

NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TESTING
PASSENGER CARS

1998 TOYOTA COROLLA
4-DOOR SEDAN
NHTSA NO: MW5105

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: December 4, 1997

Report Date: January 6, 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

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

This document is disseminated under the sponsorship of the U. S. Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its content or use thereof.

Prepared By: 
Gary Strassburg, Project Engineer

Approved By: 
John Fleck, Facility Director

Approval Date: January 15, 1998

FINAL REPORT ACCEPTED BY (OCWS):

Accepted By: _____
Contract Technical Manager

Acceptance Date: _____

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. 214D-MGA-98-013		2. Government Accession No.		3. Recipient's Catalog No.																			
4. Title and Subtitle New Car Assessment Program Side Impact Test of a 1998 Toyota Corolla 4-Door Sedan NHTSA No. MW5105				5. Report Date January 6, 1998																			
				6. Performing Organization Code MGA																			
7. Author(s) Gary Strassburg, Project Engineer				8. Performing Organization Report No. MGA-DOT-214-0																			
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105				10. Work Unit No.																			
				11. Contract or Grant No. DTNH22-93-C-02047																			
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards 400 Seventh St., S.W. Washington, D.C. 20590				13. Type of Report and Period Covered Final Test Report December 4, 1997 to January 6, 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 Toyota Corolla 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 December 4, 1997. 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 21.6 °C. The target vehicle post test maximum crush was 376 mm at level 3. 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>76.0</td> <td>68.5</td> </tr> <tr> <td>Left Lower Rib (LLR) Accel., g</td> <td>75.7</td> <td>78.2</td> </tr> <tr> <td>Lower Spine (T₁₂) Accel., g</td> <td>84.5</td> <td>80.9</td> </tr> <tr> <td>Thoracic Trauma Index (TTI)</td> <td>80.3</td> <td>79.6</td> </tr> <tr> <td>Pelvis (PEV) Accel., g</td> <td>108.3</td> <td>89.7</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	76.0	68.5	Left Lower Rib (LLR) Accel., g	75.7	78.2	Lower Spine (T ₁₂) Accel., g	84.5	80.9	Thoracic Trauma Index (TTI)	80.3	79.6	Pelvis (PEV) Accel., g	108.3	89.7
	<u>DRIVER</u>	<u>PASS.</u>																					
Left Upper Rib (LUR) Accel., g	76.0	68.5																					
Left Lower Rib (LLR) Accel., g	75.7	78.2																					
Lower Spine (T ₁₂) Accel., g	84.5	80.9																					
Thoracic Trauma Index (TTI)	80.3	79.6																					
Pelvis (PEV) Accel., g	108.3	89.7																					
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																			
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages 310																			
				22. Price																			

TABLE OF CONTENTS

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

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 Toyota Corolla VE 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 Toyota Corolla VE 4-Door 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 38.3 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 December 4, 1997. 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)	80.3	79.6
Pelvis (g)	108.3	89.7

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/Toyota Corolla/VE/4-Door
Vehicle NHTSA No.: MW5105 VIN: 1NXBR12E7WZ021714
Vehicle Body Color: White Build Date: 10-97
Engine Data: 4 Cylinders; CID; 1.8 Liter; cc
Placement Longitudinal; X Lateral
Transmission: 4 Speed; Manual; X Automatic; X Overdrive
Final Drive: Rear Wheel Drive; X Frt. Wheel Drive; Four Wheel Drive

Odometer Reading 52 miles
Options: X A/C; X Pwr. Steering; X Pwr. Brakes; Pwr. Windows;
 Cruise Control; Tilt Wheel; Power Door Locks;

DATA FROM TIRE PLACARD:

Tire Pressure (at capacity): 30 Psi FRONT
30 Psi REAR

Recommended Tire Size: P175/65R/14

Tires on Test Vehicle: P175/65R/14 Manufacturer: Firestone

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>326.6</u> kg	Right Rear	=	<u>217.7</u> kg
Left Front	=	<u>340.7</u> kg	Left Rear	=	<u>217.7</u> kg
TOTAL FRONT	=	<u>667.3</u> kg	TOTAL REAR	=	<u>435.4</u> kg
% of Total Vehicle Weight	=	<u>60.5</u> %;	% of Total Weight	=	<u>39.5</u> %
TOTAL WEIGHT	=	<u>1102.7</u> kg			

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

Year/Make/Model/Body Style: 1998/Toyota/Corolla/VE/4-Door

Vehicle NHTSA No.: MW5105 Test Date: December 4, 1997

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Test Vehicle Delivered Weight with Maximum Fluids	= <u>1102.7</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>1309.5</u> kg

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

Right Front	= <u>336.6</u> kg	Right Rear	= <u>271.7</u> kg
Left Front	= <u>383.7</u> kg	Left Rear	= <u>316.6</u> kg
TOTAL FRONT	= <u>720.3</u> kg	TOTAL REAR	= <u>588.3</u> kg
% of Total Weight	= <u>55.0</u> %	% of Total Weight	= <u>45.0</u> %
TOTAL TEST WEIGHT	= <u>1308.6</u> kg		

TEST VEHICLE ATTITUDE:

CURB WEIGHT ATTITUDE:

Right Front 650 mm Left Front 648 mm Right Rear 634 mm Left Rear 624 mm

FULLY LOADED WEIGHT ATTITUDE:

Right Front 641 mm Left Front 625 mm Right Rear 600 mm Left Rear 570 mm

TEST ATTITUDE:

Right Front 636 mm Left Front 628 mm Right Rear 600 mm Left Rear 577 mm

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

Test Vehicle Wheelbase: 2465 mm

C.G. = 1073 mm rearward of front wheel centerline

TOTAL VEHICLE LENGTH:

Right Side = 4155 mm

Centerline = 4377 mm

Left Side = 4155 mm

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

Year/Make/Model/Body Style: 1998/Toyota/Corolla/VE/4-Door

Vehicle NHTSA No.: MW5105 Test Date: December 4, 1997

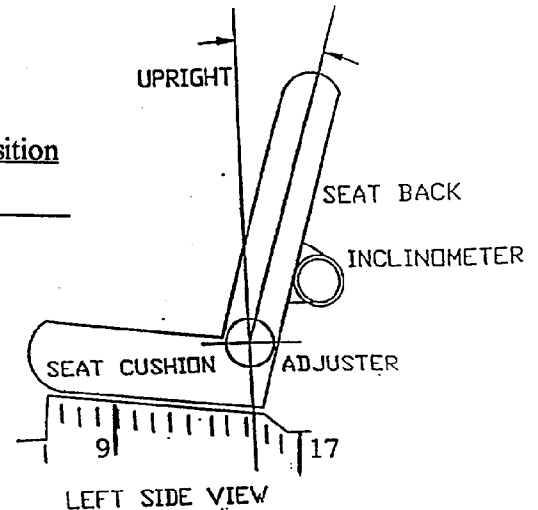
FRONT SEAT CUSHION PLACEMENT:

Total Length of Adjustment Travel: 245 mm

Test Position: 9th position from foremost locking position
out of 17 possible positions.

FRONT SEAT BACK ADJUSTMENT POSITION:

Seat Back Angle = 4th position back from first
locking position



SECOND POSITION SEAT:

Total Length of Fore/Aft Adjustment Travel: N/A

Seat Back Adjustment Position: N/A

ADJUSTABLE STEERING COLUMN POSITION: N/A

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 = 13.2 gallons (50 liters)

Test Volume: 12.14 gallons 92 % of capacity

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

Wheelbase: = 2465 mm

Impact Point is 293 mm rearward of front axle centerline

DATA SHEET NO. 2
TEST VEHICLE SUMMARY OF RESULTS

Year/Make/Model/Body Style: 1998/Toyota/Corolla/VE/4-Door
Vehicle NHTSA No.: MW5105 Test Date: December 4, 1997
Overall Length = 4377 mm; Overall Width = 1695 mm

TEST WEIGHT:

Right Front = 346.1 kg Right Rear = 270.8 kg
Left Front = 389.6 kg Left Rear = 296.7 kg
TOTAL FRONT = 735.7 kg TOTAL REAR = 567.5 kg
% of Total Weight = 56.5 % % of Total Weight = 43.5 %
TOTAL VEHICLE WEIGHT = 1303.2 kg
Wheelbase = 2465 mm
Longitudinal C.G. from Center of Front Axle = 1073 mm
Impact Angle with Respect to Impactor = 0° degrees

MAXIMUM EXTERIOR STATIC CRUSH:

1. LEVEL 1 (244 mm above ground) = 183 mm
 2. LEVEL 2 (460 mm above ground) = 369 mm
 3. LEVEL 3 (556 mm above ground) = 376 mm
 4. LEVEL 4 (830 mm above ground) = 273 mm
 5. LEVEL 5 (1283 mm above ground) = 58 mm
- Maximum Post-Test Intrusion = 376 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 airbag</u>	<u>type II belt</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/Toyota/Corolla/VE/4-Door

Vehicle NHTSA No.: MW5105 Test Date: December 4, 1997

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: 38.28 mph (61.6 kph) Secondary: 38.17 mph (61.4 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>201</u> mm |
| 2. | Row B Mid Stack (686 mm) | = <u>141</u> mm |
| 3. | Row C Top of Bumper (533 mm) | = <u>80</u> mm |
| 4. | Row D Center of Bumper (432 mm) | = <u>120</u> mm |

INSTRUMENTATION:

Number of MDB Data Channels = 5

DATA SHEET NO. 4
POST-TEST OBSERVATIONS

Year/Make/Model/Body Style: 1998/Toyota/Corolla/VE/4-Door

Vehicle NHTSA No.: MW5105 Test Date: December 4, 1997

VISIBLE DUMMY CONTACT POINTS:

	<u>LEFT FRONT SID</u>	<u>LEFT REAR SID</u>
Head	<u>to window sill</u>	<u>to C-post</u>
Arm	<u>to door panel and armrest</u>	<u>to door panel</u>
Pelvis	<u>to armrest</u>	<u>to armrest</u>
Left Knee	<u>to door panel</u>	<u>to door panel</u>
Right Knee	<u>to left knee</u>	<u>to left knee</u>

DOOR OPENING:

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

MDB DISTANCE FROM TARGET IMPACT POINT:

Horizontal: 2 mm rearward Vertical: 4 mm high

ARM REST LOCATIONS:

Front: 243 mm from bottom of window
Rear: 251 mm from bottom of window

POST-TEST OBSERVATIONS (Cont'd)

SEAT CRUSH:

Front Seat Back: 73 mm Front Seat Cushion: 137 mm
Left Rear Seat Back: 133 mm Rear Seat Cushion: 178 mm

GLAZING DAMAGE:

Left side windows broke, windshield cracked.

PILLAR PERFORMANCE:

No separation

SILL SEPARATION:

None

OTHER NOTABLE IMPACT EFFECTS:

Frontal airbags did not deploy.
No side airbags.

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

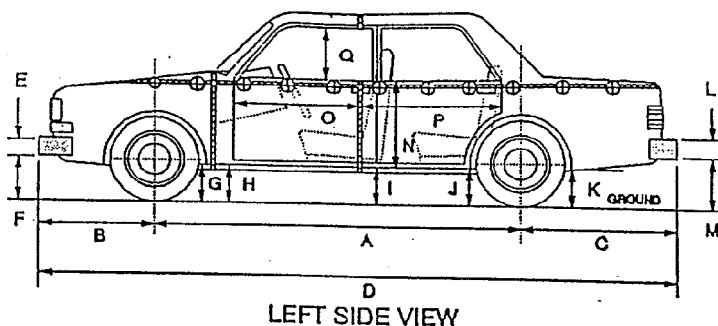
Year/Make/Model/Body Style: 1998/Toyota/Corolla/VE/4-Door

Vehicle NHTSA No.: MW5105 Test Date: December 4, 1997

	Front Dummy ID #269				Rear Dummy ID #270			
	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	76.0	23	-19.4	71	68.5	36	-5.5	139
Left Lower Rib (LLR) Y	75.7	33	-13.9	83	78.2	36	-20.6	66
SPINE ACCELERATIONS								
Lower Lateral Y	84.5	28	-28.5	59	80.9	40	-17.4	60
PELVIS ACCELERATIONS								
Lateral Y	108.3	25	-19.9	46	89.7	32	-10.0	77

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	2465	2452	13
B	870	875	-5
C	1042	1033	9
D	4377	4360	17
E	105	105	0
F	400	420	-20
G	170	127	43
H	164	200	-36
I	152	156	-4
J1/J2	148/147	163/159	-15/-12
K	206	223	-17
L	200	200	0
M	309	337	-28
N	608	497	111
O	675	669	6
P	1155	1101	54
Q	420	398	22
R	4155	4206	-51
S	4155	4148	7
T	1695	1253	442

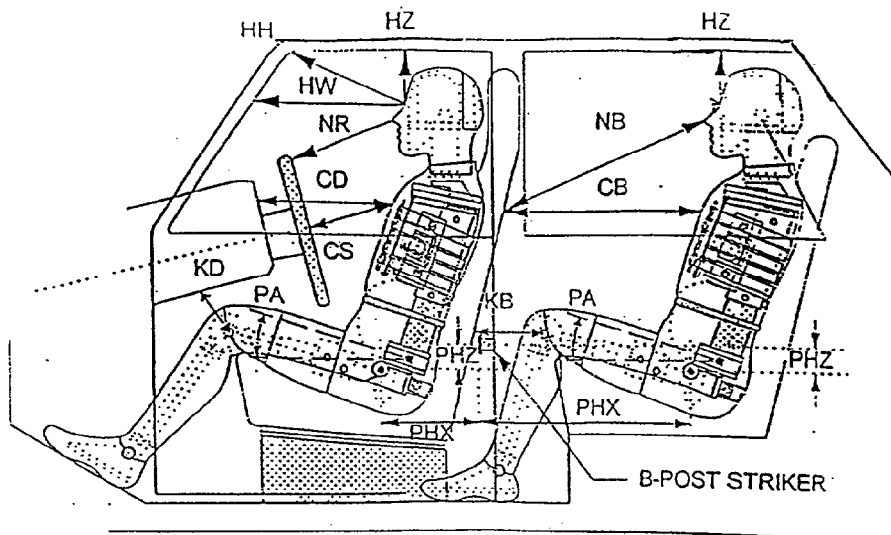
DATA SHEET NO. 7

SIDE IMPACT DUMMY (SID) LONGITUDINAL CLEARANCE DIMENSIONS

Year/Make/Model/Body Style: 1998/Toyota/Corolla/VE/4-Door

NHTSA NO.: MW5105

Test Date: December 4, 1997



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

	DRIVER SID ID #269
HH	292
HW	518
HZ	162
NR	384
CD	469
CS	288
KDL(KDA°)	158 (18.0°)
KDR(KDA°)	170 (18.7°)
PA°	24°
PHX	168
PHZ	144

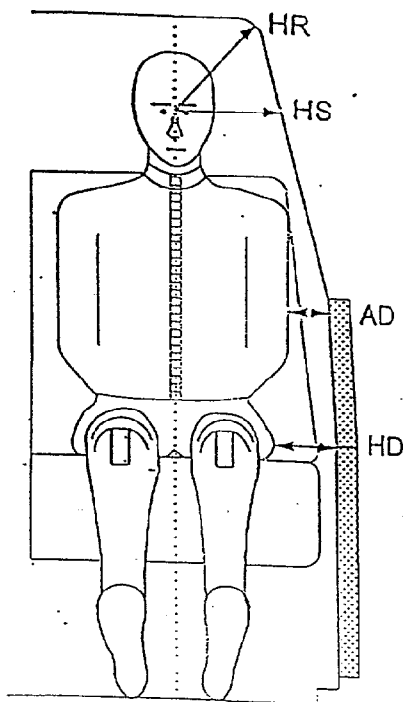
	LEFT REAR PASSENGER SID ID #270
HZ	122
NB	612
CB	532
KBL (KBA)	204 (0°)
KBR (KBA)	208 (0°)
PA°	23.8°
PHX	218
PHZ	264

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/Toyota/Corolla/VE/4-Door

NHTSA NO.: MW5105 Test Date: December 4, 1997



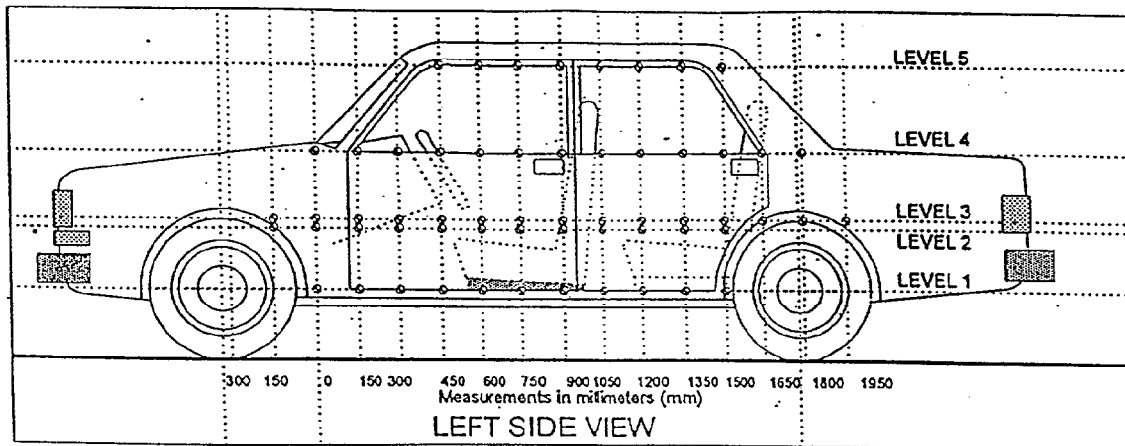
NOTE: All dimensions are in mm

	DRIVER SID ID #269	LEFT REAR PASSENGER SID ID #270
HR	190	218
HS	285	320
AD	87	92
HD	114	154

DATA SHEET NO. 9
VEHICLE SIDE MEASUREMENTS

Year/Make/Model/Body Style: 1998/Toyota/Corolla/VE/4-Door

NHTSA NO.: MW5105 Test Date: December 4, 1997



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)	= <u>244</u> mm
Level 2 @ Occupant H-Point	= <u>460</u> mm
Level 3 @ Mid Door	= <u>556</u> mm
Level 4 @ Window Sill	= <u>830</u> mm
Level 5 @ Window Top	= <u>1283</u> 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	777	853	76
300	777	923	146
450	774	929	155
600	773	935	162
750	772	952	180
900	772	954	182
1050	771	946	175
1200	773	956	183
1350	774	939	165
1500	774	903	129
1650	776	872	96
1800	770	832	62

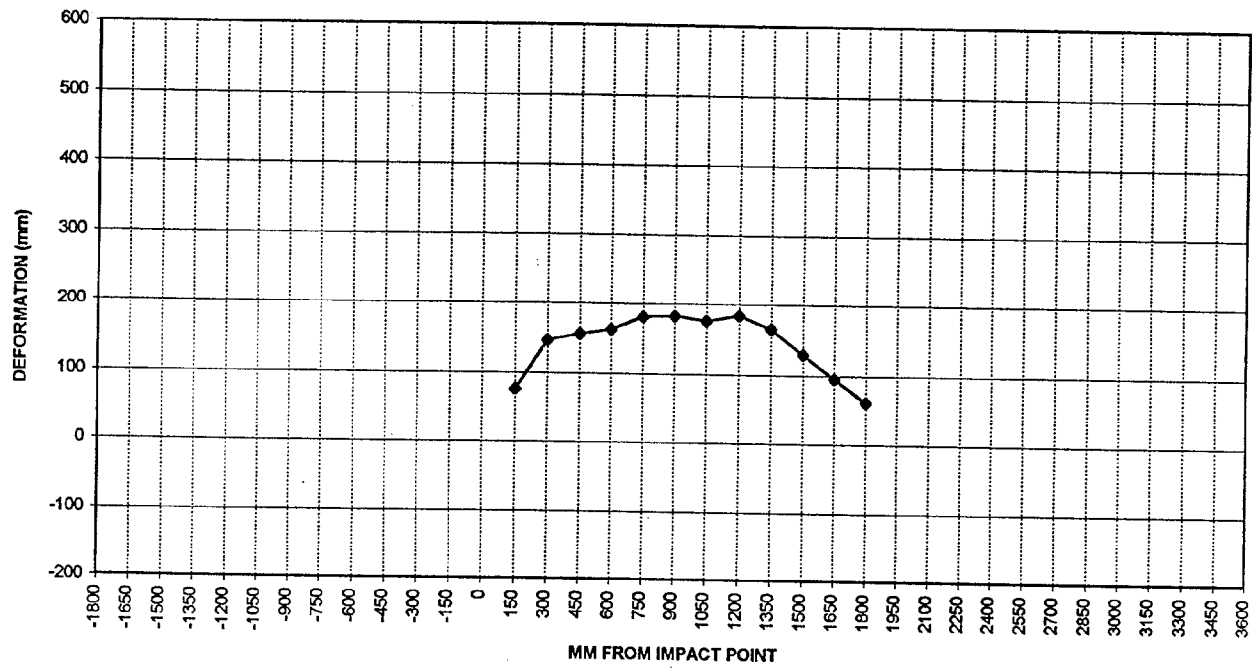
Reference plane is parallel to test vehicle longitudinal centerline.
Given dimensions = Reference plane to car body

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			
-750			
-600			
-450			
-300			
-150			
0 (impact point)			
150	721	882	161
300	720	1042	322
450	716	1047	331
600	715	1056	341
750	712	1067	355
900	712	1076	364
1050	711	1074	363
1200	711	1080	369
1350	712	1062	350
1500	713	1041	328
1650	714	1006	292
1800	716	949	233

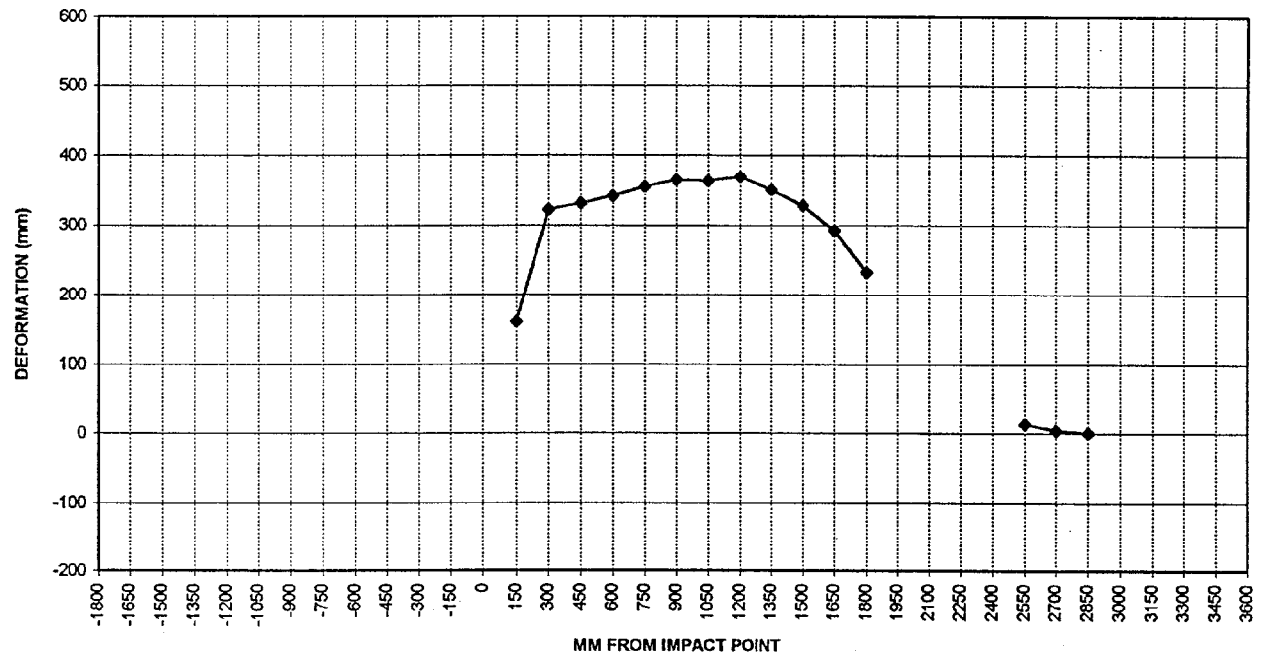
Reference plane is parallel to test vehicle longitudinal centerline.
Given dimensions = Reference plane to car body

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			
2100			
2250			
2400			
2550	736	749	13
2700	755	759	4
2850	772	772	0
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			
-600			
-450			
-300			
-150			
0 (impact point)	718	794	76
150	718	818	100
300	717	1018	301
450	717	1046	329
600	716	1072	356
750	715	1082	367
900	714	1090	376
1050	714	1077	363
1200	714	1077	363
1350	715	1058	343
1500	715	1043	328
1650	716	1012	296
1800	716	967	251

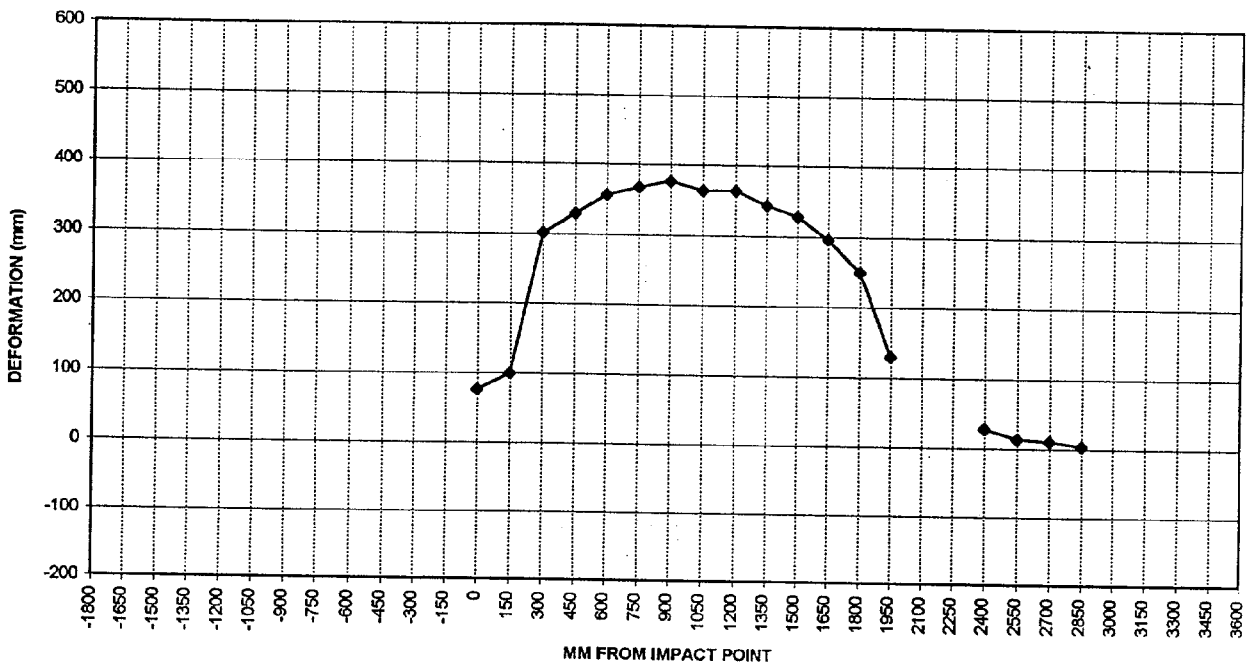
Reference plane is parallel to test vehicle longitudinal centerline.
 Given dimensions = Reference plane to car body

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	708	838	130
2100			
2250			
2400	719	746	27
2550	749	762	13
2700	766	776	10
2850	786	789	3
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	884	886	2
-750	850	855	5
-600	828	829	1
-450	803	810	7
-300	791	790	-1
-150	781	776	-5
0 (impact point)	776	772	-4
150	771	796	25
300	769	933	164
450	769	997	228
600	771	1026	255
750	770	1027	257
900	768	1033	265
1050	765	1036	271
1200	772	1045	273
1350	774	1042	268
1500	778	1038	260
1650	777	1033	256
1800	781	970	189

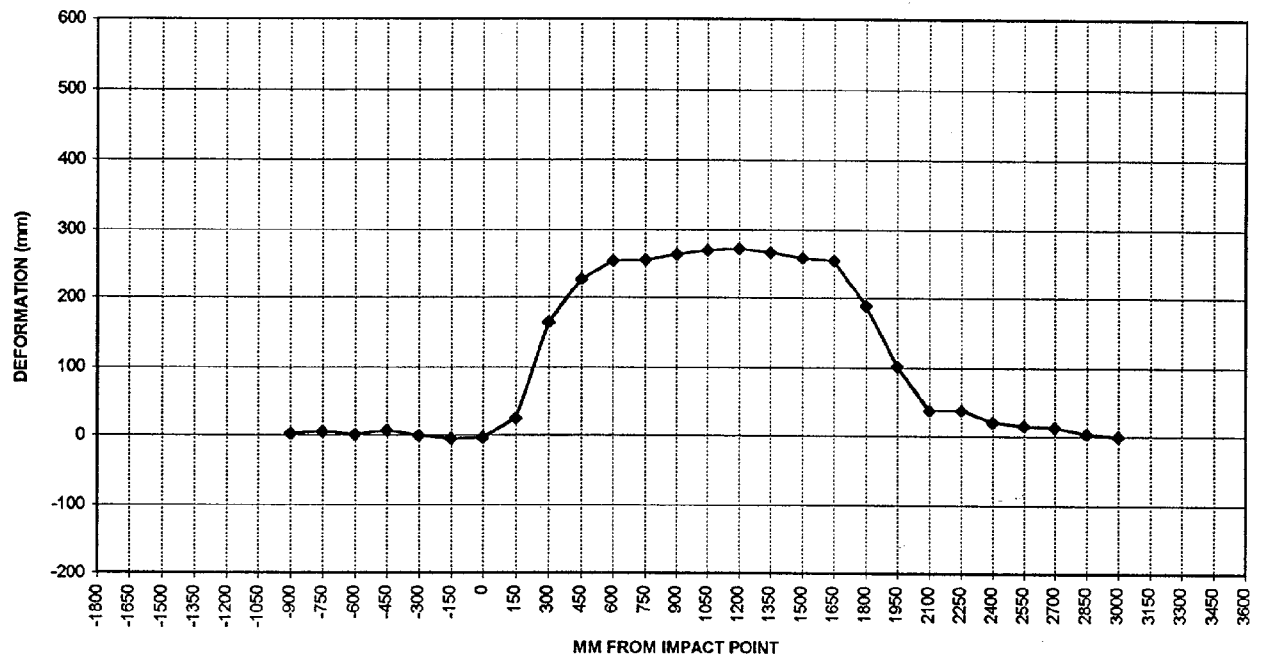
Reference plane is parallel to test vehicle longitudinal centerline.
Given dimensions = Reference plane to car body

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	780	882	102
2100	784	822	38
2250	790	828	38
2400	803	823	20
2550	813	828	15
2700	826	839	13
2850	847	850	3
3000	888	887	-1
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	1014	1053	39
900	1005	1052	47
1050	1010	1064	54
1200	1009	1063	54
1350	1009	1067	58
1500	1011	1064	53
1650	1012	1052	40
1800	1011	1046	35

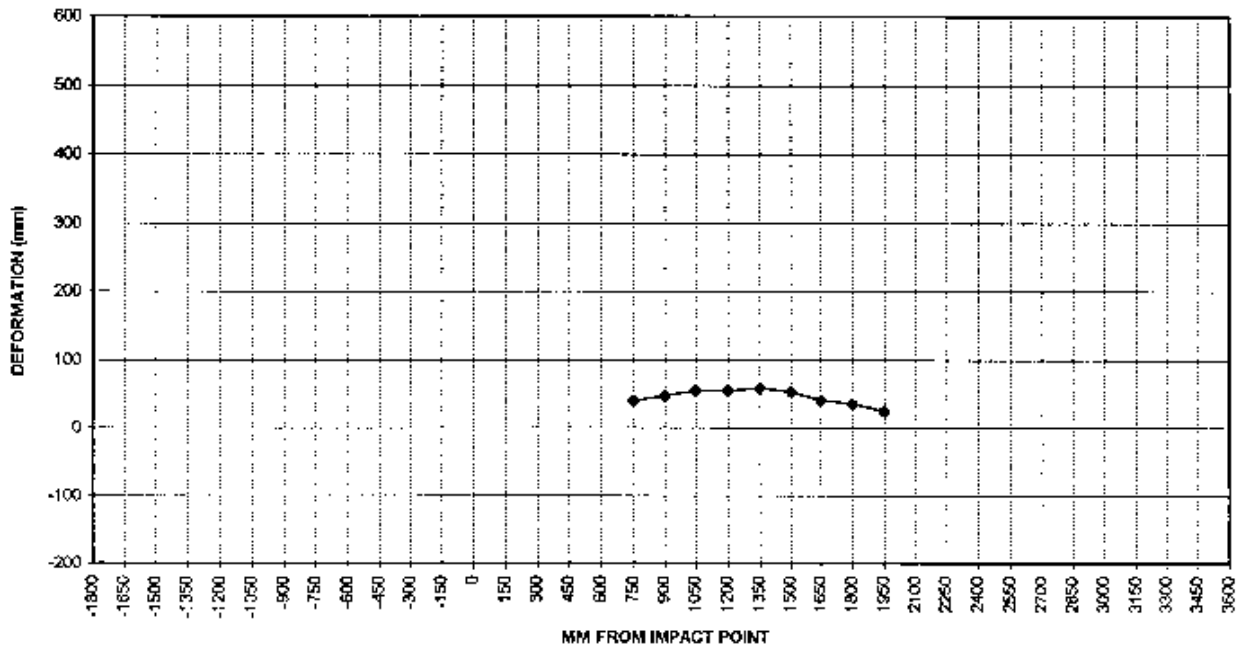
Reference plane is parallel to test vehicle longitudinal centerline.
 Given dimensions = Reference plane to car body

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	1021	1045	24
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



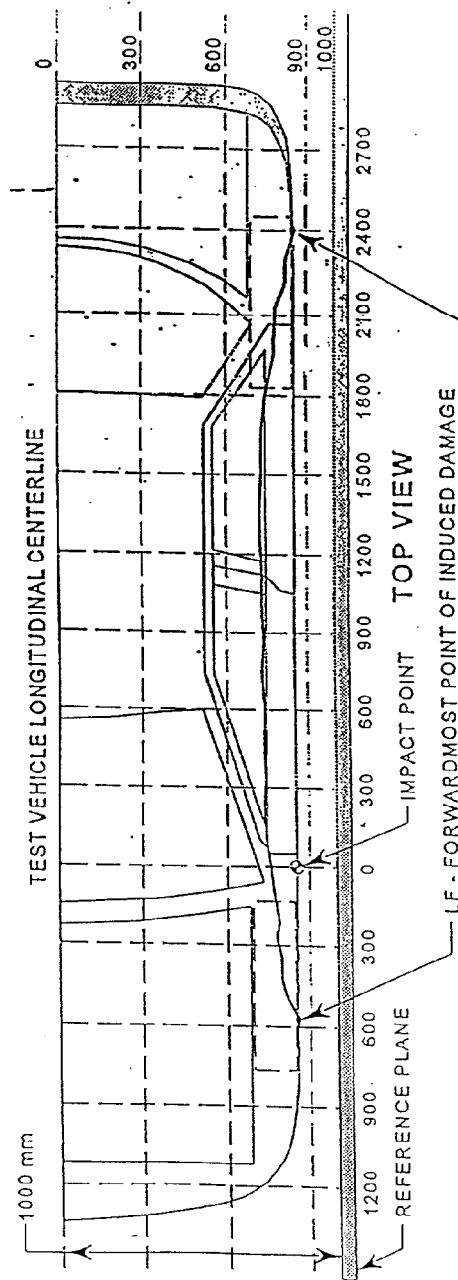
LEVEL 5 - WINDOW TOP

DATA SHEET NO. 11

VEHICLE DAMAGE PROFILE DISTANCES

Year/Make/Model/Body Style: 1998/Toyota/Corolla/VE/4-Door

NHTSA NO.: MW5105 Test Date: December 4, 1997



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 = <u>0</u> mm)	772	776	-4
2. 522 mm	1075	715	360
3. 1101 mm	1089	714	375
4. 1671 mm	1031	779	252
5. 2288 mm	823	790	33
6. (LR = <u>2850</u> mm)	850	847	3

DATA SHEET NO. 12

EXTERIOR STATIC CRUSH FOR SIDE IMPACTOR

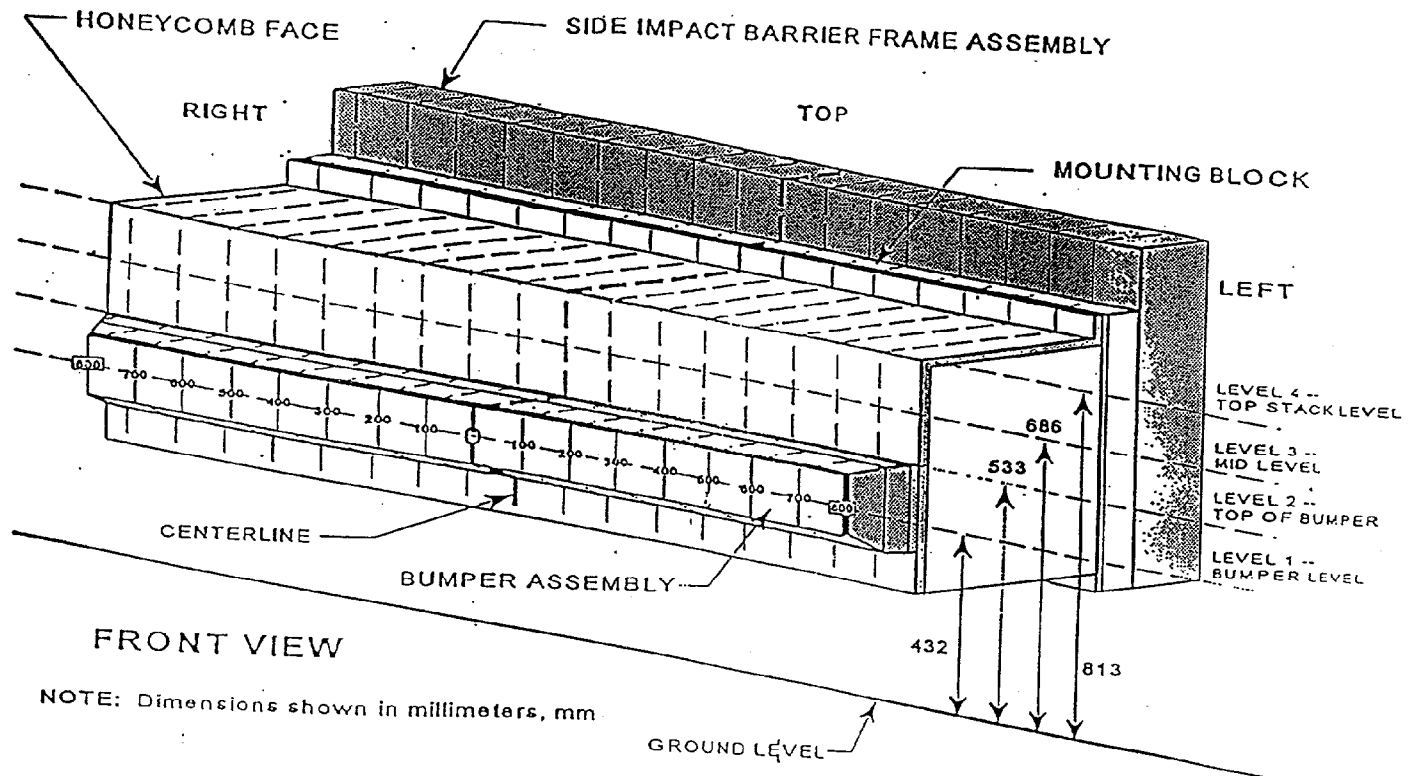
Year/Make/Model/Body Style: 1998/Toyota/Corolla/VE/4-Door

Vehicle NHTSA No.: MW5105 Test Date: December 4, 1997

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	60	10	1	2	3	4	6	7	9	11	13	17	26	56	91	137	201
Mid Level Level 3	686 mm	54	18	1	0	0	2	7	8	7	4	4	7	10	14	31	85	141
Top Bumper Level 2	533 mm	80	48	26	20	20	25	24	21	17	20	22	27	30	37	46	59	79
Mid Bumper Level 1	432 mm	107	85	70	58	57	61	65	62	58	55	59	63	67	80	89	113	121

See next page for Barrier Face Graphic

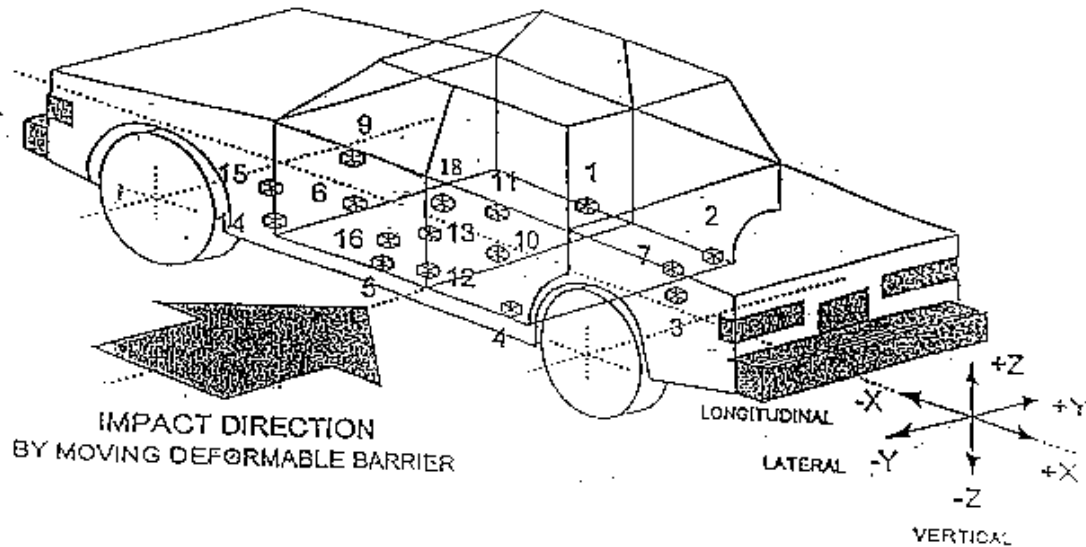
DATA SHEET NO. 12 (Cont'd)



DATA SHEET 13
TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 1998/Toyota/Corolla/VE/4-Door

Vehicle NHTSA No.: MW5105 Test Date: December 4, 1997



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/Toyota/Corolla/VE/4-Door

Vehicle NHTSA No.: MW5105 Test Date: December 4, 1997

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	2565	615	195	7.0	-5.0	20.1	-2.5	6.6	-6.0	20.8
2	Rt. Side Sill @ Rear Seat	1698	640	204	7.1	-5.6	20.5	-2.3	6.9	-2.9	20.6
3	Rr. Floorpan Above Axle	1086	0	486	4.1	-8.2	25.5	-3.2	8.2	-8.3	26.5
4	Left Side Sill @ Rr. Seat	1705	-640	197	---	---	34.2	-4.3	---	---	---
5	Left Side Sill @ Frt. Seat	2567	-615	193	---	---	33.6	-4.0	---	---	---
6	Left Front Door Centerline	2594	-723	640	---	---	199.9	-105.5	---	---	---
7	Right Rear Occupant Compartment	1790	727	322	---	---	22.9	-2.7	---	---	---
8	Mid Rear of Left Front Door	2222	-721	602	---	---	145.3	*	---	---	---
9	Left Front Door Upper Centerline	2608	-710	785	---	---	121.2	-172.0	---	---	---
10	Left Rear Door Mid Rear	1604	-726	652	---	---	196.1	-120.4	---	---	---
11	Left Rear Door Upper Centerline	1616	-702	860	---	---	135.6	-87.1	---	---	---
12	Left Lower B-Post	2014	-649	315	---	---	97.4	-32.7	---	---	---
13	Left Mid B-Post	1997	-683	813	---	---	187.8	-38.6	---	---	---
14	Left Lower A-Post	2993	-689	295	---	---	52.0	-14.9	---	---	---
15	Left Mid A-Post	3034	-746	785	---	---	61.8	-11.1	---	---	---
16	Driver Left Seat Track	2094	-589	390	---	---	174.7	-59.4	---	---	---
18	Vehicle CG	2450	30	410	7.4	-12.9	79.9	-19.5	15.5	-19.2	82.2

*Reference: X - Rear Bumper (+ Forward) * Not valid after approximately 20 msec.

Y - Vehicle Centerline (+ To right)

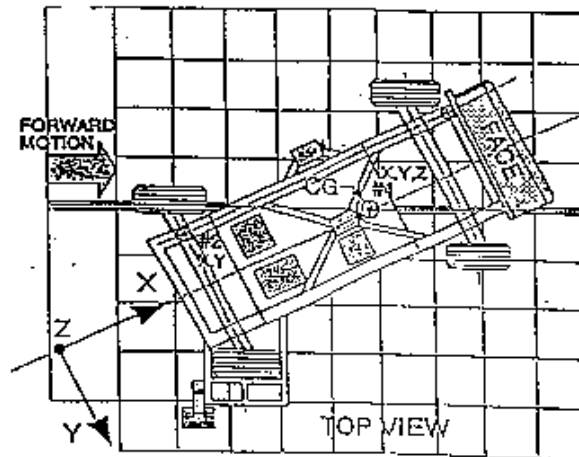
Z - Ground Level (+ Up)

DATA SHEET NO. 14

MOVING DEFORMABLE BARRIER (MDB) ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 1998/Toyota/Corolla/VE/4-Door

Vehicle NHTSA No.: MW5105 Test Date: December 4, 1997



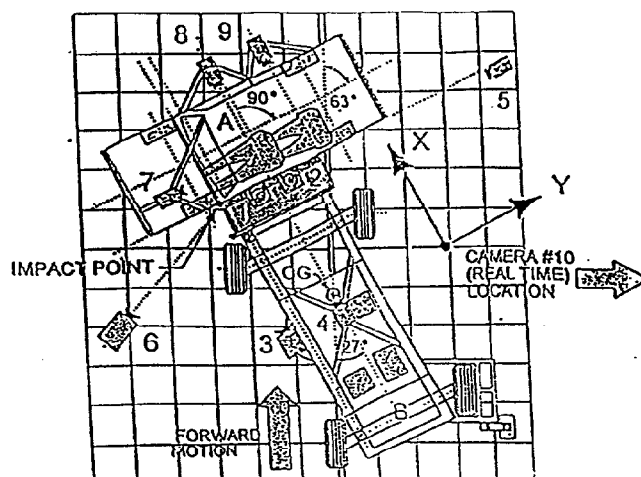
Accel. No.	Description	Coordinates (mm)*			(+) Positive		(-) Negative	
		X	Y	Z	Max. (g)	Time (msec)	Max. (g)	Time (msec)
1	MDB Center of Gravity	-1092	0	483				
	Longitudinal (X)	---	---	---	1.1	176	-18.9	40
	Lateral (Y)	---	---	---	3.1	58	-6.7	39
	Vertical (Z)	---	---	---	18.1	58	-14.1	43
	Resultant (R)	---	---	---	25.1	39	---	--
2	Rear Frame Member	-2591	-625	622				
	Longitudinal (X)	---	---	---	1.9	190	-22.7	37
	Lateral (Y)	---	---	---	3.1	18	-2.1	185

*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/Toyota/Corolla/VE/4-Door

Vehicle NHTSA No.: MW5105 Test Date: December 4, 1997



Camera No.	View	Coordinates (mm)*			Angle	Lens (mm)	Film Speed (fps)
		X	Y	Z			
	Real Time						
6	Left Impact	-1200	-2230	1730		13	899
8	Onboard Driver					13	930
9	Onboard Passenger					8	1183
7	Onboard Hood					13	800
5	Right Impact	-100	9880	1650		25	848
1	Top Overall	40	310	5000		8	1042
2	Top Impact	-300	0	5000		13	952
4	Cart Overall					13	1015
3	Cart Pointer					35	1005

* 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/Toyota/Corolla/VE/4-Door

Vehicle NHTSA No.: MW5105 Test Date: December 4, 1997

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 38.3 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

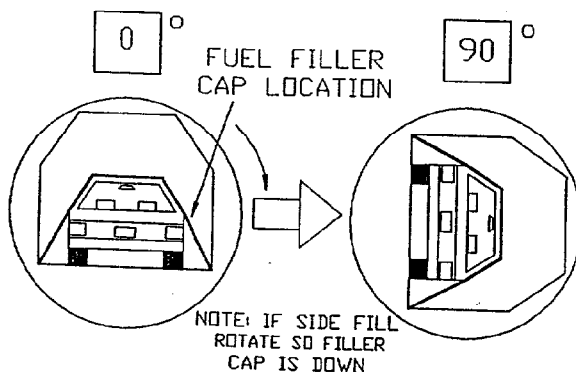
DATA SHEET 16

FMVSS 301 STATIC ROLLOVER TEST DATA

Vehicle Year/Make/Model/Body Style: 1998/Toyota/Corolla/VE/4-Door

Vehicle NHTSA No.: MW5105 Test Date: December 4, 1997

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

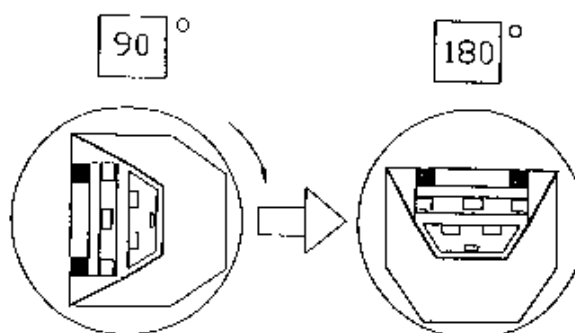
DATA SHEET 16

FMVSS 301 STATIC ROLLOVER TEST DATA (Cont'd)

Vehicle Year/Make/Model/Body Style: 1998/Toyota/Corolla/VE/4-Door

Vehicle NHTSA No.: MW5105 Test Date: December 4, 1997

TEST PHASE: 90° - 180°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 33 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 33 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

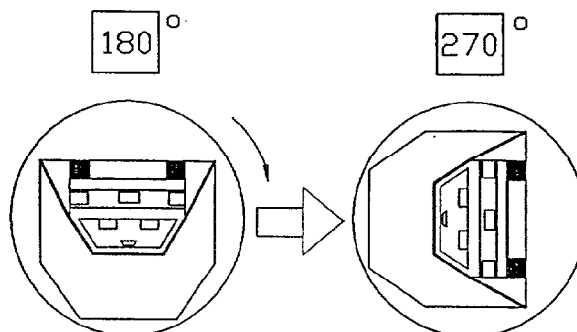
DATA SHEET 16

FMVSS 301 STATIC ROLLOVER TEST DATA (Cont'd)

Vehicle Year/Make/Model/Body Style: 1998/Toyota/Corolla/VE/4-Door

Vehicle NHTSA No.: MW5105 Test Date: December 4, 1997

TEST PHASE: 180° - 270°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 12 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 12 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

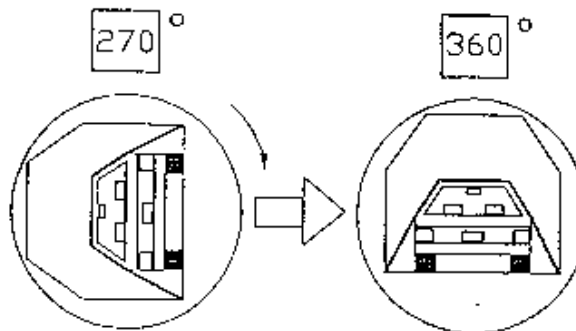
DATA SHEET 16

FMVSS 301 STATIC ROLLOVER TEST DATA

Vehicle Year/Make/Model/Body Style: 1998/Toyota/Corolla/VE/4-Door

Vehicle NHTSA No.: MW5105 Test Date: December 4, 1997

TEST PHASE: 270° - 360°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 41 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 41 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

APPENDIX A - PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

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

TABLE OF PHOTOGRAPHS

	<u>Page No.</u>
Photo No. A-29 - Post-Test Driver Dummy Head Contact	A-29
Photo No. A-30 - Post-Test Driver Dummy Head Contact	A-30
Photo No. A-31 - Pre-Test Passenger Dummy Right Side View	A-31
Photo No. A-32 - Post-Test Passenger Dummy Right Side View	A-32
Photo No. A-33 - Pre-Test Passenger Dummy Left Side View	A-33
Photo No. A-34 - Post-Test Passenger Dummy Left Side View	A-34
Photo No. A-35 - Pre-Test Passenger Dummy Left Side View (Door Open)	A-35
Photo No. A-36 - Pre-Test Passenger Dummy Shoulder and Door Top View	A-36
Photo No. A-37 - Post-Test Passenger Dummy Shoulder and Door Top View	A-37
Photo No. A-38 - Post-Test Passenger Dummy Contact	A-38
Photo No. A-39 - Post-Test Passenger Dummy Head Contact	A-39
Photo No. A-40 - Pre-Test Left Front Impact Point on Vehicle	A-40
Photo No. A-41 - Post-Test Left Front Impact Point on Vehicle	A-41
Photo No. A-42 - Impact	A-42
Photo No. A-43 - Vehicle Certification Label	A-43
Photo No. A-44 - Tire Placard	A-44
Photo No. A-45 - Rollover 90°	A-45
Photo No. A-46 - Rollover 180°	A-46
Photo No. A-47 - Rollover 270°	A-47
Photo No. A-48 - Rollover 360°	A-48
Photo No. A-49 - Left Front Attitude Point	A-49
Photo No. A-50 - Right Front Attitude Point	A-50
Photo No. A-51 - Left Rear Attitude Point	A-51
Photo No. A-52 - Right Rear Attitude Point	A-52

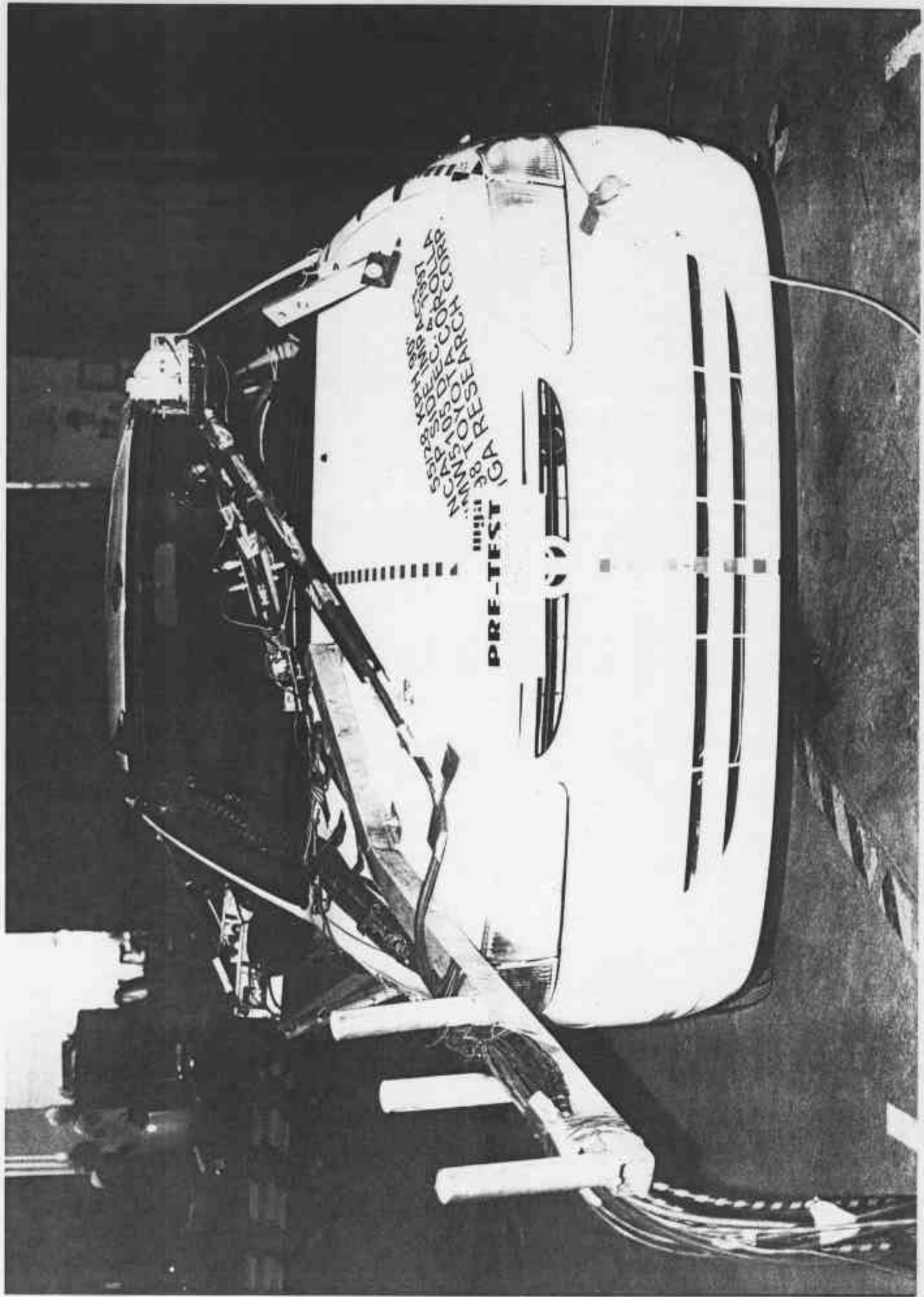


Photo No. A-1 - Pre-Test Front View of Test Vehicle

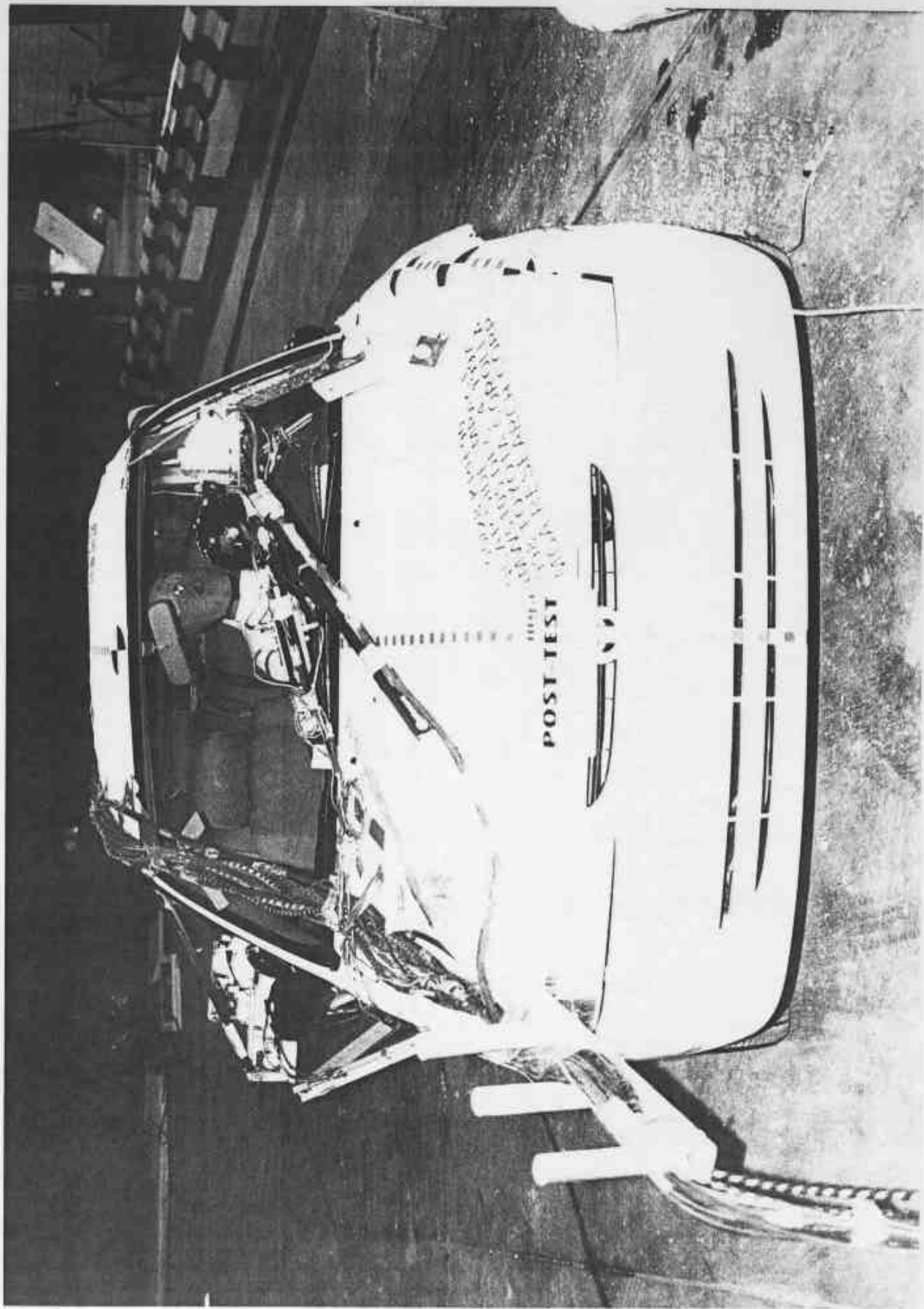


Photo No. A-2 - Post-Test Front View of Test Vehicle



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



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

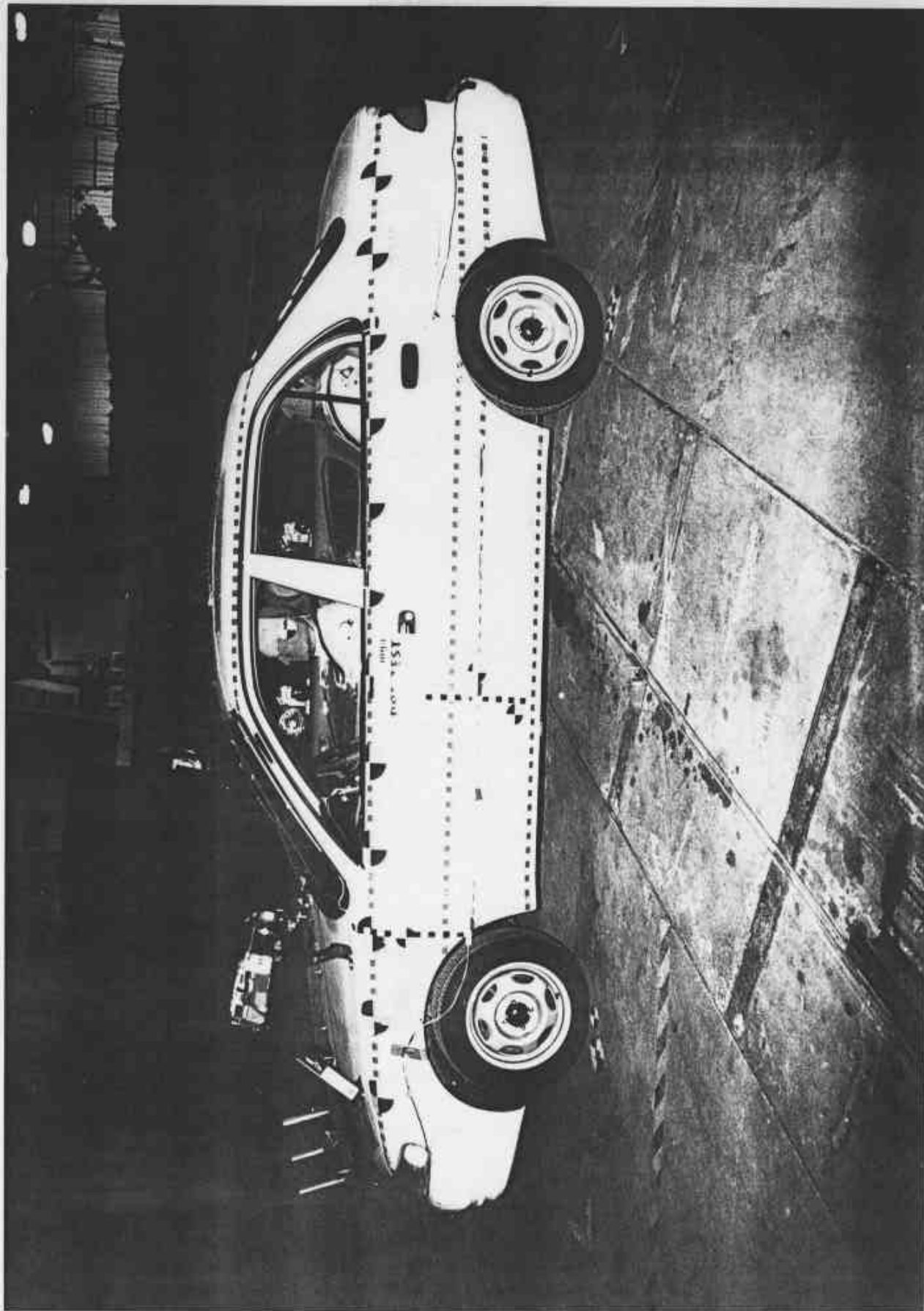
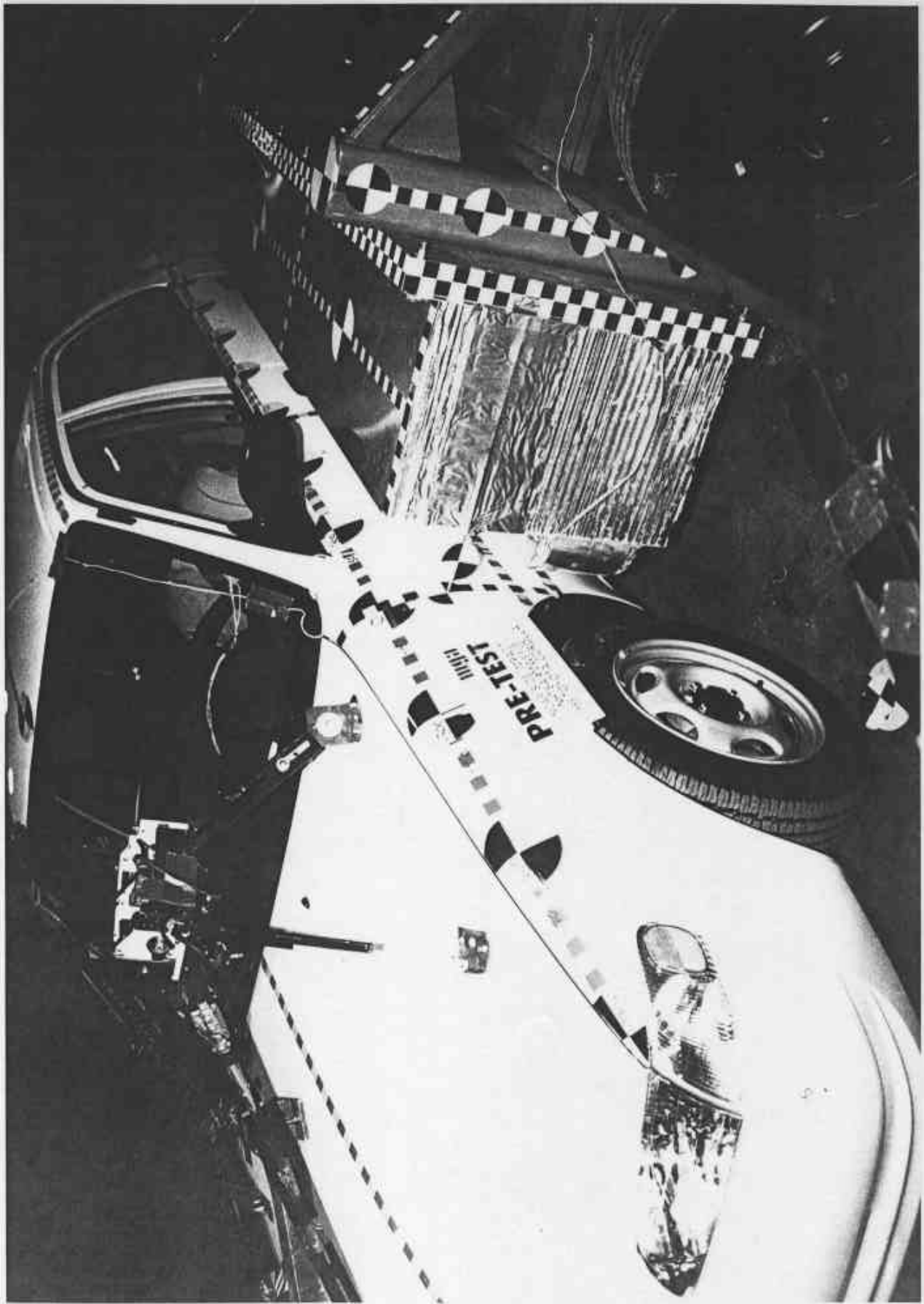


Photo No. A-5 - Pre-Test Left Side View of Test Vehicle



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



A-7

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

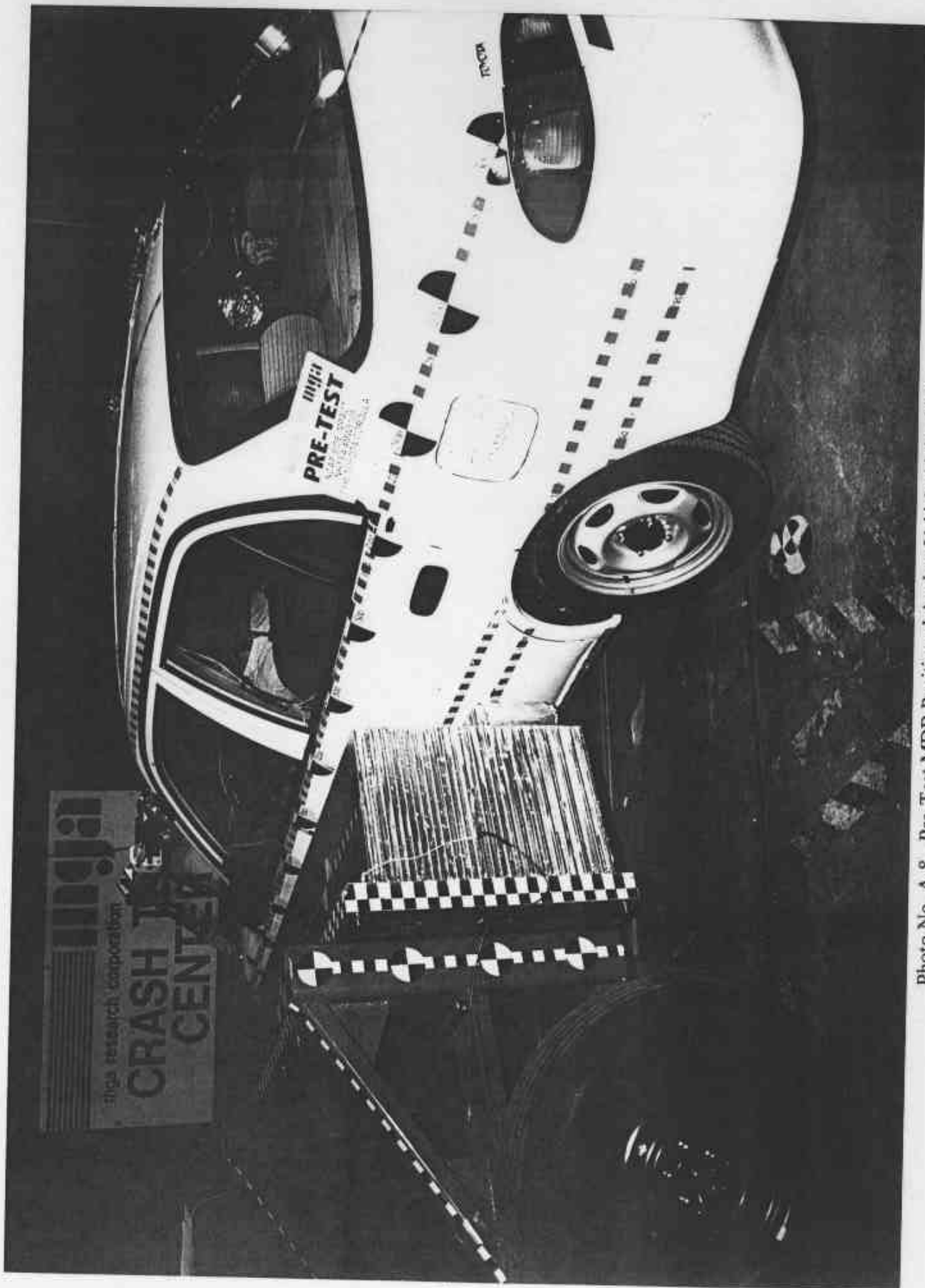


Photo No. A-8 - Pre-Test MDB Positioned Against Vehicle (right side)

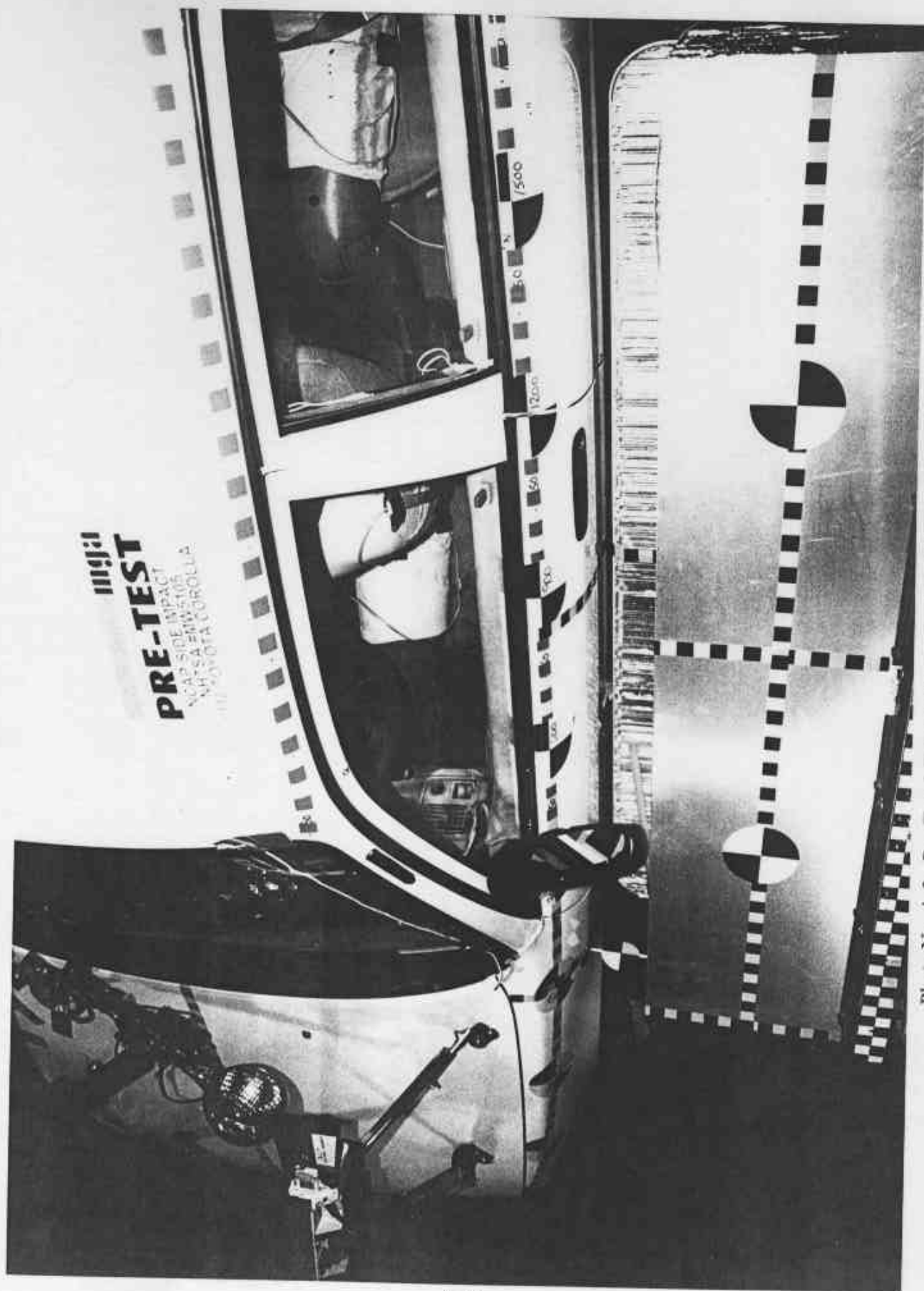


Photo No. A-9 - Pre-Test MDB Positioned Against Vehicle Overhead View

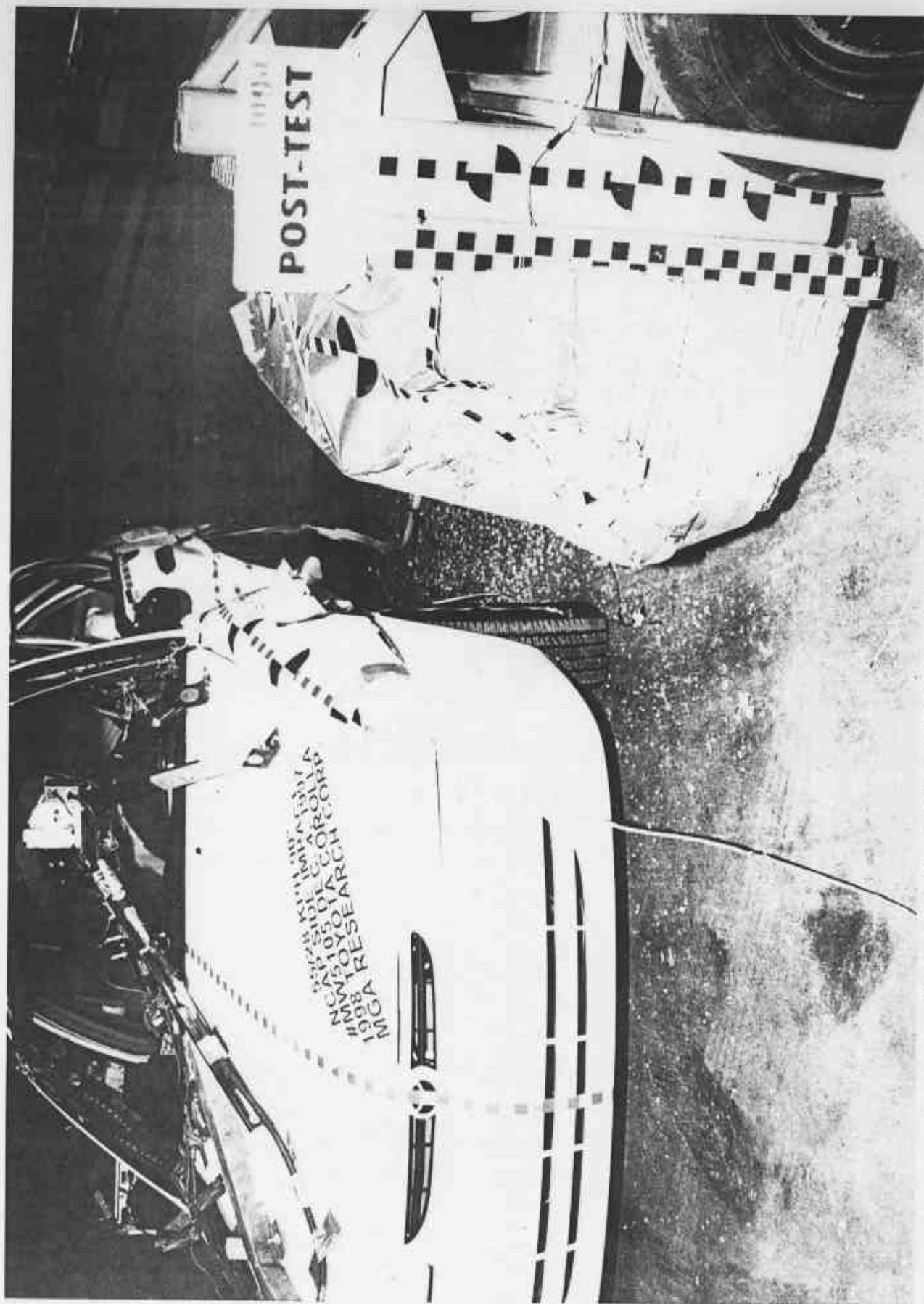


Photo No. A-10 - Post-Test MDB Positioned Against Vehicle (left side)

A-10

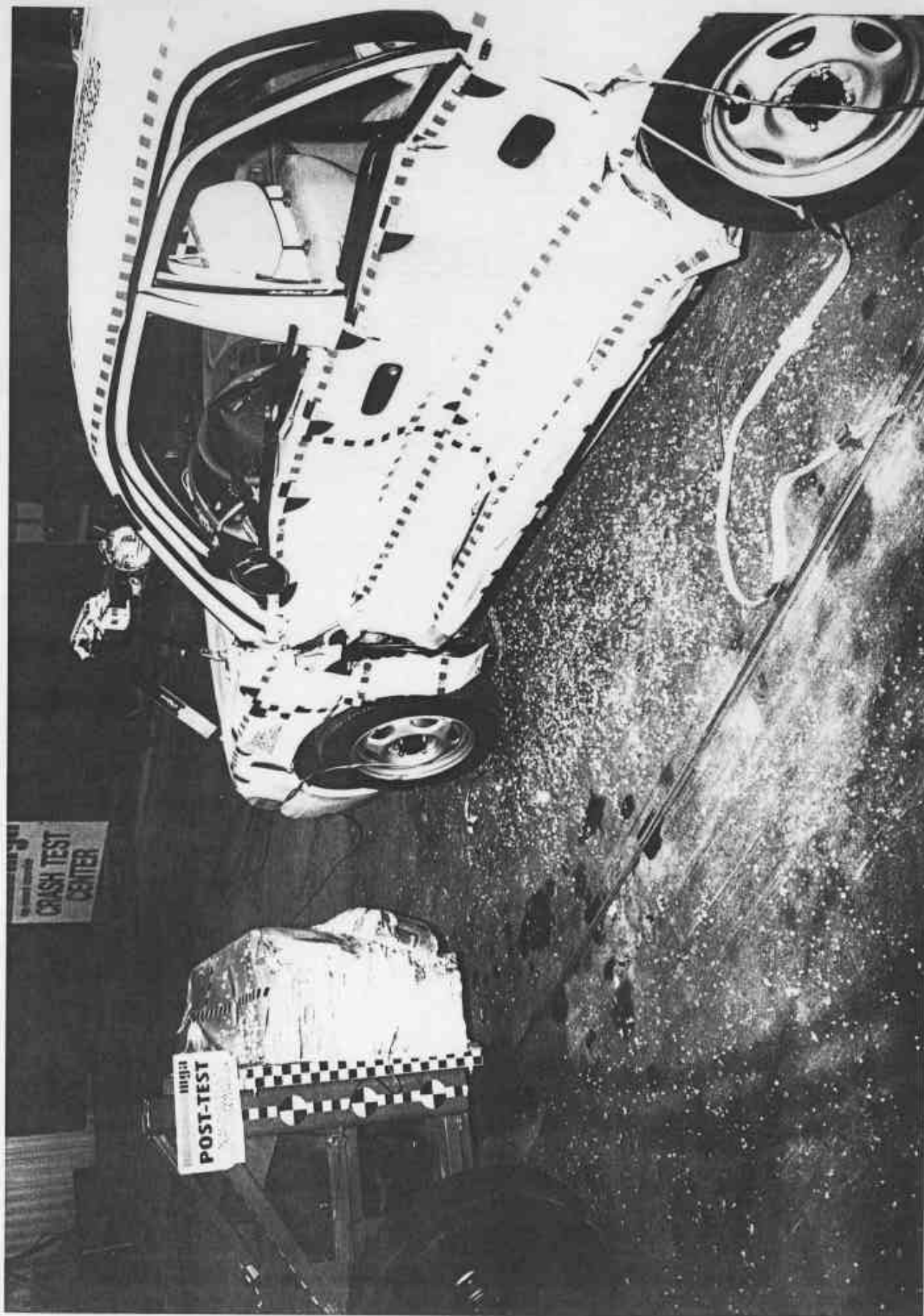


Photo No. A-11 - Post-Test MDB Positioned Against Vehicle (right side)

A-11

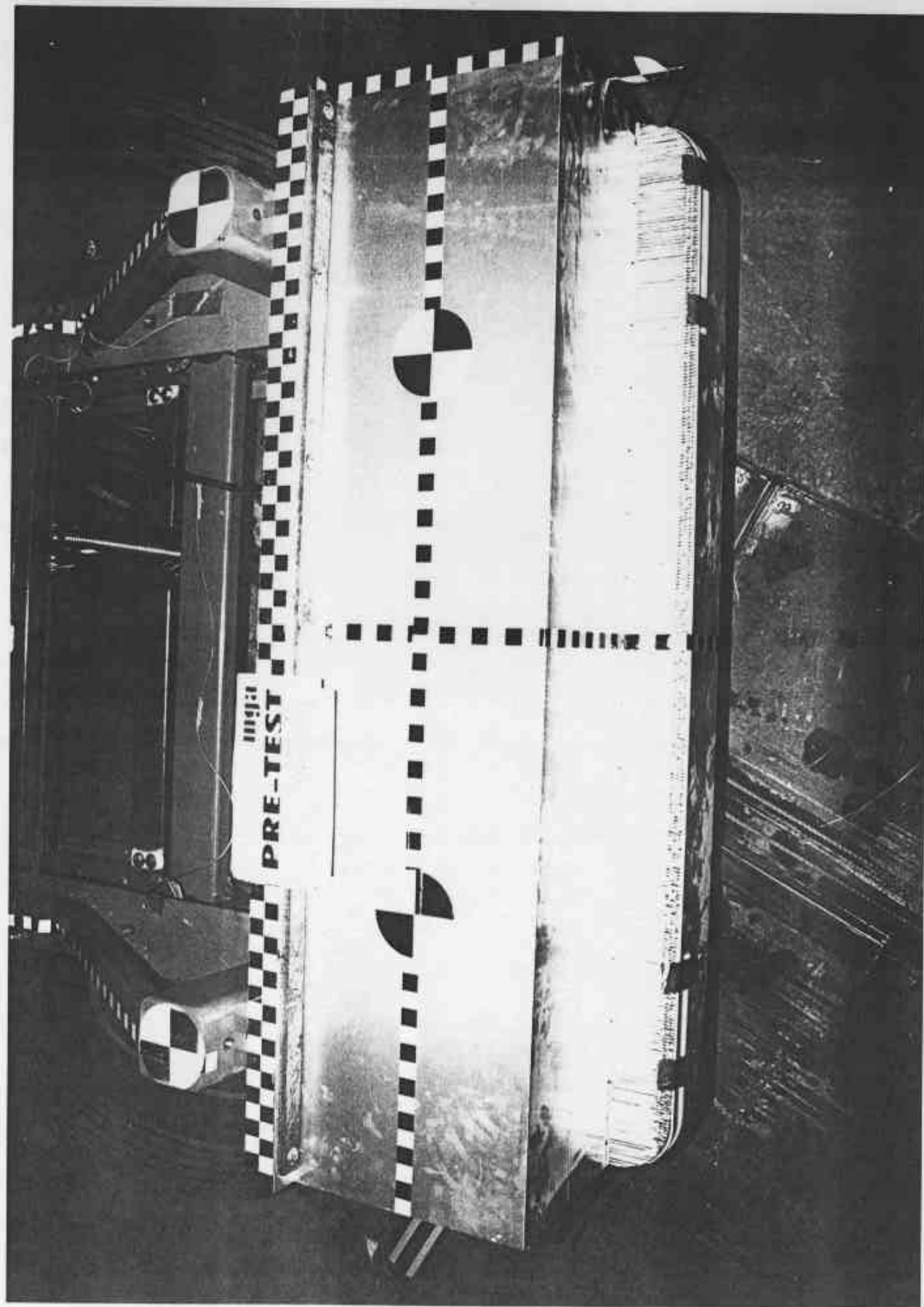


Photo No. A-12 - Pre-Test MDB Top View

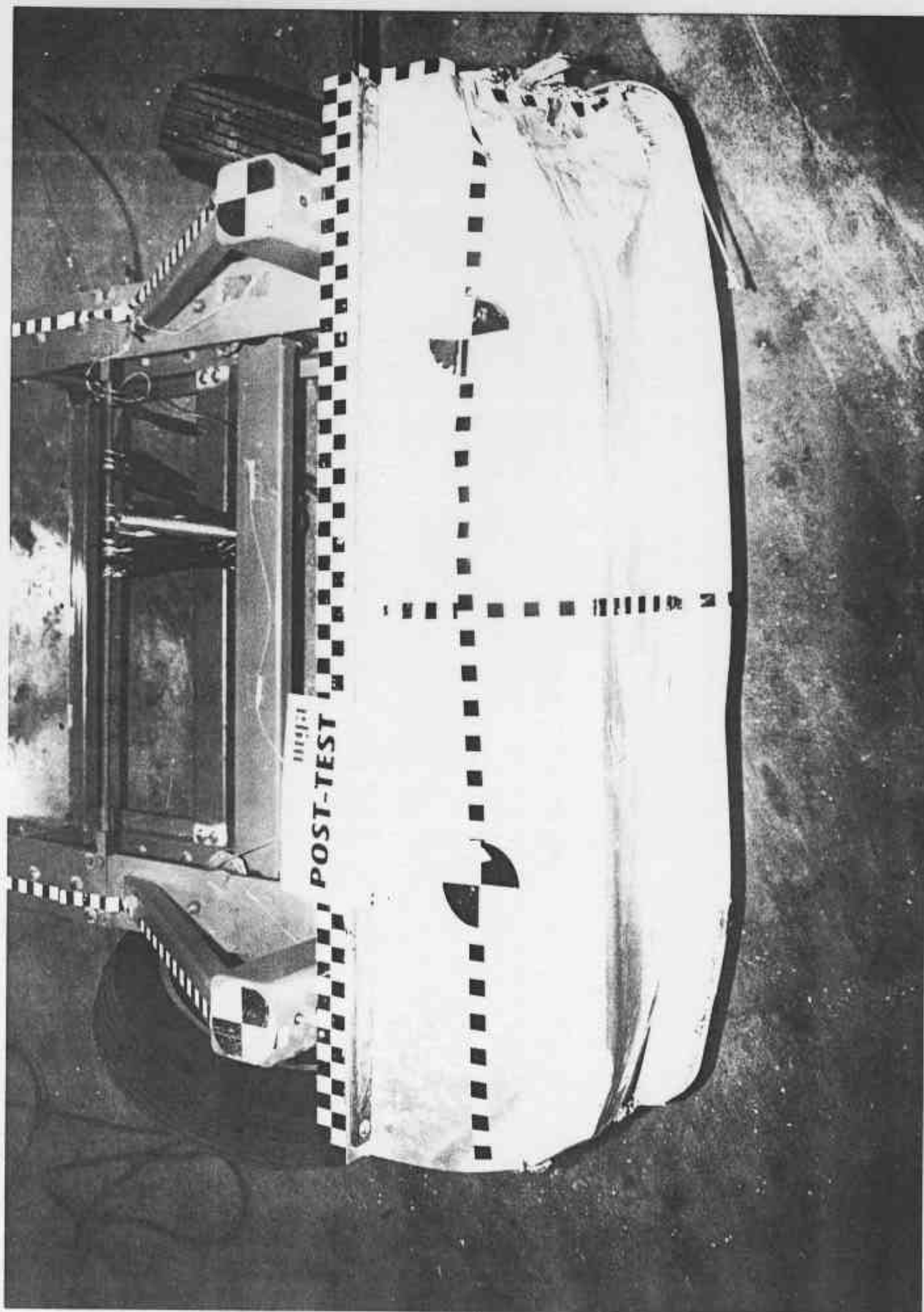


Photo No. A-13 - Post-Test MDB Top View

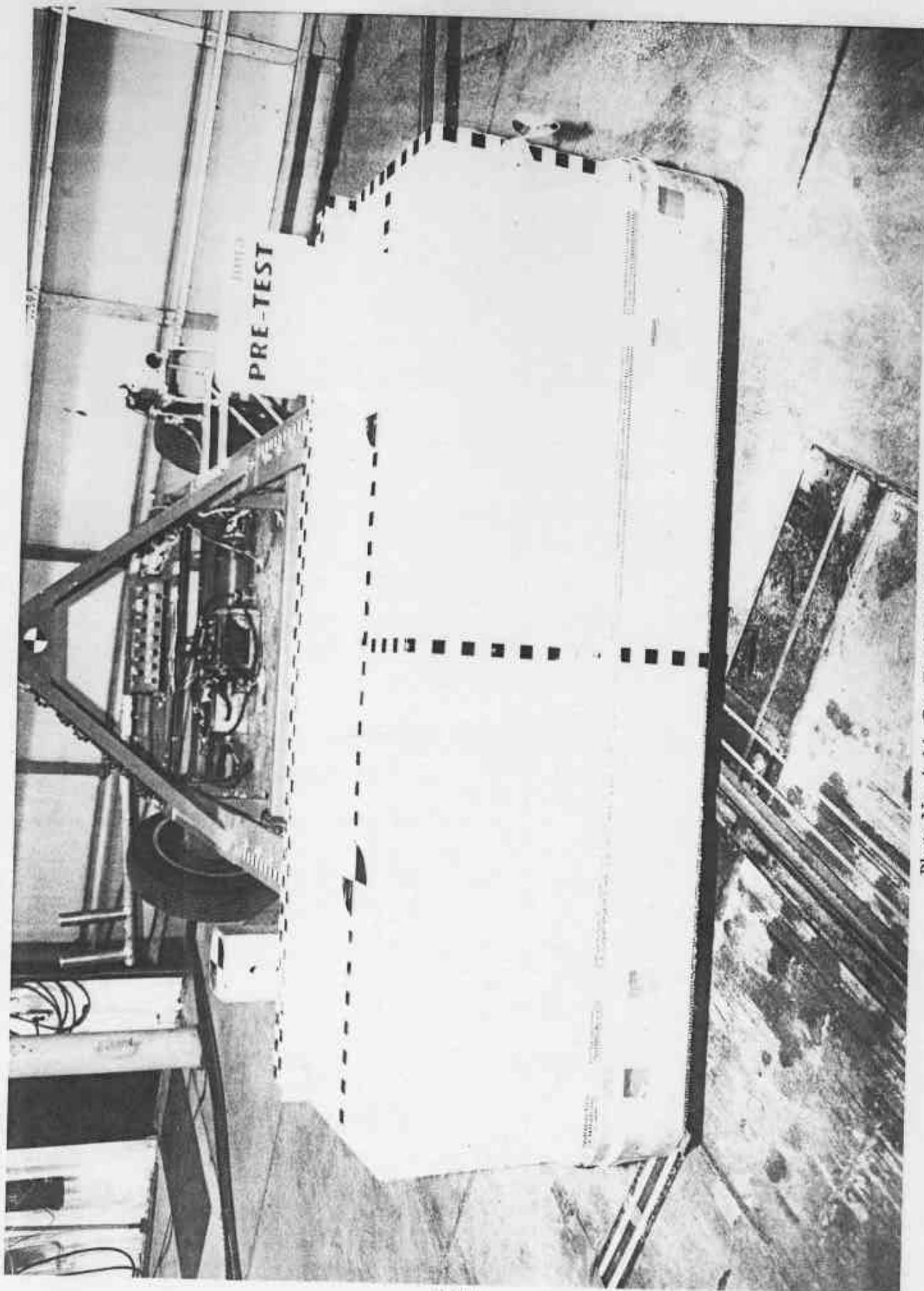
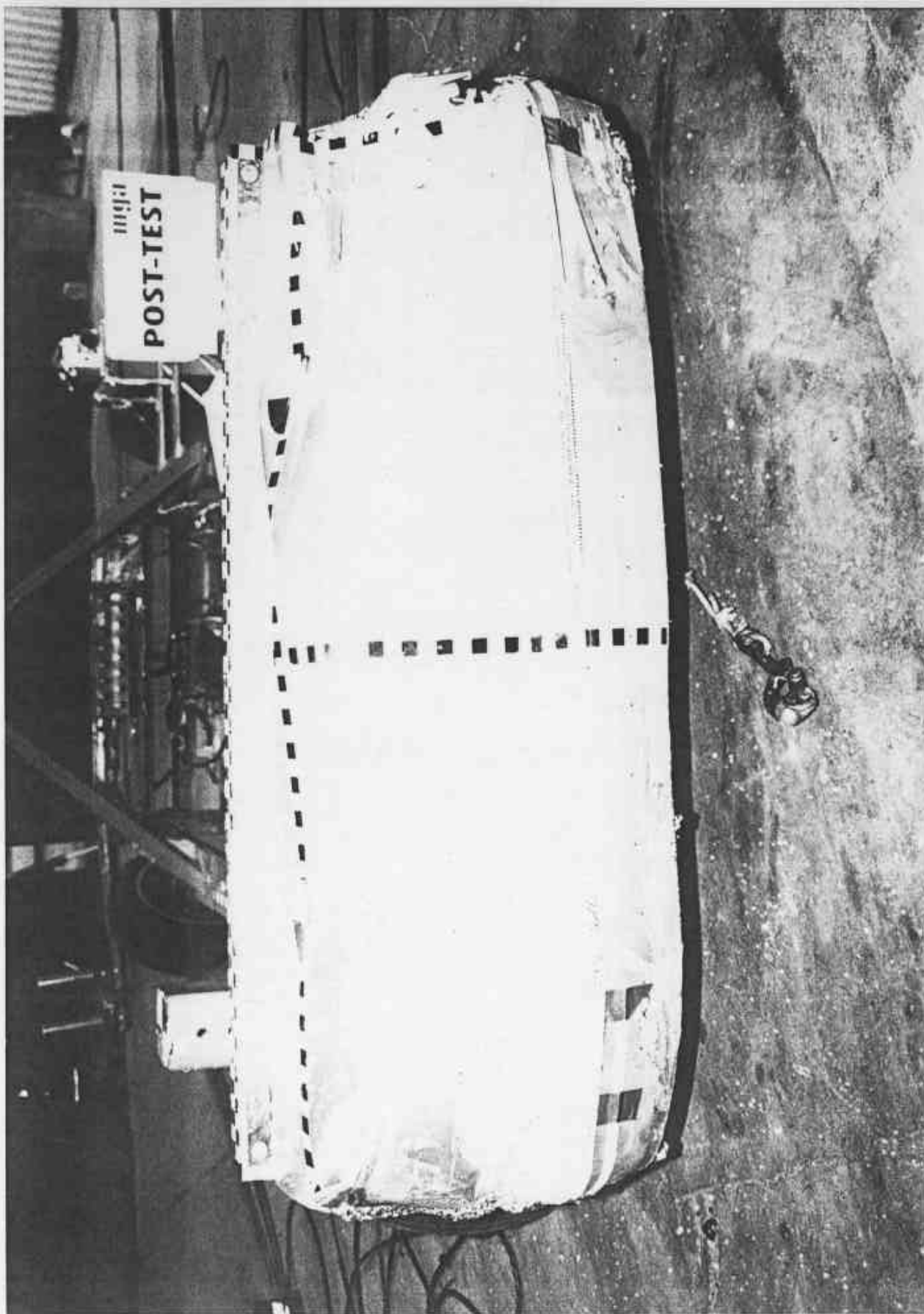


Photo No. A-14 - Pre-Test MDB Front View

A-14



A-15

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

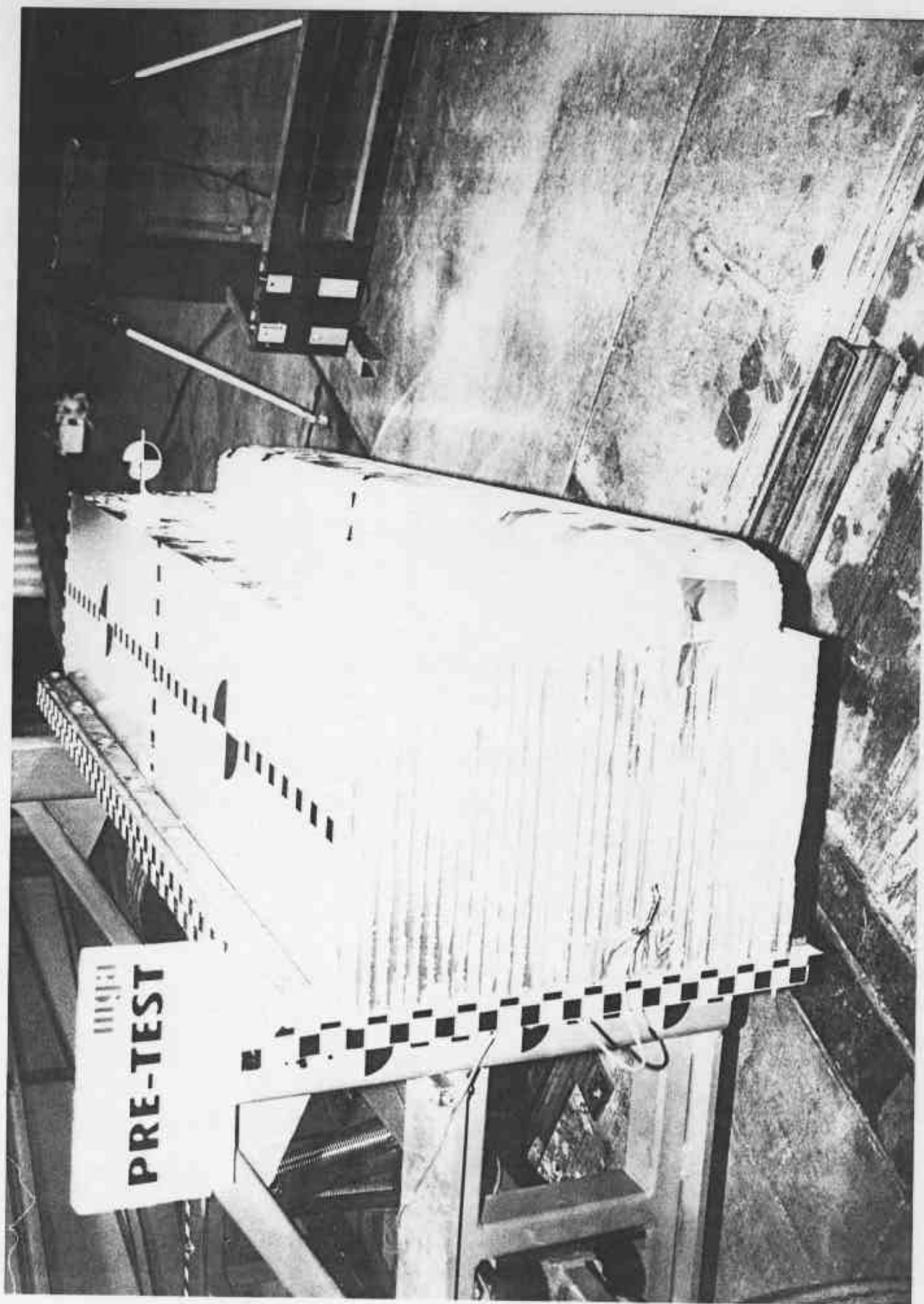


Photo No. A-16 - Pre-Test MDB Right Side View

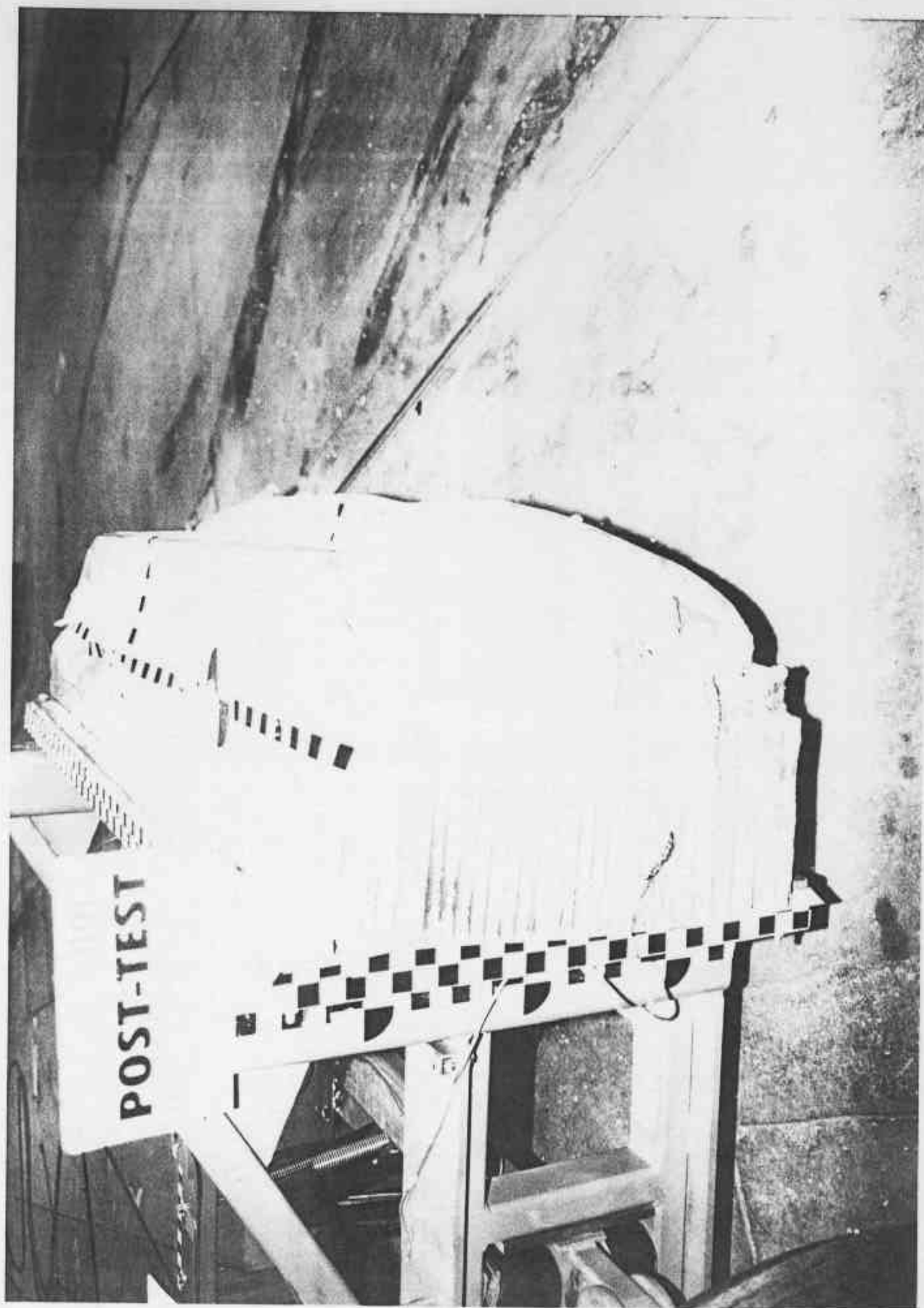


Photo No. A-17 - Post-Test MDB Right Side View

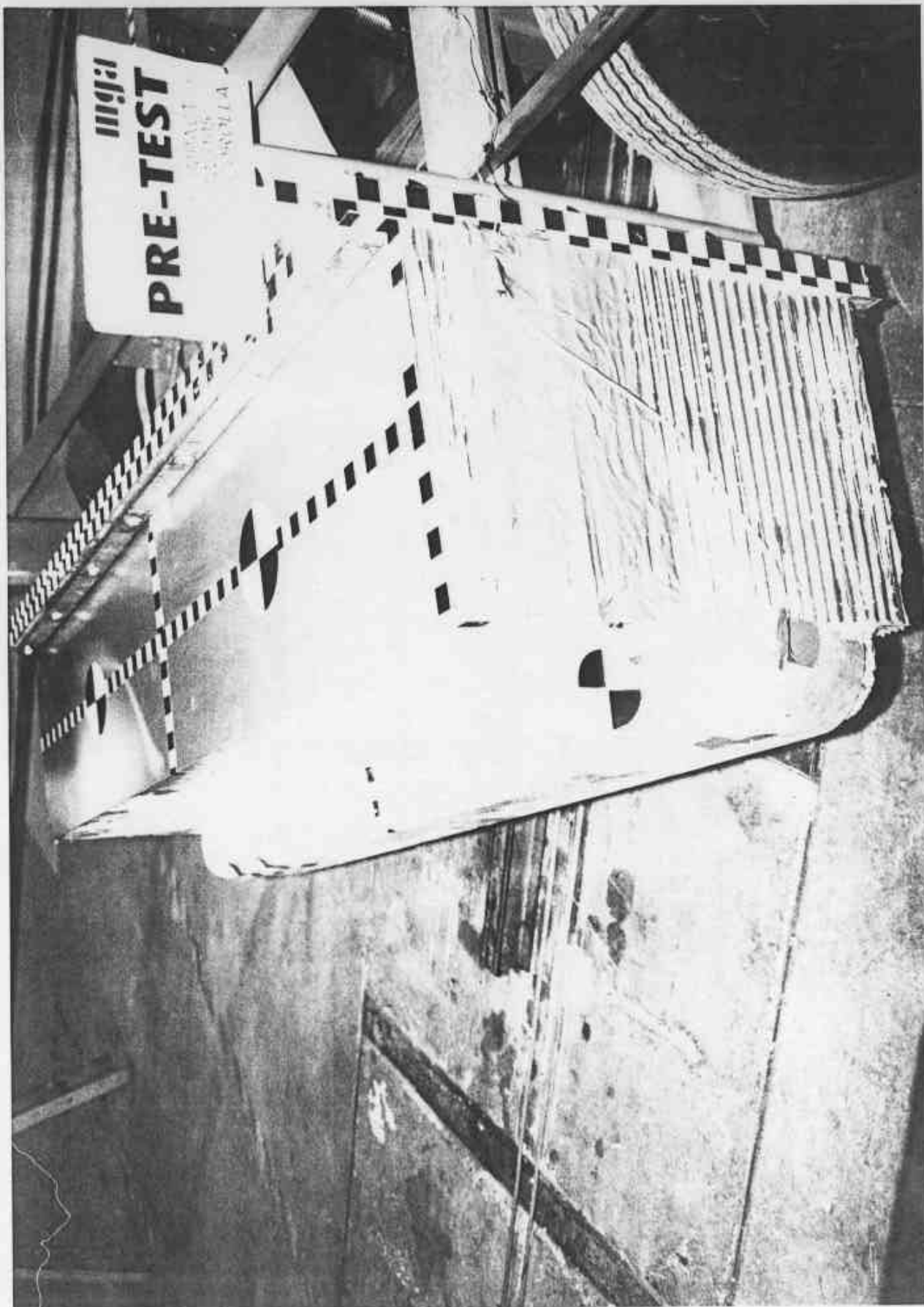


Photo No. A-18 - Pre-Test MDB Left Side View

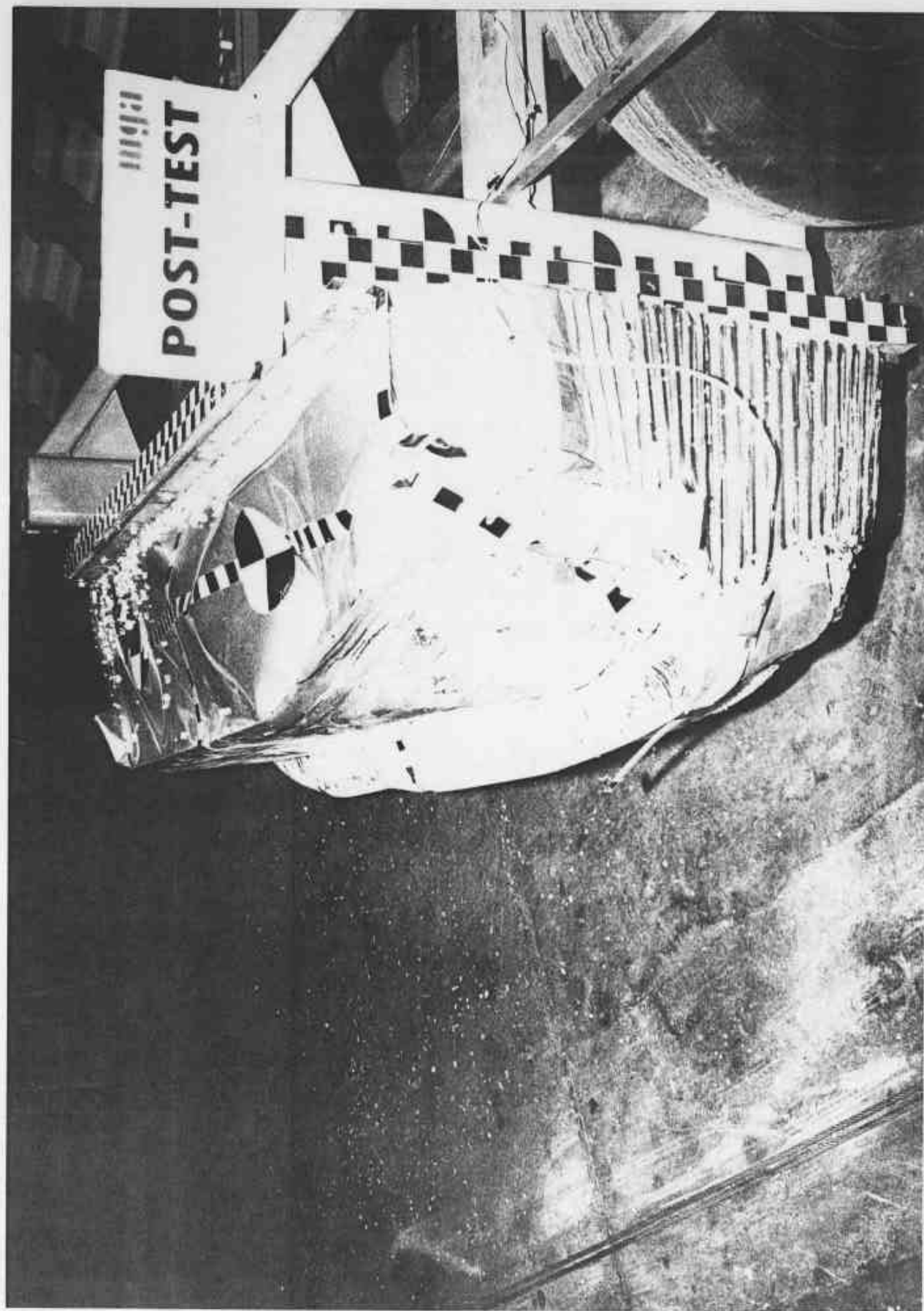


Photo No. A-19 - Post-Test MDB Left Side View

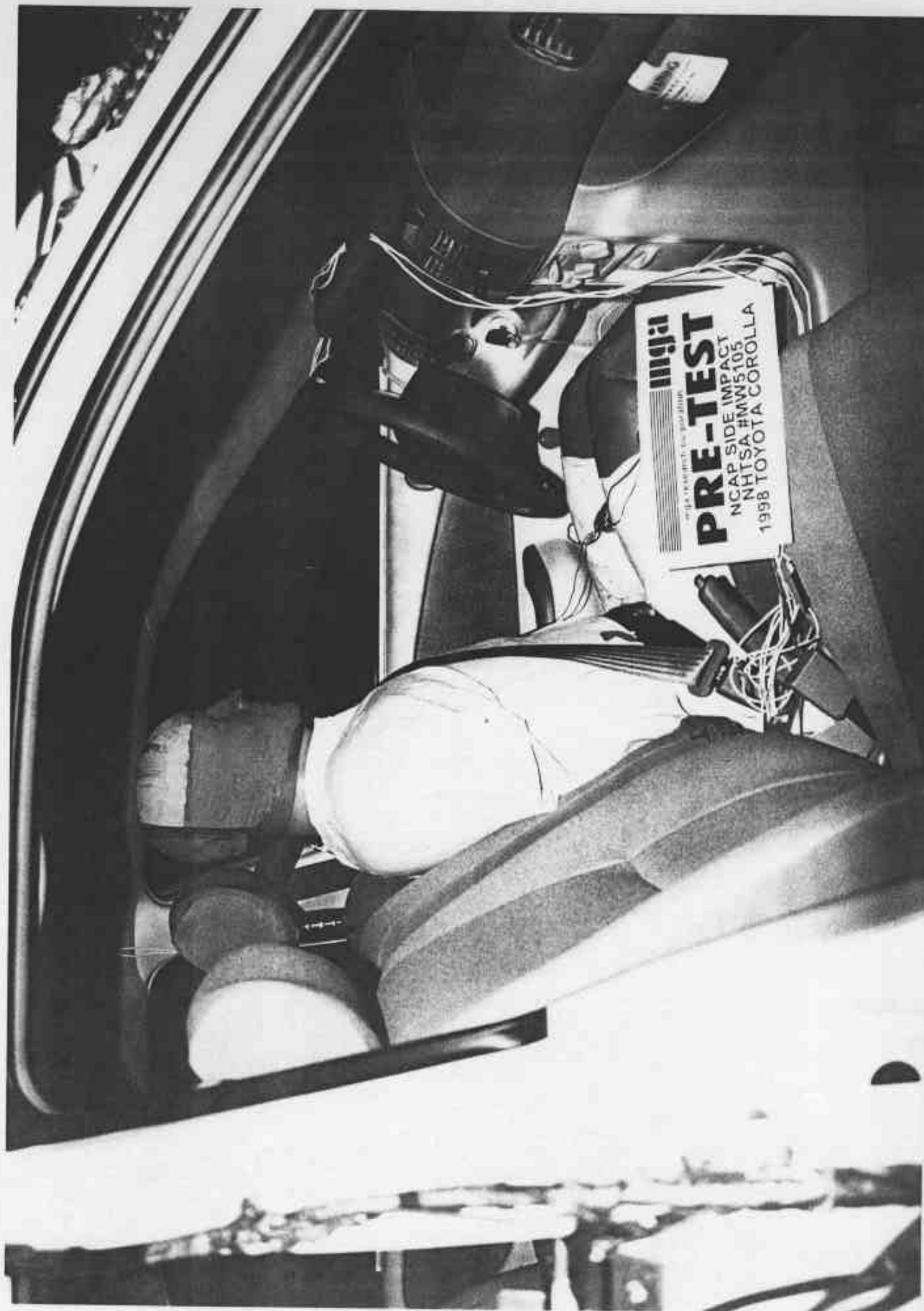
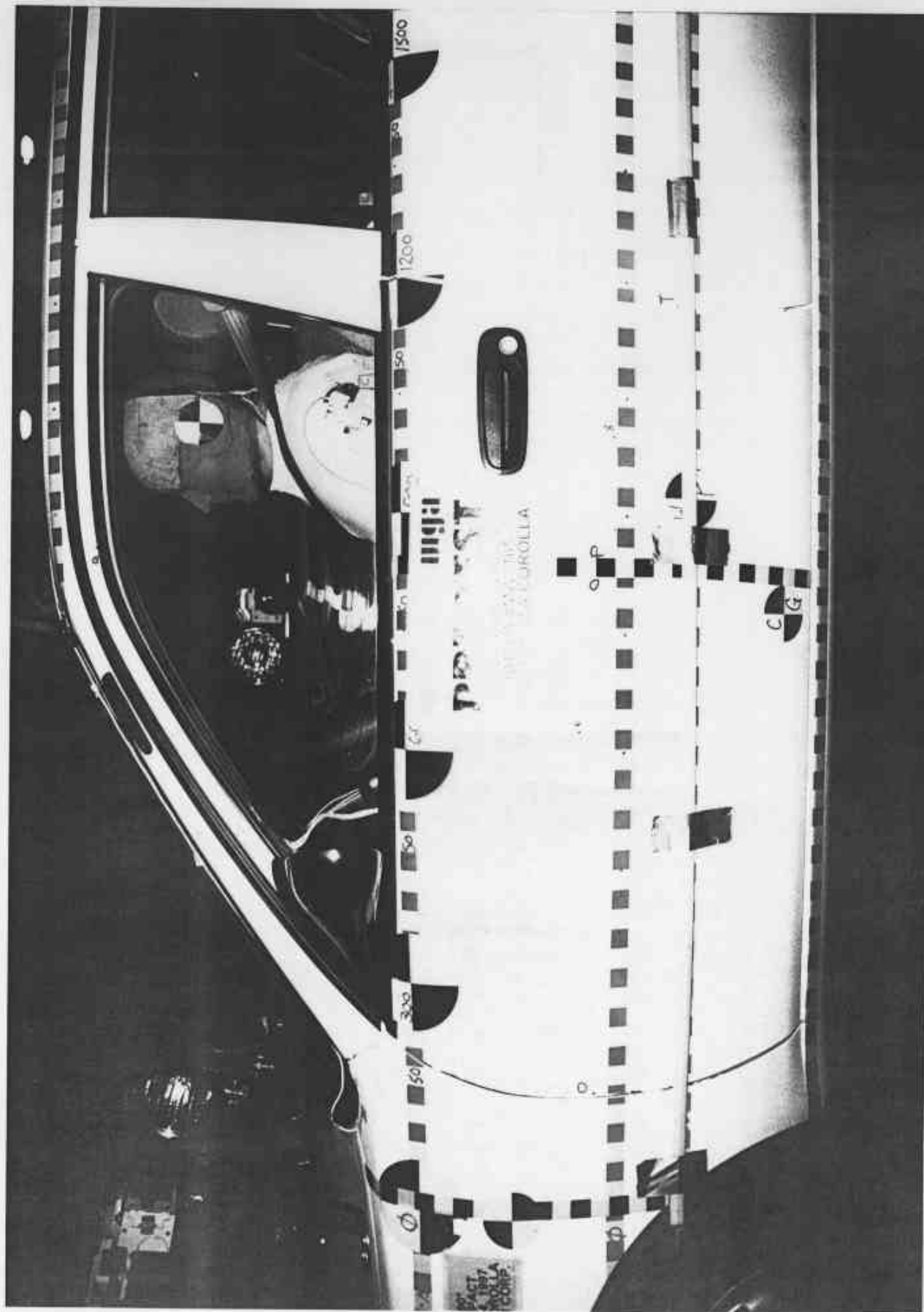


Photo No. A-20 - Pre-Test Driver Dummy Right Side View



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



A-22

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

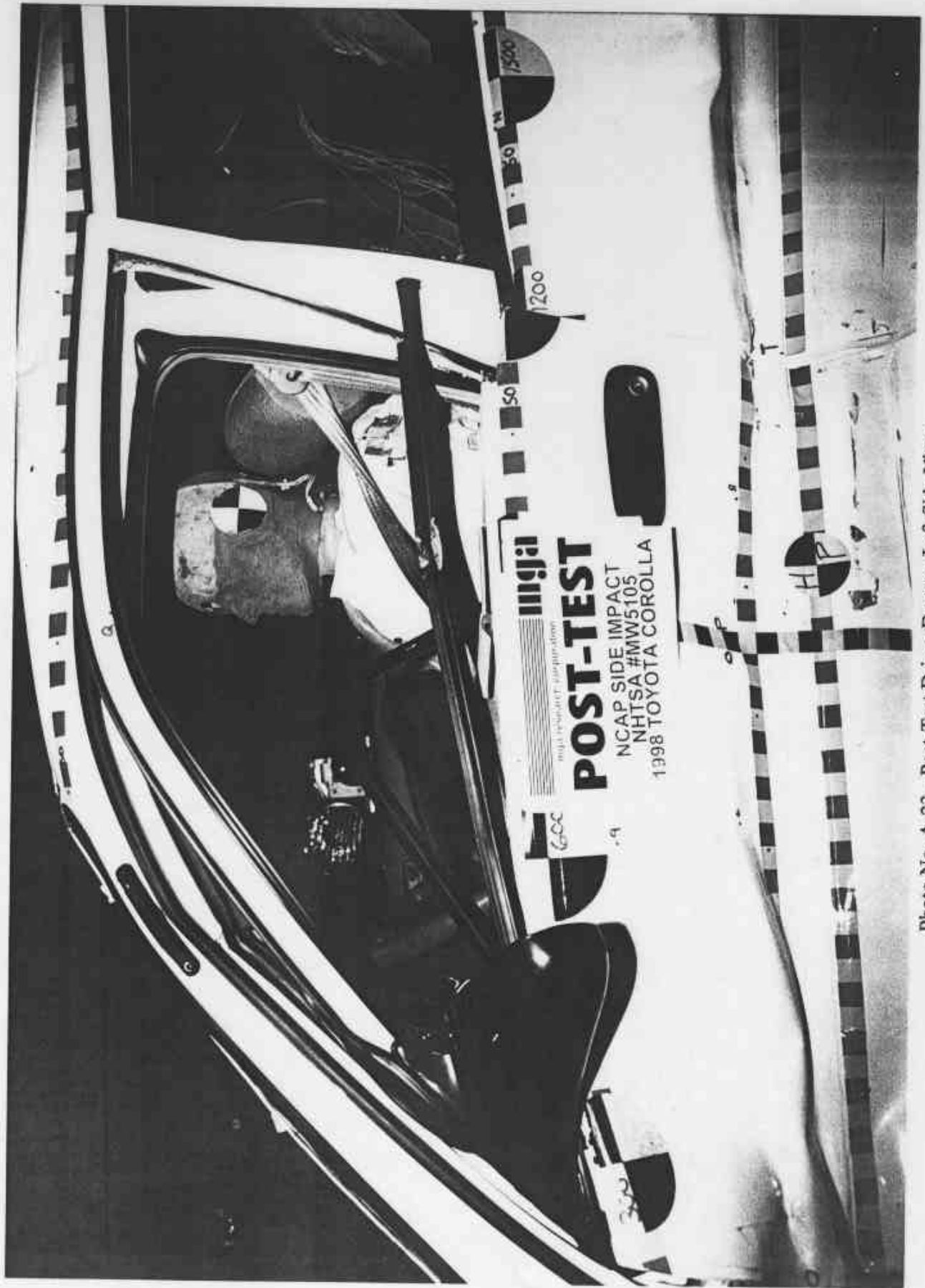
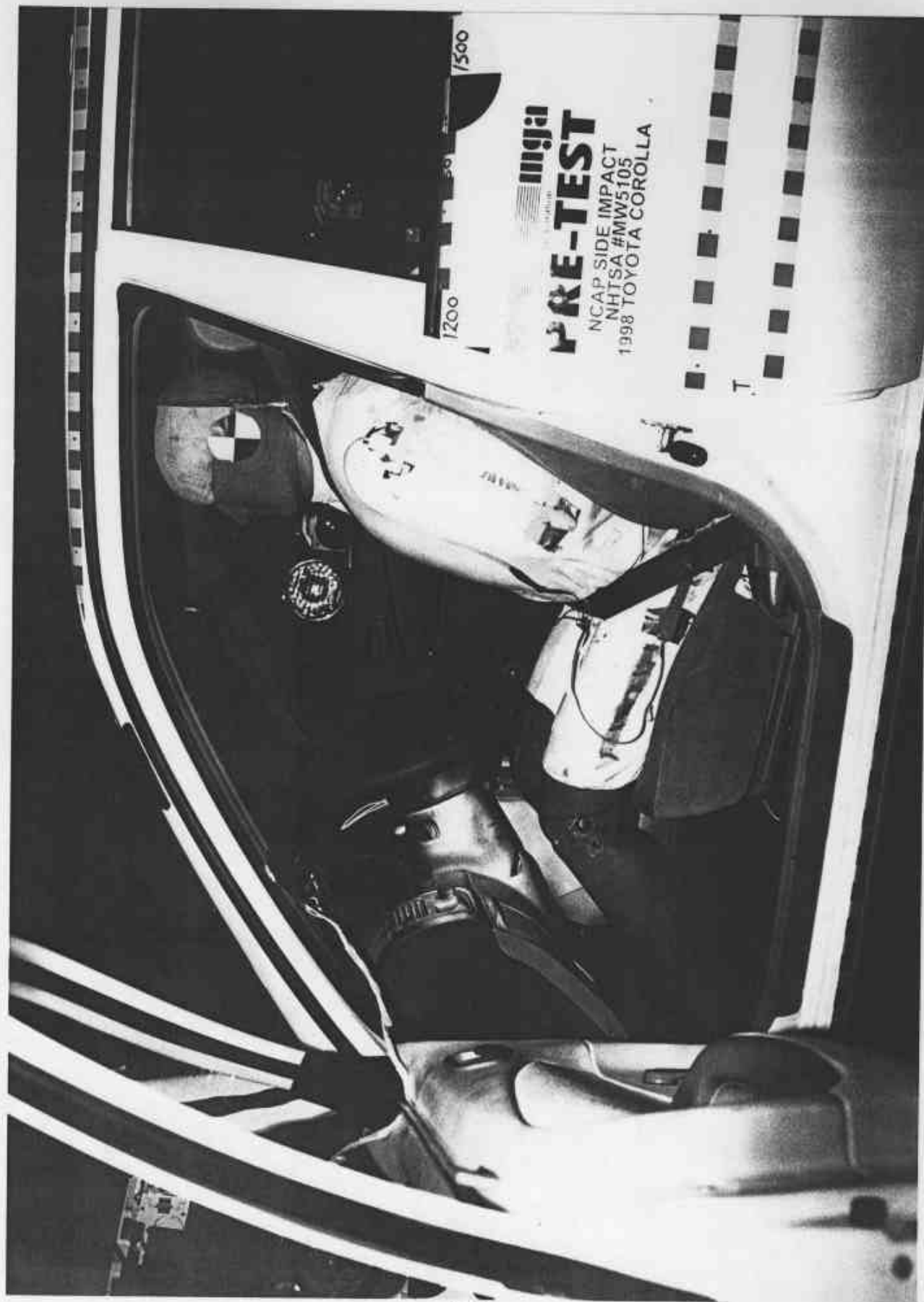


Photo No. A-23 - Post-Test Driver Dummy Left Side View



A-24

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



A-25

Photo No. A-25 - Pre-Test Driver Dummy Shoulder and Door Top View



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



Photo No. A-27 - Post-Test Driver Dummy Contact

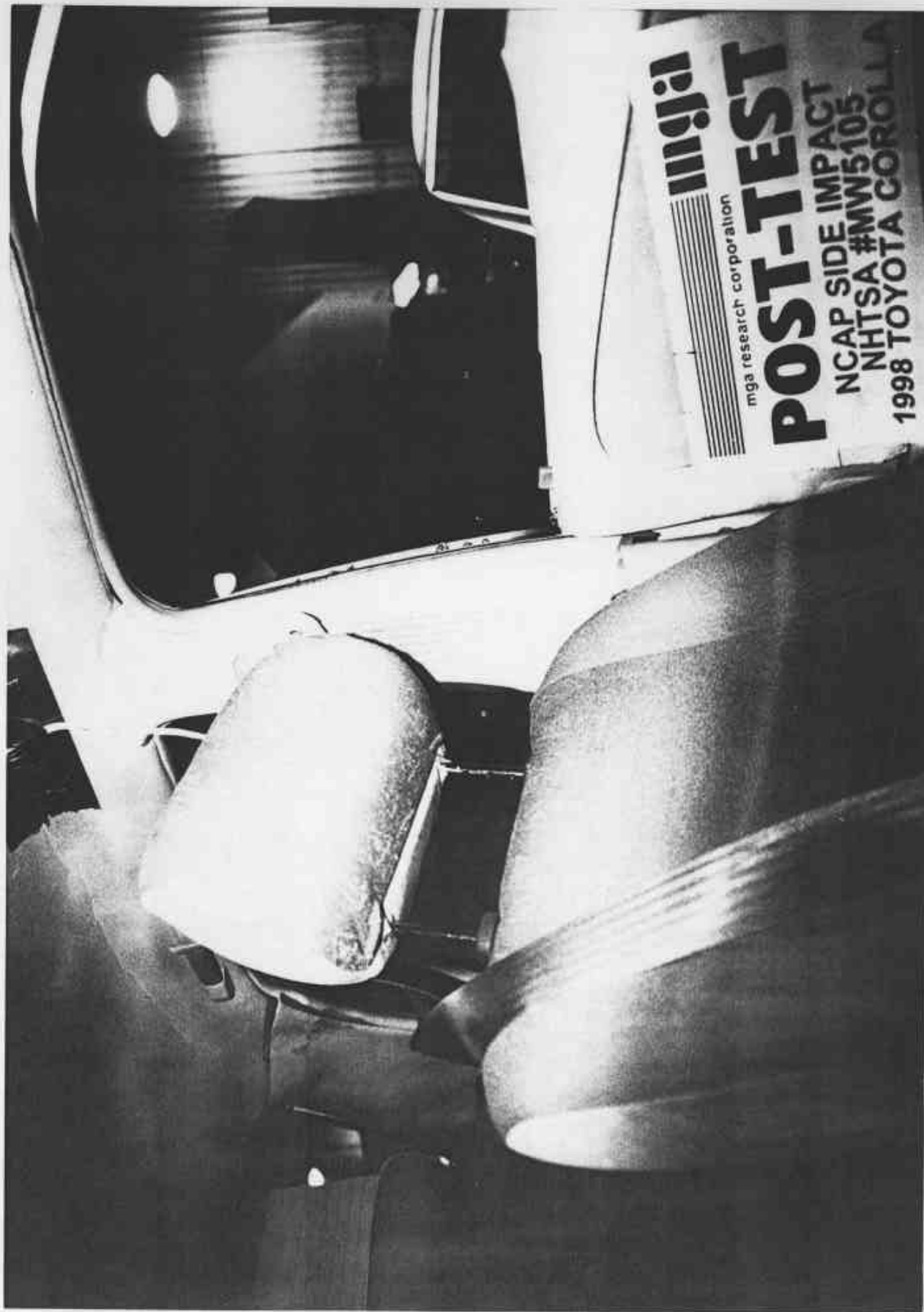


Photo No. A-28 - Post-Test Driver Dummy Head Contact

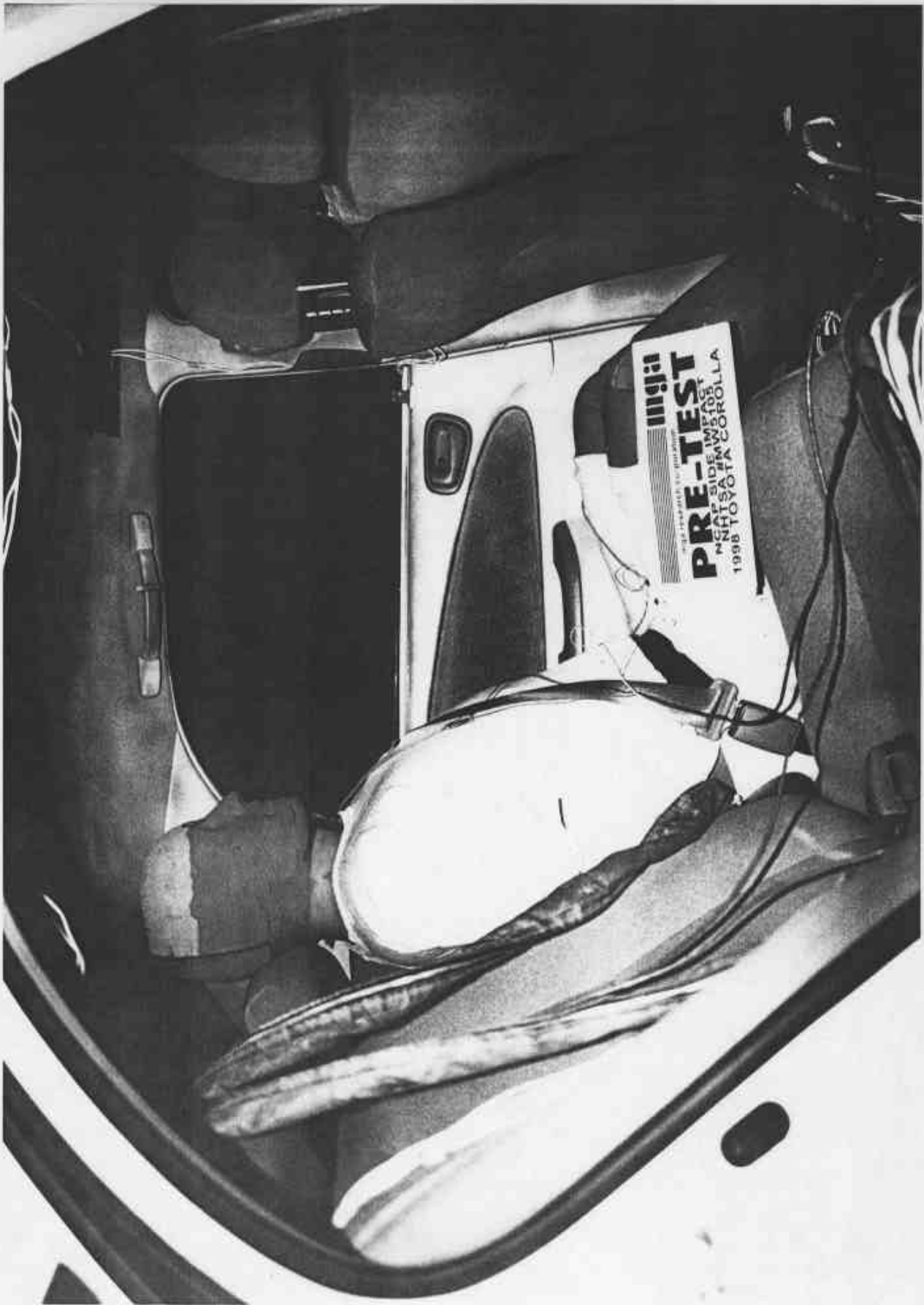


Photo No. A-29 - Pre-Test Passenger Dummy Right Side View



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

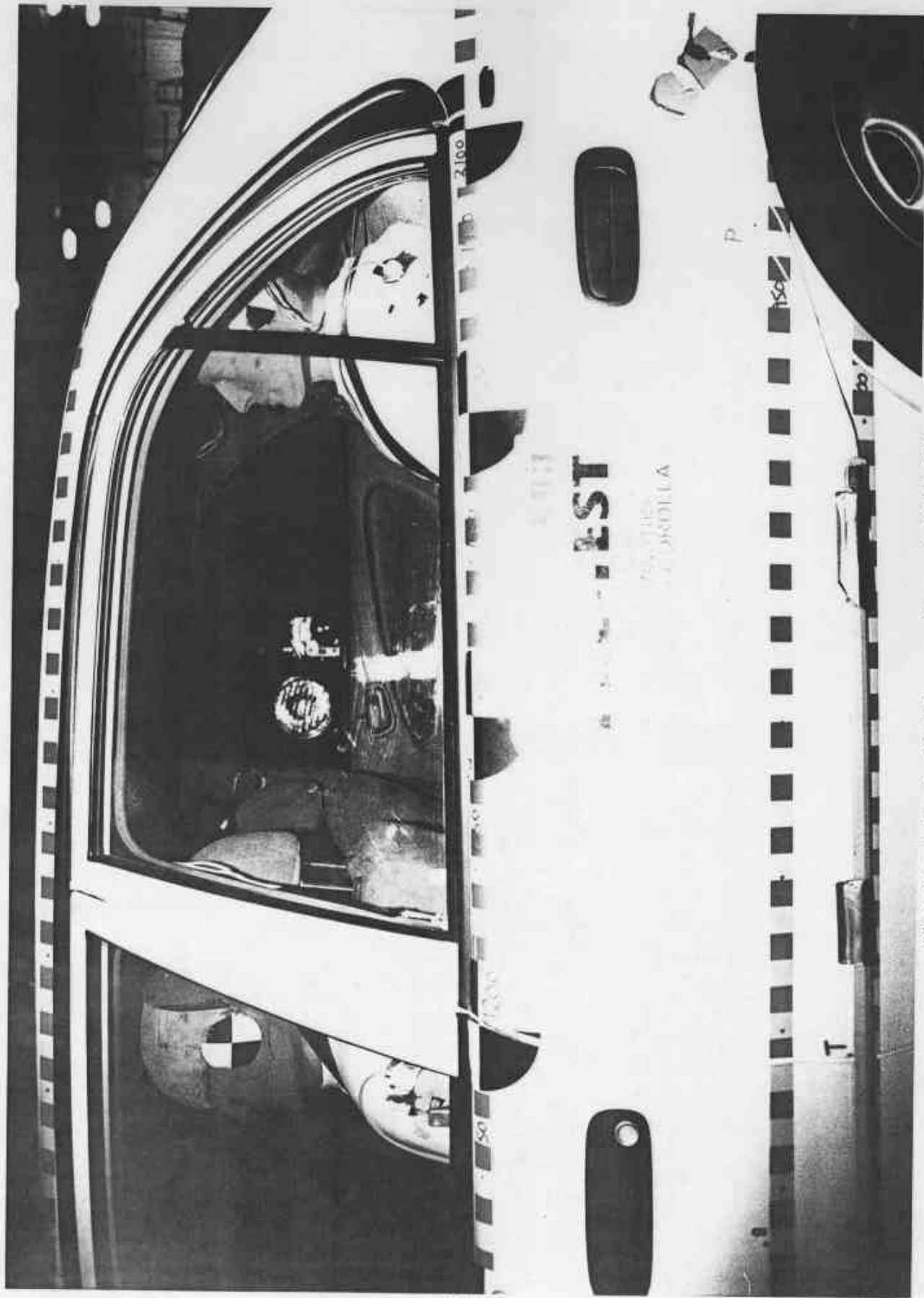
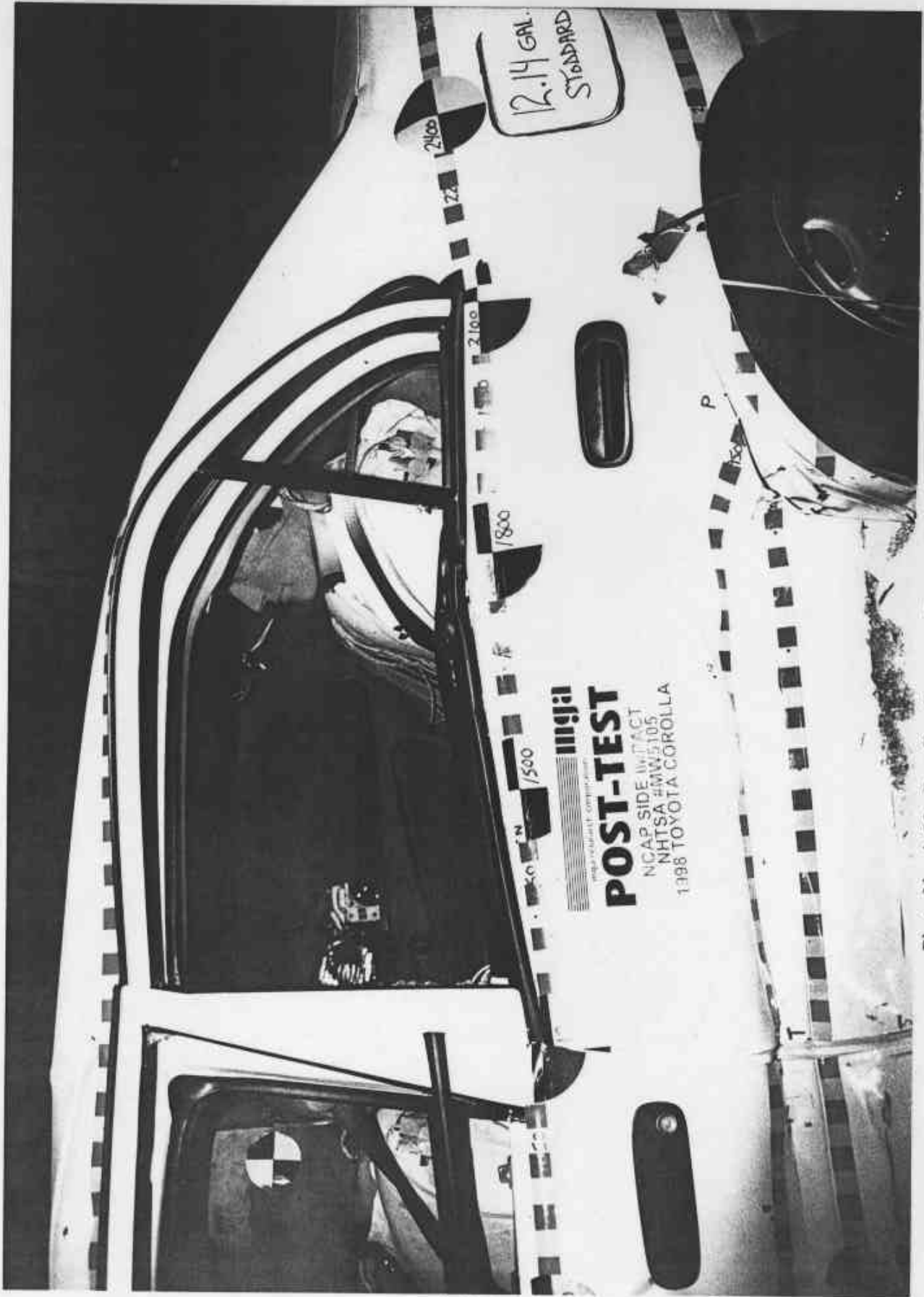


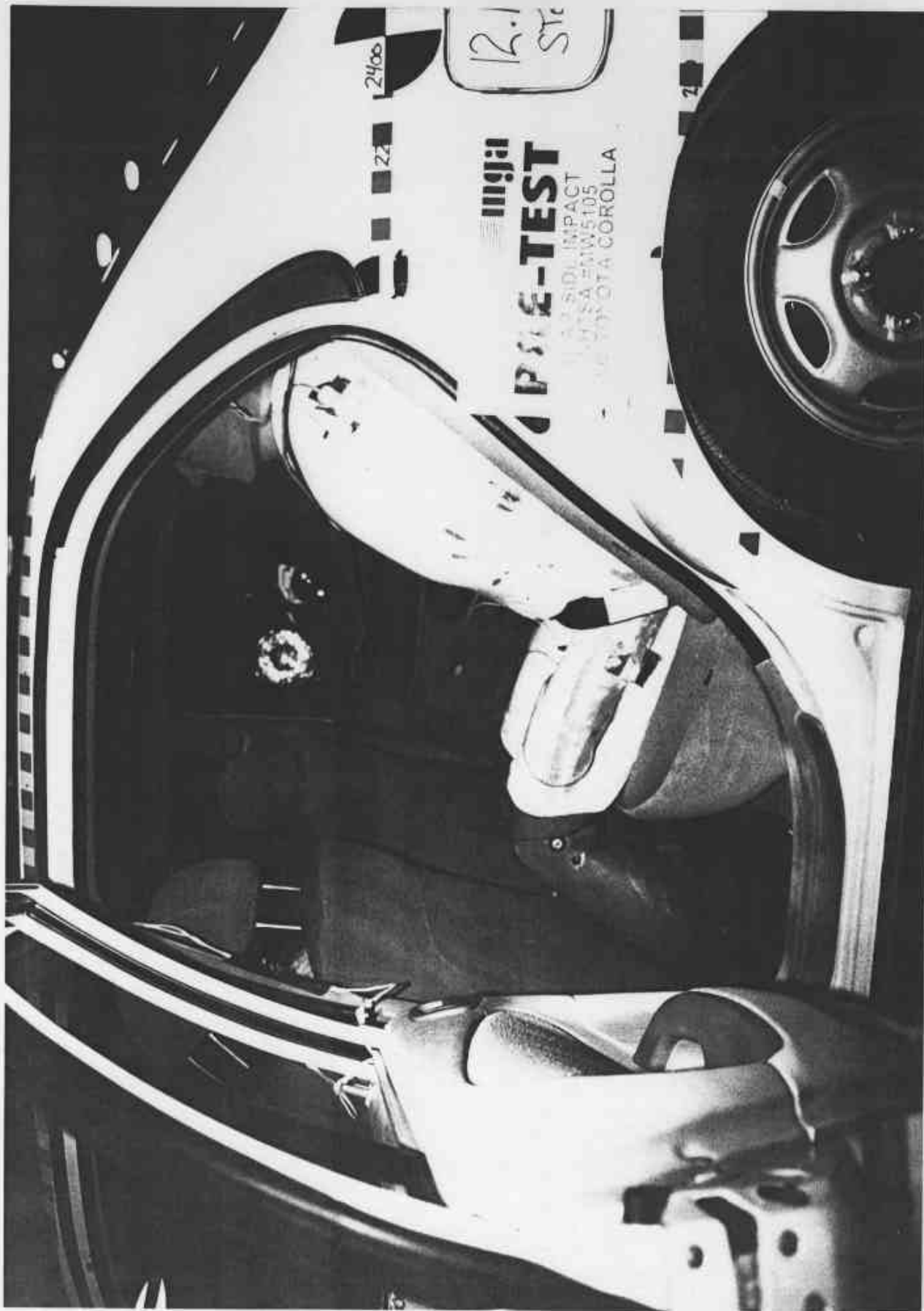
Photo No. A-31 - Pre-Test Passenger Dummy Left Side View

A-31



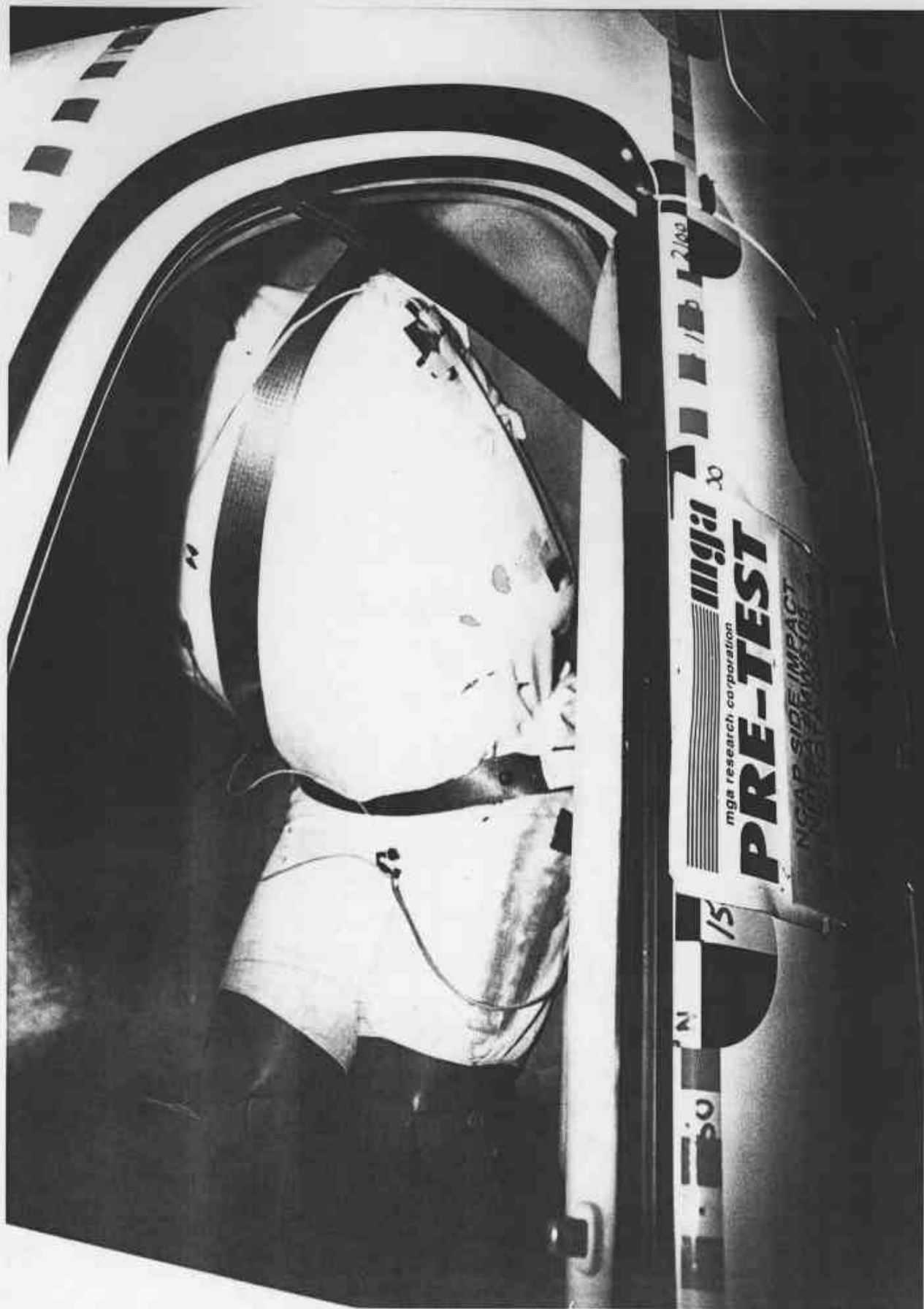
A-32

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



A-33

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



A-34

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

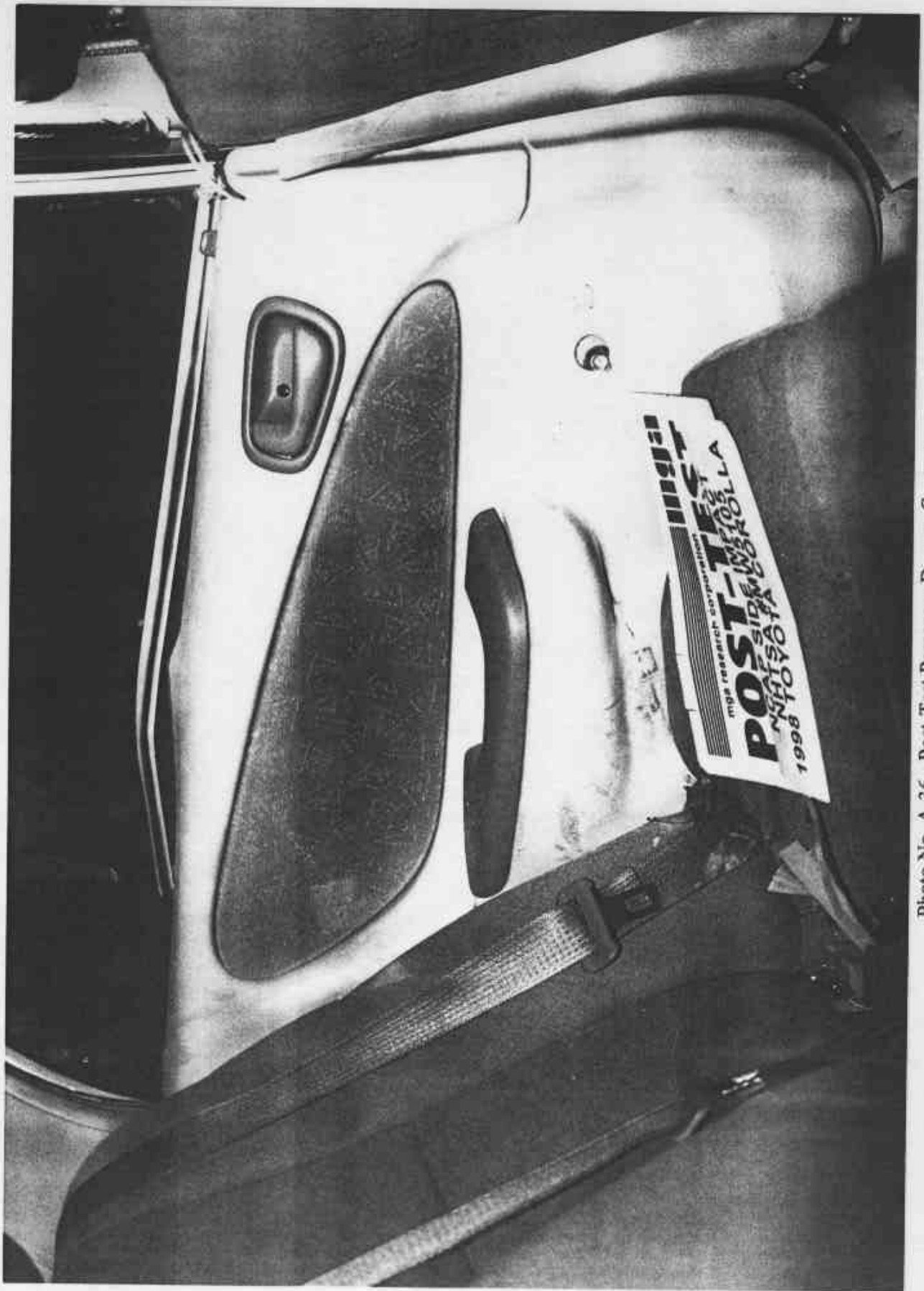


Photo No. A-36 - Post-Test Passenger Dummy Contact



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



Photo No. A-38 - Post-Test Passenger Dummy Head Contact



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



mg3res0107-001010

POST-TEST

NCAP SIDE IMPACT
NHTSA #MW5105
1998 TOYOTA COROLLA

A-40

Photo No. A-40 - Post-Test Left Front Impact Point on Vehicle

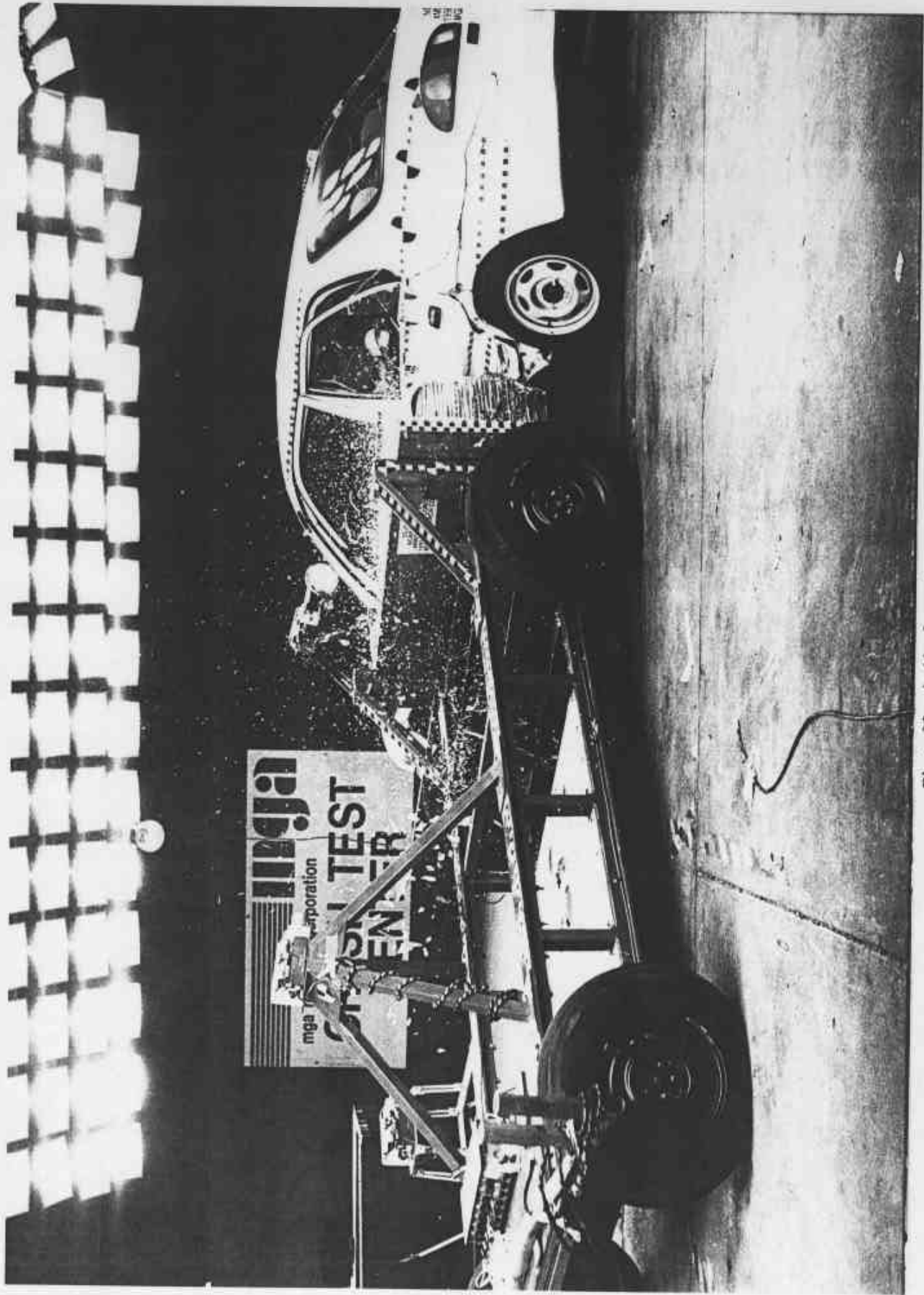


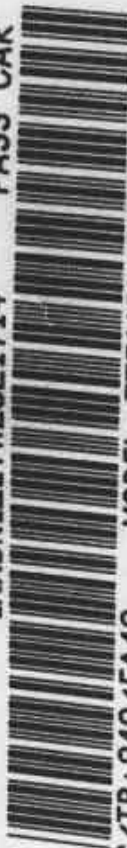
Photo No. A-41 - Impact

A-41

MFD BY: NEW UNITED MOTOR MANUFACTURING
INC. 10/97

GVWR 3515LB GAWR FR 1815LB RR 1720LB
THIS VEHICLE CONFORMS TO ALL APPLICABLE
FEDERAL MOTOR VEHICLE SAFETY BUMPER AND
THEFT PREVENTION STANDARDS IN EFFECT ON
THE DATE OF MANUFACTURE SHOWN ABOVE.

INXBR12E7WZ021714 PASS CAR



C/TR: 040/FA40
A/TM: -03A/A131L

MODEL: ZZE110L-DEHRKA

BA2052250

VEHICLE CAPACITY WEIGHT : 850 lbs (385kg)
 DESIGNATED SEATING CAPACITY : TOTAL 5 (FRONT 2, REAR 3)
 RECOMMENDED COLD TIRE INFLATION PRESSURE : psi (kPa)
 REAR 30 (210), REAR 30 (210)
 RECOMMENDED TIRE SIZE : P175 / 65R14 81 S
 COMPACT SPARE TIRE INFLATION PRESSURE : 60 psi (420 kPa)
 RECOMMENDED CORE SIZE : T115 / 70D14 88M
 RECOMMENDED INFLATION PRESSURE : 60 psi (420 kPa)
 SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION
 CHARGE MAXIMALE DU VEHICULE : 850 LIVRES (385kg)
 NOMBRE DESIGNÉ DE PLACES ASSISES : TOTAL 5 (AVANT 2, ARRIERE 3)
 PRESSION RECOMMANDÉE DE GONFLAGE À FROID DES PNEUS
 AU POIDS MAXIMAL DU VEHICULE CHARGE : LB / PO² (kPa)
 AVANT 30 (210), ARRIERE 30 (210)
 DIMENSION RECOMMANDÉE DES PNEUS : P175 / 65R14 81 S
 PNEU DE RECHANGE COMPACT
 DIMENSION RECOMMANDÉE DU PNEU : T115 / 70D14 88M
 PRESSION RECOMMANDÉE DE GONFLAGE À FROID : 60 LB / PO² (420kPa)
 POUR DE PLUS AMPLES DETAILS, VOIR LE MANUEL DU PROPRIÉTAIRE

02120

TU

Photo No. A-43 - Tire Placard

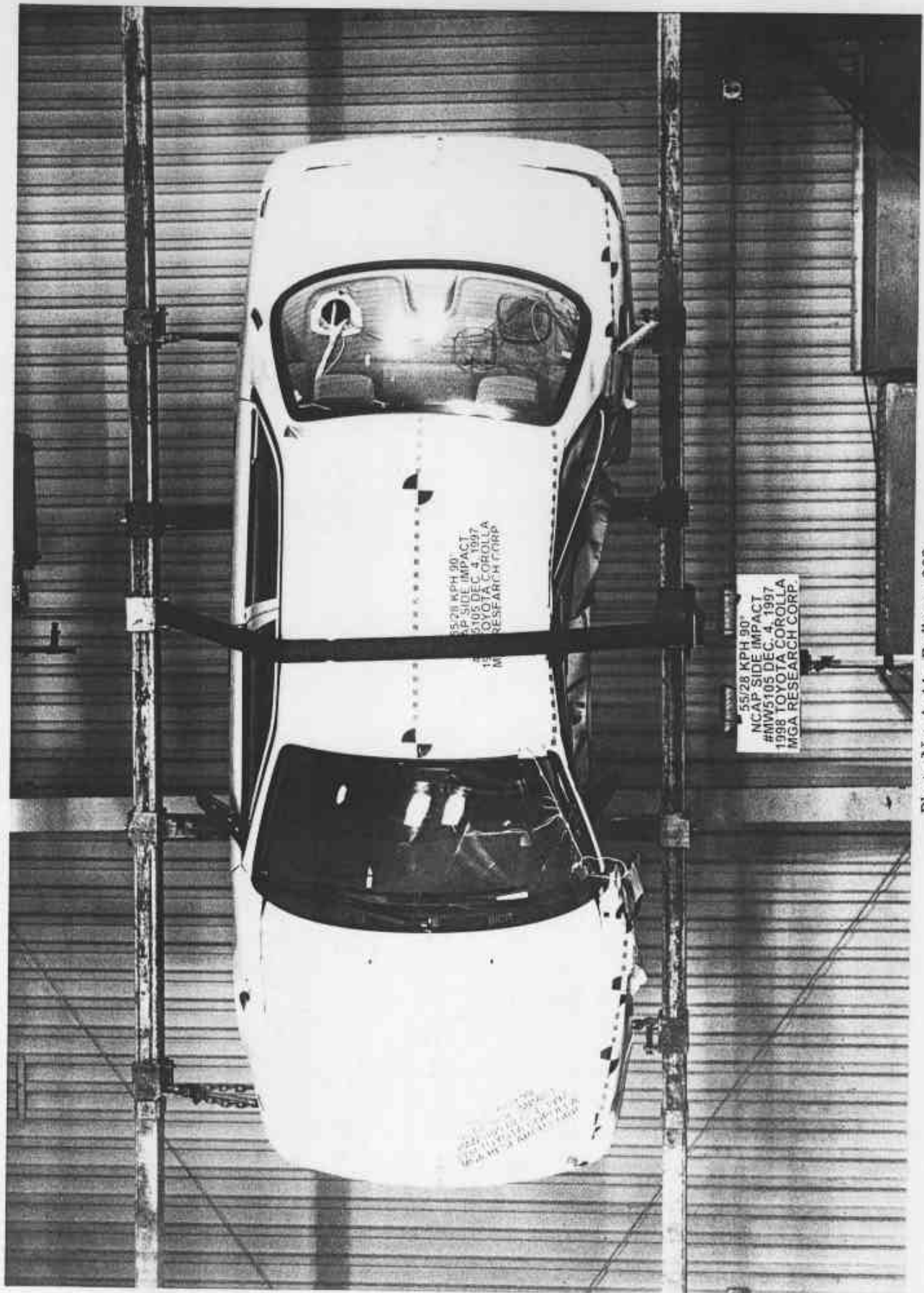


Photo No. A-44 - Rollover 90°

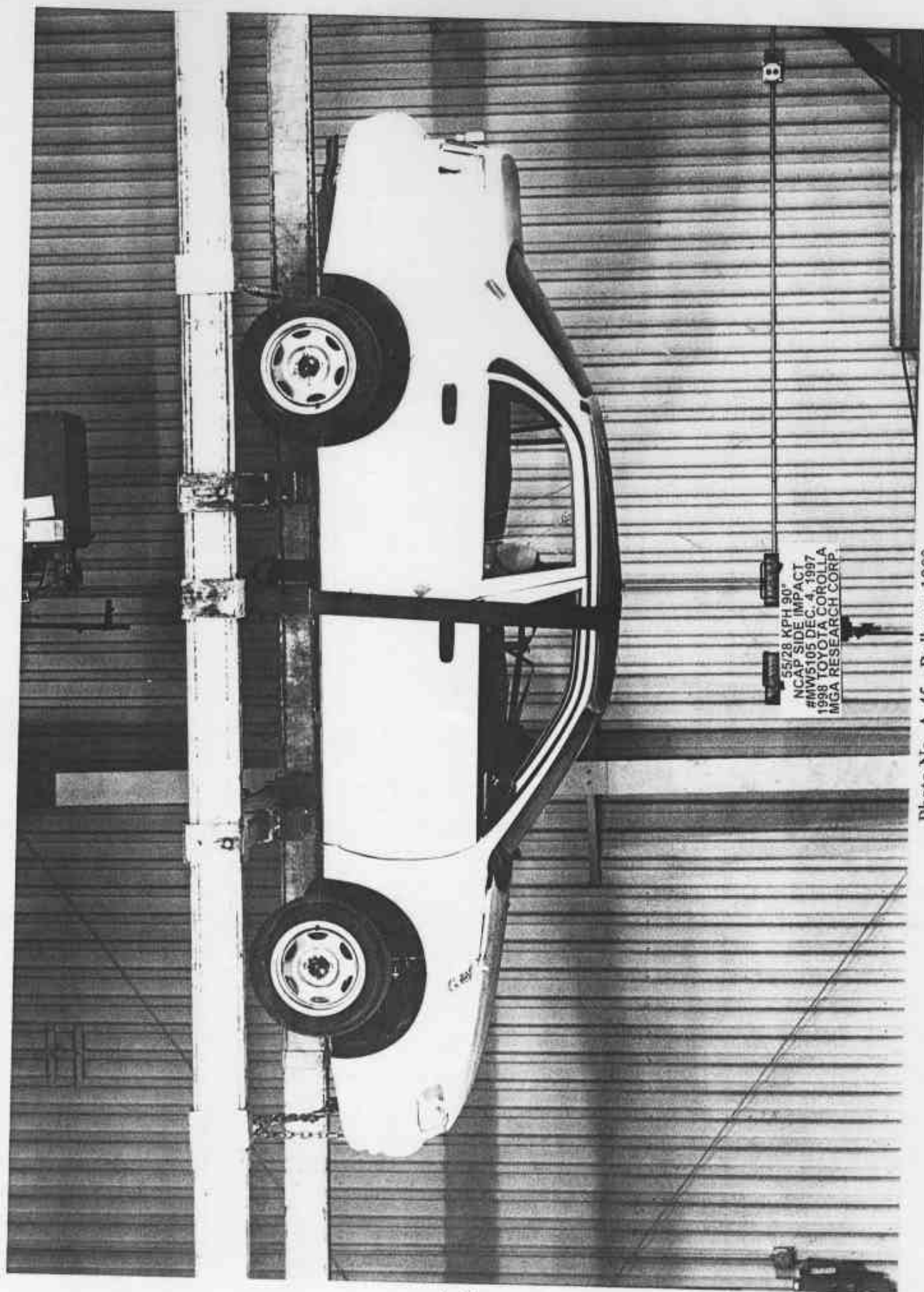


Photo No. A-45 - Rollover 180°

A-45

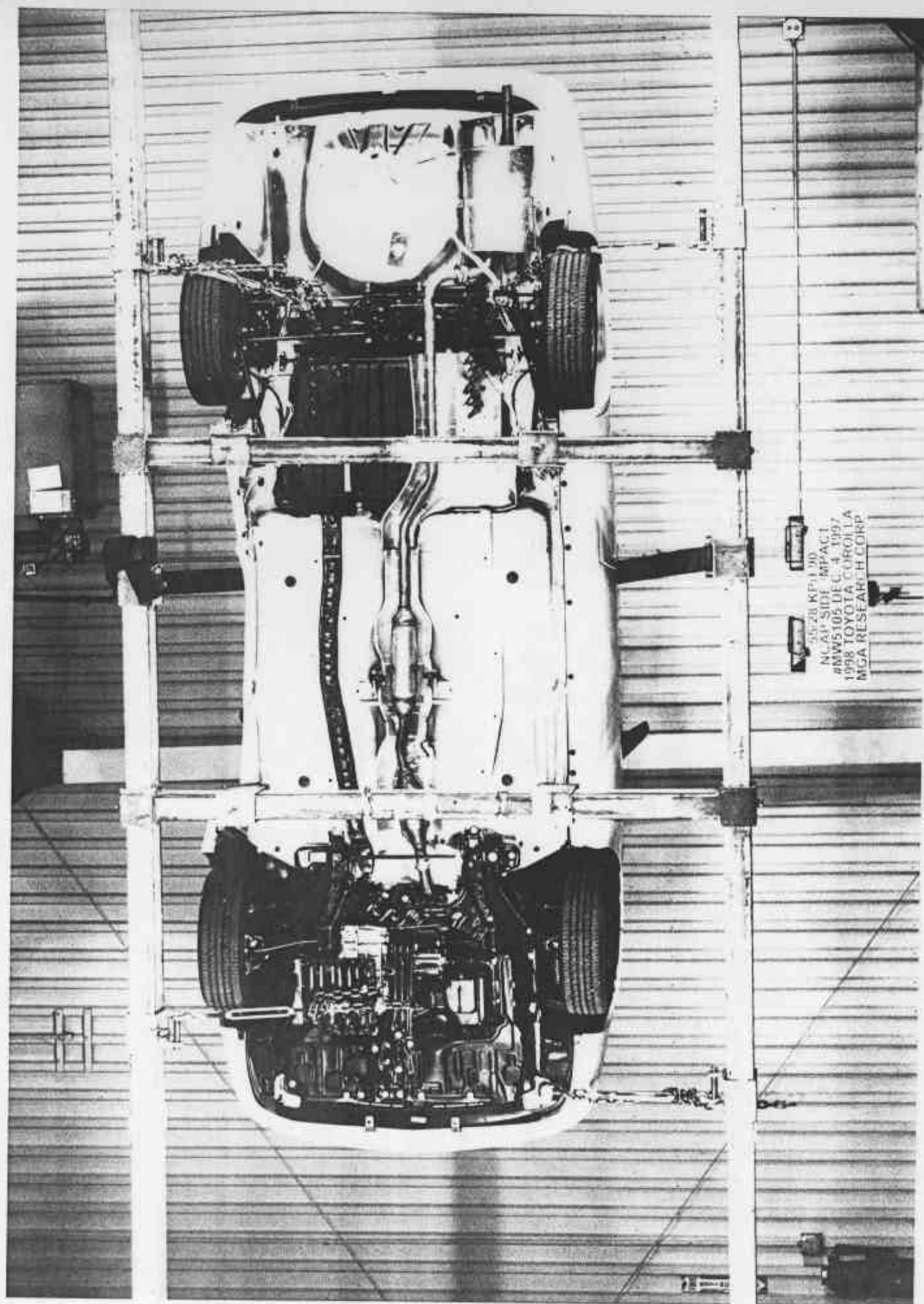


Photo No. A-46 - Rollover 270°

A-46

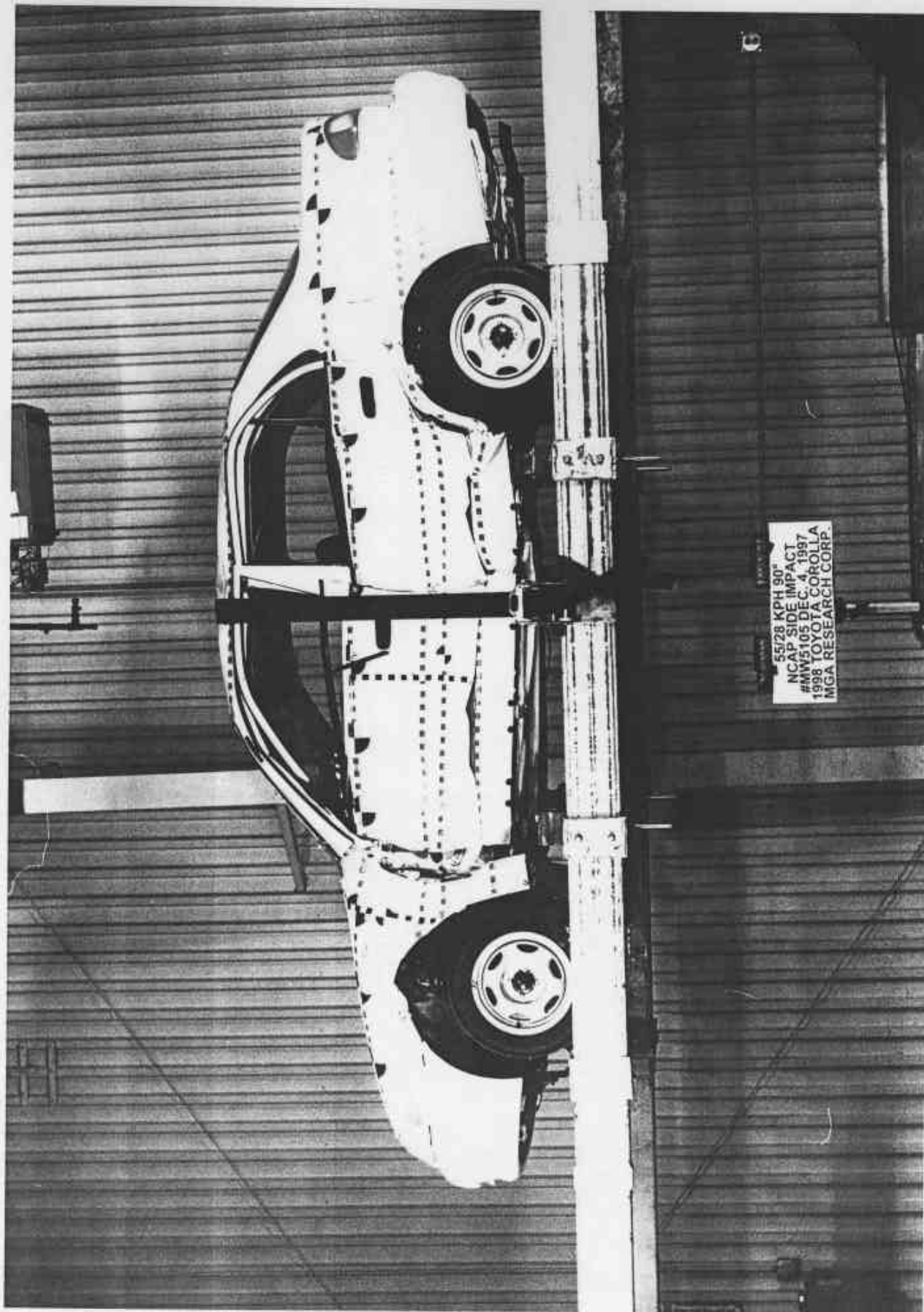


Photo No. A-47 - Rollover 360°

A-47

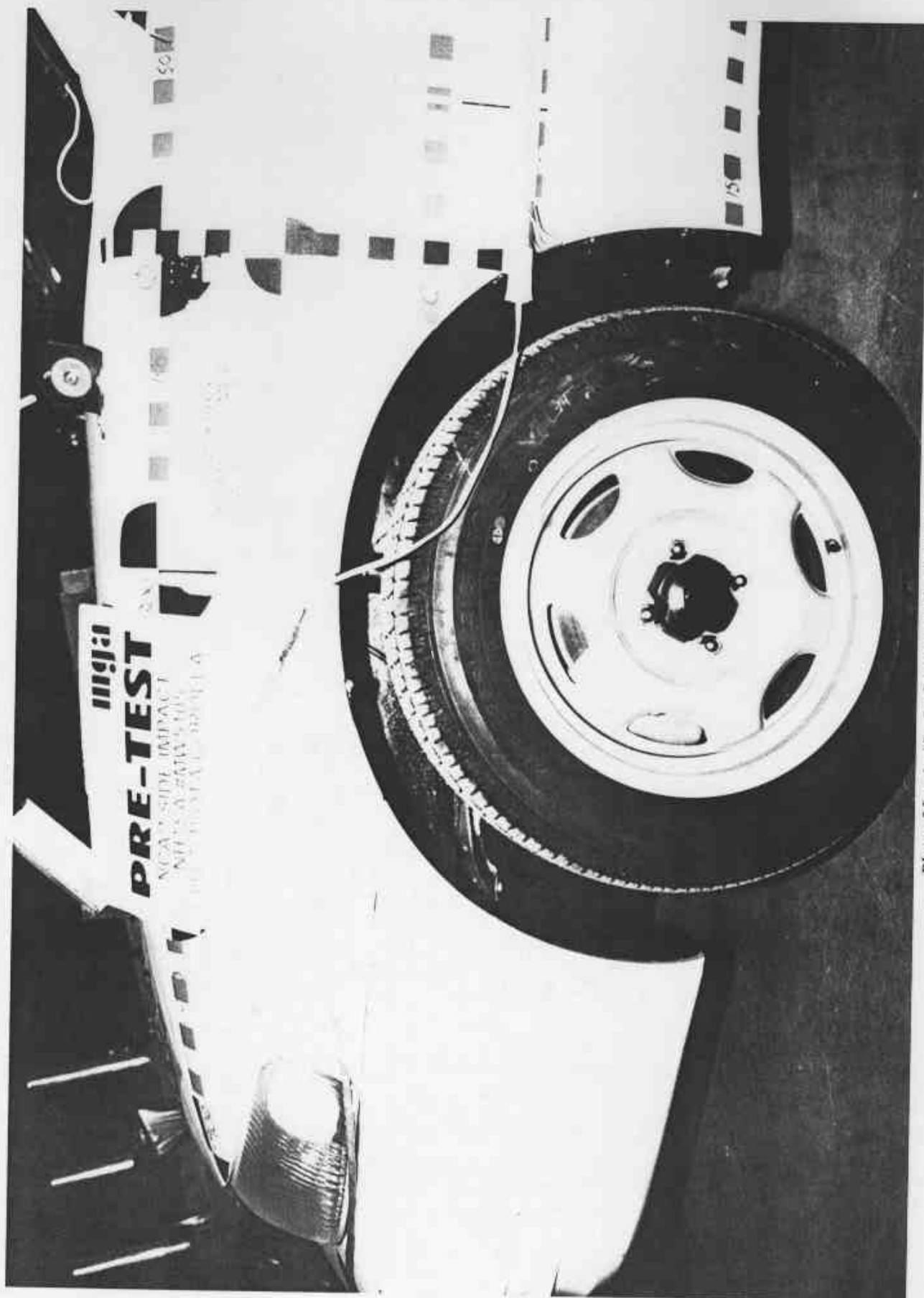


Photo No. A-48 - Left Front Attitude Point

A-48



Photo No. A-49 - Right Front Attitude Point

A-49



Photo No. A-50 - Left Rear Attitude Point

A-50



Photo No. A-51 - Right Rear Attitude Point

A-51

APPENDIX B - VEHICLE AND SID RESPONSE DATA

Table of Data Plots

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

Table of Data Plots

Occupant (Cont'd):

	<u>Page No</u>
Figure B-30 - Rear Passenger Lower Spine Y Velocity vs. Time	B-30
Figure B-31 - Rear Passenger Pelvis Y Acceleration vs. Time	B-31
Figure B-32 - Rear Passenger Pelvis Y Velocity vs. Time	B-32
Figure B-33 - Rear Passenger Shoulder Contact vs. Time	B-33
Figure B-34 - Rear Passenger Pelvis Contact vs. Time	B-34

Vehicle:

Figure B-35 - Left Side Sill at Front Seat Y Acceleration vs. Time	B-35
Figure B-36 - Left Side Sill at Front Seat Y Velocity vs. Time	B-36
Figure B-37 - Left Side Sill at Rear Seat Y Acceleration vs. Time	B-37
Figure B-38 - Left Side Sill at Rear Seat Y Velocity vs. Time	B-38
Figure B-39 - Right Side Sill at Front Seat X Acceleration vs. Time	B-39
Figure B-40 - Right Side Sill at Front Seat X Velocity vs. Time	B-40
Figure B-41 - Right Side Sill at Front Seat Y Acceleration vs. Time	B-41
Figure B-42 - Right Side Sill at Front Seat Y Velocity vs. Time	B-42
Figure B-43 - Right Side Sill at Front Seat Z Acceleration vs. Time	B-43
Figure B-44 - Right Side Sill at Front Seat Z Velocity vs. Time	B-44
Figure B-45 - Right Side Sill at Front Seat Resultant Acceleration vs. Time	B-45
Figure B-46 - Right Side Sill at Rear Seat X Acceleration vs. Time	B-46
Figure B-47 - Right Side Sill at Rear Seat X Velocity vs. Time	B-47
Figure B-48 - Right Side Sill at Rear Seat Y Acceleration vs. Time	B-48
Figure B-49 - Right Side Sill at Rear Seat Y Velocity vs. Time	B-49
Figure B-50 - Right Side Sill at Rear Seat Z Acceleration vs. Time	B-50
Figure B-51 - Right Side Sill at Rear Seat Z Velocity vs. Time	B-51
Figure B-52 - Right Side Sill at Rear Seat Resultant Acceleration vs. Time	B-52
Figure B-53 - Left Driver Seat Track Y Acceleration vs. Time	B-53
Figure B-54 - Left Driver Seat Track Y Velocity vs. Time	B-54
Figure B-55 - Rear Floorpan above Axle X Acceleration vs. Time	B-55

Table of Data Plots

<u>Vehicle (Cont'd):</u>	<u>Page No</u>
Figure B-56 - Rear Floorpan above Axle X Velocity vs. Time	B-56
Figure B-57 - Rear Floorpan above Axle Y Acceleration vs. Time	B-57
Figure B-58 - Rear Floorpan above Axle Y Velocity vs. Time	B-58
Figure B-59 - Rear Floorpan above Axle Z Acceleration vs. Time	B-59
Figure B-60 - Rear Floorpan above Axle Z Velocity vs. Time	B-60
Figure B-61 - Rear Floorpan above Axle Resultant Acceleration vs. Time	B-61
Figure B-62 - Right Rear Occupant Compartment Y Acceleration vs. Time	B-62
Figure B-63 - Right Rear Occupant Compartment Y Velocity vs. Time	B-63
Figure B-64 - Left Lower A-Post Y Acceleration vs. Time	B-64
Figure B-65 - Left Lower A-Post Y Velocity vs. Time	B-65
Figure B-66 - Left Mid A-Post Y Acceleration vs. Time	B-66
Figure B-67 - Left Mid A-Post Y Velocity vs. Time	B-67
Figure B-68 - Left Lower B-Post Y Acceleration vs. Time	B-68
Figure B-69 - Left Lower B-Post Y Velocity vs. Time	B-69
Figure B-70 - Left Mid B-Post Y Acceleration vs. Time	B-70
Figure B-71 - Left Mid B-Post Y Velocity vs. Time	B-71
Figure B-72 - Vehicle Center of Gravity X Acceleration vs. Time	B-72
Figure B-73 - Vehicle Center of Gravity X Velocity vs. Time	B-73
Figure B-74 - Vehicle Center of Gravity Y Acceleration vs. Time	B-74
Figure B-75 - Vehicle Center of Gravity Y Velocity vs. Time	B-75
Figure B-76 - Vehicle Center of Gravity Z Acceleration vs. Time	B-76
Figure B-77 - Vehicle Center of Gravity Z Velocity vs. Time	B-77
Figure B-78 - Vehicle Center of Gravity Resultant Acceleration vs. Time	B-78
Figure B-79 - Left Front Door Midrear Y Acceleration vs. Time	B-79
Figure B-80 - Left Front Door Midrear Y Velocity vs. Time	B-80
Figure B-81 - Left Front Door Centerline Y Acceleration vs. Time	B-81
Figure B-82 - Left Front Door Centerline Y Velocity vs. Time	B-82
Figure B-83 - Left Front Door Upper Centerline Y Acceleration vs. Time	B-83
Figure B-84 - Left Front Door Upper Centerline Y Velocity vs. Time	B-84

Table of Data Plots

Vehicle (Cont'd):

	<u>Page No</u>
Figure B-85 - Left Rear Door Midrear Y Acceleration vs. Time	B-85
Figure B-86 - Left Rear Door Midrear Y Velocity vs. Time	B-86
Figure B-87 - Left Rear Door Upper Centerline Y Acceleration vs. Time	B-87
Figure B-88 - Left Rear Door Upper Centerline Y Velocity vs. Time	B-88

Barrier:

Figure B-89 - Moving Barrier Center of Gravity X Acceleration vs. Time	B-89
Figure B-90 - Moving Barrier Center of Gravity X Velocity vs. Time	B-90
Figure B-91 - Moving Barrier Center of Gravity Y Acceleration vs. Time	B-91
Figure B-92 - Moving Barrier Center of Gravity Y Velocity vs. Time	B-92
Figure B-93 - Moving Barrier Center of Gravity Z Acceleration vs. Time	B-93
Figure B-94 - Moving Barrier Center of Gravity Z Velocity vs. Time	B-94
Figure B-95 - Moving Barrier Center of Gravity Resultant Acceleration vs. Time	B-95
Figure B-96 - Moving Barrier Rear Axle X Acceleration vs. Time	B-96
Figure B-97 - Moving Barrier Rear Axle X Velocity vs. Time	B-97
Figure B-98 - Moving Barrier Rear Axle Y Acceleration vs. Time	B-98
Figure B-99 - Moving Barrier Rear Axle Y Velocity vs. Time	B-99
Figure B-100 - Left Barrier Contact	B-100
Figure B-101 - Right Barrier Contact	B-101

Redundant:

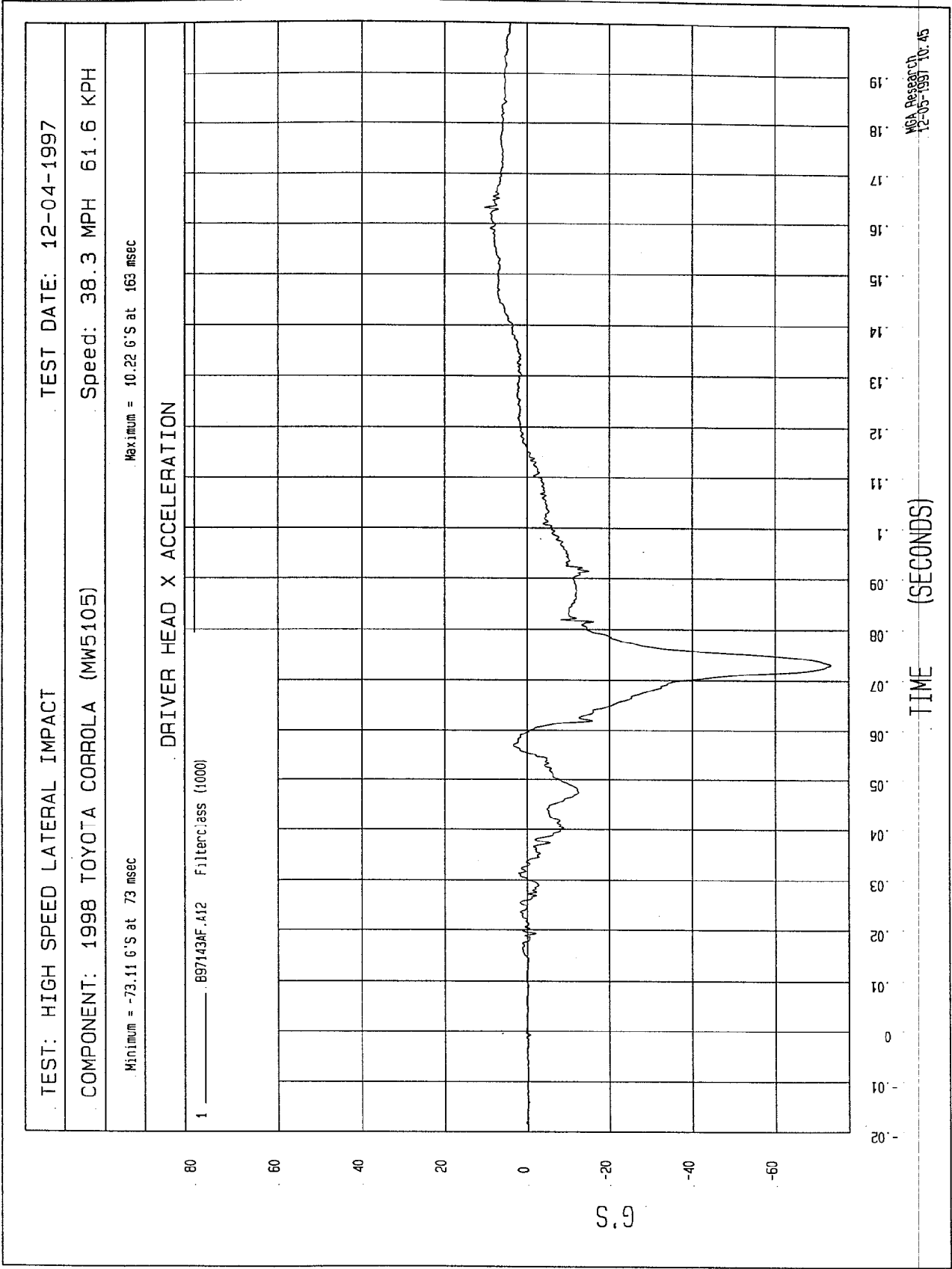
Figure B-102 - Driver Upper Rib Y Redundant Acceleration vs. Time	B-102
Figure B-103 - Driver Upper Rib Y Redundant Velocity vs. Time	B-103
Figure B-104 - Driver Lower Rib Y Redundant Acceleration vs. Time	B-104
Figure B-105 - Driver Lower Rib Y Redundant Velocity vs. Time	B-105
Figure B-106 - Driver Lower Spine Y Redundant Acceleration vs. Time	B-106
Figure B-107 - Driver Lower Spine Y Redundant Velocity vs. Time	B-107

Table of Data Plots

<u>Redundant (Cont'd):</u>	<u>Page No</u>
Figure B-108 - Driver Pelvis Y Redundant Acceleration vs. Time	B-108
Figure B-109 - Driver Pelvis Y Redundant Velocity vs. Time	B-109
Figure B-110 - Rear Passenger Upper Rib Y Redundant Acceleration vs. Time	B-110
Figure B-111 - Rear Passenger Upper Rib Y Redundant Velocity vs. Time	B-111
Figure B-112 - Rear Passenger Lower Rib Y Redundant Acceleration vs. Time	B-112
Figure B-113 - Rear Passenger Lower Rib Y Redundant Velocity vs. Time	B-113
Figure B-114 - Rear Passenger Lower Spine Y Redundant Acceleration vs. Time	B-114
Figure B-115 - Rear Passenger Lower Spine Y Redundant Velocity vs. Time	B-115
Figure B-116 - Rear Passenger Pelvis Y Redundant Acceleration vs. Time	B-116
Figure B-117 - Rear Passenger Pelvis Y Redundant Velocity vs. Time	B-117

FIR Filtered

Figure B-118 - Driver Upper Rib Y Acceleration vs. Time	B-118
Figure B-119 - Driver Upper Rib Y Redundant Acceleration vs. Time	B-119
Figure B-120 - Driver Lower Rib Y Acceleration vs. Time	B-120
Figure B-121 - Driver Lower Rib Y Redundant Acceleration vs. Time	B-121
Figure B-122 - Driver Lower Spine Y Acceleration vs. Time	B-122
Figure B-123 - Driver Lower Spine Y Redundant Acceleration vs. Time	B-123
Figure B-124 - Driver Pelvis Y Acceleration vs. Time	B-124
Figure B-125 - Driver Pelvis Y Redundant Acceleration vs. Time	B-125
Figure B-126 - Rear Passenger Upper Rib Y Acceleration vs. Time	B-126
Figure B-127 - Rear Passenger Upper Rib Y Redundant Acceleration vs. Time	B-127
Figure B-128 - Rear Passenger Lower Rib Y Acceleration vs. Time	B-128
Figure B-129 - Rear Passenger Lower Rib Y Redundant Acceleration vs. Time	B-129
Figure B-130 - Rear Passenger Lower Spine Y Acceleration vs. Time	B-130
Figure B-131 - Rear Passenger Lower Spine Y Redundant Acceleration vs. Time	B-131
Figure B-132 - Rear Passenger Pelvis Y Acceleration vs. Time	B-132
Figure B-133 - Rear Passenger Pelvis Y Redundant Acceleration vs. Time	B-133

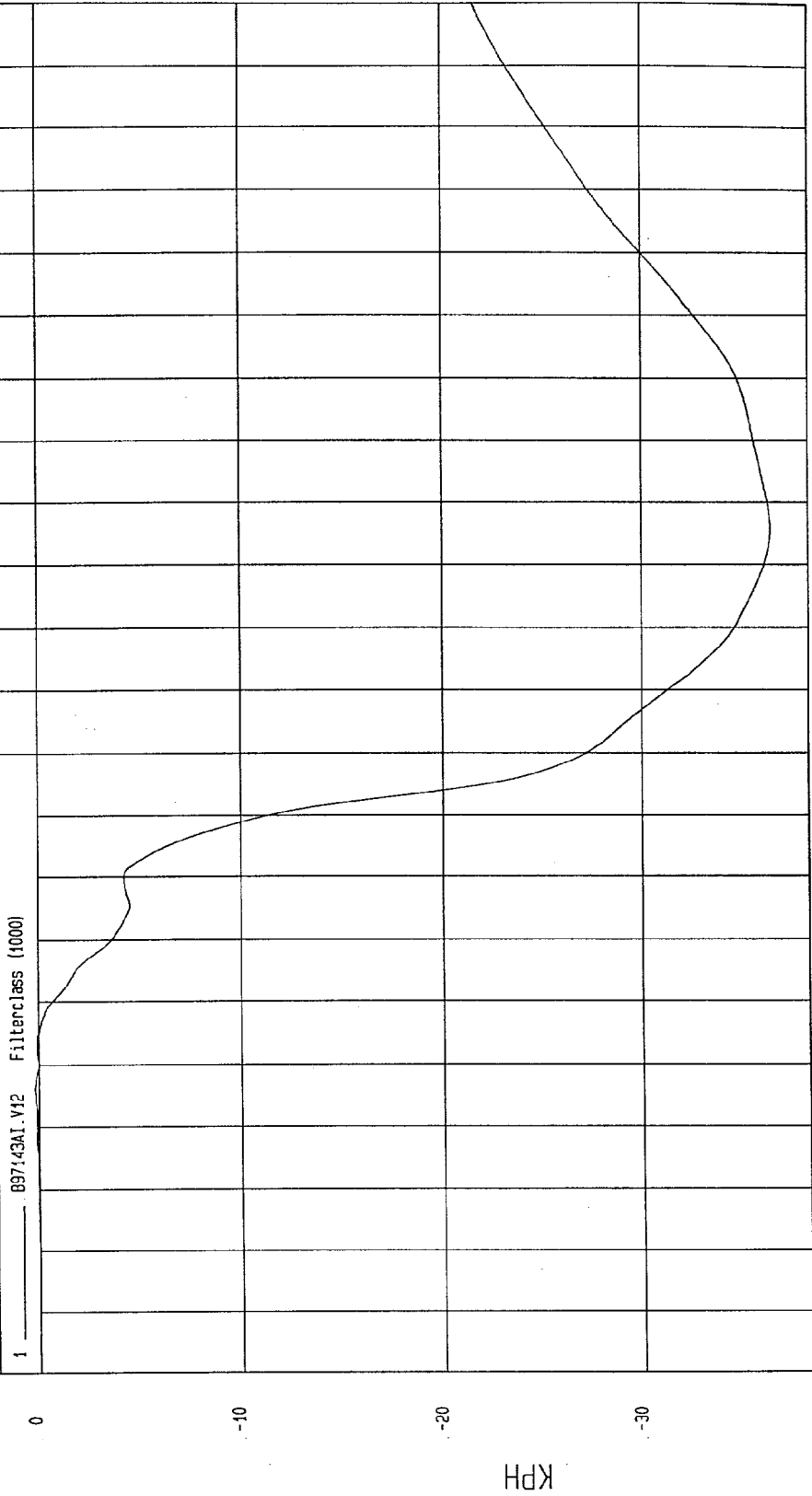


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -36.37 KPH at 116 msec Maximum = .20 KPH at 26 msec

DRIVER HEAD X VELOCITY



TIME Seconds

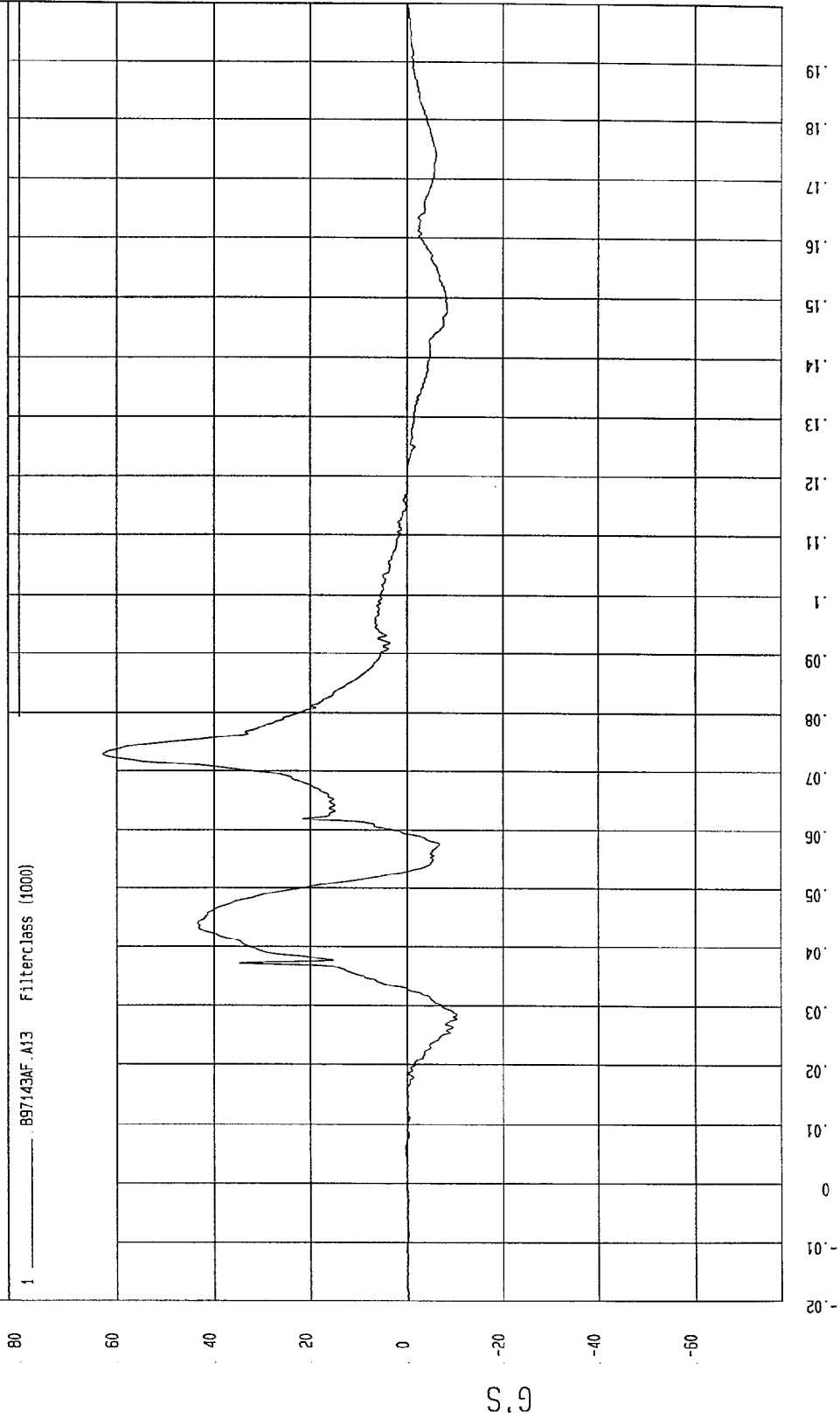
MOA Research
12-05-1997 10.46

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997
COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

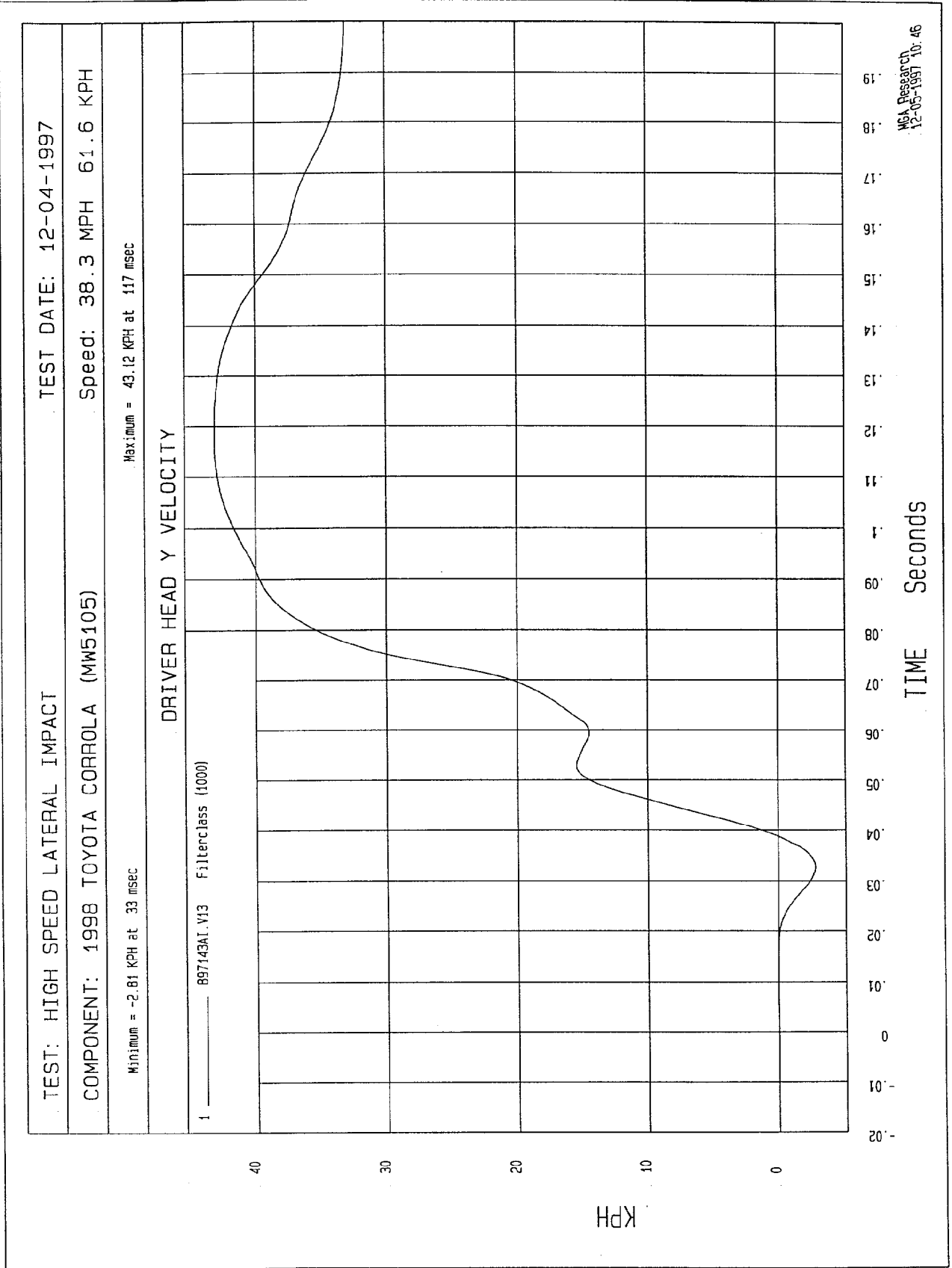
Minimum = -10.47 G'S at 28 msec Maximum = 62.88 G'S at 73 msec

DRIVER HEAD Y ACCELERATION

1 _____ 897143AF.A13 Filterclass (1000)



MCA Research
12-05-1997 10:46

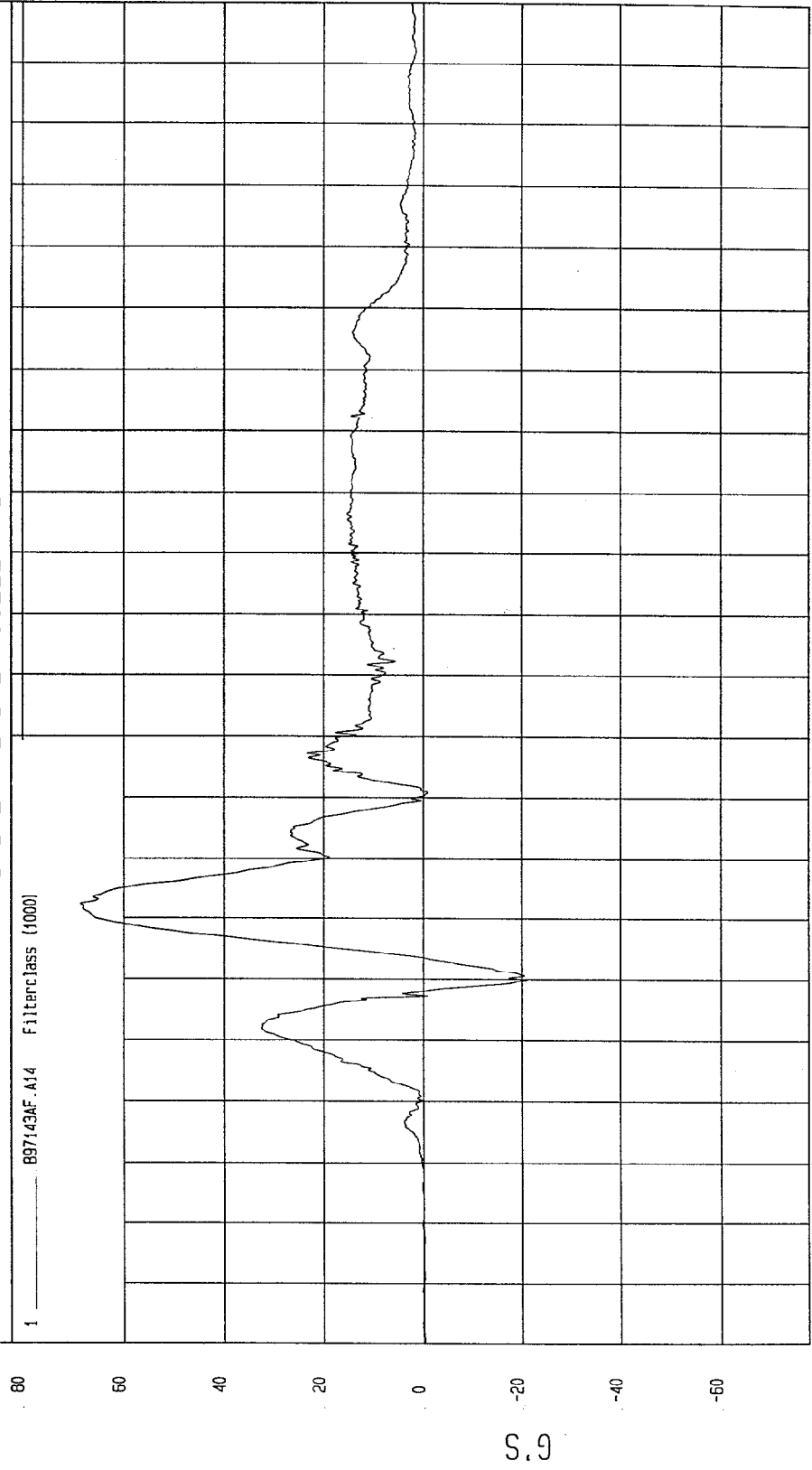


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -21.06 G'S at 40 msec Maximum = 68.74 G'S at 52 msec

DRIVER HEAD Z ACCELERATION



MCA Research
12-05-1997 10:45

TIME (SECONDS)

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

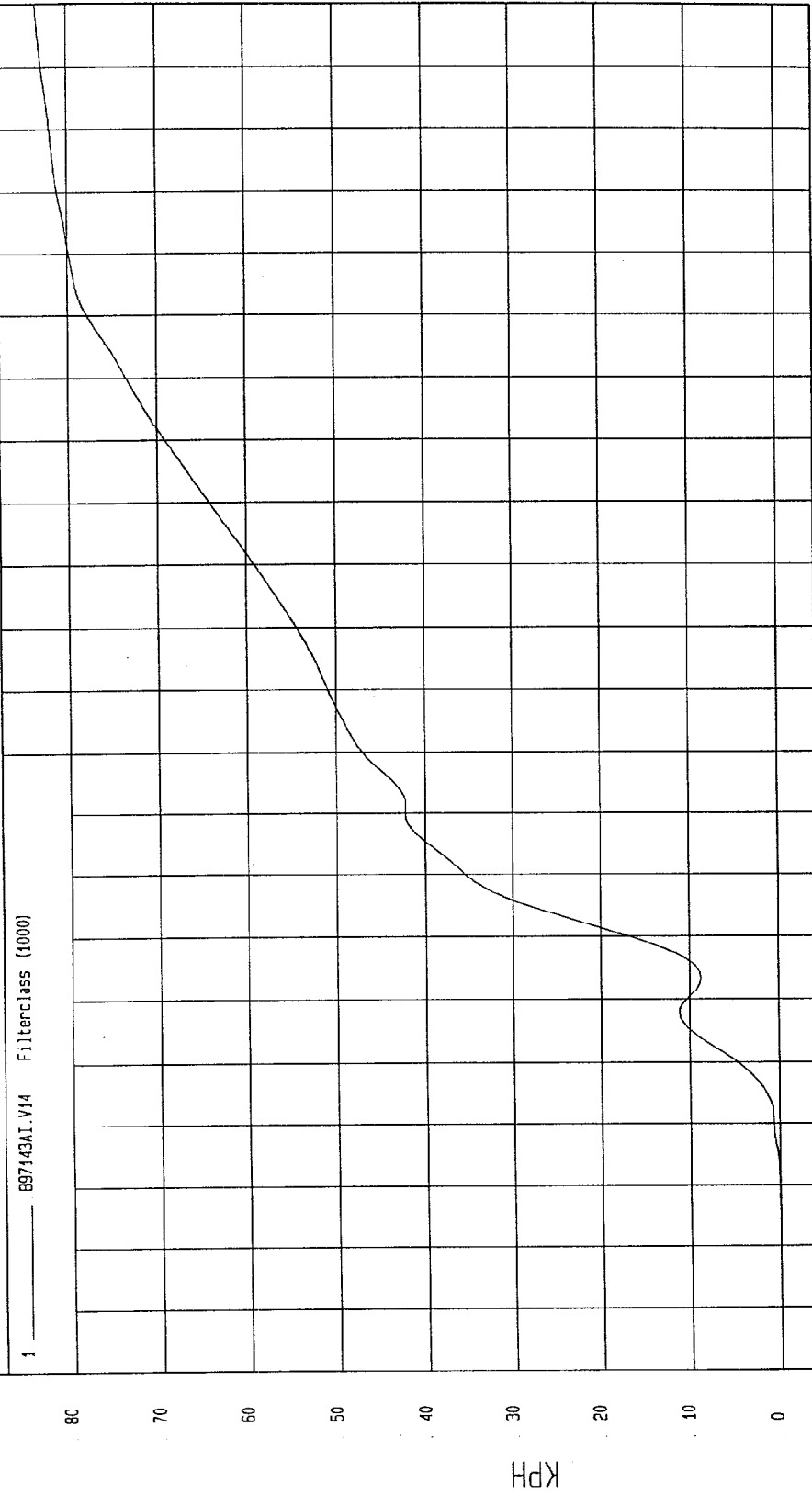
SPEED: 38.3 MPH 61.6 KPH

COMPONENT: 1998 TOYOTA CORROLA (MW5105)

Maximum = 83.55 KPH at 200 msec

Minimum = -8.68E-03 KPH at -18 msec

DRIVER HEAD Z VELOCITY



WCA Research
12-05-1997 10:46

TIME Seconds

19

18

17

16

15

14

13

12

11

10

09

08

07

06

05

04

03

02

01

0

-01

-02

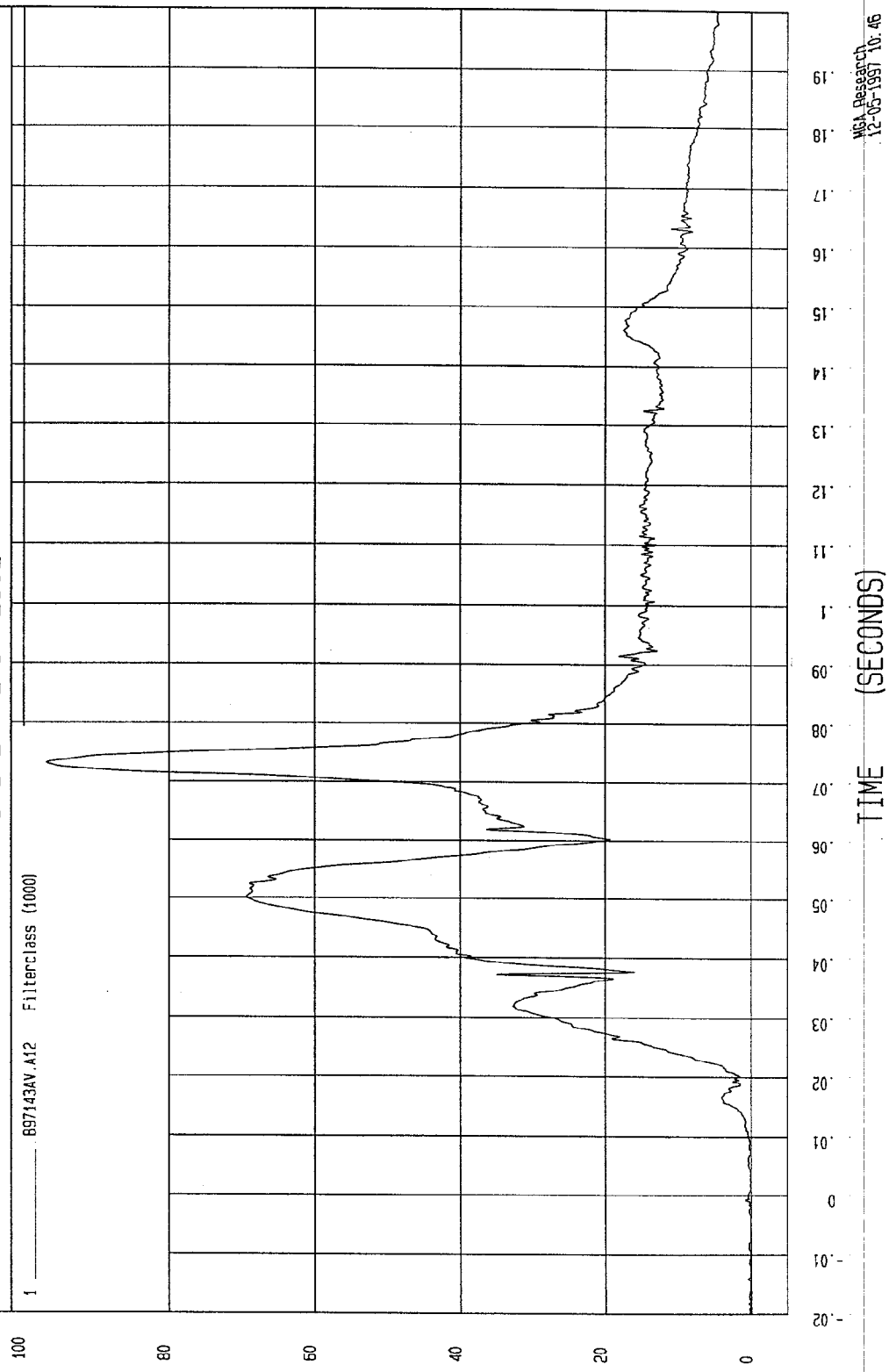
KPH

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = 1.74E-02 G'S at -13 msec
Maximum = 96.84 G'S at 73 msec

DRIVER HEAD RESULTANT



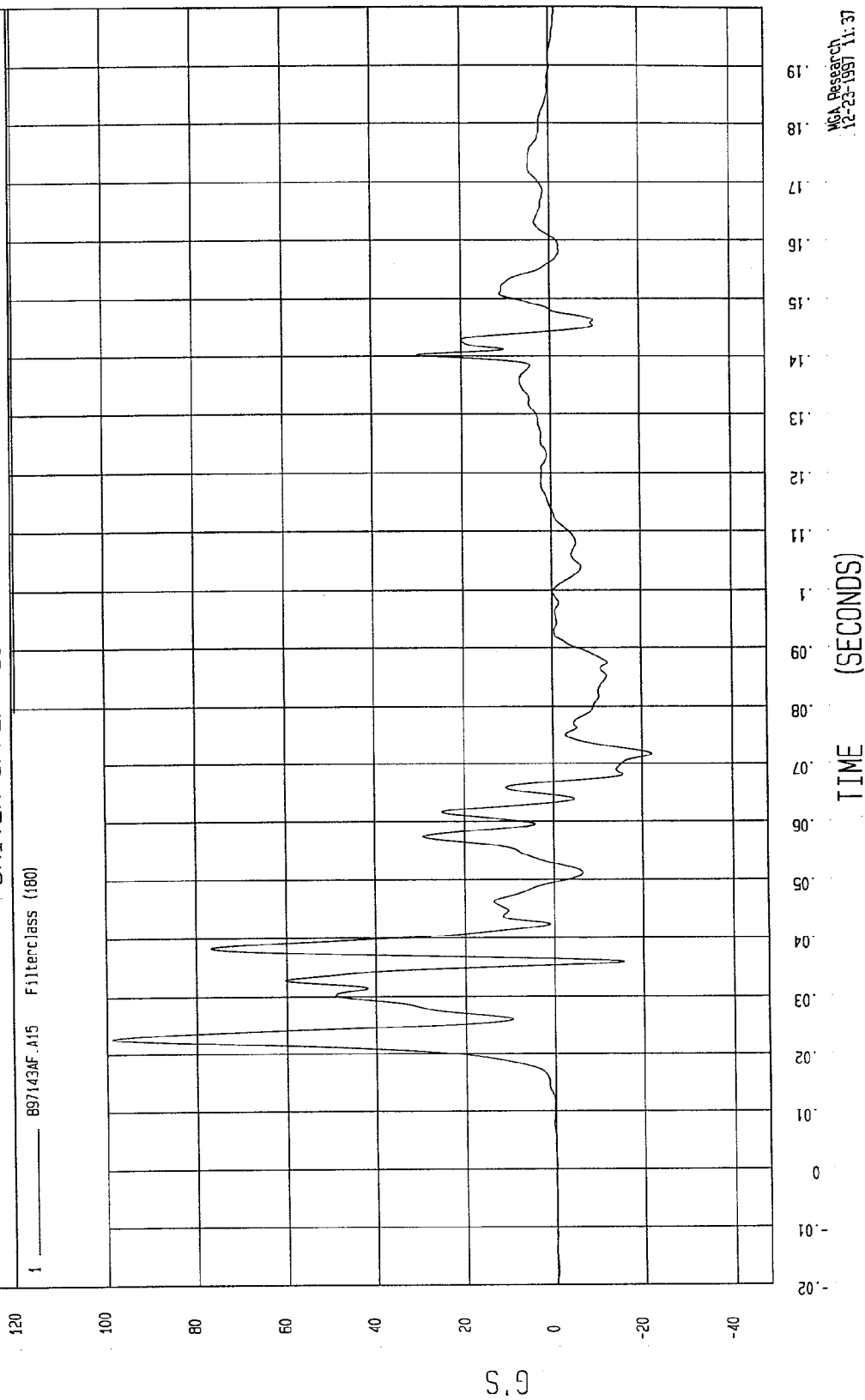
WCA Research
12-05-1997 10:46

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -22.09 G'S at 72 msec Maximum = 98.78 G'S at 23 msec

DRIVER UPPER RIB Y ACCELERATION



TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 12-04-1997

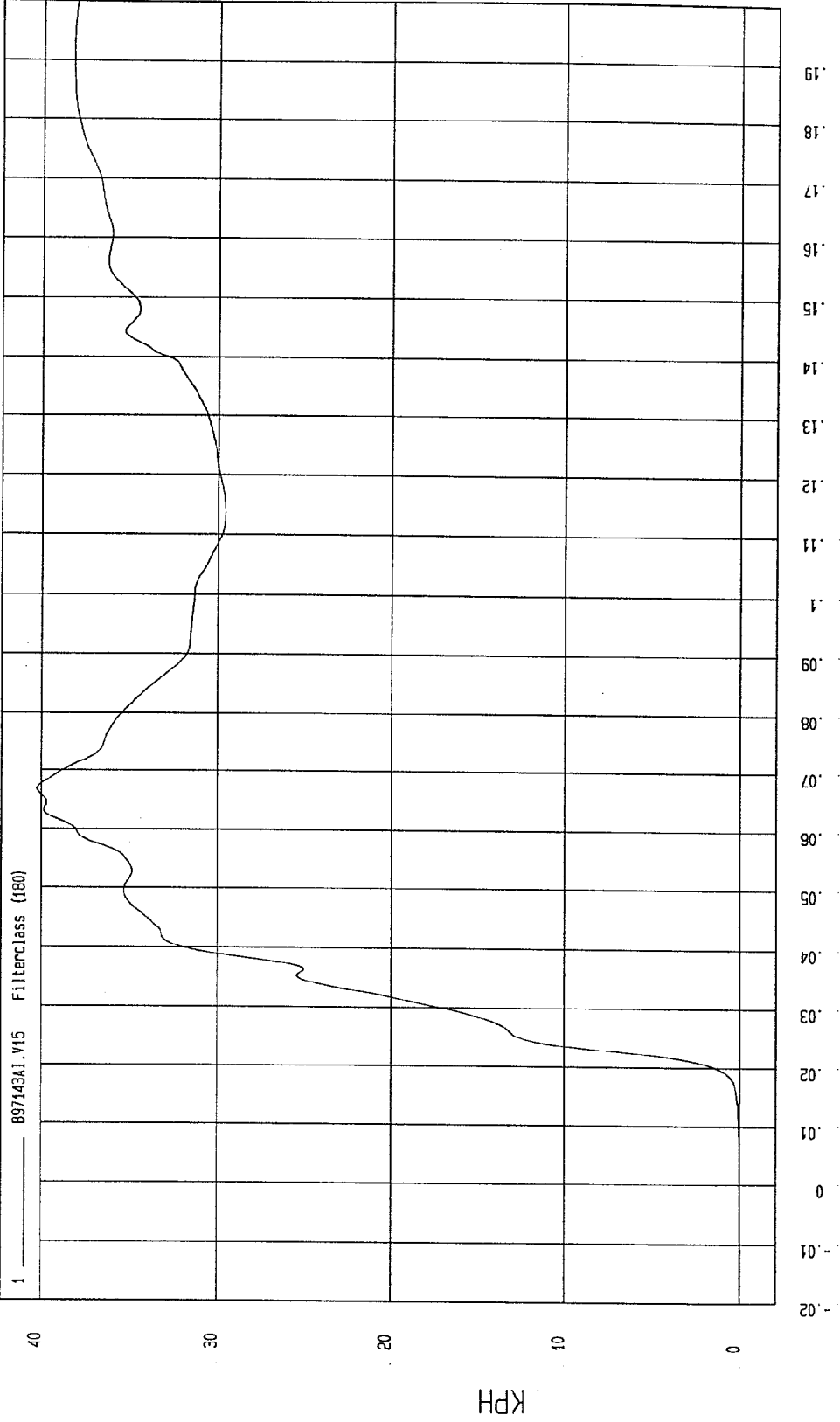
COMPONENT: 1998 TOYOTA CORROLA (MW5105)

Speed: 38.3 MPH 61.6 KPH

Minimum = -1.04E-02 KPH at -15 msec

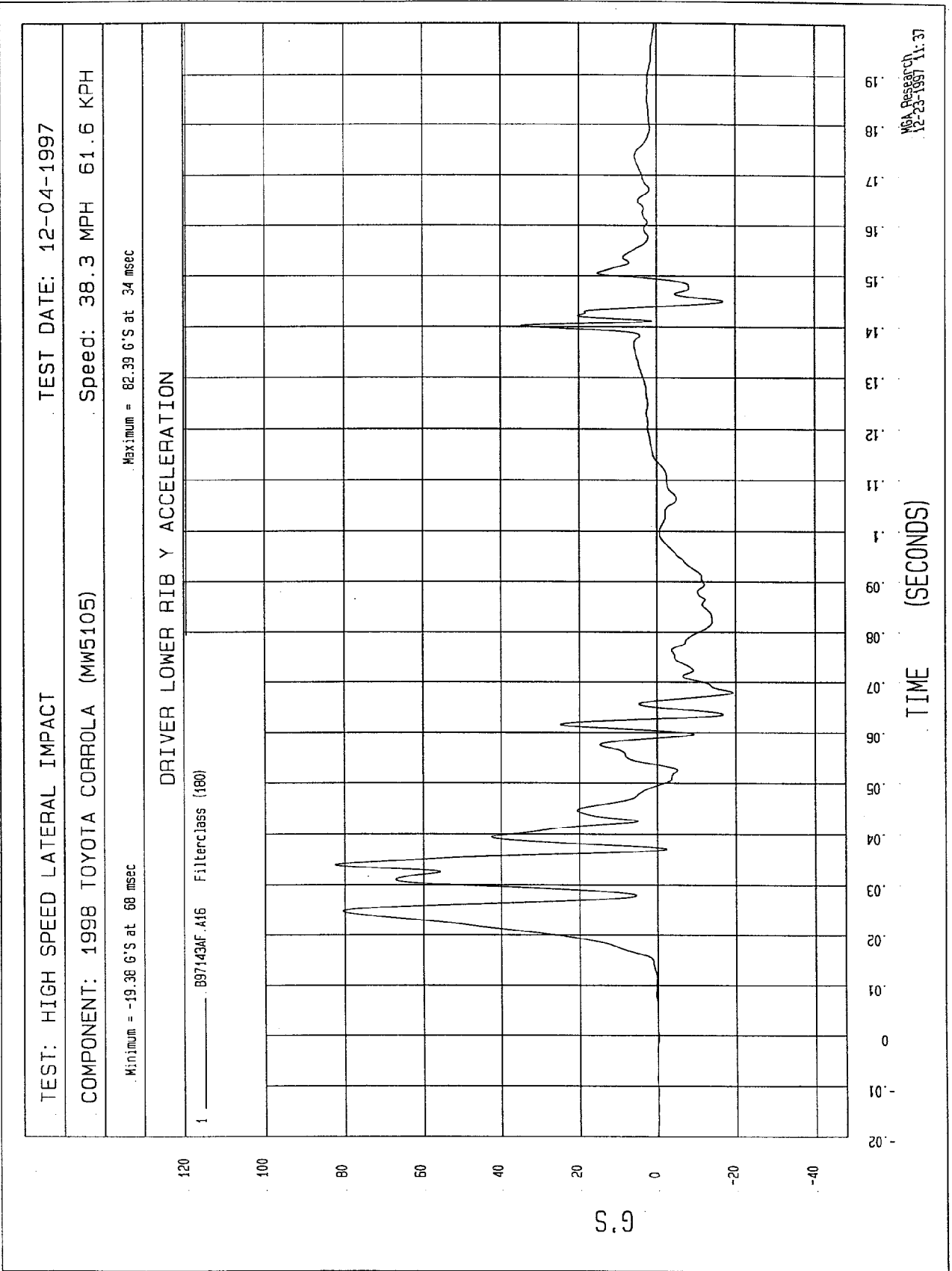
Maximum = 40.25 KPH at 67 msec

DRIVER UPPER RIB Y VELOCITY



NCA Research
12-23-1997 11:39

TIME Seconds



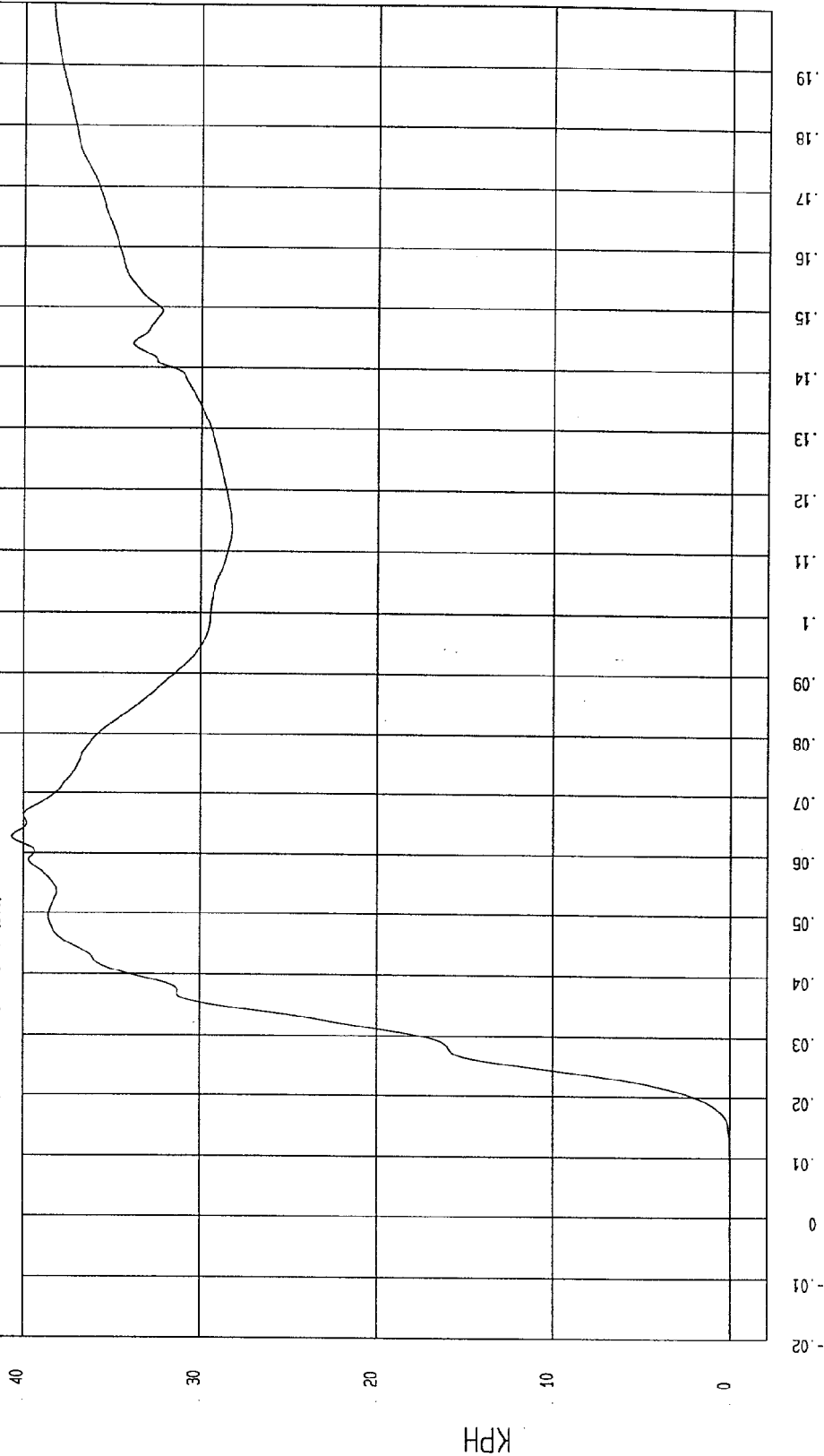
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -2.18E-02 KPH at 6 msec Maximum = 40.64 KPH at 63 msec

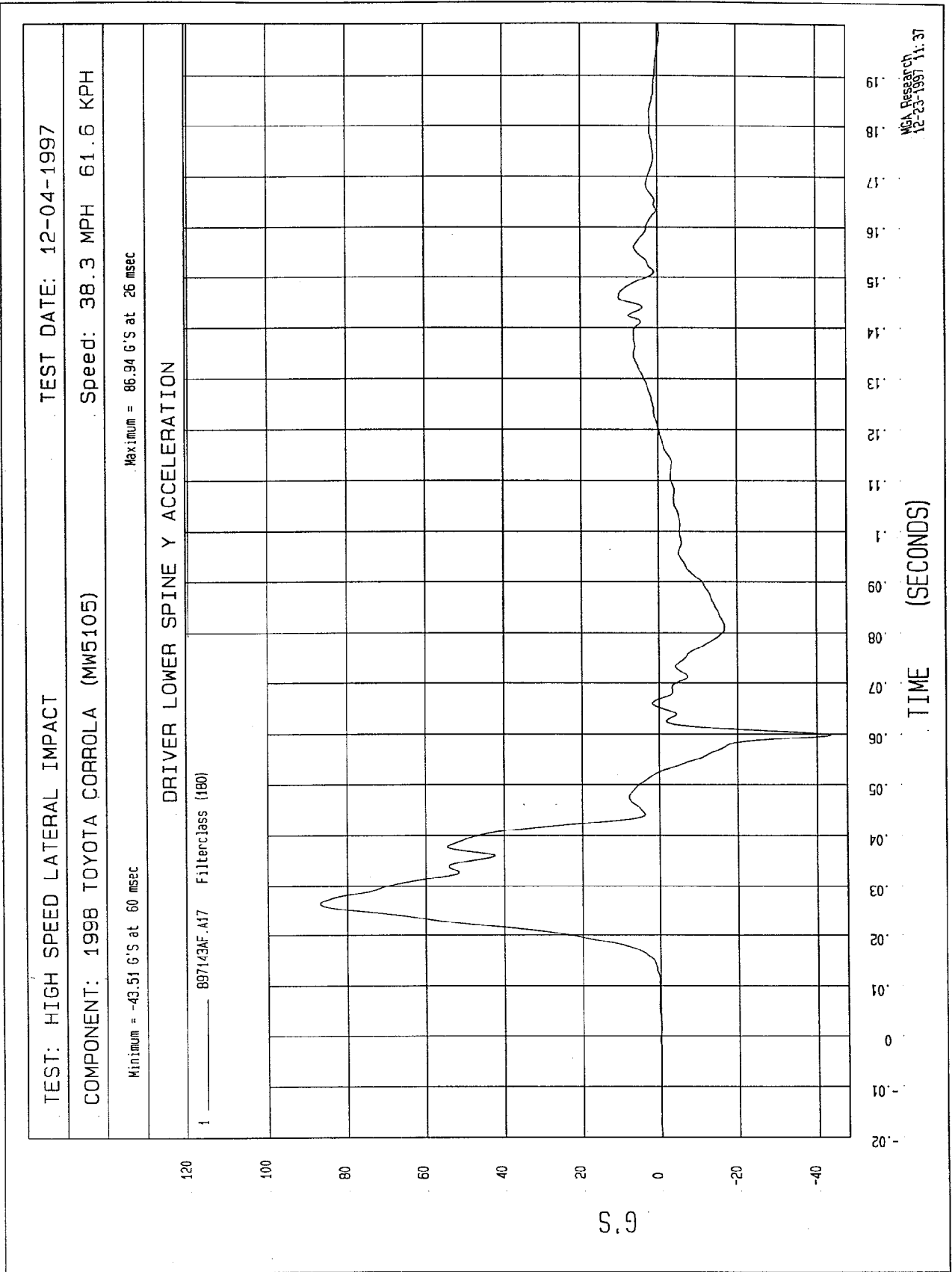
DRIVER LOWER RIB Y VELOCITY

1 897143A1.V16 Filterclass (180)



NCA Research
12-23-1997 11:39

TIME Seconds



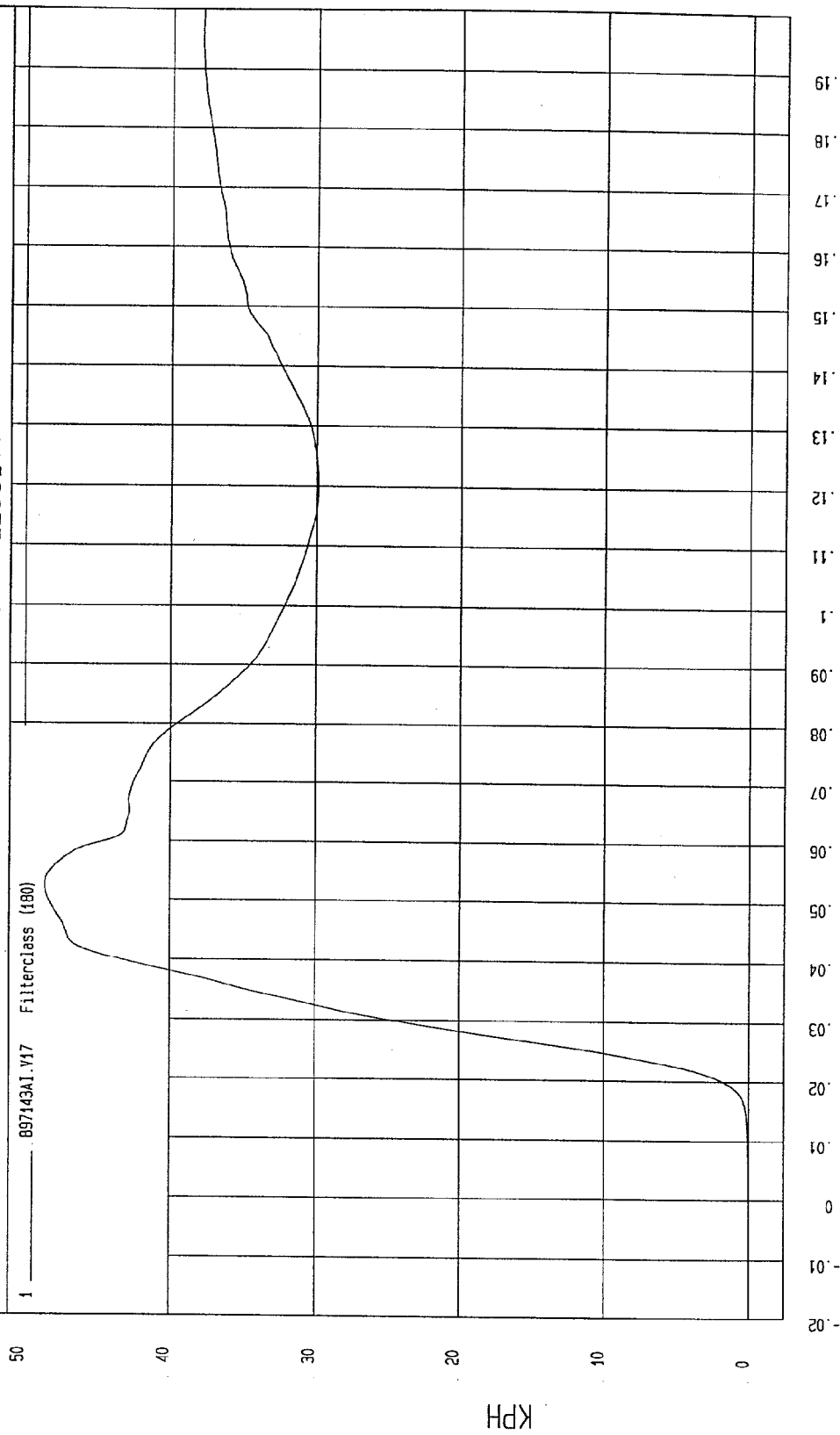
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -1.12E-02 KPH at -18 msec Maximum = 48.61 KPH at 52 msec

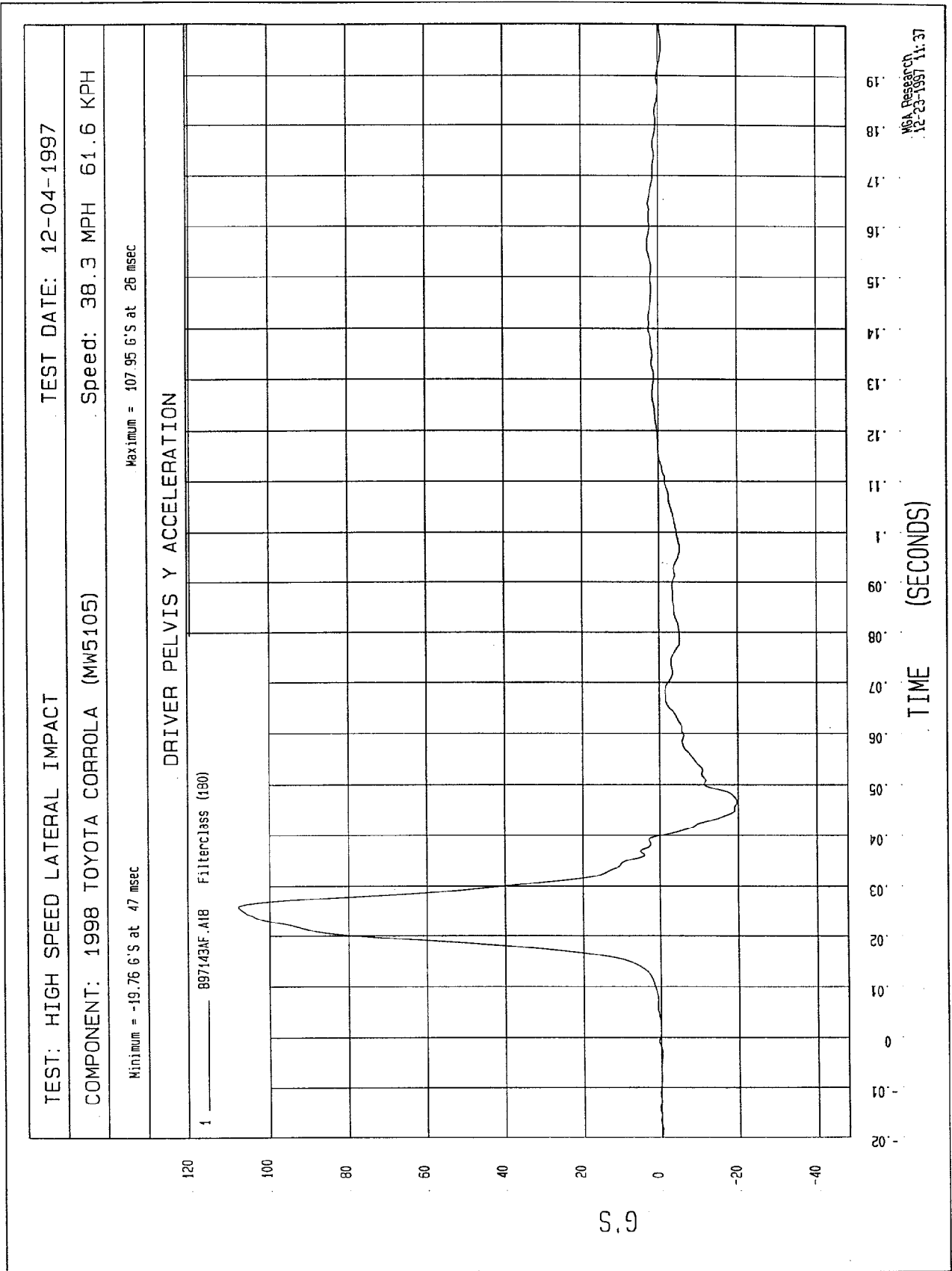
DRIVER LOWER SPINE Y VELOCITY

1 ——— 897143A1.V17 Filterclass (180)



MEA Research
12-23-1997 11:39

TIME Seconds



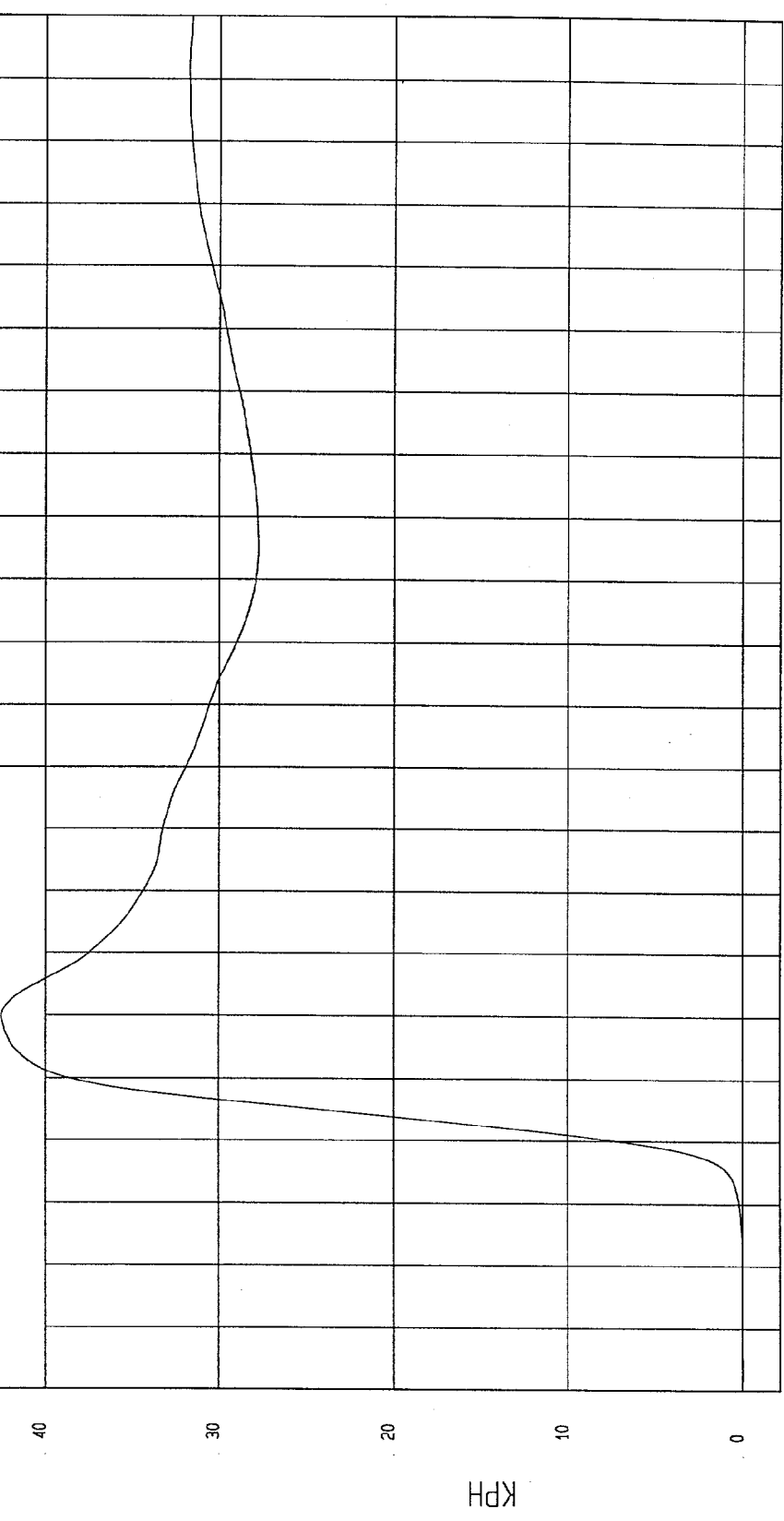
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

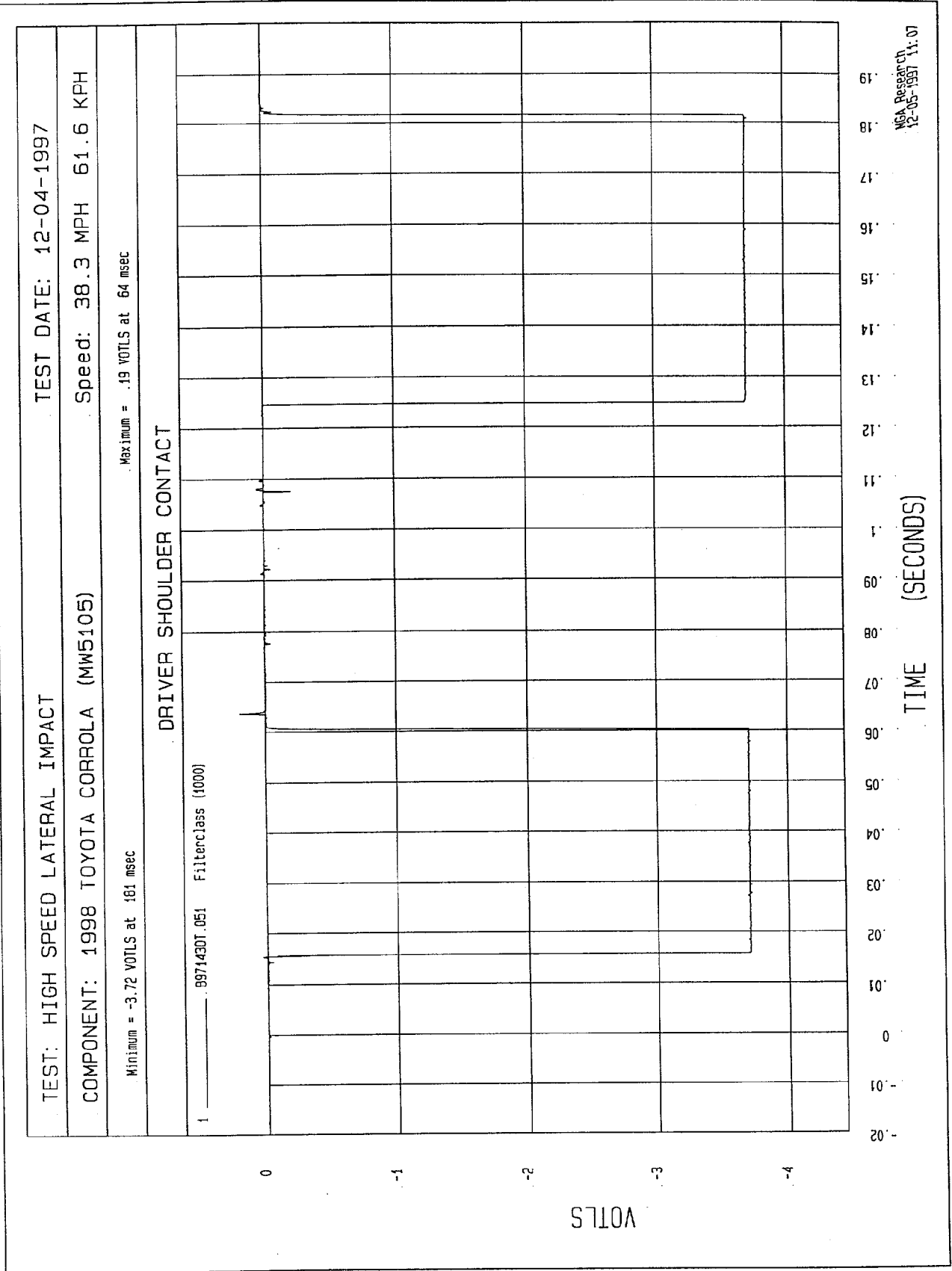
Minimum = -1.91E-02 KPH at -17 msec Maximum = 42.53 KPH at 40 msec

DRIVER PELVIS Y VELOCITY

1 897143A1.V18 Filterclass (180)



WCA Research
12-23-1997 11:39

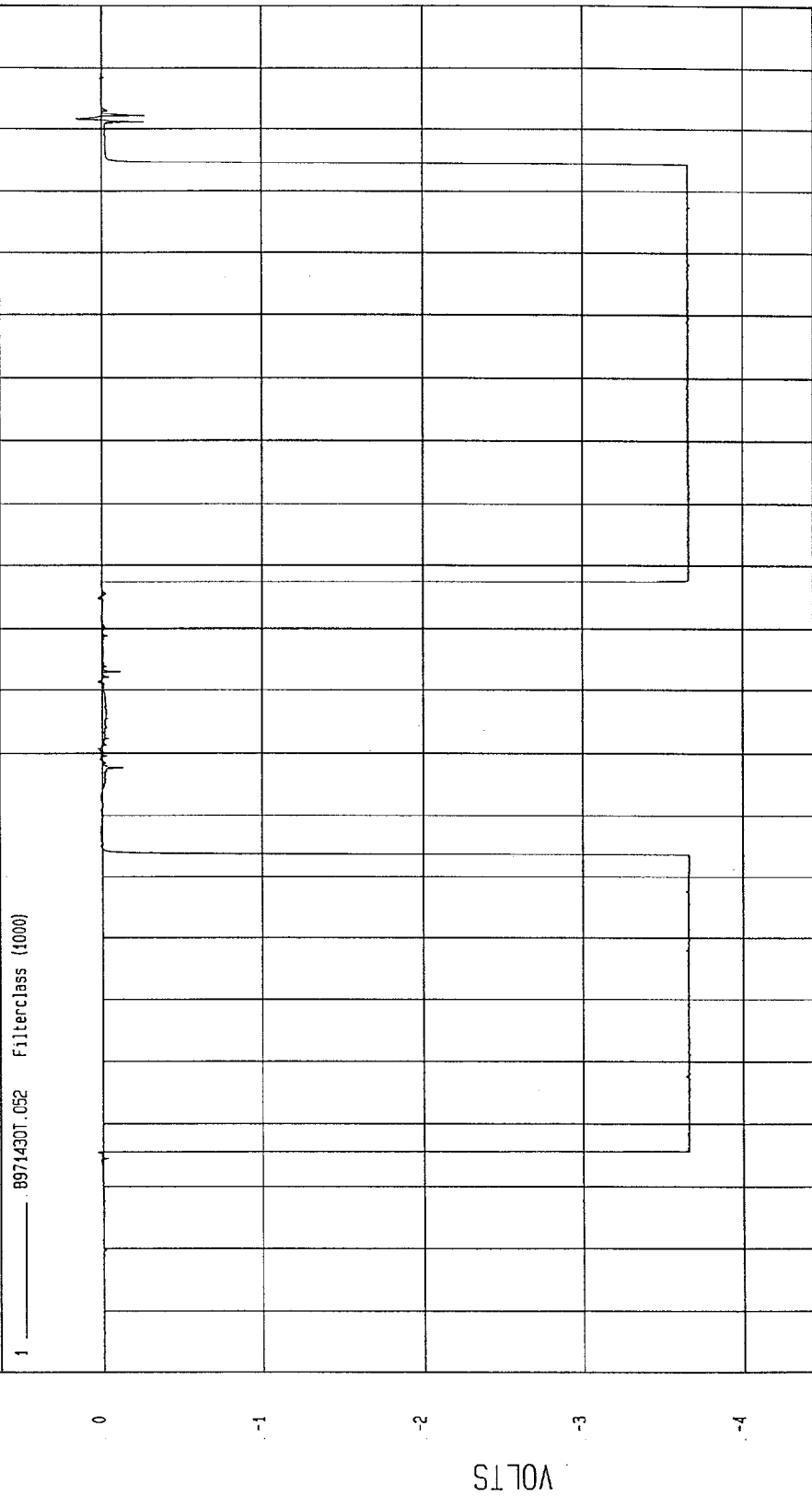


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

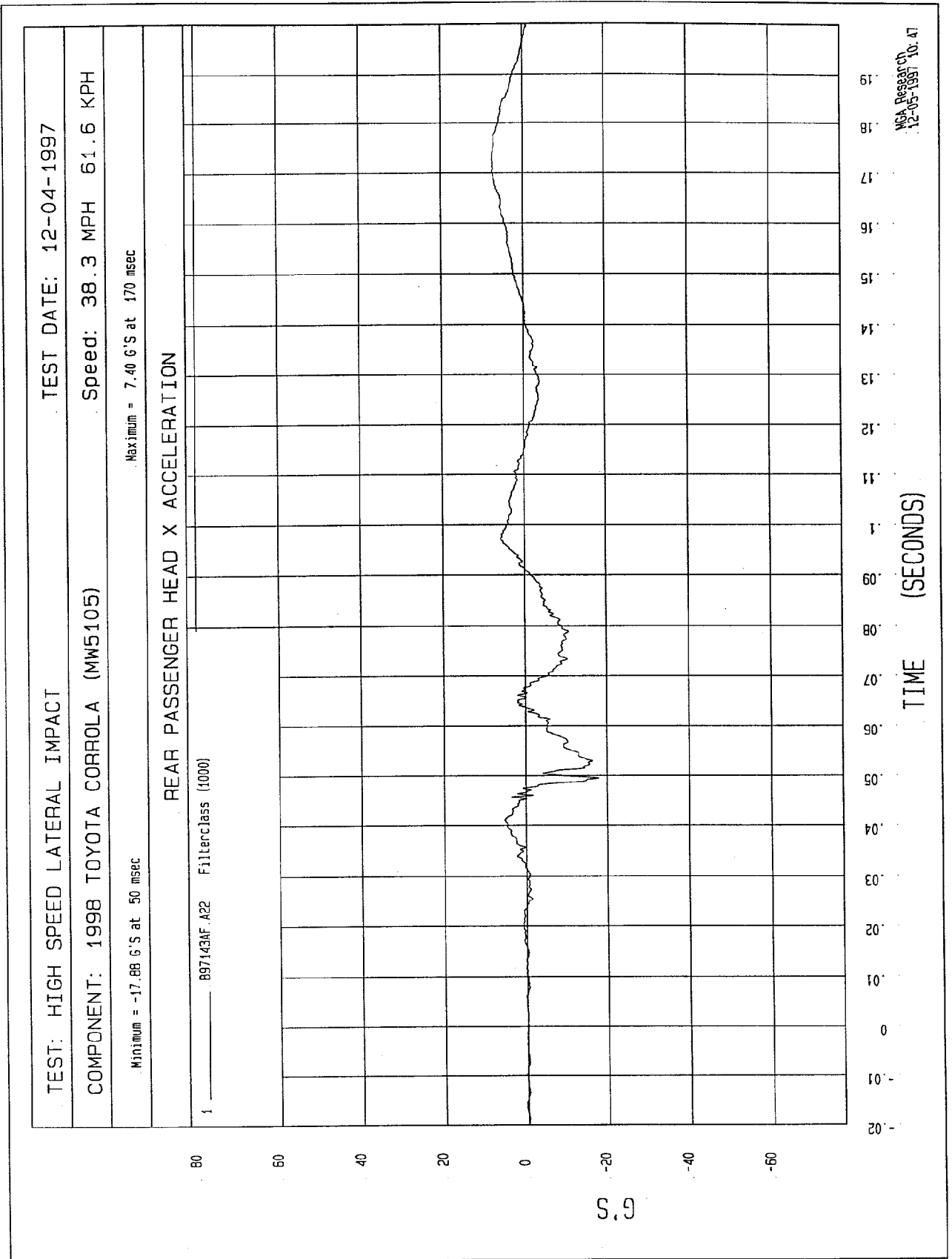
Minimum = -3.66 VOLTS at 121 msec Maximum = .15 VOLTS at 182 msec

DRIVER PELVIS CONTACT



MCA Research
12-05-1997 11:06

TIME (SECONDS)



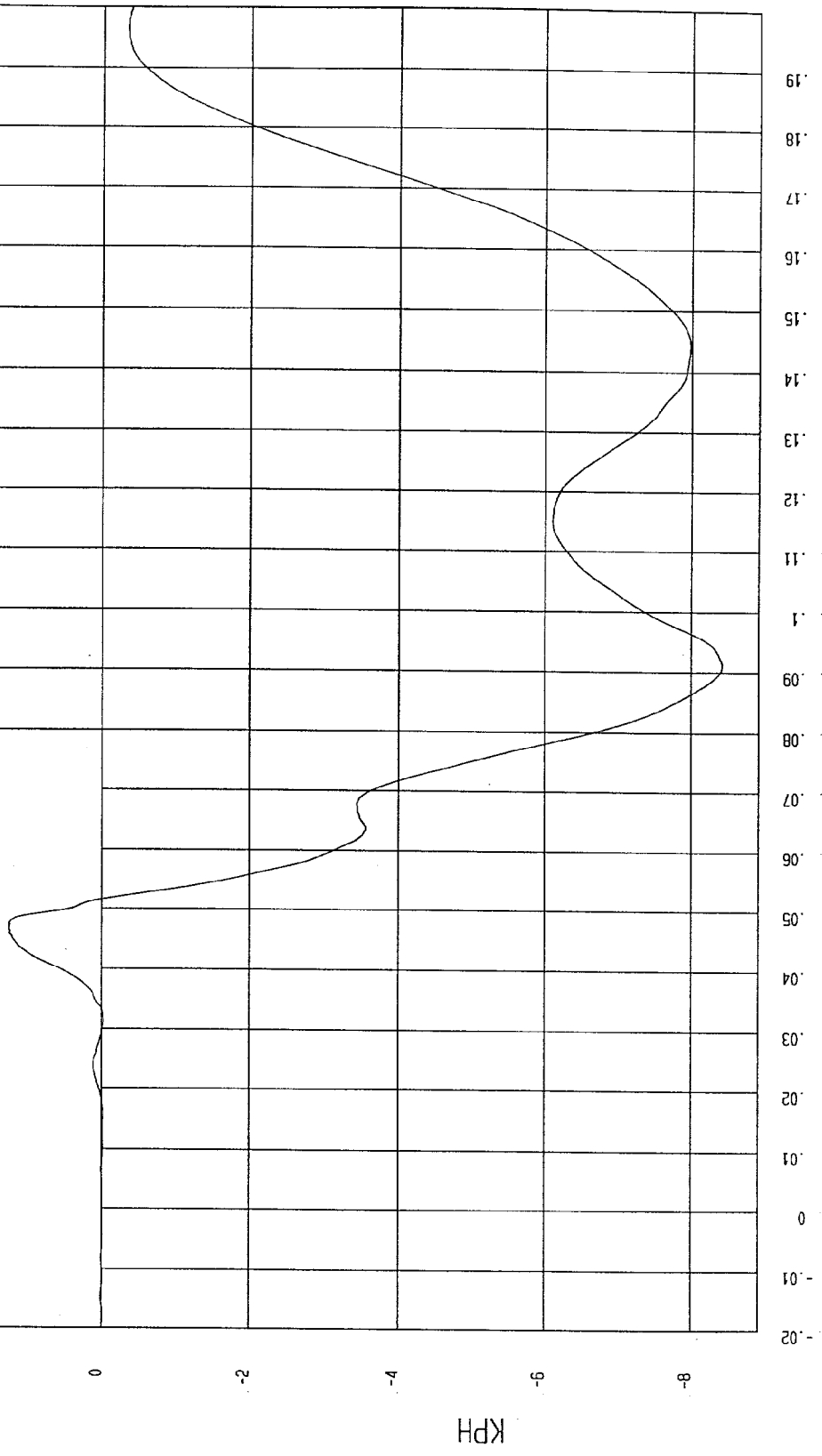
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -8.41 KPH at 91 msec Maximum = 1.24 KPH at 47 msec

REAR PASSENGER HEAD X VELOCITY

1 B97143A1.V22 Filterclass (1000)



NCA Research
12-05-1997 10: 47

TIME Seconds

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 12-04-1997

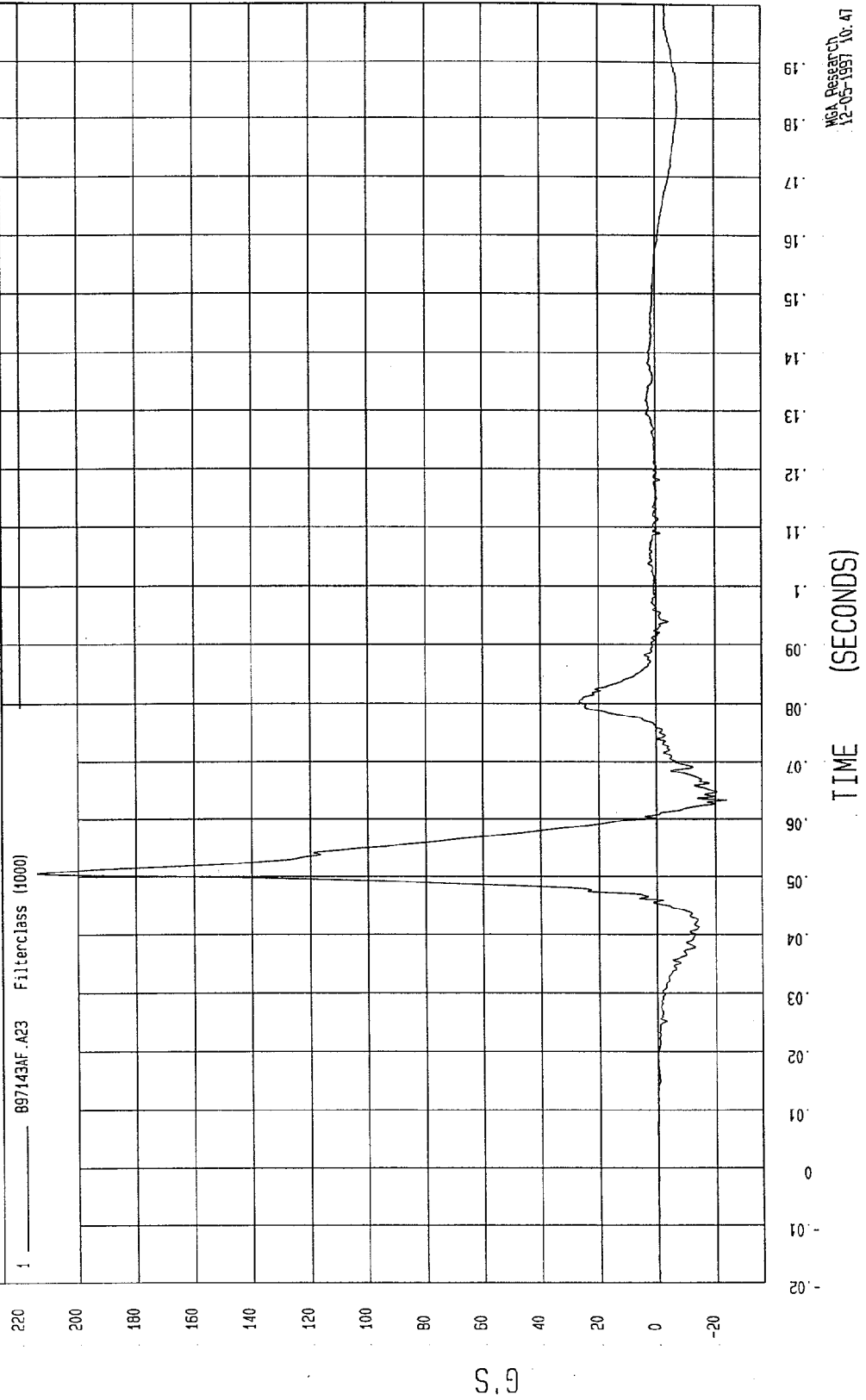
Speed: 38.3 MPH 61.6 KPH

COMPONENT: 1998 TOYOTA CORROLA (MW5105)

Maximum = 214.24 G'S at 51 msec

Minimum = -23.92 G'S at 63 msec

REAR PASSENGER HEAD Y ACCELERATION

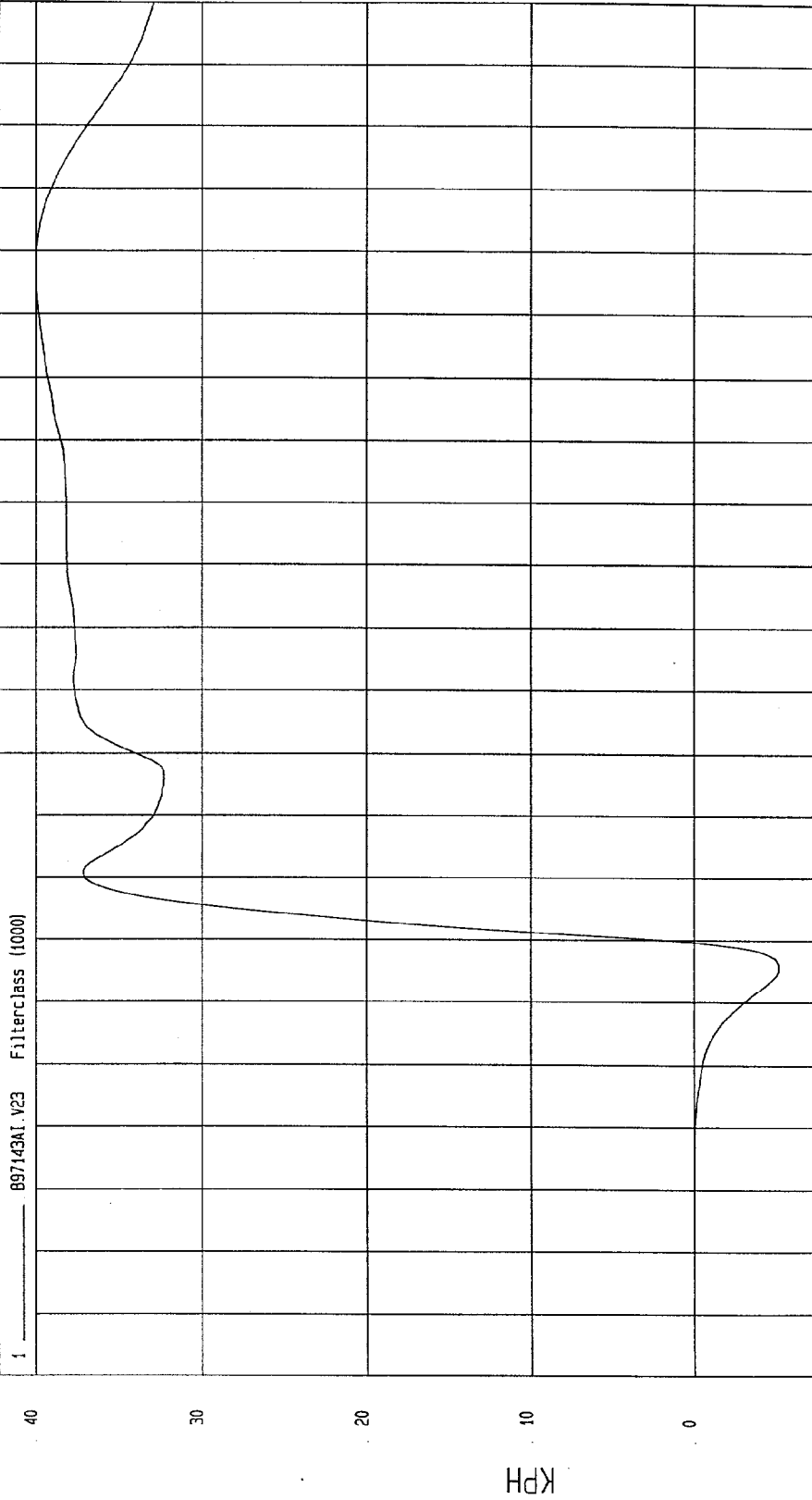


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

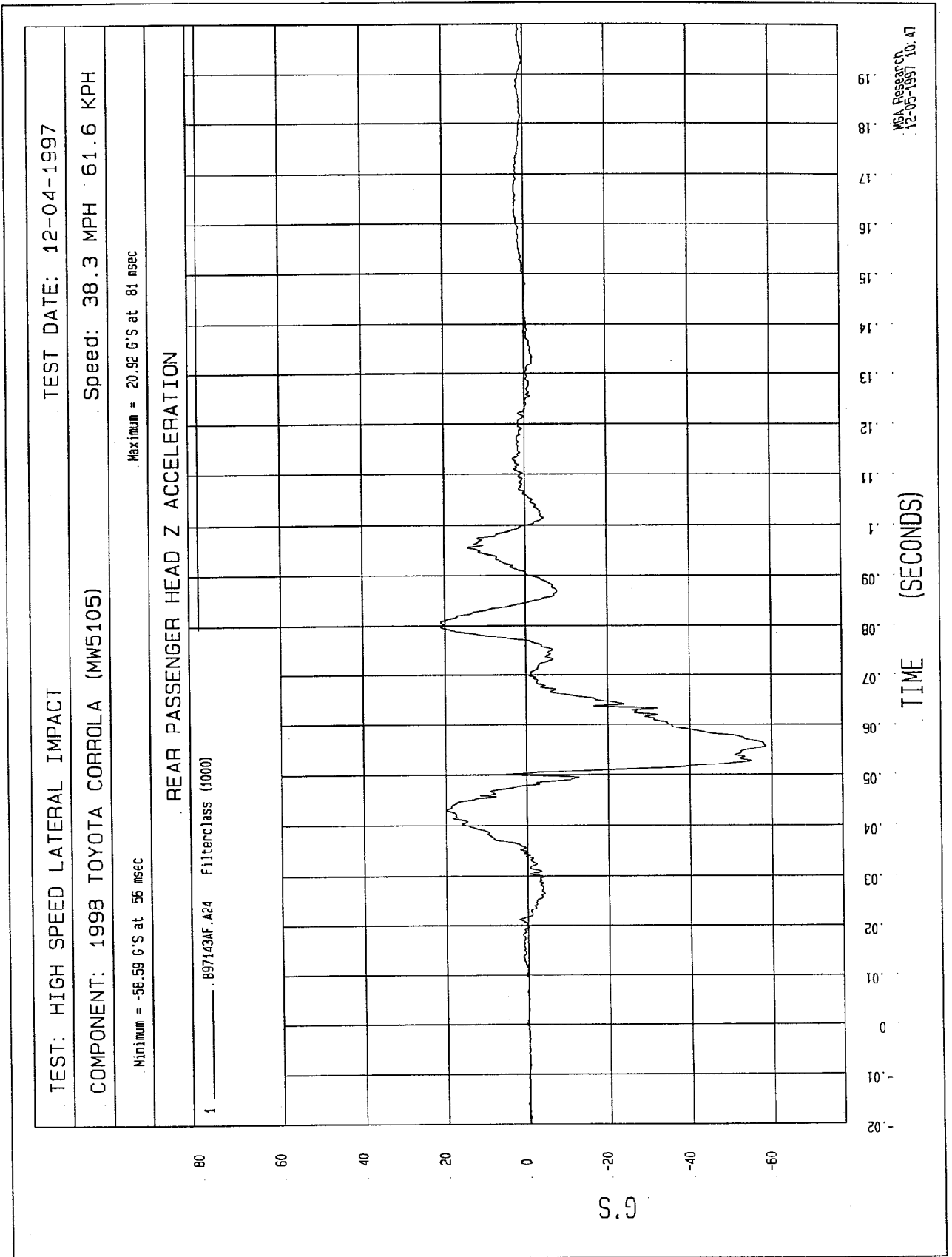
Minimum = -5.12 KPH at 46 msec Maximum = 40.02 KPH at 158 msec

REAR PASSENGER HEAD Y VELOCITY



TIME Seconds

MCA Research
12-05-1997 11:07

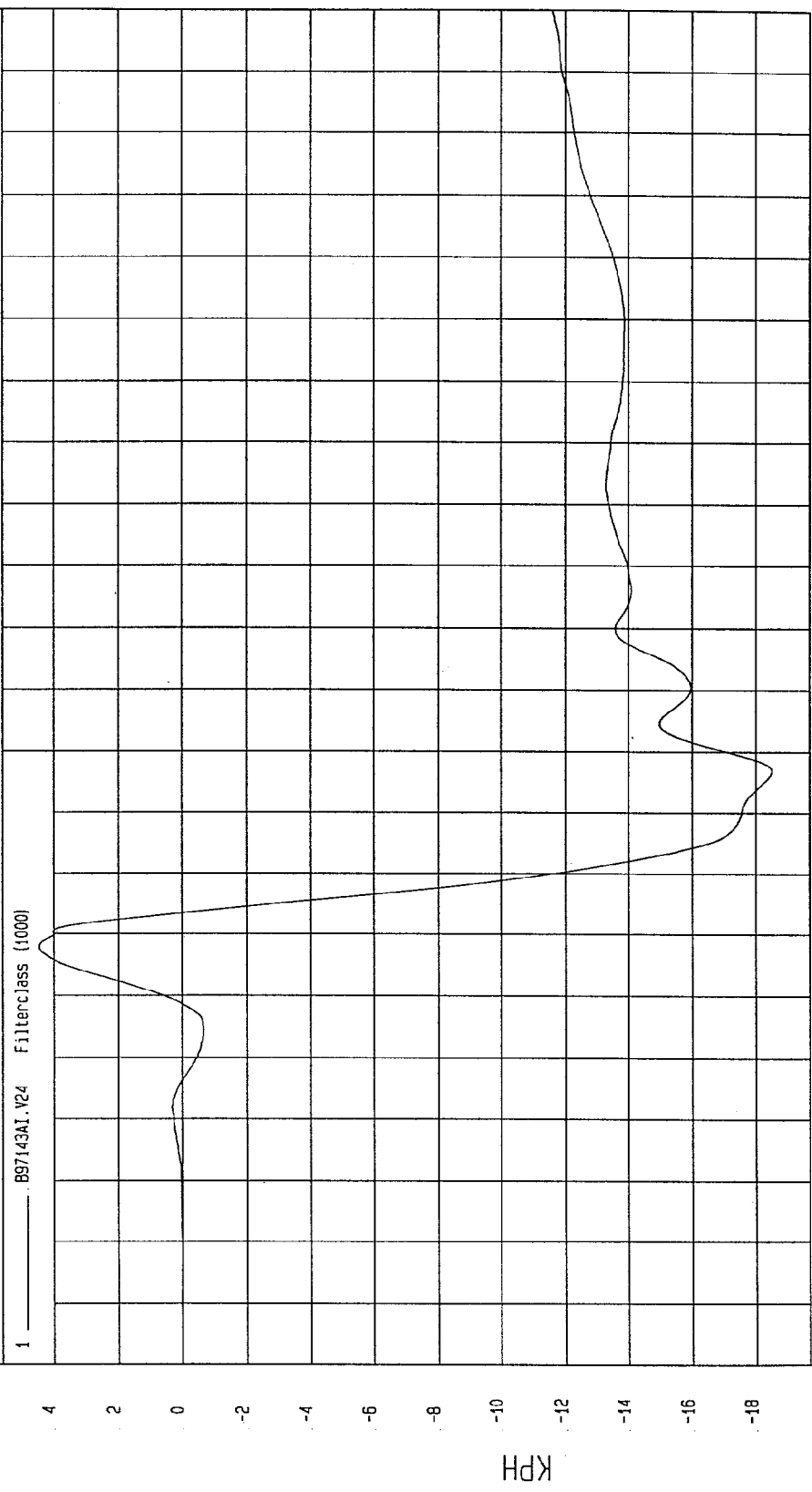


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -18.49 KPH at 77 msec Maximum = 4.45 KPH at 48 msec

REAR PASSENGER HEAD Z VELOCITY



TIME Seconds
NGA Research
12-05-1997 11: 07

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 12-04-1997

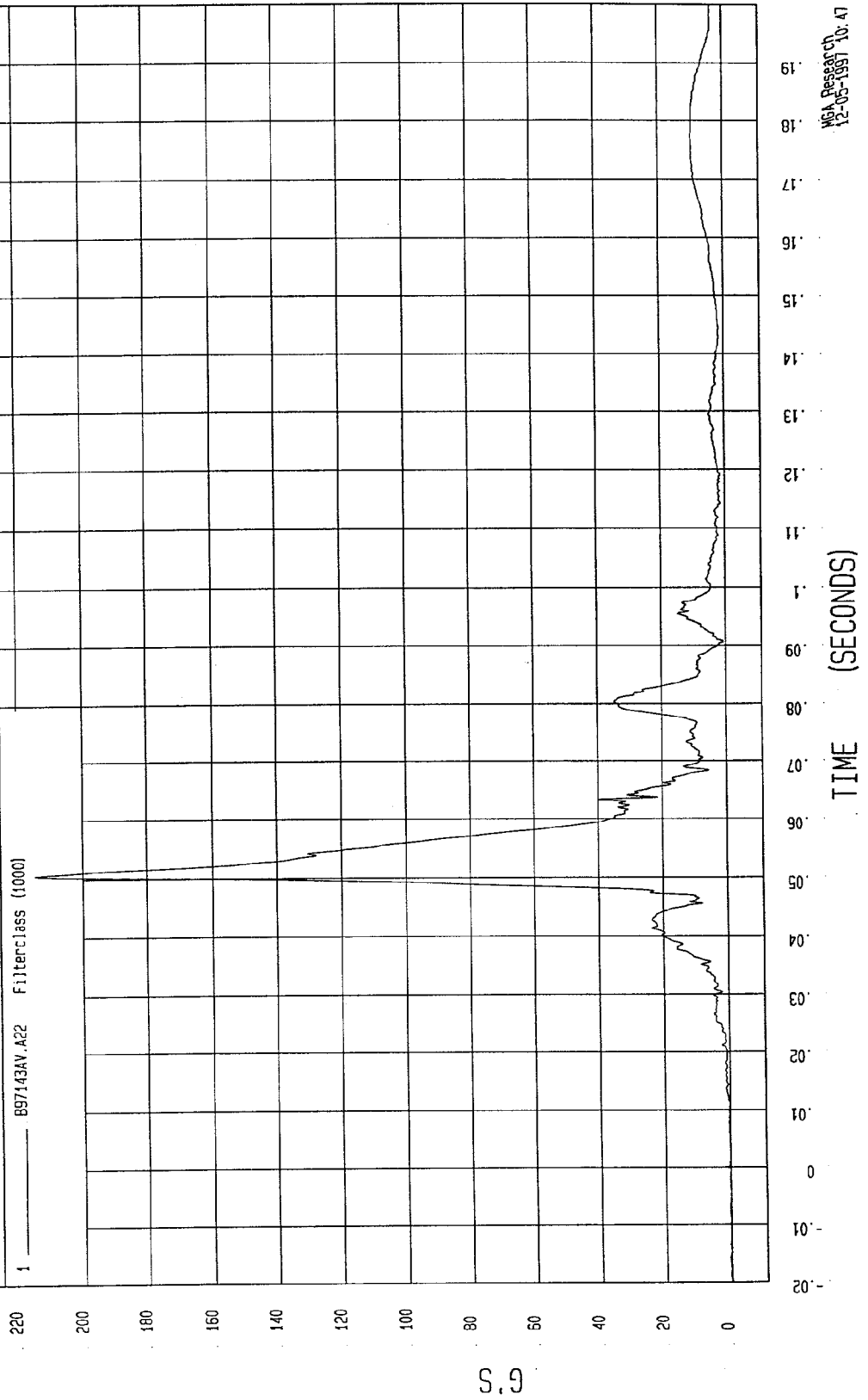
Speed: 38.3 MPH 61.6 KPH

COMPONENT: 1998 TOYOTA CORROLA (MW5105)

Maximum = 214.36 G'S at 51 msec

Minimum = 2.34E-02 G'S at -4 msec

REAR PASSENGER HEAD RESULTANT



TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105)

Speed: 38.3 MPH 61.6 KPH

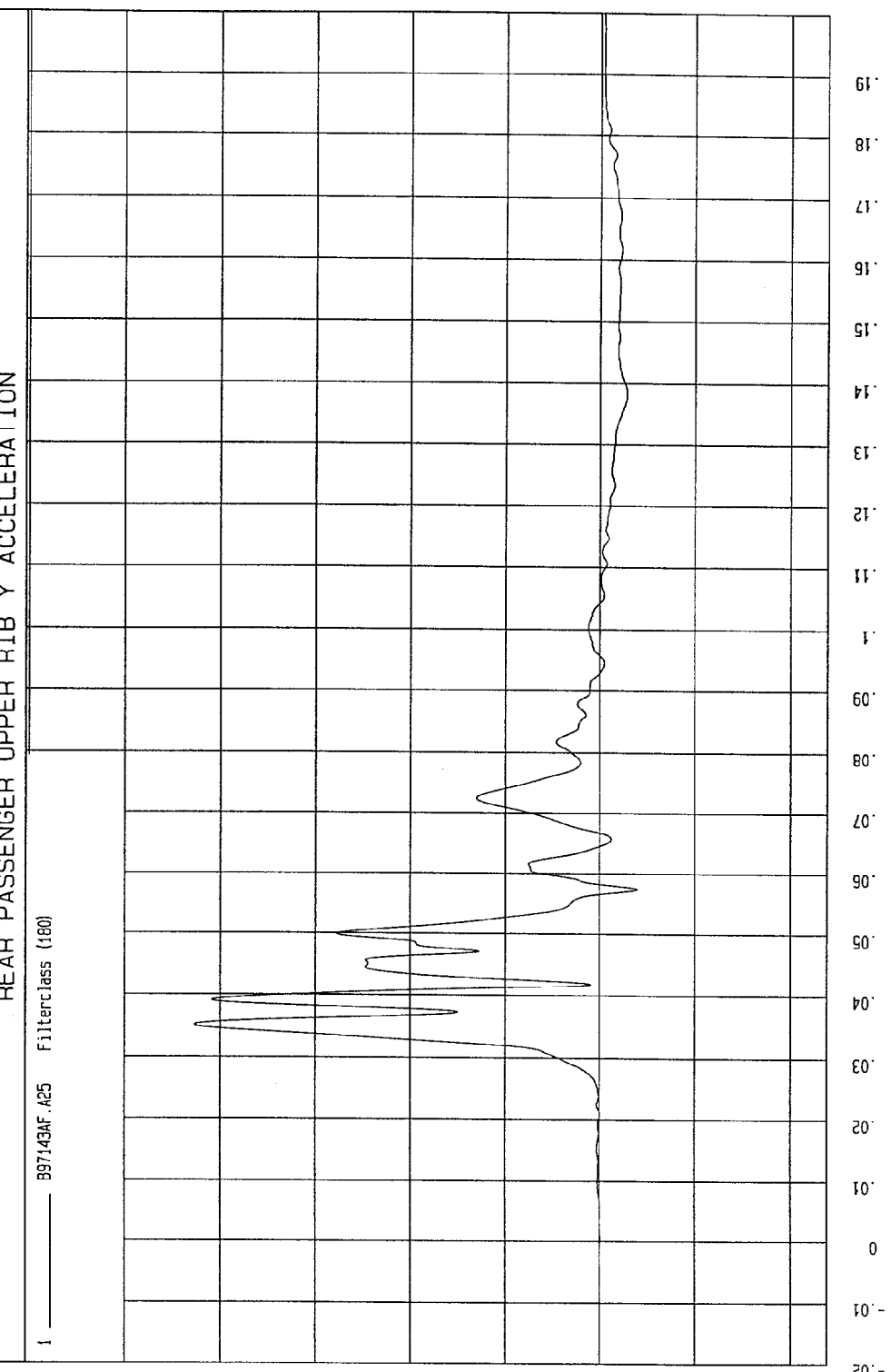
Minimum = -7.98 G'S at 57 msec

Maximum = 85.27 G'S at 35 msec

REAR PASSENGER UPPER RIB Y ACCELERATION

1 ——— B97143AF.A25 Filterclass (180)

G.S



NSA Research
12-23-1997 11:37

TIME (SECONDS)

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -2.07E-02 KPH at 2 msec
Maximum = 46.28 KPH at 104 msec

REAR PASSENGER UPPER RIB Y VELOCITY

1 ——— 897143A1.V25 Filterclass (180)

KPH

40
30
20
10
0

TIME Seconds

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

NGA Research
12-23-1997 11:39

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -23.10 G'S at 64 msec Maximum = 83.17 G'S at 34 msec

REAR PASSENGER LOWER RIB Y ACCELERATION

1 _____ 897143AF.A26 Filterclass (180)

120

100

80

60

40

20

0

-20

-40

G'S

-0.02

-0.01

0

0.01

0.02

0.03

0.04

0.05

0.06

0.07

0.08

0.09

0.1

0.11

0.12

0.13

0.14

0.15

0.16

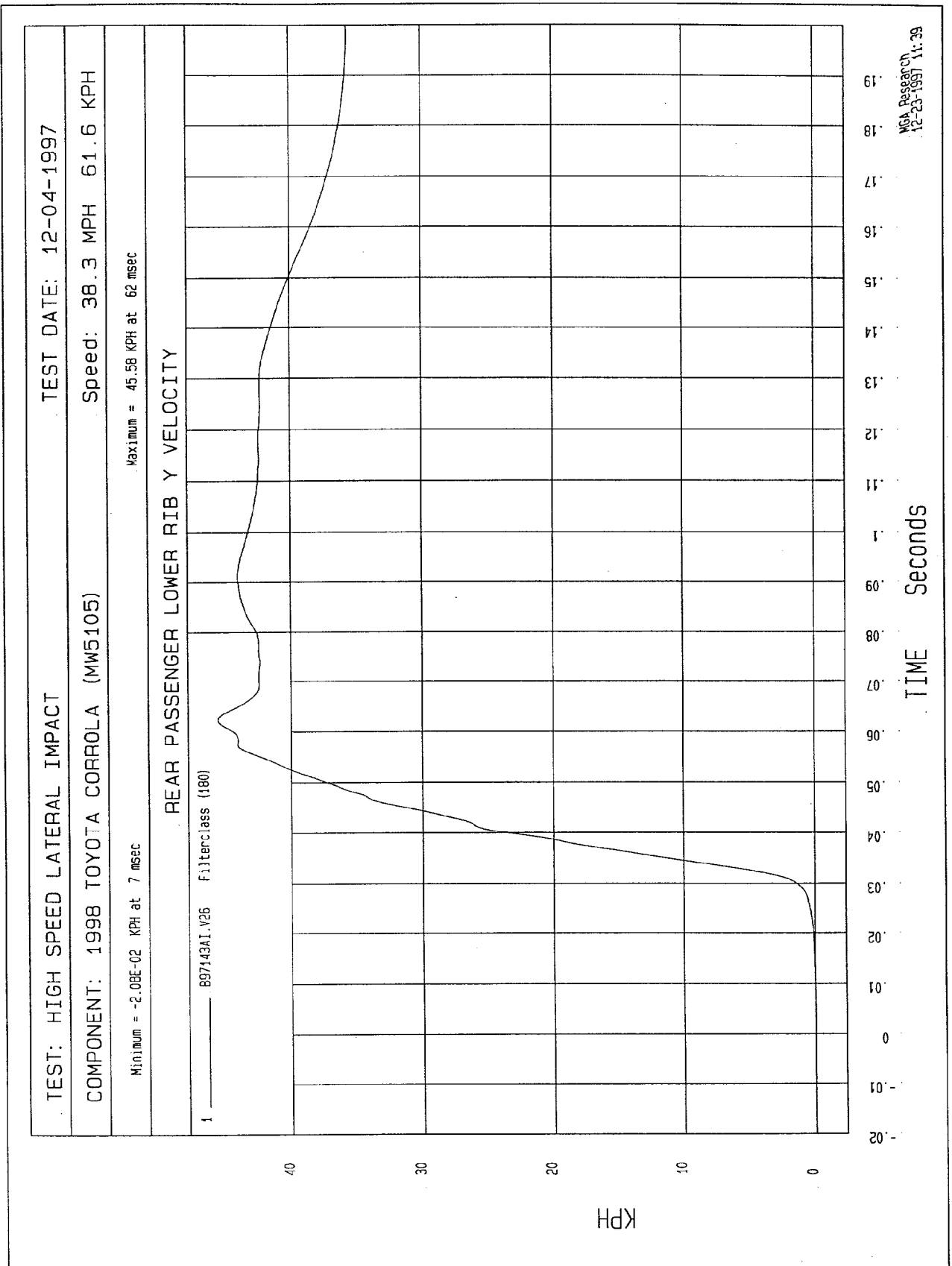
0.17

0.18

0.19

TIME (SECONDS)

W&A Research
12-23-1997 11:37



TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -18.51 G'S at 62 msec Maximum = 83.34 G'S at 40 msec

REAR PASSENGER LOWER SPINE Y ACCELERATION

1 897143AF.A27 FilterClass (160)

120

100

80

60

40

20

0

-20

-40

G.S

.19

.18

.17

.16

.15

.14

.13

.12

.11

.1

.09

.08

.07

.06

.05

.04

.03

.02

.01

0

-.01

-.02

TIME (SECONDS)

MCA Research
12-23-1997 11:38

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105)

Speed: 38.3 MPH 61.6 KPH

Minimum = 0 KPH at -20 msec

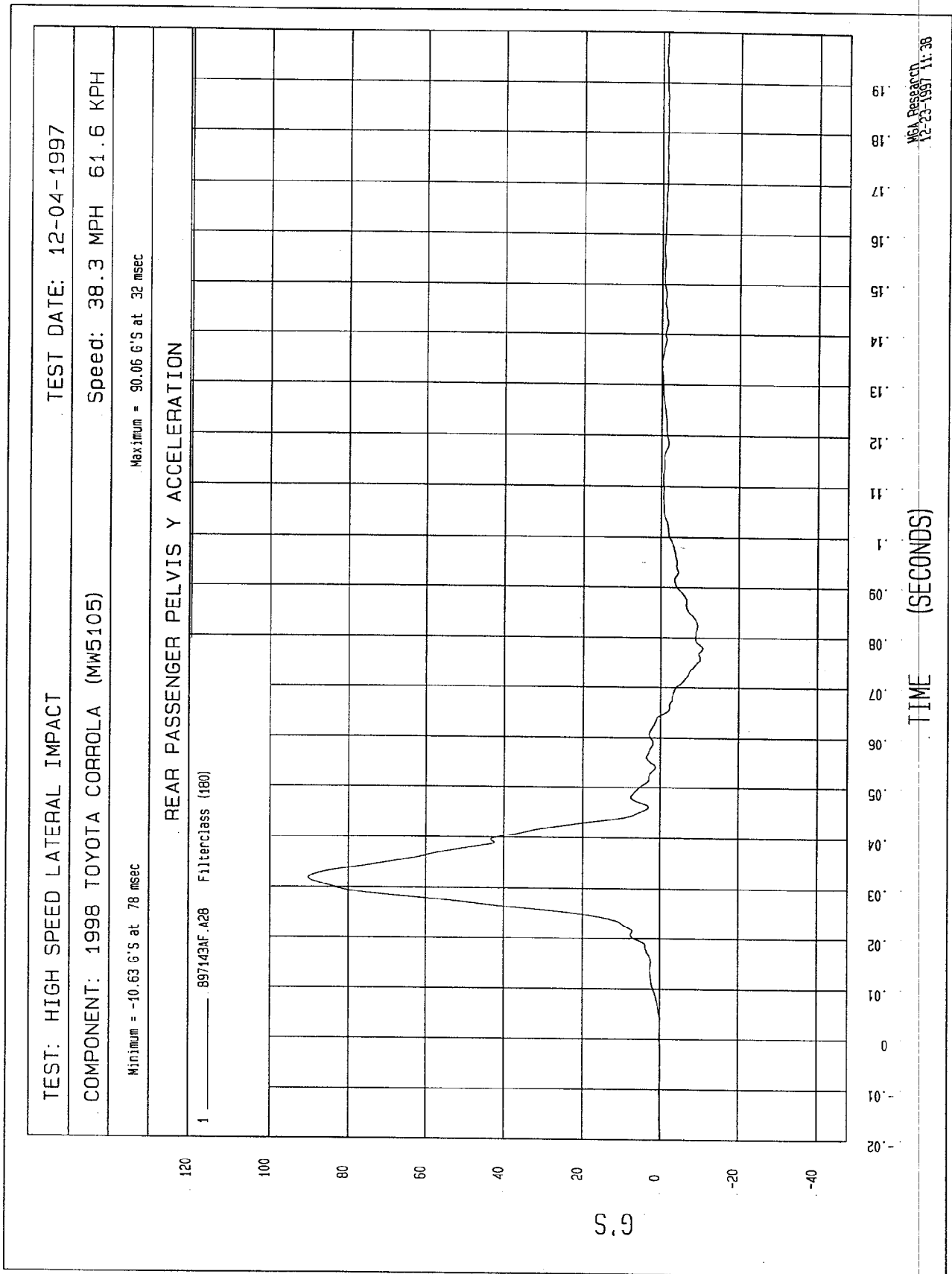
Maximum = 49.99 KPH at 56 msec

REAR PASSENGER LOWER SPINE Y VELOCITY



TIME Seconds

WCA Research
12-23-1997 11:39



TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 12-04-1997

Speed: 38.3 MPH 61.6 KPH

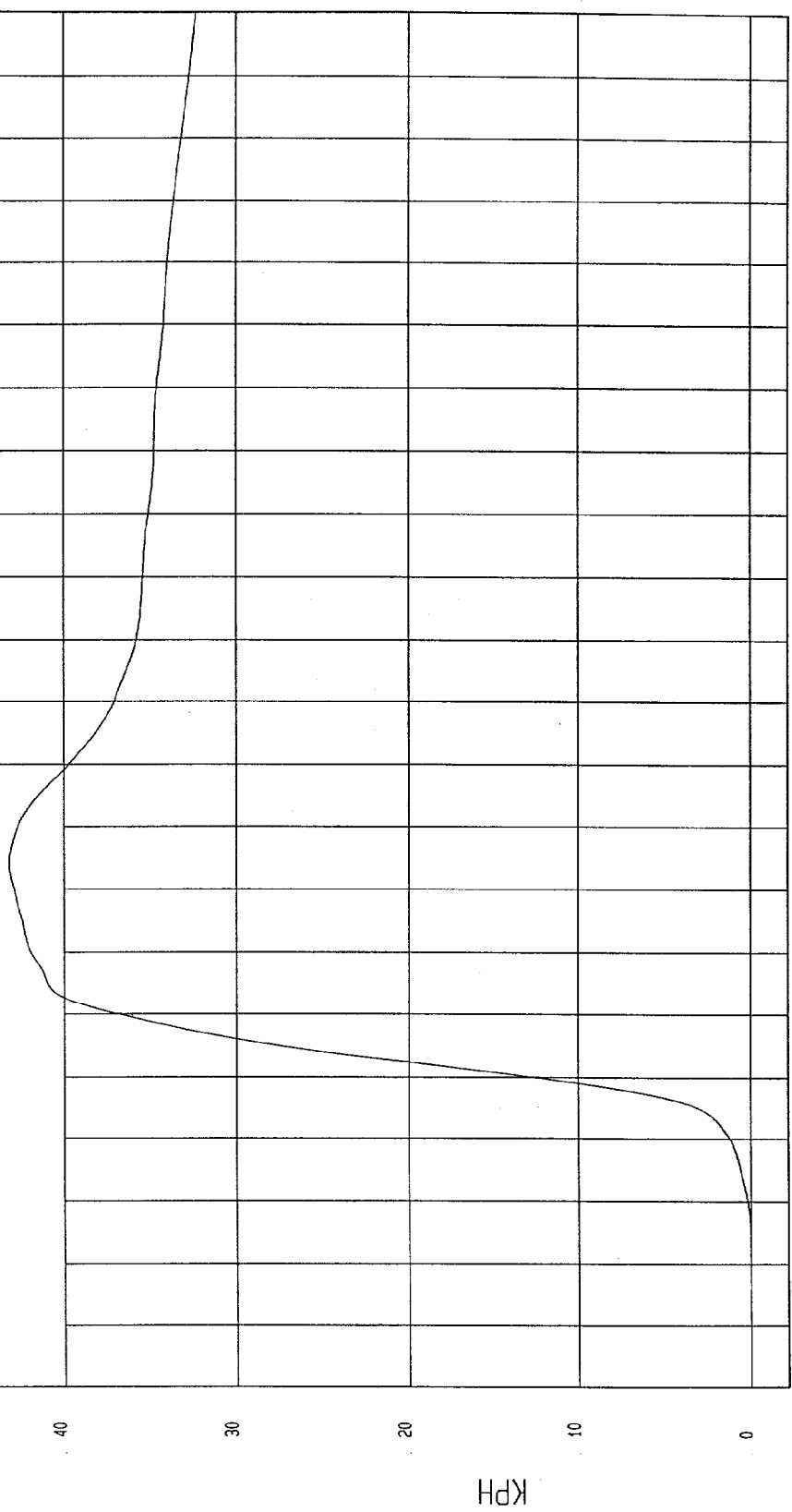
COMPONENT: 1998 TOYOTA CORROLA (MW5105)

Maximum = 43.17 KPH at 54 msec

Minimum = -6.05E-03 KPH at -17 msec

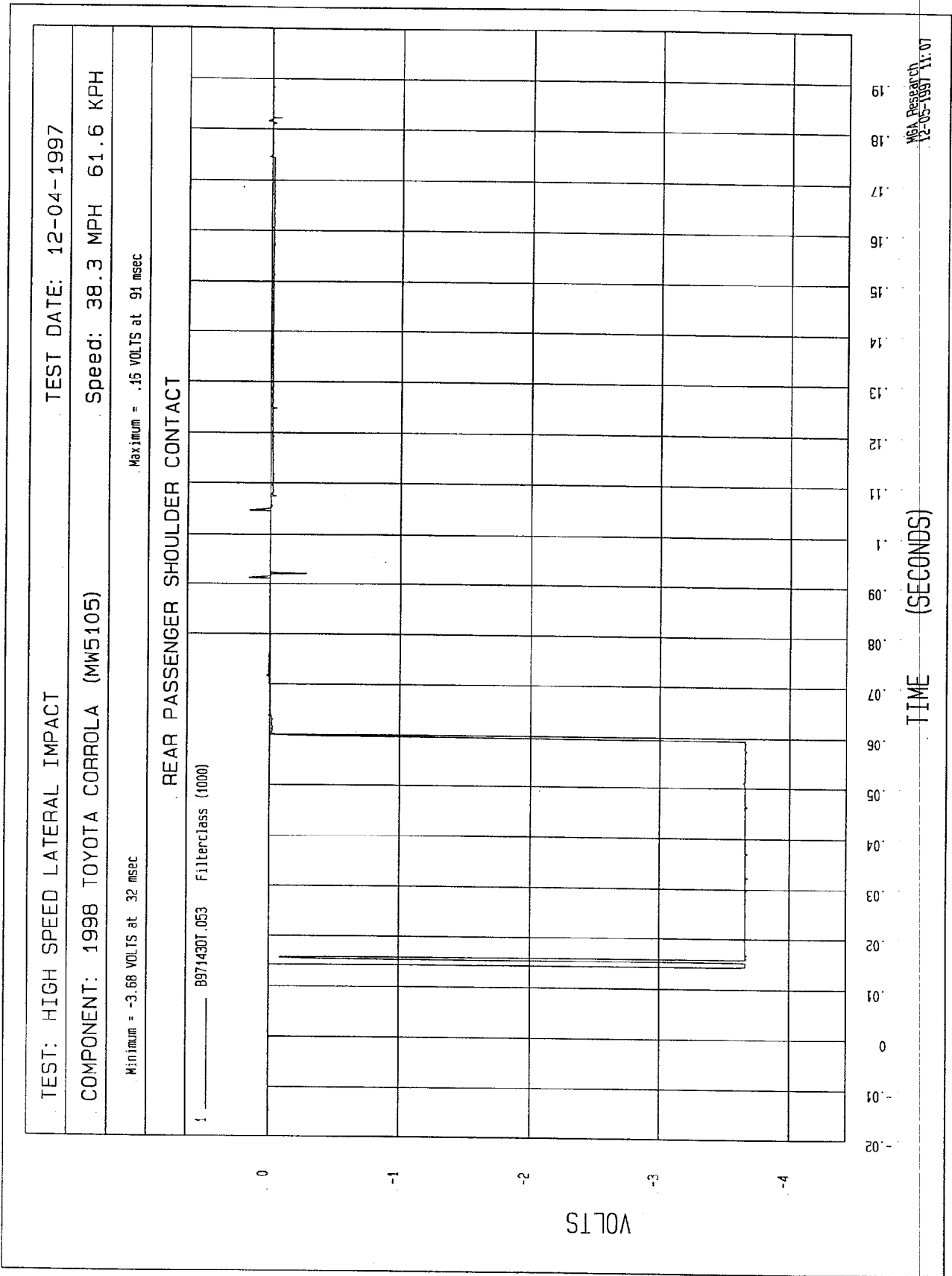
REAR PASSENGER PELVIS Y VELOCITY

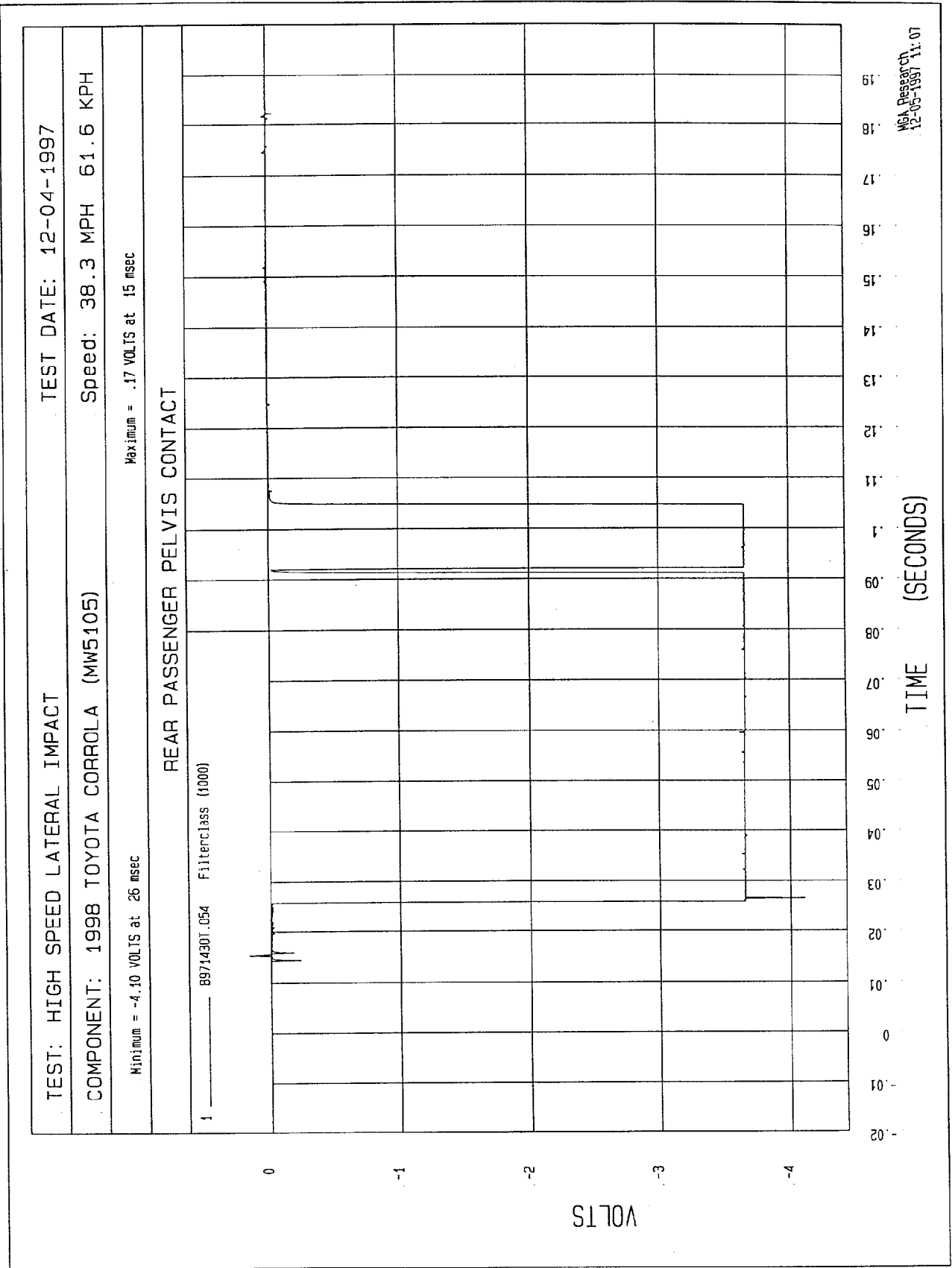
1 ——— B97143A1.V28 Filterclass (180)

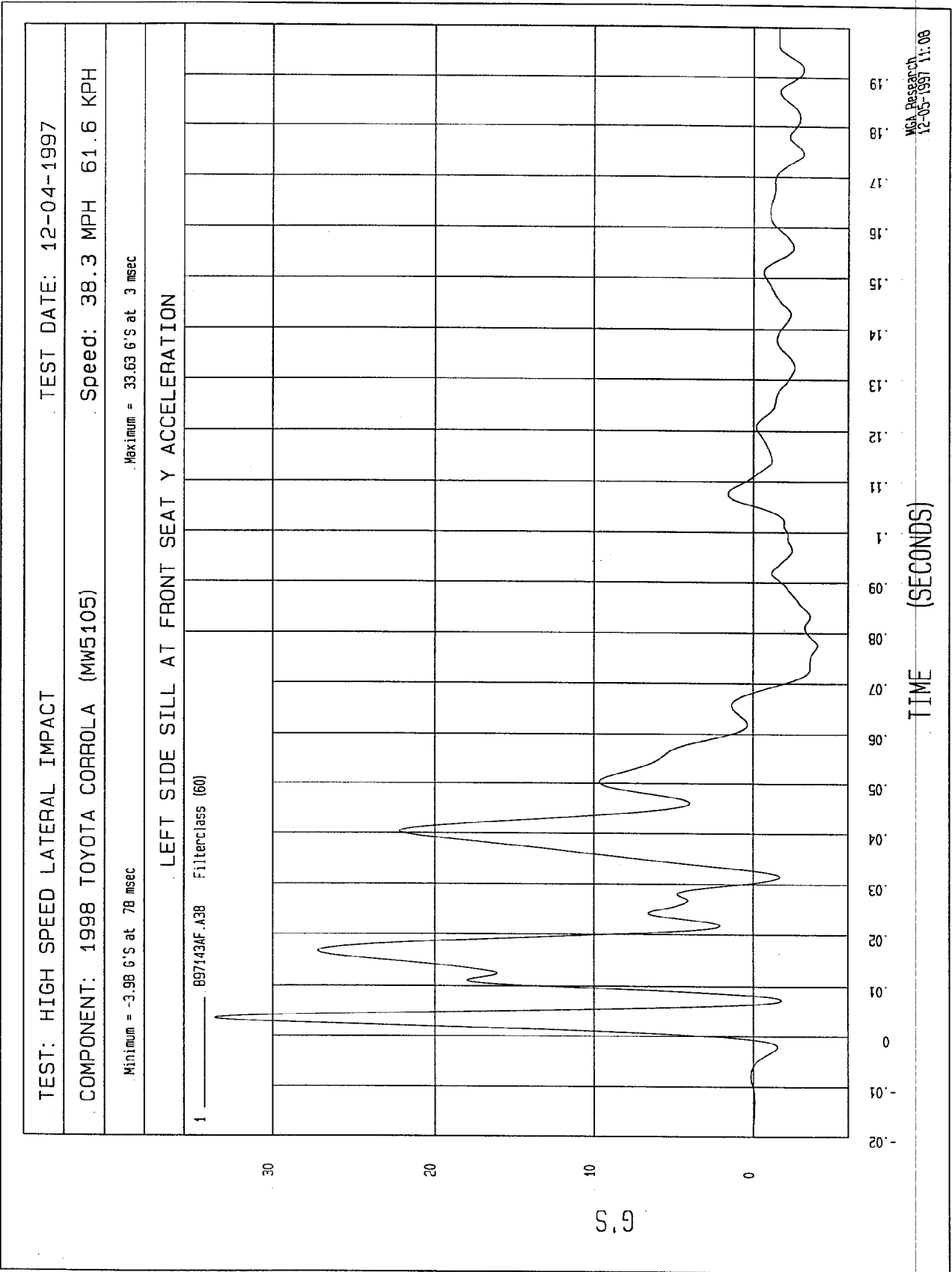


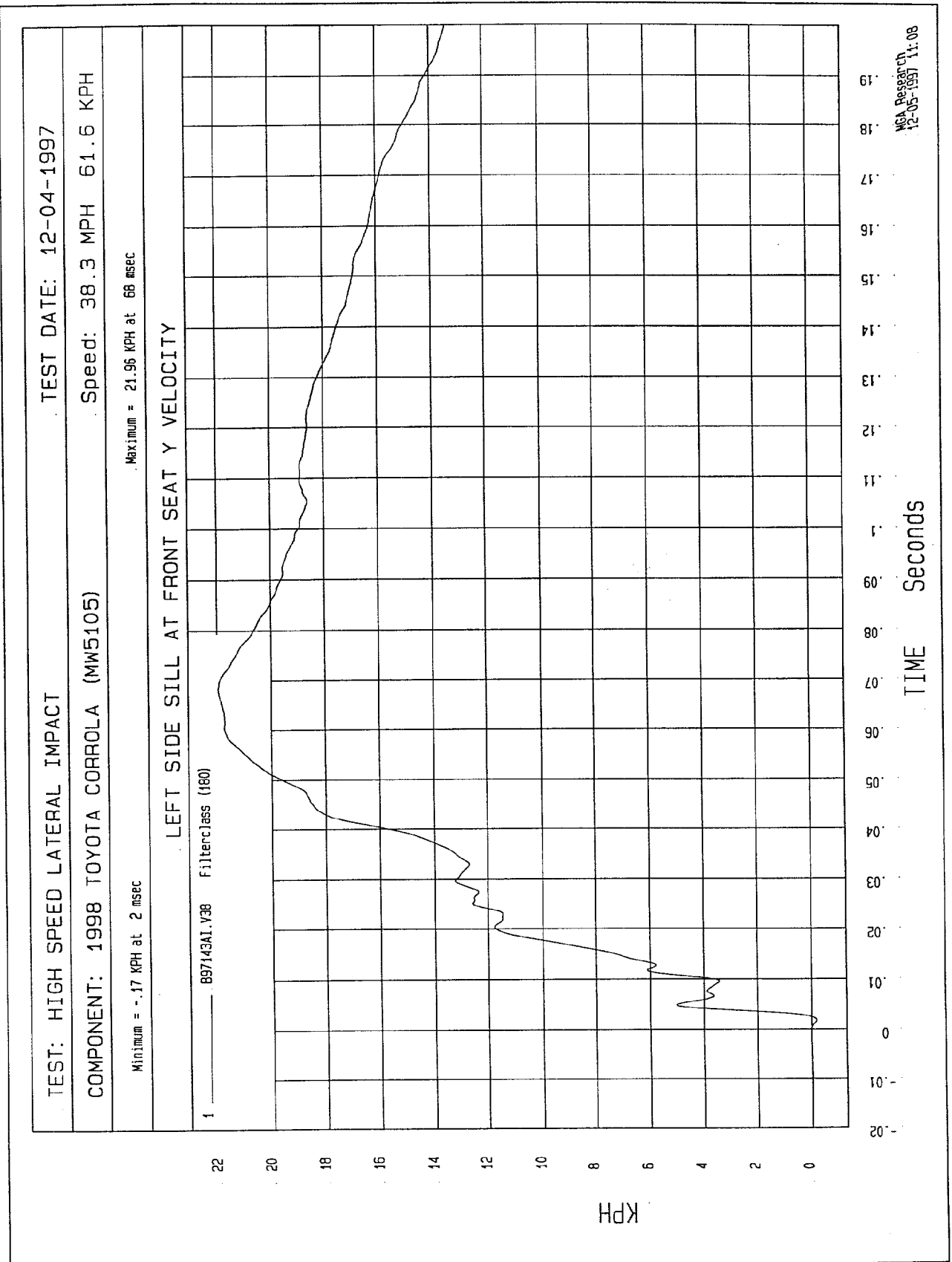
TIME Seconds

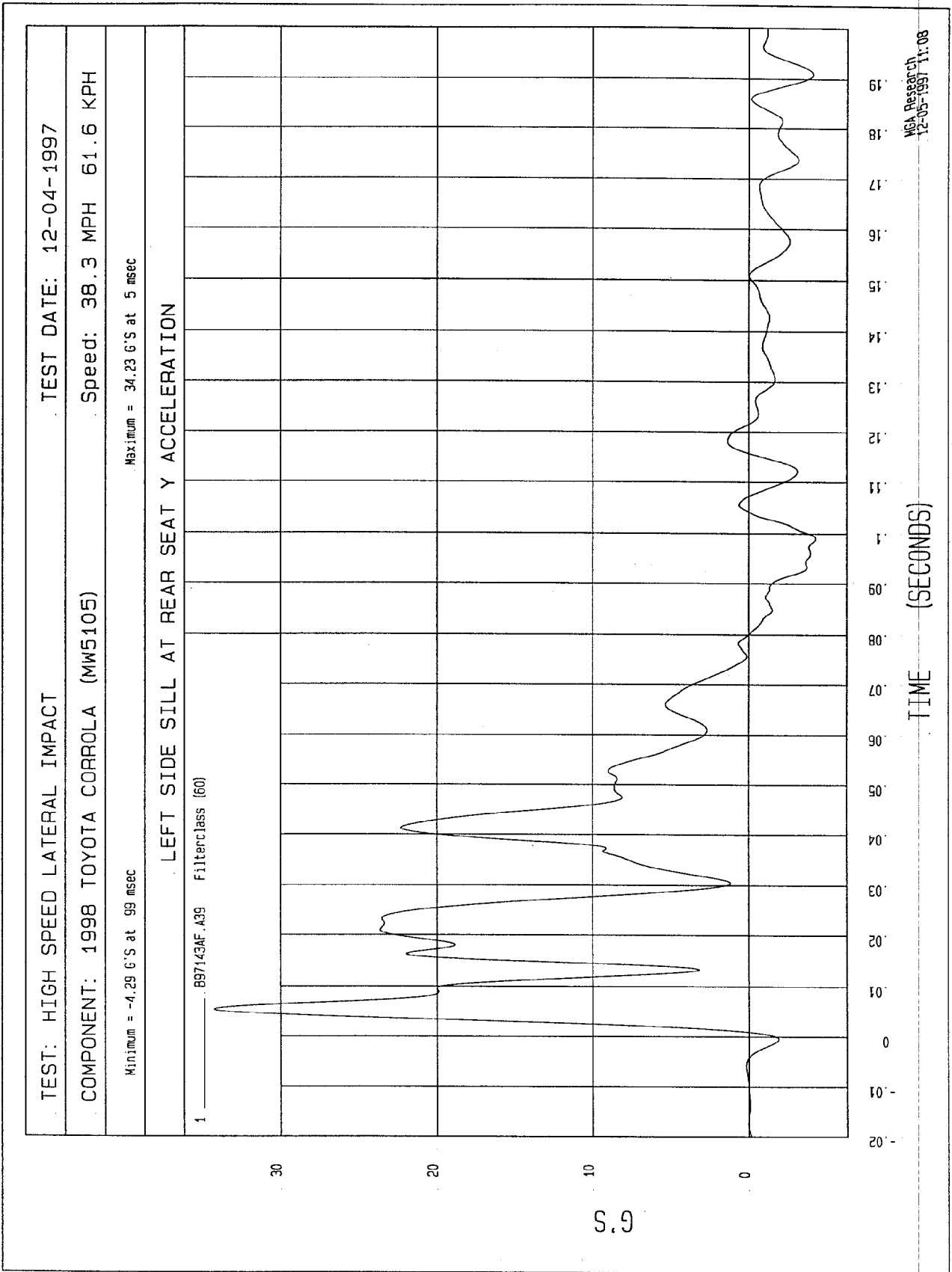
NCA Research
12-23-1997 11:40









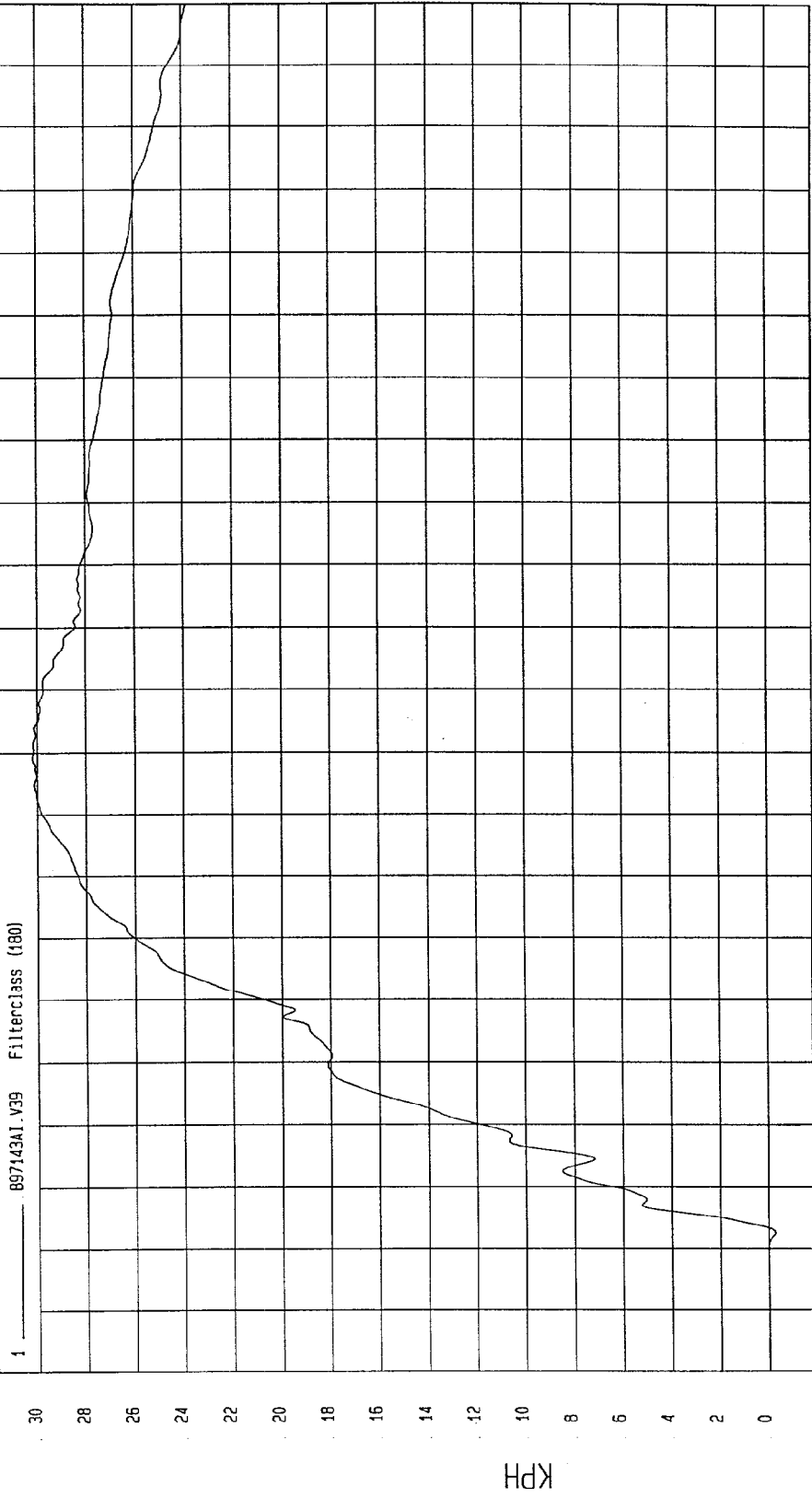


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = - 28 KPH at 2 msec Maximum = 30.19 KPH at 79 msec

LEFT SIDE SILL AT REAR SEAT Y VELOCITY



TIME Seconds

NSA Research
12-05-1997 11:08

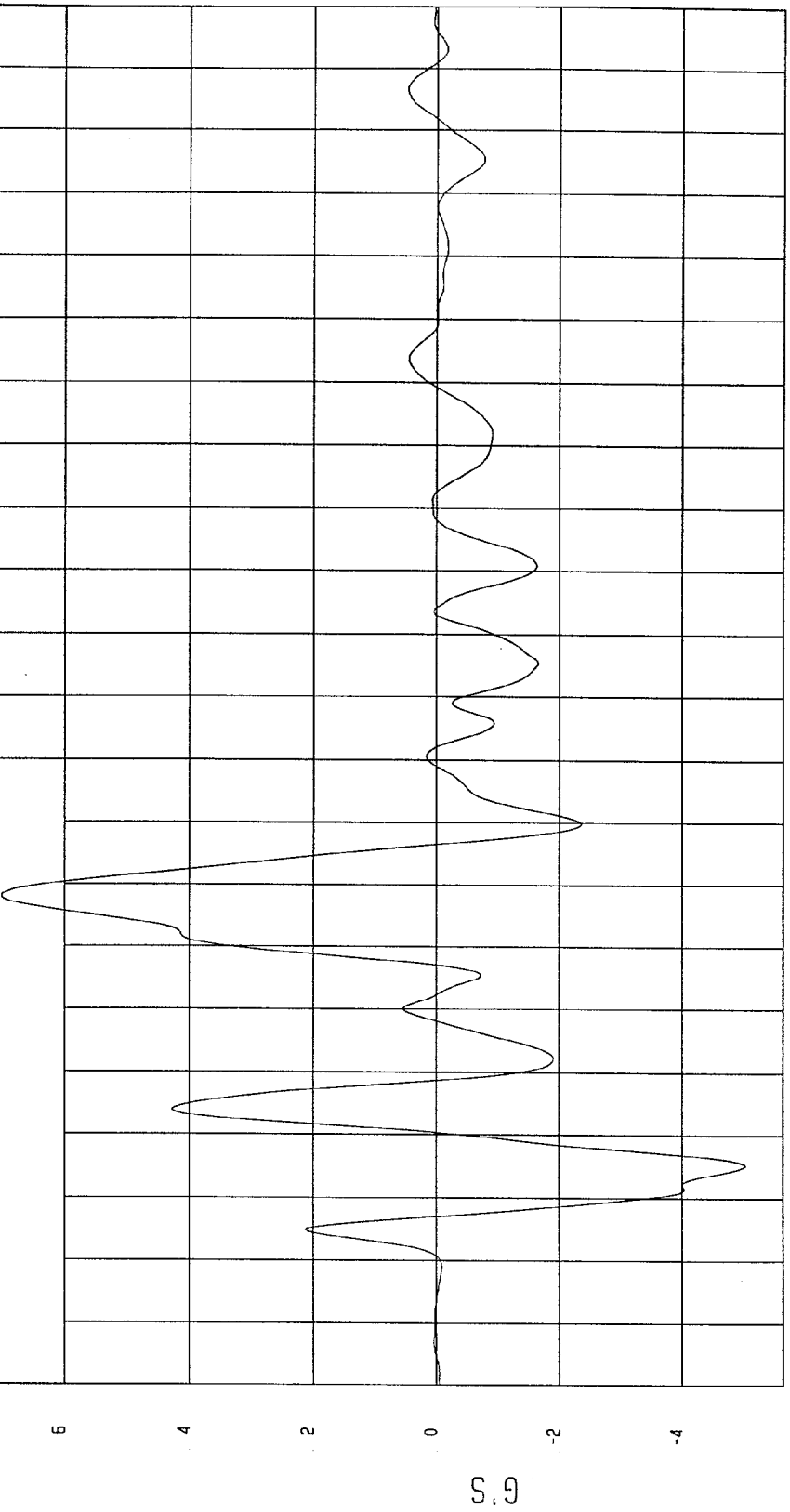
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -4.99 G'S at 15 msec Maximum = 7.00 G'S at 50 msec

RIGHT SIDE SILL AT FRONT SEAT X ACCELERATION

1 _____ B97143AF.A32 Filterclass (60)



TIME (SECONDS)

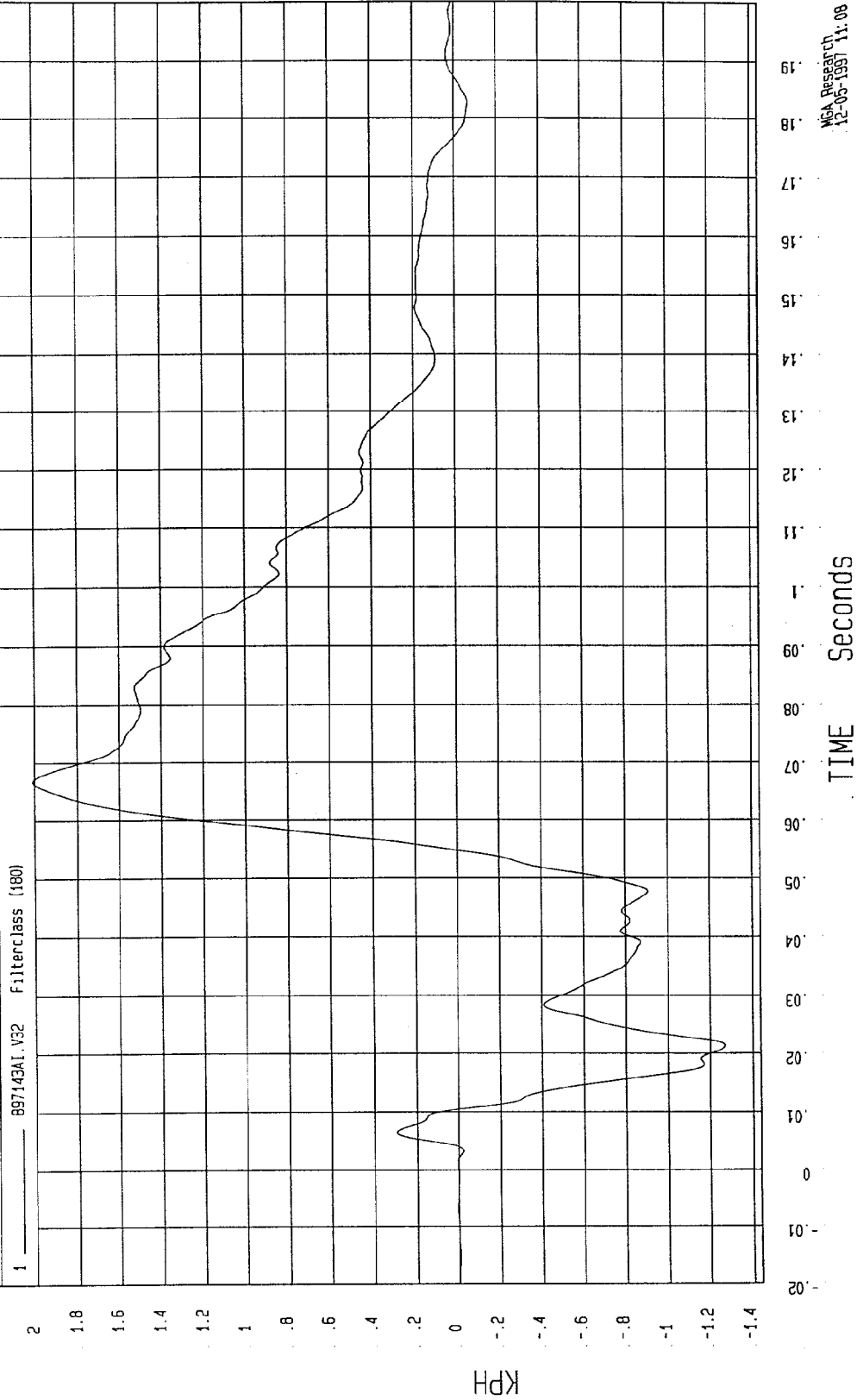
WEA Research
12-05-1997 11:08

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -1.27 KPH at 21 msec Maximum = 2.00 KPH at 67 msec

RIGHT SIDE SILL AT FRONT SEAT X VELOCITY



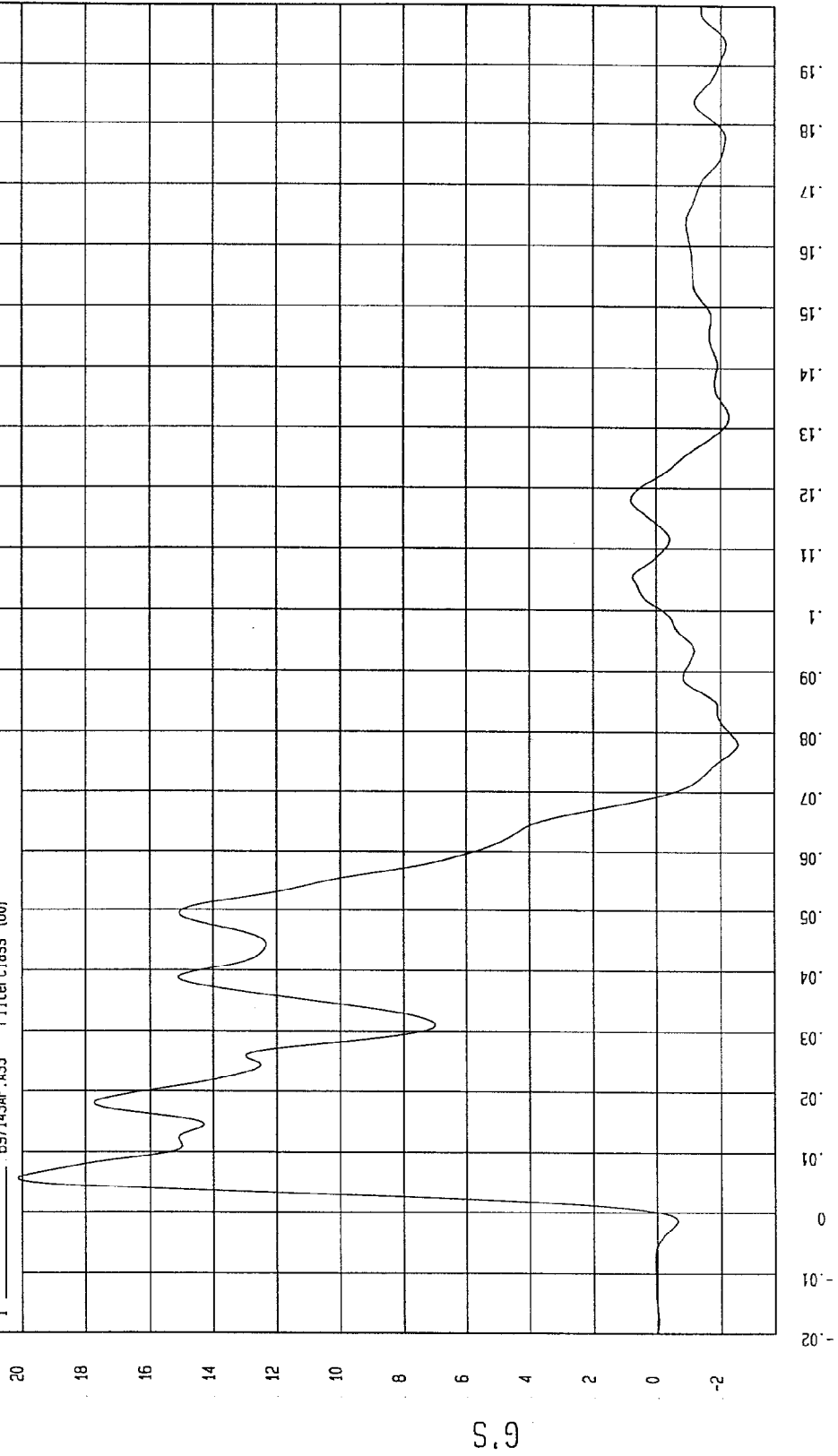
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -2.53 G'S at 78 msec Maximum = 20.12 G'S at 6 msec

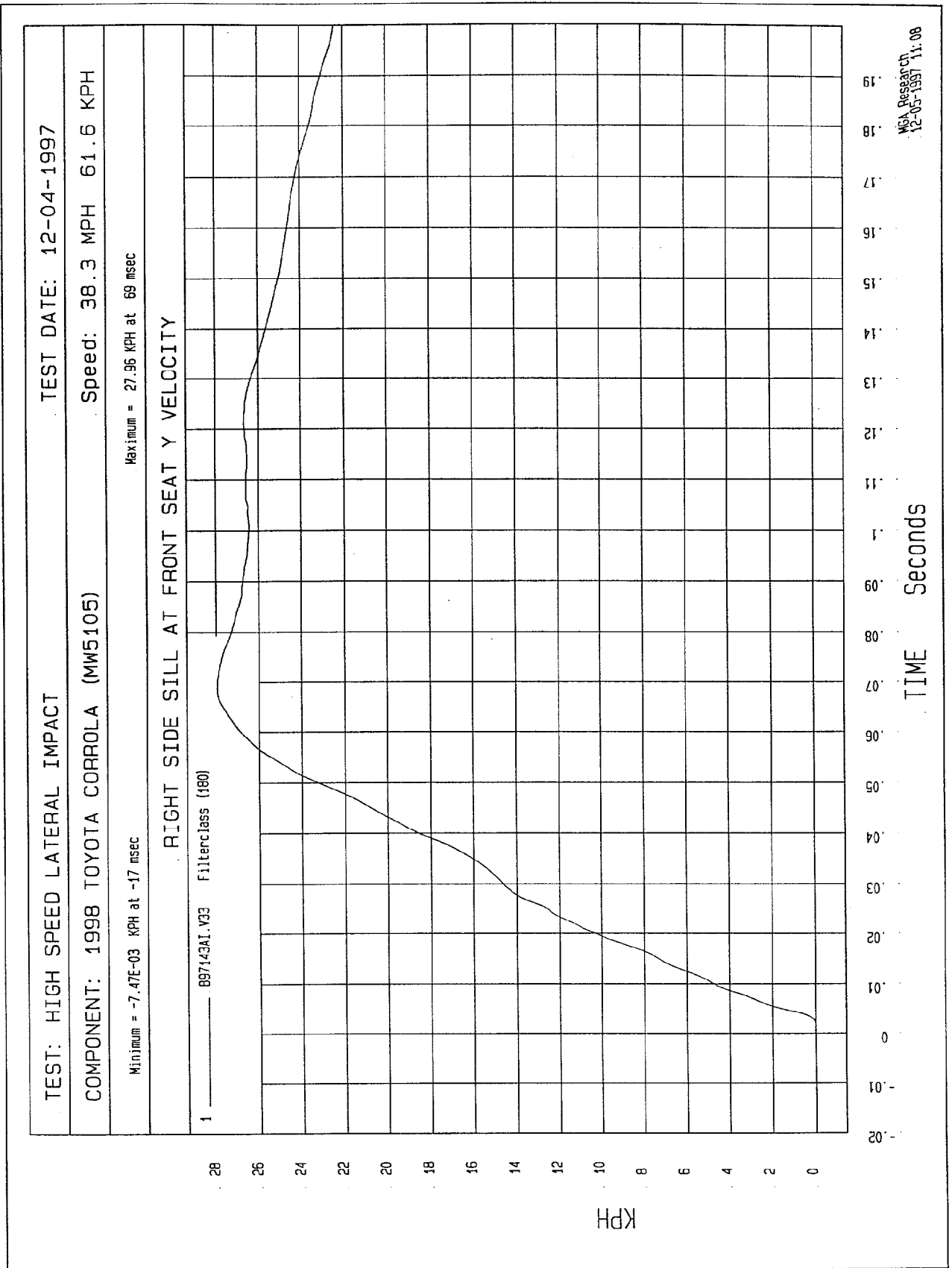
RIGHT SIDE SILL AT FRONT SEAT Y ACCELERATION

1 B97143AF.A33 Filterclass (60)



MSA Research
12-05-1997 11:06

TIME (SECONDS)



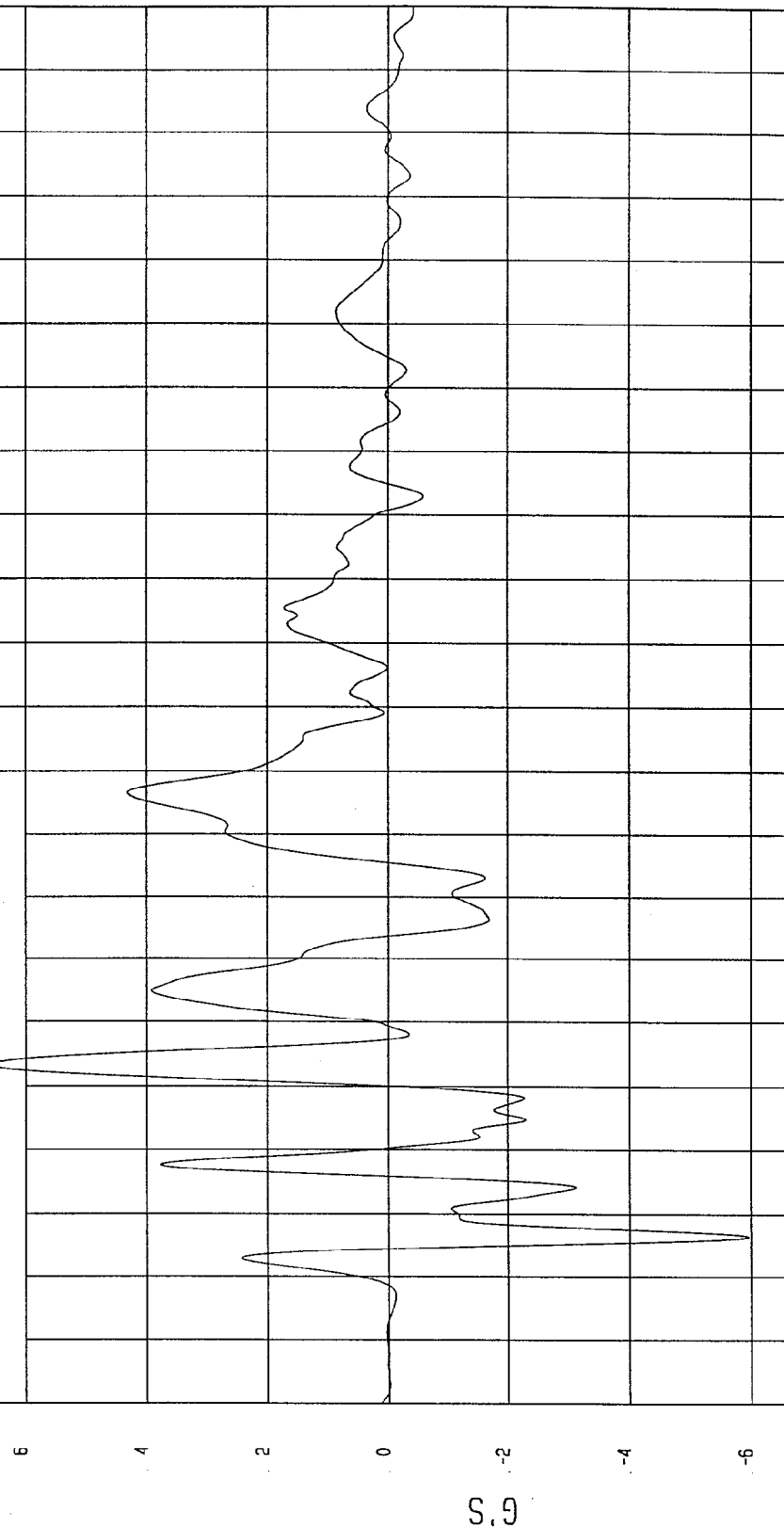
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -5.96 G's at 6 msec Maximum = 6.57 G's at 33 msec

RIGHT SIDE SILL AT FRONT SEAT Z ACCELERATION

1 _____ B97143AF.A34 Filterclass (60)

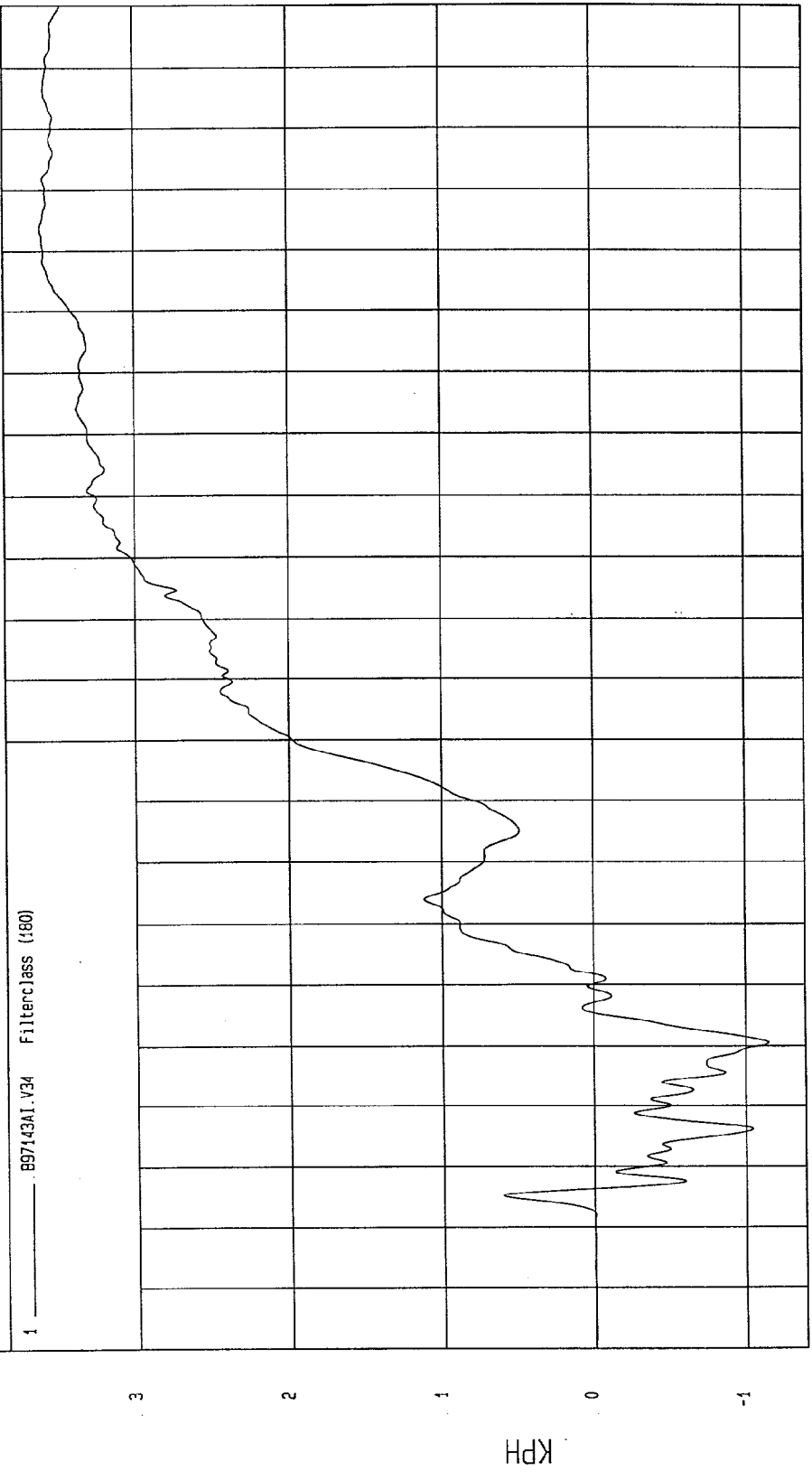


TIME (SECONDS)

MSA Research
12-05-1997 11:09

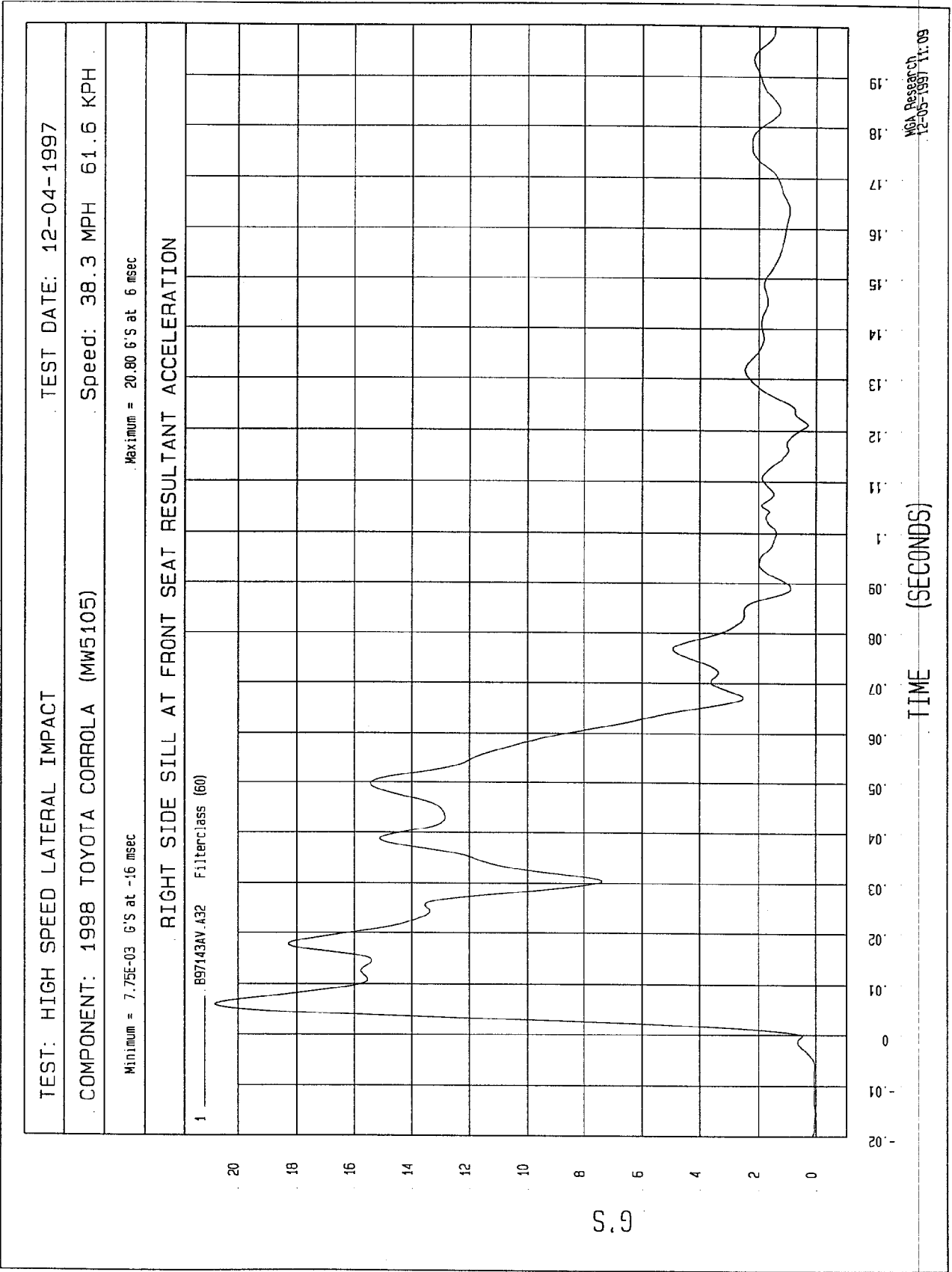
TEST: HIGH SPEED LATERAL IMPACT	TEST DATE: 12-04-1997
COMPONENT: 1998 TOYOTA CORROLA (MW5105)	Speed: 38.3 MPH 61.6 KPH
Minimum = -1.15 KPH at 30 msec	Maximum = 3.61 KPH at 164 msec

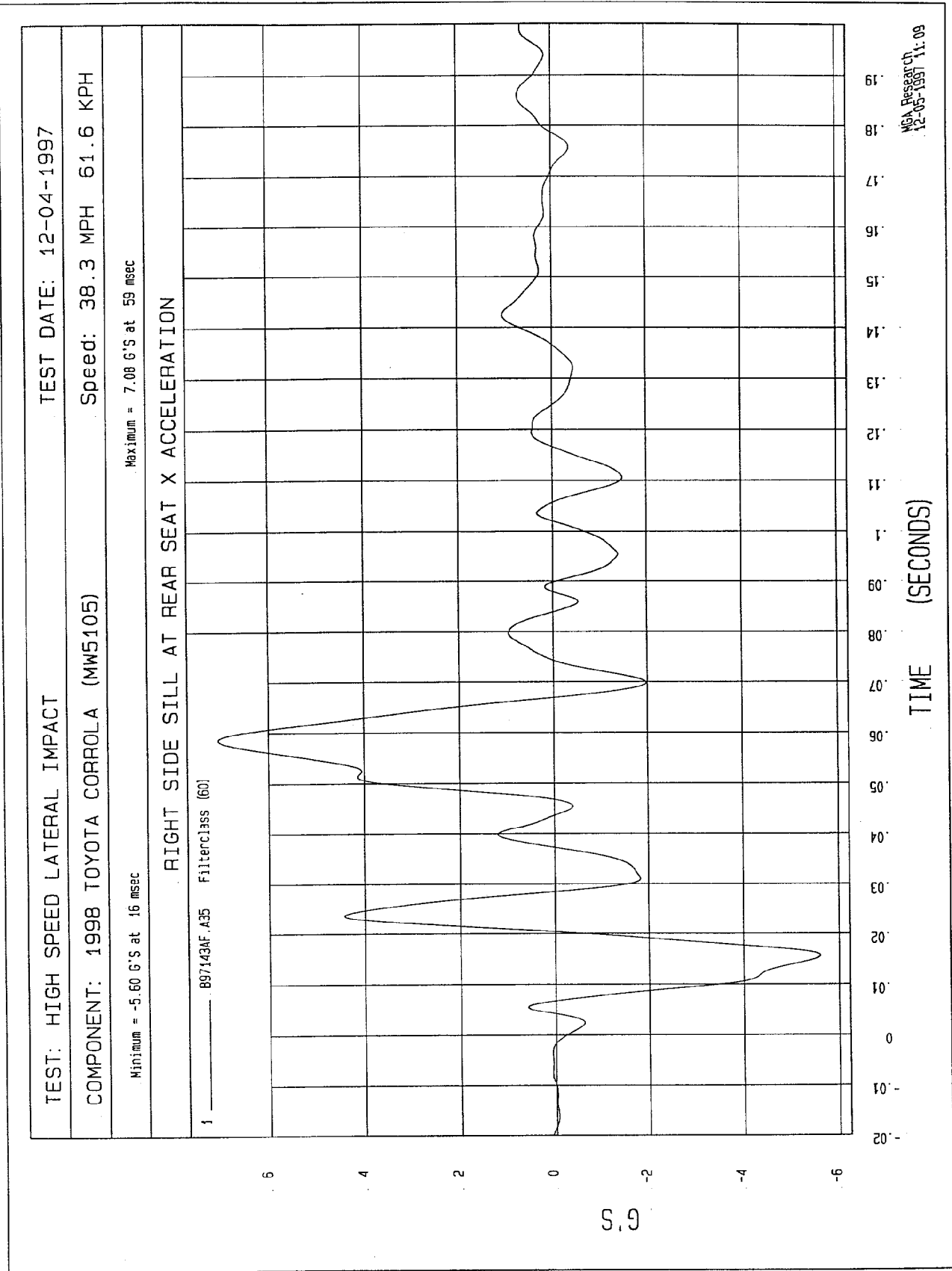
RIGHT SIDE SILL AT FRONT SEAT Z VELOCITY



TIME Seconds

NEA Research
12-05-1997 11:09



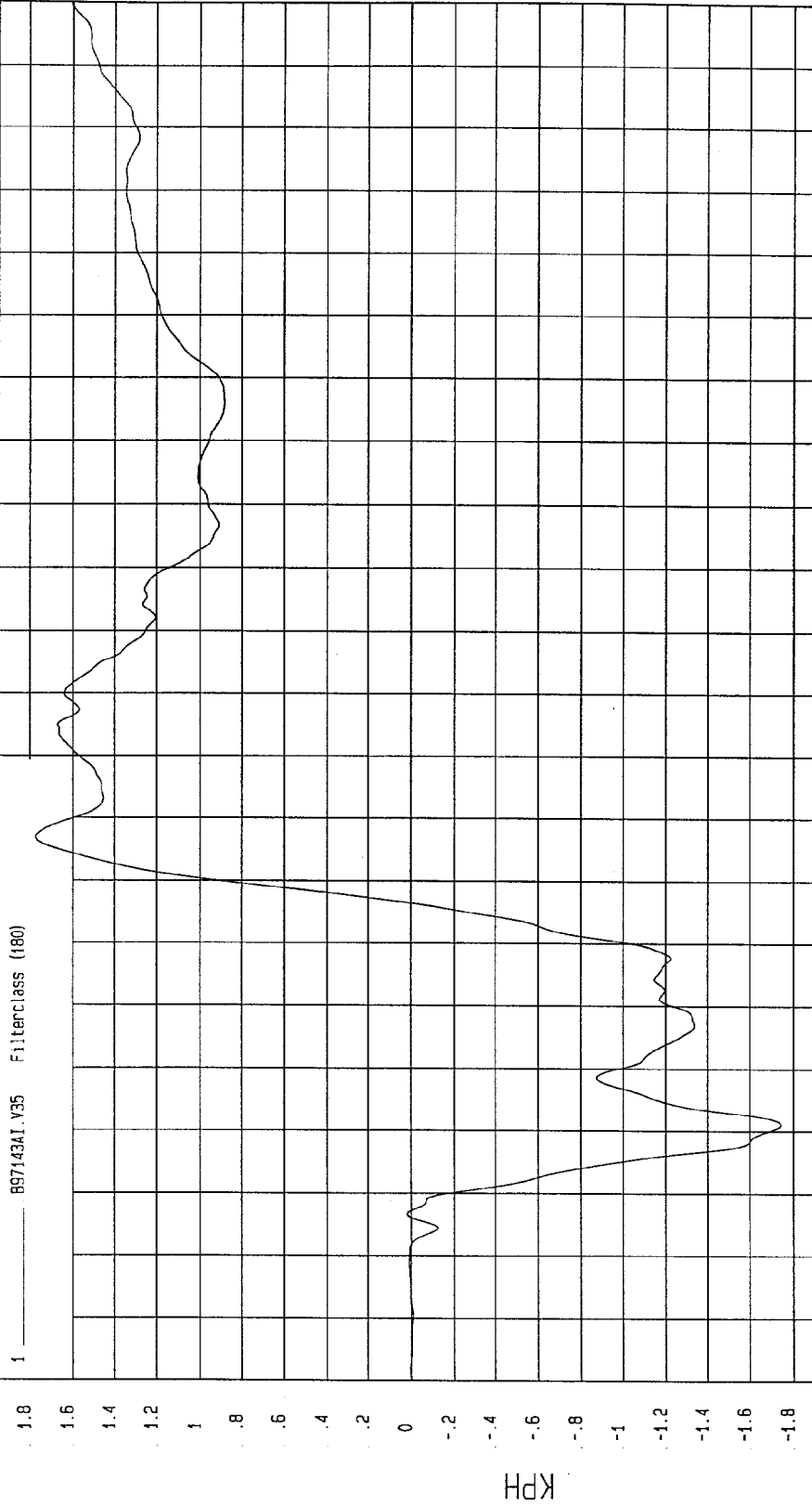


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -1.74 KPH at 21 msec
Maximum = 1.77 KPH at 67 msec

RIGHT SIDE SILL AT REAR SEAT X VELOCITY



WCA Research
12-05-1997 11:09

TIME Seconds

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 12-04-1997

Speed: 38.3 MPH 61.6 KPH

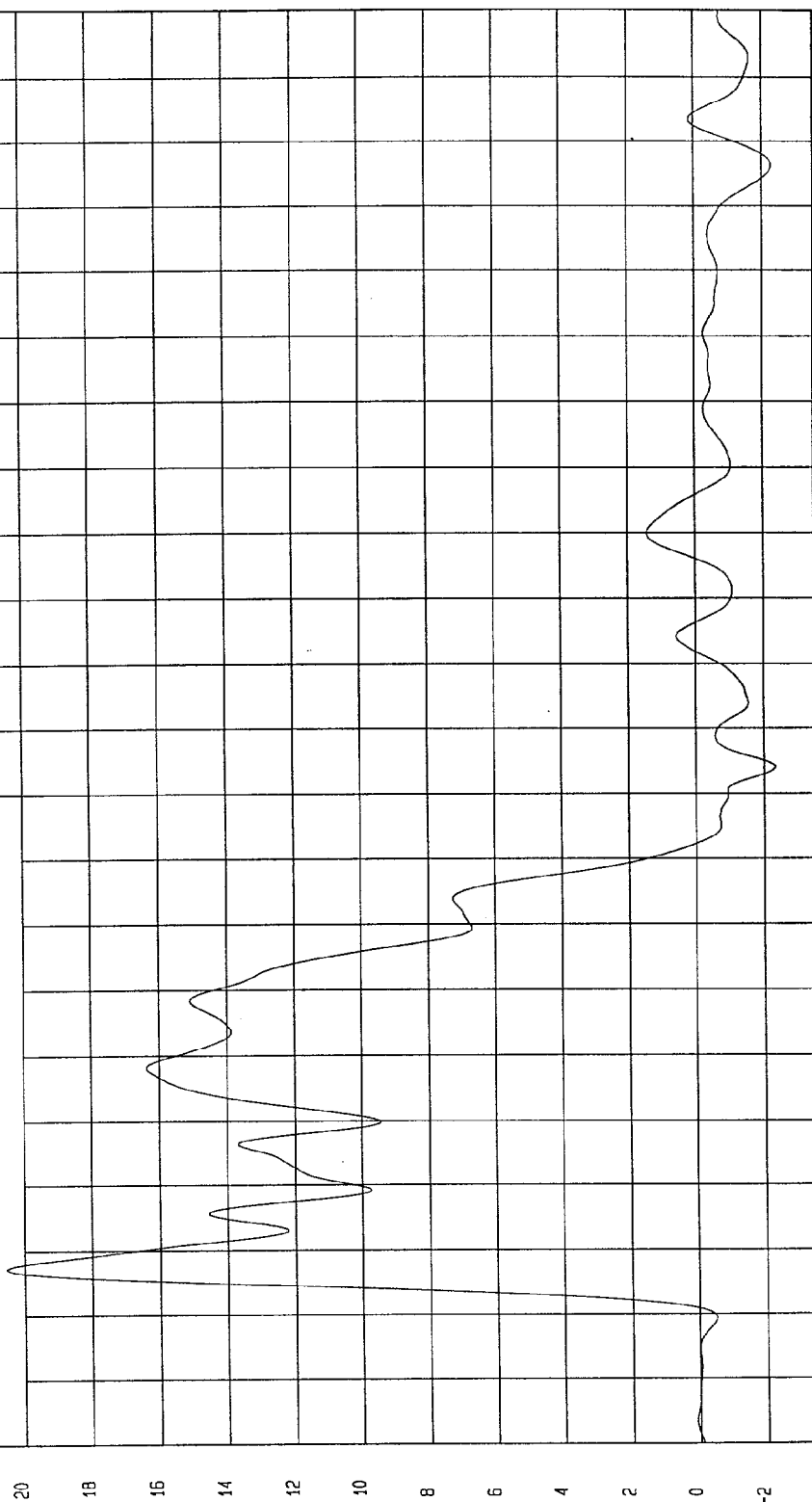
COMPONENT: 1998 TOYOTA CORROLA (MW5105)

Maximum = 20.52 G'S at 7 msec

Minimum = -2.32 G'S at 84 msec

RIGHT SIDE SILL AT REAR SEAT Y ACCELERATION

1 B97143AF A36 Filterclass (60)



MGA Research
12-05-1997 11:09

TIME (SECONDS)

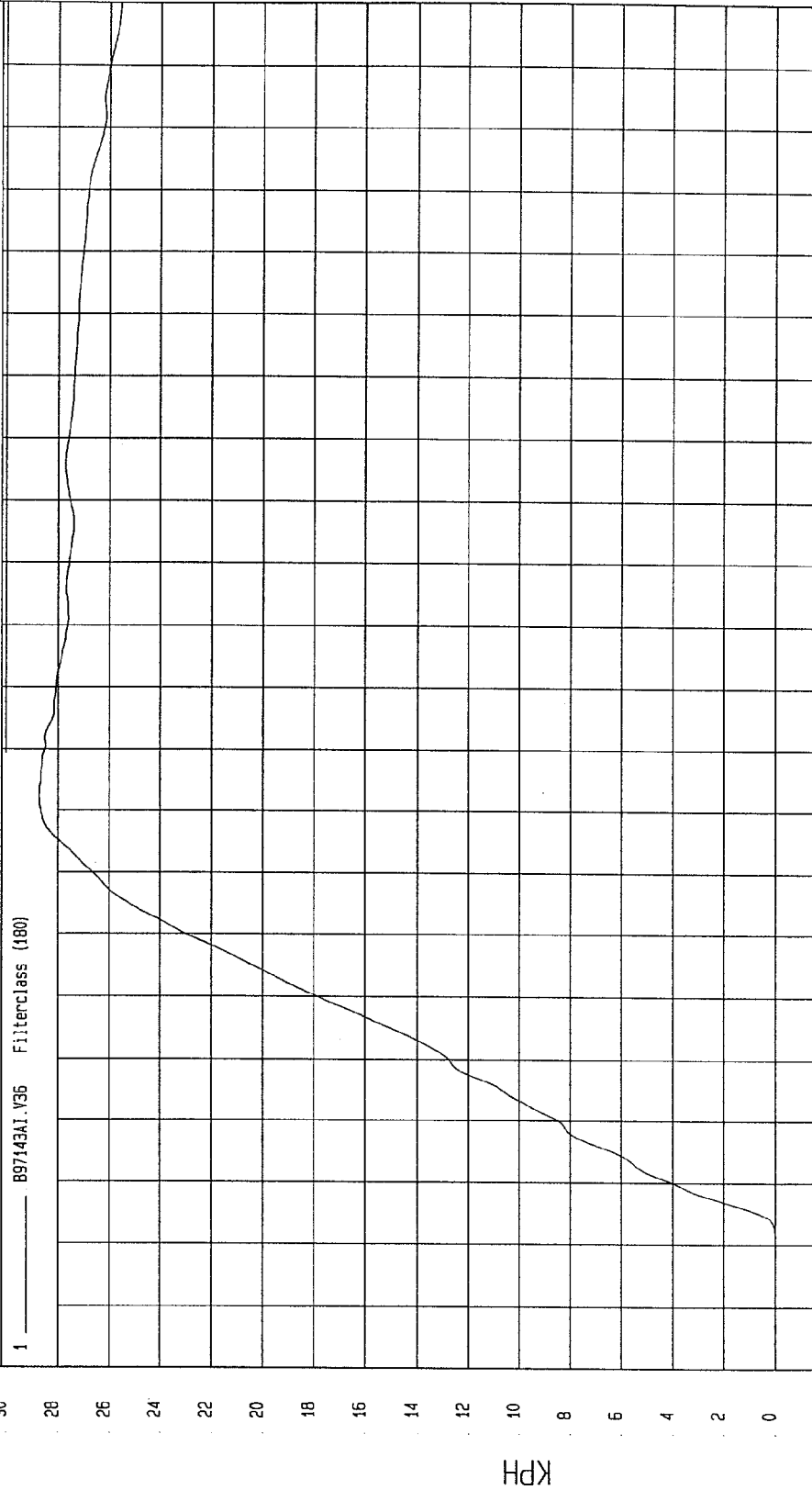
S.G

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 51.6 KPH

Minimum = -7.42E-03 KPH at 0 msec Maximum = 28.73 KPH at 73 msec

RIGHT SIDE SILL AT REAR SEAT Y VELOCITY



TIME Seconds

NSA Research
12-05-1997 11:09

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105)

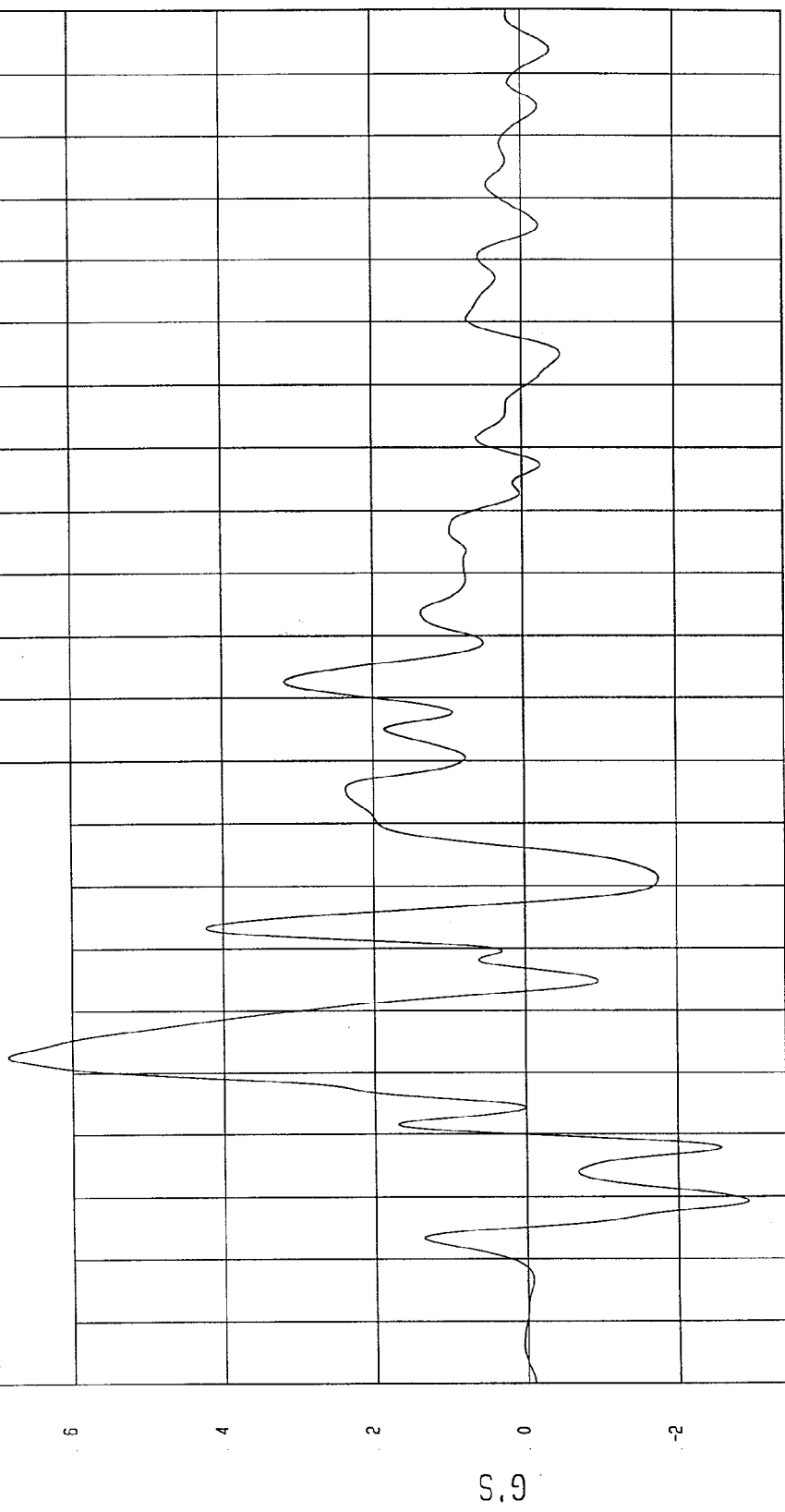
Speed: 38.3 MPH 61.6 KPH

Minimum = -2.92 G'S at 9 msec

Maximum = 6.85 G'S at 33 msec

RIGHT SIDE SILL AT REAR SEAT Z ACCELERATION

1 ——— B97143AF.A37 Filterclass (60)



TIME (SECONDS)

WCA Research
12-05-1997 11:09

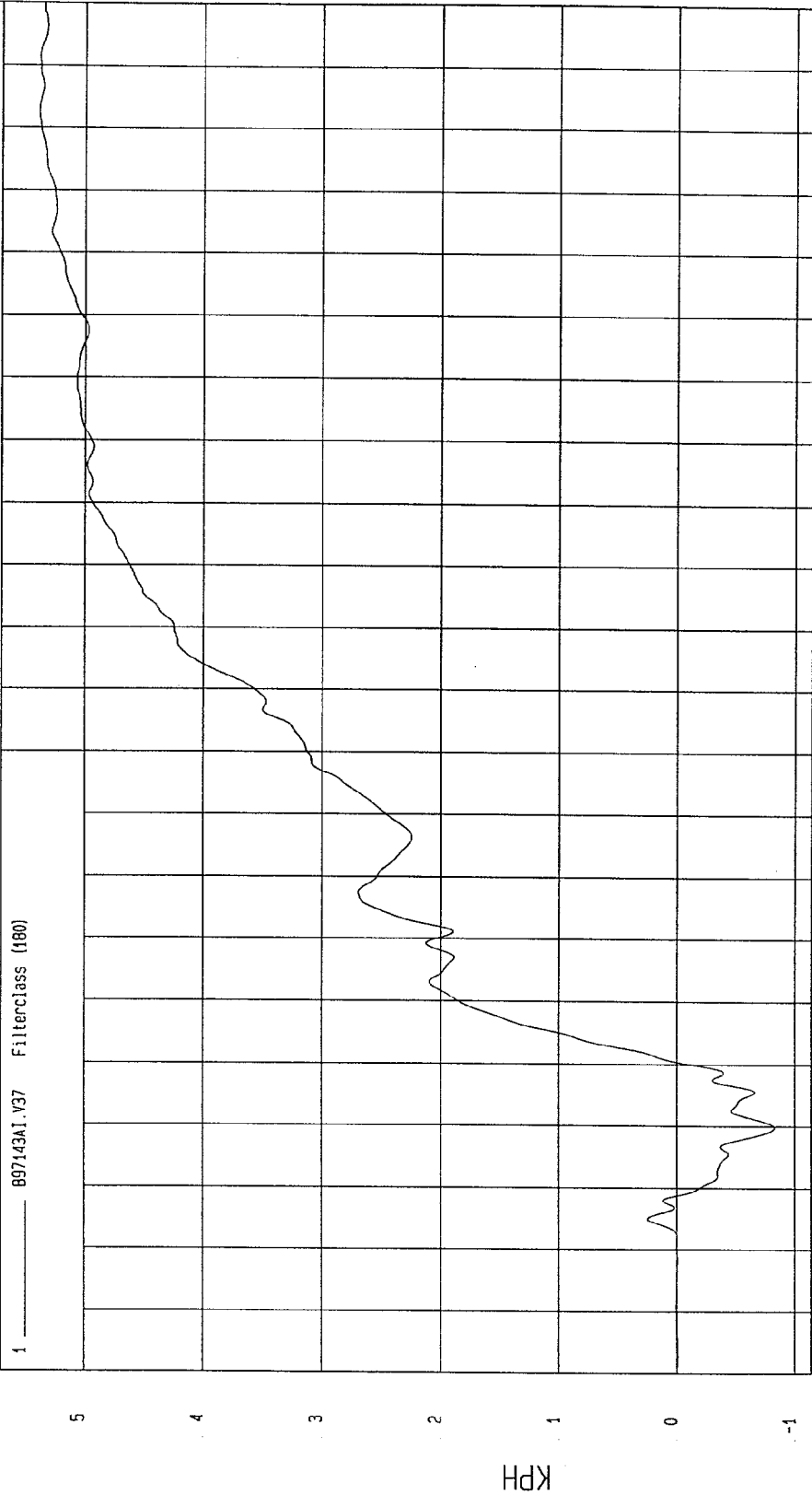
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -.82 KPH at 20 msec Maximum = 5.38 KPH at 183 msec

RIGHT SIDE SILL AT REAR SEAT Z VELOCITY

1 _____ B97143A1.V37 Filterclass (180)



TIME Seconds

WCA Research
12-05-1997 11:09

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 12-04-1997

Speed: 38.3 MPH 61.6 KPH

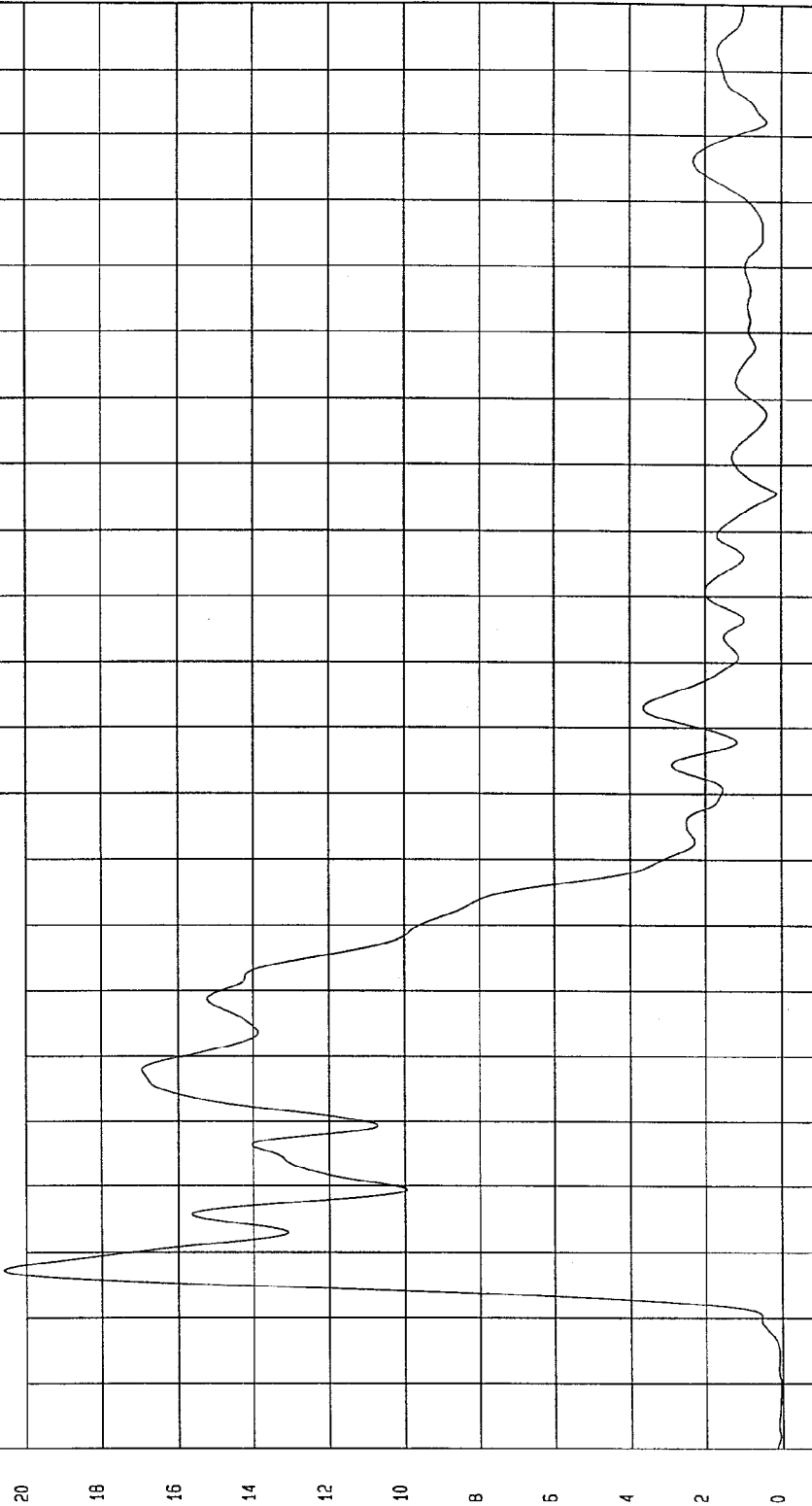
COMPONENT: 1998 TOYOTA CORROLA (MW5105)

Maximum = 20.59 G's at 7 msec

Minimum = 3.04E-02 G's at -10 msec

RIGHT SIDE SILL AT REAR SEAT RESULTANT ACCELERATION

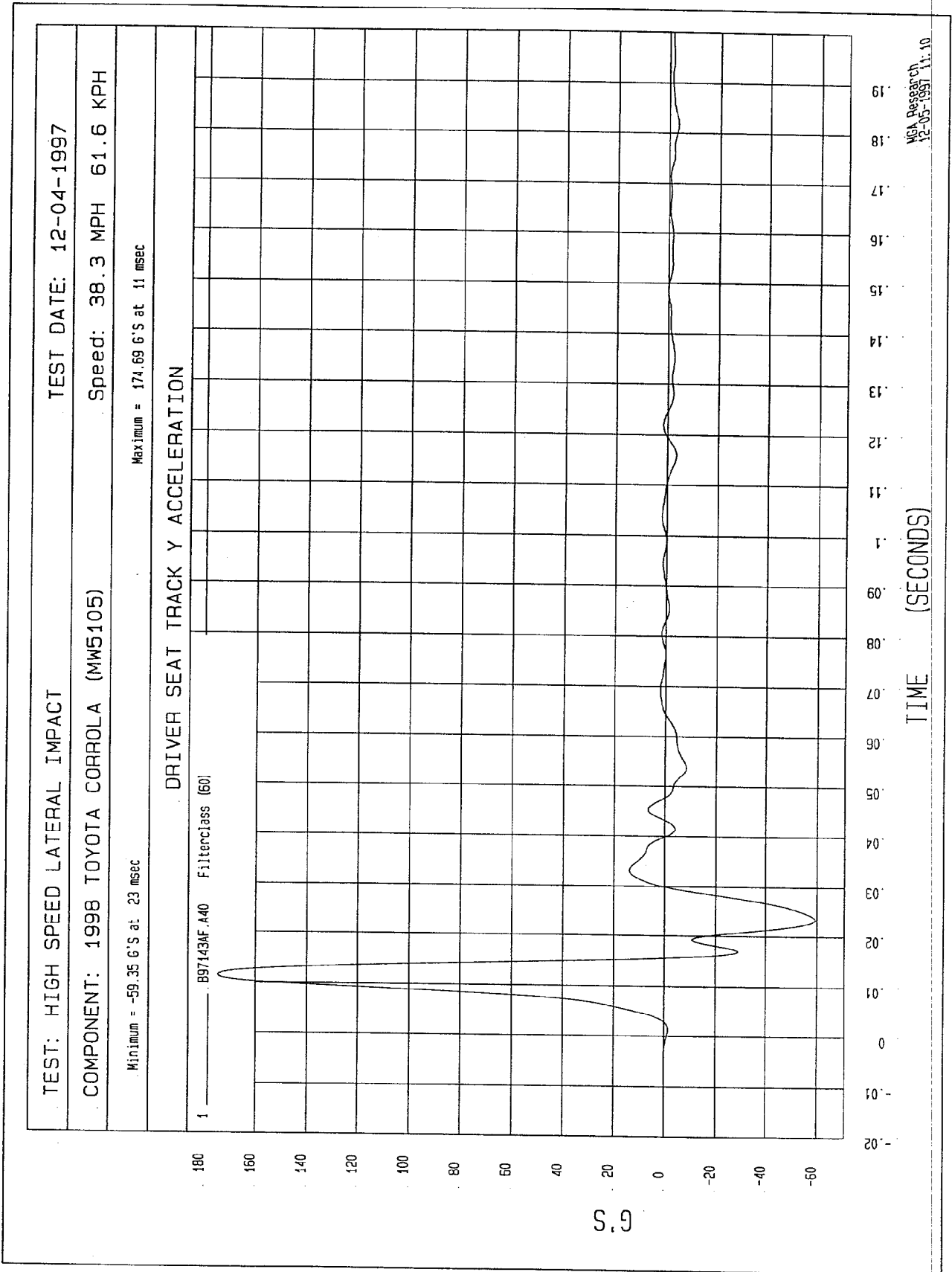
1 897143AV.A35 Filterclass (60)

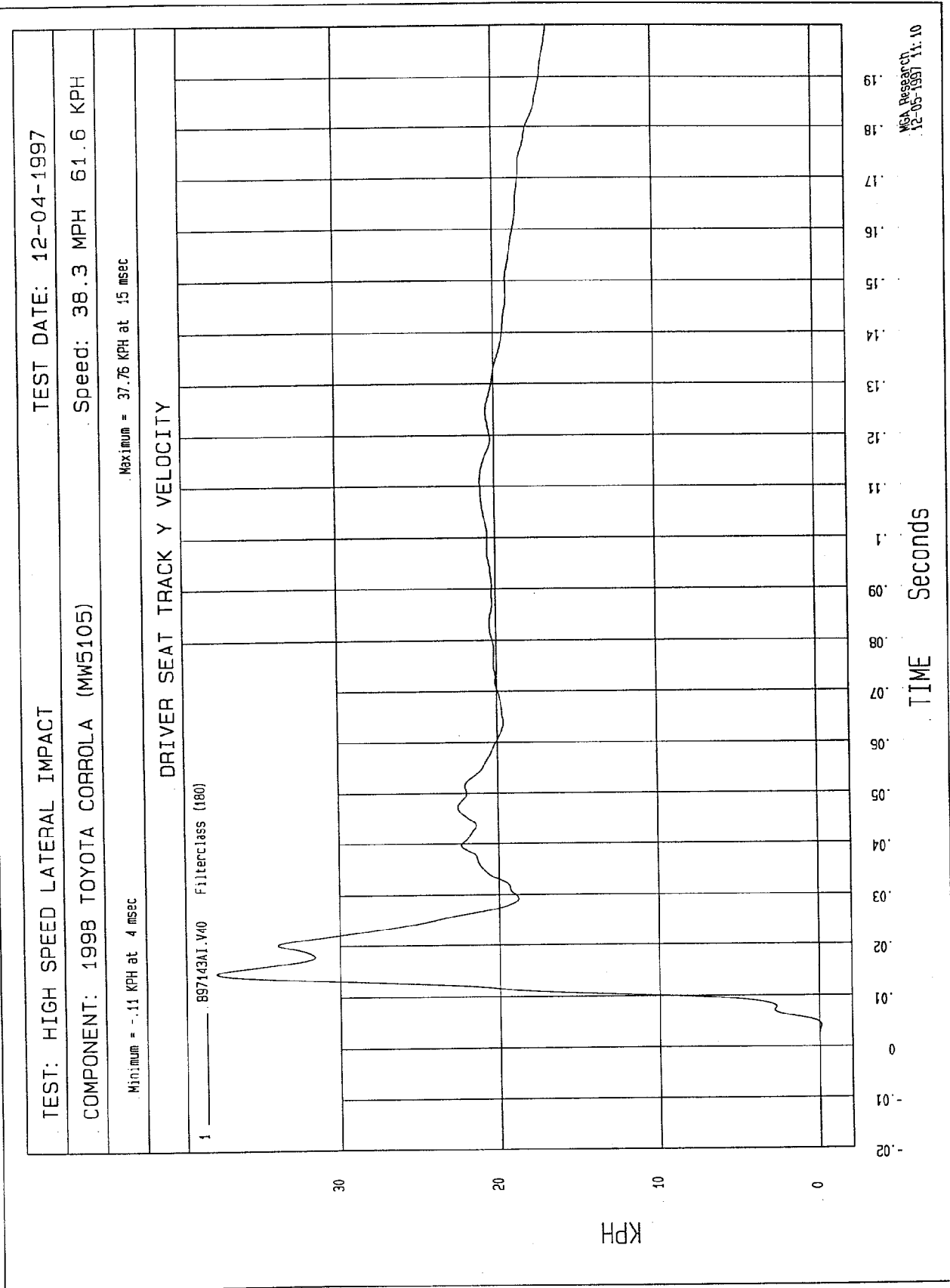


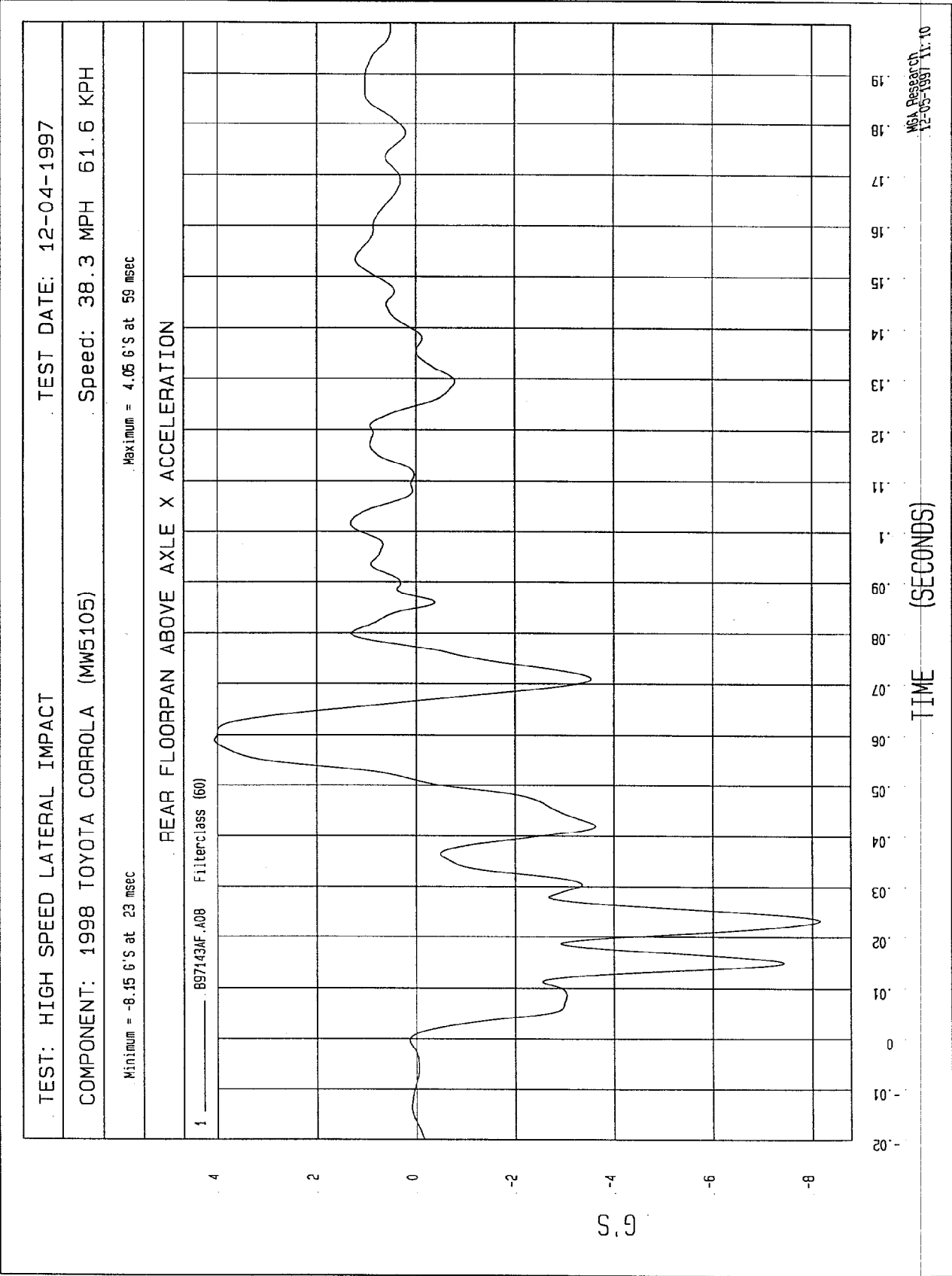
NSA Research
12-05-1997 11:10

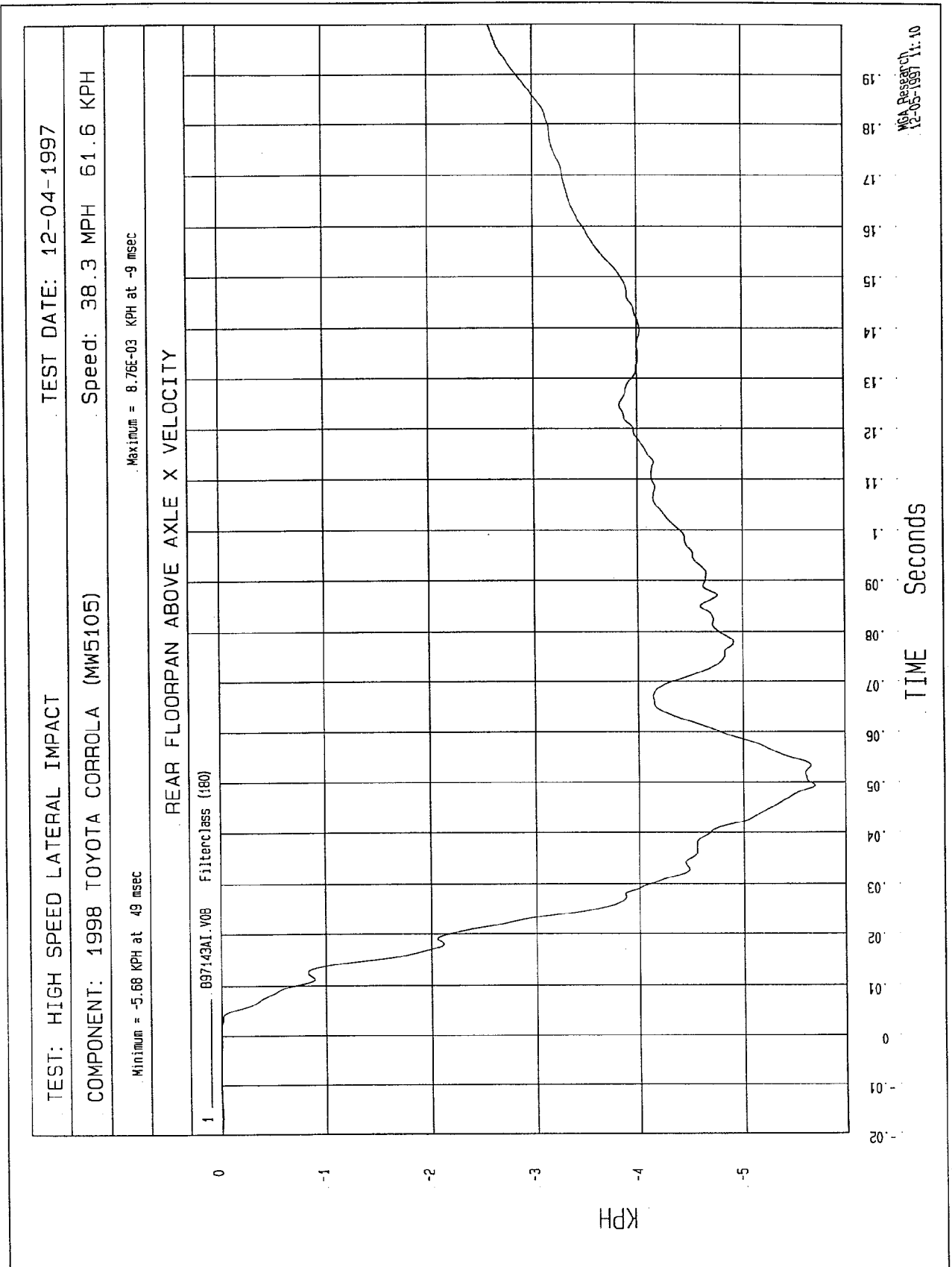
TIME (SECONDS)

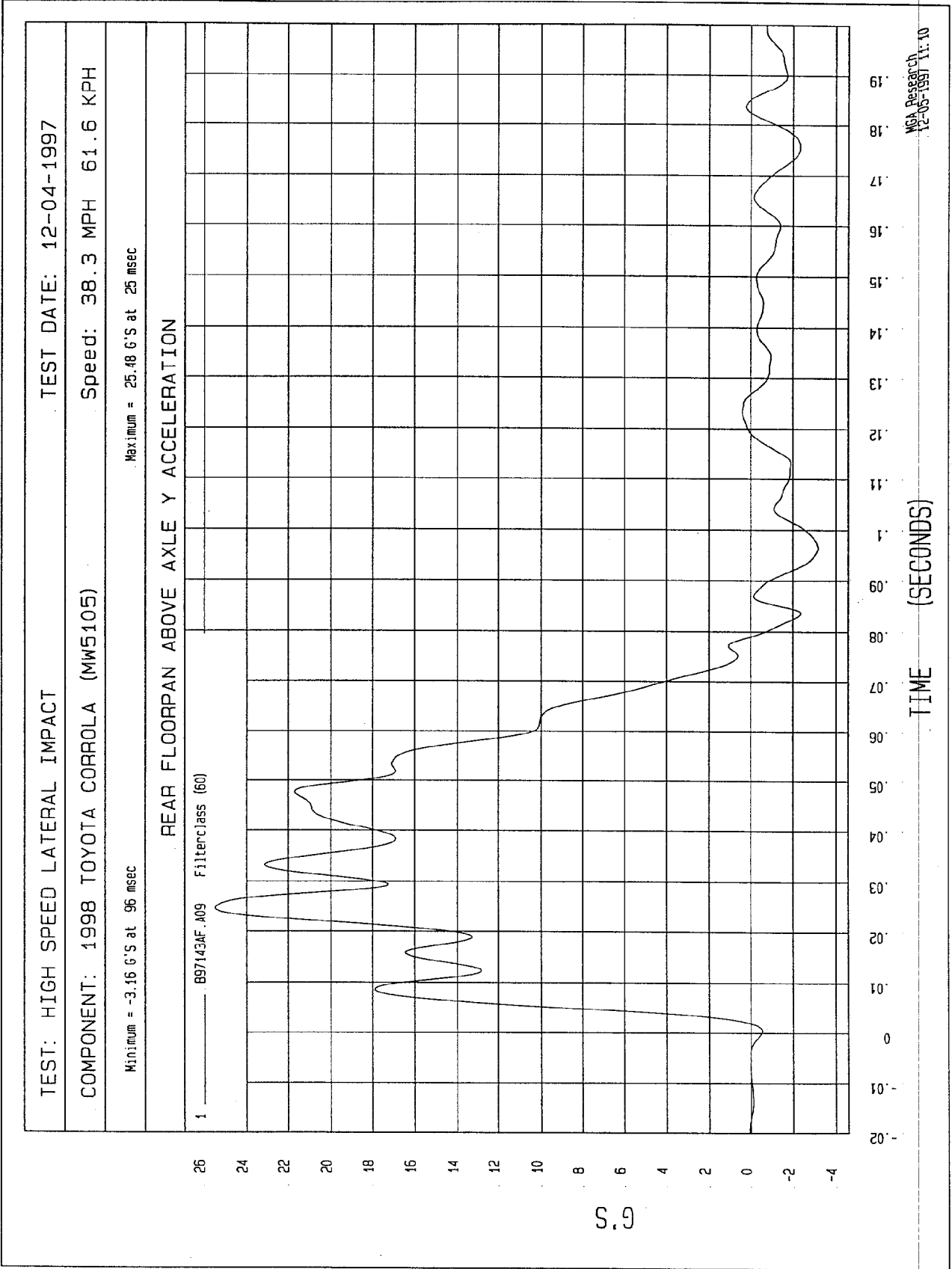
S.9

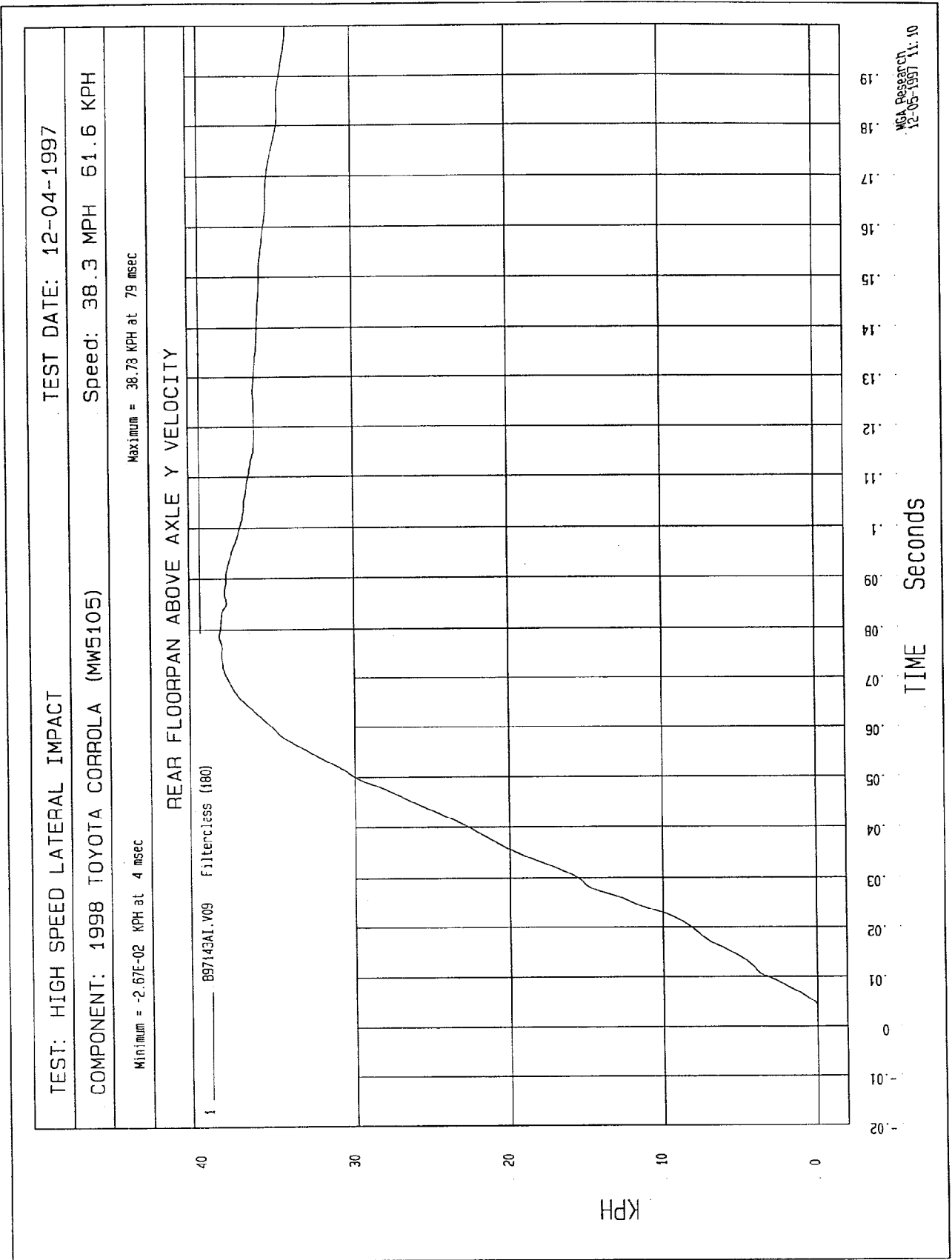












TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 12-04-1997

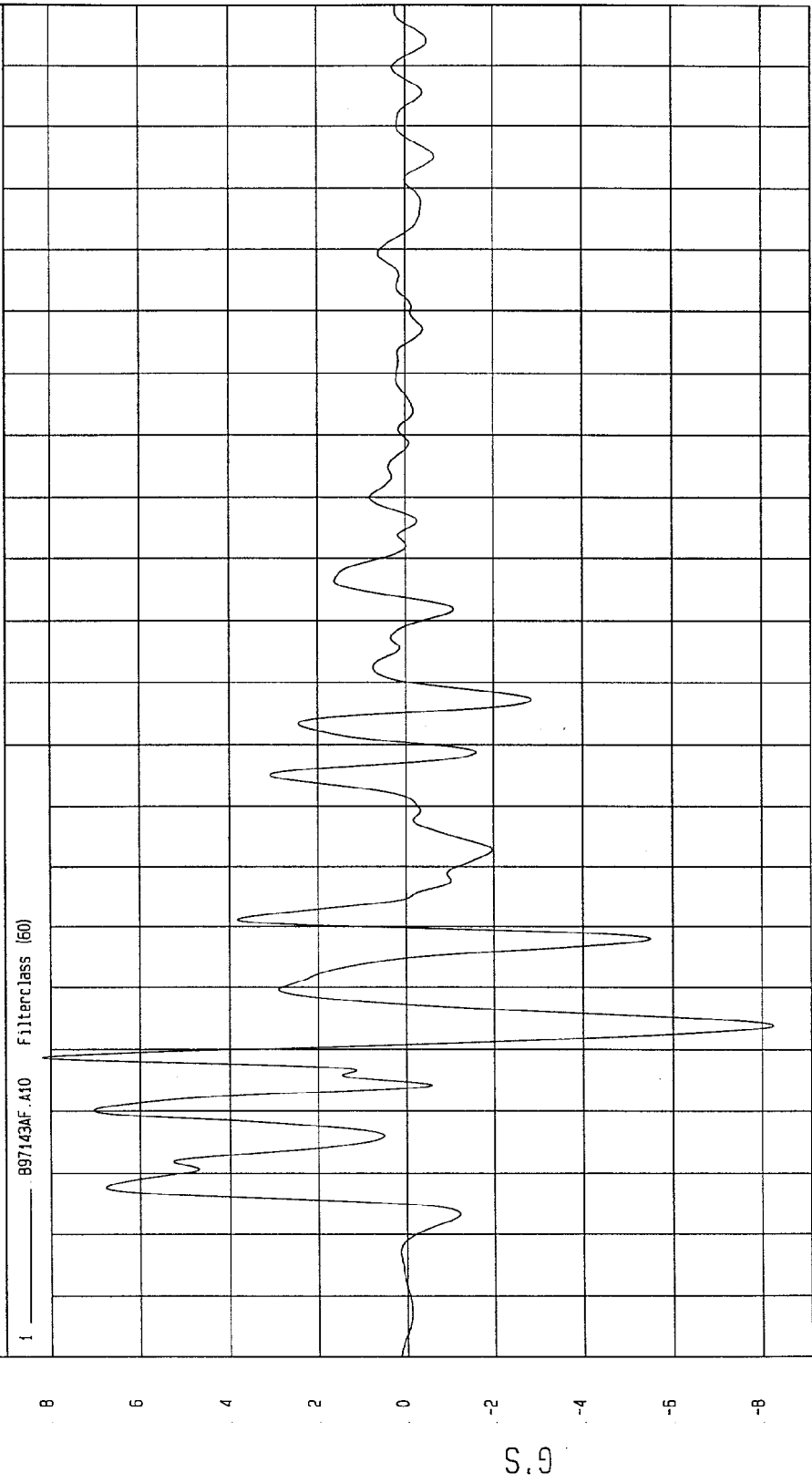
SPEED: 38.3 MPH 61.6 KPH

COMPONENT: 1998 TOYOTA CORROLA (MW5105)

Maximum = 8.19 G'S at 29 msec

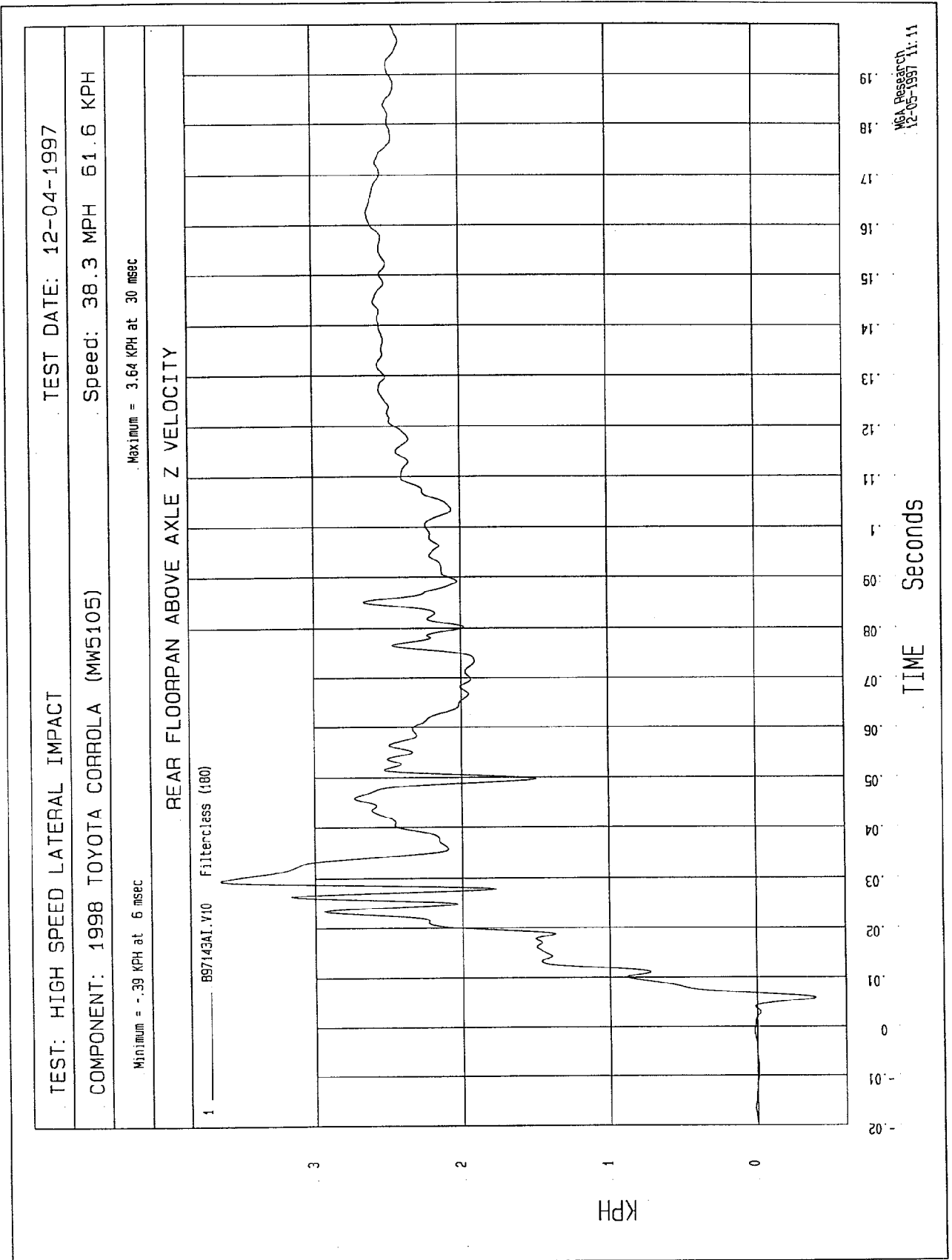
Minimum = -8.25 G'S at 34 msec

REAR FLOORPAN ABOVE AXLE Z ACCELERATION



NGA Research
12-05-1997 11:11

TIME (SECONDS)

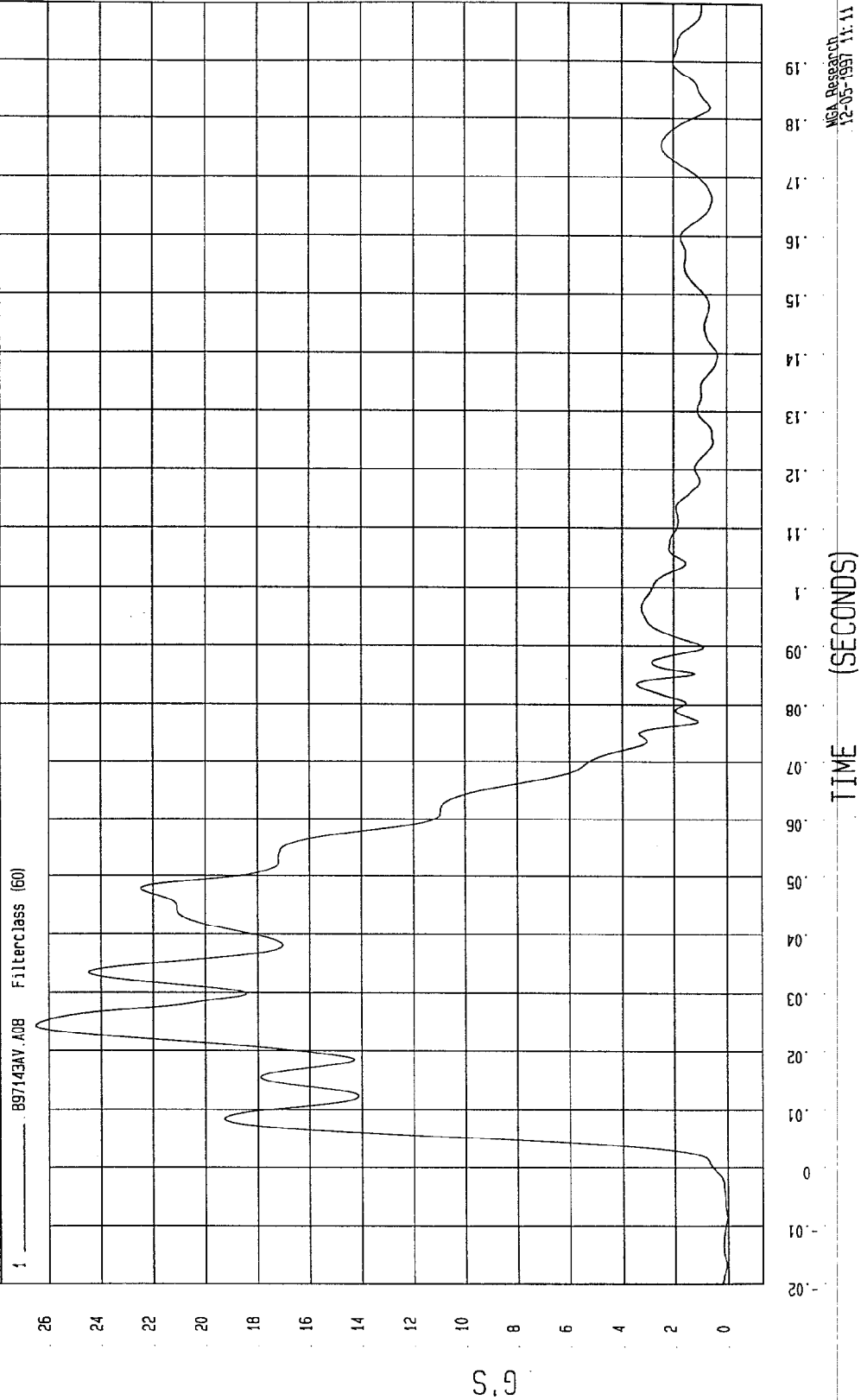


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = 8.59E-03 G'S at -9 msec Maximum = 26.50 G'S at 24 msec

REAR FLOORPAN ABOVE AXLE RESULTANT ACCELERATION



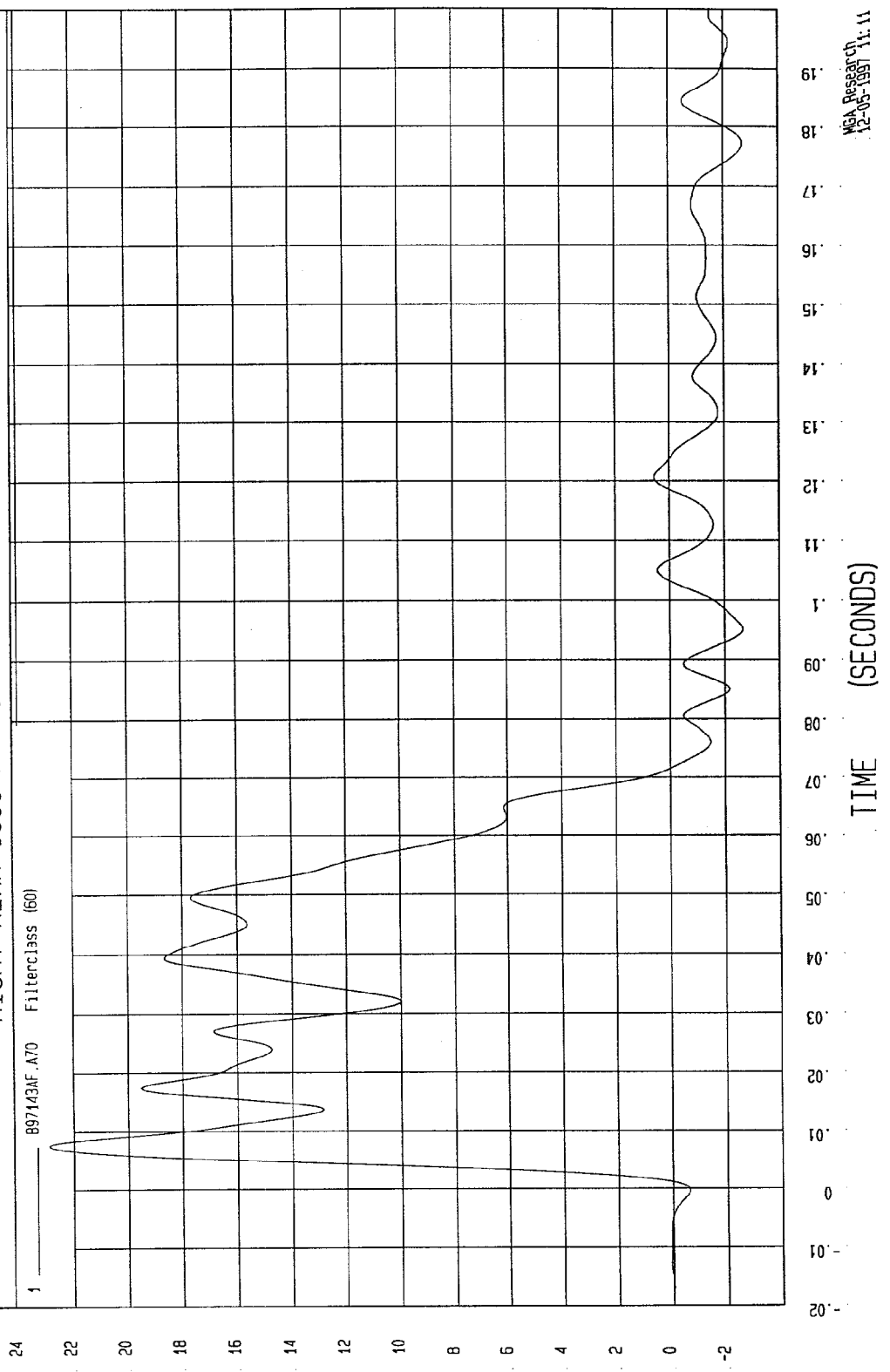
MCA Research
12-05-1997 11.11

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -2.69 G'S at 177 msec Maximum = 22.90 G'S at 8 msec

RIGHT REAR OCCUPANT COMPARTMENT Y ACCELERATION



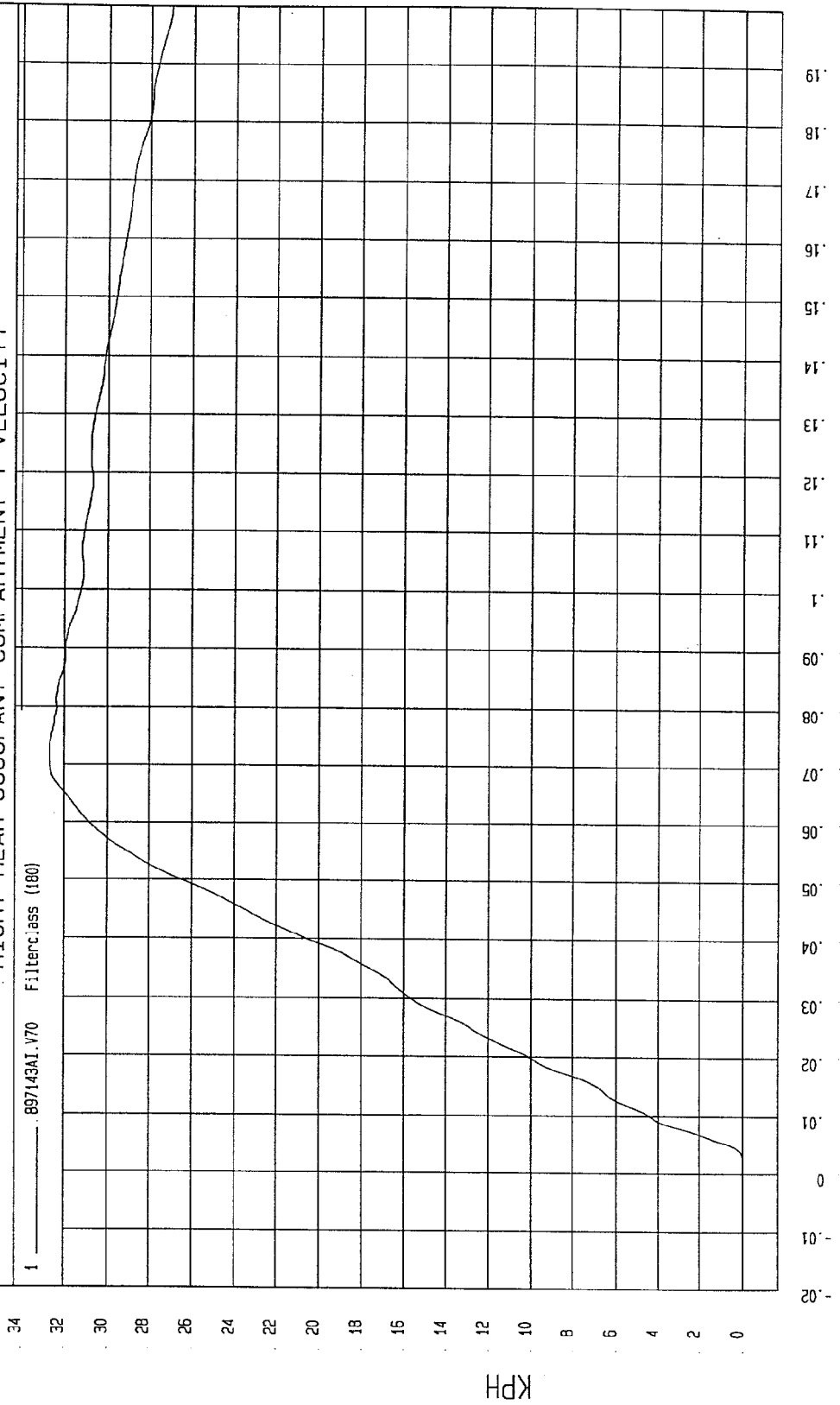
MCA Research
12-05-1997 11:11

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

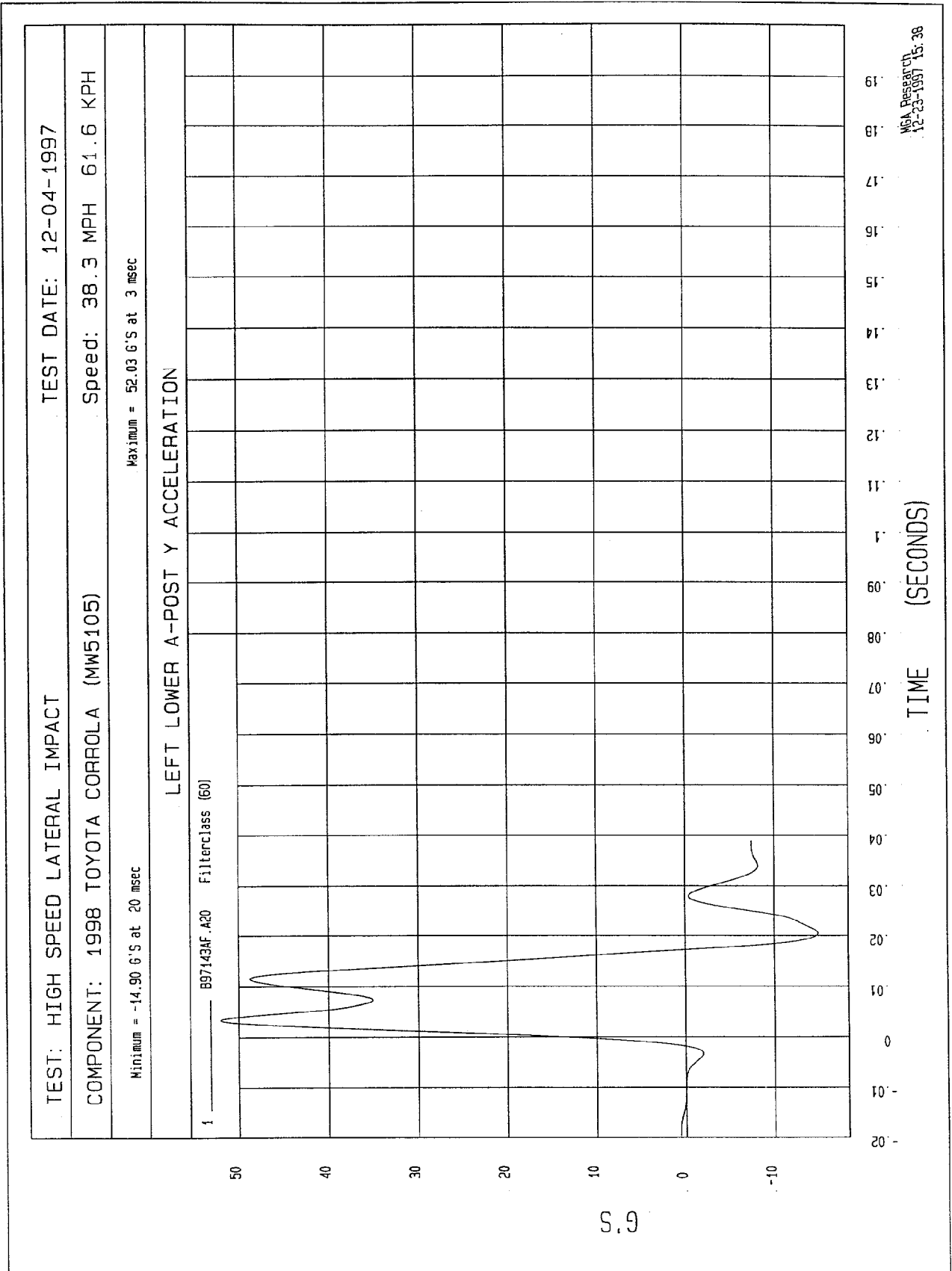
Minimum = -3.08E-03 KPH at -14 msec Maximum = 32.57 KPH at 73 msec

RIGHT REAR OCCUPANT COMPARTMENT Y VELOCITY



MCA Research
12-05-1997 11:11

TIME Seconds



TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 12-04-1997

Speed: 38.3 MPH 61.6 KPH

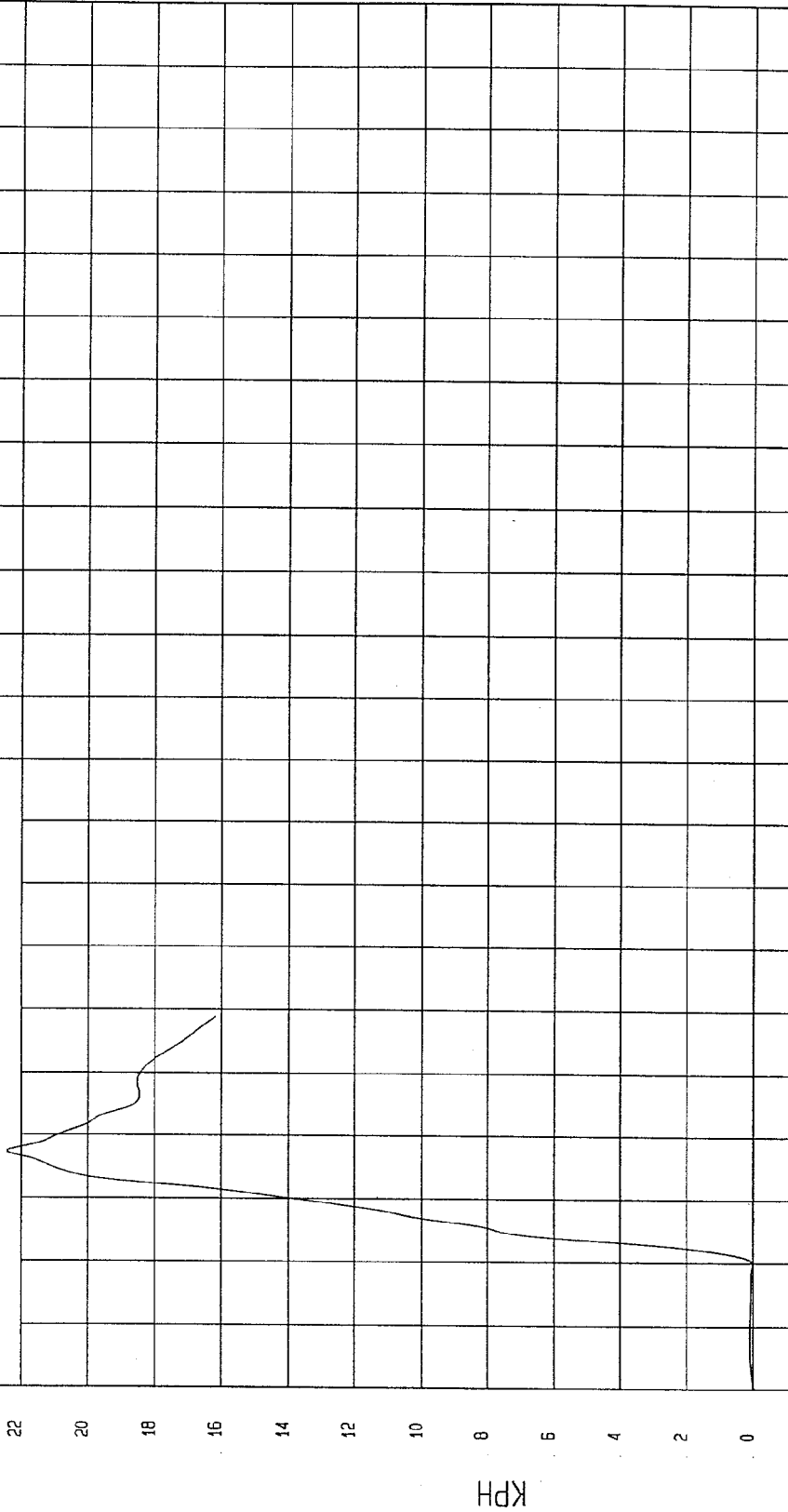
COMPONENT: 1998 TOYOTA CORROLA (MW5105)

Maximum = 22.42 KPH at 17 msec

Minimum = 0 KPH at -20 msec

LEFT LOWER A-POST Y VELOCITY

1 ——— B97143A1.Y20 Filterclass (180)



MOA Research
12-23-1997 15:33

TIME Seconds

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 12-04-1997

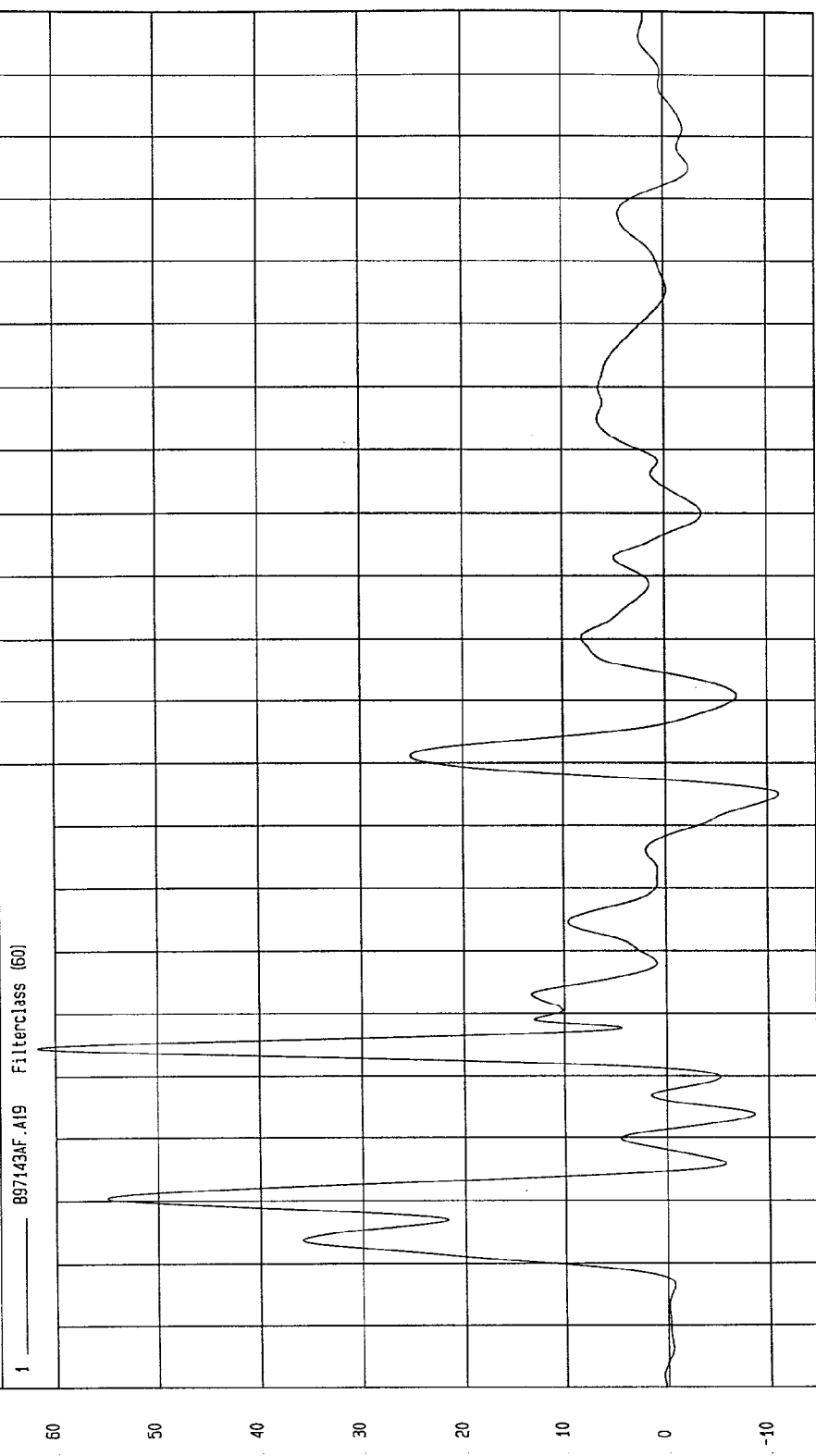
Speed: 38.3 MPH 61.6 KPH

COMPONENT: 1998 TOYOTA CORROLA (MW5105)

Maximum = 61.77 G'S at 34 msec

Minimum = -11.11 G'S at 75 msec

LEFT MID A-POST Y ACCELERATION



NSA Research
12-05-1997 11:11

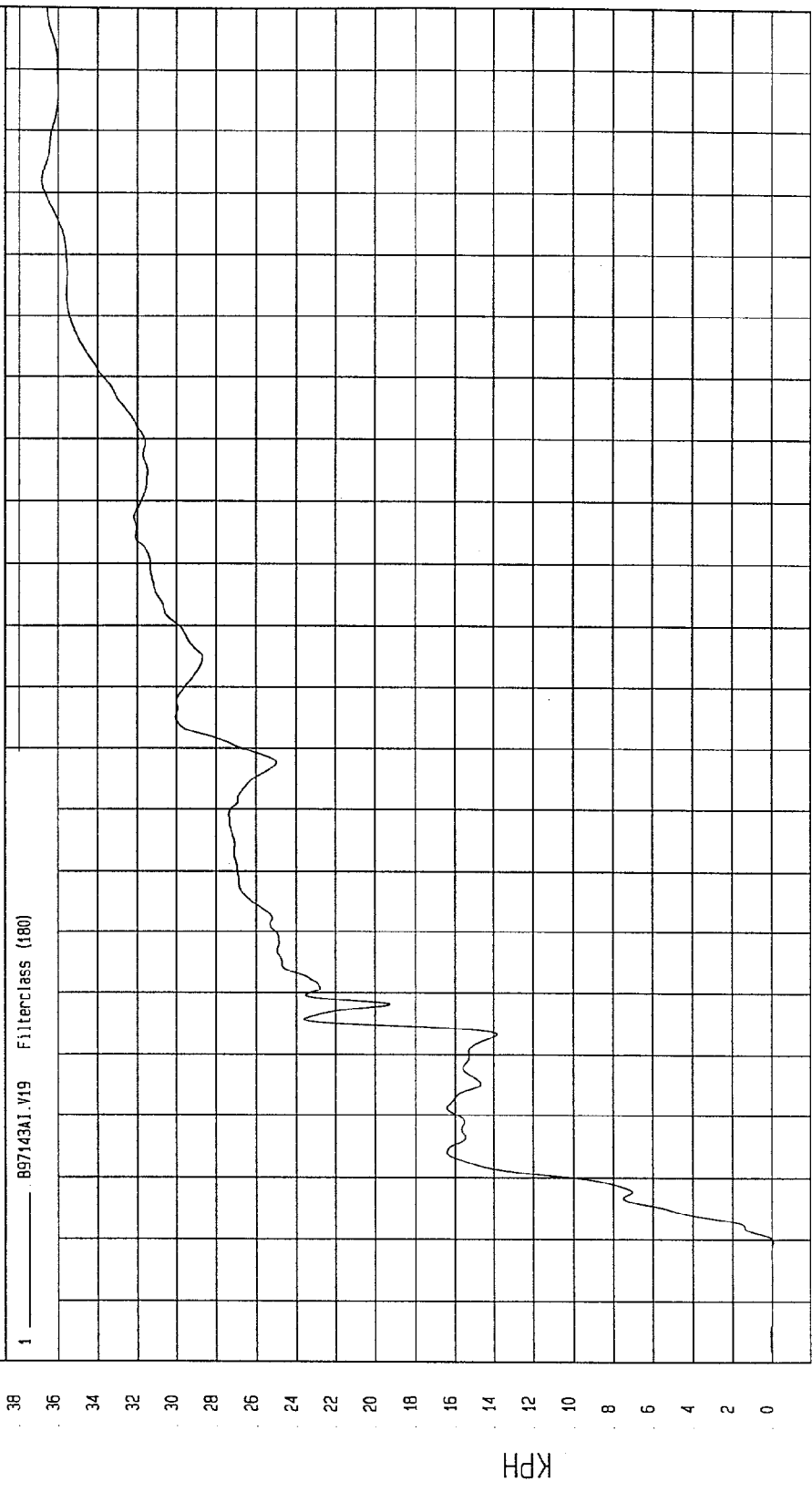
TIME (SECONDS)

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

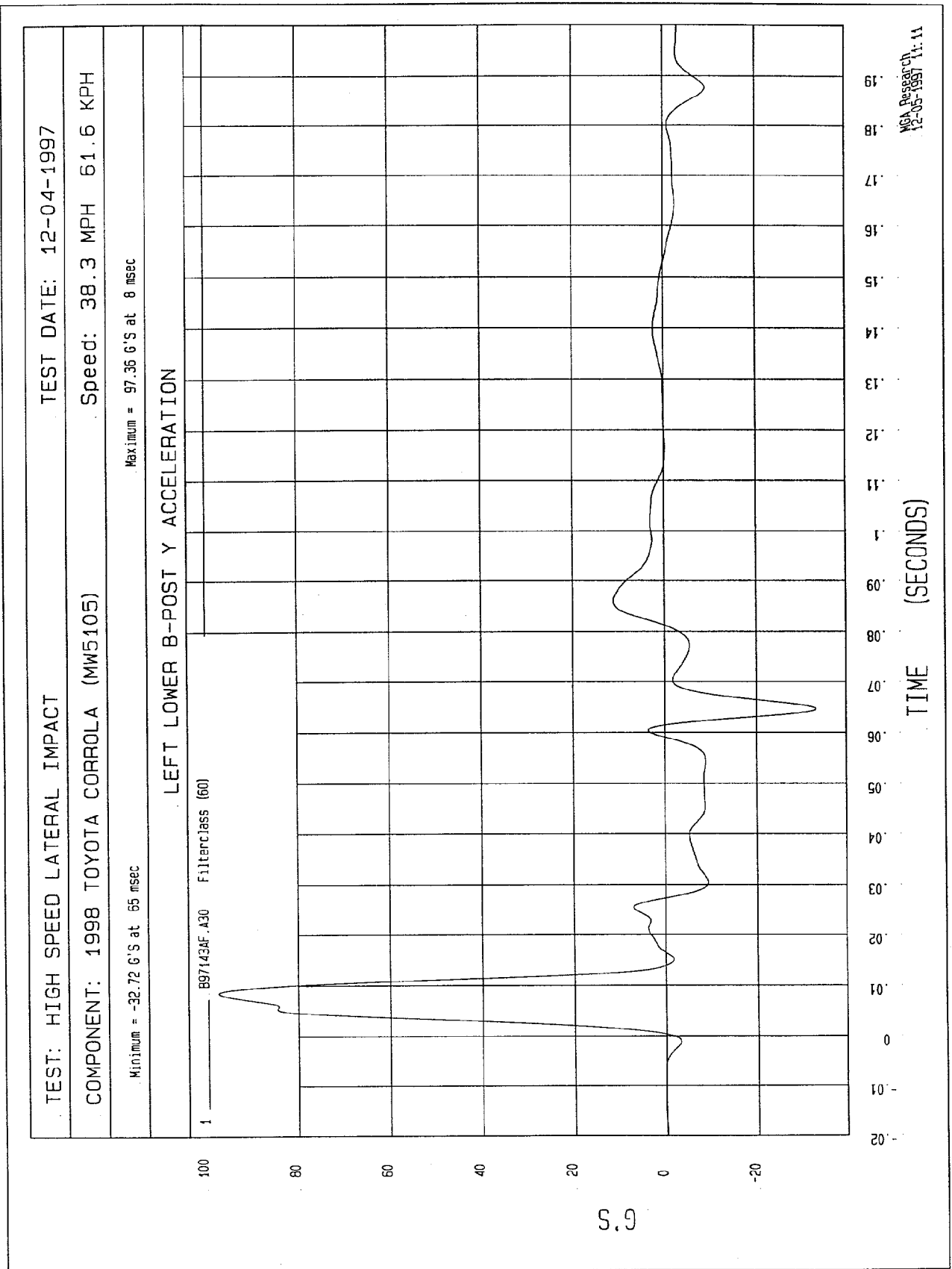
Minimum = -8.65E-02 KPH at 0 msec Maximum = 36.84 KPH at 172 msec

LEFT MID A-POST Y VELOCITY



WGL Research
12-05-1997 11:11

TIME Seconds



TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 12-04-1997

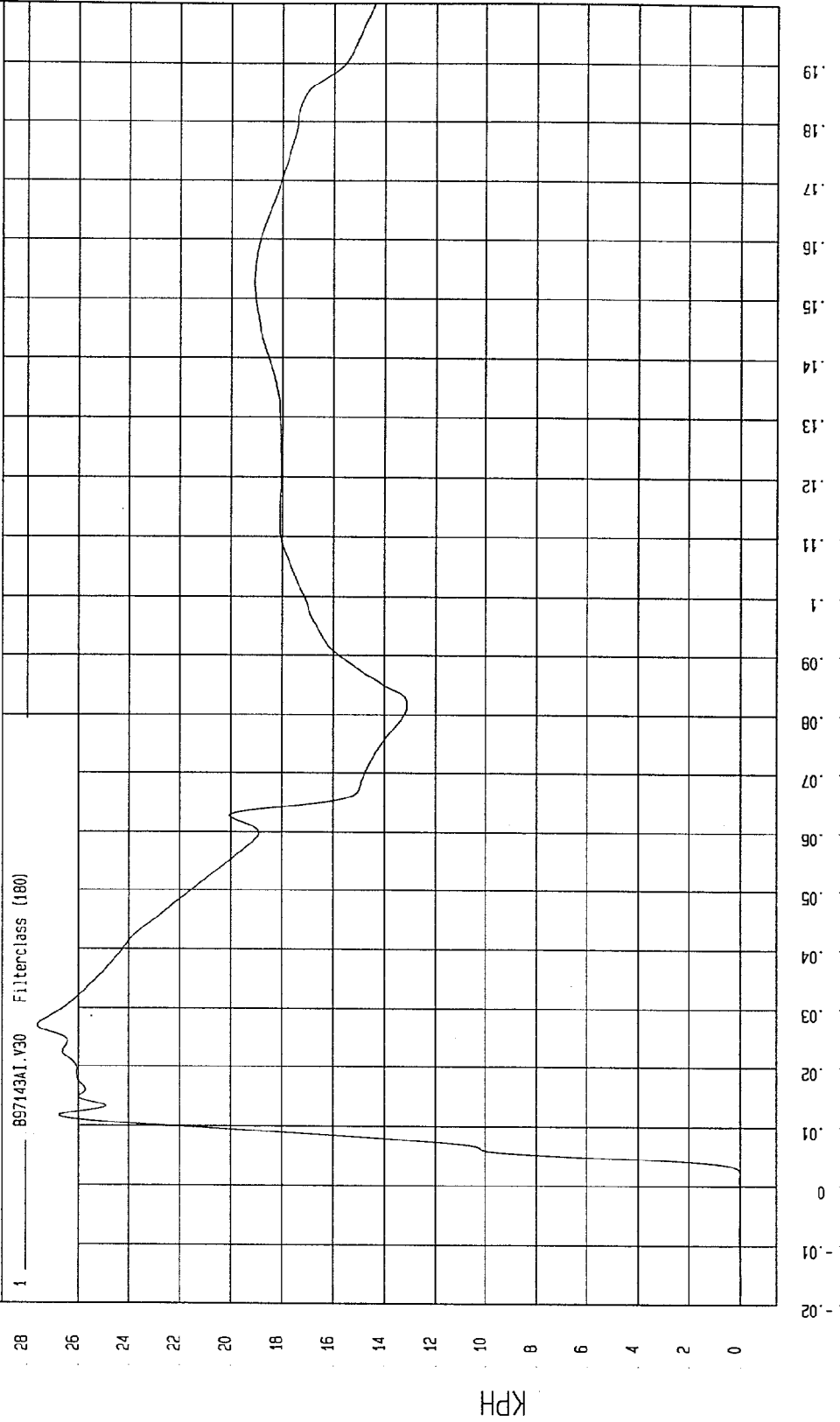
COMPONENT: 1998 TOYOTA CORROLA (MW5105)

Speed: 38.3 MPH 61.6 KPH

Minimum = -1.48E-02 KPH at -17 msec

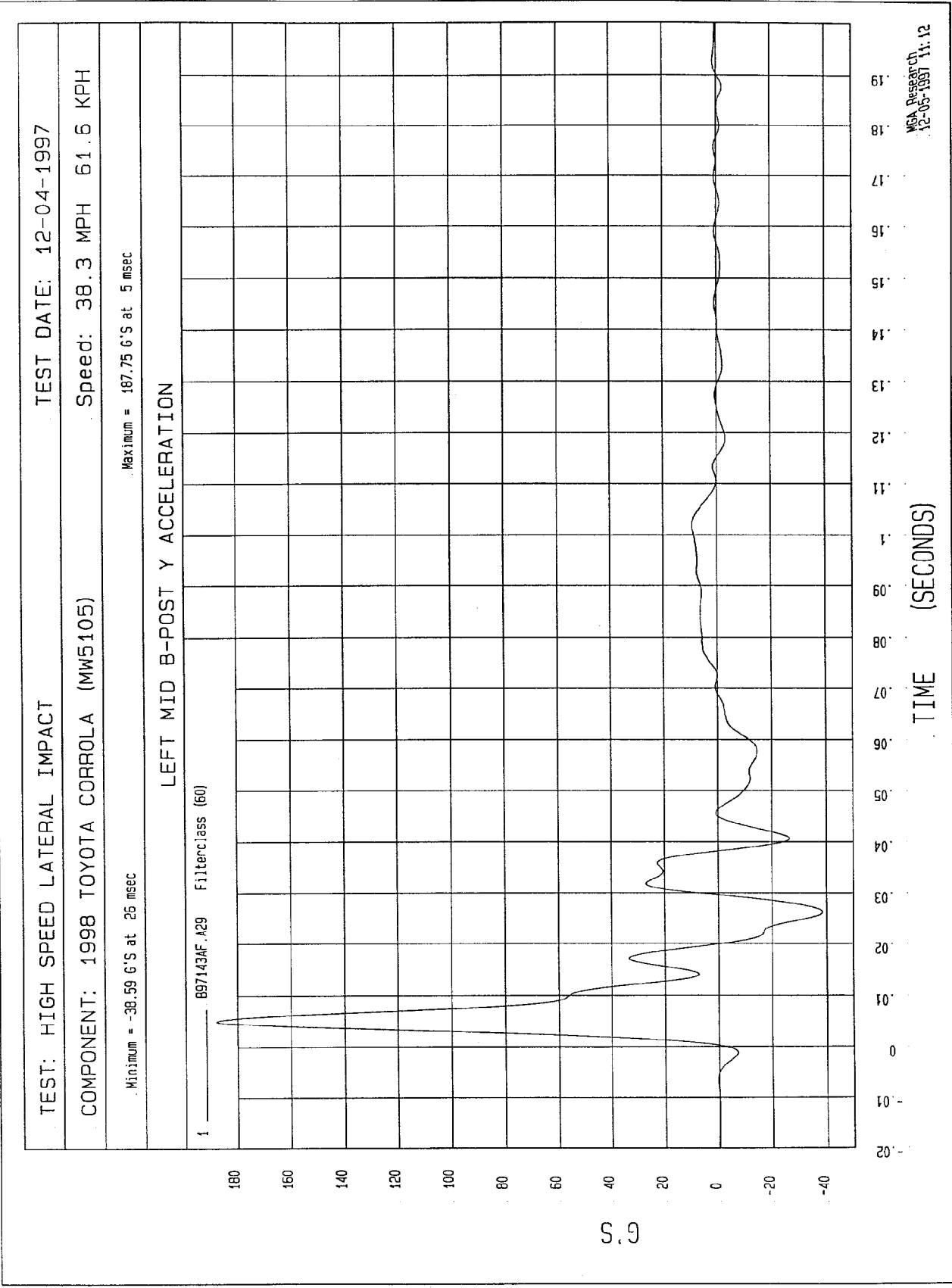
Maximum = 27.60 KPH at 27 msec

LEFT LOWER B-POST Y VELOCITY



NSA Research
12-05-1997 11:12

TIME Seconds



TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997
COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -3.51E-03 KPH at 2 msec Maximum = 42.98 KPH at 20 msec

LEFT MID B-POST Y VELOCITY

1 897143A1.V29 FilterClass (180)



MSA Research
12-05-1997 11:12

TIME Seconds

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 12-04-1997

Speed: 38.3 MPH 61.6 KPH

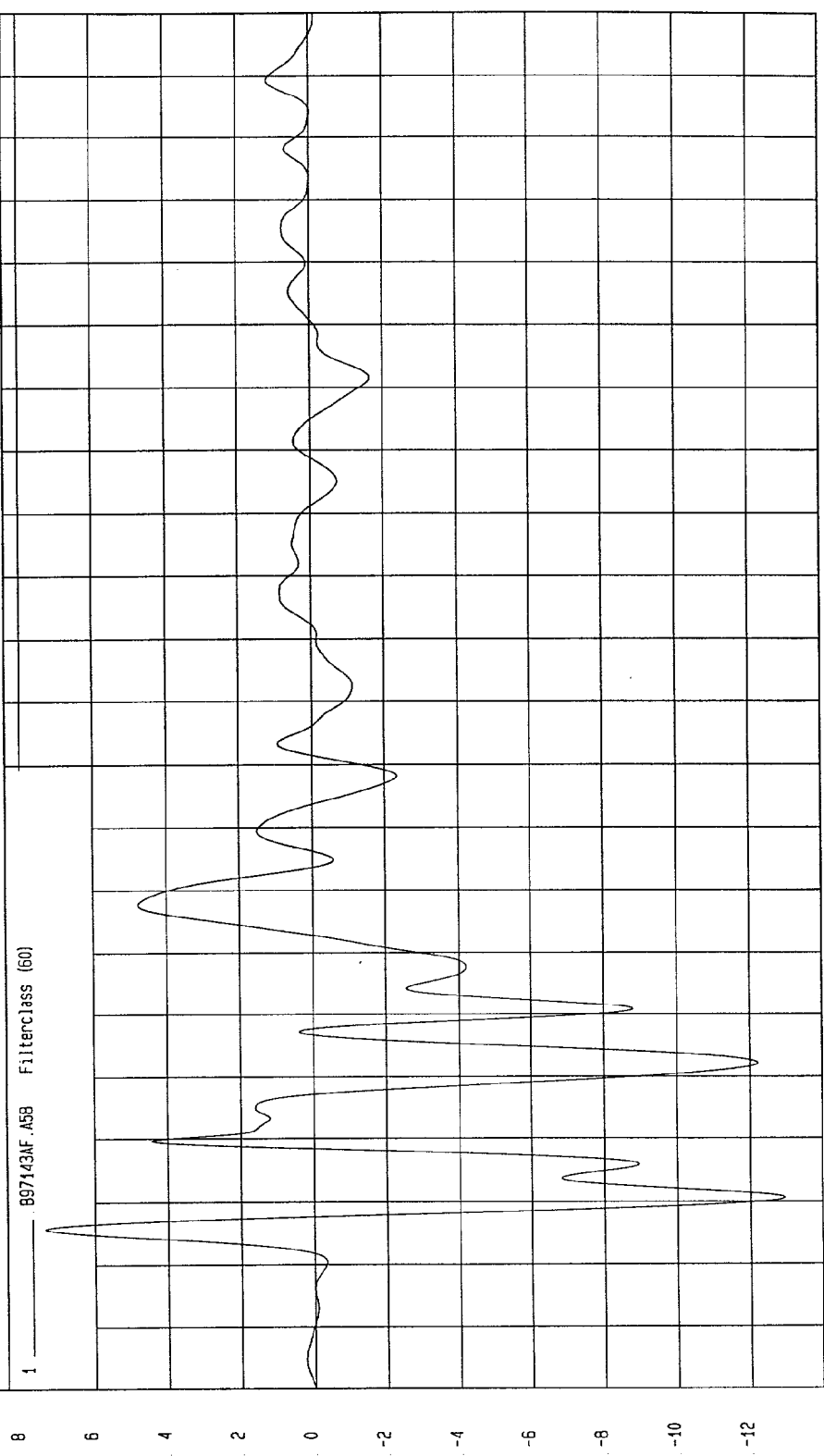
COMPONENT: 1998 TOYOTA CORROLA (MW5105)

Maximum = 7.37 G's at 6 msec

Minimum = -12.94 G's at 11 msec

VEHICLE CG X ACCELERATION

1 897143AF.A58 Filterclass (60)



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

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

MGA Research
12-05-1997 11:12

TEST DATE: 12-04-1997

TEST: HIGH SPEED LATERAL IMPACT

Speed: 38.3 MPH 61.6 KPH

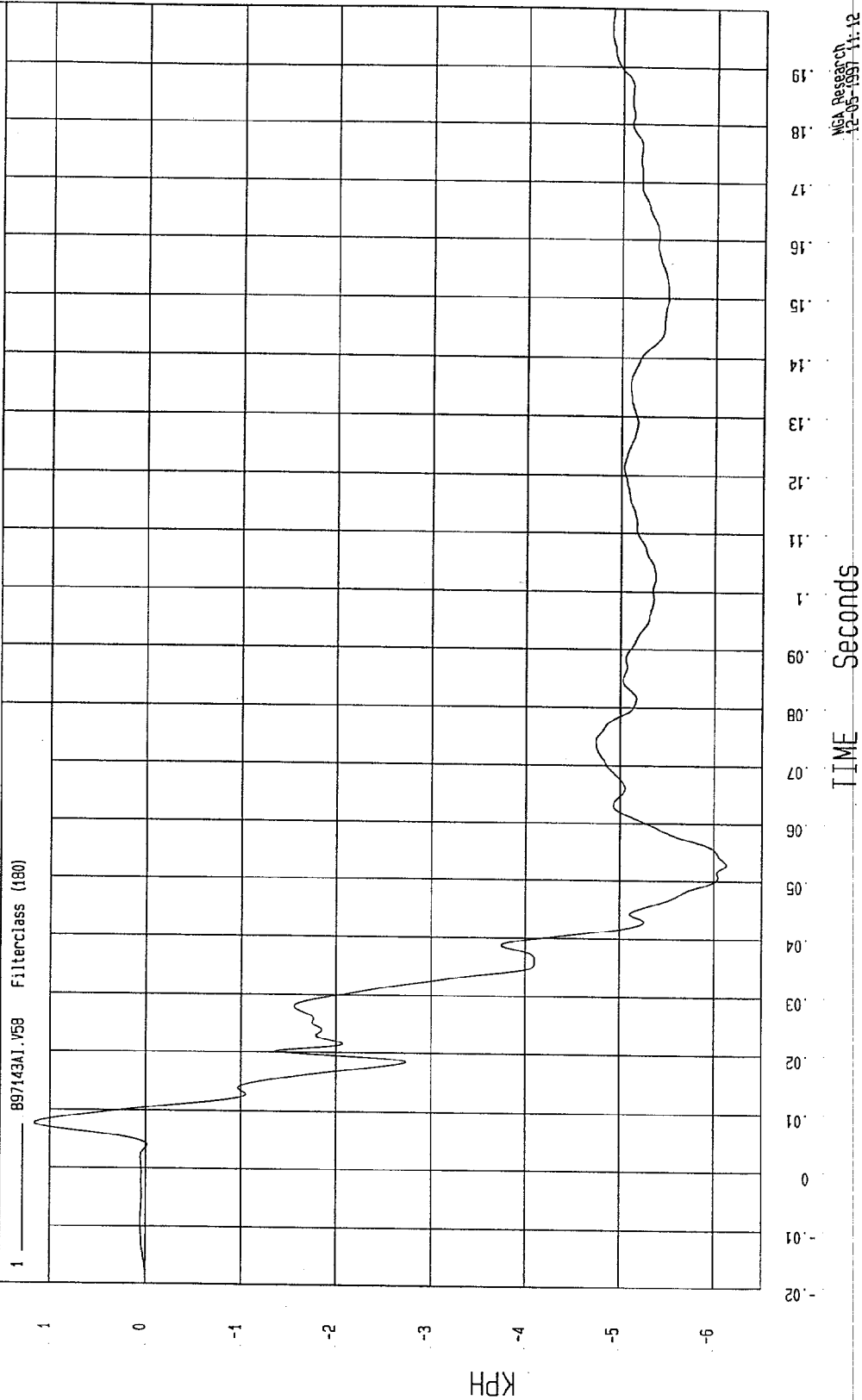
COMPONENT: 1998 TOYOTA CORROLA (MW5105)

Maximum = 1.16 KPH at 8 msec

Minimum = -6.13 KPH at 53 msec

VEHICLE CG X VELOCITY

1	897143AI.V58	Filterclass (180)



NIGA Research
12-05-1997 11:12

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 12-04-1997

Speed: 38.3 MPH 61.6 KPH

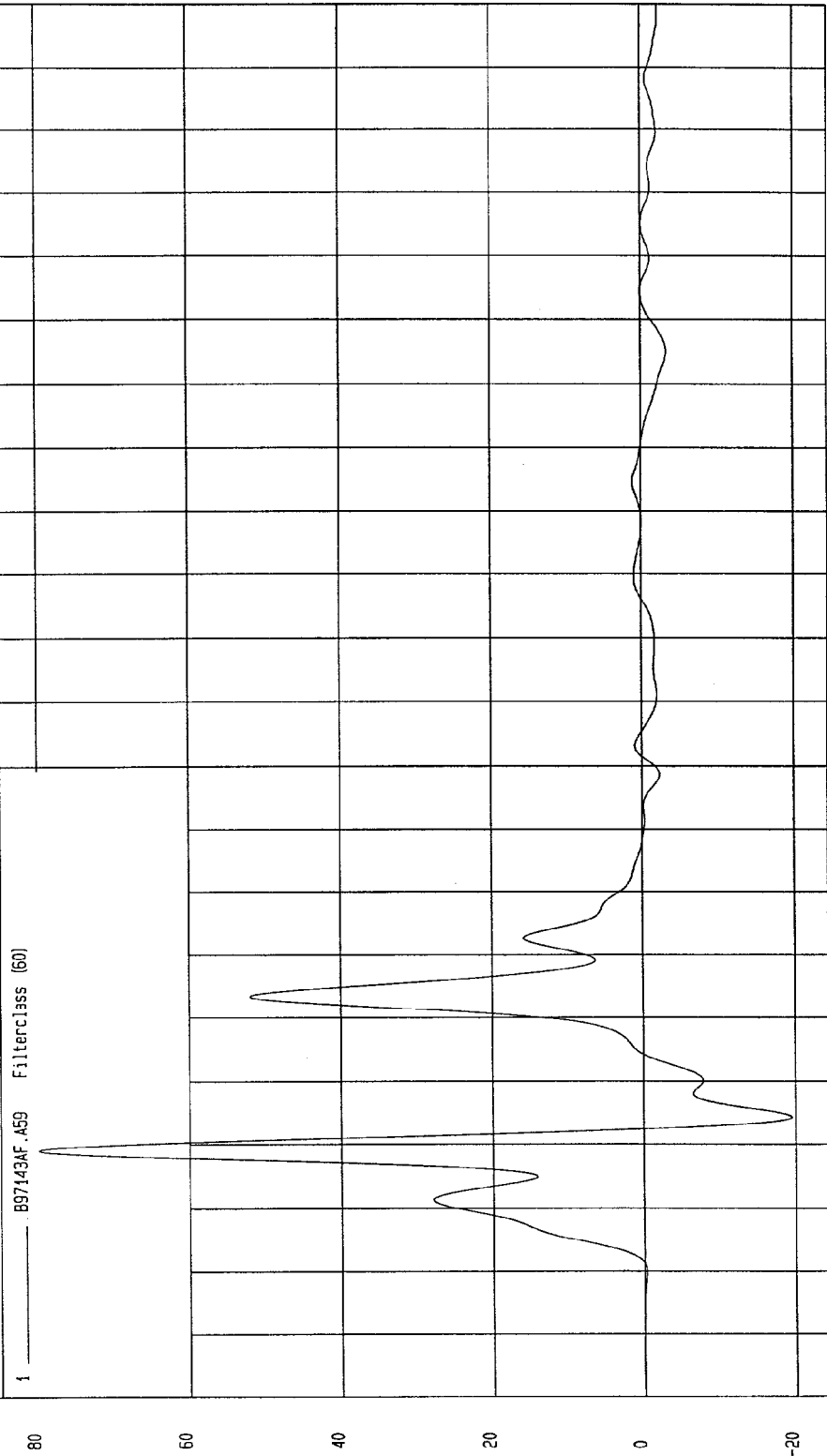
COMPONENT: 1998 TOYOTA CORROLA (MW5105)

Maximum = 79.92 G'S at 19 msec

Minimum = -19.53 G'S at 24 msec

VEHICLE CG Y ACCELERATION

1 ——— B97143AF.A59 Filterclass (60)



WGA Research
12-05-1997 11:12

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 12-04-1997

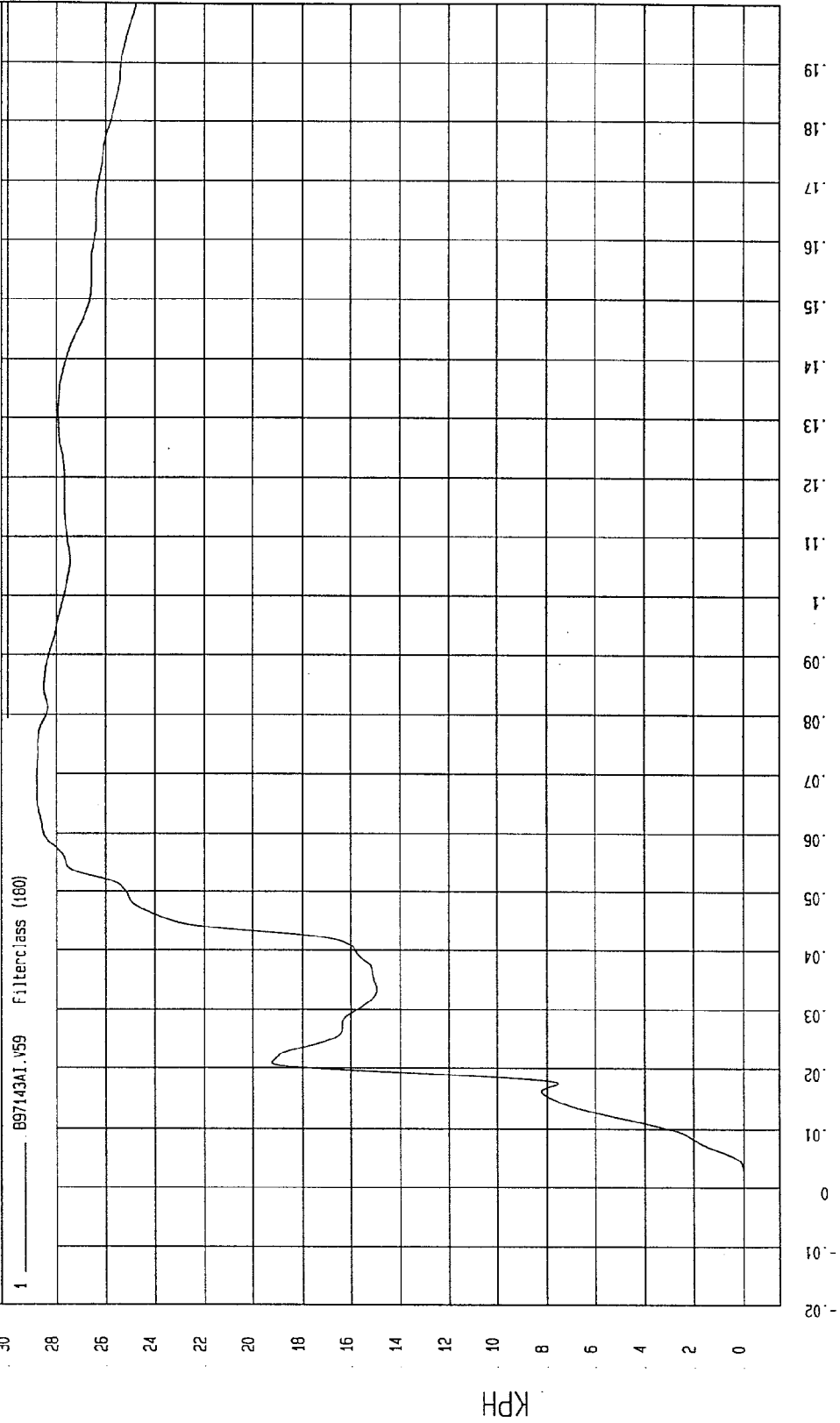
Speed: 38.3 MPH 61.6 KPH

COMPONENT: 1998 TOYOTA CORROLA (MW5105)

Maximum = 28.31 KPH at 70 msec

Minimum = -7.14E-03 KPH at -1 msec

VEHICLE CG Y VELOCITY



W&A Research
12-05-1997 11:12

TIME Seconds

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 12-04-1997

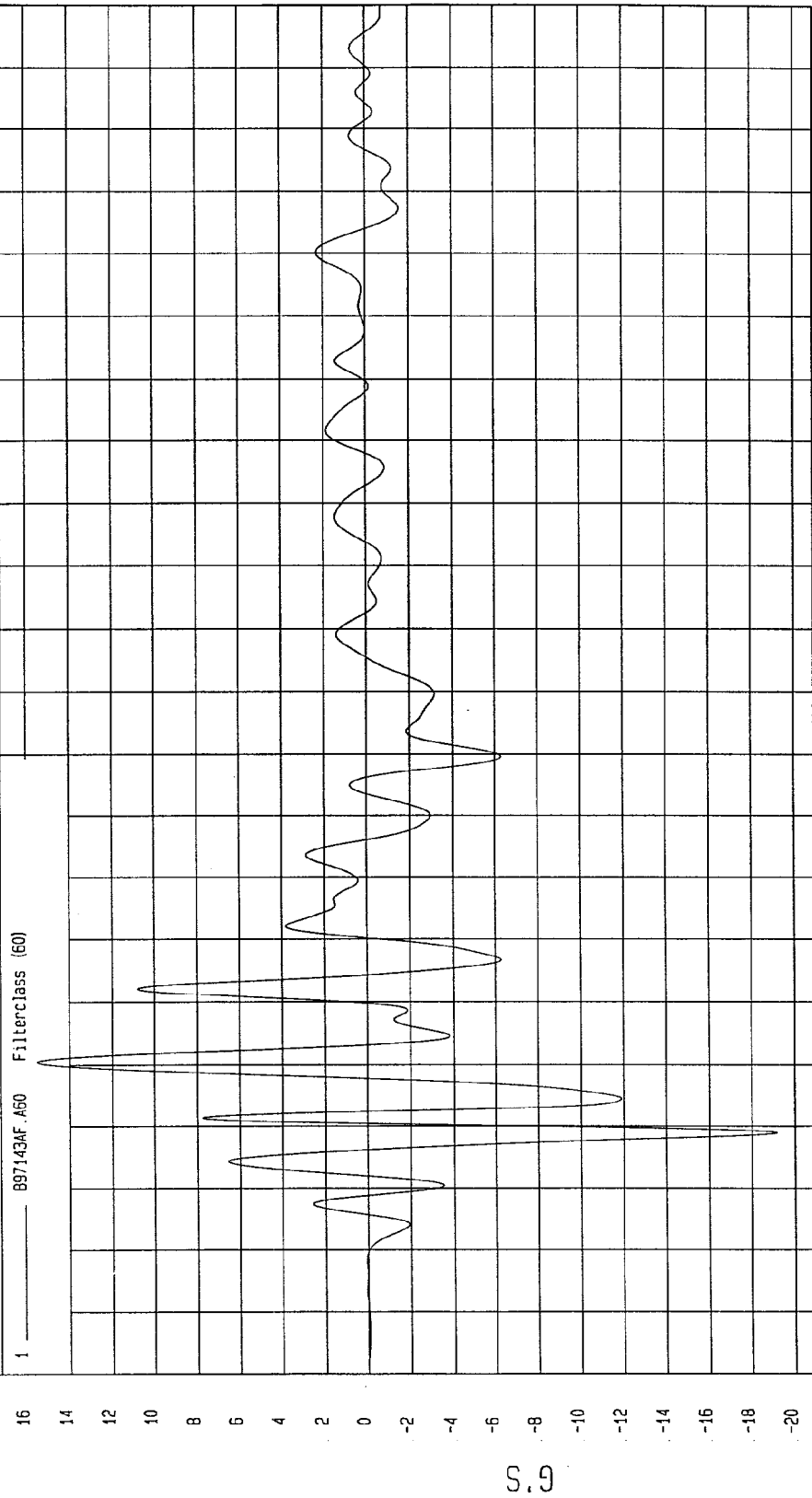
Speed: 38.3 MPH 61.6 KPH

COMPONENT: 1998 TOYOTA CORROLA (MW5105)

Maximum = 15.49 G'S at 30 msec

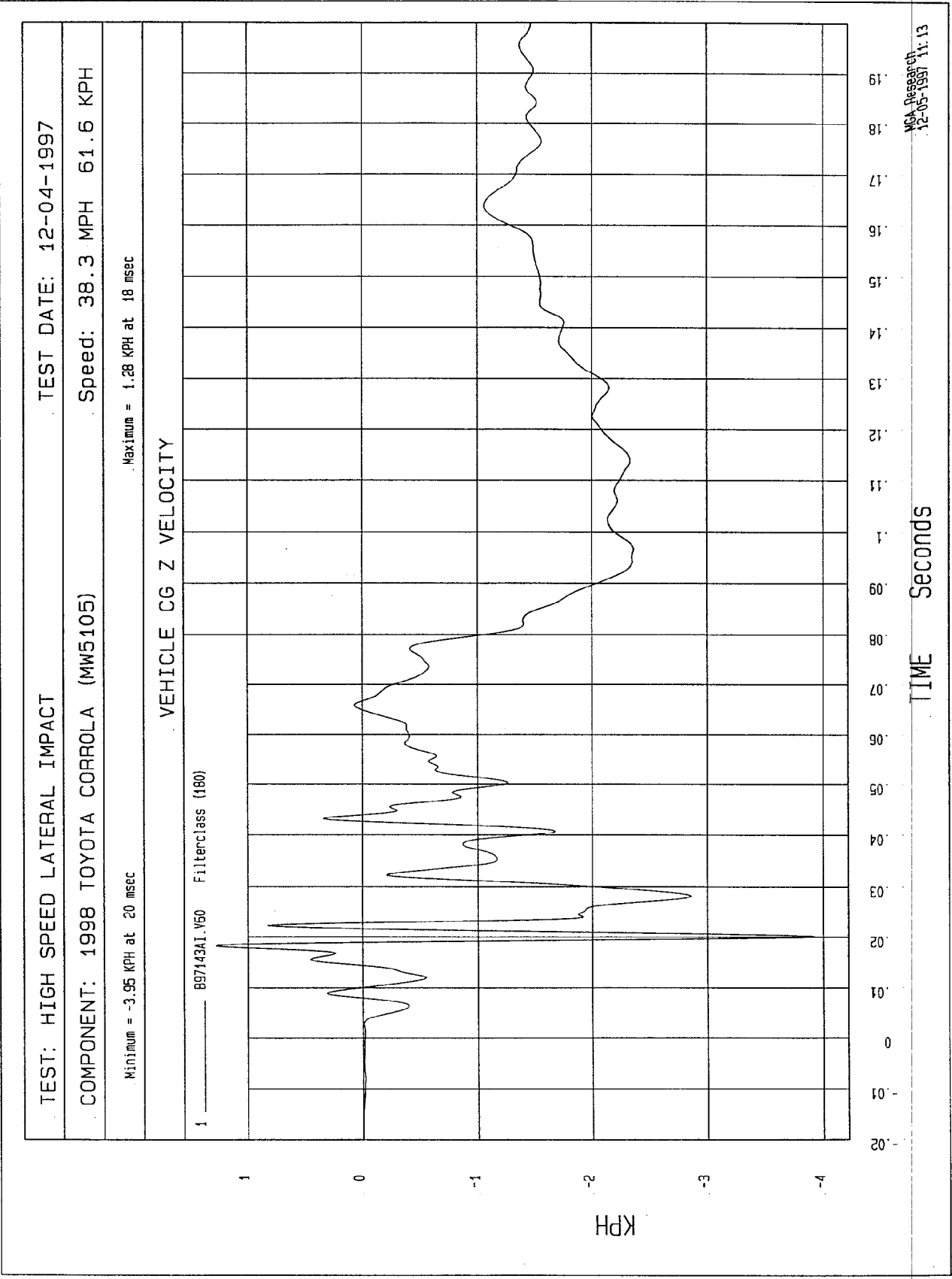
Minimum = -19.16 G'S at 19 msec

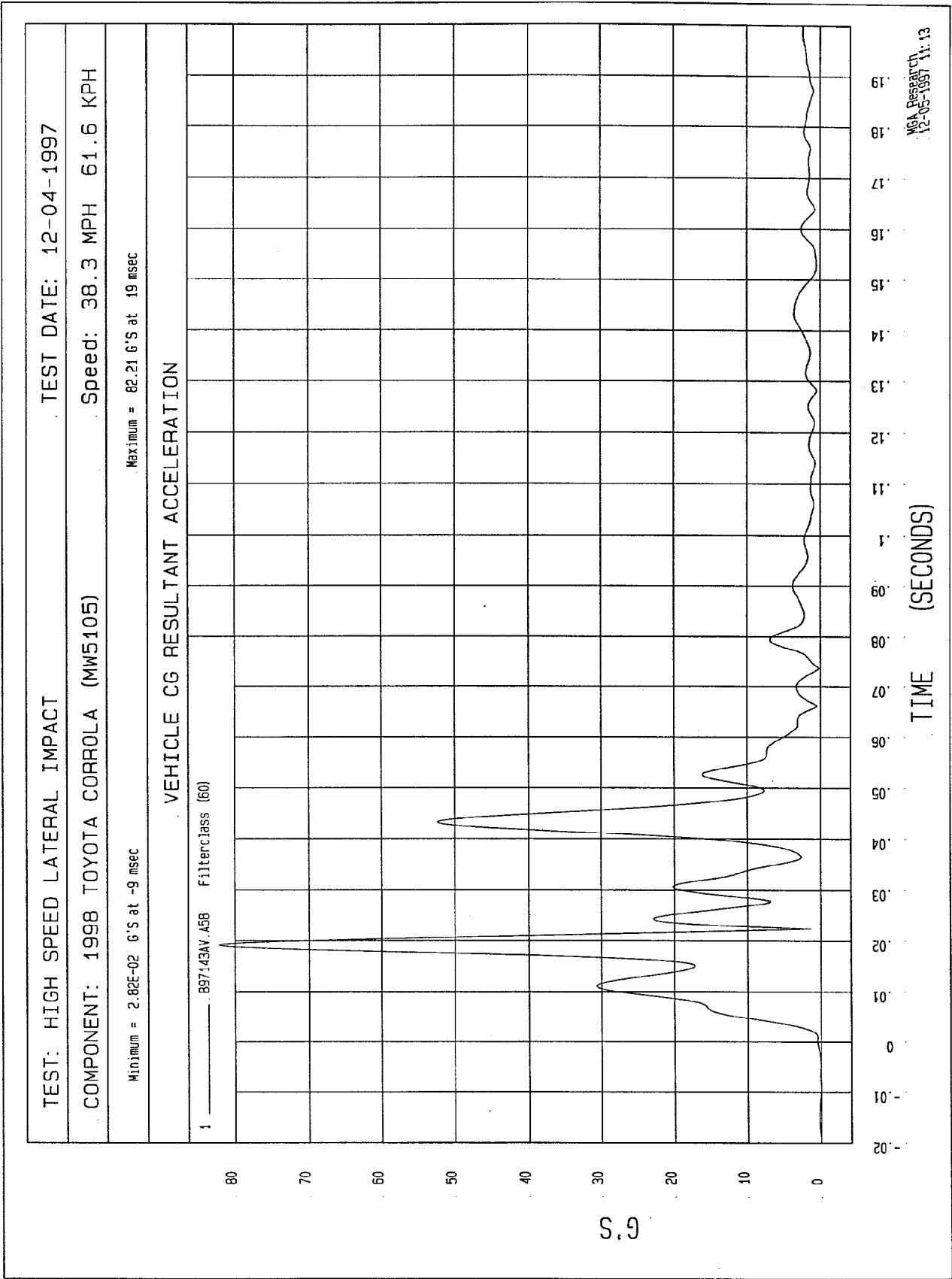
VEHICLE CG Z ACCELERATION

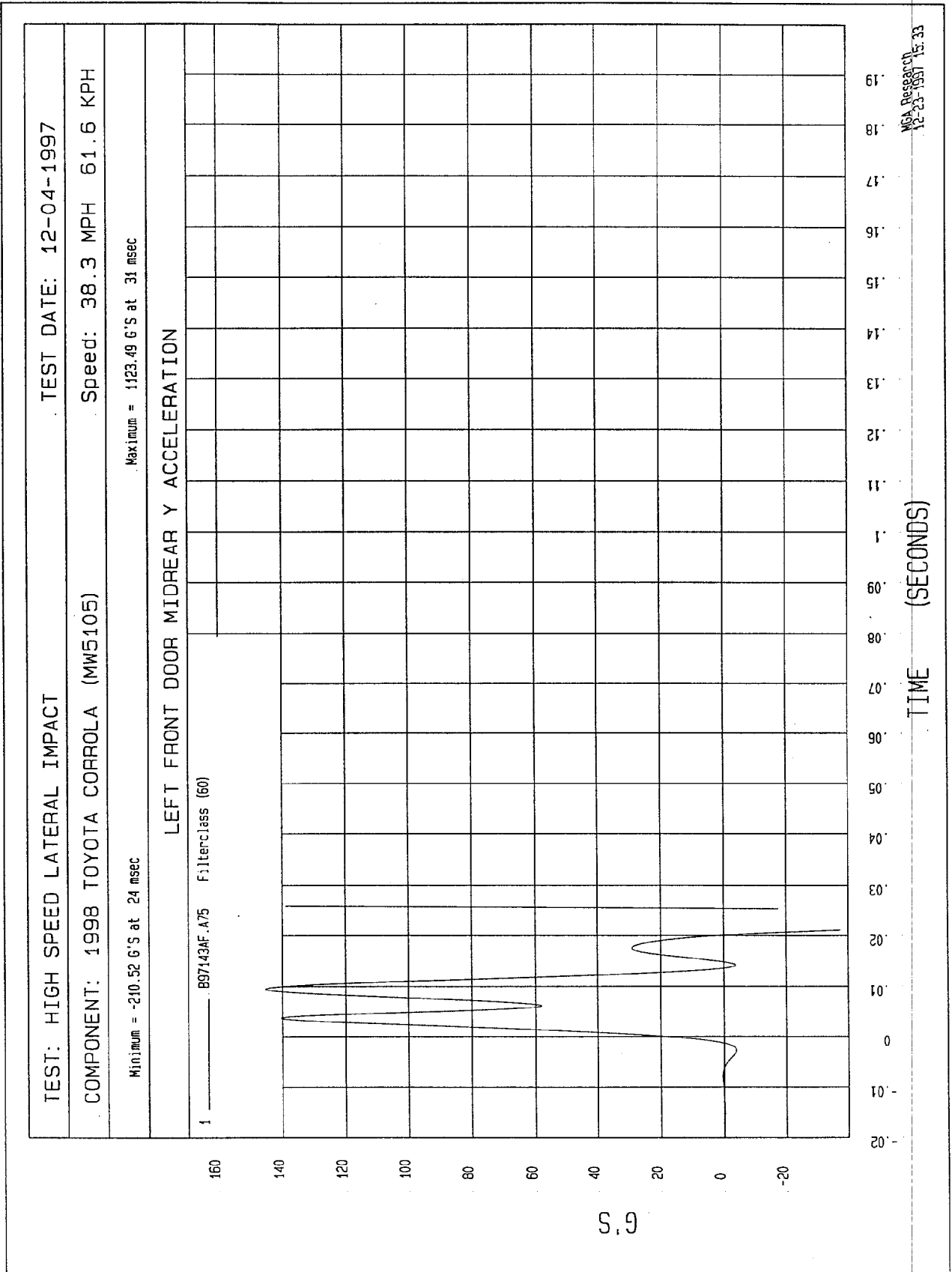


TIME (SECONDS)

MCA Research
12-05-1997 11:13







TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105)

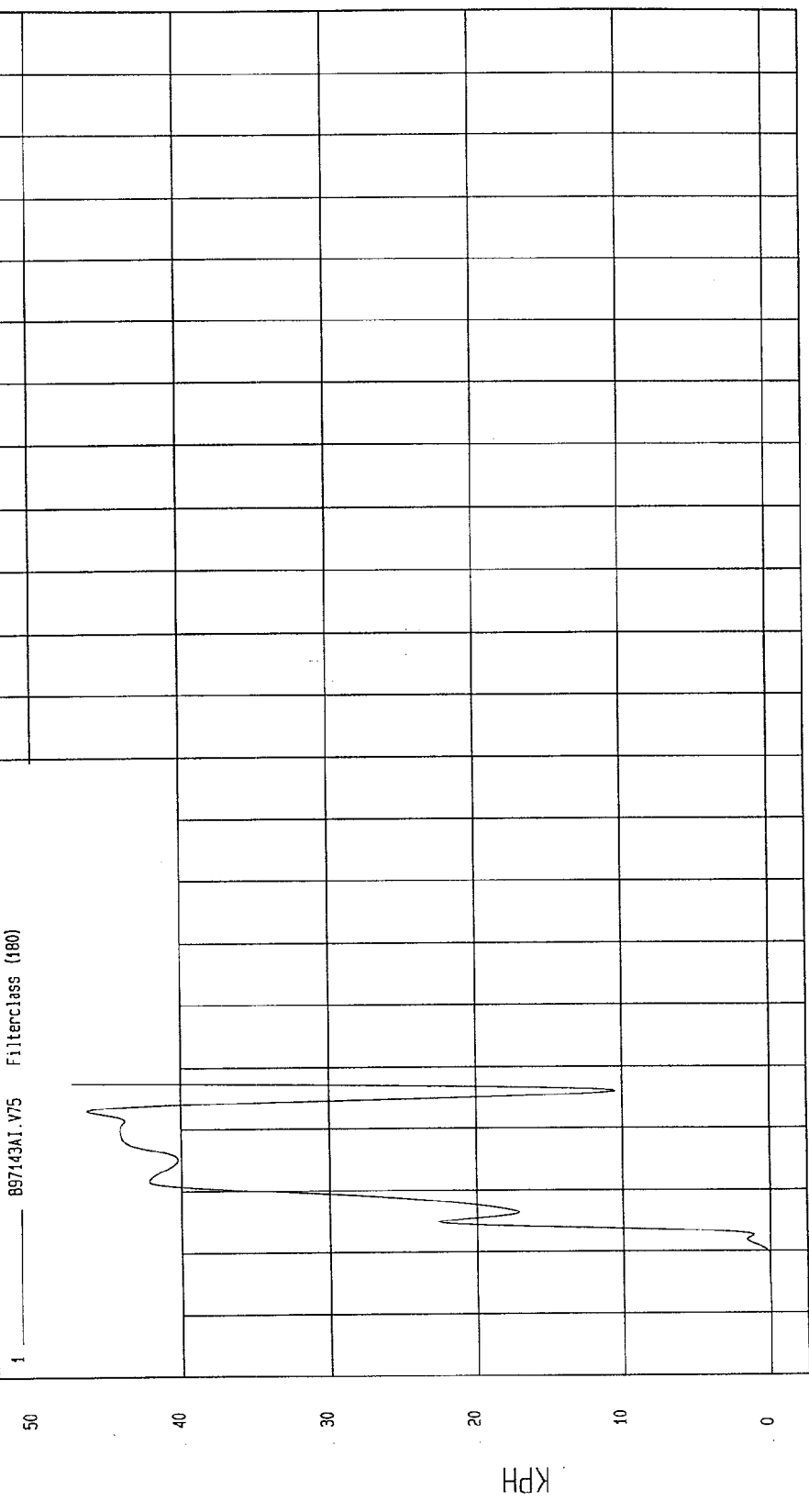
Speed: 38.3 MPH 61.6 KPH

Minimum = -1.93E-02 KPH at -13 msec

Maximum = 6595.92 KPH at 200 msec

LEFT FRONT DOOR MIDREAR Y VELOCITY

1 897143A1.V75 Filterclass (180)



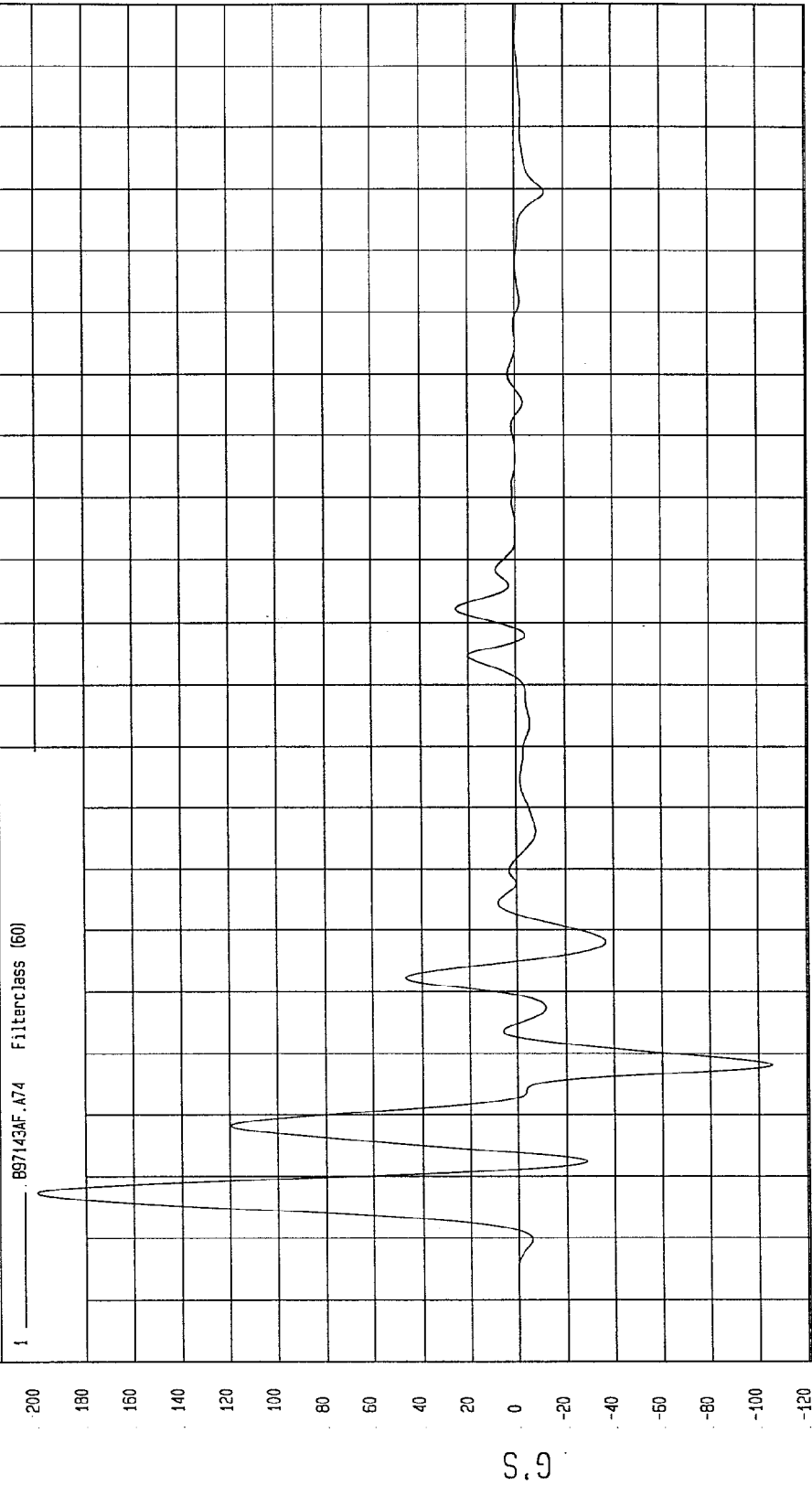
TIME Seconds
12-23-1997 15:33
NGA Research

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -105.51 G'S at 28 msec Maximum = 199.91 G'S at 7 msec

LEFT FRONT DOOR CENTERLINE Y ACCELERATION



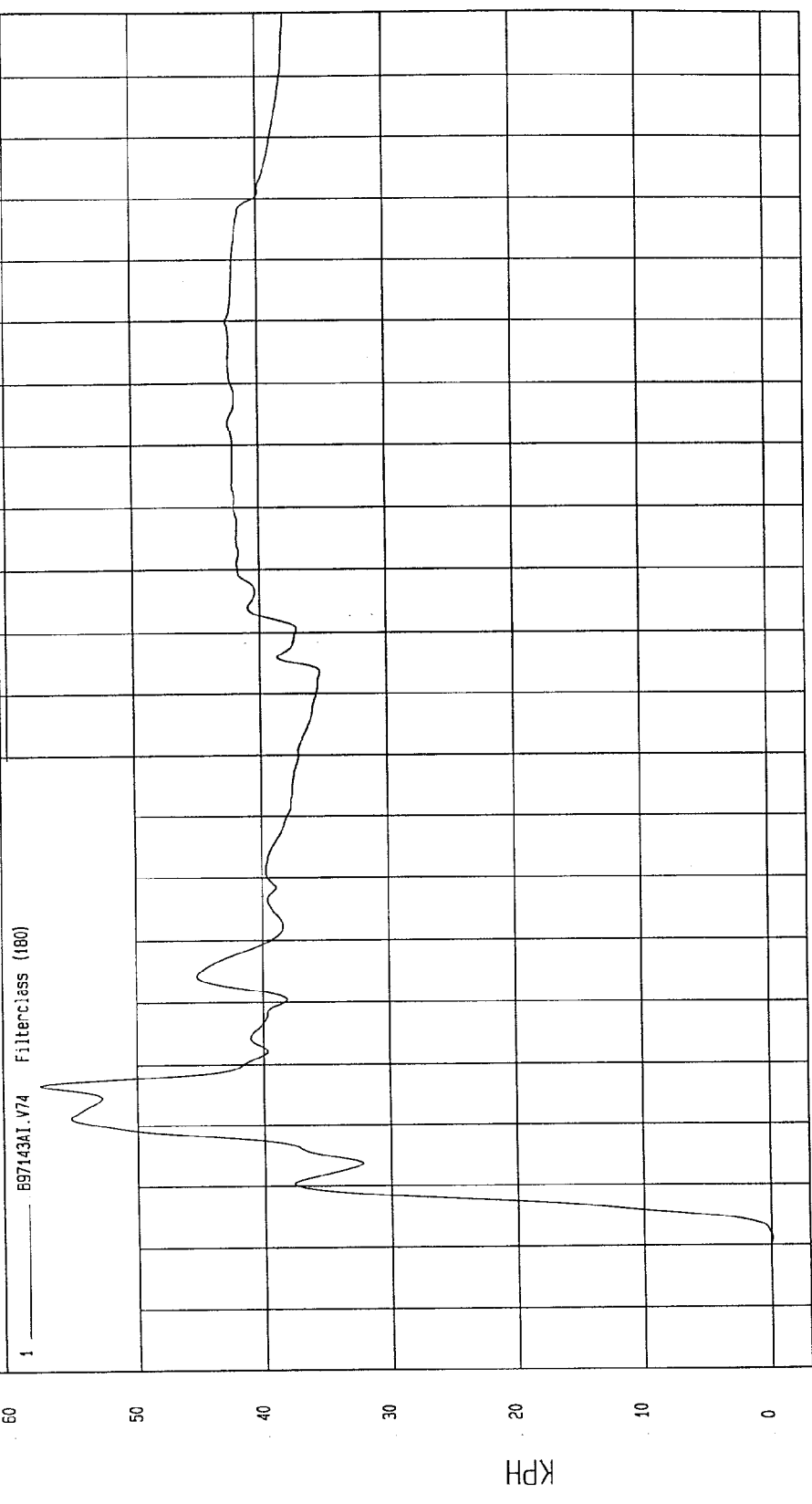
MCA Research
12-05-1997 11:13

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -11 KPH at 1 msec Maximum = 57.65 KPH at 27 msec

LEFT FRONT DOOR CENTERLINE Y VELOCITY



TIME Seconds

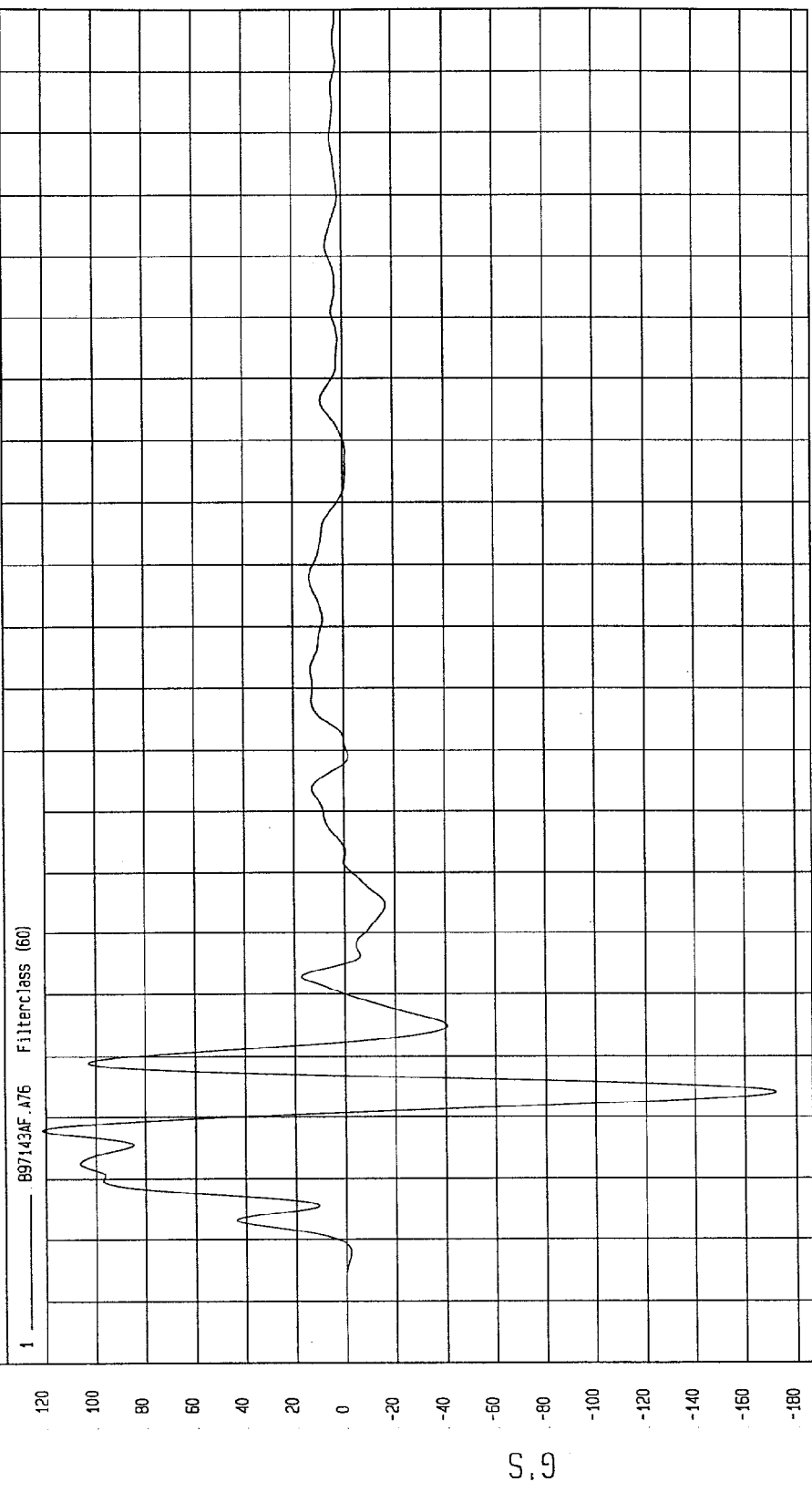
NSA Research
12-05-1997 11:13

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

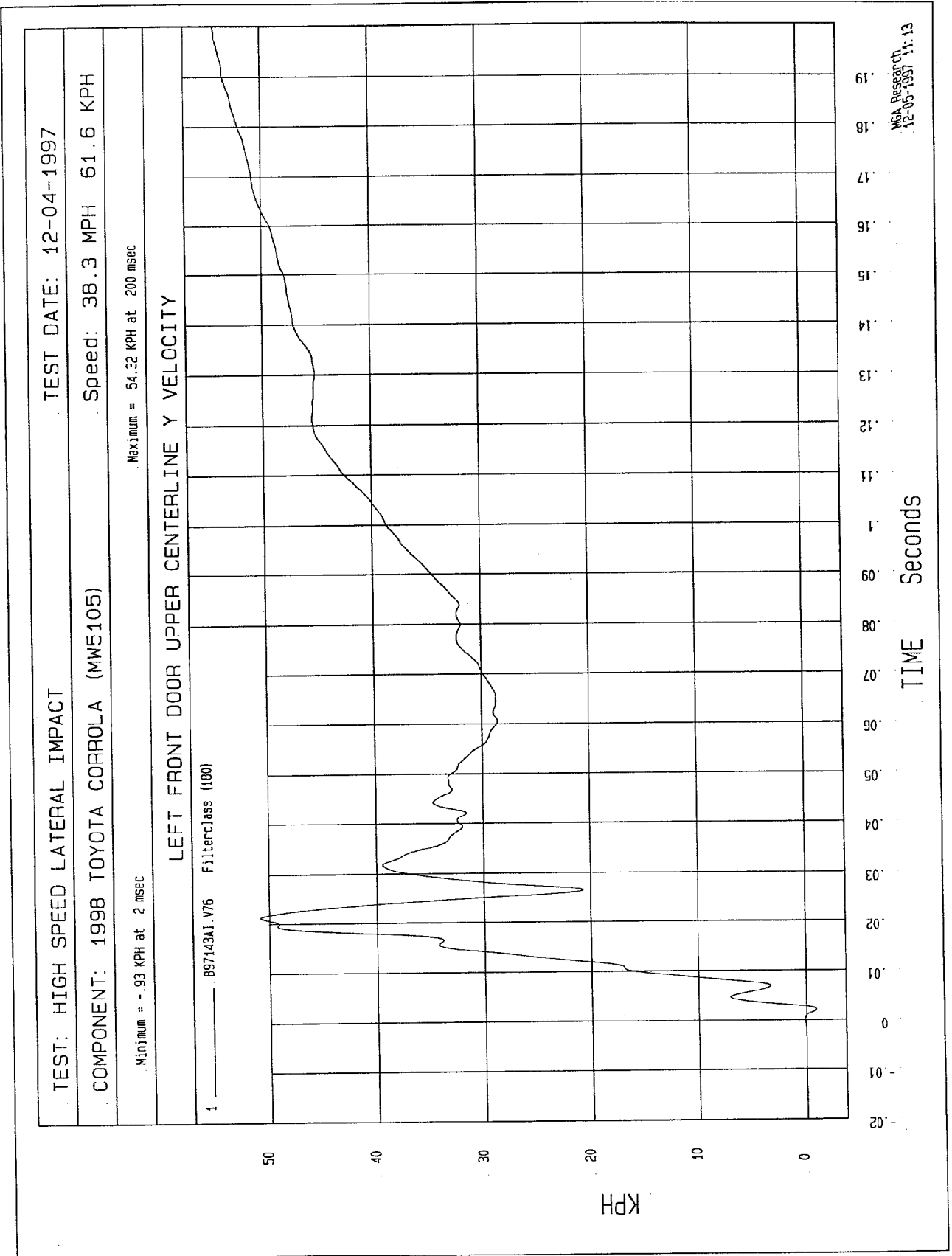
COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -172.01 G'S at 24 msec Maximum = 121.21 G'S at 18 msec

LEFT FRONT DOOR UPPER CENTERLINE Y ACCELERATION



WCA Research
12-05-1997 11:13

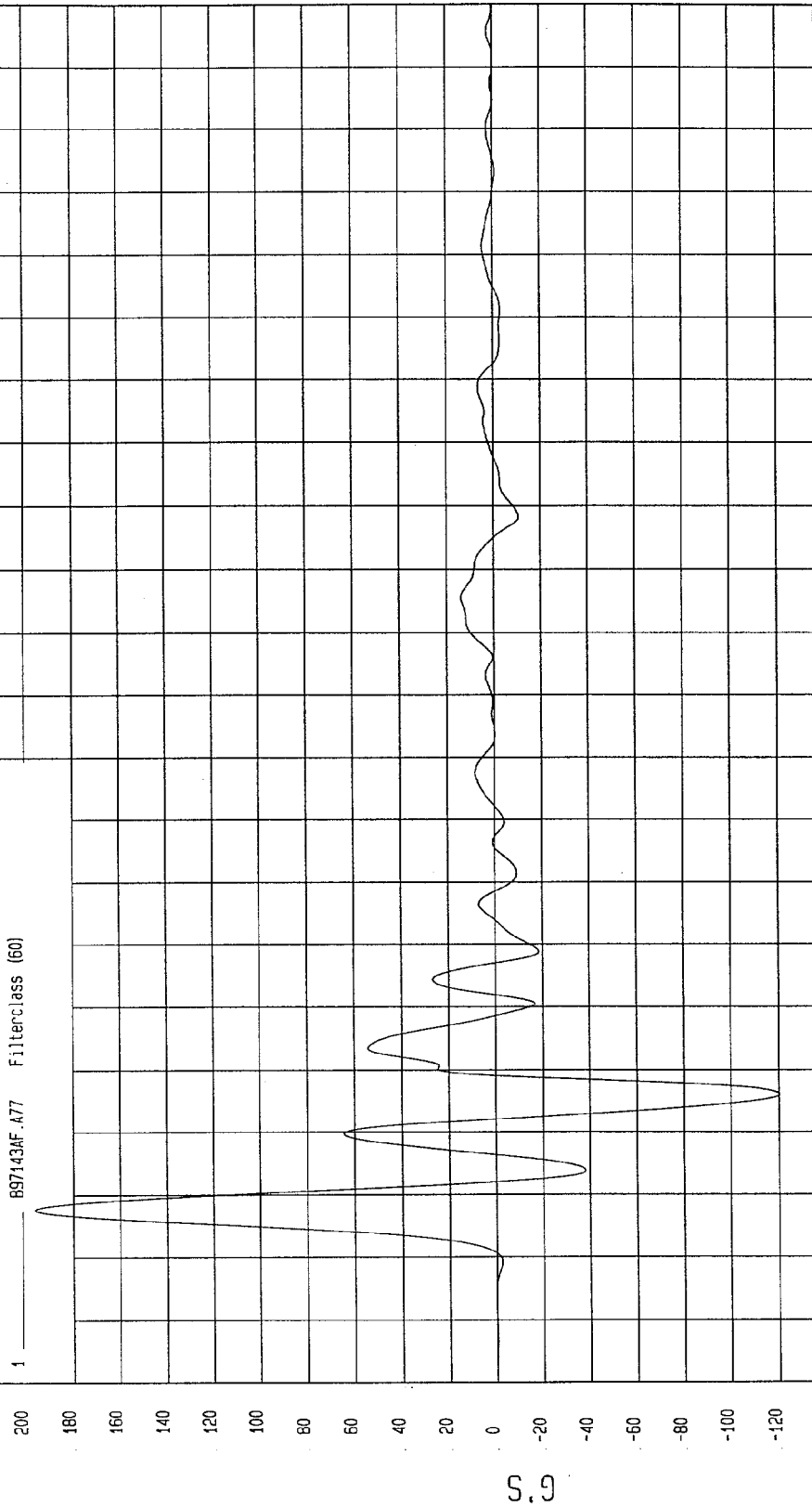


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -120.37 G'S at 26 msec Maximum = 196.06 G'S at 8 msec

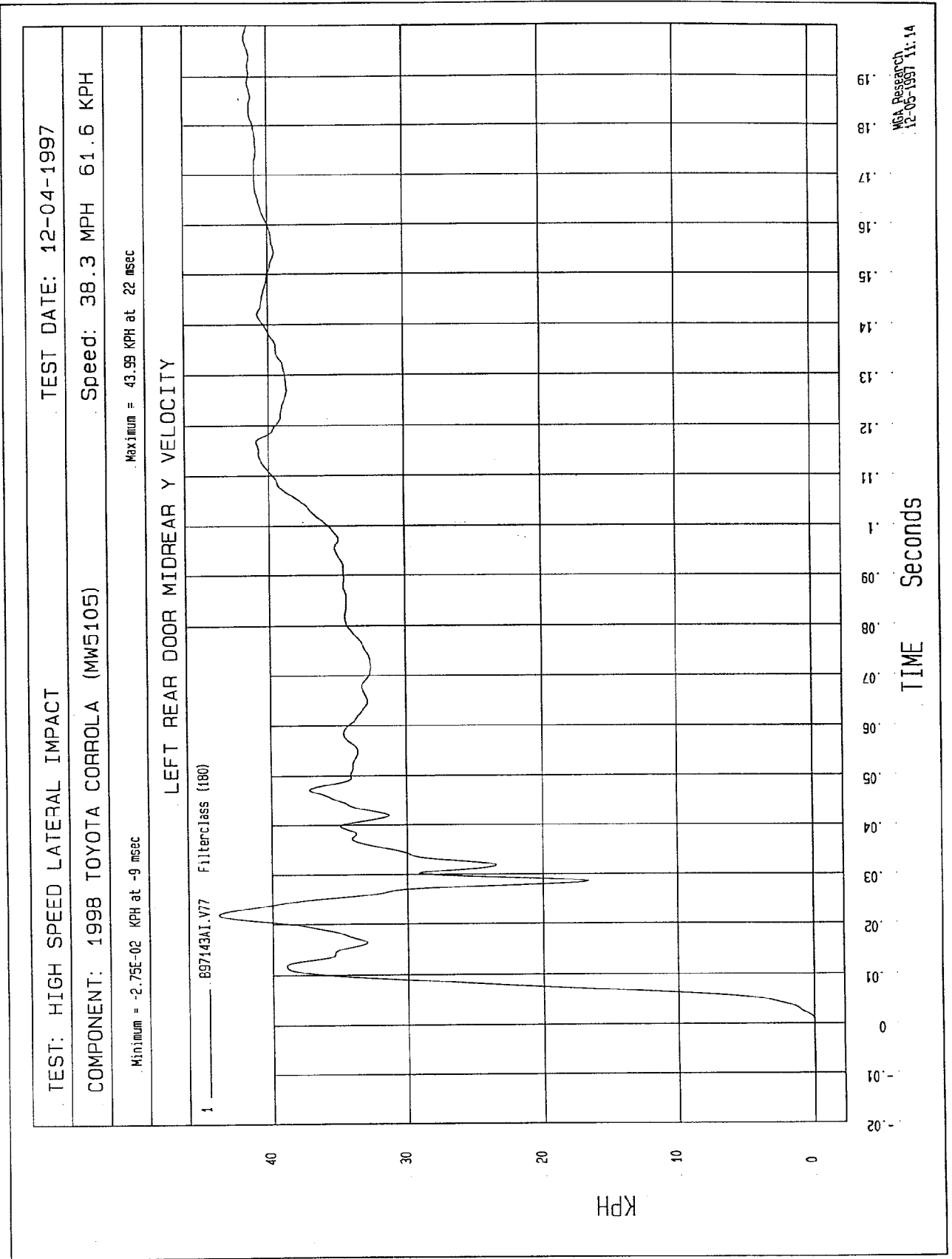
LEFT REAR DOOR MIDREAR Y ACCELERATION



TIME (SECONDS)

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

NGA Research
12-05-1997 11:14

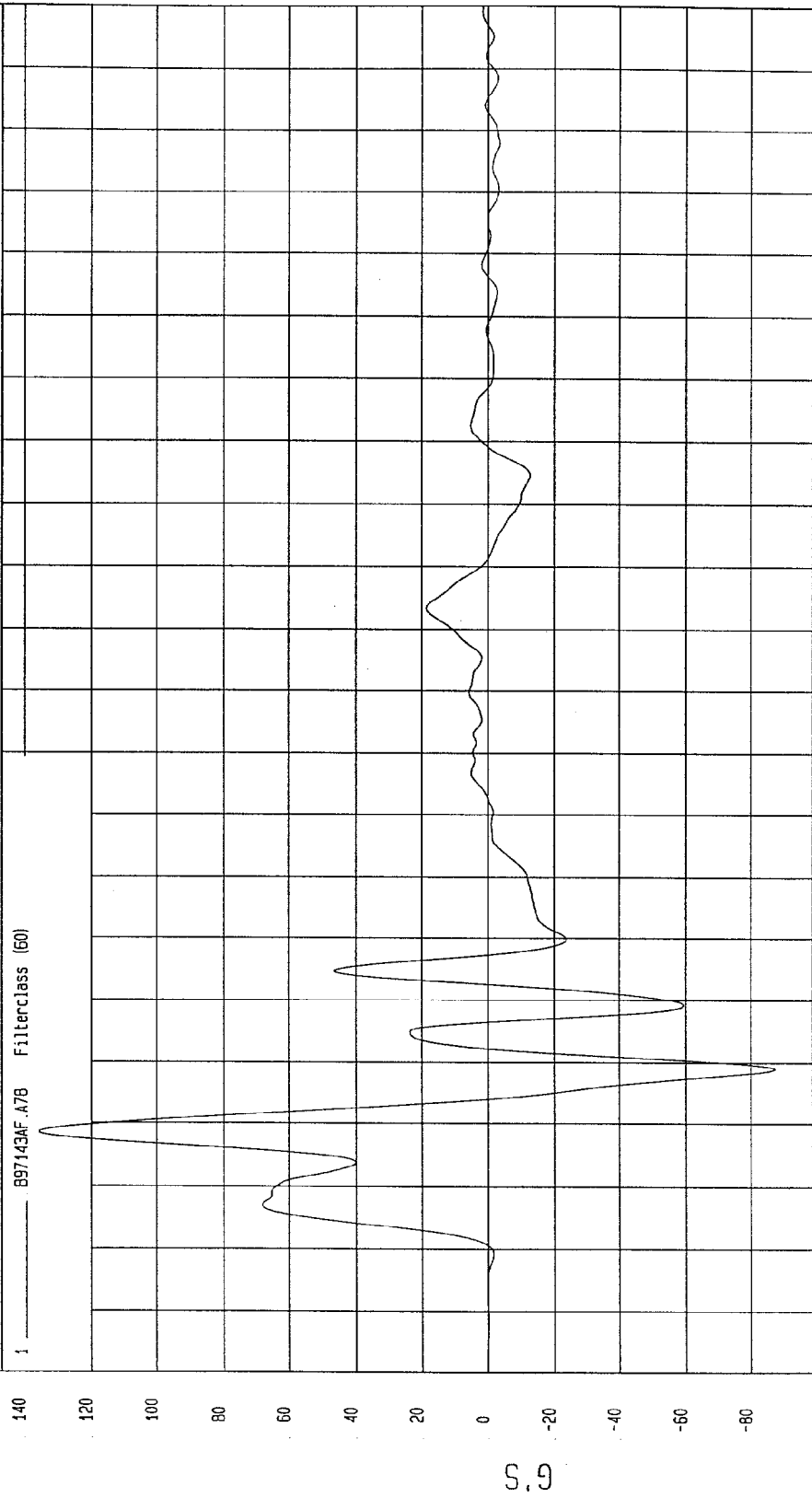


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -87.10 G'S at 29 msec Maximum = 135.63 G'S at 18 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 0.10 0.09 0.08 0.07 0.06 0.05 0.04 0.03 0.02 0.01 0 -0.01 -0.02

MCA Research
12-05-1997 11:14

TEST DATE: 12-04-1997

TEST: HIGH SPEED LATERAL IMPACT

Speed: 38.3 MPH 61.6 KPH

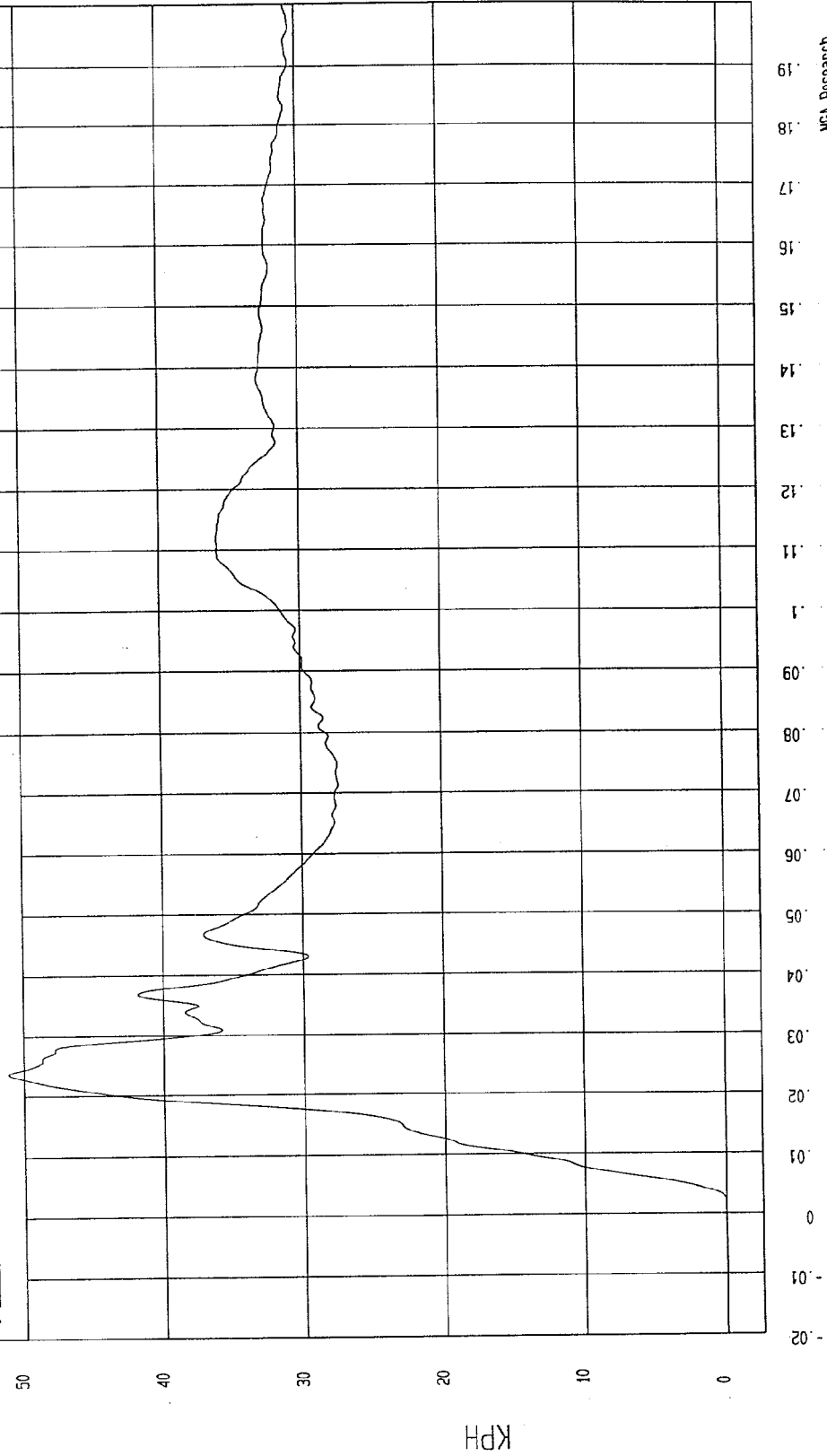
COMPONENT: 1998 TOYOTA CORROLA (MW5105)

Maximum = 51.13 KPH at 24 msec

Minimum = -2.89E-02 KPH at -9 msec

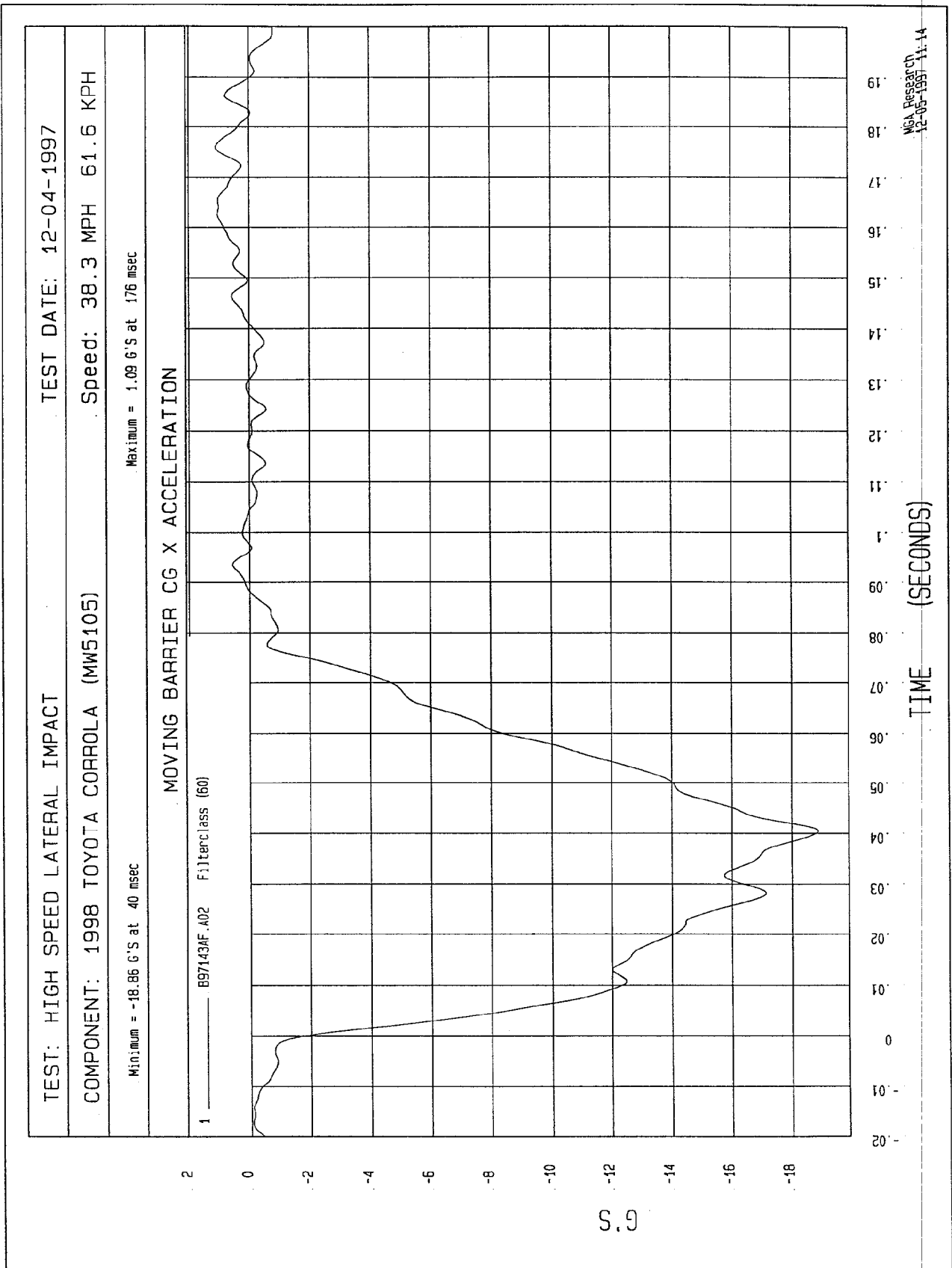
LEFT REAR DOOR UPPER CENTERLINE Y VELOCITY

1 097143A1.V78 Filterclass (180)

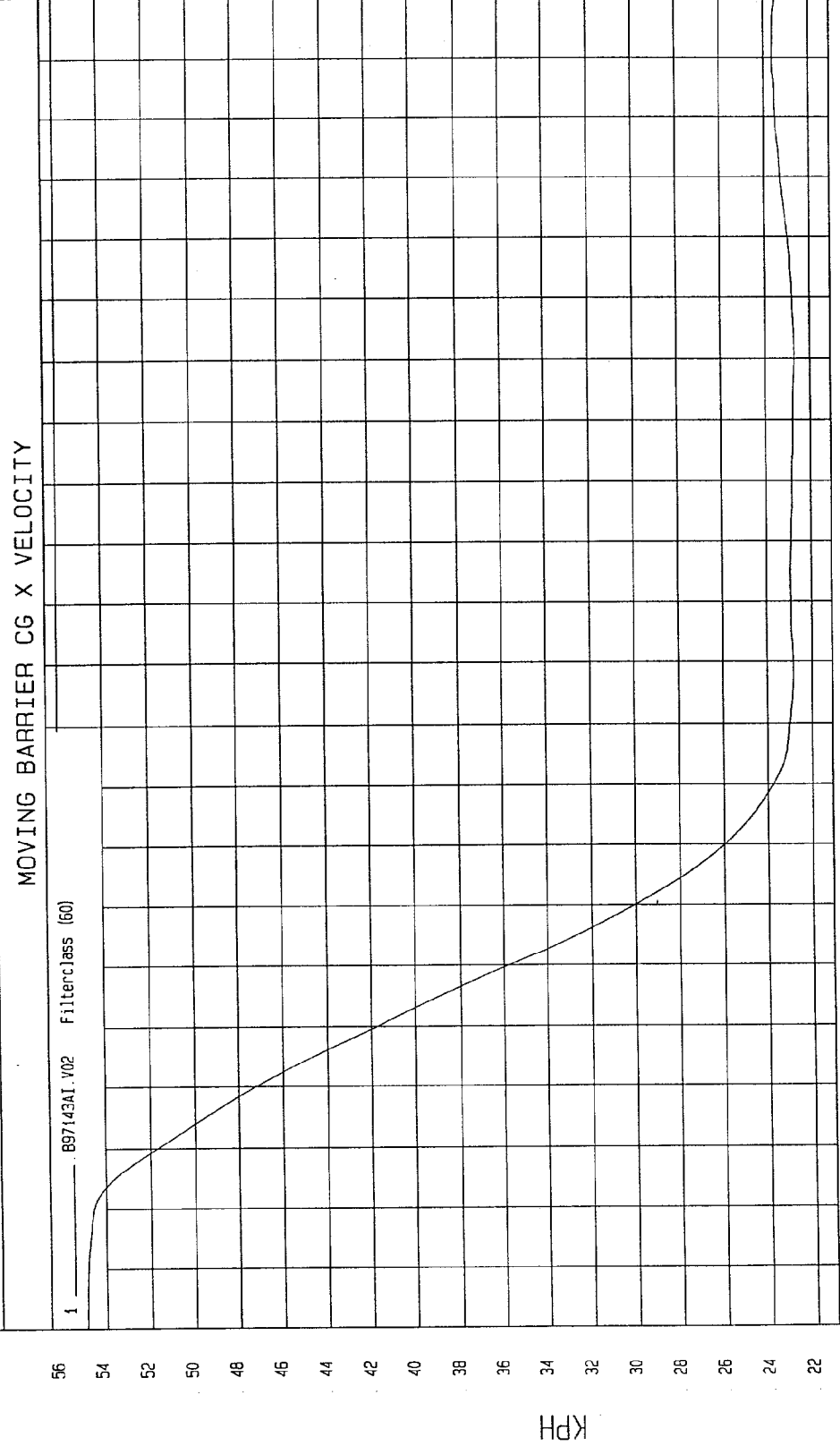


MGA Research
12-05-1997 11:14

TIME Seconds



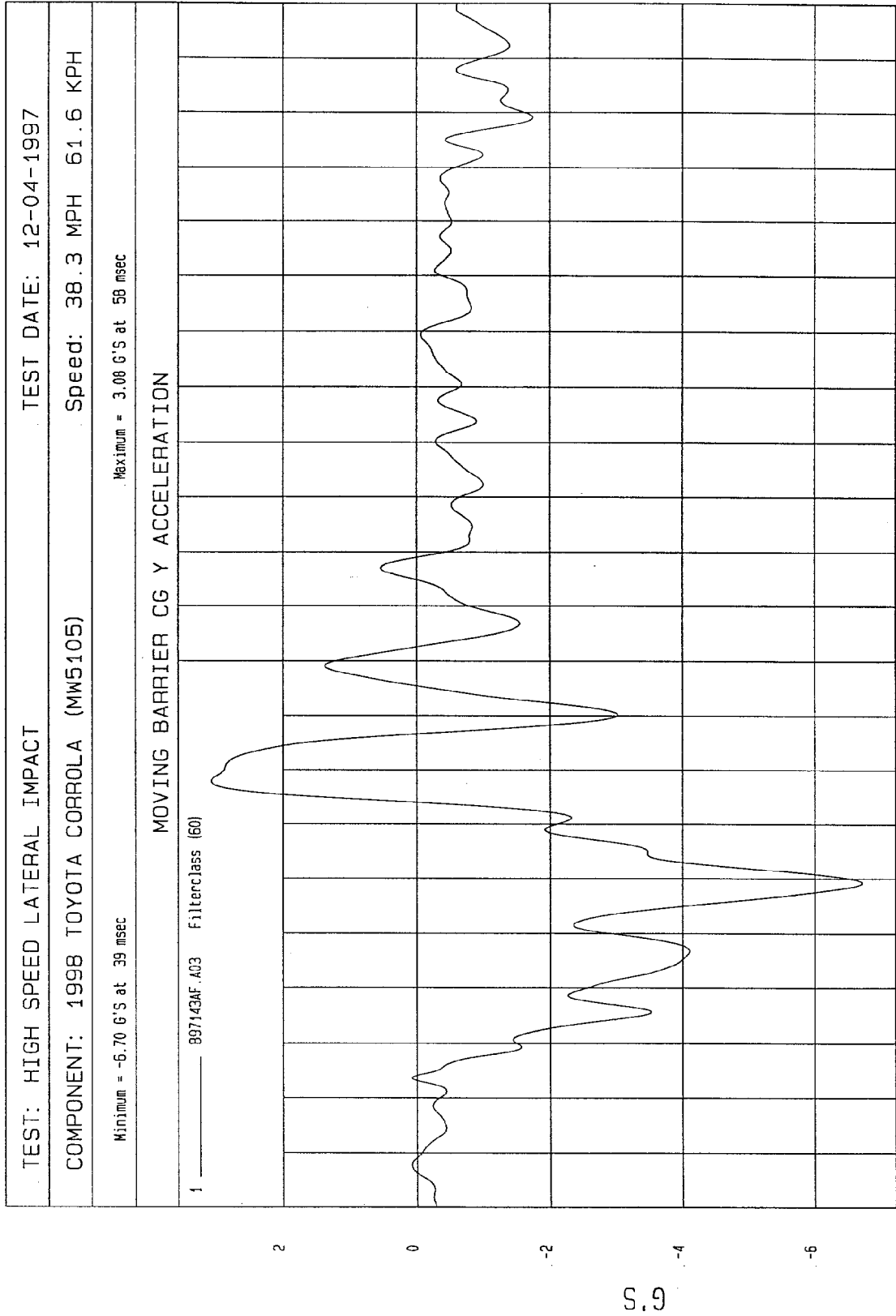
TEST: HIGH SPEED LATERAL IMPACT	TEST DATE: 12-04-1997
COMPONENT: 1998 TOYOTA CORROLA (MW5105)	Speed: 38.3 MPH 61.6 KPH
Minimum = 22.70 KPH at 141 msec	Maximum = 54.9 KPH at -20 msec



1 ——— B97143A1.V02 Filterclass (60)

TIME Seconds

NSA Research
12-05-1997 11:14



MOA Research
12-05-1997 11:14

TIME (SECONDS)

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 12-04-1997

Speed: 38.3 MPH 61.6 KPH

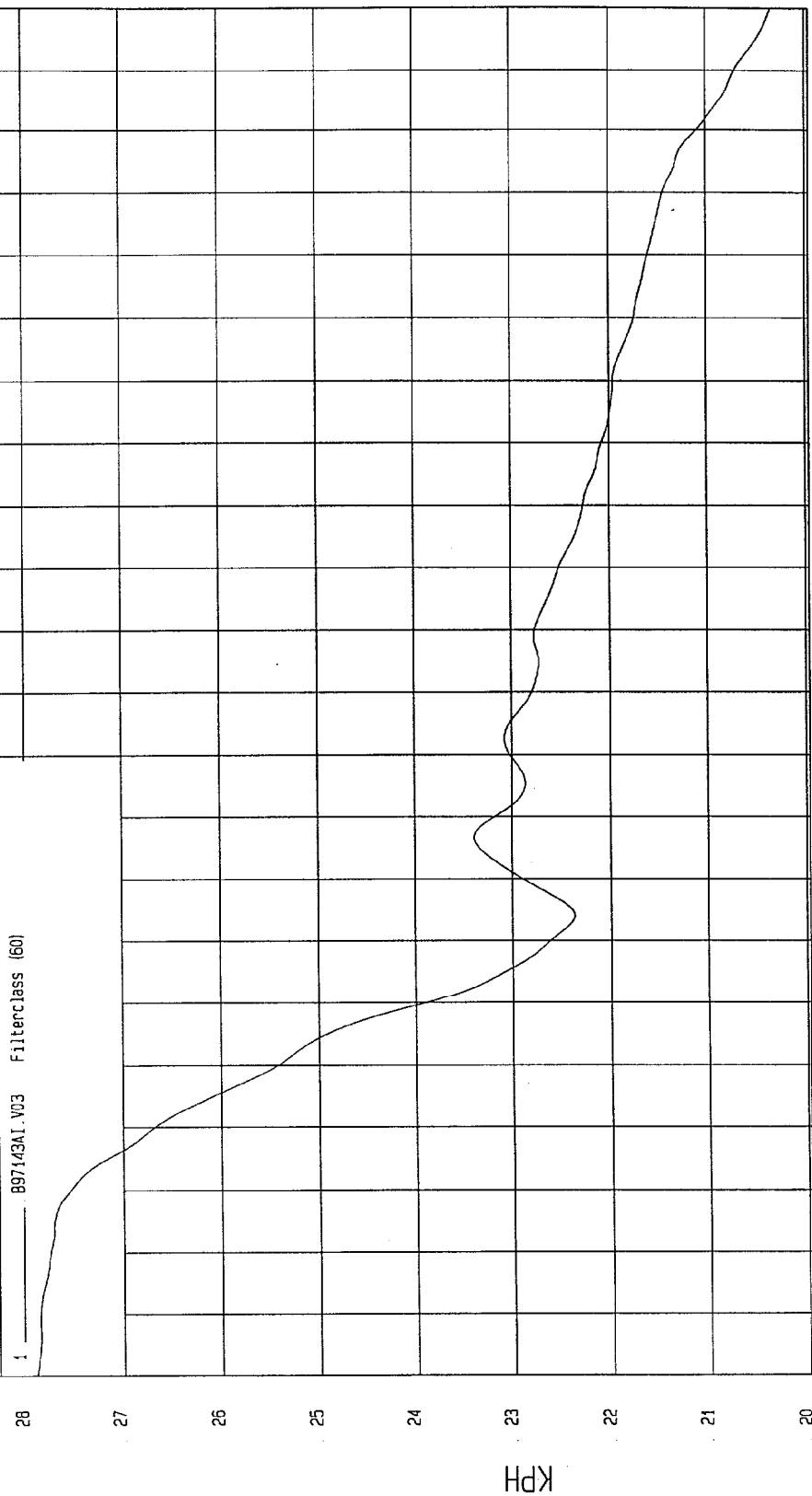
COMPONENT: 1998 TOYOTA CORROLA (MW5105)

Maximum = 27.9 KPH at -20 msec

Minimum = 20.34 KPH at 200 msec

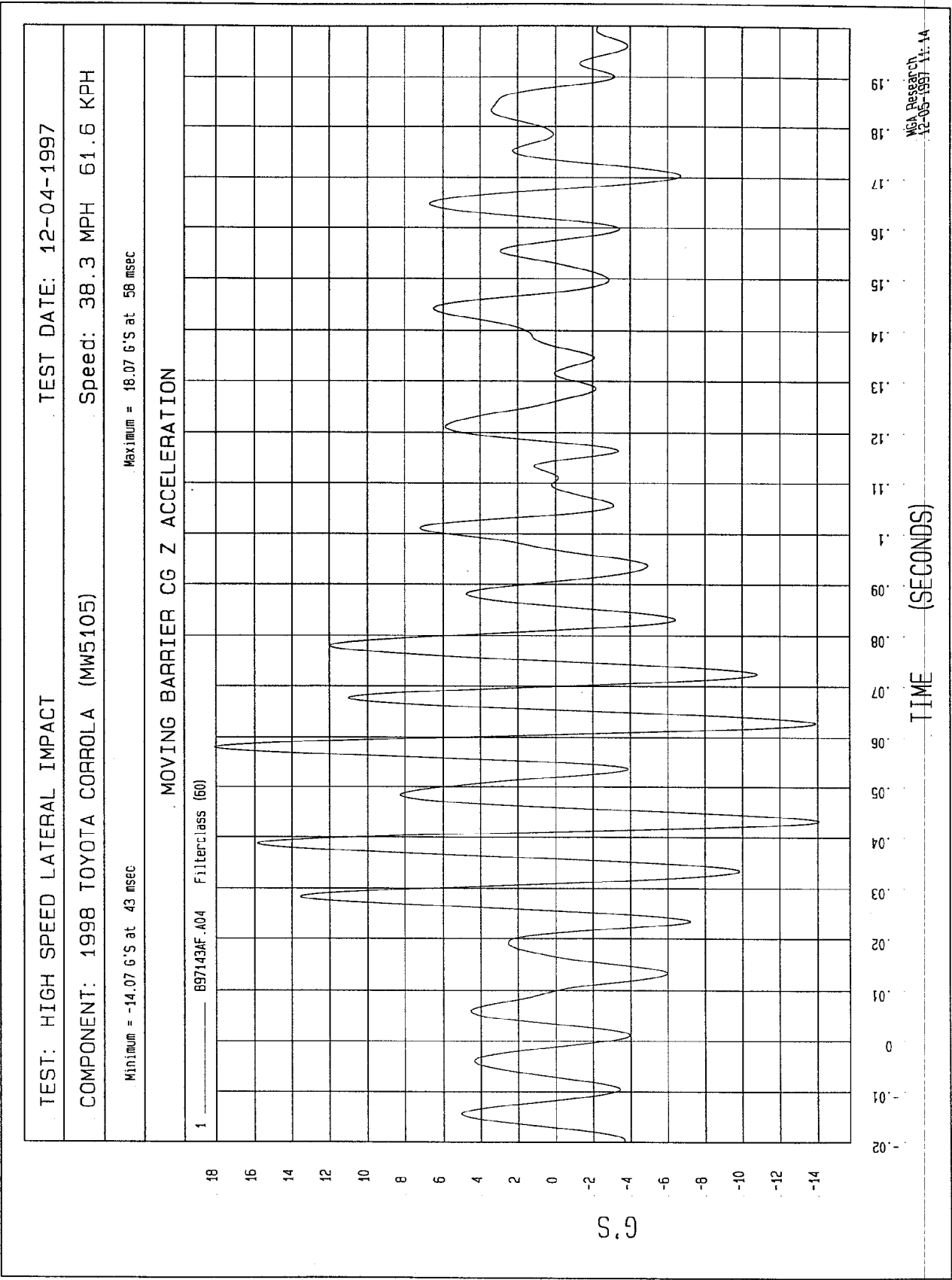
MOVING BARRIER CG Y VELOCITY

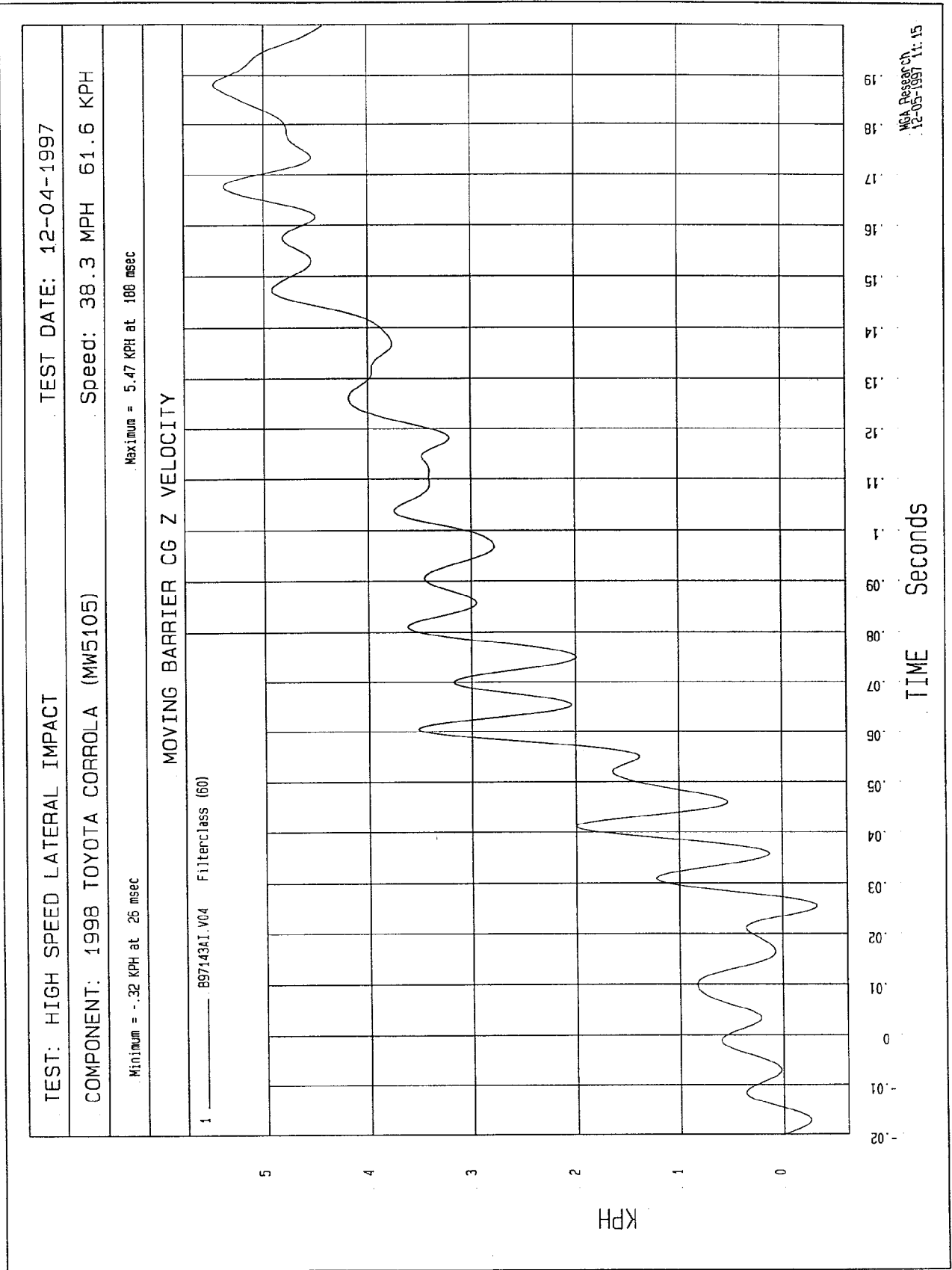
1 ——— B97143A1.V03 Filterclass (60)



WCA Research
12-05-1997 11:14

TIME Seconds



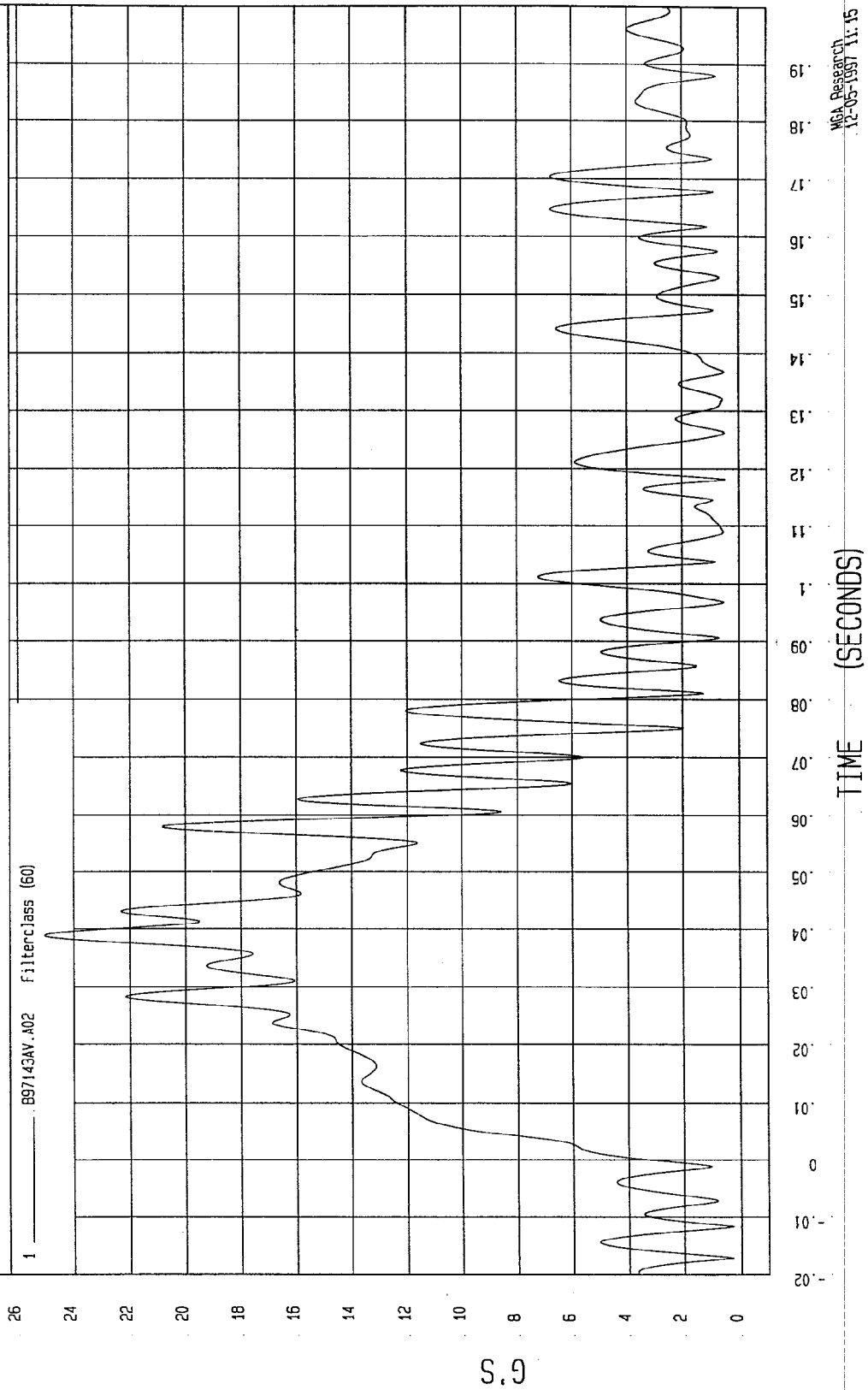


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = .24 G'S at -12 msec Maximum = 25.05 G'S at 39 msec

MOVING BARRIER CG RESULTANT ACCELERATION



TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 12-04-1997

Speed: 38.3 MPH 61.6 KPH

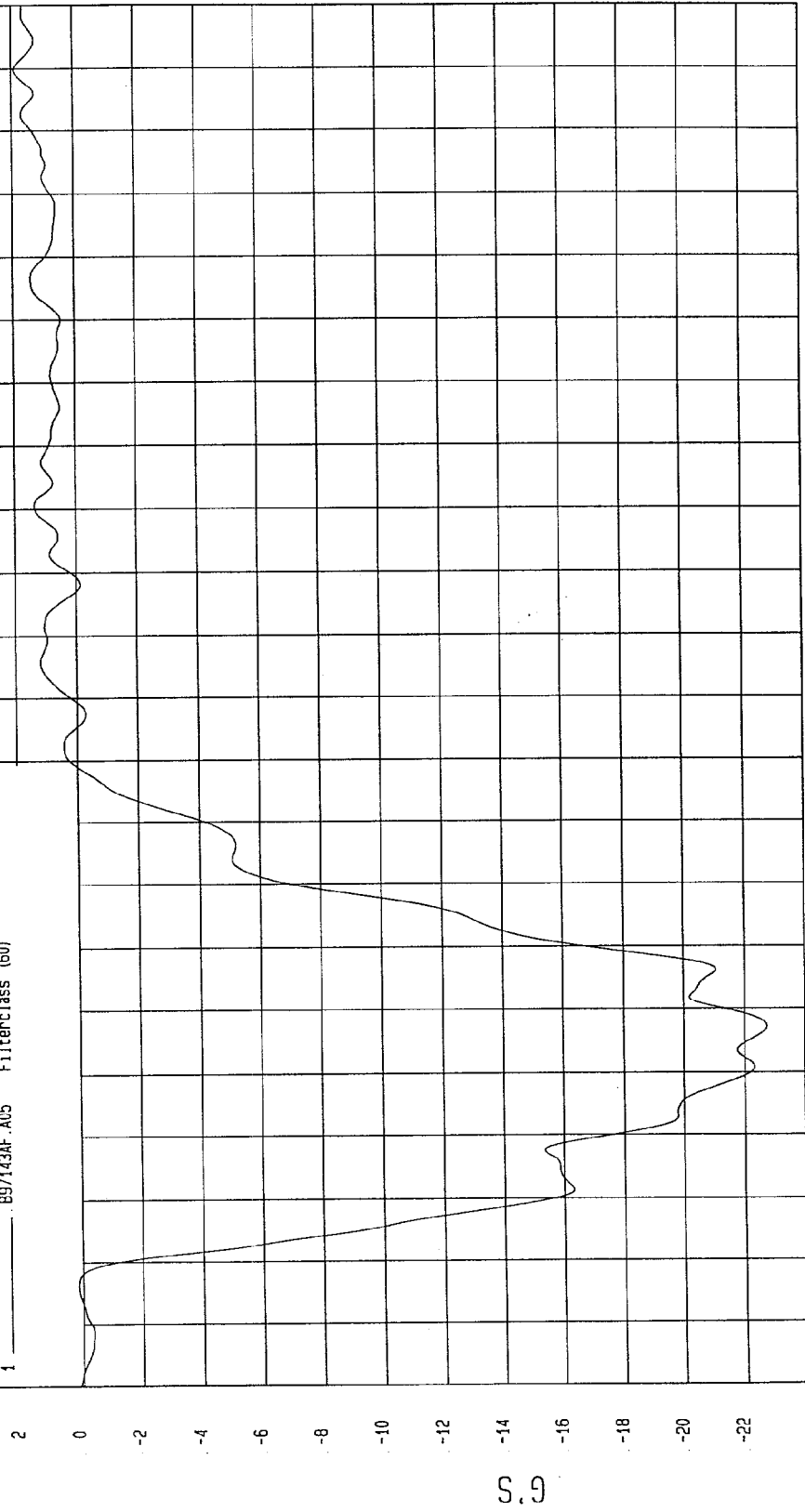
COMPONENT: 1998 TOYOTA CORROLA (MW5105)

Maximum = 1.92 G'S at 190 msec

Minimum = -22.73 G'S at 37 msec

MOVING BARRIER REAR AXLE X ACCELERATION

1 _____ 897143AF.A05 Filterclass (50)



WCA Research
12-05-1997 11:15

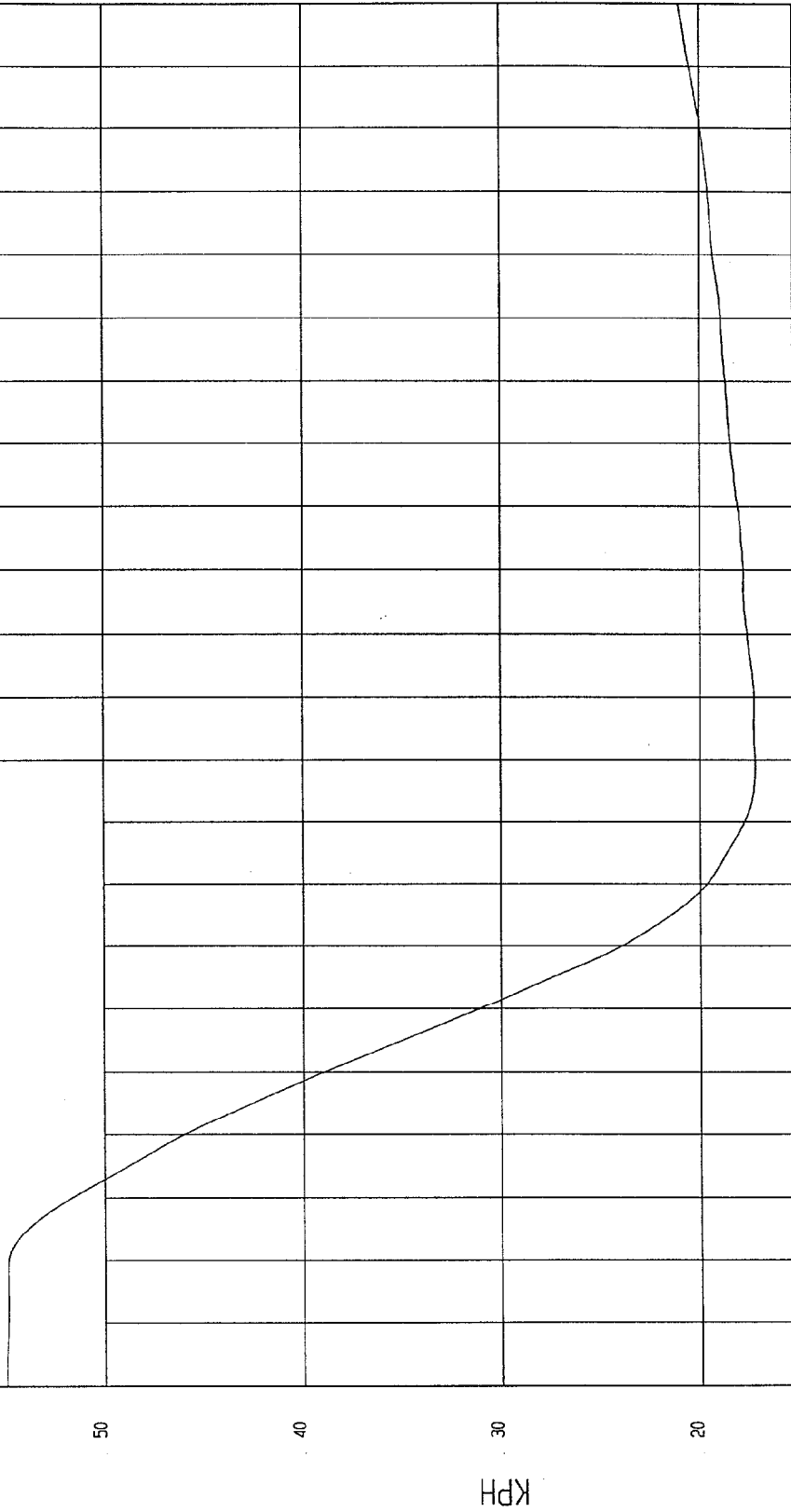
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = 17.28 KPH at 79 msec Maximum = 54.90 KPH at -18 msec

MOVING BARRIER REAR AXLE X VELOCITY

1 B97143AI.V05 Filterclass (60)



TIME Seconds
MCA Research
12-05-1997 11:15

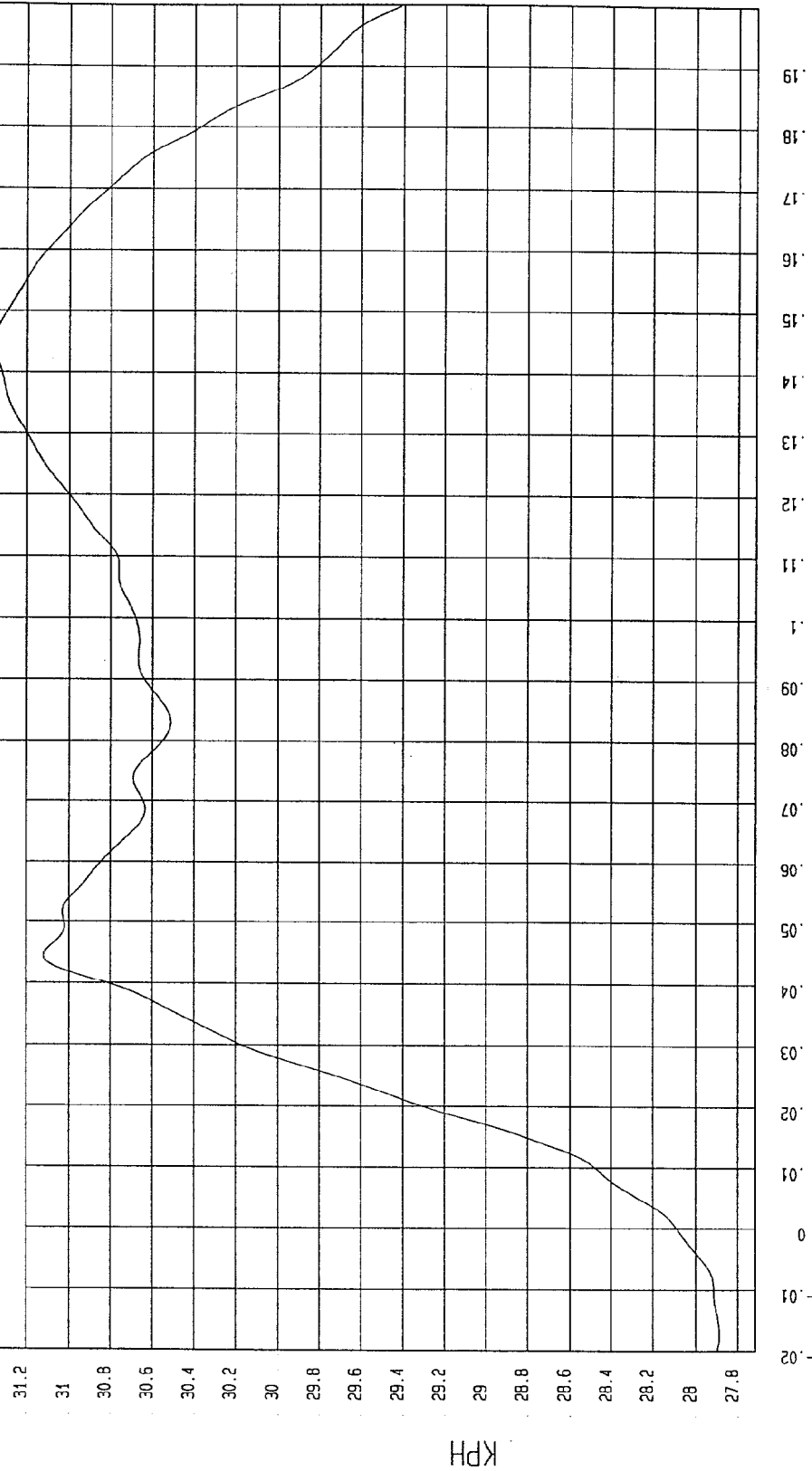
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = 27.88 KPH at -17 msec Maximum = 31.35 KPH at 145 msec

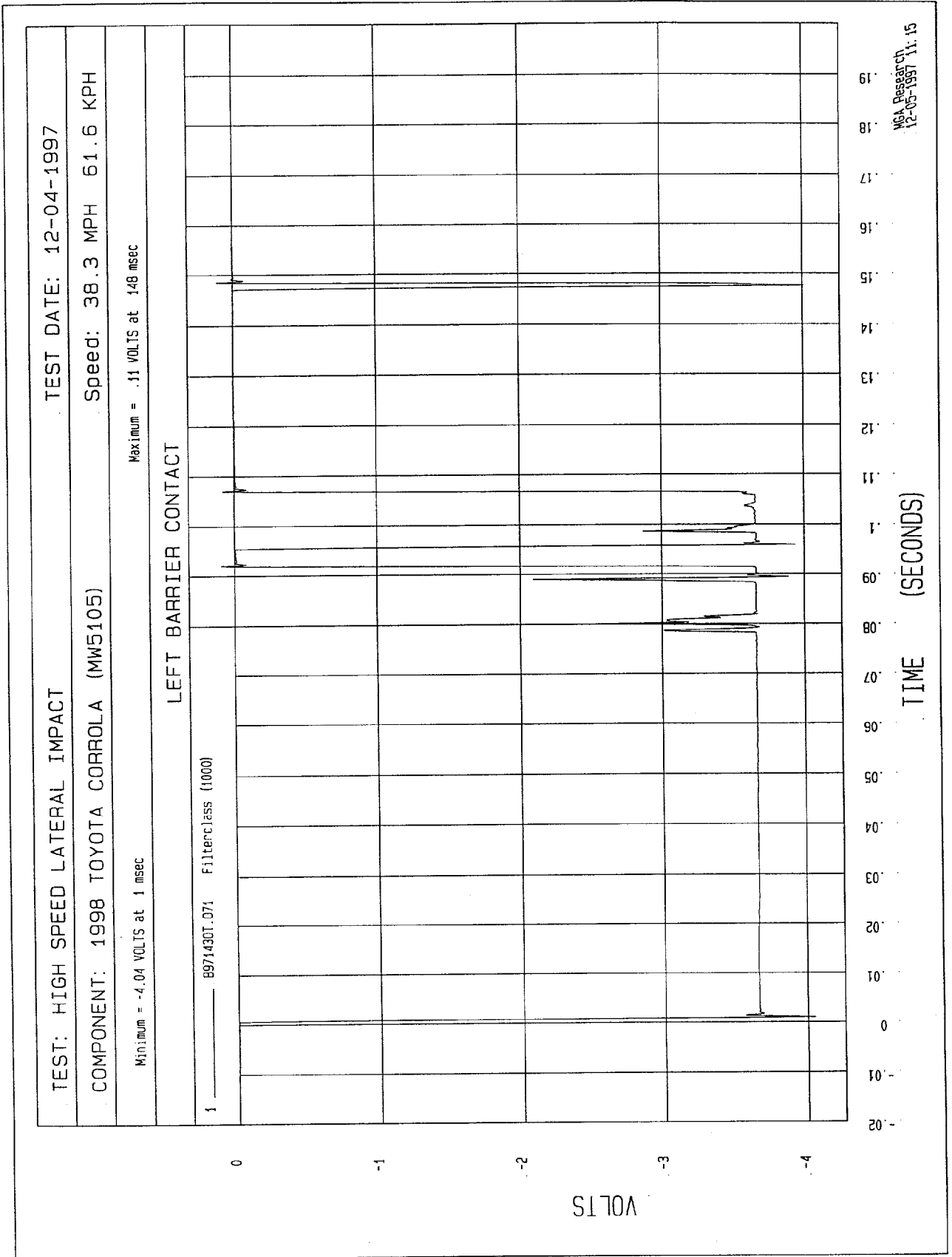
MOVING BARRIER REAR AXLE Y VELOCITY

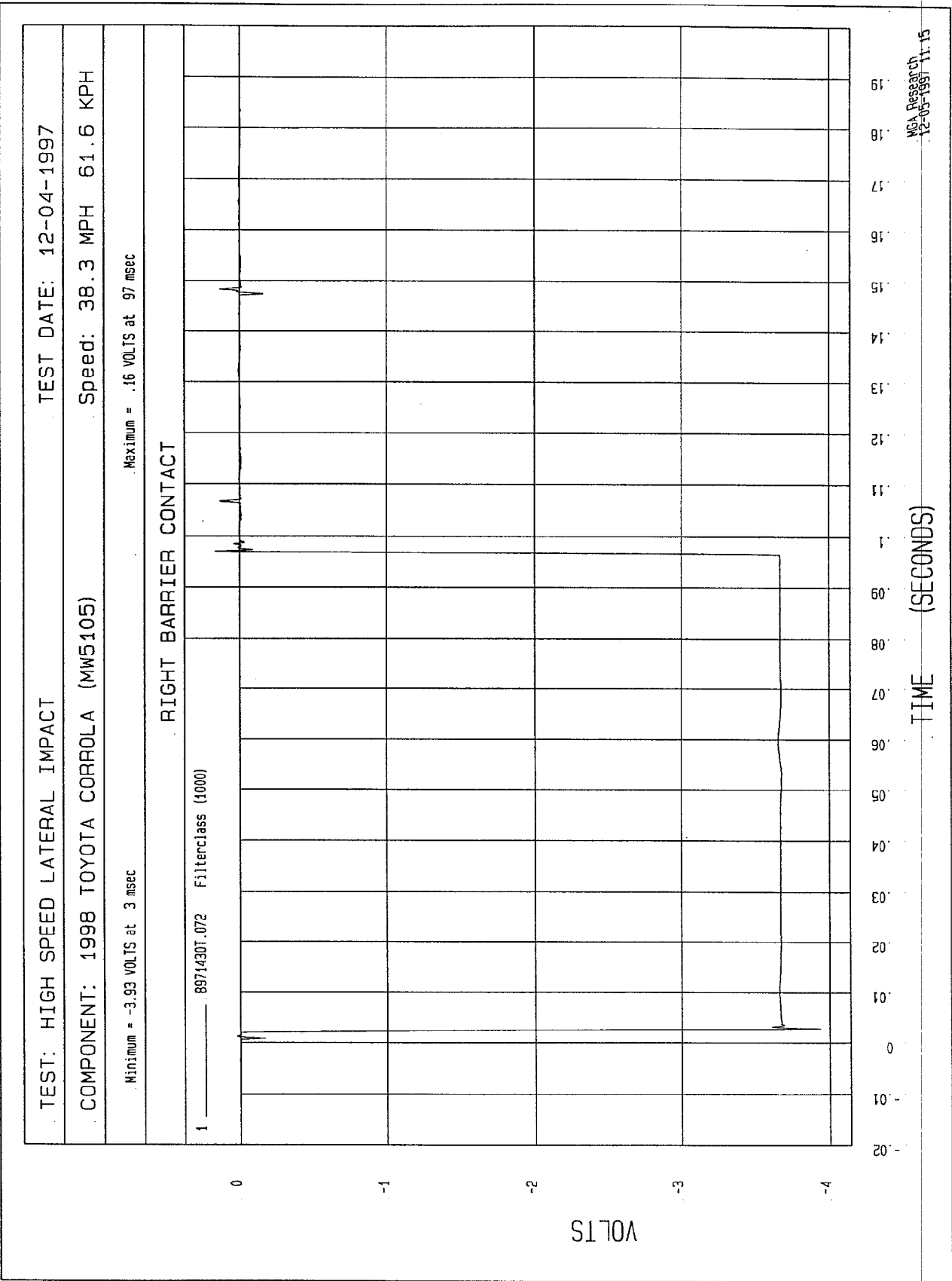
1 ——— B97143A1.V06 Filterclass (50)

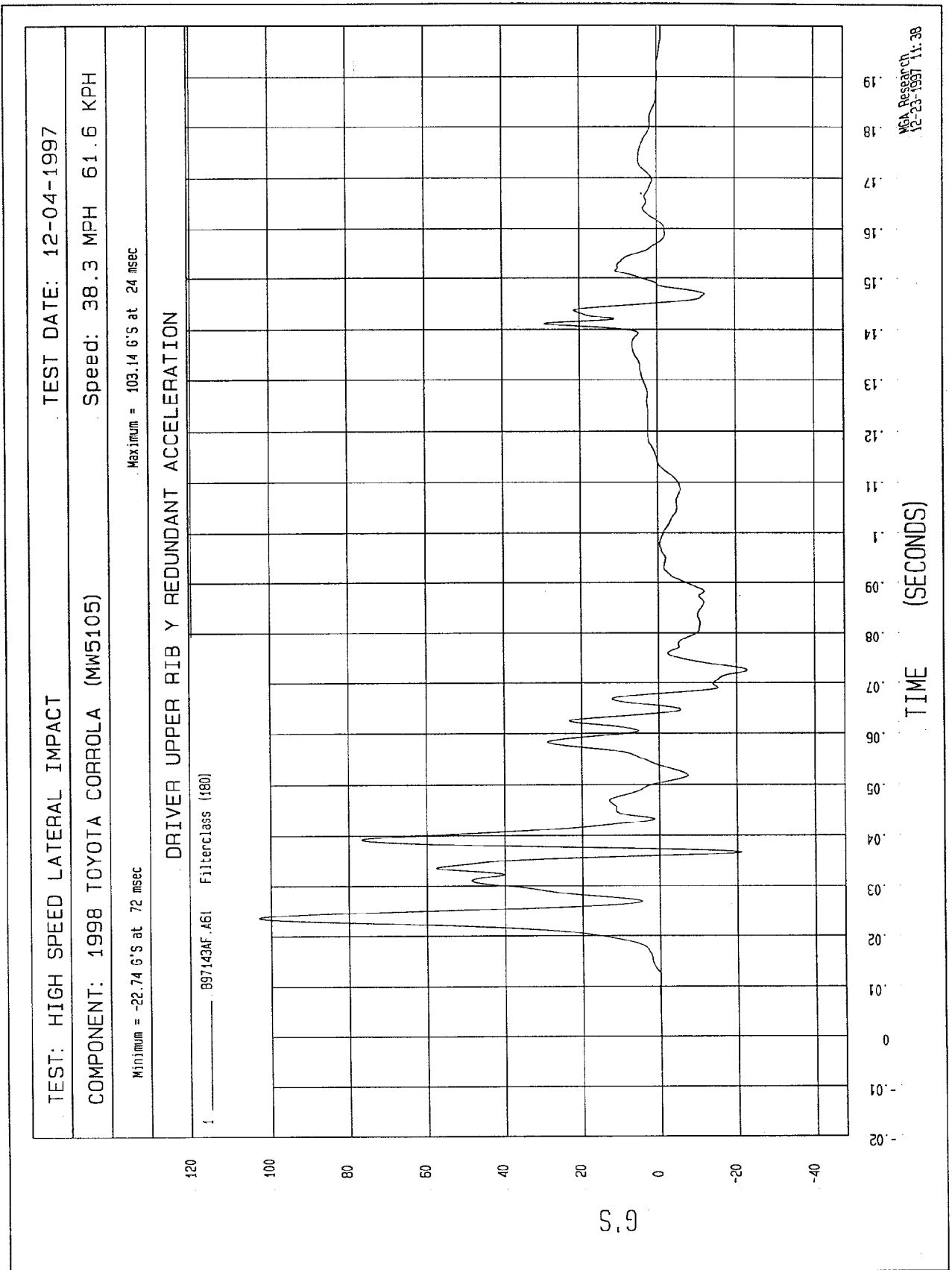


MCA Research
12-05-1997 11:15

TIME Seconds





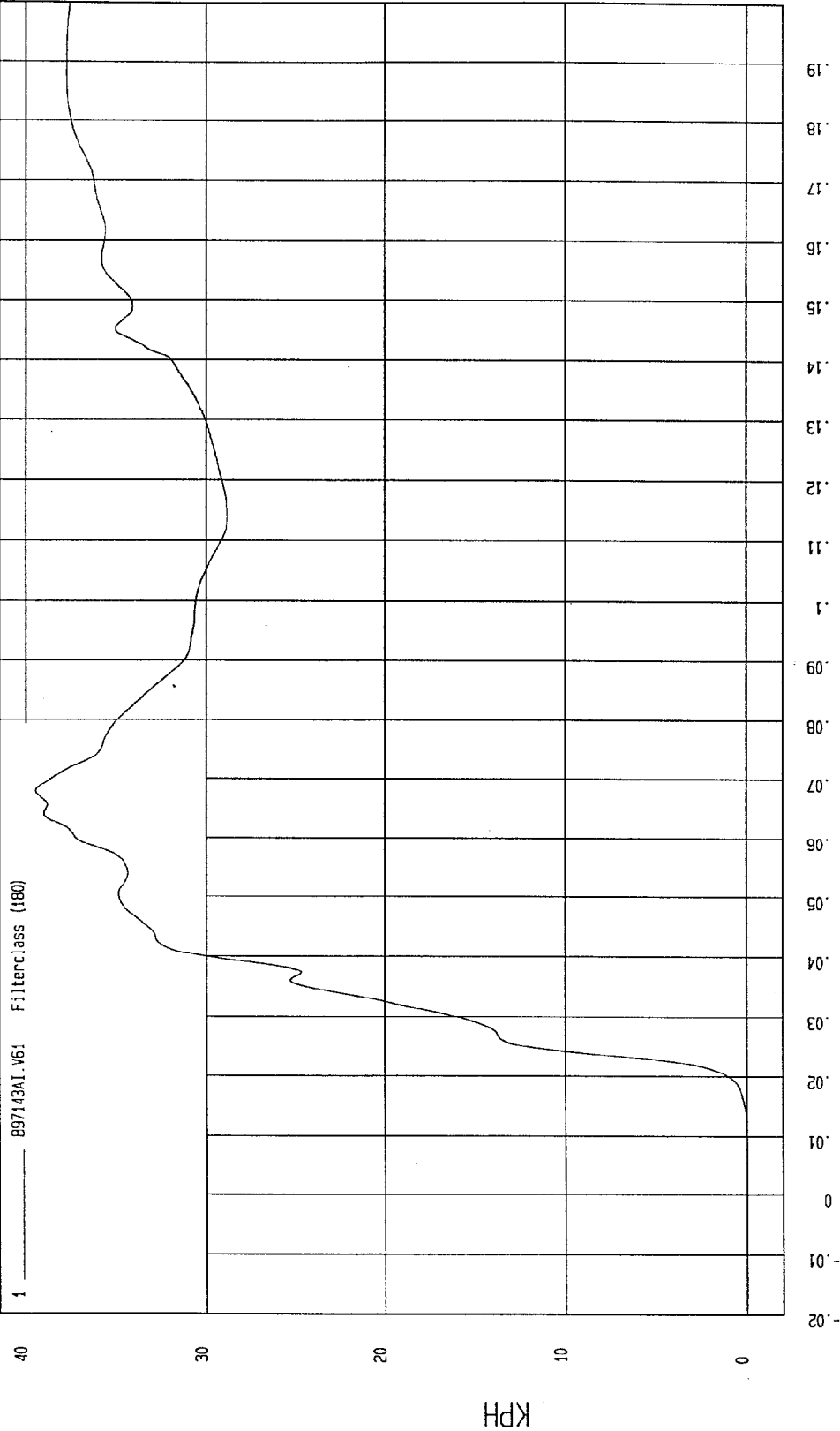


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

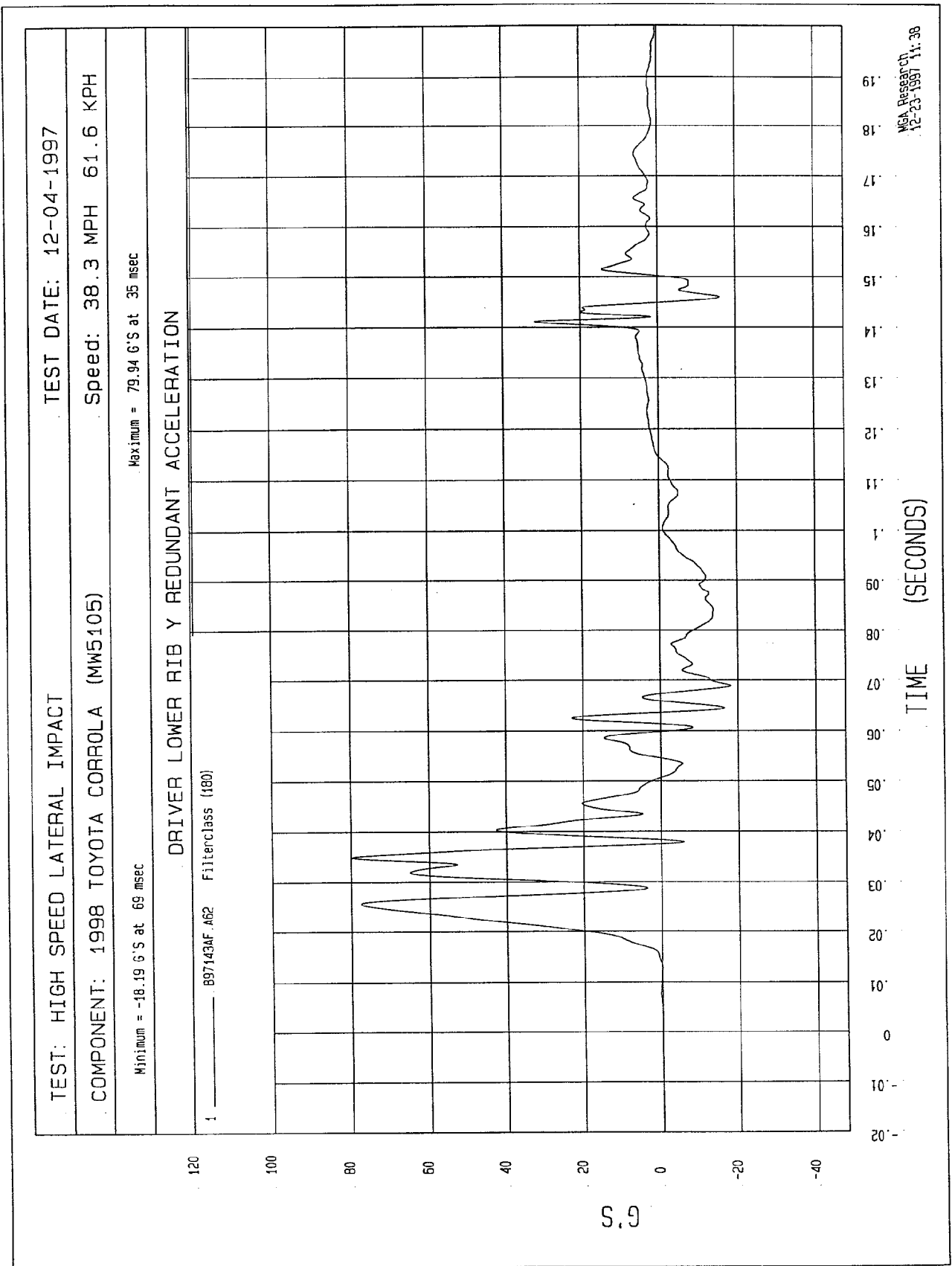
Minimum = -1.91E-02 KPH at 4 msec Maximum = 39.47 KPH at 68 msec

DRIVER UPPER RIB Y REDUNDANT VELOCITY



WCA Research
12-23-1997 11:40

TIME Seconds

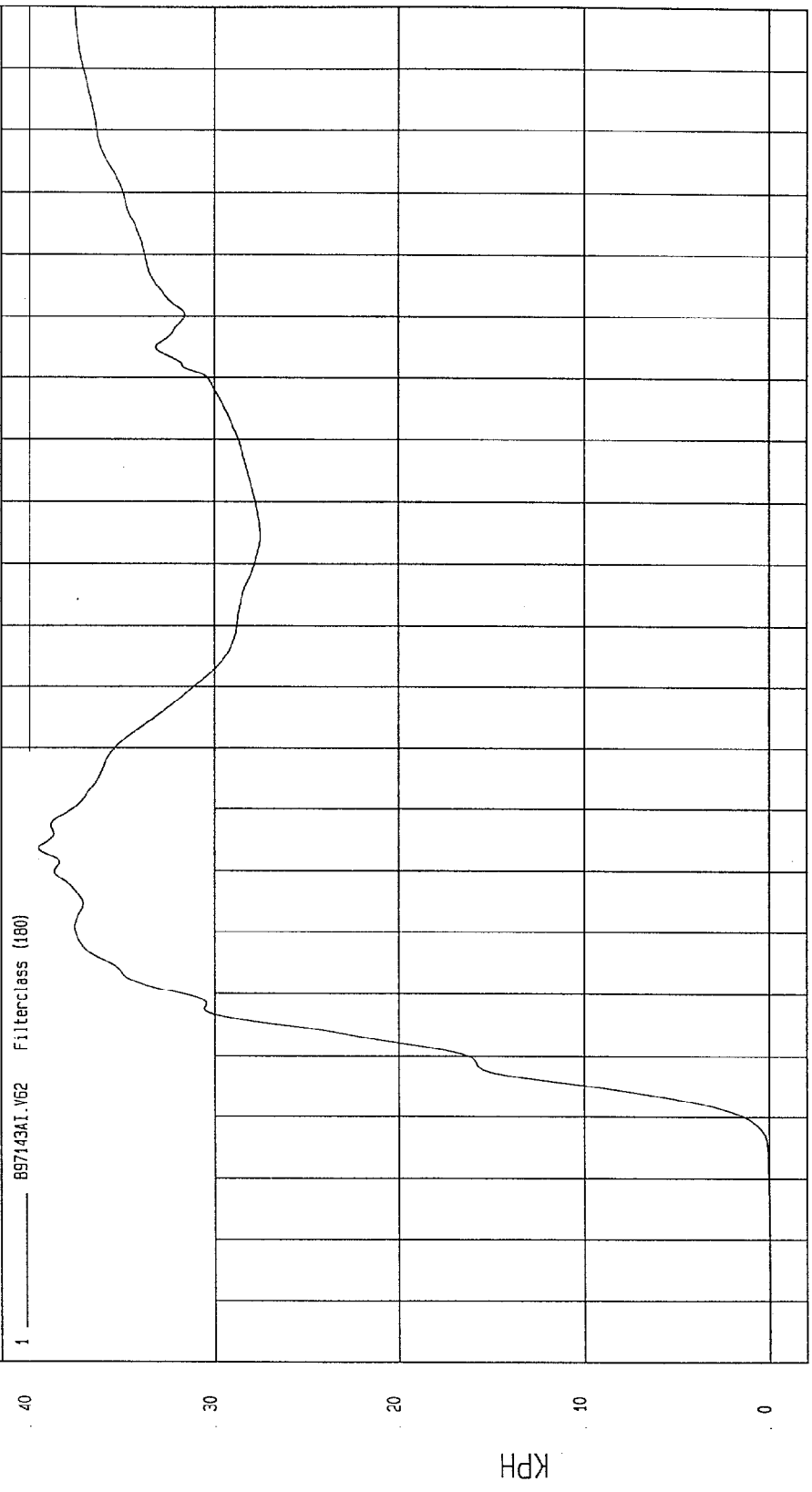


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -1.54E-02 KPH at -11 msec Maximum = 39.51 KPH at 64 msec

DRIVER LOWER RIB Y REDUNDANT VELOCITY



TIME Seconds

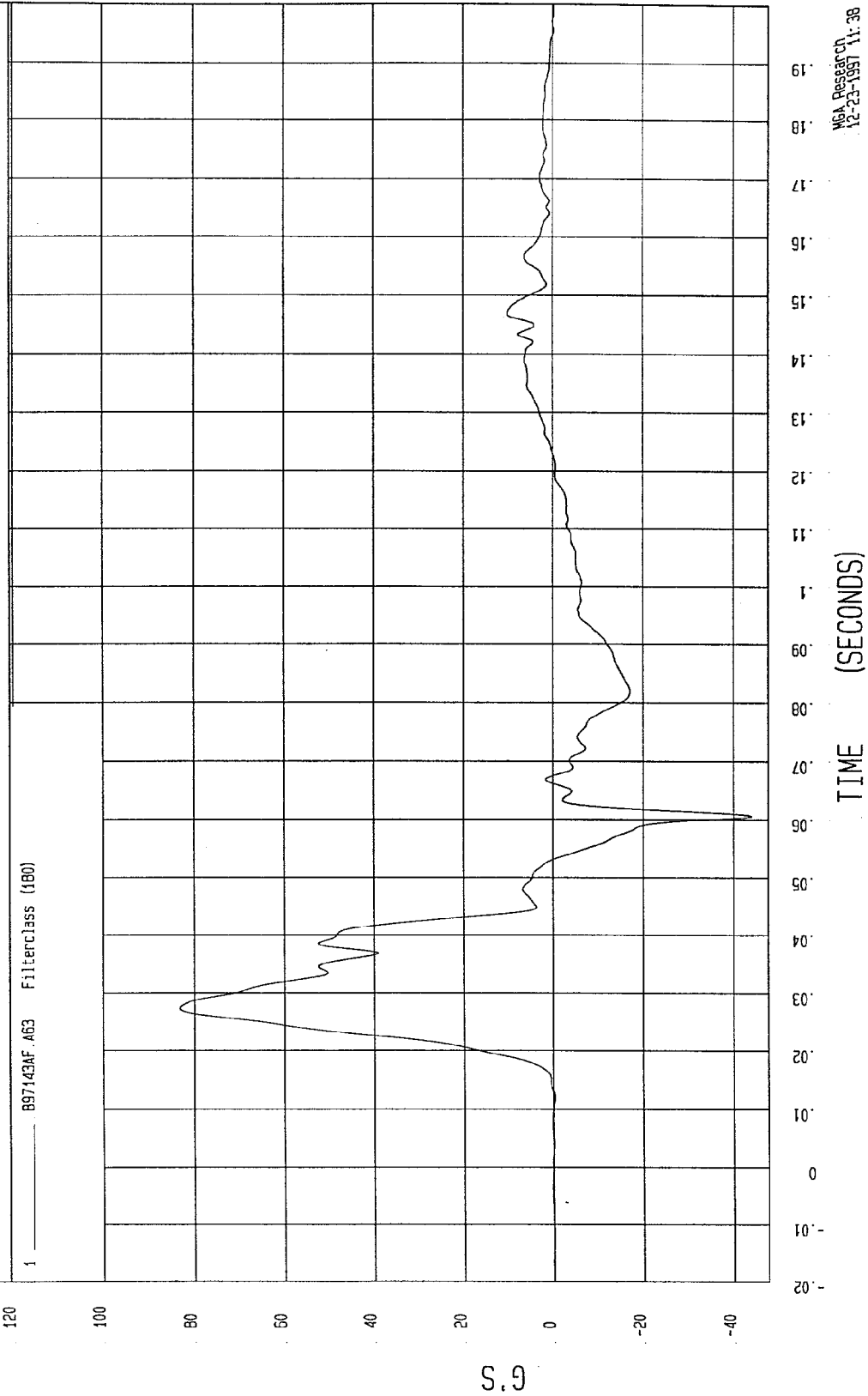
WCA Research
12-23-1997 11:40

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -43.89 G'S at 61 msec Maximum = 83.20 G'S at 27 msec

DRIVER LOWER SPINE Y REDUNDANT ACCELERATION

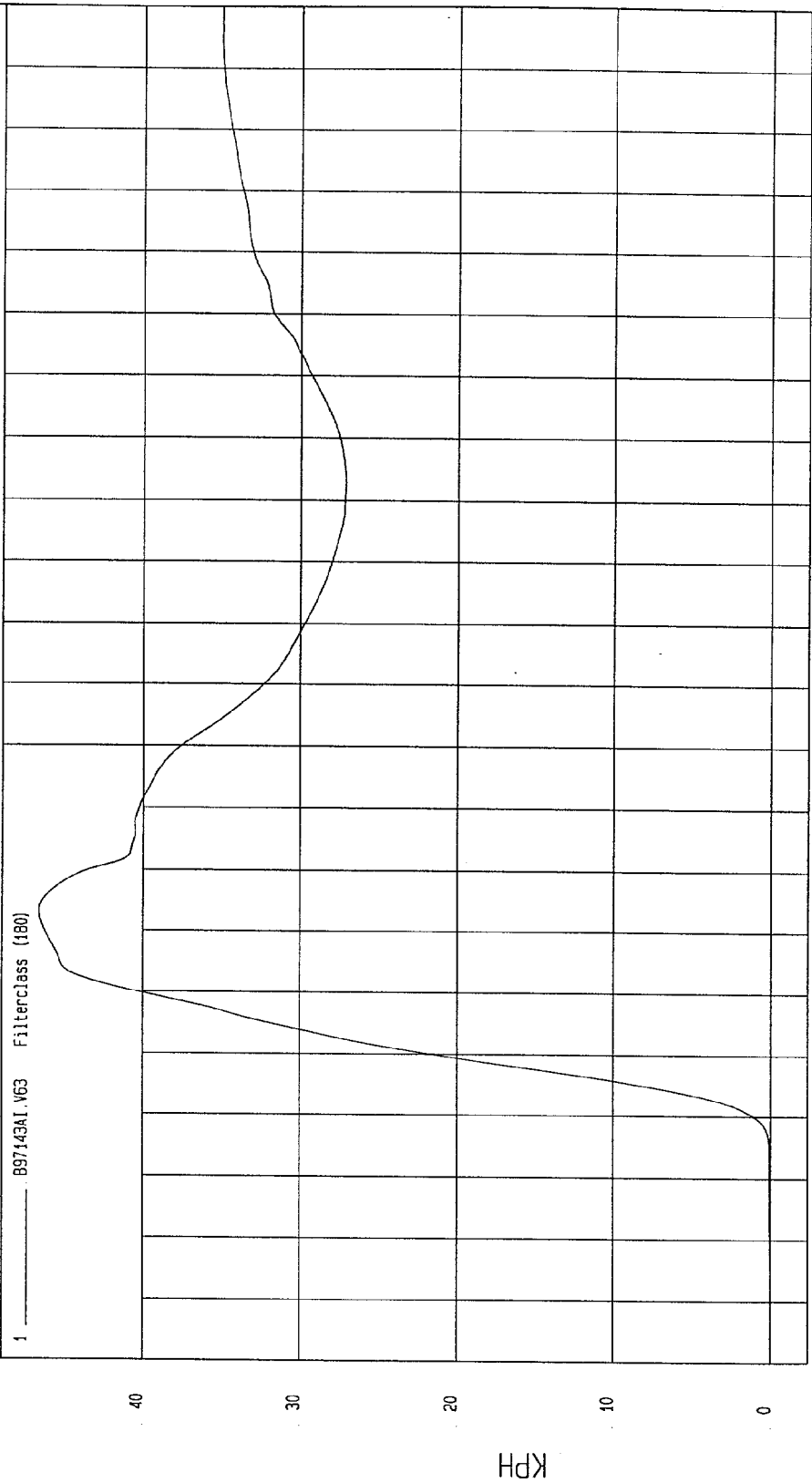


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -1.85E-03 KPH at -10 msec Maximum = 46.57 KPH at 53 msec

DRIVER LOWER SPINE Y REDUNDANT VELOCITY



TIME Seconds

61.6
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
-1
-2

MOA Research
12-23-1997 11:40

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -19.40 G'S at 47 msec Maximum = 107.35 G'S at 27 msec

DRIVER PELVIS Y REDUNDANT ACCELERATION

1 _____ 897143AF.A65 Filterclass (180)

120

100

80

60

40

20

0

-20

-40

G.S

.19

.18

.17

.16

.15

.14

.13

.12

.11

.1

.09

.08

.07

.06

.05

.04

.03

.02

.01

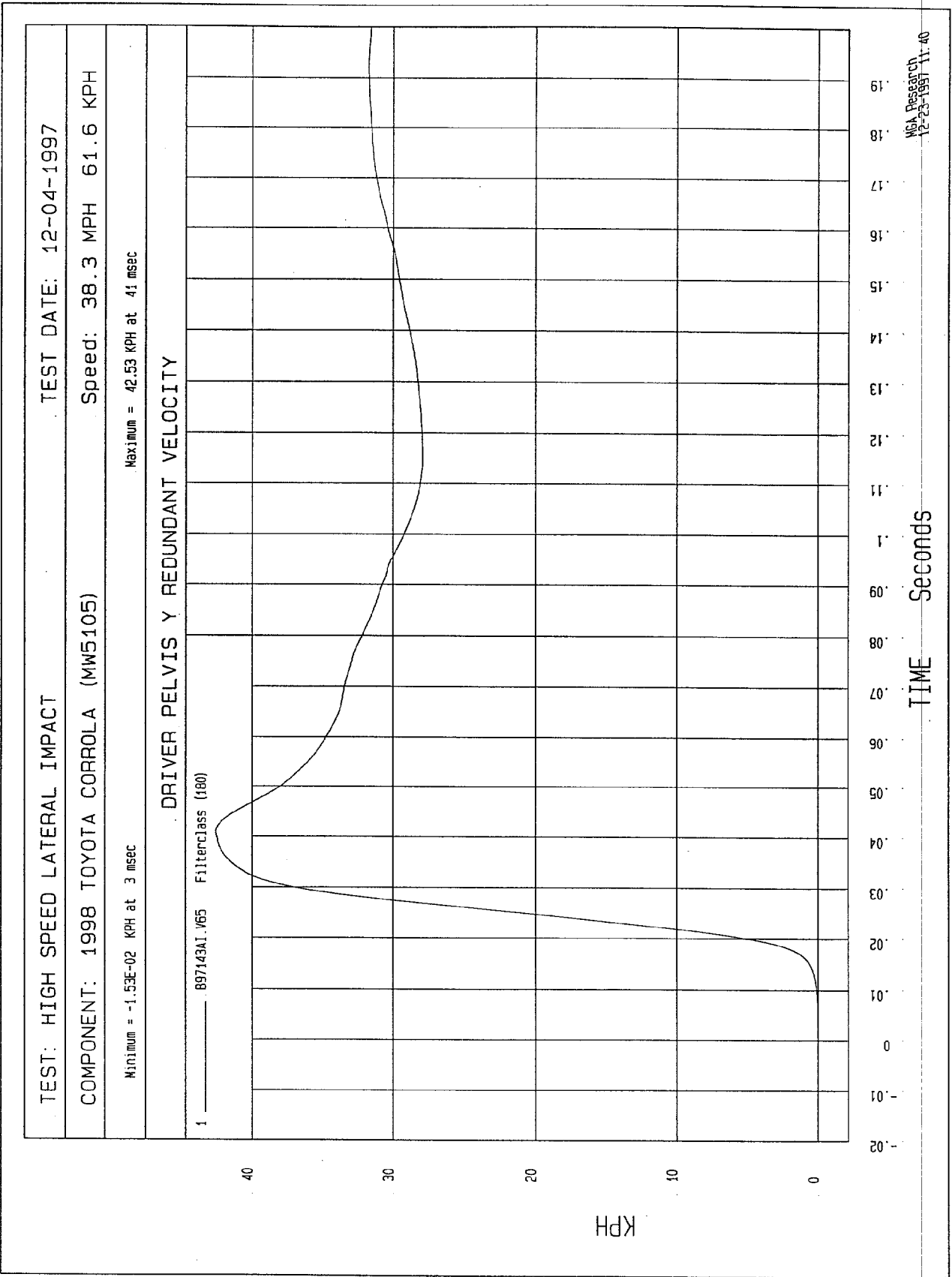
0

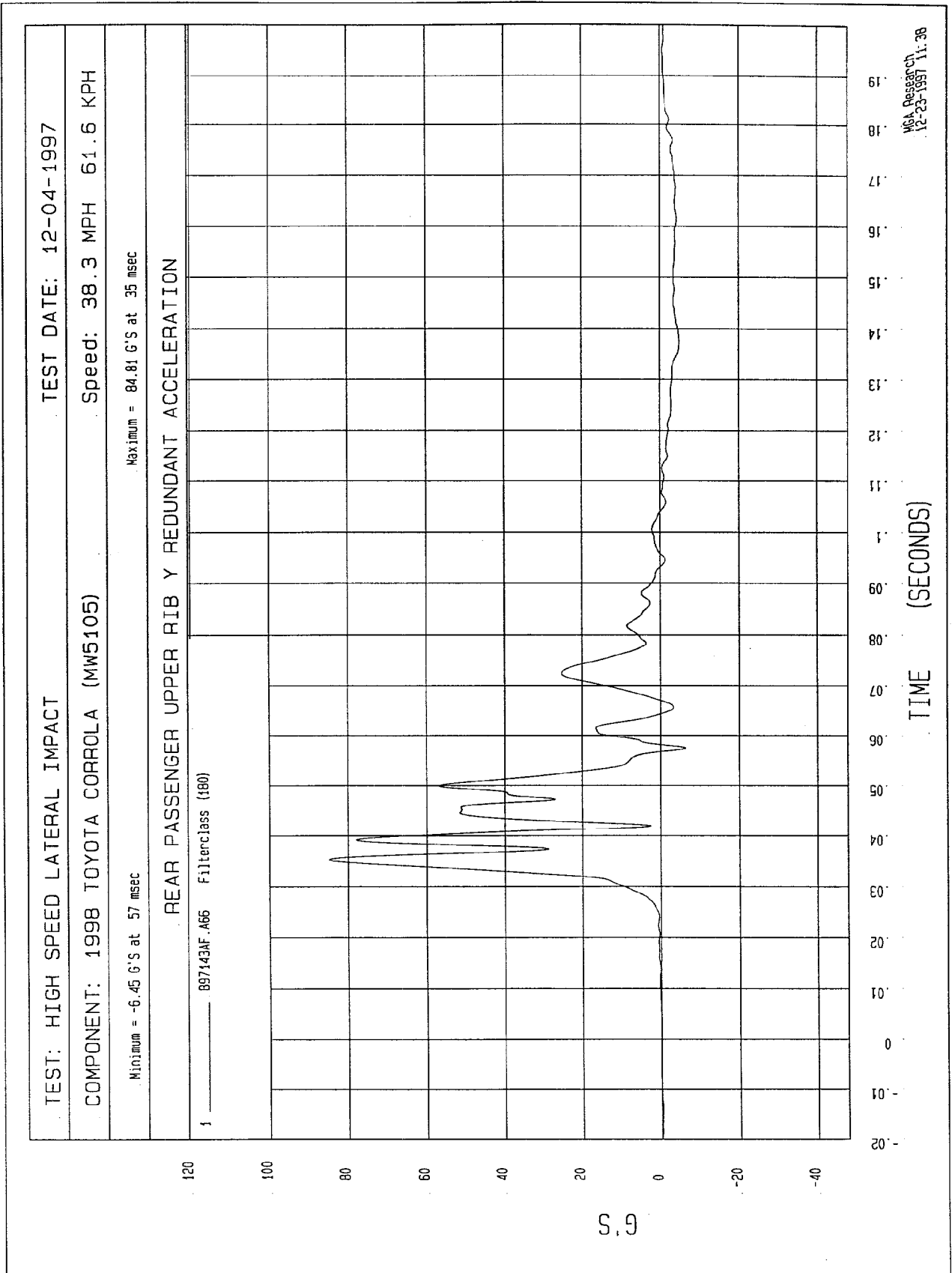
-.01

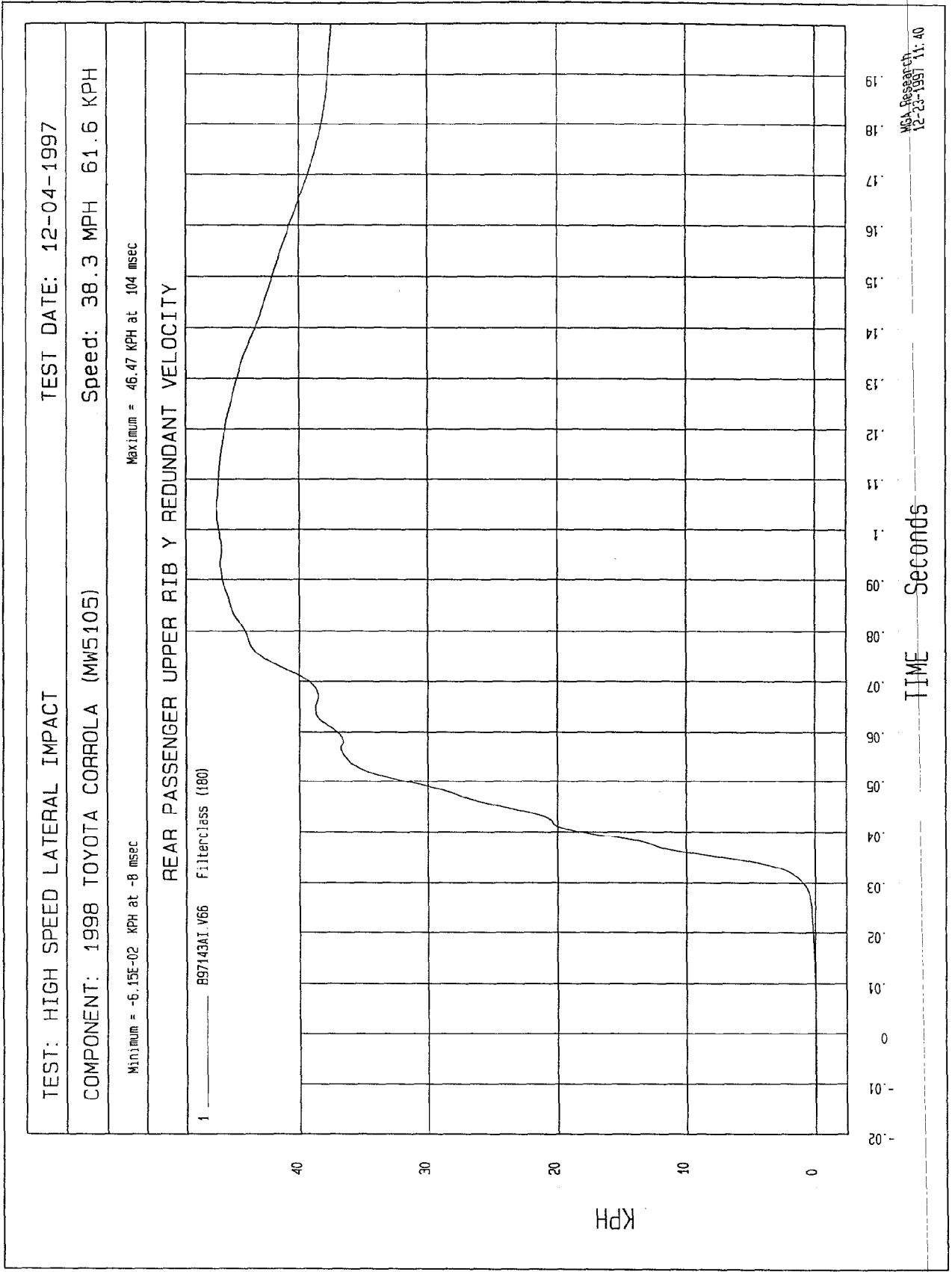
-.02

TIME (SECONDS)

MCA Research
12-23-1997 11:38







TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

SPEED: 38.3 MPH 61.6 KPH

COMPONENT: 1998 TOYOTA CORROLA (MW5105)

Maximum = 83.16 G'S at 34 msec

Minimum = -24.83 G'S at 65 msec

REAR PASSENGER LOWER RIB Y REDUNDANT ACCELERATION

1 _____ B97143AF.AE7 Filterclass (180)

120

100

80

60

40

20

0

-20

-40

G'S

19

18

17

16

15

14

13

12

11

10

09

08

07

06

05

04

03

02

01

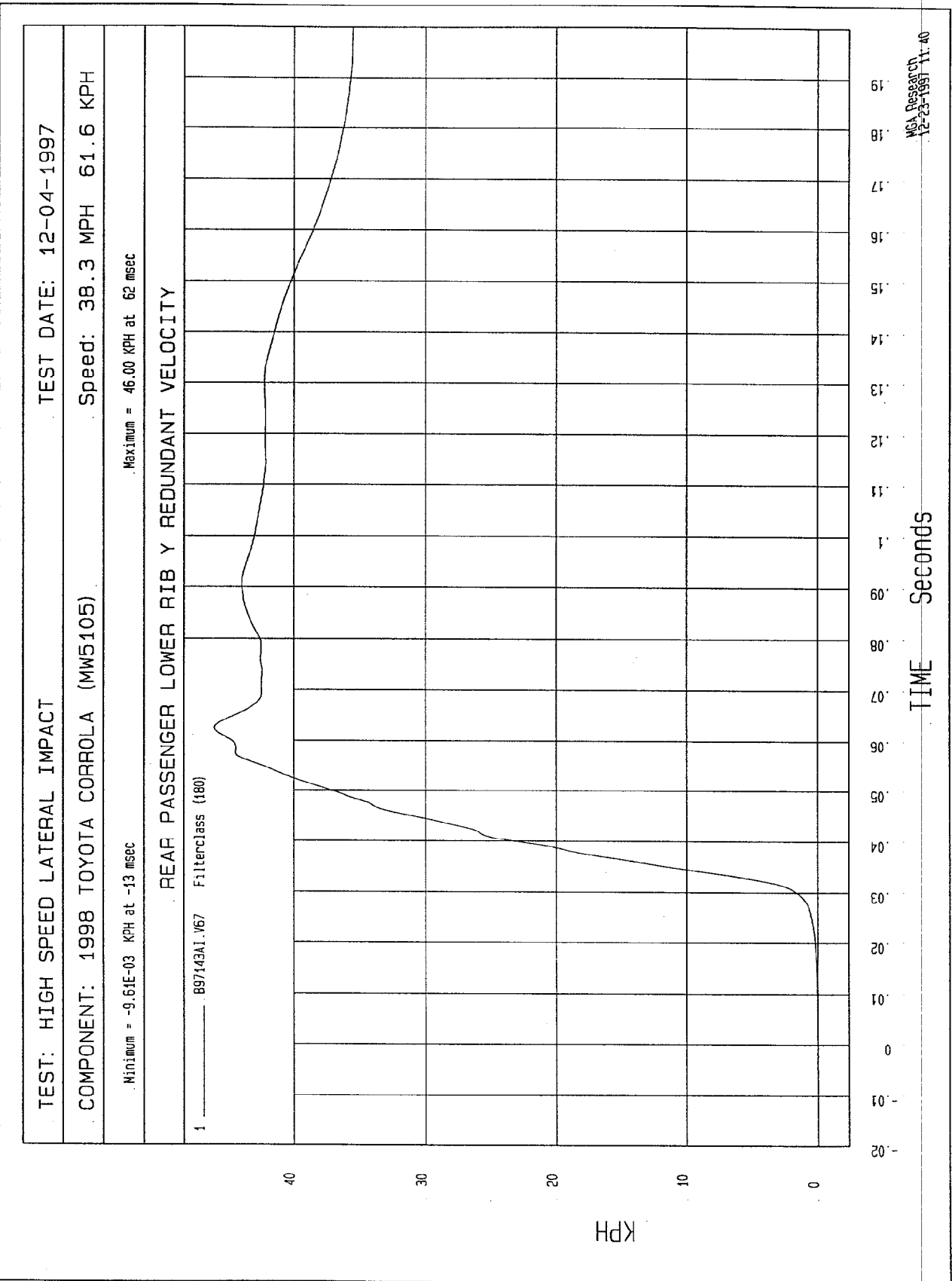
0

-01

-02

TIME (SECONDS)

MSA Research
12-23-1997 11:39



TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 12-04-1997

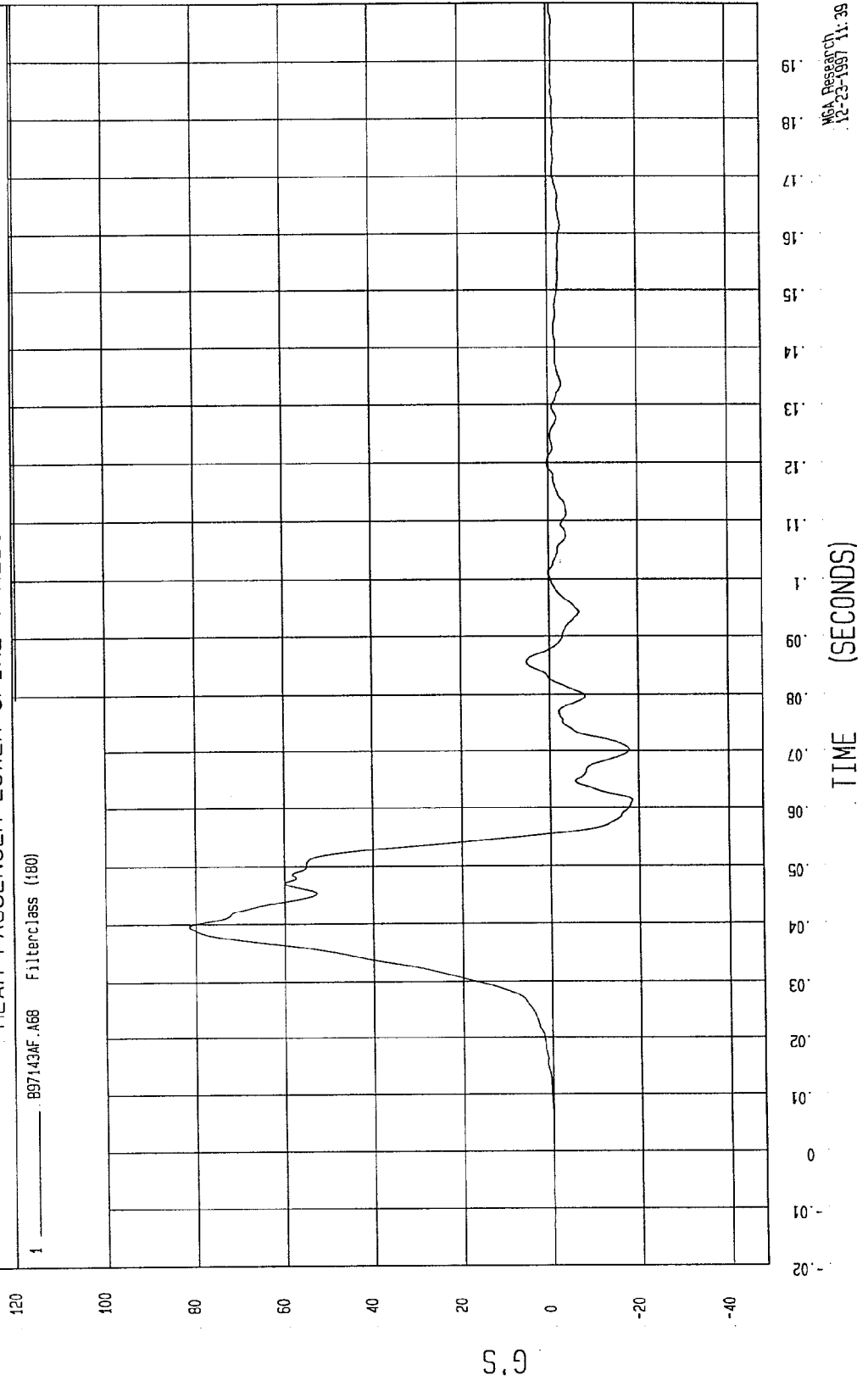
Speed: 38.3 MPH 61.6 KPH

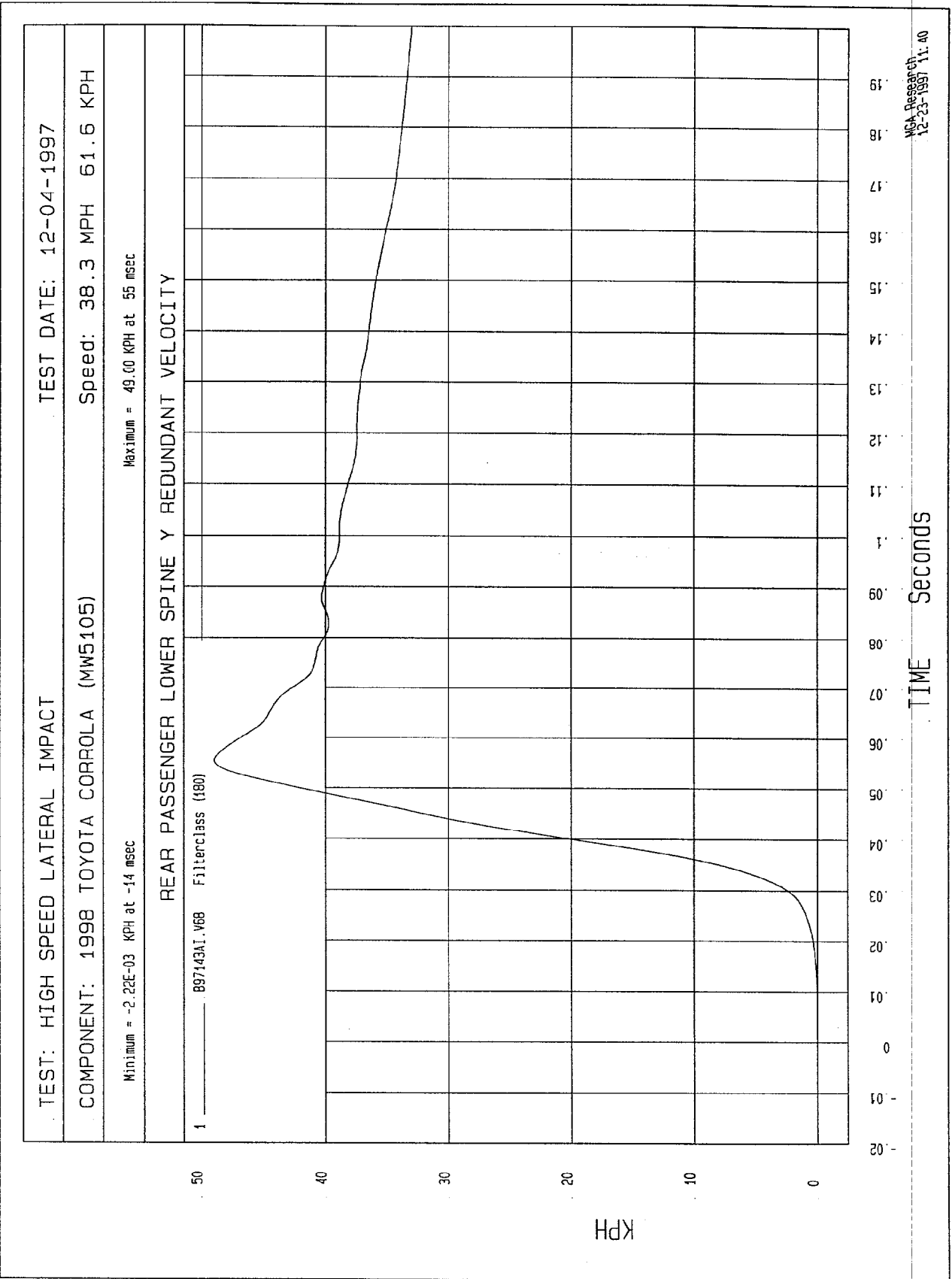
COMPONENT: 1998 TOYOTA CORROLA (MW5105)

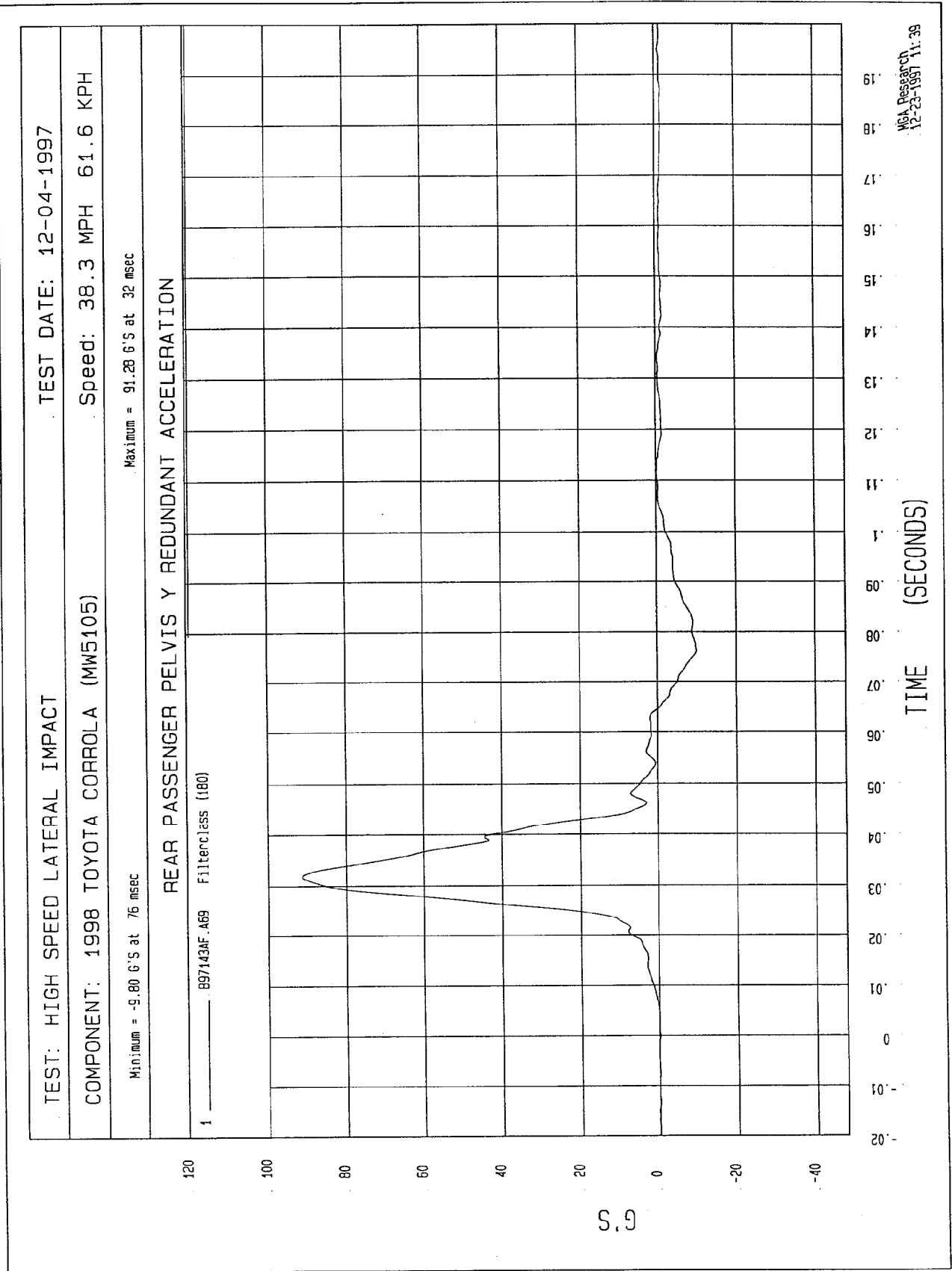
Maximum = 81.48 G'S at 40 msec

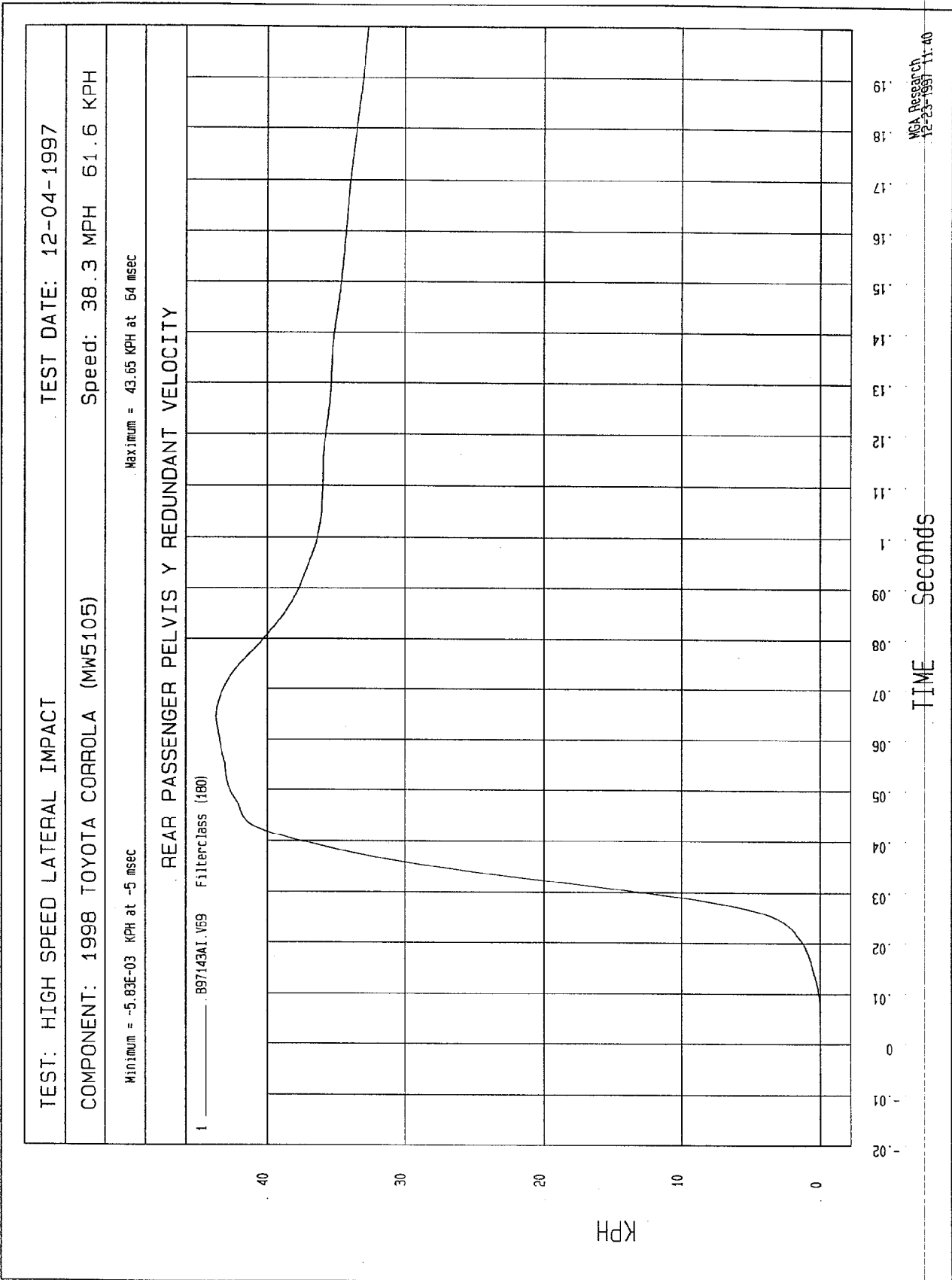
Minimum = -18.47 G'S at 61 msec

REAR PASSENGER LOWER SPINE Y REDUNDANT ACCELERATION

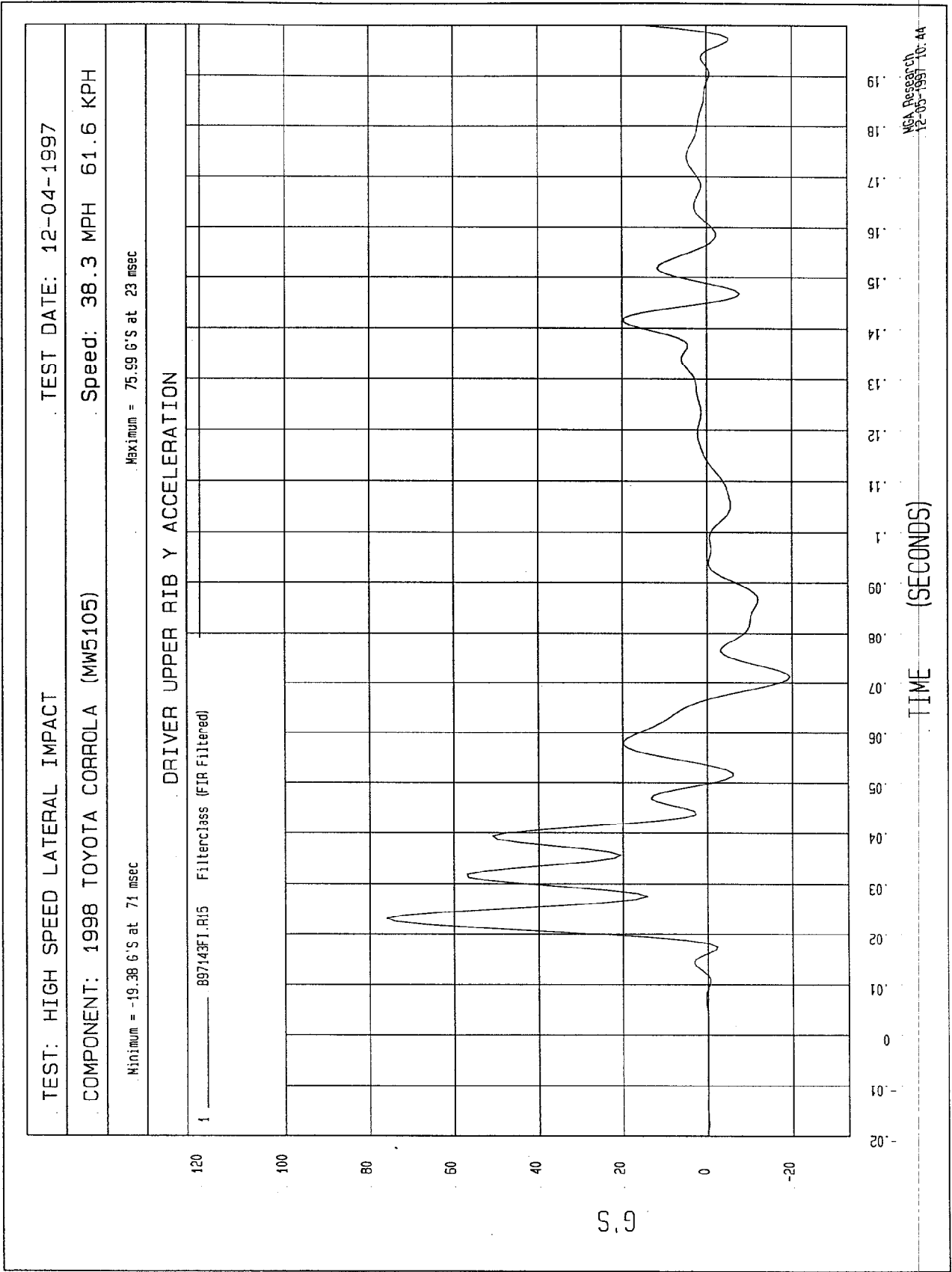


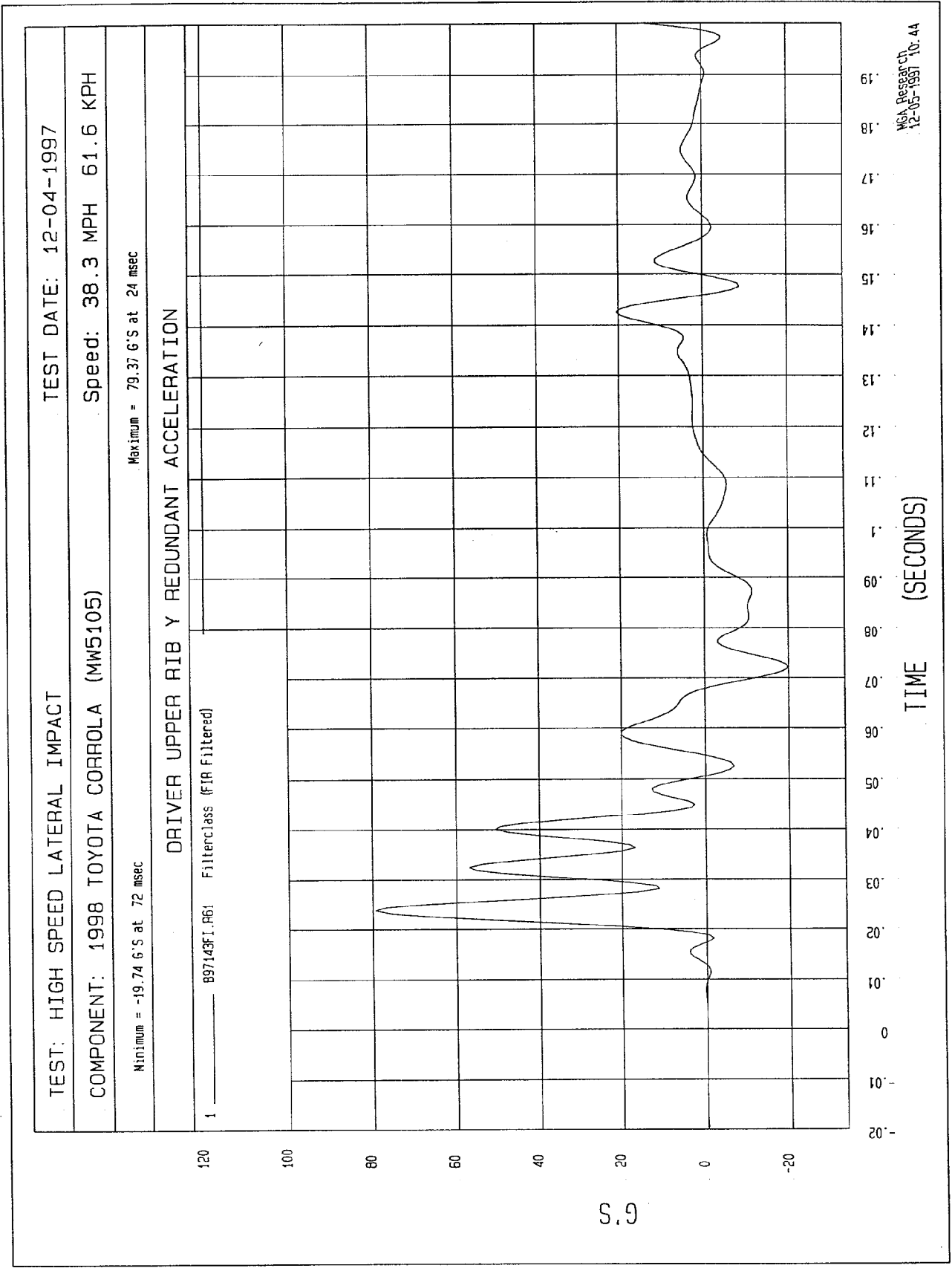






FINITE IMPULSE RESPONSE (FIR) FILTERED DATA





TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 12-04-1997

Speed: 38.3 MPH 61.6 KPH

COMPONENT: 1998 TOYOTA CORROLA (MW5105)

Maximum = 75.66 G'S at 33 msec

Minimum = -13.88 G'S at 83 msec

DRIVER LOWER RIB Y ACCELERATION

1 _____ B97143F1.R16 Filterclass (FIR Filtered)

120

100

80

60

40

20

0

-20

G

19

18

17

16

15

14

13

12

11

10

09

08

07

06

05

04

03

02

01

0

-1

-2

TIME (SECONDS)

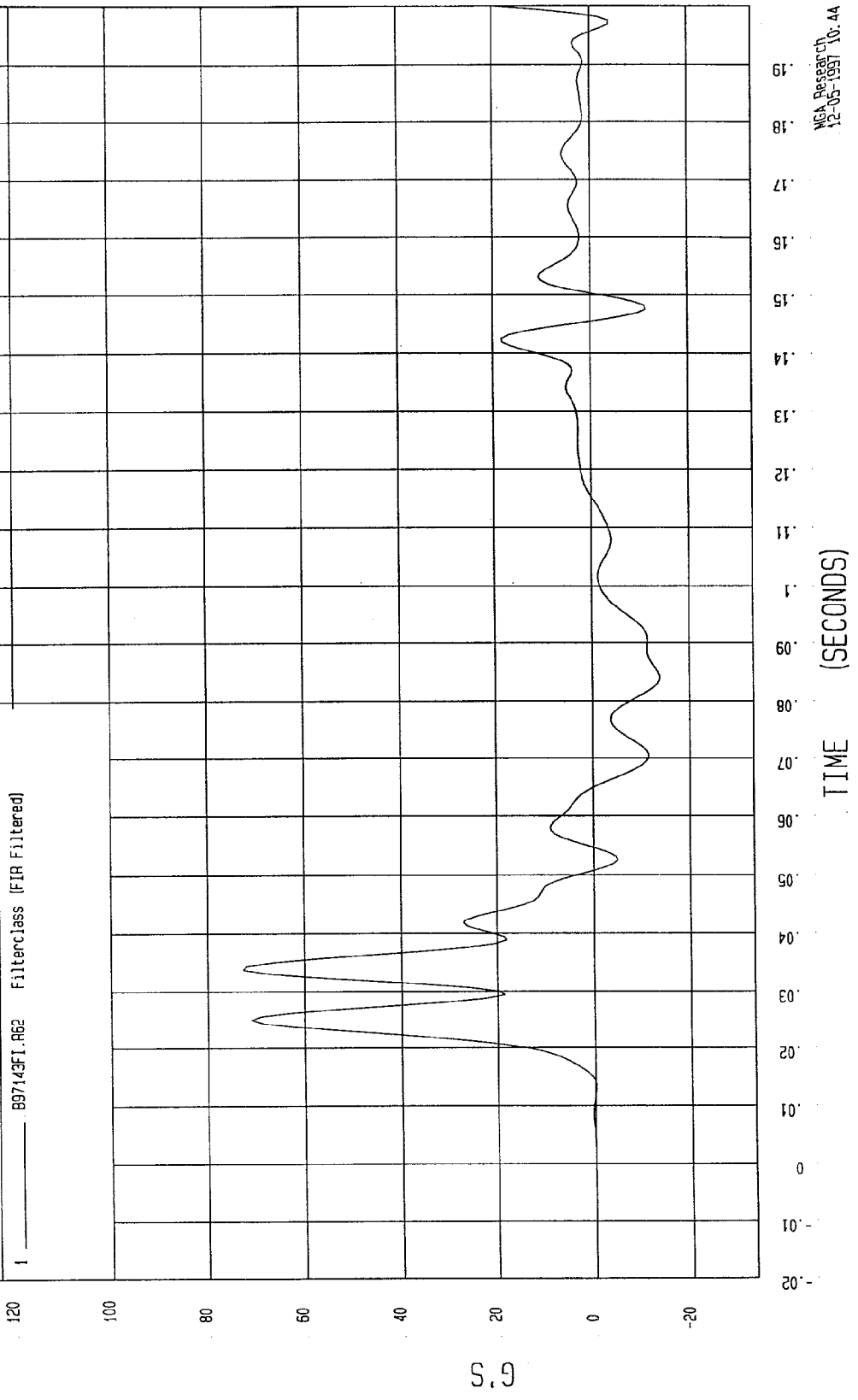
MCA Research
12-03-1997 10:44

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -13.79 G'S at 84 msec Maximum = 72.71 G'S at 34 msec

DRIVER LOWER RIB Y REDUNDANT ACCELERATION



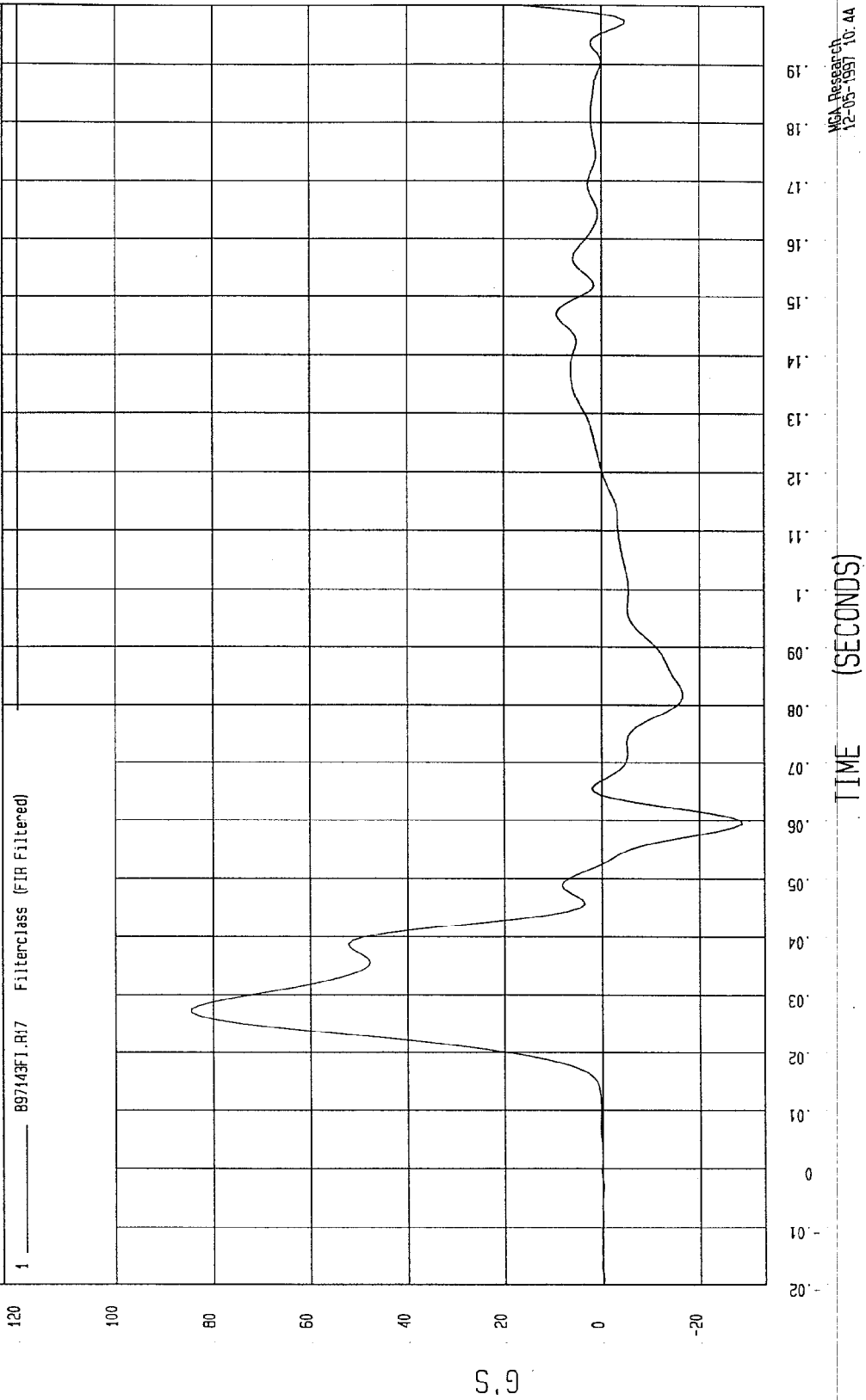
MCA Research
12-05-1997 10:44

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

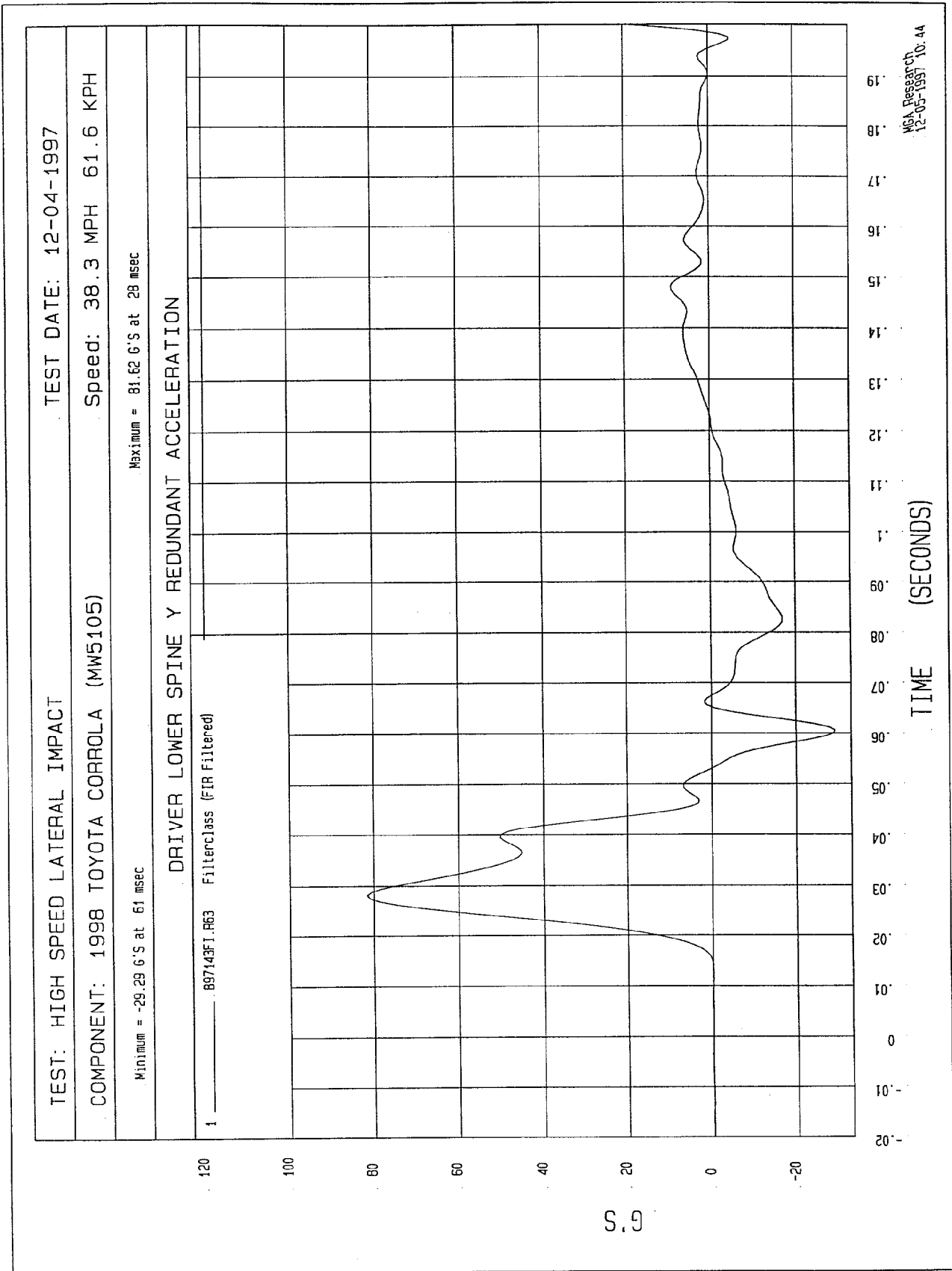
COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

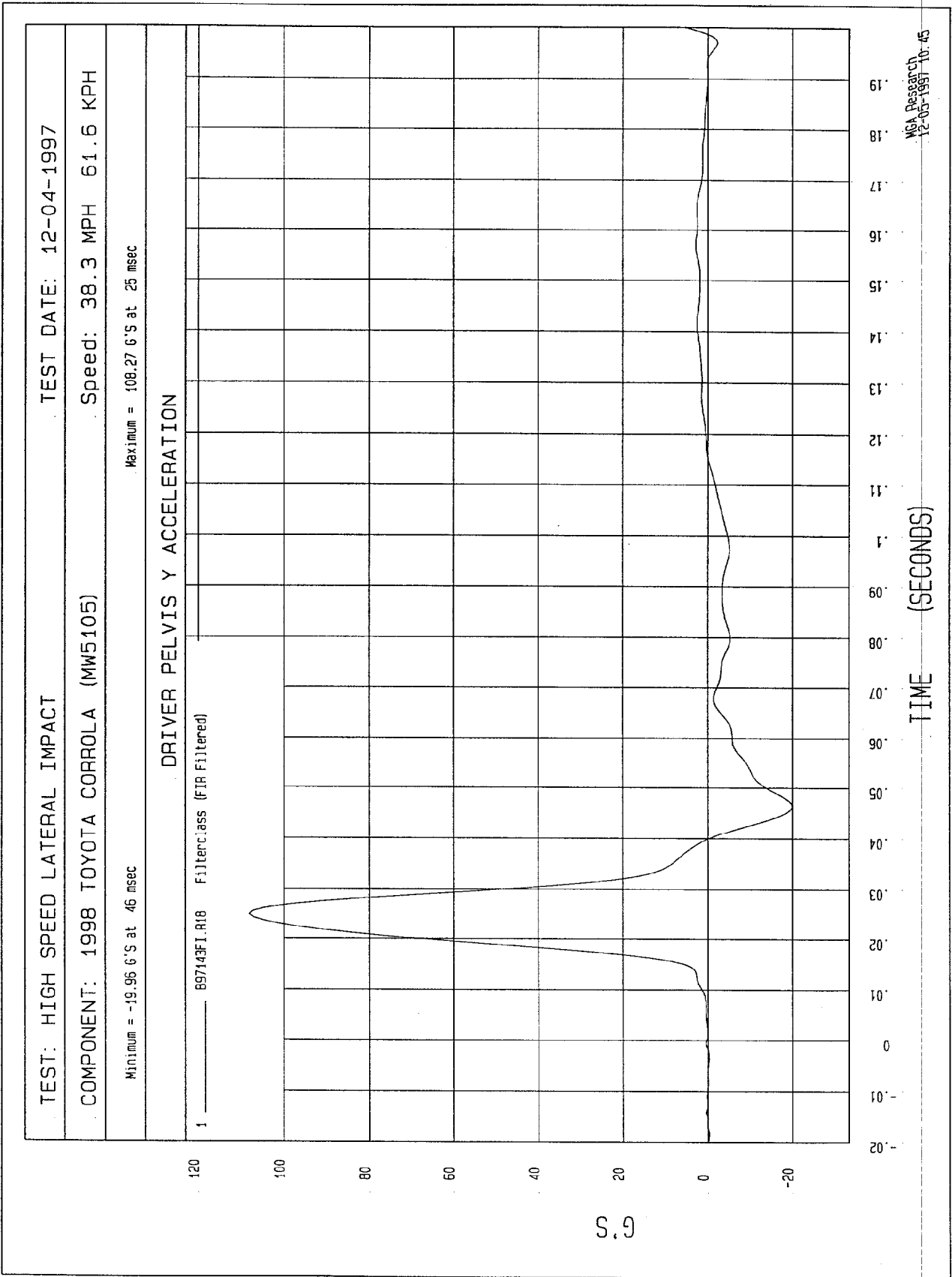
Minimum = -28.46 G'S at 59 msec Maximum = 84.53 G'S at 28 msec

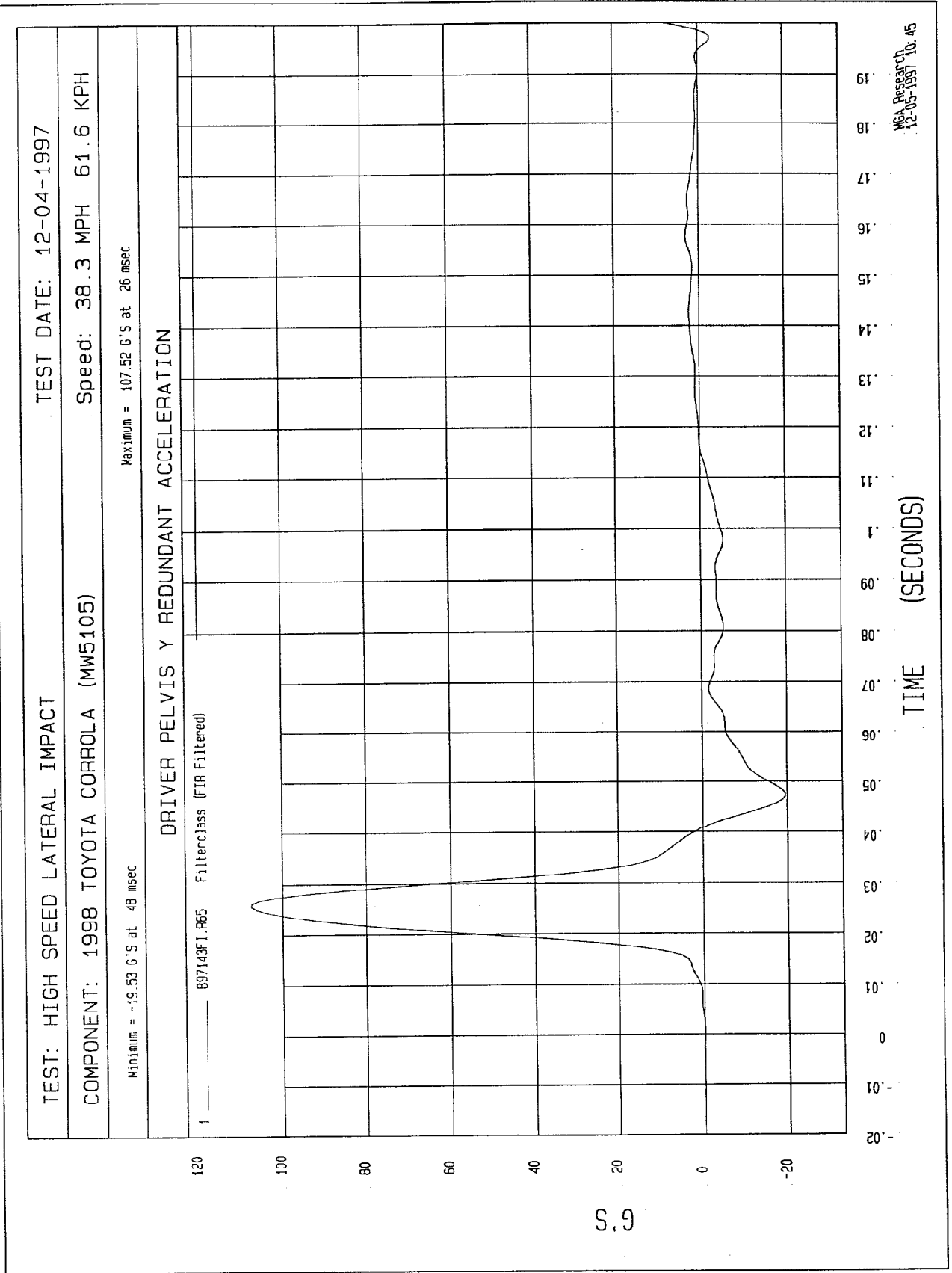
DRIVER LOWER SPINE Y ACCELERATION



MOA Research
12-05-1997 10:44







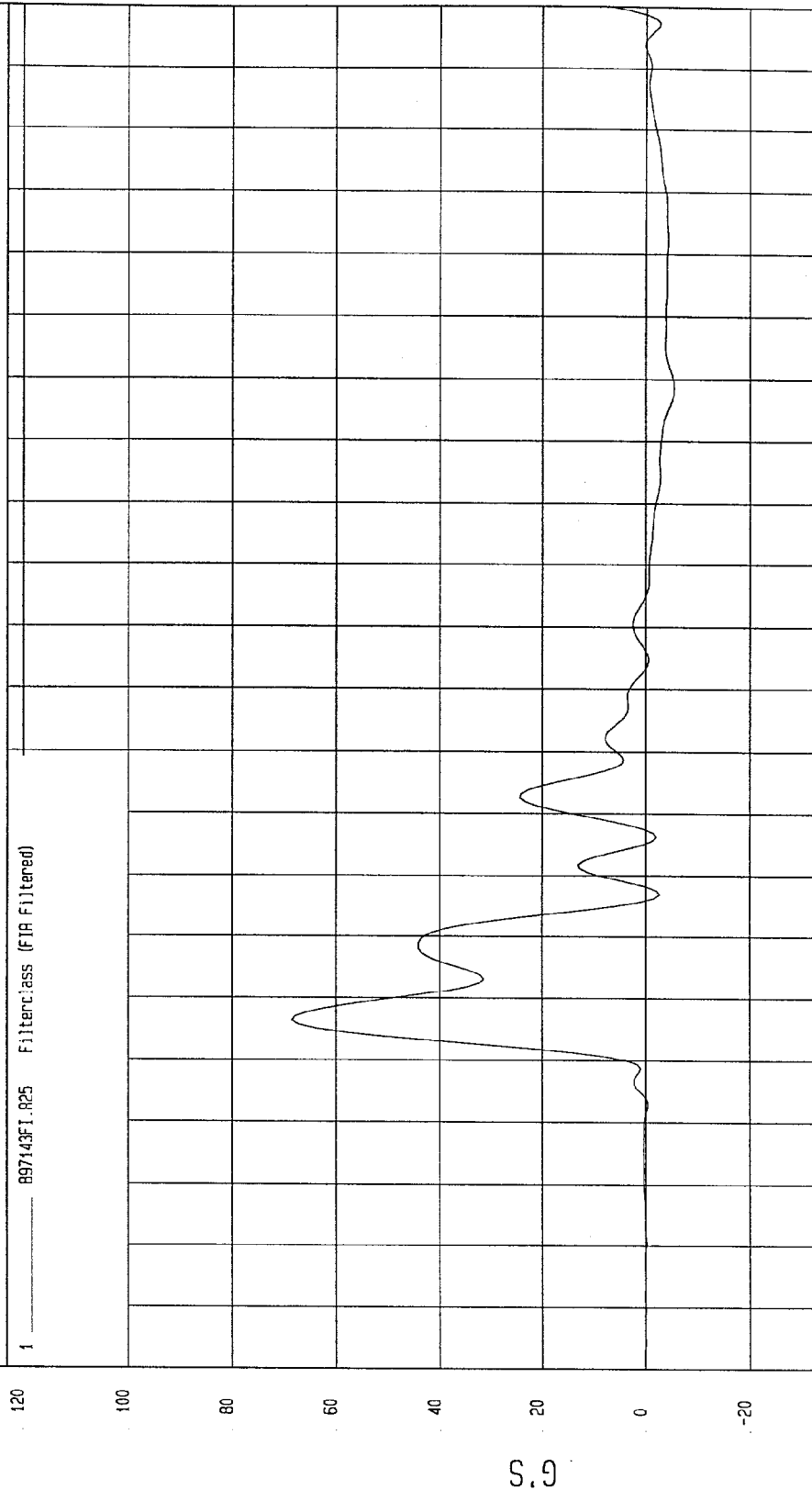
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -5.45 G'S at 139 msec
Maximum = 68.46 G'S at 36 msec

REAR PASSENGER UPPER RIB Y ACCELERATION

1 897143F1.025 Filter: class (FIR Filtered)



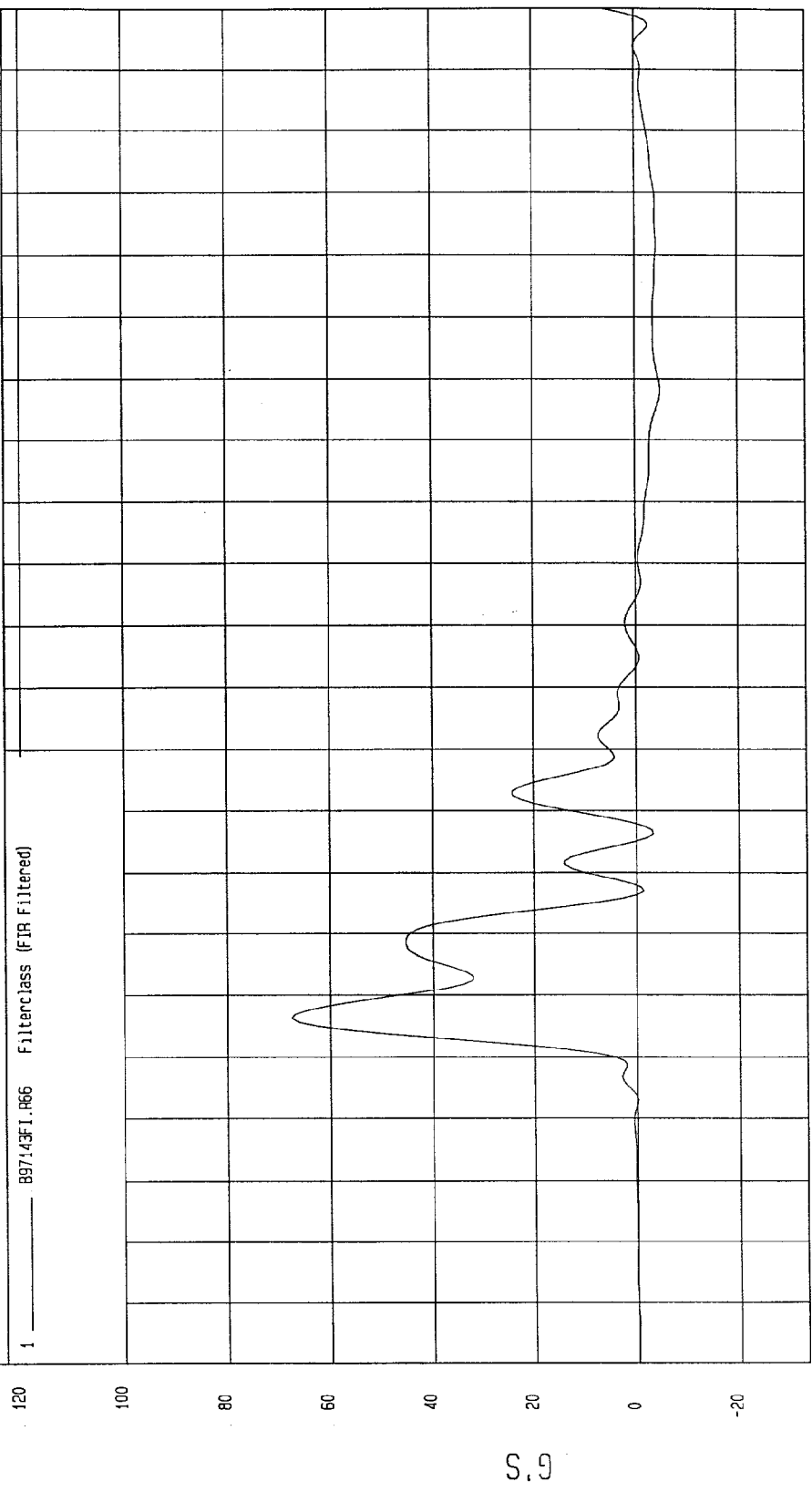
MCA Research
12-05-1997 10:45

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -4.97 G'S at 138 msec Maximum = 67.45 G'S at 36 msec

REAR PASSENGER UPPER RIB Y REDUNDANT ACCELERATION



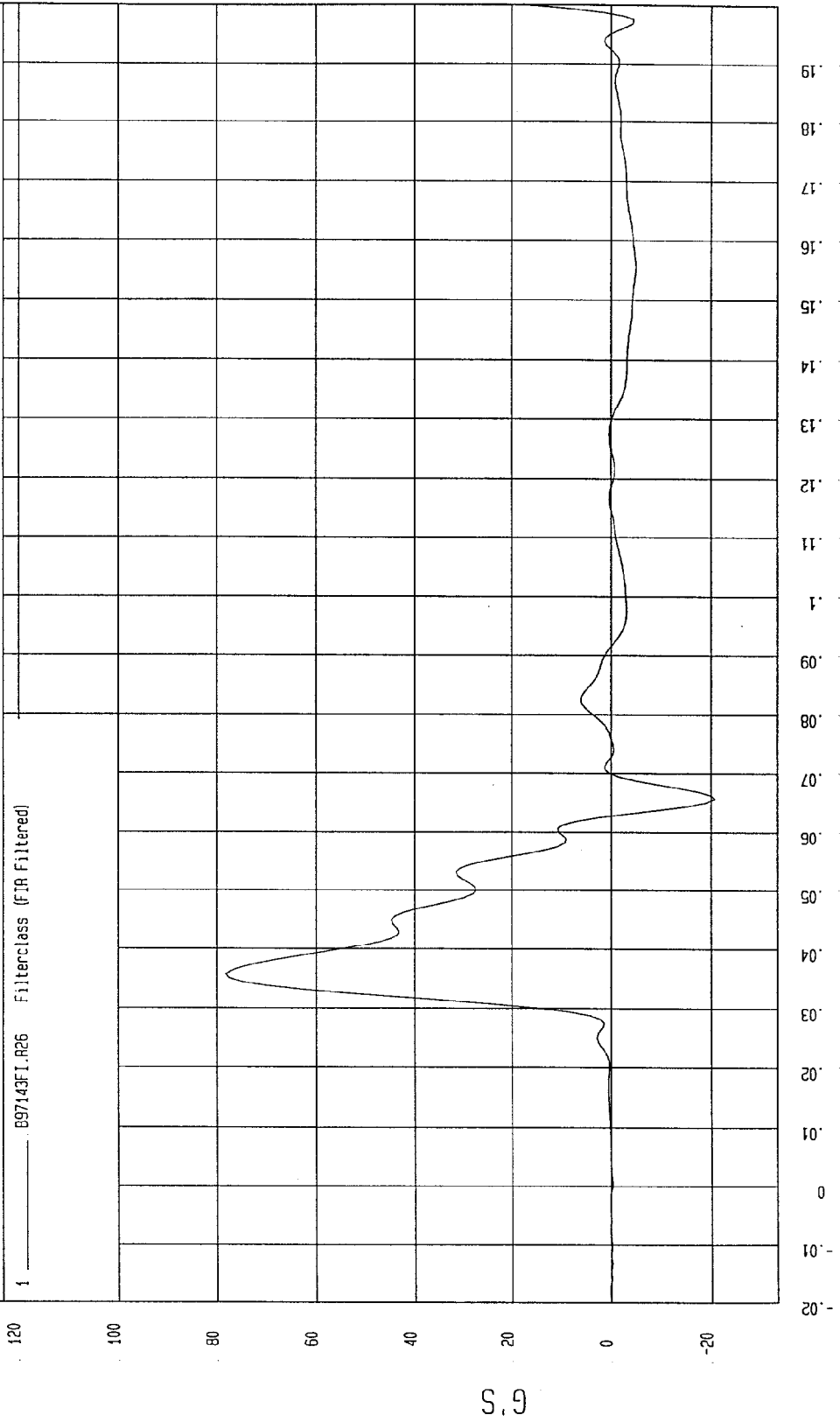
MGA Research
12-05-1997 10:45

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -20.61 G'S at 66 msec Maximum = 78.15 G'S at 36 msec

REAR PASSENGER LOWER RIB Y ACCELERATION



NSA Research
12-05-1997 10:45

TIME (SECONDS)

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -22.69 G'S at 66 msec Maximum = 77.70 G'S at 36 msec

REAR PASSENGER LOWER RIB Y REDUNDANT ACCELERATION

1 B97143F1.H67 Filterclass (FIR Filtered)

120

100

80

60

40

20

0

-20

G'S

-20

-10

0

10

20

30

40

50

60

70

80

90

100

110

120

130

140

150

160

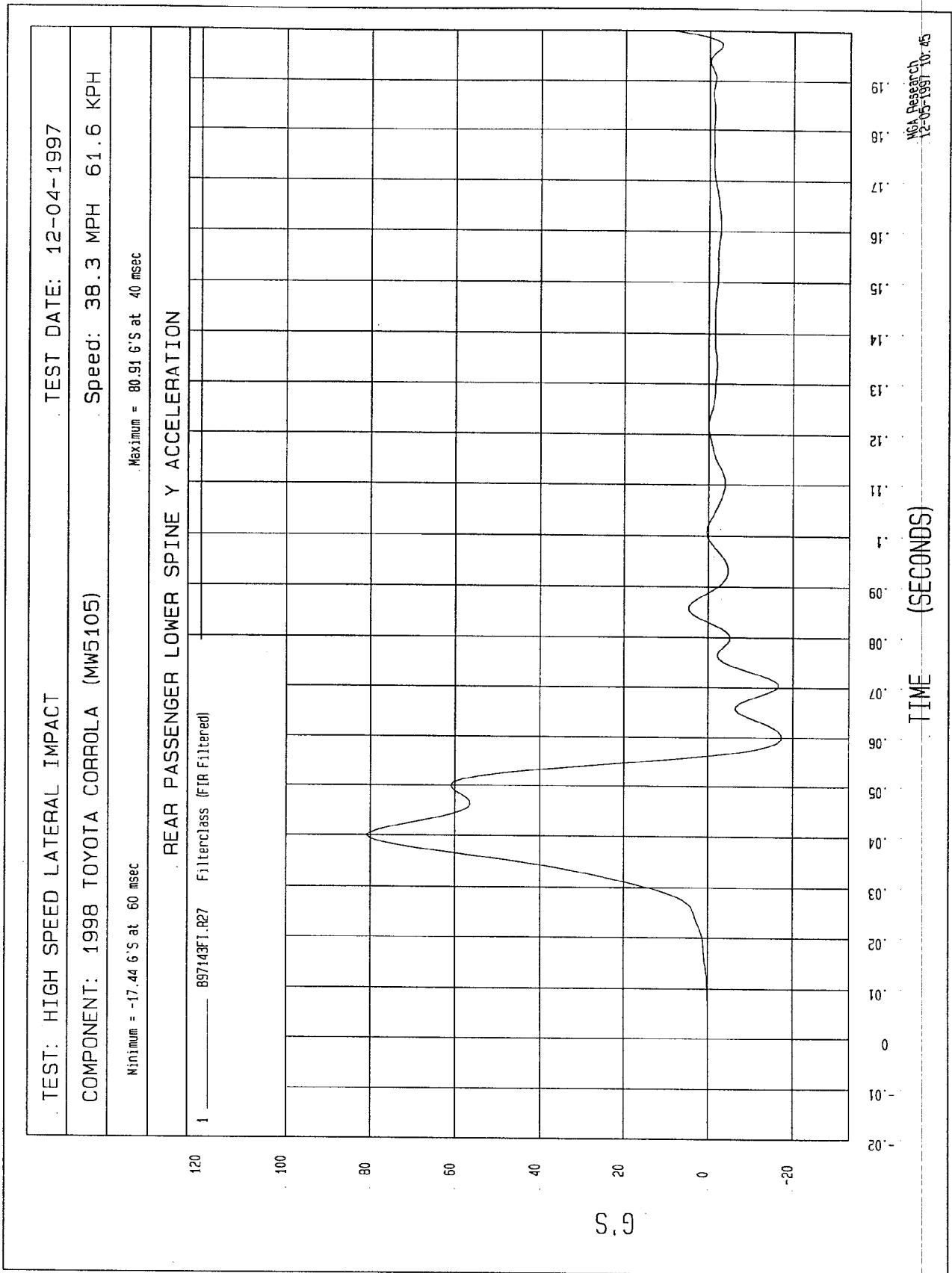
170

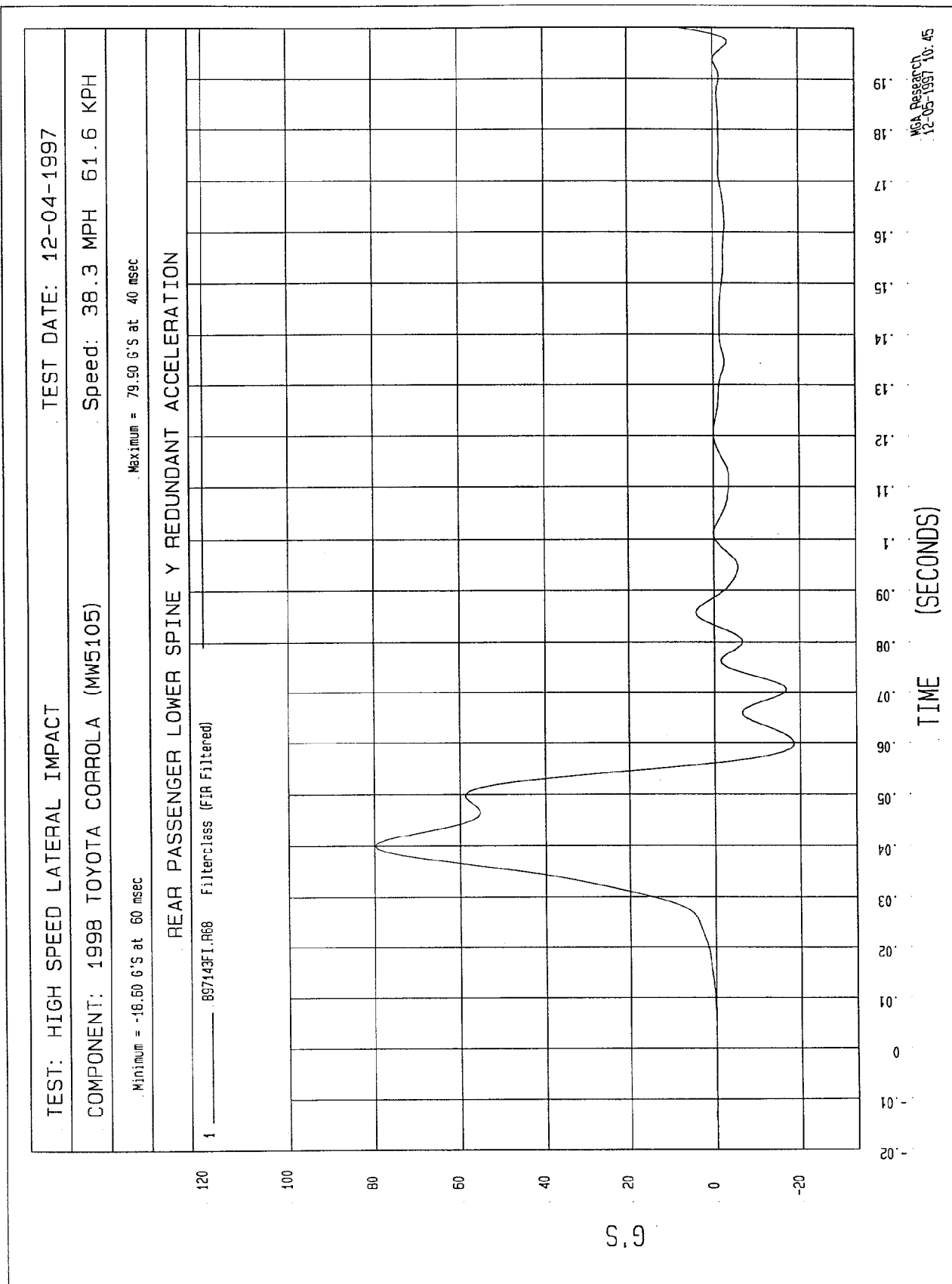
180

190

TIME (SECONDS)

NSA Research
12-05-1997 10:45





TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 12-04-1997

COMPONENT: 1998 TOYOTA CORROLA (MW5105) Speed: 38.3 MPH 61.6 KPH

Minimum = -10.03 G'S at 77 msec
Maximum = 89.70 G'S at 32 msec

REAR PASSENGER PELVIS Y ACCELERATION

1 897143F1.R28 Filterclass (FIR Filtered)

120

100

80

60

40

20

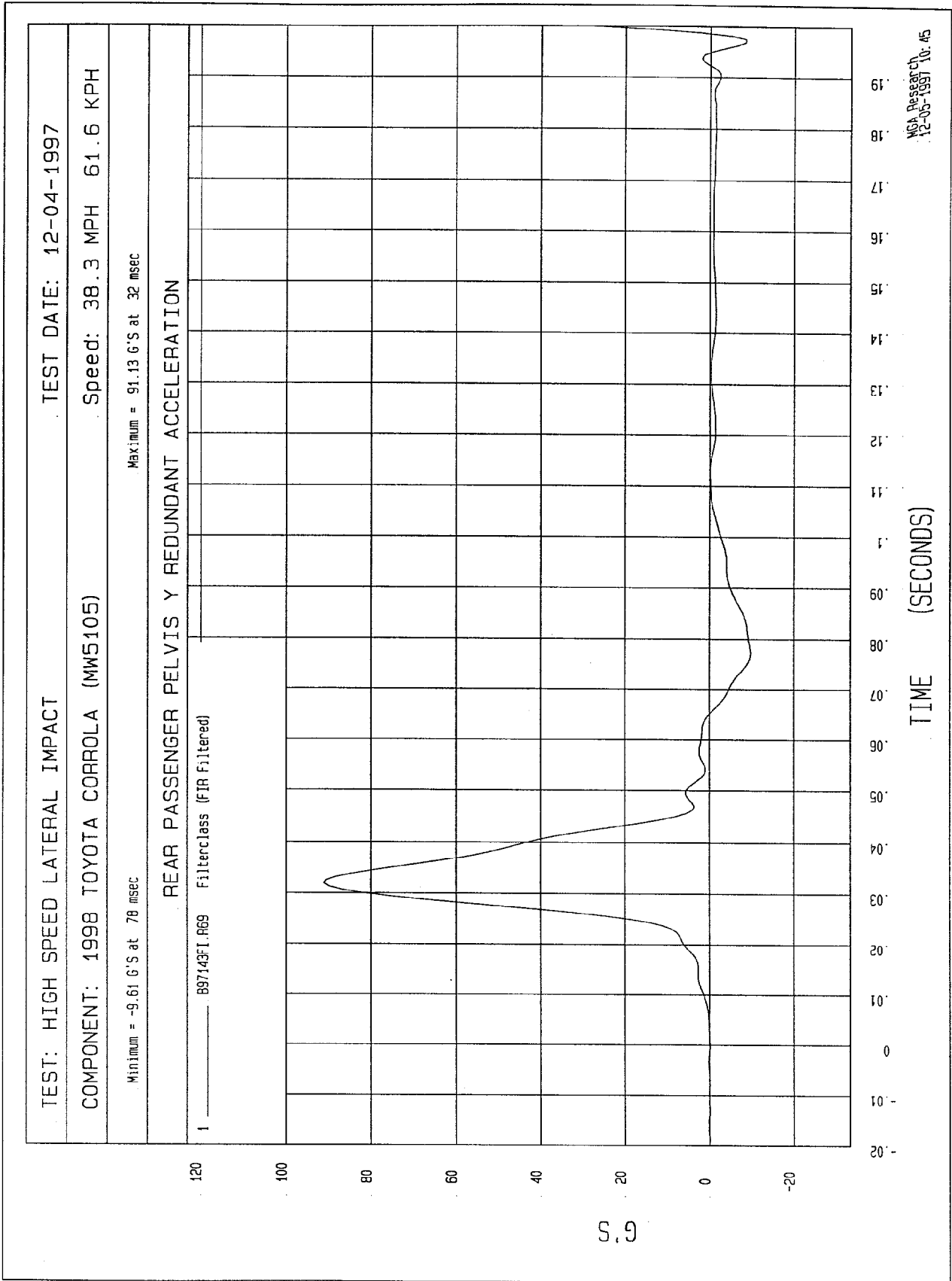
0

-20

G

TIME (SECONDS)

NSA Research
12-05-1997 10:45



APPENDIX C
SID CONFIGURATION AND PERFORMANCE VERIFICATION

REPORT NO. MGA-97-DC013

DUMMY PERFORMANCE CALIBRATIONS

NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST

1998 TOYOTA COROLLA 4-DOOR
NHTSA NO. MW5105

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: December 4, 1997

Report Date: January 6, 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

TABLE OF CONTENTS

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

PRE-TEST CERTIFICATION DATA

Front Dummy Serial Number: 269

Calibration Test Results Summary

Dummy Serial Number: 269

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.: 269

DATE OF VERIFICATION: December 4, 1997

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"	9.3
KV - Knee Pivot From Back Line	20.1" - 20.7"	20.4
SW - Knee Pivot to Floor	19.3" - 19.9"	19.4
HW - Hip Width	14.0" - 15.4"	15.1

MEASUREMENTS BY: Tim Walsh

APPROVED BY: Gene Koshake

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

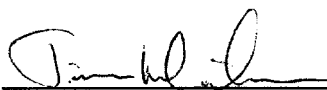
DATE: December 4, 1997

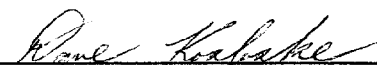
DUMMY NUMBER: 269

TEST NUMBER: D972272

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	30%
PROBE SPEED	14.0 - 14.2 fps	14.1
UPPER RIB	37 - 46 g's	44
LOWER RIB	37 - 46 g's	42
LOWER SPINE	15 - 22 g's	21

TEST MEETS SPECIFICATIONS

TECHNICIAN 

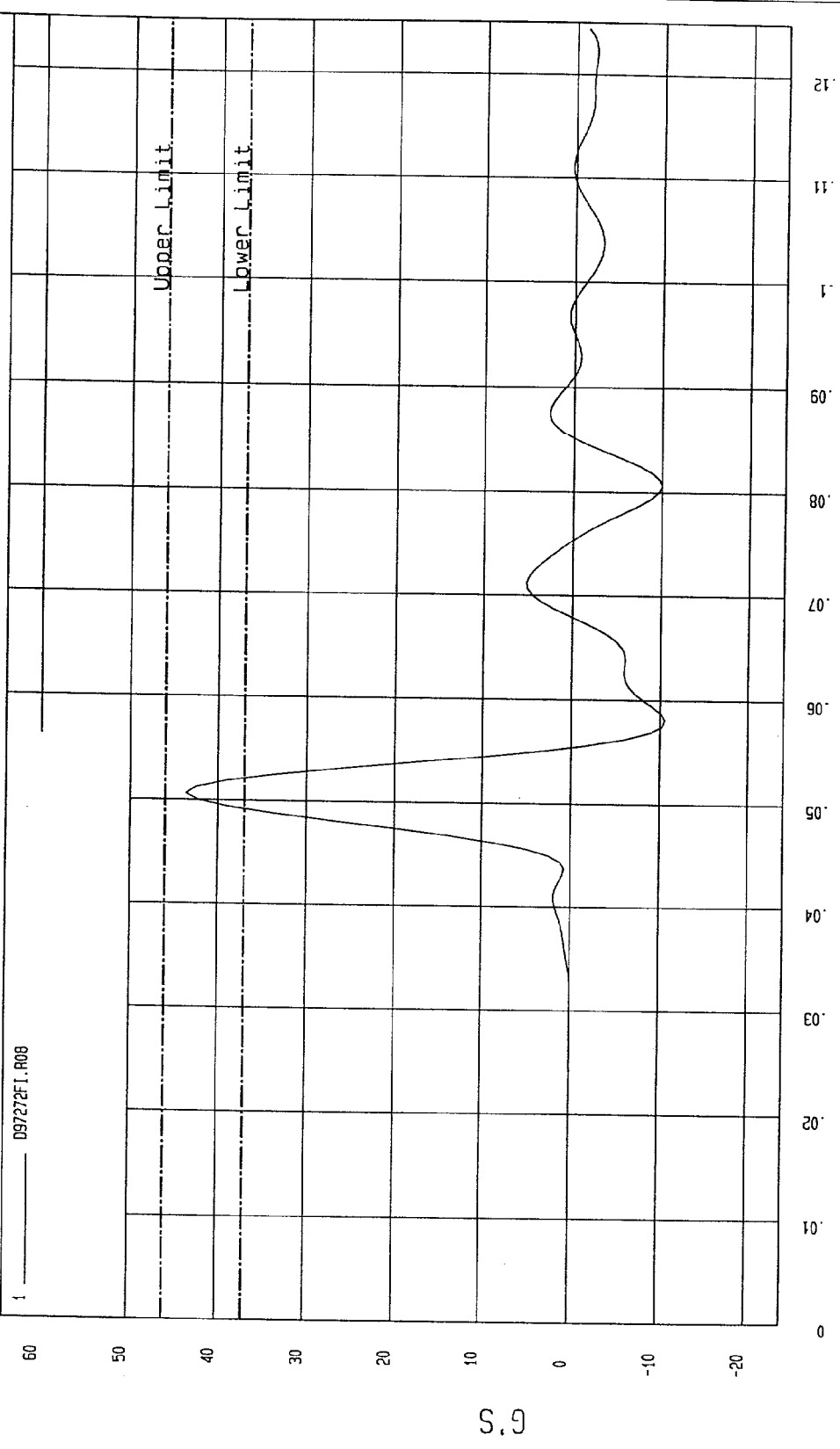
APPROVED BY 

TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 12-04-1997 - 08:48

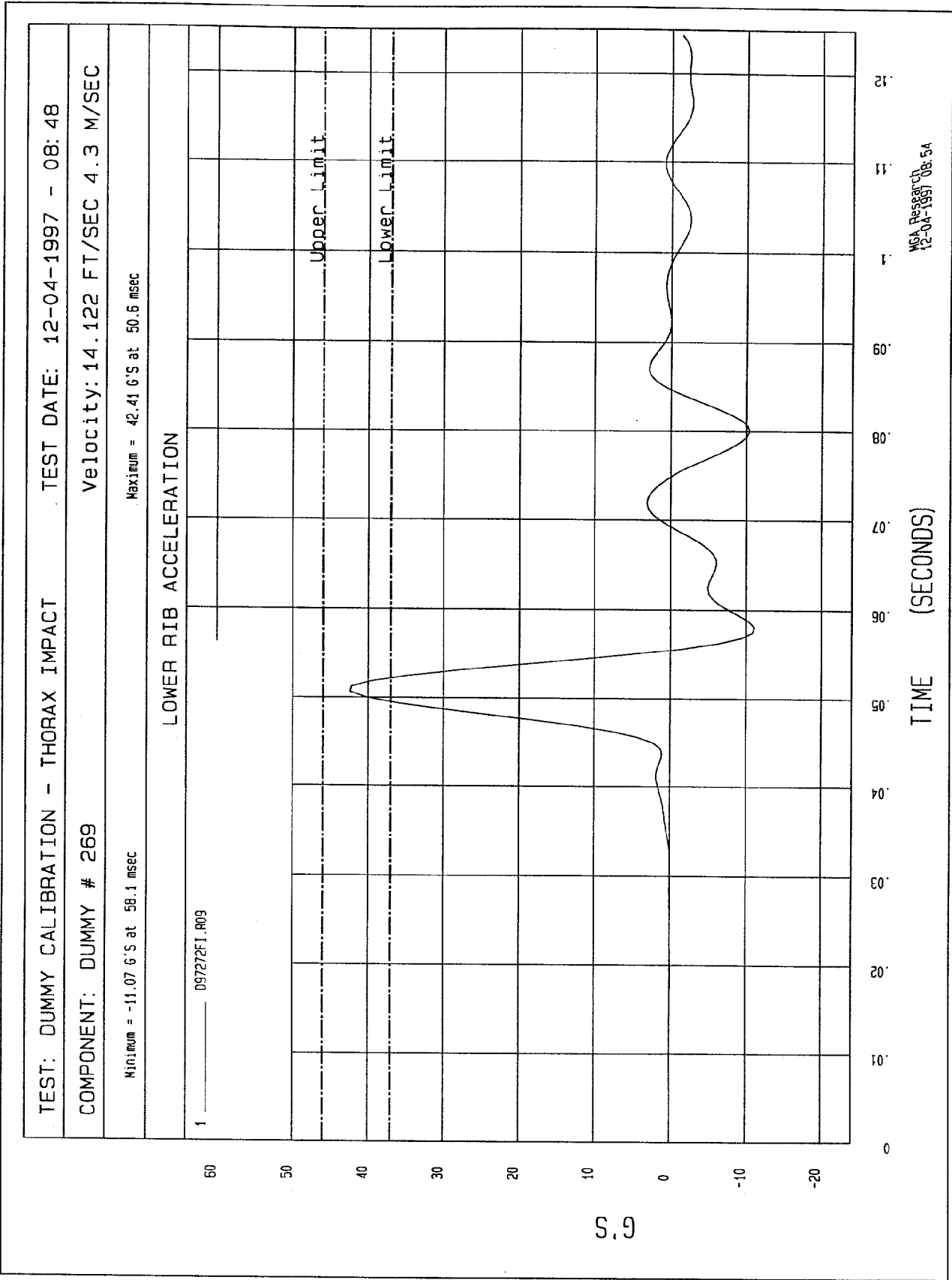
COMPONENT: DUMMY # 269 Velocity: 14.122 FT/SEC 4.3 M/SEC

Minimum = -10.55 G'S at 59.1 msec Maximum = 43.62 G'S at 50.6 msec

UPPER RIB ACCELERATION



MSA Research
12-04-1997 08:53

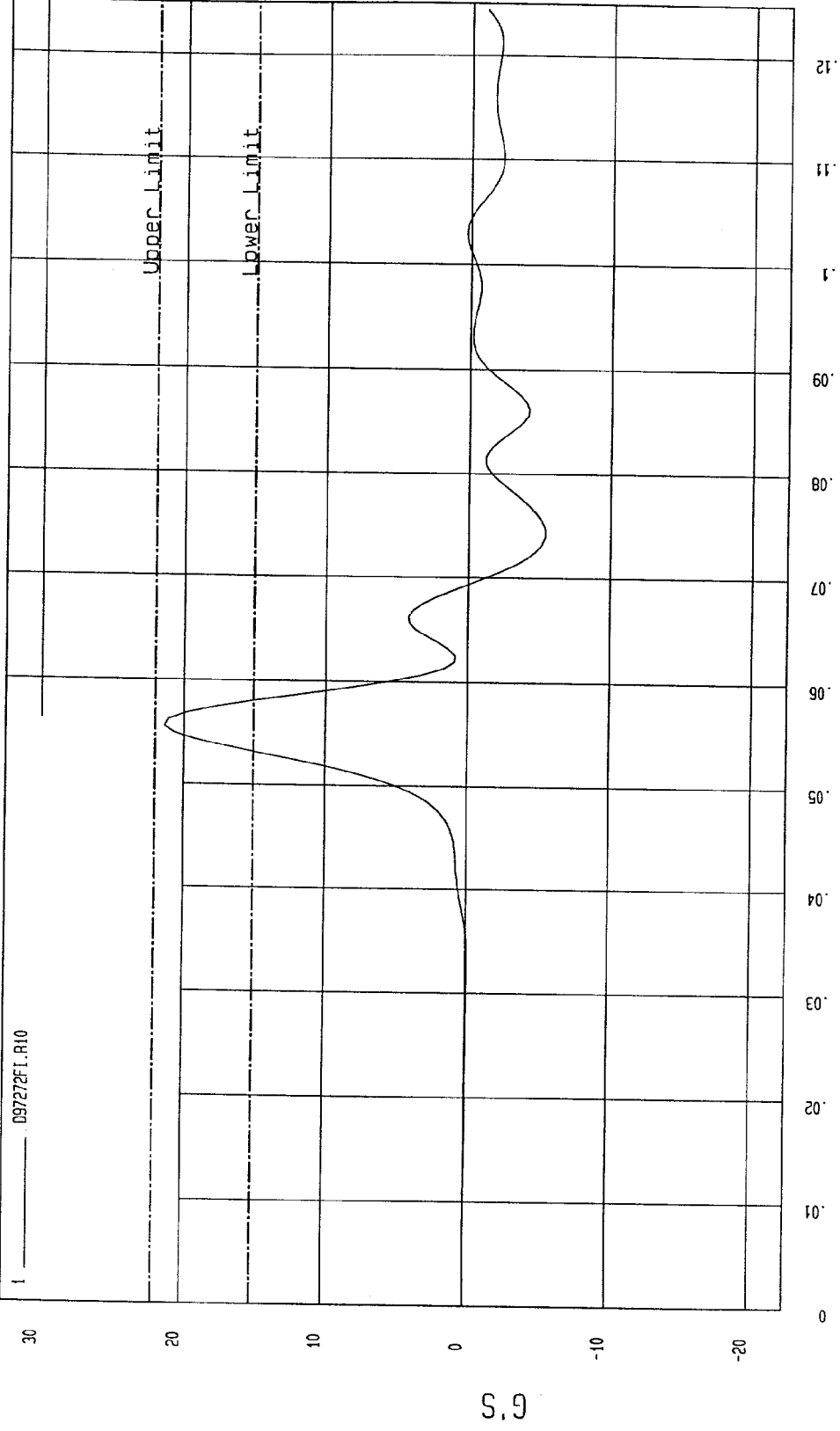


TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 12-04-1997 - 08:48

COMPONENT: DUMMY # 269 Velocity: 14.122 FT/SEC 4.3 M/SEC

Minimum = -5.44 G'S at 74.3 msec Maximum = 21.36 G'S at 55.6 msec

LOWER SPINE ACCELERATION



WCA Research
12-04-1997 08:55

MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: December 4, 1997

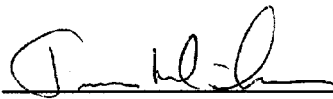
DUMMY NUMBER: 269

TEST NUMBER: D972273

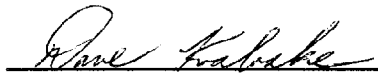
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	30%
PROBE SPEED	14.0 - 14.2 f/s	14.0
PELVIS ACCELERATION	40 - 60 g's	44

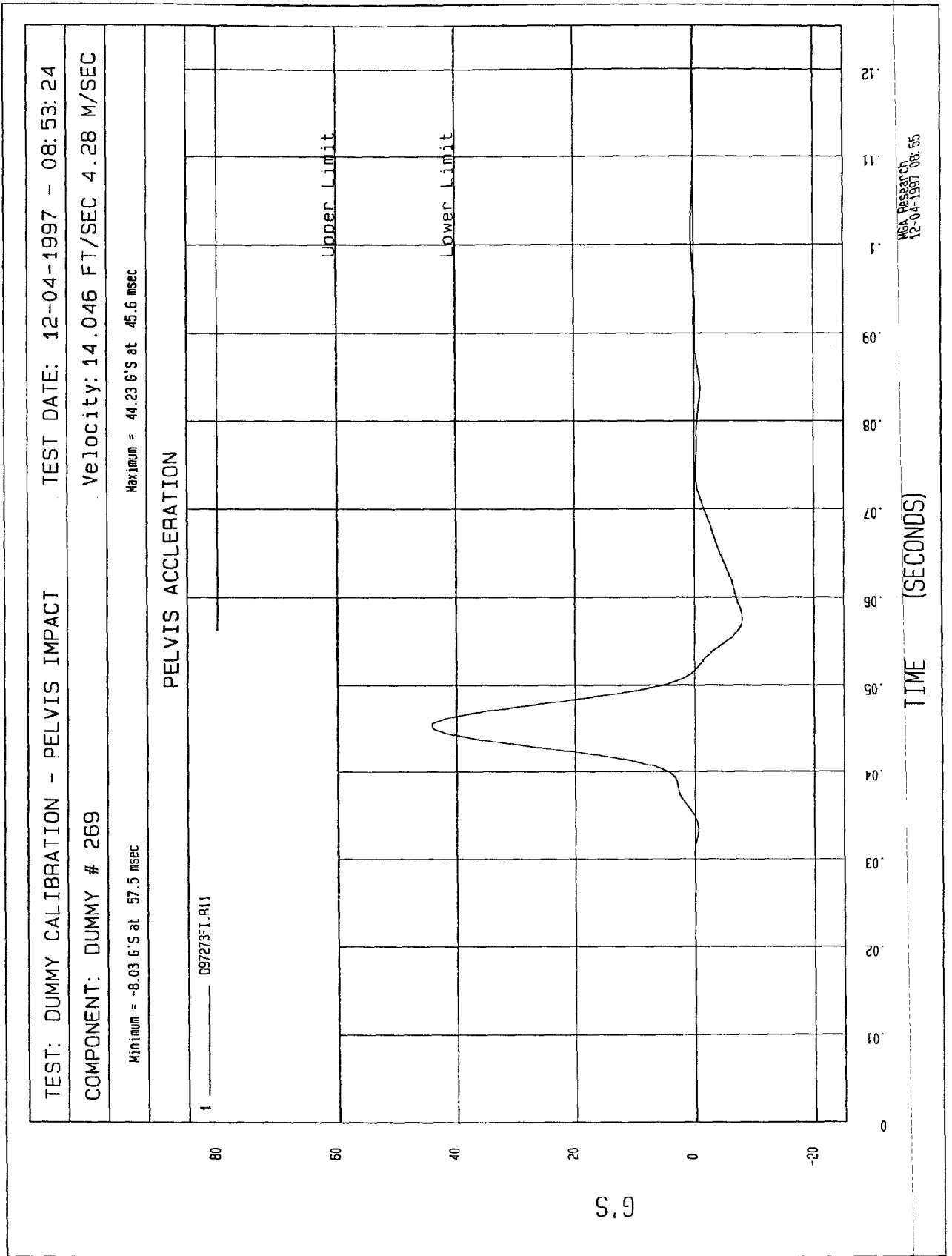
TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY





MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

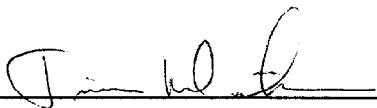
DATE: December 4, 1997

DUMMY NUMBER: 269

TEST NUMBER: D972274

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	30%
FORCE @ 0.5 in	23.3 - 36.5 lbs	34.4
FORCE @ 0.75 in	36.7 - 49.8 lbs	46.1
FORCE @ 1.0 in	50 - 63 lbs	60
FORCE @ 1.3 in	73 - 88 lbs	82

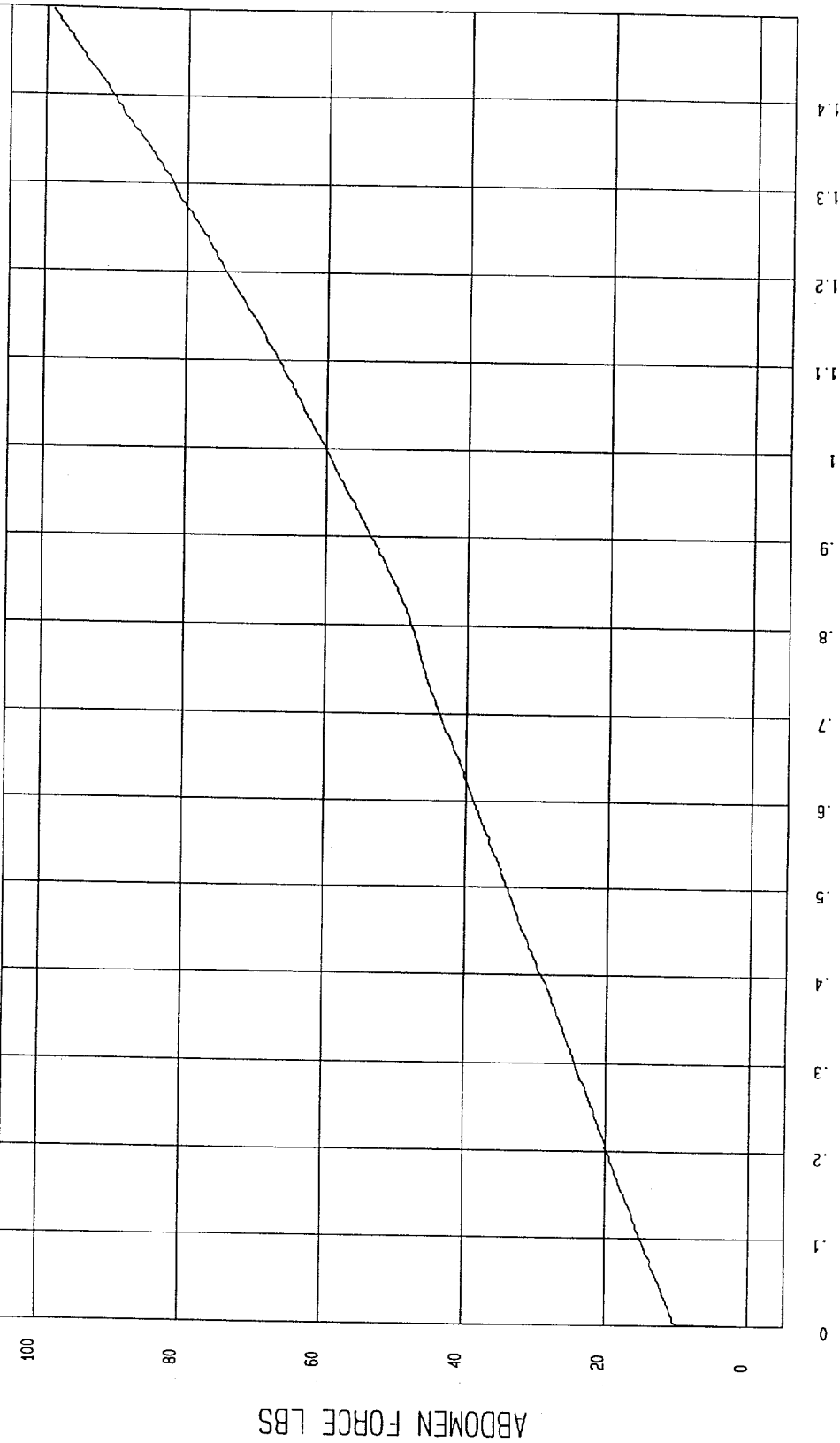
TEST MEETS SPECIFICATIONS

TECHNICIAN 

APPROVED BY 

TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSION TEST DATE: 12-04-1997 - 09:43
COMPONENT: DUMMY # 269

ABDOMEN FORCE as a function of ABDOMEN DISPLACEMENT



MSA Research
12-04-1997 10:28

ABDOMEN DISPLACEMENT INCHES

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: December 4, 1997

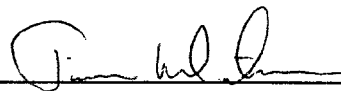
DUMMY NUMBER: 269

TEST NUMBER: D972275

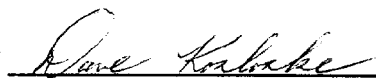
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	28%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	28
FORCE @ 30°	34 - 46 lbs	42
FORCE @ 40°	46 - 58 lbs	54
RETURN ANGLE	12° maximum	3°

TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY



TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 12-04-1997 - 10:10

COMPONENT: DUMMY # 269

FORCE as a function of TORSO ROTATION

50

40

30

20

10

0

FORCE LBS

0

10

20

30

40

TORSO ROTATION DEGREES

MGA Research
12-04-1997 10:33

PRE-TEST CERTIFICATION DATA

Rear Dummy Serial Number: 270

Calibration Test Results Summary

Dummy Serial Number: 270

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.: 270

DATE OF VERIFICATION: December 4, 1997

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.4
RH - Rib Height	19.75" - 20.50"	20.50
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"	20.6
SW - Knee Pivot to Floor	19.3" - 19.9"	19.5
HW - Hip Width	14.0" - 15.4"	15.0

MEASUREMENTS BY: Tim White

APPROVED BY: Dave Koabake

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

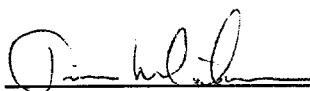
DATE: December 4, 1997

DUMMY NUMBER: 270

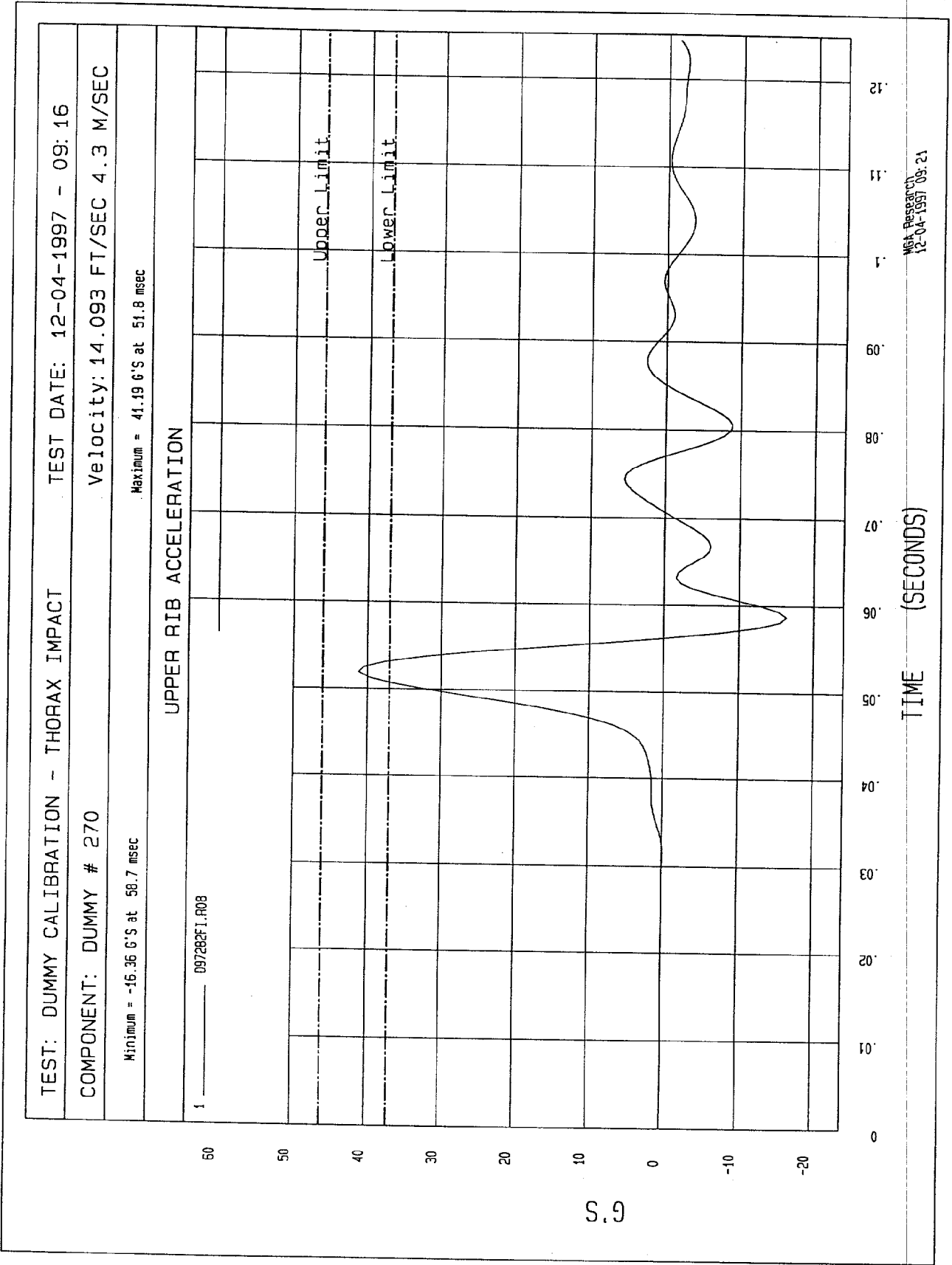
TEST NUMBER: D972282

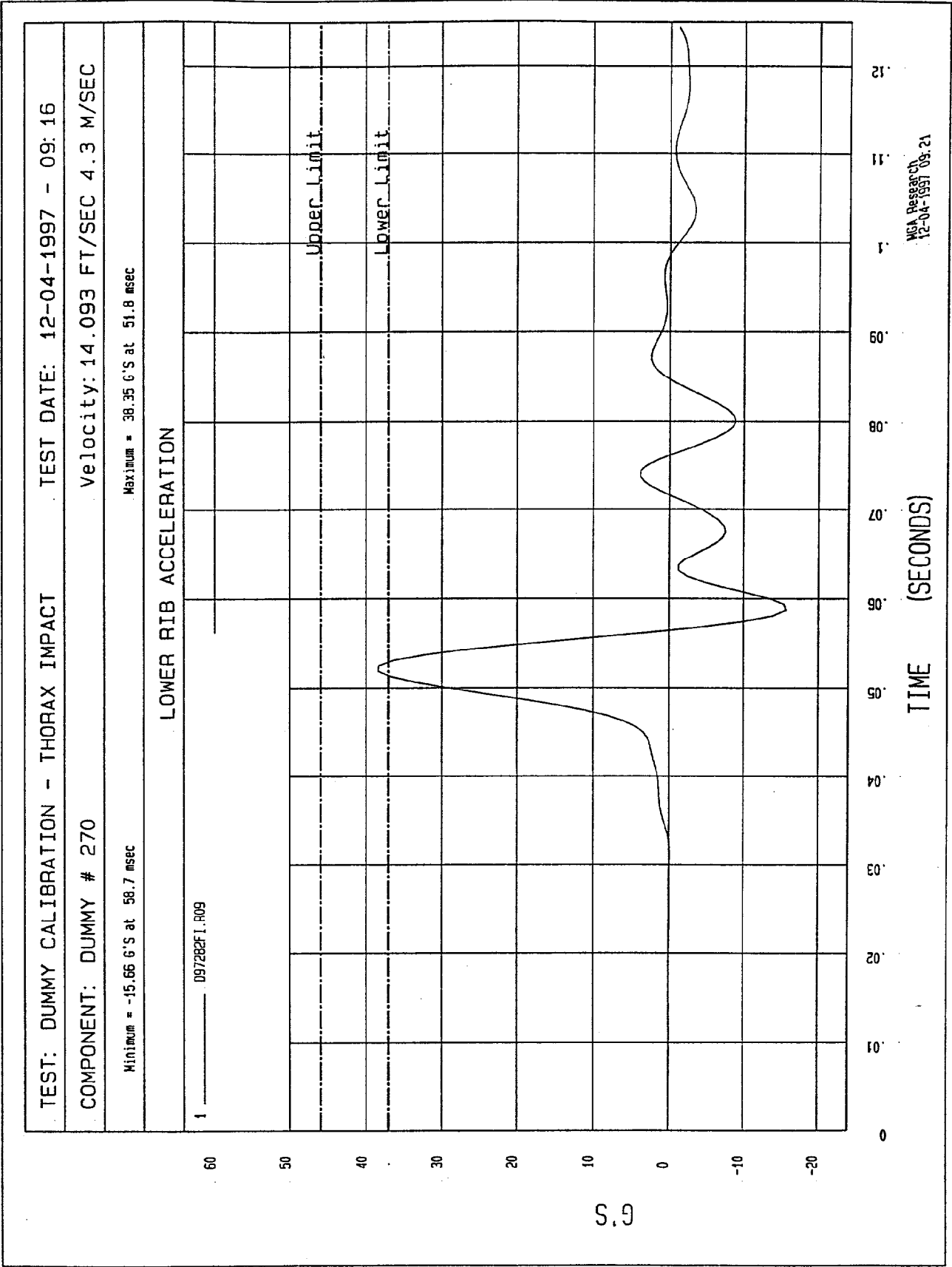
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	30%
PROBE SPEED	14.0 - 14.2 fps	14.1
UPPER RIB	37 - 46 g's	41
LOWER RIB	37 - 46 g's	38
LOWER SPINE	15 - 22 g's	20

TEST MEETS SPECIFICATIONS

TECHNICIAN 

APPROVED BY 



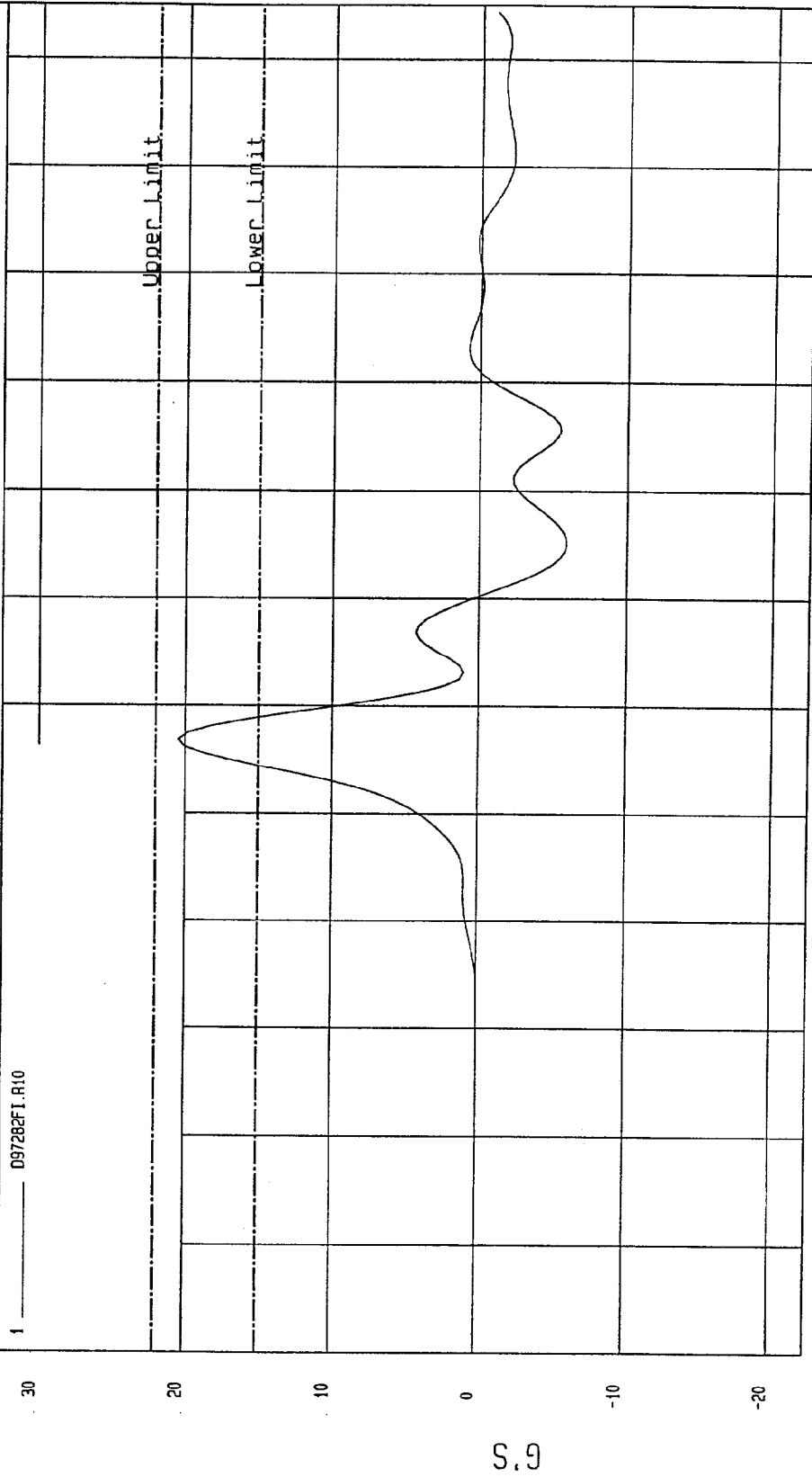


TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 12-04-1997 - 09:16

COMPONENT: DUMMY # 270 Velocity: 14.093 FT/SEC 4.3 M/SEC

Minimum = -5.88 G'S at 75 msec
Maximum = 20.46 G'S at 56.8 msec

LOWER SPINE ACCELERATION



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: December 4, 1997

DUMMY NUMBER: 270

TEST NUMBER: D972283

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	30%
PROBE SPEED	14.0 - 14.2 f/s	14.2
PELVIS ACCELERATION	40 - 60 g's	44

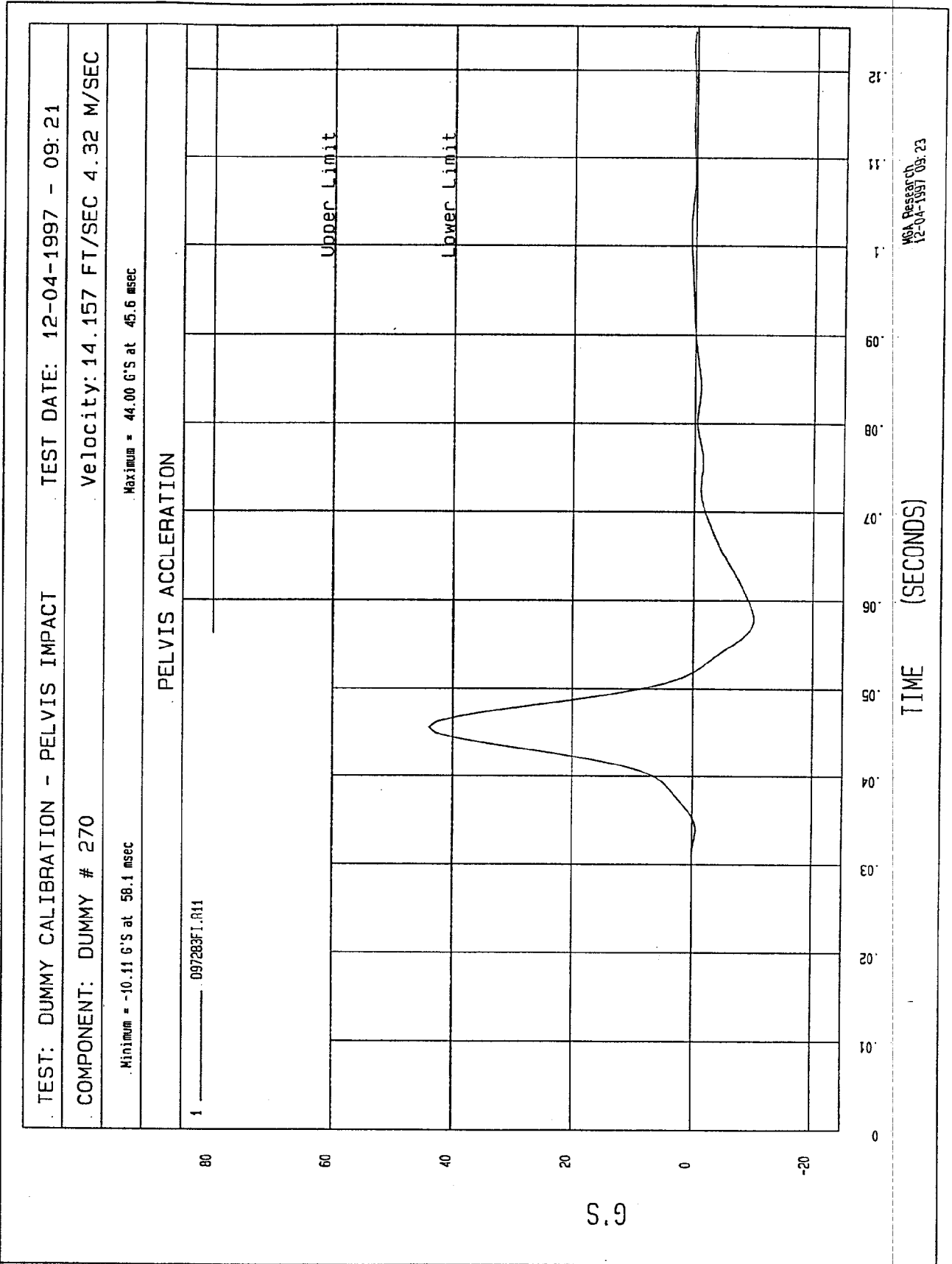
TEST MEETS SPECIFICATIONS

TECHNICIAN

Jim M. L.

APPROVED BY

Dave Katsake



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

DATE: December 4, 1997

DUMMY NUMBER: 270

TEST NUMBER: D972284

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	28%
FORCE @ 0.5 in	23.3 - 36.5 lbs	31.4
FORCE @ 0.75 in	36.7 - 49.8 lbs	43.0
FORCE @ 1.0 in	50 - 63 lbs	58
FORCE @ 1.3 in	73 - 88 lbs	79

TEST MEETS SPECIFICATIONS

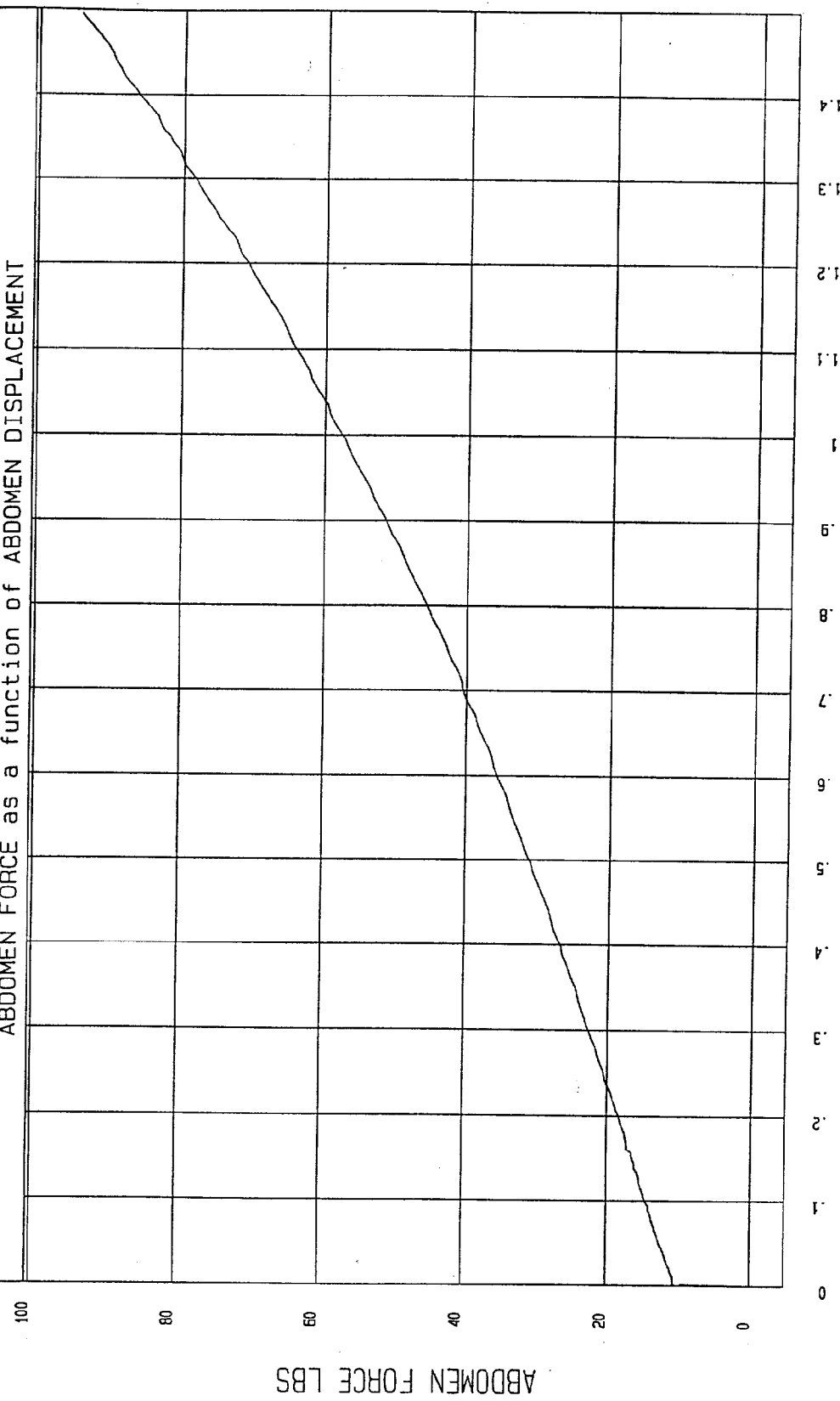
TECHNICIAN Jim White

APPROVED BY Dave Korbach

TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSION TEST DATE: 12-04-1997 - 09:48

COMPONENT: DUMMY # 270

ABDOMEN FORCE as a function of ABDOMEN DISPLACEMENT



MCA Research
12-04-1997 10:28

ABDOMEN DISPLACEMENT INCHES

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: December 4, 1997

DUMMY NUMBER: 270

TEST NUMBER: D972285

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	28%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	27
FORCE @ 30°	34 - 46 lbs	39
FORCE @ 40°	46 - 58 lbs	54
RETURN ANGLE	12° maximum	3°

TEST MEETS SPECIFICATIONS

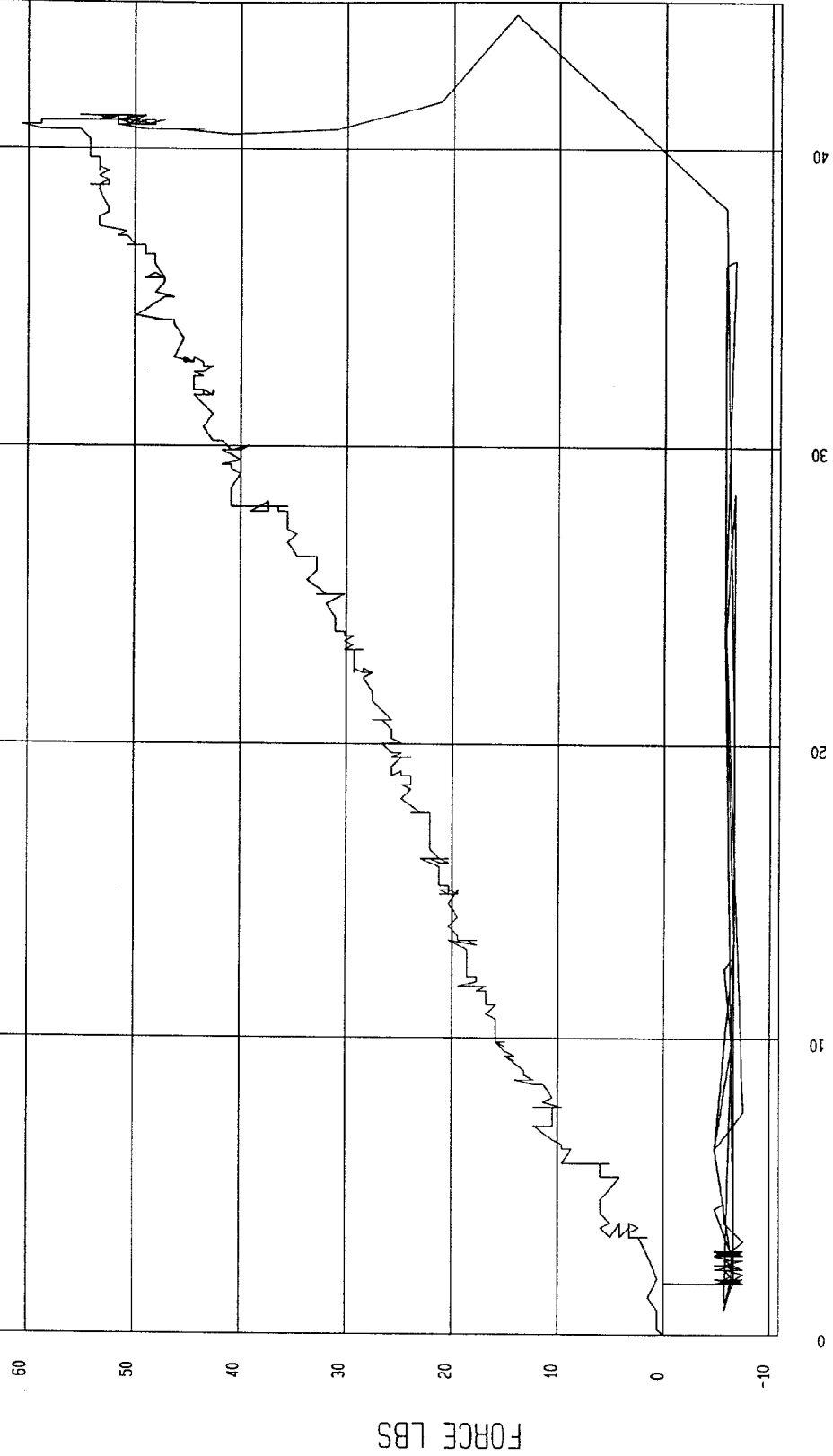
TECHNICIAN Jim W. G.

APPROVED BY Dave Koebke

TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 12-04-1997 - 10:24

COMPONENT: DUMMY # 270

FORCE as a function of TORSO ROTATION



MSA Research
12-04-1997 10:33

POST-TEST CERTIFICATION DATA

Front Dummy Serial Number: 269

Calibration Test Results Summary

Dummy Serial Number: 269

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.: 269

DATE OF VERIFICATION: December 14, 1997

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"	9.3
KV - Knee Pivot From Back Line	20.1" - 20.7"	20.4
SW - Knee Pivot to Floor	19.3" - 19.9"	19.4
HW - Hip Width	14.0" - 15.4"	15.1

MEASUREMENTS BY: Jim White

APPROVED BY: Gene Kabake

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

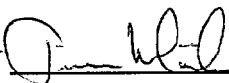
DATE: December 14, 1997

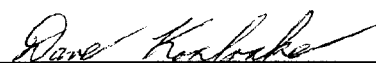
DUMMY NUMBER: 269

TEST NUMBER: D972312

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	18%
PROBE SPEED	14.0 - 14.2 fps	14.0
UPPER RIB	37 - 46 g's	45
LOWER RIB	37 - 46 g's	42
LOWER SPINE	15 - 22 g's	22

TEST MEETS SPECIFICATIONS

TECHNICIAN 

APPROVED BY 

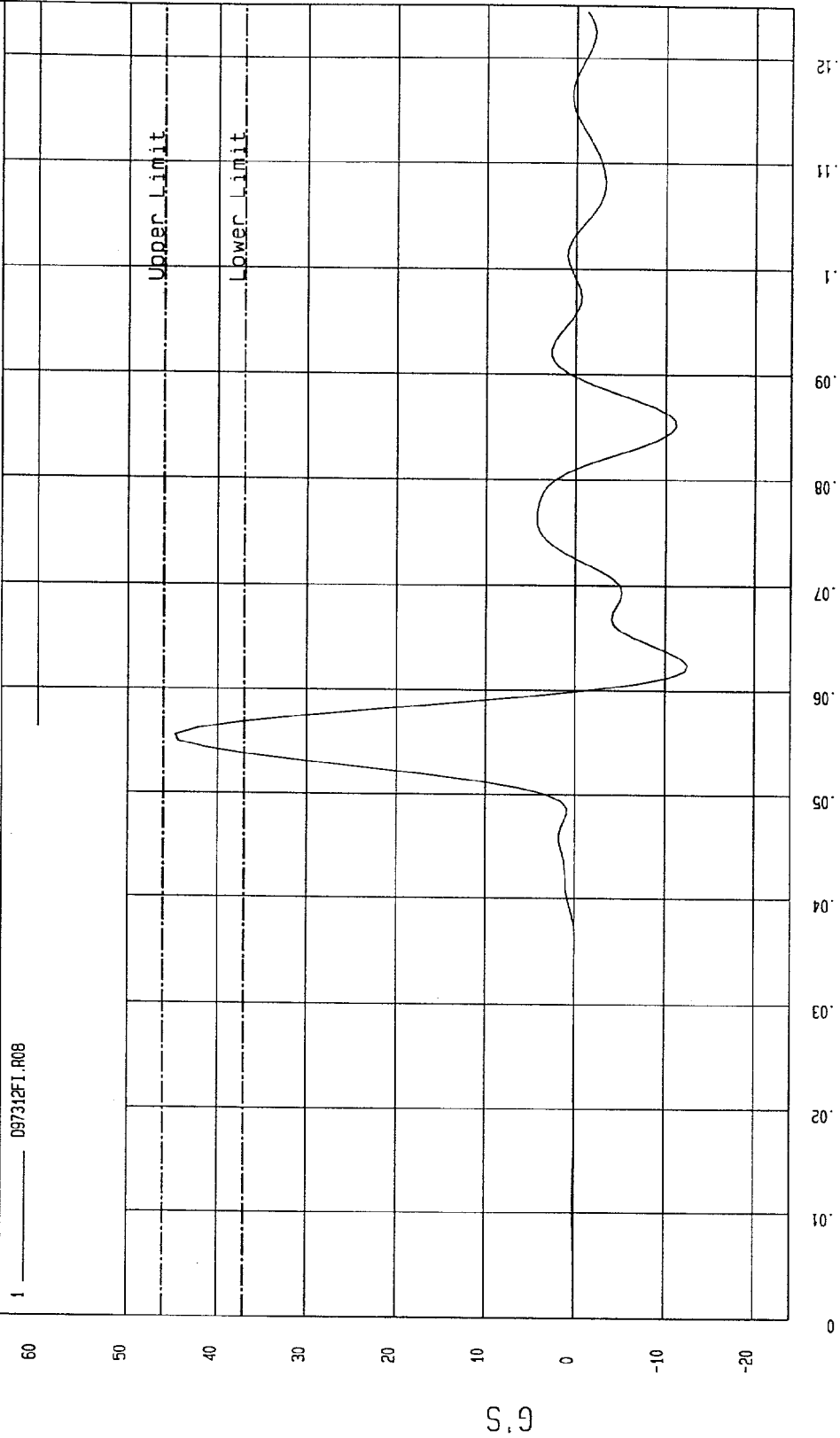
TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 12-14-1997 - 11:53

COMPONENT: DUMMY # 269 Velocity: 14.001 FT/SEC 4.27 M/SEC

Minimum = -12.55 G'S at 62.5 msec

Maximum = 44.72 G'S at 55.6 msec

UPPER RIB ACCELERATION



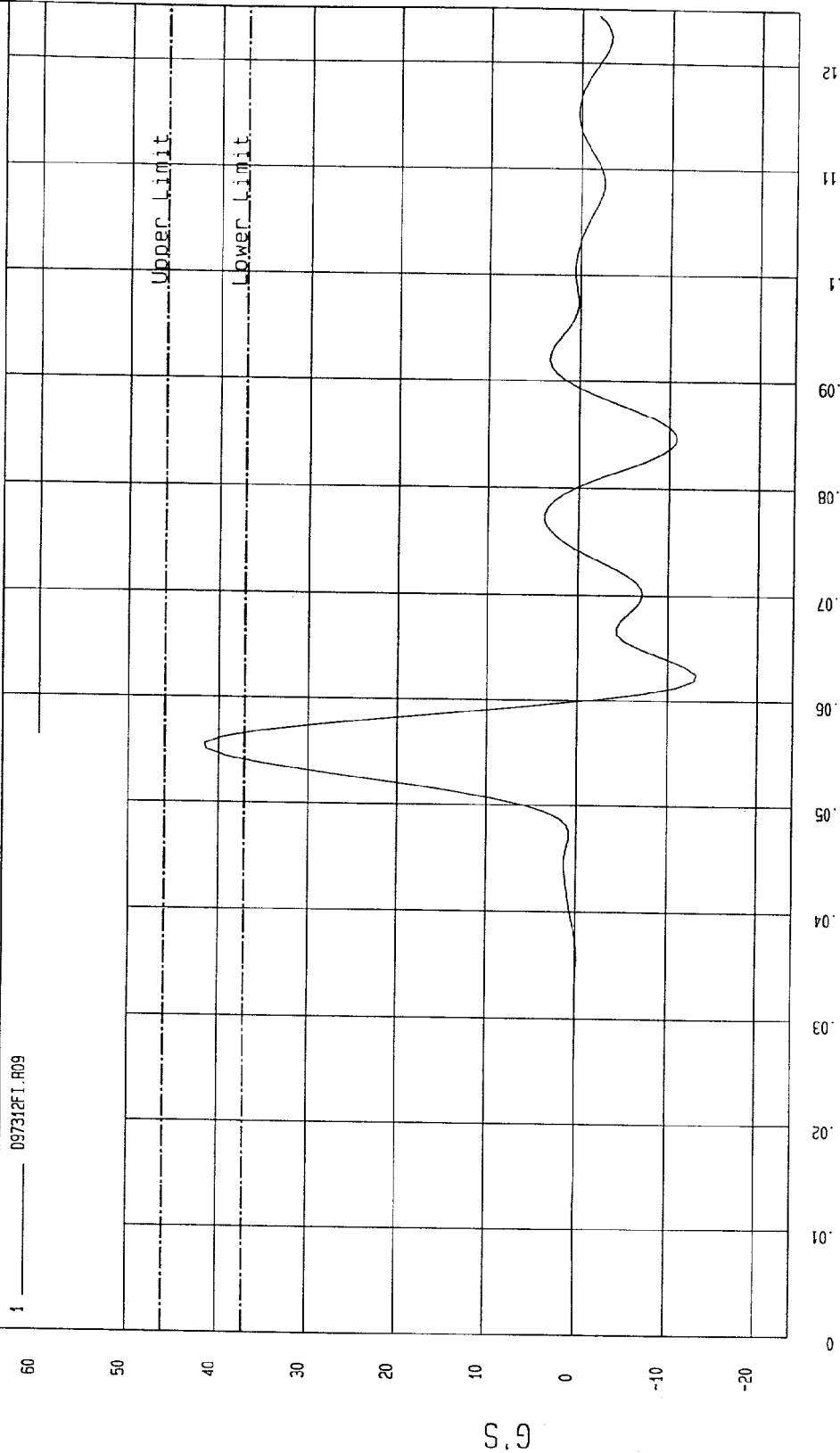
NSA Research
12-14-1997 11:59

TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 12-14-1997 - 11:53
COMPONENT: DUMMY # 269 Velocity: 14.001 FT/SEC 4.27 M/SEC

Minimum = -13.18 G'S at 62.5 msec

Maximum = 41.59 G'S at 55.6 msec

LOWER RIB ACCELERATION



M&A Research
12-14-1997 12:00

TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 12-14-1997 - 11:53

COMPONENT: DUMMY # 269

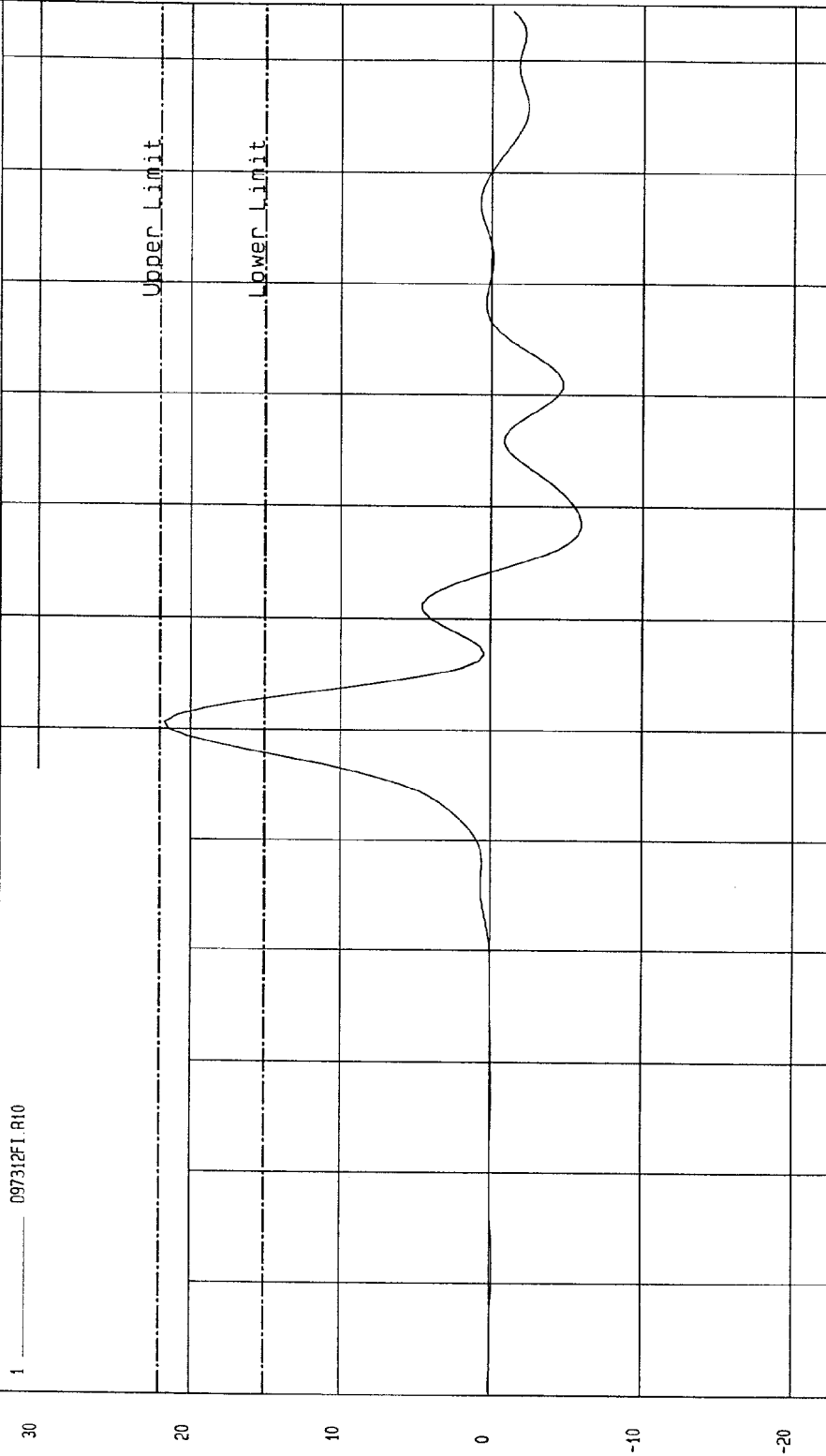
Minimum = -5.95 G'S at 78.7 msec

Velocity: 14.001 FT/SEC 4.27 M/SEC

Maximum = 21.69 G'S at 60.6 msec

LOWER SPINE ACCELERATION

1 ——— 097312FI R10



WCA Research
12-14-1997 12:00

TIME (SECONDS)

MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: December 14, 1997

DUMMY NUMBER: 269

TEST NUMBER: D972313

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	18%
PROBE SPEED	14.0 - 14.2 f/s	14.1
PELVIS ACCELERATION	40 - 60 g's	40

TEST MEETS SPECIFICATIONS

TECHNICIAN Tim Wil

APPROVED BY Steve Korbake

TEST: DUMMY CALIBRATION - PELVIS IMPACT TEST DATE: 12-14-1997 - 11:59

COMPONENT: DUMMY # 269 Velocity: 14.117 FT/SEC 4.3 M/SEC

Minimum = -7.52 G'S at 61.2 msec Maximum = 40.06 G'S at 48.7 msec

PELVIS ACCELERATION

1 _____ 097313F1.R11

80

60

40

20

0

-20

G.S

Upper Limit

Lower Limit

12

11

10

09

08

07

06

05

04

03

02

01

0

TIME (SECONDS)

MGA Research
12-15-1997 10:51

MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

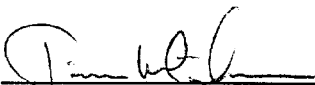
DATE: December 12, 1997

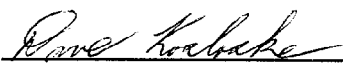
DUMMY NUMBER: 269

TEST NUMBER: D972314

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	18%
FORCE @ 0.5 in	23.3 - 36.5 lbs	32.5
FORCE @ 0.75 in	36.7 - 49.8 lbs	45.0
FORCE @ 1.0 in	50 - 63 lbs	58
FORCE @ 1.3 in	73 - 88 lbs	79

TEST MEETS SPECIFICATIONS

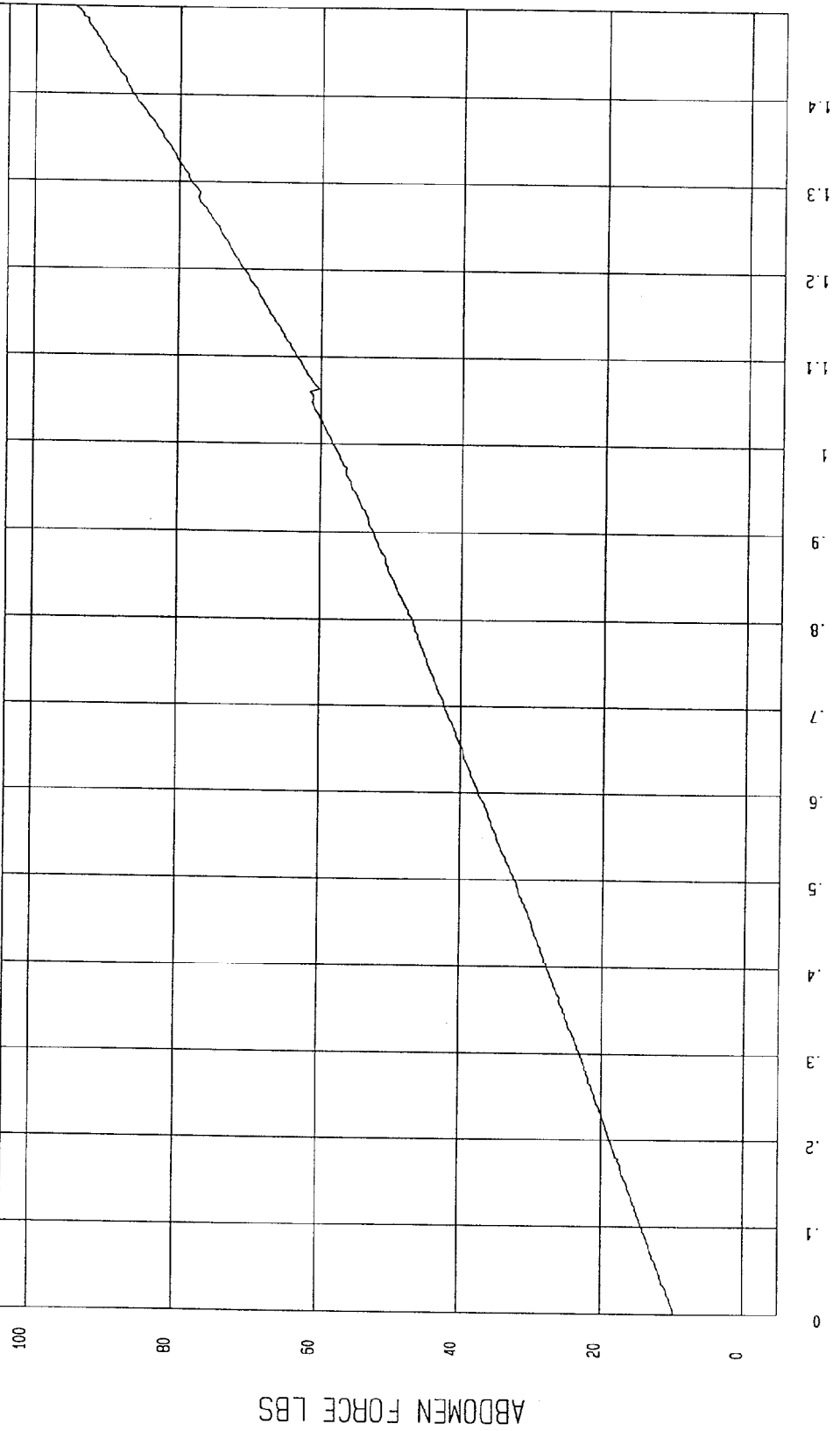
TECHNICIAN 

APPROVED BY 

TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSION TEST DATE: 12-12-1997 - 16:29

COMPONENT: DUMMY # 269

ABDOMEN FORCE as a function of ABDOMEN DISPLACEMENT



MGA Research
12-15-1997 10:47

ABDOMEN DISPLACEMENT INCHES

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

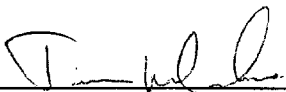
DATE: December 12, 1997

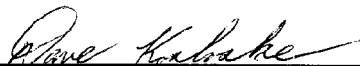
DUMMY NUMBER: 269

TEST NUMBER: D972315

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	38
FORCE @ 40°	46 - 58 lbs	48
RETURN ANGLE	12° maximum	7°

TEST MEETS SPECIFICATIONS

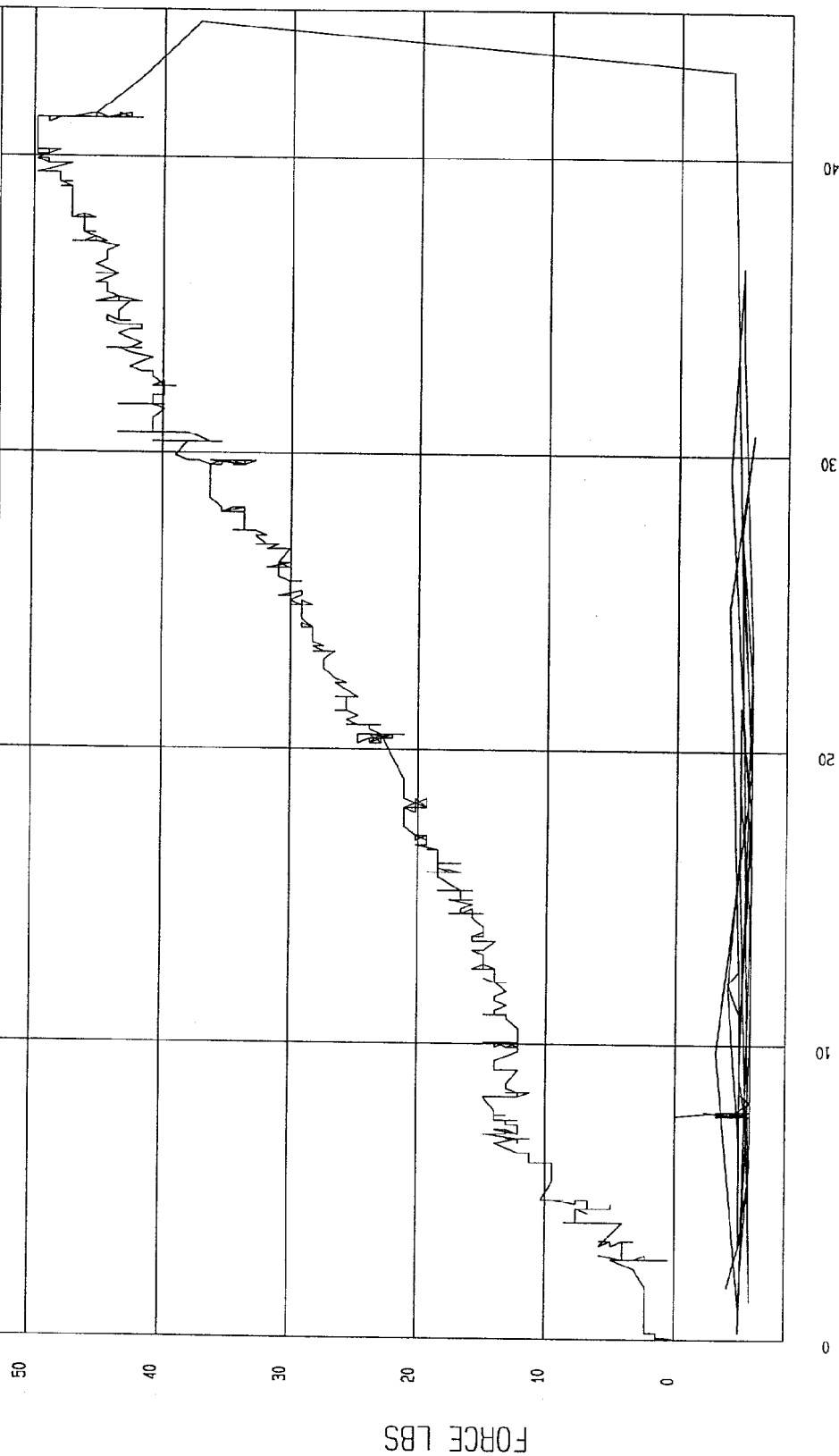
TECHNICIAN 

APPROVED BY 

TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 12-12-1997 - 15:56

COMPONENT: DUMMY # 269

FORCE as a function of TORSO ROTATION



MCA Research
12-12-1997 16:18

TORSO ROTATION DEGREES

POST-TEST CERTIFICATION DATA

Rear Dummy Serial Number: 270

Calibration Test Results Summary

Dummy Serial Number: 270

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.

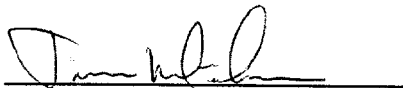
SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 270

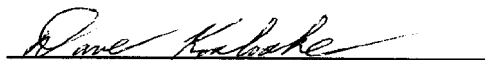
DATE OF VERIFICATION: December 14, 1997

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.4
RH - Rib Height	19.75" - 20.50"	20.50
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"	20.6
SW - Knee Pivot to Floor	19.3" - 19.9"	19.5
HW - Hip Width	14.0" - 15.4"	15.0

MEASUREMENTS BY:



APPROVED BY:



MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

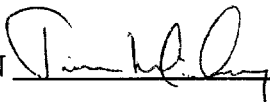
DATE: December 14, 1997

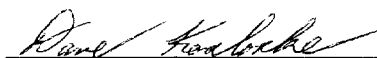
DUMMY NUMBER: 270

TEST NUMBER: D972322

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	18%
PROBE SPEED	14.0 - 14.2 fps	14.0
UPPER RIB	37 - 46 g's	43
LOWER RIB	37 - 46 g's	41
LOWER SPINE	15 - 22 g's	22

TEST MEETS SPECIFICATIONS

TECHNICIAN 

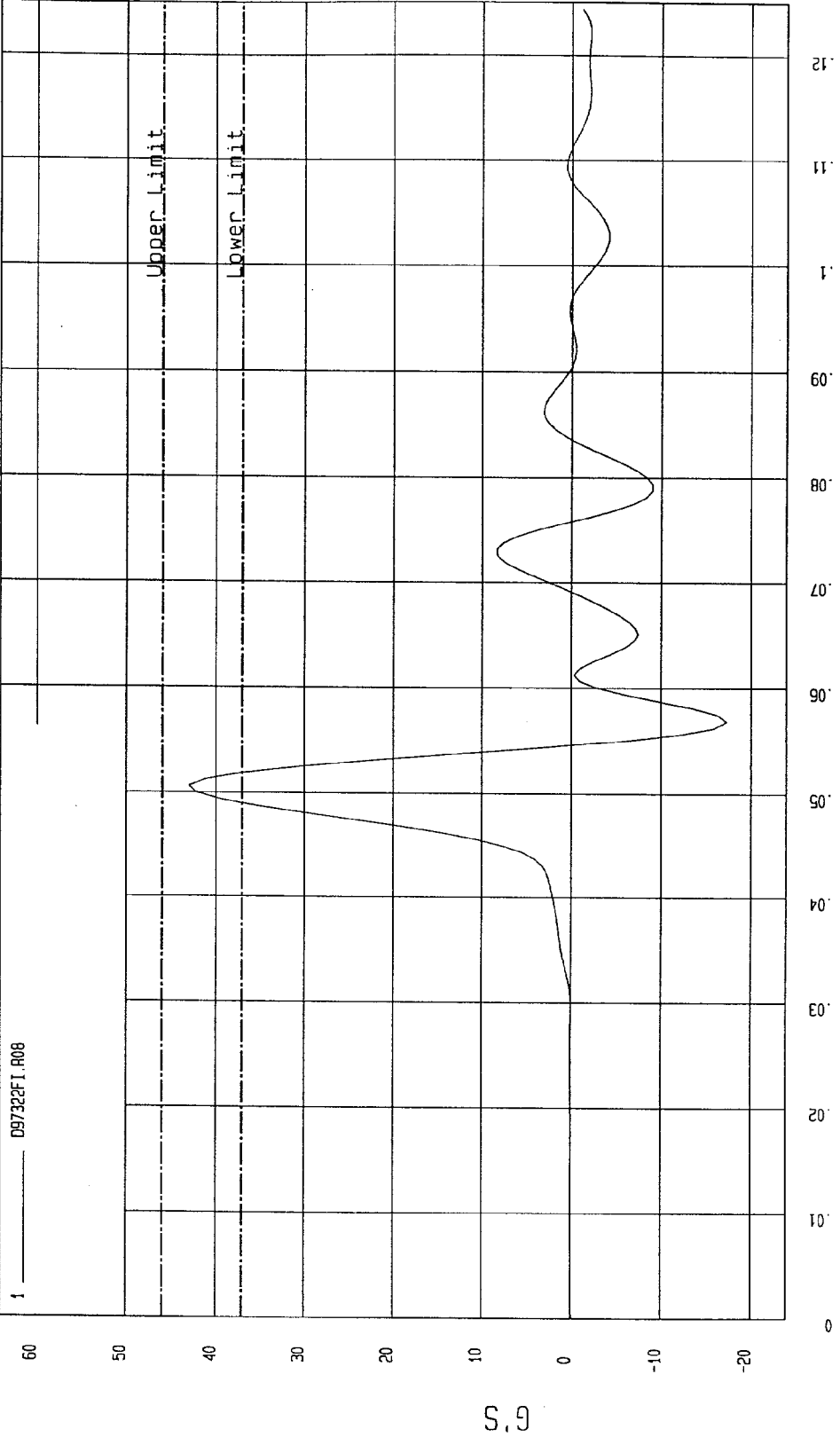
APPROVED BY 

TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 12-14-1997 - 11:26

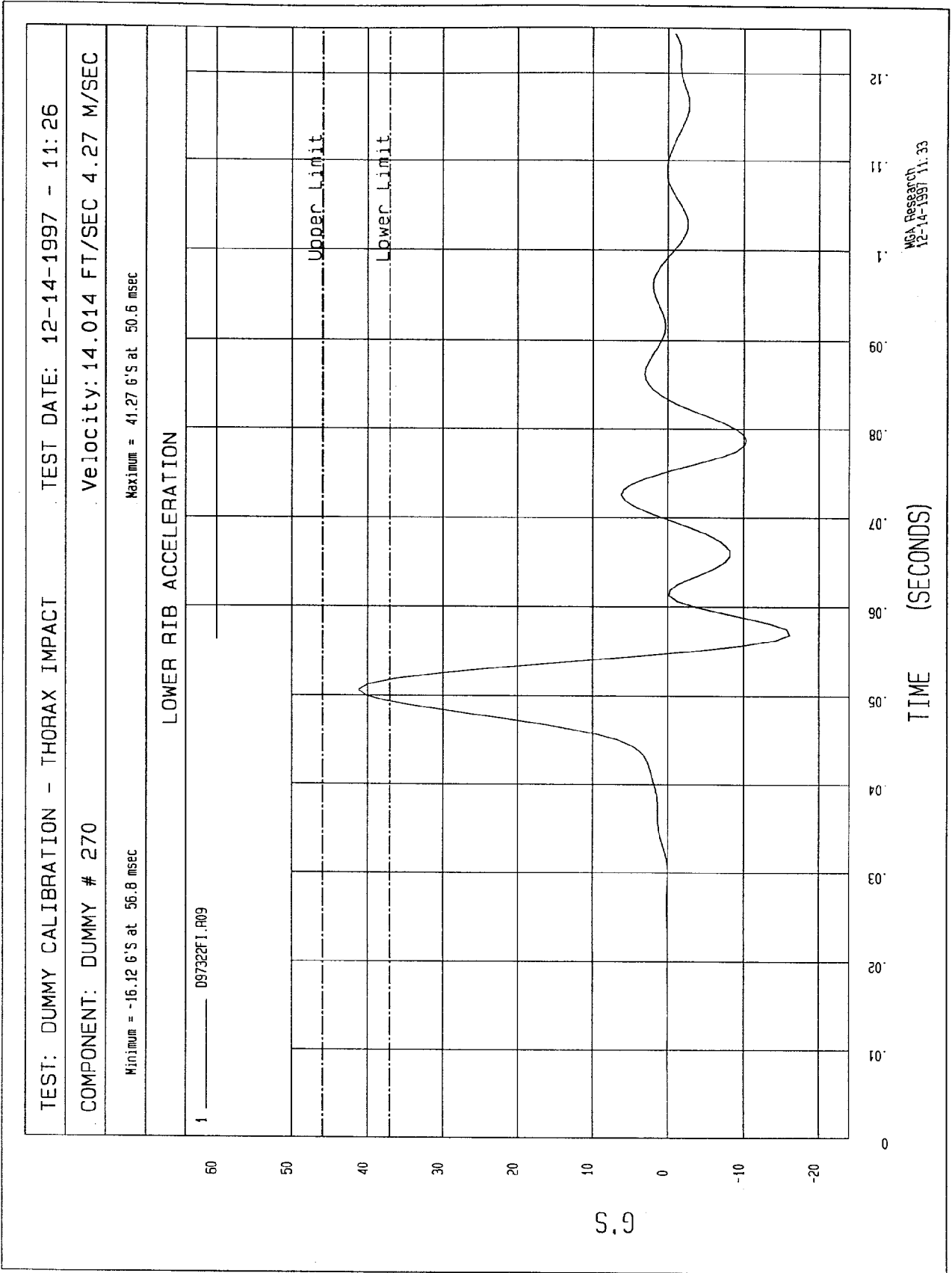
COMPONENT: DUMMY # 270 Velocity: 14.014 FT/SEC 4.27 M/SEC

Minimum = -17.27 G'S at 56.8 msec Maximum = 43.02 G'S at 50.6 msec

UPPER RIB ACCELERATION



MCA Research
12-14-1997 11:33

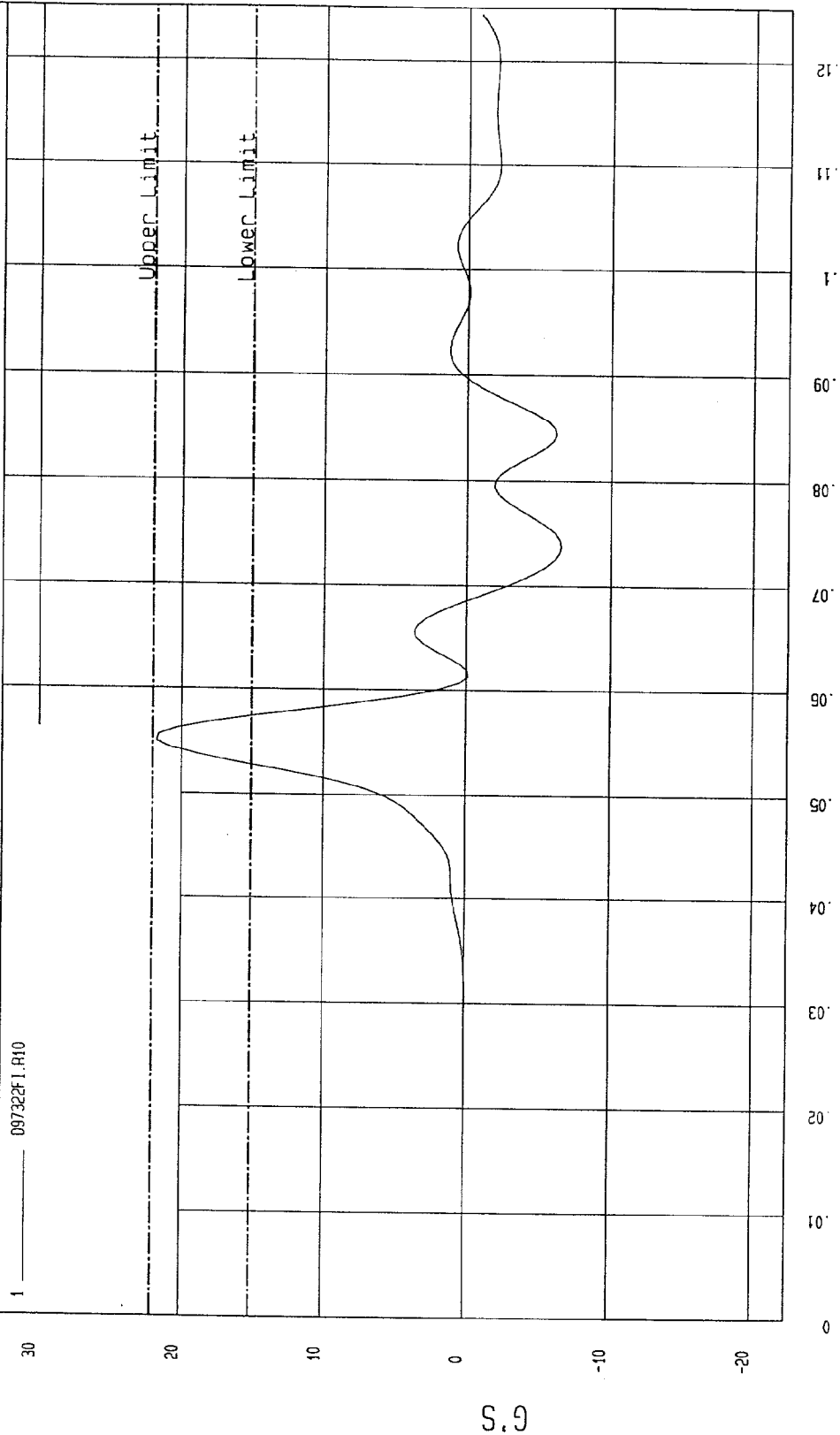


TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 12-14-1997 - 11:26

COMPONENT: DUMMY # 270 Velocity: 14.014 FT/SEC 4.27 M/SEC

Minimum = -6.61 G'S at 73.7 msec
Maximum = 21.75 G'S at 55 msec

LOWER SPINE ACCELERATION



NSA Research
12-14-1997 11:34

TIME (SECONDS)

MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

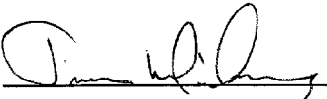
DATE: December 14, 1997

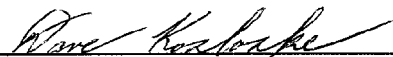
DUMMY NUMBER: 270

TEST NUMBER: D972323

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	18%
PROBE SPEED	14.0 - 14.2 f/s	14.1
PELVIS ACCELERATION	40 - 60 g's	42

TEST MEETS SPECIFICATIONS

TECHNICIAN 

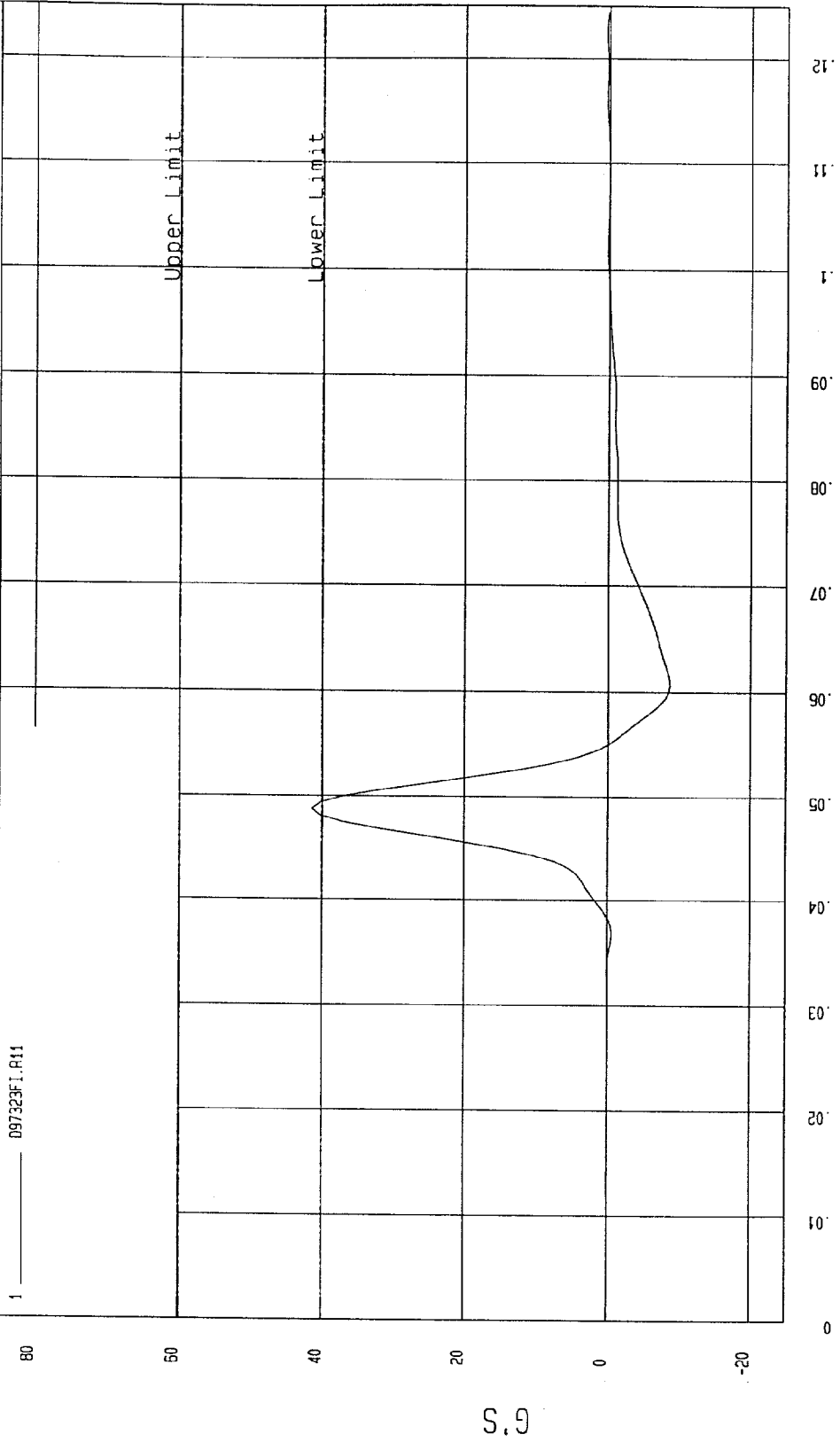
APPROVED BY 

TEST: DUMMY CALIBRATION - PELVIS IMPACT TEST DATE: 12-14-1997 - 11:32

COMPONENT: DUMMY # 270 Velocity: 14.087 FT/SEC 4.29 M/SEC

Minimum = -8.68 G'S at 60.6 msec Maximum = 41.51 G'S at 48.7 msec

PELVIS ACCELERATION



MGA Research
12-14-1997 11:34

MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

DATE: December 12, 1997

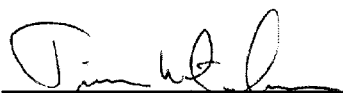
DUMMY NUMBER: 270

TEST NUMBER: D972324

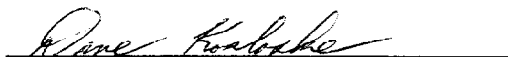
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	18%
FORCE @ 0.5 in	23.3 - 36.5 lbs	30.8
FORCE @ 0.75 in	36.7 - 49.8 lbs	42.1
FORCE @ 1.0 in	50 - 63 lbs	56
FORCE @ 1.3 in	73 - 88 lbs	77

TEST MEETS SPECIFICATIONS

TECHNICIAN



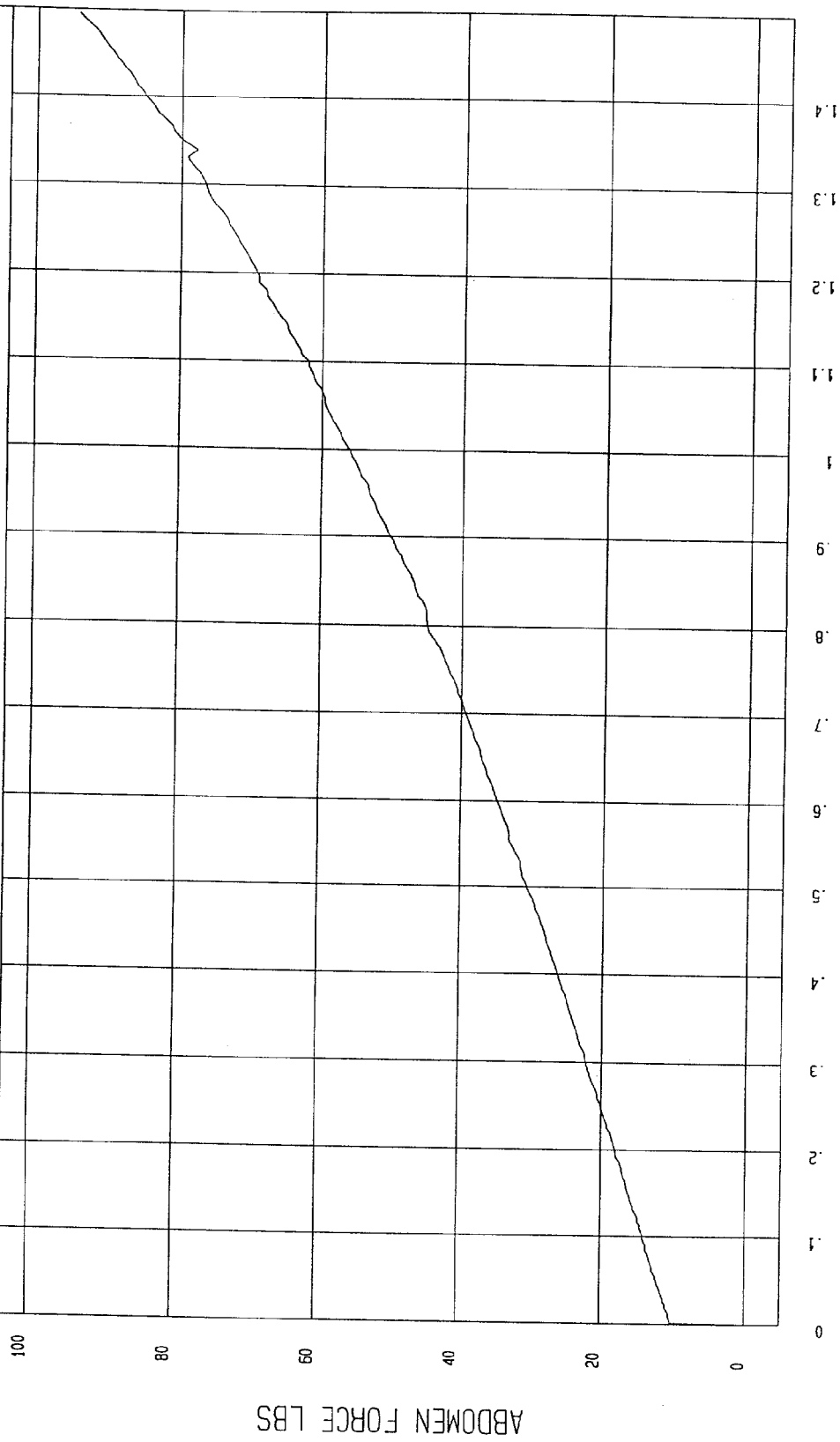
APPROVED BY



TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSION TEST DATE: 12-12-1997 - 16:34

COMPONENT: DUMMY # 270

ABDOMEN FORCE as a function of ABDOMEN DISPLACEMENT



NCA Research
12-15-1997 10:47

ABDOMEN DISPLACEMENT INCHES

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: December 12, 1997

DUMMY NUMBER: 270

TEST NUMBER: D972325

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	35
FORCE @ 40°	46 - 58 lbs	49
RETURN ANGLE	12° maximum	5°

TEST MEETS SPECIFICATIONS

TECHNICIAN



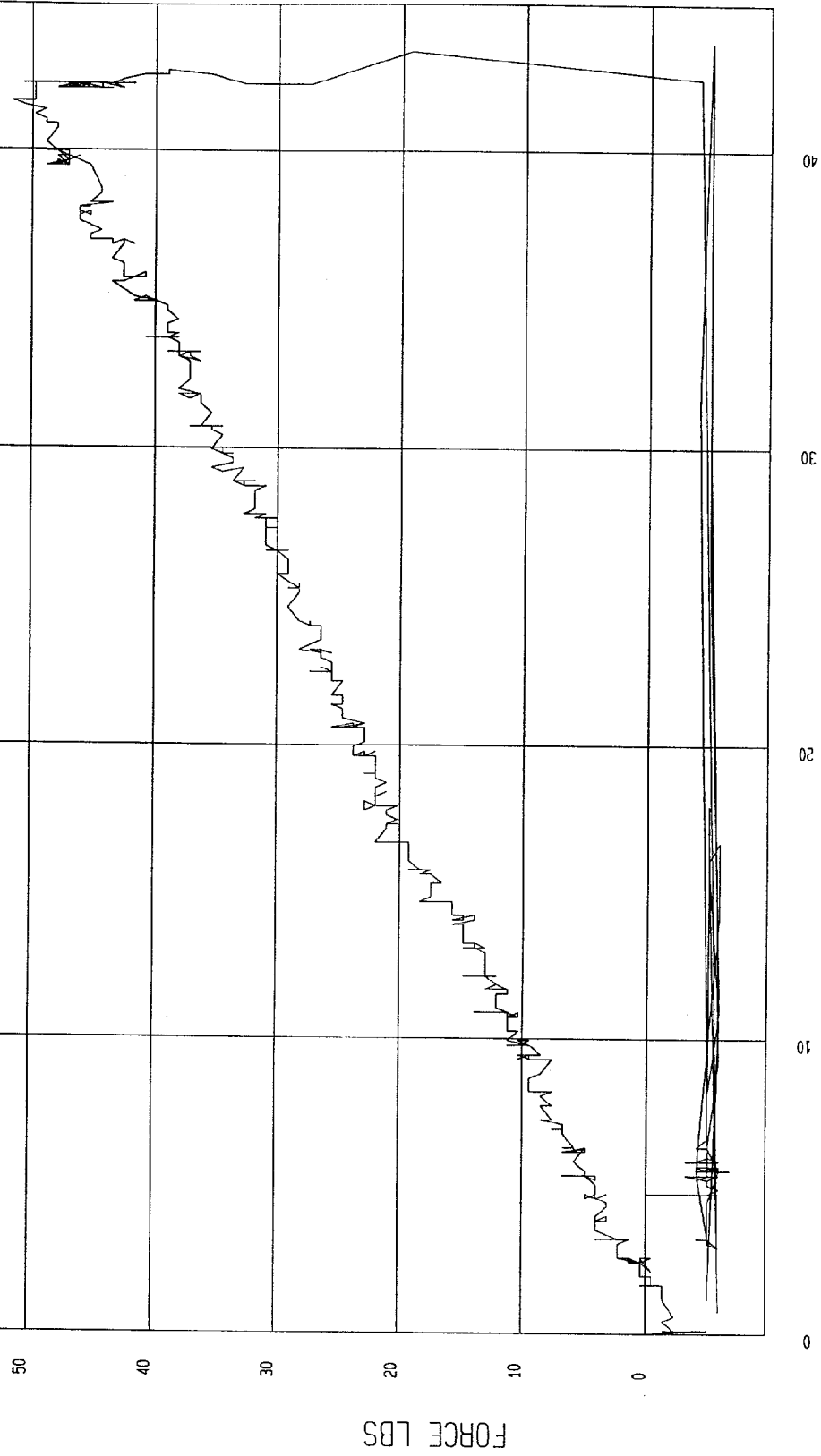
APPROVED BY



TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 12-12-1997 - 16:17

COMPONENT: DUMMY # 270

FORCE as a function of TORSO ROTATION



NCA Research
12-12-1997 16:18

TORSO ROTATION DEGREES

POST-TEST DRIVER DUMMY INSPECTION CHECKLIST

Type: Side Impact Dummy

Serial Number: 269

Inspected By: Tim Michnay

Date: December 12, 1997

<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):

POST-TEST PASSENGER DUMMY INSPECTION CHECKLIST

Type: Side Impact Dummy

Serial Number: 270

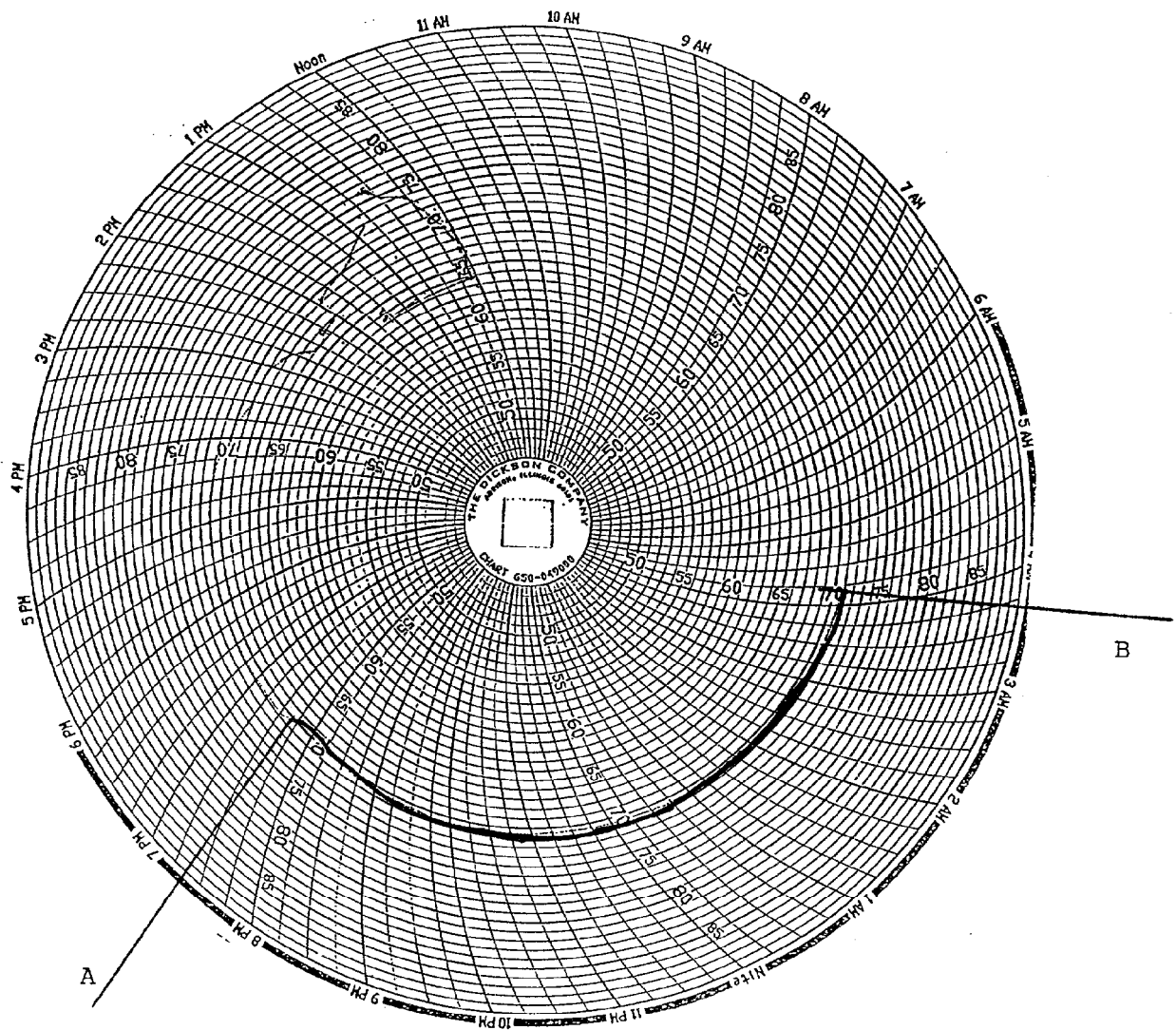
Inspected By: Tim Michnay

Date: December 12, 1997

<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 (10:00 a.m.)
B = test conducted (6:34 p.m.)

* It should be noted that the temperature plot was not correctly installed in the recorder.

APPENDIX D
TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

DUMMY AND VEHICLE CALIBRATION DATA
INSTRUMENTS FOR DRIVER DUMMY NO. 269

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y	AKAC4	Endevco	August 6, 1997
Lower Rib Y	J10431	Endevco	August 5, 1997
Lower Spine Y	AGP28	Endevco	September 15, 1997
Pelvis Y	AJ9P7	Endevco	August 6, 1997
Upper Rib Redundant Y	J13642	Endevco	August 6, 1997
Lower Rib Redundant Y	AN9E3	Endevco	August 5, 1997
Lower Spine Redundant Y	AJ8T5	Endevco	September 15, 1997
Pelvis Redundant Y	AJ462	Endevco	August 6, 1997

INSTRUMENTS FOR PASSENGER DUMMY NO. 270

	LEFT REAR PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y	AKAF3	Endevco	September 16, 1997
Lower Rib Y	ALEC1	Endevco	September 15, 1997
Lower Spine Y	ALCH7	Endevco	September 16, 1997
Pelvis Y	AKAD6	Endevco	September 11, 1997
Upper Rib Redundant Y	ALCN9	Endevco	September 16, 1997
Lower Rib Redundant Y	J10411	Endevco	September 15, 1997
Lower Spine Redundant Y	AJ420	Endevco	September 16, 1997
Pelvis Redundant Y	AJ9A7	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	H02-J02	Entran	August 6, 1997
Left Lower A-Post Y	C20-J10	Entran	August 6, 1997
Left Mid B-Post Y	G01-J10	Entran	August 7, 1997
Left Lower B-Post Y	I26-D06	Entran	August 5, 1997
Rear Floorpan Above Axle X	J10-E06	Entran	August 1, 1997
Rear Floorpan Above Axle Y	I26-D02	Entran	August 7, 1997
Rear Floorpan Above Axle Z	F11-G08	Entran	August 7, 1997
Driver Seat Track Y	I25-J19	Entran	August 7, 1997
Right Side Sill at Front Seat X	E13-D01	Entran	August 1, 1997
Right Side Sill at Front Seat Y	C14-Z08	Entran	August 1, 1997
Right Side Sill at Front Seat Z	A09-G05	Entran	August 1, 1997
Right Side Sill at Rear Seat X	G13-B09	Entran	August 5, 1997
Right Side Sill at Rear Seat Y	I26-D19	Entran	July 16, 1997
Right Side Sill at Rear Seat Z	F11-D05	Entran	August 7, 1997
Left Side Sill at Front Seat Y	F12-G06	Entran	July 14, 1997

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO	MANUFACTURER	CALIBRATION DATE
Left Side Sill at Rear Seat Y	L14-D13	Entran	August 1, 1997
Right Rear Occupant Compartment Y	L18-E06	Entran	November 5, 1997
Vehicle CG X	F12-G03	Entran	July 11, 1997
Vehicle CG Y	D05-R20	Entran	July 7, 1997
Vehicle CG Z	D05-R16	Entran	July 7, 1997
Left Front Door on Centerline	J13-F16	Entran	August 6, 1997
Midrear of Left Front Door	B14-R09	Entran	July 2, 1997
Left Front Door Upper Centerline	J13-F17	Entran	August 6, 1997
Midrear of Left Rear Door	F12-G05	Entran	August 7, 1997
Left Rear Door Upper Centerline	F11-G07	Entran	July 16, 1997

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