

REPORT NO.: MGA-94-21412

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

SAAB AUTOMOBILE AB
1994 SAAB 900S 5 DOOR HATCHBACK
NHTSA NO: CR0504

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105



MGA Ref. No.: G93A-02

Test Date: June 28, 1994

Report Date: July 28, 1994

FINAL REPORT

Prepared For:

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16. Abstract Compliance tests were conducted on the subject 1994 Saab 900S 5 Door Hatchback 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 June 28, 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 78°F. The maximum static crush of the impacted vehicle was 13.2 inches at level 2, the H-Point level. 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>55 g's</td> <td>90 g's</td> </tr> <tr> <td>Pelvis Acceleration</td> <td>62.0 g's</td> <td>59.0 g's</td> </tr> <tr> <td>Upper Rib Acceleration</td> <td>49.7 g's</td> <td>94.1 g's</td> </tr> <tr> <td>Lower Rib</td> <td>46.7 g's</td> <td>104.9 g's</td> </tr> <tr> <td>Lower Spine</td> <td>59.9 g's</td> <td>74.0 g's</td> </tr> </tbody> </table> Apparently, the 1994 Saab 900S 5 Door Hatchback did not comply with the requirements for FMVSS 214 which were set forth by the National Highway Traffic Safety Administration.							<u>Driver's SID</u>	<u>Left Rear SID</u>	Thoracic Trauma Index (TTI)	55 g's	90 g's	Pelvis Acceleration	62.0 g's	59.0 g's	Upper Rib Acceleration	49.7 g's	94.1 g's	Lower Rib	46.7 g's	104.9 g's	Lower Spine	59.9 g's	74.0 g's
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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 Saab 900S 5 Door hatchback.

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.

TEST NOTES

The MDB rear axle Y acceleration data was lost during the impact due to a intermittent umbilical wire connection.

The post-test FMVSS 301 Static Rollover was not performed due to the apparent non-compliance of the test vehicle to FMVSS 214 Dynamic Side Impact Standards.

SECTION 2

SUMMARY OF SIDE IMPACT TEST

A stationary 1994 Saab 900S 5 Door hatchback 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 June 28, 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 summary of the side impact dummy (SID) configuration and performance verification test data are shown in Appendix C.

The driver's Thoracic Trauma Index (TTI) was 54.8 g's. Maximum pelvic Y acceleration was 62.0 g's.

The left rear passenger's TTI was 89.5 g's. Maximum pelvic Y acceleration was 58.9 g's.

SECTION 3
SUMMARY OF TEST DATA

TABLE 1
GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 1994/Saab/900S/5 Door Hatchback
 Vehicle NHTSA No.: CR0504 VIN: YS3DM55B3R2038085
 Vehicle Body Color: Green Month & Year of Manufacture: 05-94
 Engine Data: 4 cylinders; CID; 2.3 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 78 miles
 Options: X A/C; X Pwr. Steering.; X Pwr. Brakes; X Pwr. Windows
 Power Seats; X Tilt Wheel; X Power Door Locks; Self Leveling System

DATA FROM TIRE PLACARD:

Tire Pressure (at capacity): 32 psi FRONT
32 psi REAR
 Recommended Tire Size: P195/60R15
 Tires on Test Vehicle: P195/60R15 Manufacturer: Pirrelli

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 Lever
 Vehicle Maximum Capacity Loading* = 880 lbs (A)
 No. of Occupants x 150 lbs. = 750 lbs (B)
 Cargo Capacity (A-B) = 130 lbs

WEIGHT OF TEST VEHICLE WITH MAXIMUM FLUIDS:

Right Front	=	<u>928</u> lbs	Right Rear	=	<u>581</u> lbs
Left Front	=	<u>948</u> lbs	Left Rear	=	<u>578</u> lbs
TOTAL FRONT	=	<u>1876</u> lbs	TOTAL REAR	=	<u>1159</u> lbs
% of Total Vehicle Weight	=	<u>61.8</u> %;	% of Total Weight	=	<u>38.2</u> %
TOTAL WEIGHT	=	<u>3035</u> lbs			

* Supplied by manufacturer

TABLE 2
TEST VEHICLE DATA

Year/Make/Model/Body Style: 1994/Saab/900S/5 Door Hatchback

Vehicle NHTSA No.: CR0504 TEST DATE: June 28, 1994

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Test Vehicle Delivered Weight with Maximum Fluids = 3035 lbs

Maximum Cargo Carrying Capacity of Test Vehicle = 130 lbs

Weight of 2 Side Impact Dummies (2 x 178 lbs.) = 356 lbs

TEST VEHICLE TARGET WEIGHT: = 3521 lbs

ACTUAL WEIGHT OF TEST VEHICLE WITH 2 DUMMIES AND CARGO:

Right Front = 990 lbs Right Rear = 713 lbs

Left Front = 1058 lbs Left Rear = 749 lbs

TOTAL FRONT = 2048 lbs TOTAL REAR = 1462 lbs

% of Total Weight = 58.3 % % of Total Weight = 41.7 %

TOTAL TEST WEIGHT = 3510 lbs

TEST VEHICLE ATTITUDE (all dimensions in inches):

CURB WEIGHT ATTITUDE: (in)

Right Front 26.7 Left Front 26.6 Right Rear 27.1 Left Rear 27.0

FULLY LOADED WEIGHT ATTITUDE: (in)

Right Front 25.6 Left Front 26.0 Right Rear 26.0 Left Rear 25.3

TEST ATTITUDE: (in)

Right Front 26.0 Left Front 26.1 Right Rear 26.2 Left Rear 25.9

Test Vehicle Wheelbase: 102.5 inches

C.G. = 42.7 inches rearward of front wheel centerline

TOTAL VEHICLE LENGTH:

Right Side = 171.1 in

Centerline = 180.8 in

Left Side = 171.1 in

FIGURE 1
PRE-TEST CONDITIONS

Year/Make/Model/Body Style: 1994/Saab/900S/5 Door Hatchback

Vehicle NHTSA No.: CR0504 TEST DATE: June 28, 1994

FRONT SEAT CUSHION PLACEMENT:

Total Length of Adjustment Travel: 8.5 inches

Total Number of Adjustment Positions or Detents: 18

Adjustment Position: 9th detent

FRONT SEAT BACK ADJUSTMENT POSITION:

Seat Back Angle = 16.0° 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 down Right Rear down

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 = 17.1 gallons

Test Volume: 16 gallons (94% of capacity)

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

Wheelbase: = 102.5 in

Impact Point is 14.25 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/Saab/900S/4 Door Hatchback

Vehicle NHTSA No.: CR0504 TEST DATE: June 28, 1994

Overall Length = 180.8 in; Overall Width = 66.7 in

TEST WEIGHT:

Right Front	=	<u>990</u> lbs	Right Rear	=	<u>713</u> lbs
Left Front	=	<u>1058</u> lbs	Left Rear	=	<u>749</u> lbs
TOTAL FRONT	=	<u>2048</u> lbs	TOTAL REAR	=	<u>1462</u> lbs
TOTAL VEHICLE WEIGHT <u>3510</u> lbs					
Wheelbase = <u>102.5</u> in					
Longitudinal C.G. front Center of Front Axle = <u>42.7</u> in					
Impact Angle with Respect to Impactor = <u>90°</u> degrees					

MAXIMUM EXTERIOR STATIC CRUSH:

1. LEVEL 1 (10.5 in above ground) = 6.2 in
2. LEVEL 2 (19.3 in above ground) = 13.2 in
3. LEVEL 3 (23.5 in above ground) = 11.7 in
4. LEVEL 4 (35.5 in above ground) = 9.9 in
5. LEVEL 5 (52.3 in above ground) = -5.6 in
Maximum Post-Test Intrusion = 13.2 in

OCCUPANTS:

	<u>Left Front Passenger</u>	<u>Left Rear Passenger</u>
Type of Dummy	<u>SID</u>	<u>SID</u>
Restraints Used	<u>3 pt. lap & shoulder belt with airbag</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>7</u>
Deformable Barrier	=	<u>2</u>
TOTAL	=	<u>9</u>

TABLE 4
CRASH TEST SUMMARY FOR SIDE IMPACTOR

Year/Make/Model/Body Style: 1994/Saab/900S/5 Door Hatchback
Vehicle NHTSA No.: CR0504 TEST DATE: June 28, 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: 32.9 mph Secondary: 33.2 mph

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE:

1. Row A Top of Stack (33 in)	= <u>4.5</u> in
2. Row B Mid Stack (27 in)	= <u>3.0</u> in
3. Row C Top of Bumper (21 in)	= <u>1.8</u> in
4. Row D Center of Bumper (17 in)	= <u>3.1</u> in

INSTRUMENTATION:

Number of MDB Data Channels = 7

TABLE 5
POST-TEST OBSERVATIONS

Year/Make/Model/Body Style: 1994/Saab/900S/5 Door Hatchback

Vehicle NHTSA No.: CR0504 TEST DATE: June 28, 1994

VISIBLE DUMMY CONTACT POINTS:

	<u>LEFT FRONT SID</u>	<u>LEFT REAR SID</u>
Head	<u>to left shoulder</u>	<u>to "C" Post</u>
Arm	<u>to "B" post and door trim</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: 0.5 inches rearward Vertical: .75 inches high

ARM REST LOCATIONS:

Front: 9.5 inches below window opening

Rear: 9.5 inches below window opening

SEAT CRUSH:

Driver Seat Back: 5.8 inches Driver Seat Cushion: 2.8 inches

Left Rear Seat Back: 5.8 inches Left Rear Seat Cushion: 4.8 inches

GLAZING DAMAGE:

Left rear side door glass broken and windshield cracked

PILLAR PERFORMANCE:

No separation noted

SILL SEPARATION:

No sill separation noted

OTHER NOTABLE IMPACT EFFECTS:

Both driver and passenger front seating position airbags deployed

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

TABLE 6

SIDE IMPACT DUMMY (SID) TEST DATA SUMMARYYear/Make/Model/Body Style: 1994/Saab/900S/5 Door HatchbackVehicle NHTSA No.: CR0504 TEST DATE: June 28, 1994

	Front Dummy ID # 272				Rear Dummy ID # 271			
	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	49.7	38	-15.7	77	94.1	45	-11.2	121
Upper Rib Lateral....Y(R)	48.8	38	-14.4	78	94.4	45	-10.1	121
Lower Rib Lateral.....Y	46.7	40	-13.1	90	104.9	45	-16.7	71
Lower Rib Lateral.....Y(R)	45.8	40	-11.7	90	106.3	45	-16.8	71
SPINE ACCELERATIONS:								
Lower Lateral.....Y	59.9	34	-13.3	68	74.0	46	-36.6	71
Lower Lateral.....Y(R)	59.2	34	-14.1	68	71.4	46	-37.9	71
PELVIC ACCELERATIONS:								
Lateral.....Y	62.0	30	-15.9	57	59.0	36	-10.5	77
Lateral.....Y(R)	62.8	30	-15.1	57	59.3	36	-9.4	77

REFERENCE:

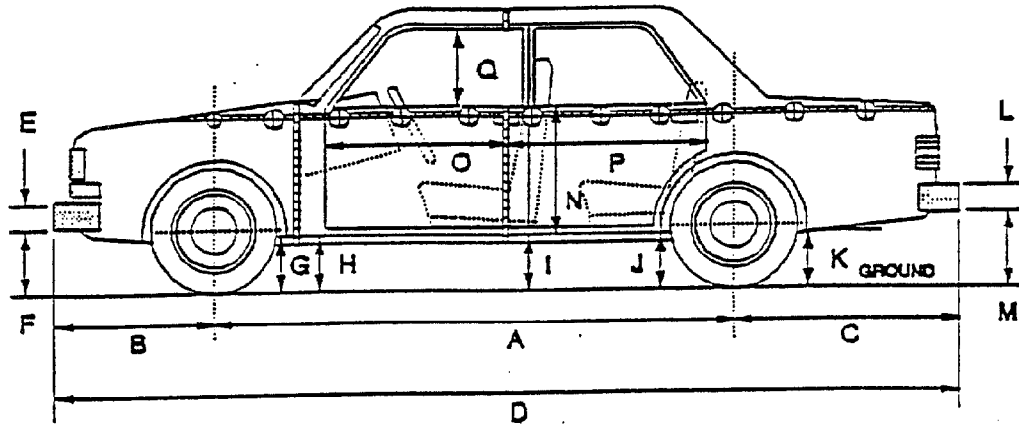
Positive Direction - Longitudinal (X) = forward

Lateral (Y) = to right

Vertical (Z) = up

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

FIGURE 2
PRE- AND POST-TEST MEASUREMENTS



LEFT SIDE VIEW

D = Length at Centerline

R = Right Side Length

S = Left Side Length

T = Width at B Post

E & L = Bumper Thickness

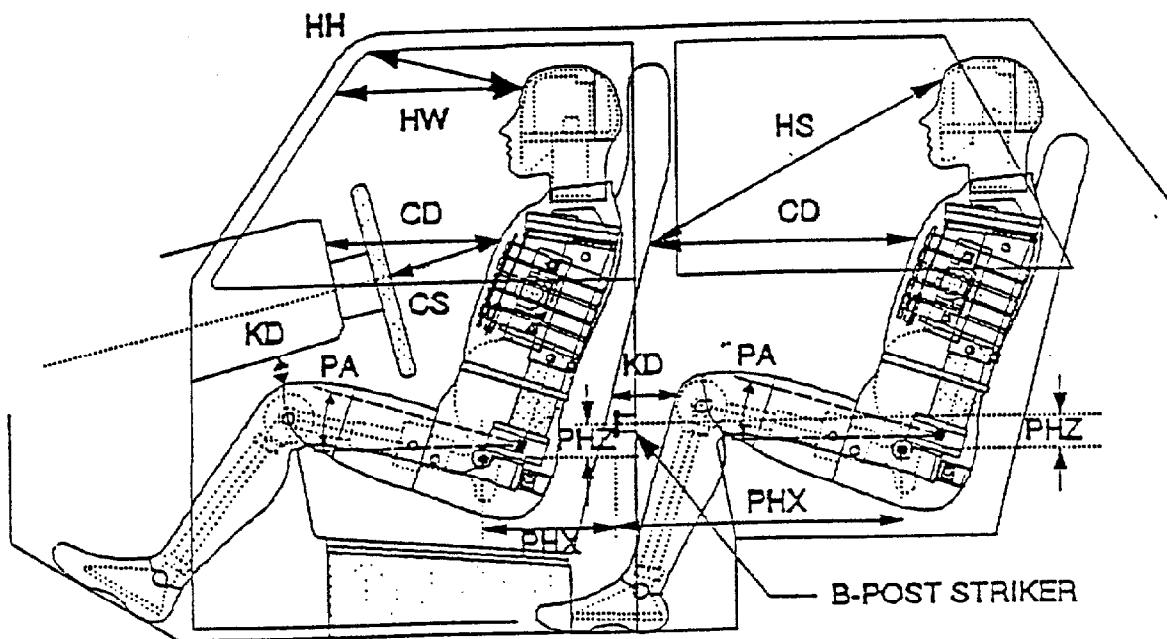
J1 = To Pinch Weld

J2 = To Sill

Units: in

LOCATION	PRE-TEST	POST-TEST	Δ CHANGE
A	102.5	101.6	0.9
B	39.1	39.1	0
C	39.2	39.1	0.1
D	180.8	179.8	1.0
E	7.5	7.5	0
F	13.6	14.1	0.5
G	7.4	7.9	0.5
H	7.4	8.5	1.1
I	6.6	6.5	0.1
J1/J2	6.5/7.1	6.0/6.1	0.5/1.0
K	9.0	9.1	0.1
L	8.4	8.4	0
M	13.8	13.8	0
N	26.3	20.9	5.4
O	30.6	29.5	1.1
P	50.3	47.6	2.7
Q	16.5	16.3	0.2
R	171.1	171.1	0
S	171.1	170.4	0.7
T	66.7	60.5	6.2

FIGURE 3
SIDE IMPACT DUMMY (SID) LONGITUDINAL CLEARANCE DIMENSIONS



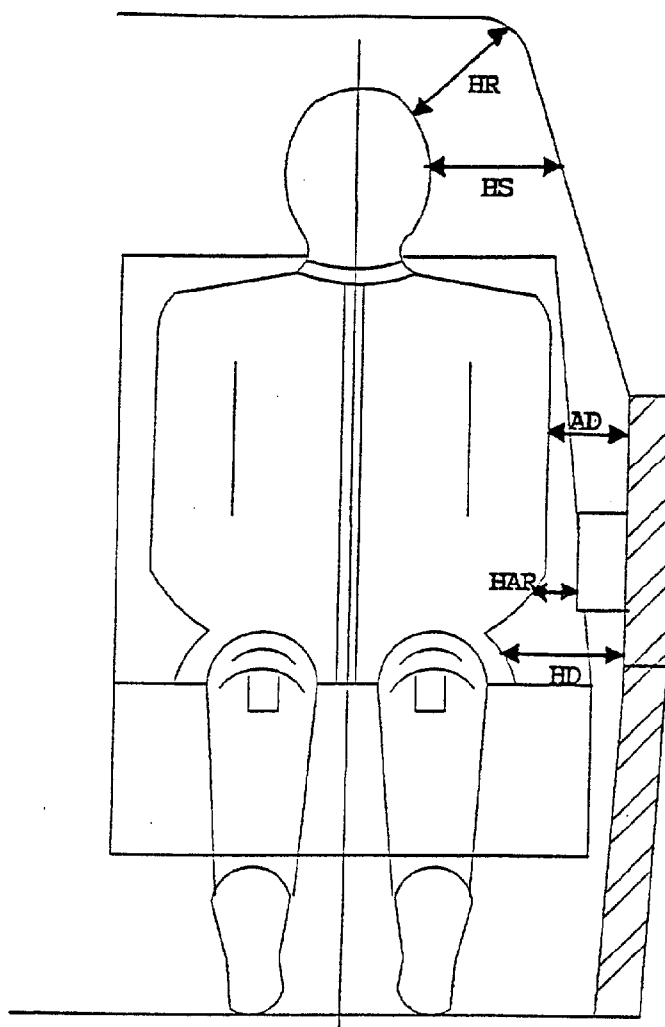
LEFT SIDE VIEW

NOTE: All dimensions are in inches

	DRIVER ID #272	LEFT REAR PASSENGER ID #271
HH	20.0	---
HW	26.9	---
HS	---	23.9
CD	23.0	18.7
CS	14.7	---
KDL	6.9	5.5
KDR	6.2	5.8
PA°	24.8°	23.9°
PHX	6.1	10.5
PHZ	5.7	9.6

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

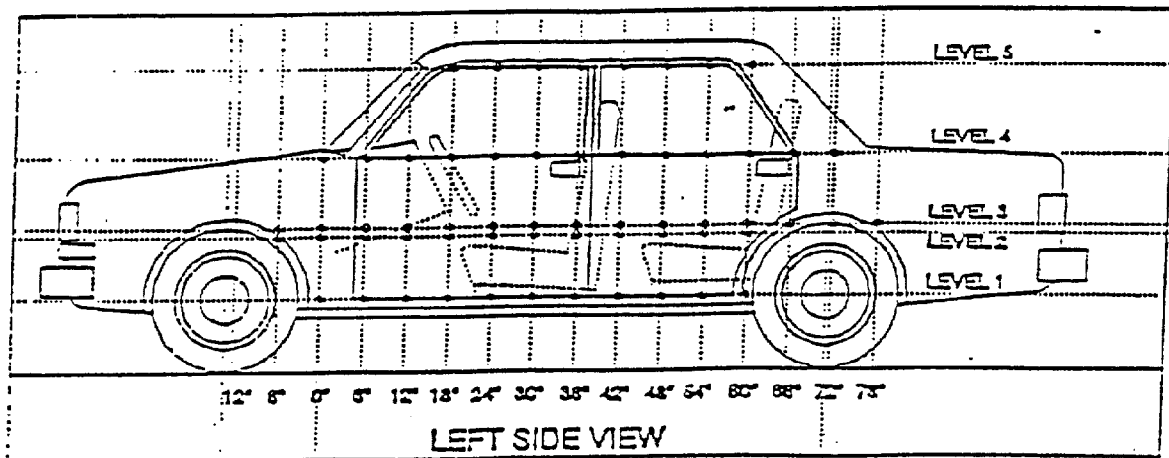


NOTE: All dimensions are in inches

	DRIVER ID #272	LEFT REAR PASSENGER ID #271
HR	6.1	4.5
HS	10.6	7.1
AD	4.1	3.1
HD	5.5	4.8

FIGURE 5
VEHICLE SIDE MEASUREMENTS

Year/Make/Model/Body Style: 1994/Saab/900S/5 Door Hatchback
Vehicle NHTSA No.: CR0504 TEST DATE: June 28, 1994



Height measurements are with respect to ground along the vertical 33" line shown above:

	<u>33" Side Profile</u>
Level 5 @ Window Top	= <u>52.3</u> in
Level 4 @ Window Sill	= <u>35.5</u> in
Level 3 @ Mid Door	= <u>23.5</u> in
Level 2 @ Occupant H-Point	= <u>19.3</u> in
Level 1 @ Axle Centerline Height (or Sill Top Height)	= <u>10.5</u> in

TABLE 7

TEST VEHICLE EXTERIOR PROFILES FROM REFERENCE PLANE AND STATIC CRUSH

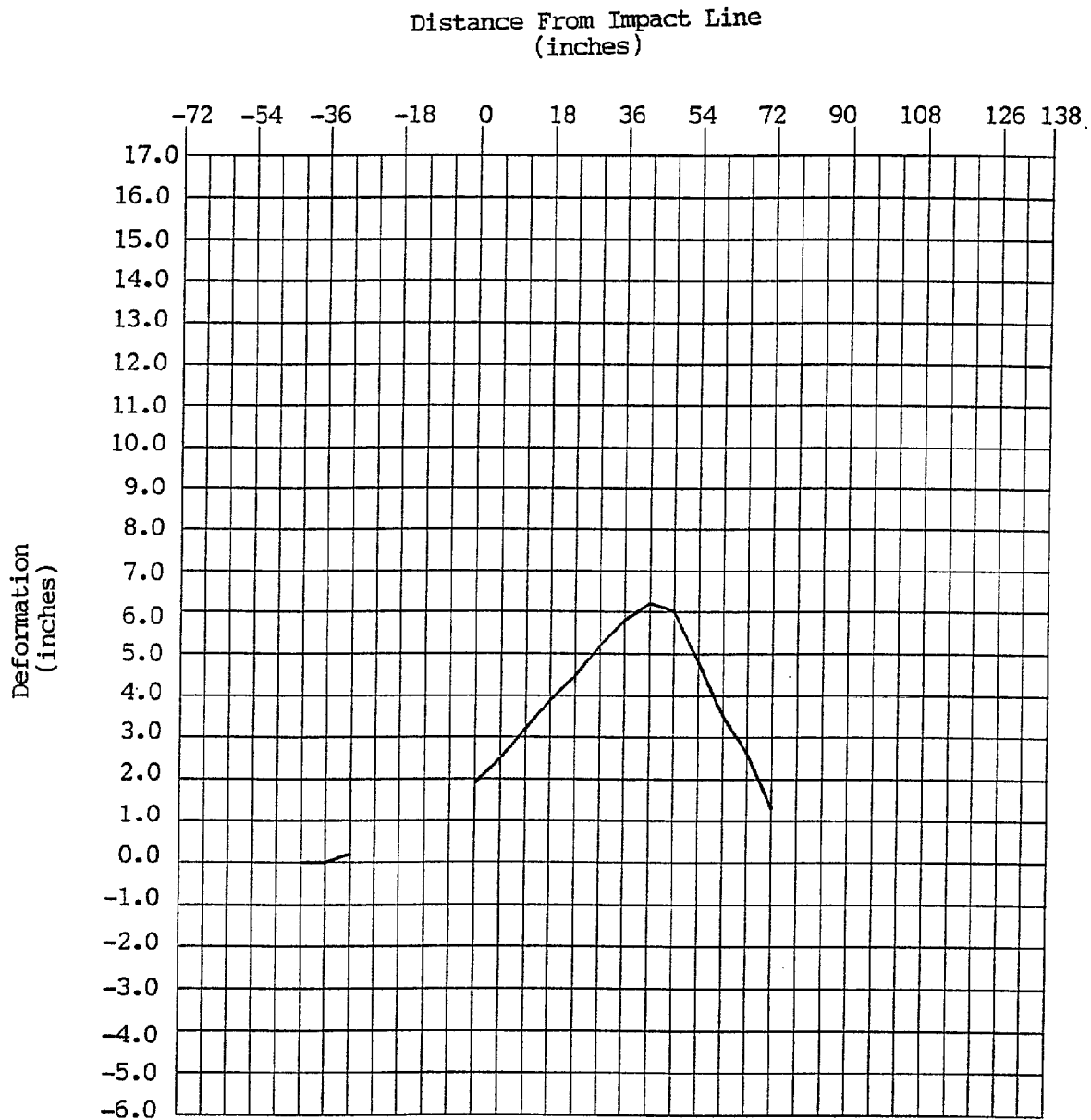
LEVEL 1 AT AXLE CENTER LINE

Year/Make/Model/Body Style: 1994/Saab/900S/5 Door HatchbackVehicle NHTSA No.: CR0504 TEST DATE: June 28, 1994

Longitudinal Distance (in)	PRE-TEST (in)	POST-TEST (in)	STATIC CRUSH (in)
-72	---	---	---
-66	---	---	---
-60	---	---	---
-54	---	---	---
-48	---	---	---
-42	35.4	35.4	0
-36	33.4	33.4	0
-30	31.9	32.1	0.2
-24	---	---	---
-18	---	---	---
-12	---	---	---
-6	---	---	---
0	30.7	32.6	1.9 (impact point)
6	31.2	33.7	2.5
12	31.5	34.7	3.2
18	31.7	35.6	3.9
24	31.8	36.3	4.5
30	31.8	37.0	5.2
36	31.8	37.6	5.8
42	31.7	37.9	6.2
48	31.6	37.6	6.0
54	31.5	36.3	4.8
60	31.5	35.0	3.5
66	31.3	33.9	2.6
72	31.1	32.6	1.3
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

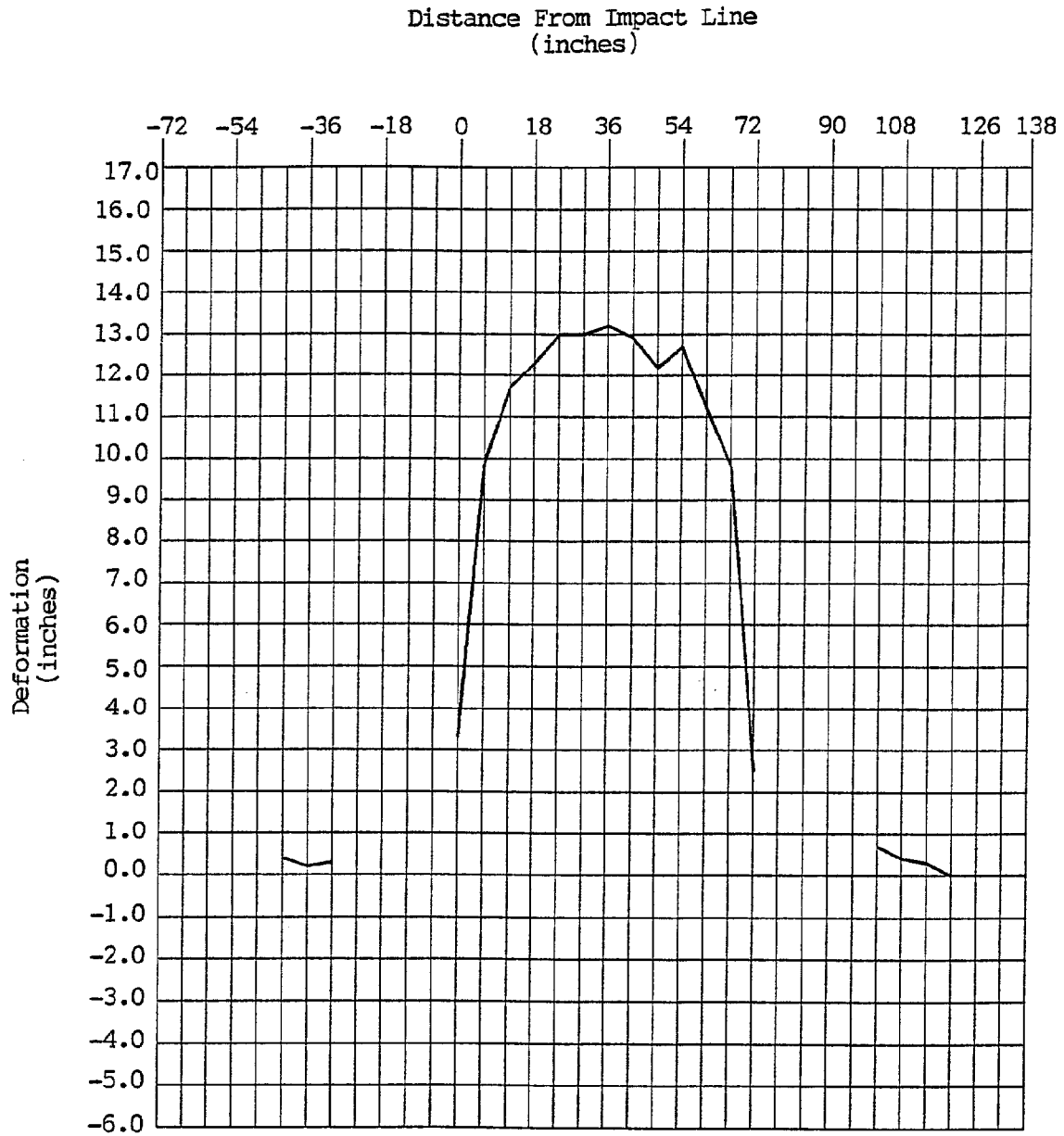
LEVEL 2 AT OCCUPANT H-POINT

Year/Make/Model/Body Style: 1994/Saab/900S/5 Door HatchbackVehicle NHTSA No.: CR0504 TEST DATE: June 28, 1994

Longitudinal Distance (in)	PRE-TEST (in)	POST-TEST (in)	STATIC CRUSH (in)
-72	---	---	---
-66	---	---	---
-60	---	---	---
-54	---	---	---
-48	---	---	---
-42	33.2	32.8	0.4
-36	31.5	31.7	0.2
-30	30.8	31.1	0.3
-24	---	---	---
-18	---	---	---
-12	---	---	---
-6	---	---	---
0	30.1	33.4	3.3 (impact point)
6	30.1	40.0	9.9
12	30.0	41.7	11.7
18	30.0	42.3	12.3
24	29.9	42.7	13.0
30	29.8	42.9	13.0
36	29.8	43.0	13.2
42	29.7	42.7	12.9
48	29.9	42.1	12.2
54	29.8	42.5	12.7
60	29.8	41.0	11.2
66	29.8	39.6	9.8
72	31.1	33.6	2.5
78	---	---	---
84	---	---	---
90	---	---	---
96	---	---	---
102	30.6	31.3	0.7
108	31.3	31.7	0.4
114	32.0	32.3	0.3
120	33.2	33.2	0
126	---	---	---
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

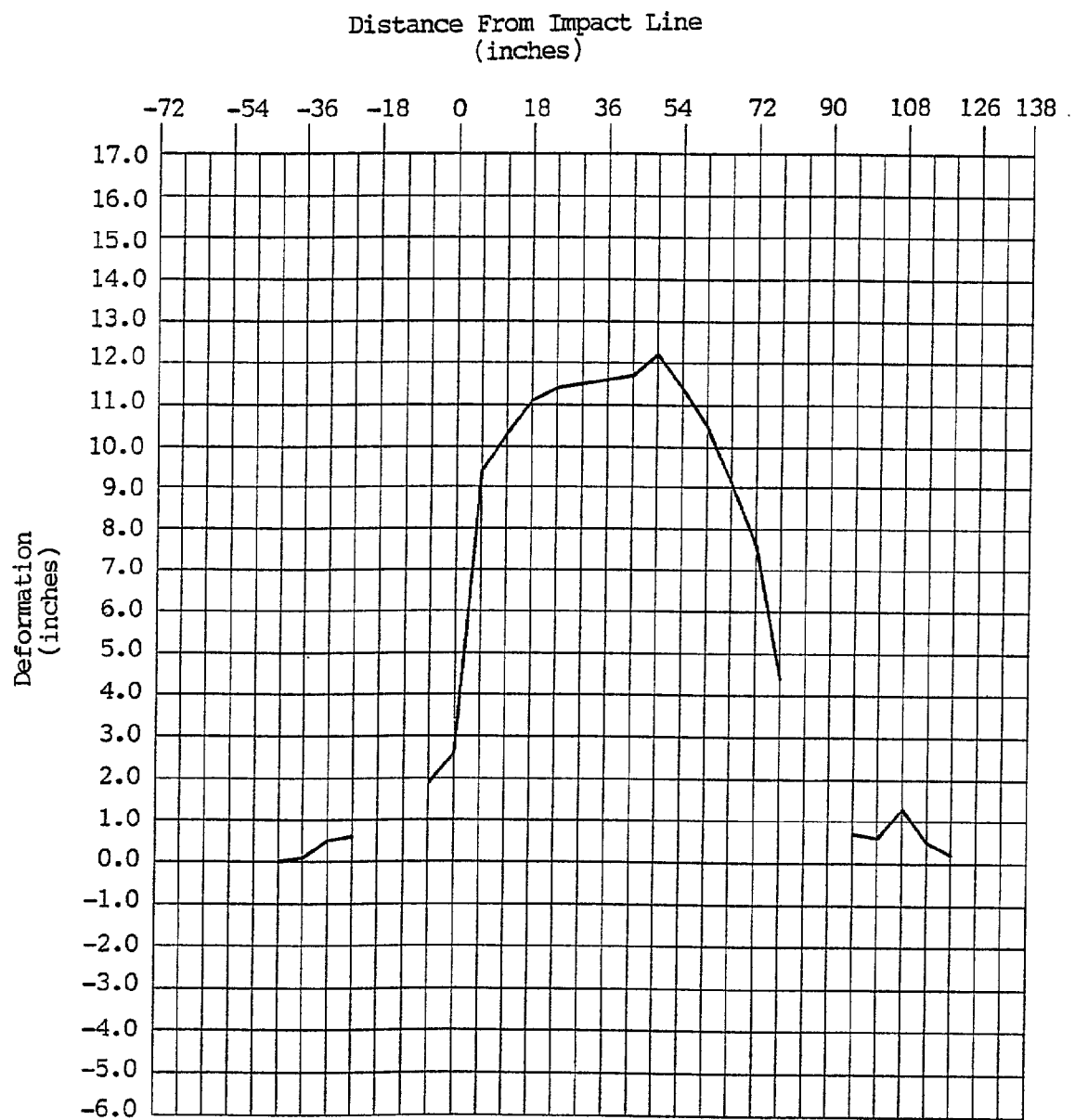
LEVEL 3 AT MID-DOOR

Year/Make/Model/Body Style: 1994/Saab/900S/5 Door HatchbackVehicle NHTSA No.: CR0504 TEST DATE: June 28, 1994

Longitudinal Distance (in)	PRE-TEST (in)	POST-TEST (in)	STATIC CRUSH (in)
-72	---	---	---
-66	---	---	---
-60	---	---	---
-54	---	---	---
-48	---	---	---
-42	34.5	34.5	0
-36	32.3	32.4	0.1
-30	31.3	31.8	0.5
-24	30.0	30.6	0.6
-18	---	---	---
-12	---	---	---
-6	29.3	31.2	1.9
0	29.3	31.9	2.6 (impact point)
6	29.8	39.2	9.4
12	29.8	40.1	10.3
18	29.6	40.7	11.1
24	29.5	40.9	11.4
30	29.4	40.9	11.5
36	29.3	40.9	11.6
42	29.3	41.0	11.7
48	29.3	41.5	12.2
54	29.2	40.6	11.4
60	29.3	39.8	10.5
66	29.5	38.6	9.1
72	29.6	37.2	7.6
78	29.8	34.2	4.4
84	---	---	---
90	---	---	---
96	30.1	30.8	0.7
102	31.1	31.7	0.6
108	32.0	33.3	1.3
114	32.8	33.3	0.5
120	34.8	34.6	0.2
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

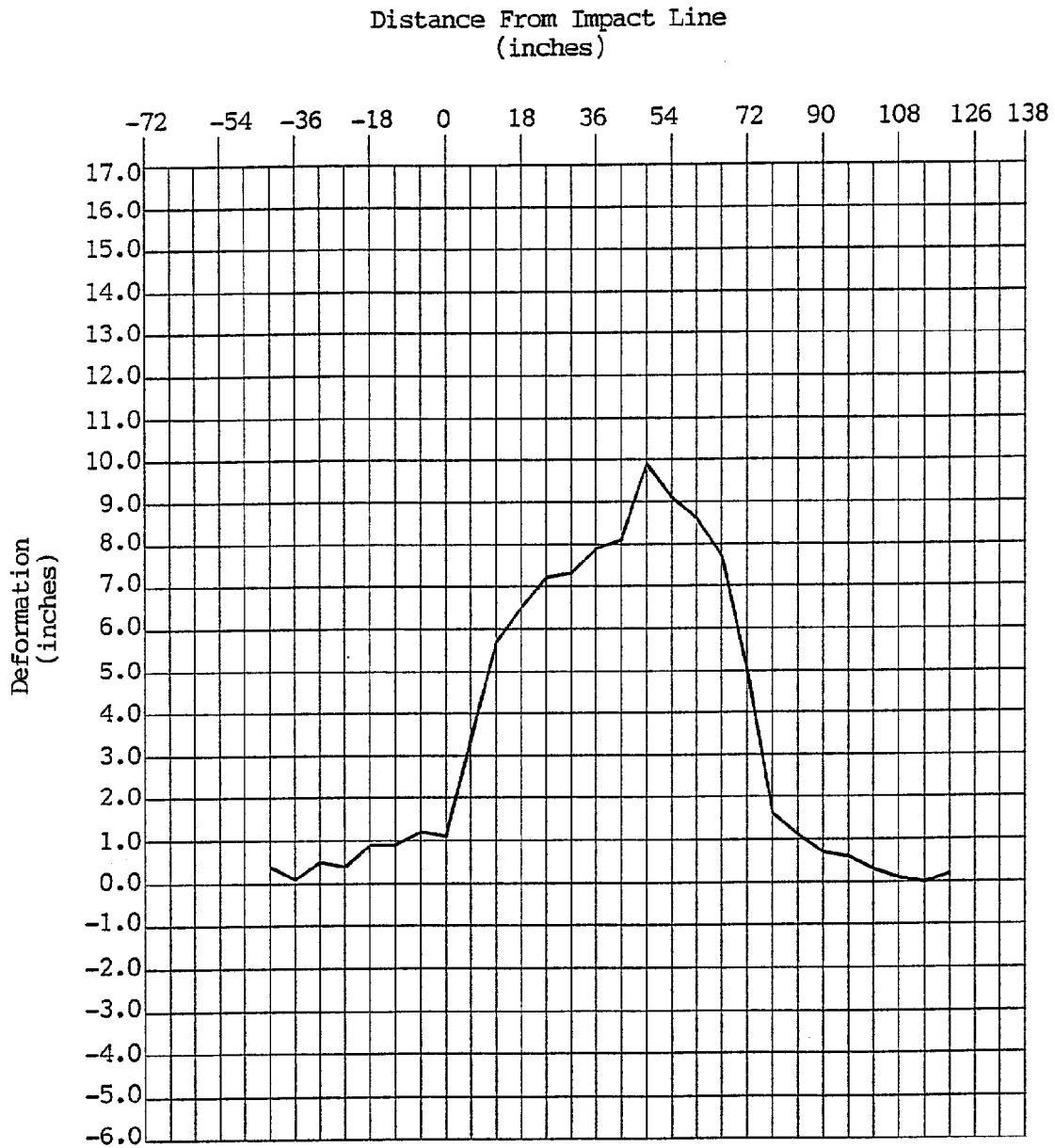
LEVEL 4 AT WINDOW SILL

Year/Make/Model/Body Style: 1994/Saab/900S/5 Door HatchbackVehicle NHTSA No.: CR0504 TEST DATE: June 28, 1994

Longitudinal Distance (in)	PRE-TEST (in)	POST-TEST (in)	STATIC CRUSH (in)
-72	---	---	---
-66	---	---	---
-60	---	---	---
-54	---	---	---
-48	---	---	---
-42	37.8	38.2	0.4
-36	36.7	36.8	0.1
-30	35.9	36.4	0.5
-24	35.3	35.7	0.4
-18	34.5	35.4	0.9
-12	33.9	34.8	0.9
-6	33.7	34.9	1.2
0	33.2	34.3	1.1 (impact point)
6	33.1	36.5	3.4
12	32.9	38.6	5.7
18	32.7	39.2	6.5
24	32.3	39.5	7.2
30	32.5	39.8	7.3
36	32.4	40.3	7.9
42	32.4	40.5	8.1
48	32.3	42.2	9.9
54	32.4	41.5	9.1
60	32.5	41.1	8.6
66	32.7	40.4	7.7
72	32.8	37.8	5.0
78	32.9	34.5	1.6
84	33.3	34.4	1.1
90	33.7	34.4	0.7
96	34.1	34.7	0.6
102	34.6	34.9	0.3
108	35.2	35.3	0.1
114	36.1	36.1	0
120	37.4	37.2	0.2
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

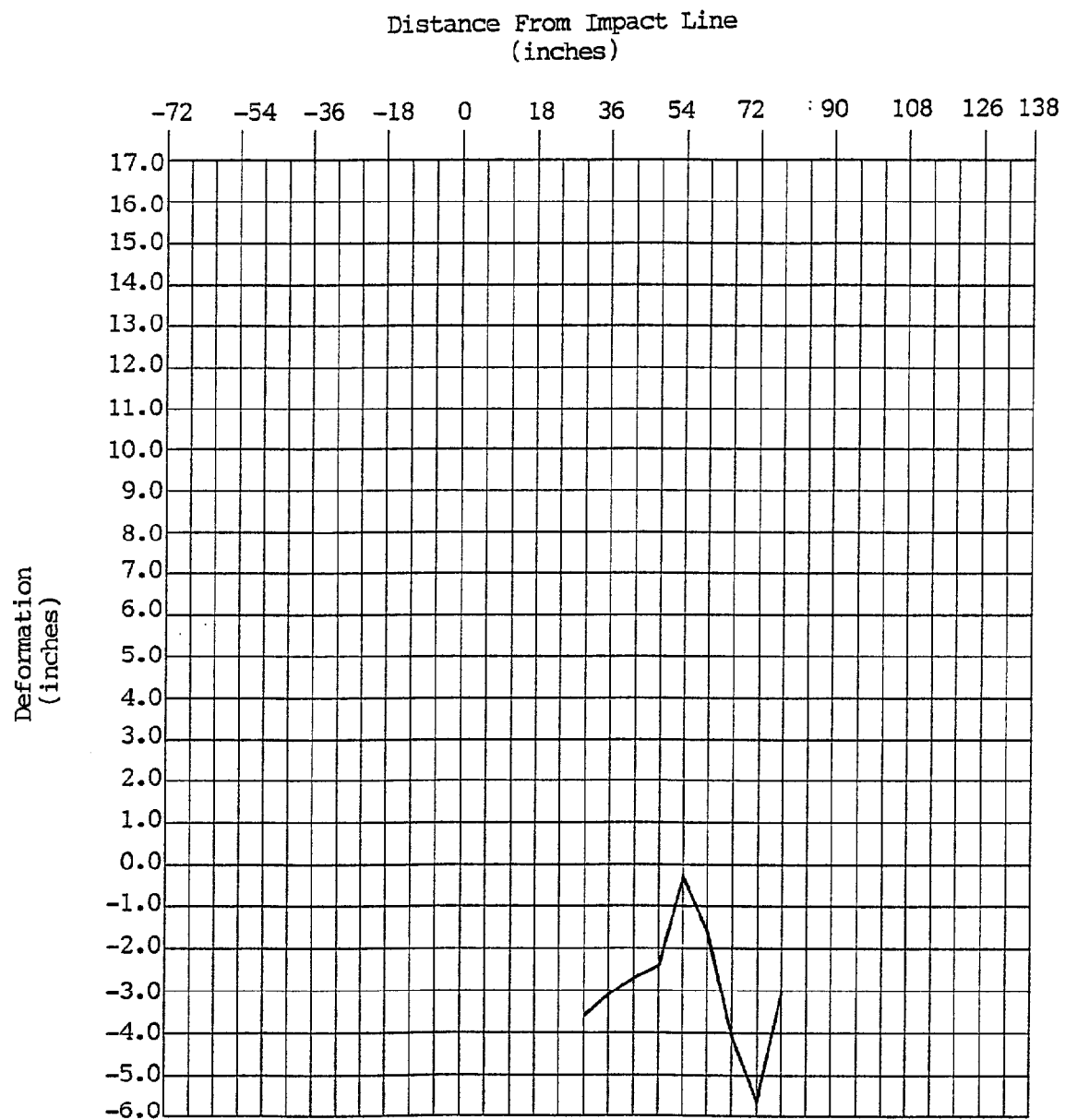
LEVEL 5 AT WINDOW TOP

Year/Make/Model/Body Style: 1994/Saab/900S/5 Door HatchbackVehicle NHTSA No.: CR0504 TEST DATE: June 28, 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	---	---	---	(impactpoint)
6	---	---	---	
12	---	---	---	
18	---	---	---	
24	---	---	---	
30	41.3	37.7	-3.6	
36	41.1	38.0	-3.1	
42	41.2	38.5	-2.7	
48	41.4	39.0	-2.4	
54	41.4	41.1	-0.3	
60	41.5	39.4	-1.6	
66	41.8	37.7	-4.1	
72	42.1	36.5	-5.6	
78	42.6	39.6	-3.0	
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 5 AT WINDOW TOP

FIGURE 7
TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 1994/Saab/900S/5 Door Hatchback
 Vehicle NHTSA No.: CR0504 TEST DATE: June 28, 1994

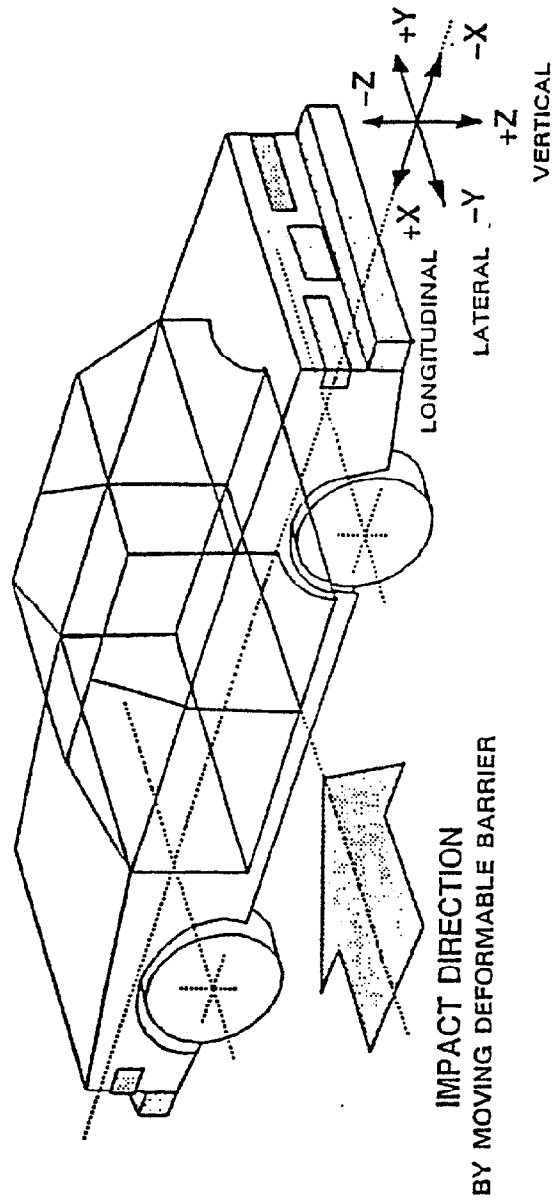
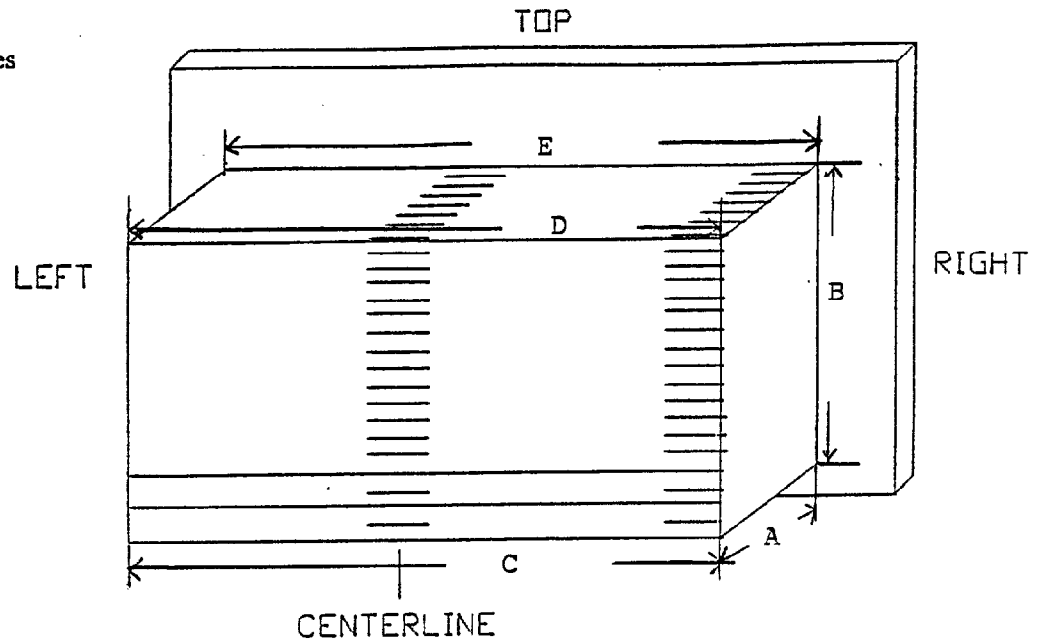


FIGURE 8
MDB FACE DIMENSIONS

Measurements in inches

A = 15.1
B = 22.3
C = 66.3
D = 66.1
E = 66.3



Measurements in inches

	Right	Left
A =	<u>11.1</u>	<u>10.9</u>
B =	<u>13.1</u>	<u>13.0</u>
C =	<u>21.1</u>	<u>20.9</u>
D =	<u>33.1</u>	<u>32.9</u>

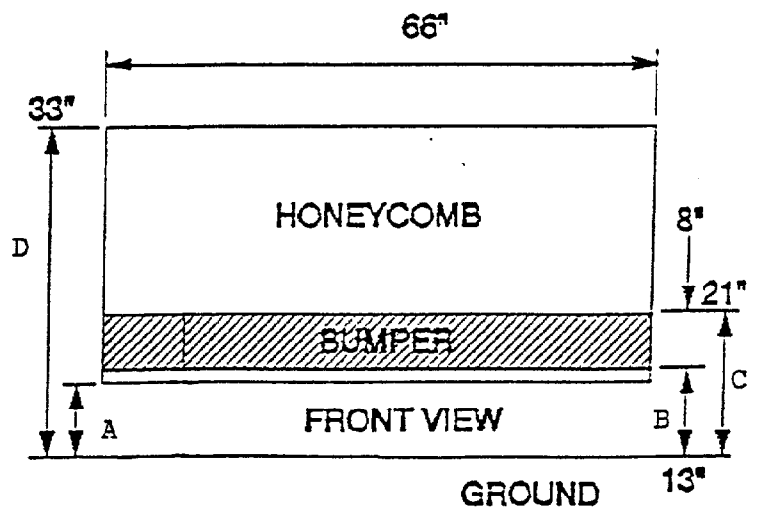


TABLE 8

EXTERIOR STATIC CRUSH FOR SIDE IMPACTORYear/Make/Model/Body Style: 1994/Saab/900S/5 Door HatchbackVehicle NHTSA No.: CR0504 TEST DATE: June 28, 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"	4.5	3.0	1.8	2.8
28"	2.5	1.1	1.0	1.1
24"	1.3	0.6	0.6	1.1
20"	0.4	0.3	0.5	1.5
16"	0.5	0.3	0.6	1.5
12"	0.4	0.3	0.6	1.4
8"	0.3	0.2	0.6	1.4
4"	0.2	0.1	0.5	1.4
0"	0.4	0.1	0.4	1.4
4"	0.1	0.2	0.5	1.5
8"	0.1	0.1	0.5	1.4
12"	0	0.1	0.5	1.6
16"	0	0.1	0.5	1.7
20"	-0.6	0	0.6	1.5
24"	-0.1	0	1.0	3.6
28"	0.1	0	1.3	3.5
32"	1.3	0.5	1.8	3.1

Left Side

Right Side

TABLE 9

TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARYYear/Make/Model/Body Style: 1994/Saab/900S/5 Door HatchbackVehicle NHTSA No.: CR0504 TEST DATE: June 28, 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	109.1	25.1	10.5	4.4	-6.4	15.9	-3.0	4.2	-6.9	16.4
2	Rt. Side Sill @ Rear Seat	74.8	25.3	10.9	4.3	-7.8	21.0	-3.4	5.1	-4.9	21.1
3	Rr. Floorpan Above Axle	48.5	12.3	12.3	11.8	-13.5	26.7	-2.6	9.8	-7.9	26.9
4	Left Side Sill @ Rr. Seat	72.3	-25.6	8.0	---	---	31.9	-4.6	---	---	---
5	Left Side Sill @ Frt. Seat	102.6	-25.6	7.9	---	---	47.6	-5.1	---	---	---
6	Driver Left Seat Track	94.1	-21.5	10.0	---	---	72.8	-21.6	---	---	---
7	Right Rear Occupant Compartment	72.9	0	23.0	---	---	21.7	-2.9	---	---	---
8	Left A-Post Lower	117.9	-27.8	12.5	---	---	75.0	-8.5	---	---	---
9	Left B-Post Mid	81.1	-26.4	30.9	---	---	210.4	-44.4	---	---	---

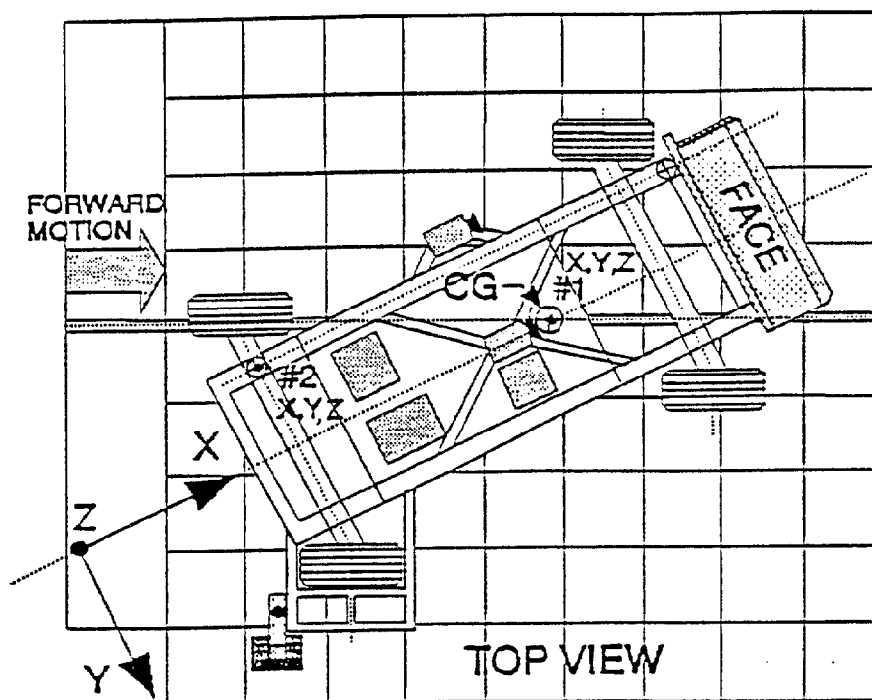
*Reference: X - Rear Bumper (+ Forward)
Y - Vehicle Centerline (+ To right)
Z - Ground Level (+ Up)

FIGURE 9

MOVING DEFORMABLE BARRIER (MDB) ACCELEROMETER LOCATIONS

Year/Make/Model/Body Style: 1994/Saab/900S/5 Door Hatchback

Vehicle NHTSA No.: CR0504 TEST DATE: June 28, 1994



Accel. No.	Location	Coordinates (in)			Pos. Direct.		Neg. Direct.	
					Max	Time	Max	Time
		X	Y	Z	(g)	(msec)	(g)	(msec)
1	MDB Center of Gravity							
	Longitudinal ... X				1.3	117	-17.4	41
	Lateral Y	-43.0	0	19.0	0.9	147	-7.2	26
	Vertical Z				7.0	48	-10.4	61
	Resultant R				18.6	39	---	---
2	Rear Frame Member							
	Longitudinal ... X	-102.0	-24.6	24.5	3.7	108	-21.6	34
	Lateral Y				*	*	*	*

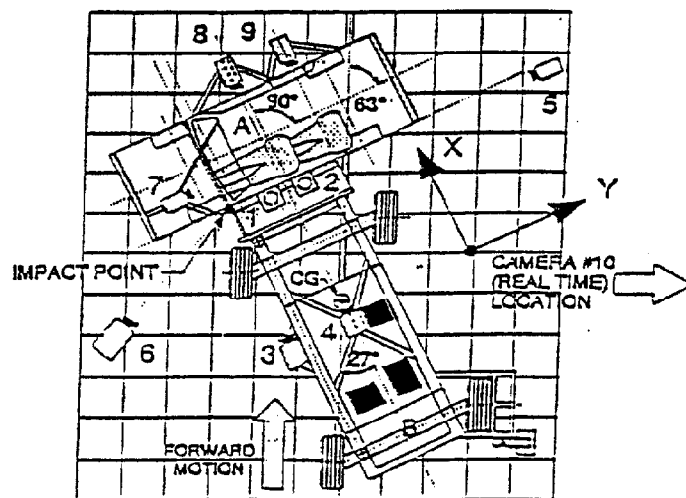
Reference: X = Front Axle (+Forward)
Y = Vehicle Centerline (+ To Right)
Z = Ground Level (+ Up)

* No valid data collected

FIGURE 10
HIGH SPEED CAMERA LOCATIONS AND DATA

Year/Make/Model/Body Style: 1994/Saab/900S/5 Door Hatchback

Vehicle NHTSA No.: CR0504 TEST DATE: June 28, 1994



Camera No.	View	Coordinates (in)			Angle	Lens (mm)	Film Speed (fps)
		X*	Y*	Z*			
	Real Time					10	24
1	Top Pointer	0	14.9	193.7		13	no timing
2	Top Wide	15.7	0	211.0		8	1156
3	Cart Pointer					35	1000
4	Cart					13	1010
5	Right Impact	20	335.8	30.6	45°	35	1000
6	Left Impact	-95.3	112.2	51.9	45°	13	1176
7	Onboard Hood					13	1000
8	Onboard Driver					7.5	769
9	Onboard Passenger					8	1000

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

TABLE OF PHOTOGRAPHS

	<u>Page No.</u>
Photo No. A-32 - Impact	A-32
Photo No. A-33 - Vehicle Certification Label	A-33
Photo No. A-34 - Vehicle Tire Placard	A-34

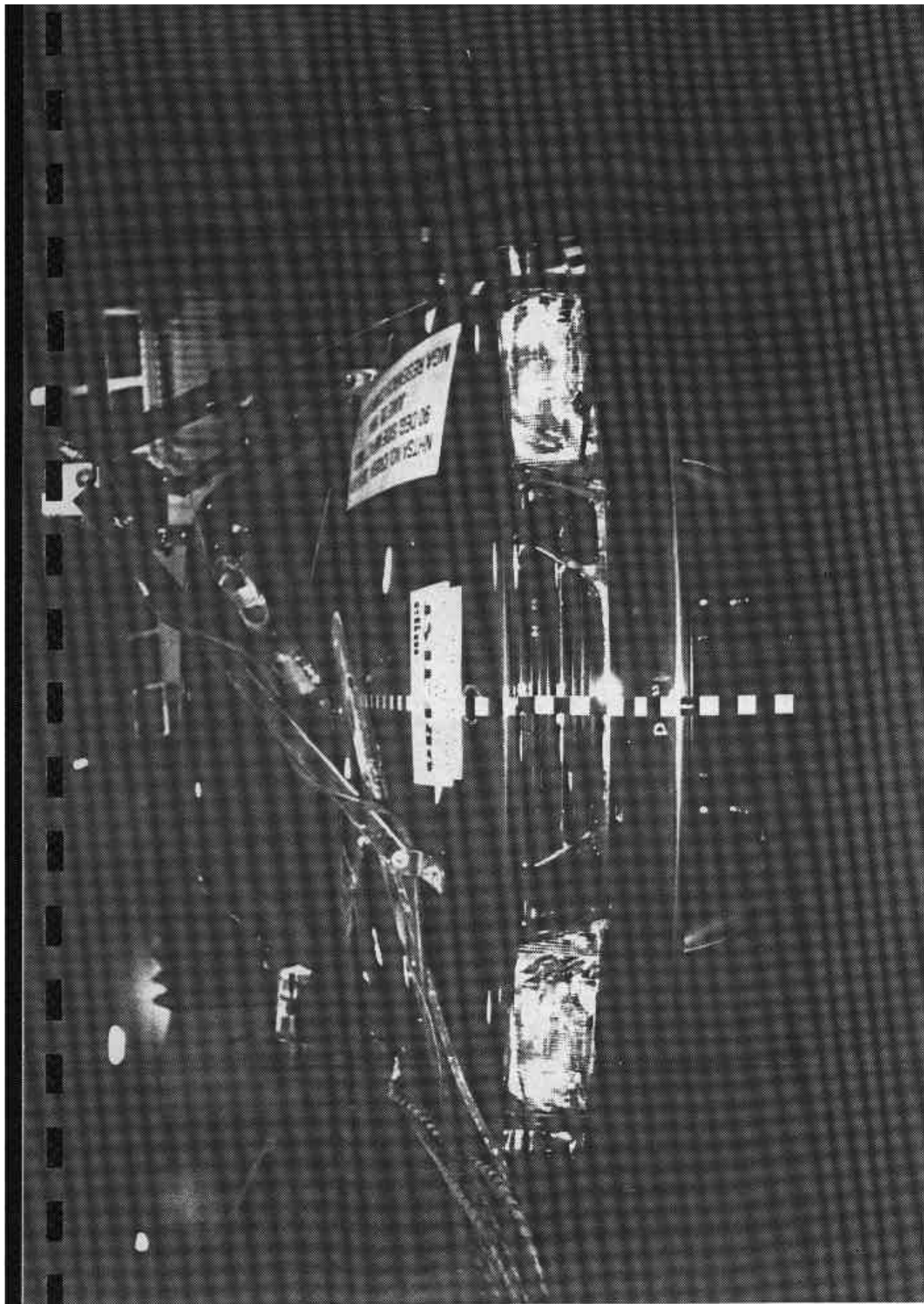


Photo No. A-1 - Pre-Test Front View of Test Vehicle

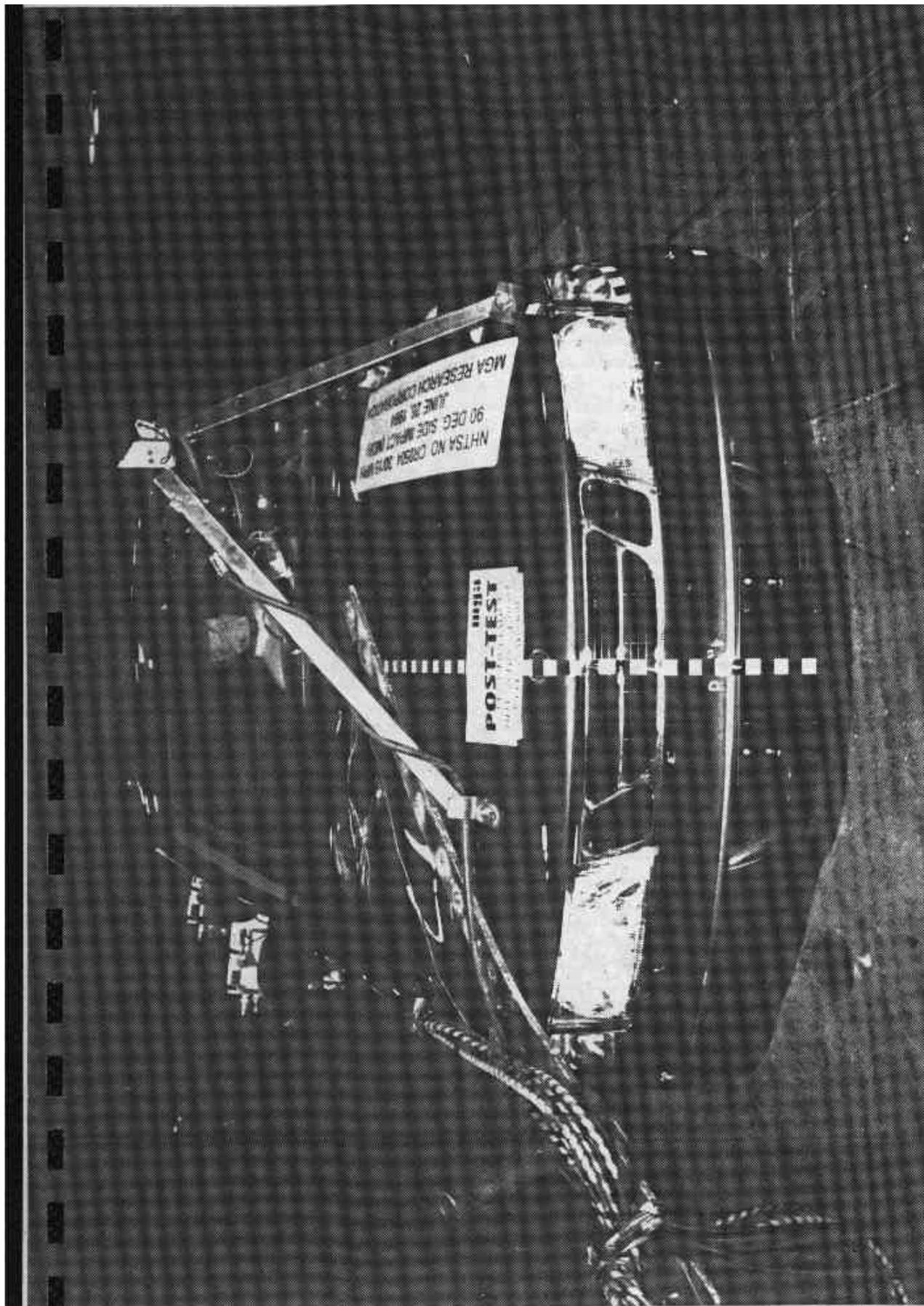


Photo No. A-2 - Post-Test Front View of Test Vehicle

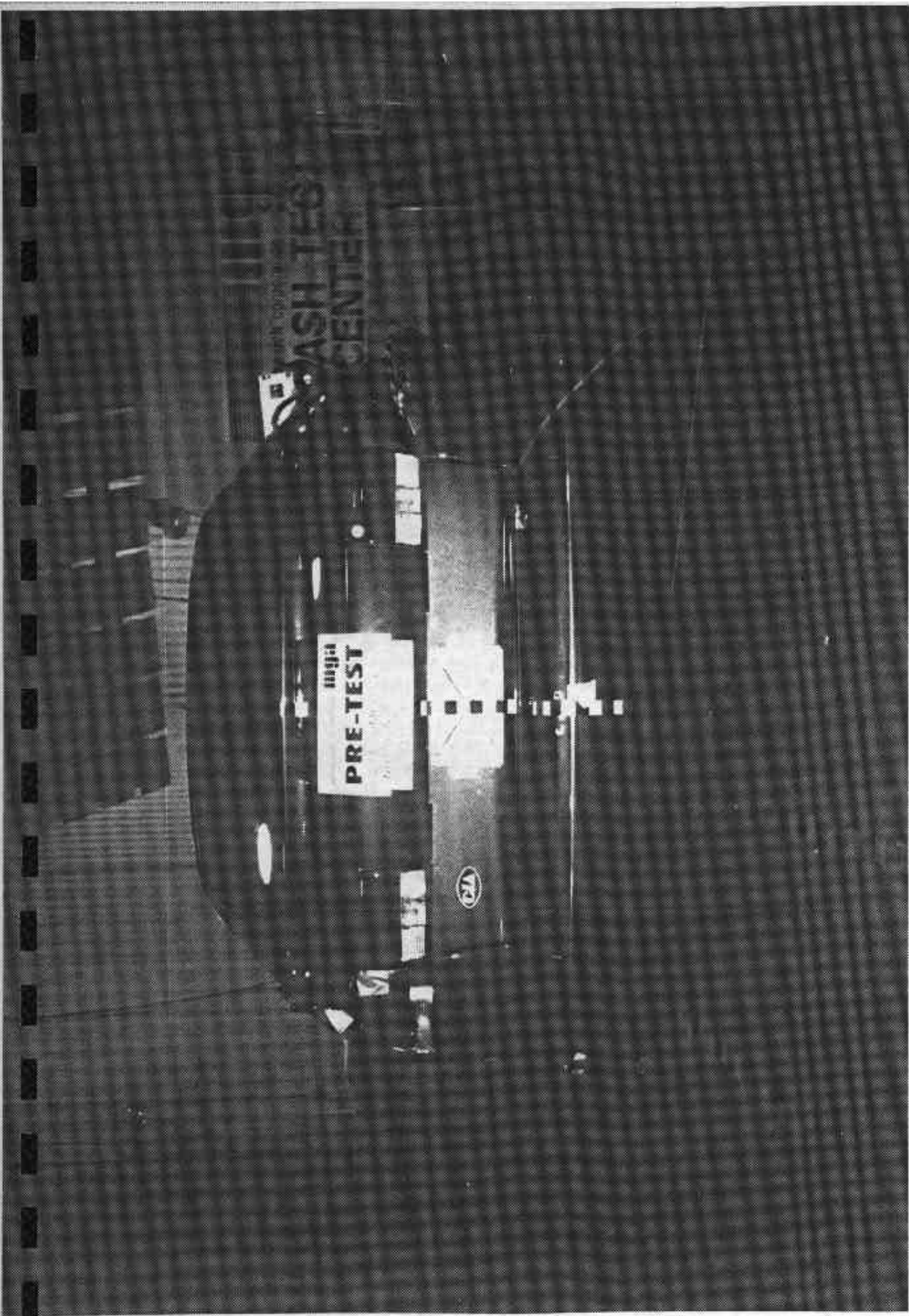


Photo No. A-3 - Pre-Test Rear View of Test Vehicle

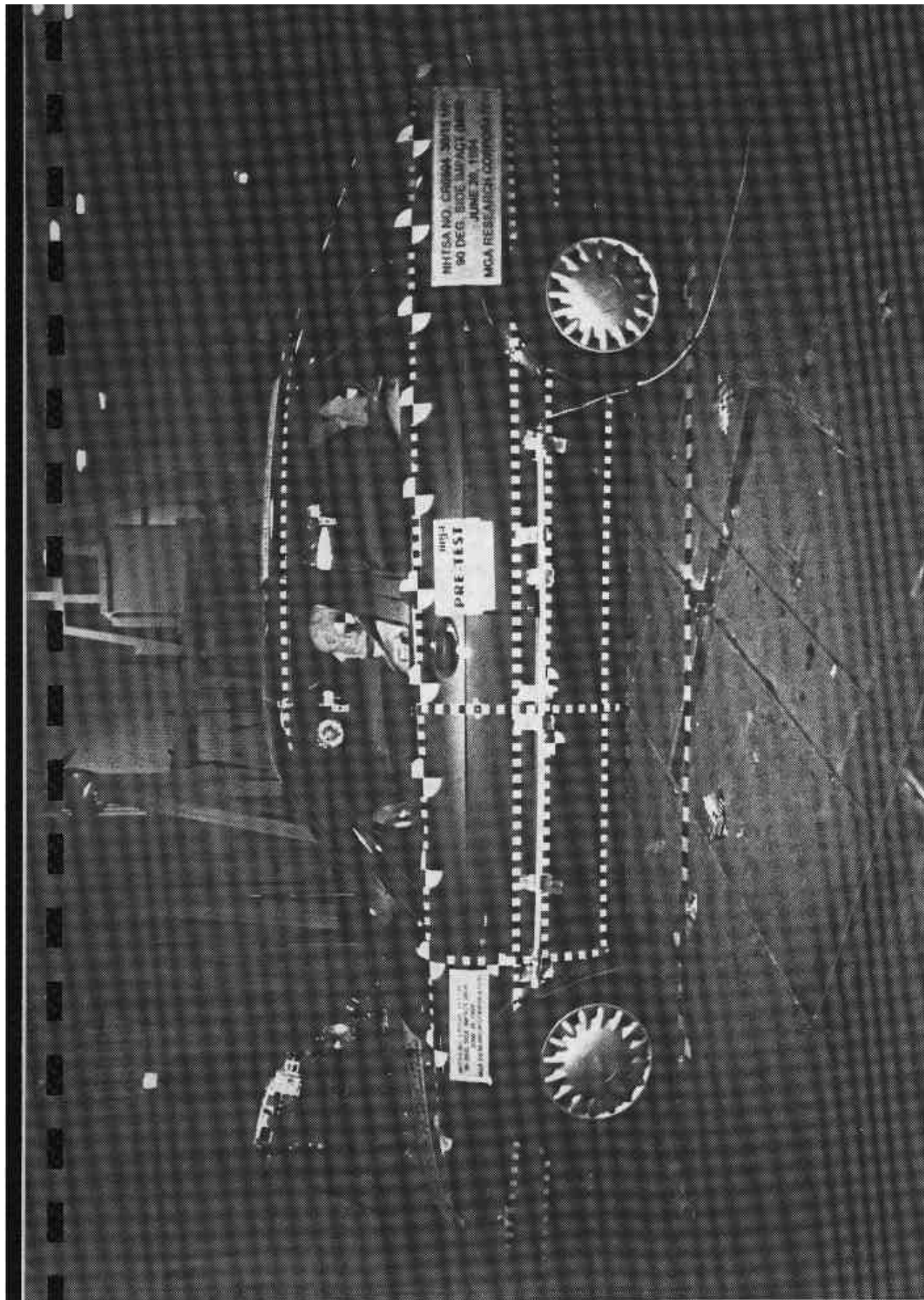


Photo No. A-4 - Pre-Test Left Side View of Test Vehicle

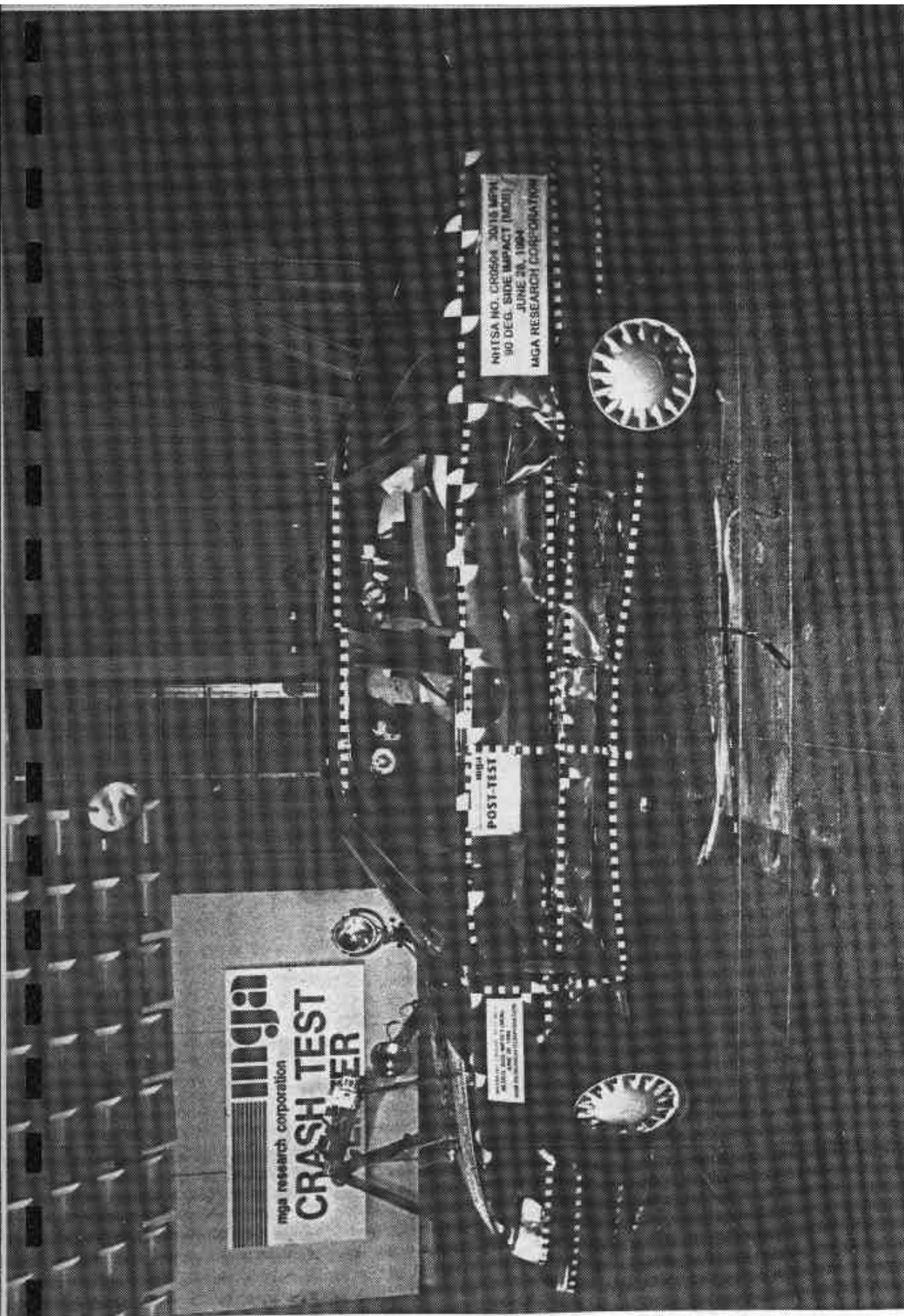


Photo No. A-5 - Post-Test Left Side View of Test Vehicle

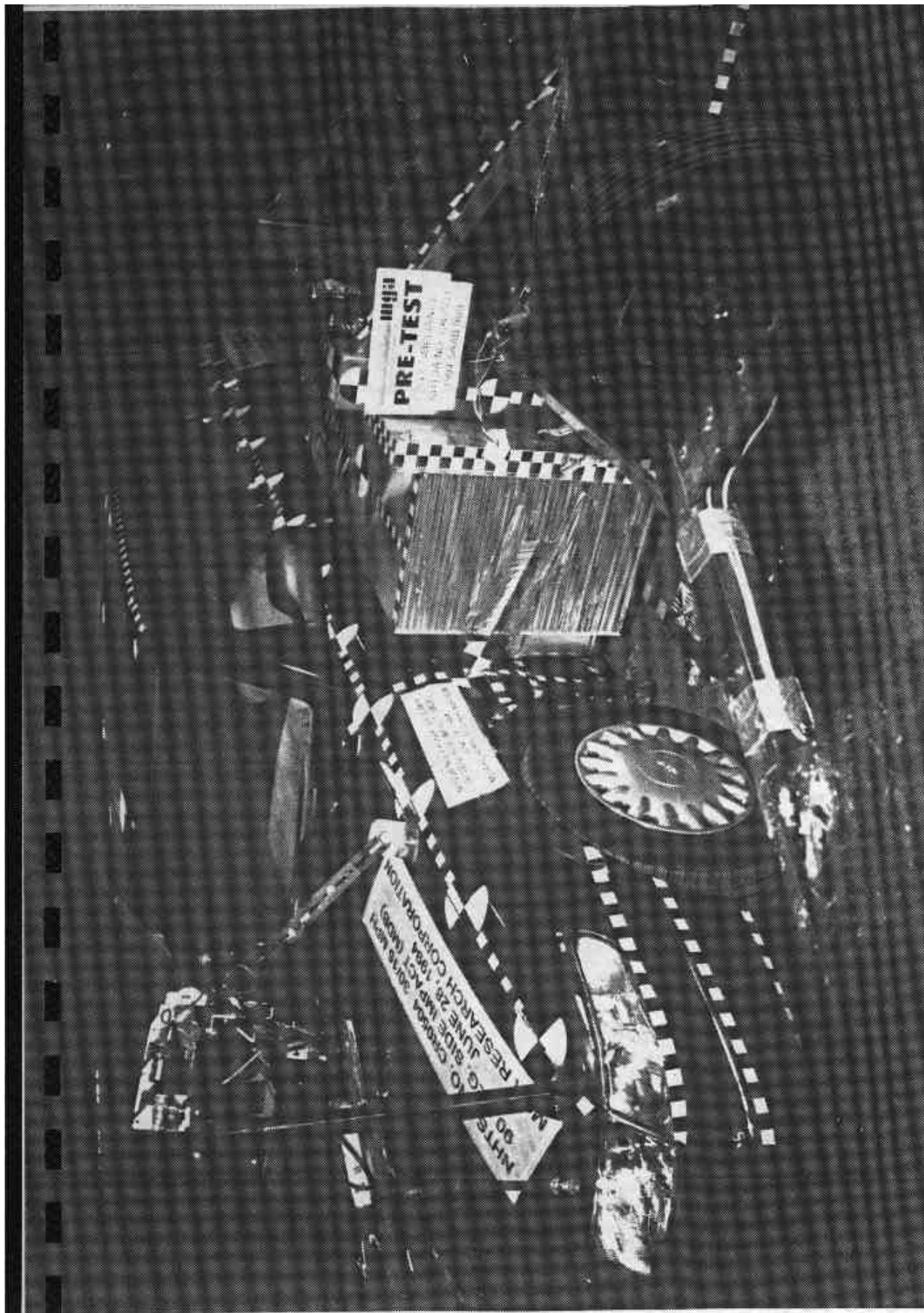


Photo No. A-6 - Pre-Test MDB Positioned Against Vehicle (left side)

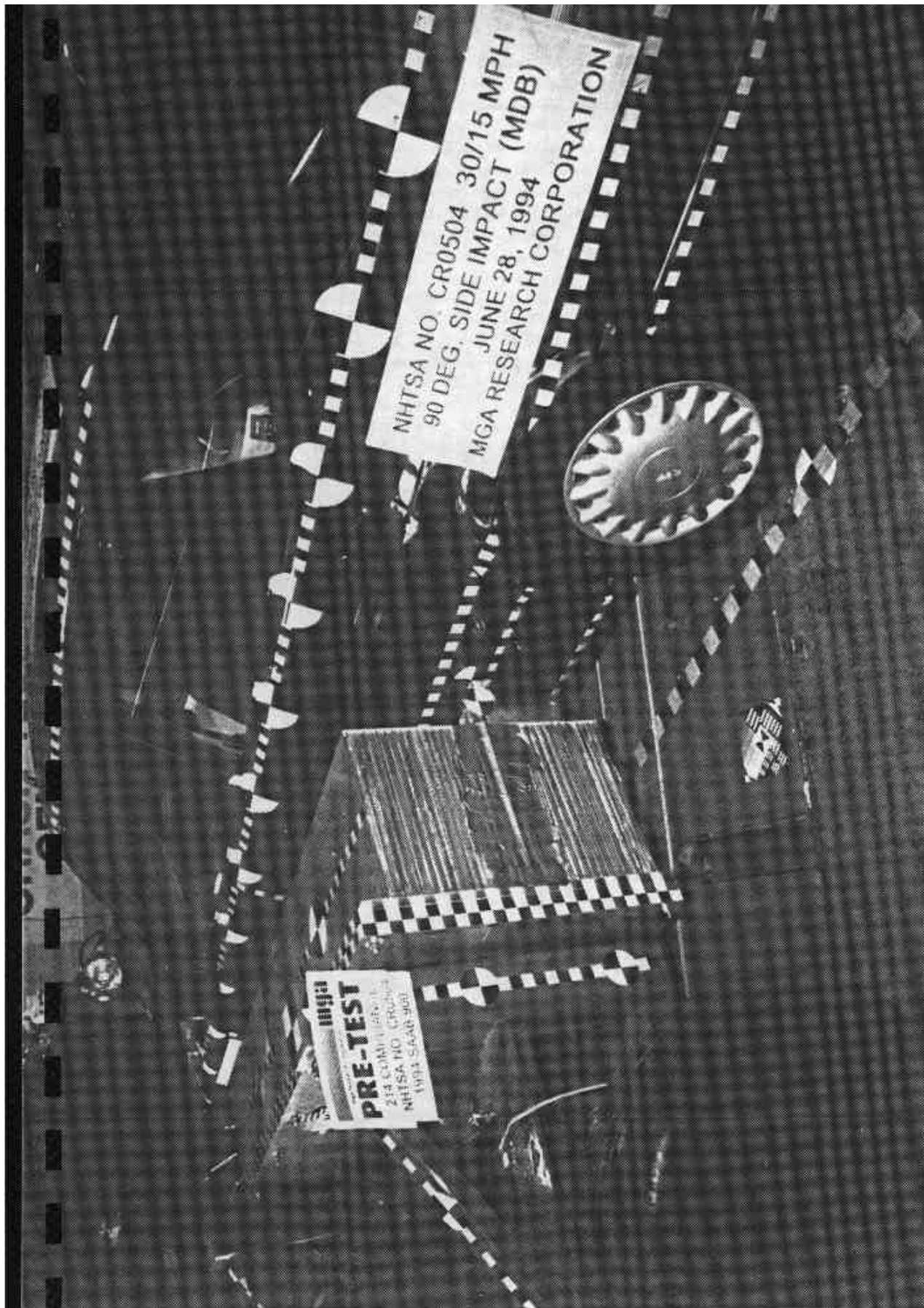


Photo No. A-7 - Pre-Test MDB Positioned Against Vehicle (right side)

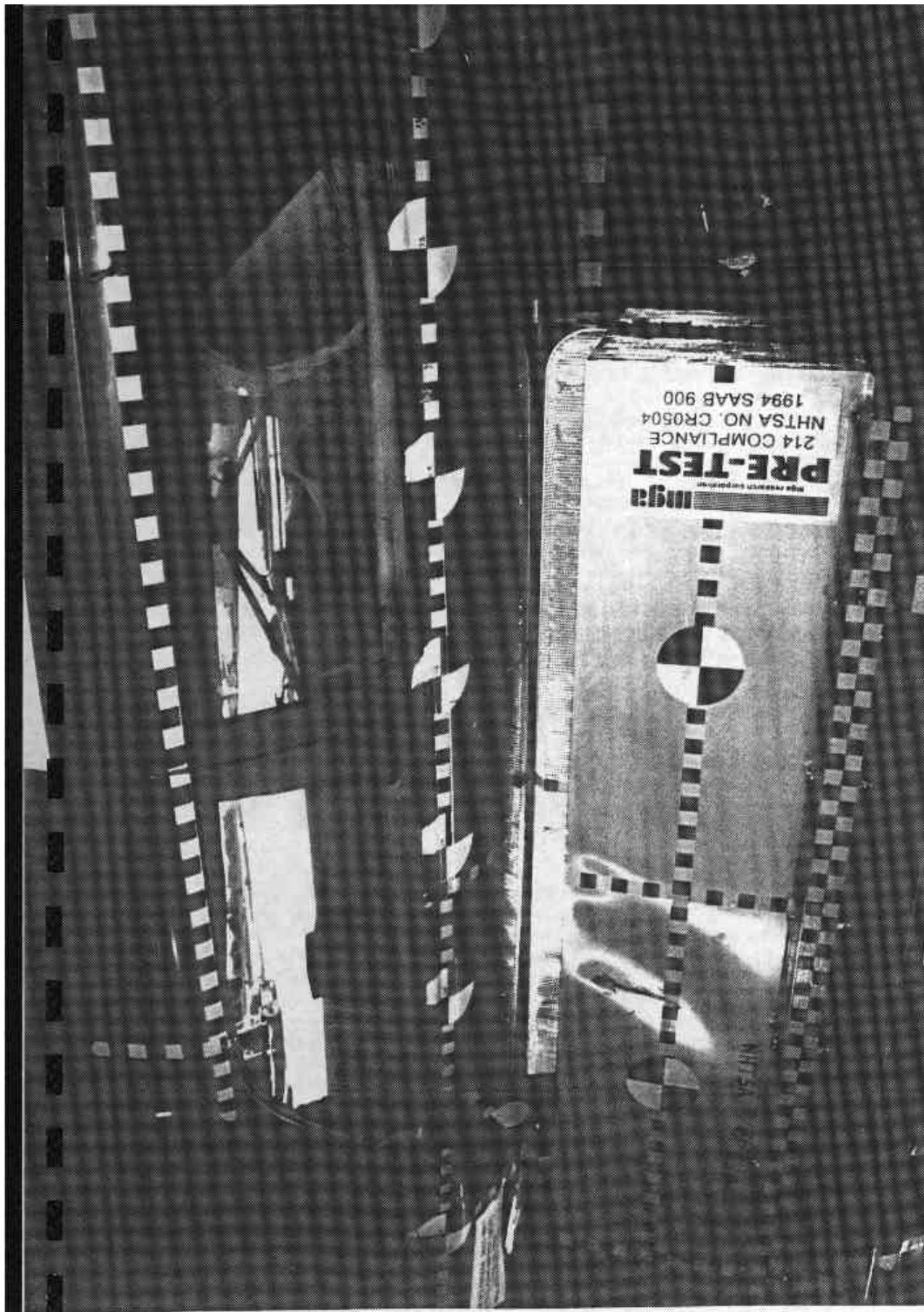


Photo No. A-8 - Pre-Test MDB Position Against Vehicle Overhead View

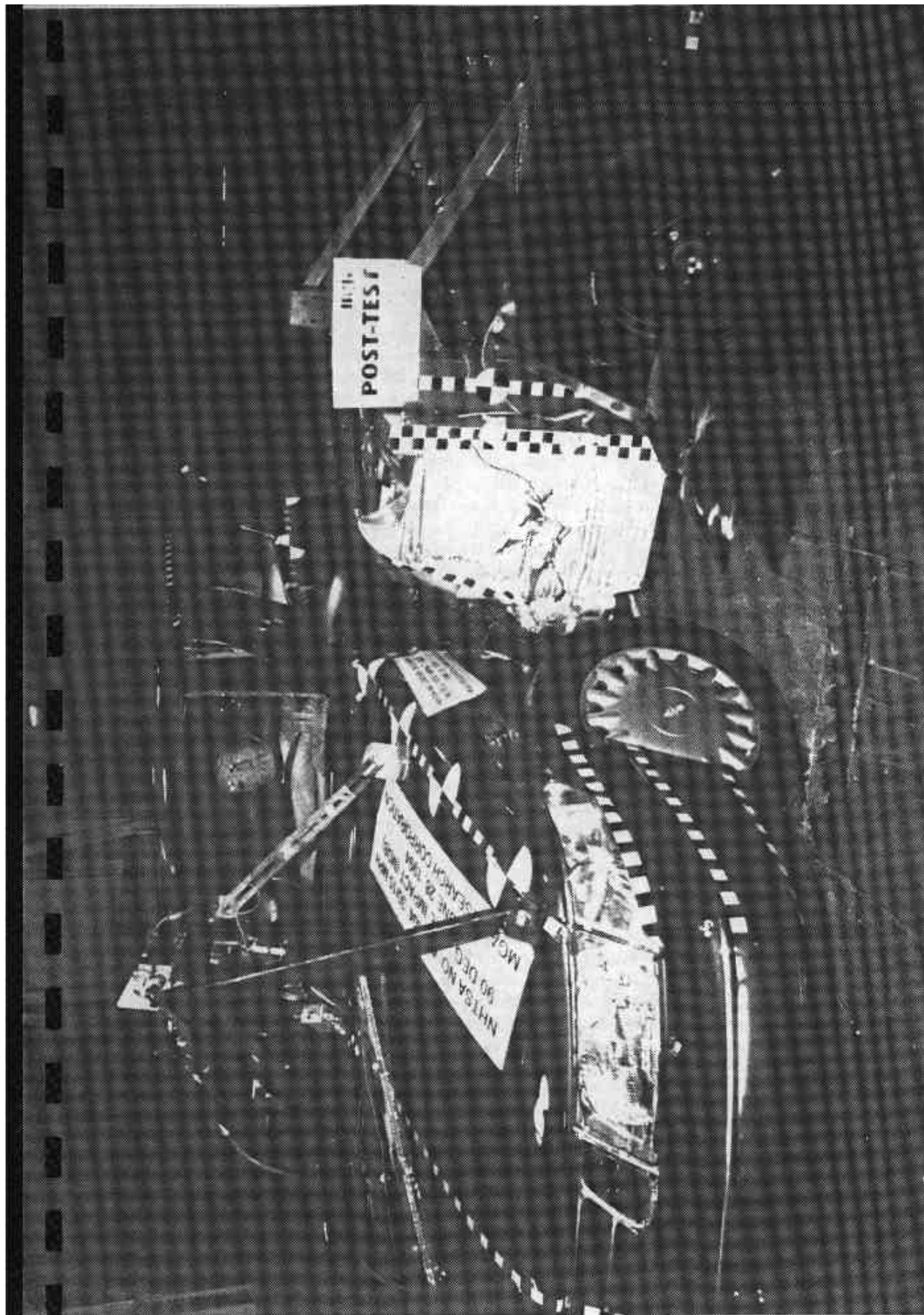


Photo No. A-9 - Post-Test MDB and Vehicle Left Side Front View

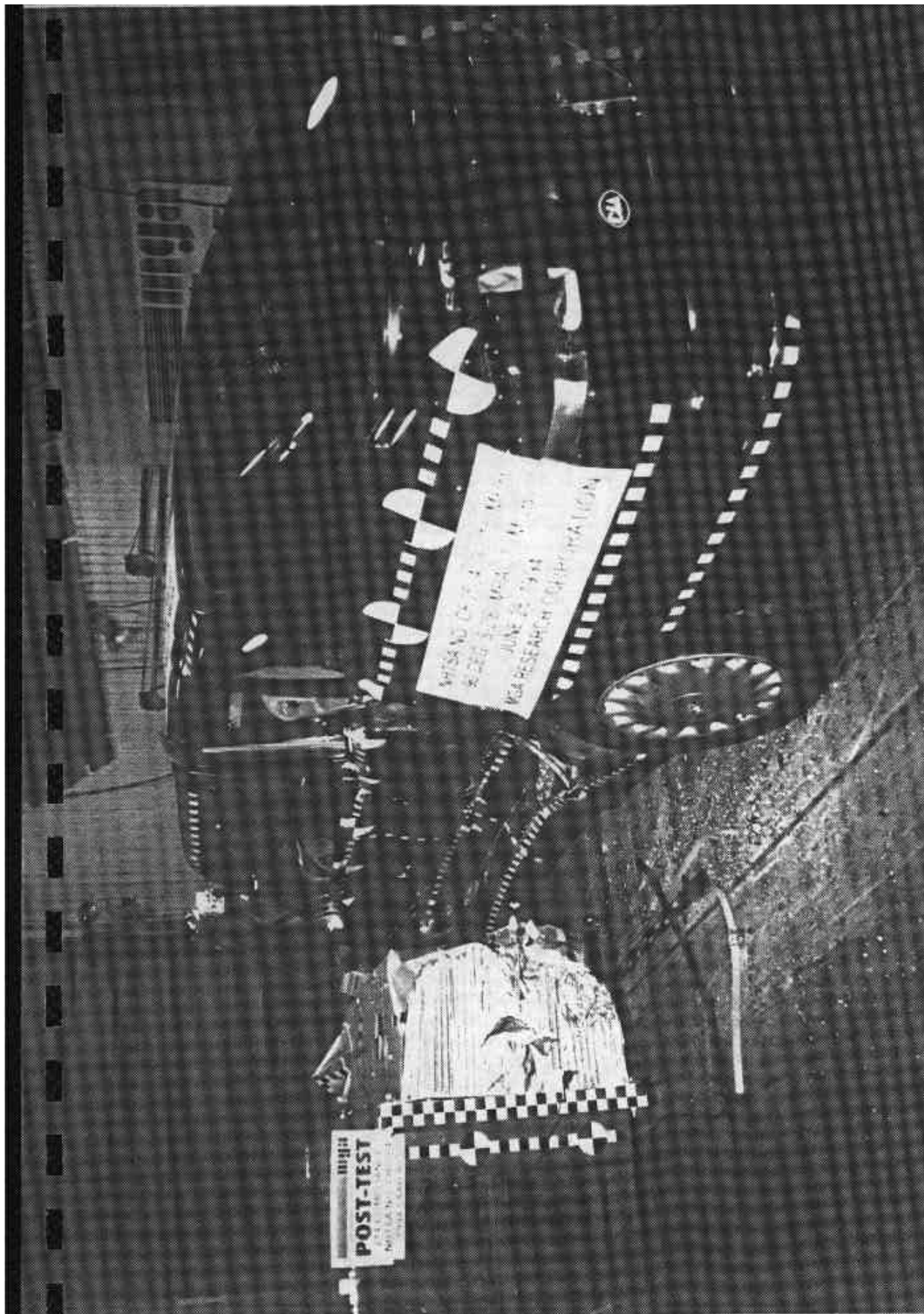


Photo No. A-10 - Post-Test MDB and Vehicle Right Side Rear View

A-10

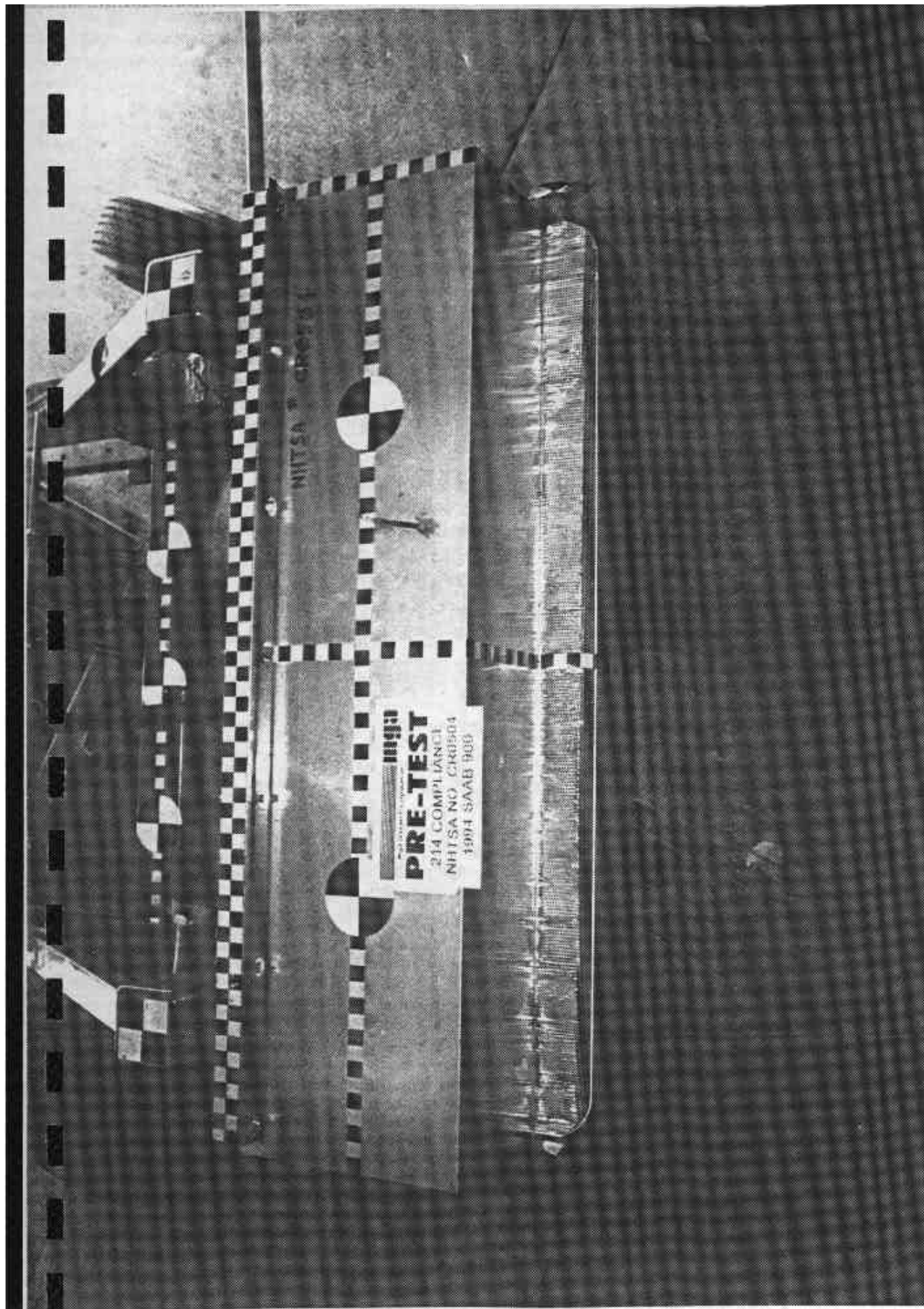


Photo No. A-11 - Pre-Test MDB Top View

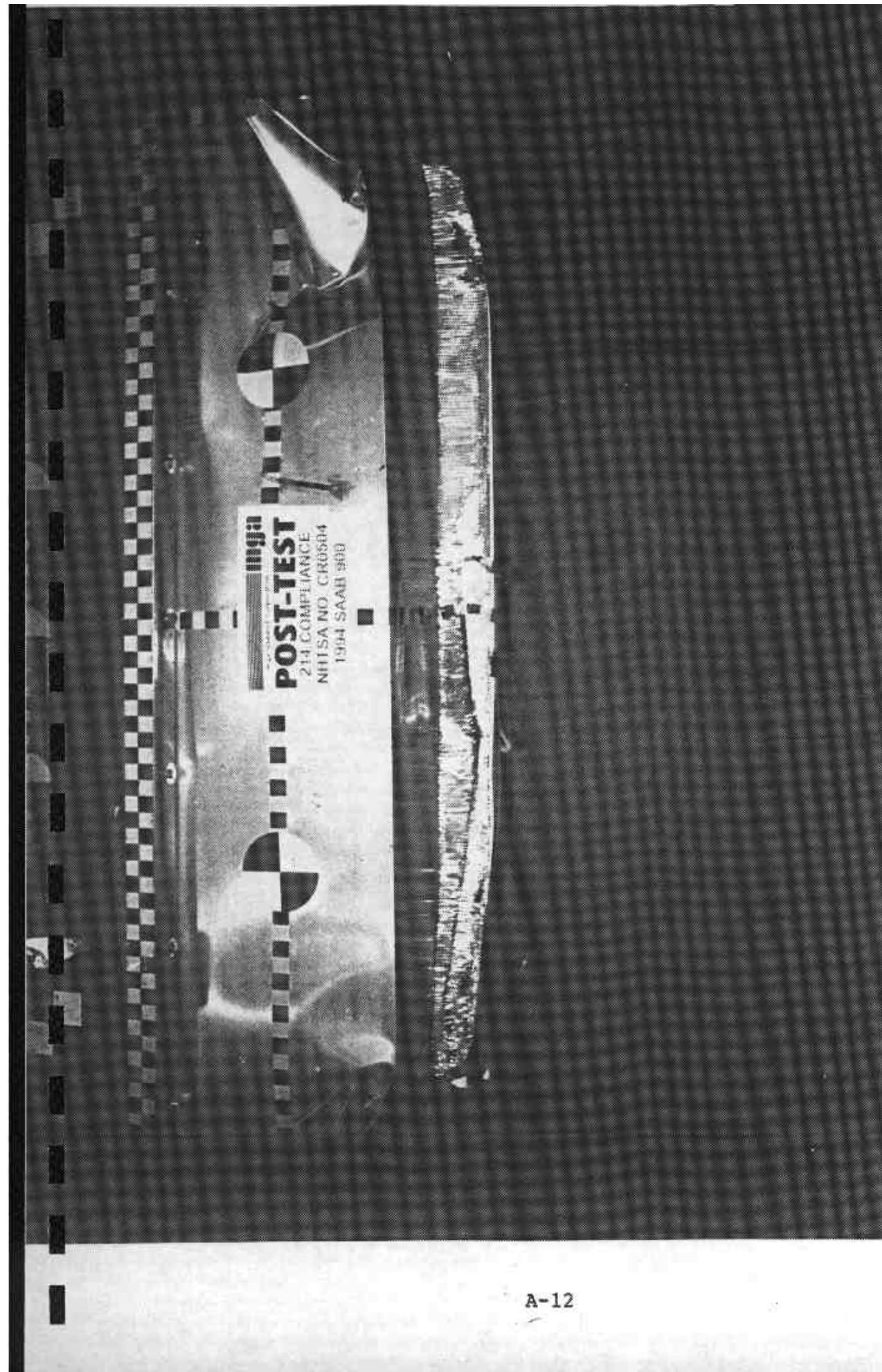


Photo No. A-12 - Post-Test MDB Top View

PRE-TEST
SIL CONCRETE RANGE
NHTSA HCS 1783104
1834 2AAB 800

Photo No. A-13 - Pre-Test MDB Front View

POST-TEST
214 COMPLIANCE
NHTSA NO. CH0594
1994 SAAB 900

A-14

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

PR
214 COMPLIANCE
NHISA NO. CR0564
1994 SAAB 900

Photo No. A-15 - Pre-Test MDB Left Side View

A-15

POST-TEST

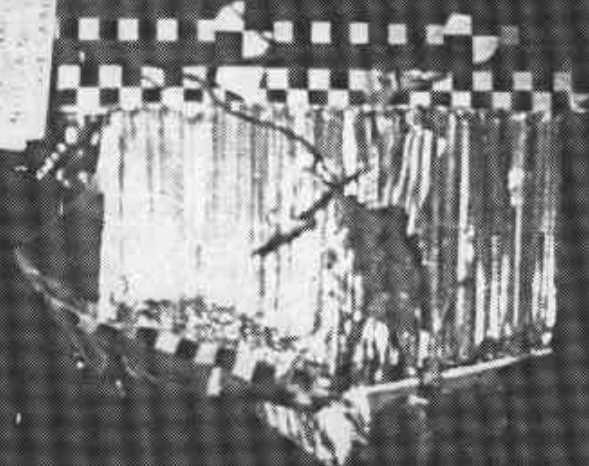


Photo No. A-16 - Post-Test MDB Left Side View

A-16

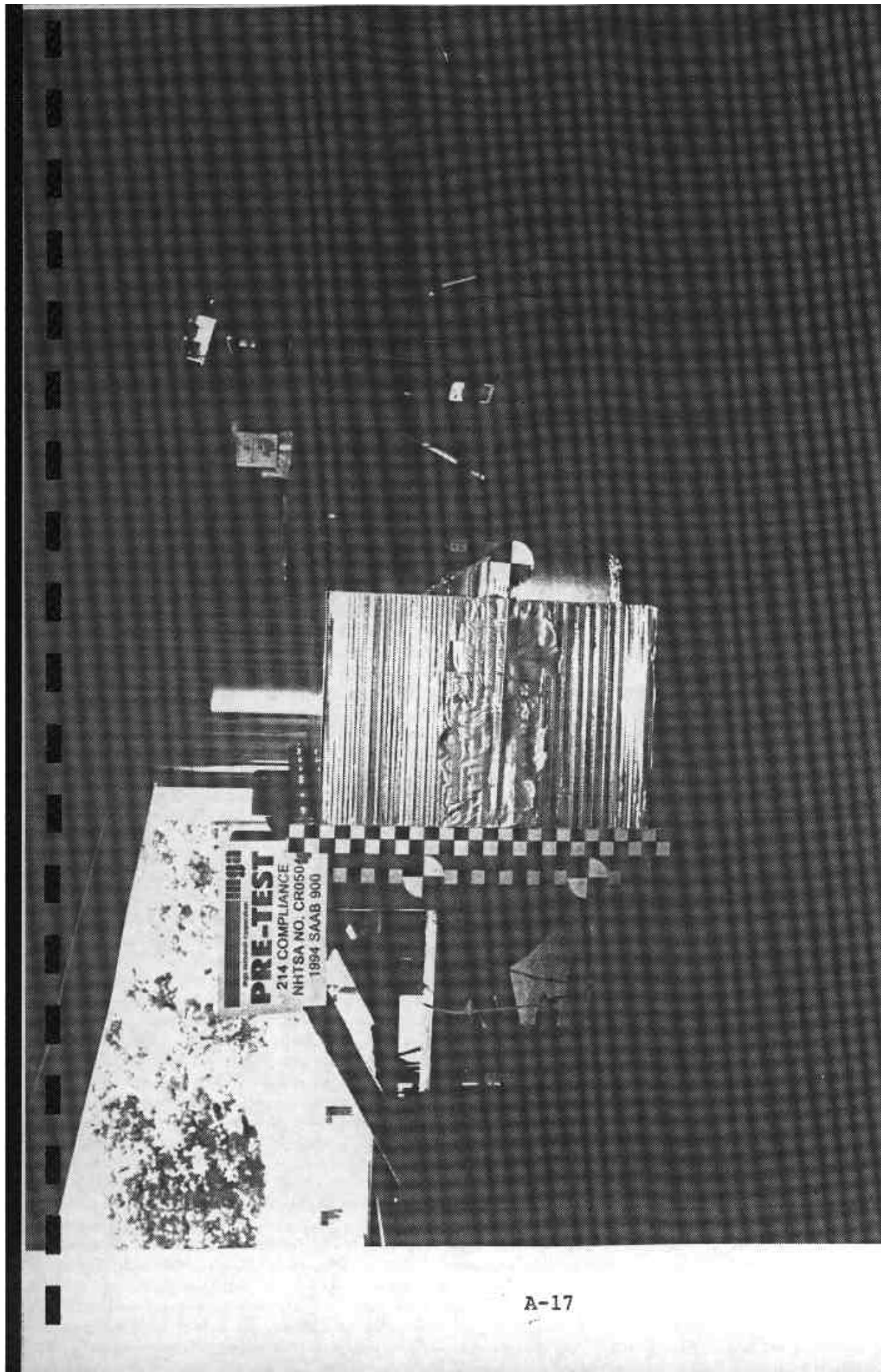


Photo No. A-17 - Pre-Test MDB Right Side View

11 1914
POST-TEST

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

A-18



Photo No. A-19 - Post-Test MDB and Vehicle Overhead View

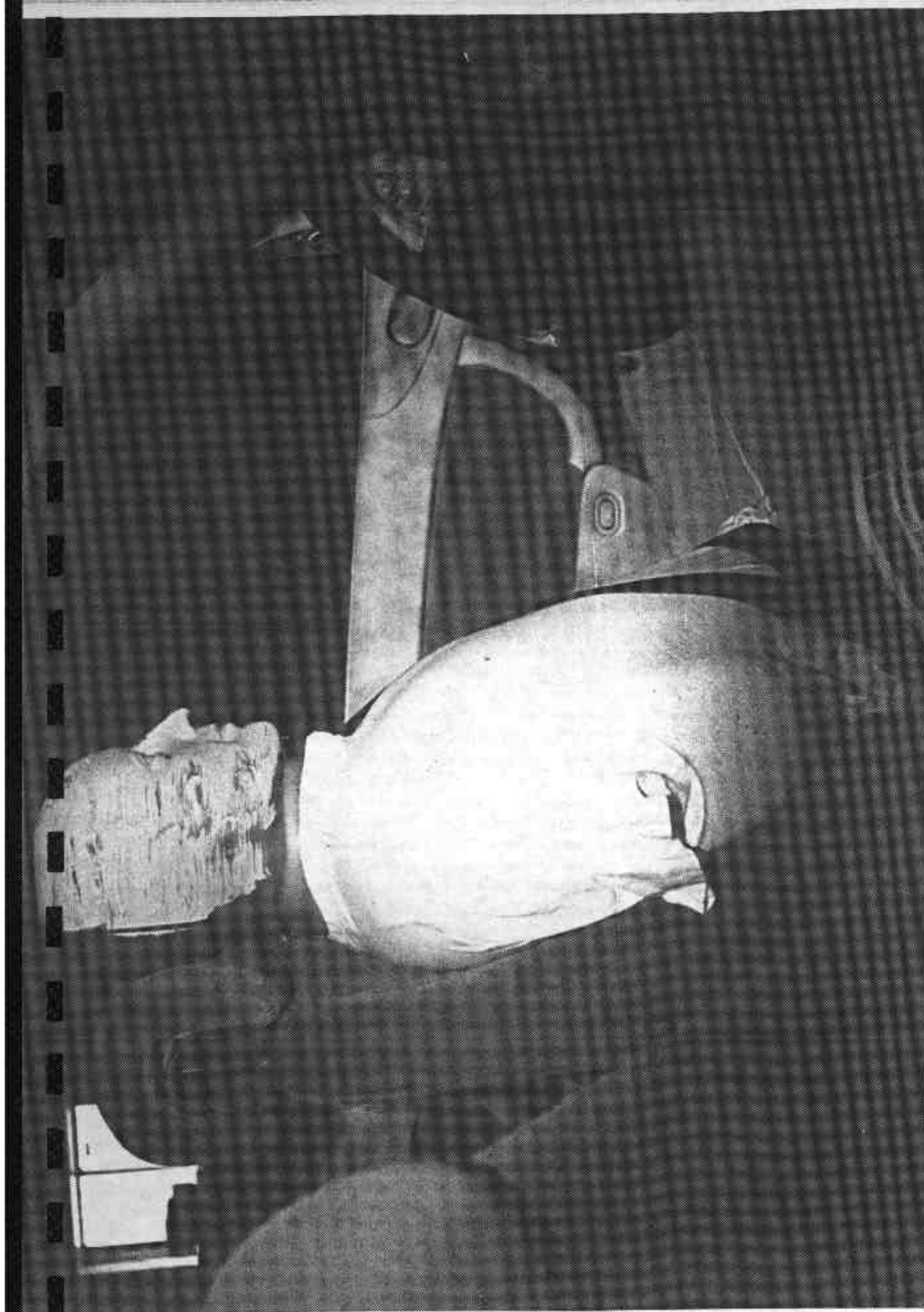


Photo No. A-20 - Pre-Test Driver Dummy Right Side View

A-20



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



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

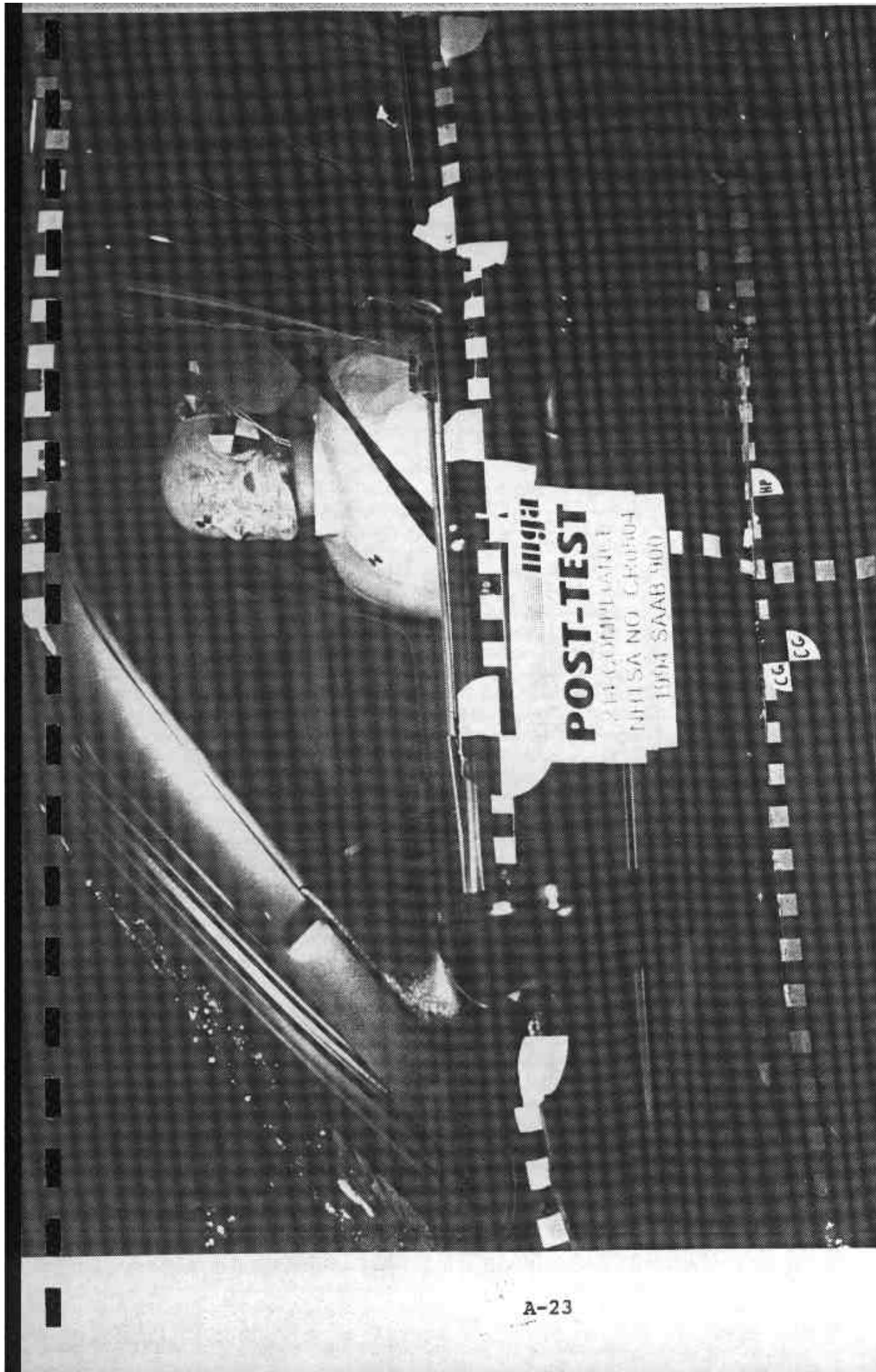


Photo No. A-23 - Post-Test Driver Dummy Left Side View

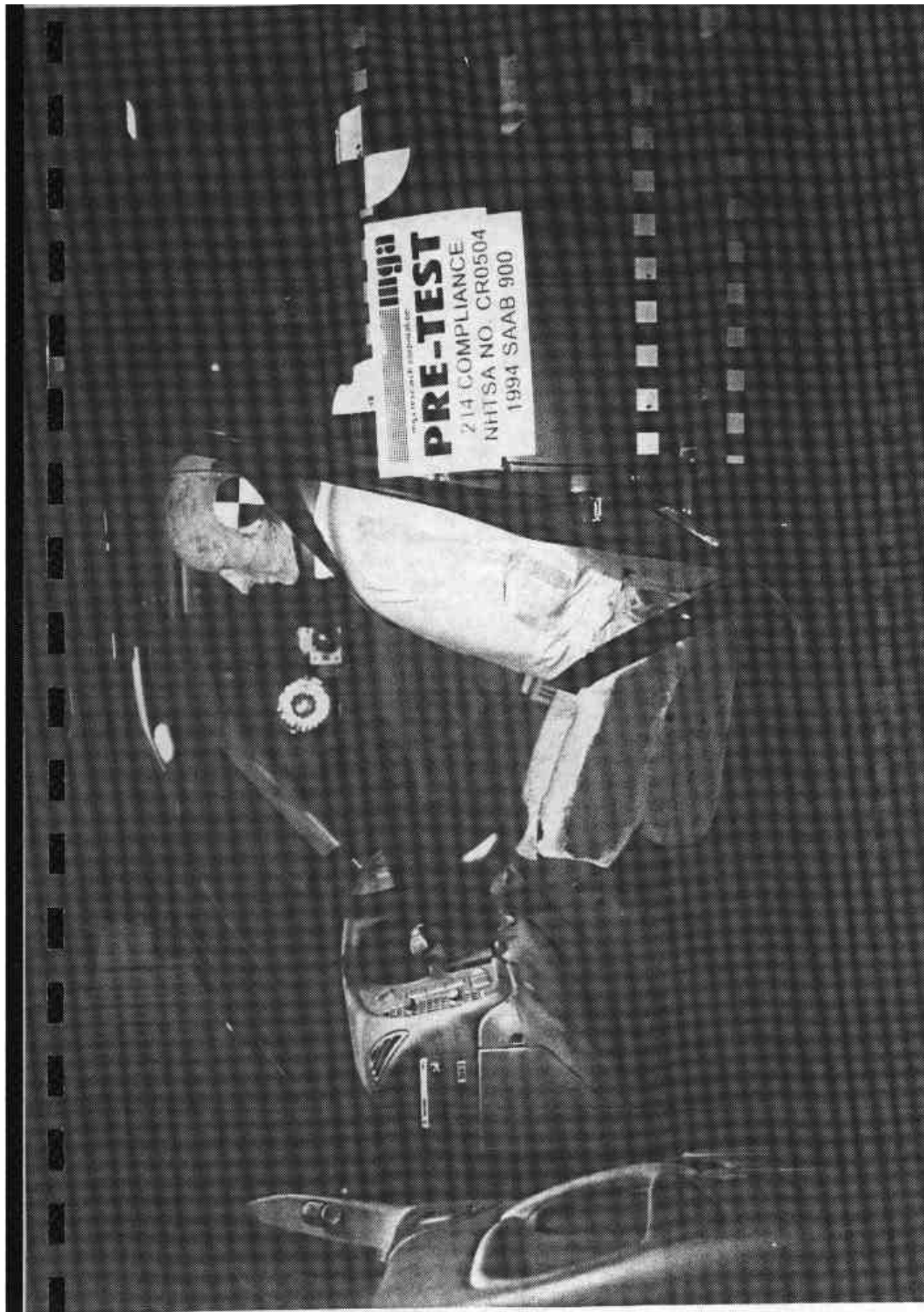


Photo No. A-24 - Pre-Test Driver Dummy Left Side View (Door Open)



Photo No. A-25 - Post-Test Driver Dummy Impact Points

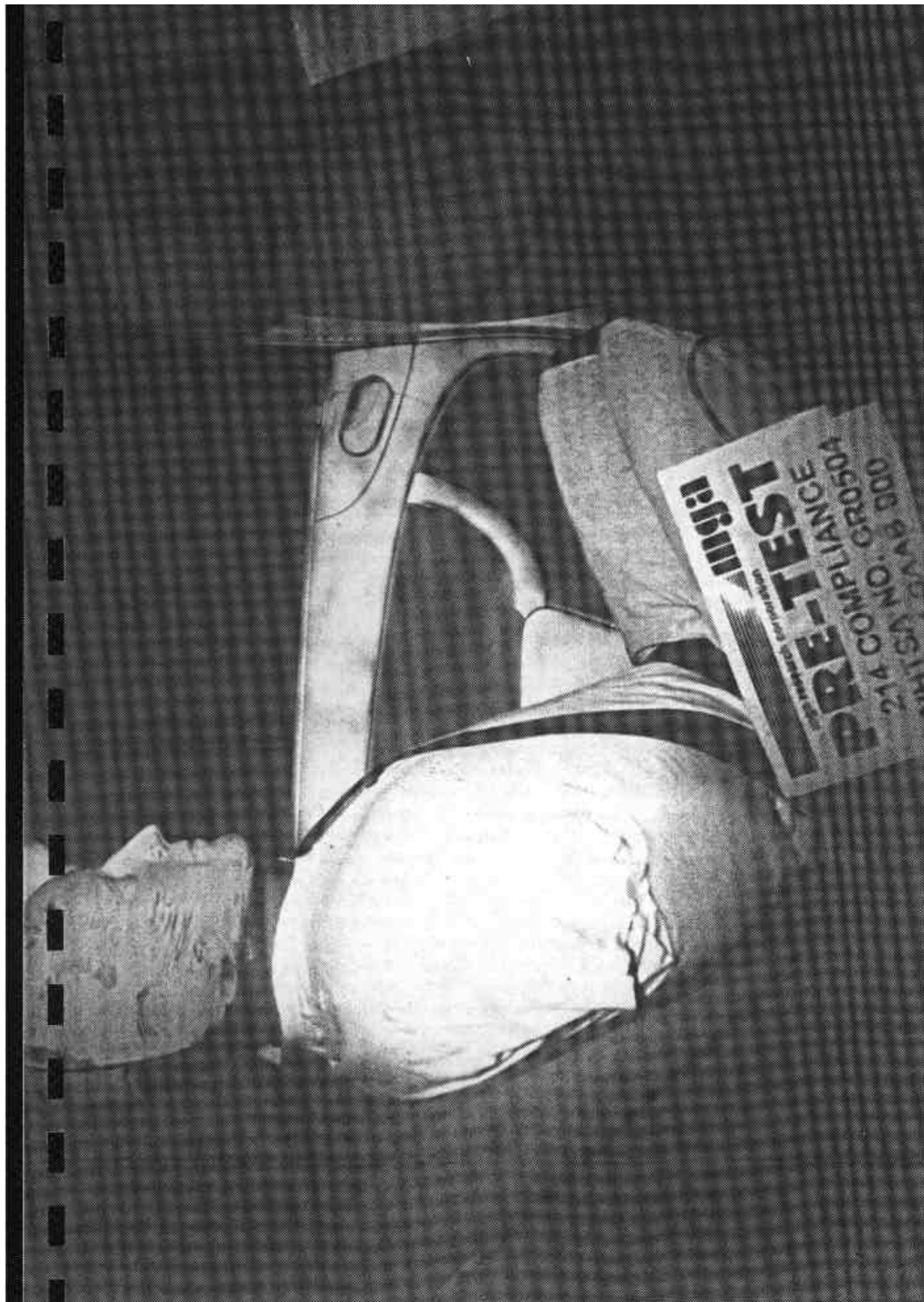


Photo No. A-26 - Pre-Test Passenger Dummy Right Side View



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



Photo No. A-28 - Pre-Test Passenger Dummy Left Side View

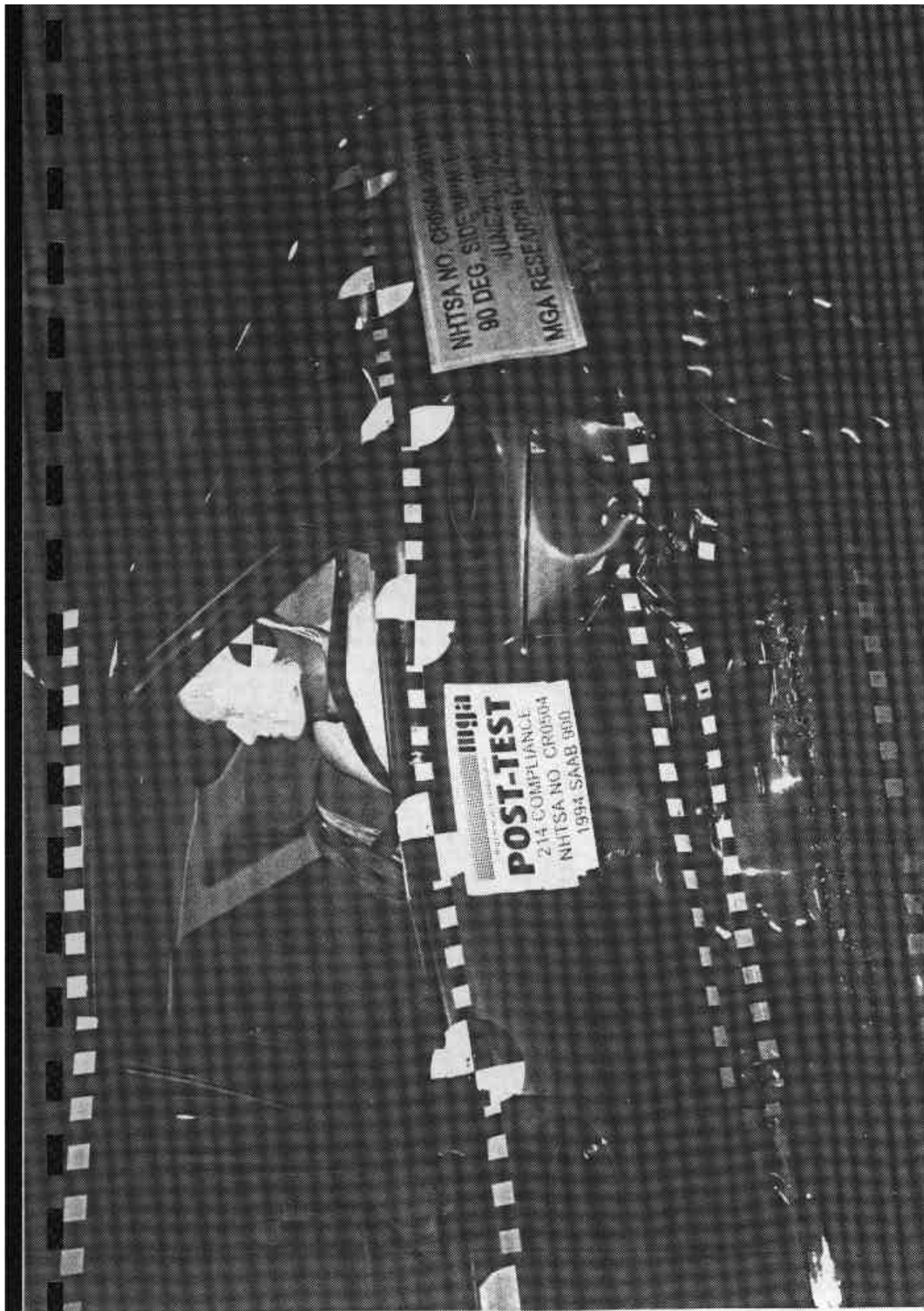


Photo No. A-29 - Post-Test Passenger Dummy Left Side View



Photo No. A-30 - Pre-Test Passenger Dummy Left Side View (Door Open)

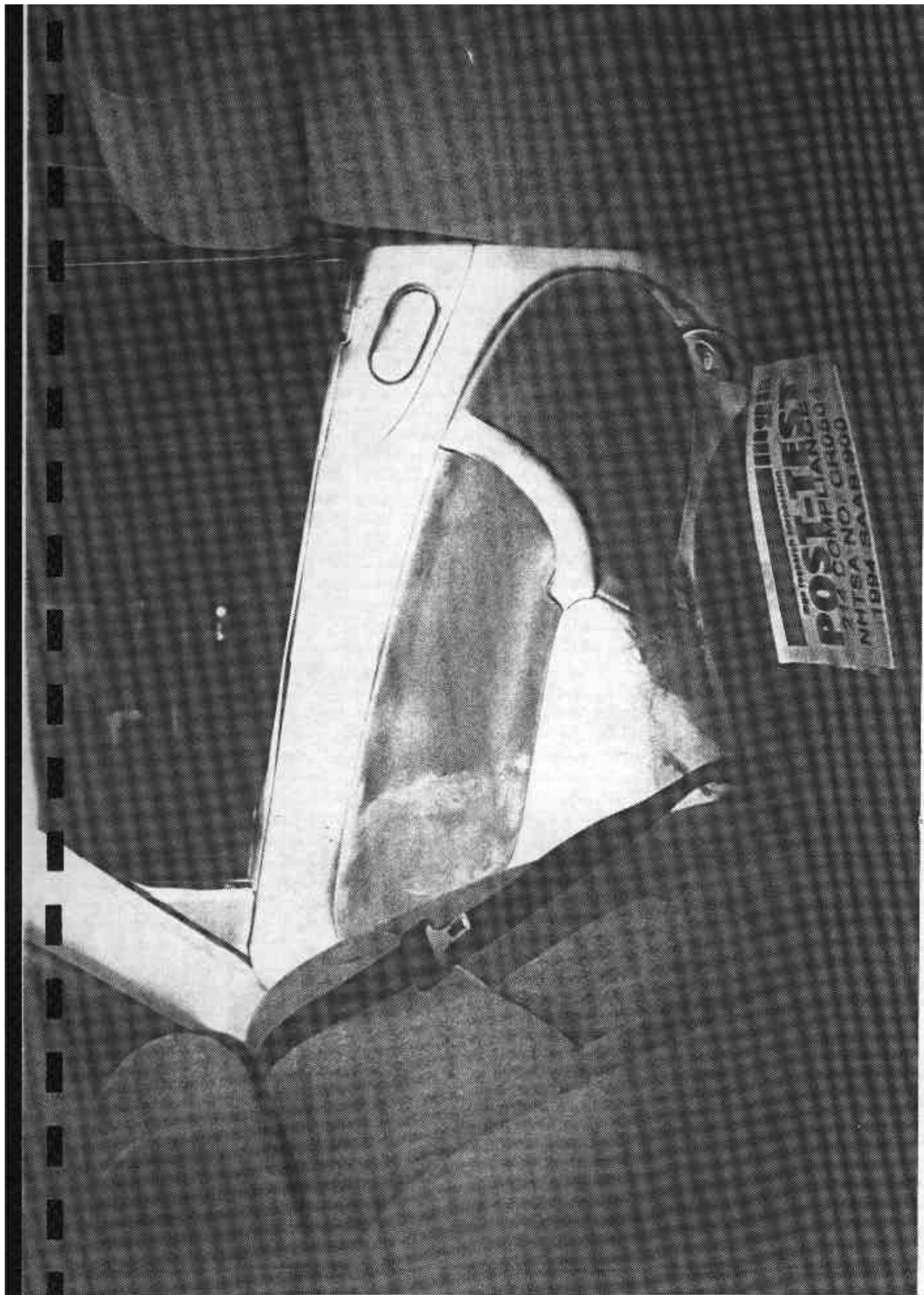


Photo No. A-31 - Post-Test Passenger Dummy Impact Points

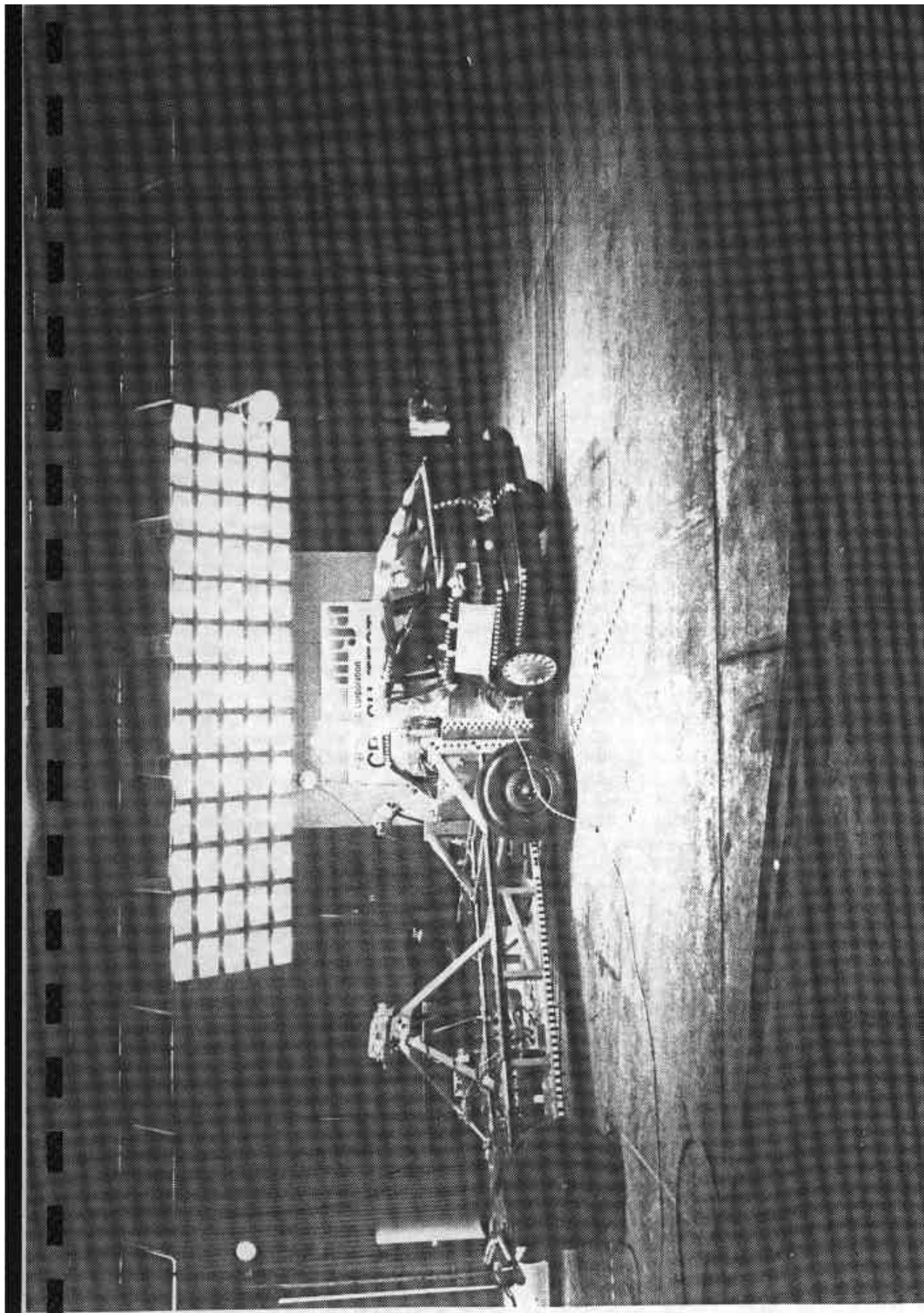


Photo No. A-32 - Impact

94	3950 LB	2270 LB	1870 LB	G.A. V.P. 9500
	1790 KO	1030 KO	850 KO	

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

1 42418485 0423 CAR

Photo No. A-33 - Vehicle Certification Label

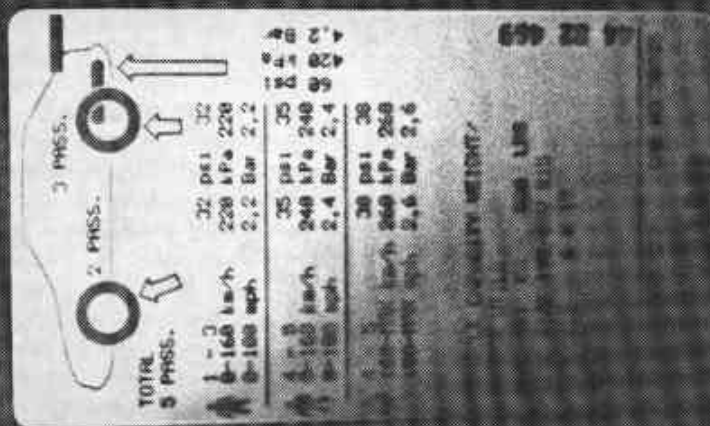


Photo No. A-34 - Vehicle Tire Placard

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 - Right Front Sill X Acceleration vs. Time	B-21
Figure B-22 - Right Front Sill X Velocity vs. Time	B-22
Figure B-23 - Right Front Sill Y Acceleration vs. Time	B-23
Figure B-24 - Right Front Sill Y Velocity vs. Time	B-24
Figure B-25 - Right Front Sill Z Acceleration vs. Time	B-25
Figure B-26 - Right Front Sill Z Velocity vs. Time	B-26
Figure B-27 - Right Front Sill at Front Seat Resultant vs. Time	B-27
Figure B-28 - Right Rear Sill X Acceleration vs. Time	B-28
Figure B-29 - Right Rear Sill X Velocity vs. Time	B-29
Figure B-30 - Right Rear Sill Y Acceleration vs. Time	B-30
Figure B-31 - Right Rear Sill Y Velocity vs. Time	B-31

Table of Data Plots

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

Table of Data Plots

Page No.

Redundant:

Figure B-63 - Driver Upper Rib Y Redundant Acceleration vs. Time	B-63
Figure B-64 - Driver Upper Rib Y Redundant Velocity vs. Time	B-64
Figure B-65 - Driver Lower Rib Y Redundant Acceleration vs. Time	B-65
Figure B-66 - Driver Lower Rib Y Redundant Velocity vs. Time	B-66
Figure B-67 - Driver Lower Spine Y Redundant Acceleration vs. Time	B-67
Figure B-68 - Driver Lower Spine Y Redundant Velocity vs. Time	B-68
Figure B-69 - Driver Pelvis Y Redundant Acceleration vs. Time	B-69
Figure B-70 - Driver Pelvis Y Redundant Velocity vs. Time	B-70
Figure B-71 - Passenger Upper Rib Y Redundant Acceleration vs. Time	B-71
Figure B-72 - Passenger Upper Rib Y Redundant Velocity vs. Time	B-72
Figure B-73 - Passenger Lower Rib Y Redundant Acceleration vs. Time	B-73
Figure B-74 - Passenger Lower Rib Y Redundant Velocity vs. Time	B-74
Figure B-75 - Passenger Lower Spine Y Redundant Acceleration vs. Time	B-75
Figure B-76 - Passenger Lower Spine Y Redundant Velocity vs. Time	B-76
Figure B-77 - Passenger Pelvis Y Redundant Acceleration vs. Time	B-77
Figure B-78 - Passenger Pelvis Y Redundant Velocity vs. Time	B-78

Filter: Class 180 (300 Hz)

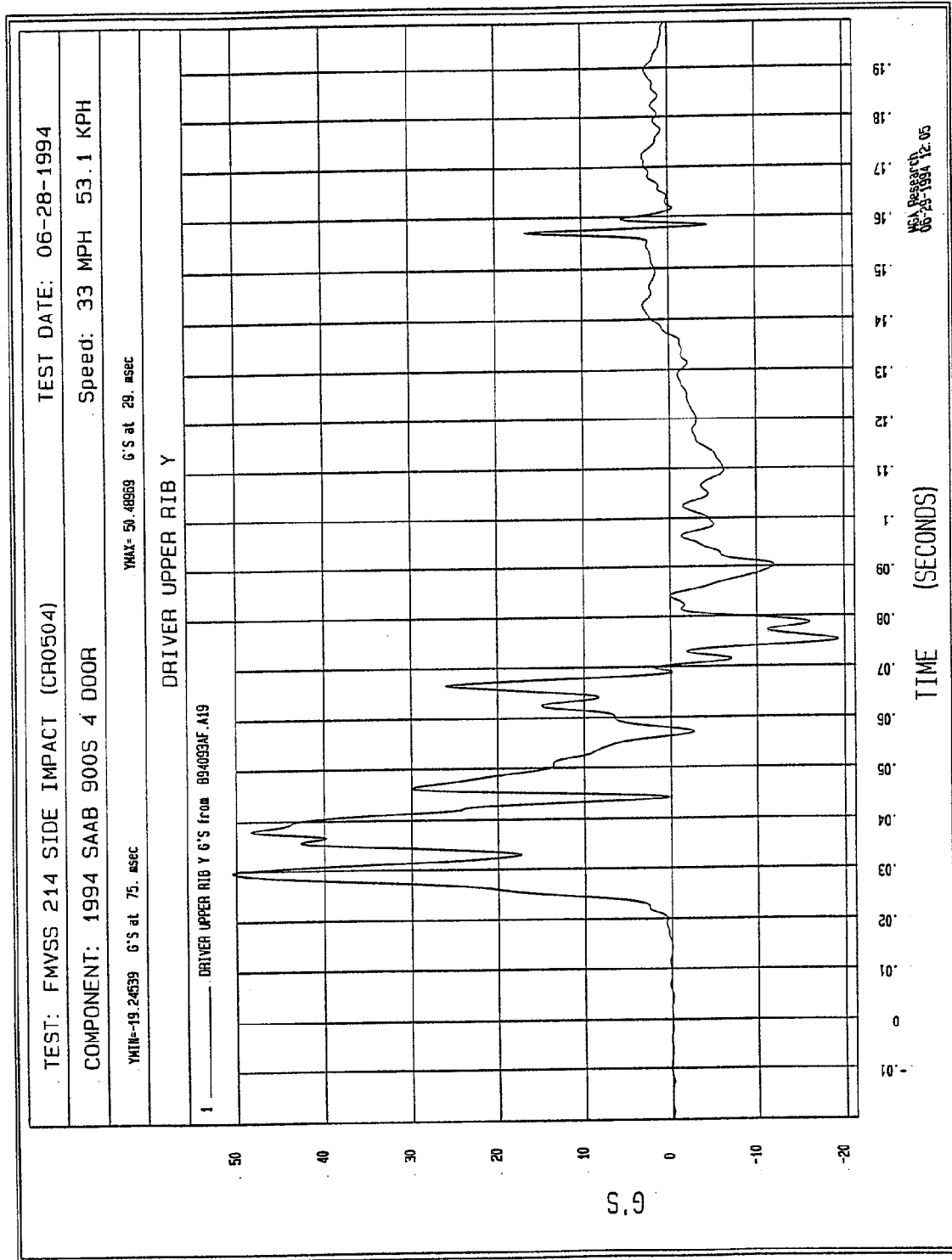


Figure B-1 - Driver Upper Rib Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

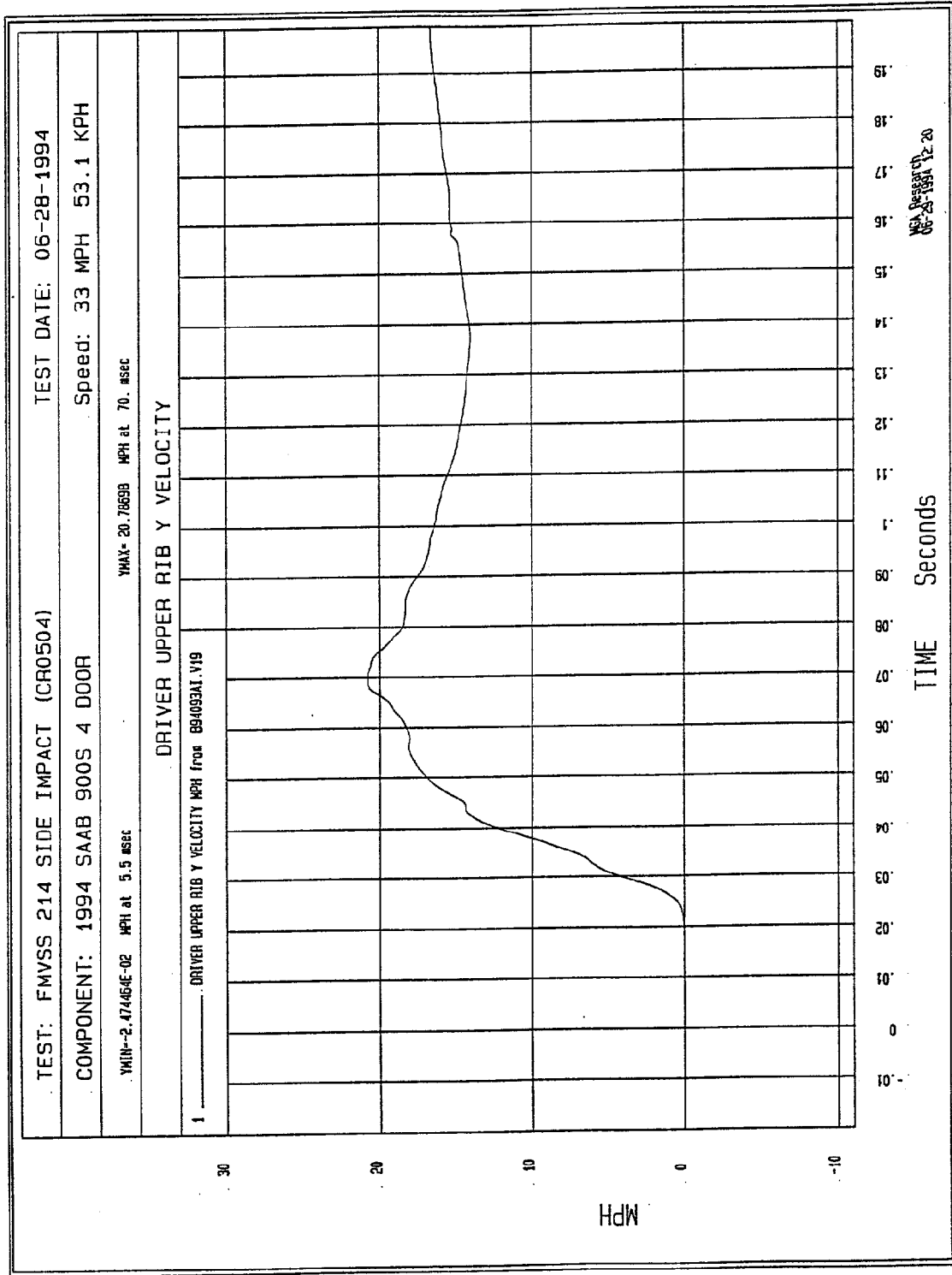


Figure B-2 - Driver Upper Rib Y Velocity vs. Time

Filter: Class 180 (300 Hz)

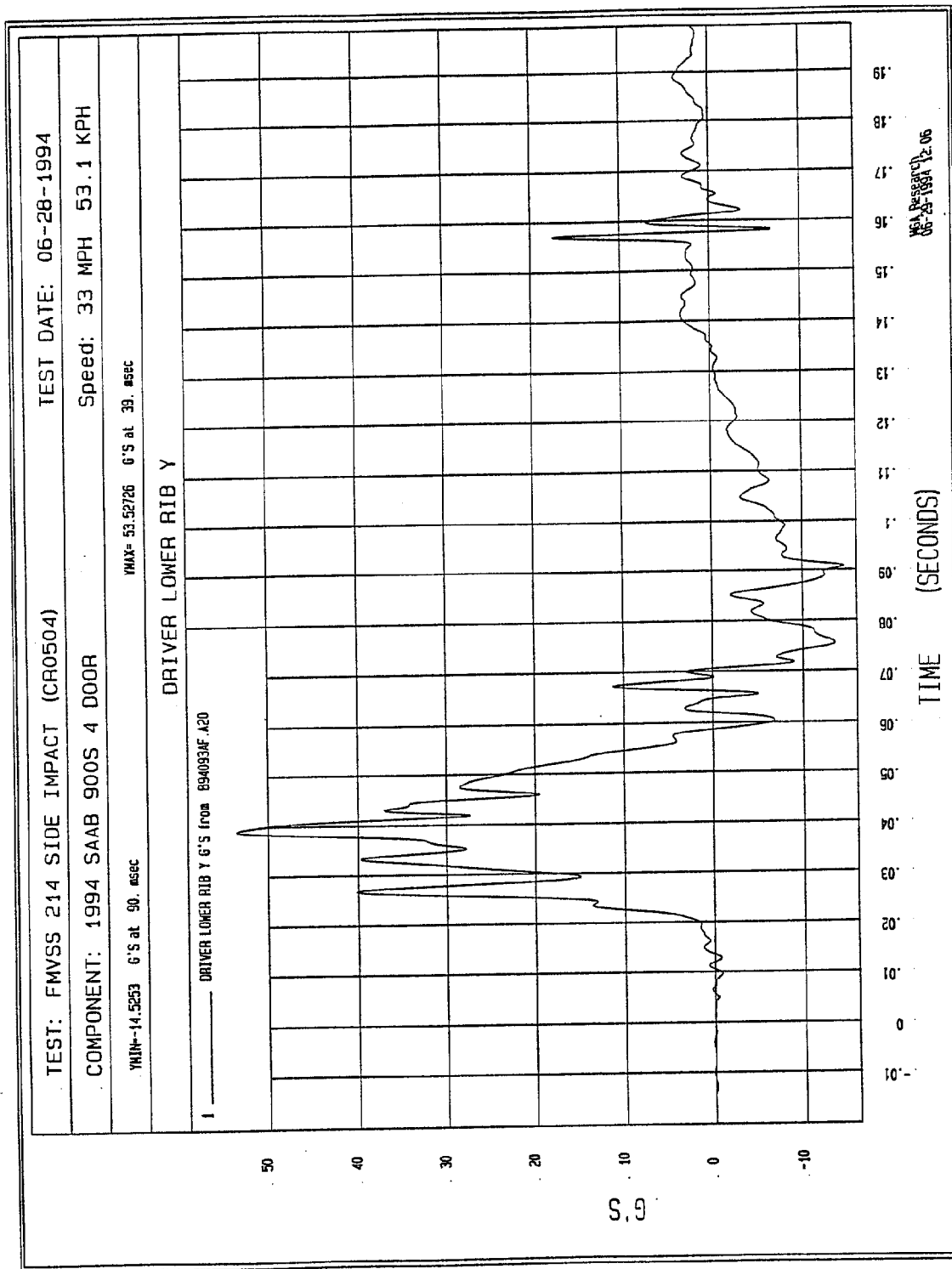


Figure B-3 - Driver Lower Rib Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

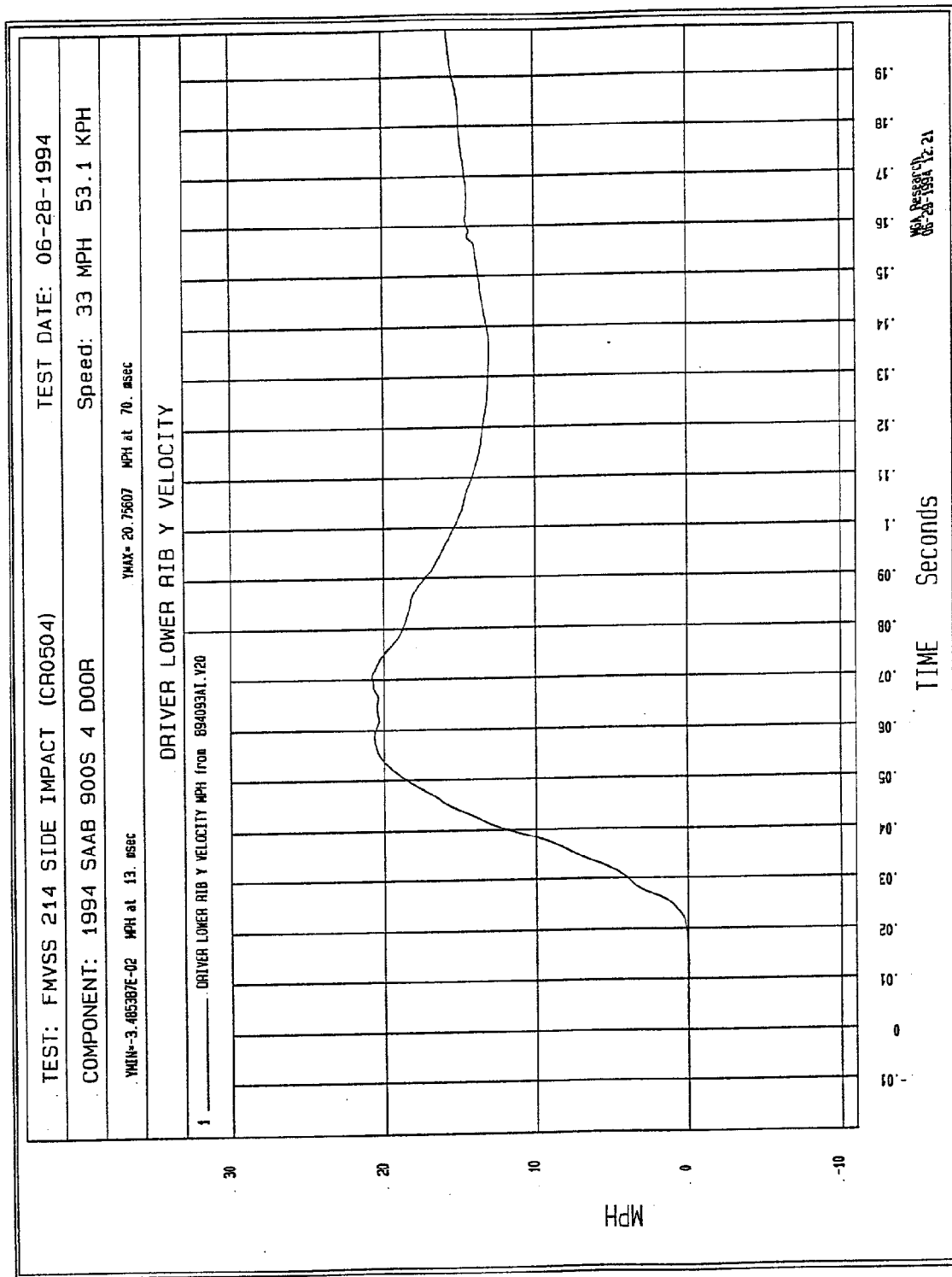


Figure B-4 - Driver Lower Rib Y Velocity vs. Time

Filter: Class 180 (300 Hz)

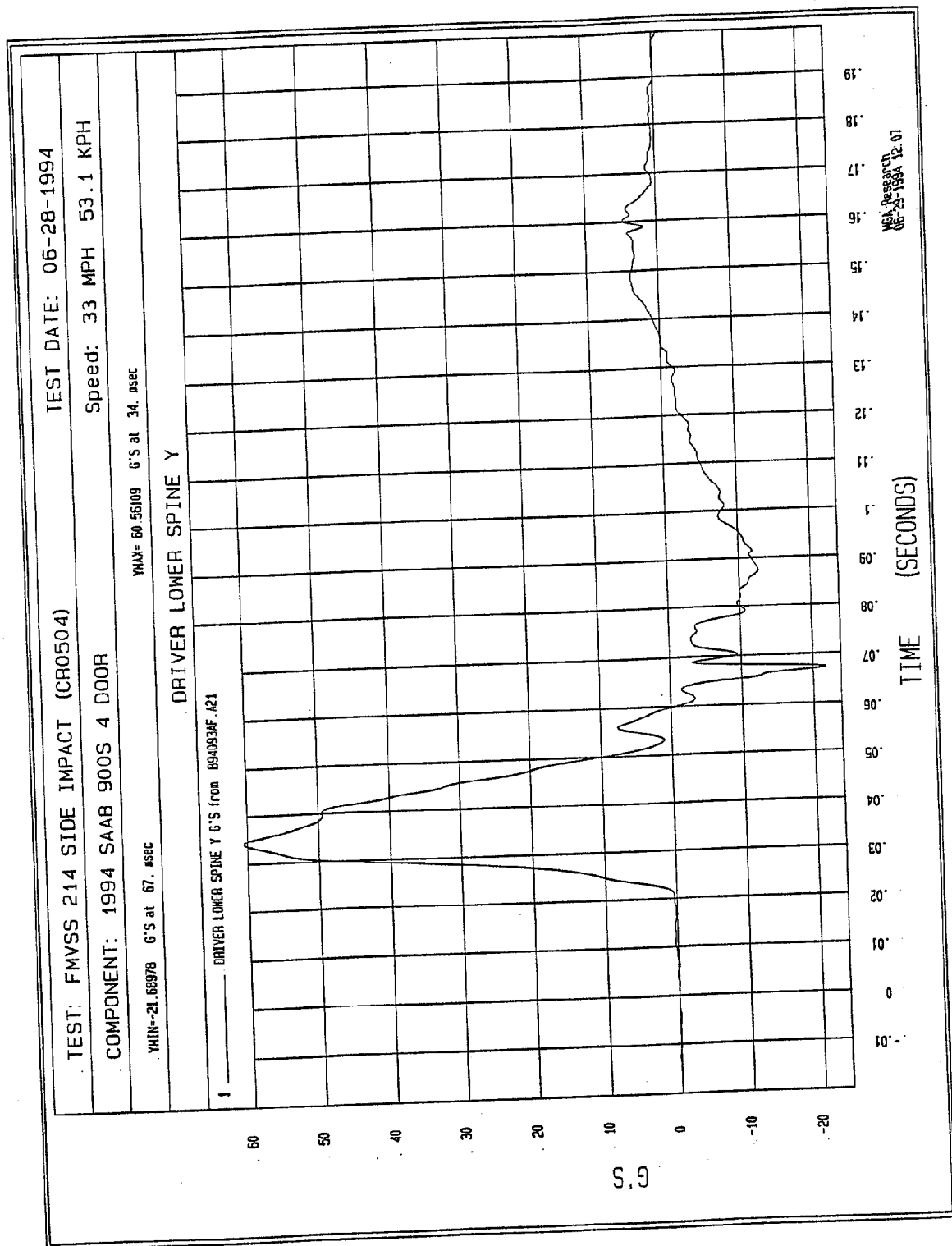


Figure B-5 - Driver Lower Spine Y Acceleration vs. Time

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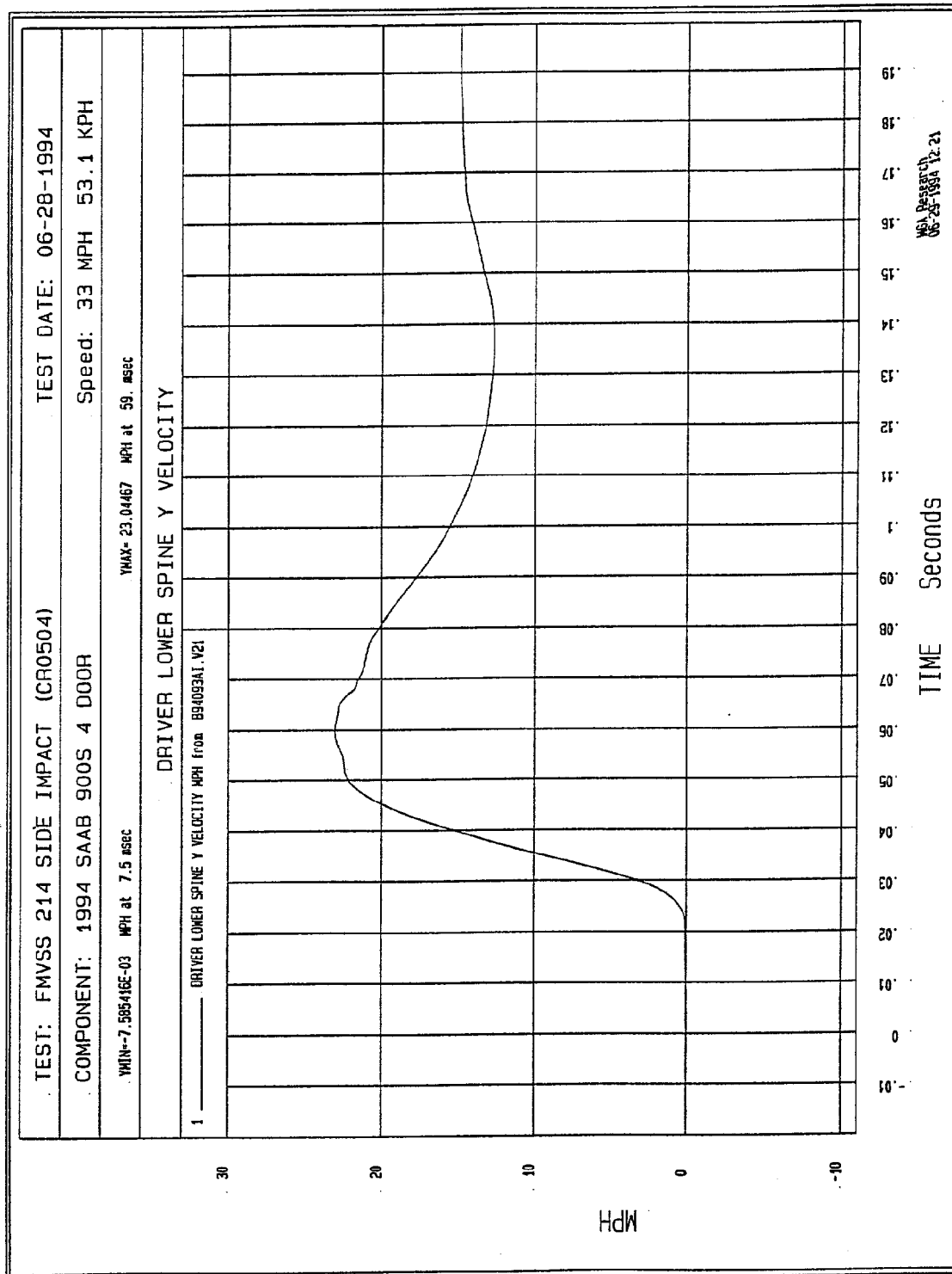


Figure B-6 - Driver Lower Spine Y Velocity vs. Time

Filter: Class 180 (300 Hz)

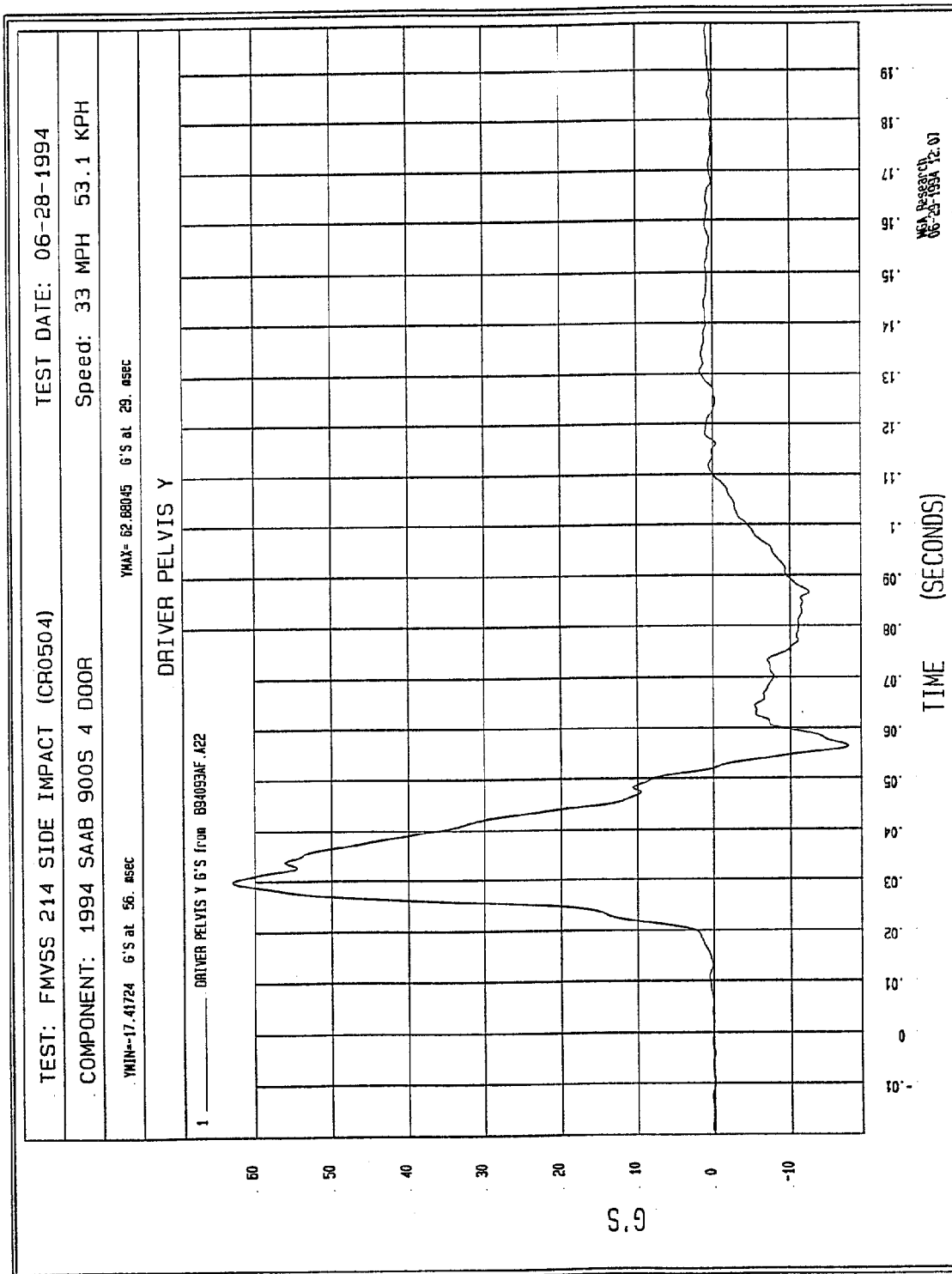


Figure B-7 - Driver Pelvis Y Acceleration vs. Time

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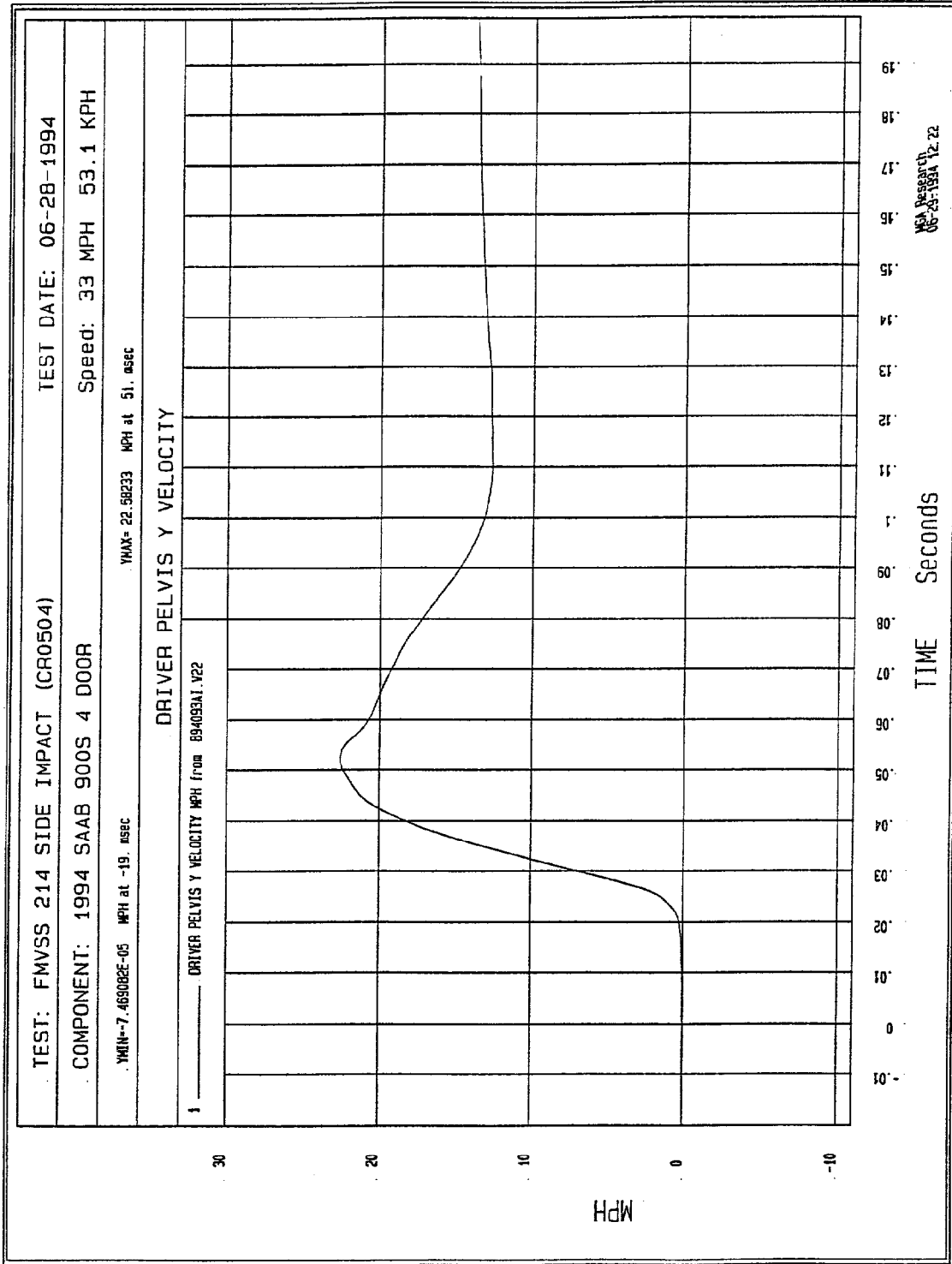


Figure B-8 - Driver Pelvis Y Velocity vs. Time

Filter: Class 180 (300 Hz)

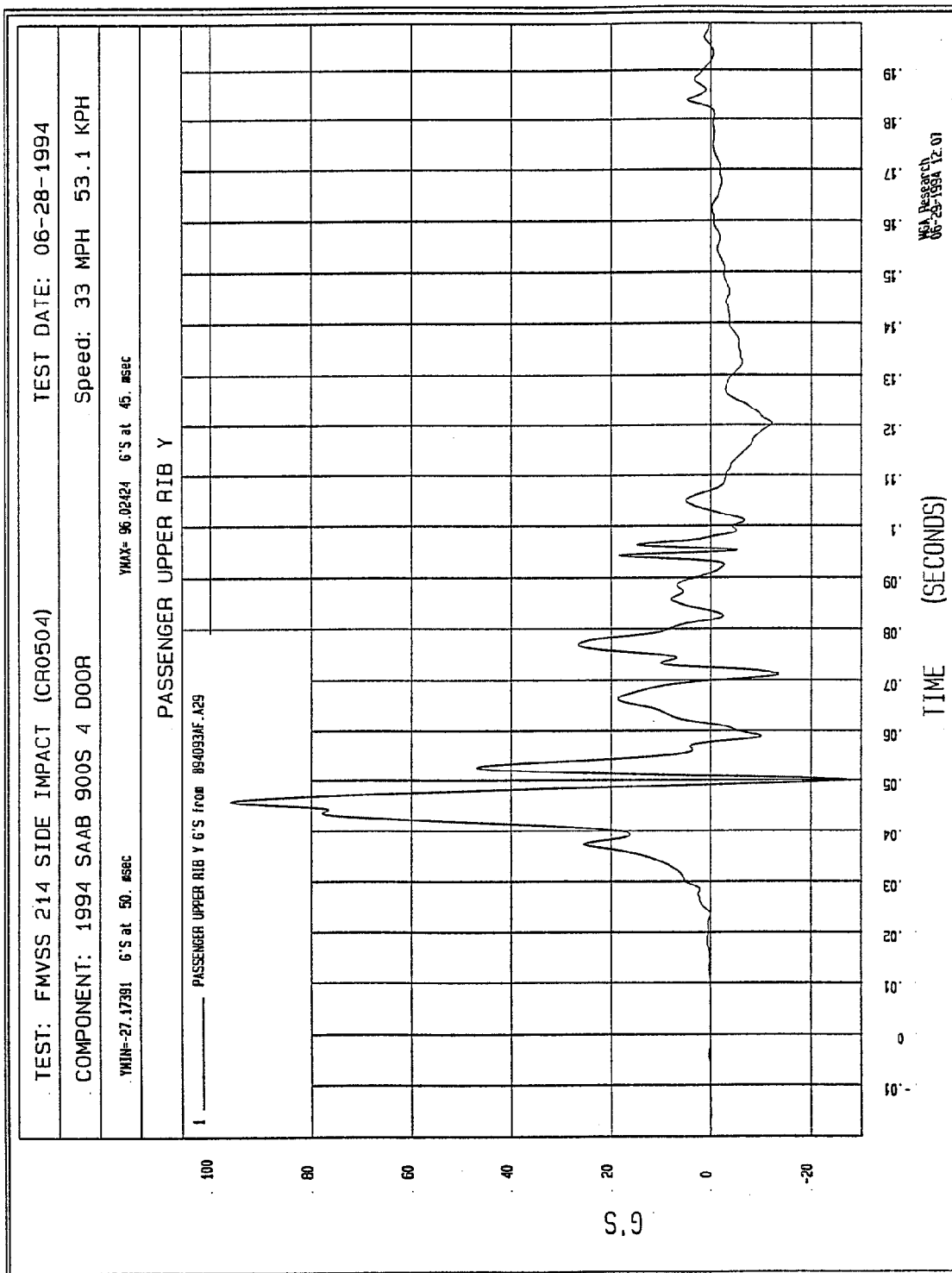


Figure B-9 - Passenger Upper Rib Y Acceleration vs. Time

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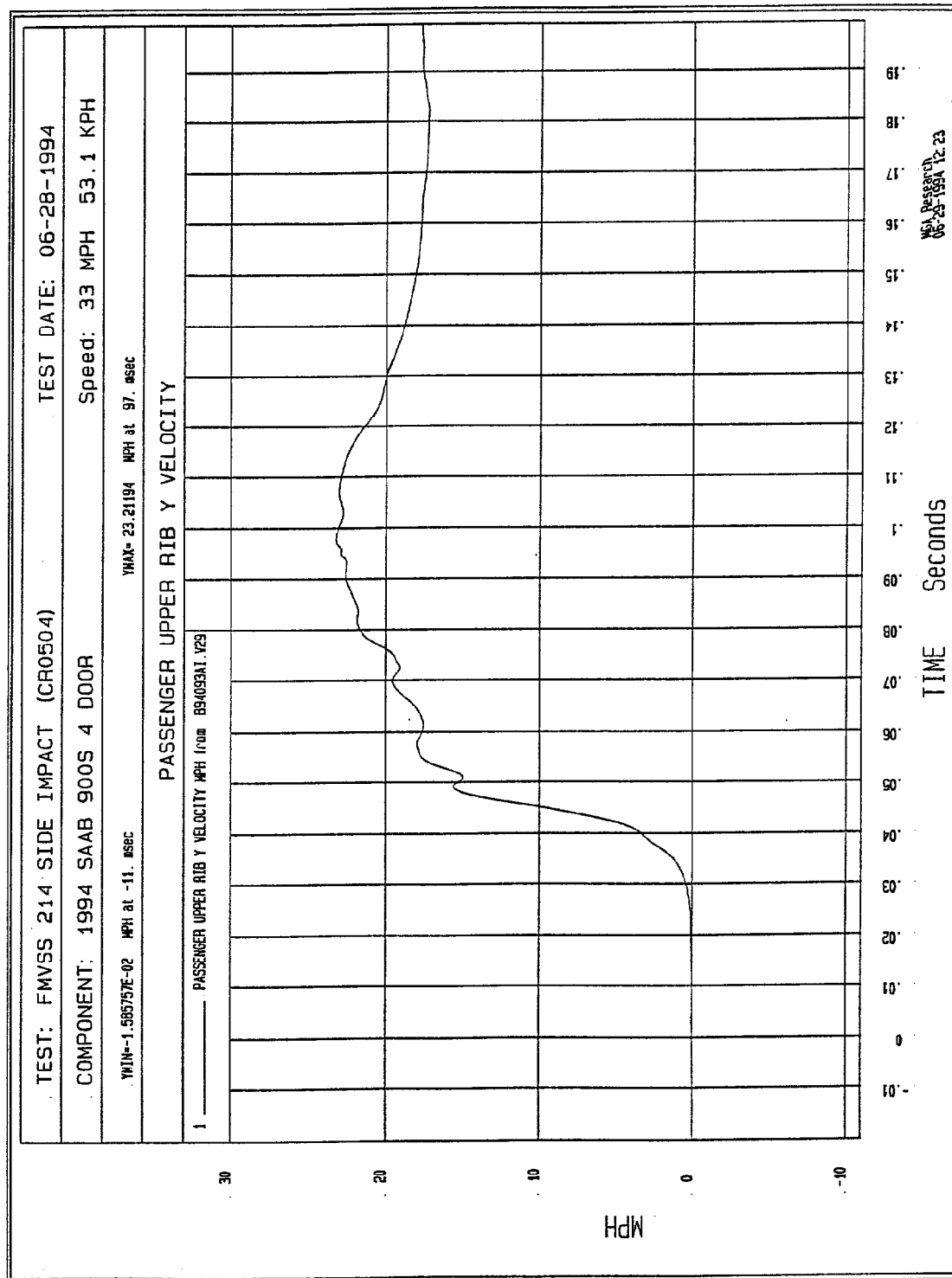


Figure B-10 - Passenger Upper Rib Y Velocity vs. Time

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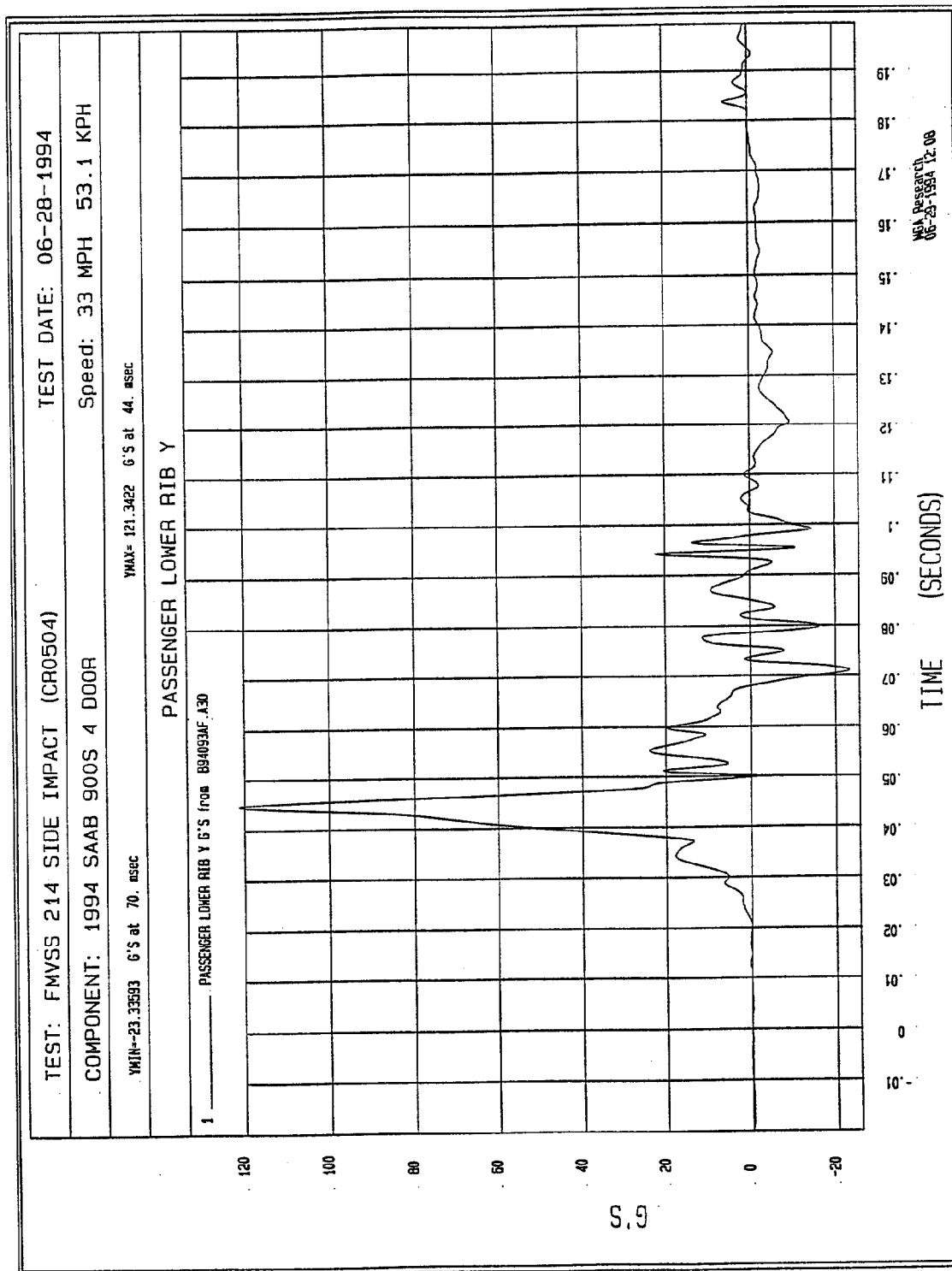


Figure B-11 - Passenger Lower Rib Y Acceleration vs. Time

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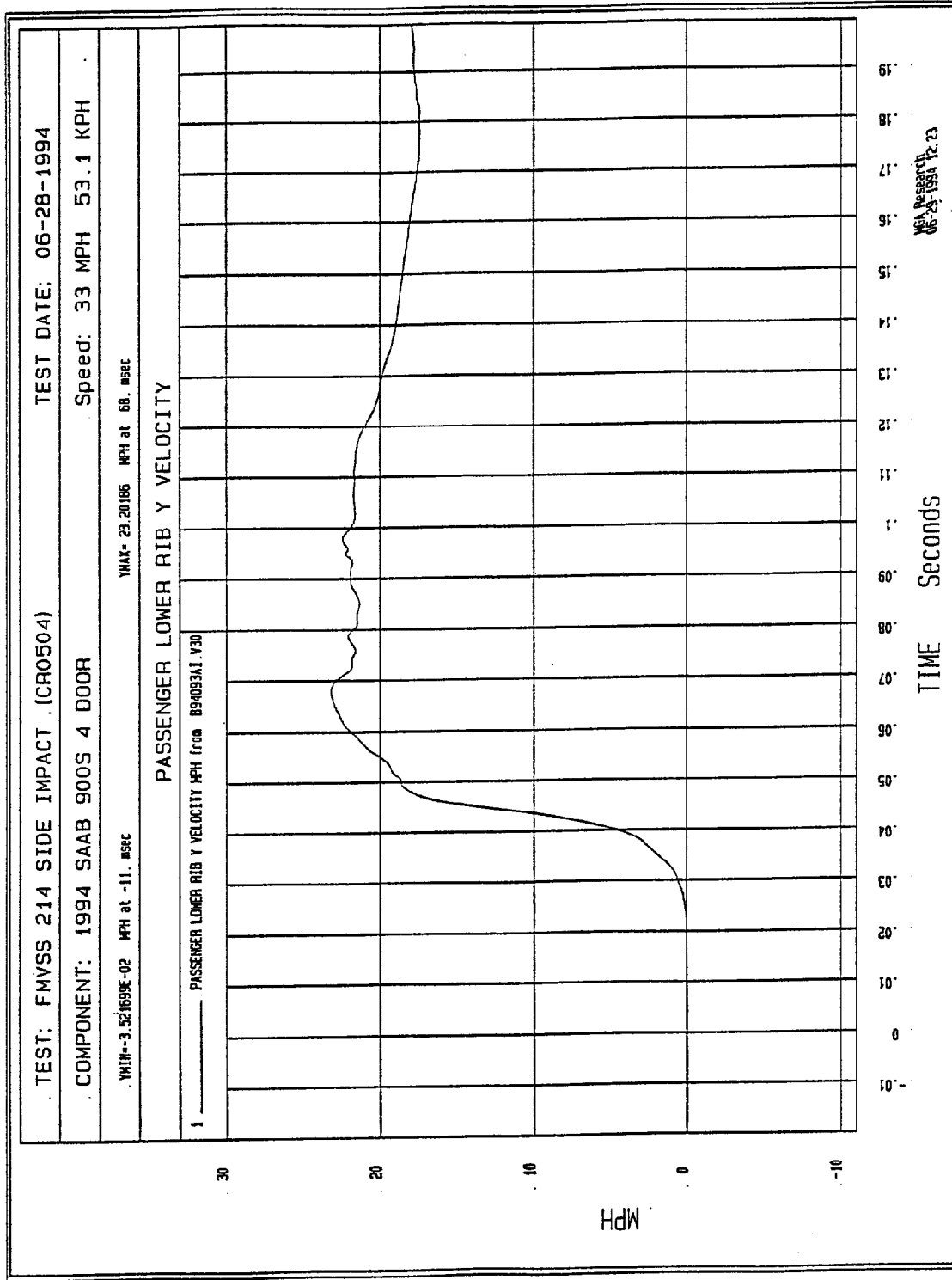


Figure B-12 - Passenger Lower Rib Y Velocity vs. Time

Filter: Class 180 (300 Hz)

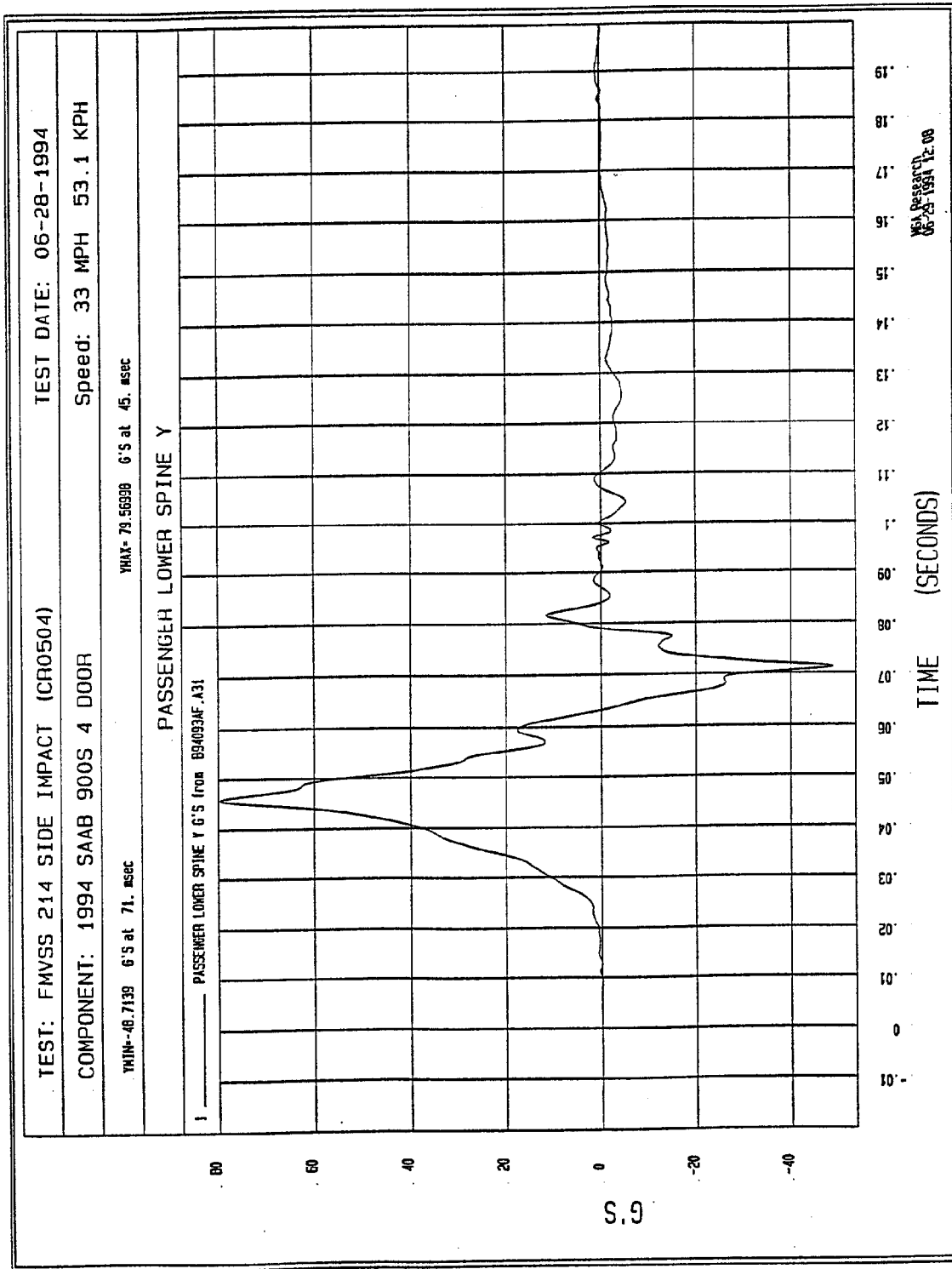


Figure B-13 - Passenger Lower Spine Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

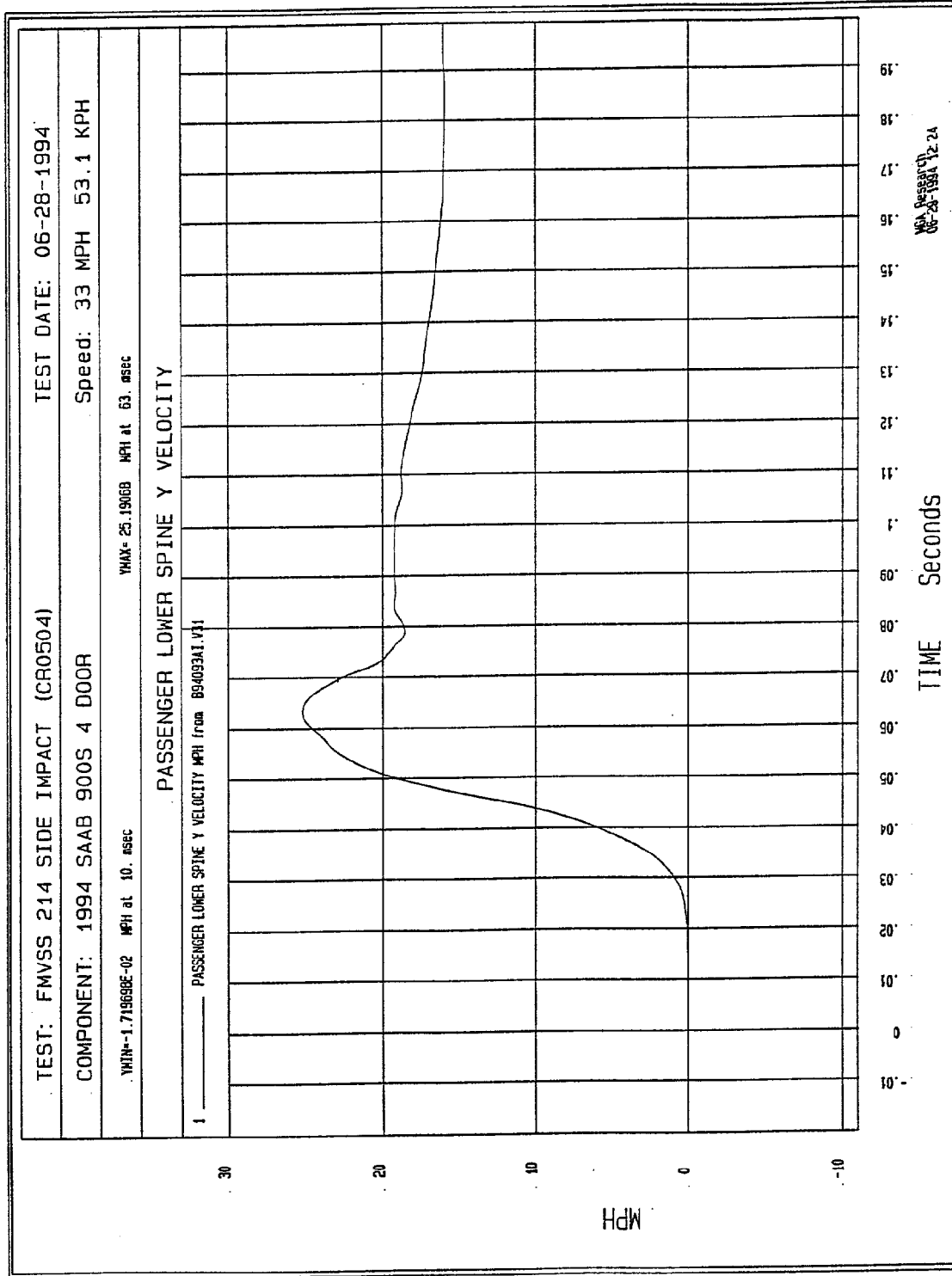


Figure B-14 - Passenger Lower Spine Y Velocity vs. Time

Filter: Class 180 (300 Hz)

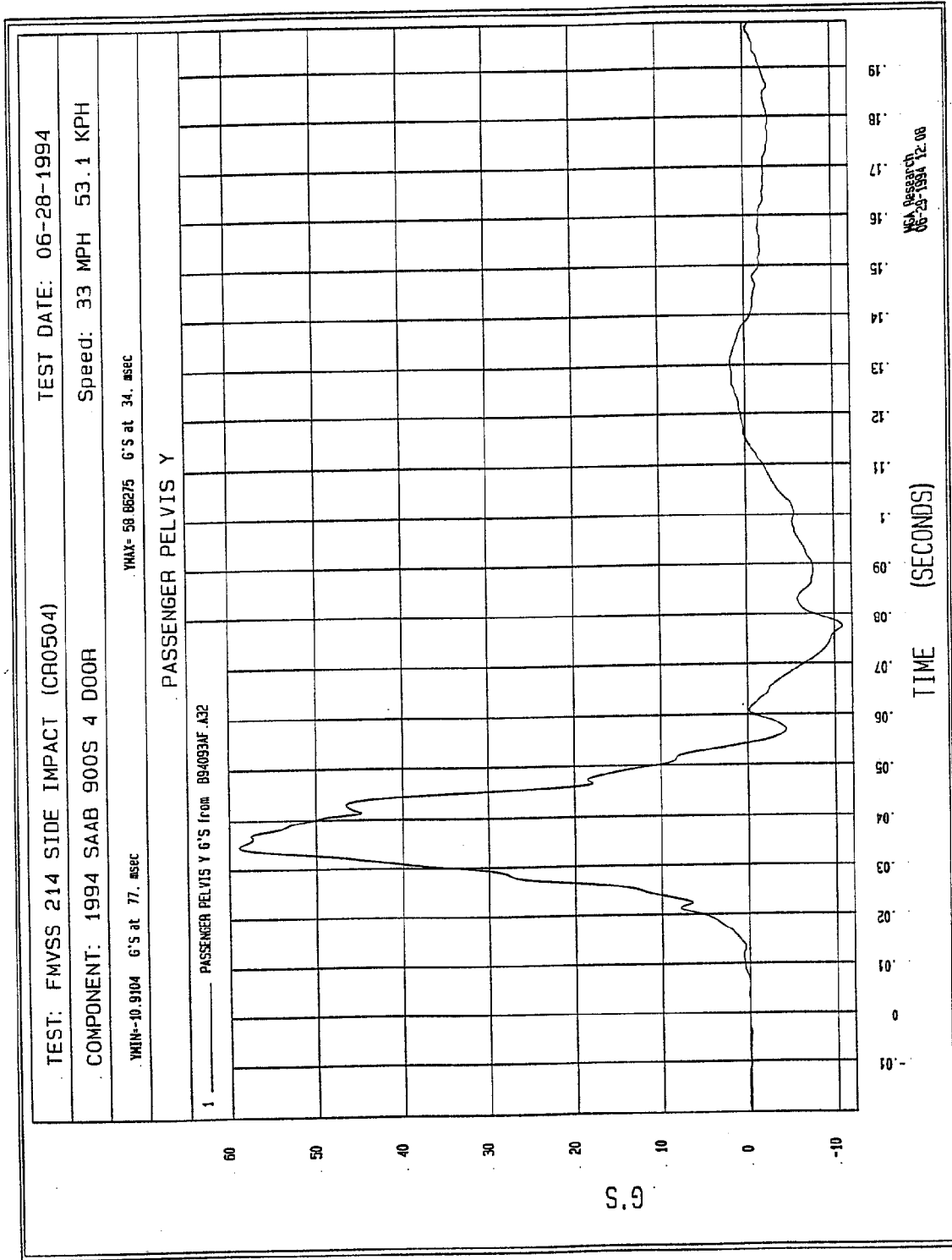


Figure B-15 - Passenger Pelvis Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

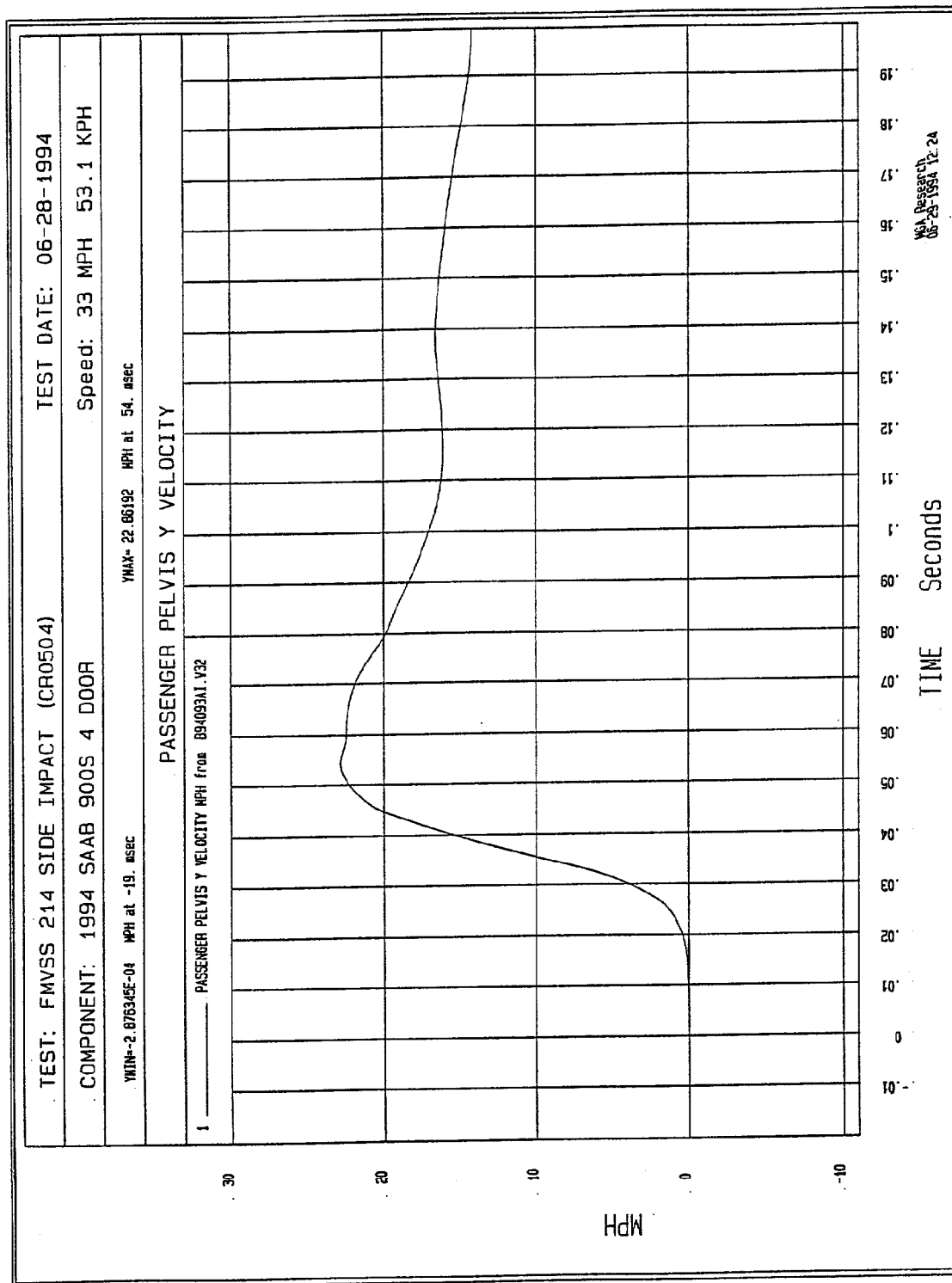


Figure B-16 - Passenger Pelvis Y Velocity vs. Time

Filter: Class 60 (100 Hz)

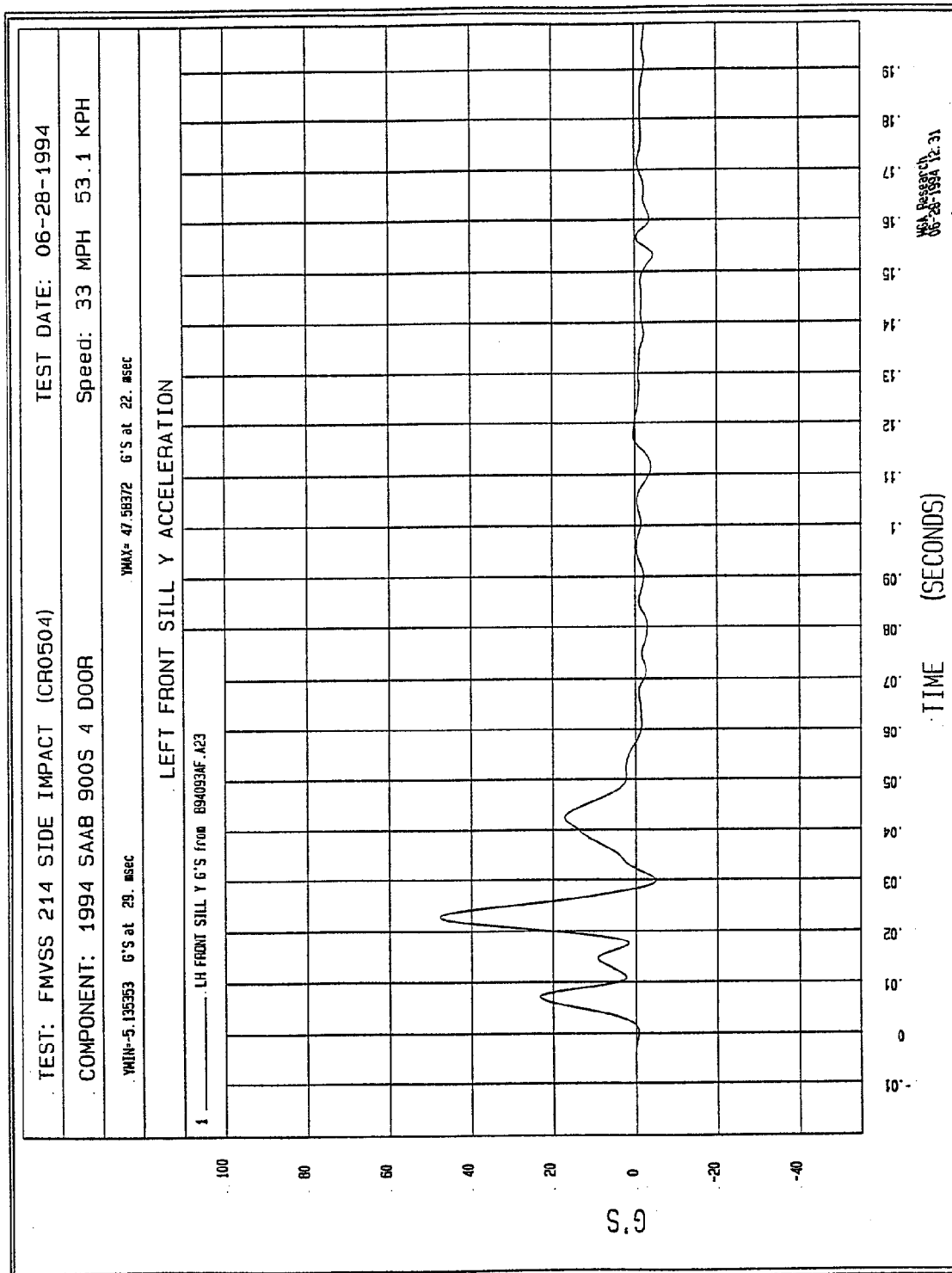


Figure B-17 - Left Front Sill Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

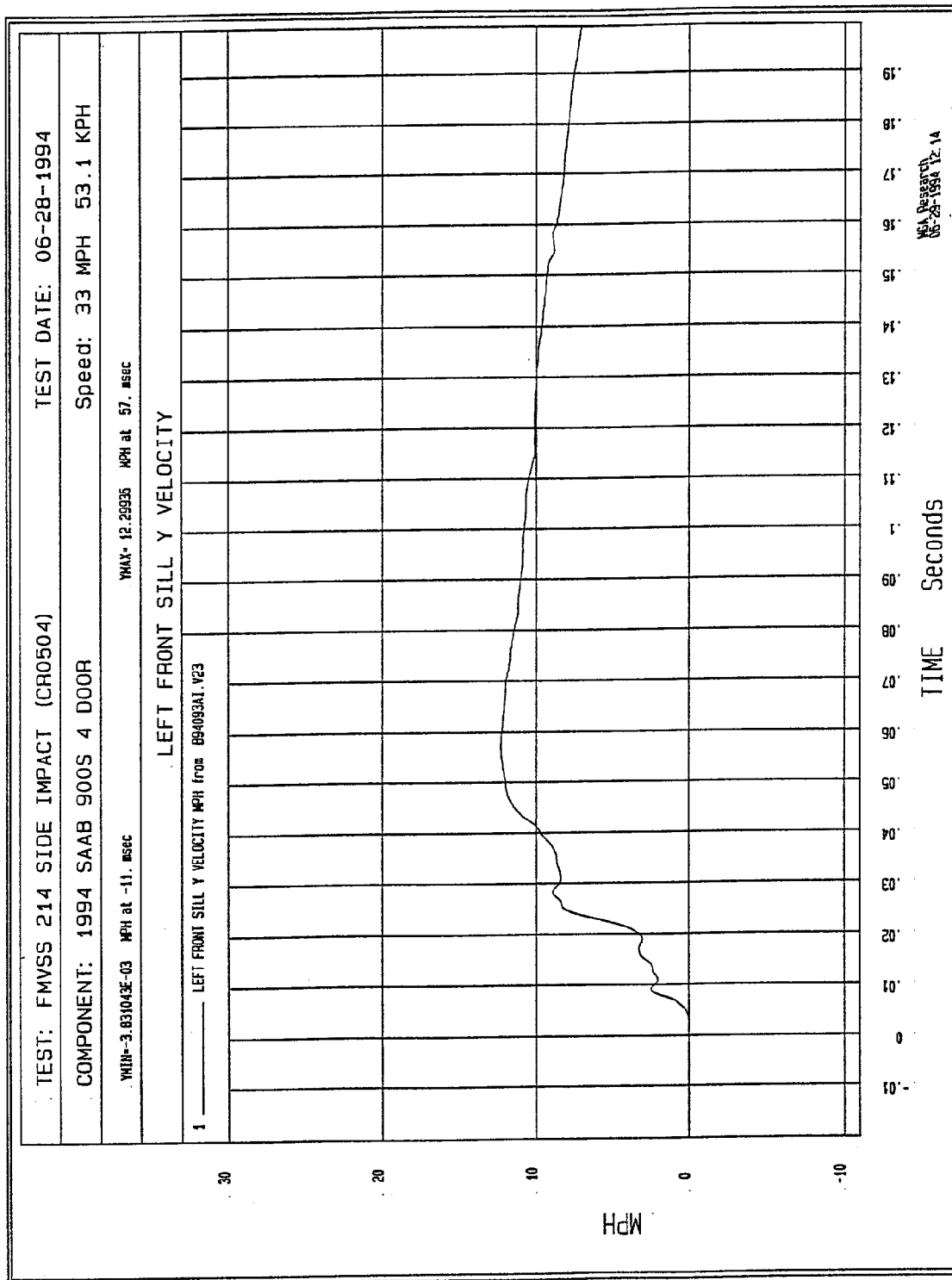


Figure B-18 - Left Front Sill Y Velocity vs. Time

Filter: Class 60 (100 Hz)

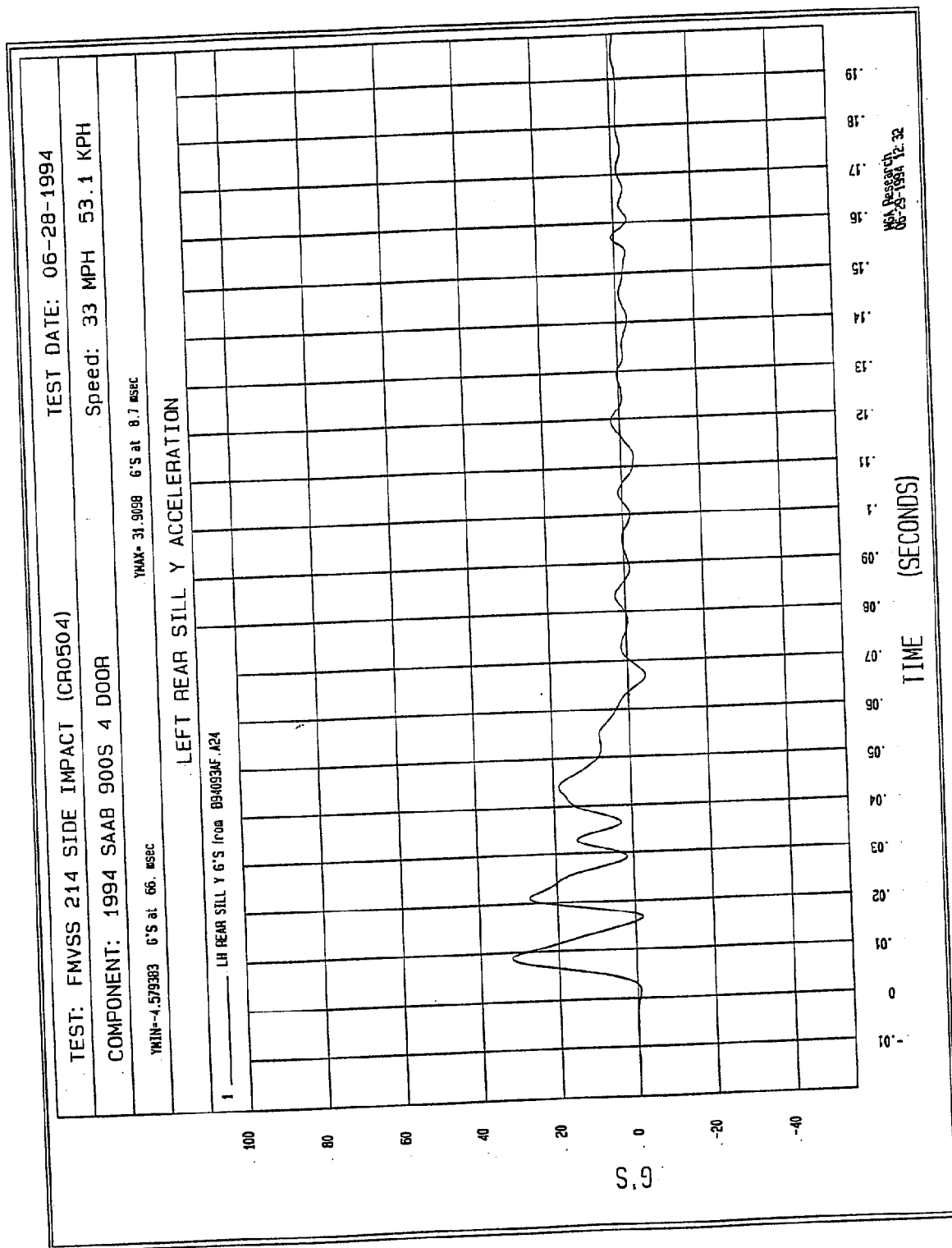


Figure B-19 - Left Rear Sill Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

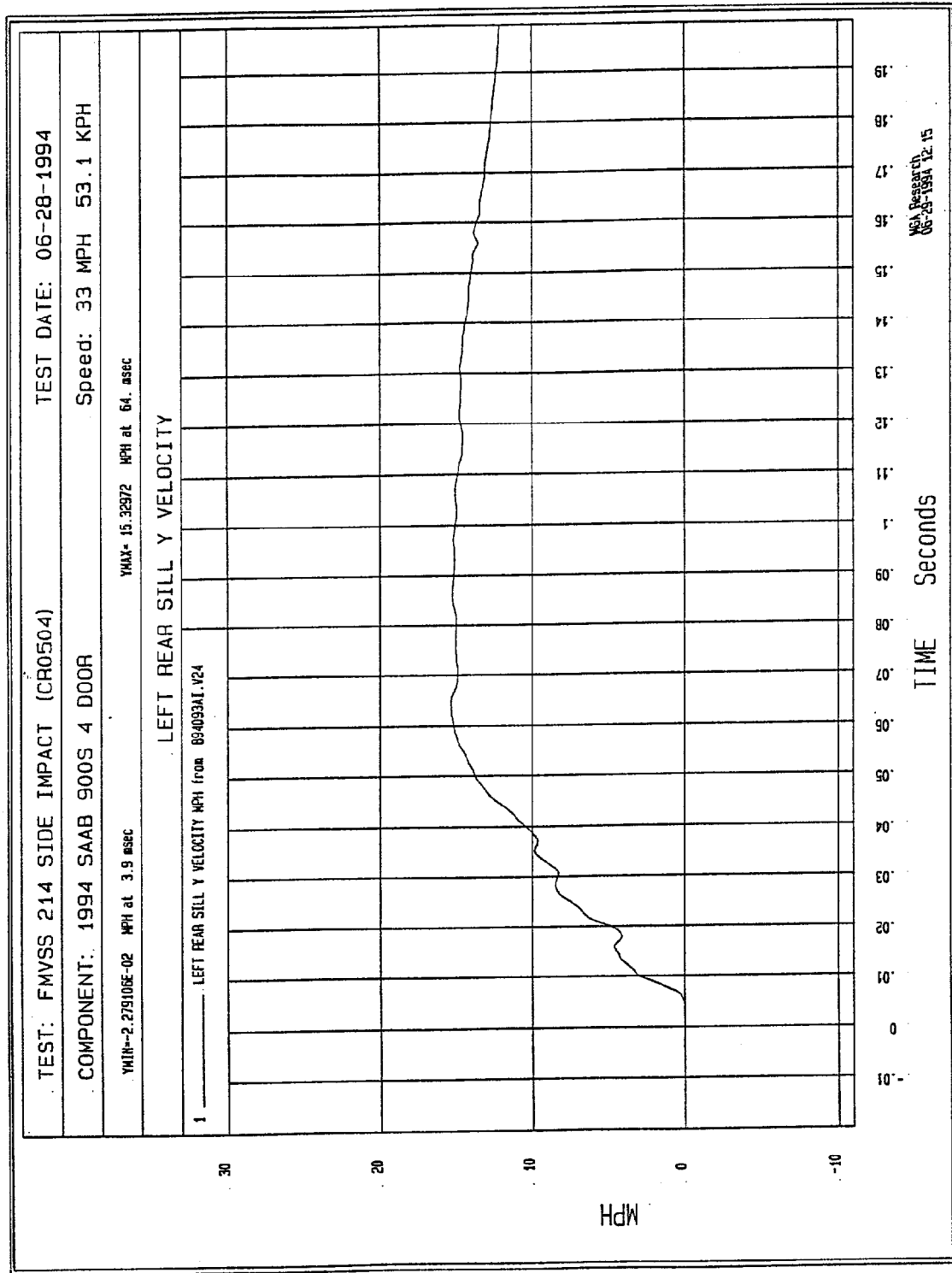


Figure B-20 - Left Rear Sill Y Velocity vs. Time

Filter: Class 60 (100 Hz)

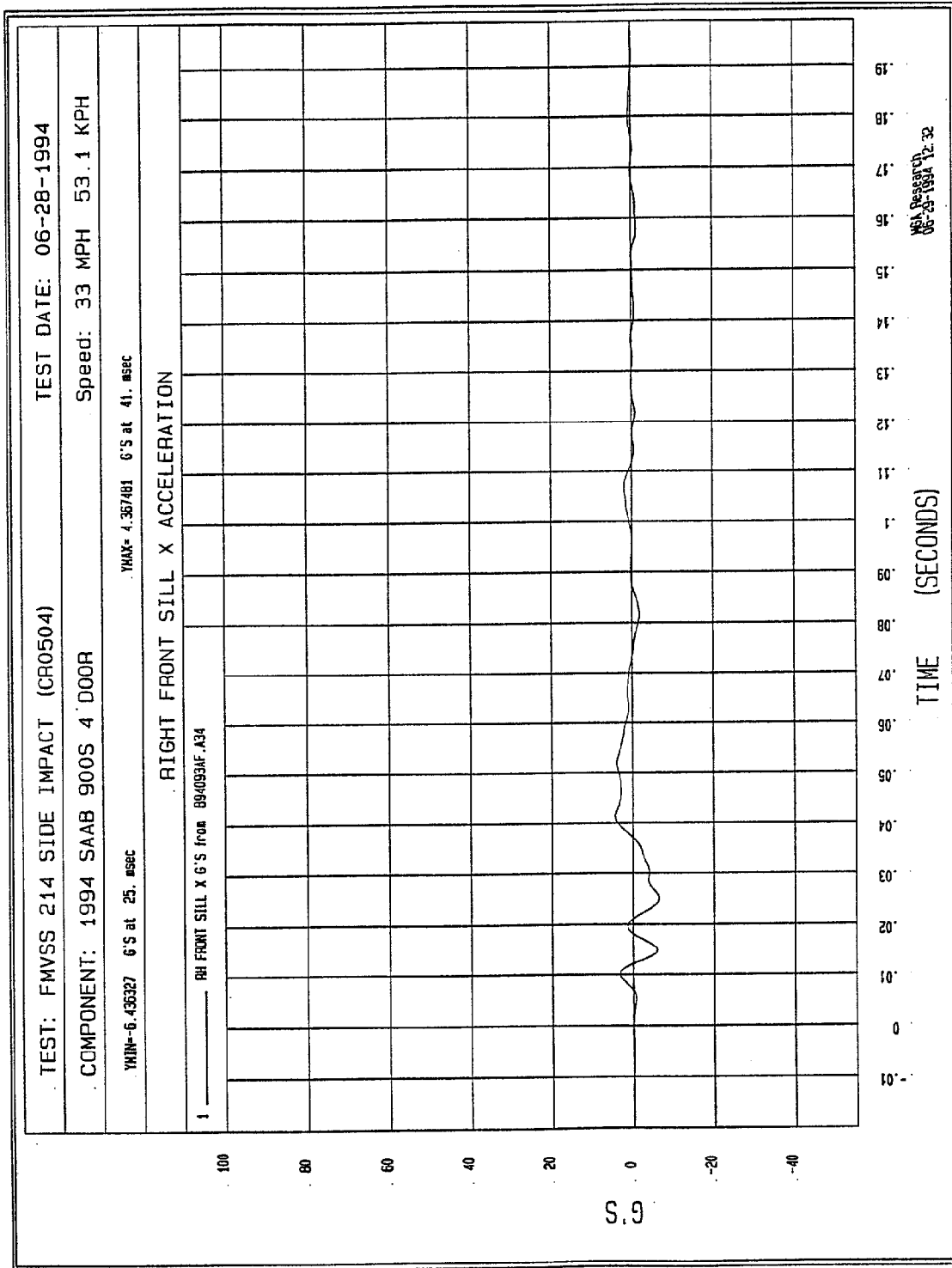


Figure B-21 - Right Front Sill X Acceleration vs. Time

Filter: Class 180 (300 Hz)

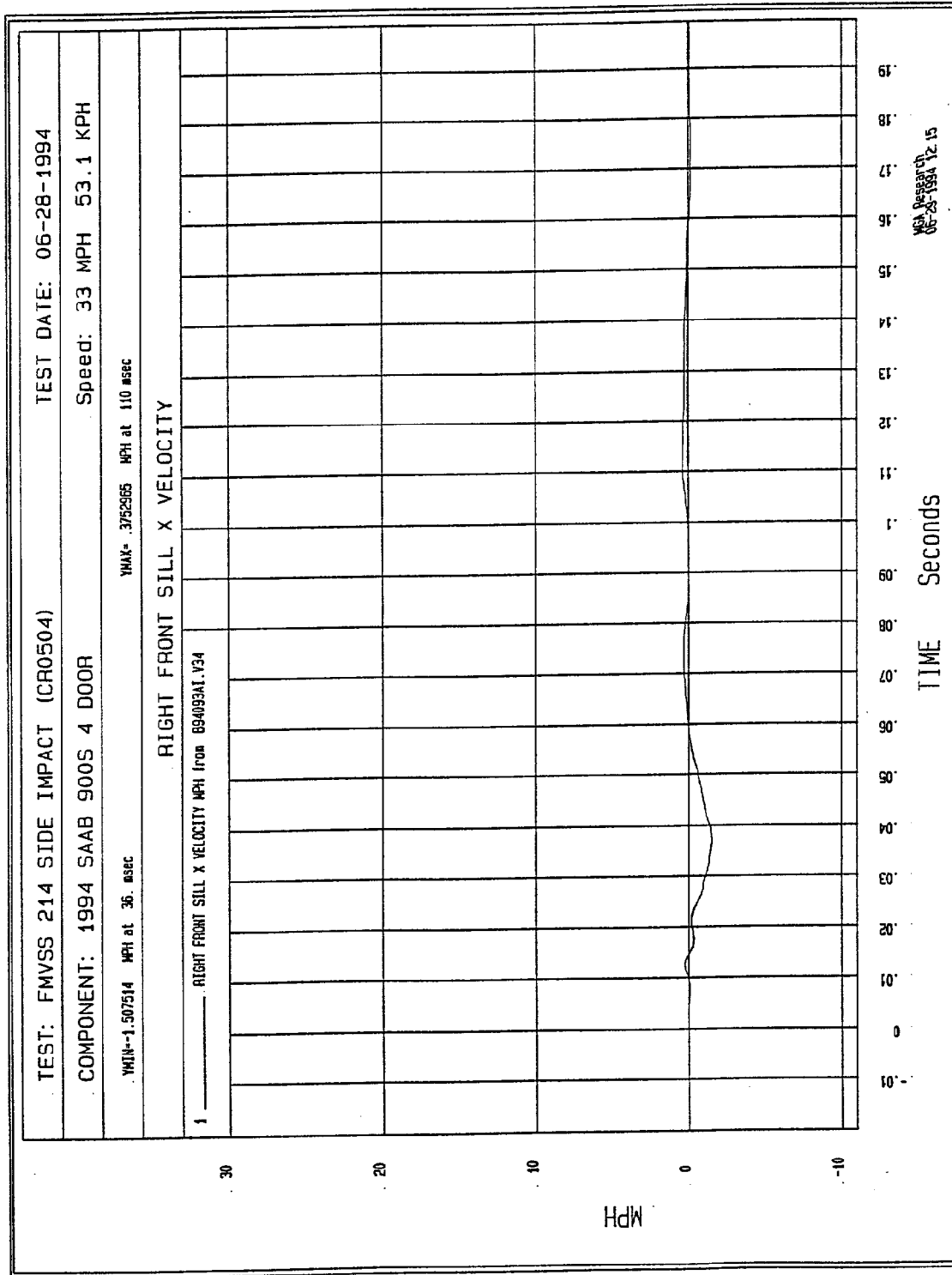


Figure B-22 - Right Front Sill X Velocity vs. Time

Filter: Class 60 (100 Hz)

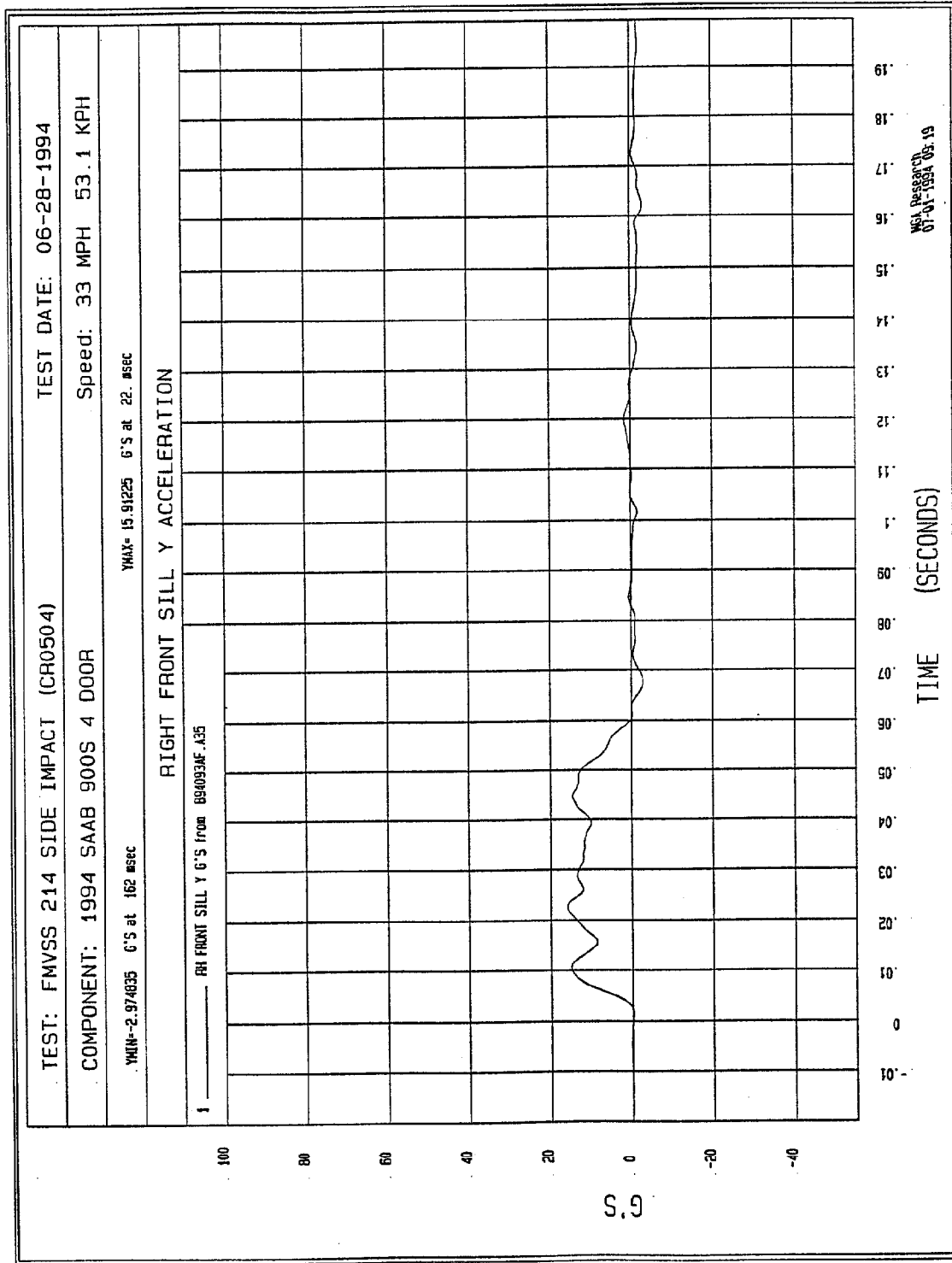


Figure B-23 - Right Front Sill Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

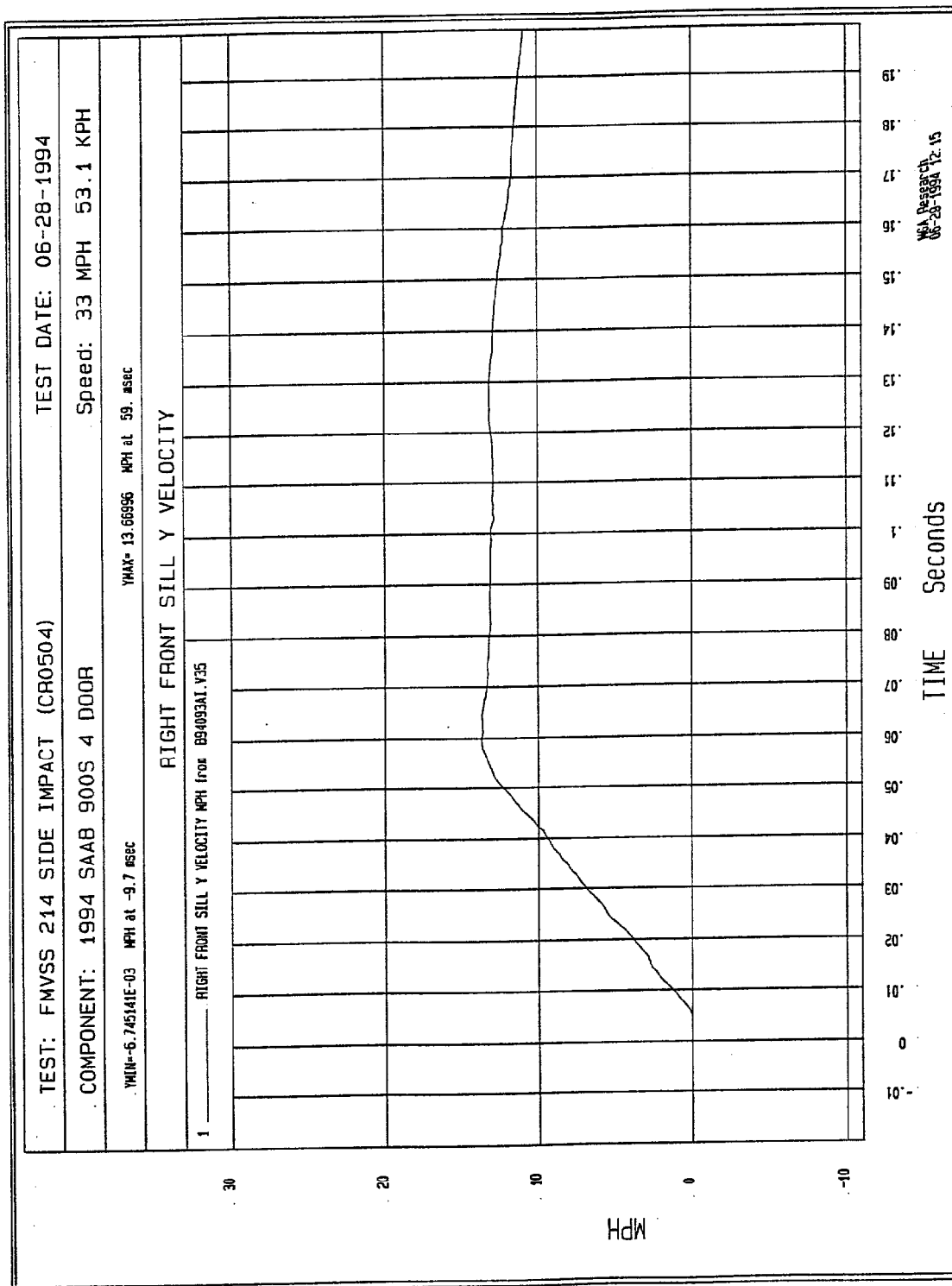


Figure B-24 - Right Front Sill Y Velocity vs. Time

Filter: Class 60 (100 Hz)

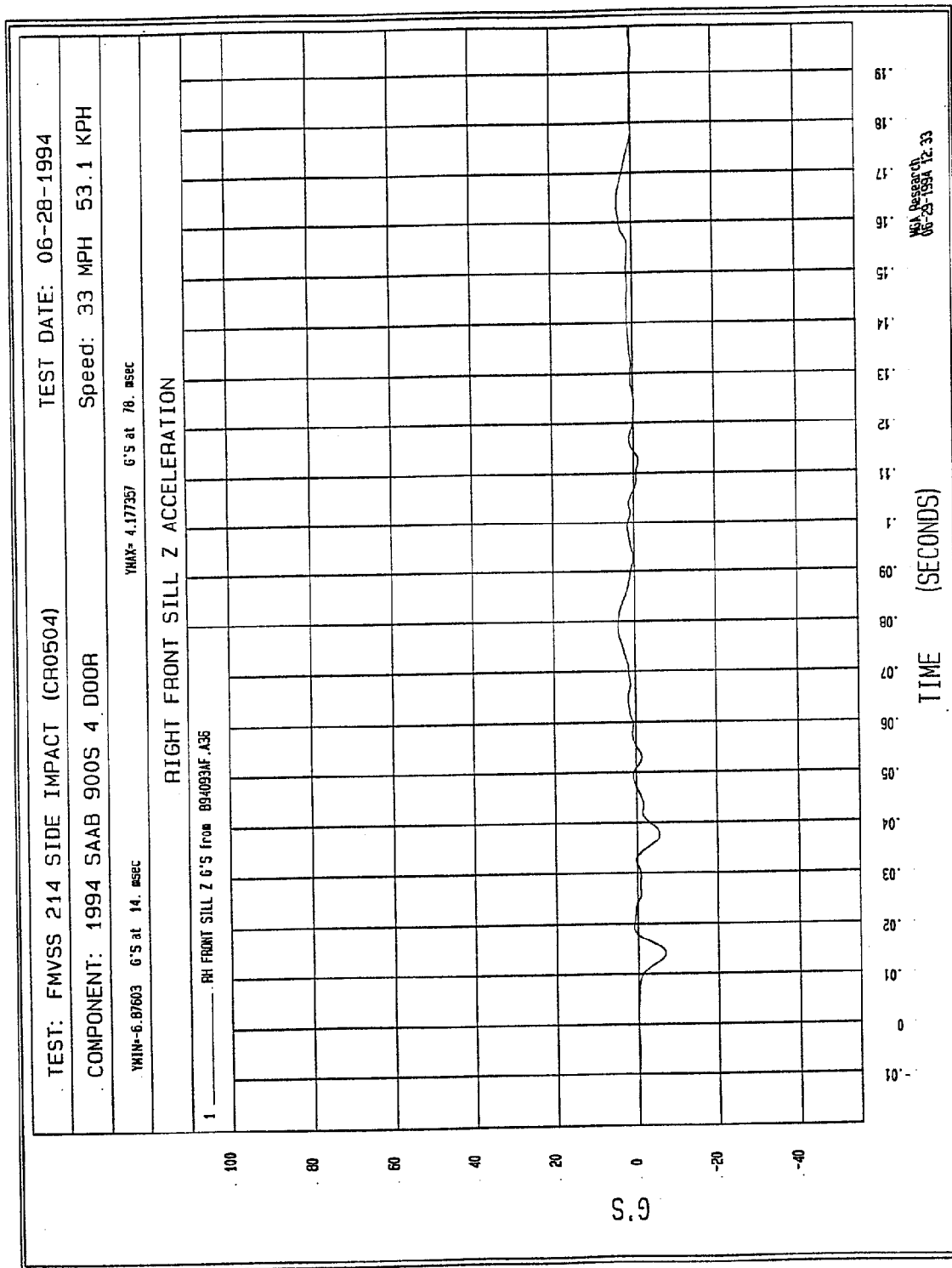


Figure B-25 - Right Front Sill Z Acceleration vs. Time

Filter: Class 180 (300 Hz)

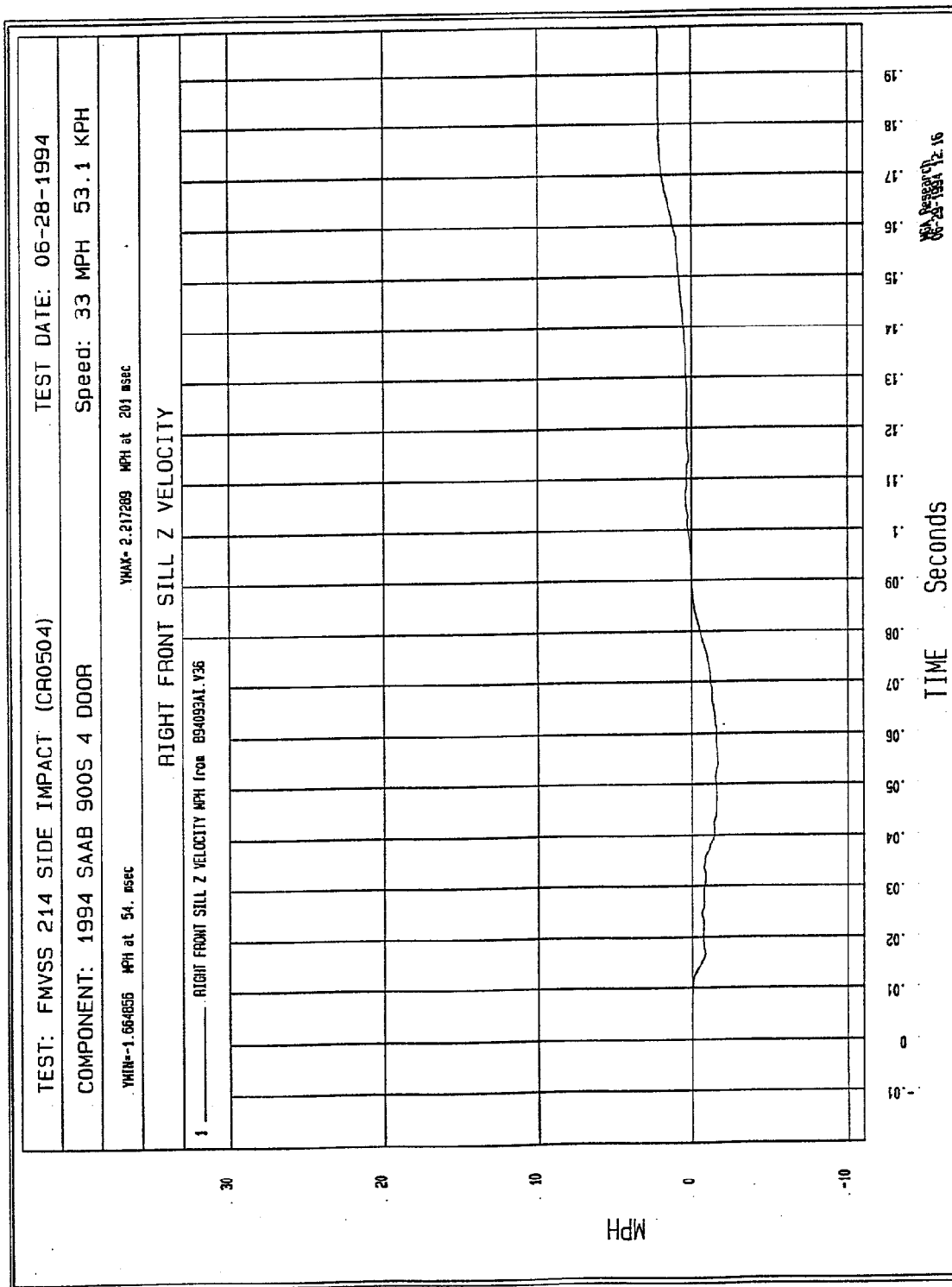


Figure B-26 - Right Front Sill z Velocity vs. Time

Filter: Class 60 (100 Hz)

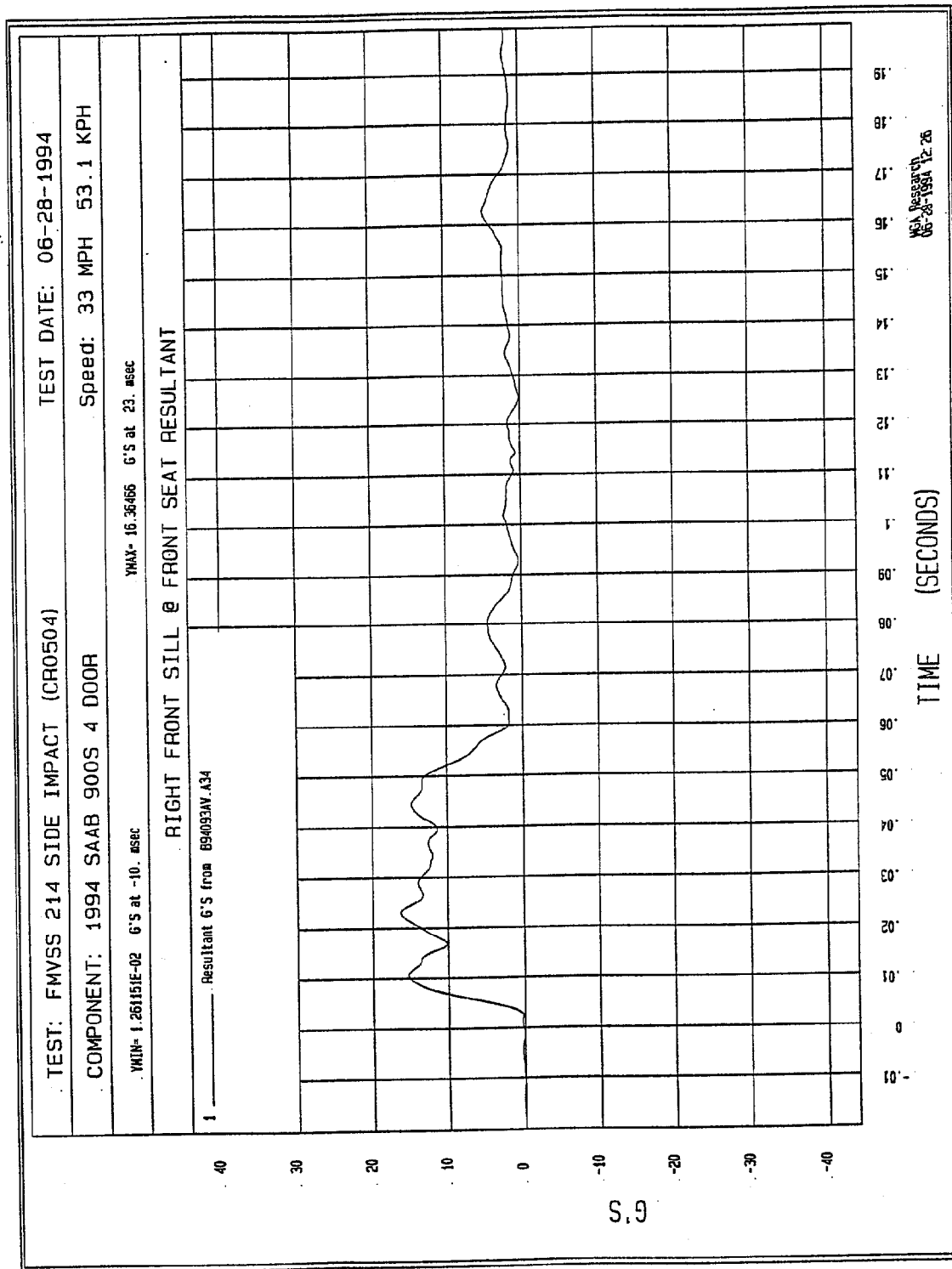


Figure B-27 - Right Front Sill at Front Seat Resultant vs. Time

Filter: Class 60 (100 Hz)

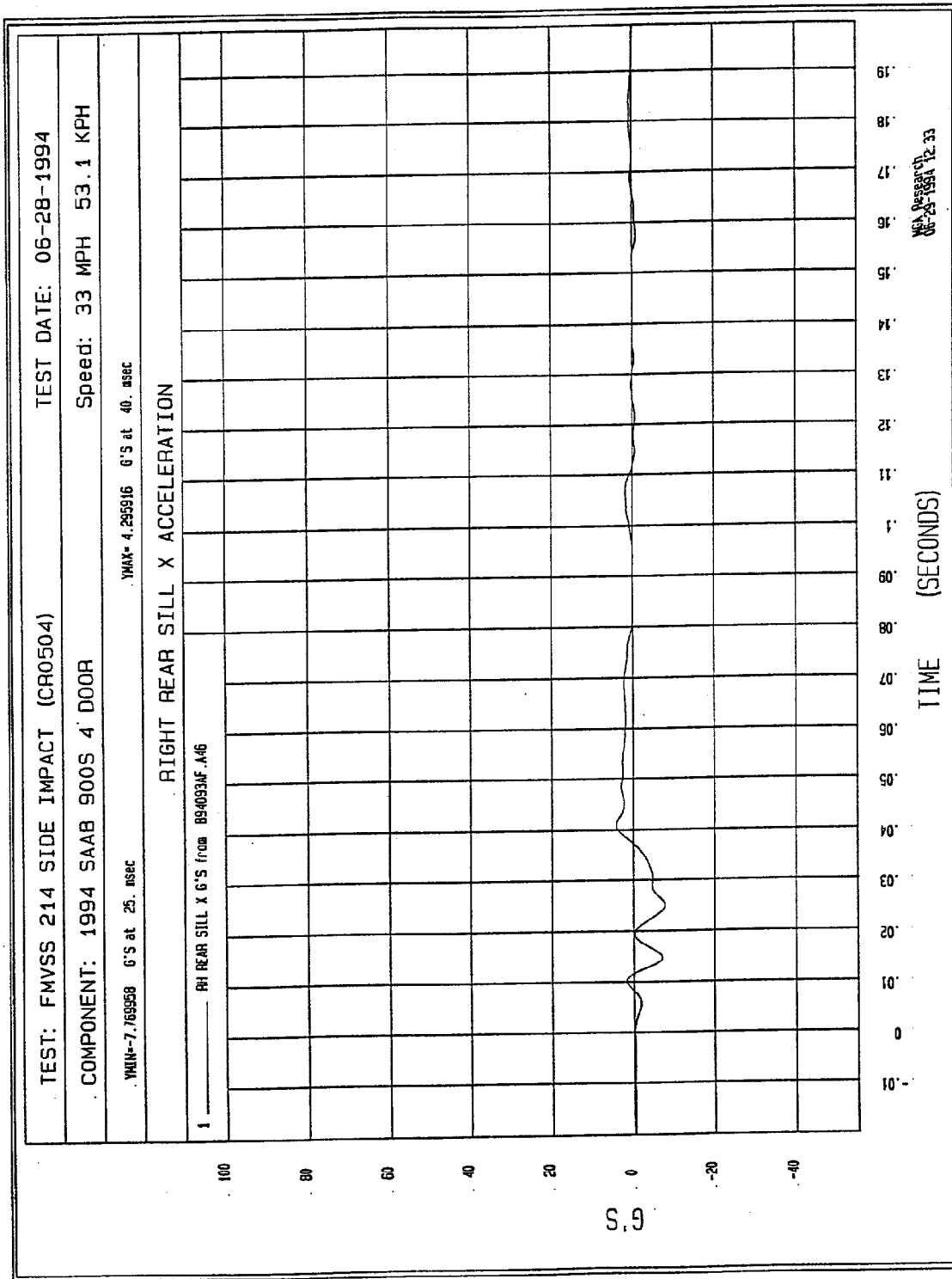


Figure B-28 - Right Rear Sill X Acceleration vs. Time

Filter: Class 180 (300 Hz)

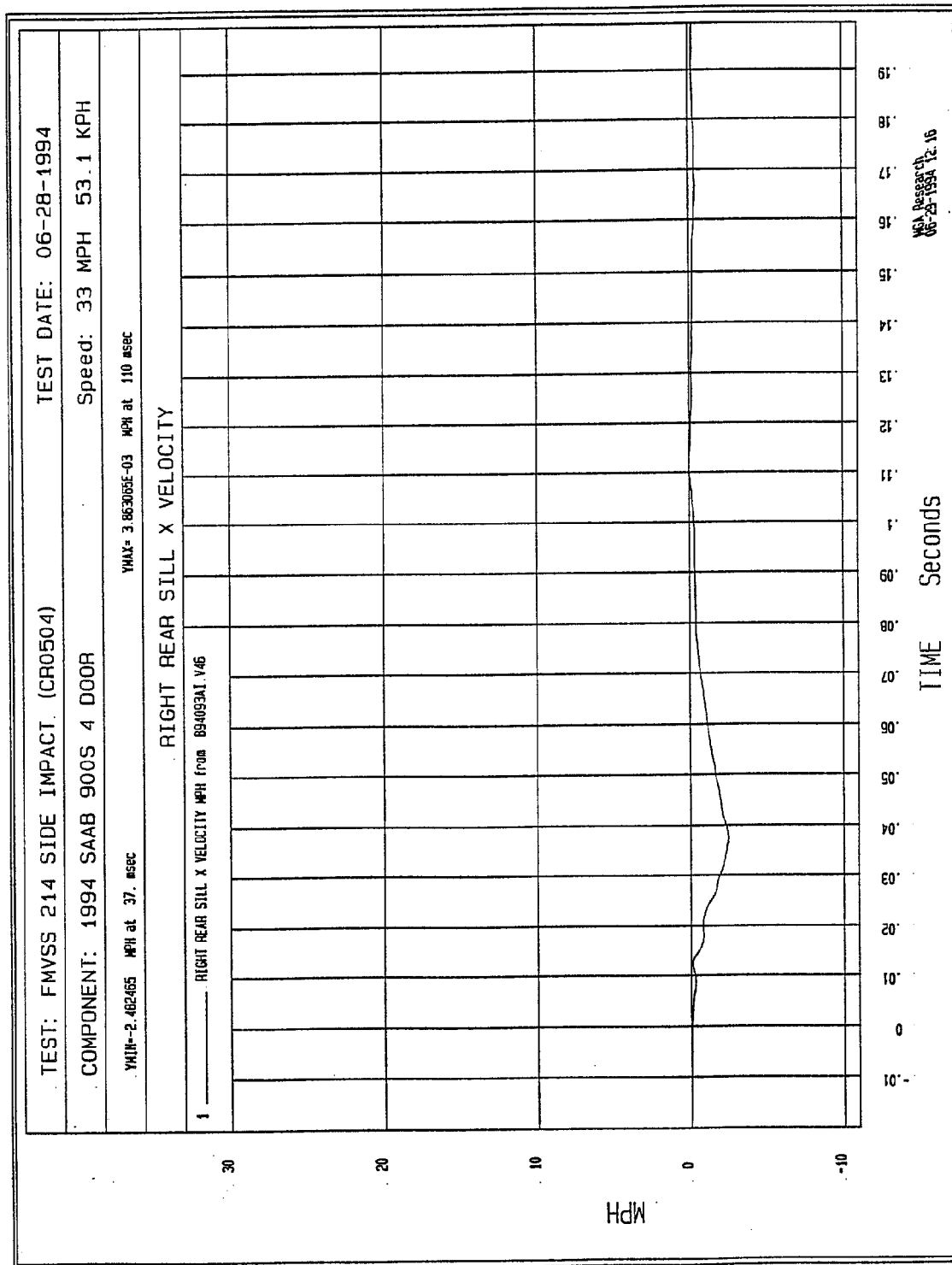


Figure B-29 - Right Rear Sill X Velocity vs. Time

TEST: FMVSS 214 SIDE IMPACT (CR0504) TEST DATE: 06-28-1994

COMPONENT: 1994 SAAB 900S 4 DOOR Speed: 33 MPH 53.1 KPH

WIN-3-40551 G'S at 164 msec YMAX= 21.01826 G'S at 10. msec

RIGHT REAR SILL Y ACCELERATION

1 RH REAR SILL Y G'S from B94053AF A47

TIME (SECONDS)

WCA Research
06-28-1994 12:34

Figure B-30 - Right Rear Sill Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

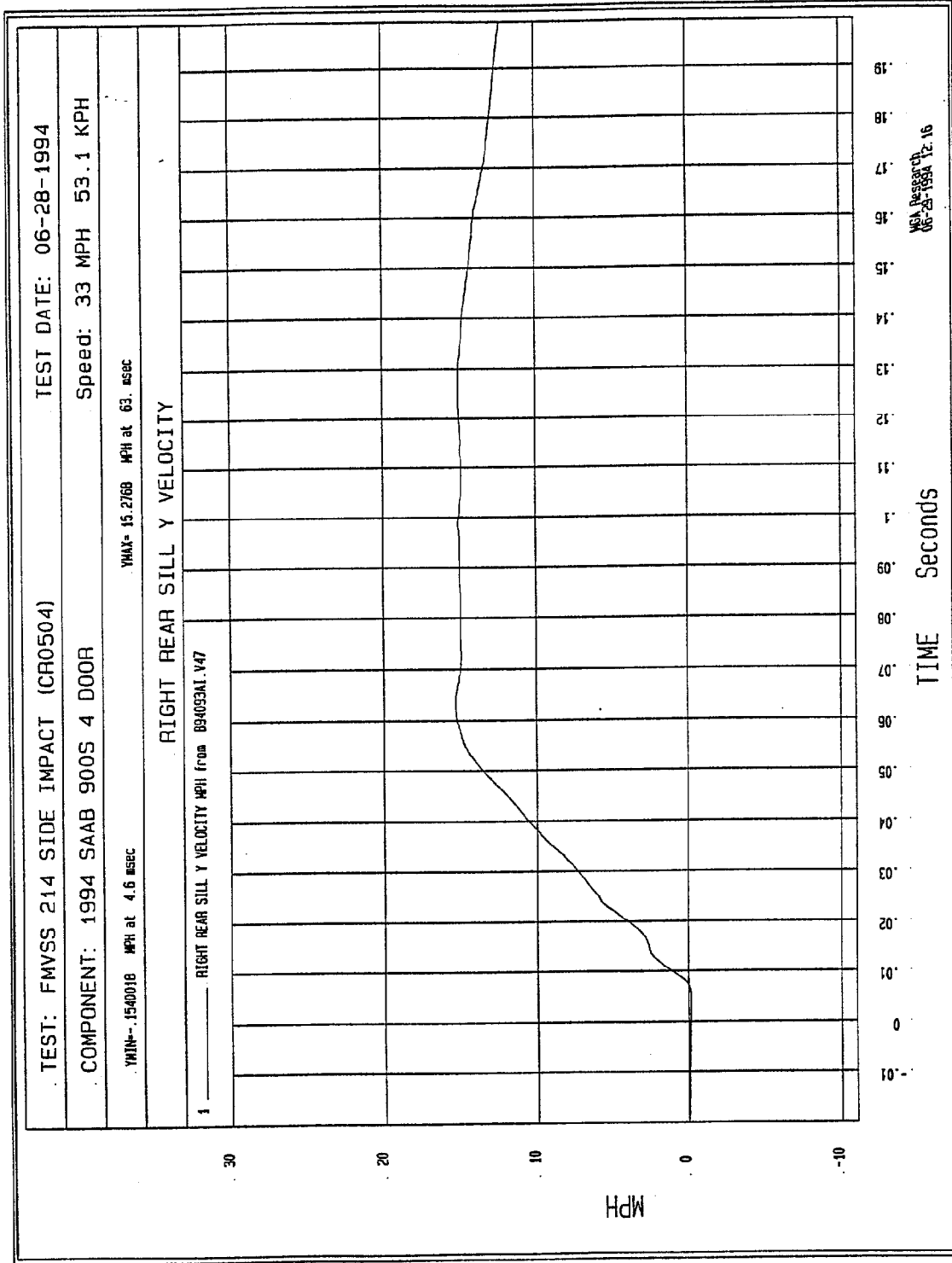


Figure B-31 - Right Rear Sill Y Velocity vs. Time

Filter: Class 60 (100 Hz)

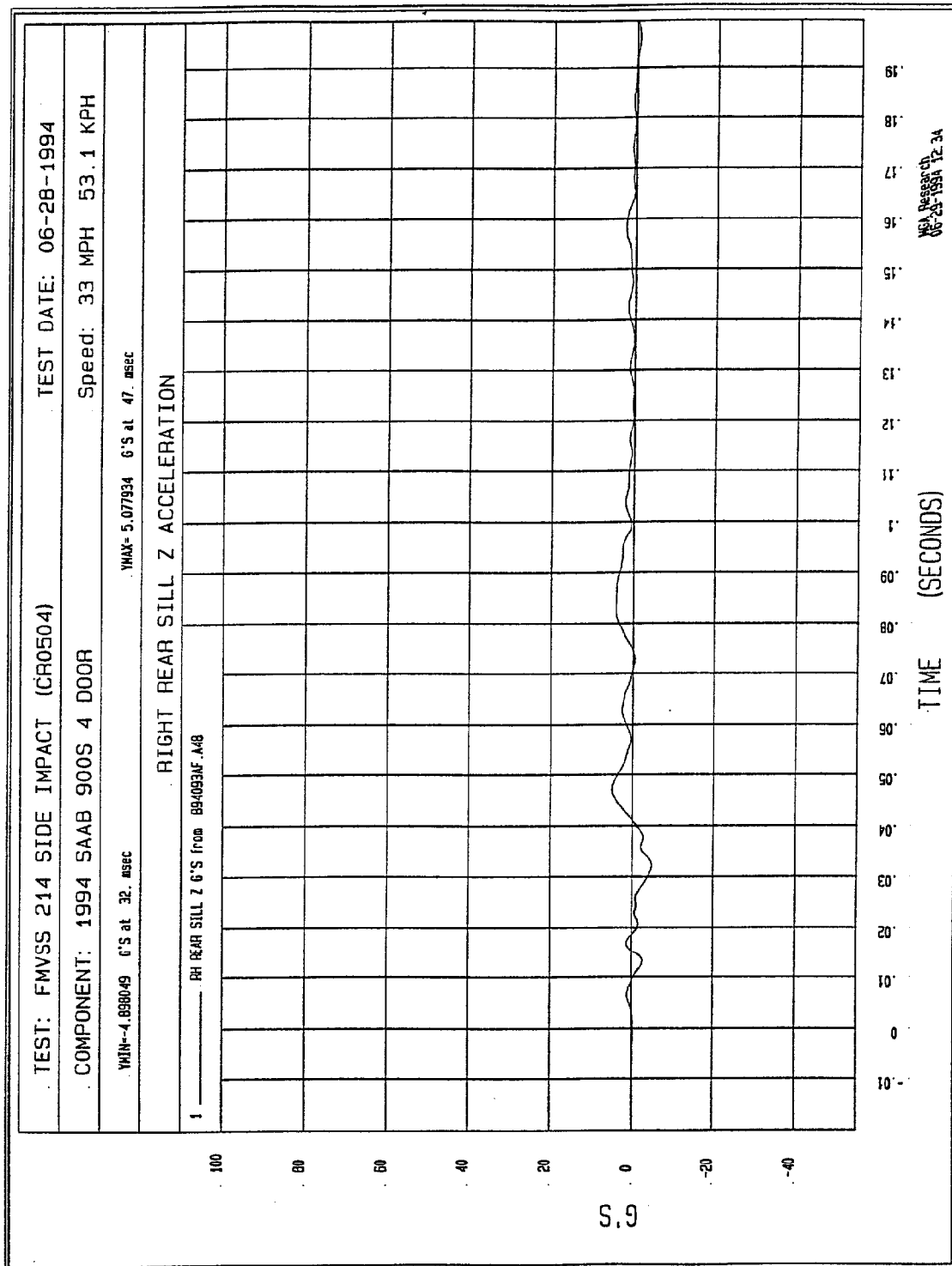


Figure B-32 - Right Rear Sill Z Acceleration vs. Time

Filter: Class 180 (300 Hz)

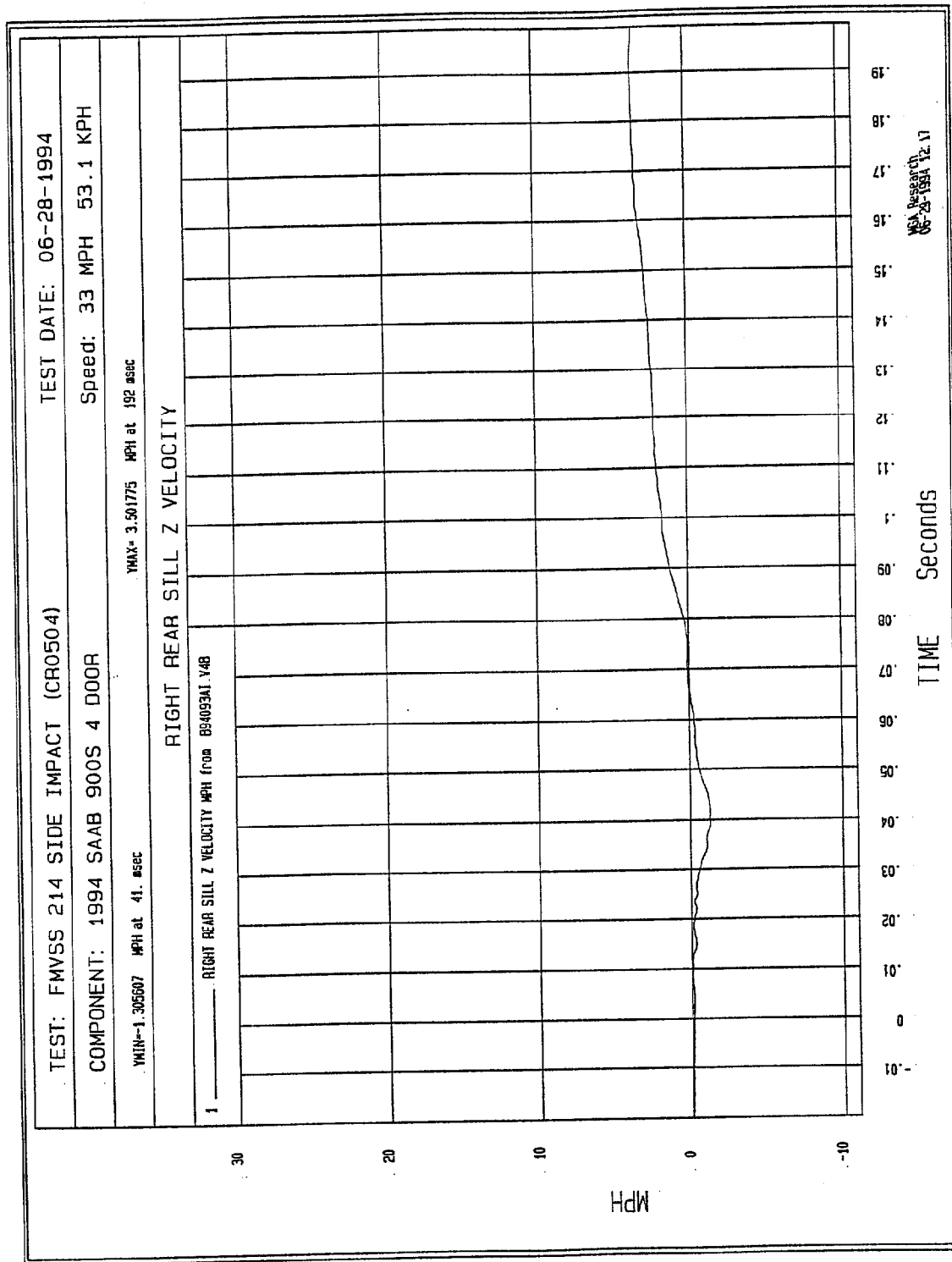


Figure B-33 - Right Rear Sill Z Velocity vs. Time

Filter: Class 60 (100 Hz)

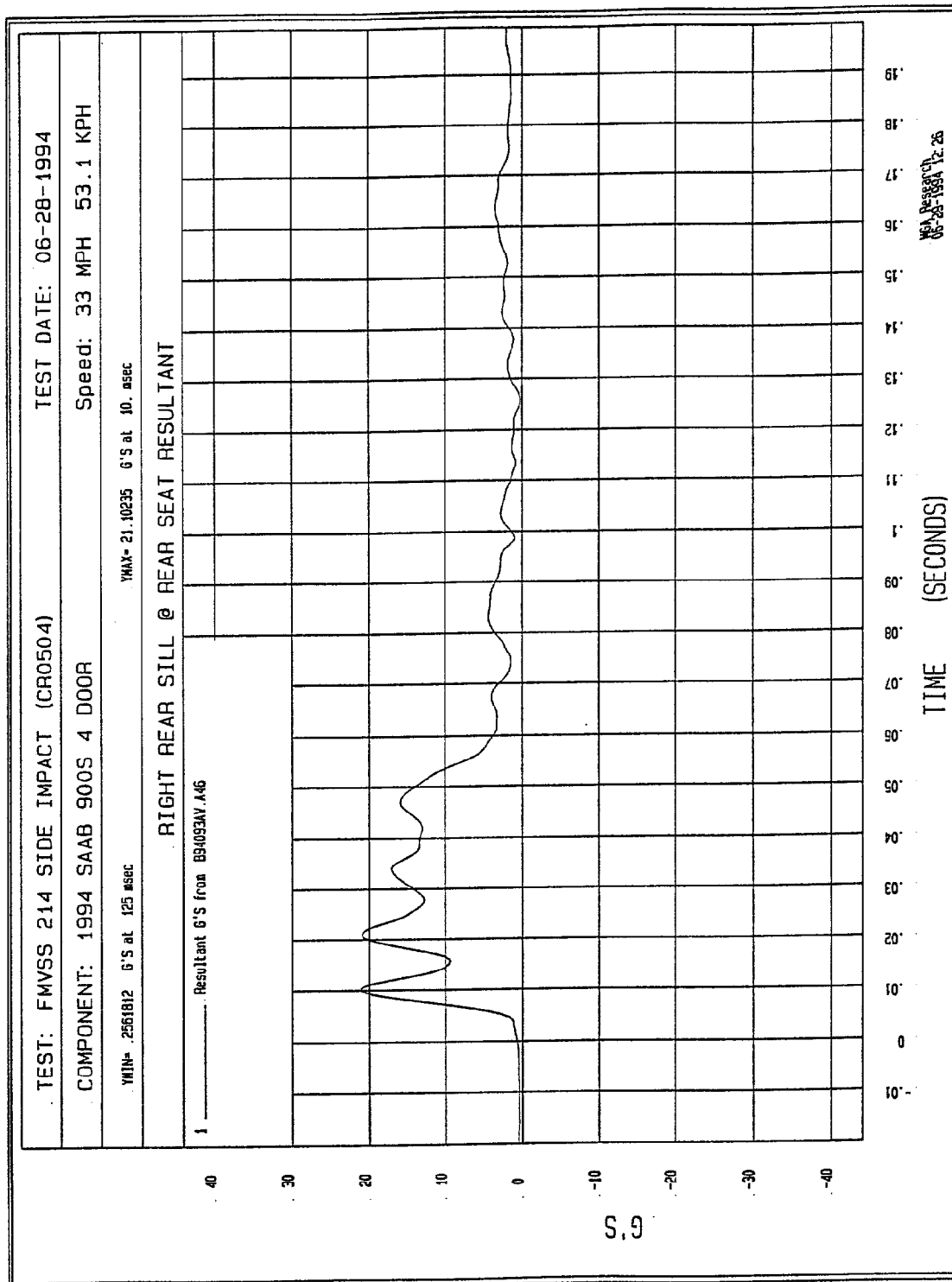


Figure B-34 - Right Rear Sill at Rear Seat Resultant vs. Time

Filter: Class 60 (100 Hz)

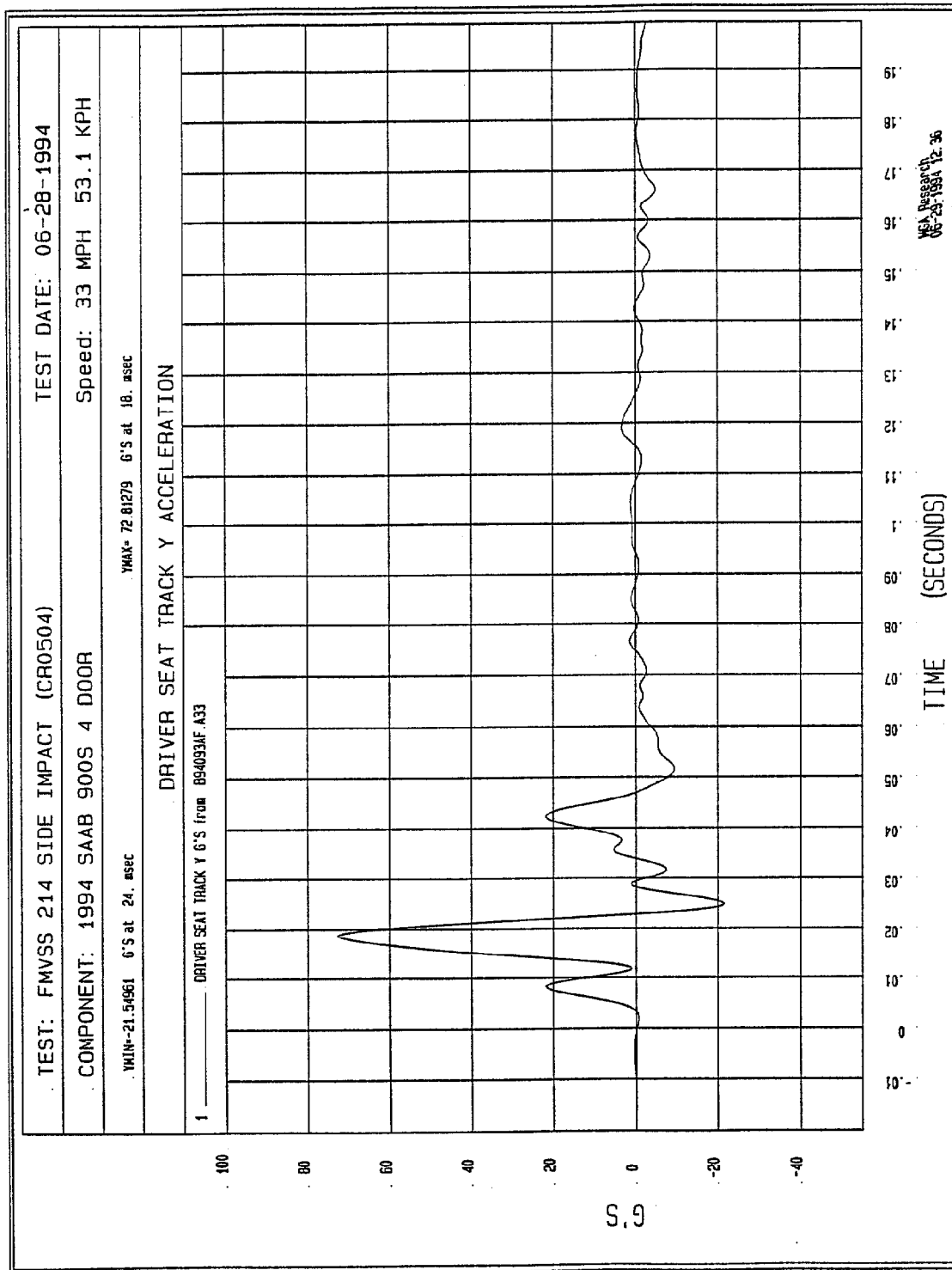


Figure B-35 - Driver Seat Track Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

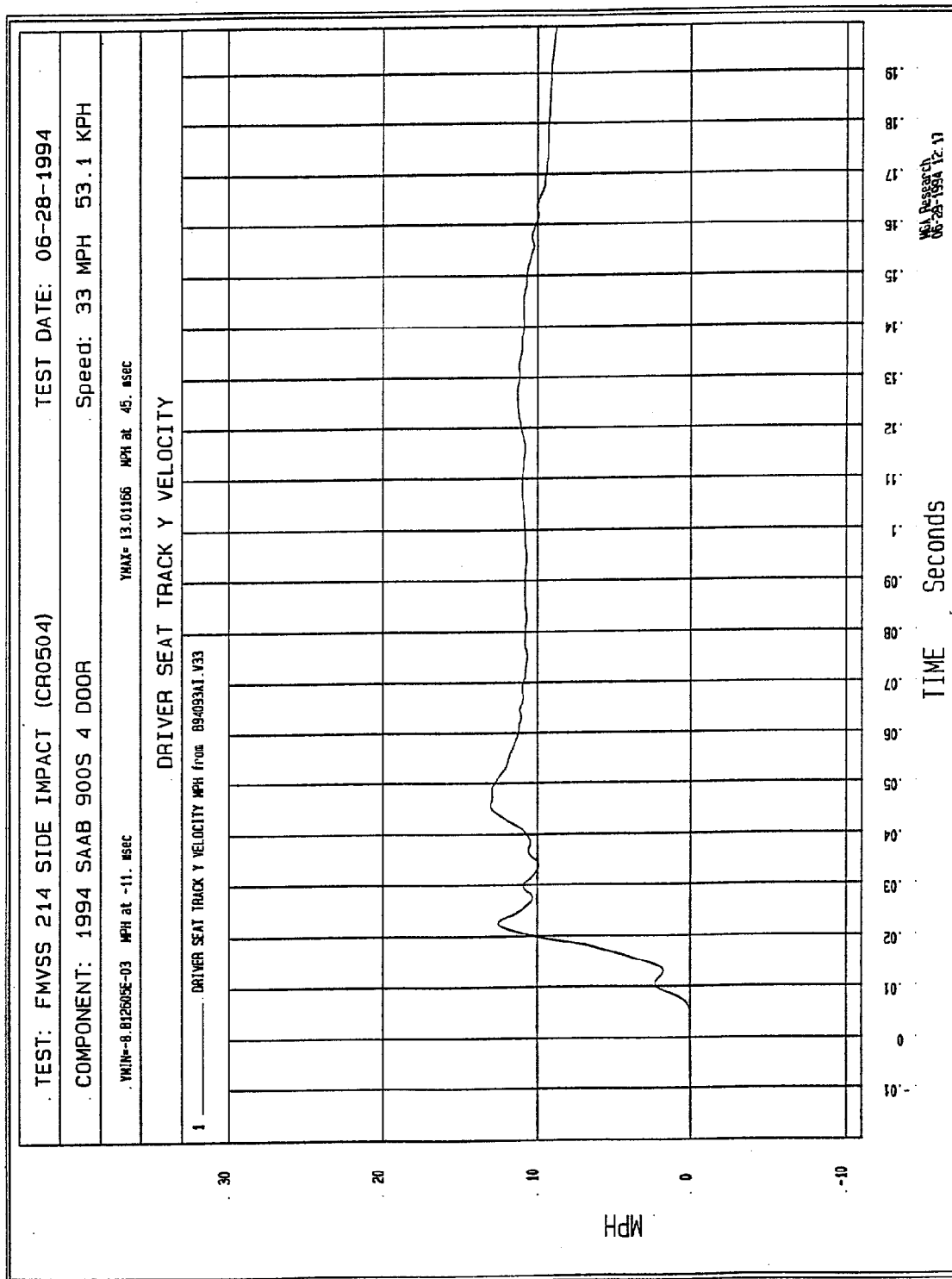


Figure B-36 - Driver Seat Track Y Velocity vs. Time

Filter: Class 60 (100 Hz)

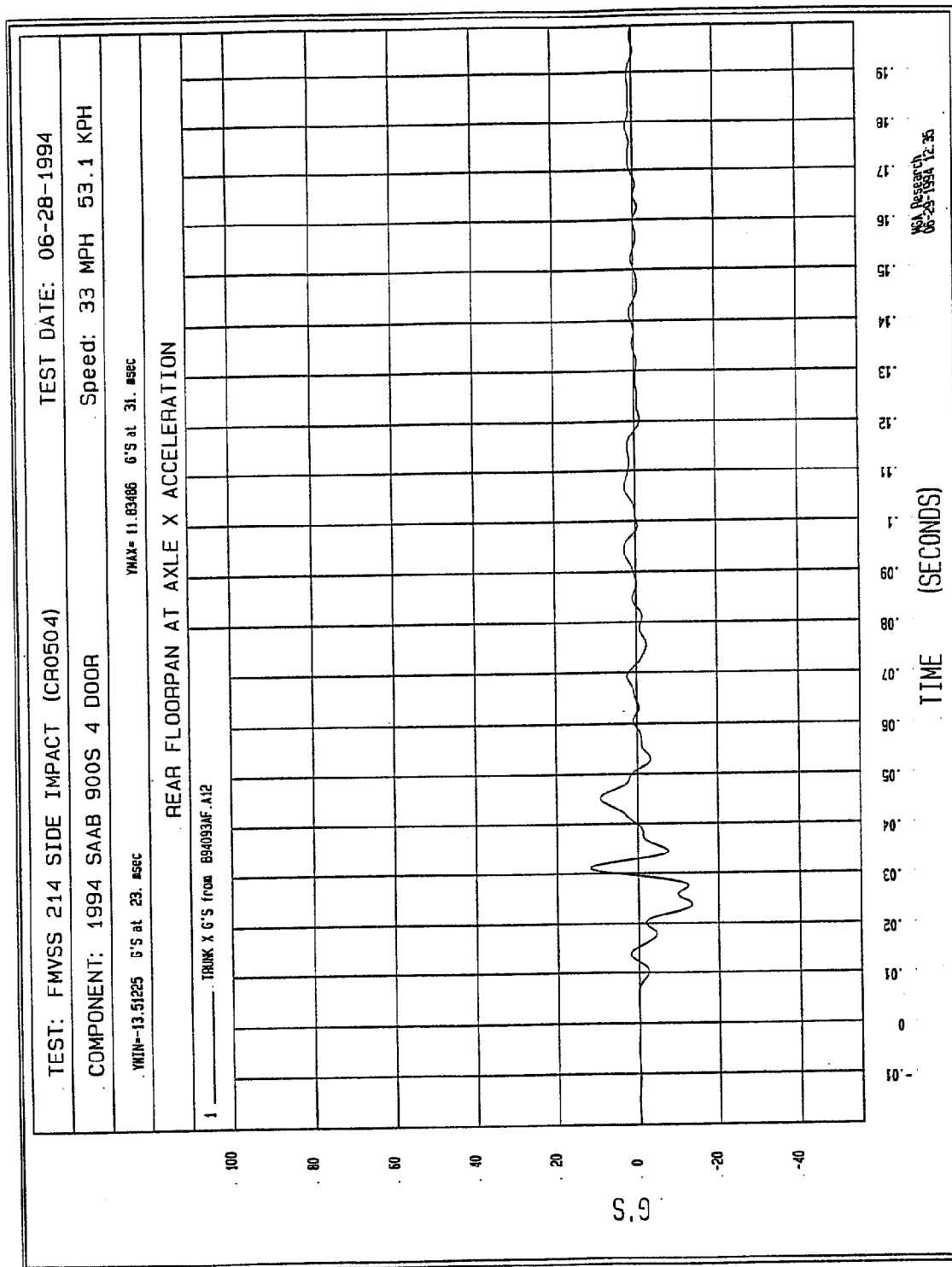


Figure B-37 - Rear Floorpan at Axle X Acceleration vs. Time

Filter: Class 180 (300 Hz)

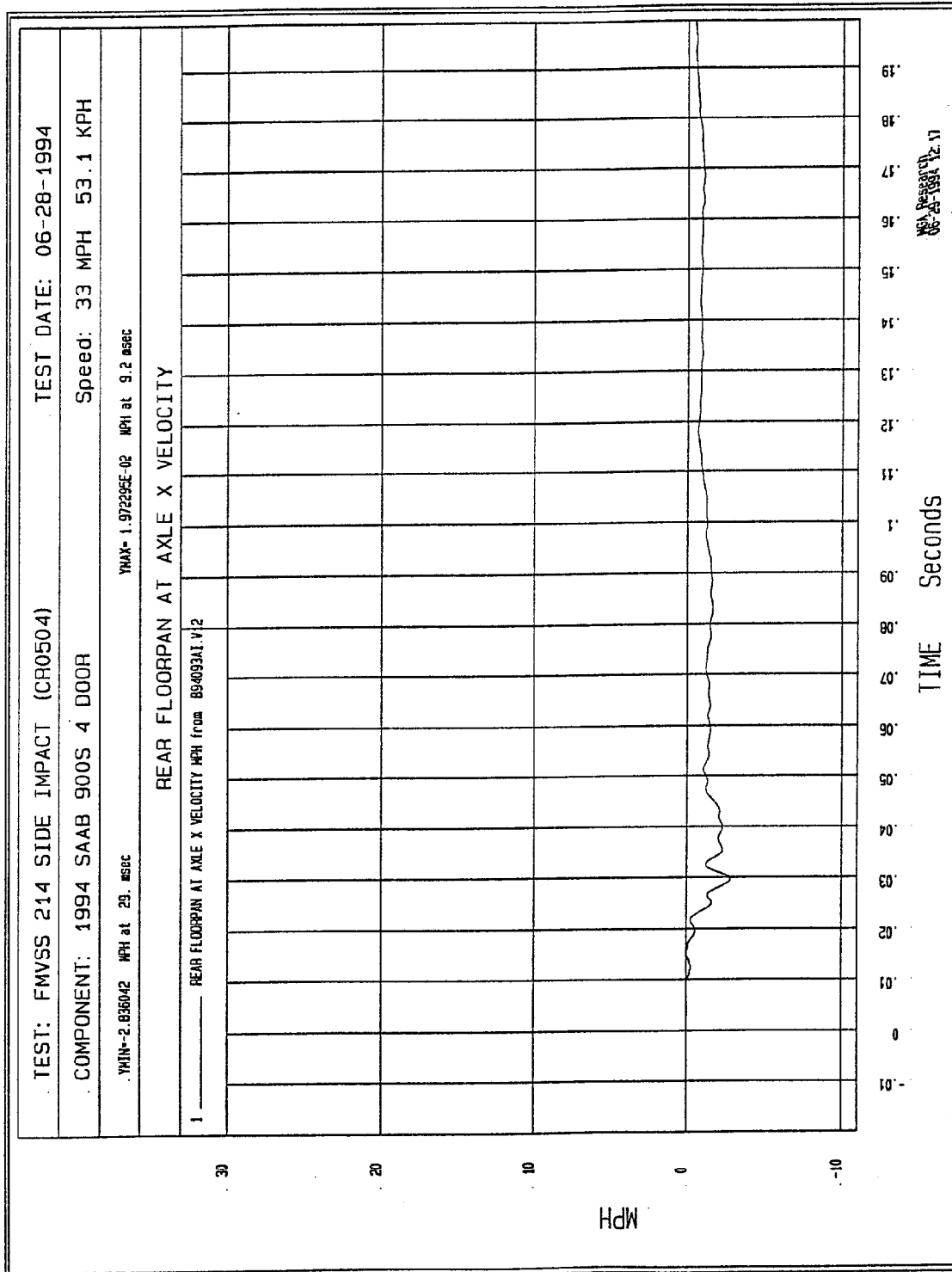


Figure B-38 - Rear Floorpan at Axle X Velocity vs. Time

Filter: Class 60 (100 Hz)

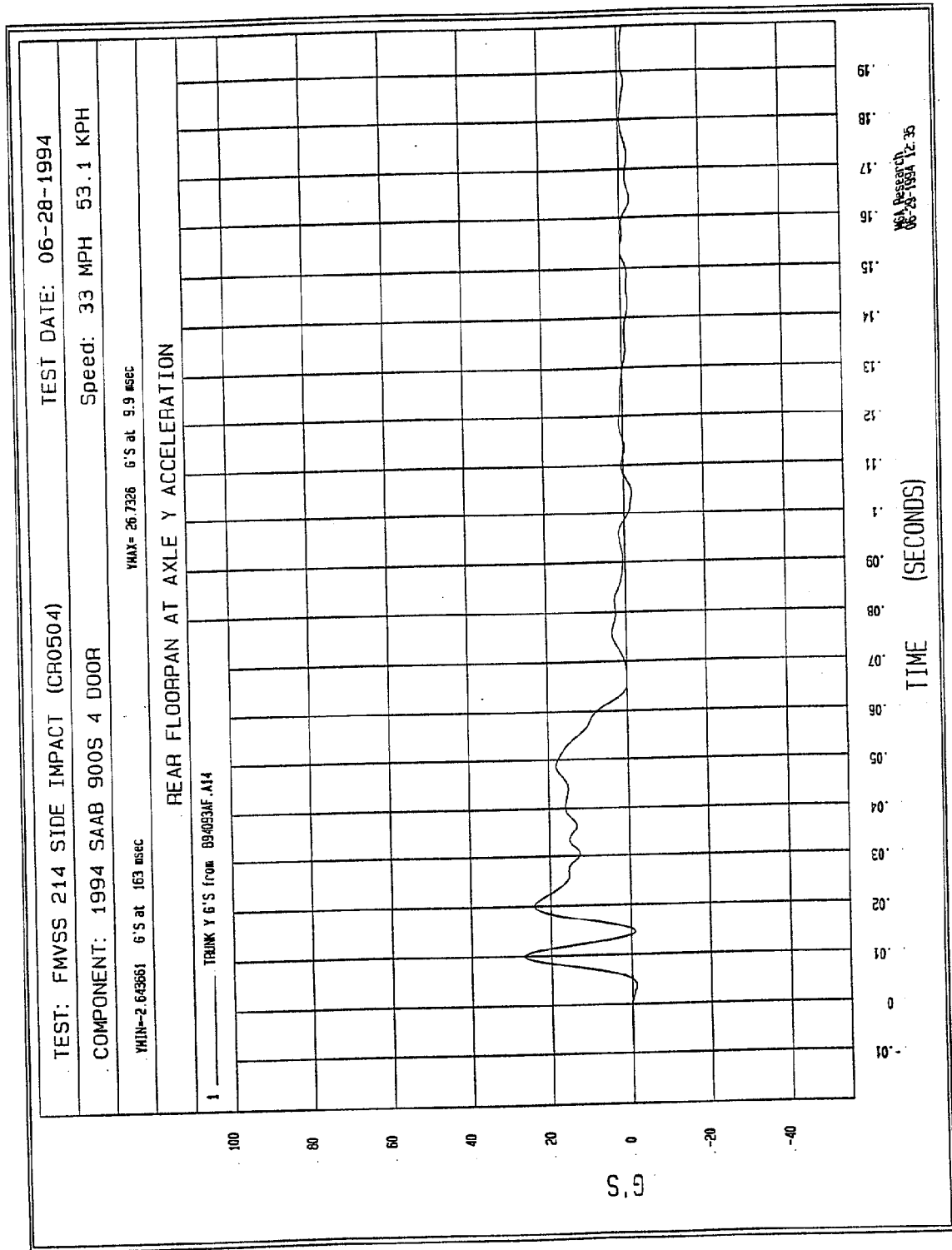
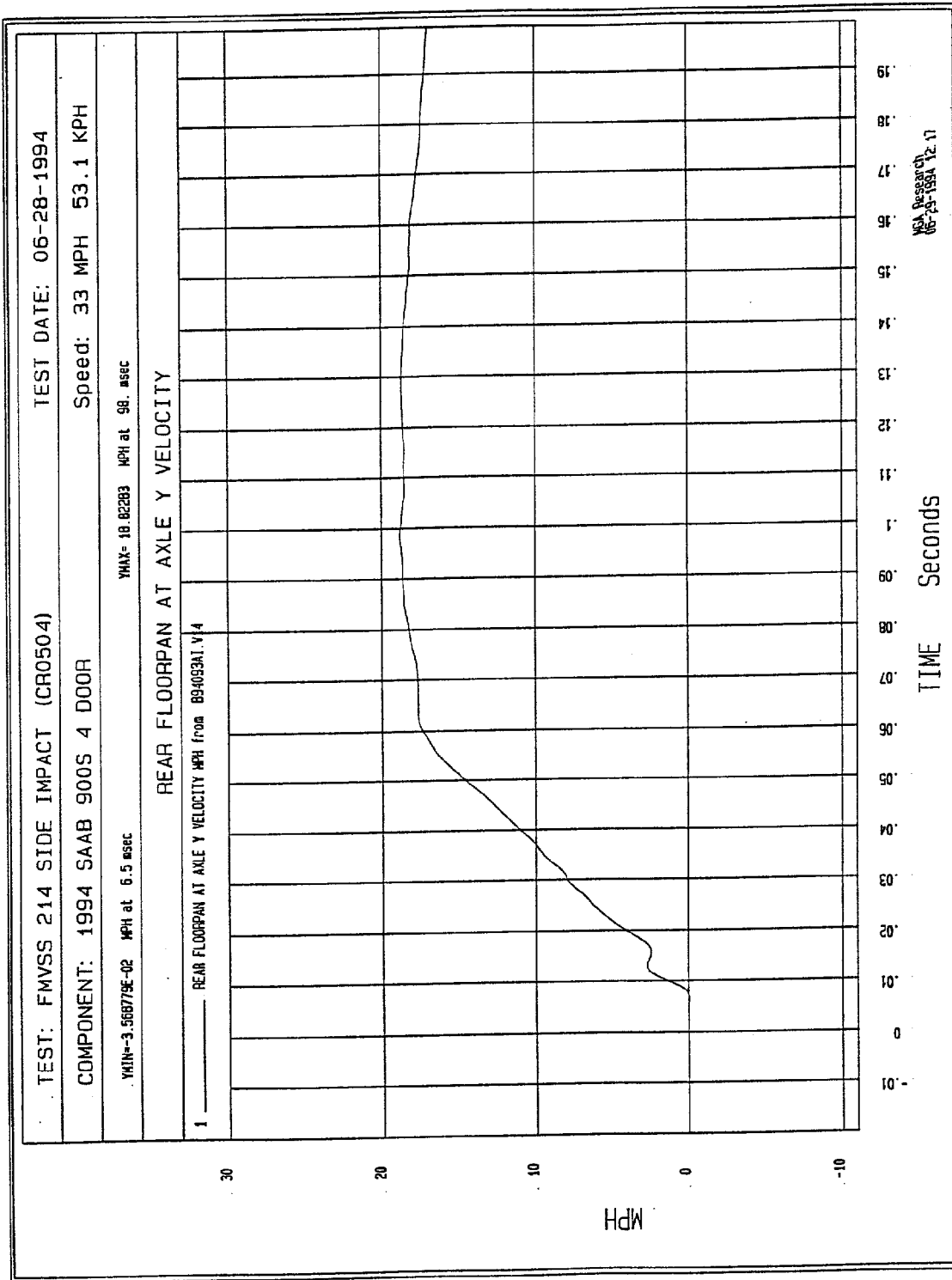


Figure B-39 - Rear Floorpan at Axle Y Acceleration vs. Time

Filter: Class 180 (300 Hz)



B-40

Figure B-40 - Rear Floorpan at Axle Y Velocity vs. Time

Filter: Class 60 (100 Hz)

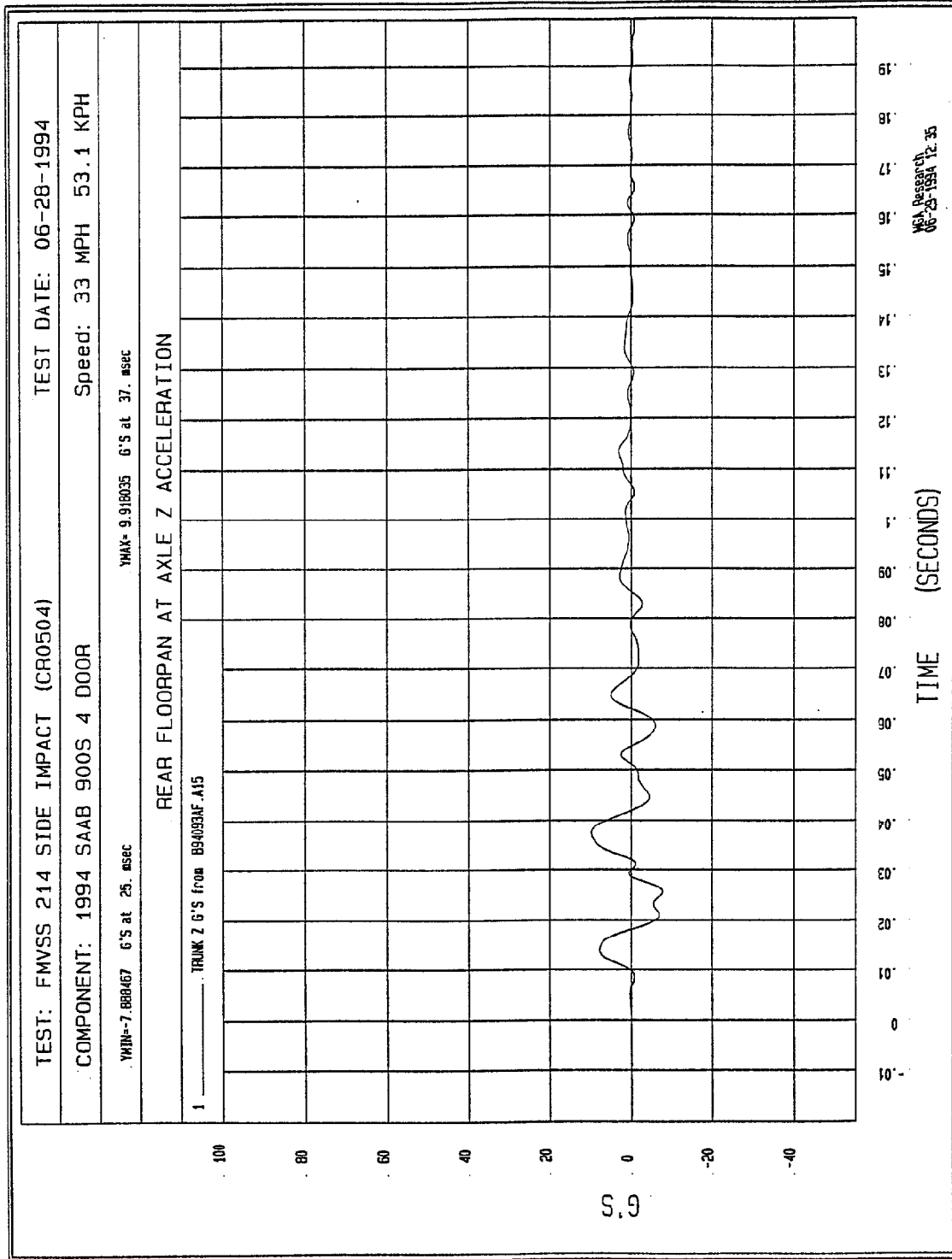


Figure B-41 - Rear Floorpan at Axle Z Acceleration vs. Time

Filter: Class 180 (300 Hz)

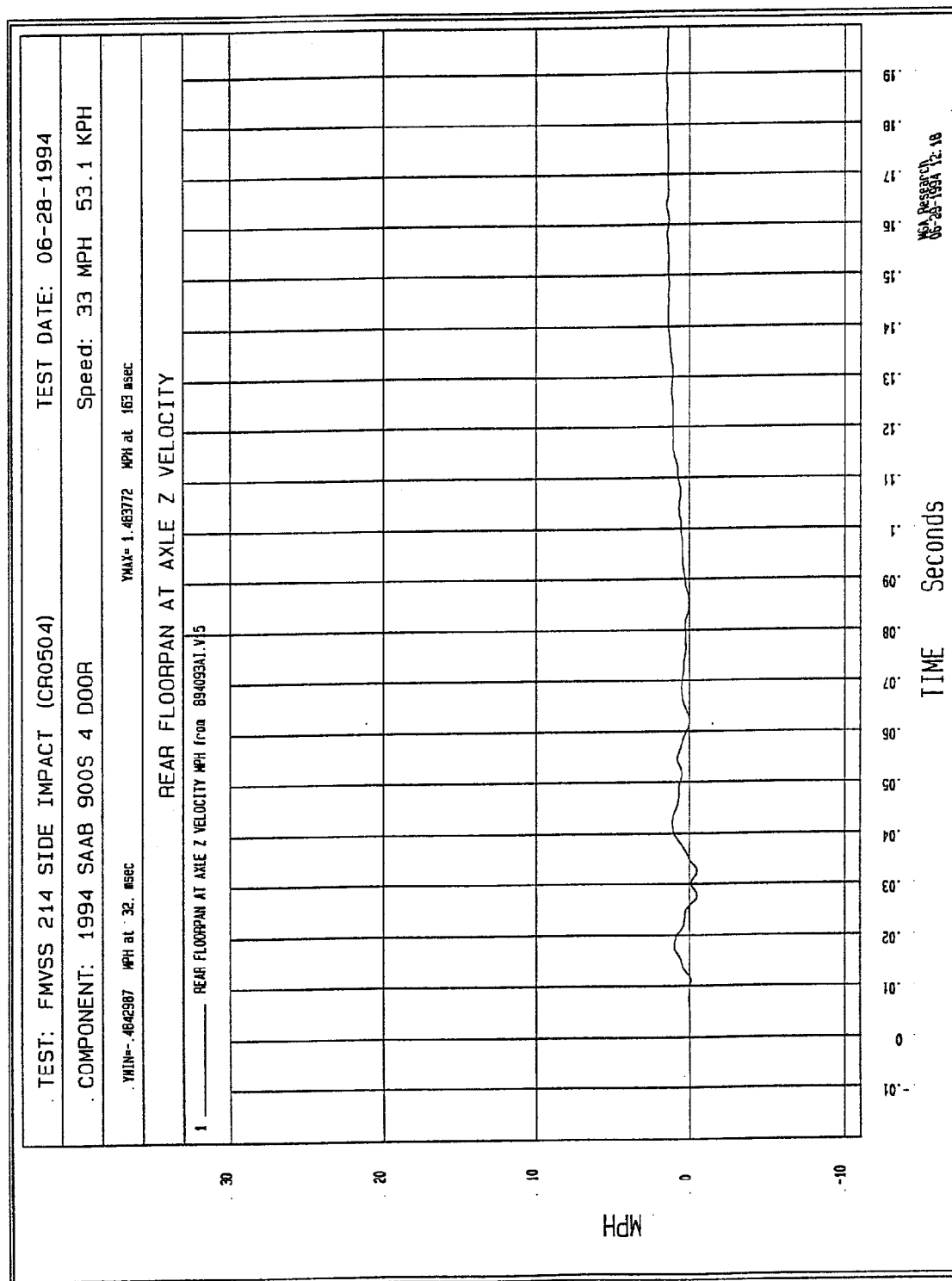


Figure B-42 - Rear Floorpan at Axle Z Velocity vs. Time

Filter: Class 60 (100 Hz)

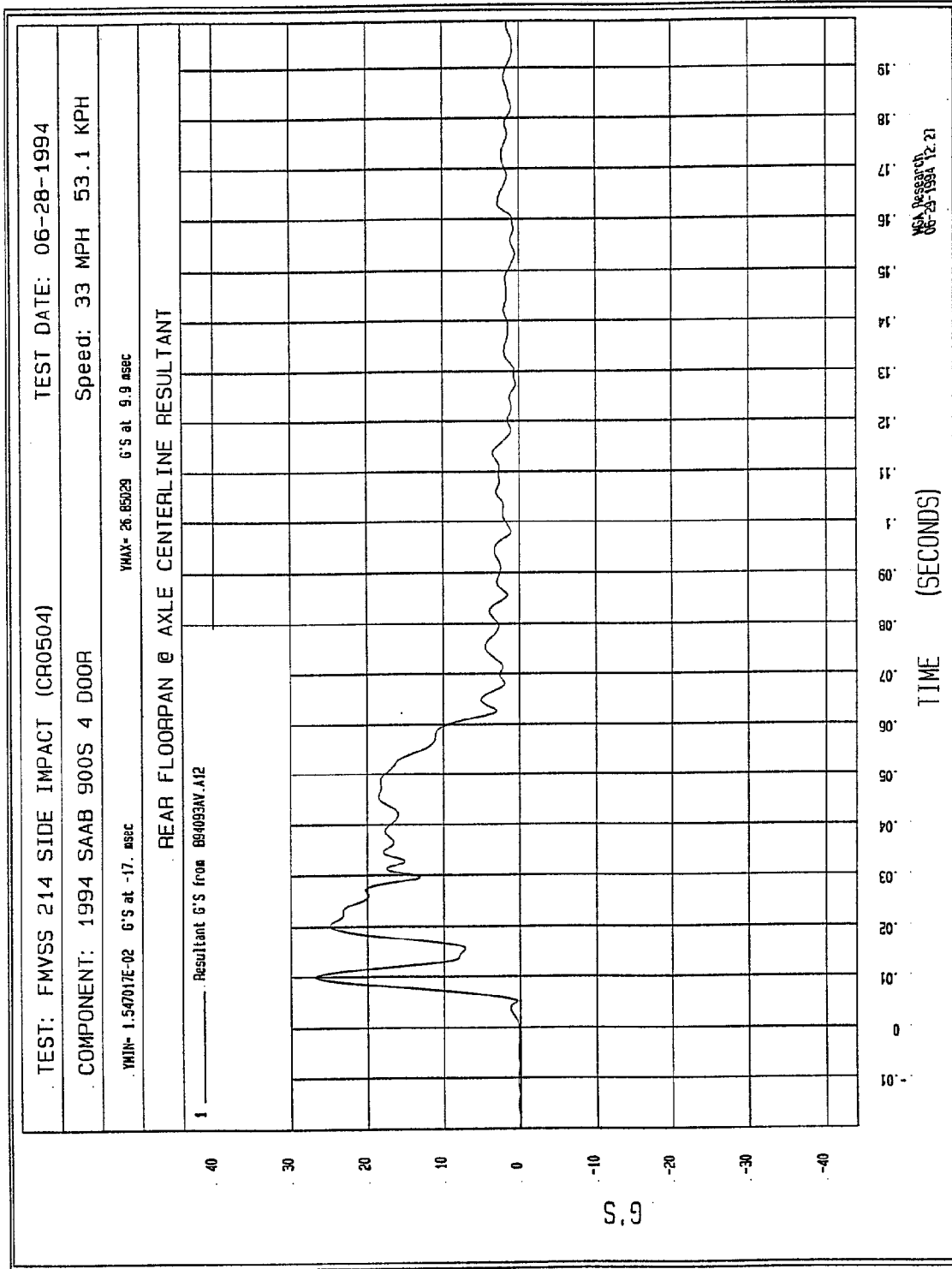


Figure B-43 - Rear Floorpan at Axle Centerline Resultant vs. Time

Filter: Class 60 (100 Hz)

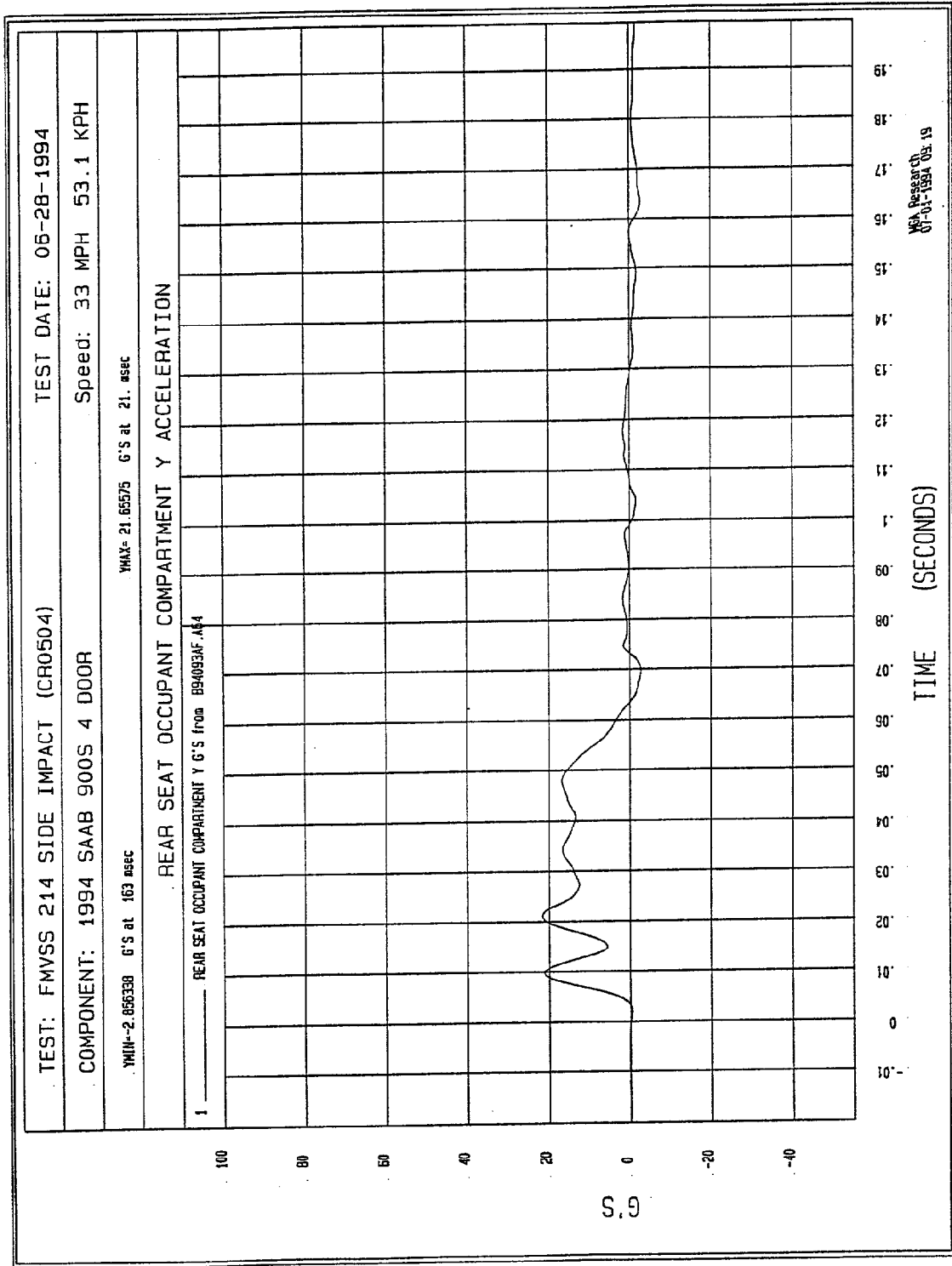


Figure B-44 - Rear Seat Occupant Compartment Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

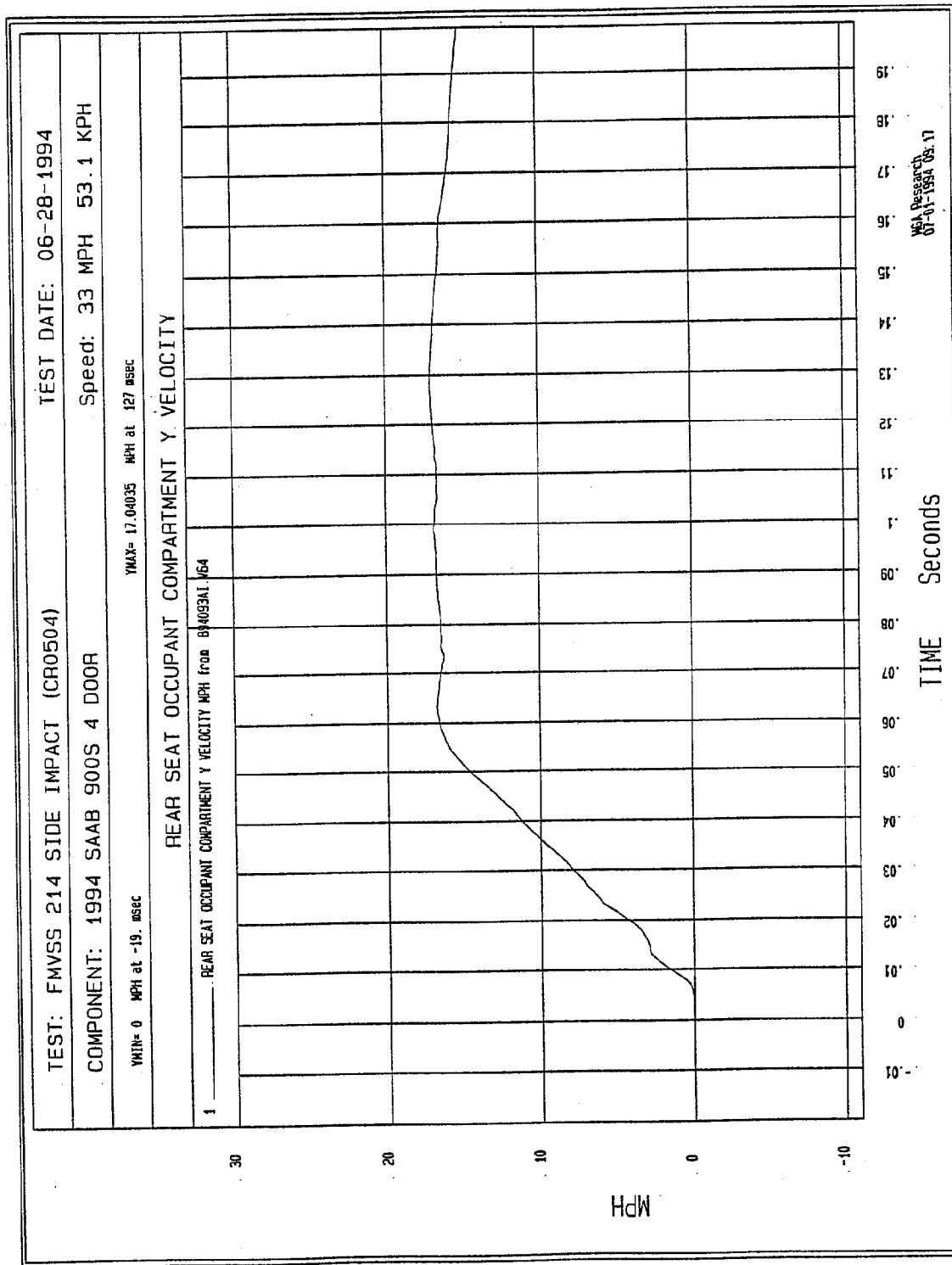


Figure B-45 - Rear Seat Occupant Compartment Y Velocity vs. Time

Filter: Class 60 (100 Hz)

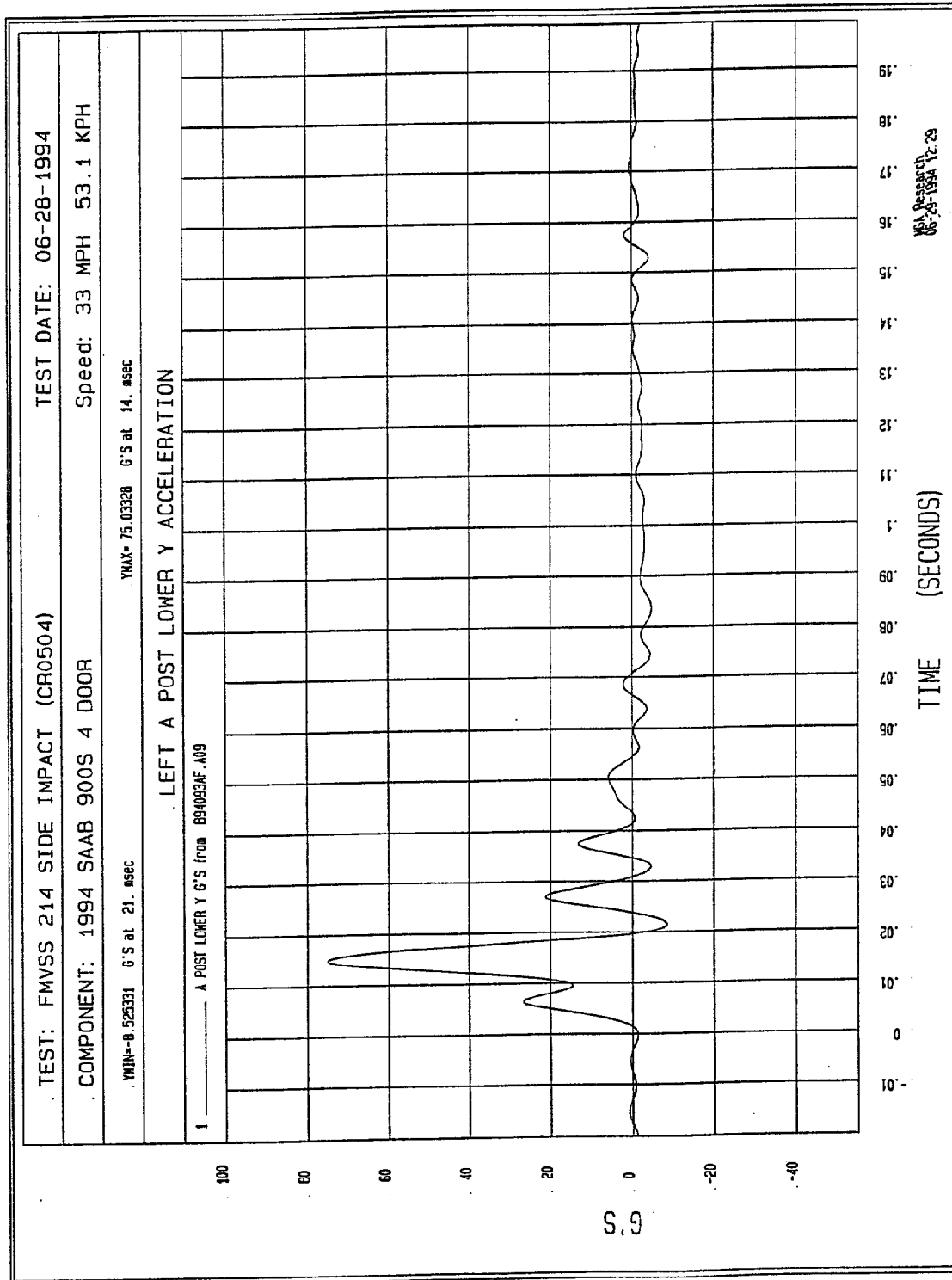


Figure B-46 - Left A Post Lower Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

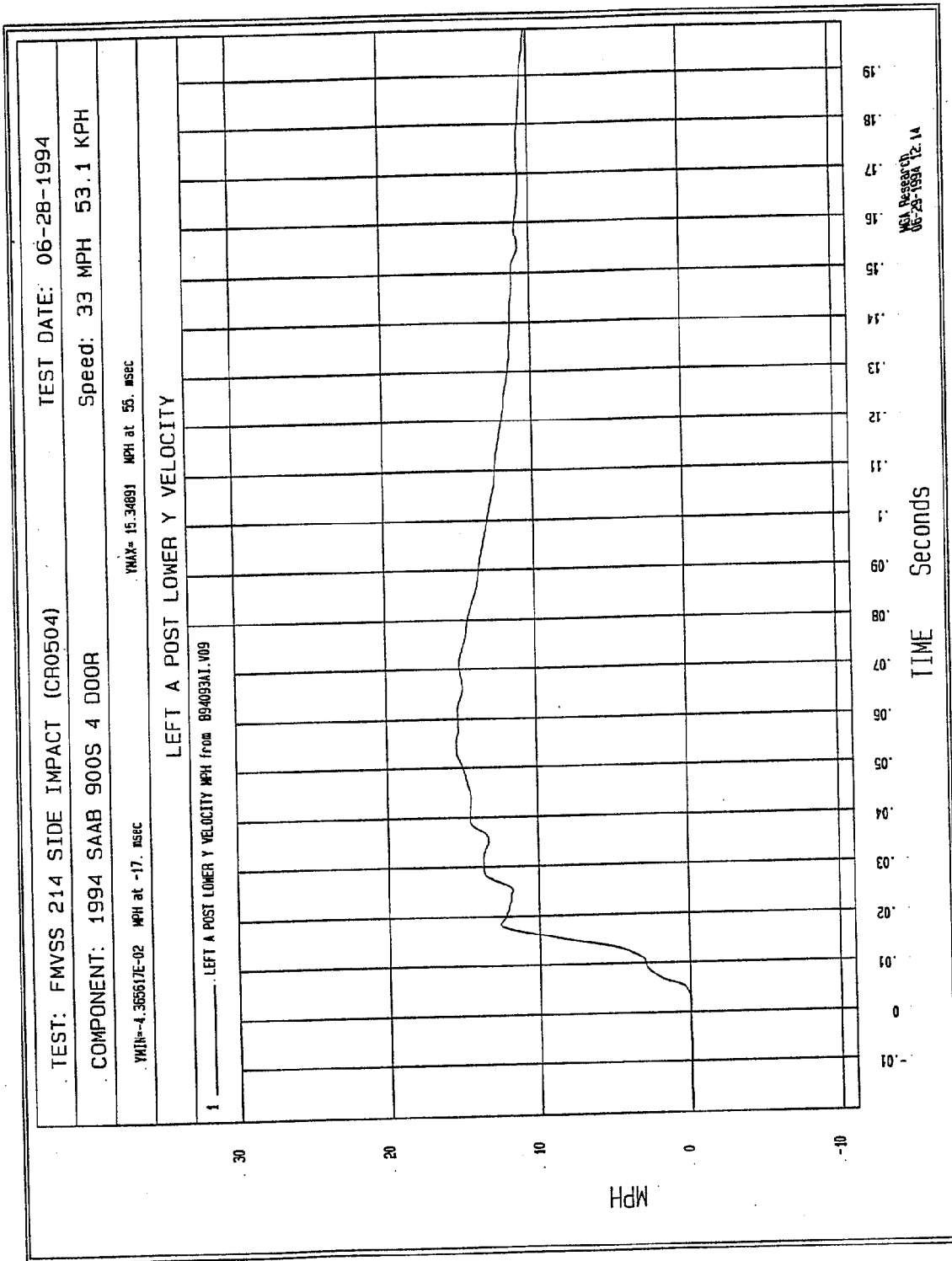


Figure B-47 - Left A Post Lower Y Velocity vs. Time

Filter: Class 60 (100 Hz)

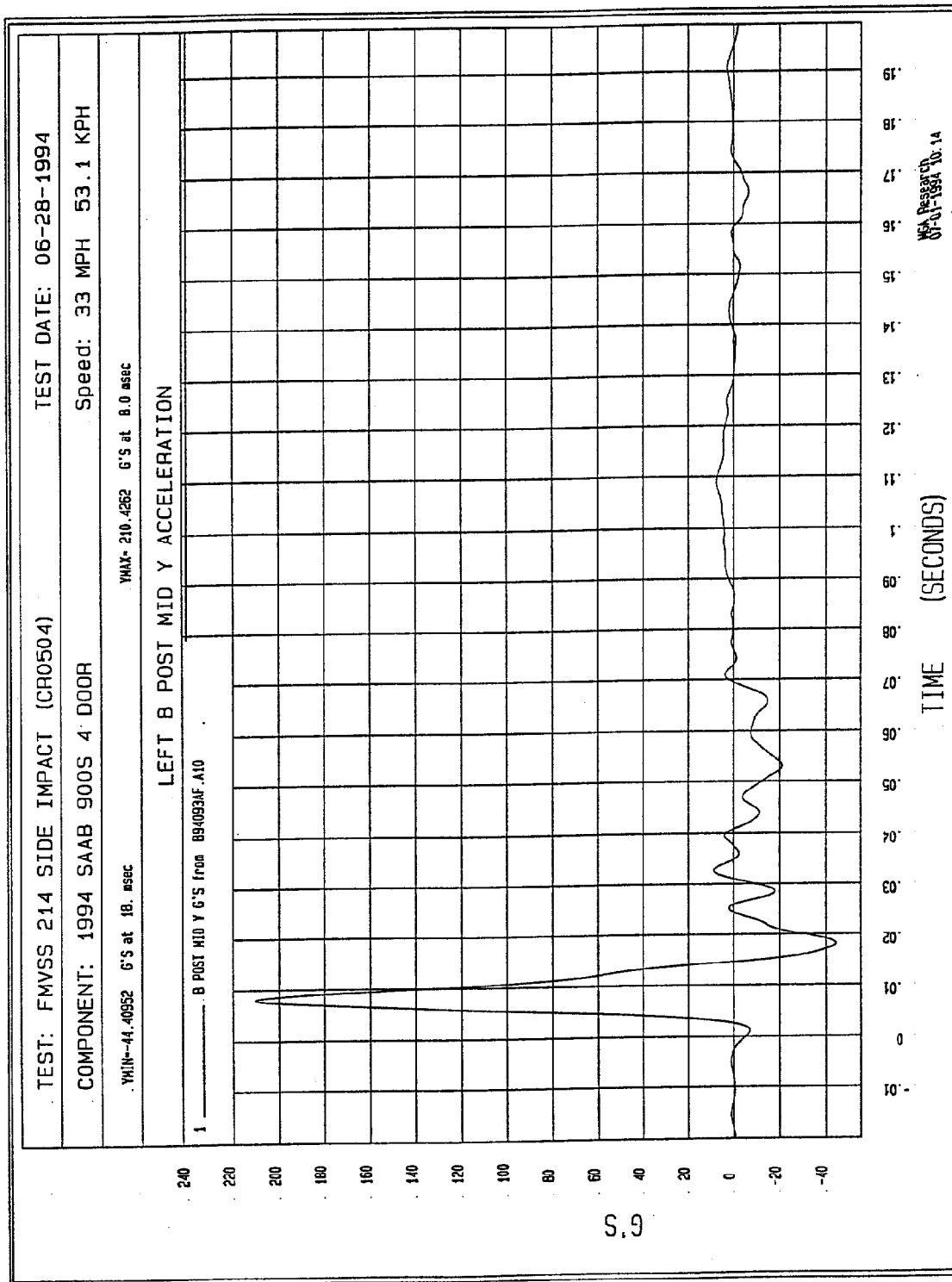


Figure B-48 - Left B Post Mid Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

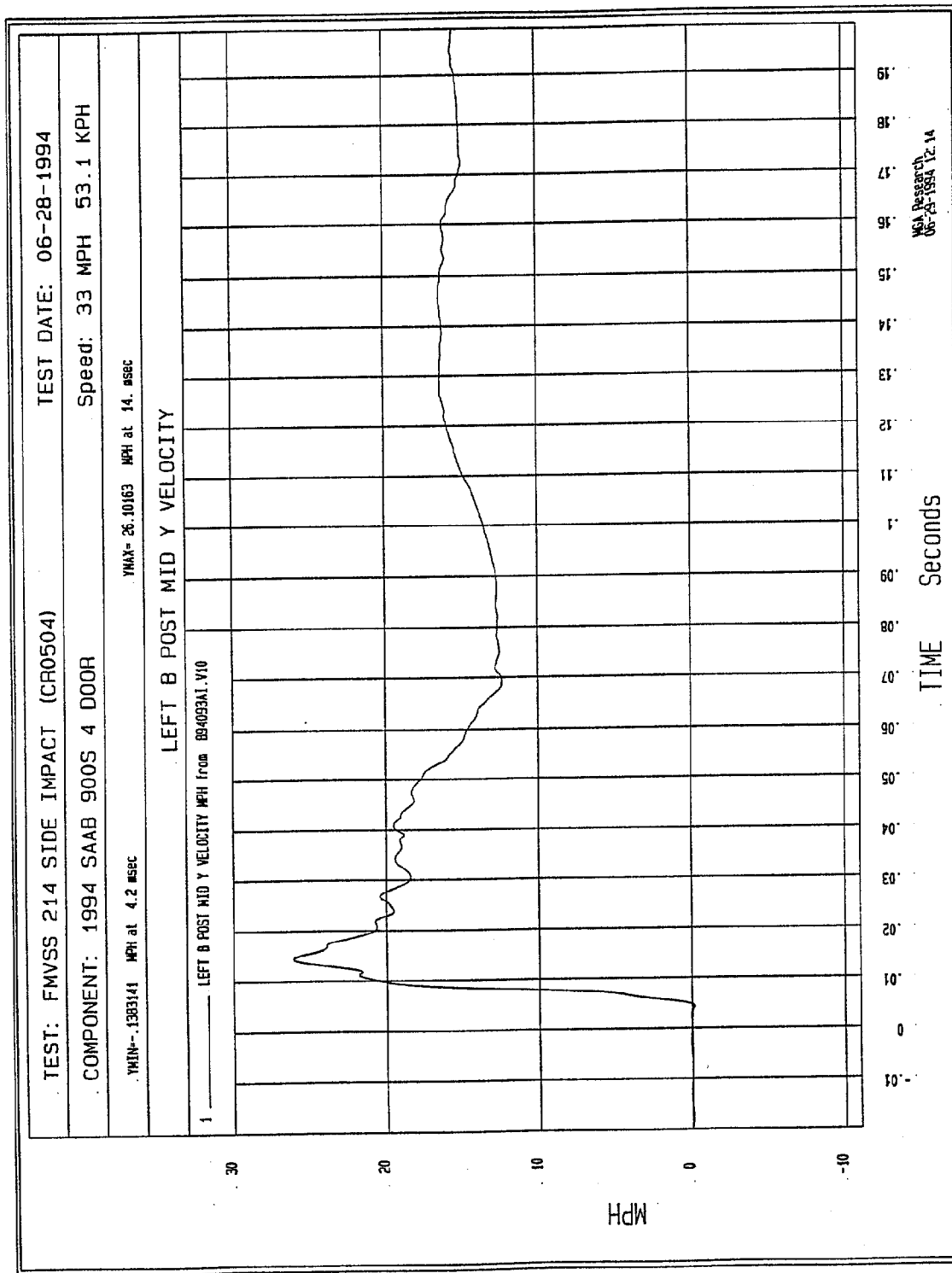


Figure B-49 - Left B Post Mid Y Velocity vs. Time

Filter: Class 60 (100 Hz)

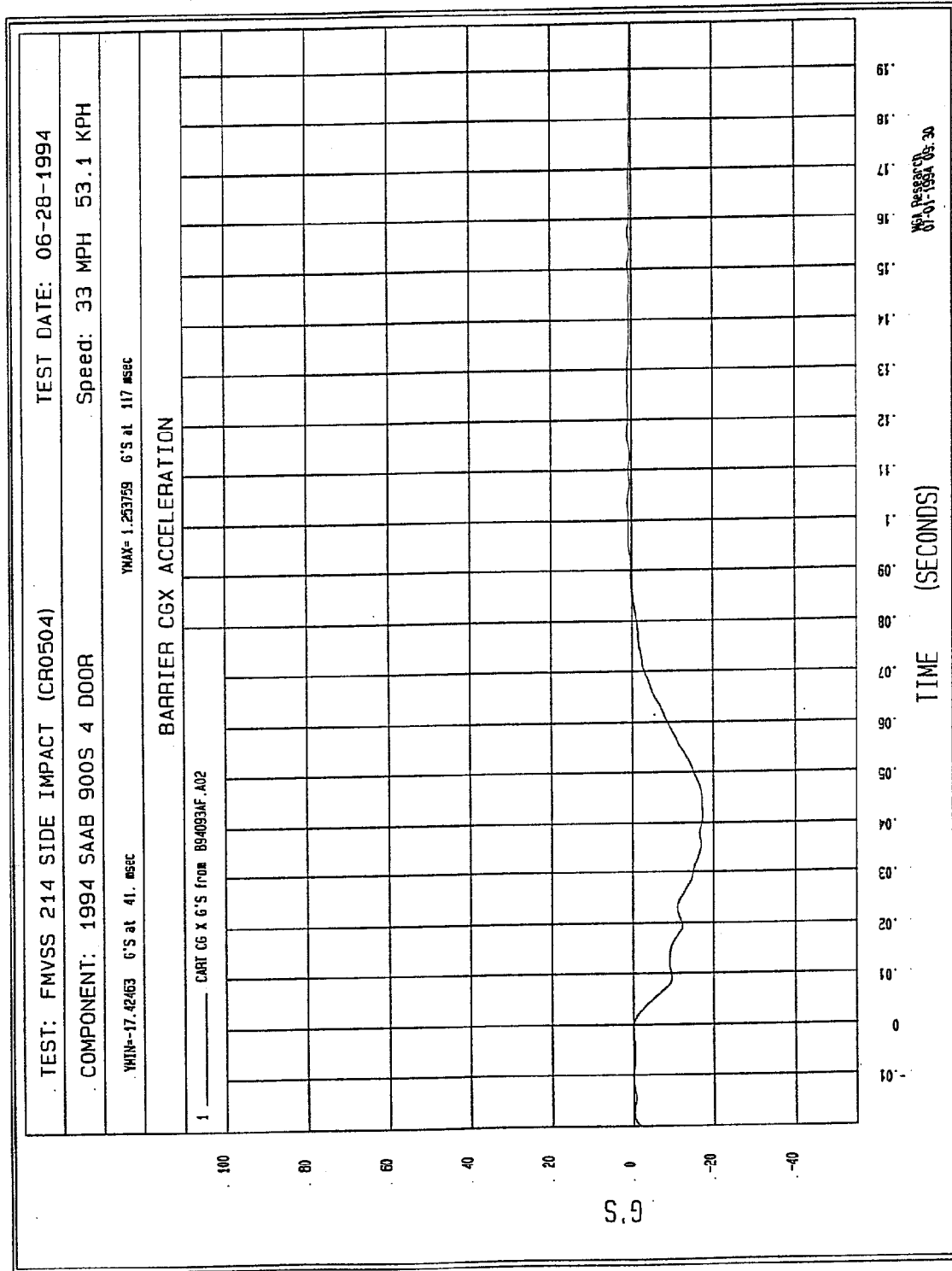


Figure B-50 - Moving Barrier Center of Gravity X Acceleration vs. Time

Filter: Class 180 (300 Hz)

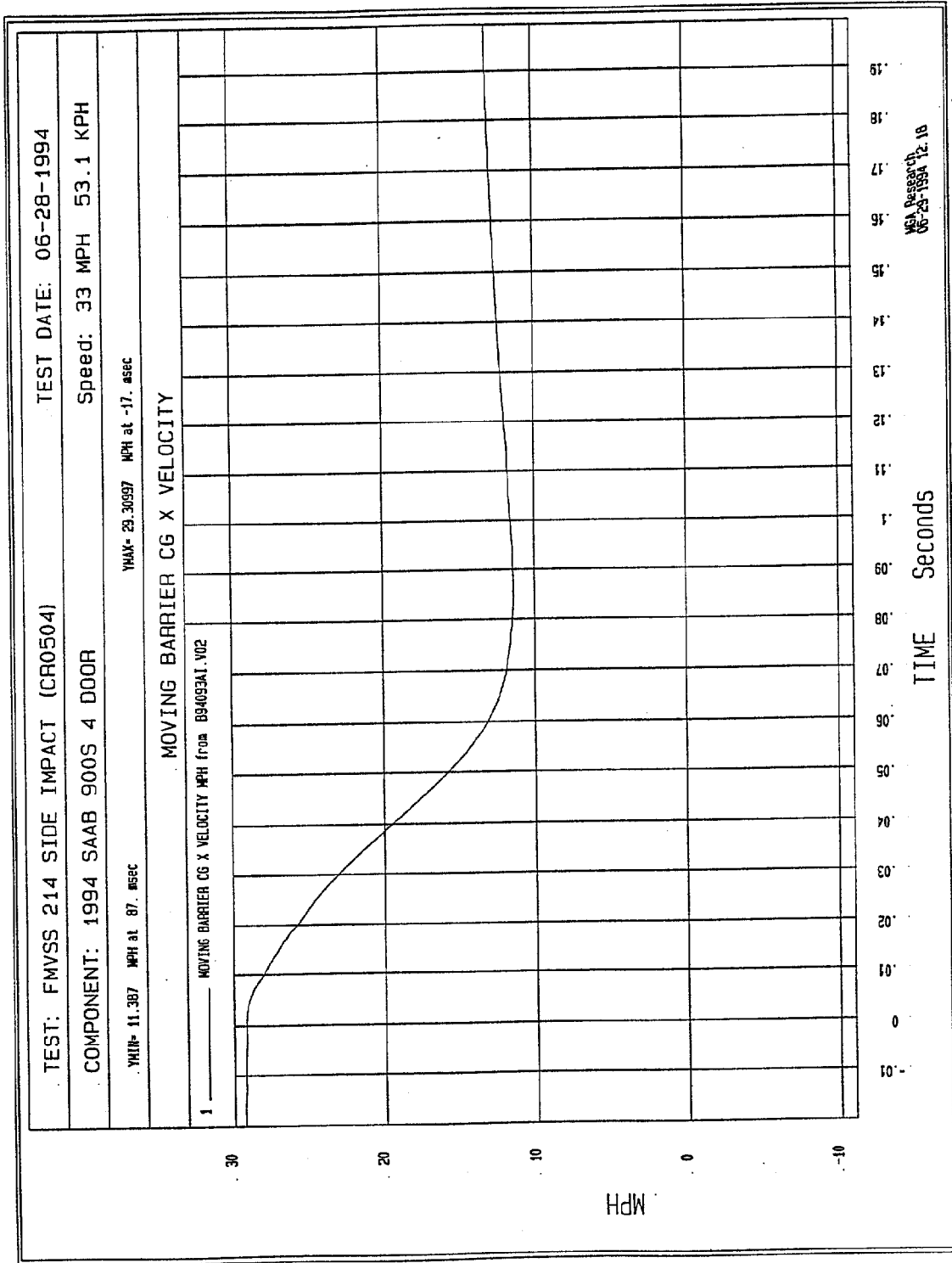


Figure B-51 - Moving Barrier Center of Gravity X Velocity vs. Time

Filter: Class 60 (100 Hz)

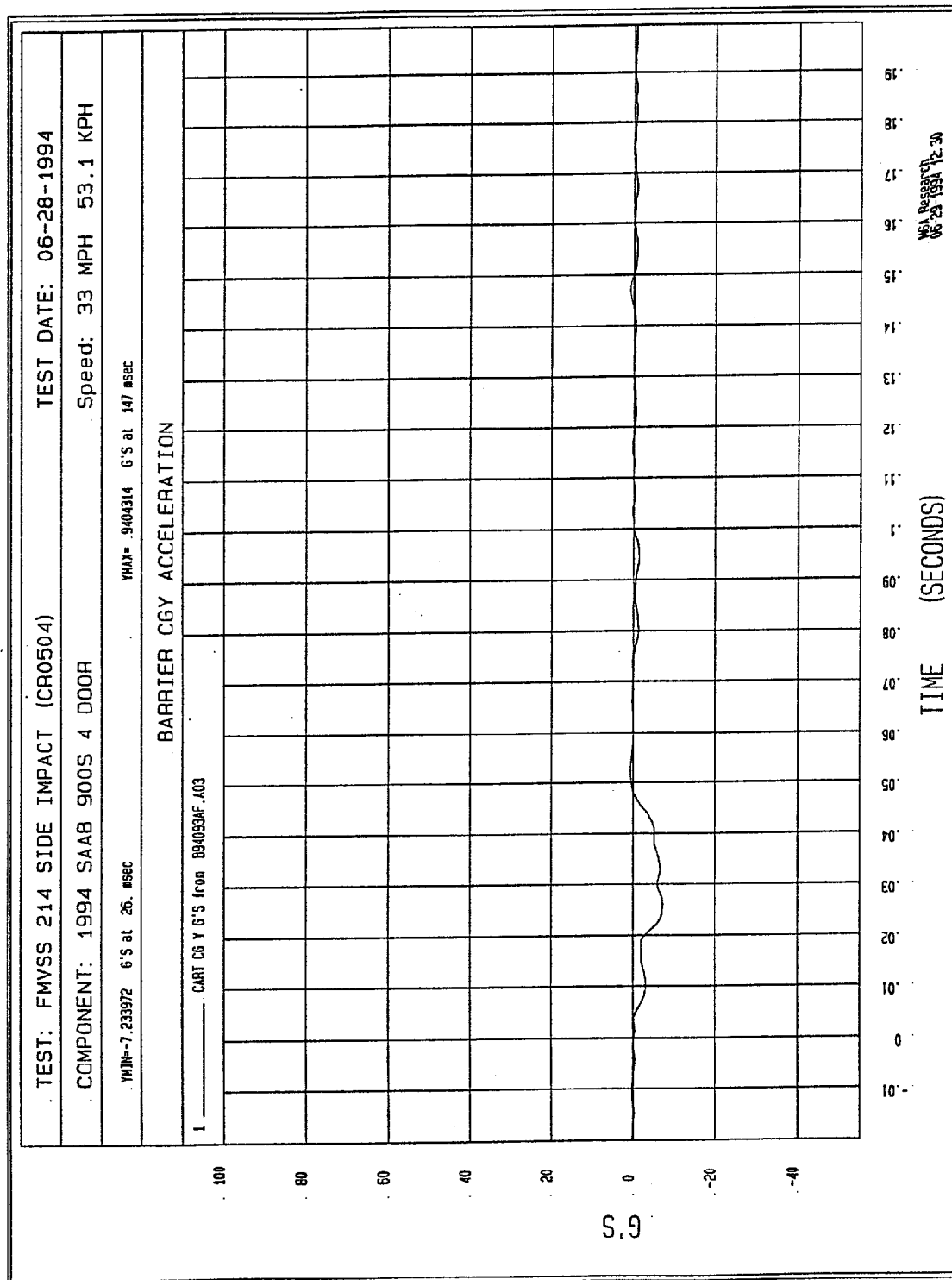


Figure B-52 - Moving Barrier Center of Gravity Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

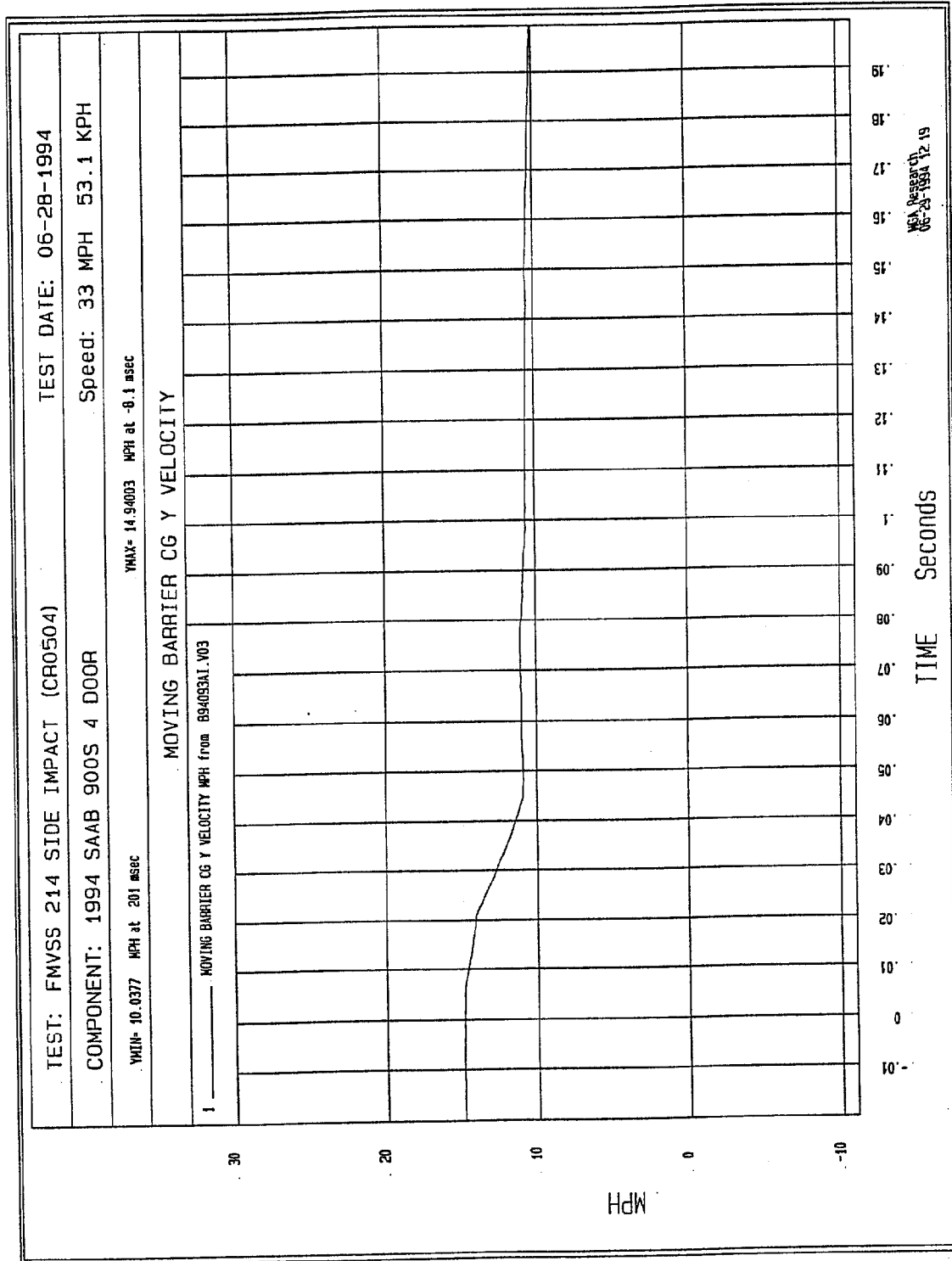


Figure B-53 - Moving Barrier Center of Gravity Y Velocity vs. Time

Filter: Class 60 (100 Hz)

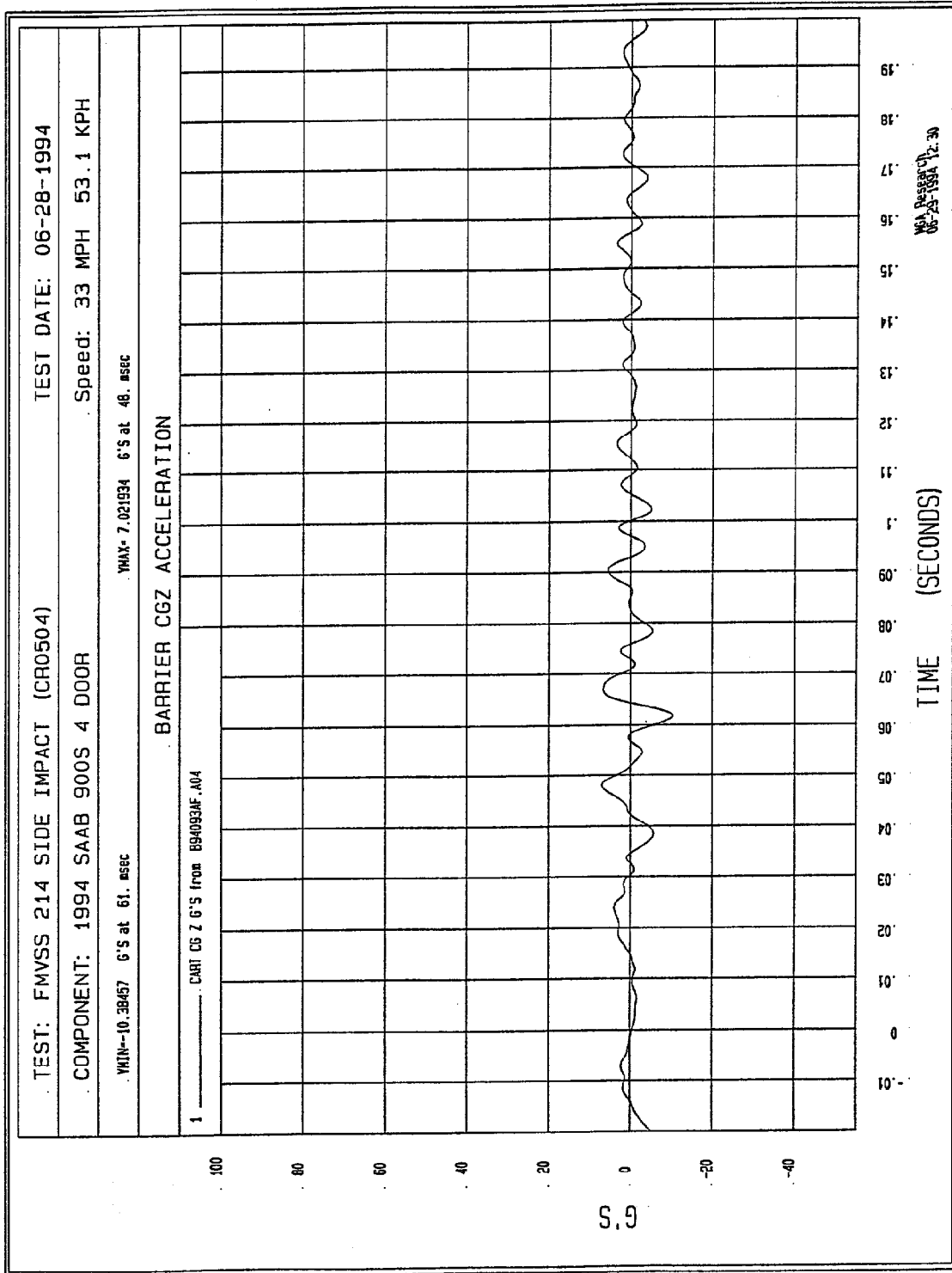


Figure B-54 - Moving Barrier Center of Gravity Z Acceleration vs. Time

Filter: Class 180 (300 Hz)

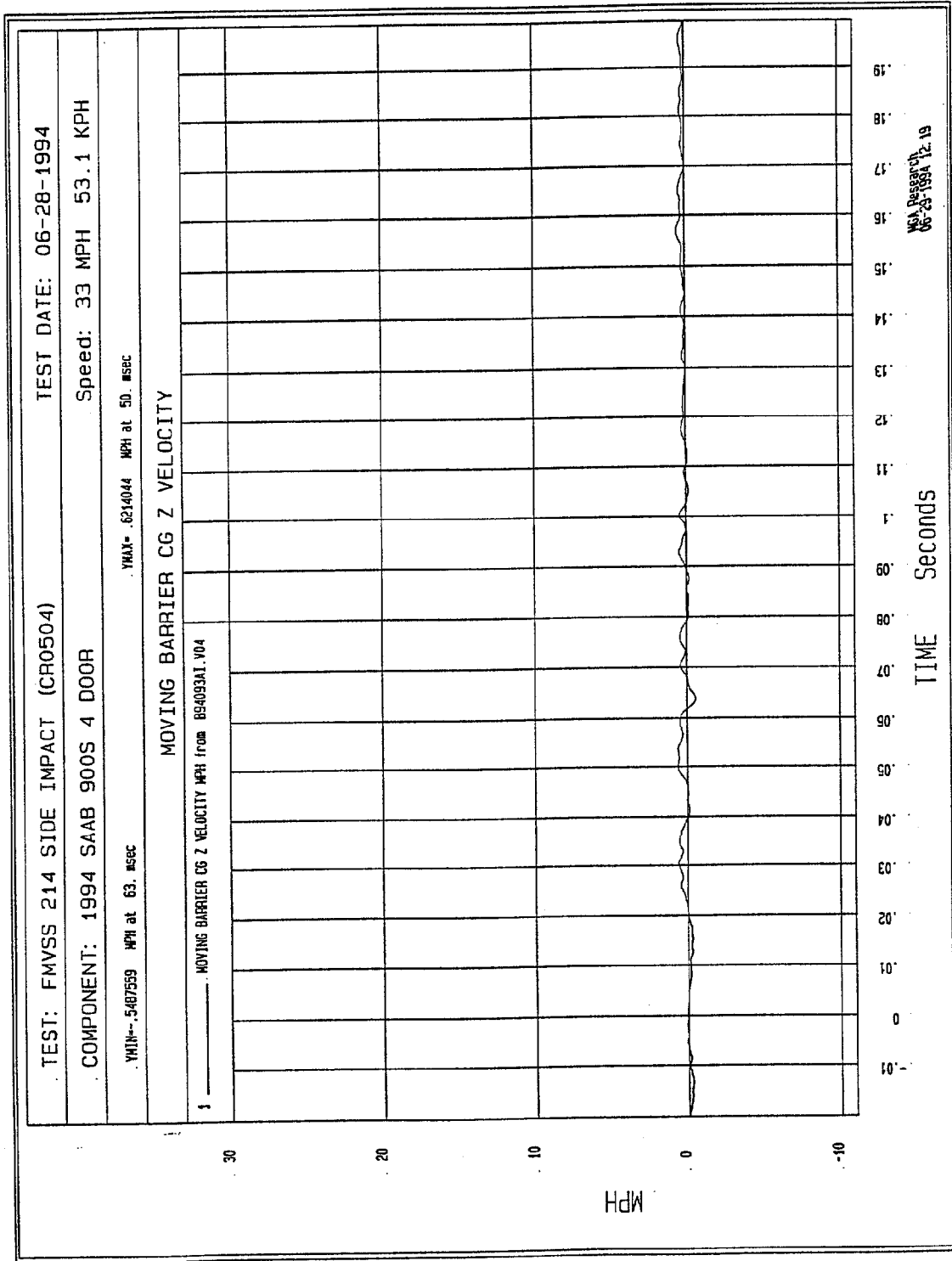


Figure B-55 - Moving Barrier Center of Gravity Z Velocity vs. Time

Filter: Class 60 (100 Hz)

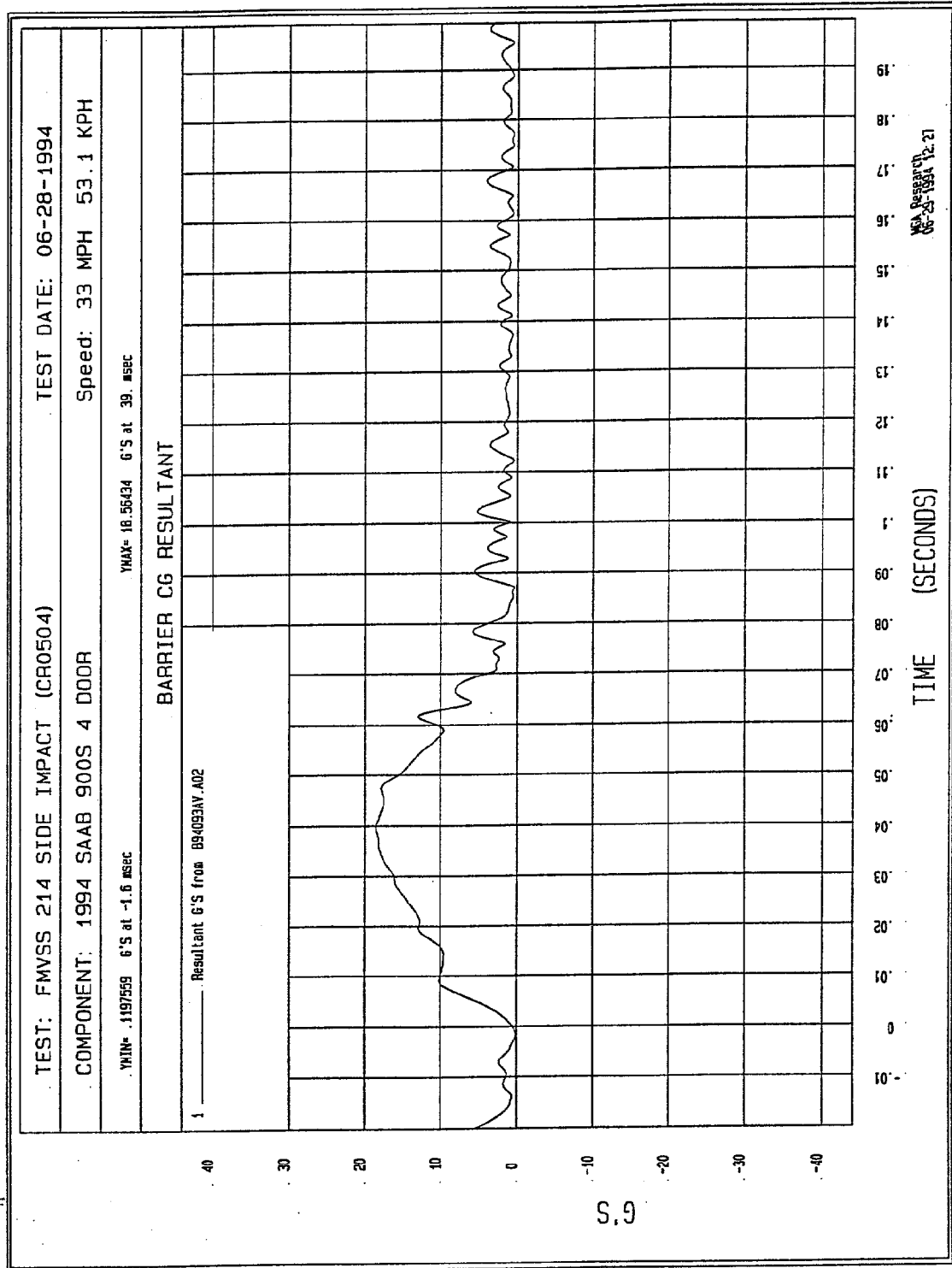


Figure B-56 - Moving Barrier Center of Gravity Resultant vs. Time

Filter: Class 60 (100 Hz)

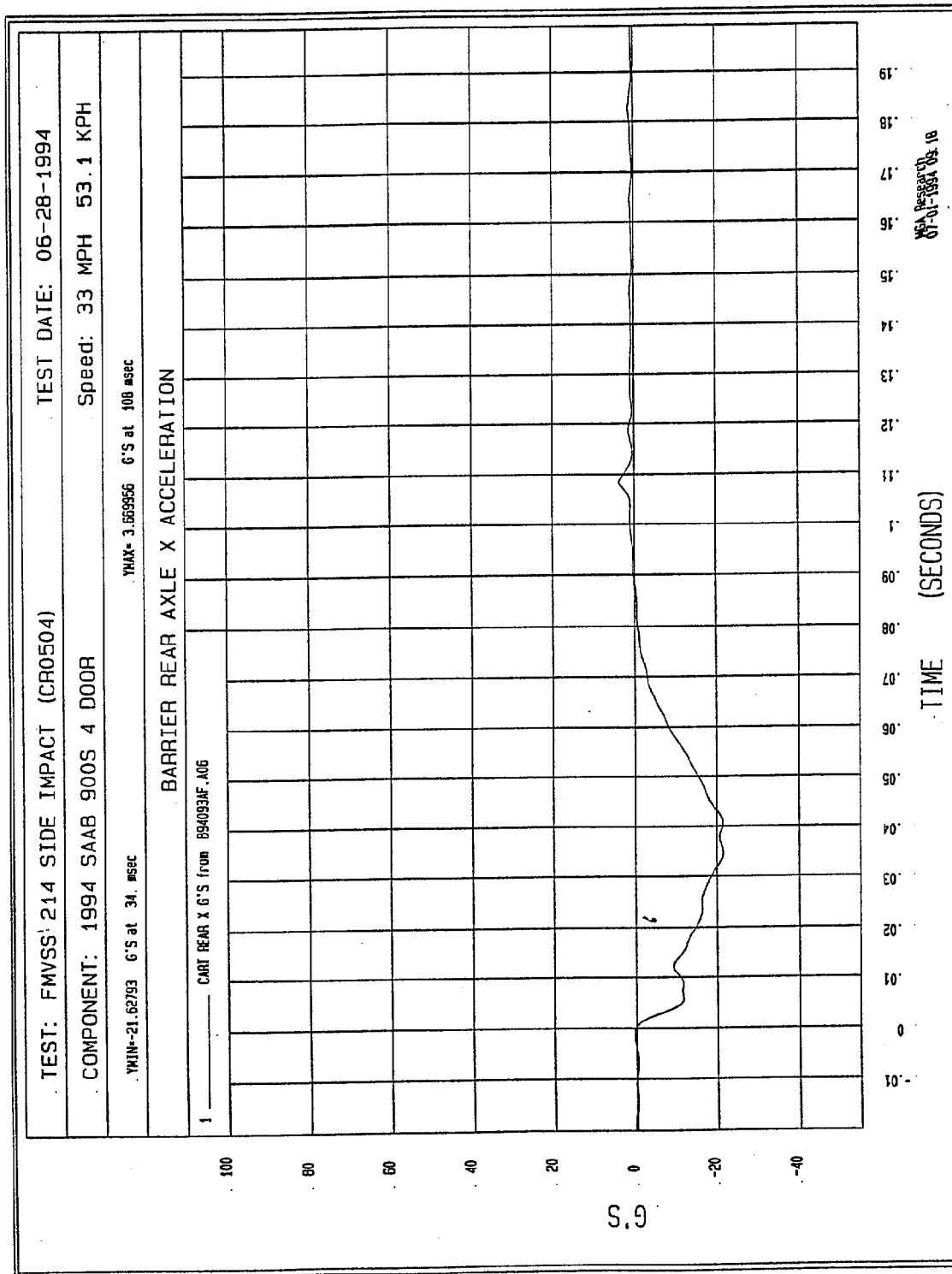


Figure B-57 - Moving Barrier Rear Axle X Acceleration vs. Time

Filter: Class 180 (300 Hz)

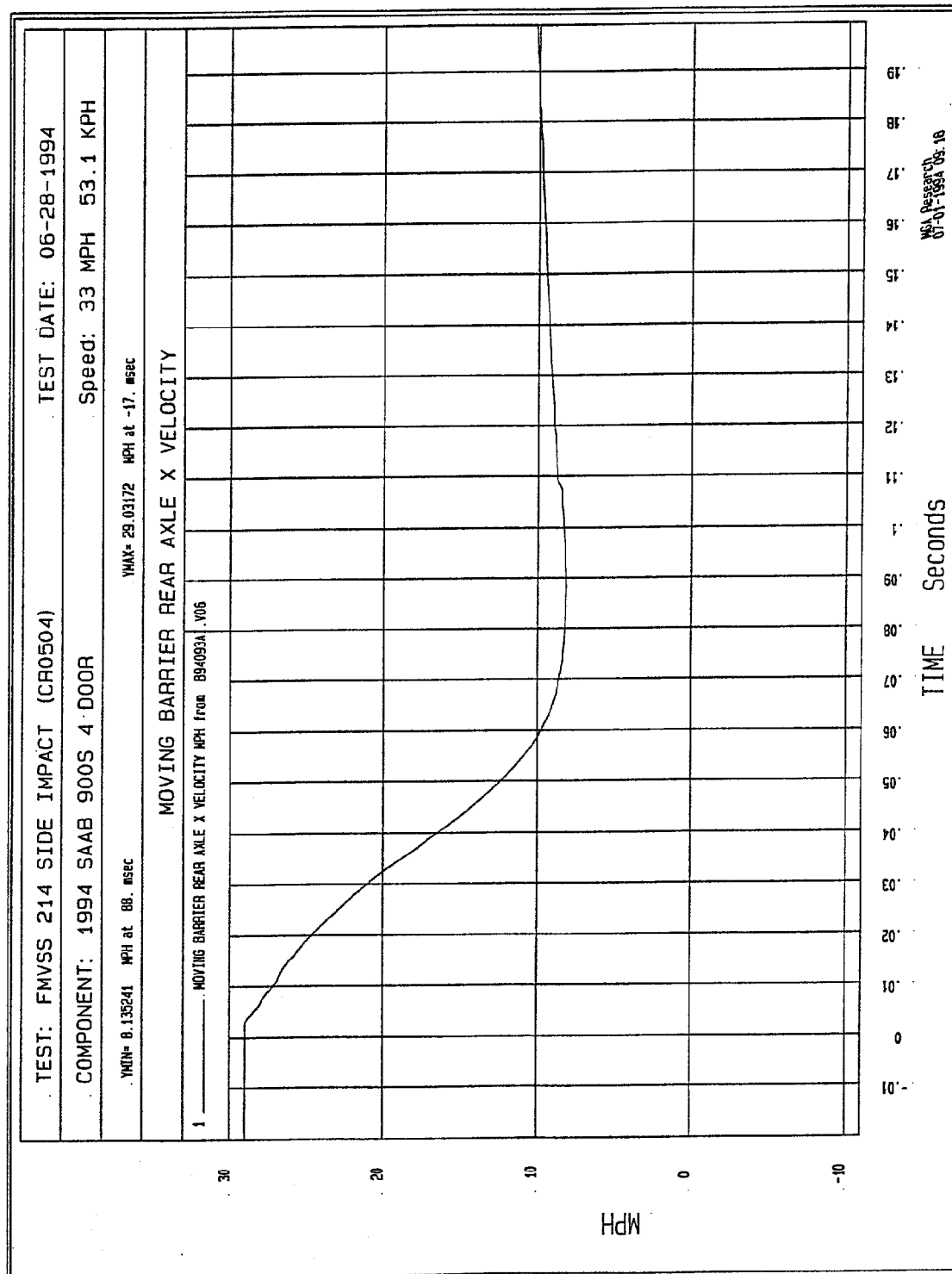


Figure B-58 - Moving Barrier Rear Axle X Velocity vs. Time

NO VALID DATA COLLECTED

B-59

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

NO VALID DATA COLLECTED

B-60

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

Filter: Class 1000 (1650 Hz)

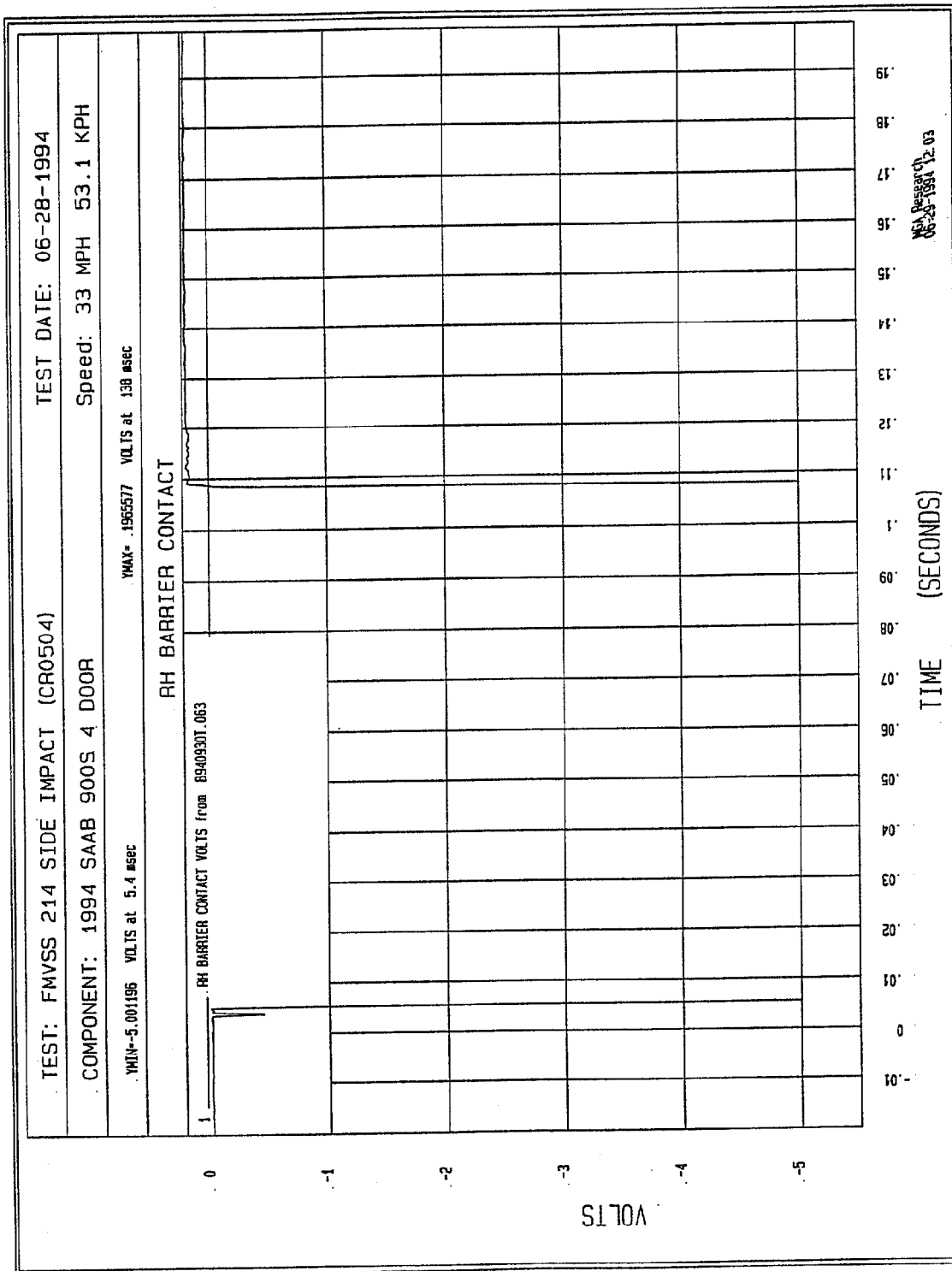


Figure B-61 - Right Hand Barrier Contact

Filter: Class 1000 (1650 Hz)

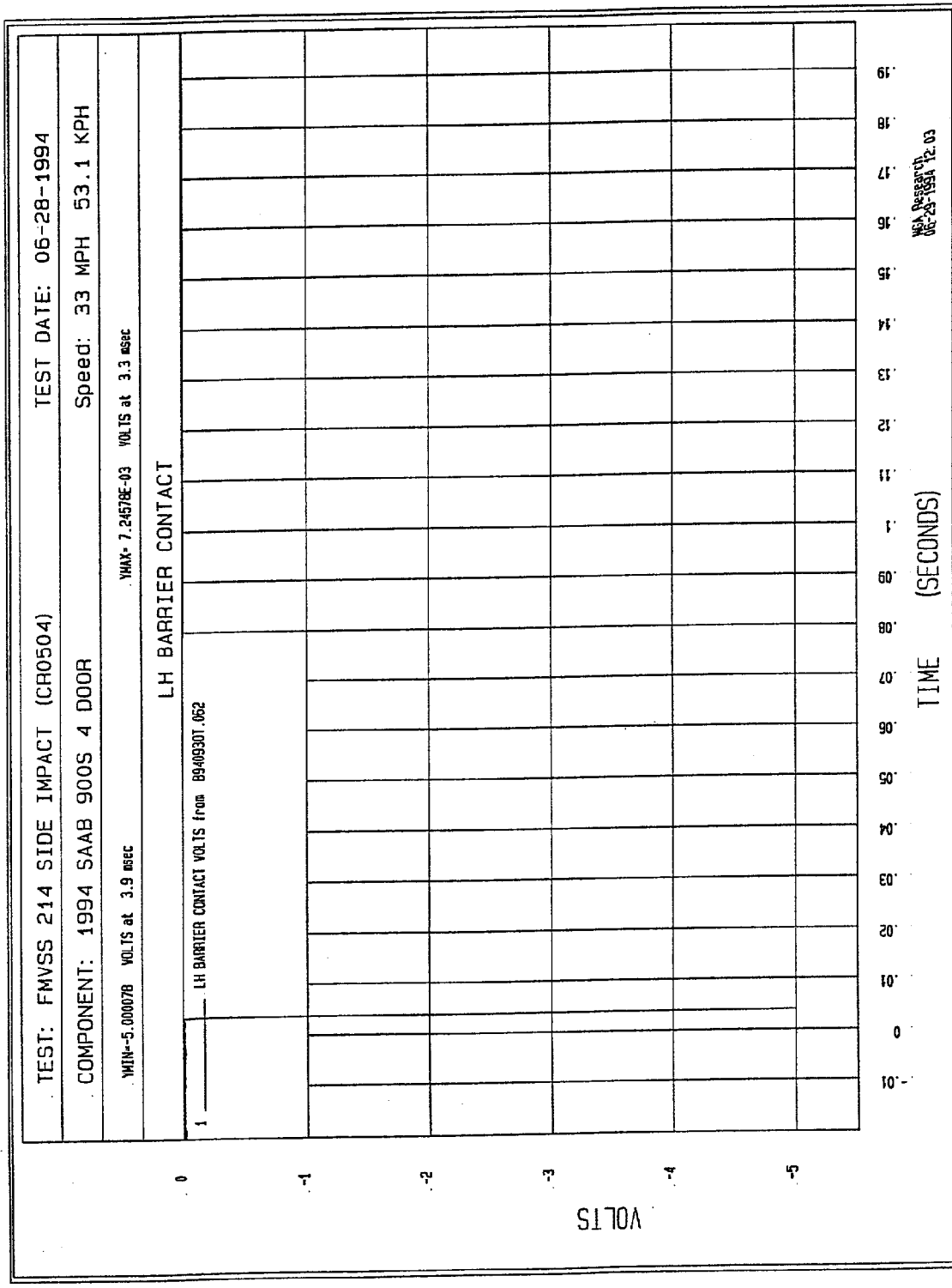


Figure B-62 - Left Hand Barrier Contact

Filter: Class 180 (300 Hz)

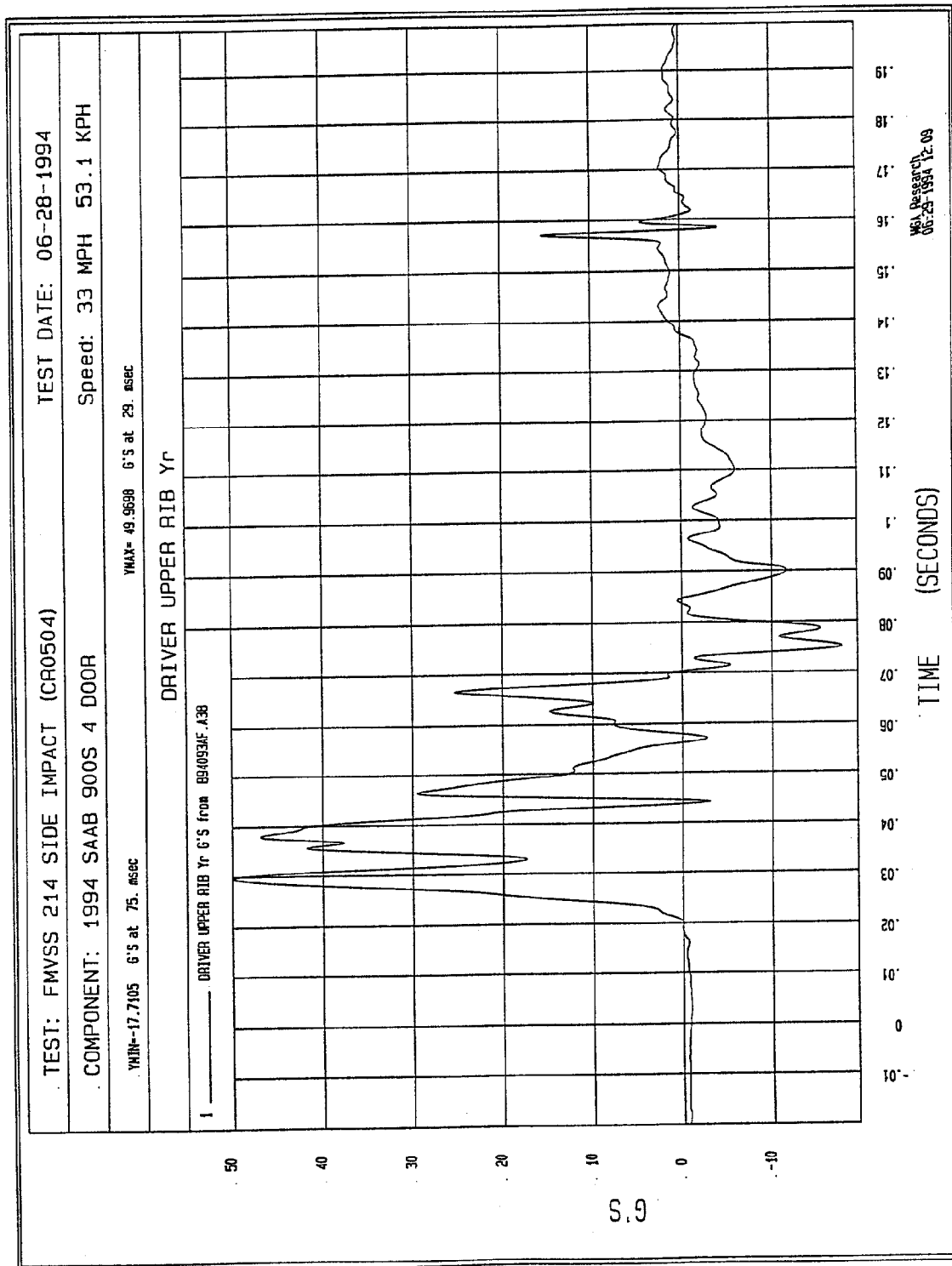


Figure B-63 - Driver Upper Rib Y Redundant Acceleration vs. Time

Filter: Class 180 (300 Hz)

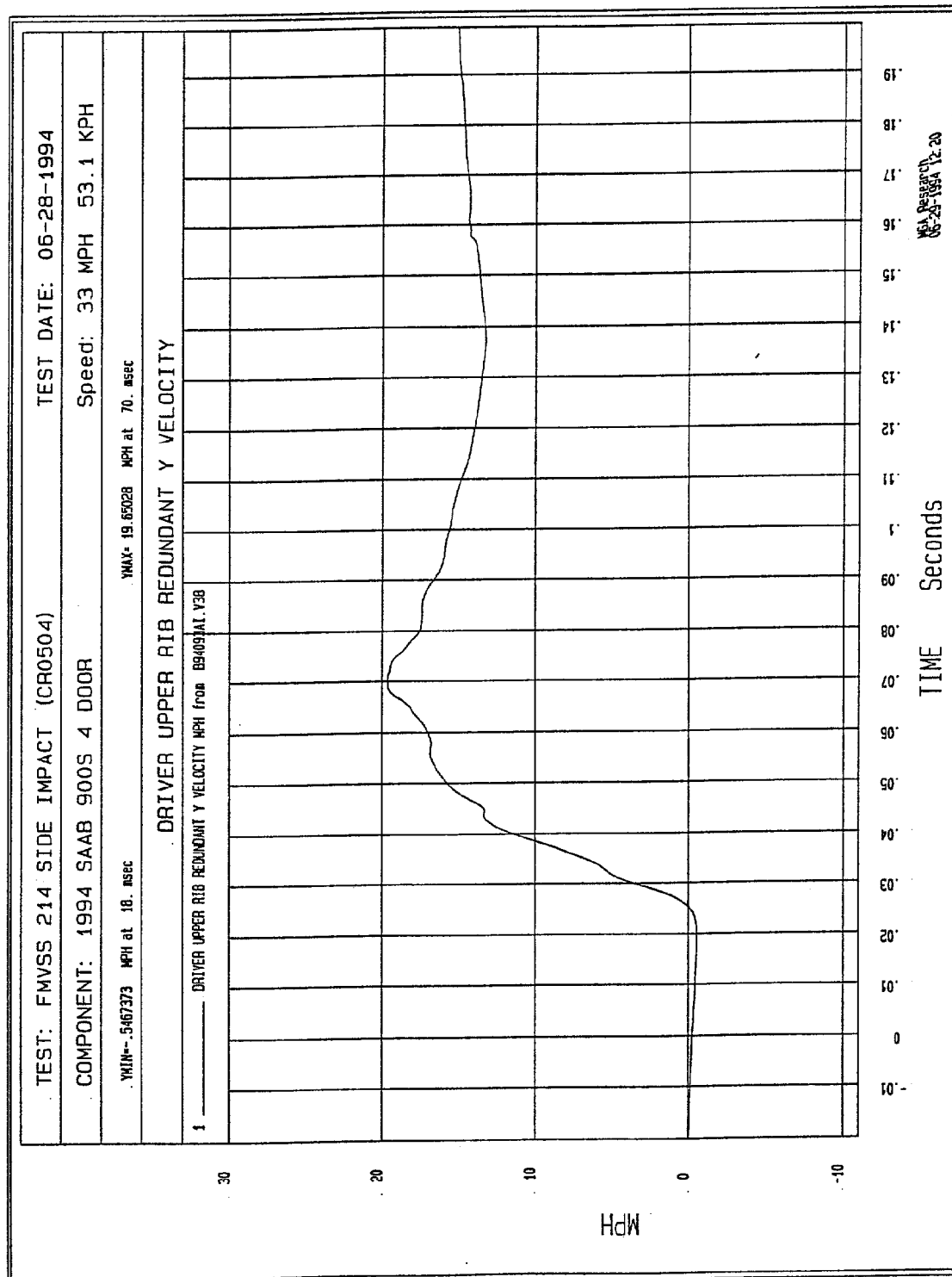


Figure B-64 - Driver Upper Rib Y Redundant Velocity vs. Time

Filter: Class 180 (300 Hz)

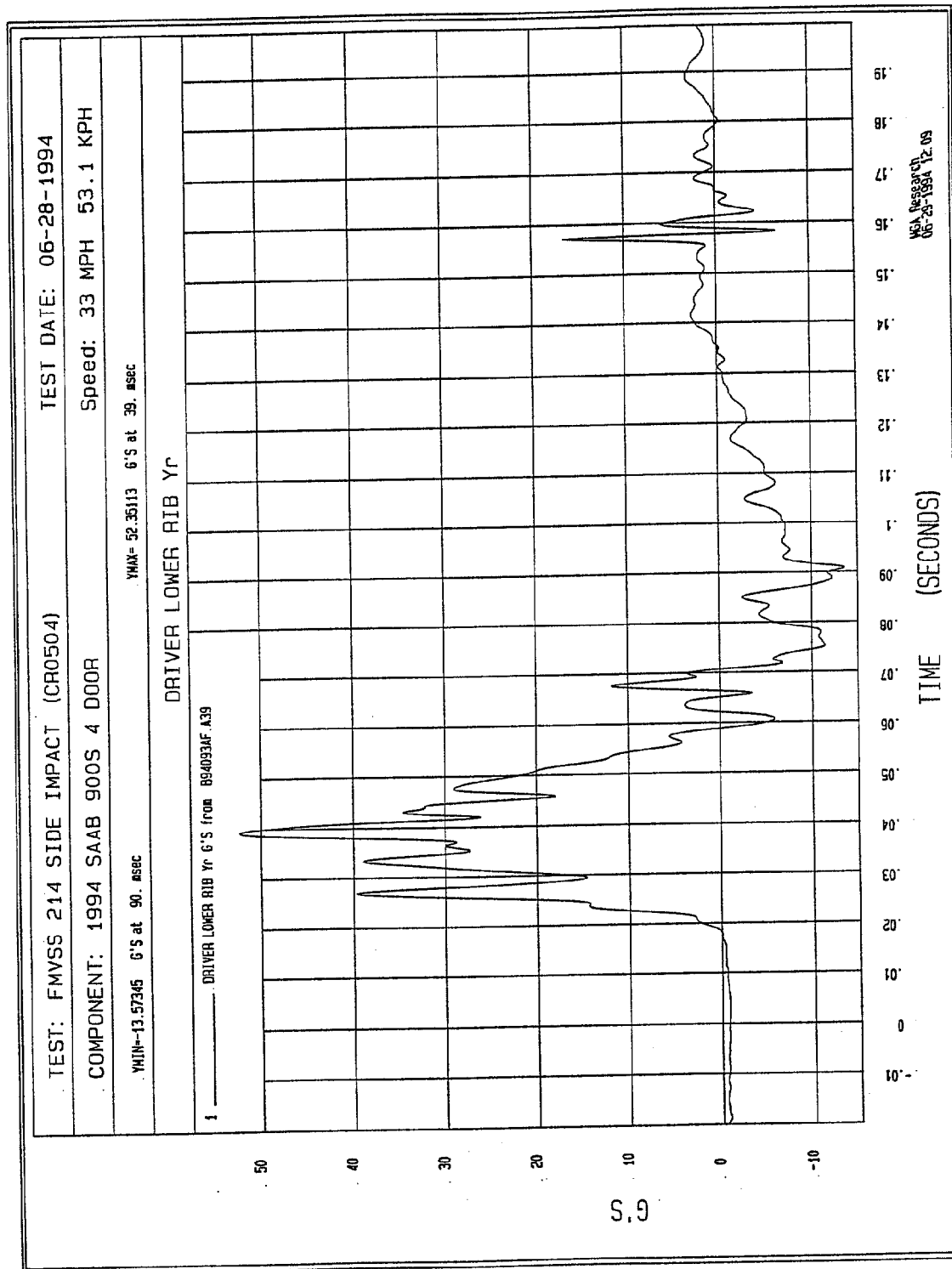


Figure B-65 - Driver Lower Rib Y Redundant Acceleration vs. Time

Filter: Class 180 (300 Hz)

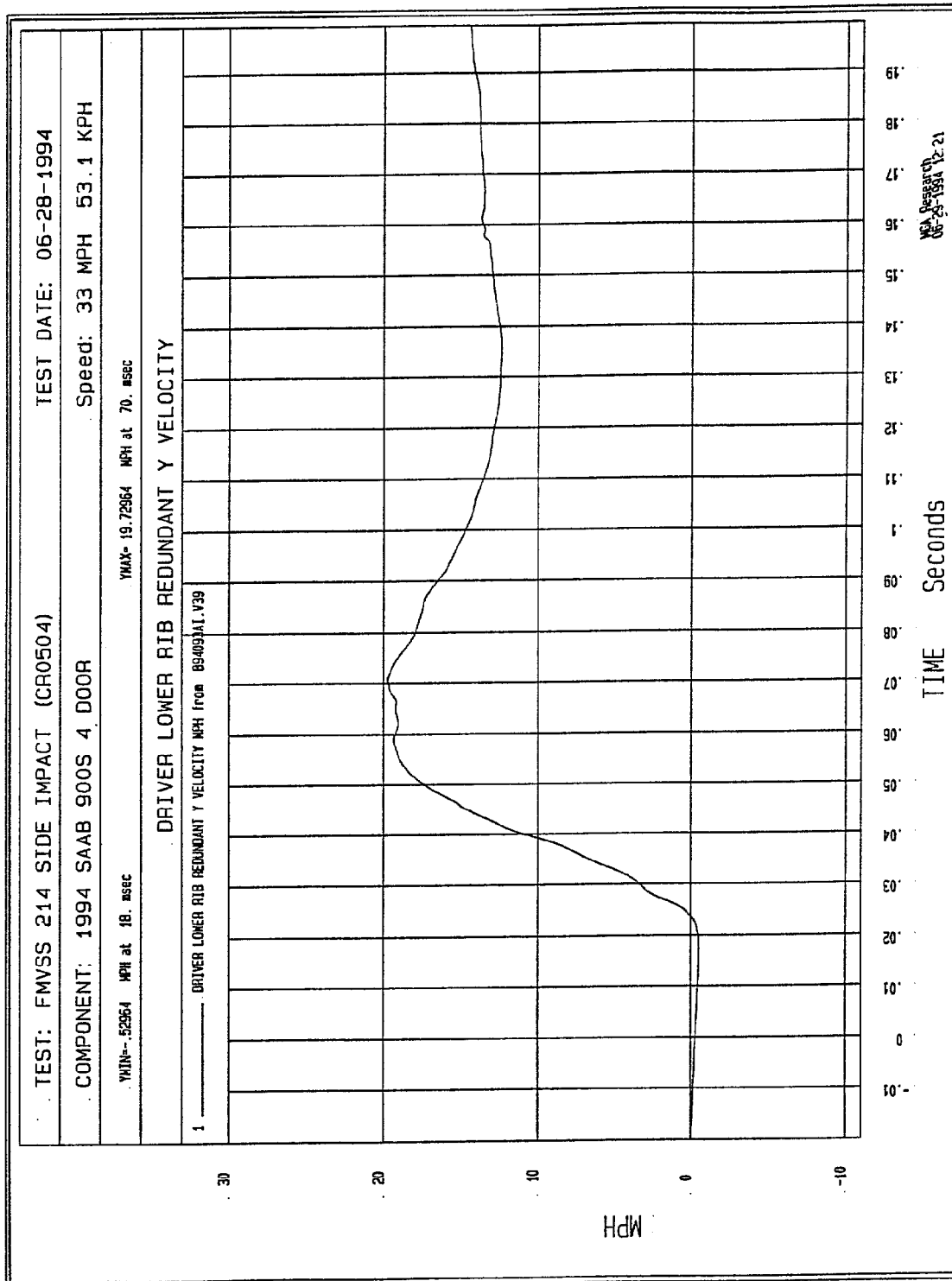


Figure B-66 - Driver Lower Rib Y Redundant Velocity vs. Time

Filter: Class 180 (300 Hz)

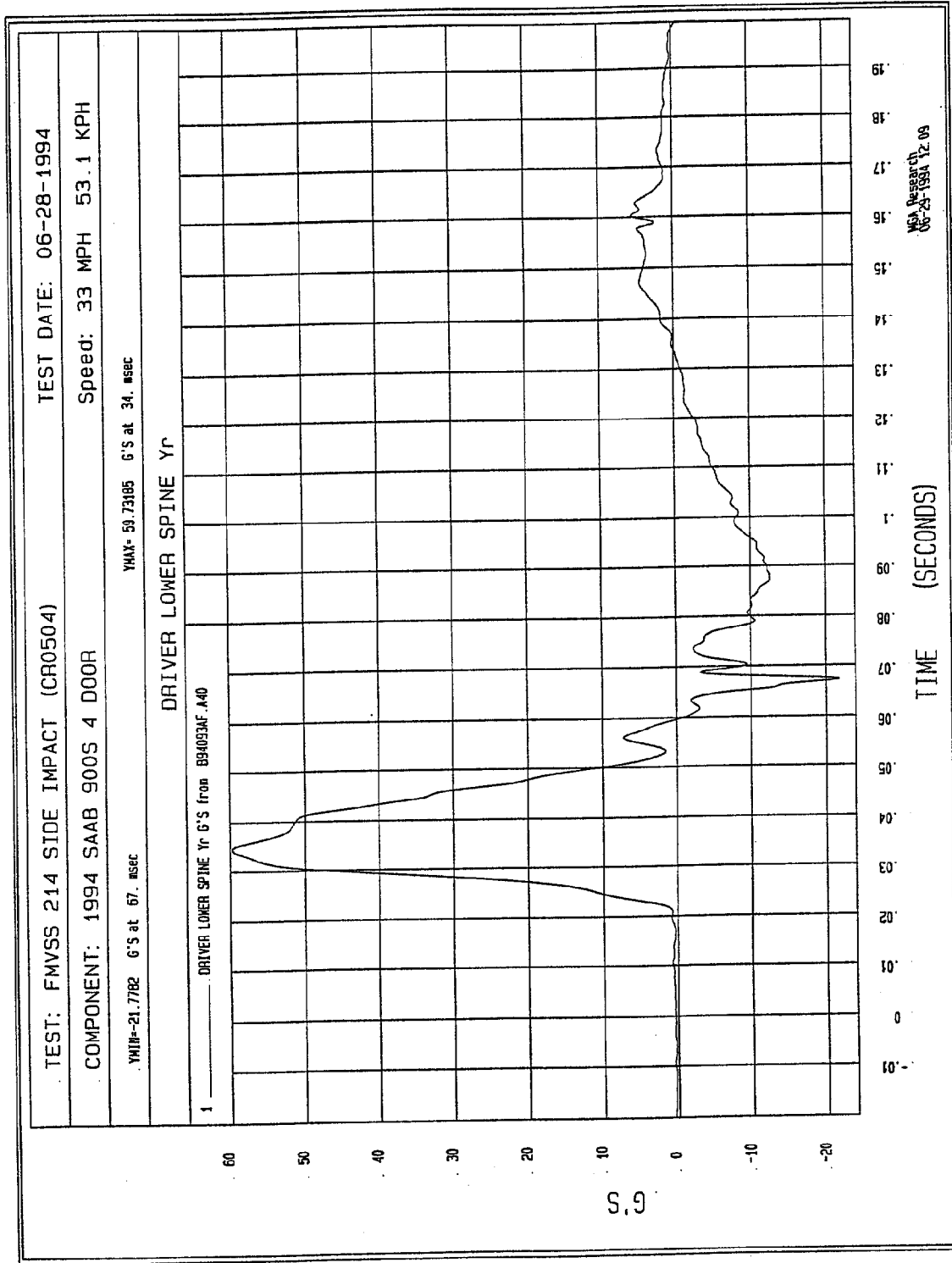


Figure B-67 - Driver Lower Spine Y Redundant Acceleration vs. Time

Filter: Class 180 (300 Hz)

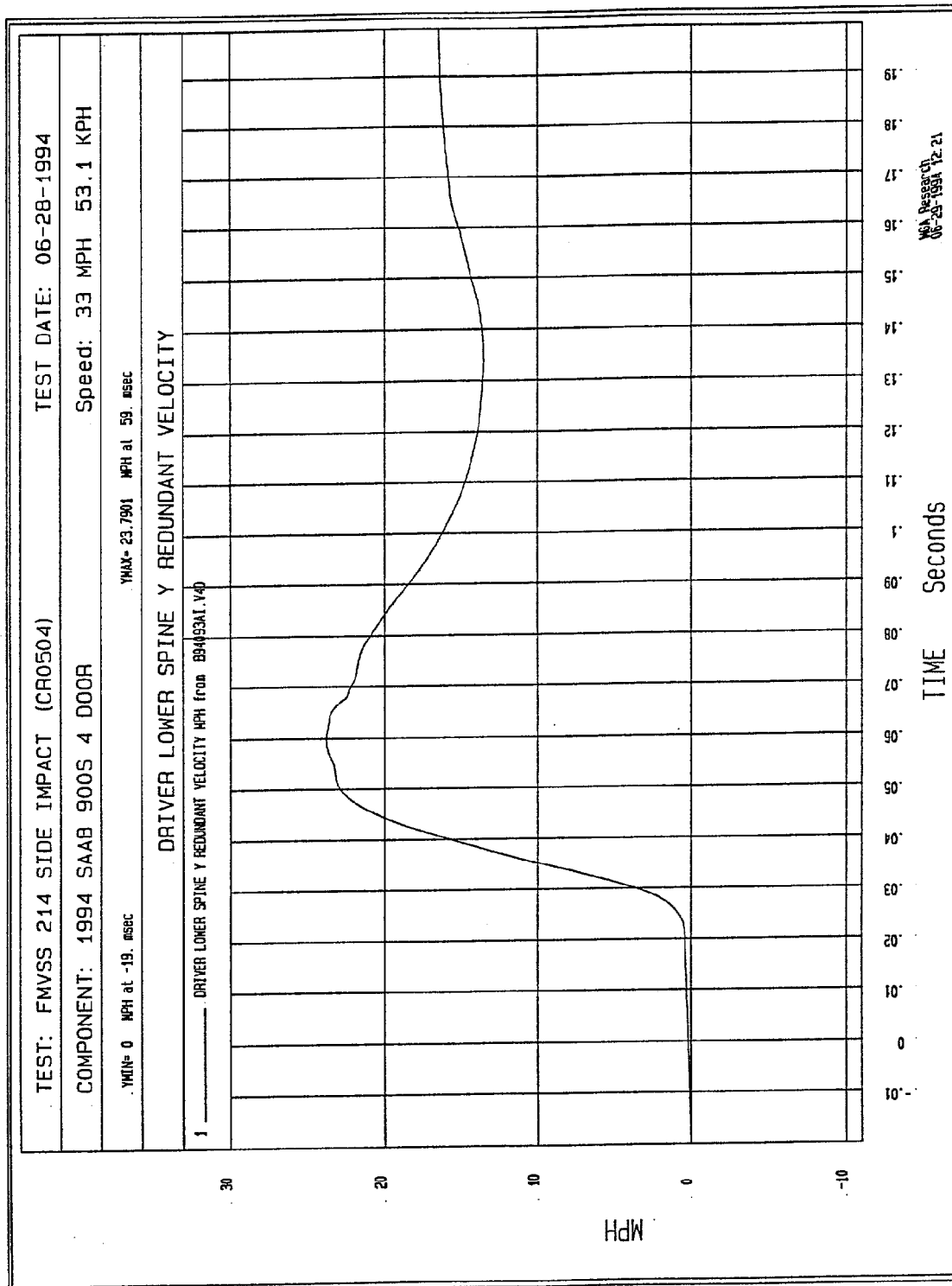


Figure B-68 - Driver Lower Spine Y Redundant Velocity vs. Time

Filter: Class 180 (300 Hz)

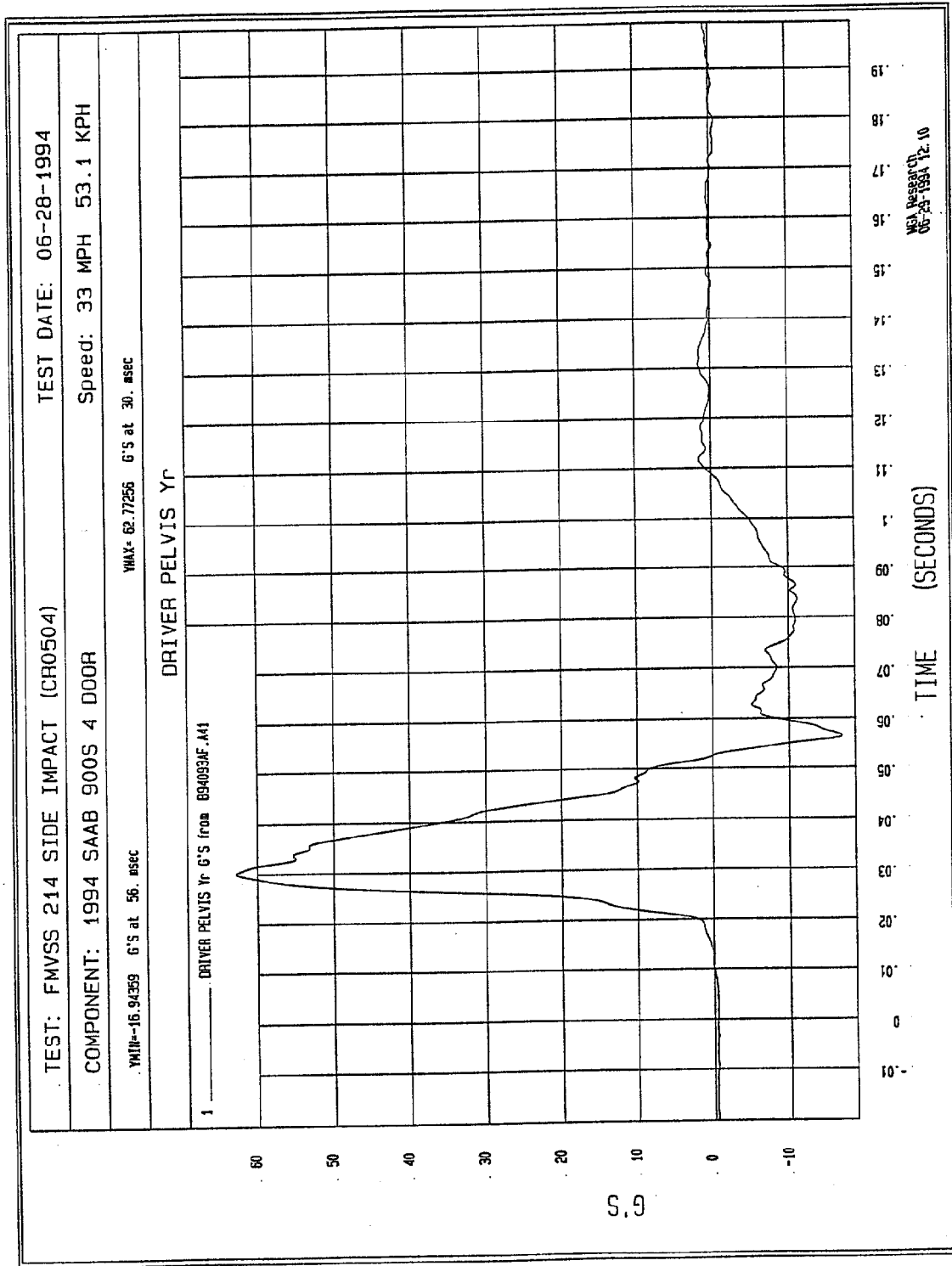


Figure B-69 - Driver Pelvis Y Redundant Acceleration vs. Time

Filter: Class 180 (300 Hz)

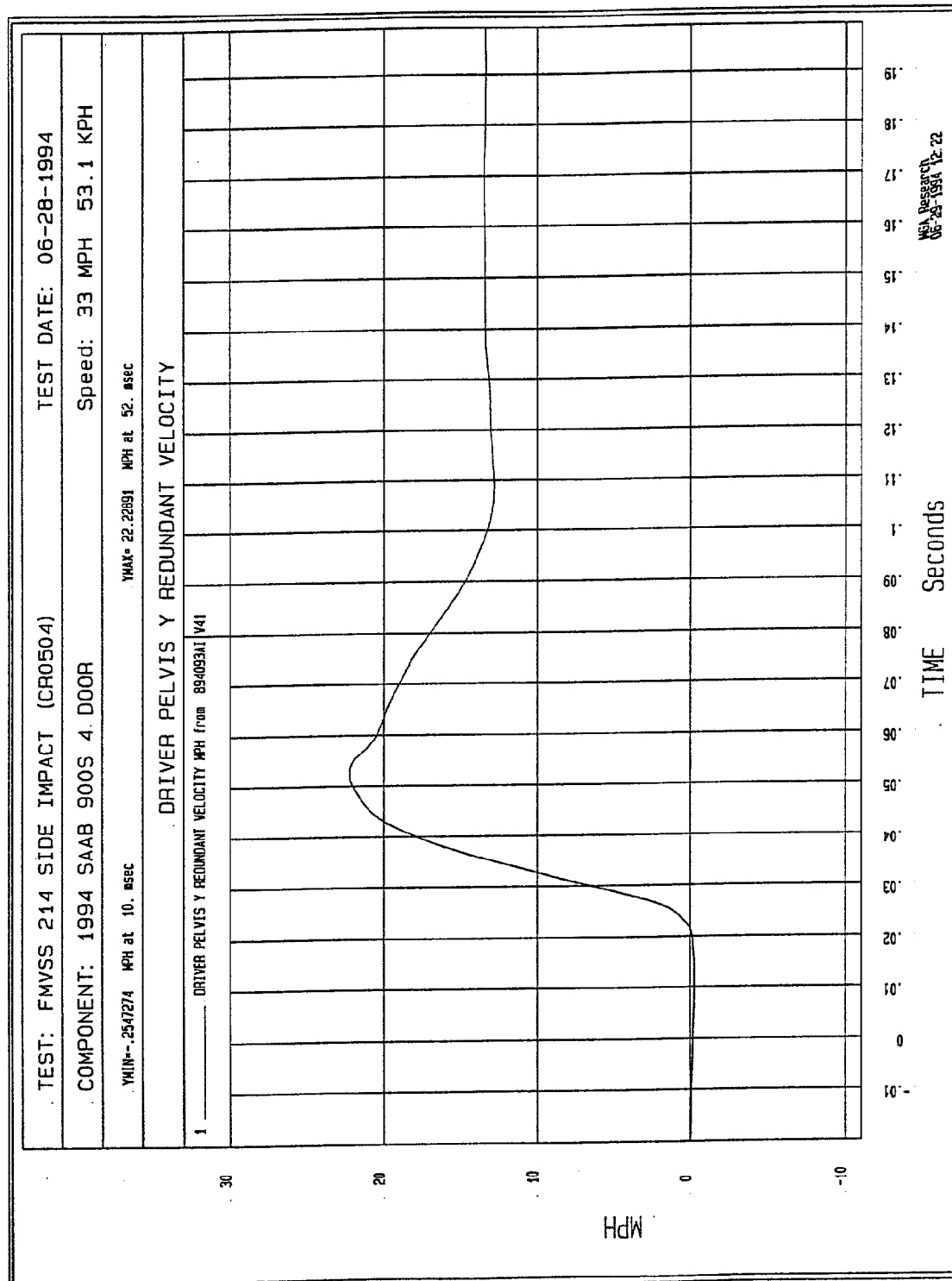


Figure B-70 - Driver Pelvis Y Redundant Velocity vs. Time

Filter: Class 180 (300 Hz)

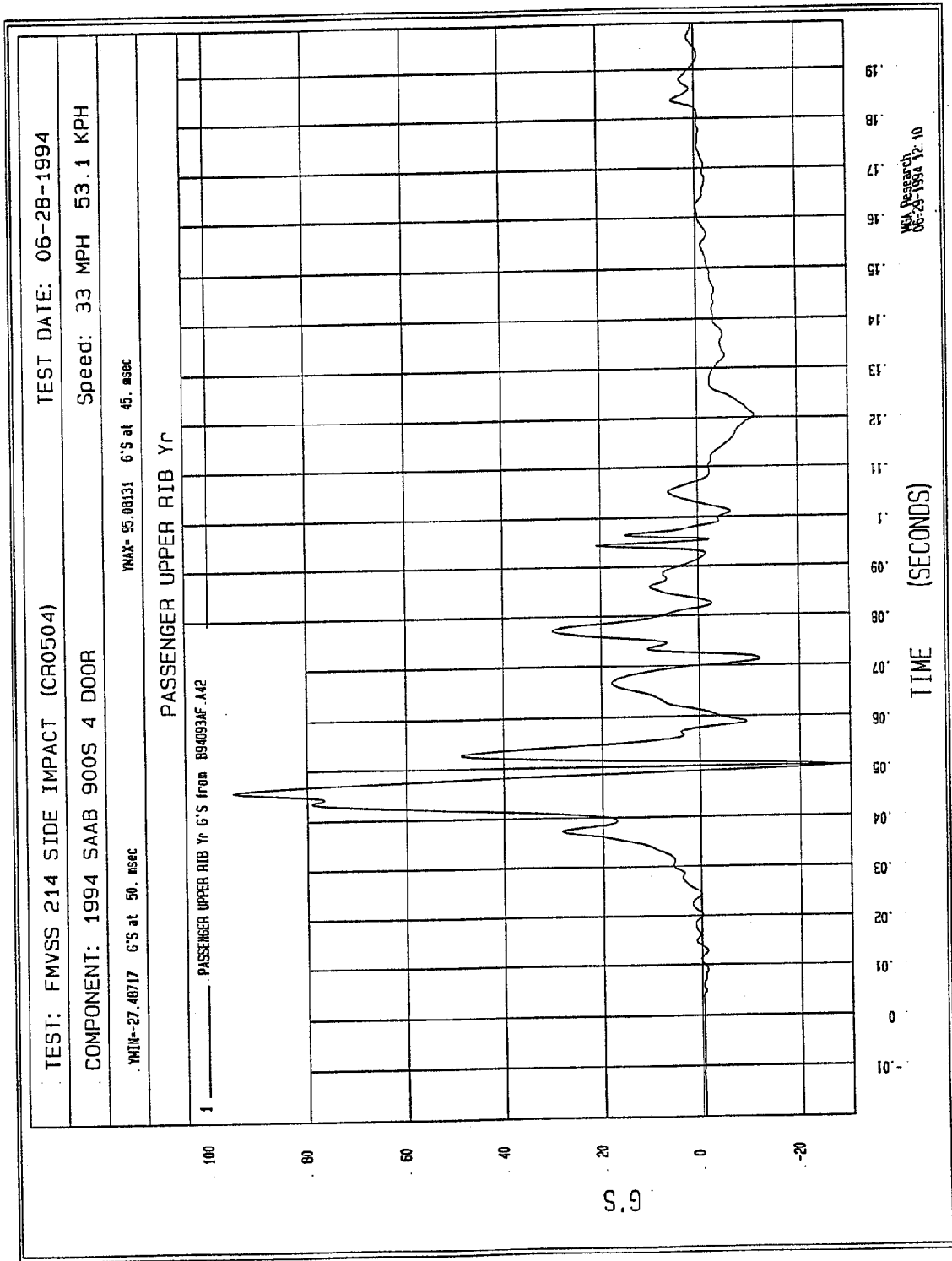


Figure B-71 - Passenger Upper Rib Y Redundant Acceleration vs. Time

Filter: Class 180 (300 Hz)

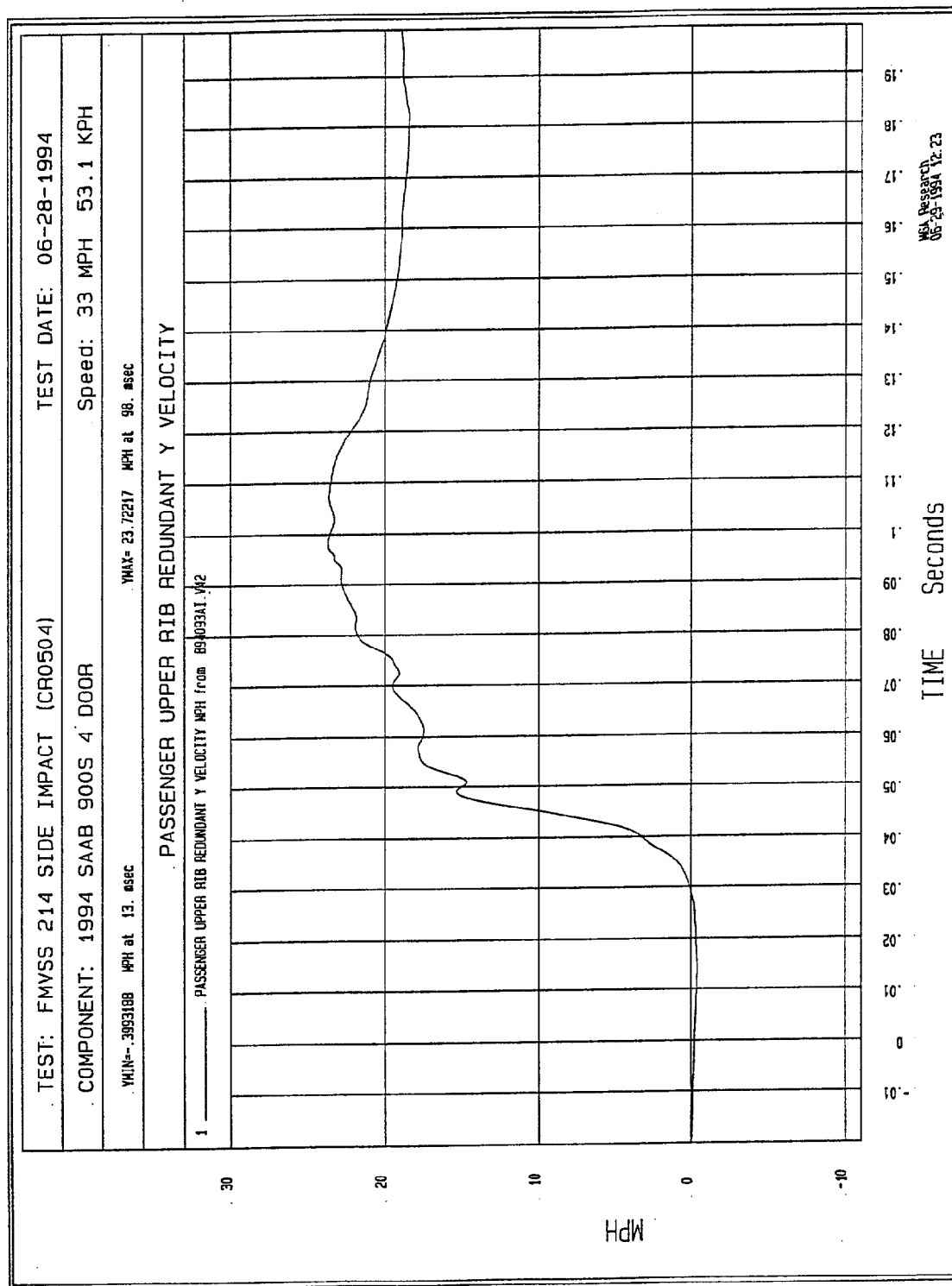
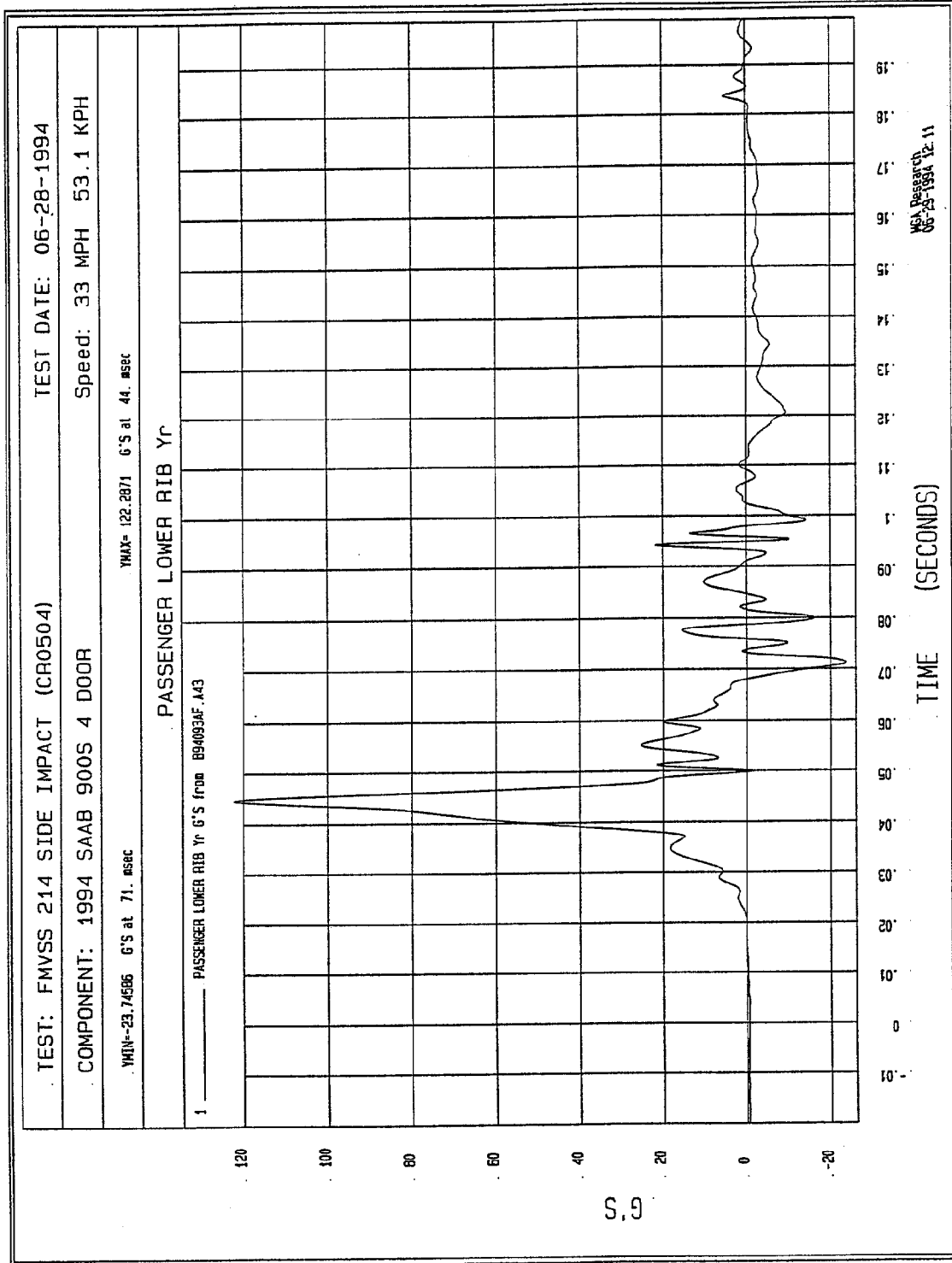


Figure B-72 - Passenger Upper Rib Y Redundant Velocity vs. Time

Filter: Class 180 (300 Hz)



B-73

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

Filter: Class 180 (300 Hz)

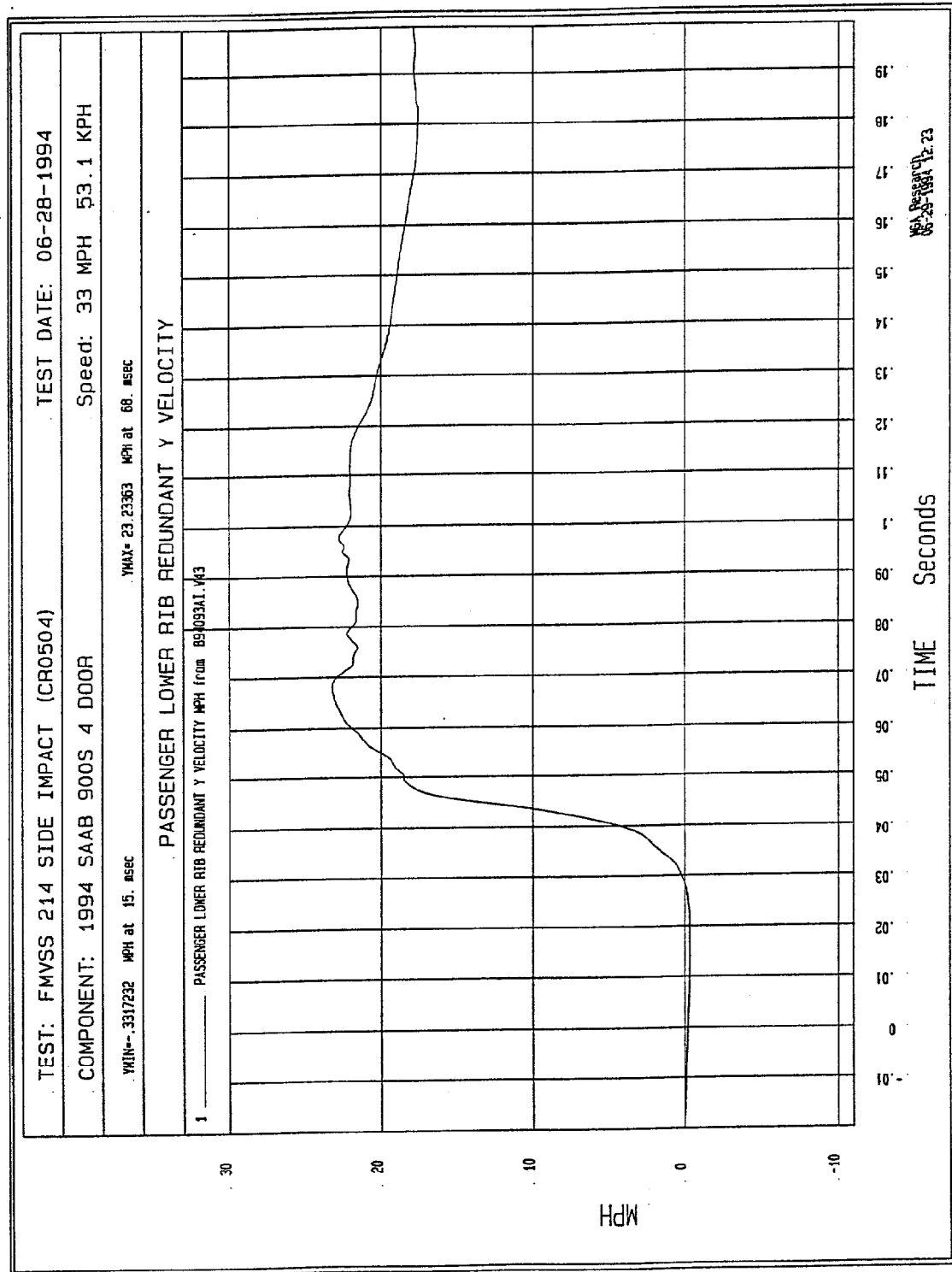


Figure B-74 - Passenger Lower Rib Y Redundant Velocity vs. Time

Filter: Class 180 (300 Hz)

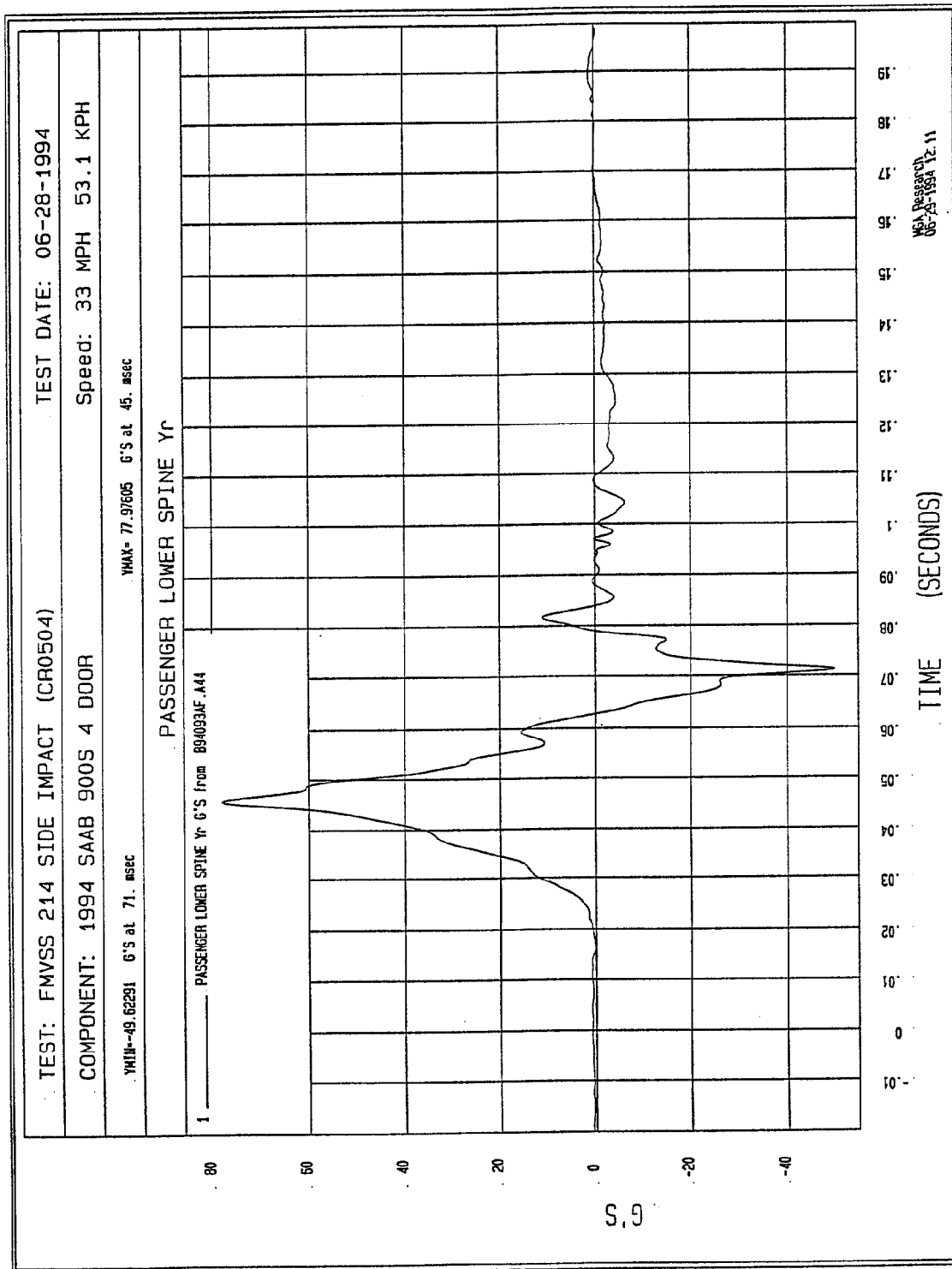


Figure B-75 - Passenger Lower Spine Y Redundant Acceleration vs. Time

Filter: Class 180 (300 Hz)

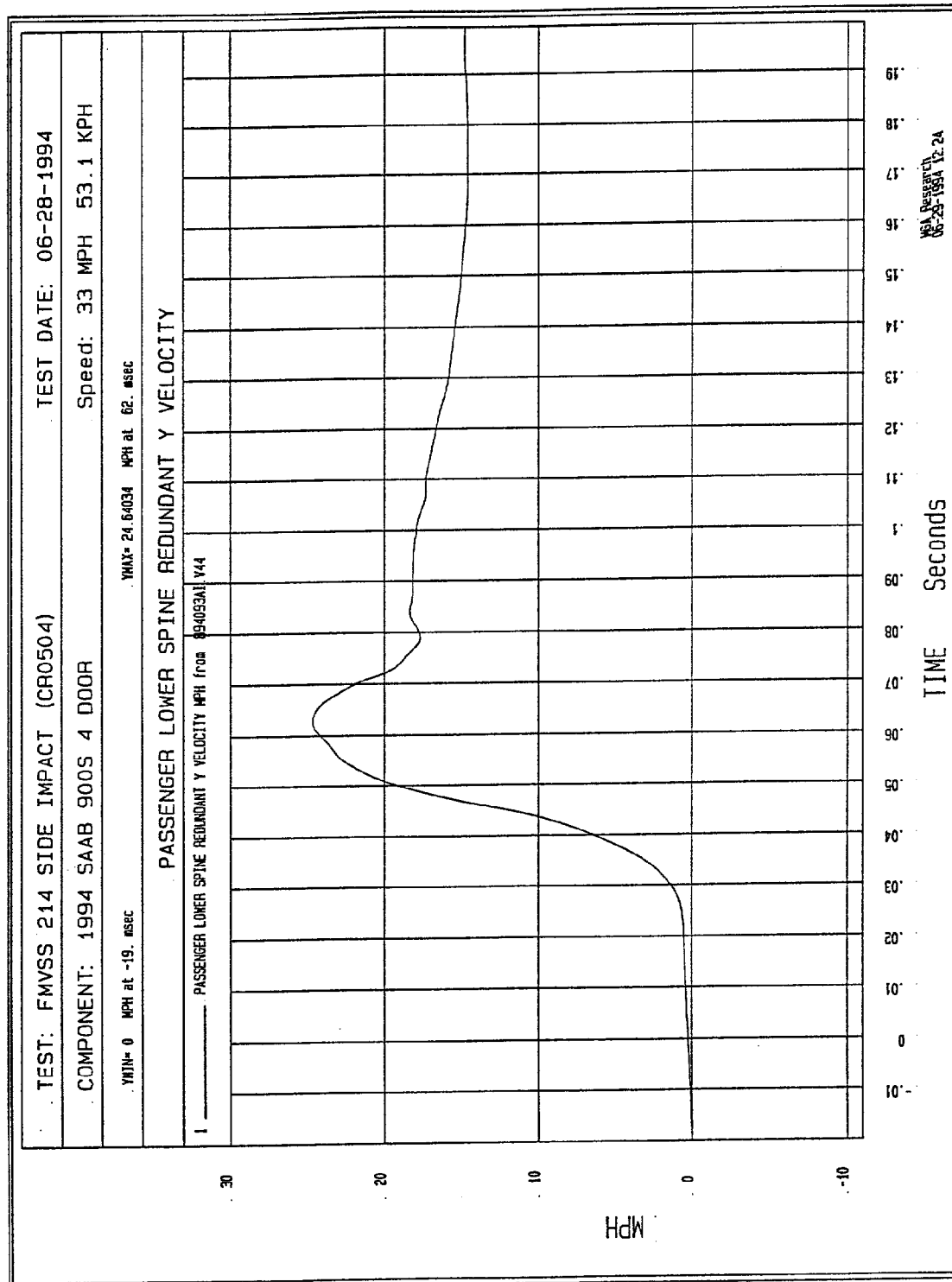


Figure B-76 - Passenger Lower Spine Y Redundant Velocity vs. Time

Filter: Class 180 (300 Hz)

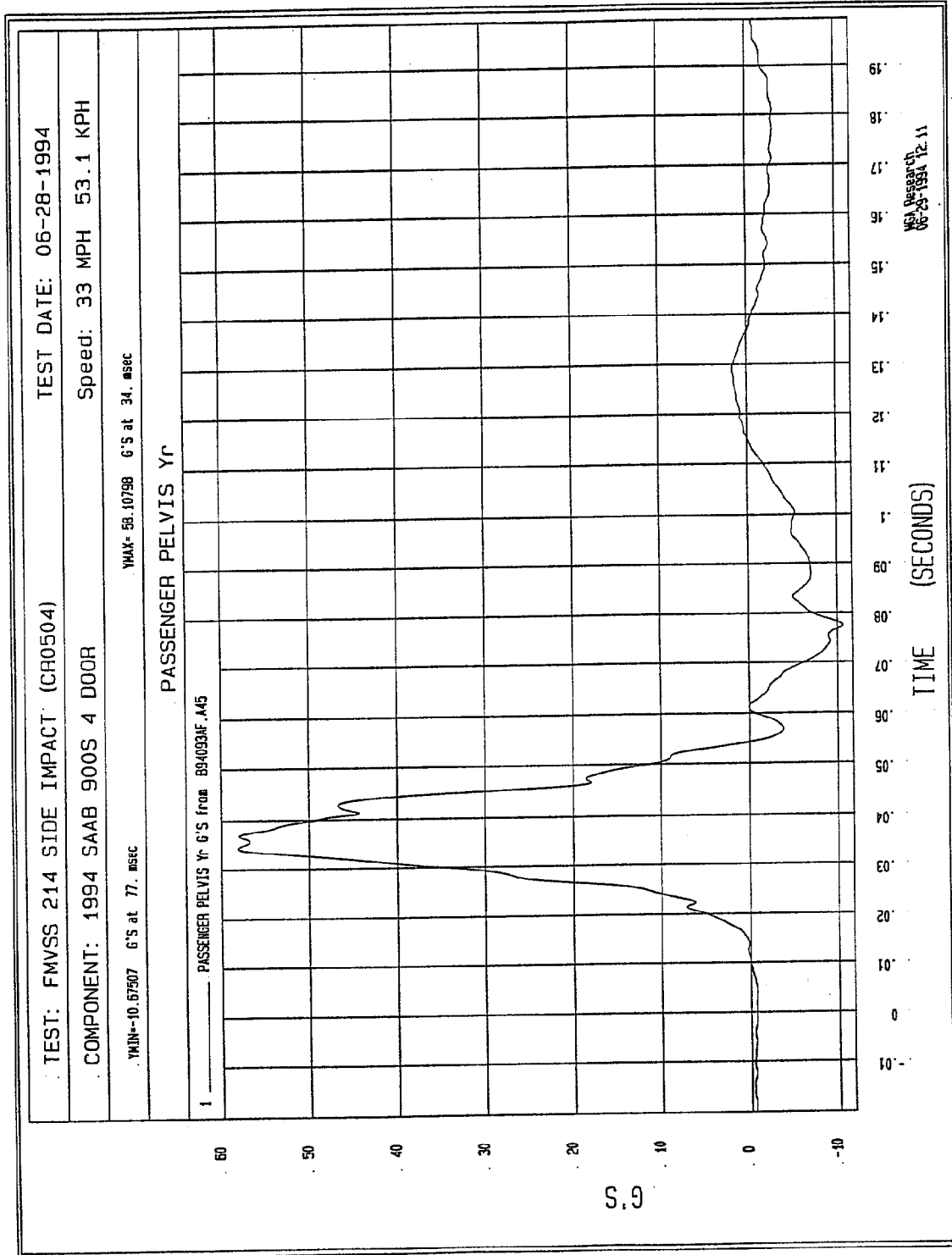


Figure B-77 - Passenger Pelvis Y Redundant Acceleration vs. Time

Filter: Class 180 (300 Hz)

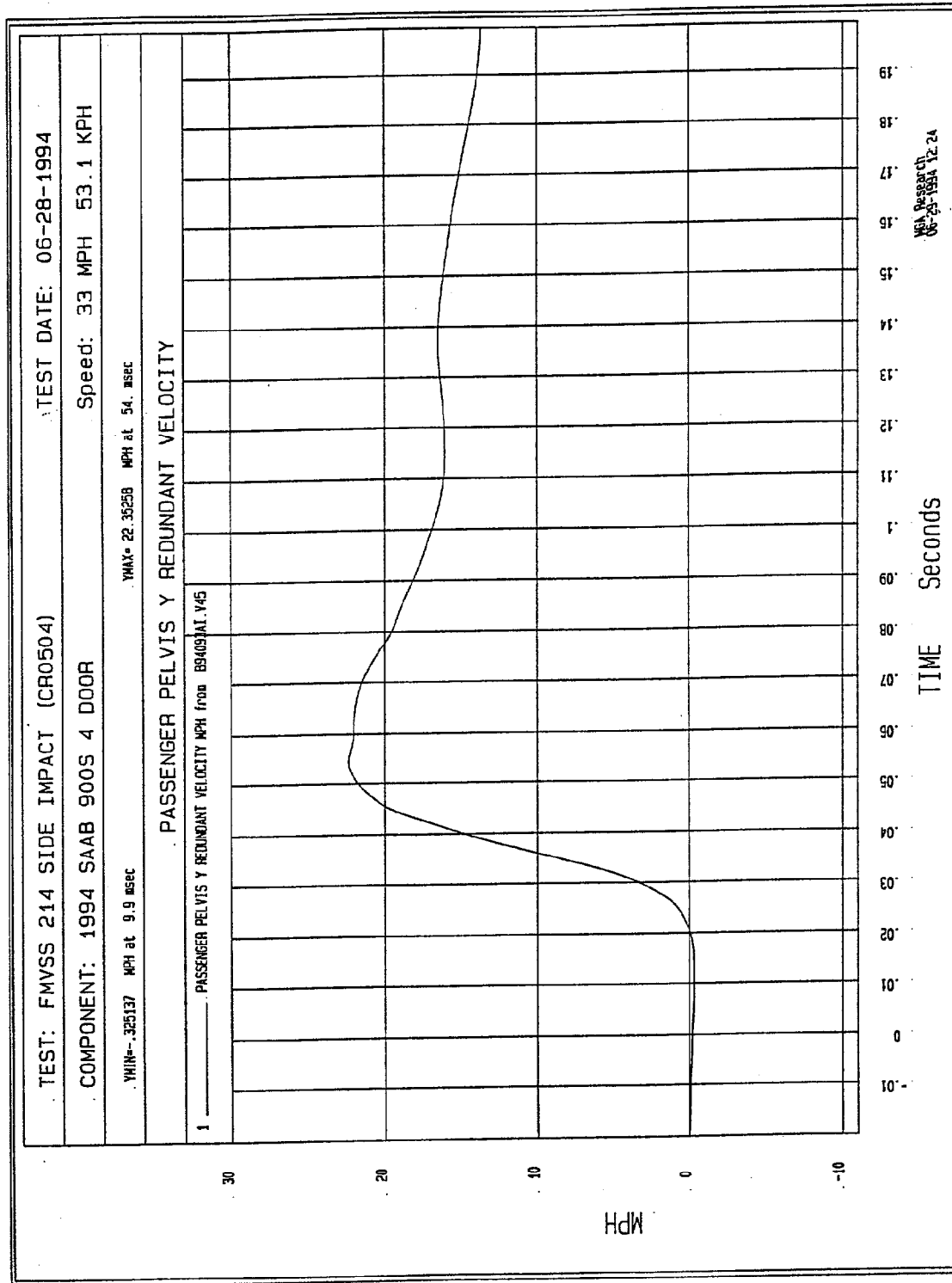


Figure B-78 - Passenger Pelvis Y Redundant Velocity vs. Time

FINITE IMPULSE RESPONSE (FIR) FILTERED DATA

Table of Data Plots

	<u>Page No.</u>
Figure B-79 - Driver Upper Rib Y Acceleration vs. Time	B-79
Figure B-80 - Driver Upper Rib Y Redundant Acceleration vs. Time	B-80
Figure B-81 - Driver Lower Rib Y Acceleration vs. Time	B-81
Figure B-82 - Driver Lower Rib Y Redundant Acceleration vs. Time	B-82
Figure B-83 - Driver Lower Spine Y Acceleration vs. Time	B-83
Figure B-84 - Driver Lower Spine Y Redundant Acceleration vs. Time	B-84
Figure B-85 - Driver Pelvis Y Acceleration vs. Time	B-85
Figure B-86 - Driver Pelvis Y Redundant Acceleration vs. Time	B-86
Figure B-87 - Passenger Upper Rib Y Acceleration vs. Time	B-87
Figure B-88 - Passenger Upper Rib Y Redundant Acceleration vs. Time	B-88
Figure B-89 - Passenger Lower Rib Y Acceleration vs. Time	B-89
Figure B-90 - Passenger Lower Rib Y Redundant Acceleration vs. Time	B-90
Figure B-91 - Passenger Lower Spine Y Acceleration vs. Time	B-91
Figure B-92 - Passenger Lower Spine Y Redundant Acceleration vs. Time	B-92
Figure B-93 - Passenger Pelvis Y Acceleration vs. Time	B-93
Figure B-94 - Passenger Pelvis Y Redundant Acceleration vs. Time	B-94

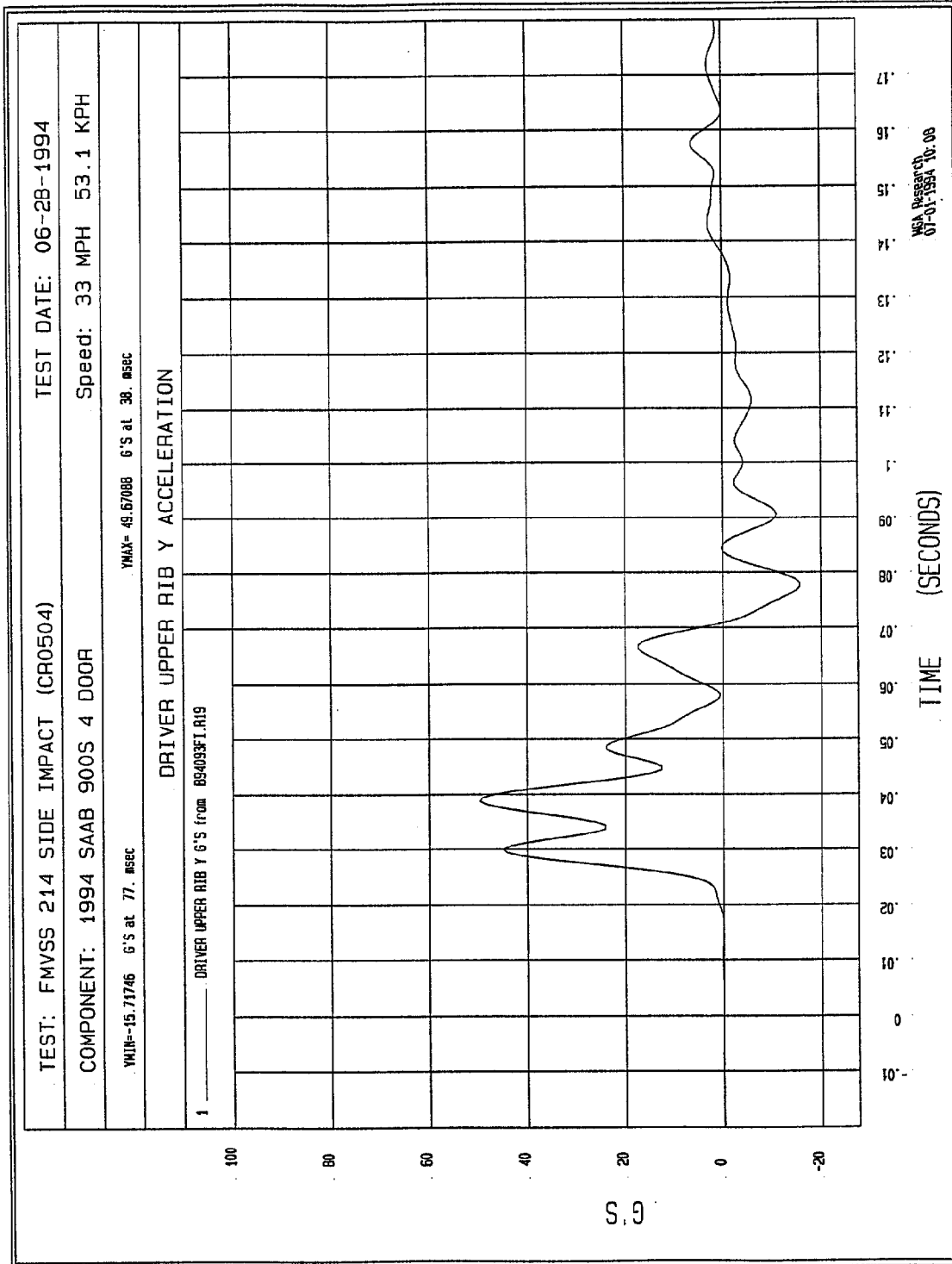


Figure B-79 - Driver Upper Rib Y Acceleration vs. Time

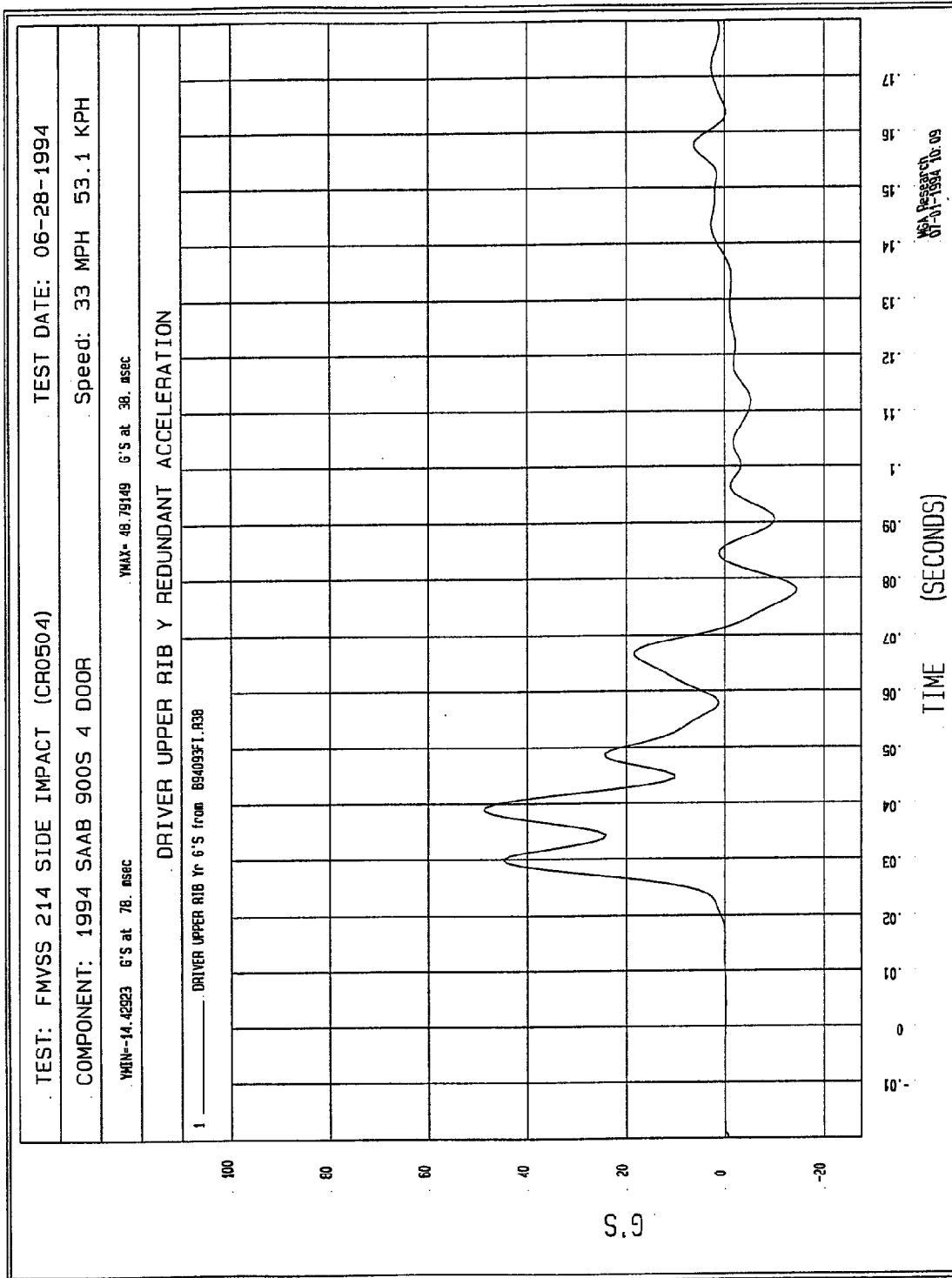


Figure B-80 - Driver Upper Rib Y Redundant Acceleration vs. Time

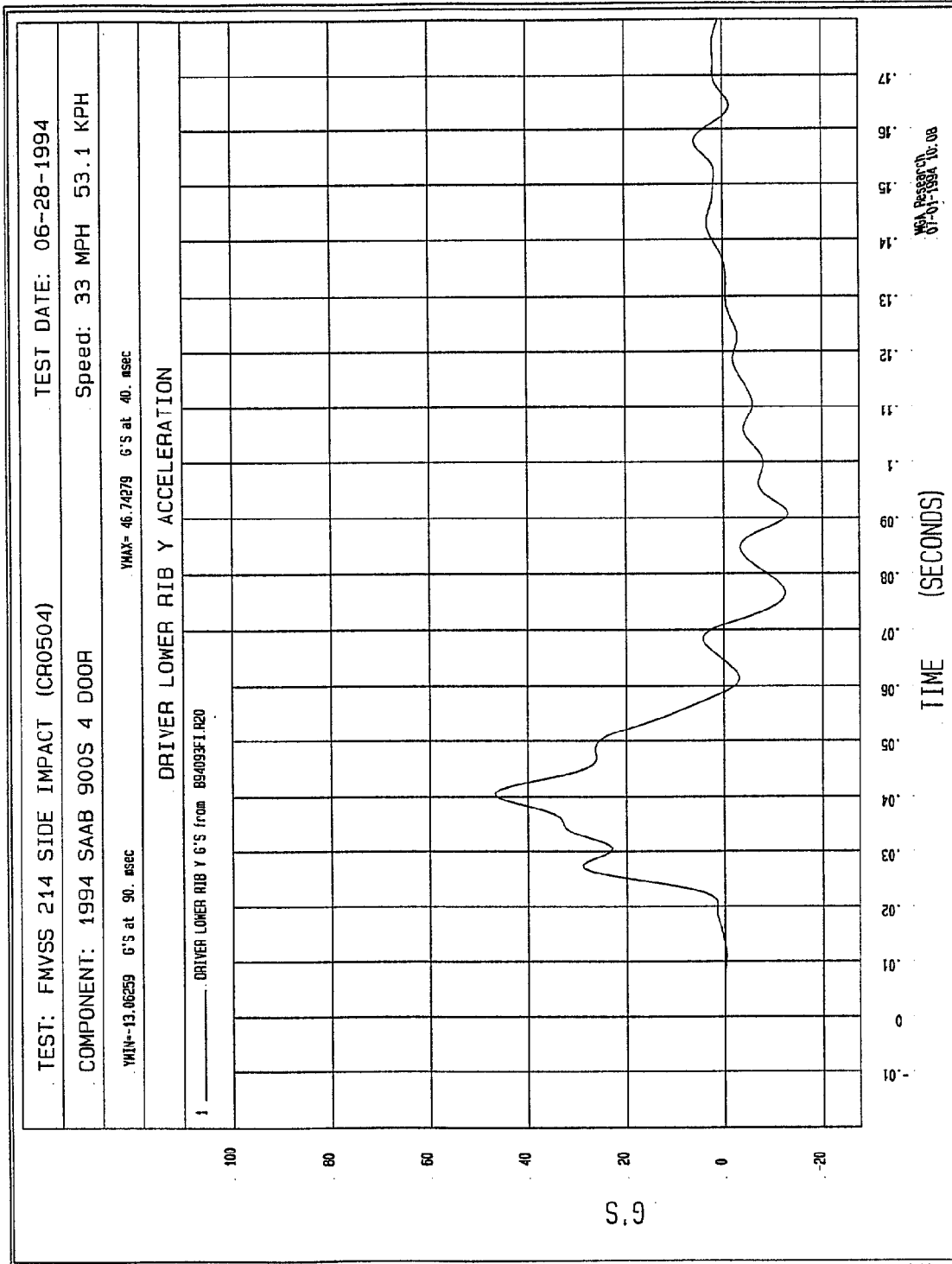


Figure B-81 - Driver Lower Rib Y Acceleration vs. Time

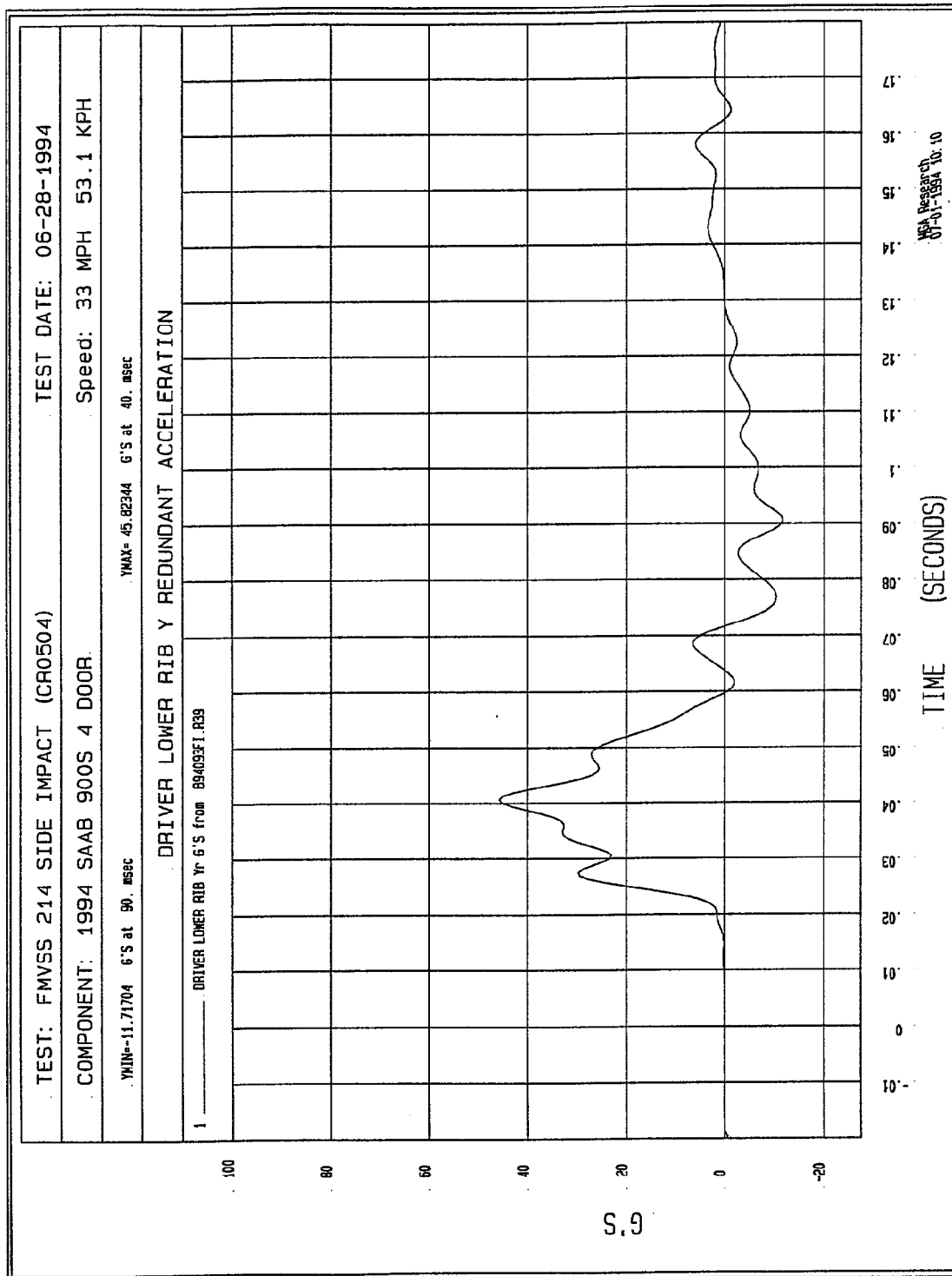


Figure B-82 - Driver Lower Rib Y Redundant Acceleration vs. Time

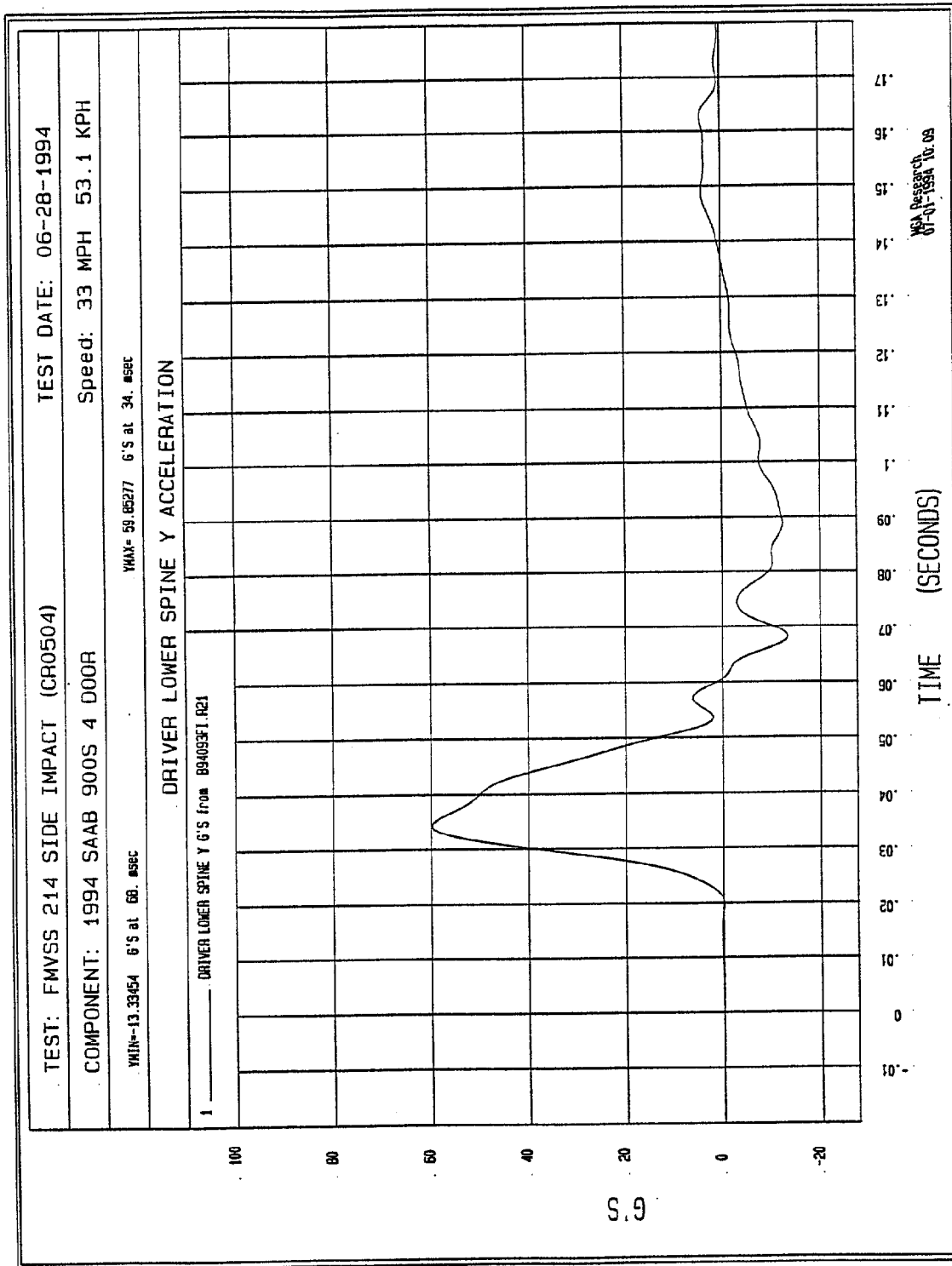


Figure B-83 - Driver Lower Spine Y Acceleration vs. Time

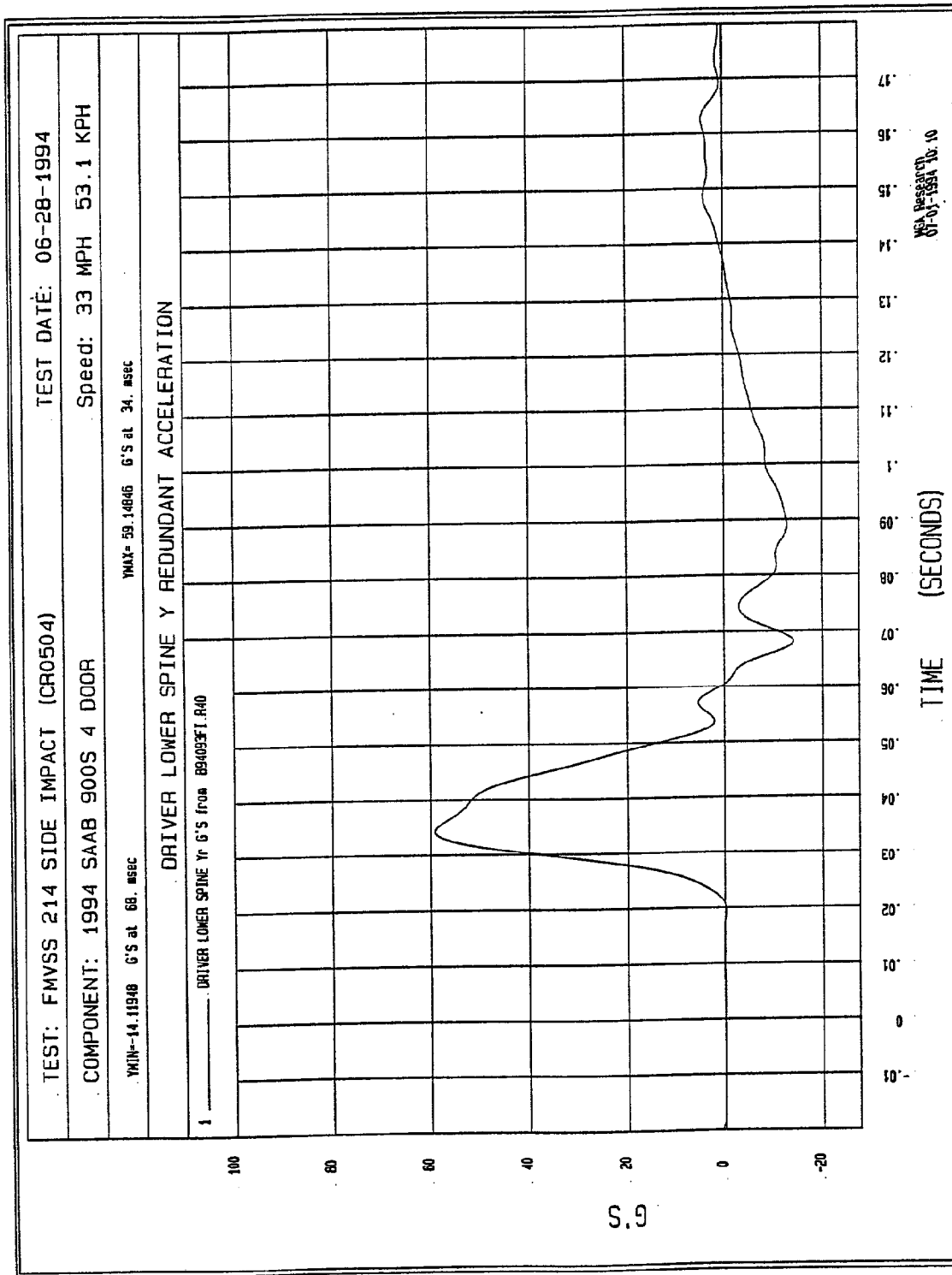


Figure B-84 - Driver Lower Spine Y Redundant Acceleration vs. Time

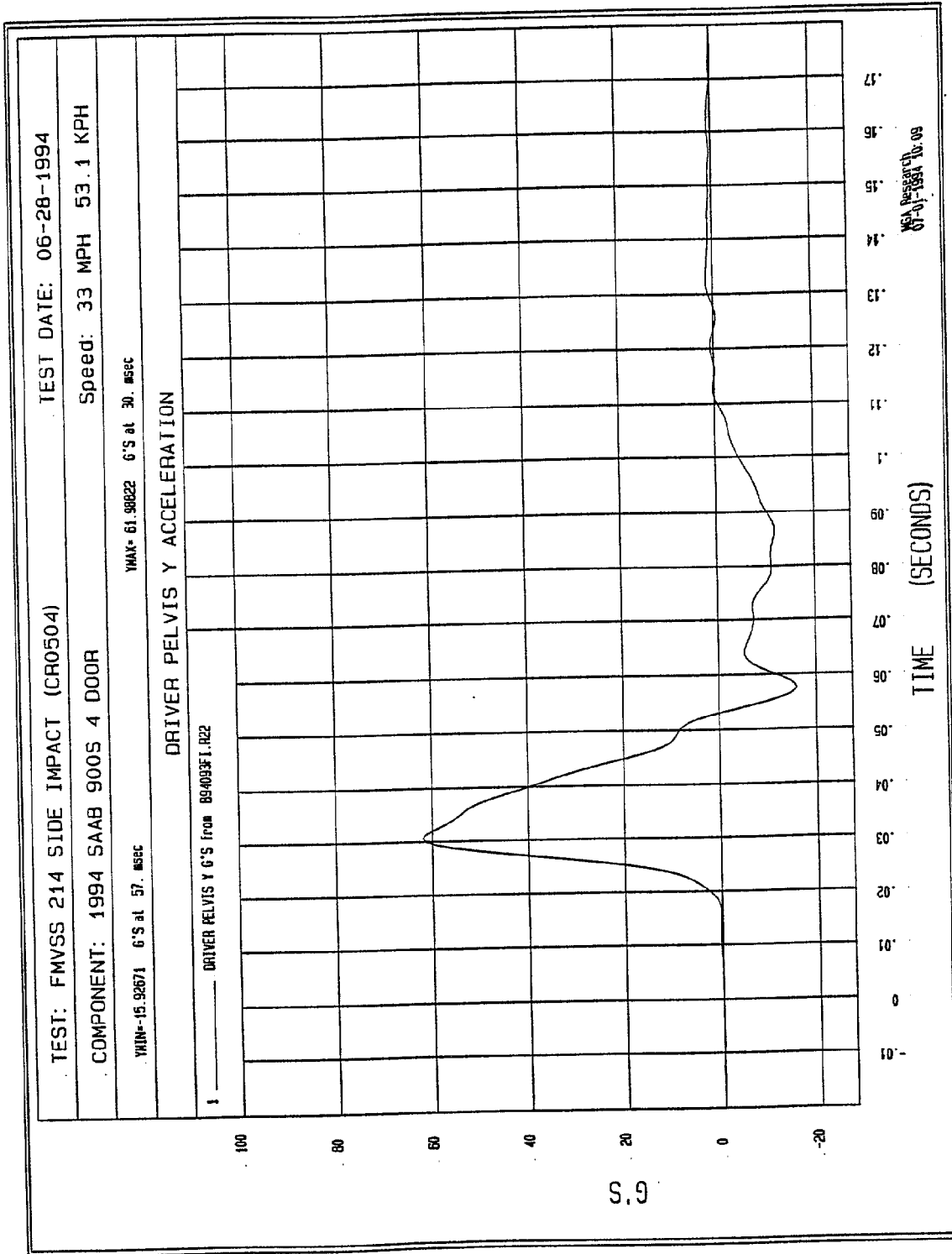


Figure B-85 - Driver Pelvis Y Acceleration vs. Time

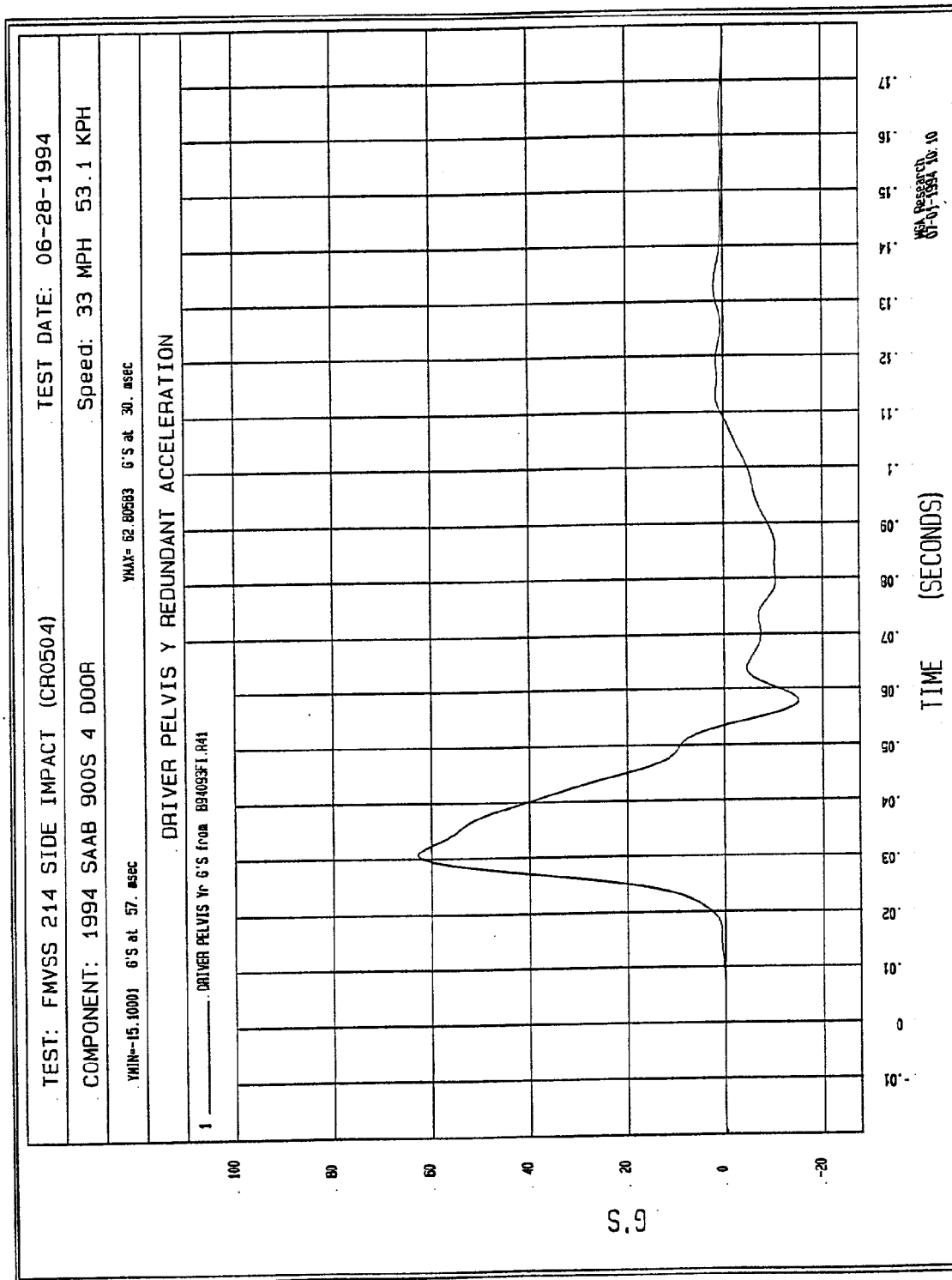


Figure B-86 - Driver Pelvis Y Redundant Acceleration vs. Time

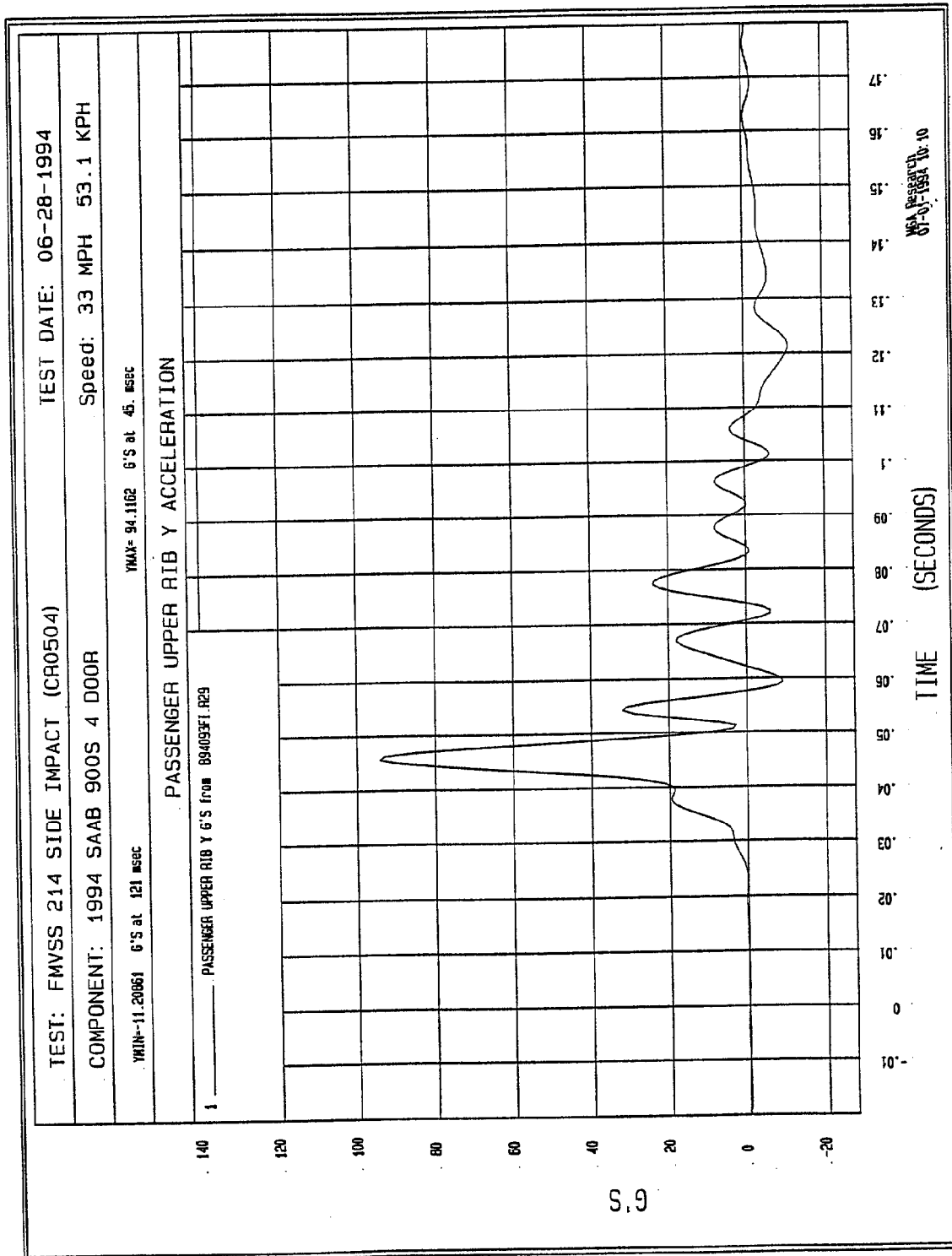


Figure B-87 - Passenger Upper Rib Y Acceleration vs. Time

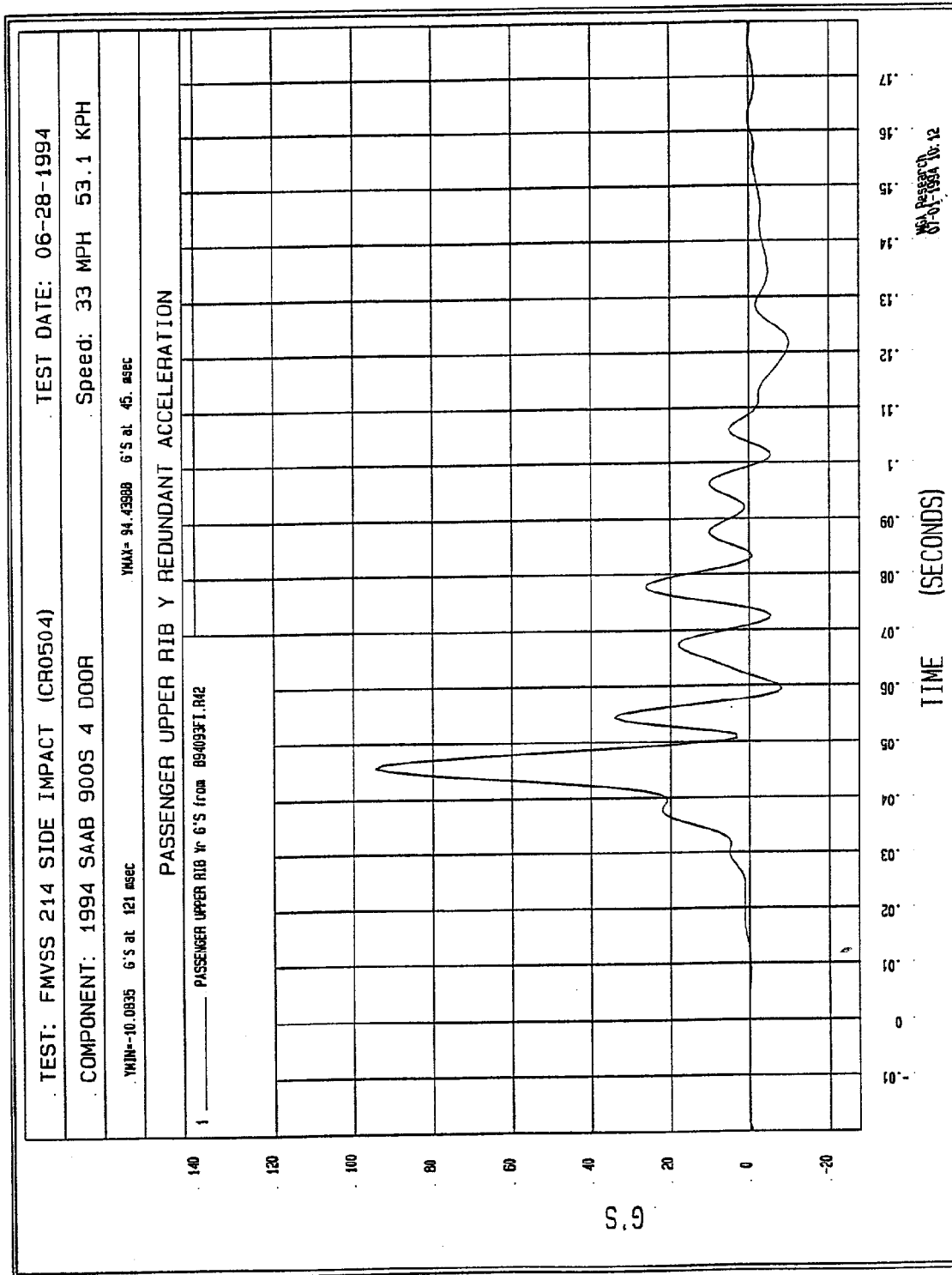


Figure B-88 - Passenger Upper Rib Y Redundant Acceleration vs. Time

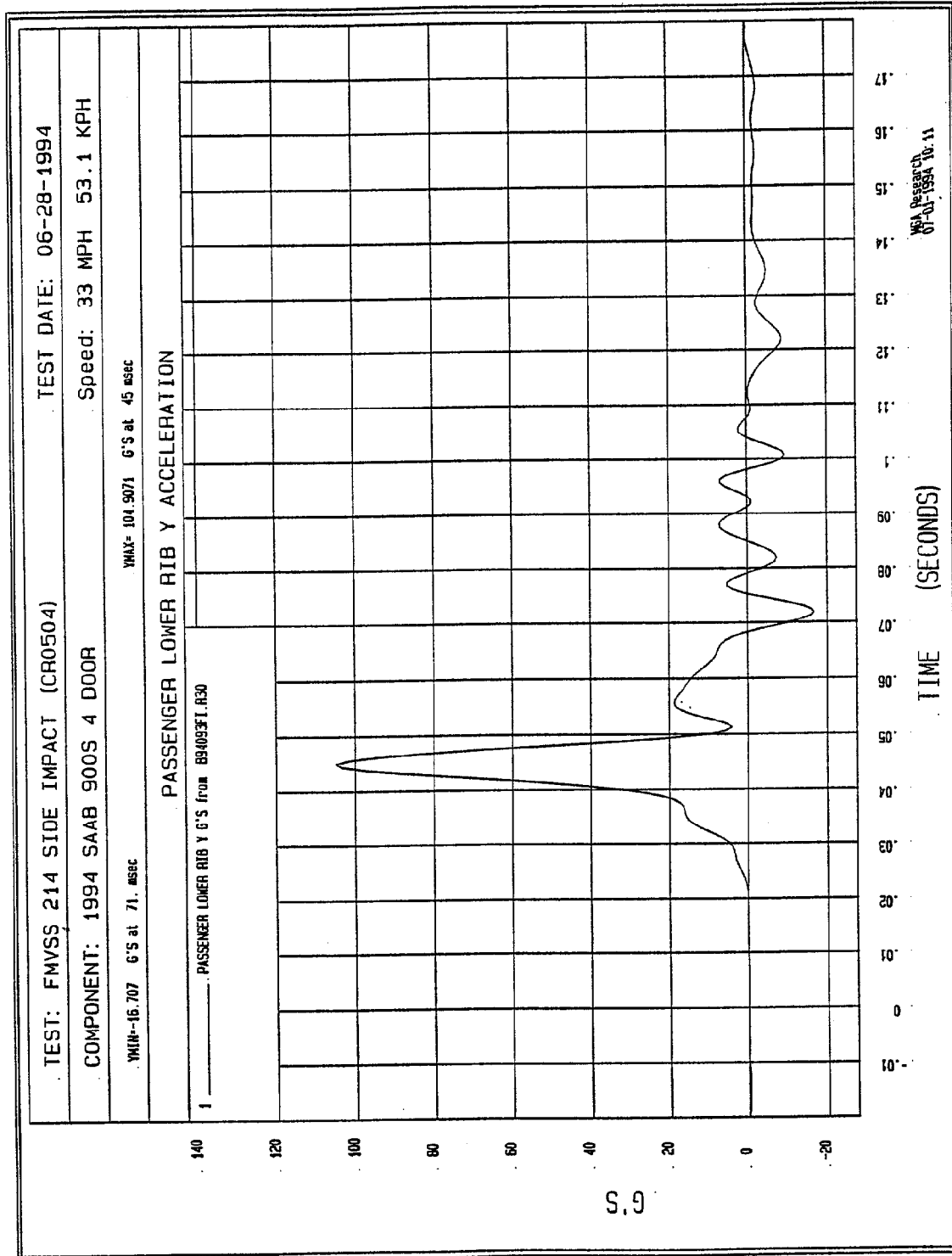


Figure B-89 - Passenger Lower Rib Y Acceleration vs. Time

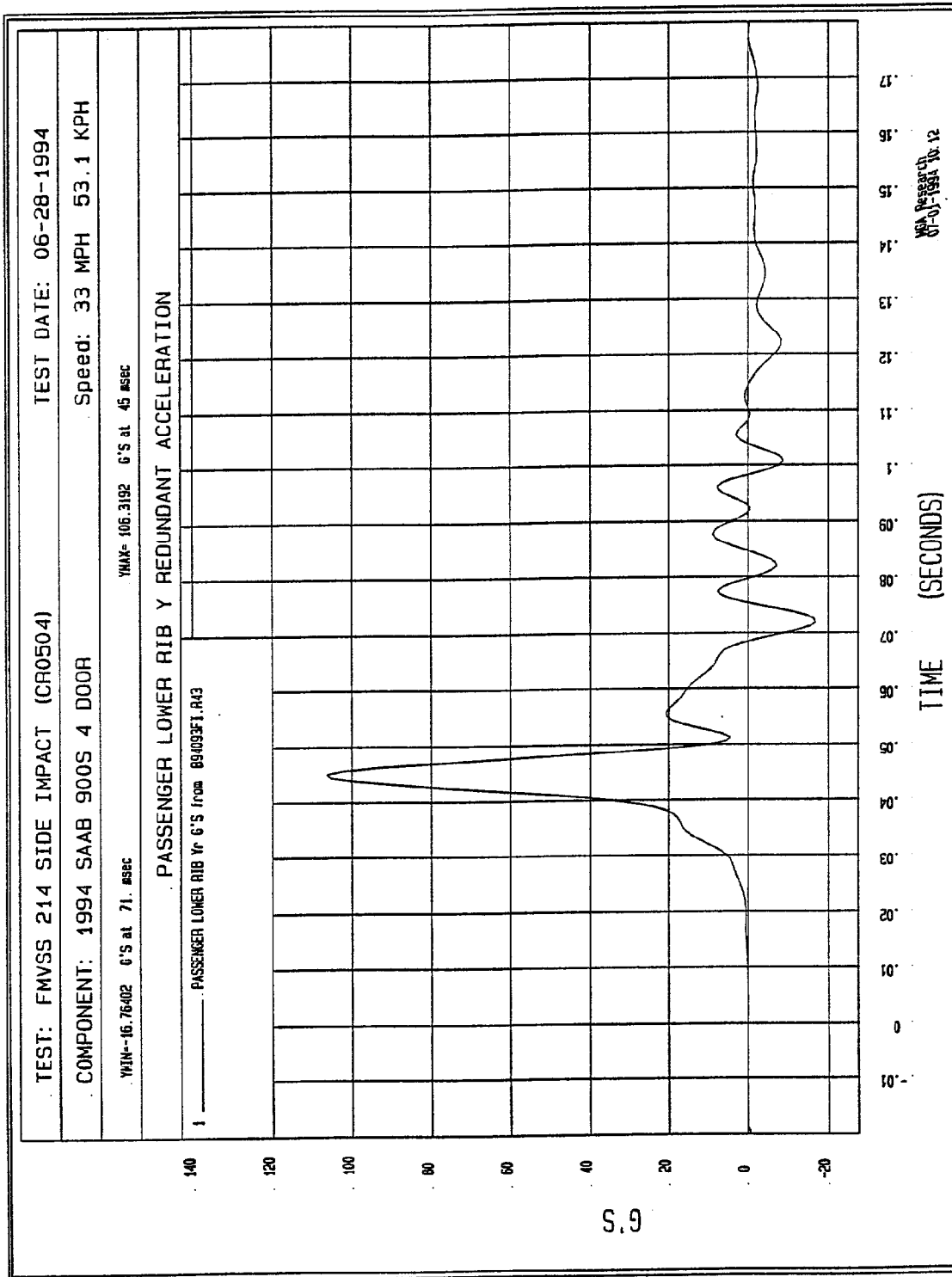


Figure B-90 - Passenger Lower Rib Y Redundant Acceleration vs. Time

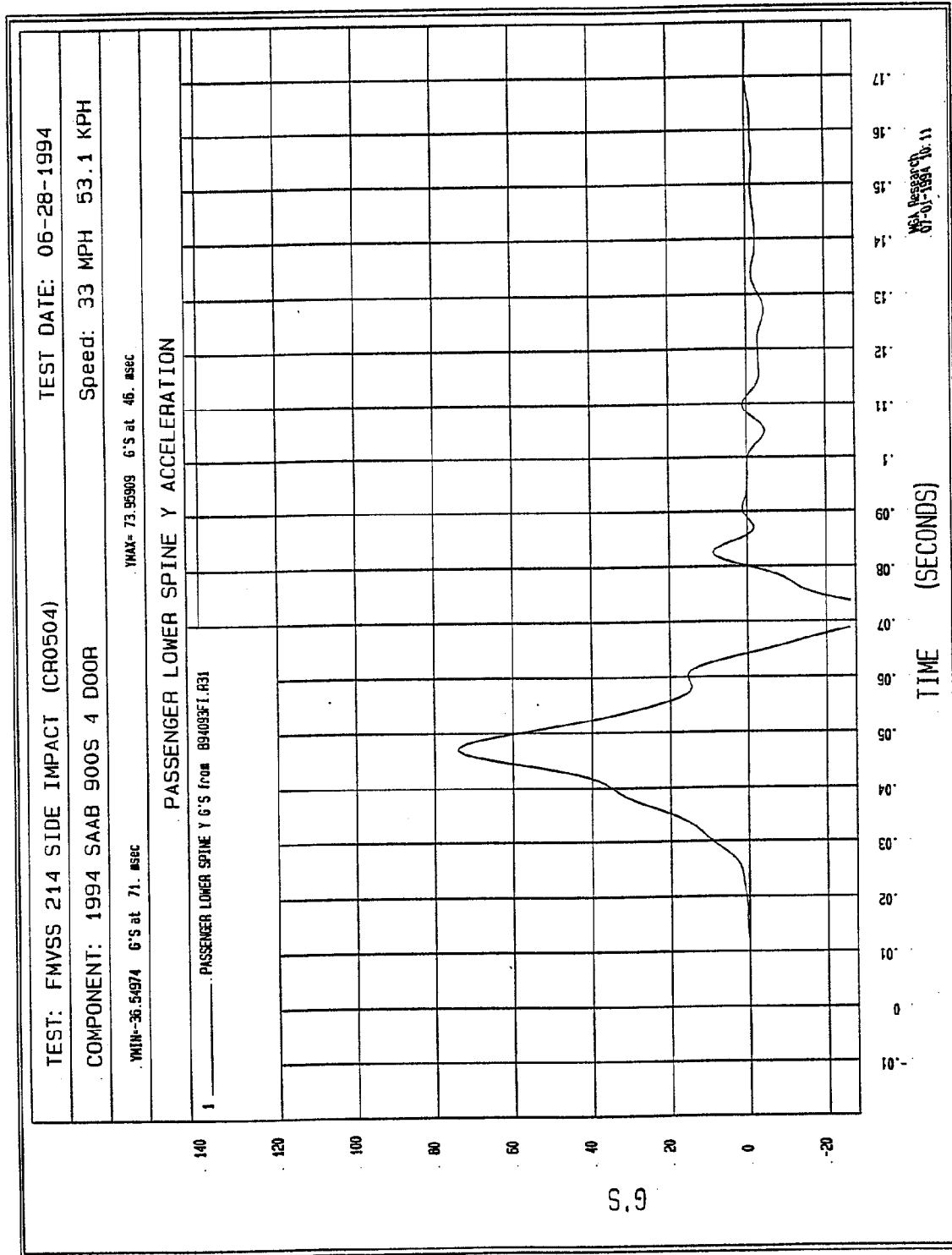


Figure B-91 - Passenger Lower Spine Y Acceleration vs. Time

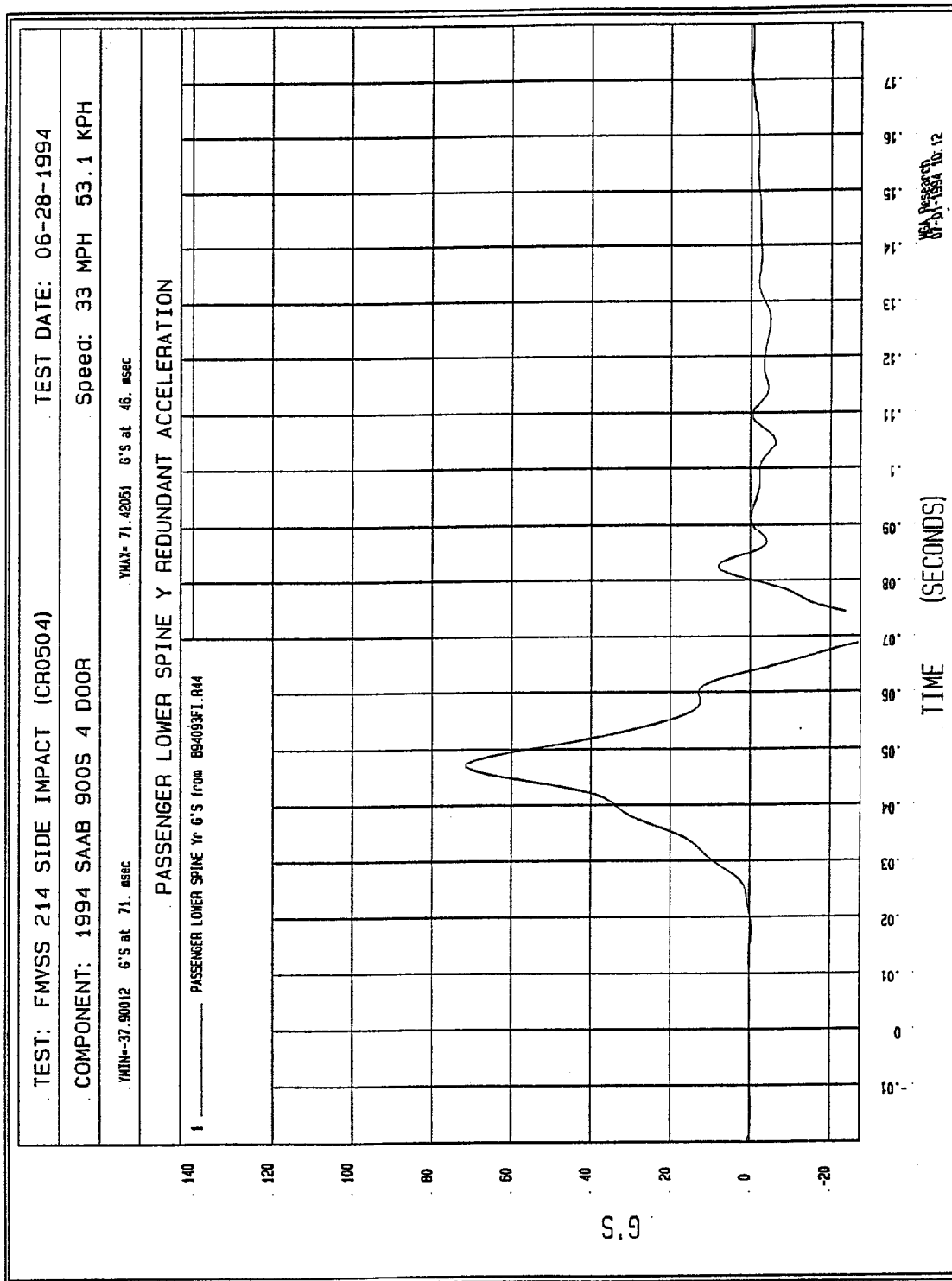


Figure B-92 - Passenger Lower Spine Y Redundant Acceleration vs. Time

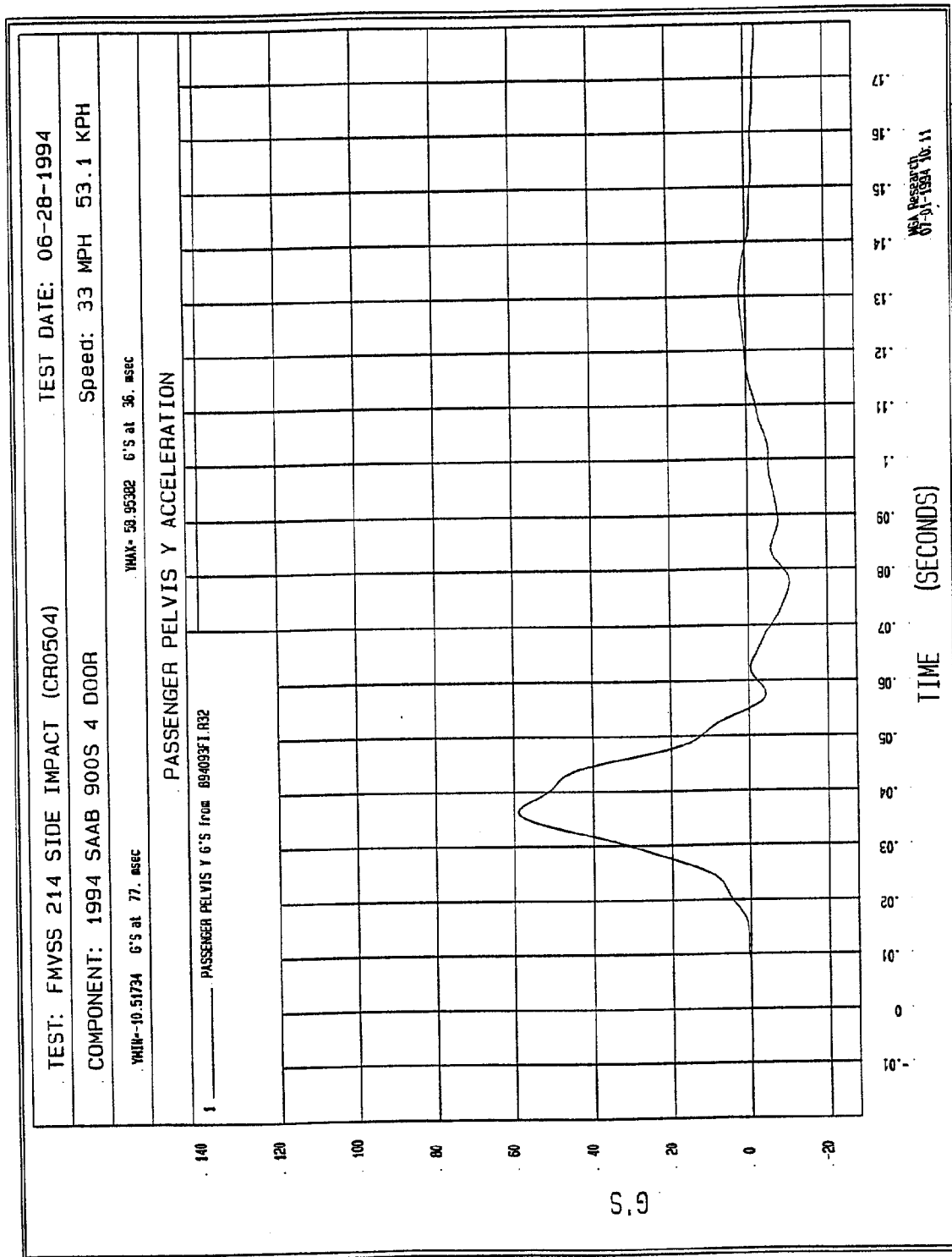


Figure B-93 - Passenger Pelvis Y Acceleration vs. Time

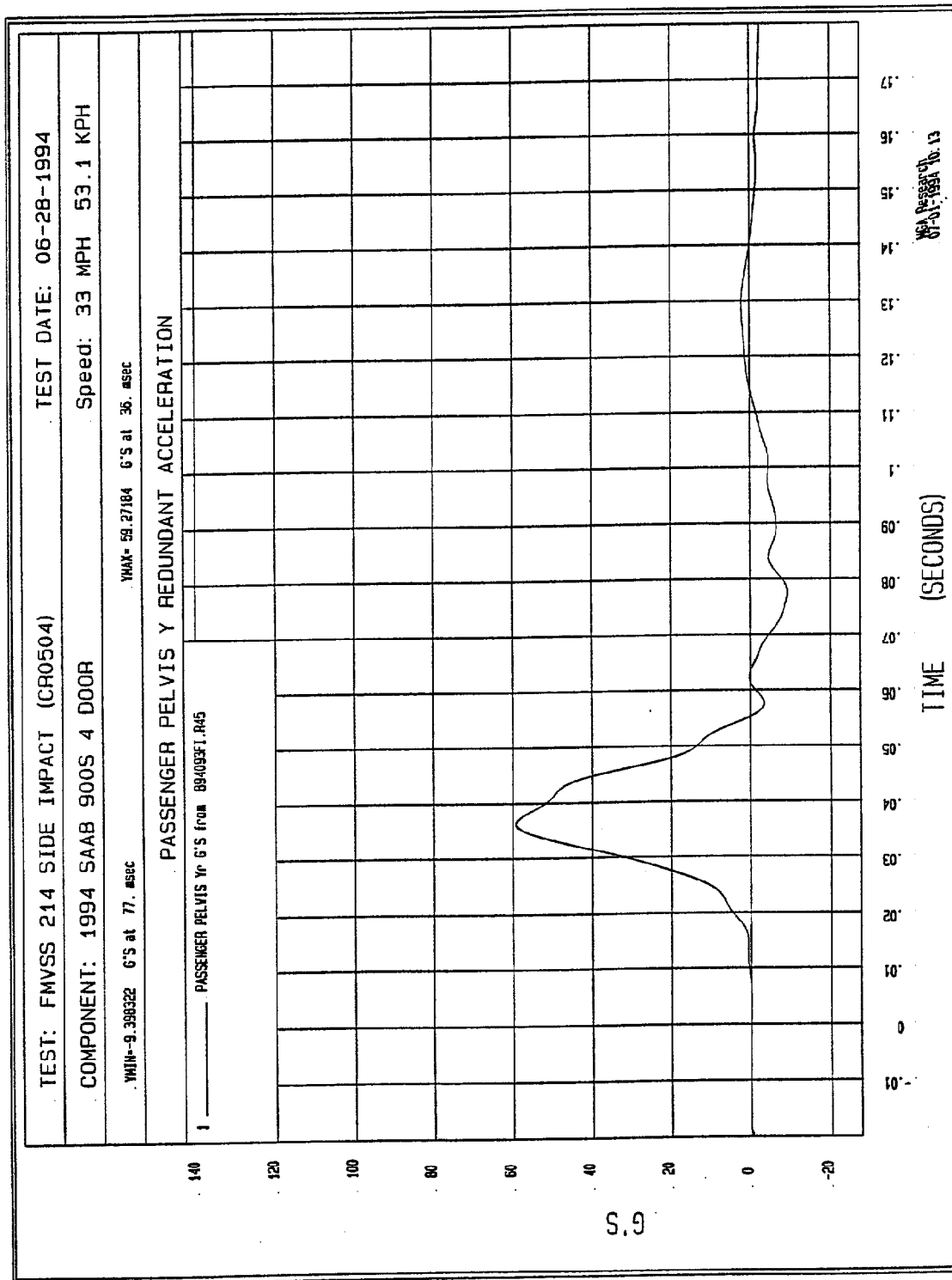


Figure B-94 - Passenger Pelvis Y Redundant Acceleration vs. Time

APPENDIX C
SID CONFIGURATION AND PERFORMANCE VERIFICATION

REPORT NO. MGA-94-DC011

DUMMY PERFORMANCE CALIBRATIONS

FMVSS 214 - SIDE IMPACT TEST

SAAB AUTOMOBILE AB
1994 SAAB 900S 5 DOOR HATCHBACK
NHTSA NO. CR0504

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: June 28, 1994

Report Date: July 7, 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

PRE-TEST CERTIFICATION DATA

Driver Dummy Serial Number: 272

TABLE OF CONTENTS

		<u>Page No.</u>
DUMMY S/N: 272	PRE-TEST CERTIFICATION DATA	1-1
DUMMY S/N: 271	PRE-TEST CERTIFICATION DATA	2-1
DUMMY S/N: 272	POST-TEST CERTIFICATION DATA	3-1
DUMMY S/N: 271	POST-TEST CERTIFICATION DATA	4-1
DUMMY S/N: 272	POST-TEST INSPECTION CHECKLIST	5-1
DUMMY S/N: 271	POST-TEST INSPECTION CHECKLIST	6-1
	VEHICLE AND DUMMY TEMPERATURE	7-1

Calibration Test Results Summary

Dummy Serial Number: 272

Pre-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements
Lumbar Flexion Test:	The lumbar passed all flexion test requirements

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 272

DATE OF VERIFICATION: June 22, 1994

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.5
RH - Rib Height	19.75 - 20.5"	20.2
HP - Hip Pivot Height	3.9" ref.	3.9
RD - Rib From Back Line	9.0" to 9.5"	9.4
KV - Knee Pivot From Back Line	20.1" - 20.7"	20.4
SW - Knee Pivot to Floor	19.3" - 19.9"	19.6
HW - Hip Width	14.0" - 15.4"	15.1

MEASUREMENTS BY: _____



APPROVED BY: _____



MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: June 22, 1994

DUMMY NUMBER: 272

TEST NUMBER: D94242

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	69°
RELATIVE HUMIDITY	10 - 70%	50%
PROBE SPEED	13.8 - 14.2 fps	13.9
UPPER RIB	37 - 46 g's	40
LOWER RIB	37 - 46 g's	38
LOWER SPINE	15 - 22 g's	19

TEST MEETS SPECIFICATIONS

TECHNICIAN

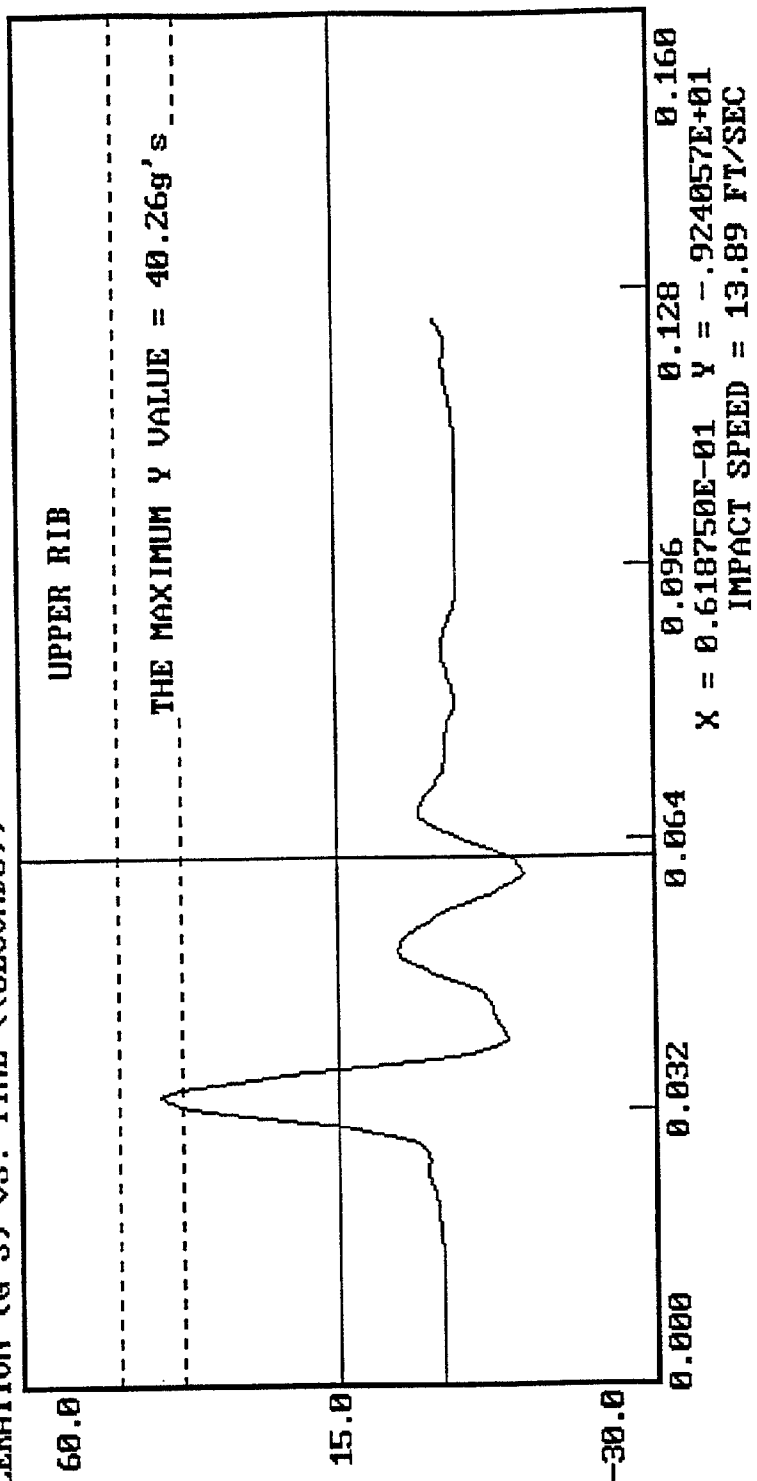
A. Chlum

APPROVED BY

J. Robbins

06-23-1994 10:20

DUMMY CALIBRATION - THORAX IMPACT
DUMMY # 272
ACCELERATION (G'S) VS. TIME ((SECONDS))

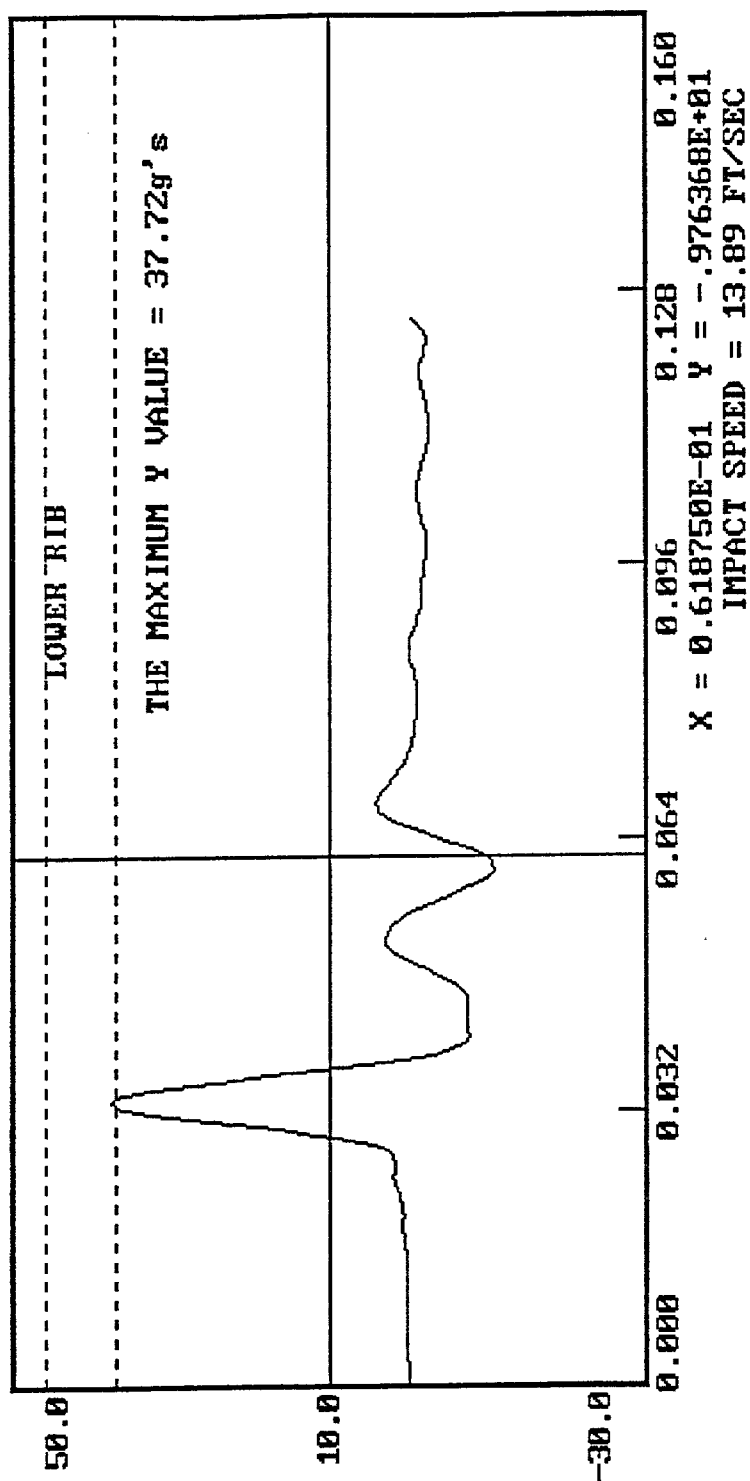


06-23-1994 10:20

DUMMY CALIBRATION - THORAX IMPACT

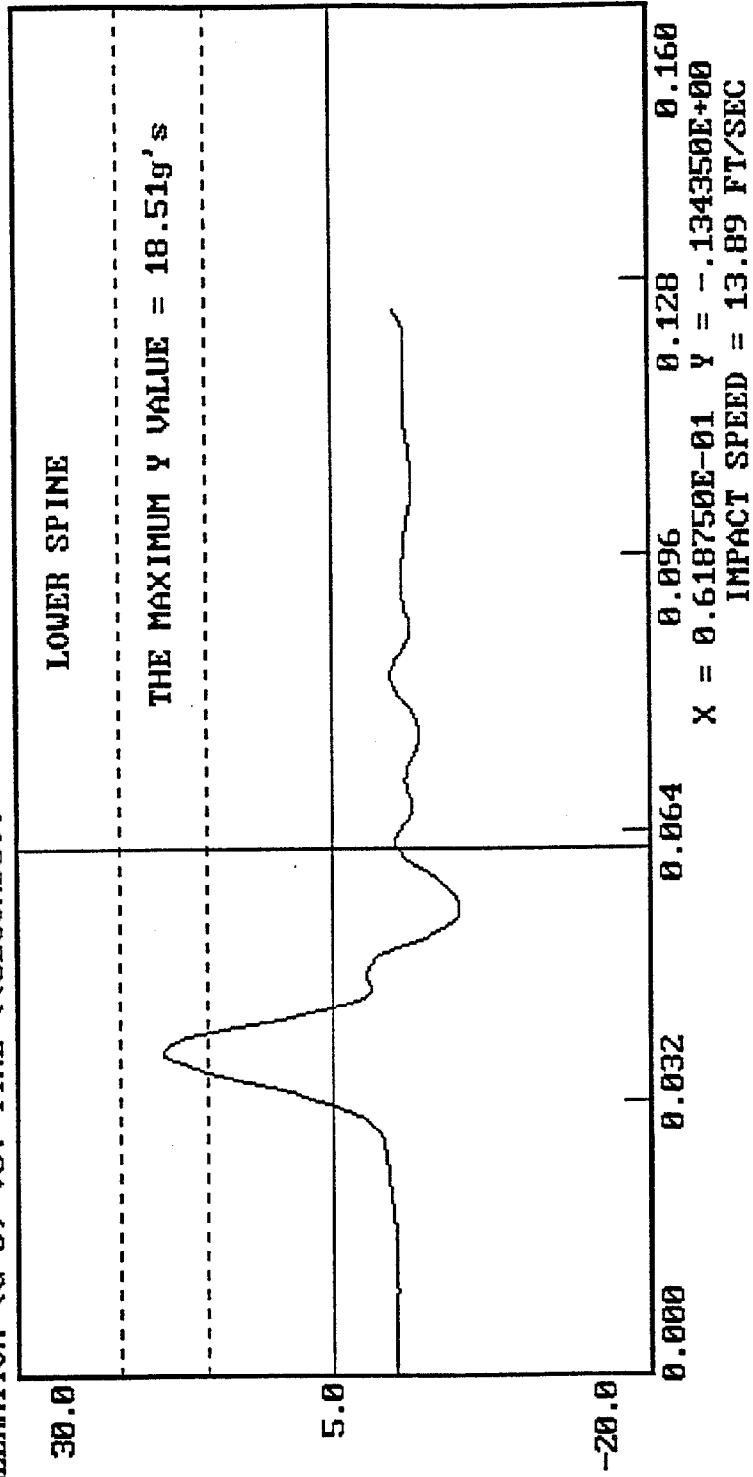
DUMMY # 272

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



06-23-1994 10:20

DUMMY CALIBRATION - THORAX IMPACT
DUMMY # 272
ACCELERATION (G'S) VS. TIME ((SECONDS))



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: June 22, 1994

DUMMY NUMBER: 272

TEST NUMBER: D94243

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	50%
PROBE SPEED	13.8 - 14.2 fps	13.8
PELVIS ACCELERATION	40 - 60 g's	51

TEST MEETS SPECIFICATIONS

TECHNICIAN

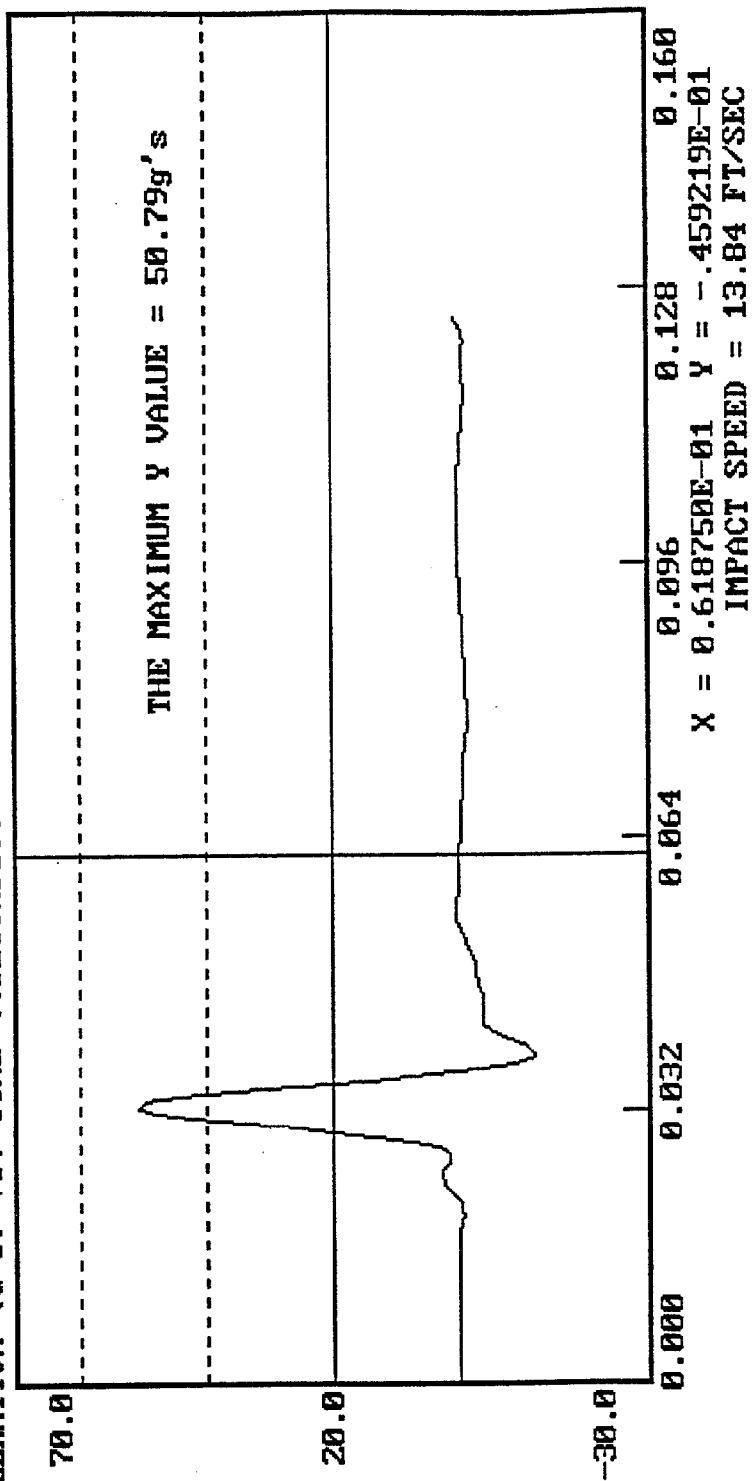
APPROVED BY

06-22-1994 15:13

DUMMY CALIBRATION - PELVIS IMPACT

DUMMY # 272

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



MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

DATE: June 24, 1994

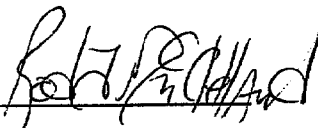
DUMMY NUMBER: 272

TEST NUMBER: D94924

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	58%
FORCE @ 0.5 in	23.3 - 36.5 lbs	33.7
FORCE @ 0.75 in	36.7 - 49.8 lbs	44.9
FORCE @ 1.0 in	50 - 63 lbs	58
FORCE @ 1.3 in	73 - 88 lbs	80

TEST MEETS SPECIFICATIONS

TECHNICIAN _____



APPROVED BY _____

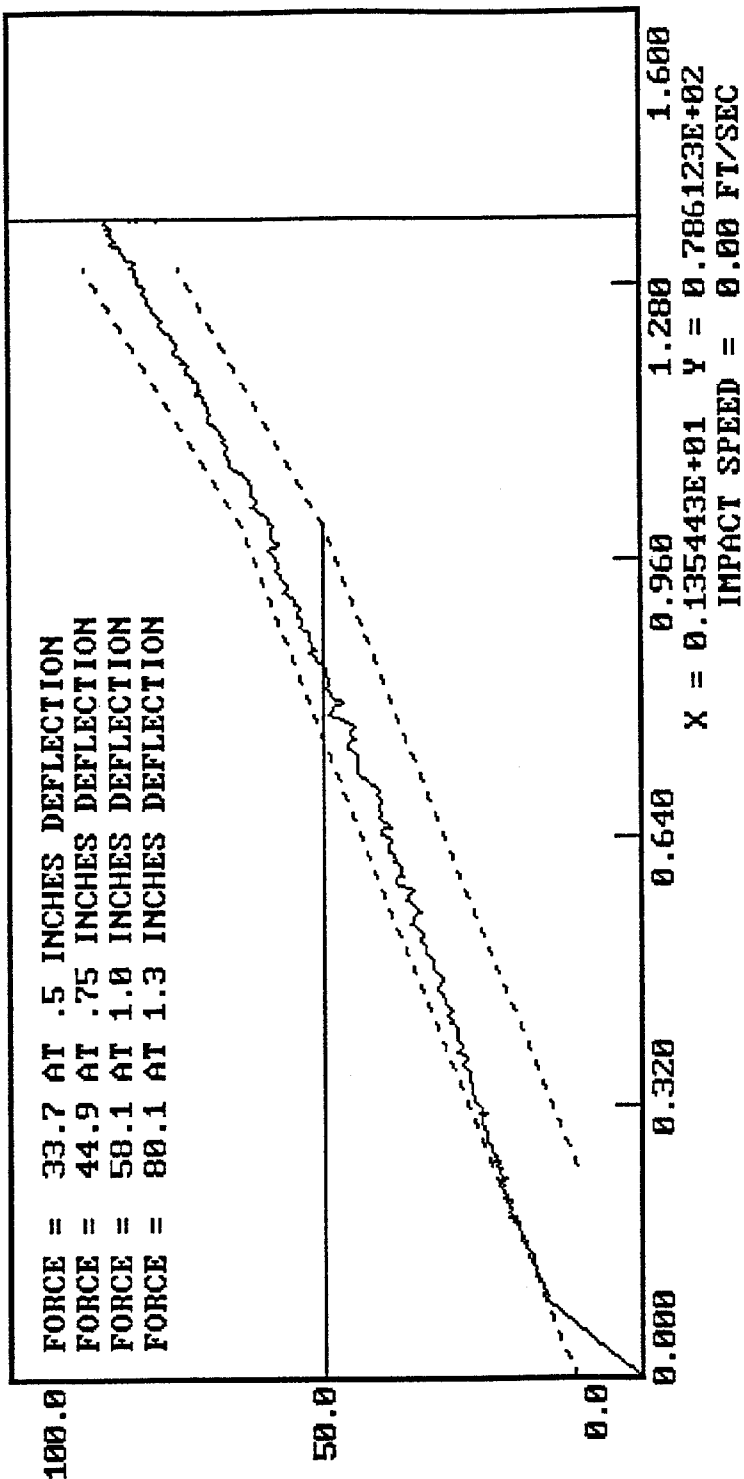


06-24-1994 16:11

DUMMY CALIBRATION - ABDOMEN COMPRESSION

DUMMY # 272

ABDOMEN FORCE () VS. ABDOMEN DISPLACEMENT (INCHES)



MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: June 27, 1994

DUMMY NUMBER: 272

TEST NUMBER: D94245

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	58%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	23
FORCE @ 30°	34 - 46 lbs	34
FORCE @ 40°	46 - 58 lbs	48
RETURN ANGLE	12° maximum	6°

TEST MEETS SPECIFICATIONS

TECHNICIAN

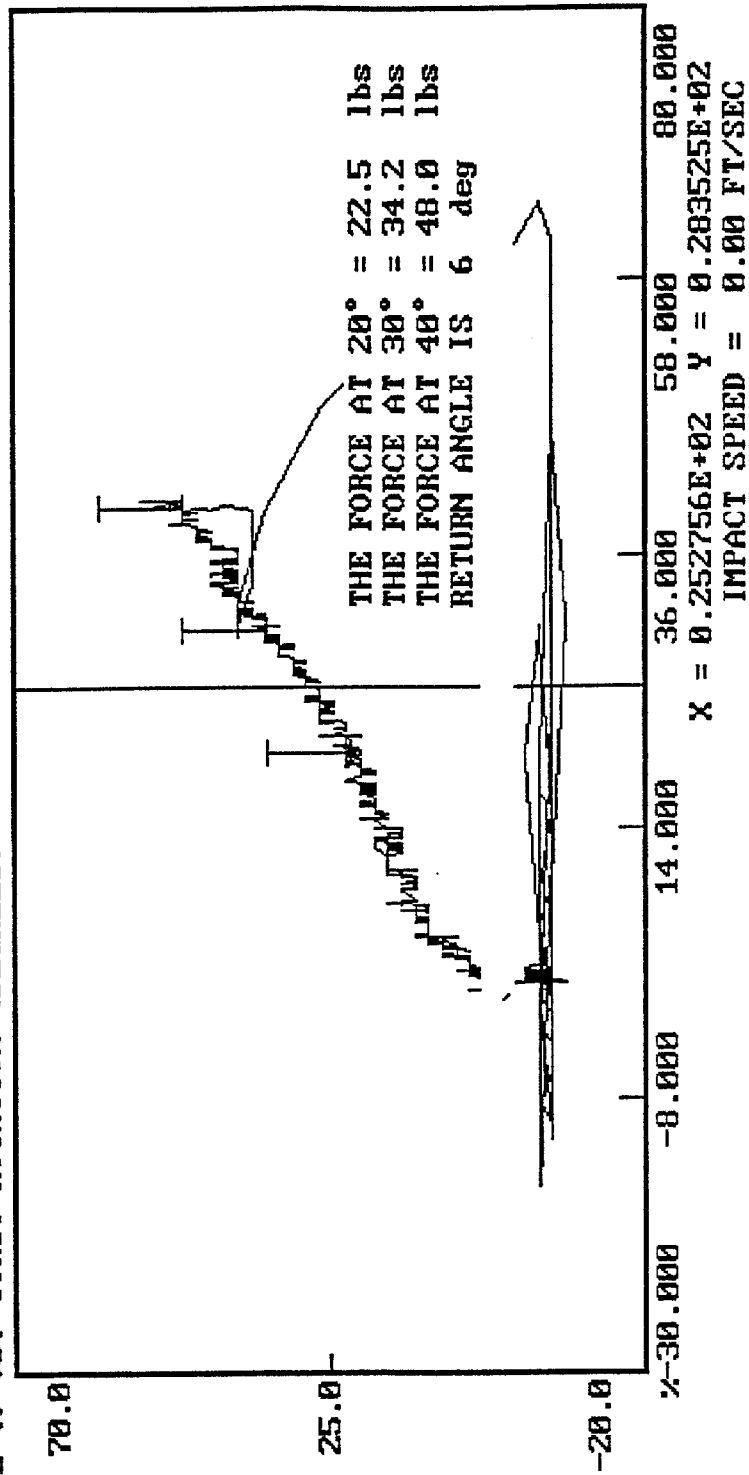
He Chen

APPROVED BY

J. Robbins

06-27-1994 09:46

DUMMY CALIBRATION - LUMBAR FLEXION
DUMMY # 272
FORCE () US. TORSO ROTATION (DEGREES)



PRE-TEST CERTIFICATION DATA

Passenger Dummy Serial Number: 271

Calibration Test Results Summary

Passenger Serial Number: 271

Pre-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements
Lumbar Flexion Test:	The lumbar passed all flexion test requirements

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 271

DATE OF VERIFICATION: June 27, 1994

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.4
RH - Rib Height	19.75 - 20.5"	19.9
HP - Hip Pivot Height	3.9" ref.	3.9
RD - Rib From Back Line	9.0" to 9.5"	9.5
KV - Knee Pivot From Back Line	20.1" - 20.7"	20.4
SW - Knee Pivot to Floor	19.3" - 19.9"	19.4
HW - Hip Width	14.0" - 15.4"	14.8

MEASUREMENTS BY: _____

Robert E. Cella

APPROVED BY: _____

J. R. Williams

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: June 27, 1994

DUMMY NUMBER: 271

TEST NUMBER: D94312

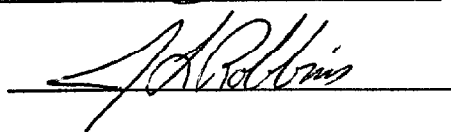
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	72°
RELATIVE HUMIDITY	10 - 70%	50%
PROBE SPEED	13.8 - 14.2 fps	14
UPPER RIB	37 - 46 g's	38
LOWER RIB	37 - 46 g's	38
LOWER SPINE	15 - 22 g's	19

TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY

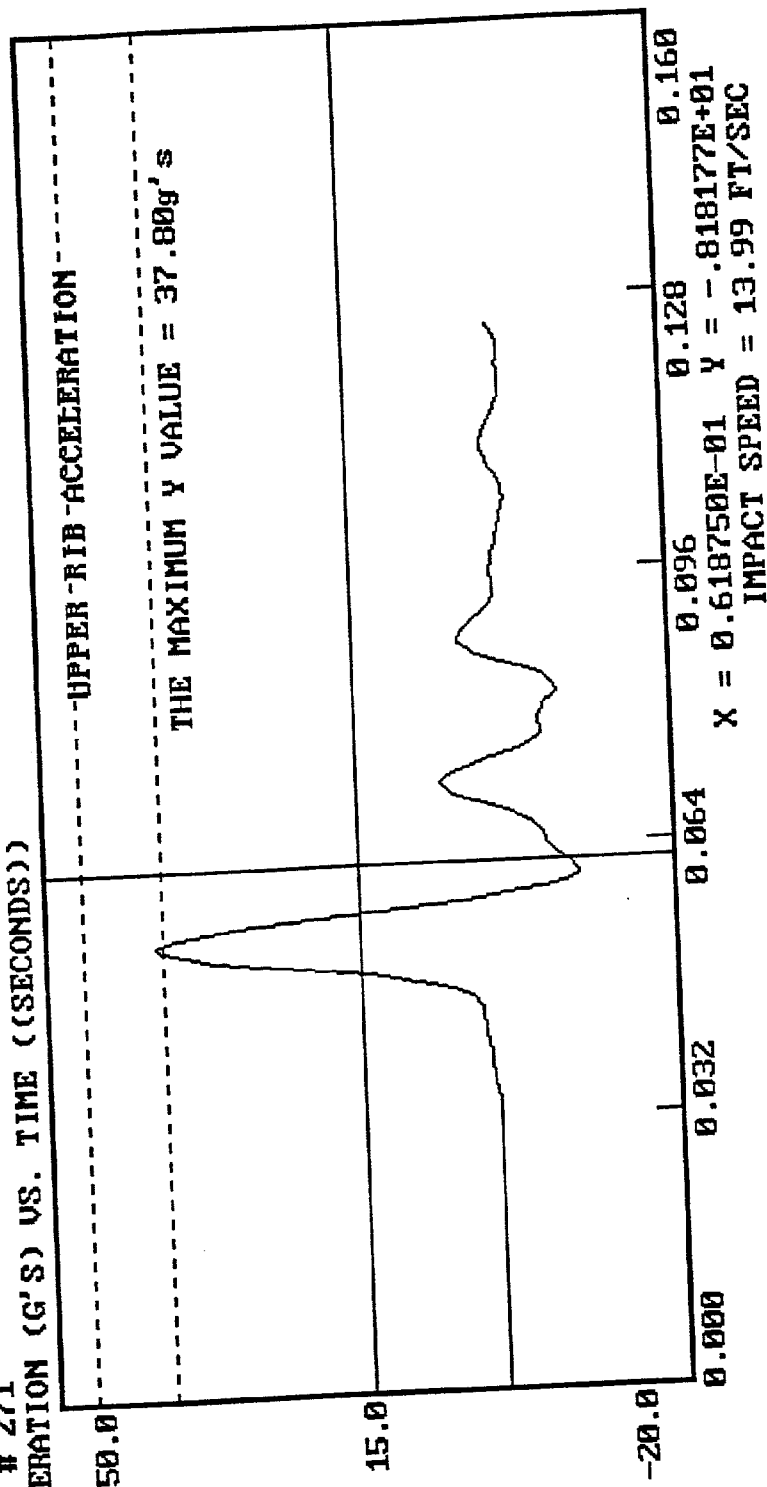


06-27-1994 14:01

DUMMY CALIBRATION - THORAX IMPACT

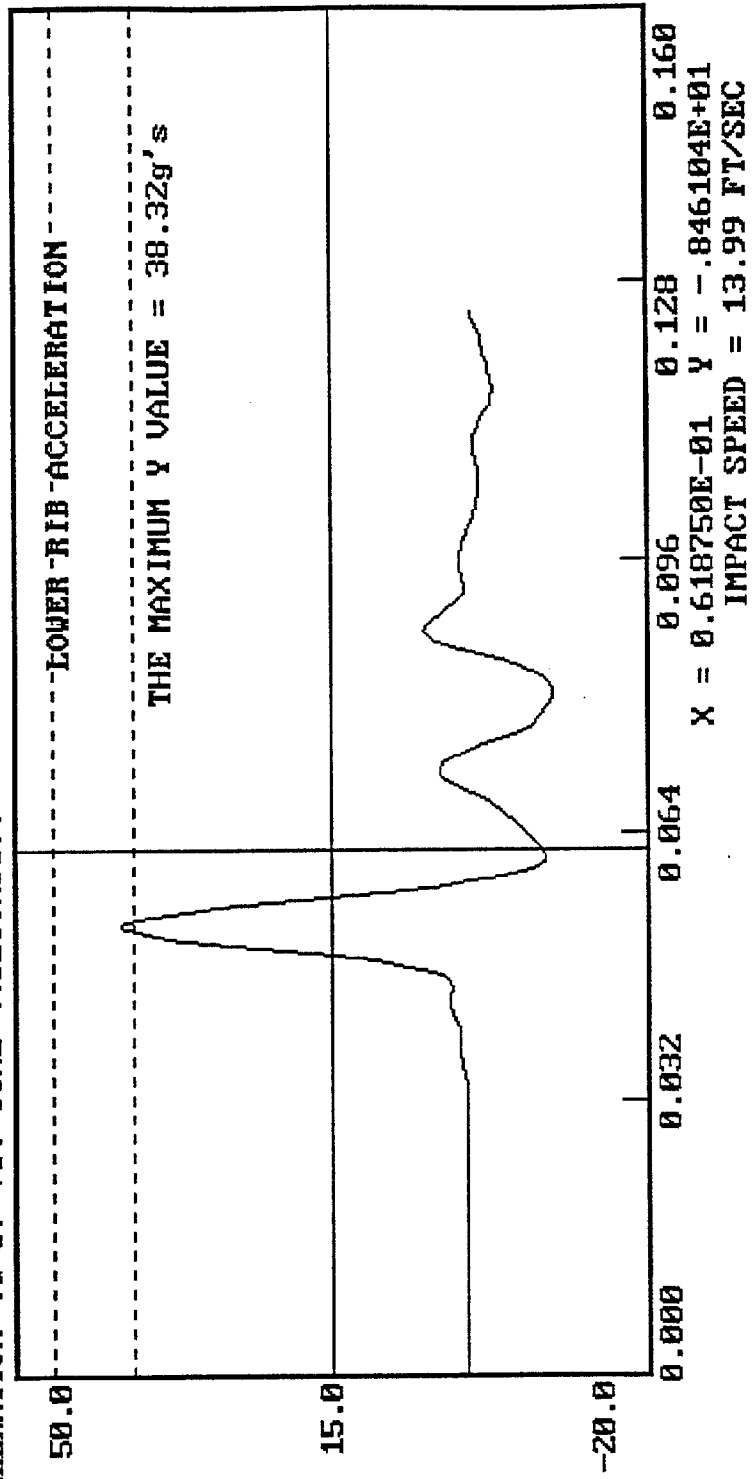
DUMMY # 271

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



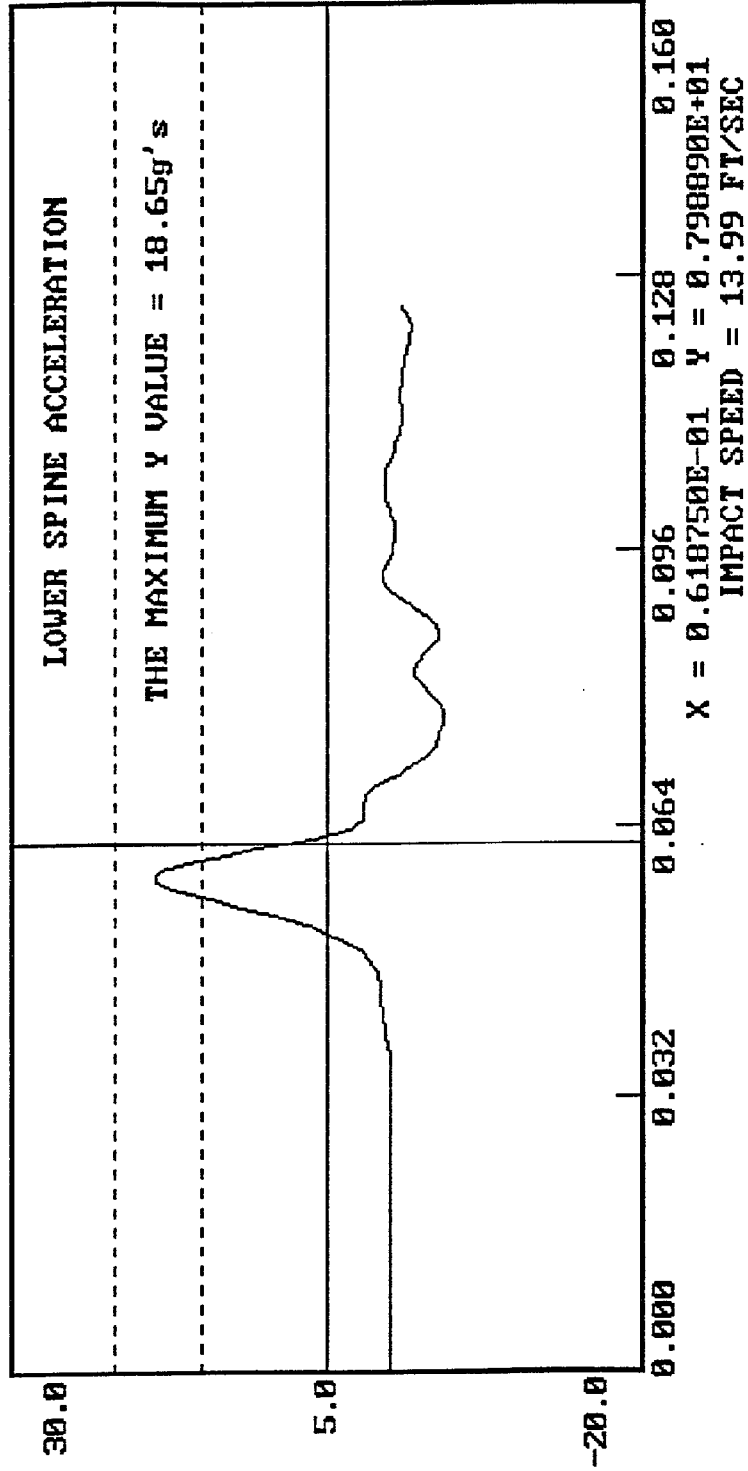
06-27-1994 14:01

DUMMY CALIBRATION - THORAX IMPACT
DUMMY # 271
ACCELERATION (G'S) VS. TIME ((SECONDS))



06-27-1994 14:01

DUMMY CALIBRATION - THORAX IMPACT
DUMMY # 271
ACCELERATION (G'S) VS. TIME ((SECONDS))



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

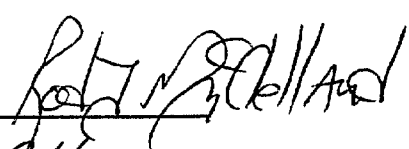
DATE: June 27, 1994

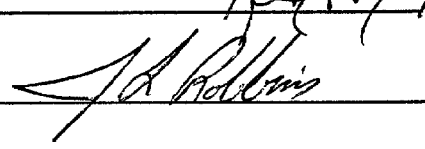
DUMMY NUMBER: 271

TEST NUMBER: D94313

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	72°
RELATIVE HUMIDITY	10 - 70%	50%
PROBE SPEED	13.8 - 14.2 fps	13.9
PELVIS ACCELERATION	40 - 60 g's	59

TEST MEETS SPECIFICATIONS

TECHNICIAN 

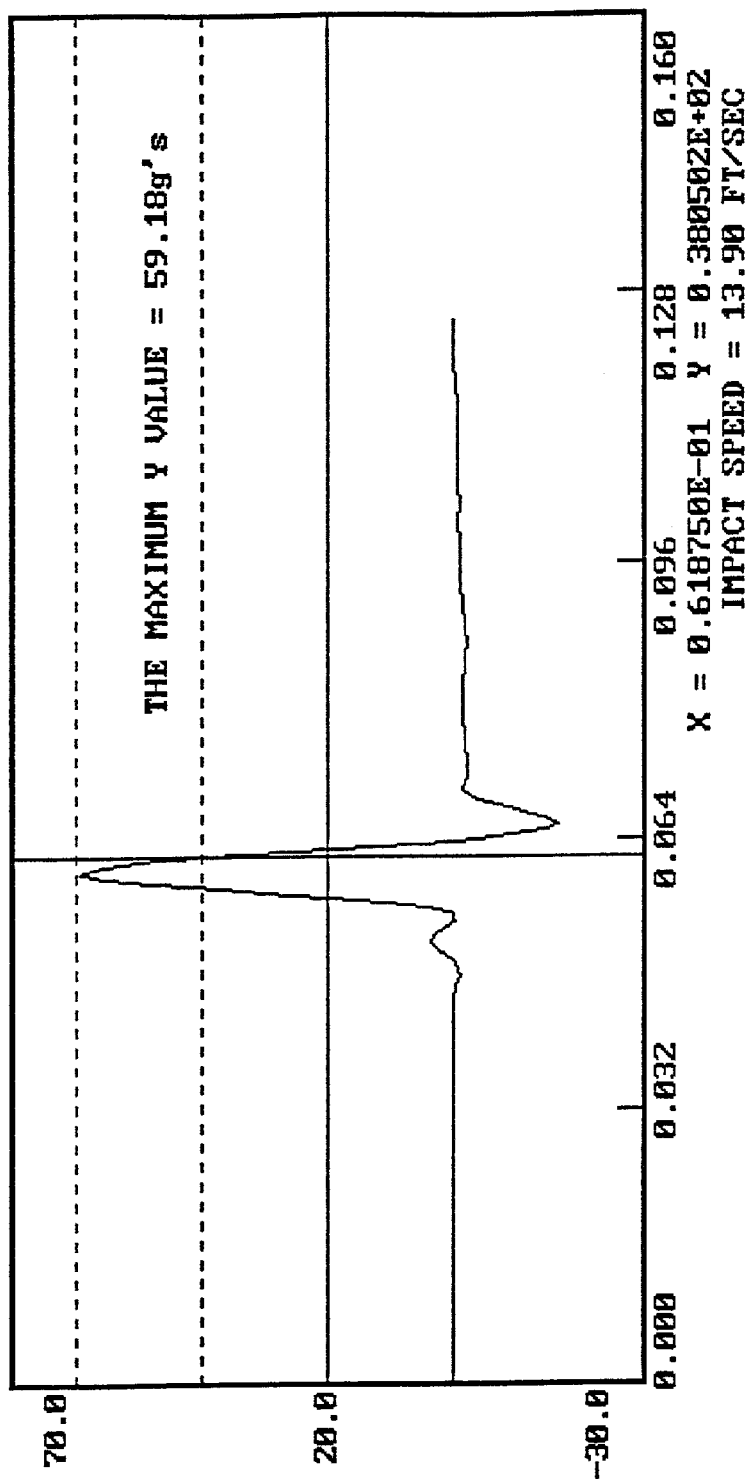
APPROVED BY 

06-27-1994 15:29

DUMMY CALIBRATION - PELVIS IMPACT

DUMMY # 271

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



MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

DATE: June 27, 1994

DUMMY NUMBER: 271

TEST NUMBER: D94314

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	58%
FORCE @ 0.5 in	23.3 - 36.5 lbs	27.8
FORCE @ 0.75 in	36.7 - 49.8 lbs	42.8
FORCE @ 1.0 in	50 - 63 lbs	56
FORCE @ 1.3 in	73 - 88 lbs	83

TEST MEETS SPECIFICATIONS

TECHNICIAN 

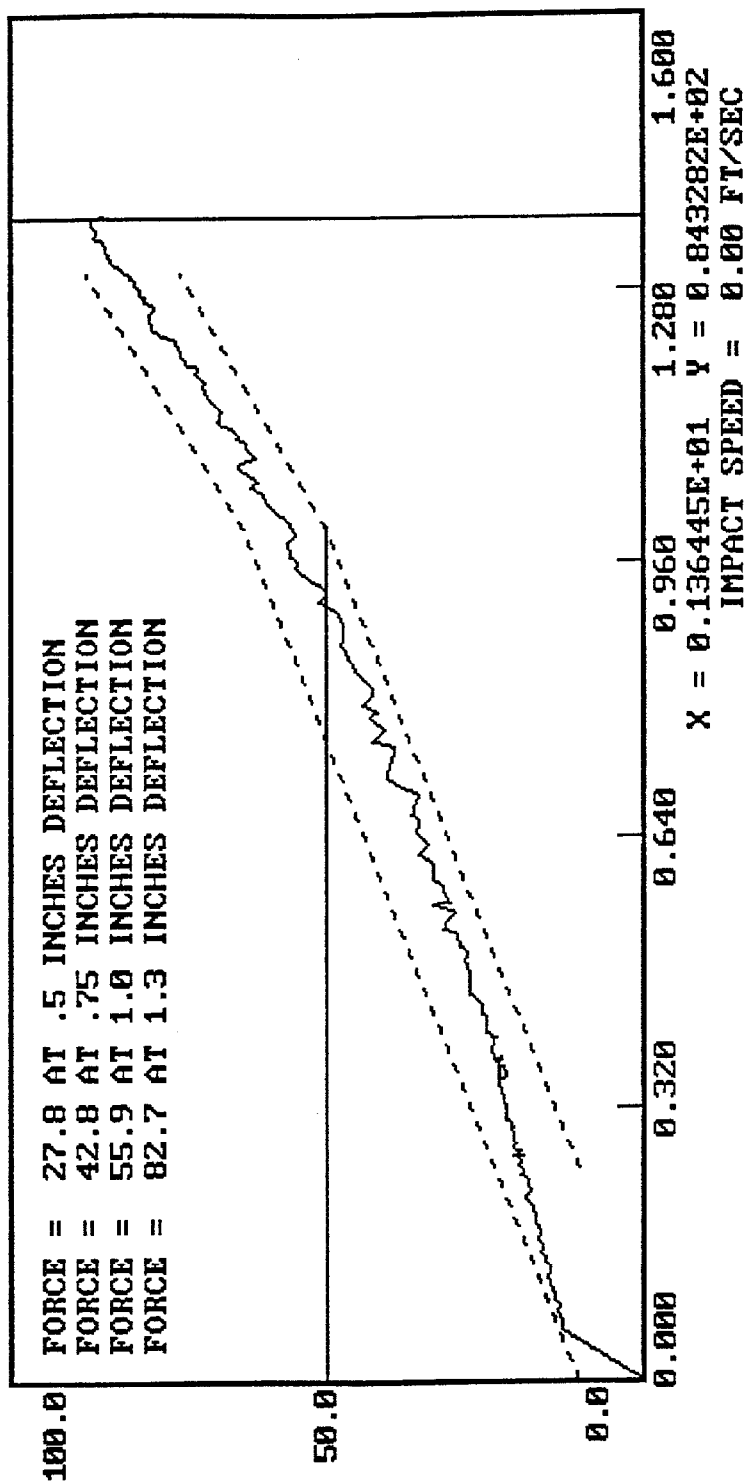
APPROVED BY 

06-27-1994 10:32

DUMMY CALIBRATION - ABDOMEN COMPRESSION

DUMMY # 271

ABDOMEN FORCE () VS. ABDOMEN DISPLACEMENT (INCHES)



MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: June 27, 1994

DUMMY NUMBER: 271

TEST NUMBER: D94315

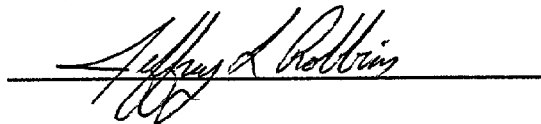
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	58%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	31
FORCE @ 30°	34 - 46 lbs	44
FORCE @ 40°	46 - 58 lbs	52
RETURN ANGLE	12° maximum	3°

TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY

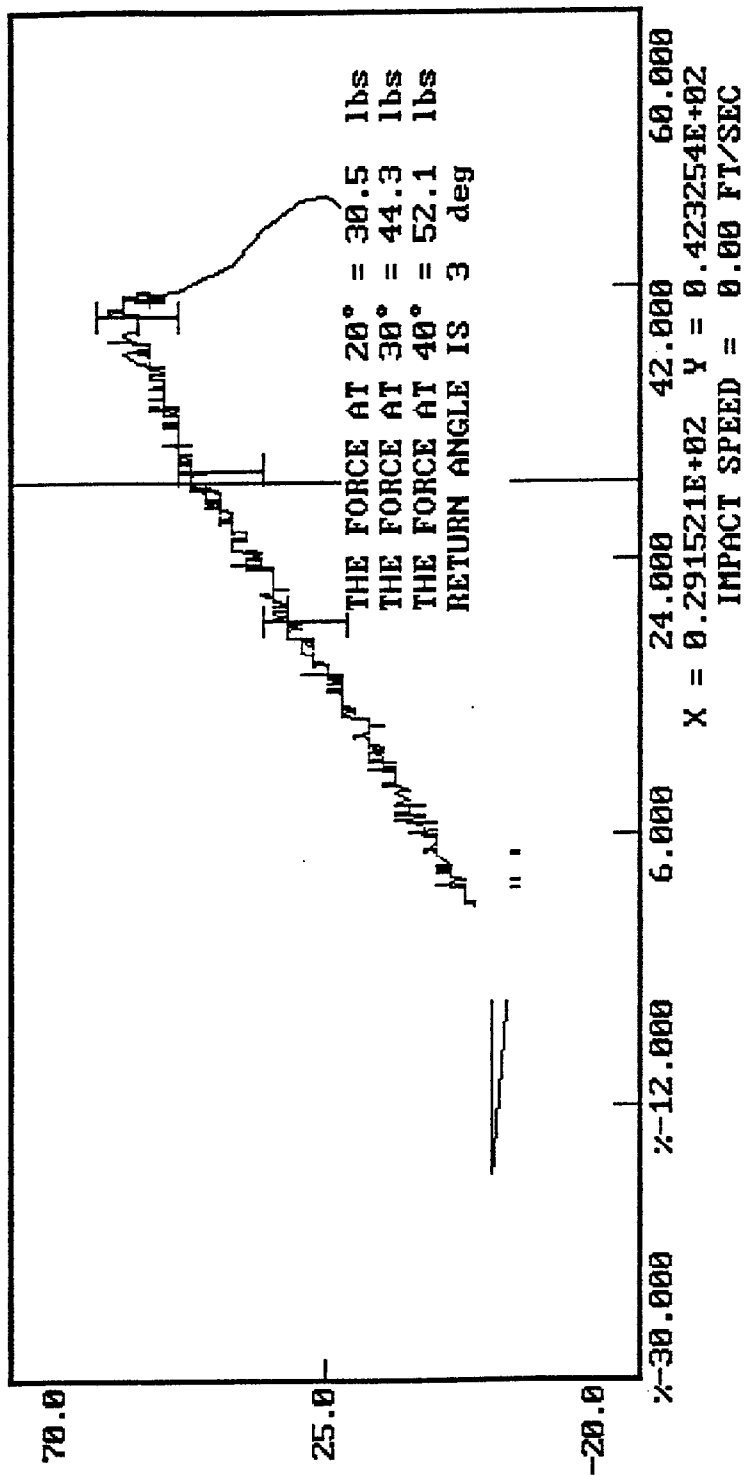


DUMMY CALIBRATION -- LUMBAR FLEXION

DUMMY # 271

FORCE () VS. TORSO ROTATION (DEGREES)

06-27-1994 10:55



POST-TEST CERTIFICATION DATA

Driver Dummy Serial Number: 272

Calibration Test Results Summary

Dummy Serial Number: 272

Post-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Thorax Impact Test:	The thorax would not pass post-test impact test requirements.*
Pelvis Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

* Dummy #272 would not pass post-test thorax impact calibration requirements. Visual inspection found damage to the rib wrap assembly. The rib wrap assembly was replaced and this dummy then passed all thorax calibration requirements.

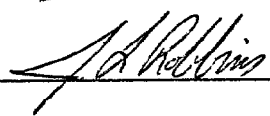
SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 272

DATE OF VERIFICATION: June 29, 1994

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.4
RH - Rib Height	19.75 - 20.5"	20.1
HP - Hip Pivot Height	3.9" ref.	3.9
RD - Rib From Back Line	9.0" to 9.5"	9.4
KV - Knee Pivot From Back Line	20.1" - 20.7"	20.5
SW - Knee Pivot to Floor	19.3" - 19.9"	19.7
HW - Hip Width	14.0" - 15.4"	15.1

MEASUREMENTS BY: 

APPROVED BY: 

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

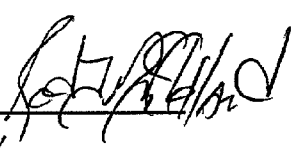
DATE: June 29, 1994

DUMMY NUMBER: 272

TEST NUMBER: D94342

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	72°
RELATIVE HUMIDITY	10 - 70%	50%
PROBE SPEED	13.8 - 14.2 fps	13.8
UPPER RIB	37 - 46 g's	47*
LOWER RIB	37 - 46 g's	45
LOWER SPINE	15 - 22 g's	20

* TEST DOES NOT MEET SPECIFICATION REQUIREMENTS

TECHNICIAN 

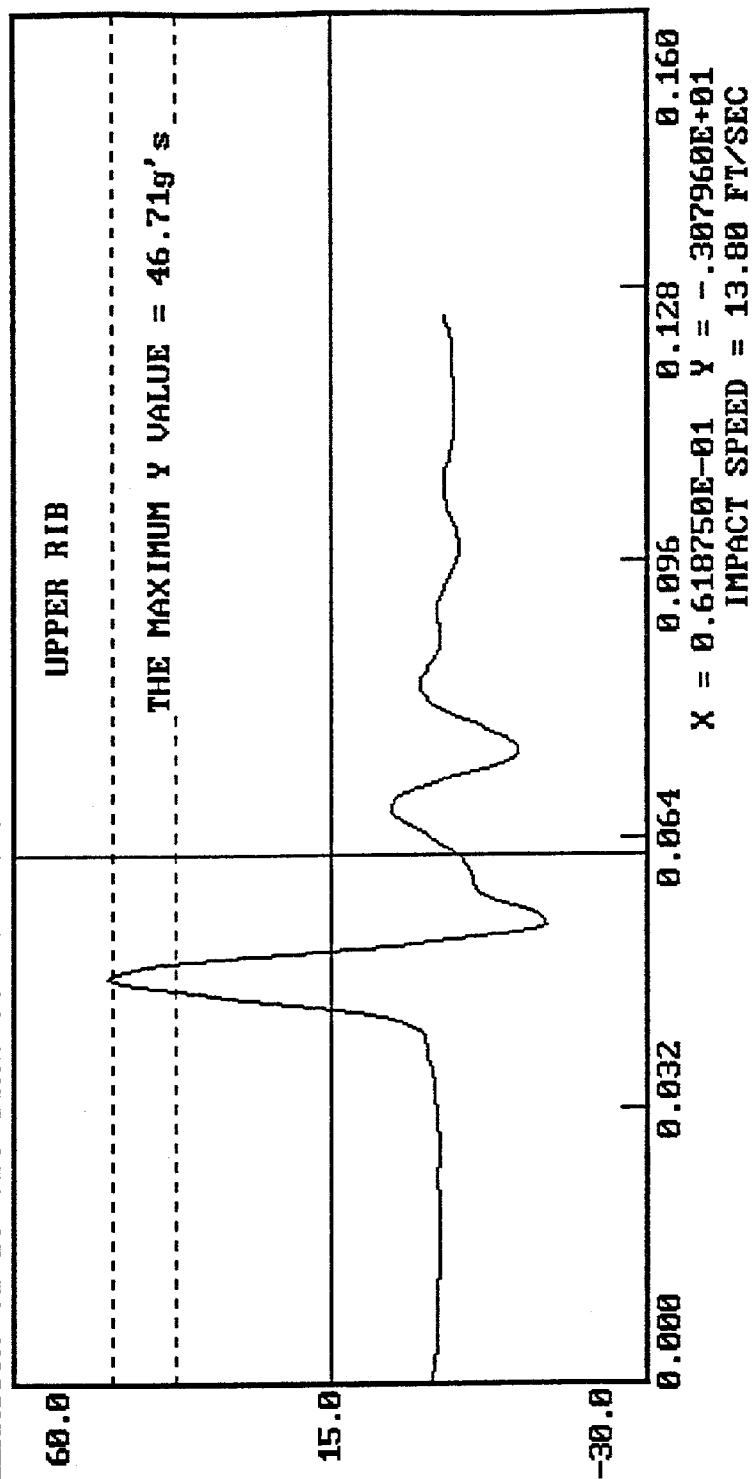
APPROVED BY 

06-29-1994 14:57

DUMMY CALIBRATION - THORAX IMPACT

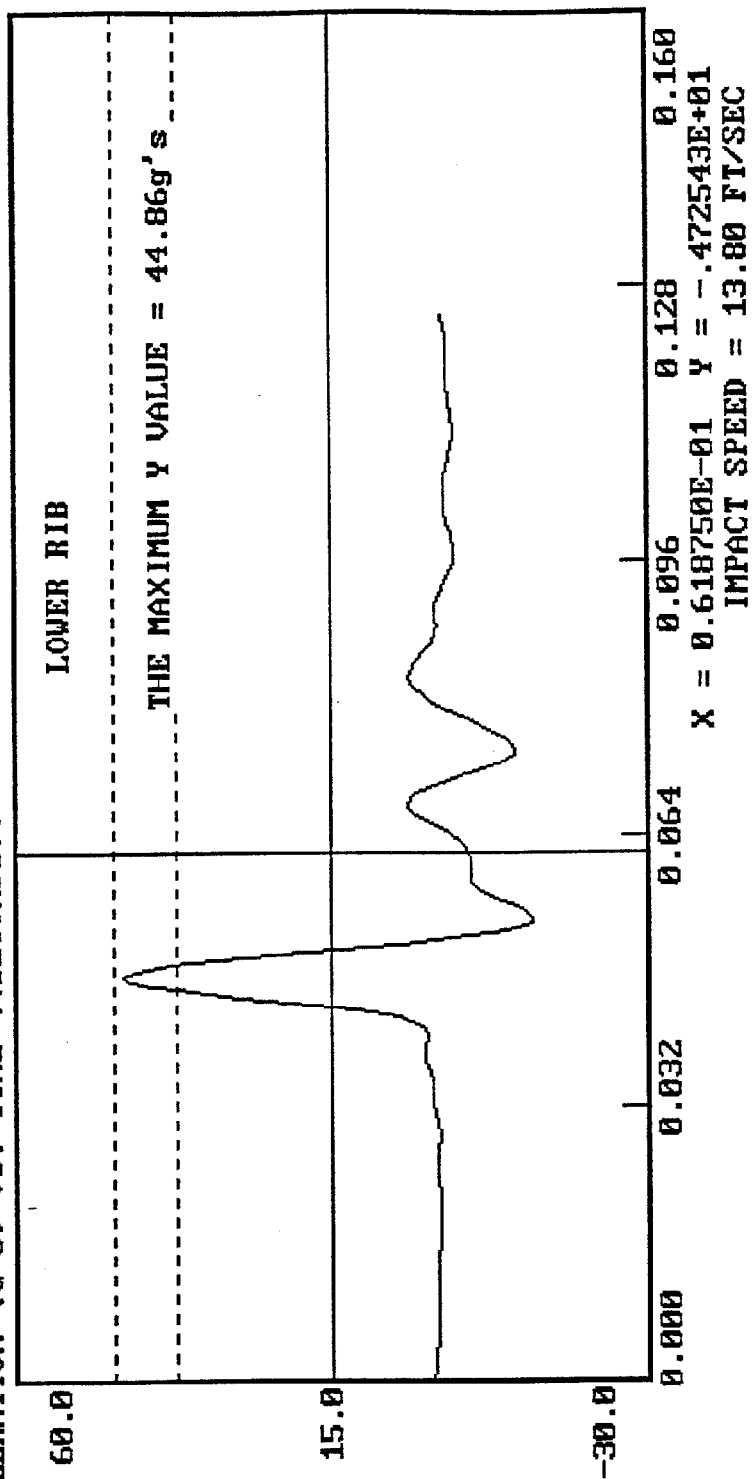
DUMMY # 272

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



06-29-1994 14:57

DUMMY CALIBRATION - THORAX IMPACT
DUMMY # 272
ACCELERATION (G'S) VS. TIME ((SECONDS))

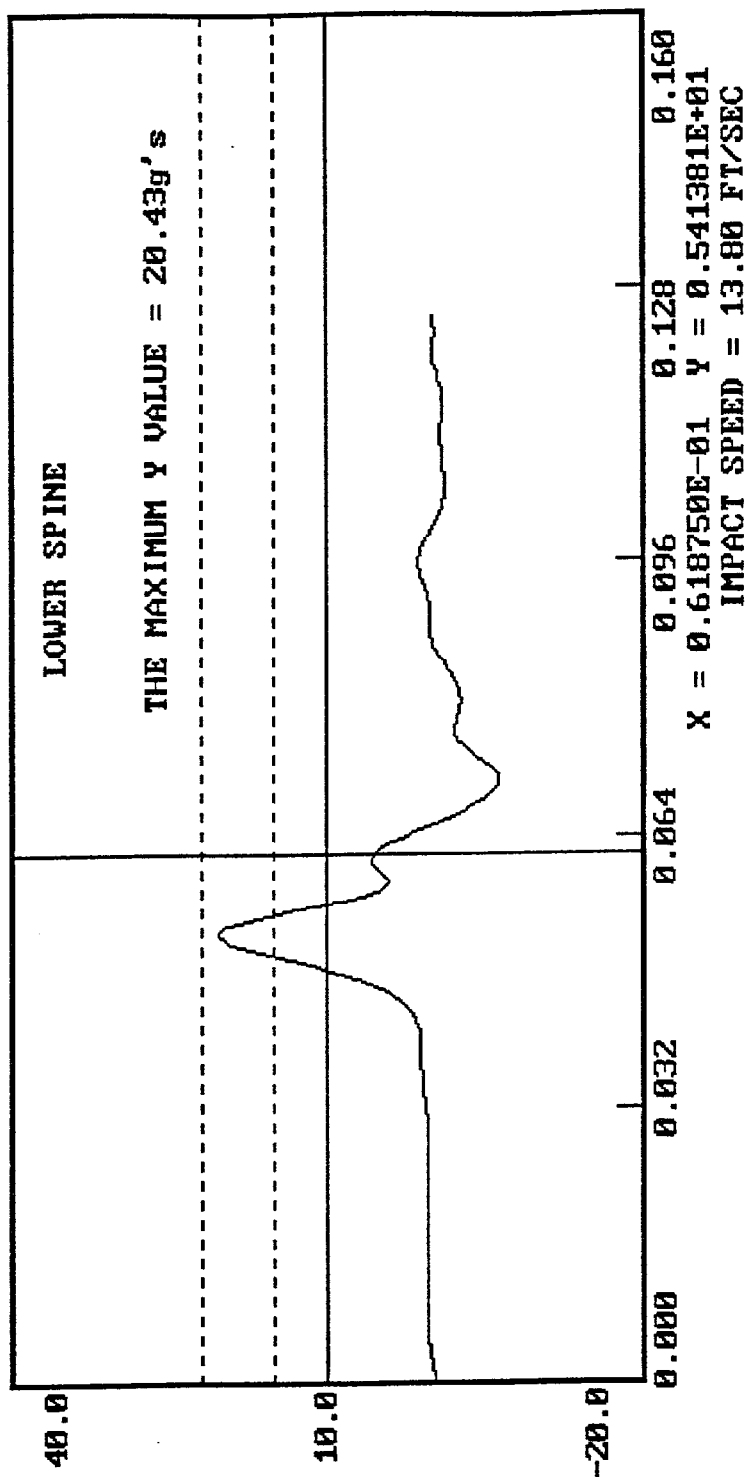


06-29-1994 14:57

DUMMY CALIBRATION - THORAX IMPACT

DUMMY # 272

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



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: June 29, 1994

DUMMY NUMBER: 272

TEST NUMBER: D94343

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	52%
PROBE SPEED	13.8 - 14.2 fps	13.8
PELVIS ACCELERATION	40 - 60 g's	56

TEST MEETS SPECIFICATIONS

TECHNICIAN

[Signature]

APPROVED BY

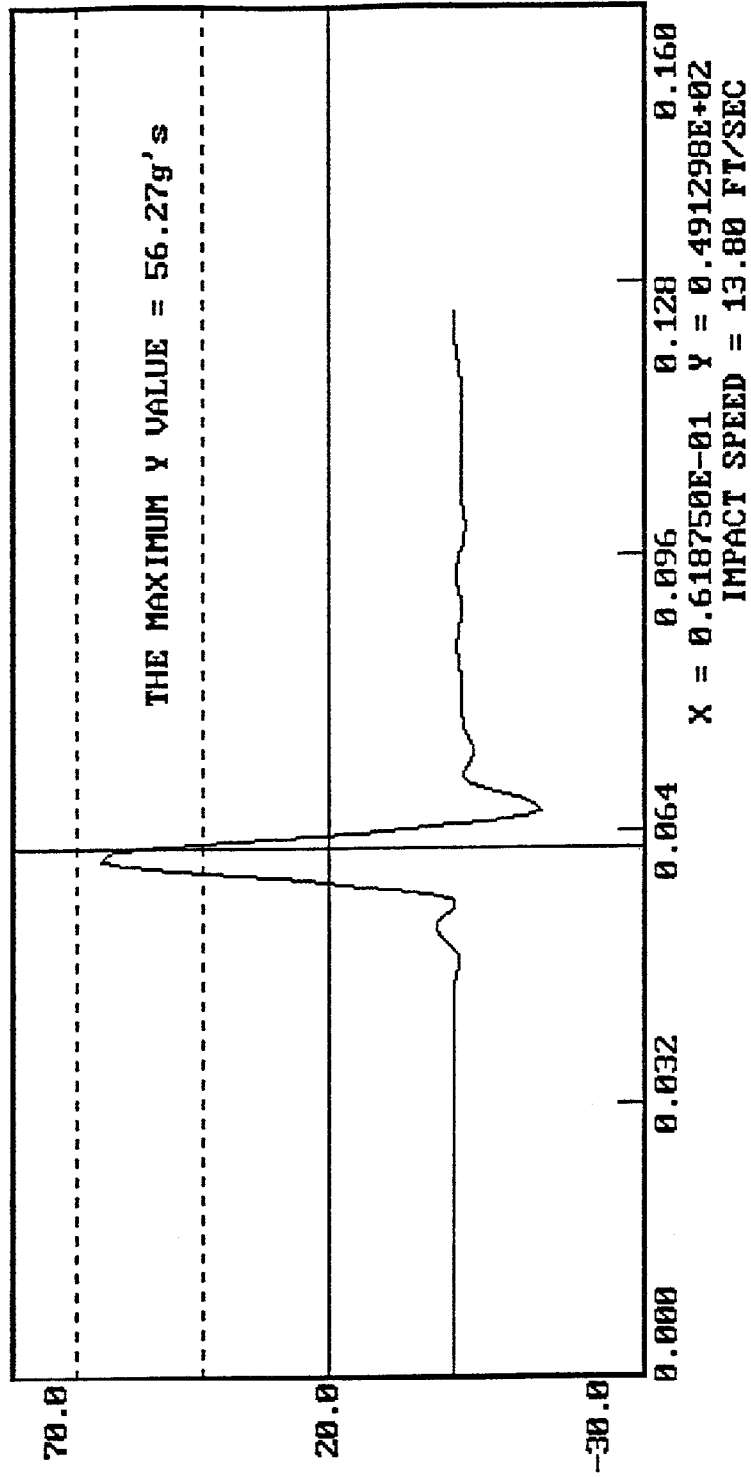
[Signature]

06-29-1994 11:31

DUMMY CALIBRATION - PELVIS IMPACT

DUMMY # 272

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



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

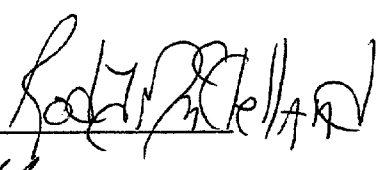
DATE: June 1, 1994

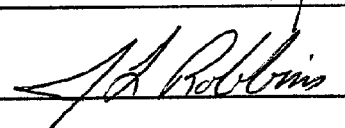
DUMMY NUMBER: 272

TEST NUMBER: D94344

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	72°
RELATIVE HUMIDITY	10 - 70%	54%
FORCE @ 0.5 in	23.3 - 36.5 lbs	29.6
FORCE @ 0.75 in	36.7 - 49.8 lbs	42.2
FORCE @ 1.0 in	50 - 63 lbs	56
FORCE @ 1.3 in	73 - 88 lbs	81

TEST MEETS SPECIFICATIONS

TECHNICIAN 

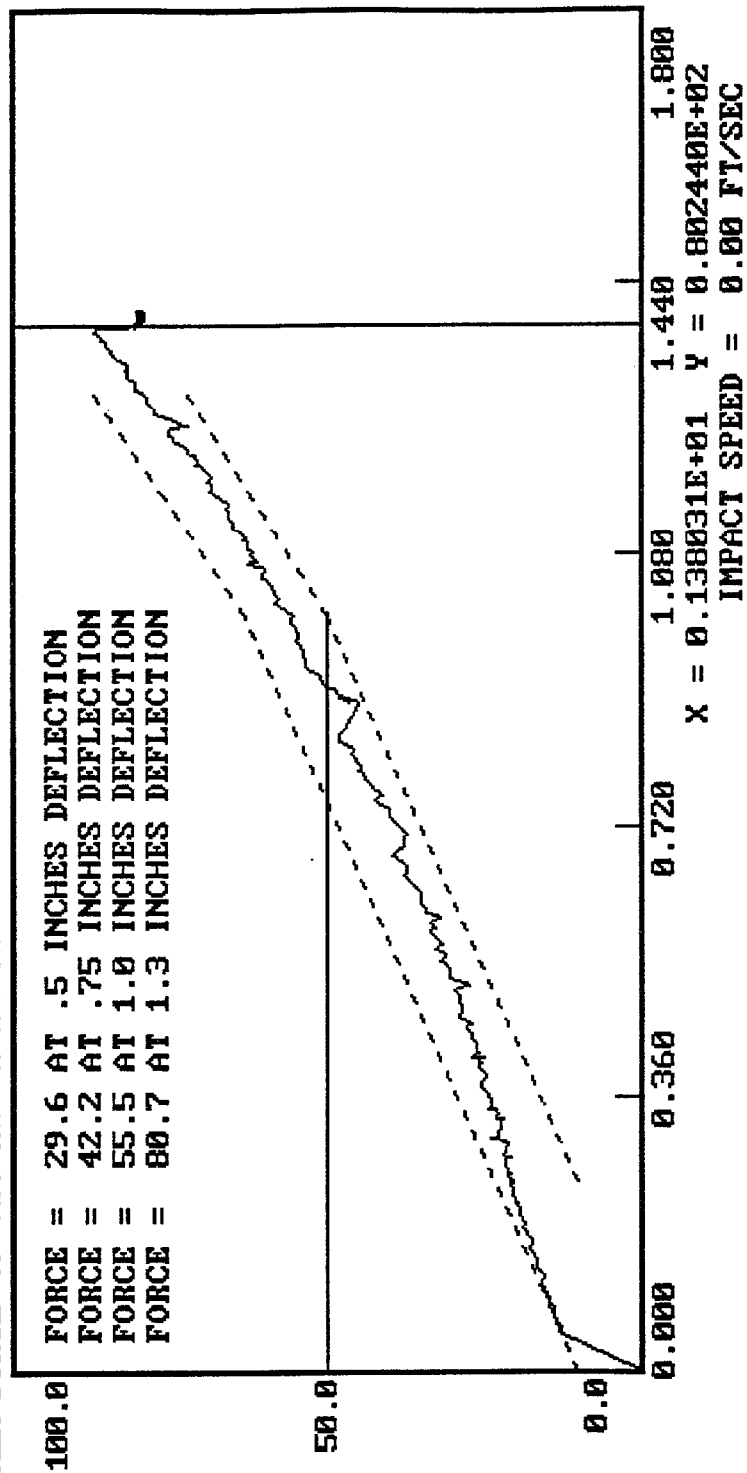
APPROVED BY 

07-01-1994 09:38

DUMMY CALIBRATION - ABDOMEN COMPRESSION

DUMMY # 272

ABDOMEN FORCE () VS. ABDOMEN DISPLACEMENT (INCHES)



MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: June 11, 1994

DUMMY NUMBER: 272

TEST NUMBER: D94345

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	72°
RELATIVE HUMIDITY	10 - 70%	54%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	26
FORCE @ 30°	34 - 46 lbs	40
FORCE @ 40°	46 - 58 lbs	54
RETURN ANGLE	12° maximum	6°

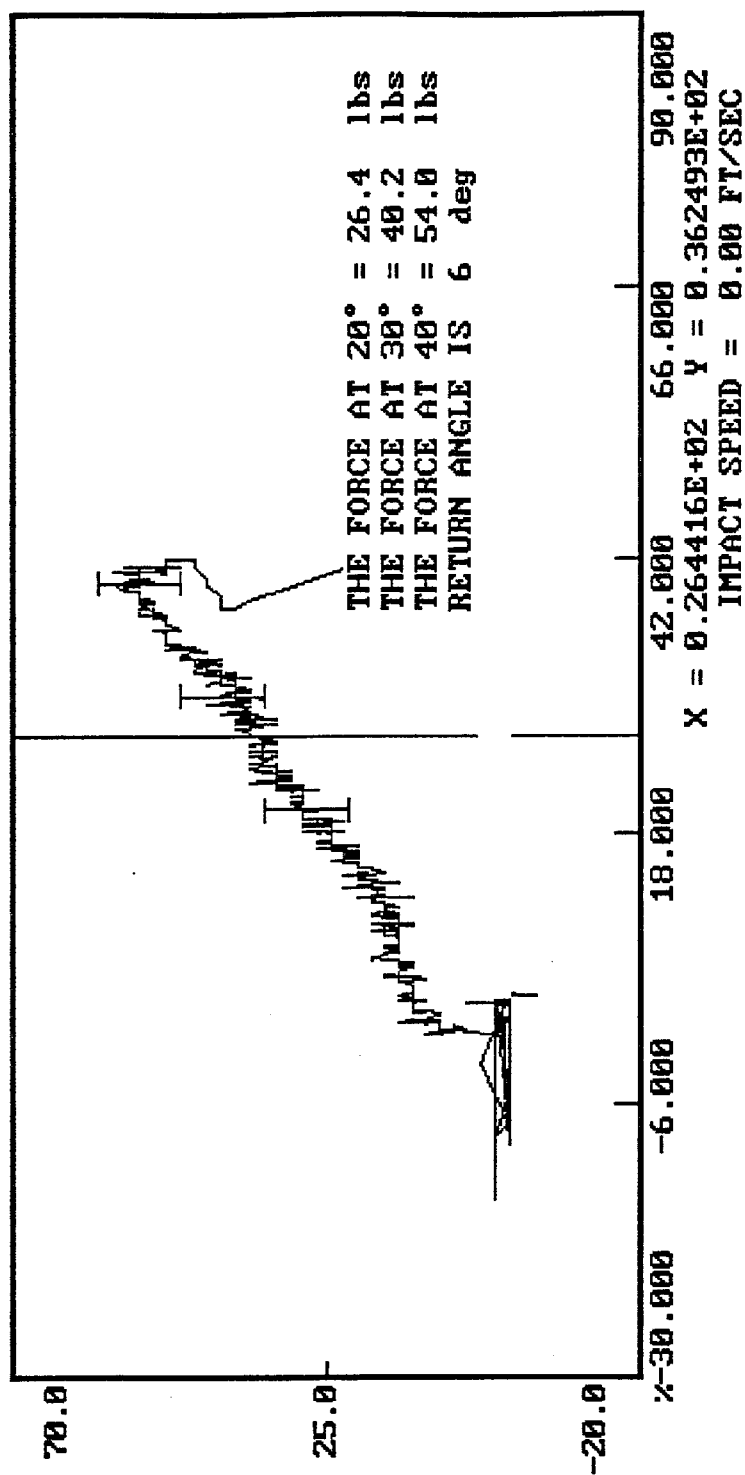
TEST MEETS SPECIFICATIONS

TECHNICIAN

APPROVED BY

07-01-1994 08:41

DUMMY CALIBRATION - LUMBAR FLEXION
DUMMY # 272
FORCE () US. TORSO ROTATION (DEGREES)



POST-TEST CERTIFICATION DATA

Passenger Dummy Serial Number: 271

Calibration Test Results Summary

Dummy Serial Number: 271

Post-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvis Impact Tests:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 271

DATE OF VERIFICATION: June 29, 1994

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.4
RH - Rib Height	19.75 - 20.5"	19.8
HP - Hip Pivot Height	3.9" ref.	3.9
RD - Rib From Back Line	9.0" to 9.5"	9.4
KV - Knee Pivot From Back Line	20.1" - 20.7"	20.4
SW - Knee Pivot to Floor	19.3" - 19.9"	19.4
HW - Hip Width	14.0" - 15.4"	15.0

MEASUREMENTS BY:



APPROVED BY:



MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: June 29, 1994

DUMMY NUMBER: 271

TEST NUMBER: D94352

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	72°
RELATIVE HUMIDITY	10 - 70%	50%
PROBE SPEED	13.8 - 14.2 fps	13.9
UPPER RIB	37 - 46 g's	38
LOWER RIB	37 - 46 g's	38
LOWER SPINE	15 - 22 g's	20

TEST MEETS SPECIFICATIONS

TECHNICIAN *Da Chen*

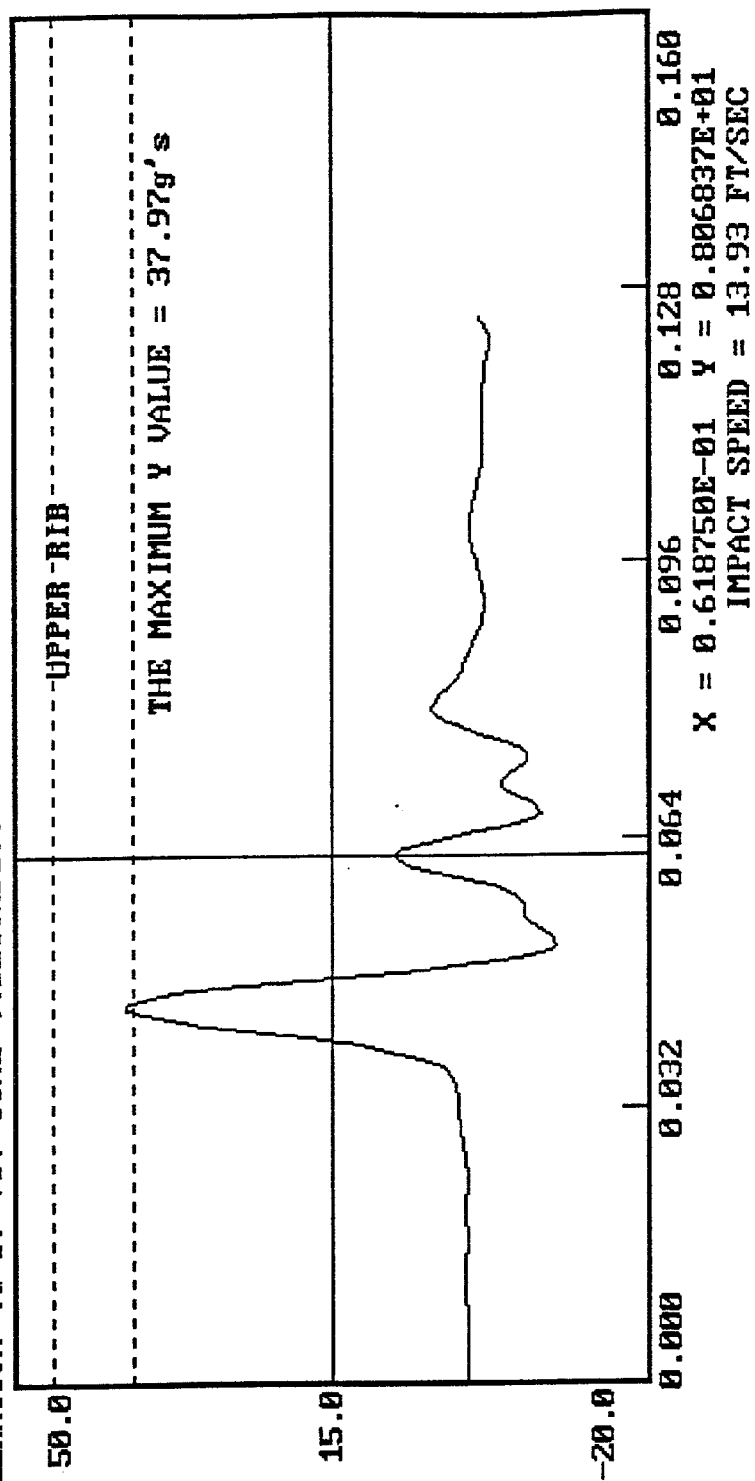
APPROVED BY *J. D. Rollins*

06-29-1994 17:45

DUMMY CALIBRATION - THORAX IMPACT

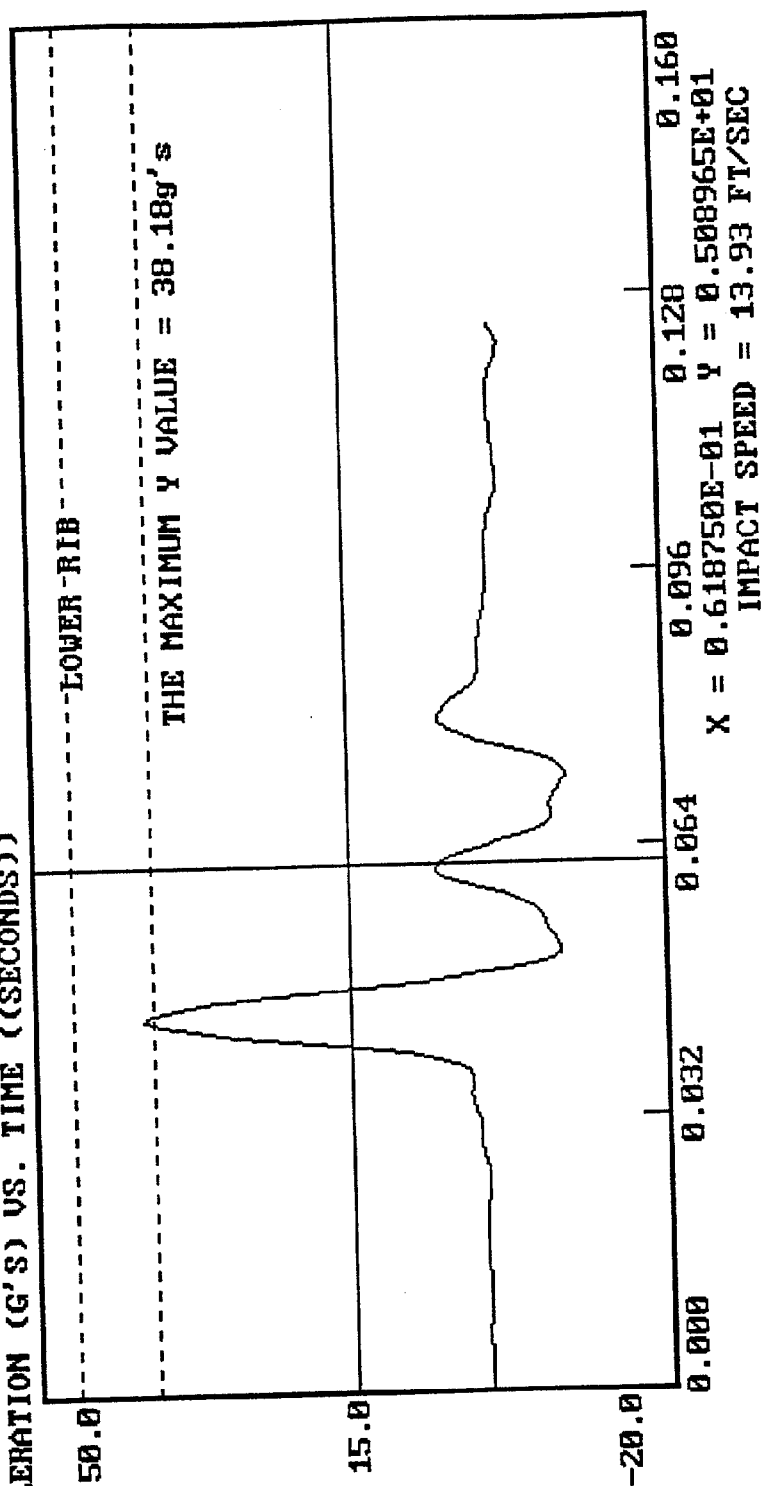
DUMMY # 271

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



06-29-1994 17:45

DUMMY CALIBRATION - THORAX IMPACT
DUMMY # 271
ACCELERATION (G'S) VS. TIME ((SECONDS))

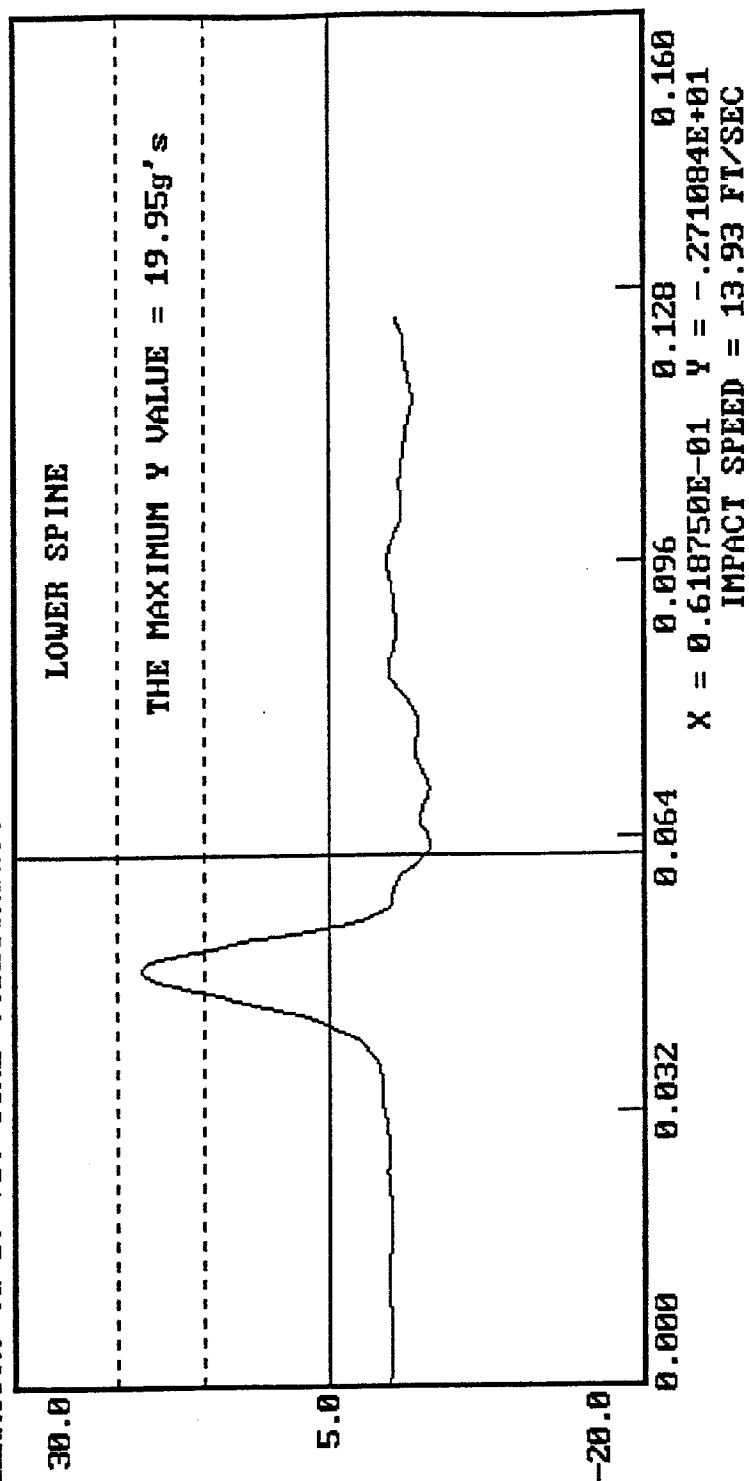


06-29-1994 17:45

DUMMY CALIBRATION - THORAX IMPACT

DUMMY # 271

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



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: June 29, 1994

DUMMY NUMBER: 271

TEST NUMBER: D94353

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	72°
RELATIVE HUMIDITY	10 - 70%	52%
PROBE SPEED	13.8 - 14.2 fps	13.8
PELVIS ACCELERATION	40 - 60 g's	58

TEST MEETS SPECIFICATIONS

TECHNICIAN 

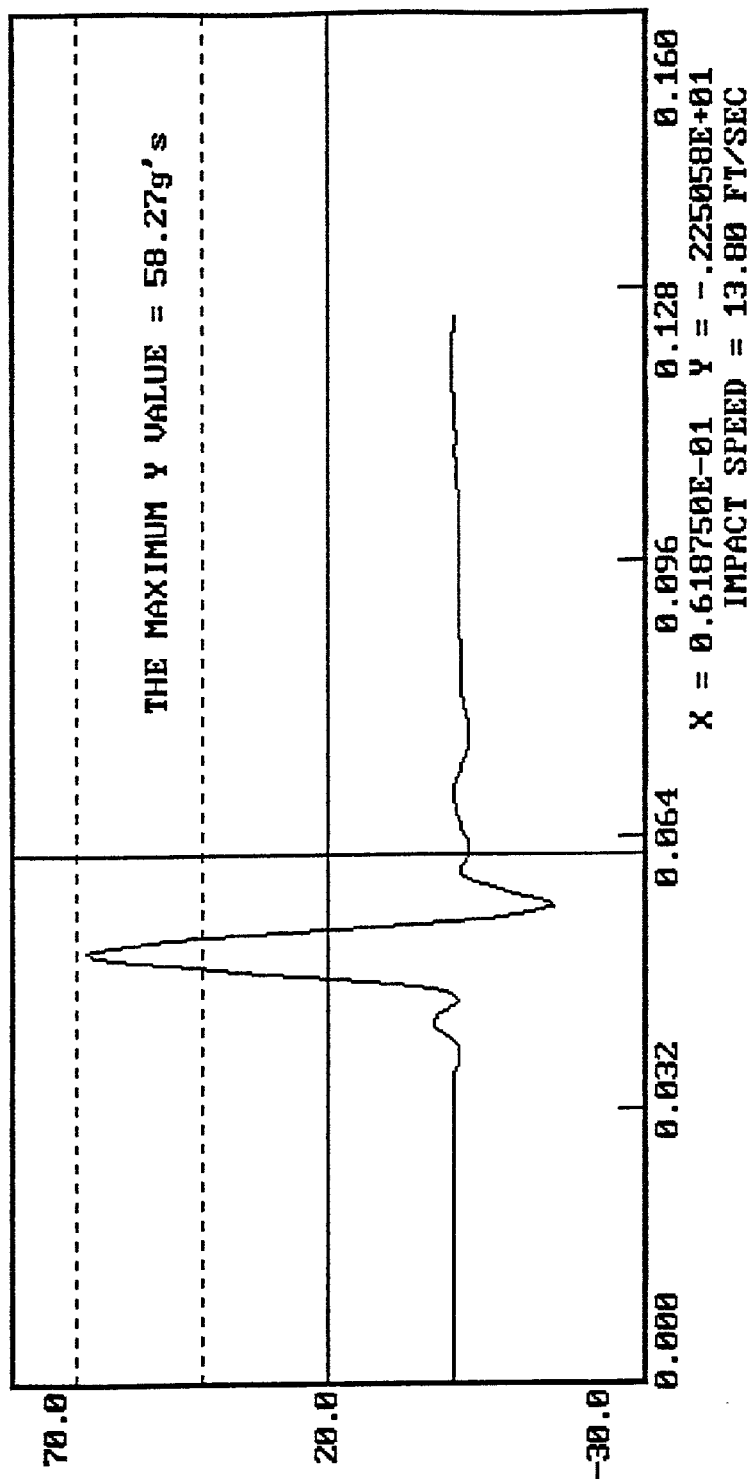
APPROVED BY 

06-29-1994 12:24

DUMMY CALIBRATION - PELVIS IMPACT

DUMMY # 271

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



MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

DATE: July 1, 1994

DUMMY NUMBER: 271

TEST NUMBER: D94354

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	72°
RELATIVE HUMIDITY	10 - 70%	52%
FORCE @ 0.5 in	23.3 - 36.5 lbs	29.9
FORCE @ 0.75 in	36.7 - 49.8 lbs	41.1
FORCE @ 1.0 in	50 - 63 lbs	57
FORCE @ 1.3 in	73 - 88 lbs	80

TEST MEETS SPECIFICATIONS

TECHNICIAN *He C. De*

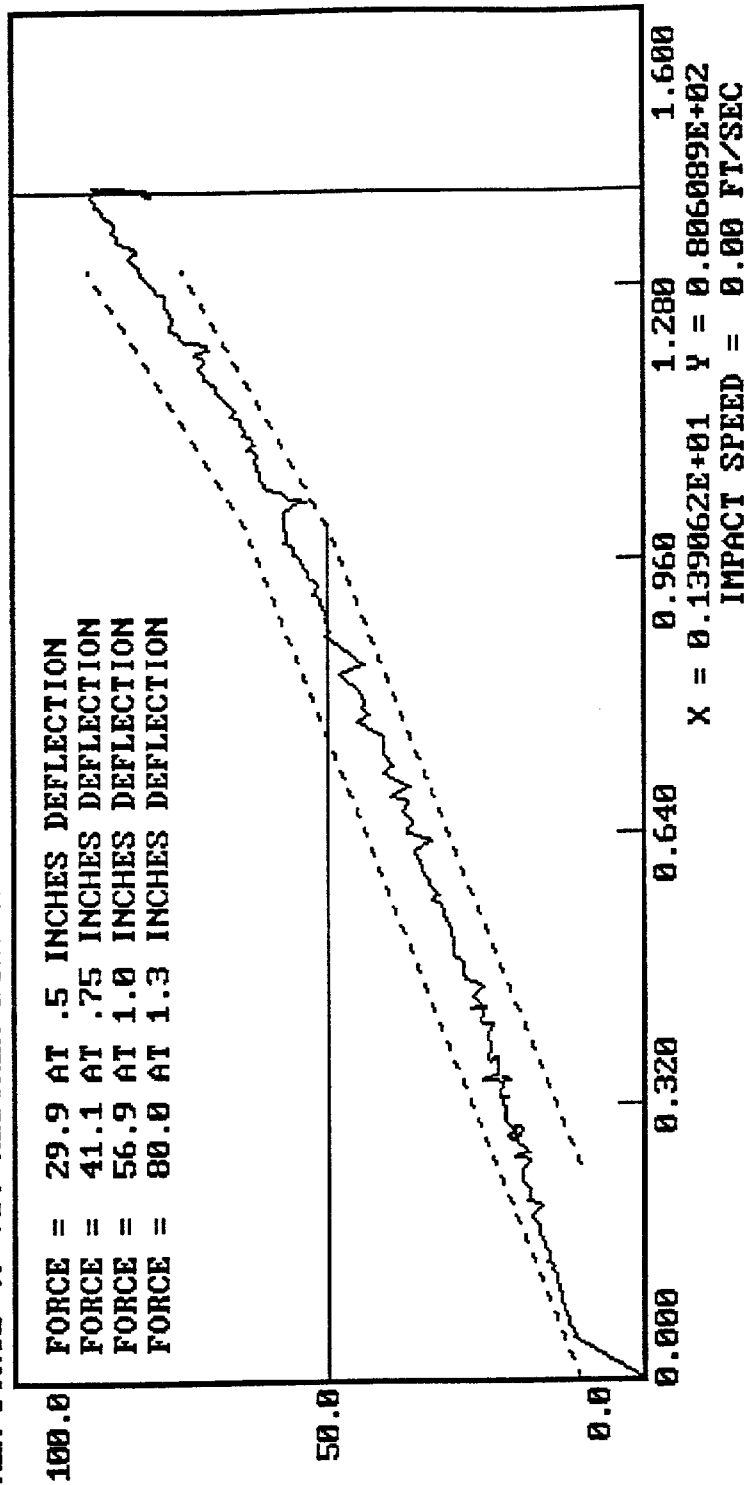
APPROVED BY *J. Robbins*

07-01-1994 09:49

DUMMY CALIBRATION - ABDOMEN COMPRESSION

DUMMY # 271

ABDOMEN FORCE () VS. ABDOMEN DISPLACEMENT (INCHES)



MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: June 30, 1994

DUMMY NUMBER: 271

TEST NUMBER: D94355

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	72°
RELATIVE HUMIDITY	10 - 70%	45%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	30
FORCE @ 30°	34 - 46 lbs	46
FORCE @ 40°	46 - 58 lbs	55
RETURN ANGLE	12° maximum	3°

TEST MEETS SPECIFICATIONS

TECHNICIAN: 

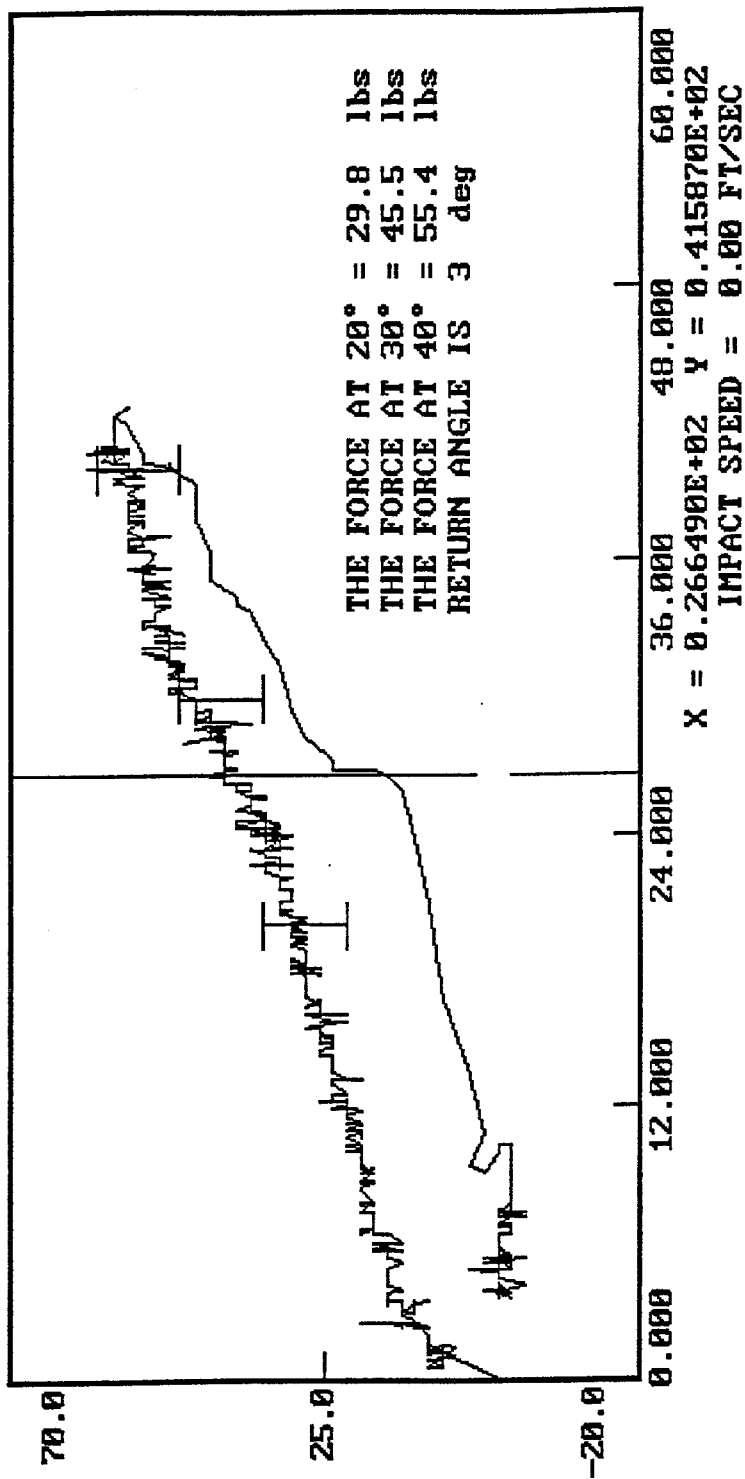
APPROVED BY: 

DUMMY CALIBRATION - LUMBAR FLEXION

DUMMY # 271

FORCE () VS. TORSO ROTATION (DEGREES)

06-30-1994 17:06



POST-TEST DRIVER DUMMY INSPECTION CHECKLIST

Type: Side Impact Dummy

Serial Number: 272

Inspected By: Jeff Robbins

Date: June 29, 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	DAMAGED*
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):

- * Four rivets on posterior side of rib wrap assembly failed. The rivets were located on the impact side of the assembly.

POST-TEST PASSENGER DUMMY INSPECTION CHECKLIST

Type: Side Impact Dummy

Serial Number: 271

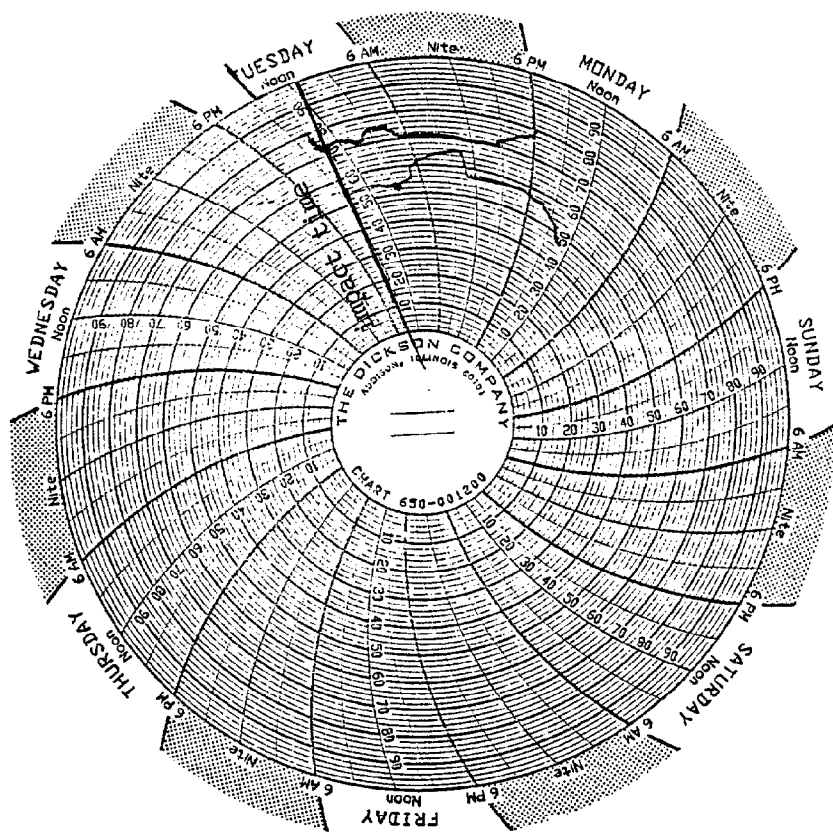
Inspected By: Jeff Robbins

Date: June 29, 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



TEMPERATURE
(degrees F)

APPENDIX D
DUMMY AND VEHICLE CALIBRATION DATA

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DRIVER DUMMY NO. 272

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib	AGTM2	Endevco	June 27, 1994
Lower Rib	AGT81	Endevco	June 27, 1994
Lower Spine	AGR57	Endevco	June 27, 1994
Pelvis	AHWK8	Endevco	June 27, 1994
Upper Rib Redundant	AGTB5	Endevco	June 27, 1994
Lower Rib Redundant	AHTP3	Endevco	June 27, 1994
Lower Spine Redundant	AGTG8	Endevco	June 27, 1994
Pelvis Redundant	AGTR3	Endevco	June 27, 1994

INSTRUMENTS FOR PASSENGER DUMMY NO. 271

	LEFT REAR PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib	AHY21	Endevco	June 21, 1994
Lower Rib	AH0A2	Endevco	June 21, 1994
Lower Spine	AHR15	Endevco	June 21, 1994
Pelvis	AH1G2	Endevco	June 20, 1994
Upper Rib Redundant	AHW86	Endevco	June 21, 1994
Lower Rib Redundant	AHWN3	Endevco	June 21, 1994
Lower Spine Redundant	AH0A7	Endevco	June 20, 1994
Pelvis Redundant	AH0M0	Endevco	June 20, 1994

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
MDB CG X	MGA135	Entran	June 13, 1994
MDB CG Y	MGA126	Entran	June 13, 1994
MDB CG Z	AZ02	Endevco	June 13, 1994
MDB Rear Axle X	MGA054	Entran	June 13, 1994
MDB Rear Axle Y	MGA165	Entran	June 13, 1994
Lower Left A-Post	MGA079	Entran	June 14, 1994
Lower Left B-Post	MGA079	Entran	June 14, 1994
Mid Left B-Post	MGA016	Entran	June 14, 1994
Trunk Centerline X	MGA137	Entran	May 24, 1994
Trunk Centerline Y	MGA143	Entran	June 14, 1994
Trunk Centerline Z	MGA158	Entran	June 14, 1994
Driver Seat Track	MGA131	Entran	June 14, 1994
Right Front Sill X	A99L	Endevco	June 2, 1994
Right Front Sill Y	MGA154	Entran	April 25, 1994
Right Front Sill Z	MGA091	Entran	June 2, 1994
Right Rear Sill X	AC815	Endevco	June 13, 1994
Right Rear Sill Y	MGA124	Entran	June 13, 1994
Right Rear Sill Z	MGA007	Entran	June 14, 1994
Right Rear Seat Occupant Compartment	MGA035	Entran	May 24, 1994
Left Front Sill Y	MGA145	Entran	May 24, 1994
Left Rear Sill Y	MGA003	Entran	June 9, 1994

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