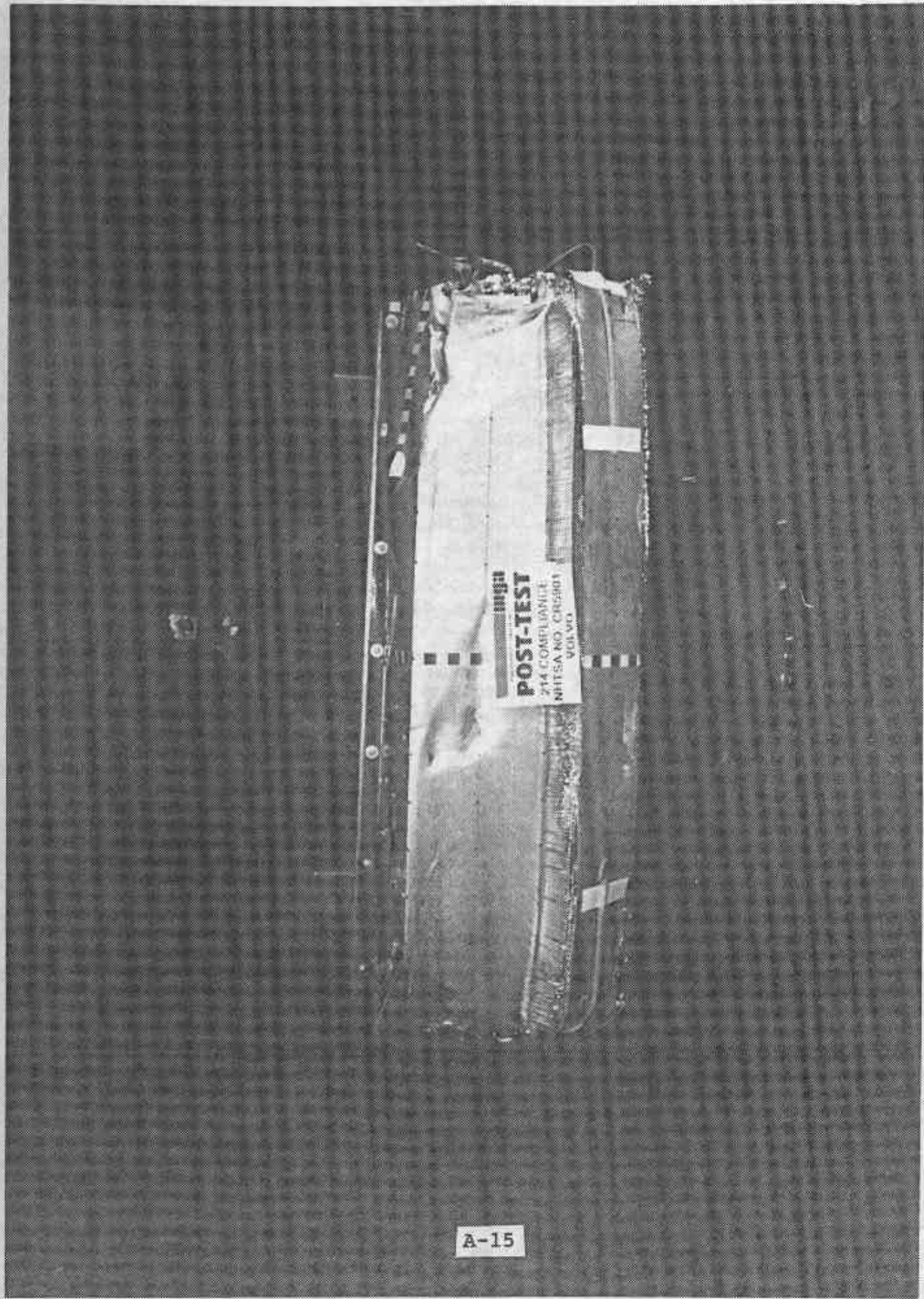


Photo No. A-14 - Pre-Test MDB Front View



A-15

Photo No. A-15 - Post-Test MDB Front View

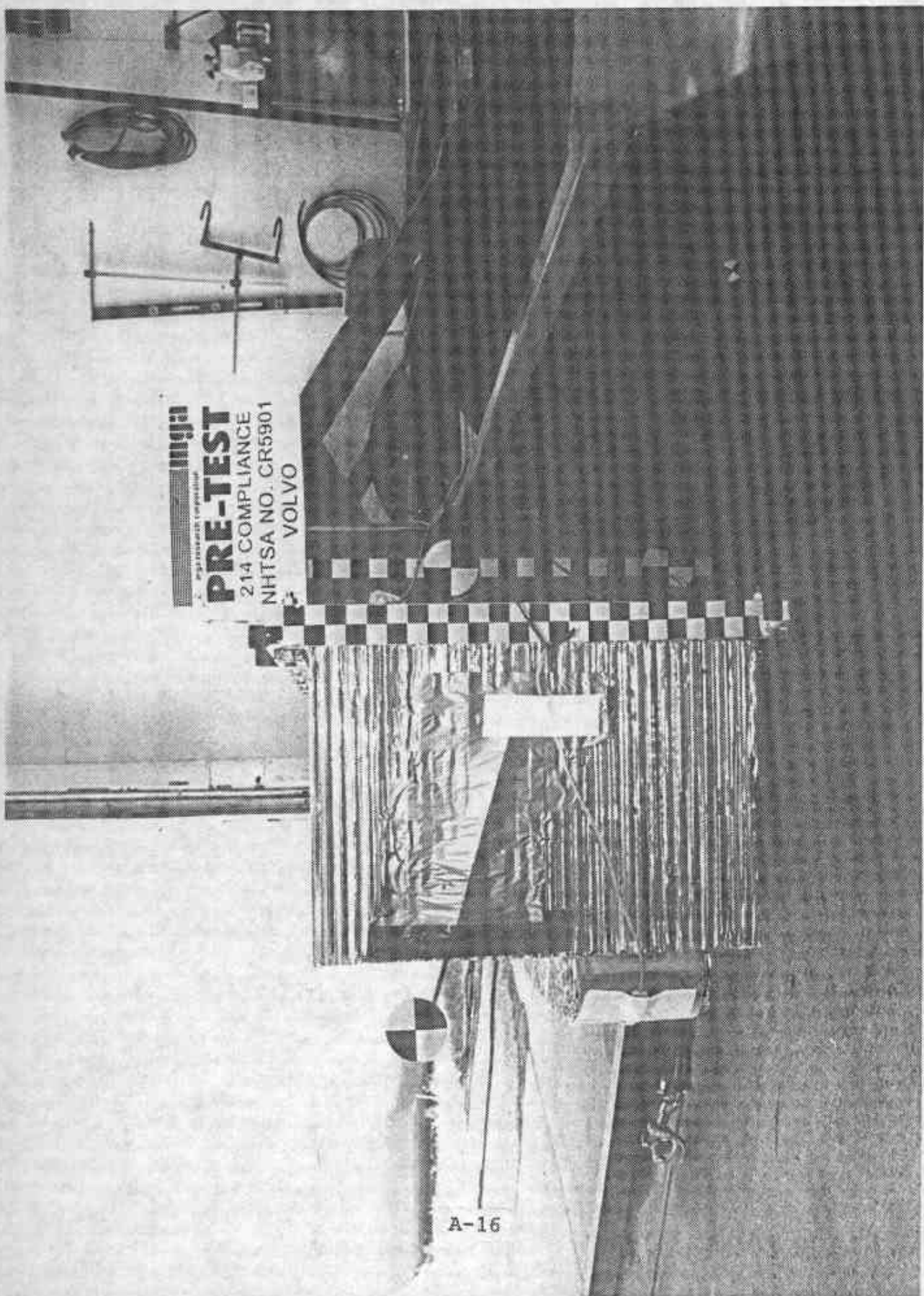


Photo No. A-16 - Pre-Test MDB Left Side View

POST-TEST
14 COMPLIANCE
TSA NO. CR5901
VOLVO

A-17

Photo No. A-17 - Post-Test MDB Left Side View



Photo No. A-18 - Pre-Test MDB Right Side View

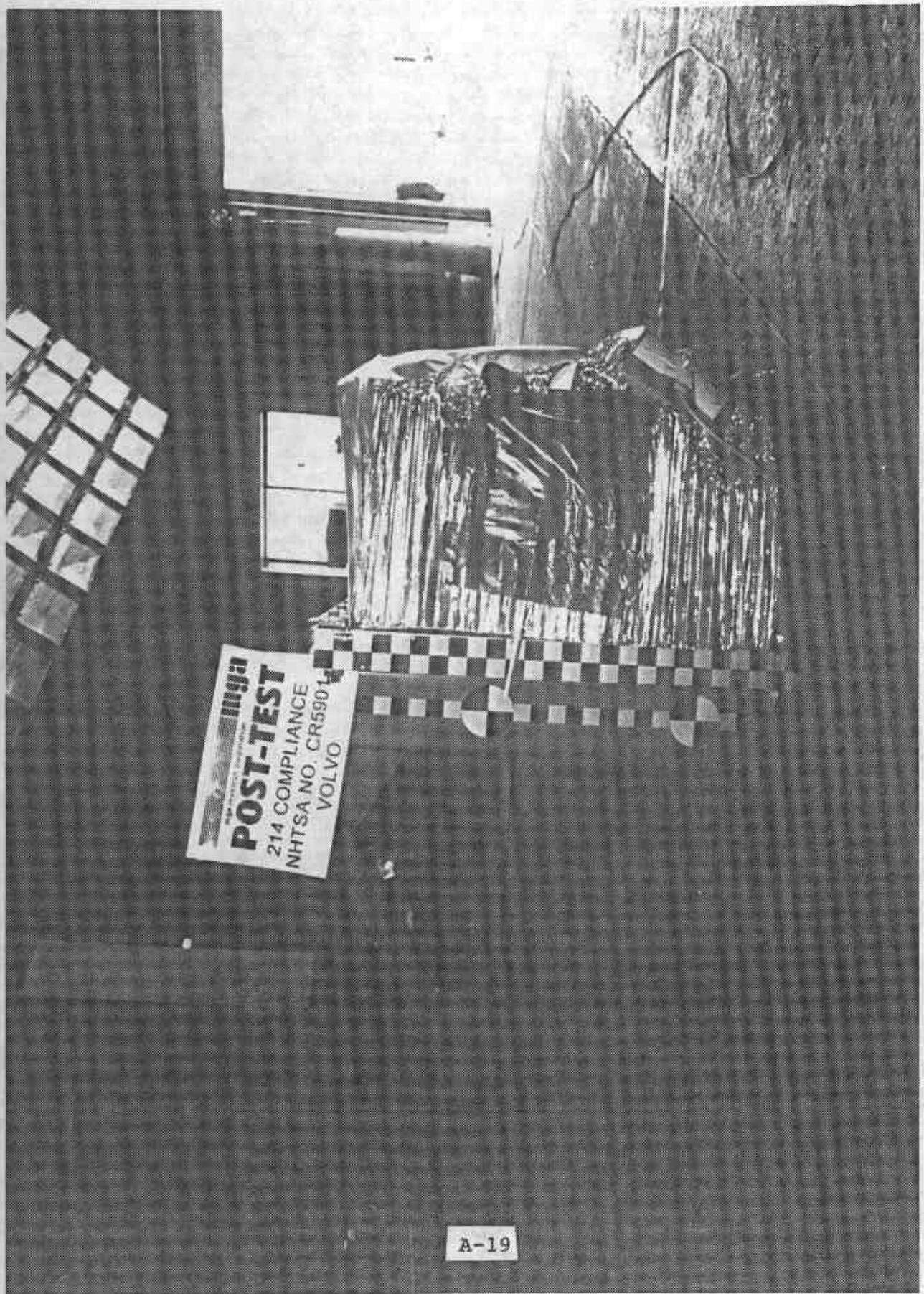


Photo No. A-19 - Post-Test MDB Right Side View



Photo No. A-20 - Post-Test MDB and Vehicle Overhead View

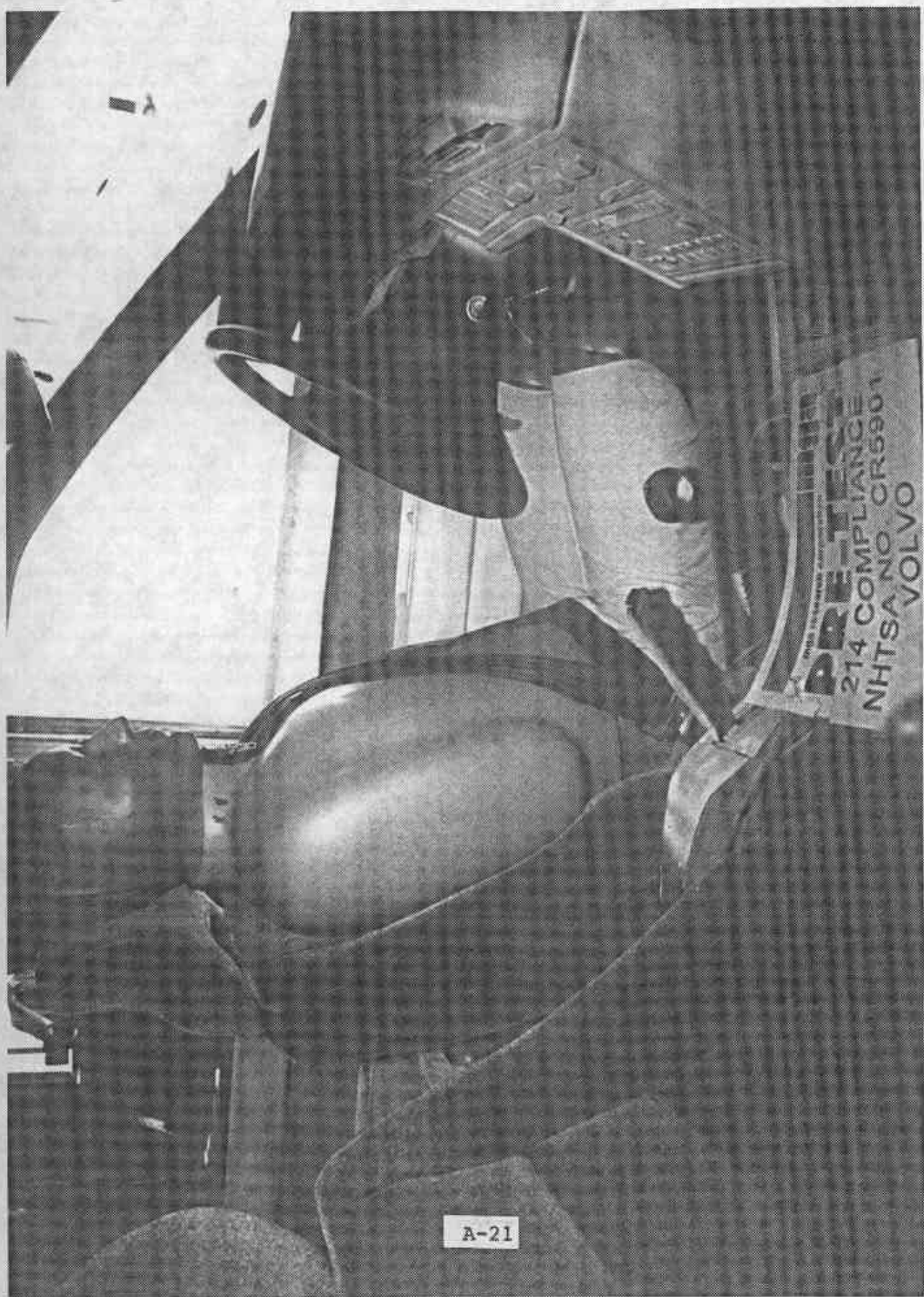


Photo No. A-21 - Pre-Test Driver Dummy Right Side View

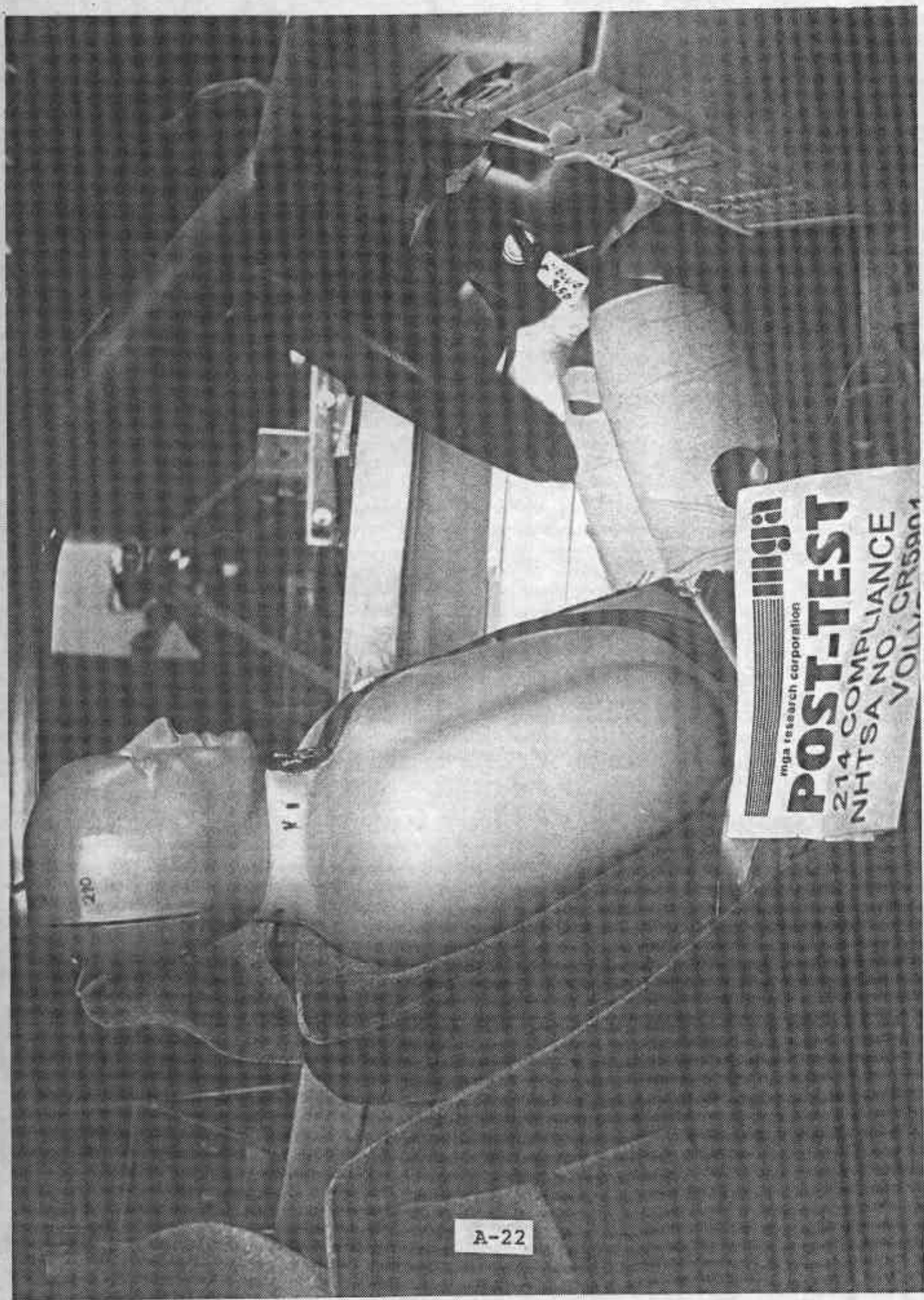


Photo No. A-22 - Post-Test Driver Dummy Right Side View

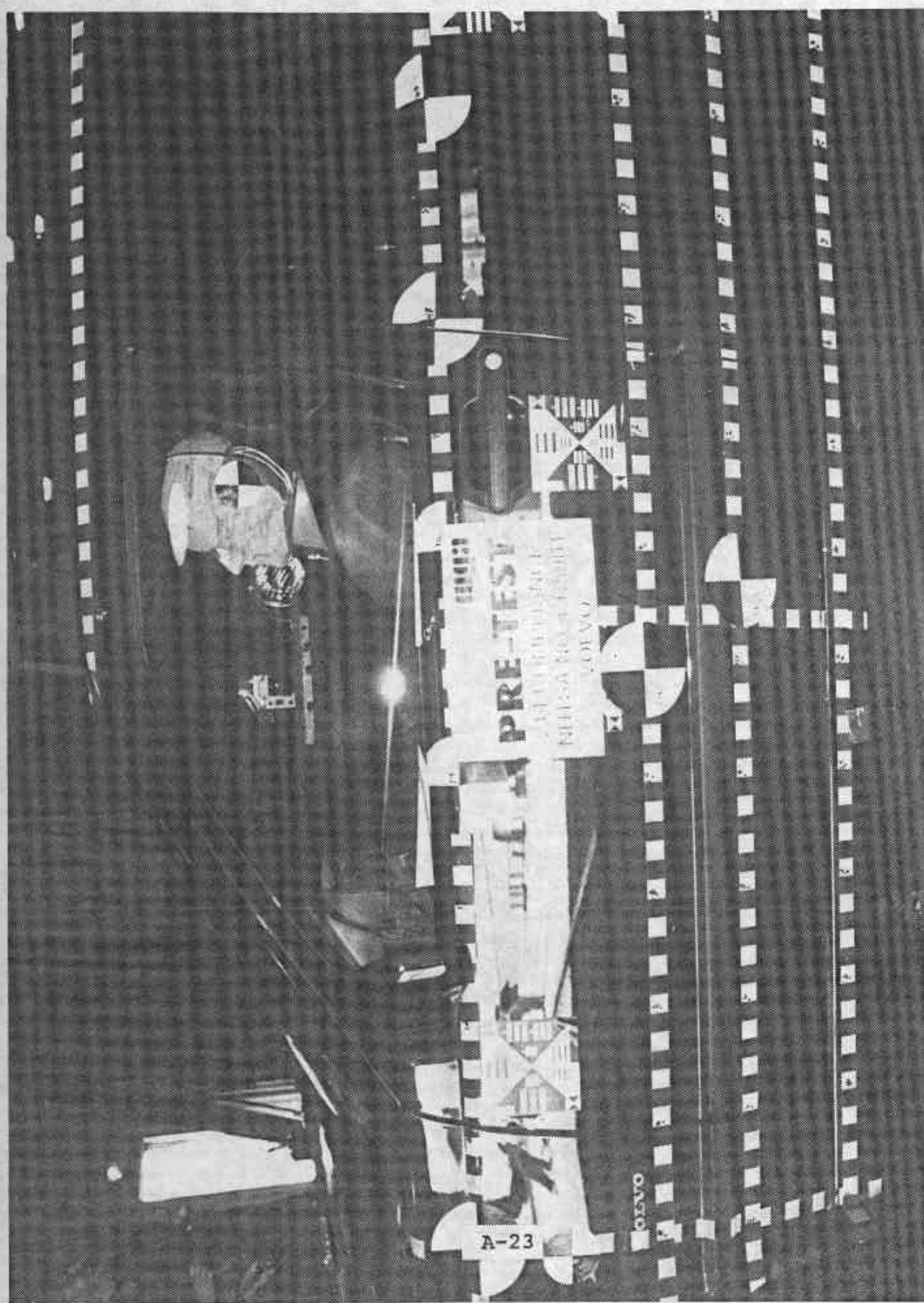


Photo No. A-23 - Pre-Test Driver Dummy Left Side View



Photo No. A-24 - Post-Test Driver Dummy Left Side View

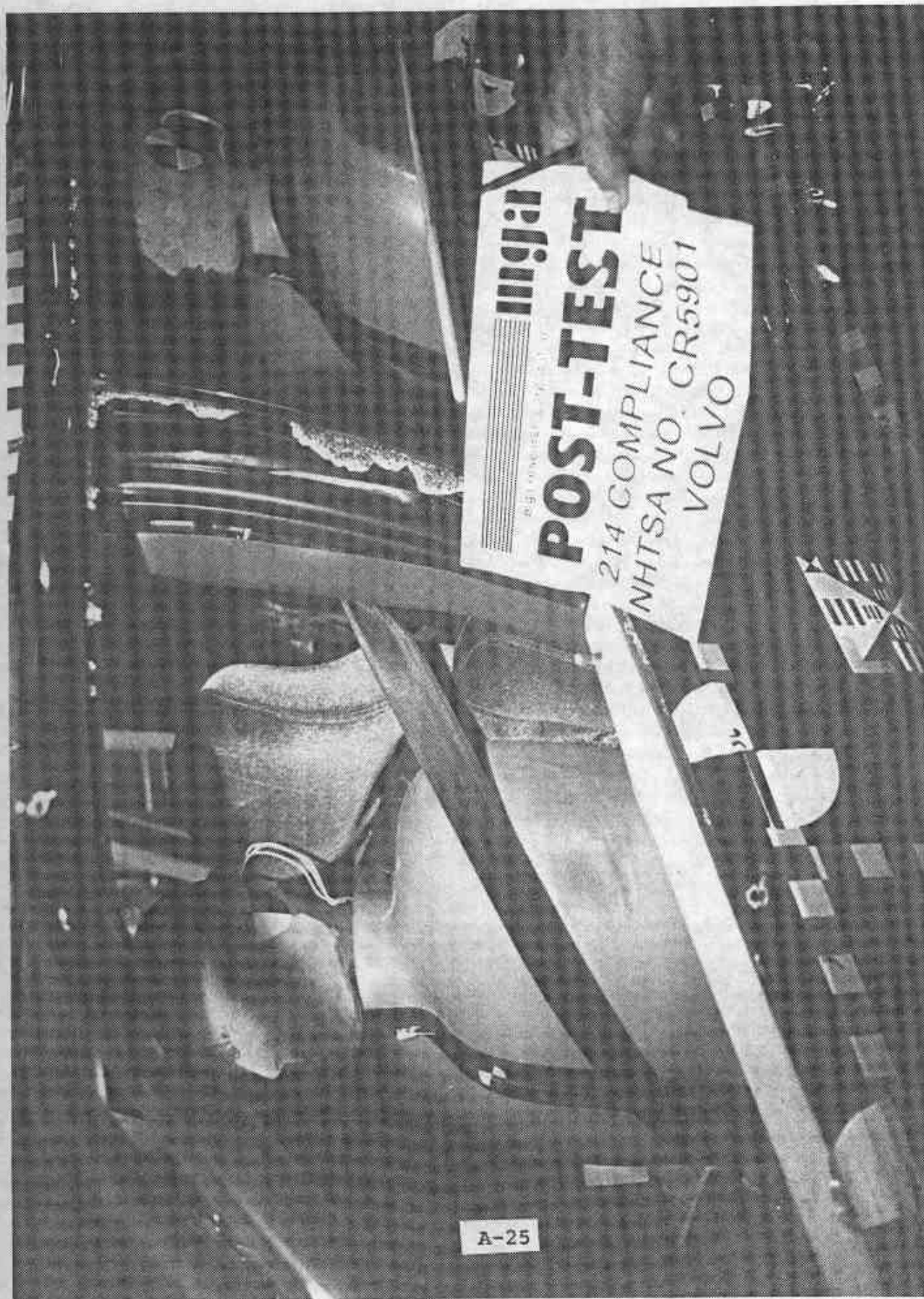


Photo No. A-25 - Post-Test Driver Dummy Front Oblique View



Photo No. A-26 - Pre-Test Driver Dummy Left Side View (Door Open)

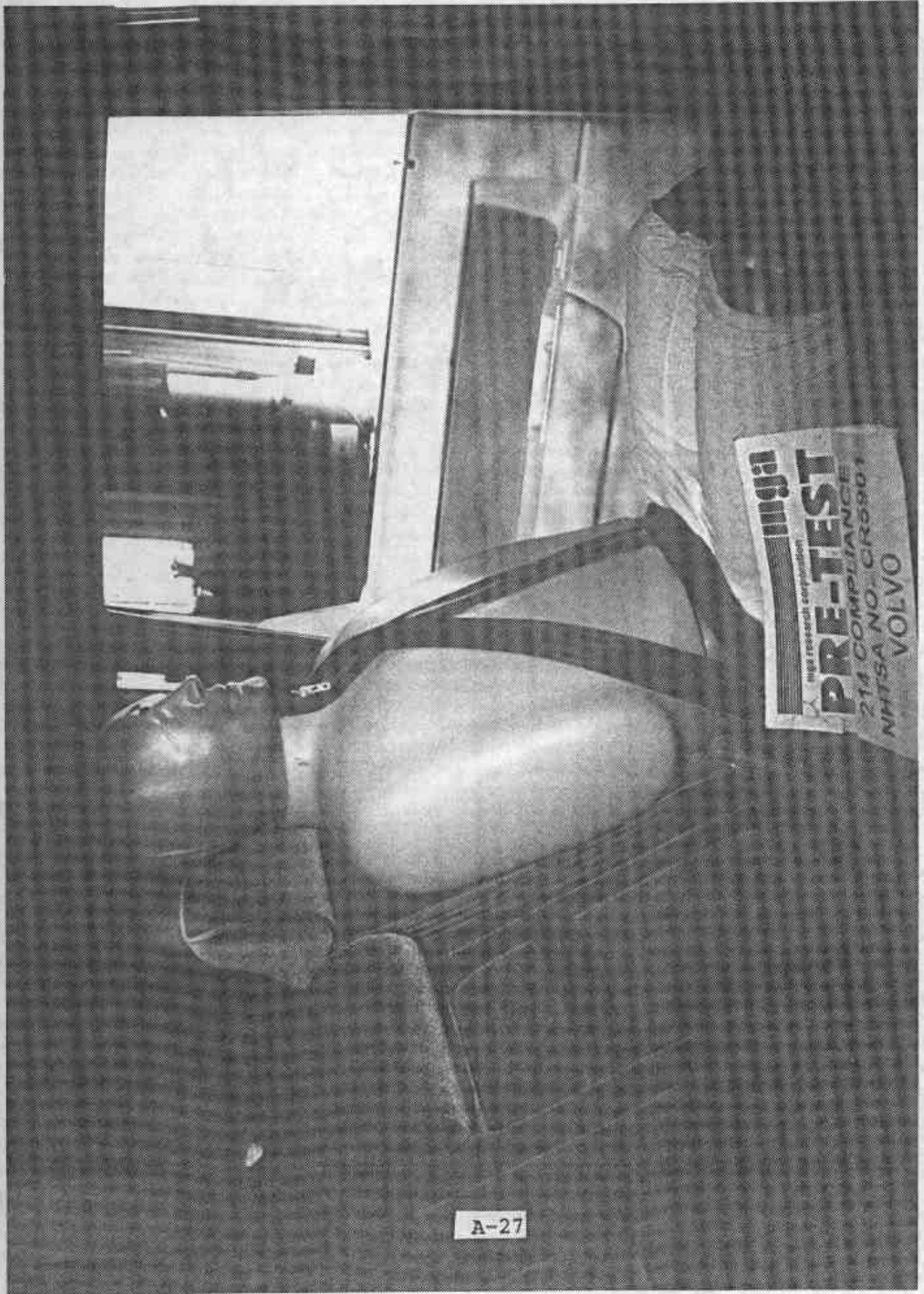


Photo No. A-27 - Pre-Test Passenger Dummy Right Side View

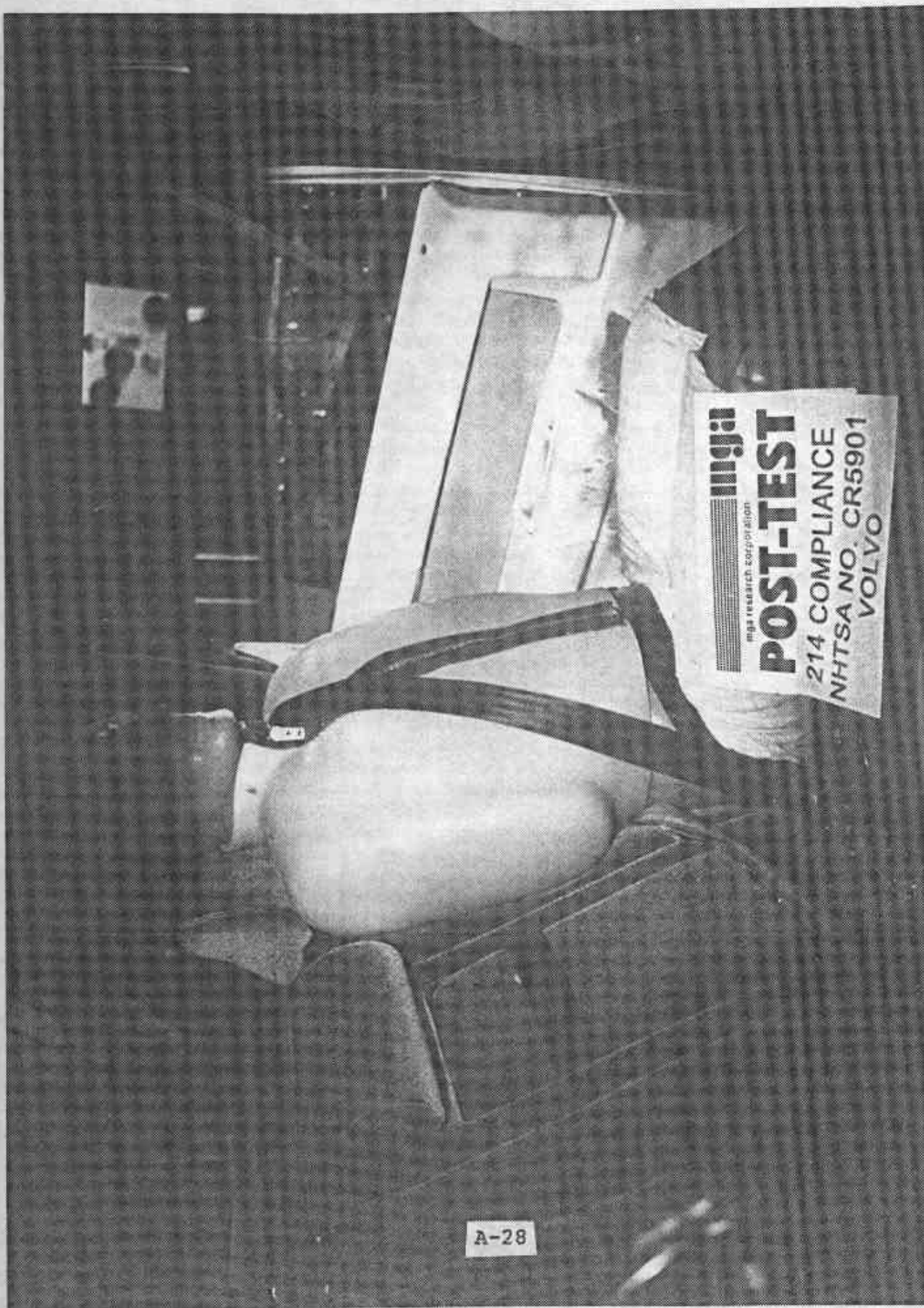


Photo No. A-28 - Post-Test Passenger Dummy Right Side View

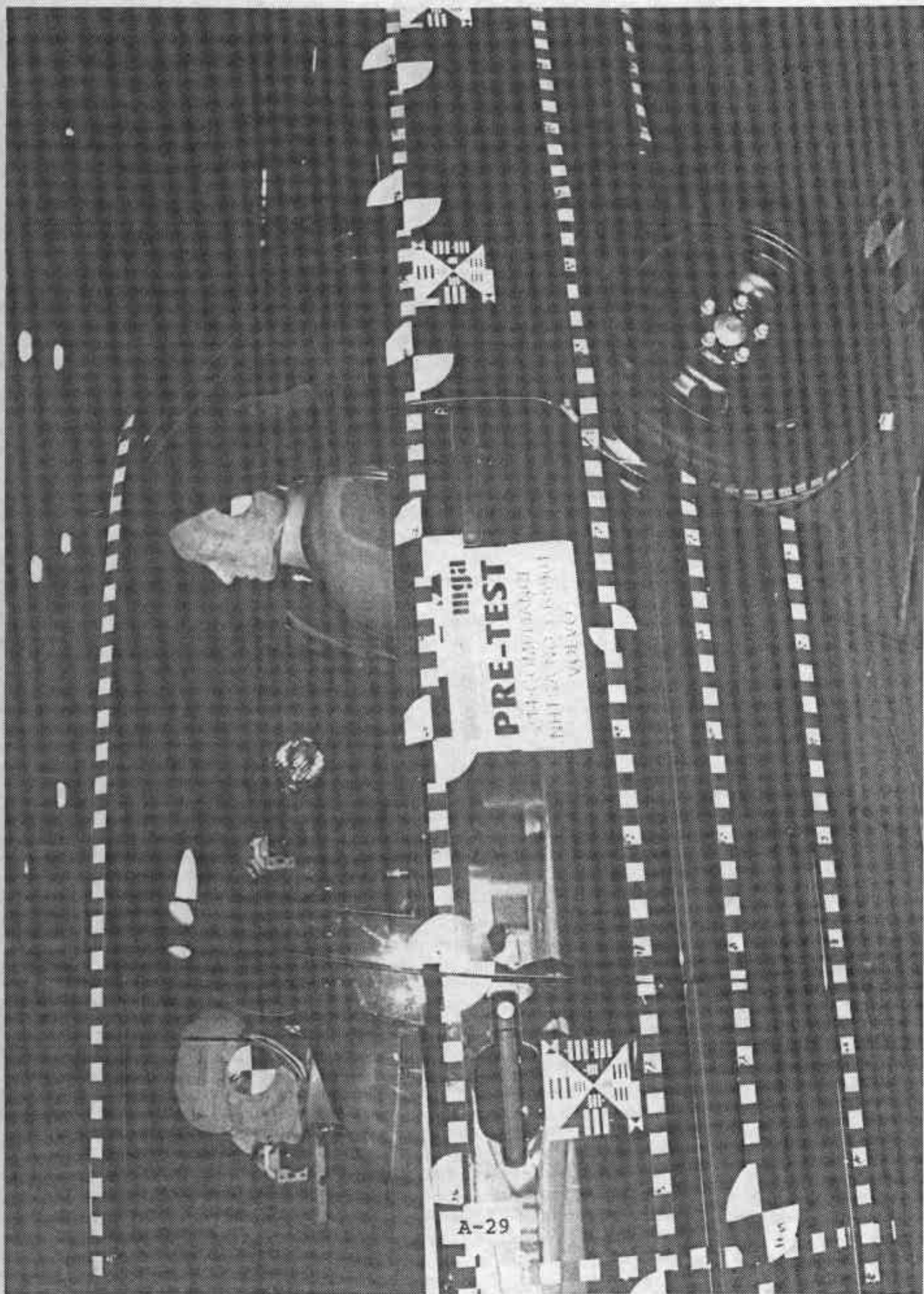


Photo No. A-29 - Pre-Test Passenger Dummy Left Side View

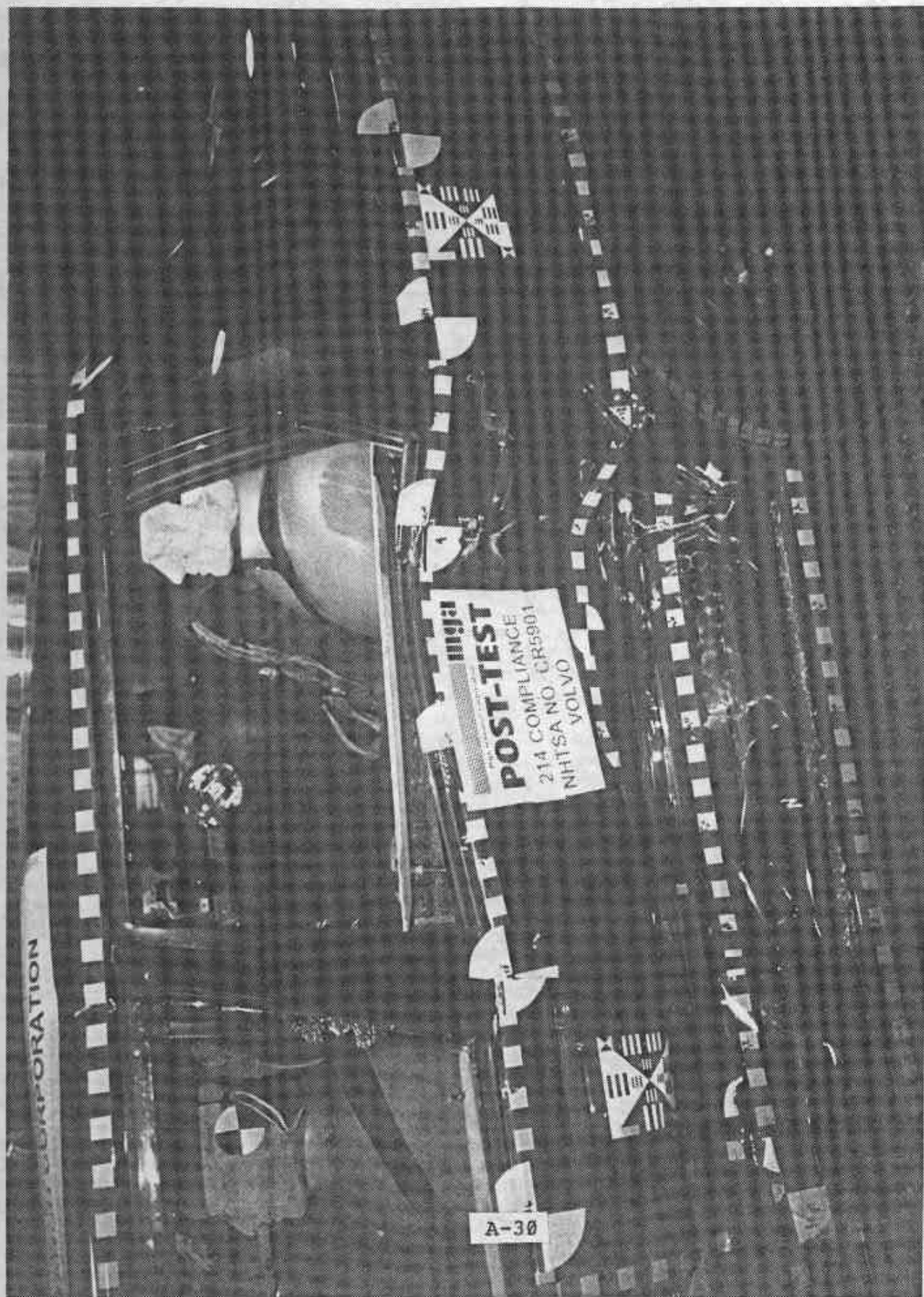


Photo No. A-30 - Post-Test Passenger Dummy Left Side View



Photo No. A-31 - Pre-Test Passenger Dummy Front Oblique View

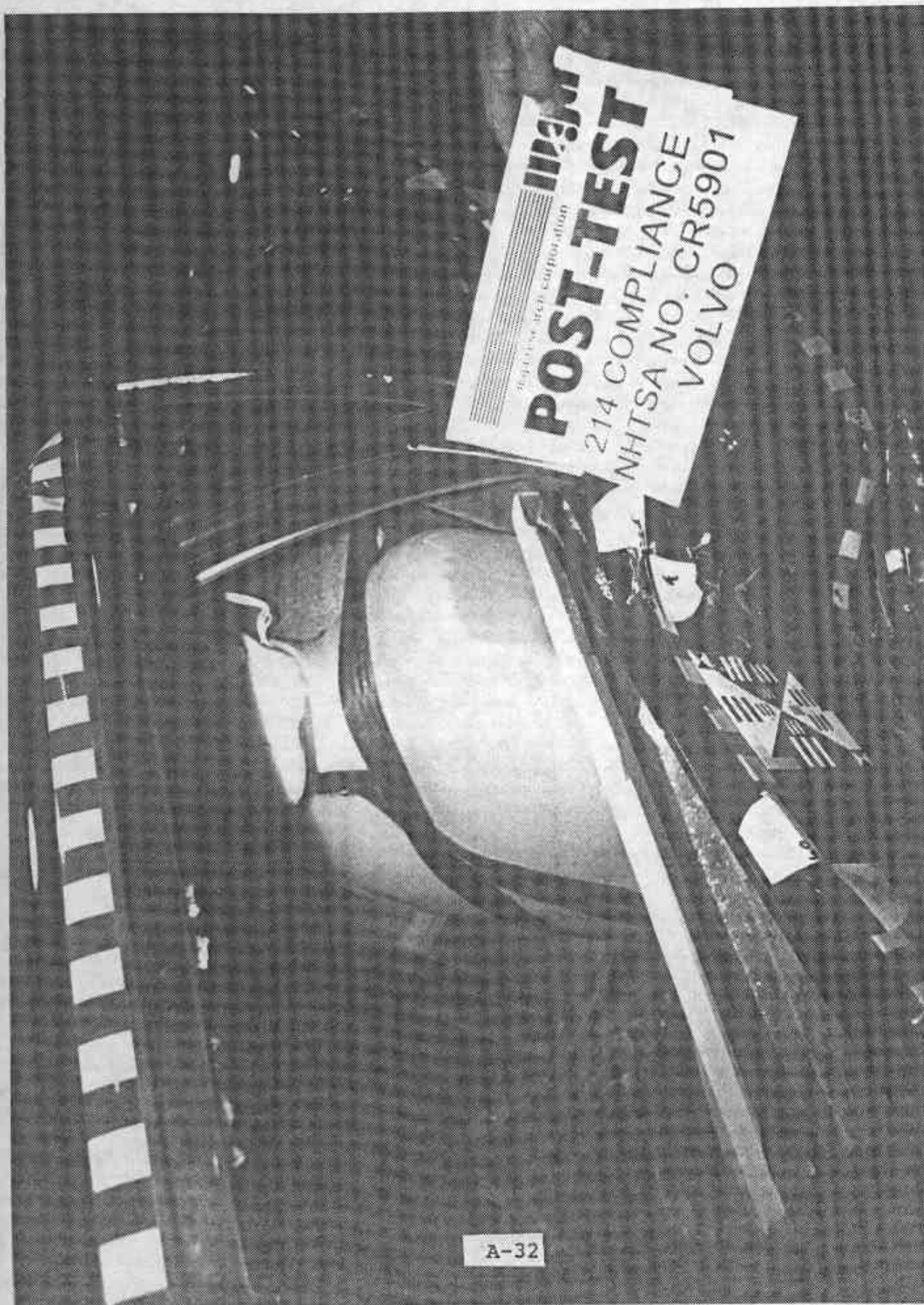


Photo No. A-32 - Post-Test Passenger Dummy Front Oblique View

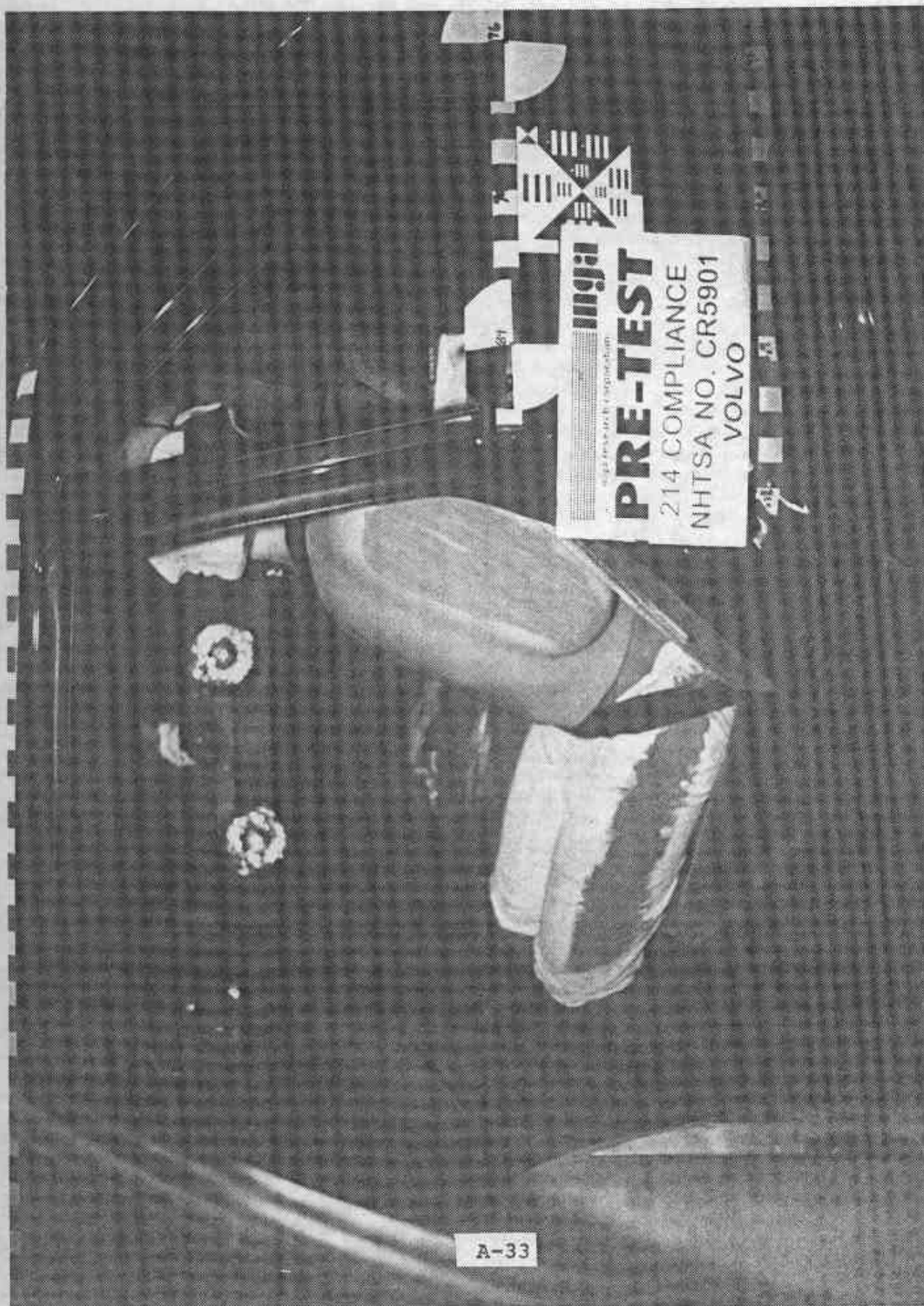


Photo No. A-33 - Pre-Test Passenger Dummy Left Side View (Door Open)

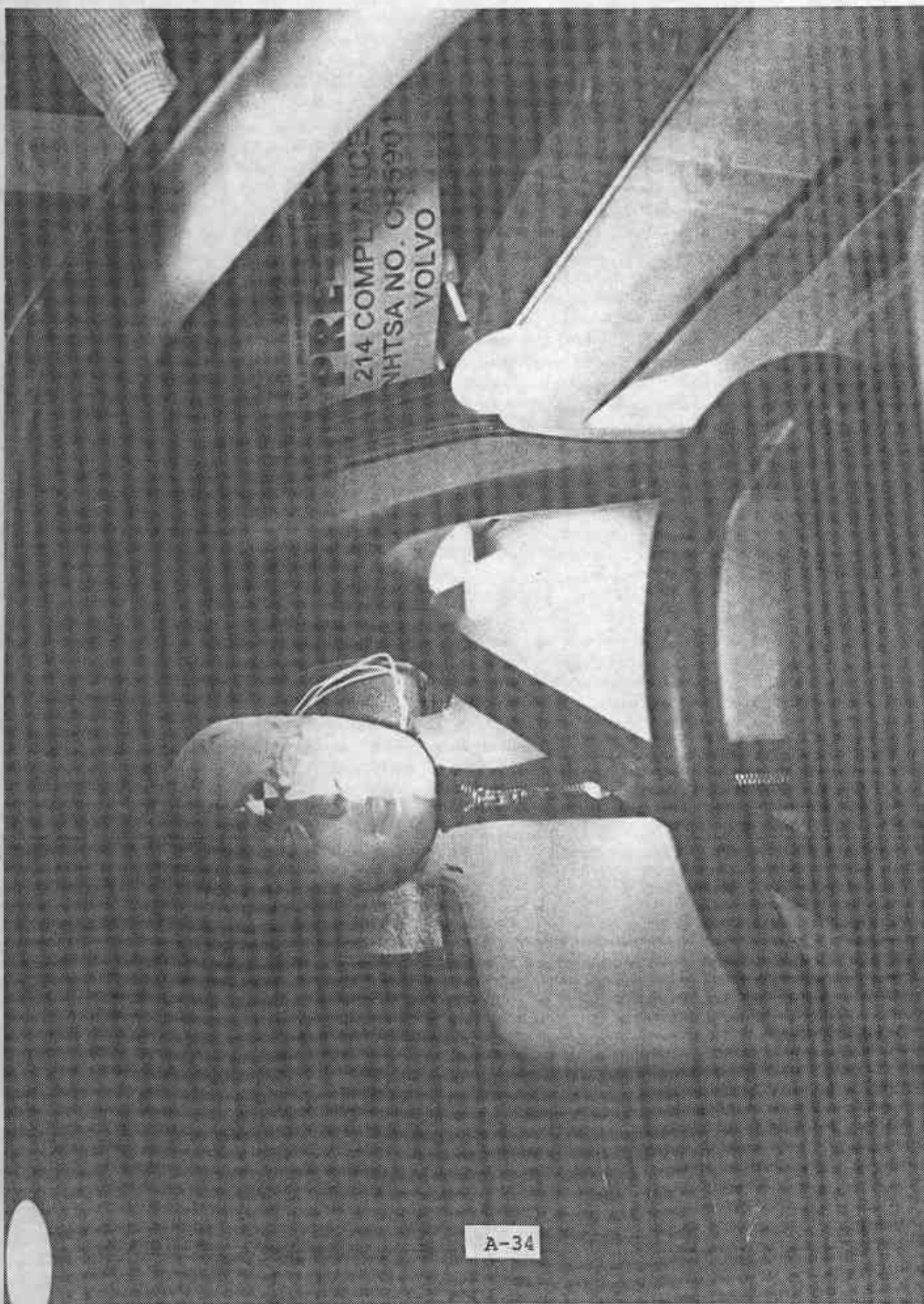


Photo No. A-34 - Pre-Test Driver Dummy Front View

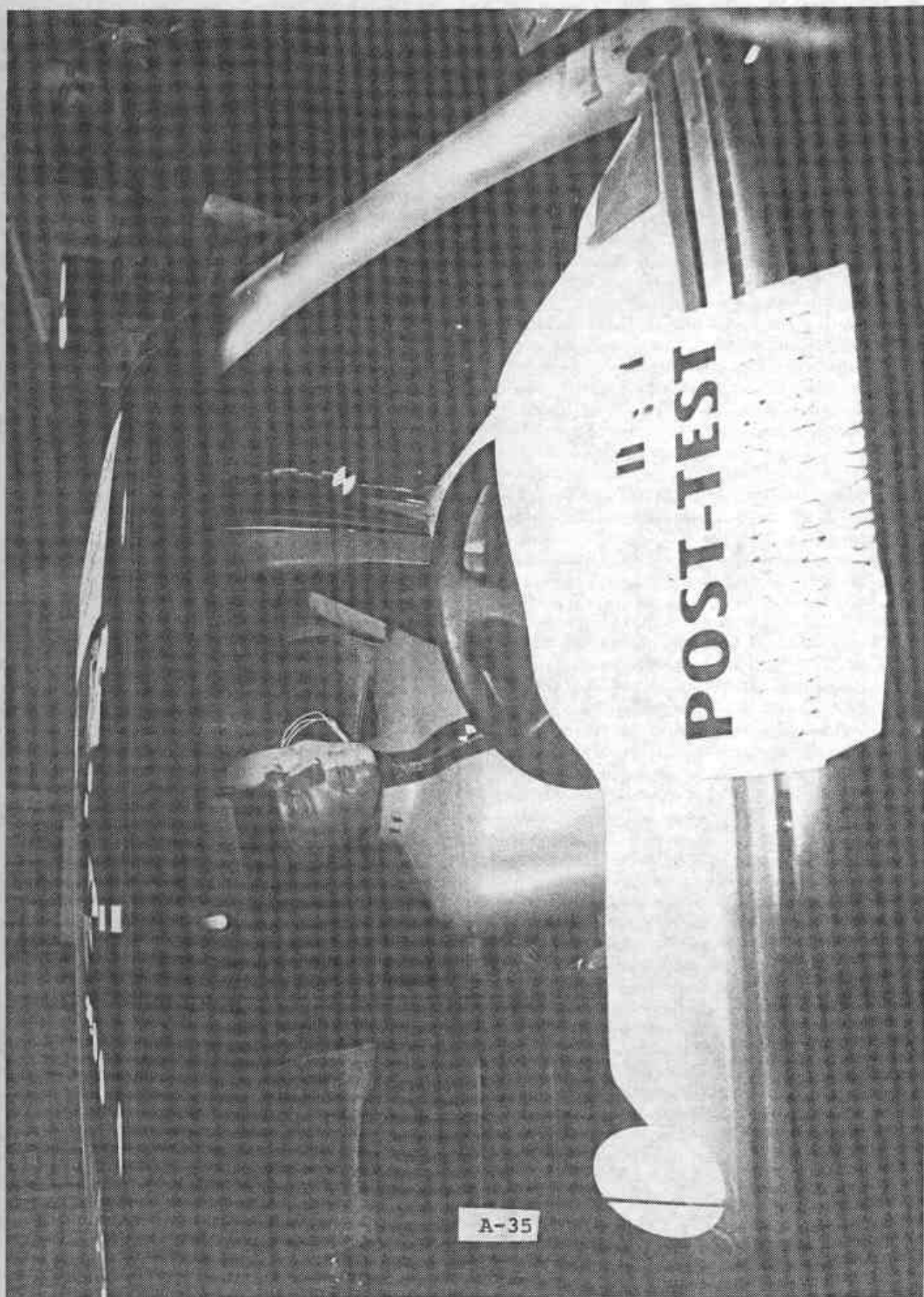


Photo No. A-35 - Post-Test Driver Dummy Front View

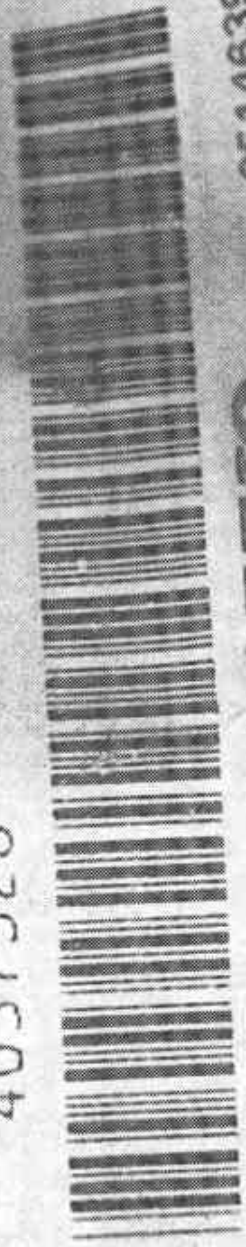
MADE BY VOLVO GOTHENBURG SWEDEN

DATE: 11/93 GV.W.R. 4180 G.A.W.R. FRONT 2240 G.A.W.R. REAR 1980 LB

THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR VEHICLE SAFETY, BUMPER AND THEFT PROTECTION STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.

VIN YV1LS5513R2120814

4037328



3514635

VOLVO

T

A-36

Photo No. A-36 - Tire Placard and Vehicle Certification Label

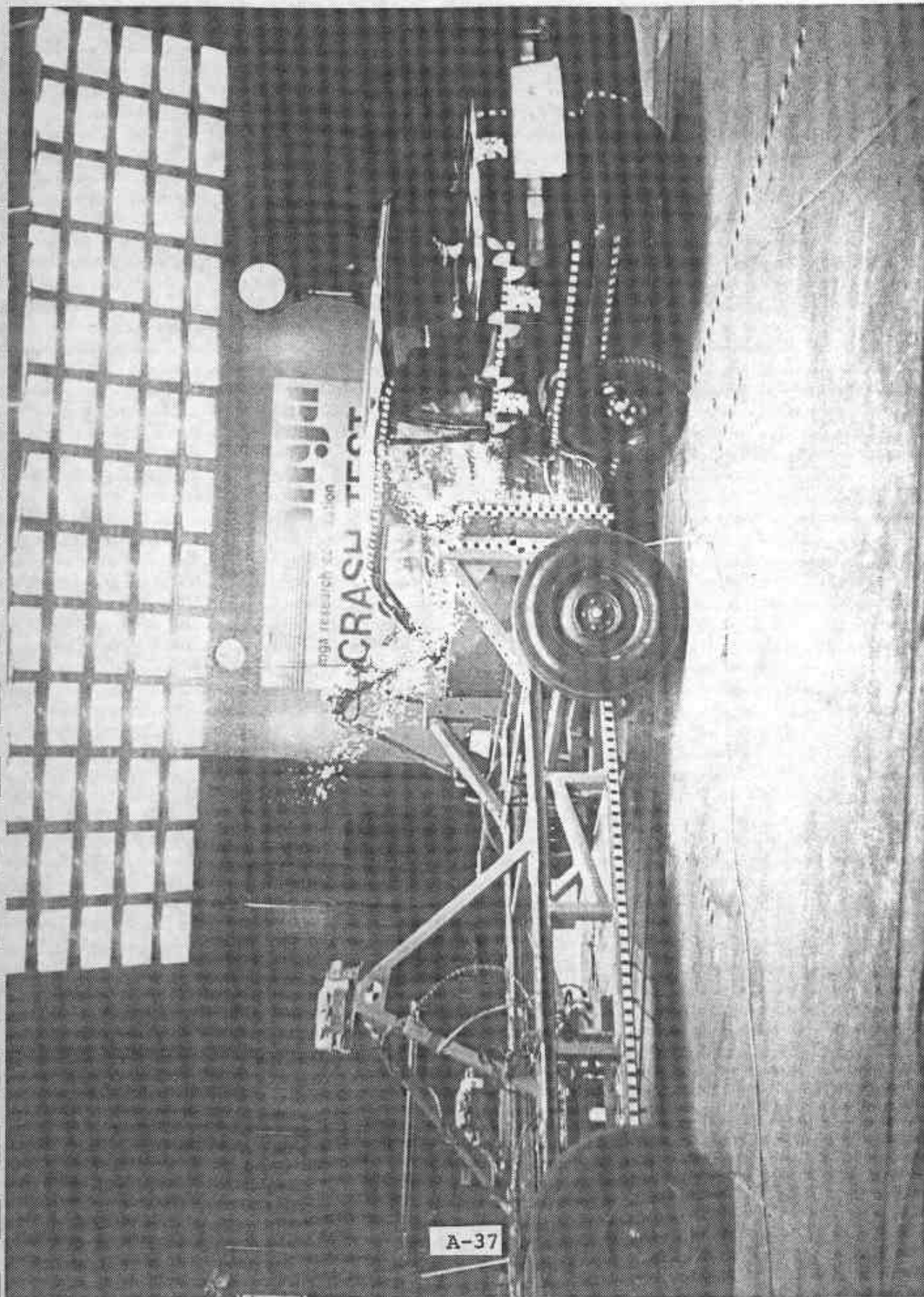


Photo No. A-37 - Impact

APPENDIX B - DATA PLOTS

Table of Data Plots

<u>Occupant:</u>	<u>Page No.</u>
Figure B-1 - Driver Upper Rib Y Acceleration vs. Time	B-1
Figure B-2 - Driver Upper Rib Y Velocity vs. Time	B-2
Figure B-3 - Driver Lower Rib Y Acceleration vs. Time	B-3
Figure B-4 - Driver Lower Rib Y Velocity vs. Time	B-4
Figure B-5 - Driver Lower Spine Y Acceleration vs. Time	B-5
Figure B-6 - Driver Lower Spine Y Velocity vs. Time	B-6
Figure B-7 - Driver Pelvis Y Acceleration vs. Time	B-7
Figure B-8 - Driver Pelvis Y Velocity vs. Time	B-8
Figure B-9 - Passenger Upper Rib Y Acceleration vs. Time	B-9
Figure B-10 - Passenger Upper Rib Y Velocity vs. Time	B-10
Figure B-11 - Passenger Lower Rib Y Acceleration vs. Time	B-11
Figure B-12 - Passenger Lower Rib Y Velocity vs. Time	B-12
Figure B-13 - Passenger Lower Spine Y Acceleration vs. Time	B-13
Figure B-14 - Passenger Lower Spine Y Velocity vs. Time	B-14
Figure B-15 - Passenger Pelvis Y Acceleration vs. Time	B-15
Figure B-16 - Passenger Pelvis Y Velocity vs. Time	B-16
 <u>Vehicle:</u>	
Figure B-17 - Left Front Sill Y Acceleration vs. Time	B-17
Figure B-18 - Left Front Sill Y Velocity vs. Time	B-18
Figure B-19 - Left Rear Sill Y Acceleration vs. Time	B-19
Figure B-20 - Left Rear Sill Y Velocity vs. Time	B-20
Figure B-21 - Left A Post Lower Y Acceleration vs. Time	B-21
Figure B-22 - Left A Post Lower Y Velocity vs. Time	B-22
Figure B-23 - Left B Post Lower Y Acceleration vs. Time	B-23
Figure B-24 - Left B Post Lower Y Velocity vs. Time	B-24
Figure B-25 - Left B Post Mid Y Acceleration vs. Time	B-25
Figure B-26 - Left B Post Mid Y Velocity vs. Time	B-26
Figure B-27 - Right Front Sill X Acceleration vs. Time	B-27
Figure B-28 - Right Front Sill X Velocity vs. Time	B-28
Figure B-29 - Right Front Sill Y Acceleration vs. Time	B-29
Figure B-30 - Right Front Sill Y Velocity vs. Time	B-30
Figure B-31 - Right Front Sill Z Acceleration vs. Time	B-31

Table of Data Plots

	<u>Page No.</u>
<u>Vehicle (Cont'd):</u>	
Figure B-32 - Right Front Sill Z Velocity vs. Time	B-32
Figure B-33 - Right Front Sill at Front Seat Resultant vs. Time	B-33
Figure B-34 - Right Rear Sill X Acceleration vs. Time	B-34
Figure B-35 - Right Rear Sill X Velocity vs. Time	B-35
Figure B-36 - Right Rear Sill Y Acceleration vs. Time	B-36
Figure B-37 - Right Rear Sill Y Velocity vs. Time	B-37
Figure B-38 - Right Rear Sill Z Acceleration vs. Time	B-38
Figure B-39 - Right Rear Sill Z Velocity vs. Time	B-39
Figure B-40 - Right Rear Sill at Rear Seat Resultant vs. Time	B-40
Figure B-41 - Driver Seat Track Y Acceleration vs. Time	B-41
Figure B-42 - Driver Seat Track Y Velocity vs. Time	B-42
Figure B-43 - Rear Floorpan at Axle X Acceleration vs. Time	B-43
Figure B-44 - Rear Floorpan at Axle X Velocity vs. Time	B-44
Figure B-45 - Rear Floorpan at Axle Y Acceleration vs. Time	B-45
Figure B-46 - Rear Floorpan at Axle Y Velocity vs. Time	B-46
Figure B-47 - Rear Floorpan at Axle Z Acceleration vs. Time	B-47
Figure B-48 - Rear Floorpan at Axle Z Velocity vs. Time	B-48
Figure B-49 - Rear Floorpan at Axle Centerline Resultant vs. Time	B-49
Figure B-50 - Rear Seat Occupant Compartment Y Acceleration vs. Time	B-50
Figure B-51 - Rear Seat Occupant Compartment Y Velocity vs. Time	B-51
Figure B-52 - Moving Barrier Center of Gravity X Acceleration vs. Time	B-52
Figure B-53 - Moving Barrier Center of Gravity X Velocity vs. Time	B-53
Figure B-54 - Moving Barrier Center of Gravity Y Acceleration vs. Time	B-54
Figure B-55 - Moving Barrier Center of Gravity Y Velocity vs. Time	B-55
Figure B-56 - Moving Barrier Center of Gravity Z Acceleration vs. Time	B-56
Figure B-57 - Moving Barrier Center of Gravity Z Velocity vs. Time	B-57
Figure B-58 - Moving Barrier Center of Gravity Resultant vs. Time	B-58
Figure B-59 - Moving Barrier Rear Axle X Acceleration vs. Time	B-59
Figure B-60 - Moving Barrier Rear Axle X Velocity vs. Time	B-60
Figure B-61 - Moving Barrier Rear Axle Y Acceleration vs. Time	B-61
Figure B-62 - Moving Barrier Rear Axle Y Velocity vs. Time	B-62
Figure B-63 - Right Hand Barrier Contact*	B-63
Figure B-64 - Left Hand Barrier Contact	B-64

* No valid data collected

Table of Data Plots

	<u>Page No.</u>
<u>Redundant:</u>	
Figure B-65 - Driver Upper Rib Y Redundant Acceleration vs. Time	B-65
Figure B-66 - Driver Upper Rib Y Redundant Velocity vs. Time	B-66
Figure B-67 - Driver Lower Rib Y Redundant Acceleration vs. Time	B-67
Figure B-68 - Driver Lower Rib Y Redundant Velocity vs. Time	B-68
Figure B-69 - Driver Lower Spine Y Redundant Acceleration vs. Time	B-69
Figure B-70 - Driver Lower Spine Y Redundant Velocity vs. Time	B-70
Figure B-71 - Driver Pelvis Y Redundant Acceleration vs. Time	B-71
Figure B-72 - Driver Pelvis Y Redundant Velocity vs. Time	B-72
Figure B-73 - Passenger Upper Rib Y Redundant Acceleration vs. Time	B-73
Figure B-74 - Passenger Upper Rib Y Redundant Velocity vs. Time	B-74
Figure B-75 - Passenger Lower Rib Y Redundant Acceleration vs. Time	B-75
Figure B-76 - Passenger Lower Rib Y Redundant Velocity vs. Time	B-76
Figure B-77 - Passenger Lower Spine Y Redundant Acceleration vs. Time	B-77
Figure B-78 - Passenger Lower Spine Y Redundant Velocity vs. Time	B-78
Figure B-79 - Passenger Pelvis Y Redundant Acceleration vs. Time	B-79
Figure B-80 - Passenger Pelvis Y Redundant Velocity vs. Time	B-80

Filter: Class 180 (300 Hz)

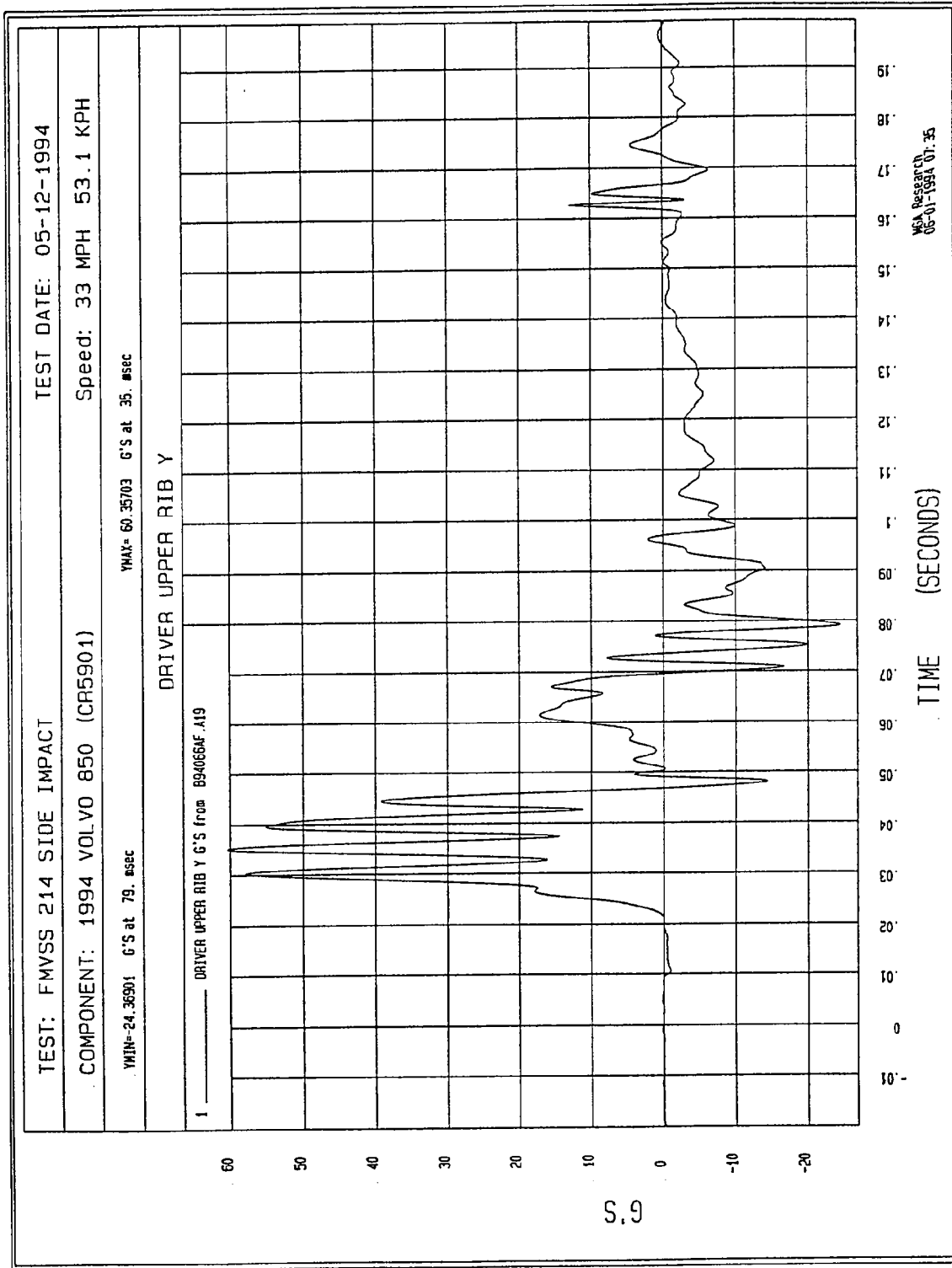


Figure B-1 - Driver Upper Rib Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

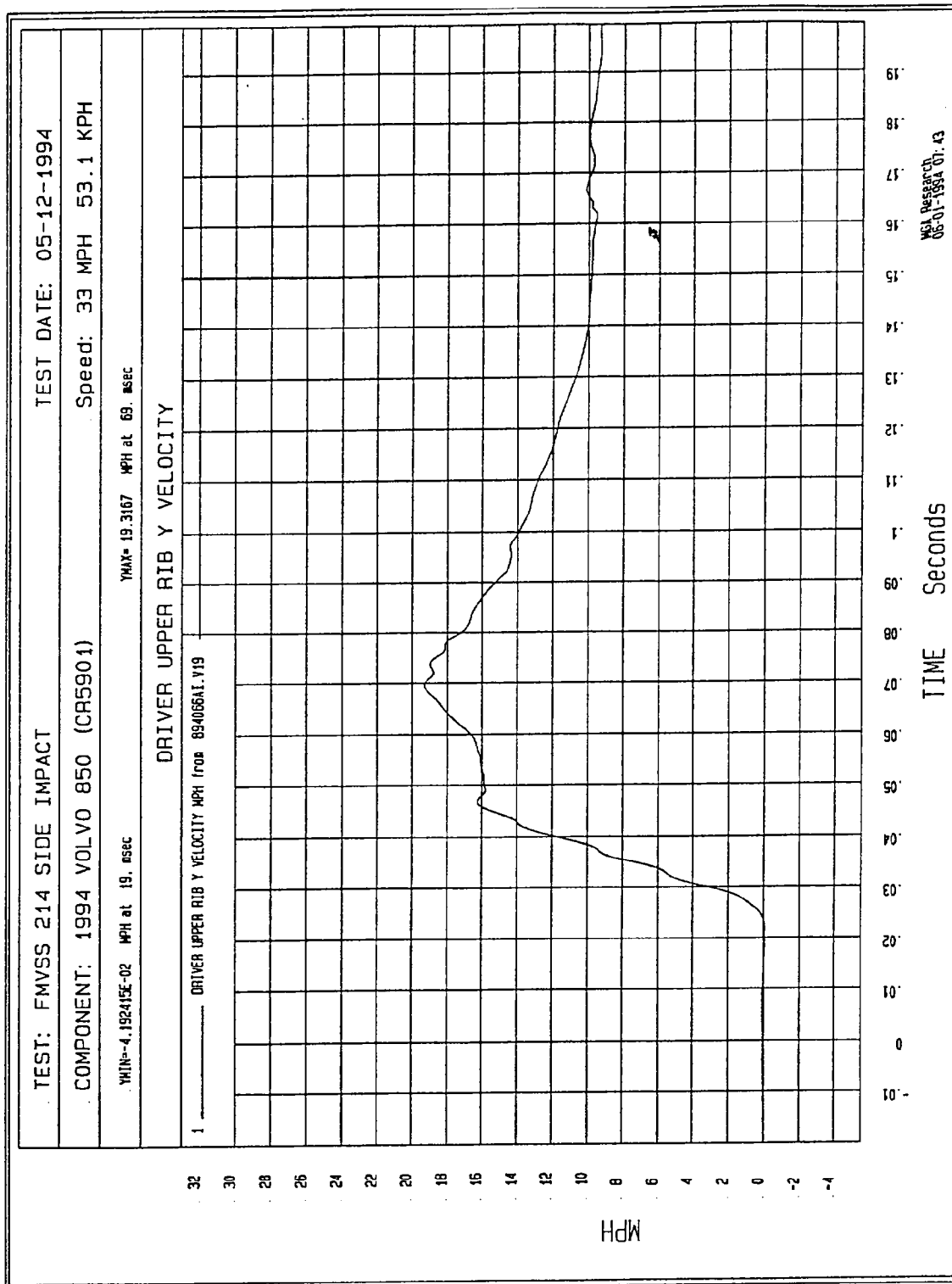


Figure B-2 - Driver Upper Rib Y Velocity vs. Time

Filter: Class 180 (300 Hz)

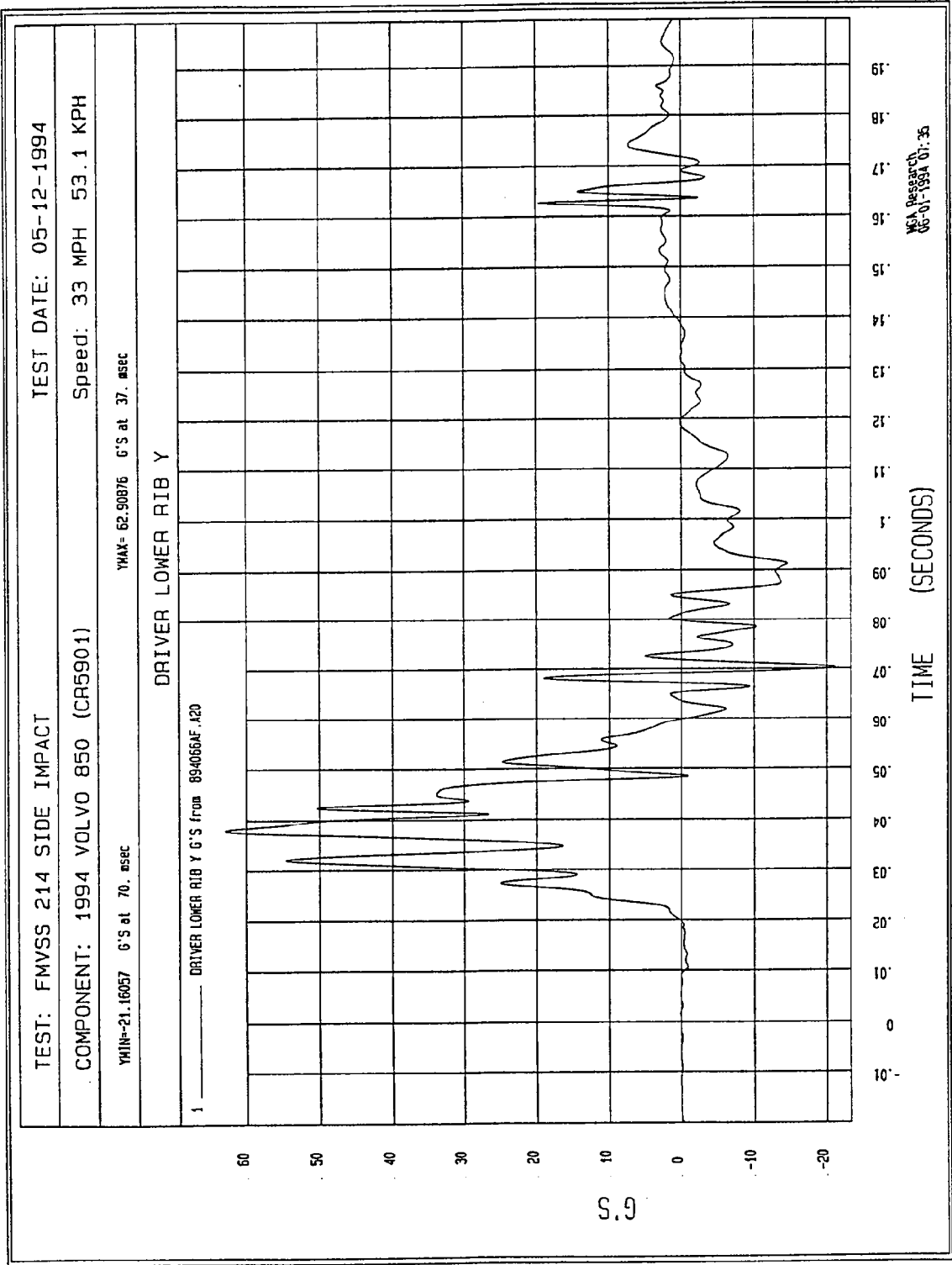


Figure B-3 - Driver Lower Rib Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

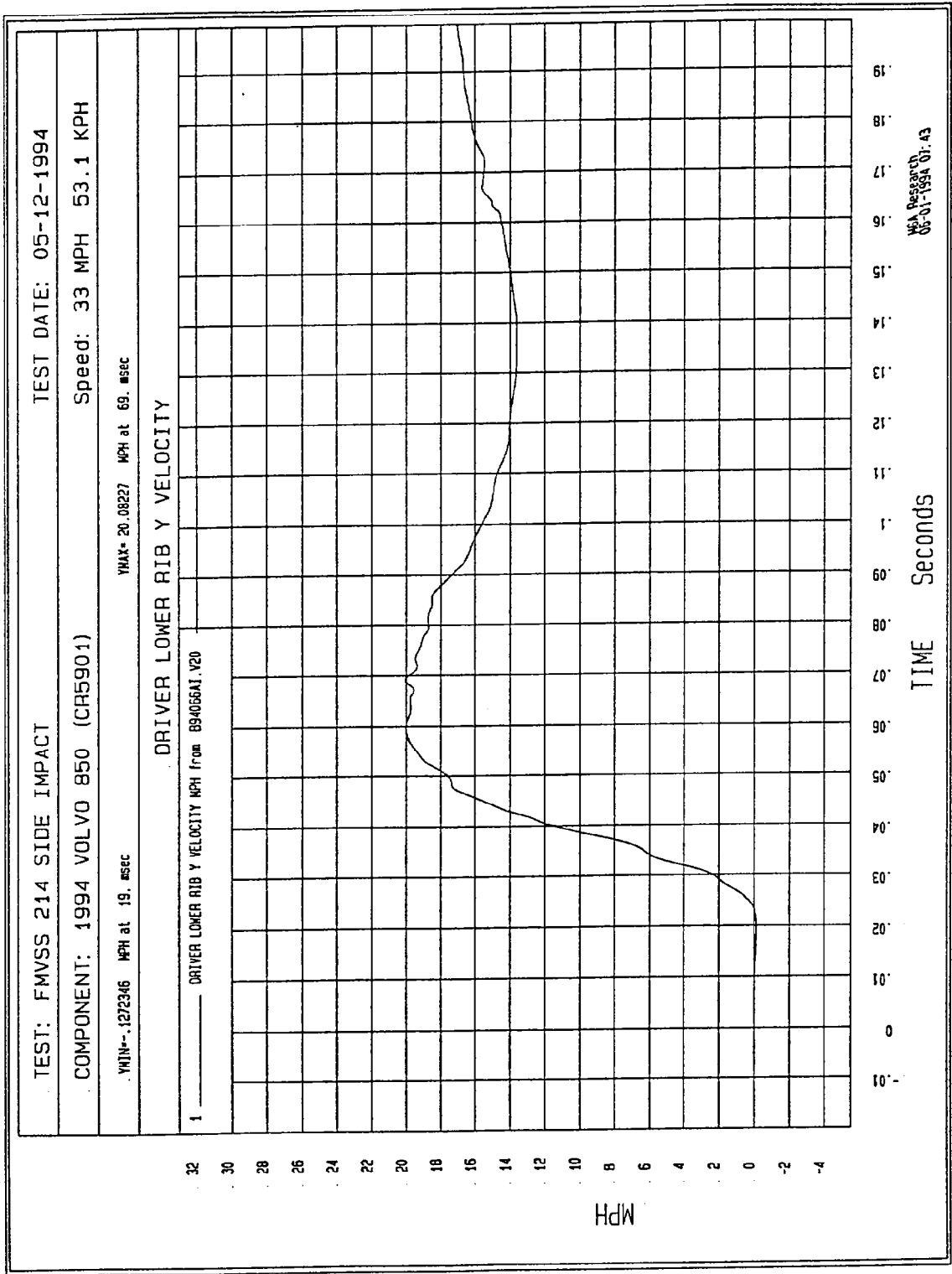


Figure B-4 - Driver Lower Rib Y Velocity vs. Time

Filter: Class 180 (300 Hz)

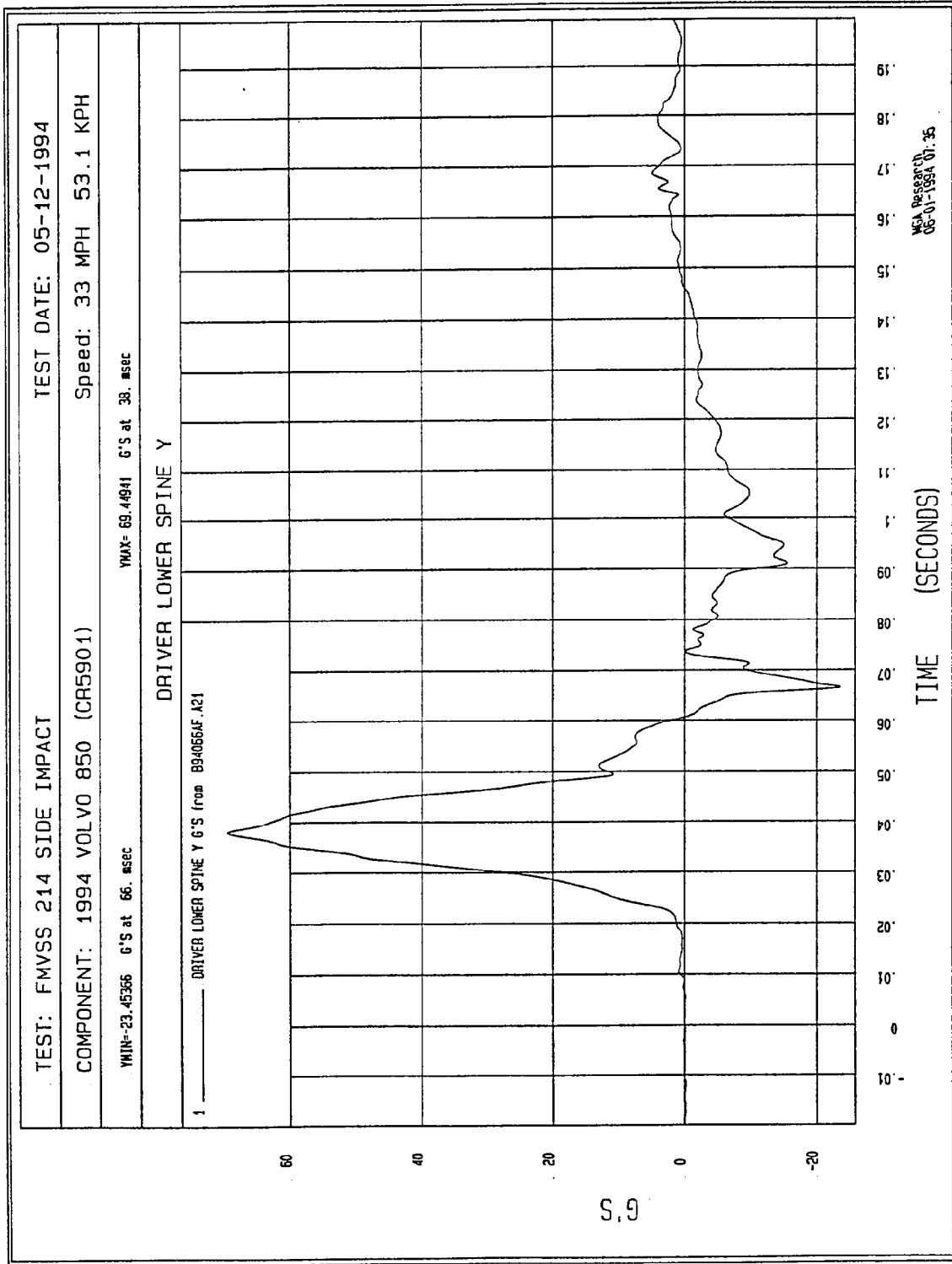


Figure B-5 - Driver Lower Spine Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

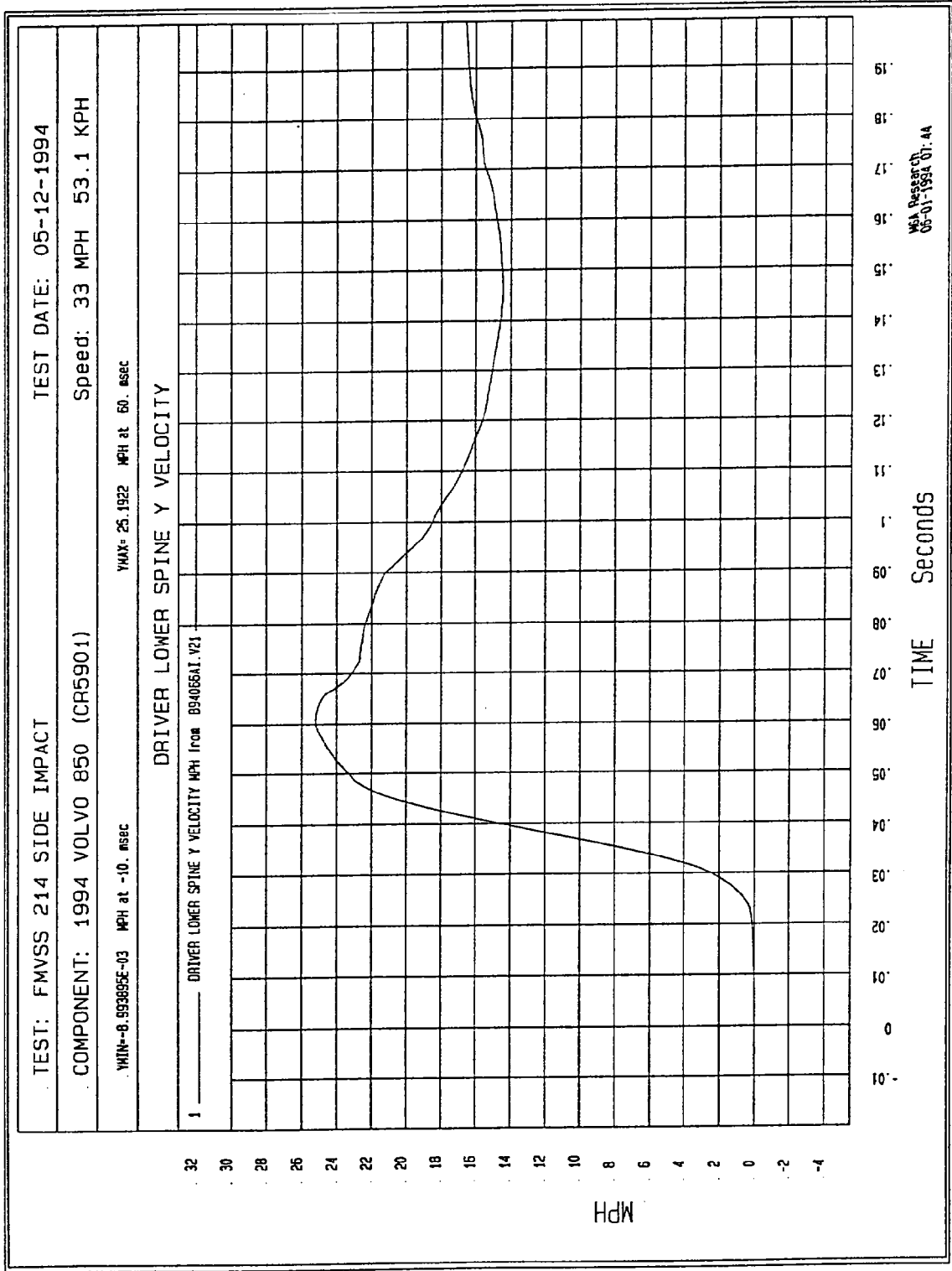


Figure B-6 - Driver Lower Spine Y Velocity vs. Time

Filter: Class 180 (300 Hz)

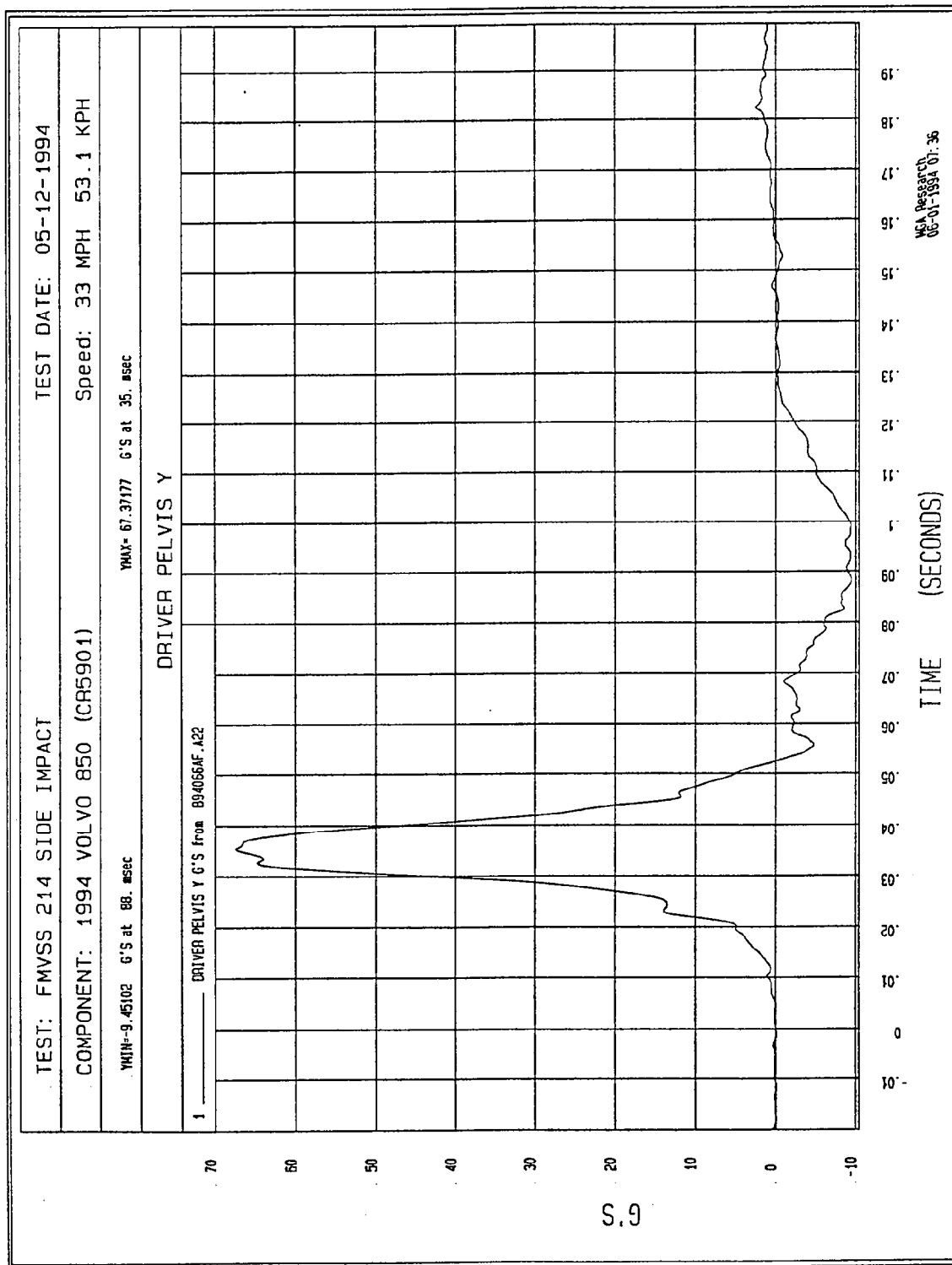


Figure B-7 - Driver Pelvis Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

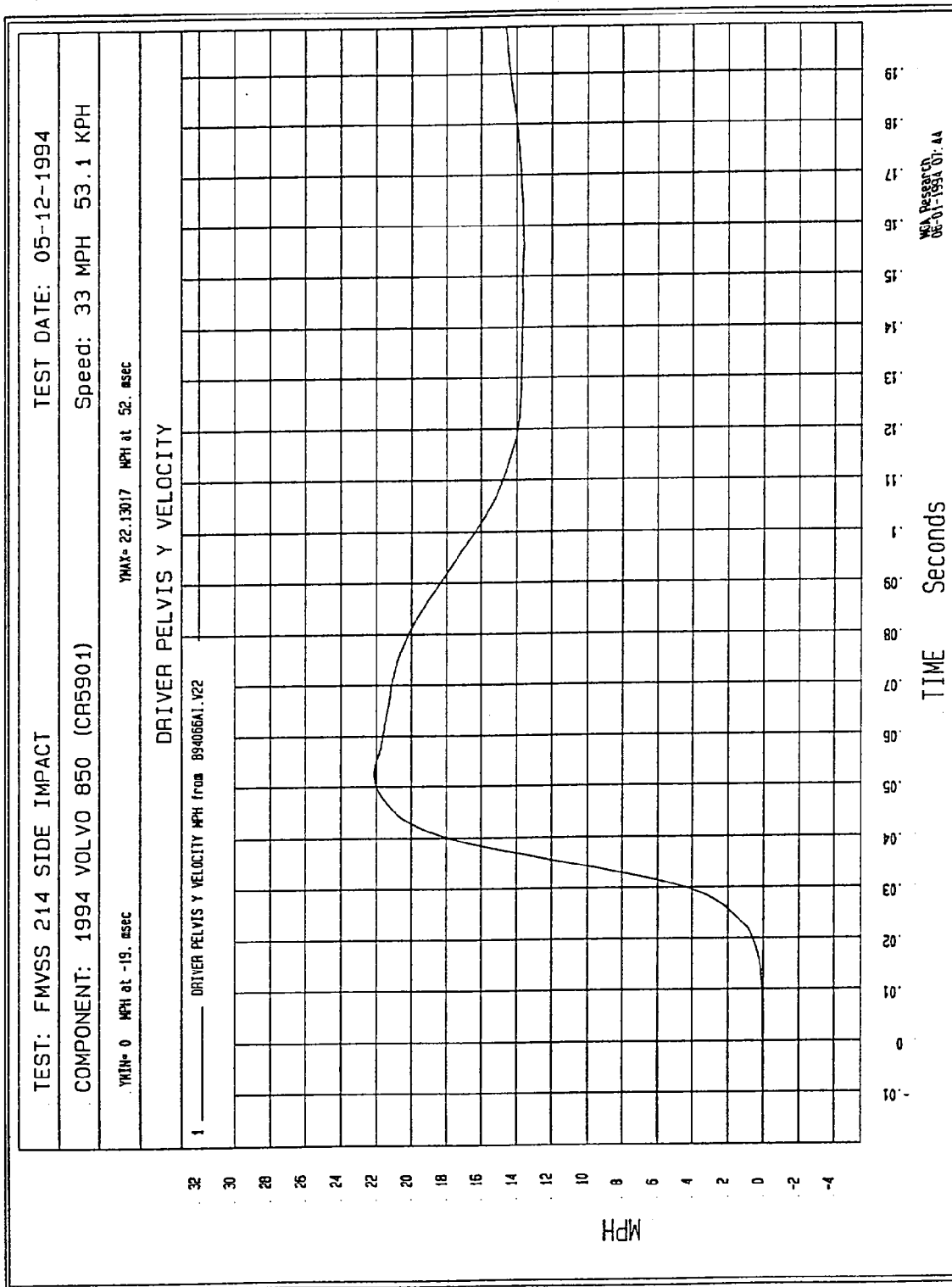


Figure B-8 - Driver Pelvis Y Velocity vs. Time

Filter: Class 180 (300 Hz)

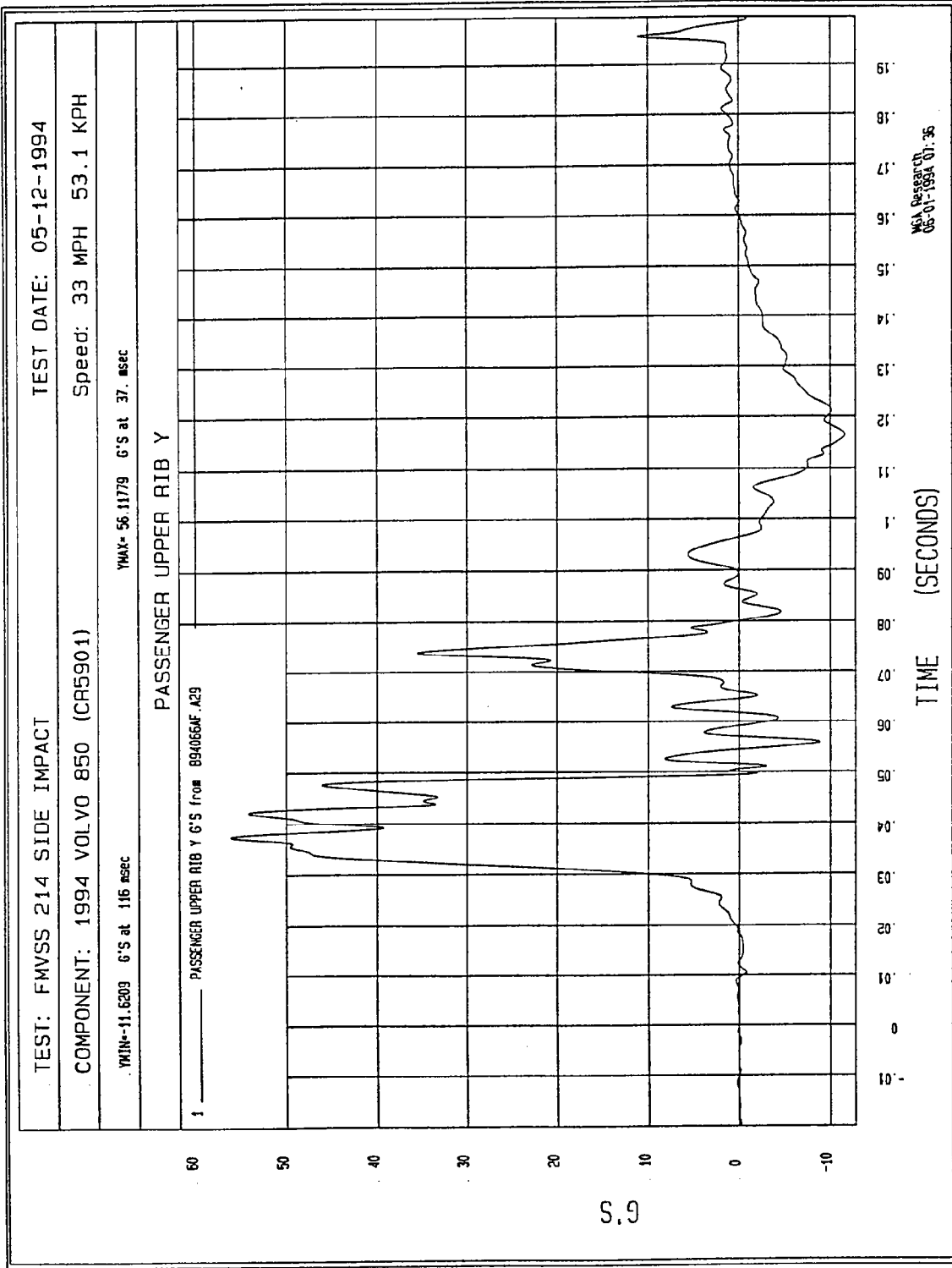


Figure B-9 - Passenger Upper Rib Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

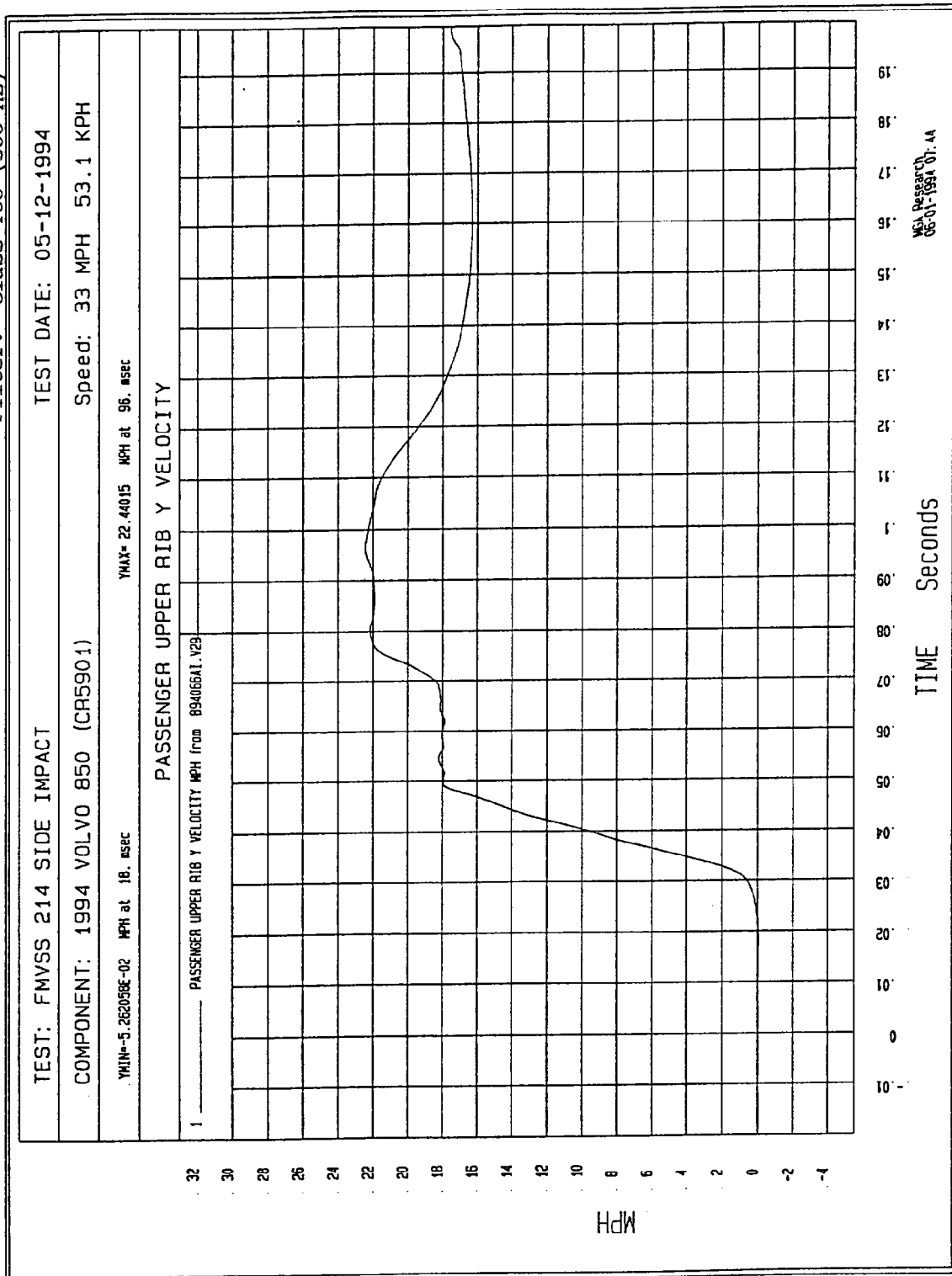


Figure B-10 - Passenger Upper Rib Y Velocity vs. Time

Filter: Class 180 (300 Hz)

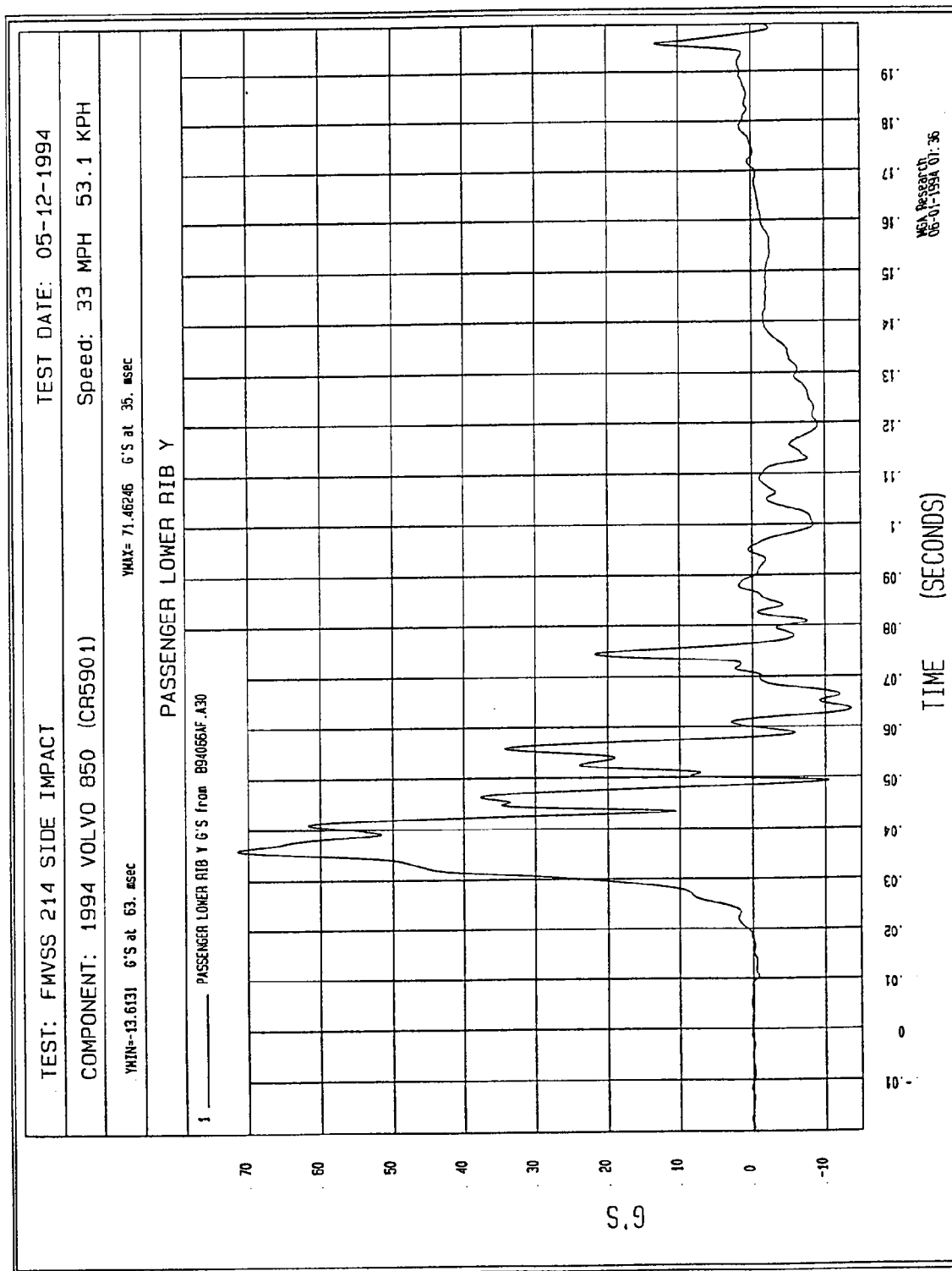


Figure B-11 - Passenger Lower Rib Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

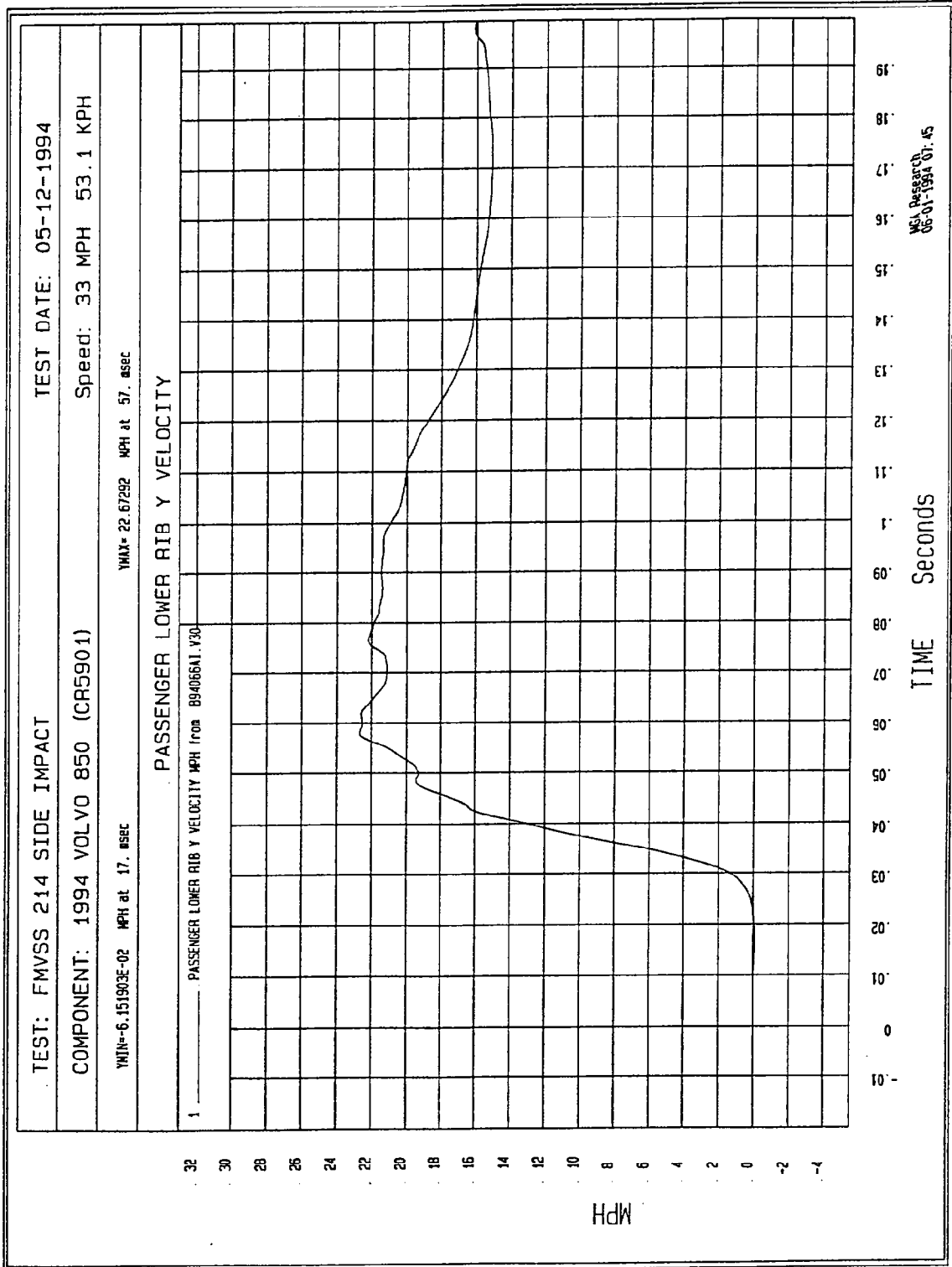


Figure B-12 - Passenger Lower Rib Y Velocity vs. Time

Filter: Class 180 (300 Hz)

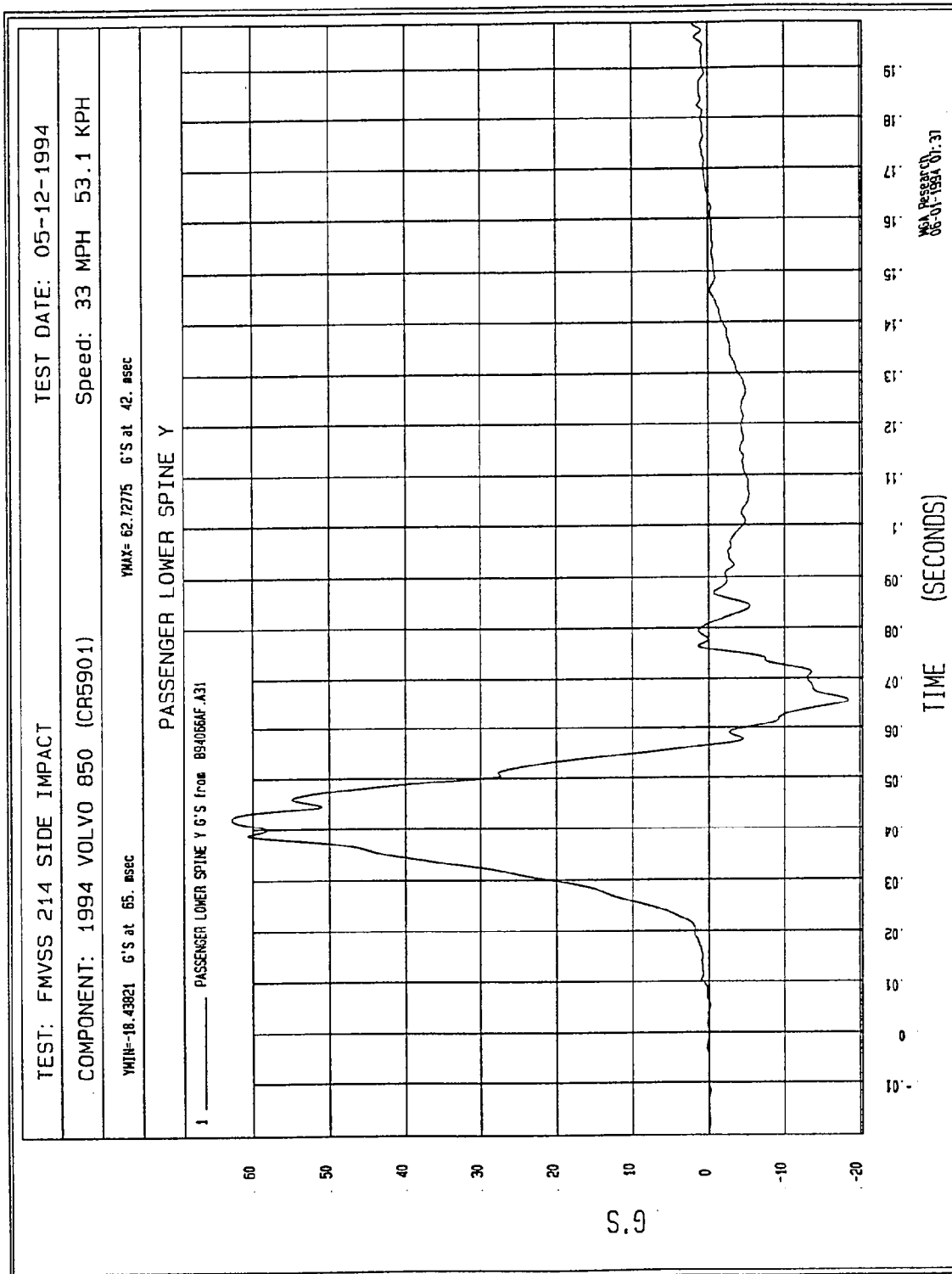


Figure B-13 - Passenger Lower Spine Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

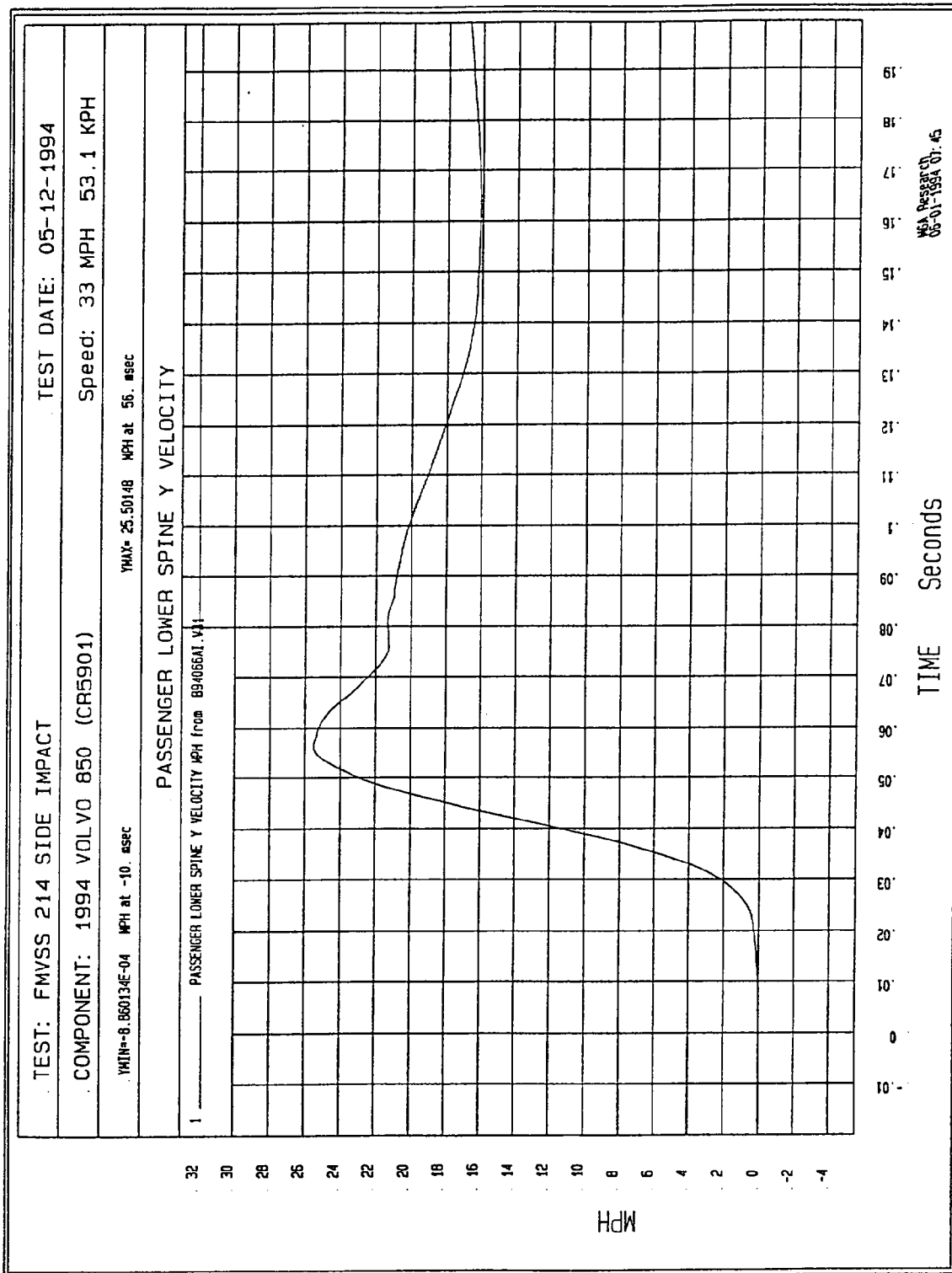


Figure B-14 - Passenger Lower Spine Y Velocity vs. Time

Filter: Class 180 (300 Hz)

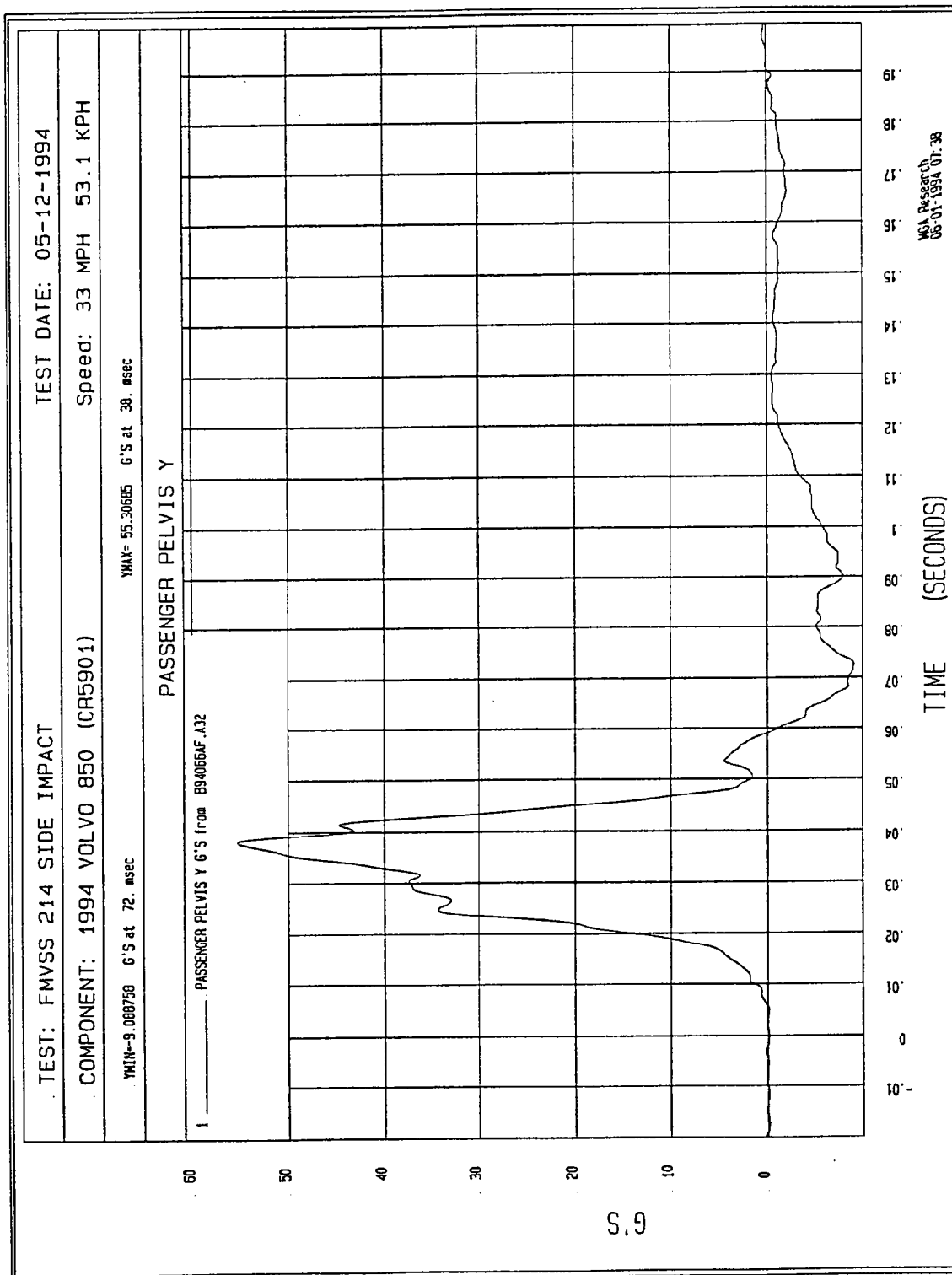


Figure B-15 - Passenger Pelvis Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

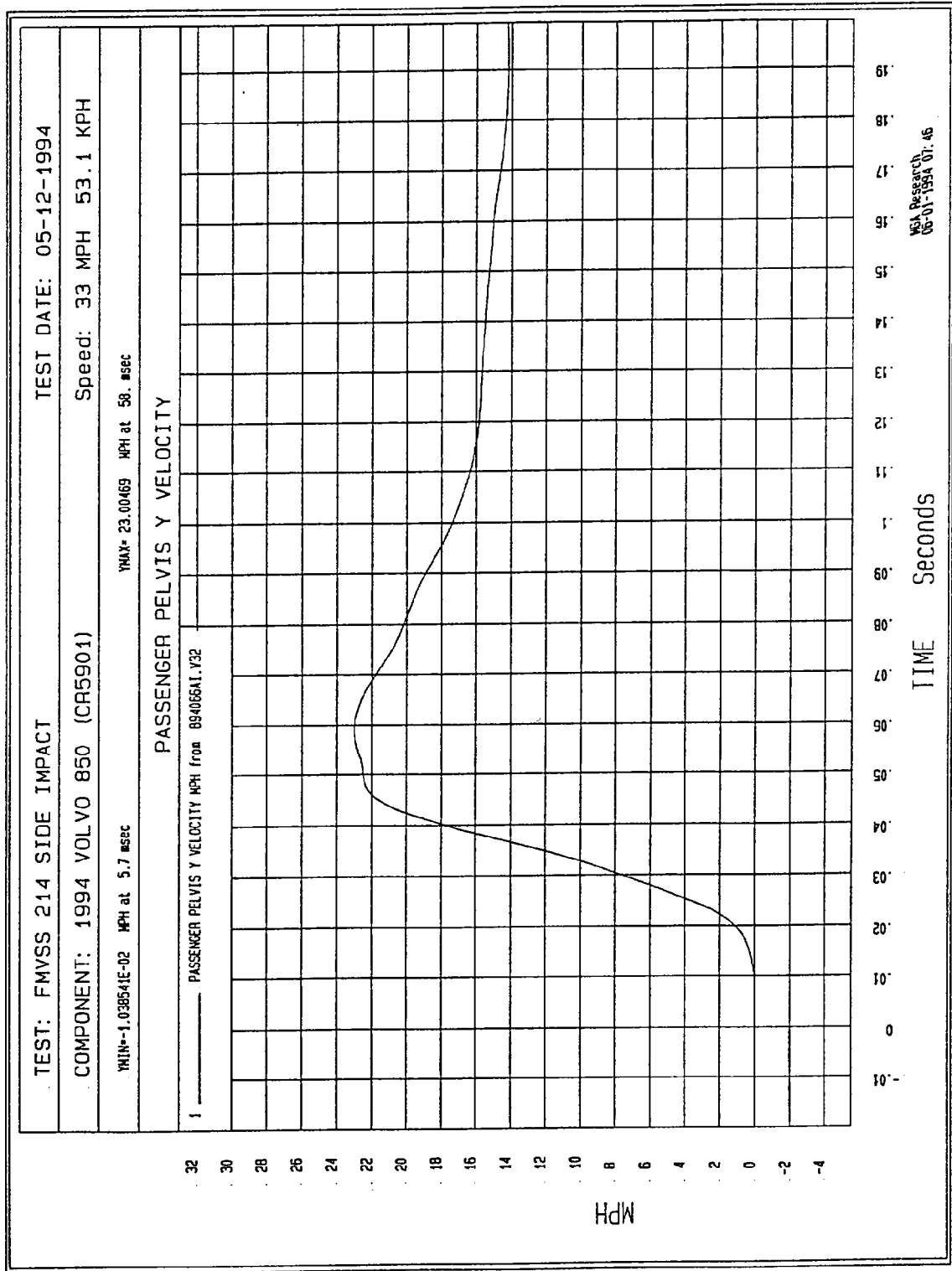


Figure B-16 - Passenger Pelvis Y Velocity vs. Time

Filter: Class 60 (100 Hz)

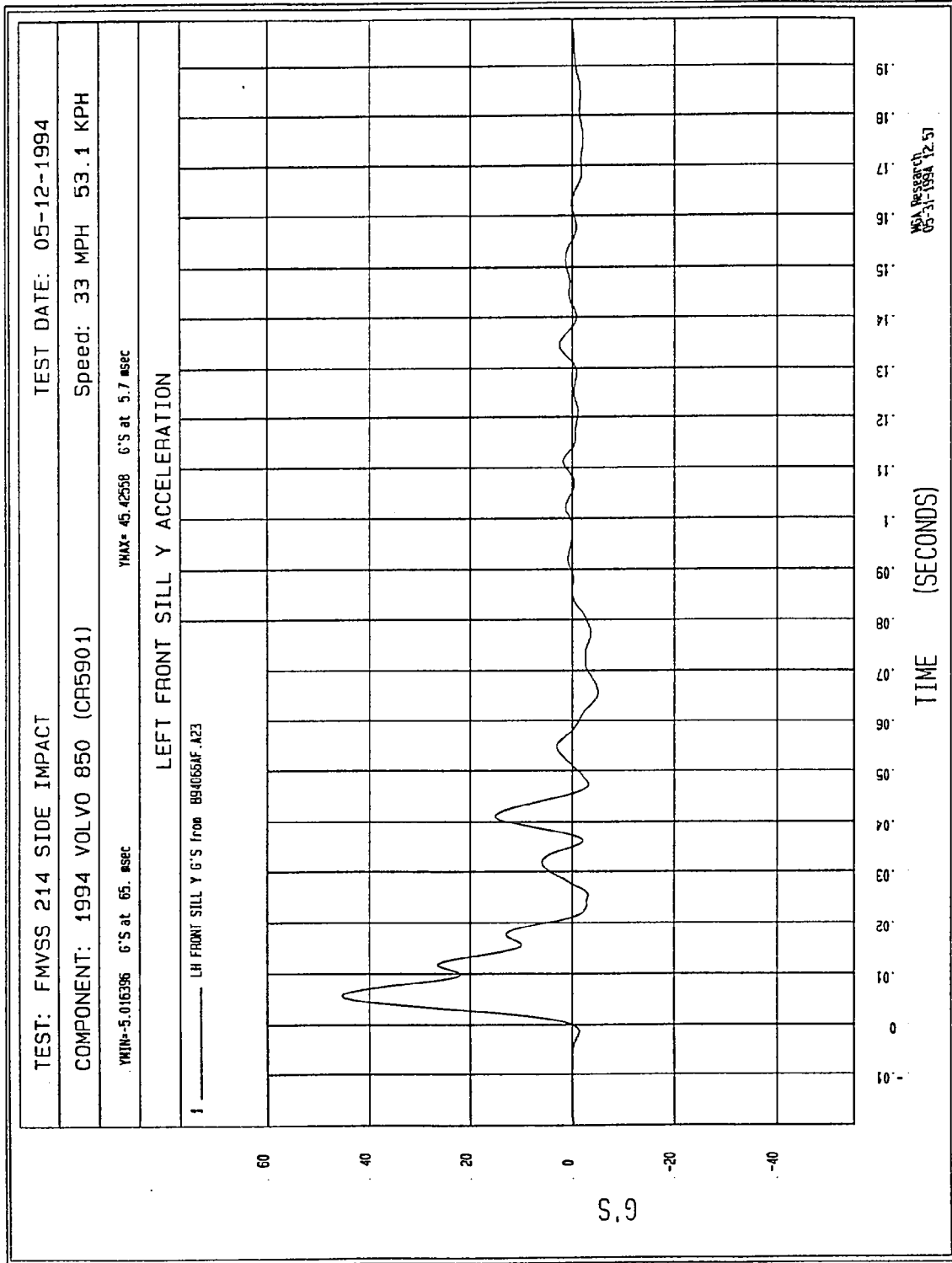


Figure B-17 - Left Front Sill Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

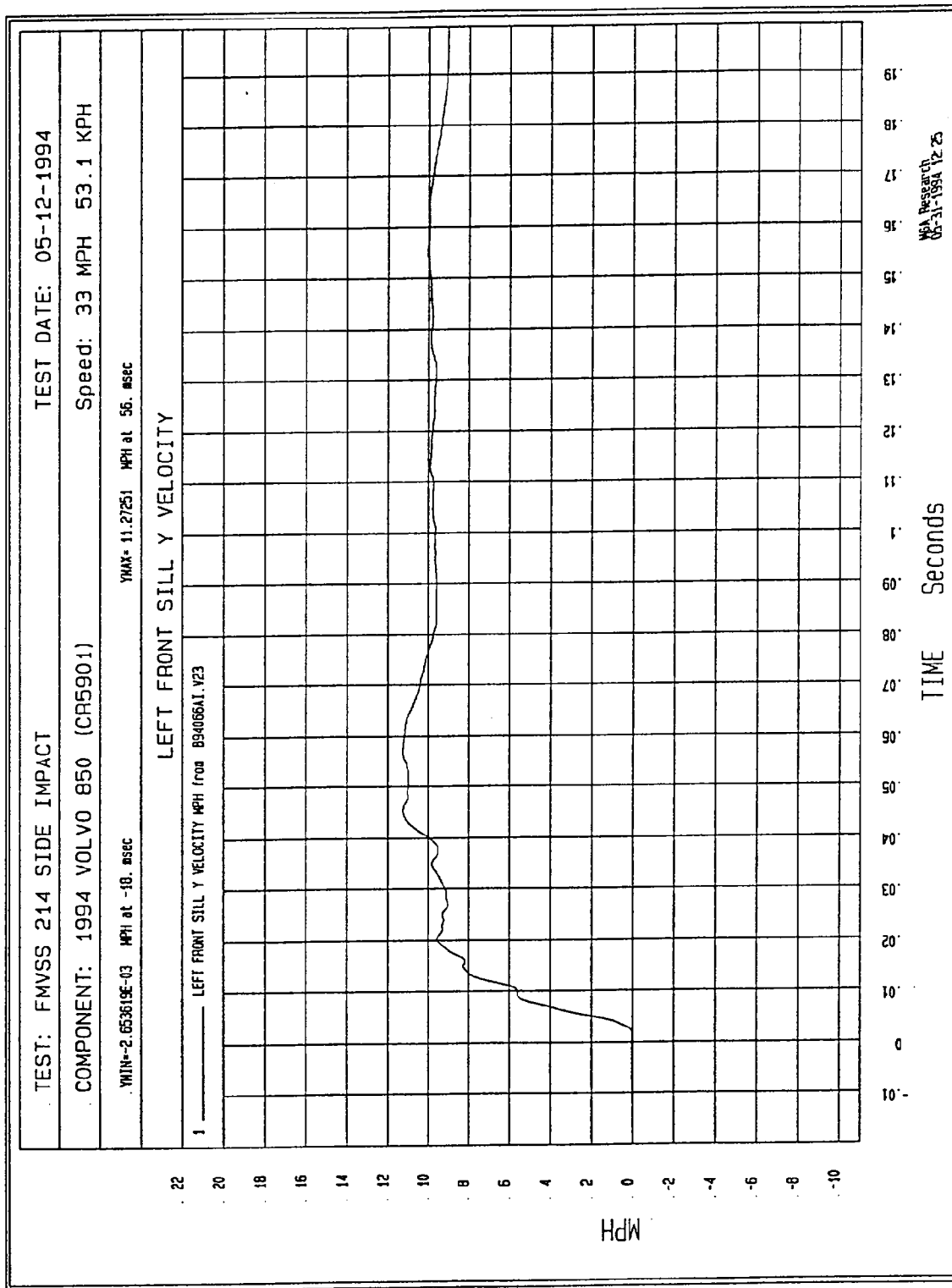


Figure B-18 - Left Front Sill Y Velocity vs. Time

Filter: Class 60 (100 Hz)

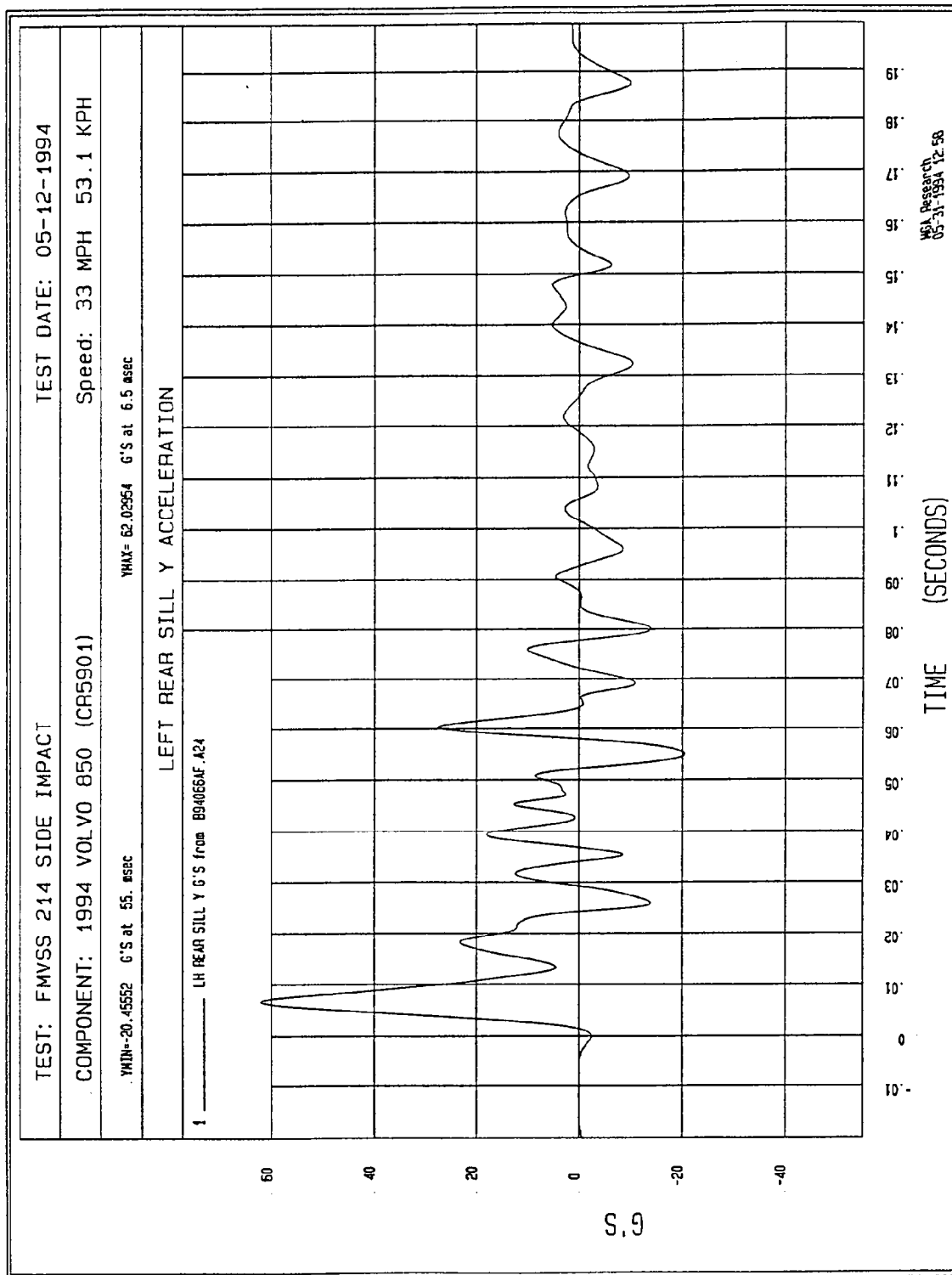
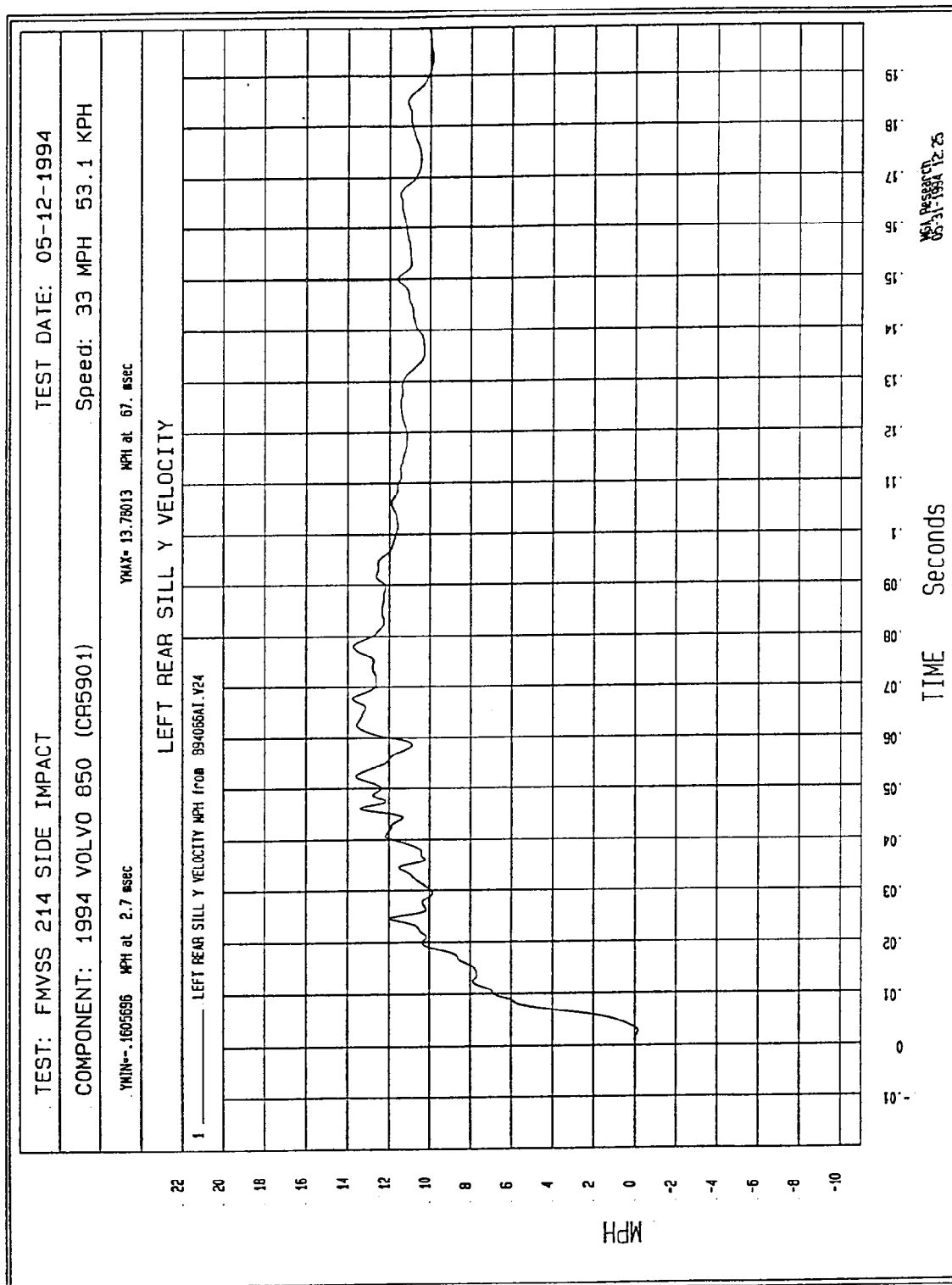


Figure B-19 - Left Rear Sill Y Acceleration vs. Time

Filter: Class 180 (300 Hz)



B-20

Figure B-20 - Left Rear Sill Y Velocity vs. Time

Filter: Class 60 (100 Hz)

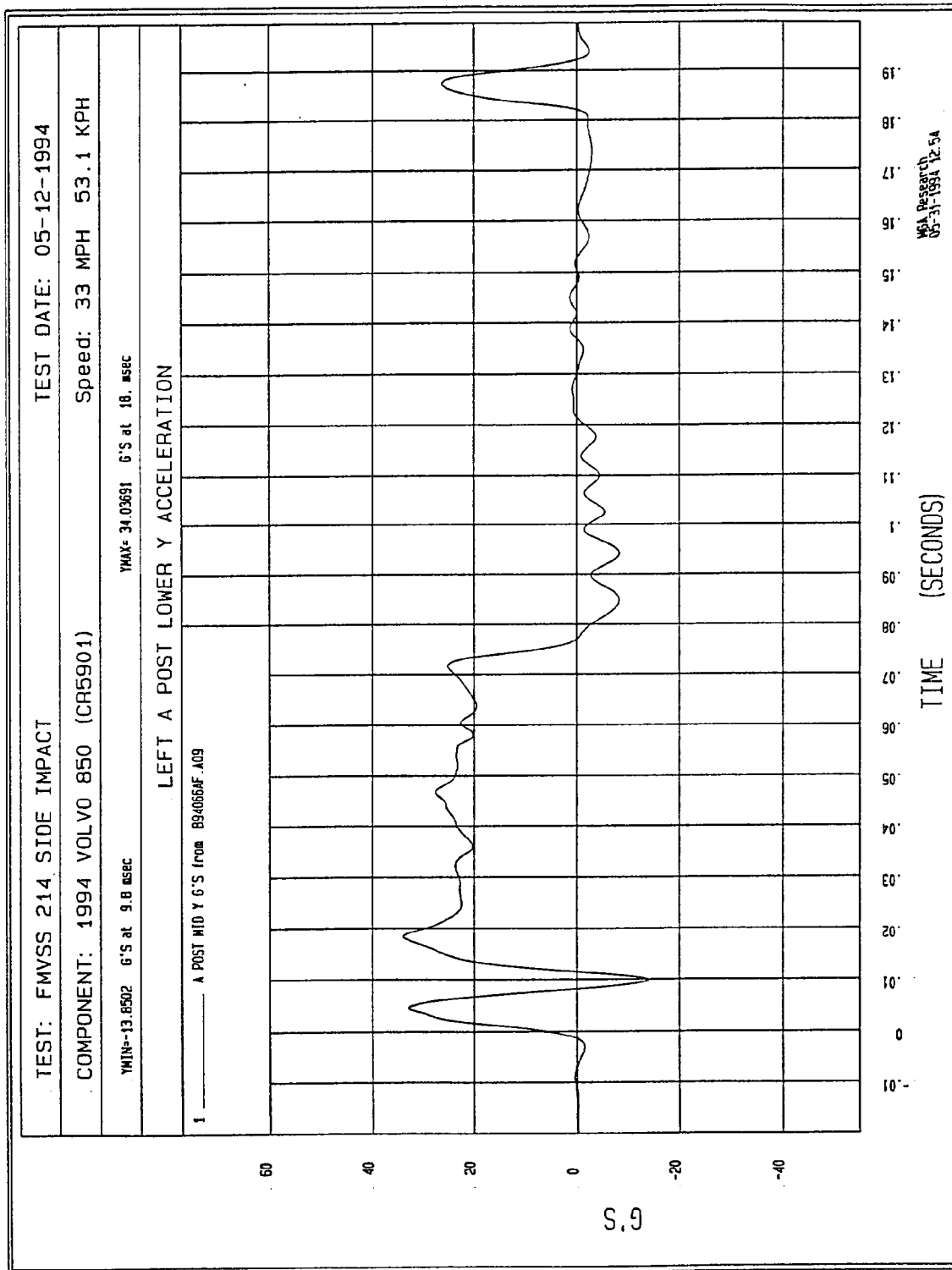


Figure B-21 - Left A Post Lower Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

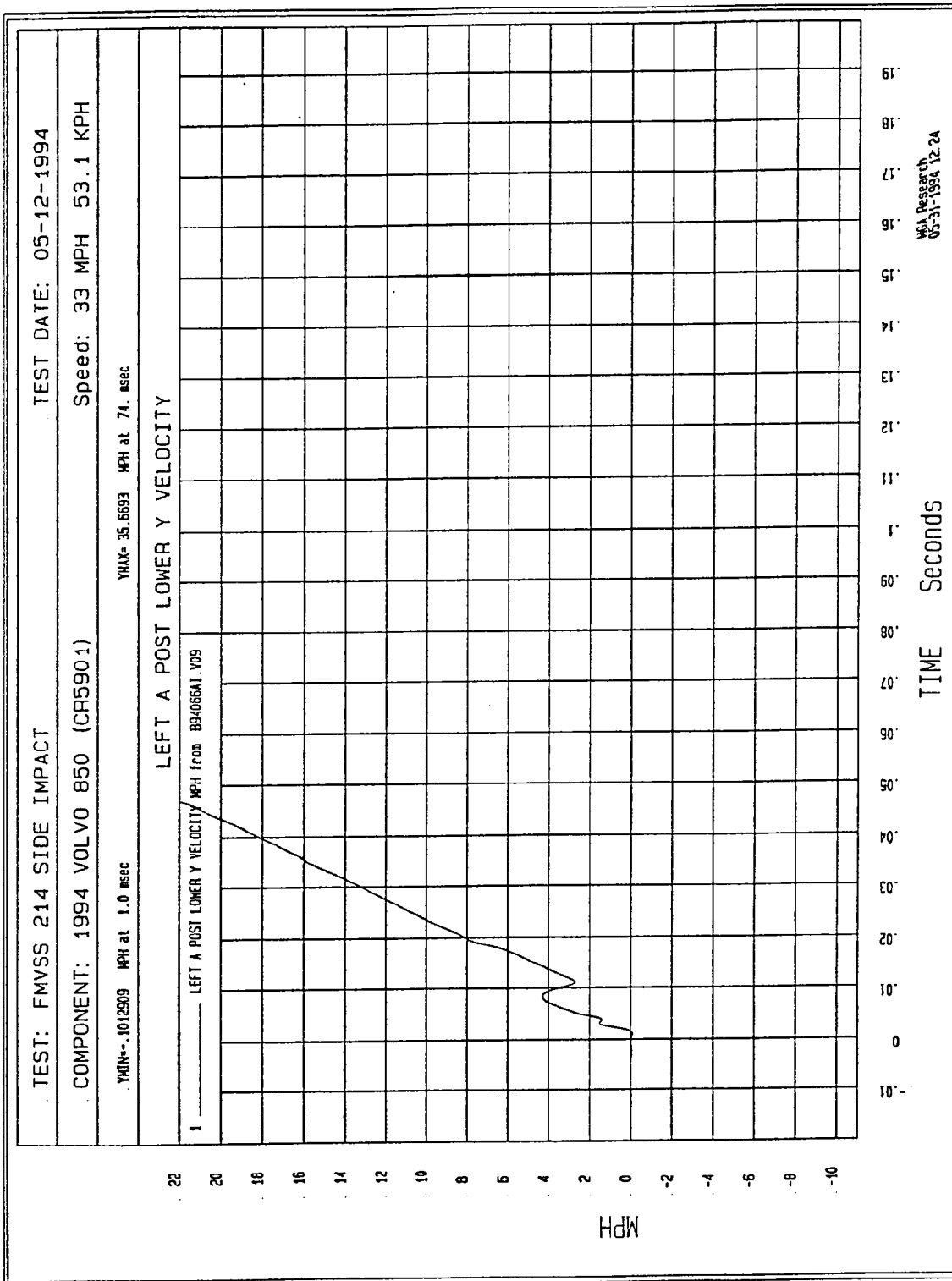


Figure B-22 - Left A Post Lower Y Velocity vs. Time

Filter: Class 60 (100 Hz)

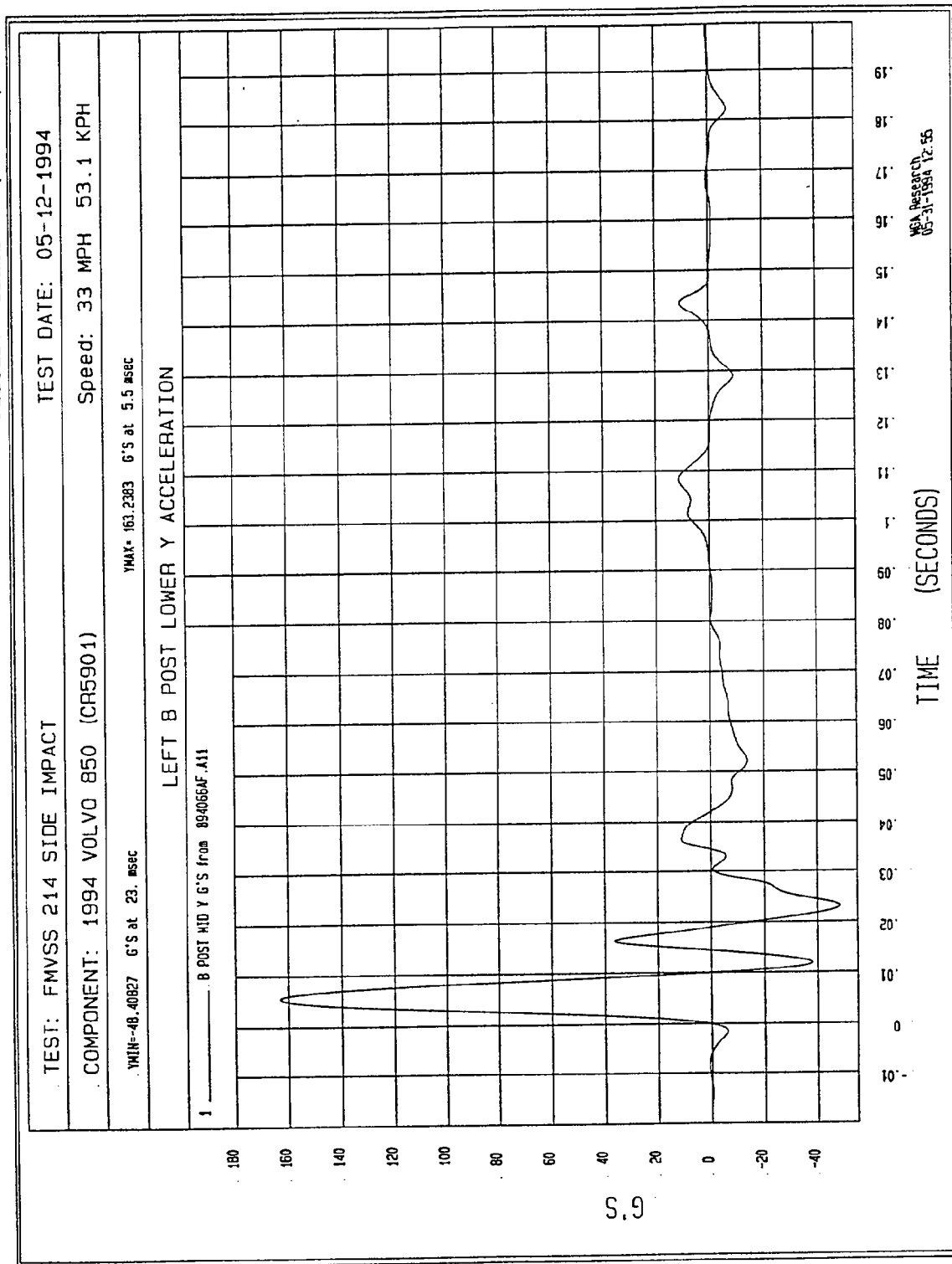


Figure B-23 - Left B Post Lower Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

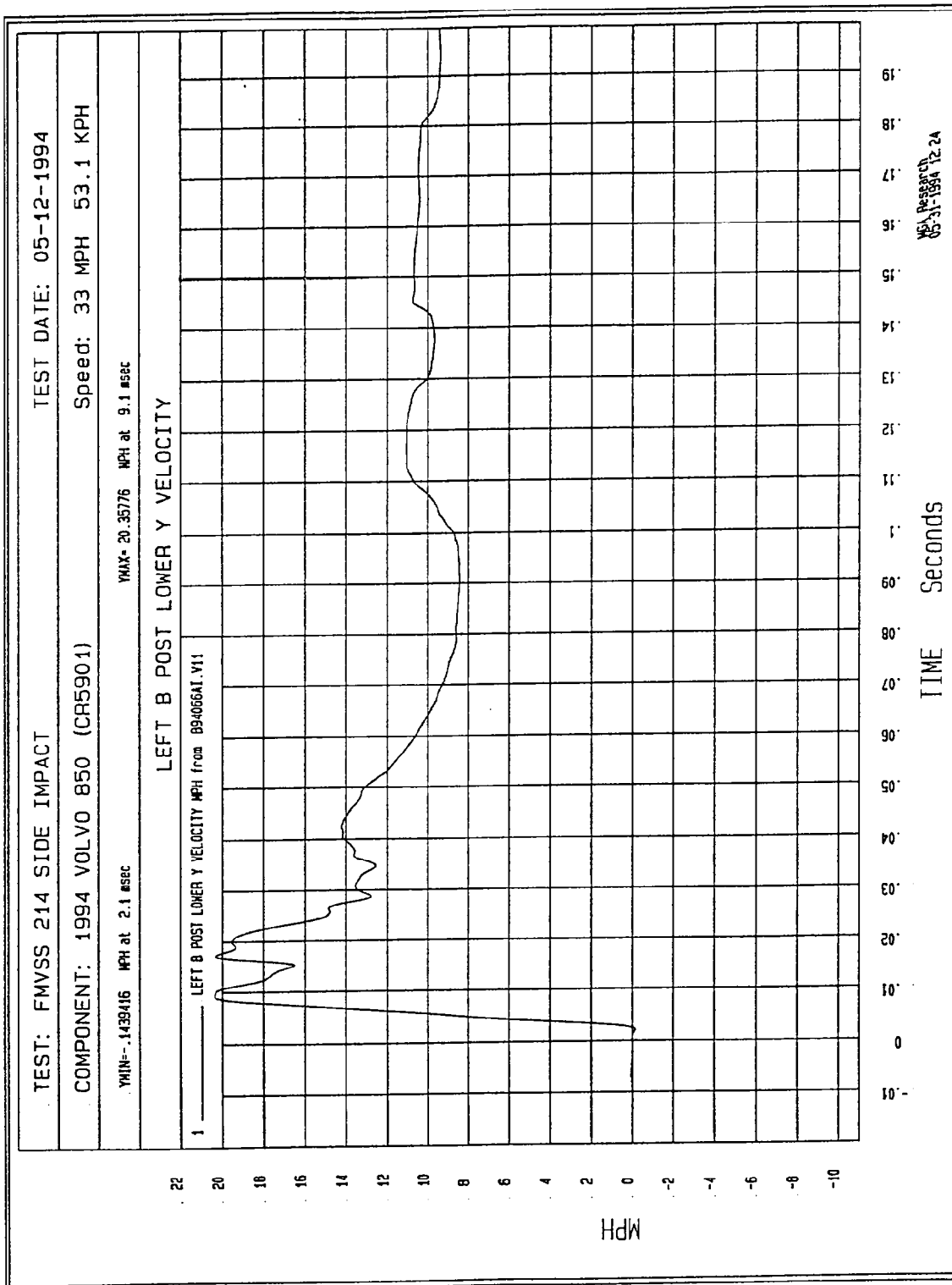


Figure B-24 - Left B Post Lower Y Velocity vs. Time

Filter: Class 60 (100 Hz)

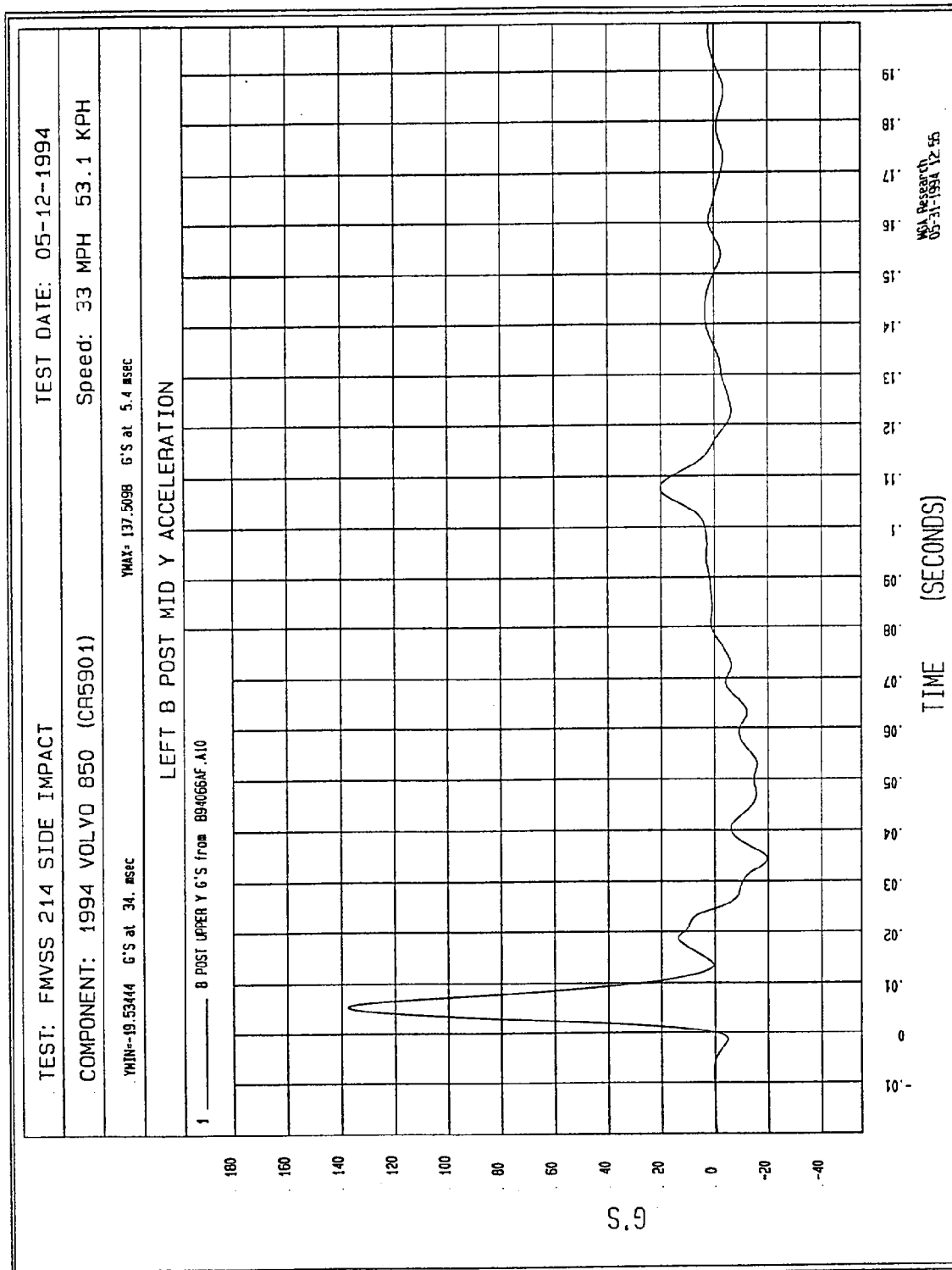


Figure B-25 - Left B Post Mid Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

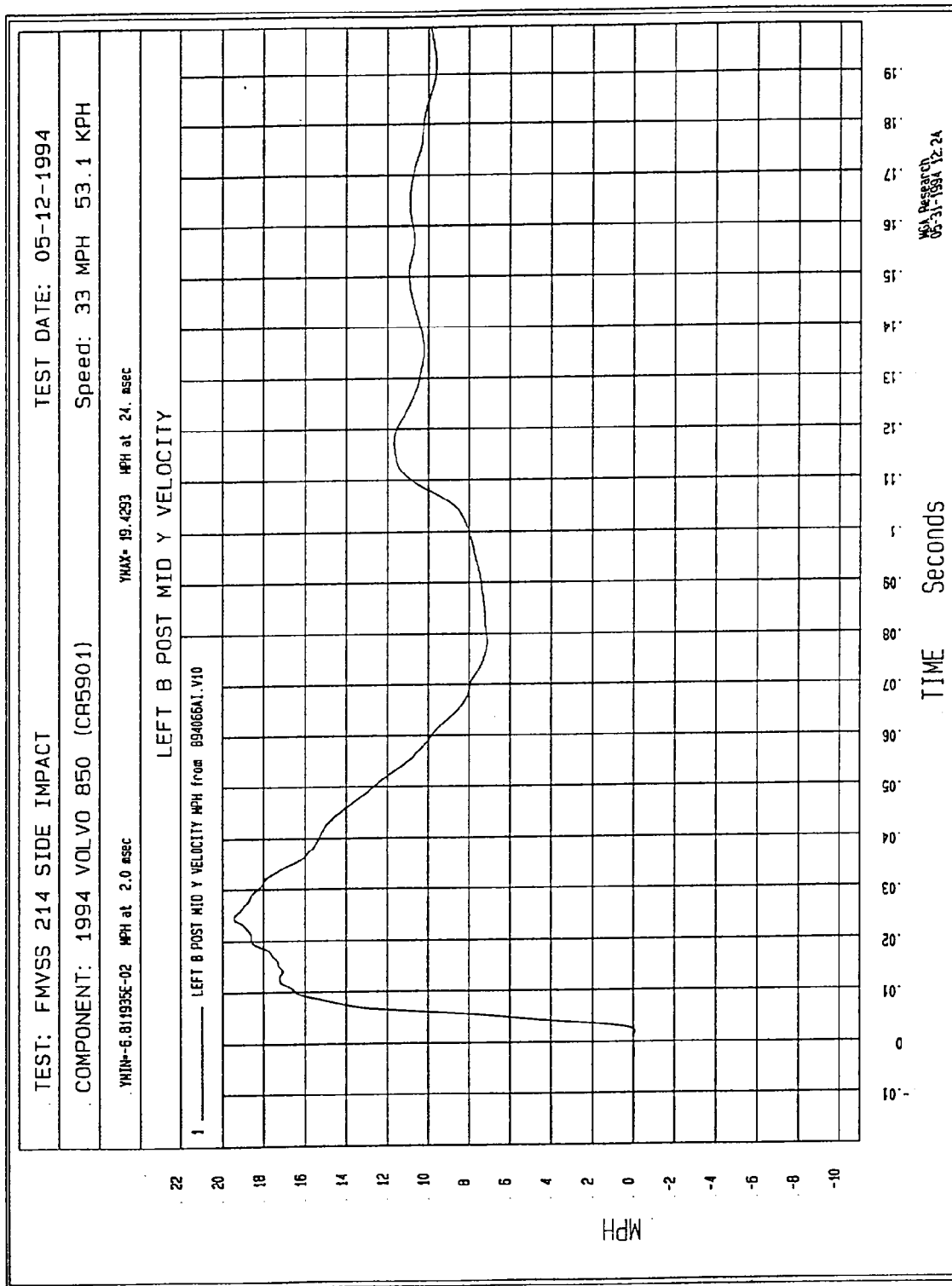


Figure B-26 - Left B Post Mid Y Velocity vs. Time

Filter: Class 60 (100 Hz)

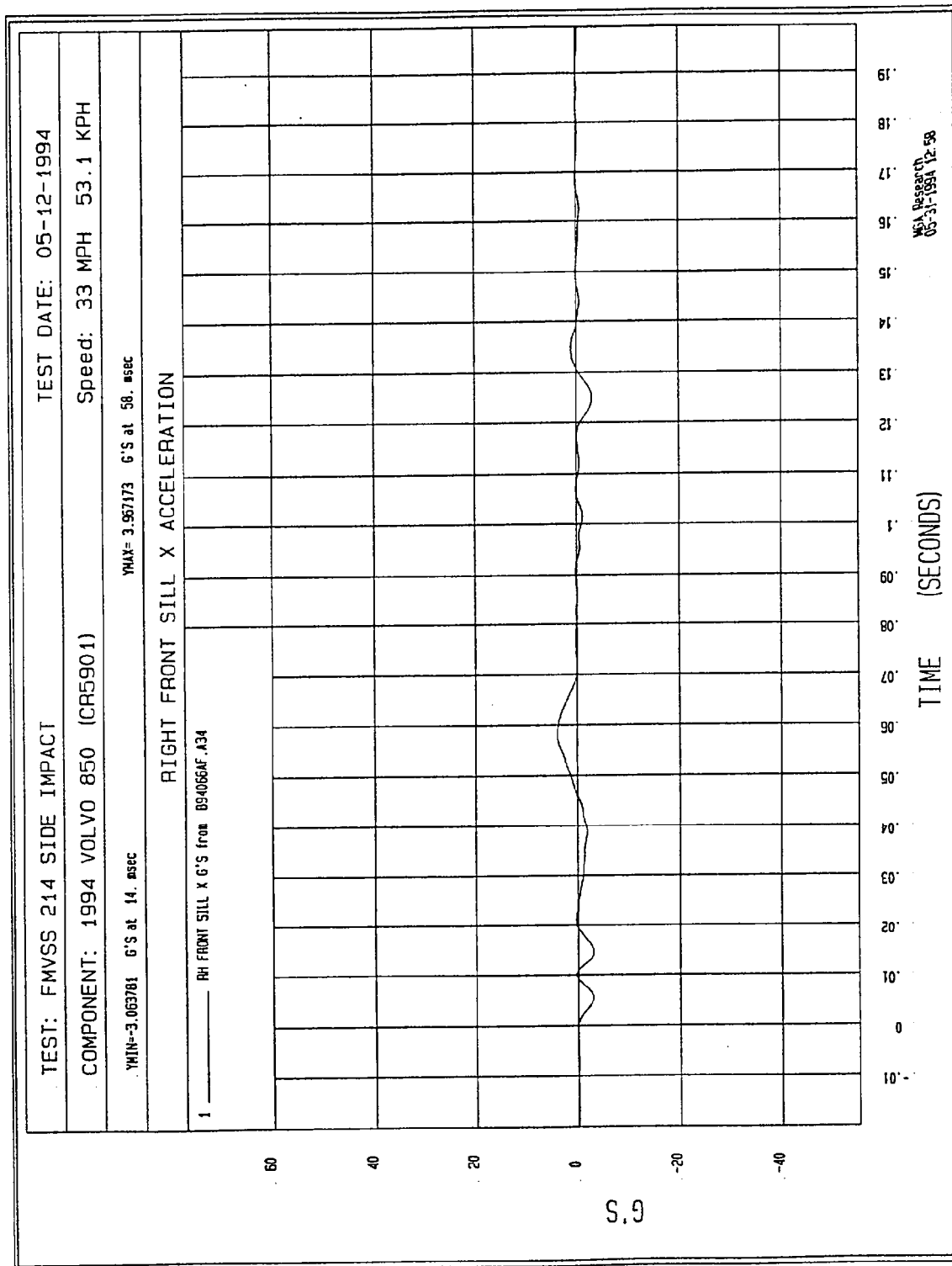


Figure B-27 - Right Front Sill X Acceleration vs. Time

Filter: Class 180 (300 Hz)

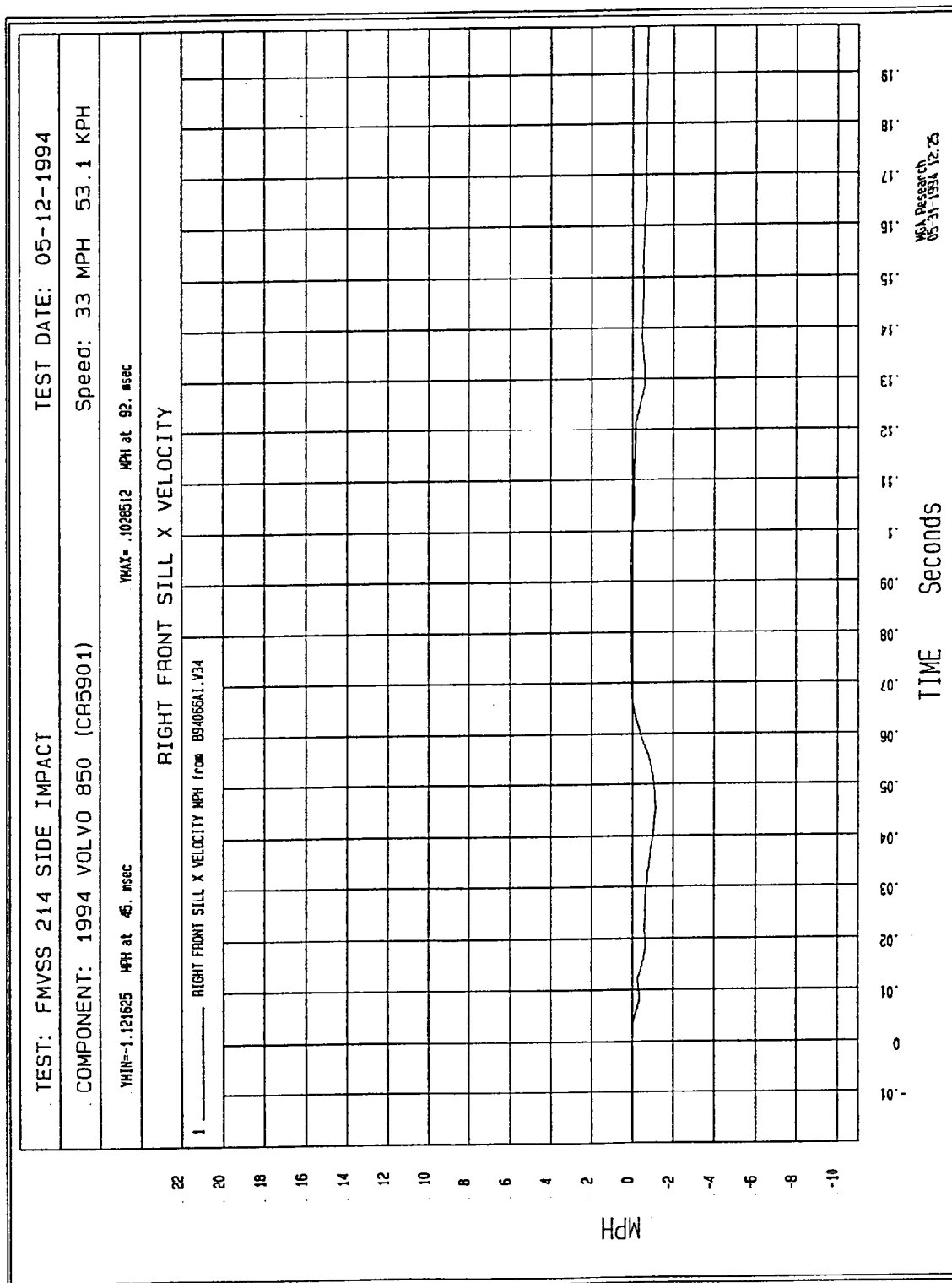


Figure B-28 - Right Front Sill X Velocity vs. Time

Filter: Class 60 (100 Hz)

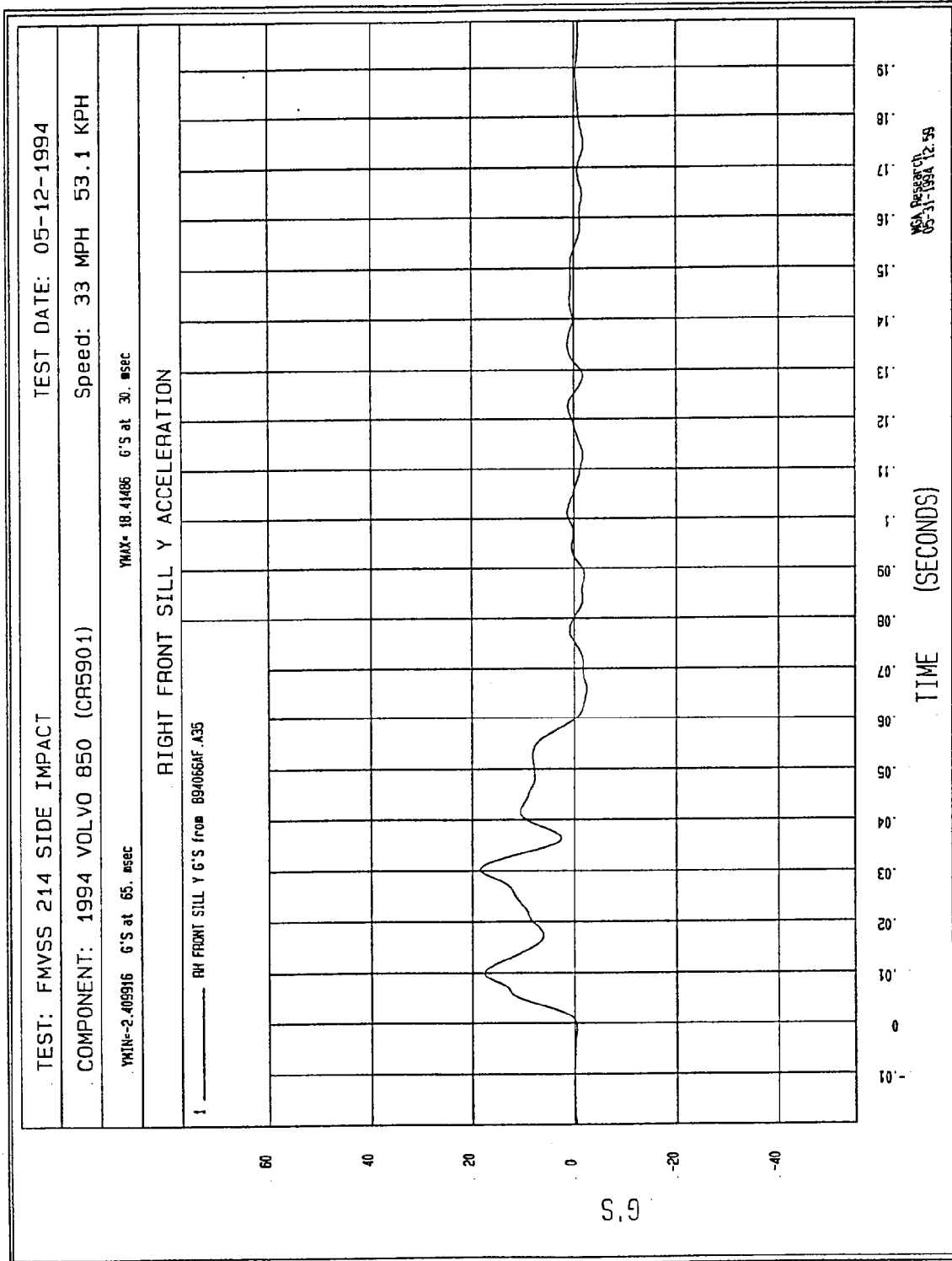


Figure B-29 - Right Front Sill Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

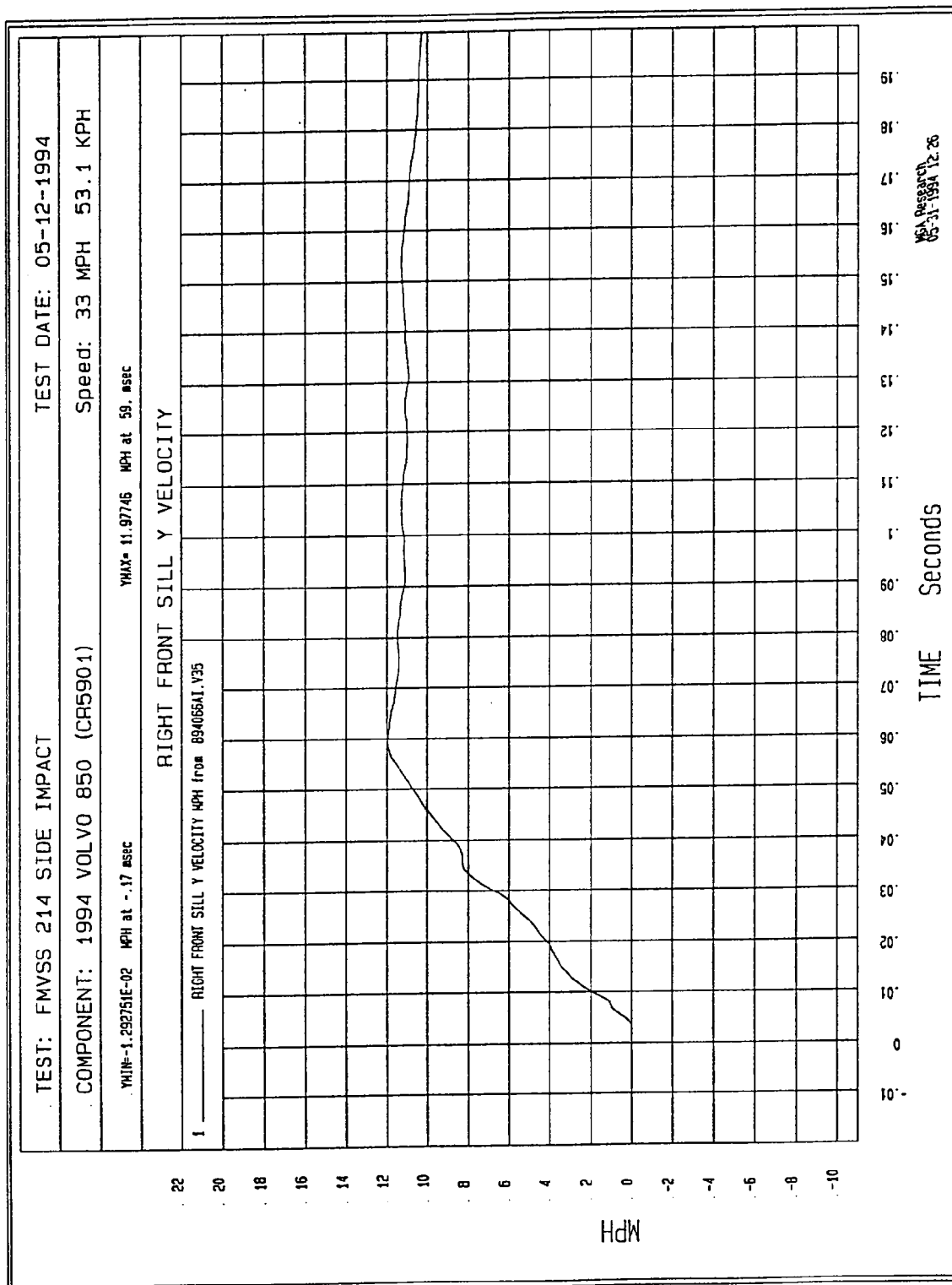


Figure B-30 - Right Front Sill Y Velocity vs. Time

Filter: Class 60 (100 Hz)

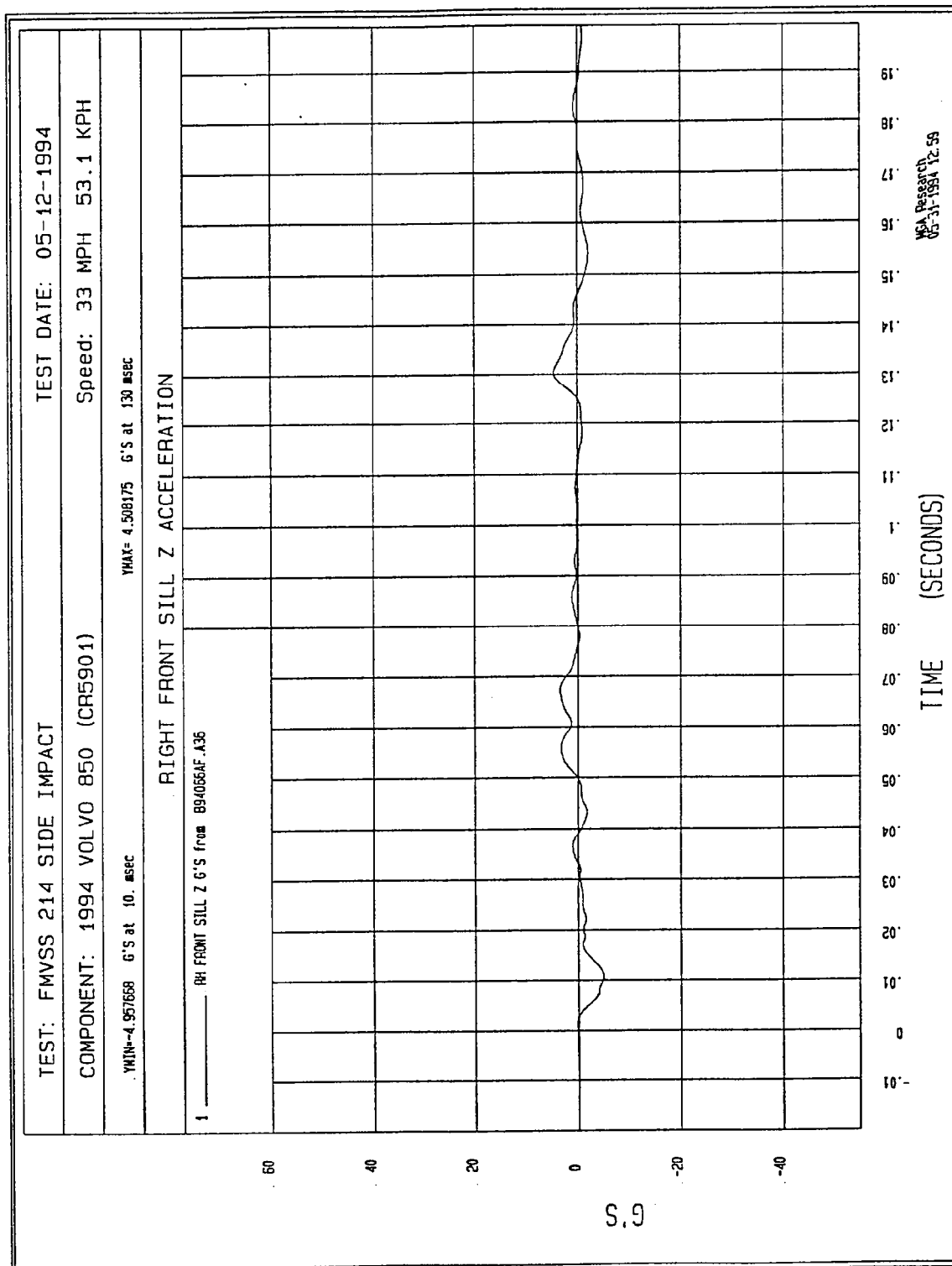


Figure B-31 - Right Front Sill Z Acceleration vs. Time

Filter: Class 180 (300 Hz)

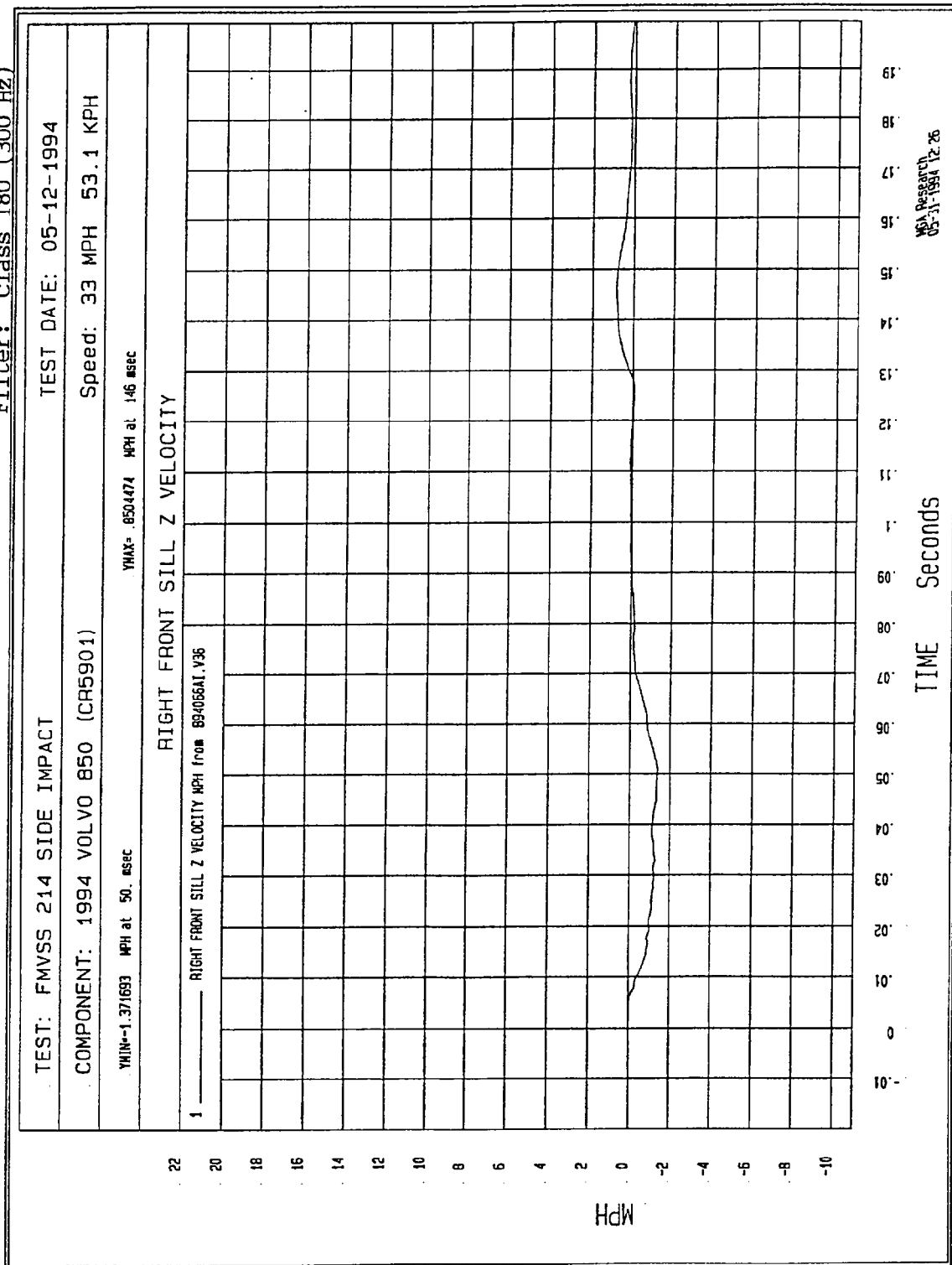


Figure B-32 - Right Front Sill Z Velocity vs. Time

Filter: Class 60 (100 Hz)

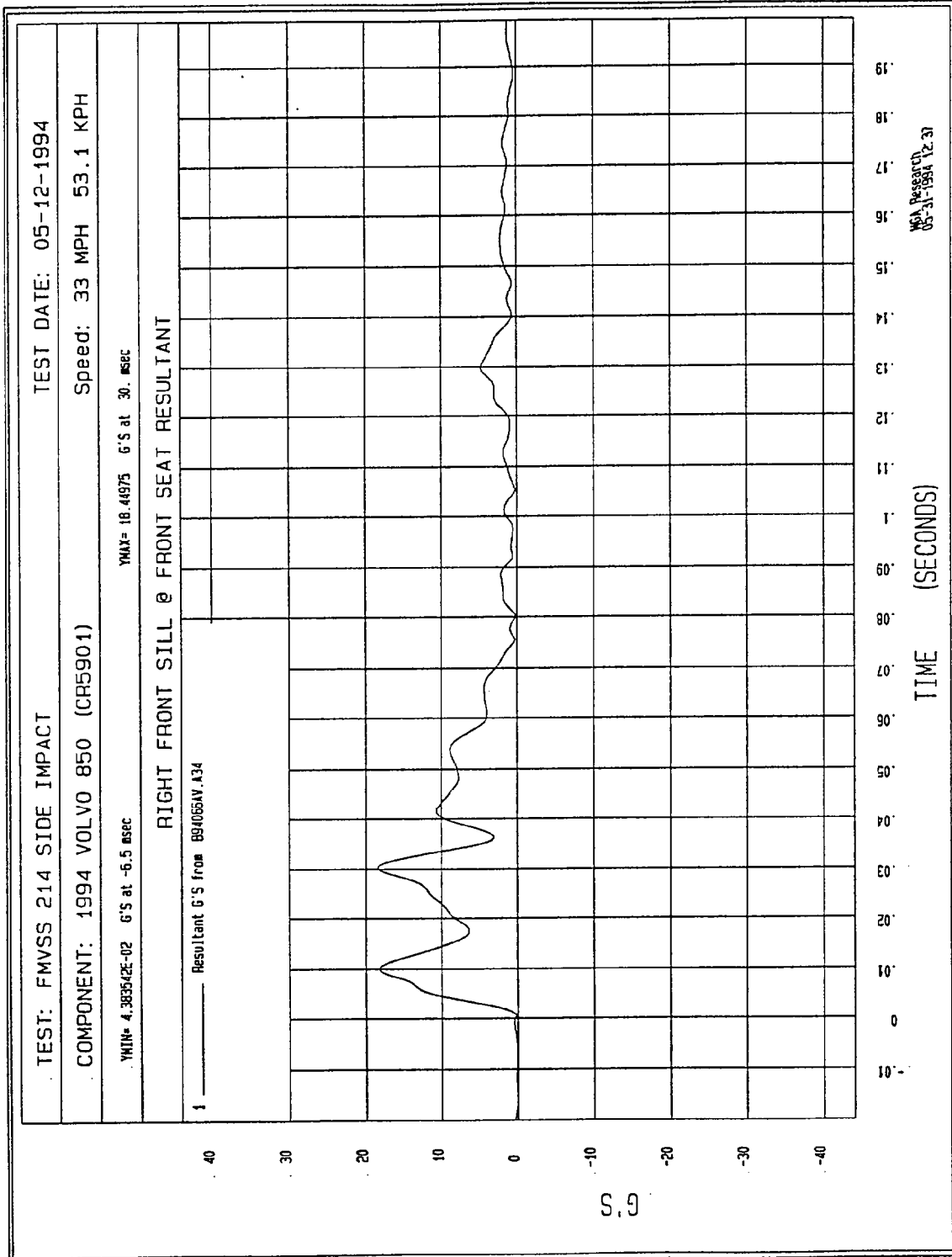


Figure B-33 - Right Front Sill at Front Seat Resultant vs. Time

Filter: Class 60 (100 Hz)

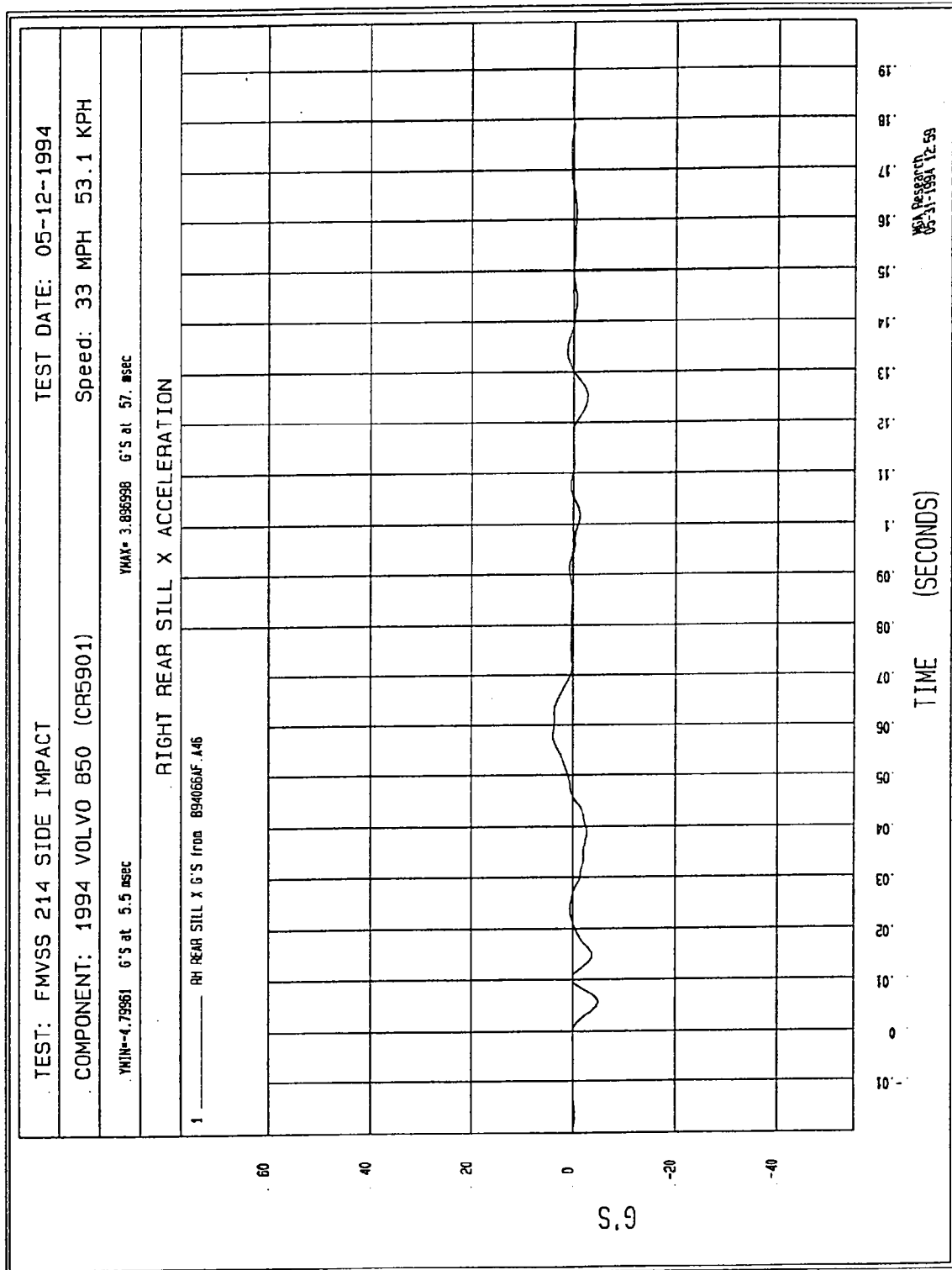


Figure B-34 - Right Rear Sill X Acceleration vs. Time

Filter: Class 180 (300 Hz)

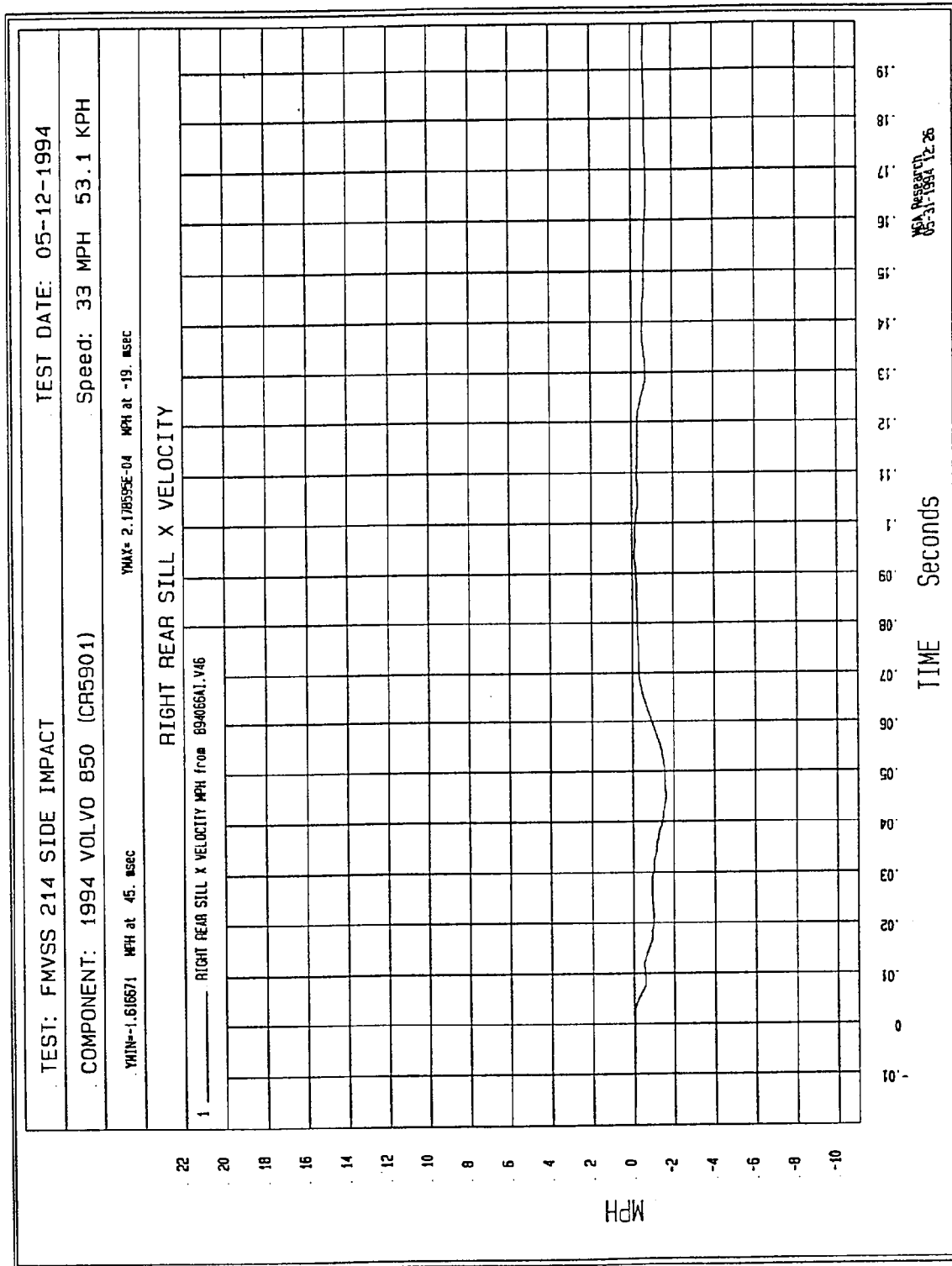


Figure B-35 - Right Rear Sill X Velocity vs. Time

Filter: Class 60 (100 Hz)

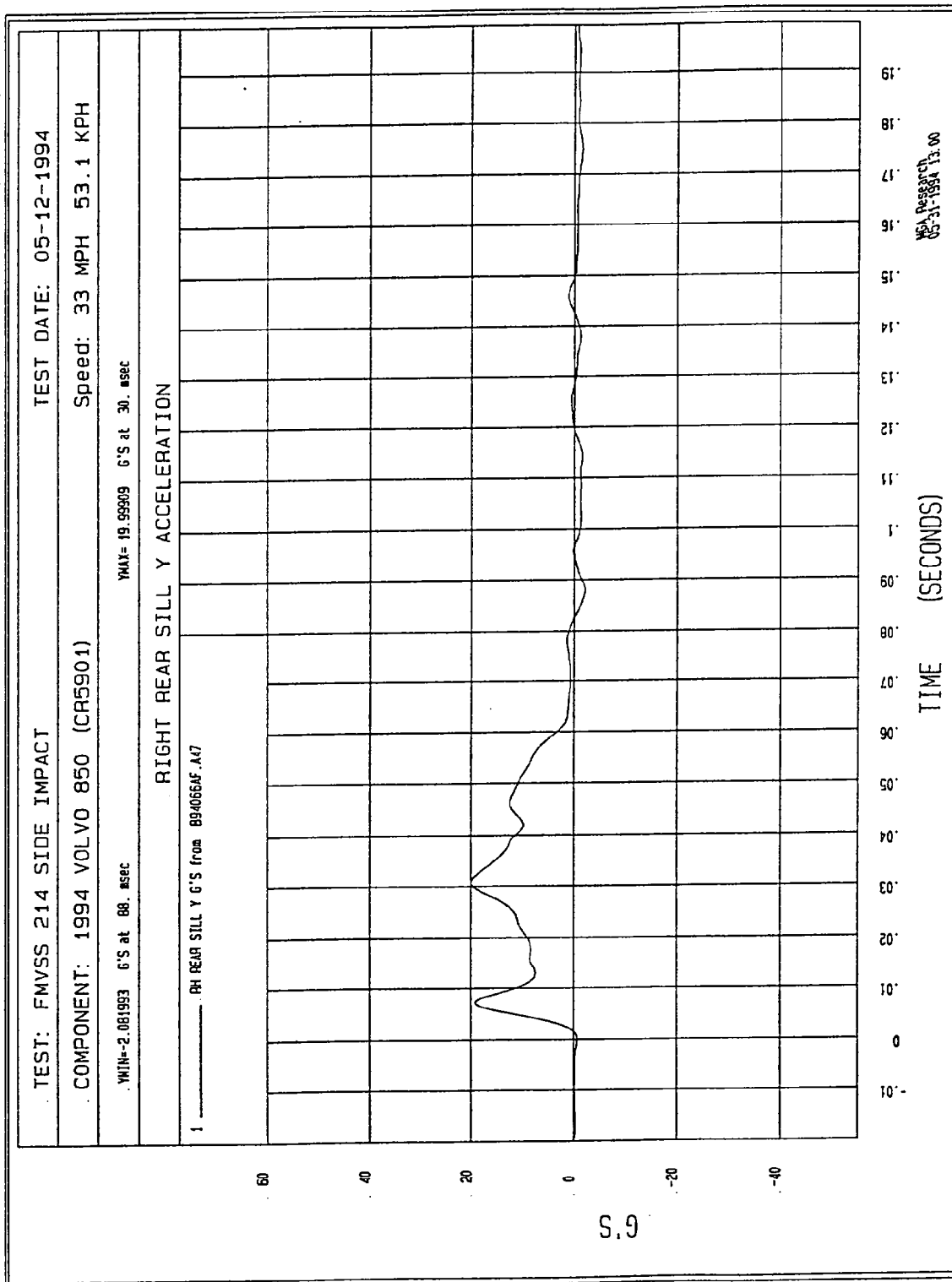


Figure B-36 - Right Rear Sill Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

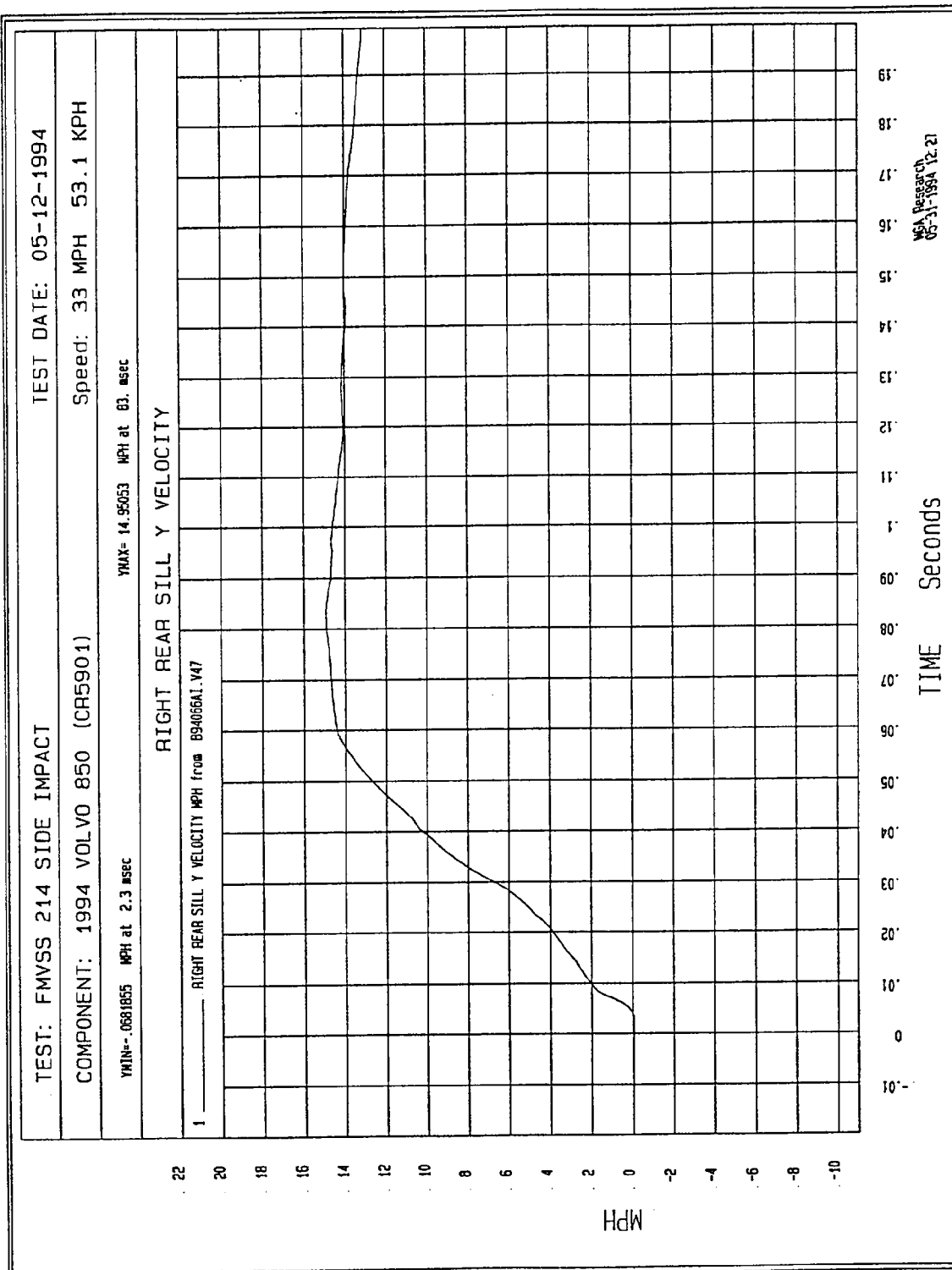


Figure B-37 - Right Rear Sill Y Velocity vs. Time

Filter: Class 60 (100 Hz)

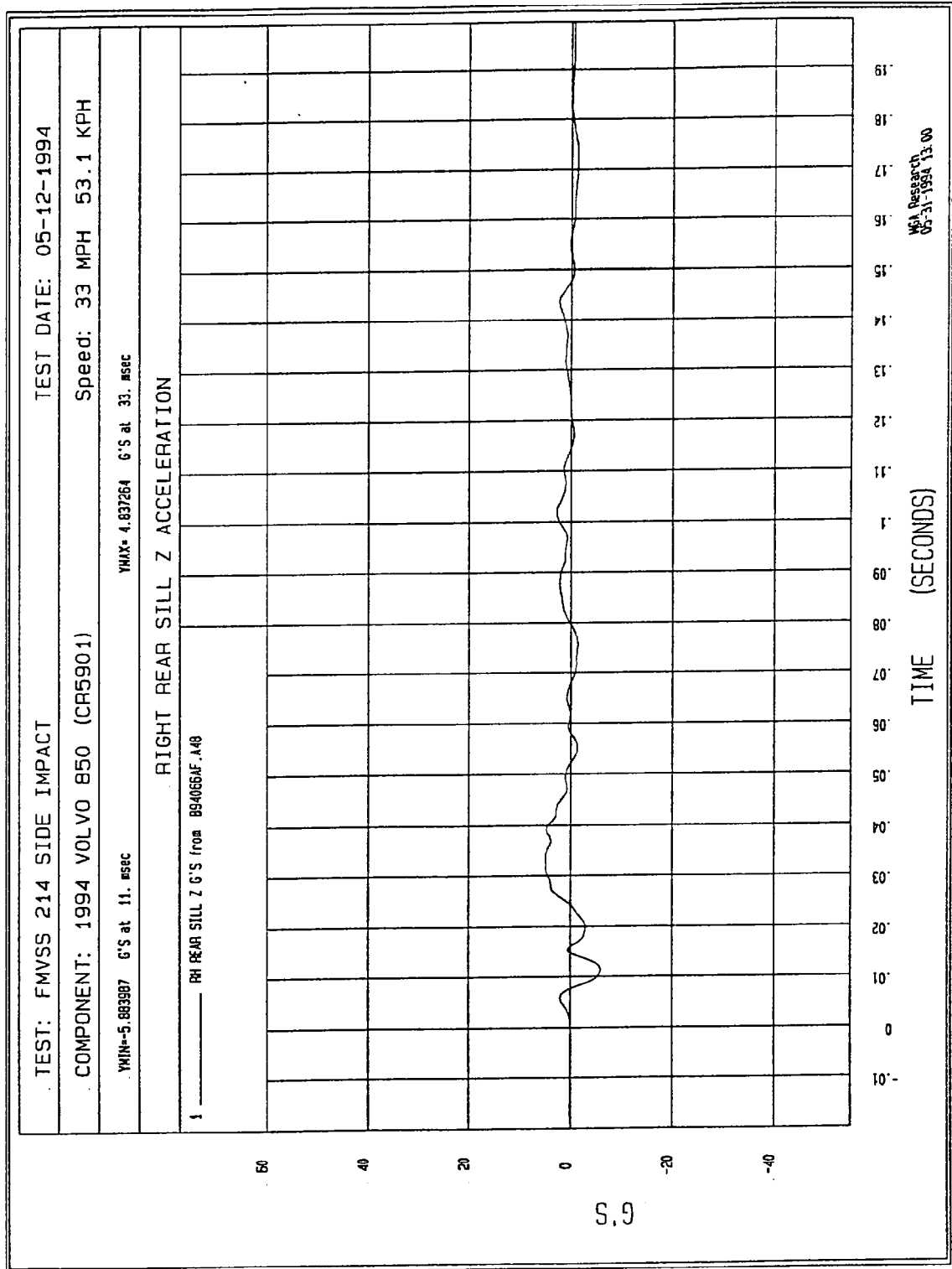


Figure B-38 - Right Rear Sill Z Acceleration vs. Time

Filter: Class 180 (300 Hz)

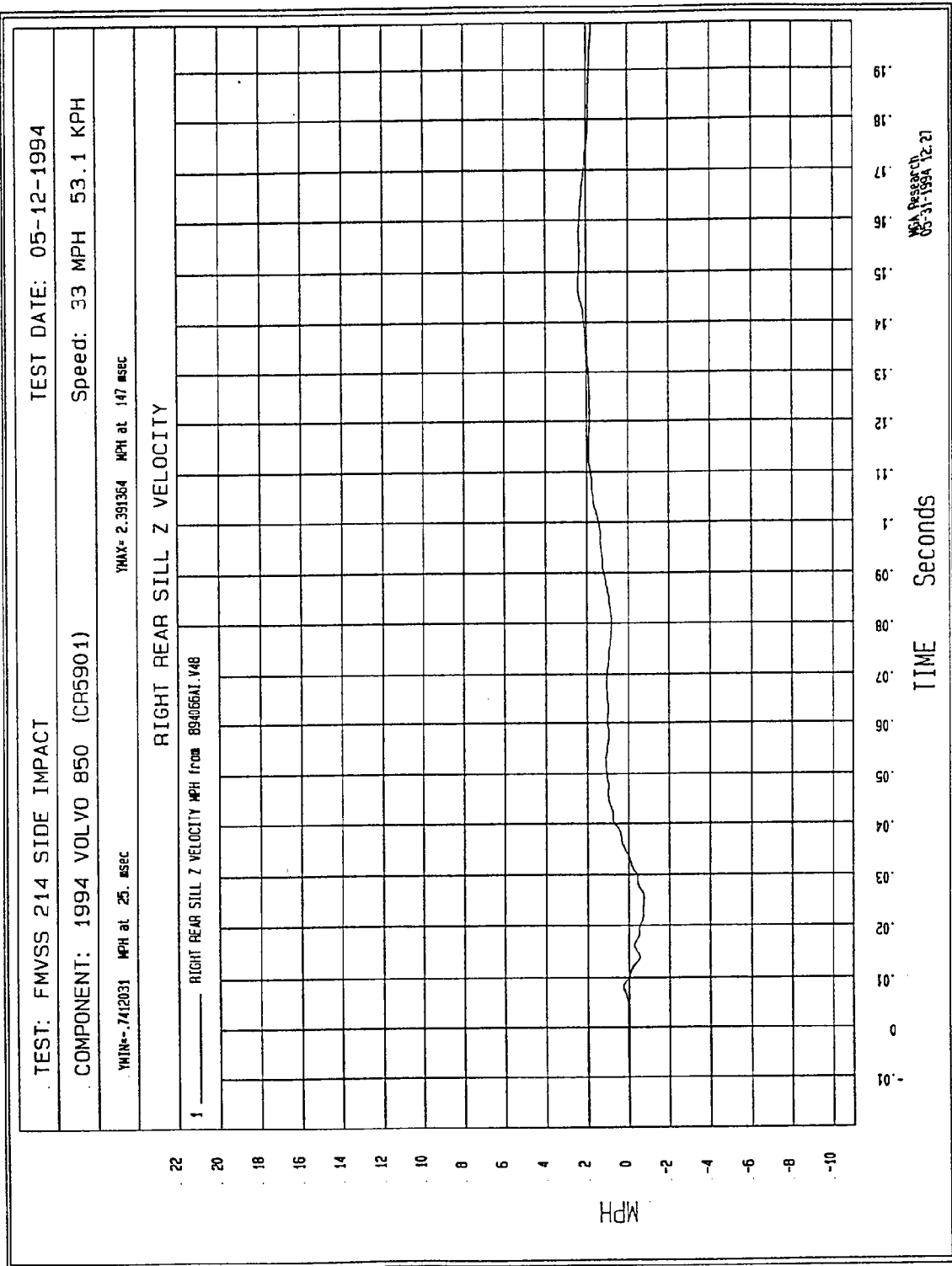


Figure B-39 - Right Rear Sill Z Velocity vs. Time

Filter: Class 60 (100 Hz)

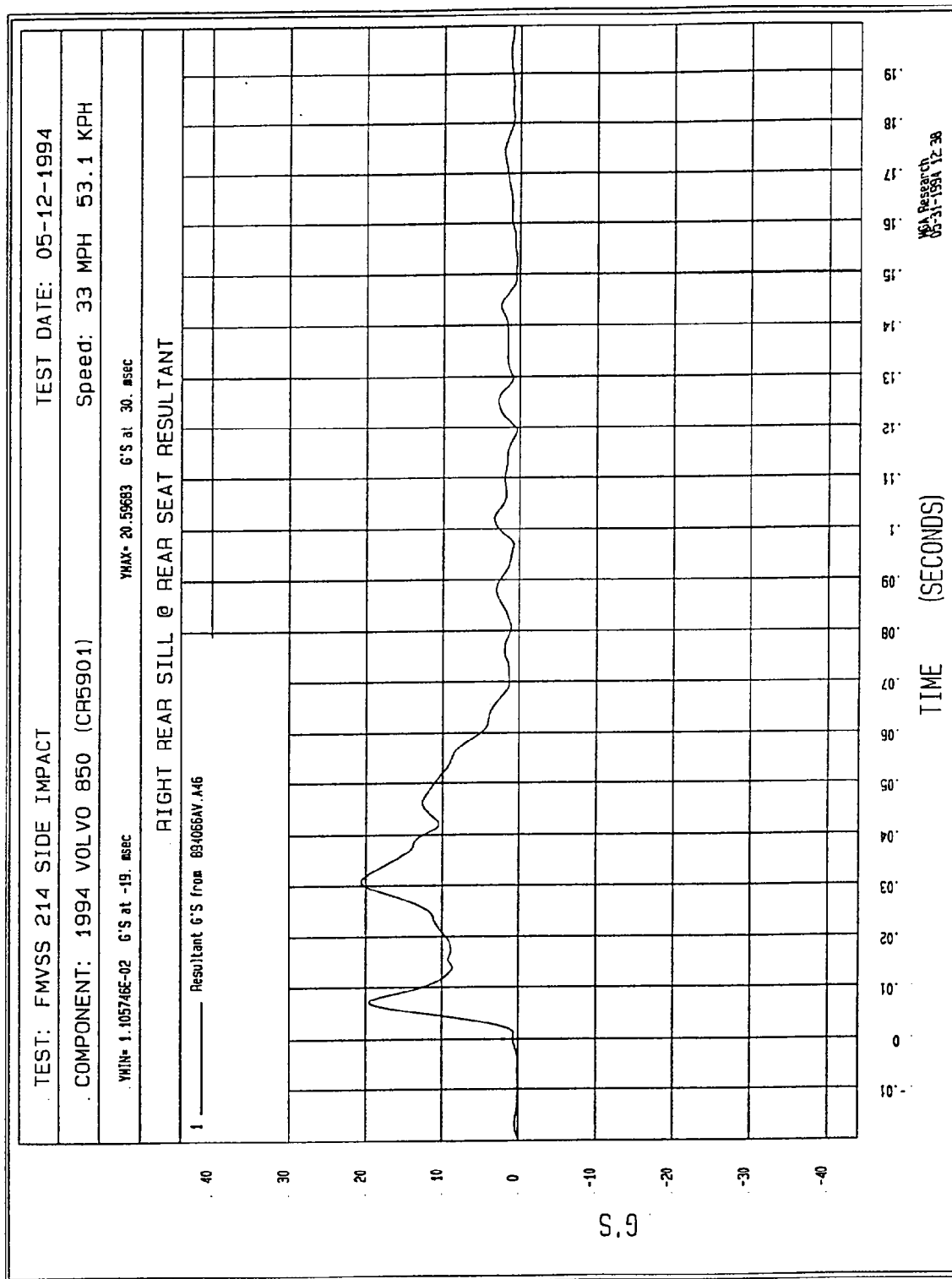


Figure B-40 - Right Rear Sill at Rear Seat Resultant vs. Time

Filter: Class 60 (100 Hz)

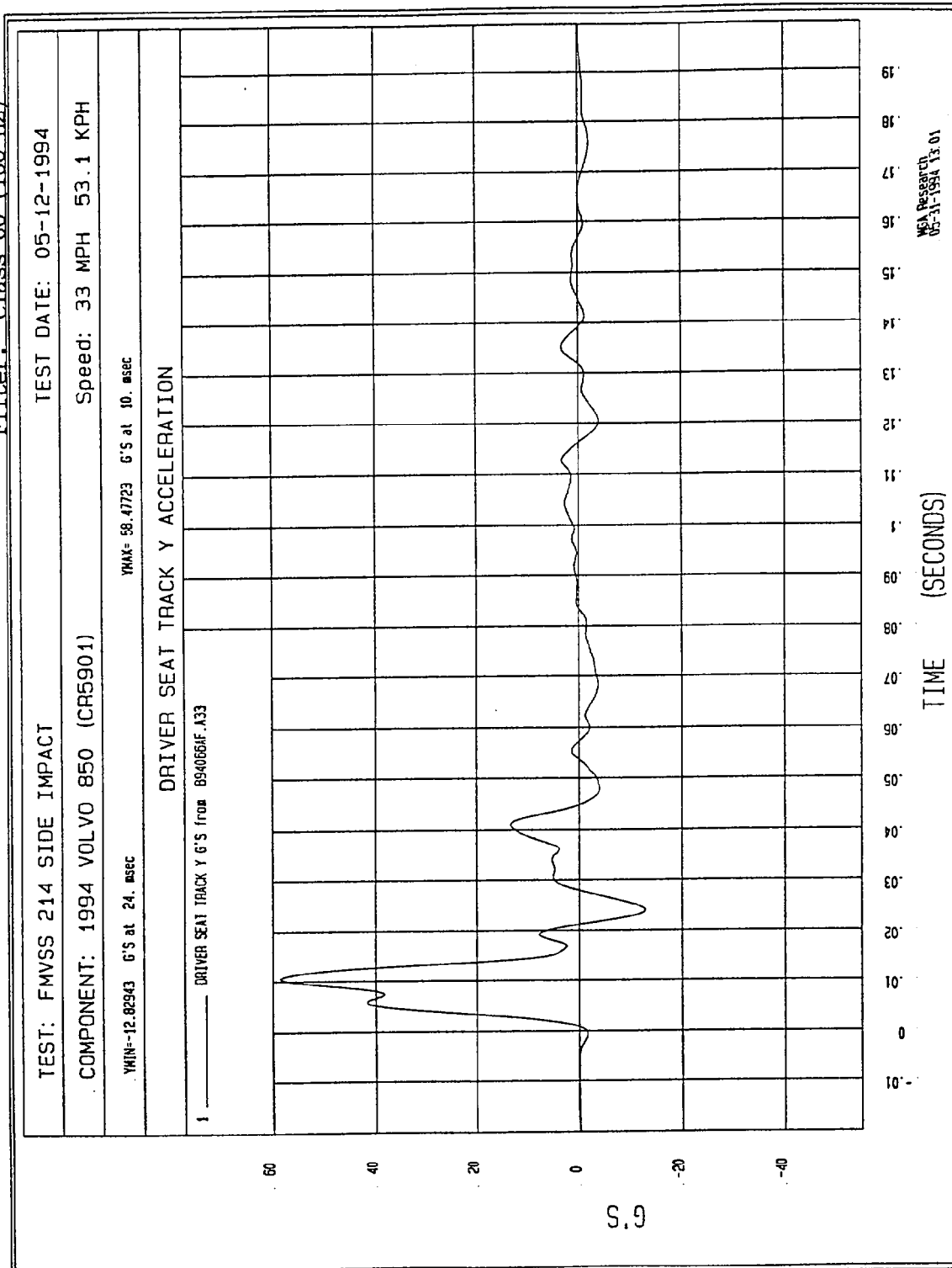


Figure B-41 - Driver Seat Track Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

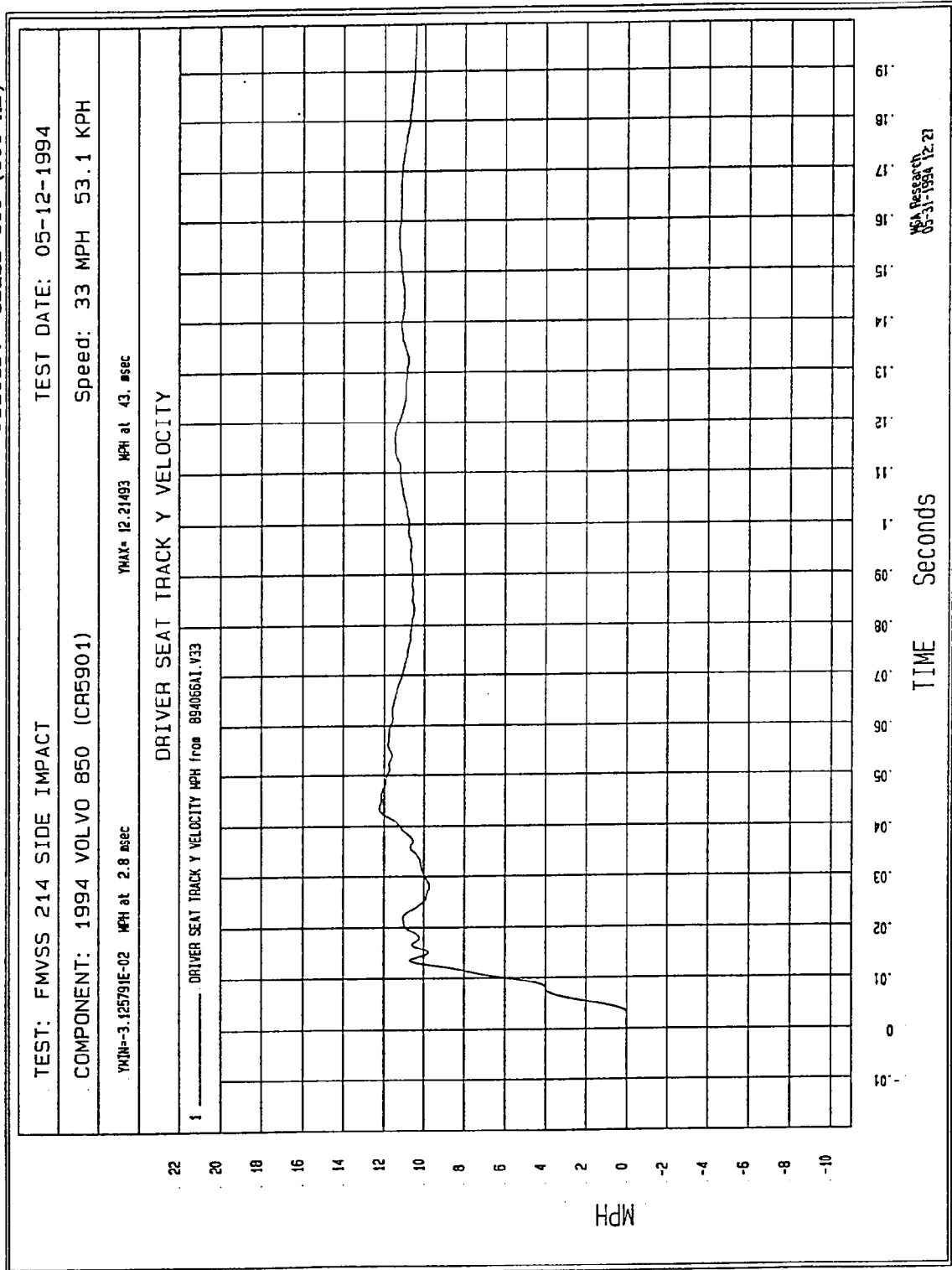


Figure B-42 - Driver Seat Track Y Velocity vs. Time

Filter: Class 60 (100 Hz)

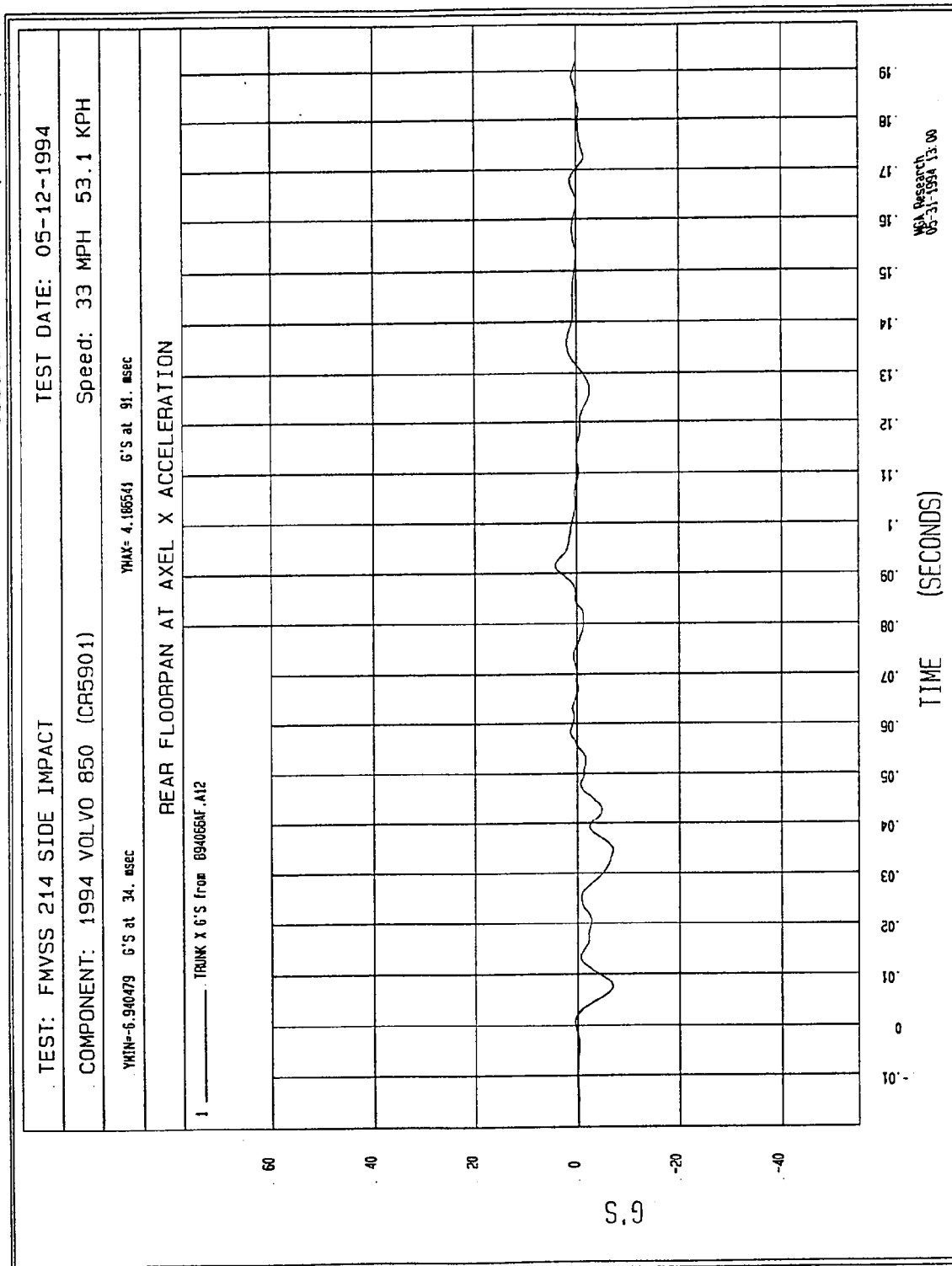


Figure B-43 - Rear Floorpan at Axle X Acceleration vs. Time

Filter: Class 180 (300 Hz)

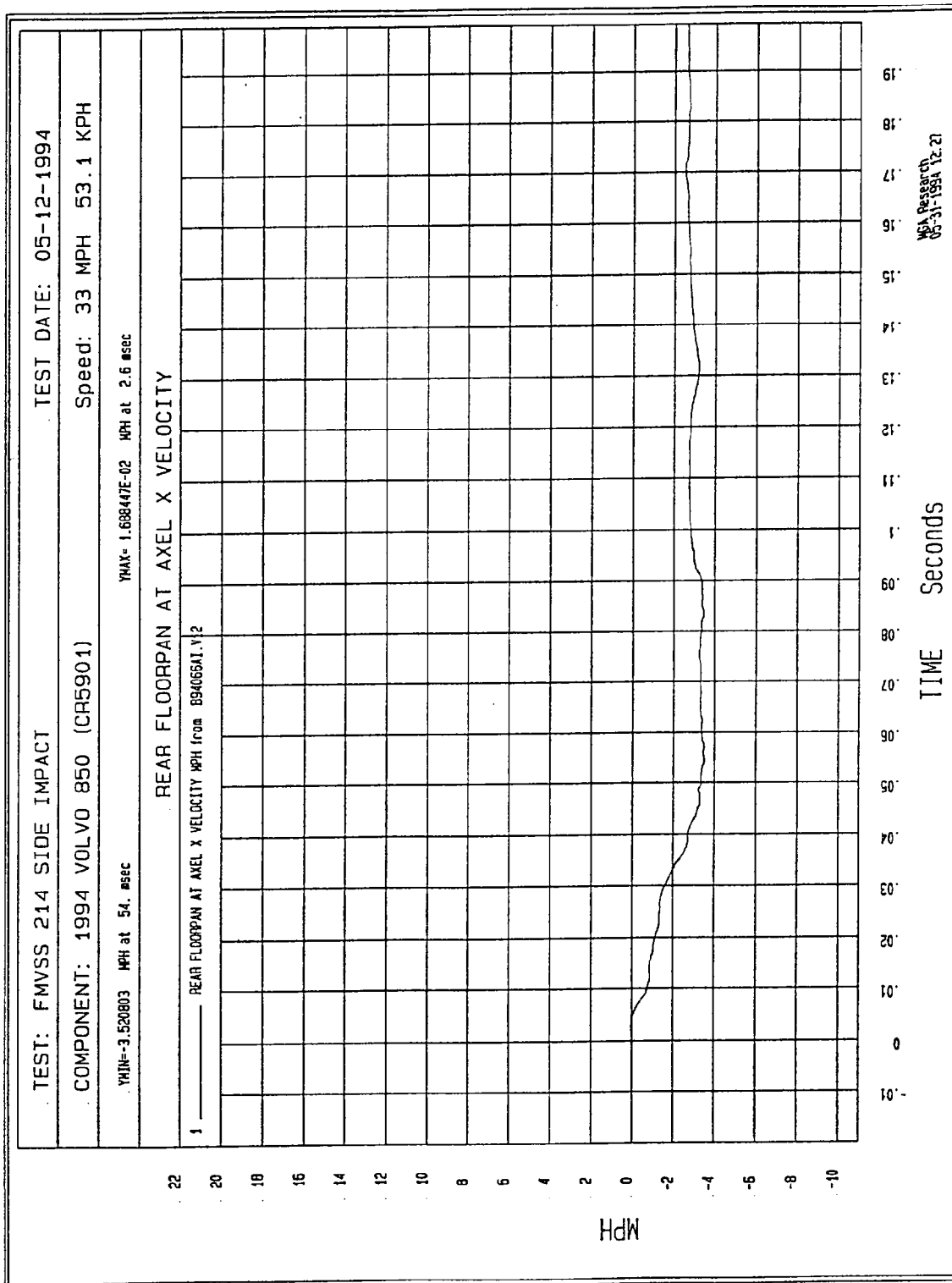


Figure B-44 - Rear Floorpan at Axle X Velocity vs. Time

Filter: Class 60 (100 Hz)

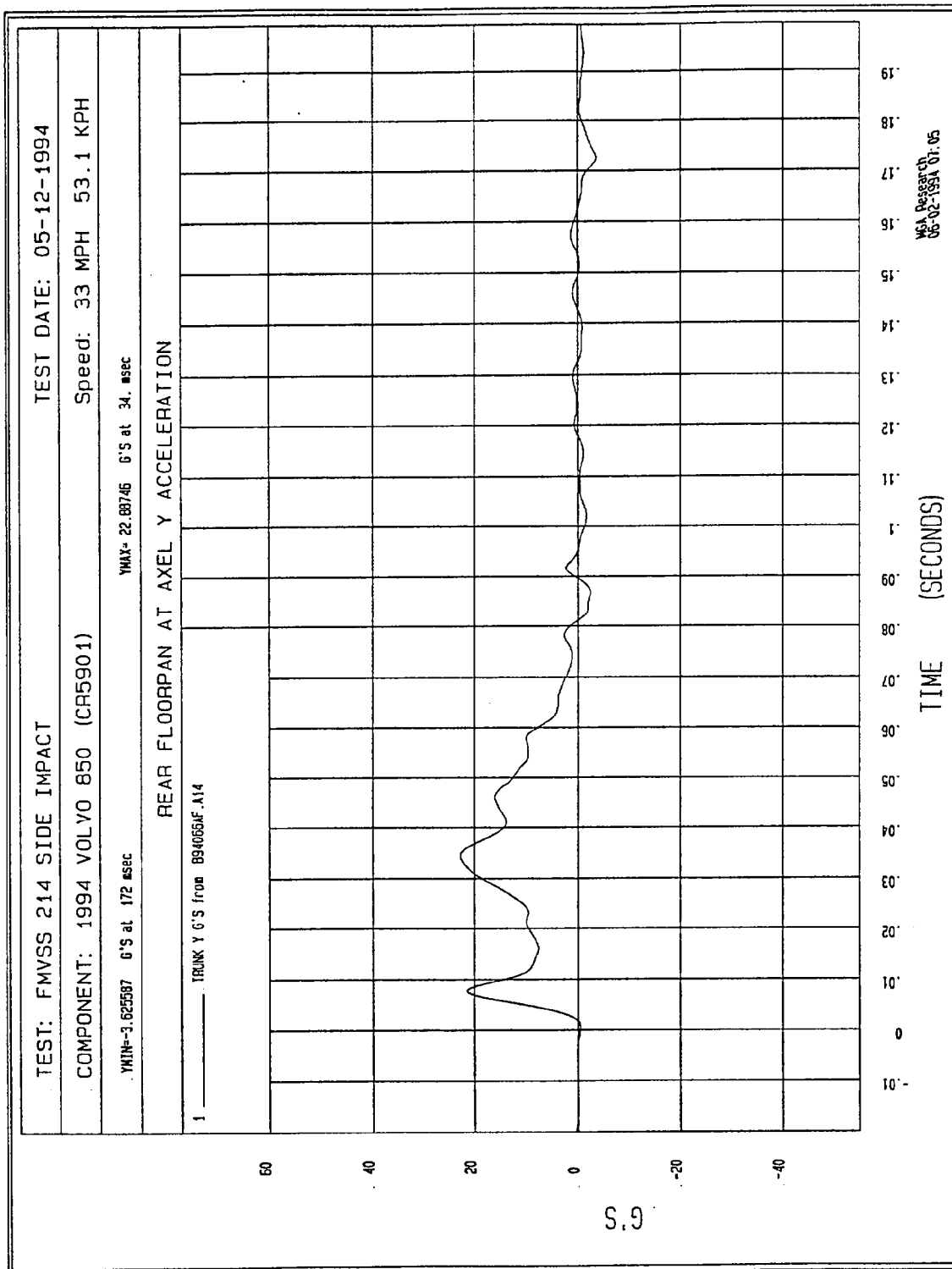


Figure B-45 - Rear Floorpan at Axle Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

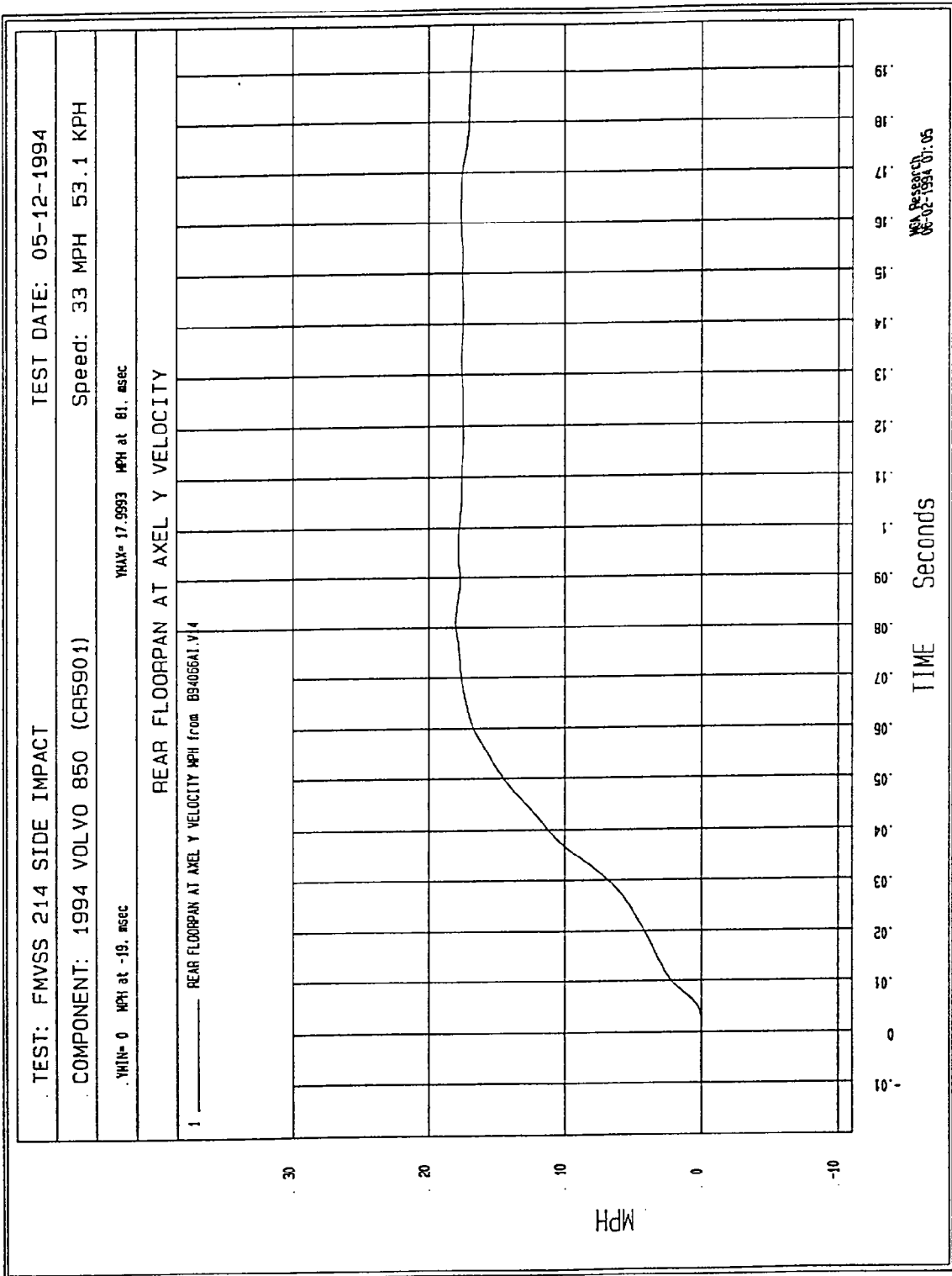


Figure B-46 - Rear Floorpan at Axle Y Velocity vs. Time

Filter: Class 60 (100 Hz)

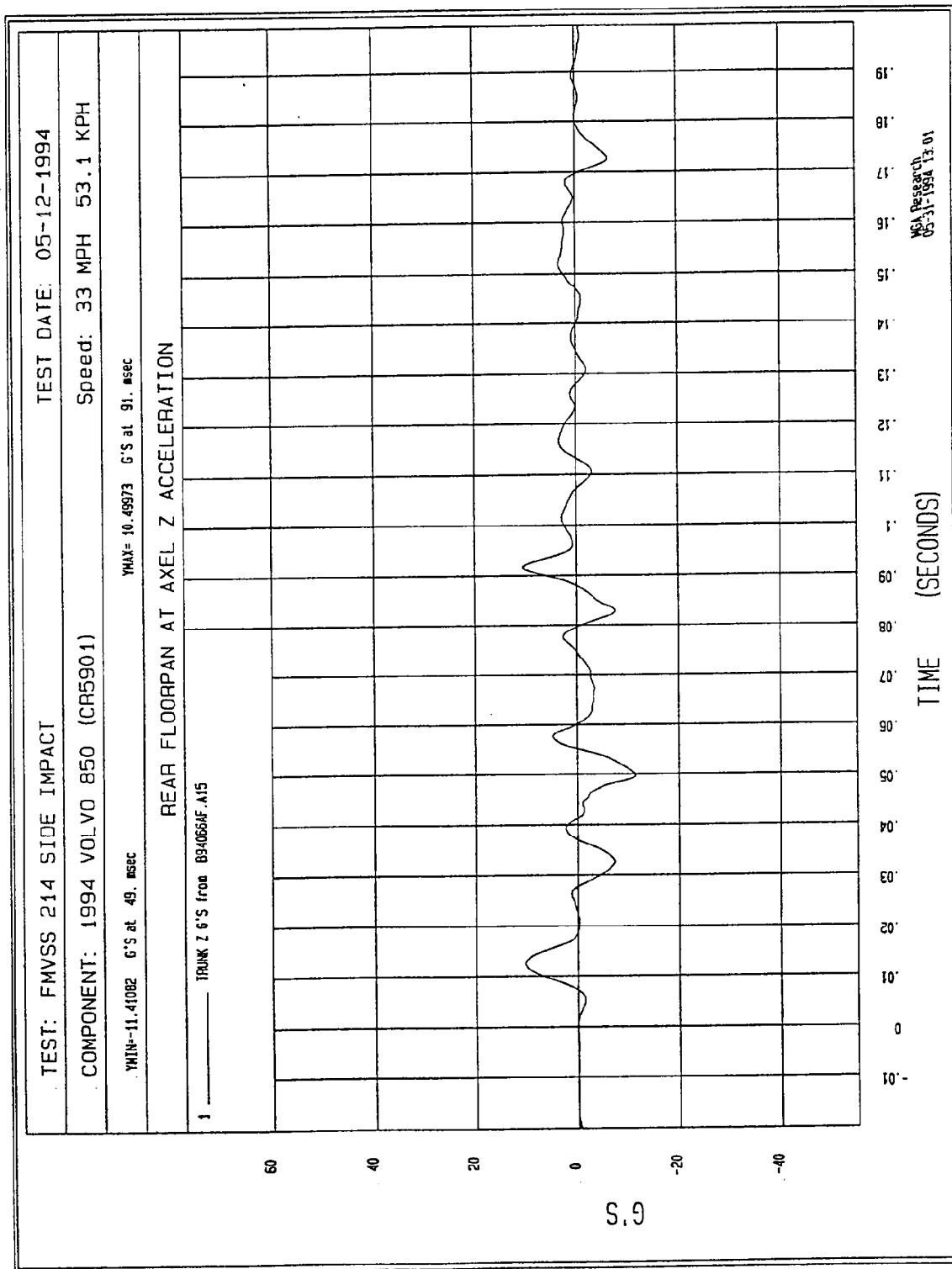
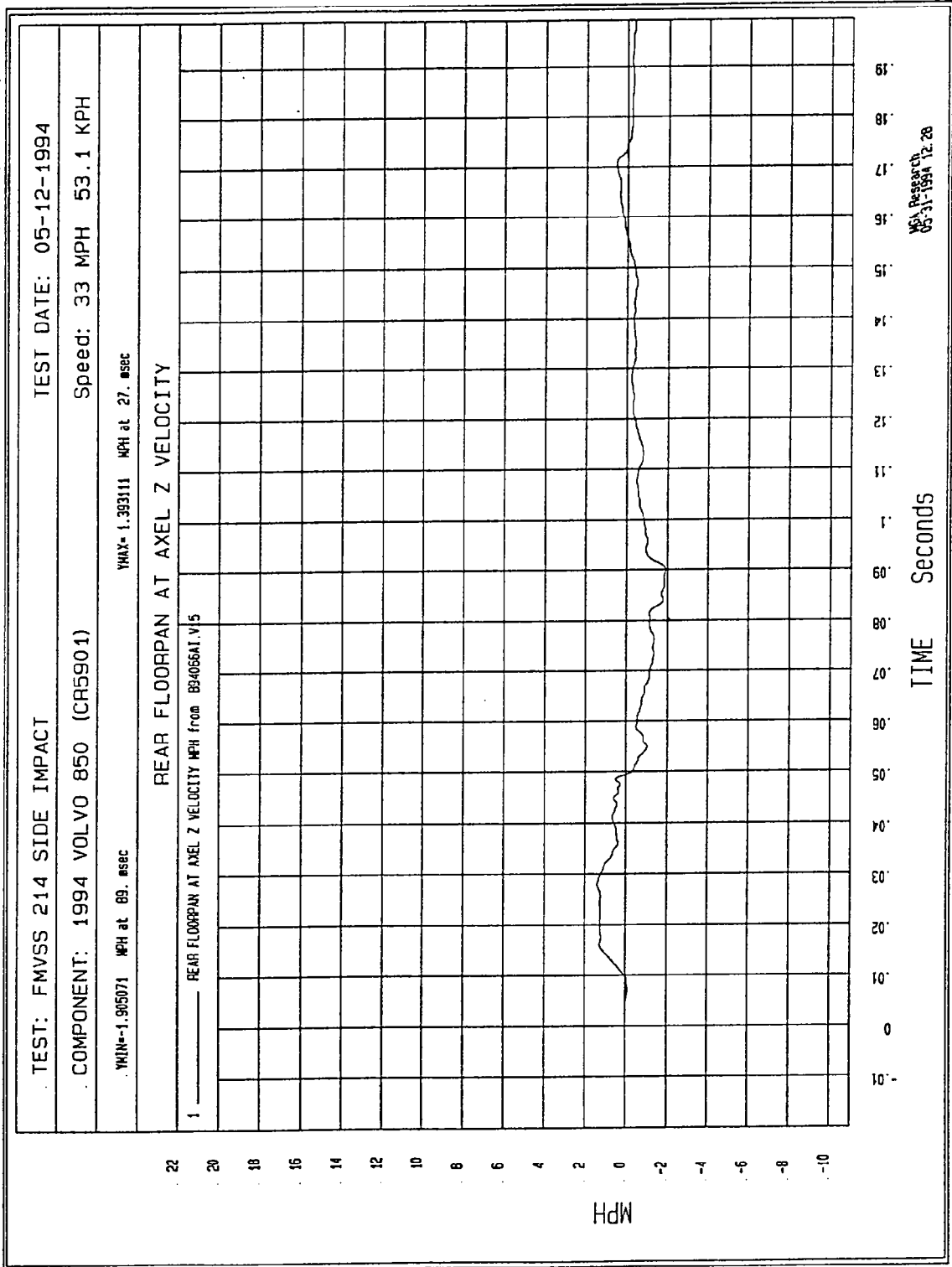


Figure B-47 - Rear Floorpan at Axle Z Acceleration vs. Time

Filter: Class 180 (300 Hz)



B-48

Figure B-48 - Rear Floorpan at Axle Z Velocity vs. Time

Filter: Class 60 (100 Hz)

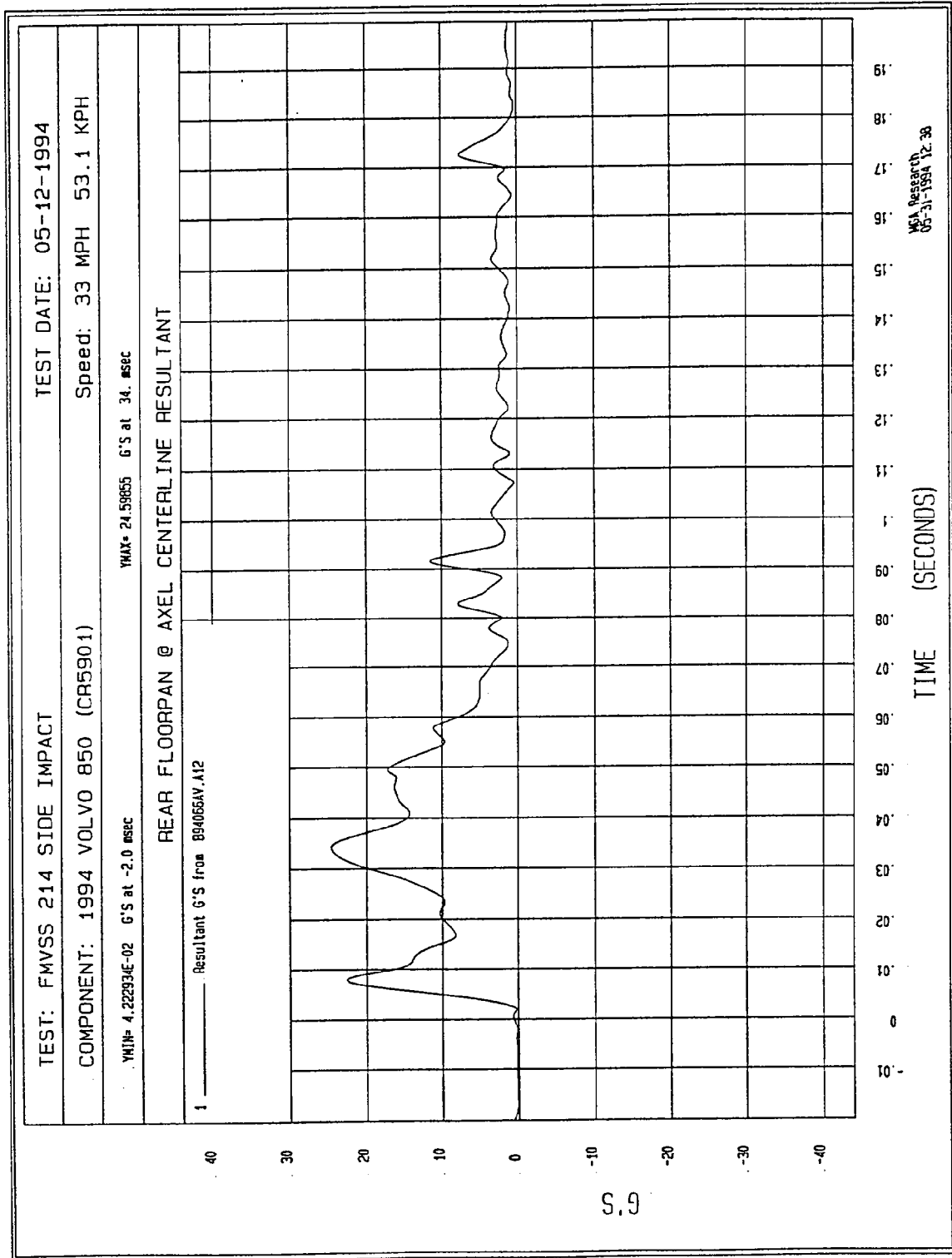


Figure B-49 - Rear Floorpan at Axle Centerline Resultant vs. Time

Filter: Class 60 (100 Hz)

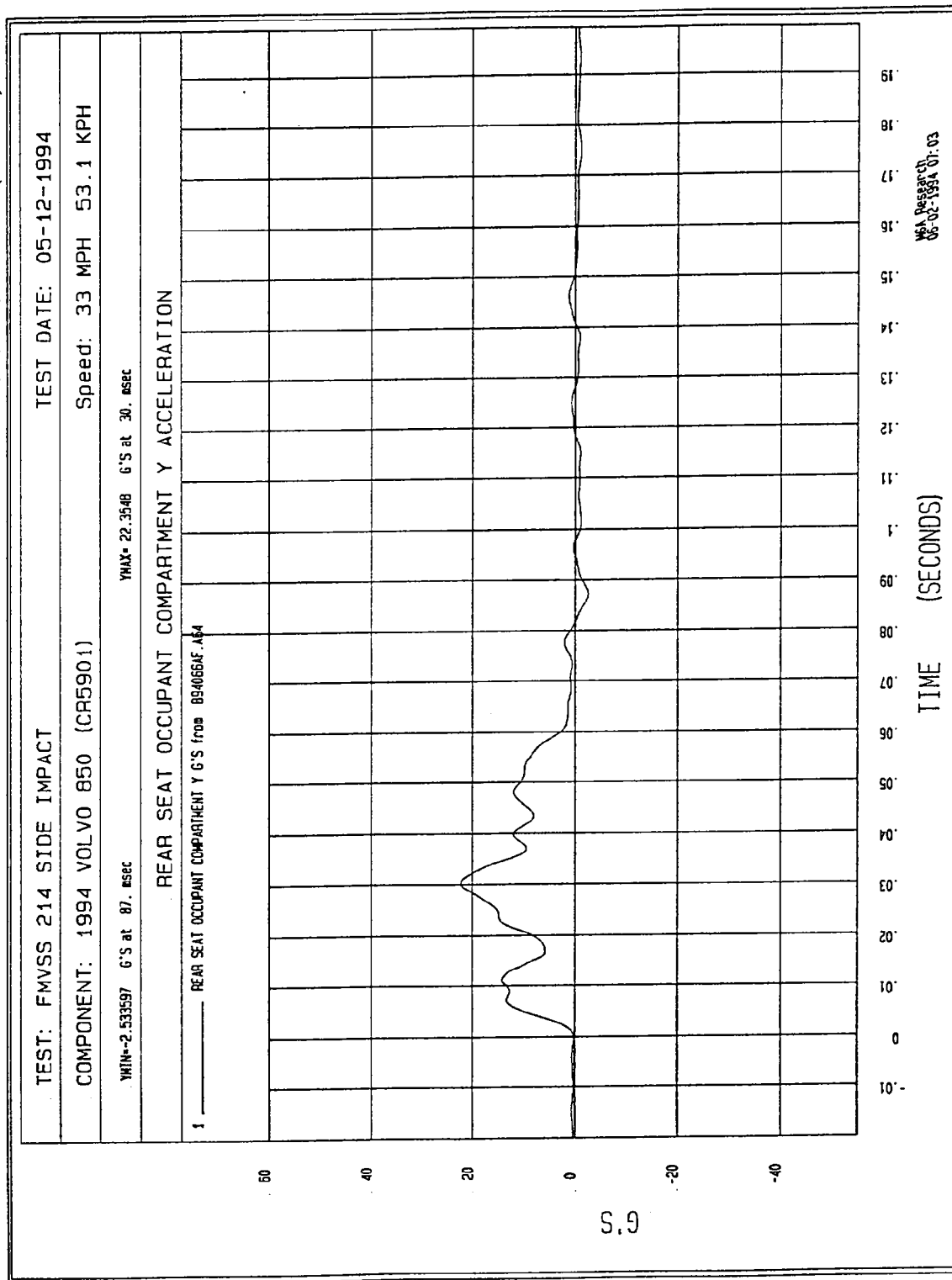


Figure B-50 - Rear Seat Occupant Compartment Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

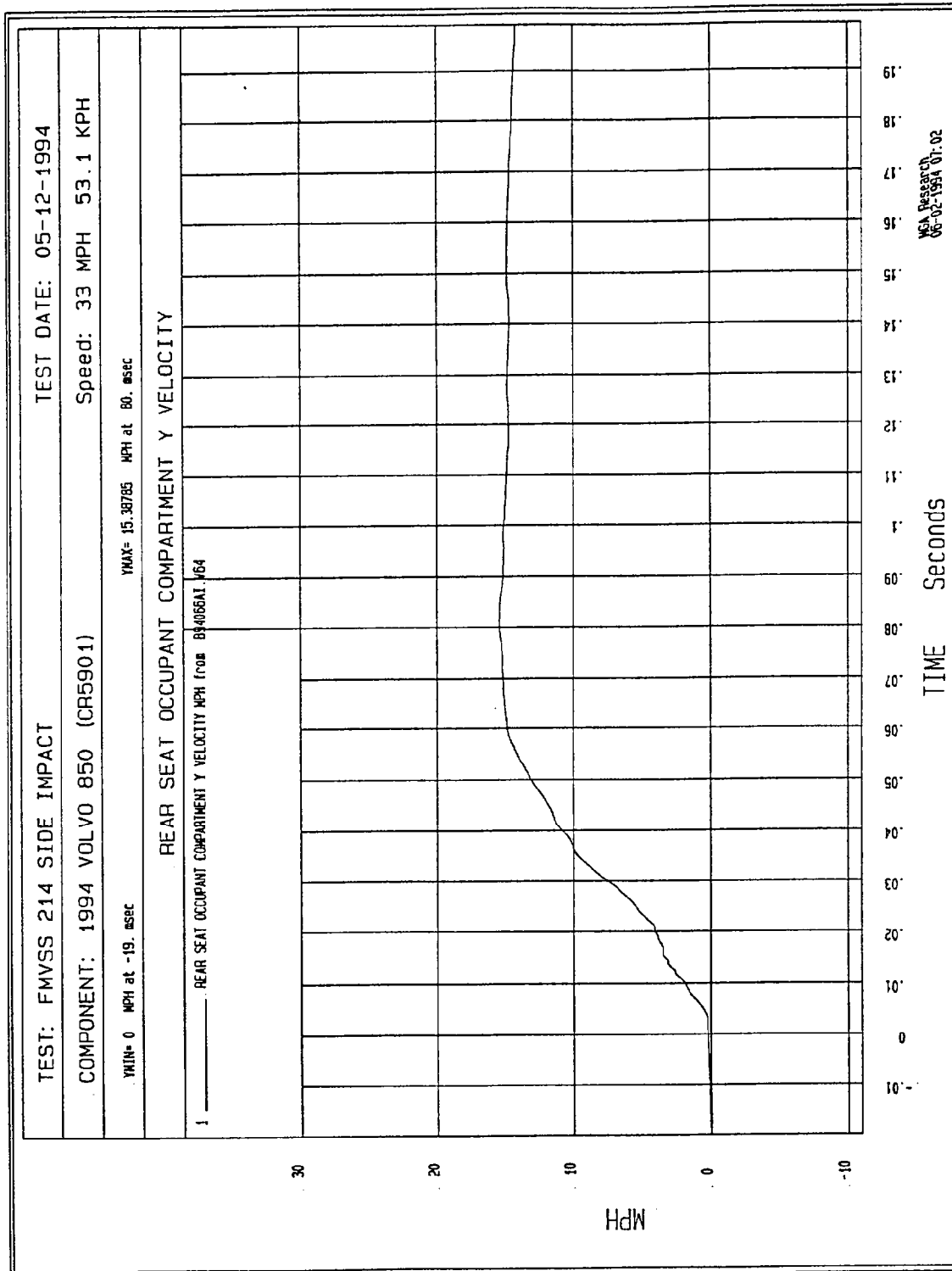


Figure B-51 - Rear Seat Occupant Compartment Y Velocity vs. Time

Filter: Class 60 (100 Hz)

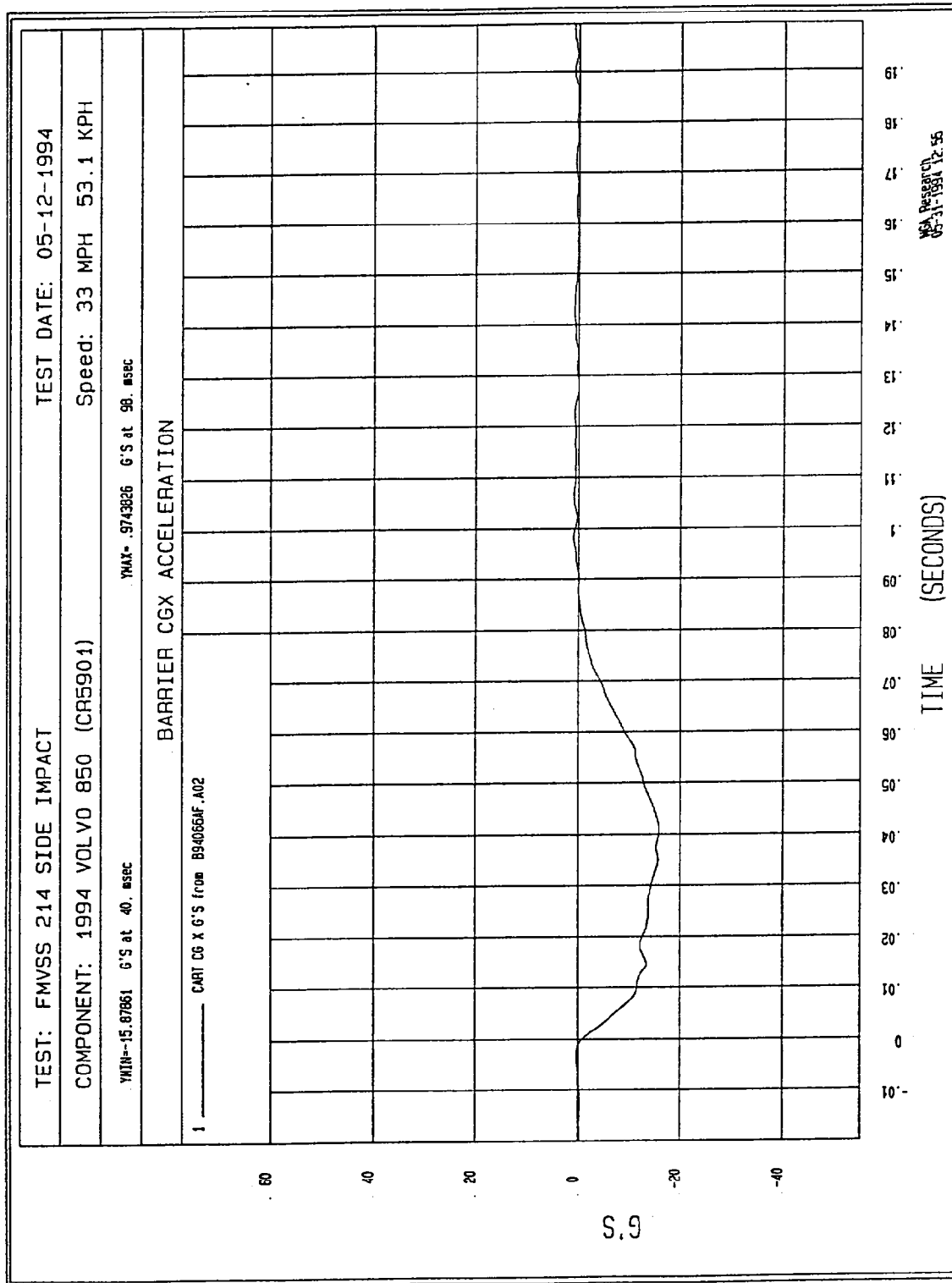


Figure B-52 - Moving Barrier Center of Gravity X Acceleration vs. Time

Filter: Class 180 (300 Hz)

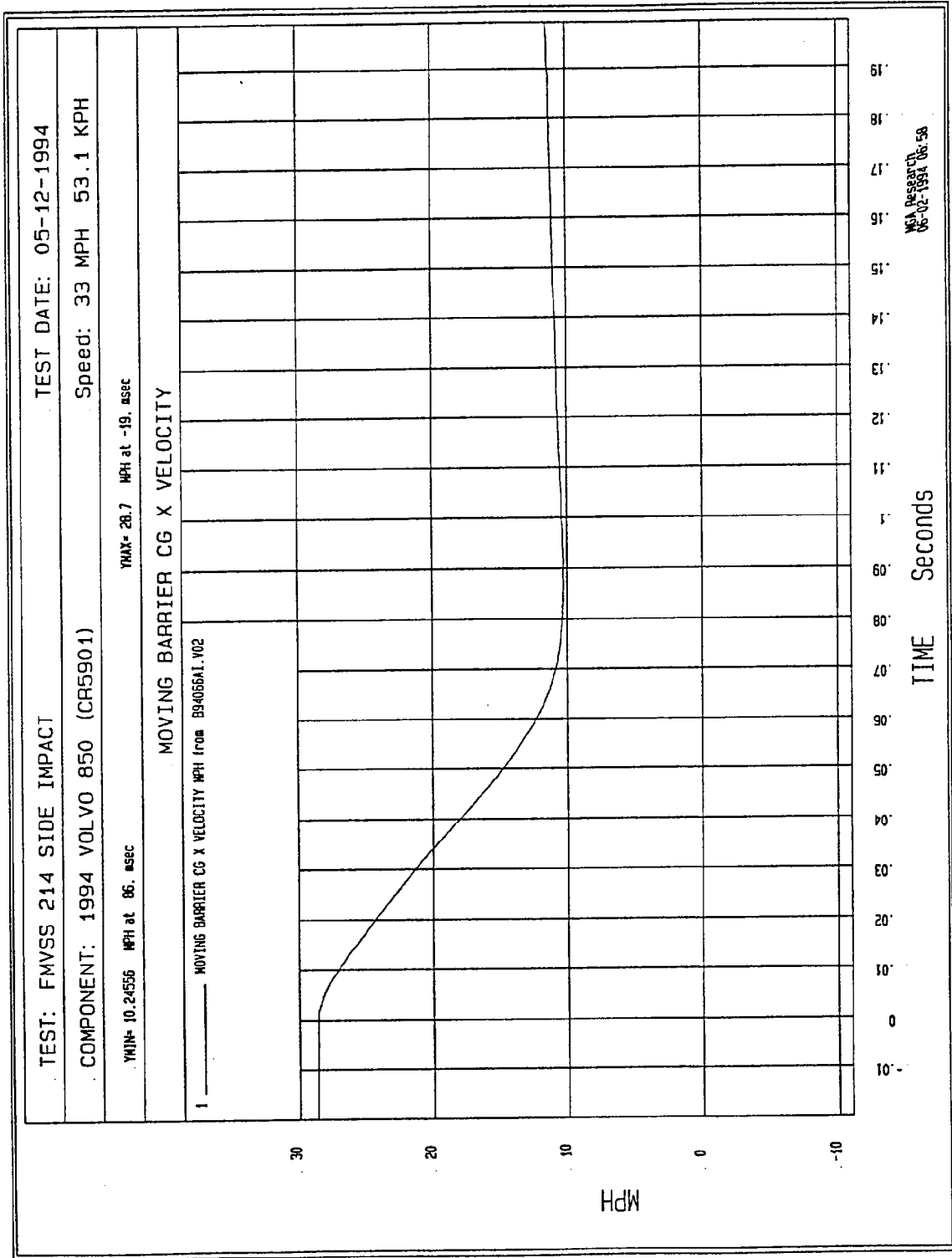


Figure B-53 - Moving Barrier Center of Gravity X Velocity vs. Time

Filter: Class 60 (100 Hz)

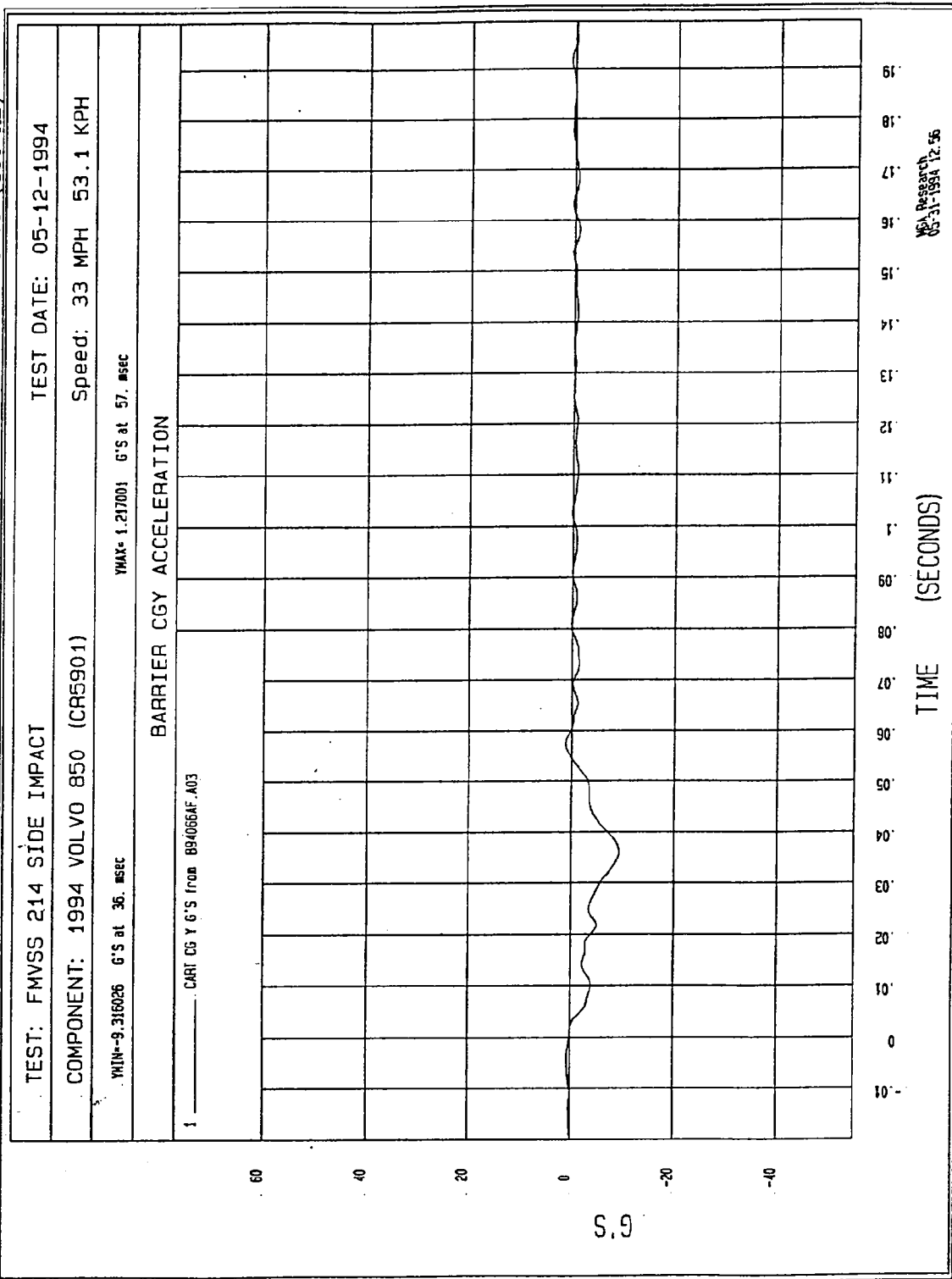


Figure B-54 - Moving Barrier Center of Gravity Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

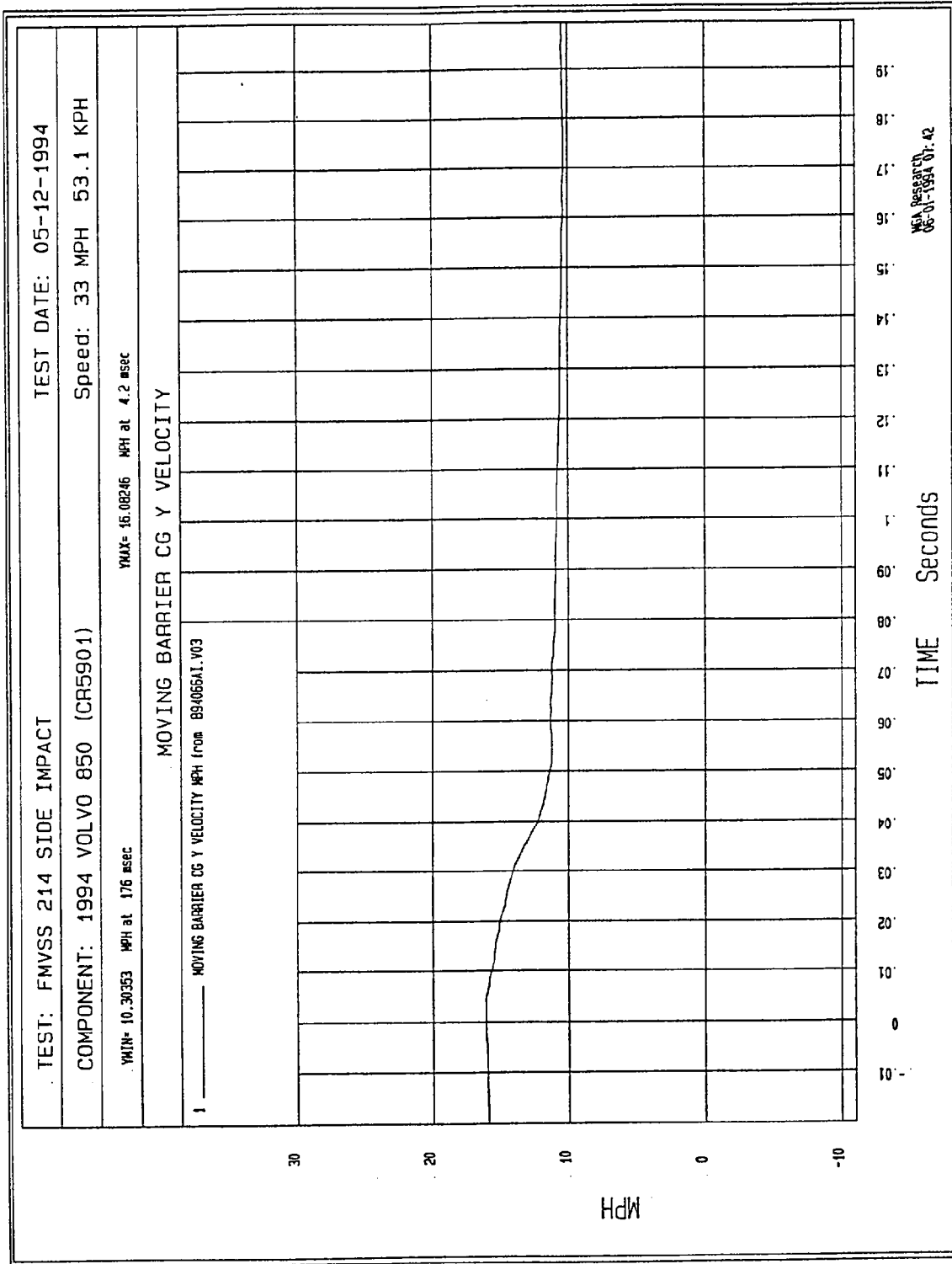


Figure B-55 - Moving Barrier Center of Gravity Y Velocity vs. Time

Filter: Class 60 (100 Hz)

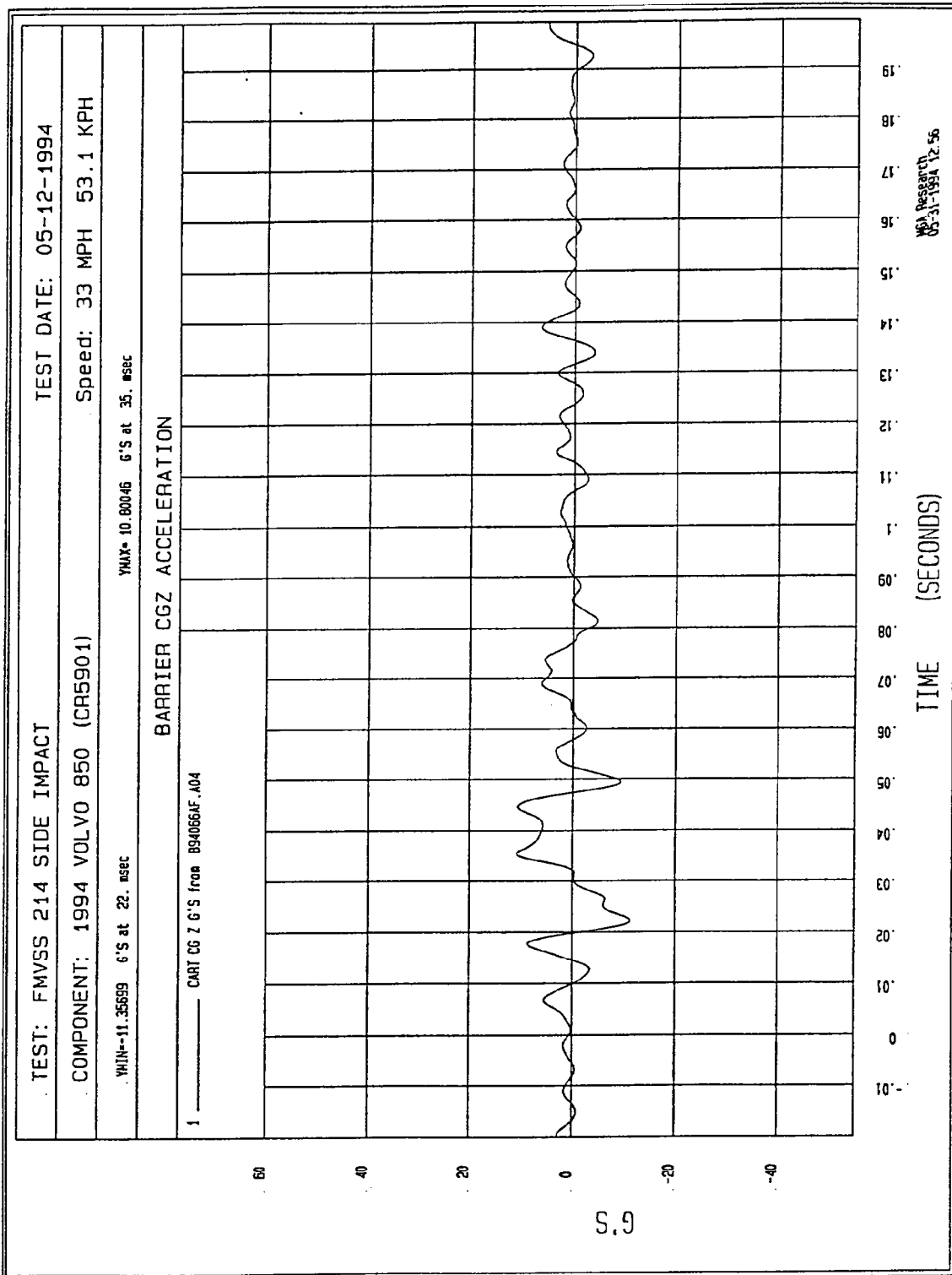


Figure B-56 - Moving Barrier Center of Gravity Z Acceleration vs. Time

Filter: Class 180 (300 Hz)

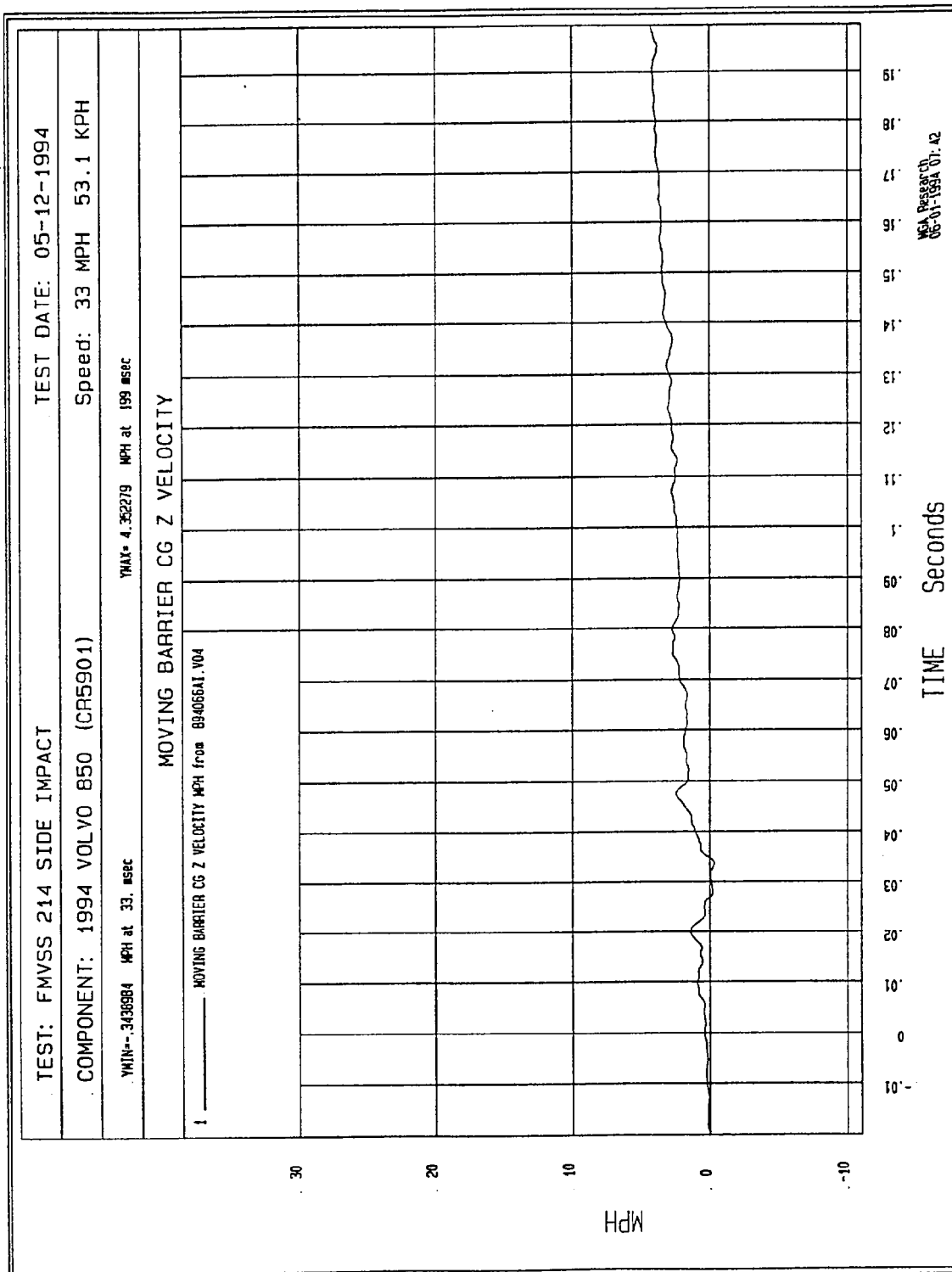
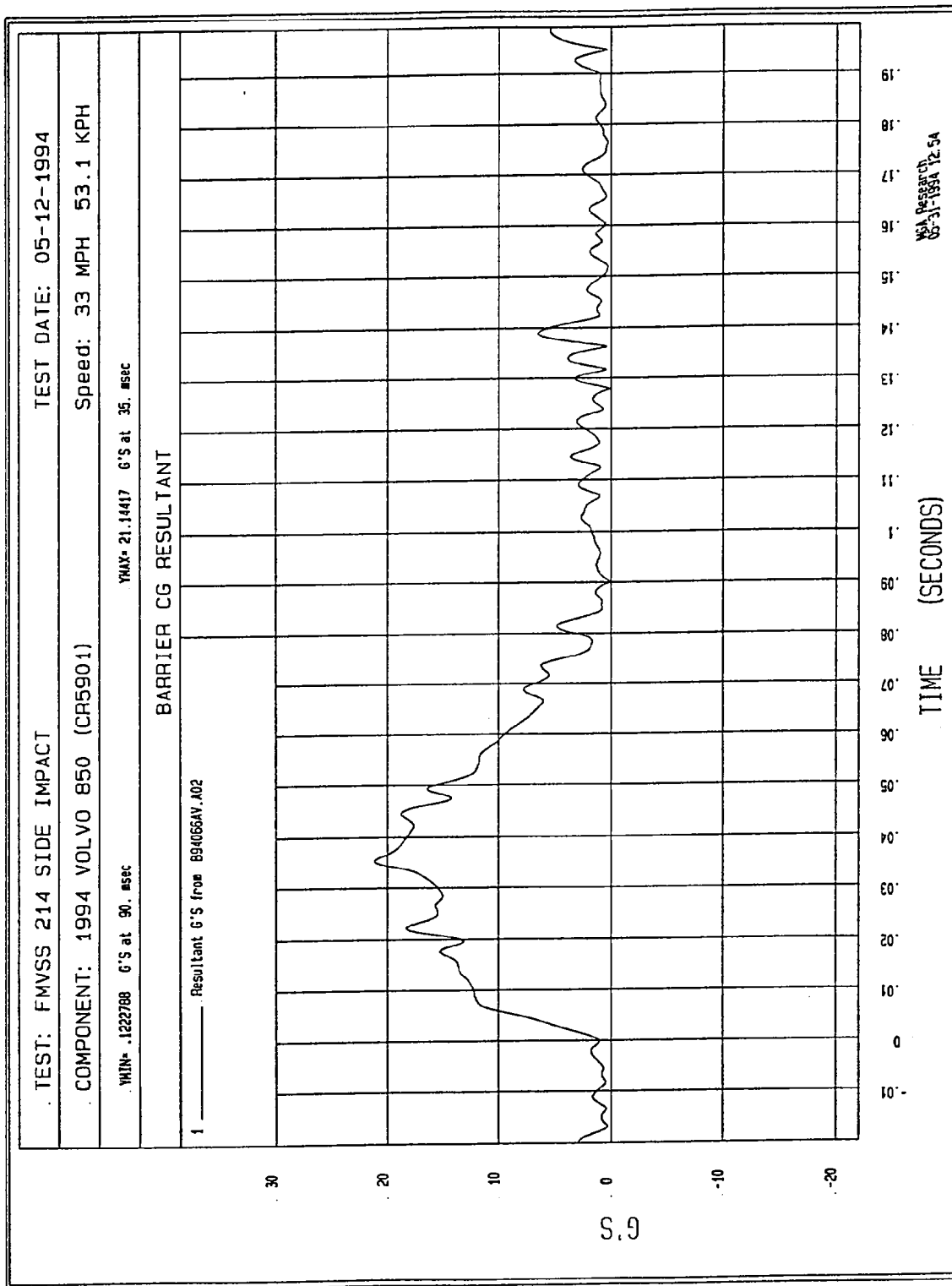


Figure B-57 - Moving Barrier Center of Gravity Z Velocity vs. Time

Filter: Class 60 (100 Hz)



Filter: Class 60 (100 Hz)

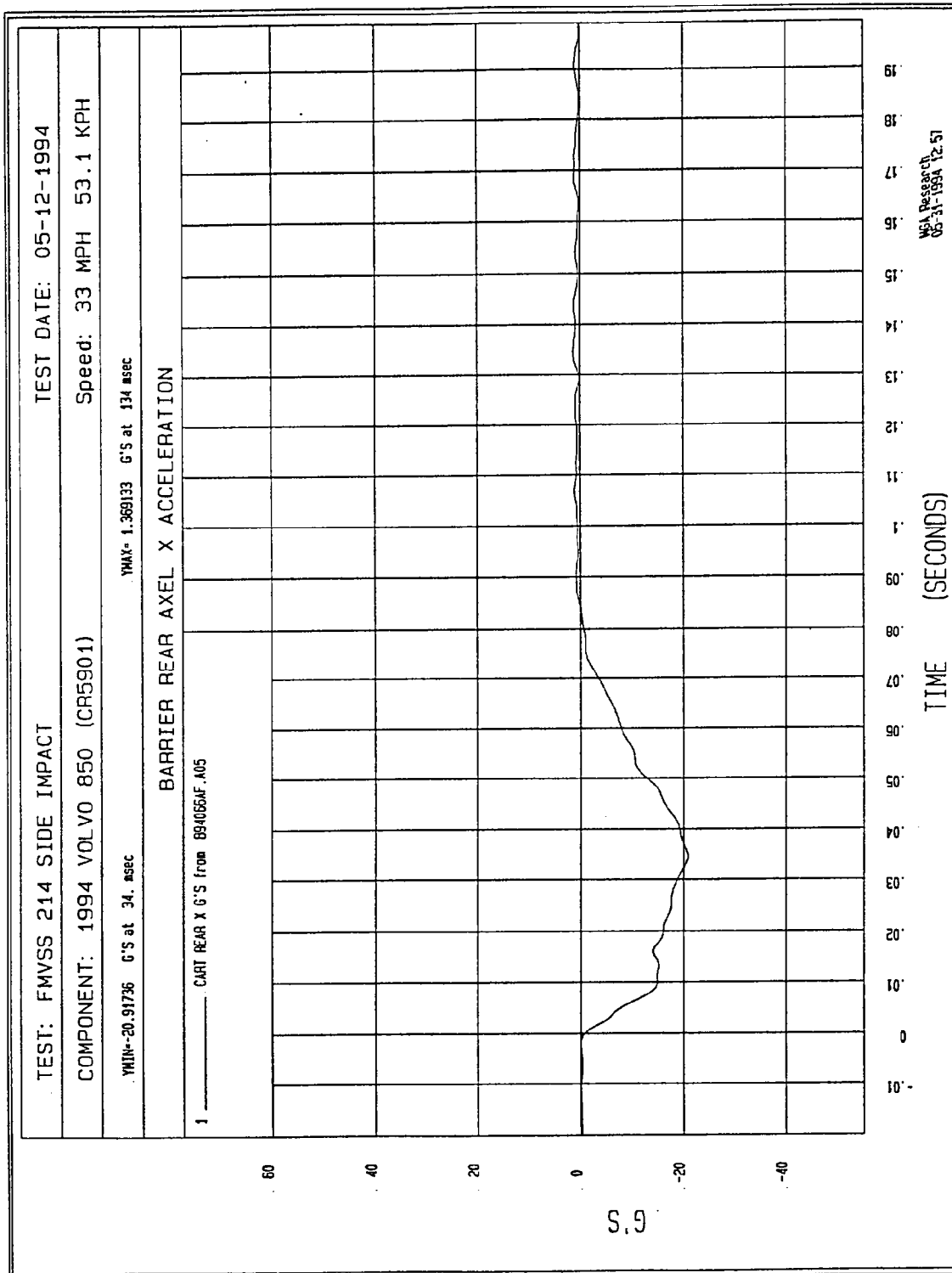


Figure B-59 - Moving Barrier Rear Axle X Acceleration vs. Time

Filter: Class 180 (300 Hz)

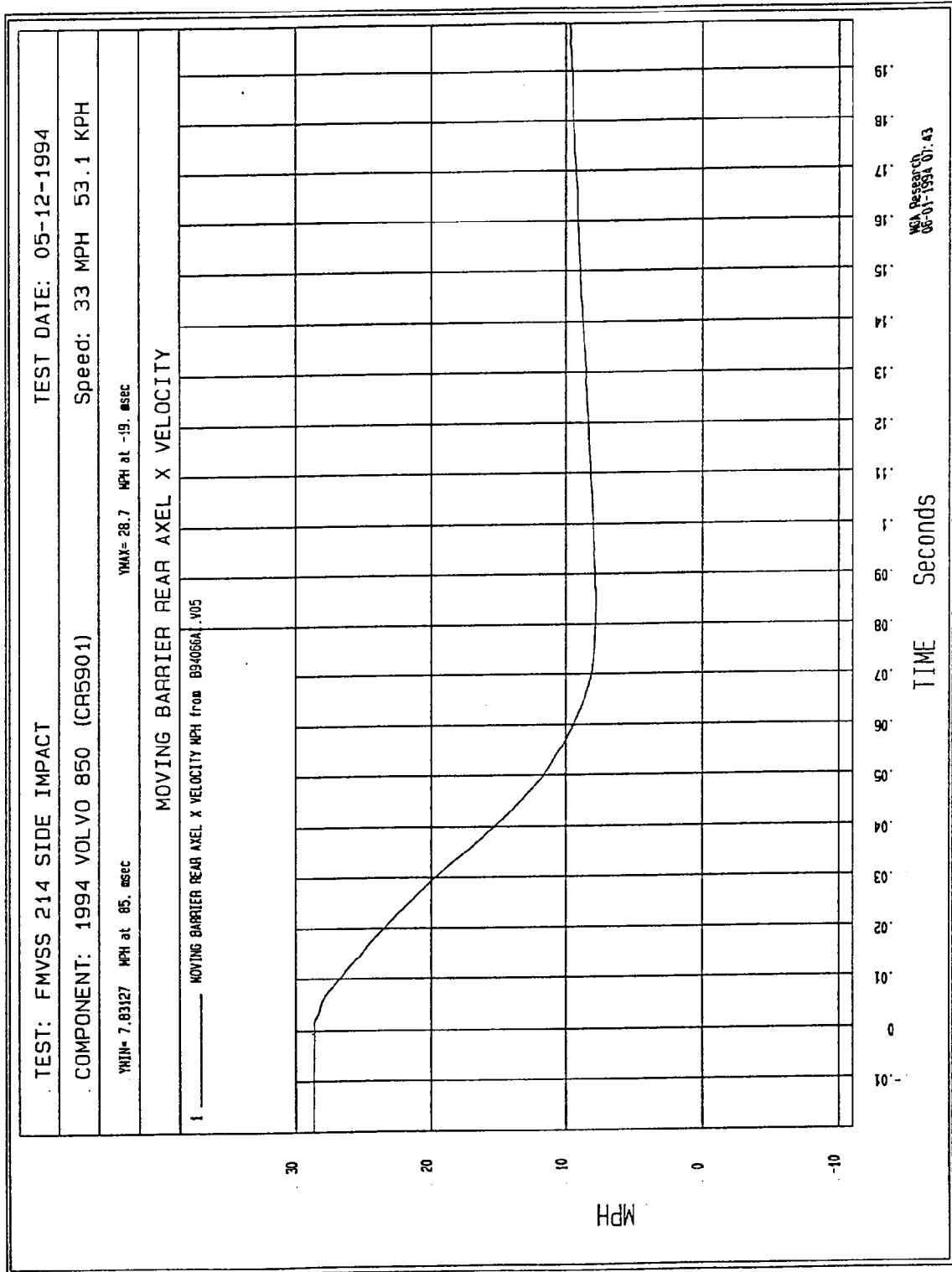


Figure B-60 - Moving Barrier Rear Axle X Velocity vs. Time

Filter: Class 60 (100 Hz)

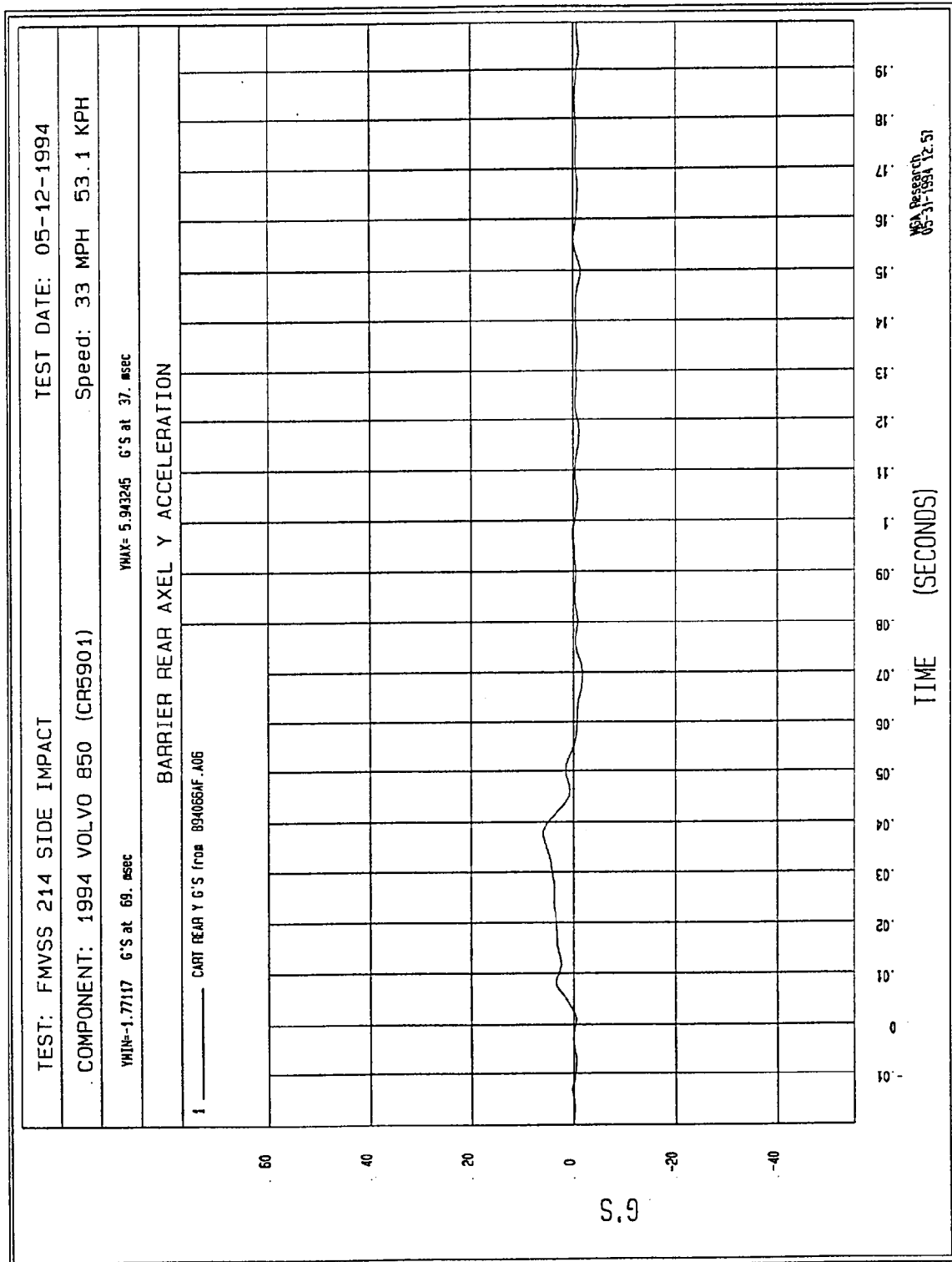


Figure B-61 - Moving Barrier Rear Axle Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

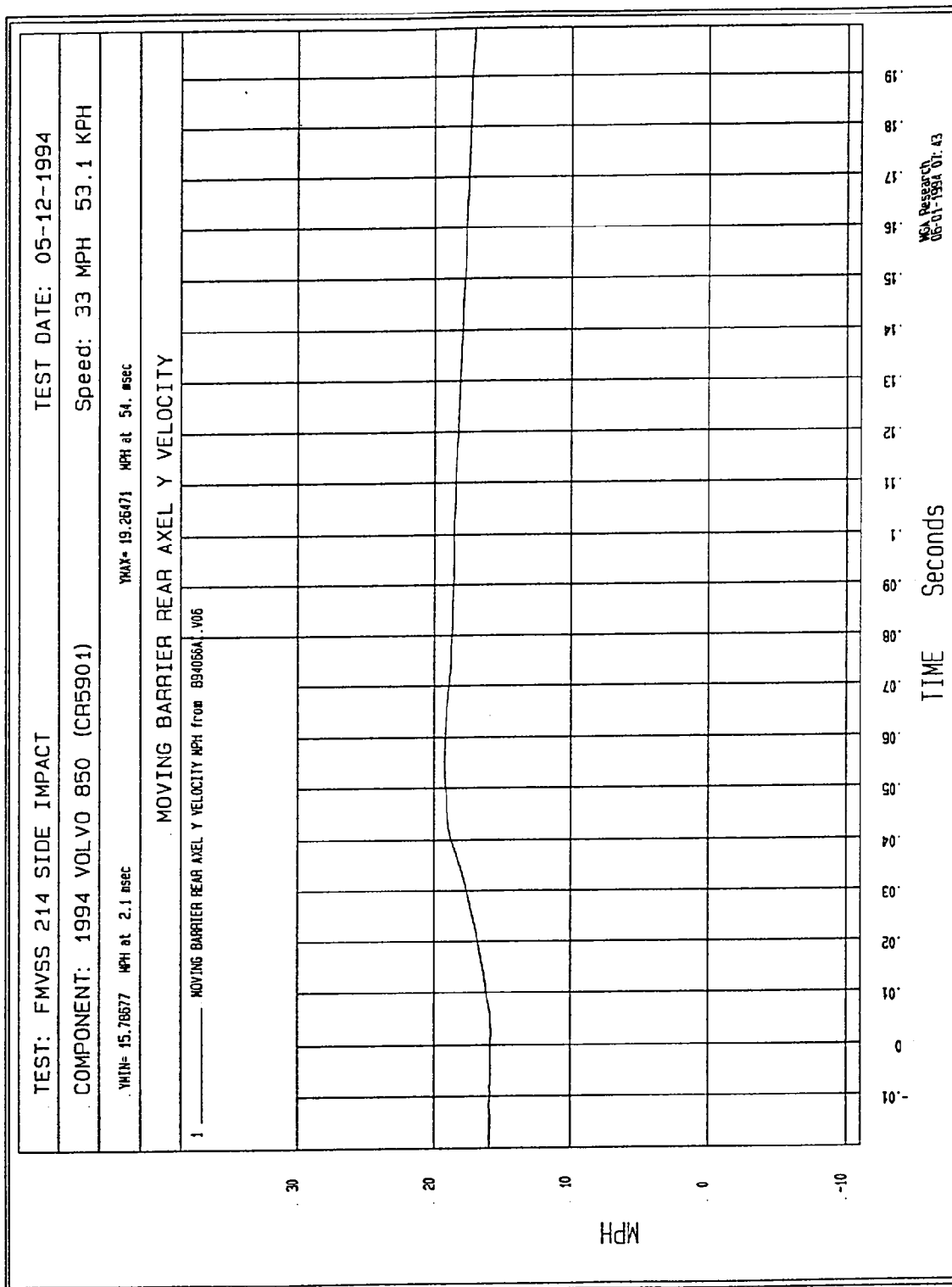


Figure B-62 - Moving Barrier Rear Axle Y Velocity vs. Time

NO VALID DATA COLLECTED

B-63

Figure B-63 - Right Hand Barrier Contact

Filter: Class 1000 (1650 Hz)

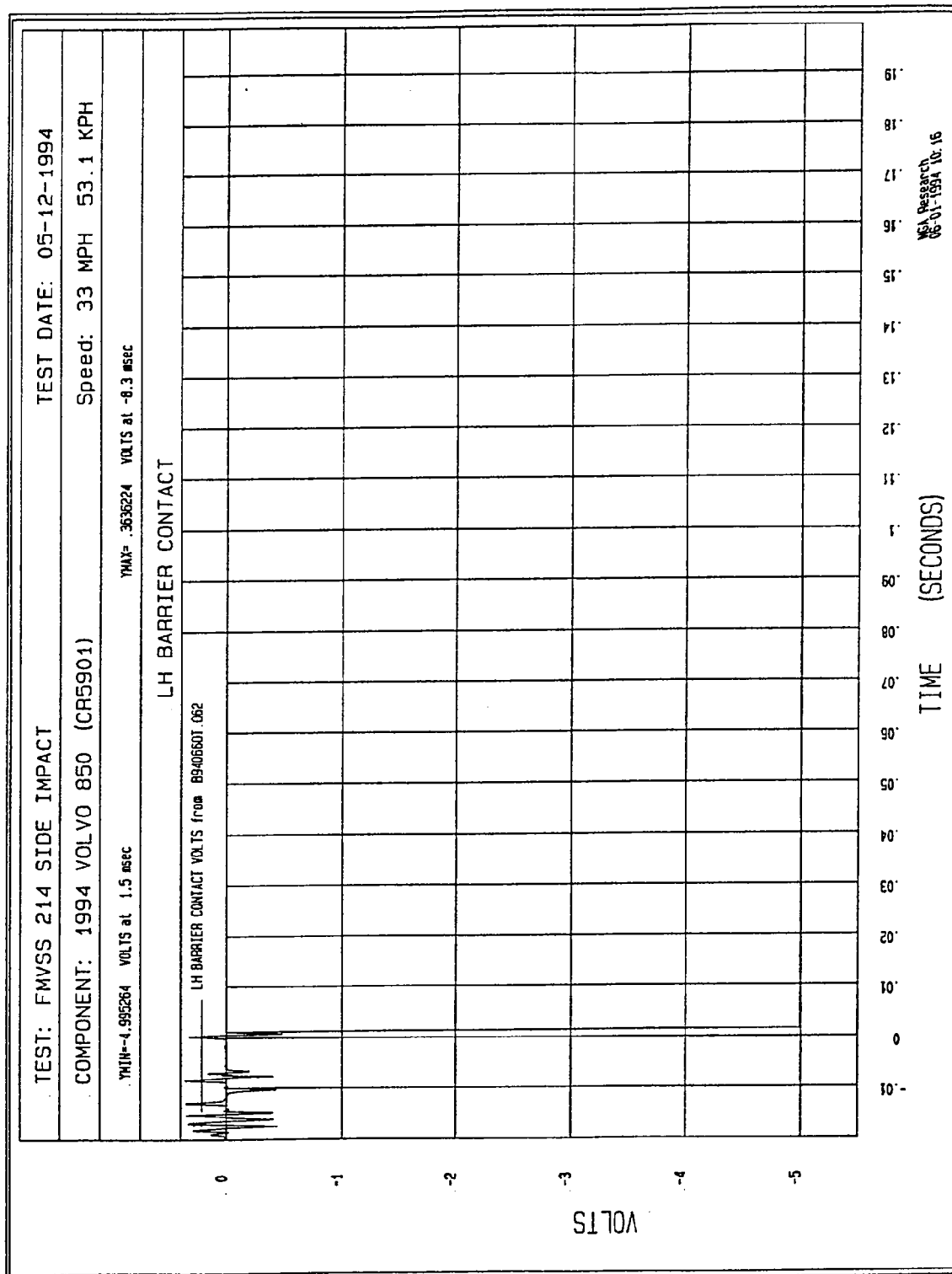


Figure B-64 - Left Hand Barrier Contact

Filter: Class 180 (300 Hz)

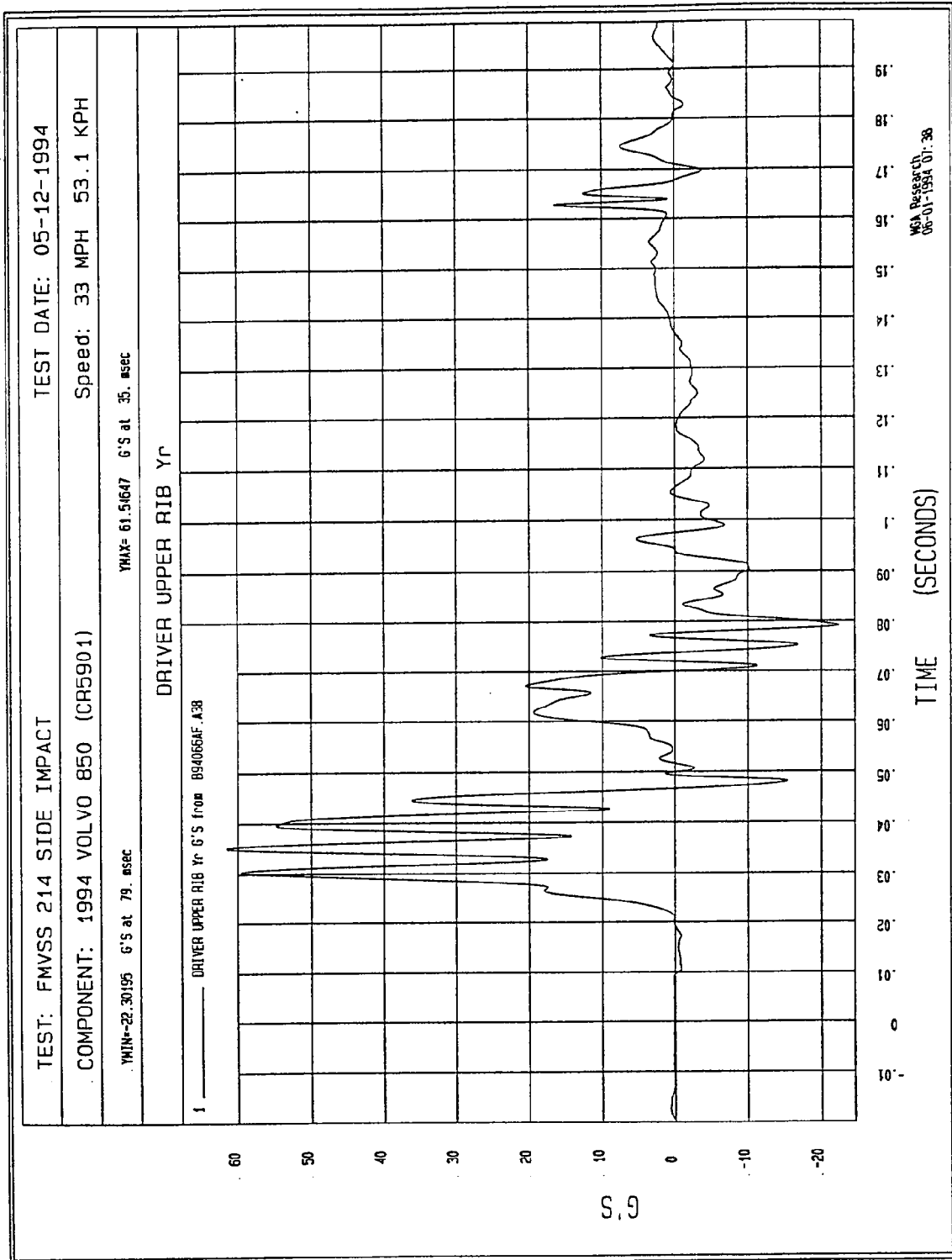


Figure B-65 - Driver Upper Rib Y Redundant Acceleration vs. Time

Filter: Class 180 (300 Hz)

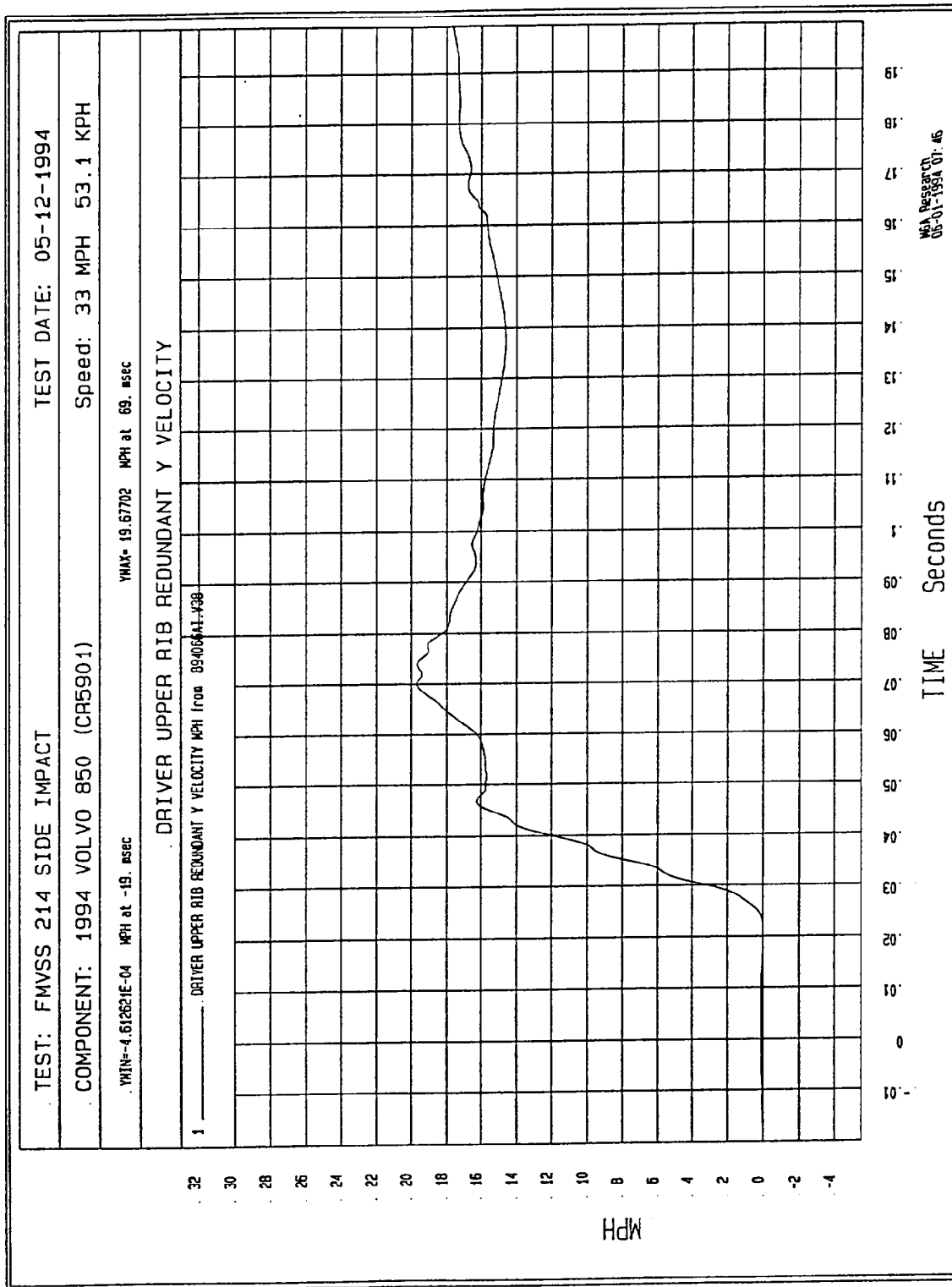


Figure B-66 - Driver Upper Rib Y Redundant Velocity vs. Time

Filter: Class 180 (300 Hz)

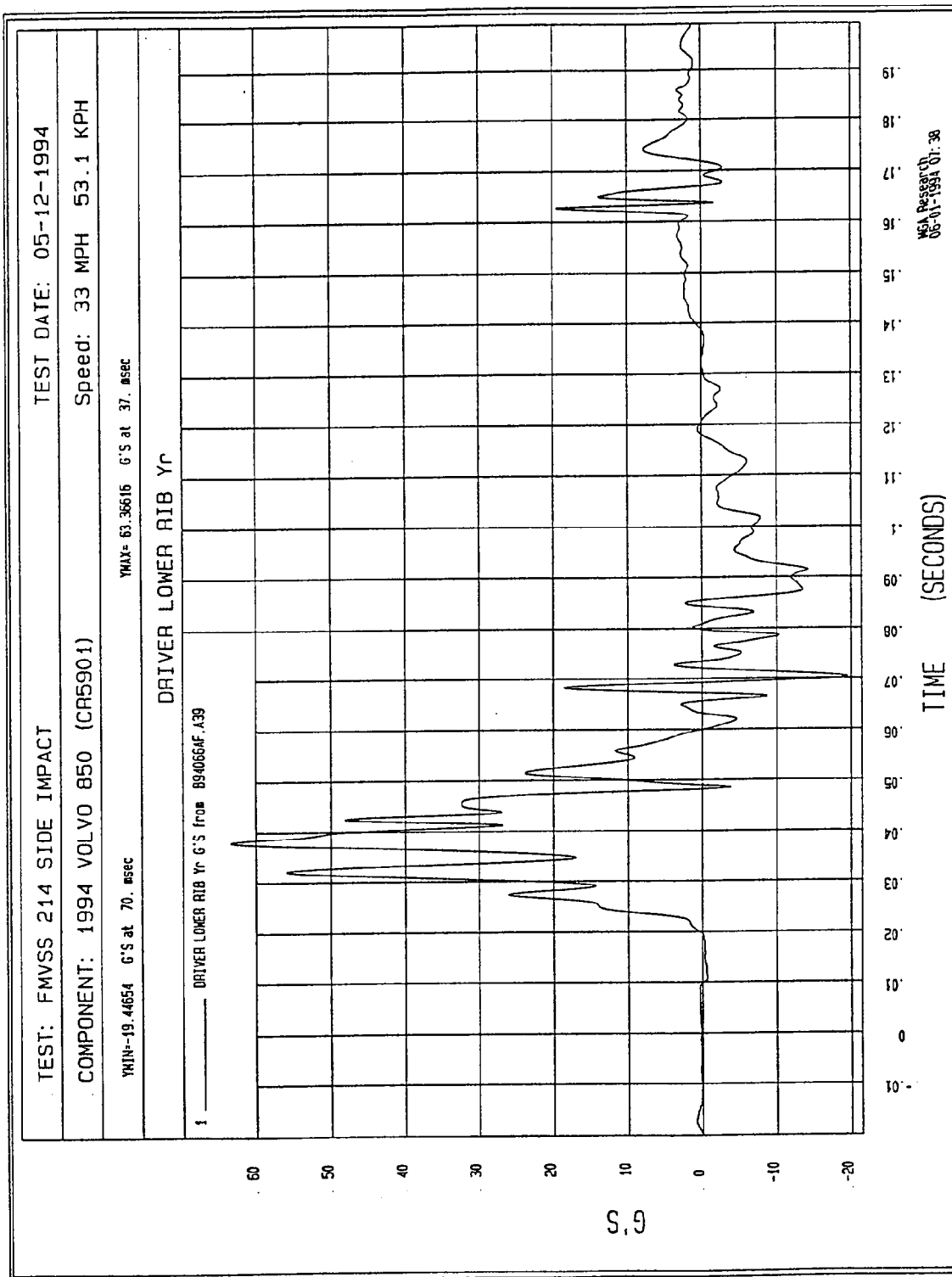


Figure B-67 - Driver Lower Rib Y Redundant Acceleration vs. Time

Filter: Class 180 (300 Hz)

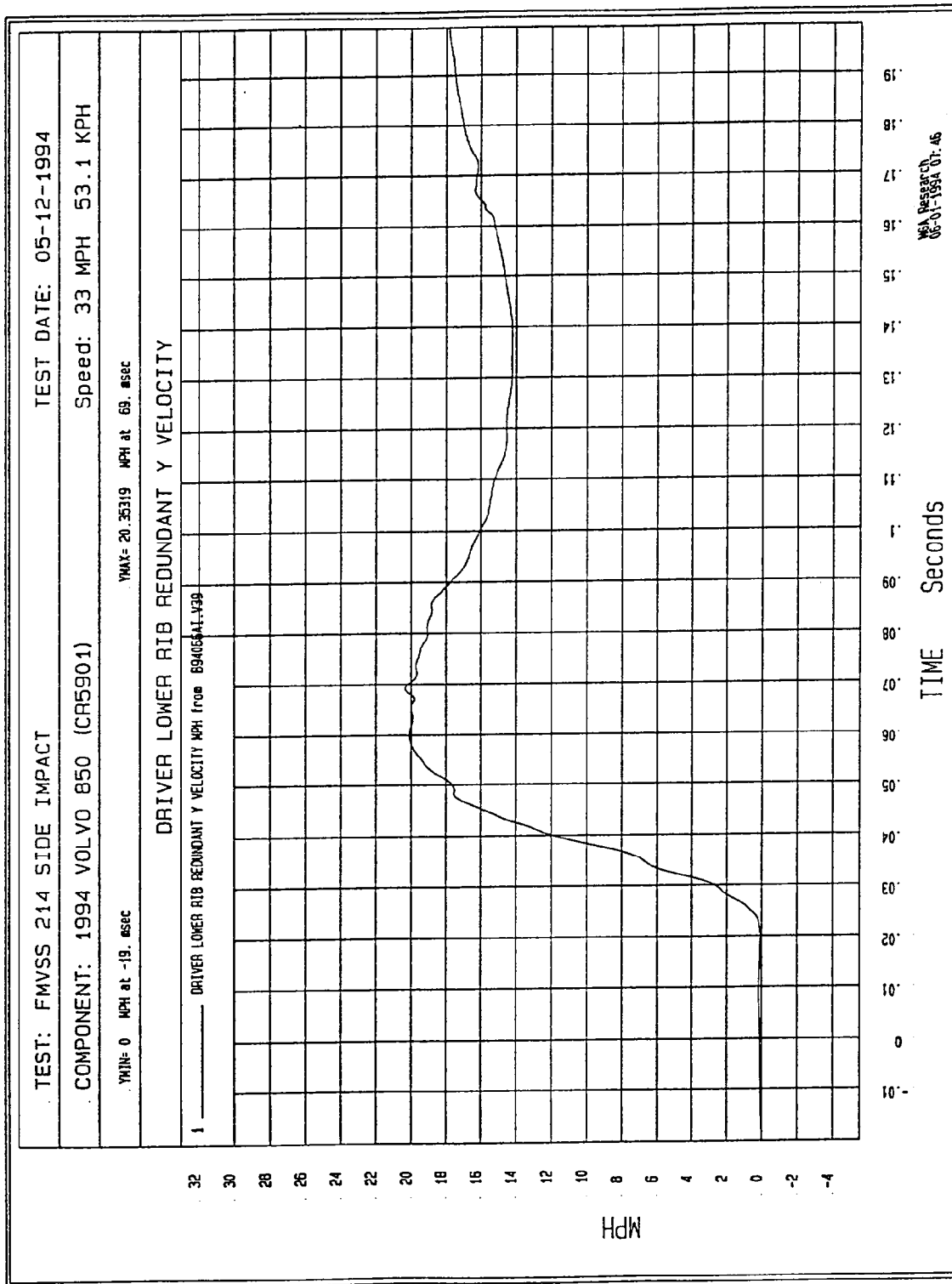


Figure B-68 - Driver Lower Rib Y Redundant Velocity vs. Time

Filter: Class 180 (300 Hz)

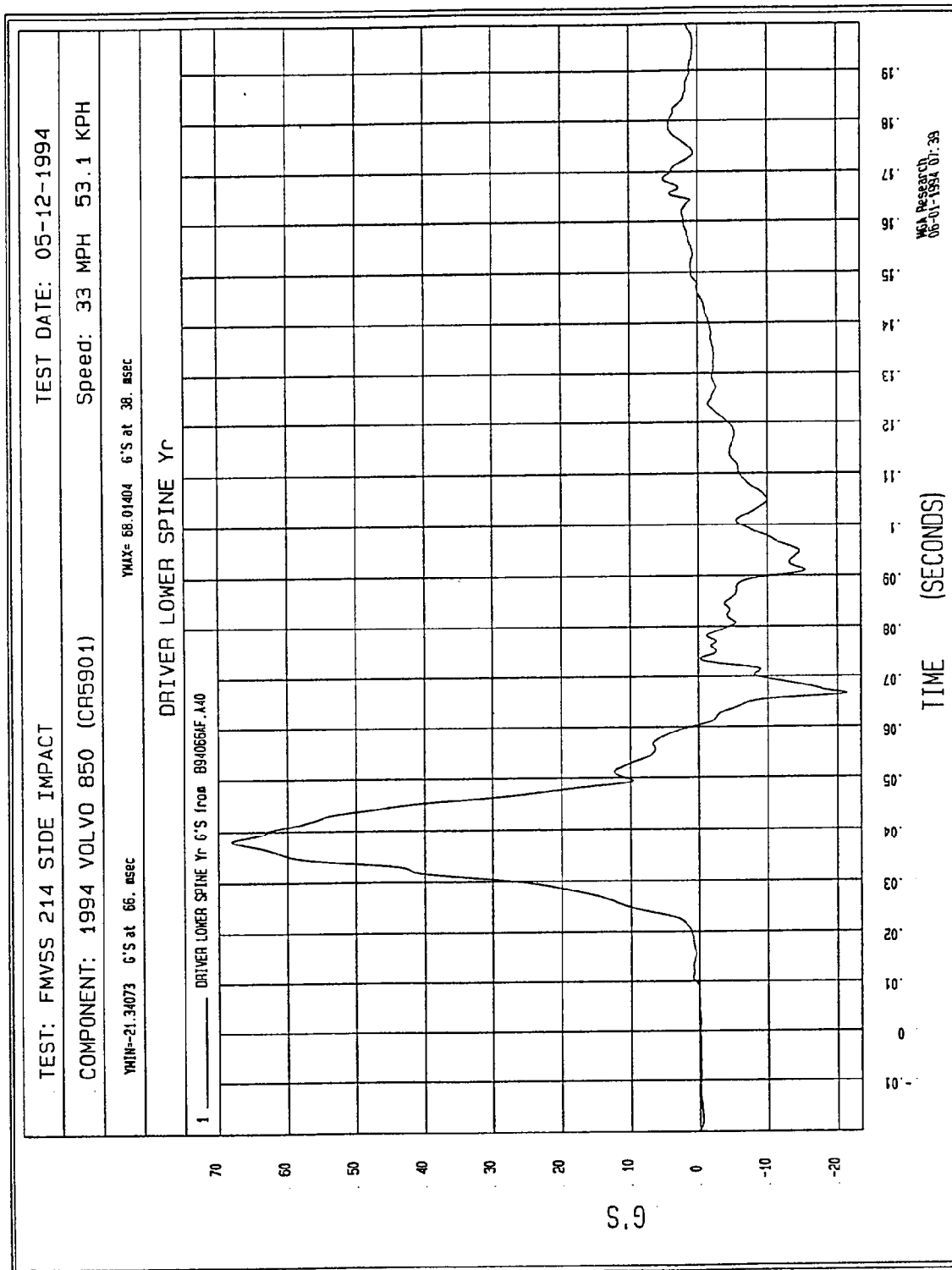
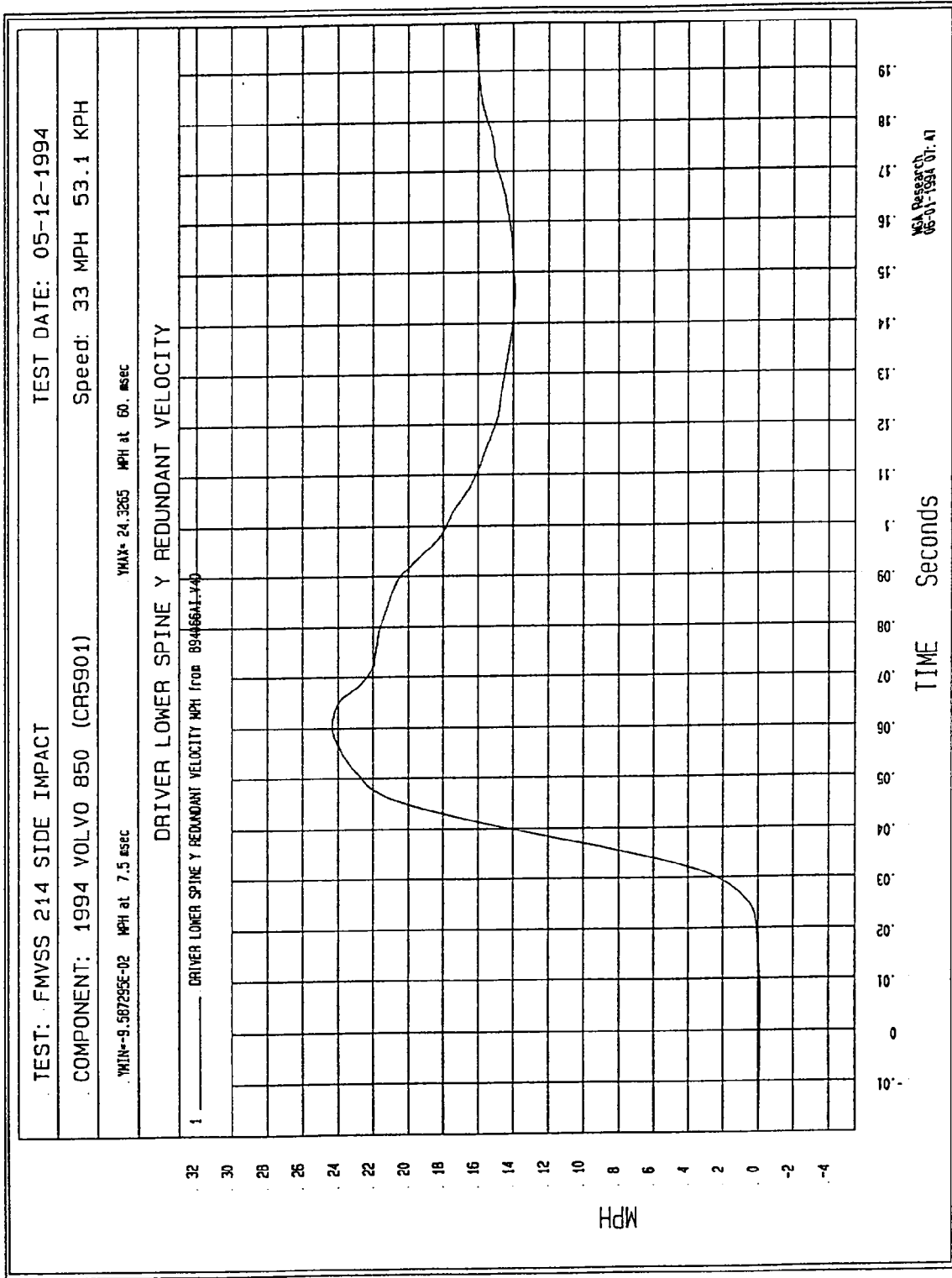


Figure B-69 - Driver Lower Spine Y Redundant Acceleration vs. Time

Filter: Class 180 (300 Hz)



B-70

Figure B-70 - Driver Lower Spine Y Redundant Velocity vs. Time

Filter: Class 180 (300 Hz)

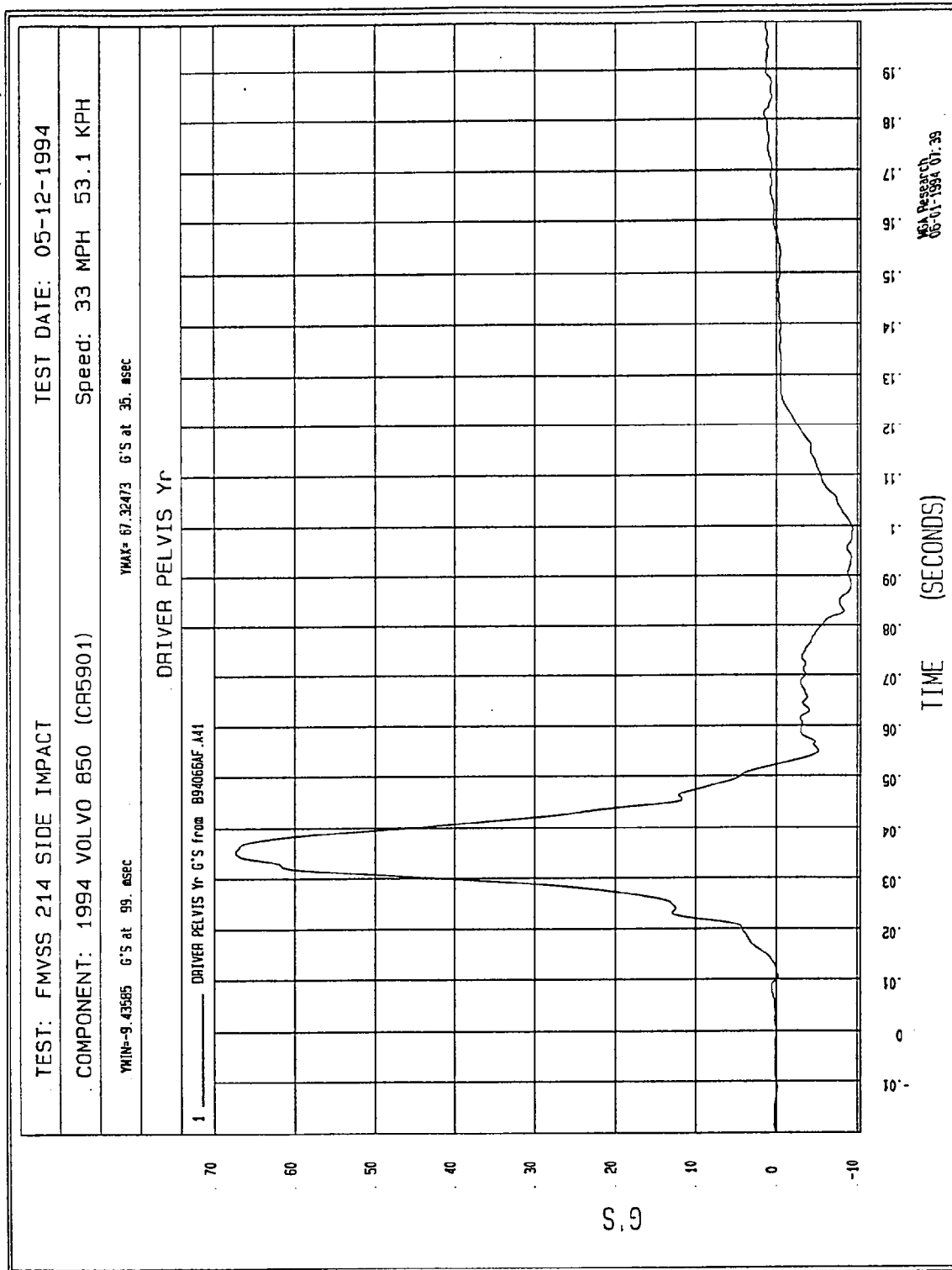


Figure B-71 - Driver Pelvis Y Redundant Acceleration vs. Time

Filter: Class 180 (300 Hz)

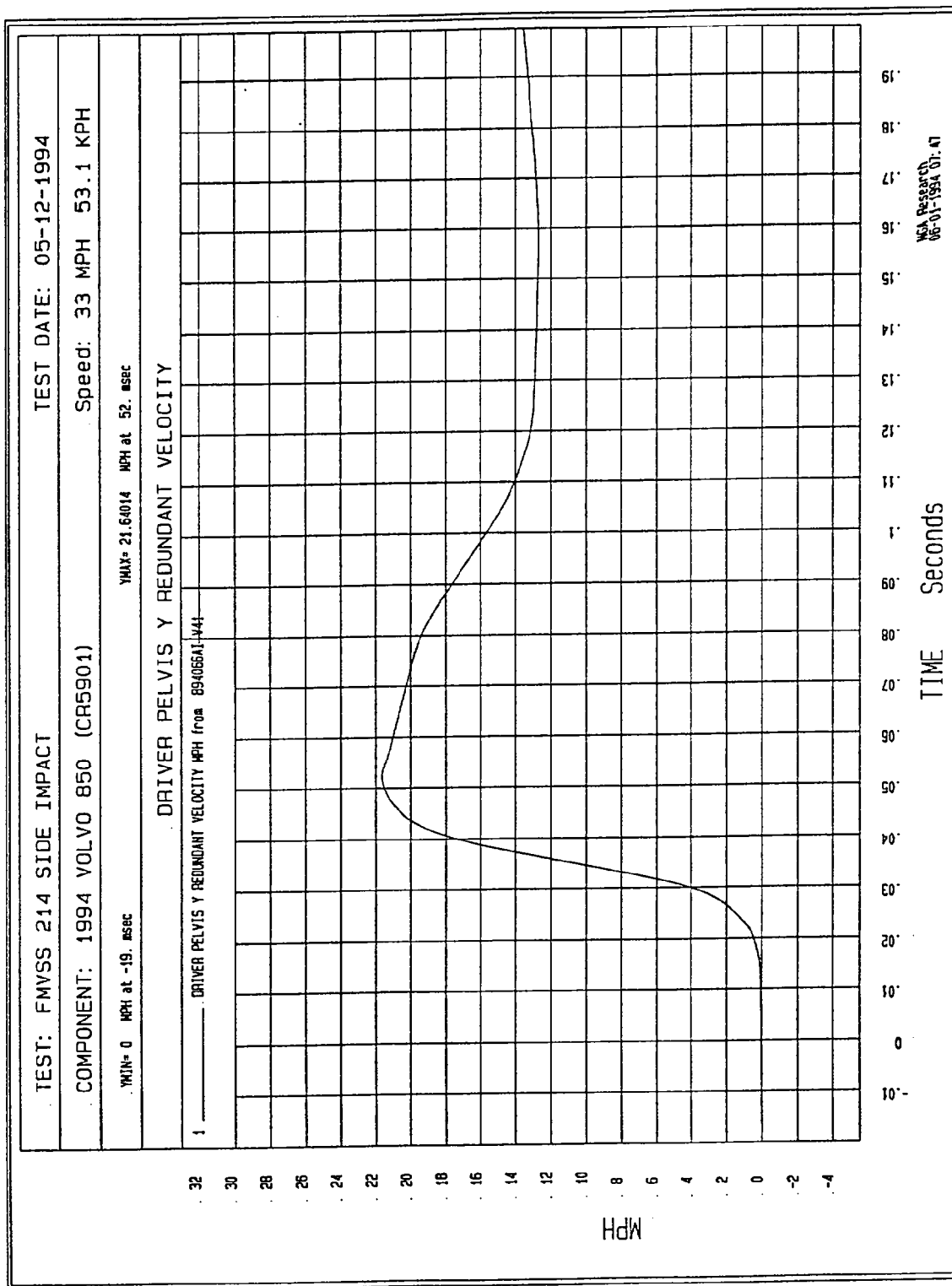


Figure B-72 - Driver Pelvis Y Redundant Velocity vs. Time

Filter: Class 180 (300 Hz)

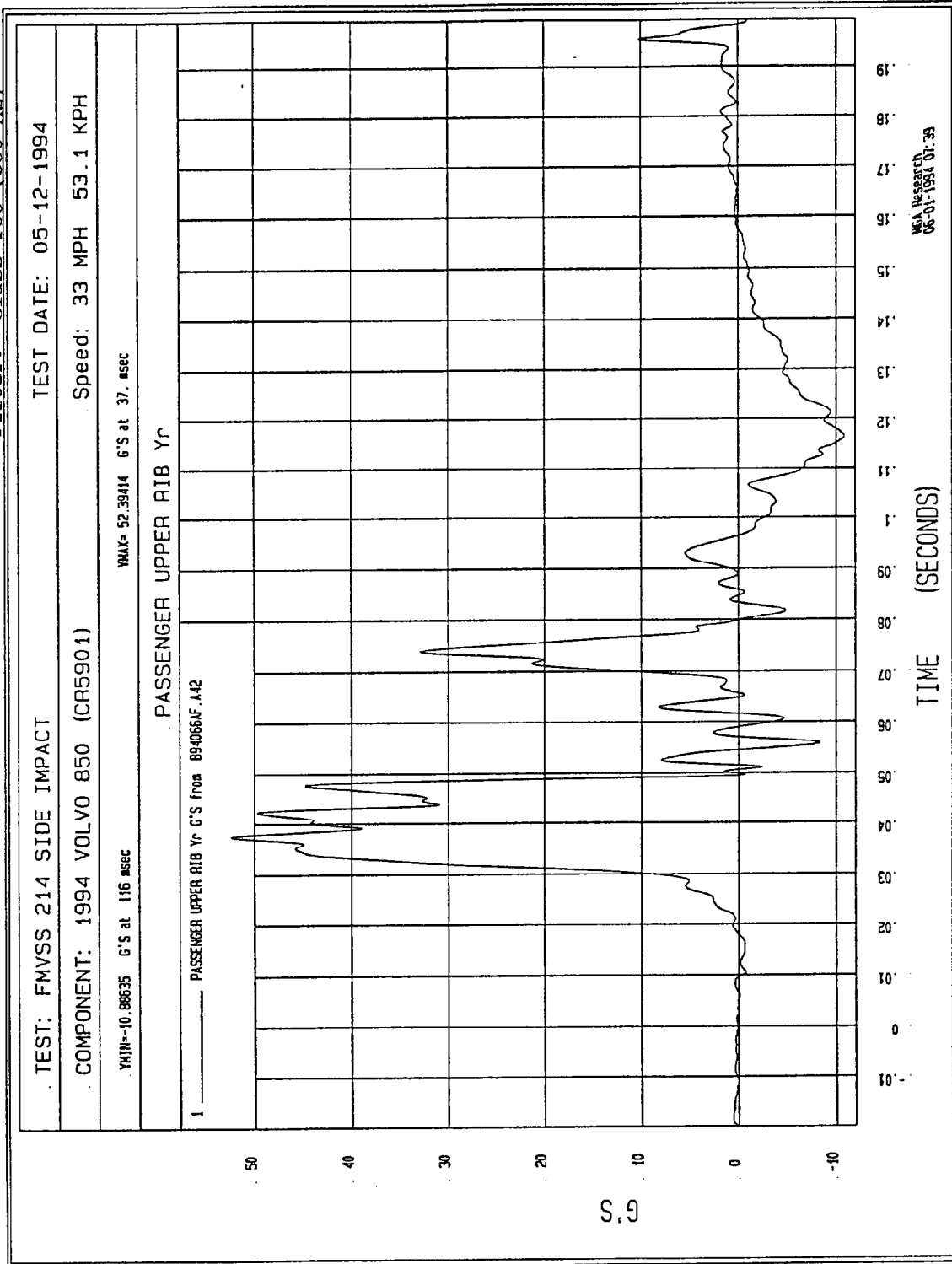


Figure B-73 - Passenger Upper Rib Y Redundant Acceleration vs. Time

Filter: Class 180 (300 Hz)

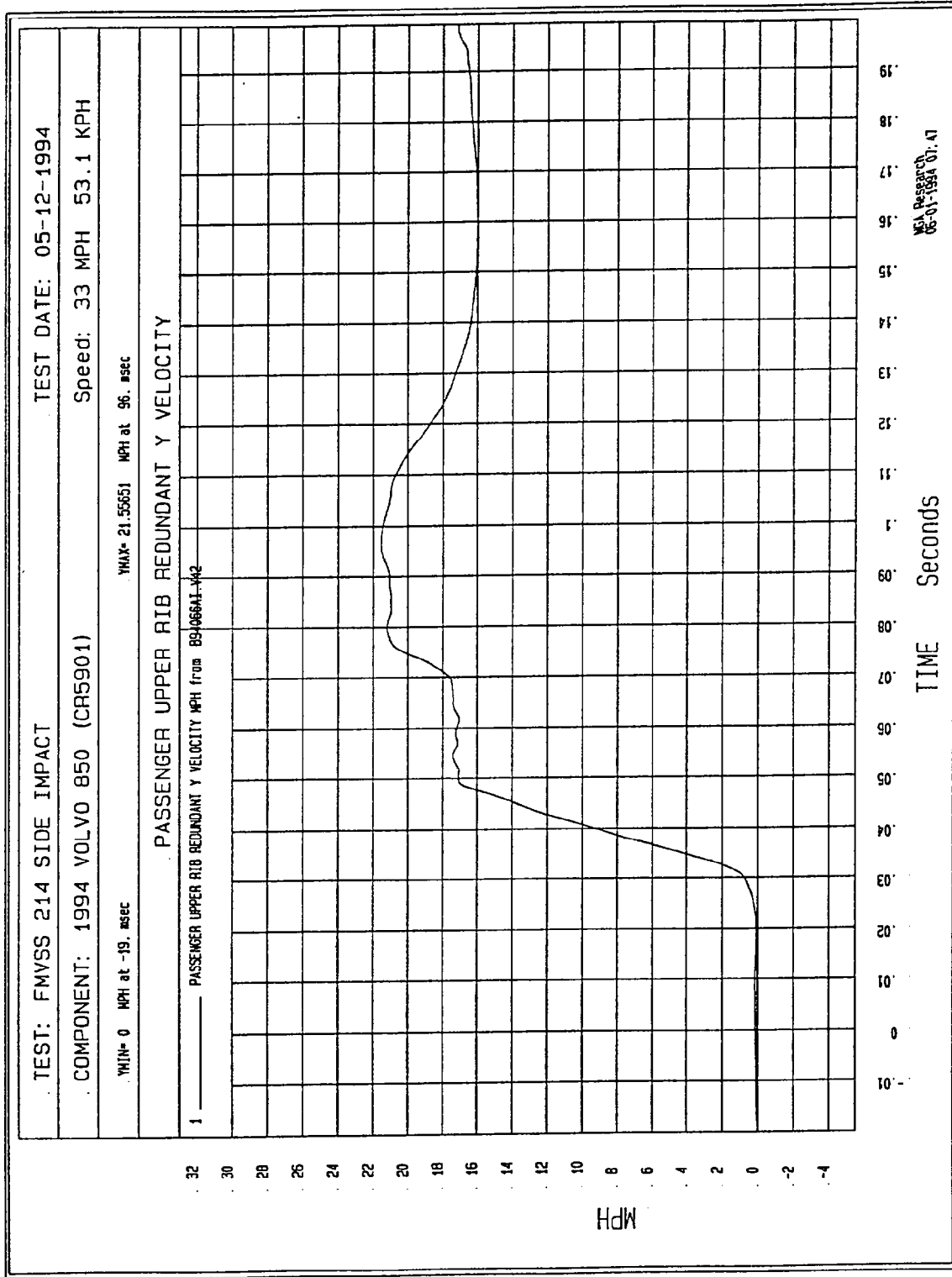


Figure B-74 - Passenger Upper Rib Y Redundant Velocity vs. Time

Filter: Class 180 (300 Hz)

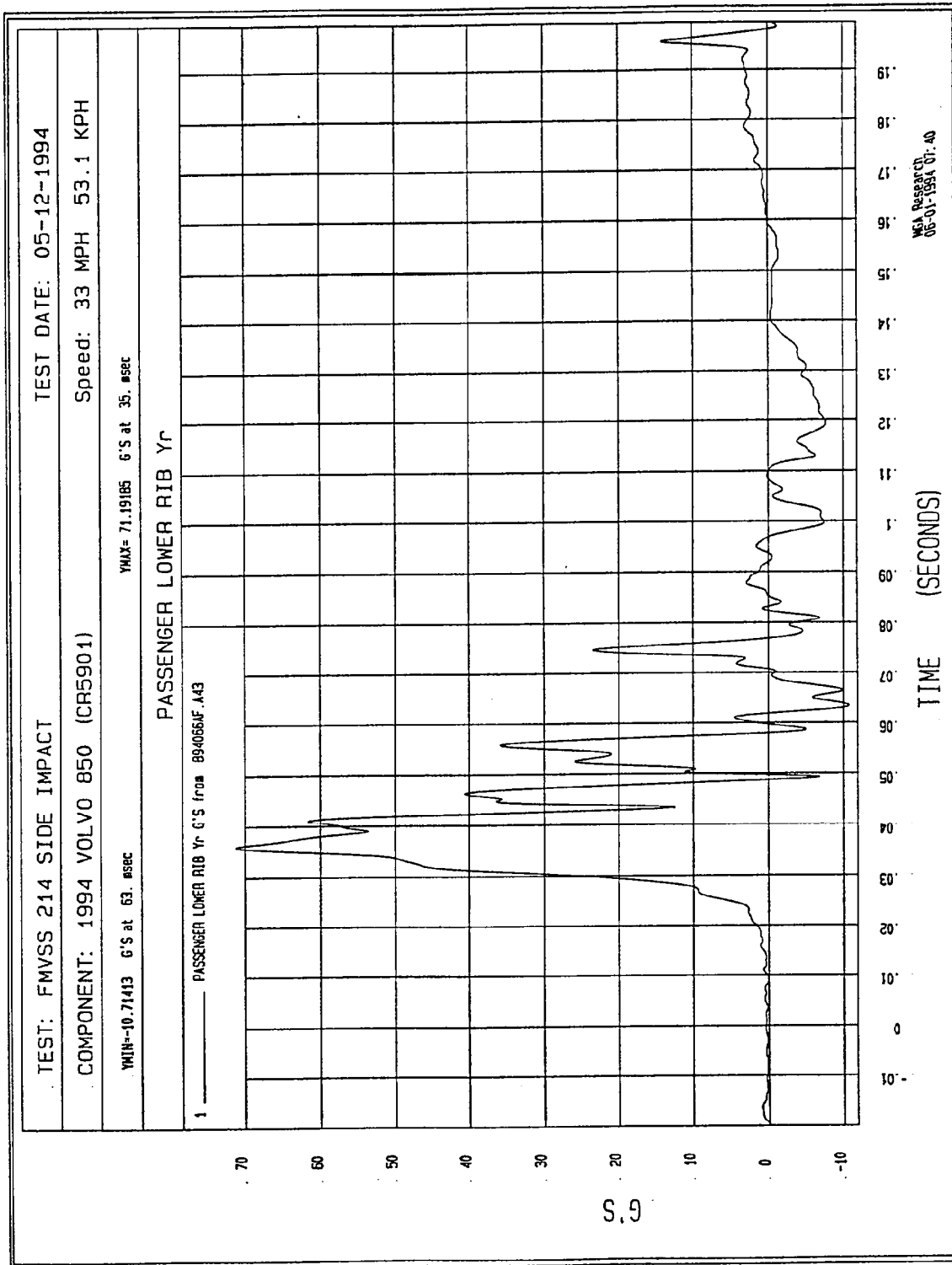


Figure B-75 - Passenger Lower Rib Y Redundant Acceleration vs. Time

Filter: Class 180 (300 Hz)

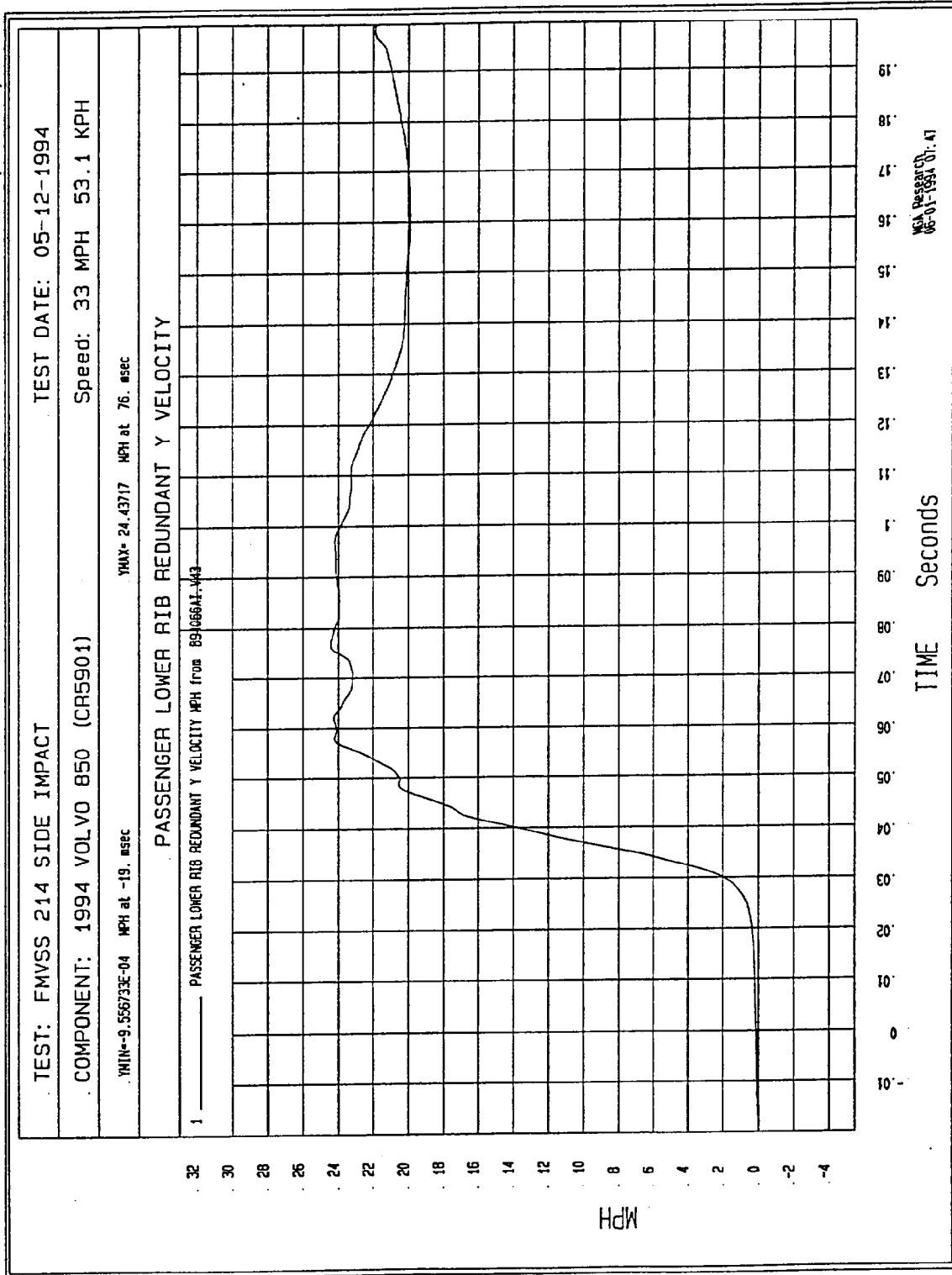


Figure B-76 - Passenger Lower Rib Y Redundant Velocity vs. Time

Filter: Class 180 (300 Hz)

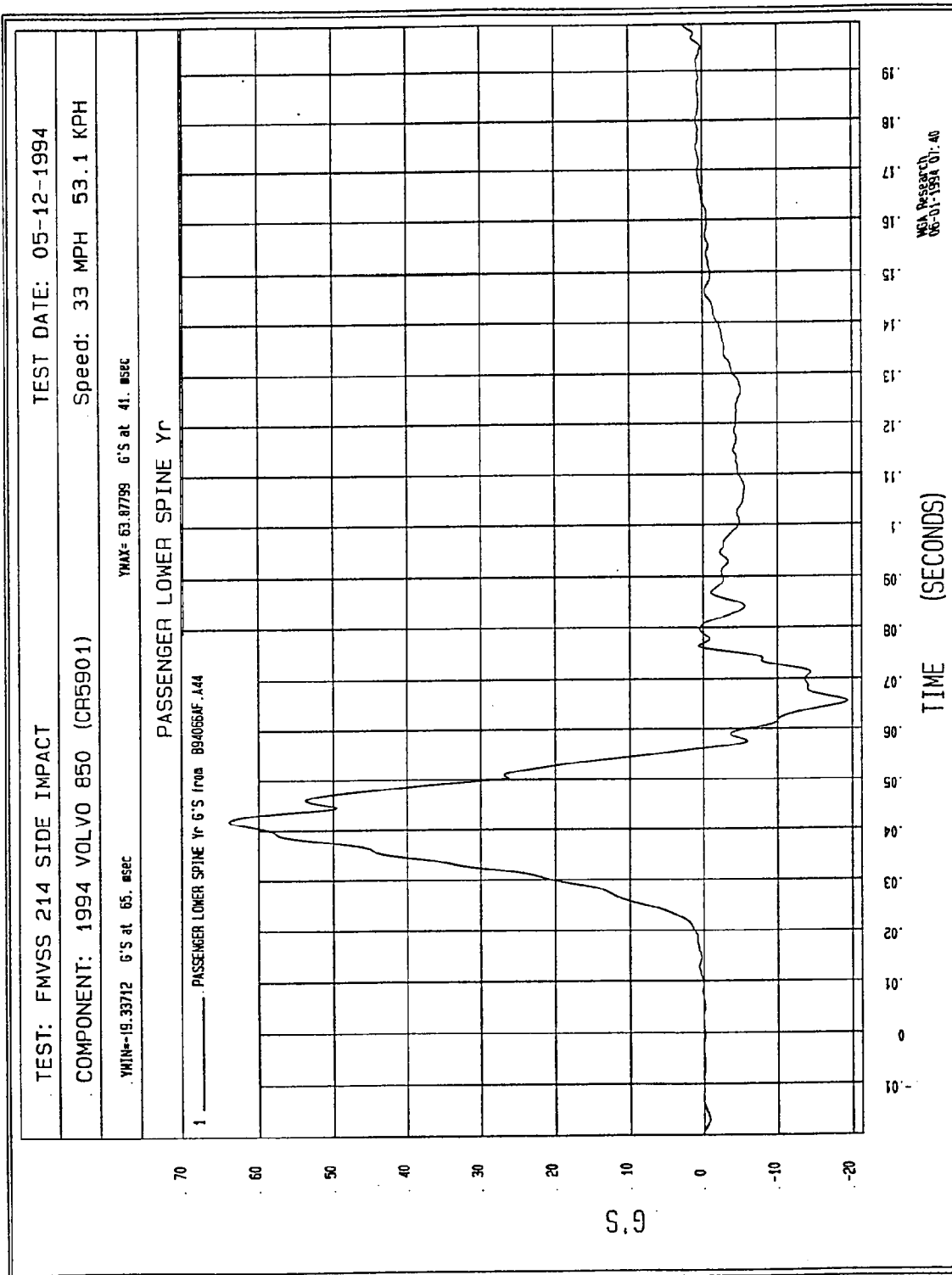


Figure B-77 - Passenger Lower Spine Y Redundant Acceleration vs. Time

Filter: Class 180 (300 Hz)

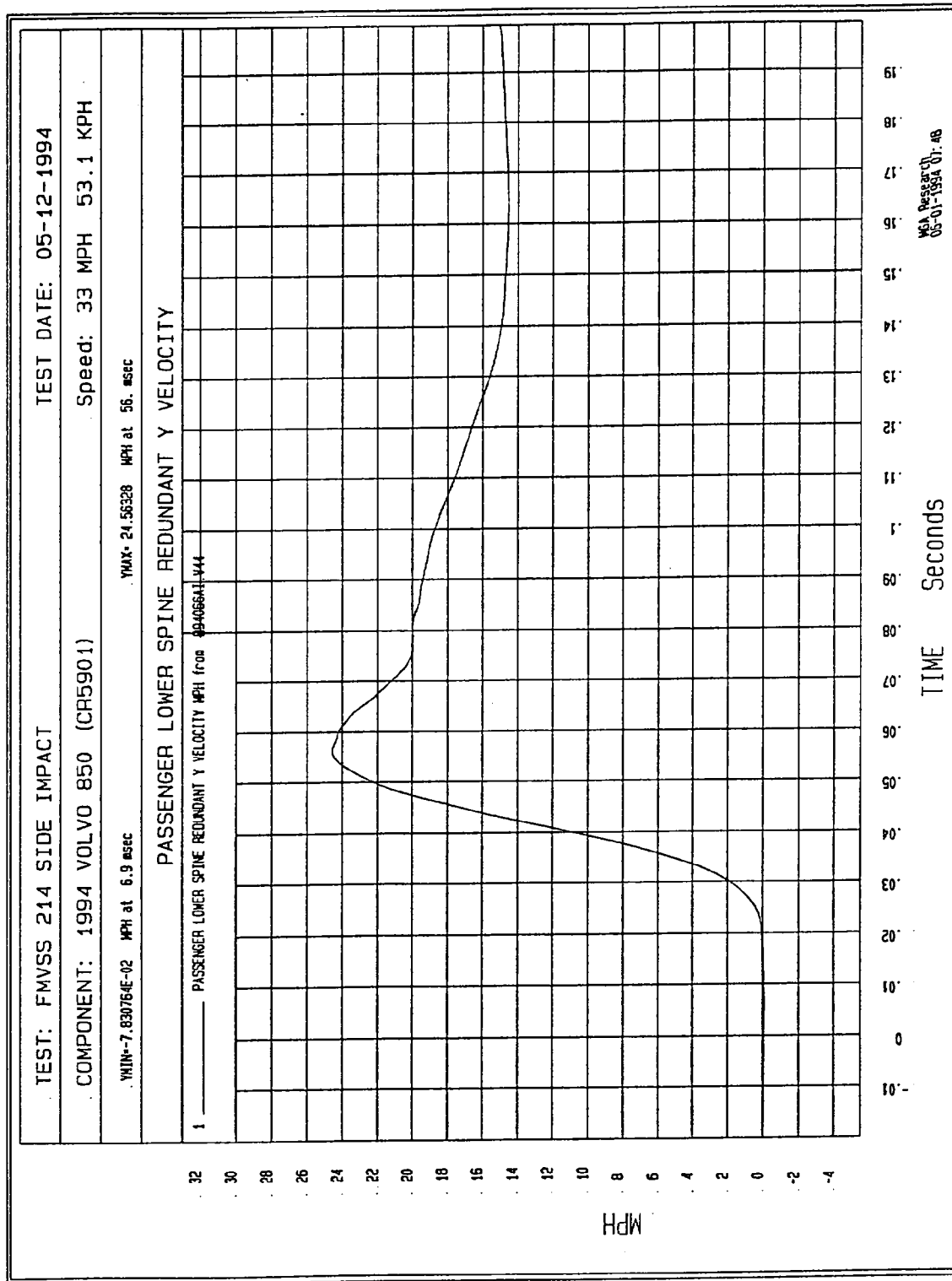


Figure B-78 - Passenger Lower Spine Y Redundant Velocity vs. Time

Filter: Class 180 (300 Hz)

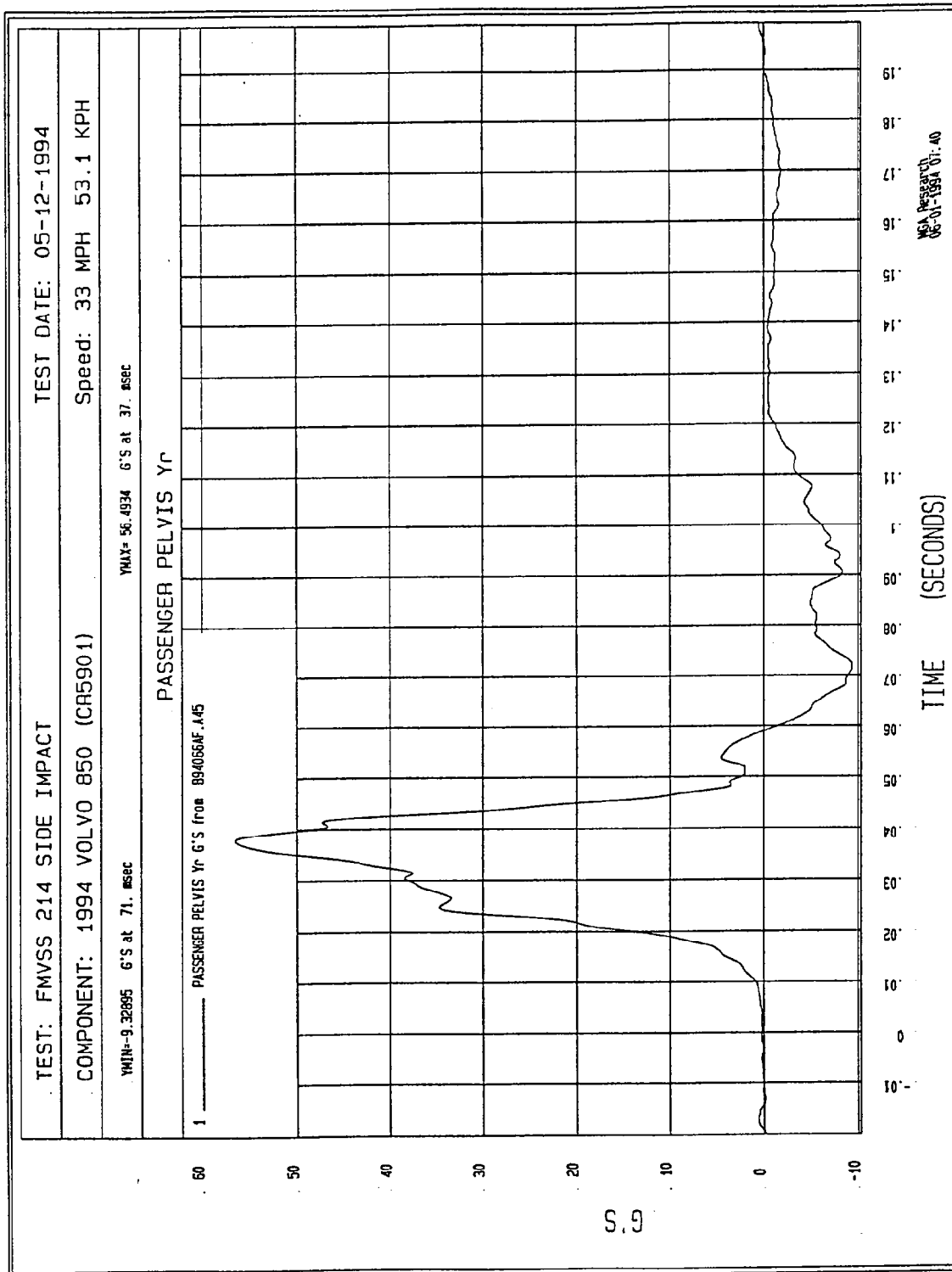


Figure B-79 - Passenger Pelvis Y Redundant Acceleration vs. Time

Filter: Class 180 (300 Hz)

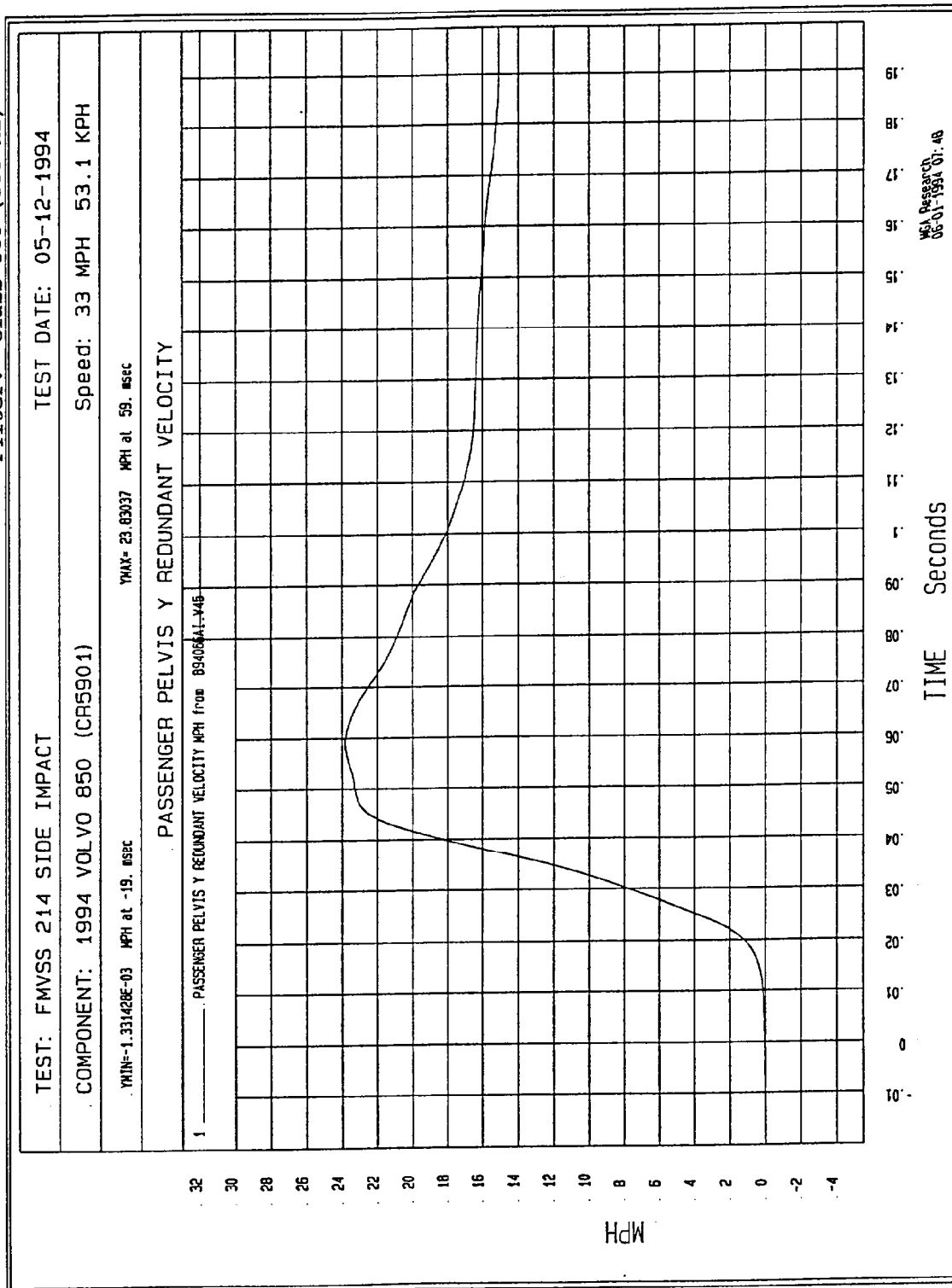


Figure B-80 - Passenger Pelvis Y Redundant Velocity vs. Time

FINITE IMPULSE RESPONSE (FIR) FILTERED DATA

Table of Data Plots

	<u>Page No.</u>
Figure B-81 - Driver Upper Rib Y Acceleration vs. Time	B-81
Figure B-82 - Driver Upper Rib Y Redundant Acceleration vs. Time	B-82
Figure B-83 - Driver Lower Rib Y Acceleration vs. Time	B-83
Figure B-84 - Driver Lower Rib Y Redundant Acceleration vs. Time	B-84
Figure B-85 - Driver Lower Spine Y Acceleration vs. Time	B-85
Figure B-86 - Driver Lower Spine Y Redundant Acceleration vs. Time	B-86
Figure B-87 - Driver Pelvis Y Acceleration vs. Time	B-87
Figure B-88 - Driver Pelvis Y Redundant Acceleration vs. Time	B-88
Figure B-89 - Passenger Upper Rib Y Acceleration vs. Time	B-89
Figure B-90 - Passenger Upper Rib Y Redundant Acceleration vs. Time	B-90
Figure B-91 - Passenger Lower Rib Y Acceleration vs. Time	B-91
Figure B-92 - Passenger Lower Rib Y Redundant Acceleration vs. Time	B-92
Figure B-93 - Passenger Lower Spine Y Acceleration vs. Time	B-93
Figure B-94 - Passenger Lower Spine Y Redundant Acceleration vs. Time	B-94
Figure B-95 - Passenger Pelvis Y Acceleration vs. Time	B-95
Figure B-96 - Passenger Pelvis Y Redundant Acceleration vs. Time	B-96

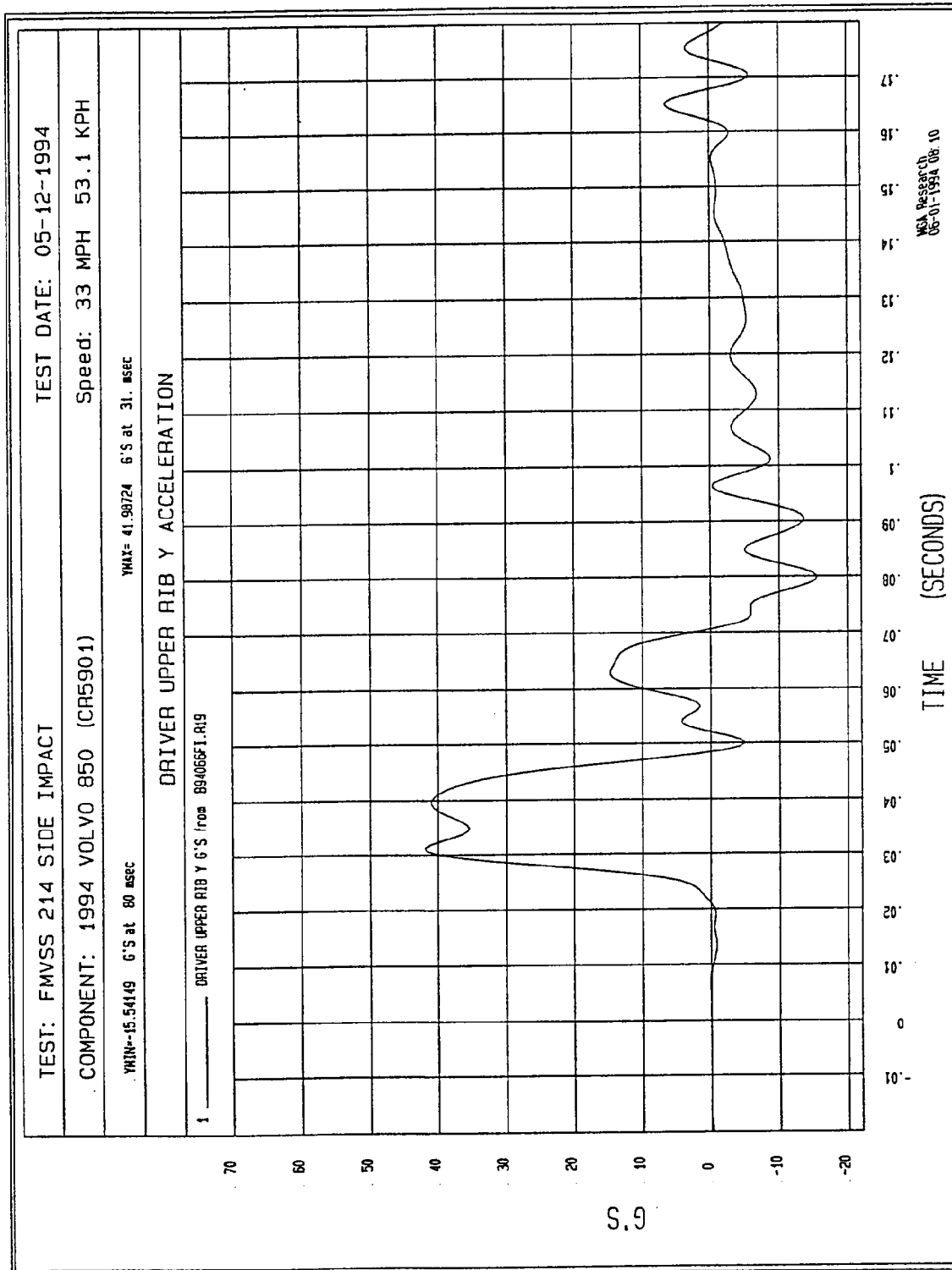


Figure B-81 - Driver Upper Rib Y Acceleration vs. Time

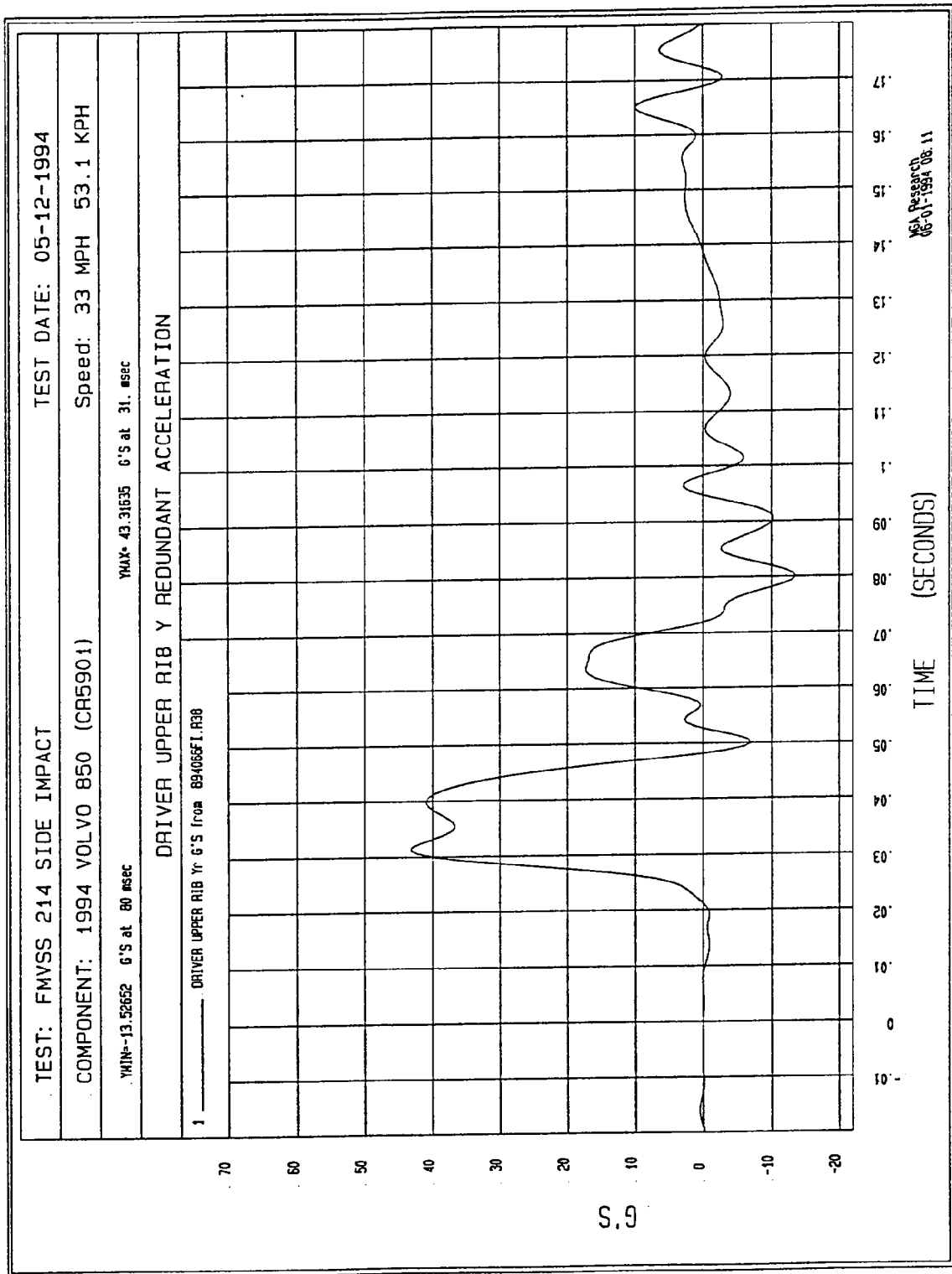


Figure B-82 - Driver Upper Rib Y Redundant Acceleration vs. Time

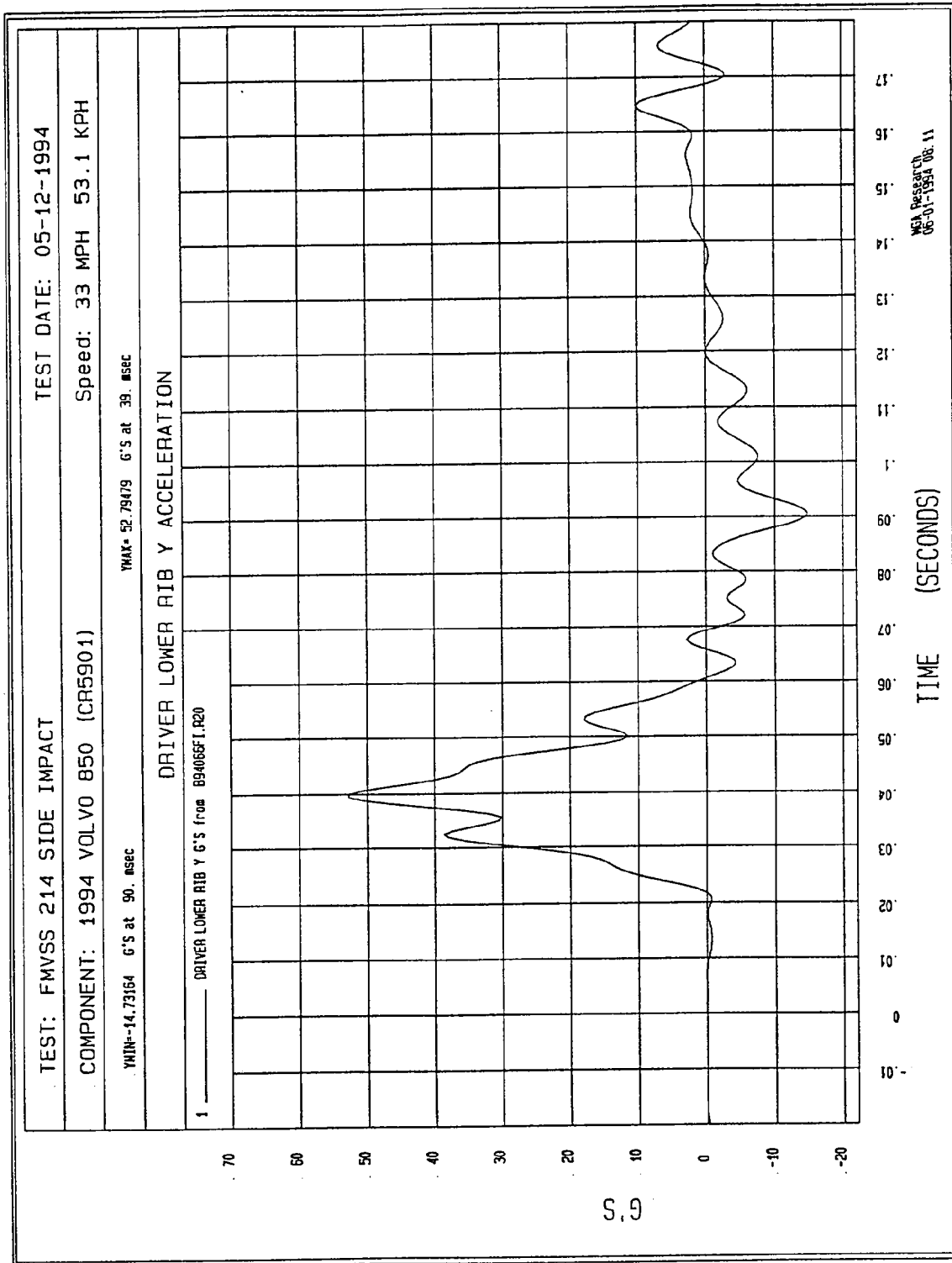


Figure B-83 - Driver Lower Rib Y Acceleration vs. Time

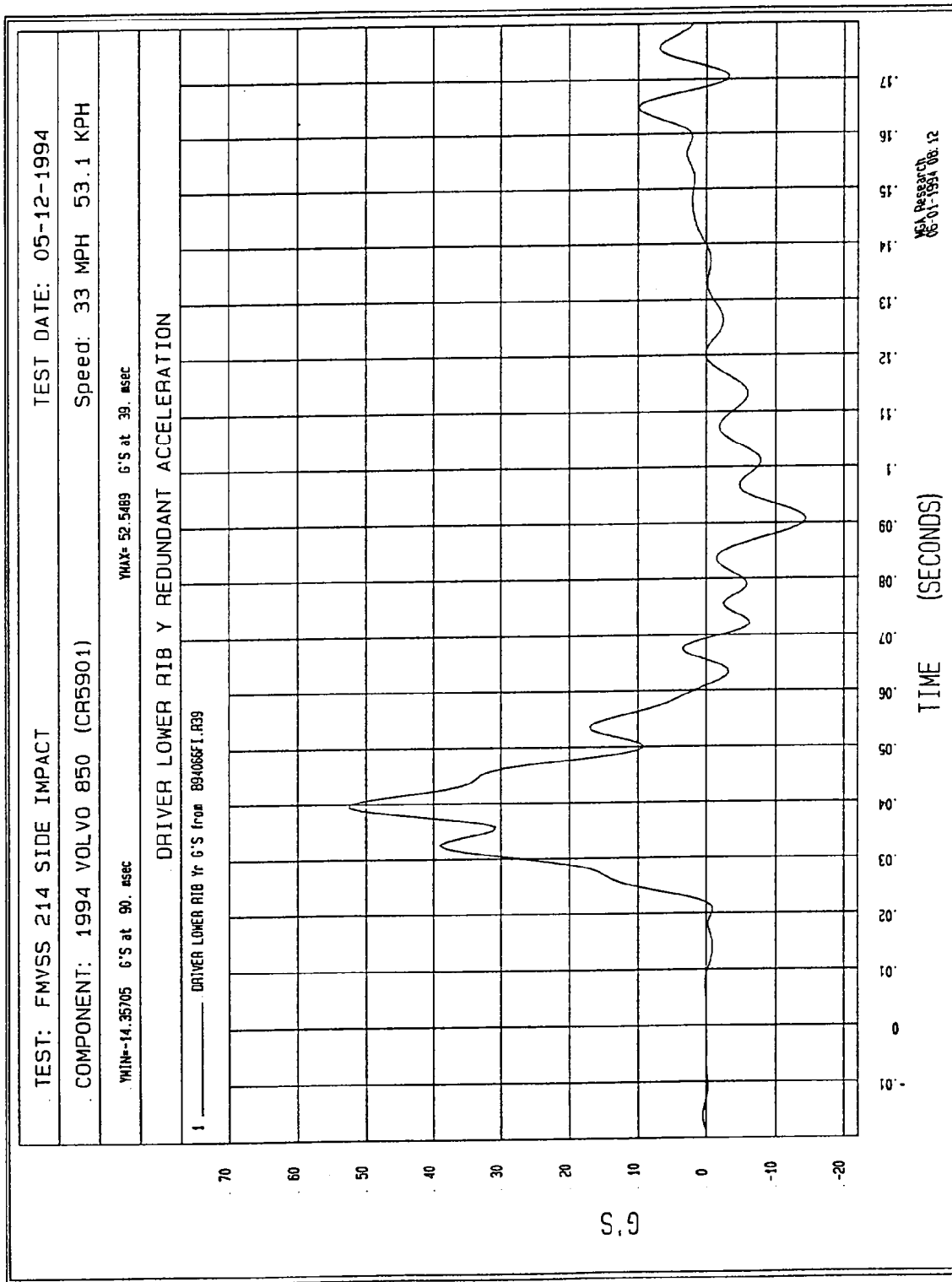


Figure B-84 - Driver Lower Rib Y Redundant Acceleration vs. Time

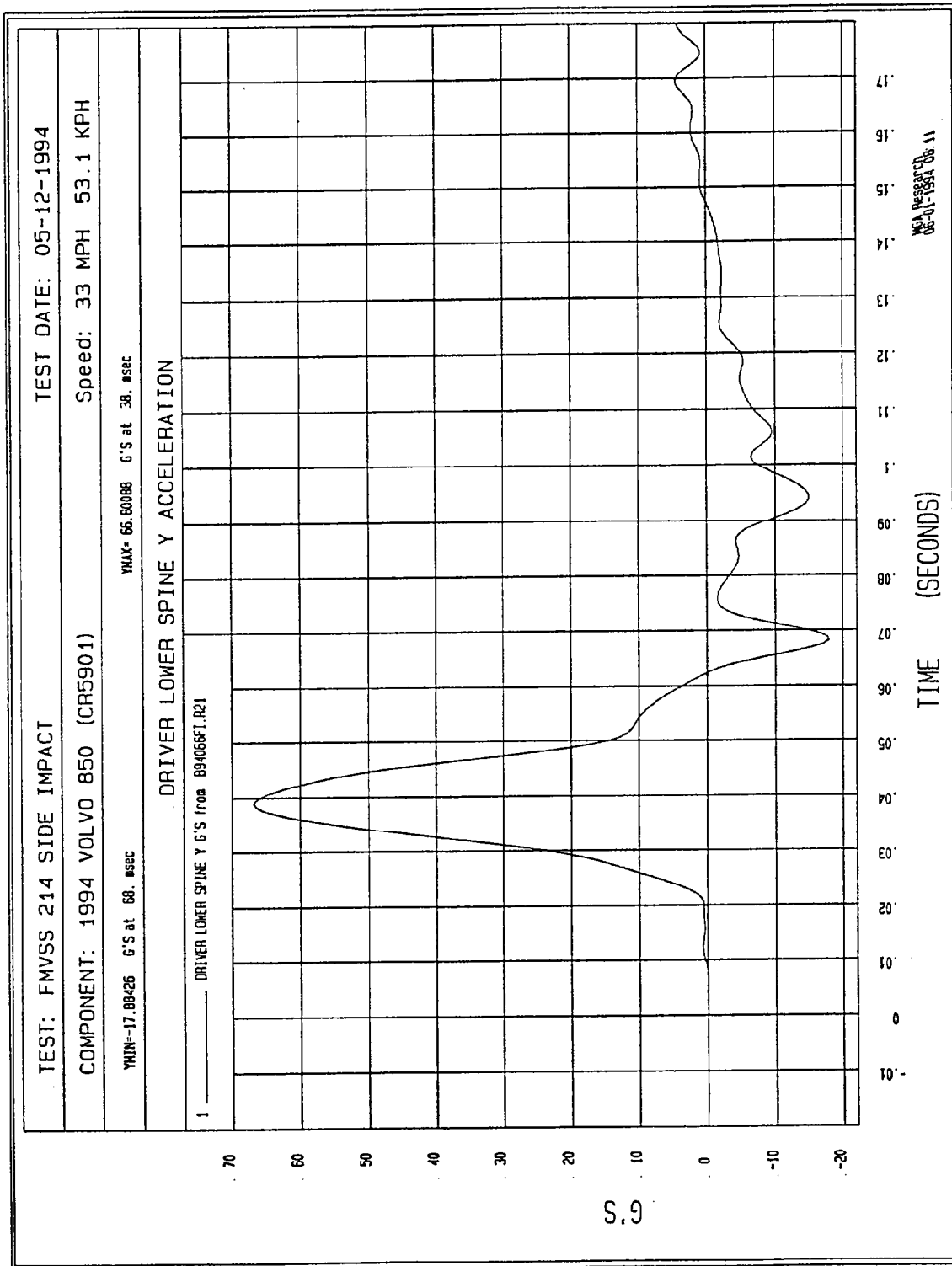


Figure B-85 - Driver Lower Spine Y Acceleration vs. Time

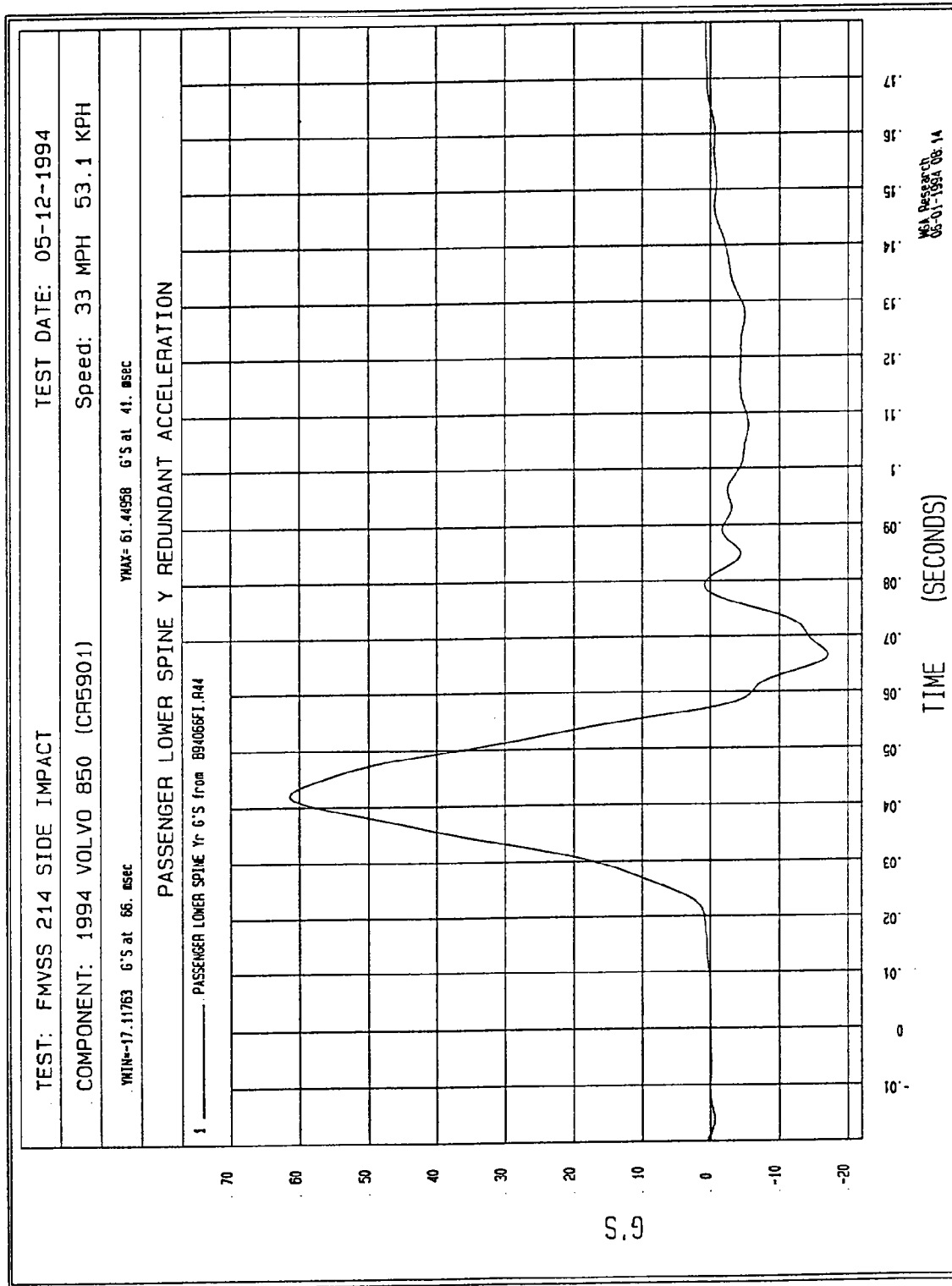


Figure B-86 - Driver Lower Spine Y Redundant Acceleration vs. Time

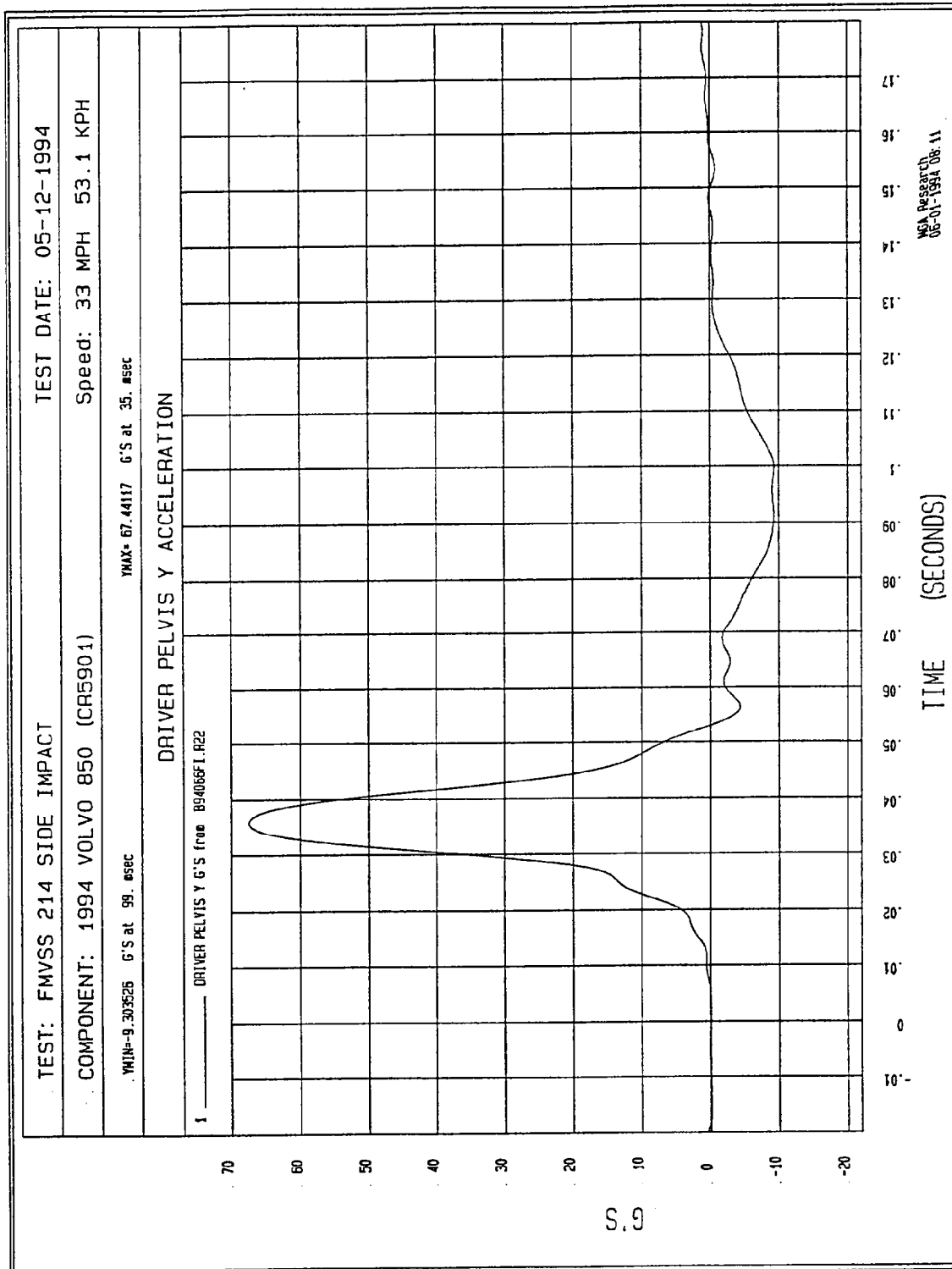


Figure B-87 - Driver Pelvis Y Acceleration vs. Time

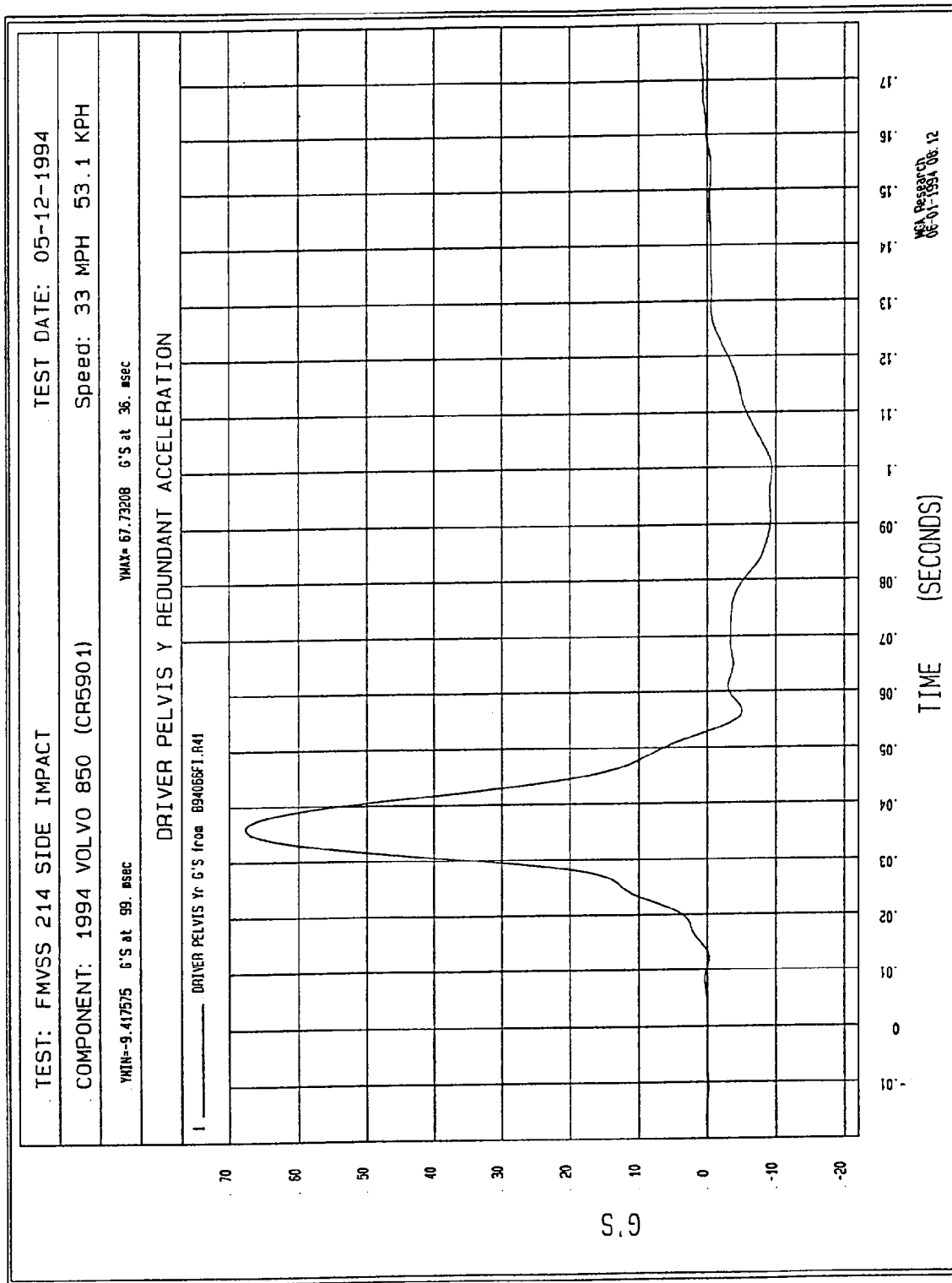
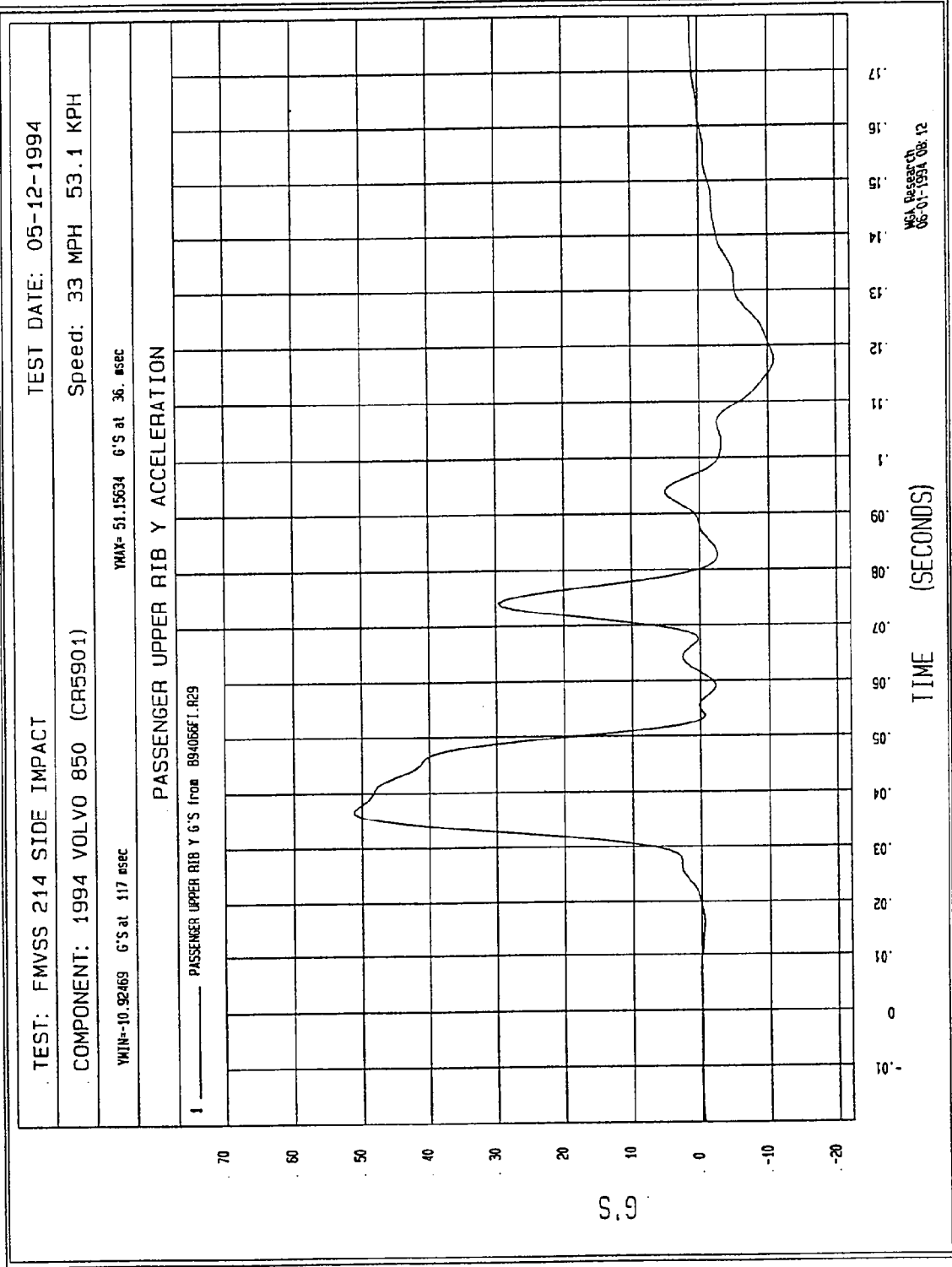


Figure B-88 - Driver Pelvis Y Redundant Acceleration vs. Time



B-89

Figure B-89 - Passenger Upper Rib Y Acceleration vs. Time

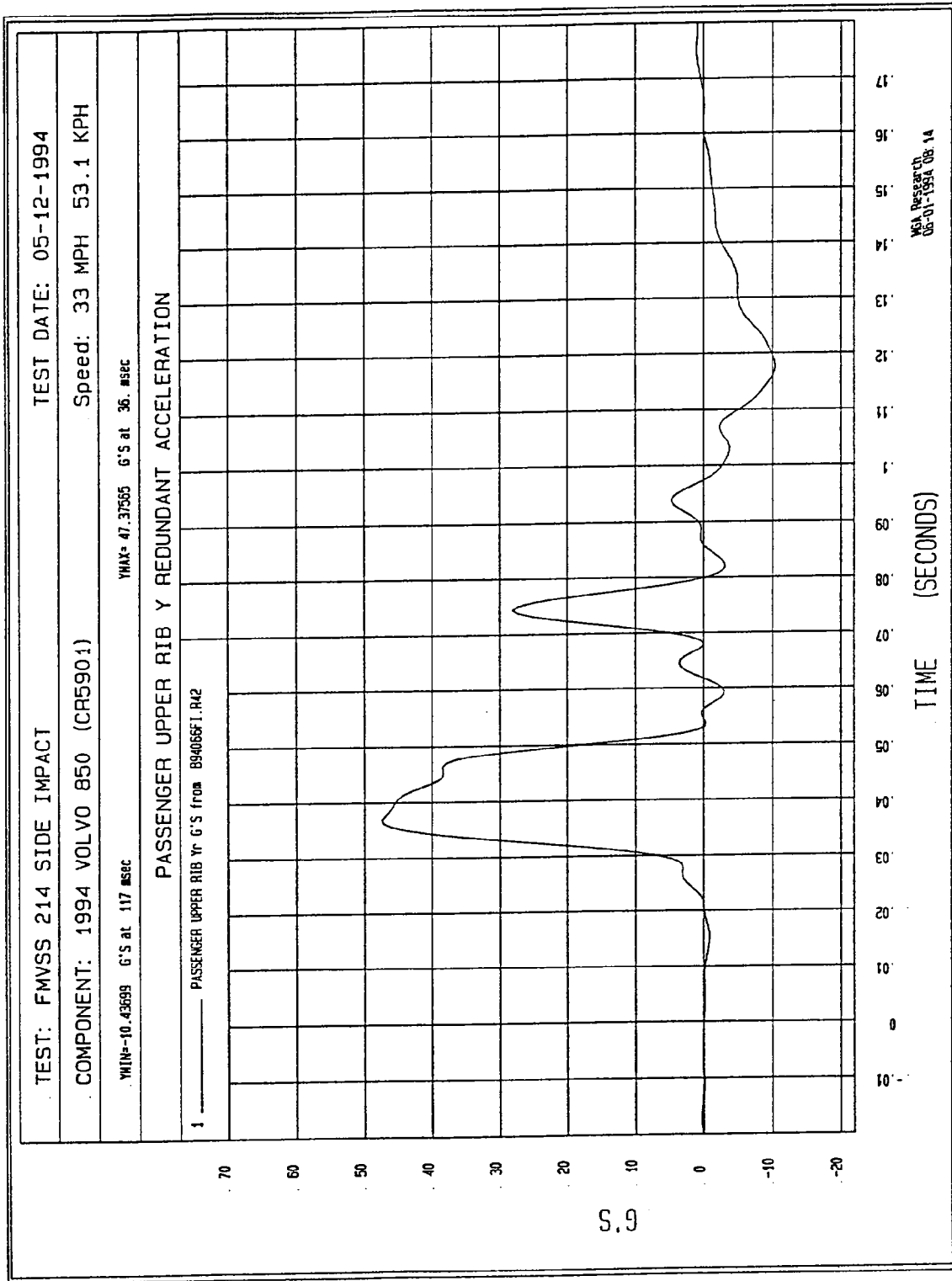


Figure B-90 - Passenger Upper Rib Y Redundant Acceleration vs. Time

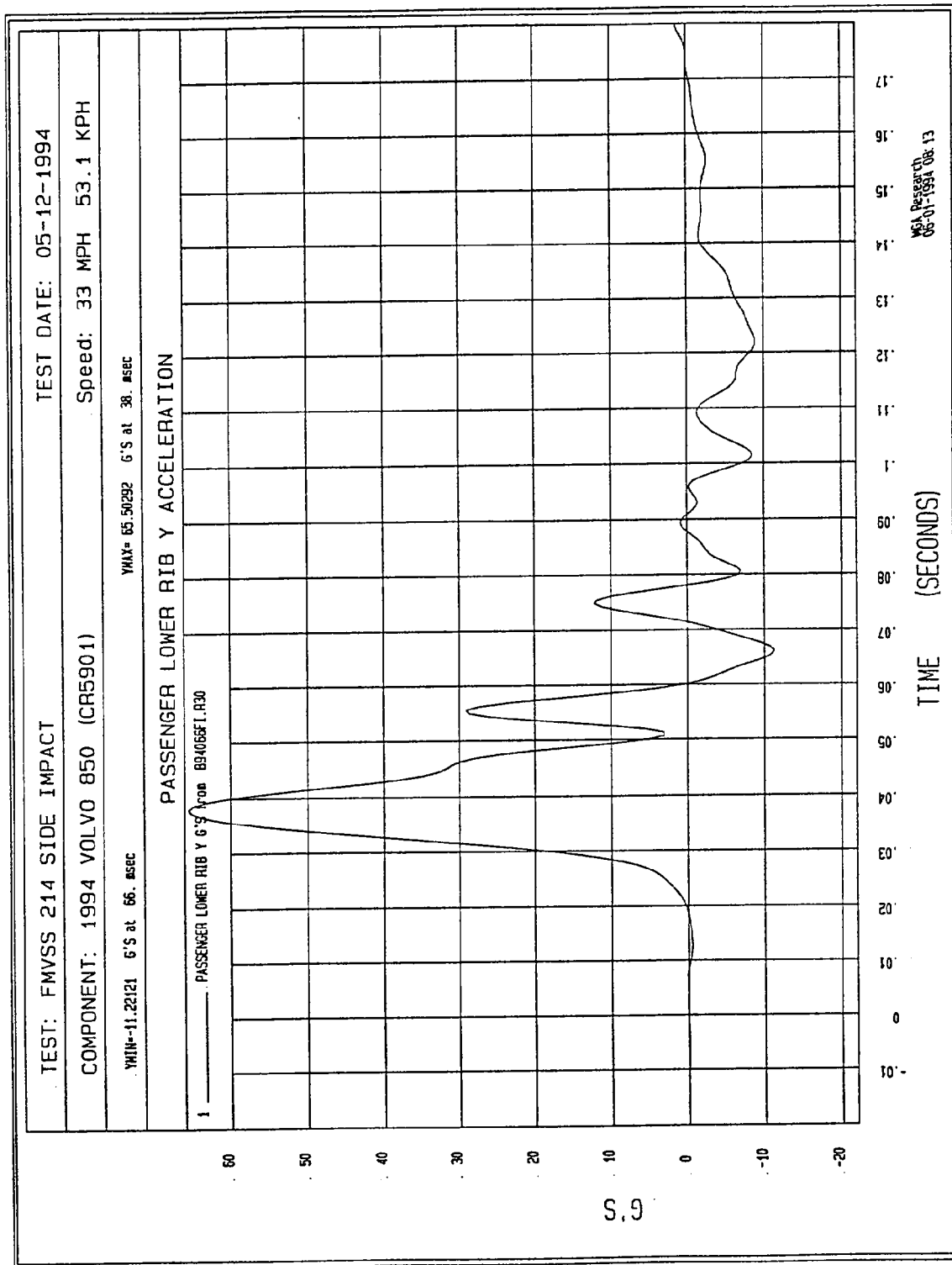


Figure B-91 - Passenger Lower Rib Y Acceleration vs. Time

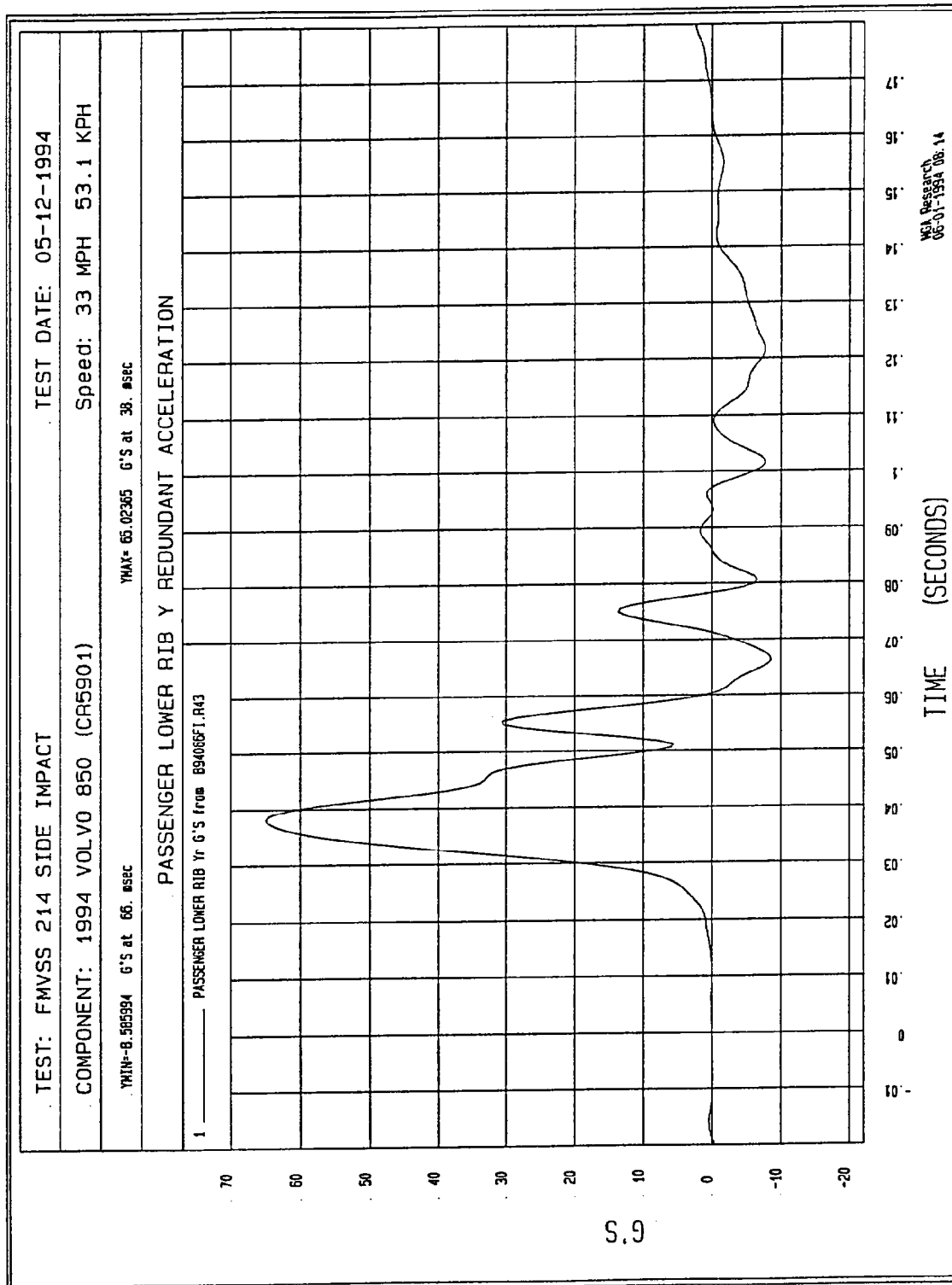


Figure B-92 - Passenger Lower Rib Y Redundant Acceleration vs. Time

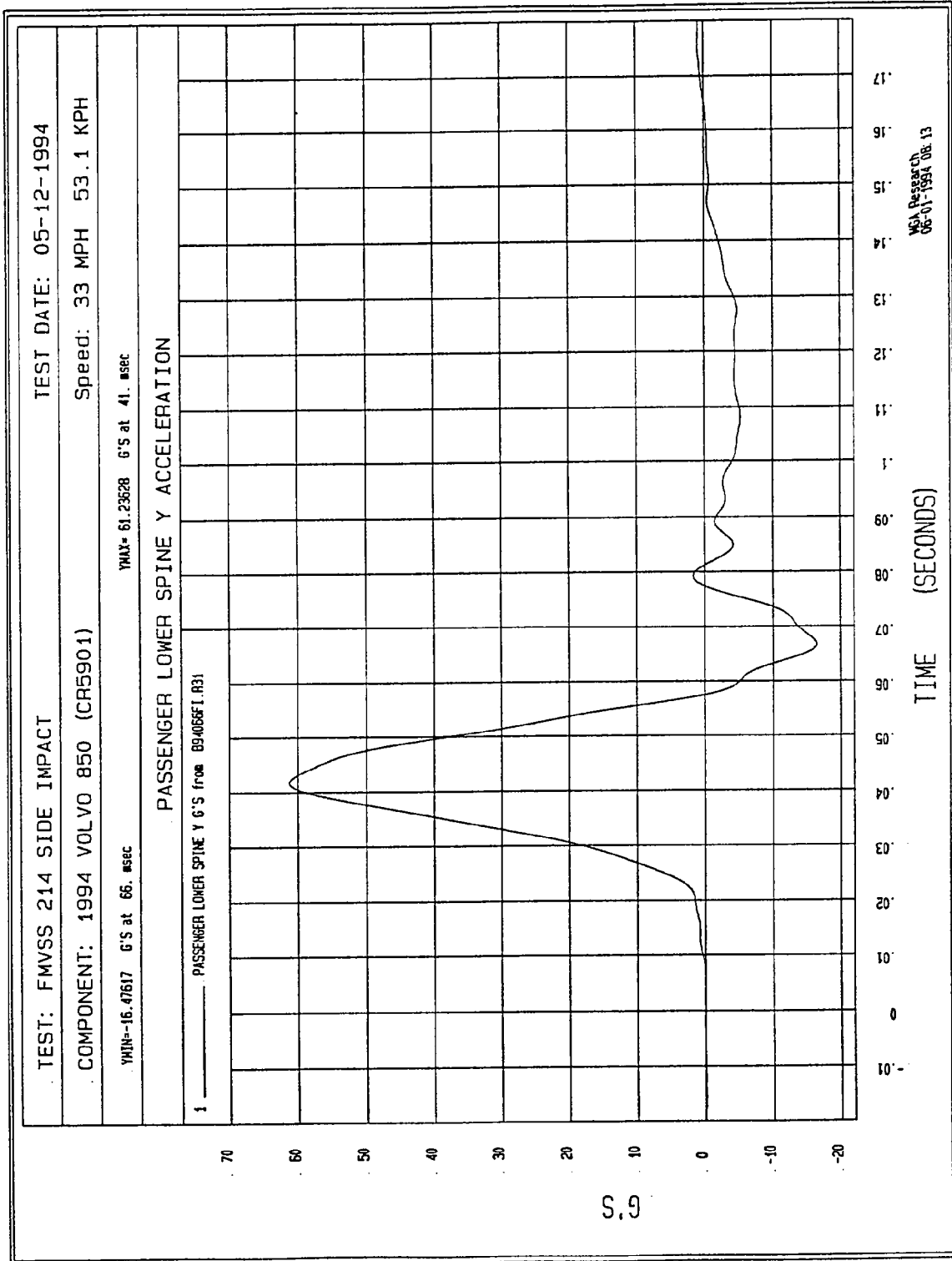


Figure B-93 - Passenger Lower Spine Y Acceleration vs. Time

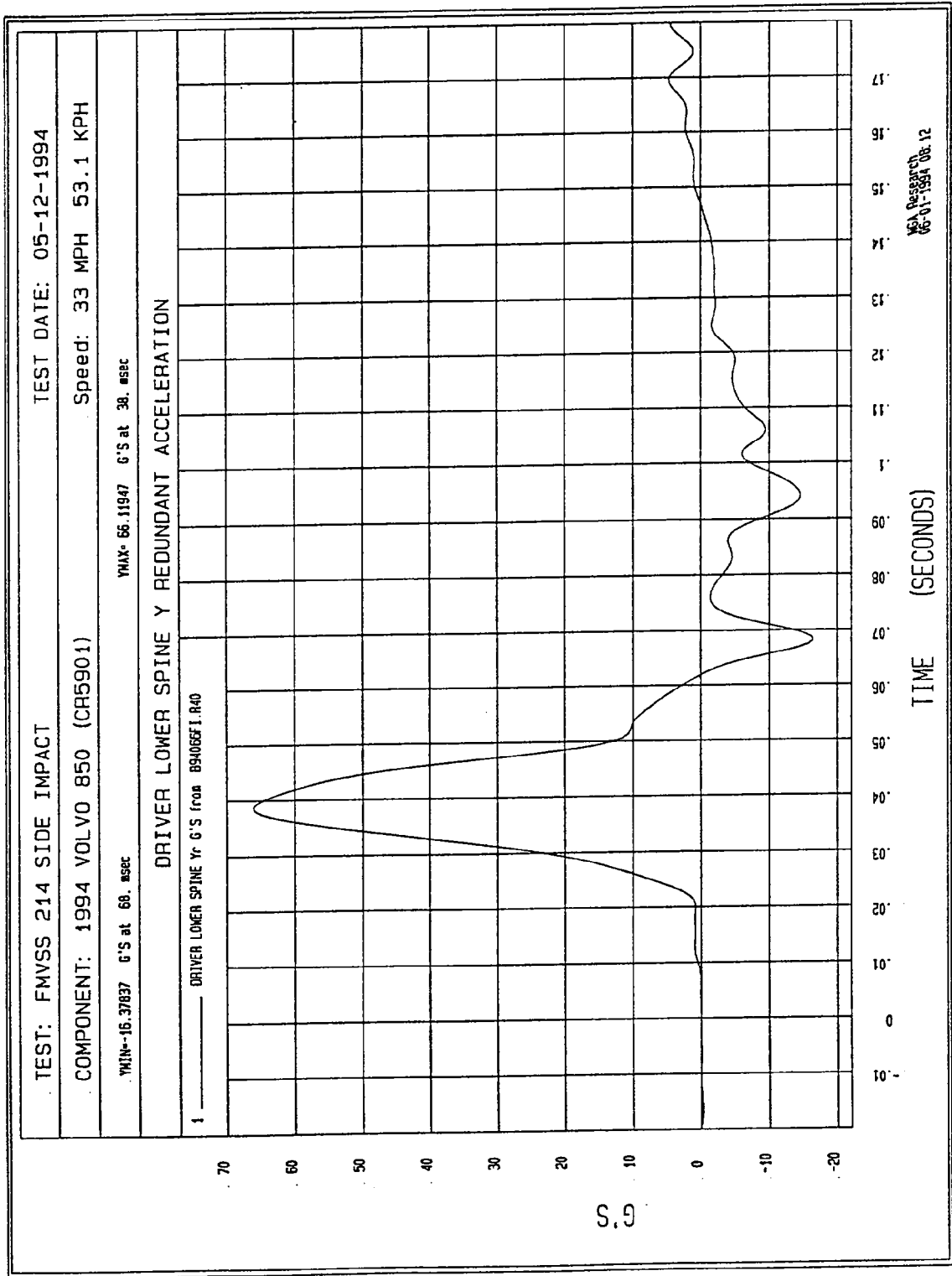


Figure B-94 - Passenger Lower Spine Y Redundant Acceleration vs. Time

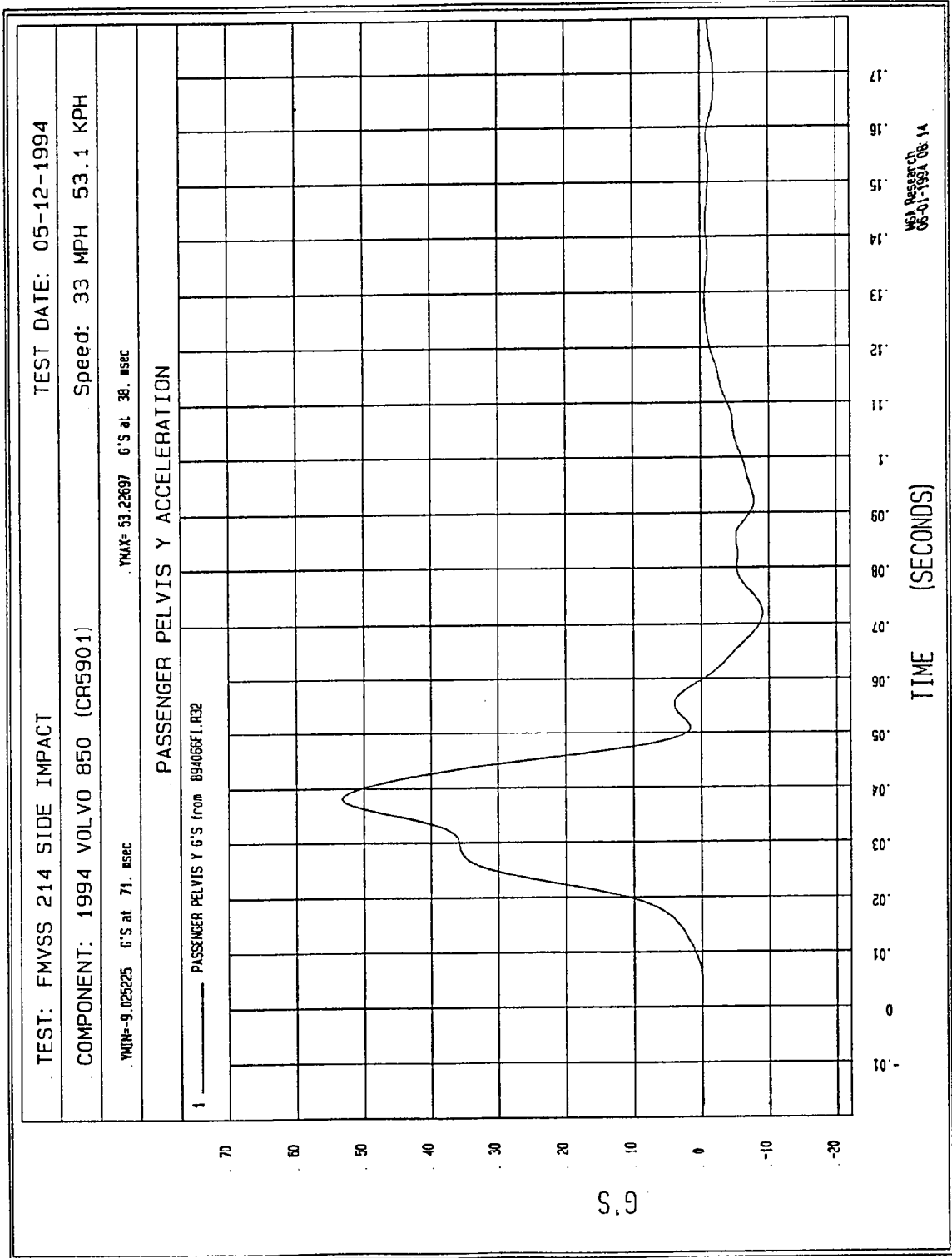


Figure B-95 - Passenger Pelvis Y Acceleration vs. Time

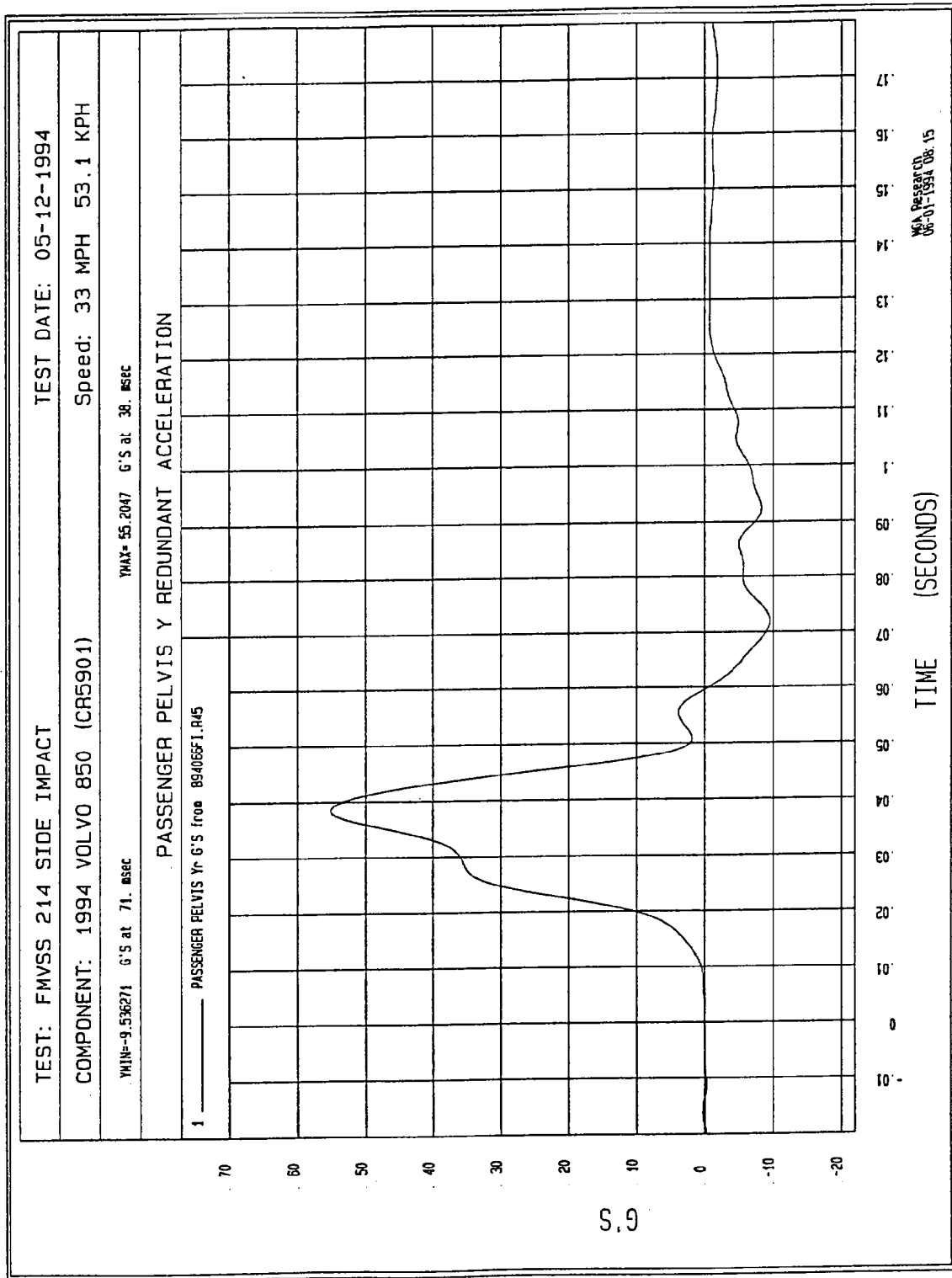


Figure B-96 - Passenger Pelvis Y Redundant Acceleration vs. Time

APPENDIX C
SID CONFIGURATION AND PERFORMANCE VERIFICATION

REPORT NO. MGA-94-DC002

DUMMY PERFORMANCE CALIBRATIONS

FMVSS 214 - SIDE IMPACT TEST

Volvo
1994 Volvo 850
NHTSA NO. CR5901

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: May 12, 1994

Report Date: June 21, 1994

FINAL REPORT

Prepared For:

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
MAIL CODE: NEF-30
400 SEVENTH STREET, S.W., ROOM 6115
Washington, D.C. 20590

TABLE OF CONTENTS

		<u>Page No.</u>
DUMMY S/N: 270	PRE-TEST CERTIFICATION DATA	1-1
DUMMY S/N: 269	PRE-TEST CERTIFICATION DATA	2-1
DUMMY S/N: 270	POST-TEST CERTIFICATION DATA	3-1
DUMMY S/N: 269	POST-TEST CERTIFICATION DATA	4-1
DUMMY S/N: 270	POST-TEST INSPECTION CHECKLIST	5-1
DUMMY S/N: 269	POST-TEST INSPECTION CHECKLIST	6-1
	VEHICLE AND DUMMY TEMPERATURE	7-1

PRE-TEST CERTIFICATION DATA

Driver Dummy Serial Number: 270

Calibration Test Results Summary

Dummy Serial Number: 270

Pre-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Head Drop Test:	The head passed all drop test requirements.
Neck Flexion Test:	The neck passed all flexion test requirements.
Neck Extension Test:	The neck passed all extension test requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Knee Impact Tests:	Both knees passed all impact test requirements.

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 270

DATE OF VERIFICATION: May 11, 1994

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.5
RH - Rib Height	19.75 - 20.5"	20.5
HP - Hip Pivot Height	3.9" ref.	3.9
RD - Rib From Back Line	9.0" to 9.5"	9.2
KV - Knee Pivot From Back Line	20.1" - 20.7"	20.7
SW - Knee Pivot to Floor	19.3" - 19.9"	19.5
HW - Hip Width	14.0" - 15.4"	14.8

MEASUREMENTS BY: *J. D. Rollins*

APPROVED BY: *J. D. Rollins*

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: April 7, 1994

DUMMY NUMBER: 270

TEST NUMBER: D94472

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	28%
PROBE SPEED	13.8 - 14.2 fps	13.9
UPPER RIB	37 - 46 g's	45
LOWER RIB	37 - 46 g's	42
LOWER SPINE	15 - 22 g's	20

TEST MEETS SPECIFICATIONS

TECHNICIAN *He Chiu*

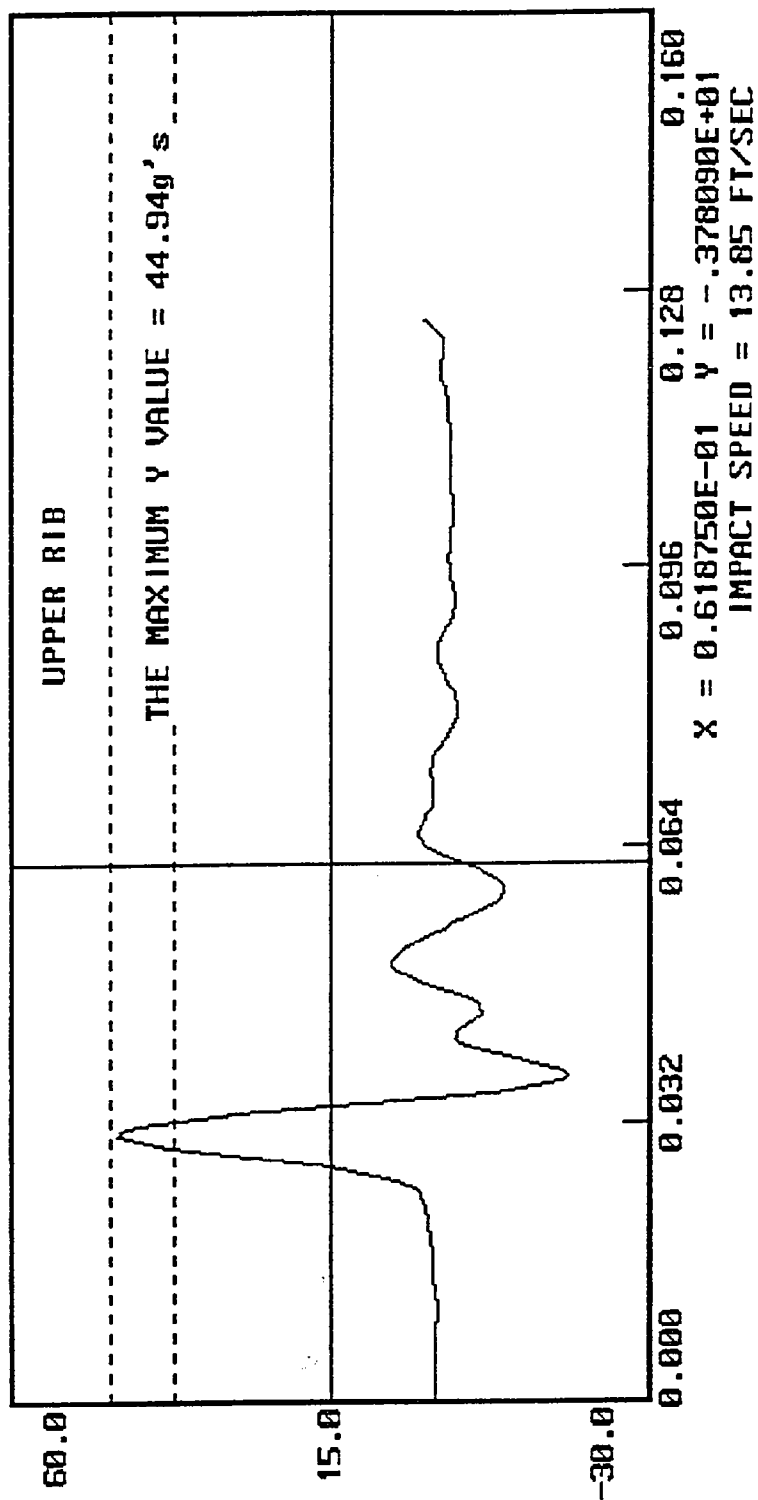
APPROVED BY *J. Robbins*

04-07-1994 08:43

DUMMY CALIBRATION - THORAX IMPACT

DUMMY # 270

ACCELERATION (G'S) VS. TIME ((SECONDS))

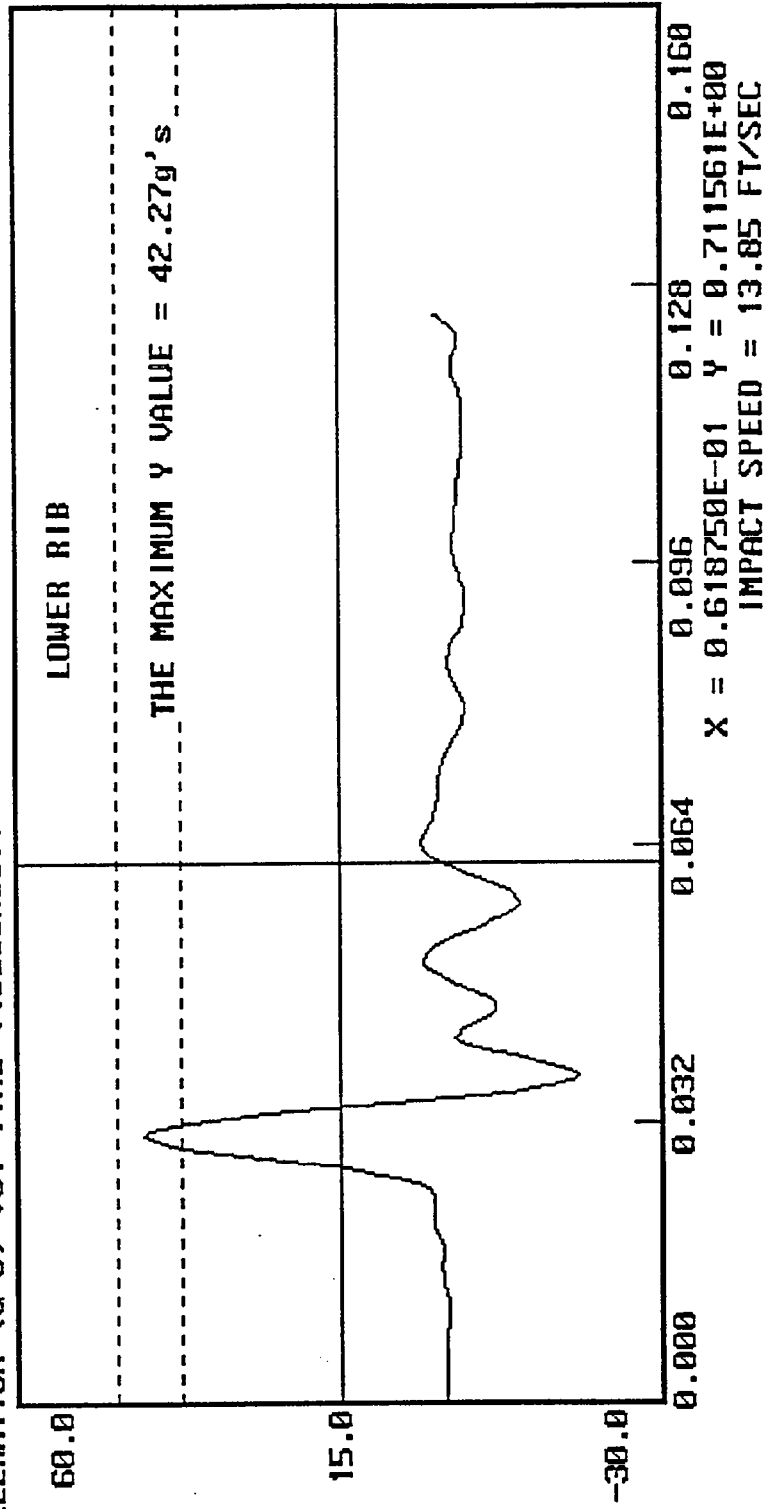


04-07-1994 08:43

DUMMY CALIBRATION - THORAX IMPACT

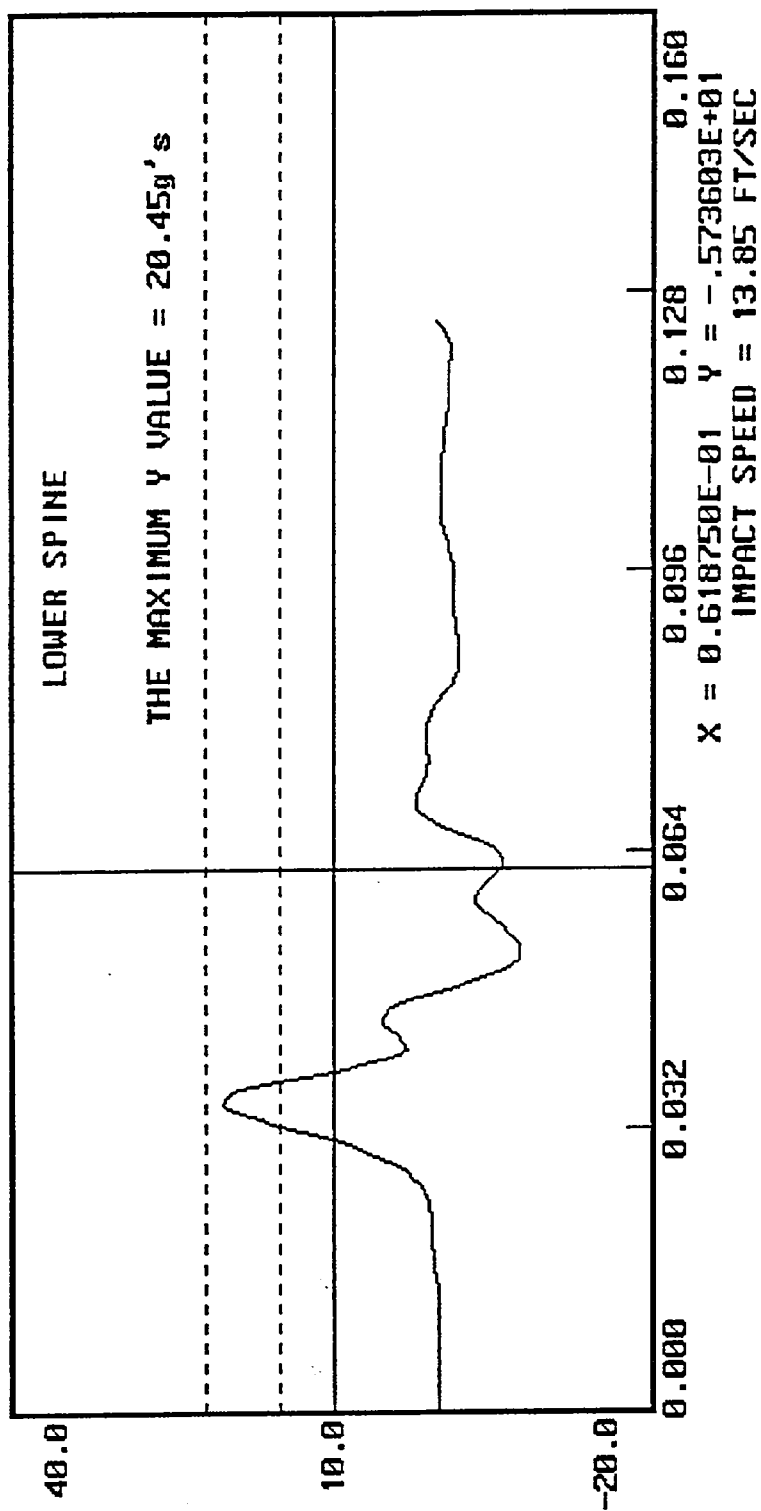
DUMMY # 270

ACCELERATION (G'S) VS. TIME ((SECONDS))



04-07-1994 08:43

DUMMY CALIBRATION - THORAX IMPACT
DUMMY # 270
ACCELERATION (G'S) VS. TIME ((SECONDS))



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: April 7, 1994

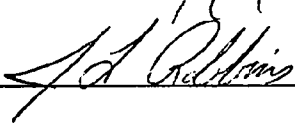
DUMMY NUMBER: 270

TEST NUMBER: D94473

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	28%
PROBE SPEED	13.8 - 14.2 f/s	13.9
PELVIS ACCELERATION	40 - 60 g's	57

TEST MEETS SPECIFICATIONS

TECHNICIAN 

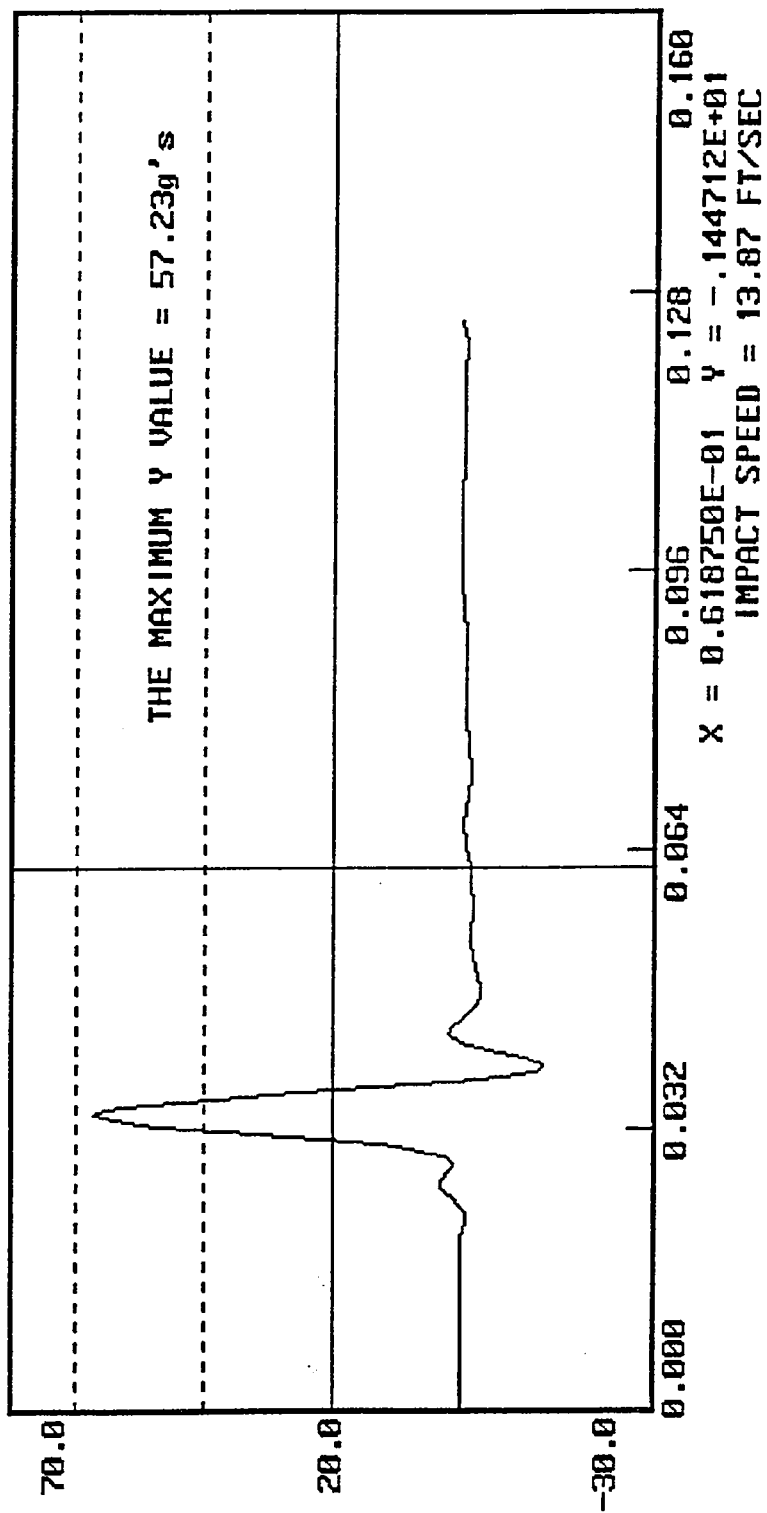
APPROVED BY 

04-07-1994 13:22

DUMMY CALIBRATION - PELVIS IMPACT

DUMMY # 270

() VS. TIME ((SECONDS))



MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

DATE: April 7, 1994

DUMMY NUMBER: 270

TEST NUMBER: D94474

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	28%
FORCE @ 0.5 in	23.3 - 36.5 lbs	34.3
FORCE @ 0.75 in	36.7 - 49.8 lbs	45.5
FORCE @ 1.0 in	50 - 63 lbs	59
FORCE @ 1.3 in	73 - 88 lbs	79

TEST MEETS SPECIFICATIONS

TECHNICIAN

Ken Clark

APPROVED BY

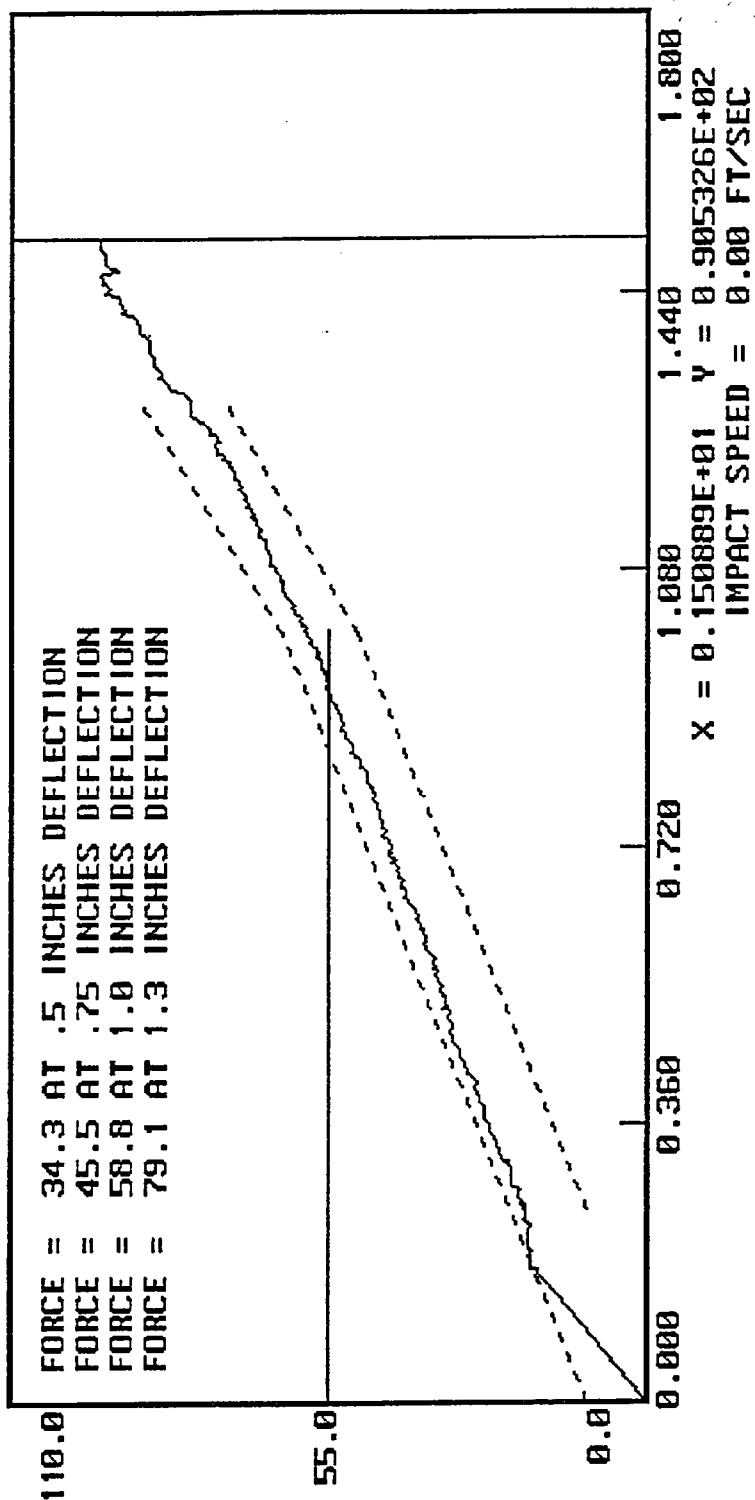
J. Robbins

DUMMY CALIBRATION - ABDOMEN COMPRESSION

DUMMY # 270

ABDOMEN FORCE () VS. ABDOMEN DISPLACEMENT (INCHES)

04-07-1994 14:49



MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: April 7, 1994

DUMMY NUMBER: 270

TEST NUMBER: D94475

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	28%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	22
FORCE @ 30°	34 - 46 lbs	35
FORCE @ 40°	46 - 58 lbs	51
RETURN ANGLE	12° maximum	4°

TEST MEETS SPECIFICATIONS

TECHNICIAN 

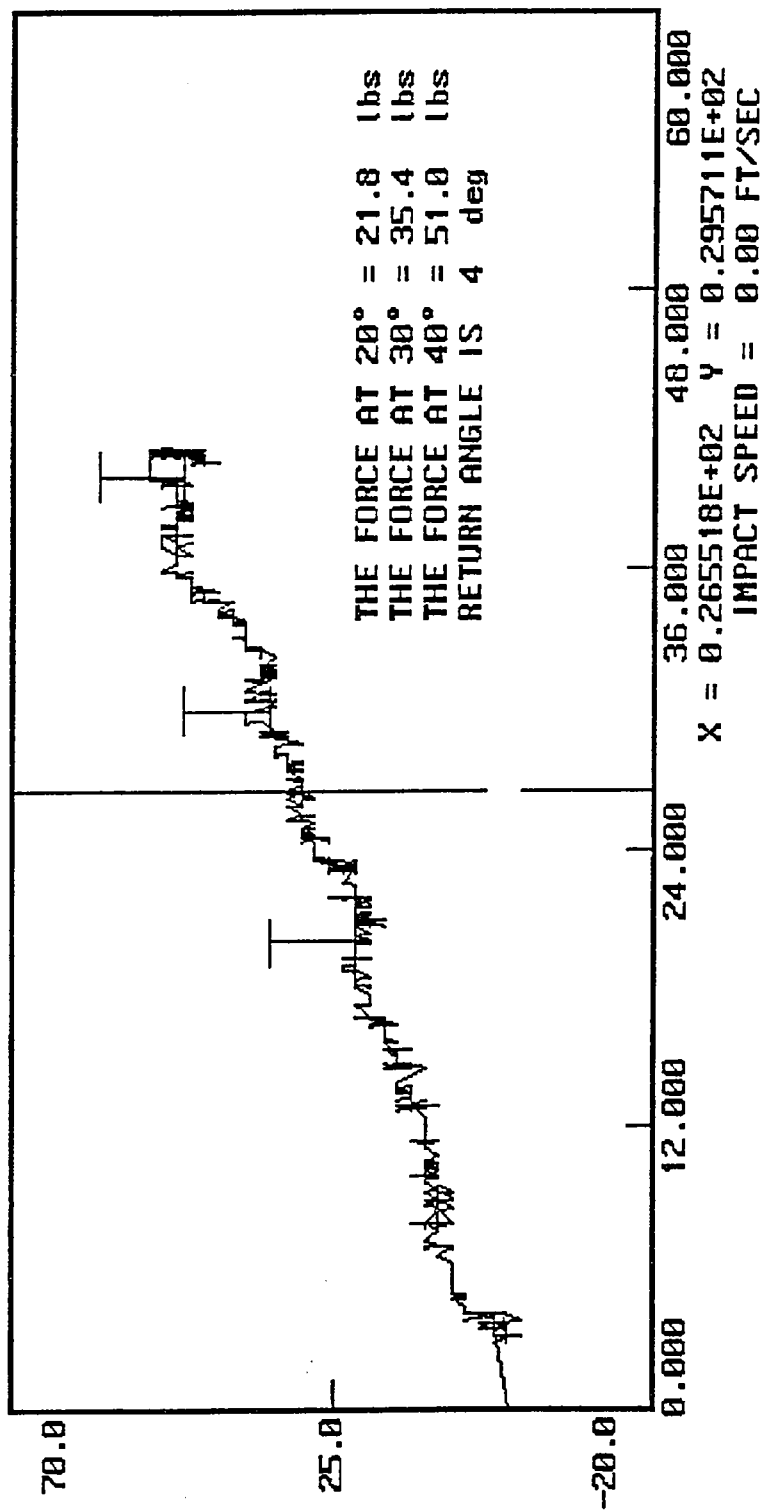
APPROVED BY 

04-07-1994 16:32

DUMMY CALIBRATION - LUMBAR FLEXION

DUMMY # 270

FORCE () VS. TORSO ROTATION (DEGREES)



PRE-TEST CERTIFICATION DATA

Passenger Dummy Serial Number: 269

Calibration Test Results Summary

Passenger Serial Number: 269

Pre-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Head Drop Test:	The head passed all drop test requirements.
Neck Flexion Test:	The neck passed all flexion test requirements.
Neck Extension Test:	The neck passed all extension test requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Knee Impact Tests:	Both knees passed all impact test requirements.

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 269

DATE OF VERIFICATION: May 11, 1994

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.6
RH - Rib Height	19.75 - 20.5"	20.3
HP - Hip Pivot Height	3.9" ref.	3.9
RD - Rib From Back Line	9.0" to 9.5"	9.3
KV - Knee Pivot From Back Line	20.1" - 20.7"	20.5
SW - Knee Pivot to Floor	19.3" - 19.9"	19.5
HW - Hip Width	14.0" - 15.4"	14.5

MEASUREMENTS BY: *J. A. Rollins*

APPROVED BY: *J. A. Rollins*

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

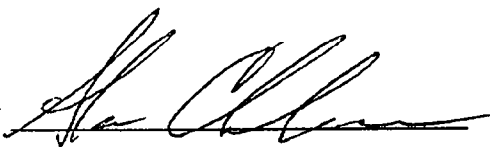
DATE: April 6, 1994

DUMMY NUMBER: 269

TEST NUMBER: D94462

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	20%
PROBE SPEED	13.8 - 14.2 fps	13.9
UPPER RIB	37 - 46 g's	41
LOWER RIB	37 - 46 g's	38
LOWER SPINE	15 - 22 g's	19

TEST MEETS SPECIFICATIONS

TECHNICIAN 

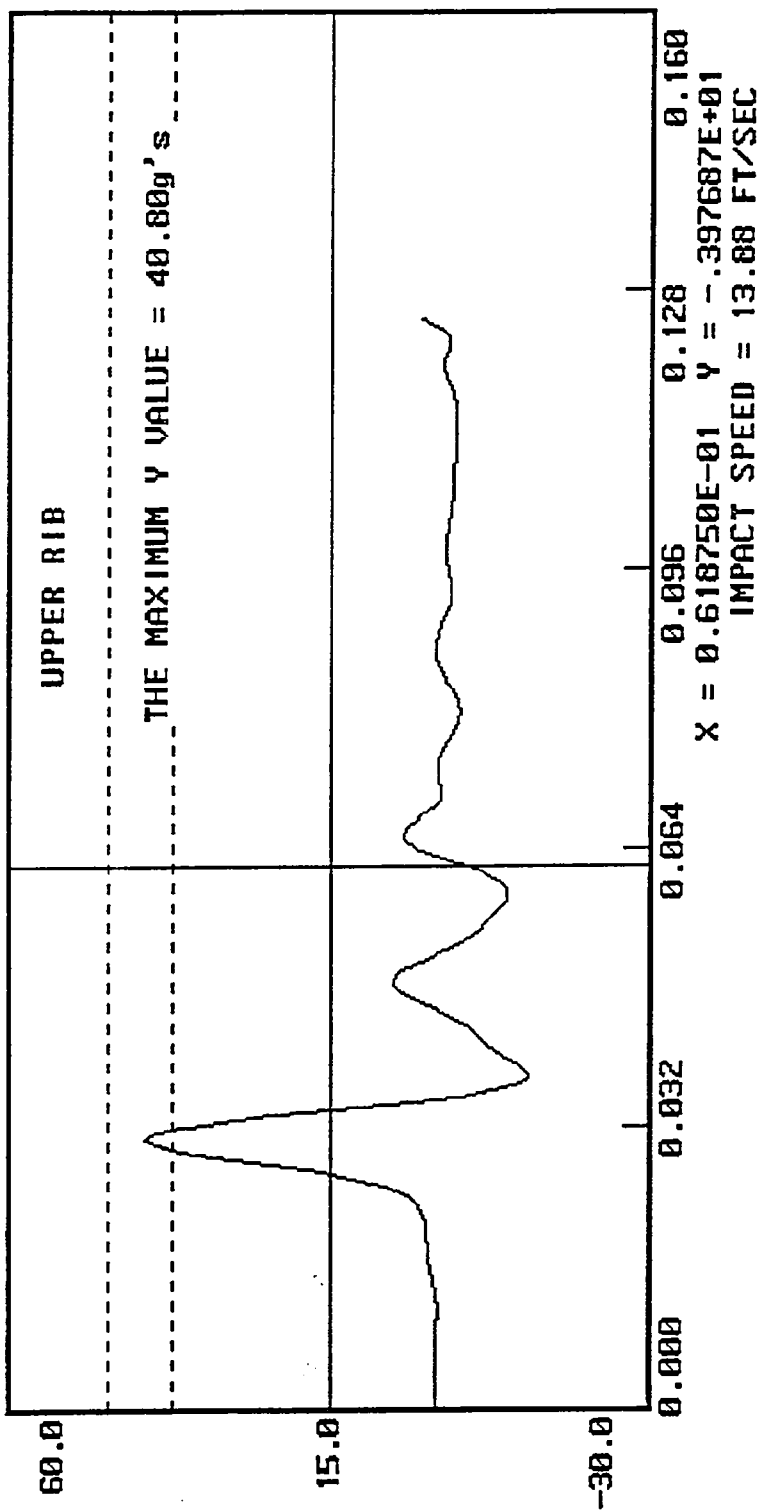
APPROVED BY 

04-06-1994 14:41

DUMMY CALIBRATION - THORAX IMPACT

DUMMY # 269

ACCELERATION (G'S) VS. TIME ((SECONDS))

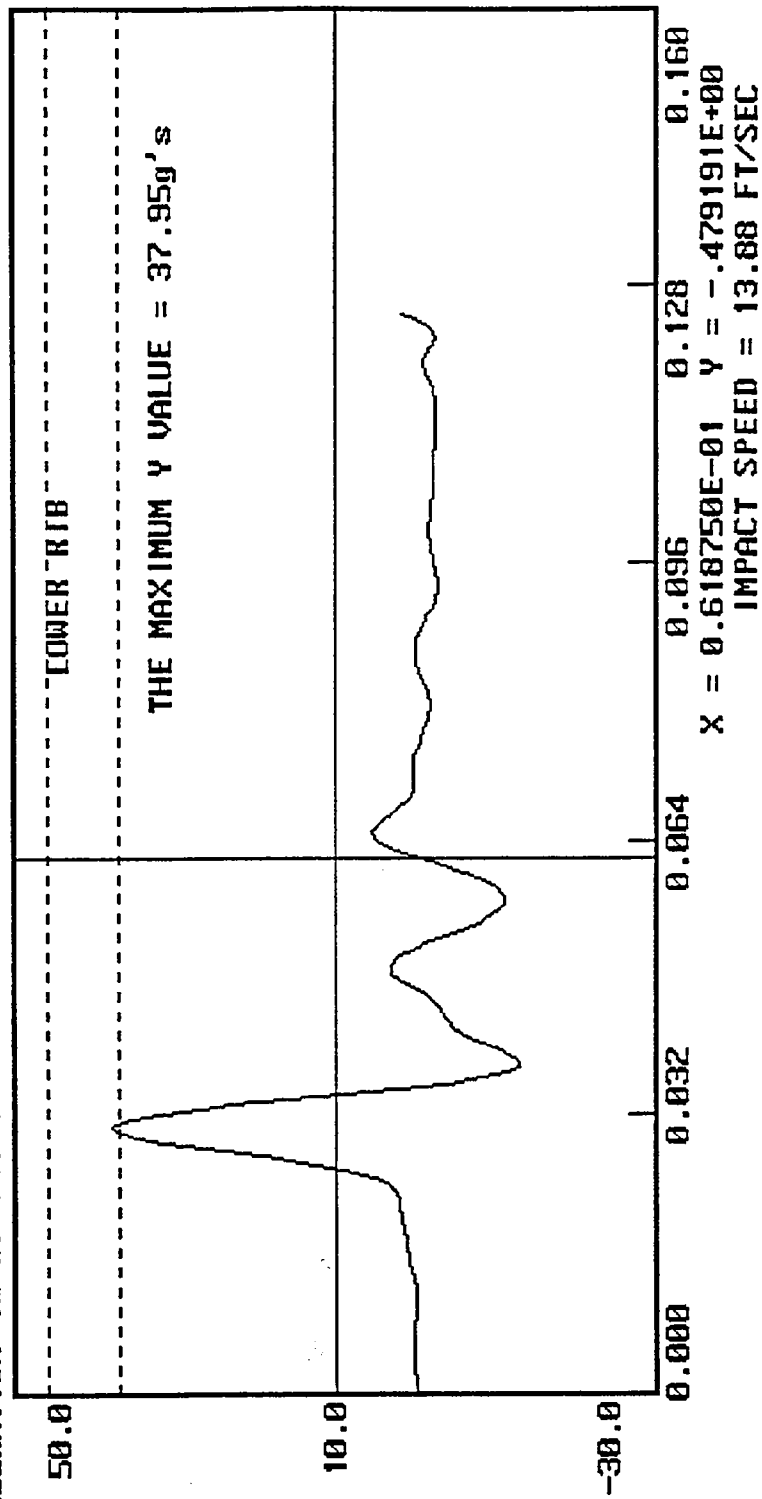


04-06-1994 14:41

DUMMY CALIBRATION - THORAX IMPACT

DUMMY # 269

ACCELERATION (G'S) VS. TIME ((SECONDS))

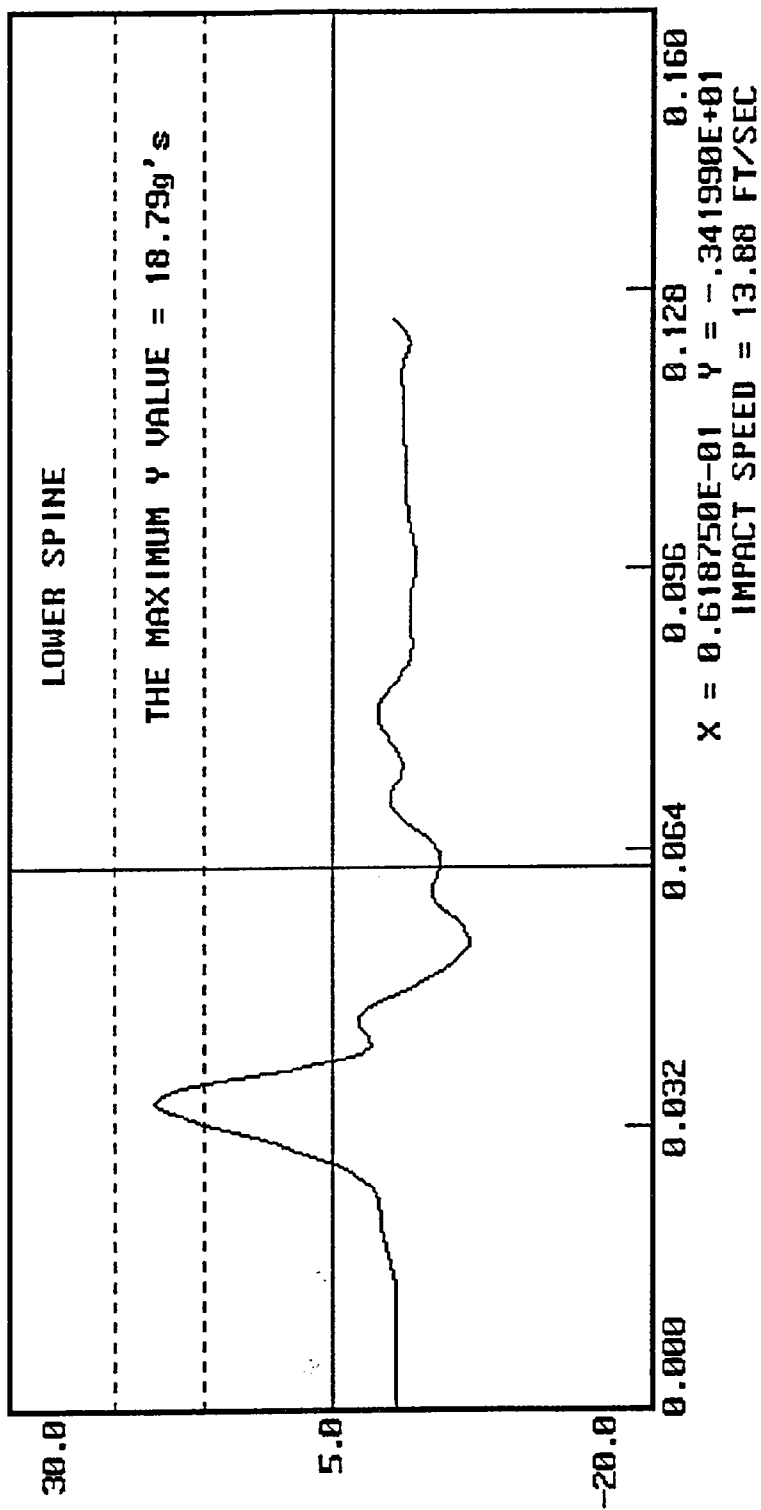


04-06-1994 14:41

DUMMY CALIBRATION - THORAX IMPACT

DUMMY # 269

ACCELERATION (G'S) VS. TIME ((SECONDS))



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: April 7, 1994

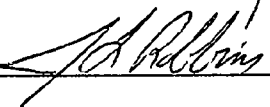
DUMMY NUMBER: 269

TEST NUMBER: D94463

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	28%
PROBE SPEED	13.8 - 14.2 f/s	13.8
PELVIS ACCELERATION	40 - 60 g's	56

TEST MEETS SPECIFICATIONS

TECHNICIAN 

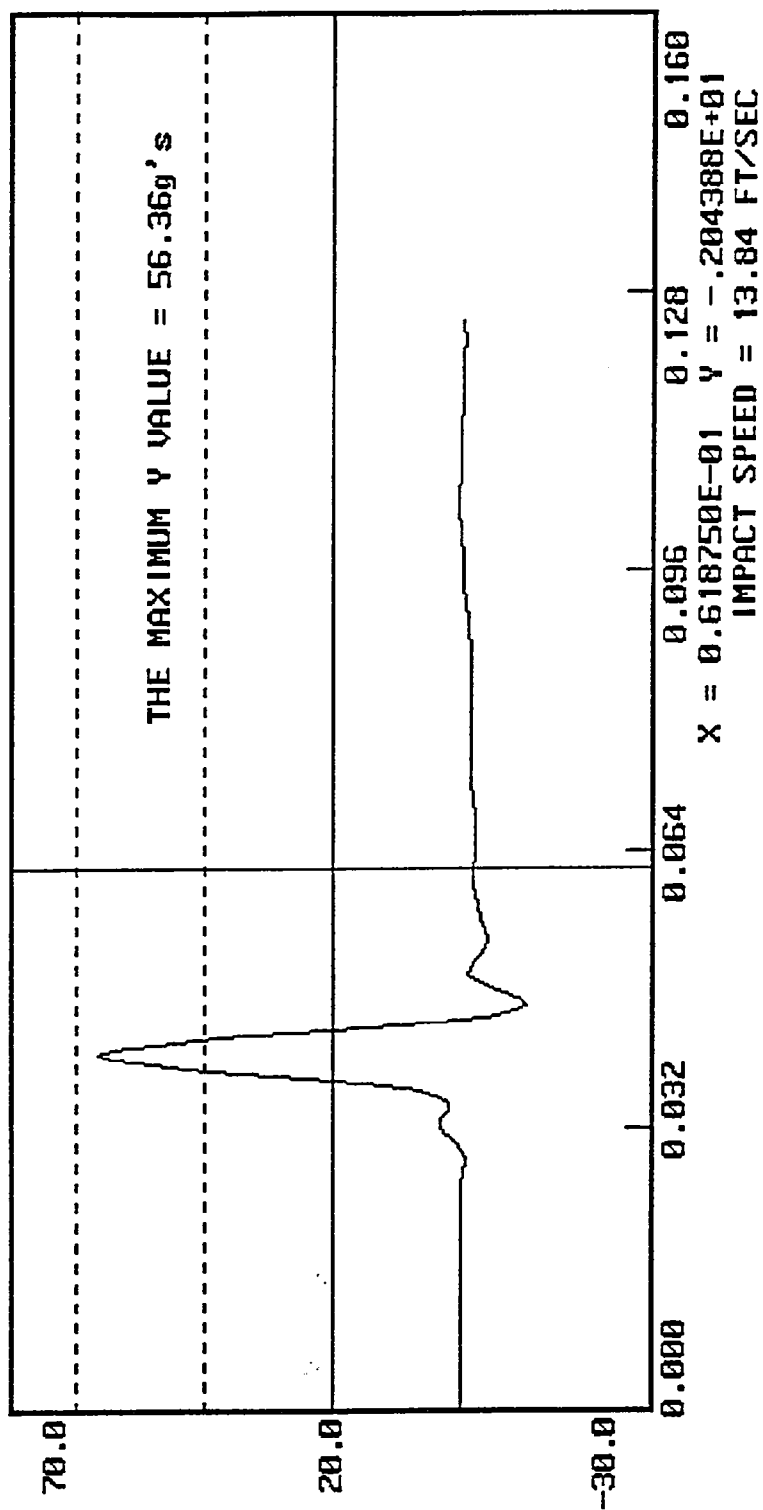
APPROVED BY 

04-07-1994 13:51

DUMMY CALIBRATION - PELVIS IMPACT

DUMMY # 269

() VS. TIME ((SECONDS))



MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

DATE: April 7, 1994

DUMMY NUMBER: 269

TEST NUMBER: D94464

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	28%
FORCE @ 0.5 in	23.3 - 36.5 lbs	31.7
FORCE @ 0.75 in	36.7 - 49.8 lbs	45.1
FORCE @ 1.0 in	50 - 63 lbs	58
FORCE @ 1.3 in	73 - 88 lbs	82

TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY

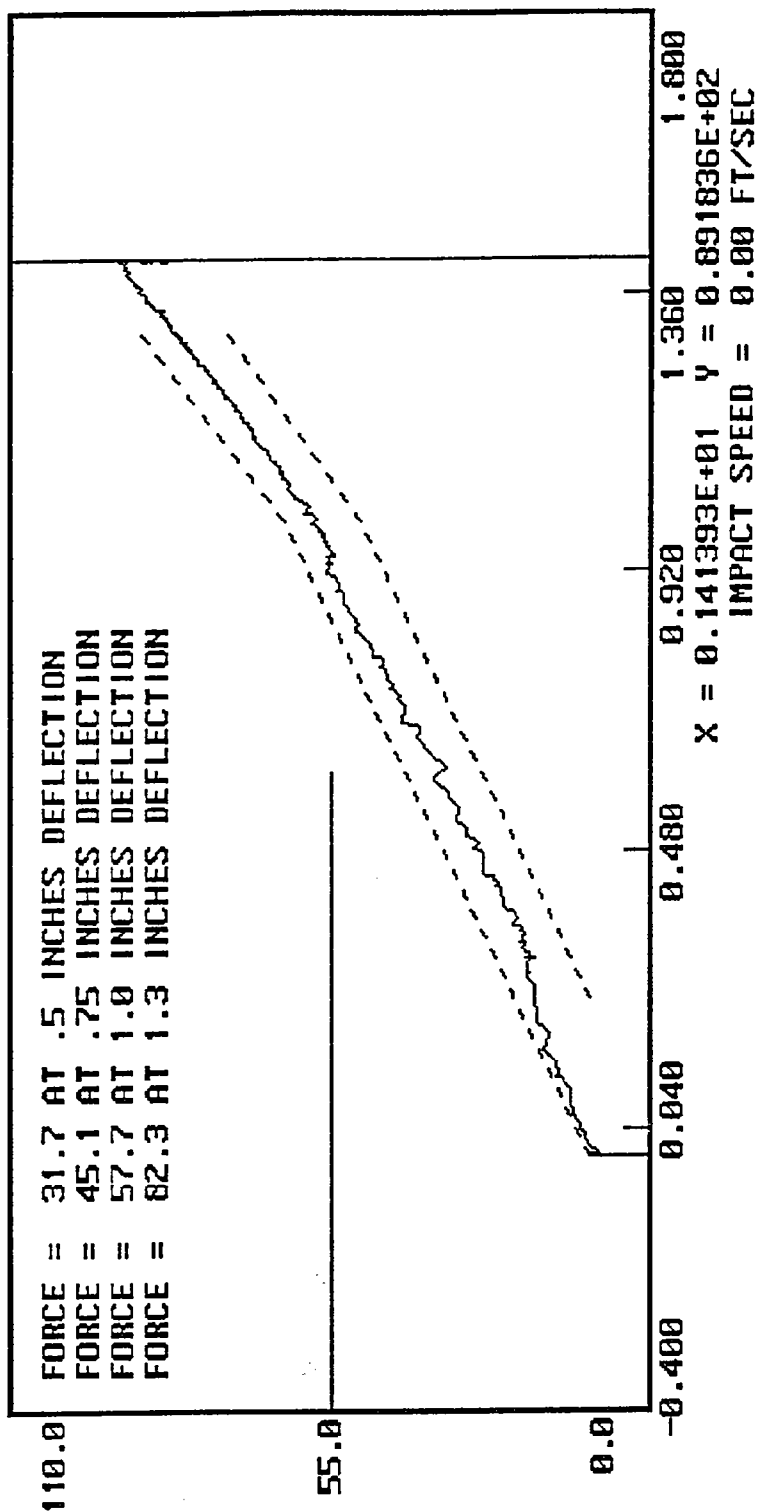


04-07-1994 14:16

DUMMY CALIBRATION - ABDOMEN COMPRESSION

DUMMY # 269

ABDOMEN FORCE () VS. ABDOMEN DISPLACEMENT (INCHES)



MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: April 7, 1994

DUMMY NUMBER: 269

TEST NUMBER: D94465

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	28%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	27
FORCE @ 30°	34 - 46 lbs	35
FORCE @ 40°	46 - 58 lbs	51
RETURN ANGLE	12° maximum	9°

TEST MEETS SPECIFICATIONS

TECHNICIAN _____

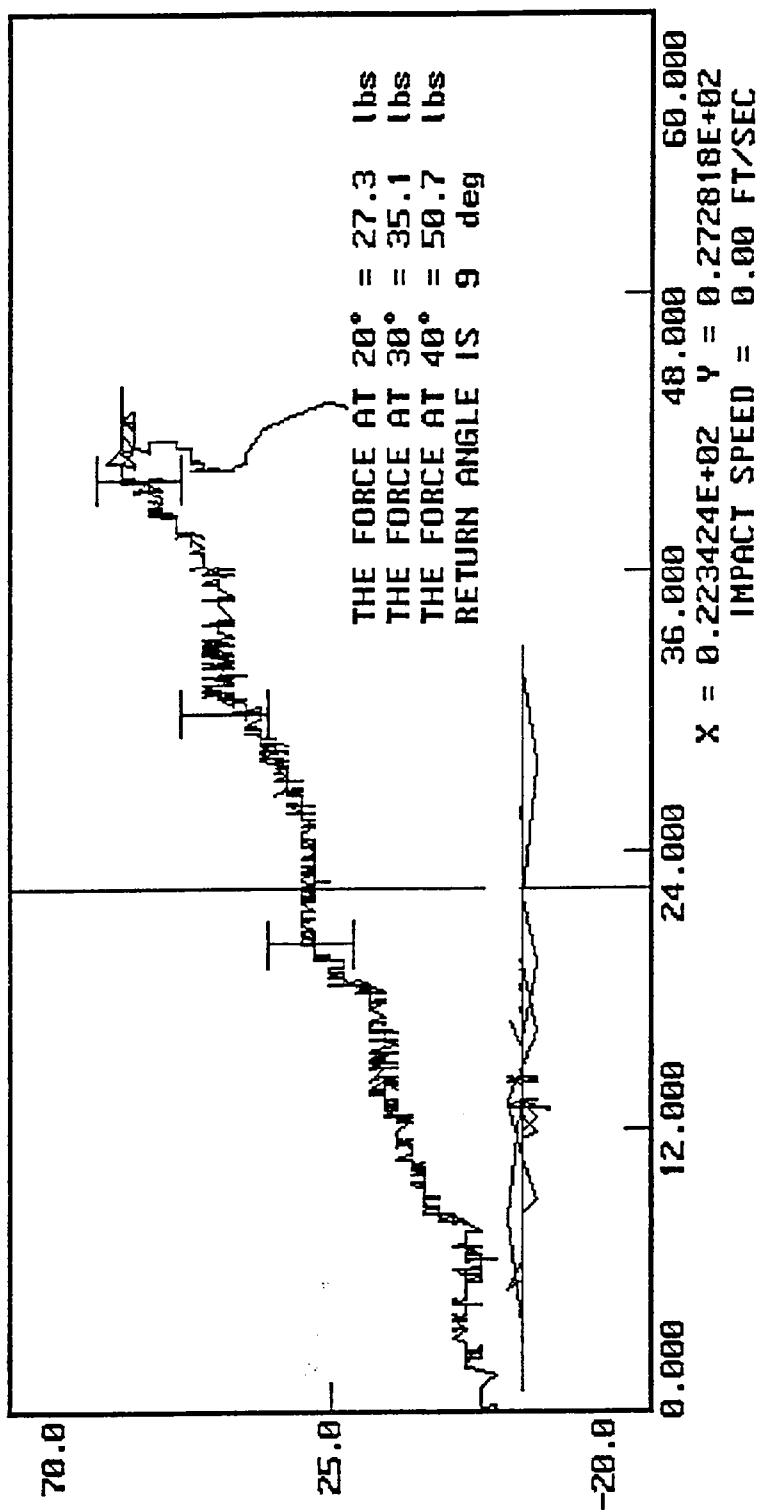
APPROVED BY _____

04-07-1994 15:17

DUMMY CALIBRATION - LUMBAR FLEXION

DUMMY # 269

FORCE () VS. TORSO ROTATION (DEGREES)



POST-TEST CERTIFICATION DATA

Driver Dummy Serial Number: 270

Calibration Test Results Summary

Dummy Serial Number: 270

Post-Test Calibration

External Dimensions: The dummy passed all external dimension requirements.

Head Drop Test: The head passed all drop test requirements.

Neck Flexion Test: The neck passed all flexion test requirements.

Neck Extension Test: The neck passed all extension test requirements.

Thorax Impact Test: The thorax passed all impact test requirements.*

Knee Impact Tests: Both knees passed all impact test requirements.

* After replacement of rib wrap assembly that was damaged during the impact test.

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 270

DATE OF VERIFICATION: May 16, 1994

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.5
RH - Rib Height	19.75 - 20.5"	20.5
HP - Hip Pivot Height	3.9" ref.	3.9
RD - Rib From Back Line	9.0" to 9.5"	9.1
KV - Knee Pivot From Back Line	20.1" - 20.7"	20.7
SW - Knee Pivot to Floor	19.3" - 19.9"	19.5
HW - Hip Width	14.0" - 15.4"	14.8

MEASUREMENTS BY:



APPROVED BY:



MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: May 24, 1994

DUMMY NUMBER: 270

TEST NUMBER: D94702

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	28%
PROBE SPEED	13.8 - 14.2 fps	13.8
UPPER RIB	37 - 46 g's	44
LOWER RIB	37 - 46 g's	42
LOWER SPINE	15 - 22 g's	19

TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY

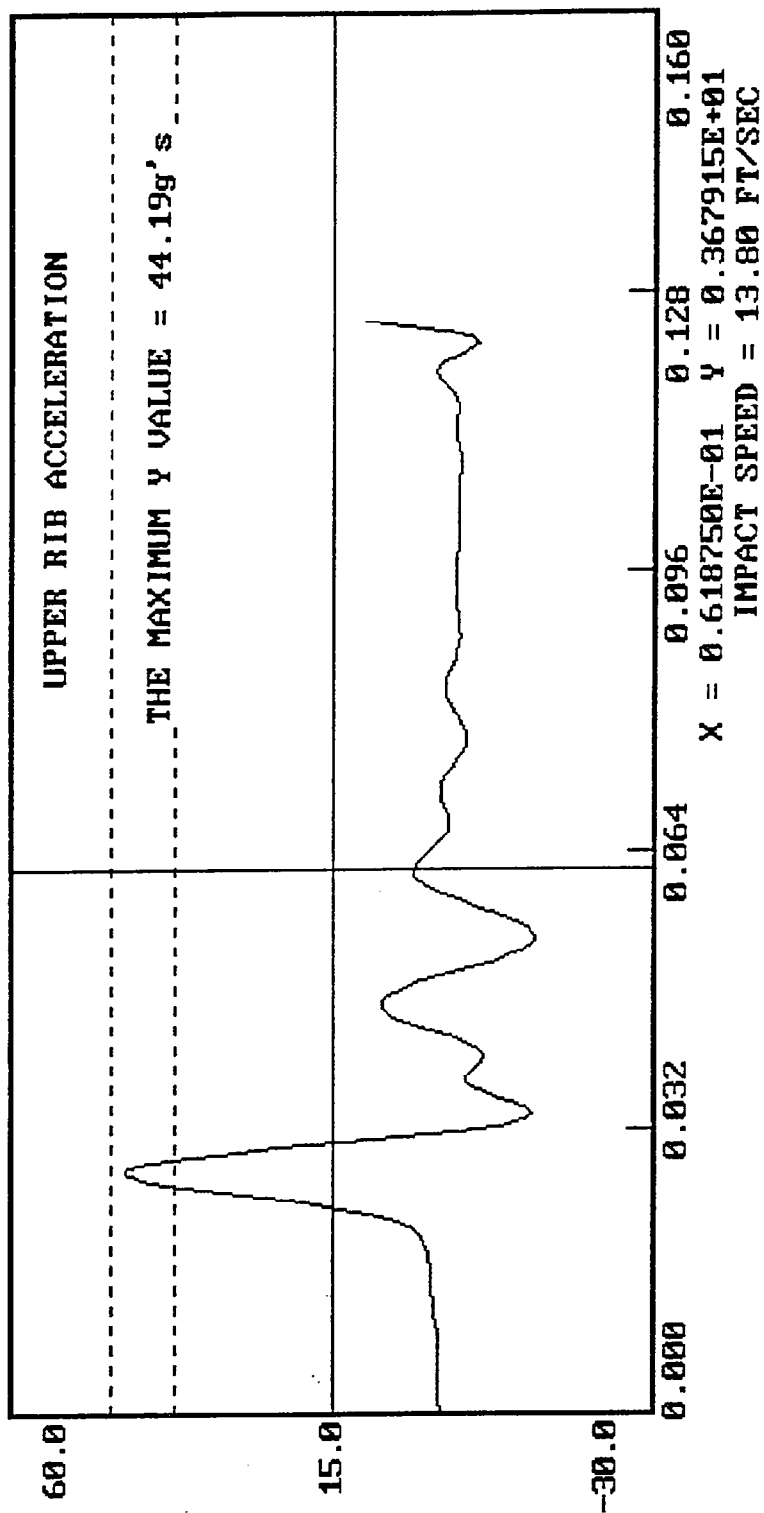


05-24-1994 14:23

DUMMY CALIBRATION - THORAX IMPACT

DUMMY # 270

ACCELERATION (G'S) VS. TIME ((SECONDS))

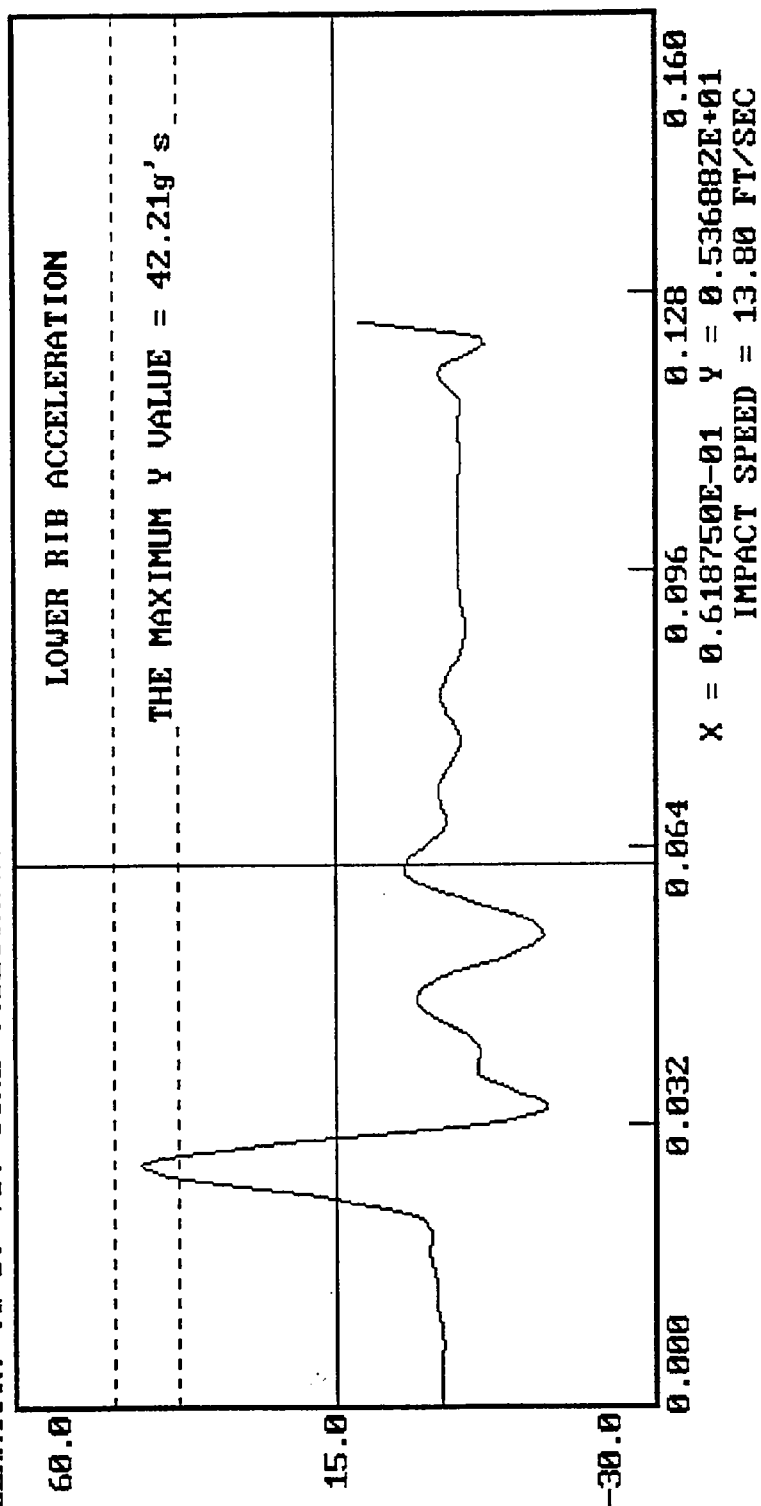


05-24-1994 14:23

DUMMY CALIBRATION - THORAX IMPACT

DUMMY # 270

ACCELERATION (G'S) VS. TIME ((SECONDS))

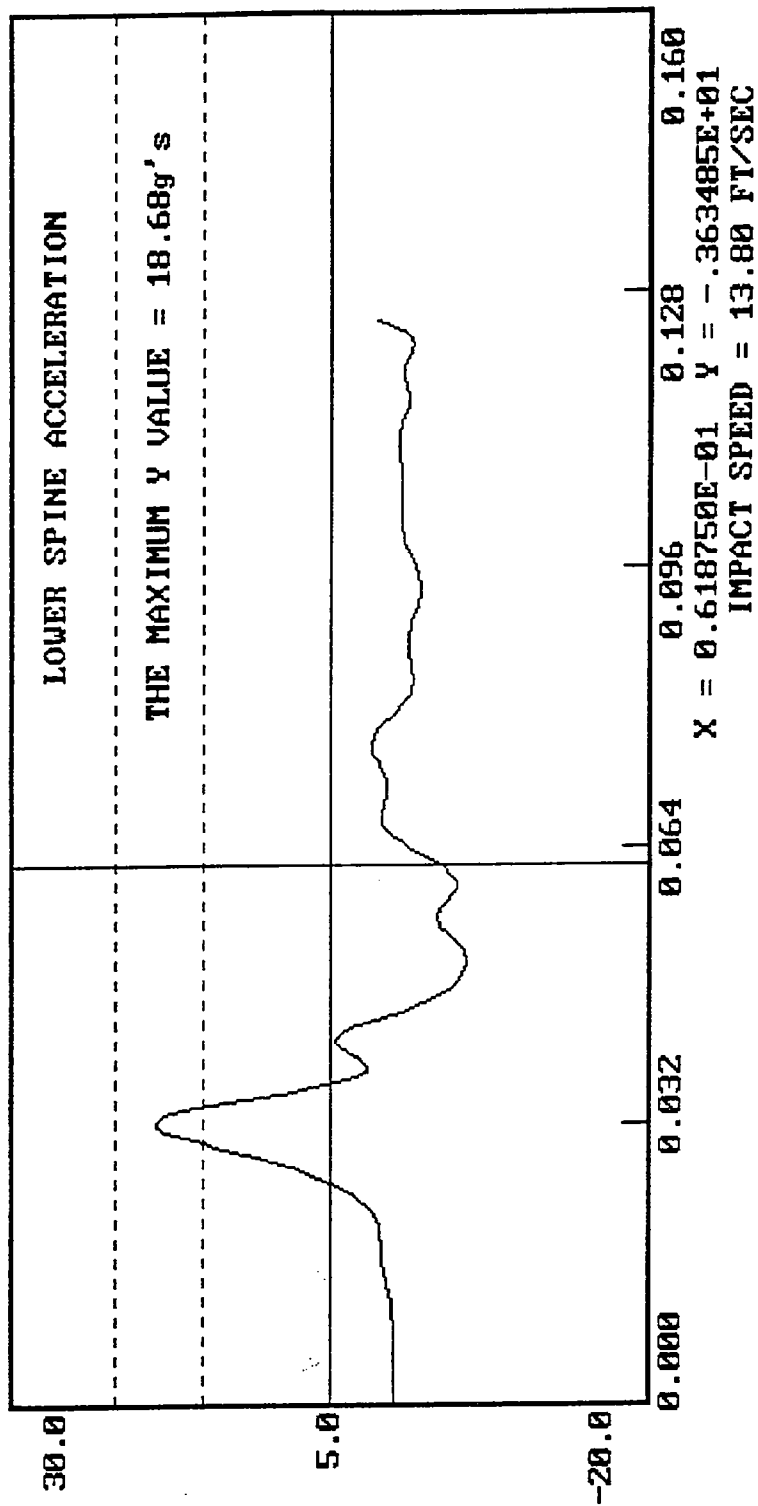


DUMMY CALIBRATION - THORAX IMPACT

05-24-1994 14:23

DUMMY # 270

() US. TIME ((SECONDS))



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: May 24, 1994

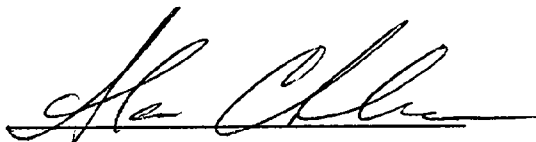
DUMMY NUMBER: 270

TEST NUMBER: D94703

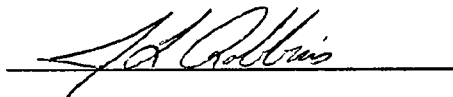
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	28%
PROBE SPEED	13.8 - 14.2 f/s	13.9
PELVIS ACCELERATION	40 - 60 g's	55

TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY

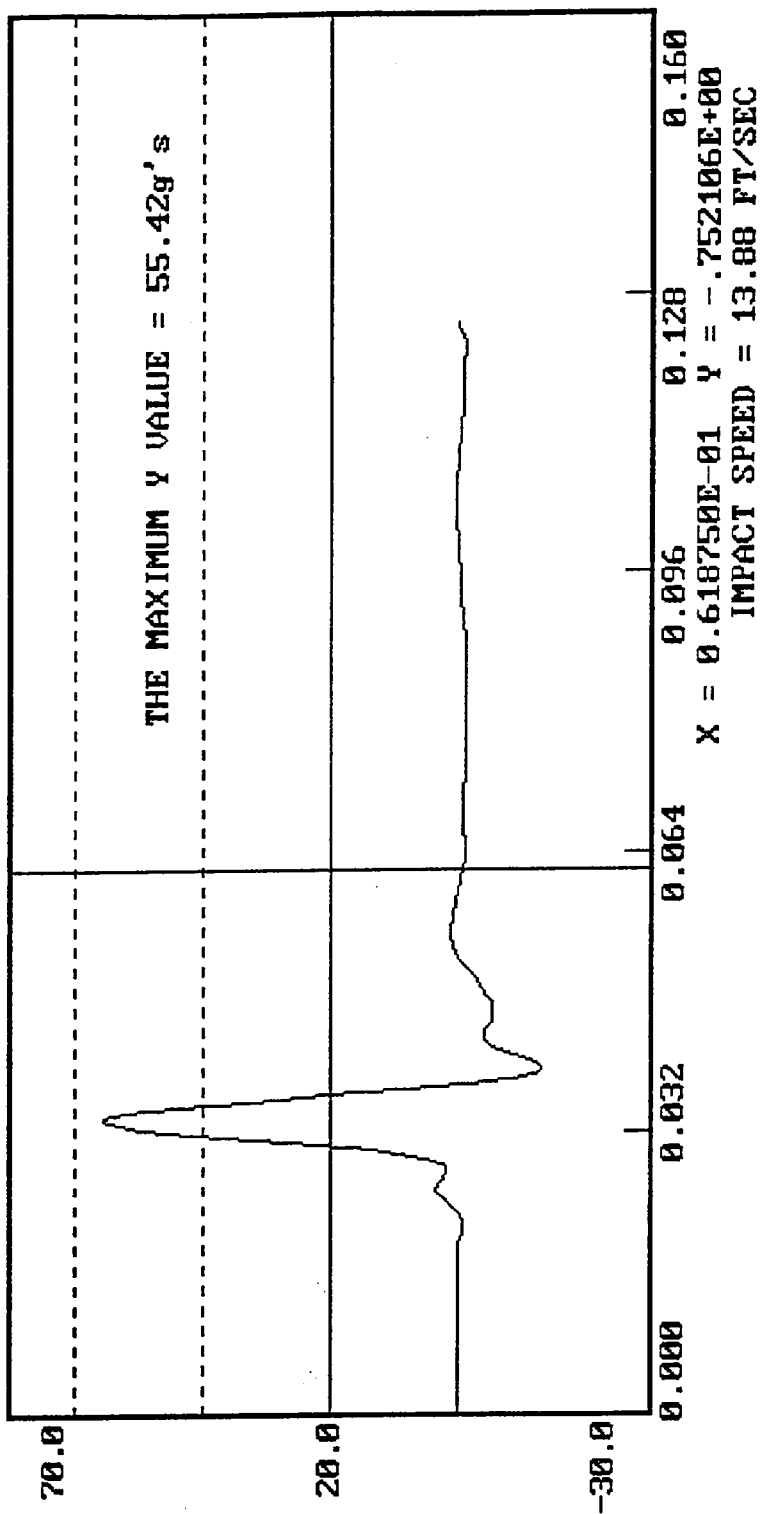


05-24-1994 18:51

DUMMY CALIBRATION - PELVIS IMPACT

DUMMY # 270

ACCELERATION (G'S) VS. TIME ((SECONDS))



MGA RESEARCH CORPORATION
ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)
SIDE IMPACT DUMMY (SID)

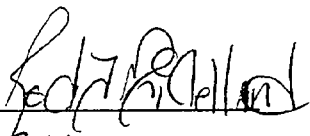
DATE: May 26, 1994

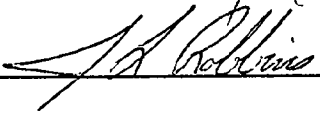
DUMMY NUMBER: 270

TEST NUMBER: D94704

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	72°
RELATIVE HUMIDITY	10 - 70%	25%
FORCE @ 0.5 in	23.3 - 36.5 lbs	32.7
FORCE @ 0.75 in	36.7 - 49.8 lbs	44.7
FORCE @ 1.0 in	50 - 63 lbs	58
FORCE @ 1.3 in	73 - 88 lbs	80

TEST MEETS SPECIFICATIONS

TECHNICIAN 

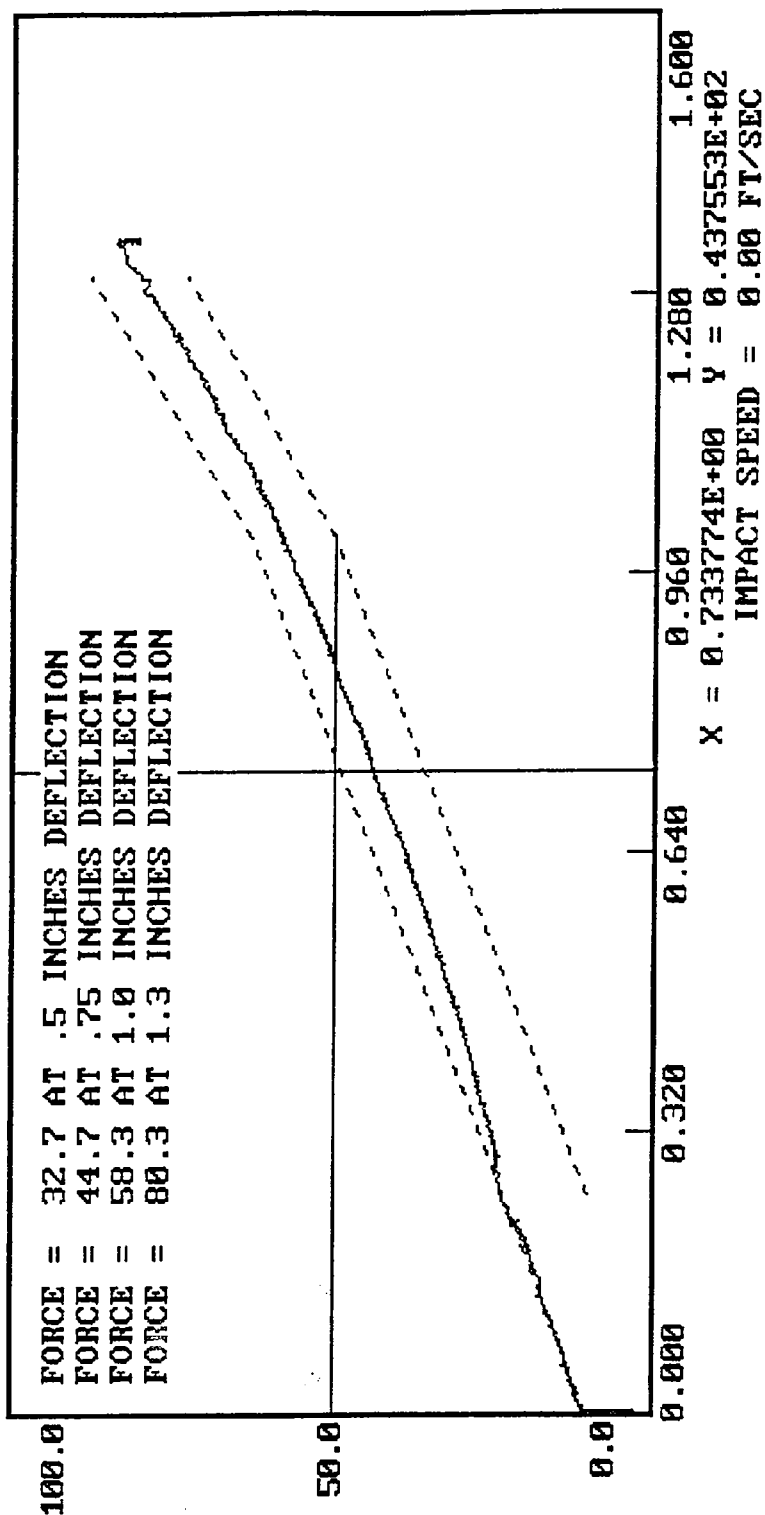
APPROVED BY 

DUMMY CALIBRATION - ABDOMEN COMPRESSION

DUMMY # 270

05-26-1994 10:22

ABDOMEN FORCE () VS. ABDOMEN DISPLACEMENT (INCHES)



MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

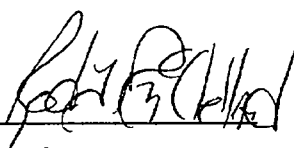
DATE: May 26, 1994

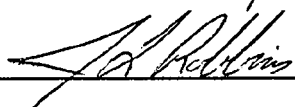
DUMMY NUMBER: 270

TEST NUMBER: D94705

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	72°
RELATIVE HUMIDITY	10 - 70%	25%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	24
FORCE @ 30°	34 - 46 lbs	35
FORCE @ 40°	46 - 58 lbs	57
RETURN ANGLE	12° maximum	8°

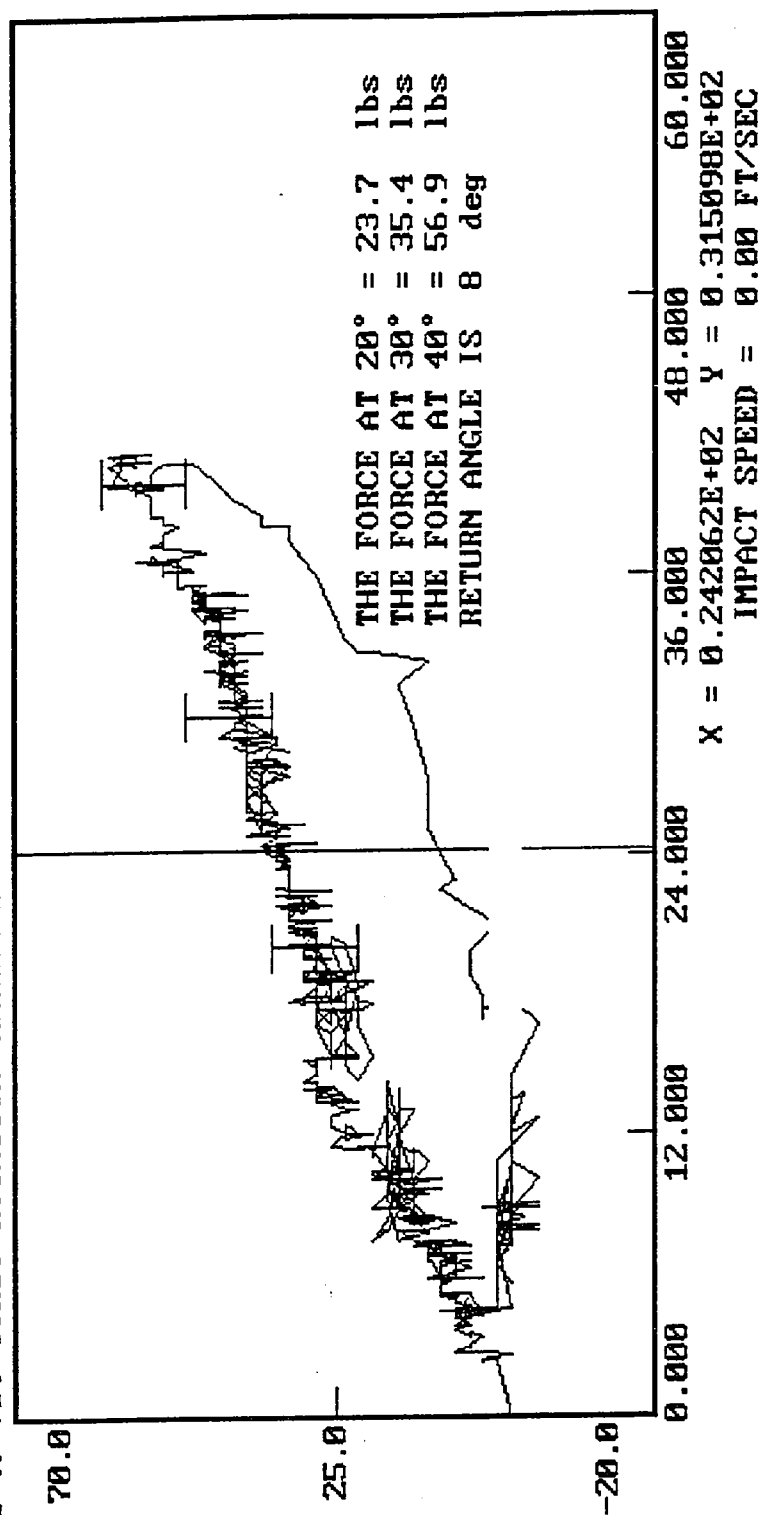
TEST MEETS SPECIFICATIONS

TECHNICIAN 

APPROVED BY 

05-26-1994 12:02

DUMMY CALIBRATION - LUMBAR FLEXION
DUMMY # 270
FORCE () VS. TORSO ROTATION (DEGREES)



POST-TEST CERTIFICATION DATA

Passenger Dummy Serial Number: 269

Calibration Test Results Summary

Dummy Serial Number: 269

Post-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Head Drop Test:	The head passed all drop test requirements.
Neck Flexion Test:	The neck passed all flexion test requirements.
Neck Extension Test:	The neck passed all extension test requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Knee Impact Tests:	Both knees passed all impact test requirements.

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 269

DATE OF VERIFICATION: May 16, 1994

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.6
RH - Rib Height	19.75 - 20.5"	20.3
HP - Hip Pivot Height	3.9" ref.	3.9
RD - Rib From Back Line	9.0" to 9.5"	9.3
KV - Knee Pivot From Back Line	20.1" - 20.7"	20.5
SW - Knee Pivot to Floor	19.3" - 19.9"	19.5
HW - Hip Width	14.0" - 15.4"	14.5

MEASUREMENTS BY: _____

Robert J. DeLauro

APPROVED BY: _____

John R. DeLauro

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: May 24, 1994

DUMMY NUMBER: 269

TEST NUMBER: D94732

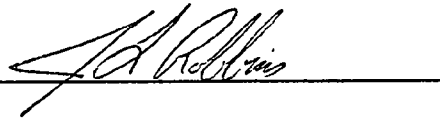
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	28%
PROBE SPEED	13.8 - 14.2 fps	13.8
UPPER RIB	37 - 46 g's	42
LOWER RIB	37 - 46 g's	39
LOWER SPINE	15 - 22 g's	16

TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY

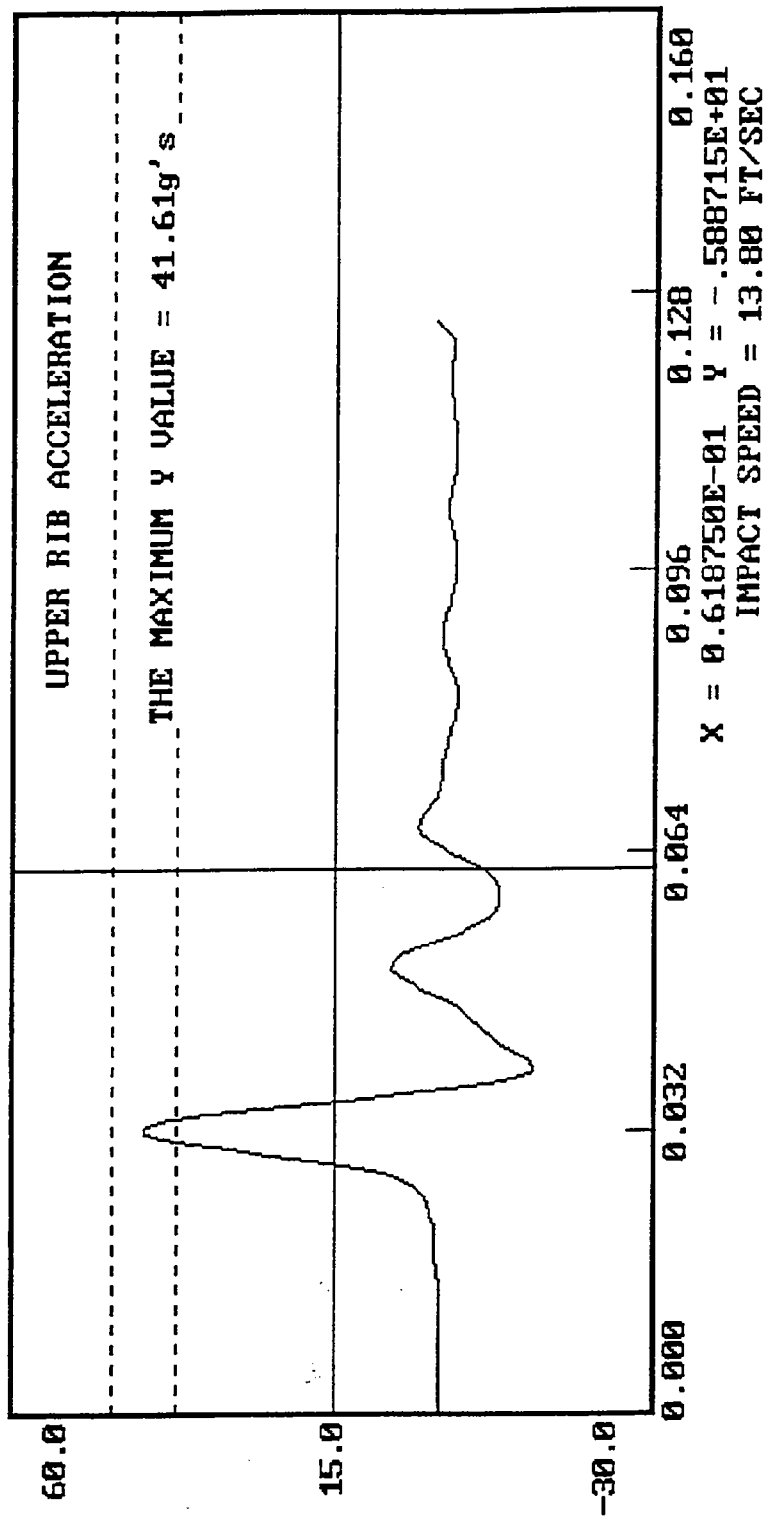


05-24-1994 13:38

DUMMY CALIBRATION - THORAX IMPACT

DUMMY # 269

ACCELERATION (G'S) VS. TIME ((SECONDS))

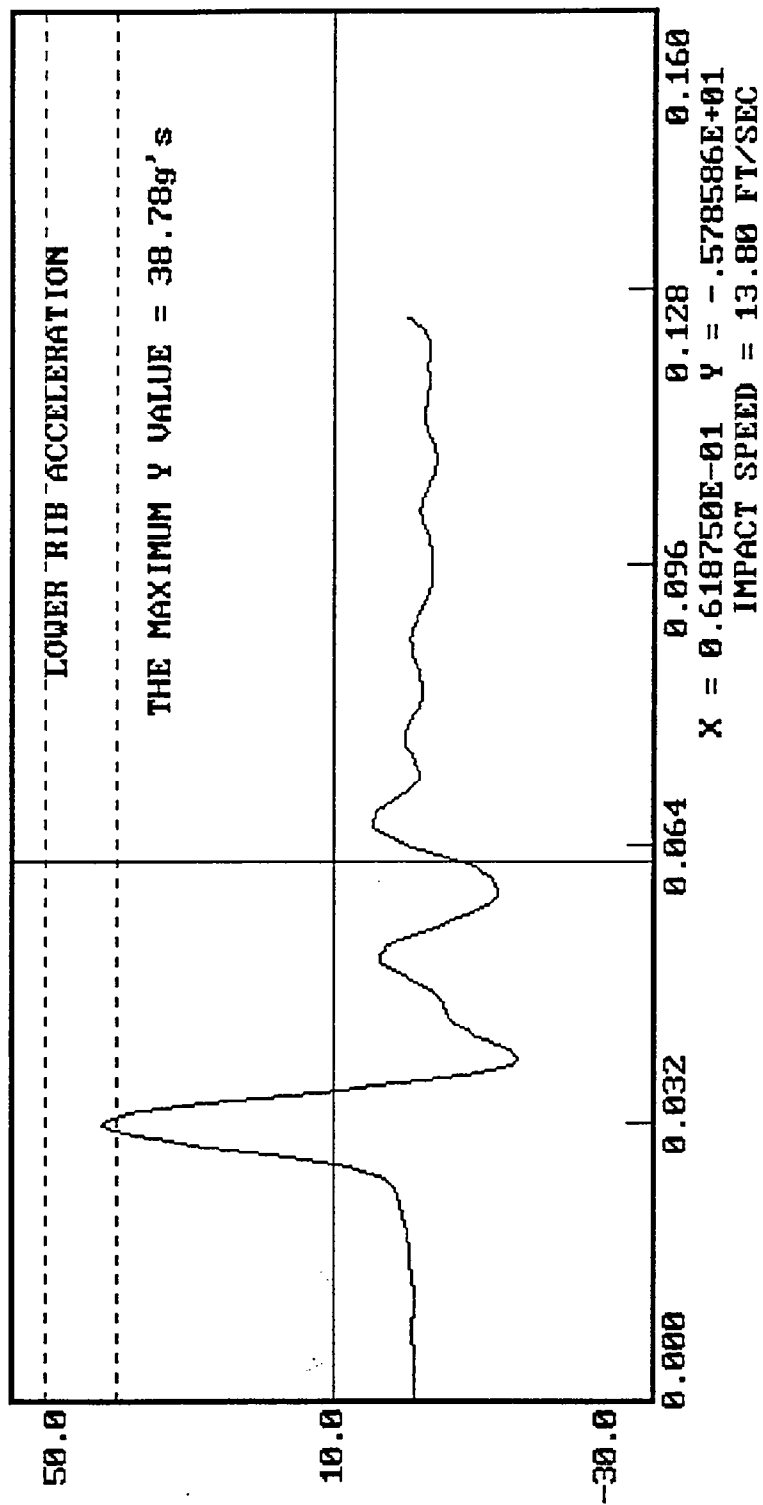


05-24-1994 13:38

DUMMY CALIBRATION - THORAX IMPACT

DUMMY # 269

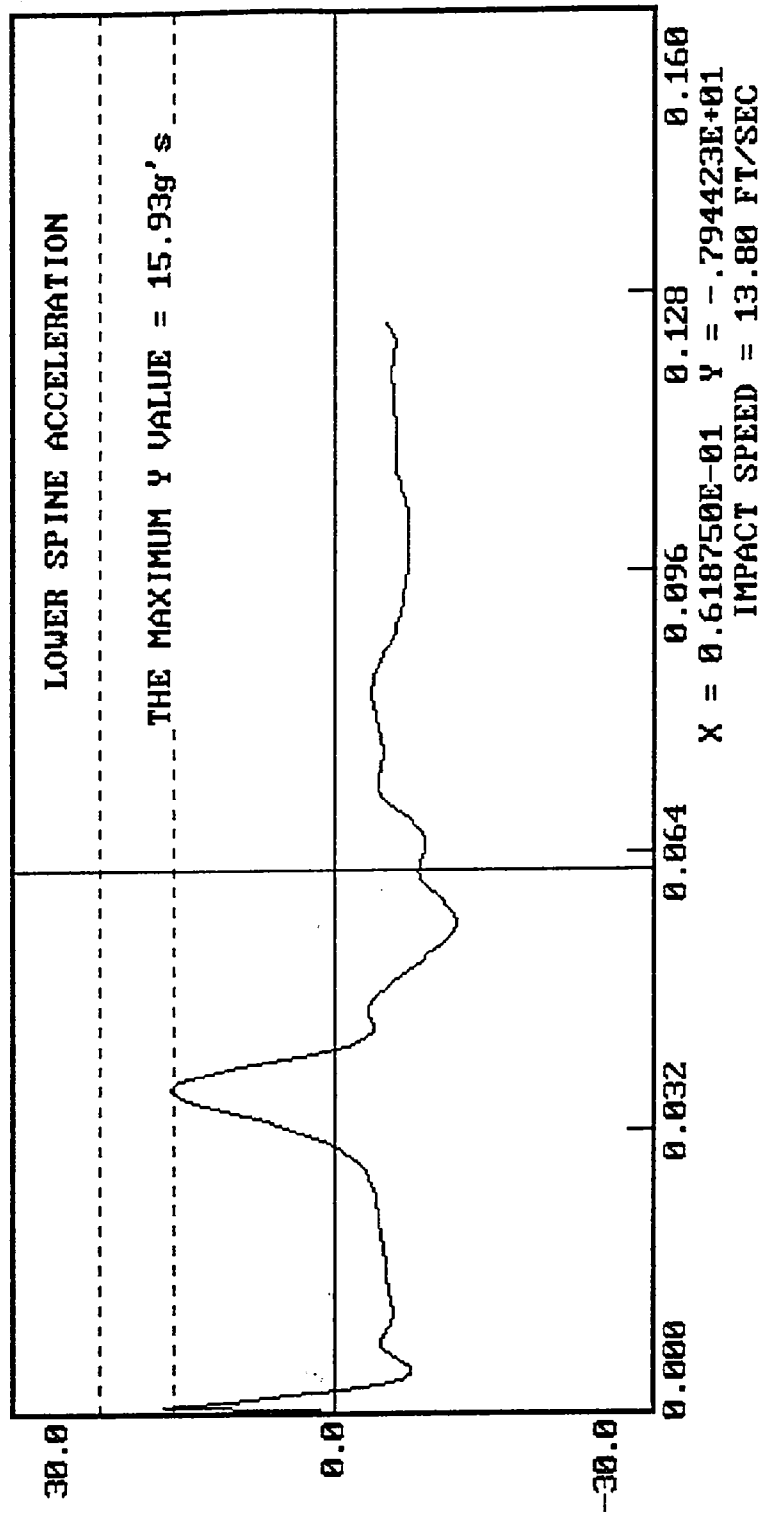
ACCELERATION (G'S) VS. TIME ((SECONDS))



DUMMY CALIBRATION - THORAX IMPACT
 DUMMY # 269

05-24-1994 13:38

ACCELERATION (G'S) VS. TIME ((SECONDS))



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: May 24, 1994

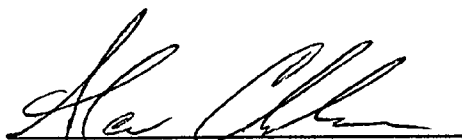
DUMMY NUMBER: 269

TEST NUMBER: D94733

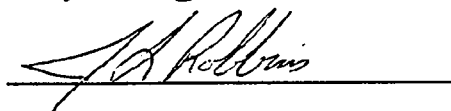
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	28%
PROBE SPEED	13.8 - 14.2 f/s	13.9
PELVIS ACCELERATION	40 - 60 g's	54

TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY

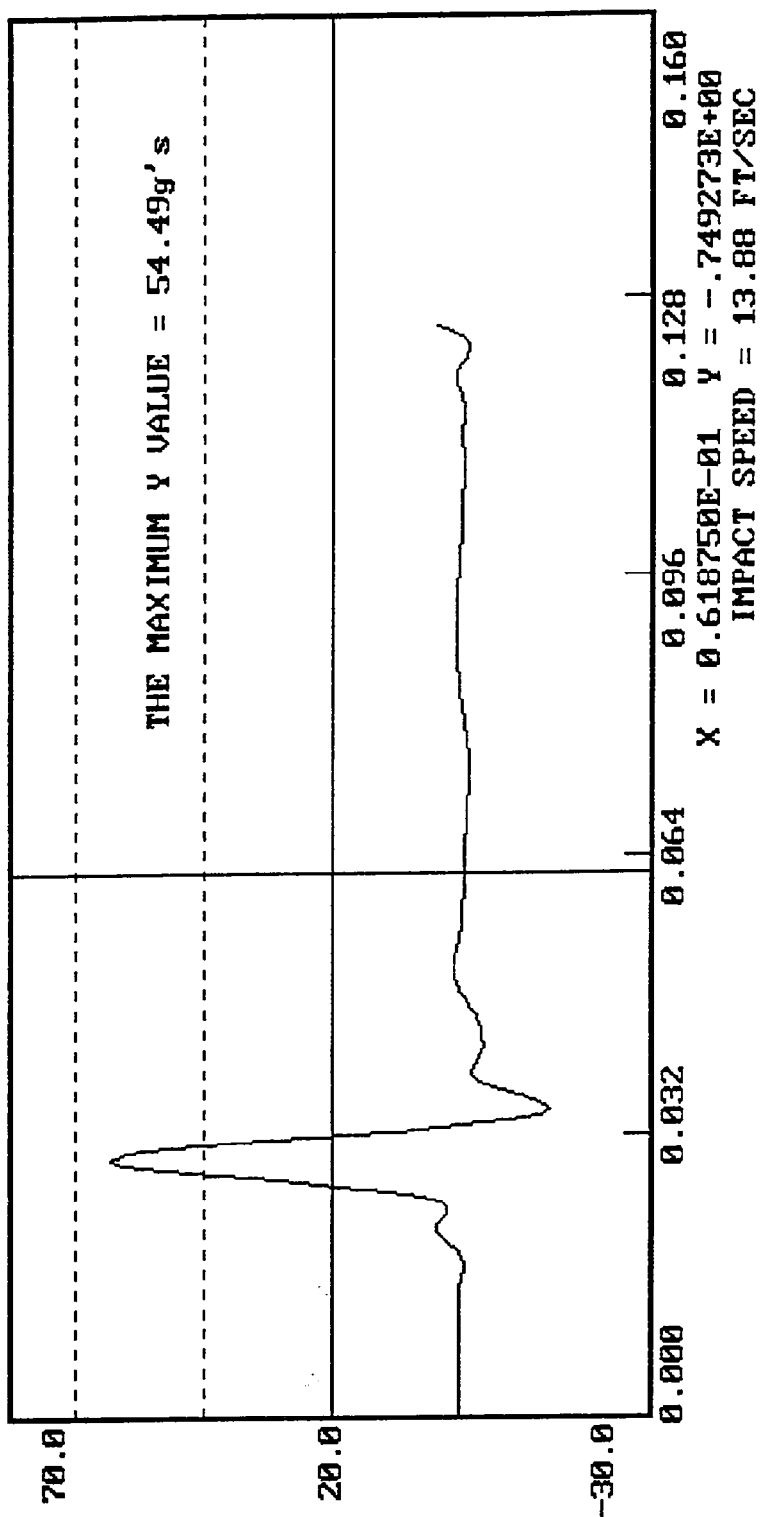


05-24-1994 19:23

DUMMY CALIBRATION - PELVIS IMPACT

DUMMY # 269

ACCELERATION (G'S) VS. TIME ((SECONDS))



MGA RESEARCH CORPORATION
ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)
SIDE IMPACT DUMMY (SID)

DATE: May 25, 1994

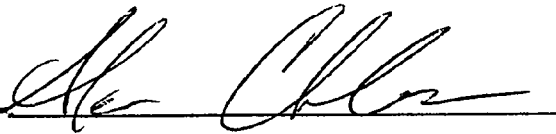
DUMMY NUMBER: 269

TEST NUMBER: D94734

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	72°
RELATIVE HUMIDITY	10 - 70%	30%
FORCE @ 0.5 in	23.3 - 36.5 lbs	33.1
FORCE @ 0.75 in	36.7 - 49.8 lbs	46.3
FORCE @ 1.0 in	50 - 63 lbs	63
FORCE @ 1.3 in	73 - 88 lbs	84

TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY

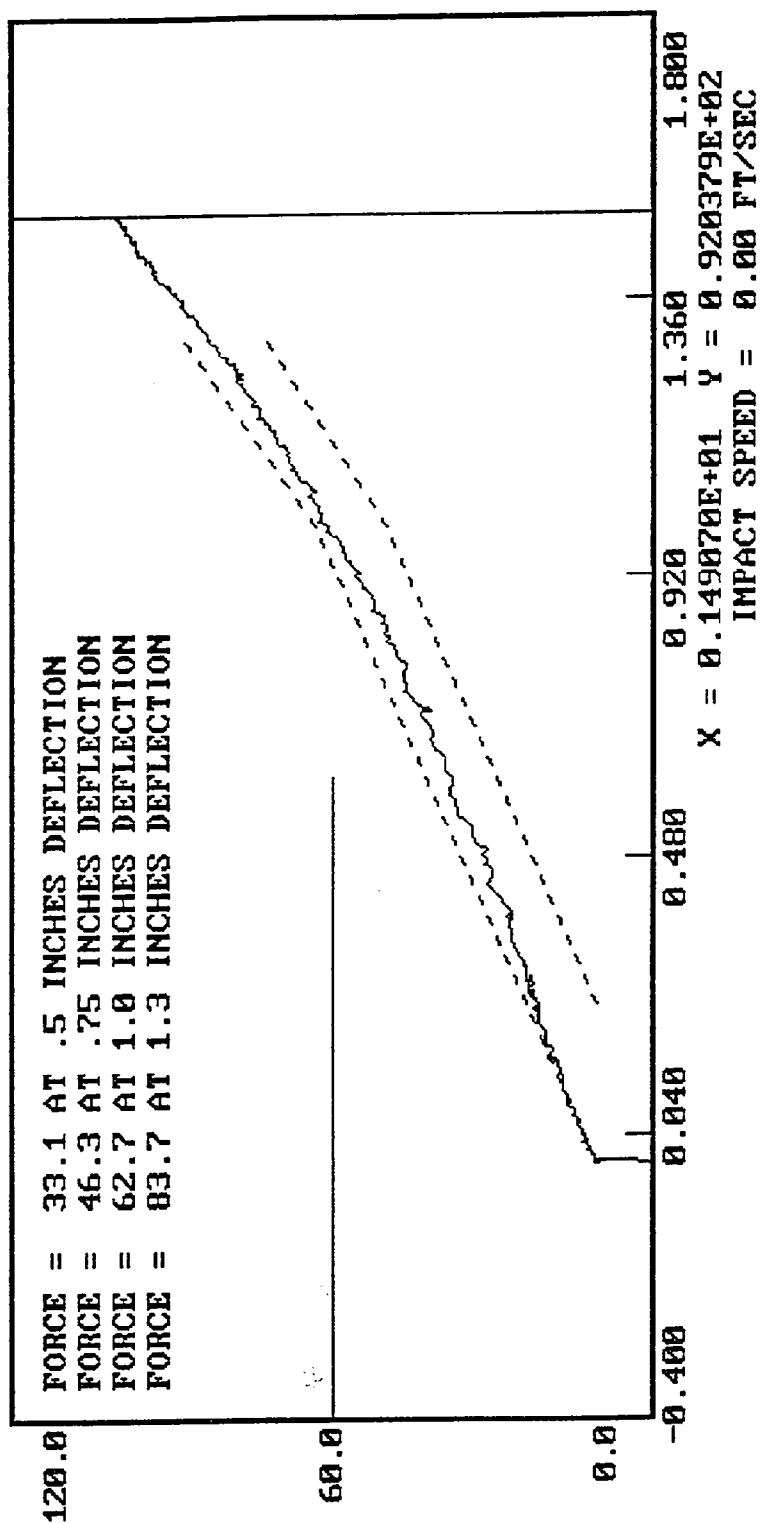


05-25-1994 16:38

DUMMY CALIBRATION - ABDOMEN COMPRESSION

DUMMY #

ABDOMEN FORCE () VS. ABDOMEN DISPLACEMENT (INCHES)



MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: May 25, 1994

DUMMY NUMBER: 269

TEST NUMBER: D94735

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	72°
RELATIVE HUMIDITY	10 - 70%	30%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	25
FORCE @ 30°	34 - 46 lbs	35
FORCE @ 40°	46 - 58 lbs	49
RETURN ANGLE	12° maximum	7°

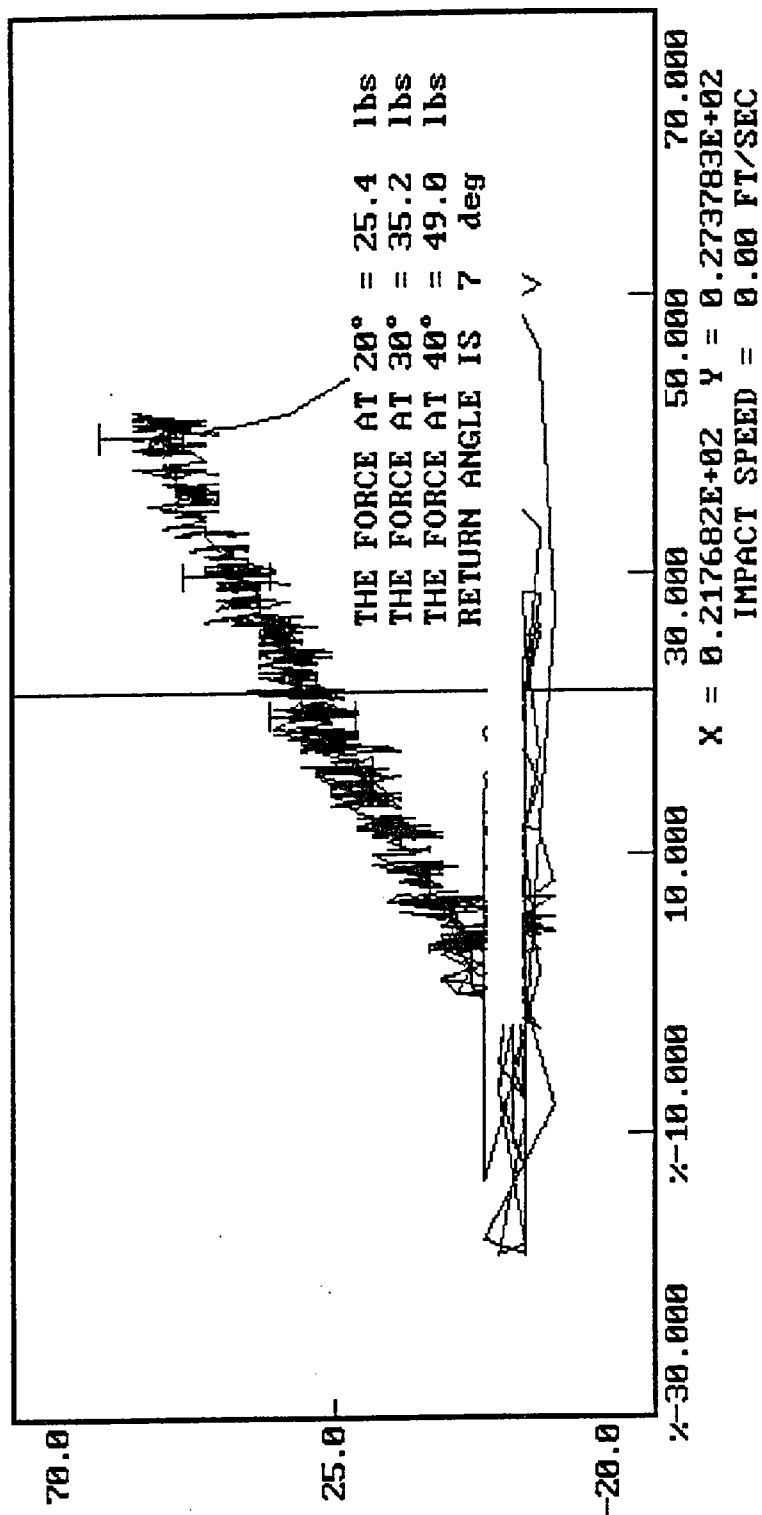
TEST MEETS SPECIFICATIONS

TECHNICIAN _____

APPROVED BY _____

05-25-1994 15:12

DUMMY CALIBRATION - LUMBAR FLEXION
DUMMY # 269
FORCE () US. TORSO ROTATION (DEGREES)



POST-TEST DRIVER DUMMY INSPECTION CHECKLIST

Type: Side Impact Dummy

Serial Number: 270

Inspected By: Jeff Robbins

Date: May 25, 1994

<u>Part</u>	<u>Items Checked</u>	<u>Comments</u>
Skin	visual inspection	OK
Head	visual, ballast, accelerometer mount	OK
Neck	visual, cable torque	OK
Spine box	visual, ballast, weldment, accelerometer mount	OK
Rib cage	visual, measure, stiffeners	OK
Sternum	visual	OK
Lumbar spine	visual	OK
Abdomen	visual	OK
Pelvis	visual, palpate, accelerometer mount	OK
Upper legs	visual	OK
Knees	visual, stops, inserts	OK
Lower legs	visual, range of motion	OK
Ankles	visual, range of motion	OK
Feet	visual, range of motion	OK
Joints	1 to 2 g range	OK
Other		

NOTES: (include component/problem/action/reason):

POST-TEST PASSENGER DUMMY INSPECTION CHECKLIST

Type: Side Impact Dummy

Serial Number: 269

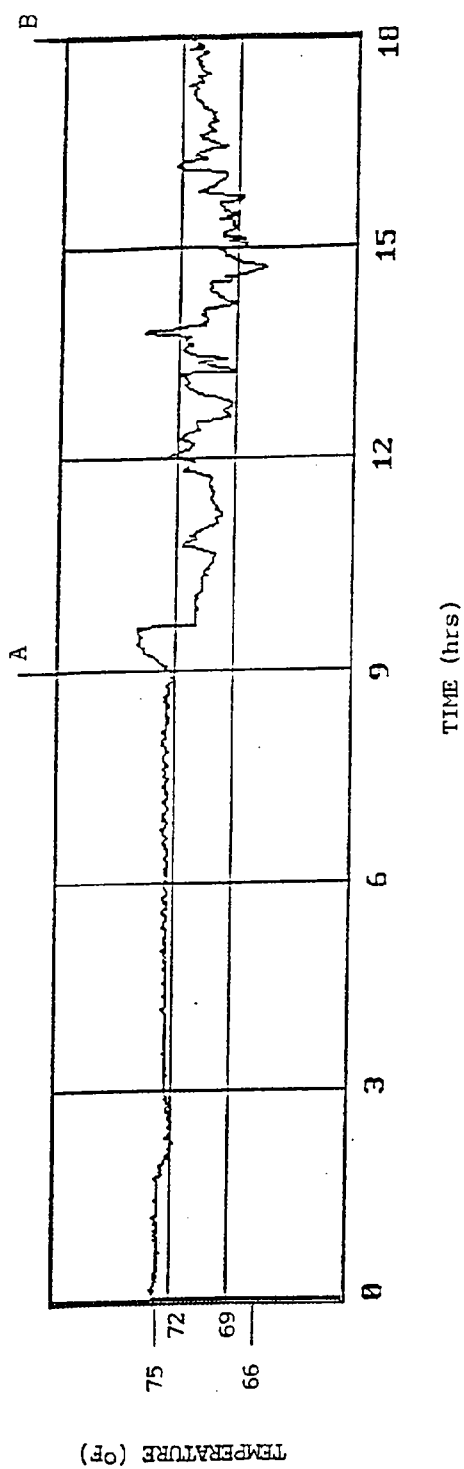
Inspected By: Jeff Robbins

Date: May 25, 1994

<u>Part</u>	<u>Items Checked</u>	<u>Comments</u>
Skin	visual inspection	OK
Head	visual, ballast, accelerometer mount	OK
Neck	visual, cable torque	OK
Spine box	visual, ballast, weldment, accelerometer mount	OK
Rib cage	visual, measure, stiffeners	OK
Sternum	visual	OK
Lumbar spine	visual	OK
Abdomen	visual	OK
Pelvis	visual, palpate, accelerometer mount	OK
Upper legs	visual	OK
Knees	visual, stops, inserts	OK
Lower legs	visual, range of motion	OK
Ankles	visual, range of motion	OK
Feet	visual, range of motion	OK
Joints	1 to 2 g range	OK
Other		

NOTES: (include component/problem/action/reason):

VEHICLE AND DUMMY TEMPERATURE



A = Dummies installed in vehicle
 B = Test conducted

APPENDIX D
DUMMY AND VEHICLE CALIBRATION DATA

**DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION
INSTRUMENTS FOR DRIVER DUMMY NO. 270**

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib	AGTP7	Endevco	April 28, 1994
Lower Rib	AHT2G	Endevco	April 27, 1994
Lower Spine	AHT06	Endevco	April 28, 1994
Pelvis	AHTN7	Endevco	April 27, 1994
Upper Rib Redundant	AGTH6	Endevco	April 28, 1994
Lower Rib Redundant	AHTY4	Endevco	April 27, 1994
Lower Spine Redundant	AGTB2	Endevco	April 28, 1994
Pelvis Redundant	AGTF7	Endevco	April 27, 1994

INSTRUMENTS FOR PASSENGER DUMMY NO. 269

	LEFT REAR PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib	AHRY3	Endevco	April 27, 1994
Lower Rib	AHT21	Endevco	April 27, 1994
Lower Spine	AHTR2	Endevco	April 28, 1994
Pelvis	AGWA4	Endevco	April 27, 1994
Upper Rib Redundant	AHTT4	Endevco	April 18, 1994
Lower Rib Redundant	AGR57	Endevco	April 27, 1994
Lower Spine Redundant	AHT13	Endevco	April 27, 1994
Pelvis Redundant	AHWK8	Endevco	April 27, 1994

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
MDB CG X	MGA016	Entran	May 06, 1994
MDB CG Y	MGA134	Entran	May 06, 1994
MDB CG Z	MGA007	Entran	May 06, 1994
MDB Rear Axle X	MGA125	Entran	April 27, 1994
MDB Rear Axle Y	MGA054	Entran	May 06, 1994
Lower Left A-Post Y	MGA078	Entran	May 06, 1994
Mid Left B-Post Y	MGA065	Entran	May 06, 1994
Upper Left B-Post Y	A87M	Endevco	May 06, 1994
Trunk Centerline X	MGA035	Entran	April 28, 1994
Trunk Centerline Y	MGA117	Entran	April 28, 1994
Trunk Centerline Z	MGA130	Entran	April 25, 1994
Driver Seat Track Y	MGA027	Entran	April 25, 1994
Right Front Sill X	MGA079	Entran	April 6, 1994
Right Front Sill Y	MGA132	Entran	April 6, 1994
Right Front Sill Z	MGA147	Entran	April 28, 1994
Right Rear Sill X	AC815	Endevco	May 06, 1994
Right Rear Sill Y	MGA124	Entran	May 06, 1994
Right Rear Sill Z	MGA146	Entran	May 06, 1994
Right Rear Seat Occupant Compartment Y	MGA145	Entran	May 06, 1994
Left Front Sill Y	MGA126	Entran	April 27, 1994
Left Rear Sill Y	MGA131	Entran	April 25, 1994

Note: All Endevco accelerometers are Model No. 7264-2000
All Entran accelerometers are Model No. EGE-72