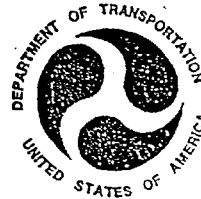


NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TESTING
PASSENGER CARS

1998 HYUNDAI ELANTRA
4-DOOR SEDAN
NHTSA NO: MW0501

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: January 28, 1998

Report Date: February 24, 1998

FINAL REPORT

Prepared For:

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
SAFETY PERFORMANCE STANDARDS
OFFICE OF CRASHWORTHINESS STANDARDS
ROOM 5313, NPS-10
400 SEVENTH STREET, SW
WASHINGTON, D.C. 20590

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Approval Date: 3/19/98

FINAL REPORT ACCEPTED BY (OCWS):

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Contract Technical Manager

Acceptance Date: _____

TECHNICAL REPORT STANDARD TITLE PAGE

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4. Title and Subtitle New Car Assessment Program Side Impact Test of a 1998 Hyundai Elantra 4-Door Sedan NHTSA No. MW0501				5. Report Date February 24, 1998																			
				6. Performing Organization Code MGA																			
7. Author(s) Gary Strassburg, Project Engineer				8. Performing Organization Report No. MGA-DOT-214-0																			
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12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards 400 Seventh St., S.W. Washington, D.C. 20590				13. Type of Report and Period Covered Final Test Report January 28, 1998 to February 24, 1998																			
				14. Sponsoring Agency Code NPS-10																			
15. Supplementary Notes																							
16. Abstract A 90° Moving Deformable Barrier NCAP side impact was conducted on the subject 1998 Hyundai Elantra 4-Door to obtain new car assessment and research data indicant of FMVSS No. 214D performance. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on January 28, 1998. The impact velocity of the Moving Deformable Barrier (MDB) was 61.6 kph, and the ambient temperature at the struck side (driver's) of the target vehicle at the time of impact was 20°C. The target vehicle post test maximum crush was 370 mm at level 2. The test vehicle's performance follows: <table border="0"> <thead> <tr> <th></th> <th><u>DRIVER</u></th> <th><u>PASS.</u></th> </tr> </thead> <tbody> <tr> <td>Left Upper Rib (LUR) Accel., g</td> <td>73.6</td> <td>109.2</td> </tr> <tr> <td>Left Lower Rib (LLR) Accel., g</td> <td>77.4</td> <td>154.3</td> </tr> <tr> <td>Lower Spine (T₁₂) Accel., g</td> <td>97.1</td> <td>84.8</td> </tr> <tr> <td>Thoracic Trauma Index (TTI)</td> <td>87.3</td> <td>119.6</td> </tr> <tr> <td>Pelvis (PEV) Accel., g</td> <td>127.7</td> <td>81.7</td> </tr> </tbody> </table> The doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.							<u>DRIVER</u>	<u>PASS.</u>	Left Upper Rib (LUR) Accel., g	73.6	109.2	Left Lower Rib (LLR) Accel., g	77.4	154.3	Lower Spine (T ₁₂) Accel., g	97.1	84.8	Thoracic Trauma Index (TTI)	87.3	119.6	Pelvis (PEV) Accel., g	127.7	81.7
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17. Key Words New Car Assessment Program (NCAP) FMVSS No. 214D Side Impact Dummy (SID) Occupant Side Impact Protection				18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Adm. Technical Ref. Division, Room 5108 (NAD-52) 400 Seventh Street, S.W. Washington, D.C. 20590																			
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SECTION 1
PURPOSE AND TEST PROCEDURE

This side impact test is part of the FY98 NCAP Side Impact 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 of a 1998 Hyundai Elantra 4-Door.

This side impact test was conducted in accordance with the New Car Assessment Program Side Impact Testing Procedure dated October 1996.

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 1998 Hyundai Elantra 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 tow road guidance system at a velocity of 38.25 mph (61.6 kph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by MGA Research Corporation in Burlington, Wisconsin, on January 28, 1998. Pre- and post-test photographs of the test vehicle, the MDB and the side impact dummies (SIDs) are included in Appendix A.

Two Side Impact Dummies (SIDs) were placed in the driver and left rear designated seating positions according to instructions specified in the New Car Assessment Program Side Impact Laboratory Test Procedure which is dated October 1996. The side impact event was documented by nine high speed cameras. Camera locations and other pertinent camera information can be found in this report.

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)
5. Head Center of Gravity triaxial accelerometers (X, Y, and Z-direction)

Appendix B contains the vehicle and dummy response data traces. A summary of the side impact dummy (SID) configuration and performance verification test data is shown in Appendix C. Dummy and vehicle calibration data can be found in Appendix D of this report.

The following table summarizes the results of the test:

Injury Criteria	Front SID	Rear SID
TTI (g)	87.3	119.6
Pelvis (g)	127.7	81.7

SECTION 3
SIDE IMPACT DUMMY (SID) AND
VEHICLE TEST DATA

DATA SHEET NO. 1
GENERAL VEHICLE TEST PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 1998/Hyundai/Elantra/4-Door
Vehicle NHTSA No.: MW0501 VIN: KMHJF24M6WU685016
Vehicle Body Color: Blue Build Date: 10/30/97
Engine Data: 4 Cylinders; CID; 1.8 Liter; cc
Placement Longitudinal; X Lateral
Transmission: 4 Speed; Manual; X Automatic; Overdrive
Final Drive: Rear Wheel Drive; X Frt. Wheel Drive; Four Wheel Drive

Odometer Reading 73 miles
Options: X A/C; X Pwr. Steering; X Pwr. Brakes; Pwr. Windows;
 Cruise Control; X Tilt Wheel; Power Door Locks;

DATA FROM TIRE PLACARD:

Tire Pressure (at capacity): 32 Psi FRONT
32 Psi REAR
Recommended Tire Size: P175/65/R14
Tires on Test Vehicle: P175/65/R14 Manufacturer: Uniroyal

Vehicle Capacity Data:

Number of Occupants: 2 Front; 3 Rear; 3rd Seat, 5 Total
Type of Front Seats: X Bucket; Bench; Split Bench
Type of Front Seat Back: Fixed; X Adjustable with X Lever
Vehicle Maximum Capacity Loading = 385.6 kg (A)
No. of Occupants x 68.04 kg. = 340.2 kg (B)
Cargo Capacity (A-B) = 45.4 kg

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

WEIGHT OF TEST VEHICLE WITH MAXIMUM FLUIDS:

Right Front	=	<u>372.9</u> kg	Right Rear	=	<u>219.1</u> kg
Left Front	=	<u>378.3</u> kg	Left Rear	=	<u>229.1</u> kg
TOTAL FRONT	=	<u>751.2</u> kg	TOTAL REAR	=	<u>448.3</u> kg
% of Total Vehicle Weight	=	<u>62.6</u> %;	% of Total Weight	=	<u>37.4</u> %
TOTAL WEIGHT	=	<u>1199.4</u> kg			

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

Year/Make/Model/Body Style: 1998/Hyundai/Elantra/4-Door

Vehicle NHTSA No.: MW0501 Test Date: January 28, 1998

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Test Vehicle Delivered Weight with Maximum Fluids	=	<u>1199.4</u> kg
Cargo Carrying Capacity of Test Vehicle	=	<u>45.4</u> kg
Weight of 2 Side Impact Dummies (2 x <u>80.7</u> kg.)	=	<u>161.4</u> kg
TEST VEHICLE TARGET WEIGHT	=	<u>1406.2</u> kg

ACTUAL WEIGHT OF TEST VEHICLE WITH 2 DUMMIES AND CARGO (Fully Loaded):

Right Front	=	<u>376.5</u> kg	Right Rear	=	<u>276.2</u> kg
Left Front	=	<u>432.7</u> kg	Left Rear	=	<u>320.7</u> kg
TOTAL FRONT	=	<u>809.2</u> kg	TOTAL REAR	=	<u>596.9</u> kg
% of Total Weight	=	<u>57.5</u> %	% of Total Weight	=	<u>42.5</u> %
TOTAL TEST WEIGHT	=	<u>1406.1</u> kg			

TEST VEHICLE ATTITUDE:

CURB WEIGHT ATTITUDE:

Right Front 639 mm Left Front 643 mm Right Rear 642 mm Left Rear 634 mm

FULLY LOADED WEIGHT ATTITUDE:

Right Front 640 mm Left Front 621 mm Right Rear 610 mm Left Rear 593 mm

TEST ATTITUDE:

Right Front 630 mm Left Front 626 mm Right Rear 614 mm Left Rear 598 mm

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

Test Vehicle Wheelbase: 2546 mm

C.G. = 1031 mm rearward of front wheel centerline

TOTAL VEHICLE LENGTH:

Right Side = 4170 mm

Centerline = 4359 mm

Left Side = 4168 mm

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

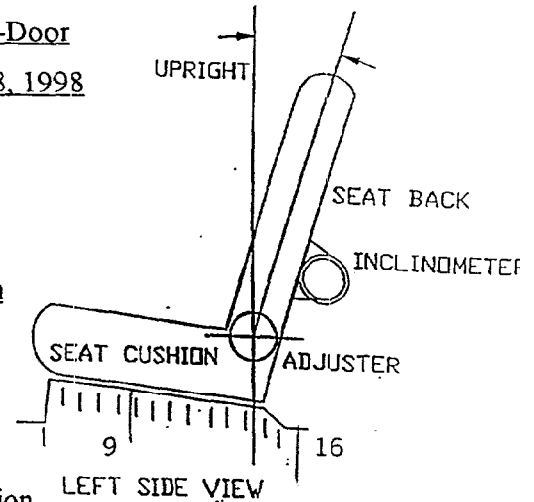
Year/Make/Model/Body Style: 1998/Hyundai/Elantra/4-Door

Vehicle NHTSA No.: MW0501 Test Date: January 28, 1998

FRONT SEAT CUSHION PLACEMENT:

Total Length of Adjustment Travel: 230 mm

Test Position: 9th notch from foremost locking position
out of 16 possible positions



FRONT SEAT BACK ADJUSTMENT POSITION:

Seat Back Angle = 8th position from first locking position

SECOND POSITION SEAT:

Total Length of Fore/Aft Adjustment Travel: 0

Seat Back Adjustment Position: N/A

ADJUSTABLE D-RING: 3rd position up from bottom position out of
5 possible positions.

ADJUSTABLE STEERING COLUMN POSITION: Mid position

WINDOW POSITIONS: Left Front Up Left Rear Up
Right Front Down Right Rear Down

AMOUNT OF STODDARD SOLVENT IN FUEL TANK:

Fuel system usable capacity = 14.5 gallons

Test Volume: 13.34 gallons 92 % of capacity

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

Wheelbase: = 2546 mm

Impact Point is 333 mm rearward of front axle centerline

DATA SHEET NO. 2
TEST VEHICLE SUMMARY OF RESULTS

Year/Make/Model/Body Style: 1998/Hyundai/Elantra/4-Door
Vehicle NHTSA No.: MW0501 Test Date: January 28, 1998
Overall Length = 4359 mm; Overall Width = 1680 mm

TEST WEIGHT:

Right Front = 400.1 kg Right Rear = 270.3 kg
Left Front = 434.1 kg Left Rear = 297.1 kg
TOTAL FRONT = 834.2 kg TOTAL REAR = 567.4 kg
% of Total Weight = 59.5 % % of Total Weight = 40.5 %
TOTAL VEHICLE WEIGHT = 1401.6 kg
Wheelbase = 2546 mm
Longitudinal C.G. from Center of Front Axle = 1031 mm
Impact Angle with Respect to Impactor = 90° degrees

MAXIMUM EXTERIOR STATIC CRUSH:

1. LEVEL 1 (258 mm above ground) = 218 mm
 2. LEVEL 2 (472 mm above ground) = 370 mm
 3. LEVEL 3 (575 mm above ground) = 355 mm
 4. LEVEL 4 (862 mm above ground) = 303 mm
 5. LEVEL 5 (1280 mm above ground) = 71 mm
- Maximum Post-Test Intrusion = 370 mm

OCCUPANTS:

	<u>Left Front Passenger</u>	<u>Left Rear Passenger</u>
Type of Dummy	<u>SID</u>	<u>SID</u>
Restraints Used	<u>type II belt</u> <u>and frontal</u> <u>airbags</u>	<u>type II belt</u> <u>and frontal</u> <u>airbags</u>

TEST VEHICLE SUMMARY OF RESULTS (Cont'd)

INSTRUMENTATION:

Number of Vehicle Data Channels:	=	<u>25</u>
Number of Cameras: Onboard Vehicle	=	<u>3</u>
Offboard Vehicle	=	<u>4</u>
Deformable Barrier	=	<u>2</u>
TOTAL	=	<u>9</u>

DATA SHEET NO. 3

MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS

Year/Make/Model/Body Style: 1998/Hyundai/Elantra/4-Door

Vehicle NHTSA No.: MW0501 Test Date: January 28, 1998

POSITION OF IMPACT (MDB) ON MONORAIL:

Crabbed 27° to left

MDB DETAILS:

Overall Width of Framework Carriage	= <u>1252 mm</u>
Overall Length of MDB (incl. honeycomb impact face)	= <u>4115 mm</u>
Wheelbase of Framework Carriage	= <u>2591 mm</u>
Tread of Framework Carriage (Front & Rear)	= <u>1880 mm</u>
C.G. Location Rearward of Front Axle	= <u>1105 mm</u>
C.G. Location From Center Line	= <u>-12 mm</u>
C.G. Location Above Ground Level	= <u>484 mm</u>

MDB WEIGHT:

Left Front	= <u>440.0 kg</u>	Left Rear	= <u>242.5 kg</u>
Right Front	= <u>338.2 kg</u>	Right Rear	= <u>331.9 kg</u>
TOTAL FRONT	= <u>778.2 kg</u>	TOTAL REAR	= <u>574.4 kg</u>
TOTAL MDB WEIGHT = <u>1352.9 kg</u>			

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

Impact Speed = Primary: 38.26 mph (61.6 kph) Secondary: 38.19 mph (61.5 kph)

CRASH TEST SUMMARY FOR SIDE IMPACTOR (Cont'd)

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE:

- | | | |
|----|---------------------------------|-----------------|
| 1. | Row A Top of Stack (813 mm) | = <u>169</u> mm |
| 2. | Row B Mid Stack (686 mm) | = <u>168</u> mm |
| 3. | Row C Top of Bumper (533 mm) | = <u>140</u> mm |
| 4. | Row D Center of Bumper (432 mm) | = <u>171</u> mm |

INSTRUMENTATION:

Number of MDB Data Channels = 5

DATA SHEET NO. 4
POST-TEST OBSERVATIONS

Year/Make/Model/Body Style: 1998/Hyundai/Elantra/4-Door

Vehicle NHTSA No.: MW0501 Test Date: January 28, 1998

VISIBLE DUMMY CONTACT POINTS:

	<u>LEFT FRONT SID</u>	<u>LEFT REAR SID</u>
Head	<u>none</u>	<u>C-post, header</u>
Arm	<u>door panel</u>	<u>door panel</u>
Pelvis	<u>door panel and armrest</u>	<u>door panel and armrest</u>
Left Knee	<u>door panel</u>	<u>door panel</u>
Right Knee	<u>left knee</u>	<u>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: 20 mm rearward

Vertical: 4 mm low

ARM REST LOCATIONS:

Front: 230 mm from bottom of window

Rear: 240 mm from bottom of window

POST-TEST OBSERVATIONS (Cont'd)

SEAT CRUSH:

Front Seat Back: 48 mm Front Seat Cushion: 88 mm

Left Rear Seat Back: 108 mm Rear Seat Cushion: 193 mm

GLAZING DAMAGE:

Left side windows and windshield broke

PILLAR PERFORMANCE:

No failure

SILL SEPARATION:

From 817 to 884 mm forward of rear wheel centerline and a vertical tear 100 mm long at
562 mm forward of rear wheel centerline.

OTHER NOTABLE IMPACT EFFECTS:

Unibody separated

AIRBAG DEPLOYMENT STATUS:

	<u>DRIVER</u>	<u>PASSENGER</u>
Frontal	<u>No</u>	<u>No</u>
Side	<u>N/A</u>	<u>N/A</u>

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

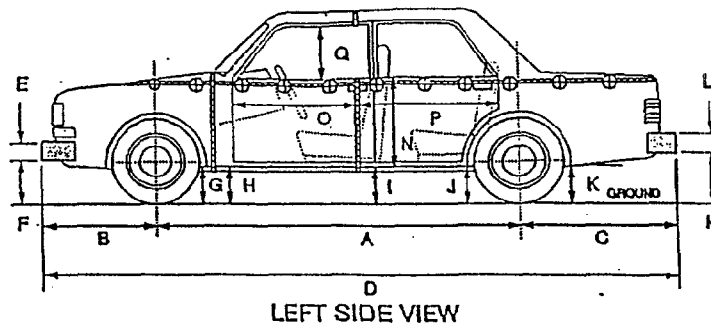
DATA SHEET NO. 5
SIDE IMPACT DUMMY (SID) INSTRUMENTATION DATA

Year/Make/Model/Body Style: 1998/Hyundai/Elantra/4-Door
Vehicle NHTSA No.: MW0501 Test Date: January 28, 1998

	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								
Left Upper Rib (LUR) Y	73.6	35	-13.9	76	109.2	38	-10.2	43
Left Lower Rib (LLR) Y	77.4	34	-13.5	91	154.3	38	-25.8	66
SPINE ACCELERATIONS								
Lower Lateral Y	97.1	32	-33.7	66	84.8	42	-21.6	71
PELVIS ACCELERATIONS								
Lateral Y	127.7	30	-14.3	77	81.7	38	-10.8	69

REFERENCE: Positive Direction- Longitudinal (X) = forward
Lateral (Y) = to right
Vertical (Z) = down

DATA SHEET NO. 6
VEHICLE 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

ALL MEASUREMENTS IN (mm)

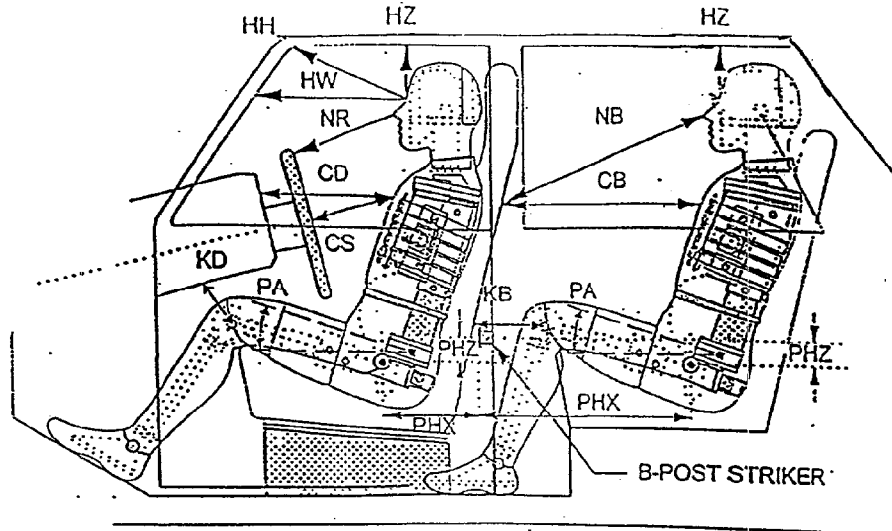
	PRE-TEST	POST-TEST	Δ CHANGE
A	2546	2497	49
B	845	804	41
C	968	906	62
D	4359	4207	152
E	130	130	0
F	395	398	-3
G	171	170	1
H	169	167	2
I	161	151	10
J1/J2	158/157	152/143	6/14
K	218	210	8
L	292	292	0
M	278	278	0
N	639	548	91
O	722	708	14
P	1183	1121	62
Q	430	409	21
R	4170	4174	-4
S	4168	4097	71
T	1680	1462	218

DATA SHEET NO. 7

SIDE IMPACT DUMMY (SID) LONGITUDINAL CLEARANCE DIMENSIONS

Year/Make/Model/Body Style: 1998/Hyundai/Elantra/4-Door

NHTSA NO.: MW0501 Test Date: January 28, 1998



NOTE: All dimensions are in mm with tolerance of ± 3 mm

	DRIVER SID ID #272		LEFT REAR PASSENGER SID ID #271
HH	372	HZ	135
HW	558	NB	588
HZ	140	CB	504
NR	495	KBL (KBA)	215 (0.0°)
CD	562	KBR (KBA)	214 (0.0°)
CS	370	PA°	23.8°
KDL(KDA°)	200 (26.8°)	PHX	184
KDR(KDA°)	195 (24.8°)	PHZ	240
PA°	24.7°		
PHX	202		
PHZ	131		

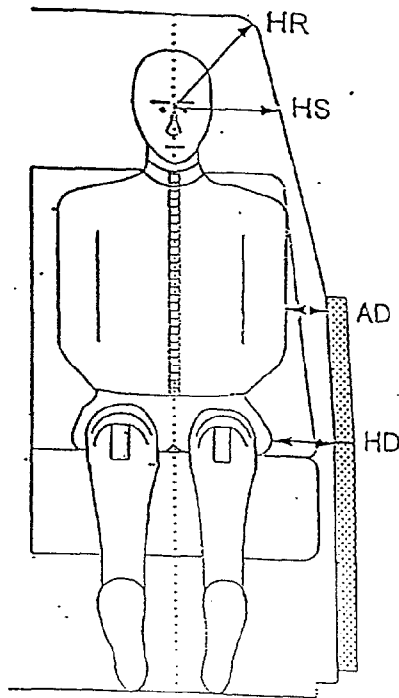
NOTE: 2-door vehicle shown. Rear dummy PHX & PHZ measurements for 4-door vehicle would use the C-post striker as reference point.

DATA SHEET NO. 8
SIDE IMPACT DUMMY (SID) LATERAL CLEARANCE DIMENSIONS

Year/Make/Model/Body Style: 1998/Hyundai/Elantra/4-Door

NHTSA NO.: MW0501

Test Date: January 28, 1998



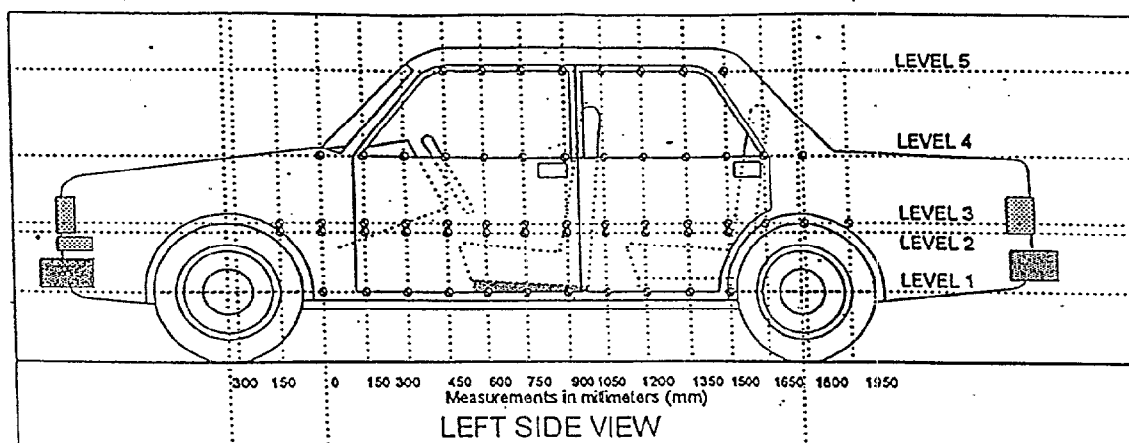
NOTE: All dimensions are in mm

	DRIVER SID ID #272	LEFT REAR PASSENGER SID ID #271
HR	178	186
HS	294	229
AD	120	111
HD	165	182

DATA SHEET NO. 9
VEHICLE SIDE MEASUREMENTS

Year/Make/Model/Body Style: 1998/Hyundai/Elantra/4-Door

NHTSA NO.: MW0501 Test Date: January 28, 1998



MEASUREMENTS ARE TAKEN WHEN THE VEHICLE IS IN THE "AS TESTED"
CONFIGURATION

MEASUREMENTS ALONG THE VERTICAL 750 mm. LINE SHOWN ABOVE

Level 1 @ Axle Centerline Height

(or Sill Top Height) = 258 mm

Level 2 @ Occupant H-Point = 472 mm

Level 3 @ Mid Door = 575 mm

Level 4 @ Window Sill = 862 mm

Level 5 @ Window Top = 1280 mm

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

	Level 1 - Axle Centerline		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1800			
-1650			
-1500			
-1350			
-1200			
-1050			
-900			
-750			
-600			
-450			
-300			
-150			
0 (impact point)			
150	738	782	44
300	737	873	136
450	737	894	157
600	736	912	176
750	736	918	182
900	736	932	196
1050	736	938	202
1200	736	954	218
1350	736	927	191
1500	735	914	179
1650	735	891	156
1800	734	858	124

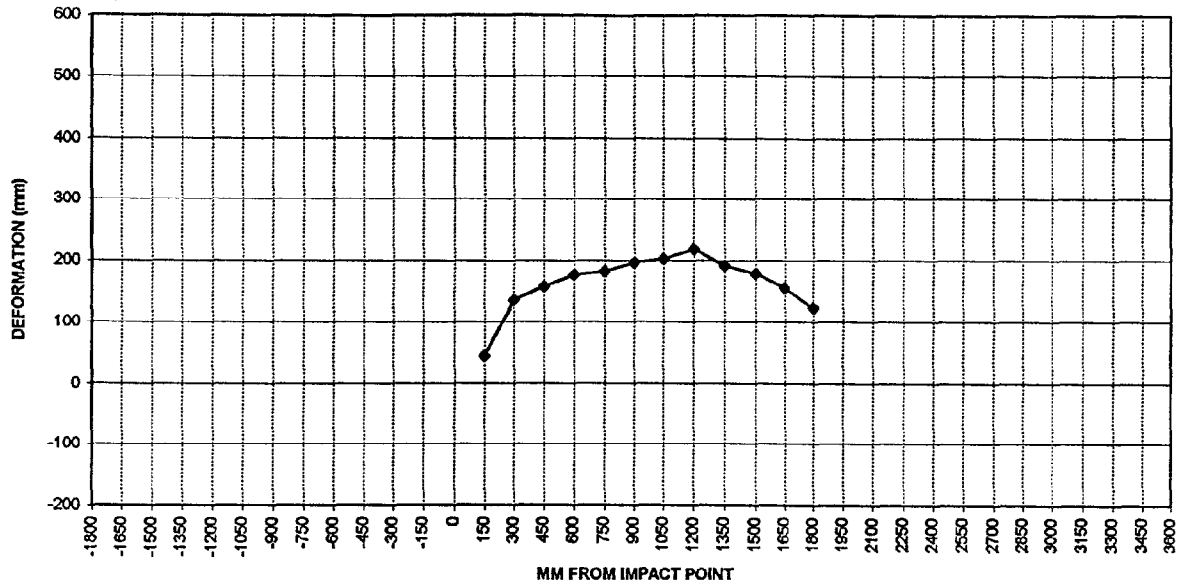
Reference plane is parallel to test vehicle longitudinal centerline.
Given dimensions = Reference plane to car body

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

	Level 1 - Axle Centerline		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
1950			
2100			
2250			
2400			
2550			
2700			
2850			
3000			
3150			
3300			
3450			
3600			

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

VEHICLE EXTERIOR STATIC CRUSH



LEVEL 1 - AXLE CENTERLINE

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

	Level 2 - Occupant H-Point		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1800			
-1650			
-1500			
-1350			
-1200			
-1050			
-900	752	763	11
-750	725	738	13
-600			
-450			
-300			
-150			
0 (impact point)	701	764	63
150	706	925	219
300	707	1012	305
450	709	1044	335
600	708	1058	350
750	706	1064	358
900	705	1072	367
1050	704	1074	370
1200	702	1062	360
1350	700	1060	360
1500	699	1038	339
1650	696	1028	332
1800	694	987	293

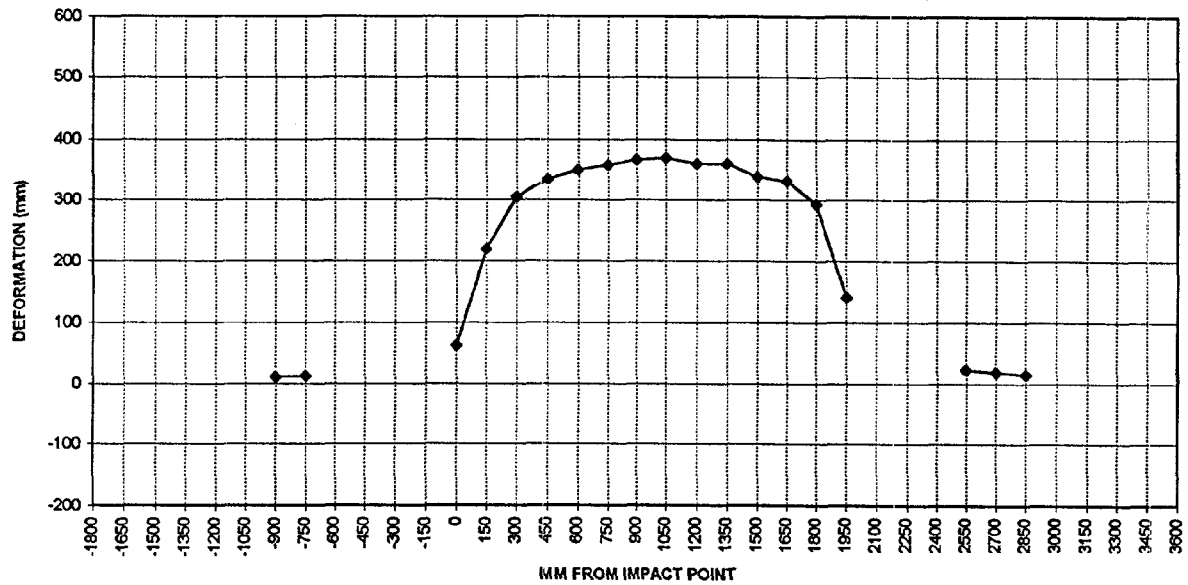
Reference plane is parallel to test vehicle longitudinal centerline.
Given dimensions = Reference plane to car body

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

	Level 2 - Occupant H-Point		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
1950	693	834	141
2100			
2250			
2400			
2550	704	727	23
2700	725	744	19
2850	750	765	15
3000			
3150			
3300			
3450			
3600			

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

VEHICLE EXTERIOR STATIC CRUSH



LEVEL 2 - OCCUPANT H-POINT

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

	Level 3 - Mid-Door		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1800			
-1650			
-1500			
-1350			
-1200			
-1050			
-900			
-750	734	748	14
-600	700	720	20
-450			
-300			
-150			
0 (impact point)	688	744	56
150	690	888	198
300	693	957	264
450	694	999	305
600	695	920	225
750	696	1026	330
900	697	1052	355
1050	697	1032	335
1200	697	1040	343
1350	697	1020	323
1500	695	993	298
1650	695	970	275
1800	689	941	252

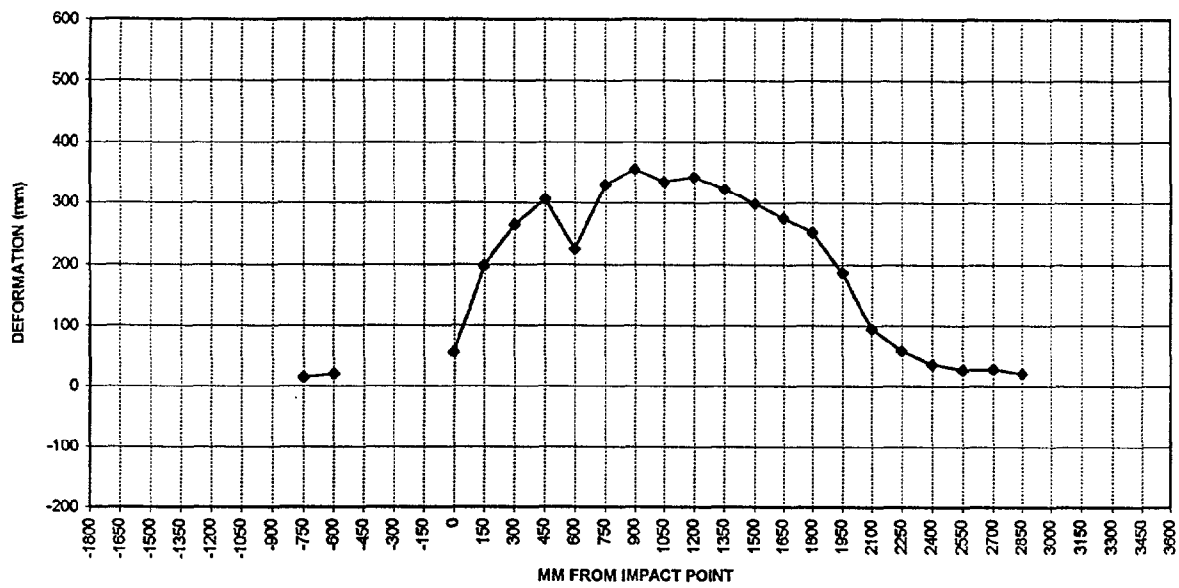
Reference plane is parallel to test vehicle longitudinal centerline.
Given dimensions = Reference plane to car body

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

	Level 3 - Mid-Door		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
1950	685	872	187
2100	684	778	94
2250	684	742	58
2400	690	726	36
2550	707	734	27
2700	732	760	28
2850	765	786	21
3000			
3150			
3300			
3450			
3600			

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

VEHICLE EXTERIOR STATIC CRUSH



LEVEL 3 - MID-DOOR

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

	Level 4 - Window Sill		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1800			
-1650			
-1500			
-1350			
-1200			
-1050			
-900	855	860	5
-750	824	840	16
-600	806	828	22
-450	794	822	28
-300	788	822	34
-150	783	824	41
0 (impact point)	778	828	50
150	771	854	83
300	768	906	138
450	765	954	189
600	763	985	222
750	763	994	231
900	762	1007	245
1050	761	1024	263
1200	761	1064	303
1350	760	1059	299
1500	760	1044	284
1650	760	1027	267
1800	758	964	206

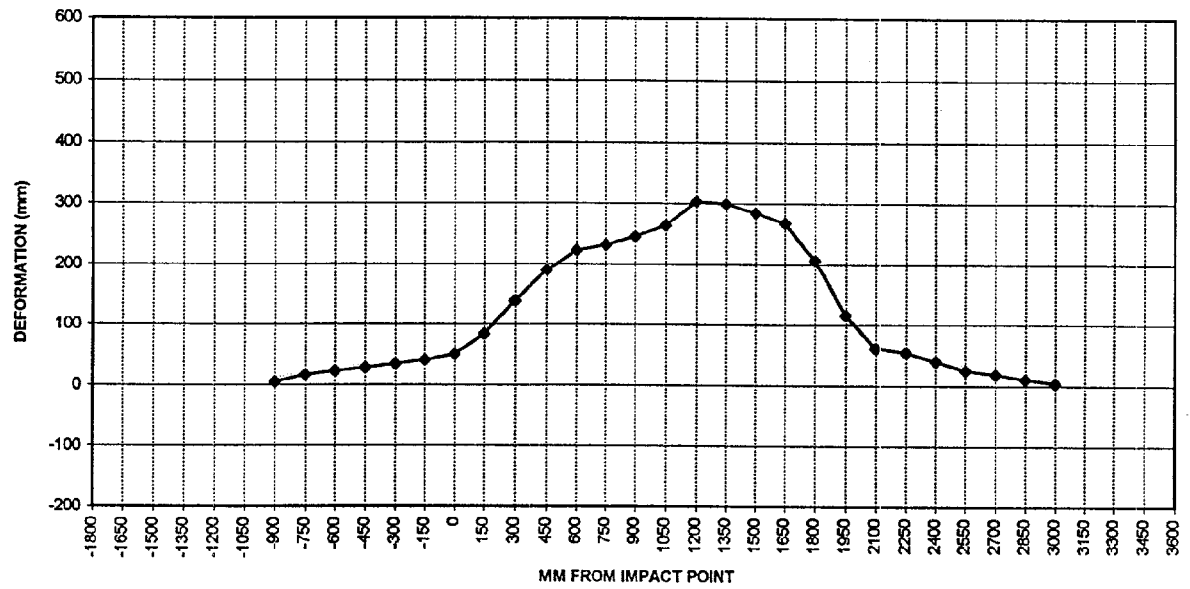
Reference plane is parallel to test vehicle longitudinal centerline.
 Given dimensions = Reference plane to car body

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

	Level 4 - Window Sill		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
1950	760	875	115
2100	765	826	61
2250	770	824	54
2400	777	817	40
2550	784	809	25
2700	798	816	18
2850	820	830	10
3000	871	875	4
3150			
3300			
3450			
3600			

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

VEHICLE EXTERIOR STATIC CRUSH



LEVEL 4 - WINDOW SILL

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

	Level 5 - Window Top		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1800			
-1650			
-1500			
-1350			
-1200			
-1050			
-900			
-750			
-600			
-450			
-300			
-150			
0 (impact point)			
150			
300			
450			
600			
750			
900	988	984	-4
1050	980	1000	20
1200	980	1025	45
1350	980	1051	71
1500	980	1001	21
1650	979	950	-29
1800	979	1027	48

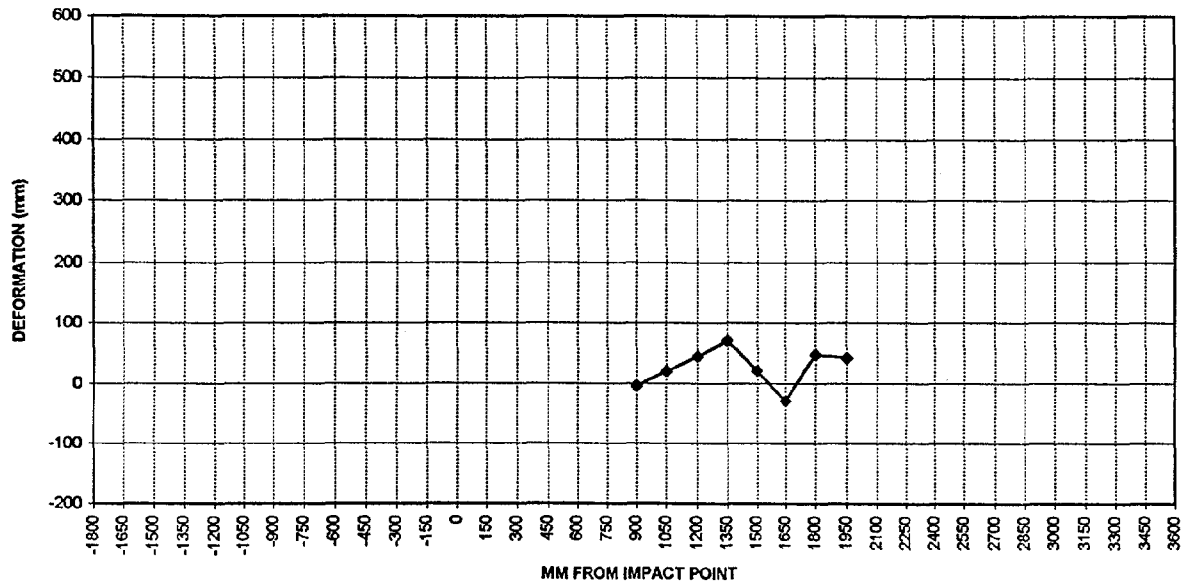
Reference plane is parallel to test vehicle longitudinal centerline.
Given dimensions = Reference plane to car body

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

	Level 5 - Window Top		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
1950	988	1030	42
2100			
2250			
2400			
2550			
2700			
2850			
3000			
3150			
3300			
3450			
3600			

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

VEHICLE EXTERIOR STATIC CRUSH



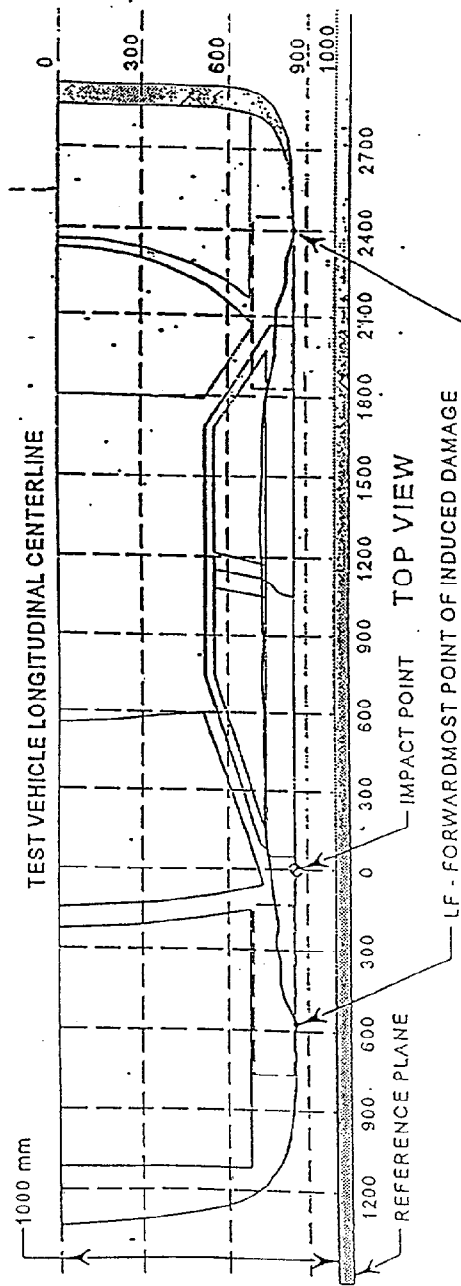
LEVEL 5 - WINDOW TOP

DATA SHEET NO. 11

VEHICLE DAMAGE PROFILE DISTANCES

Year/Make/Model/Body Style: 1998/Hyundai/Elantra/4-Door

NHTSA NO.: MW0501 Test Date: January 28, 1998



MEASUREMENT CONVENTIONS:
Forward of the impact point (towards front of vehicle) is considered negative (-).
Rearward of the impact point (toward rear of vehicle) is considered positive (+).

DPD MEASUREMENTS	POST-TEST (mm)	PRE-TEST (mm)	STATIC CRUSH (mm)
1. (LF = -900 mm)	855	855	0
2. -150 mm	824	783	41
3. 600 mm	1058	708	350
4. 1500 mm	1038	699	339
5. 2250 mm	742	684	58
6. (LR = 3000 mm)	871	871	0

DATA SHEET NO. 12

EXTERIOR STATIC CRUSH FOR SIDE IMPACTOR

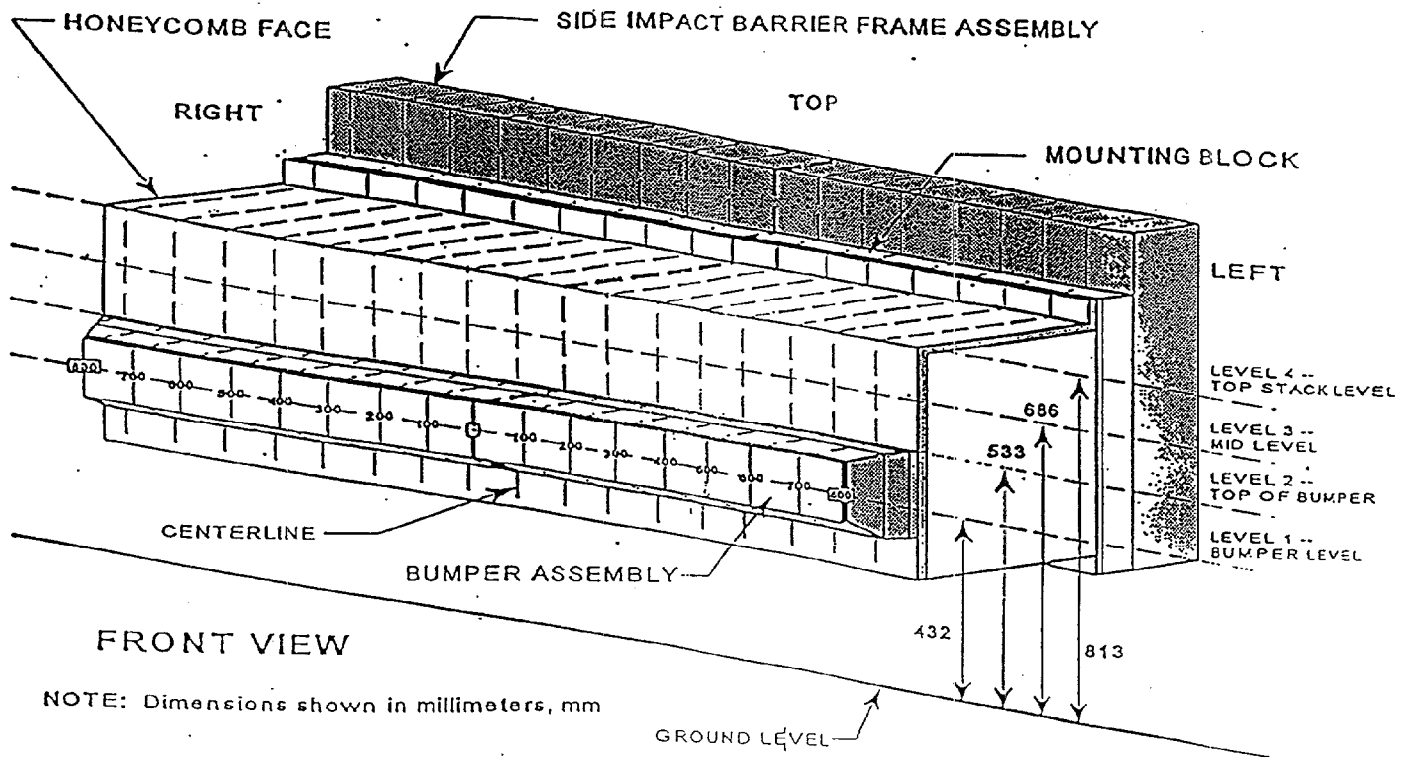
Year/Make/Model/Body Style: 1998/Hyundai/Elantra/4-Door

Vehicle NHTSA No.: MW0501 Test Date: January 28, 1998

Location	Height at CL	Distance Right of Center (mm)									Distance Left of Center (mm)							
		800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
Top Stack Level 4	813 mm	70	13	2	1	3	6	7	11	13	17	20	22	26	49	81	122	169
Mid Level Level 3	686 mm	53	29	12	2	-1	-1	5	10	8	8	11	13	18	118	135	93	168
Top Bumper Level 2	533 mm	77	60	50	38	29	26	26	22	21	25	28	33	40	46	61	88	140
Mid Bumper Level 1	432 mm	109	98	83	72	61	60	57	53	51	55	56	61	64	72	92	129	171

See next page for Barrier Face Graphic

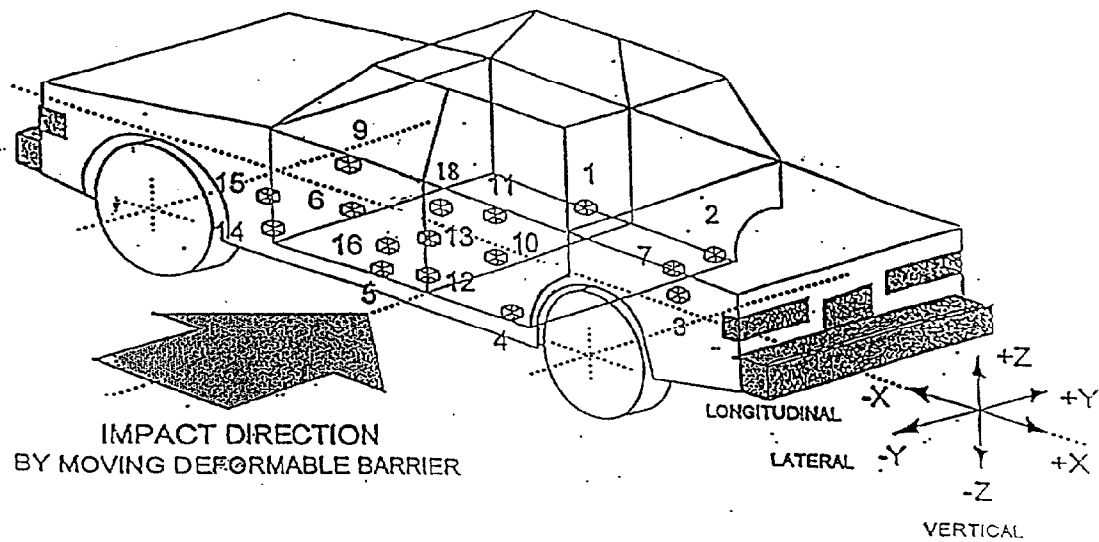
DATA SHEET NO. 12 (Cont'd)



DATA SHEET 13
TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 1998/Hyundai/Elantra/4-Door

Vehicle NHTSA No.: MW0501 Test Date: January 28, 1998



- 1-RT. Side Sill @ Frt Seat
- 2-RT. Side Sill @ Rr. Seat
- 3-Rr. Floorpan Above Axle
- 4-Left Side Sill @ Rr. Seat
- 5-Left Side Sill @ Frt. Seat
- 6-Left Frt. Door on Centerline
- 7-Rt. Rr. Occ. Compartment
- 9-Left Frt. Door Upper Ctrline

- 10-Midrear of Left Rear Door
- 11-Left Rear Door Upper Ctrline
- 12-Left Lower B-Post
- 13-Left Middle B-Post
- 14-Left Lower A-Post
- 15-Left Middle A-Post
- 16-Front Seat Track
- 18-Vehicle C.G.

DATA SHEET NO. 13

TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 1998/Hyundai/Elantra/4-Door

Vehicle NHTSA No.: MW0501 Test Date: January 28, 1998

Accel. No.	Description	Coordinates (mm)*			Long. (X) Maximums (g's)		Lat. (Y) Maximums (g's)		Vert. (Z) Maximums (g's)		Resultant (g's)
		X	Y	Z	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	
1	Rt. Side Sill @ Front Seat	2361	649	200	3.3	-4.9	20.4	-2.4	5.9	-4.7	20.5
2	Rt. Side Sill @ Rear Seat	1385	650	205	3.2	-5.1	26.4	-5.2	5.9	-3.8	27.0
3	Rr. Floorpan Above Axle	930	0	480	2.4	-8.6	25.8	-3.6	9.3	-6.4	26.2
4	Left Side Sill @ Rr. Seat	1404	-658	210	---	---	44.2	-10.2	---	---	---
5	Left Side Sill @ Frt. Seat	2358	-657	200	---	---	52.5	-5.5	---	---	---
6	Left Front Door Centerline	2488	-716	670	---	---	219.7	-123.1	---	---	---
7	Right Rear Occupant Compartment	1644	354	220	---	---	25.8	-4.1	---	---	---
8	Mid Rear of Left Front Door	2080	-713	675	---	---	135.0	-81.6	---	---	---
9	Left Front Door Upper Centerline	2470	-708	850	---	---	267.9	-187.8	---	---	---
10	Left Rear Door Mid Rear	1592	-707	702	---	---	205.1	-214.4	---	---	---
11	Left Rear Door Upper Centerline	1530	-697	895	---	---	204.8	-107.8	---	---	---
12	Left Lower B-Post	1906	-658	260	---	---	109.9	-27.0	---	---	---
13	Left Mid B-Post	1928	-701	800	---	---	145.7	-35.5	---	---	---
14	Left Lower A-Post	2910	-697	340	---	---	69.7	-43.6	---	---	---
15	Left Mid A-Post	3000	-734	865	---	---	35.9	-11.0	---	---	---
16	Driver Left Seat Track	2044	-558	320	---	---	175.2	-71.2	---	---	---
18	Vehicle CG	2684	30	300	4.2	-9.6	20.1	*	8.3	-8.3	22.4

*Reference: X - Rear Bumper (+ Forward)

Y - Vehicle Centerline (+ To right)

Z - Ground Level (+ Up)

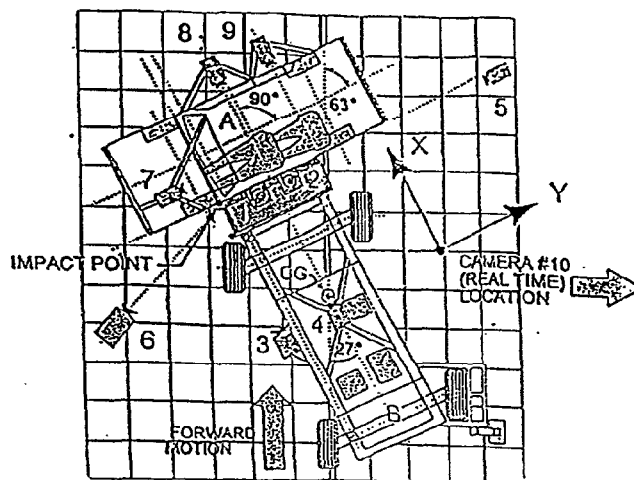
* Data is not valid after 70 msec.

DATA SHEET NO. 14

MOVING DEFORMABLE BARRIER (MDB) ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 1998/Hyundai/Elantra/4-Door

Vehicle NHTSA No.: MW0501 Test Date: January 28, 1998



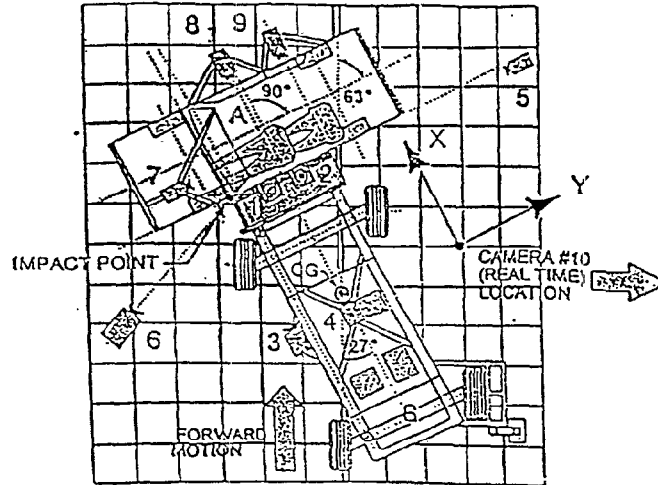
Accel. No.	Description	Coordinates (mm)*			(+) Positive		(-) Negative	
		X	Y	Z	Max. (g)	Time (msec)	Max. (g)	Time (msec)
1	MDB Center of Gravity	-1092	0	483				
	Longitudinal (X)	---	---	---	1.0	104	-19.1	41
	Lateral (Y)	---	---	---	3.5	60	-5.4	37
	Vertical (Z)	---	---	---	17.3	57	-17.4	65
	Resultant (R)	---	---	---	21.1	57	---	---
2	Rear Frame Member	-2591	-625	622				
	Longitudinal (X)	---	---	---	2.2	179	-22.0	31
	Lateral (Y)	---	---	---	3.5	38	-1.7	176

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

DATA SHEET NO. 15
HIGH SPEED CAMERA LOCATIONS AND DATA

Year/Make/Model/Body Style: 1998/Hyundai/Elantra/4-Door

Vehicle NHTSA No.: MW0501 Test Date: January 28, 1998



Camera No.	View	Coordinates (mm)*			Angle	Lens (mm)	Film Speed (fps)
		X	Y	Z			
	Real Time						
6	Left Impact	-545	-2360	1670		13	971
8	Onboard Driver					8	939
9	Onboard Passenger					8	1105
7	Onboard Hood	-810	10500	1925		13	1005
5	Right Impact					25	1015
1	Top Overall	-40	1290	5000		8	1010
2	Top Impact	-430	-50	5000		13	1000
4	Cart Overall					13	1015
3	Cart Pointer					35	926

* Reference: (from point of impact)

+X = Forward

+Y = To Right

+Z = Upward

DATA SHEET 16
FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

Vehicle Year/Make/Model/Body Style: 1998/Hyundai/Elantra/4-Door

Vehicle NHTSA No.: MW0501 Test Date: January 28, 1998

TEST REQUIREMENTS:

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

TEST VEHICLE IMPACT TYPE: X Side Impact MDB 38.25 mph (61.6 kph)

FUEL SPILLAGE MEASUREMENT:

POST IMPACT TEST	TEST RESULTS	MAXIMUM ALLOWABLE
1. From impact until vehicle motion ceases	0	1 oz
2. For 5 minute period after vehicle motion ceases	0	5 oz
3. For next 25 minutes	0	1 oz./1 min

FUEL SPILLAGE LOCATION(S): None

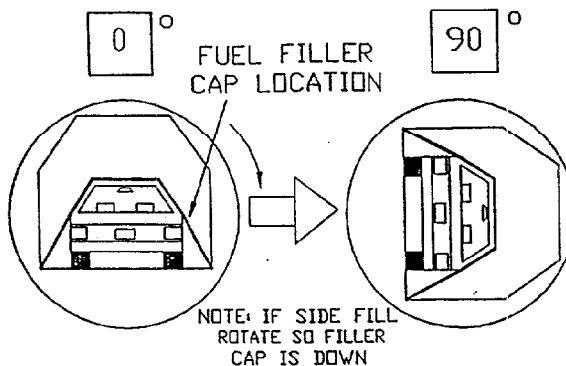
DATA SHEET 16

FMVSS 301 STATIC ROLLOVER TEST DATA

Vehicle Year/Make/Model/Body Style: 1998/Hyundai/Elantra/4-Door

Vehicle NHTSA No.: MW0501 Test Date: January 28, 1998

TEST PHASE: 0° - 90°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 54 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 54 seconds

Next Whole Minute Interval = 8 minutes

FUEL SPILLAGE MEASUREMENT:

0° TO 90° ROTATION (FILLER CAP DOWN)	TEST RESULTS	MAXIMUM ALLOWABLE
1. First 5 Minutes From Onset of Rotation	0 oz	5 oz
2. Sixth Minute From Onset of Rotation	0 oz	1 oz
3. Seventh Minute From Onset of Rotation	0 oz	1 oz
4. Eighth Minute if Required	0 oz	1 oz

FUEL SPILLAGE LOCATIONS(S): None

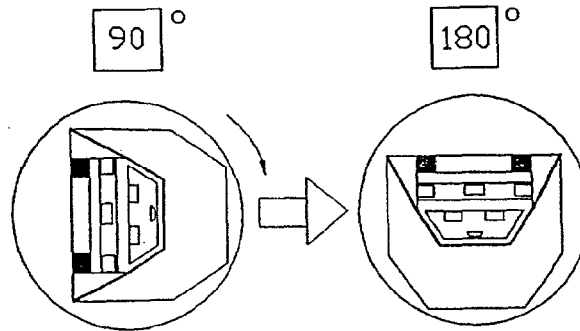
DATA SHEET 16

FMVSS 301 STATIC ROLLOVER TEST DATA (Cont'd)

Vehicle Year/Make/Model/Body Style: 1998/Hyundai/Elantra/4-Door

Vehicle NHTSA No.: MW0501 Test Date: January 28, 1998

TEST PHASE: 90° - 180°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 32 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 32 seconds

Next Whole Minute Interval = 8 minutes

FUEL SPILLAGE MEASUREMENT:

90° TO 180° ROTATION	TEST RESULTS	MAXIMUM ALLOWABLE
1. First 5 Minutes From Onset of Rotation	0 oz	5 oz
2. Sixth Minute From Onset of Rotation	0 oz	1 oz
3. Seventh Minute From Onset of Rotation	0 oz	1 oz
4. Eighth Minute if Required	0 oz	1 oz

FUEL SPILLAGE LOCATIONS(S): None

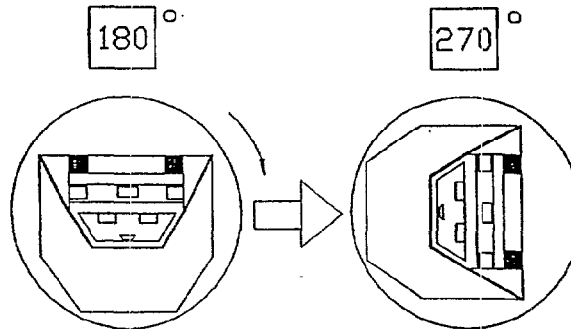
DATA SHEET 16

FMVSS 301 STATIC ROLLOVER TEST DATA (Cont'd)

Vehicle Year/Make/Model/Body Style: 1998/Hyundai/Elantra/4-Door

Vehicle NHTSA No.: MW0501 Test Date: January 28, 1998

TEST PHASE: 180° - 270°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 14 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 14 seconds

Next Whole Minute Interval = 8 minutes

FUEL SPILLAGE MEASUREMENT:

180° TO 270° ROTATION	TEST RESULTS	MAXIMUM ALLOWABLE
1. First 5 Minutes From Onset of Rotation	0 oz	5 oz
2. Sixth Minute From Onset of Rotation	0 oz	1 oz
3. Seventh Minute From Onset of Rotation	0 oz	1 oz
4. Eighth Minute if Required	0 oz	1 oz

FUEL SPILLAGE LOCATIONS(S): None

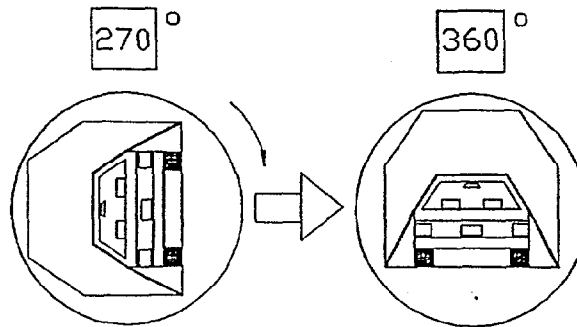
DATA SHEET 16

FMVSS 301 STATIC ROLLOVER TEST DATA

Vehicle Year/Make/Model/Body Style: 1998/Hyundai/Elantra/4-Door

Vehicle NHTSA No.: MW0501 Test Date: January 28, 1998

TEST PHASE: 270° - 360°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 37 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 37 seconds

Next Whole Minute Interval = 8 minutes

FUEL SPILLAGE MEASUREMENT:

270° TO 360° ROTATION	TEST RESULTS	MAXIMUM ALLOWABLE
1. First 5 Minutes From Onset of Rotation	0 oz	5 oz
2. Sixth Minute From Onset of Rotation	0 oz	1 oz
3. Seventh Minute From Onset of Rotation	0 oz	1 oz
4. Eighth Minute if Required	0 oz	1 oz

FUEL SPILLAGE LOCATIONS(S): None

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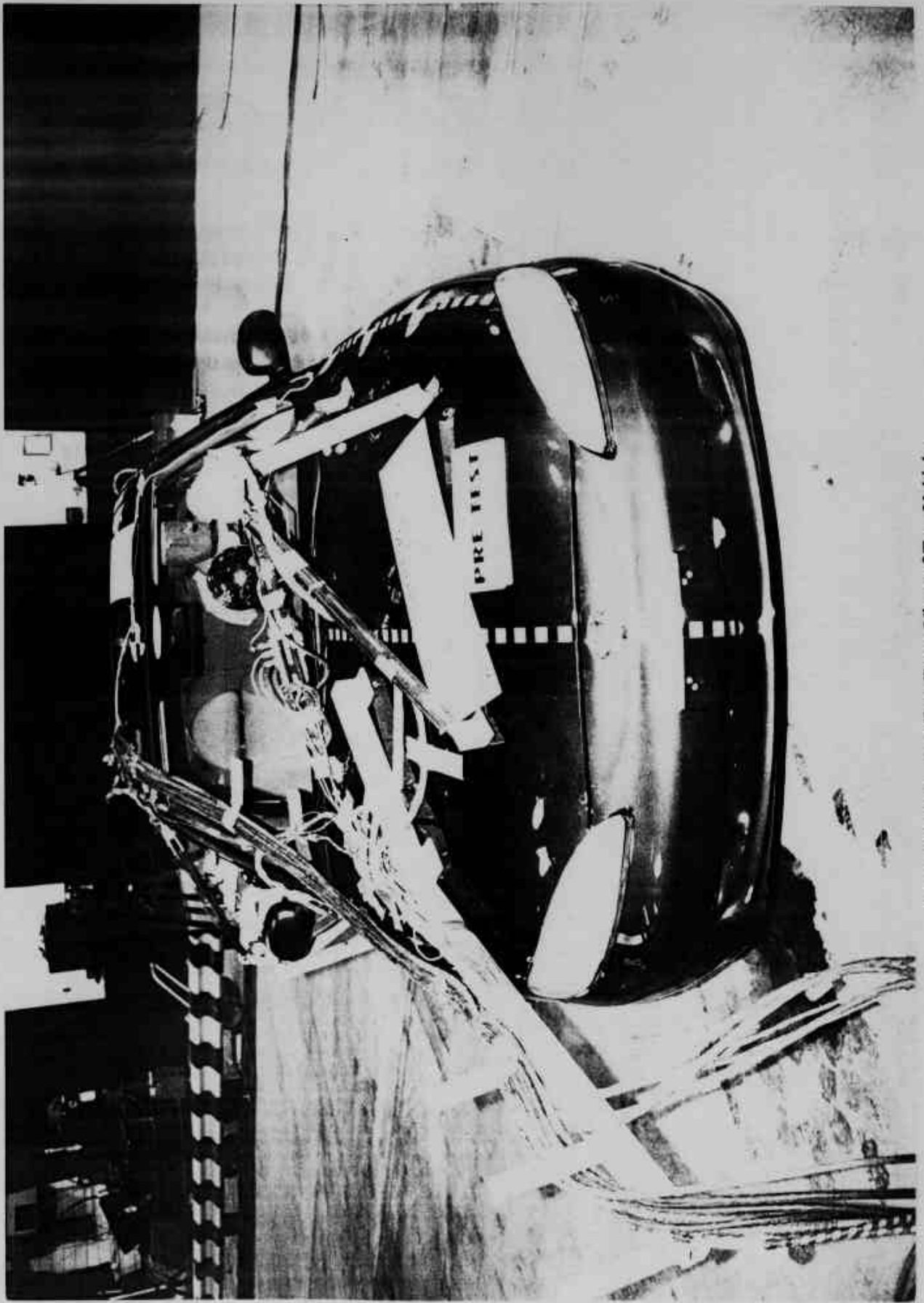


Photo No. A-1 - Pre-Test Front View of Test Vehicle

A-1

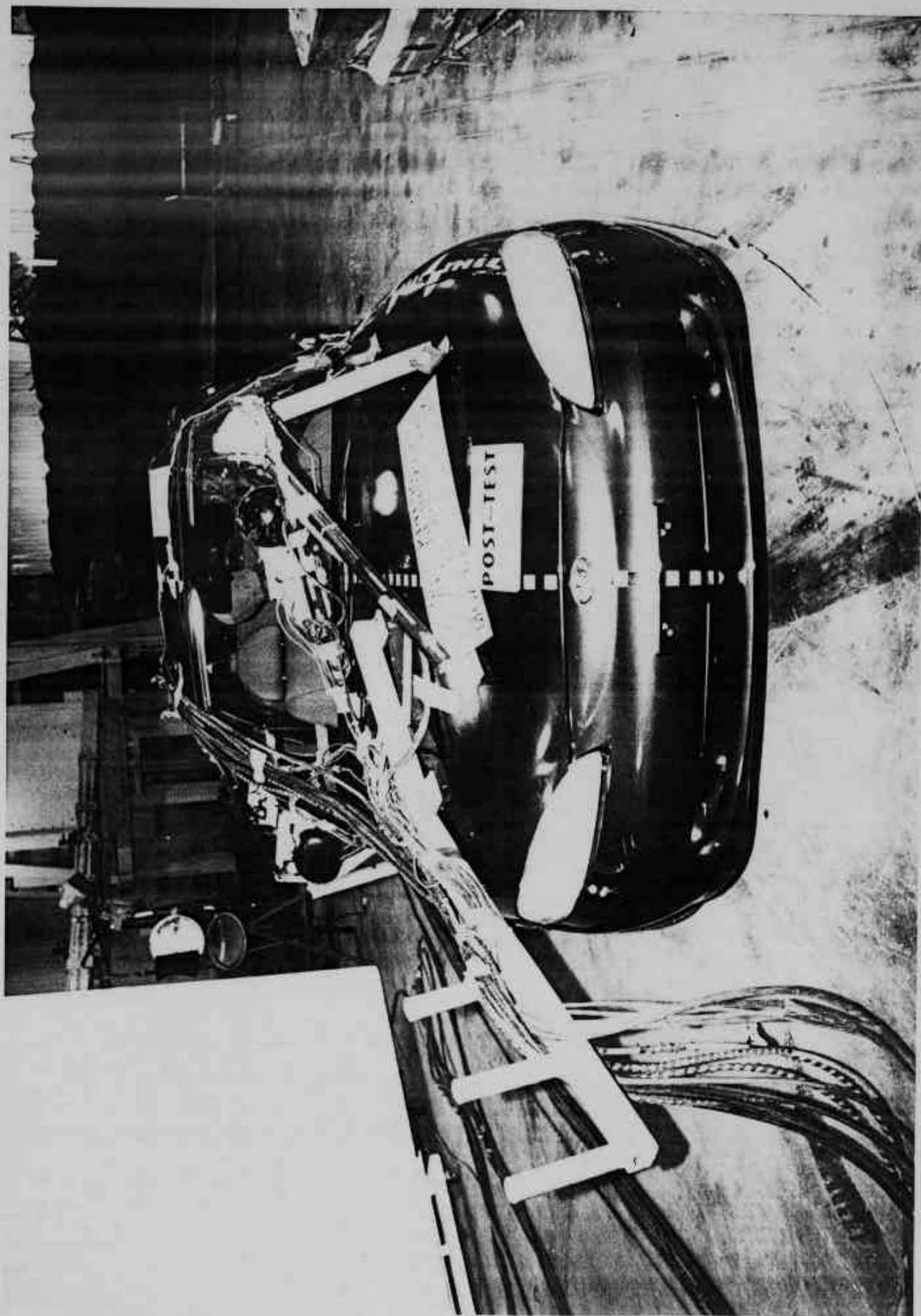


Photo No. A-2 - Post-Test Front View of Test Vehicle

A-2

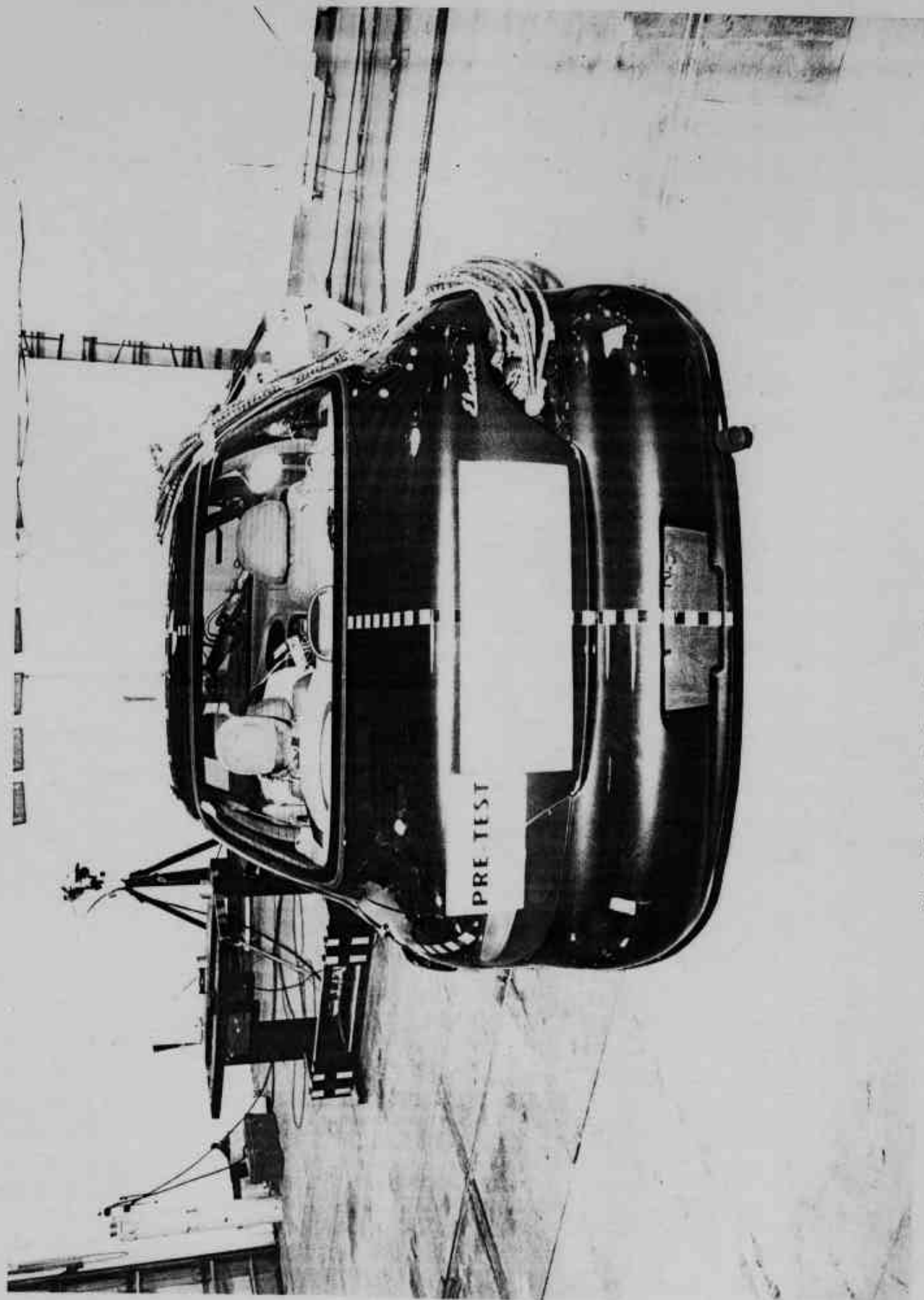


Photo No. A-3 - Pre-Test Rear View of Test Vehicle

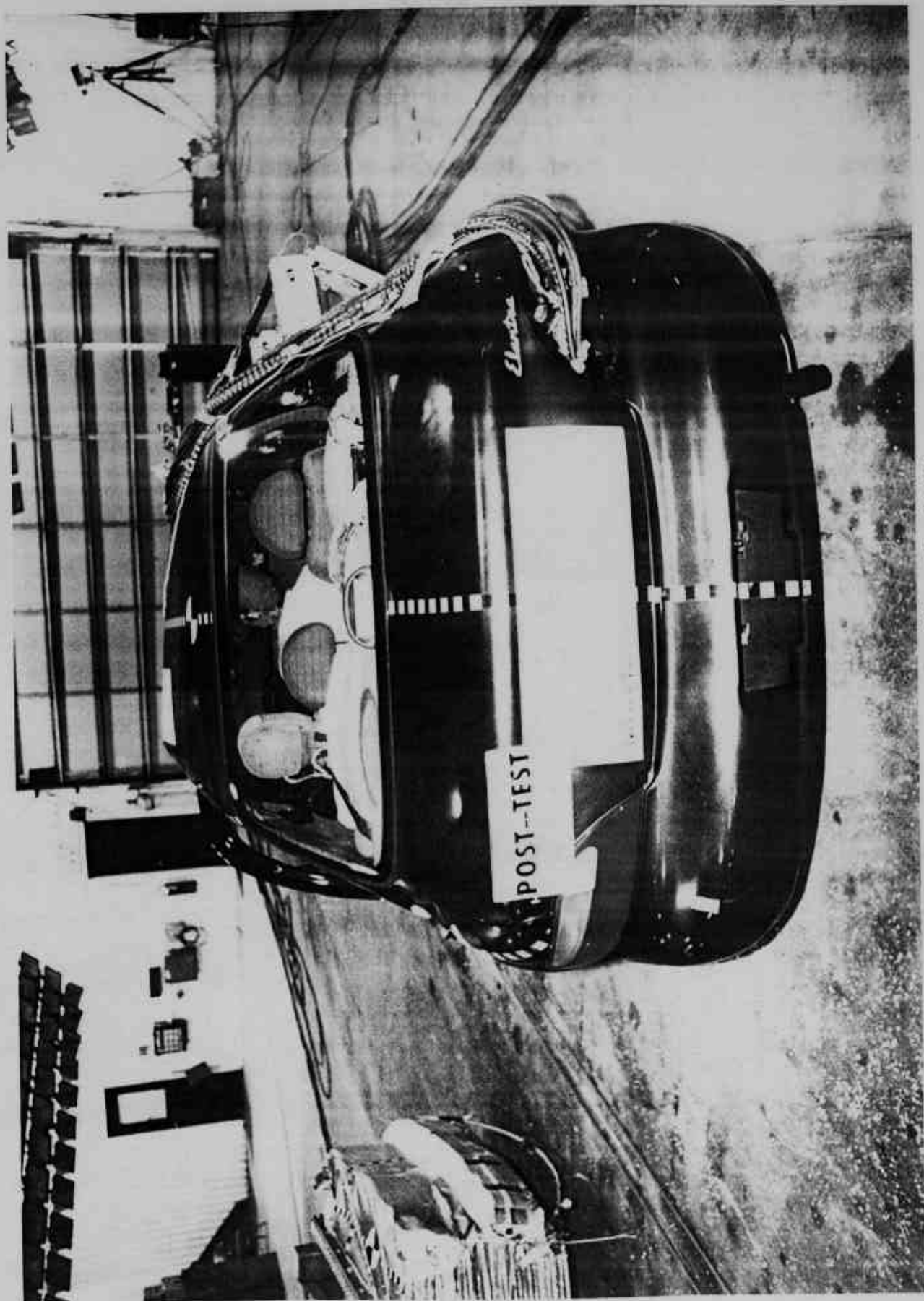
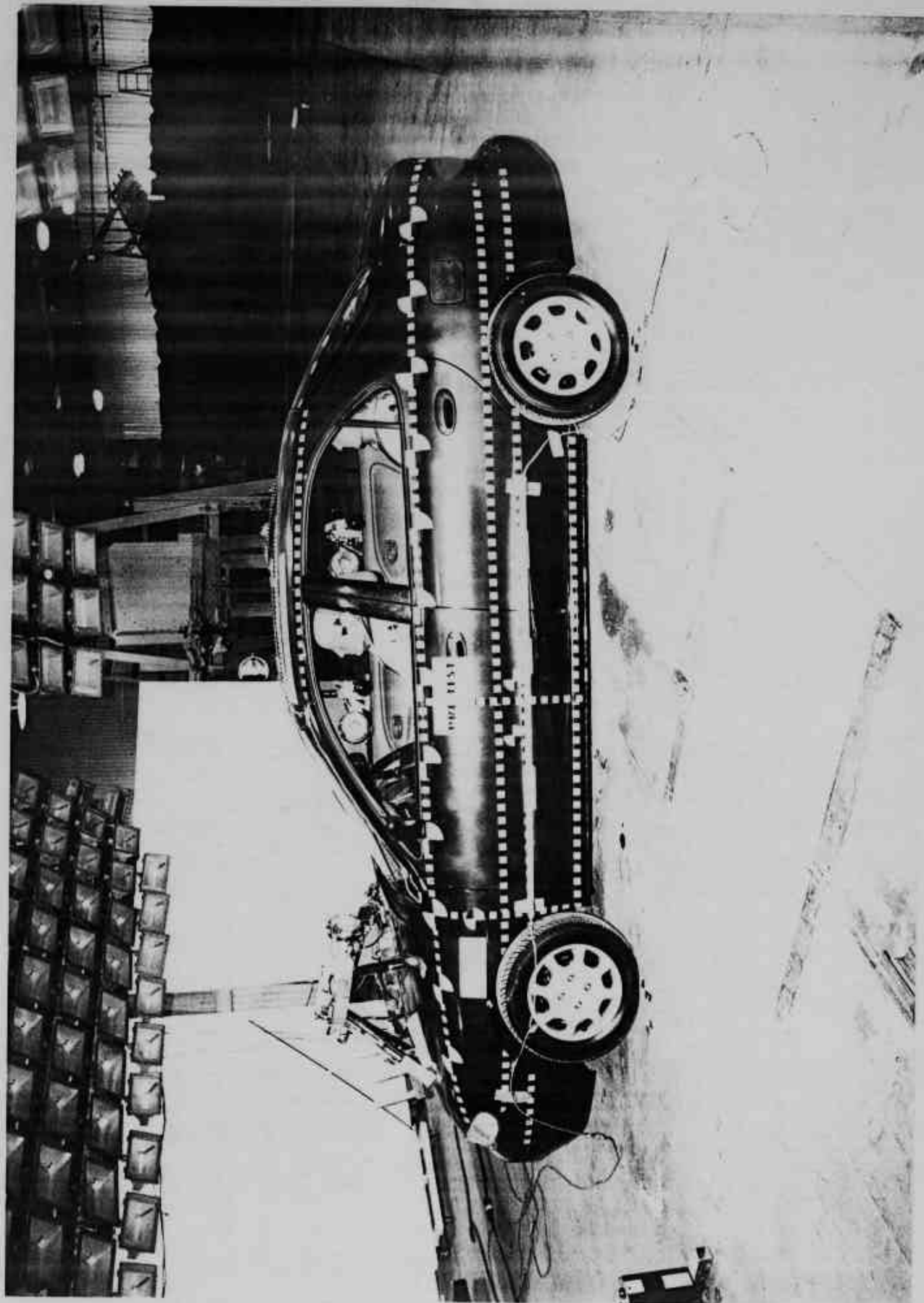


Photo No. A-4 - Post-Test Rear View of Test Vehicle



A-5

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

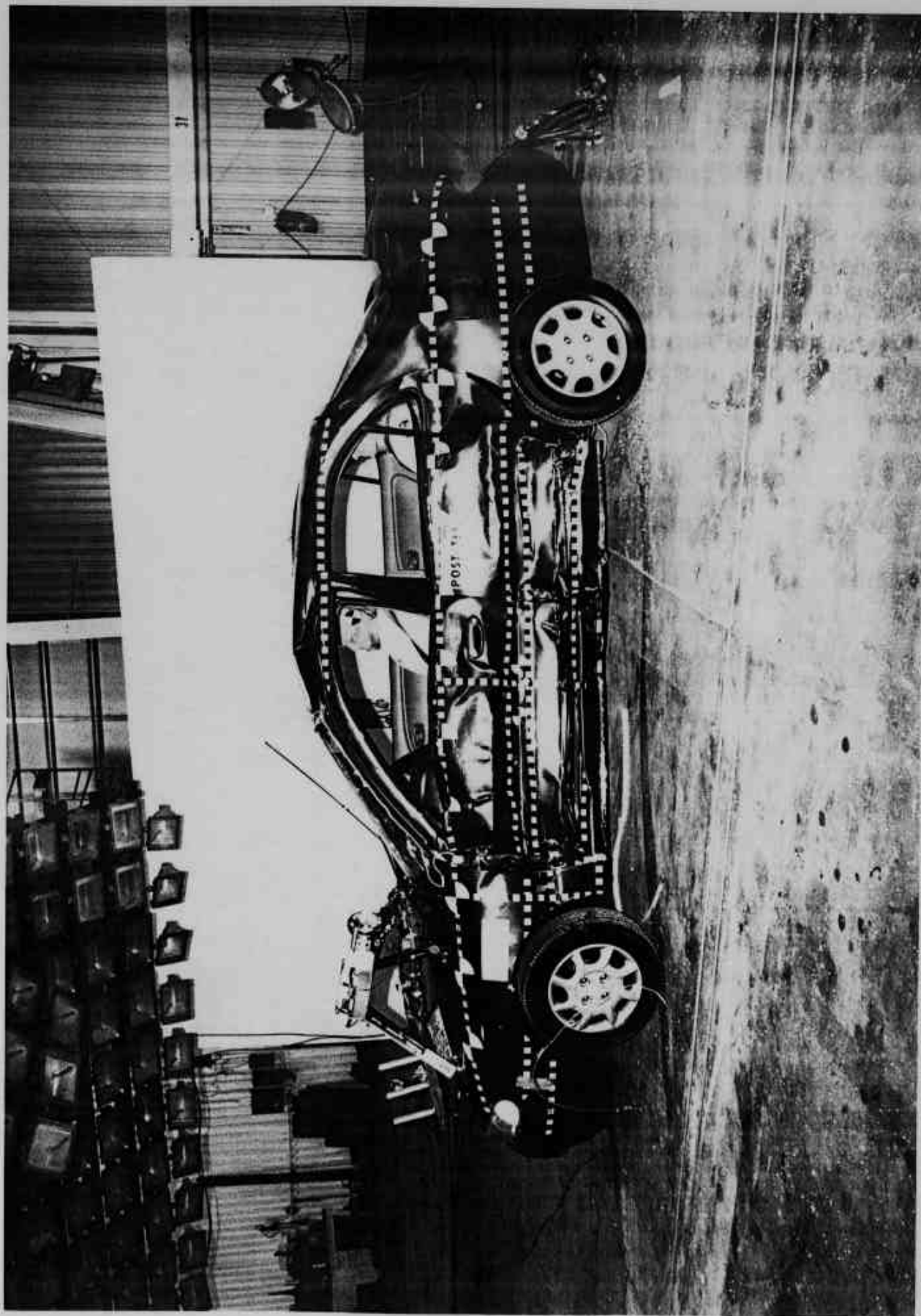


Photo No. A-6 - Post-Test Left Side View of Test Vehicle

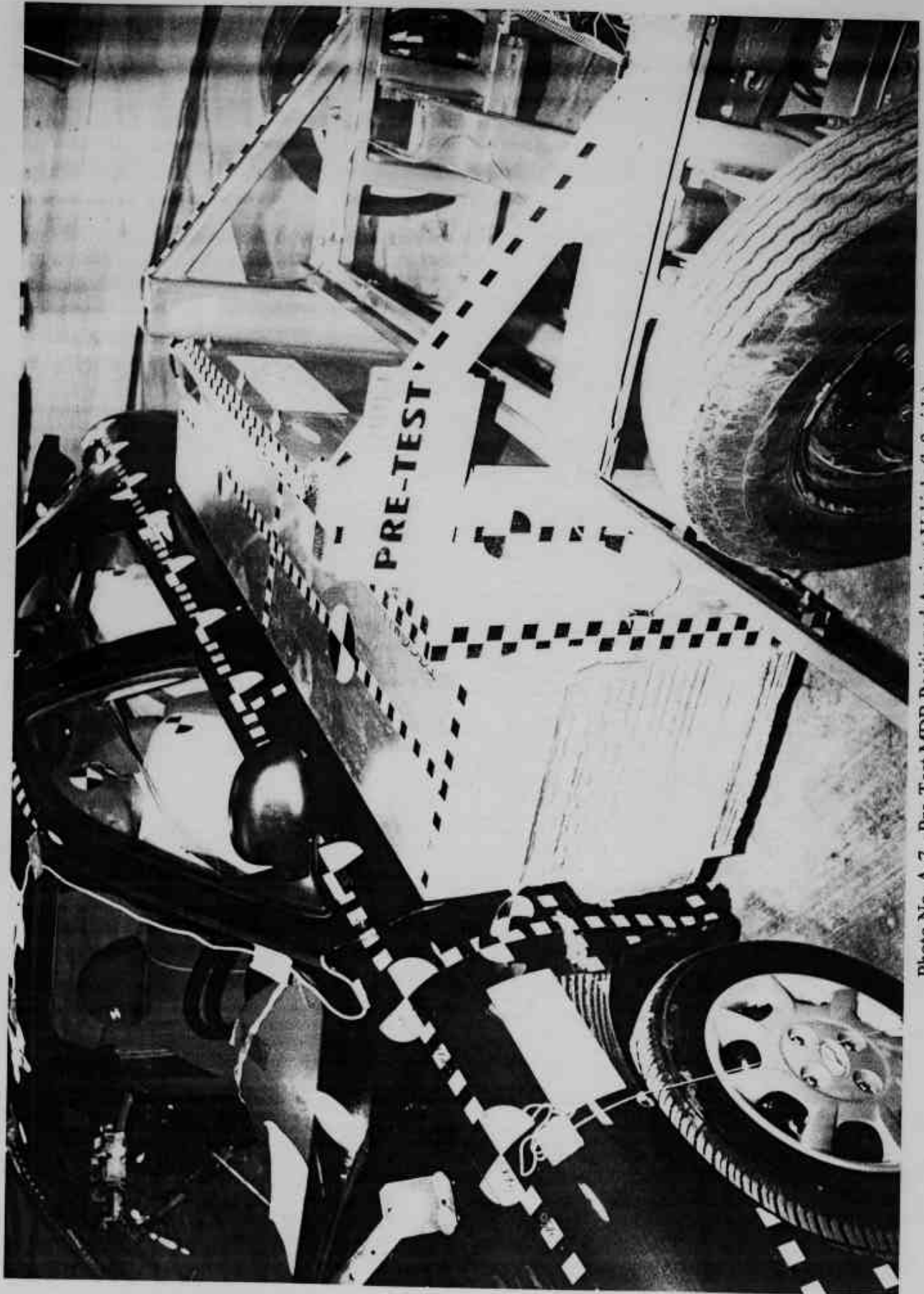


Photo No. A-7 - Pre-Test MDB Positioned Against Vehicle (left side)

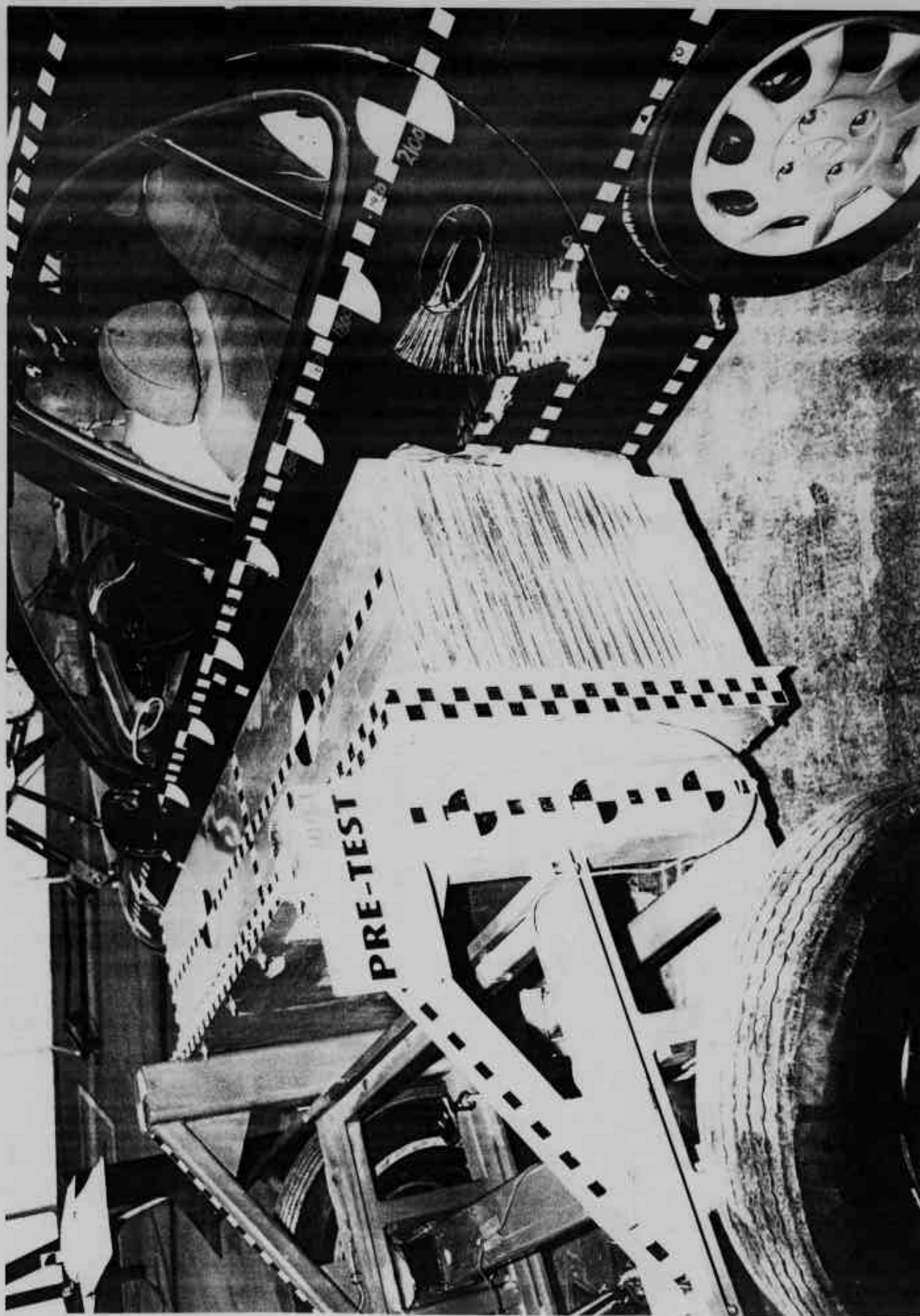


Photo No. A-8 - Pre-Test MDB Positioned Against Vehicle (right side)

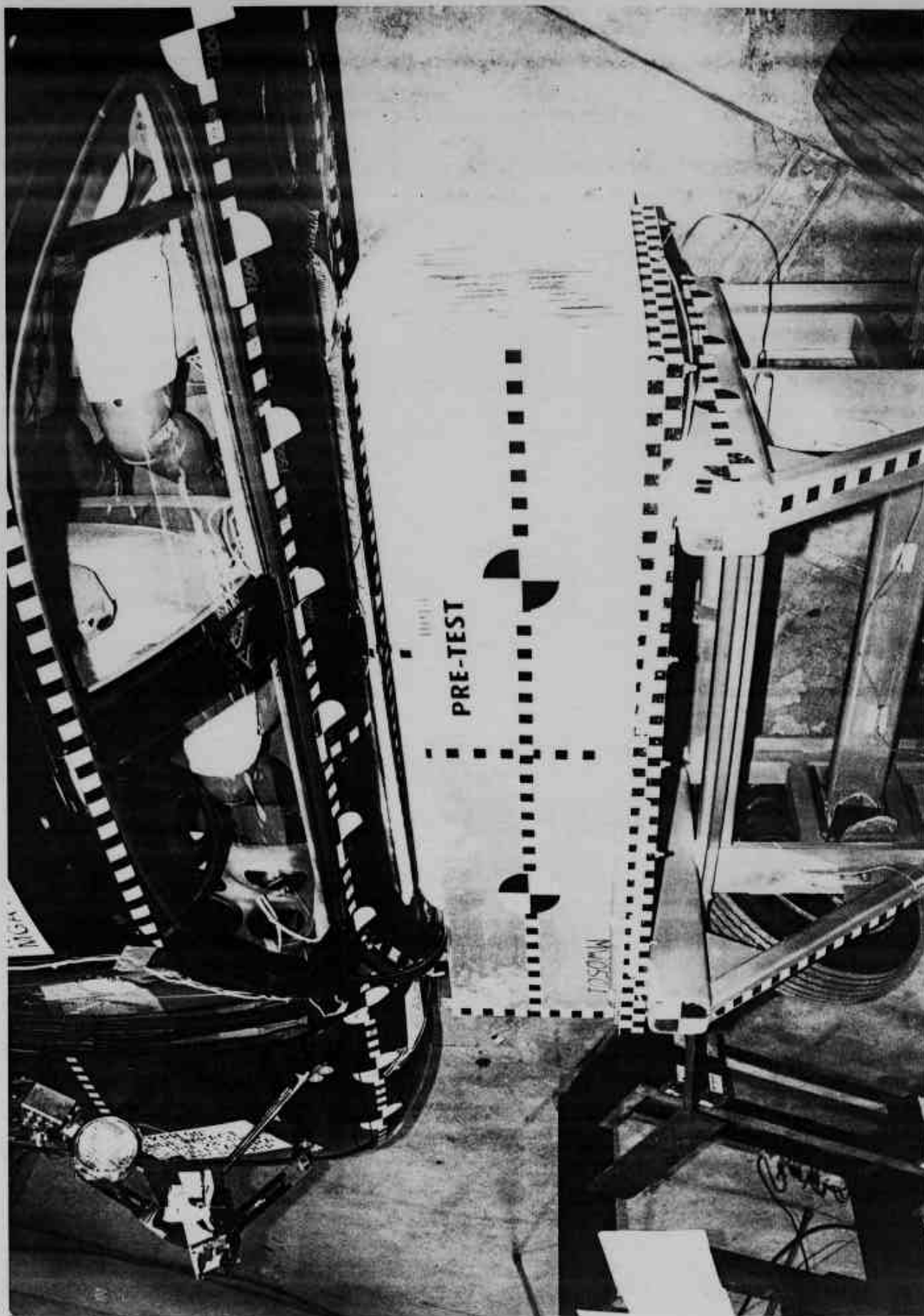


Photo No. A-9 - Pre-Test MDB Positioned Against Vehicle Overhead View

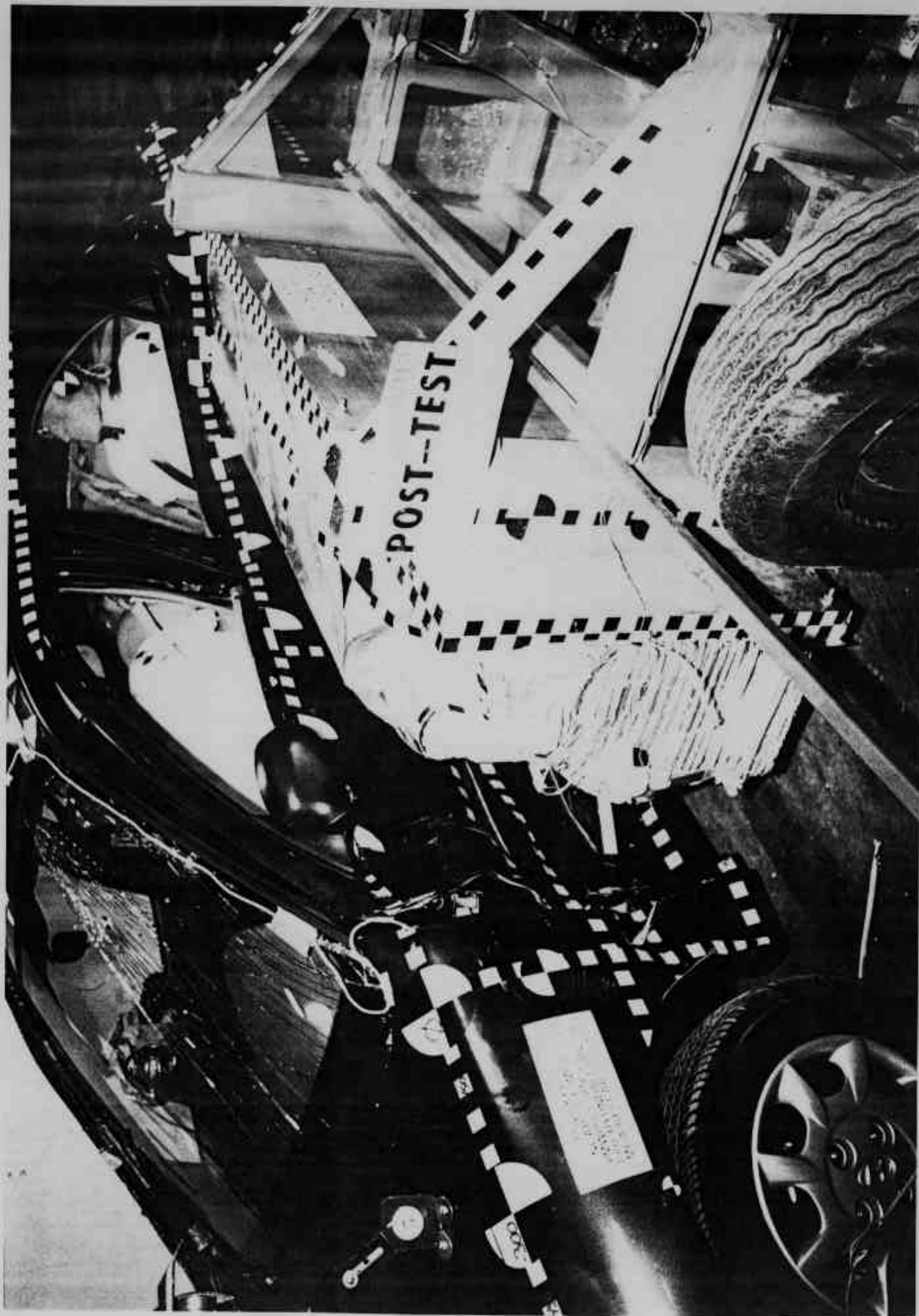


Photo No. A-10 - Post-Test MDB Positioned Against Vehicle (left side)

A-10

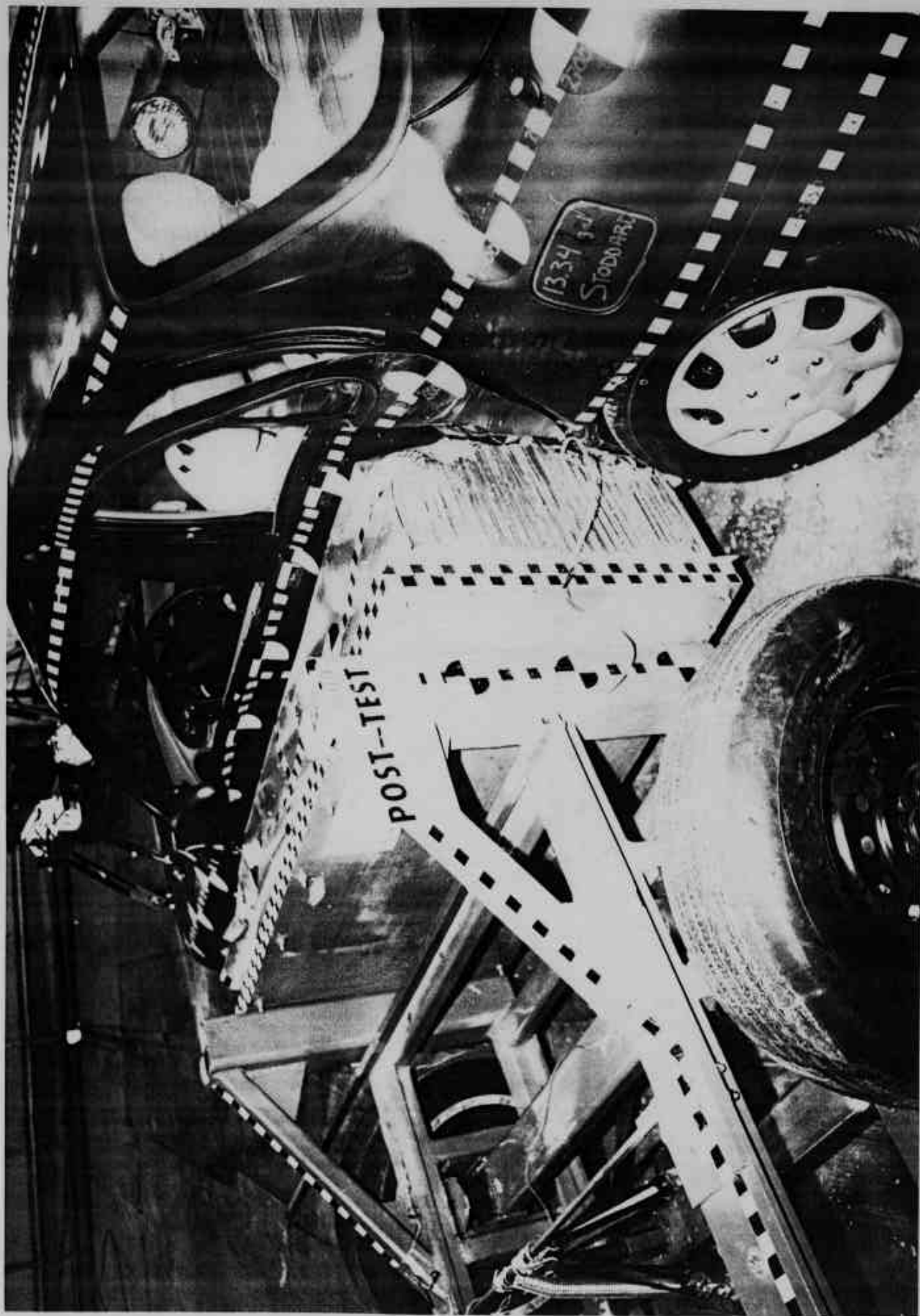


Photo No. A-11 - Post-Test MDB Positioned Against Vehicle (right side)

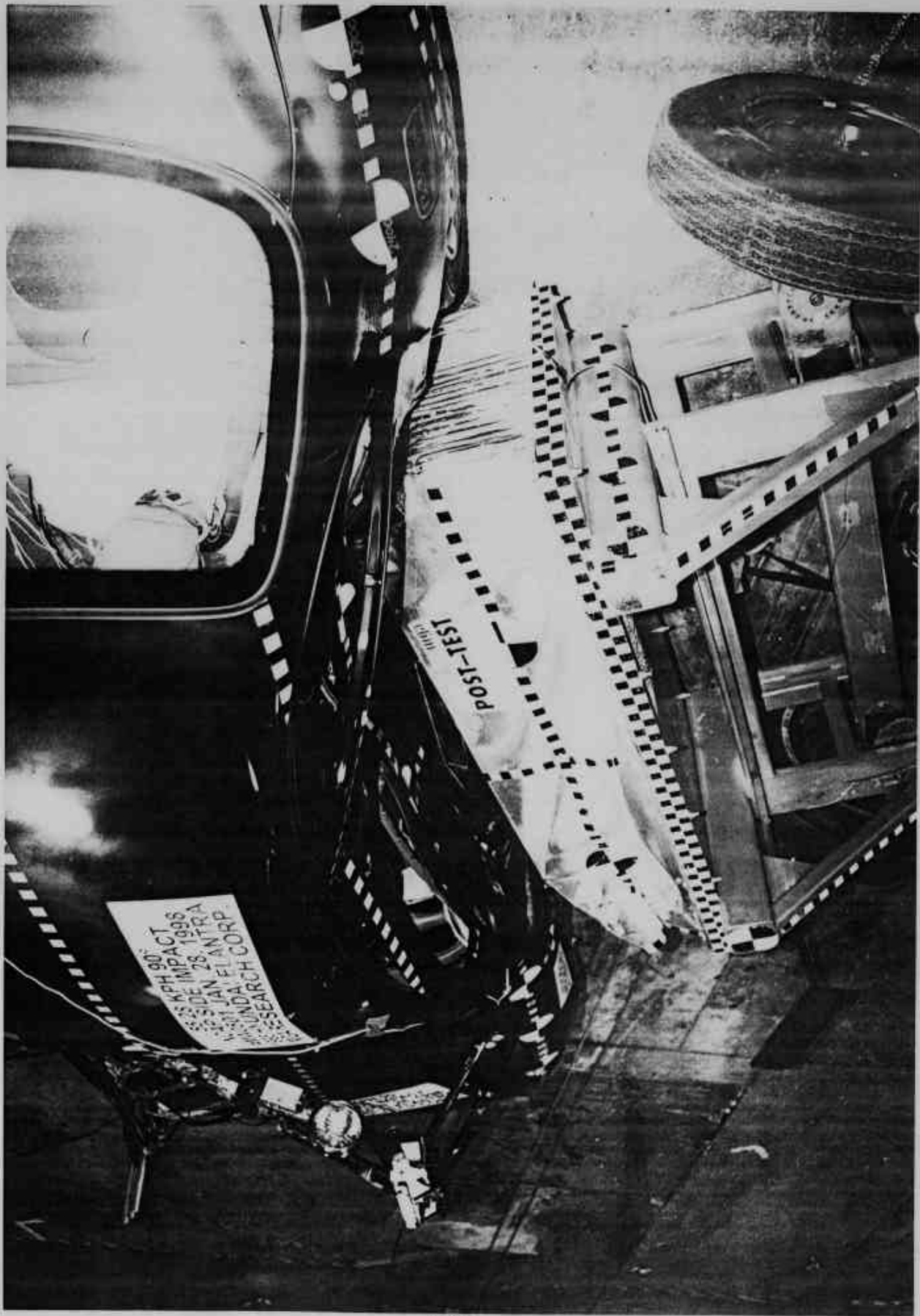


Photo No. A-12 - Post-Test MDB Positioned Against Vehicle Overhead View

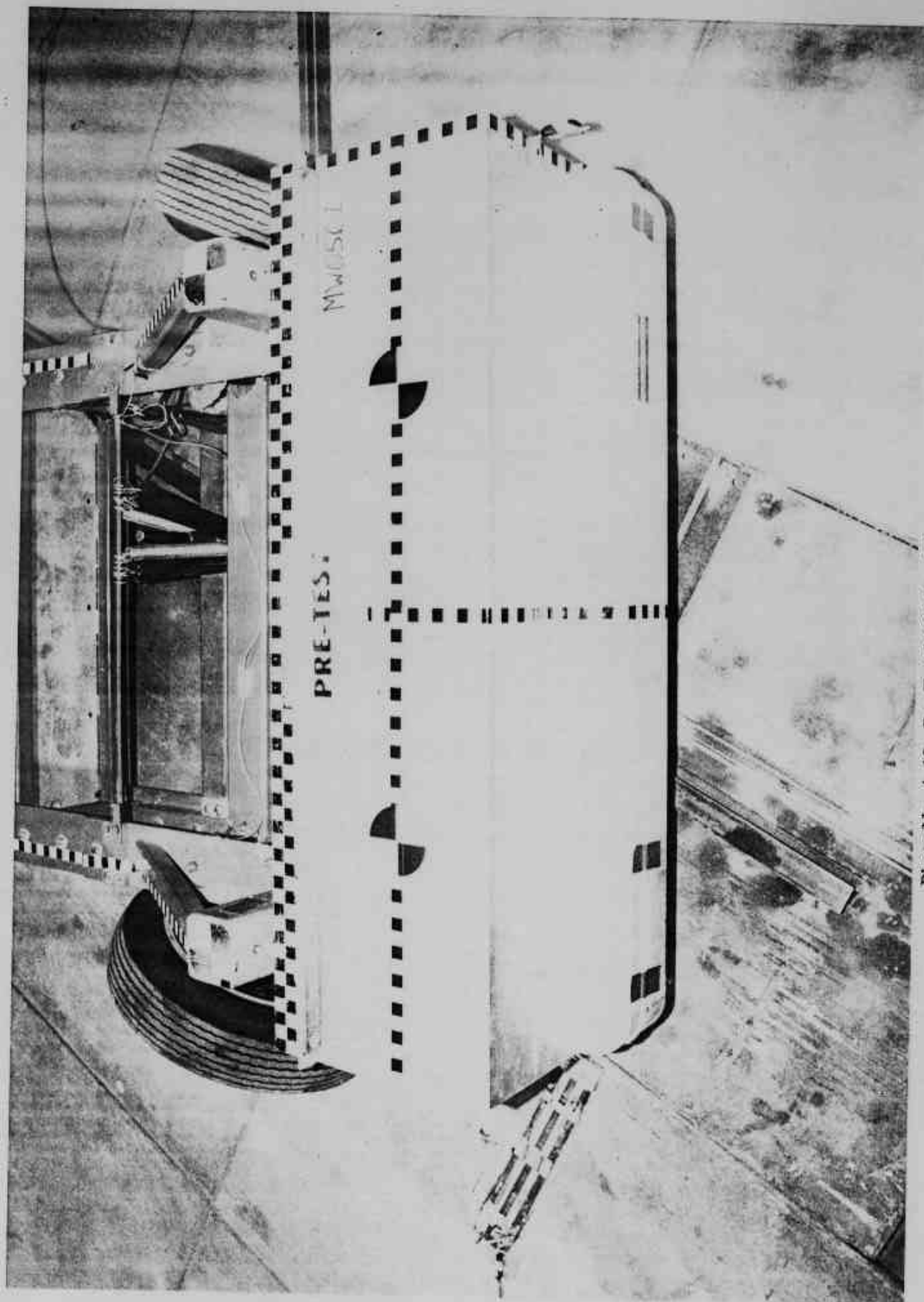


Photo No. A-13 - Pre-Test MDB Top View

A-13

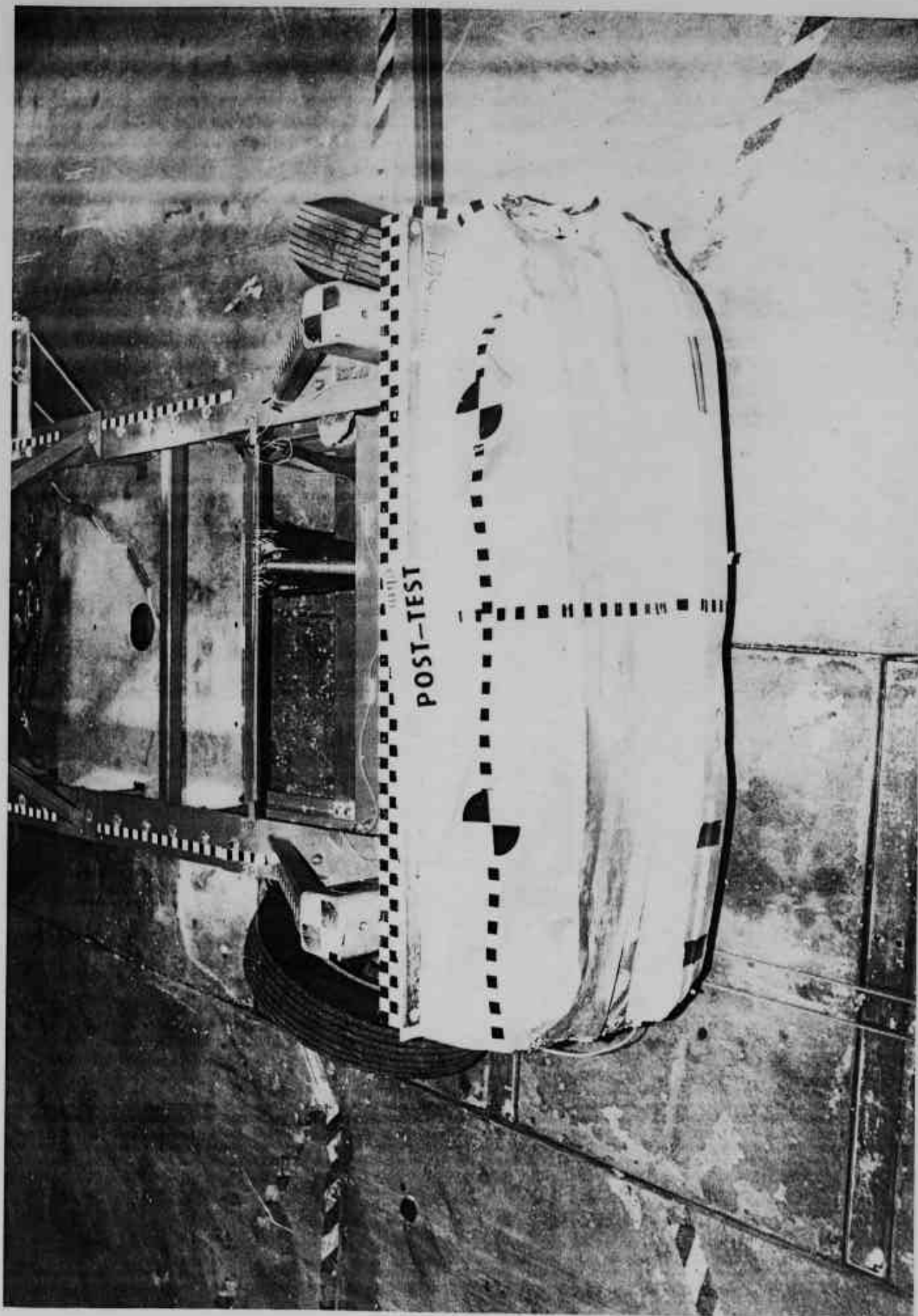


Photo No. A-14 - Post-Test MDB Top View

A-14

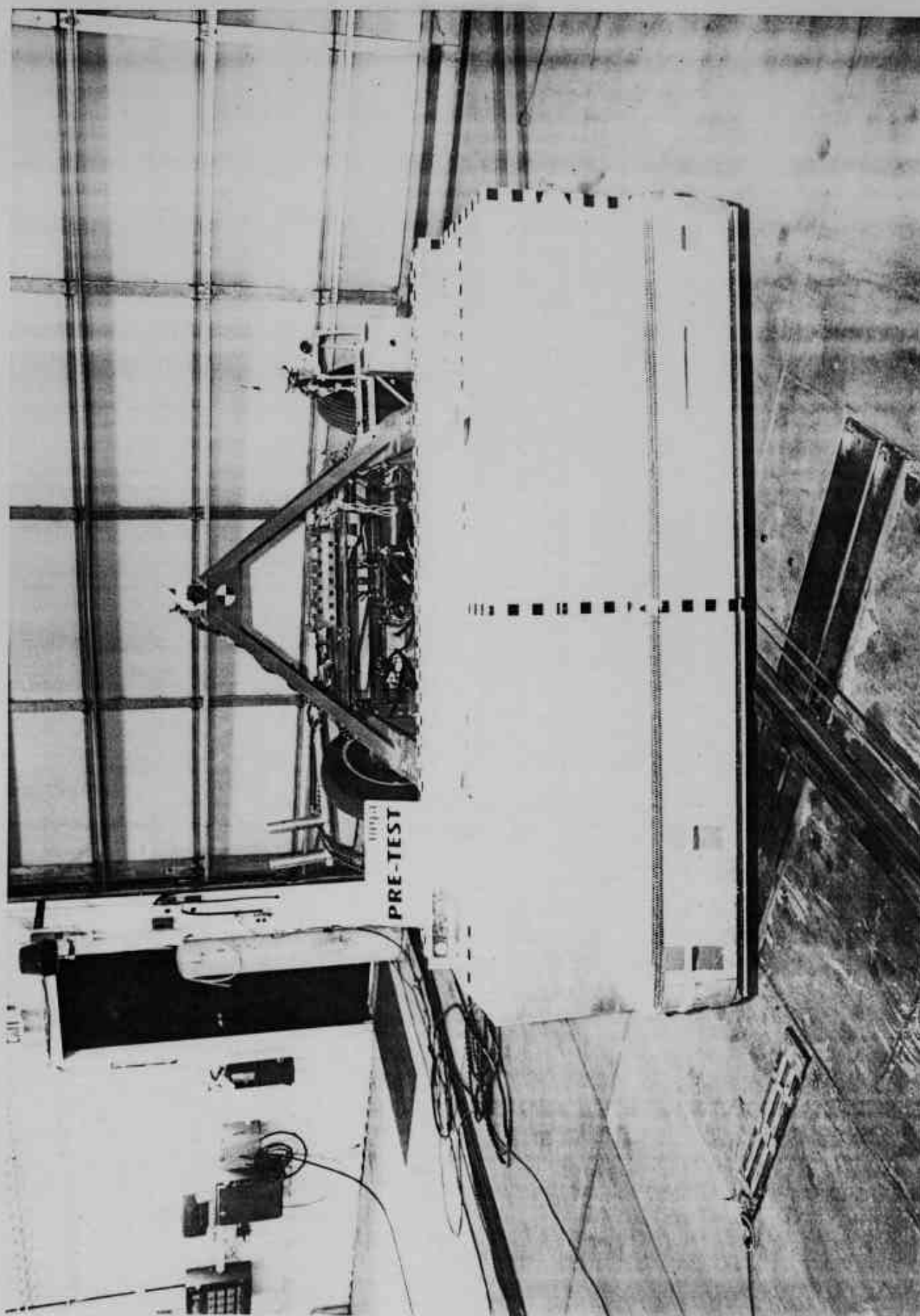


Photo No. A-15 - Pre-Test MDB Front View

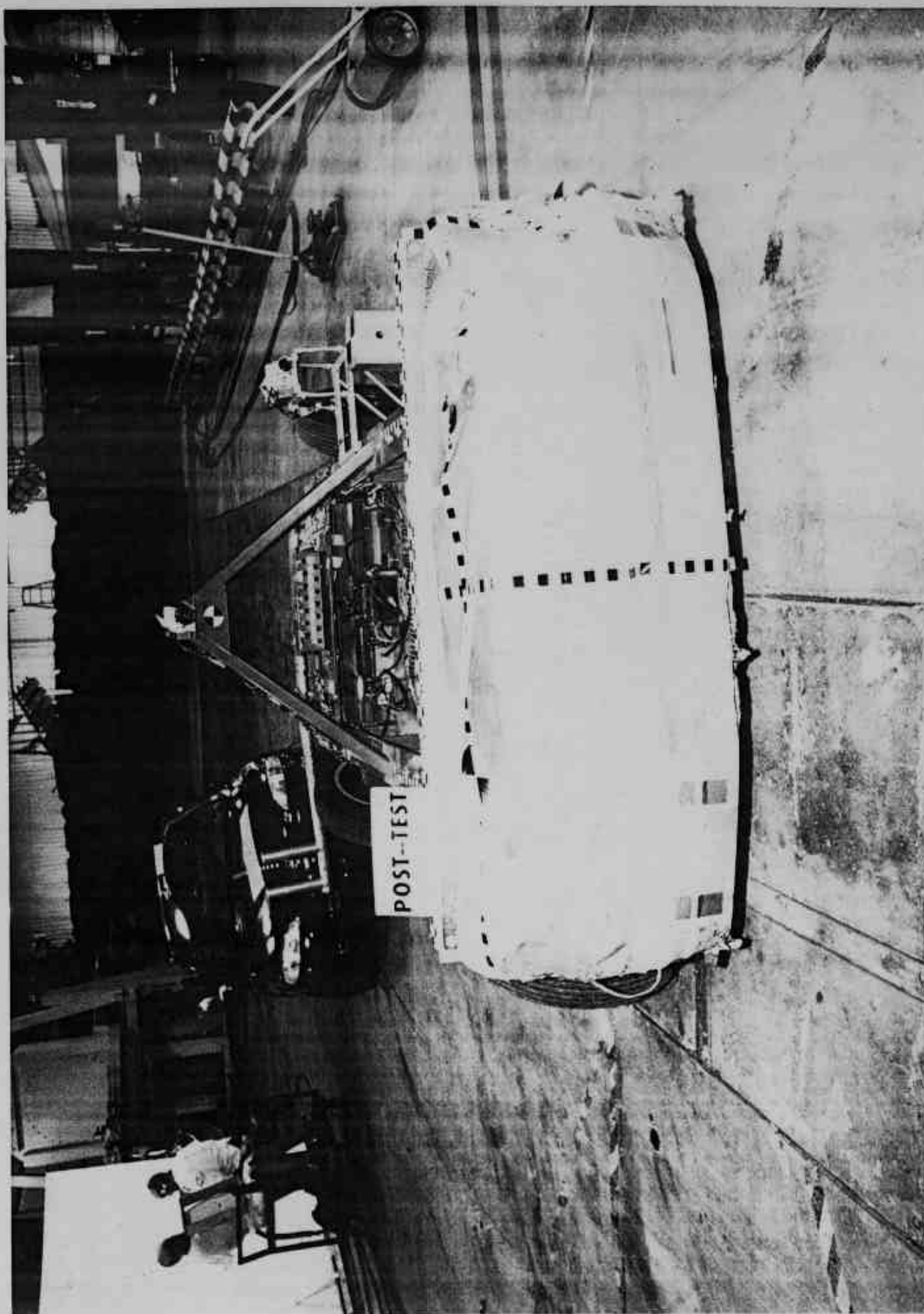


Photo No. A-16 - Post-Test MDB Front View

A-16

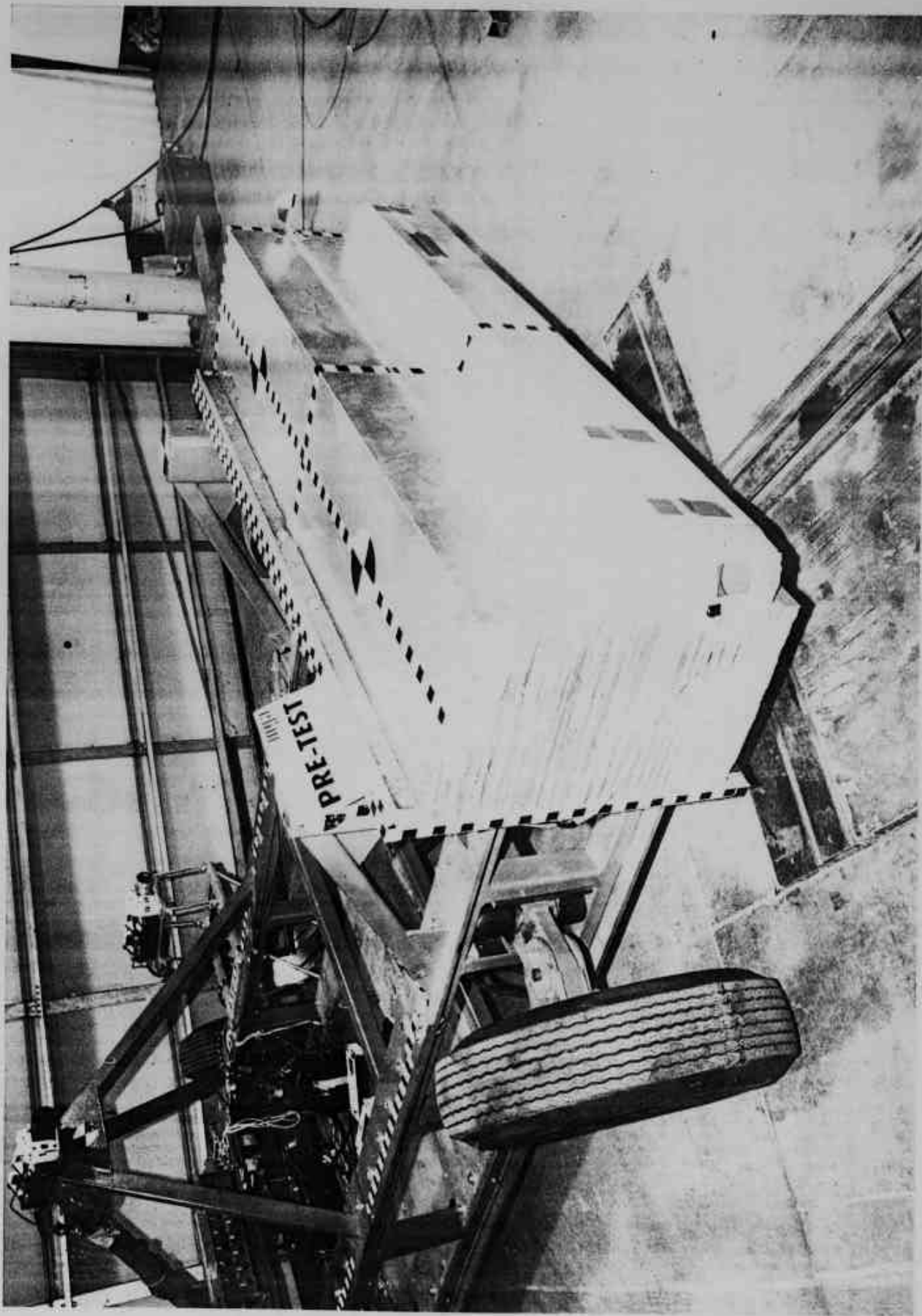


Photo No. A-17 - Pre-Test MDB Right Side View

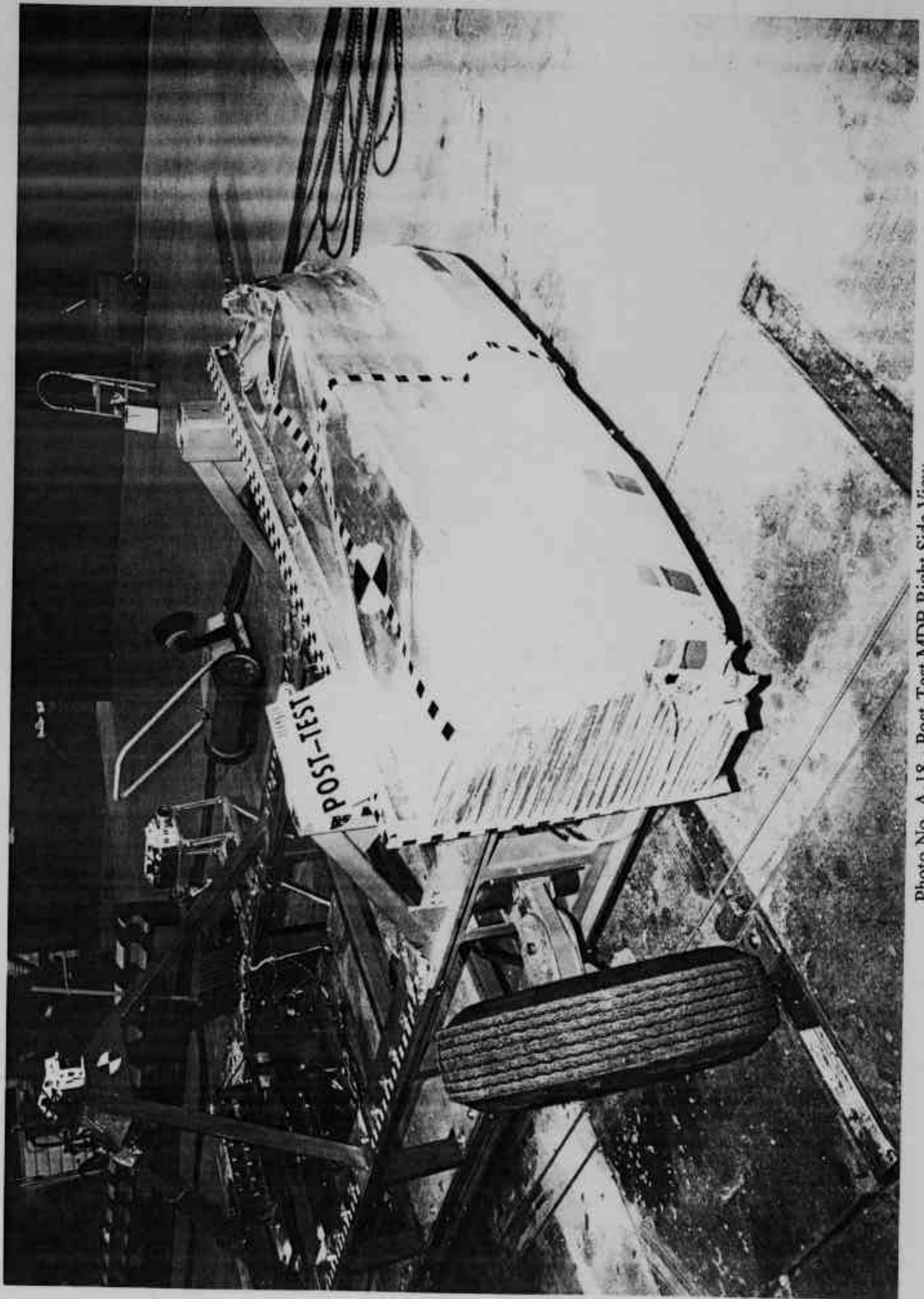


Photo No. A-18 - Post-Test MDB Right Side View

A-18

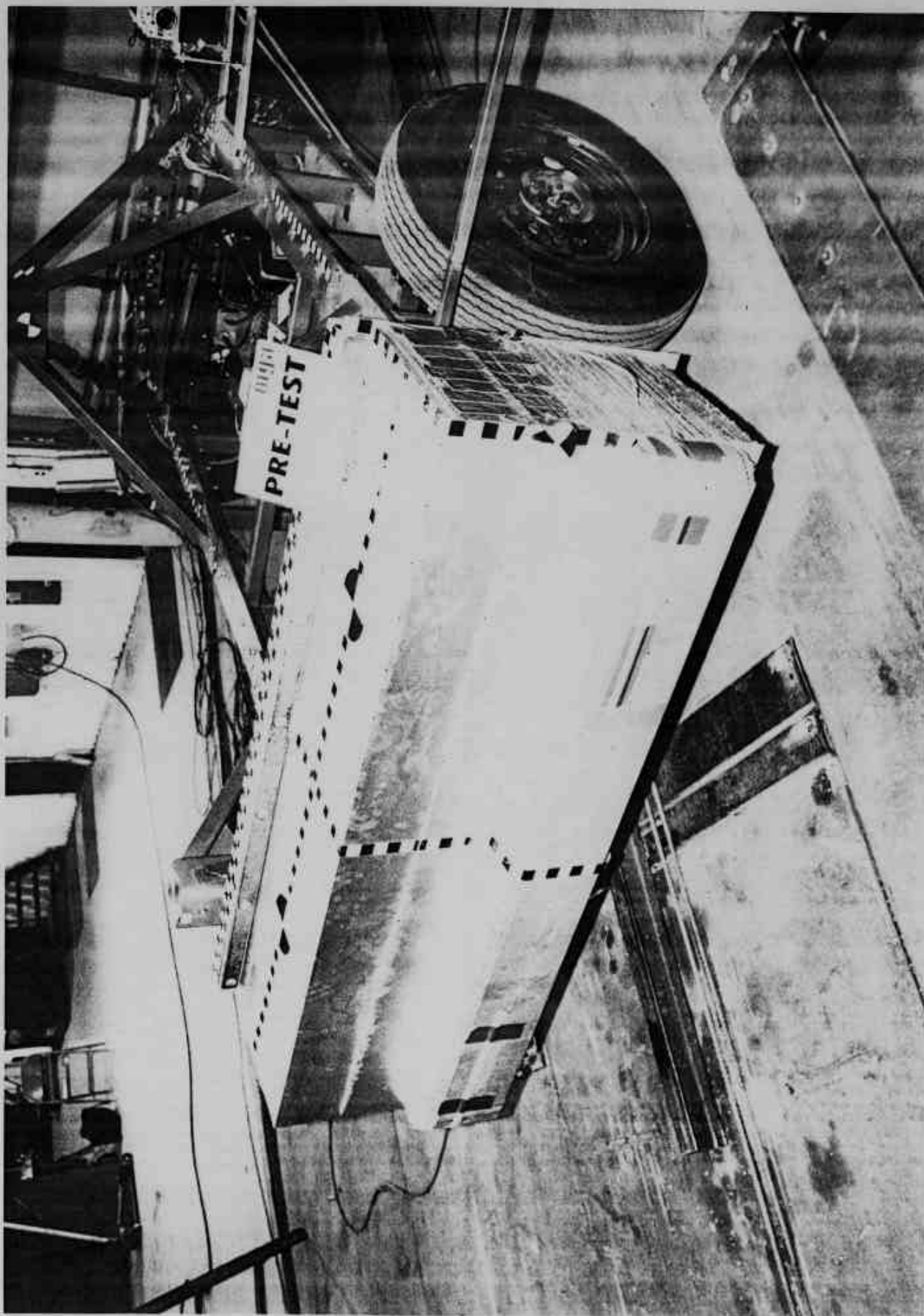


Photo No. A-19 - Pre-Test MDB Left Side View

A-19

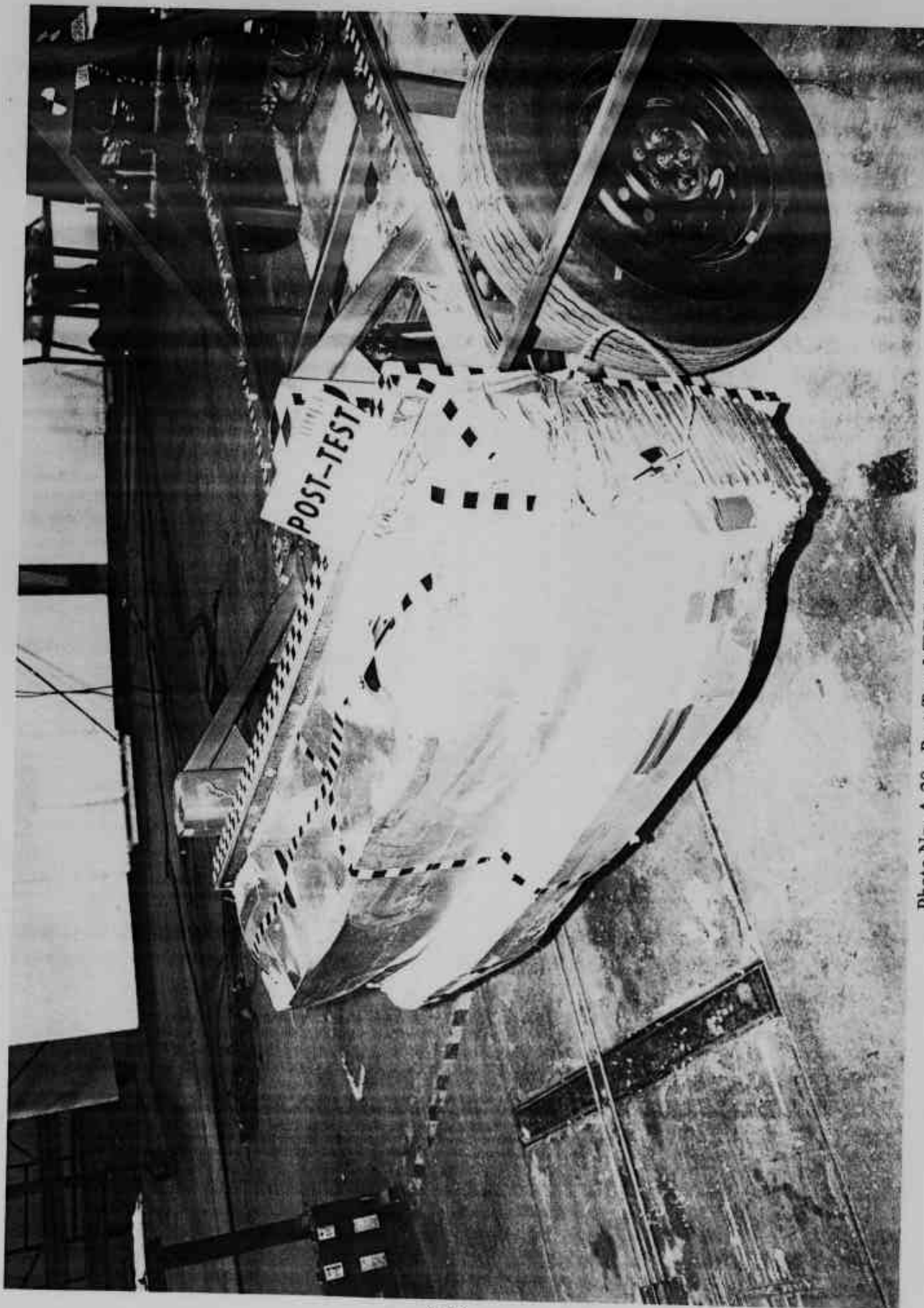


Photo No. A-20 - Post-Test MDB Left Side View

A-20



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

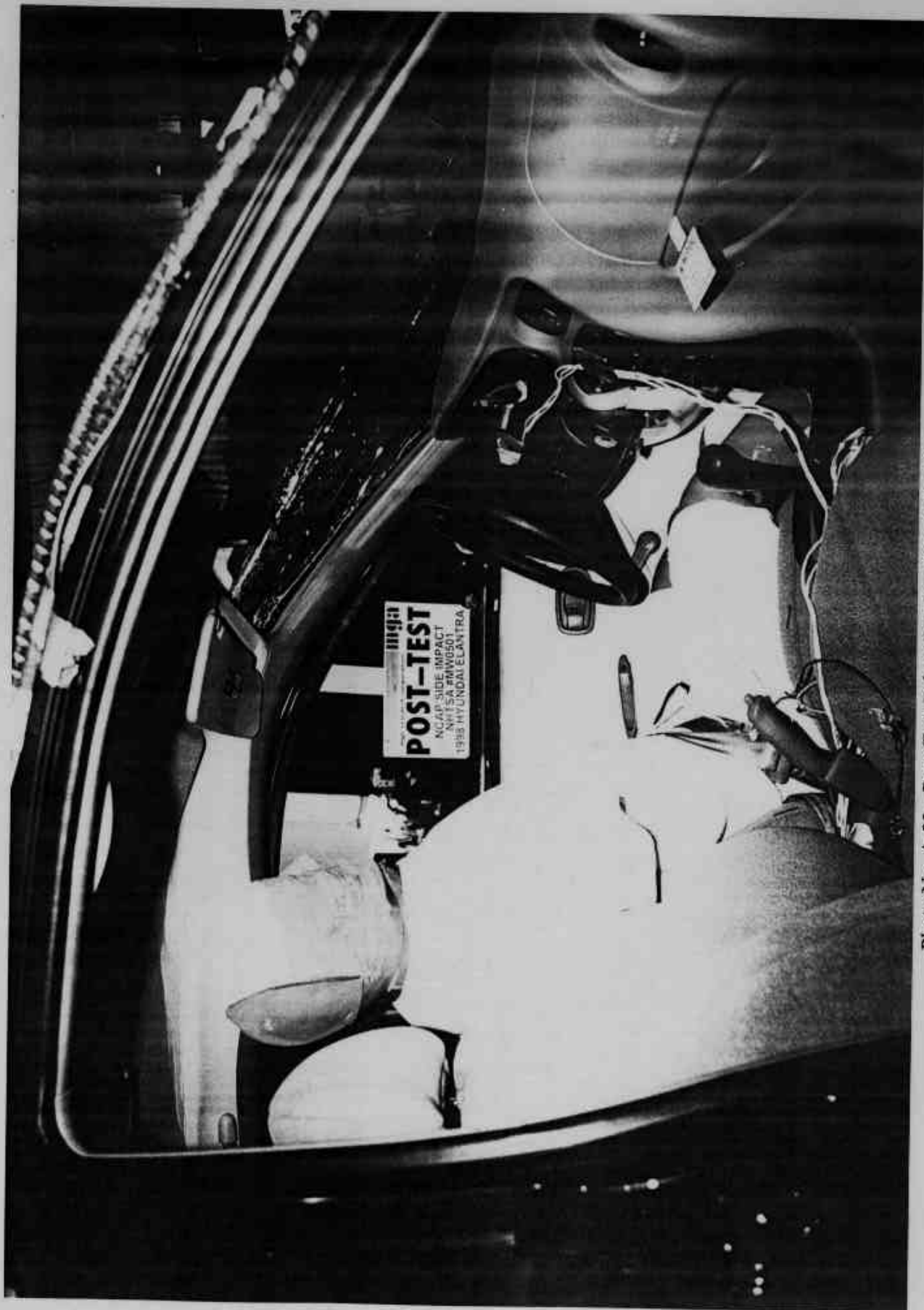
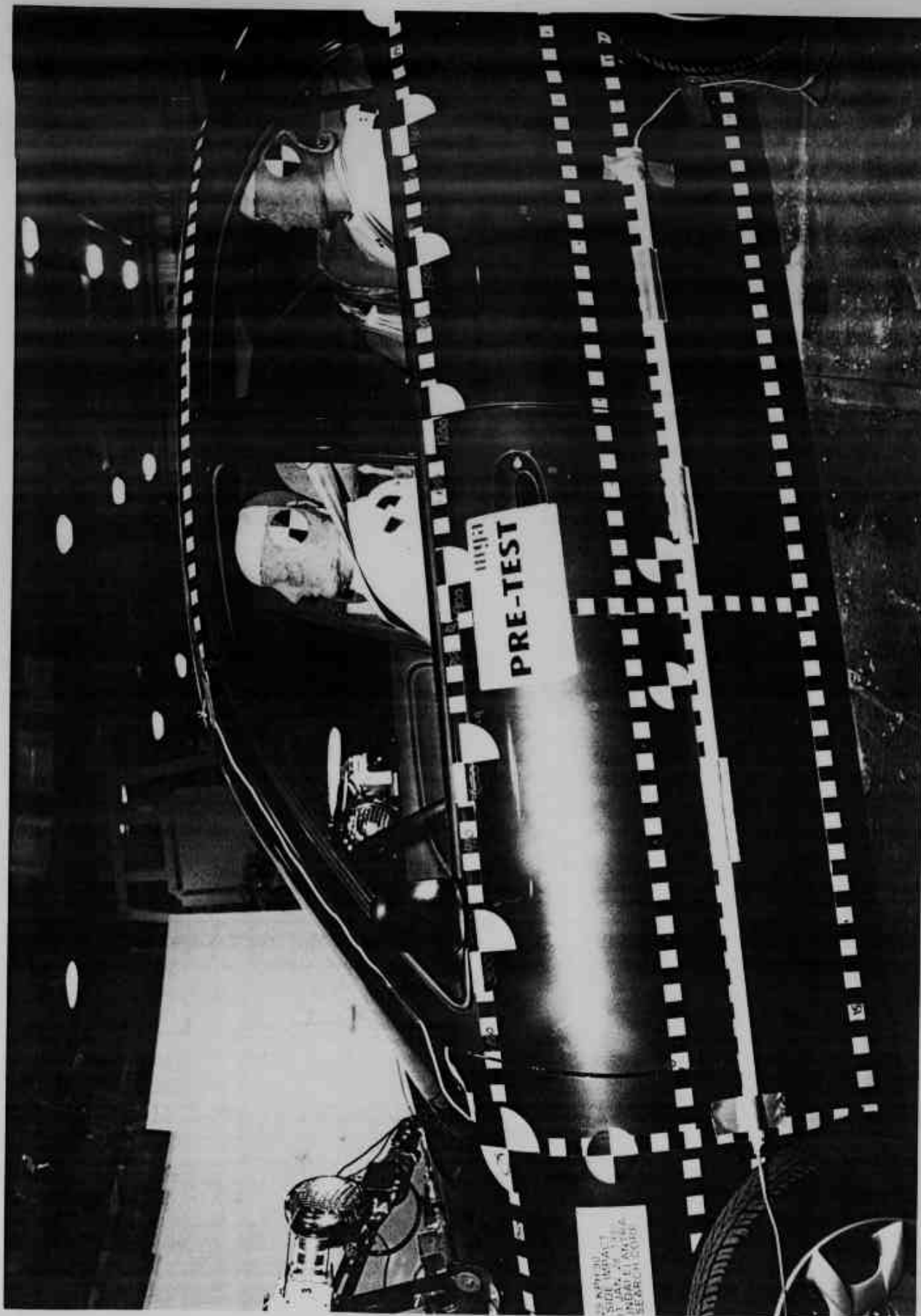
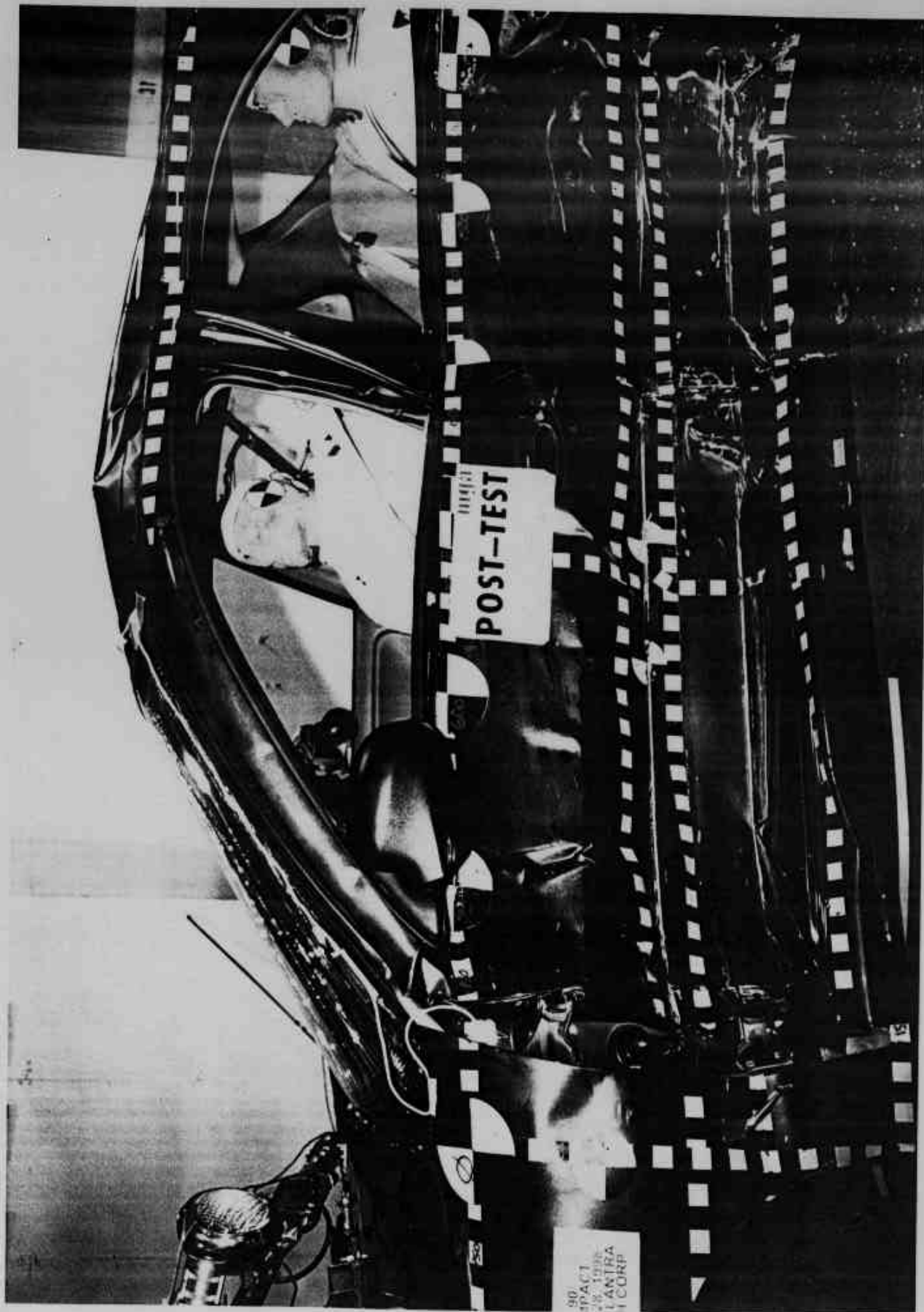


Photo No. A-22 - Post-Test Driver Dummy Right Side View



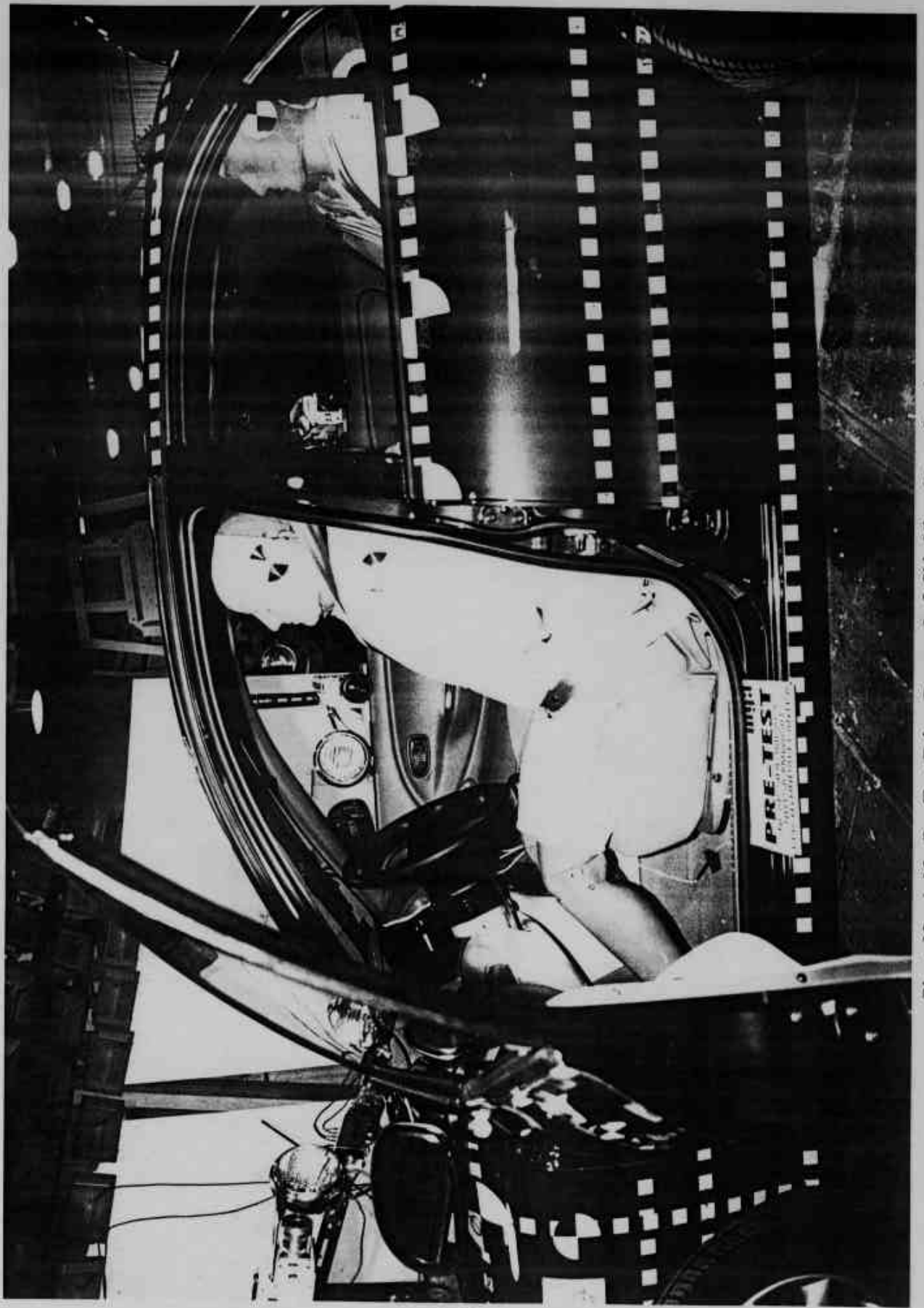
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Photo No. A-23 - Pre-Test Driver Dummy Left Side View



A-24

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



A-25

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



A-26

Photo No. A-26 - Pre-Test Driver Dummy Shoulder and Door Top View



A-27

Photo No. A-27 - Post-Test Driver Dummy Shoulder and Door Top View

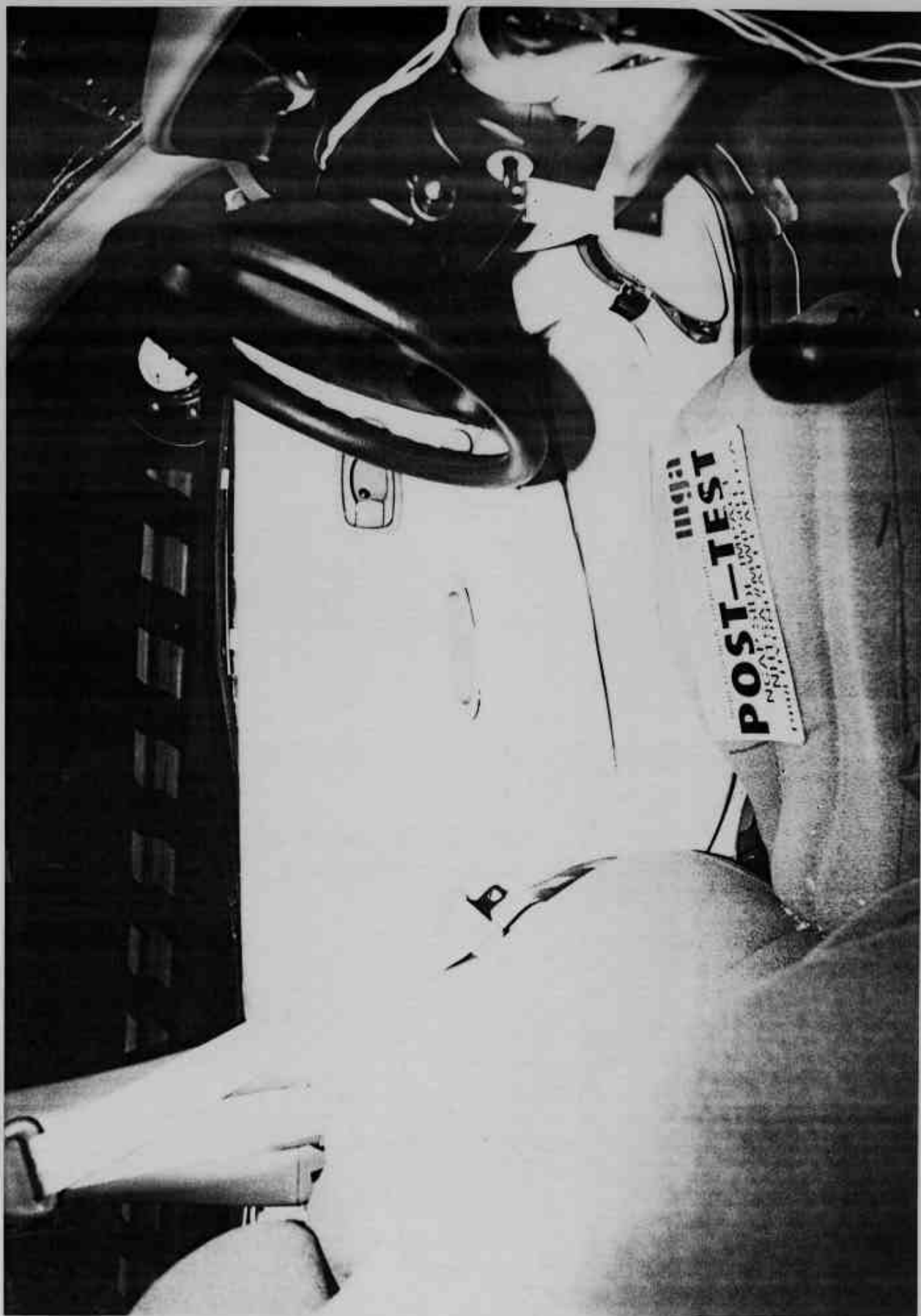


Photo No. A-28 - Post-Test Driver Dummy Contact



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

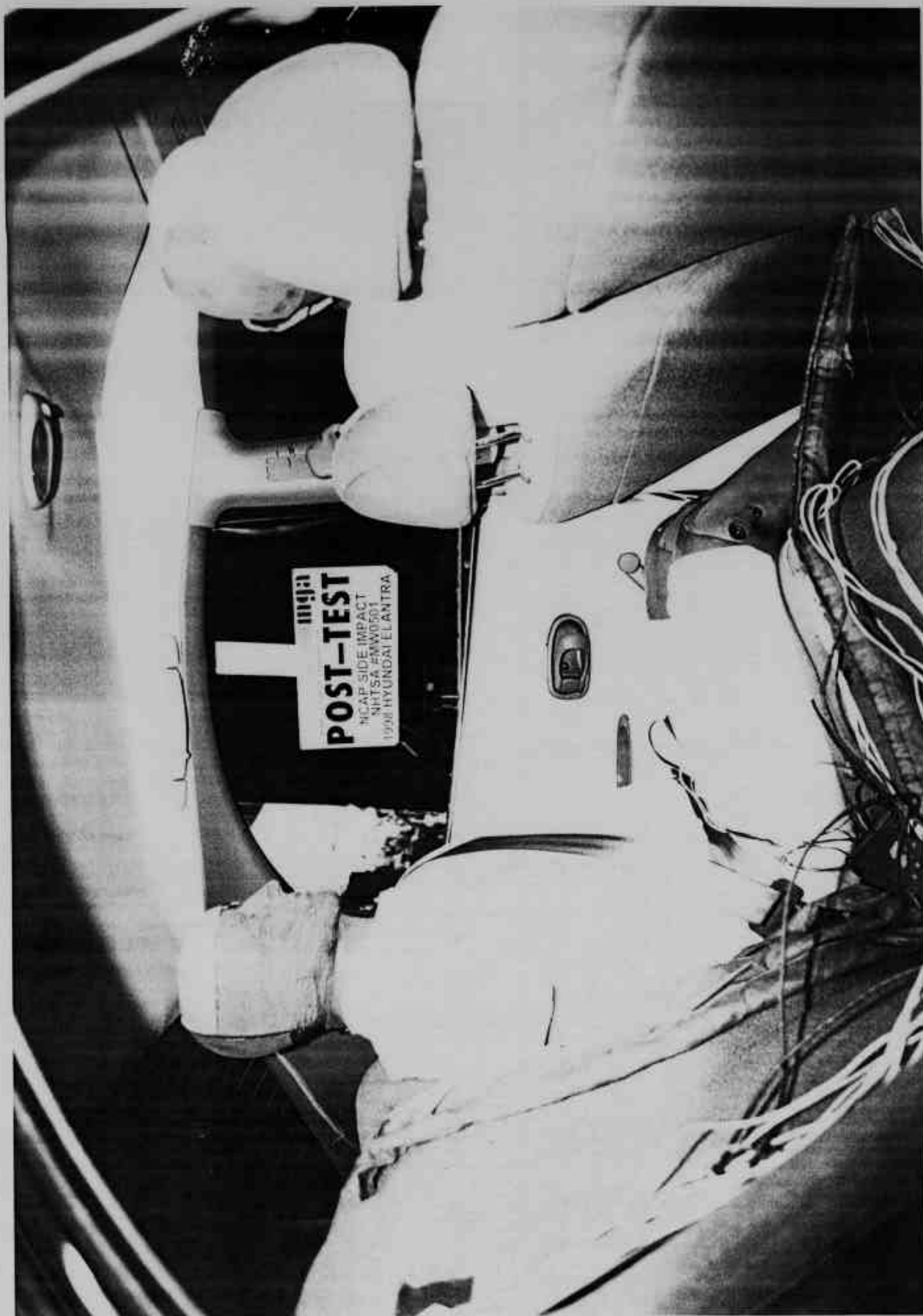


Photo No. A-30 - Post-Test Passenger Dummy Right Side View

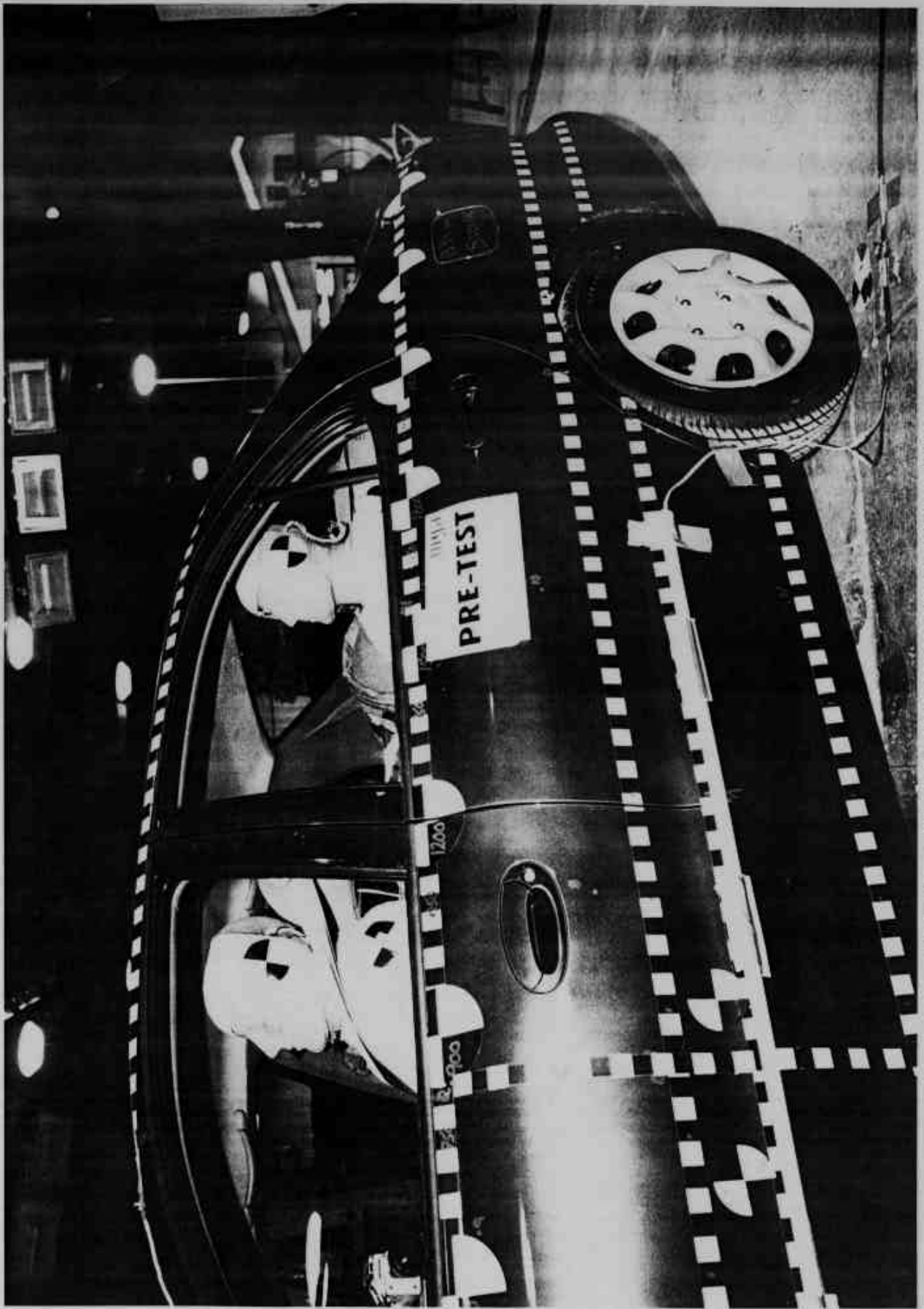


Photo No. A-31 - Pre-Test Passenger Dummy Left Side View

A-31

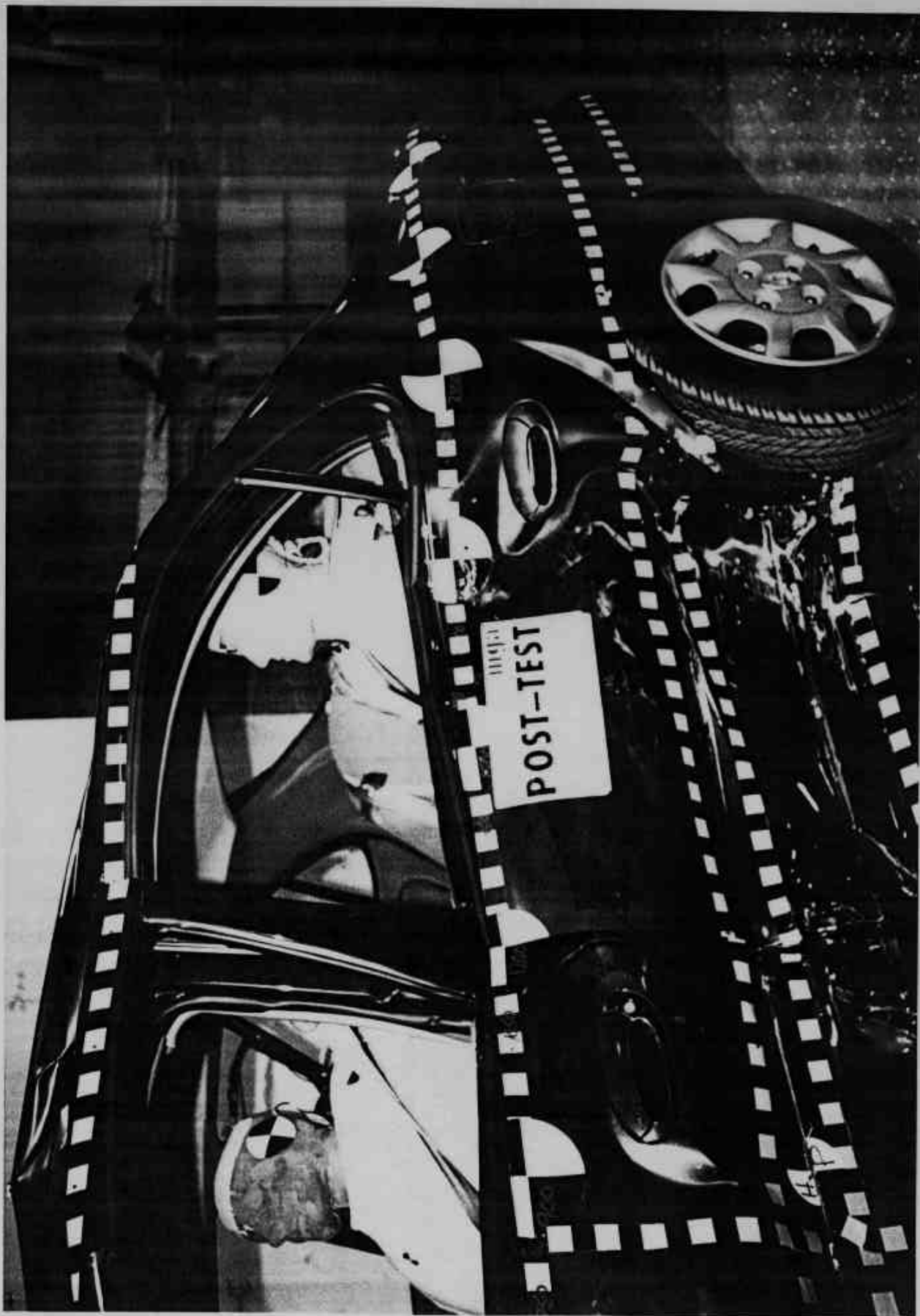


Photo No. A-32 - Post-Test Passenger Dummy Left Side View

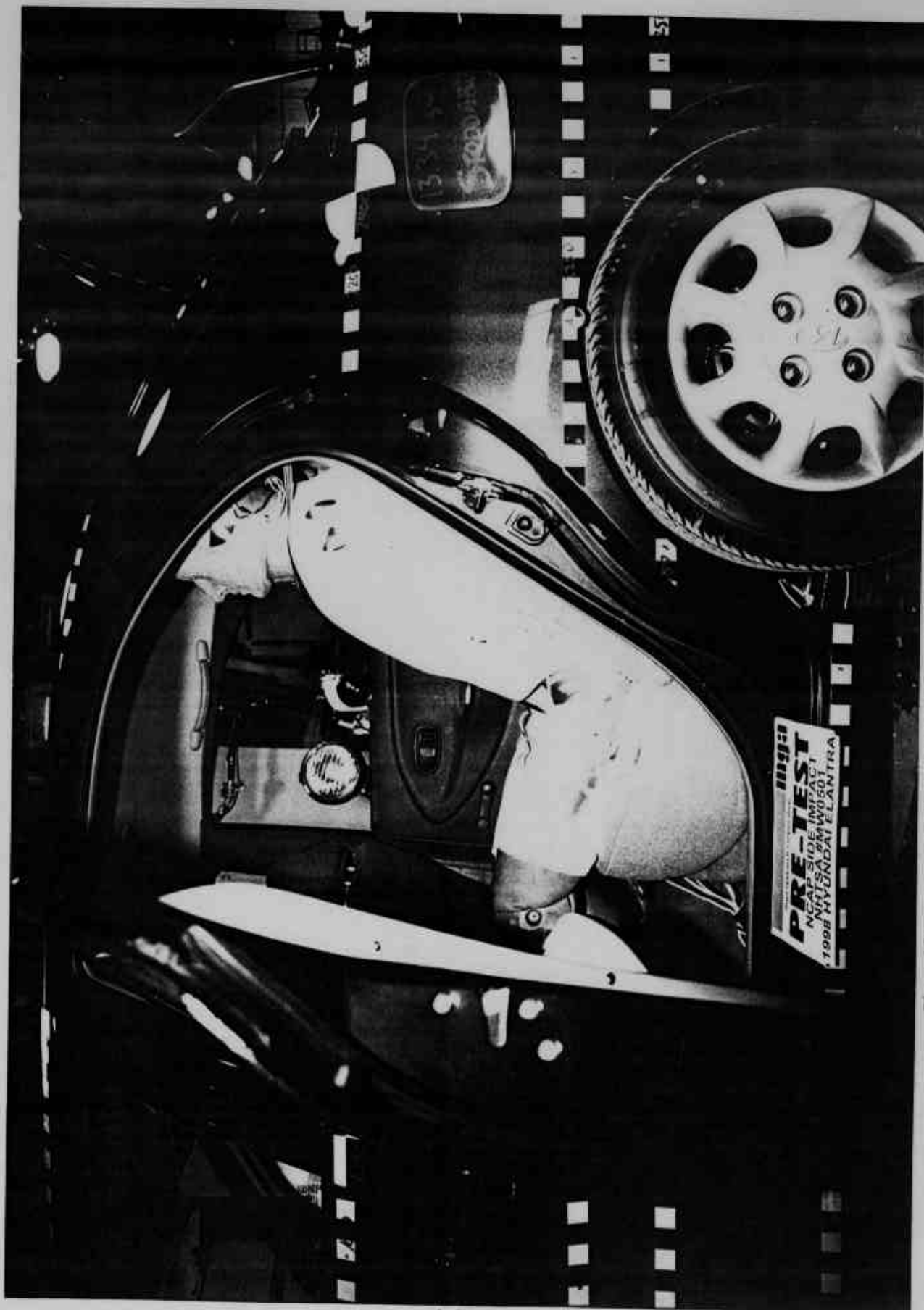


Photo No. A-33 - Pre-Test Passenger Dummy Left Side View (Door Open)

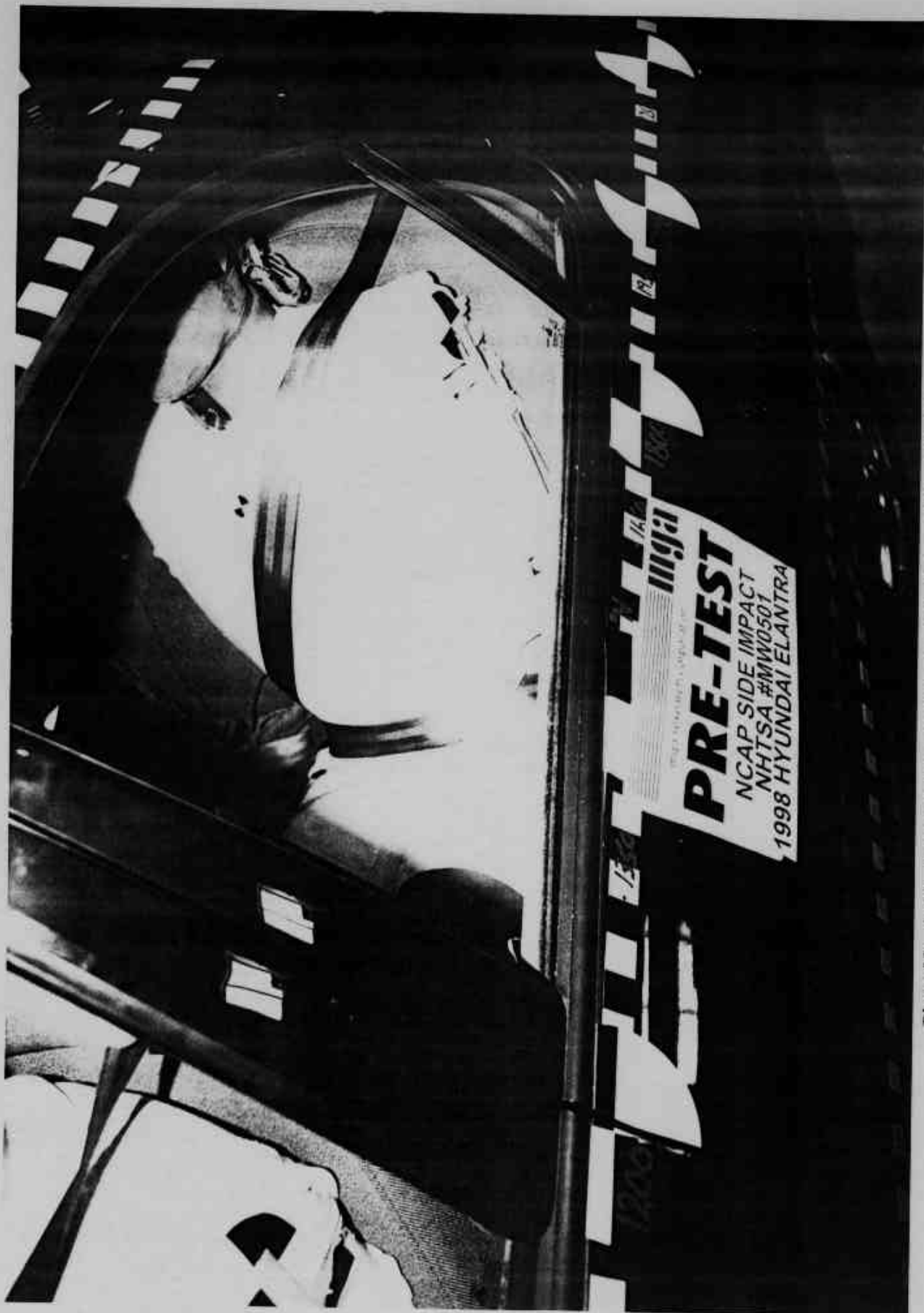


Photo No. A-34 - Pre-Test Passenger Dummy Shoulder and Door Top View



Photo No. A-35 - Post-Test Passenger Dummy Shoulder and Door Top View

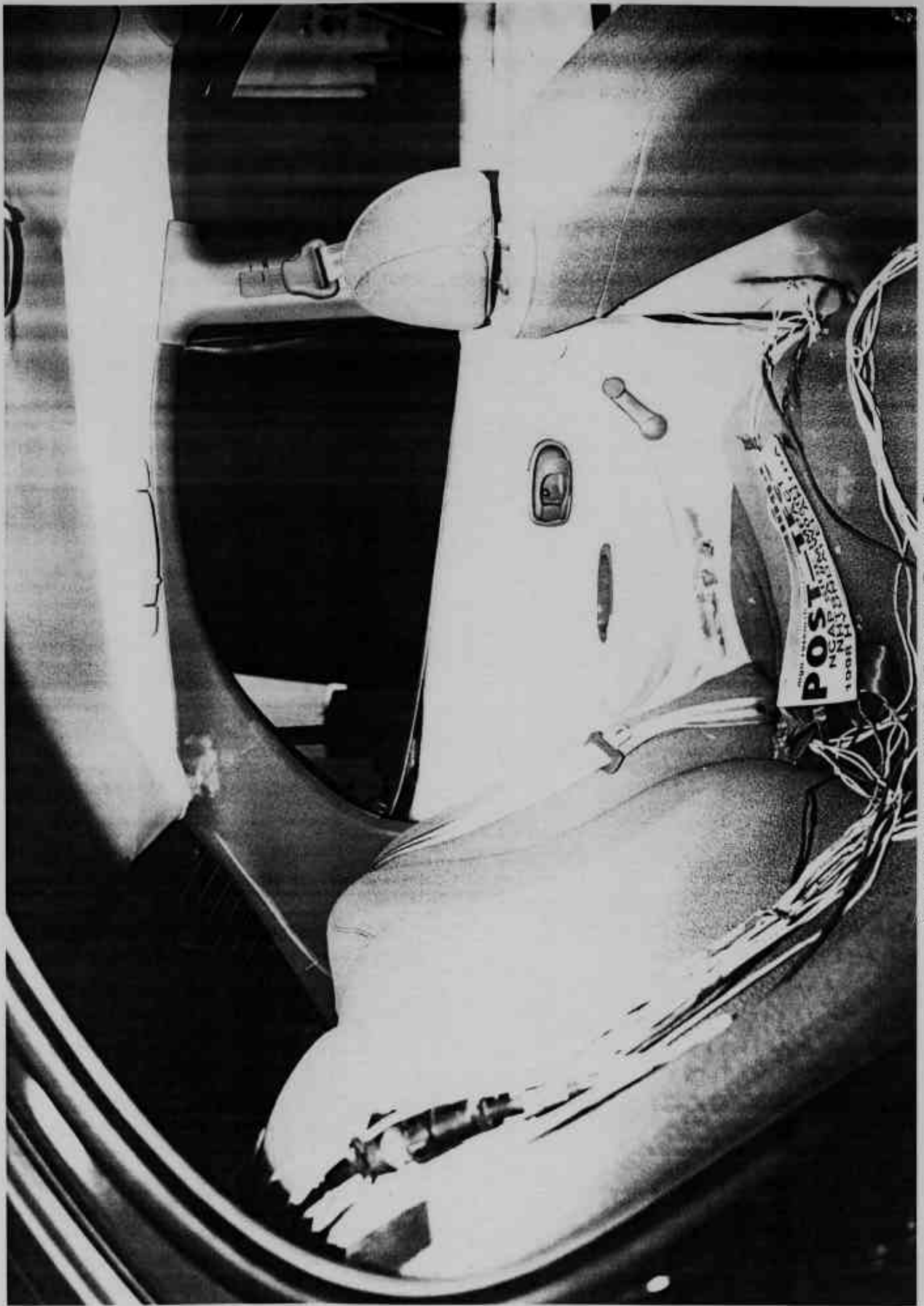


Photo No. A-36 - Post-Test Passenger Dummy Contact

A-36



Photo No. A-37 - Post-Test Passenger Dummy Head Contact

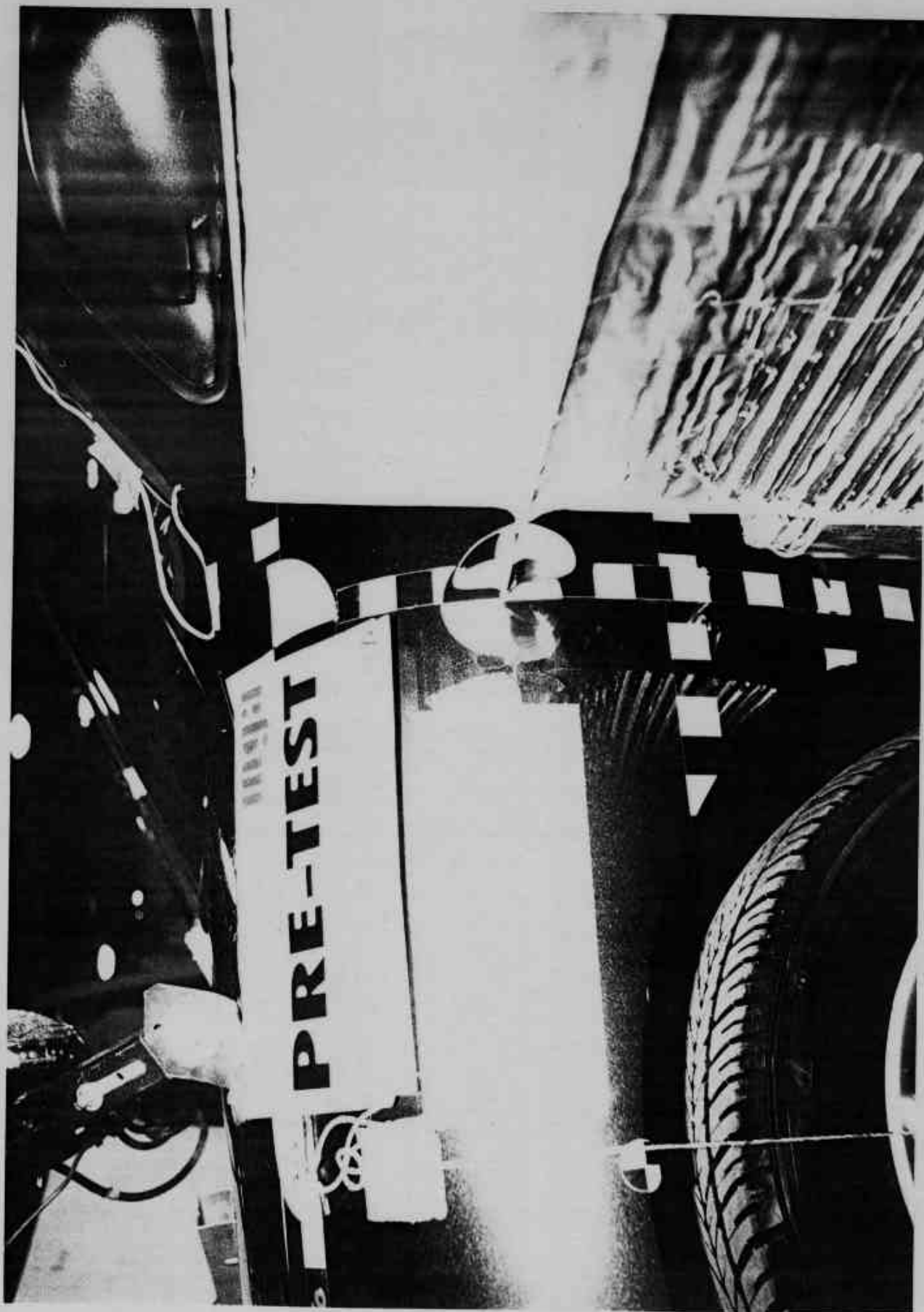


Photo No. A-38 - Pre-Test Left Front Impact Point on Vehicle

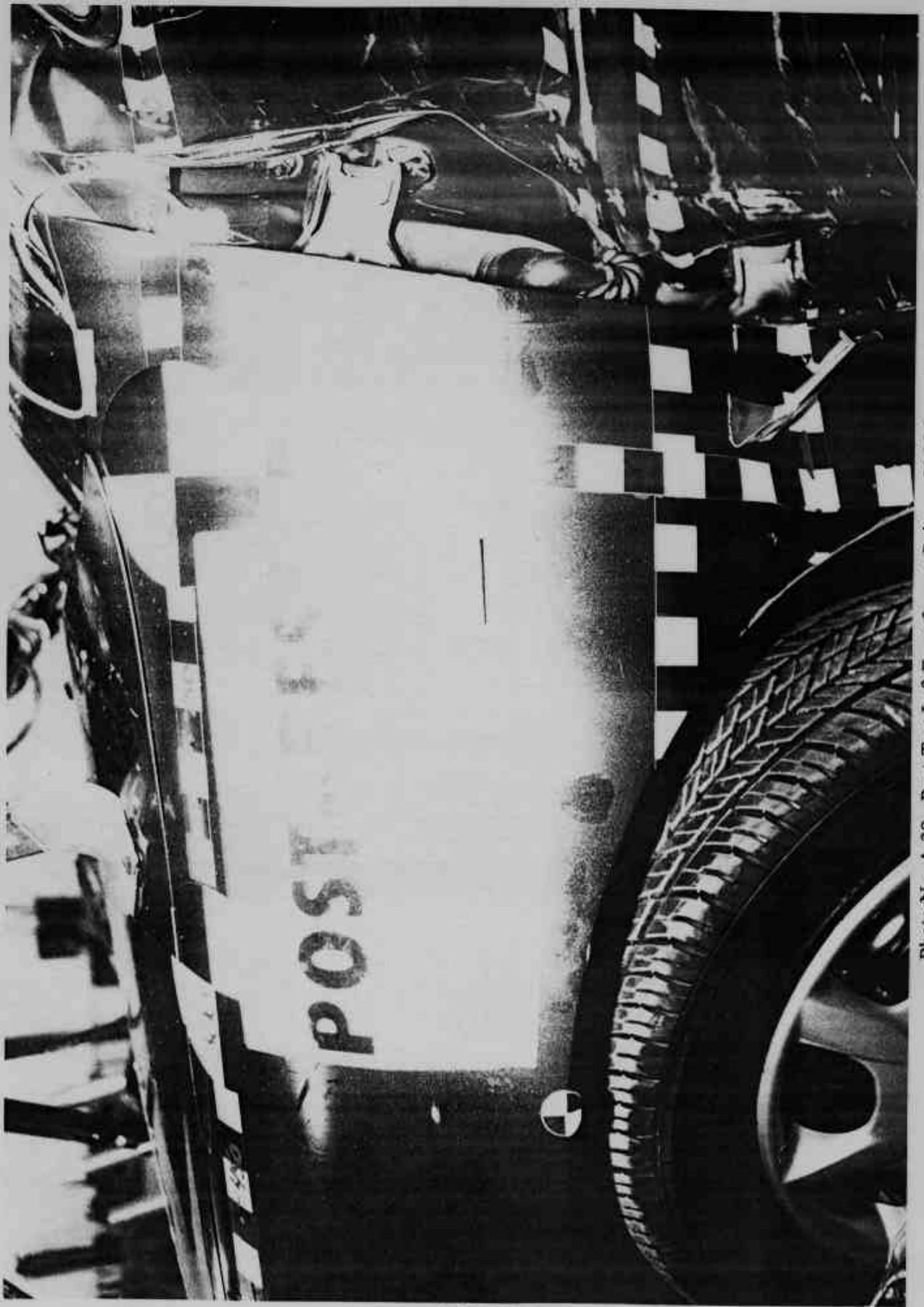


Photo No. A-39 - Post-Test Left Front Impact Point on Vehicle

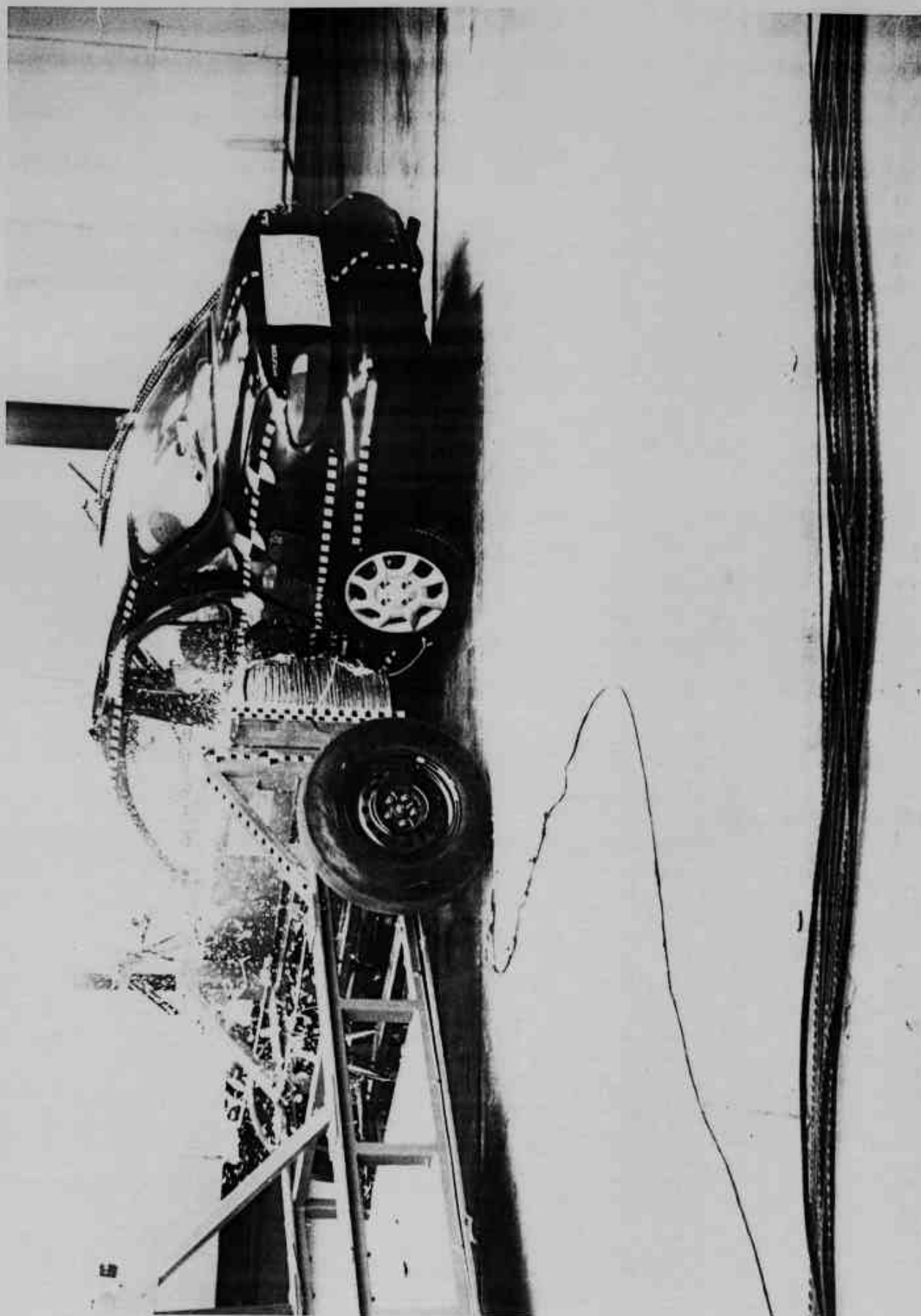
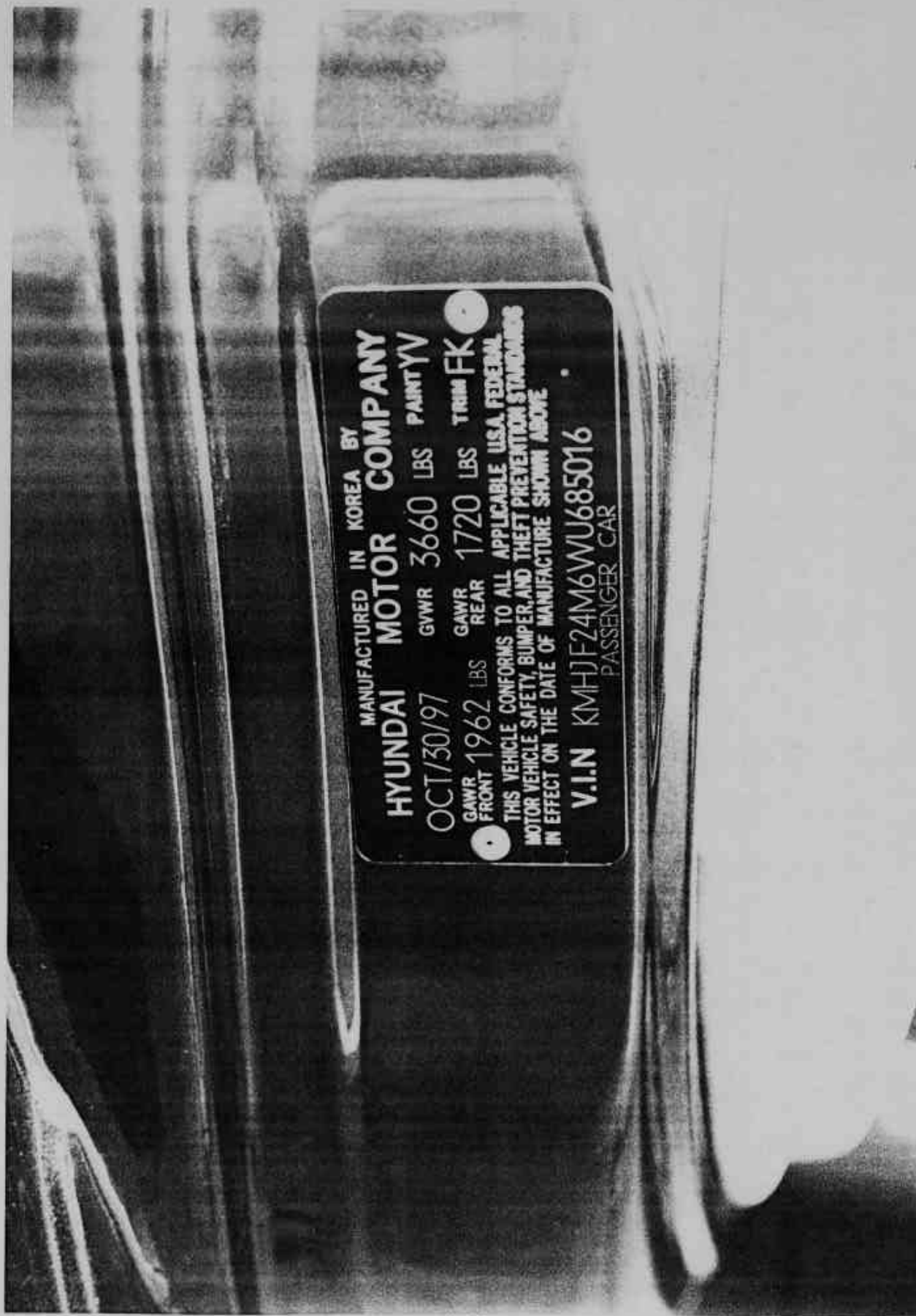


Photo No. A-40 - Impact

A-40



MANUFACTURED IN KOREA BY
HYUNDAI MOTOR COMPANY

OCT/30/97 GVWR **3660** LBS PAINT **YV**

GAWR **1962** LBS GAWR **1720** LBS TRIM **FK**

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

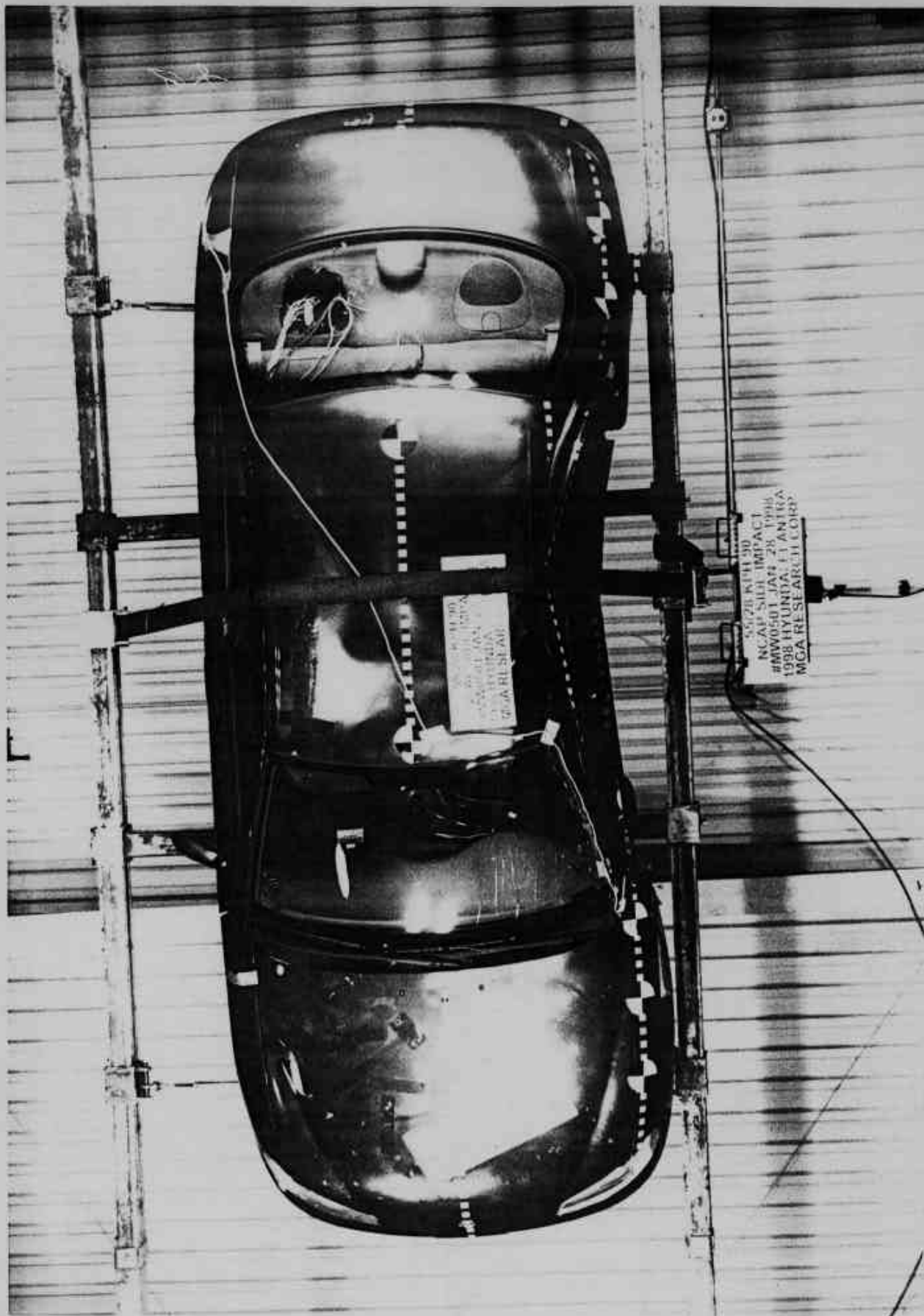
V.I.N **KMHJF24M6WU685016**
PASSENGER CAR

Photo No. A-41 - Vehicle Certification Label



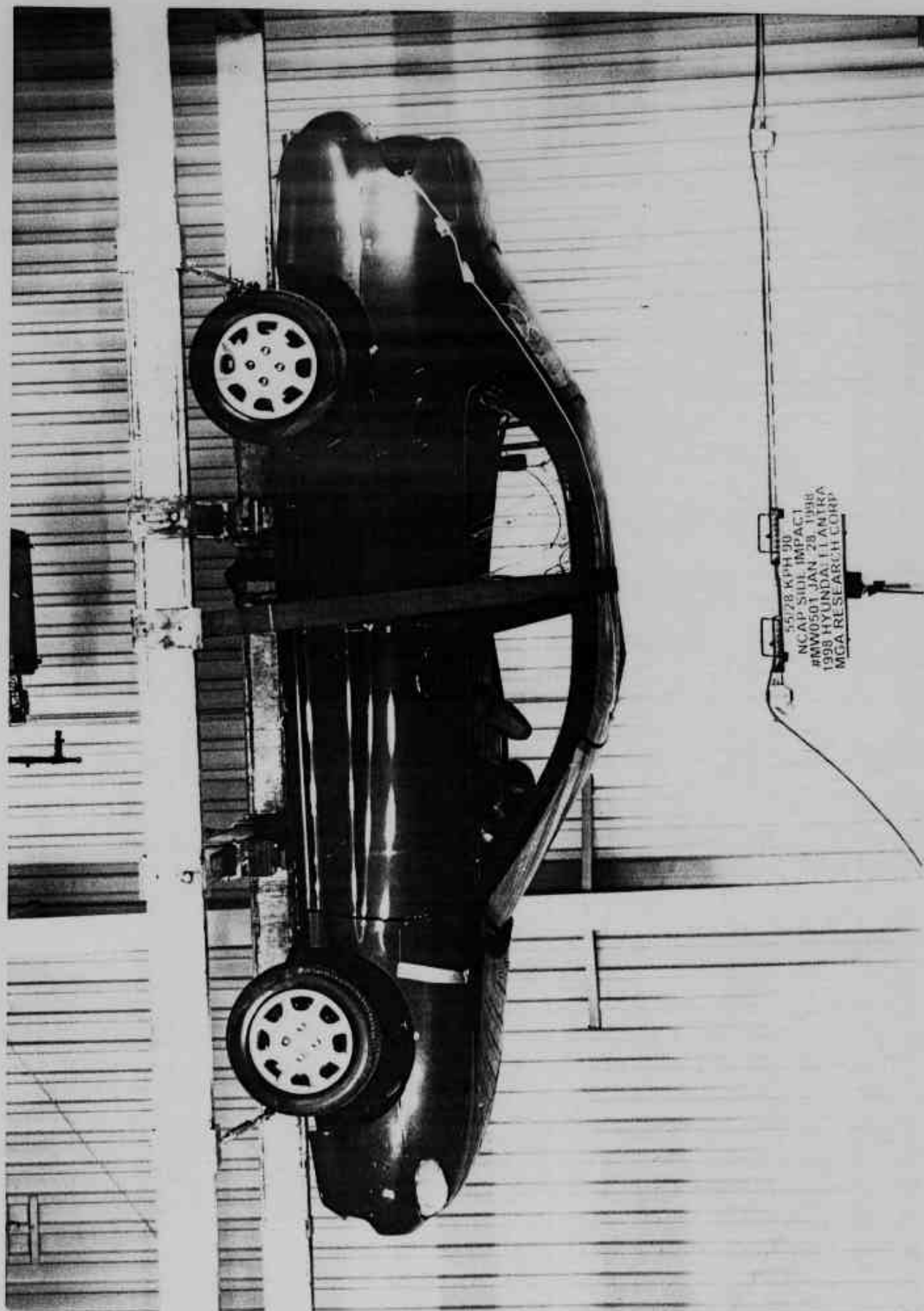
TIRE INFLATION PRESSURES					
VEHICLE CAPACITY WEIGHT LBS. 850			REAR 3		
SEATING CAPACITY TOTAL 5			FRONT 2		
TIRE PRESSURES-COLD: KPA					
TIRE SIZE	LOAD UP TO 2 PERSONS		VEHICLE WEIGHT LIMIT		
	FRT	RR	FRONT	RR	
P175/65 R14	210 (30)	210 (30)	210 (30)	220 (32)	220 (32)
P195/60 R14	210 (30)	210 (30)	210 (30)	210 (30)	210 (30)
T125/70 D15	420 (60)	420 (60)	420 (60)	420 (60)	420 (60)

Photo No. A-42 - Tire Placard



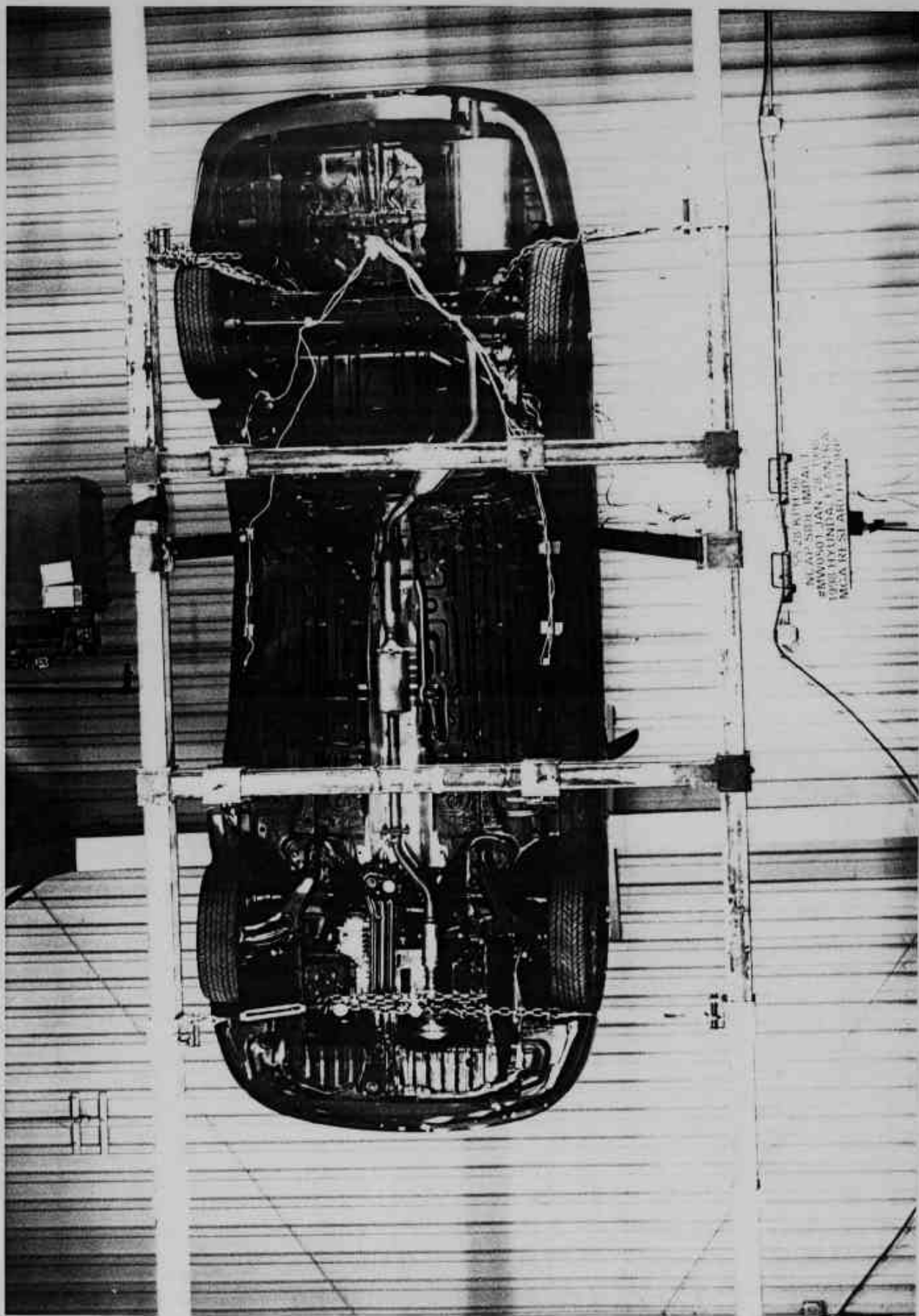
A-43

Photo No. A-43 - Rollover 90°

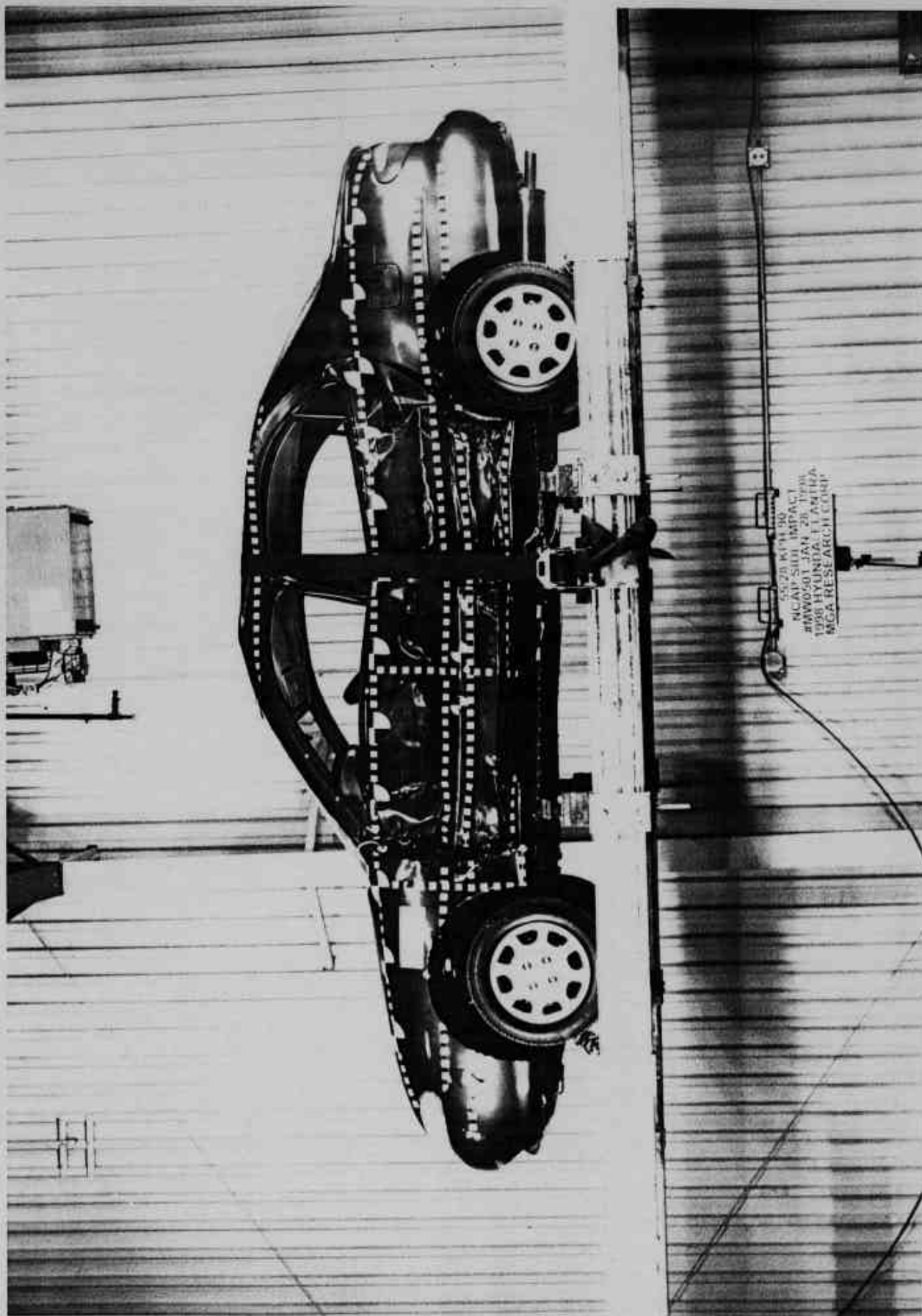


5528 KPH 198
NCAP SIDE IMPACT
#MW0501 JAN 28 1998
1998 HYUNDAI ELANTRA
MGA RE SEARCH CORP

Photo No. A-44 - Rollover 180°



A-45



A-46

Photo No. A-46 - Rollover 360°

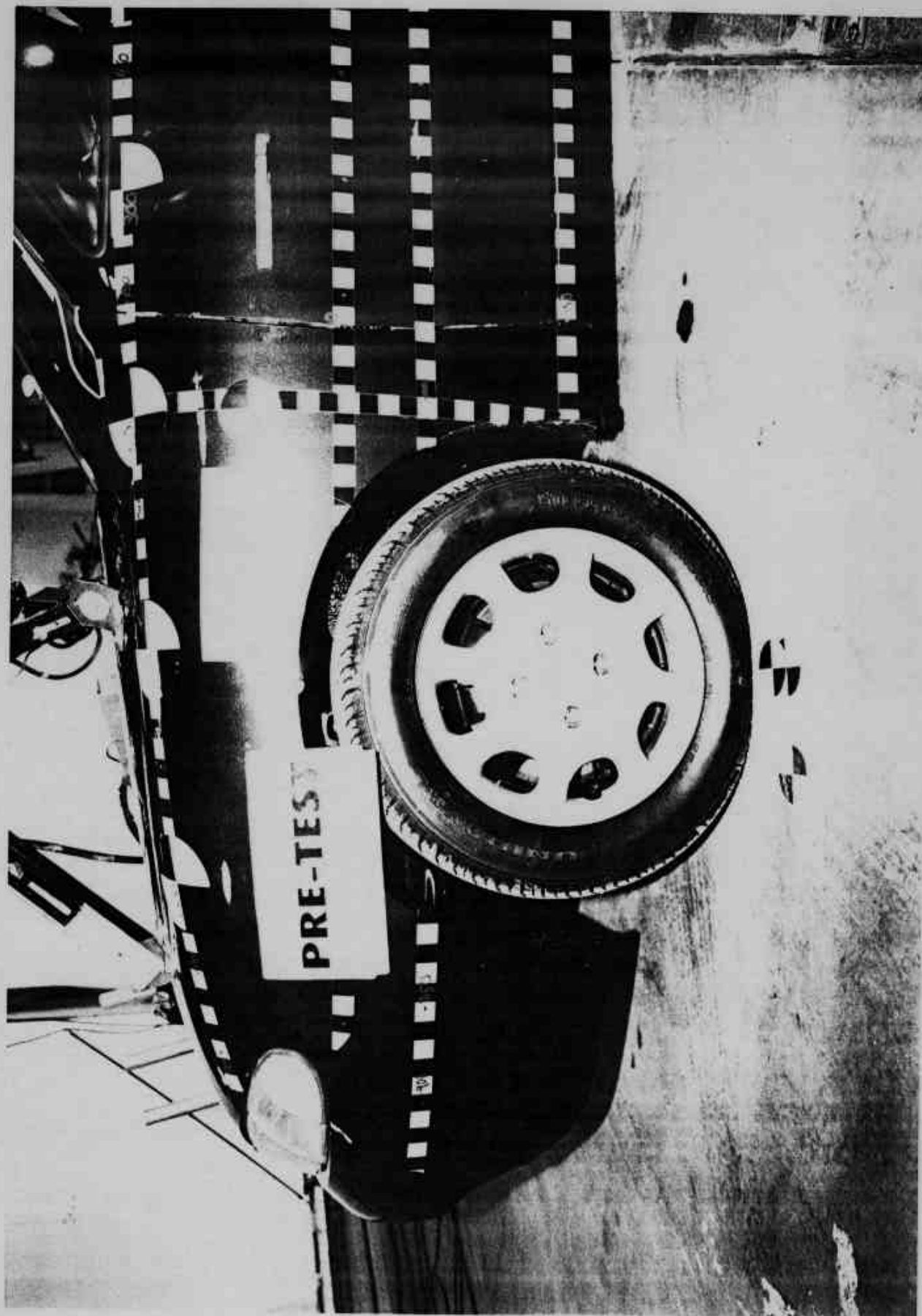


Photo No. A-47 - Left Front Attitude Point

A-47

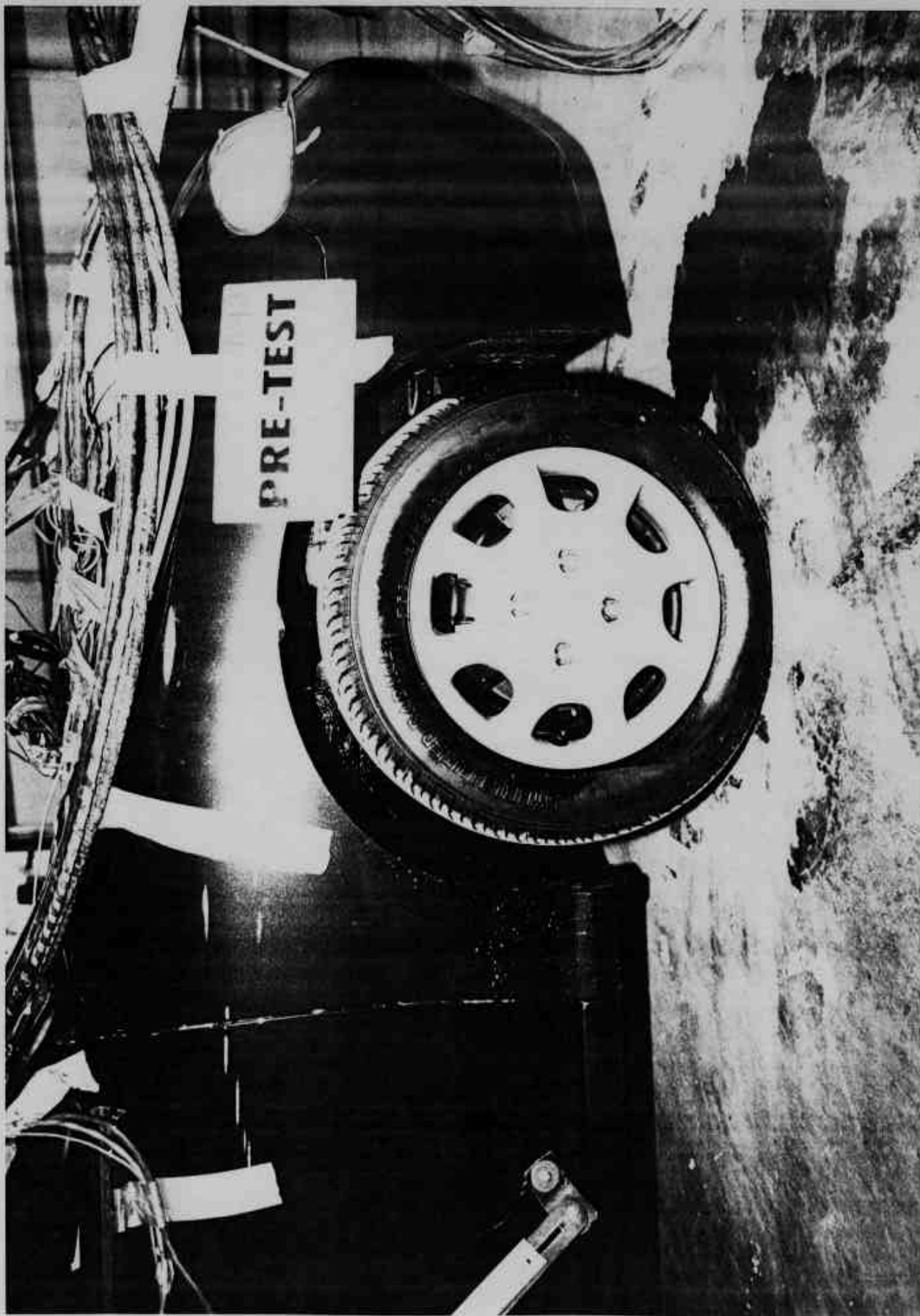


Photo No. A-48 - Right Front Attitude Point

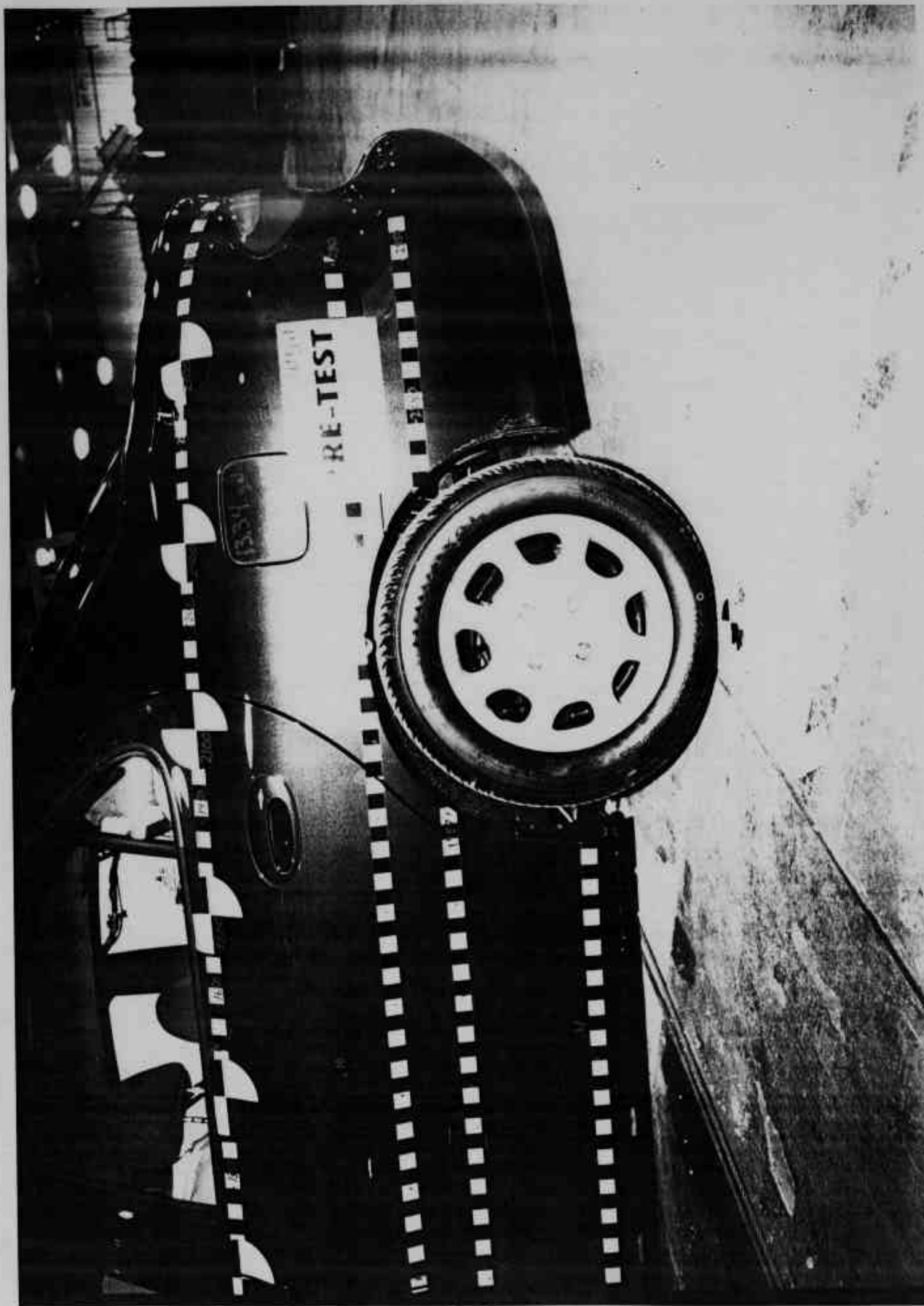


Photo No. A-49 - Left Rear Attitude Point

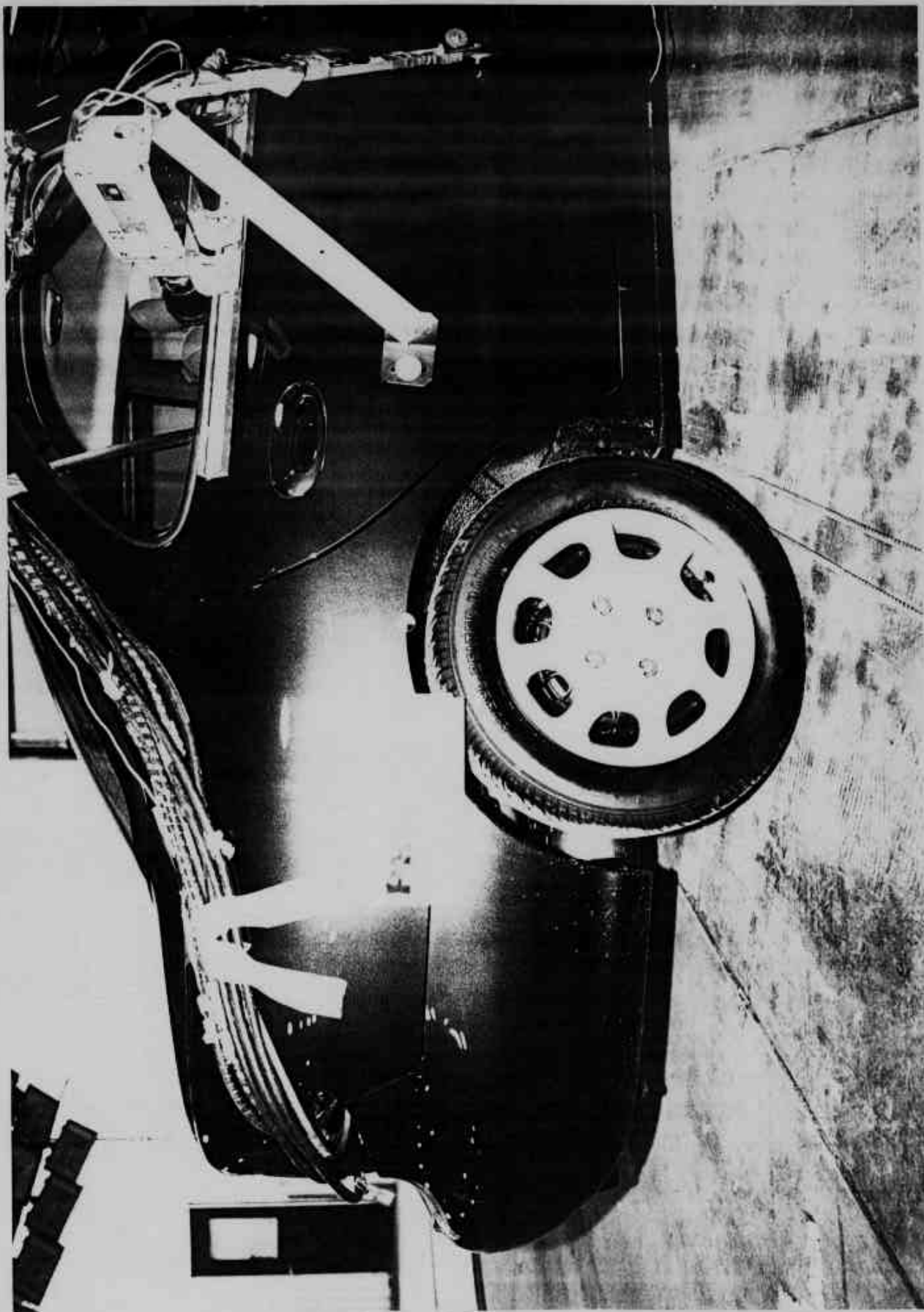


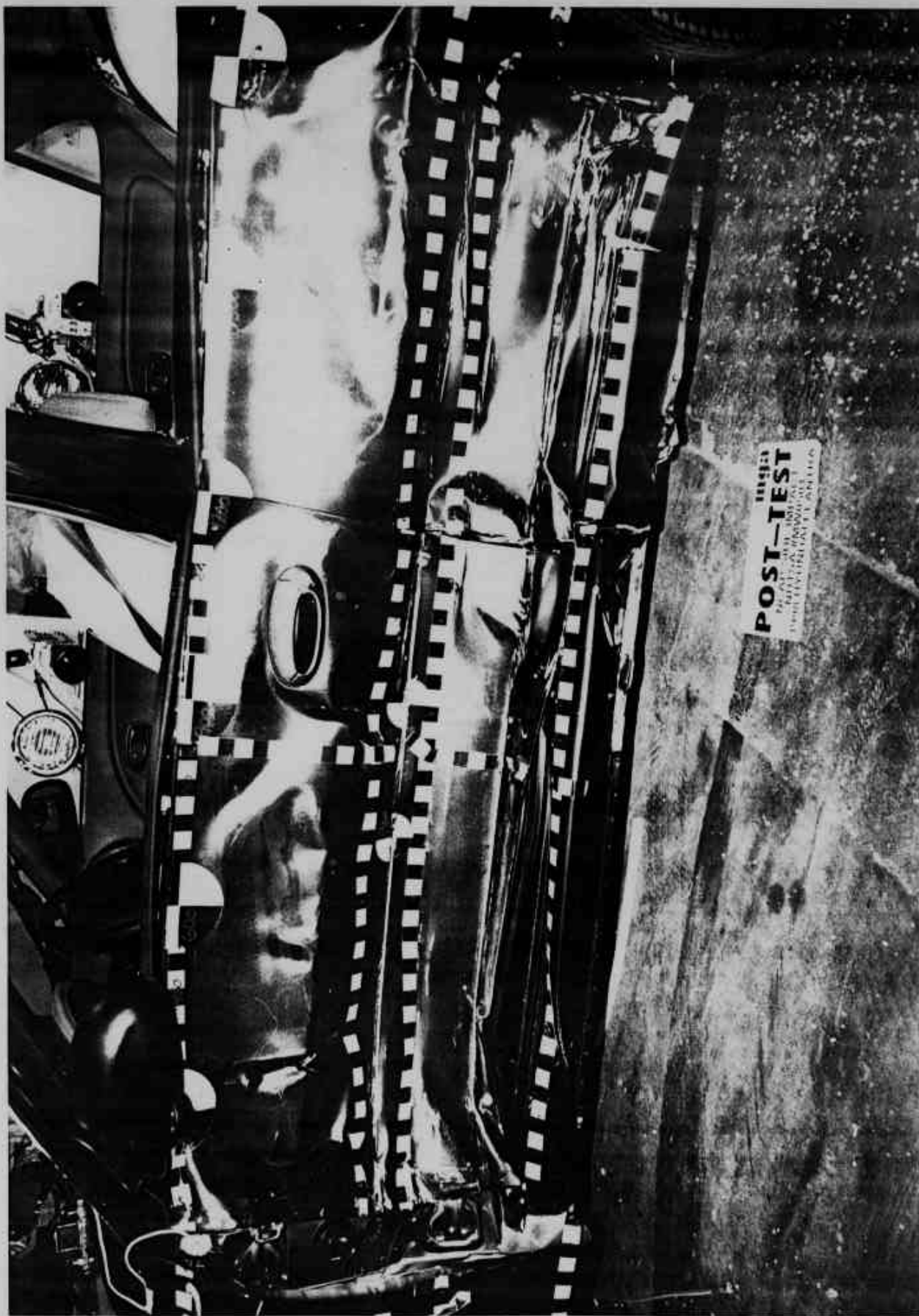
Photo No. A-50 - Right Rear Attitude Point

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Photo No. A-51 - Sill Separation



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Photo No. A-52 - Sill Separation

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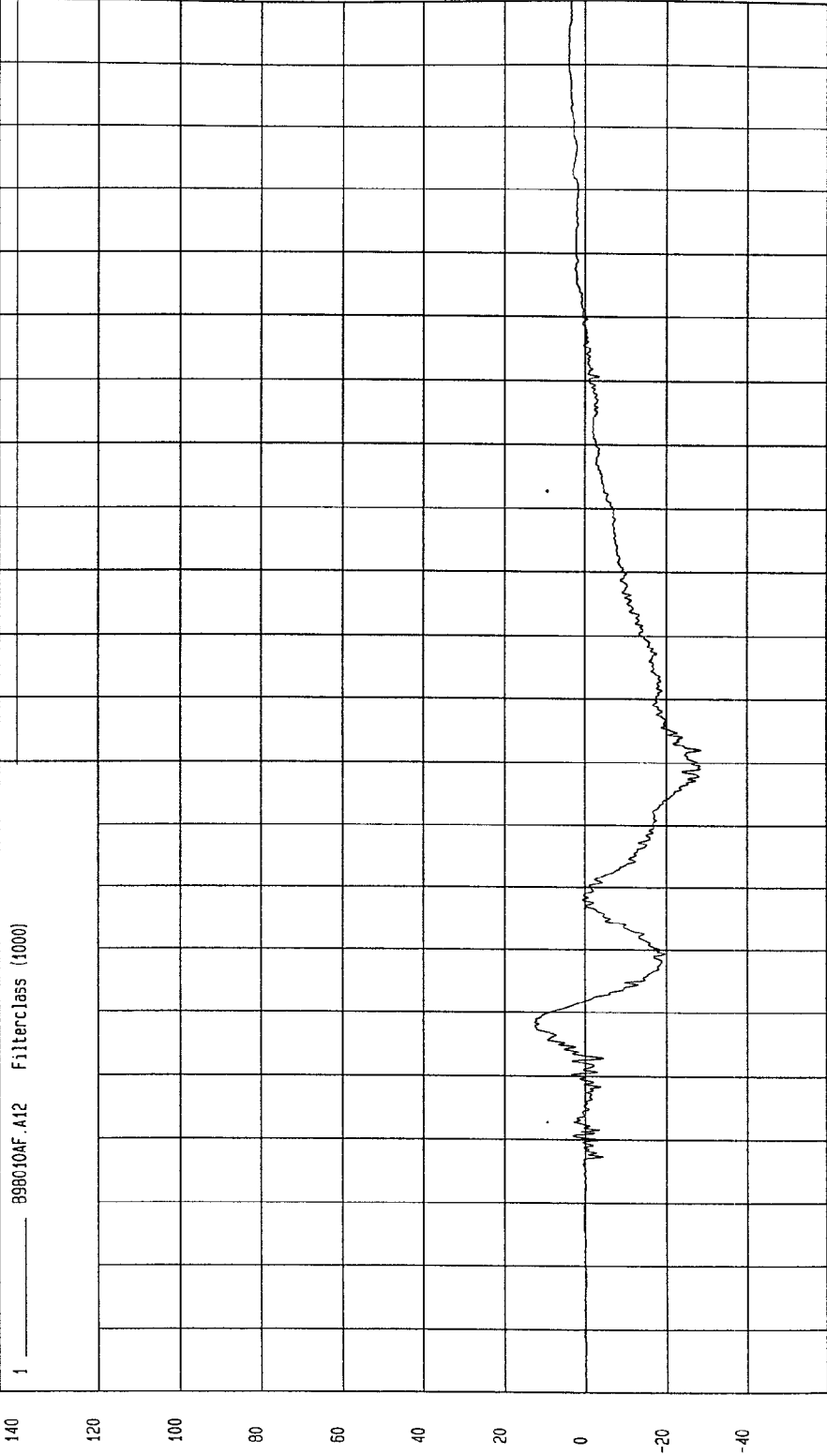
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Figure B-133 - Rear Passenger Pelvis Y Redundant Acceleration vs. Time	B-133

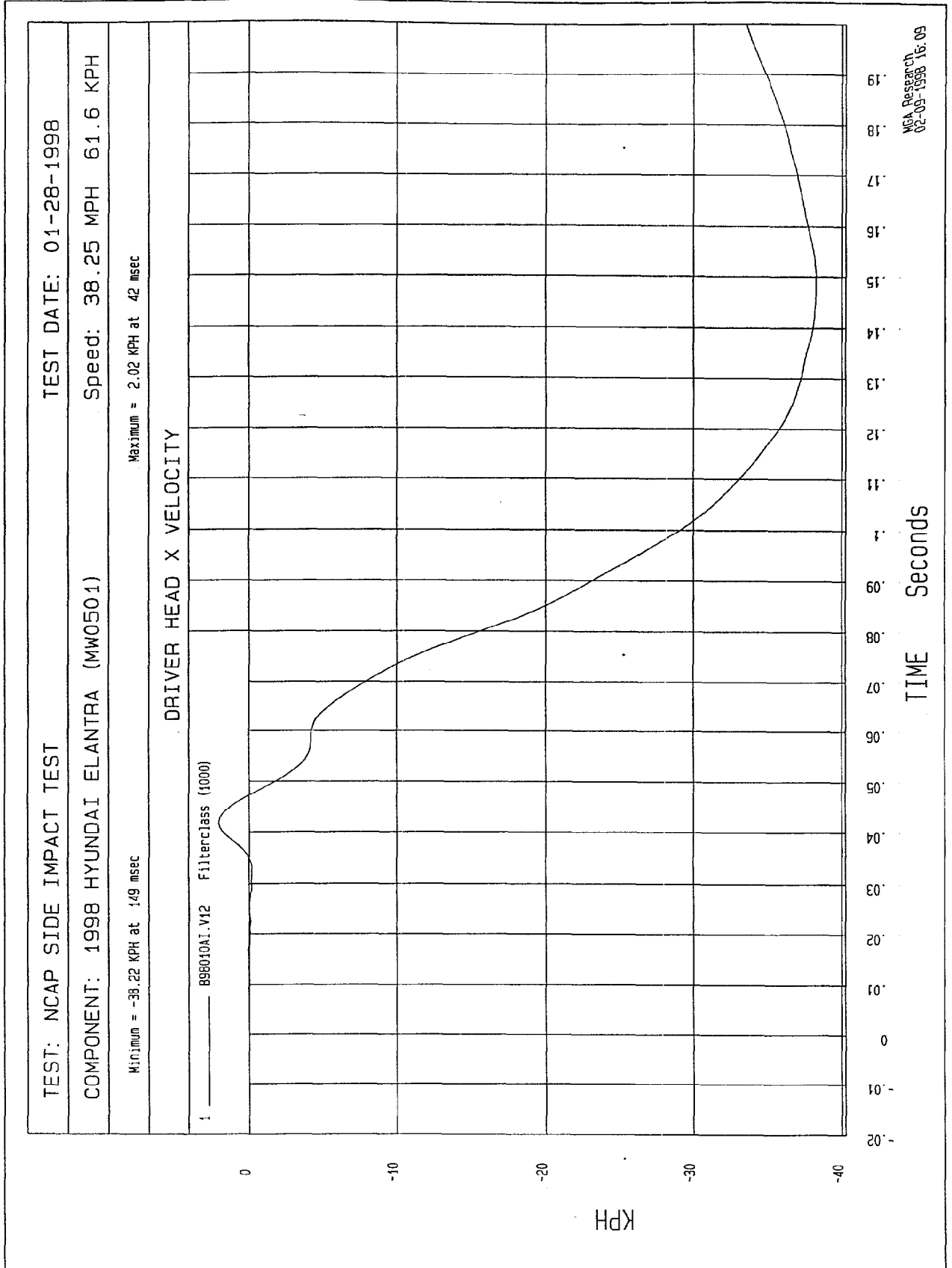
TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -28.45 G'S at 82 msec Maximum = 12.51 G'S at 38 msec

DRIVER HEAD X ACCELERATION



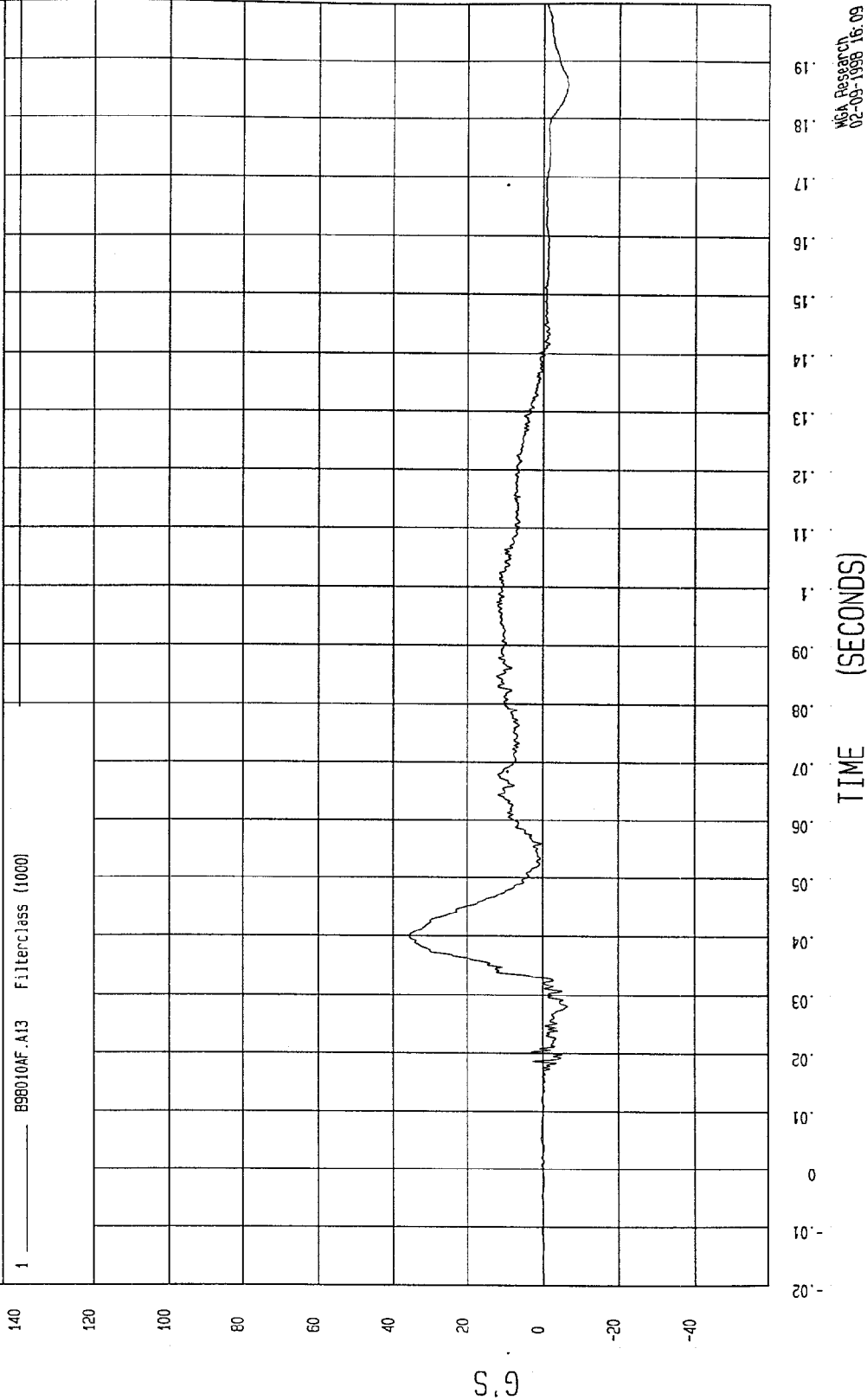


TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

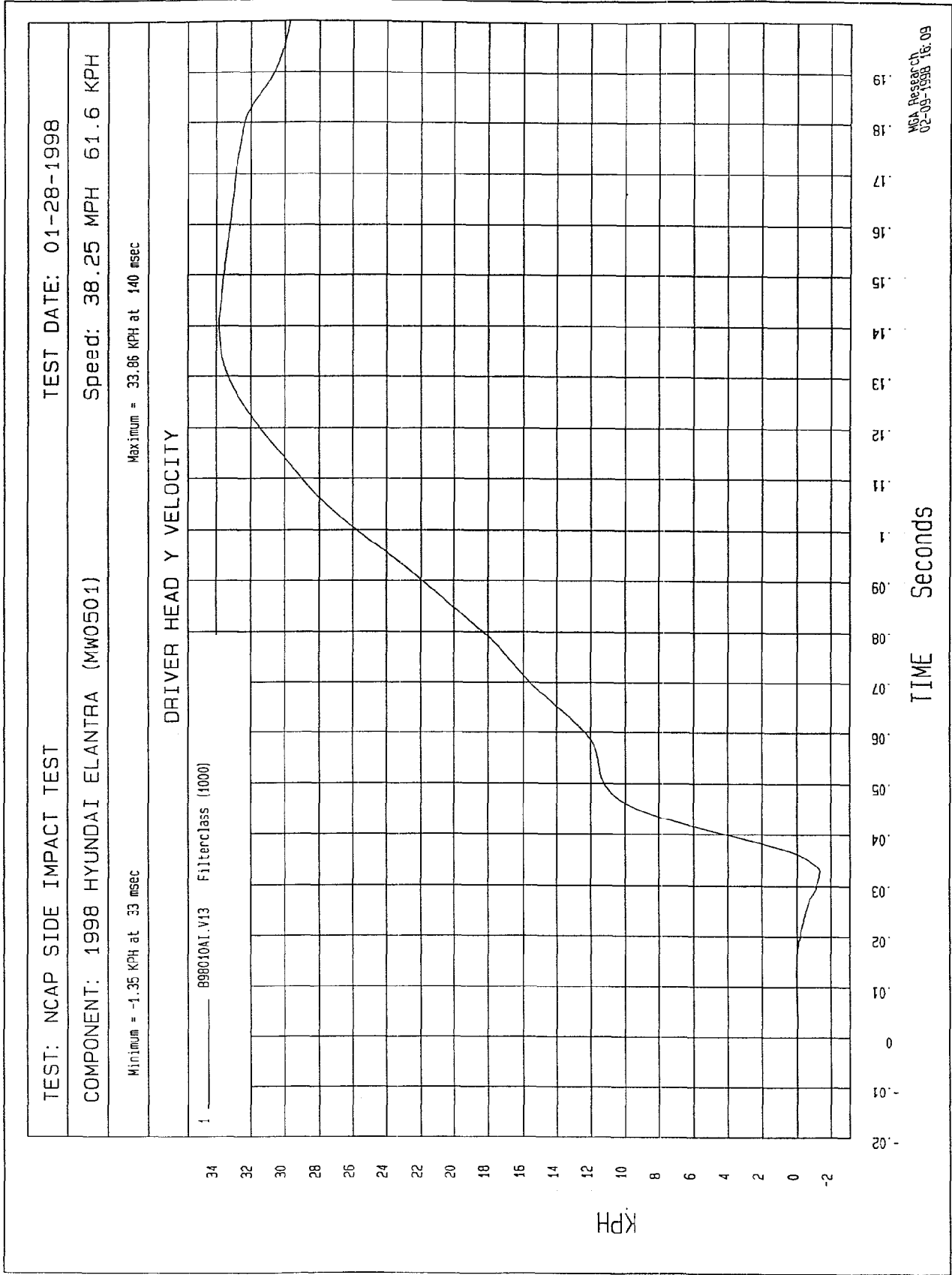
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -6.43 G'S at 186 msec Maximum = 35.67 G'S at 40 msec

DRIVER HEAD Y ACCELERATION



WGA Research
02-09-1998 16:09



TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

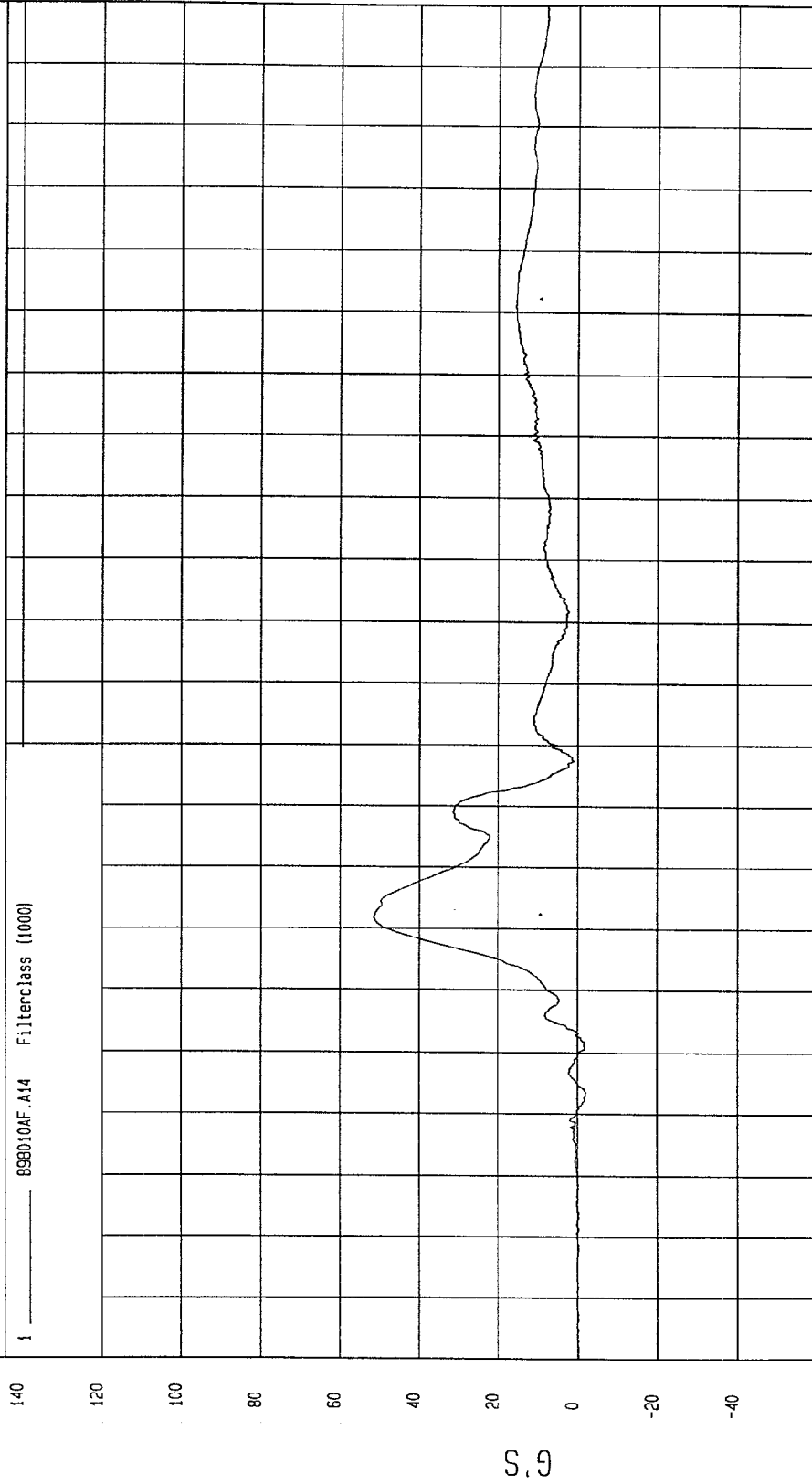
Speed: 38.25 MPH 61.6 KPH

Minimum = -2.09 G'S at 23 msec

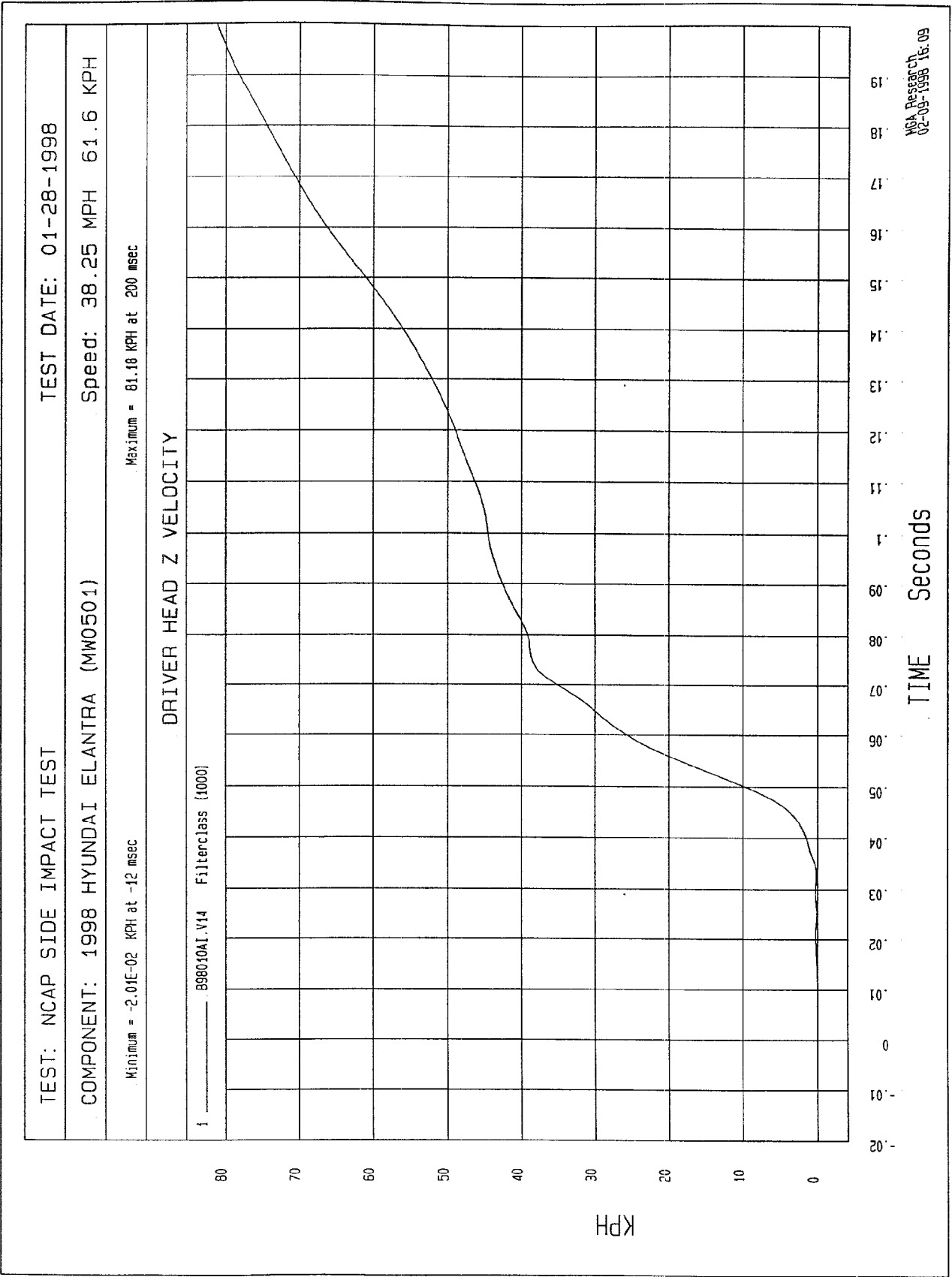
Maximum = 51.30 G'S at 52 msec

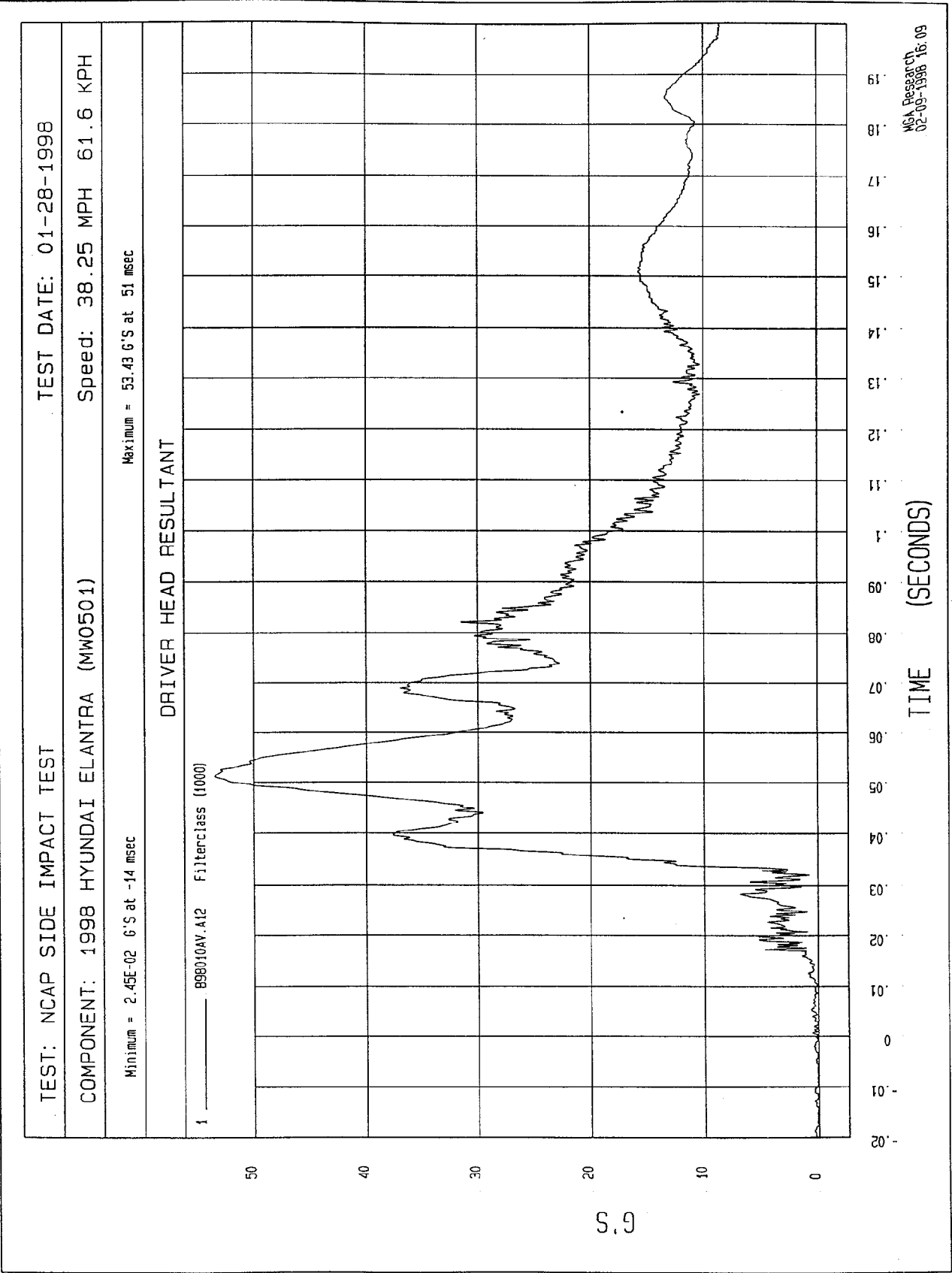
DRIVER HEAD Z ACCELERATION

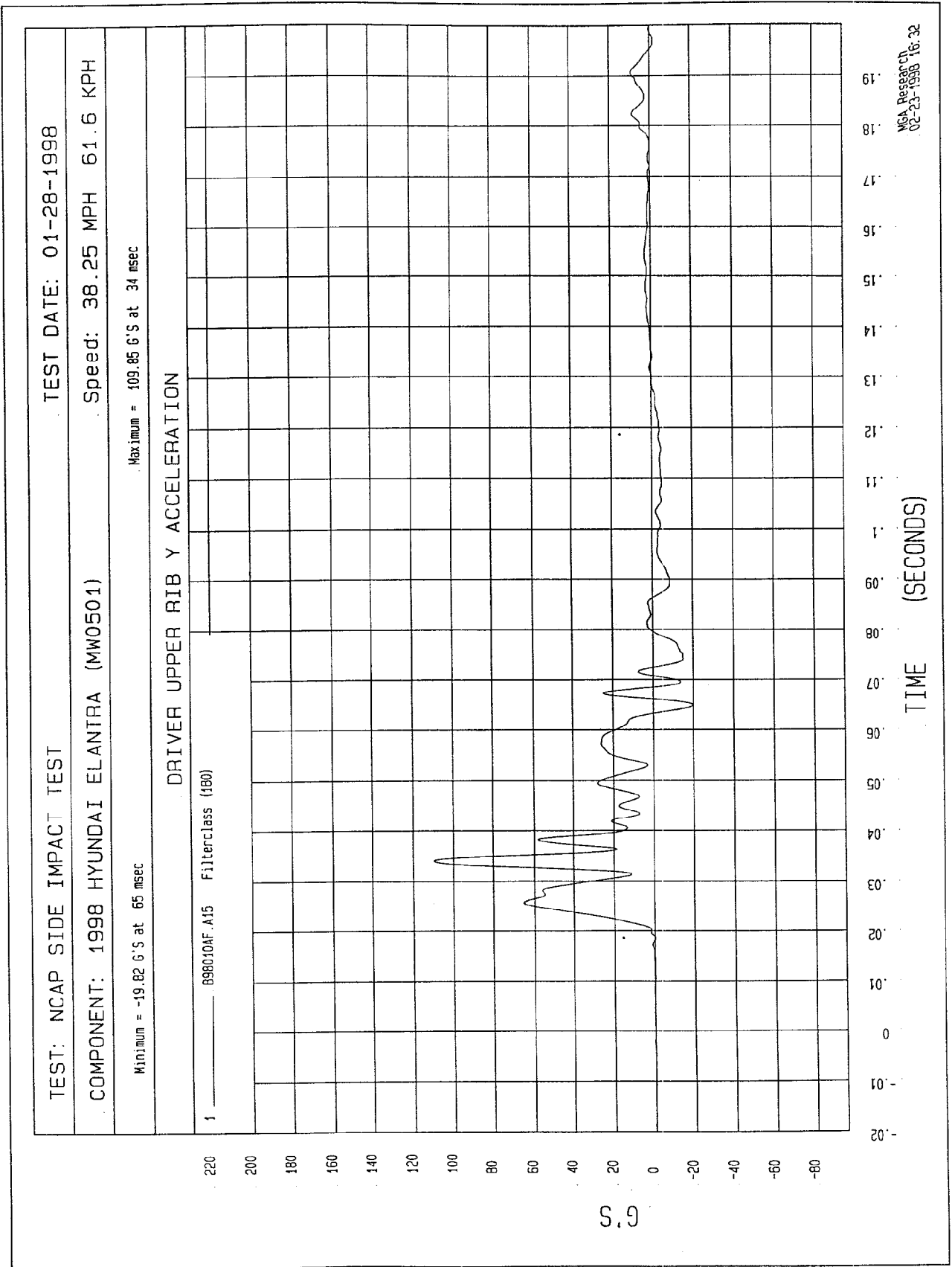
1 898010AF.A14 Filterclass (1000)

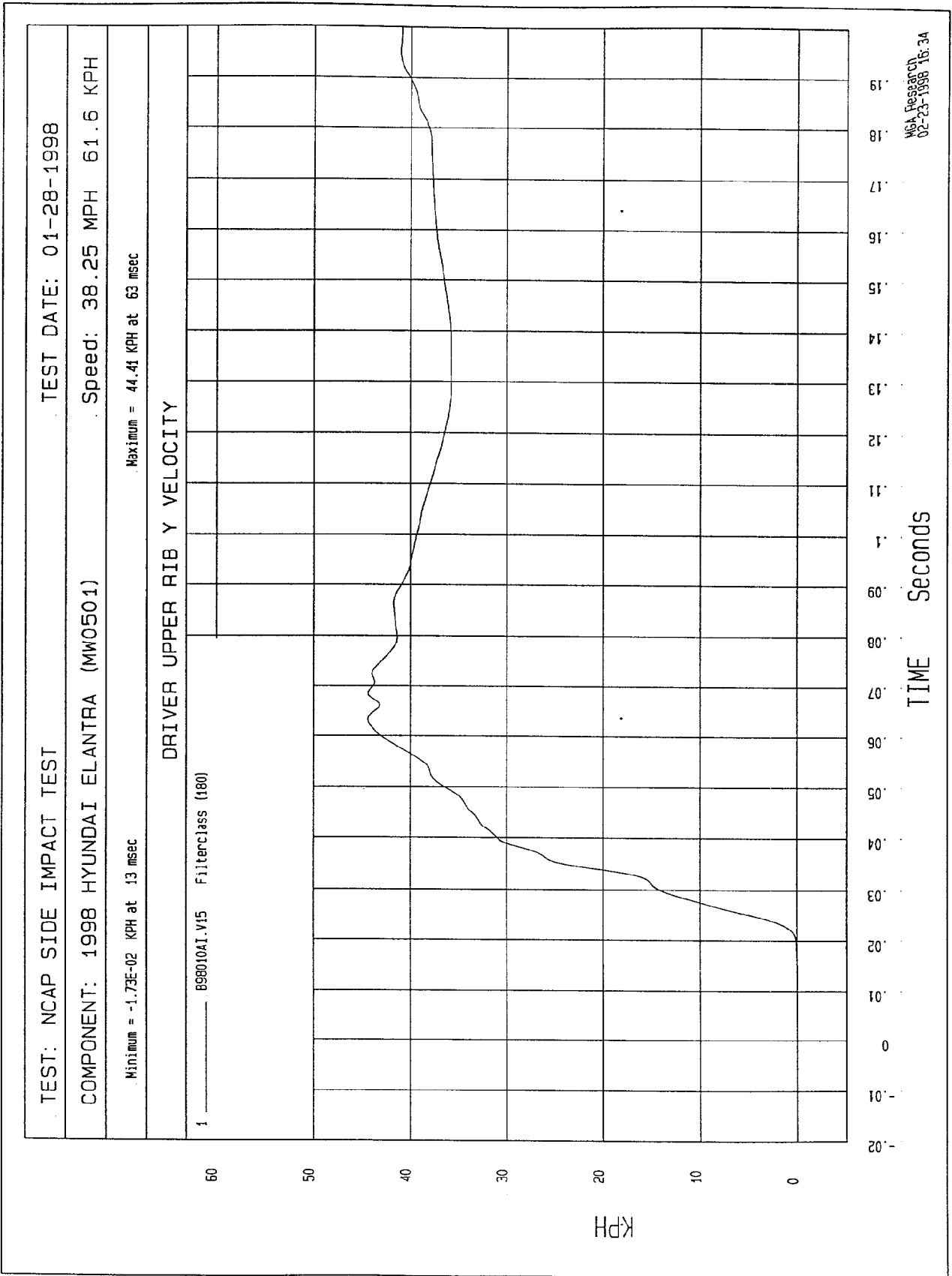


WGA Research
02-09-1998 16:09







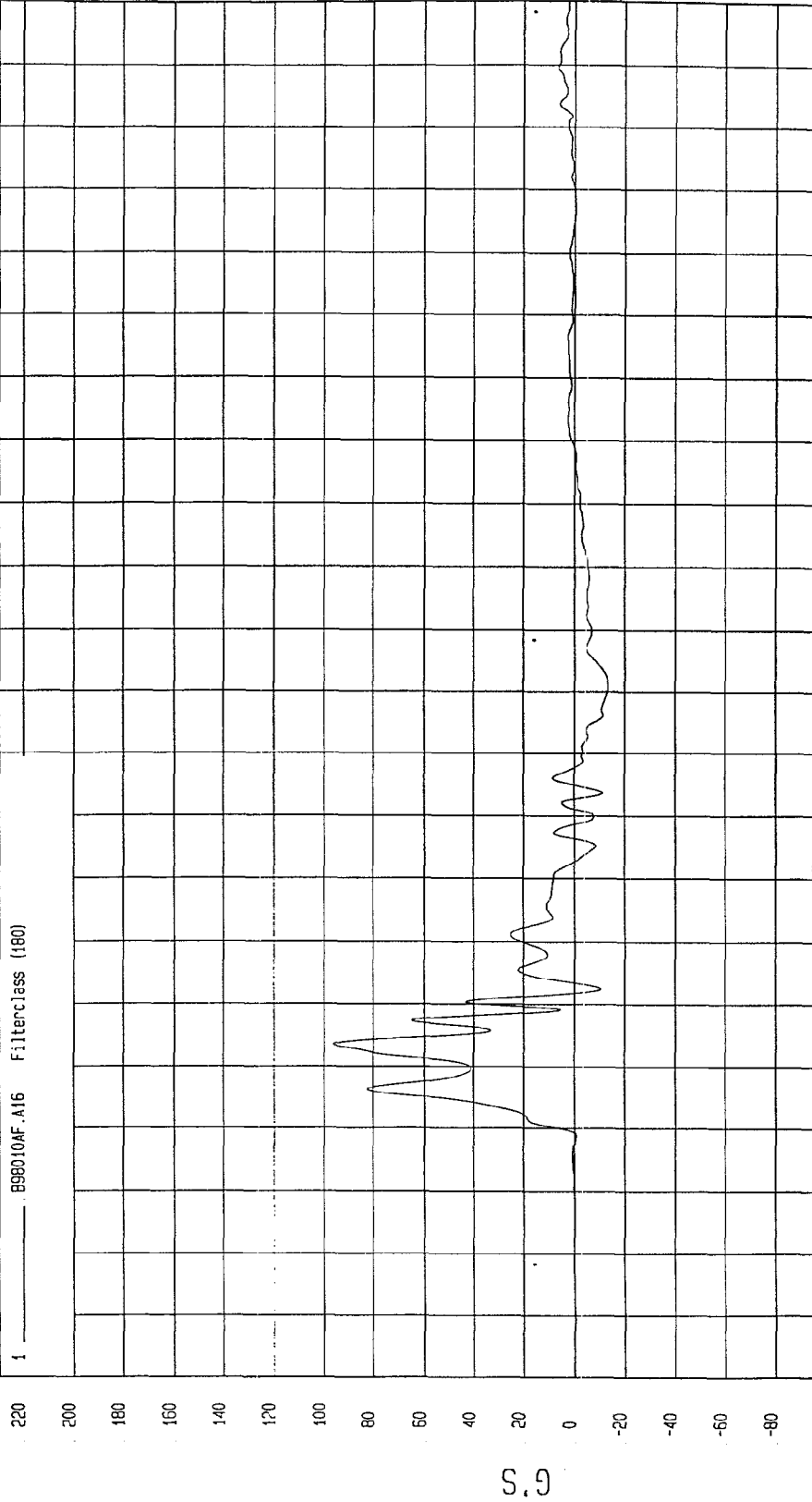


TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

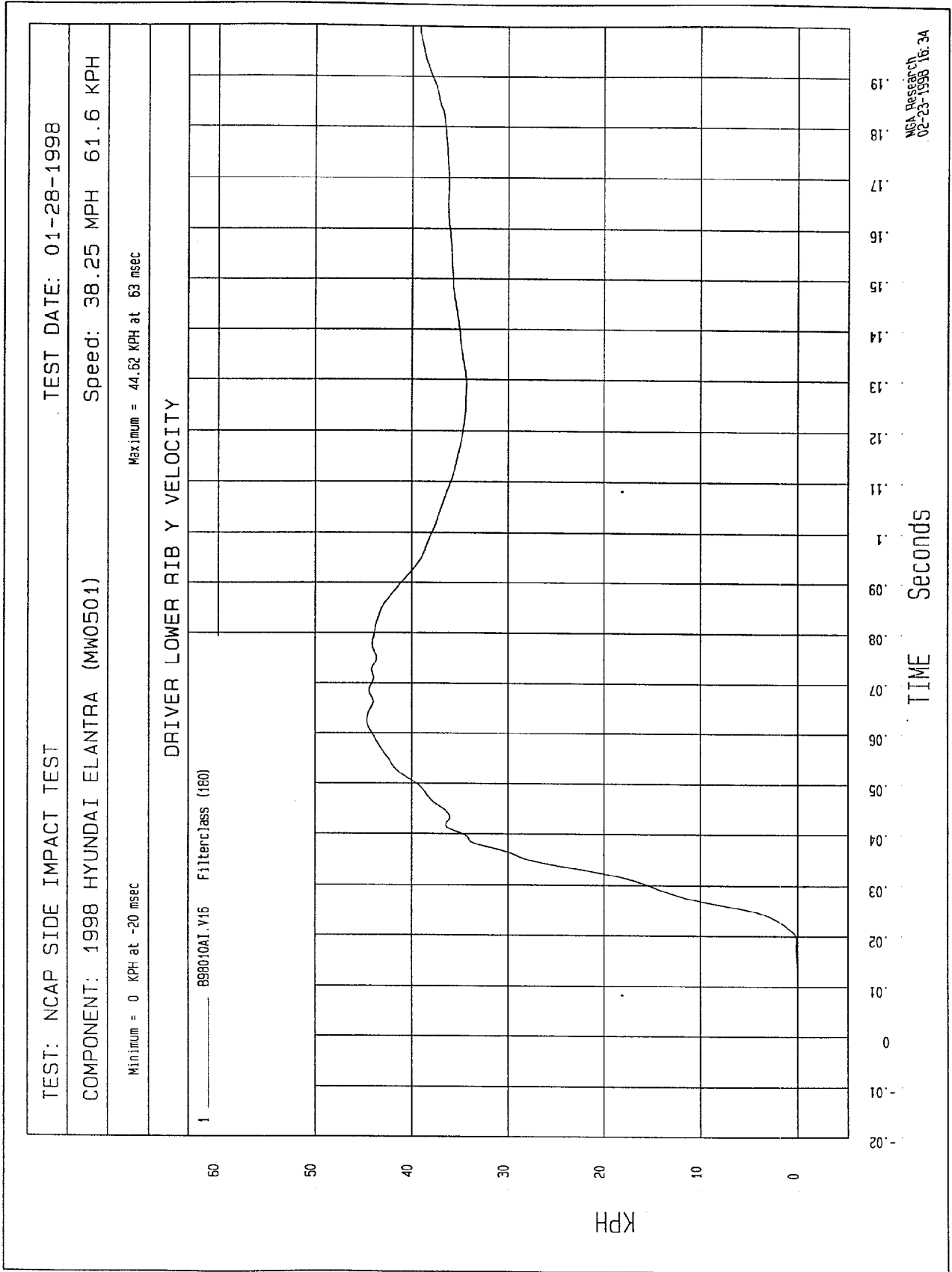
Minimum = -13.55 G'S at 91 msec Maximum = 96.28 G'S at 34 msec

DRIVER LOWER RIB Y ACCELERATION



NSA Research
02-23-1998 16:32

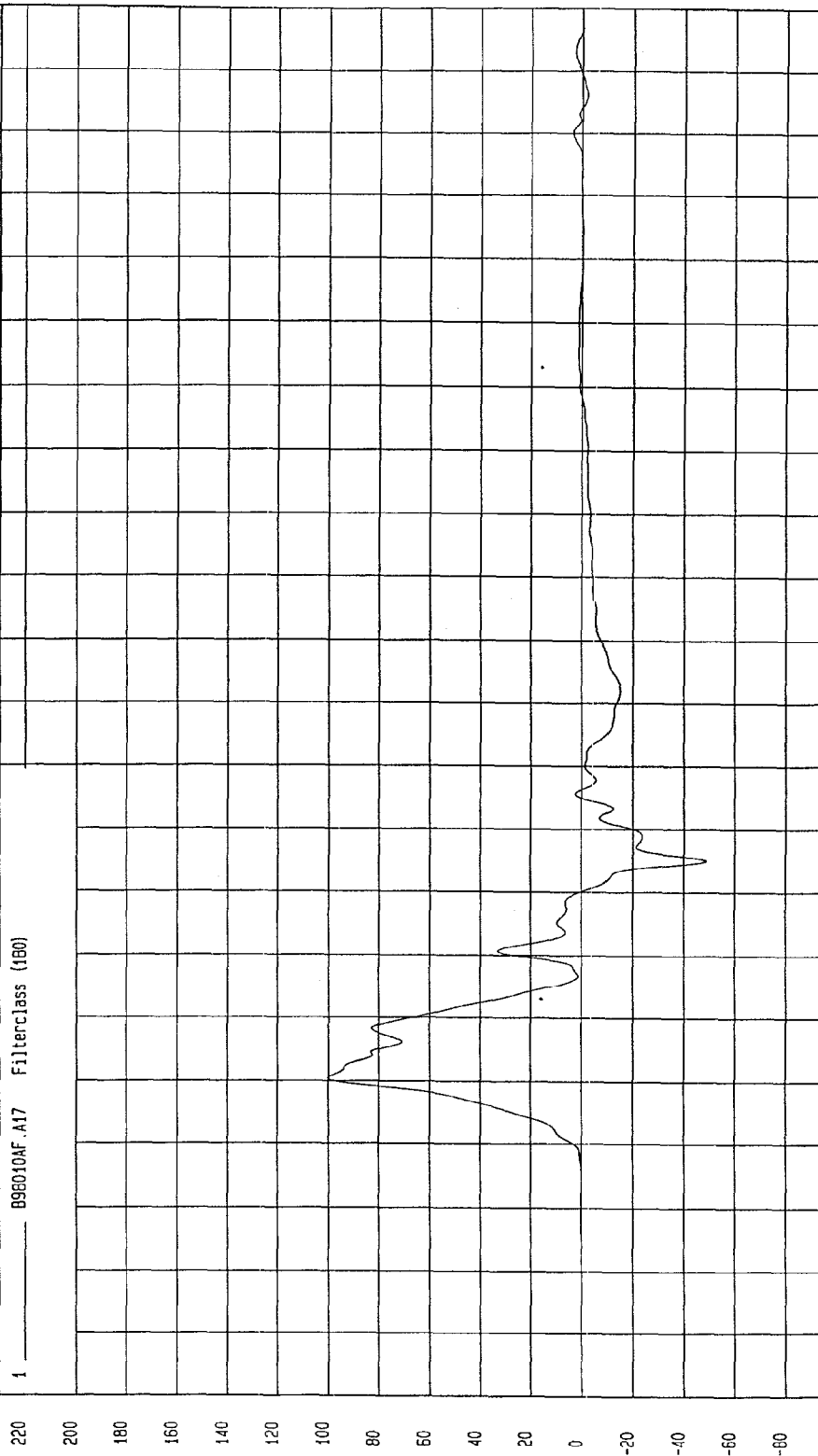
TIME (SECONDS)



TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -48.97 G'S at 65 msec Maximum = 100.40 G'S at 30 msec

DRIVER LOWER SPINE Y ACCELERATION



TIME (SECONDS)

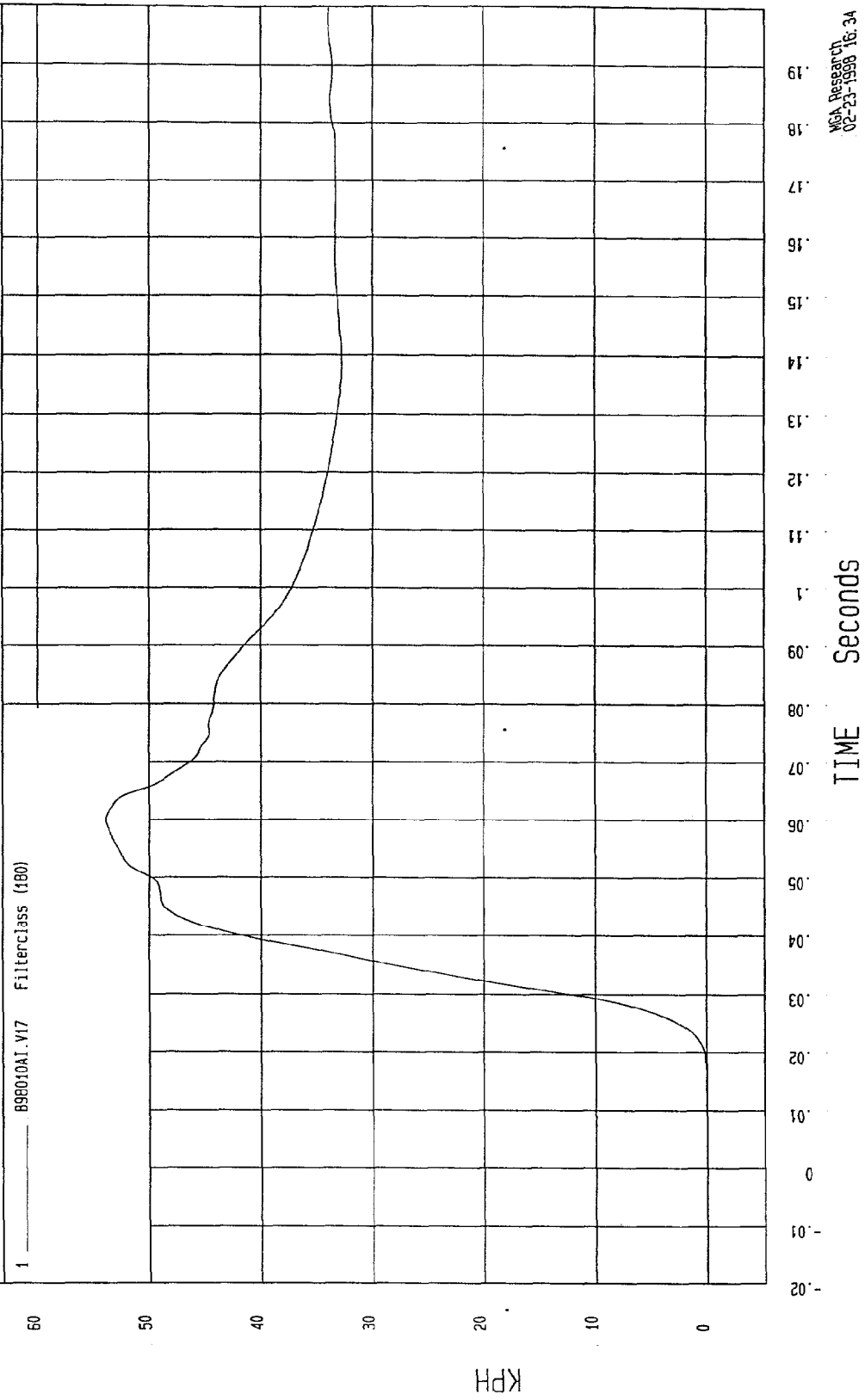
MGA Research
02-23-1998 16:32

TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -1.90E-02 KPH at -12 msec Maximum = 53.91 KPH at 60 msec

DRIVER LOWER SPINE Y VELOCITY

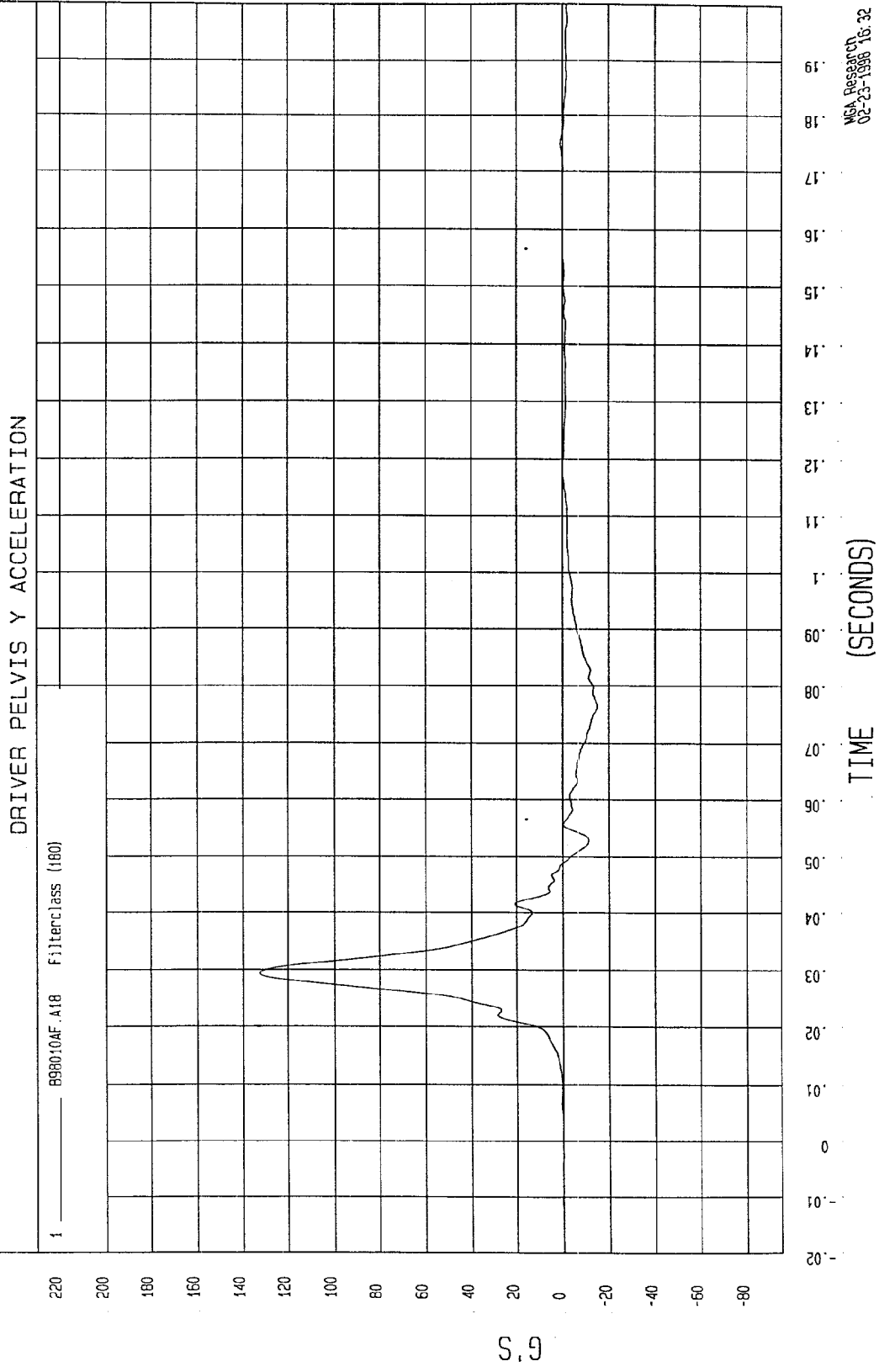


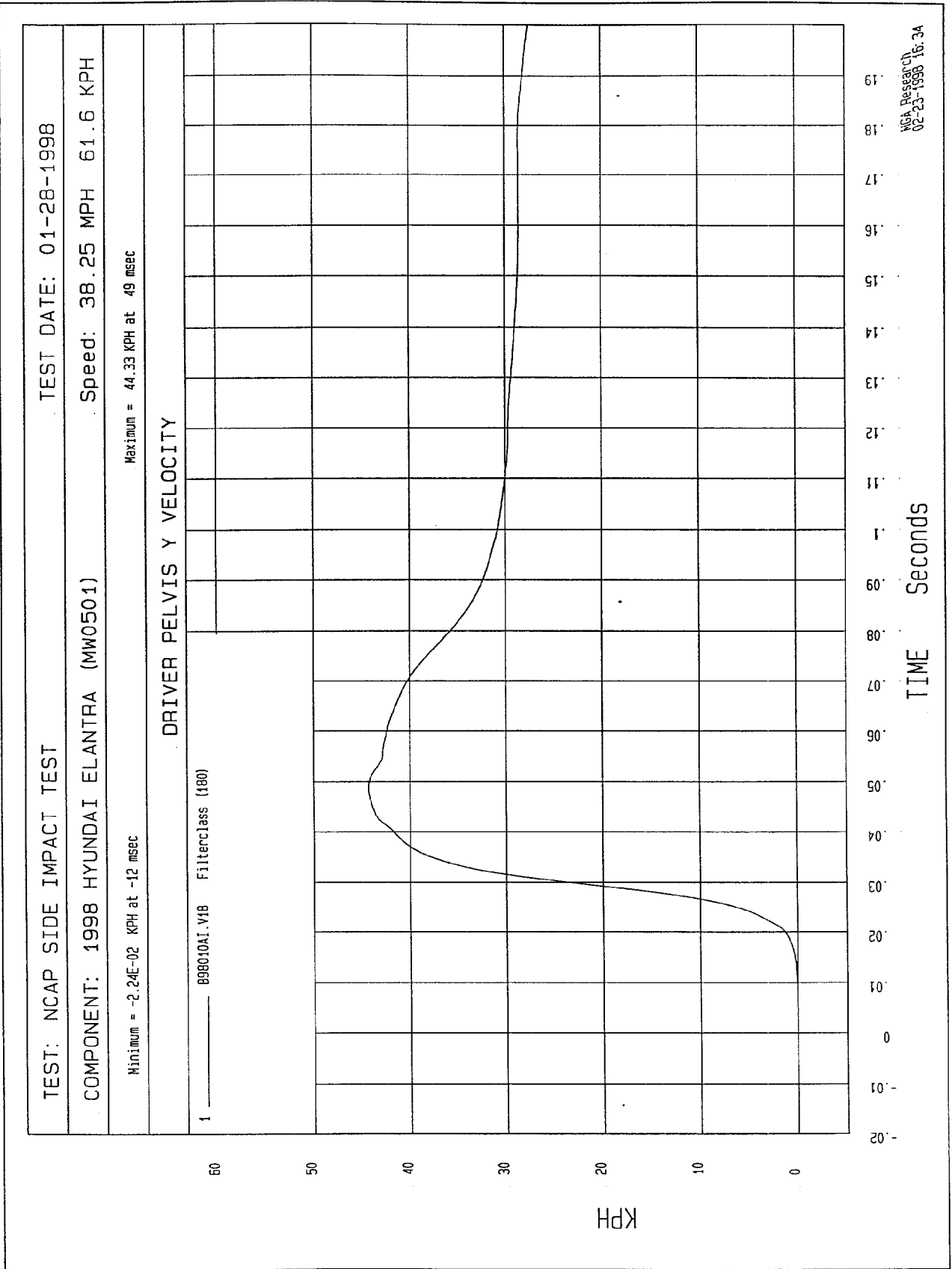
WCA Research
02-23-1998 16:34

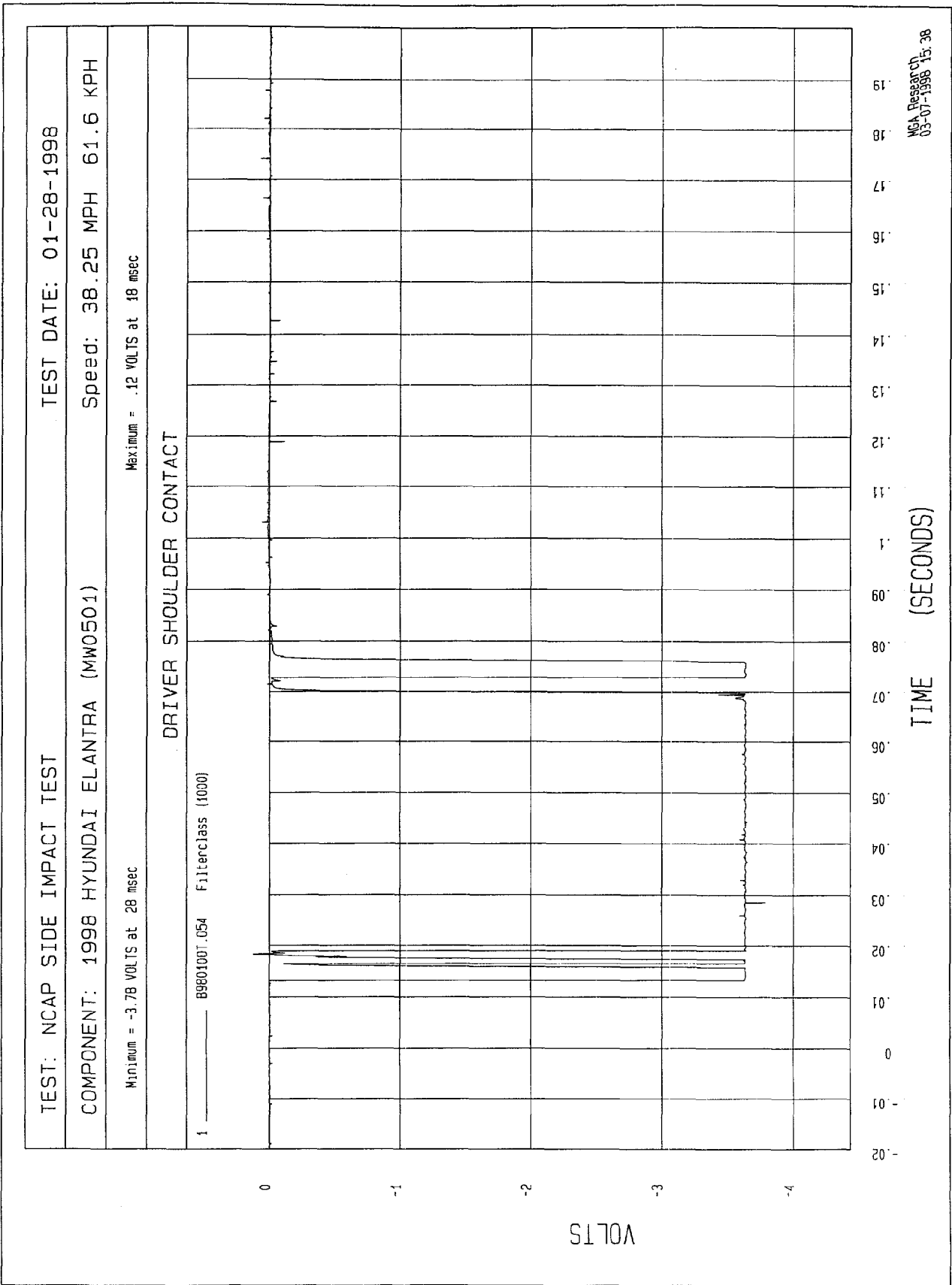
TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -15.20 G'S at 76 msec Maximum = 132.46 G'S at 29 msec







TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

Speed: 38.25 MPH 61.6 KPH

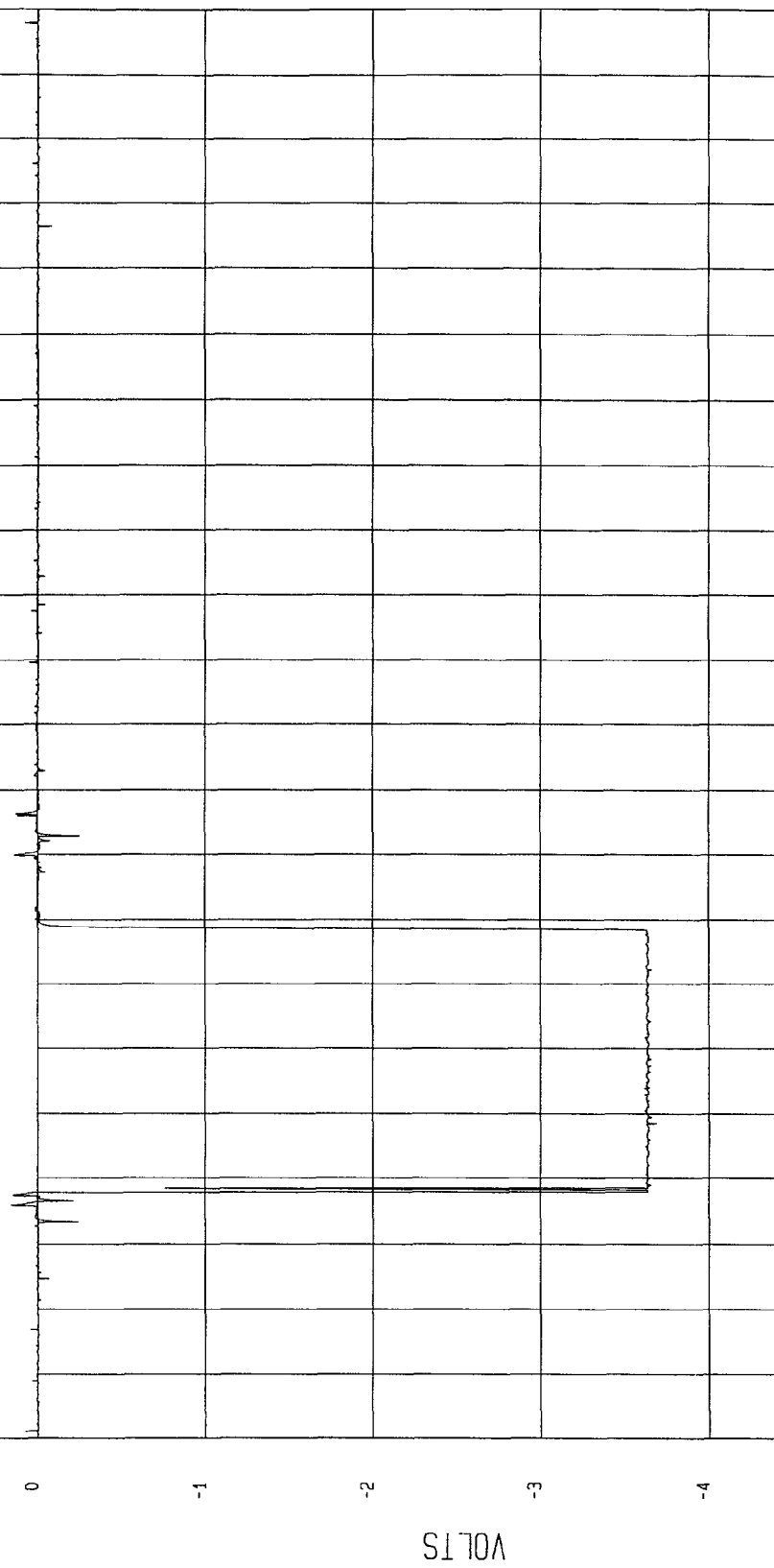
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

Maximum = .15 VOLTS at .16 msec

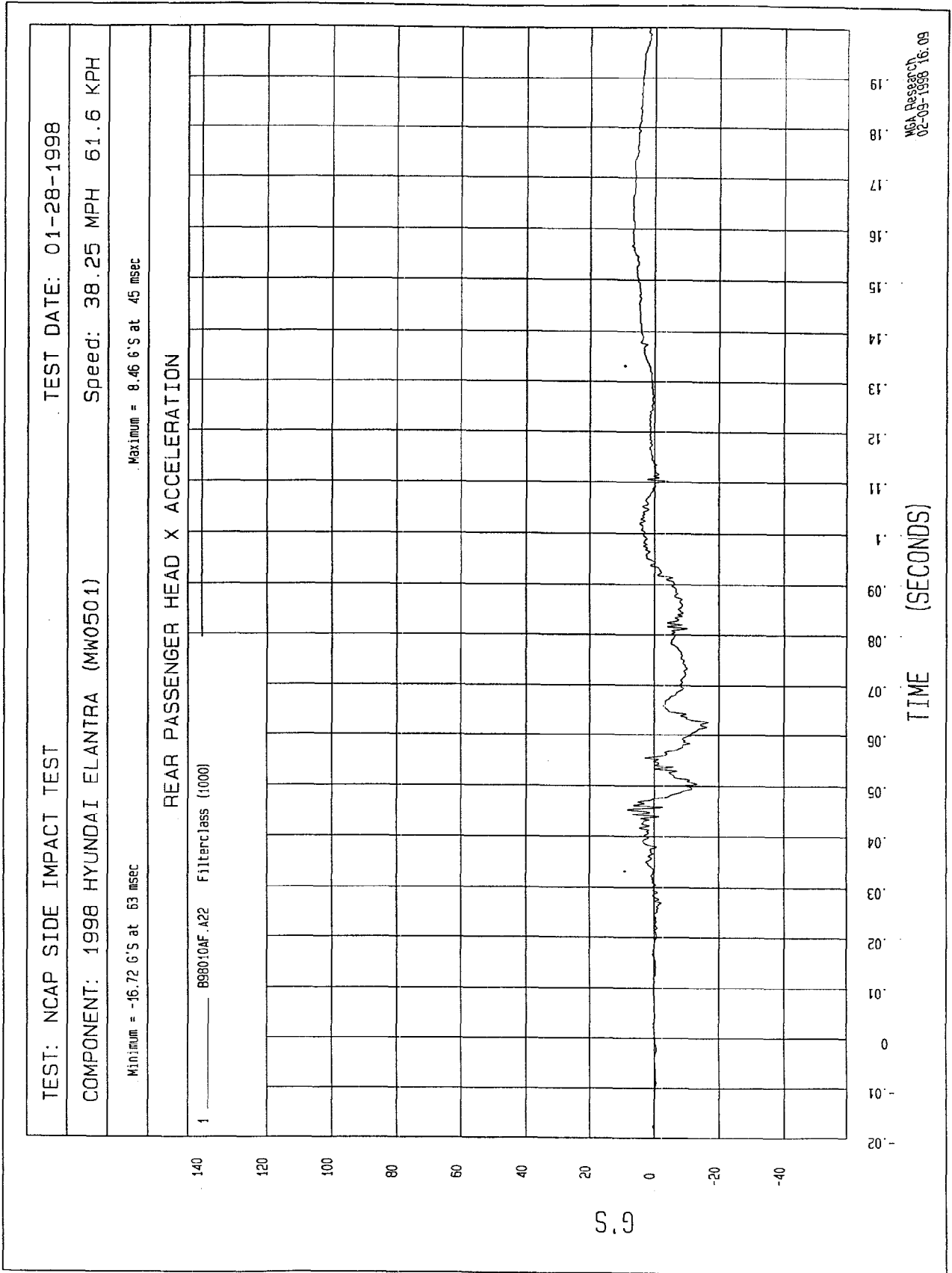
Minimum = -3.68 VOLTS at .28 msec

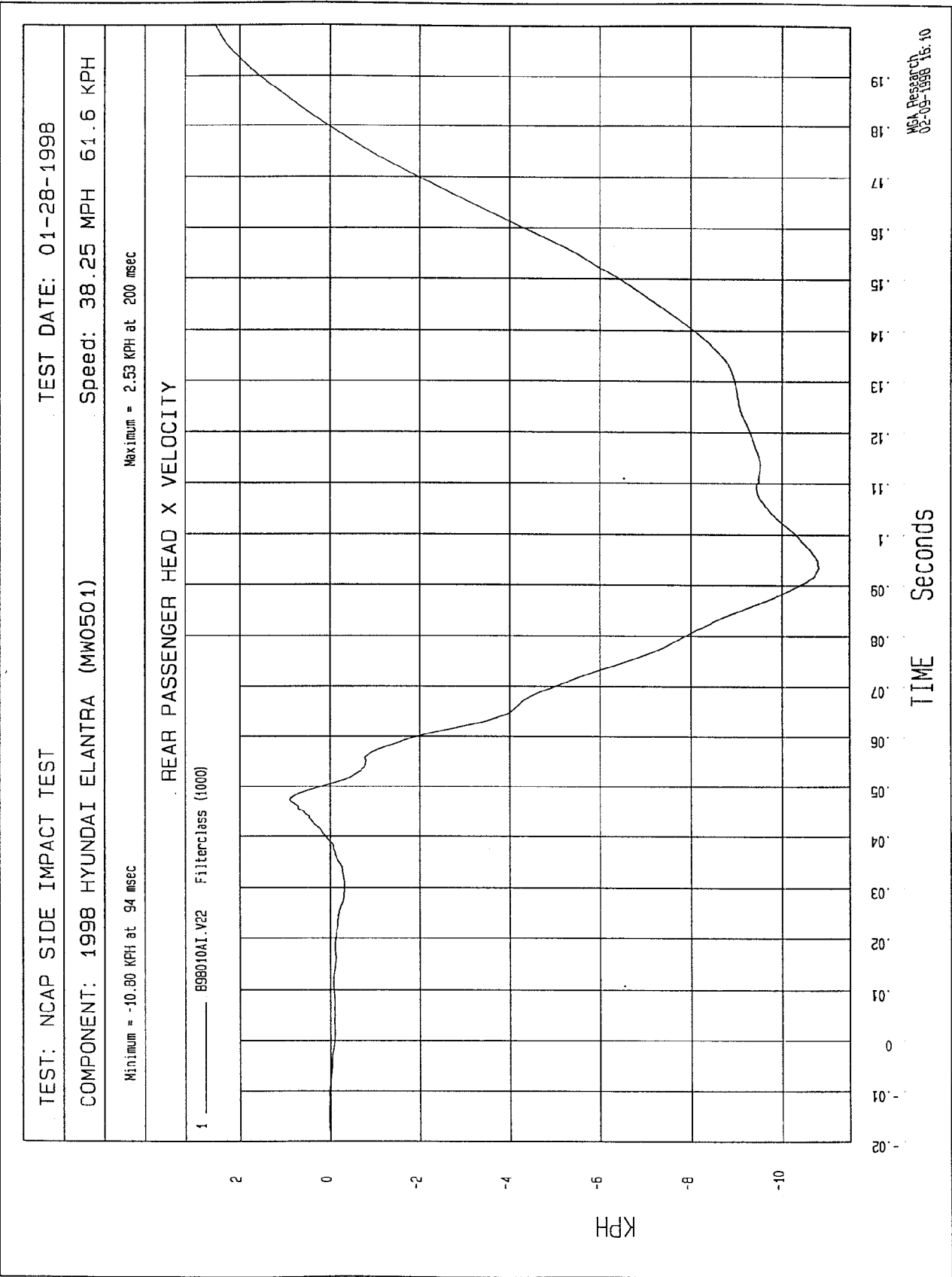
DRIVER PELVIS CONTACT

1 ——— 8980100T.053 Filterclass (1000)



MOA Research
03-01-1998 15:38



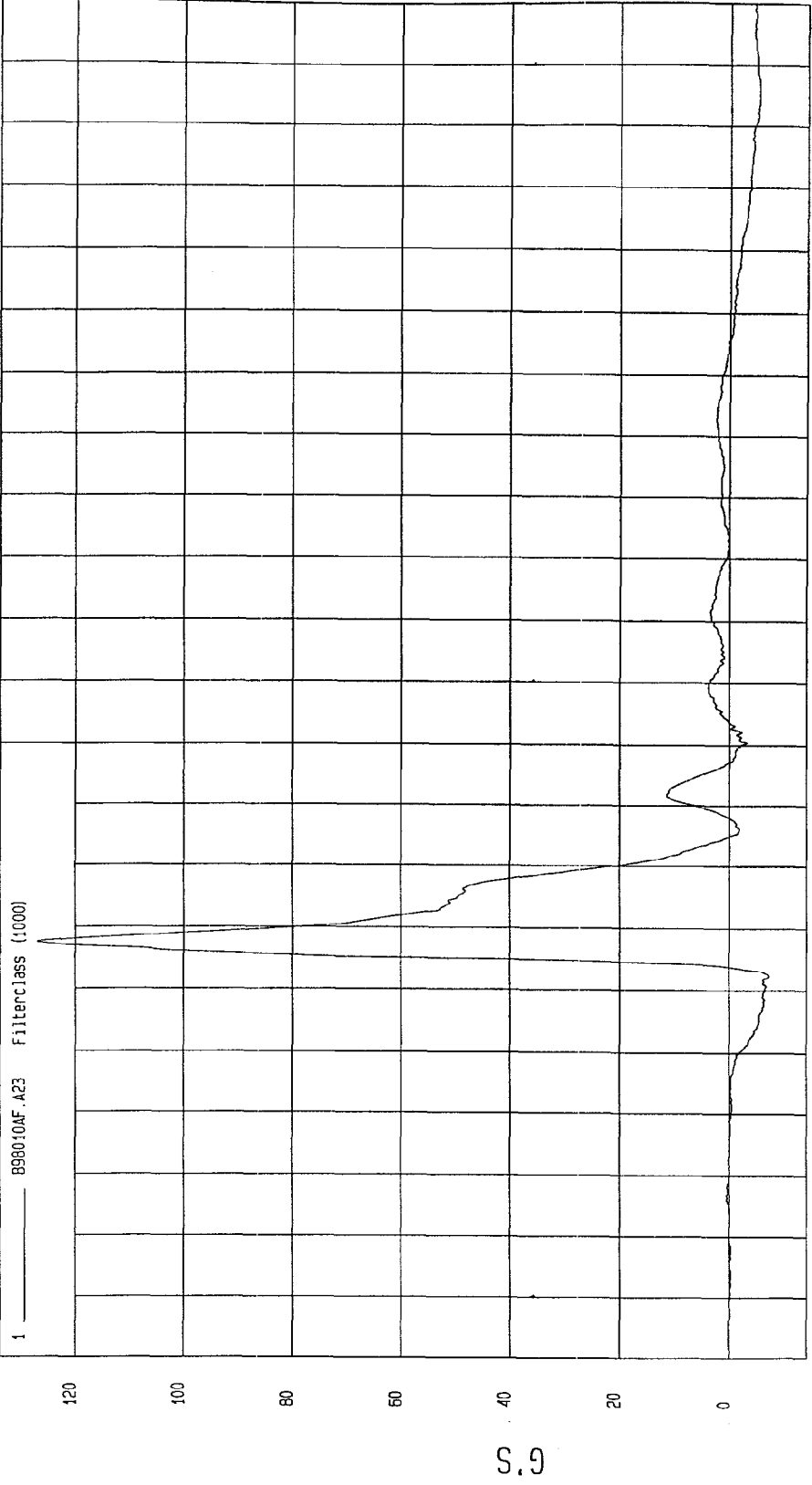


TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -7.31 G'S at 42 msec Maximum = 126.95 G'S at 48 msec

REAR PASSENGER HEAD Y ACCELERATION



19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
-1
-2

TIME (SECONDS)

0.19
0.18
0.17
0.16
0.15
0.14
0.13
0.12
0.11
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02

NSA Research
02-09-1998 16:10

TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

Speed: 38.25 MPH 61.6 KPH

Minimum = -2.80 KPH at 44 msec

Maximum = 39.79 KPH at 146 msec

REAR PASSENGER HEAD Y VELOCITY

1 ——— B98010A1.V23 Filterclass (1000)



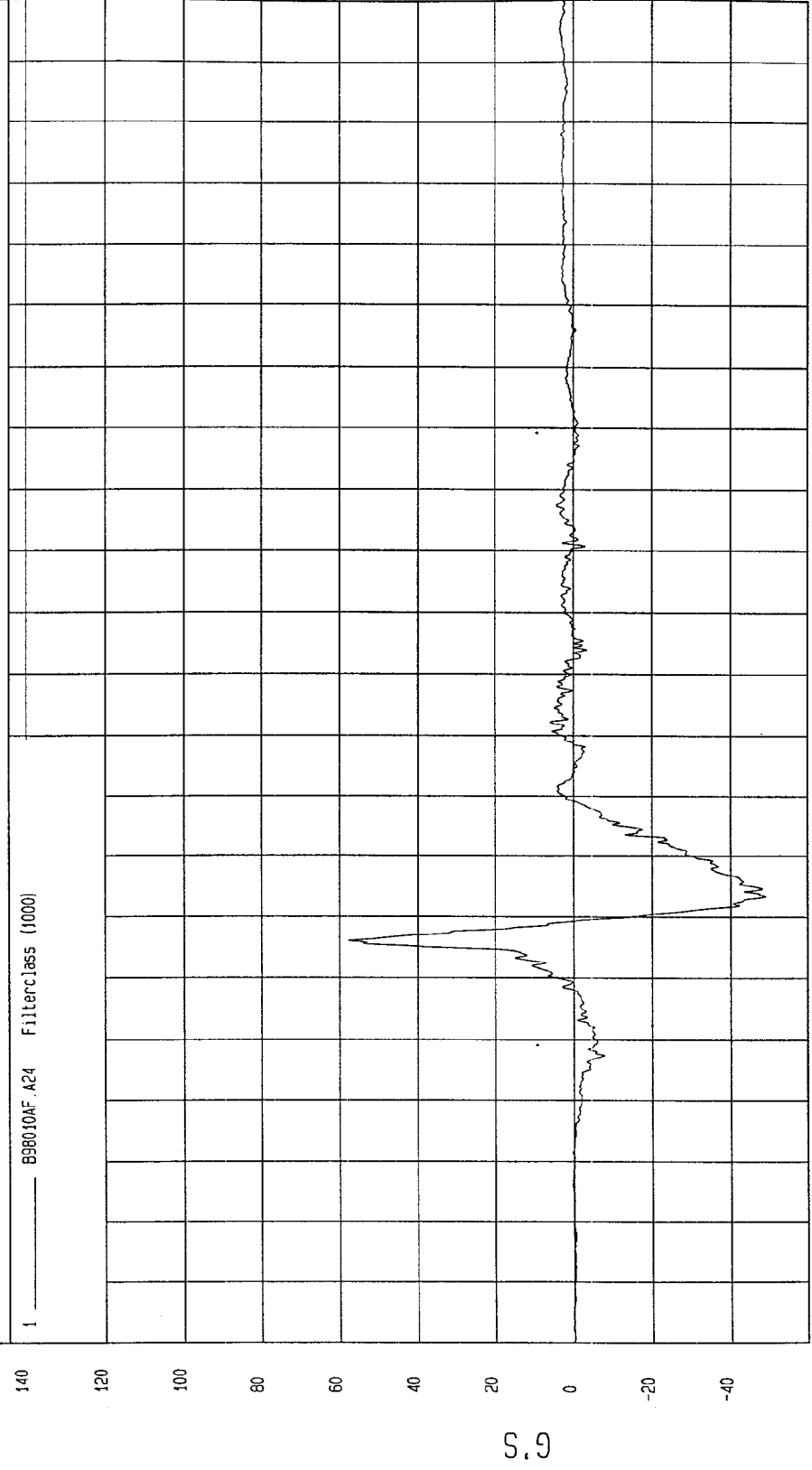
MGA Research
02-09-1998 16:10

TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -48.81 G'S at 53 msec Maximum = 57.69 G'S at 46 msec

REAR PASSENGER HEAD Z ACCELERATION



TIME (SECONDS)

0.19
0.18
0.17
0.16
0.15
0.14
0.13
0.12
0.11
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02

MEA Research
02-09-1998 16:10

TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

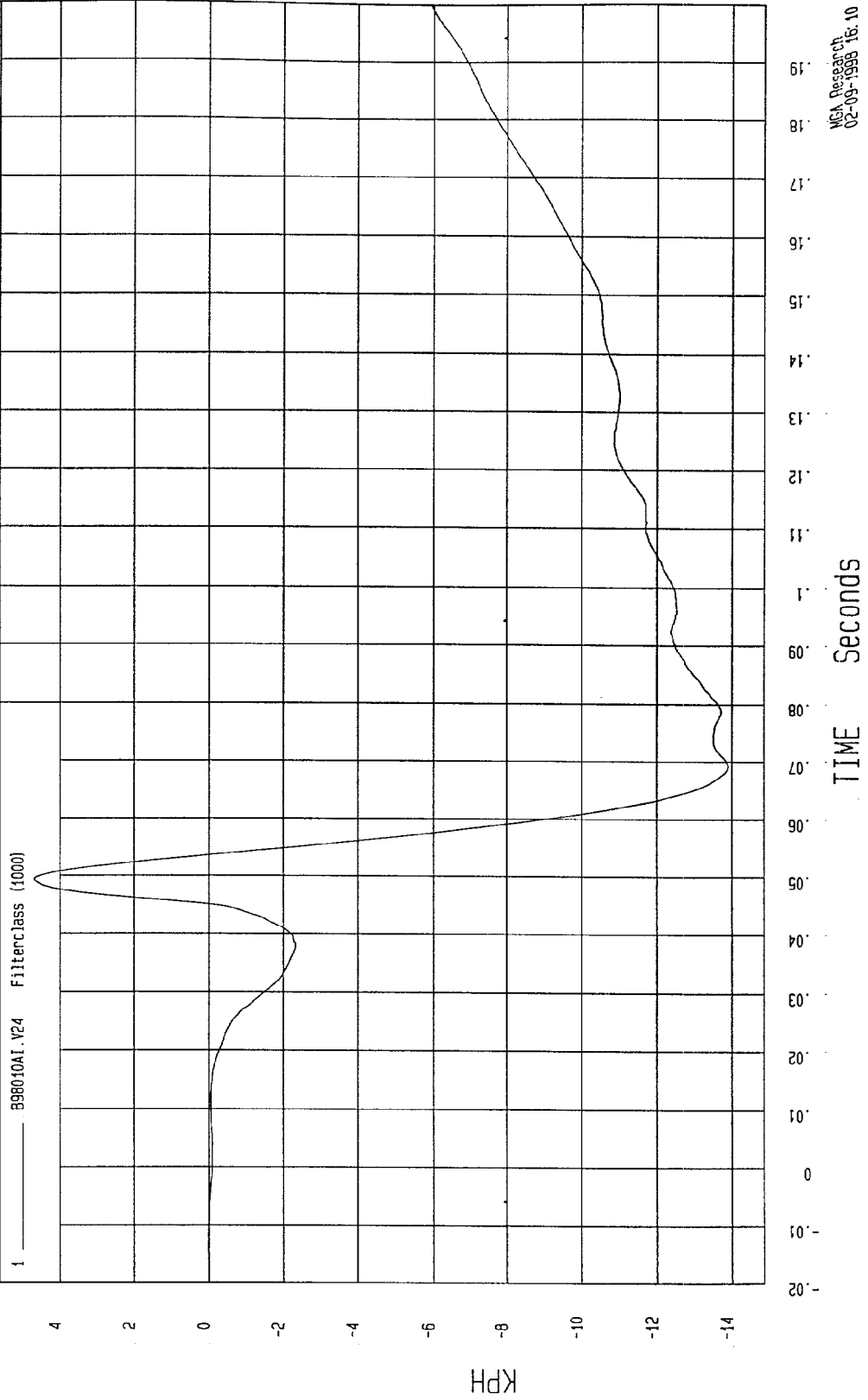
Speed: 38.25 MPH 61.6 KPH

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

Maximum = 4.67 KPH at 49 msec

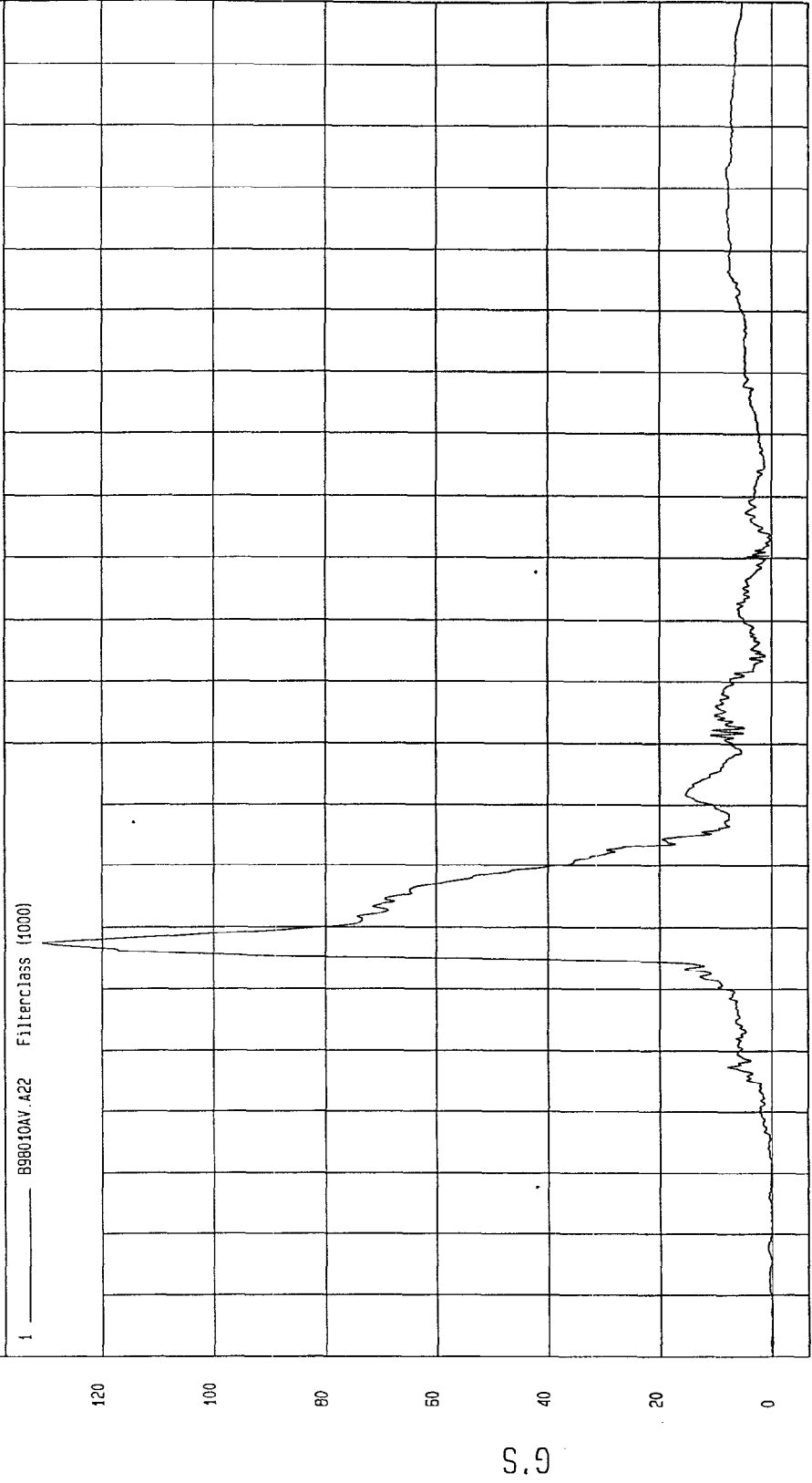
Minimum = -13.89 KPH at 69 msec

REAR PASSENGER HEAD Z VELOCITY



TEST: NCAP SIDE IMPACT TEST	TEST DATE: 01-28-1998
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)	Speed: 38.25 MPH 61.6 KPH
Minimum = 6.41E-02 G'S at -14 msec	Maximum = 130.83 G'S at 48 msec

REAR PASSENGER HEAD RESULTANT



TIME (SECONDS)

0.19
0.18
0.17
0.16
0.15
0.14
0.13
0.12
0.11
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02

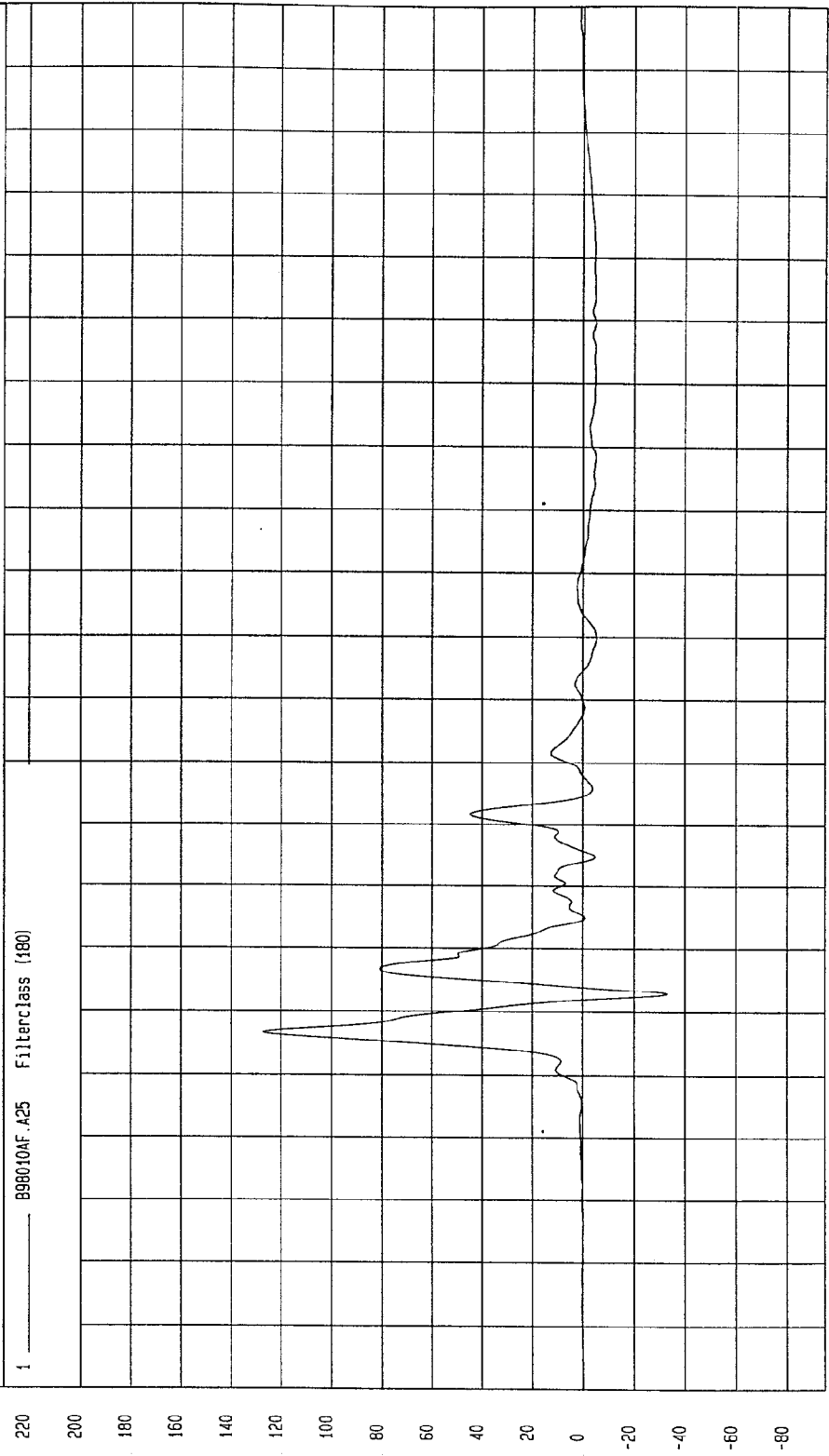
WCA Research
02-09-1998 16.10

TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -33.25 G'S at 43 msec Maximum = 127.31 G'S at 37 msec

REAR PASSENGER UPPER RIB Y ACCELERATION



TIME (SECONDS)

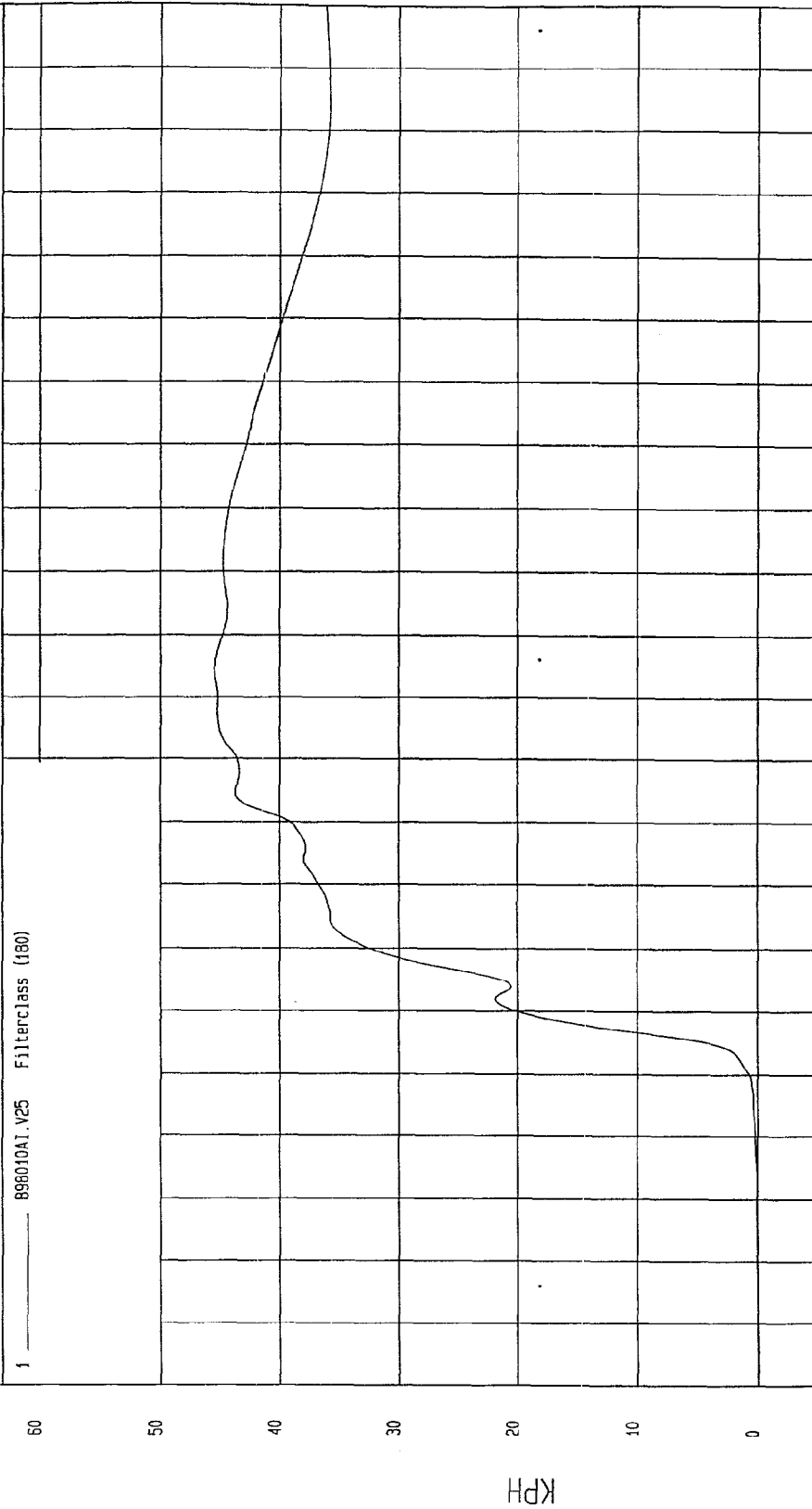
NSA Research
02-23-1998 16:32

TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

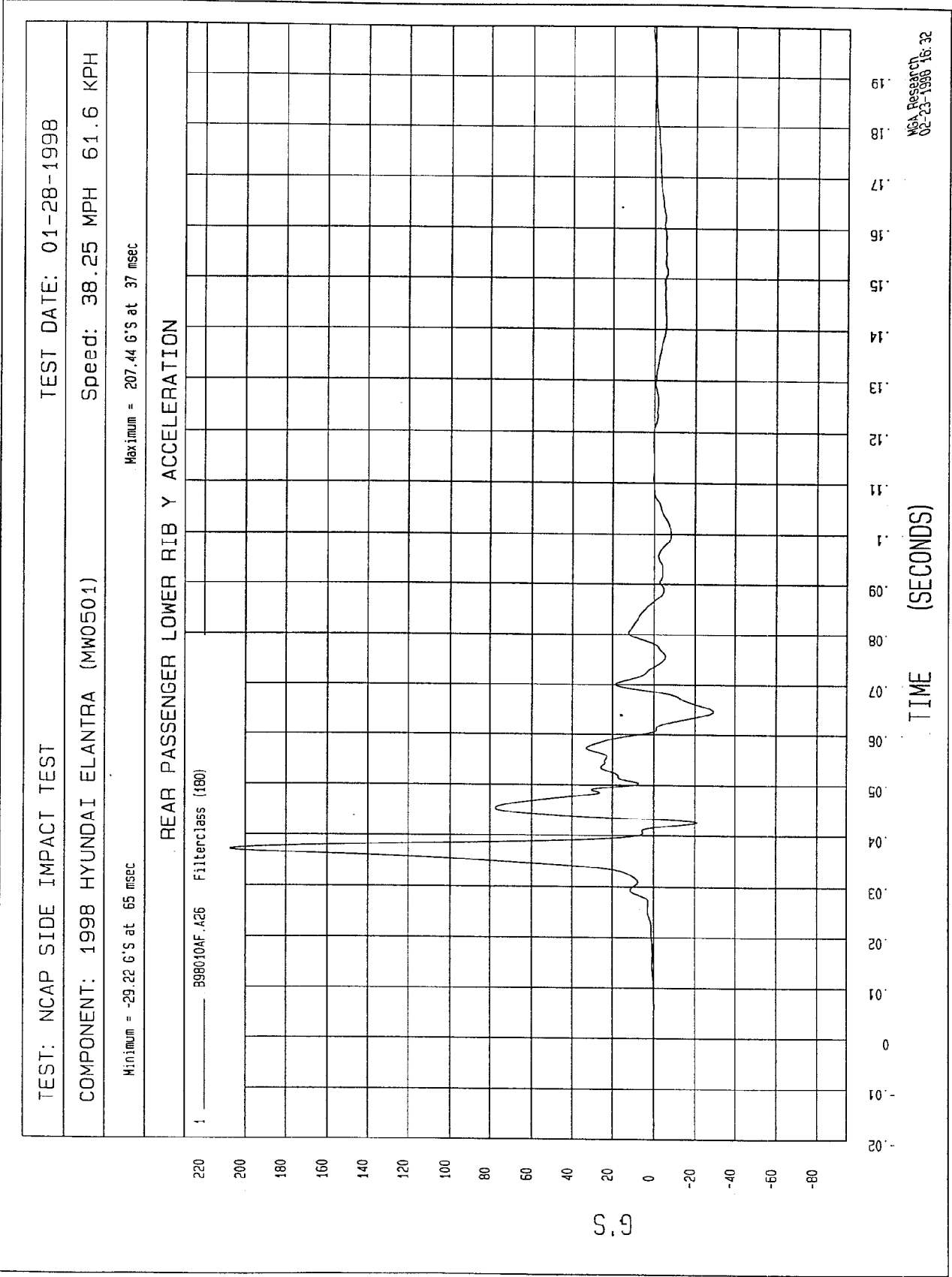
Minimum = -2.40E-02 KPH at -14 msec Maximum = 45.44 KPH at 94 msec

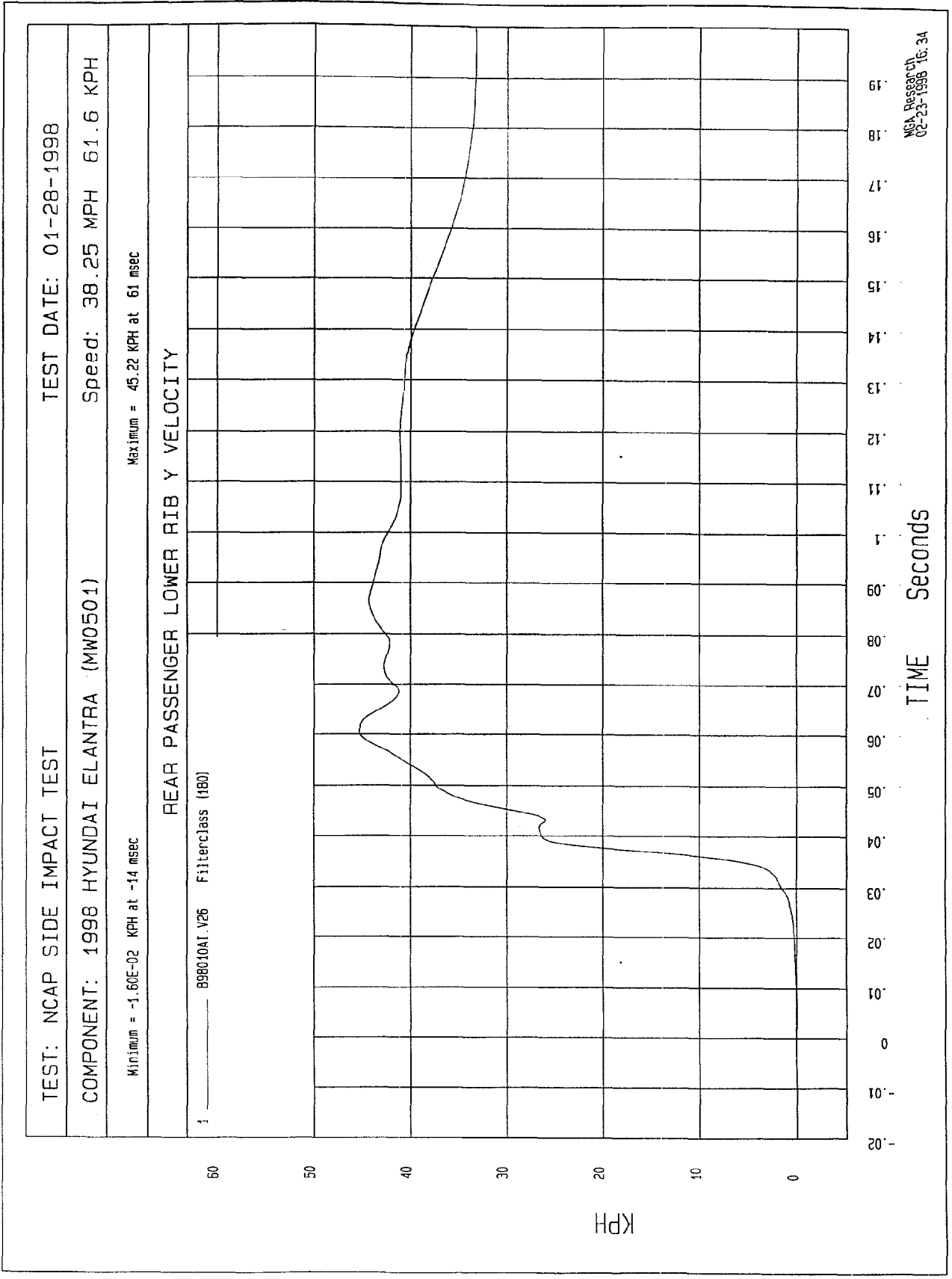
REAR PASSENGER UPPER RIB Y VELOCITY



TIME Seconds

MGA Research
02-23-1998 16:34





TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

Speed: 38.25 MPH 61.6 KPH

Minimum = -24.90 G'S at 70 msec

Maximum = 94.17 G'S at 42 msec

REAR PASSENGER LOWER SPINE Y ACCELERATION

1 _____ 898010AF.A27 Filter: class (180)

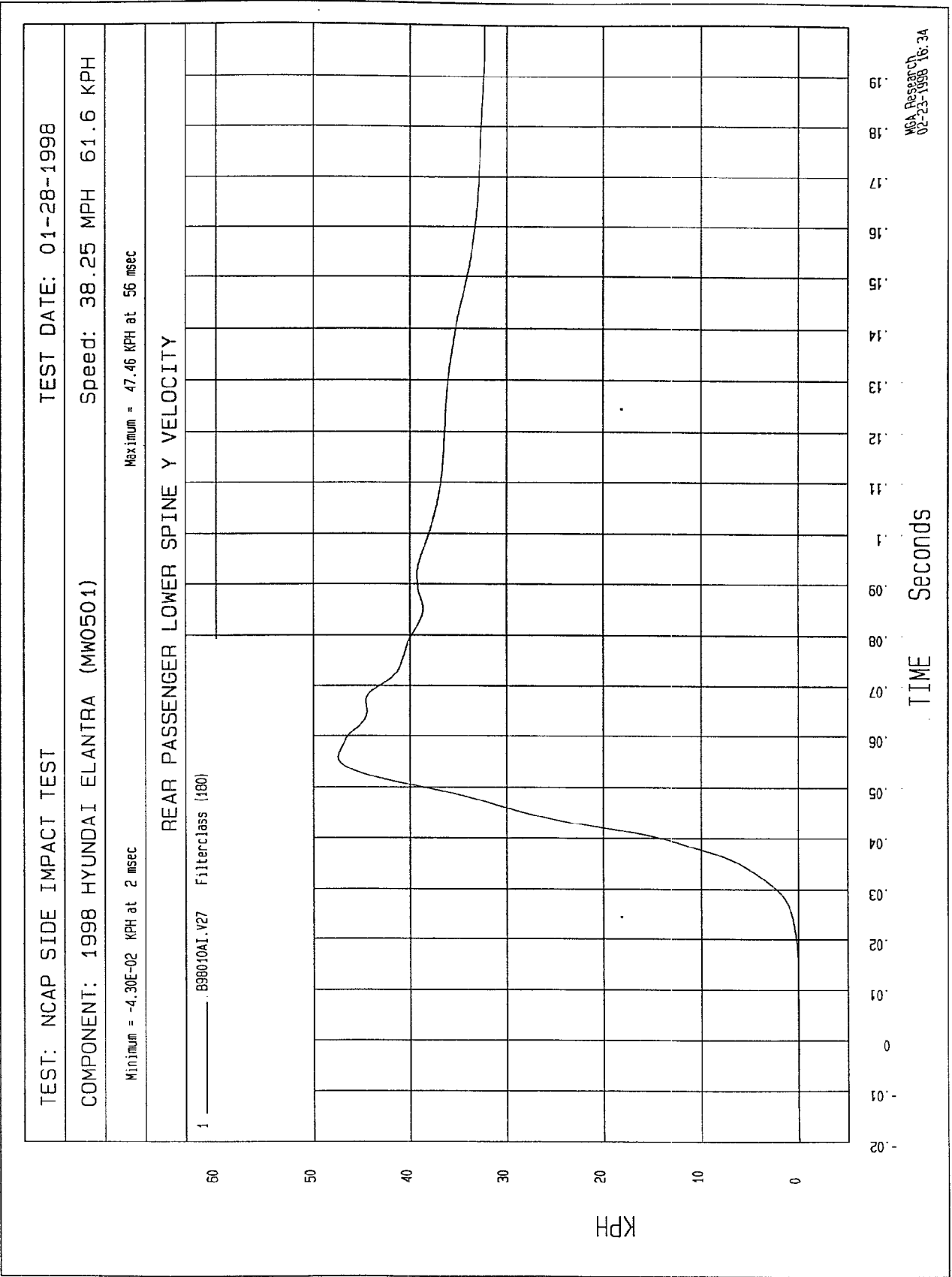
220
200
180
160
140
120
100
80
60
40
20
0
-20
-40
-60
-80

G

-.02 -.01 0 .01 .02 .03 .04 .05 .06 .07 .08 .09 .1 .11 .12 .13 .14 .15 .16 .17 .18 .19

TIME (SECONDS)

MGA Research
02-23-1998 16:33

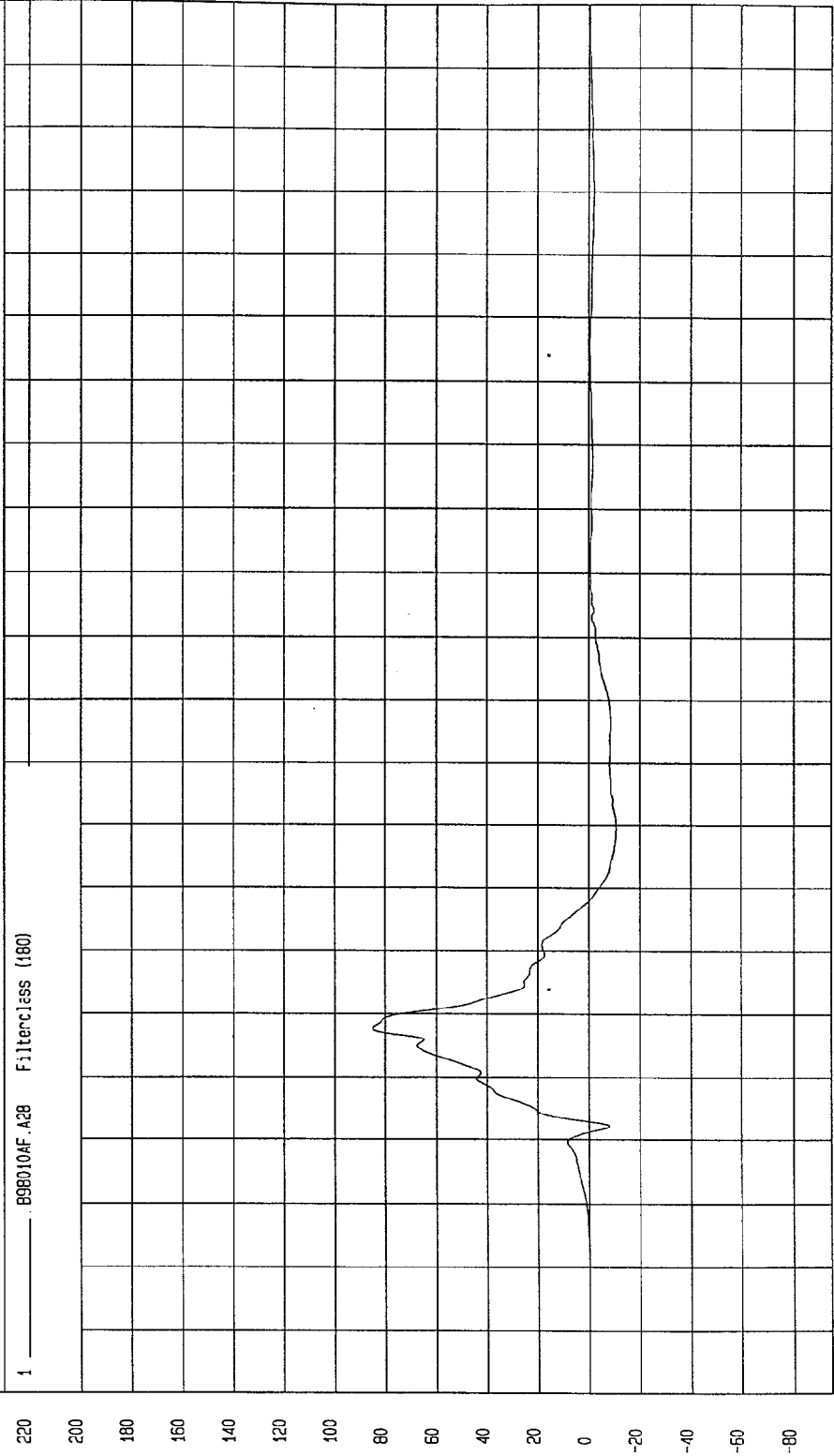


TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -10.87 G'S at 69 msec Maximum = 85.04 G'S at 38 msec

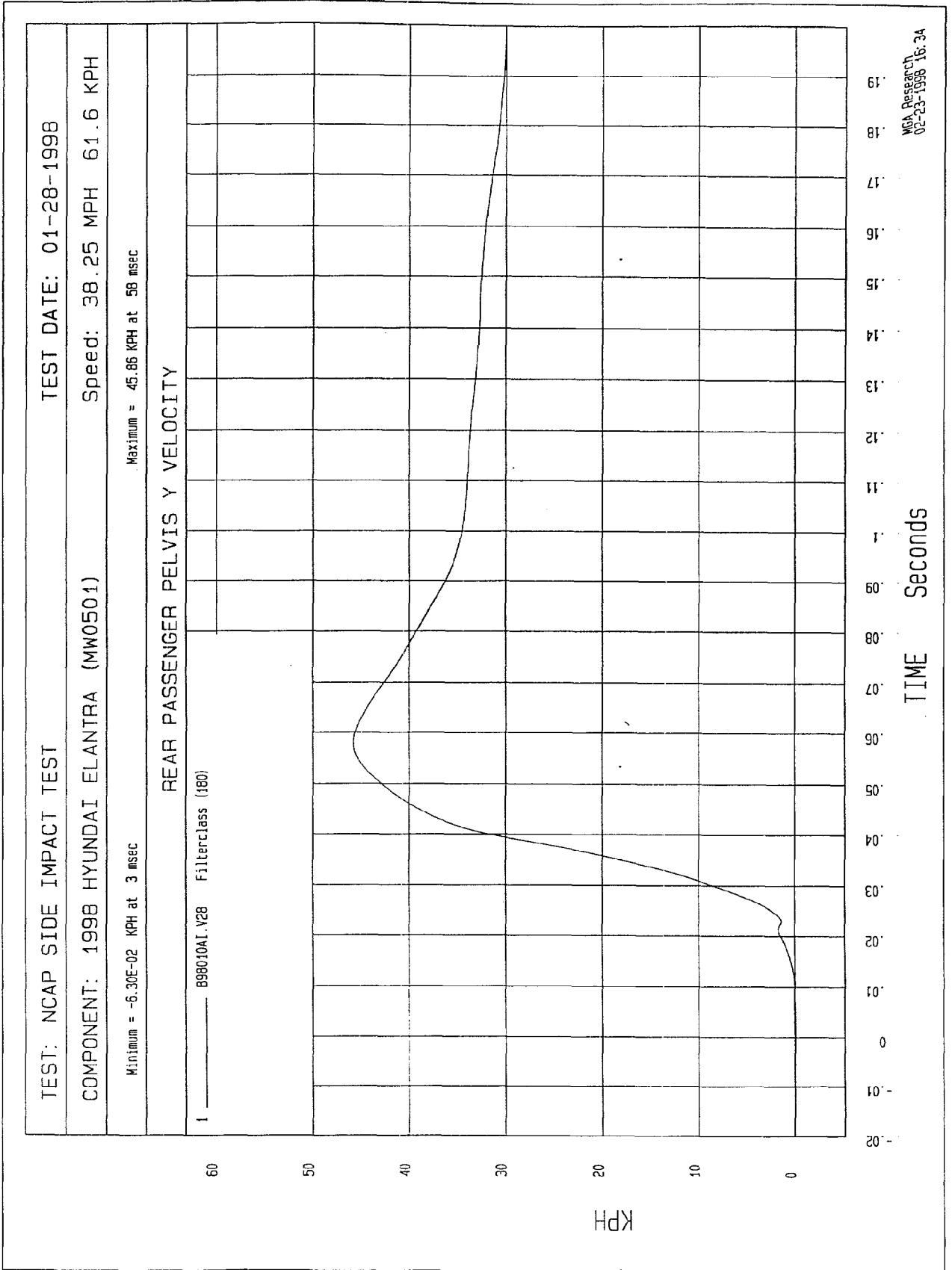
REAR PASSENGER PELVIS Y ACCELERATION



TIME (SECONDS)

19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 -1 -2 -3 -4 -5 -6 -7 -8

NGA Research
02-23-1998 16:33



TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

Speed: 38.25 MPH 61.6 KPH

Minimum = -3.71 VOLTS at 30 msec

Maximum = .11 VOLTS at 104 msec

REAR PASSENGER SHOULDER CONTACT

1 _____ B980100T.051 Filterclass (1000)

0

-1

-2

-3

-4

VOLTS

20

10

0

-10

-20

TIME (SECONDS)

0

10

20

30

40

50

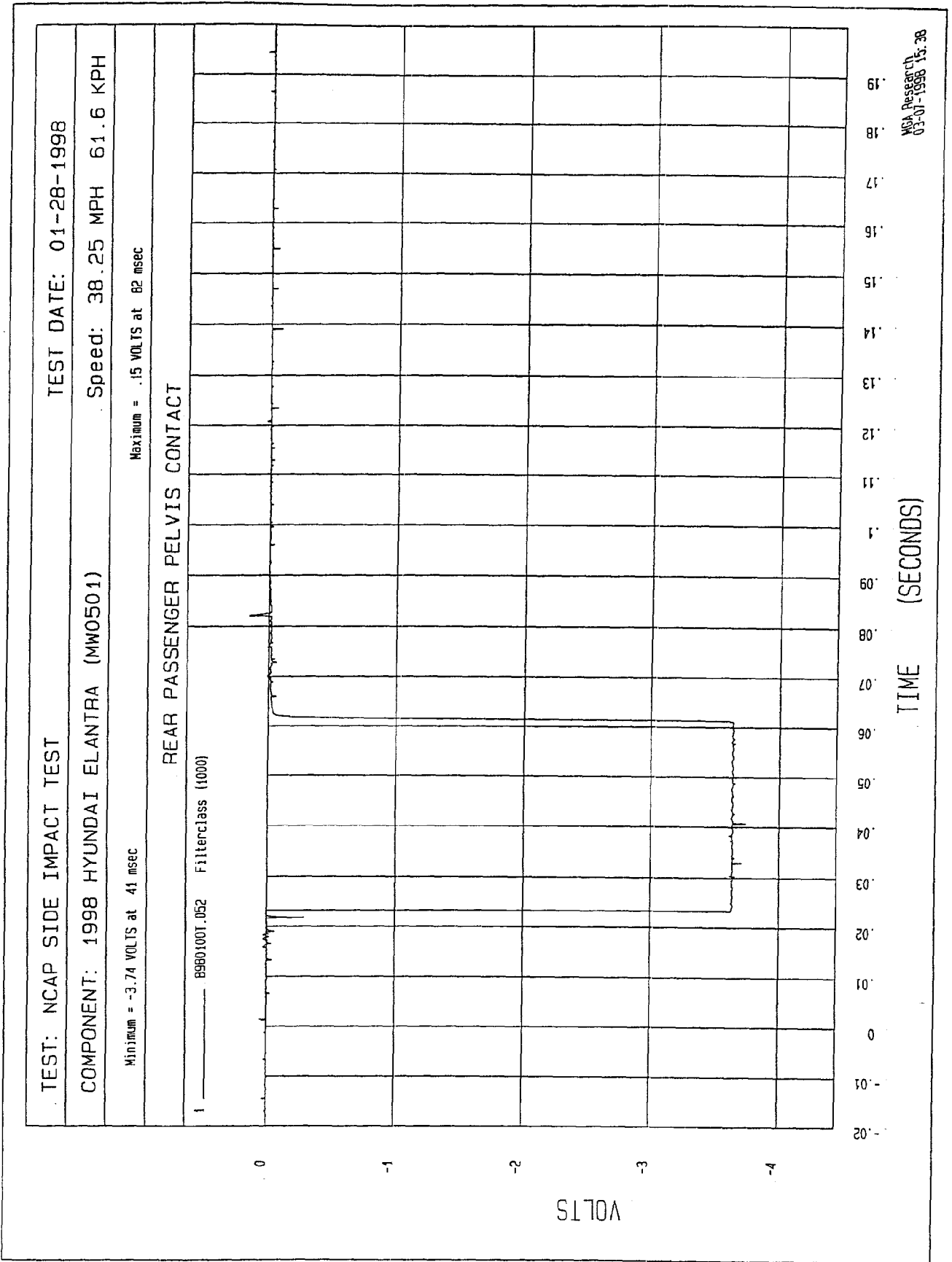
60

70

80

90

NSA Research
03-07-1998 15:38



TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

Speed: 38.25 MPH 61.6 KPH

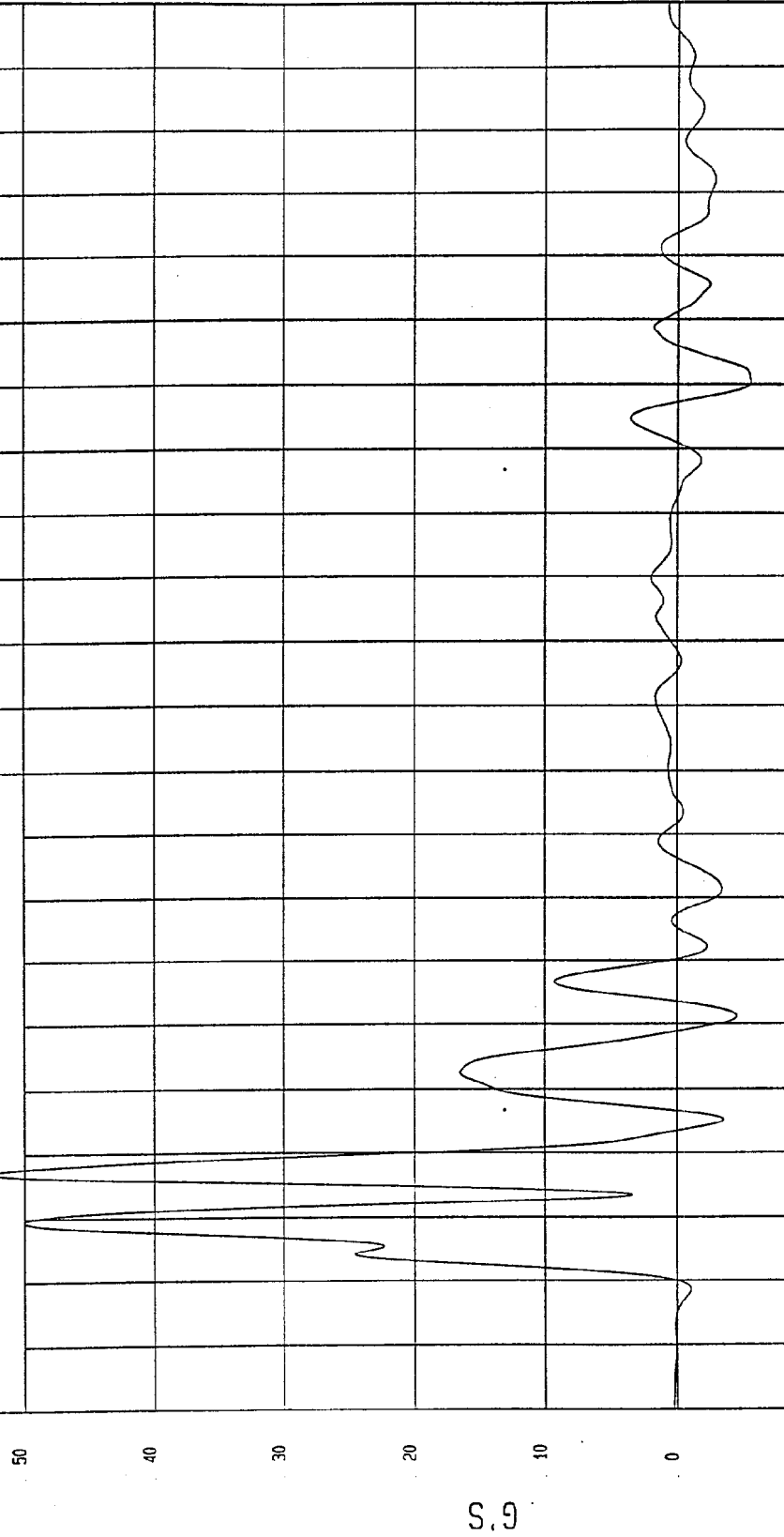
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

Maximum = 52.50 G's at 17 msec

Minimum = -5.47 G's at 140 msec

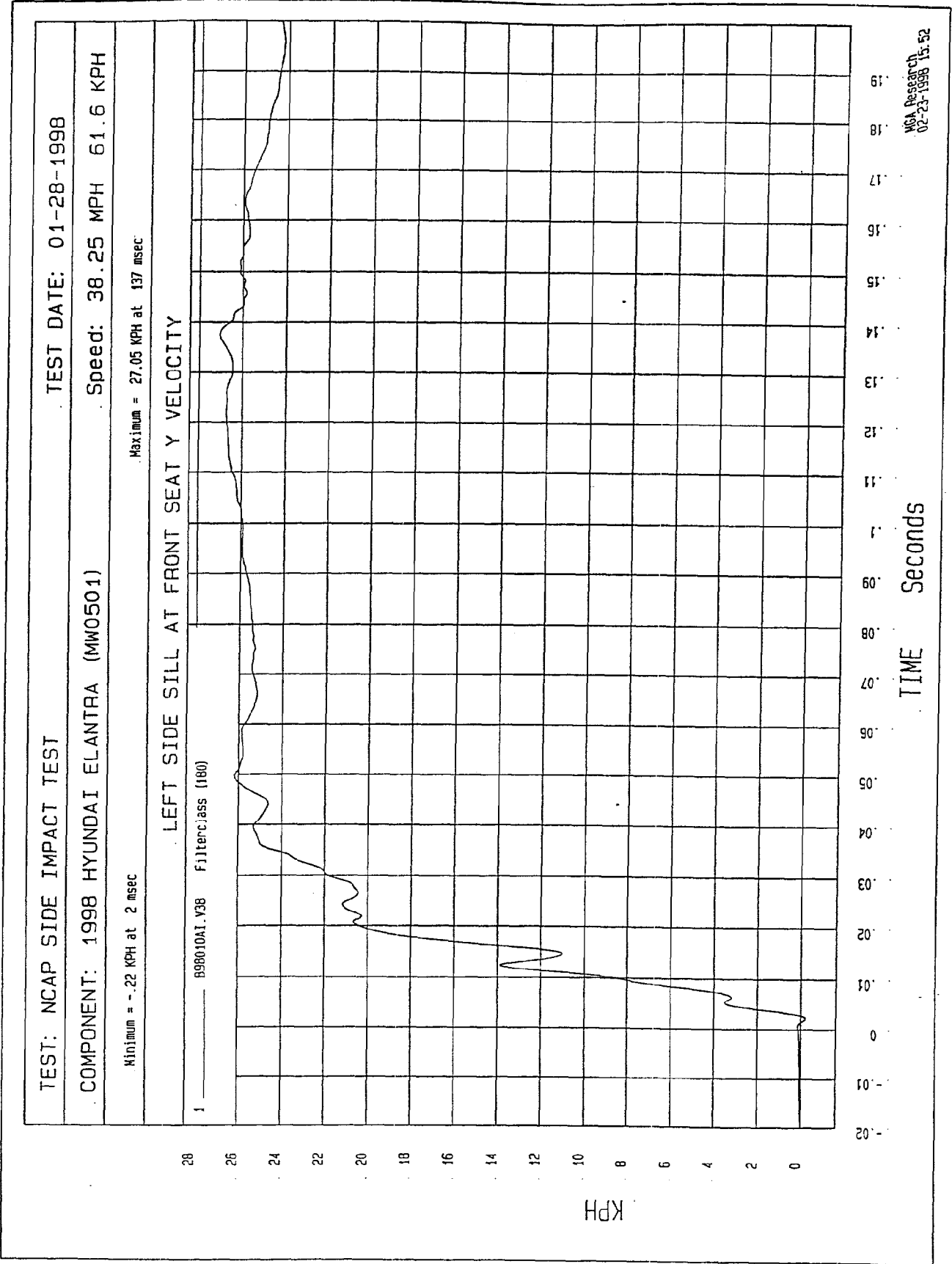
LEFT SIDE SILL AT FRONT SEAT Y ACCELERATION

1 B98010AF.A38 Filterclass (60)



TIME (SECONDS)

MSA Research
02-09-1998 16: 11



TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

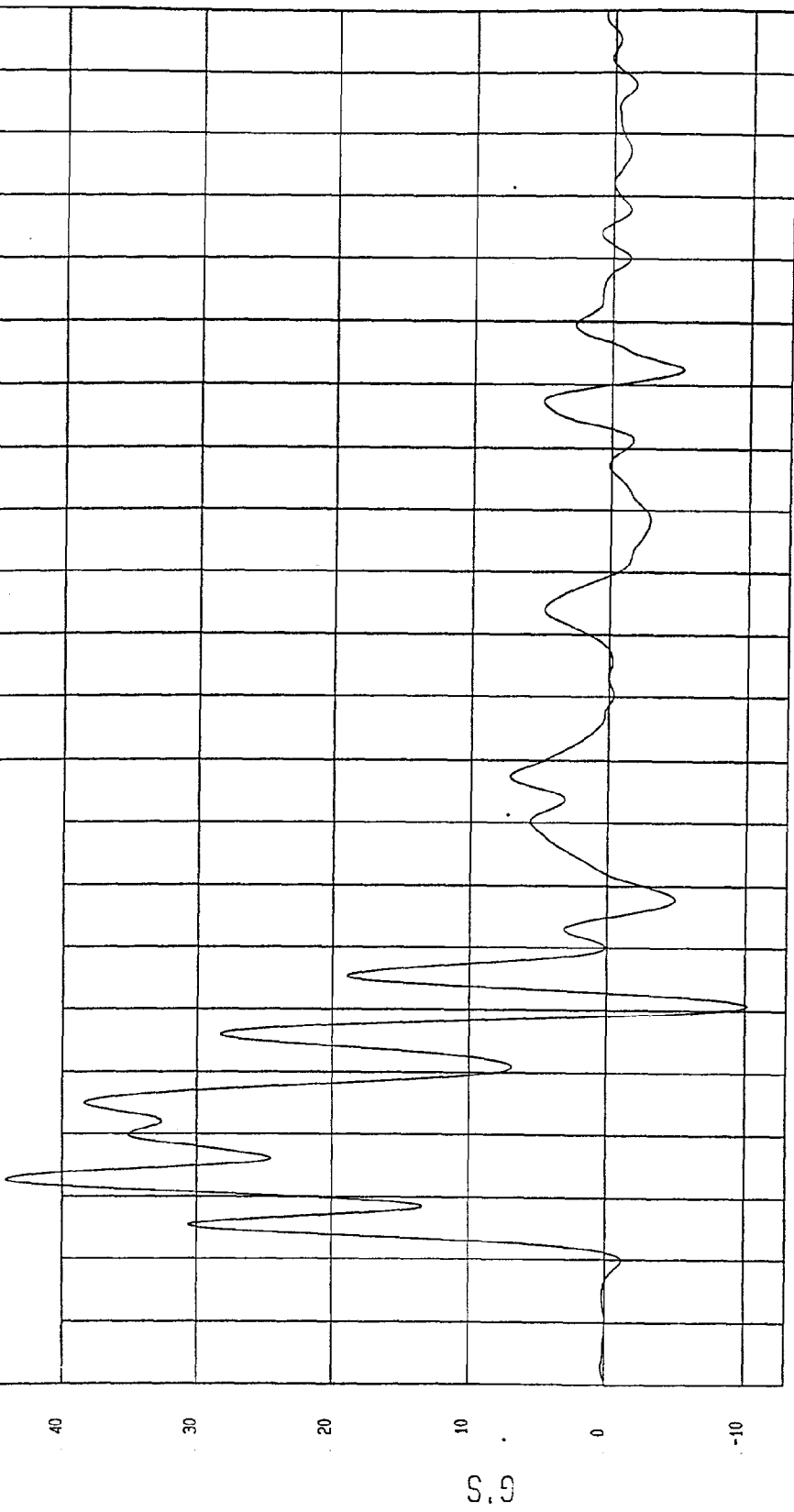
Speed: 38.25 MPH 61.6 KPH

Minimum = -10.17 G'S at 41 msec

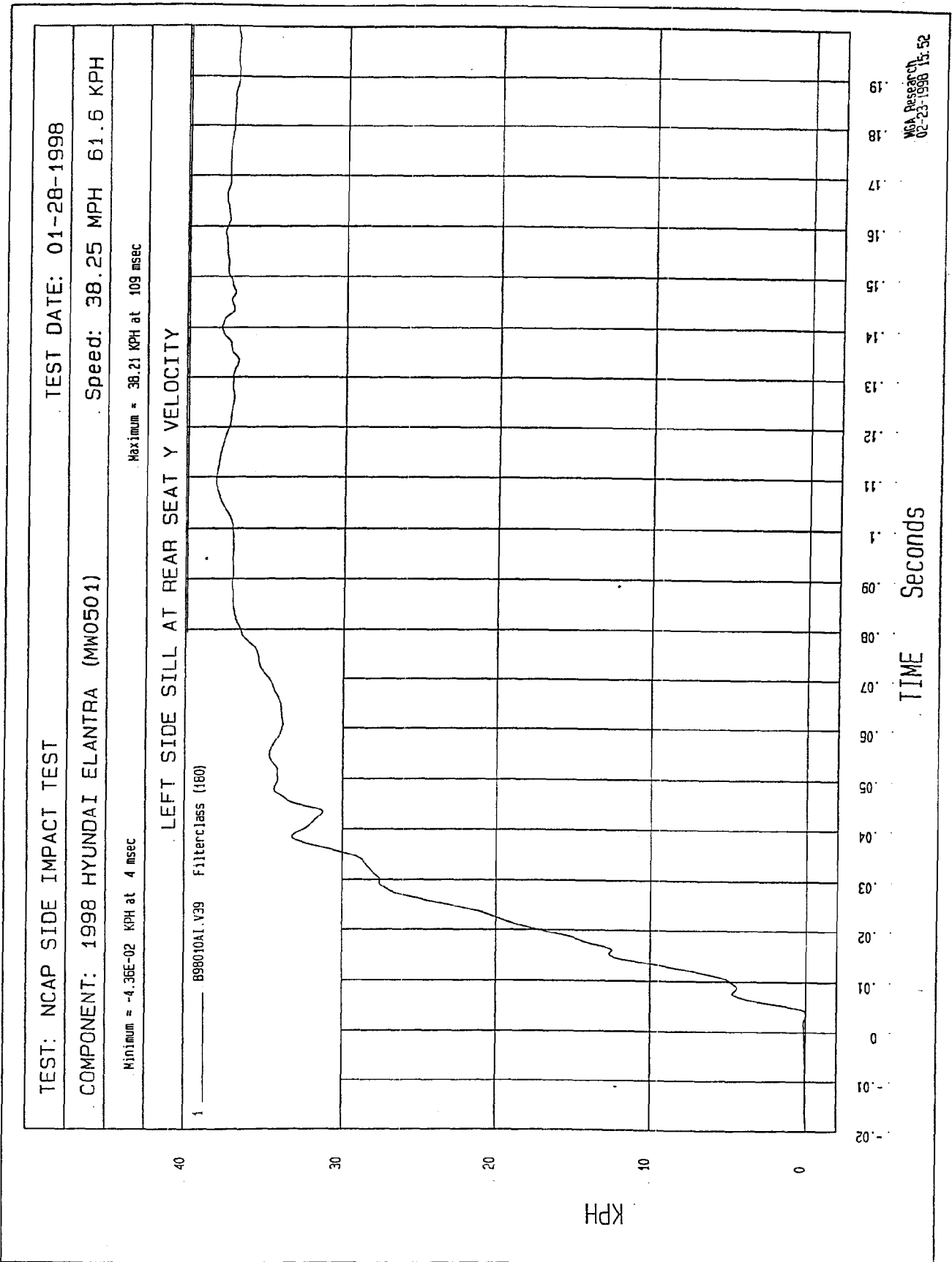
Maximum = 44.18 G'S at 13 msec

LEFT SIDE SILL AT REAR SEAT Y ACCELERATION

1 998010AF.A39 FilterClass (50)

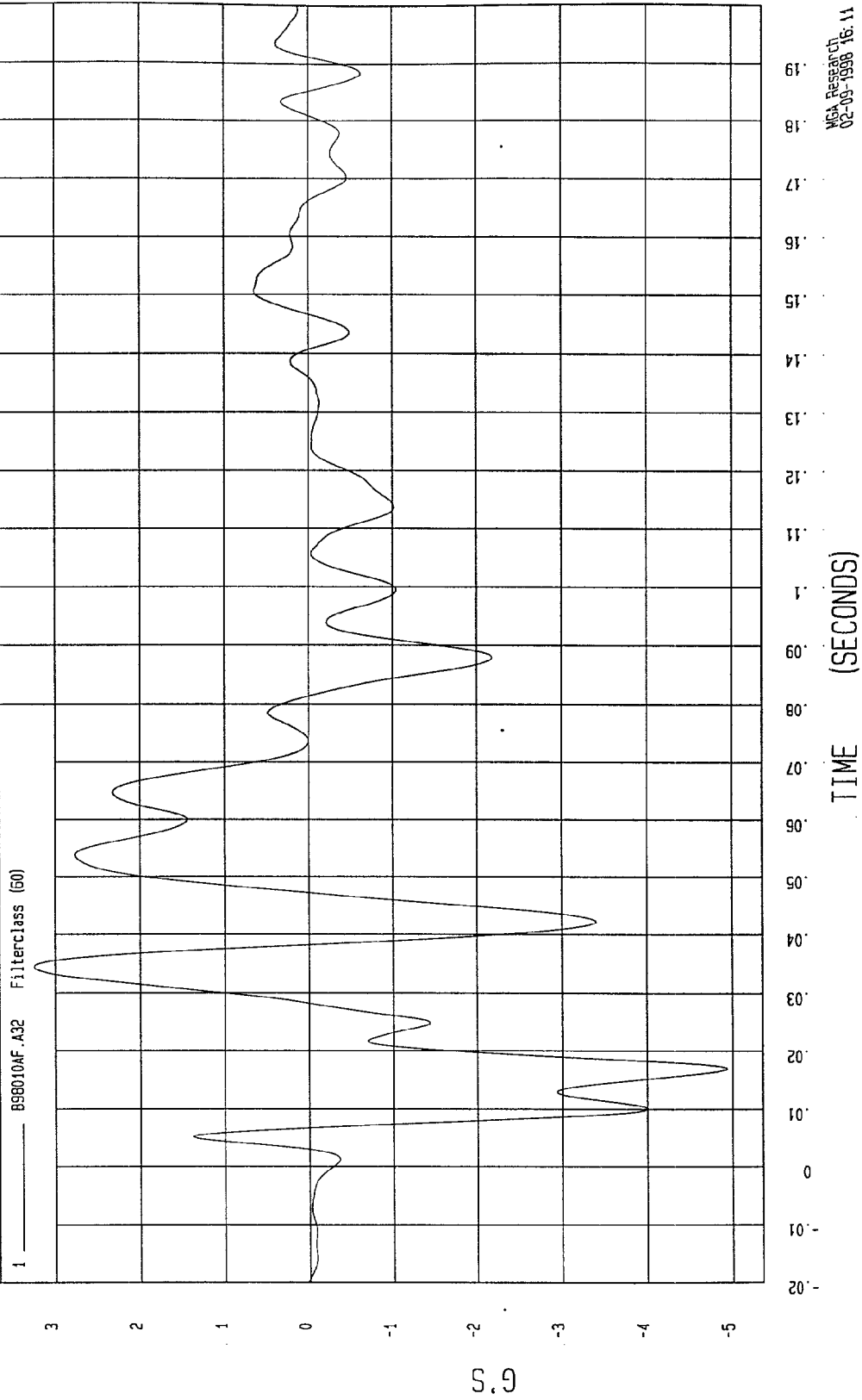


MCA Research
02-09-1998 16:11



TEST: NCAP SIDE IMPACT TEST	TEST DATE: 01-28-1998
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)	Speed: 38.25 MPH 61.6 KPH
Minimum = -4.93 G'S at 17 msec	
Maximum = 3.25 G'S at 34 msec	

RIGHT SIDE SILL AT FRONT SEAT X ACCELERATION



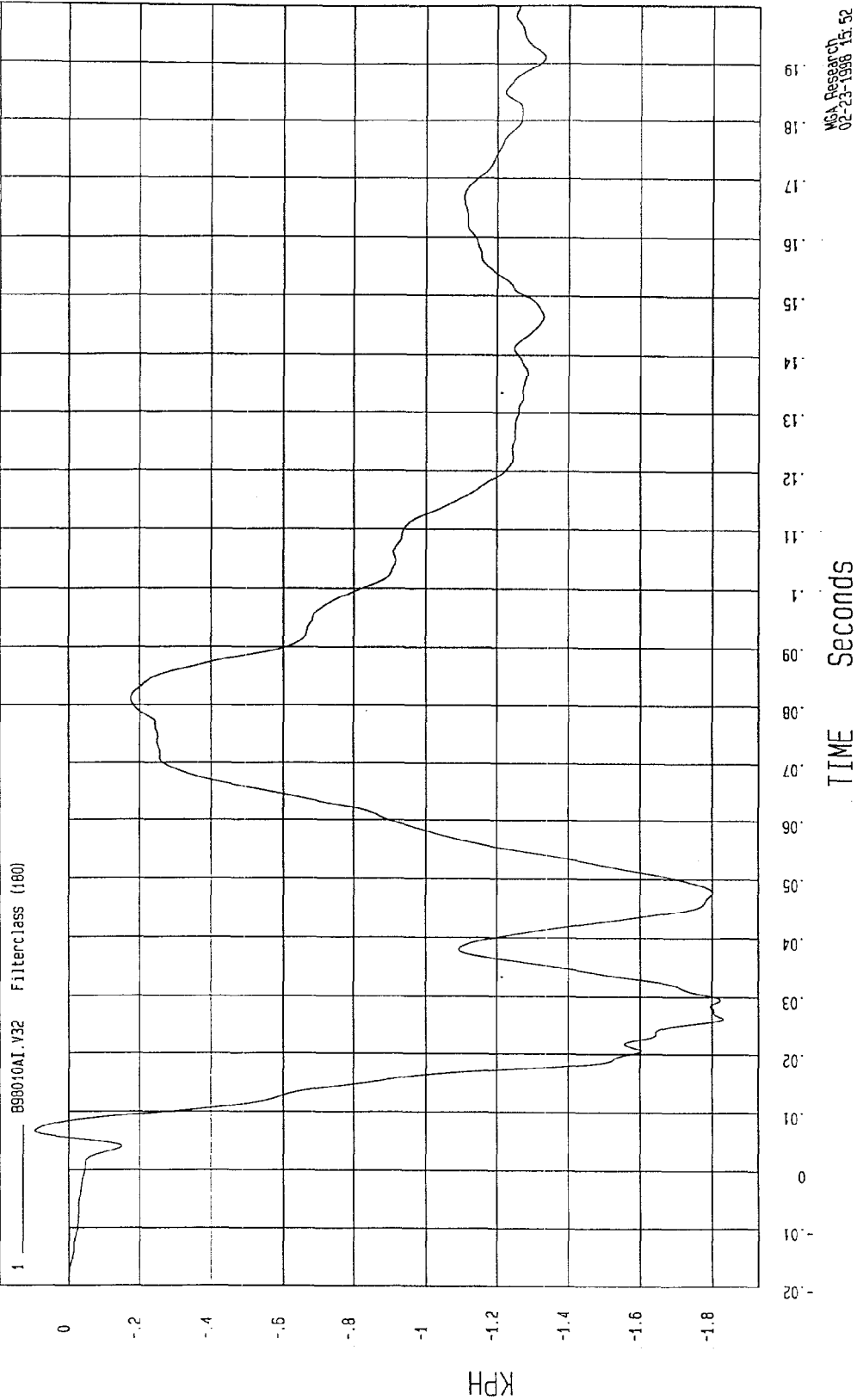
MOA Research
02-09-1998 16:11

TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -1.83 KPH at 26 msec Maximum = 9.45E-02 KPH at 7 msec

RIGHT SIDE SILL AT FRONT SEAT X VELOCITY



TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

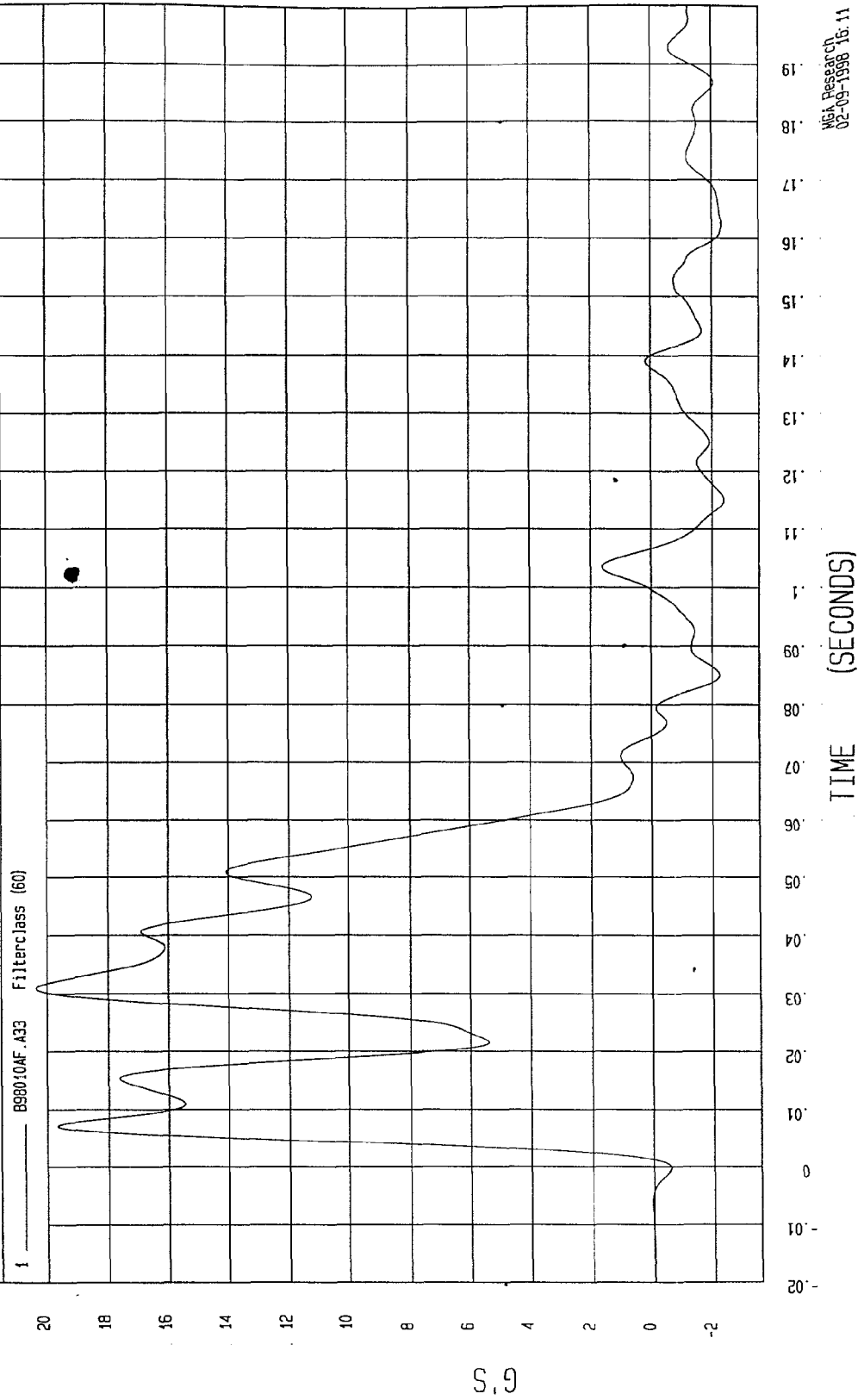
Speed: 38.25 MPH 61.6 KPH

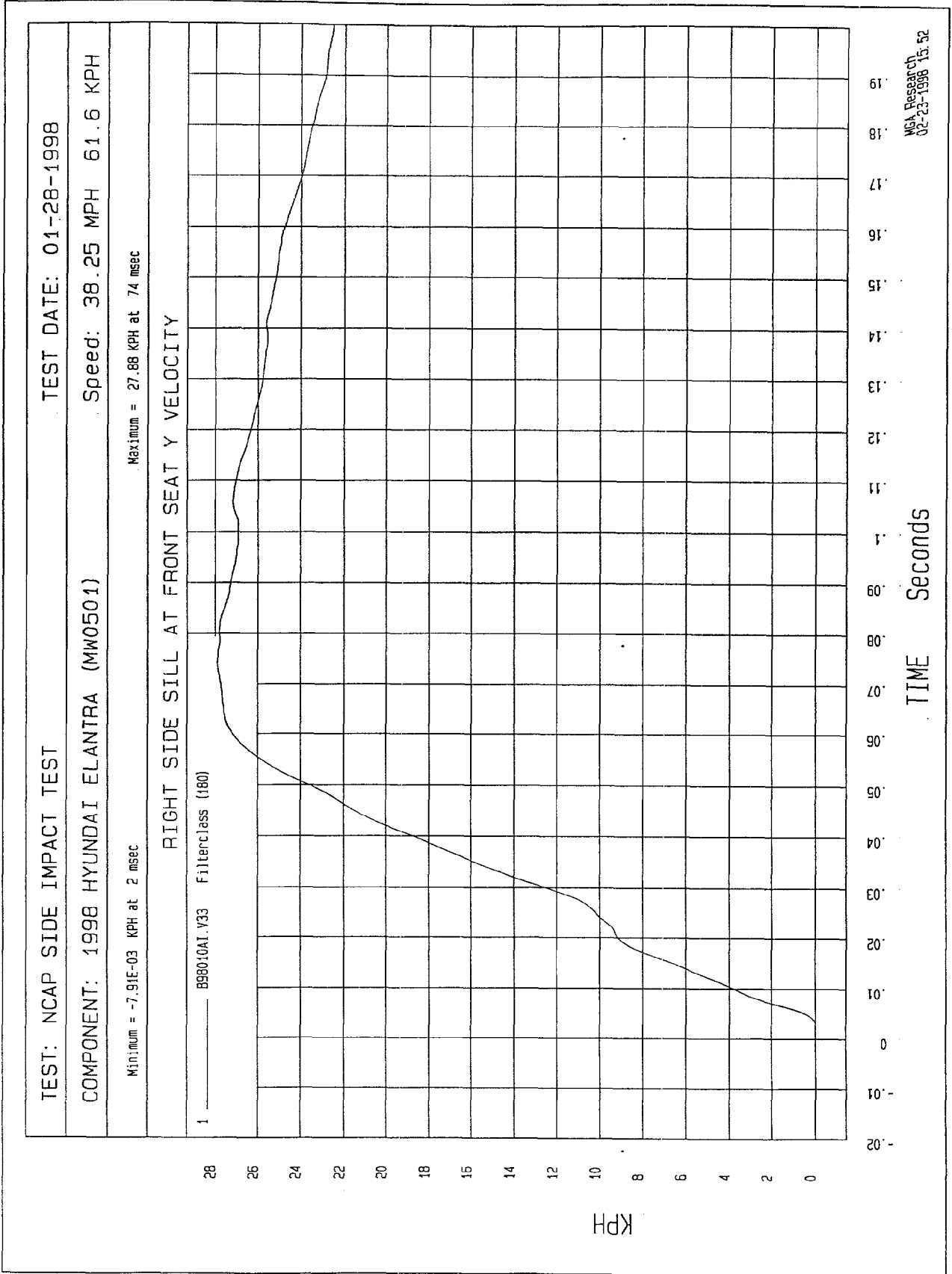
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

Maximum = 20.35 G'S at 31 msec

Minimum = -2.39 G'S at 115 msec

RIGHT SIDE SILL AT FRONT SEAT Y ACCELERATION



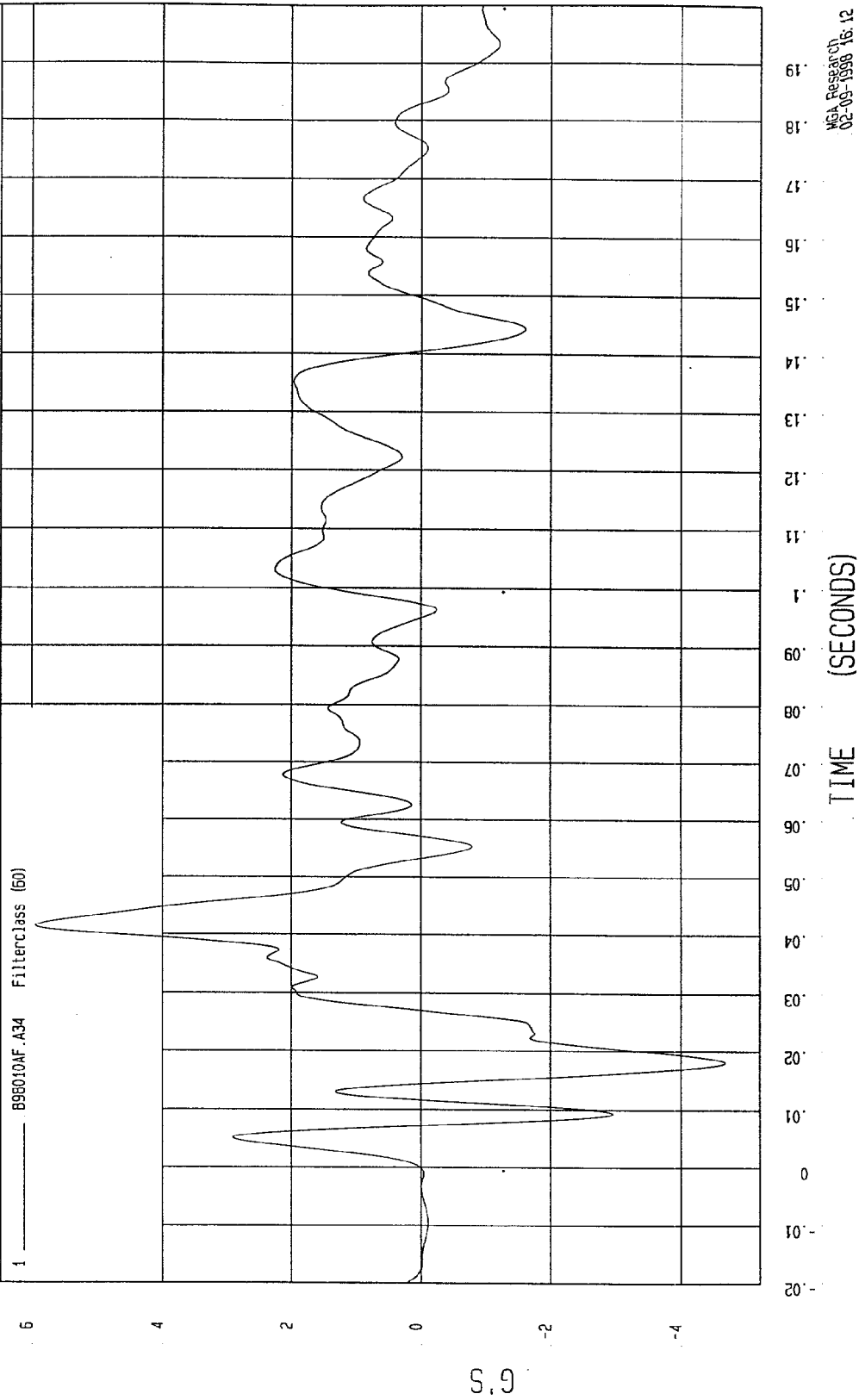


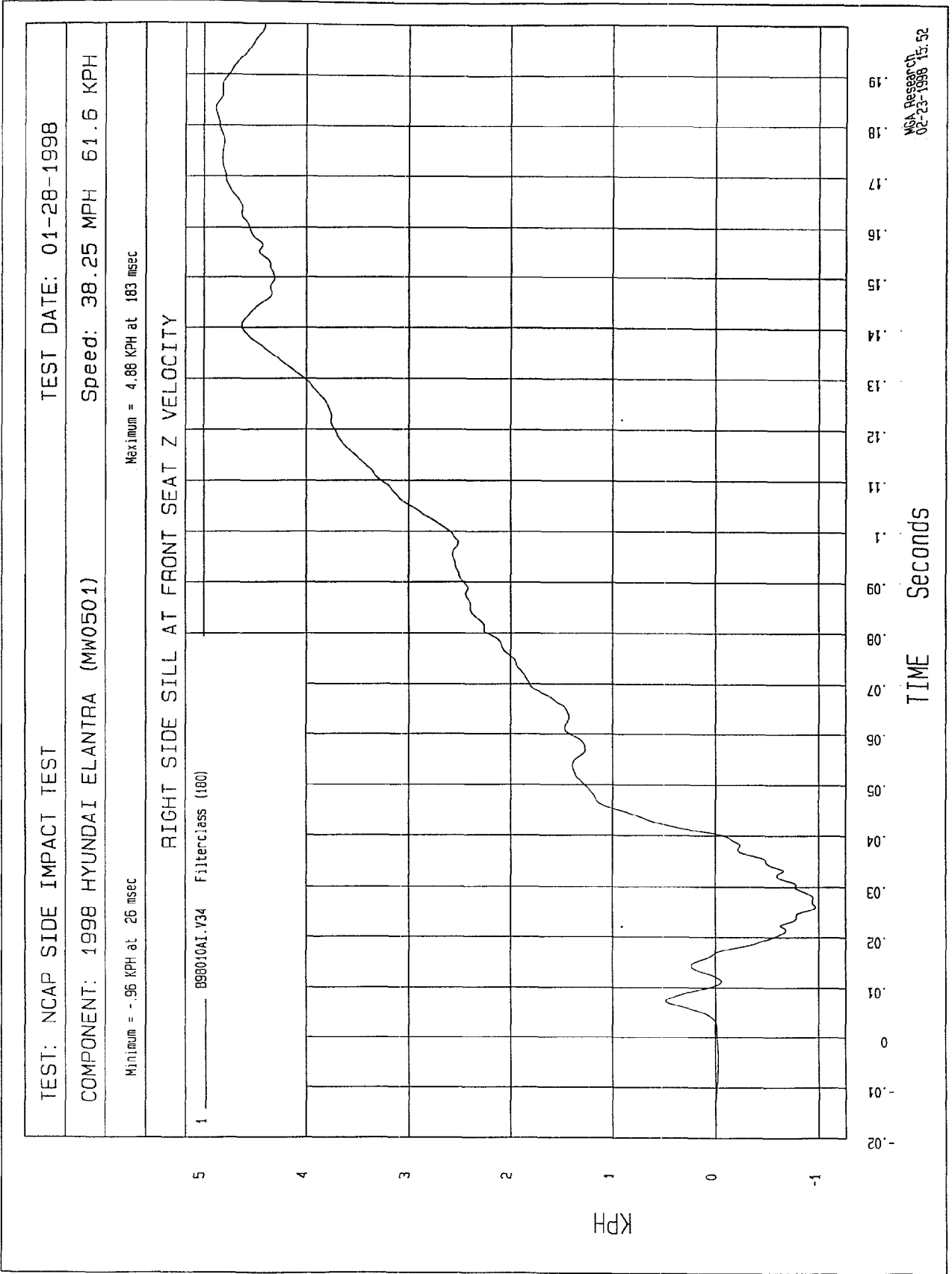
TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -4.69 G'S at 18 msec Maximum = 5.94 G'S at 42 msec

RIGHT SIDE SILL AT FRONT SEAT Z ACCELERATION





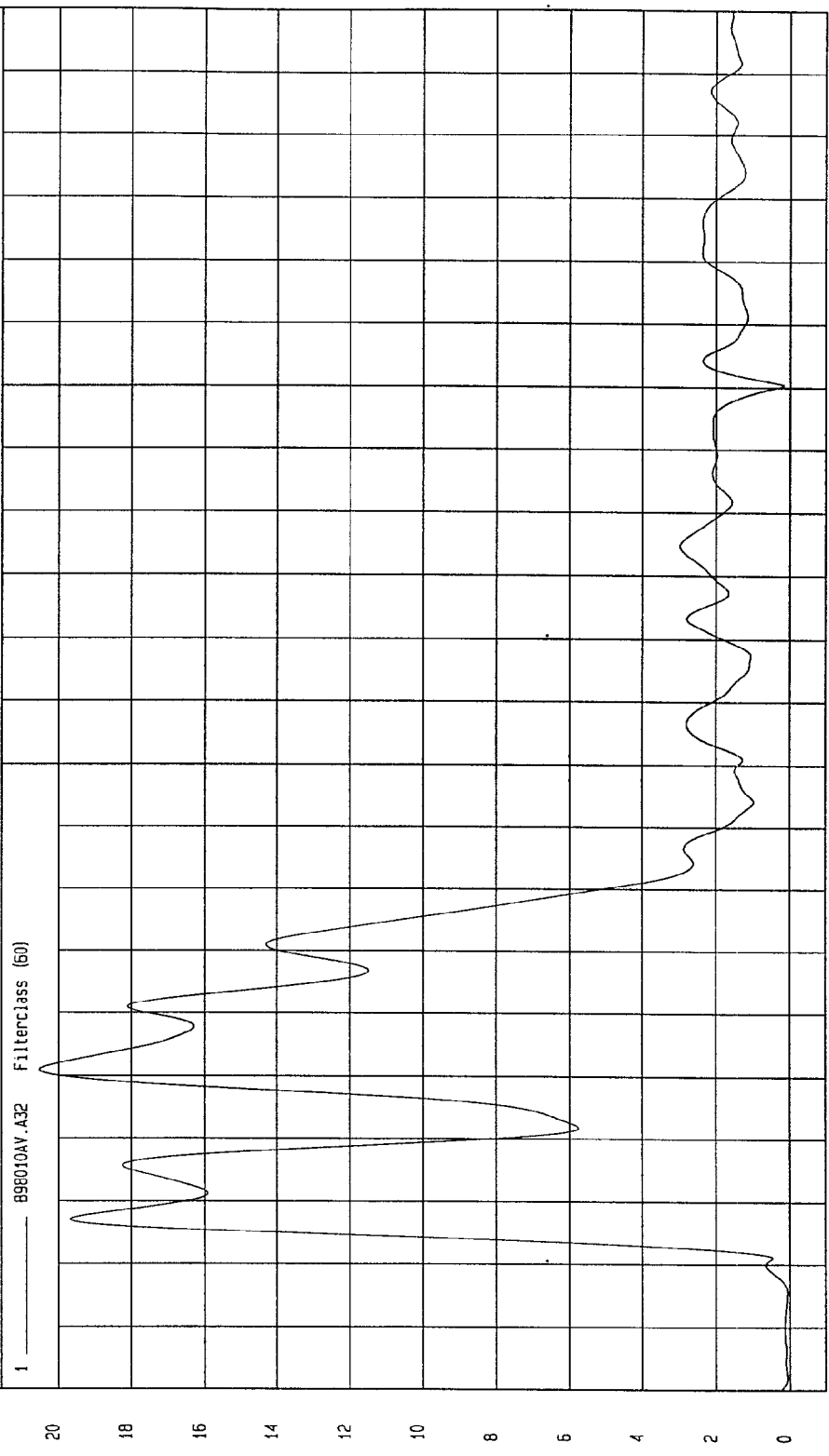
TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = .05 G'S at -18 msec Maximum = 20.51 G'S at 31 msec

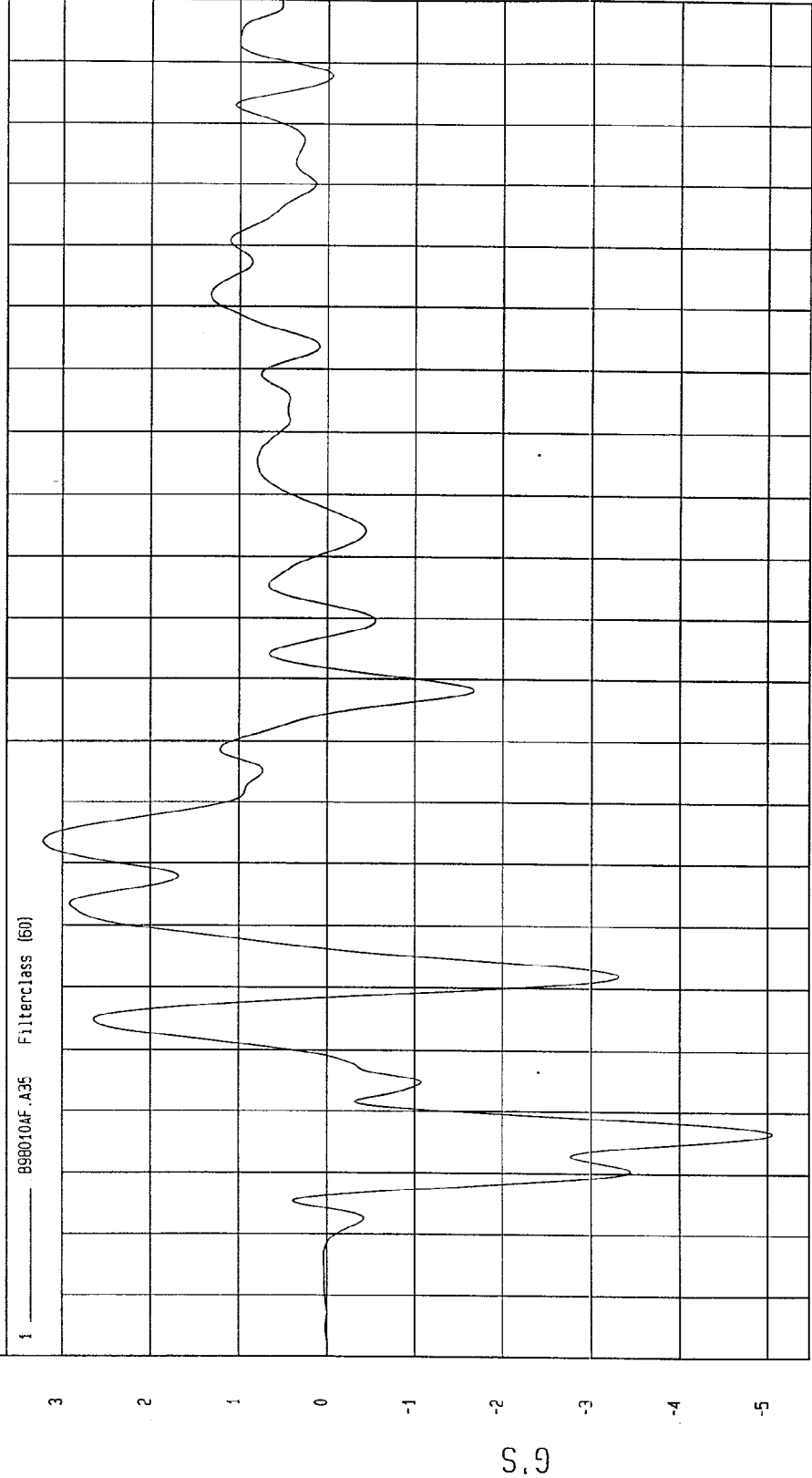
RIGHT SIDE SILL AT FRONT SEAT RESULTANT ACCELERATION



TIME (SECONDS)

NCA Research
02-09-1998 16:12

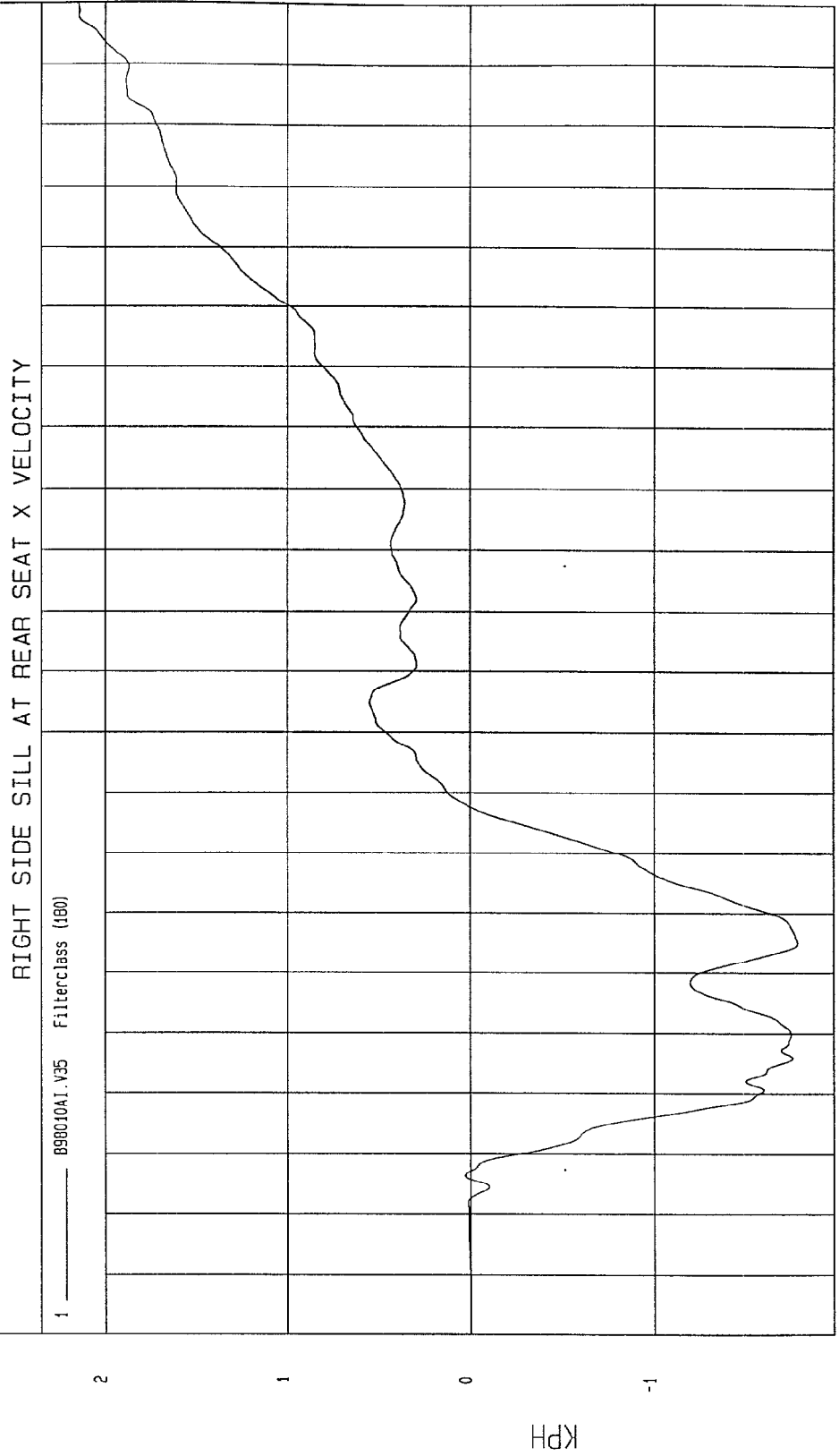
TEST: NCAP SIDE IMPACT TEST	TEST DATE: 01-28-1998
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)	Speed: 38.25 MPH 61.6 KPH
Minimum = -5.05 G'S at 16 msec	
Maximum = 3.21 G'S at 64 msec	
RIGHT SIDE SILL AT REAR SEAT X ACCELERATION	



TIME (SECONDS)

WCA Research
02-09-1998 16:12

TEST: NCAP SIDE IMPACT TEST	TEST DATE: 01-28-1998
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)	Speed: 38.25 MPH 61.6 KPH
Minimum = -1.77 KPH at 45 msec	Maximum = 2.14 KPH at 200 msec



TIME Seconds

MSA Research
02-23-1998 15:53

TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

Speed: 38.25 MPH 61.6 KPH

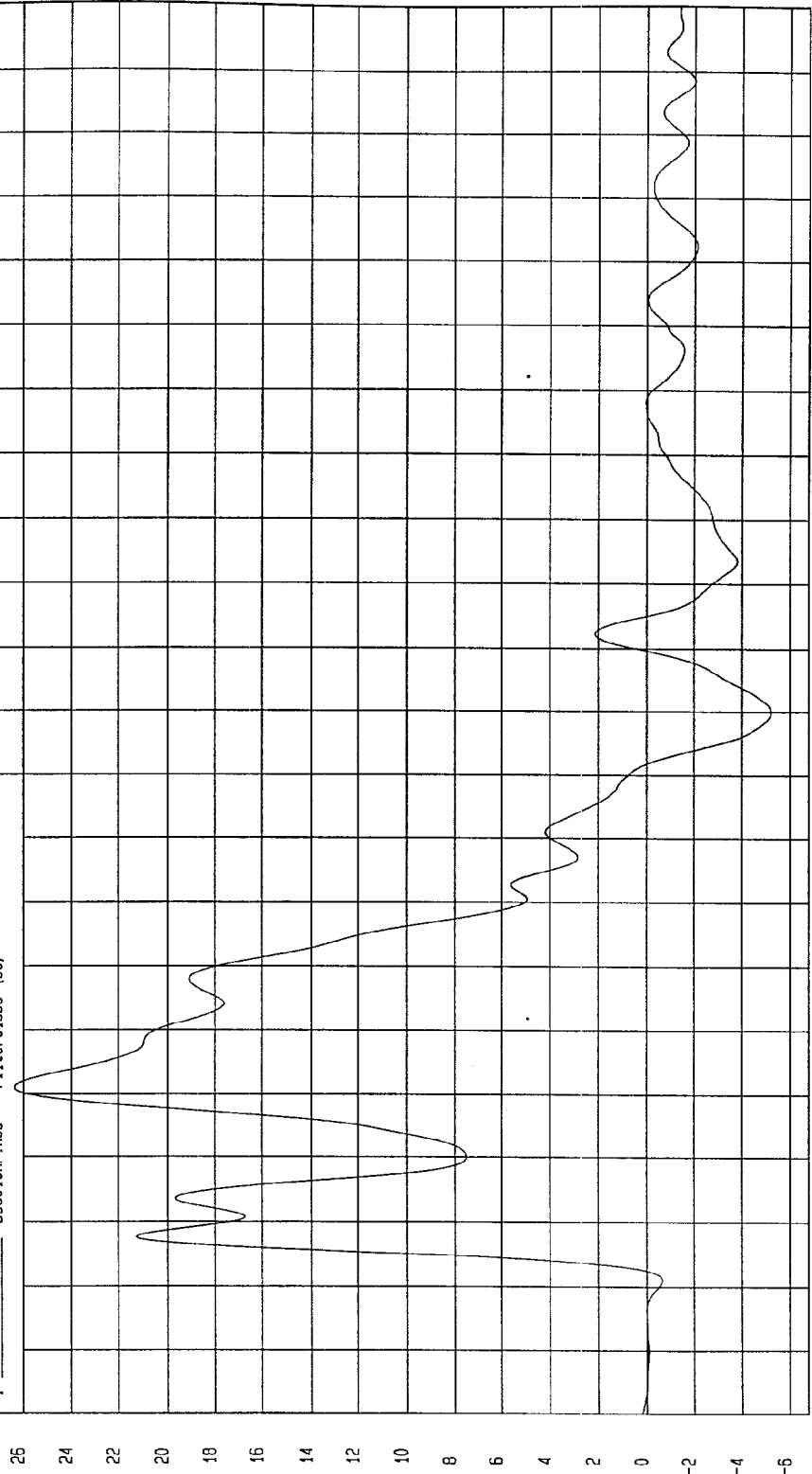
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

Maximum = 26.37 G'S at 31 msec

Minimum = -5.19 G'S at 90 msec

RIGHT SIDE SILL AT REAR SEAT Y ACCELERATION

1 998010AF.A36 Filterclass (60)



W&A Research
02-09-1998 16:12

TIME (SECONDS)

TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

Speed: 38.25 MPH 61.6 KPH

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

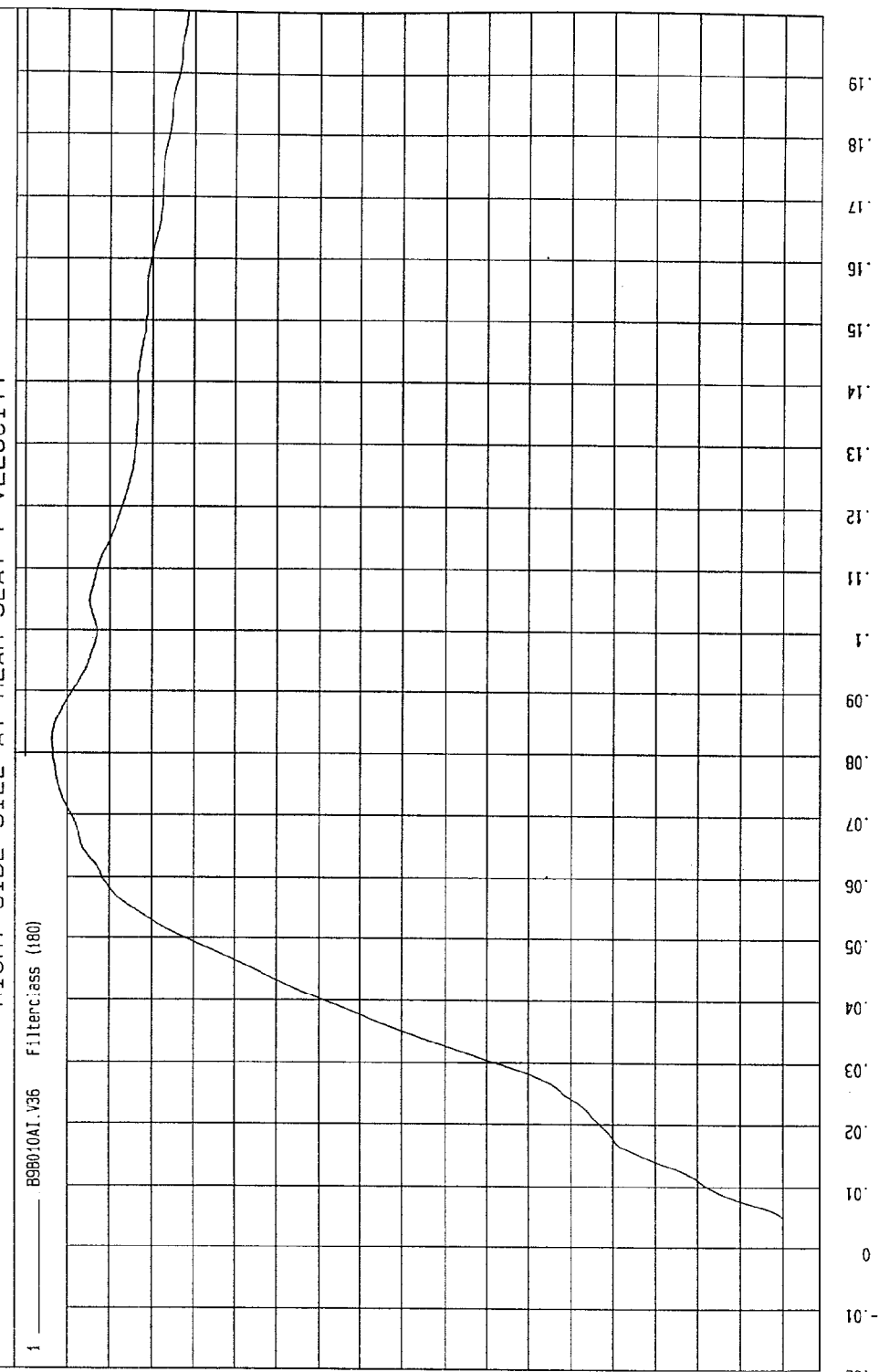
Minimum = -1.23E-02 KPH at -3 msec

Maximum = 34.74 KPH at 82 msec

FIGHT SIDE SILL AT REAR SEAT Y VELOCITY

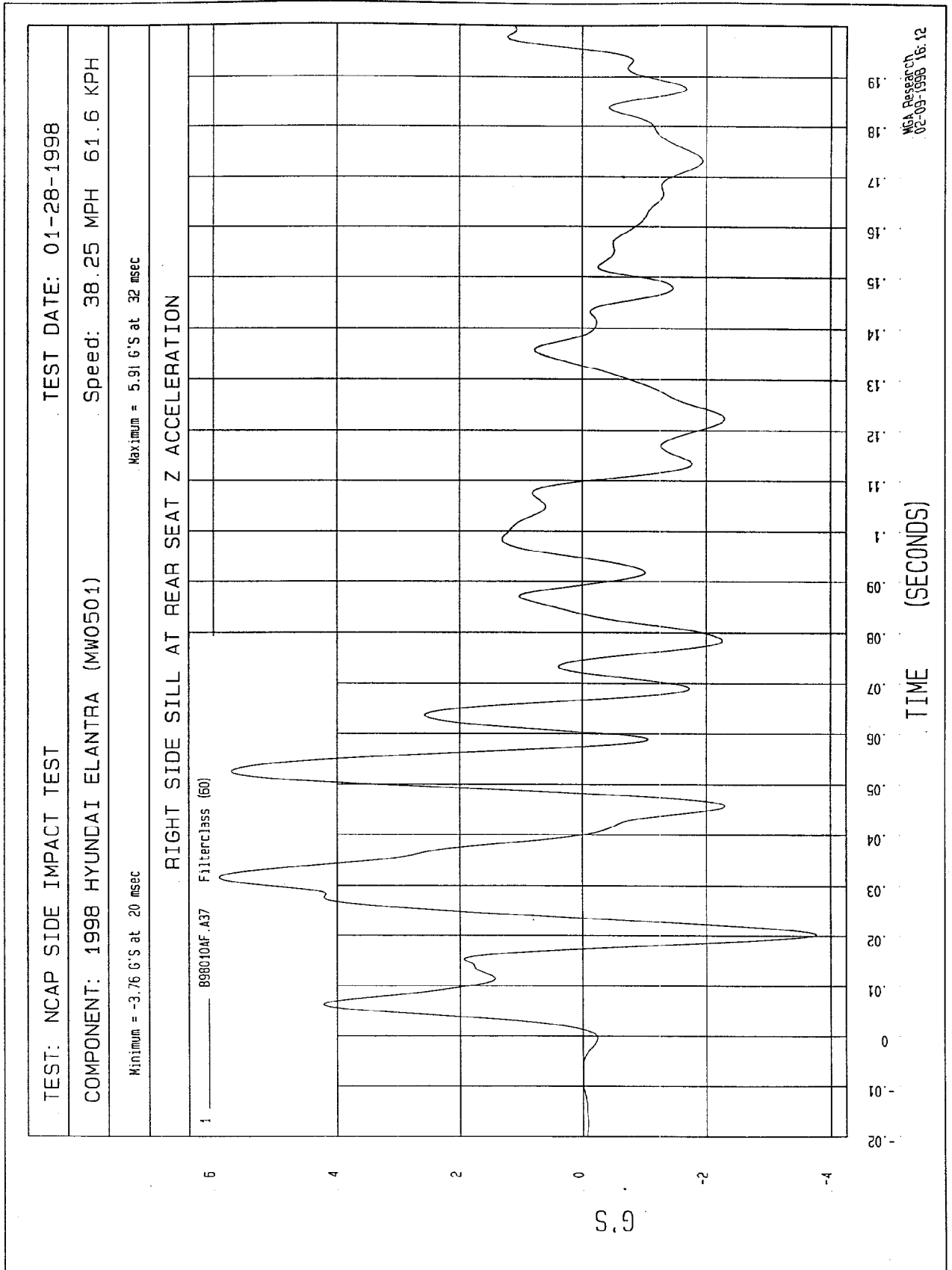
1 B98010A1.V36 Filter: class (180)

KPH



MSA Research
02-23-1998 15:53

TIME Seconds



TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

Speed: 38.25 MPH 61.6 KPH

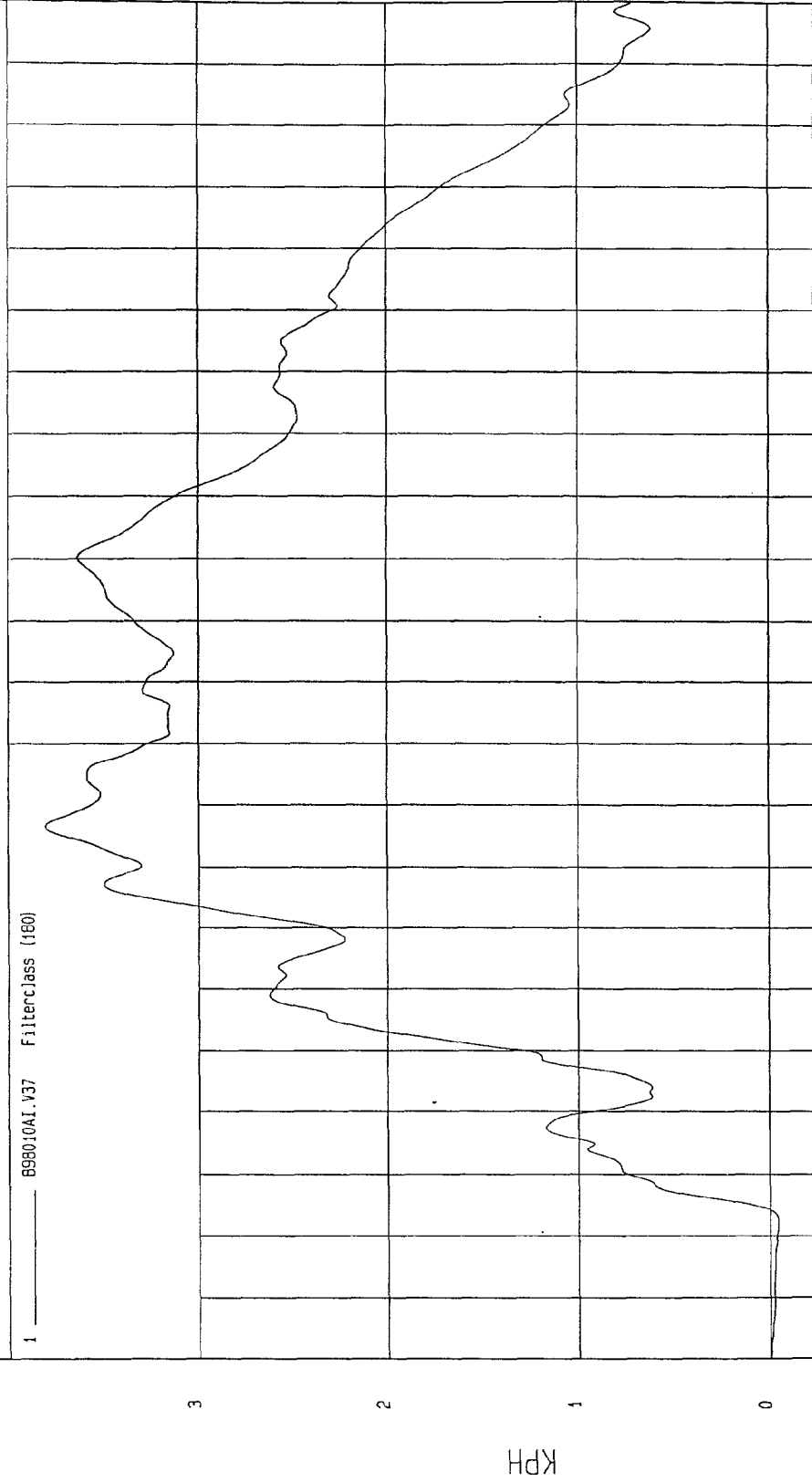
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

Maximum = 3.80 KPH at 66 msec

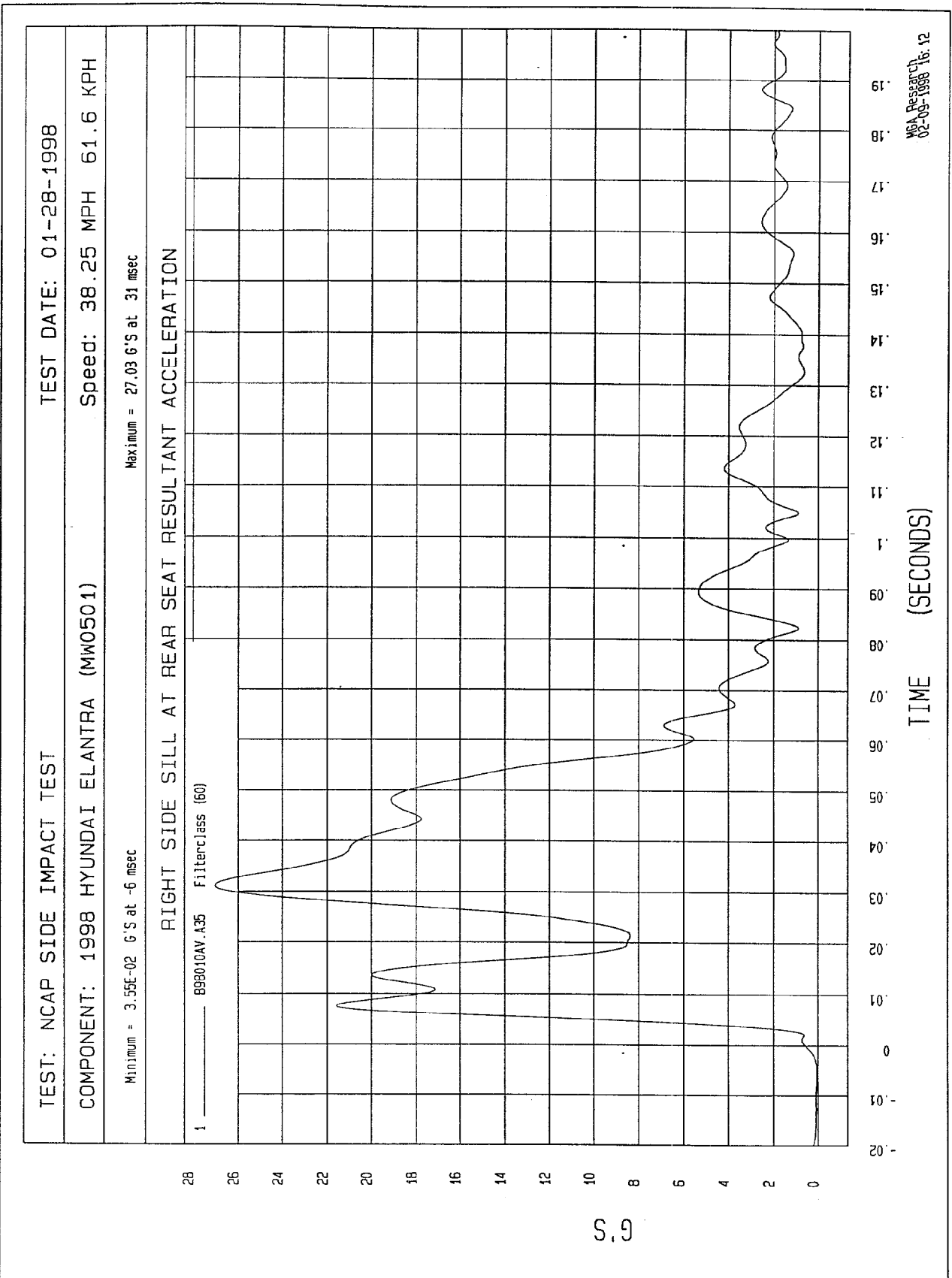
Minimum = -4.17E-02 KPH at 2 msec

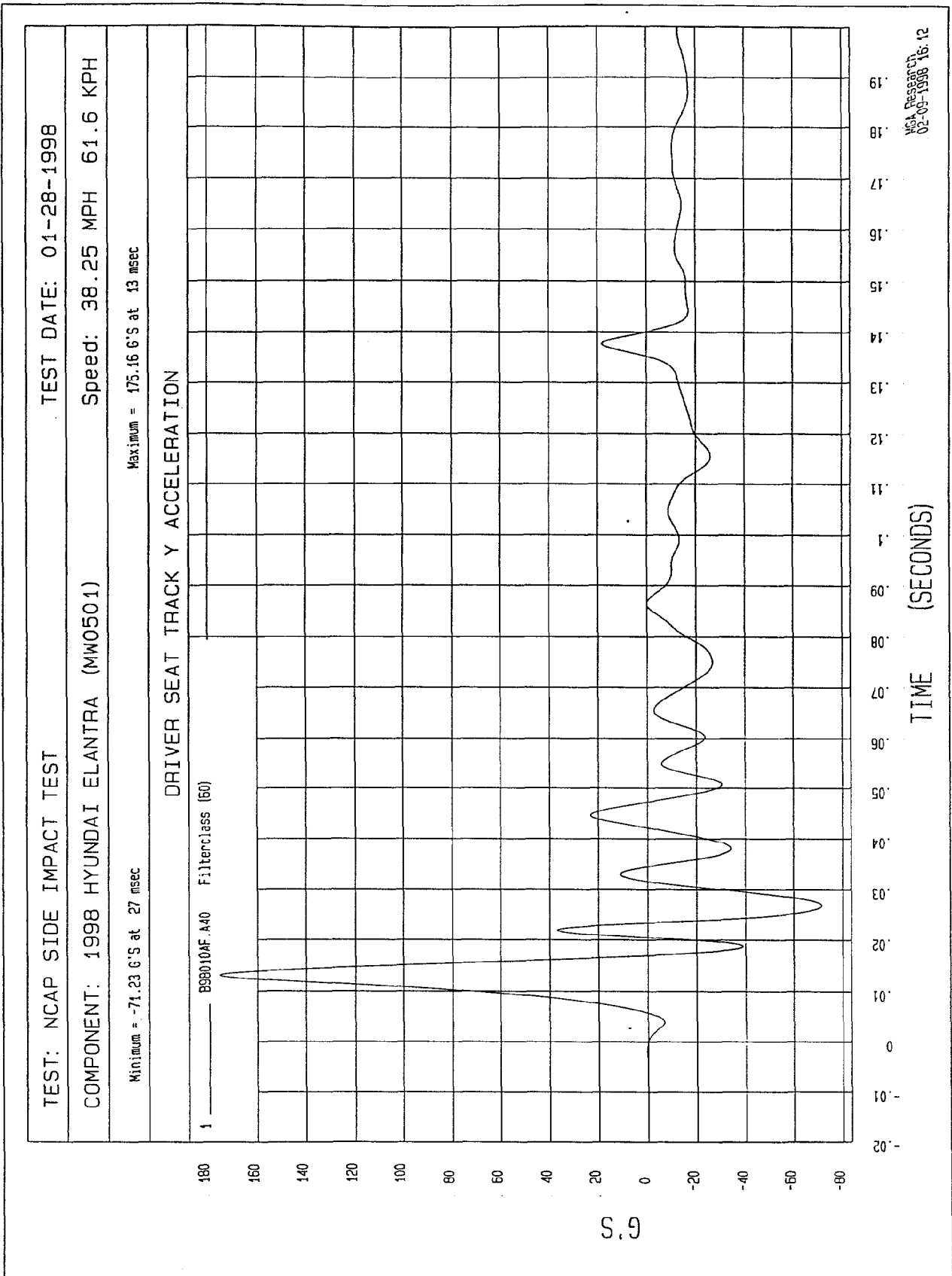
RIGHT SIDE SILL AT REAR SEAT Z VELOCITY

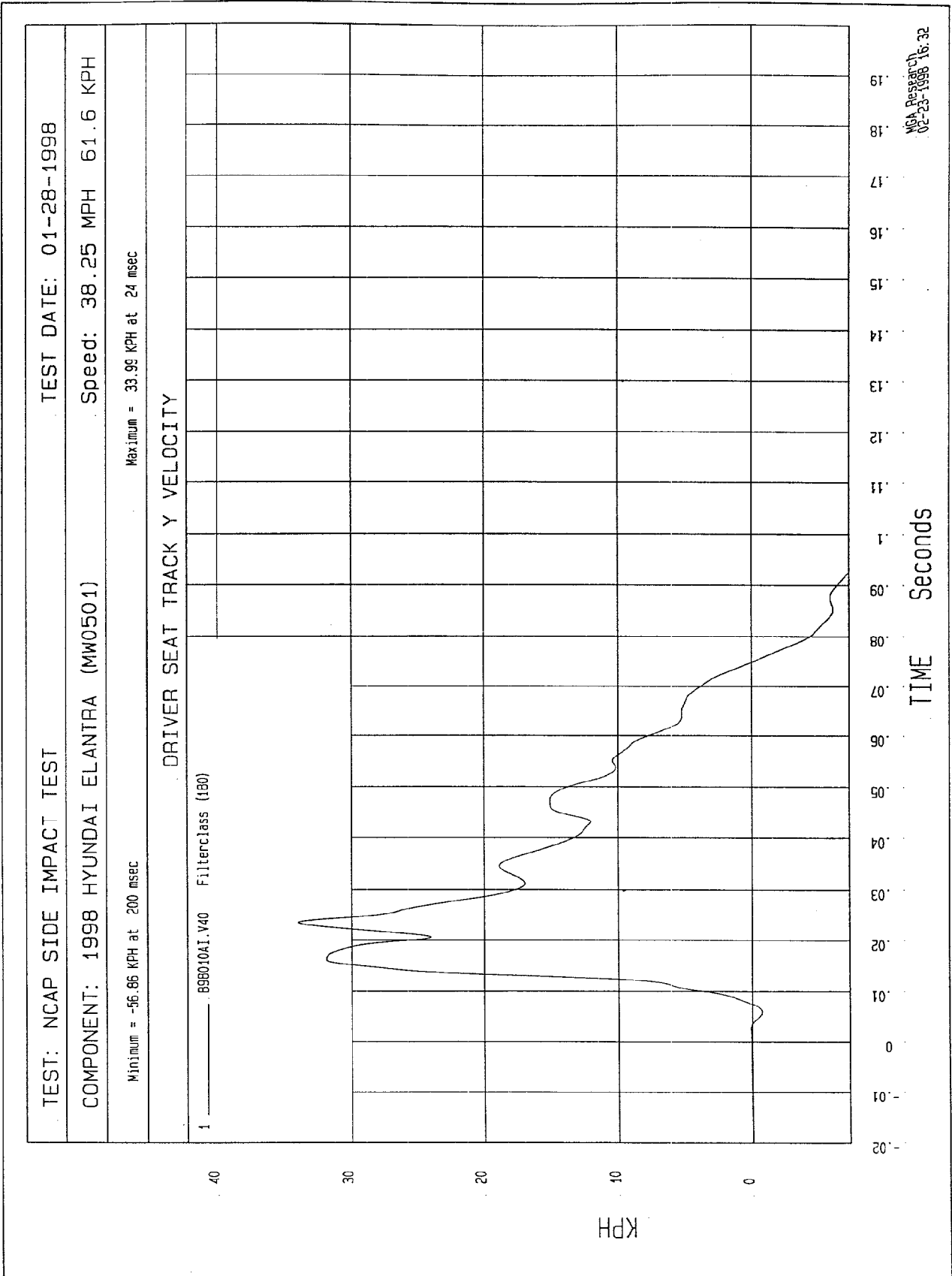
1 _____ 898010A1.V37 FilterClass (160)



TIME Seconds
MSA Research
02-23-1998 15:53



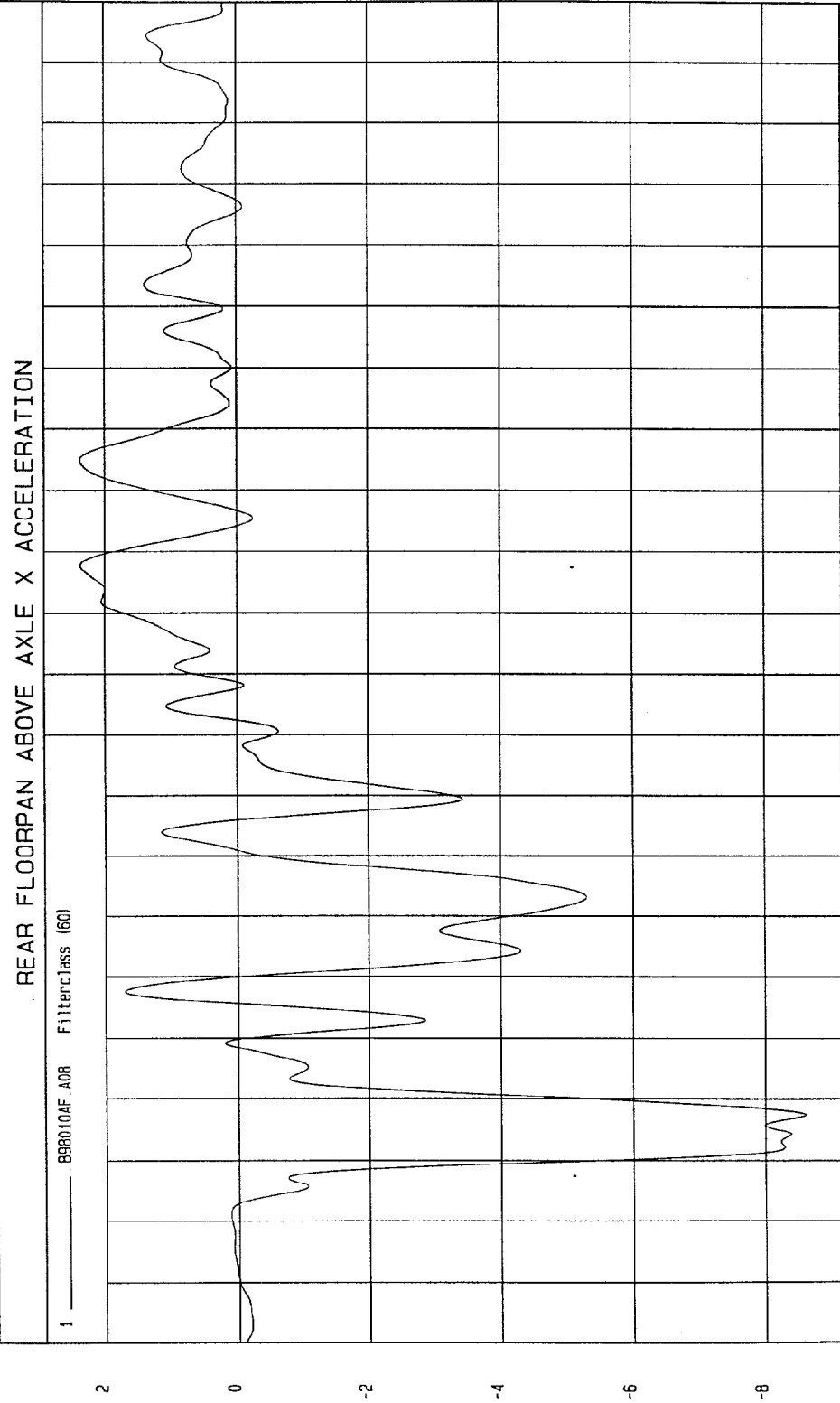




TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -8.50 G'S at 17 msec Maximum = 2.35 G'S at 125 msec



TIME (SECONDS)

0.19 0.18 0.17 0.16 0.15 0.14 0.13 0.12 0.11 0.1 0.09 0.08 0.07 0.06 0.05 0.04 0.03 0.02 0.01 0 -0.01 -0.02

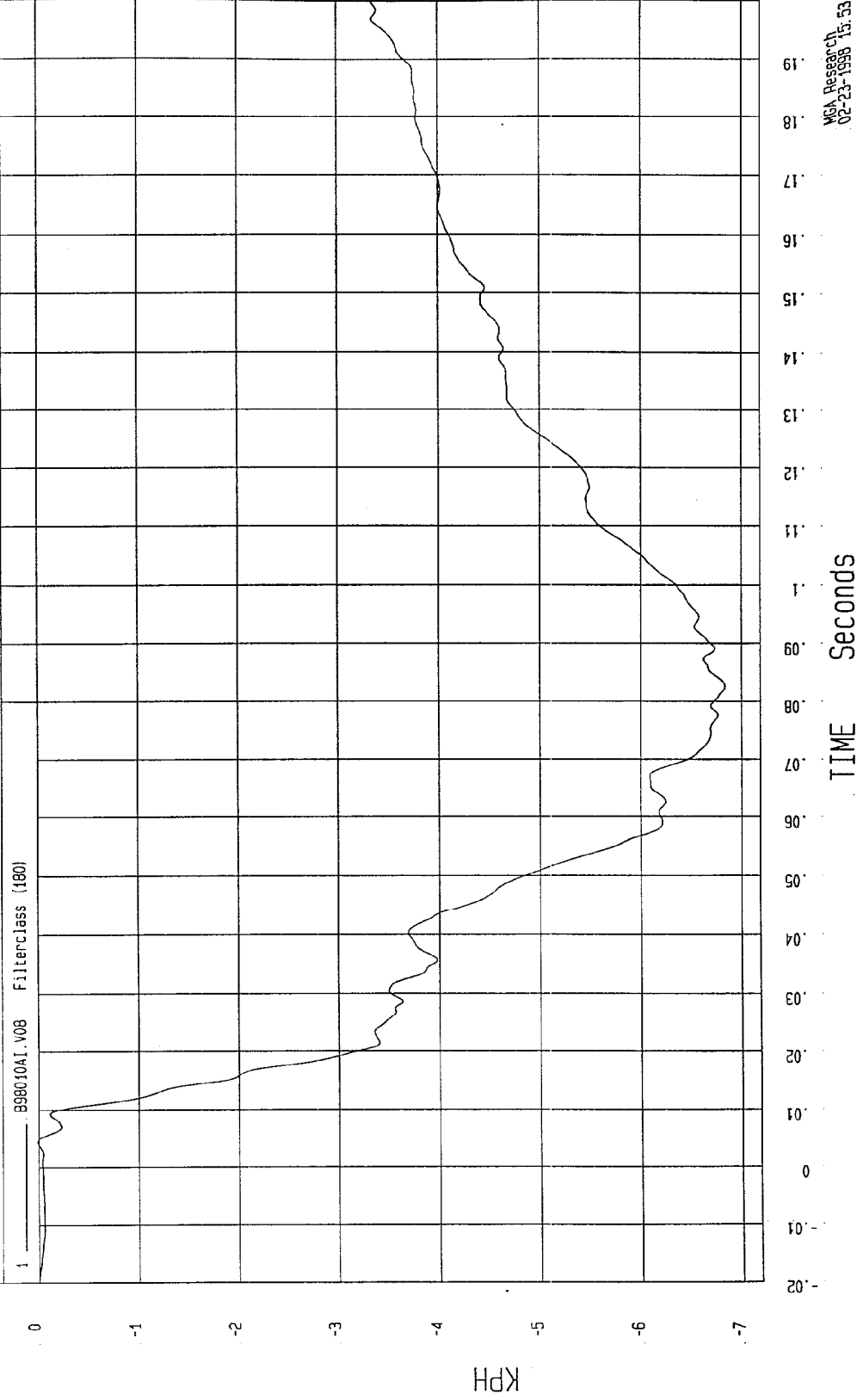
NSA Research
02-09-1998 16:13

TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -5.84 KPH at 83 msec Maximum = 1.35E-02 KPH at 4 msec

REAR FLOORPAN ABOVE AXLE X VELOCITY



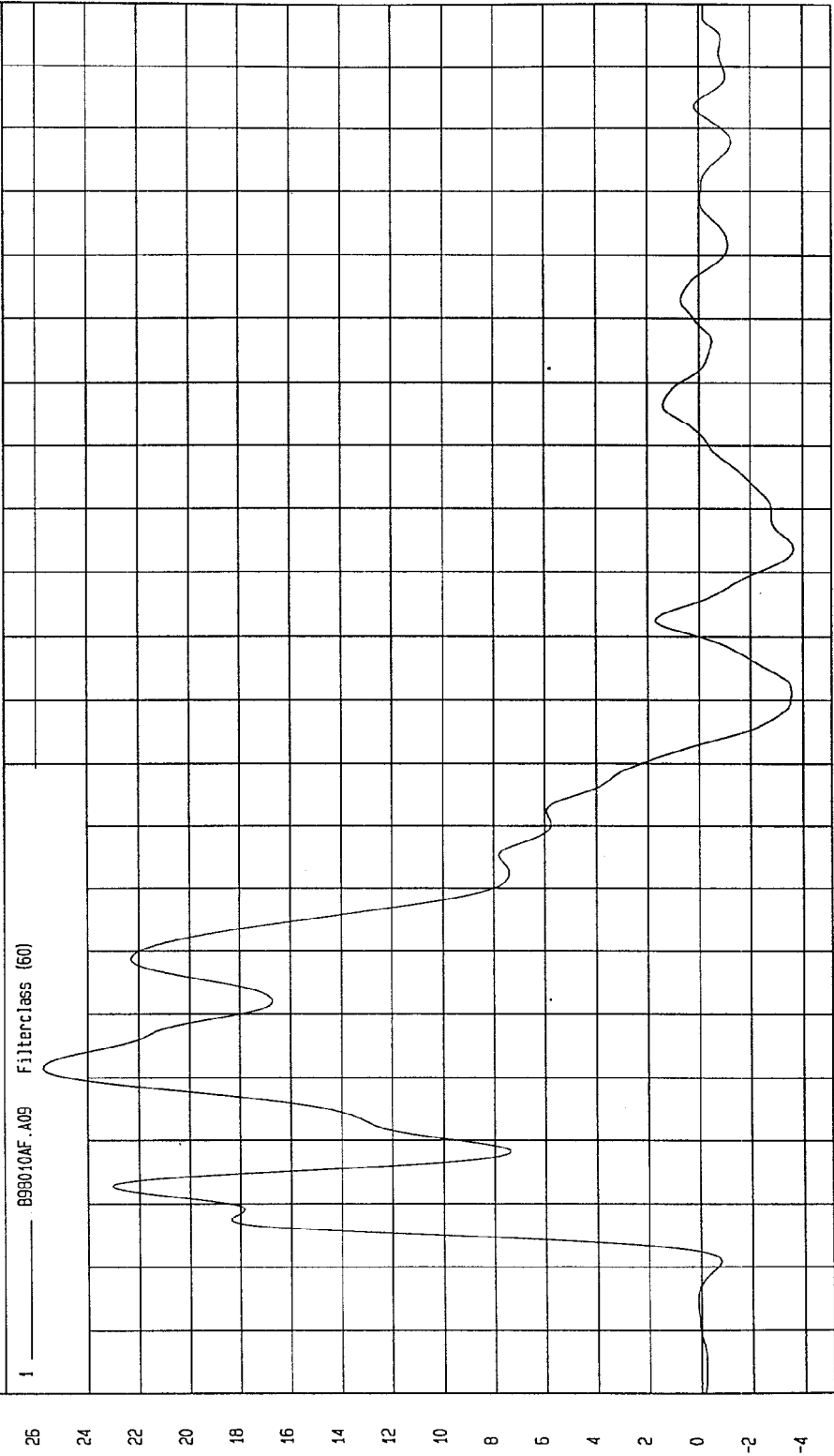
WGA Research
02-23-1998 15:53

TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 51.6 KPH

Minimum = -3.63 G'S at 114 msec Maximum = 25.76 G'S at 32 msec

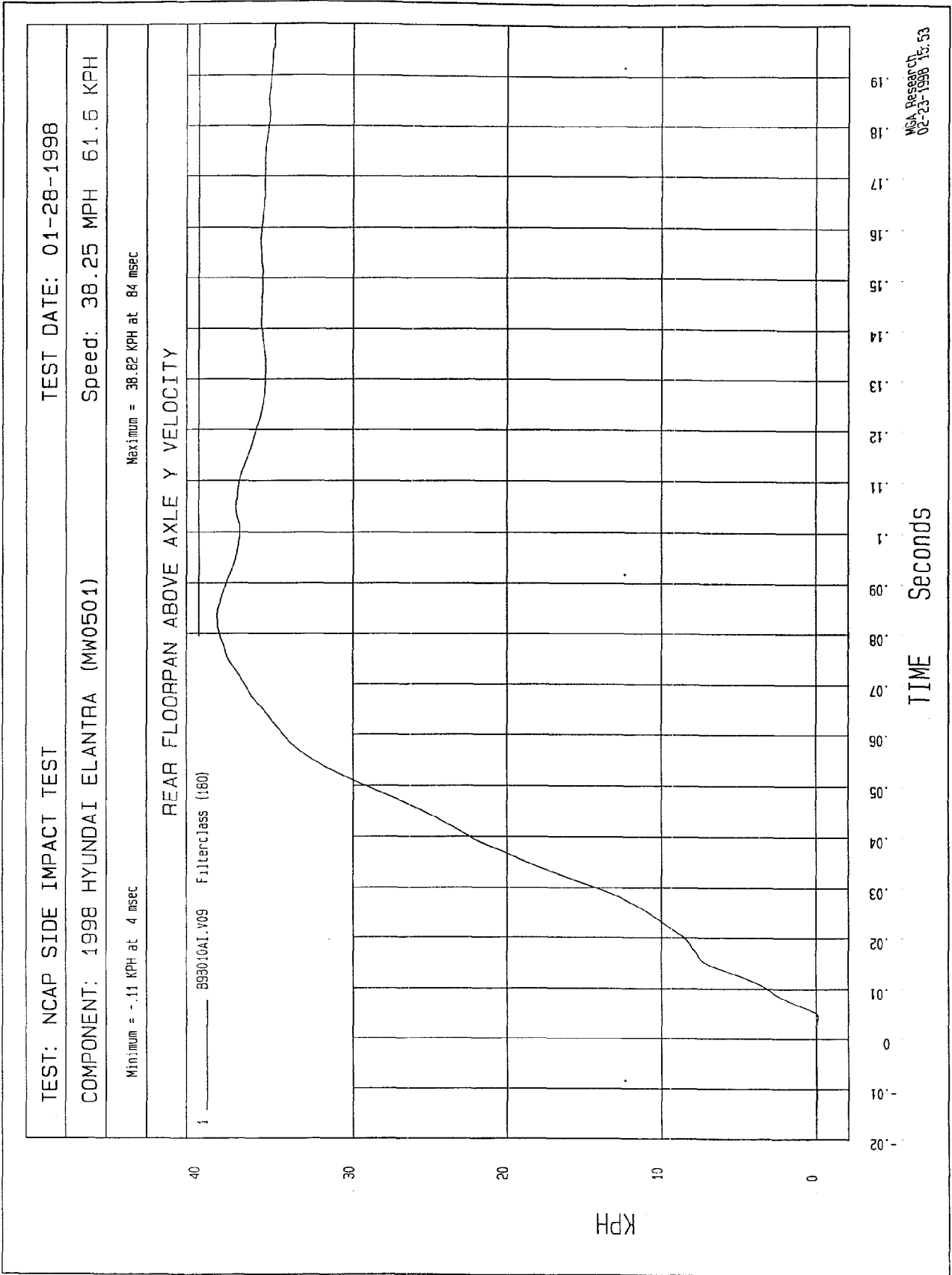
REAR FLOORPAN ABOVE AXLE Y ACCELERATION



TIME (SECONDS)

19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 -1 -2 -3 -4

WCA Research
02-09-1998 16:13

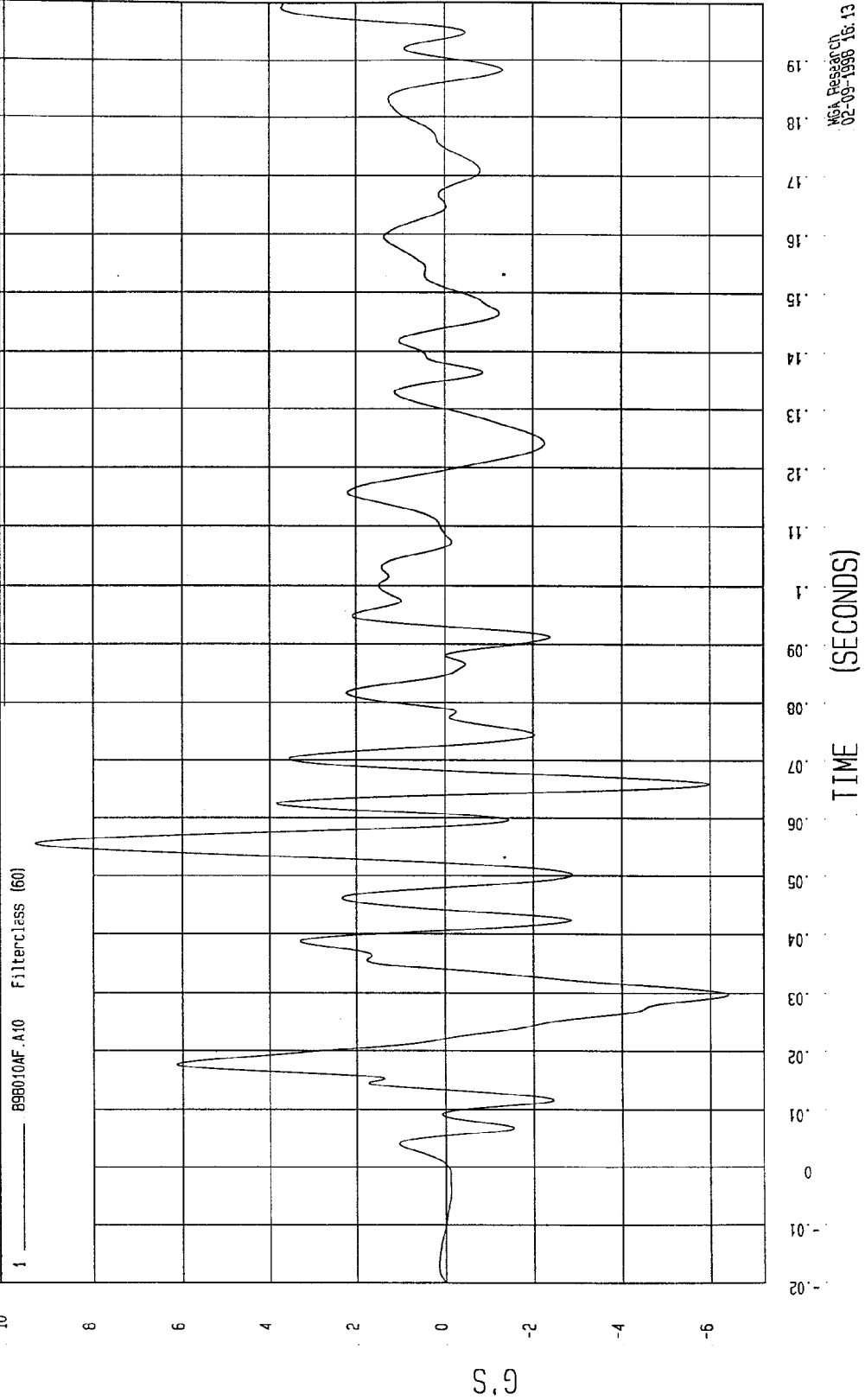


TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -6.41 G'S at 30 msec Maximum = 9.32 G'S at 56 msec

REAR FLOORPAN ABOVE AXLE Z ACCELERATION



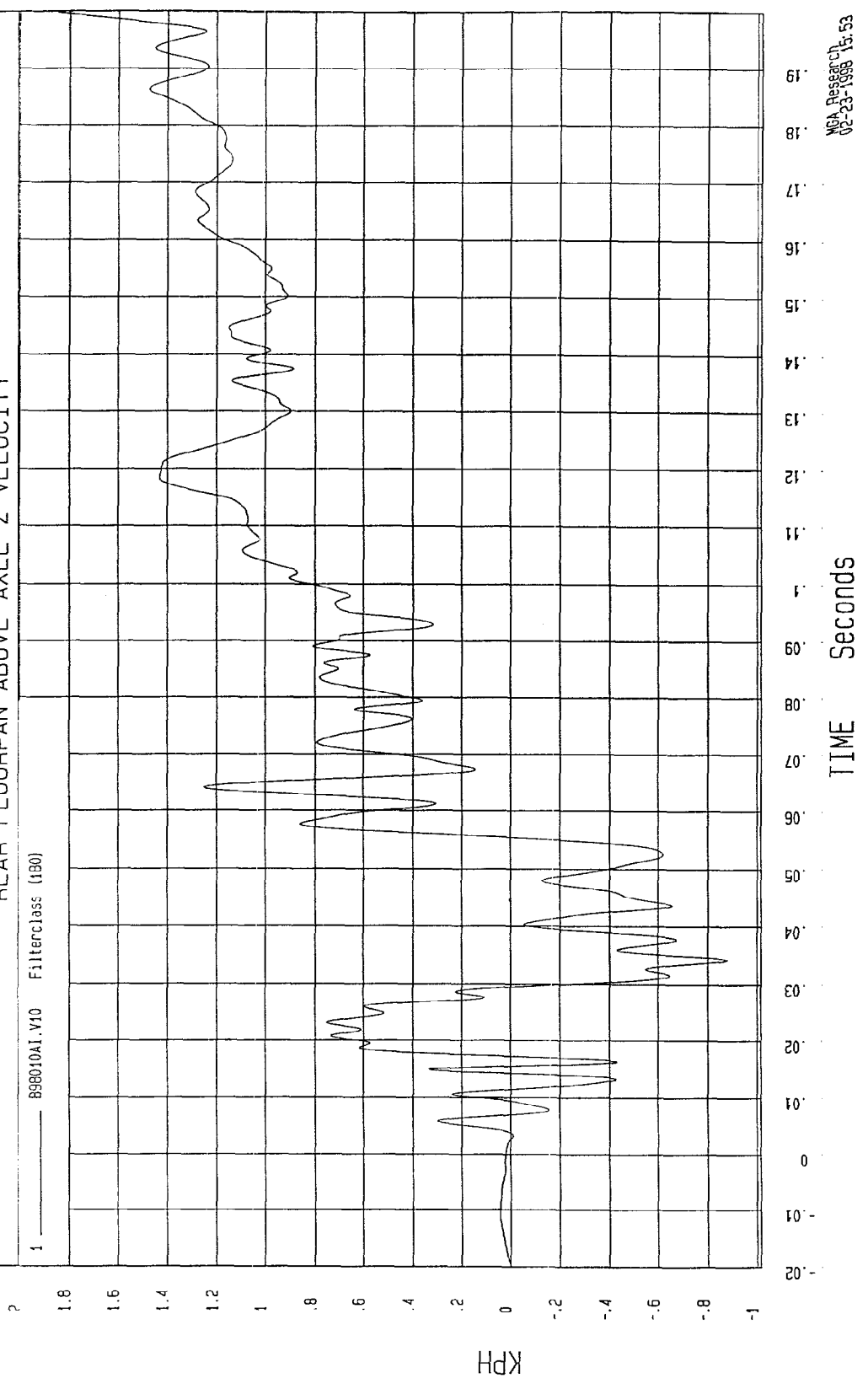
MGA Research
02-09-1998 16:13

TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -.07 KPH at 34 msec Maximum = 1.06 KPH at 200 msec

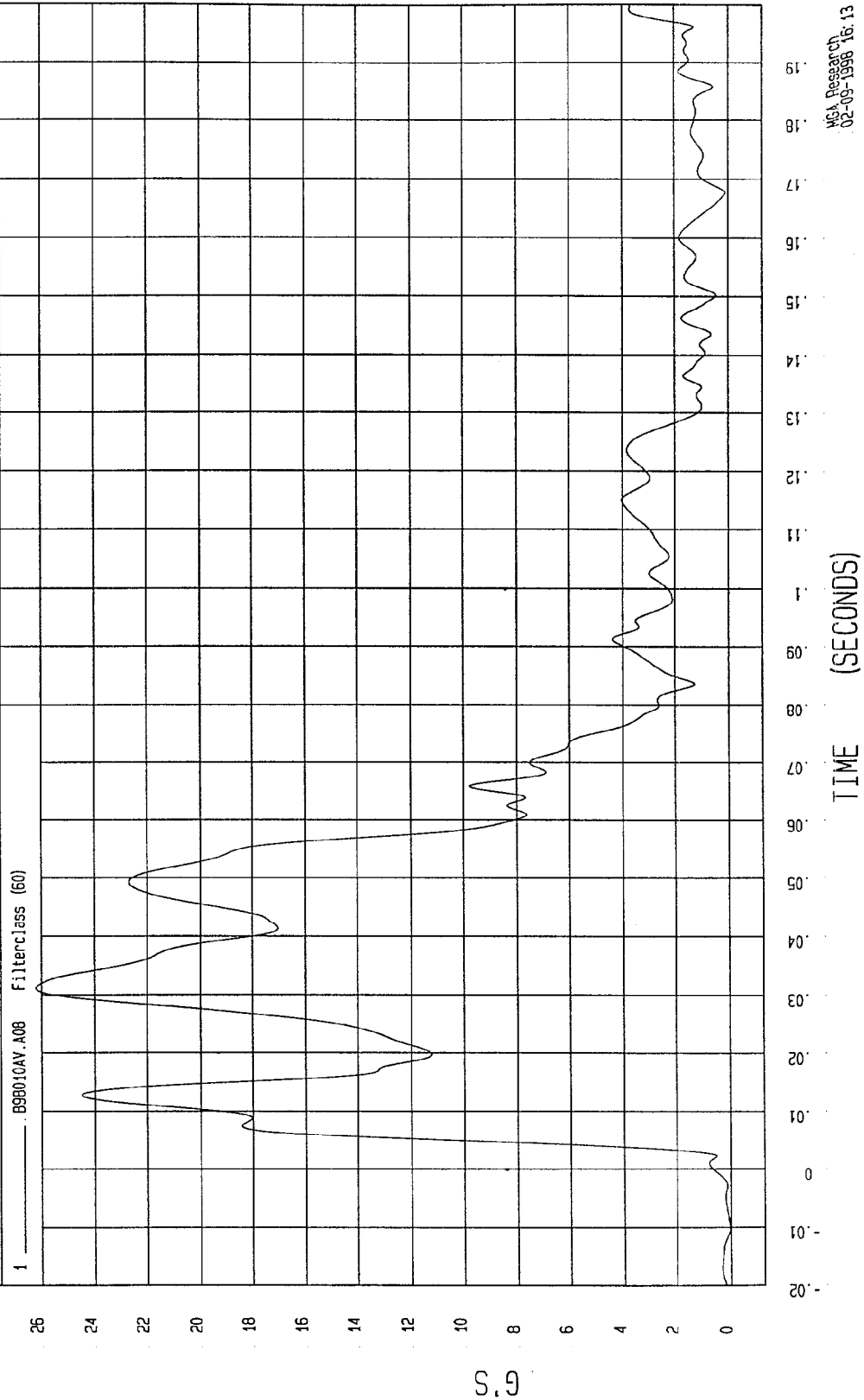
REAR FLOORPAN ABOVE AXLE Z VELOCITY



NGA Research
02-23-1998 15:53

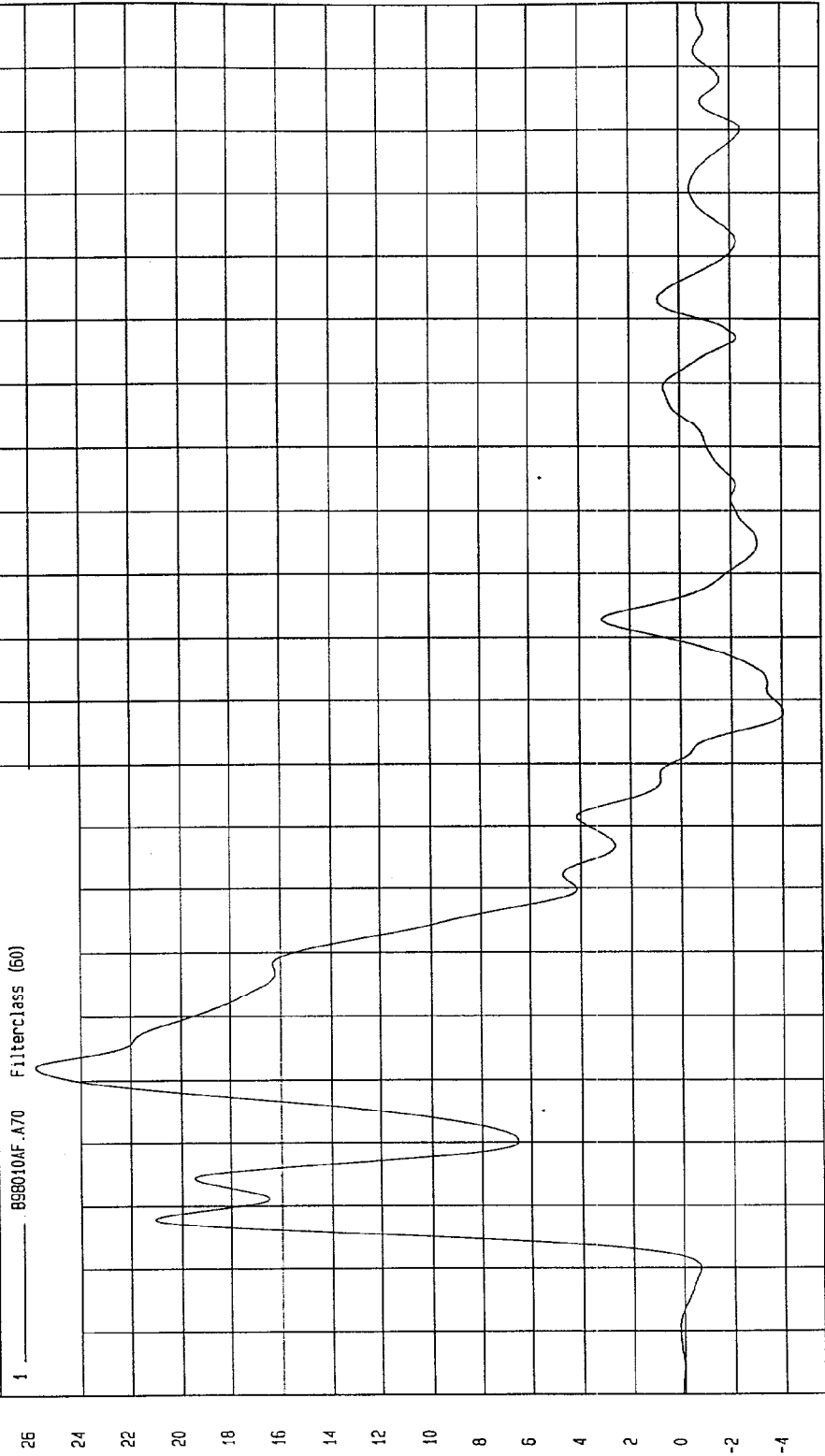
TEST: NCAP SIDE IMPACT TEST	TEST DATE: 01-28-1998
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)	Speed: 38.25 MPH 61.6 KPH
Minimum = .02 G'S at -10 msec	Maximum = 26.19 G'S at 31 msec

REAR FLOORPAN ABOVE AXLE RESULTANT ACCELERATION



TEST: NCAP SIDE IMPACT TEST	TEST DATE: 01-28-1998
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)	Speed: 38.25 MPH 61.6 KPH
Minimum = -4.05 G'S at 88 msec	Maximum = 25.81 G'S at 32 msec

RIGHT REAR OCCUPANT COMPARTMENT Y ACCELERATION



TIME (SECONDS)

0.02 0.03 0.04 0.05 0.06 0.07 0.08 0.09 0.10 0.11 0.12 0.13 0.14 0.15 0.16 0.17 0.18 0.19

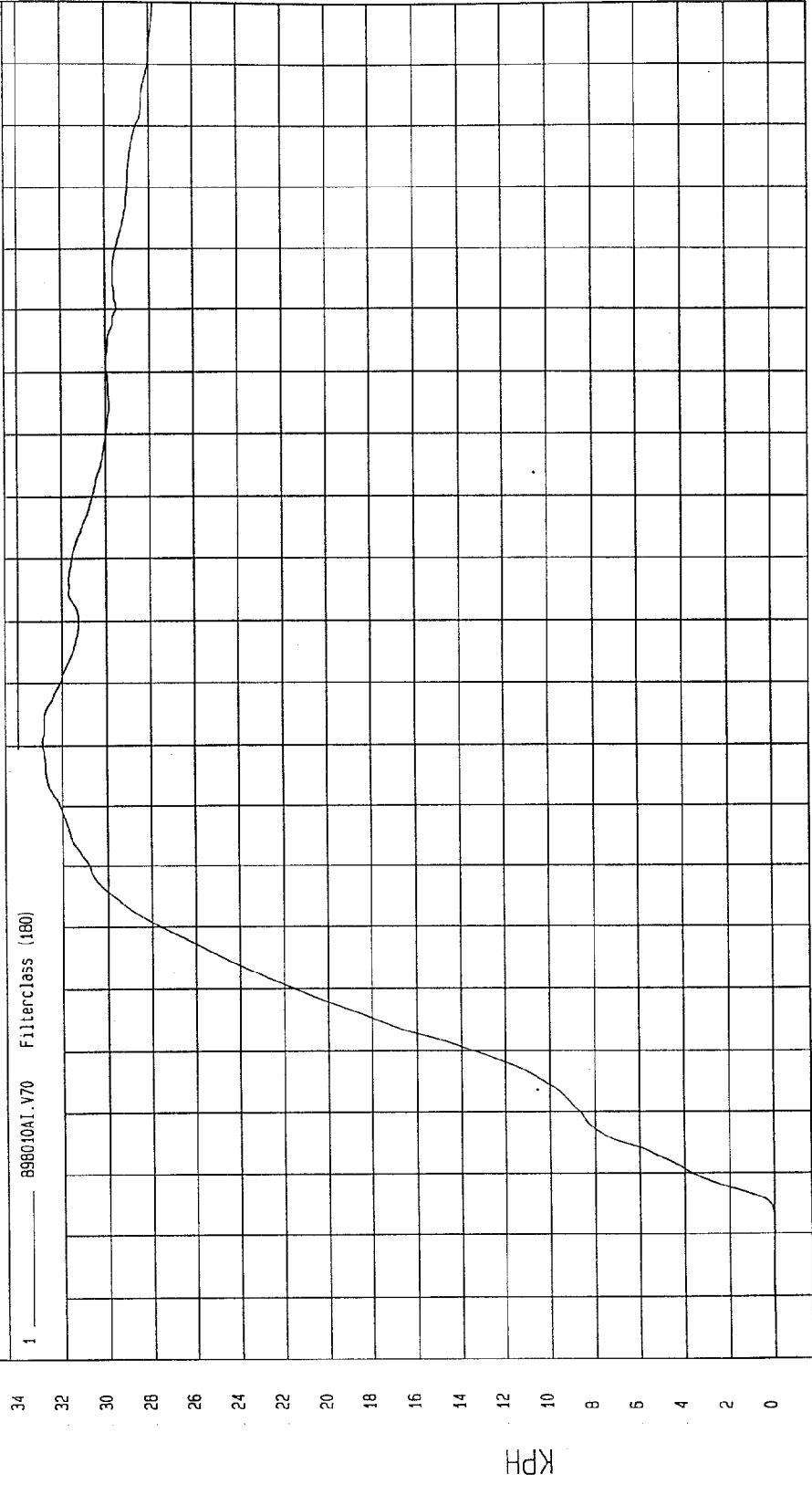
WCA Research
02-09-1998 16:13

TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 51.6 KPH

Minimum = -2.14E-02 KPH at 1 msec Maximum = 32.92 KPH at 81 msec

RIGHT REAR OCCUPANT COMPARTMENT Y VELOCITY



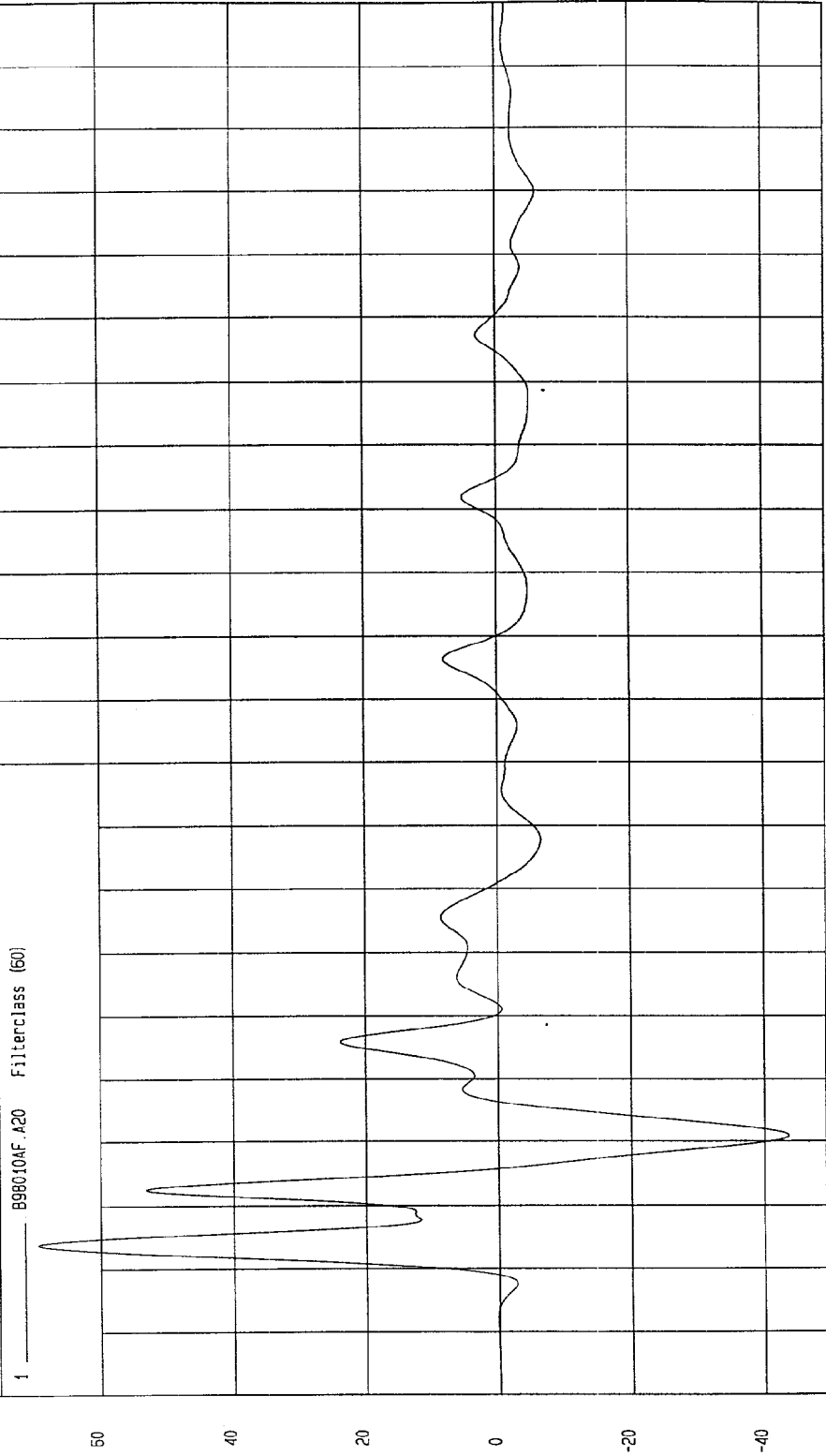
TIME Seconds

61' 19' 18' 17' 16' 15' 14' 13' 12' 11' 10' 09' 08' 07' 06' 05' 04' 03' 02' 01' 0 -01' -02'

NCA Research
02-23-1998 15:53

TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH
Minimum = -43.63 G'S at 21 msec Maximum = 69.65 G'S at 4 msec

LEFT LOWER A-POST Y ACCELERATION



TIME (SECONDS)

NSA Research
02-09-1998 16:13

TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

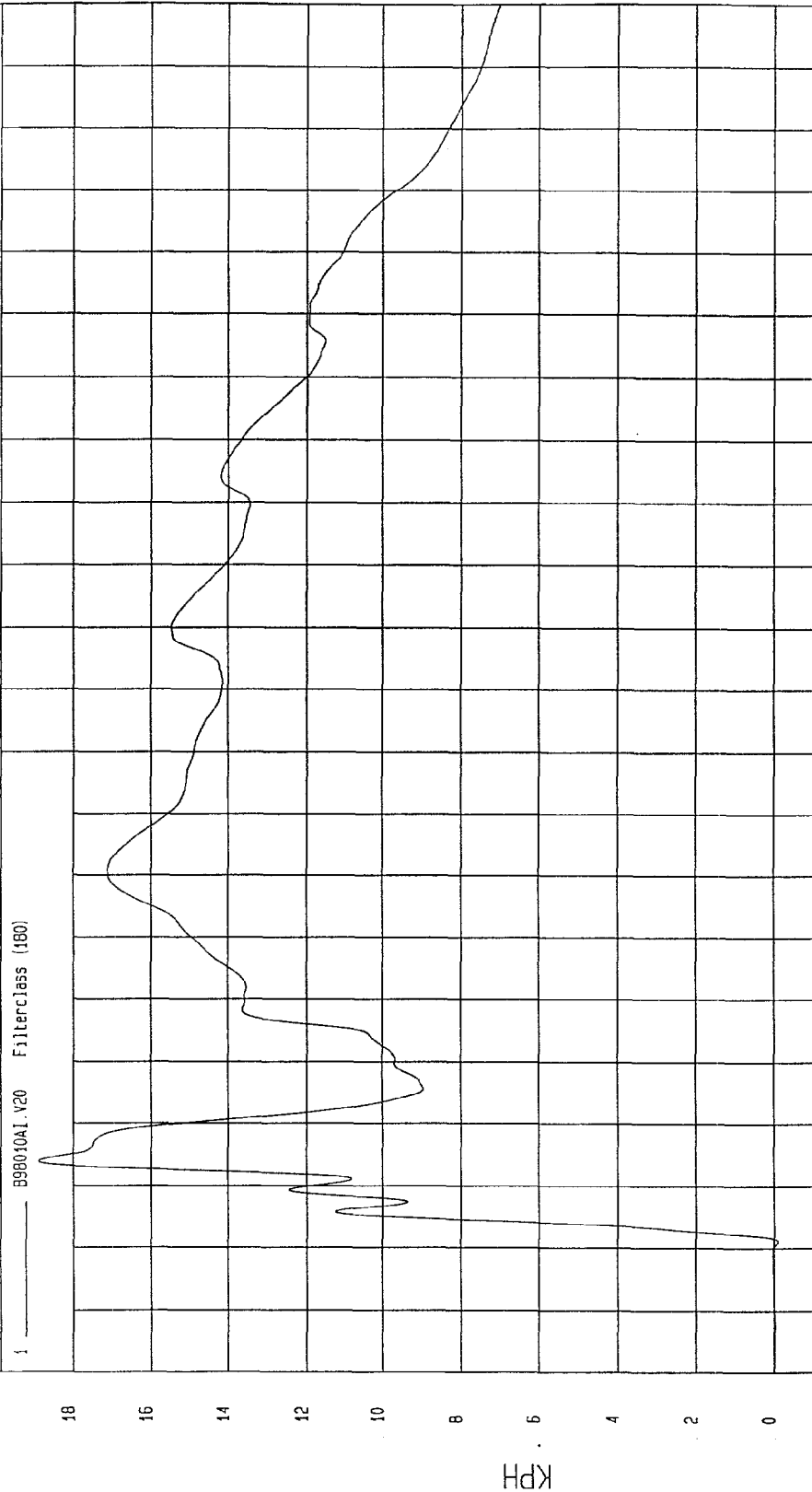
Speed: 38.25 MPH 61.6 KPH

Minimum = -.10 KPH at 1 msec

Maximum = 18.89 KPH at 14 msec

LEFT LOWER A-POST Y VELOCITY

1 B98010A1.V20 Filterclass (180)



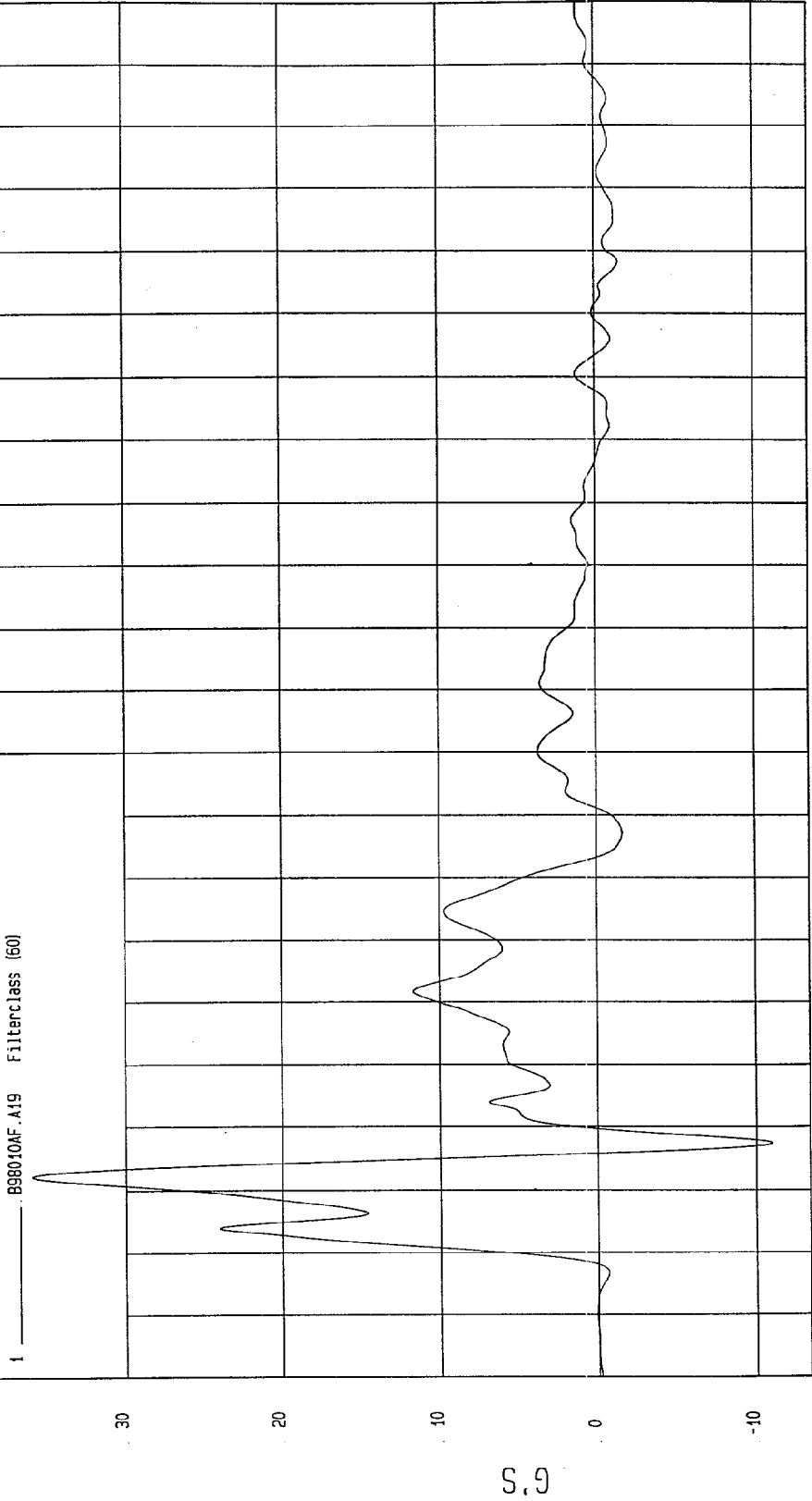
TIME Seconds

18.89 KPH at 14 msec

02-23-1998 15:53

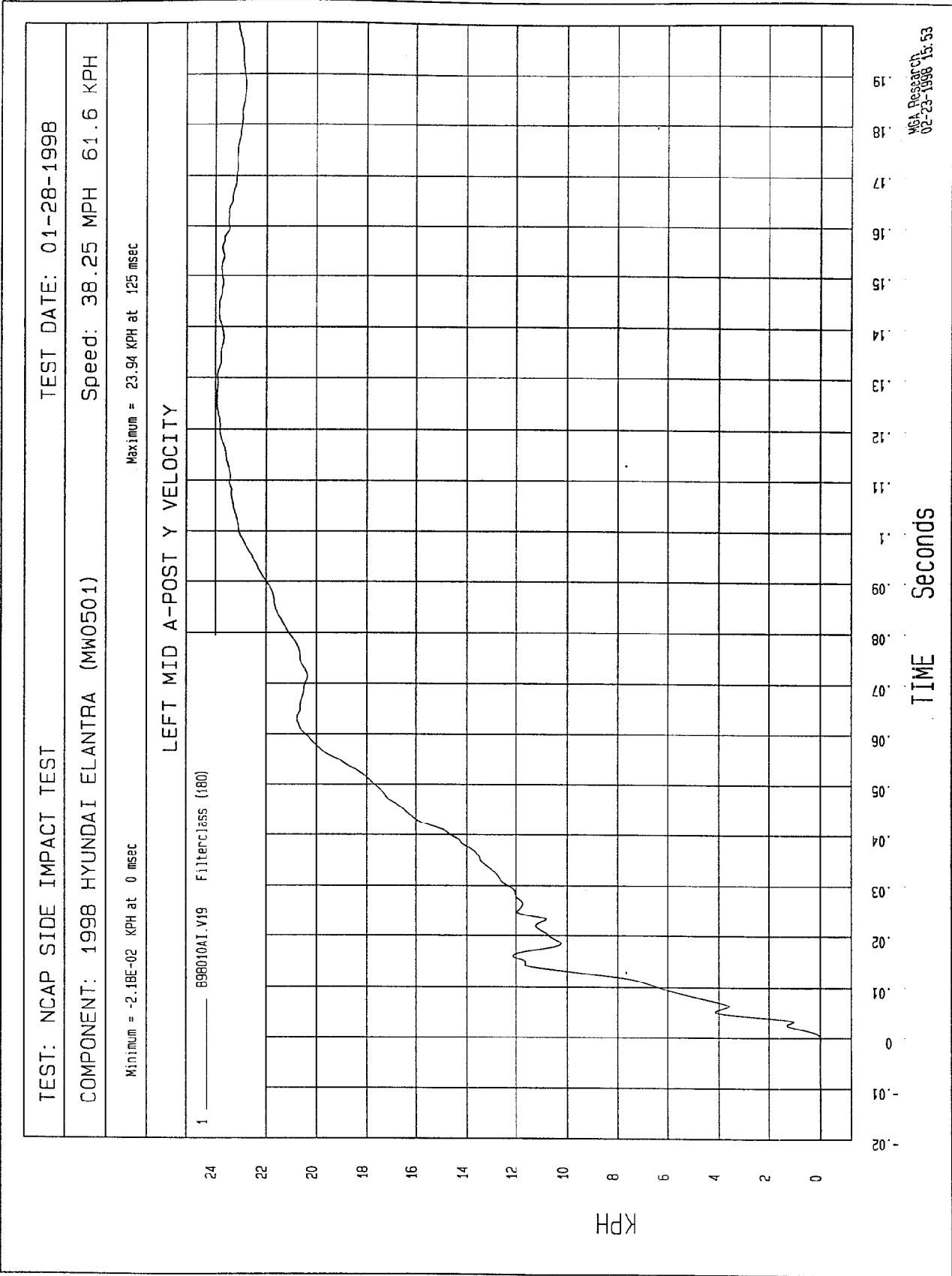
TEST: NCAP SIDE IMPACT TEST	TEST DATE: 01-28-1998
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)	Speed: 38.25 MPH 61.6 KPH
Minimum = -11.01 G'S at 17 msec	Maximum = 35.91 G'S at 12 msec

LEFT MID A-POST Y ACCELERATION



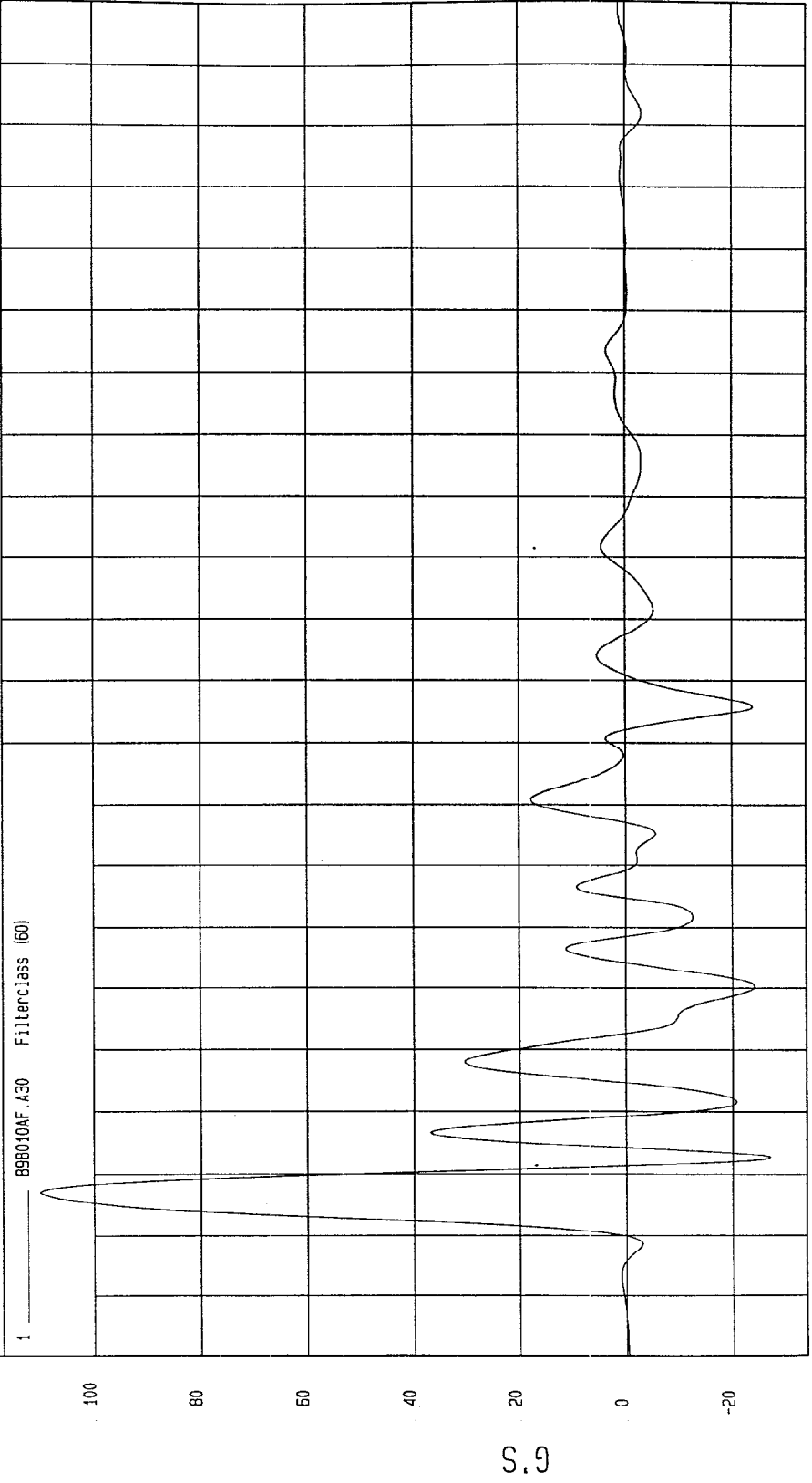
TIME (SECONDS)

MCA Research
02-09-1998 16:13

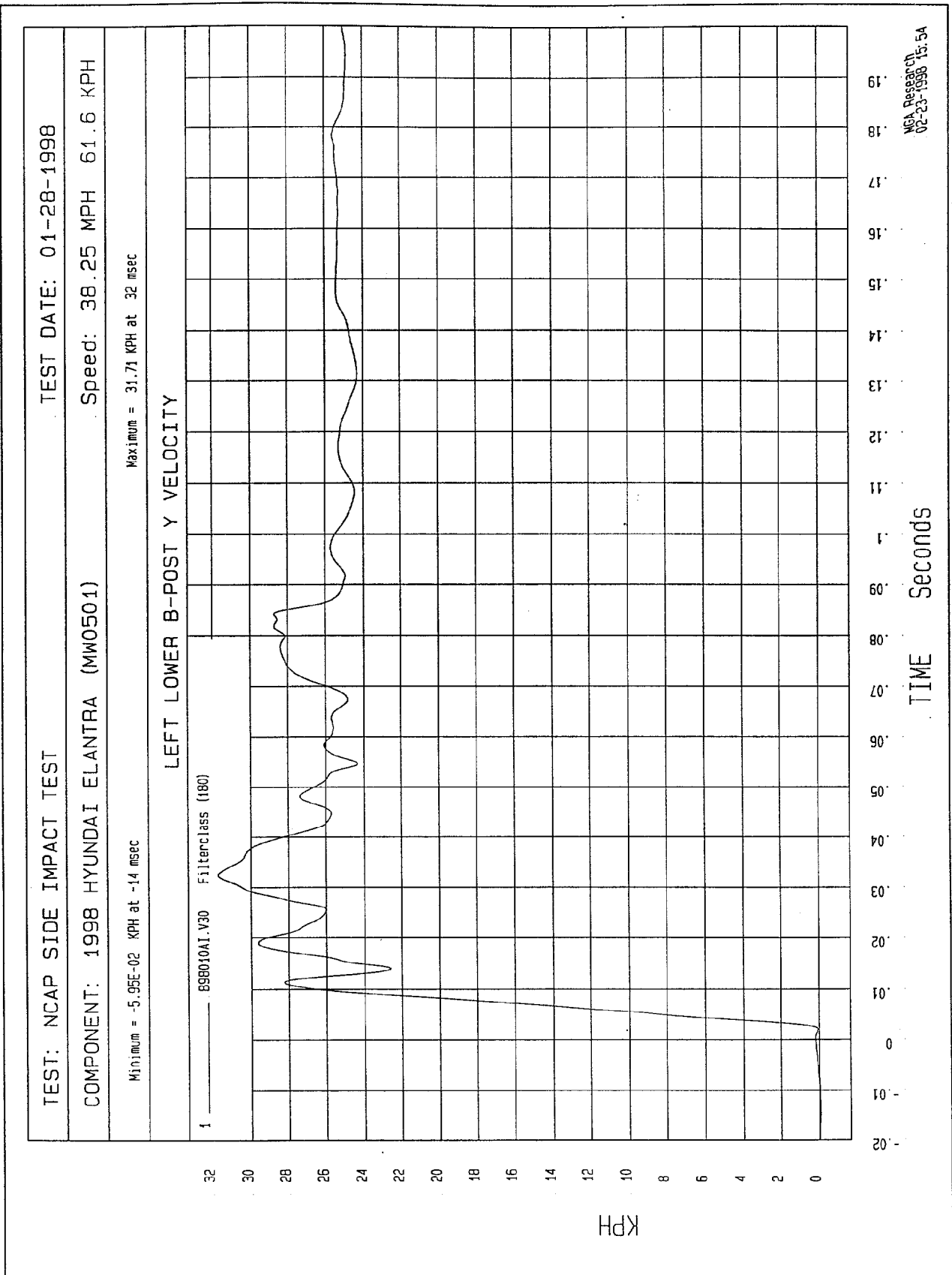


TEST: NCAP SIDE IMPACT TEST	TEST DATE: 01-28-1998
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)	Speed: 38.25 MPH 61.6 KPH
Minimum = -27.01 G'S at 13 msec	Maximum = 109.93 G'S at 7 msec

LEFT LOWER B-POST Y ACCELERATION



MSA Research
02-09-1998 16:13

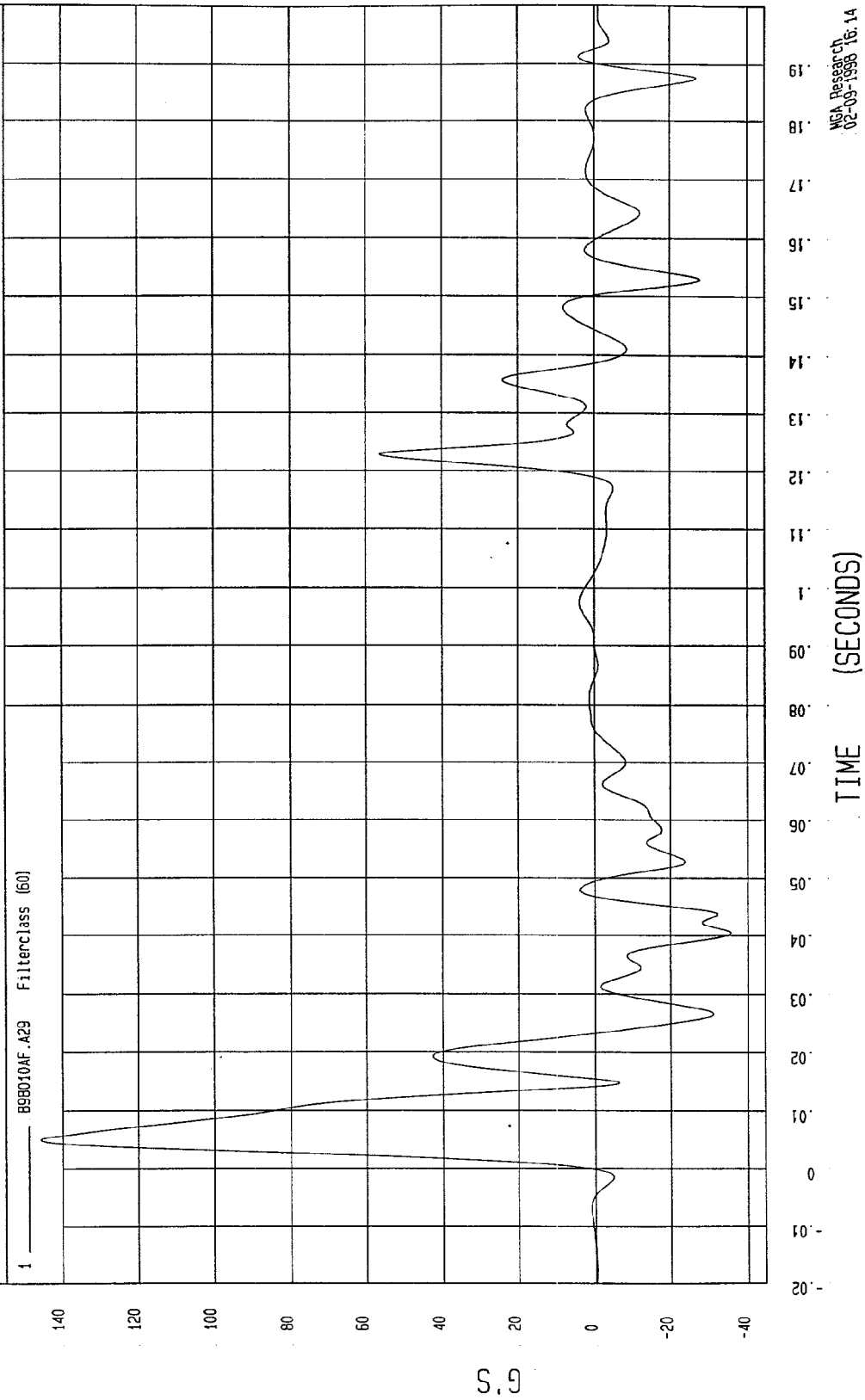


TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -35.53 G's at 40 msec Maximum = 145.74 G's at 5 msec

LEFT MID B-POST Y ACCELERATION



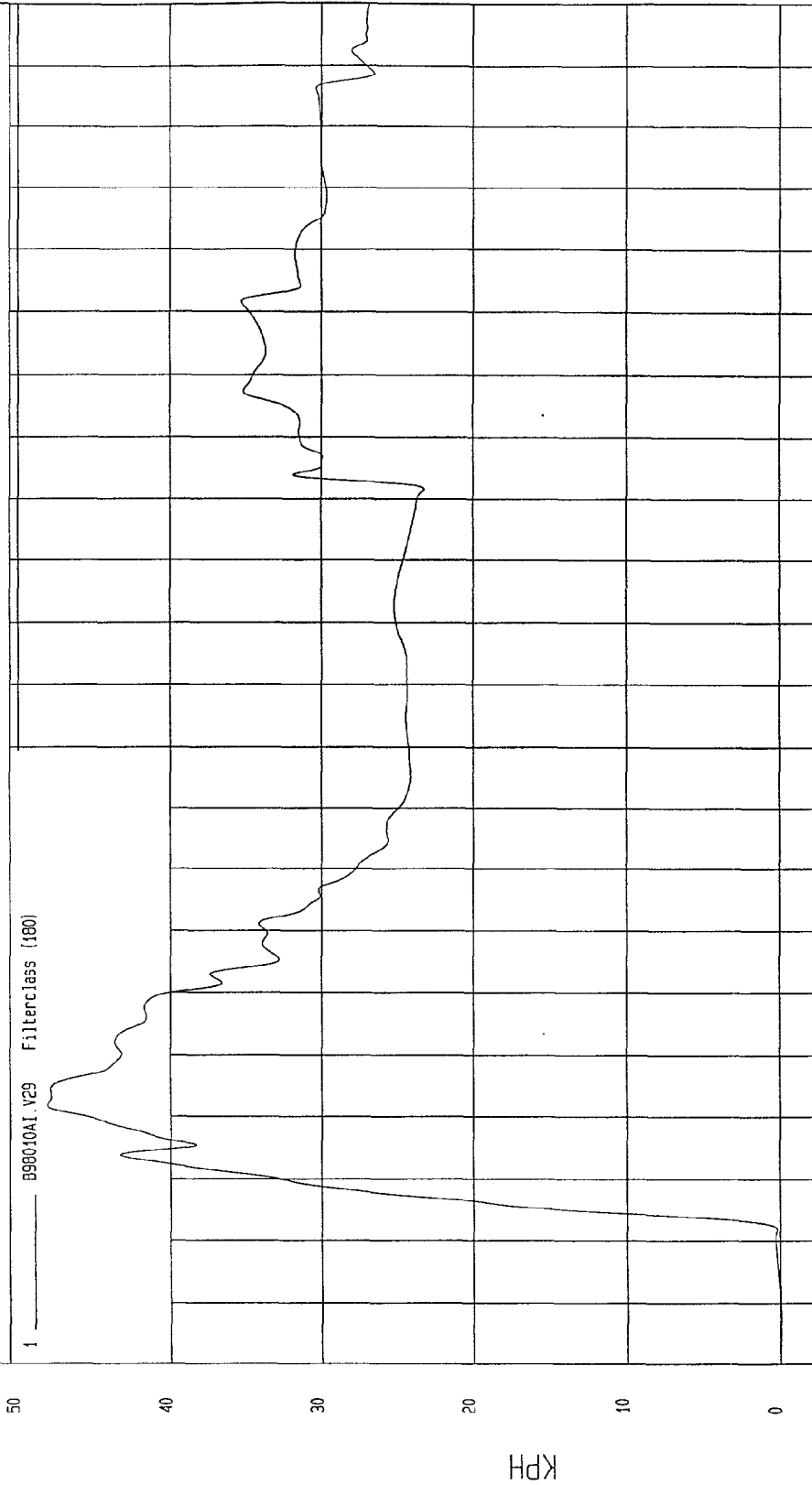
NSA Research
02-09-1998 16:14

TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

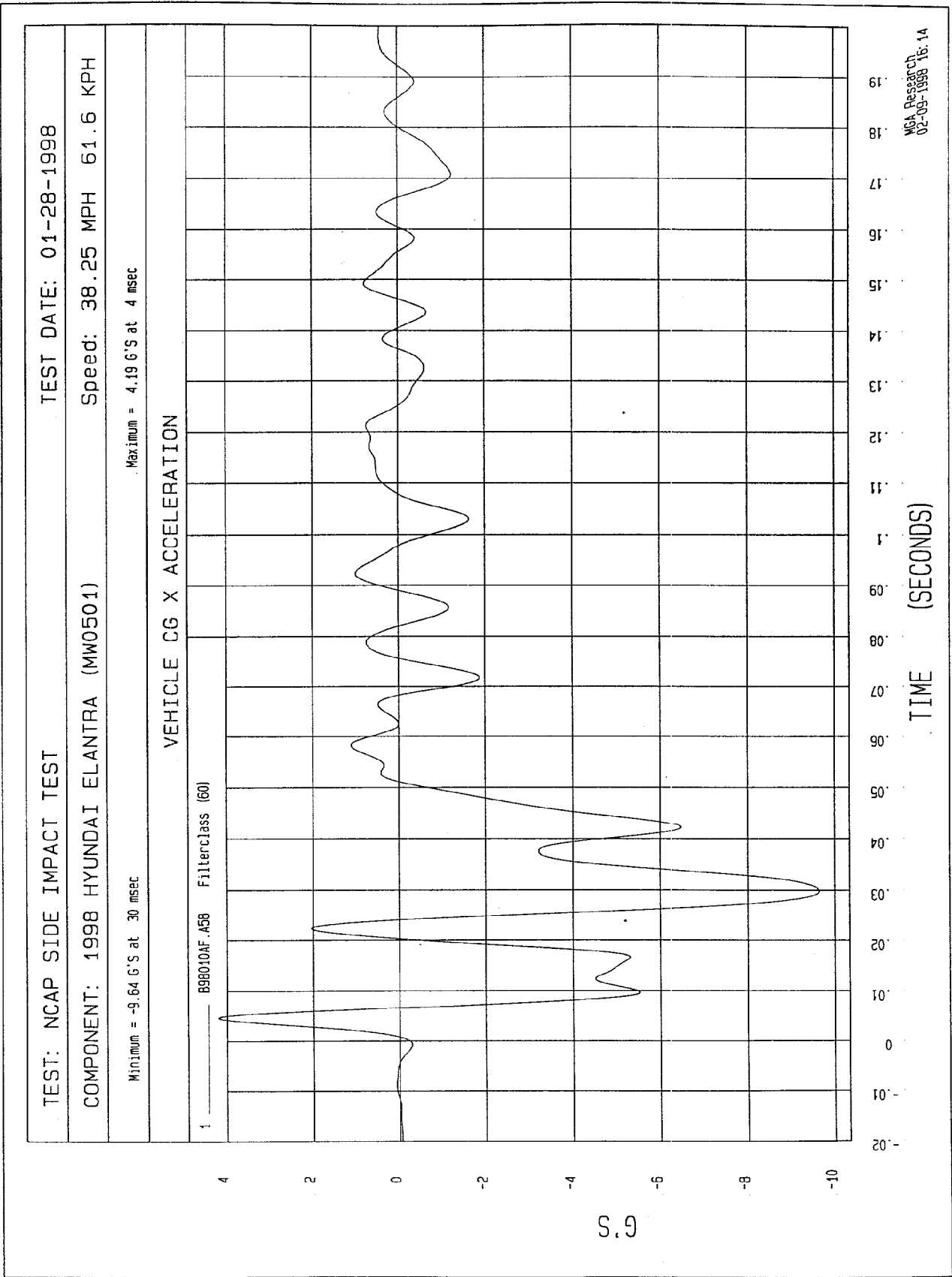
Minimum = -6.62E-02 KPH at -14 msec Maximum = 48.12 KPH at 22 msec

LEFT MID B-POST Y VELOCITY



TIME Seconds

MOI Research
02-23-1998 15:54



TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

SPEED: 38.25 MPH 61.6 KPH

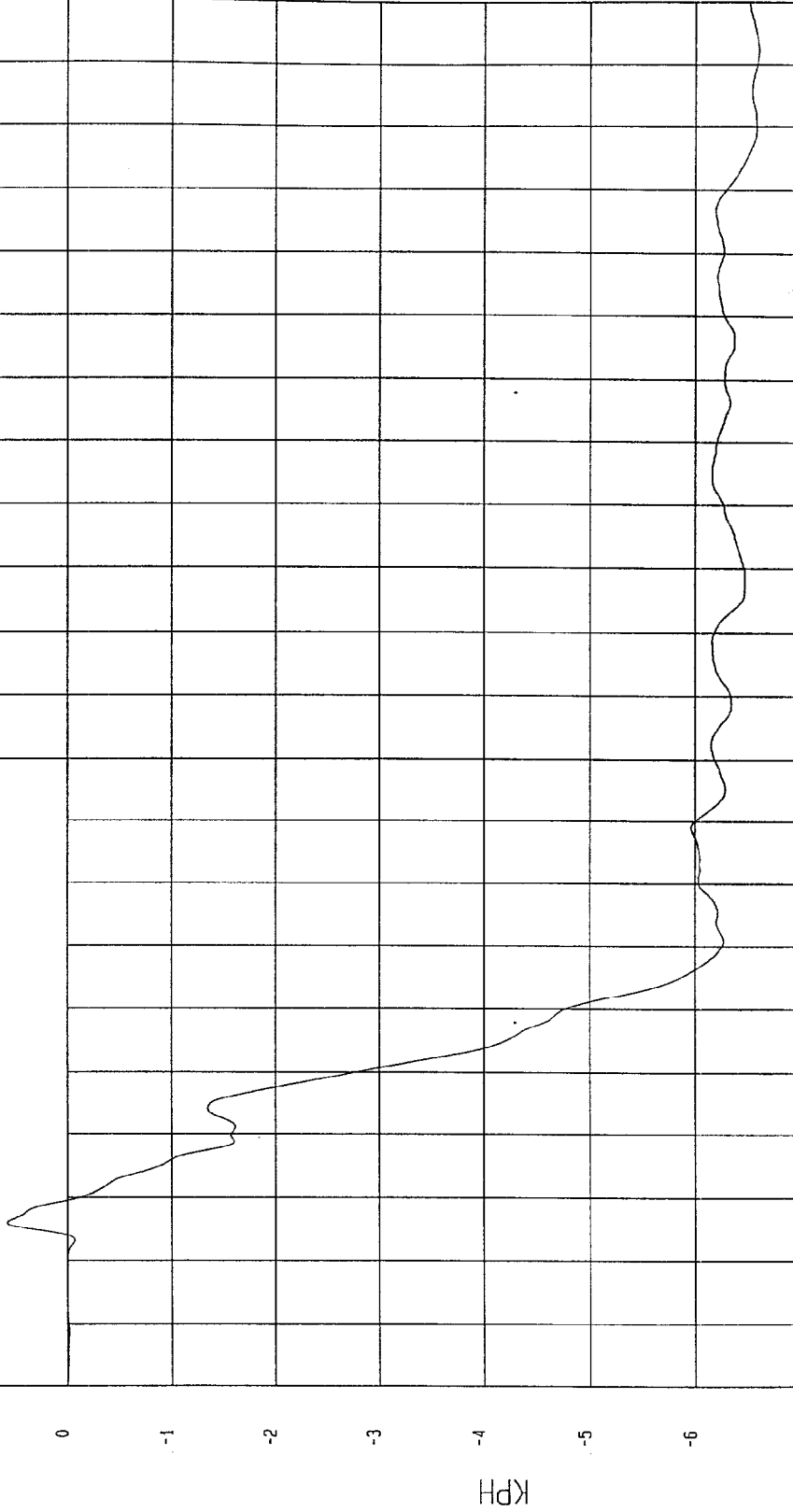
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

Maximum = .57 KPH at 6 msec

Minimum = -6.59 KPH at 192 msec

VEHICLE CG X VELOCITY

1 — B98010A1.V58 Filterclass (190)

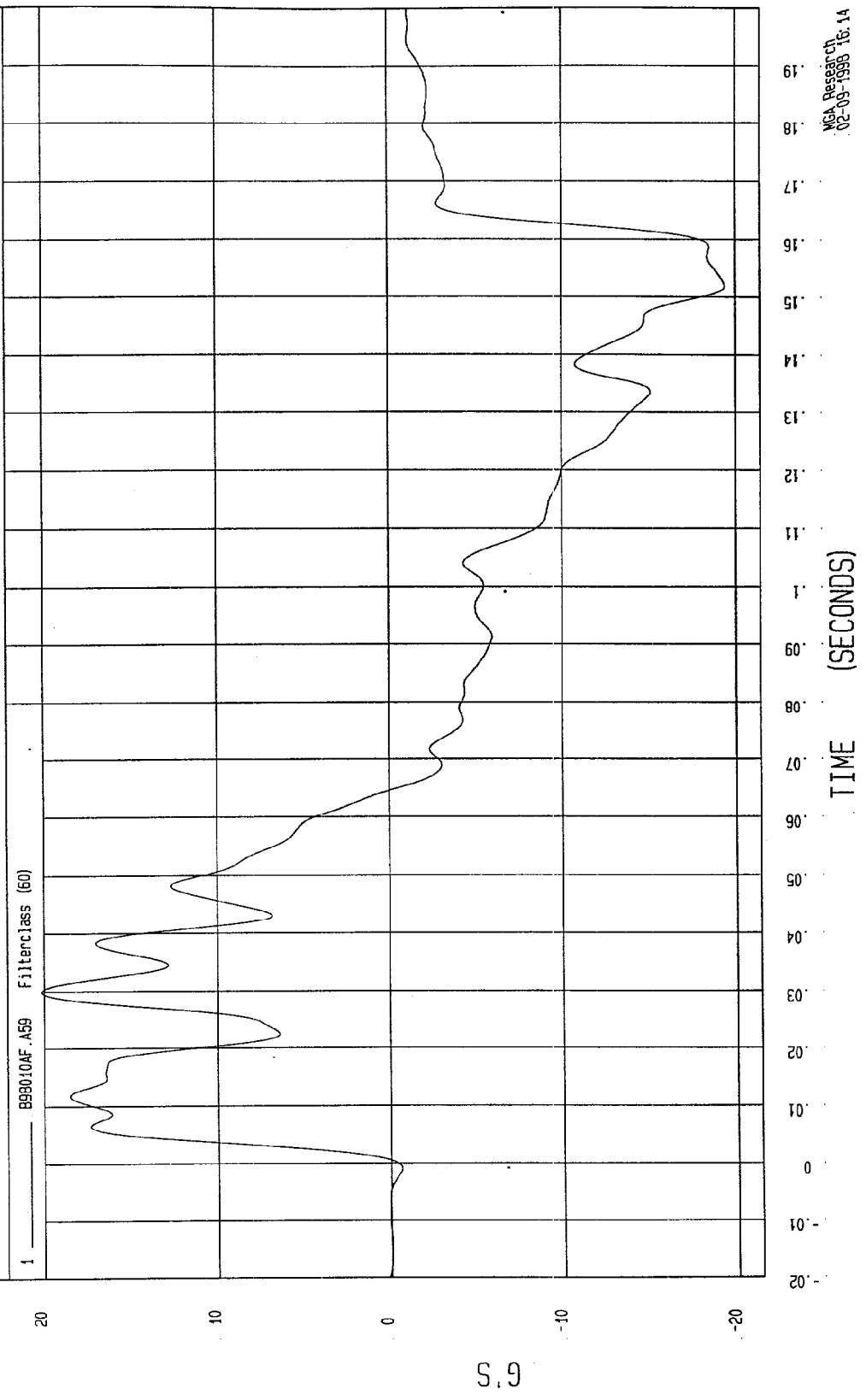


TIME Seconds

MCA Research
02-23-1998 15:54

TEST: NCAP SIDE IMPACT TEST	TEST DATE: 01-28-1998
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)	Speed: 38.25 MPH 61.6 KPH
Minimum = -19.39 G'S at 152 msec	Maximum = 20.13 G'S at 30 msec

VEHICLE CG Y ACCELERATION



NCA Research
02-09-1998 16:14

TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

Speed: 38.25 MPH 61.6 KPH

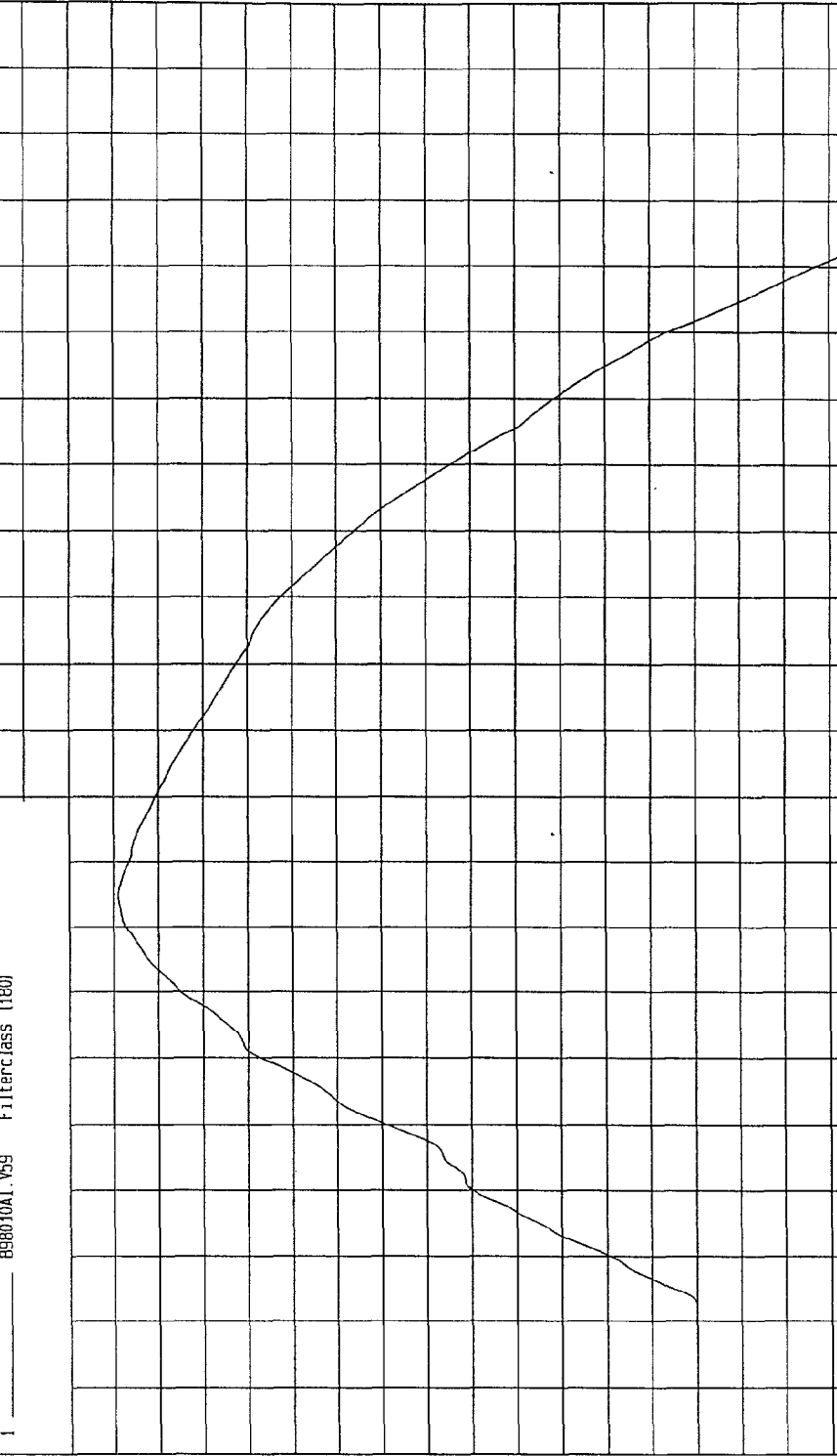
Minimum = -10.03 KPH at 200 msec

Maximum = 25.80 KPH at 65 msec

VEHICLE CG Y VELOCITY

1 _____ B98010A1.V59 Filterclass (160)

KPH

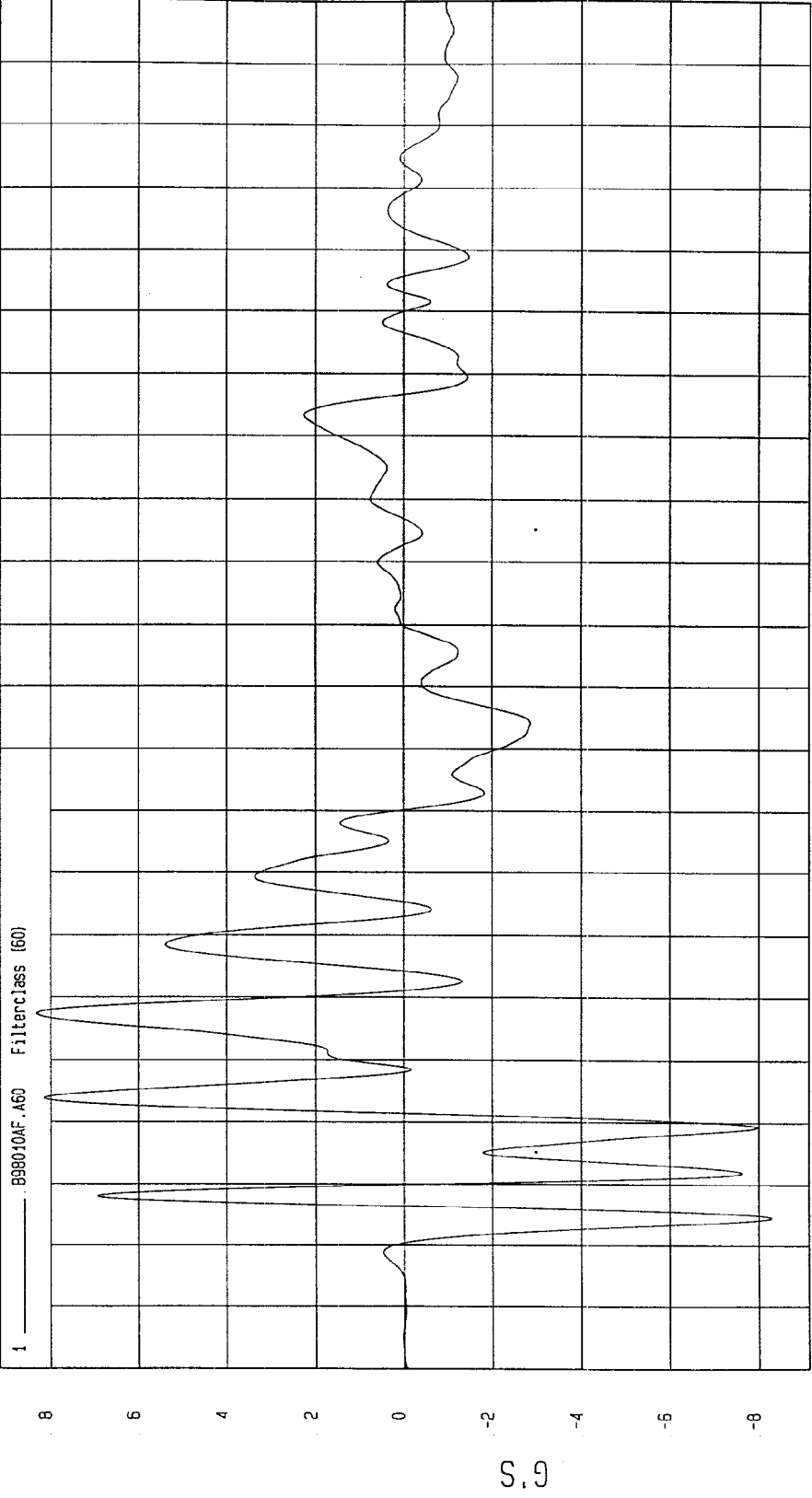


TIME Seconds

W&A Research
02-23-1998 16:32

TEST: NCAP SIDE IMPACT TEST	TEST DATE: 01-28-1998
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)	Speed: 38.25 MPH 61.6 KPH
Minimum = -8.29 G'S at 4 msec	Maximum = 8.31 G'S at 37 msec

VEHICLE CG Z ACCELERATION



TIME (SECONDS)

0.19
0.18
0.17
0.16
0.15
0.14
0.13
0.12
0.11
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02

NGA Research
02-09-1998 16:14

TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

Speed: 38.25 MPH 61.6 KPH

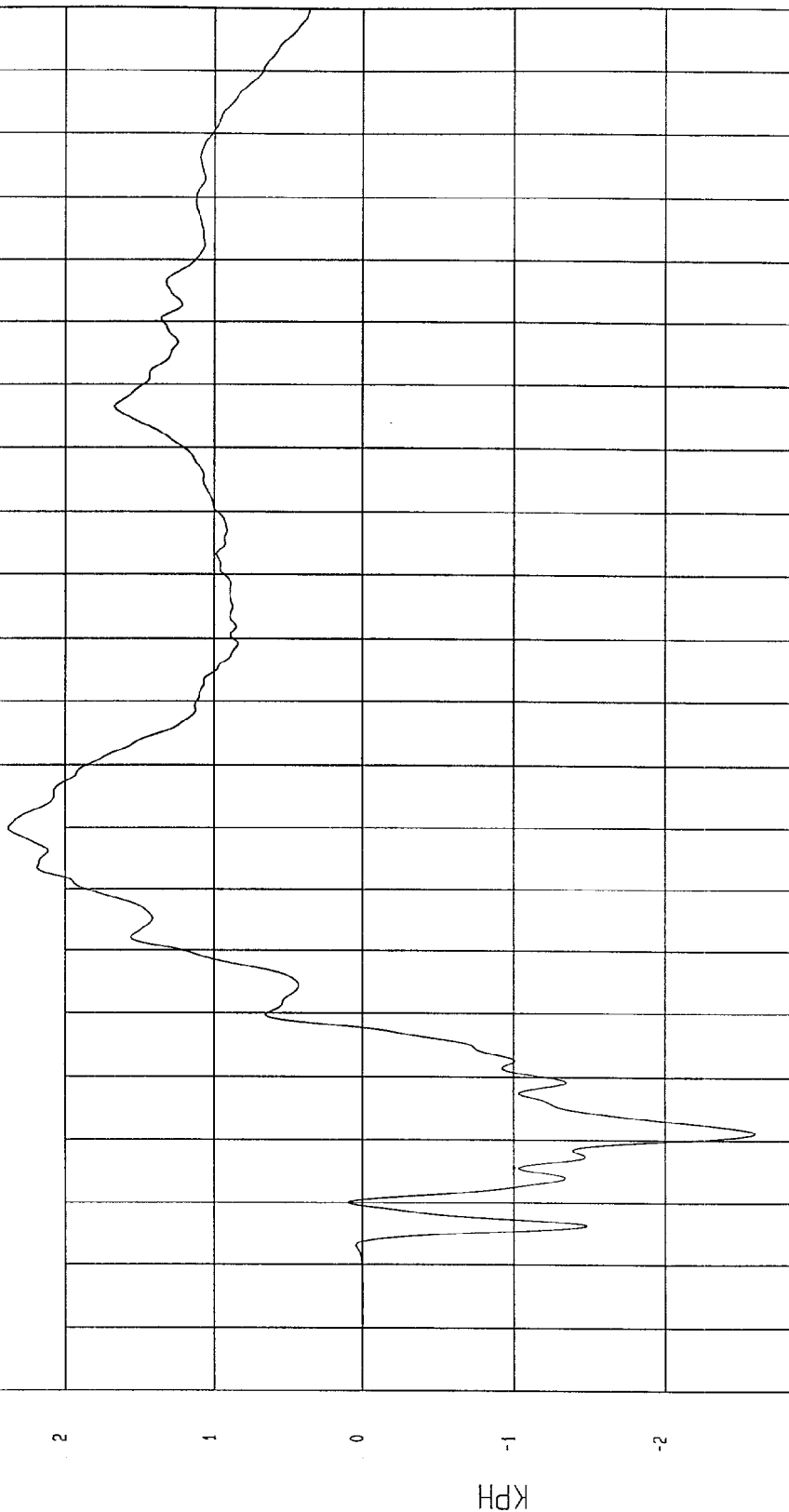
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

Minimum = -2.60 KPH at 21 msec

Maximum = 2.37 KPH at 70 msec

VEHICLE CG Z VELOCITY

1 ——— B98C10A1.V60 Filterclass (180)



TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

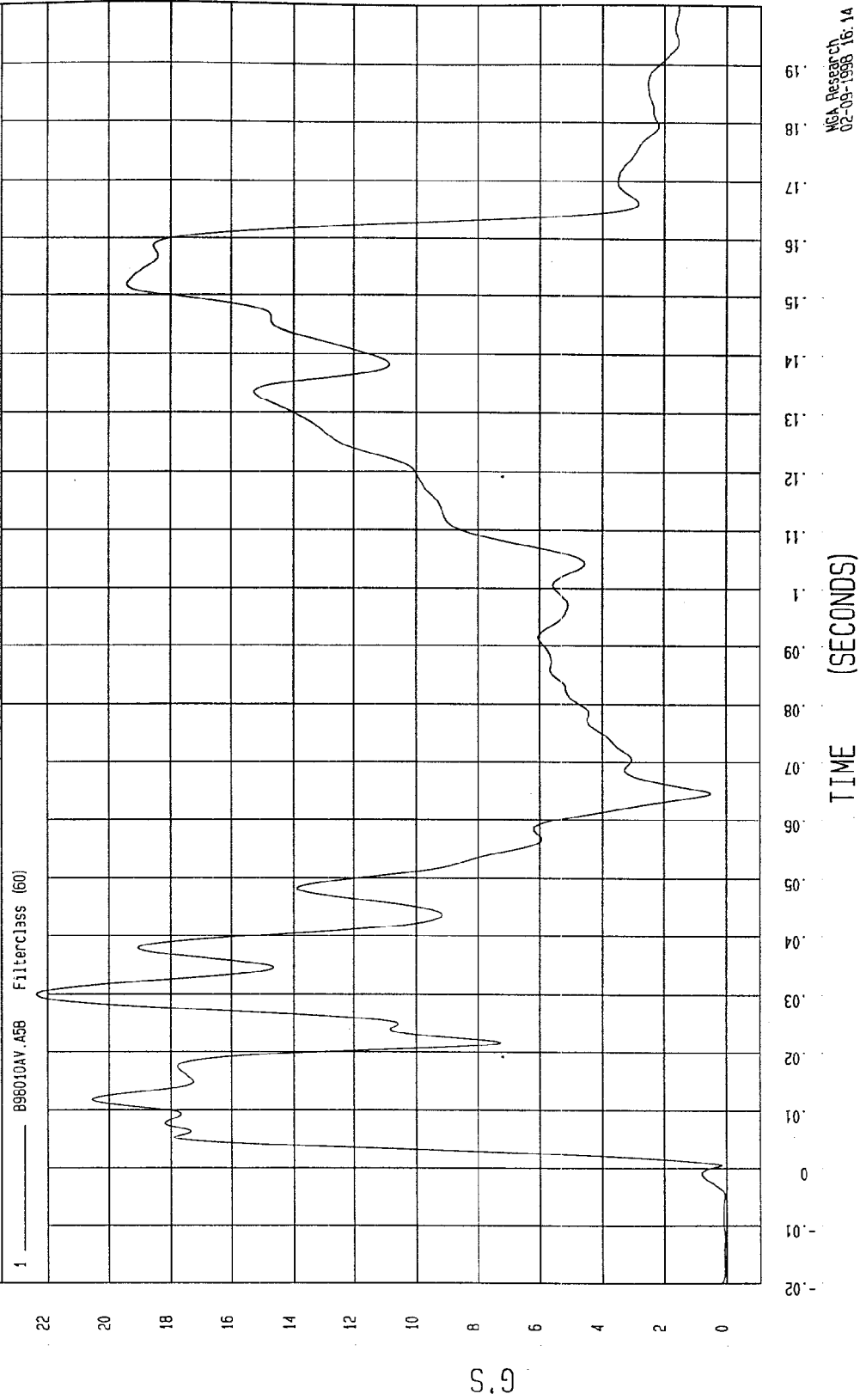
Speed: 38.25 MPH 61.6 KPH

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

Maximum = 22.35 G's at 30 msec

Minimum = 3.16E-02 G's at -12 msec

VEHICLE CG RESULTANT ACCELERATION



TEST DATE: 01-28-1998

TEST: NCAP SIDE IMPACT TEST

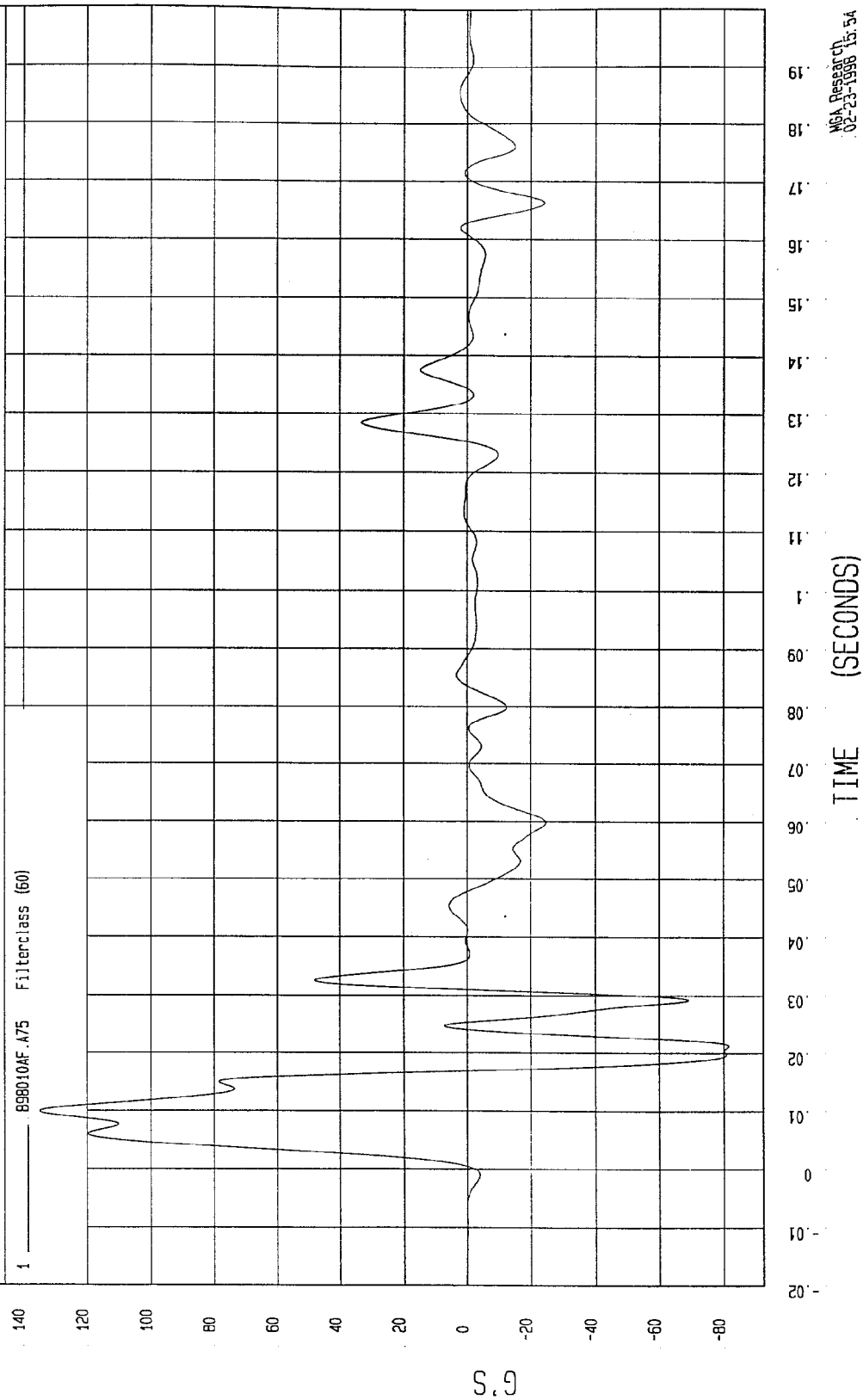
Speed: 38.25 MPH 61.6 KPH

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

Maximum = 135.03 G'S at 10 msec

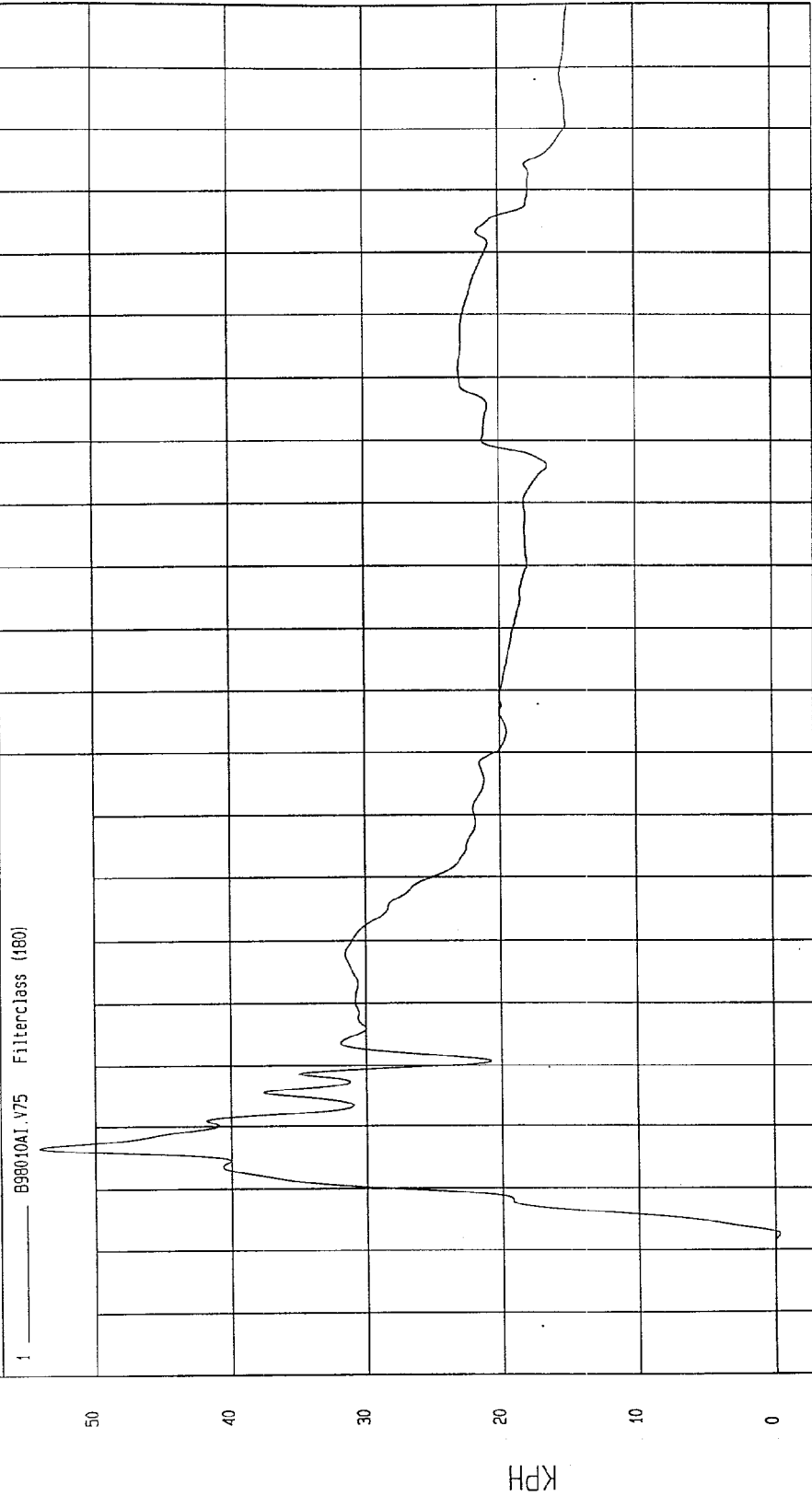
Minimum = -81.63 C'S at 21 msec

LEFT FRONT DOOR MIDREAR Y ACCELERATION



TEST: NCAP SIDE IMPACT TEST	TEST DATE: 01-28-1998
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)	Speed: 38.25 MPH 61.6 KPH
Minimum = -34 KPH at 2 msec	Maximum = 54.16 KPH at 17 msec

LEFT FRONT DOOR MIDREAR Y VELOCITY



TIME Seconds

0.02 0.01 0 10 20 30 40 50

0.19 0.18 0.17 0.16 0.15 0.14 0.13 0.12 0.11 0.1 0.09 0.08 0.07 0.06 0.05 0.04 0.03 0.02 0.01 0 -0.01 -0.02

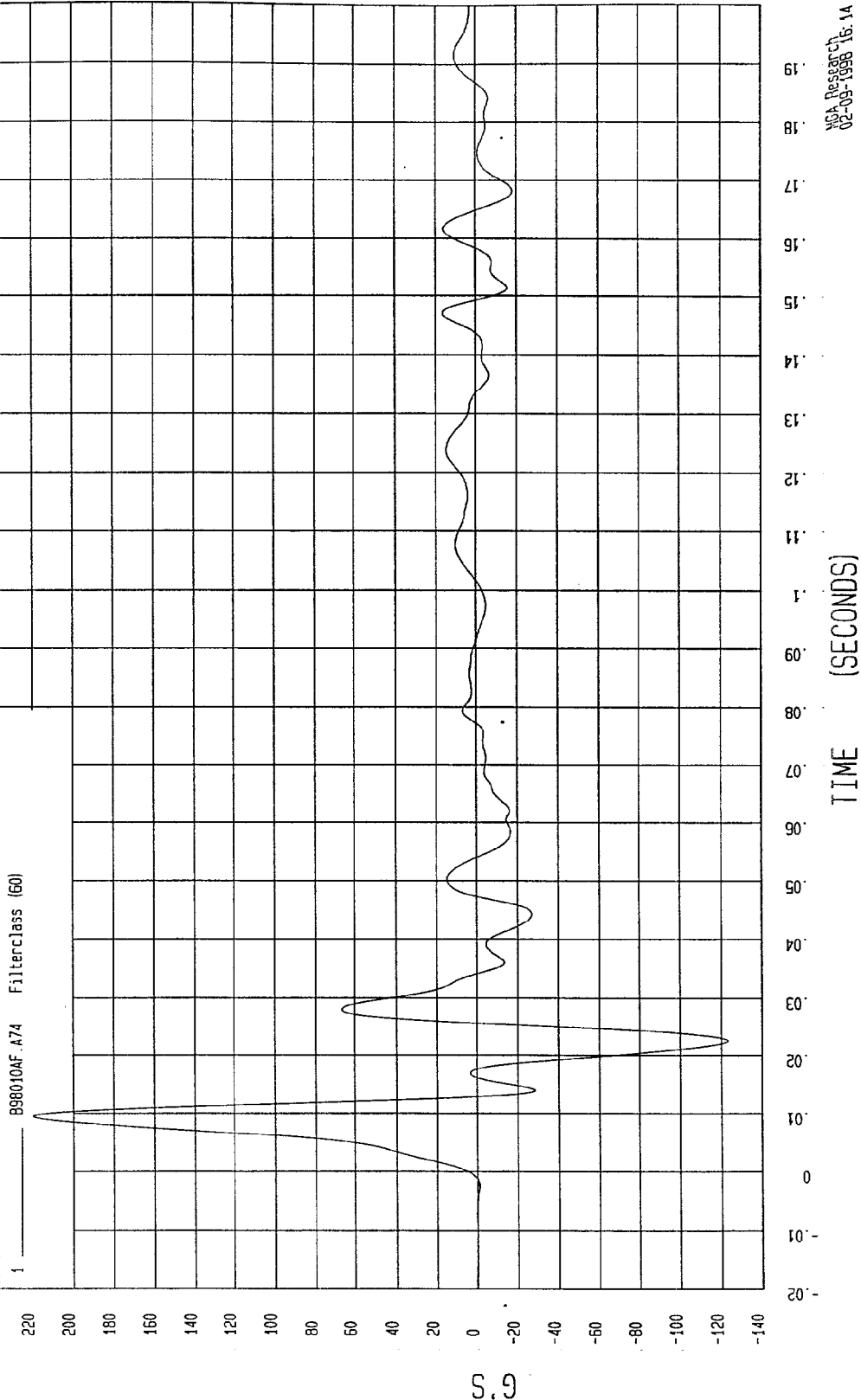
WGA Research
02-23-1998 15:54

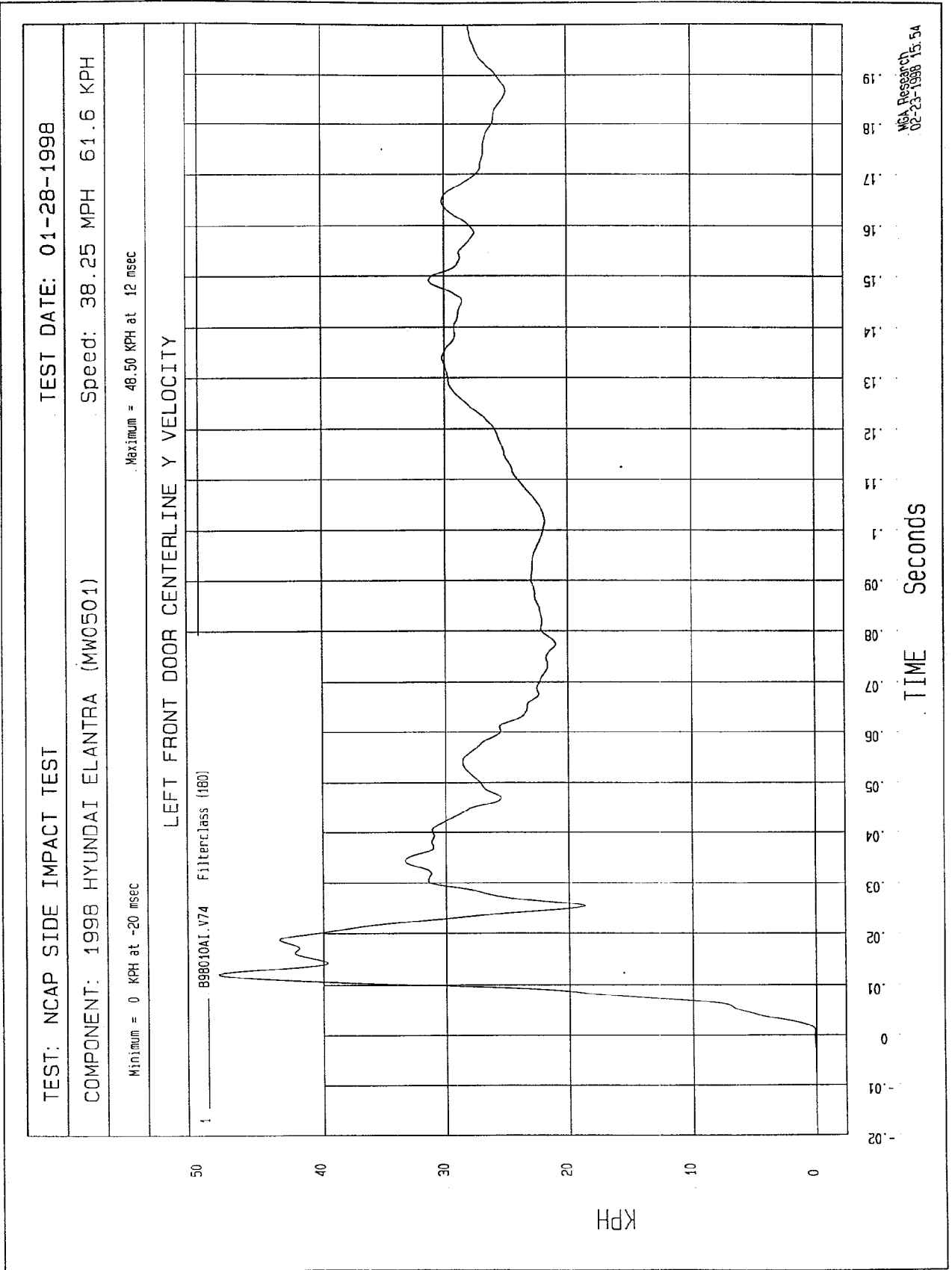
TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -123.08 G'S at 22 msec Maximum = 219.74 G'S at 10 msec

LEFT FRONT DOOR CENTERLINE Y ACCELERATION



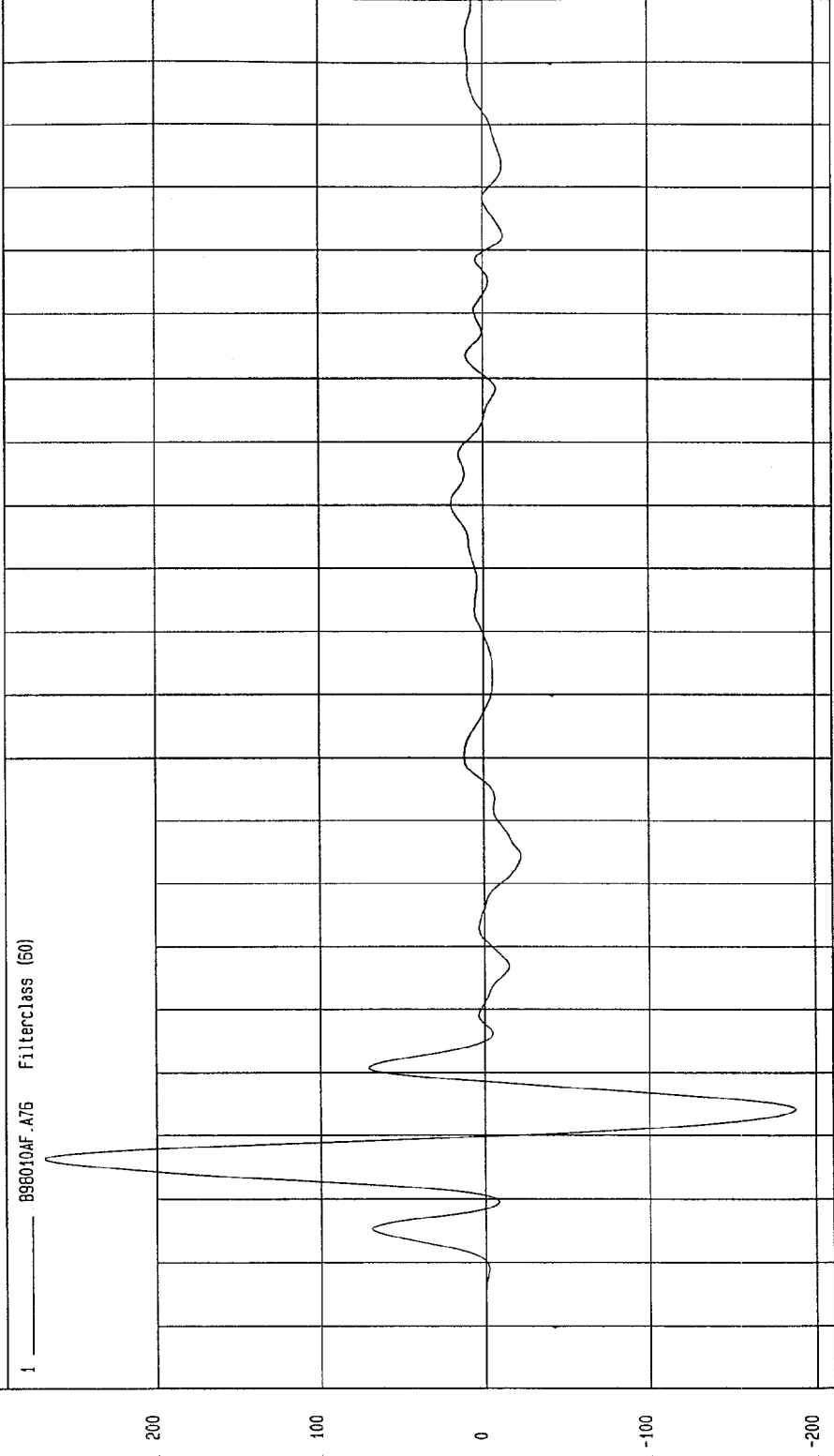


TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -187.75 G'S at 24 msec Maximum = 267.95 G'S at 16 msec

LEFT FRONT DOOR UPPER CENTERLINE Y ACCELERATION



TIME (SECONDS)

MCA Research
02-09-1998 16:14

TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = 0 KPH at -20 msec Maximum = 61.42 KPH at 19 msec

LEFT FRONT DOOR UPPER CENTERLINE Y VELOCITY

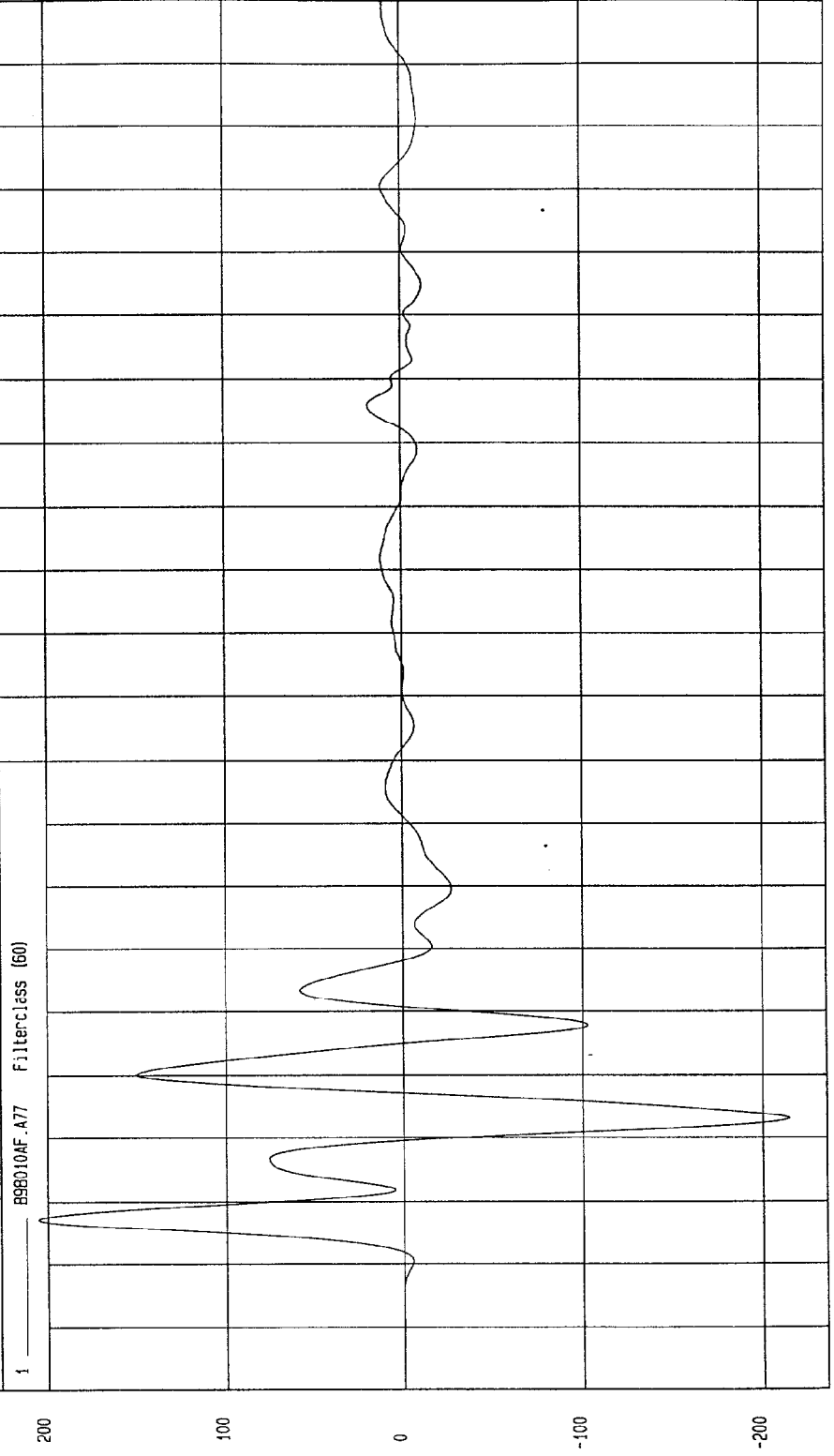


TIME Seconds

NSA Research
02-23-1998 15:55

TEST: NCAP SIDE IMPACT TEST	TEST DATE: 01-28-1998
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)	Speed: 38.25 MPH 61.6 KPH
Minimum = -214.38 G'S at 23 msec	
Maximum = 205.06 G'S at 7 msec	

LEFT REAR DOOR MIDREAR Y ACCELERATION



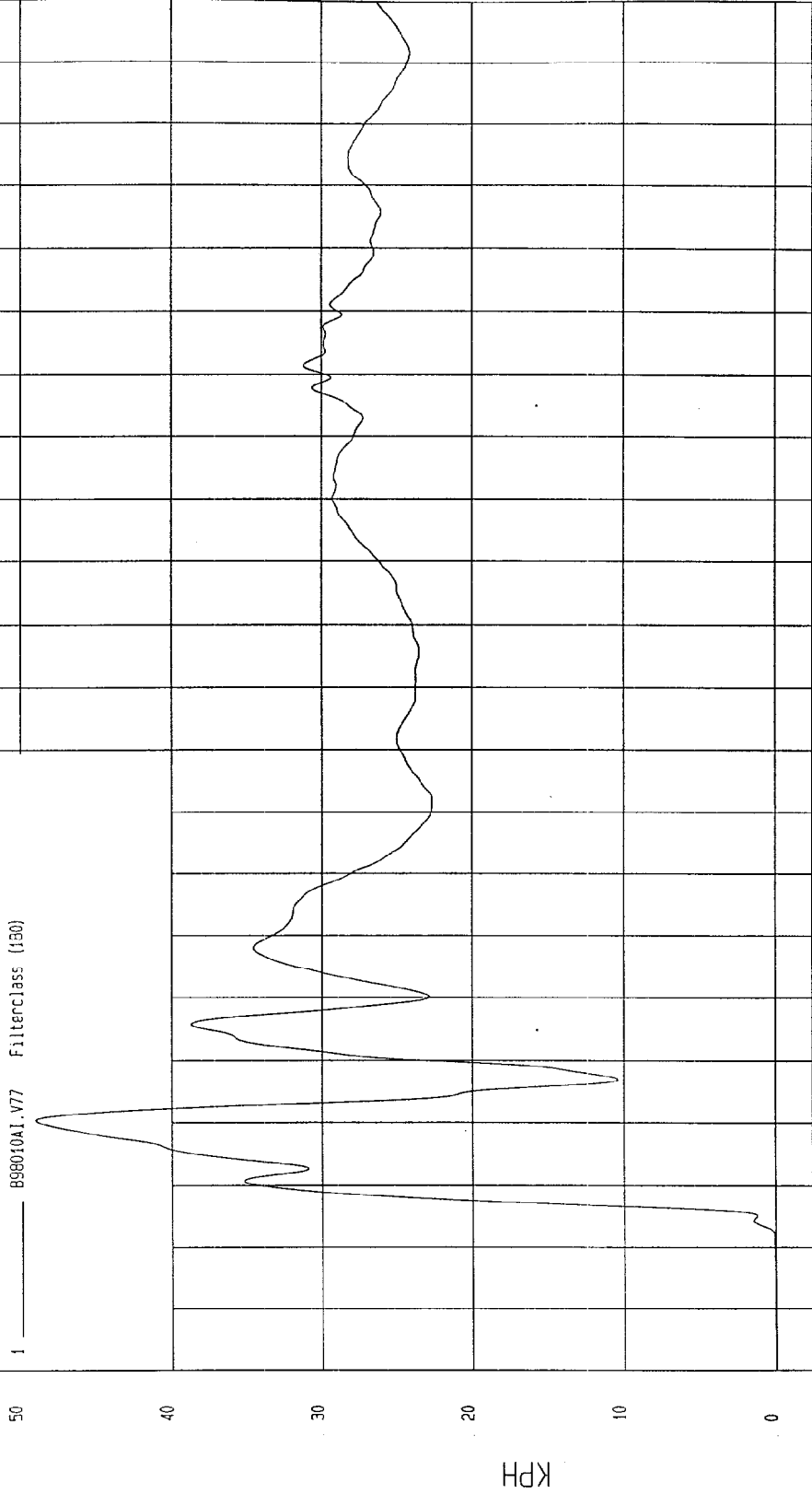
TIME (SECONDS)

MCA Research
02-09-1998 16.15

TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -1.10E-04 KPH at -20 msec Maximum = 49.08 KPH at 20 msec

LEFT REAR DOOR MIDREAR Y VELOCITY



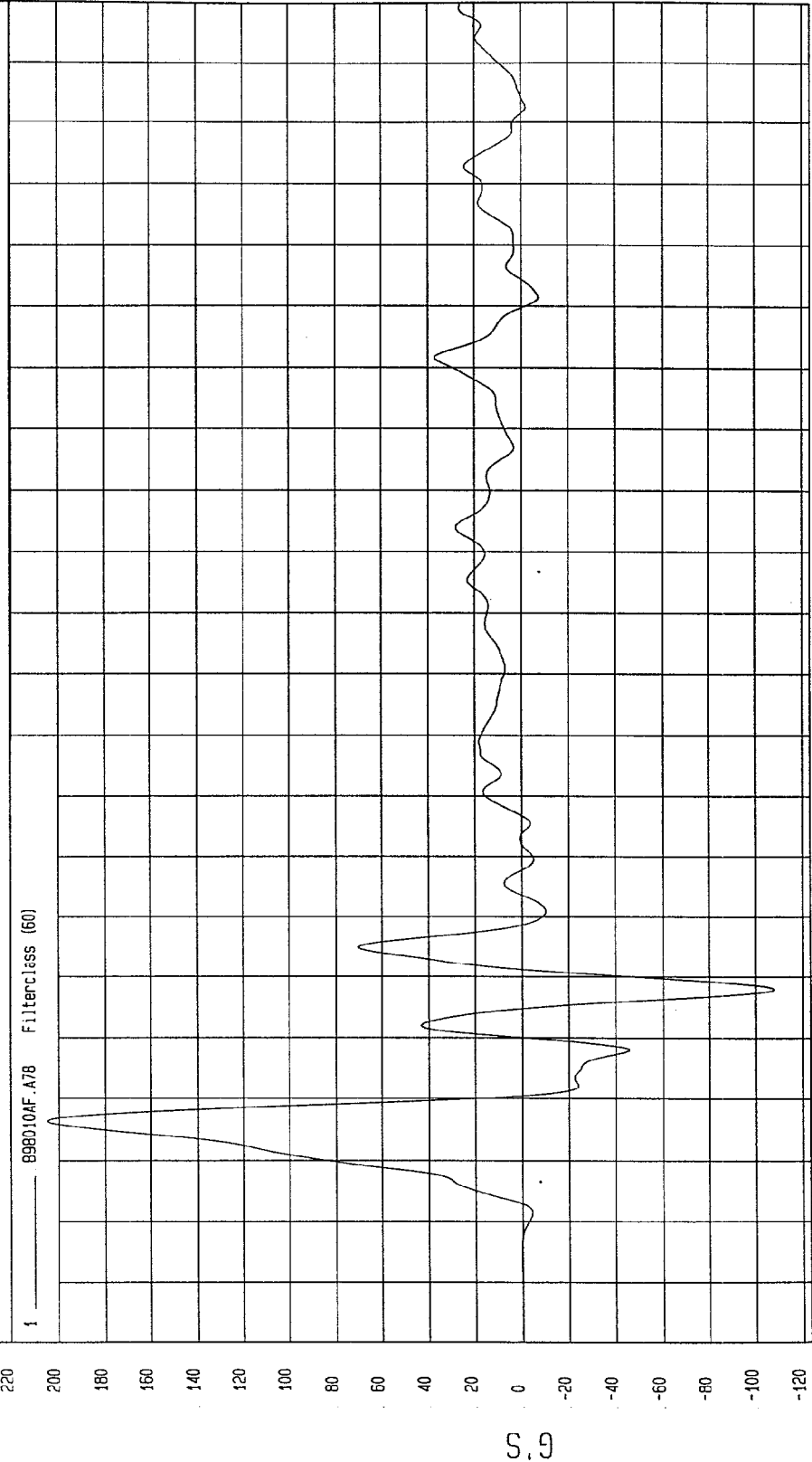
MOA Research
02-23-1998 15:55

TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -107.75 G'S at 38 msec Maximum = 204.77 G'S at 16 msec

LEFT REAR DOOR UPPER CENTERLINE Y ACCELERATION



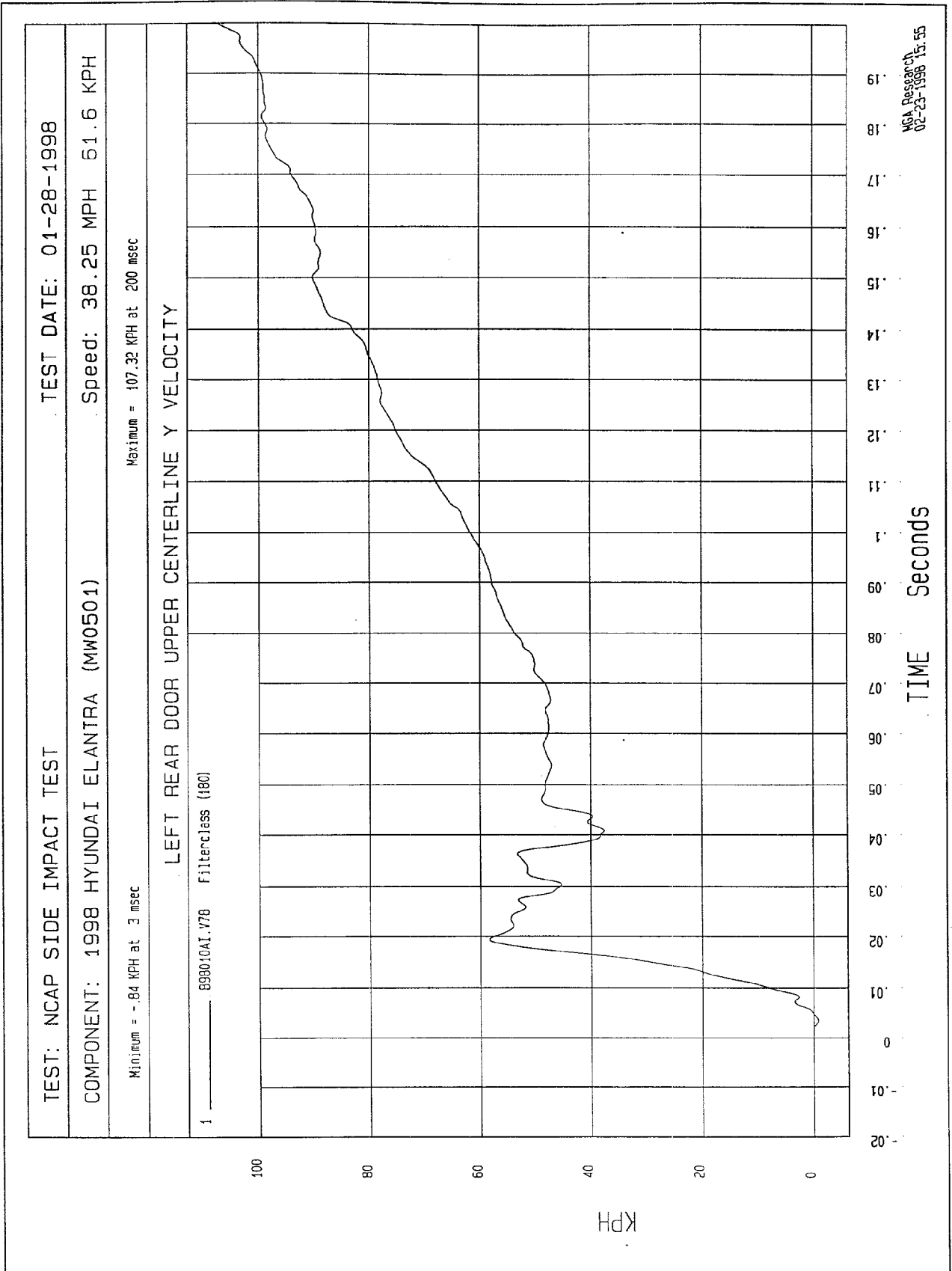
TIME (SECONDS)

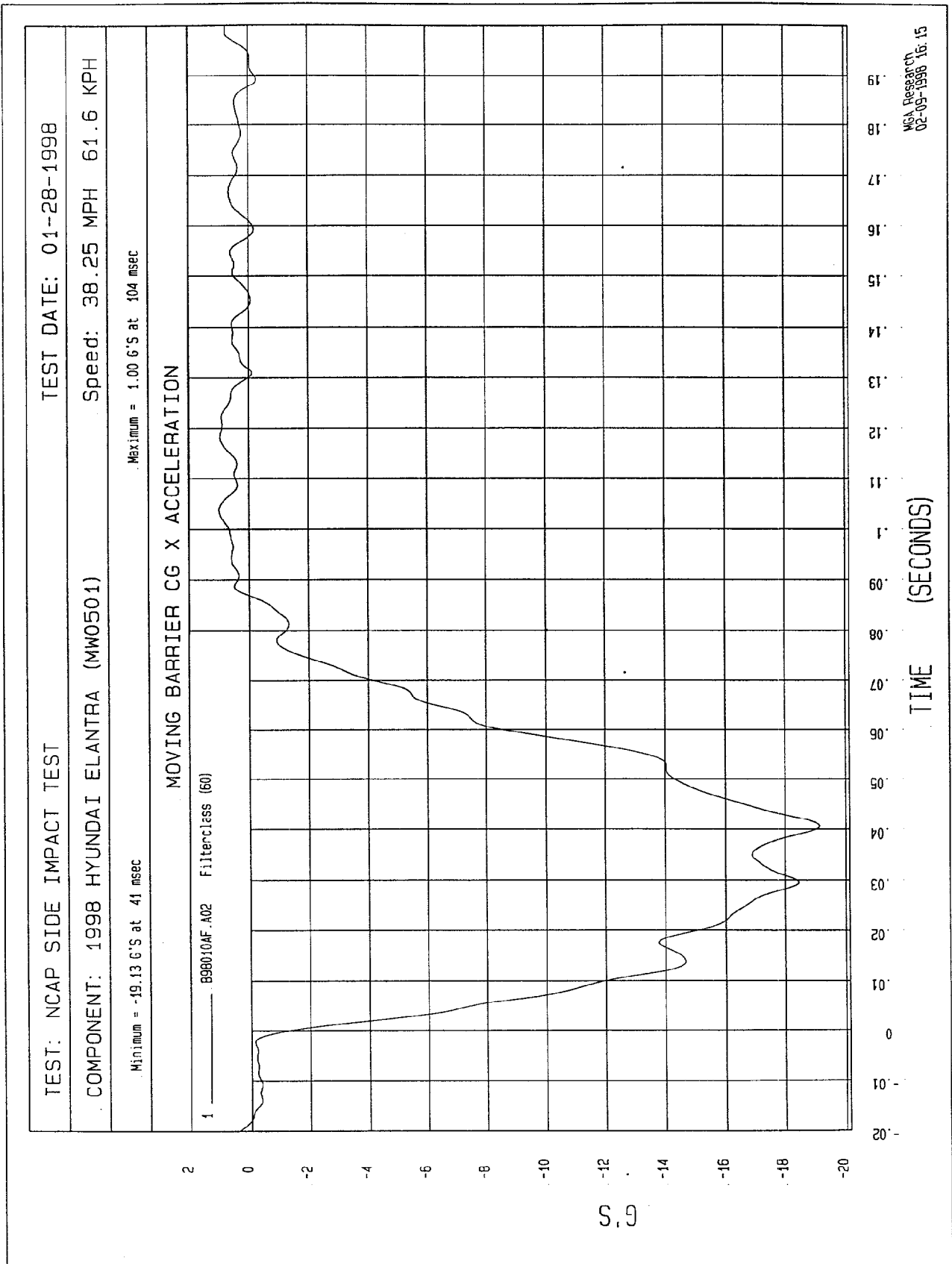
0.19 0.18 0.17 0.16 0.15 0.14 0.13 0.12 0.11 0.1 0.09 0.08 0.07 0.06 0.05 0.04 0.03 0.02 0.01 0 -0.01 -0.02

220 200 180 160 140 120 100 80 60 40 20 0 -20 -40 -60 -80 -100 -120

G

WCA Research
02-09-1998 16:45



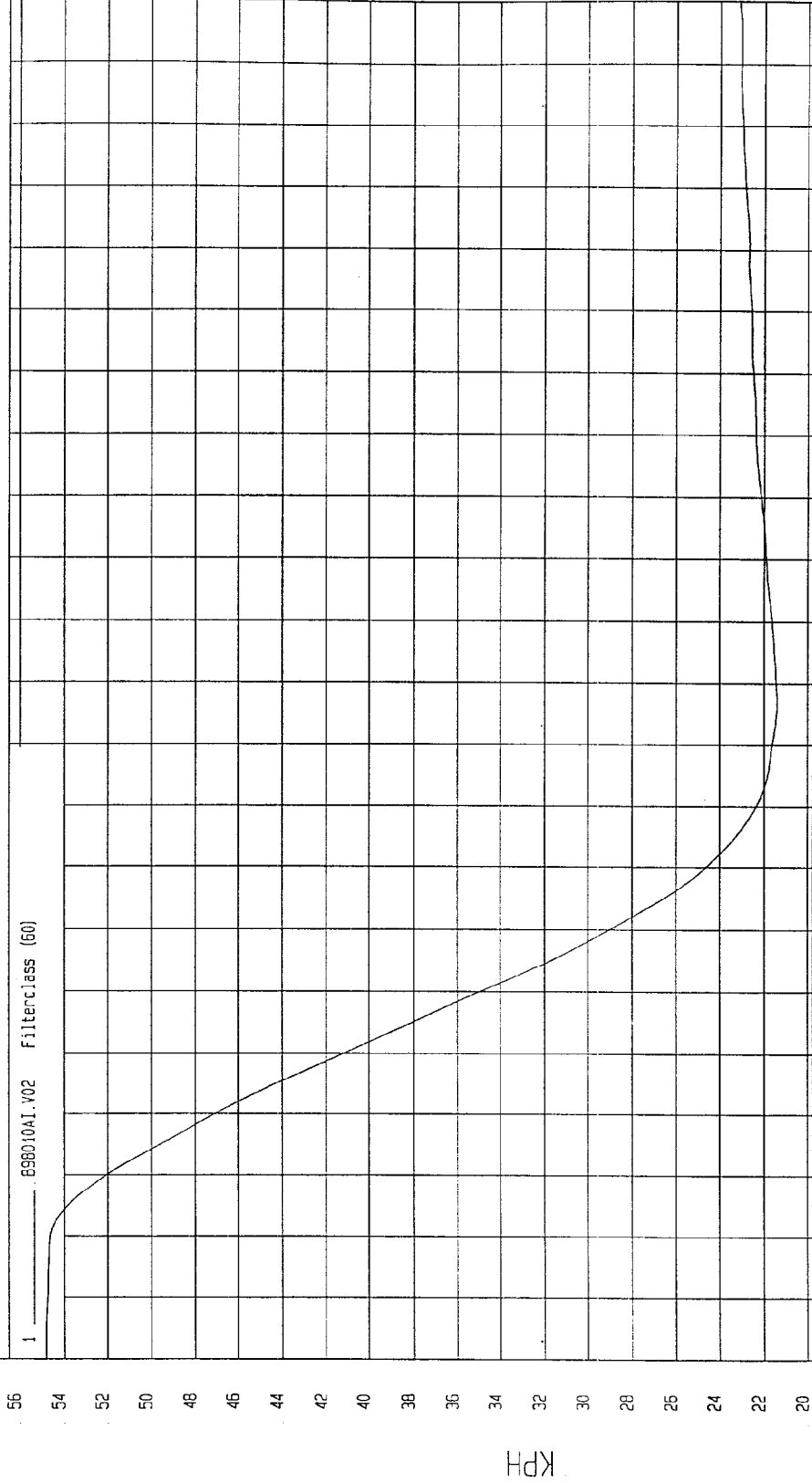


TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = 21.41 KPH at 87 msec Maximum = 54.61 KPH at -18 msec

MOVING BARRIER CG X VELOCITY



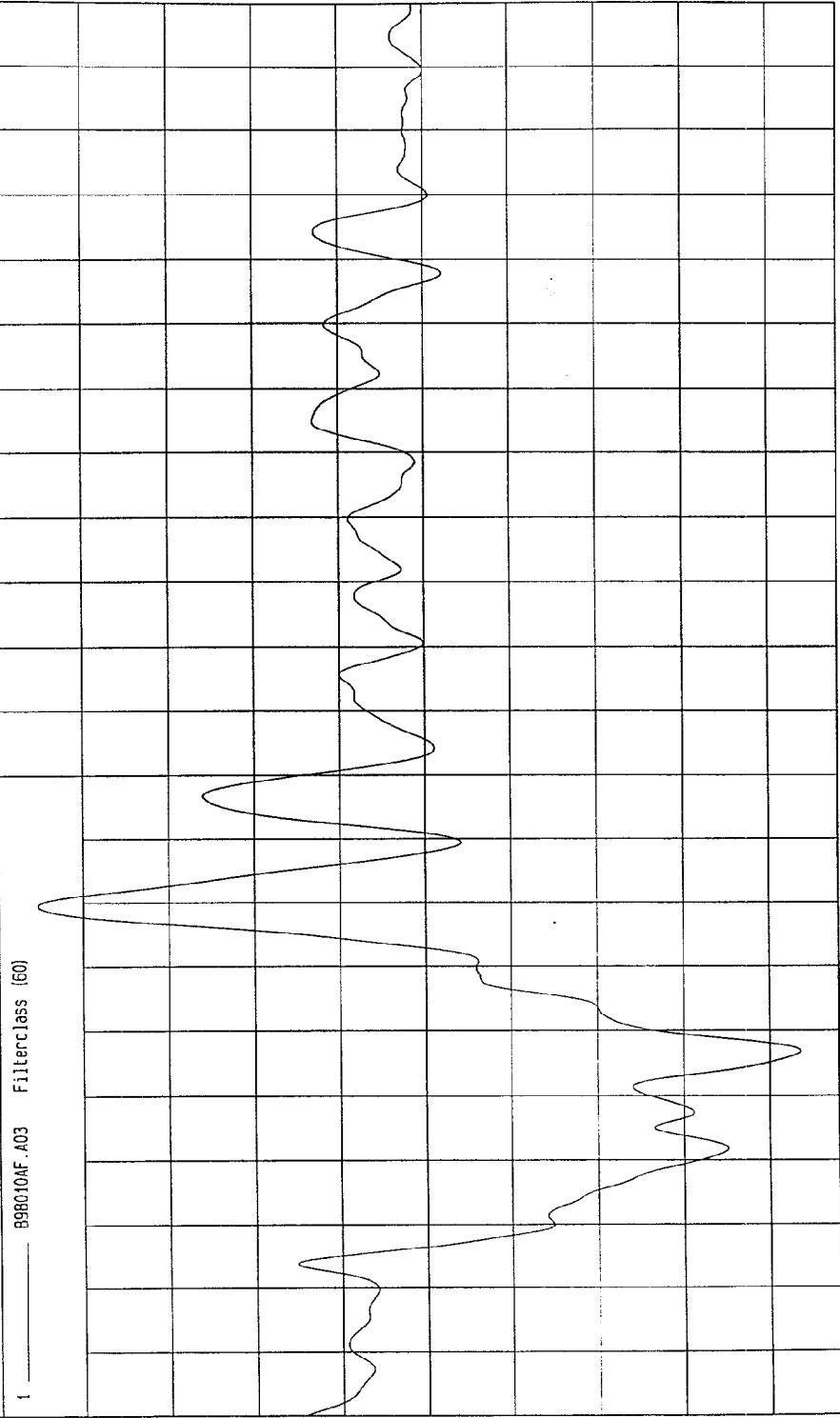
NGA Research
02-23-1998 15:55

TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -5.36 G'S at 37 msec Maximum = 3.52 G'S at 60 msec

MOVING BARRIER CG Y ACCELERATION



TIME (SECONDS)

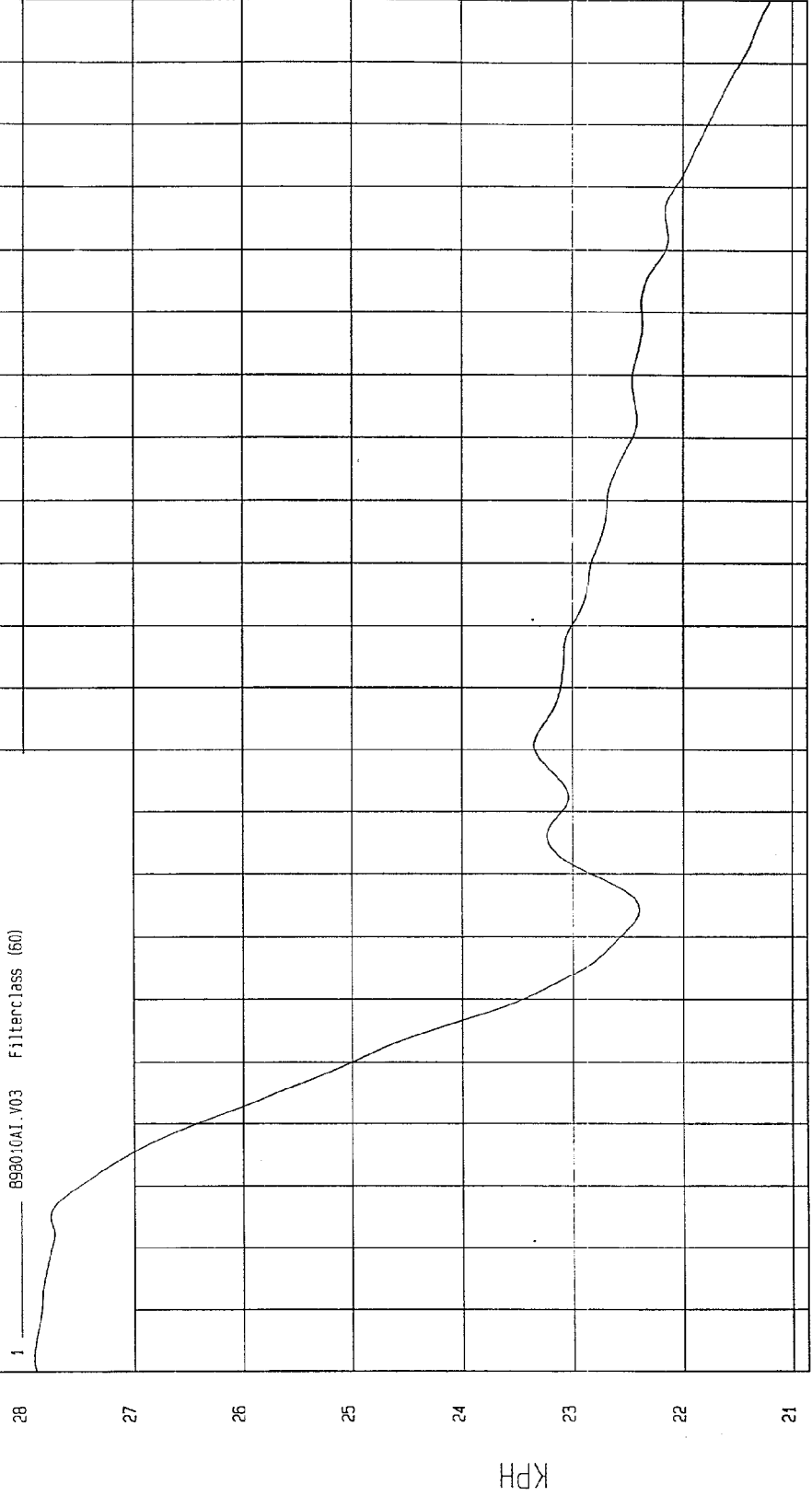
NGA Research
02-23-1998 15:56

TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = 21.20 KPH at 200 msec Maximum = 27.91 KPH at -18 msec

MOVING BARRIER CG Y VELOCITY

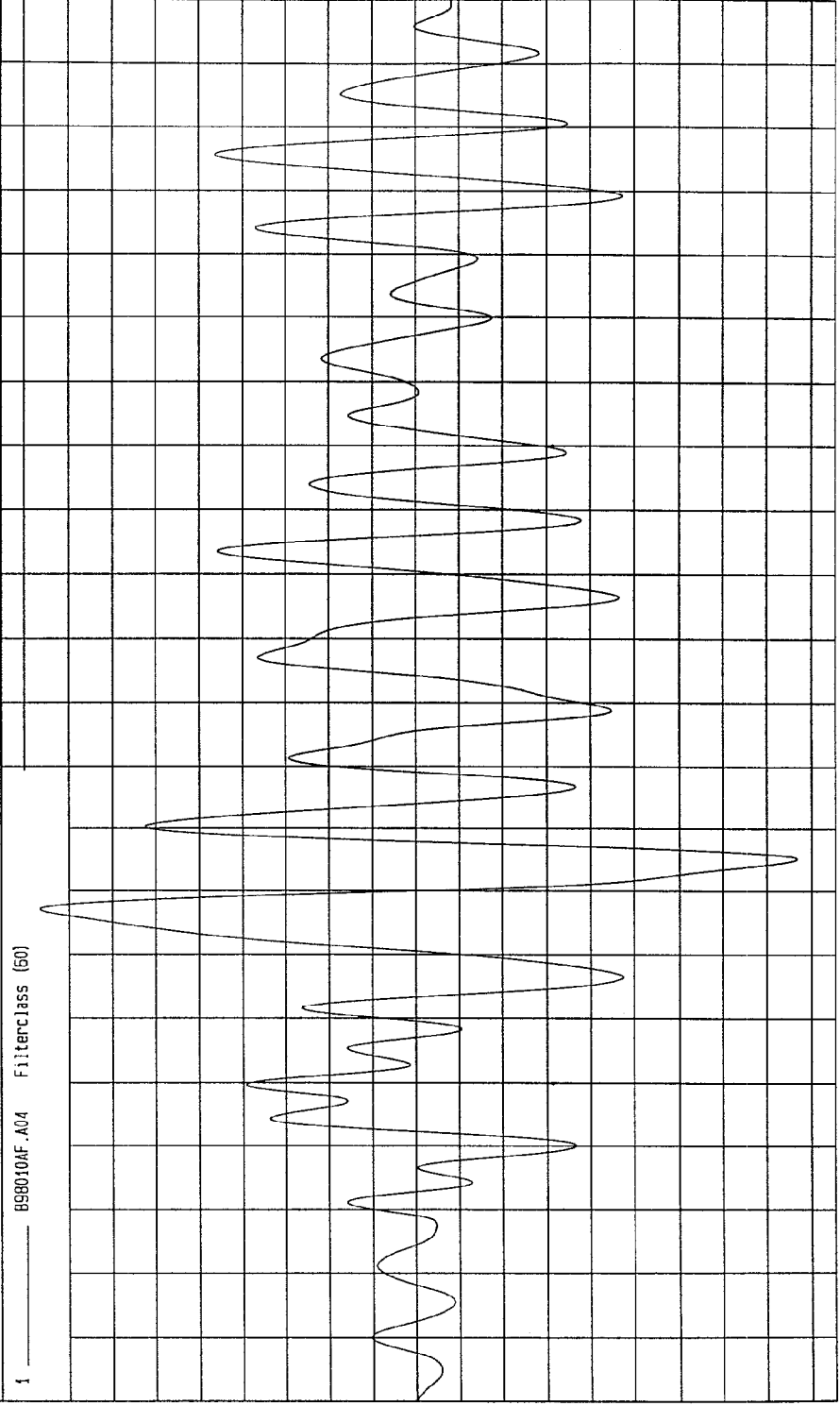


TIME Seconds

NGA Research
02-23-1998 15:56

TEST: NCAP SIDE IMPACT TEST	TEST DATE: 01-28-1998
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)	Speed: 38.25 MPH 61.6 KPH
Minimum = -17.35 G'S at 65 msec	Maximum = 17.31 G'S at 57 msec

MOVING BARRIER CG Z ACCELERATION



TIME (SECONDS)

19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
-12
-13
-14
-15
-16
-17
-18

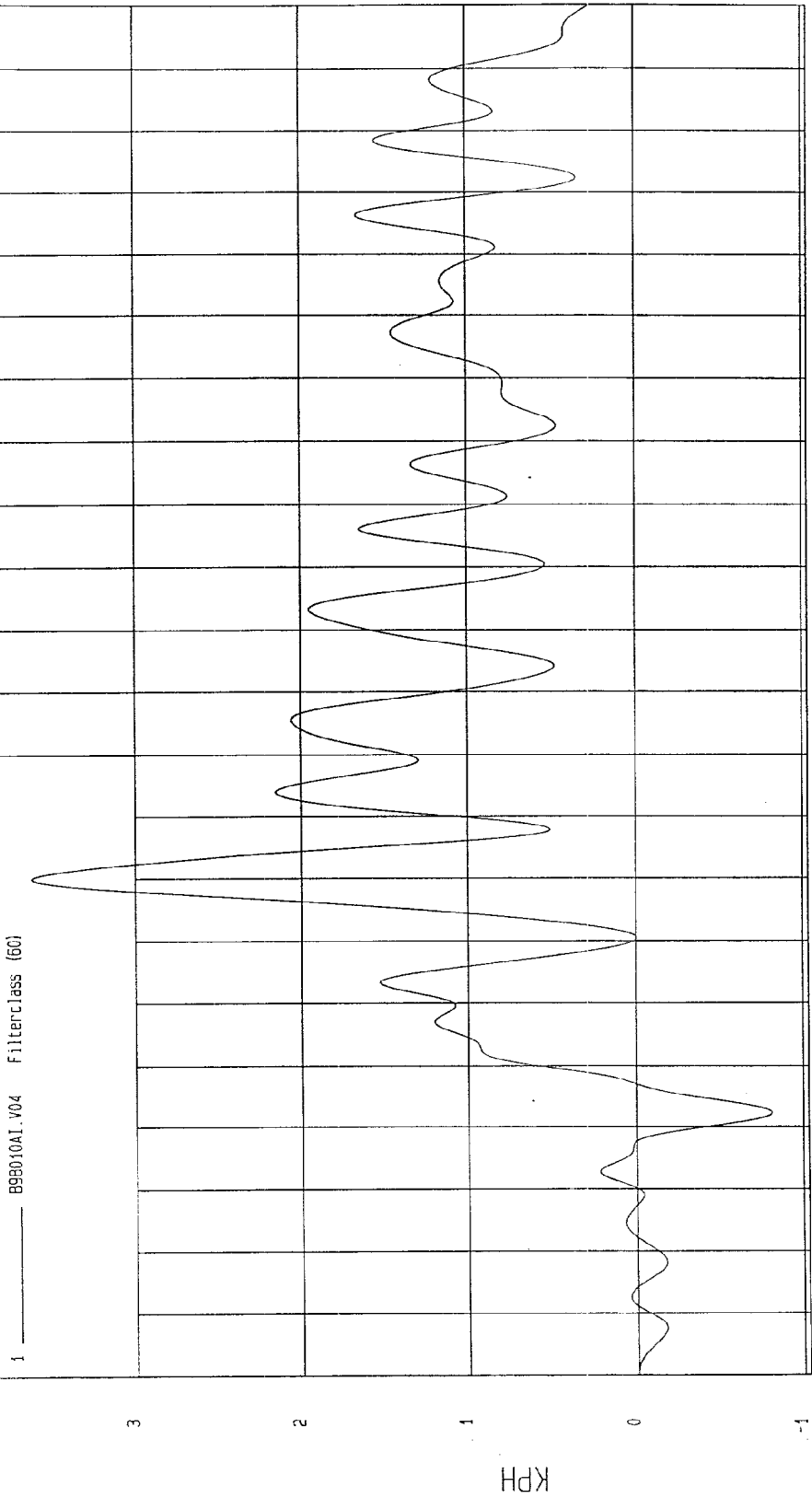
0.19
0.18
0.17
0.16
0.15
0.14
0.13
0.12
0.11
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02

MECA Research
02-09-1998 16.15

G.S

TEST: NCAP SIDE IMPACT TEST	TEST DATE: 01-28-1998
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)	Speed: 38.25 MPH 61.6 KPH
Minimum = -80 KPH at 22 msec	Maximum = 3.62 KPH at 60 msec

MOVING BARRIER CG Z VELOCITY



TIME Seconds

0.19
0.18
0.17
0.16
0.15
0.14
0.13
0.12
0.11
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02

NSA Research
02-23-1998 15:56

TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

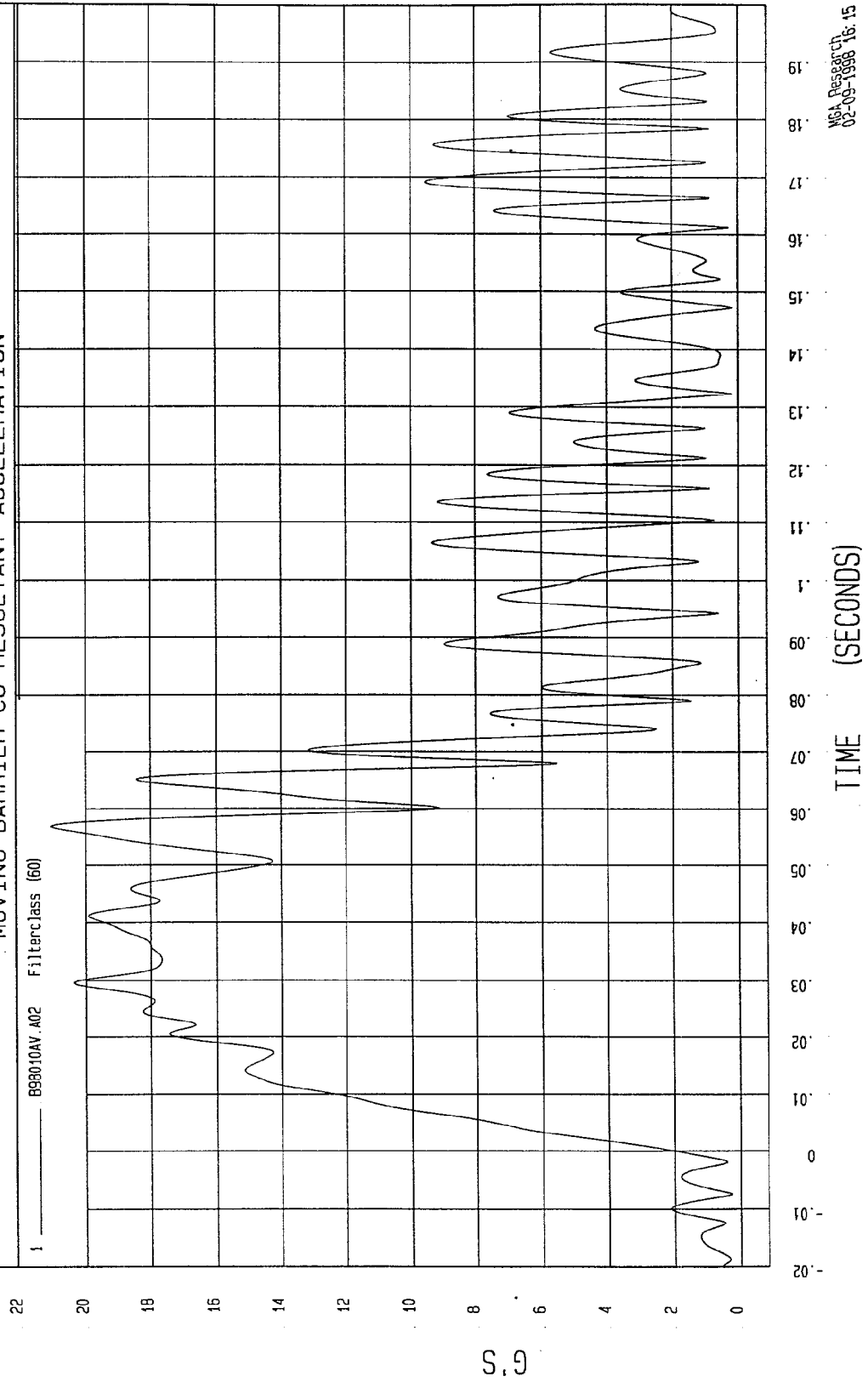
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

Speed: 38.25 MPH 61.6 KPH

Minimum = .18 G'S at 147 msec

Maximum = 21.05 G'S at 57 msec

MOVING BARRIER CG RESULTANT ACCELERATION



TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

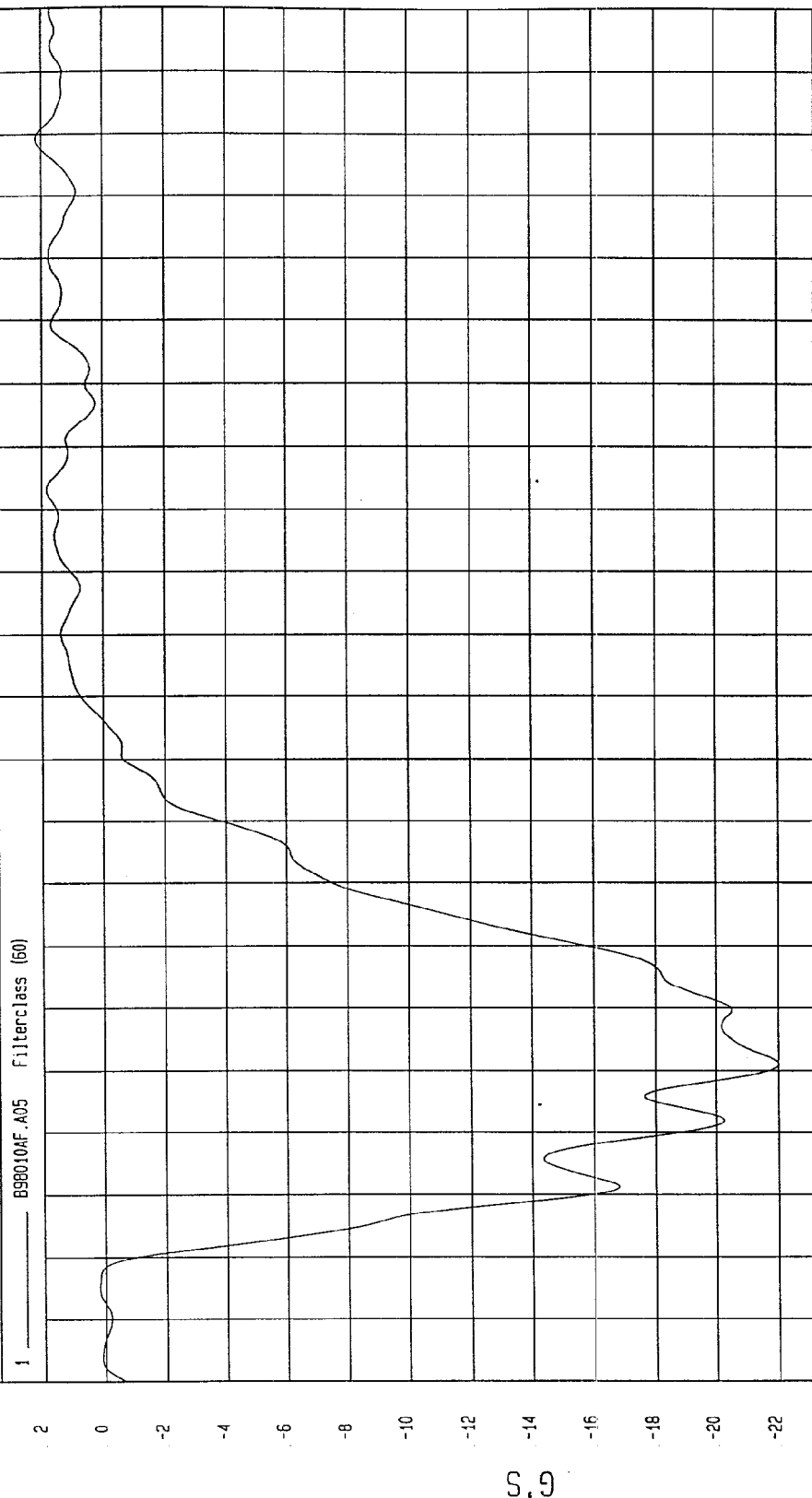
Speed: 38.25 MPH 61.6 KPH

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

Maximum = 2.18 G'S at 179 msec

Minimum = -22.00 G'S at 31 msec

MOVING BARRIER REAR AXLE X ACCELERATION



TIME (SECONDS)

NCA Research
02-09-1998 16:15

TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

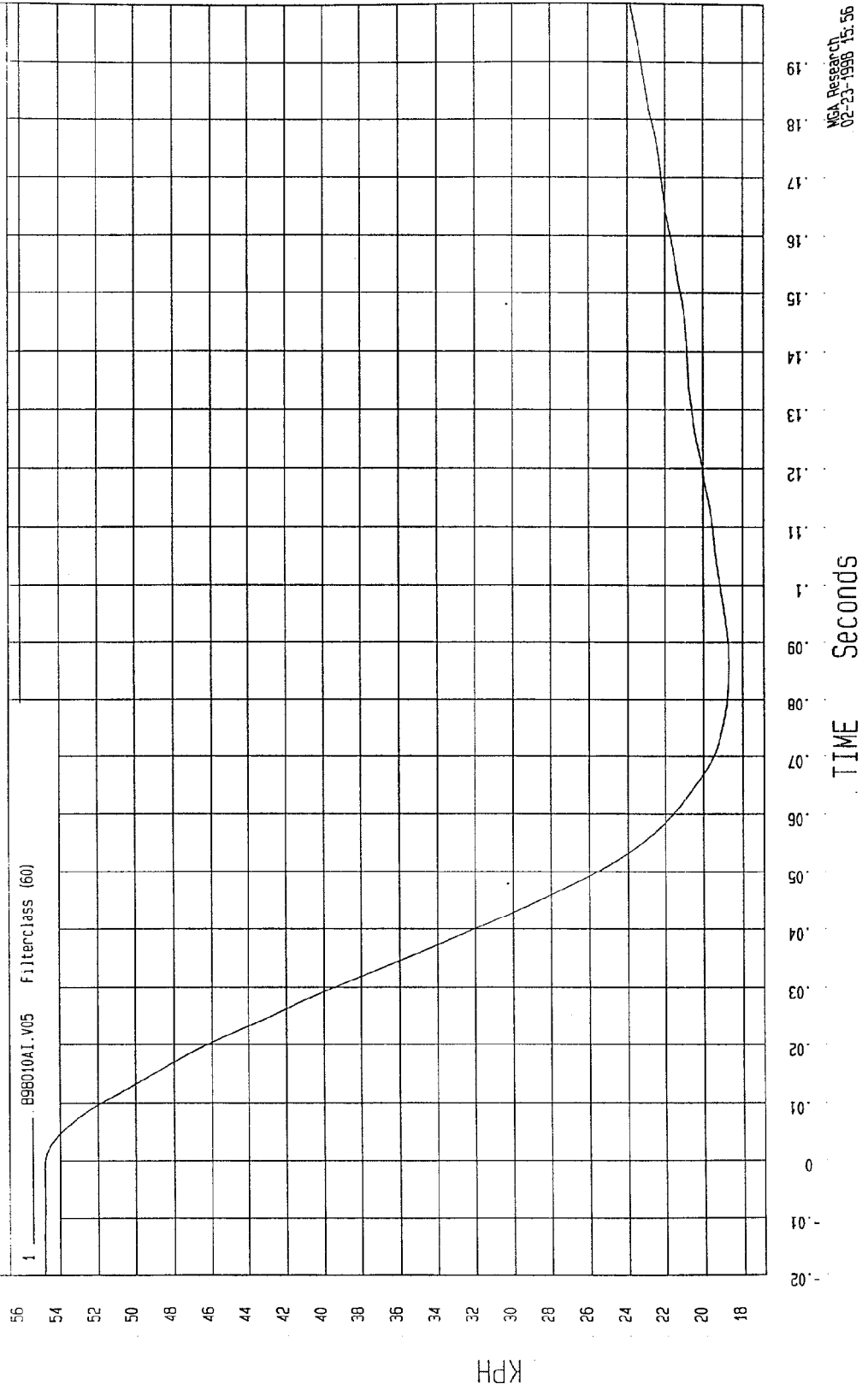
Speed: 38.25 MPH 61.6 KPH

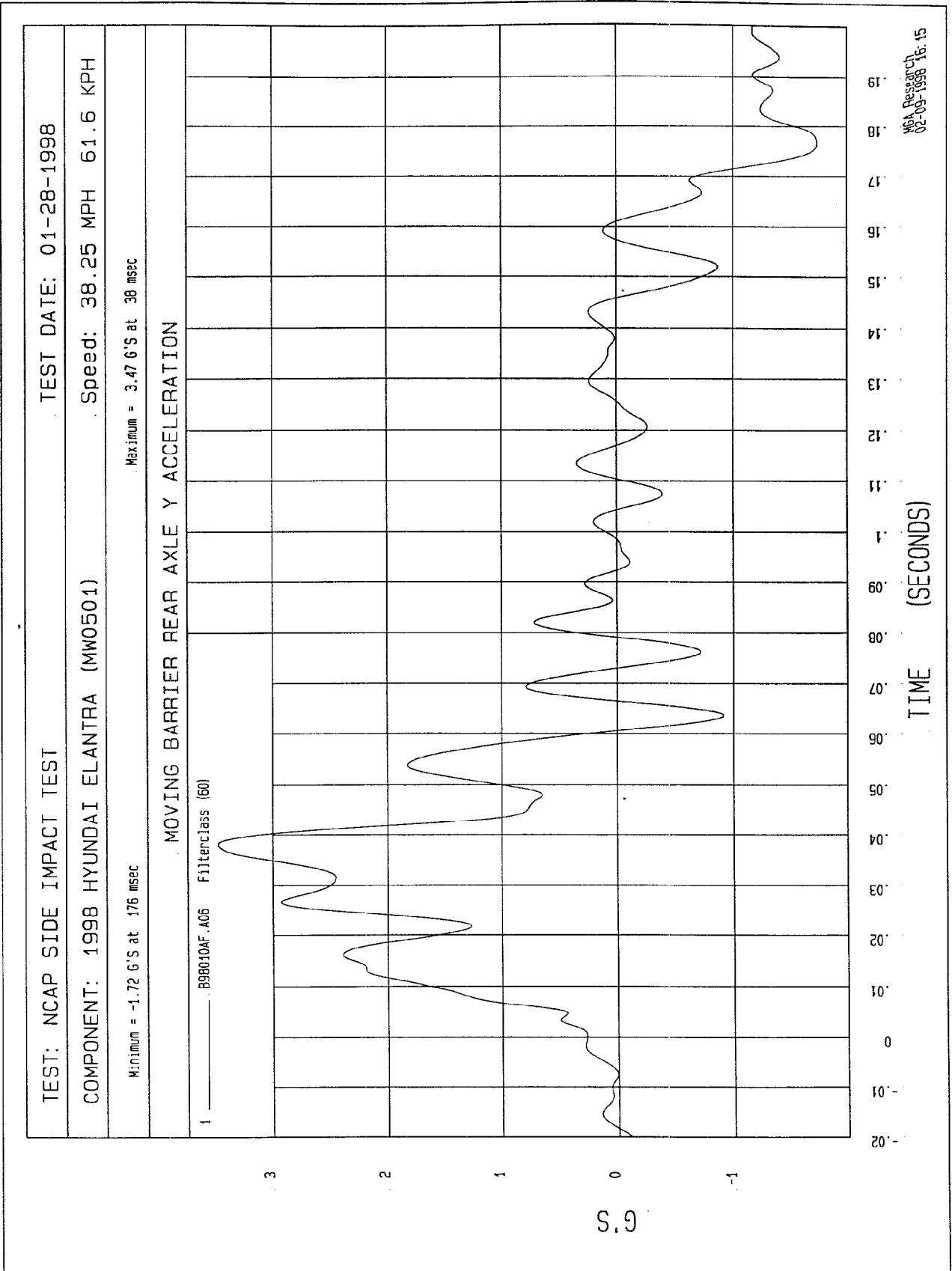
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

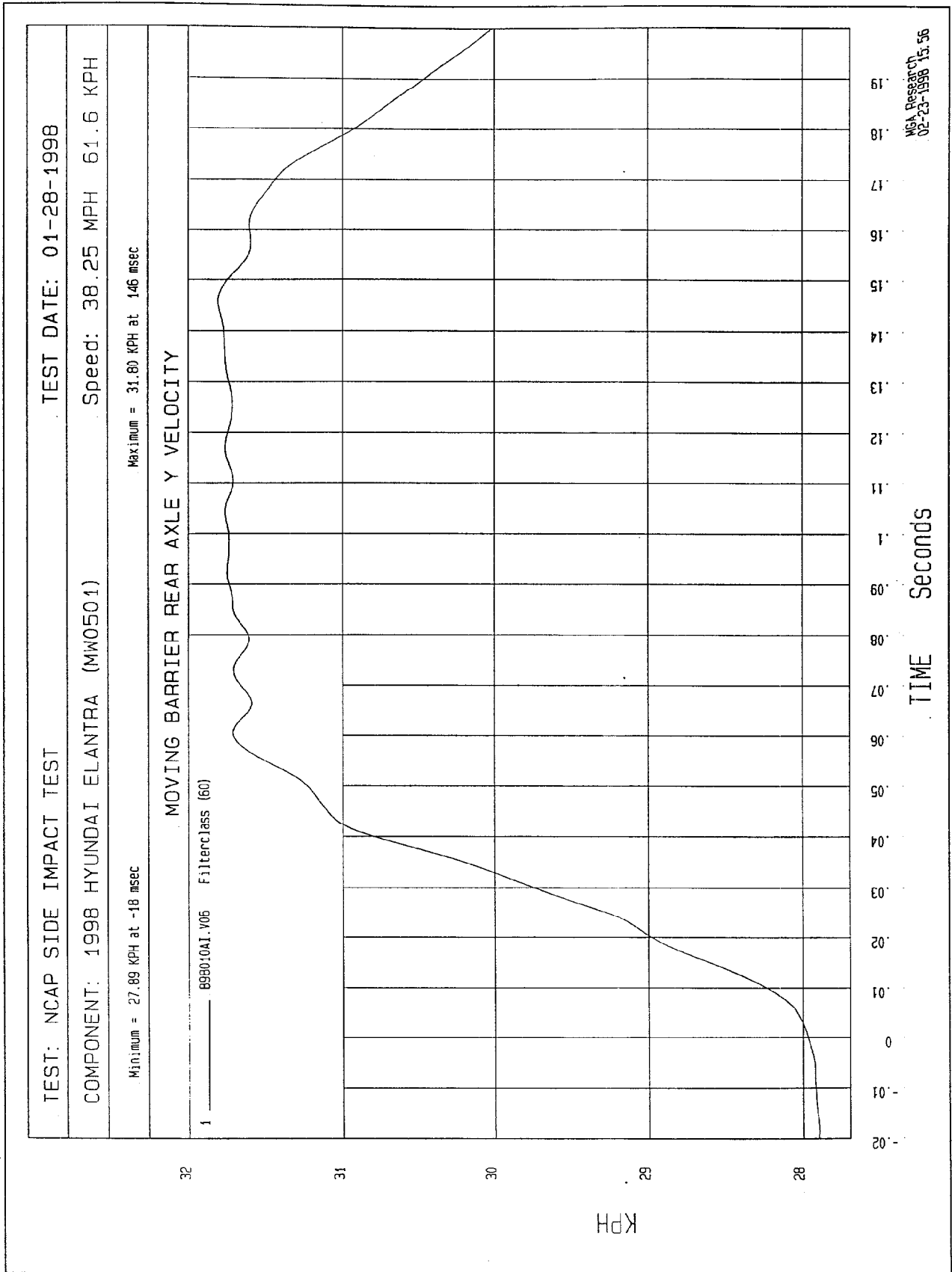
Maximum = 54.8 KPH at -20 msec

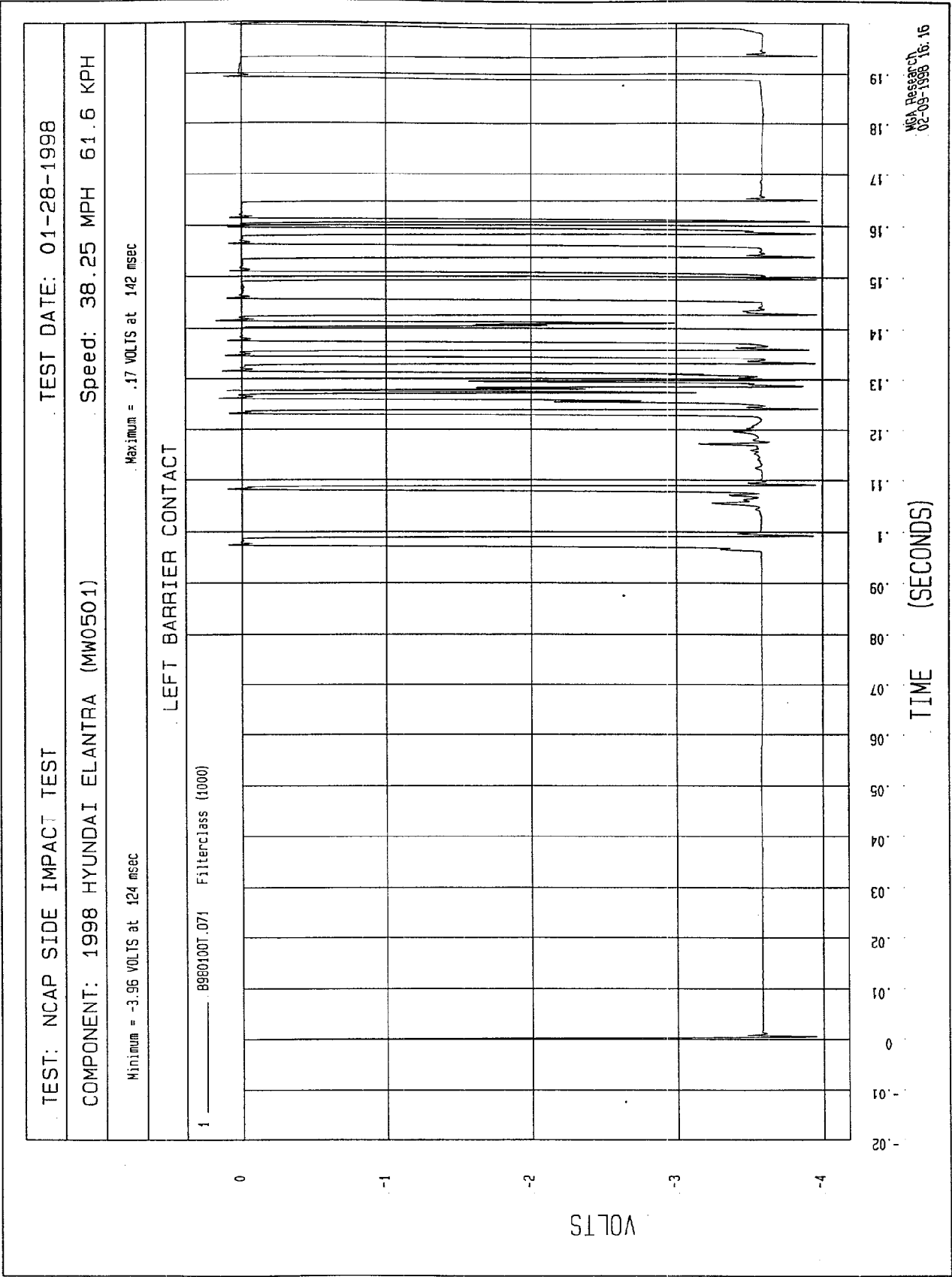
Minimum = 18.70 KPH at 86 msec

MOVING BARRIER REAR AXLE X VELOCITY







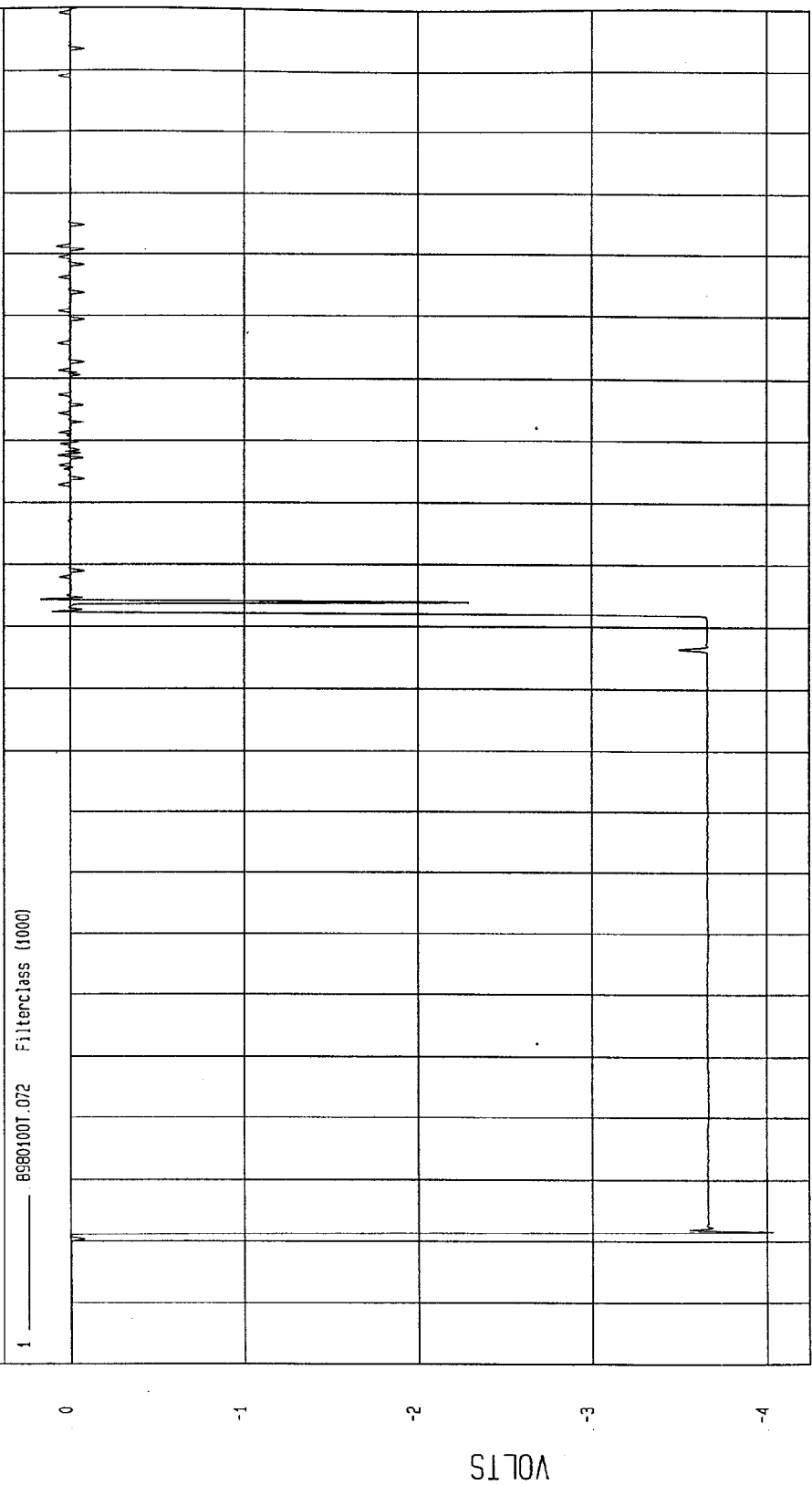


TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -4.03 VOLTS at 2 msec Maximum = .17 VOLTS at 104 msec

RIGHT BARRIER CONTACT



TIME (SECONDS)

0.19 0.18 0.17 0.16 0.15 0.14 0.13 0.12 0.11 0.10 0.09 0.08 0.07 0.06 0.05 0.04 0.03 0.02 0.01 0 -0.01 -0.02

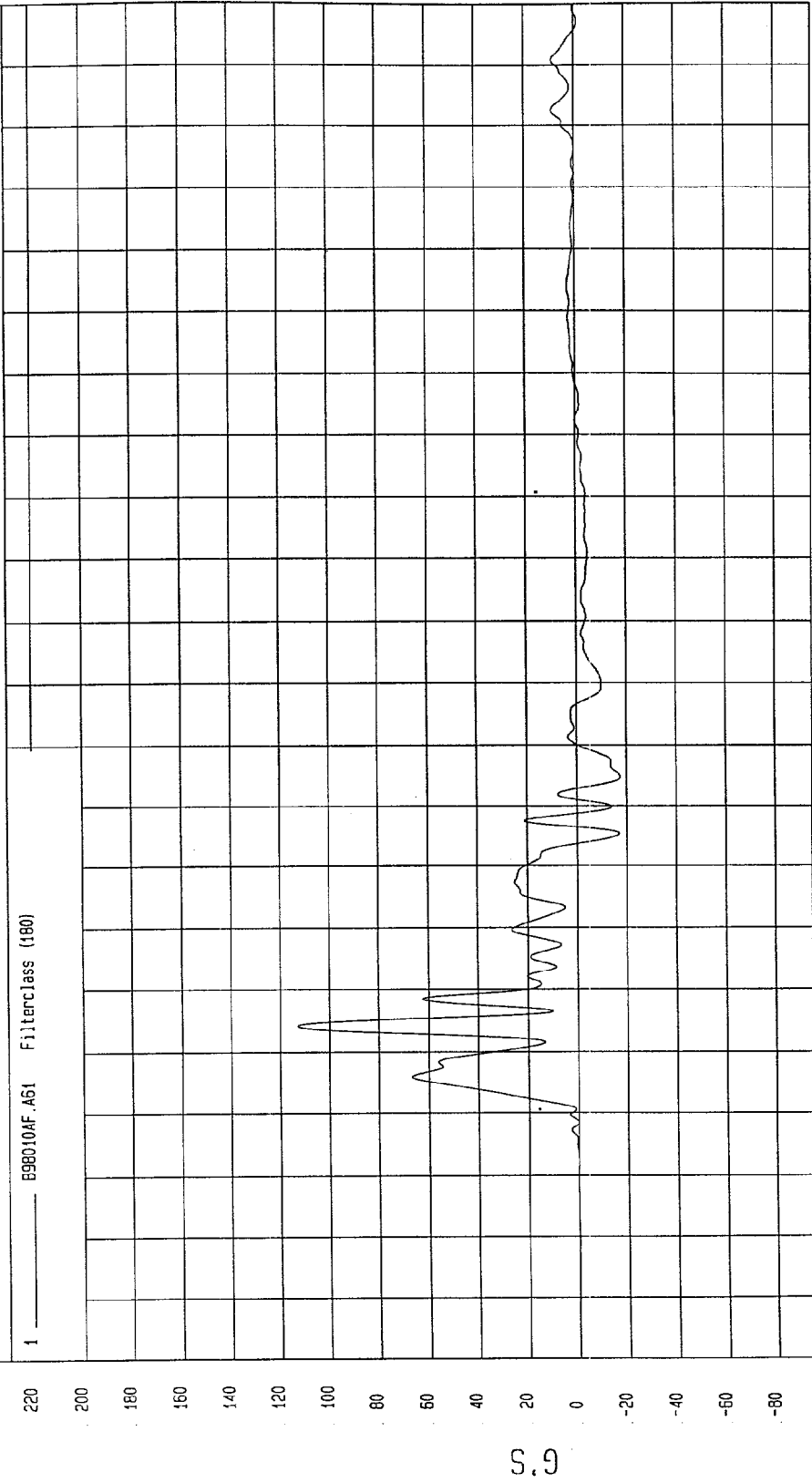
VCA Research
02-09-1998 16:16

TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -17.59 G'S at 75 msec Maximum = 112.96 G'S at 34 msec

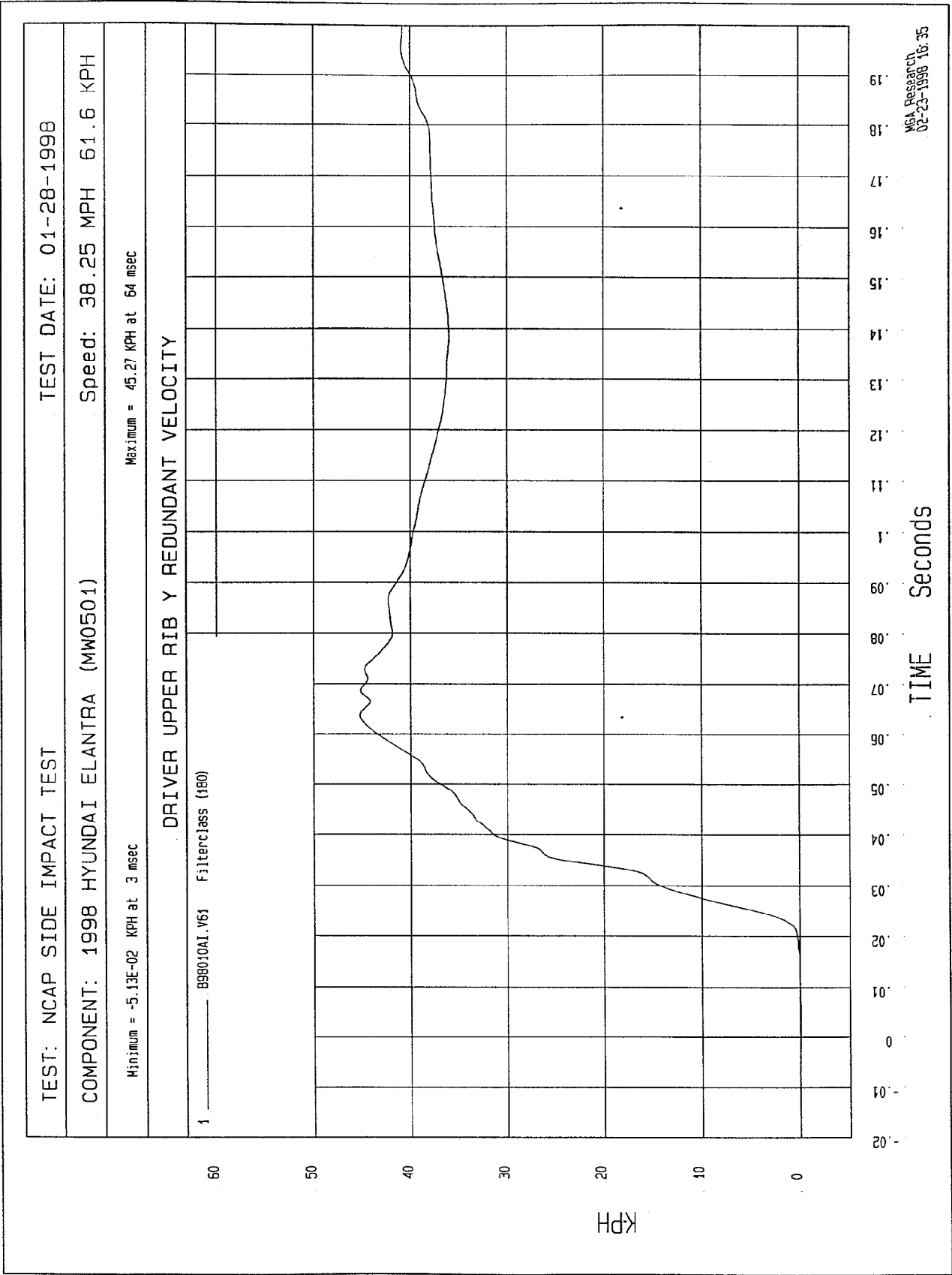
DRIVER UPPER RIB Y REDUNDANT ACCELERATION



TIME (SECONDS)

0.19 0.18 0.17 0.16 0.15 0.14 0.13 0.12 0.11 0.1 0.09 0.08 0.07 0.06 0.05 0.04 0.03 0.02 0.01 0 -0.01 -0.02

NSA Resistor
02-23-1998 16:33

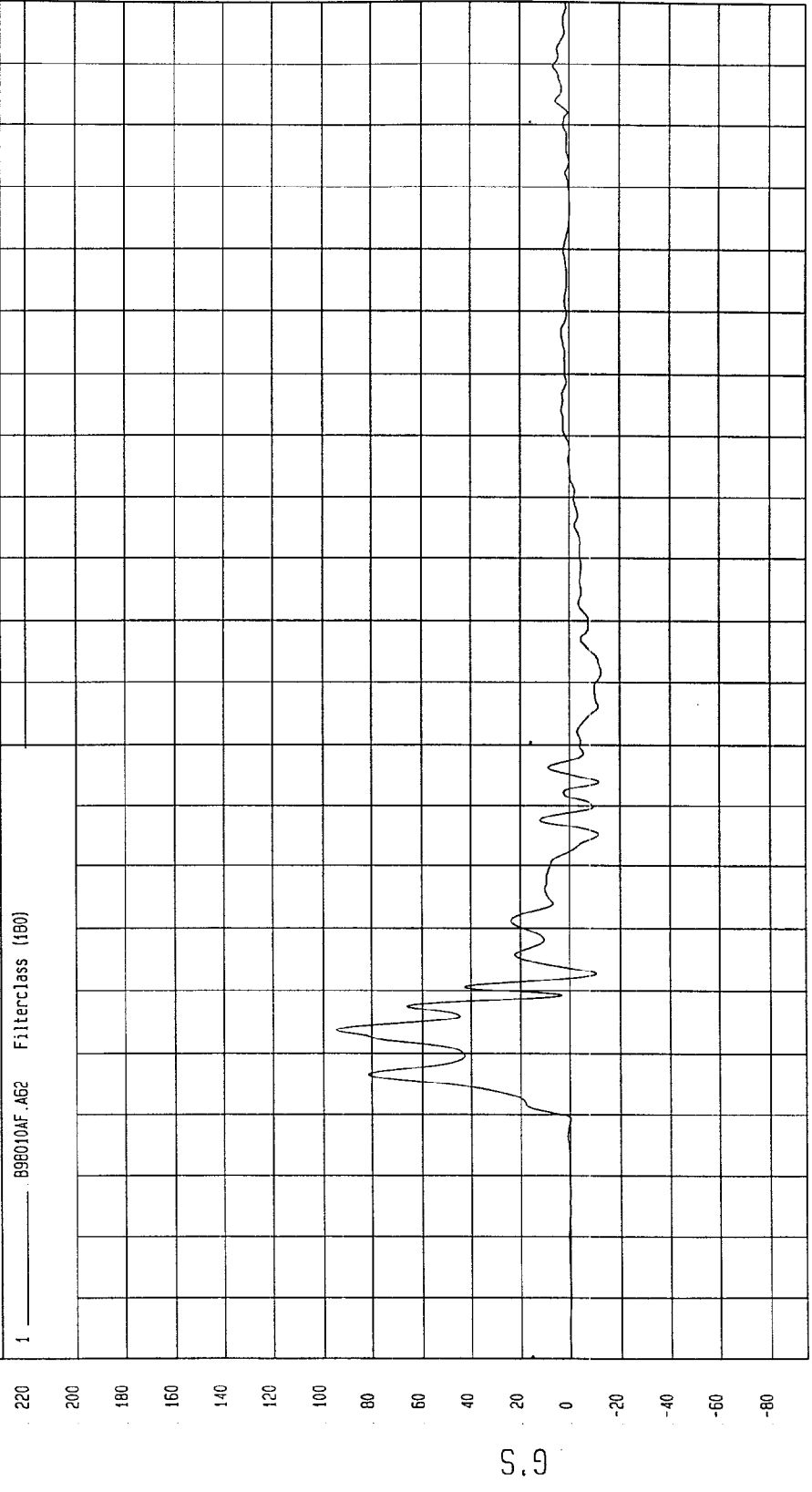


TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -12.80 G'S at 92 msec Maximum = 94.65 G'S at 34 msec

DRIVER LOWER RIB Y REDUNDANT ACCELERATION



TIME (SECONDS)

0.19 0.18 0.17 0.16 0.15 0.14 0.13 0.12 0.11 0.1 0.09 0.08 0.07 0.06 0.05 0.04 0.03 0.02 0.01 0 -0.01 -0.02

MSA Research
02-23-1998 16:33

TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

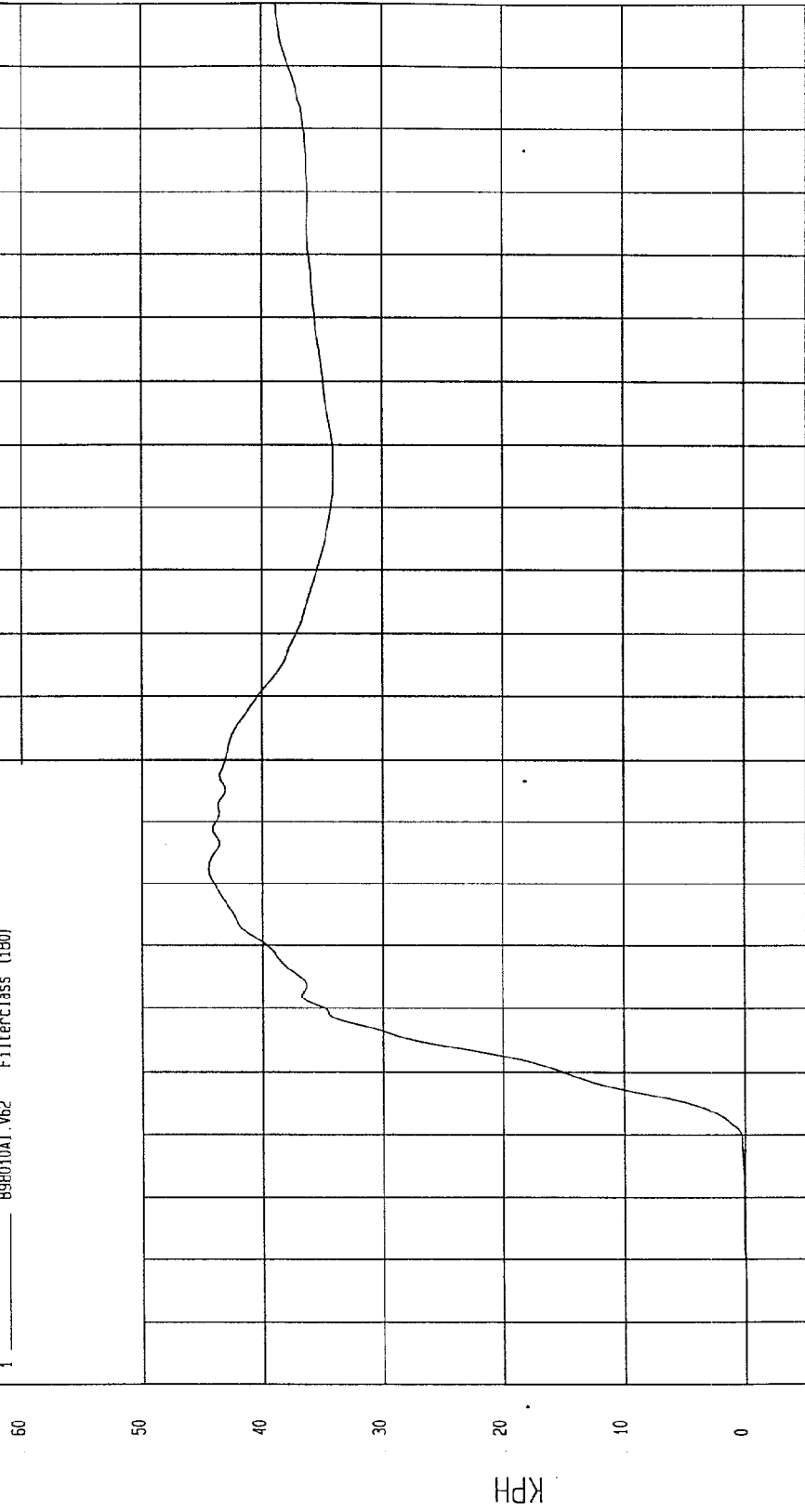
Speed: 38.25 MPH 61.6 KPH

Minimum = -.02 KPH at -6 msec

Maximum = 44.46 KPH at 62 msec

DRIVER LOWER RIB Y REDUNDANT VELOCITY

1 — 898010A1.V62 Filterclass (180)



WCA Research
02-23-1998 16:35

TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

Speed: 38.25 MPH 61.6 KPH

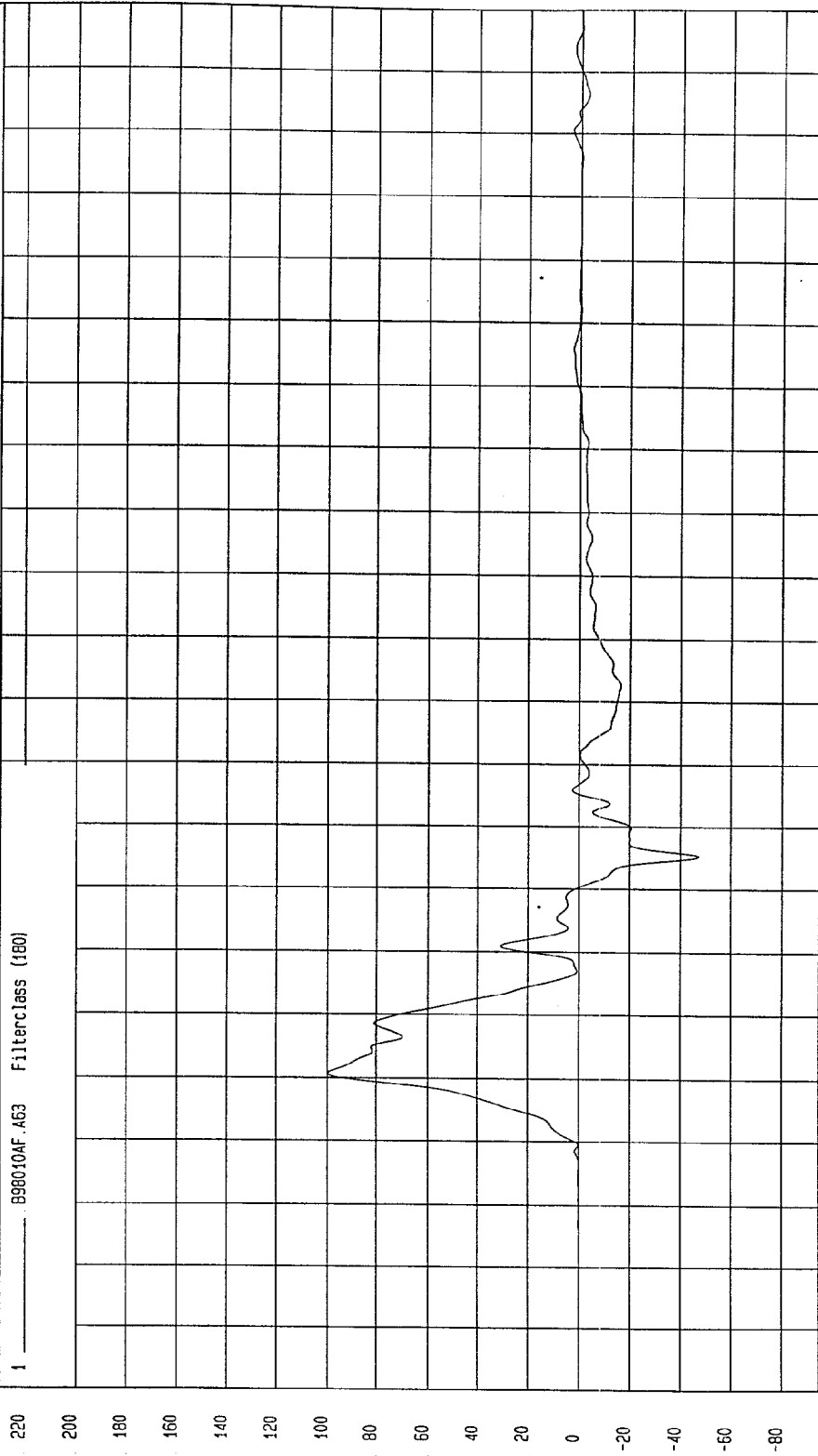
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

Maximum = 99.93 G'S at 31 msec

Minimum = -47.13 G'S at 65 msec

DRIVER LOWER SPINE Y REDUNDANT ACCELERATION

1 898010AF.A63 Filterclass (180)



NGA Research
02-23-1998 16:33

TIME (SECONDS)

TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

Speed: 38.25 MPH 61.6 KPH

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

Minimum = -1.36E-02 KPH at -12 msec

Maximum = 52.31 KPH at 60 msec

DRIVER LOWER SPINE Y REDUNDANT VELOCITY

1 B96010A1.V63 Filterclass (180)

60

50

40

30

20

10

0

KPH

19

18

17

16

15

14

13

12

11

10

09

08

07

06

05

04

03

02

01

0

-01

-02

TIME Seconds

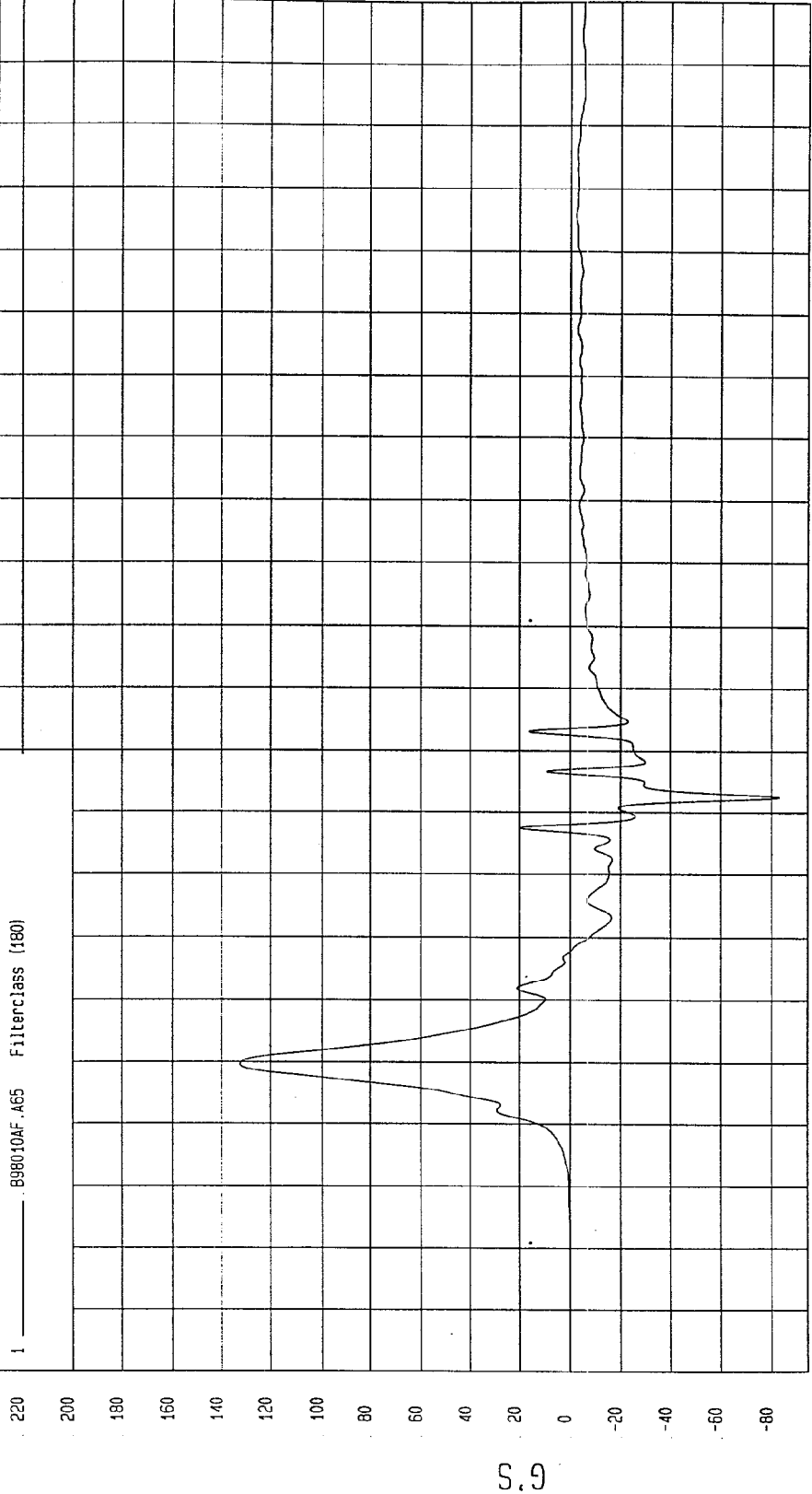
NGA Research
02-23-1998 16:35

TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -83.08 G'S at 72 msec Maximum = 132.17 G'S at 30 msec

DRIVER PELVIS Y REDUNDANT ACCELERATION



TIME (SECONDS)

0.19 0.18 0.17 0.16 0.15 0.14 0.13 0.12 0.11 0.1 0.09 0.08 0.07 0.06 0.05 0.04 0.03 0.02 0.01 0 -0.01 -0.02

NGA Research
02-23-1998 16:33

TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

Speed: 38.25 MPH 61.6 KPH

Minimum = 0 KPH at -20 msec

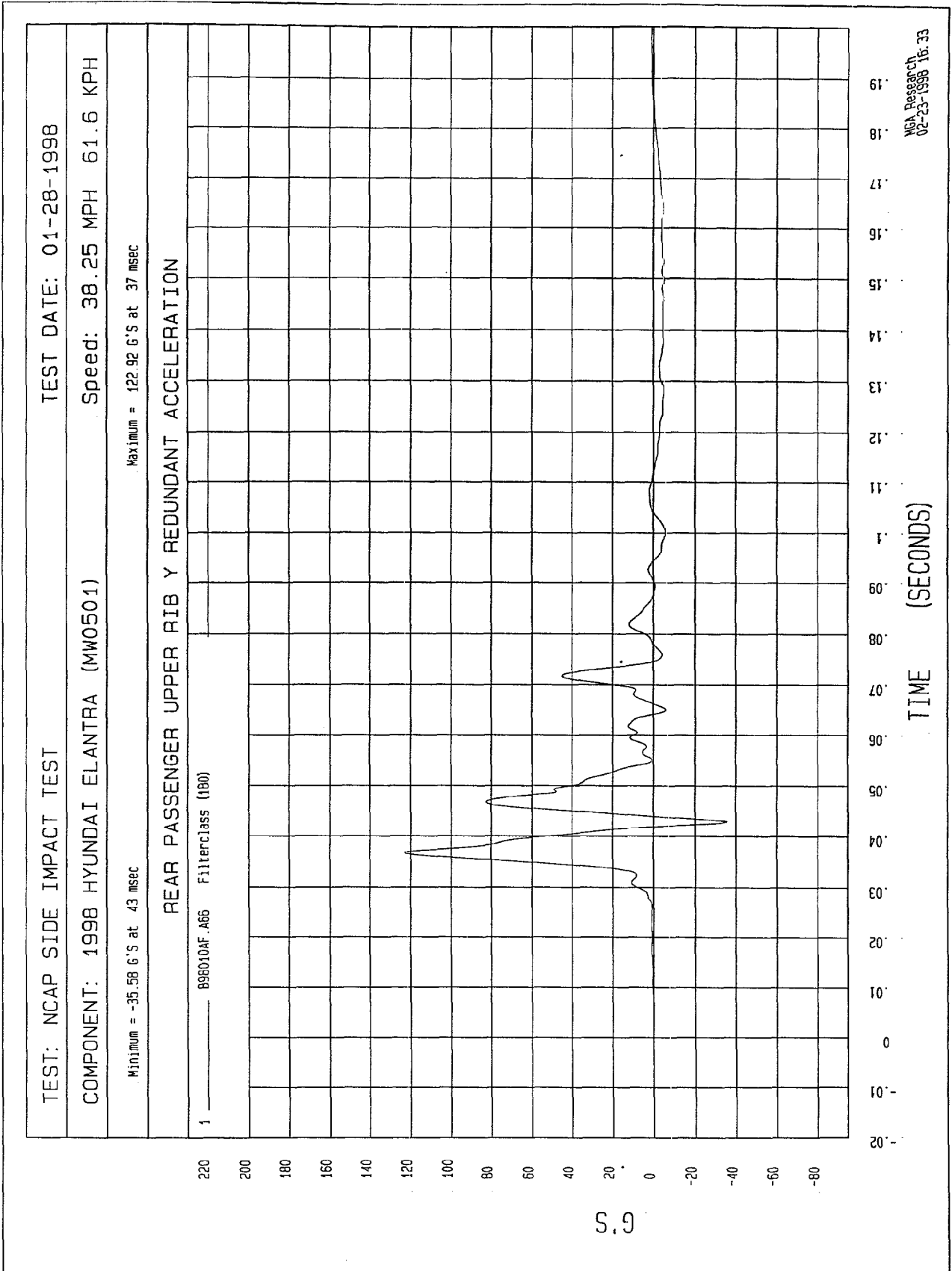
Maximum = 45.35 KPH at 48 msec

DRIVER PELVIS Y REDUNDANT VELOCITY

1 ——— B98010A1.V65 Filterclass (180)



WCA Research
02-23-1998 16:35



TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

SPEED: 38.25 MPH 61.6 KPH

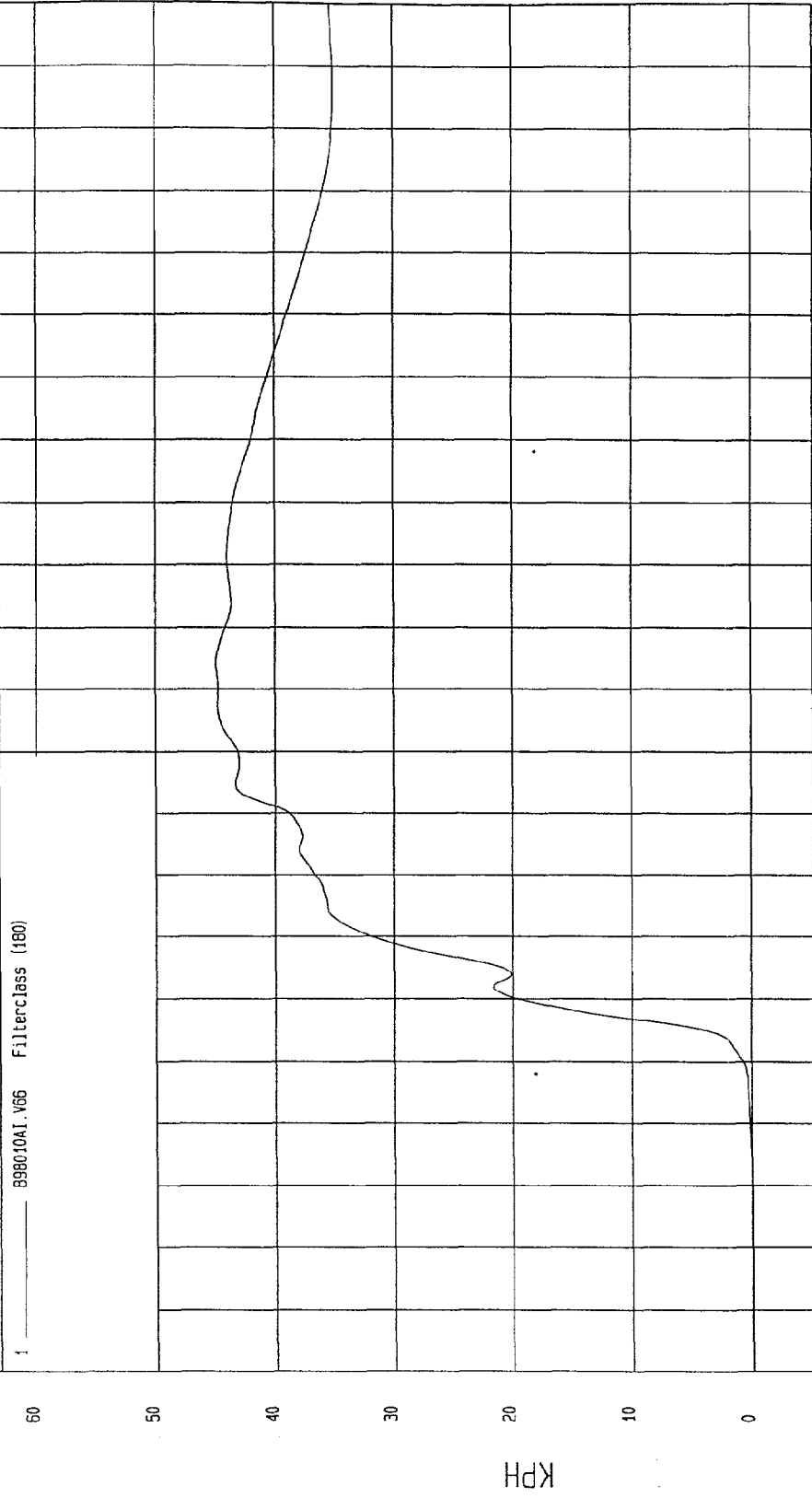
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

Maximum = 44.96 KPH at 94 msec

Minimum = -0.1 KPH at 4 msec

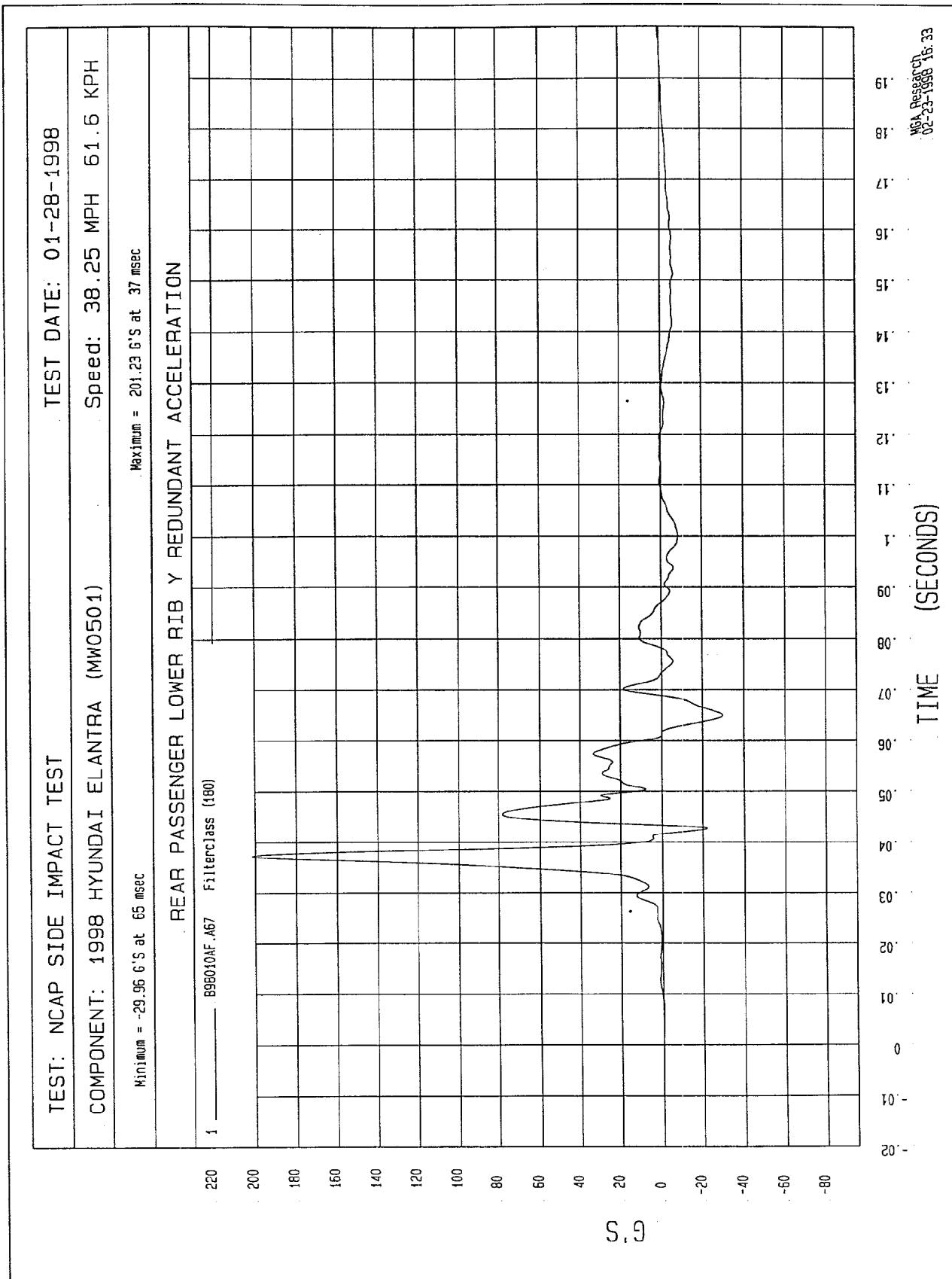
REAR PASSENGER UPPER RIB Y REDUNDANT VELOCITY

1 — 898010A1.V66 Filterclass (180)



TIME Seconds

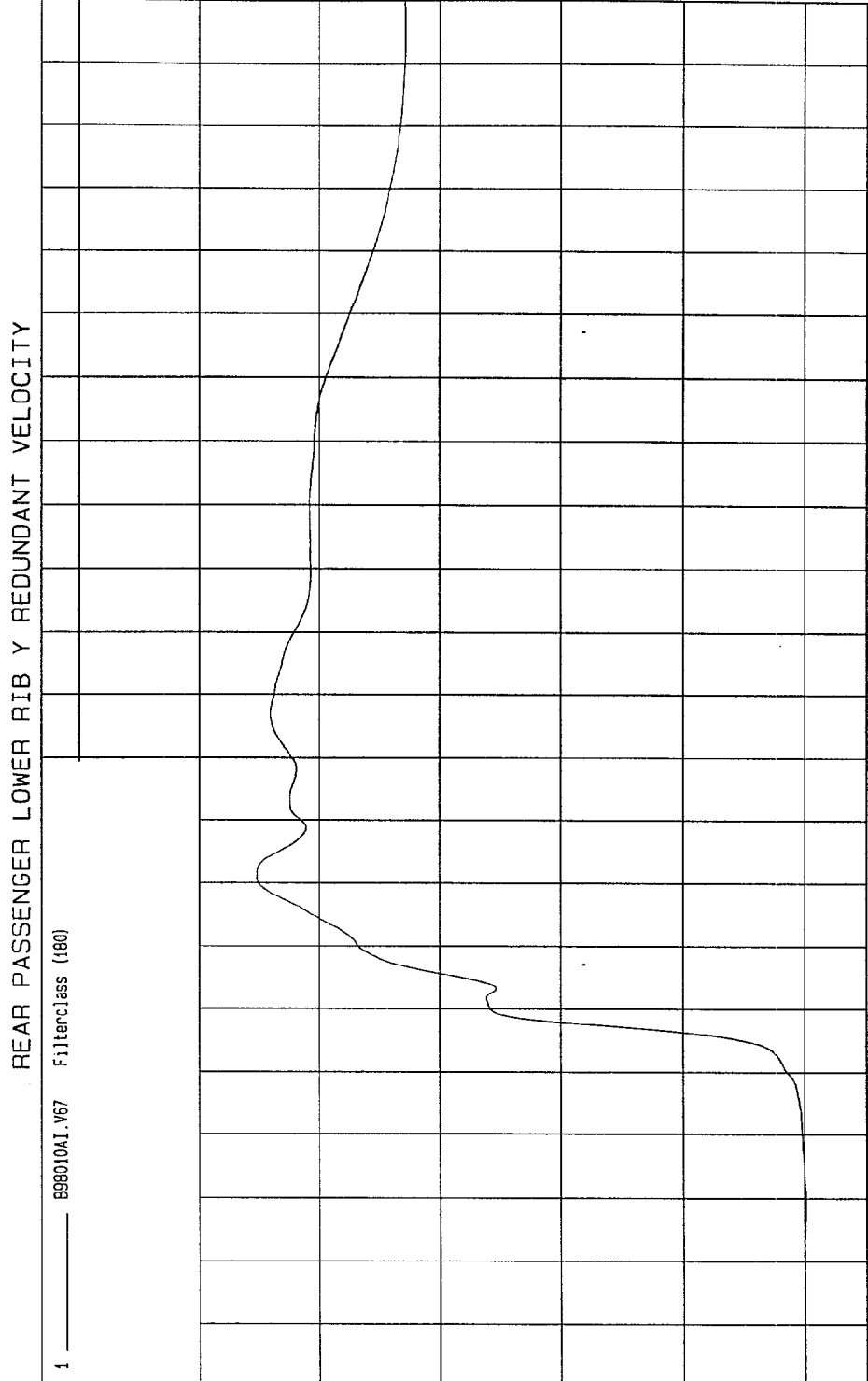
WCA Research
02-23-1998 16:35



TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -.10 KPH at 9 msec Maximum = 45.20 KPH at 61 msec



TIME Seconds

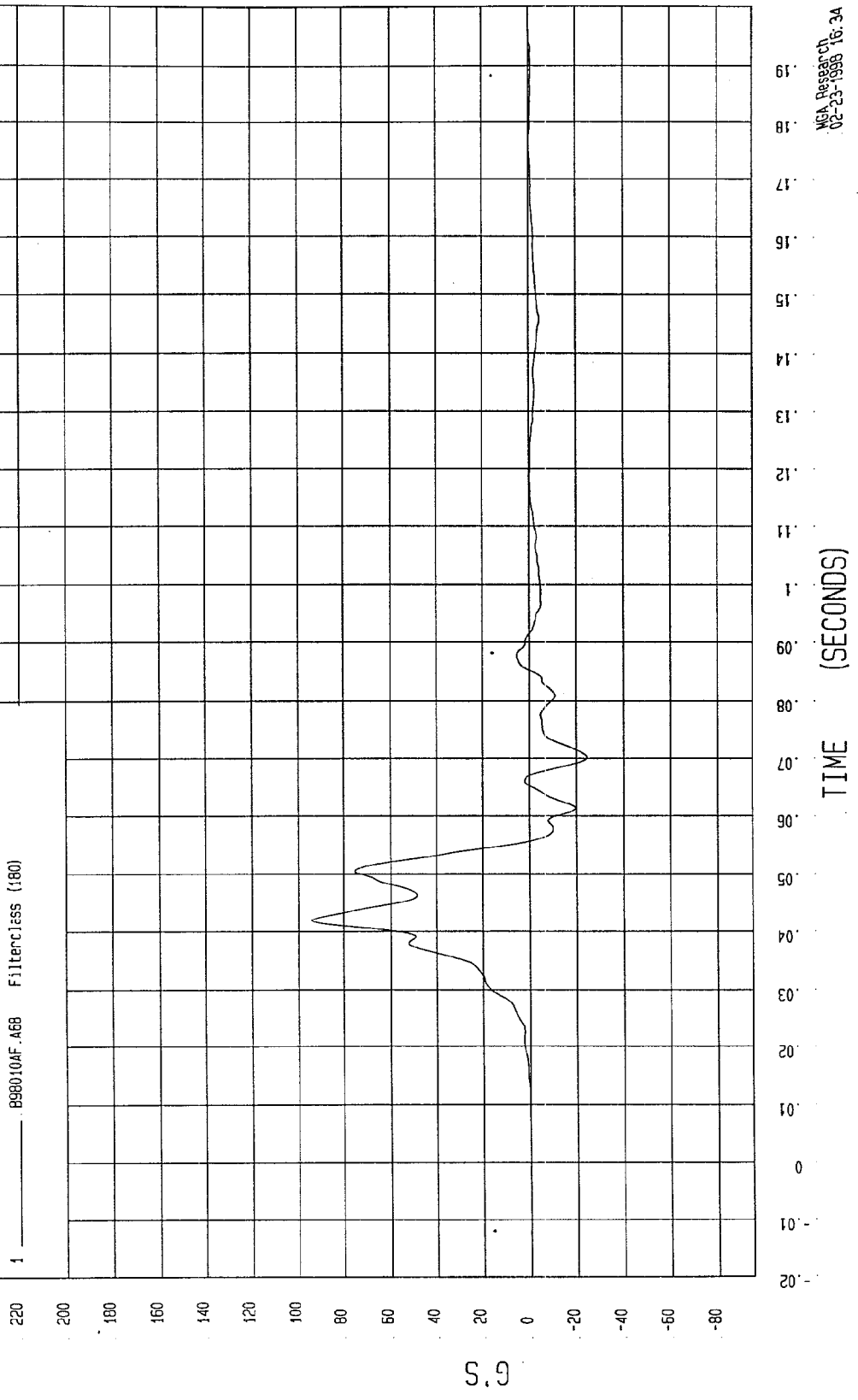
MOA Research
02-23-1998 16:35

TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -24.53 G'S at 70 msec Maximum = 94.00 G'S at 42 msec

REAR PASSENGER LOWER SPINE Y REDUNDANT ACCELERATION



MOA Research
02-23-1998 16:34

TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

SPEED: 38.25 MPH 61.6 KPH

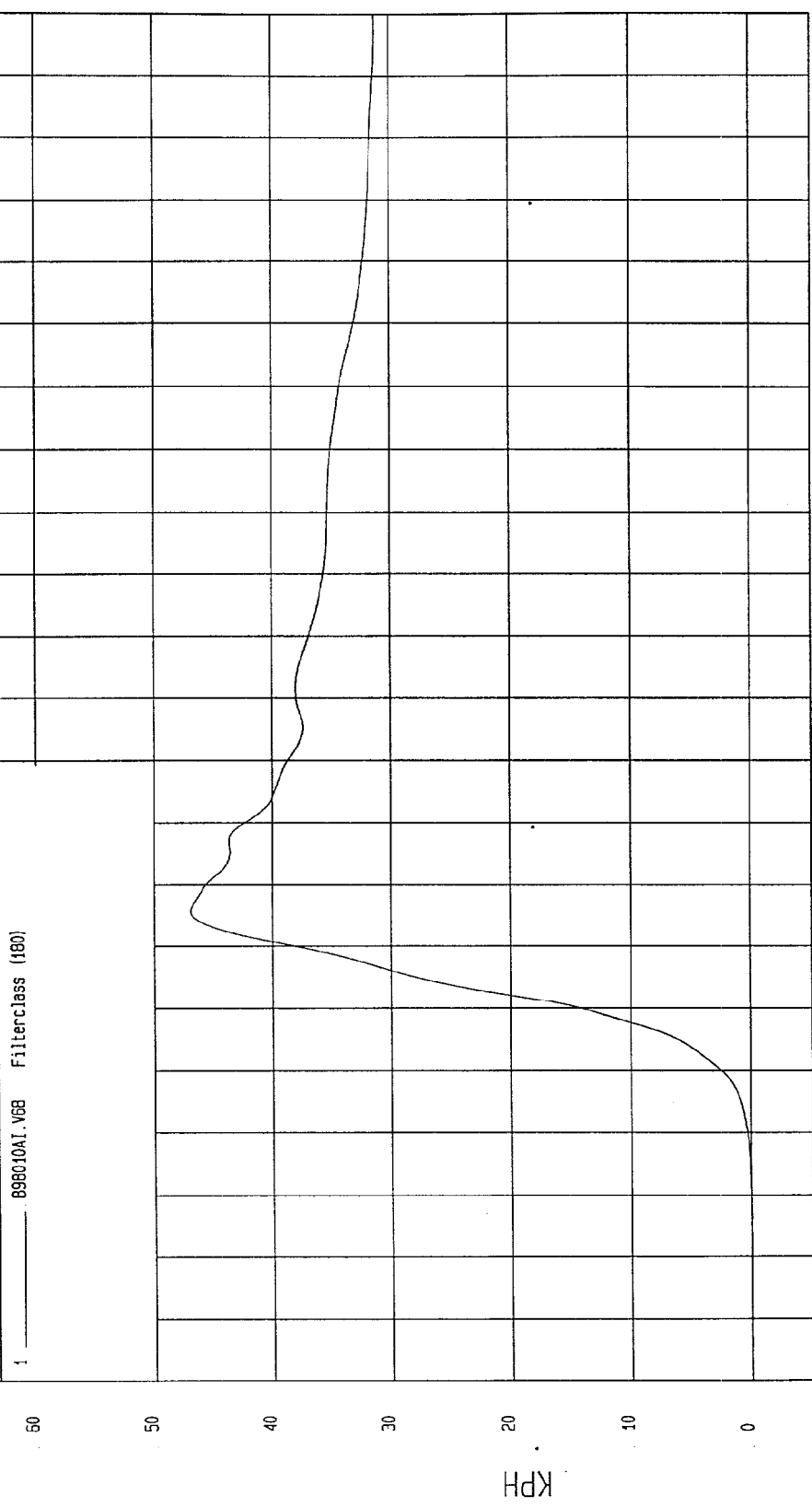
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

Minimum = -1.85E-03 KPH at -3 msec

Maximum = 47.01 KPH at 56 msec

REAR PASSENGER LOWER SPINE Y REDUNDANT VELOCITY

1 898010A1.V68 Filterclass (180)



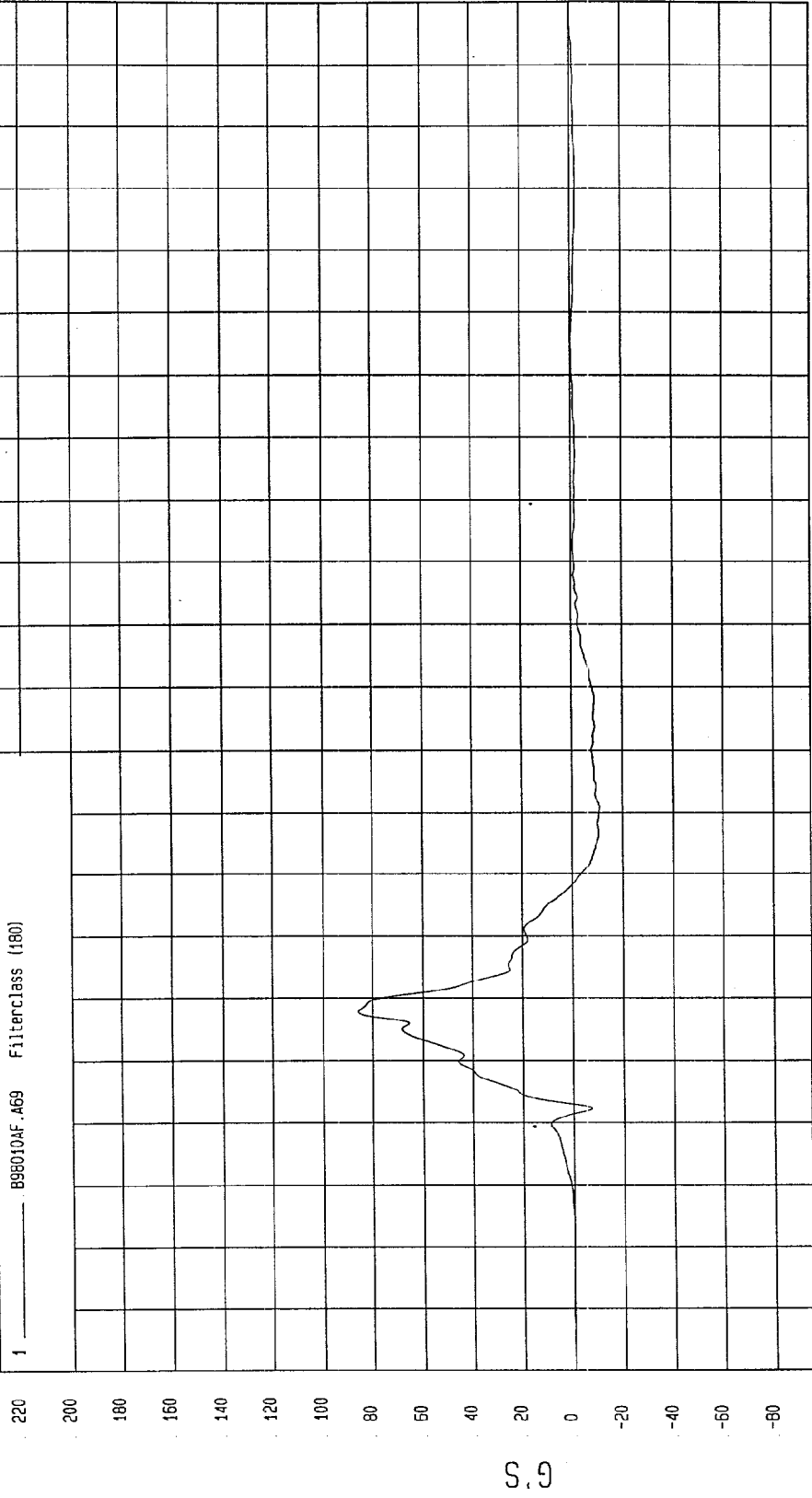
NSA Research
02-23-1998 16:35

TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -11.05 G'S at 71 msec Maximum = 85.72 G'S at 38 msec

REAR PASSENGER PELVIS Y REDUNDANT ACCELERATION



TIME (SECONDS)

0.19 0.18 0.17 0.16 0.15 0.14 0.13 0.12 0.11 0.1 0.09 0.08 0.07 0.06 0.05 0.04 0.03 0.02 0.01 0 -0.01 -0.02

WCA Research
02-23-1998 16:34

TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

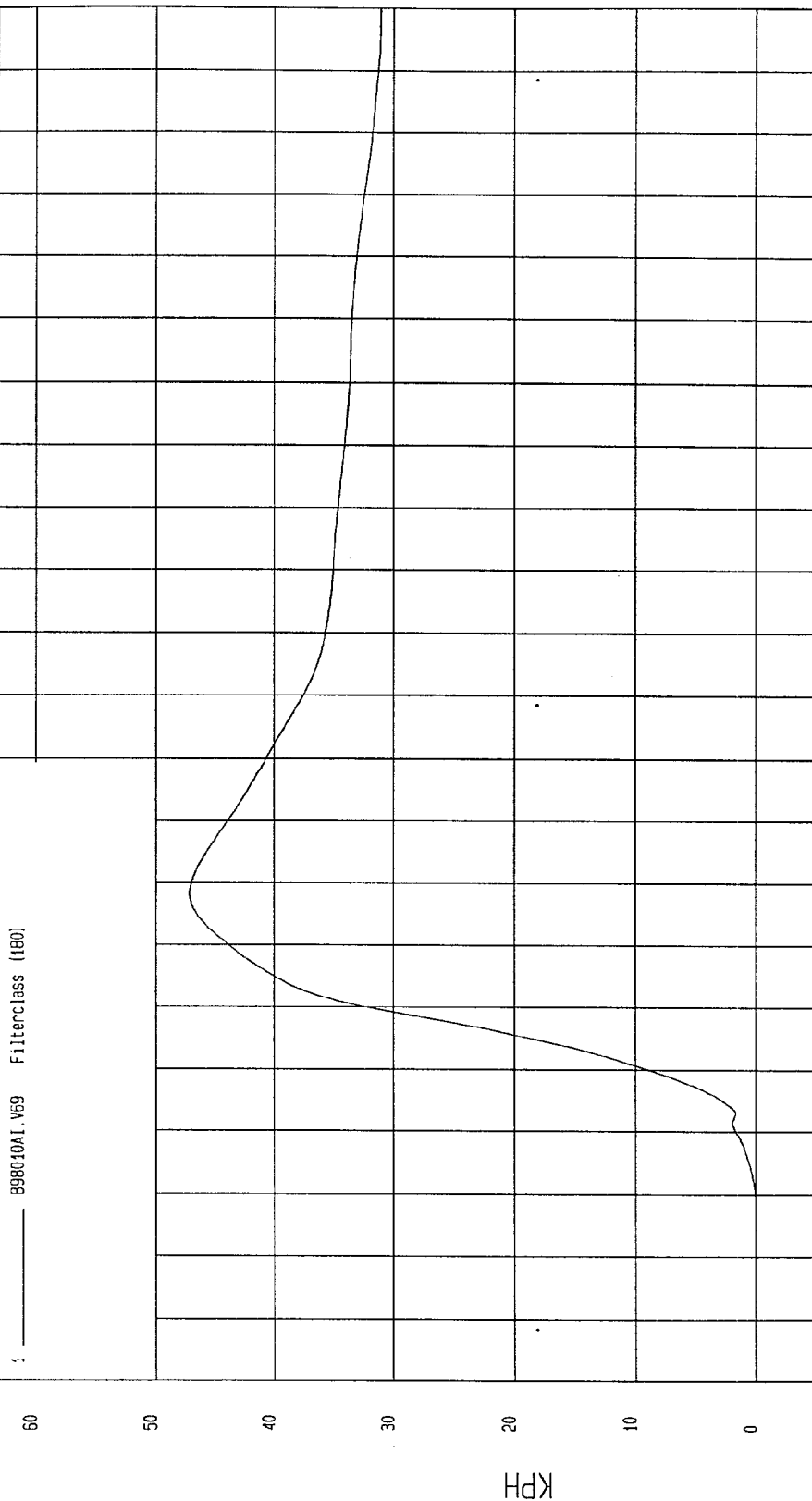
Speed: 38.25 MPH 61.6 KPH

Minimum = -7.69E-03 KPH at -17 msec

Maximum = 47.18 KPH at 58 msec

REAR PASSENGER PELVIS Y REDUNDANT VELOCITY

1 — 998010A1.V59 Filterclass (180)



MOA Research
02-23-1998 16:35

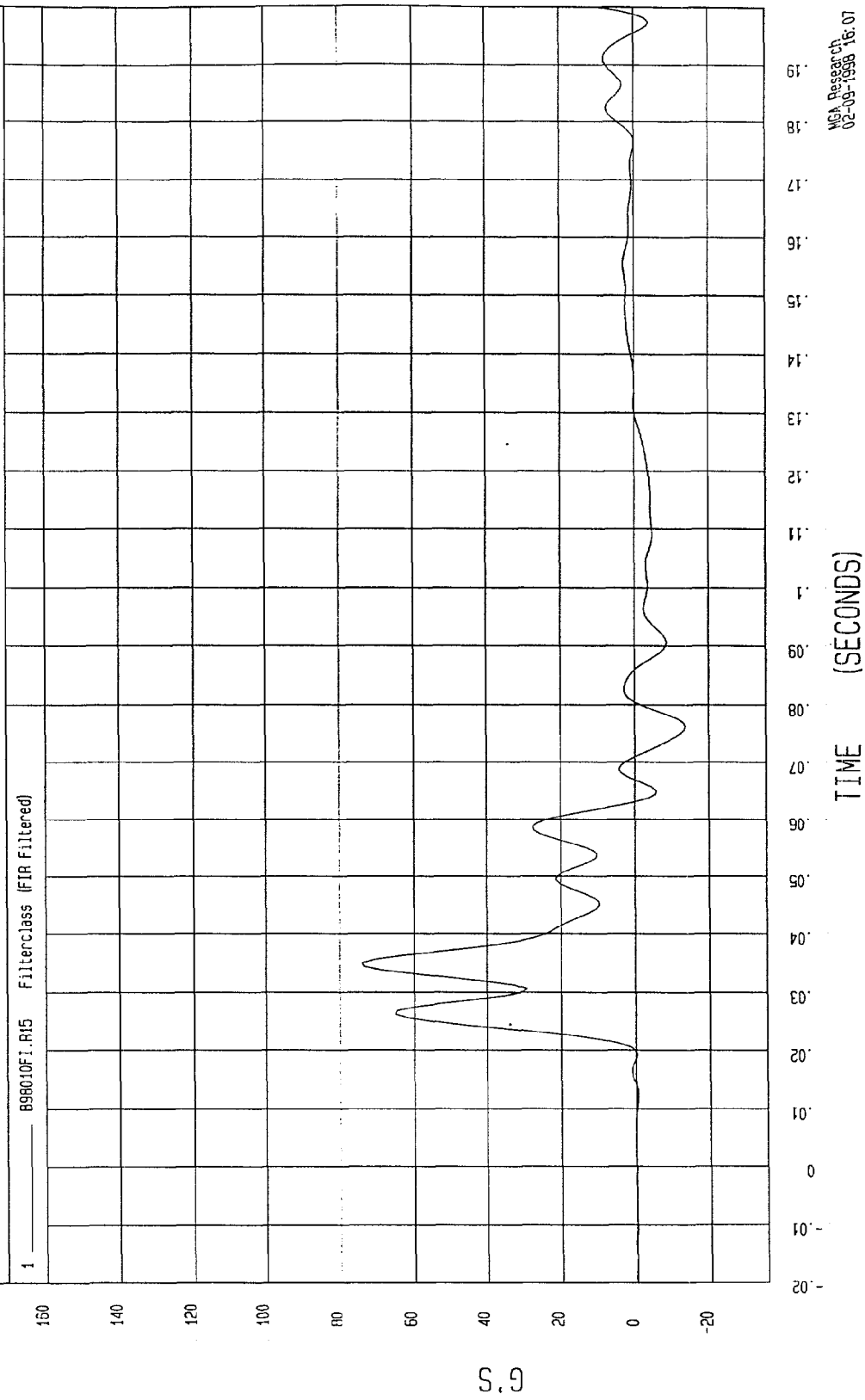
FINITE IMPULSE RESPONSE (FIR) FILTERED DATA

TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -13.85 G'S at 76 msec Maximum = 73.62 G'S at 35 msec

DRIVER UPPER RIB Y ACCELERATION



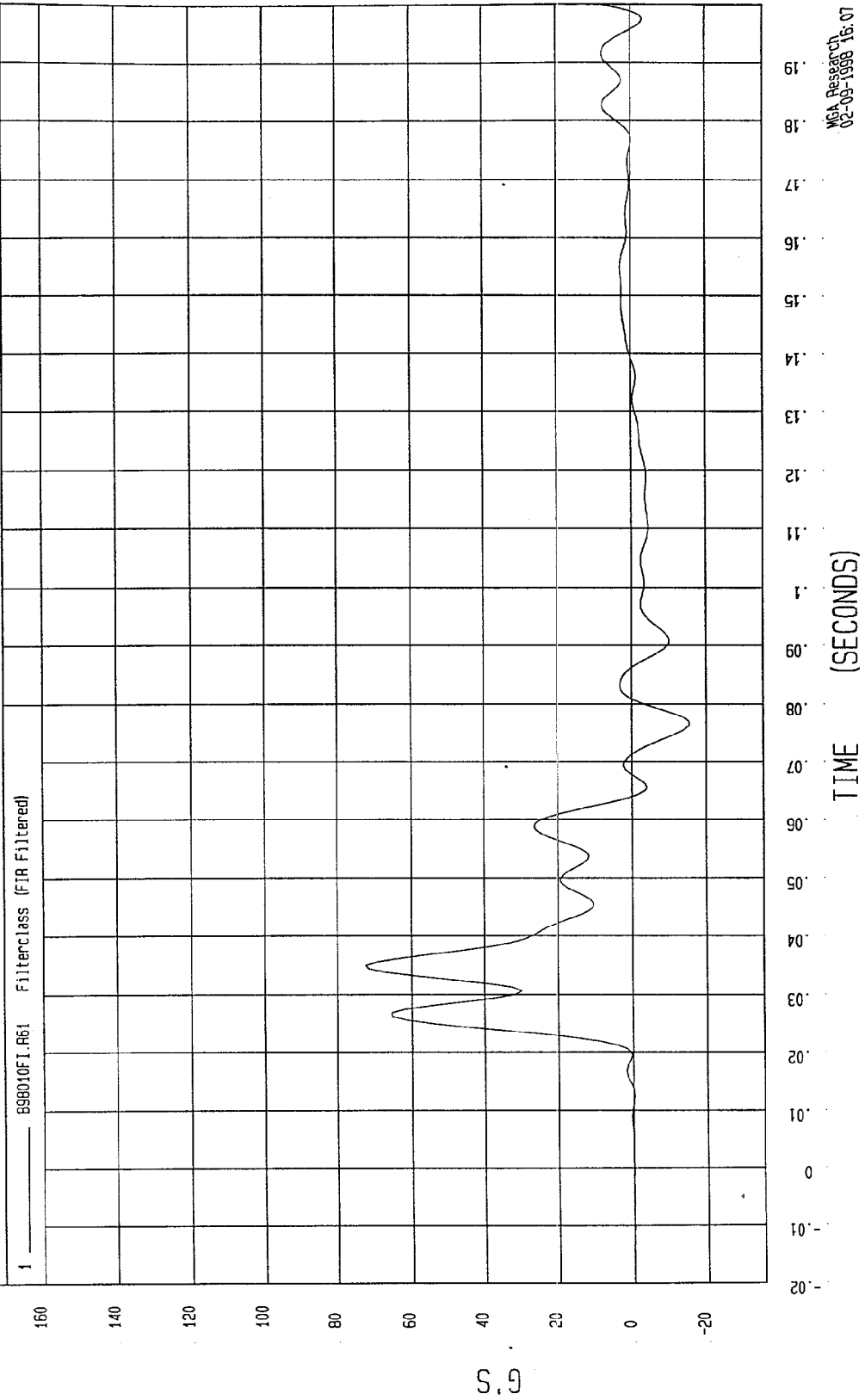
MPA Research
02-09-1998 16:07

TEST: NCAP SIDE IMPACT TEST TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501) Speed: 38.25 MPH 61.6 KPH

Minimum = -15.47 G'S at 76 msec Maximum = 72.34 G'S at 35 msec

DRIVER UPPER RIB Y REDUNDANT ACCELERATION



MSA Research
02-09-1998 16:07

TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

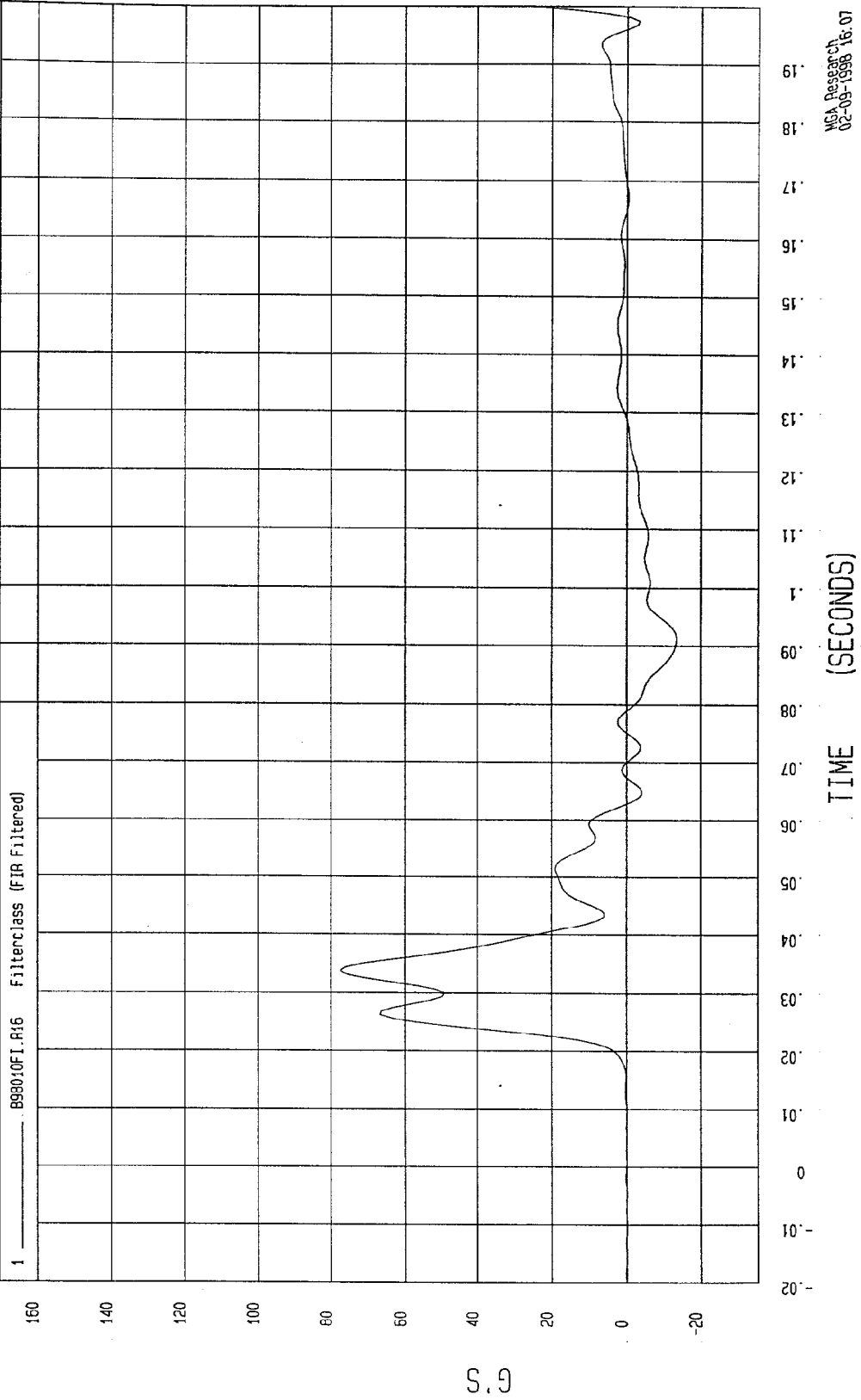
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

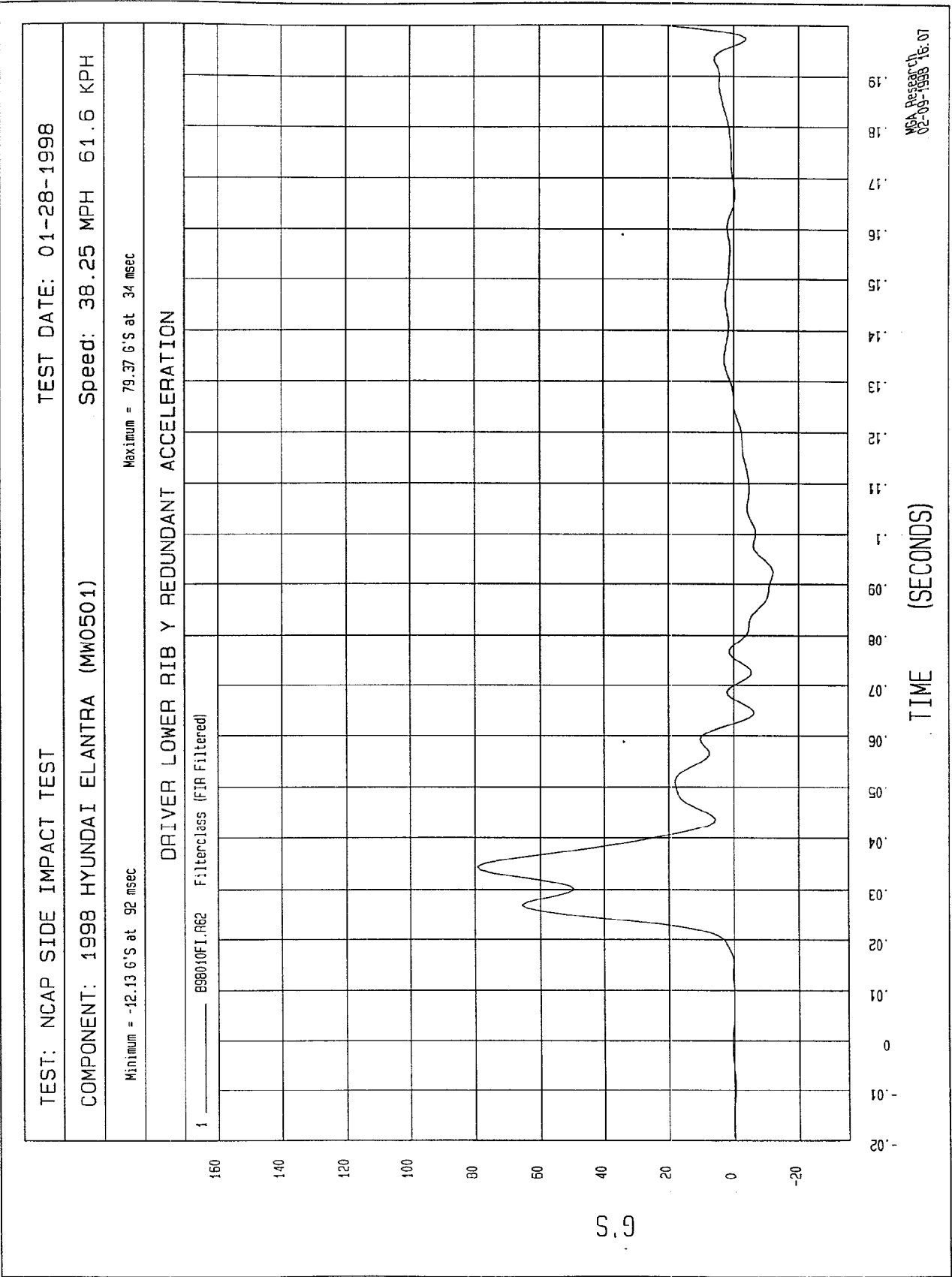
Speed: 38.25 MPH 61.6 KPH

Minimum = -13.54 G'S at 91 msec

Maximum = 77.41 G'S at 34 msec

DRIVER LOWER RIB Y ACCELERATION





TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

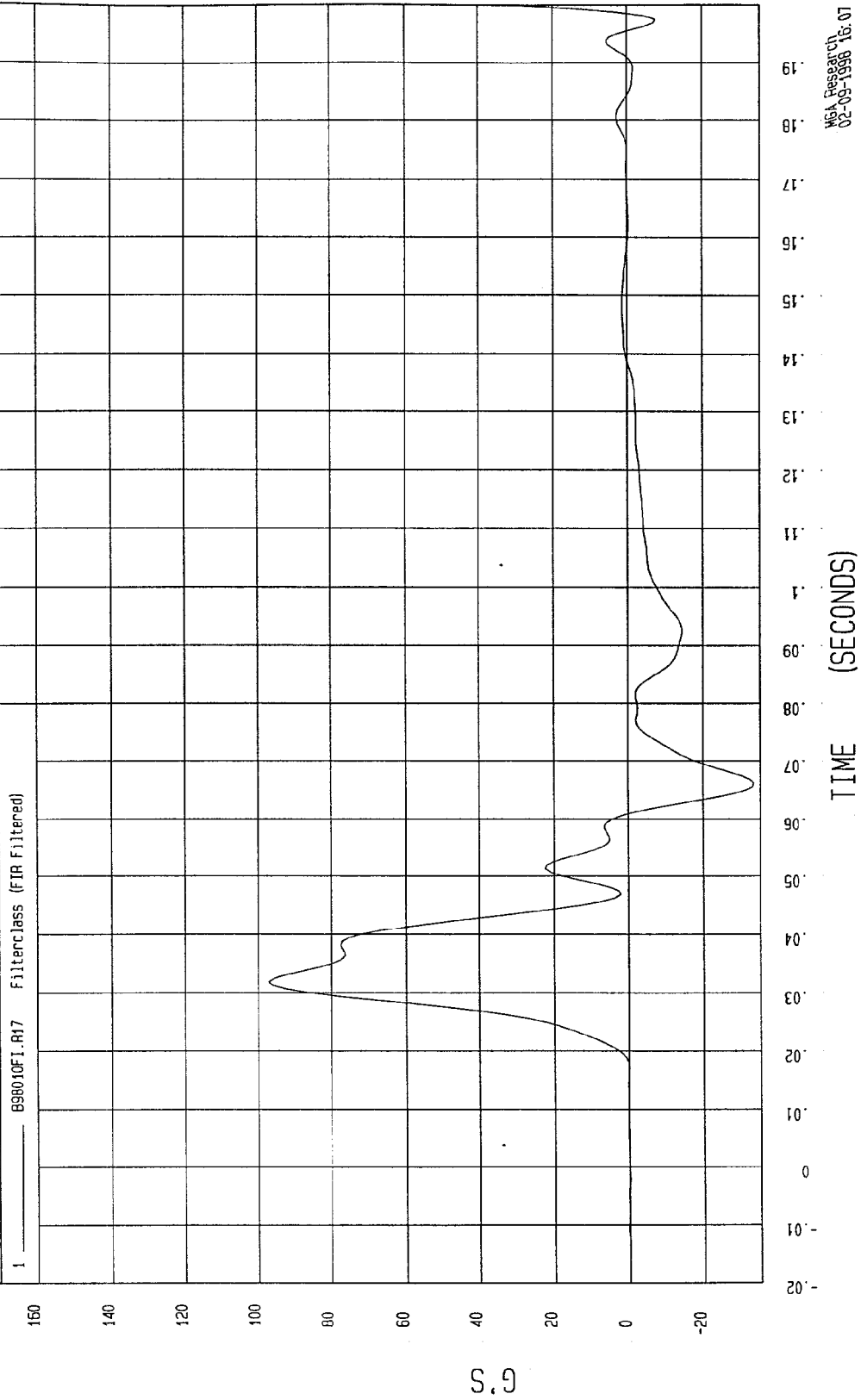
Speed: 38.25 MPH 61.6 KPH

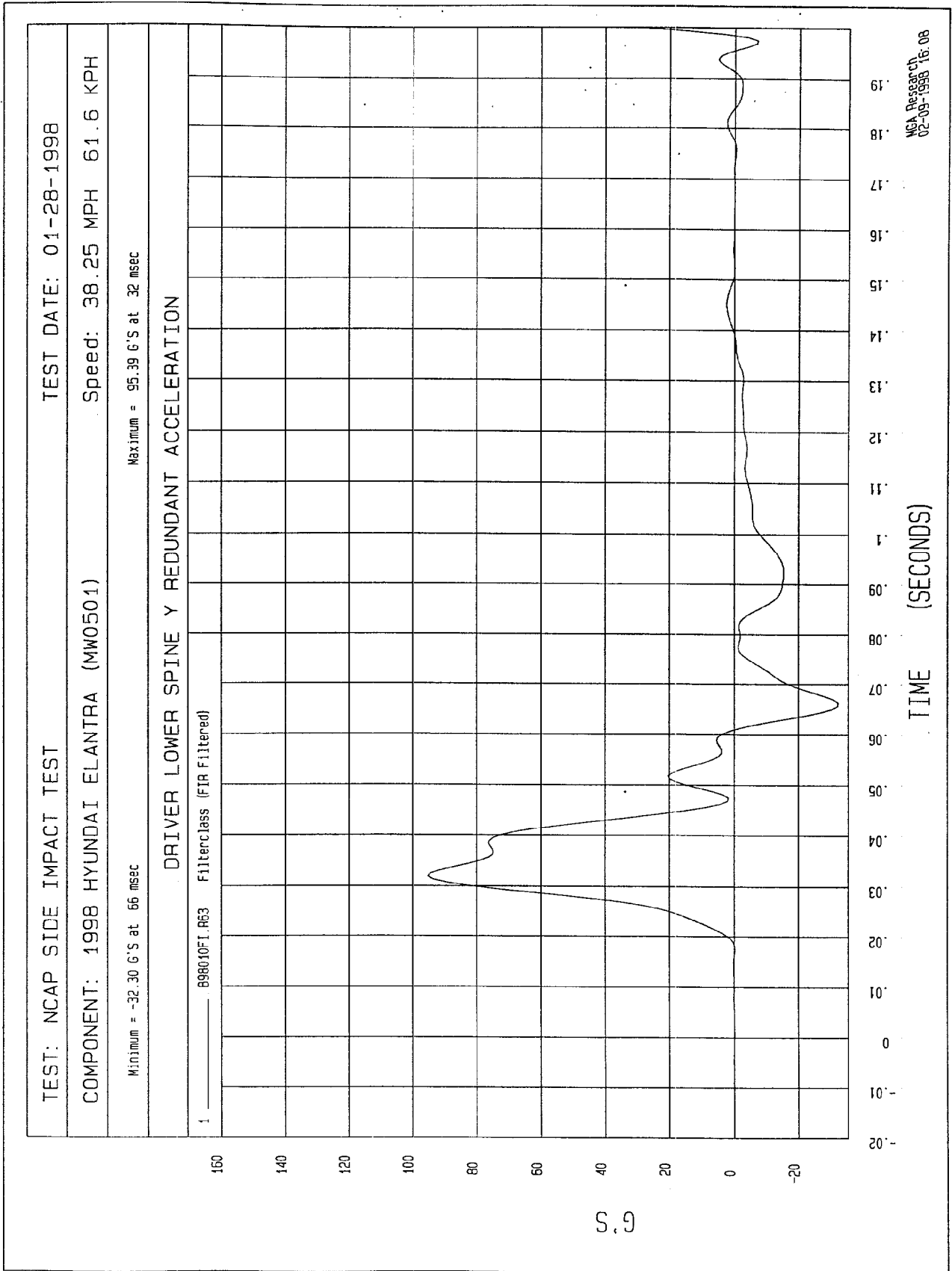
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

Maximum = 97.14 G'S at 32 msec

Minimum = -33.66 G'S at 66 msec

DRIVER LOWER SPINE Y ACCELERATION





TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

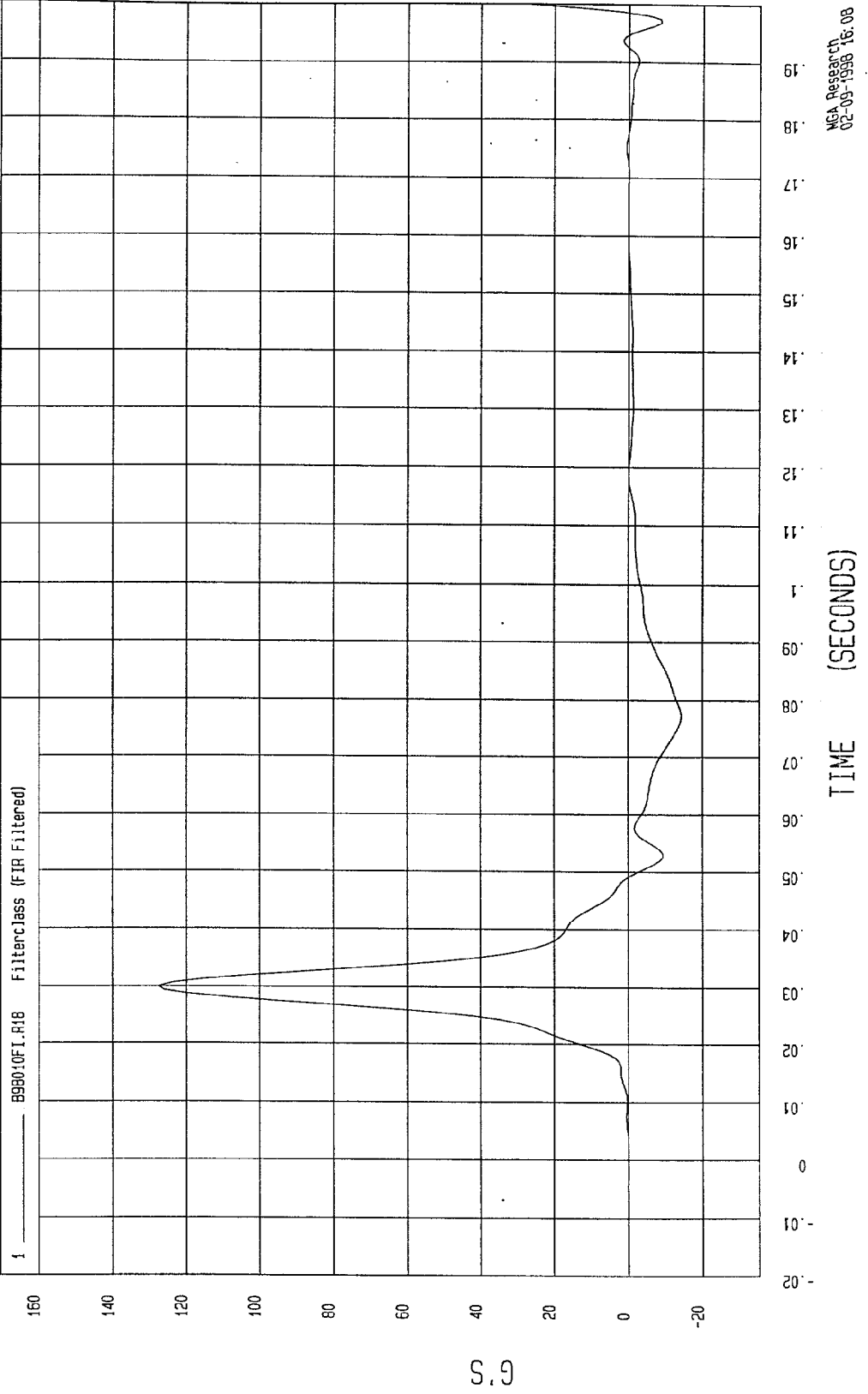
Speed: 38.25 MPH 61.6 KPH

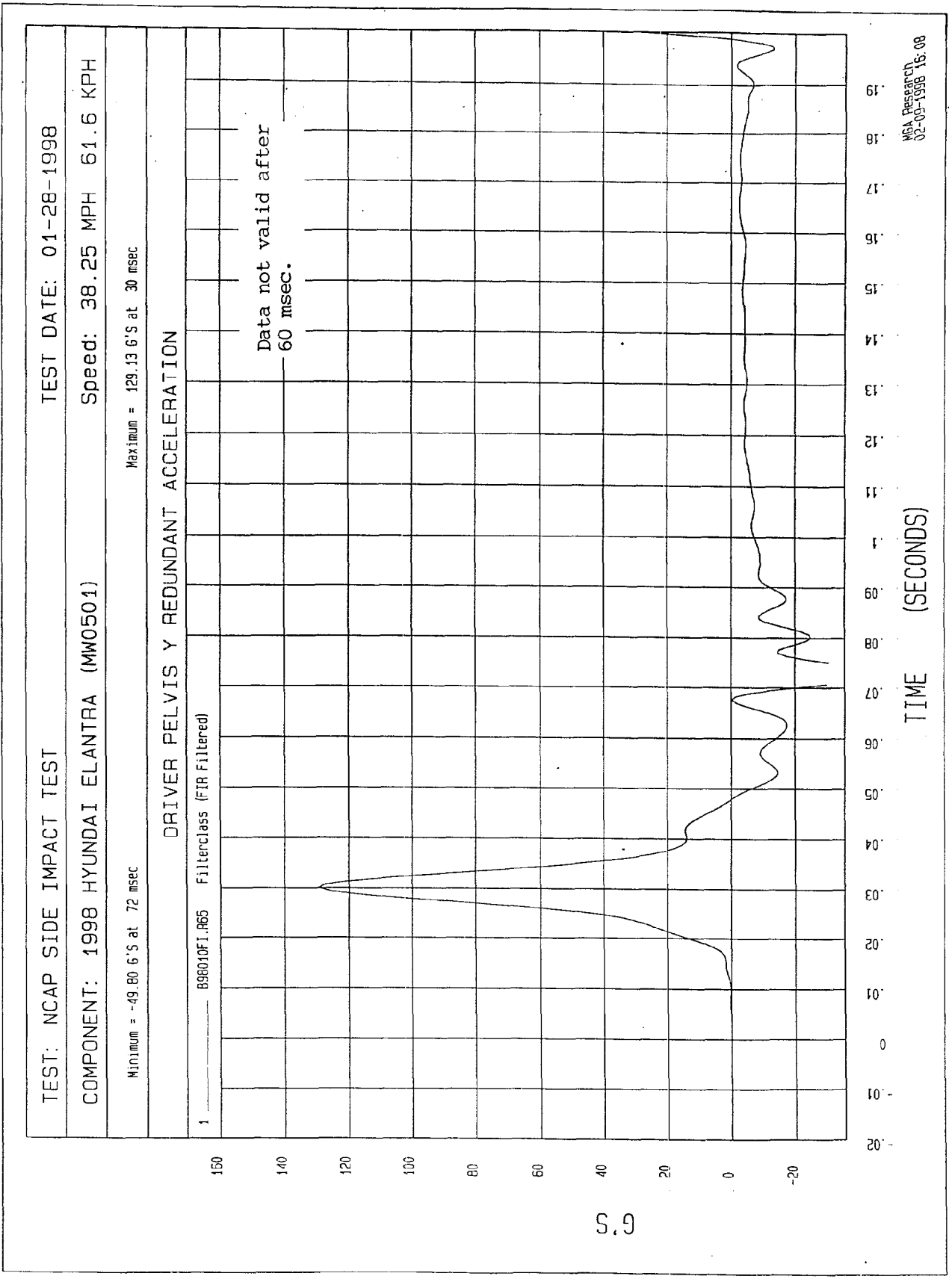
COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

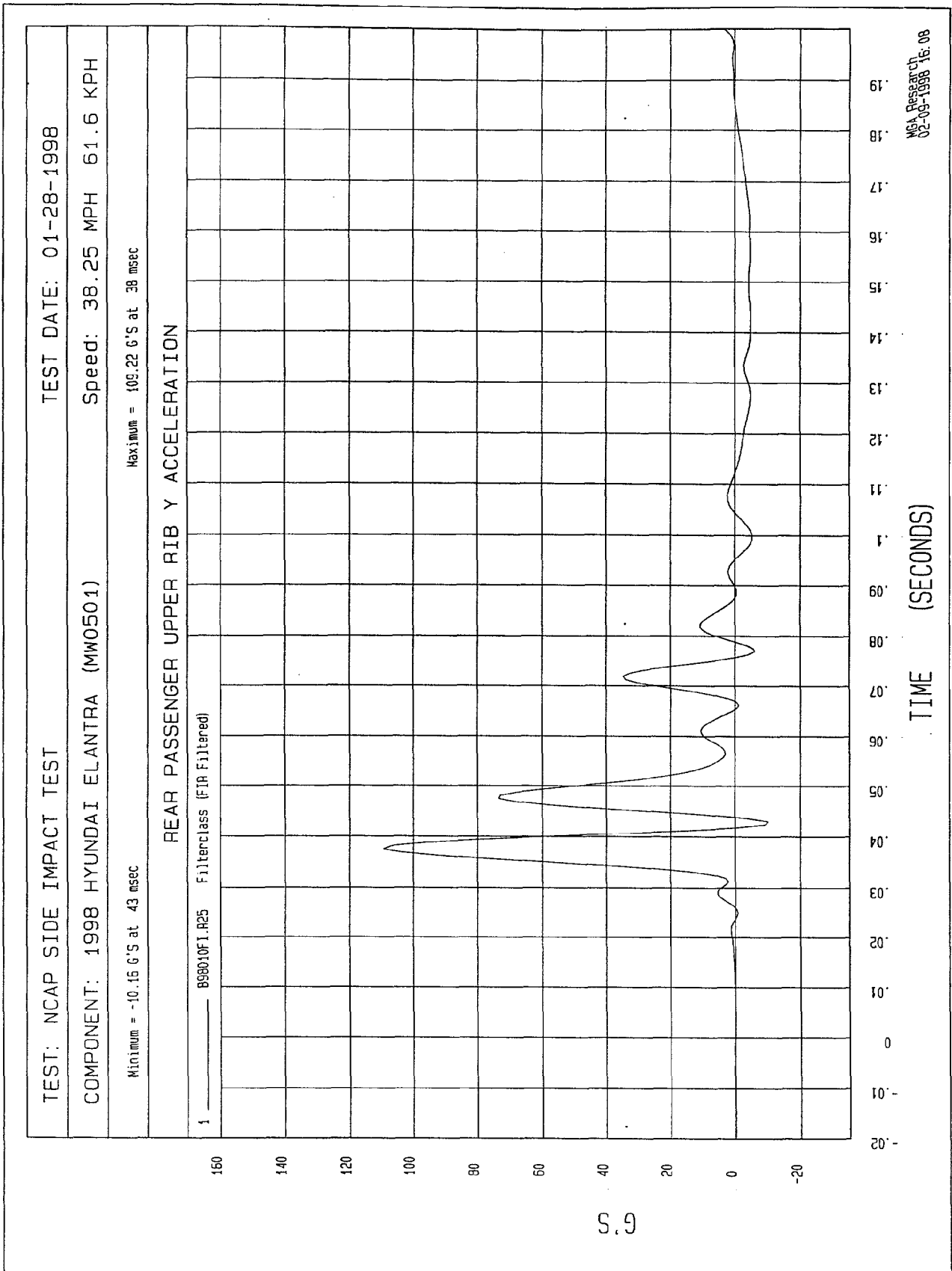
Maximum = 127.66 G'S at 30 msec

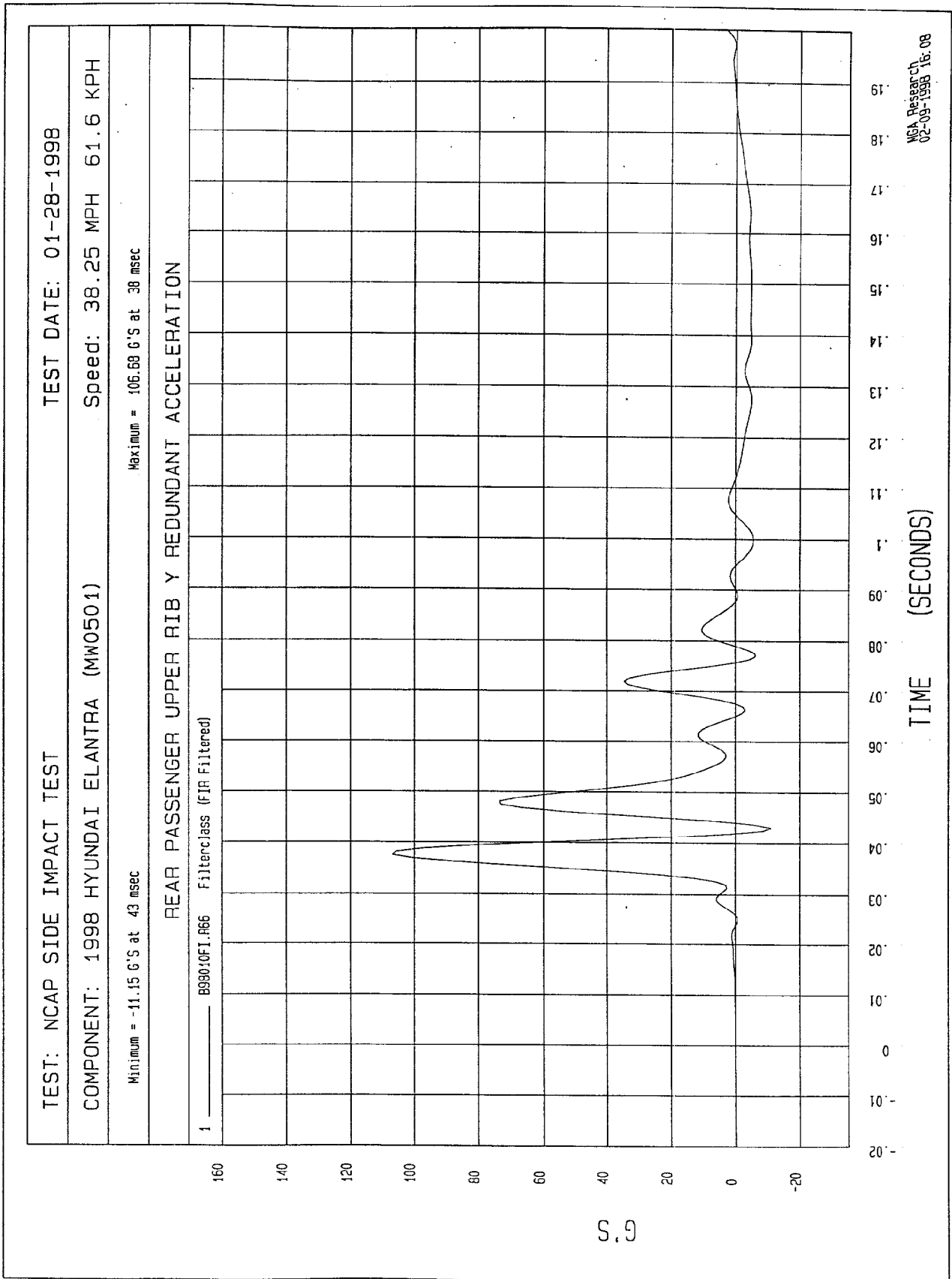
Minimum = -14.32 G'S at 77 msec

DRIVER PELVIS Y ACCELERATION

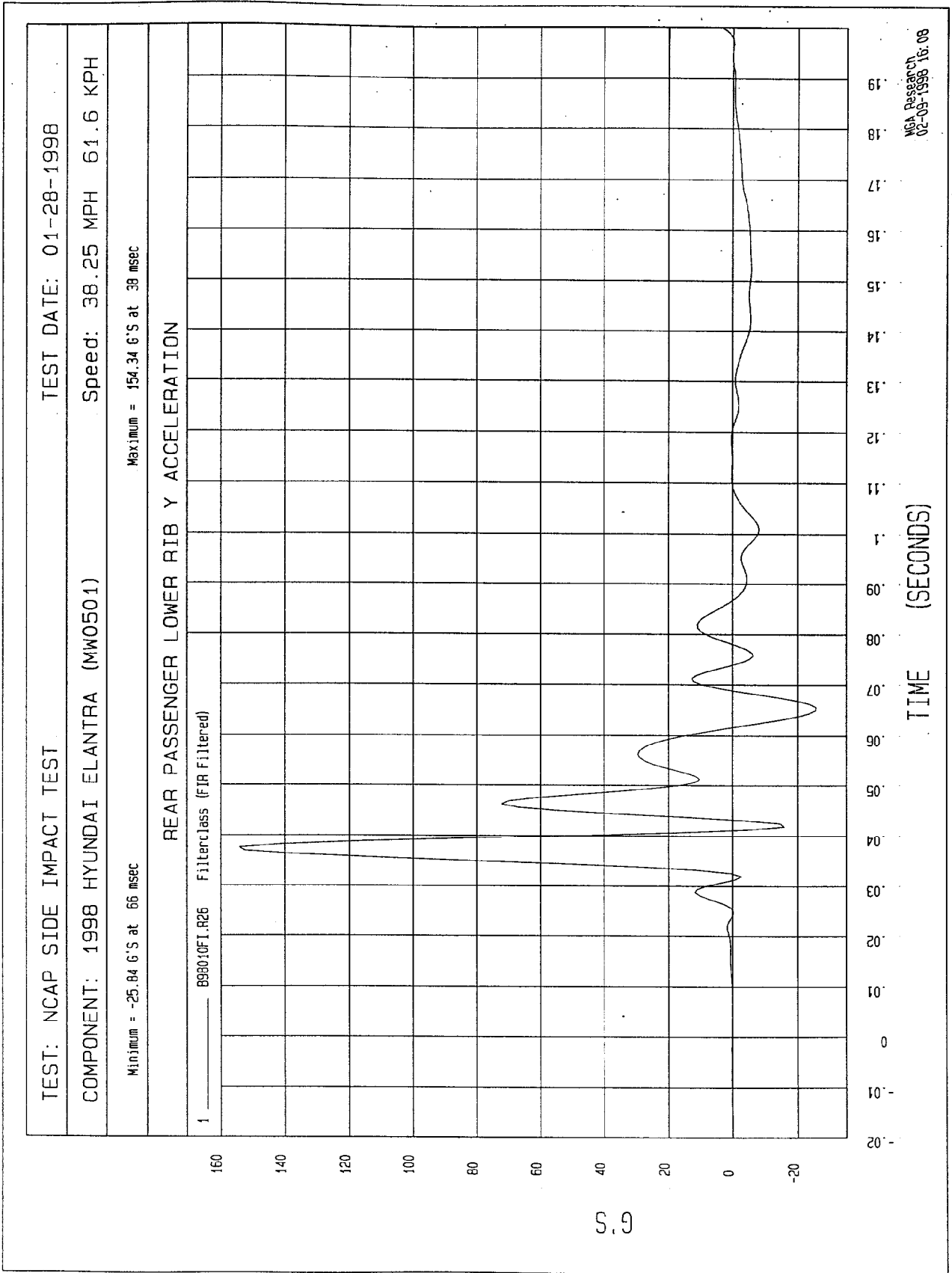








MECA Research
02-09-1998 16:08



TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MN0501)

Speed: 38.25 MPH 61.6 KPH

Minimum = -26.80 G's at 66 msec

Maximum = 151.92 G's at 38 msec

REAR PASSENGER LOWER RIB Y REDUNDANT ACCELERATION

1 B98010F1.R67 Filterclass (FIR Filtered)

160

140

120

100

80

60

40

20

0

-20

G

20

10

0

10

20

30

40

50

60

70

80

90

100

110

120

130

140

150

160

170

180

190

TIME (SECONDS)

WGA Research
02-09-1998 16:08

TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

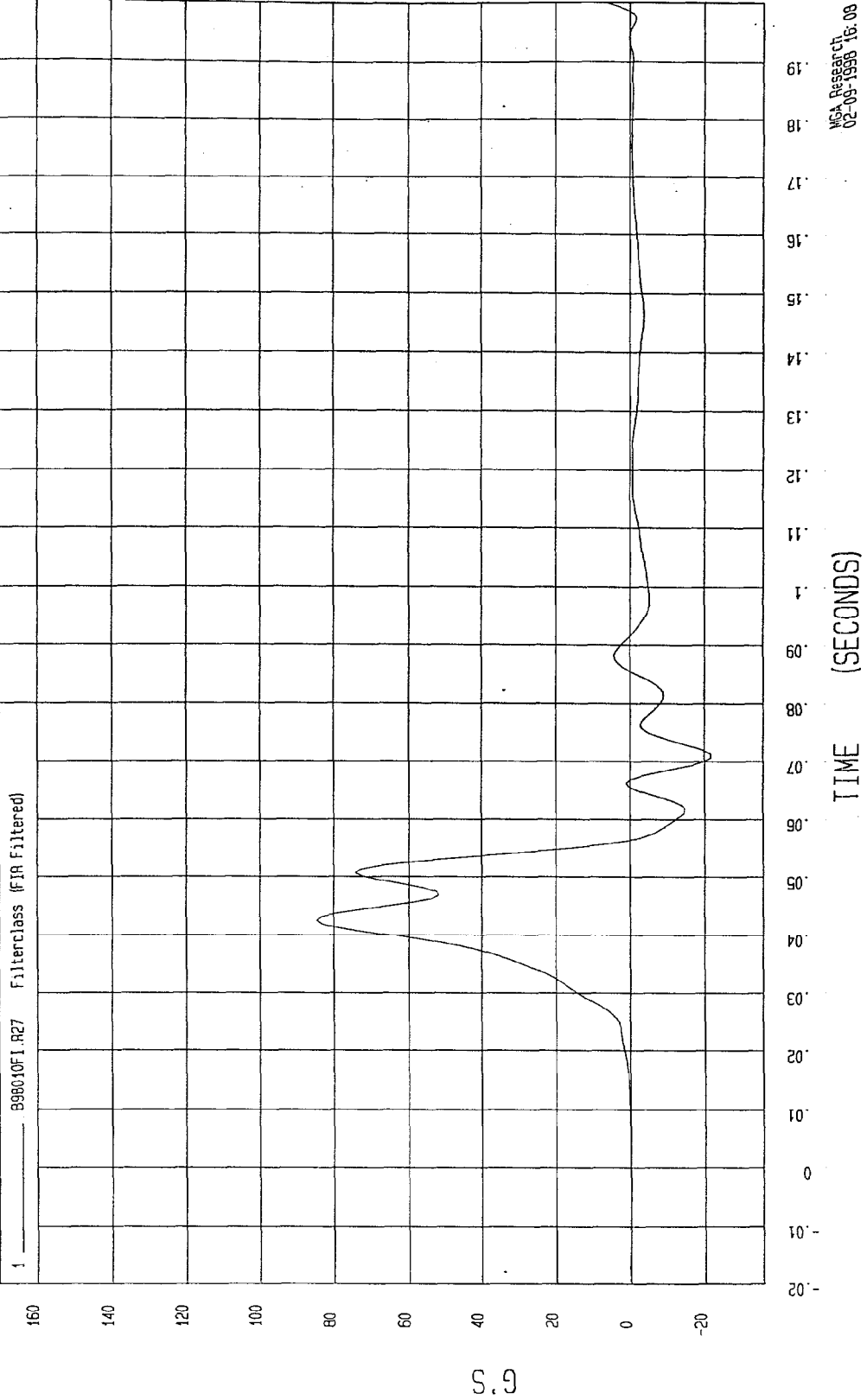
Speed: 38.25 MPH 61.6 KPH

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

Maximum = 84.79 G'S at 42 msec

Minimum = -21.63 G'S at 71 msec

REAR PASSENGER LOWER SPINE Y ACCELERATION



TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

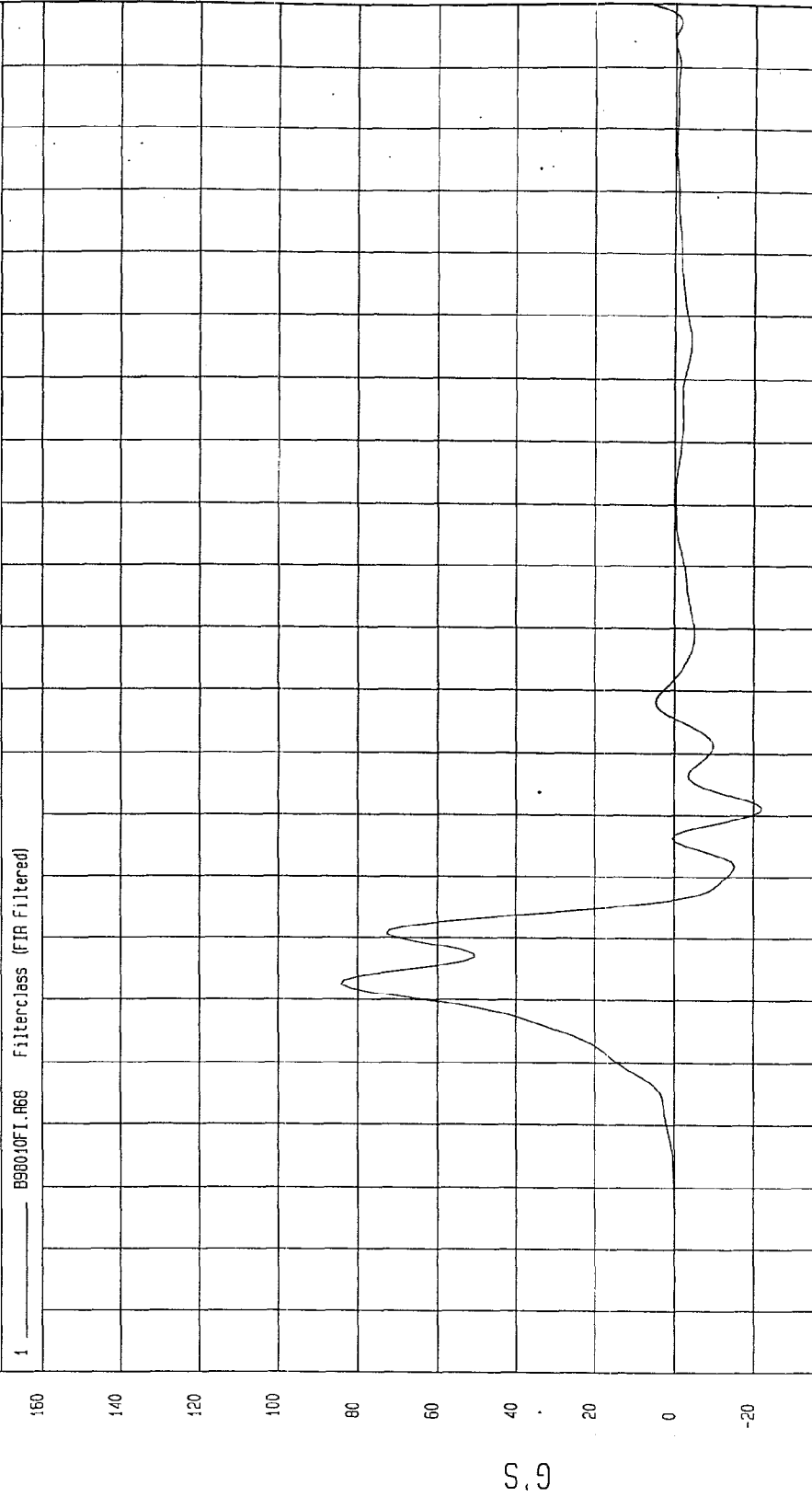
Speed: 38.25 MPH 61.6 KPH

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

Maximum = 84.27 G'S at 42 msec

Minimum = -21.99 G'S at 71 msec

REAR PASSENGER LOWER SPINE Y REDUNDANT ACCELERATION



NCA Research
02-09-1998 16:08

TIME (SECONDS)

TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

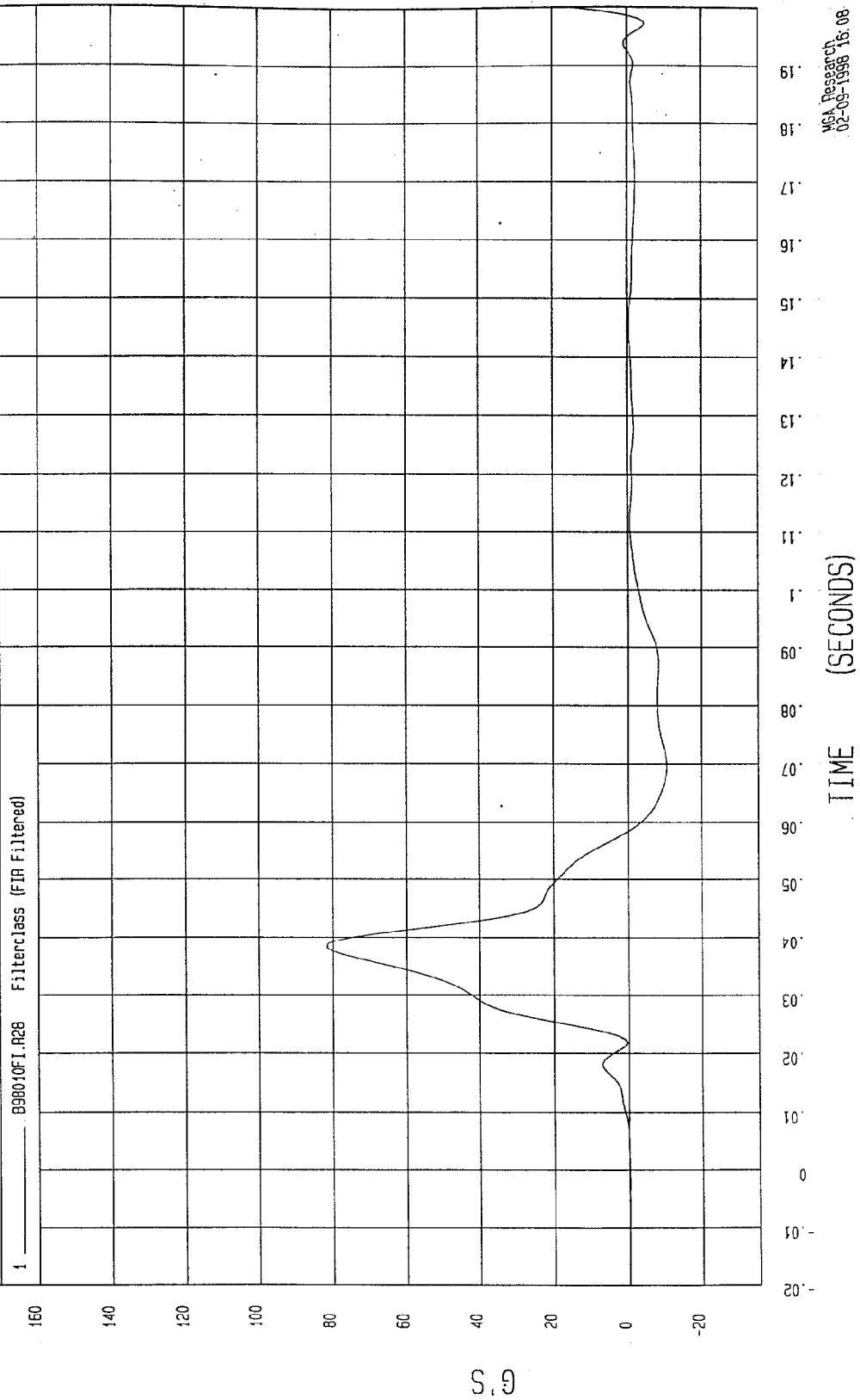
Speed: 38.25 MPH 61.6 KPH

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

Maximum = 81.73 G'S at 38 msec

Minimum = -10.82 G'S at 69 msec

REAR PASSENGER PELVIS Y ACCELERATION



TEST: NCAP SIDE IMPACT TEST

TEST DATE: 01-28-1998

COMPONENT: 1998 HYUNDAI ELANTRA (MW0501)

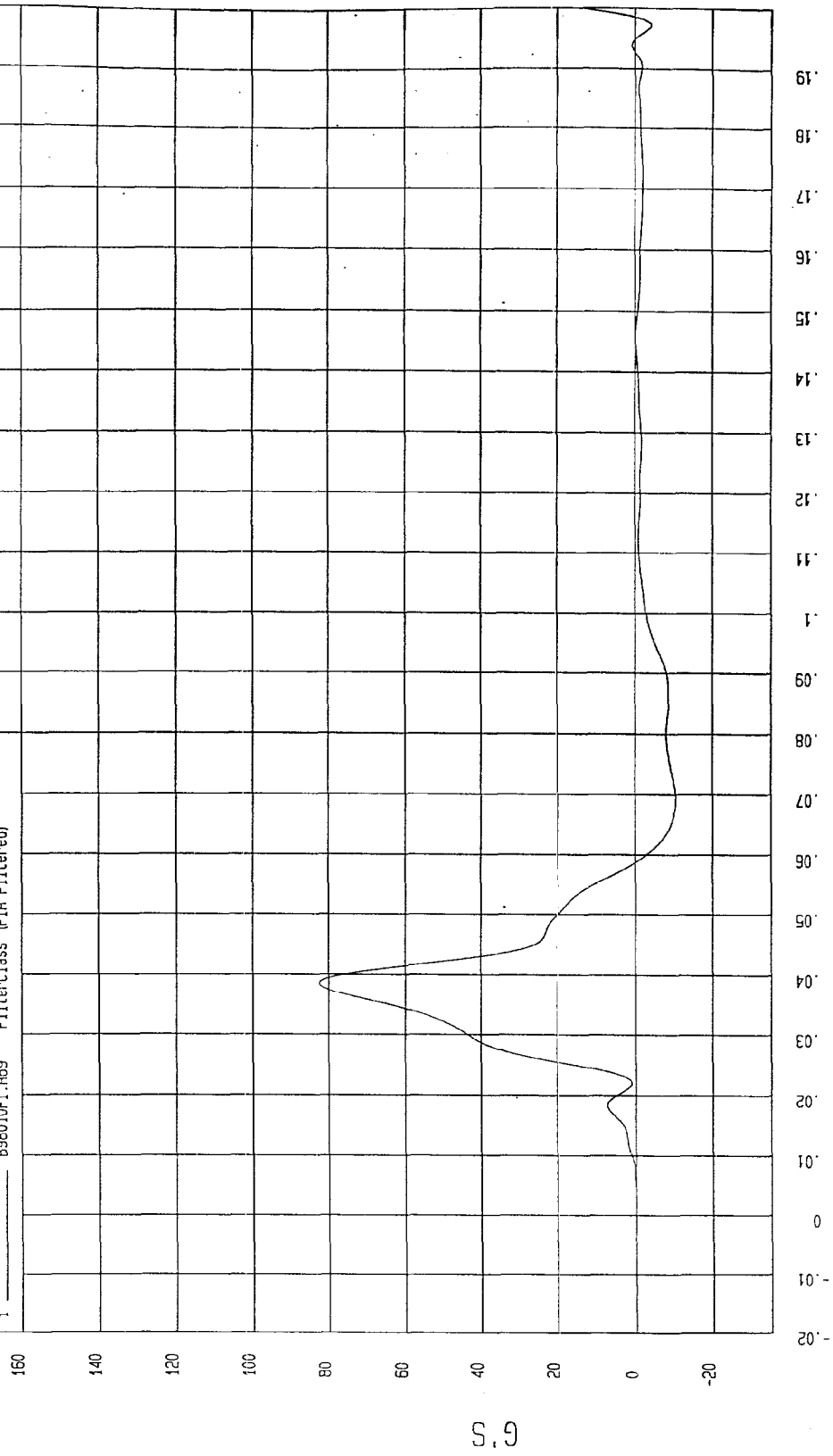
Speed: 38.25 MPH 61.6 KPH

Minimum = -10.70 G'S at 69 msec

Maximum = 82.53 G'S at 39 msec

REAR PASSENGER PELVIS Y REDUNDANT ACCELERATION

1 898010F1.R69 Filterclass (FIR Filtered)



MCA Research
02-09-1998 16:08

APPENDIX C
SID CONFIGURATION AND PERFORMANCE VERIFICATION

REPORT NO. MGA-98-DC020

DUMMY PERFORMANCE CALIBRATIONS

NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST

1998 HYUNDAI ELANTRA 4-DOOR
NHTSA NO. MW0501

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: January 28, 1998

Report Date: February 24, 1998

FINAL REPORT

Prepared For:

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
ROOM 5313, NPS-10
400 SEVENTH STREET, S.W.
Washington, D.C. 20590

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PRE-TEST CERTIFICATION DATA

Front Dummy Serial Number: 272

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: January 25, 1998

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.2
RH - Rib Height	19.75" - 20.50"	20.20
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"	20.7
SW - Knee Pivot to Floor	19.3" - 19.9"	19.6
HW - Hip Width	14.0" - 15.4"	15.0

MEASUREMENTS BY: 

APPROVED BY: 

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

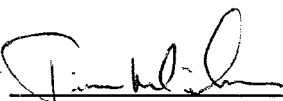
DATE: January 25, 1998

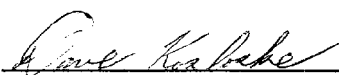
DUMMY NUMBER: 272

TEST NUMBER: D98162

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	22%
PROBE SPEED	14.0 - 14.2 fps	14.1
UPPER RIB	37 - 46 g's	42
LOWER RIB	37 - 46 g's	38
LOWER SPINE	15 - 22 g's	21

TEST MEETS SPECIFICATIONS

TECHNICIAN 

APPROVED BY 

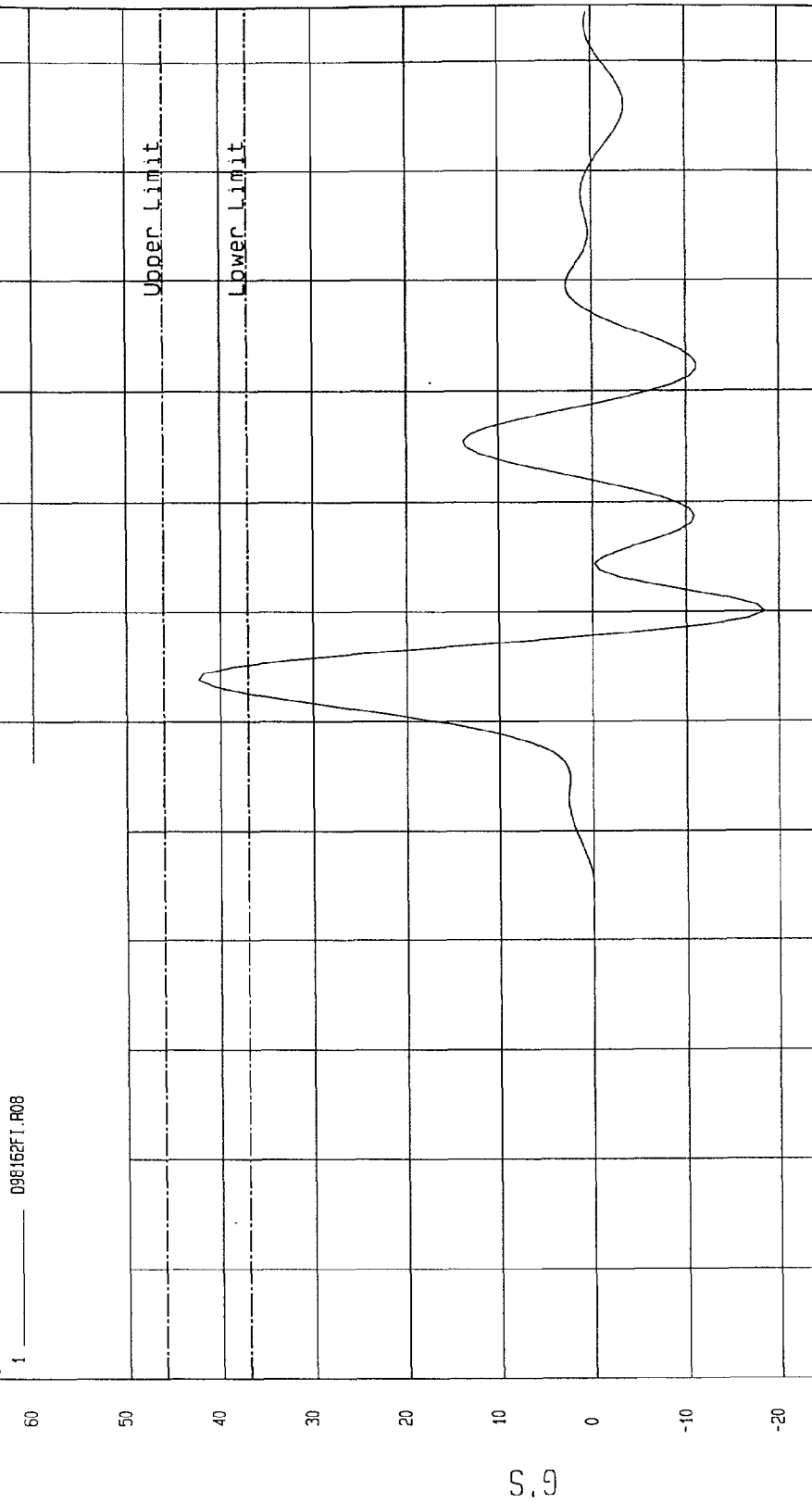
TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-25-1998 - 11:16

COMPONENT: DUMMY # 272 Velocity: 14.055 FT/SEC 4.28 M/SEC

Minimum = -18.51 G'S at 70 msec

Maximum = 42.33 G'S at 63.7 msec

UPPER RIB ACCELERATION



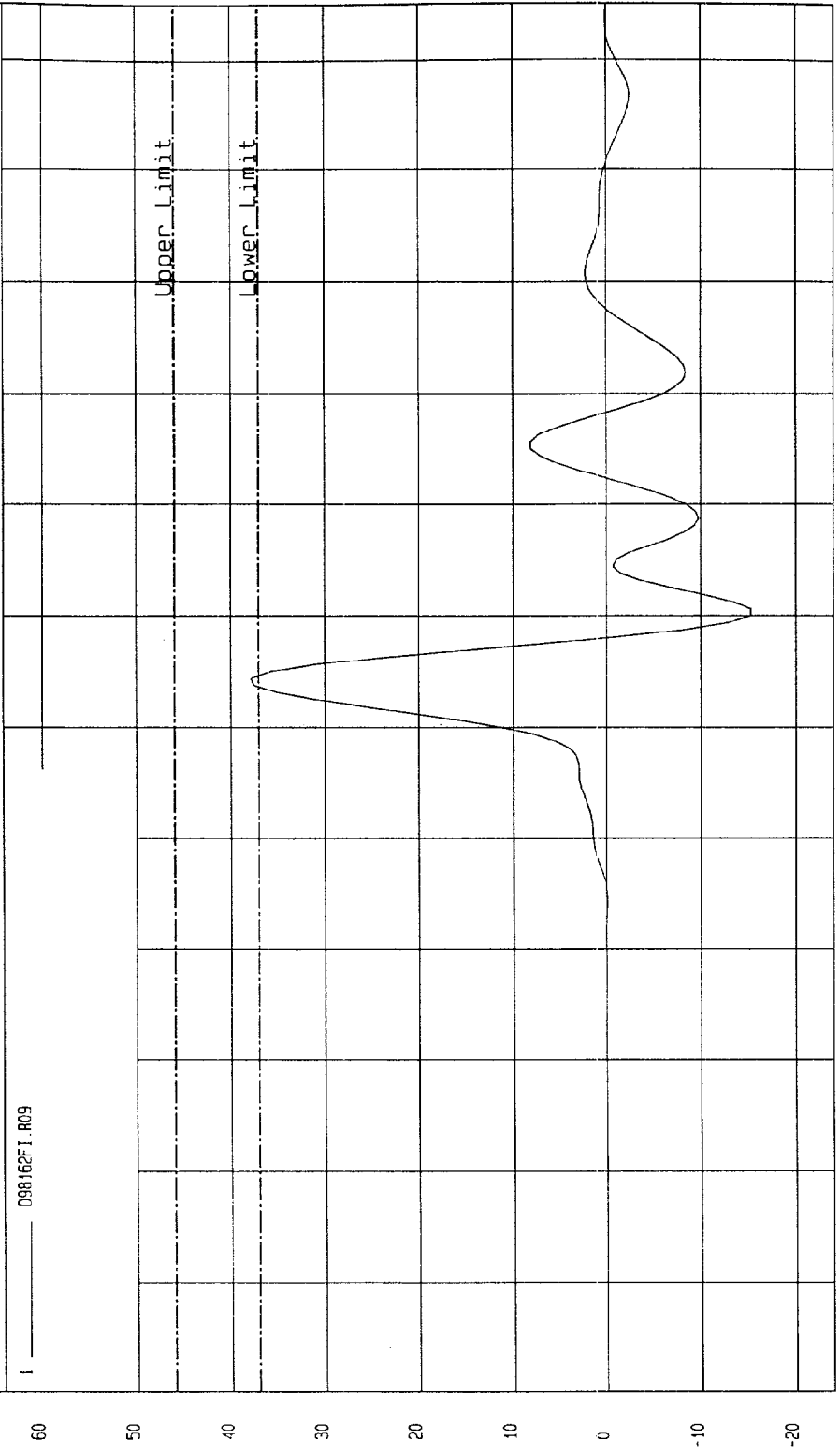
NCA Research
01-25-1998 11:17

TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-25-1998 - 11:16

COMPONENT: DUMMY # 272 Velocity: 14.055 FT/SEC 4.28 M/SEC

Minimum = -15.30 G'S at 70.6 msec Maximum = 37.81 G'S at 64.3 msec

LOWER RIB ACCELERATION



MSA Research
01-25-1998 11:17

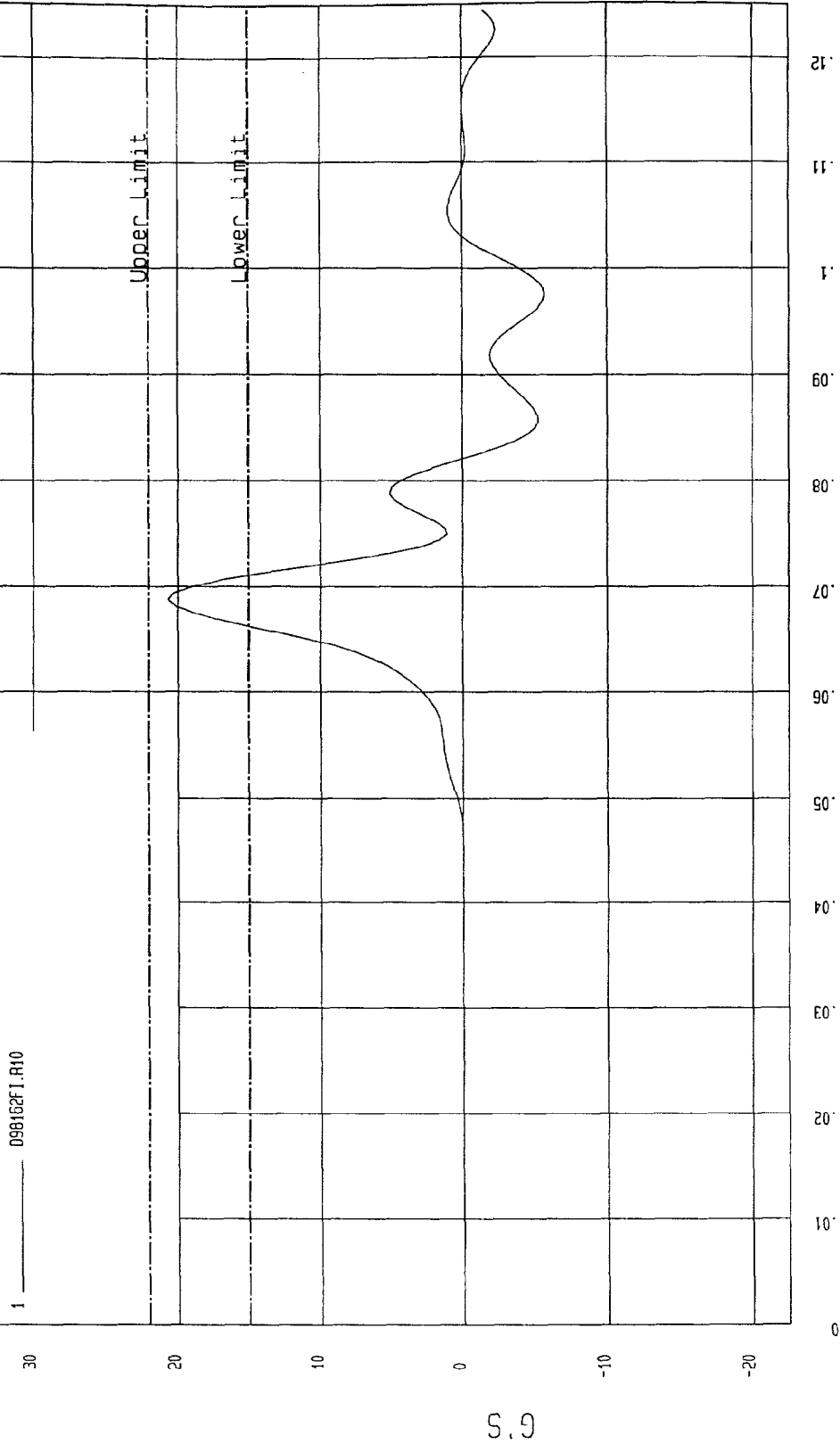
TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-25-1998 - 11:16

COMPONENT: DUMMY # 272 Velocity: 14.055 FT/SEC 4.28 M/SEC

Minimum = -5.65 G'S at 97.5 msec

Maximum = 20.69 G'S at 68.7 msec

LOWER SPINE ACCELERATION



NCA Research
01-25-1998 11:18

MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: January 13, 1998

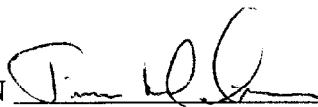
DUMMY NUMBER: 272

TEST NUMBER: D98163

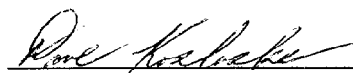
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	12%
PROBE SPEED	14.0 - 14.2 f/s	14.0
PELVIS ACCELERATION	40 - 60 g's	52

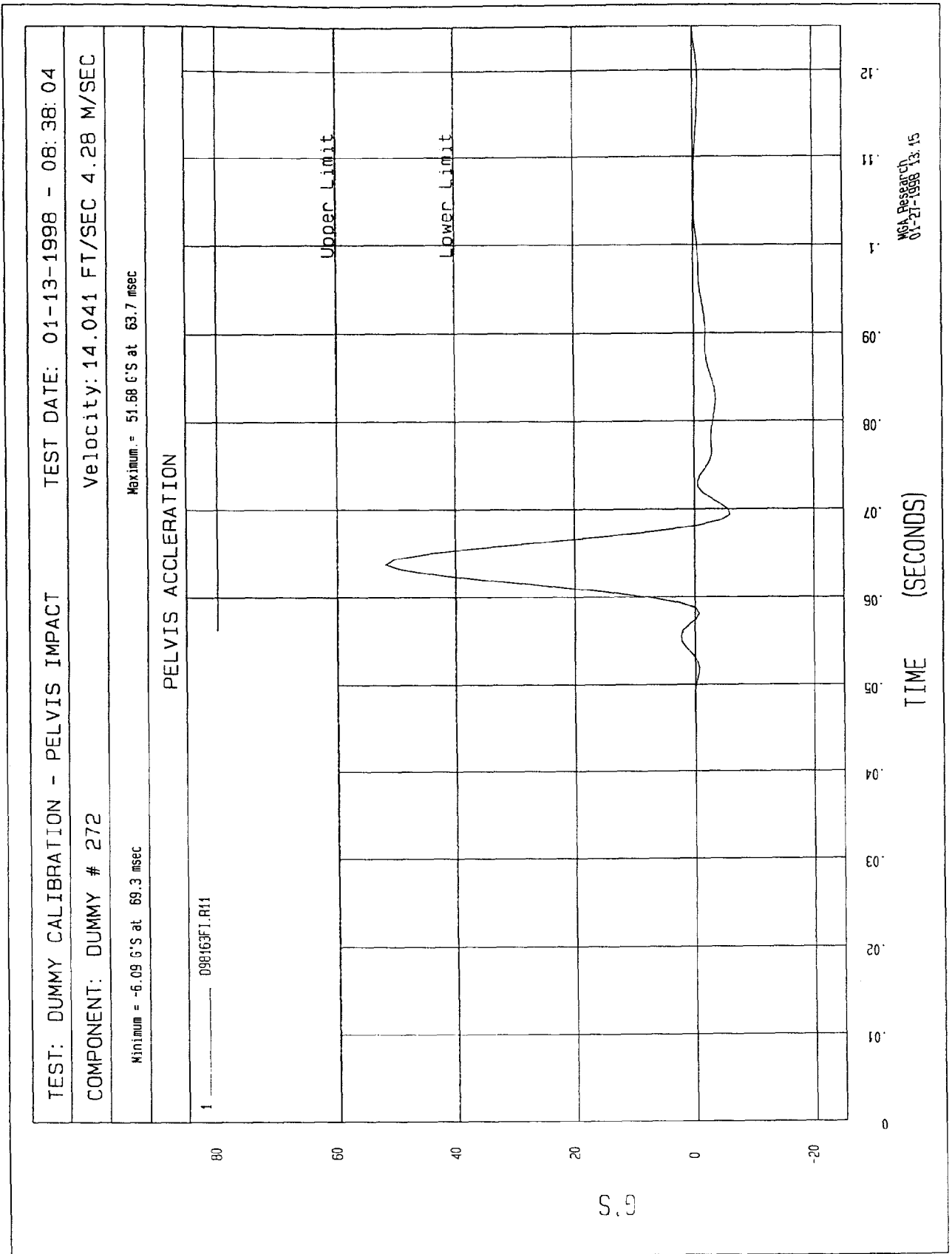
TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY





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

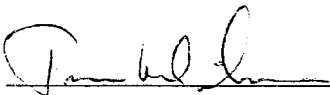
DATE: January 13, 1998

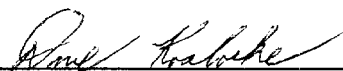
DUMMY NUMBER: 272

TEST NUMBER: D98164

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	12%
FORCE @ 0.5 in	23.3 - 36.5 lbs	31.1
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	76

TEST MEETS SPECIFICATIONS

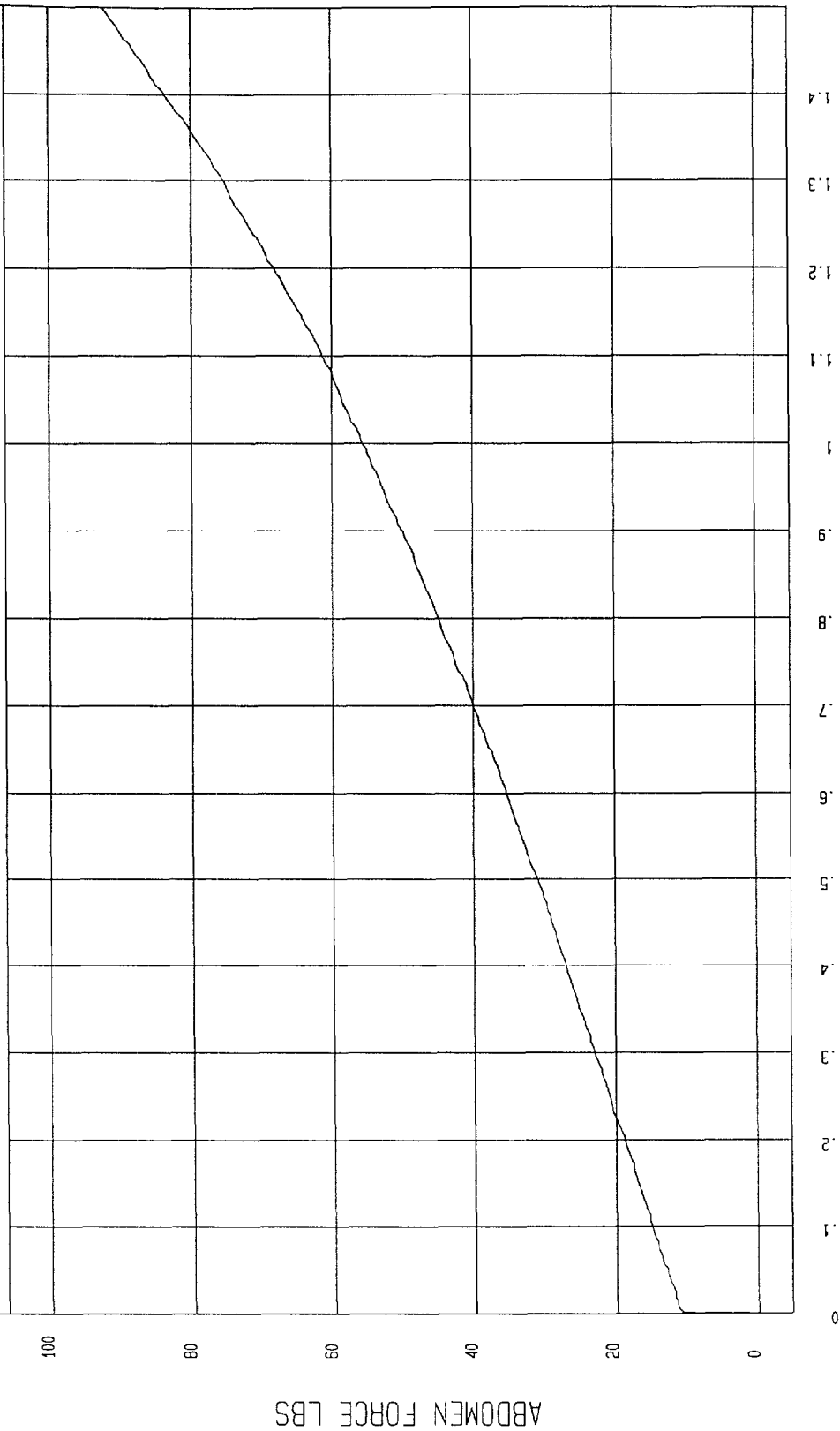
TECHNICIAN 

APPROVED BY 

TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSION TEST DATE: 01-13-1998 - 17:46

COMPONENT: DUMMY # 272

ABDOMEN FORCE as a function of ABDOMEN DISPLACEMENT



NCA Research
01-21-1998 13:20

ABDOMEN DISPLACEMENT INCHES

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: January 21, 1998

DUMMY NUMBER: 272

TEST NUMBER: D98165

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	18%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	23
FORCE @ 30°	34 - 46 lbs	34
FORCE @ 40°	46 - 58 lbs	49
RETURN ANGLE	12° maximum	6°

TEST MEETS SPECIFICATIONS

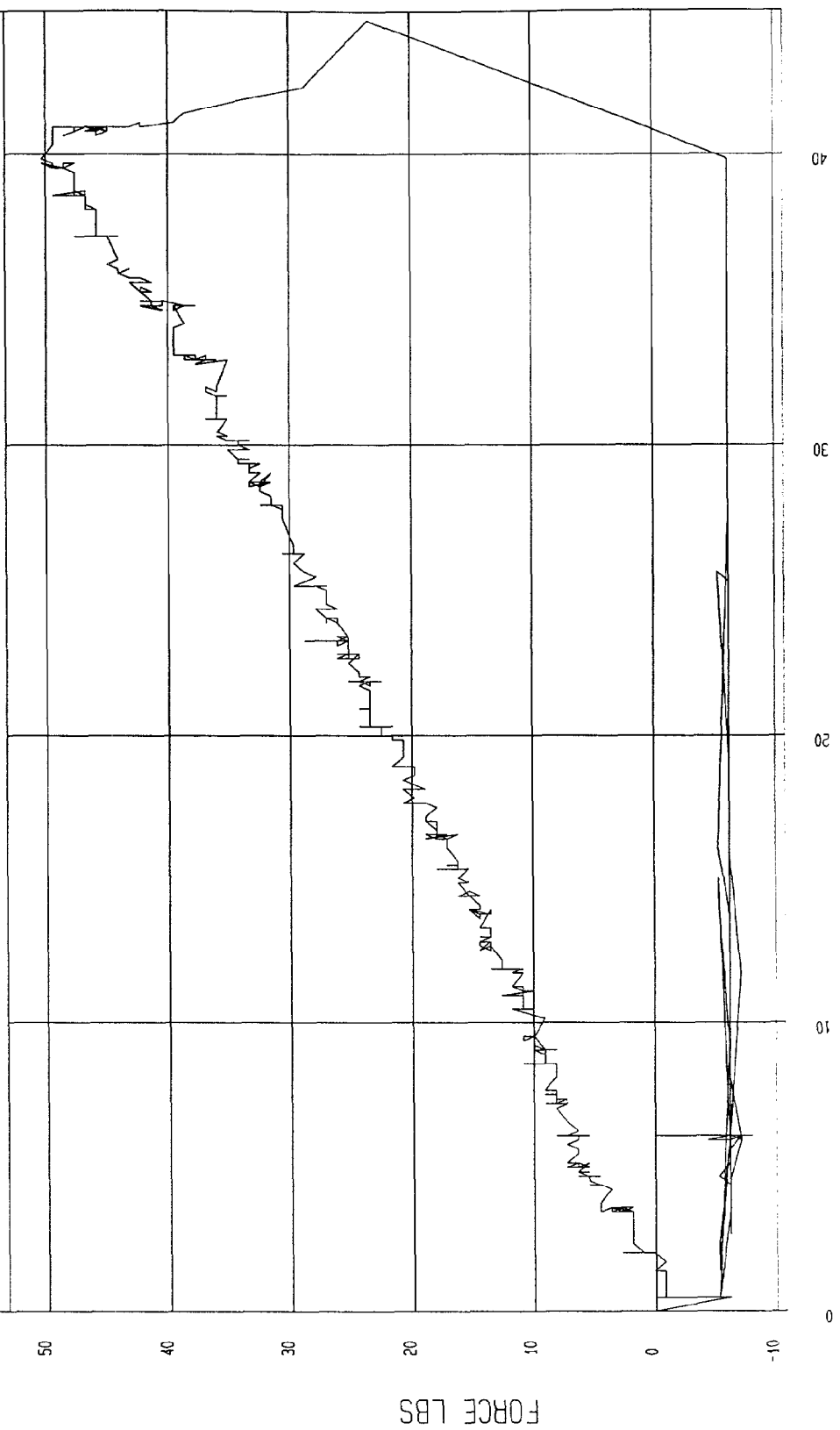
TECHNICIAN Jim W. L.

APPROVED BY David K. K.

TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 01-21-1998 - 11:03

COMPONENT: DUMMY # 272

FORCE as a function of TORSO ROTATION



MSA Research
01-21-1998 13:19

PRE-TEST CERTIFICATION DATA

Rear Dummy Serial Number: 271

Calibration Test Results Summary

Dummy 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.

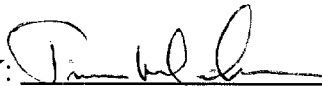
SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 271

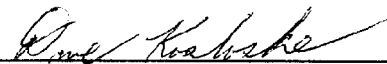
DATE OF VERIFICATION: January 27, 1998

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.6
RH - Rib Height	19.75" - 20.50"	20.40
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"	19.5
HW - Hip Width	14.0" - 15.4"	15.1

MEASUREMENTS BY:



APPROVED BY:



MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

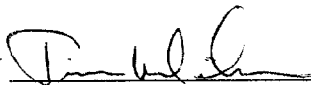
DATE: January 27, 1998

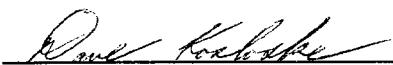
DUMMY NUMBER: 271

TEST NUMBER: D98172

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	24%
PROBE SPEED	14.0 - 14.2 fps	14.1
UPPER RIB	37 - 46 g's	45
LOWER RIB	37 - 46 g's	40
LOWER SPINE	15 - 22 g's	20

TEST MEETS SPECIFICATIONS

TECHNICIAN 

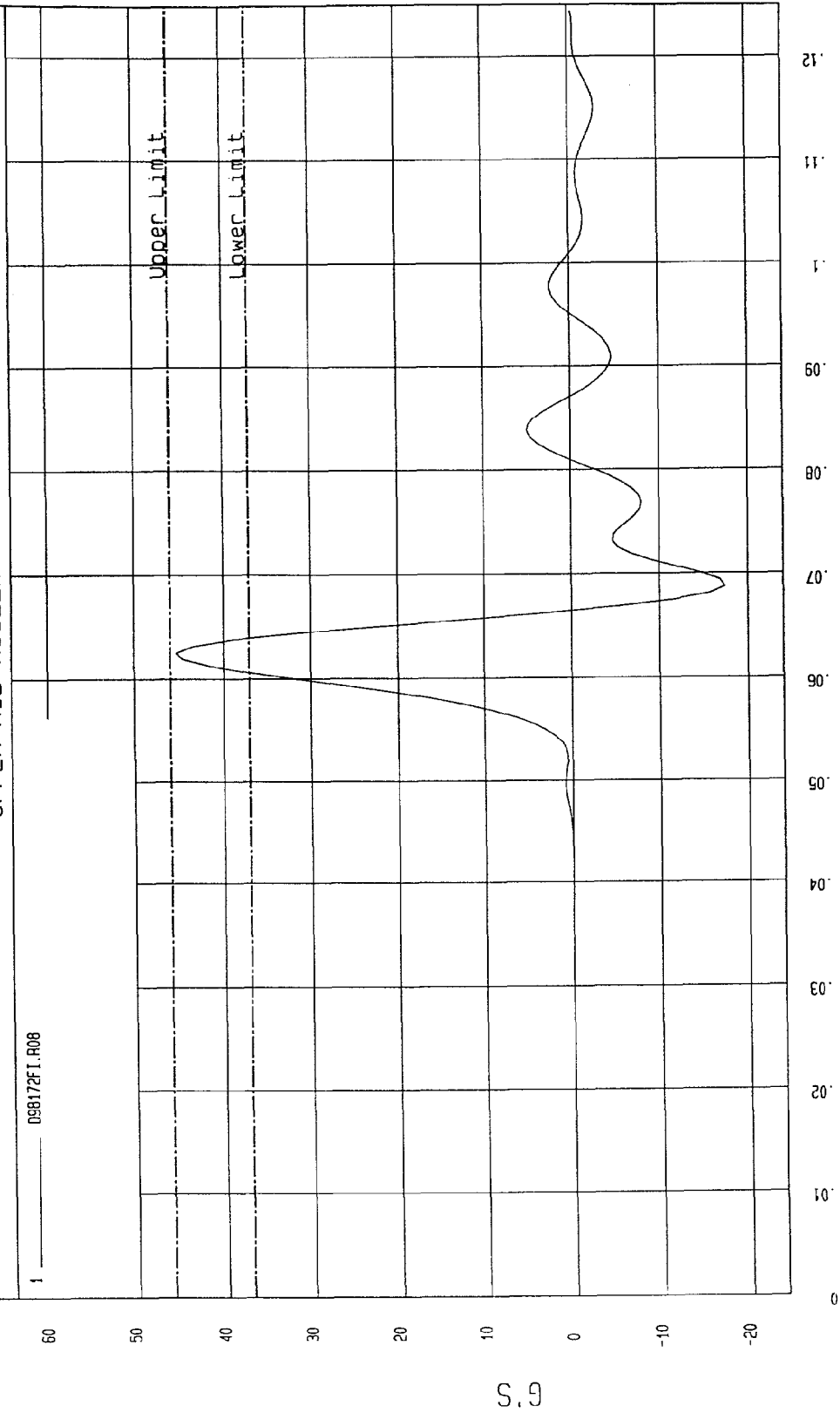
APPROVED BY 

TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-27-1998 - 19:55

COMPONENT: DUMMY # 271 Velocity: 14.066 FT/SEC 4.29 M/SEC

Minimum = -17.40 G'S at 68.7 msec Maximum = 45.36 G'S at 52.5 msec

UPPER RIB ACCELERATION



NSA Research
01-27-1998 20:01

TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-27-1998 - 19:55

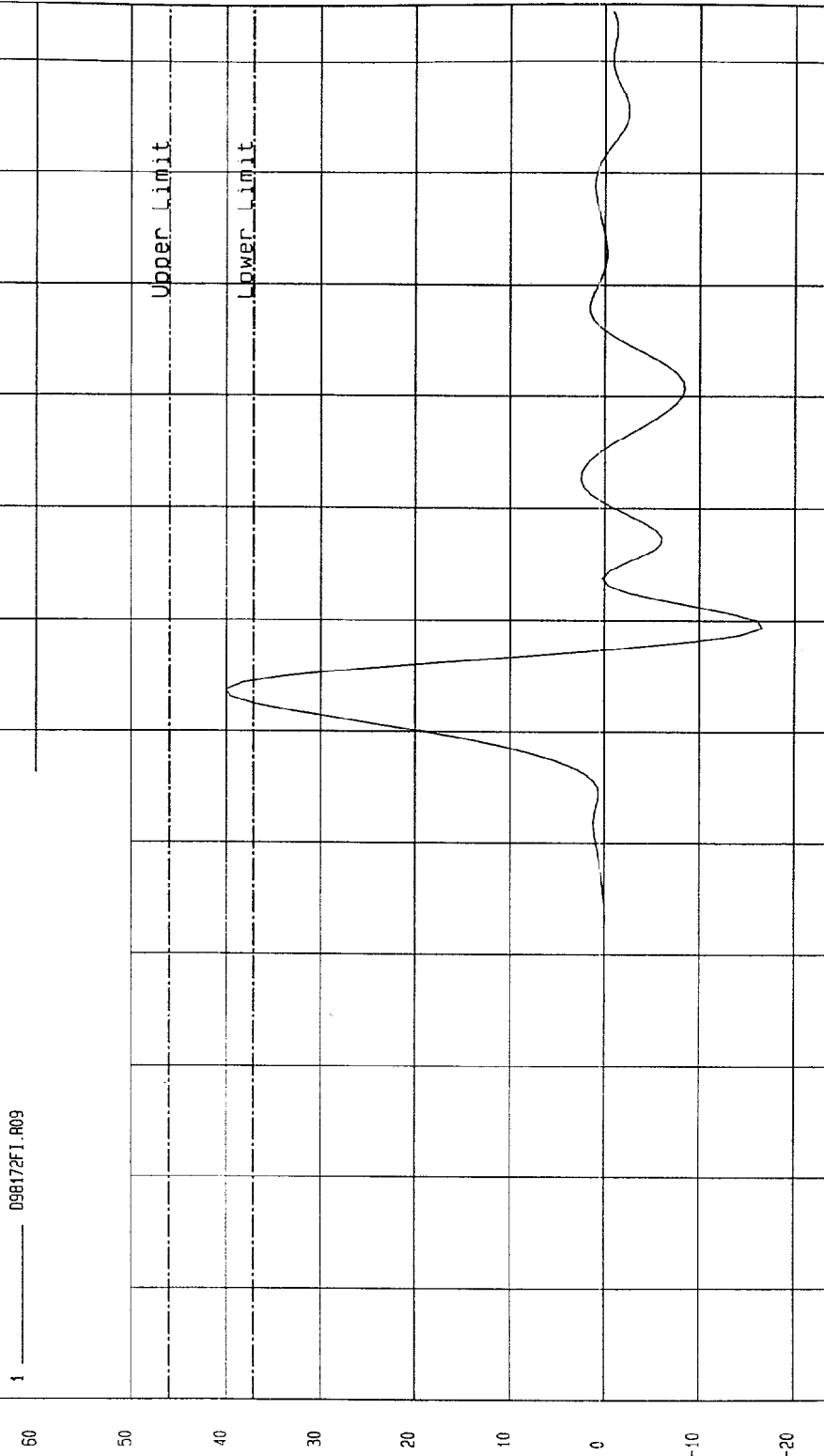
COMPONENT: DUMMY # 271 Velocity: 14.066 FT/SEC 4.29 M/SEC

Minimum = -16.57 G'S at 69.3 msec

Maximum = 40.08 G'S at 63.7 msec

LOWER RIB ACCELERATION

1 096172F1.R09



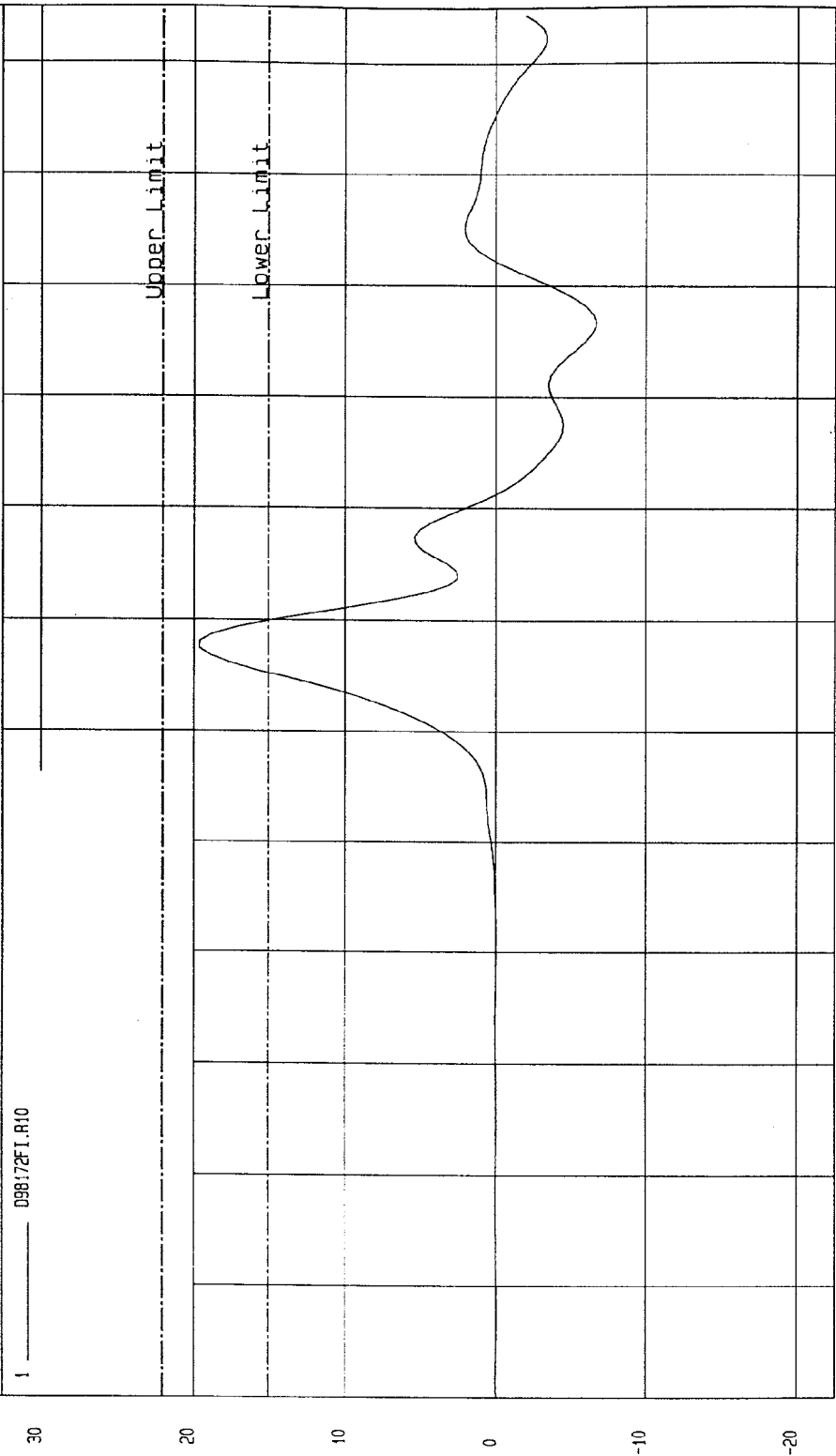
MCA Research
01-27-1998 20:01

TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-27-1998 - 19:56:29

COMPONENT: DUMMY # 271 Velocity: 14.066 FT/SEC 4.29 M/SEC

Minimum = -6.68 G'S at 96.8 msec Maximum = 19.67 G'S at 67.5 msec

LOWER SPINE ACCELERATION



TIME (SECONDS)

WCA Research
01-27-1998 20:04

MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: January 27, 1998

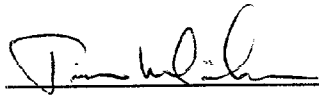
DUMMY NUMBER: 271

TEST NUMBER: D98173

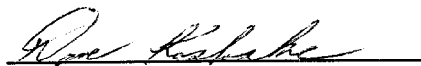
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	24%
PROBE SPEED	14.0 - 14.2 f/s	14.1
PELVIS ACCELERATION	40 - 60 g's	51

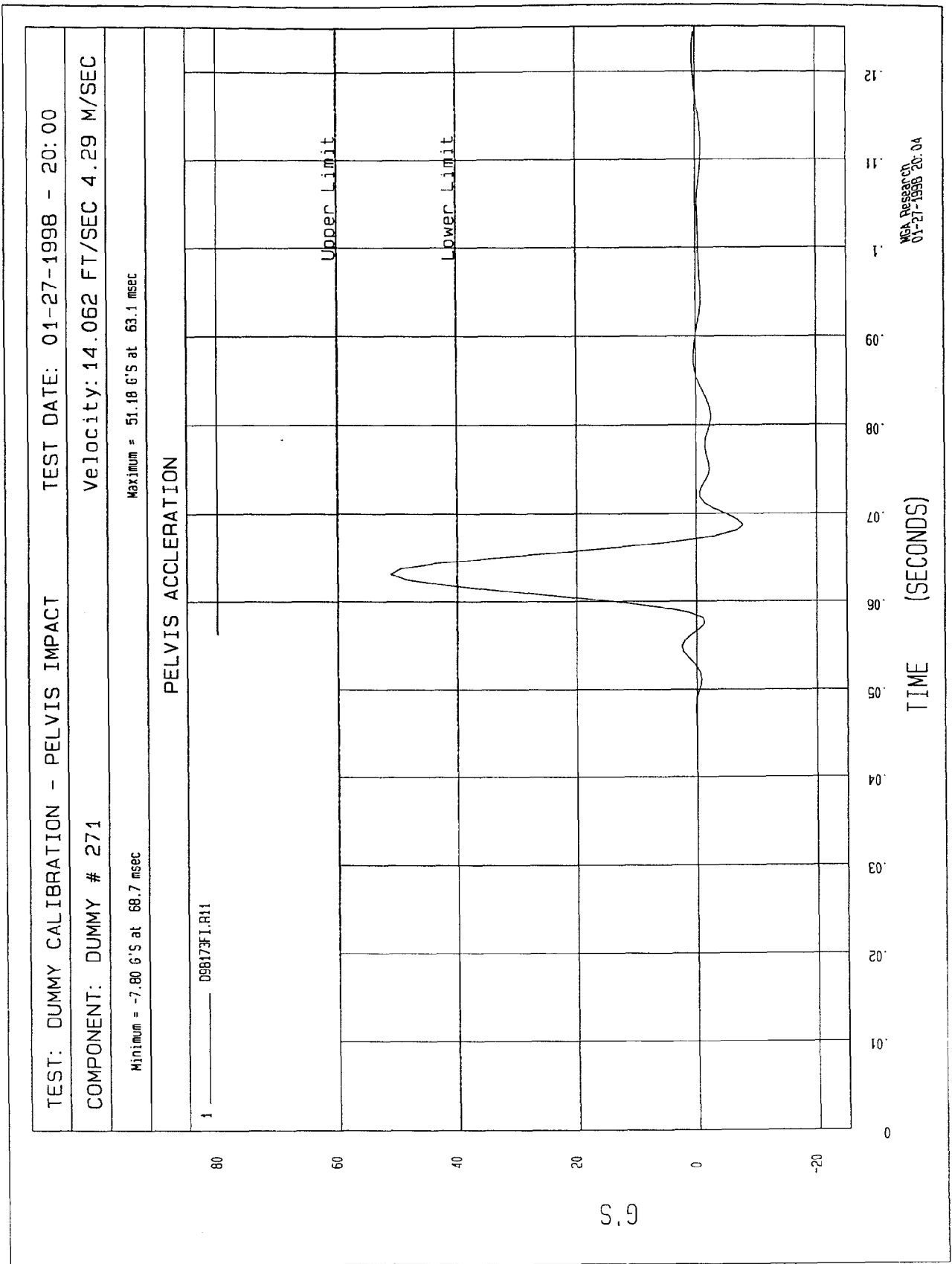
TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY





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

DATE: January 27, 1998

DUMMY NUMBER: 271

TEST NUMBER: D98174

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	24%
FORCE @ 0.5 in	23.3 - 36.5 lbs	32.3
FORCE @ 0.75 in	36.7 - 49.8 lbs	44.1
FORCE @ 1.0 in	50 - 63 lbs	58
FORCE @ 1.3 in	73 - 88 lbs	78

TEST MEETS SPECIFICATIONS

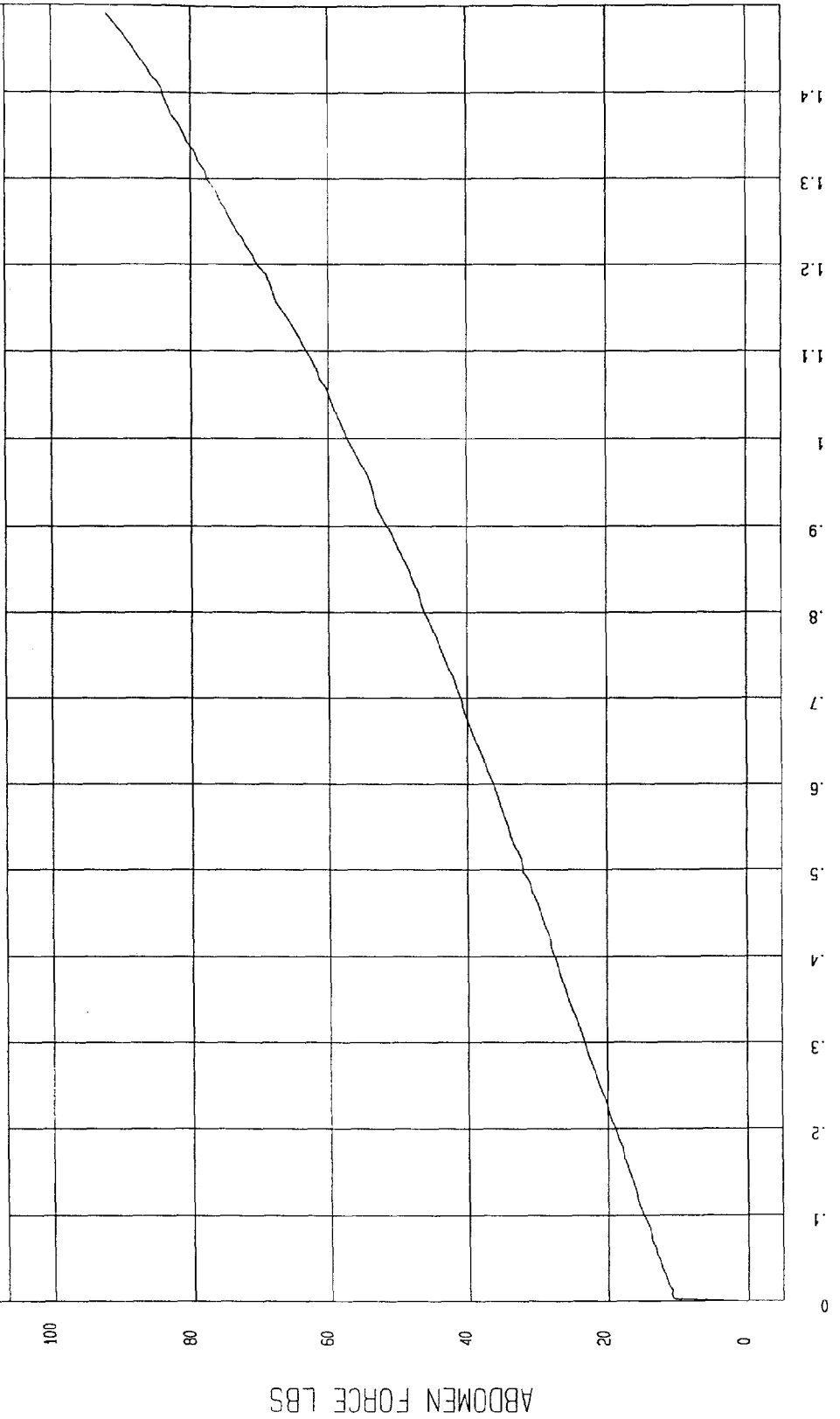
TECHNICIAN Jim White

APPROVED BY Paul Kishake

TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSION TEST DATE: 01-27-1998 - 21:02

COMPONENT: DUMMY # 271

ABDOMEN FORCE as a function of ABDOMEN DISPLACEMENT



WCA Research
01-27-1998 21:02

ABDOMEN DISPLACEMENT INCHES

ABDOMEN FORCE LBS

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: January 27, 1998

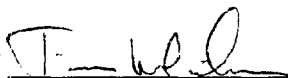
DUMMY NUMBER: 271

TEST NUMBER: D98175

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	24%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	27
FORCE @ 30°	34 - 46 lbs	39
FORCE @ 40°	46 - 58 lbs	50
RETURN ANGLE	12° maximum	6°

TEST MEETS SPECIFICATIONS

TECHNICIAN



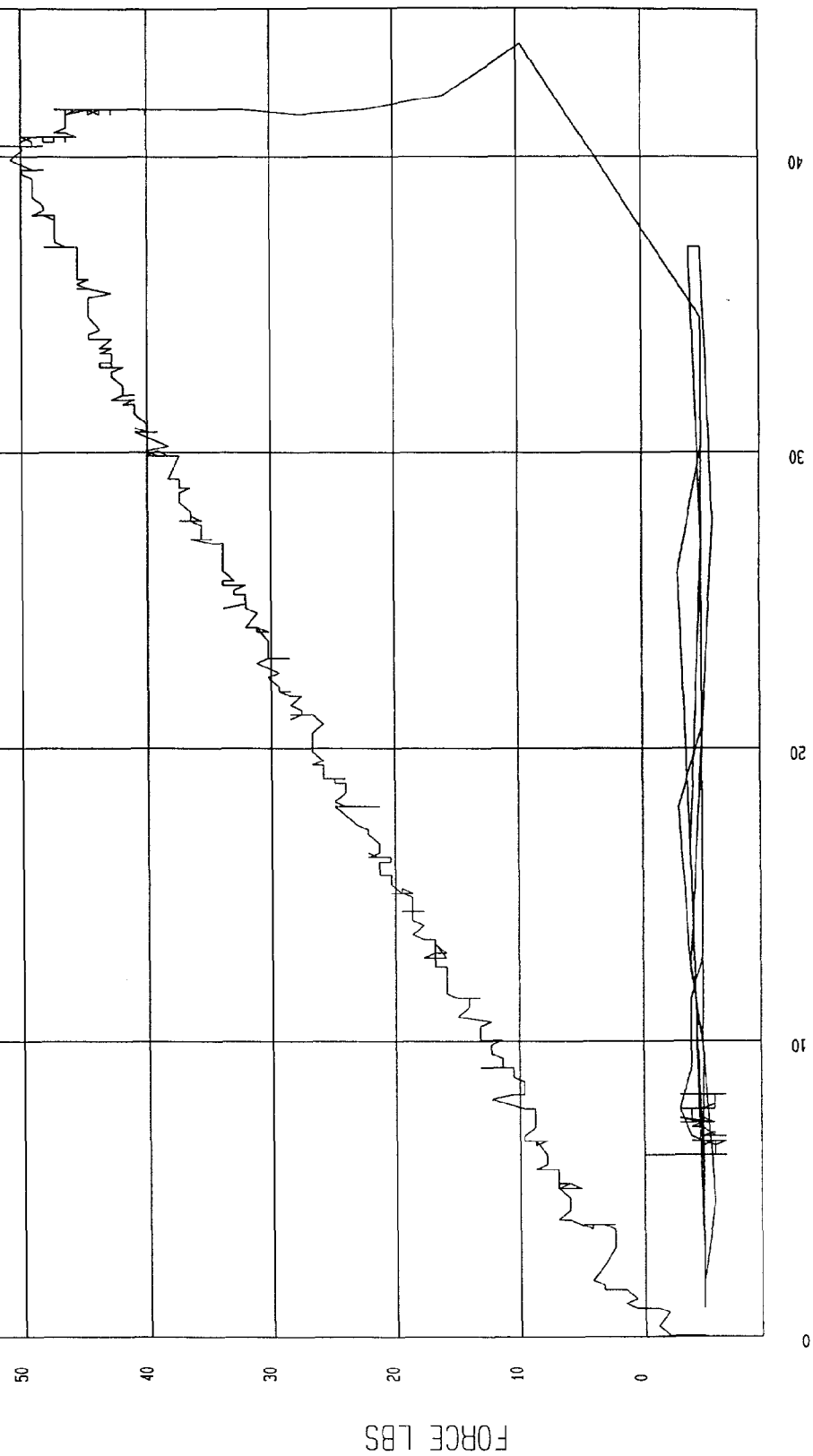
APPROVED BY



TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 01-27-1998 - 20:37

COMPONENT: DUMMY # 271

FORCE as a function of TORSO ROTATION



NCA Research
01-27-1998 20:50

POST-TEST CERTIFICATION DATA

Front 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 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: January 30, 1998

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.2
RH - Rib Height	19.75" - 20.50"	20.20
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"	20.7
SW - Knee Pivot to Floor	19.3" - 19.9"	19.6
HW - Hip Width	14.0" - 15.4"	15.0

MEASUREMENTS BY: Tim W. L.

APPROVED BY: Dave Koschke

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: January 29, 1998

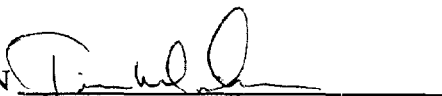
DUMMY NUMBER: 272

TEST NUMBER: D98222

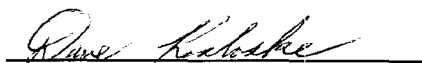
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	25%
PROBE SPEED	14.0 - 14.2 fps	14.1
UPPER RIB	37 - 46 g's	41
LOWER RIB	37 - 46 g's	39
LOWER SPINE	15 - 22 g's	19

TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY

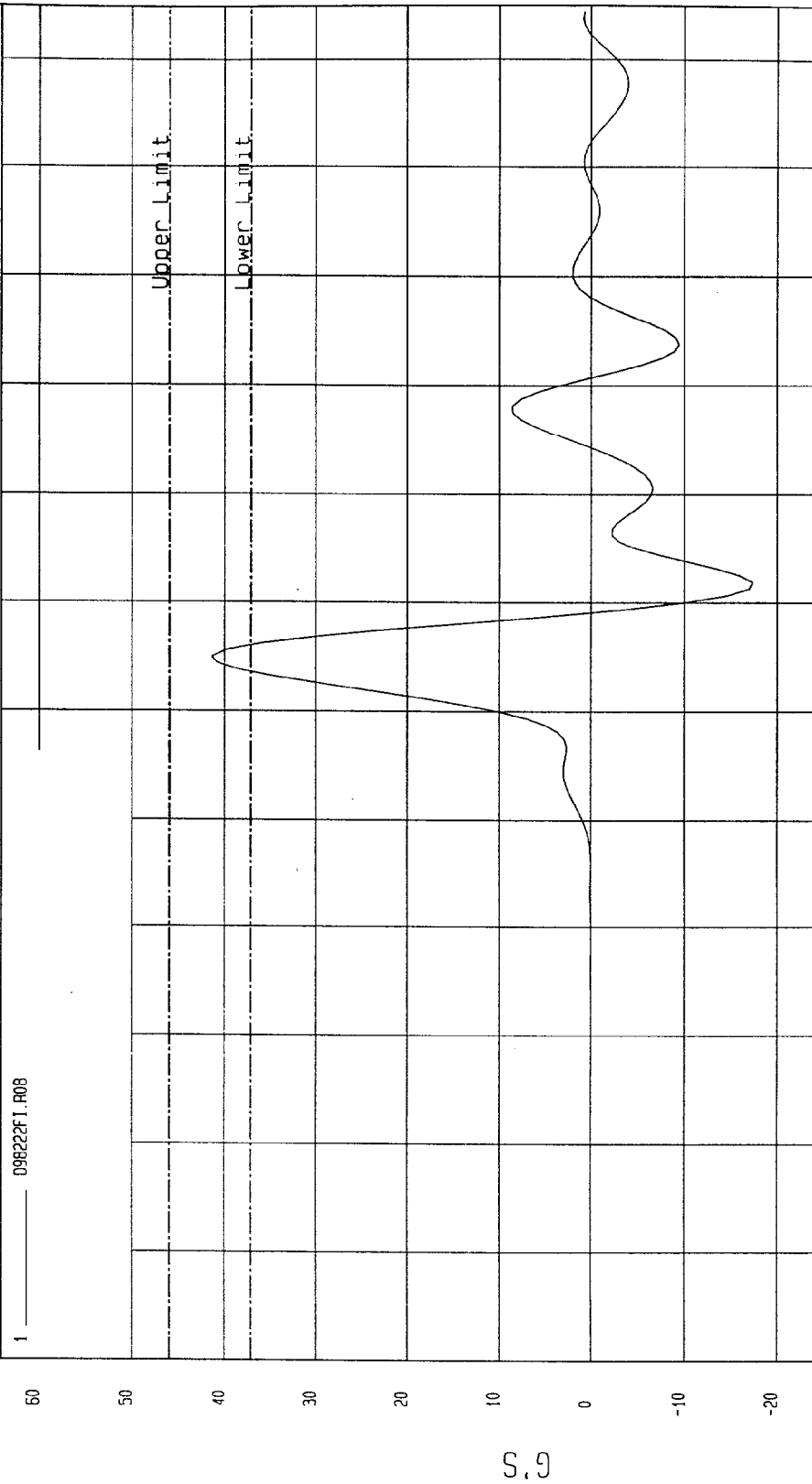


TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-29-1998 - 15:12

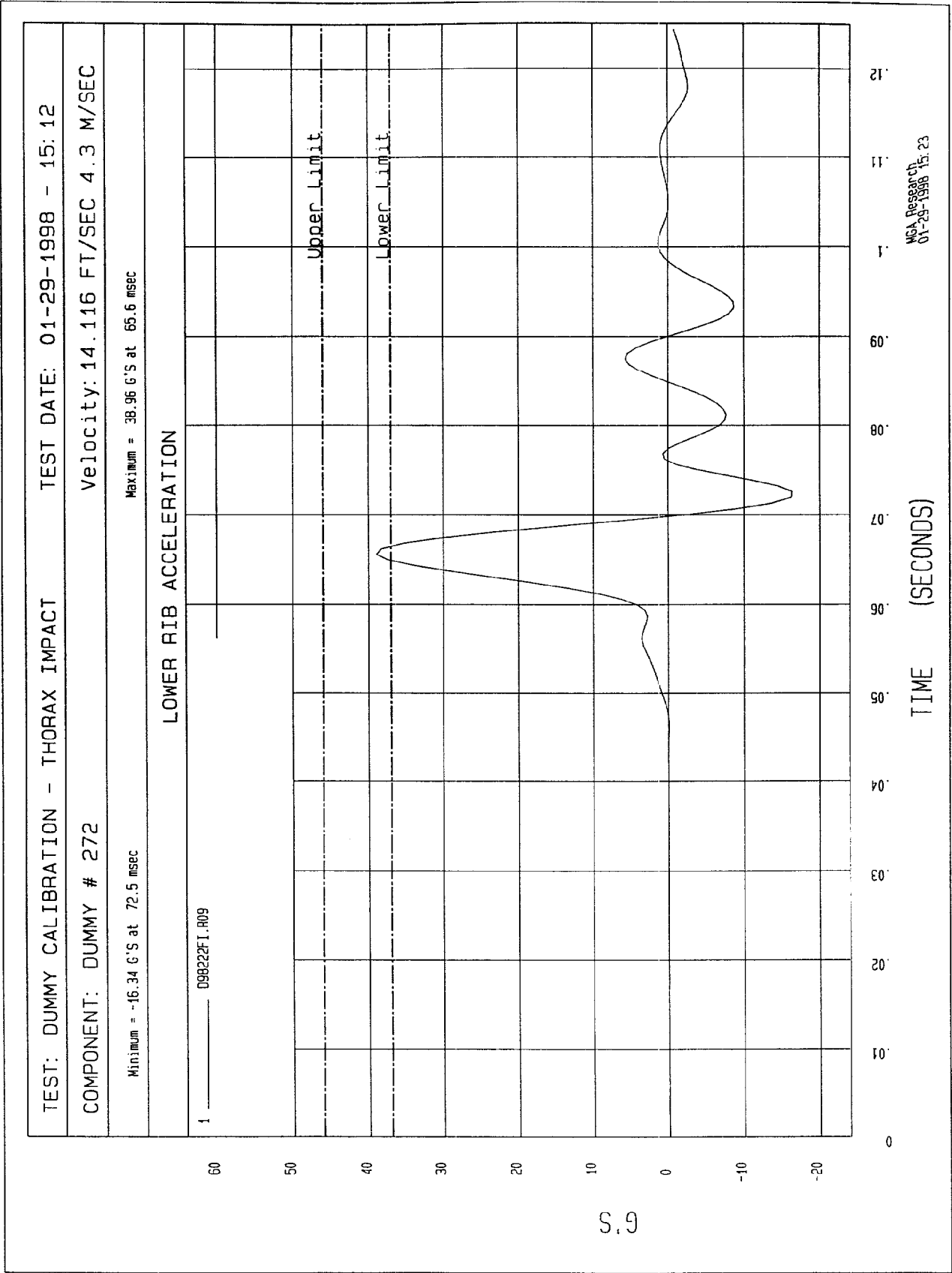
COMPONENT: DUMMY # 272 Velocity: 14.116 FT/SEC 4.3 M/SEC

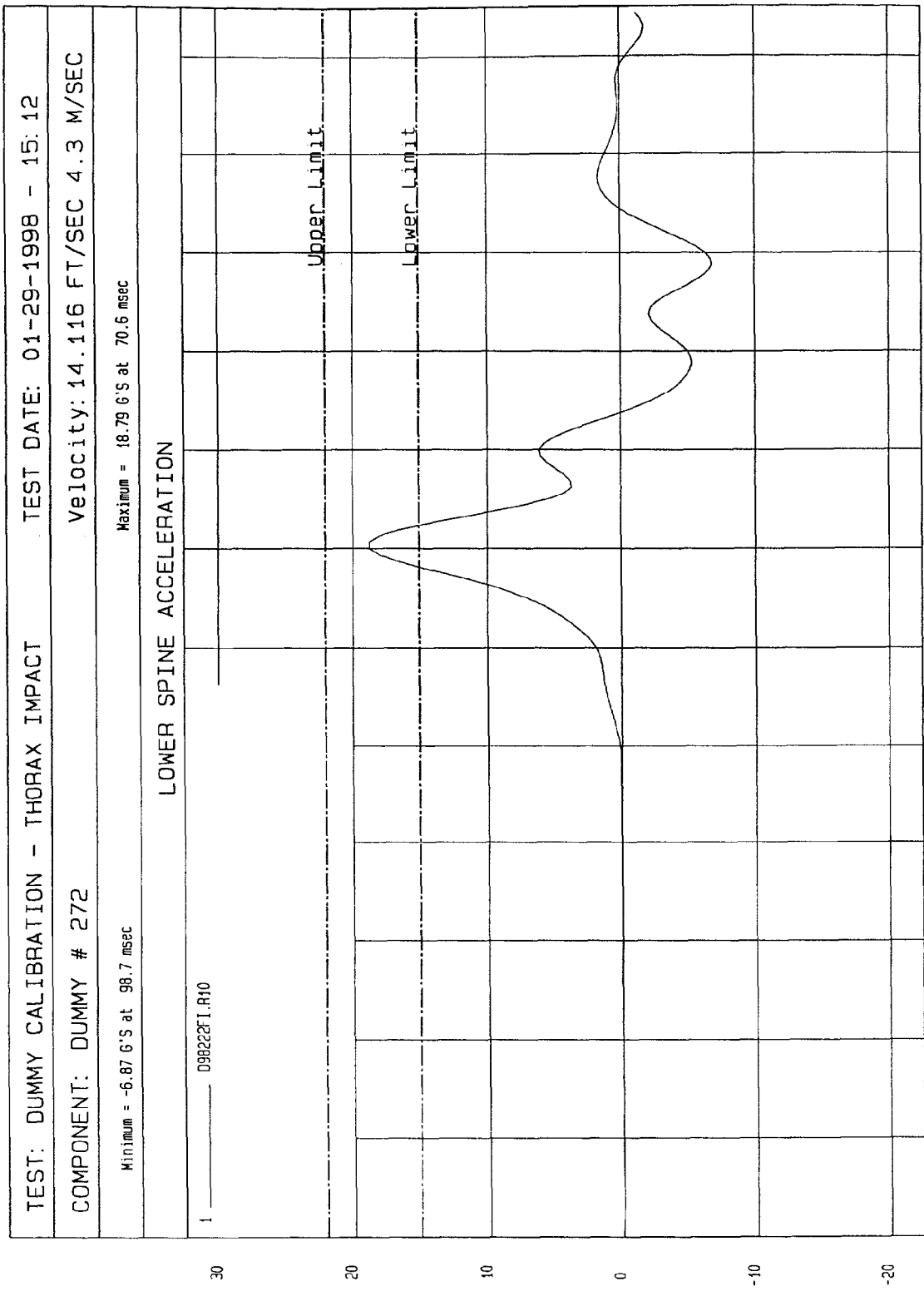
Minimum = -17.36 G'S at 71.8 msec Maximum = 41.41 G'S at 65 msec

UPPER RIB ACCELERATION



MGA Research
01-29-1998 15:23





WGA Research
01-29-1998 15:23

MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: January 29, 1998

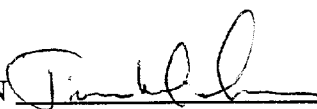
DUMMY NUMBER: 272

TEST NUMBER: D98223

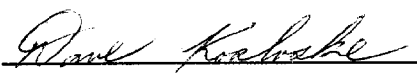
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	25%
PROBE SPEED	14.0 - 14.2 f/s	14.1
PELVIS ACCELERATION	40 - 60 g's	60

TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY

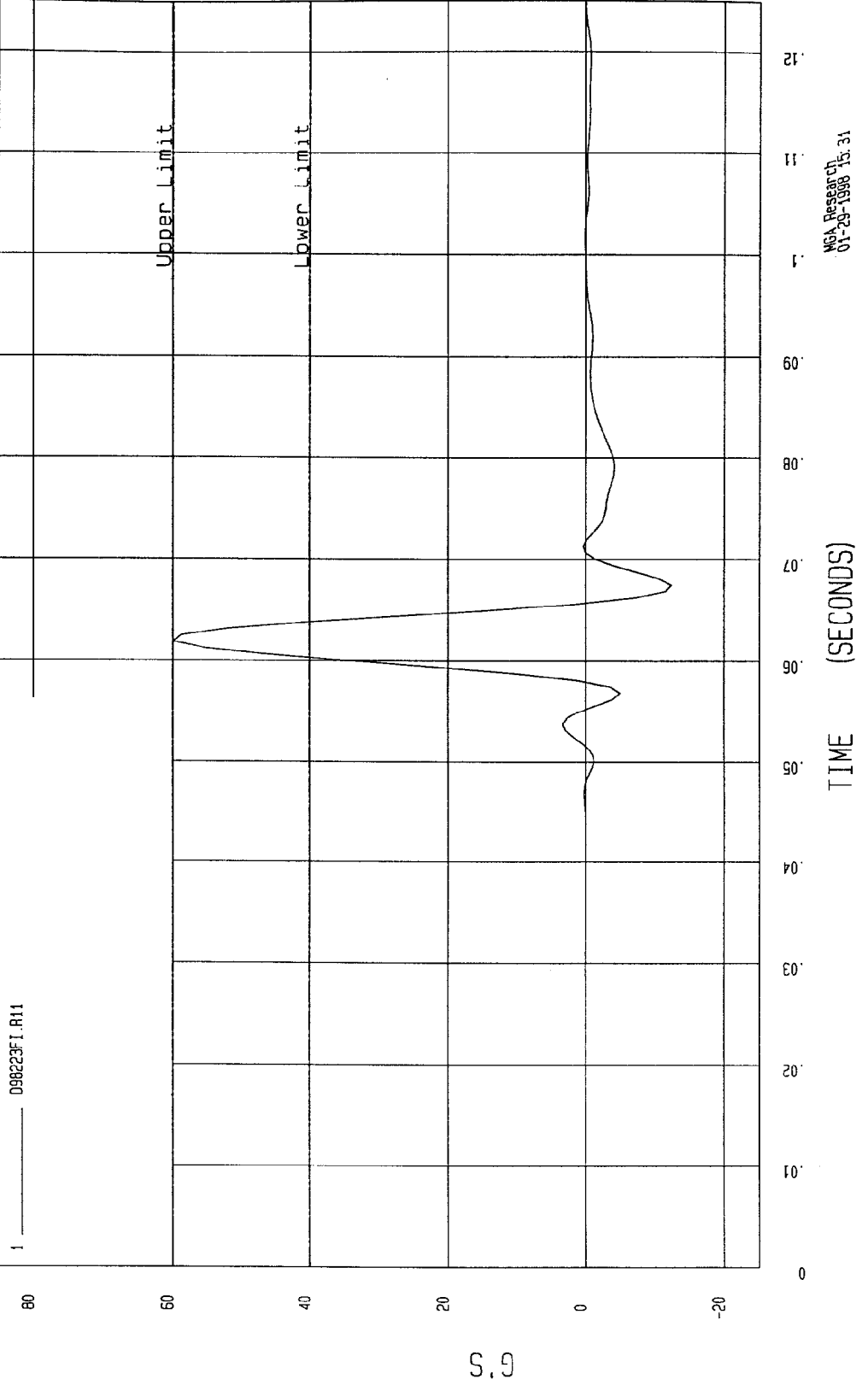


TEST: DUMMY CALIBRATION - PELVIS IMPACT TEST DATE: 01-29-1998 - 15:22:33

COMPONENT: DUMMY # 272 Velocity: 14.081 FT/SEC 4.29 M/SEC

Minimum = -12.28 G'S at 67.5 msec Maximum = 59.95 G'S at 61.8 msec

PELVIS ACCELERATION



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

DATE: January 30, 1998

DUMMY NUMBER: 272

TEST NUMBER: D98224

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	24%
FORCE @ 0.5 in	23.3 - 36.5 lbs	33.6
FORCE @ 0.75 in	36.7 - 49.8 lbs	45.6
FORCE @ 1.0 in	50 - 63 lbs	60
FORCE @ 1.3 in	73 - 88 lbs	81

TEST MEETS SPECIFICATIONS

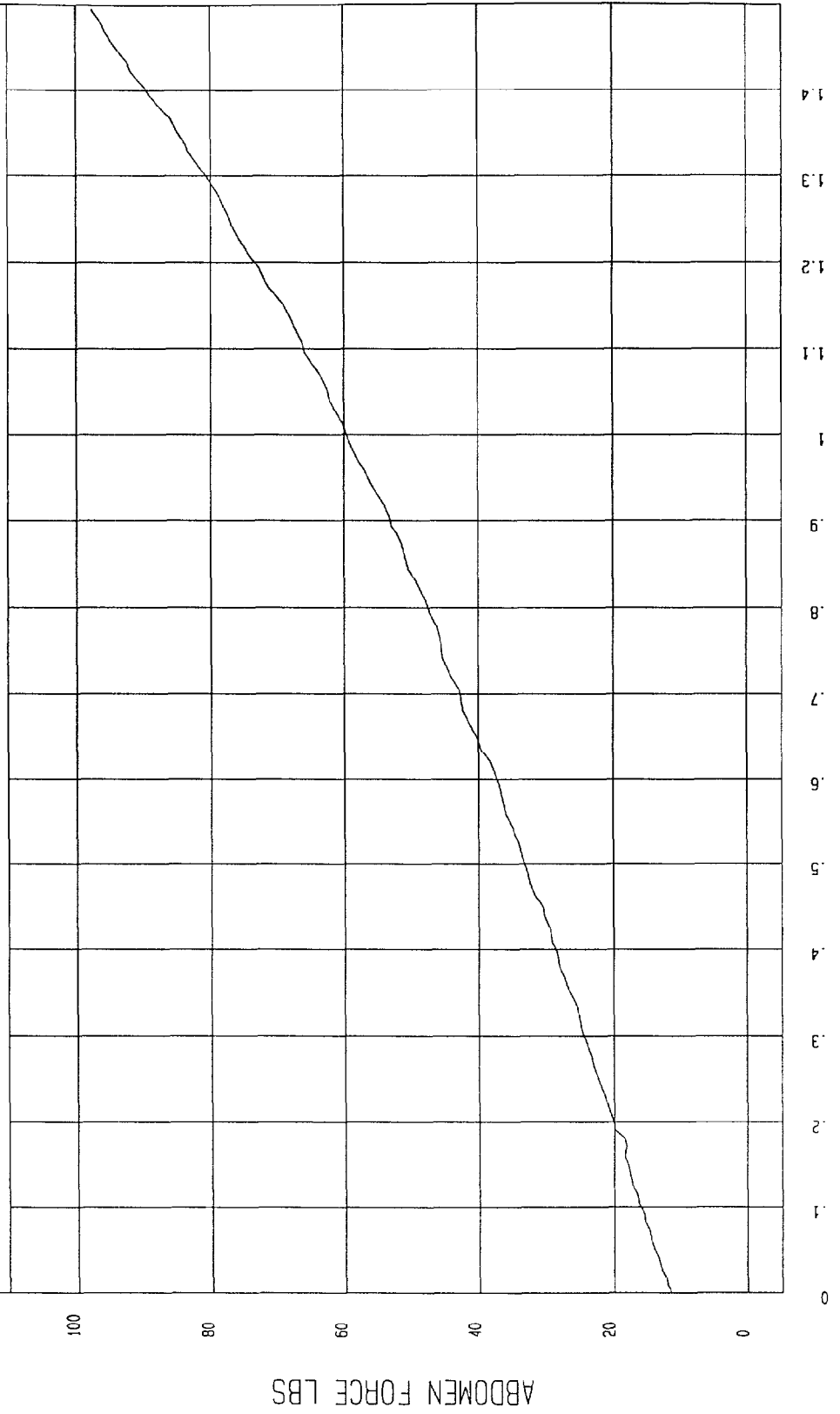
TECHNICIAN Tim W. L.

APPROVED BY Rene K. K.

TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSION TEST DATE: 01-30-1998 - 18:01

COMPONENT: DUMMY # 272

ABDOMEN FORCE as a function of ABDOMEN DISPLACEMENT



MCA Research
01-30-1998 18.04

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: January 30, 1998

DUMMY NUMBER: 272

TEST NUMBER: D98225

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	24%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	28
FORCE @ 30°	34 - 46 lbs	36
FORCE @ 40°	46 - 58 lbs	55
RETURN ANGLE	12° maximum	2°

TEST MEETS SPECIFICATIONS

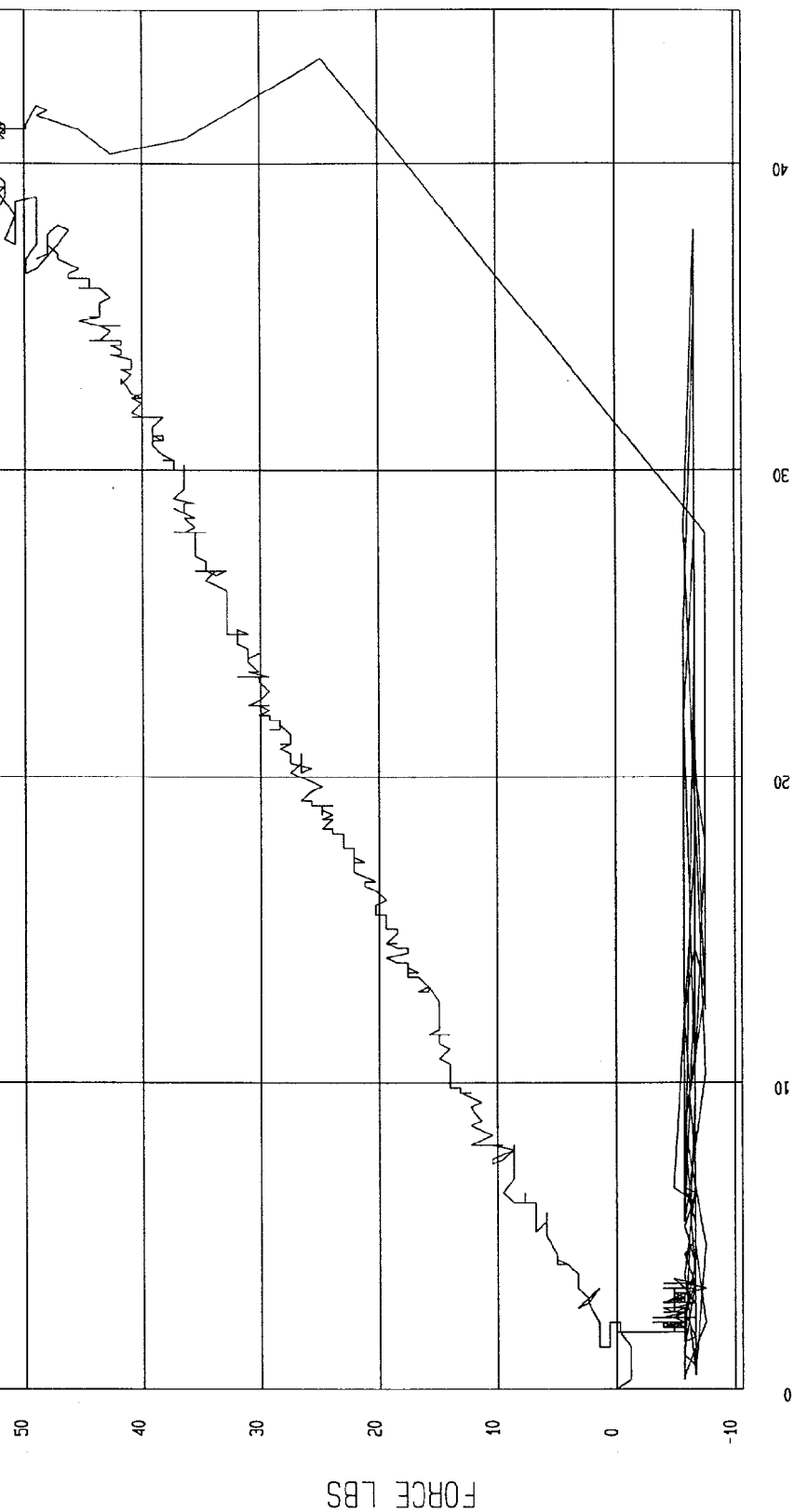
TECHNICIAN Tim White

APPROVED BY Dave Korbach

TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 01-30-1998 - 19:01

COMPONENT: DUMMY # 272

FORCE as a function of TORSO ROTATION



MGA Research
01-30-1998 19:04

POST-TEST CERTIFICATION DATA

Rear Dummy Serial Number: 271

Calibration Test Results Summary

Dummy Serial Number: 271

Post-Test Calibration

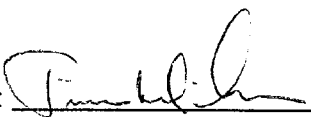
External Dimensions:	The dummy passed all external dimension requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion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

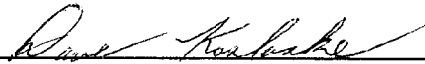
SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 271

DATE OF VERIFICATION: January 30, 1998

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.6
RH - Rib Height	19.75" - 20.50"	20.40
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"	19.5
HW - Hip Width	14.0" - 15.4"	15.1

MEASUREMENTS BY: 

APPROVED BY: 

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

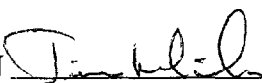
DATE: January 29, 1998

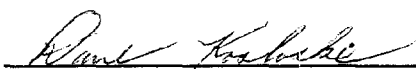
DUMMY NUMBER: 271

TEST NUMBER: D98212

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	25%
PROBE SPEED	14.0 - 14.2 fps	14.1
UPPER RIB	37 - 46 g's	43
LOWER RIB	37 - 46 g's	42
LOWER SPINE	15 - 22 g's	20

TEST MEETS SPECIFICATIONS

TECHNICIAN 

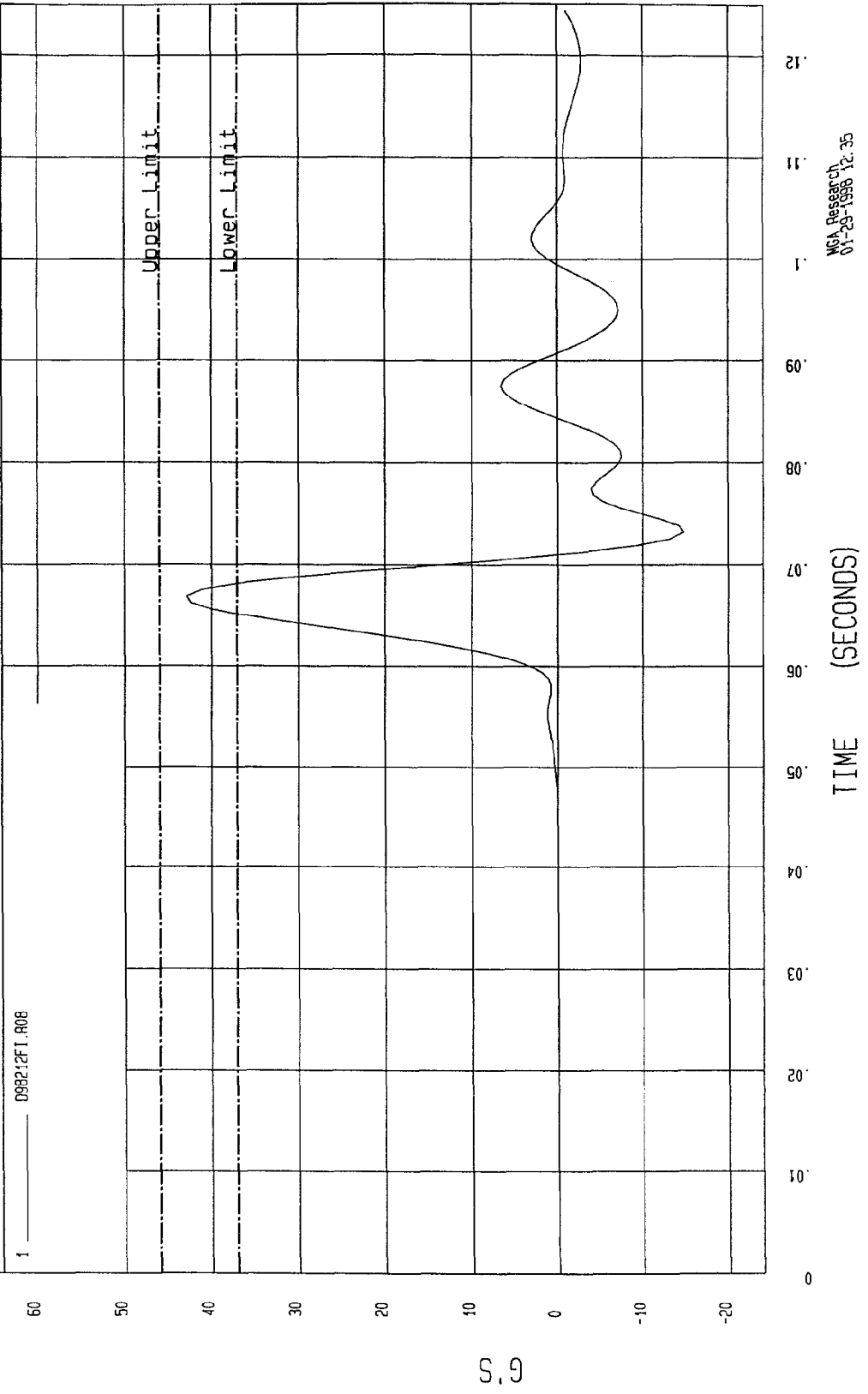
APPROVED BY 

TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-29-1998 - 12:13

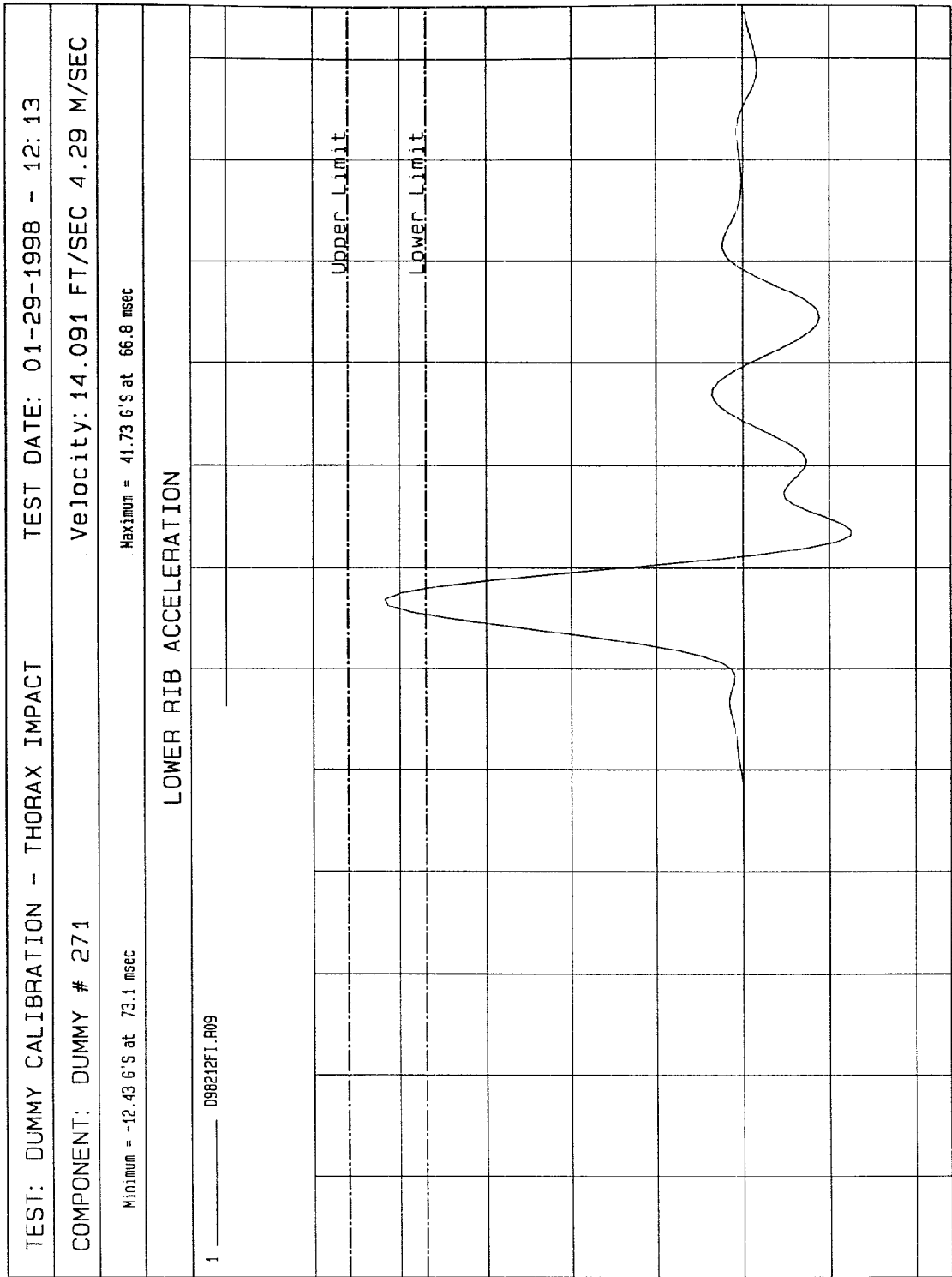
COMPONENT: DUMMY # 271 Velocity: 14.091 FT/SEC 4.29 M/SEC

Minimum = -14.84 G'S at 73.1 msec Maximum = 42.92 G'S at 66.8 msec

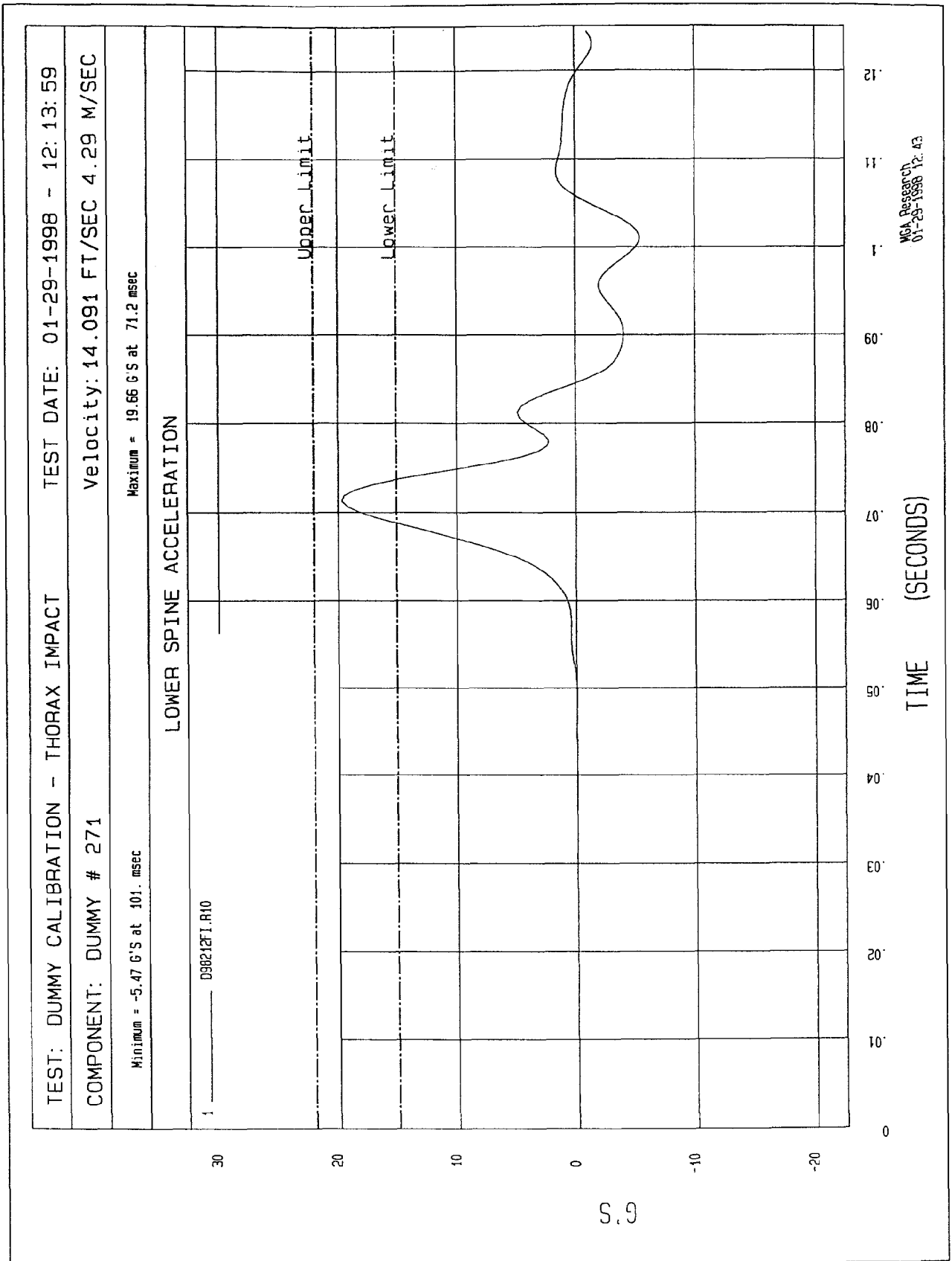
UPPER RIB ACCELERATION



WCA Research
01-29-1998 12:35



MGA Research
01-29-1998 12:35



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: January 29, 1998

DUMMY NUMBER: 271

TEST NUMBER: D98213

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	25%
PROBE SPEED	14.0 - 14.2 f/s	14.1
PELVIS ACCELERATION	40 - 60 g's	56

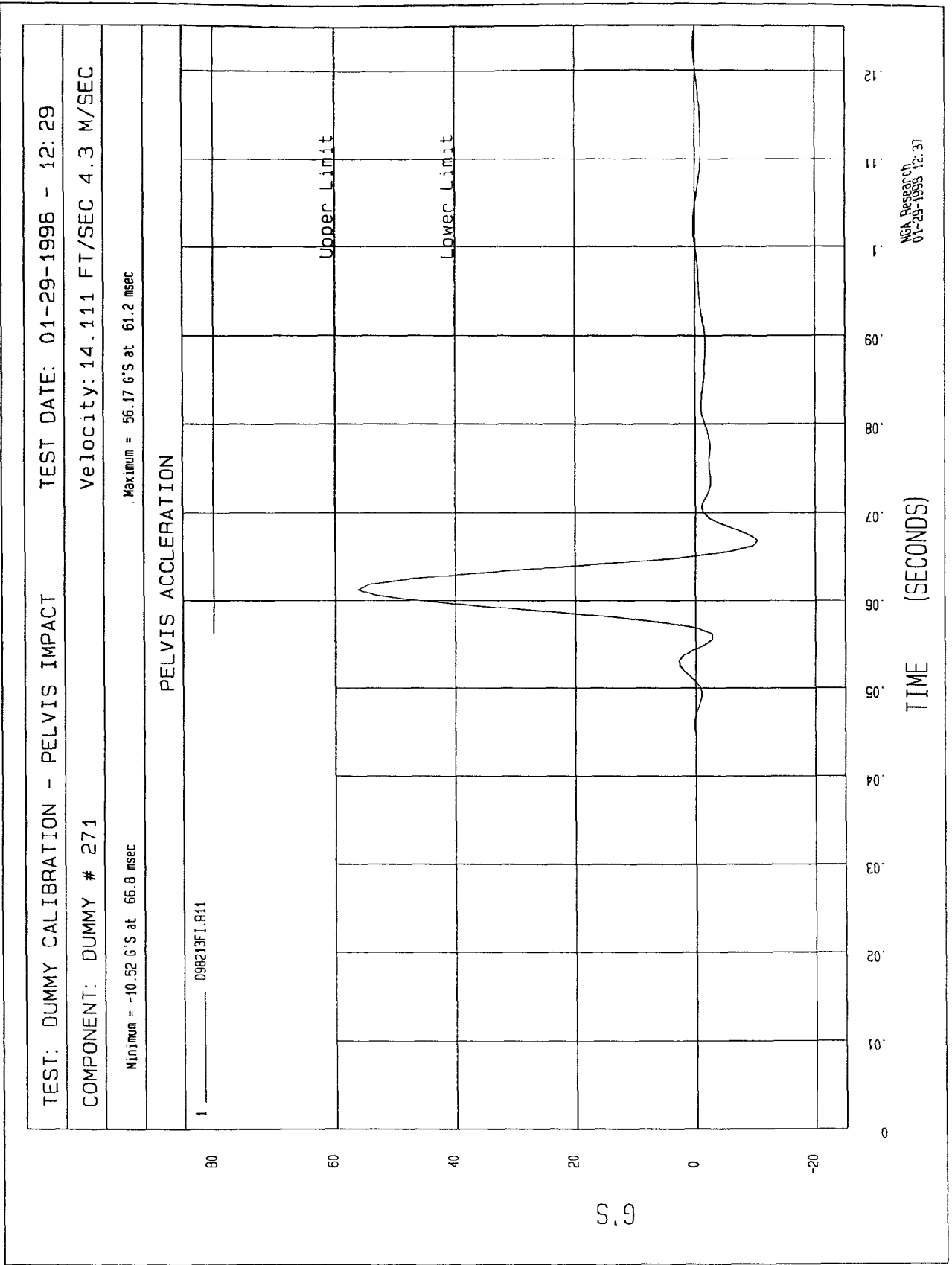
TEST MEETS SPECIFICATIONS

TECHNICIAN

Tim White

APPROVED BY

Gene Kelsch



NCA Research
01-29-1998 12: 31

MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

DATE: January 30, 1998

DUMMY NUMBER: 271

TEST NUMBER: D98214

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	24%
FORCE @ 0.5 in	23.3 - 36.5 lbs	30.4
FORCE @ 0.75 in	36.7 - 49.8 lbs	41.2
FORCE @ 1.0 in	50 - 63 lbs	55
FORCE @ 1.3 in	73 - 88 lbs	73

TEST MEETS SPECIFICATIONS

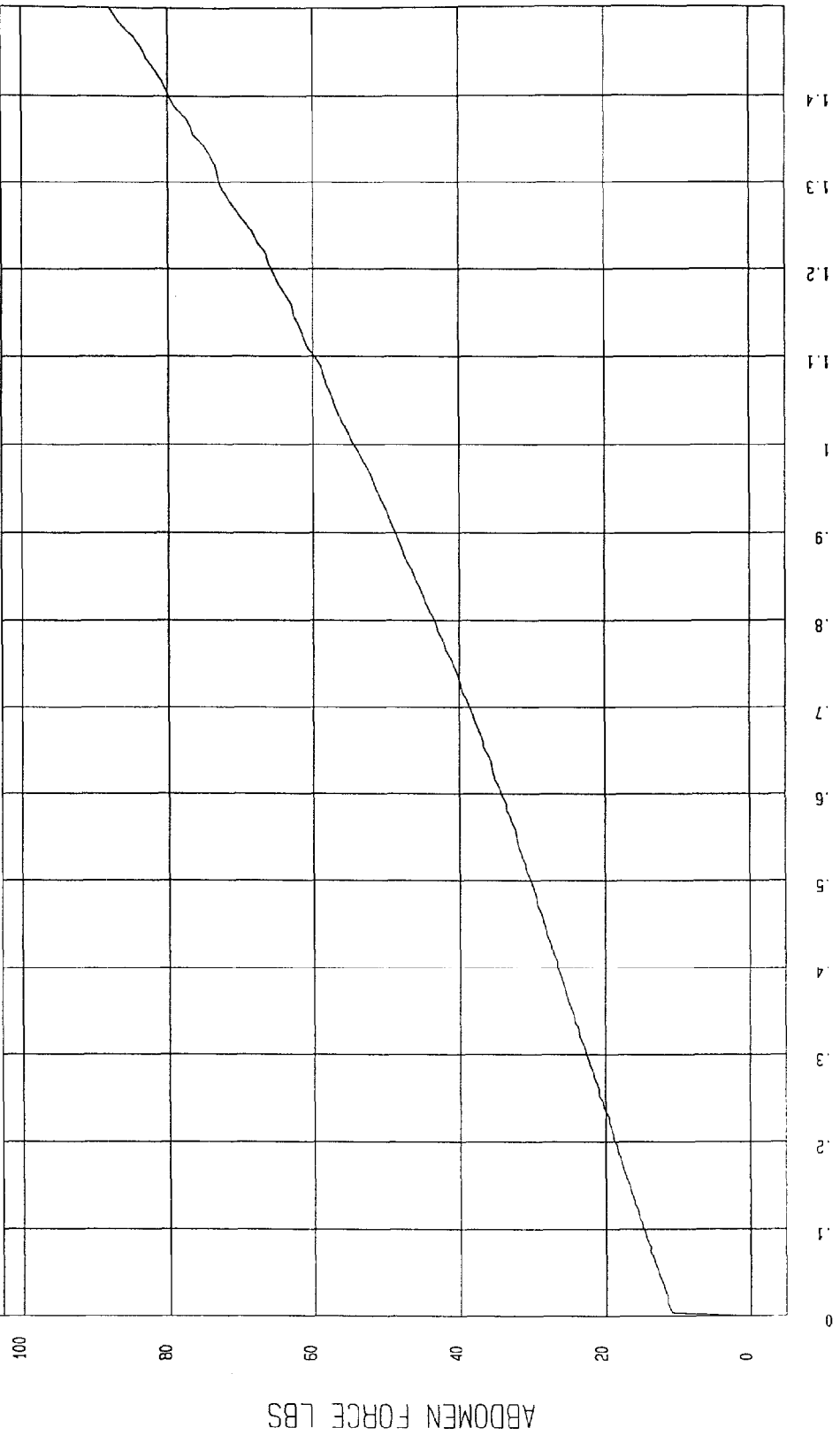
TECHNICIAN Jim Wilkin

APPROVED BY Steve Kibbe

TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSION TEST DATE: 01-30-1998 - 17:49

COMPONENT: DUMMY # 271

ABDOMEN FORCE as a function of ABDOMEN DISPLACEMENT



MOA Research
01-30-1998 18:04

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: January 30, 1998

DUMMY NUMBER: 271

TEST NUMBER: D98215

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	24%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	25
FORCE @ 30°	34 - 46 lbs	45
FORCE @ 40°	46 - 58 lbs	56
RETURN ANGLE	12° maximum	6°

TEST MEETS SPECIFICATIONS

TECHNICIAN

Tim W. L.

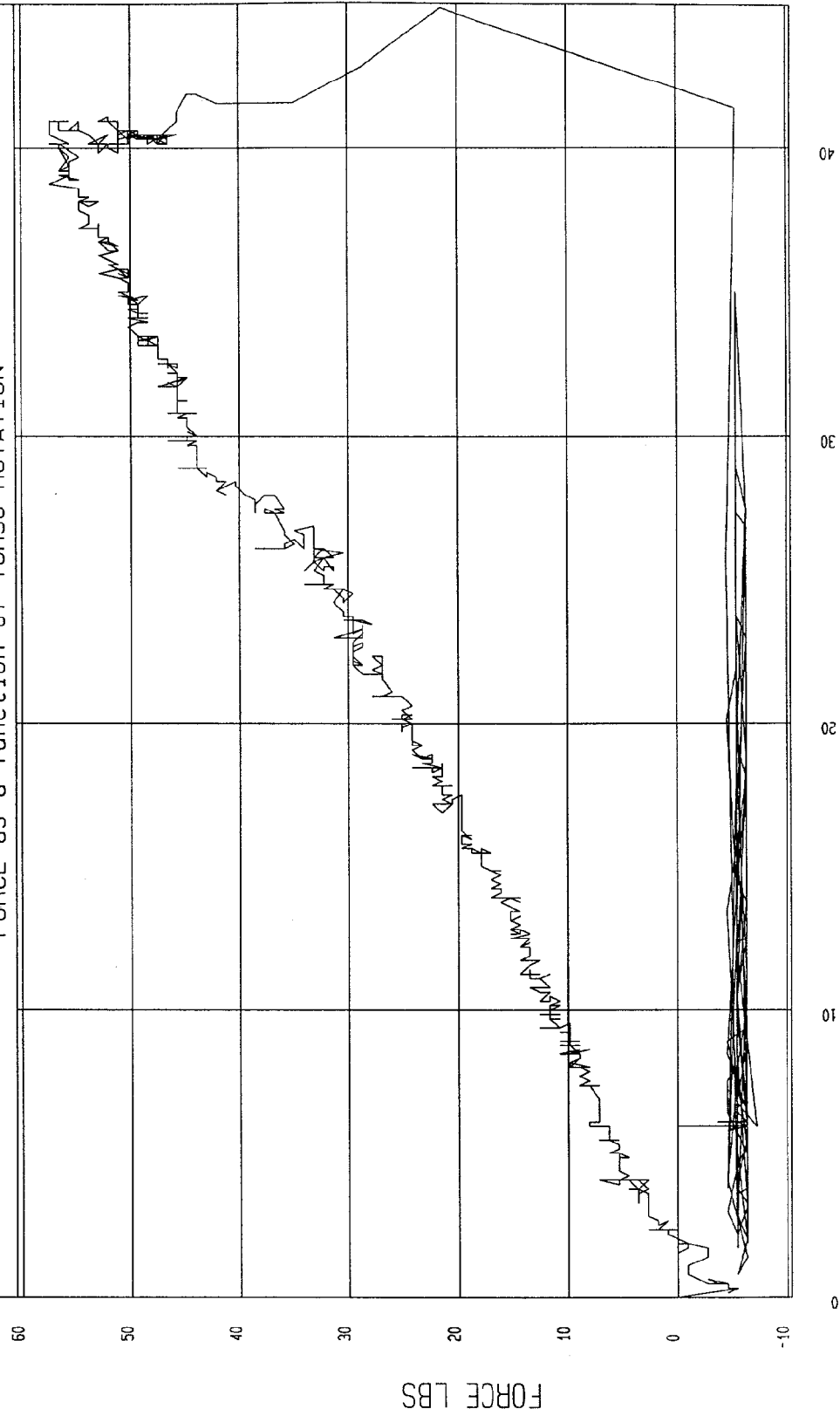
APPROVED BY

Paul Kalsche

TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 01-30-1998 - 18:50

COMPONENT: DUMMY # 271

FORCE as a function of TORSO ROTATION



MEA Research
01-30-1998 19:04

POST-TEST DRIVER DUMMY INSPECTION CHECKLIST

Type: Side Impact Dummy

Serial Number: 272

Inspected By: Tim Michnay

Date: January 30, 1998

<u>Part</u>	<u>Items Checked</u>	<u>Comments</u>
Skin	visual inspection	OK
Head	visual, ballast, accelerometer mount	OK
Neck	visual	OK
Spine box	visual, ballast, weldment, accelerometer mount	OK
Rib cage	visual, measure	OK
Sternum	visual	OK
Lumbar spine	visual	OK
Abdomen	visual	OK
Pelvis	visual, palpate, accelerometer mount	OK
Upper legs	visual	OK
Knees	visual	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	Rib wrap foam torn from rivets on impact side--Replaced	

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

POST-TEST PASSENGER DUMMY INSPECTION CHECKLIST

Type: Side Impact Dummy

Serial Number: 271

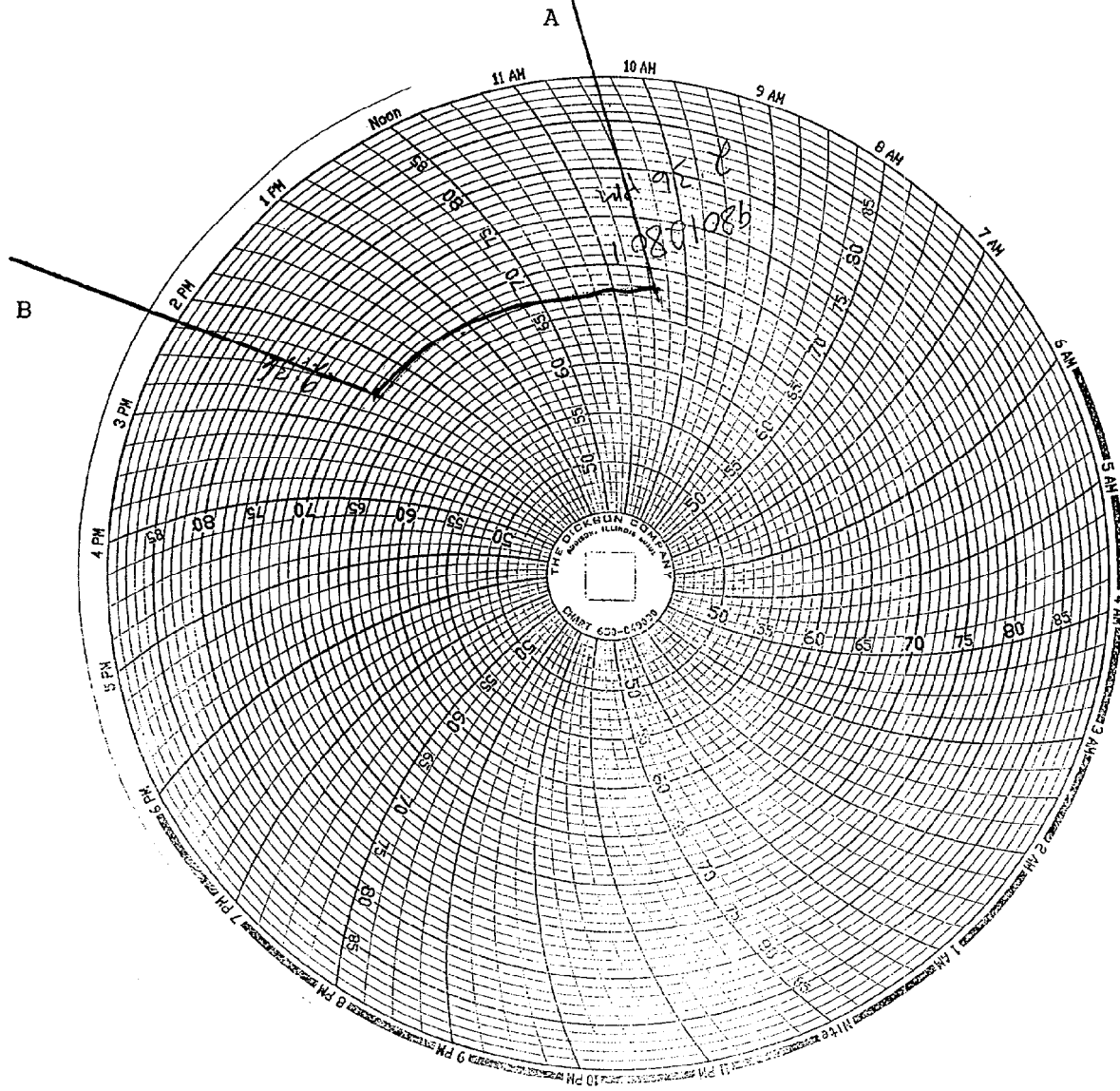
Inspected By: Tim Michnay

Date: January 30, 1998

<u>Part</u>	<u>Items Checked</u>	<u>Comments</u>
Skin	visual inspection	OK
Head	visual, ballast, accelerometer mount	OK
Neck	visual	OK
Spine box	visual, ballast, weldment, accelerometer mount	OK
Rib cage	visual, measure	OK
Sternum	visual	OK
Lumbar spine	visual	OK
Abdomen	visual	OK
Pelvis	visual, palpate, accelerometer mount	OK
Upper legs	visual	OK
Knees	visual	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
TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

DUMMY AND VEHICLE CALIBRATION DATA
INSTRUMENTS FOR DRIVER DUMMY NO. 272

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y	ALFJ7	Endevco	September 11, 1997
Lower Rib Y	APYNO	Endevco	September 11, 1997
Lower Spine Y	APOG2	Endevco	September 11, 1997
Pelvis Y	APY15	Endevco	September 11, 1997
Upper Rib Redundant Y	ALDD6	Endevco	September 11, 1997
Lower Rib Redundant Y	APYN3	Endevco	September 11, 1997
Lower Spine Redundant Y	AP138	Endevco	September 11, 1997
Pelvis Redundant Y	APY16	Endevco	September 11, 1997

INSTRUMENTS FOR PASSENGER DUMMY NO. 271

	LEFT REAR PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y	AP2A4	Endevco	September 11, 1997
Lower Rib Y	AP1B3	Endevco	September 11, 1997
Lower Spine Y	ANAP1	Endevco	September 11, 1997
Pelvis Y	AHTC3	Endevco	September 11, 1997
Upper Rib Redundant Y	AP2D8	Endevco	September 11, 1997
Lower Rib Redundant Y	AP1C6	Endevco	September 11, 1997
Lower Spine Redundant Y	ANAT6	Endevco	September 11, 1997
Pelvis Redundant Y	AGP53	Endevco	September 11, 1997

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Moving Barrier CG X	J04-F10	Entran	August 7, 1997
Moving Barrier CG Y	F11-G04	Entran	August 7, 1997
Moving Barrier CG Z	J04-F12	Entran	August 7, 1997
Moving Barrier Rear Axle X	G13-B07	Entran	August 6, 1997
Moving Barrier Rear Axle Y	L14-D04	Entran	August 4, 1997
Left Mid A-Post Y	J06-D24	Entran	December 10, 1997
Left Lower A-Post Y	MGA095	Entran	January 12, 1998
Left Mid B-Post Y	C25-A11	Entran	August 5, 1997
Left Lower B-Post Y	J13-F16	Entran	August 6, 1997
Rear Floorpan Above Axle X	B13-Z05	Entran	January 12, 1998
Rear Floorpan Above Axle Y	H02-J01	Entran	August 6, 1997
Rear Floorpan Above Axle Z	F12-G04	Entran	January 12, 1998
Driver Seat Track Y	L18-E06	Entran	November 5, 1997
Right Side Sill at Front Seat X	F12-G06	Entran	January 12, 1998
Right Side Sill at Front Seat Y	F13-B12	Entran	January 12, 1998
Right Side Sill at Front Seat Z	D05-R10	Entran	January 12, 1998
Right Side Sill at Rear Seat X	G13-B14	Entran	January 12, 1998
Right Side Sill at Rear Seat Y	H02-J02	Entran	January 12, 1998
Right Side Sill at Rear Seat Z	E10-F14	Entran	January 12, 1998
Left Side Sill at Front Seat Y	J06-D19	Entran	December 10, 1998

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO	MANUFACTURER	CALIBRATION DATE
Left Side Sill at Rear Seat Y	F20-G01	Entran	January 12, 1998
Right Rear Occupant Compartment Y	F20-G05	Entran	August 7, 1997
Vehicle CG X	G13-B09	Entran	January 8, 1998
Vehicle CG Y	F12-G08	Entran	January 8, 1998
Vehicle CG Z	F11-G05	Entran	January 8, 1998
Left Front Door on Centerline	F10-D04	Entran	August 4, 1997
Midrear of Left Front Door	E24-G07	Entran	December 10, 1997
Left Front Door Upper Centerline	G08-B03	Entran	January 12, 1998
Midrear of Left Rear Door	J23-E07	Entran	November 5, 1997
Left Rear Door Upper Centerline	I25-J10	Entran	August 7, 1997

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