

REPORT NO.: 214D-MGA-99-15

V3010

NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TESTING
PASSENGER CARS

TOYOTA MOTOR CORPORATION

1999 TOYOTA 4 RUNNER

NHTSA NO: MX5106

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: January 18, 1999

Report Date: February 2, 1999

FINAL REPORT

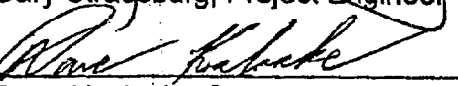
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Prepared By: 
Gary Strassburg, Project Engineer

Approved By: 
Dave Kosloske, Program Manager

Approval Date: 2-8-99

Technicians:

- Al Chalmers
- Wayne Dahlke
- Jan Eide
- Chris Kulis
- Tim Michnay
- Erika Miller
- Erik Nelson
- Chris Novak
- Paul Schlimmer
- Kyle Shelton
- Todd Stevenson
- John Wistert

Secretary: Carol Beck

FINAL REPORT ACCEPTED BY (OCWS):

Accepted By:  (COTR)

Acceptance Date: 03/04/99

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				14. Sponsoring Agency Code NPS-10																			
15. Supplementary Notes																							
16. Abstract A 90° Moving Deformable Barrier NCAP side impact was conducted on the subject 1999 Toyota 4 Runner to obtain new car assessment and research data indicant of FMVSS No. 214D performance. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on January 18, 1999. The impact velocity of the Moving Deformable Barrier (MDB) was 61.5 kph, and the ambient temperature at the struck side (driver's) of the target vehicle at the time of impact was 20 °C. The target vehicle post test maximum crush was 289 mm at level 1. The test vehicle's performance follows: <table border="0" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th style="text-align: center;"><u>DRIVER</u></th> <th style="text-align: center;"><u>PASS.</u></th> </tr> </thead> <tbody> <tr> <td>Left Upper Rib (LUR) Accel., g</td> <td style="text-align: center;">26</td> <td style="text-align: center;">25</td> </tr> <tr> <td>Left Lower Rib (LLR) Accel., g</td> <td style="text-align: center;">24</td> <td style="text-align: center;">22</td> </tr> <tr> <td>Lower Spine (T₁₂) Accel., g</td> <td style="text-align: center;">23</td> <td style="text-align: center;">17</td> </tr> <tr> <td>Thoracic Trauma Index (TTI)</td> <td style="text-align: center;">25</td> <td style="text-align: center;">21</td> </tr> <tr> <td>Pelvis (PEV) Accel., g</td> <td style="text-align: center;">50</td> <td style="text-align: center;">28</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	26	25	Left Lower Rib (LLR) Accel., g	24	22	Lower Spine (T ₁₂) Accel., g	23	17	Thoracic Trauma Index (TTI)	25	21	Pelvis (PEV) Accel., g	50	28
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17. Key Words New Car Assessment Program (NCAP) FMVSS No. 214D Side Impact Dummy (SID) Occupant Side Impact Protection				18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Adm. Technical Ref. Division, Room 5108 (NAD-52) 400 Seventh Street, S.W. Washington, D.C. 20590																			
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SECTION 1
PURPOSE AND TEST PROCEDURE

This side impact test is part of the FY99 NCAP Side Impact Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-97-D-22001. The purpose of this test was to evaluate side impact protection of a 1999 Toyota 4 Runner.

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.

SECTION 2

SUMMARY OF SIDE IMPACT TEST

A 1999 Toyota 4 Runner 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 38.22 mph (61.5 kph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by MGA Research Corporation in Burlington, Wisconsin, on January 18, 1999. 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)	25	21
Pelvis (g)	50	28

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: 1999/Toyota/4 Runner/SUV
 Vehicle NHTSA No.: MX5106 VIN: JT3HN86R1X0213062
 Vehicle Body Color: Red Build Date: 11/98
 Engine Data: 6 Cylinders; CID; 3.4 Liter; cc
 Placement X Longitudinal; Lateral
 Transmission: 4 Speed; Manual; X Automatic; X Overdrive
 Final Drive: Rear Wheel Drive; Frt. Wheel Drive; X Four Wheel Drive

Odometer Reading 187 miles

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

Other: Sunroof, Tow Hitch

DATA FROM TIRE PLACARD:

Tire Pressure (at capacity): 32 Psi FRONT

32 Psi REAR

Recommended Tire Size: P225/75R15

Tires on Test Vehicle: P265/70R16 Manufacturer: Goodyear

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 = 453.6 kg (A)

No. of Occupants x 68.04 kg. = 340.2 kg (B)

Cargo Capacity (A-B) = 113.4 kg

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)WEIGHT OF TEST VEHICLE WITH MAXIMUM FLUIDS:Right Front = 494.0 kgRight Rear = 423.2 kgLeft Front = 518.0 kgLeft Rear = 428.2 kgTOTAL FRONT = 1012.0 kgTOTAL REAR = 851.4 kg% of Total Vehicle Weight = 54.3 %;% of Total Weight = 45.7 %TOTAL WEIGHT = 1863.4 kg

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)Year/Make/Model/Body Style: 1999/Toyota/4 Runner/SUVVehicle NHTSA No.: MX5106 Test Date: January 18, 1999CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Test Vehicle Delivered Weight with Maximum Fluids	=	<u>1863.4</u> kg
Cargo Carrying Capacity of Test Vehicle	=	<u>113.4</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>2138.2</u> kg

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

Right Front	=	<u>485.8</u> kg	Right Rear	=	<u>528.0</u> kg
Left Front	=	<u>570.6</u> kg	Left Rear	=	<u>553.4</u> kg
TOTAL FRONT	=	<u>1056.4</u> kg	TOTAL REAR	=	<u>1081.4</u> kg
% of Total Weight	=	<u>49.4</u> %	% of Total Weight	=	<u>50.6</u> %
TOTAL WEIGHT	=	<u>2137.8</u> kg			

TEST VEHICLE ATTITUDE:

CURB WEIGHT ATTITUDE:

Right Front 995 mm Left Front 993 mm Right Rear 1007 mm Left Rear 1000 mm

FULLY LOADED WEIGHT ATTITUDE:

Right Front 994 mm Left Front 985 mm Right Rear 969 mm Left Rear 951 mm

TEST ATTITUDE:

Right Front 988 mm Left Front 990 mm Right Rear 968 mm Left Rear 952 mm

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

Test Vehicle Wheelbase: 2674 mm

C.G. = 1324 mm rearward of front wheel centerline

TOTAL VEHICLE LENGTH:

Right Side = 4370 mm

Centerline = 4668 mm

Left Side = 4370 mm

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

Year/Make/Model/Body Style: 1999/Toyota/4 Runner/SUV

Vehicle NHTSA No.: MX5106 Test Date: January 18, 1999

FRONT SEAT CUSHION PLACEMENT:

Total Length of Adjustment Travel: 195 mm

Test Position: 7th position rearward out of 14 possible positions

FRONT SEAT BACK ADJUSTMENT POSITION:

Seat Back = set in 7th locking position

SECOND POSITION SEAT:

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

Seat Back Adjustment Position: N/A

ADJUSTABLE STEERING COLUMN POSITION: Mid position

WINDOW POSITIONS: Left Front Closed Left Rear Closed
 Right Front Open Right Rear Open

AMOUNT OF STODDARD SOLVENT IN FUEL TANK:

Fuel system usable capacity = 18.5 gallons

Test Volume: 17.2 gallons 93 % of capacity

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

Wheelbase: = 2674 mm

Impact Point is 397 mm rearward of front axle centerline

DATA SHEET NO. 2
TEST VEHICLE SUMMARY OF RESULTS

Year/Make/Model/Body Style: 1999/Toyota/4 Runner/SUV
 Vehicle NHTSA No.: MX5106 Test Date: January 18, 1999
 Overall Length = 4668 mm; Overall Width = 1678 mm

TEST WEIGHT:

Right Front	= <u>513.9</u> kg	Right Rear	= <u>528.0</u> kg
Left Front	= <u>563.4</u> kg	Left Rear	= <u>528.0</u> kg
TOTAL FRONT	= <u>1077.3</u> kg	TOTAL REAR	= <u>1056.0</u> kg
% of Total Weight	= <u>50.5</u> %	% of Total Weight	= <u>49.5</u> %
TOTAL VEHICLE WEIGHT = <u>2133.3</u> kg			
Wheelbase = <u>2674</u> mm			
Longitudinal C.G. from Center of Front Axle = <u>1324</u> mm			
Impact Angle with Respect to Impactor = <u>90°</u> degrees			

MAXIMUM EXTERIOR STATIC CRUSH:

1. LEVEL 1 (501 mm above ground) = 289 mm
 2. LEVEL 2 (818 mm above ground) = 235 mm
 3. LEVEL 3 (842 mm above ground) = 223 mm
 4. LEVEL 4 (1151 mm above ground) = 190 mm
 5. LEVEL 5 (1658 mm above ground) = 32 mm
- Maximum Post-Test Intrusion = 289 mm

OCCUPANTS:

	<u>Driver</u>	<u>Left Rear Passenger</u>
Type of Dummy	<u>SID</u>	<u>SID</u>
Restraints Used	<u>3 point belt and</u> <u>frontal airbag</u>	<u>3 point 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 RESULTSYear/Make/Model/Body Style: 1999/Toyota/4 Runner/SUVVehicle NHTSA No.: MX5106 Test Date: January 18, 1999POSITION OF IMPACT (MDB) ON MONORAIL:Crabbed 27° to leftMDB 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>1098 mm</u>
C.G. Location From Center Line	=	<u>-15 mm</u>
C.G. Location Above Ground Level	=	<u>485 mm</u>

MDB WEIGHT:

Left Front	=	<u>457.7 kg</u>	Left Rear	=	<u>235.1 kg</u>
Right Front	=	<u>328.1 kg</u>	Right Rear	=	<u>342.6 kg</u>
TOTAL FRONT	=	<u>785.8 kg</u>	TOTAL REAR	=	<u>577.7 kg</u>
TOTAL MDB WEIGHT = <u>1363.5 kg</u>					

Impact Angle (MDB C/L to Target Vehicle C/L) = 90° degreesImpact Speed = Primary: 38.22 mph (61.5 kph) Secondary: 38.36 mph (61.7 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>182</u> mm |
| 2. | Row B Mid Stack (686 mm) | = | <u>161</u> mm |
| 3. | Row C Top of Bumper (533 mm) | = | <u>123</u> mm |
| 4. | Row D Center of Bumper (432 mm) | = | <u>96</u> mm |

INSTRUMENTATION:

Number of MDB Data Channels = 7

DATA SHEET NO. 4
POST-TEST OBSERVATIONS

Year/Make/Model/Body Style: 1999/Toyota/4 Runner/SUV

Vehicle NHTSA No.: MX5106 Test Date: January 18, 1999

VISIBLE DUMMY CONTACT POINTS:

	<u>LEFT FRONT SID</u>	<u>LEFT REAR SID</u>
Head	<u>Window header</u>	<u>C-post</u>
Arm	<u>Door panel</u>	<u>Door panel</u>
Pelvis	<u>Door panel</u>	<u>Door panel</u>
Left Knee	<u>Door panel</u>	<u>Door panel</u>
Right Knee	<u>Left knee</u>	<u>Left knee</u>

DOOR OPENING:

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

MDB DISTANCE FROM TARGET IMPACT POINT:

Horizontal: 10 mm forward Vertical: 8 mm high

ARM REST LOCATIONS:

Front: 205 mm from below window

Rear: 215 mm from below window

POST-TEST OBSERVATIONS (Cont'd)SEAT CRUSH:

Front Seat Back: 0 mm Front Seat Cushion: 15 mm
Left Rear Seat Back: 12 mm Rear Seat Cushion: 16 mm

GLAZING DAMAGE:

Left rear door glass broke

PILLAR PERFORMANCE:

No separation

SILL SEPARATION:

Separation from 2047 mm to 2126 mm rearward of front axle centerline

OTHER NOTABLE IMPACT EFFECTS:

Right rear tire was flat, the seal between the tire and rim broke

AIRBAG DEPLOYMENT STATUS:

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

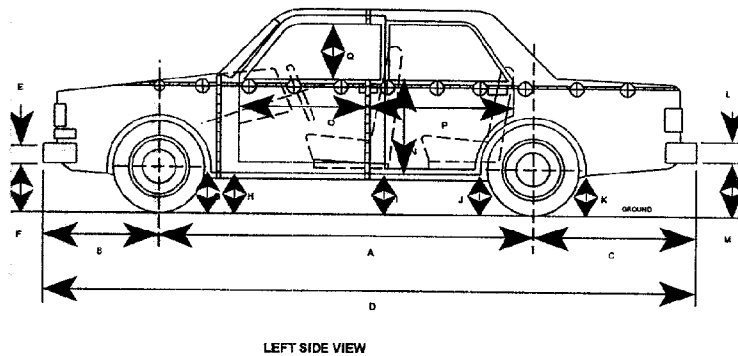
SECTION 4
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 5
SIDE IMPACT DUMMY (SID) INSTRUMENTATION DATA
 Year/Make/Model/Body Style: 1999Toyota/4 Runner/SUV
 Vehicle NHTSA No.: MX5106 Test Date: January 18, 1999

	Driver SID ID # 269			Left Passenger SID ID # 270		
	Pos. Direct.		Neg. Direct.	Pos. Direct.		Neg. Direct.
	Max (g)	Time (msec)	Max (g)	Max (g)	Time (msec)	Max (g)
RIB ACCELERATIONS						
Left Upper Rib (LUR) Y	26.3	65	-4.4	24.9	76	-2.9
Left Lower Rib (LLR) Y	24.1	43	-4.1	22.0	51	-6.3
SPINE ACCELERATIONS						
Lower Lateral Y	23.3	39	-26.3	17.5	60	-3.2
PELVIS ACCELERATIONS						
Lateral Y	50.1	38	-18.1	27.6	42	-13.7
						85

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

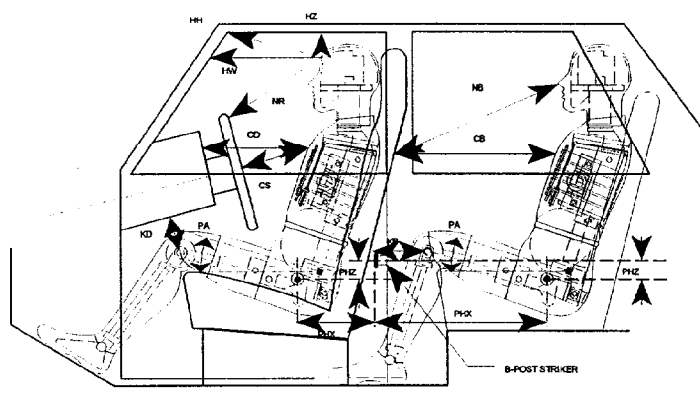
J1 = To Pinch Weld

J2 = To Sill

ALL MEASUREMENTS IN (mm)

	PRE-TEST	POST-TEST	Δ CHANGE
A	2674	2674	0
B	811	924	-113
C	1183	1050	133
D	4668	4648	20
E	315	315	0
F	488	511	-23
G	474	485	-11
H	407	405	2
I	452	419	33
J1/J2	448/270	455/226	-7/44
K	457	406	49
L	140	140	0
M	471	365	106
N	700	696	4
O	718	712	6
P	1201	1130	71
Q	472	475	-3
R	4370	4385	-15
S	4370	4322	48
T	1678	1501	177

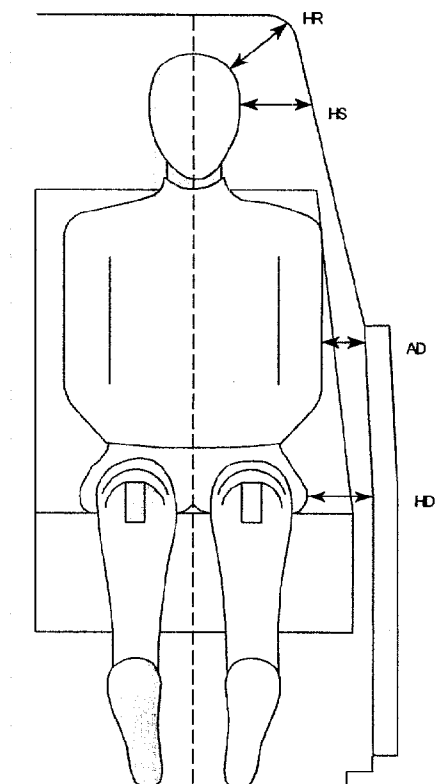
DATA SHEET NO. 7

SIDE IMPACT DUMMY (SID) LONGITUDINAL CLEARANCE DIMENSIONSYear/Make/Model/Body Style: 1999/Toyota/4 Runner/SUVNHTSA NO.: MX5106 Test Date: January 18, 1999NOTE: All dimensions are in mm with tolerance of ± 3 mm

	DRIVER SID ID # 269		LEFT REAR PASSENGER SID ID # 270
HH	380	HZ	184
HW	534	NB	680
HZ	162	CB	600
NR	410	KBL (KBA)	262 (0.0°)
CD	520	KBR (KBA)	273 (0.0°)
CS	309	PA°	24.5
KDL(KDA°)	230 (0.0°)	PHX	248
KDR(KDA°)	232 (0.0°)	PHZ	198
PA°	24.4°		
PHX	227		
PHZ	101		

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 DIMENSIONSYear/Make/Model/Body Style: 1999/Toyota/4 Runner/SUVNHTSA NO.: MX5106 Test Date: January 18, 1999

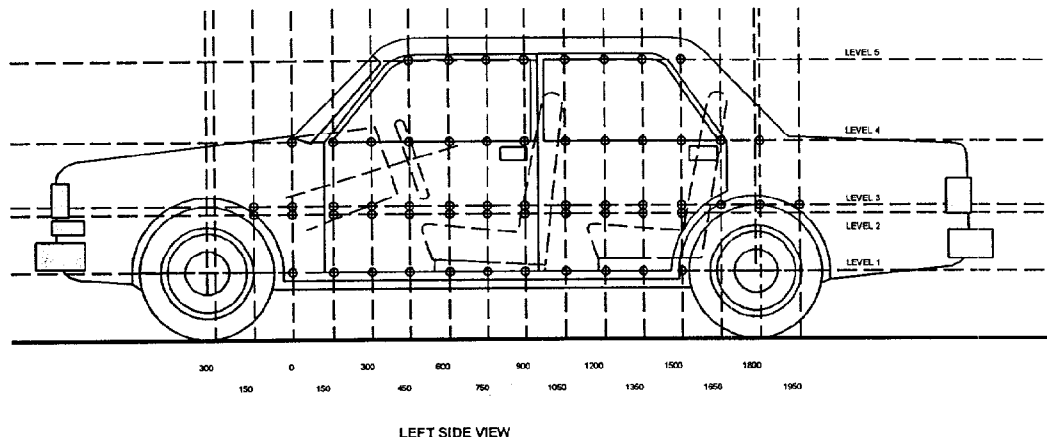
NOTE: All dimensions are in mm

	DRIVER SID ID # 269	LEFT REAR PASSENGER SID ID # 270
HR	211	191
HS	293	204
AD	72	83
HD	122	118

DATA SHEET NO. 9
VEHICLE SIDE MEASUREMENTS

Year/Make/Model/Body Style: 1999/Toyota/4 Runner/SUV

NHTSA NO.: MX5106 Test Date: January 18, 1999



NOTE: All measurements are in millimeters (mm)

LEVEL 5 - WINDOW TOP
LEVEL 4 - WINDOW SILL
LEVEL 3 - MID-DOOR
LEVEL 2 - OCCUPANT H-POINT
LEVEL 1 - AXLE CENTERLINE HEIGHT OR SILL TOP HEIGHT

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>501</u> mm
Level 2 @ Occupant H-Point	= <u>818</u> mm
Level 3 @ Mid Door	= <u>842</u> mm
Level 4 @ Window Sill	= <u>1151</u> mm
Level 5 @ Window Top	= <u>1658</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	779	905	126
300	779	961	182
450	779	1001	222
600	780	1026	246
750	781	1038	257
900	781	1049	268
1050	781	1052	271
1200	781	1052	271
1350	781	1070	289
1500	781	1058	277
1650	779	1032	253
1800			

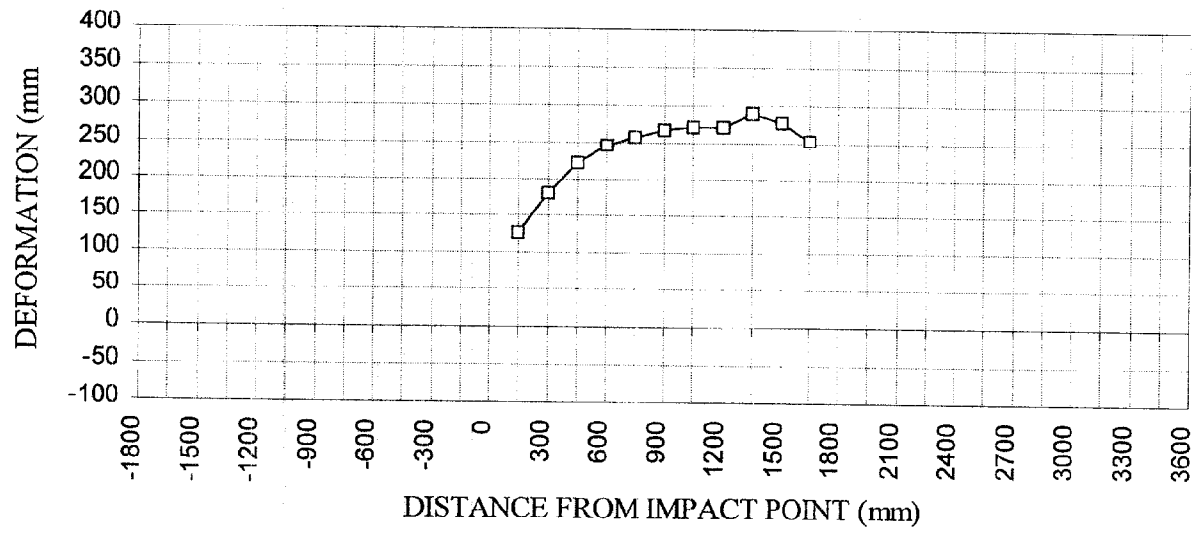
Reference plane is parallel to test vehicle longitudinal centerline.
Given dimensions = Reference plane to car body

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

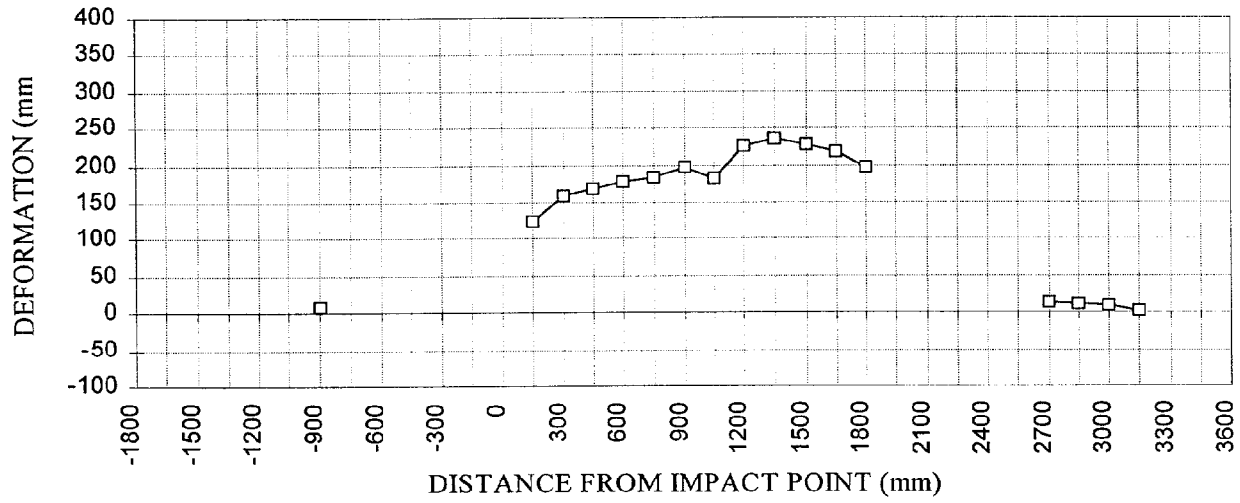
	Level 2 - Occupant H-Point		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1800			
-1650			
-1500			
-1350			
-1200			
-1050			
-900	754	762	8
-750			
-600			
-450			
-300			
-150			
0 (impact point)			
150	722	848	126
300	724	884	160
450	726	894	168
600	727	905	178
750	727	912	185
900	727	924	197
1050	728	911	183
1200	727	952	225
1350	727	962	235
1500	725	952	227
1650	720	939	219
1800	712	909	197

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			
2700	708	722	14
2850	723	734	11
3000	731	741	10
3150	739	742	3
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	755	762	7
-750	712	729	17
-600			
-450			
-300			
-150	720	842	122
0 (impact point)	722	866	144
150	724	877	153
300	725	889	164
450	725	896	171
600	726	909	183
750	727	894	167
900	725	945	220
1050	725	948	223
1200	723	929	206
1350	719	919	200
1500	713	908	195
1650			
1800			

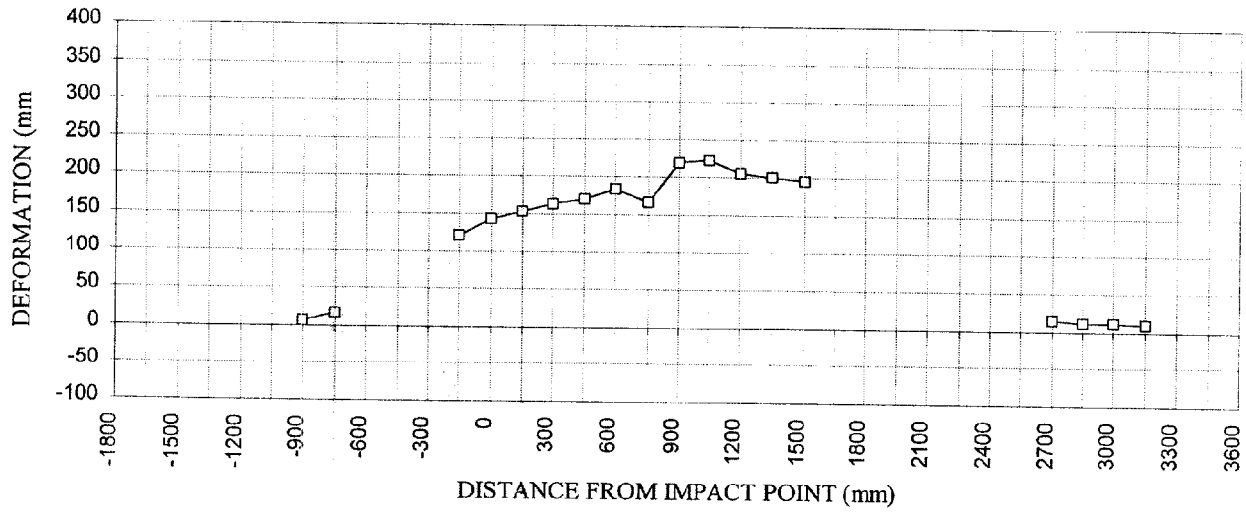
Reference plane is parallel to test vehicle longitudinal centerline.
Given dimensions = Reference plane to car body

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			
2100			
2250			
2400			
2550			
2700	709	724	15
2850	722	734	12
3000	729	741	12
3150	737	746	9
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	817	822	5
-750	795	804	9
-600	782	798	16
-450	772	795	23
-300	765	796	31
-150	762	801	39
0 (impact point)	758	804	46
150	760	811	51
300	758	820	62
450	760	822	62
600	760	822	62
750	760	823	63
900	760	828	68
1050	760	834	74
1200	762	842	80
1350	762	952	190
1500	762	906	144
1650	762	865	103
1800	762	826	64

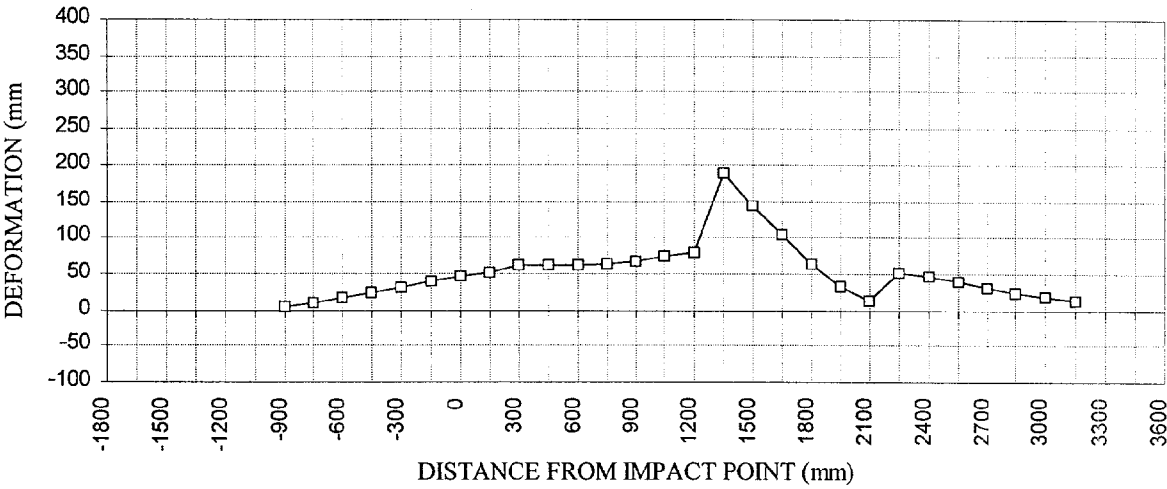
Reference plane is parallel to test vehicle longitudinal centerline.
Given dimensions = Reference plane to car body

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	762	794	32
2100	760	774	14
2250	762	813	51
2400	765	812	47
2550	768	808	40
2700	774	805	31
2850	779	803	24
3000	783	802	19
3150	790	803	13
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

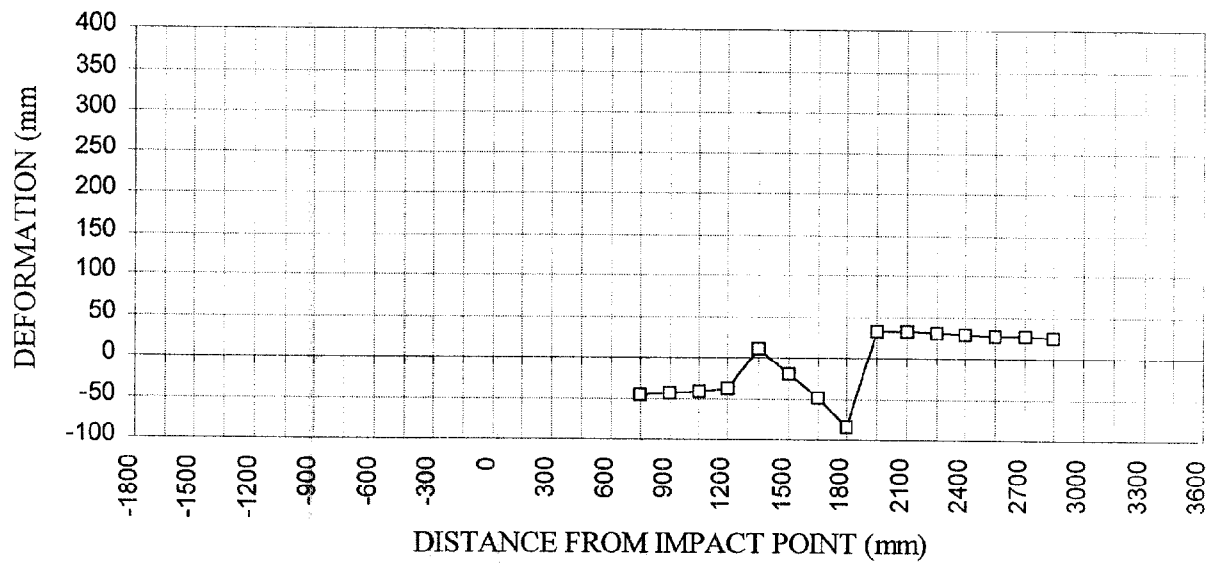
	Level 5 - Window Top		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1800			
-1650			
-1500			
-1350			
-1200			
-1050			
-900			
-750			
-600			
-450			
-300			
-150			
0 (impact point)			
150			
300			
450			
600			
750	938	892	-46
900	938	895	-43
1050	940	898	-42
1200	940	901	-39
1350	942	952	10
1500	944	924	-20
1650	944	894	-50
1800	946	862	-84

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	947	979	32
2100	949	981	32
2250	950	981	31
2400	952	981	29
2550	955	983	28
2700	960	988	28
2850	965	991	26
3000			
3150			
3300			
3450			
3600			

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

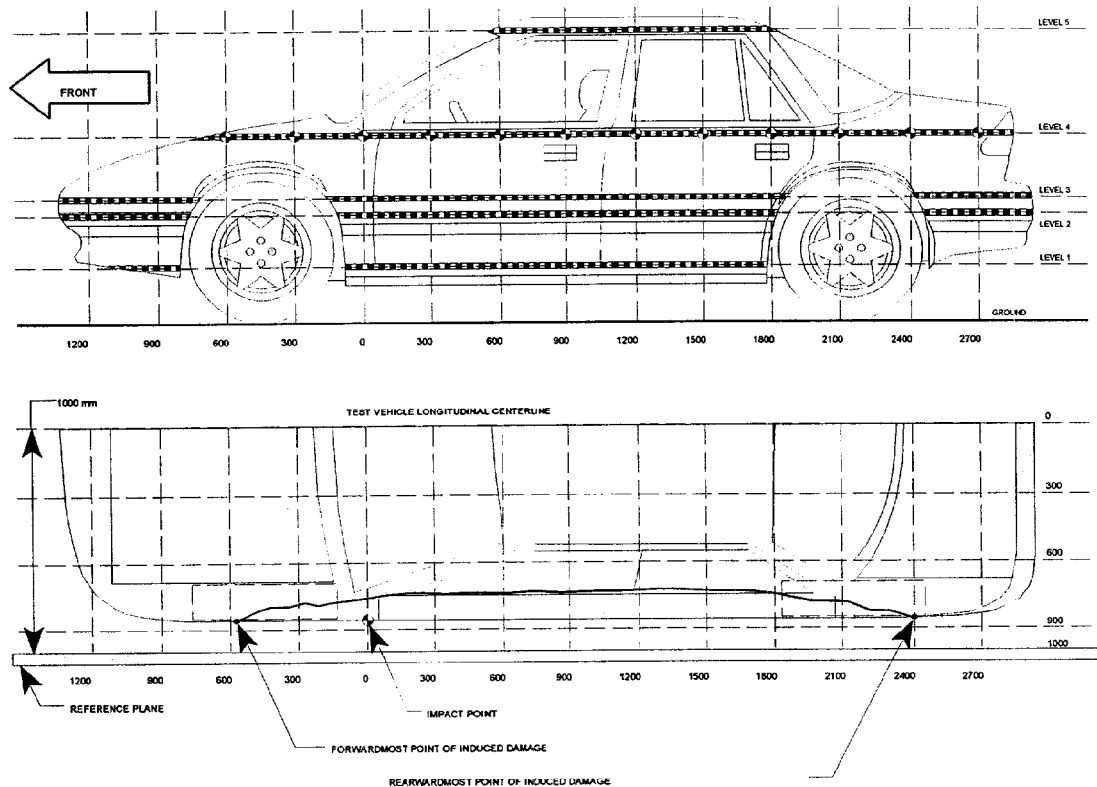
VEHICLE EXTERIOR STATIC CRUSH

LEVEL 5 - WINDOW TOP

DATA SHEET NO. 11
VEHICLE DAMAGE PROFILE DISTANCES

Year/Make/Model/Body Style: 1999/Toyota/4 Runner/SUV

NHTSA NO.: MX5106 Test Date: January 18, 1999



NOTE: All measurements are in millimeters (mm)

DPD MEASUREMENTS	POST-TEST (mm)	PRE-TEST (mm)	STATIC CRUSH (mm)
1. (LF = <u>-750</u> mm)	712	712	0
2. <u>-64</u> mm	786	758	28
3. <u>580</u> mm	1009	780	229
4. <u>1282</u> mm	1052	781	271
5. <u>2005</u> mm	775	762	13
6. (LR = <u>2700</u> mm)	709	709	0

DATA SHEET NO. 12
EXTERIOR STATIC CRUSH FOR SIDE IMPACTOR

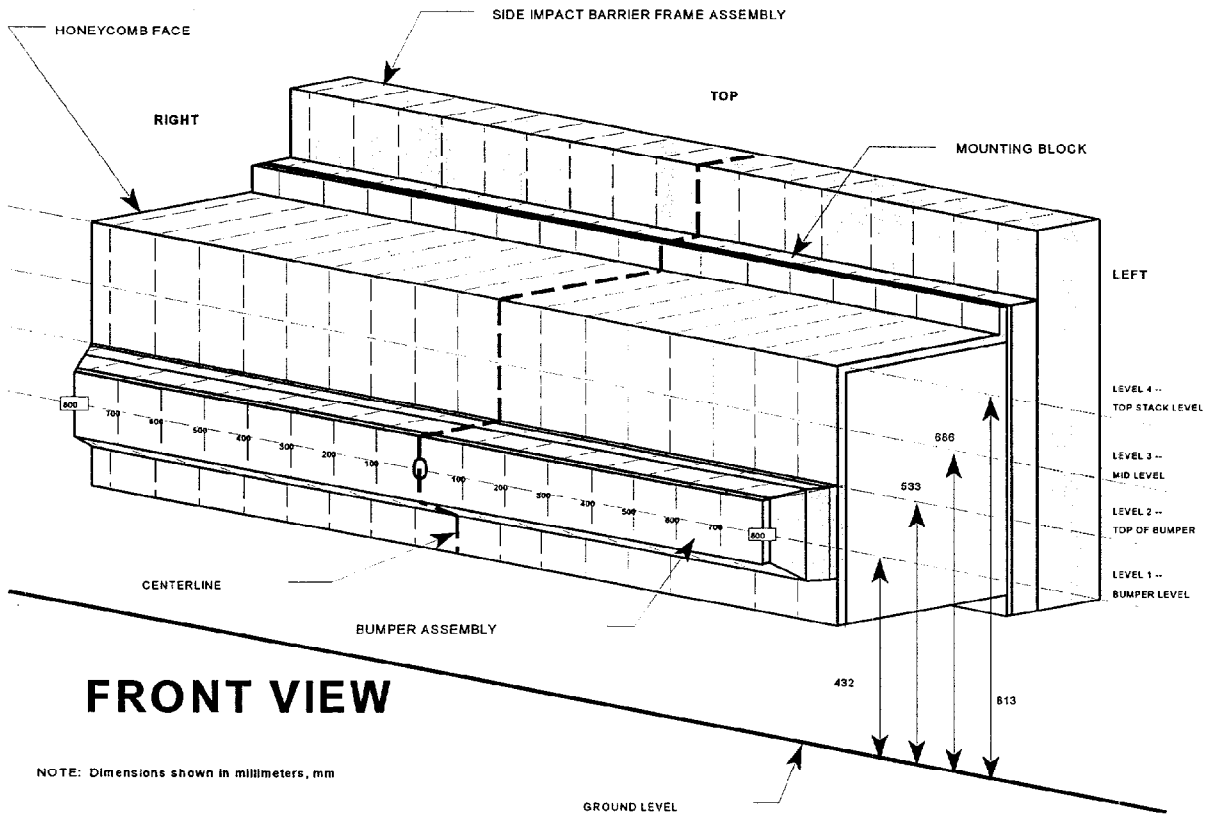
Year/Make/Model/Body Style: 1999/Toyota/4 Runner/SUV

Vehicle NHTSA No.: MX5106 Test Date: January 18, 1999

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	179	130	101	88	85	82	103	90	73	59	59	70	78	93	109	130	182
Mid Level Level 3	686 mm	161	89	60	43	38	37	48	45	41	28	36	47	61	77	93	109	147
Top Bumper Level 2	533 mm	122	123	113	98	92	92	83	79	84	74	76	78	89	94	95	103	113
Mid Bumper Level 1	432 mm	96	93	79	69	63	58	59	54	48	47	43	44	49	57	64	77	85

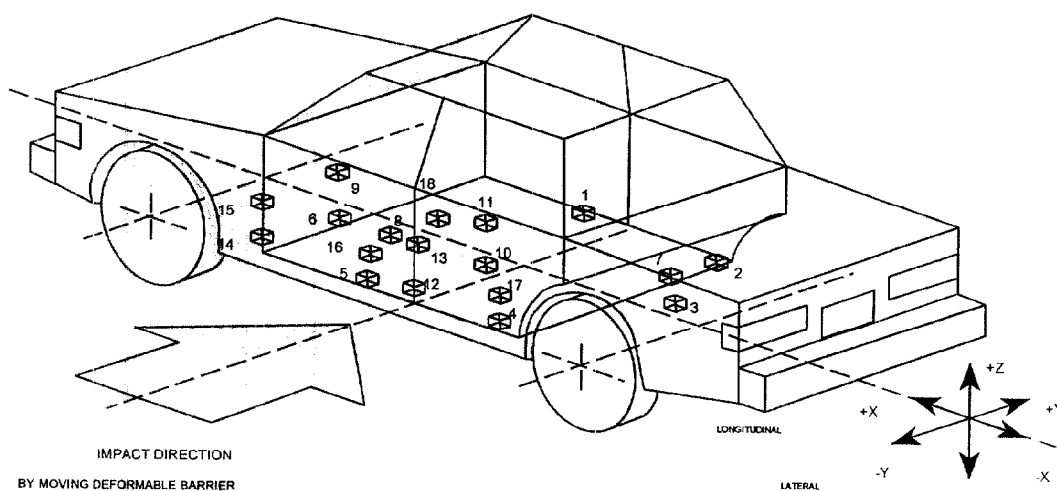
See next page for Barrier Face Graphic

DATA SHEET NO. 12 (Cont'd)



DATA SHEET 13
TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 1999/Toyota/4 Runner/SUV
 Vehicle NHTSA No.: MX5106 Test Date: January 18, 1999



- 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
- 8 - Midrear of Left Frt Door
- 9 - Left Frt Door Uptr C/Line

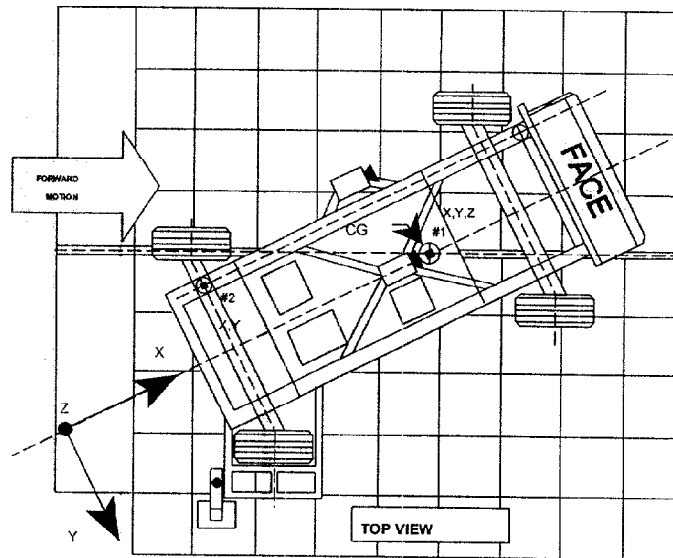
- 10 - Midrear of Left Rr Door
- 11 - Left Rr Door Uptr C/Line
- 12 - Left Lwr B-Post
- 13 - Left Middle B-Post
- 14 - Left Lwr A-Post
- 15 - Left Middle A-Post
- 16 - Frt Seat Track
- 17 - Rr Seat Track
- 18 - Vehicle C.G.

DATA SHEET NO. 13
TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY
Year/Make/Model/Body Style: 1999/Toyota/4 Runner/SUV
Vehicle NHTSA No.: MX5106 Test Date: January 18, 1999

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	2473	670	518	2.7	-6.4	26.4	-3.6	4.9	-11.5	27.6
2	Rt. Side Sill @ Rear Seat	1810	670	516	2.7	-6.8	28.0	-3.2	4.4	-7.8	28.2
3	Rr. Floorpan Above Axle	1053	0	746	6.5	-7.7	19.5	-2.3	5.3	-11.8	19.6
4	Left Side Sill @ Rr. Seat	1804	-680	485	---	---	139.8	-49.7	---	---	---
5	Left Side Sill @ Frt. Seat	2467	-680	487	---	---	**	**	---	---	---
6	Left Front Door Centerline	2652	-706	903	---	---	151.4	-55.0	---	---	---
7	Right Rear Occupant Compartment	1877	534	602	---	---	24.3	-1.8	---	---	---
8	Mid Rear of Left Front Door	2312	-712	871	---	---	122.3	-88.4	---	---	---
9	Left Front Door Upper Centerline	2648	-705	1138	---	---	56.3	-56.4	---	---	---
10	Left Rear Door Mid Rear	1542	-719	914	---	---	124.5	-74.0	---	---	---
11	Left Rear Door Upper Centerline	1649	-715	1141	---	---	71.5	-50.2	---	---	---
12	Left Lower B-Post	2078	-709	608	---	---	152.1	-36.8	---	---	---
13	Left Mid B-Post	2082	-712	1184	---	---	149.1	-42.8	---	---	---
14	Left Lower A-Post	3139	-711	643	---	---	97.2	-116.2	---	---	---
15	Left Mid A-Post	3156	-757	1153	---	---	49.3	-7.1	---	---	---
16	Driver Left Seat Track	2312	-572	648	---	---	75.2	-25.4	---	---	---
18	Vehicle CG	2388	0	760	18.2	-21.1	49.1	-29.5	35.1	-41.1	55.5

*Reference: X - Rear Bumper (+ Forward) Y - Vehicle Centerline (+ To right) Z - Ground Level (+ Up) ** No valid data collected

DATA SHEET NO. 14

MOVING DEFORMABLE BARRIER (MDB) ACCELEROMETER LOCATIONS AND DATA SUMMARYYear/Make/Model/Body Style: 1999/Toyota/4 Runner/SUVVehicle NHTSA No.: MX5106 Test Date: January 18, 1999

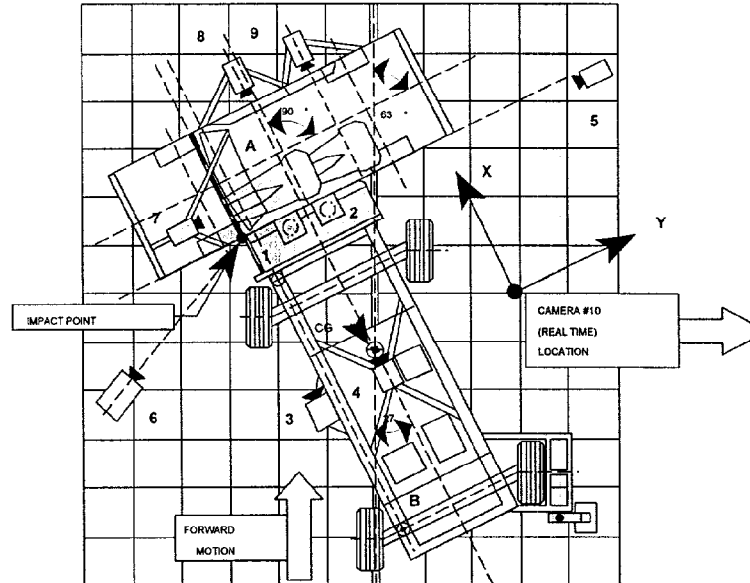
Accel. No.	Description	Coordinates (mm)*			(+) Positive		(-) Negative	
		X	Y	Z	Max. (g)	Time (msec)	Max. (g)	Time (msec)
1	MDB Center of Gravity	-1092	0	483				
	Longitudinal (X)	---	---	---	1.1	142	-18.4	37
	Lateral (Y)	---	---	---	.4	187	-7.7	50
	Vertical (Z)	---	---	---	22.1	20	-20.1	35
	Resultant (R)	---	---	---	27.0	51	----	----
2	Rear Frame Member	-2501	-625	622				
	Longitudinal (X)	---	---	---	1.1	172	-22.3	47
	Lateral (Y)	---	---	---	6.3	46	-1.2	67

*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: 1999/Toyota/4 Runner/SUV

Vehicle NHTSA No.: MX5106 Test Date: January 18, 1999



Camera No.	View	Coordinates (mm)*			Lens (mm)	Film Speed (fps)
		X	Y	Z		
	Real Time					
1	Top Overall	-200	1260	5000	8	1000
2	Top Impact	-180	70	5000	13	935
3	Cart Pointer				35	*
4	Cart Overall				13	*
5	Right Impact	-630	10530	1940	25	990
6	Left Impact	-635	-2620	1860	13	1005
7	Onboard Hood				13	1000
8	Onboard Driver				8	1111
9	Onboard Rear Passenger				8	957

* Reference: (from point of impact)

+X = Forward

+Y = To Right

+Z = Upward

** Camera's did not run

DATA SHEET 16
FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

Vehicle Year/Make/Model/Body Style: 1999/Toyota/4 Runner/SUV

Vehicle NHTSA No.: MX5106 Test Date: January 18, 1999

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 38.22 mph (61.5 kph)

FUEL SPILLAGE MEASUREMENT:

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

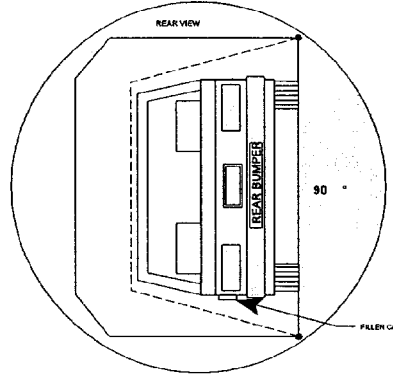
FUEL SPILLAGE LOCATION(S): None

DATA SHEET 16
FMVSS 301 STATIC ROLLOVER TEST DATA

Vehicle Year/Make/Model/Body Style: 1999/Toyota/4 Runner/SUV

Vehicle NHTSA No.: MX5106 Test Date: January 18, 1999

TEST PHASE: 0° - 90°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 45 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 45 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

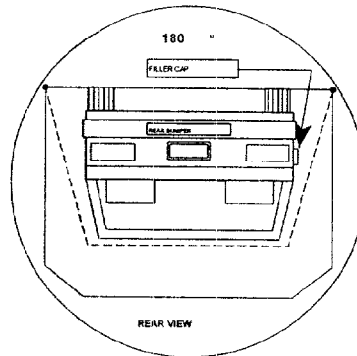
FUEL SPILLAGE LOCATIONS(S): None

DATA SHEET 16
FMVSS 301 STATIC ROLLOVER TEST DATA (Cont'd)

Vehicle Year/Make/Model/Body Style: 1999/Toyota/4 Runner/SUV

Vehicle NHTSA No.: MX5106 Test Date: January 18, 1999

TEST PHASE: 90° - 180°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 17 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 17 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

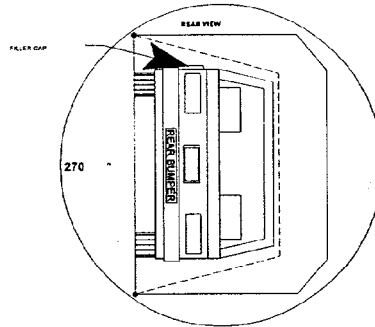
FUEL SPILLAGE LOCATIONS(S): None

DATA SHEET 16
FMVSS 301 STATIC ROLLOVER TEST DATA (Cont'd)

Vehicle Year/Make/Model/Body Style: 1999/Toyota/4 Runner/SUV

Vehicle NHTSA No.: MX5106 Test Date: January 18, 1999

TEST PHASE: 180° - 270°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 29 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 29 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

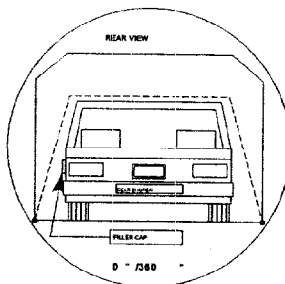
FUEL SPILLAGE LOCATIONS(S): None

DATA SHEET 16
FMVSS 301 STATIC ROLLOVER TEST DATA

Vehicle Year/Make/Model/Body Style: 1999/Toyota/4 Runner/SUV

Vehicle NHTSA No.: MX5106 Test Date: January 18, 1999

TEST PHASE: 270° - 360°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 49 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 49 seconds

Next Whole Minute Interval = 8 minutes

FUEL SPILLAGE MEASUREMENT:

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

FUEL SPILLAGE LOCATIONS(S): None

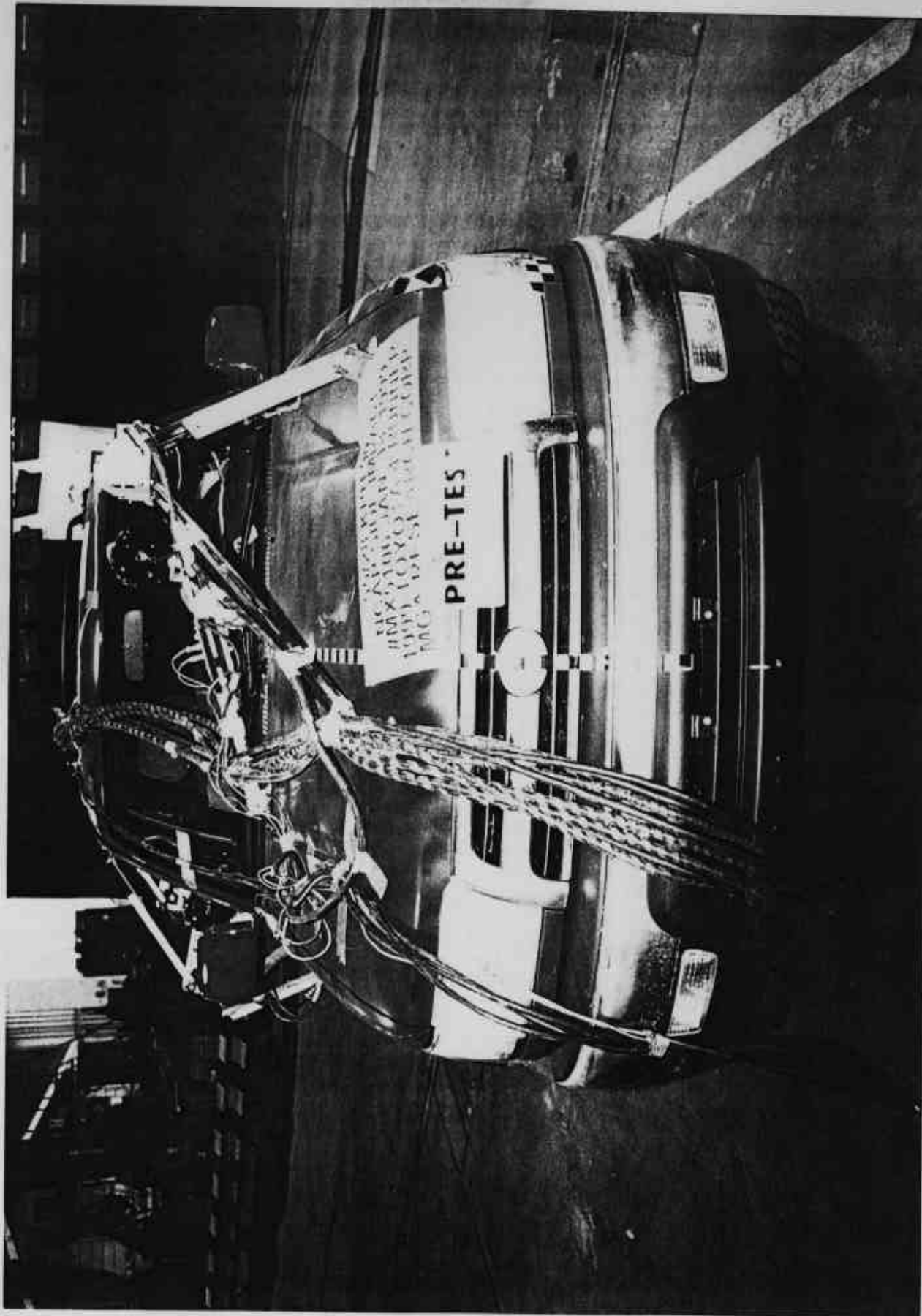
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A-1

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

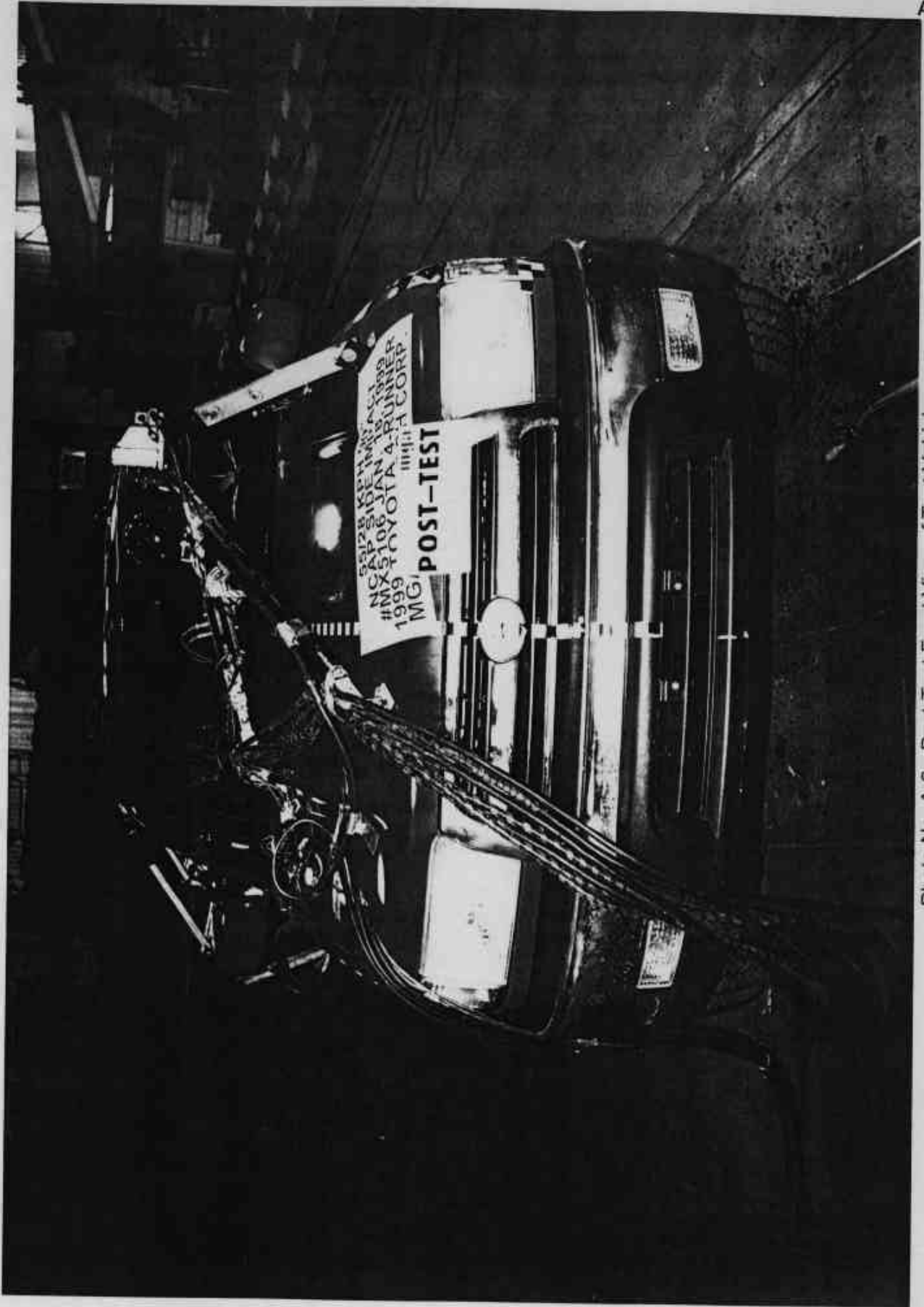


Photo No. A-2 - Post-Test Front View of Test Vehicle

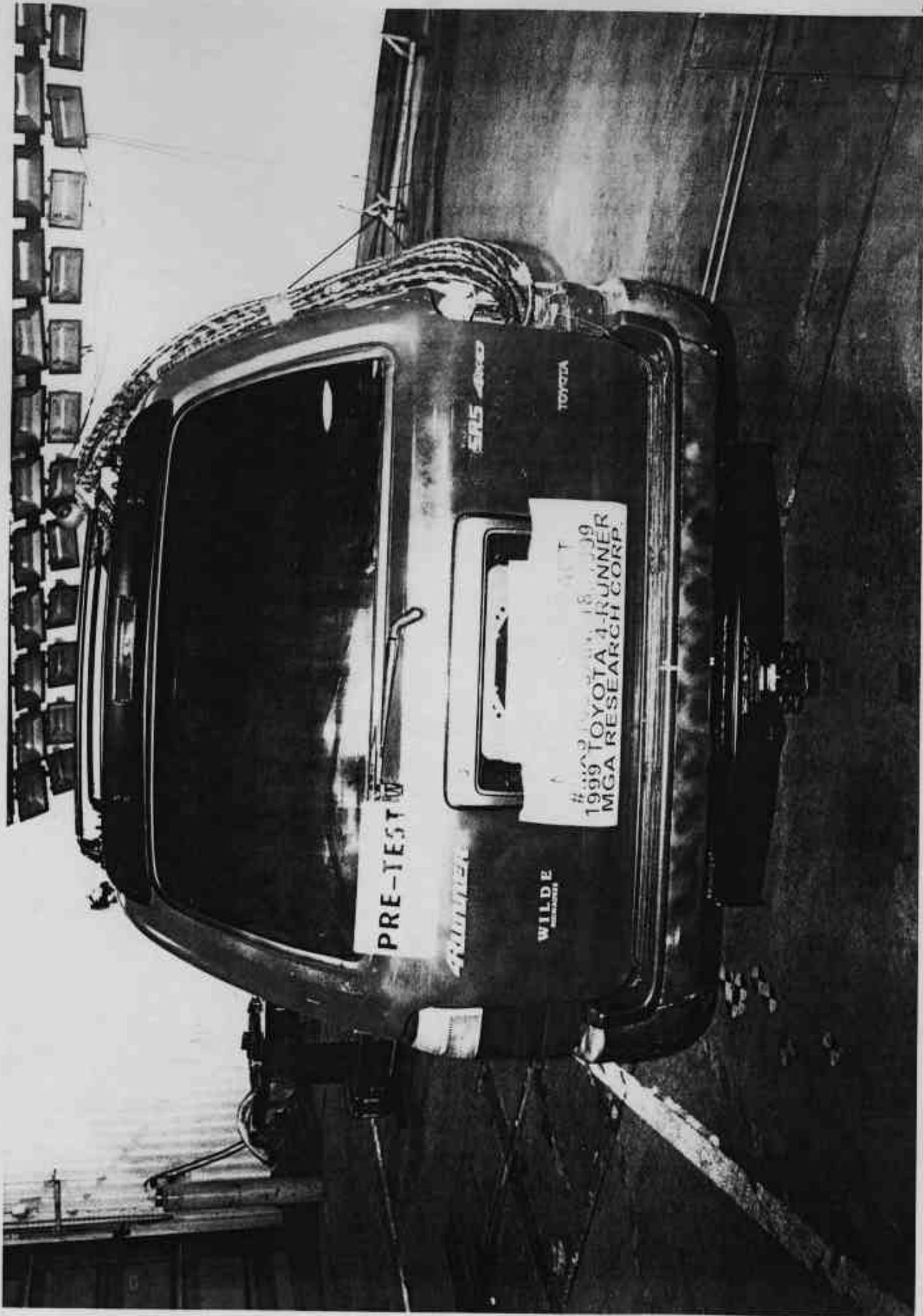


Photo No. A-3 - Pre-Test Rear View of Test Vehicle



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

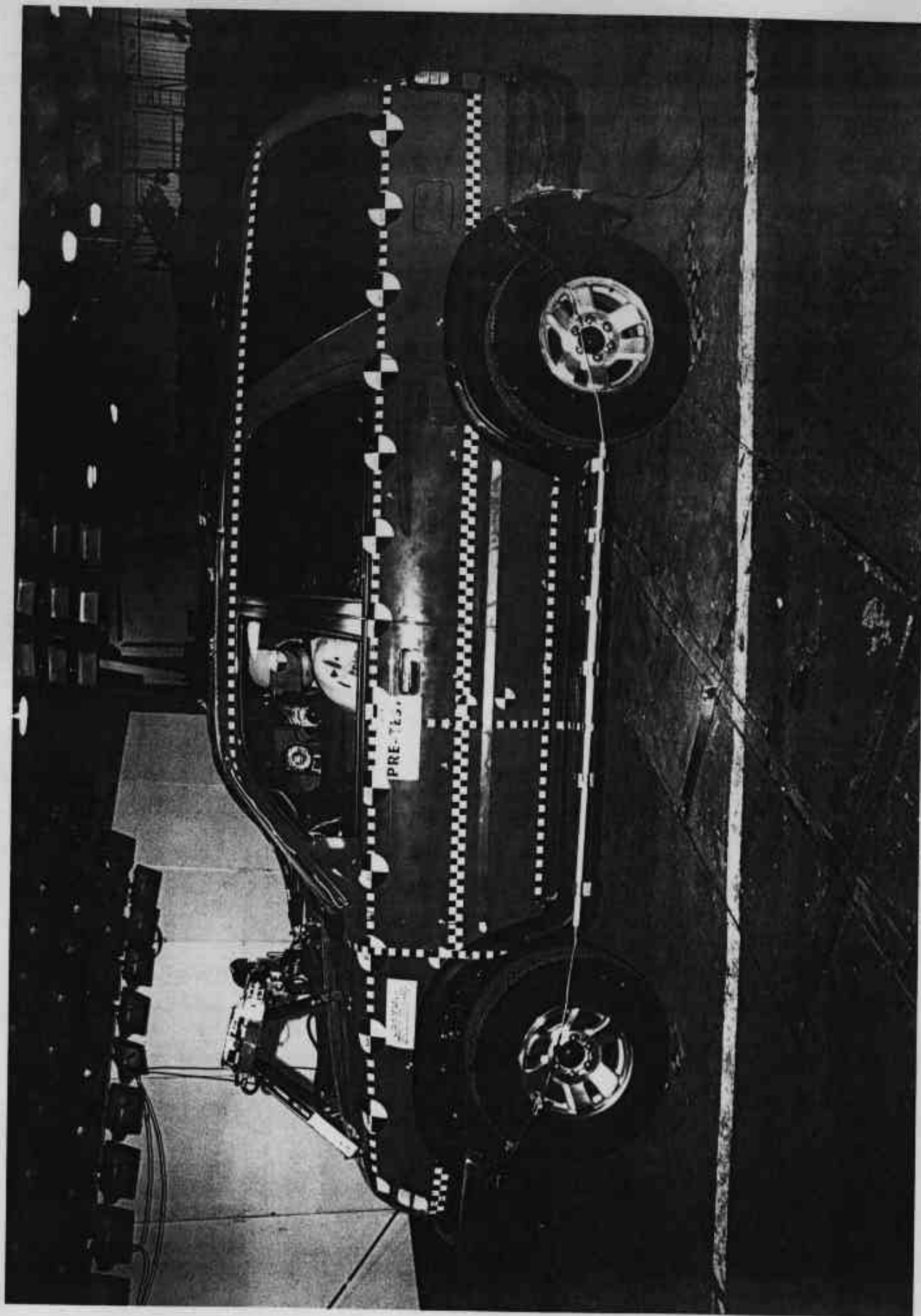


Photo No. A-5 - Pre-Test Left Side View of Test Vehicle

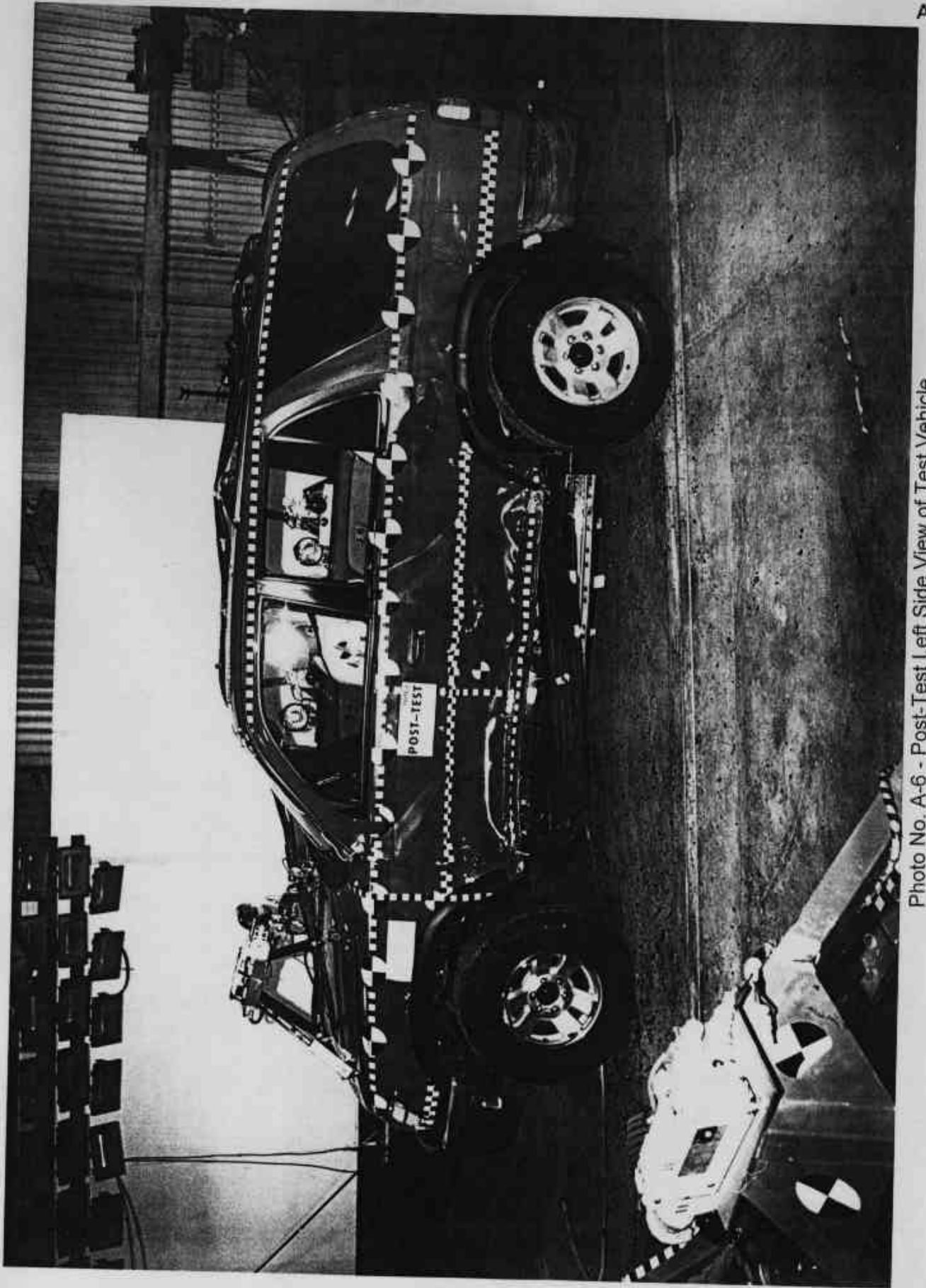


Photo No. A-6 - Post-Test Left Side View of Test Vehicle



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

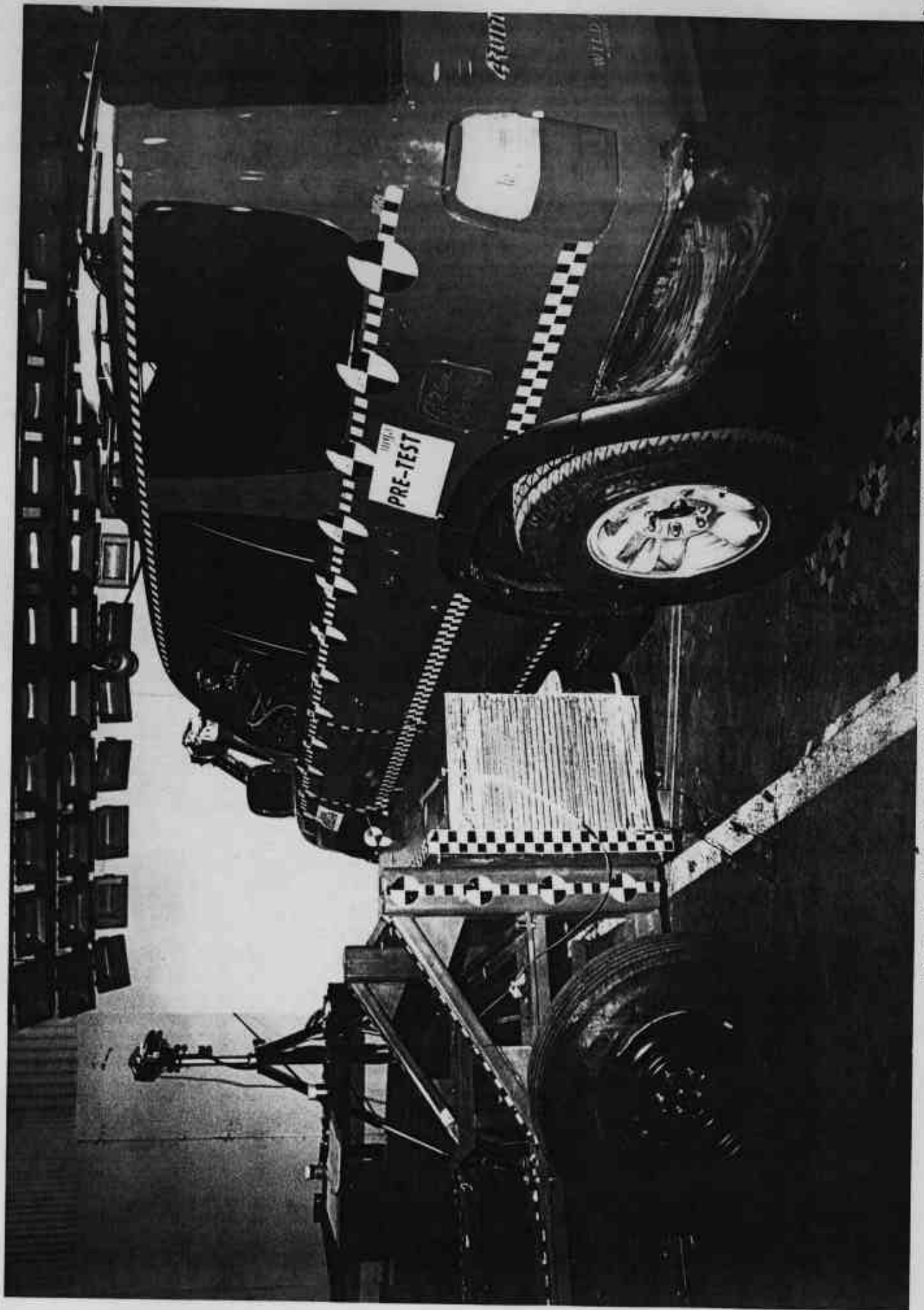


Photo No. A-8 - Pre-Test MDB Positioned Against Vehicle (right side)

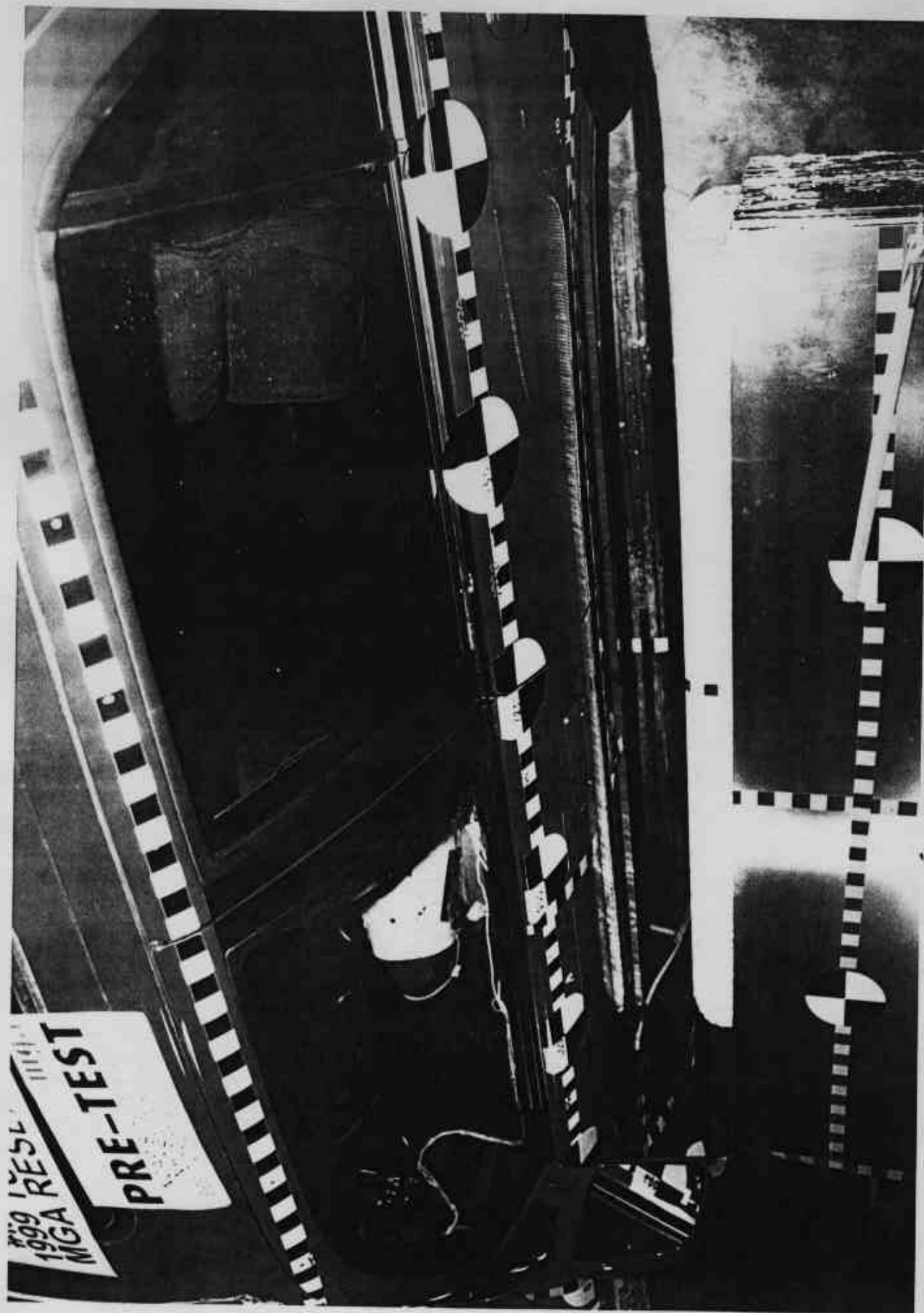


Photo No. A-9 - Pre-Test MDB Positioned Against Vehicle Overhead View

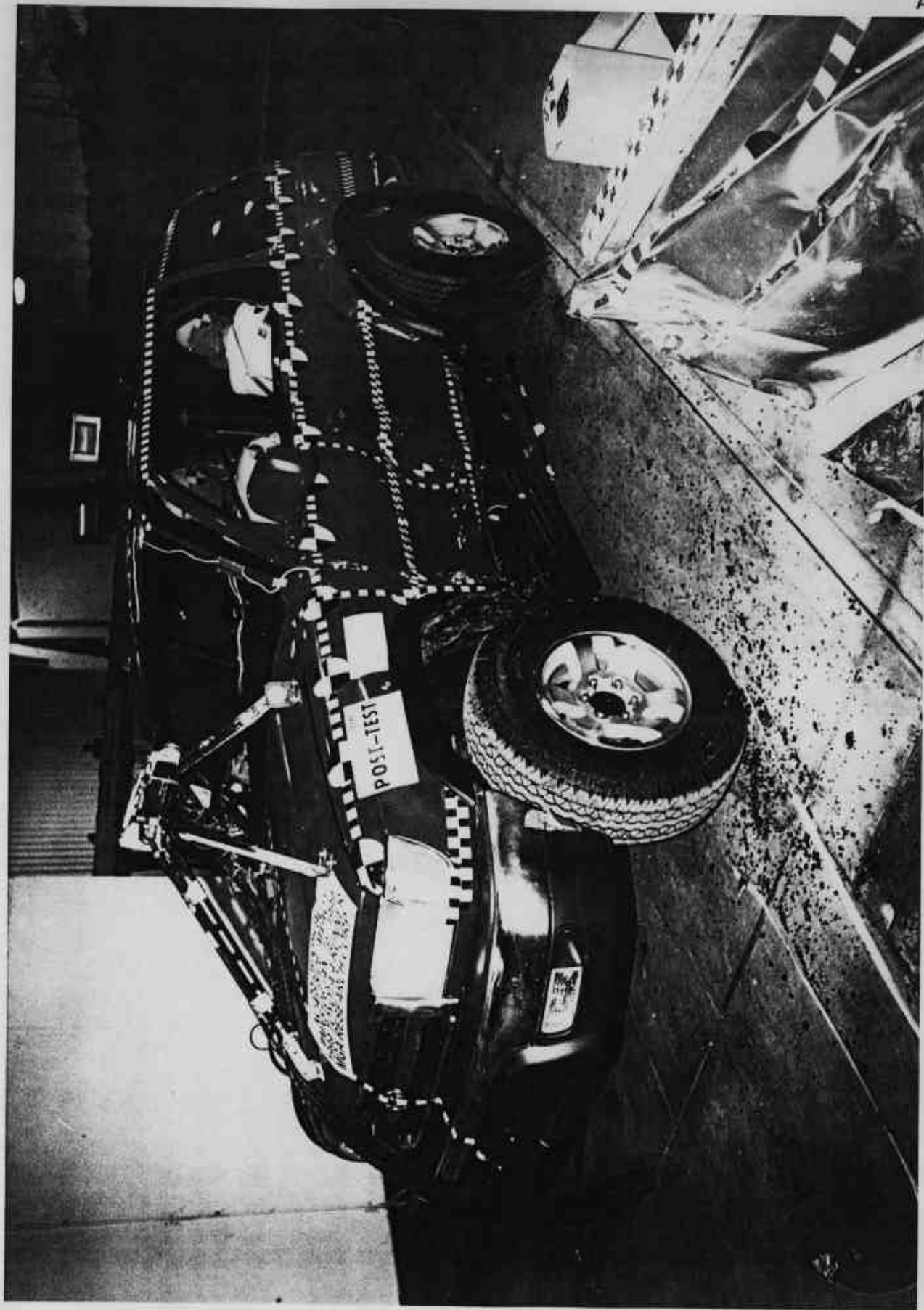


Photo No. A-10 - Post-Test MDB Positioned Against Vehicle (left side)



Photo No. A-11 - Post-Test MDB Positioned Against Vehicle Overhead View

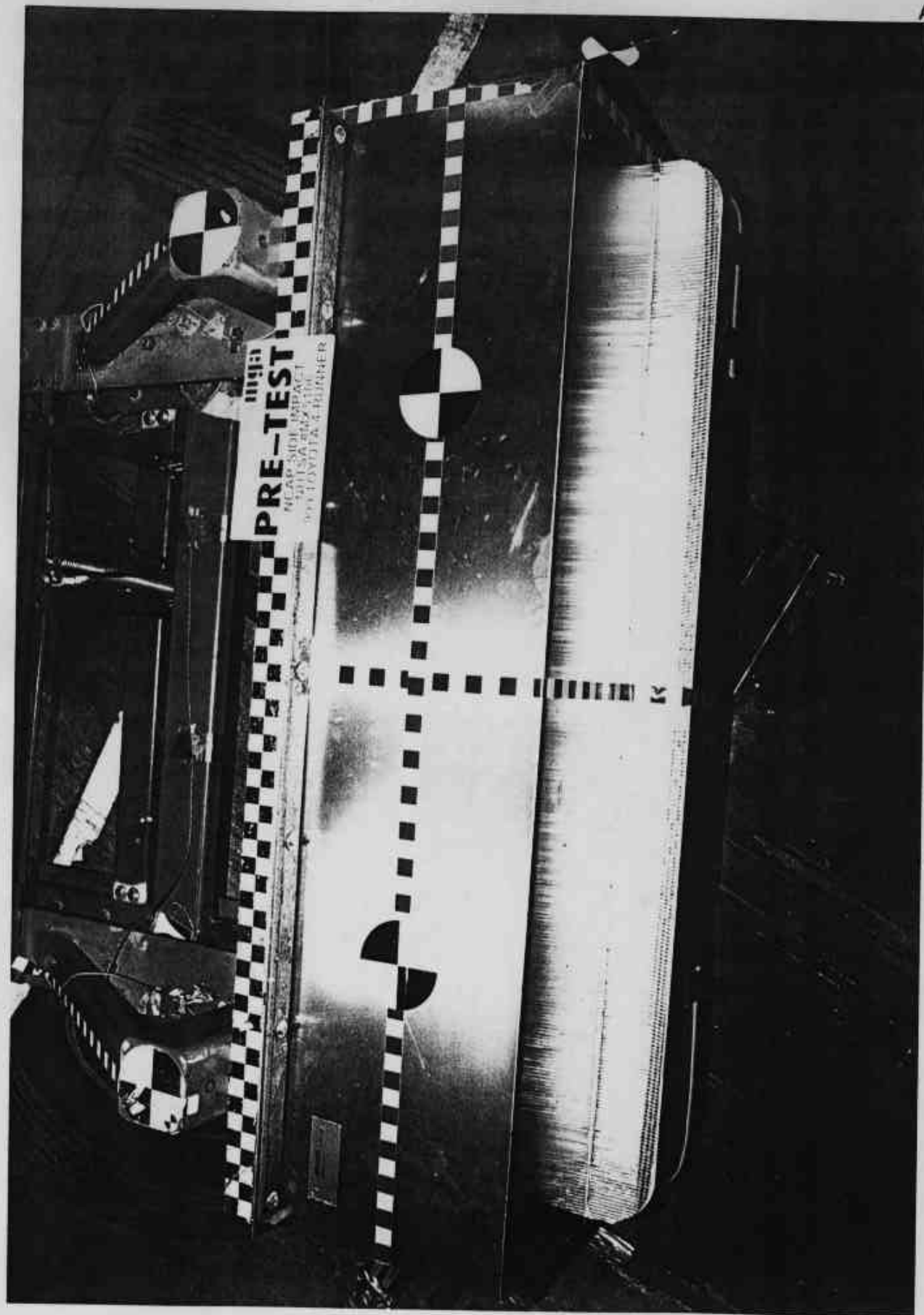


Photo No. A-12 - Pre-Test MDB Top View

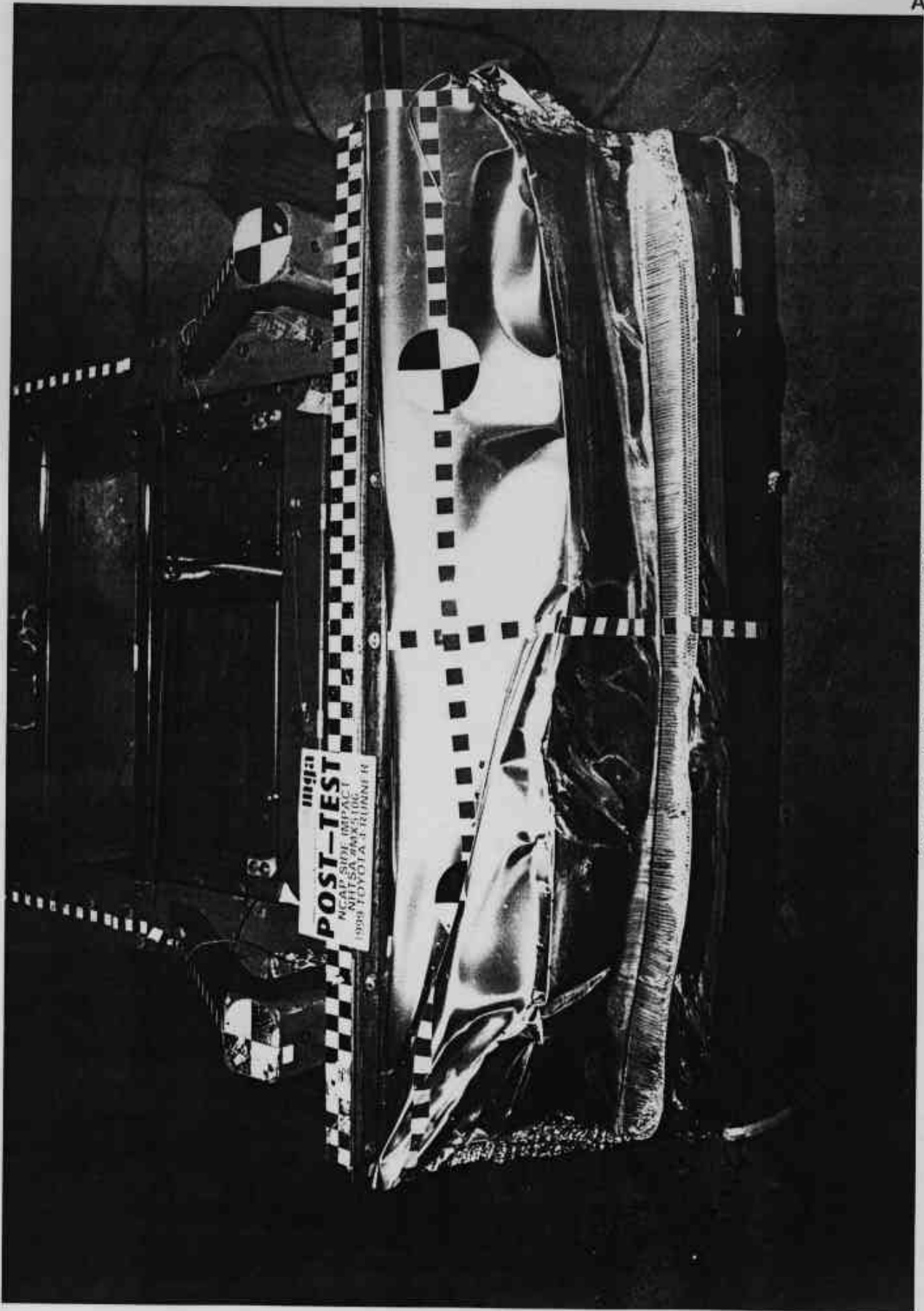


Photo No. A-13 - Post-Test MDB Top View

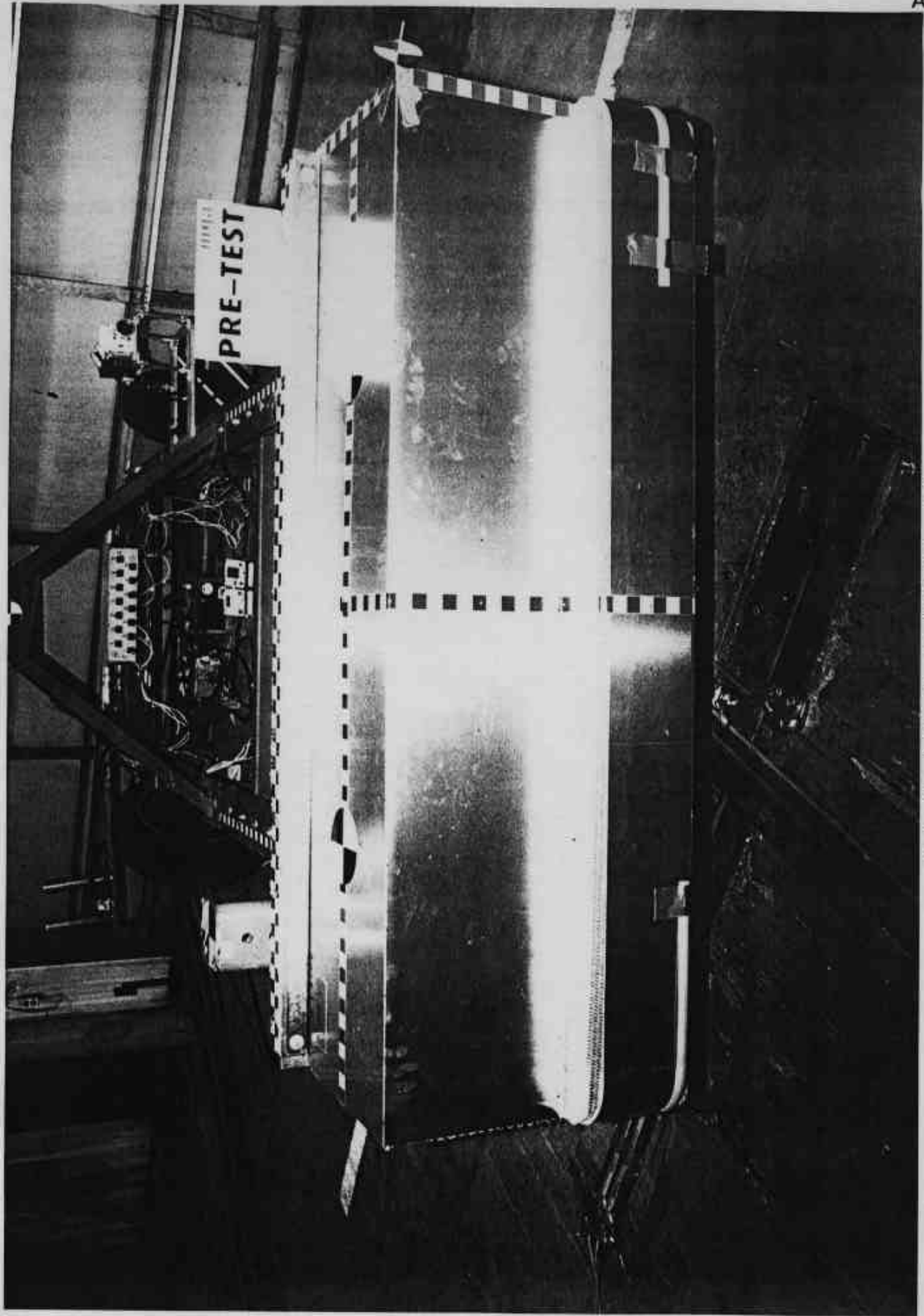


Photo No. A-14 - Pre-Test MDB Front View

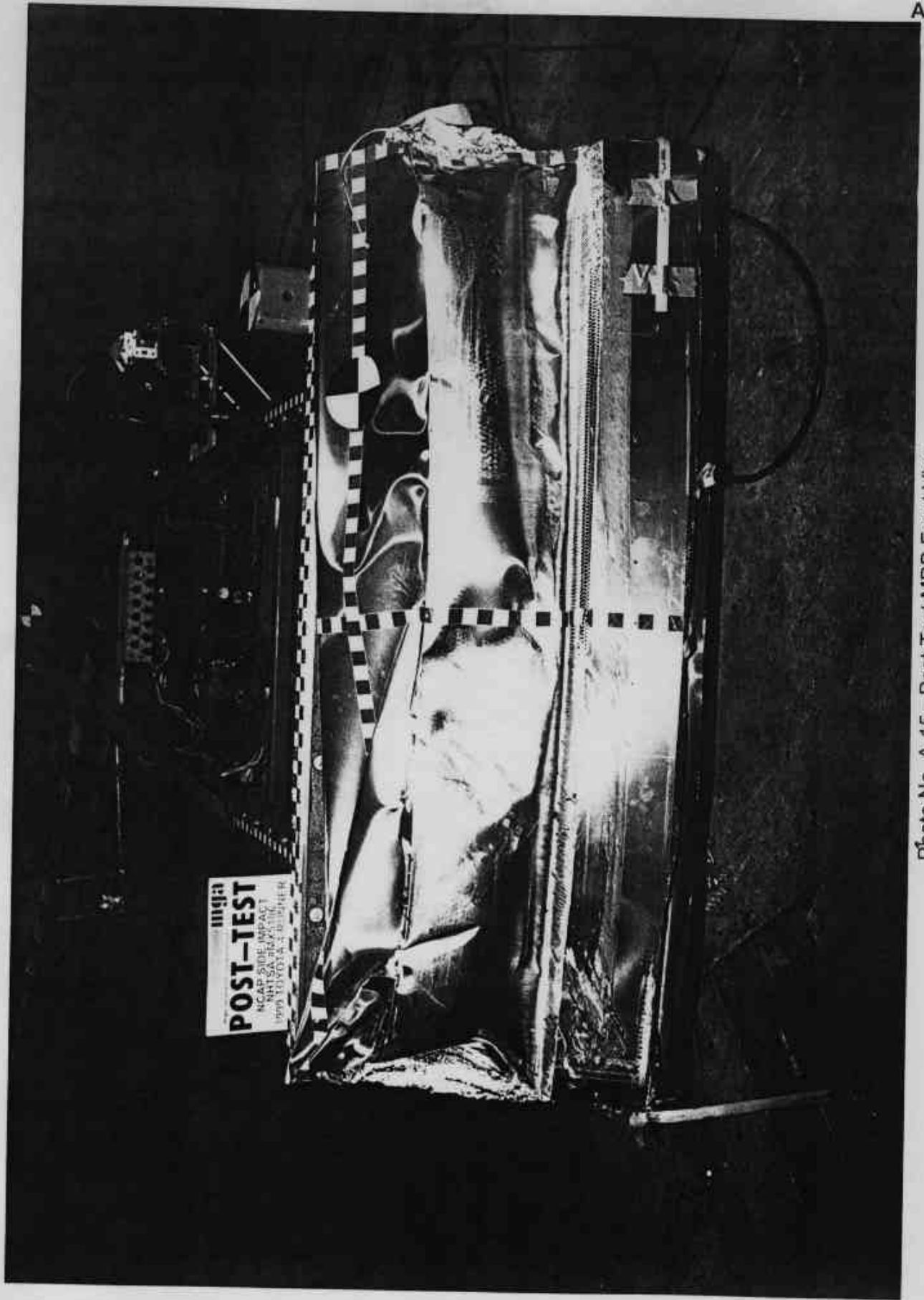


Photo No. A-15 - Post-Test MDB Front View

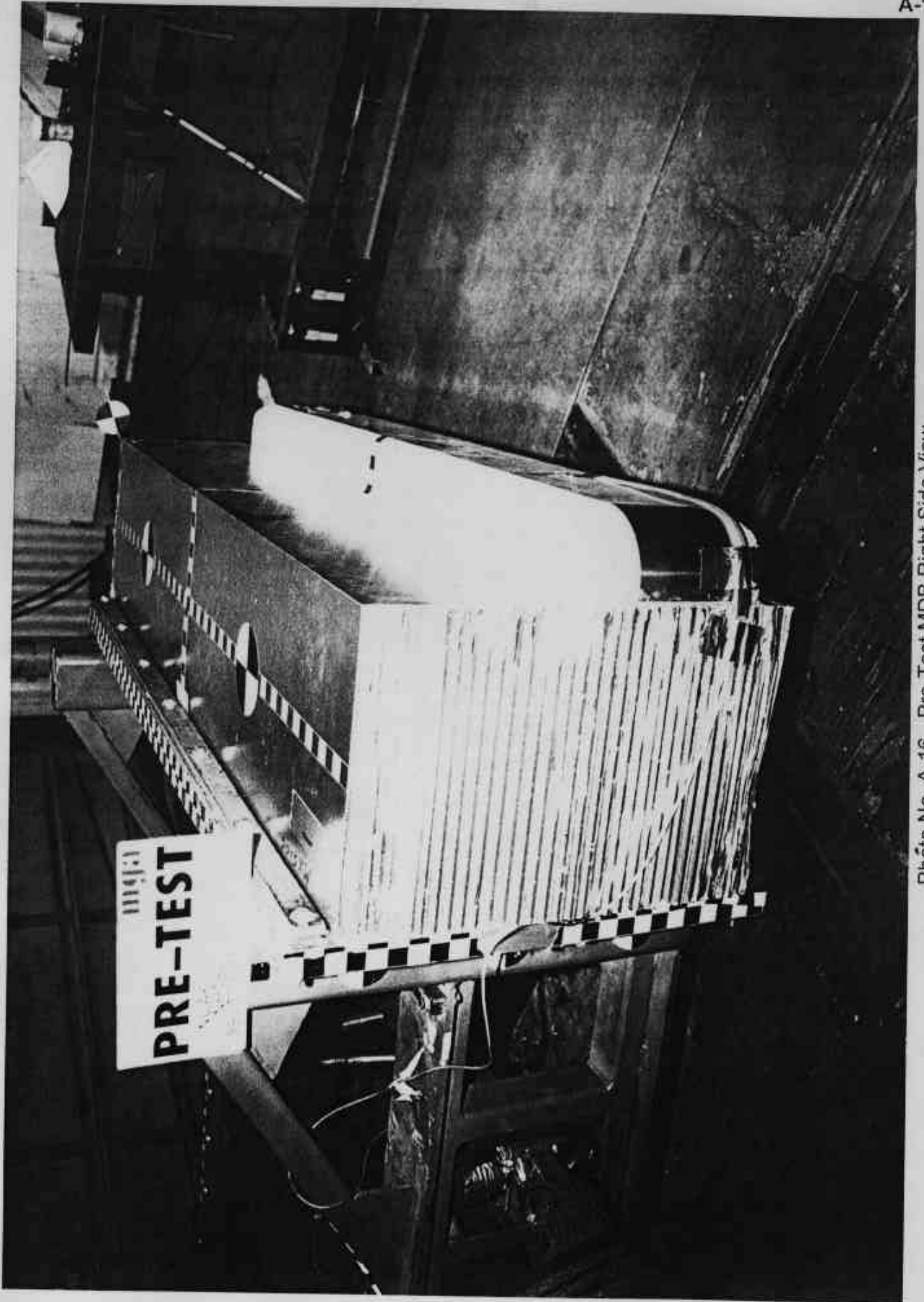


Photo No. A-16 - Pre-Test MDB Right Side View

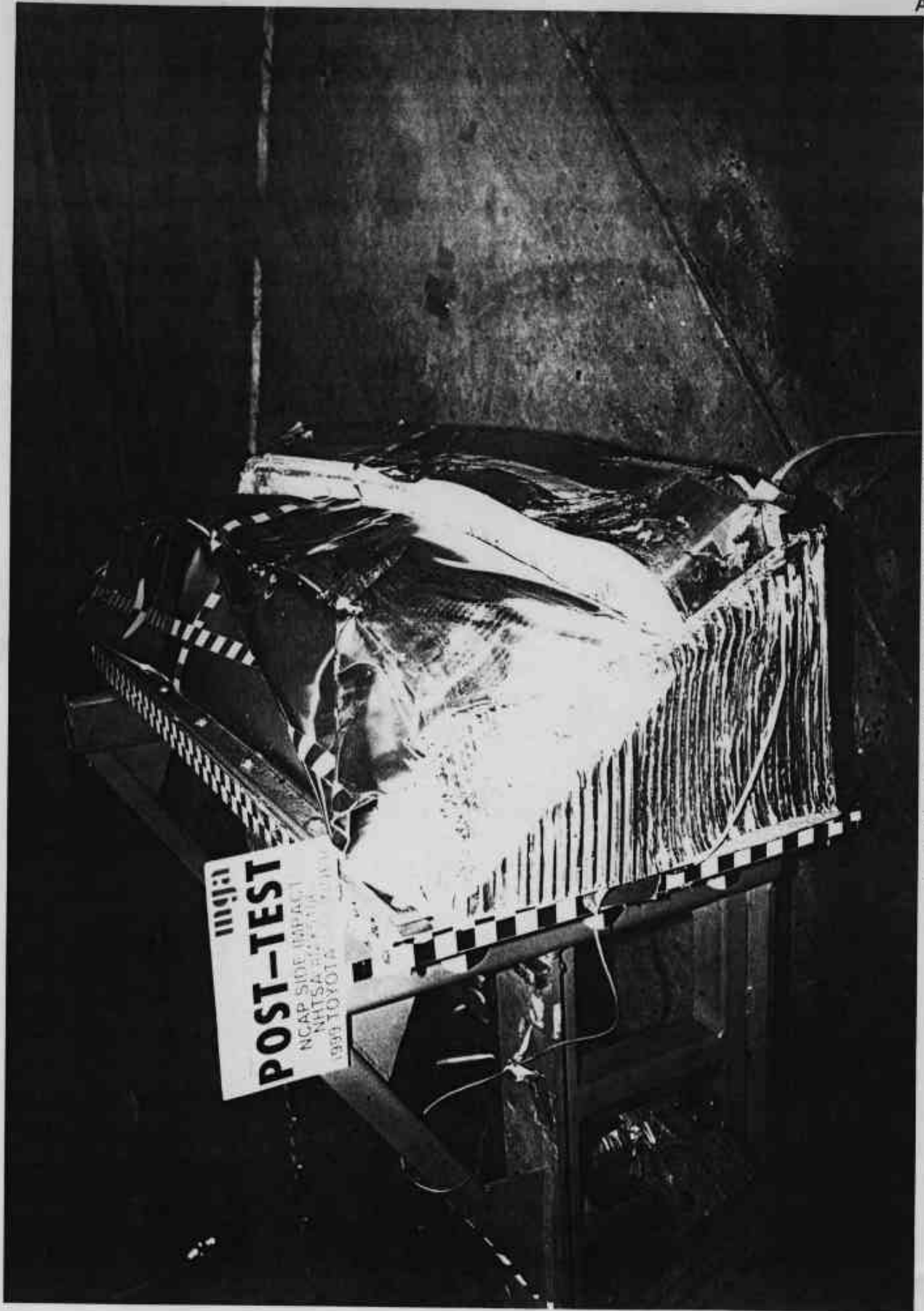


Photo No. A-17 - Post-Test MDB Right Side View

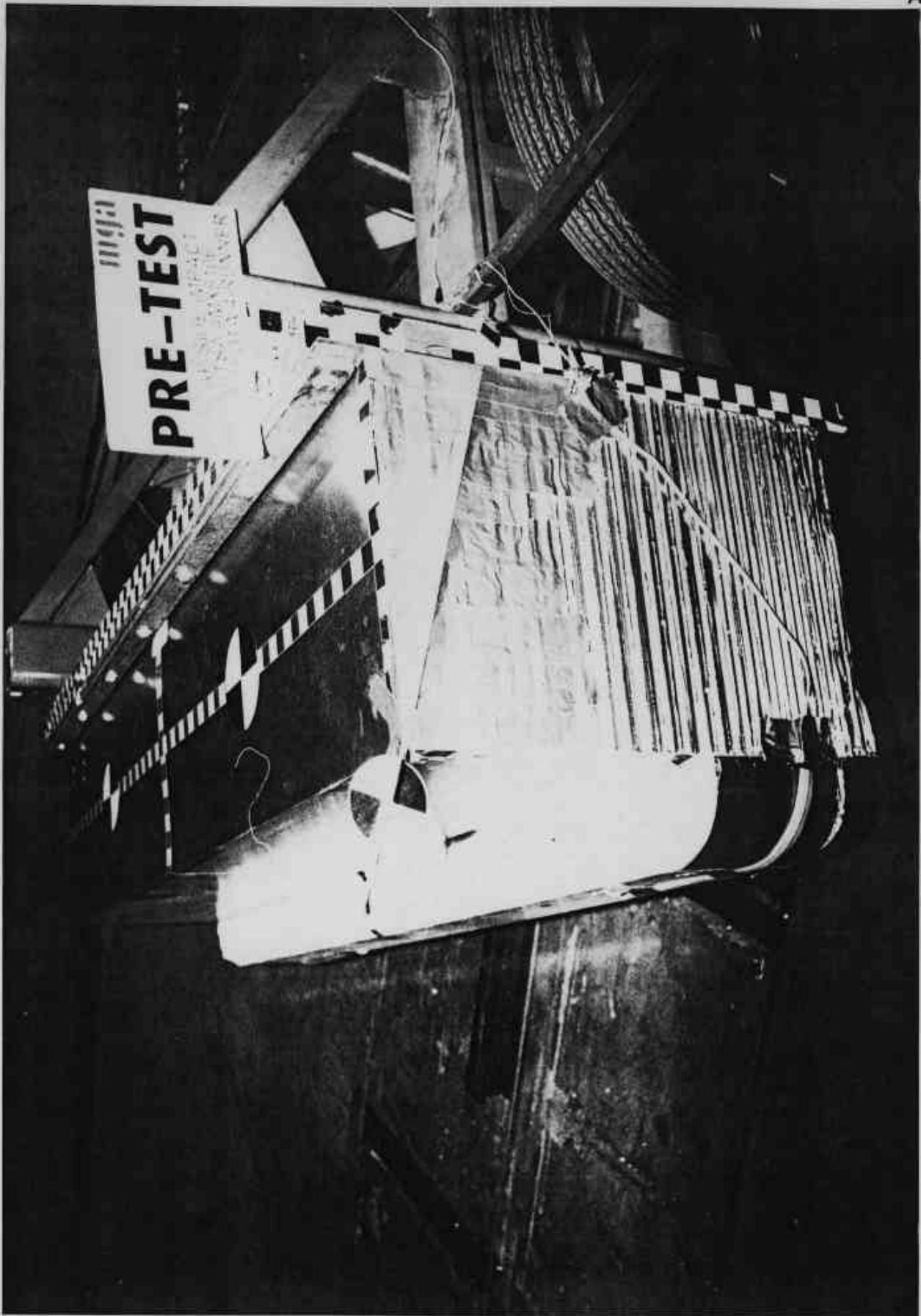


Photo No. A-18 - Pre-Test MDB Left Side View

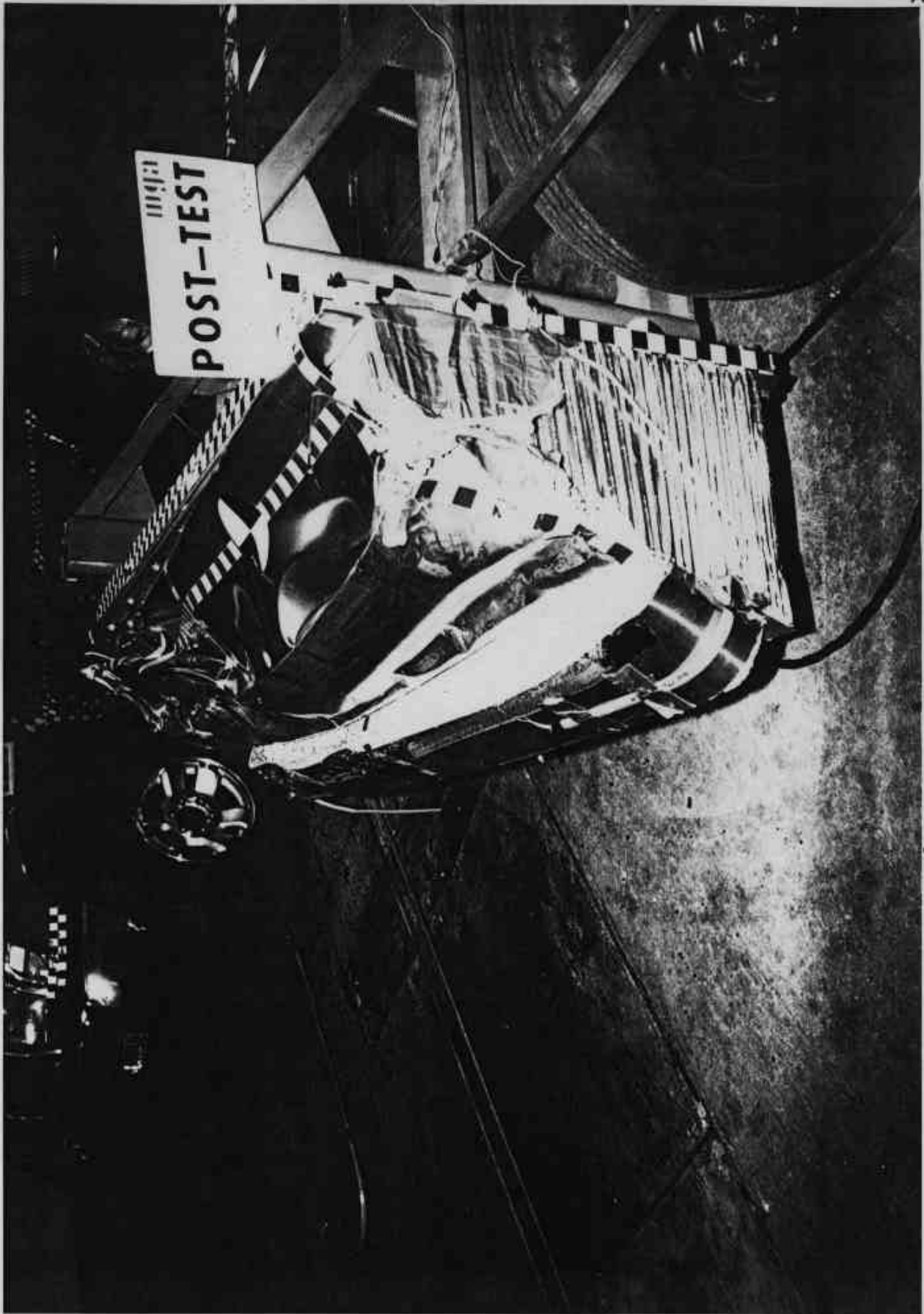


Photo No. A-19 - Post-Test MDB Left Side View



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

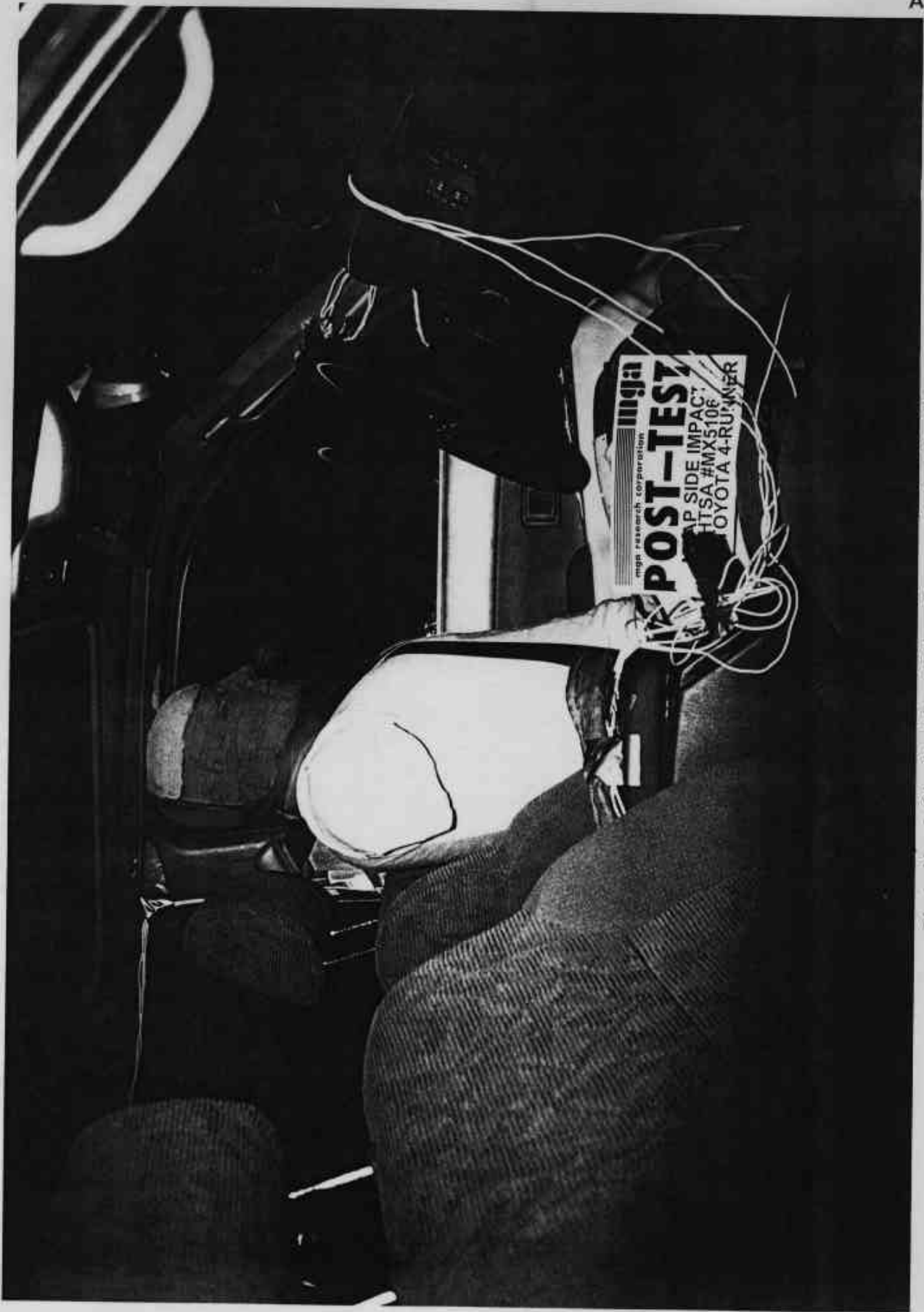


Photo No. A-21 - Post-Test Driver Dummy Right Side View



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



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



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

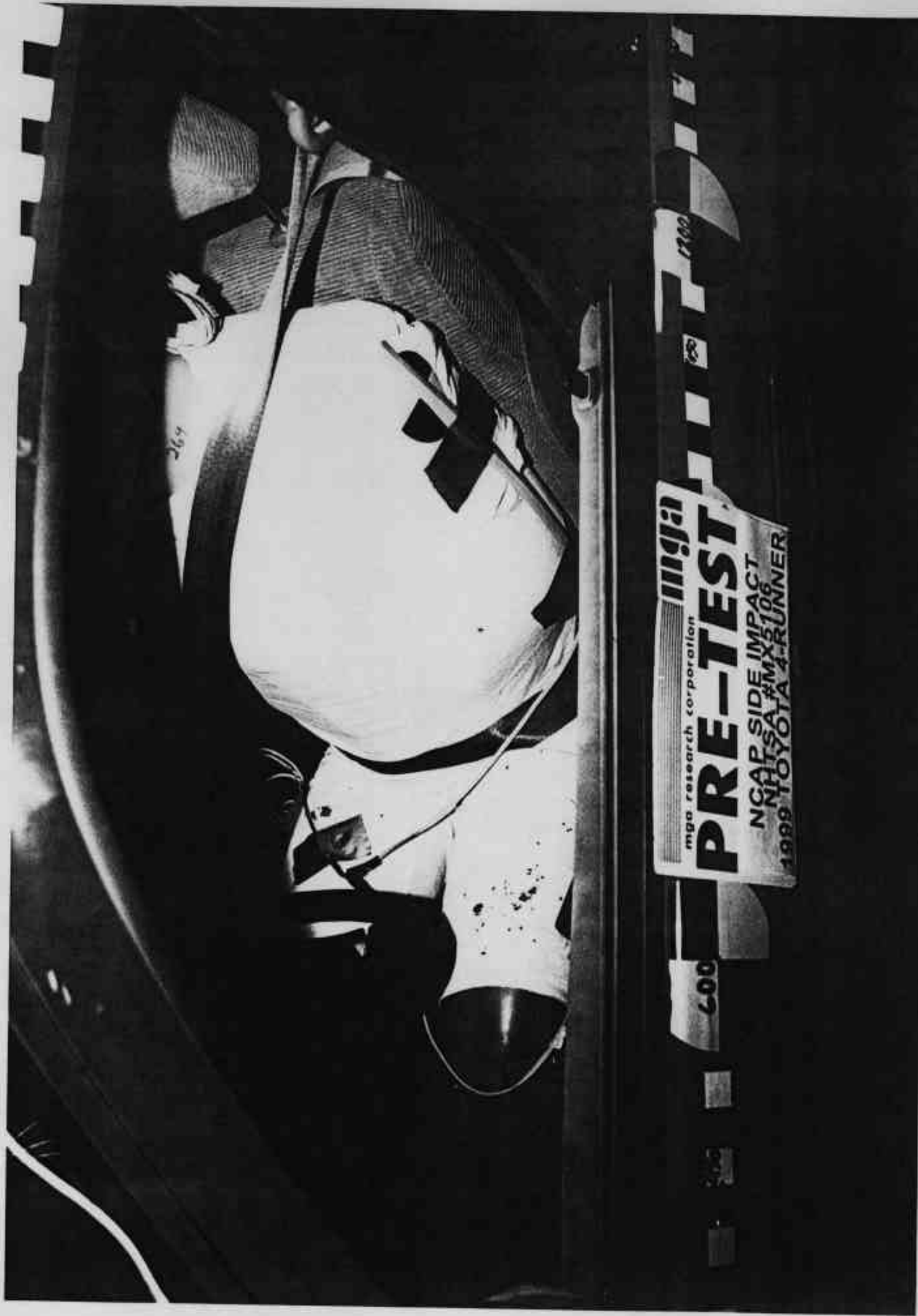


Photo No. A-25 - Pre-Test Driver Dummy Shoulder and Door Top View



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

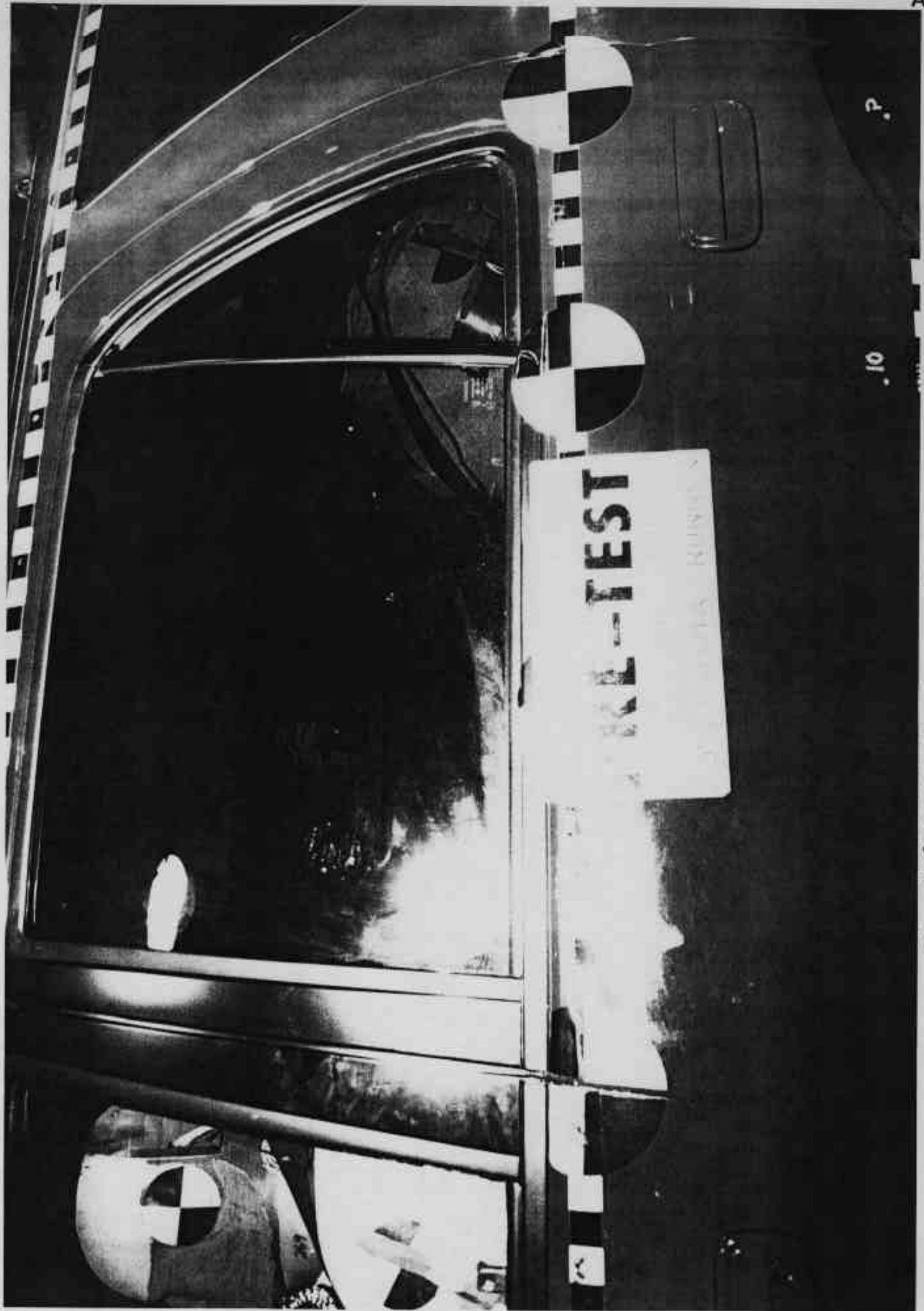


Photo No. A-31 - Pre-Test Passenger Dummy Left Side View



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

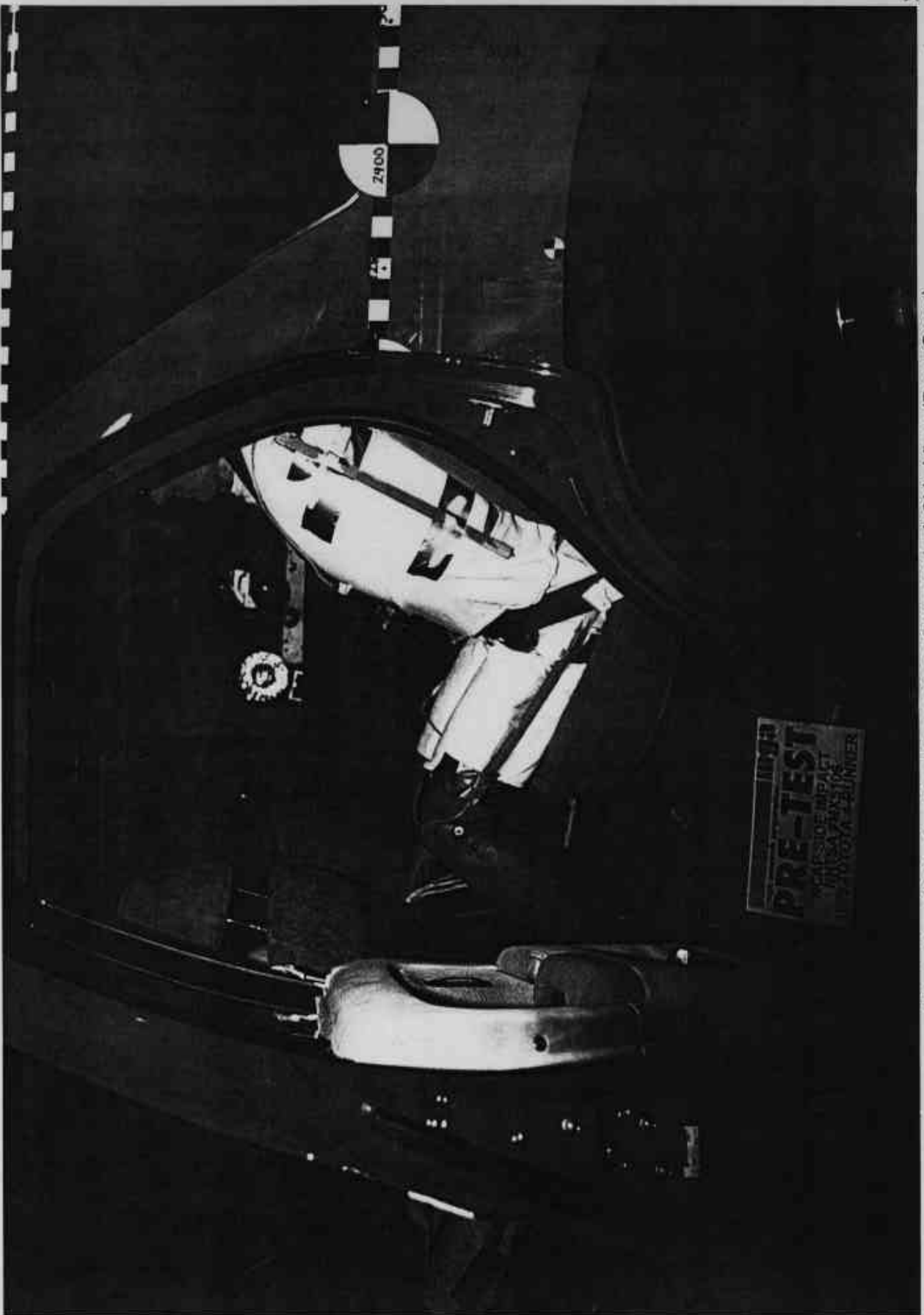


Photo No. A-33 - Pre-Test Passenger Dummy Left Side View (Door Open)



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

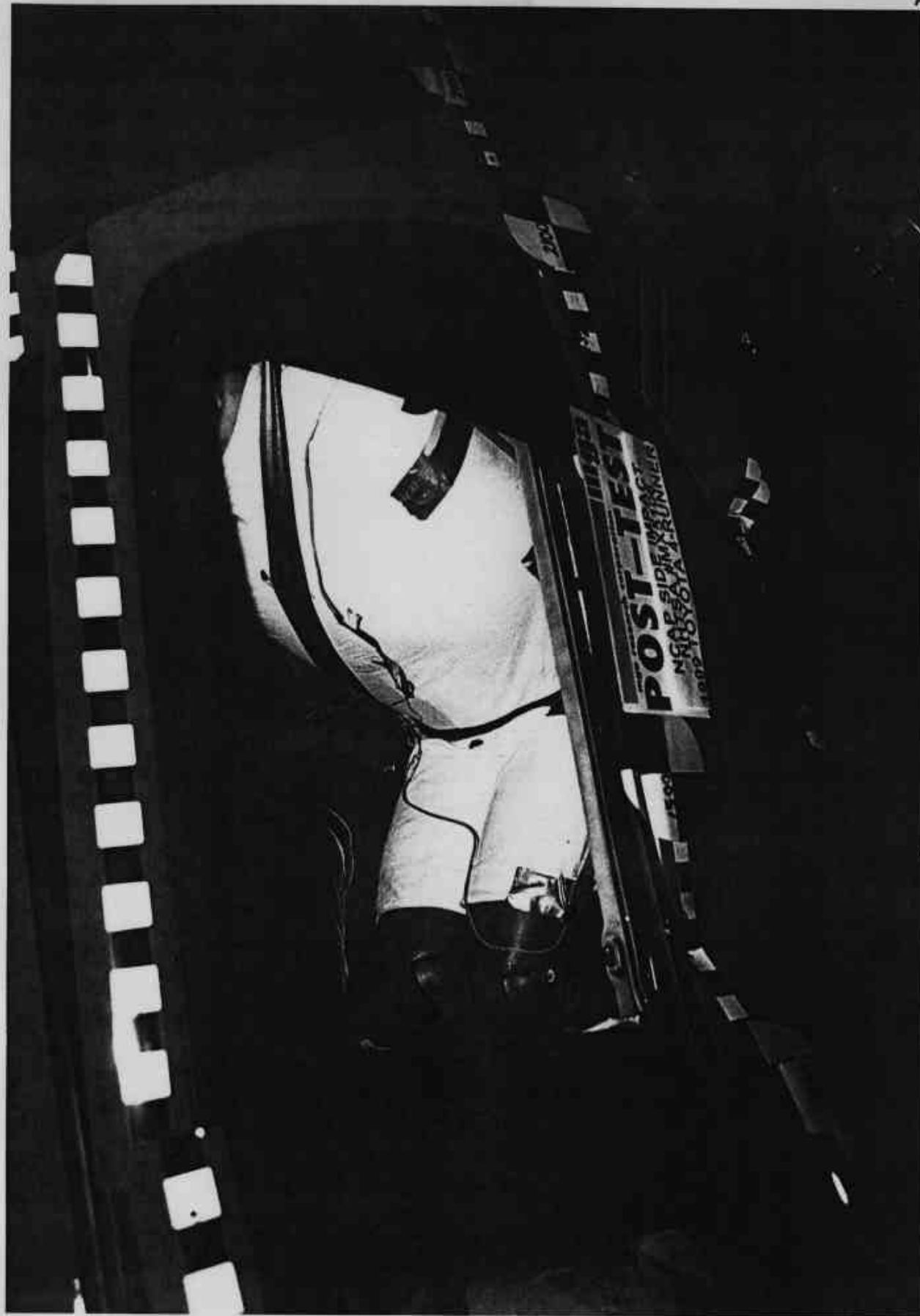


Photo No. A-35 - Post-Test Passenger Dummy Shoulder and Door Top View

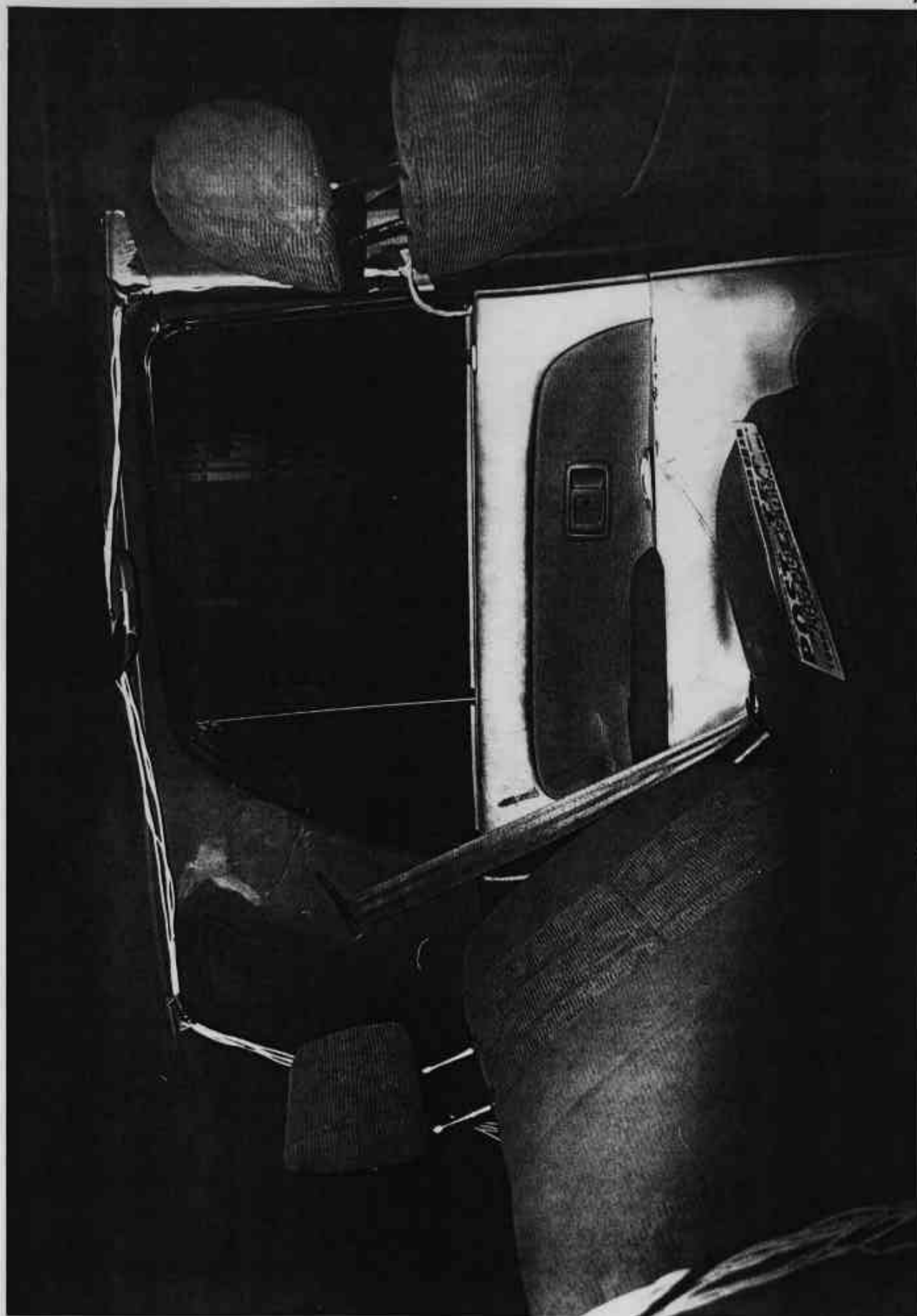


Photo No. A-36 - Post-Test Passenger Dummy Contact



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



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



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

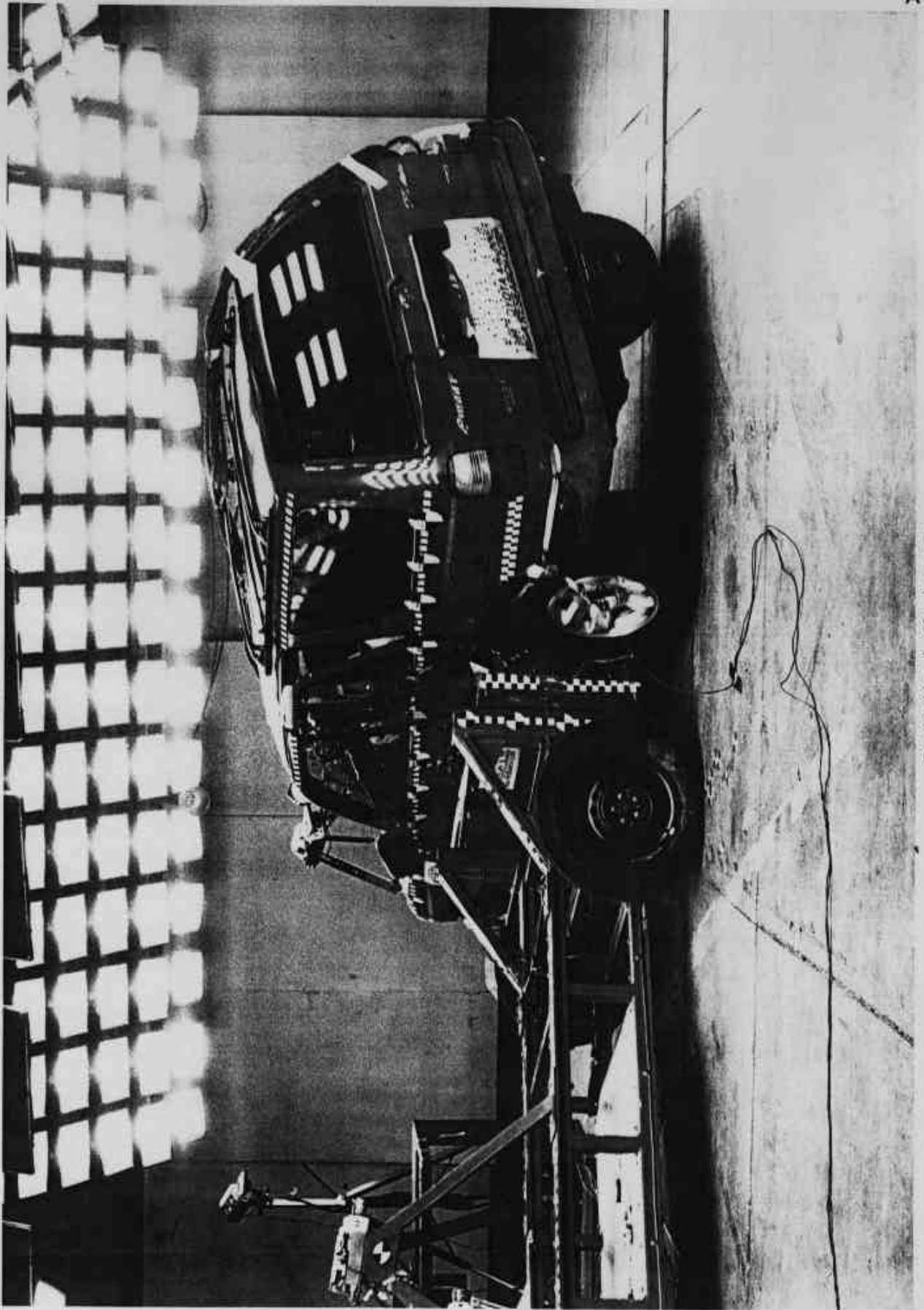


Photo No. A-40 - Impact

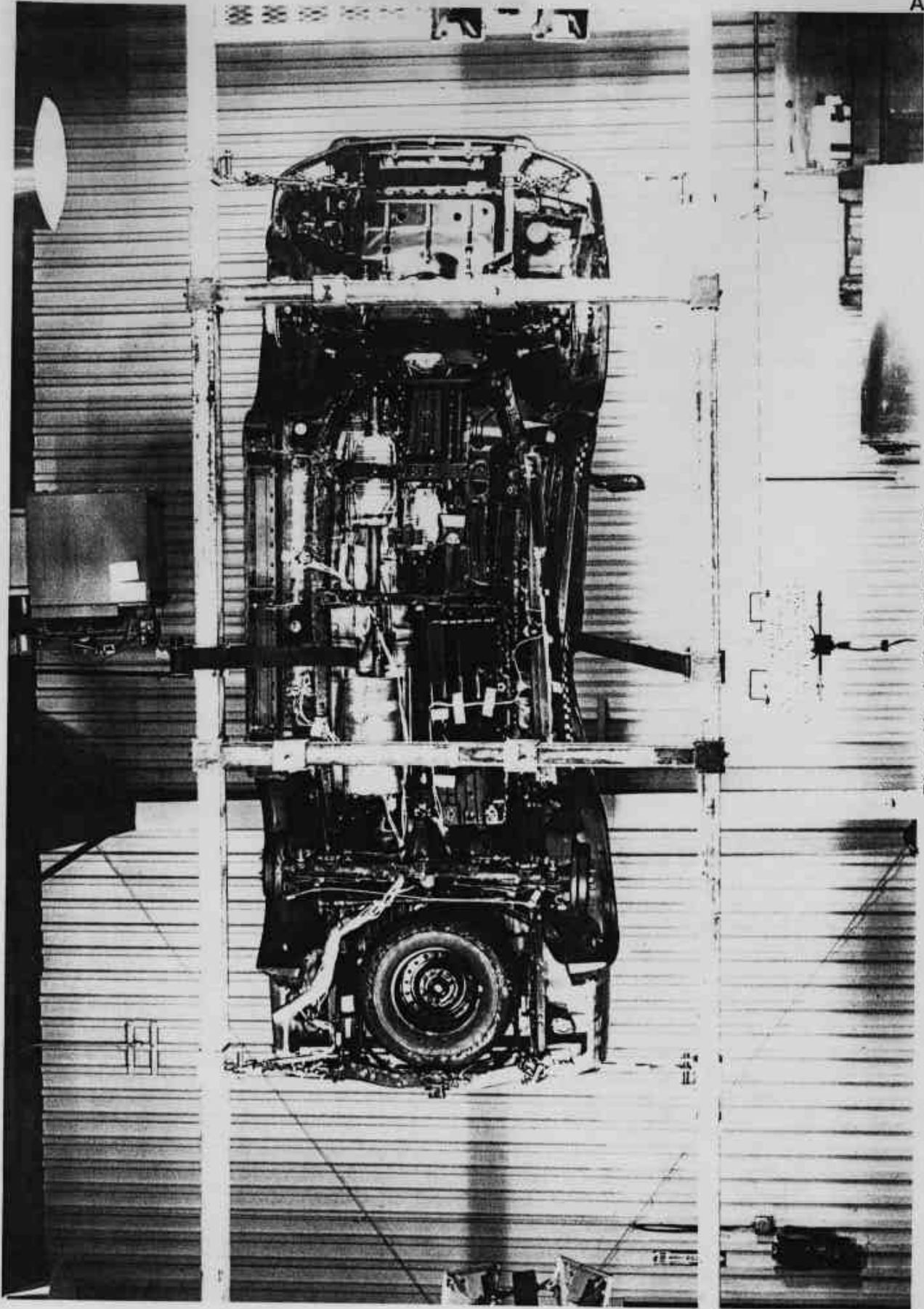


Photo No. A-42 - Rollover 90°

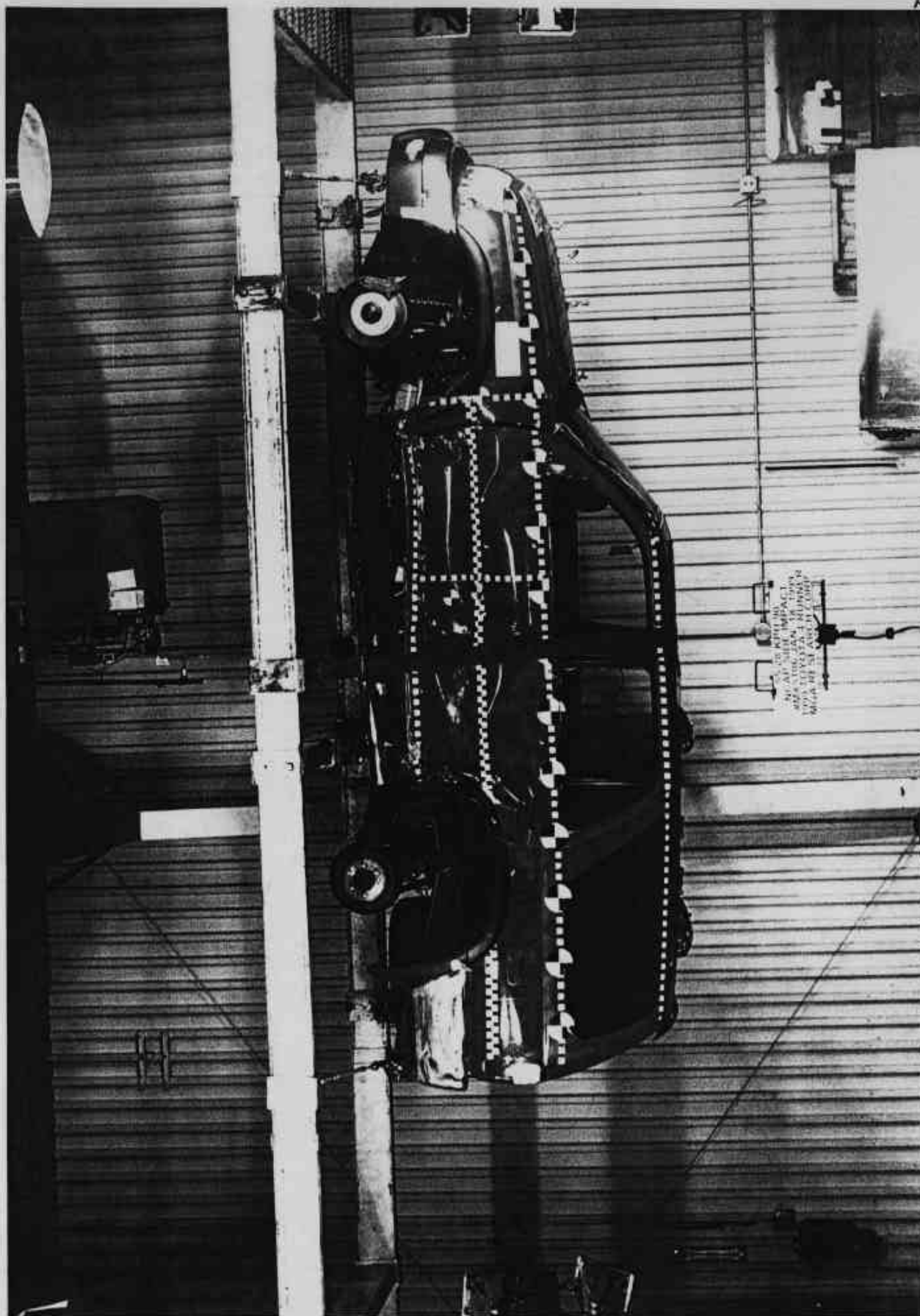


Photo No. A-43 - Rollover 180°

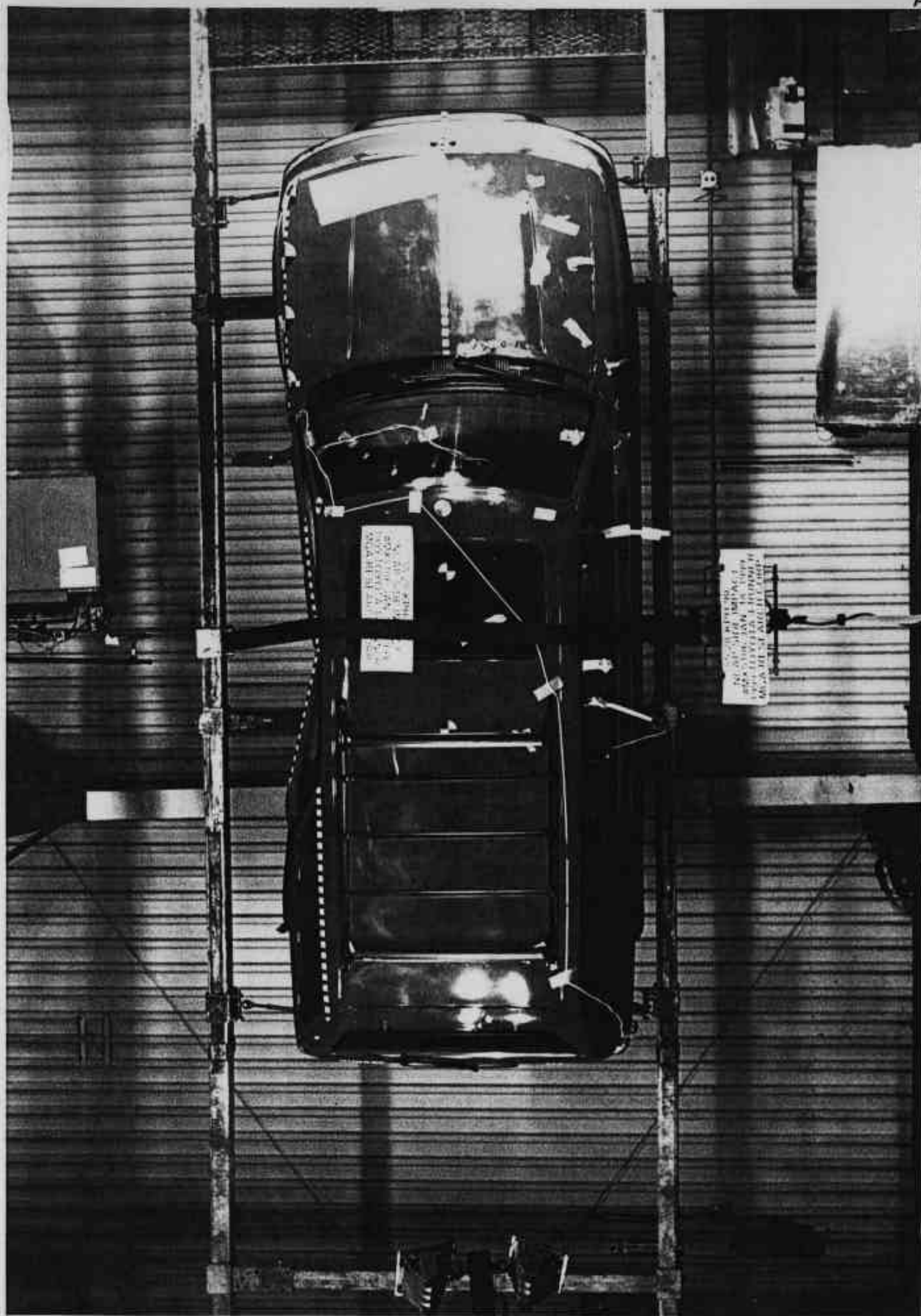


Photo No. A-44 - Rollover 270°

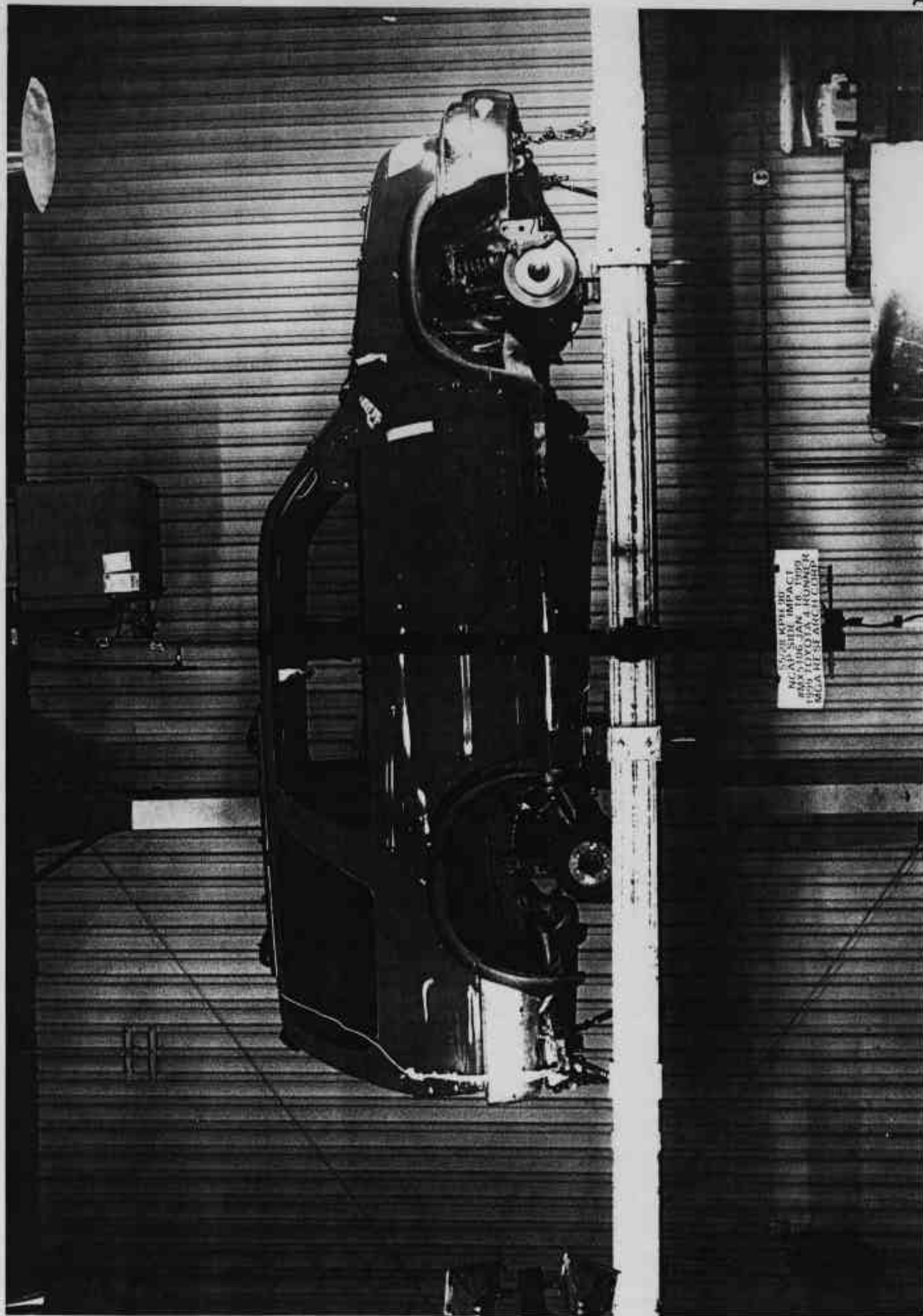


Photo No. A-45 - Rollover 360°

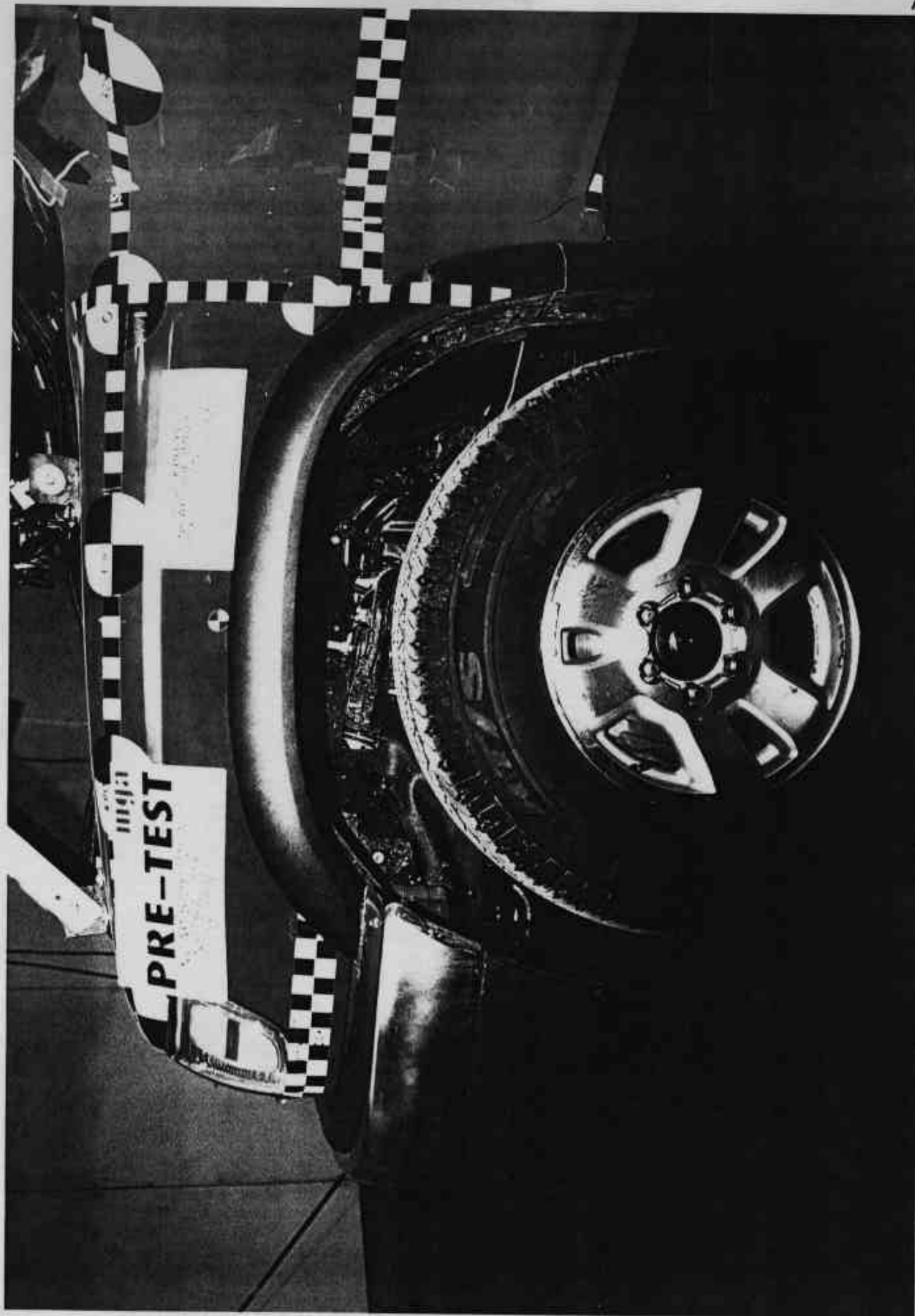


Photo No. A-46 - Left Front Attitude Point

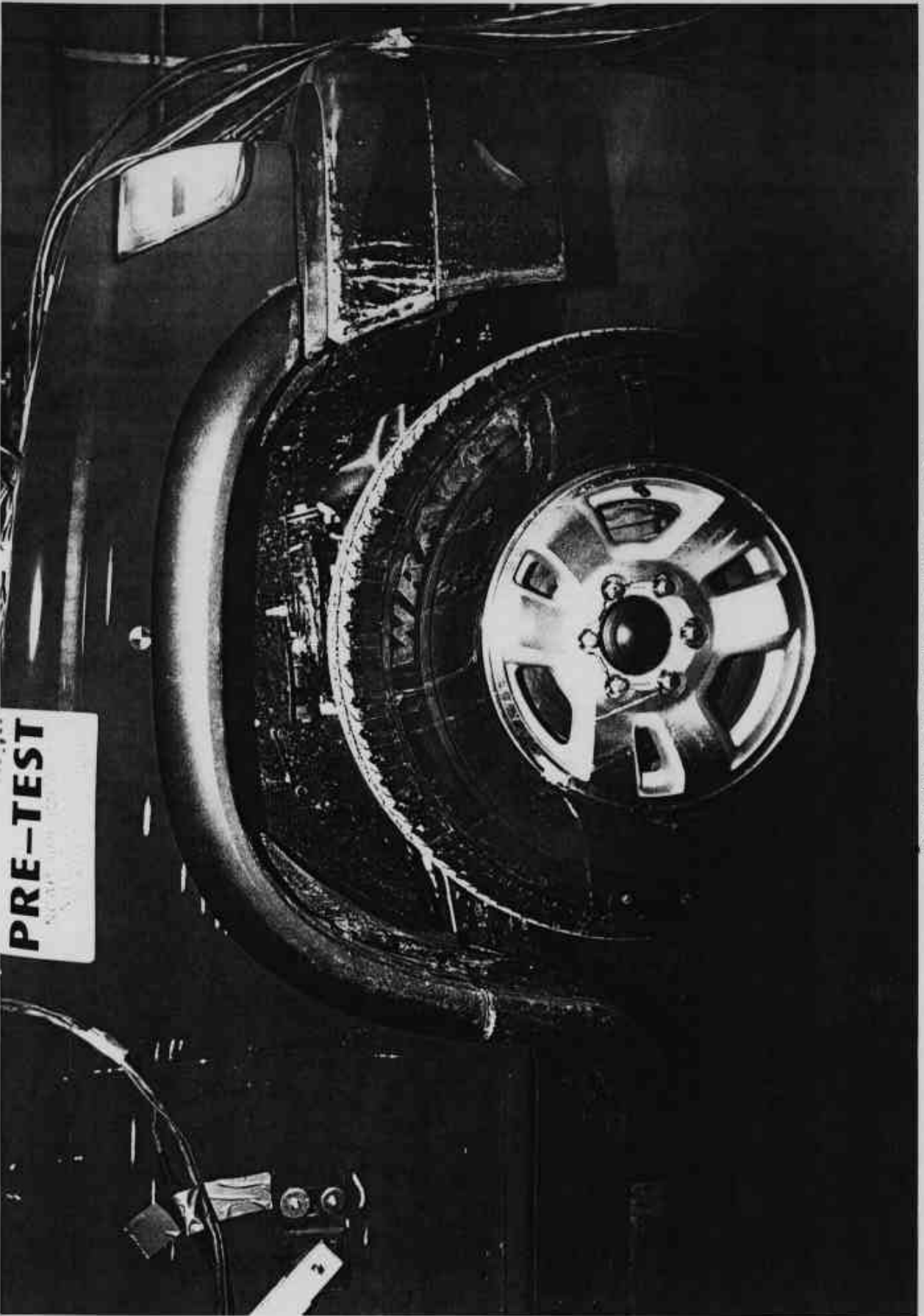


Photo No. A-47 - Right Front Attitude Point



Photo No. A-48 - Left Rear Attitude Point

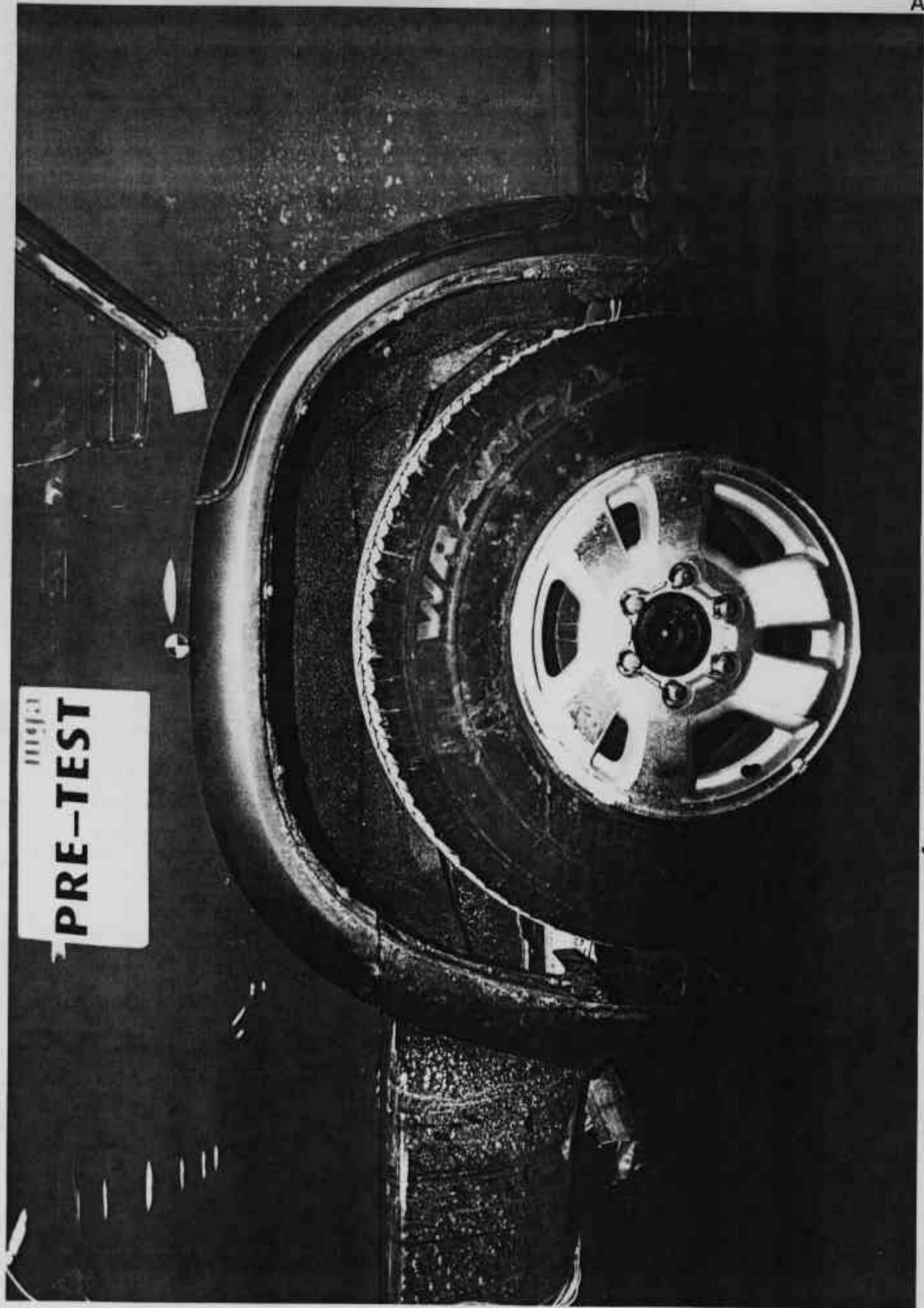


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* No valid data collected

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FIR Filtered

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TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

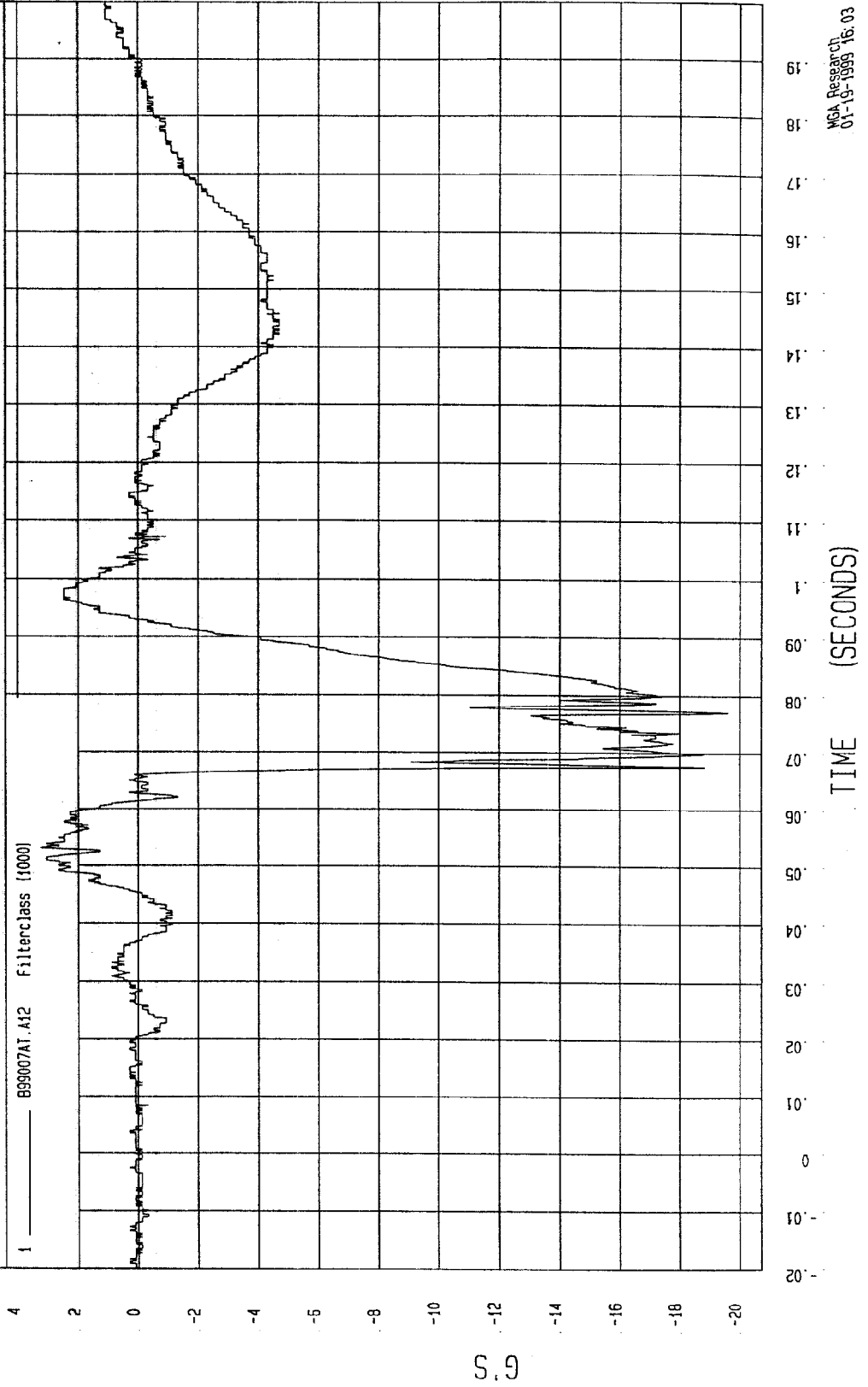
Speed: 38.22 MPH 61.5 KPH

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

Maximum = 3.26 G'S at 53 msec

Minimum = -19.59 G'S at 77 msec

DRIVER HEAD X ACCELERATION

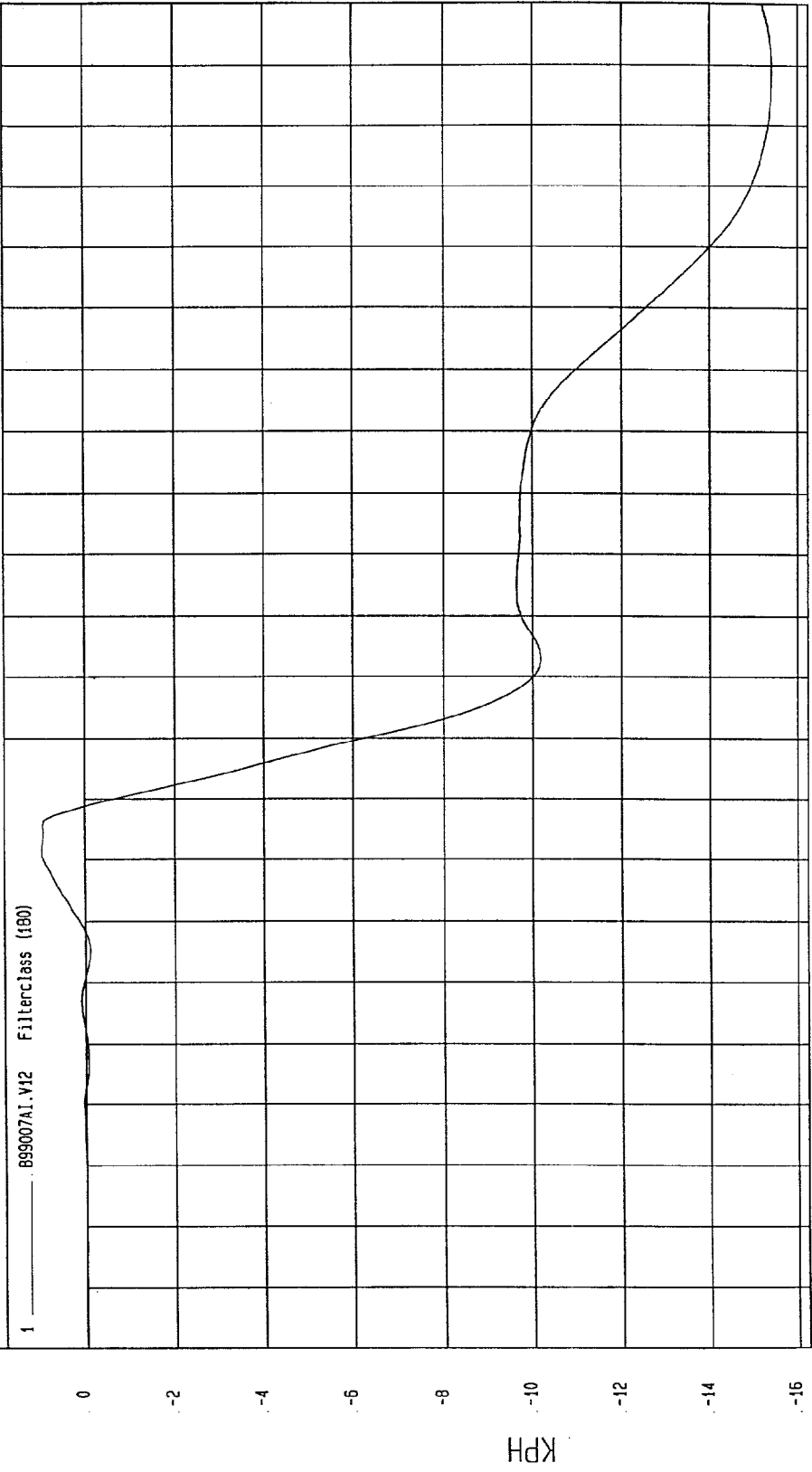


TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -15.41 KPH at 190 msec Maximum = .99 KPH at 61 msec

DRIVER HEAD X VELOCITY



TIME Seconds

WCA Research
01-19-1999 16:03

TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

Speed: 38.22 MPH 61.5 KPH

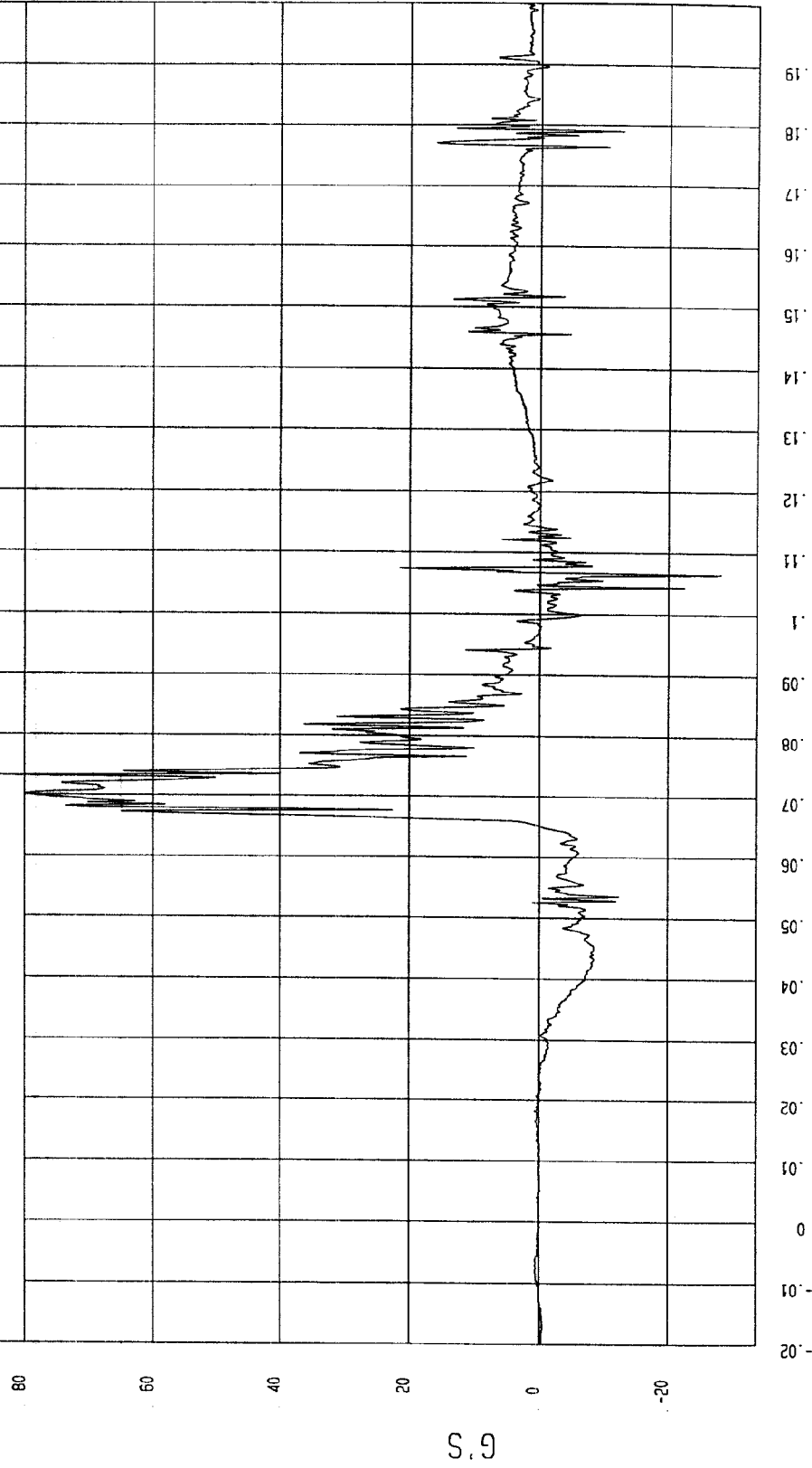
COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

Maximum = 85.14 G'S at 73 msec

Minimum = -28.1 G'S at 107 msec

DRIVER HEAD Y ACCELERATION

1 B99007AT.A13 Filterclass (1000)



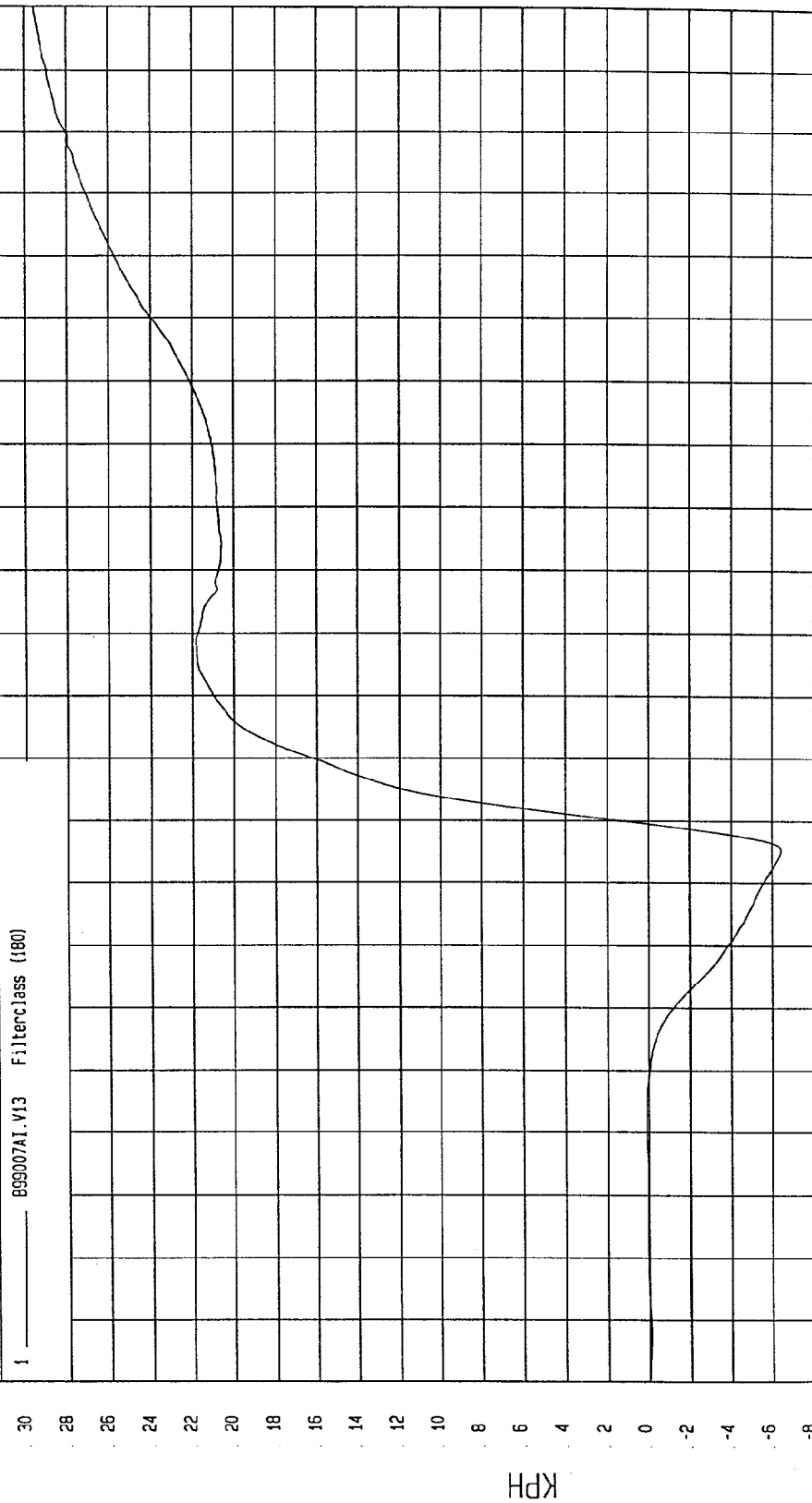
MCA Research
01-19-1999 16:03

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -6.44 KPH at 65 msec Maximum = 29.58 KPH at 200 msec

DRIVER HEAD Y VELOCITY



TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

Speed: 38.22 MPH 61.5 KPH

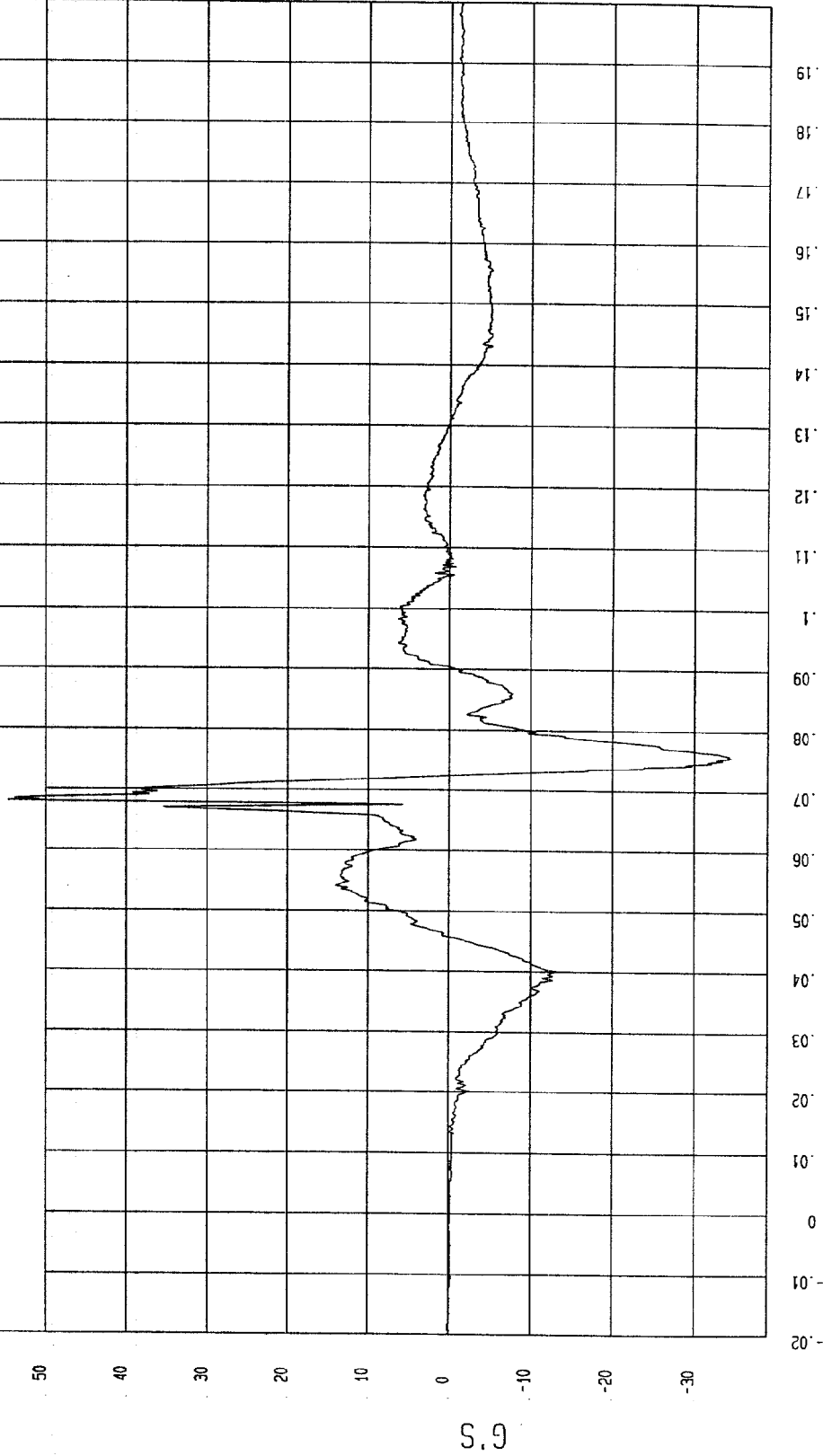
COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

Maximum = 54.6i G'S at 68 msec

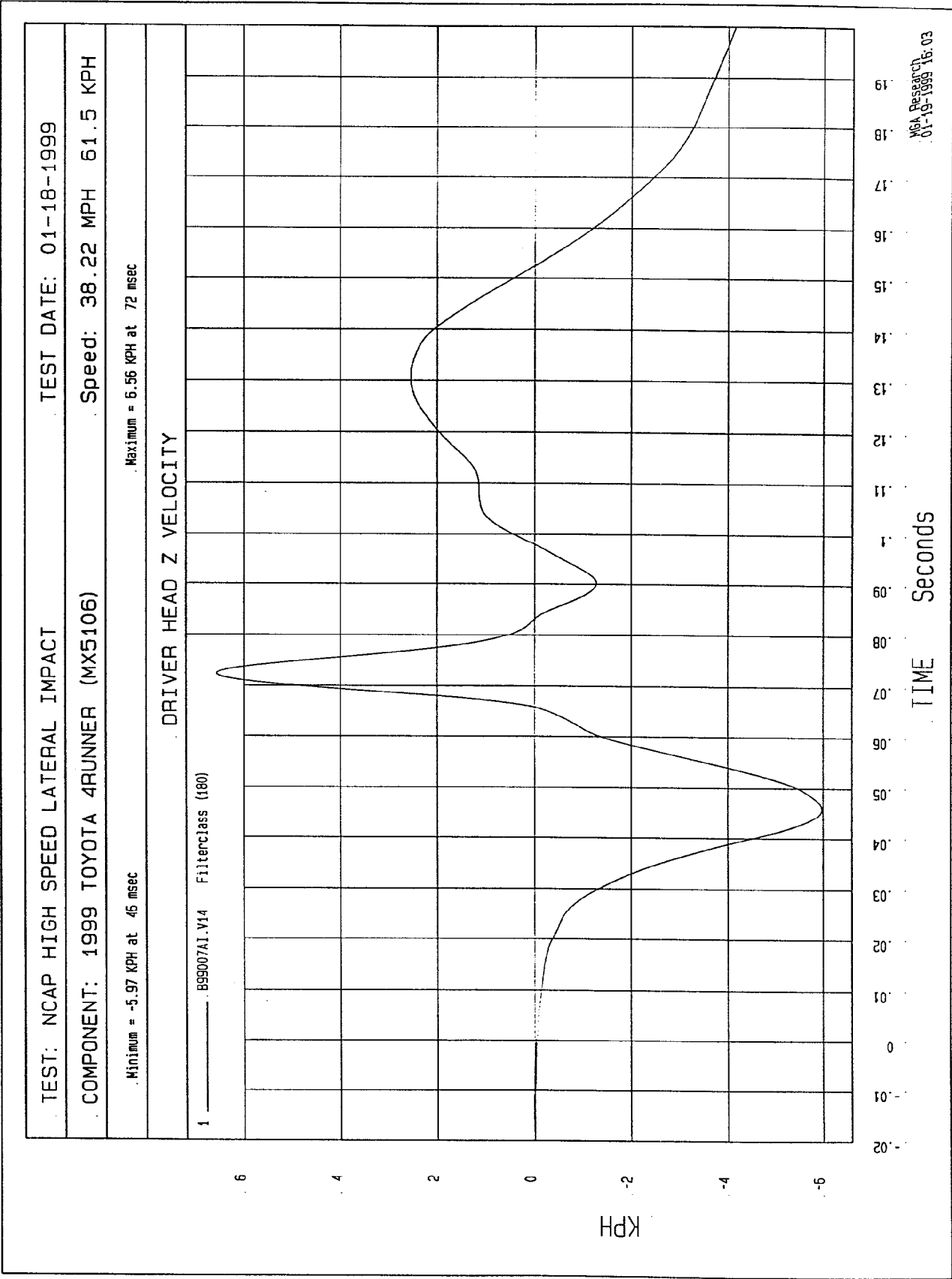
Minimum = -34.5 G'S at 76 msec

DRIVER HEAD Z ACCELERATION

1 B99007AT.M14 Filterclass (4000)



MCA Research
01-19-1999 16:03



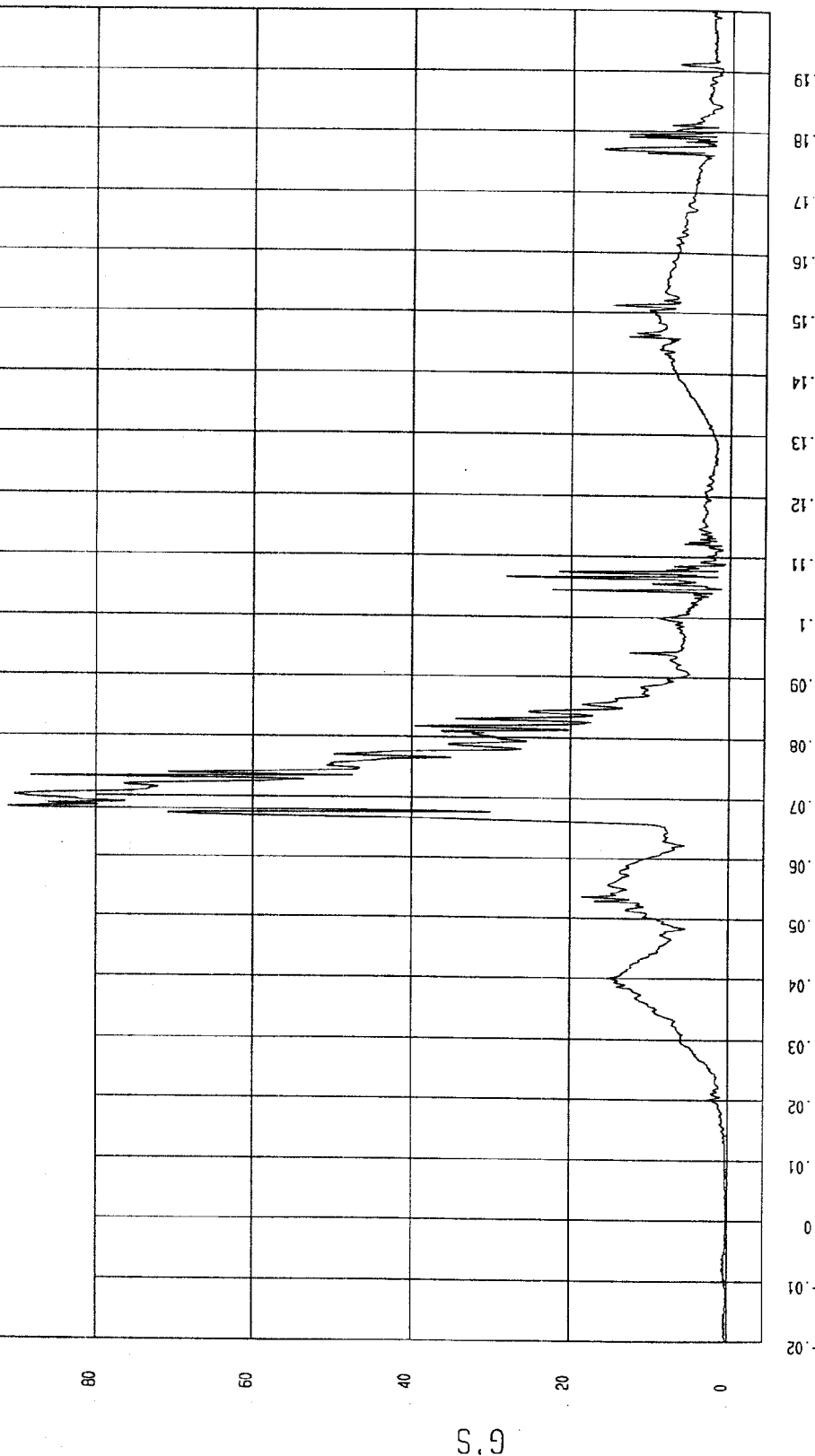
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

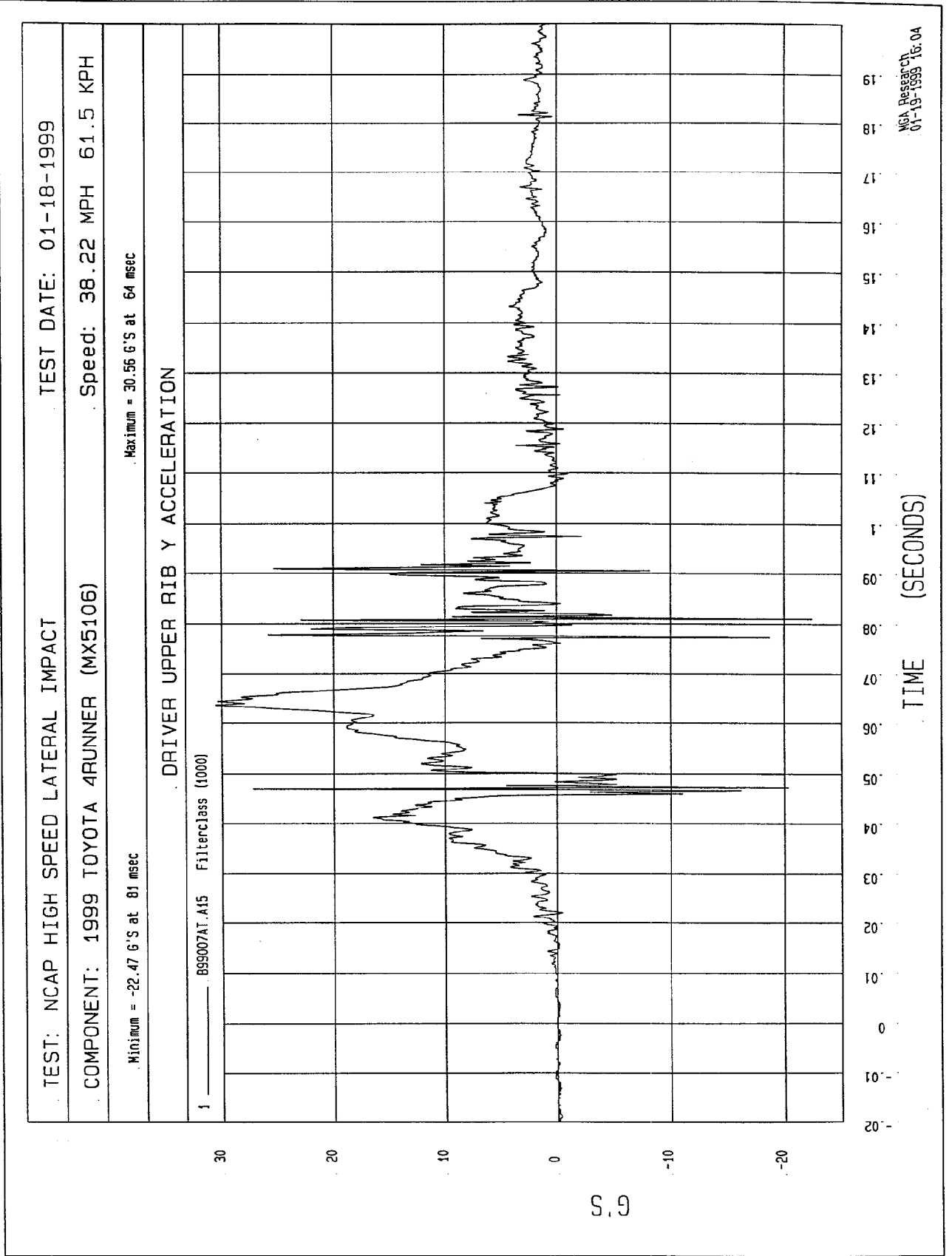
Minimum = .14 G'S at .14 msec Maximum = 91.15 G'S at 68 msec

DRIVER HEAD RESULTANT ACCELERATION

1 ——— B99007AV.M12 Filter: class (1000)



NSA Research
01-19-1999 16.03



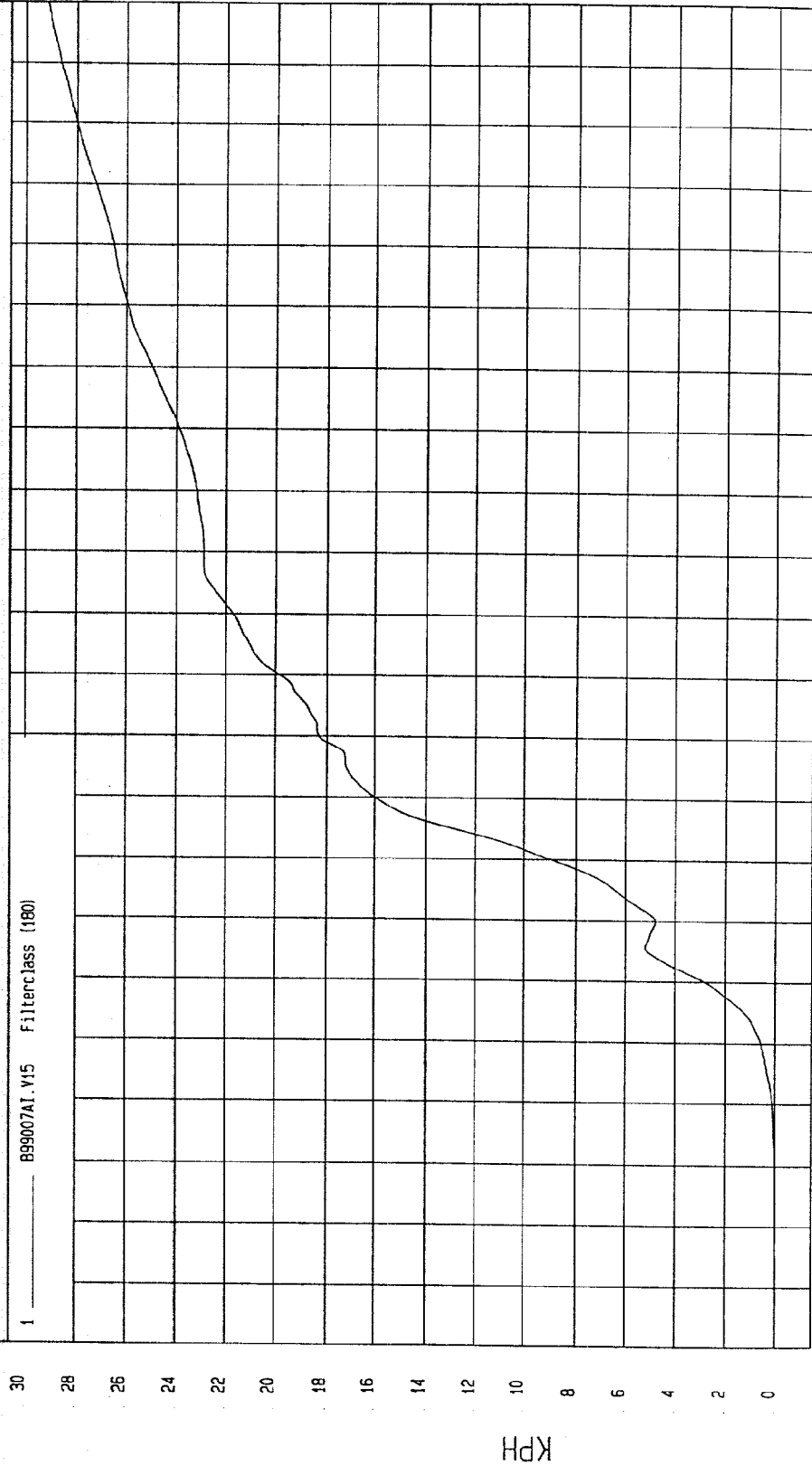
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -2.64E-02 KPH at -12 msec Maximum = 29.14 KPH at 200 msec

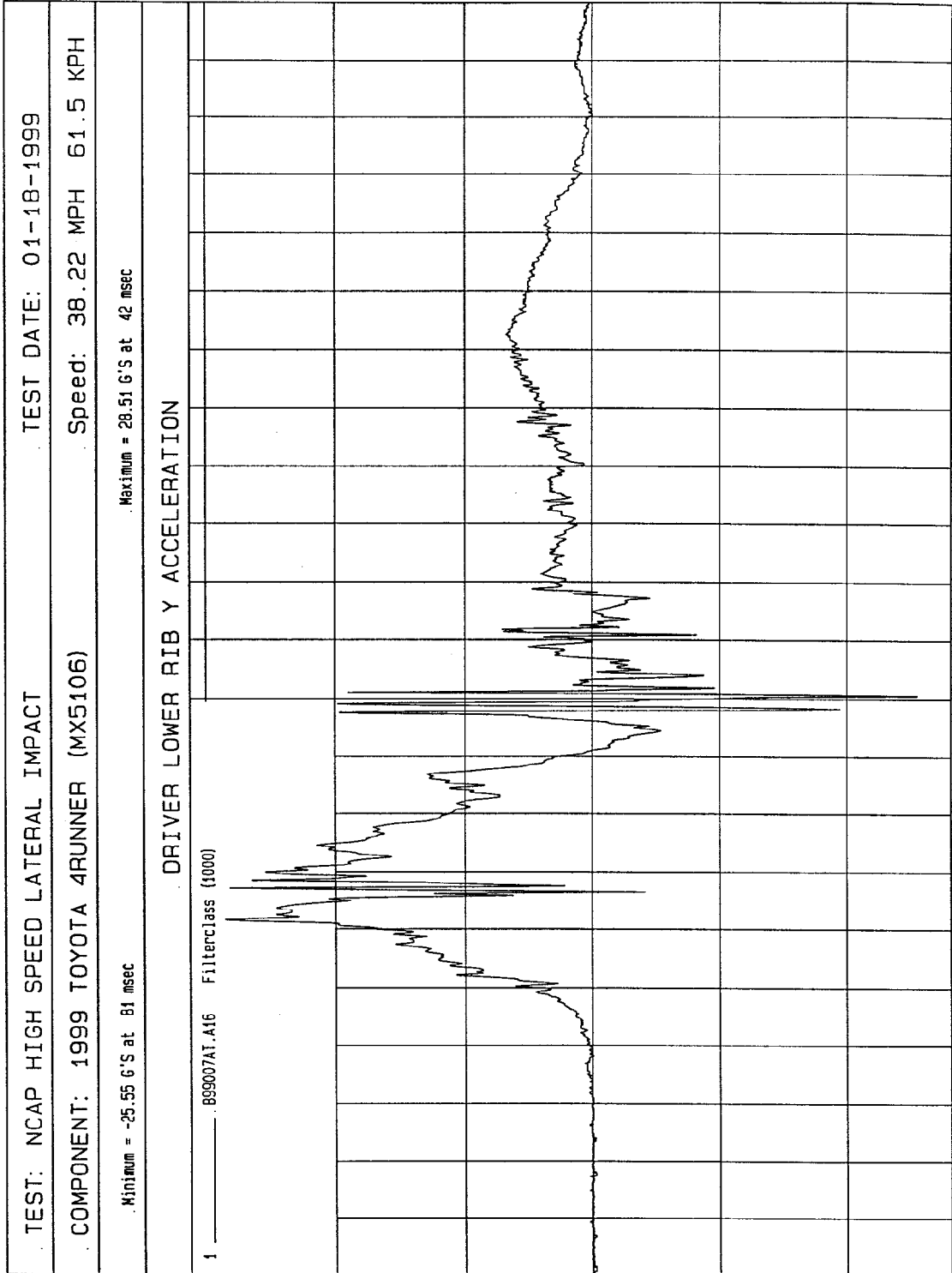
DRIVER UPPER RIB Y VELOCITY

1 B99007A1.V15 Filterclass (180)



NGA Research
01-19-1999 16:04

TIME Seconds



MCA Research
01-19-1999 16:04

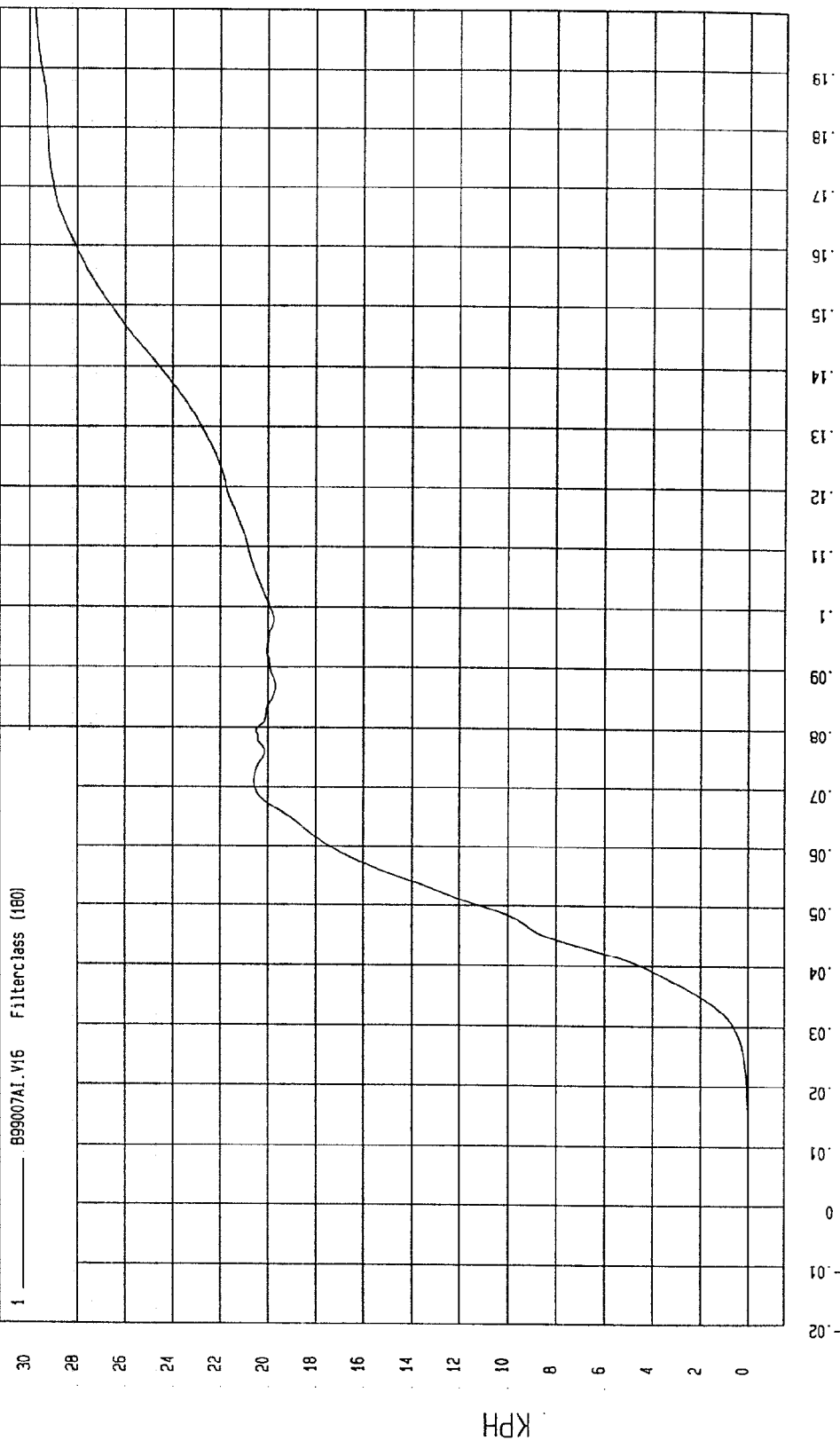
S.G

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

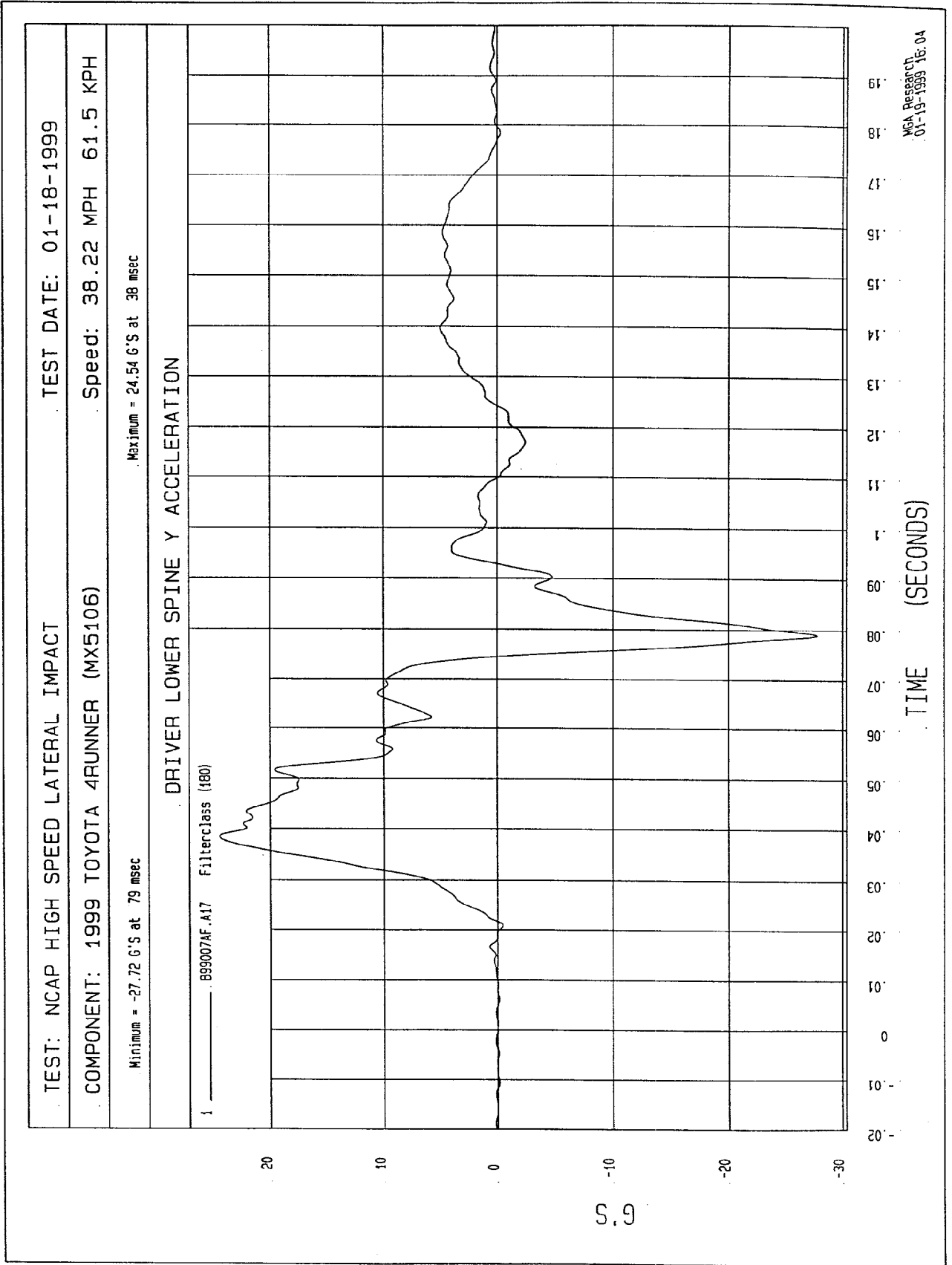
COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -1.89E-02 KPH at -12 msec Maximum = 29.75 KPH at 200 msec

DRIVER LOWER RIB Y VELOCITY



MSA Research
01-19-1999 16.04

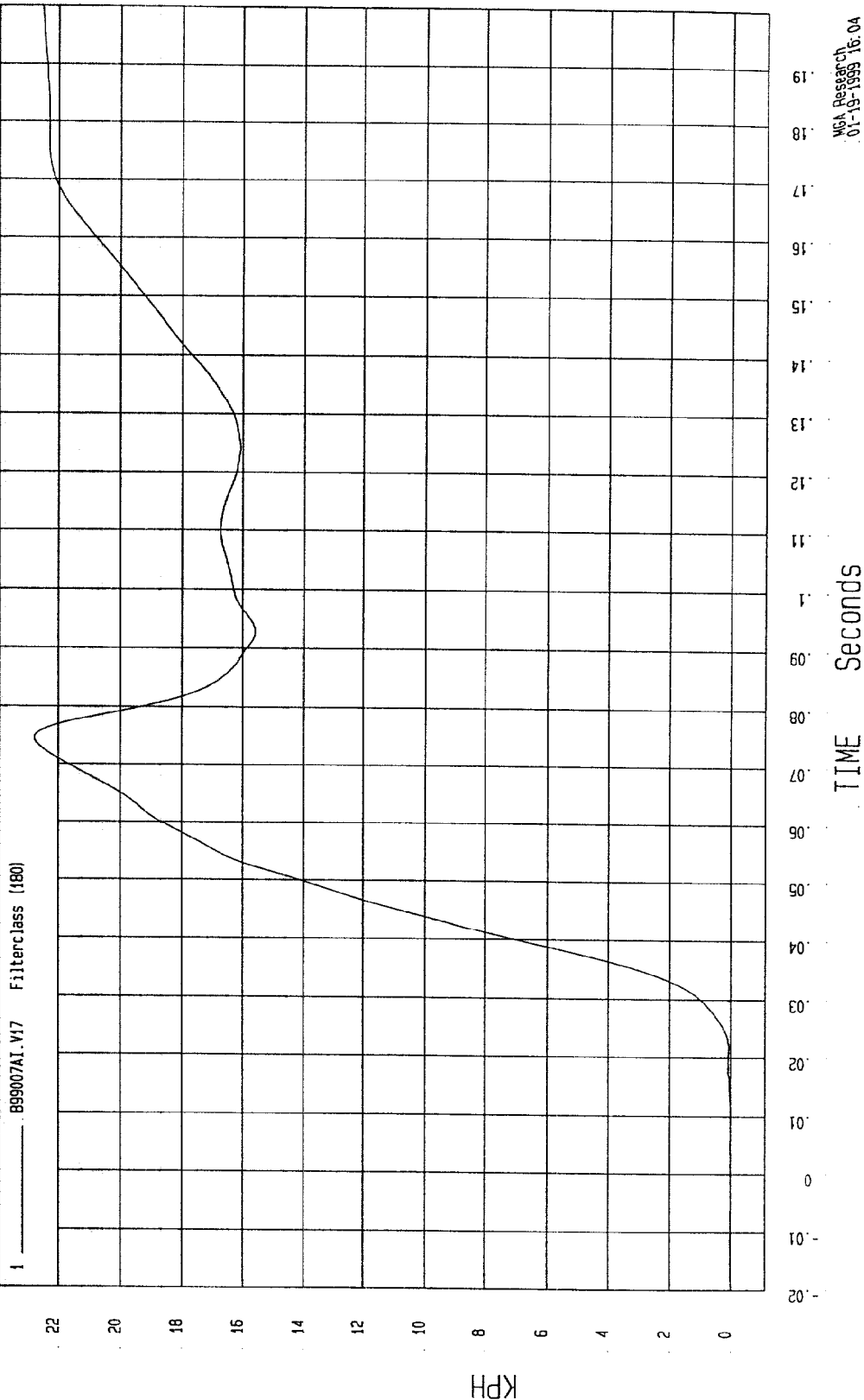


TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -3.56E-04 KPH at -4 msec Maximum = 22.78 KPH at 74 msec

DRIVER LOWER SPINE Y VELOCITY



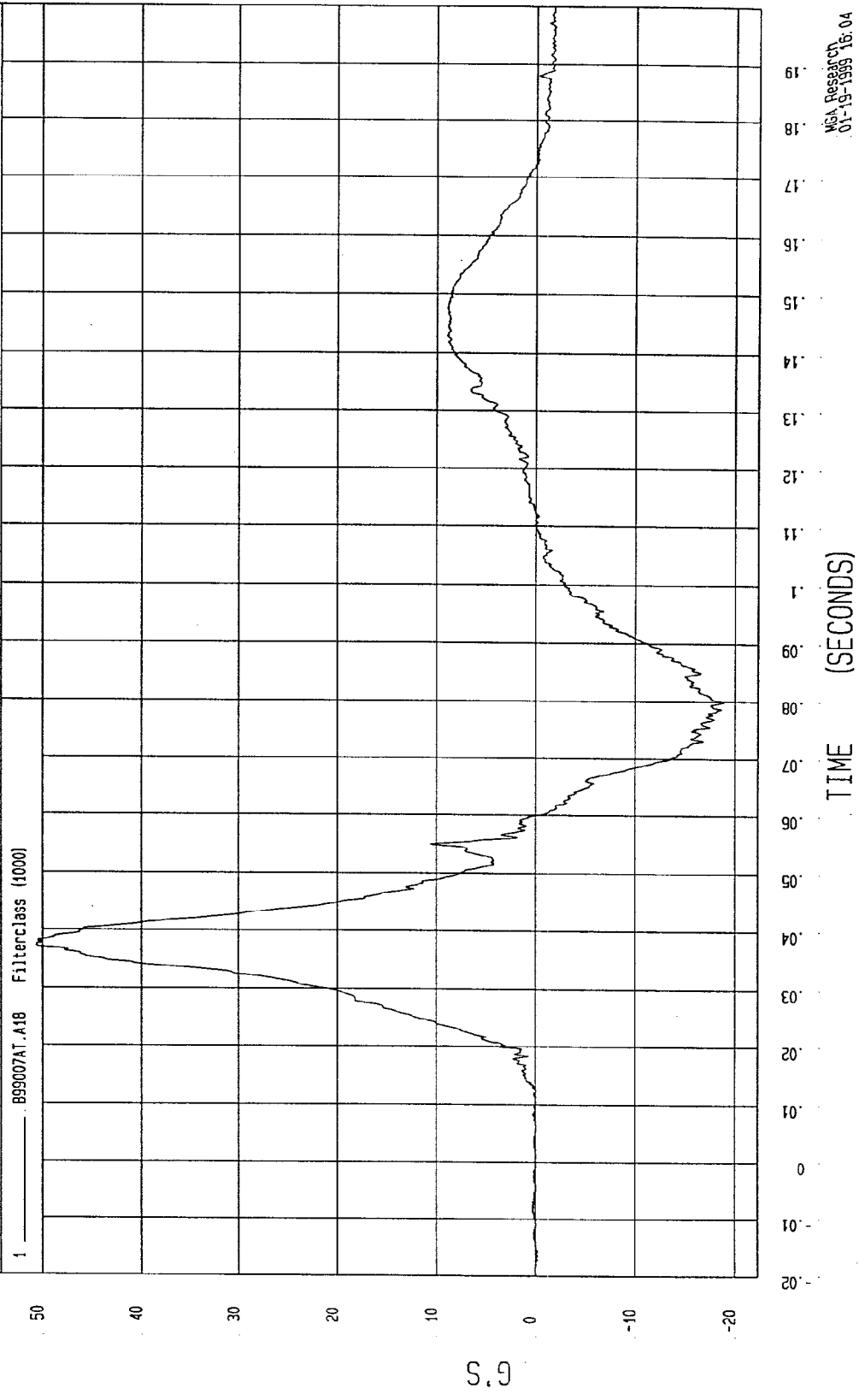
MGA Research
01-19-1999 16:04

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -18.85 G'S at 80 msec Maximum = 50.62 G'S at 37 msec

DRIVER PELVIS Y ACCELERATION



McA Research
01-19-1999 15:04

TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

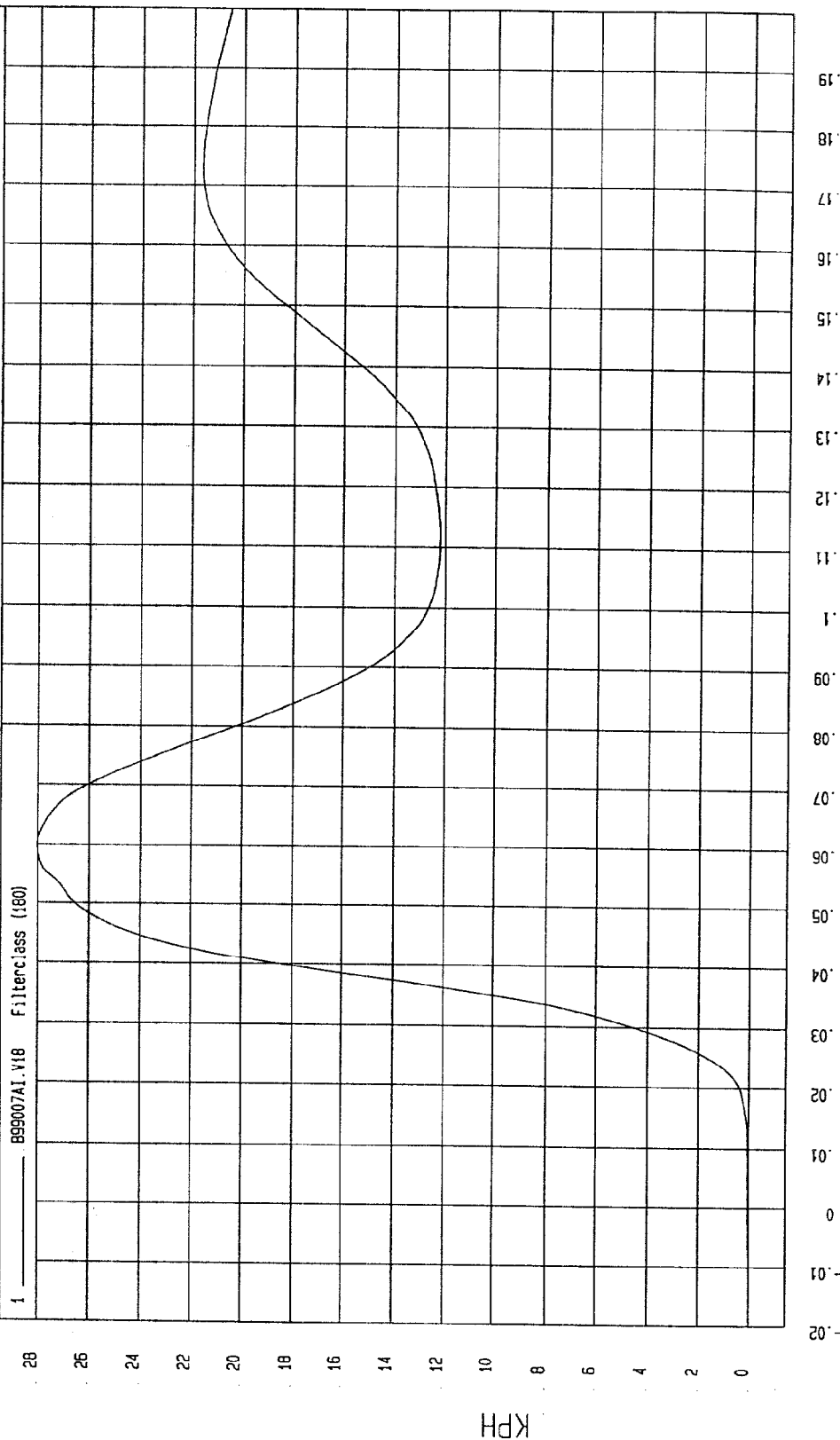
Speed: 38.22 MPH 61.5 KPH

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

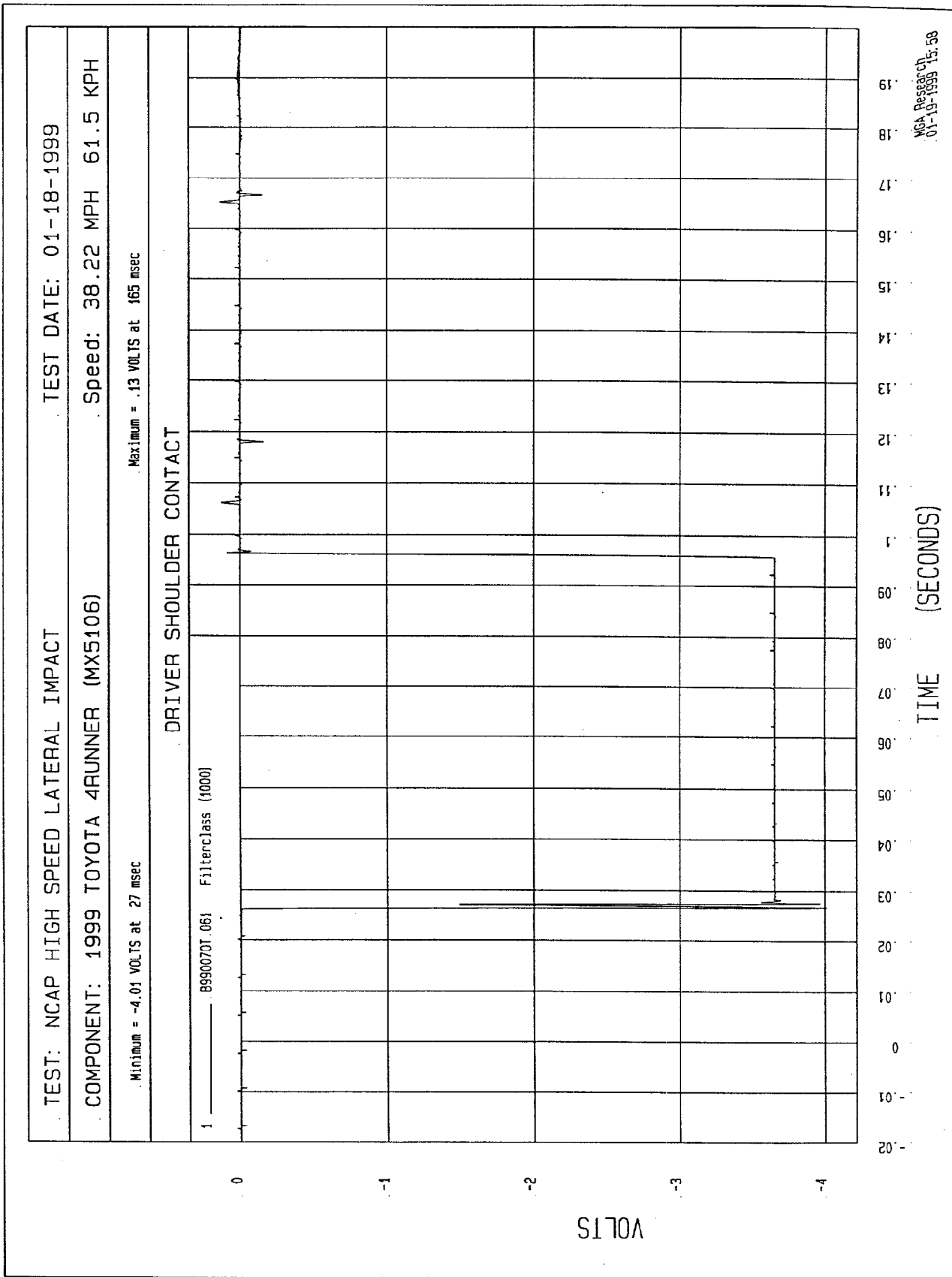
Maximum = 28.04 KPH at 60 msec

Minimum = -1.59E-02 KPH at -14 msec

DRIVER PELVIS Y VELOCITY



MGA Research
01-19-1999 16:04

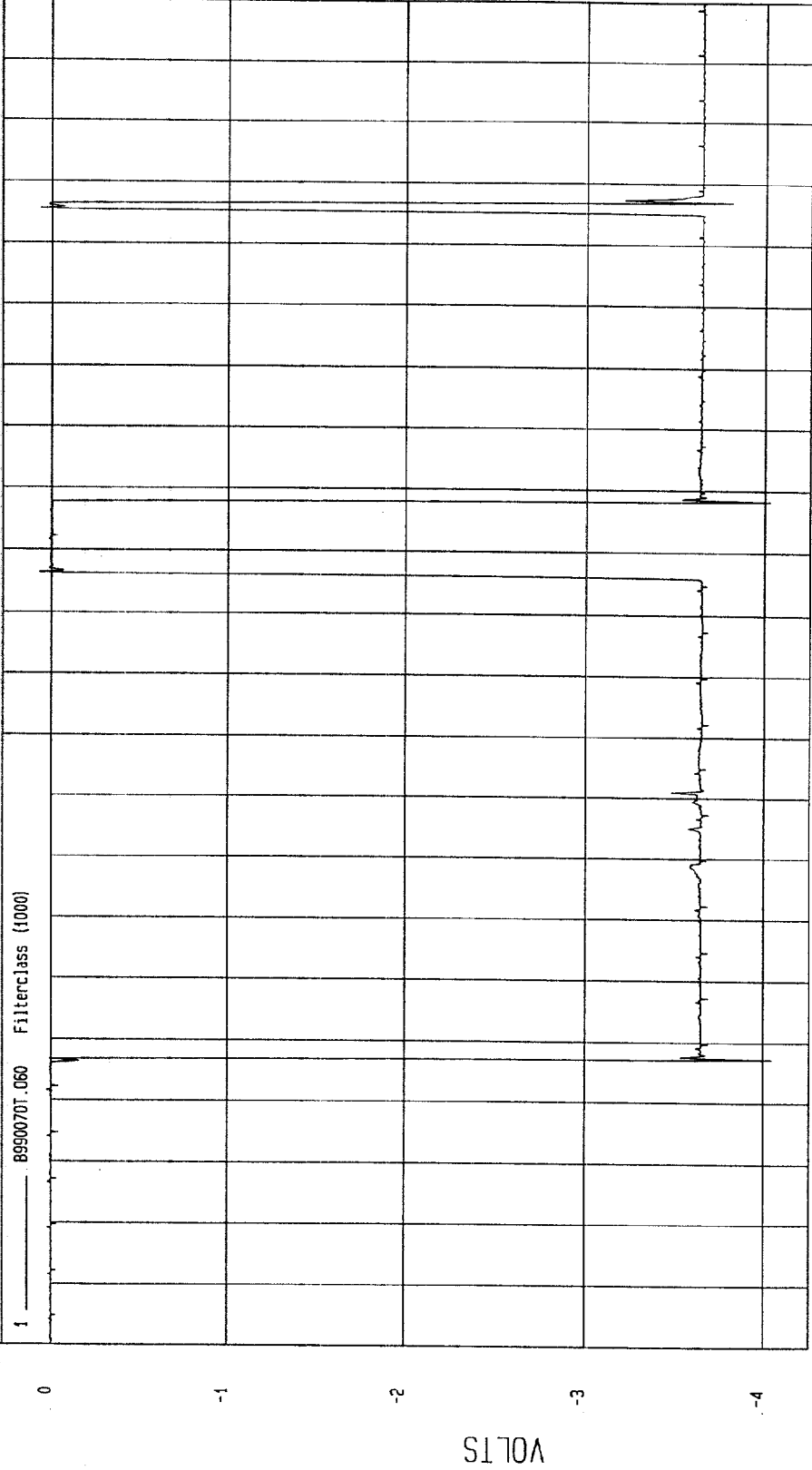


TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

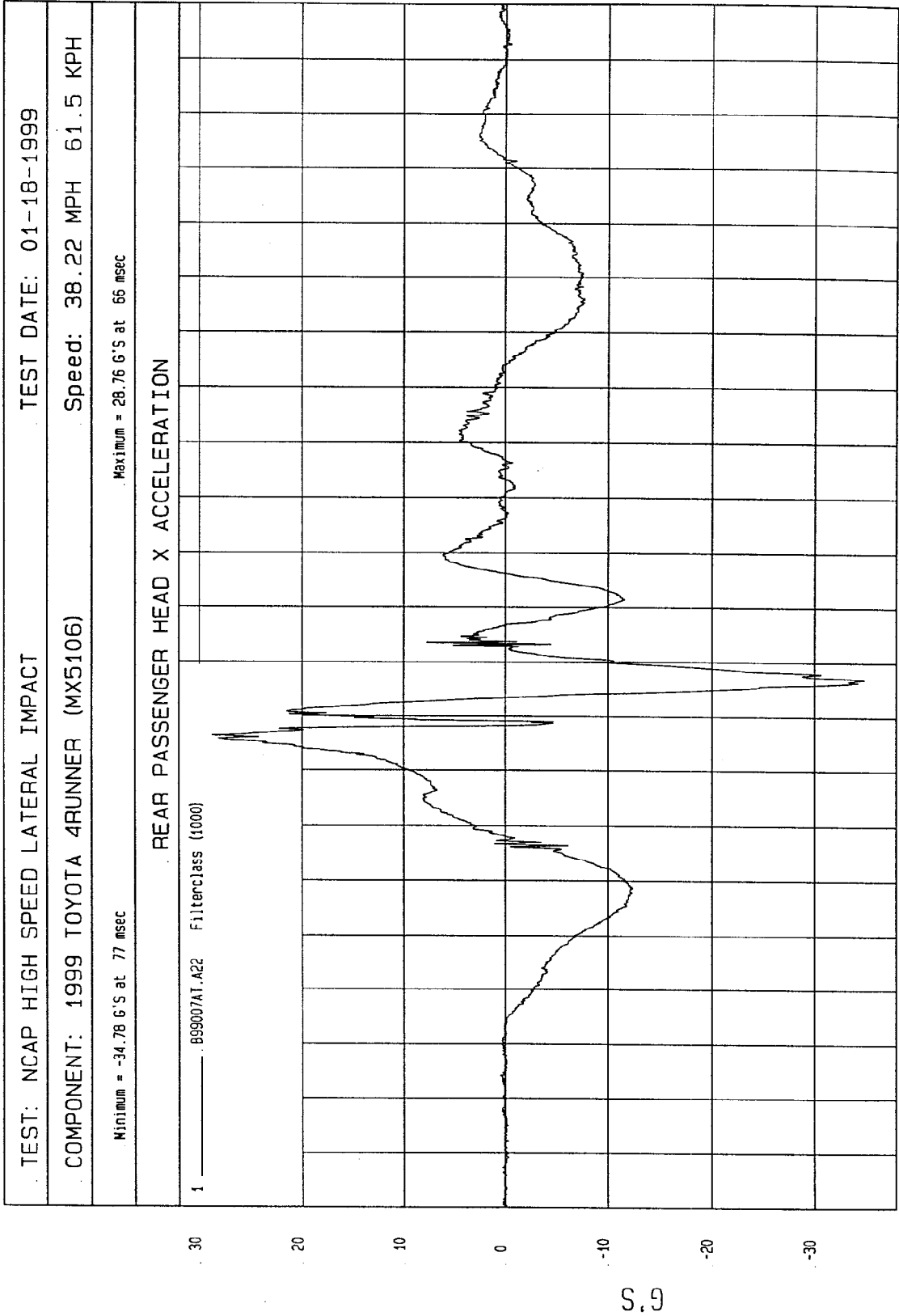
COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -4.05 VOLTS at 27 msec Maximum = 6.81E-02 VOLTS at 106 msec

DRIVER PELVIS CONTACT



MCA Research
01-18-1999 15:58



TIME (SECONDS)

MCA Research
01-19-1999 16:03

TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

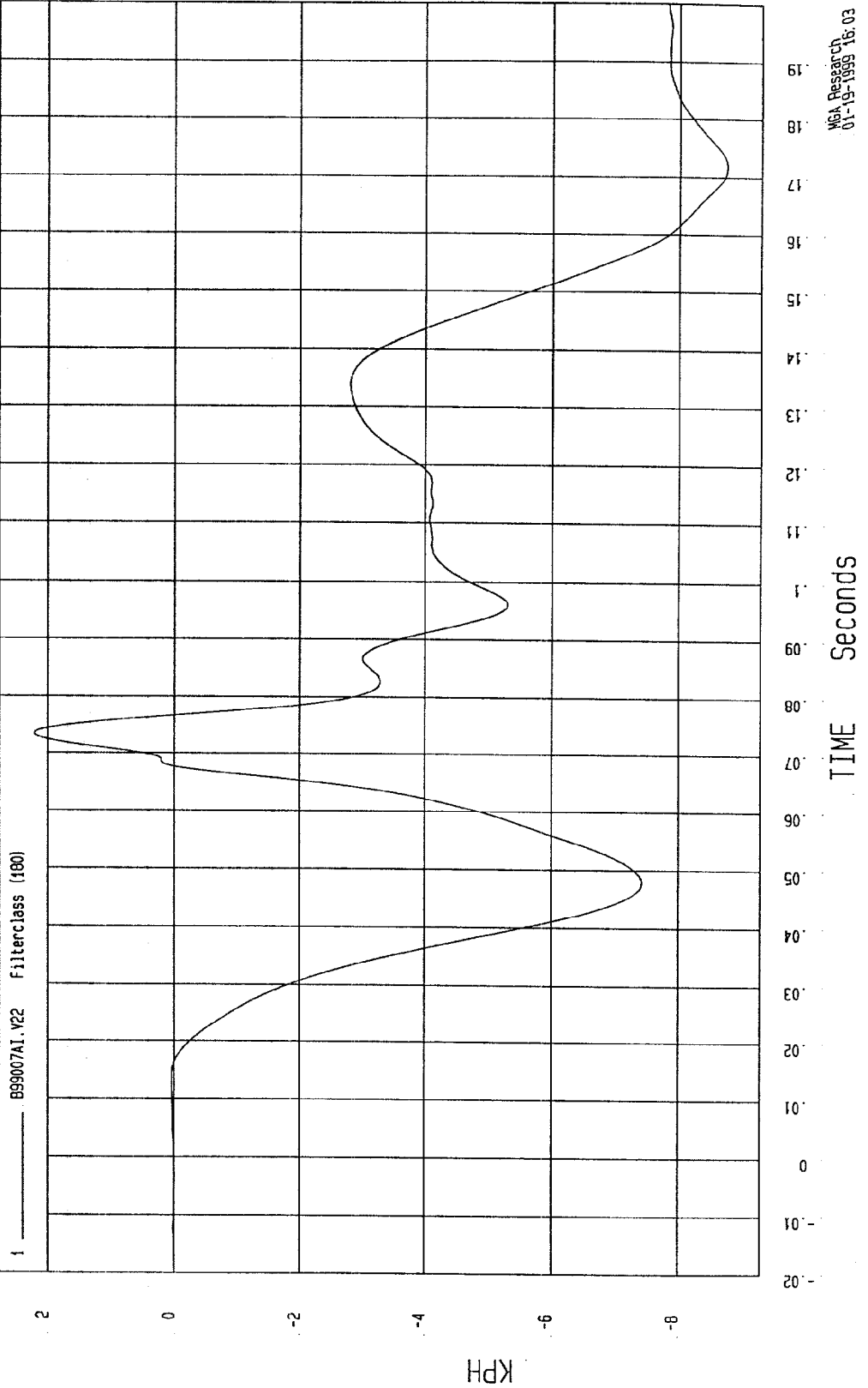
Speed: 38.22 MPH 61.5 KPH

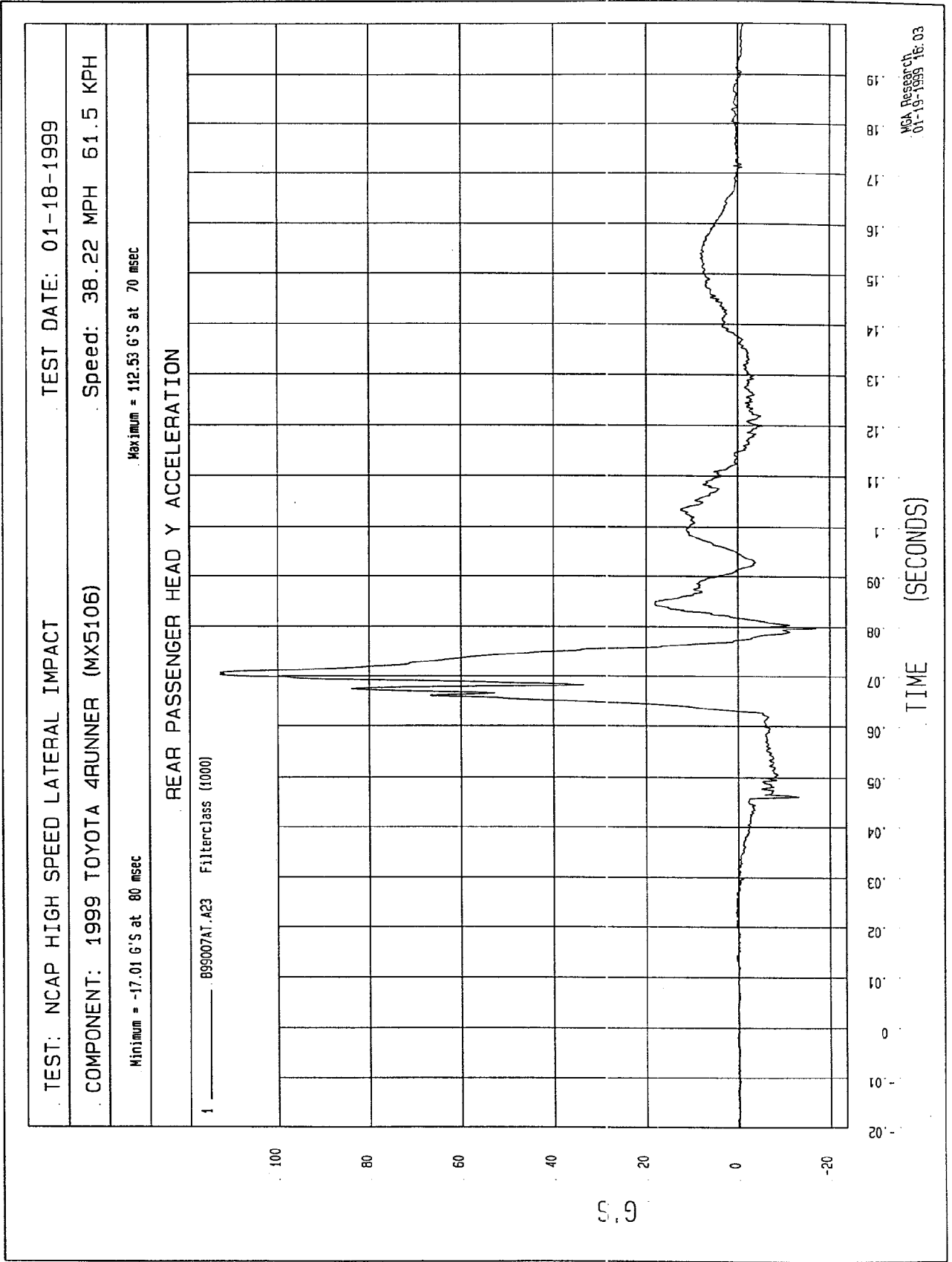
COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

Maximum = 2.21 KPH at 73 msec

Minimum = -8.76 KPH at 172 msec

REAR PASSENGER HEAD X VELOCITY





TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

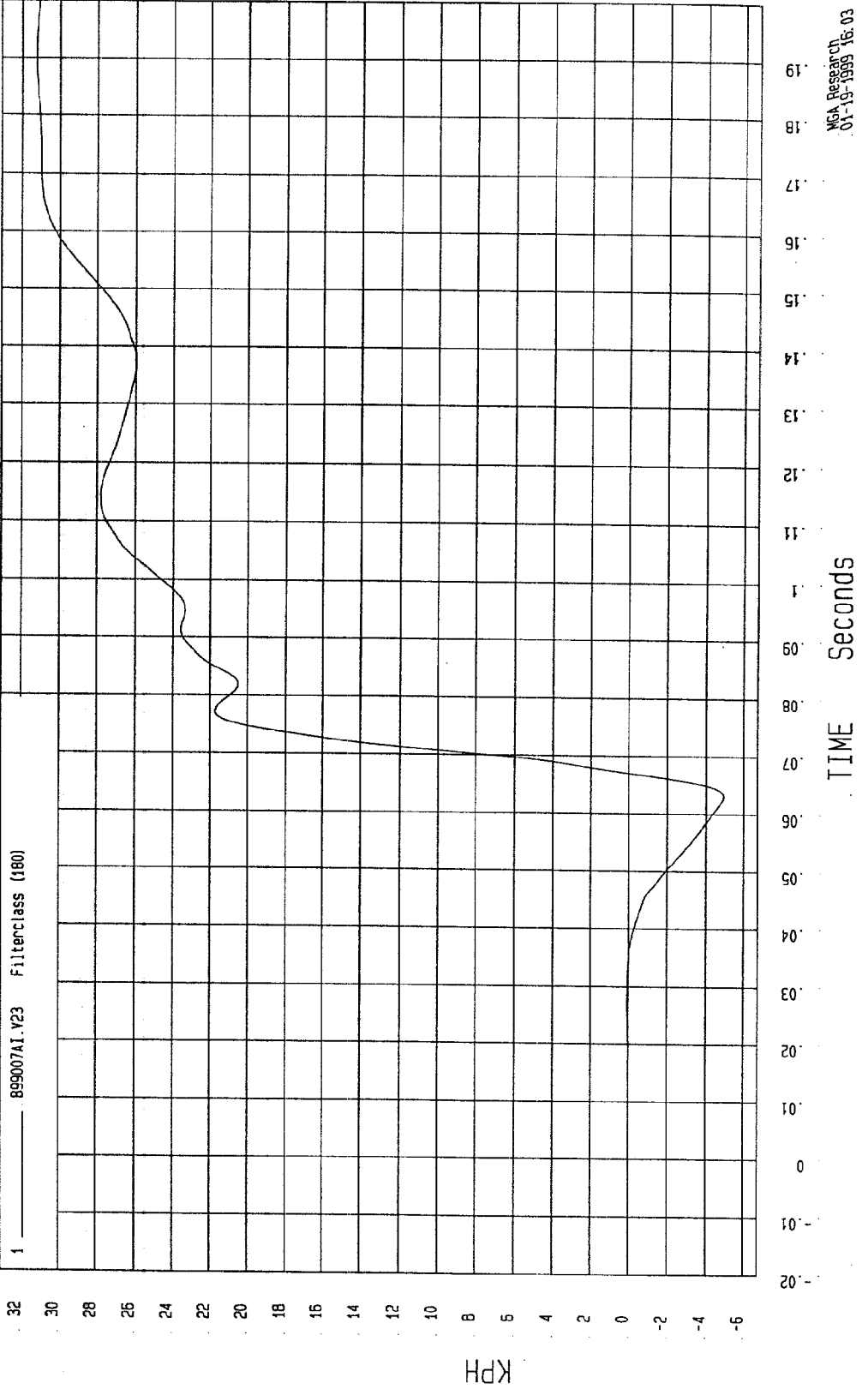
Speed: 38.22 MPH 61.5 KPH

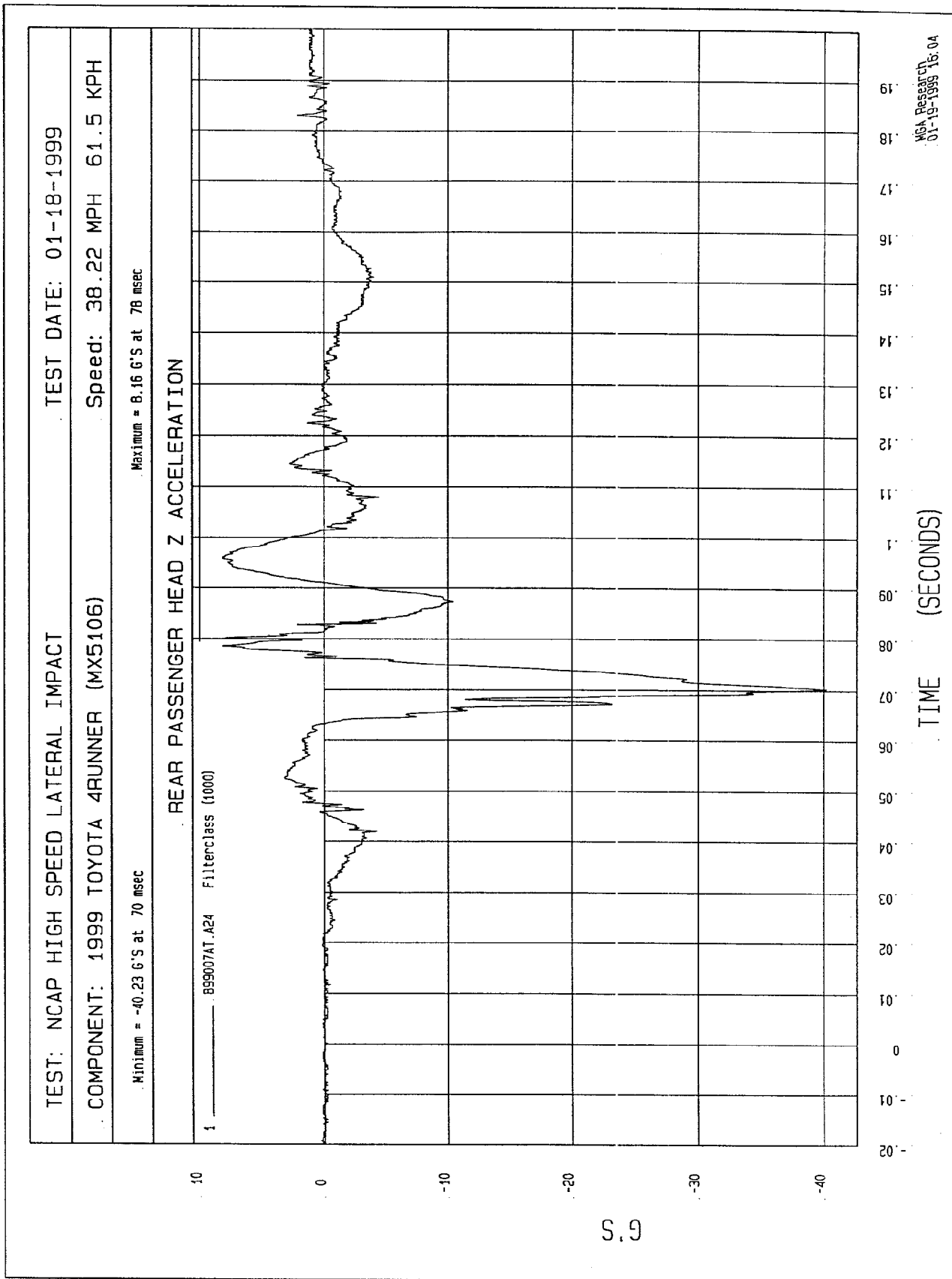
COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

Maximum = 31.25 KPH at 189 msec

Minimum = -4.95 KPH at 63 msec

REAR PASSENGER HEAD Y VELOCITY





TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

Speed: 38.22 MPH 61.5 KPH

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

Maximum = 1.10E-02 KPH at -12 msec

Minimum = -11.08 KPH at 174 msec

REAR PASSENGER HEAD Z VELOCITY

1 B99007A1.V24 Filterclass (180)



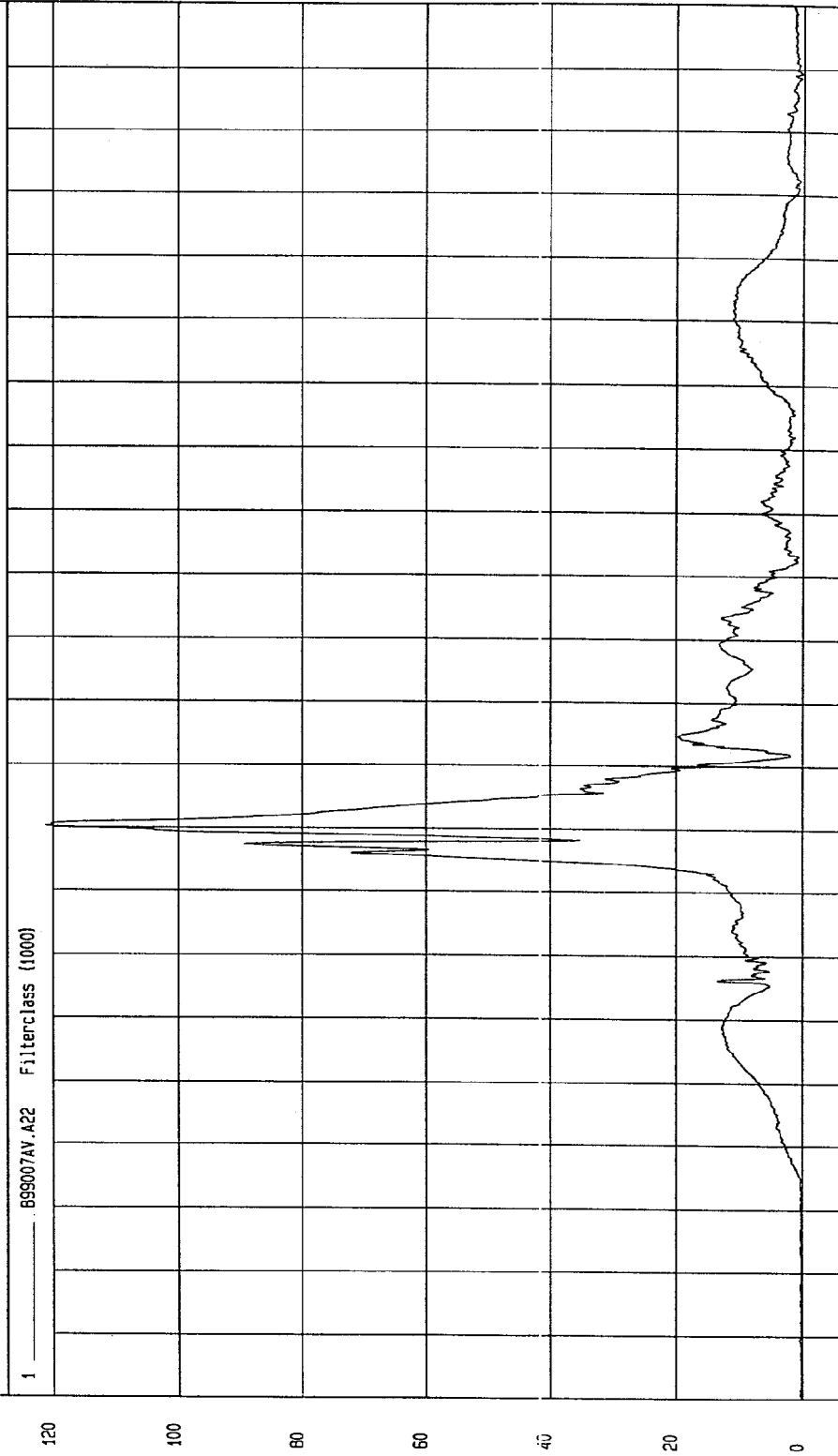
MCA Research
01-19-1999 16:04

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = 7.76E-02 G'S at -18 msec Maximum = 121.2 G'S at 70 msec

REAR PASSENGER HEAD RESULTANT ACCELERATION



TIME (SECONDS)

NGA Research
01-19-1999 16:04

TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

Speed: 38.22 MPH 61.5 KPH

Minimum = -12.11 G'S at 42 msec

Maximum = 44.3 G'S at 77 msec

REAR PASSENGER UPPER RIB Y ACCELERATION

1 _____ 899007AT.A25 FilterClass (1000)

40

30

20

10

0

-10

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

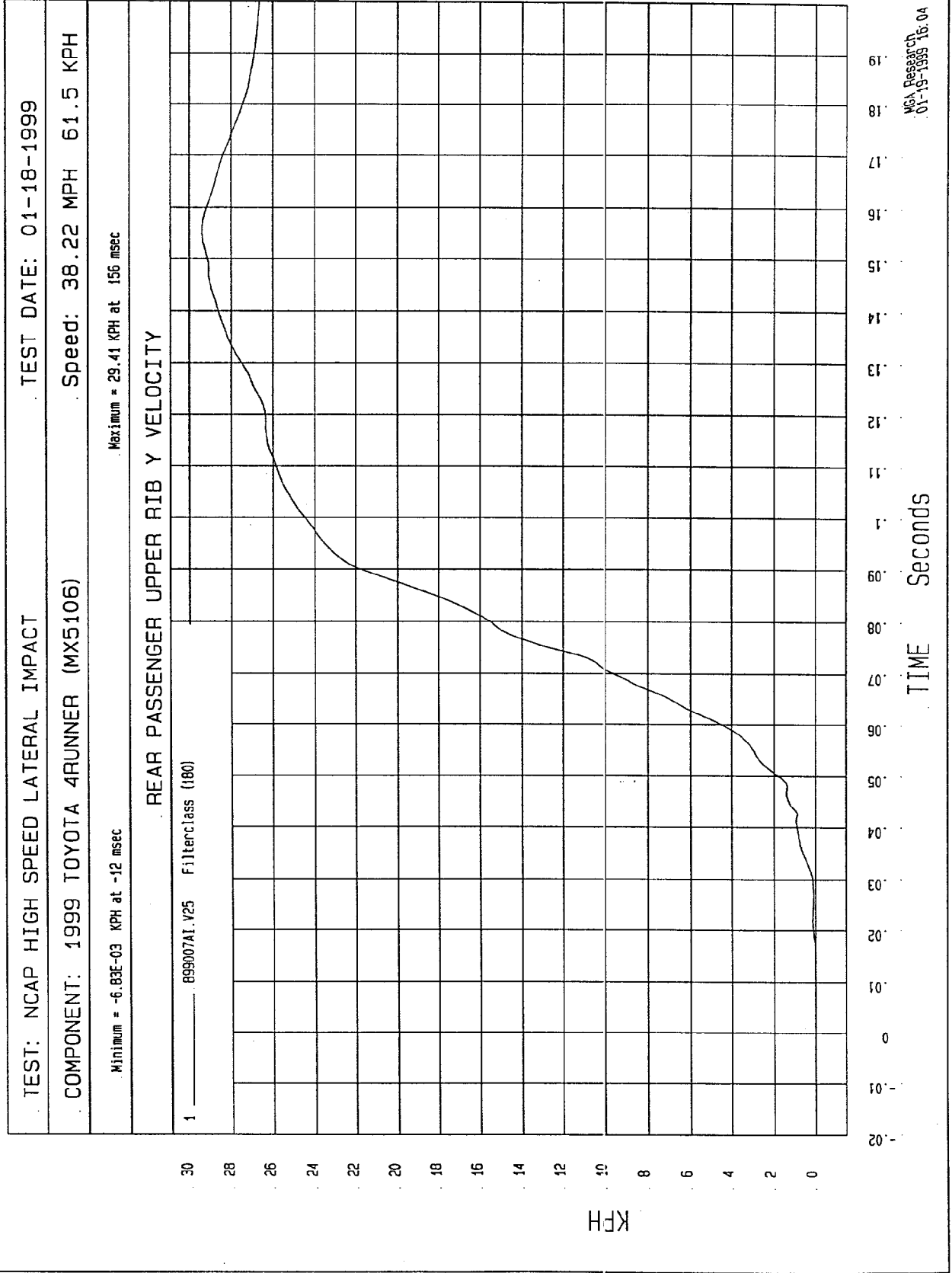
0.17

0.18

0.19

TIME (SECONDS)

MCA Research
01-19-1999 16:04



TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

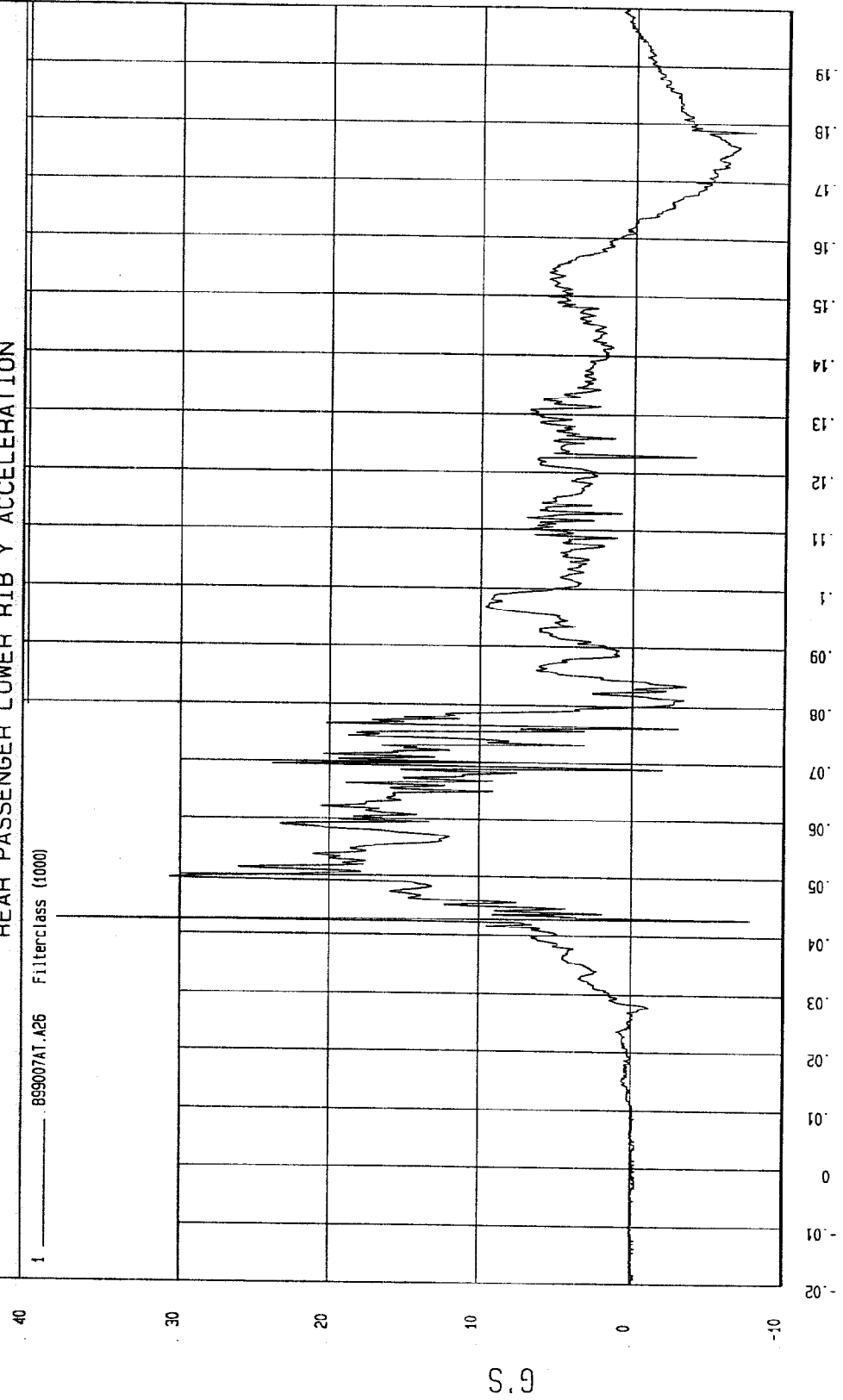
Speed: 38.22 MPH 61.5 KPH

Minimum = -7.82 G'S at 43 msec

Maximum = 38.06 G'S at 42 msec

REAR PASSENGER LOWER RIB Y ACCELERATION

1 _____ B99007A1.A26 Filterclass (1000)

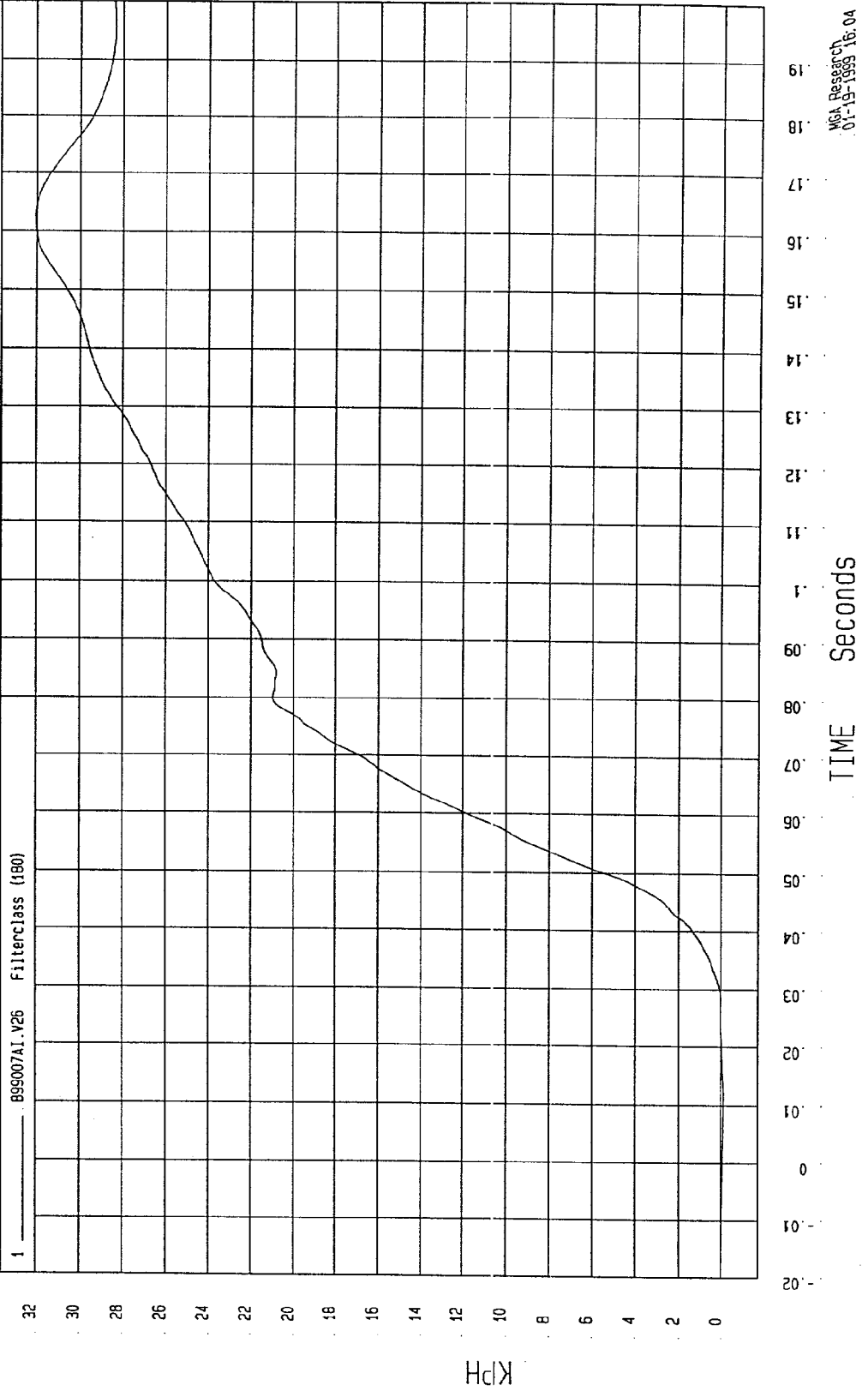


NEA Research
01-19-1999 16.04

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999
COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -.12 KPH at 11 msec Maximum = 32.04 KPH at 163 msec

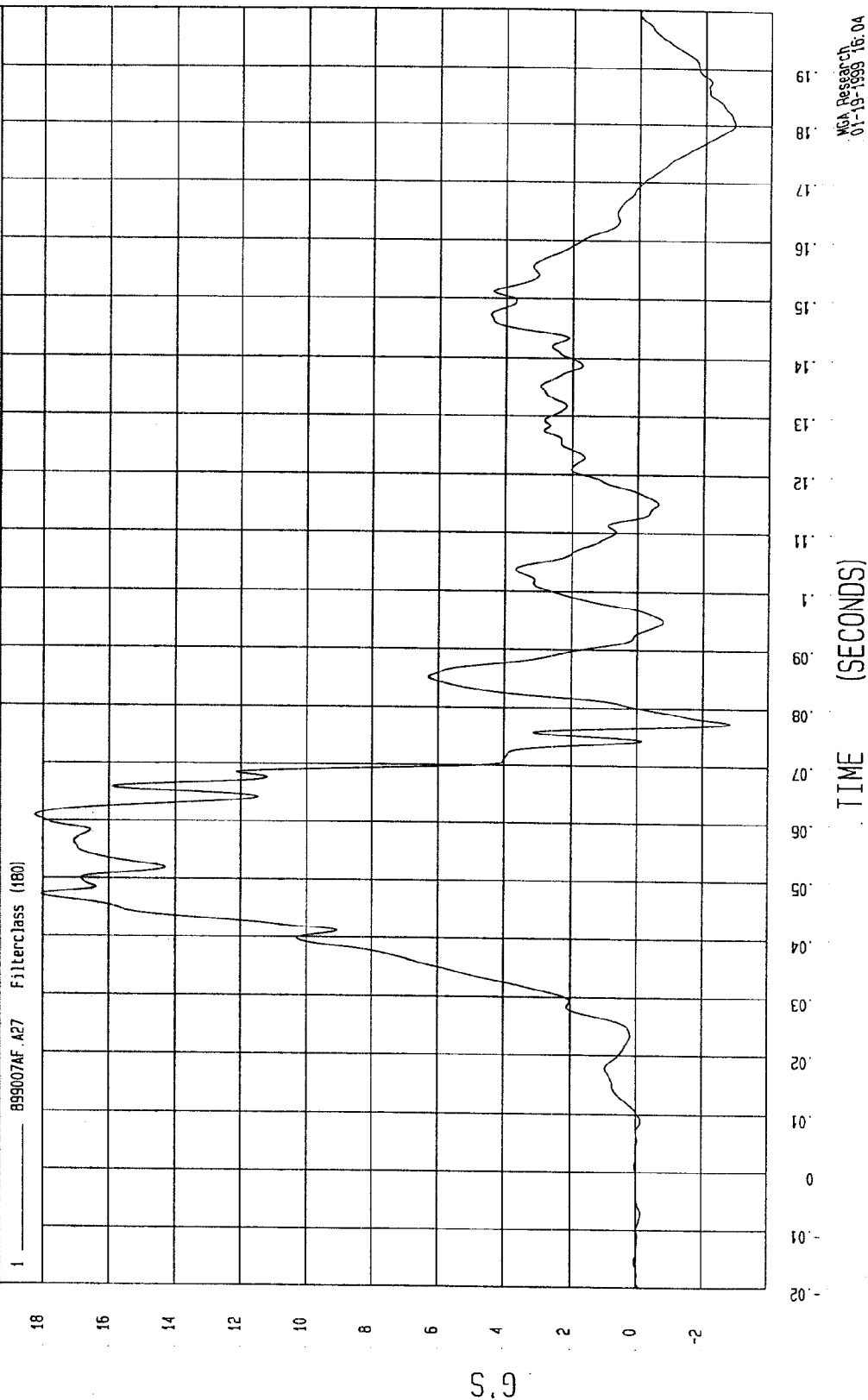
REAR PASSENGER LOWER RIB Y VELOCITY



TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999
COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

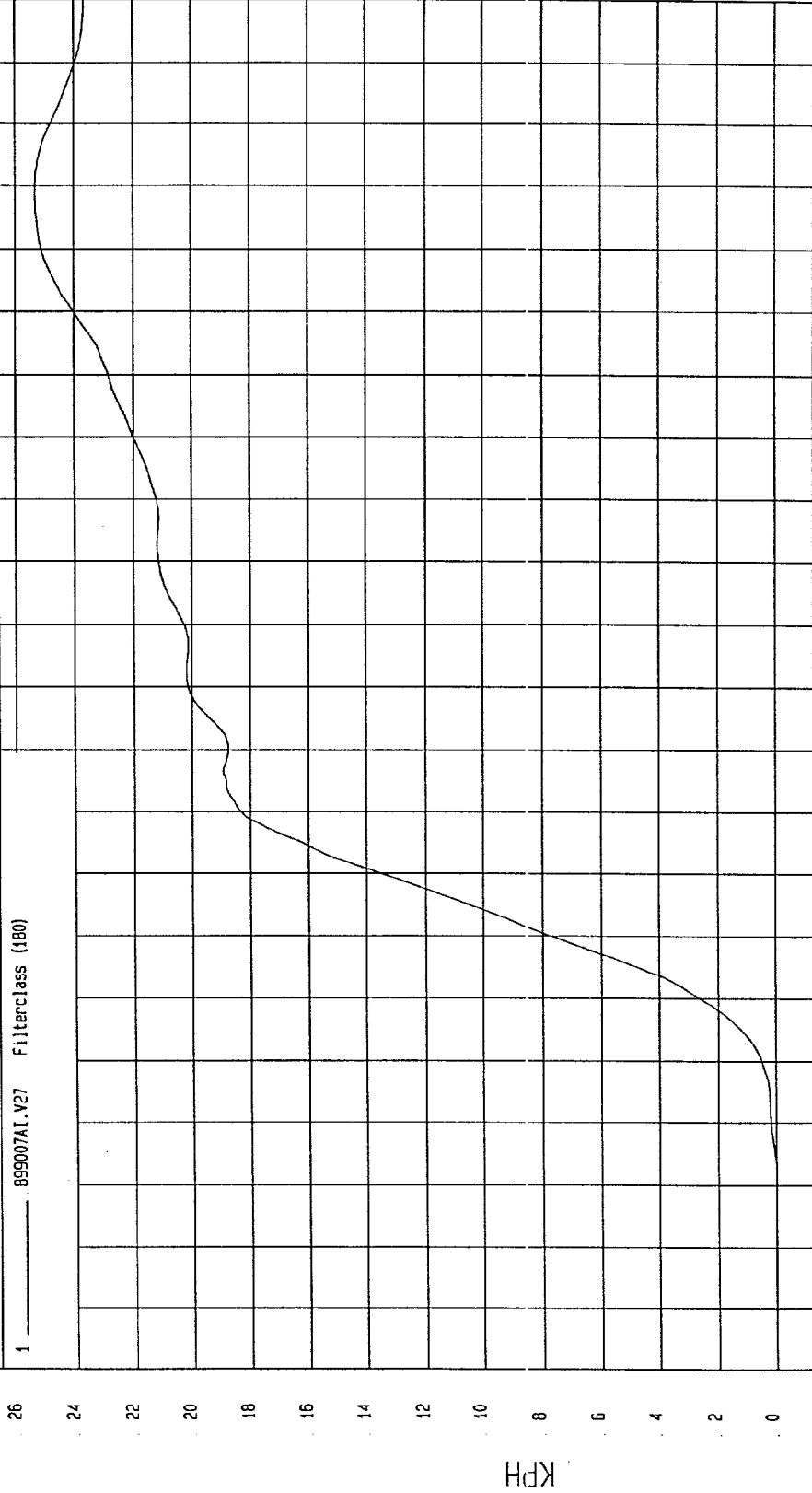
Minimum = -2.88 G's at 180 msec Maximum = 18.24 G's at 61 msec

REAR PASSENGER LOWER SPINE Y ACCELERATION



TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999
COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH
Minimum = -2.95E-02 KPH at 10 msec Maximum = 25.32 KPH at 169 msec

REAR PASSENGER LOWER SPINE Y VELOCITY



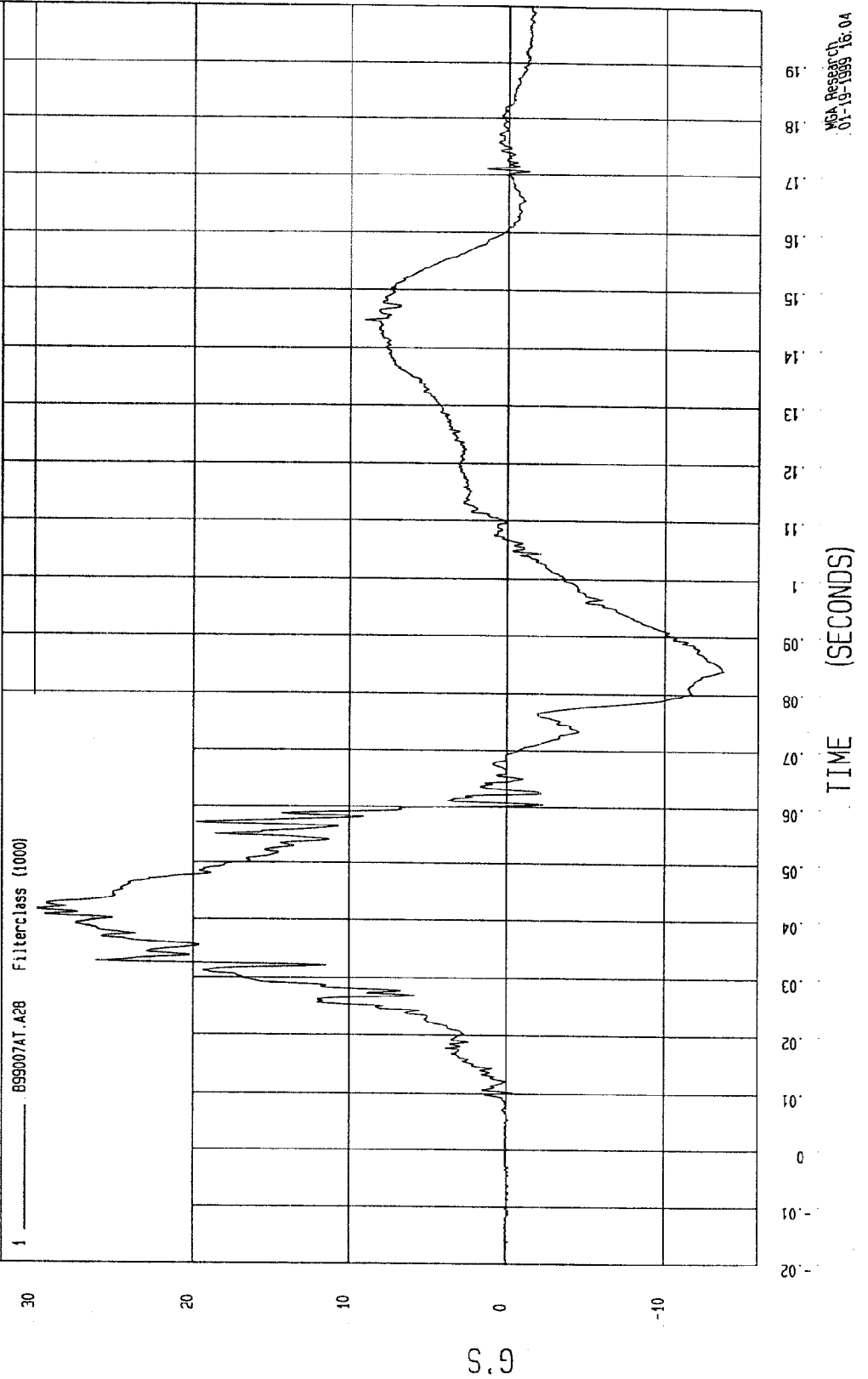
WGA Research
01-19-1999 16:04

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -13.85 G'S at 84 msec Maximum = 29.86 G'S at 42 msec

REAR PASSENGER PELVIS Y ACCELERATION

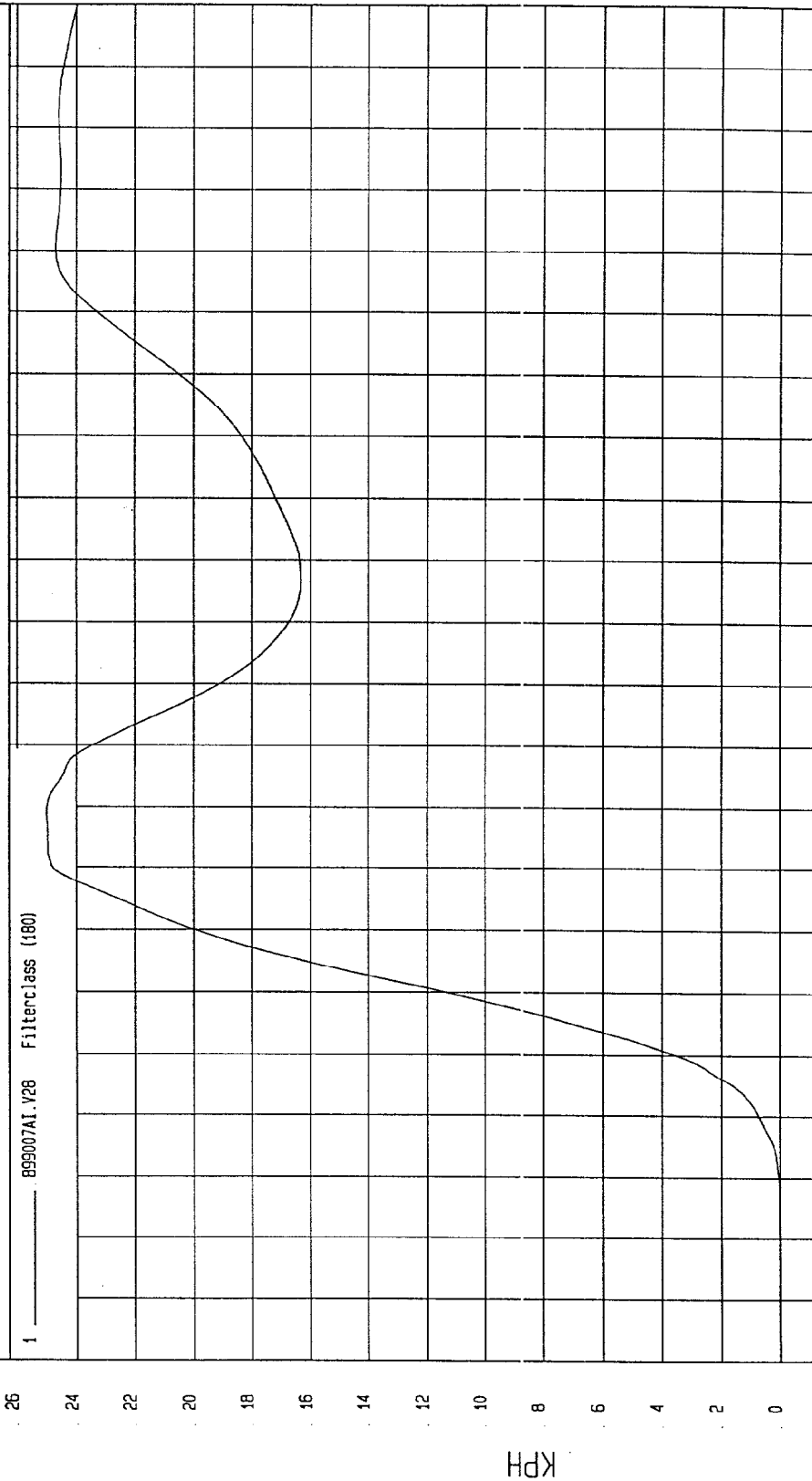


TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = 0 KPH at -20 msec Maximum = 25.01 KPH at 69 msec

REAR PASSENGER PELVIS Y VELOCITY



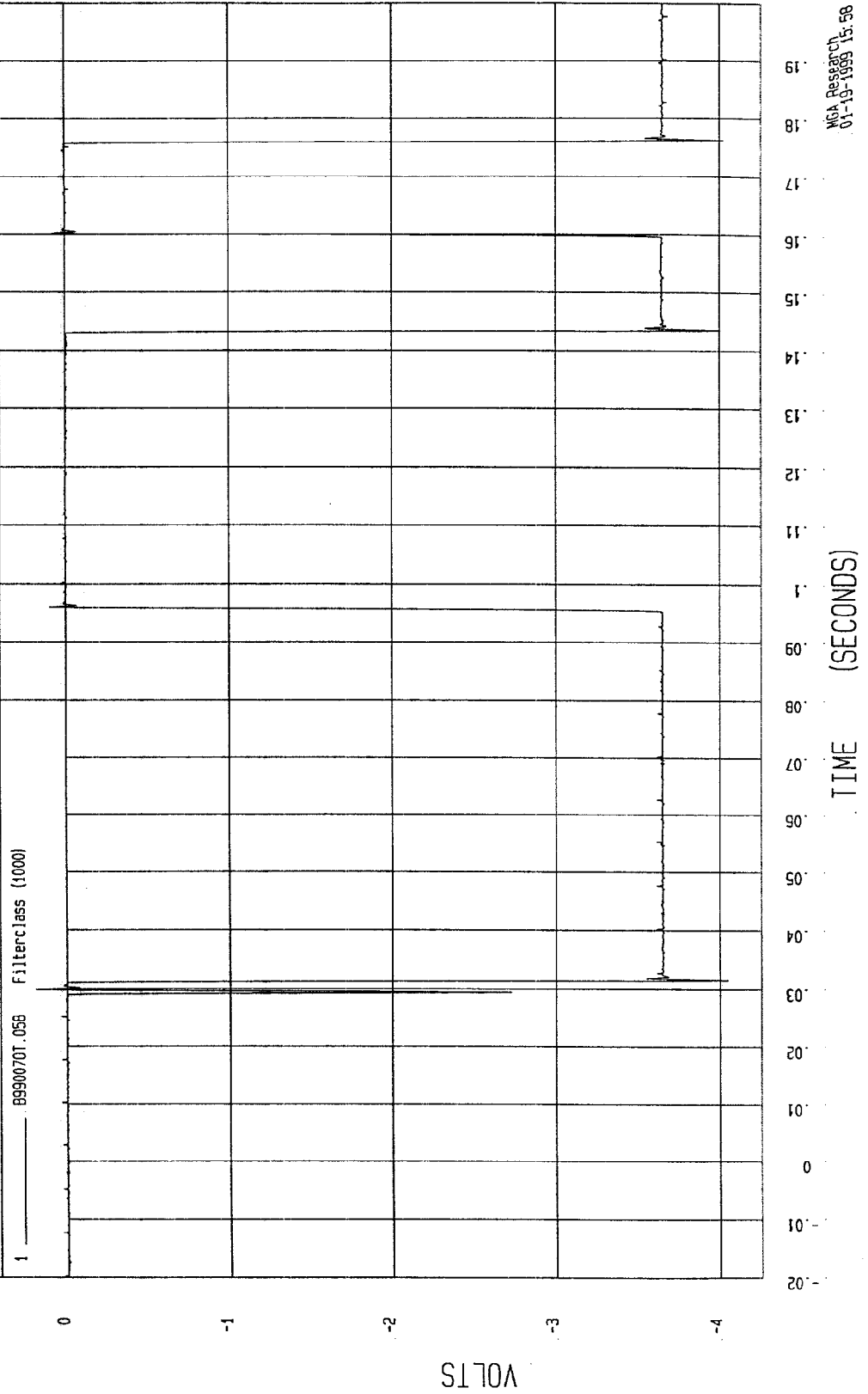
NGA Research
01-19-1999 16:05

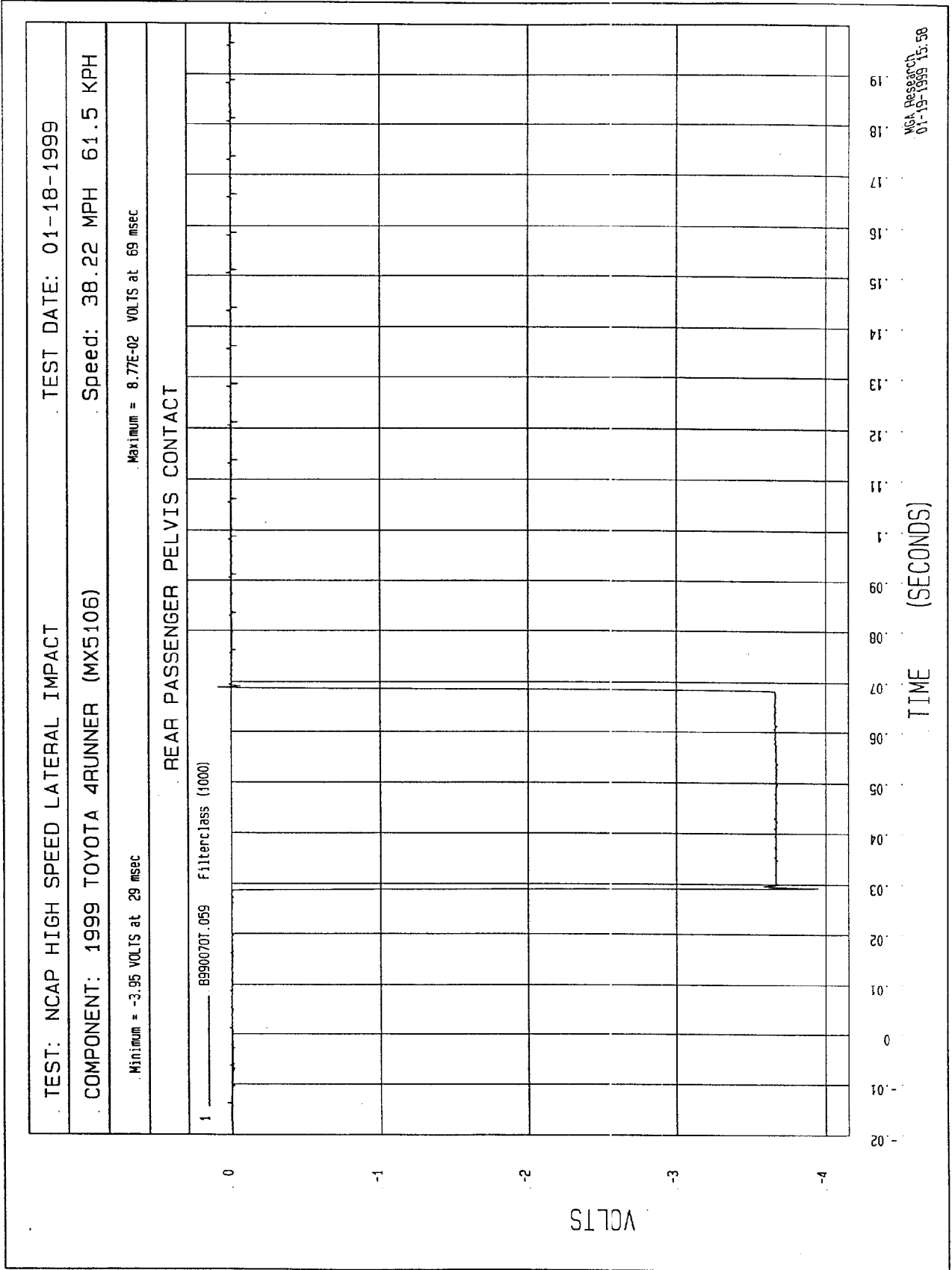
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -4.05 VOLTS at 32 msec Maximum = .19 VOLTS at 30 msec

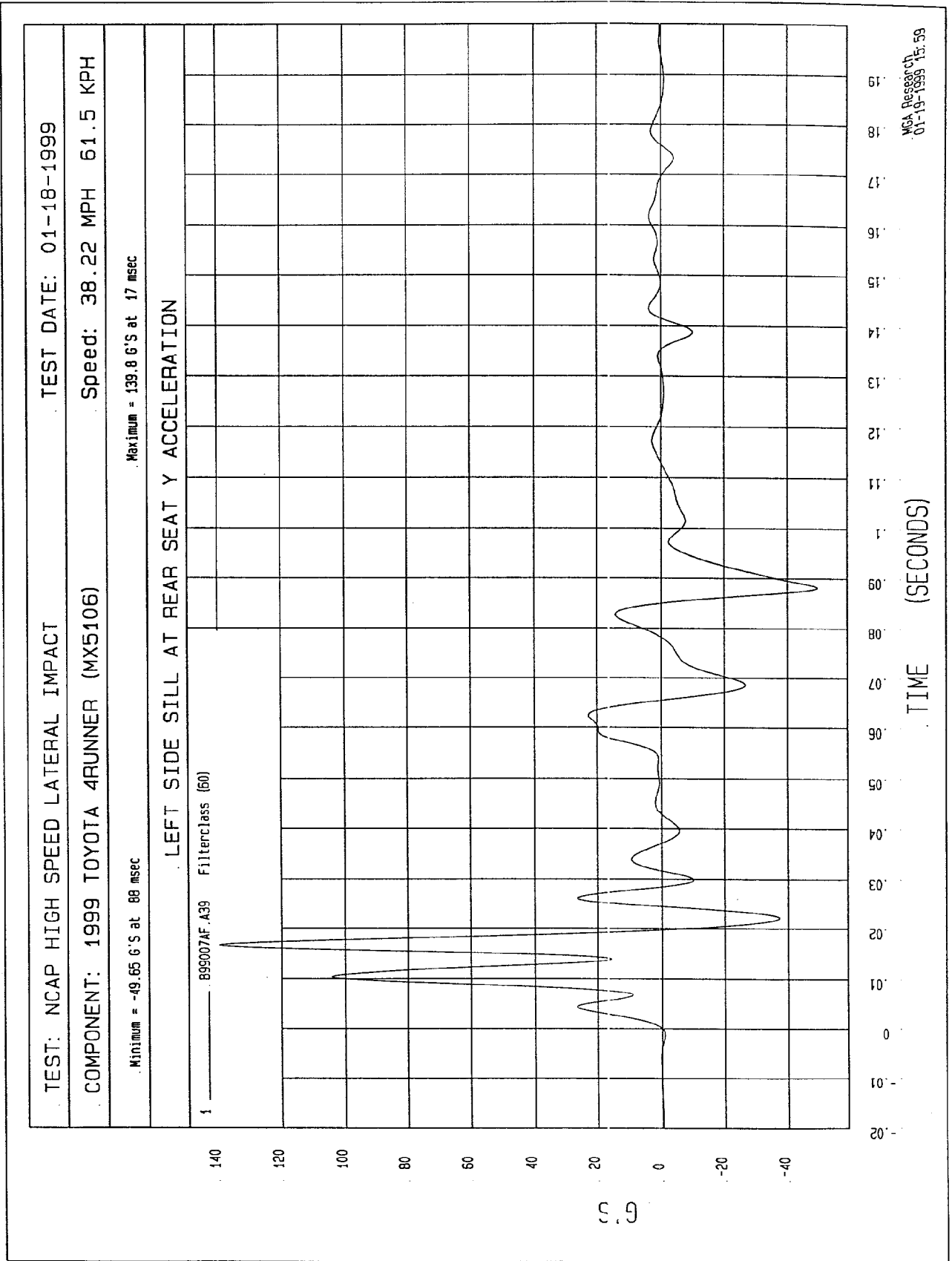
REAR PASSENGER SHOULDER CONTACT





LEFT SIDE SILL AT FRONT SEAT Y ACCELERATION VS. TIME

NO VALID DATA COLLECTED



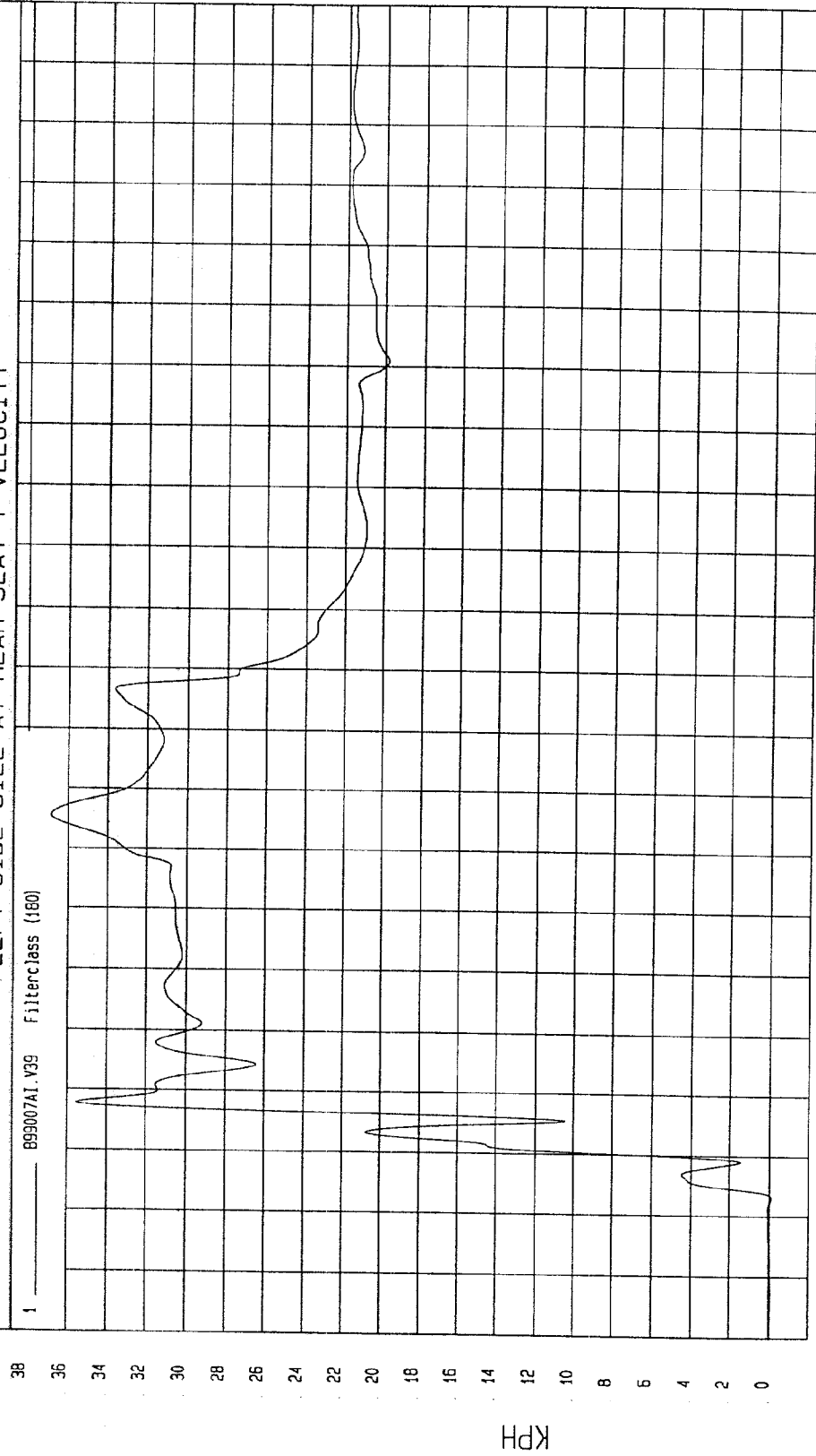
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

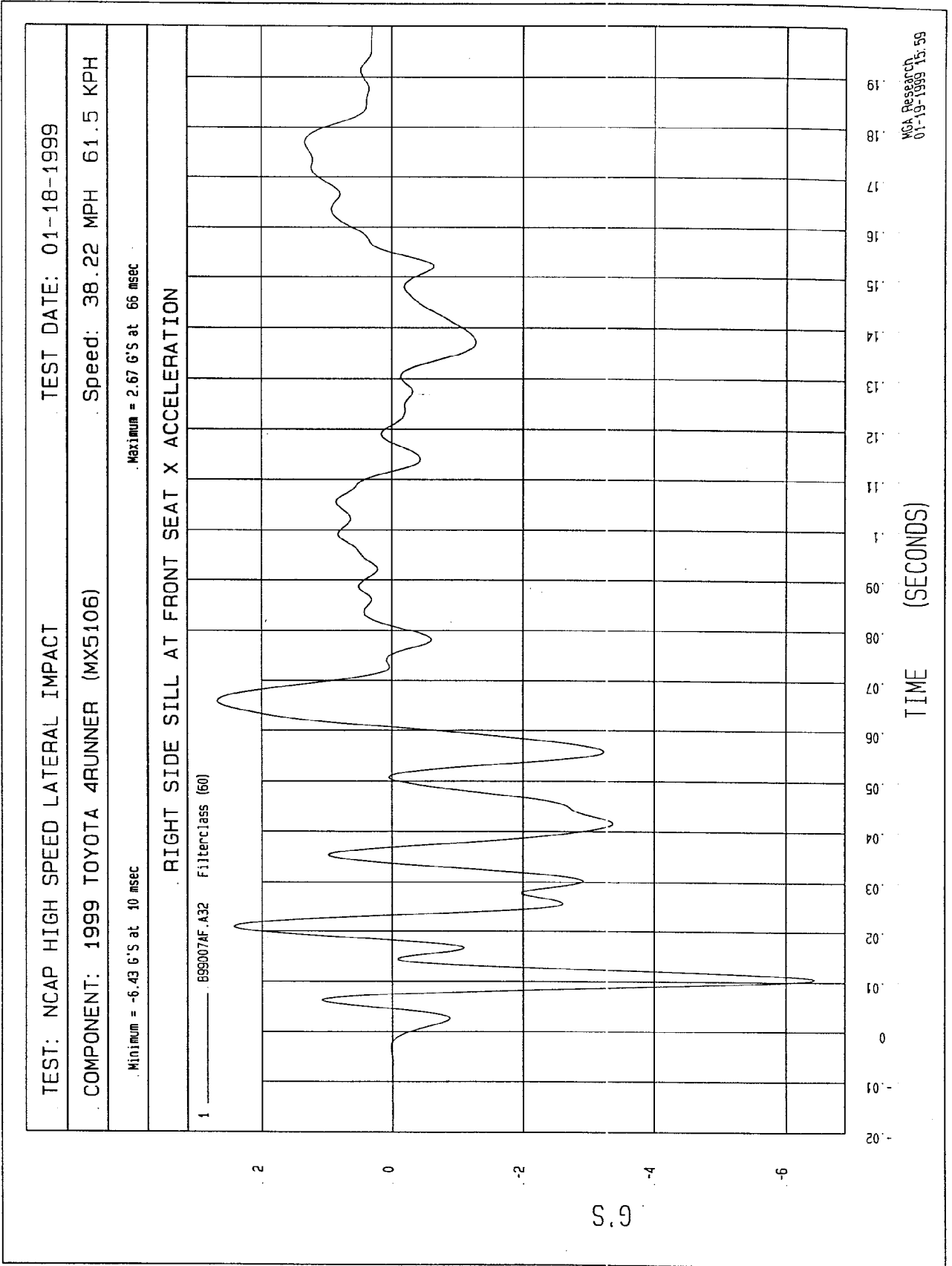
COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -11 KPH at 3 msec Maximum = 36.95 KPH at 66 msec

LEFT SIDE SILL AT REAR SEAT Y VELOCITY

1 ——— B99007AI.V39 Filterclass (160)

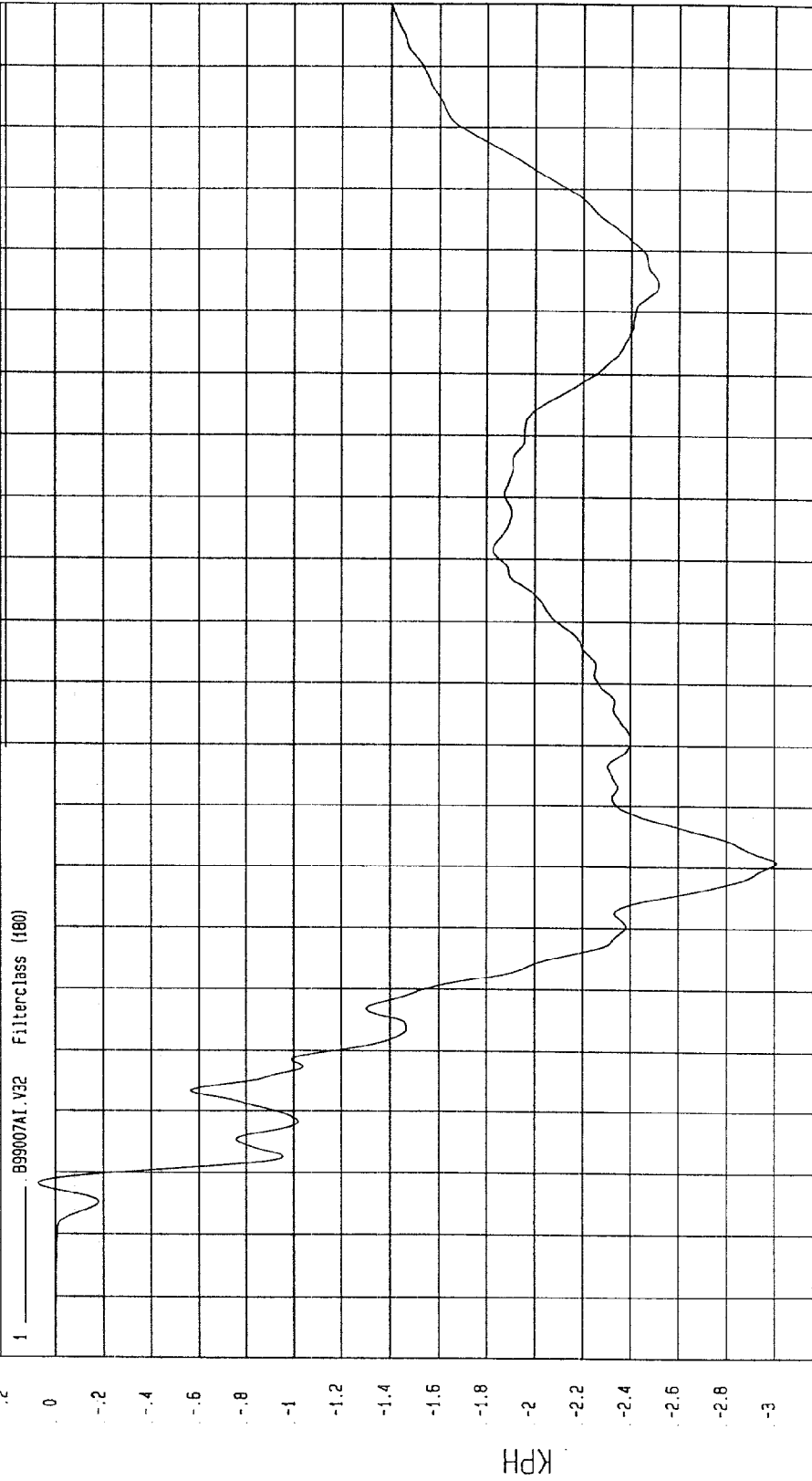




TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999
COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -3.01 KPH at 51 msec Maximum = 6.98E-02 KPH at 8 msec

RIGHT SIDE SILL AT FRONT SEAT X VELOCITY

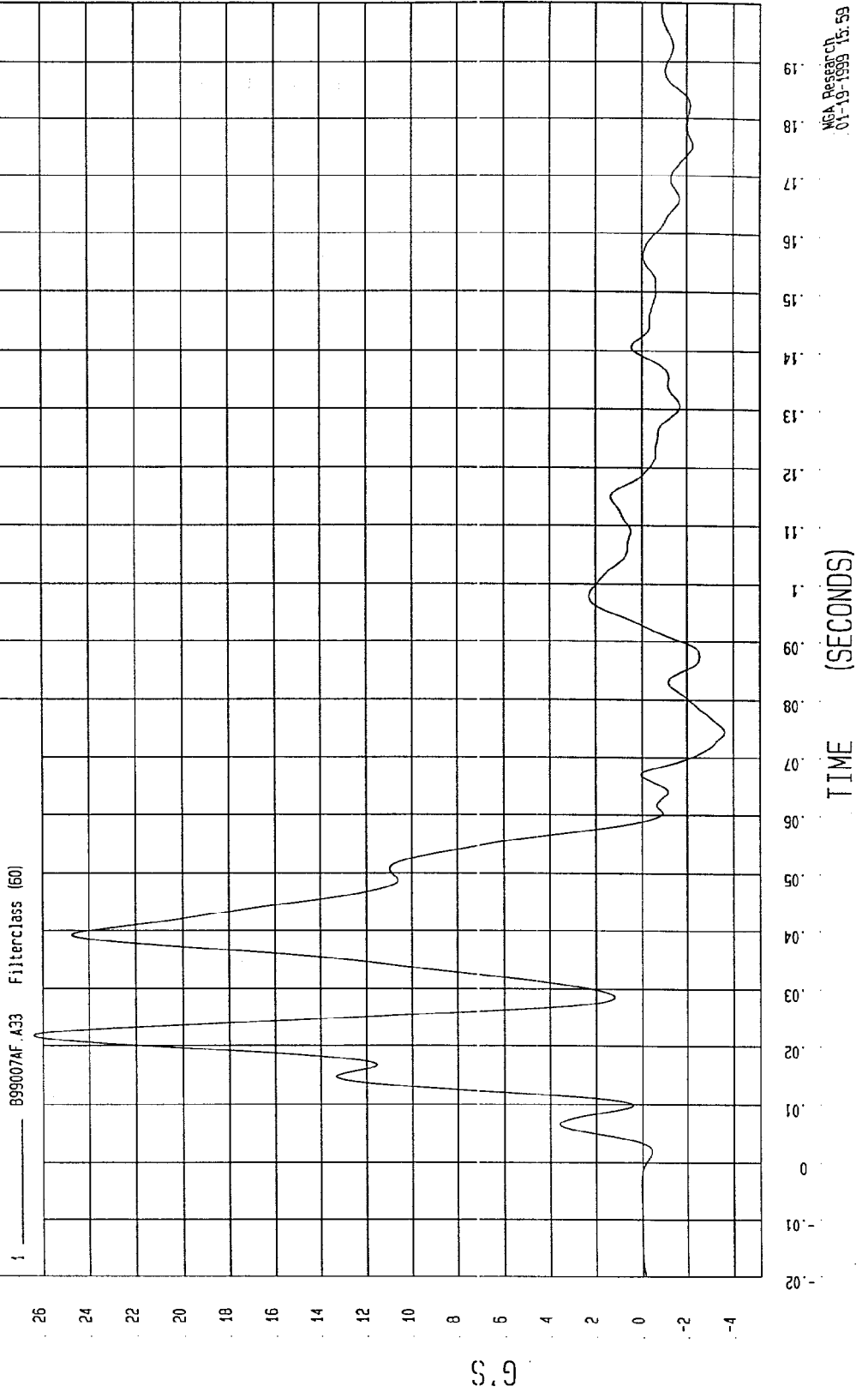


TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -3.63 G'S at 74 msec Maximum = 26.41 G'S at 22 msec

RIGHT SIDE SILL AT FRONT SEAT Y ACCELERATION



TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

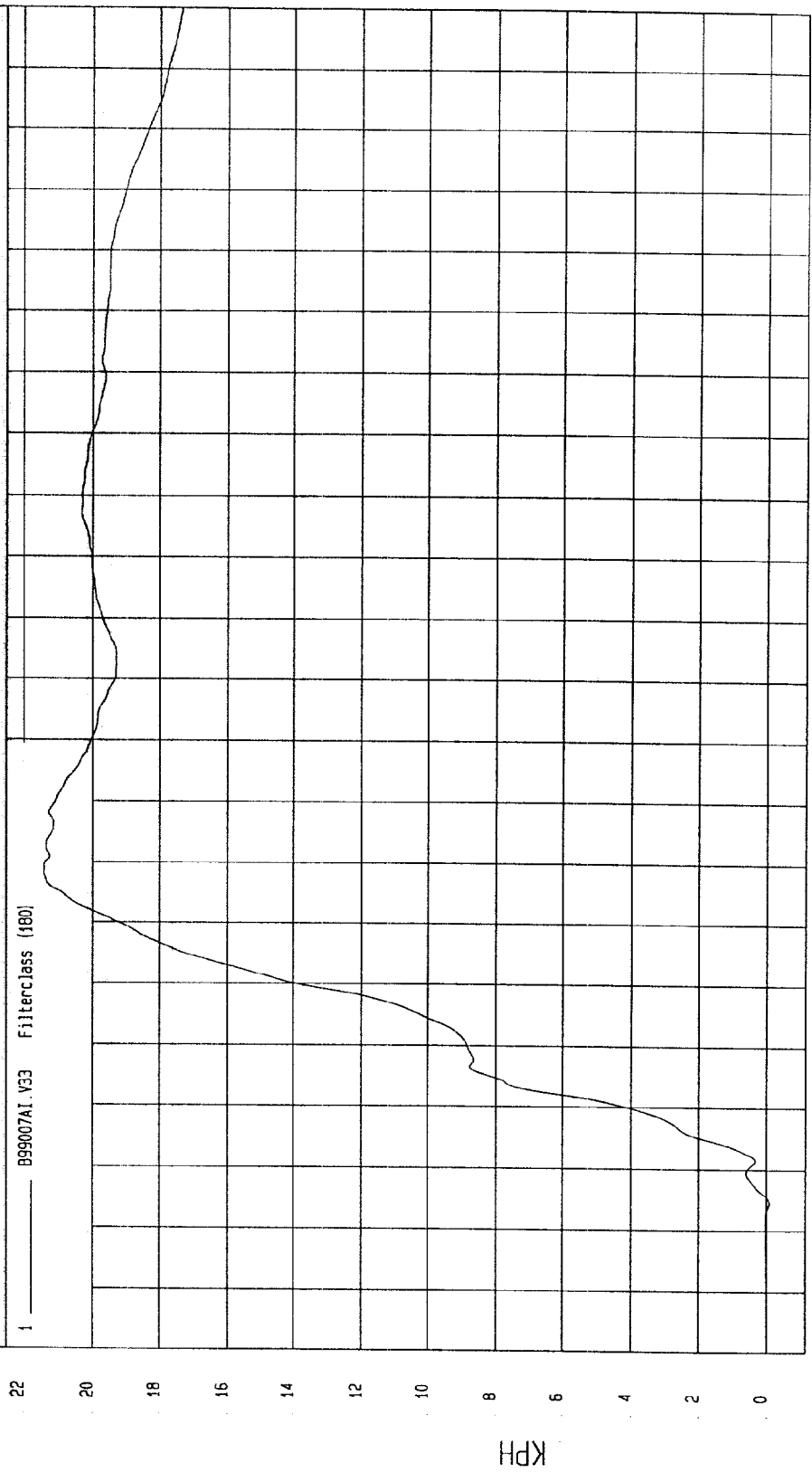
SPEED: 38.22 MPH 61.5 KPH

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

Maximum = 21.42 KPH at 58 msec

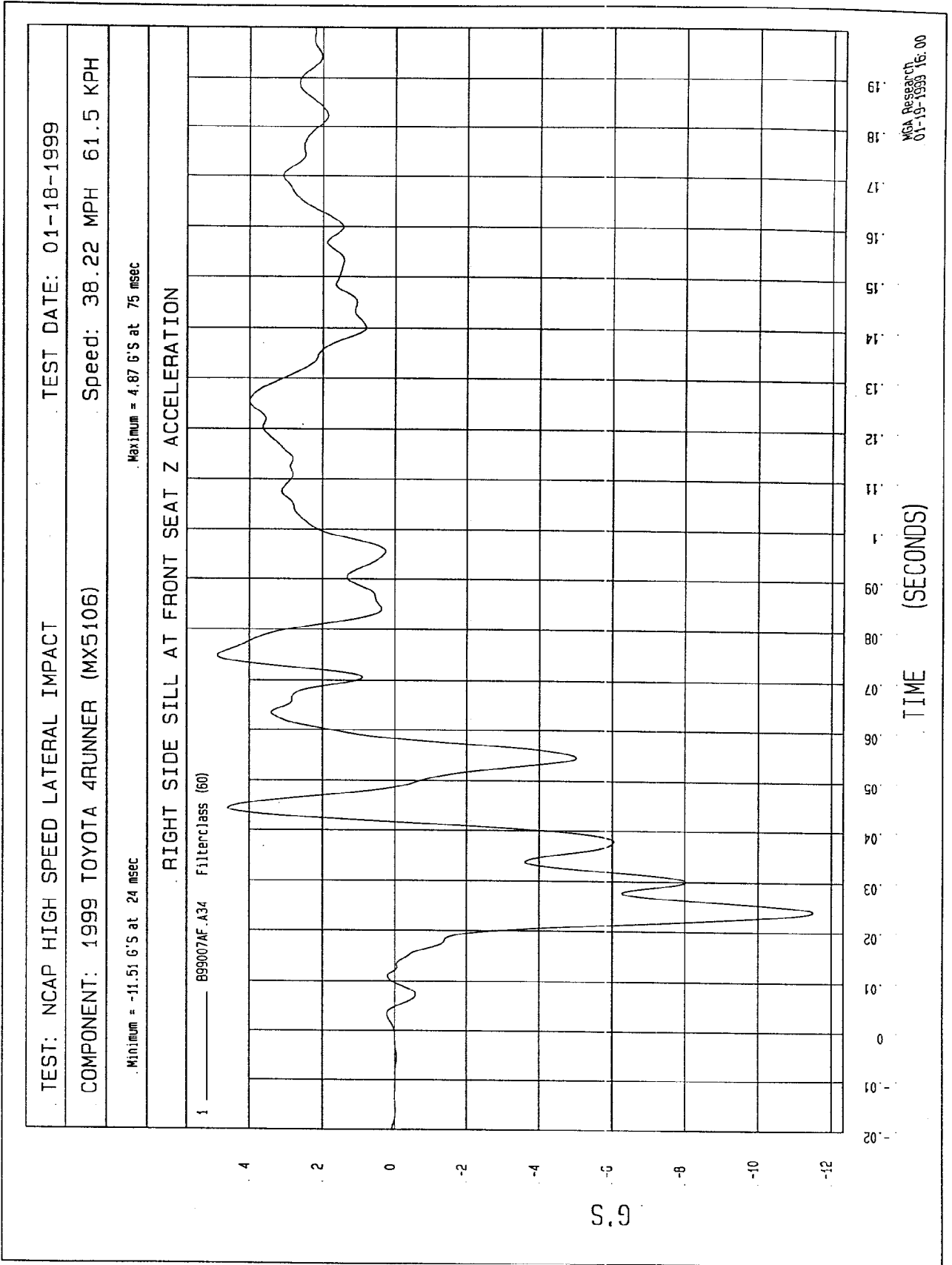
Minimum = -8.00E-02 KPH at 4 msec

RIGHT SIDE SILL AT FRONT SEAT Y VELOCITY



TIME Seconds

WCA Research
01-19-1999 16:00



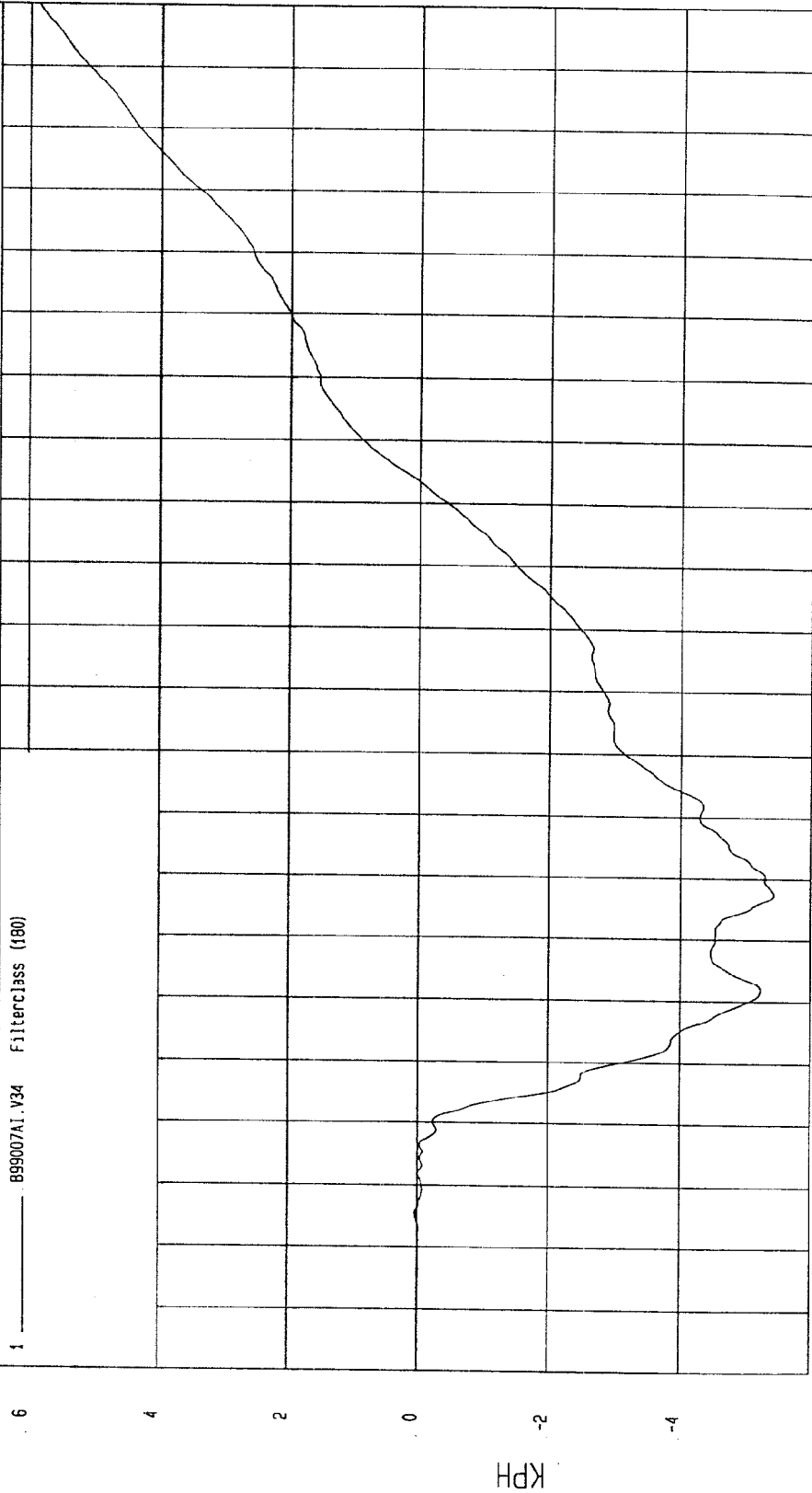
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -5.42 KPH at 57 msec Maximum = 5.87 KPH at 200 msec

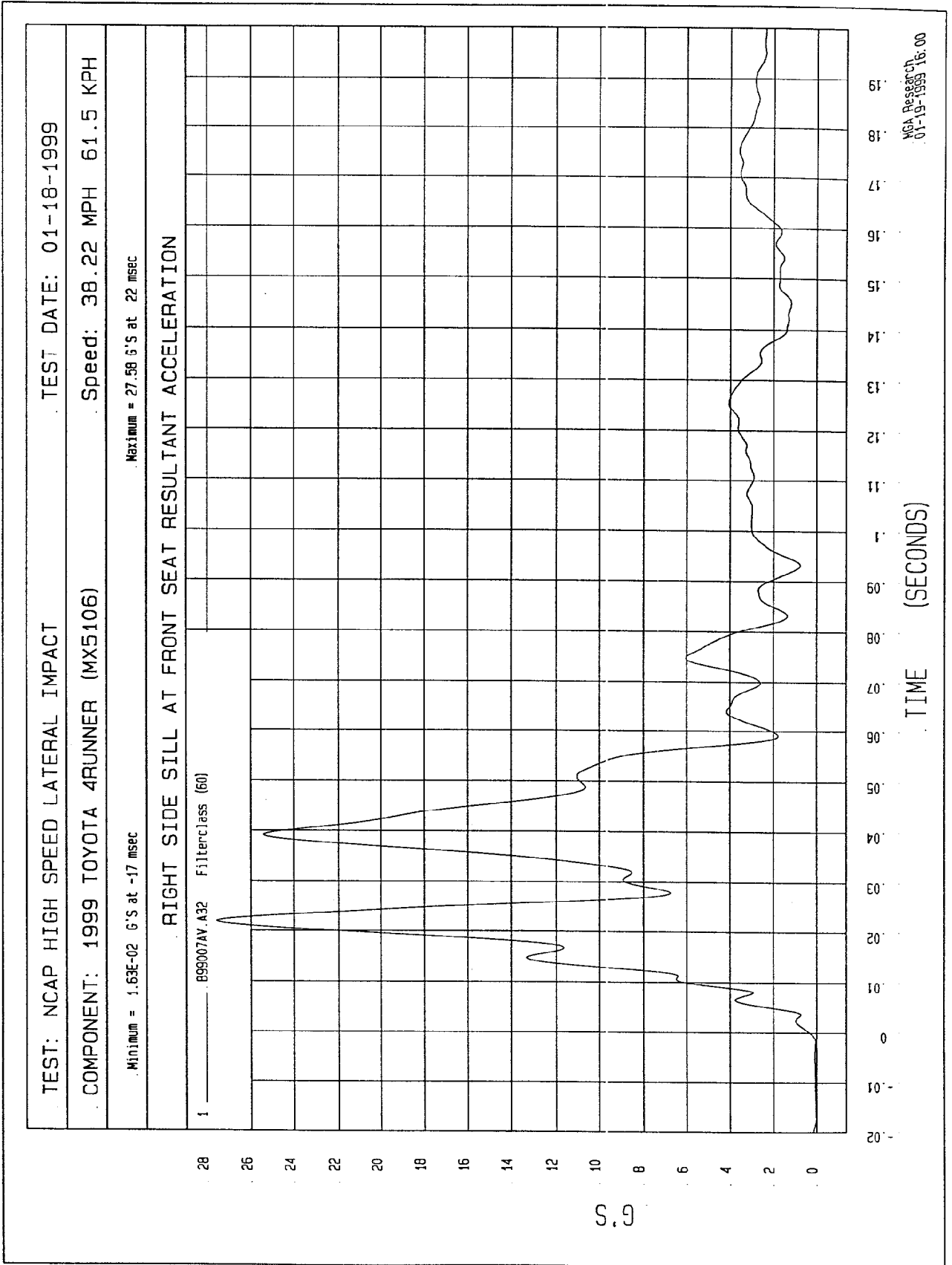
RIGHT SIDE SILL AT FRONT SEAT Z VELOCITY

1 ——— B99007A1.V34 Filterclass (180)



NGA Research
01-19-1999 16:00

TIME Seconds



TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

Speed: 38.22 MPH 61.5 KPH

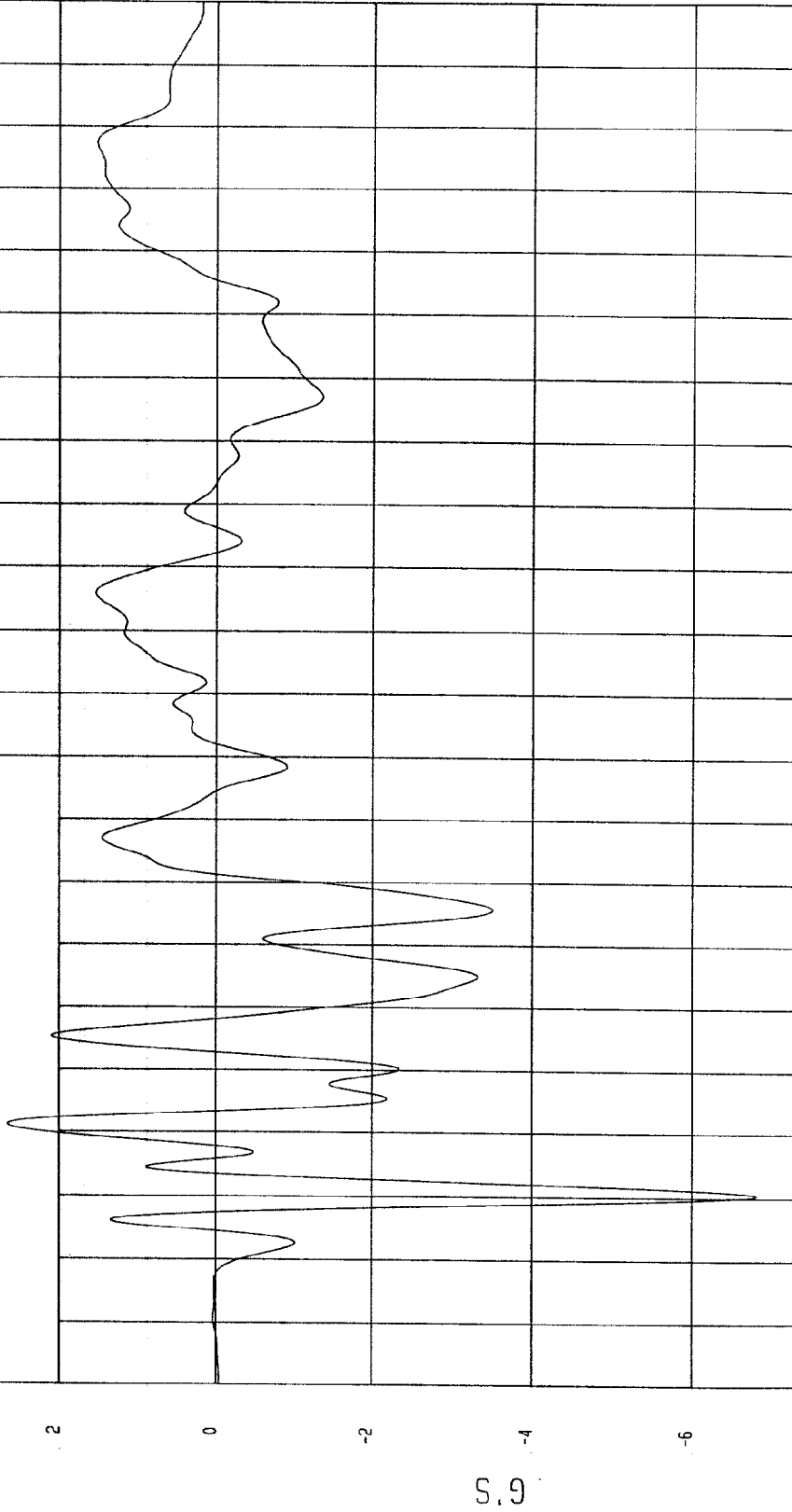
COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

Maximum = 2.65 G'S at 21 msec

Minimum = -6.81 G'S at 10 msec

RIGHT SIDE SILL AT REAR SEAT X ACCELERATION

1 _____ BS99007AF.A35 FilterClass (60)

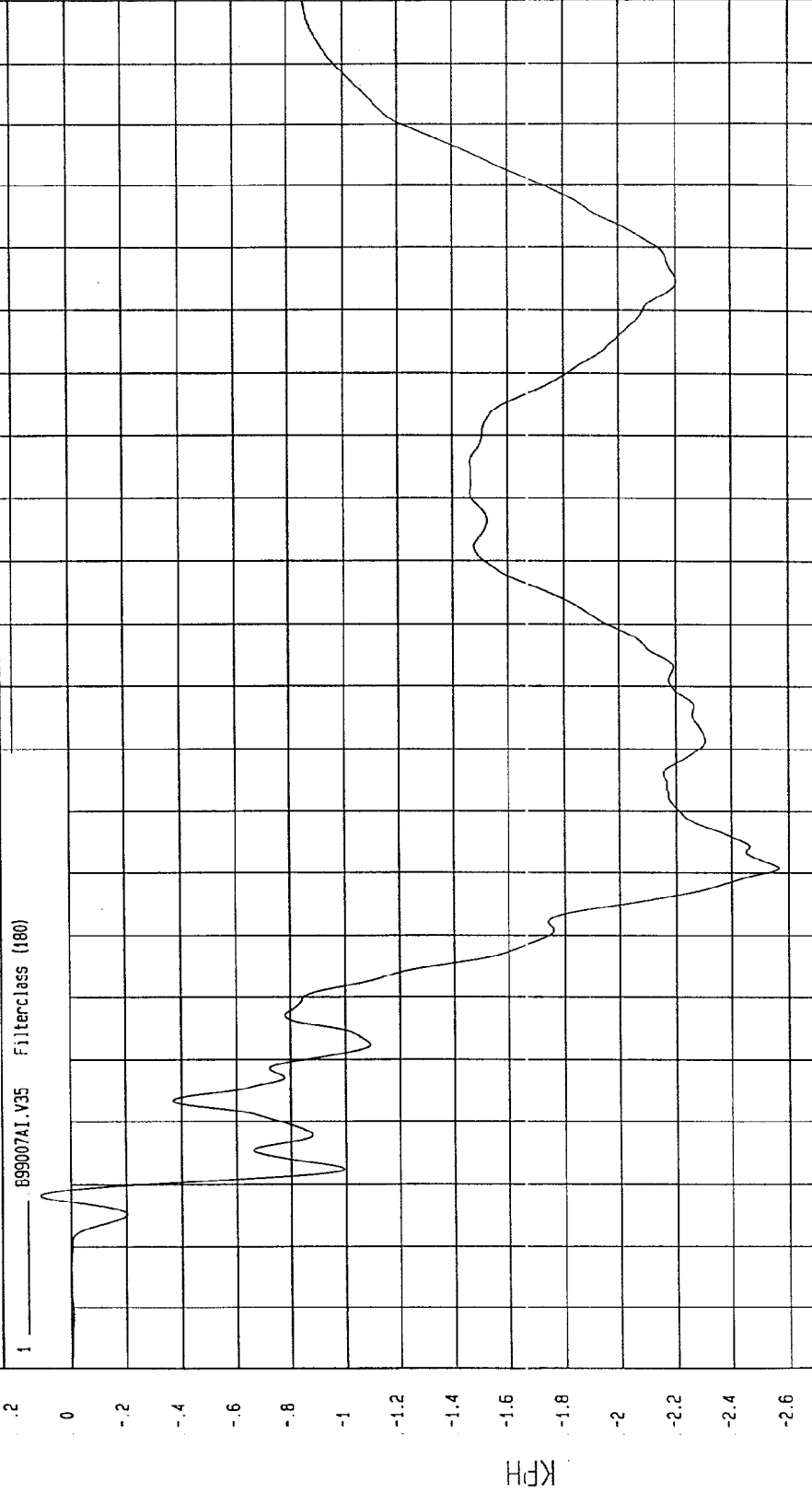


MSA Research
01-19-1999 16:00

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999
COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -2.57 KPH at 61 msec Maximum = .11 KPH at 8 msec

RIGHT SIDE SILL AT REAR SEAT X VELOCITY



TIME Seconds

WCA Research
01-19-1999 16:00

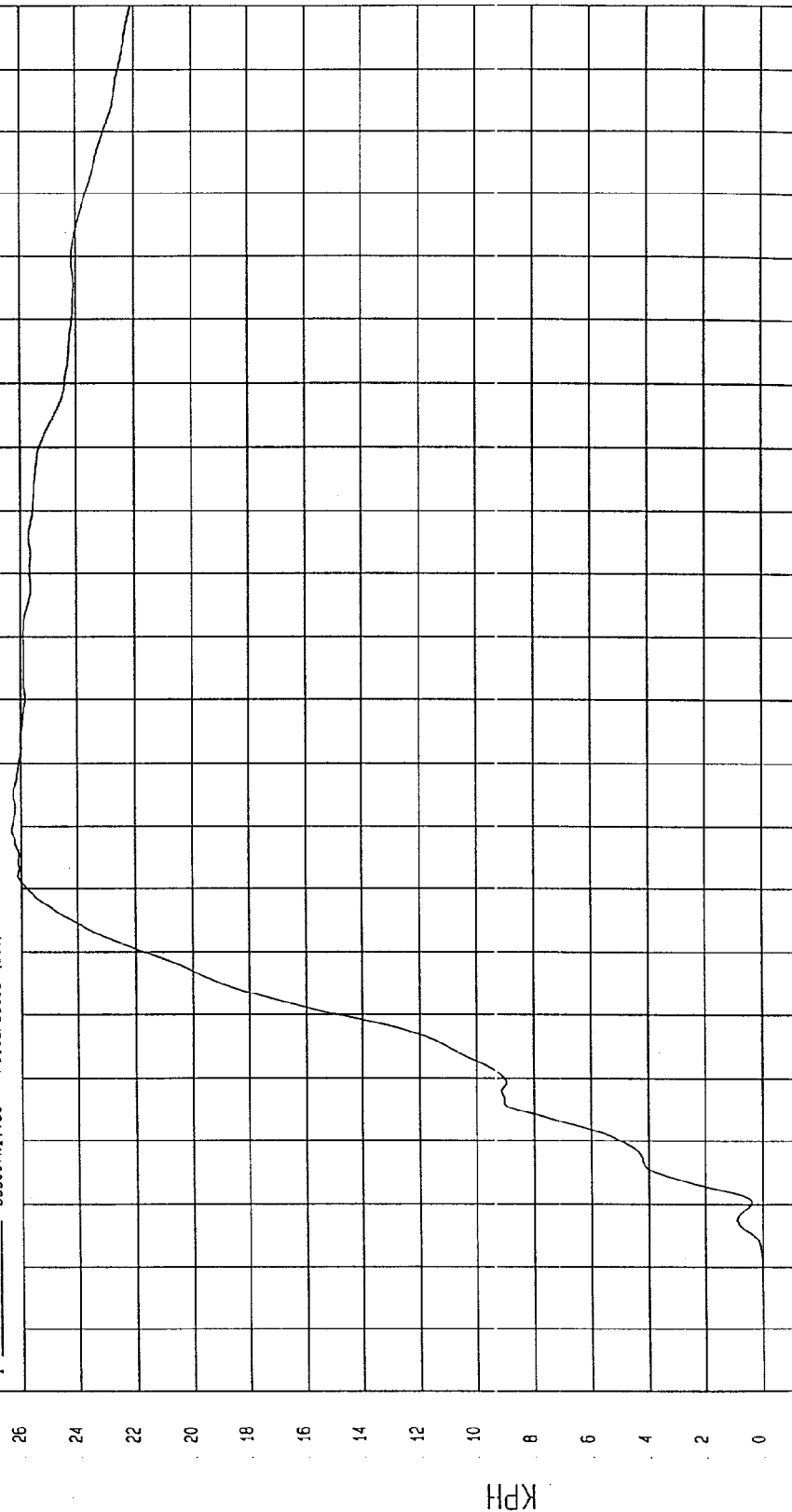
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = 0 KPH at -20 msec Maximum = 26.32 KPH at 69 msec

RIGHT SIDE SILL AT REAR SEAT Y VELOCITY

1 899007A1.V36 Filterclass (100)

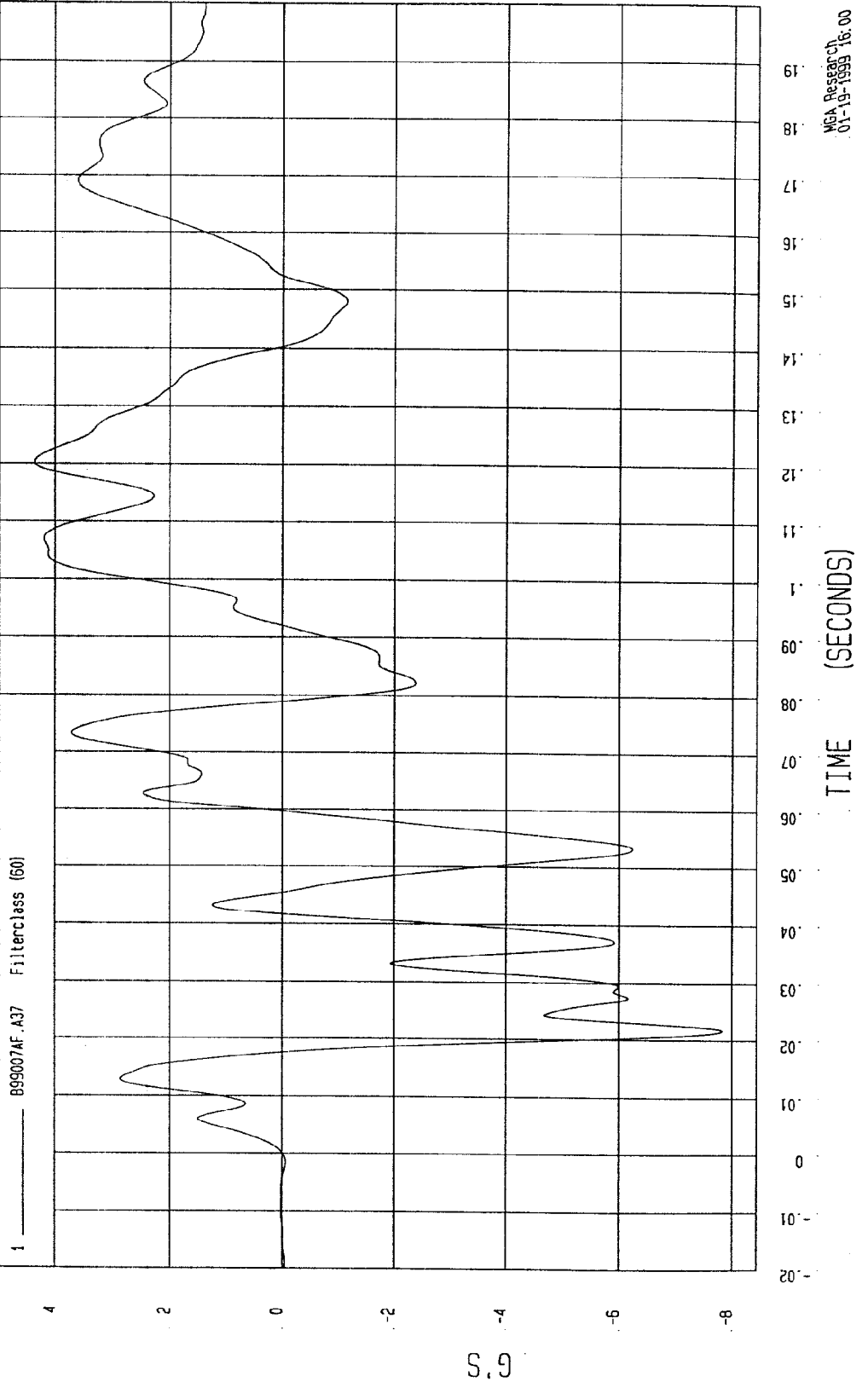


TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -7.83 G'S at 22 msec Maximum = 4.35 G'S at 120 msec

RIGHT SIDE SILL AT REAR SEAT Z ACCELERATION



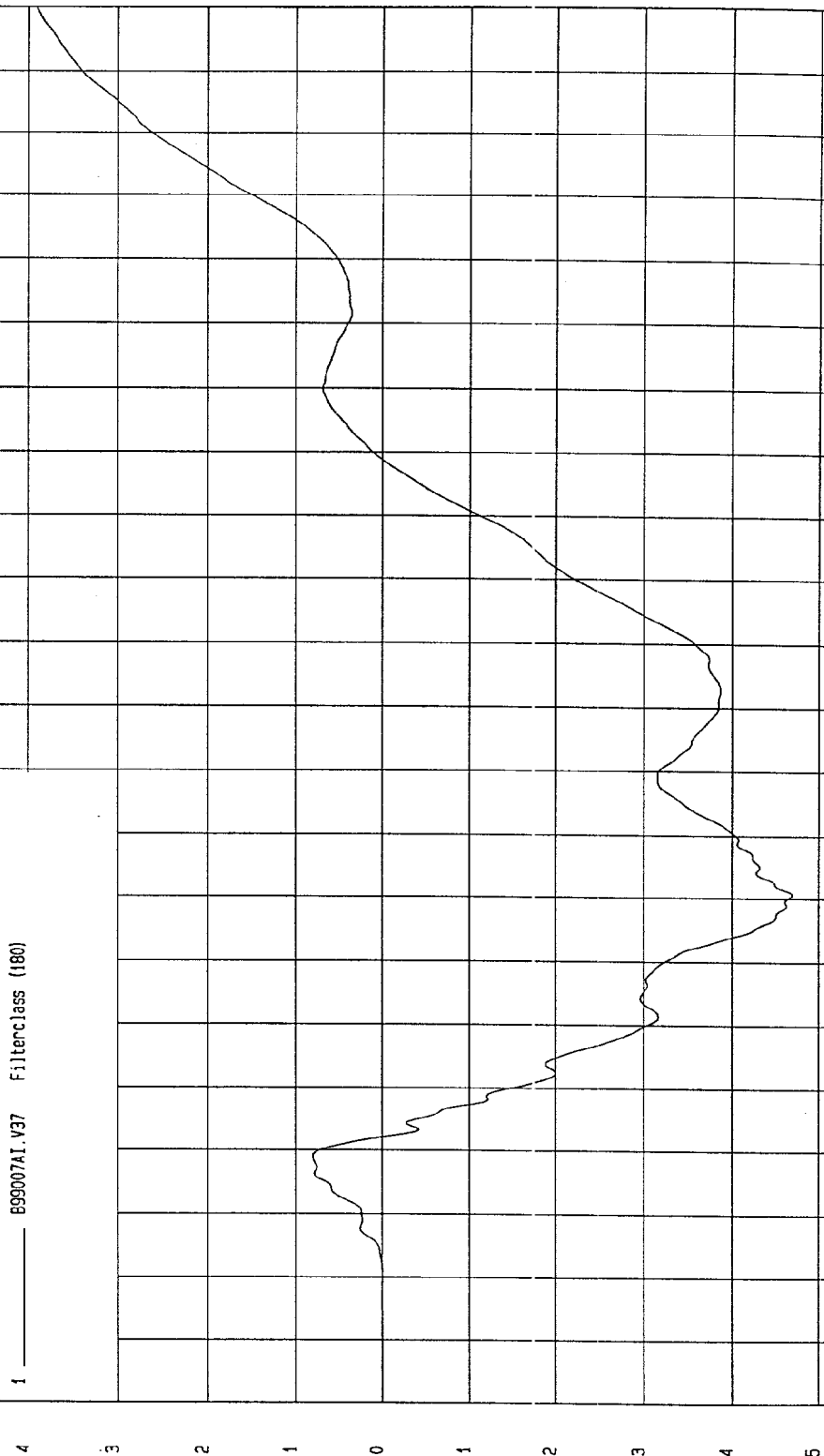
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -4.7 KPH at 61 msec Maximum = 3.91 KPH at 200 msec

RIGHT SIDE SILL AT REAR SEAT Z VELOCITY

1 ——— B99007A1.V37 Filterclass (180)



TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

Speed: 38.22 MPH 61.5 KPH

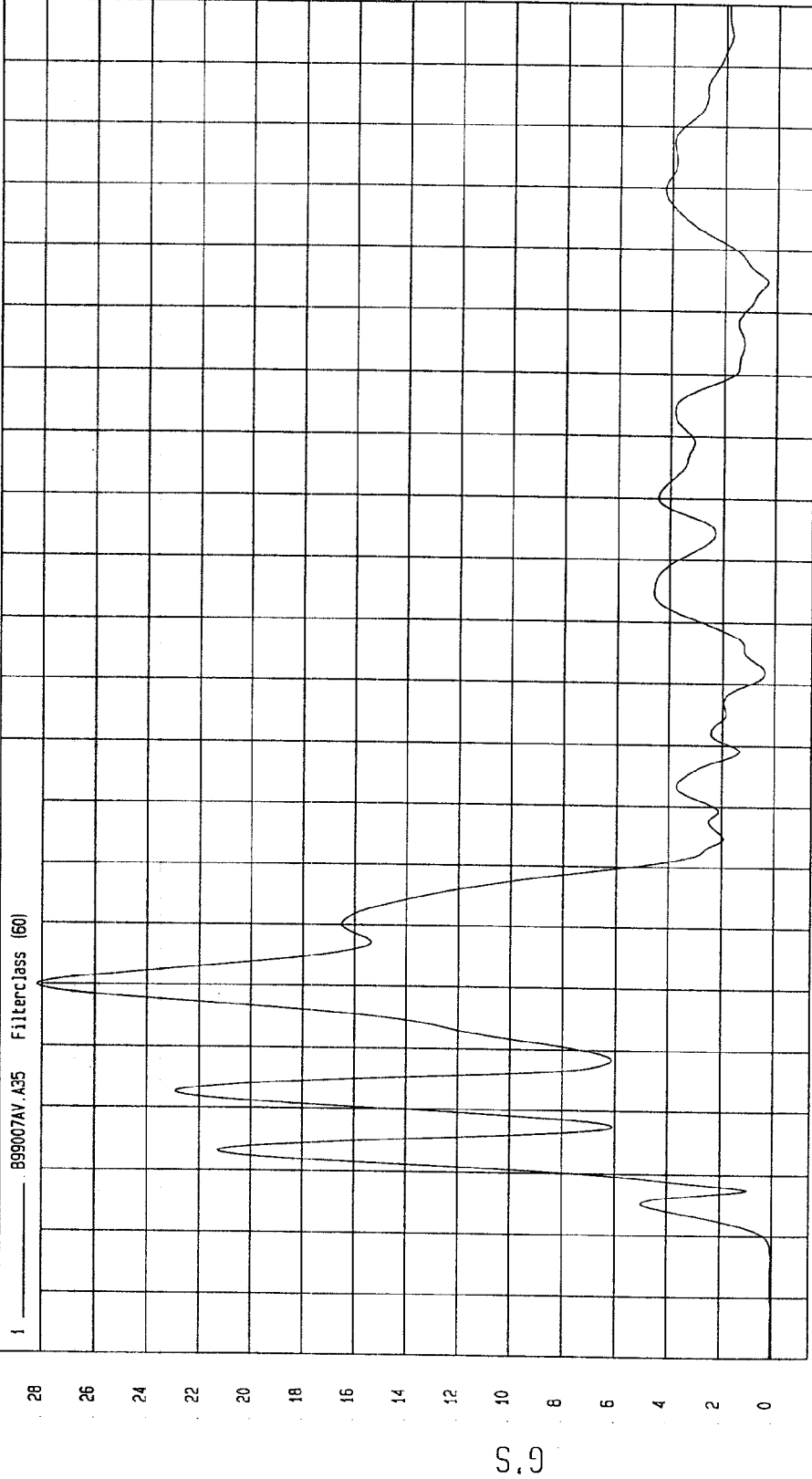
COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

Maximum = 28.19 G'S at 40 msec

Minimum = 1.67E-02 G'S at -12 msec

RIGHT SIDE SILL AT REAR SEAT RESULTANT ACCELERATION

1 B99007AV.A35 Filterclass (60)

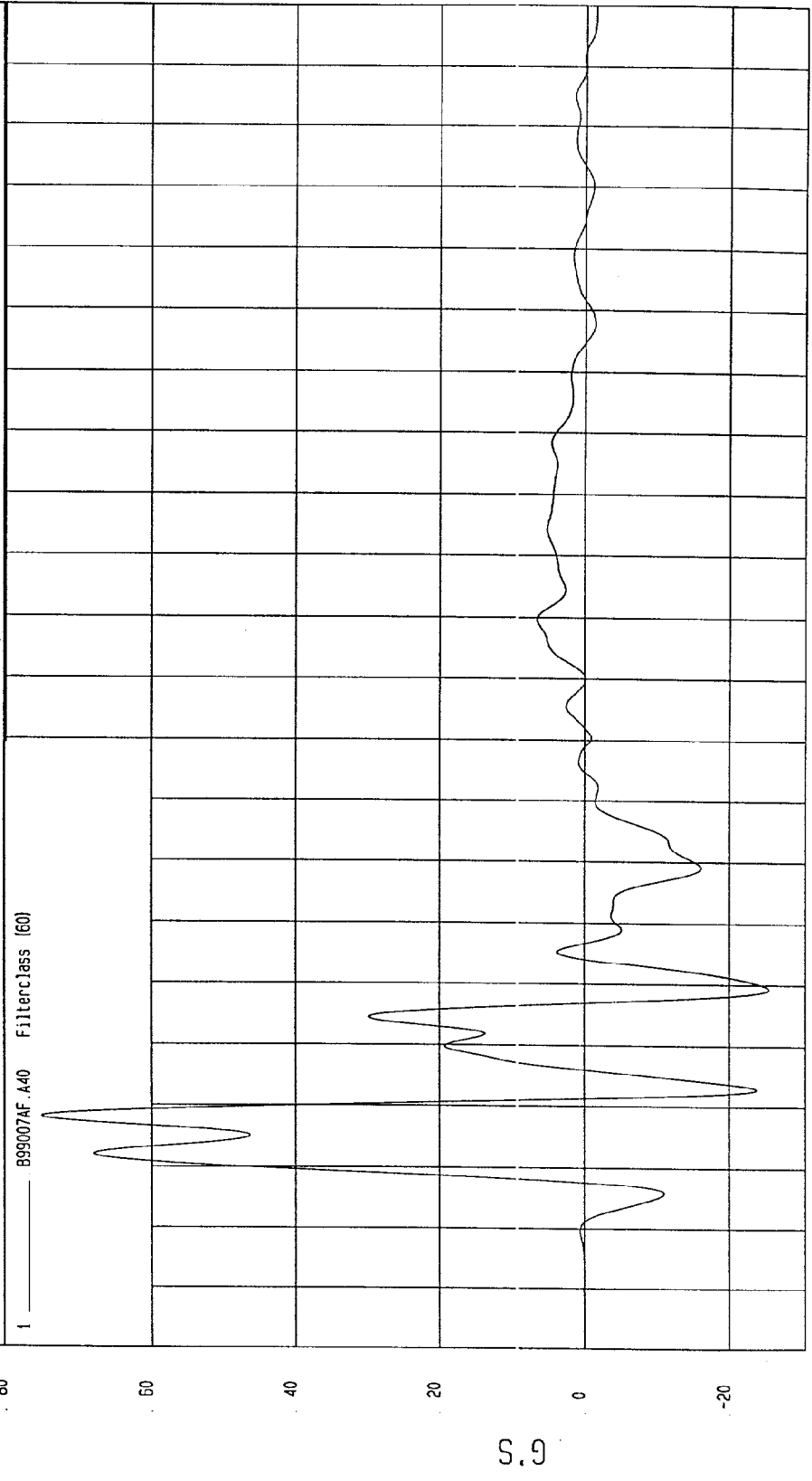


TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -25.41 G'S at 39 msec Maximum = 75.19 G'S at 18 msec

DRIVER SEAT TRACK Y ACCELERATION



TIME (SECONDS)

WCA Research
01-19-1999 16:00

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

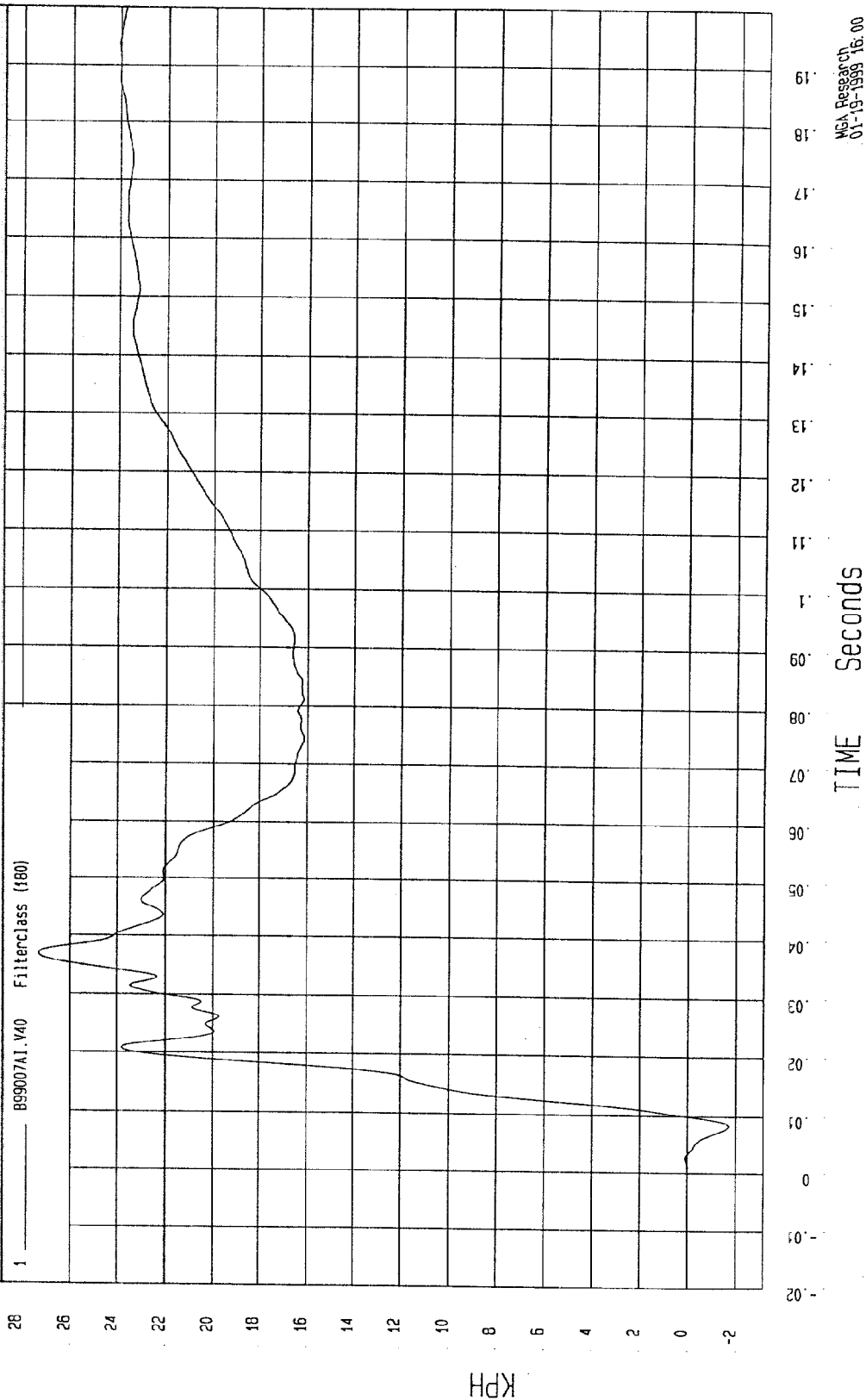
SPEED: 38.22 MPH 61.5 KPH

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

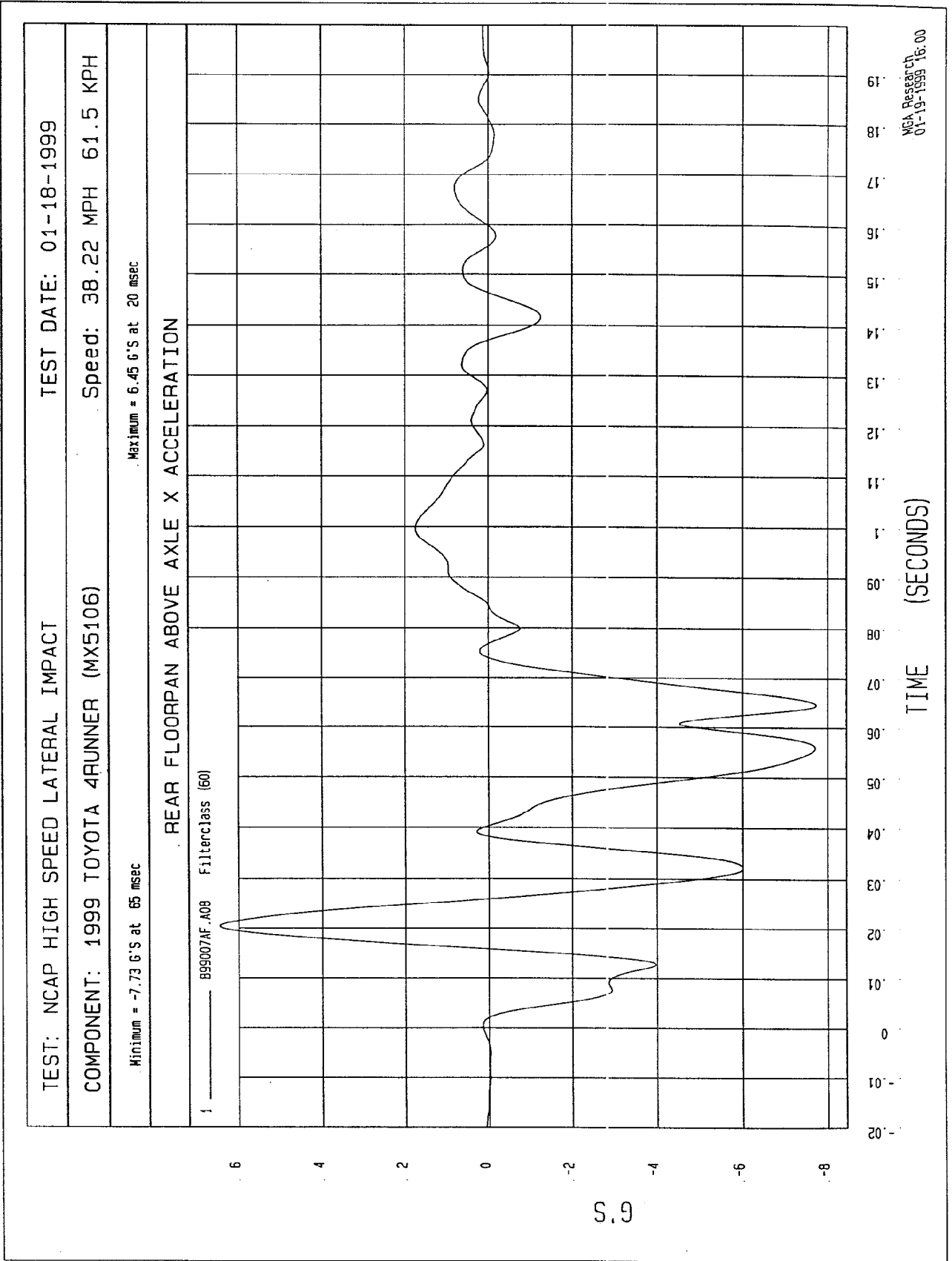
Minimum = -1.71 KPH at 8 msec

Maximum = 27.33 KPH at 37 msec

DRIVER SEAT TRACK Y VELOCITY



MCA Research
01-19-1999 16:00



TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

Speed: 38.22 MPH 61.5 KPH

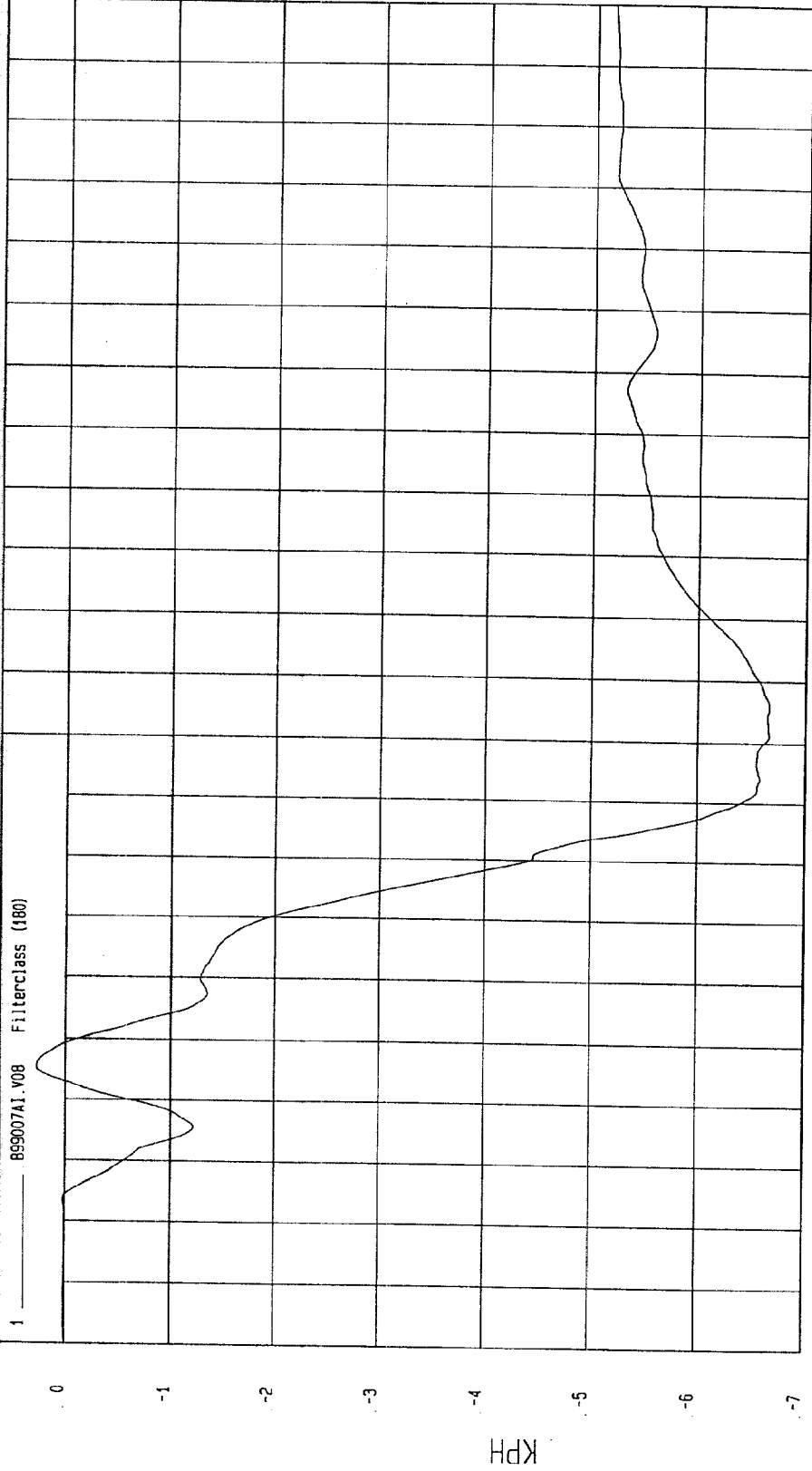
COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

Minimum = -6.66 KPH at 86 msec

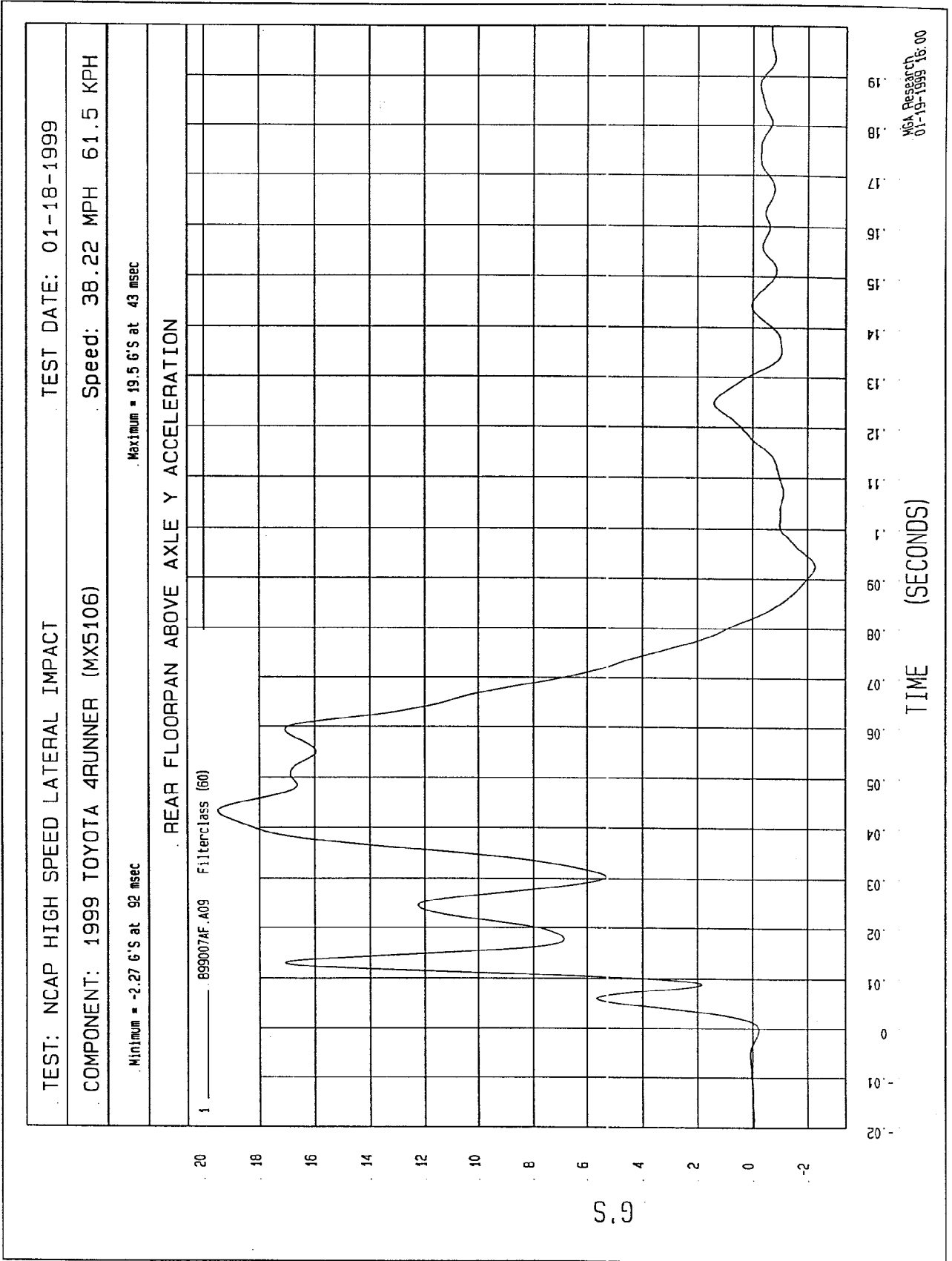
Maximum = .27 KPH at 25 msec

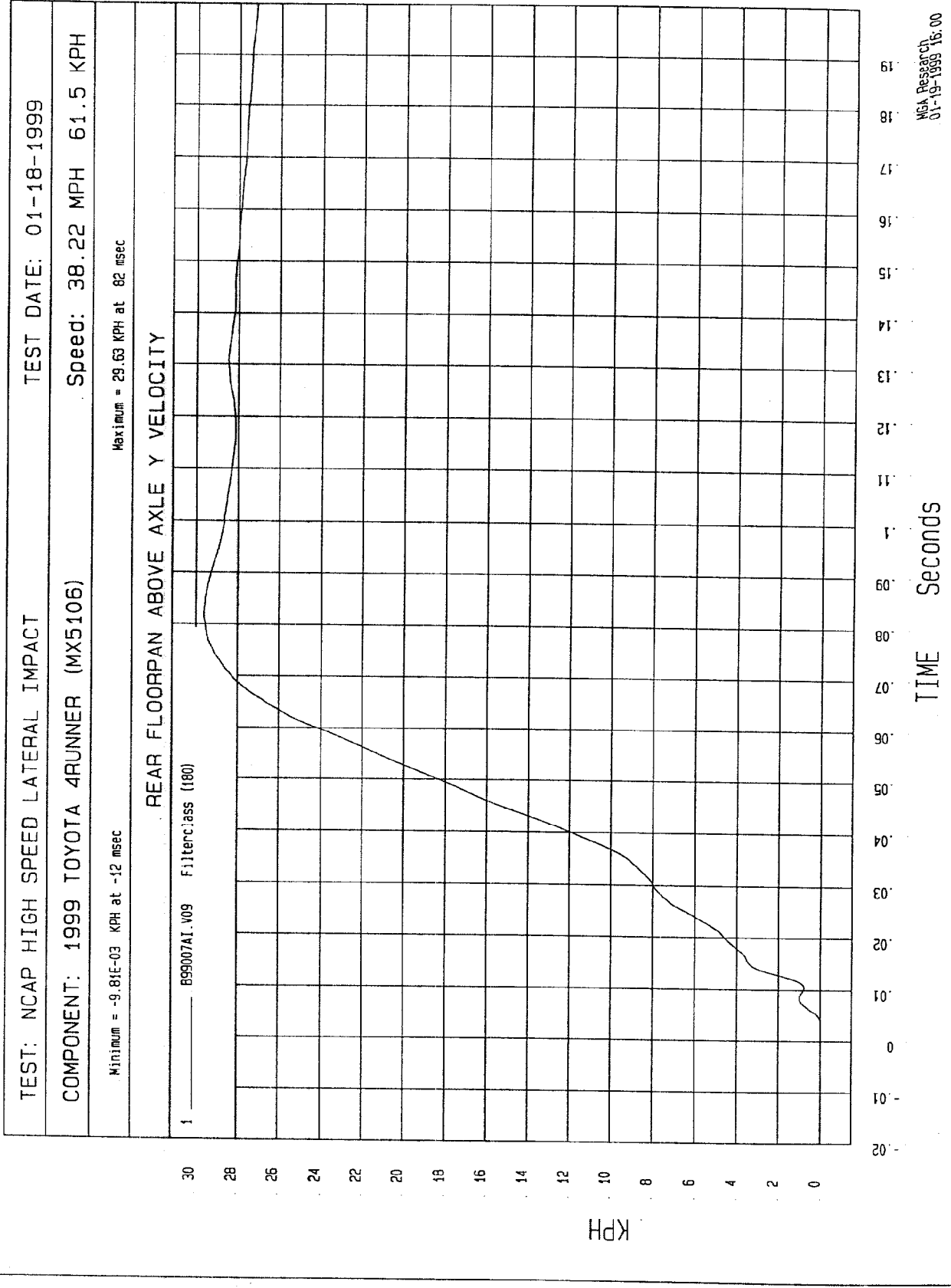
REAR FLOORPAN ABOVE AXLE X VELOCITY

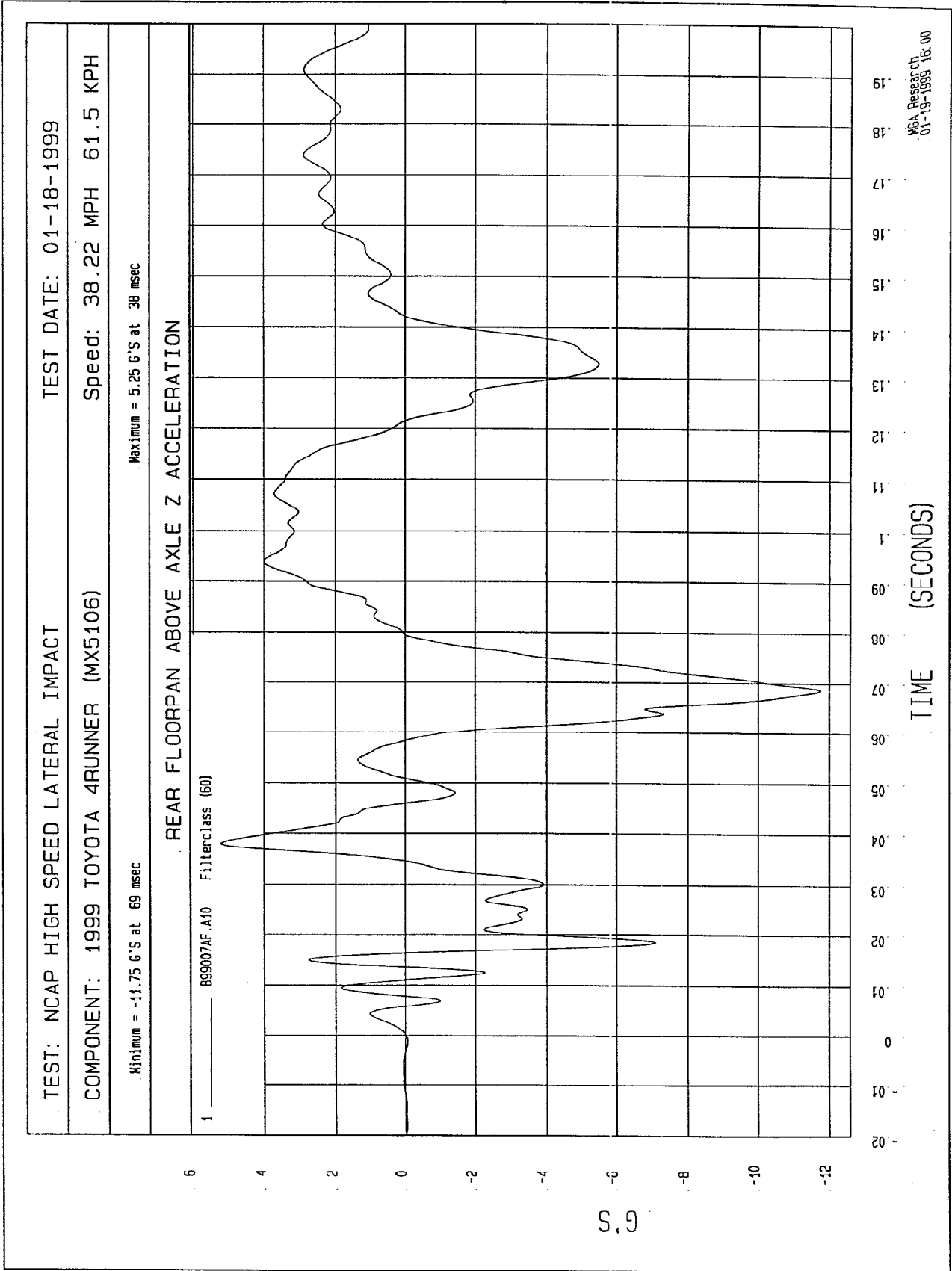
1 899007A1.V08 Filterclass (180)



MGA Research
01-19-1999 15:00







TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

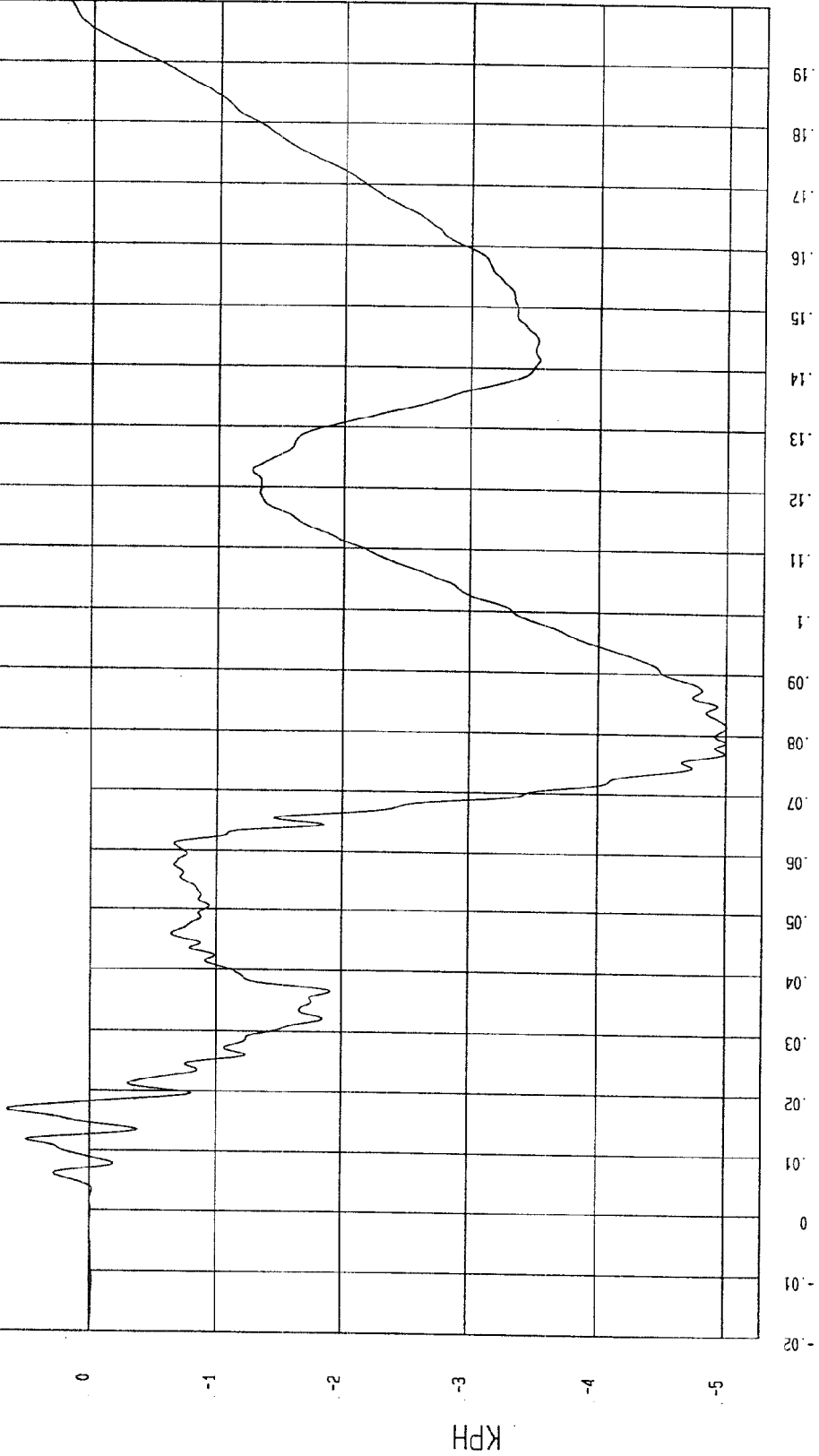
Speed: 38.22 MPH 61.5 KPH

Minimum = -5 KPH at 61 msec

Maximum = .65 KPH at 17 msec

REAR FLOORPAN ABOVE AXLE Z VELOCITY

1 — 899007A1.V10 Filterclass (180)

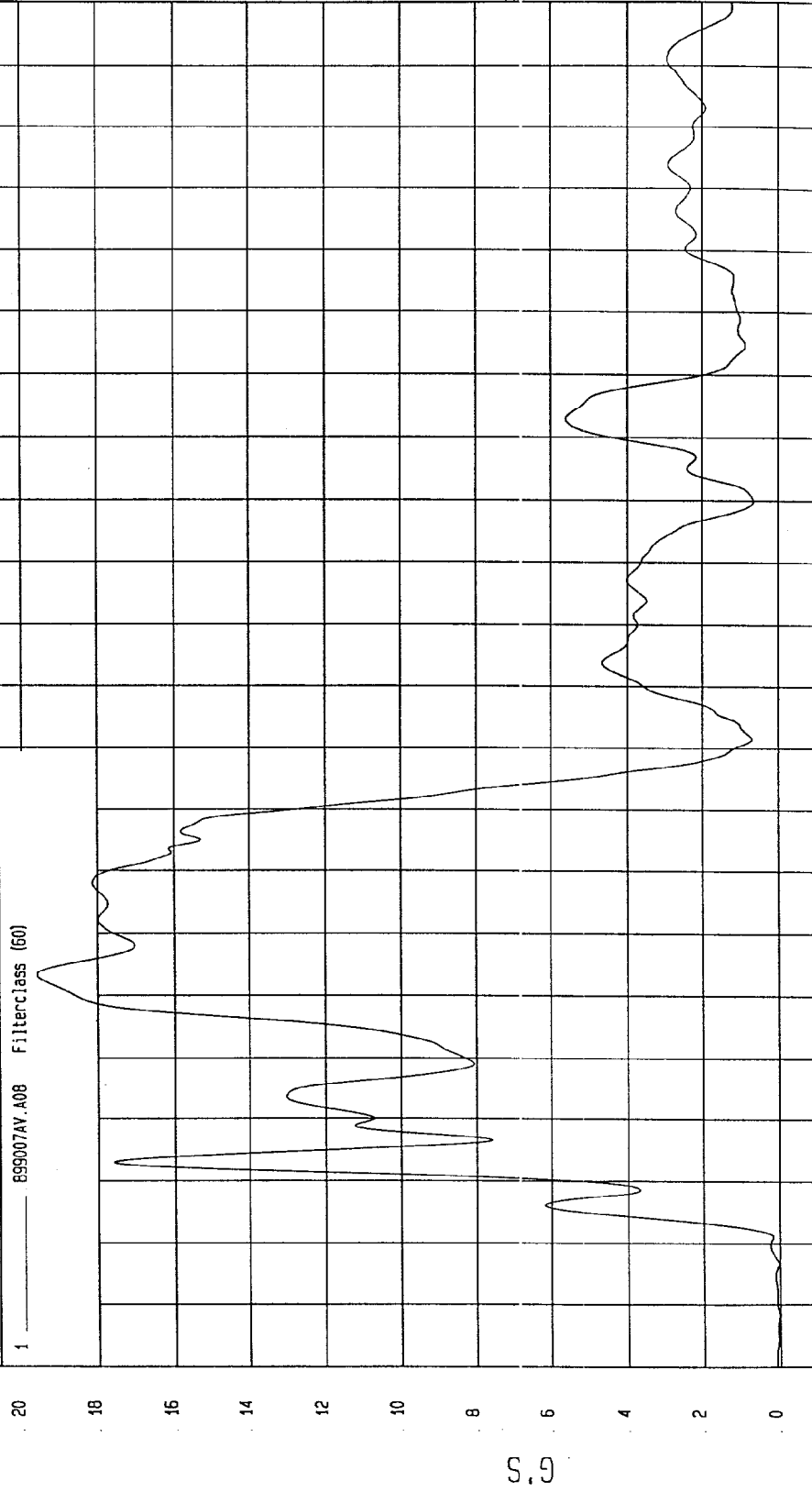


TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = 5.12E-03 G'S at -3 msec Maximum = 19.6 G'S at 43 msec

REAR FLOORPAN ABOVE AXLE RESULTANT ACCELERATION



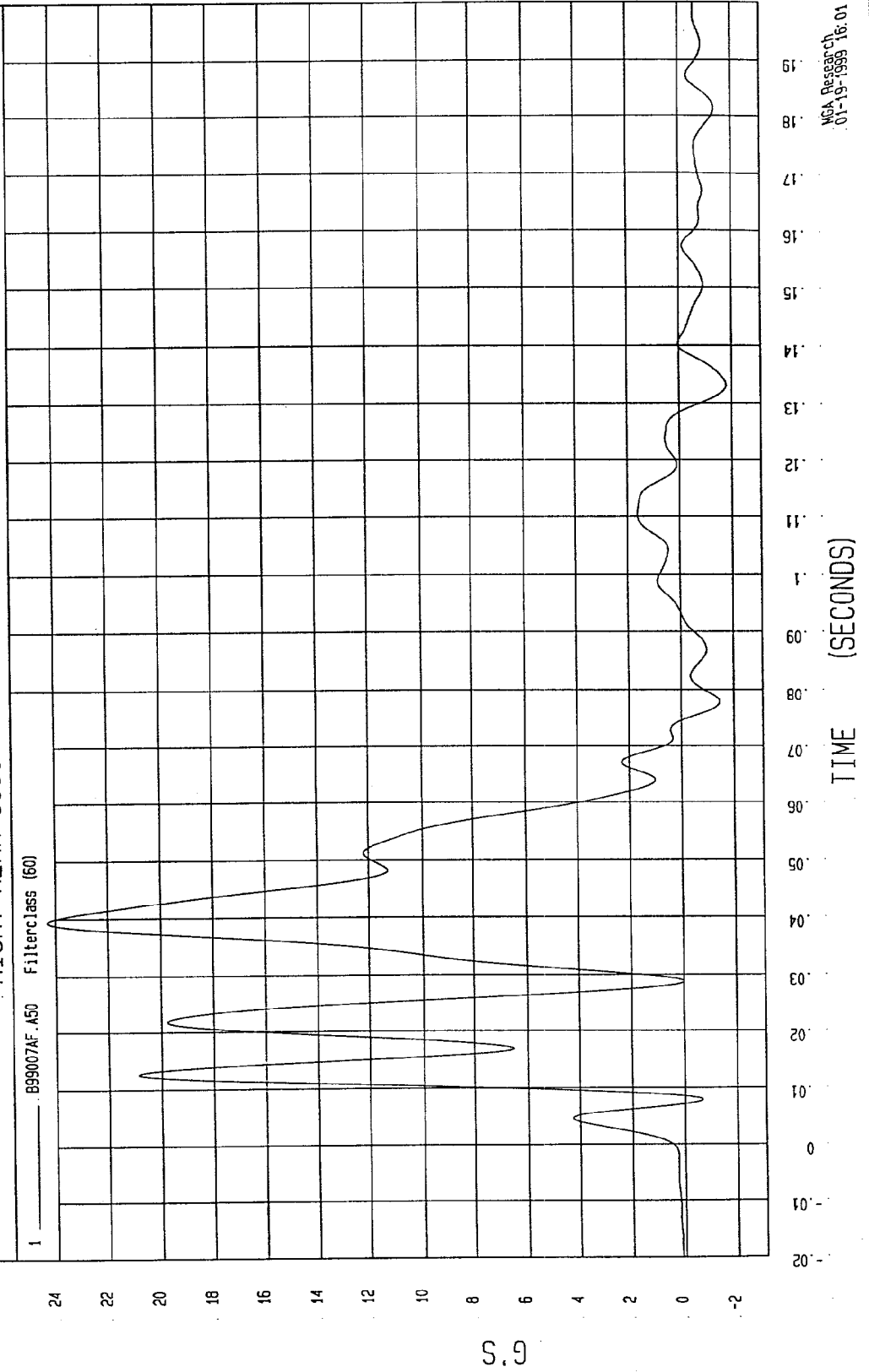
NCA Research
01-19-1999 16:01

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -1.8 G'S at 133 msec Maximum = 24.32 G'S at 39 msec

RIGHT REAR OCCUPANT COMPARTMENT Y ACCELERATION

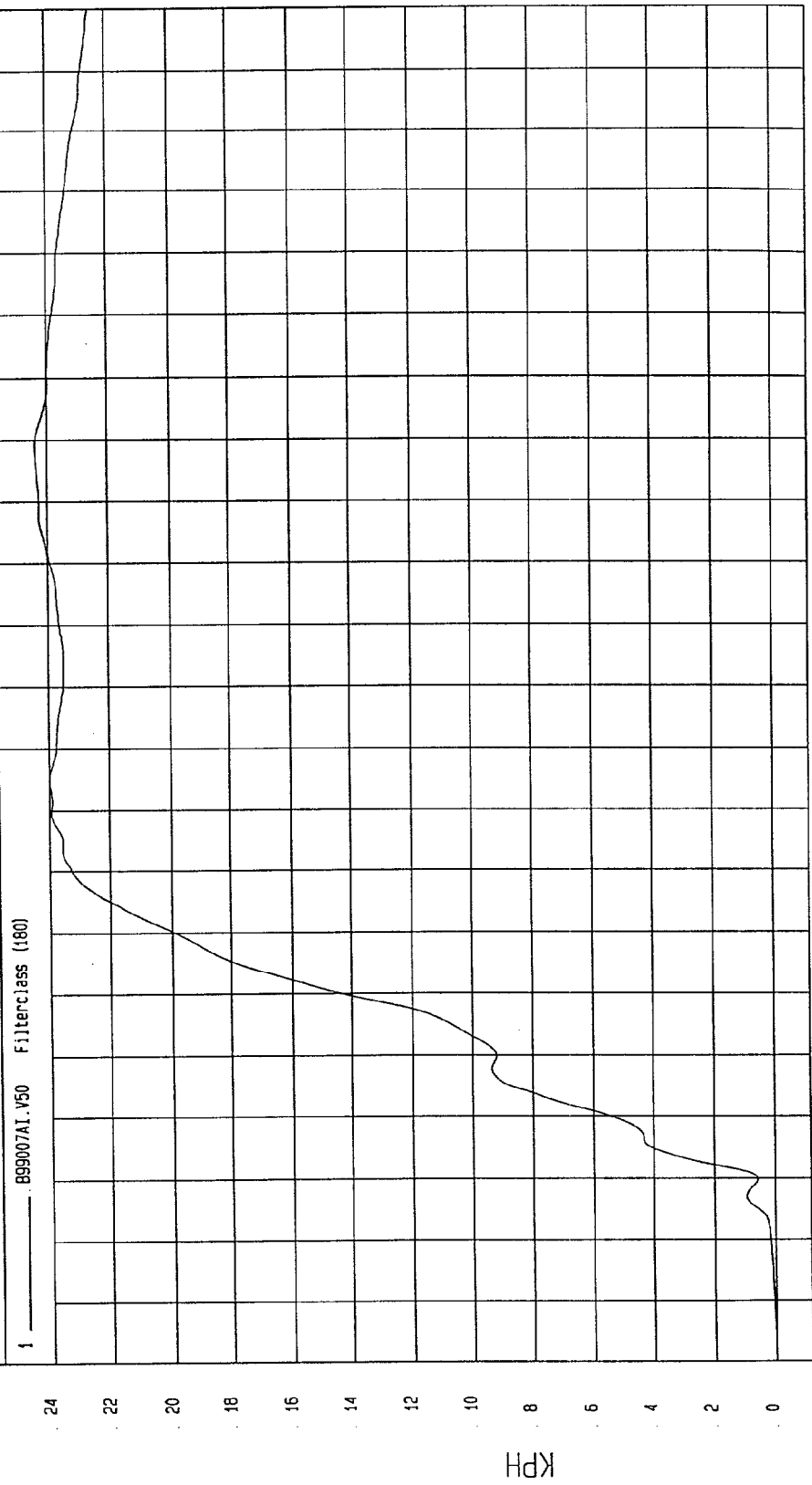


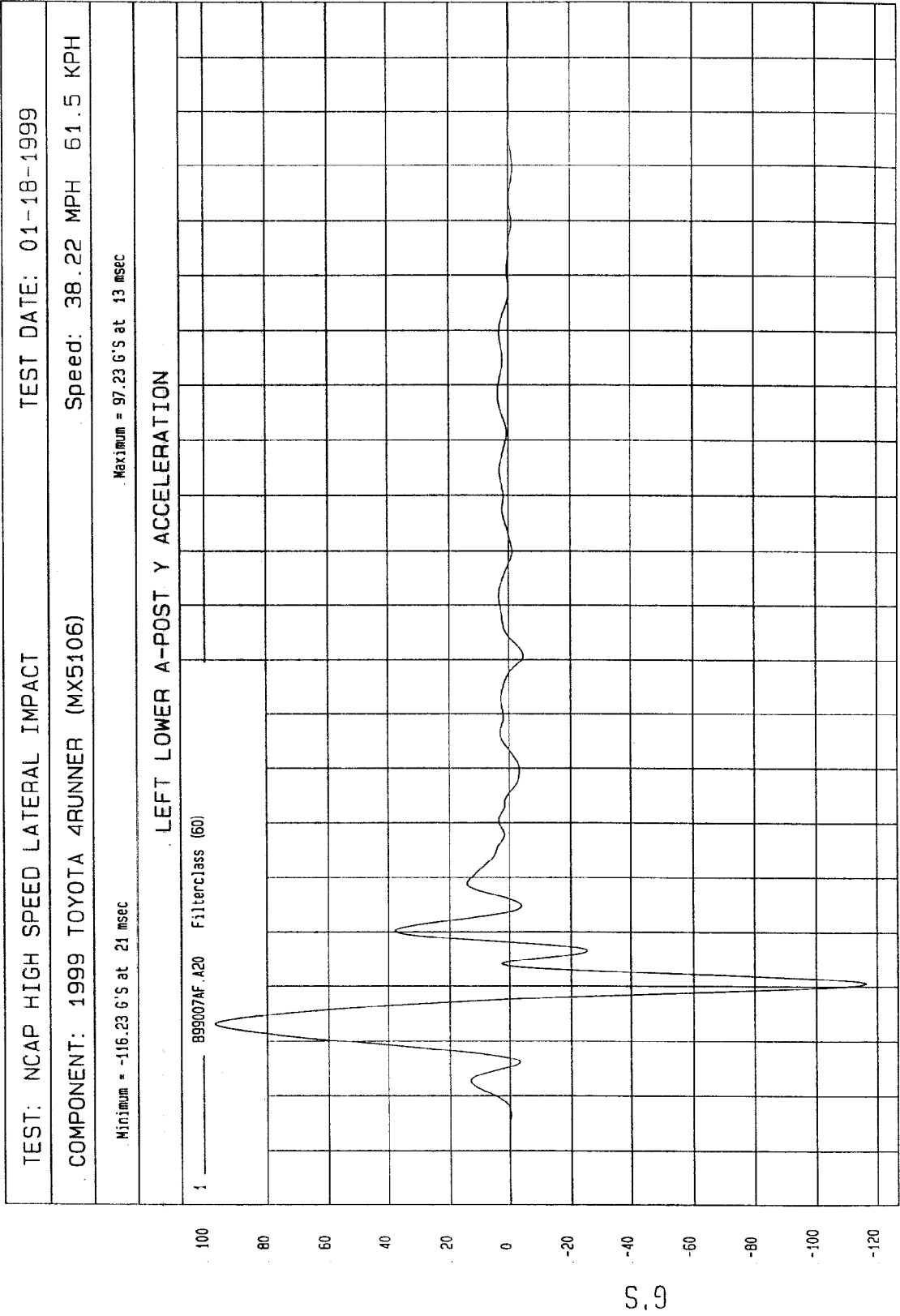
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = 0 KPH at -20 msec Maximum = 24.42 KPH at 129 msec

RIGHT REAR OCCUPANT COMPARTMENT Y VELOCITY





WCA Research
01-19-1999 16:01

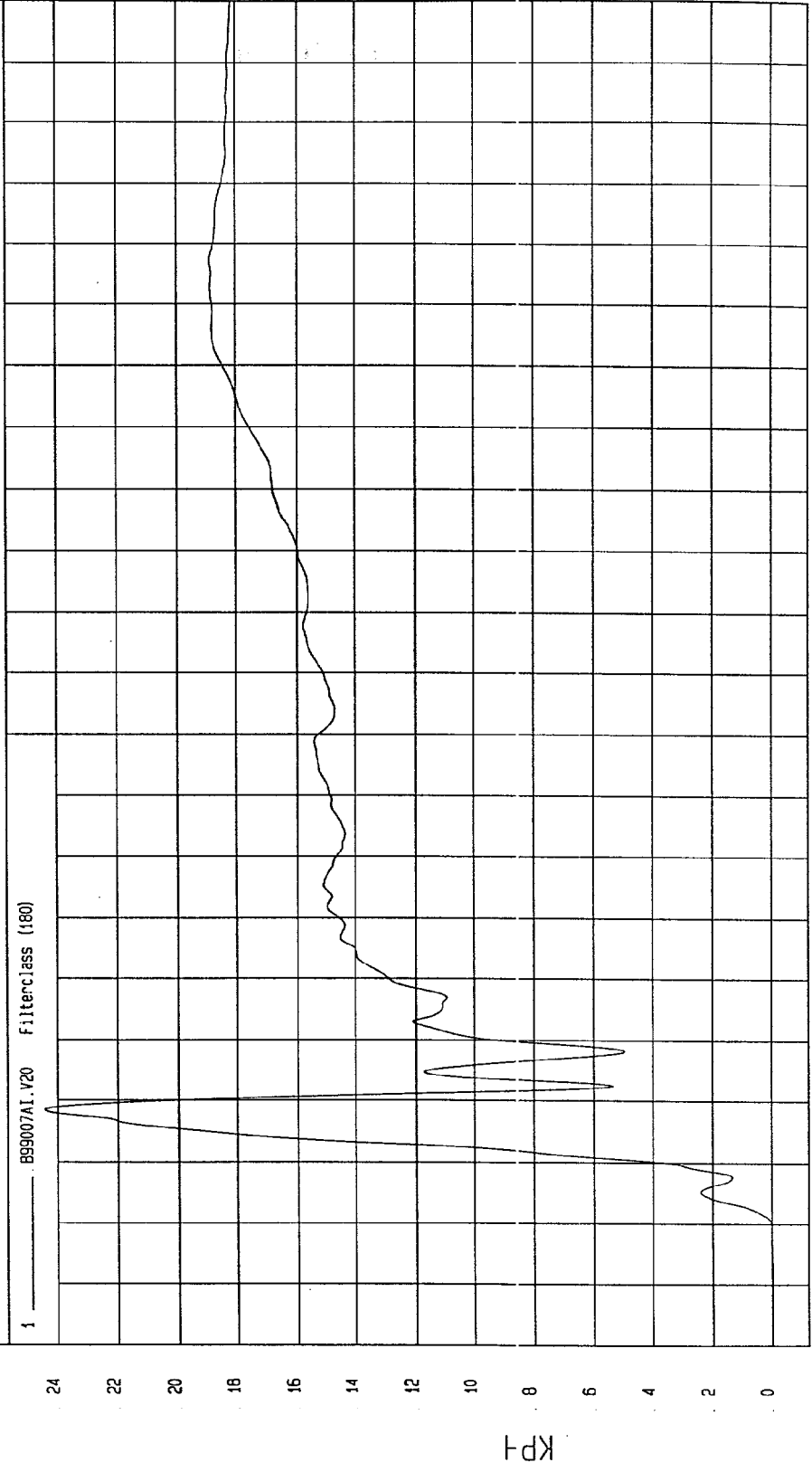
TIME (SECONDS)

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -2.86E-02 KPH at -12 msec Maximum = 24.43 KPH at 18 msec

LEFT LOWER A-POST Y VELOCITY



TIME Seconds

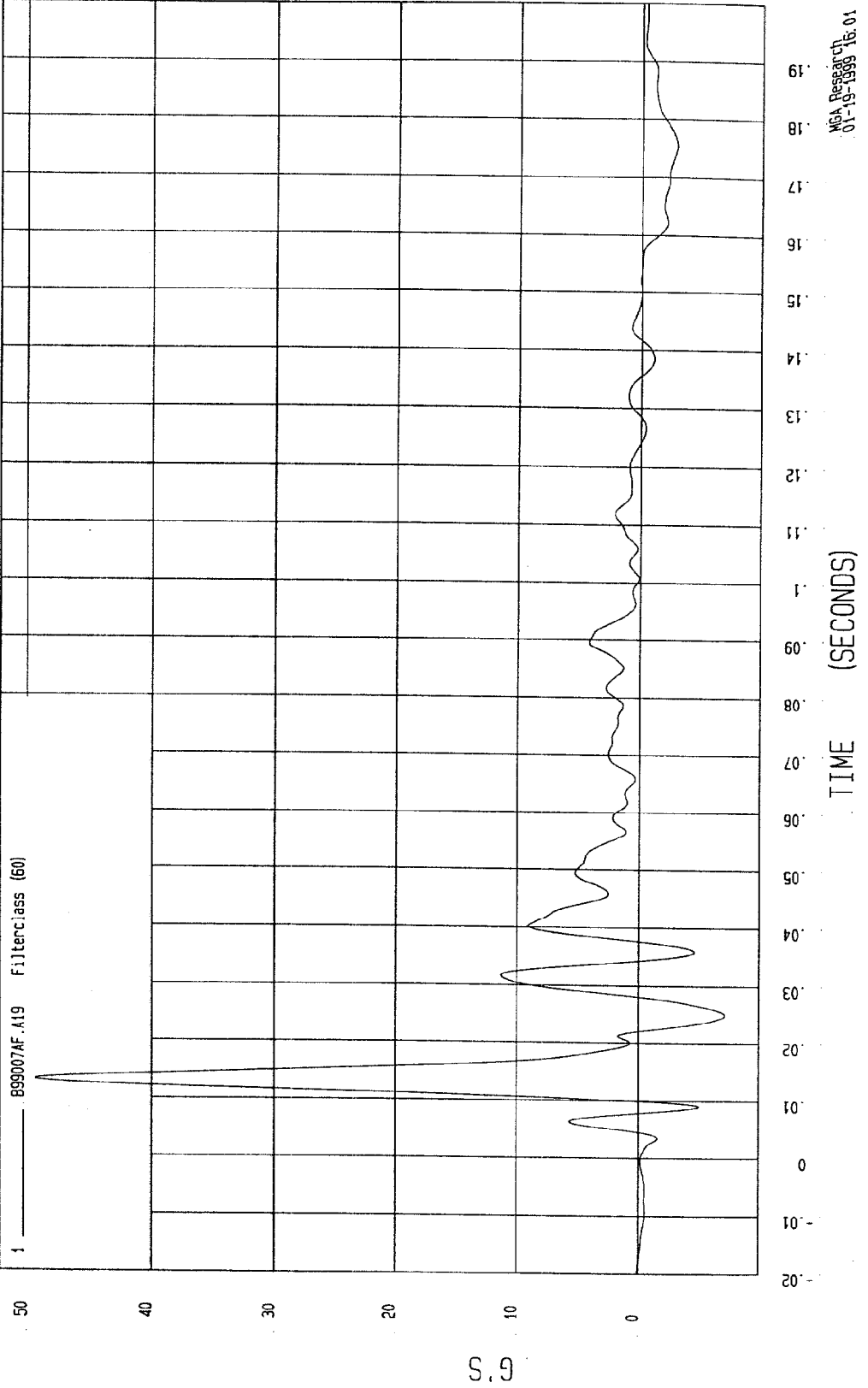
NCI Research
01-19-1999 16:01

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -7.06 G'S at 25 msec Maximum = 49.32 G'S at 13 msec

LEFT MID A-POST Y ACCELERATION



TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

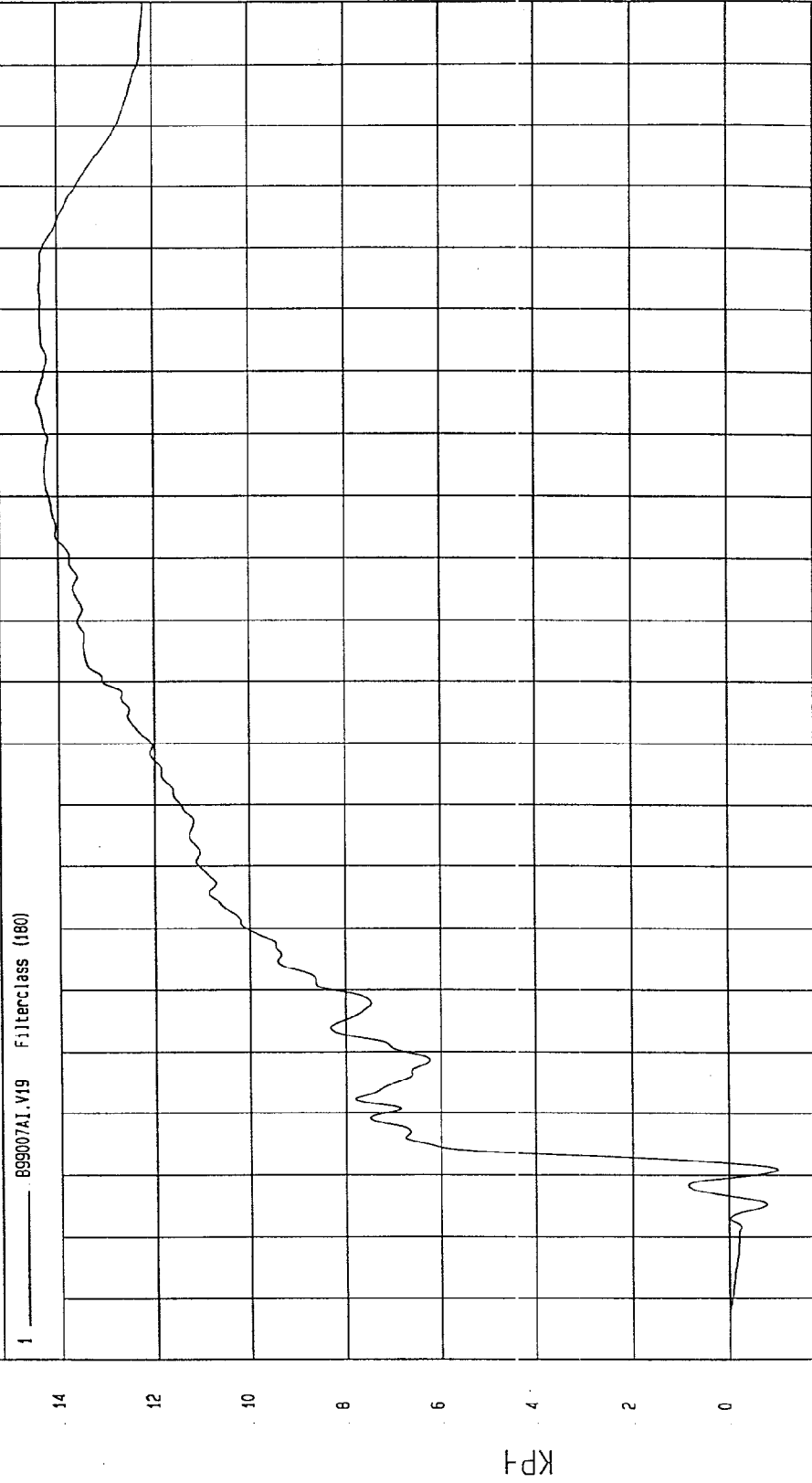
Speed: 38.22 MPH 61.5 KPH

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

Maximum = 14.45 KPH at 136 msec

Minimum = -1.02 KPH at 11 msec

LEFT MID A-POST Y VELOCITY



WCA Research
01-19-1999 16:01

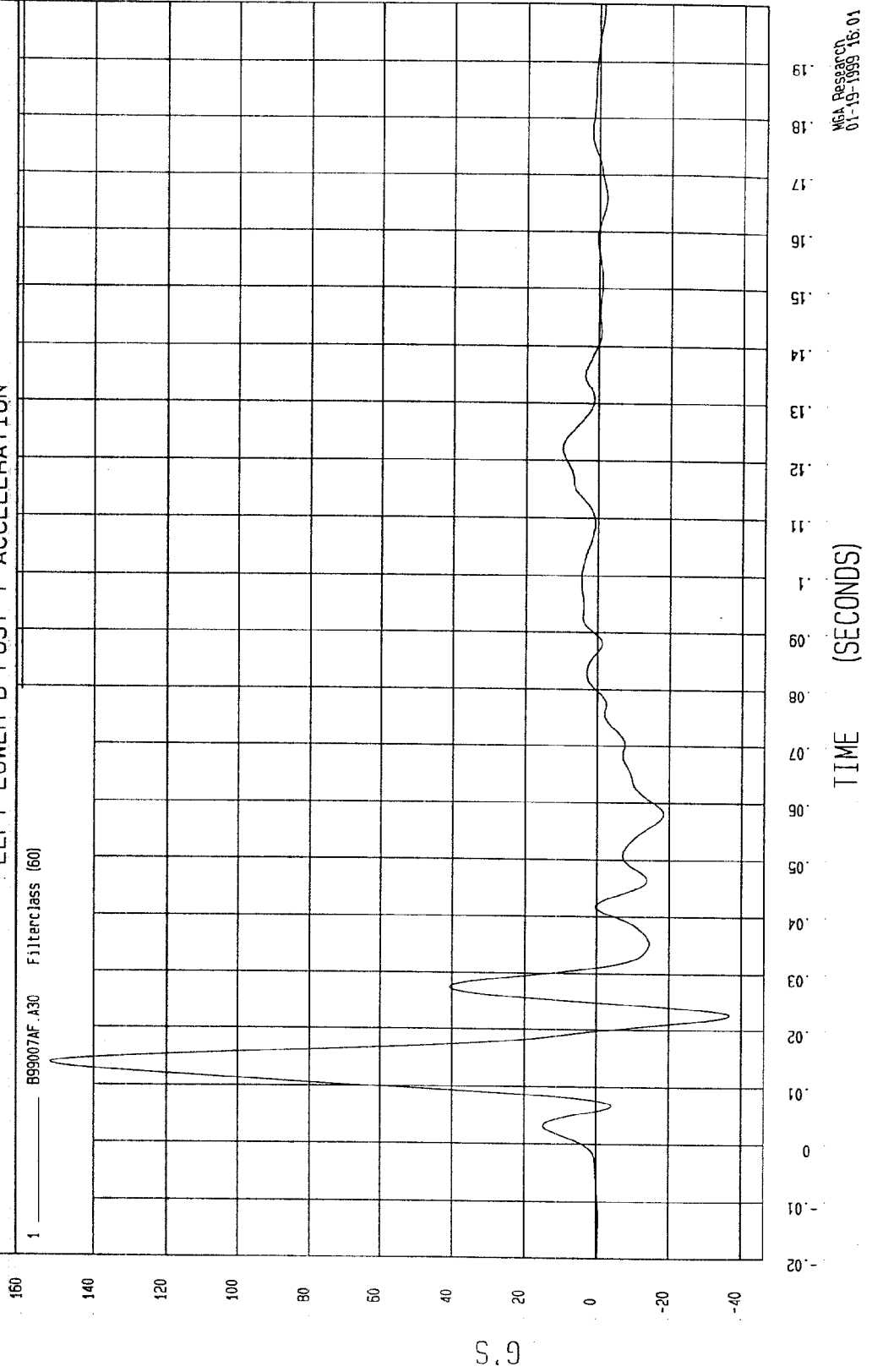
TIME Seconds

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -36.79 G'S at 23 msec Maximum = 152.14 G'S at 14 msec

LEFT LOWER B-POST Y ACCELERATION

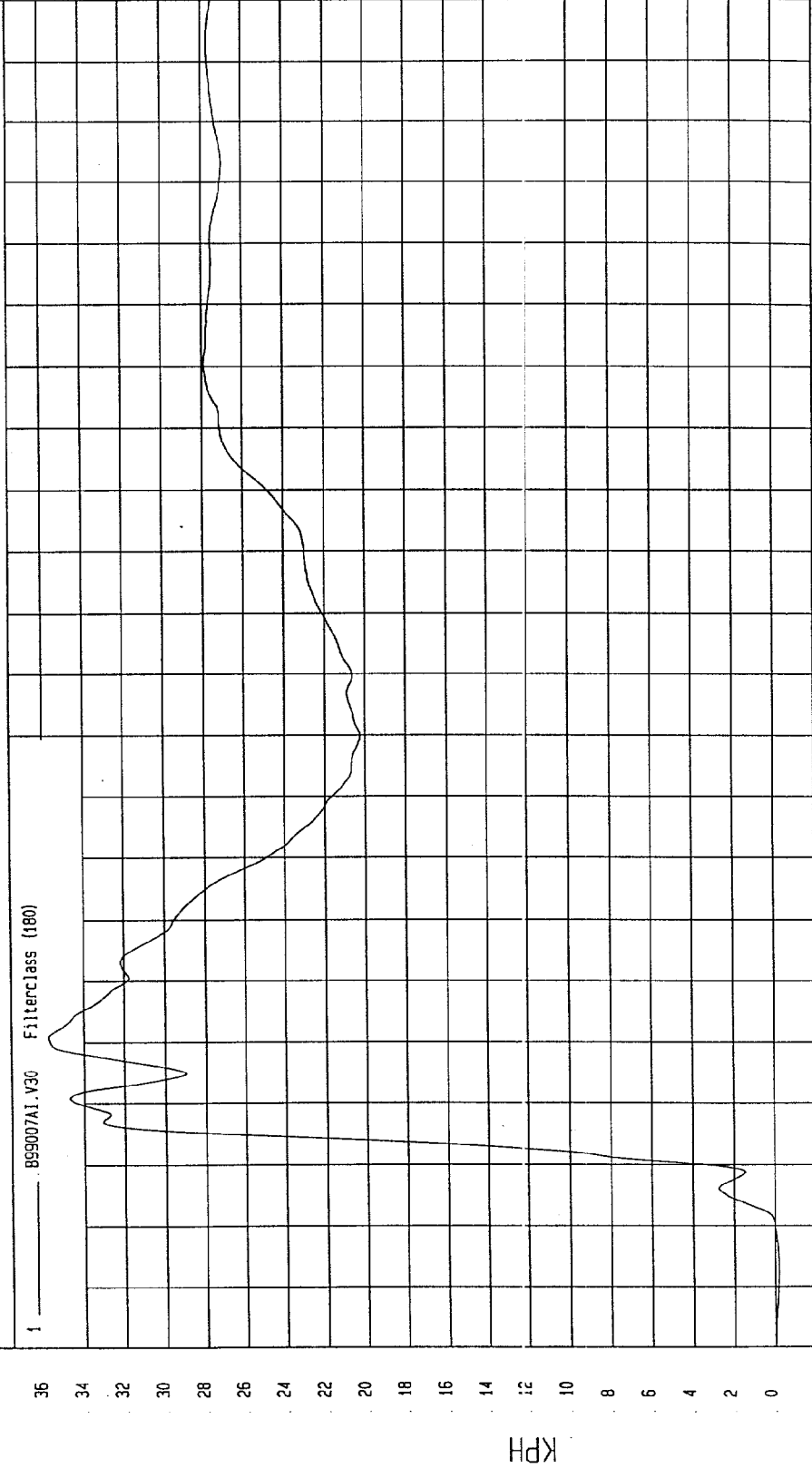


TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -.18 KPH at -.7 msec Maximum = 35.75 KPH at 31 msec

LEFT LOWER B-POST Y VELOCITY



TIME Seconds

WCA Research
01-19-1999 16:01

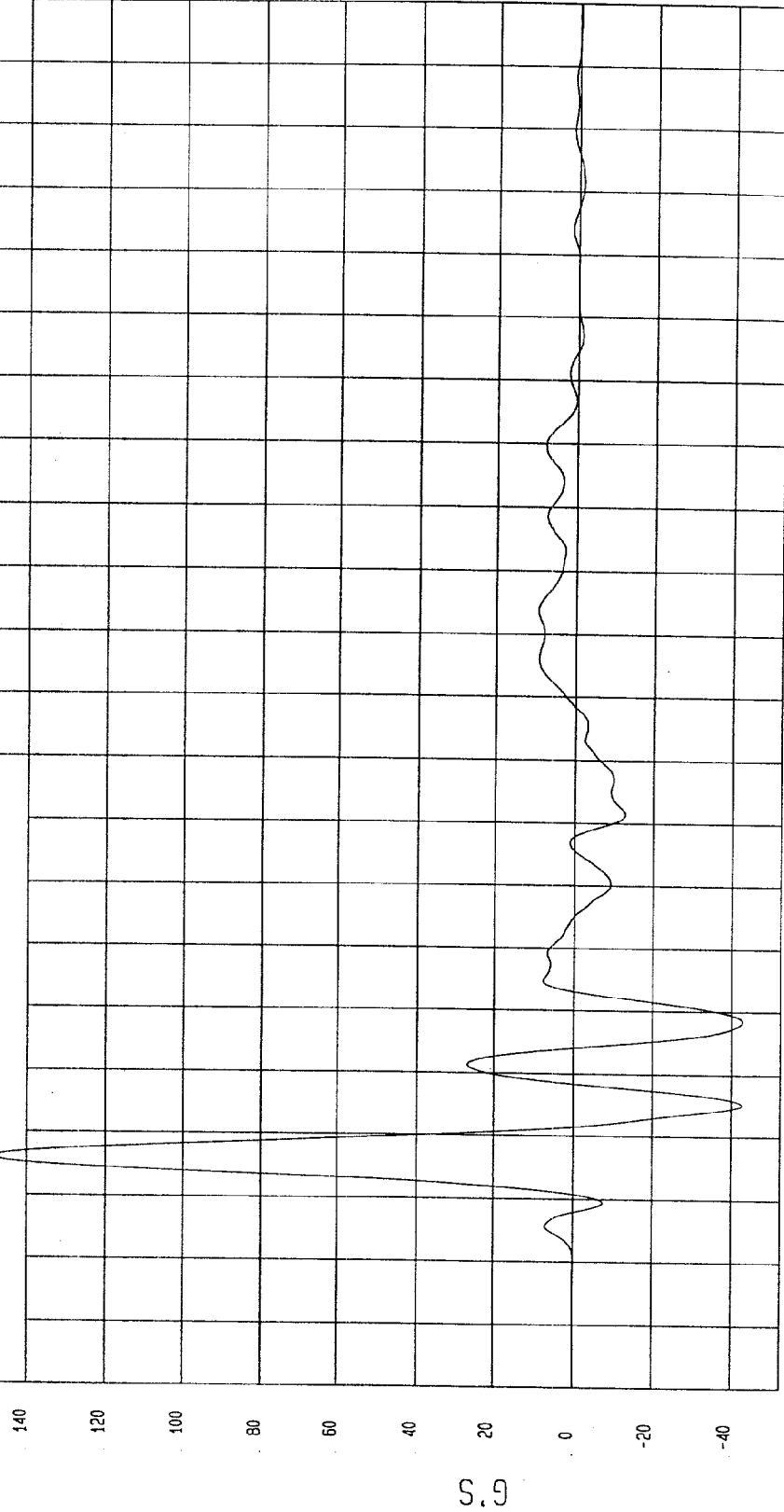
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -42.83 G'S at 38 msec Maximum = 149.06 G'S at 16 msec

LEFT MID B-POST Y ACCELERATION

1 ——— 899007AF.A29 Filterclass (60)



NSA Research
01-19-1999 16:01

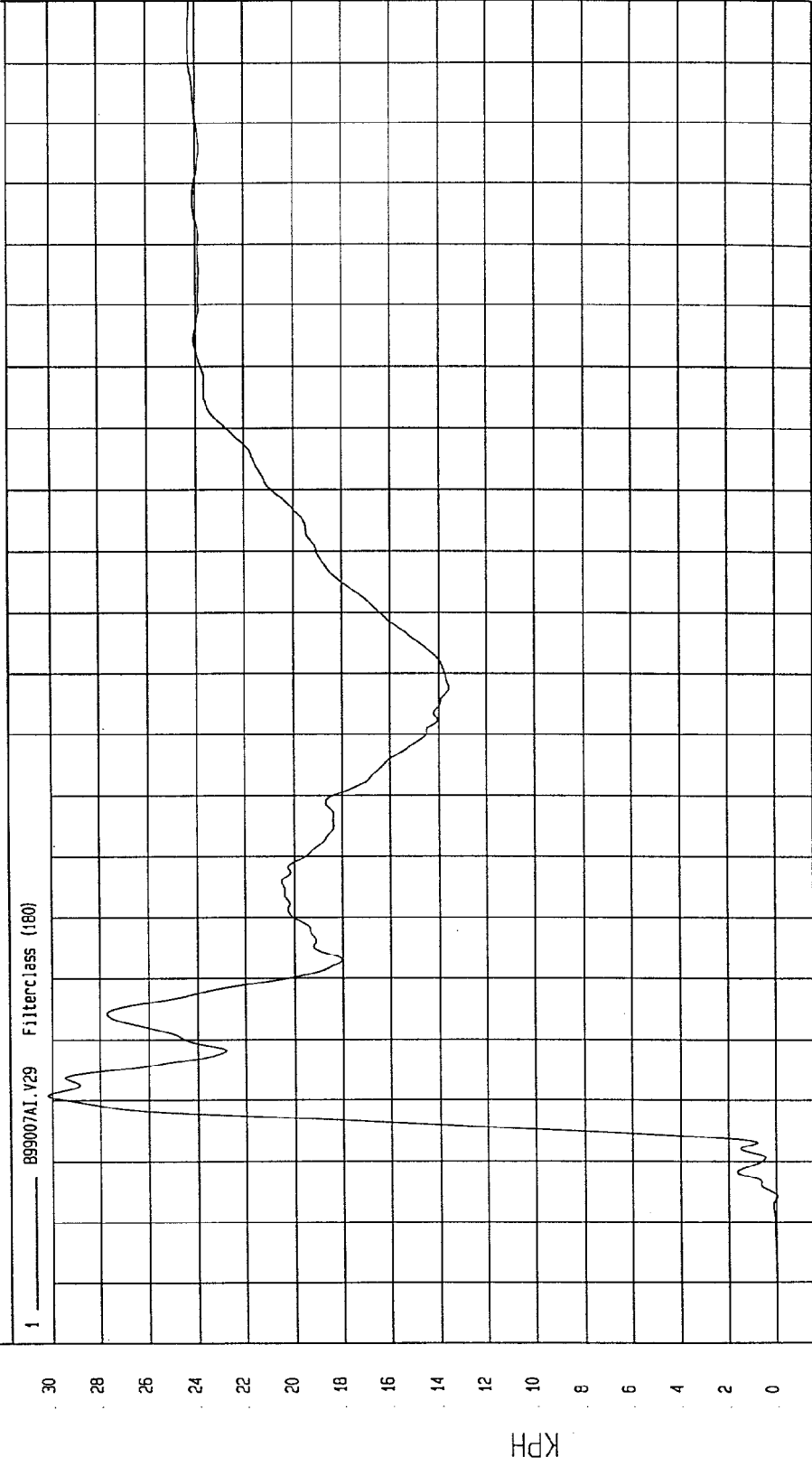
TIME (SECONDS)

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -4.50E-02 KPH at 4 msec Maximum = 30.18 KPH at 21 msec

LEFT MID B-POST Y VELOCITY



TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

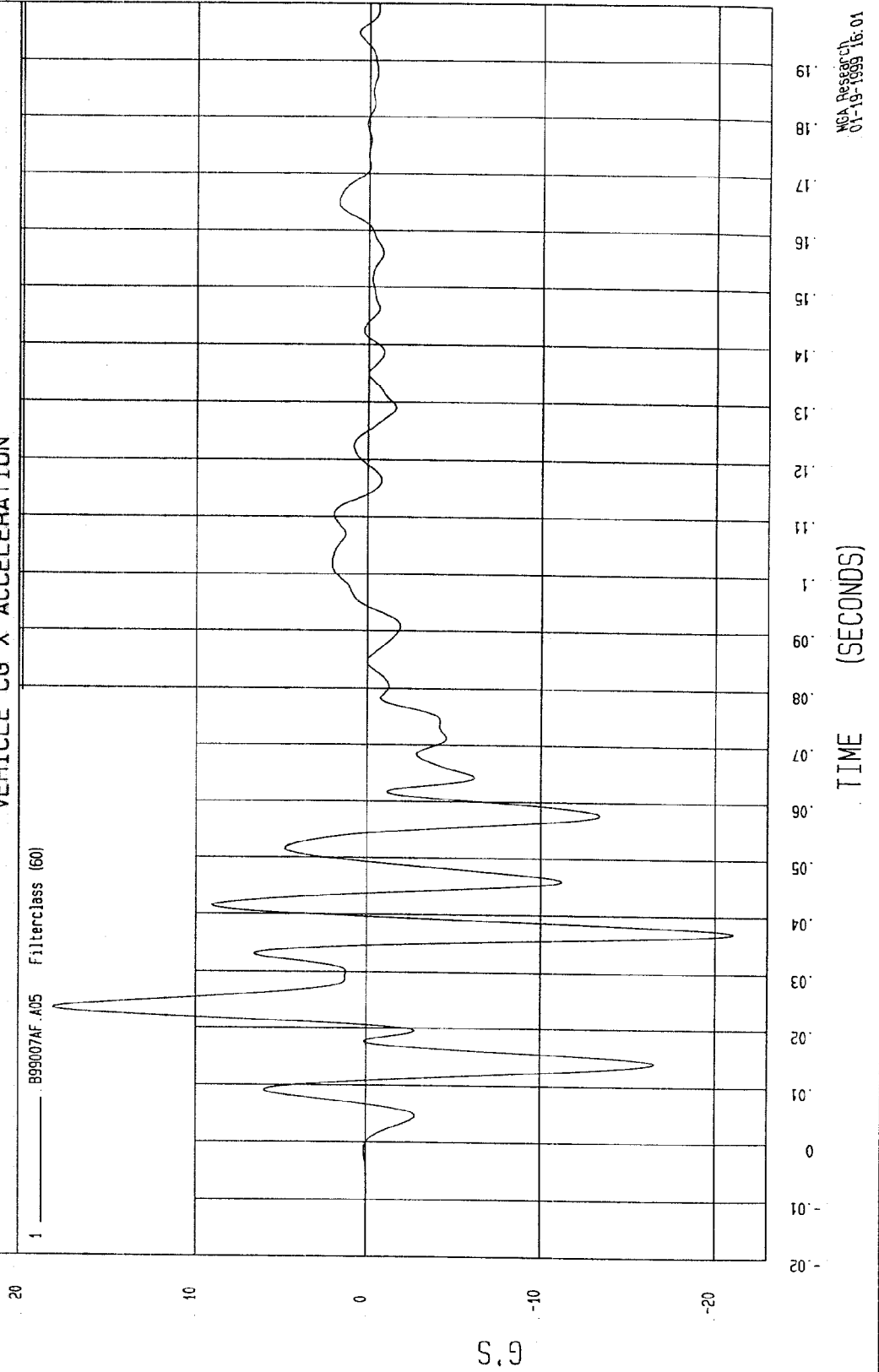
Speed: 38.22 MPH 61.5 KPH

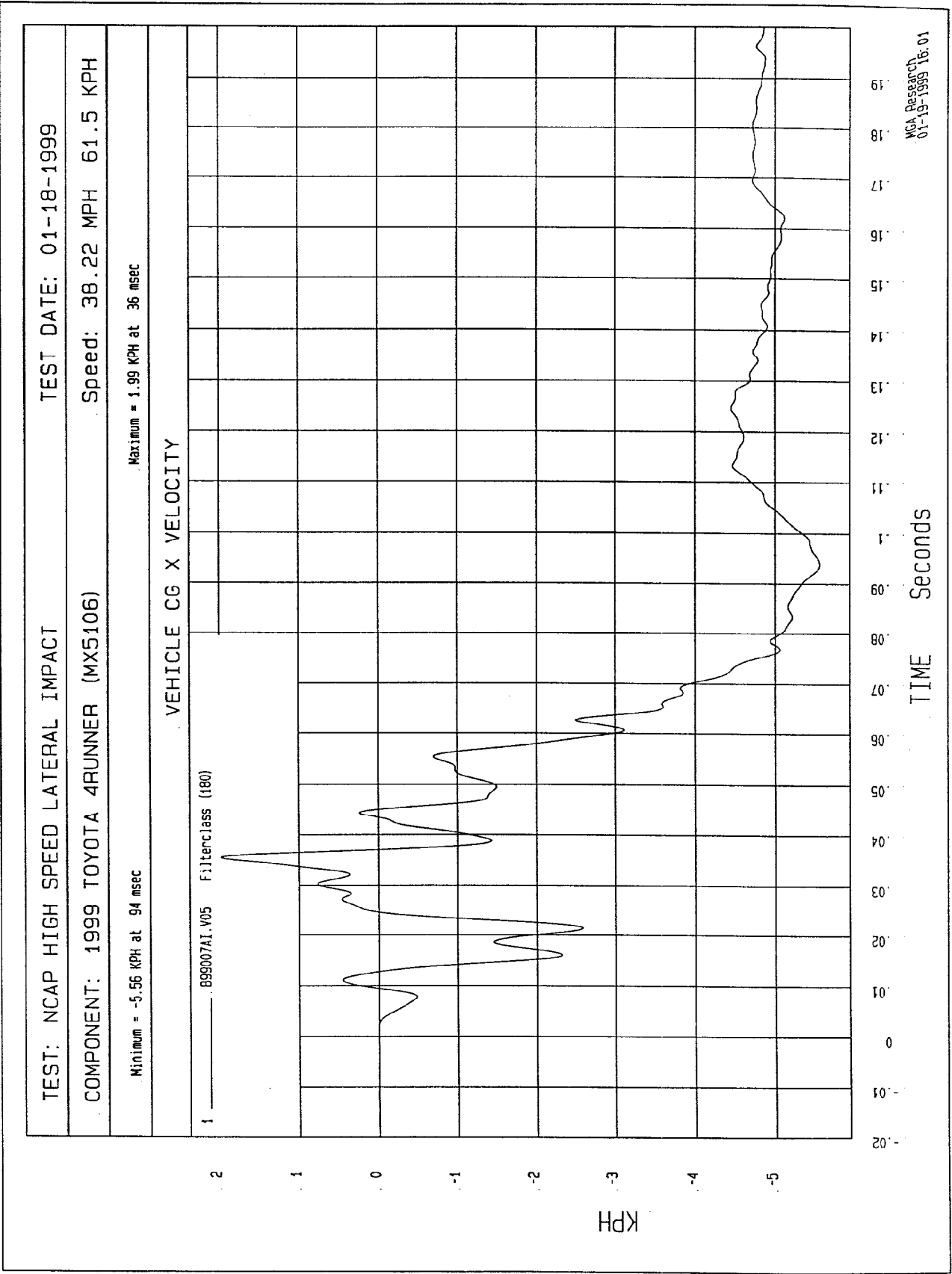
COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

Maximum = 18.24 G'S at 23 msec

Minimum = -21.08 G'S at 37 msec

VEHICLE CG X ACCELERATION



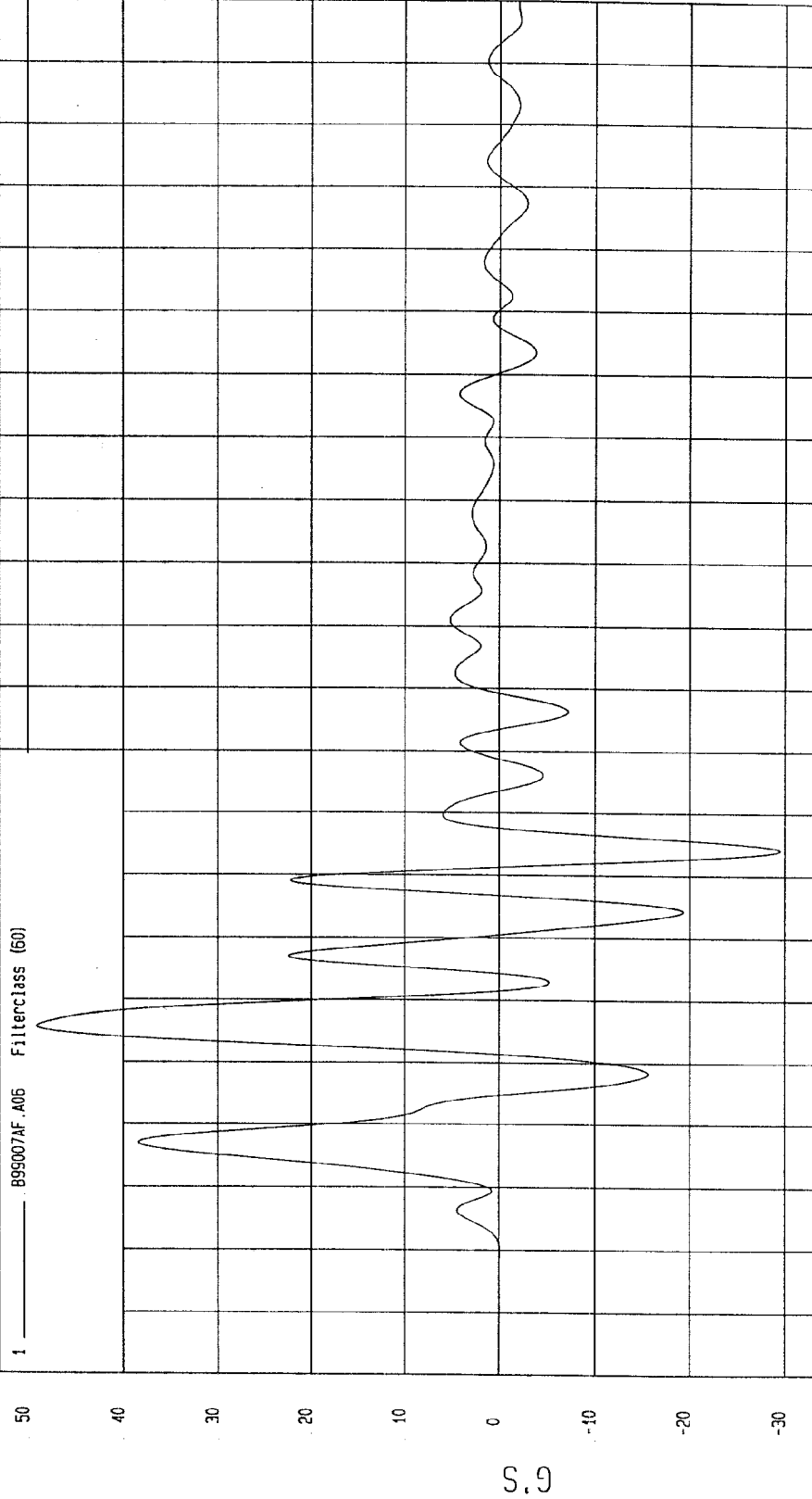


TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

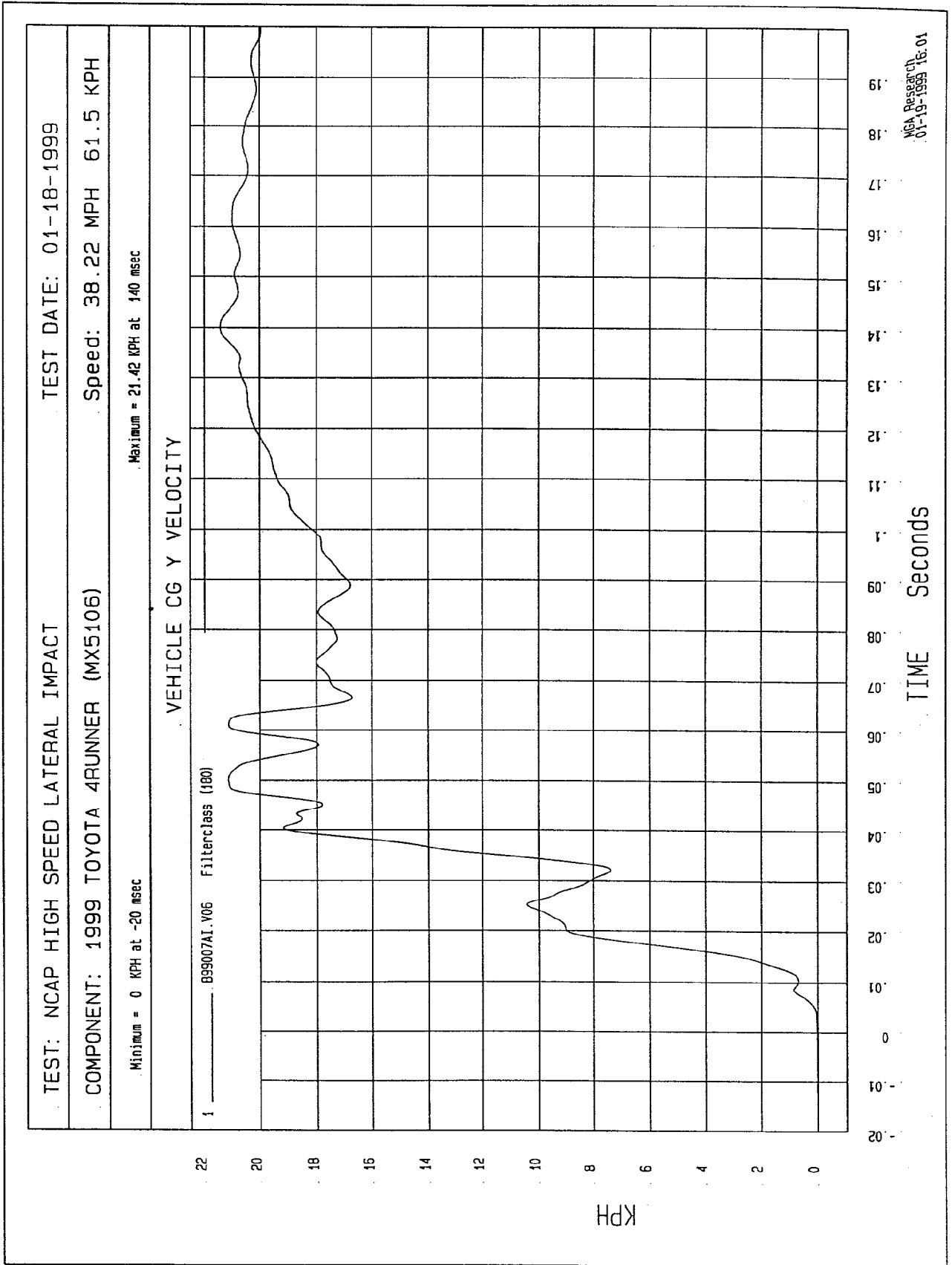
Minimum = -29.53 G's at 64 msec Maximum = 49.12 G's at 36 msec

VEHICLE CG Y ACCELERATION



TIME (SECONDS)

NSA Research
01-18-1999 16:01

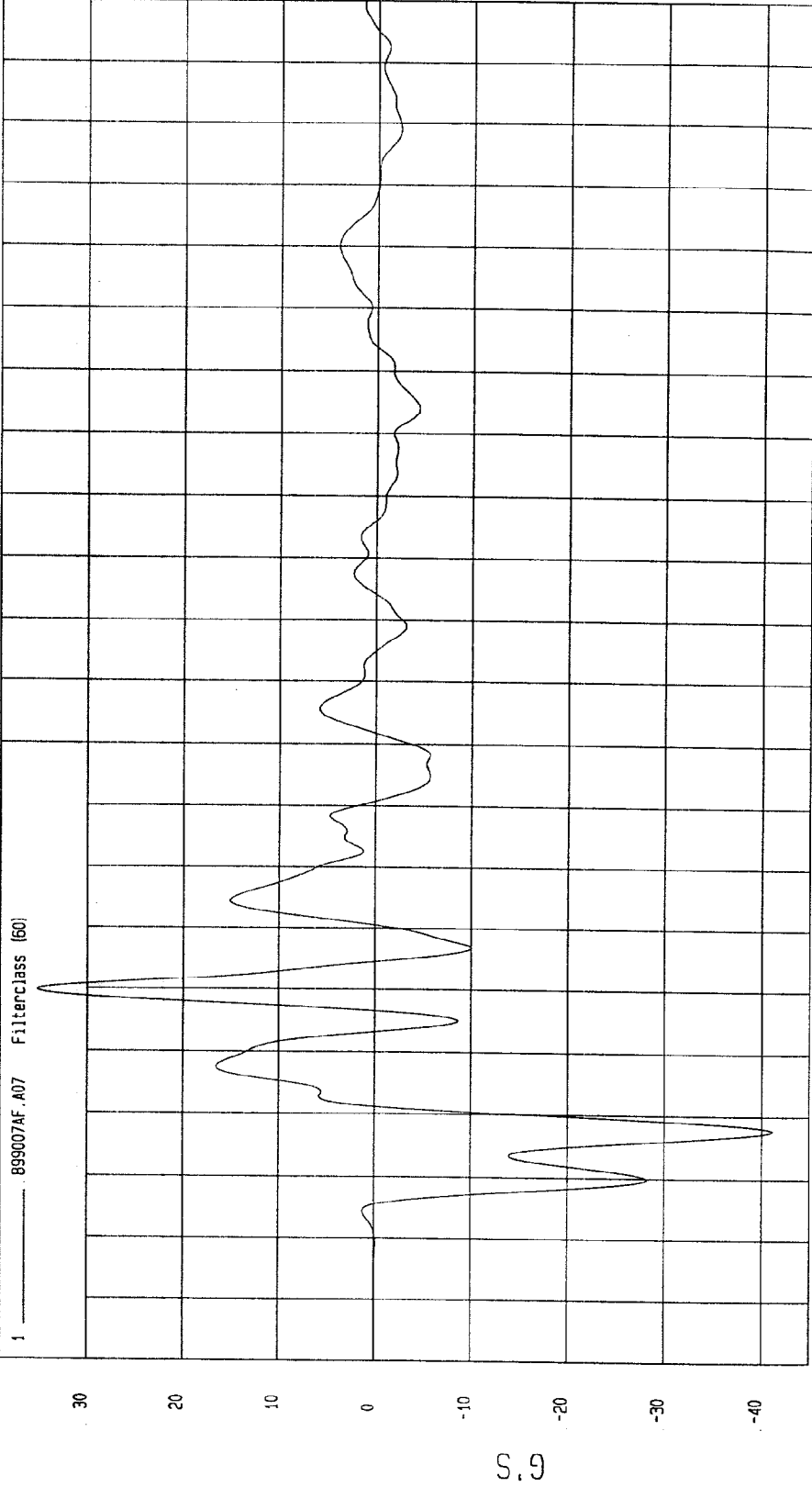


TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

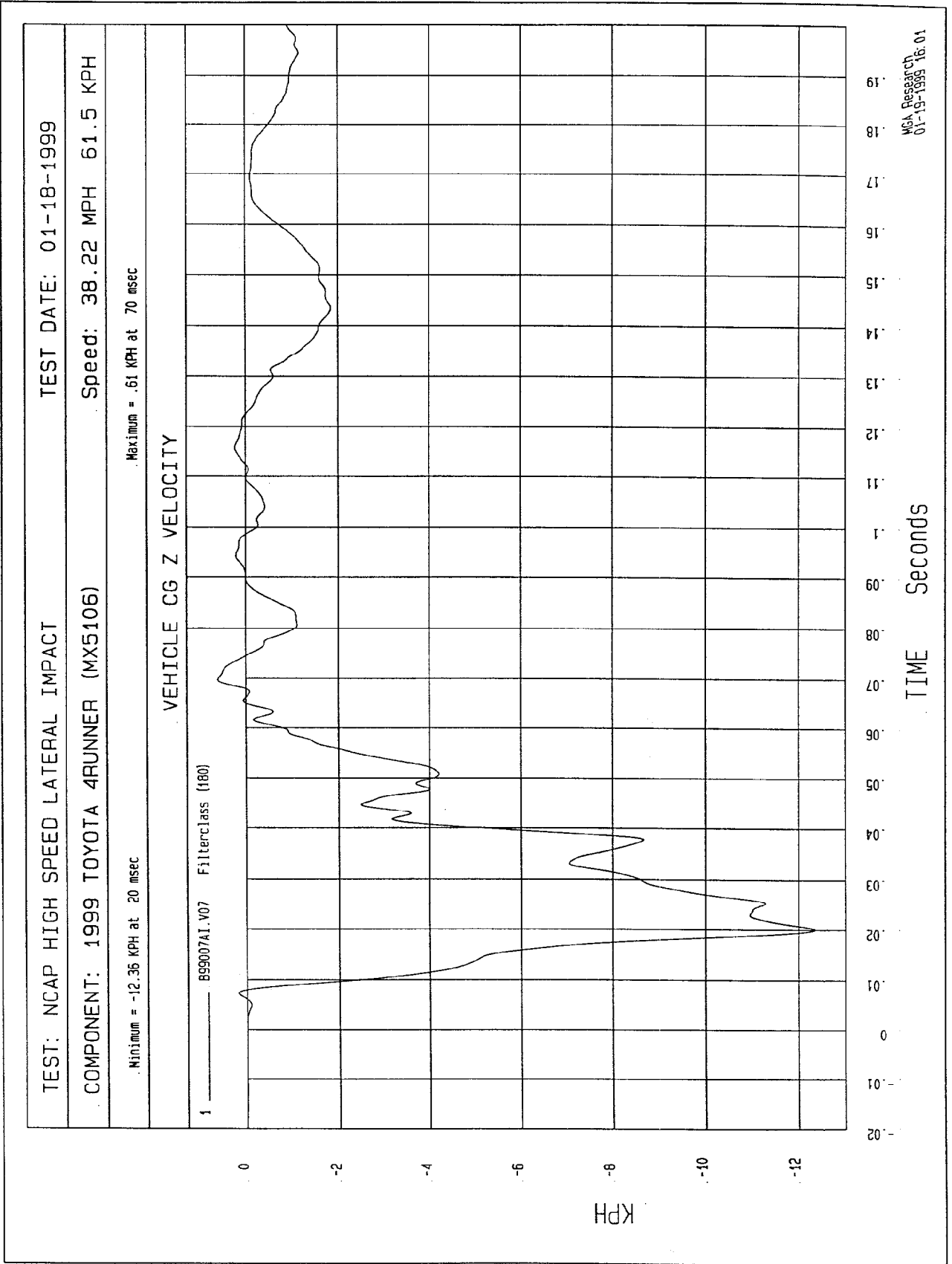
COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -41.13 G'S at 18 msec Maximum = 35.12 G'S at 40 msec

VEHICLE CG Z ACCELERATION



NGA Research
01-19-1999 16:01



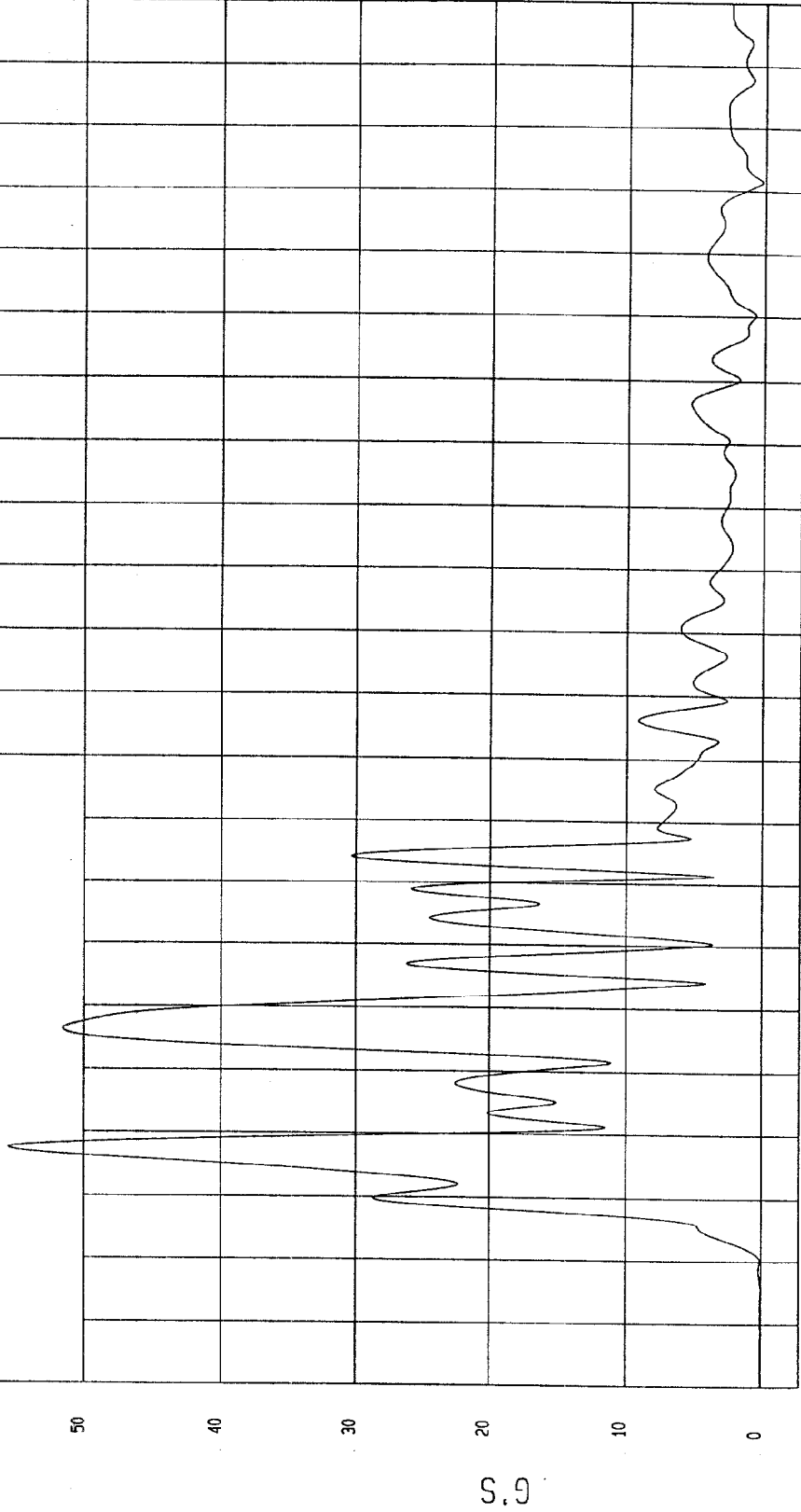
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

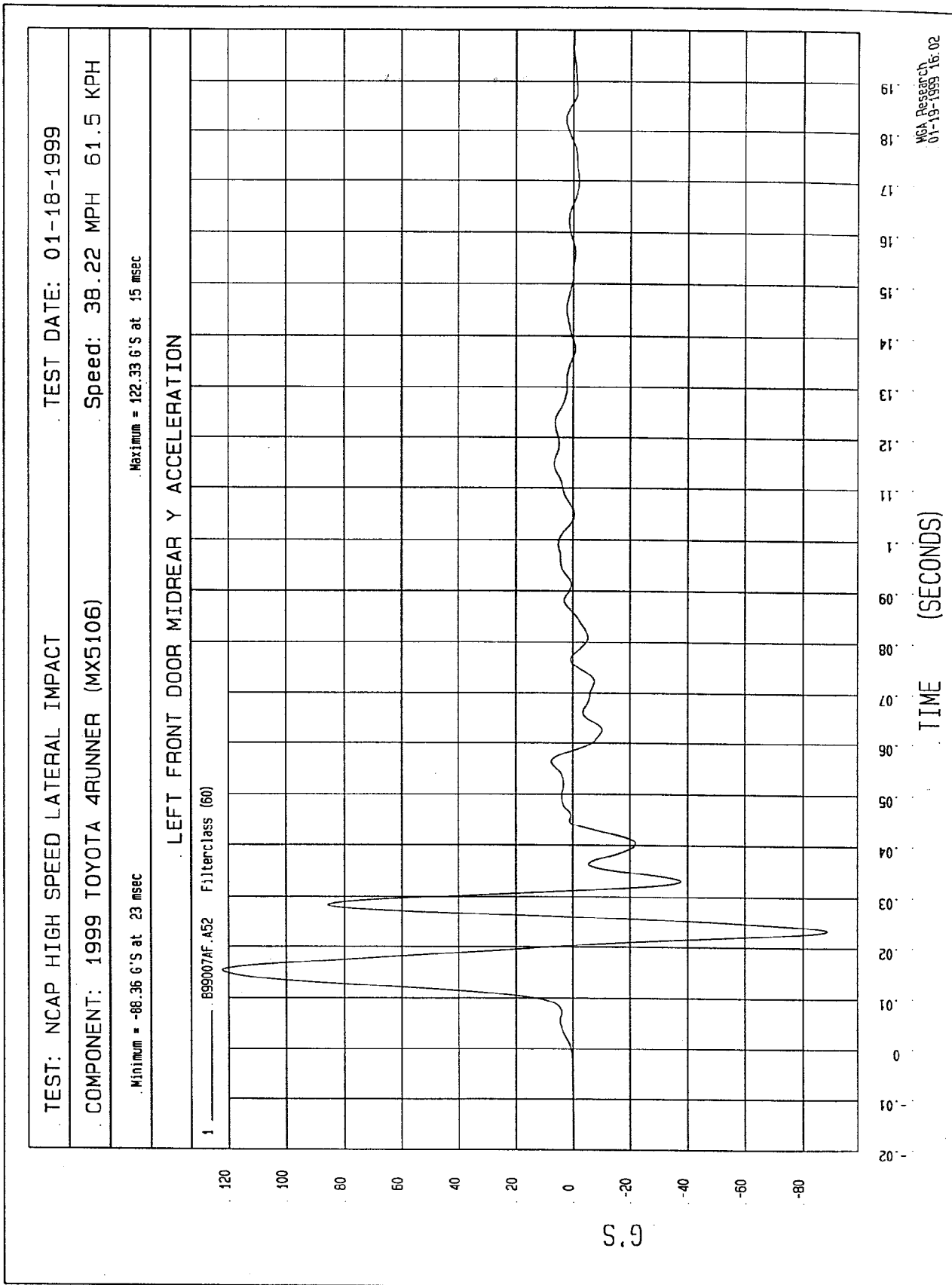
Minimum = 7.78E-03 G's at -5 msec Maximum = 55.54 G's at 17 msec

VEHICLE CG RESULTANT ACCELERATION

1 B99007AV.A05 Filterclass (60)



WCA Research
01-19-1999 16:02

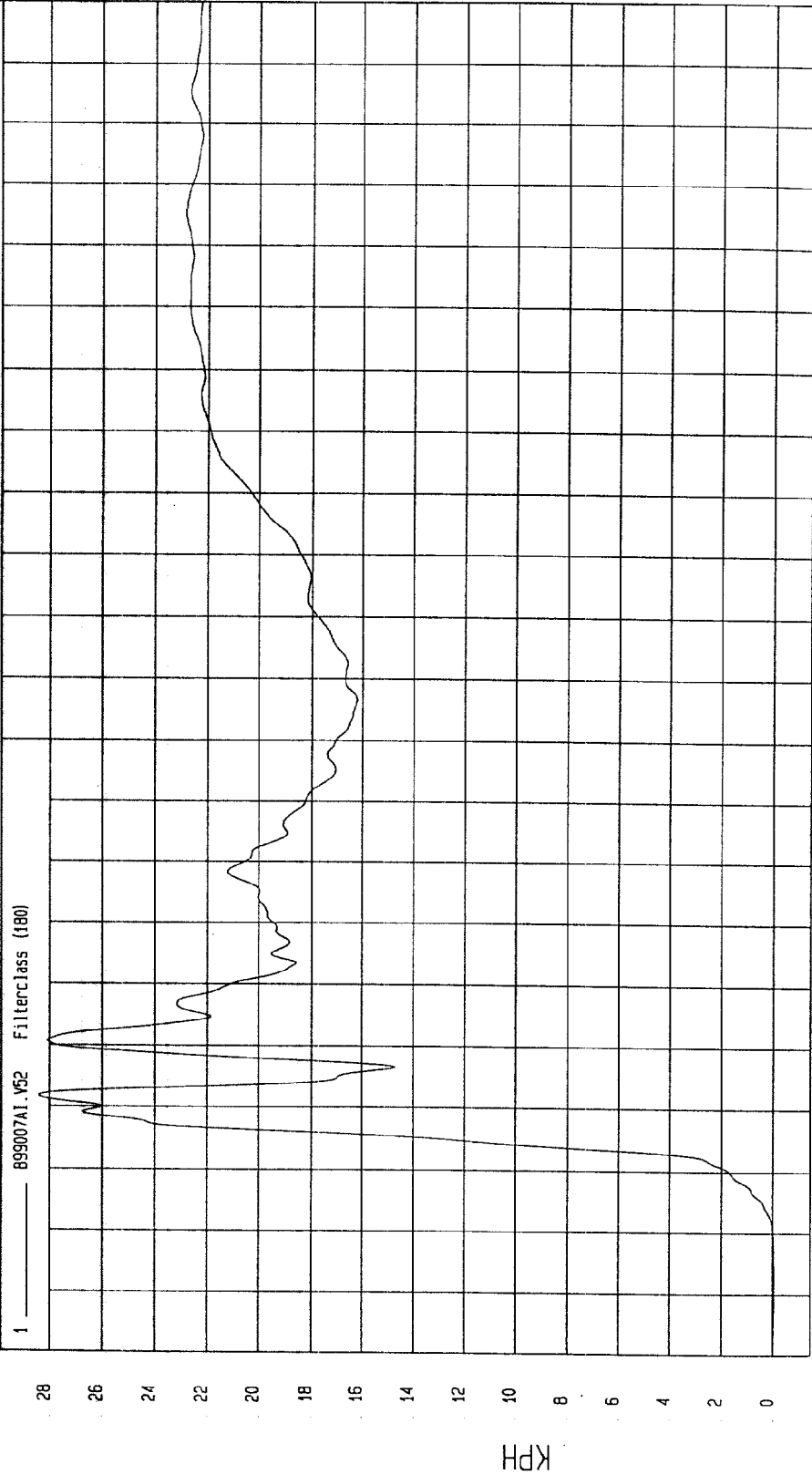


TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -4.93E-02 KPH at -12 msec Maximum = 28.41 KPH at 22 msec

LEFT FRONT DOOR MIDREAR Y VELOCITY



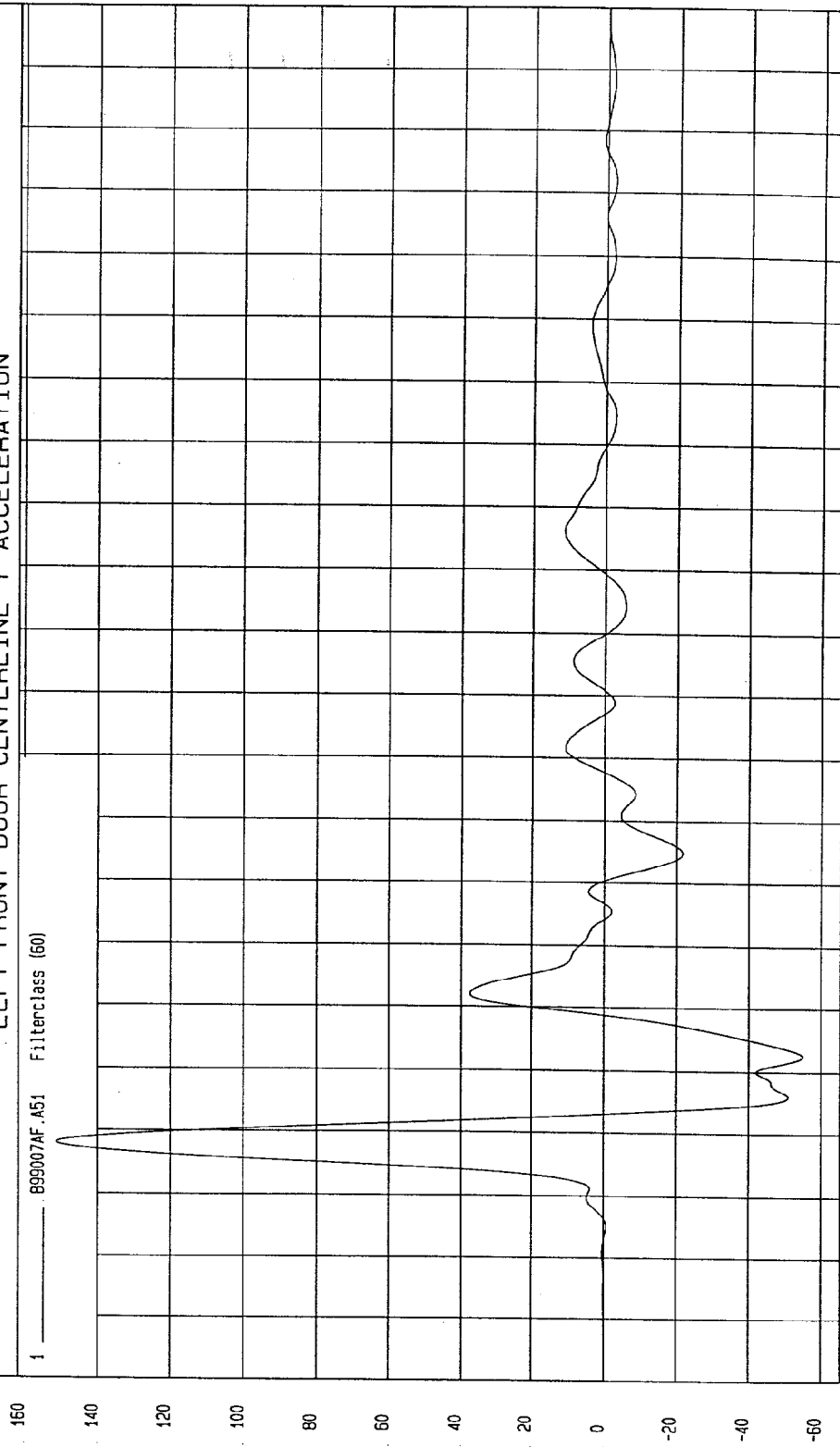
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

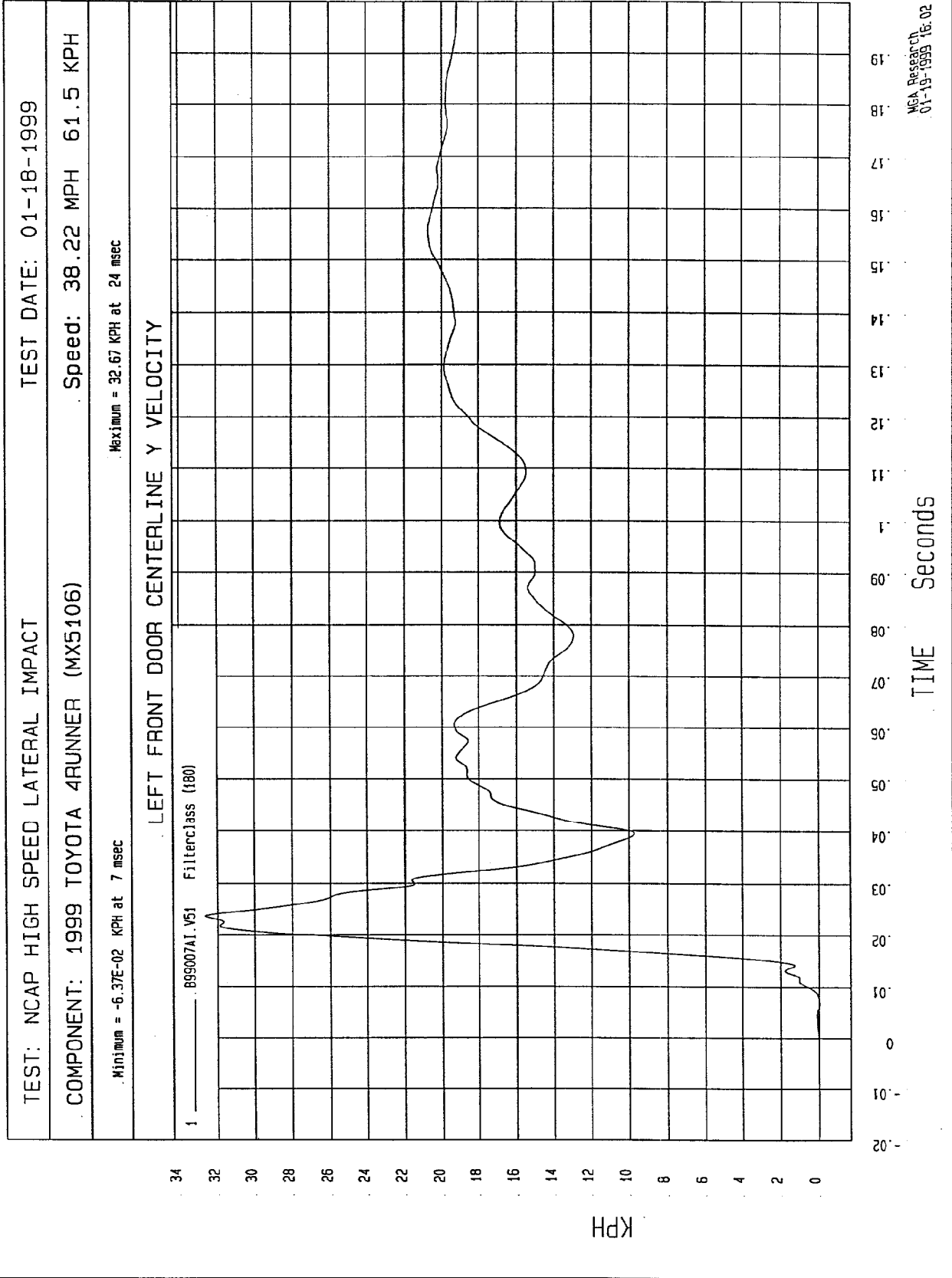
Minimum = -54.99 G'S at 32 msec Maximum = 151.35 G'S at 18 msec

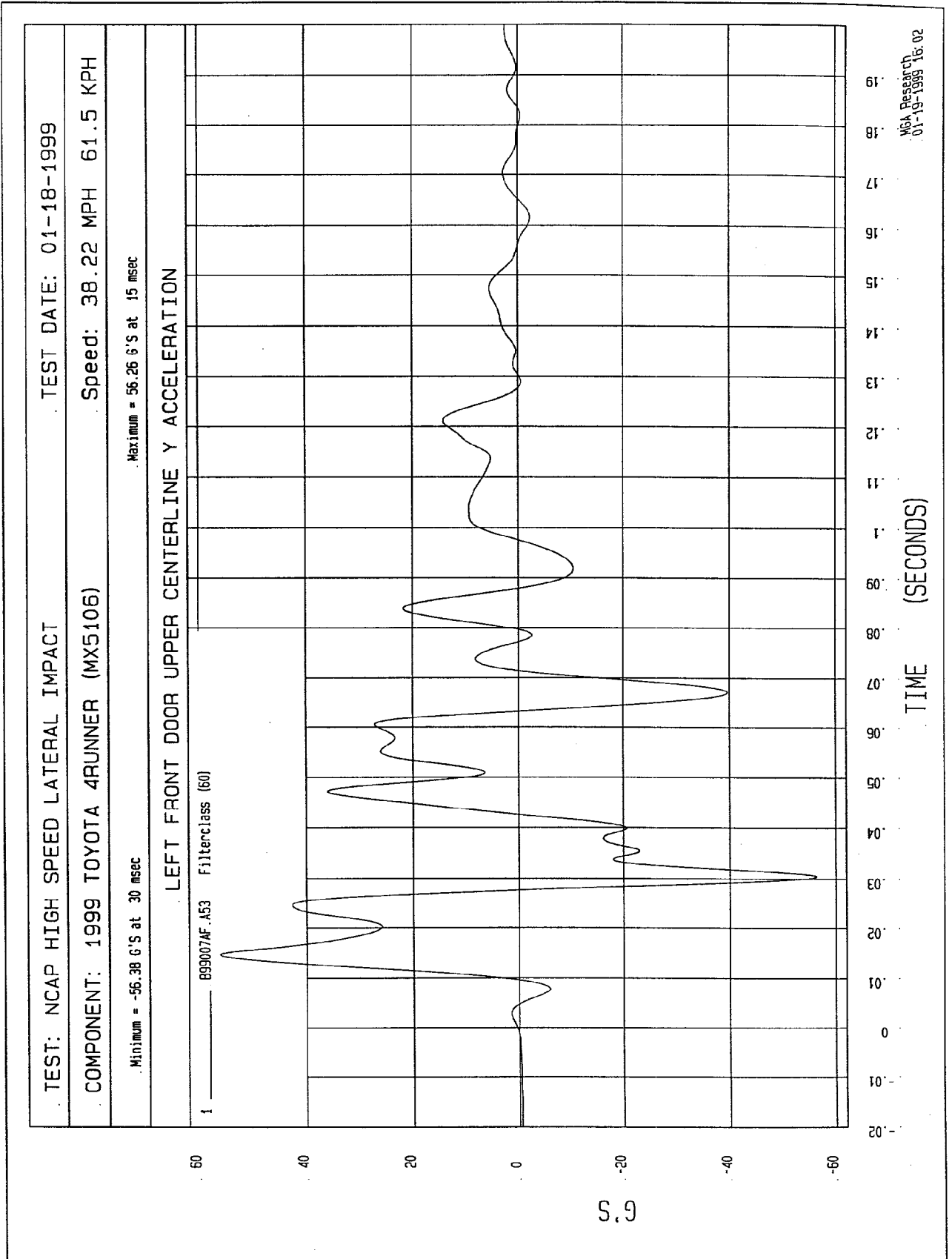
LEFT FRONT DOOR CENTERLINE Y ACCELERATION

1 _____ 899007AF.A51 Filterclass (60)



MSA Research
01-19-1999 16:02





TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

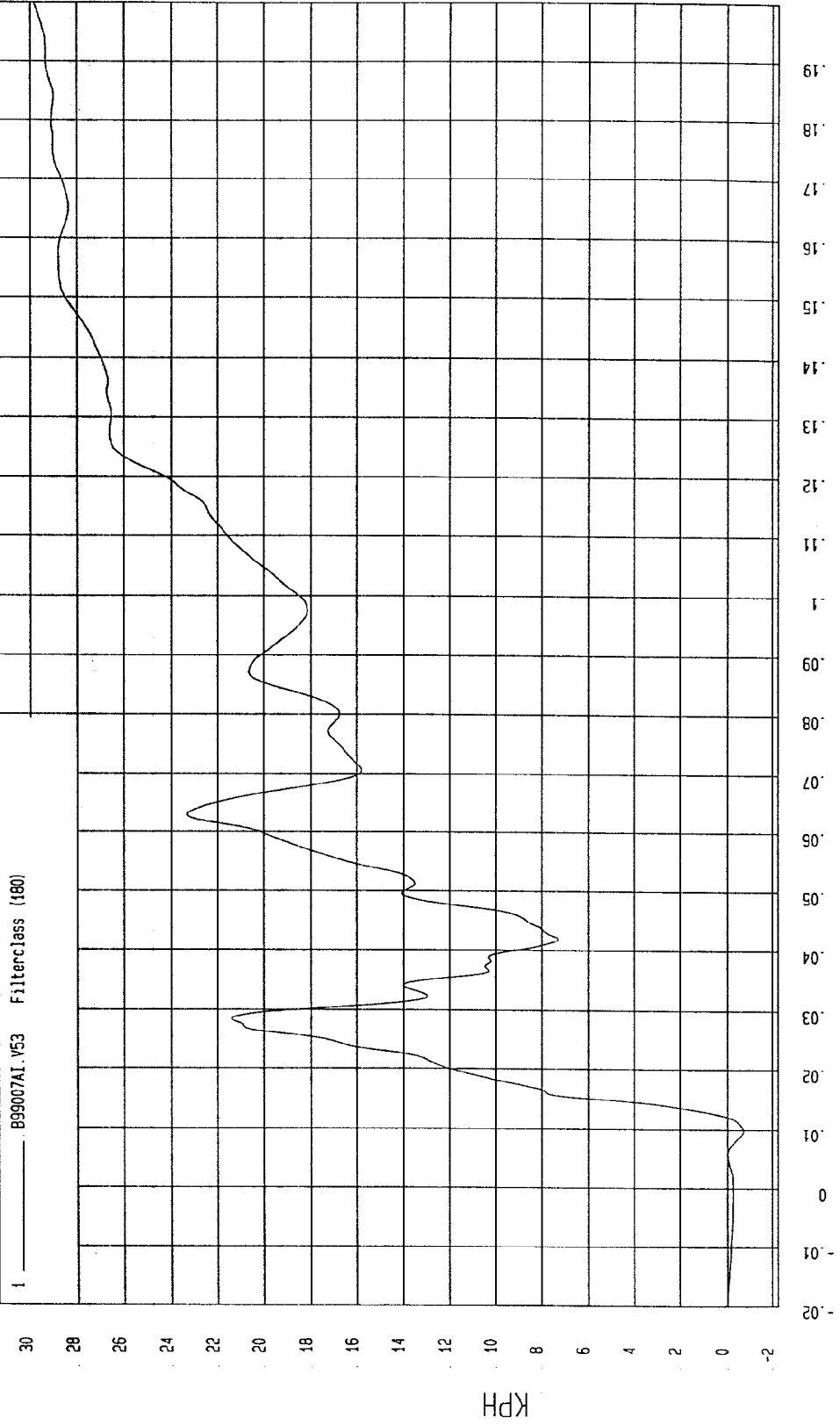
Speed: 38.22 MPH 61.5 KPH

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

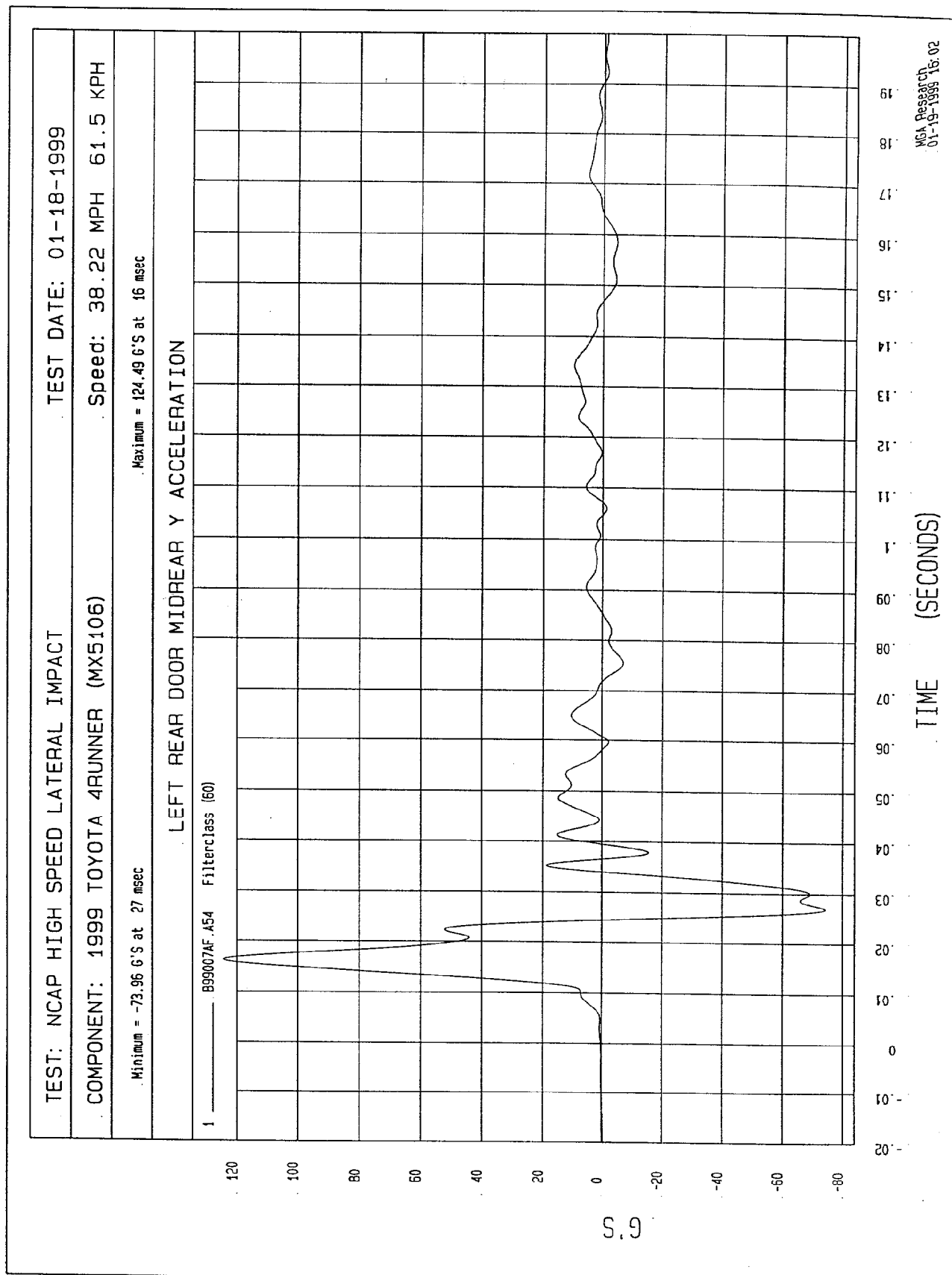
Maximum = 29.84 KPH at 200 msec

Minimum = -7.1 KPH at 10 msec

LEFT FRONT DOOR UPPER CENTERLINE Y VELOCITY



WSA Research
01-19-1999 16:02



TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

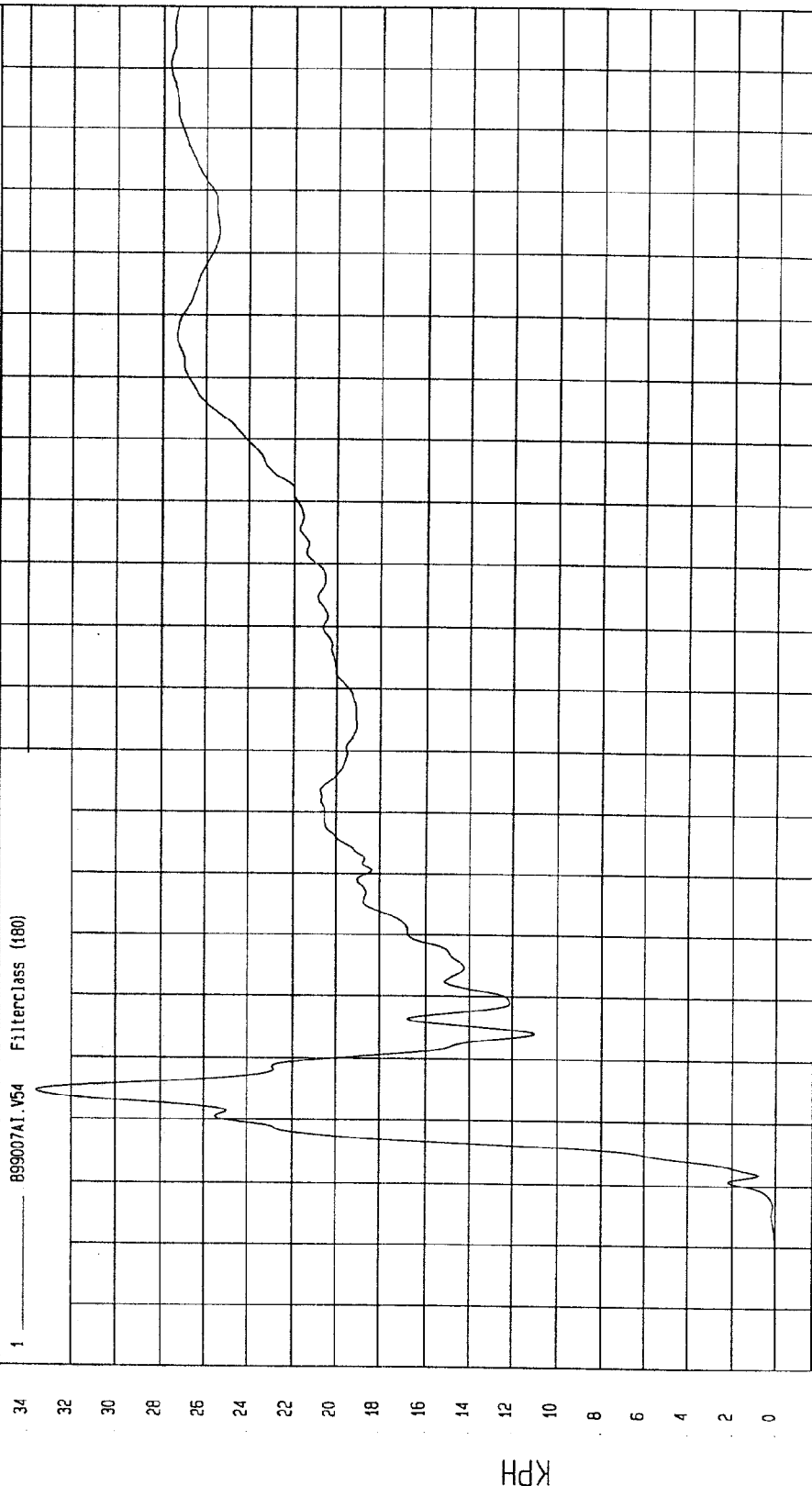
Speed: 38.22 MPH 61.5 KPH

Maximum = 33.61 KPH at 25 msec

Minimum = -2.74E-02 KPH at -12 msec

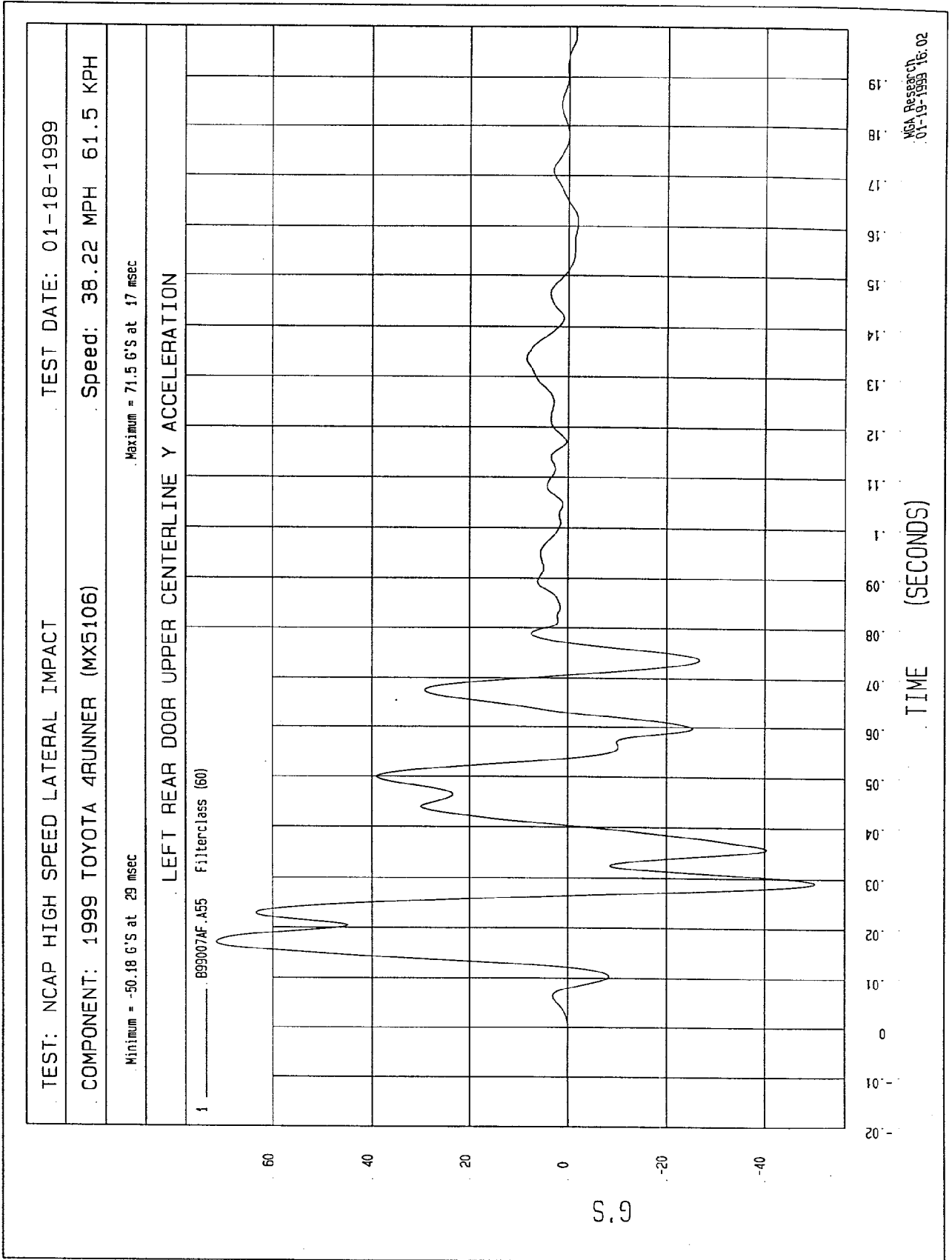
LEFT REAR DOOR MIDREAR Y VELOCITY

1 899007A1.V54 Filterclass (480)



NGA Research
01-19-1999 16:02

TIME Seconds



TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

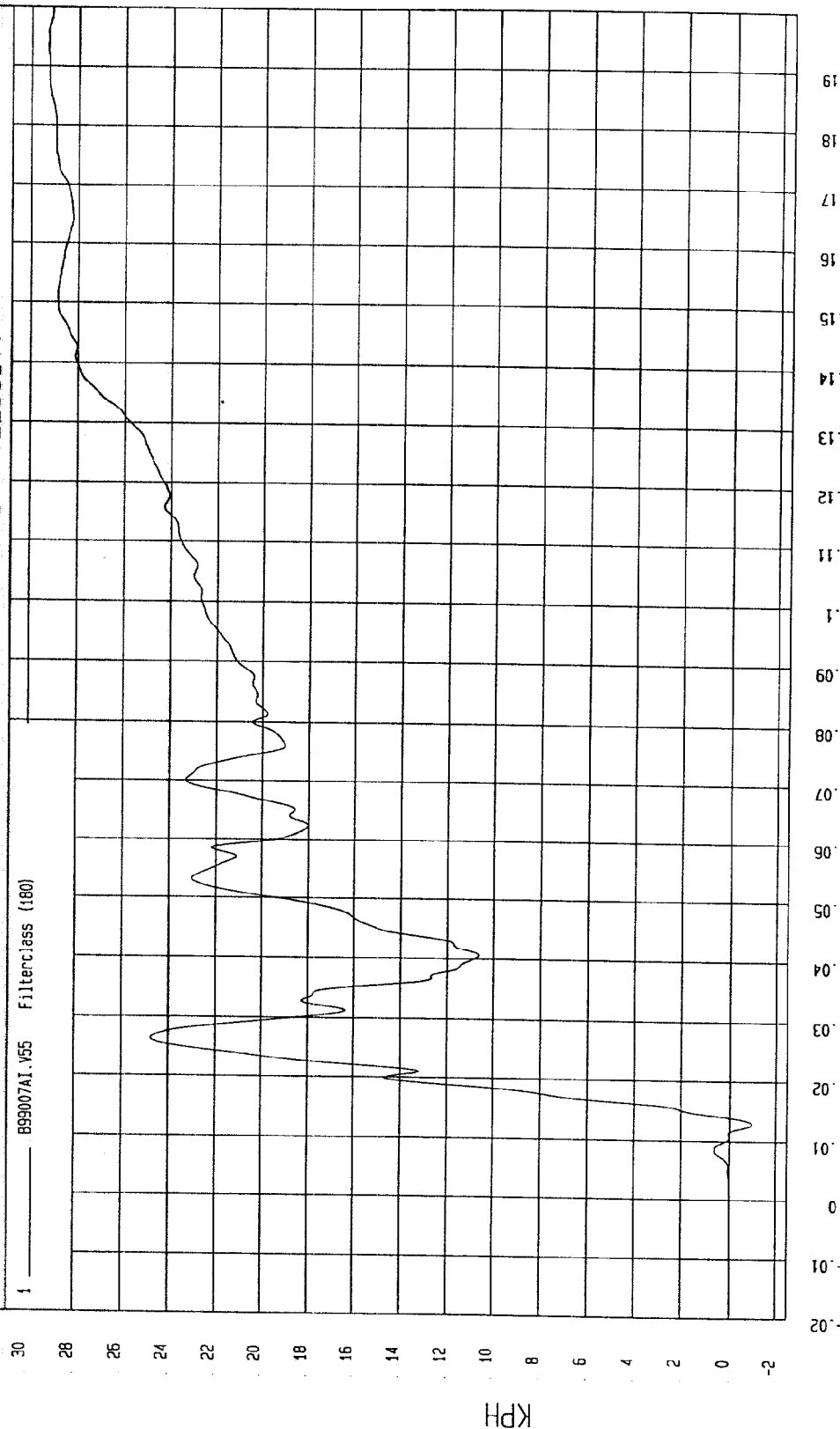
Speed: 38.22 MPH 61.5 KPH

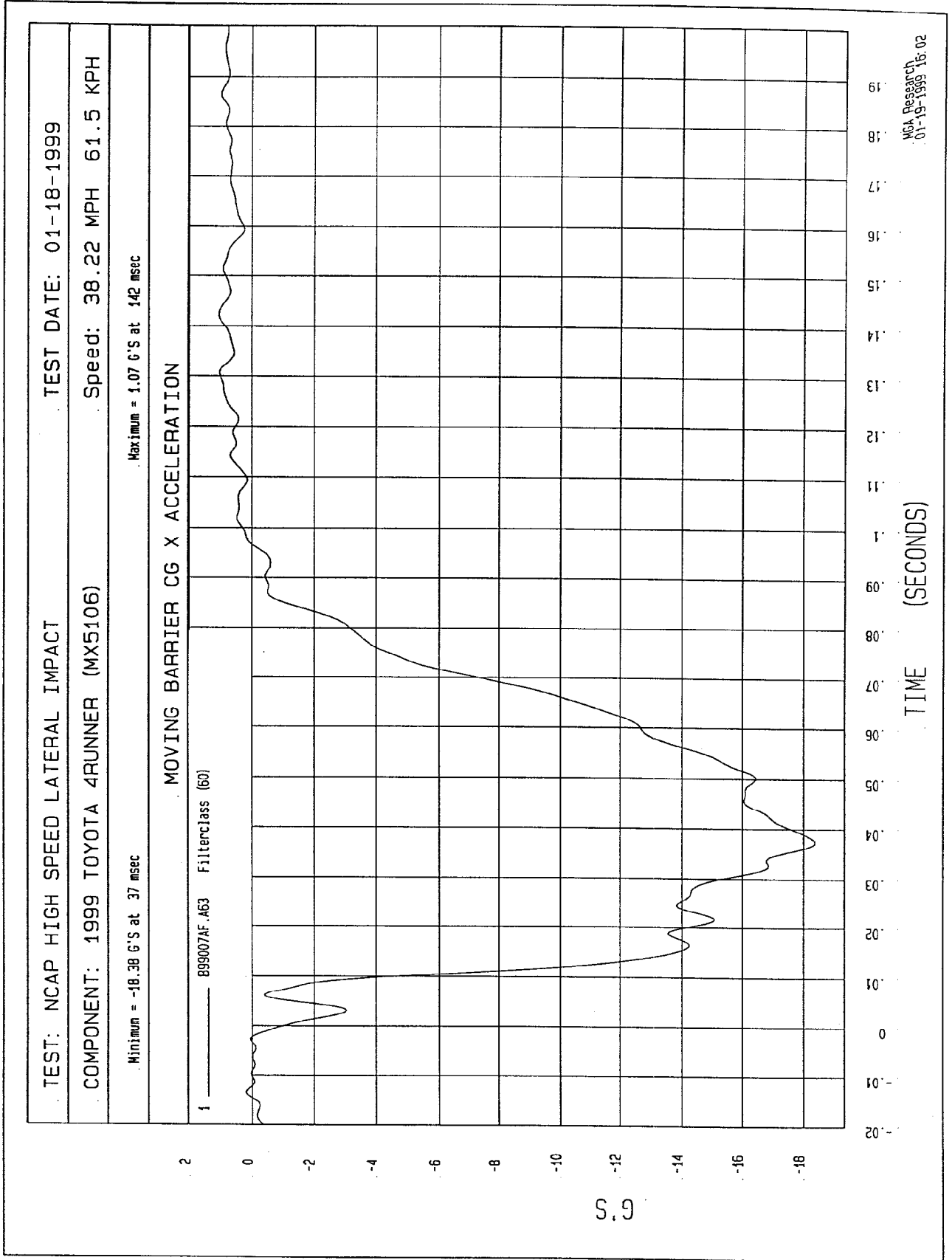
Minimum = -.96 KPH at 13 msec

Maximum = 29.28 KPH at 193 msec

LEFT REAR DOOR UPPER CENTERLINE Y VELOCITY

1 ——— B99007A1.V55 Filterclass (180)





TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

Speed: 38.22 MPH 61.5 KPH

Minimum = 21.66 KPH at 96 msec

Maximum = 54.82 KPH at -13 msec

MOVING BARRIER CG X VELOCITY

1 899007AI.V63 Filterclass (180)

56

54

52

50

48

46

44

42

40

38

36

34

32

30

28

26

24

22

20

KPH

-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

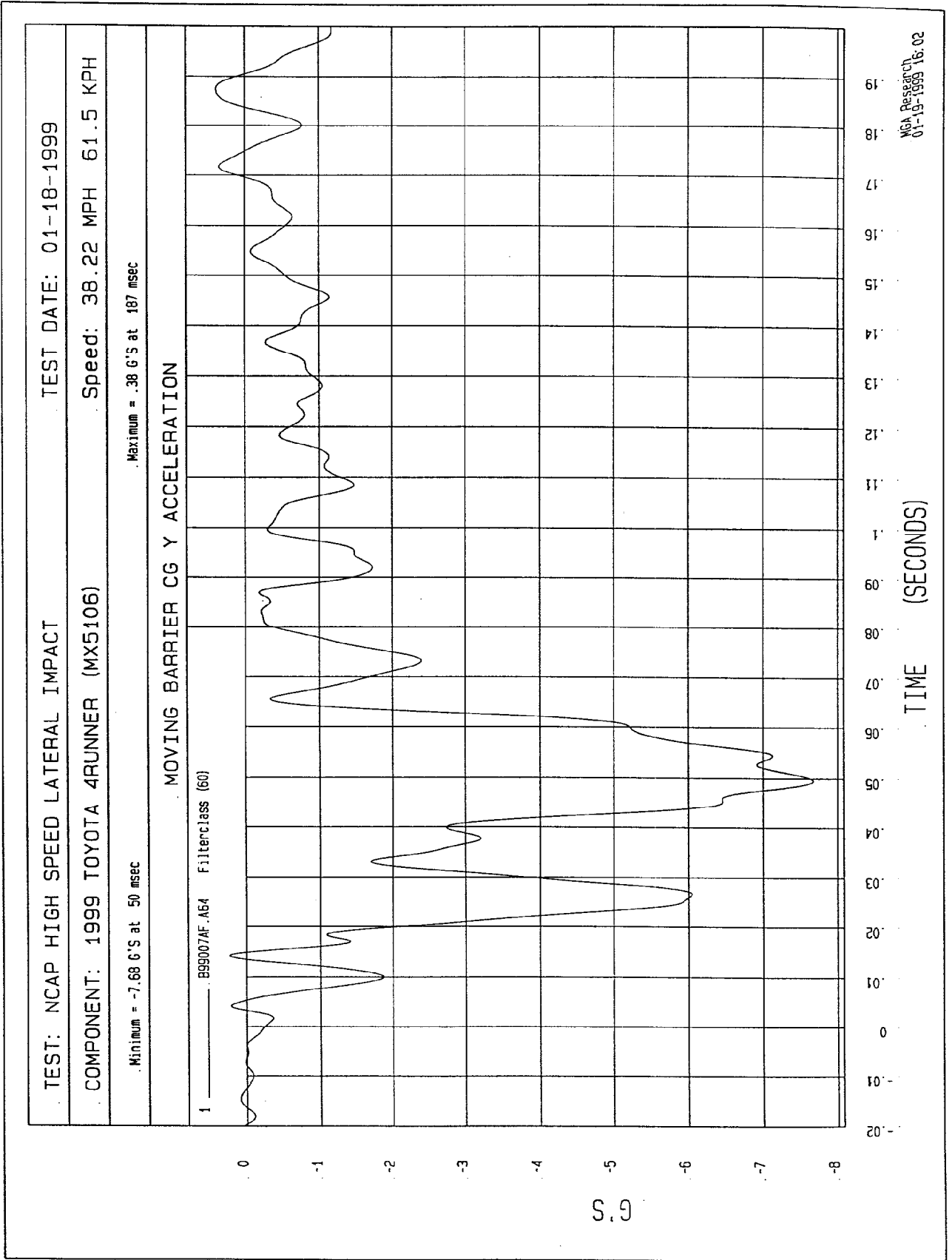
0.17

0.18

0.19

TIME Seconds

MOA Research
01-19-1999 16:02



TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

SPEED: 38.22 MPH 61.5 KPH

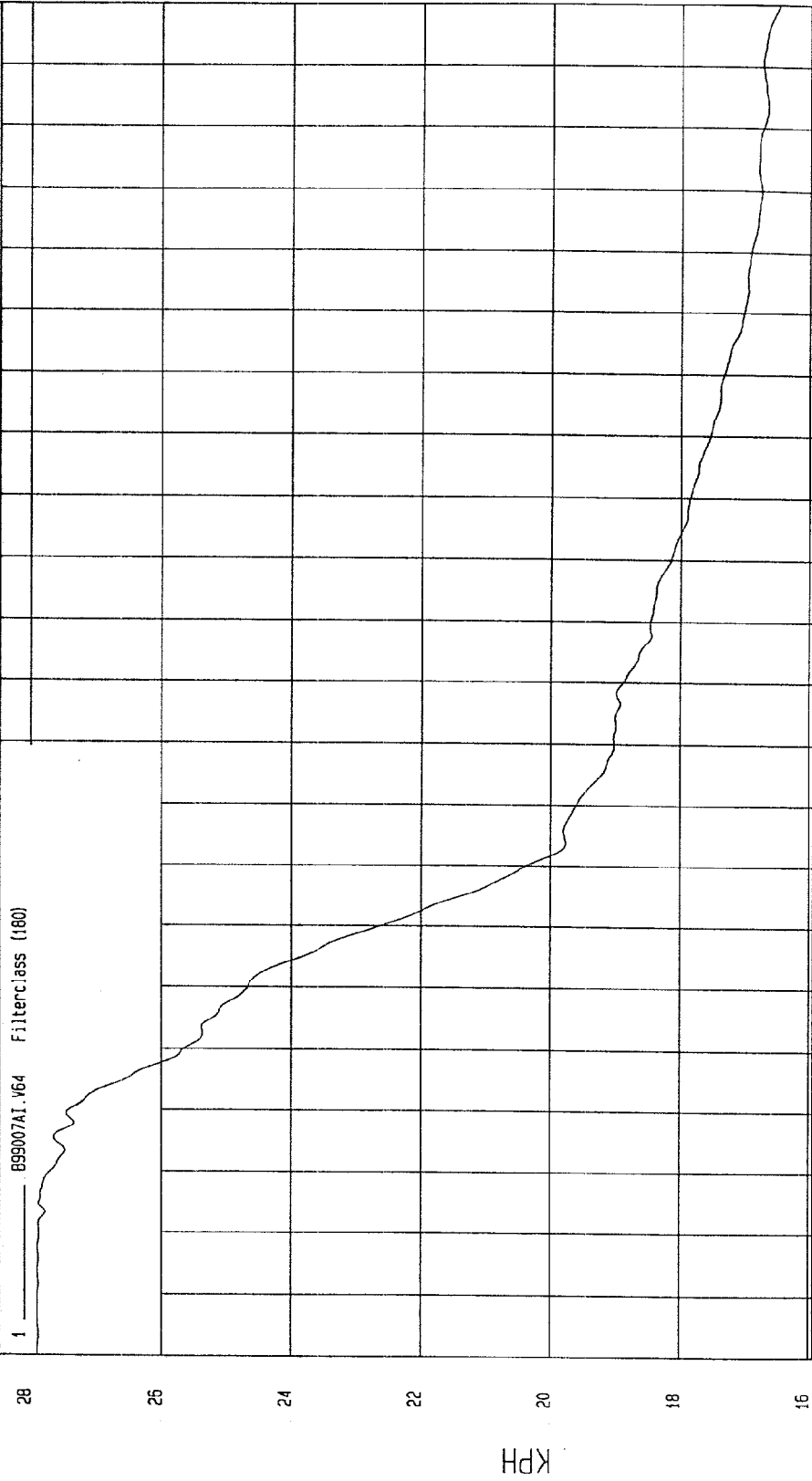
COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

Minimum = 16.5 KPH at 200 msec

Maximum = 27.9 KPH at -20 msec

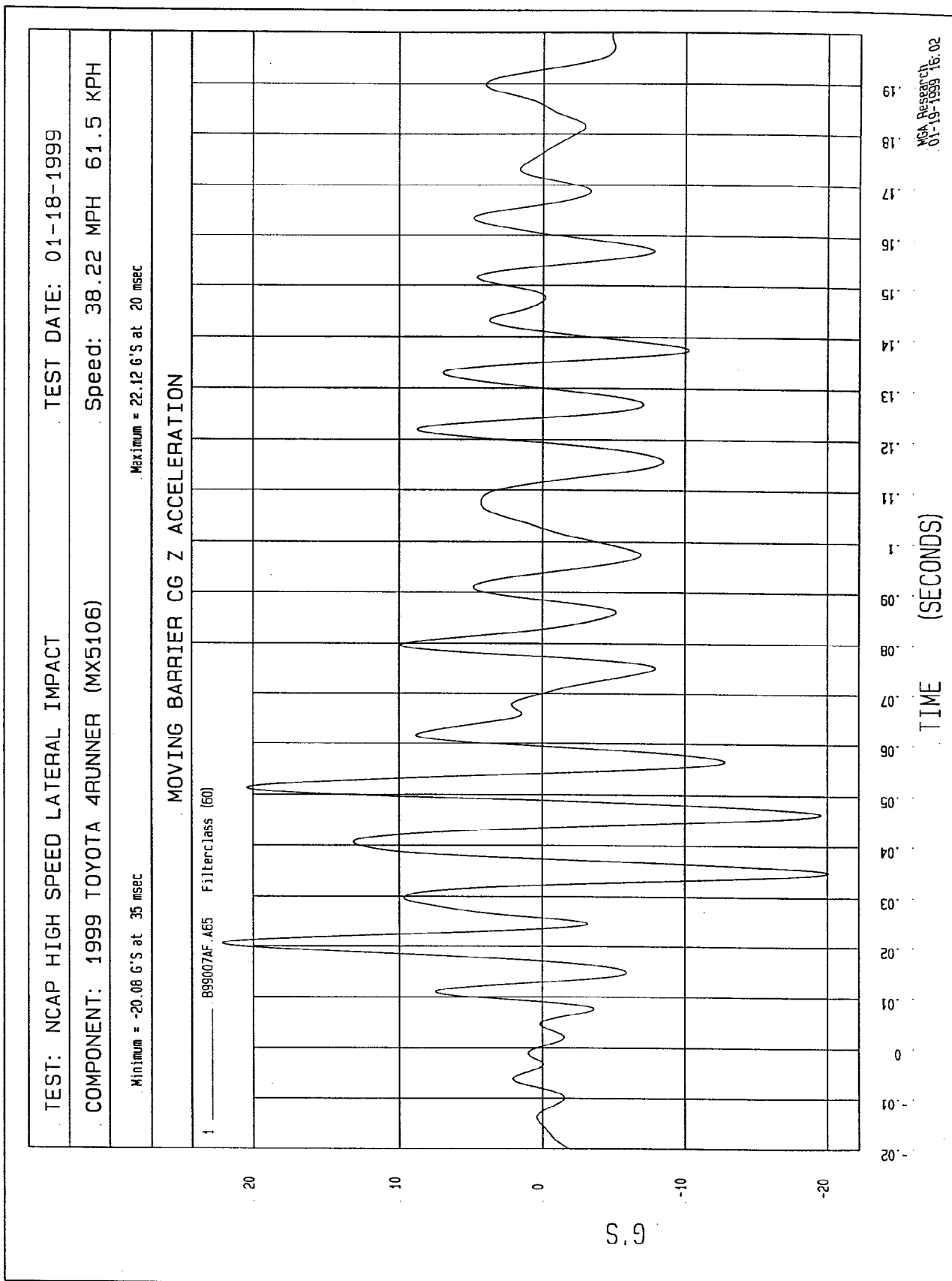
MOVING BARRIER CG Y VELOCITY

1 B99007A1.V64 Filterclass (180)



MSA Research
01-19-1999 16.02

TIME Seconds



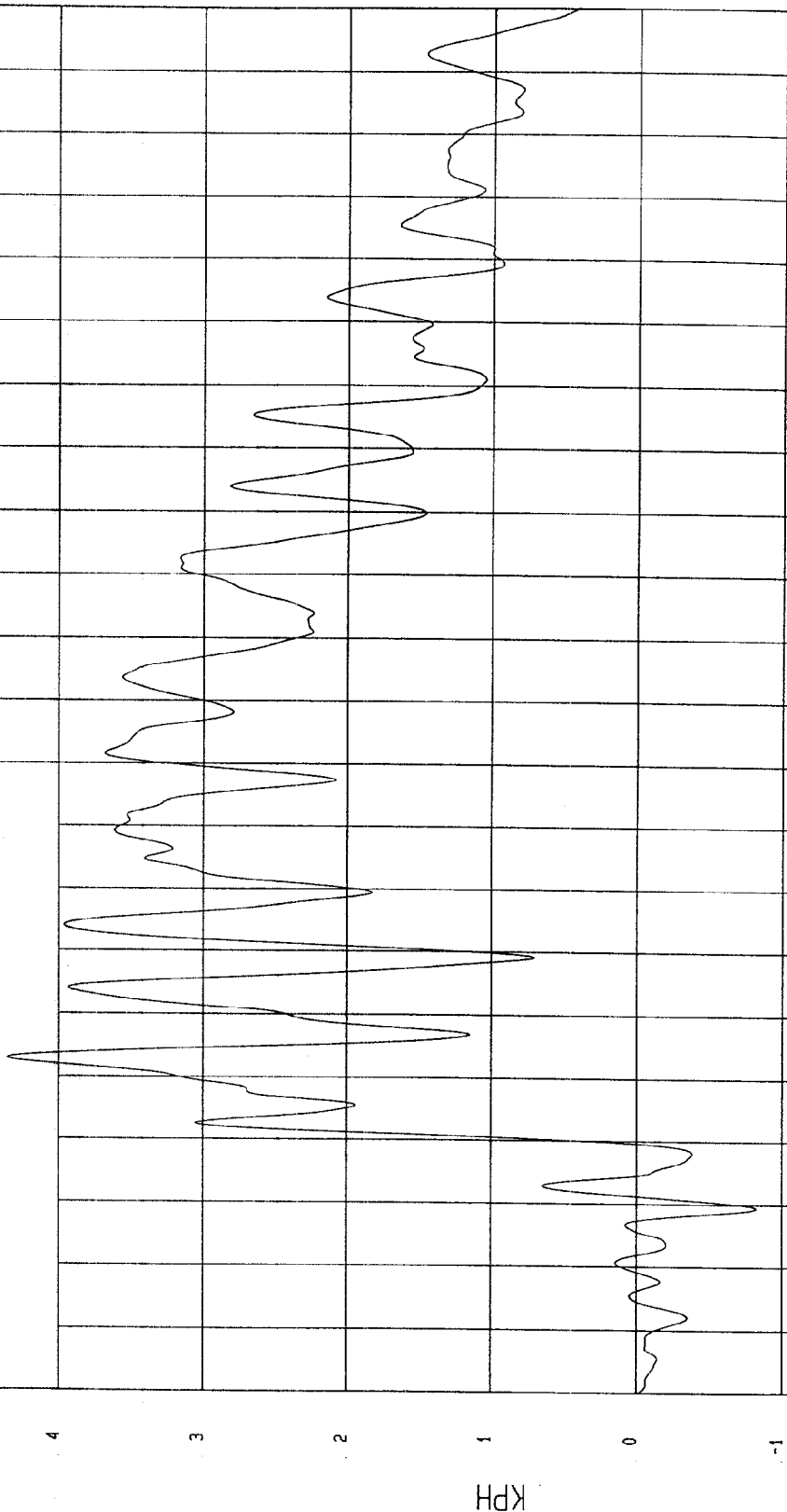
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -.82 KPH at 10 msec
Maximum = 4.35 KPH at 33 msec

MOVING BARRIER CG Z VELOCITY

1 ——— B99007A1.V65 Filterclass (180)



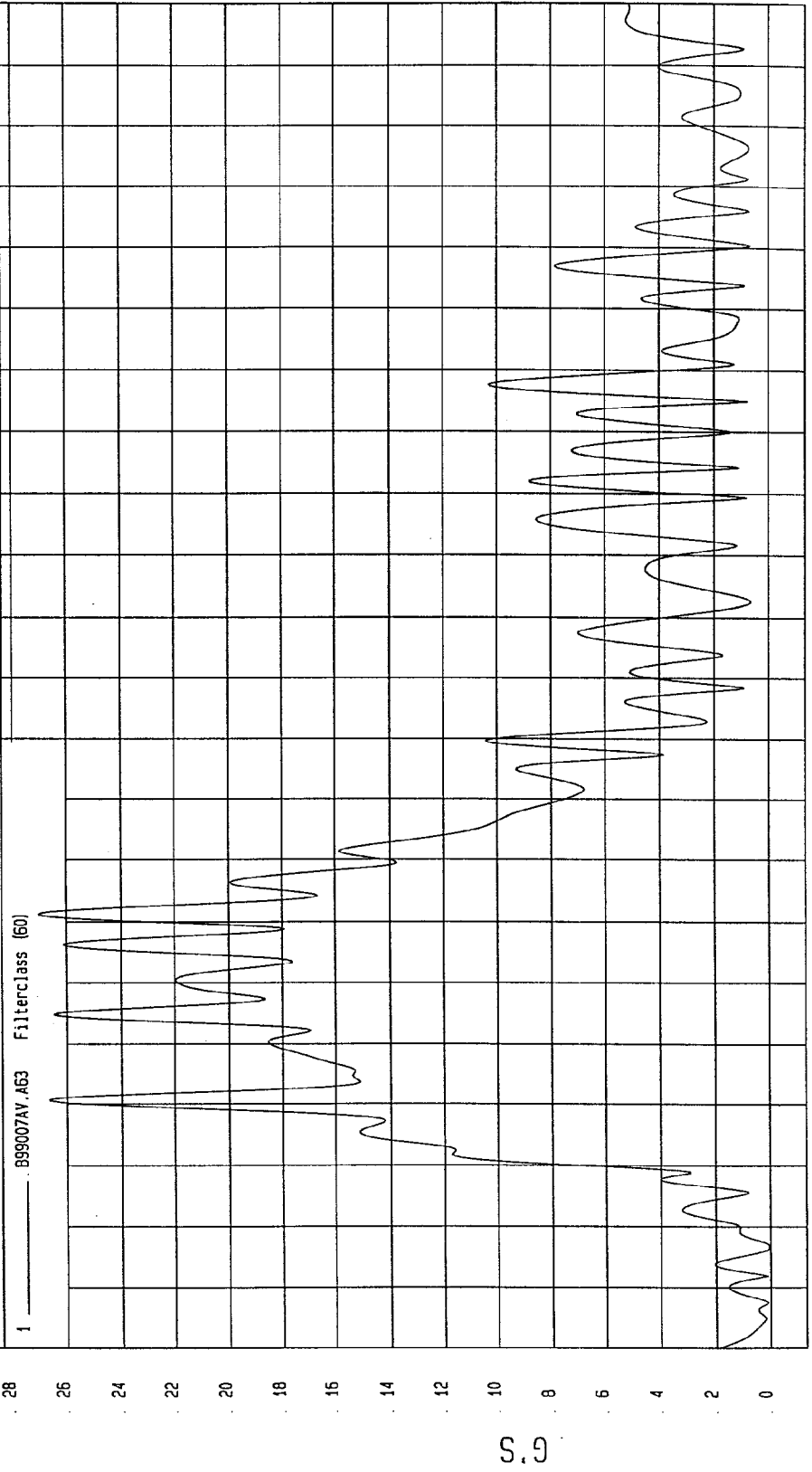
MCA Research
01-18-1999 16.02

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = 3.72E-02 G'S at -4 msec Maximum = 27.03 G'S at 51 msec

MOVING BARRIER CG RESULTANT ACCELERATION



MCA Research
01-19-1999 16:02

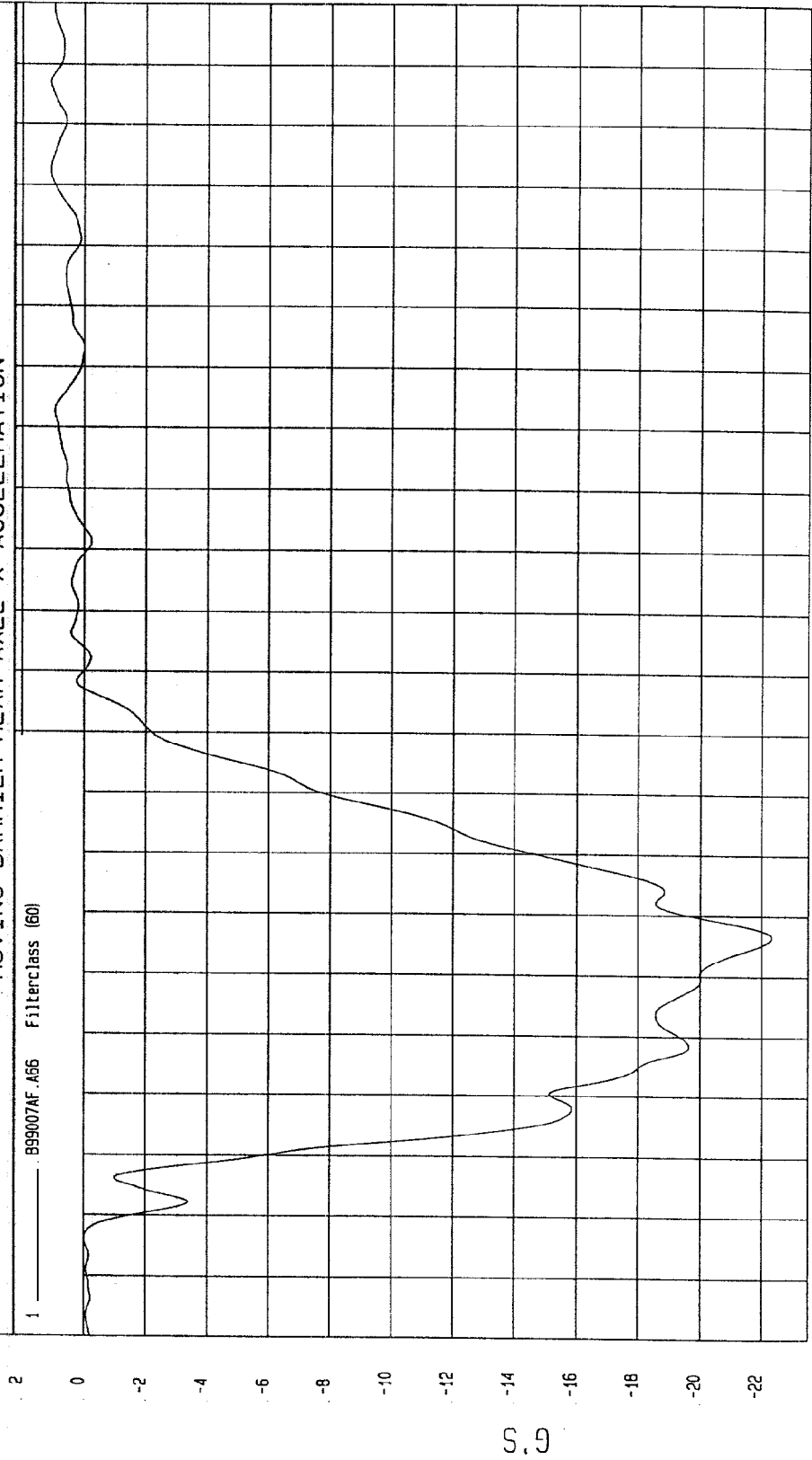
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

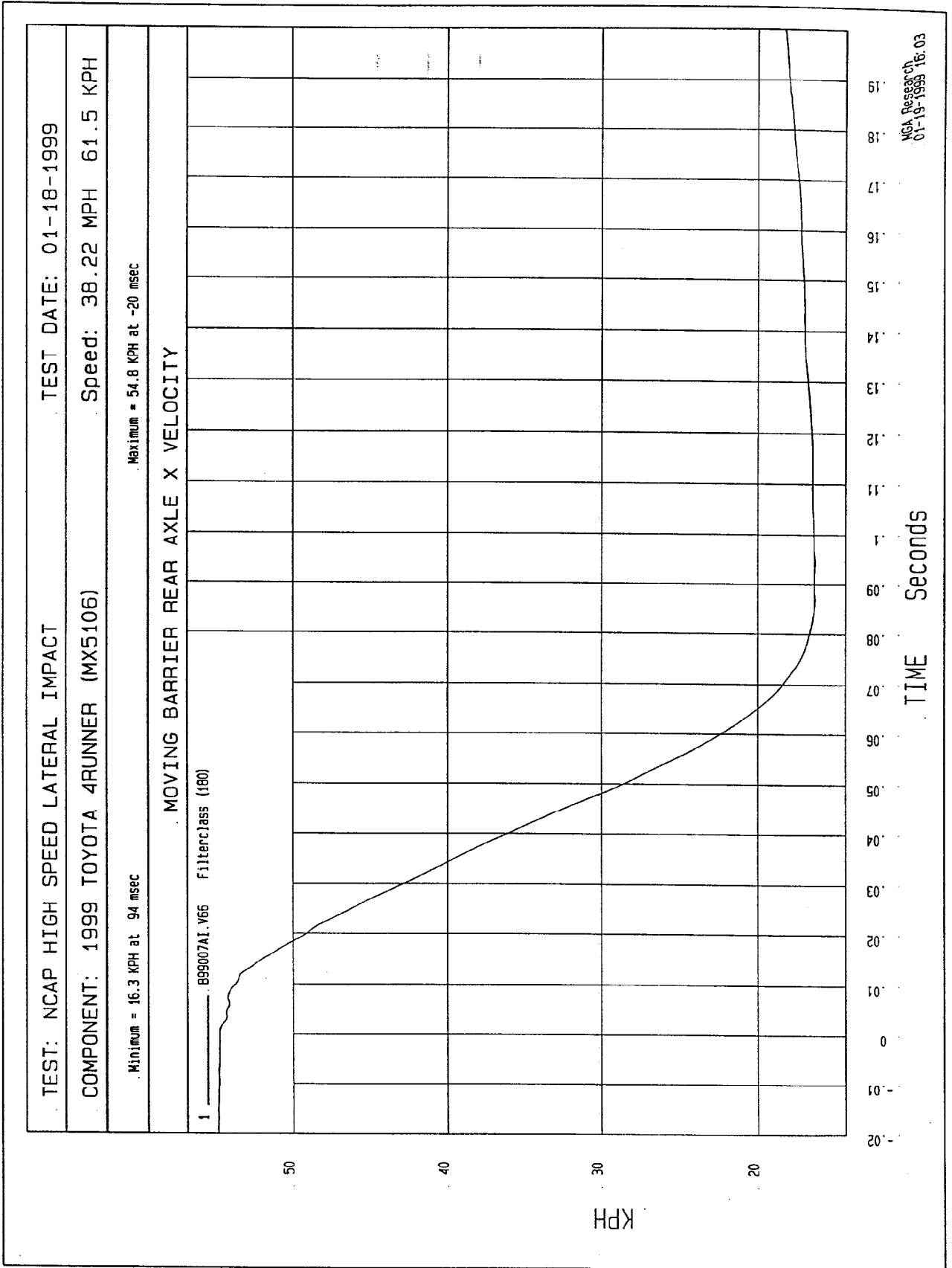
COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -22.32 G'S at 47 msec
Maximum = 1.08 G'S at 172 msec

MOVING BARRIER REAR AXLE X ACCELERATION

1 ——— B99007AF.A56 Filterclass (60)





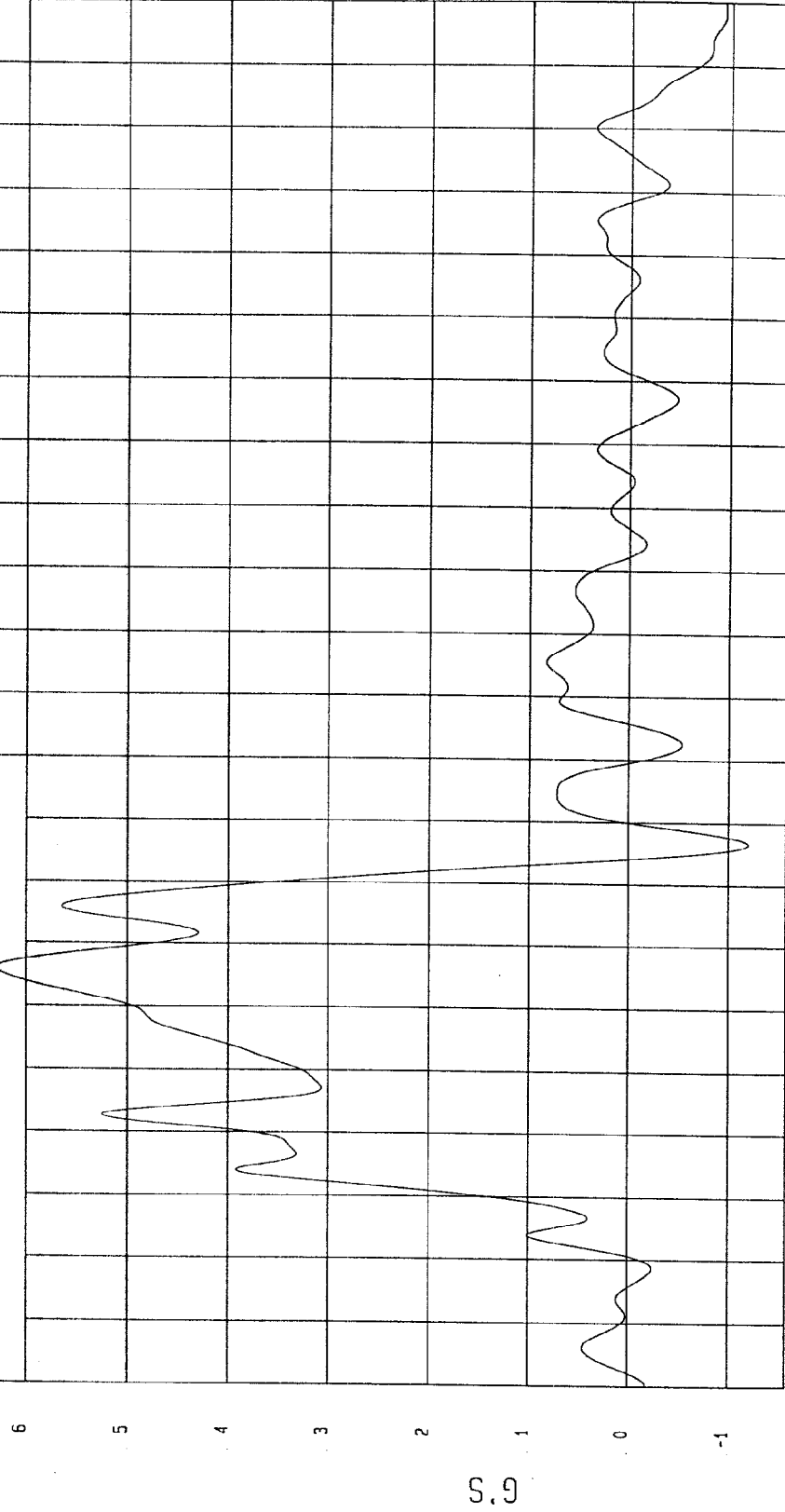
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -1.2 G'S at 67 msec
Maximum = 6.3 G'S at 46 msec

MOVING BARRIER REAR AXLE Y ACCELERATION

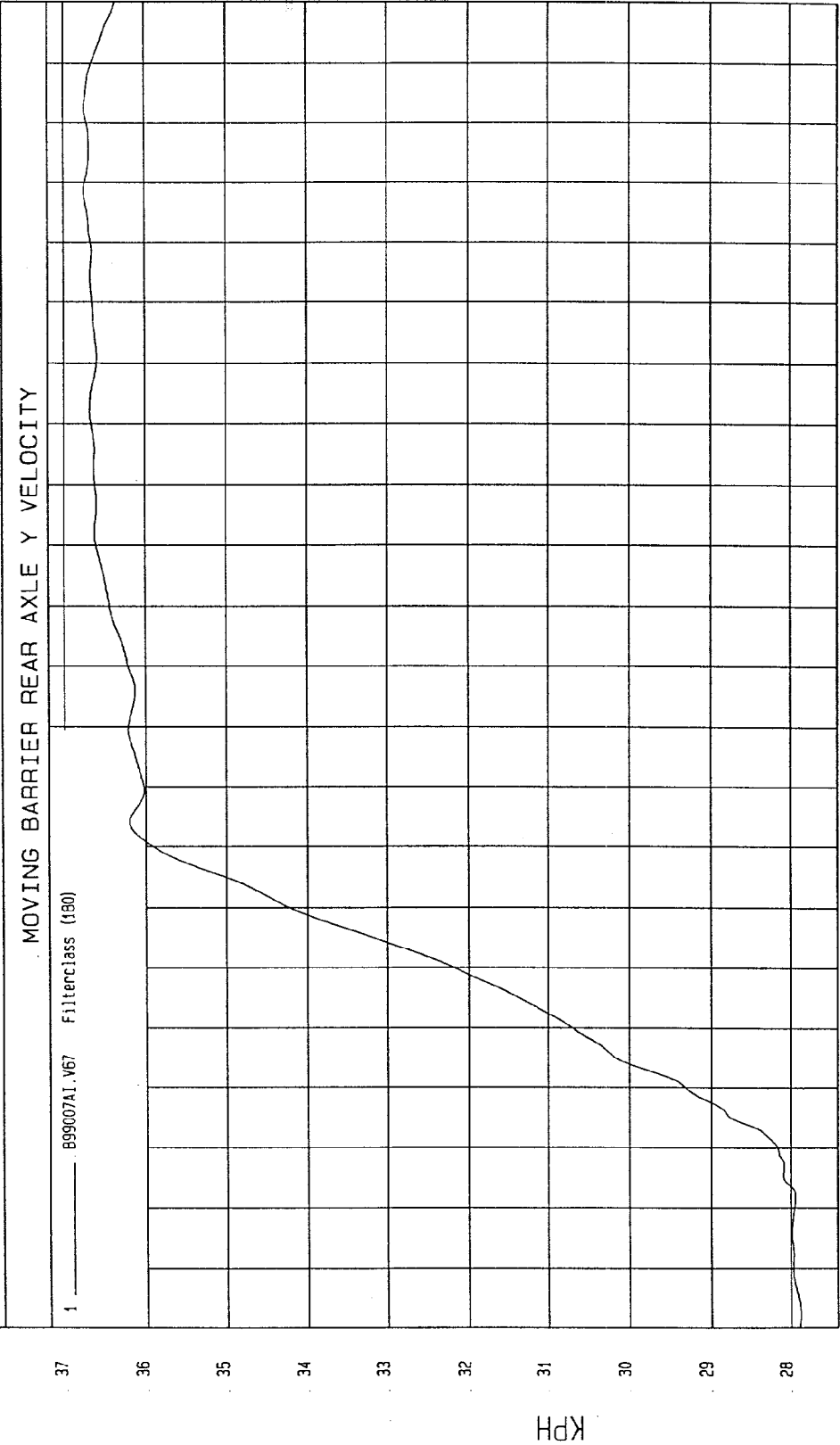
1 ——— B99007AF.A67 Filterclass (60)



TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = 27.88 KPH at -18 msec Maximum = 36.75 KPH at 169 msec



TIME Seconds

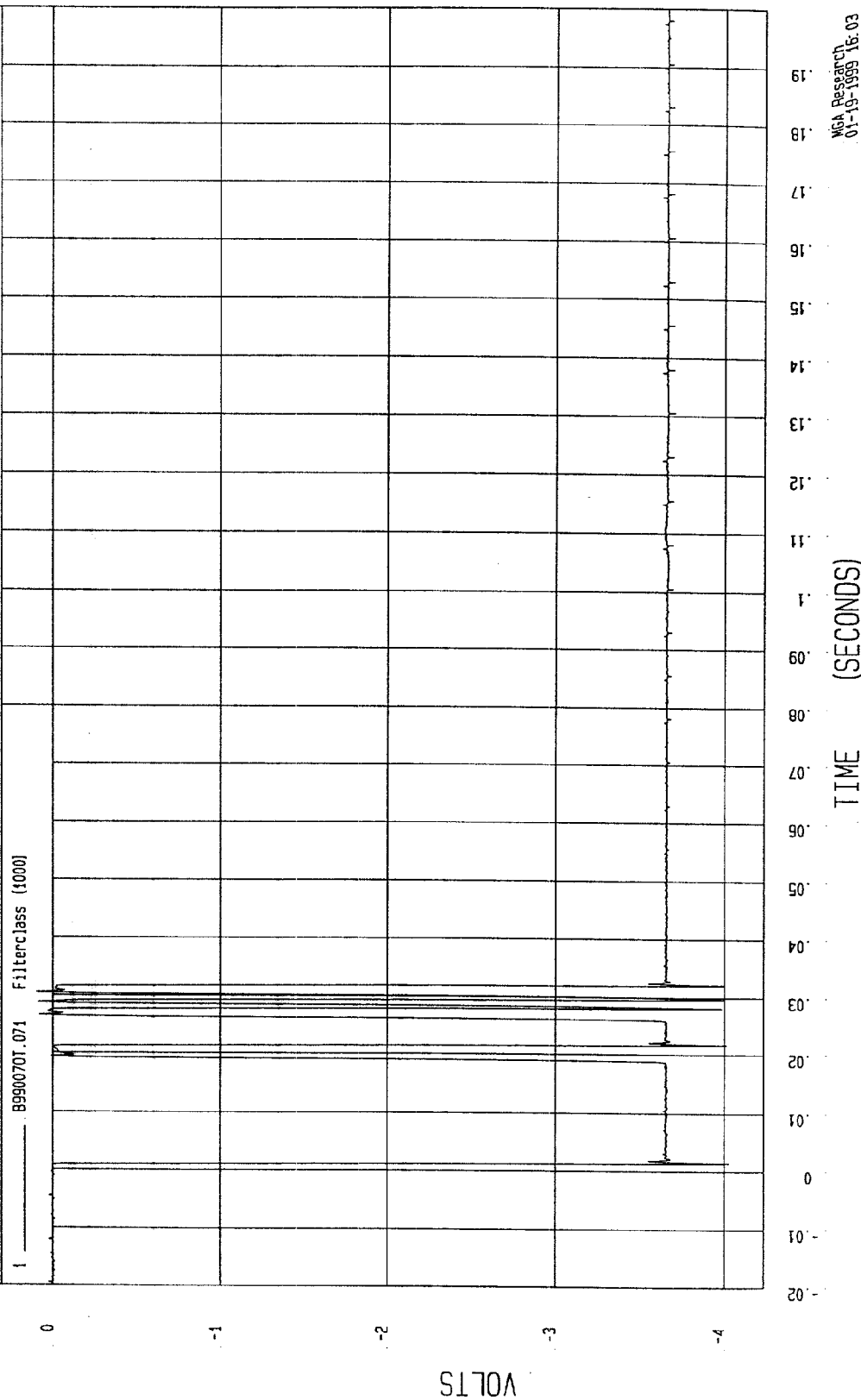
MSA Research
01-29-1999 15:39

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -4.03 VOLTS at: 1 msec Maximum = 9.50E-02 VOLTS at 30 msec

LEFT BARRIER CONTACT



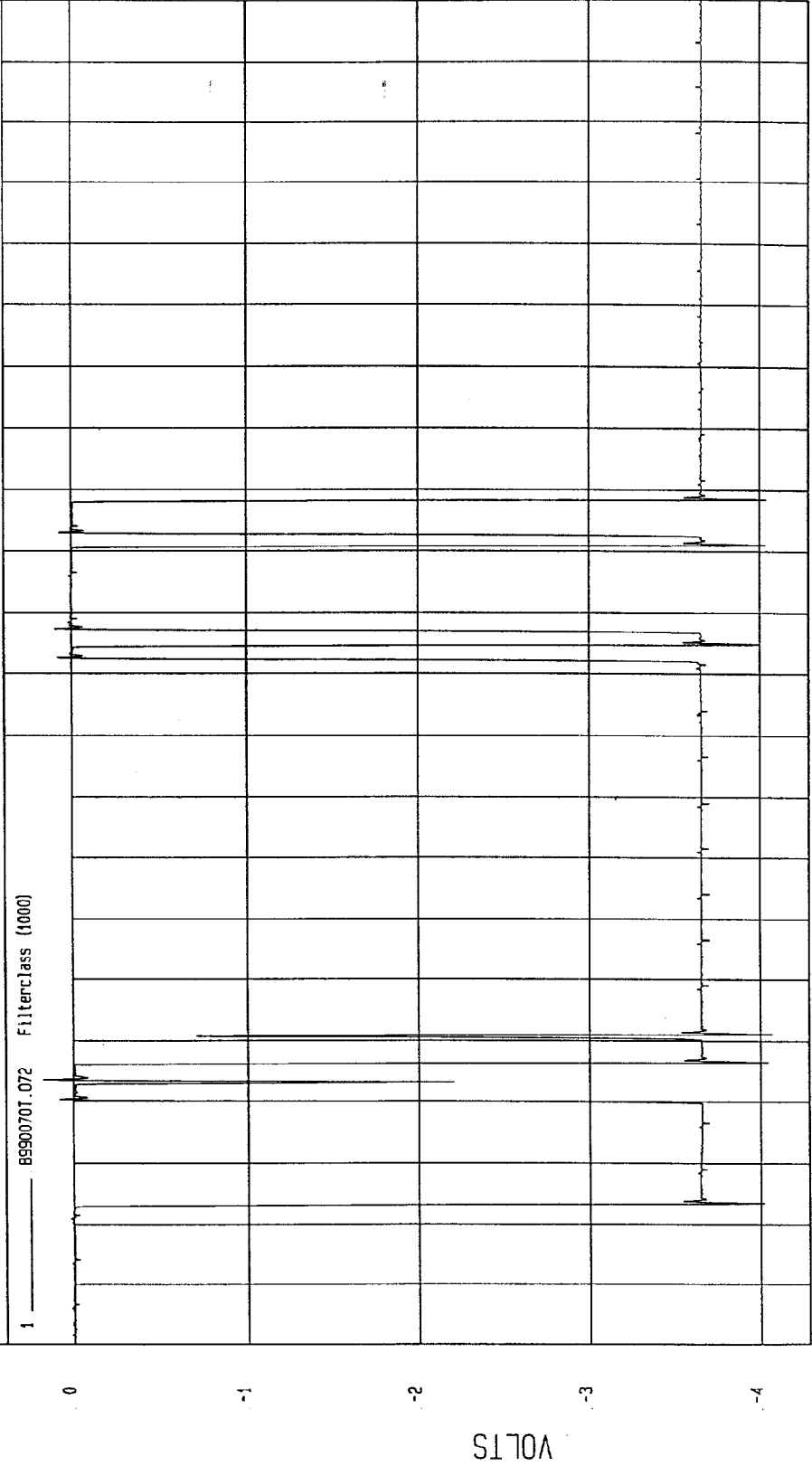
WGL Research
01-18-1999 18:03

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -4.07 VOLTS at 31 msec Maximum = .17 VOLTS at 24 msec

RIGHT BARRIER CONTACT

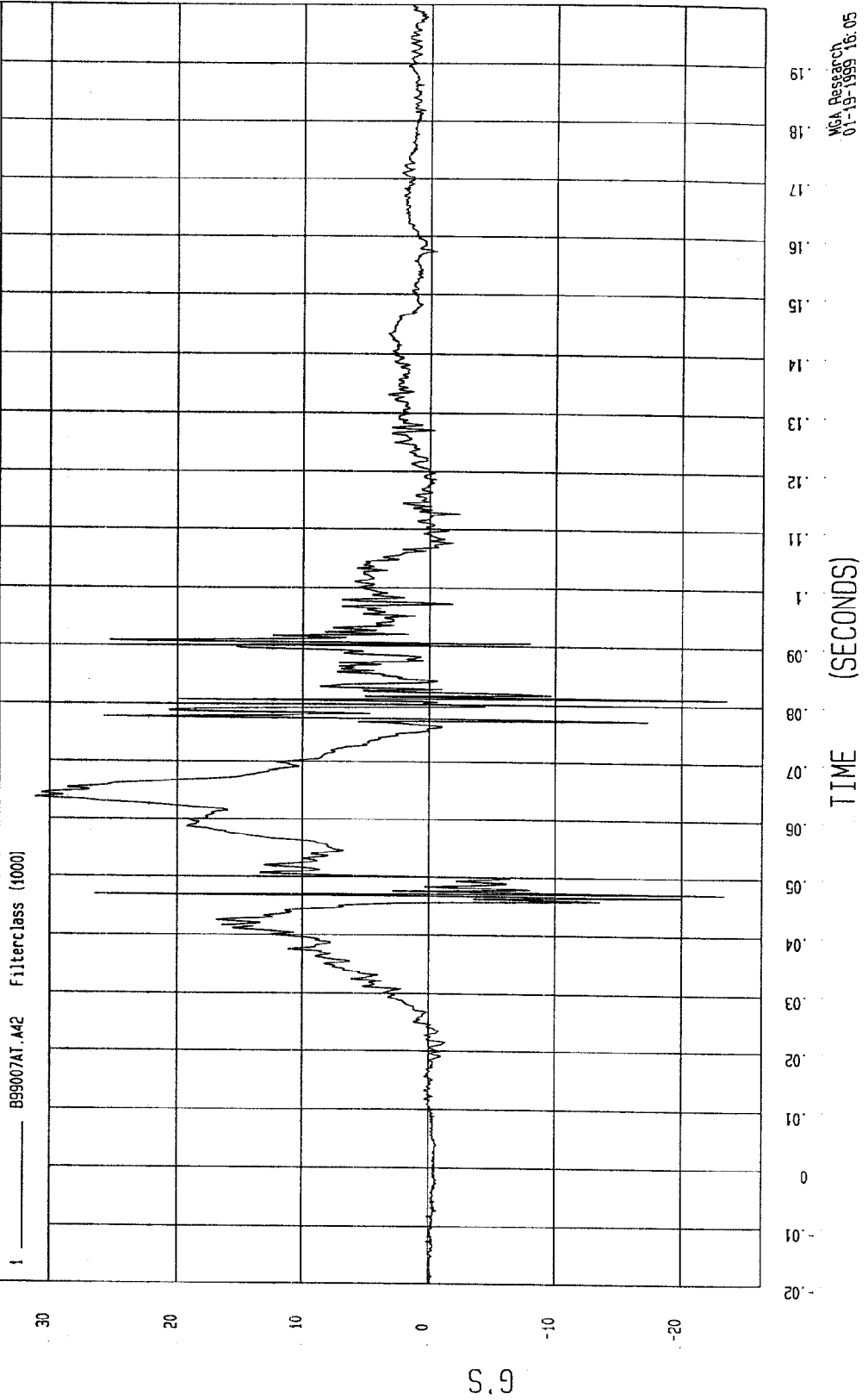


TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -23.52 G'S at 81 msec Maximum = 31.13 G'S at 64 msec

DRIVER UPPER RIB Y REDUNDANT ACCELERATION

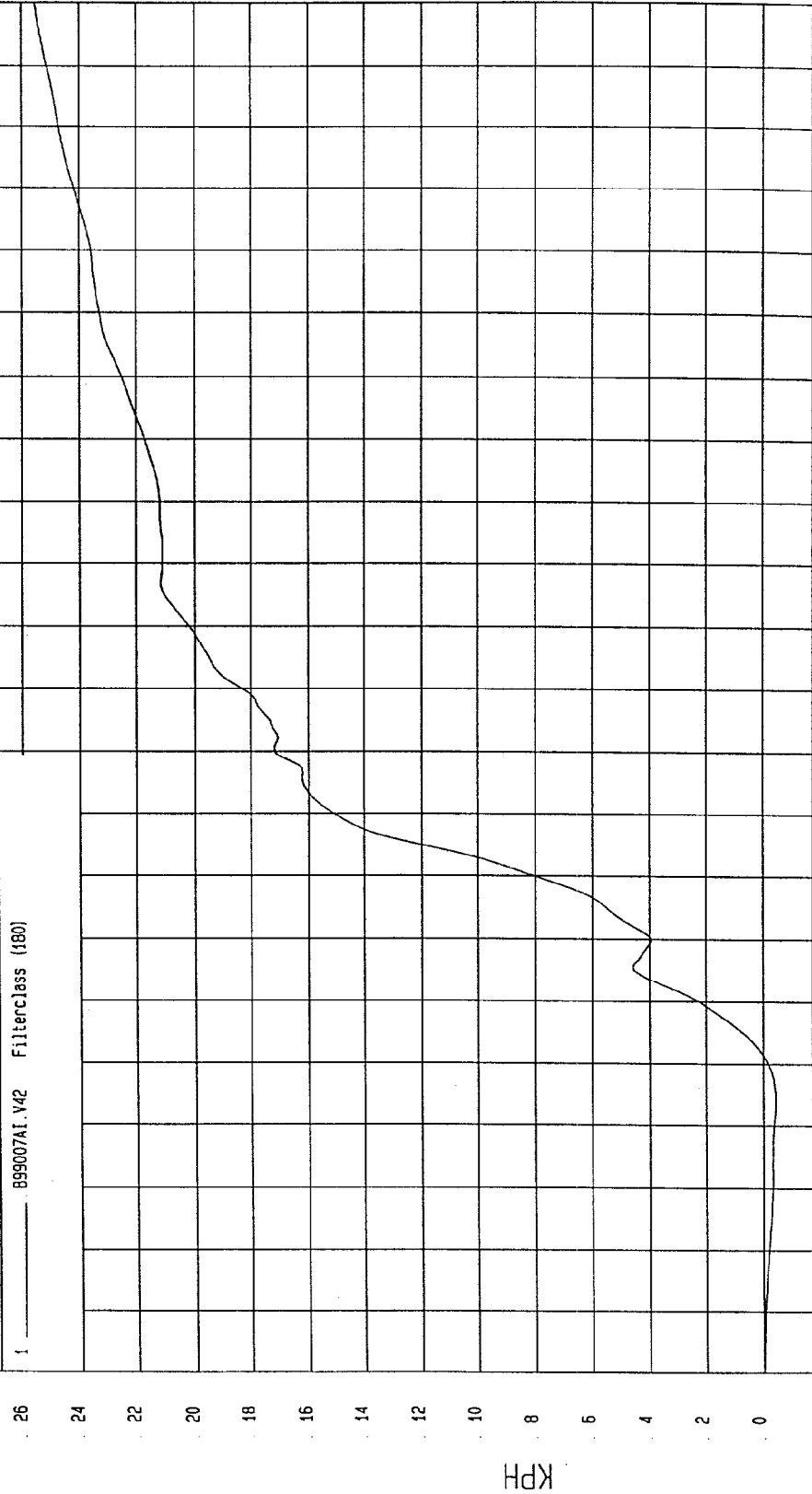


TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -43 KPH at 24 msec Maximum = 25.54 KPH at 200 msec

DRIVER UPPER RIB Y REDUNDANT VELOCITY



TIME Seconds

WCA Research
01-19-1999 16:05

TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

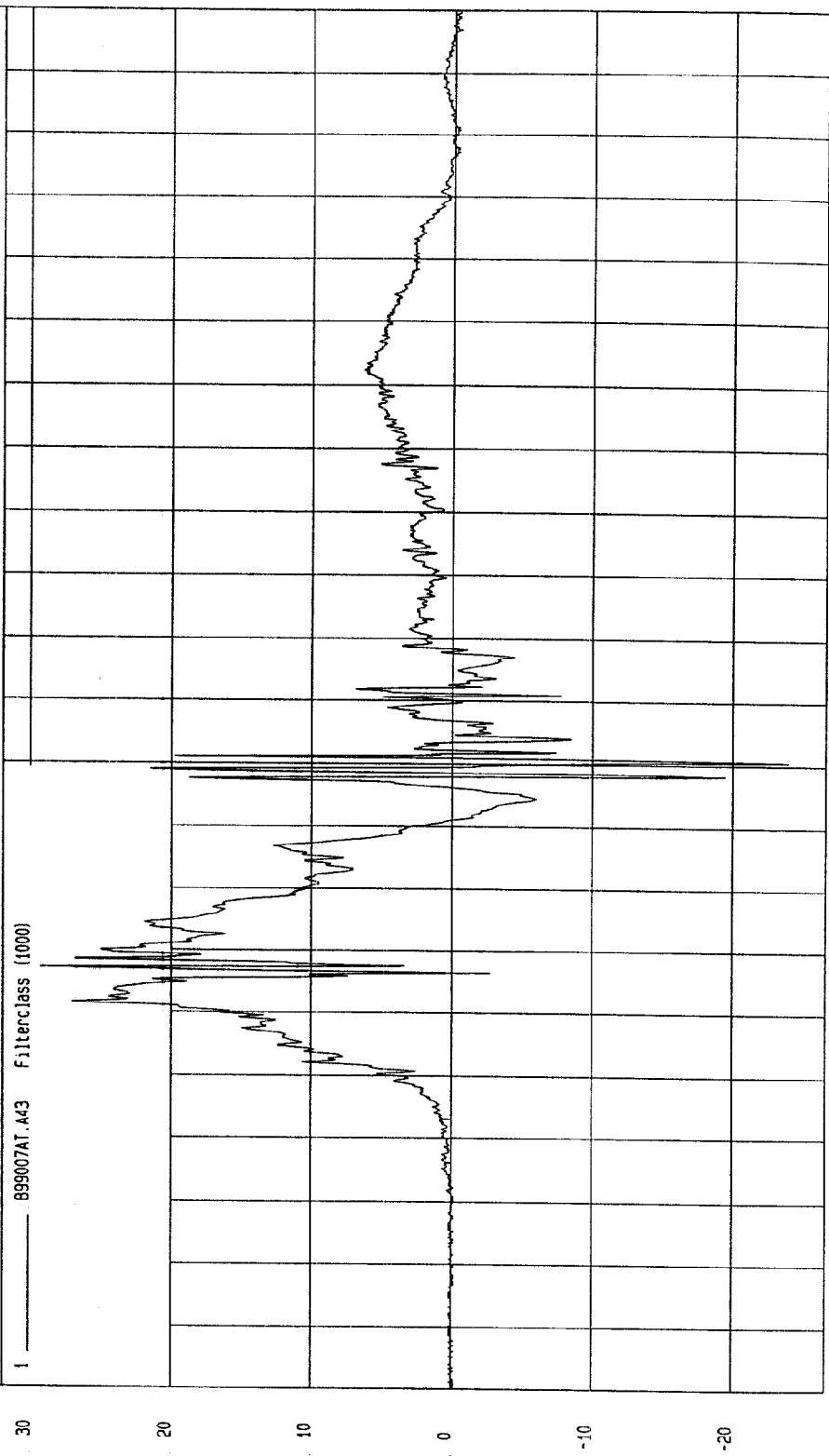
Speed: 38.22 MPH 61.5 KPH

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

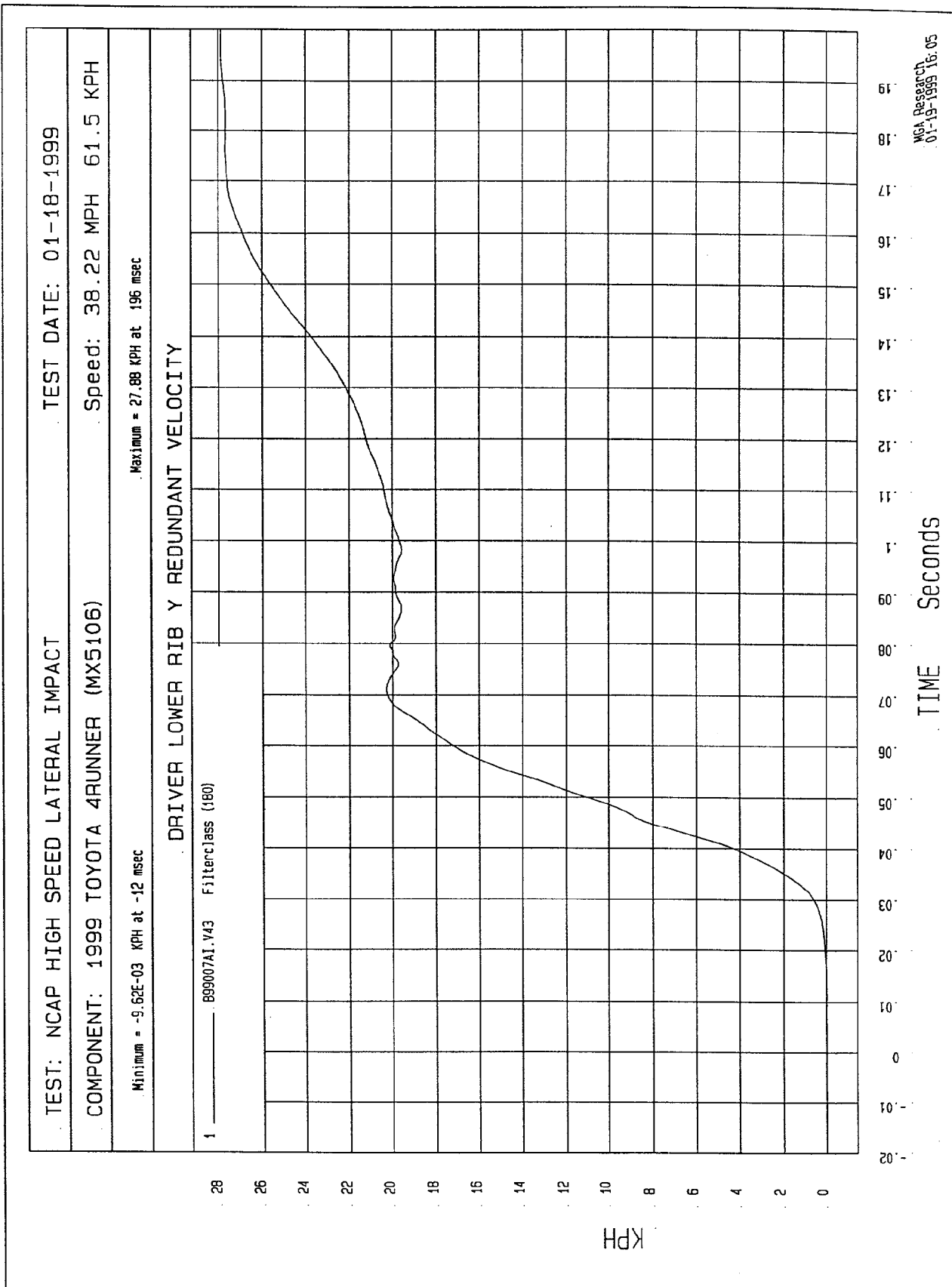
Maximum = 29.25 G'S at 47 msec

Minimum = -23.94 G'S at 81 msec

DRIVER LOWER RIB Y REDUNDANT ACCELERATION



MCA Research
01-19-1999 16:05



TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

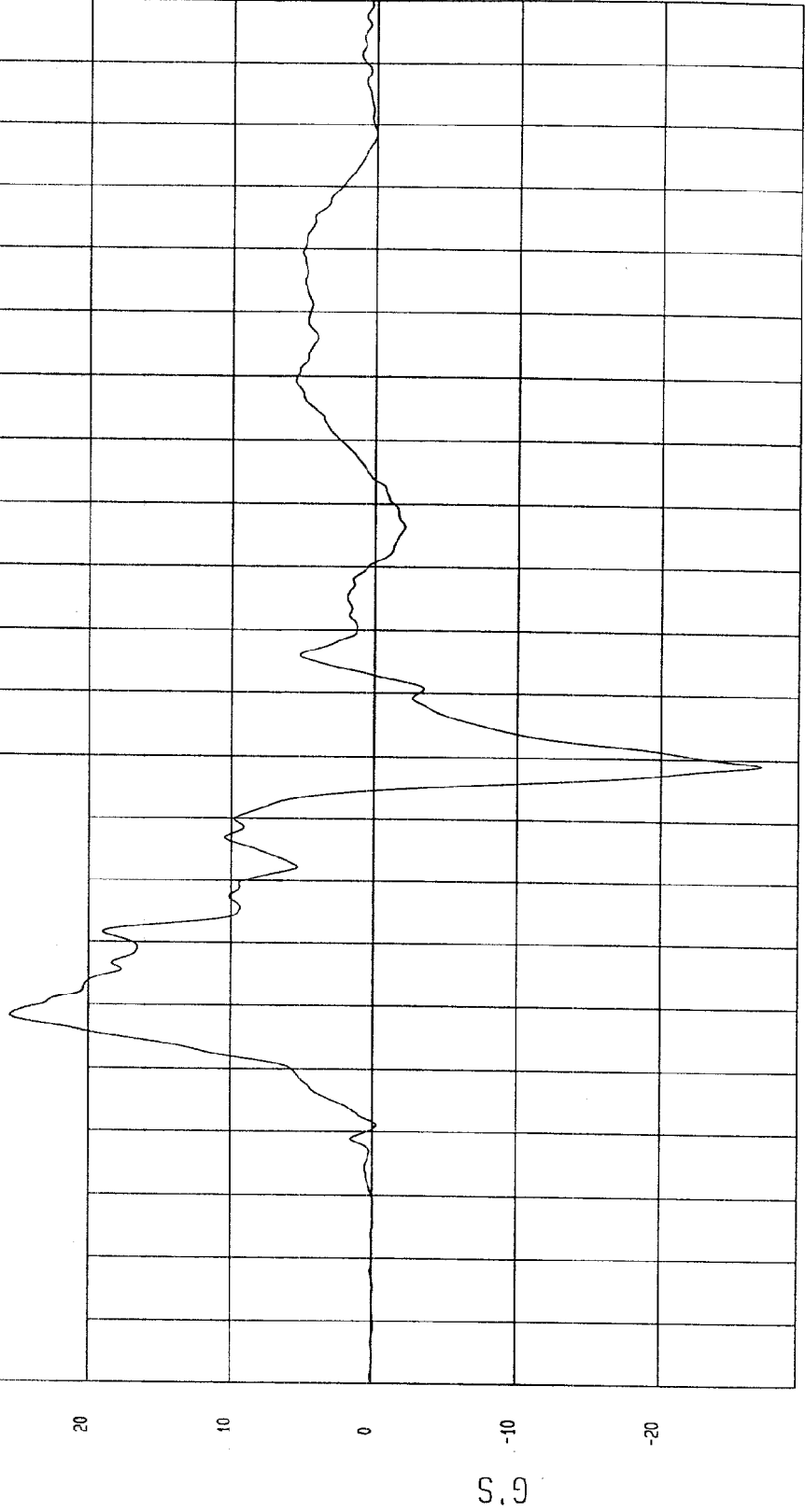
Speed: 38.22 MPH 61.5 KPH

Minimum = -25.97 G'S at 79 msec

Maximum = 25.46 G'S at 38 msec

DRIVER LOWER SPINE Y REDUNDANT ACCELERATION

1 ——— B99007AF.A44 Filterclass (180)



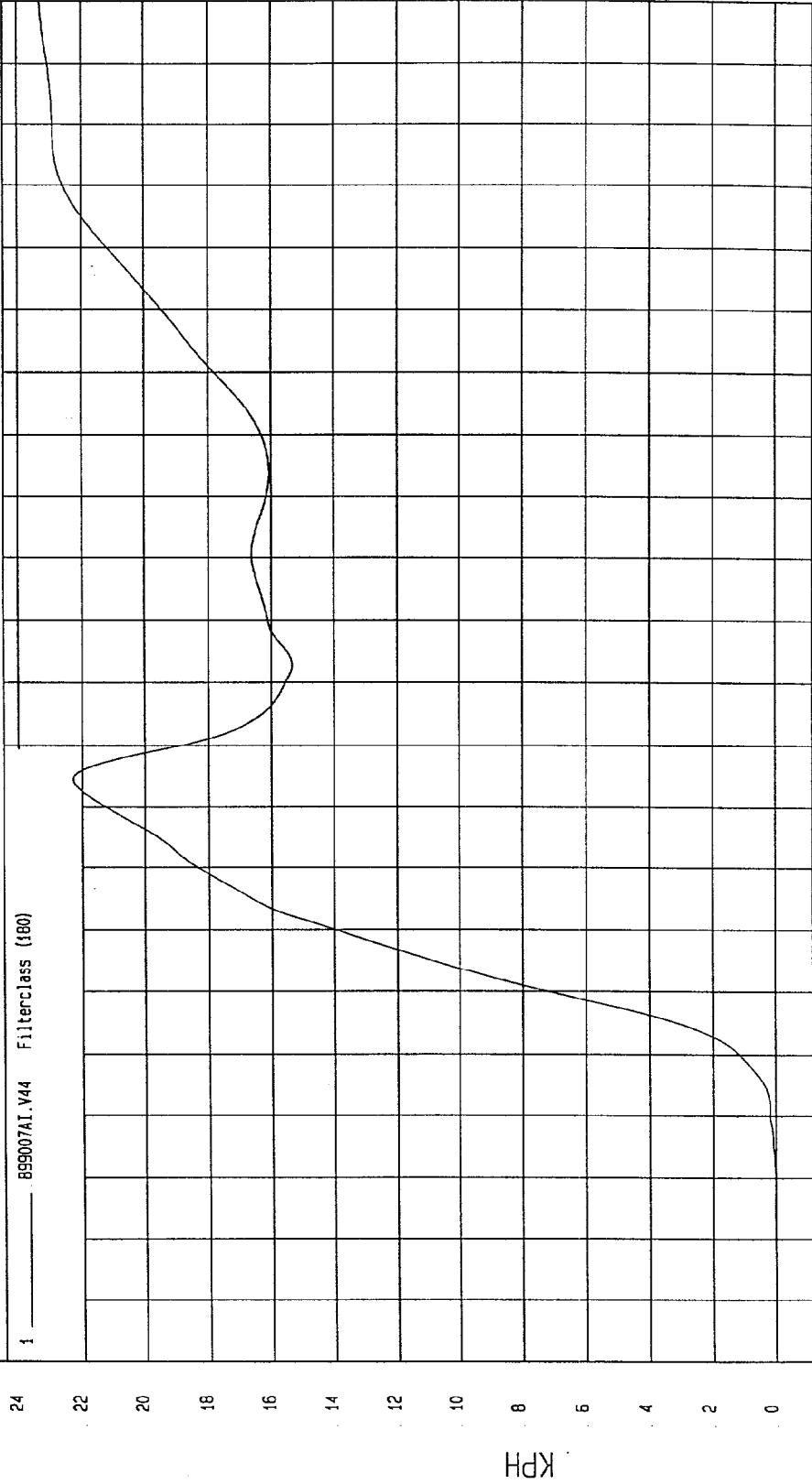
MCA Research
01-19-1999 16:05

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = 0 KPH at -20 msec Maximum = 23.3 KPH at 200 msec

DRIVER LOWER SPINE Y REDUNDANT VELOCITY



TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

SPEED: 38.22 MPH 61.5 KPH

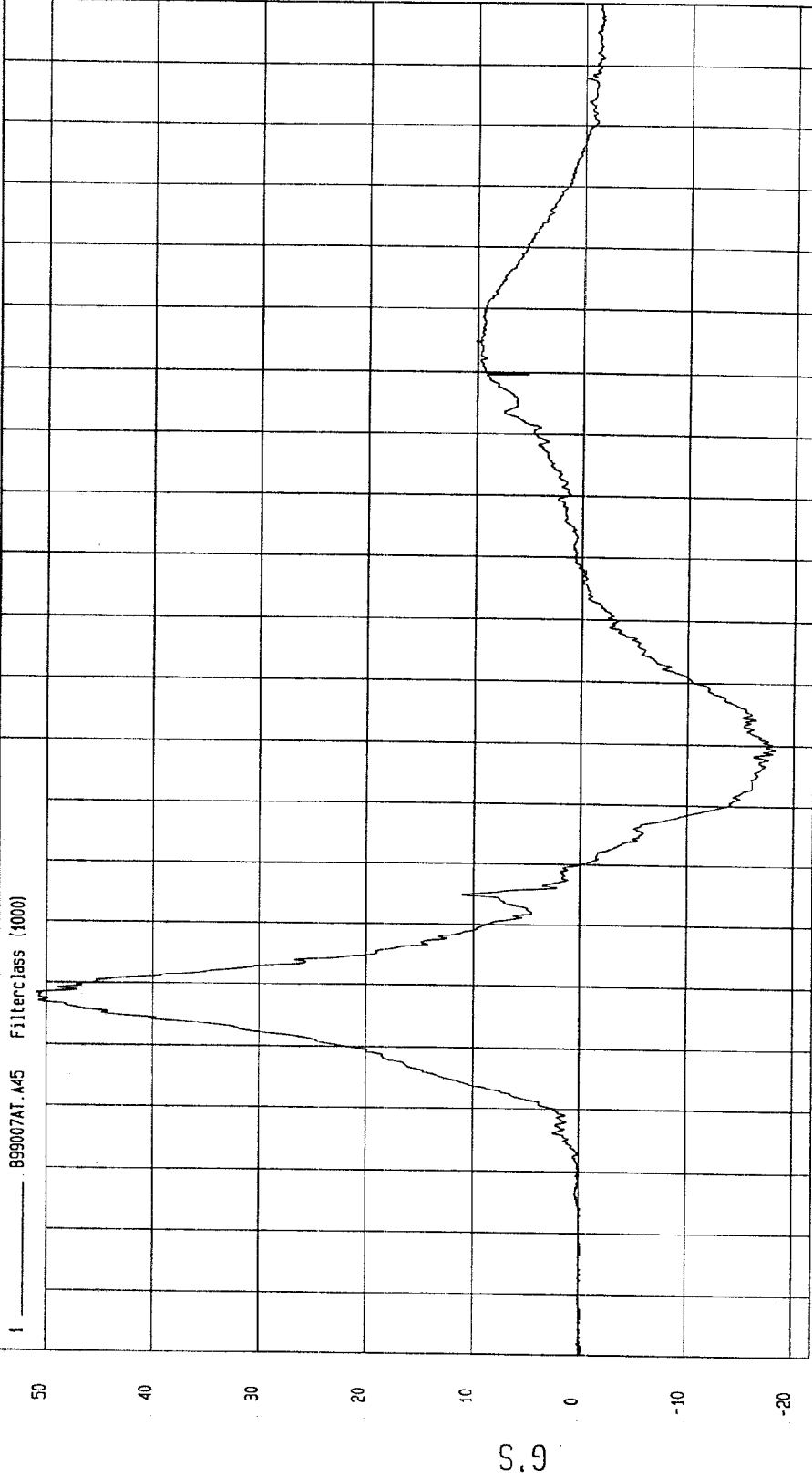
COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

Maximum = 50.97 G's at 38 msec

Minimum = -18.31 G's at 79 msec

DRIVER PELVIS Y REDUNDANT ACCELERATION

1 B99007AT.A45 Filterclass (1000)

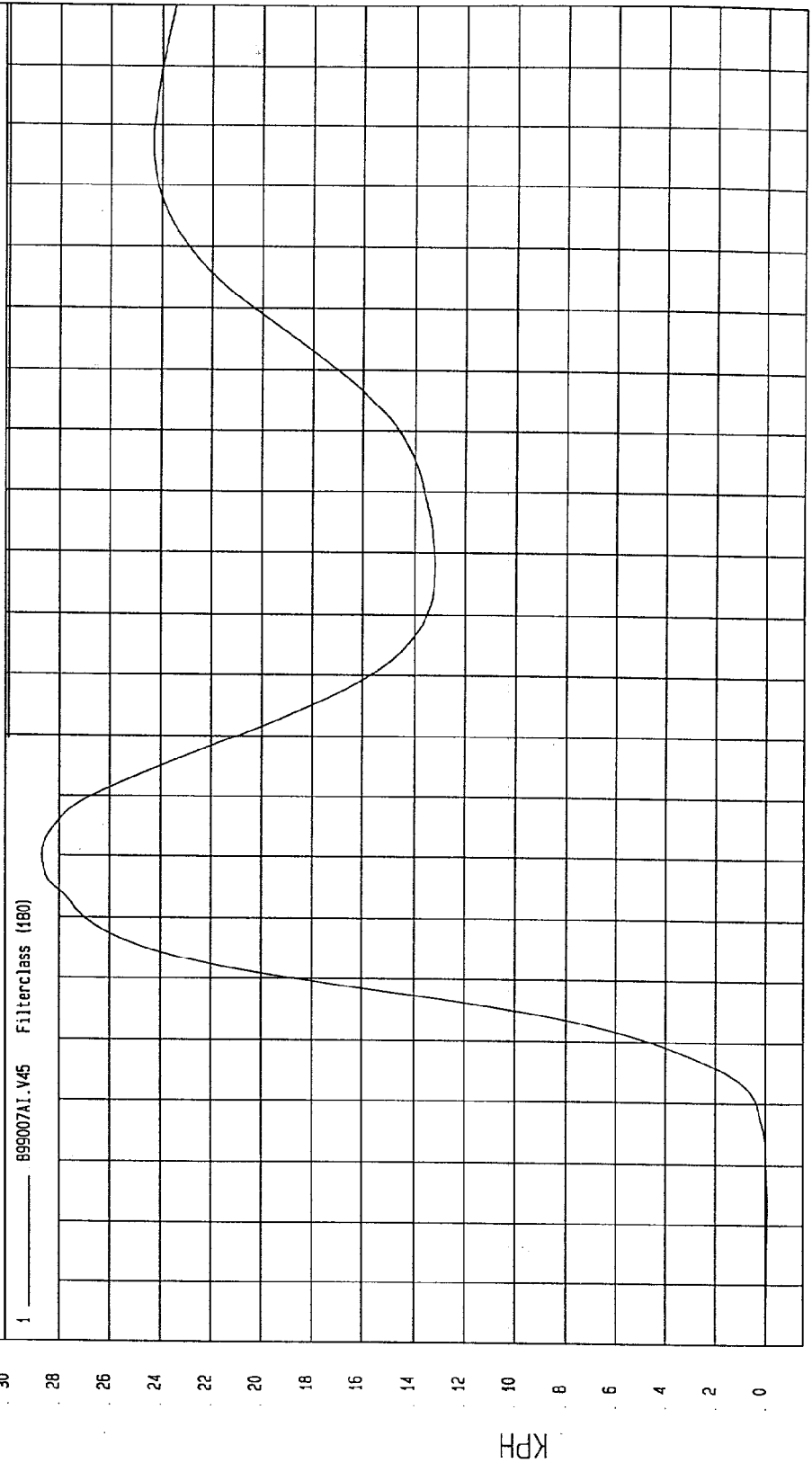


TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -6.55E-02 KPH at 4 msec Maximum = 28.69 KPH at 60 msec

DRIVER PELVIS Y REDUNDANT VELOCITY

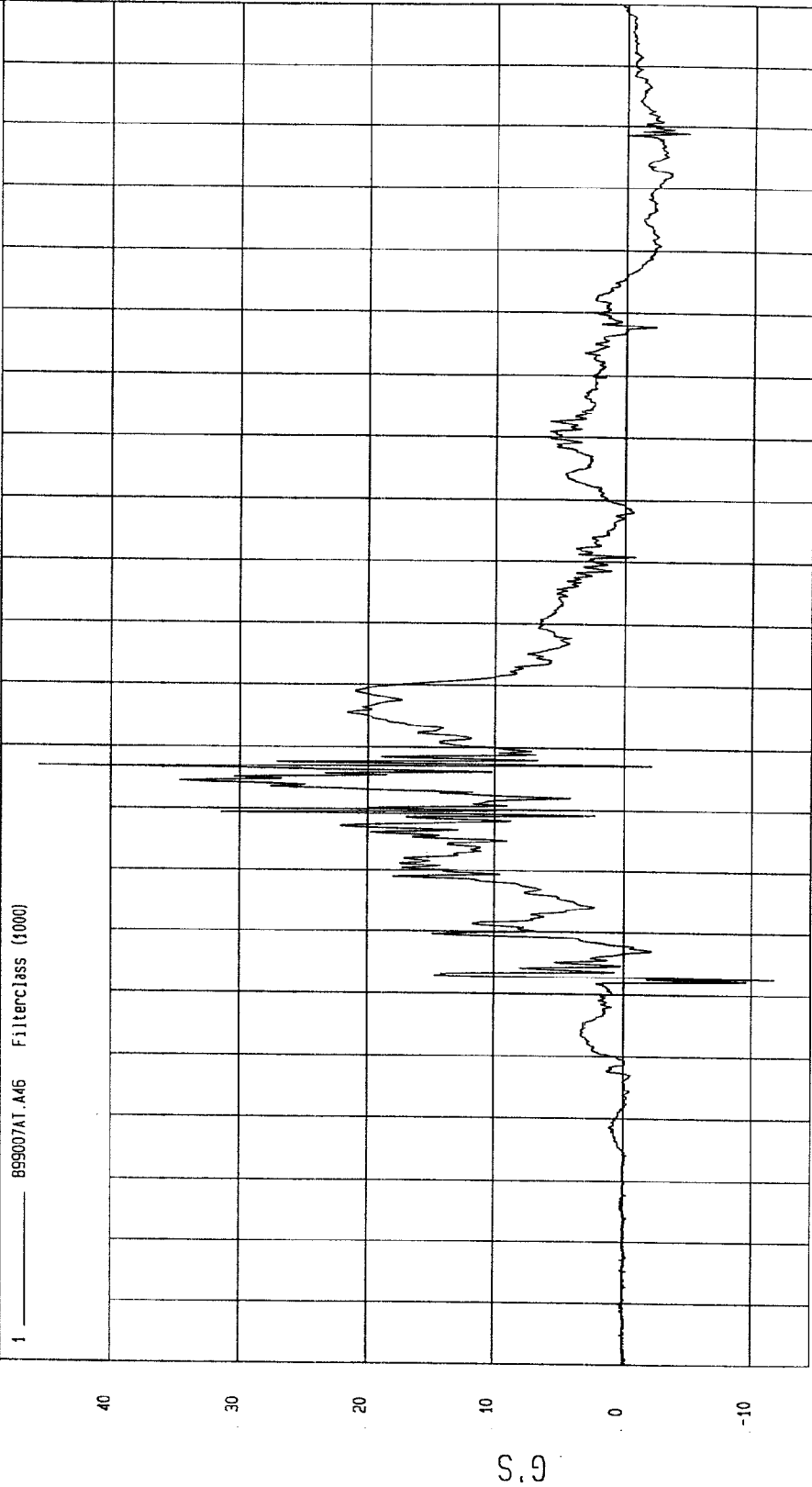


TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -11.77 G'S at 42 msec Maximum = 45.68 G'S at 77 msec

REAR PASSENGER UPPER RIB Y REDUNDANT ACCELERATION

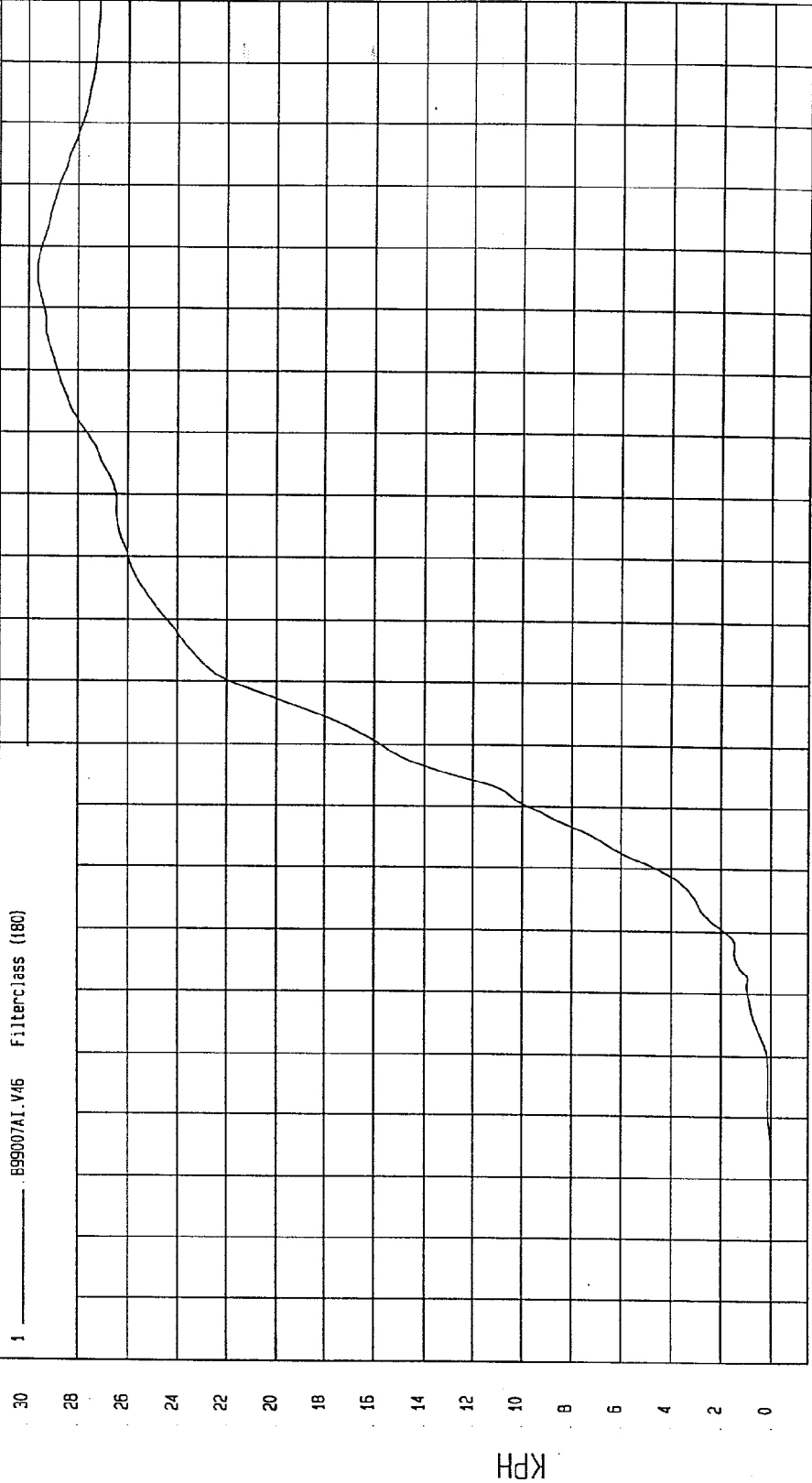


TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -1.13E-02 KPH at -12 msec Maximum = 29.64 KPH at 156 msec

REAR PASSENGER UPPER RIB Y REDUNDANT VELOCITY



TIME Seconds

MGA Research
01-19-1999 16:05

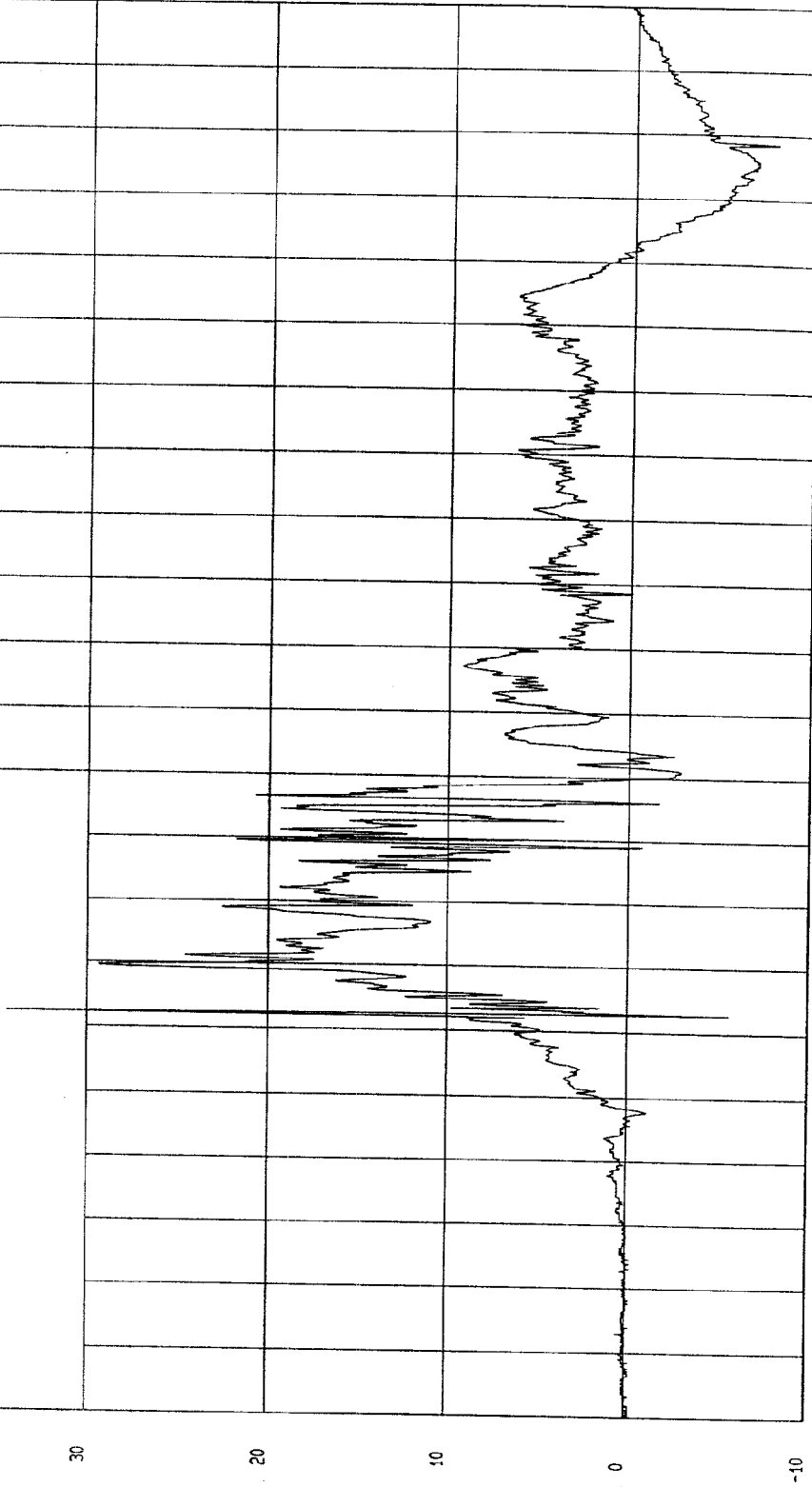
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

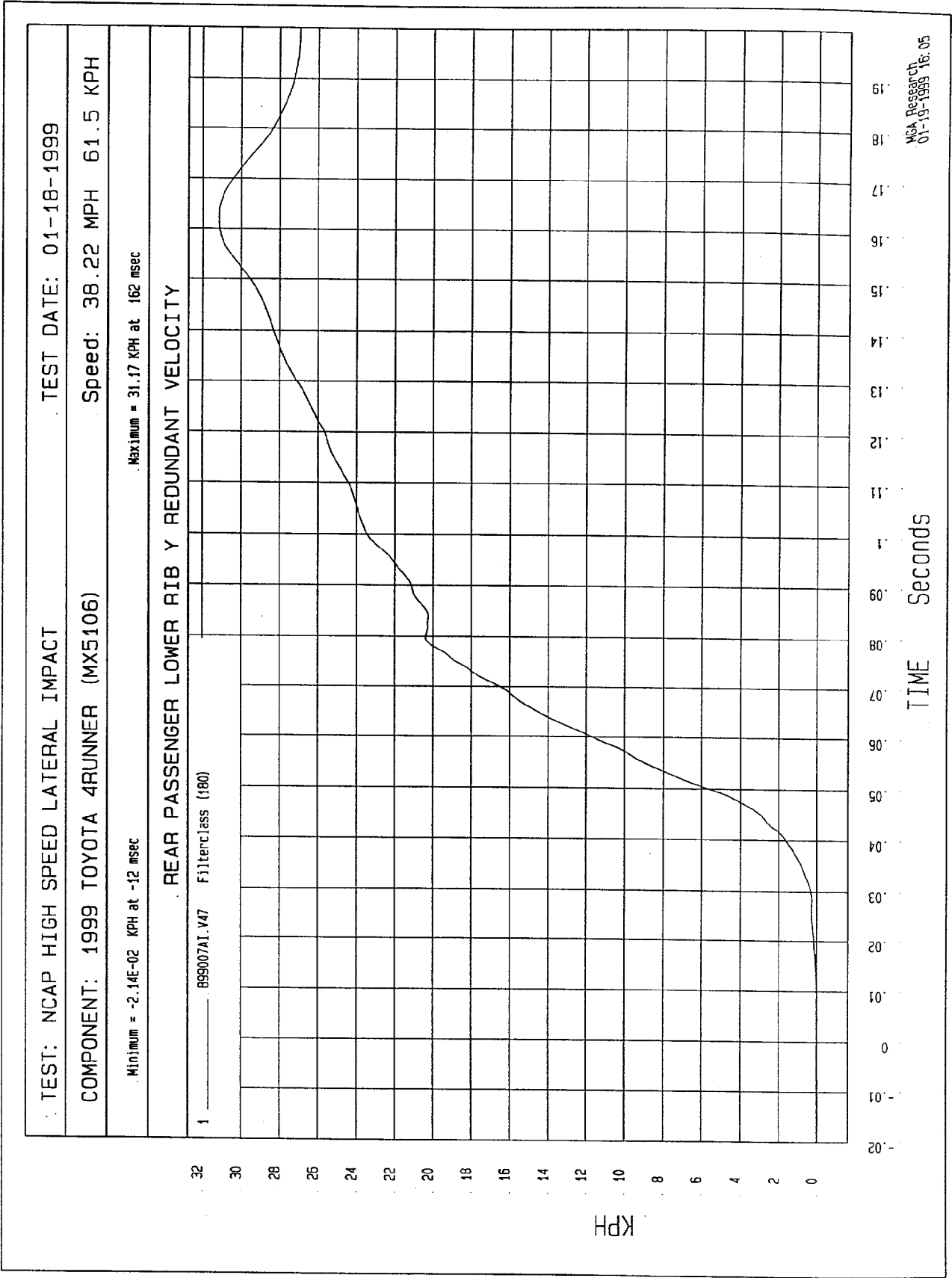
COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -7.93 G'S at 178 msec Maximum = 34.41 G'S at 42 msec

REAR PASSENGER LOWER RIB Y REDUNDANT ACCELERATION

1 899007AT.A47 Filterclass (1000)





TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

Speed: 38.22 MPH 61.5 KPH

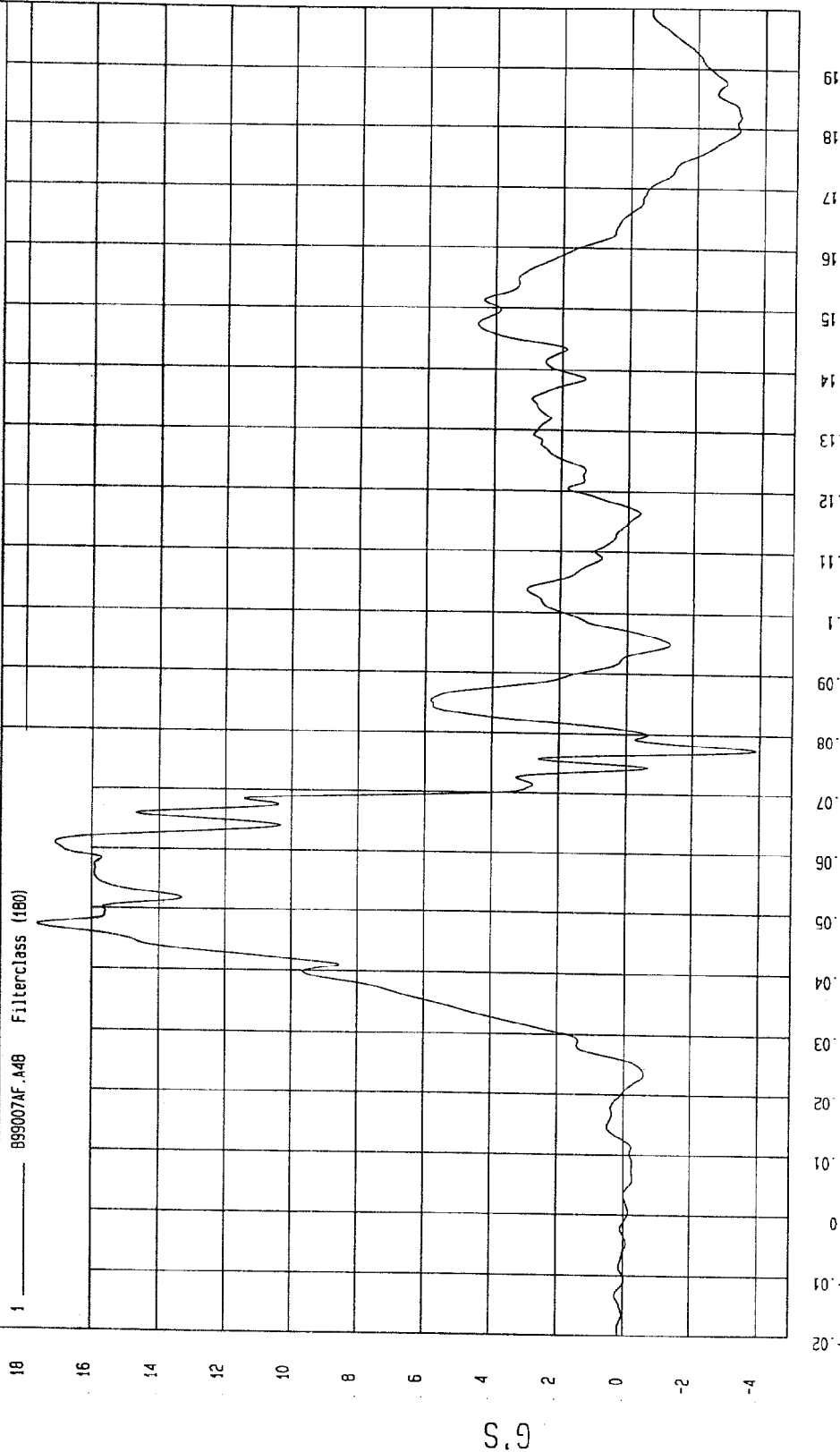
COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

Maximum = 17.65 G'S at 47 msec

Minimum = -3.88 G'S at 77 msec

REAR PASSENGER LOWER SPINE Y REDUNDANT ACCELERATION

1 — 899007AF.A48 Filterclass (180)



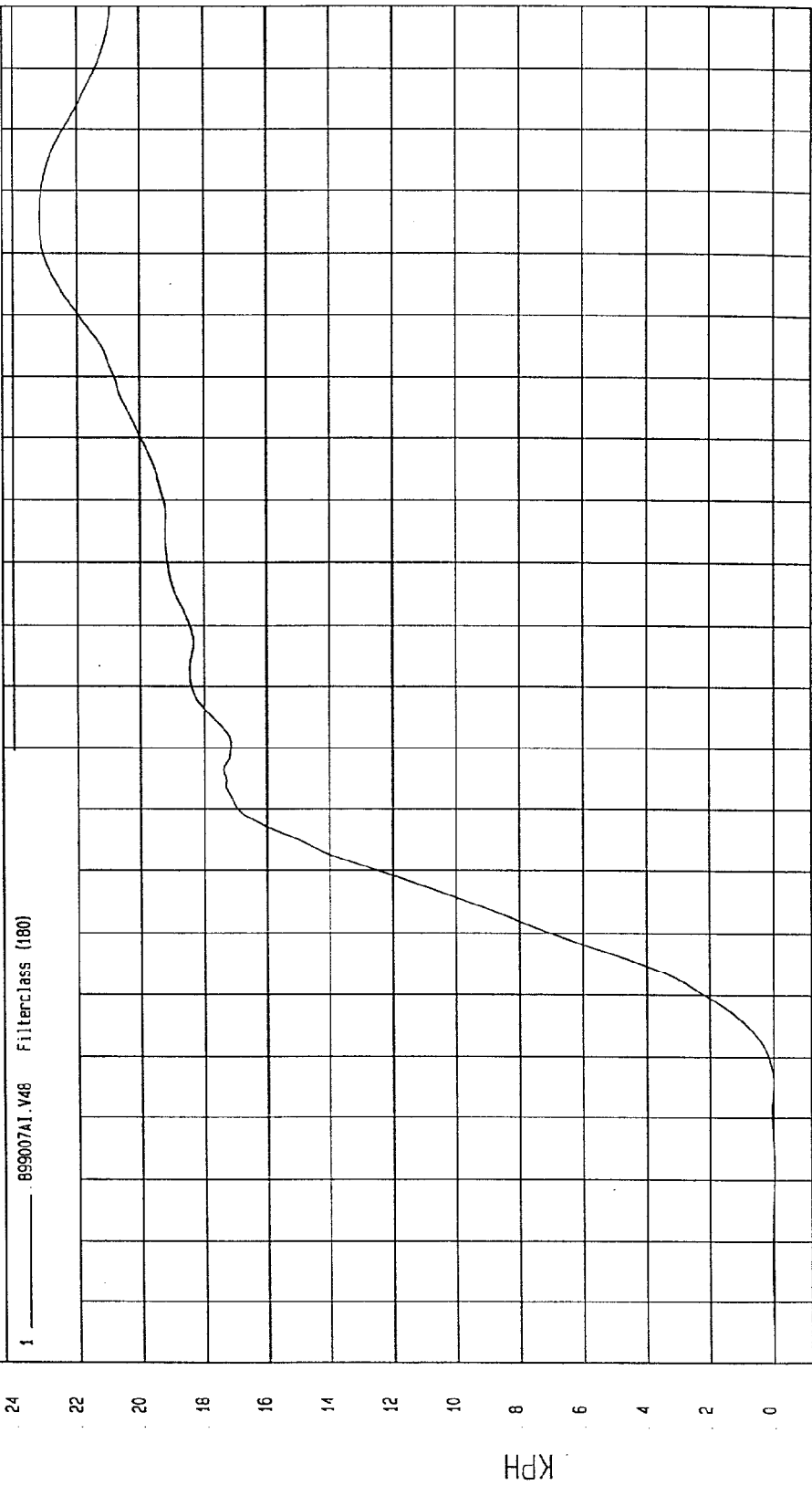
MCA Research
01-19-1999 16.05

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -2.70E-02 KPH at 12 msec Maximum = 23.17 KPH at 166 msec

REAR PASSENGER LOWER SPINE Y REDUNDANT VELOCITY



TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

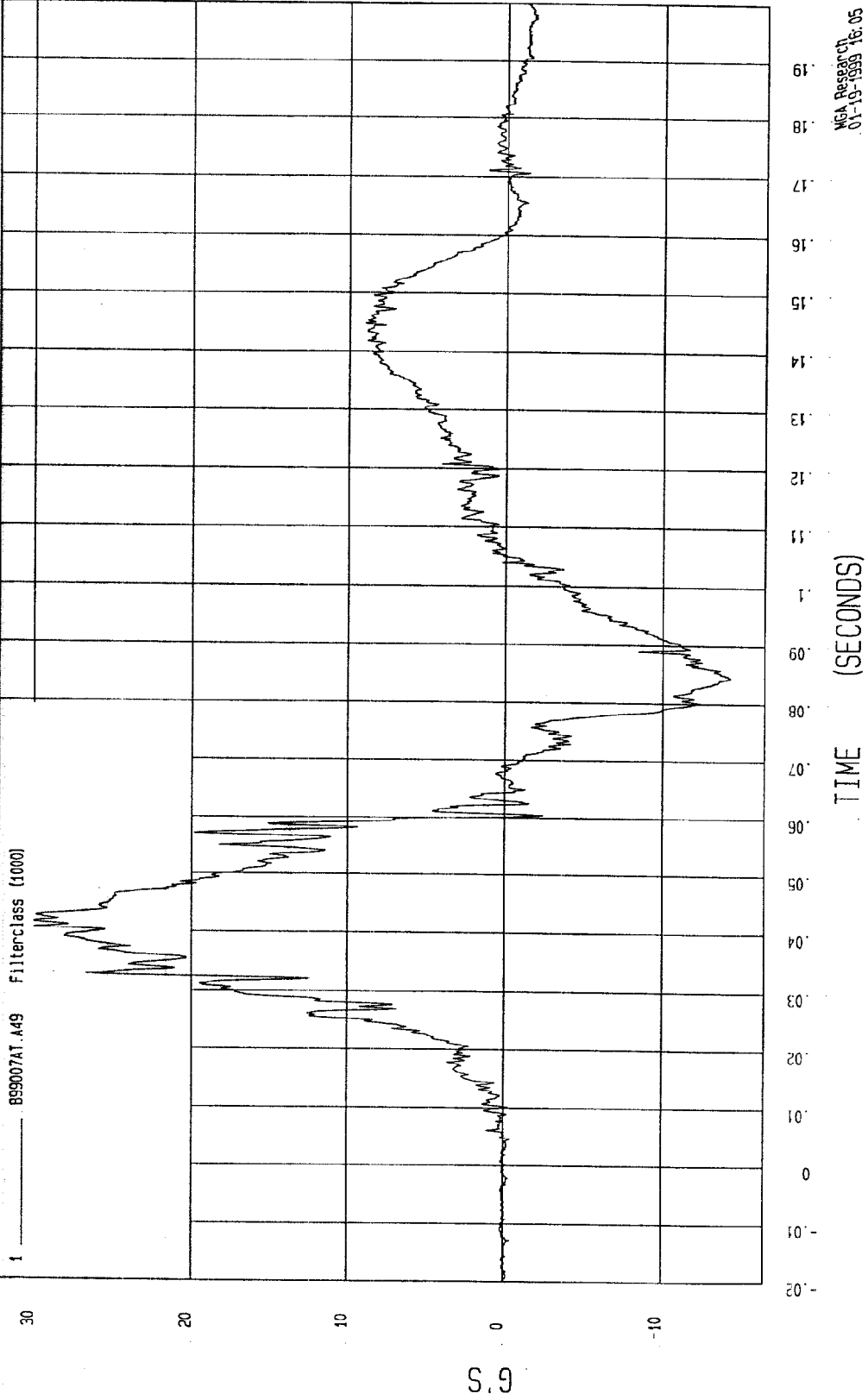
Speed: 38.22 MPH 61.5 KPH

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

Maximum = 30 G'S at 41 msec

Minimum = -14.2 G'S at 84 msec

REAR PASSENGER PELVIS Y REDUNDANT ACCELERATION

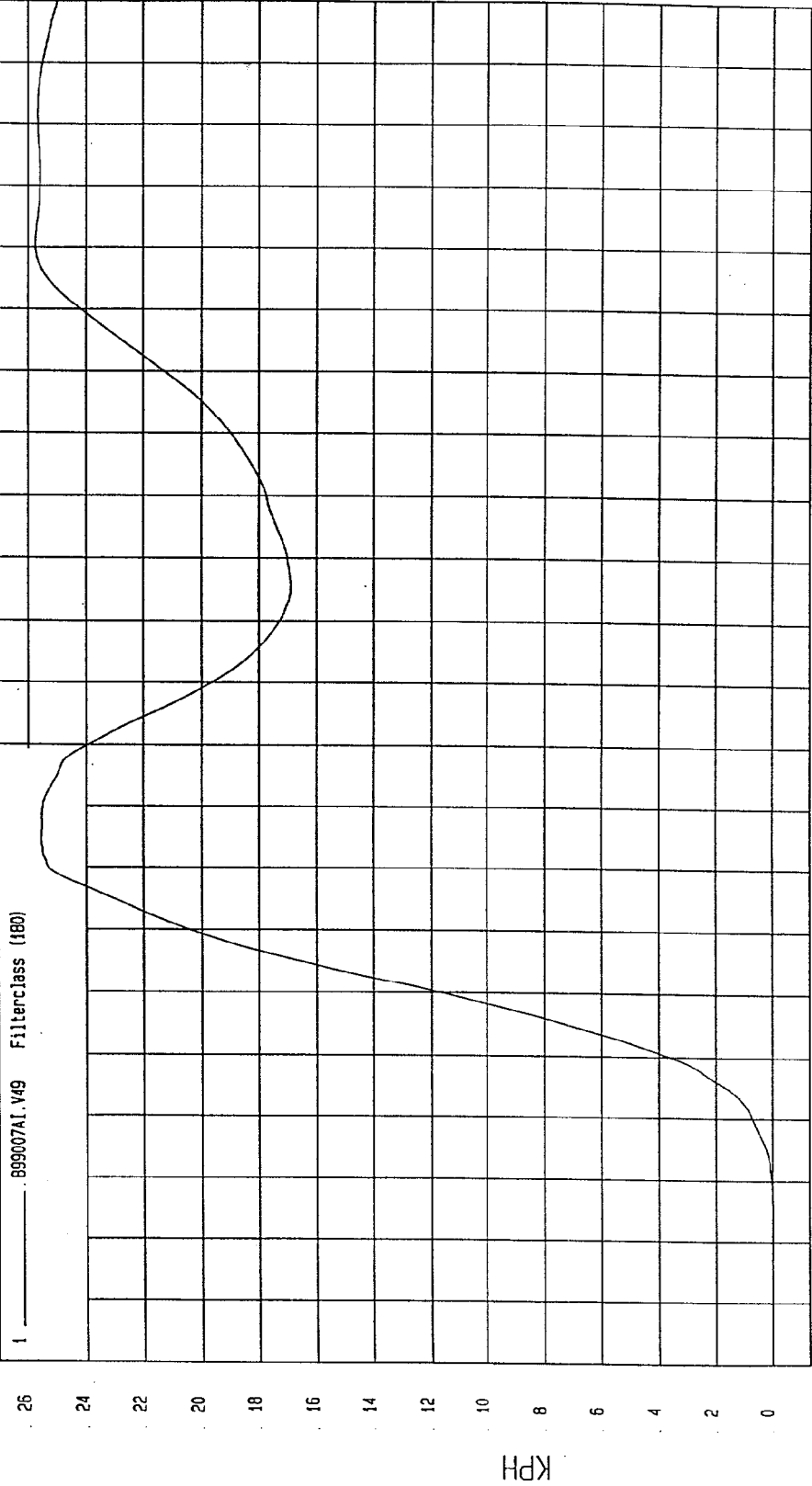


TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -2.06E-02 KPH at 5 msec Maximum = 25.75 KPH at 161 msec

REAR PASSENGER PELVIS Y REDUNDANT VELOCITY



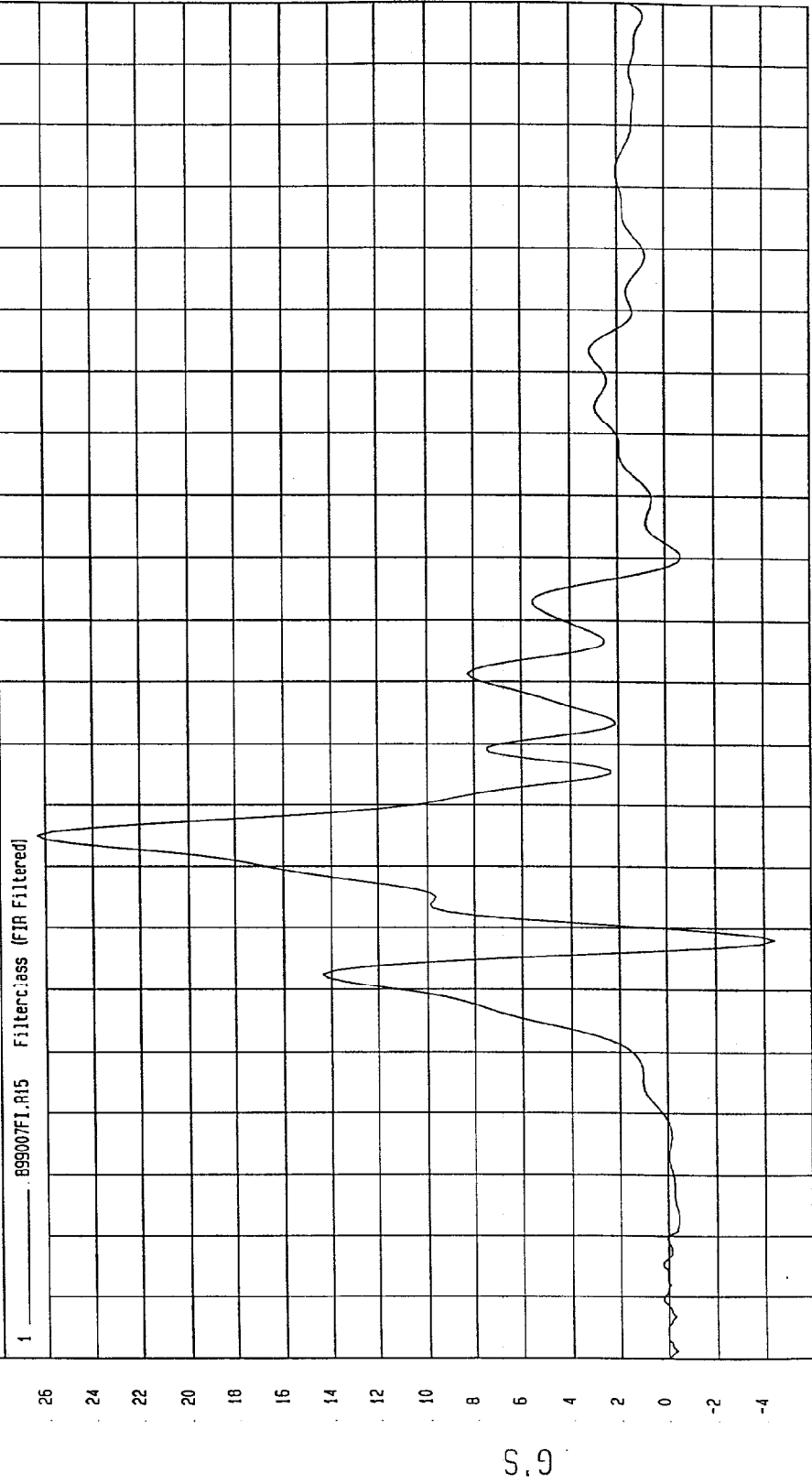
FINITE IMPULSE RESPONSE (FIR) FILTERED DATA

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -4.44 G'S at 48 msec Maximum = 26.34 G'S at 65 msec

DRIVER UPPER RIB Y ACCELERATION



TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

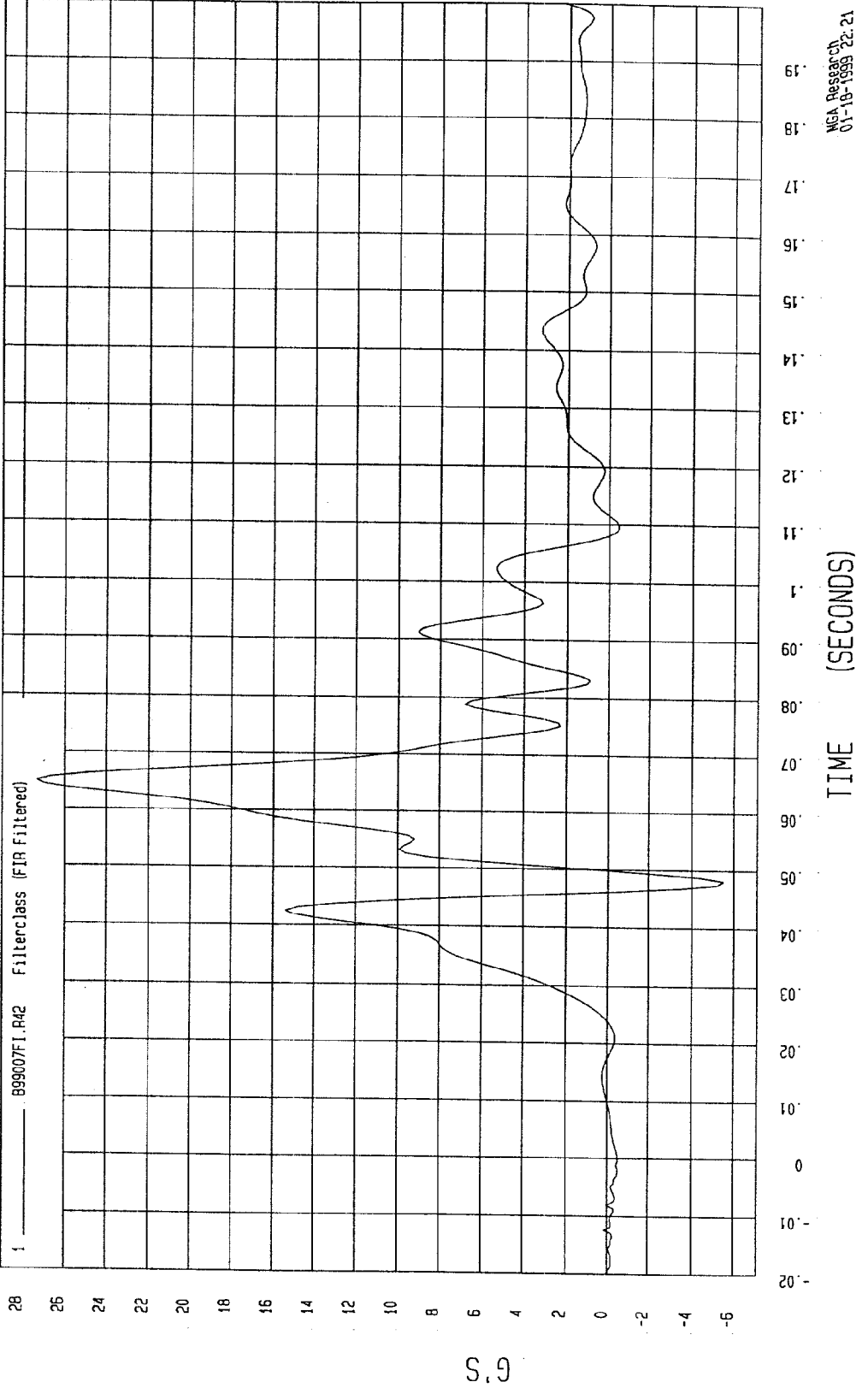
Speed: 38.22 MPH 61.5 KPH

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

Maximum = 27.33 G'S at 65 msec

Minimum = -5.51 G'S at 48 msec

DRIVER UPPER RIB Y REDUNDANT ACCELERATION

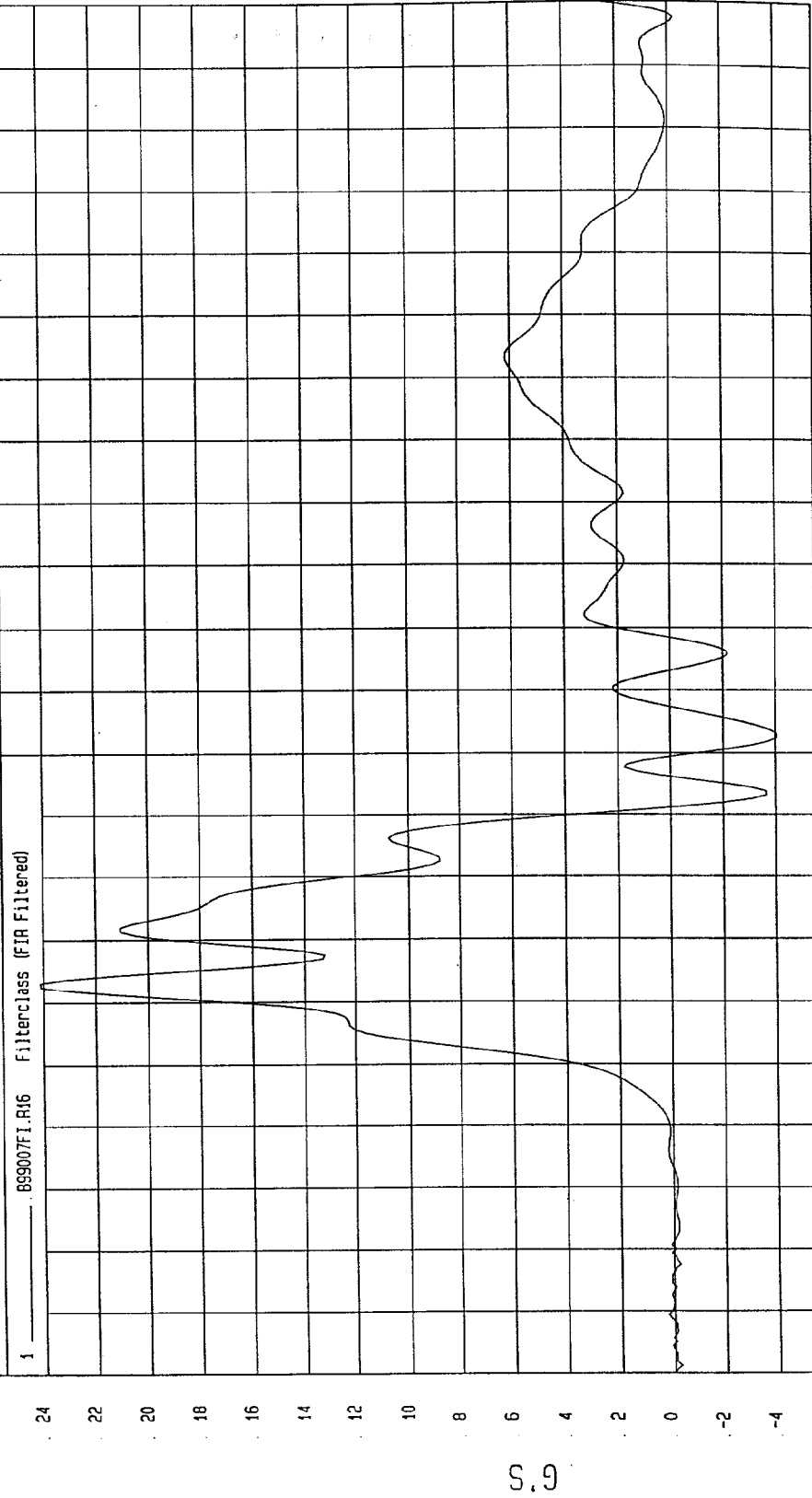


TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -4.05 G'S at 82 msec Maximum = 24.13 G'S at 43 msec

DRIVER LOWER RIB Y ACCELERATION



TIME (SECONDS)

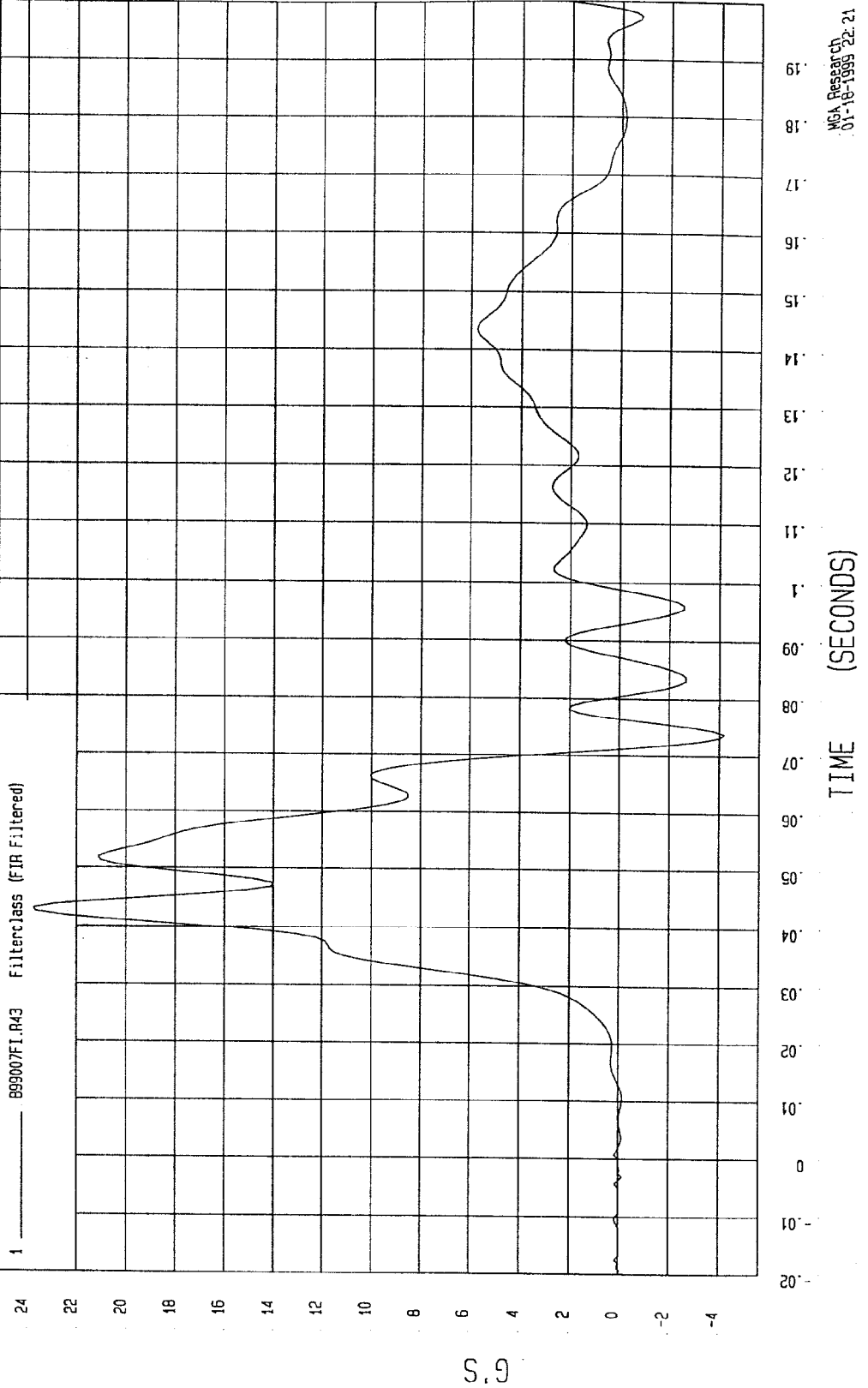
MCA Research
01-29-1999 15:48

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -4.19 G'S at 74 msec Maximum = 23.76 G'S at 43 msec

DRIVER LOWER RIB Y REDUNDANT ACCELERATION

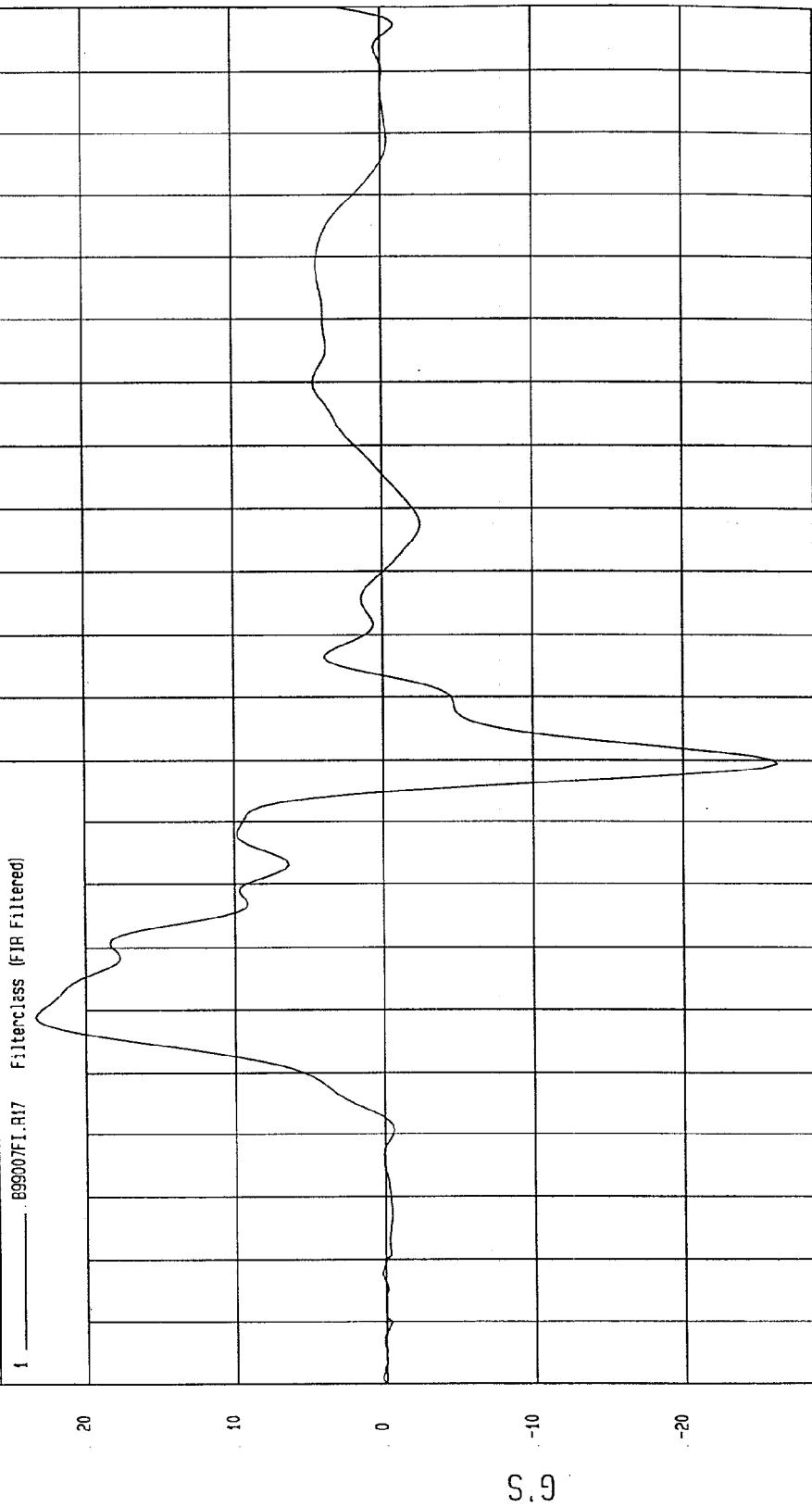


TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

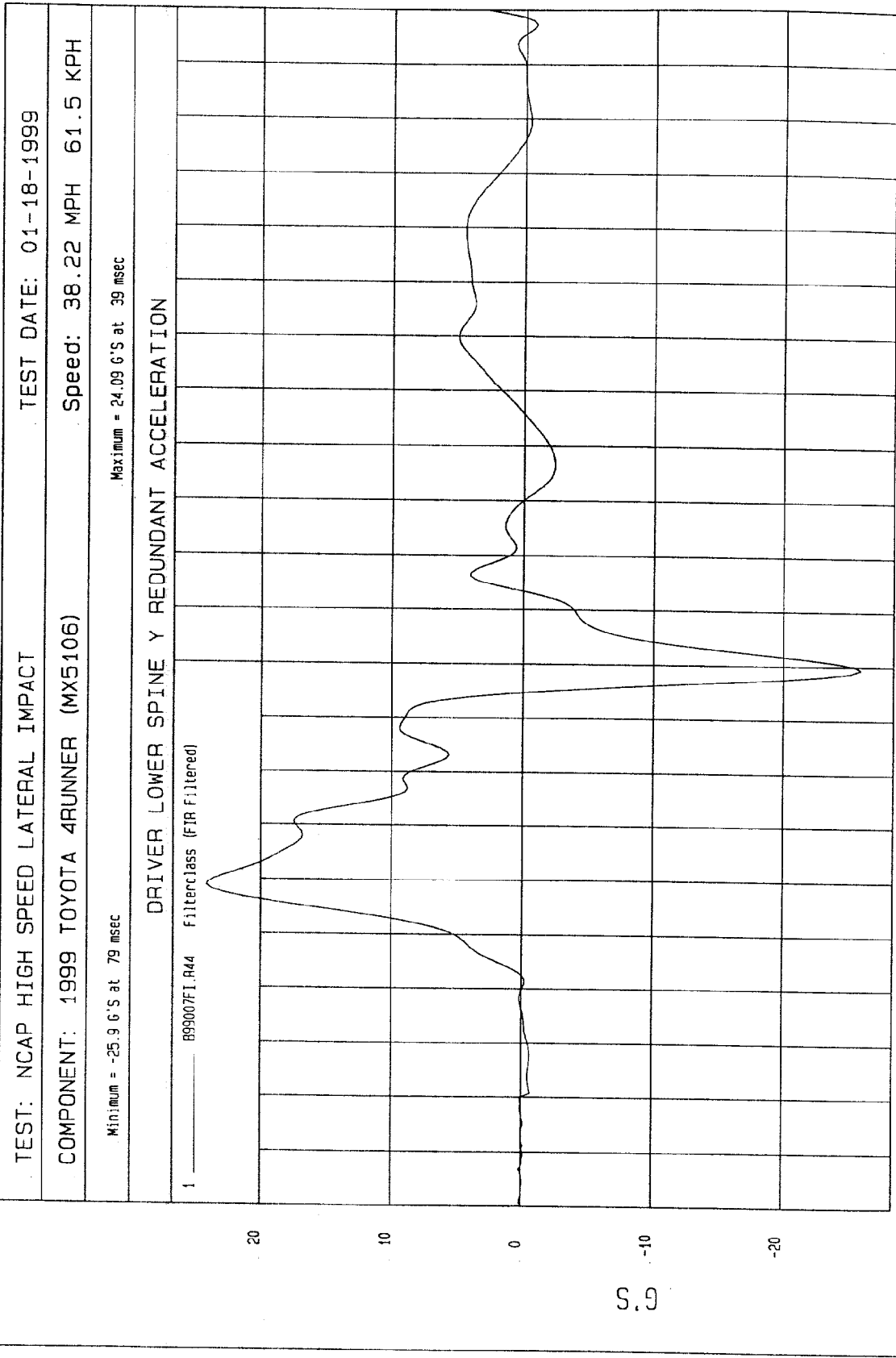
Minimum = -26.26 G'S at 79 msec Maximum = 23.34 G'S at 39 msec

DRIVER LOWER SPINE Y ACCELERATION



TIME (SECONDS)

MOA Research
01-29-1999 15:48



NCA Research
01-18-1999 22:22

TIME (SECONDS)

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

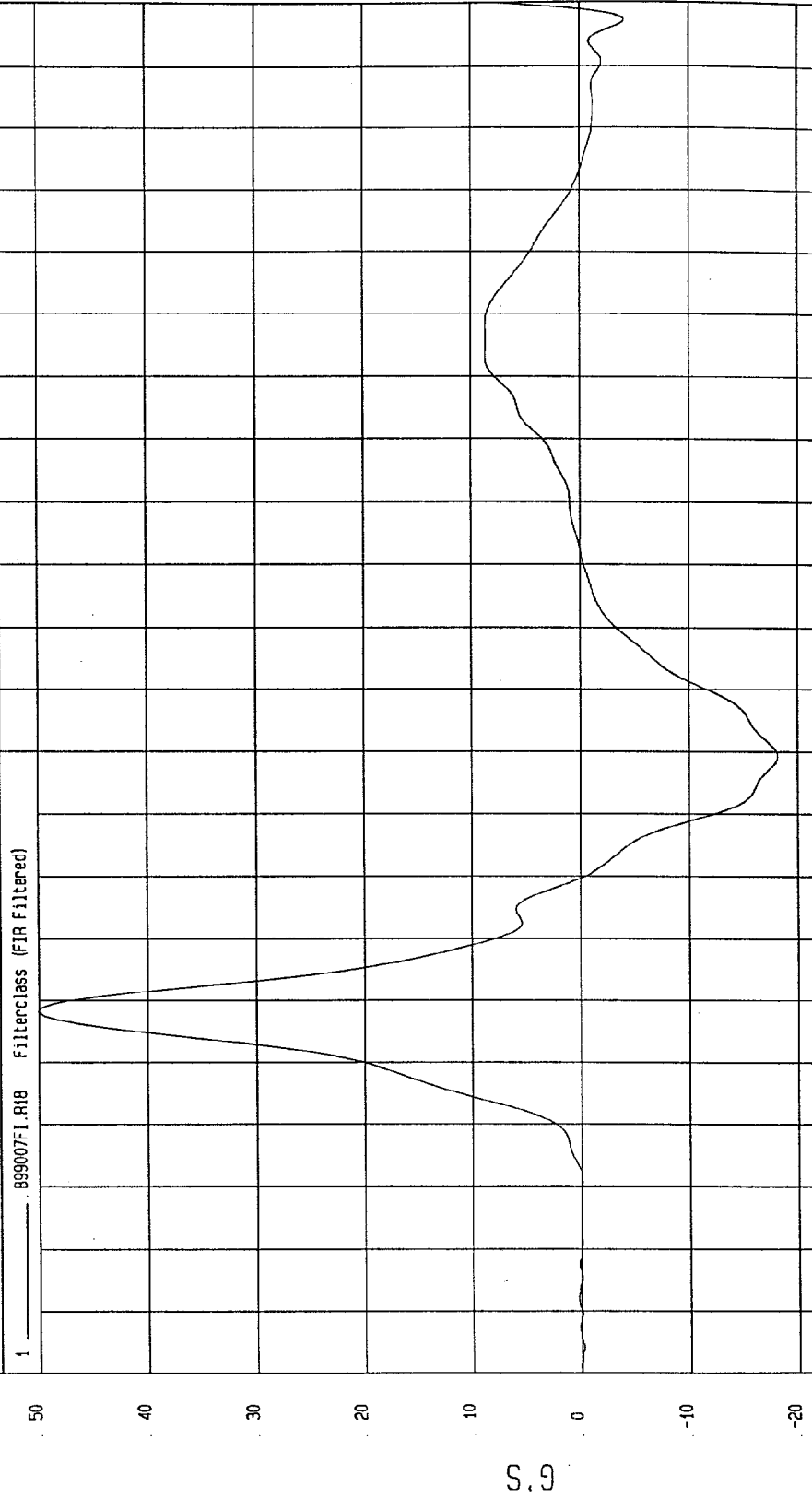
SPEED: 38.22 MPH 61.5 KPH

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

Maximum = 50.08 G'S at 38 msec

Minimum = -18.13 G'S at 79 msec

DRIVER PELVIS Y ACCELERATION



MOA Research
01-25-1999 15:48

TIME (SECONDS)

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

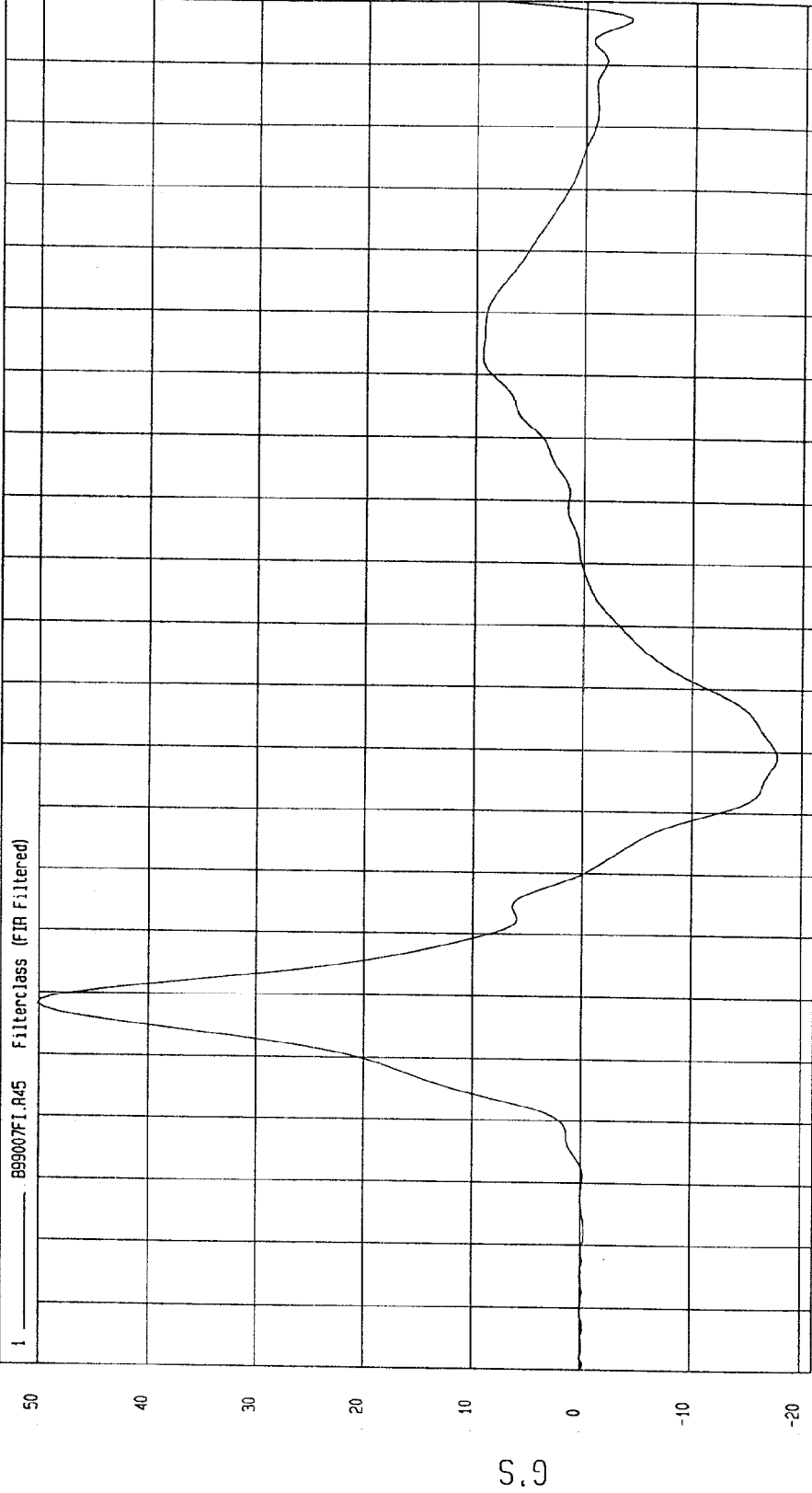
SPEED: 38.22 MPH 61.5 KPH

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

Maximum = 50.08 G'S at 38 msec

Minimum = -17.75 G'S at 79 msec

DRIVER PELVIS Y REDUNDANT ACCELERATION



NCA Research
01-18-1999 22:22

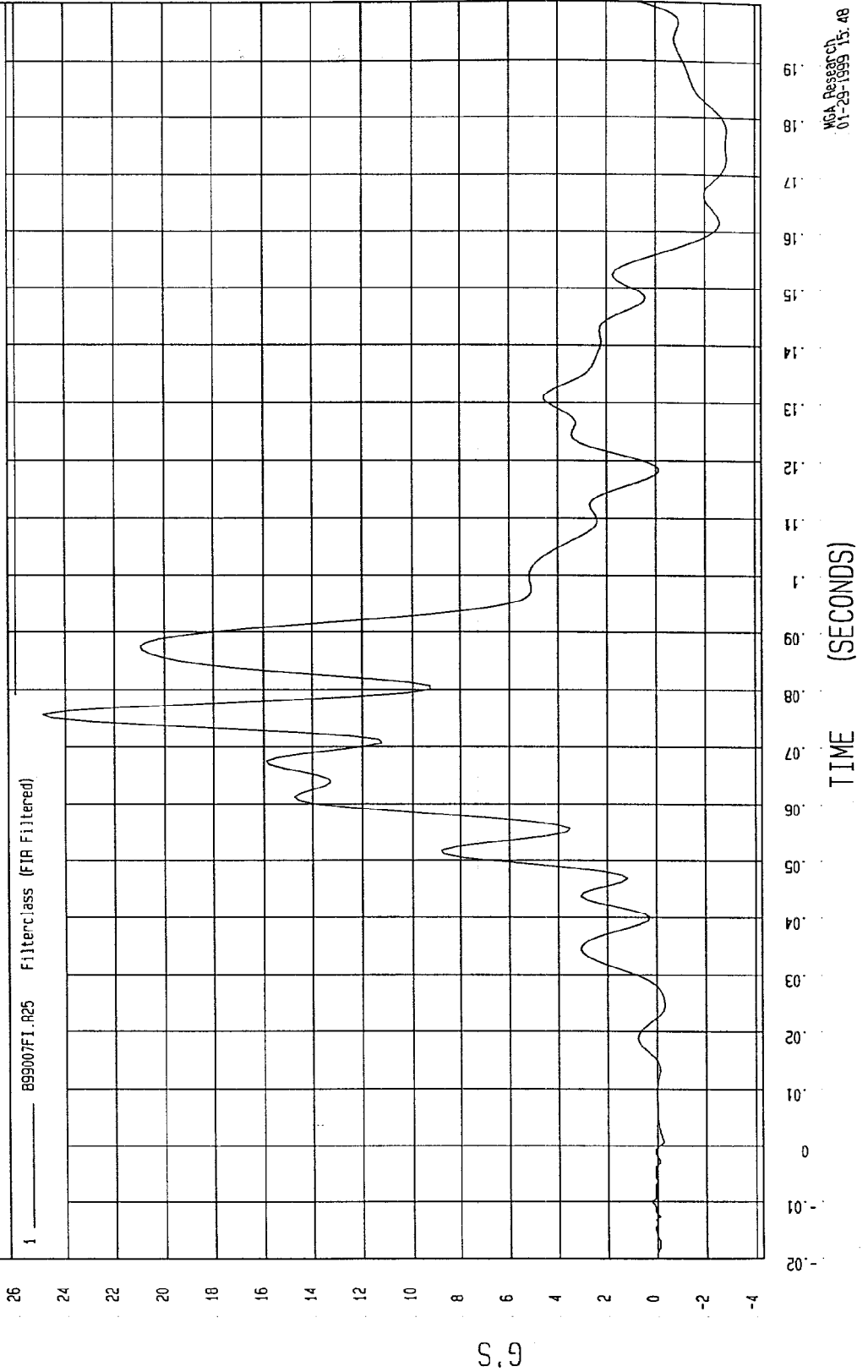
TIME (SECONDS)

TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -2.88 G'S at 178 msec Maximum = 24.91 G'S at 76 msec

REAR PASSENGER UPPER RIB Y ACCELERATION



TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

Speed: 38.22 MPH 61.5 KPH

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

Maximum = 24.8 G'S at 76 msec

Minimum = -2.73 G'S at 178 msec

REAR PASSENGER UPPER RIB Y REDUNDANT ACCELERATION

1 B99007F1.R46 FilterClass (FIR Filtered)

26

24

22

20

18

16

14

12

10

8

6

4

2

0

-2

-4

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)

WCA Research
01-18-1999 22:22

TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

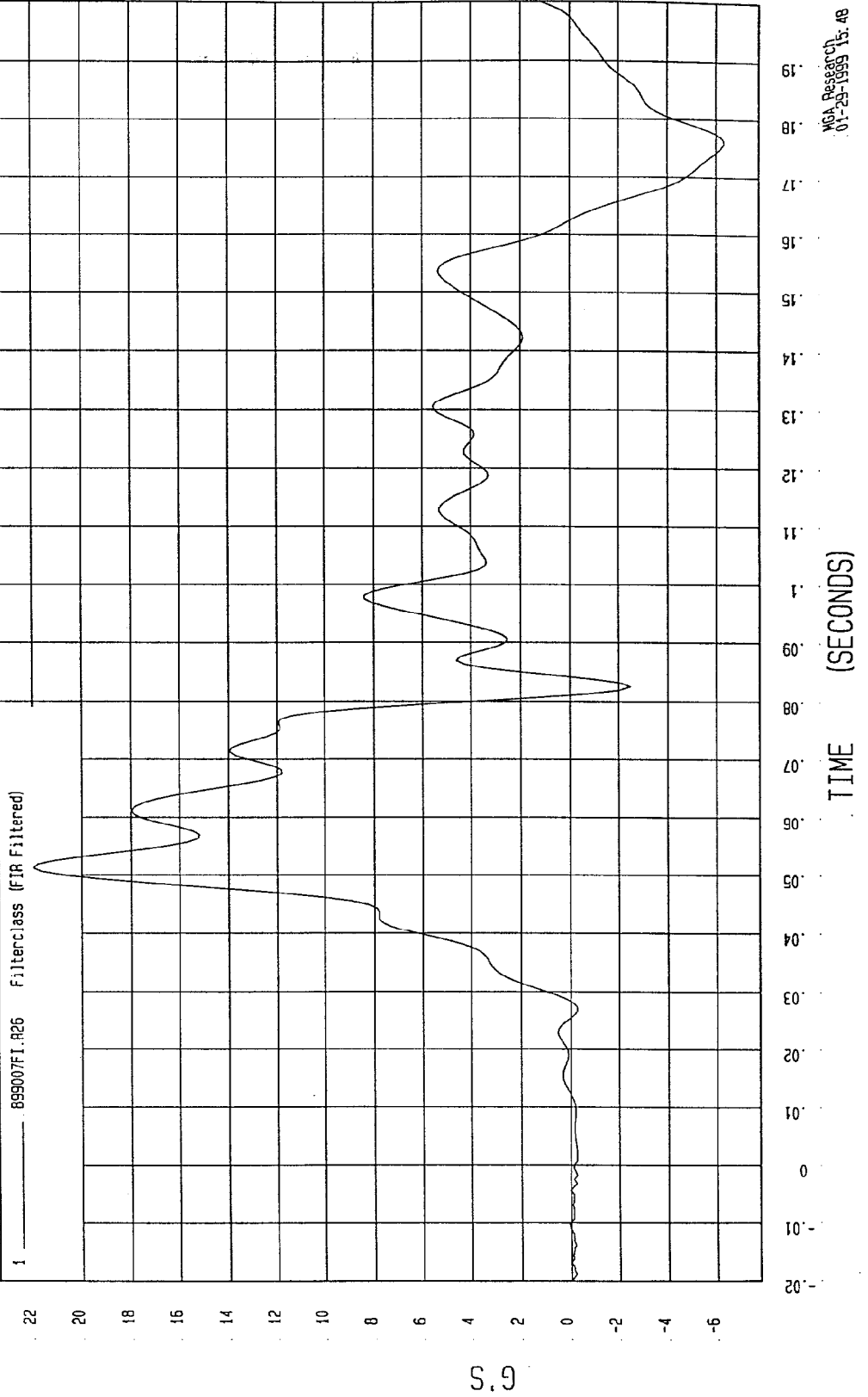
Speed: 38.22 MPH 61.5 KPH

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

Maximum = 21.98 G'S at 51 msec

Minimum = -6.32 G'S at 176 msec

REAR PASSENGER LOWER RIB Y ACCELERATION

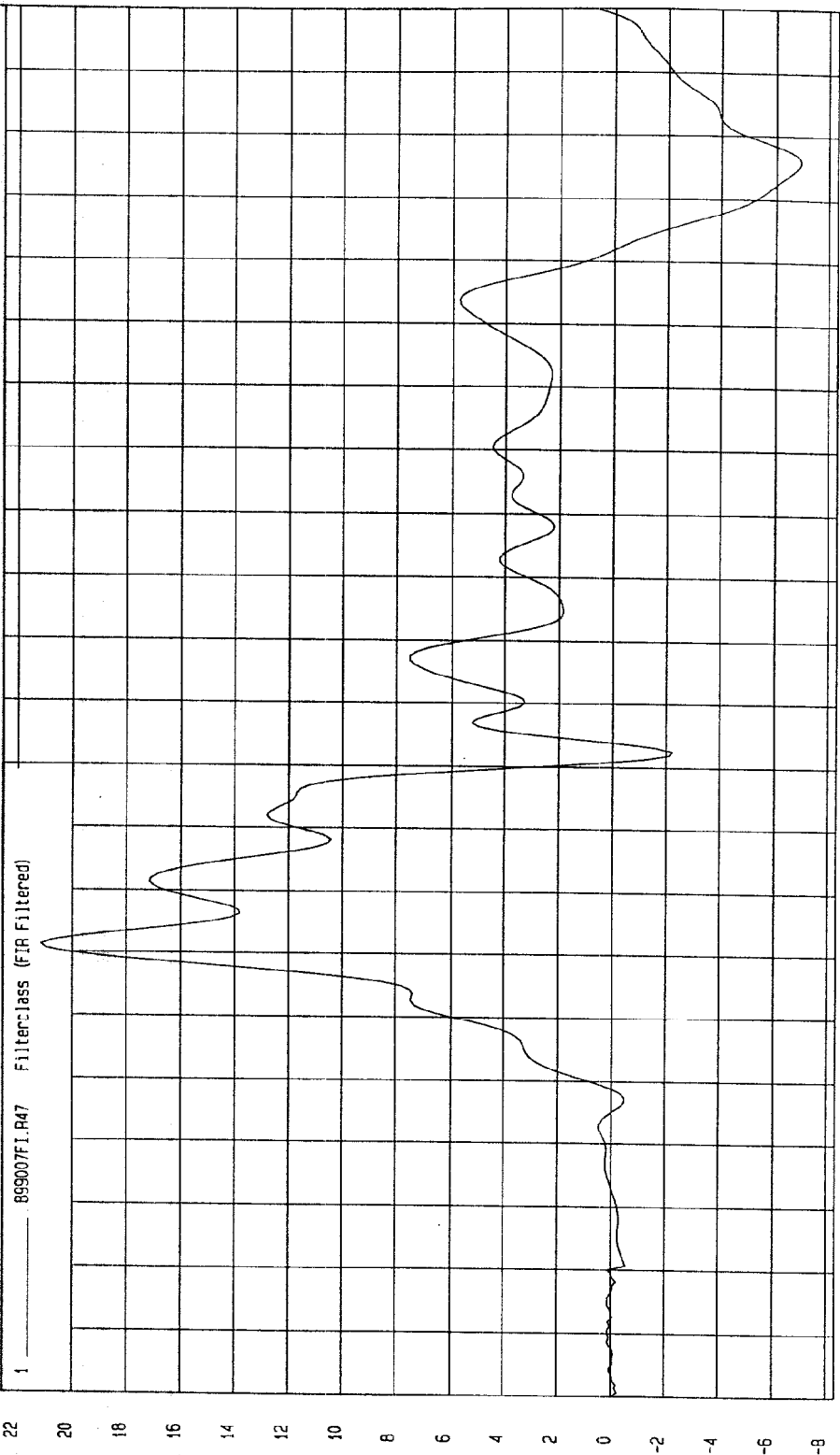


TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -6.93 G'S at 176 msec Maximum = 21.15 G'S at 51 msec

REAR PASSENGER LOWER RIB Y REDUNDANT ACCELERATION



TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

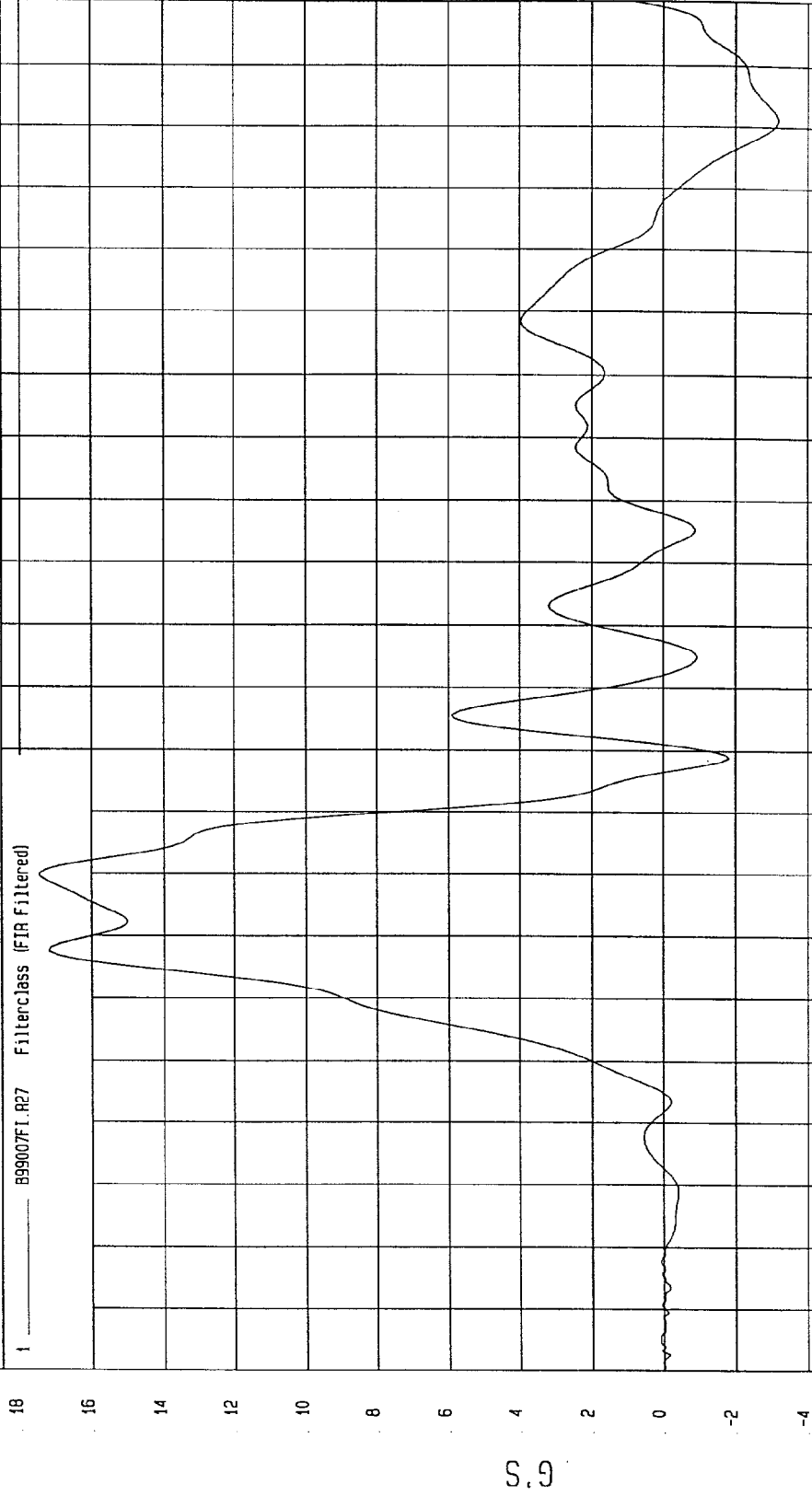
Speed: 38.22 MPH 61.5 KPH

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

Maximum = 17.47 G'S at 60 msec

Minimum = -3.17 G'S at 181 msec

REAR PASSENGER LOWER SPINE Y ACCELERATION

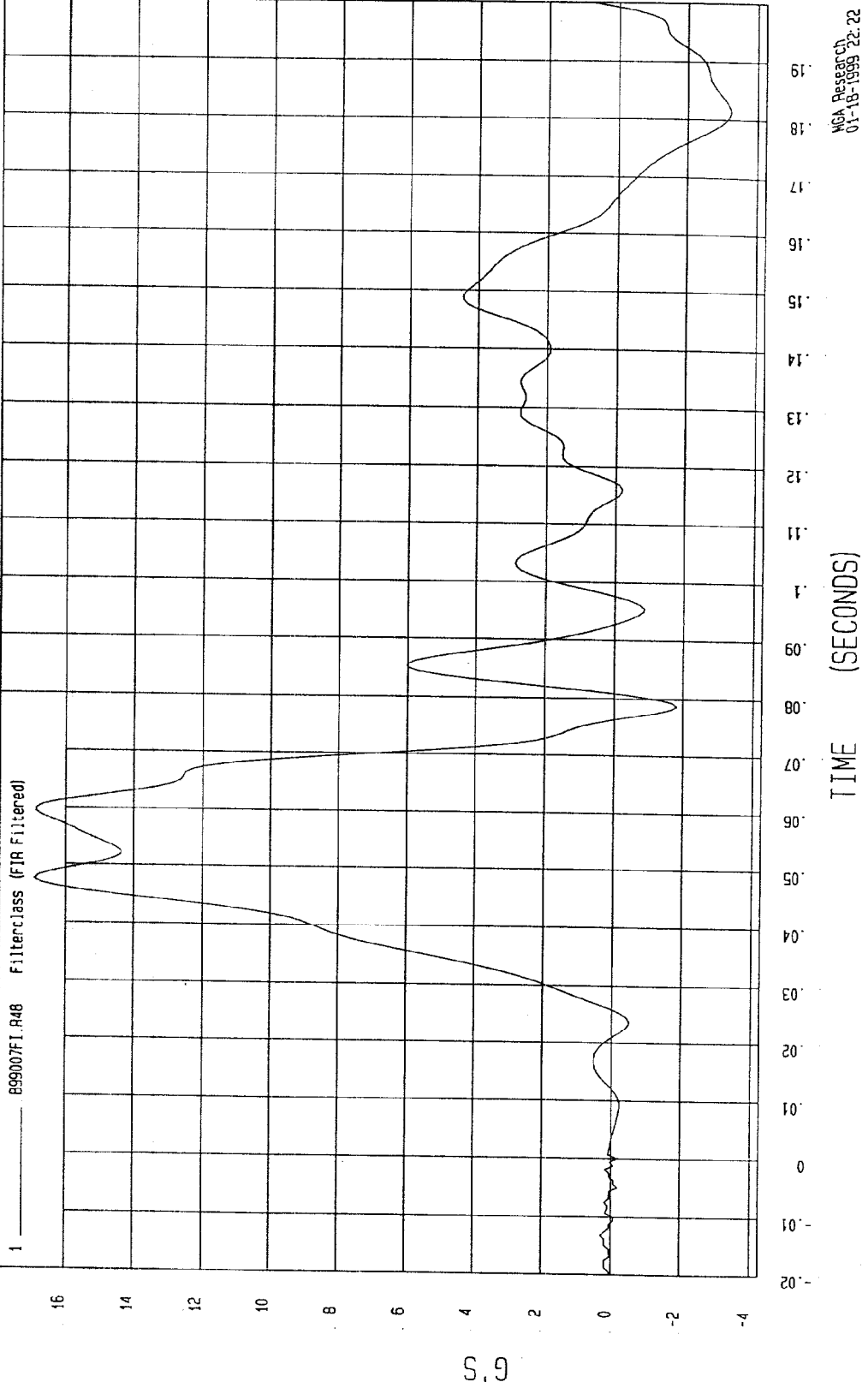


TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -3.24 G'S at 181 msec Maximum = 16.89 G'S at 48 msec

REAR PASSENGER LOWER SPINE Y REDUNDANT ACCELERATION



TEST: NCAP HIGH SPEED LATERAL IMPACT

TEST DATE: 01-18-1999

Speed: 38.22 MPH 61.5 KPH

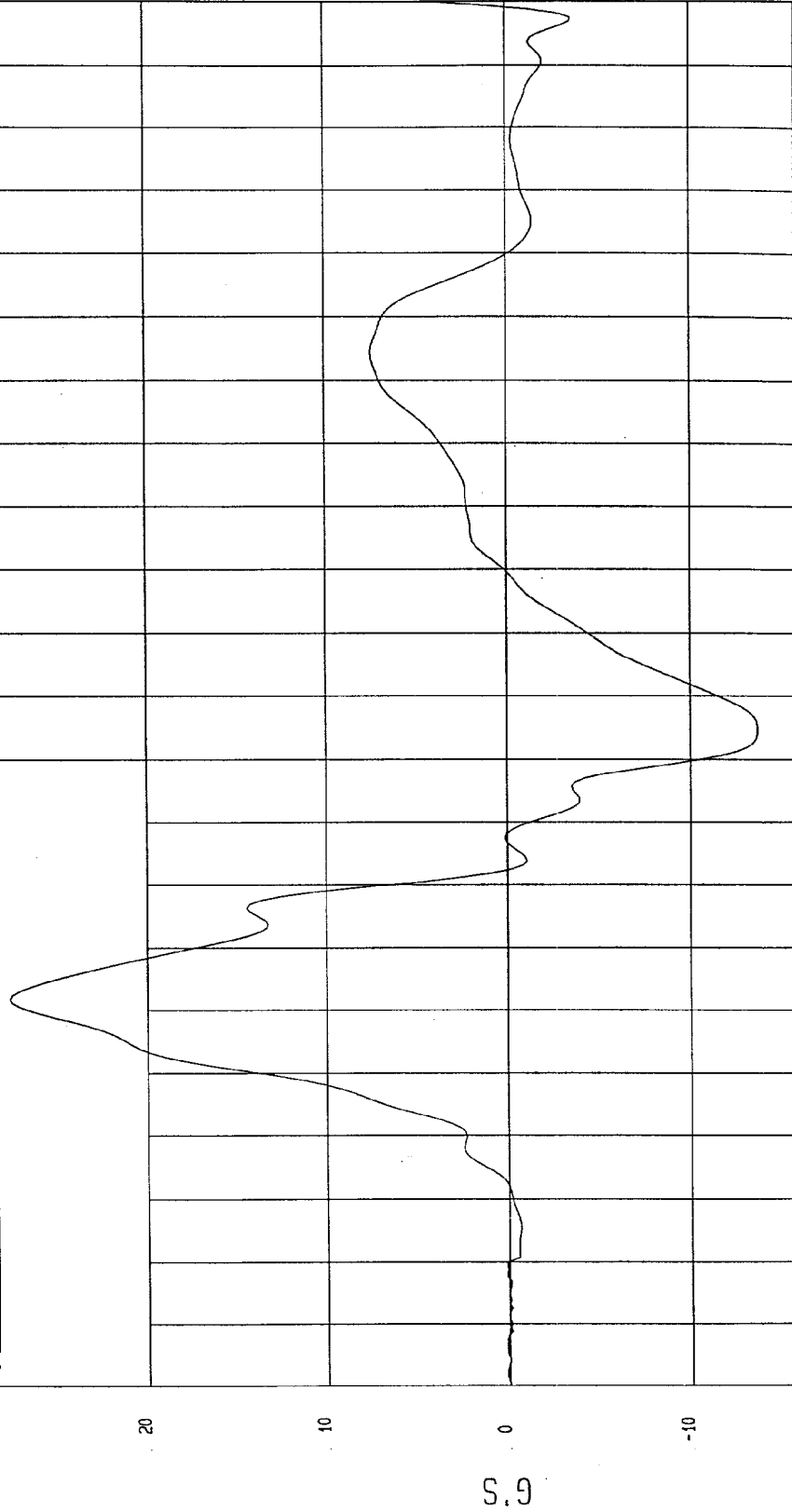
COMPONENT: 1999 TOYOTA 4RUNNER (MX5106)

Maximum = 27.58 G'S at 42 msec

Minimum = -13.66 G'S at 85 msec

REAR PASSENGER PELVIS Y ACCELERATION

1 B99007F1.R28 Filterclass (FIR Filtered)



TIME (SECONDS)

NCA Research
01-29-1999 15:48

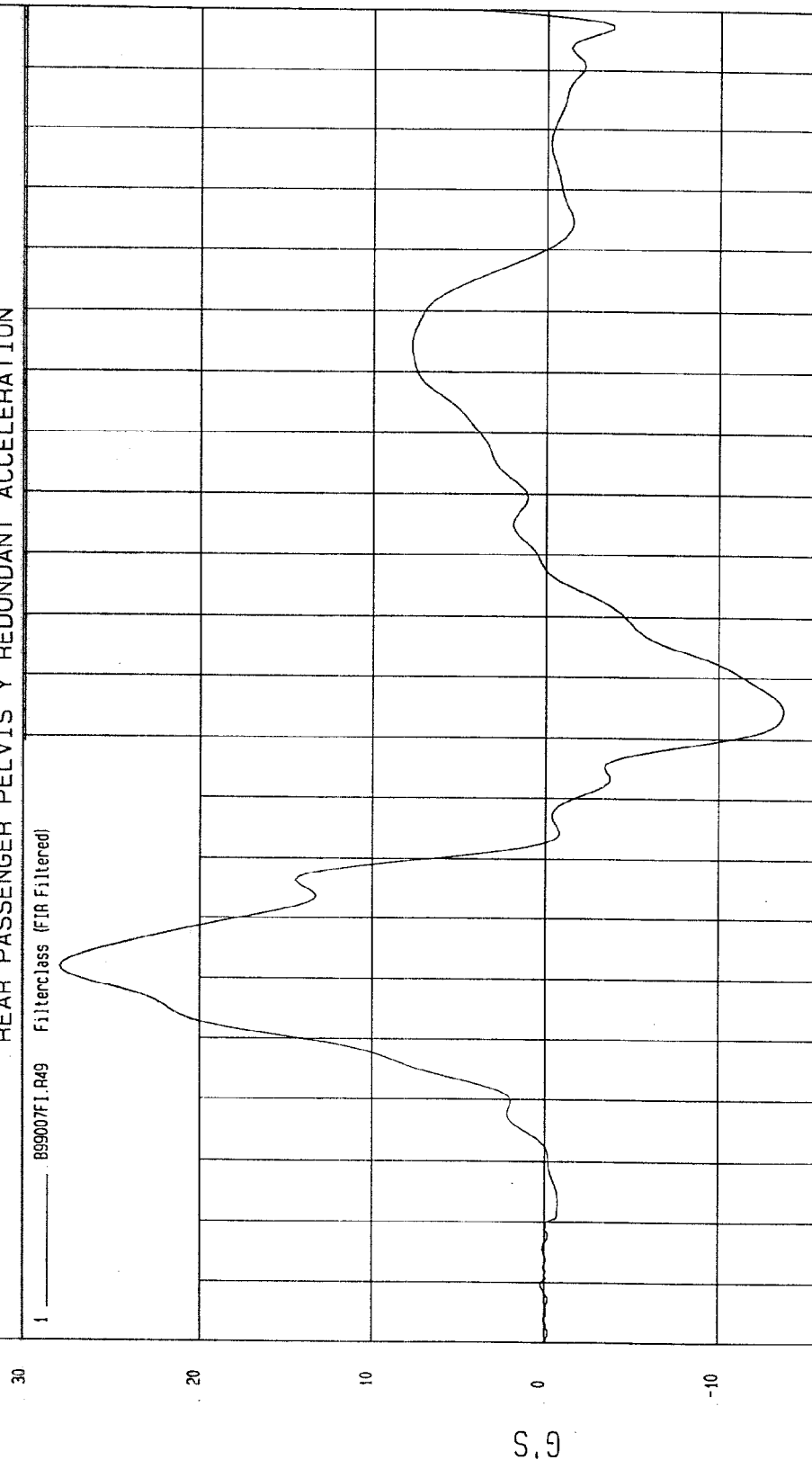
TEST: NCAP HIGH SPEED LATERAL IMPACT TEST DATE: 01-18-1999

COMPONENT: 1999 TOYOTA 4RUNNER (MX5106) Speed: 38.22 MPH 61.5 KPH

Minimum = -13.73 G'S at 84 msec Maximum = 28.06 G'S at 42 msec

REAR PASSENGER PELVIS Y REDUNDANT ACCELERATION

1 ——— B99007F1.R49 Filterclass (FIR Filtered)



MGA Research
01-18-1999 22:22

APPENDIX C
SID CONFIGURATION AND PERFORMANCE VERIFICATION

PRE-TEST CERTIFICATION DATA

C-1

Driver Dummy Serial Number: 269

Calibration Test Results Summary

Driver Dummy Serial Number: 269

Pre-Test Calibration

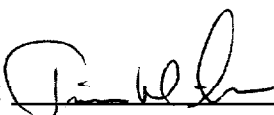
External Dimensions:	The dummy passed all external dimension requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion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

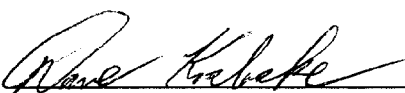
SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA C-3

DUMMY SERIAL NUMBER: 269

DATE OF VERIFICATION: January 15, 1999

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height (mm)	889 - 909	895
RH - Rib Height (mm)	501 - 521	508
HP - Hip Pivot Height (mm)	99 ref.	99
RD - Rib From Back Line (mm)	229 - 241	232
KV - Knee Pivot From Back Line (mm)	511 - 526	523
SW - Knee Pivot to Floor (mm)	490 - 505	501
HW - Hip Width (mm)	356 - 391	382

MEASUREMENTS BY: 

APPROVED BY: 

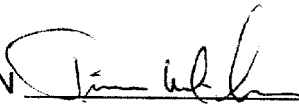
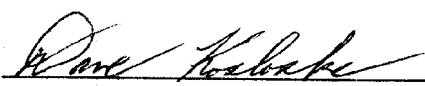
THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: January 15, 1999DUMMY SERIAL NUMBER: 269TEST NUMBER: D99162

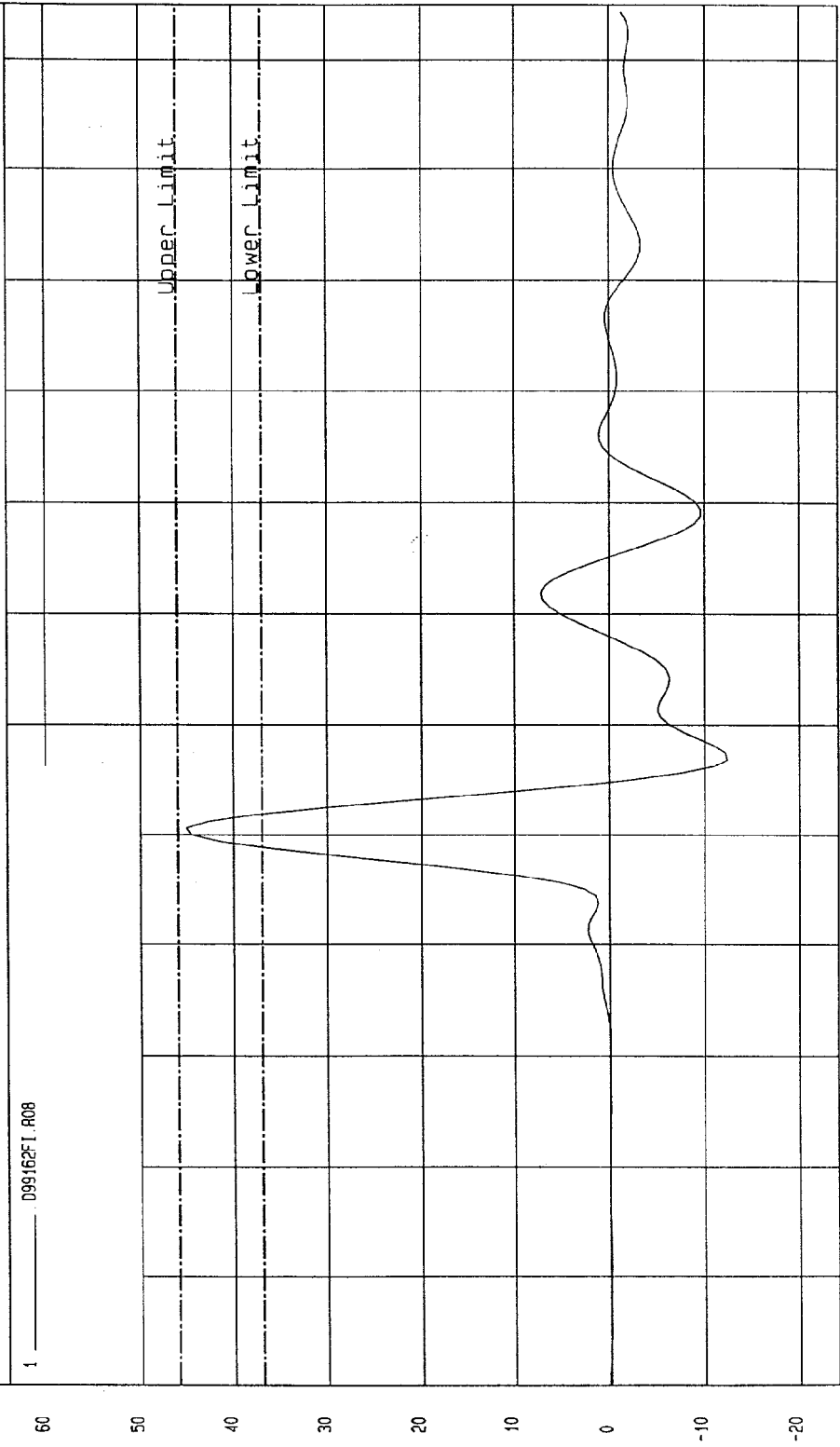
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	15%
PROBE SPEED (m/s)	4.27 - 4.33	4.31
UPPER RIB (g's)	37 - 46 g's	45
LOWER RIB (g's)	37 - 46 g's	42
LOWER SPINE (g's)	15 - 22 g's	21

TEST MEETS SPECIFICATIONS

TECHNICIAN APPROVED BY 

TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-15-1999 - 11:03
 COMPONENT: DUMMY # 269 Velocity: 14.142 FT/SEC 4.31 M/SEC
 Minimum = -12.34 G'S at 56.8 msec Maximum = 45.09 G'S at 50.6 msec

UPPER RIB ACCELERATION



TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-15-1999 - 11:03

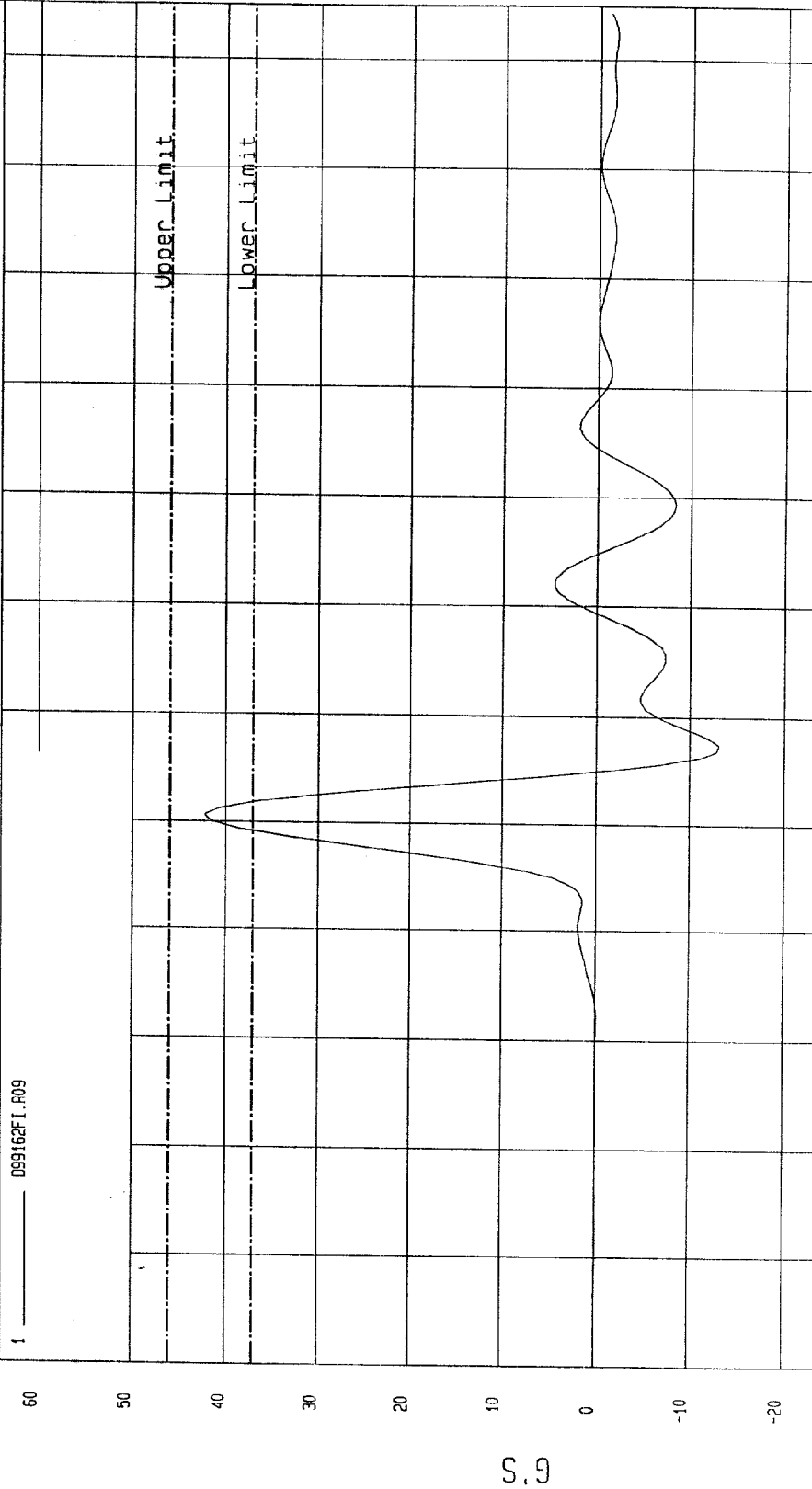
COMPONENT: DUMMY # 269 Velocity: 14.142 FT/SEC 4.31 M/SEC

Minimum = -13.00 G'S at 57.5 msec

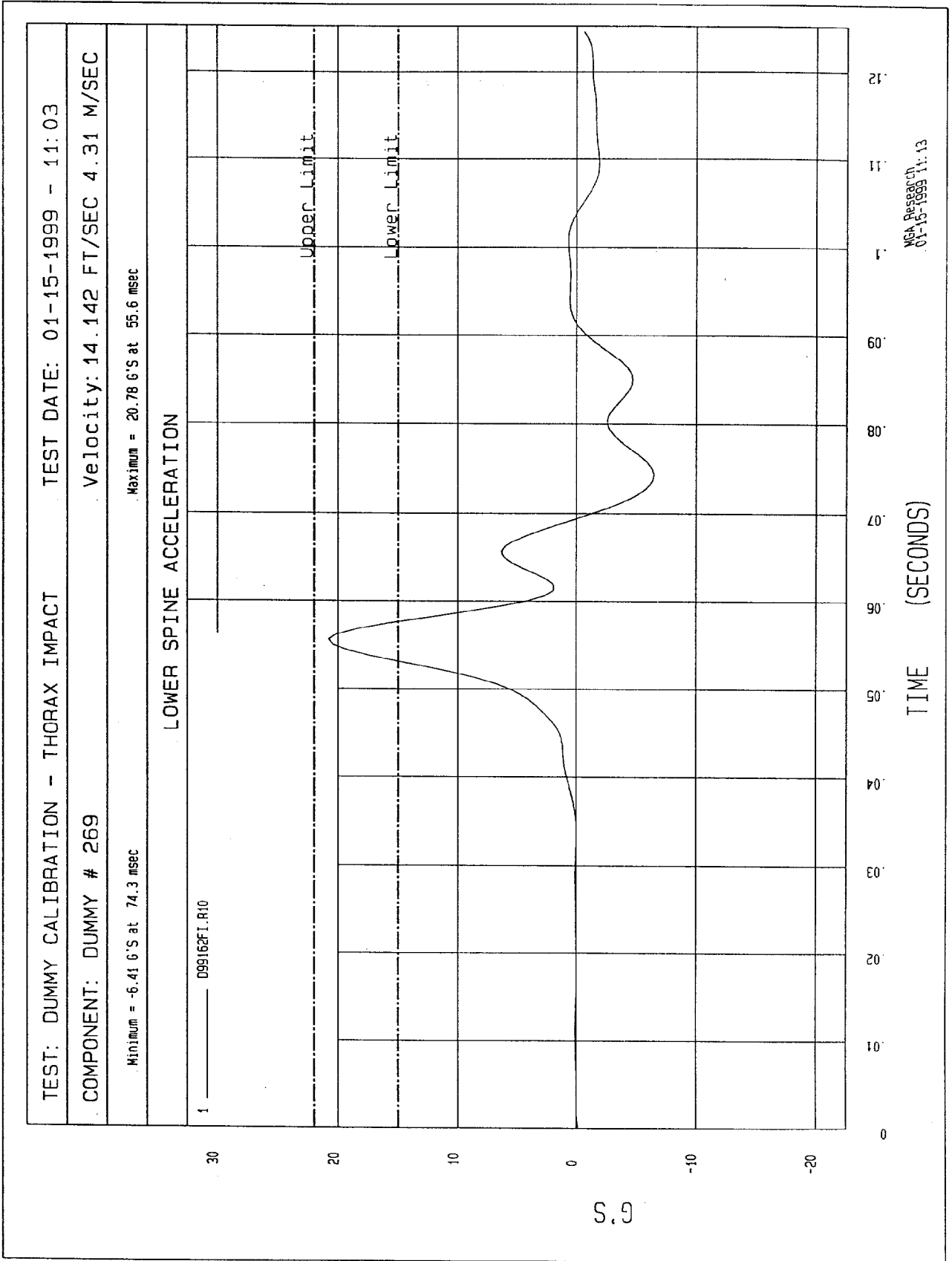
Maximum = 42.30 G'S at 50.6 msec

LOWER RIB ACCELERATION

1 _____ D99162FI.R09



NCA Research
01-15-1999 11:13



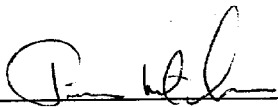
PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: January 15, 1999DUMMY SERIAL NUMBER: 269TEST NUMBER: D99163

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	14%
PROBE SPEED (m/s)	4.27 - 4.33	4.29
PELVIS ACCELERATION (g's)	40 - 60	40

TEST MEETS SPECIFICATIONS

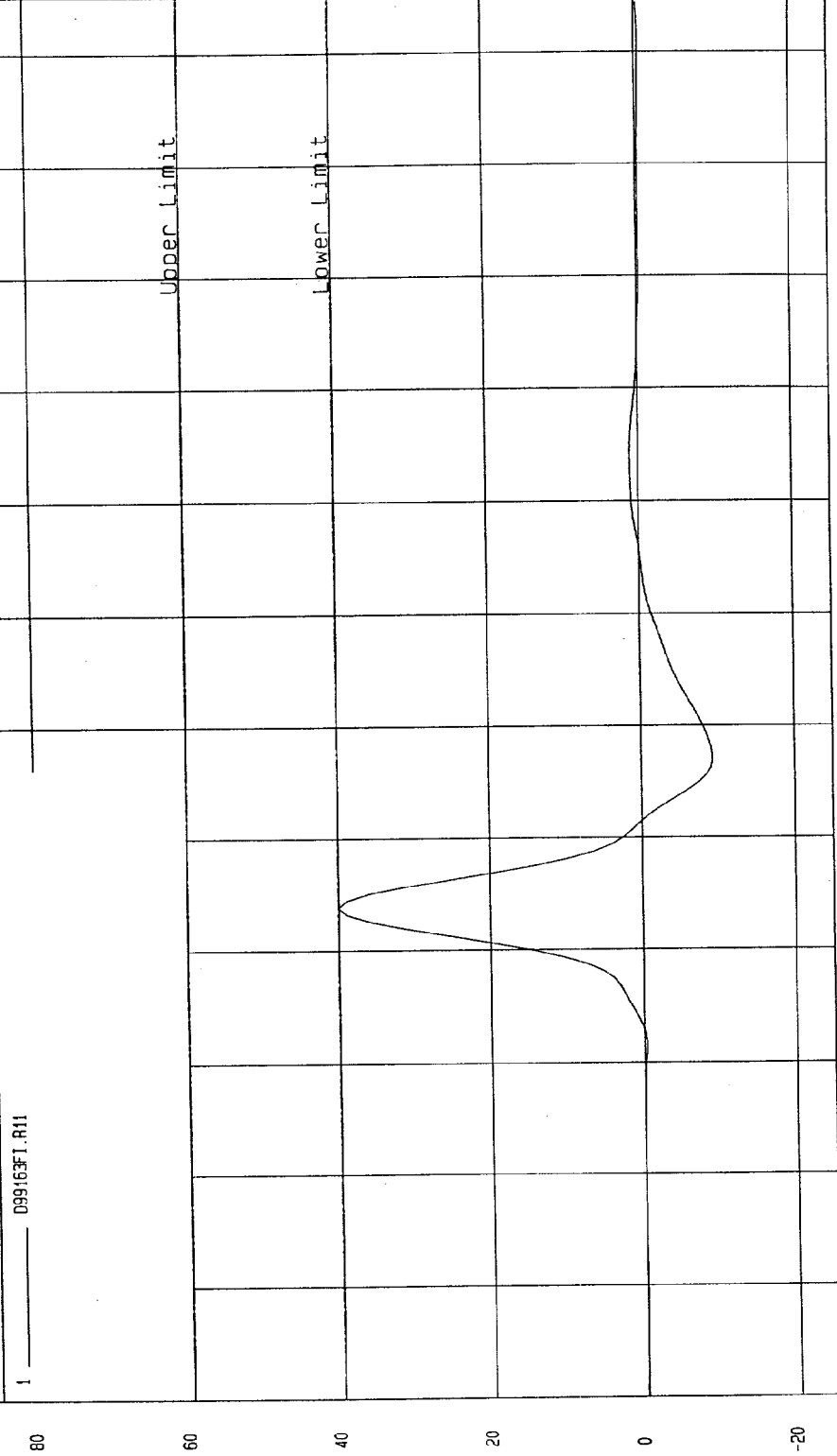
TECHNICIAN APPROVED BY 

TEST: DUMMY CALIBRATION - PELVIS IMPACT TEST DATE: 01-15-1999 - 11:12

COMPONENT: DUMMY # 269 Velocity: 14.086 FT/SEC 4.29 M/SEC

Minimum = -9.37 G'S at 56.8 msec Maximum = 40.02 G'S at 43.7 msec

PELVIS ACCELERATION



MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

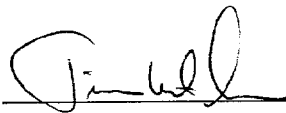
SIDE IMPACT DUMMY (SID)

DATE: January 15, 1999DUMMY SERIAL NUMBER: 269TEST NUMBER: D99164

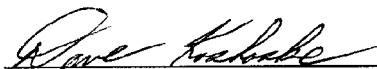
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	15%
FORCE @ 12.7 mm	104 - 162	148
FORCE @ 19.0 mm	163 - 222	207
FORCE @ 25.4 mm	222 - 280	276
FORCE @ 33 mm	325 - 391	389

TEST MEETS SPECIFICATIONS

TECHNICIAN



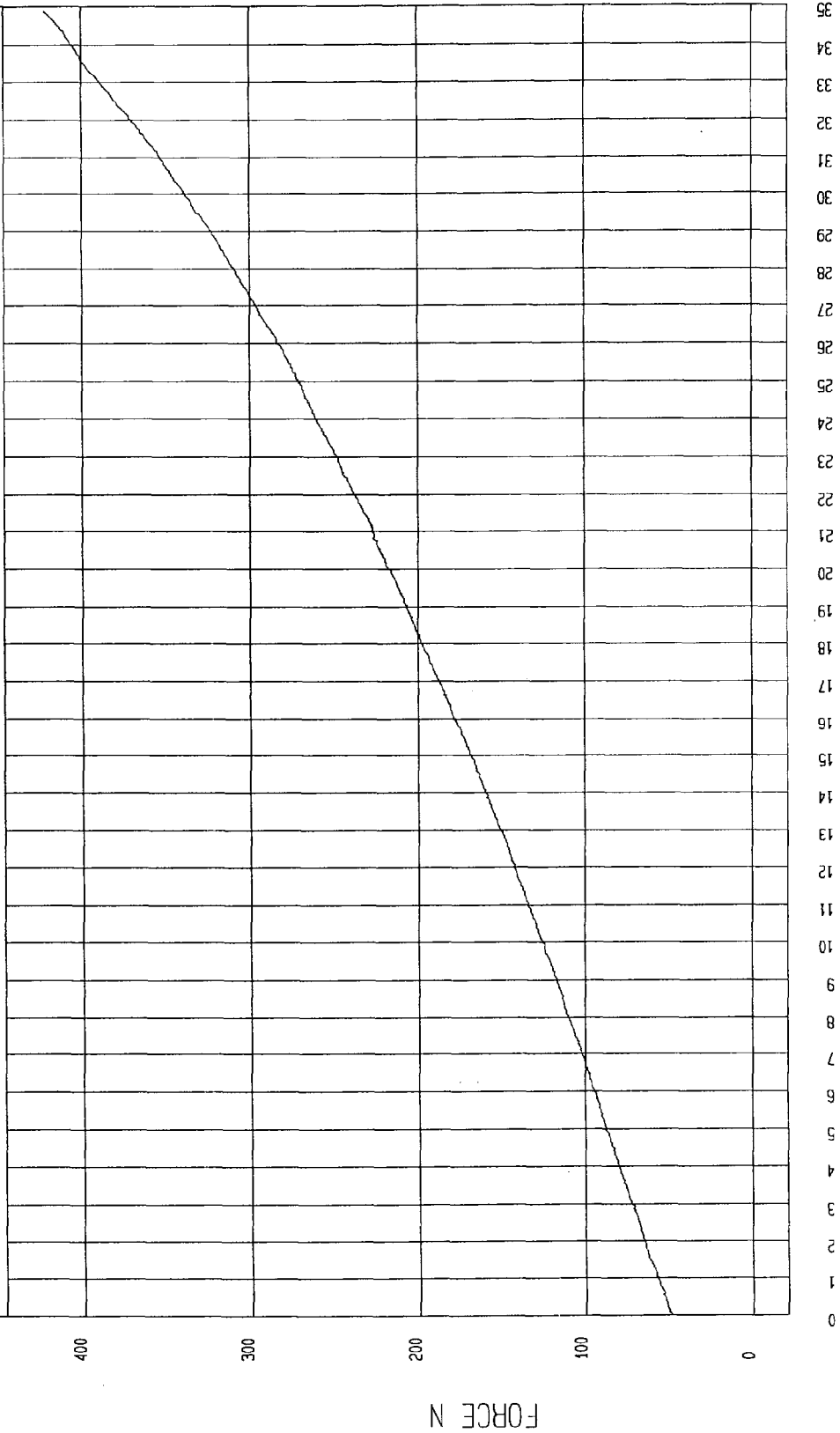
APPROVED BY



TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSION TEST DATE: 01-15-1999 - 15:25:12

COMPONENT: DUMMY # 269

FORCE as a function of DISPLACEMENT



WGA Research
02-04-1999 11:16

MGA RESEARCH CORPORATION

C-12

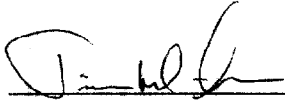
LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: January 15, 1999DUMMY SERIAL NUMBER: 269TEST NUMBER: D99165

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	15%
FORCE @ 0°	0 - 26.7	0
FORCE @ 20°	97.9 - 151.2	110.5
FORCE @ 30°	151.2 - 204.6	183.3
FORCE @ 40°	204.6 - 258.0	211.6
RETURN ANGLE	12° maximum	4°

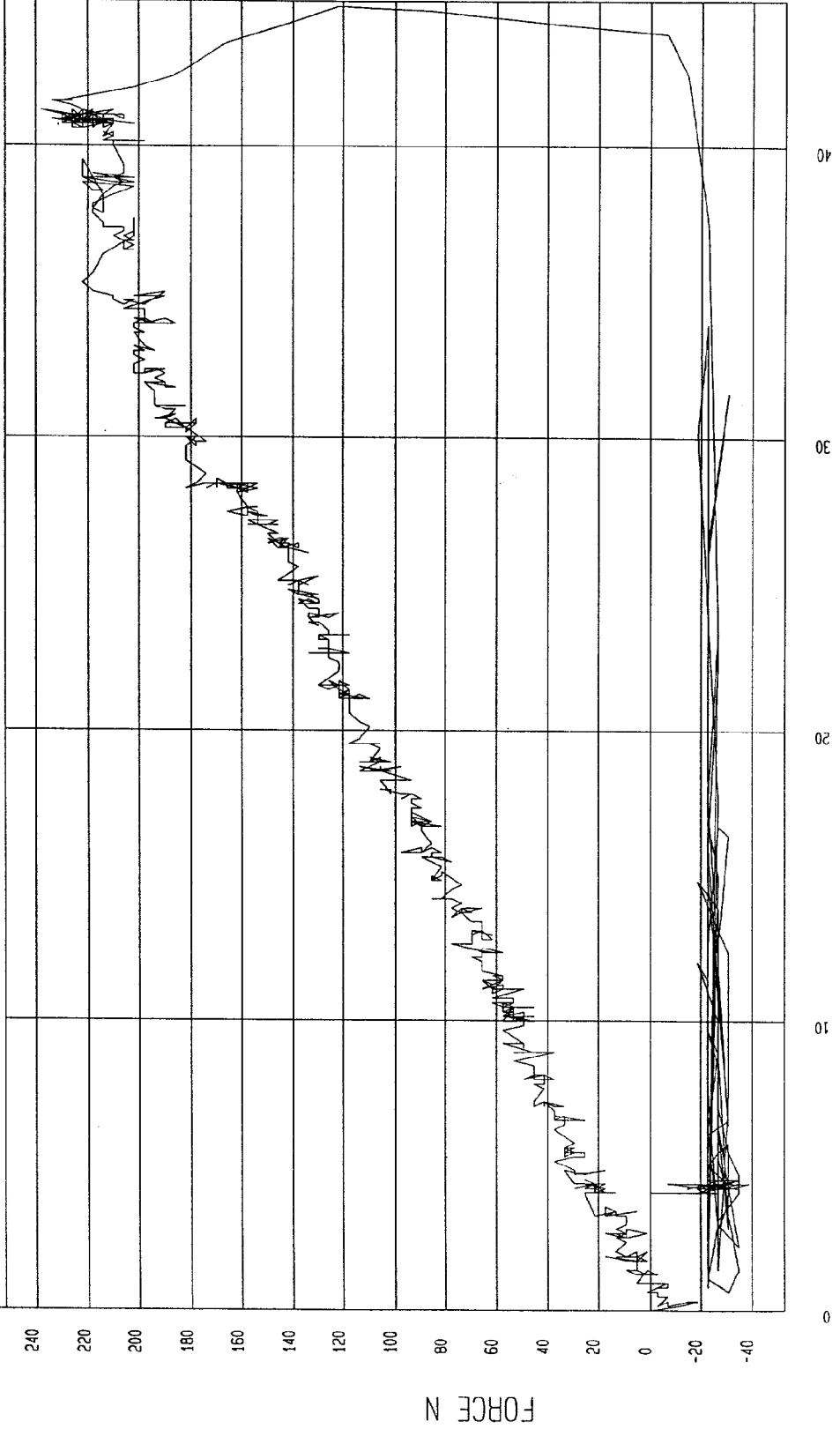
TEST MEETS SPECIFICATIONS

TECHNICIAN APPROVED BY 

TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 01-15-1999 - 12:53:29

COMPONENT: DUMMY # 269

FORCE as a function of TORSO ROTATION



MCA Research
01-15-1999 12:55

PRE-TEST CERTIFICATION DATA

C-14

Passenger Dummy Serial Number: 270

Passenger 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.

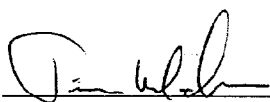
SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA ^{C-16}

DUMMY SERIAL NUMBER: 270

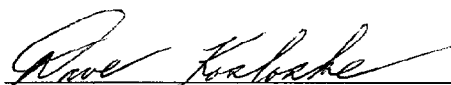
DATE OF VERIFICATION: January 15, 1999

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height (mm)	889 - 909	894
RH - Rib Height (mm)	501 - 521	514
HP - Hip Pivot Height (mm)	99 ref.	99
RD - Rib From Back Line (mm)	229 - 241	238
KV - Knee Pivot From Back Line (mm)	511 - 526	519
SW - Knee Pivot to Floor (mm)	490 - 505	494
HW - Hip Width (mm)	356 - 391	371

MEASUREMENTS BY:



APPROVED BY:



THORAX IMPACT TEST

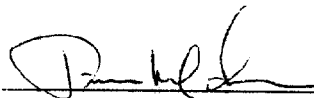
SIDE IMPACT DUMMY (SID)

DATE: January 15, 1999DUMMY SERIAL NUMBER: 270TEST NUMBER: D99172

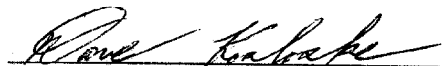
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	14%
PROBE SPEED (m/s)	4.27 - 4.33	4.29
UPPER RIB (g's)	37 - 46 g's	39
LOWER RIB (g's)	37 - 46 g's	42
LOWER SPINE (g's)	15 - 22 g's	22

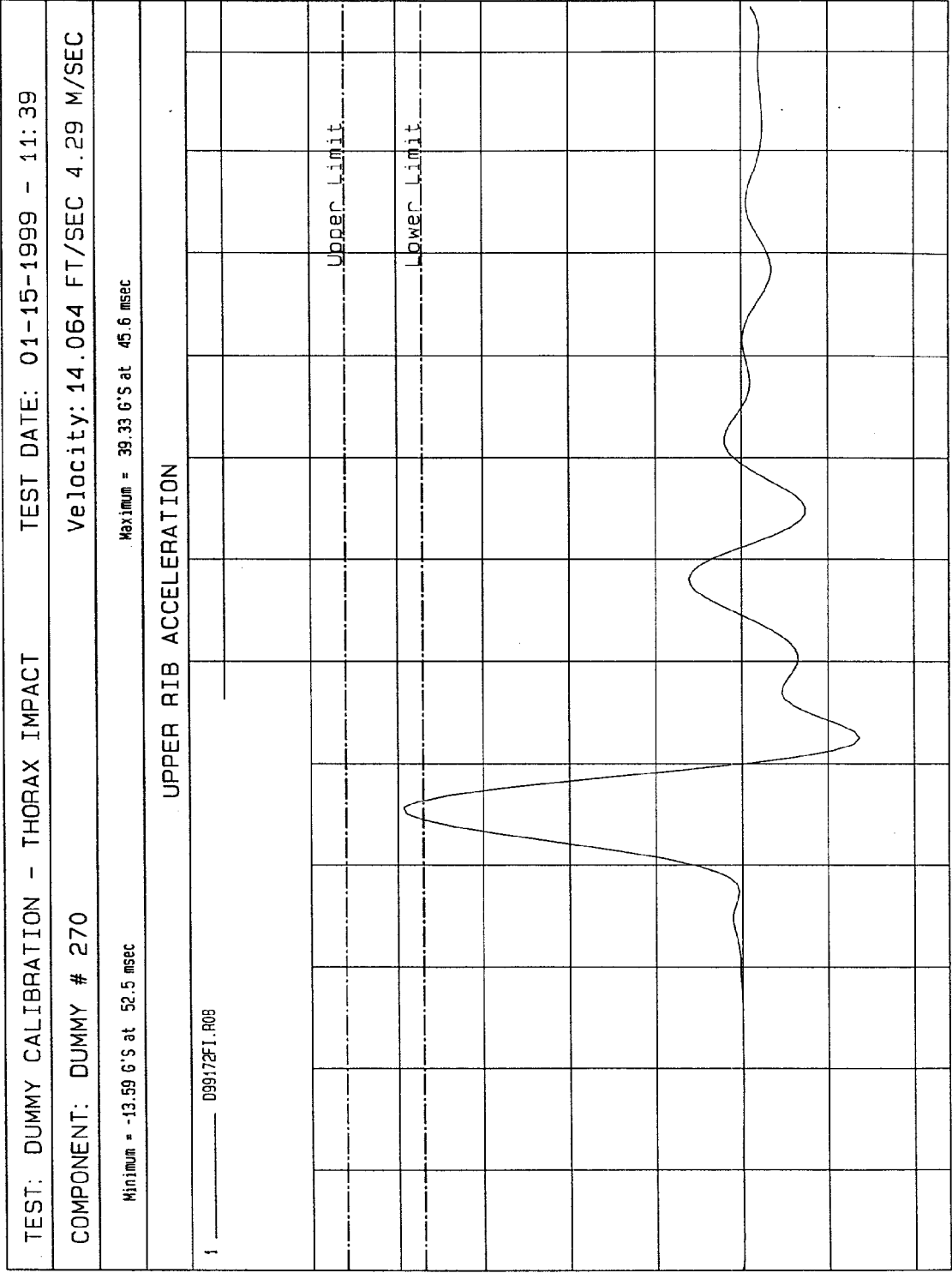
TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY





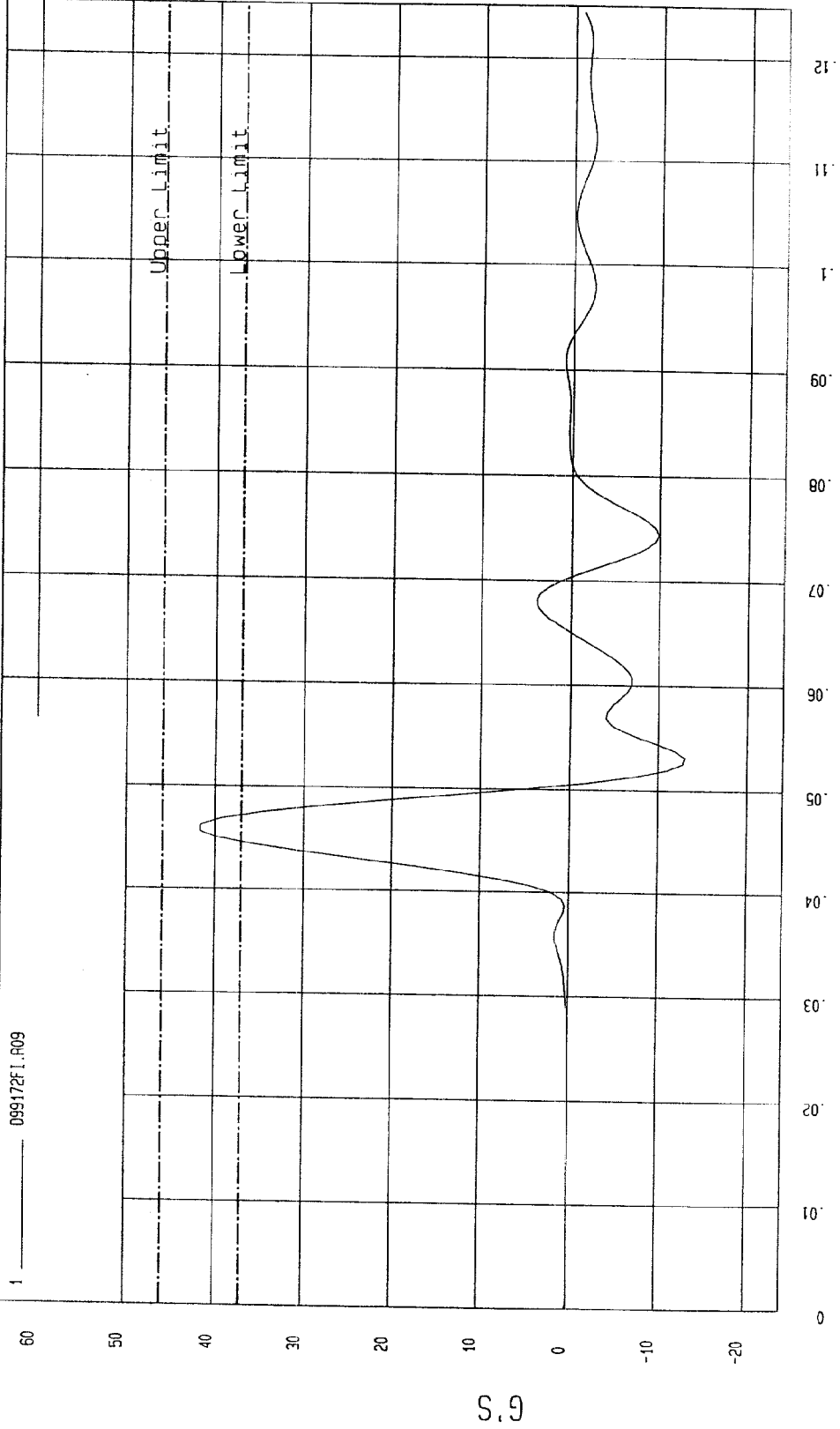
NCA Research
01-15-1999 12:10

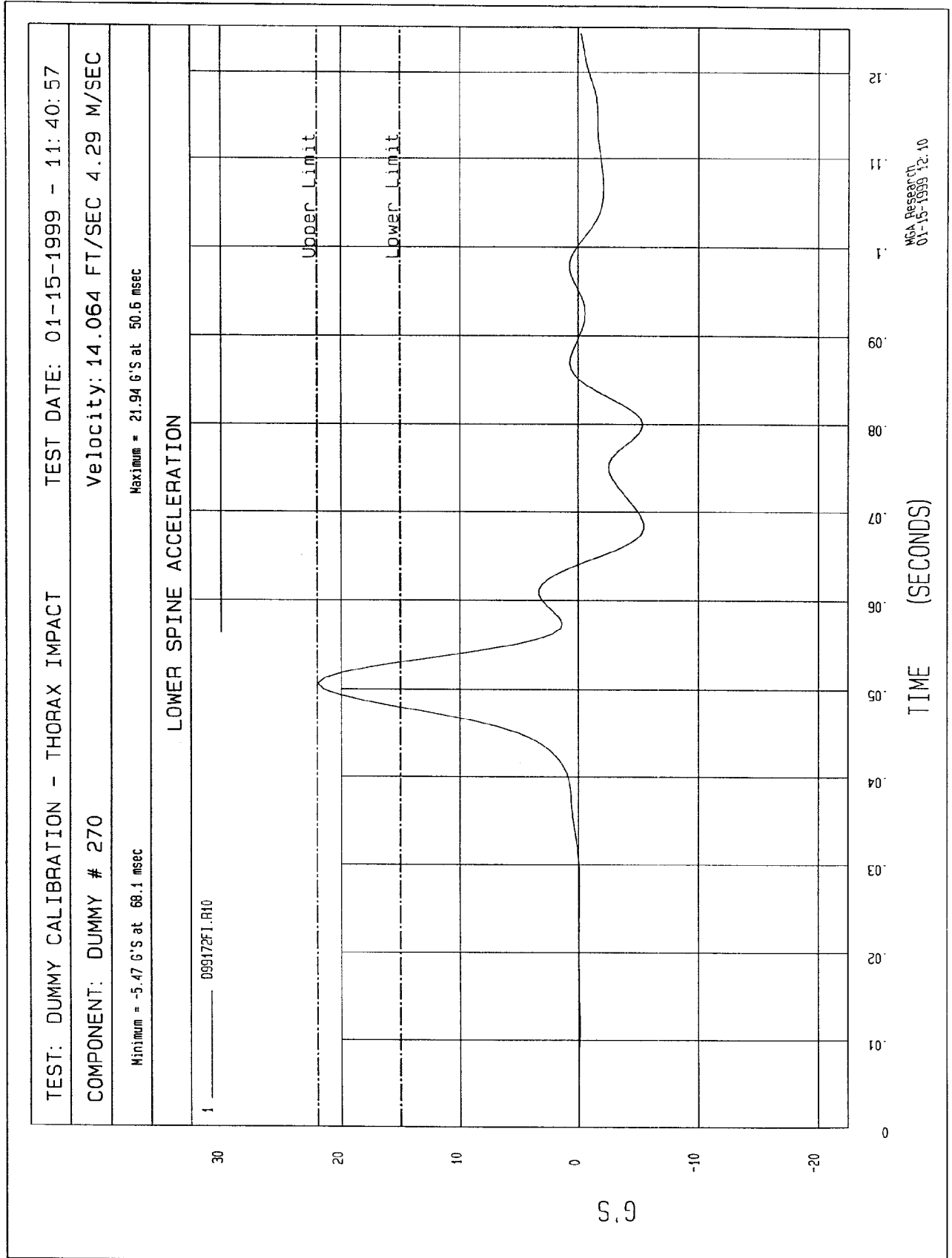
TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-15-1999 - 11:39

COMPONENT: DUMMY # 270 Velocity: 14.064 FT/SEC 4.29 M/SEC

Minimum = -12.93 G'S at 53.1 msec Maximum = 41.76 G'S at 45.6 msec

LOWER RIB ACCELERATION





PELVIS IMPACT TEST

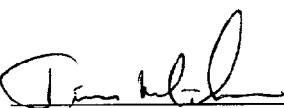
SIDE IMPACT DUMMY (SID)

DATE: January 15, 1999DUMMY SERIAL NUMBER: 270TEST NUMBER: D99173

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	14%
PROBE SPEED (m/s)	4.27 - 4.33	4.30
PELVIS ACCELERATION (g's)	40 - 60	42

TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY

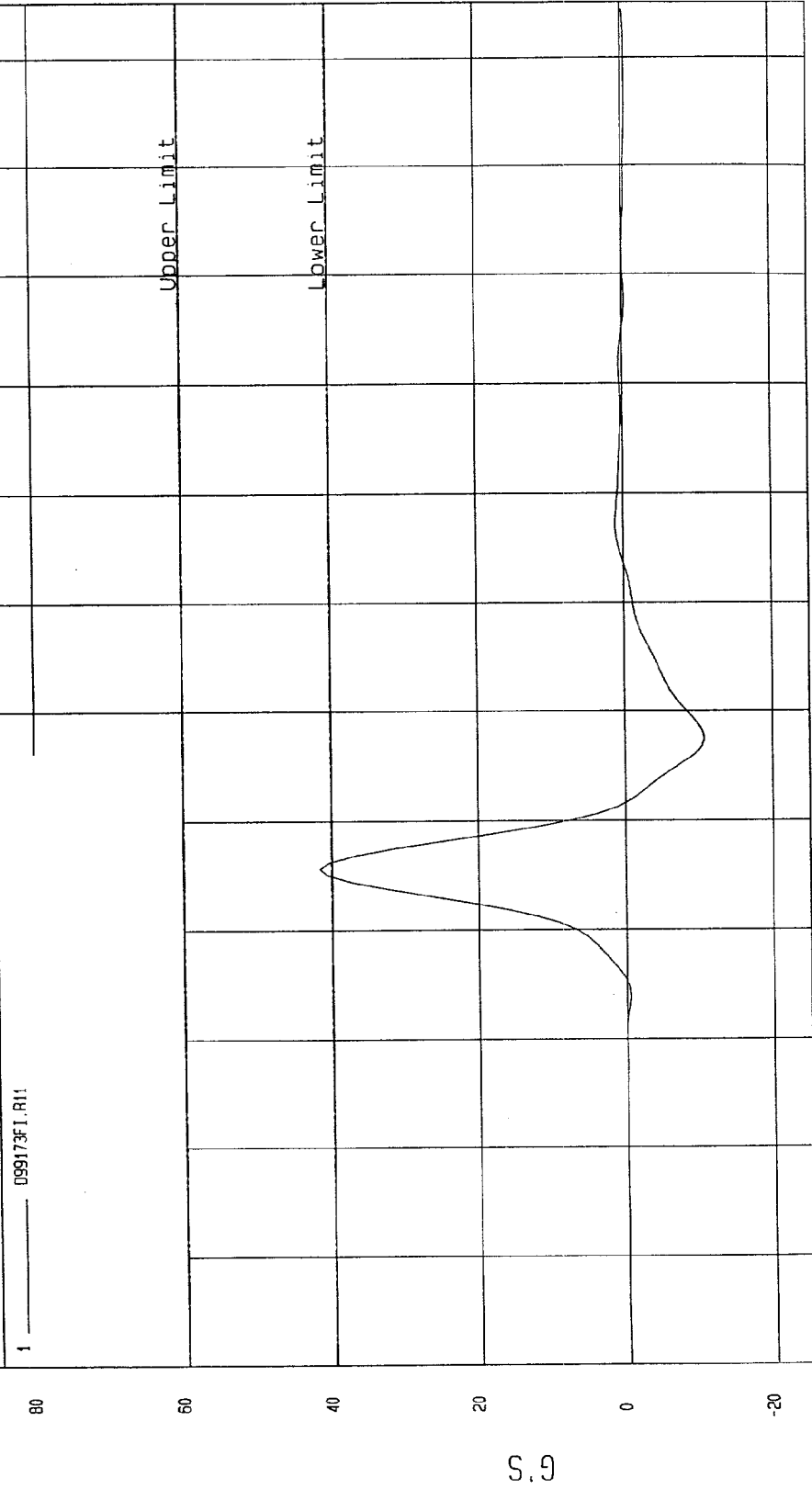


TEST: DUMMY CALIBRATION - PELVIS IMPACT TEST DATE: 01-15-1999 - 12:10

COMPONENT: DUMMY # 270 Velocity: 14.103 FT/SEC 4.3 M/SEC

Minimum = -10.67 G'S at 57.5 msec Maximum = 41.65 G'S at 45.6 msec

PELVIS ACCELERATION



MGA RESEARCH CORPORATION

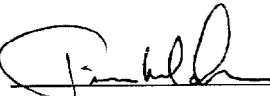
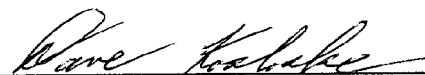
ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

DATE: January 15, 1999DUMMY SERIAL NUMBER: 270TEST NUMBER: D99174

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	13%
FORCE @ 12.7 mm	104 - 162	143
FORCE @ 19.0 mm	163 - 222	195
FORCE @ 25.4 mm	222 - 280	257
FORCE @ 33 mm	325 - 391	351

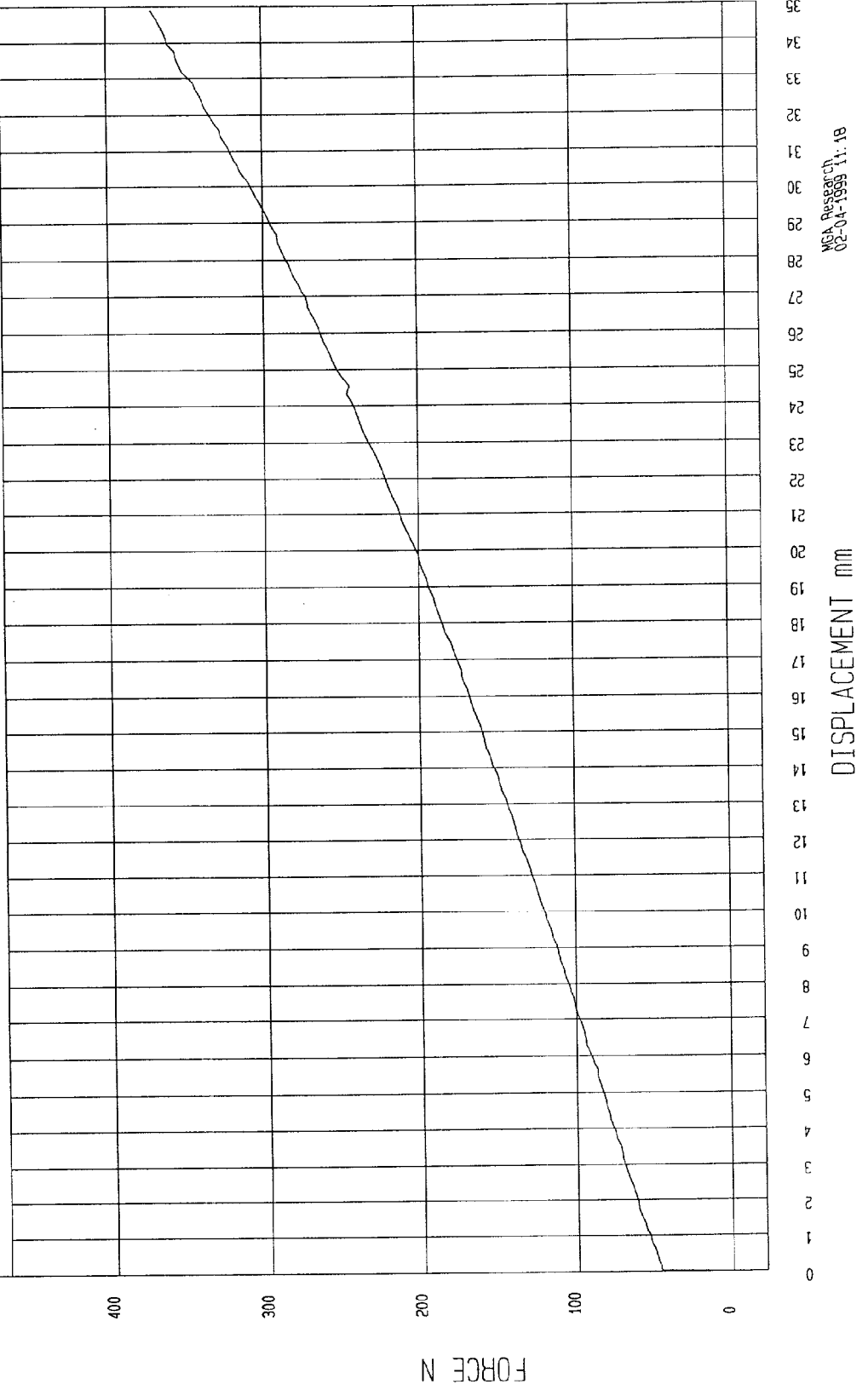
TEST MEETS SPECIFICATIONS

TECHNICIAN APPROVED BY 

TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSION TEST DATE: 01-15-1999 - 15:27:43

COMPONENT: DUMMY # 270

FORCE as a function of DISPLACEMENT



MGA Research
02-04-1999 11:18

MGA RESEARCH CORPORATION

C-25

LUMBAR FLEXION TEST

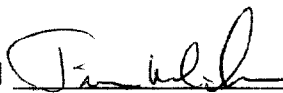
SIDE IMPACT DUMMY (SID)

DATE: January 15, 1999DUMMY SERIAL NUMBER: 270TEST NUMBER: D99175

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	13%
FORCE @ 0°	0 - 26.7	0
FORCE @ 20°	97.9 - 151.2	98.0
FORCE @ 30°	151.2 - 204.6	158.0
FORCE @ 40°	204.6 - 258.0	218.2
RETURN ANGLE	12° maximum	1°

TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY



TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 01-15-1999 - 13:28:

COMPONENT: DUMMY # 270

FORCE as a function of TORSO ROTATION

FORCE N

220

200

180

160

140

120

100

80

60

40

20

0

-20

-40

0

10

20

30

40

TORSO ROTATION DEGREES

MCA Research
01-15-1999 12:59

POST-TEST CERTIFICATION DATA

C-27

Driver Dummy Serial Number: 269

Driver Dummy Serial Number: 269

Post-Test Calibration

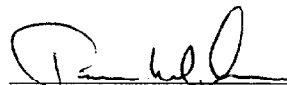
External Dimensions:	The dummy passed all external dimension requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion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

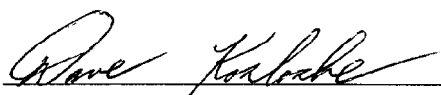
SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA ^{C-29}

DUMMY SERIAL NUMBER: 269

DATE OF VERIFICATION: January 19, 1999

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height (mm)	889 - 909	895
RH - Rib Height (mm)	501 - 521	508
HP - Hip Pivot Height (mm)	99 ref.	99
RD - Rib From Back Line (mm)	229 - 241	232
KV - Knee Pivot From Back Line (mm)	511 - 526	523
SW - Knee Pivot to Floor (mm)	490 - 505	501
HW - Hip Width (mm)	356 - 391	382

MEASUREMENTS BY: 

APPROVED BY: 

THORAX IMPACT TEST

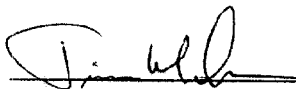
SIDE IMPACT DUMMY (SID)

DATE: January 19, 1999DUMMY SERIAL NUMBER: 269TEST NUMBER: D99202

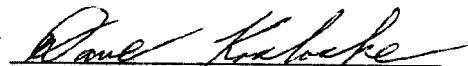
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	13%
PROBE SPEED (m/s)	4.27 - 4.33	4.30
UPPER RIB (g's)	37 - 46 g's	43
LOWER RIB (g's)	37 - 46 g's	44
LOWER SPINE (g's)	15 - 22 g's	19

TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY

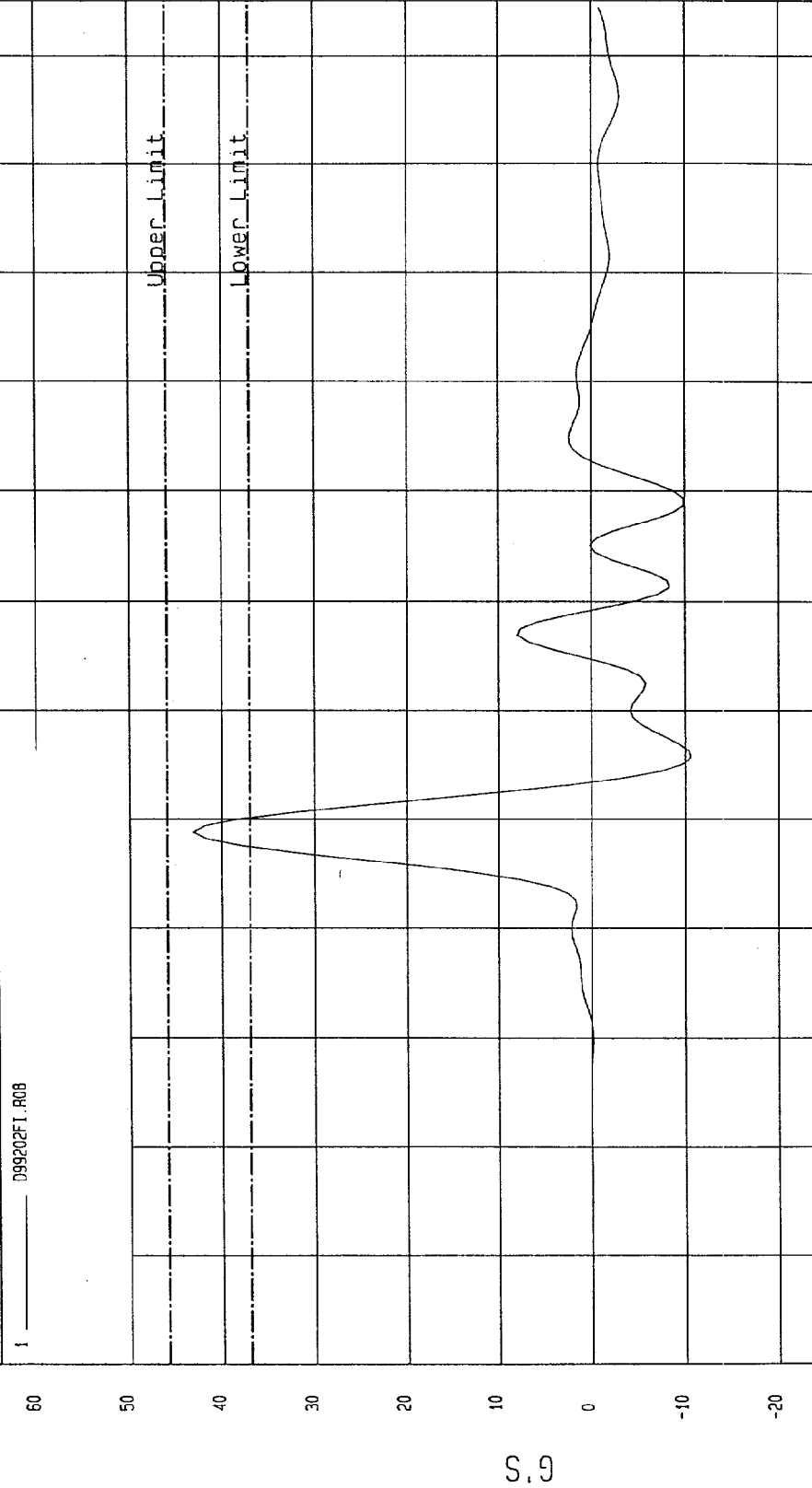


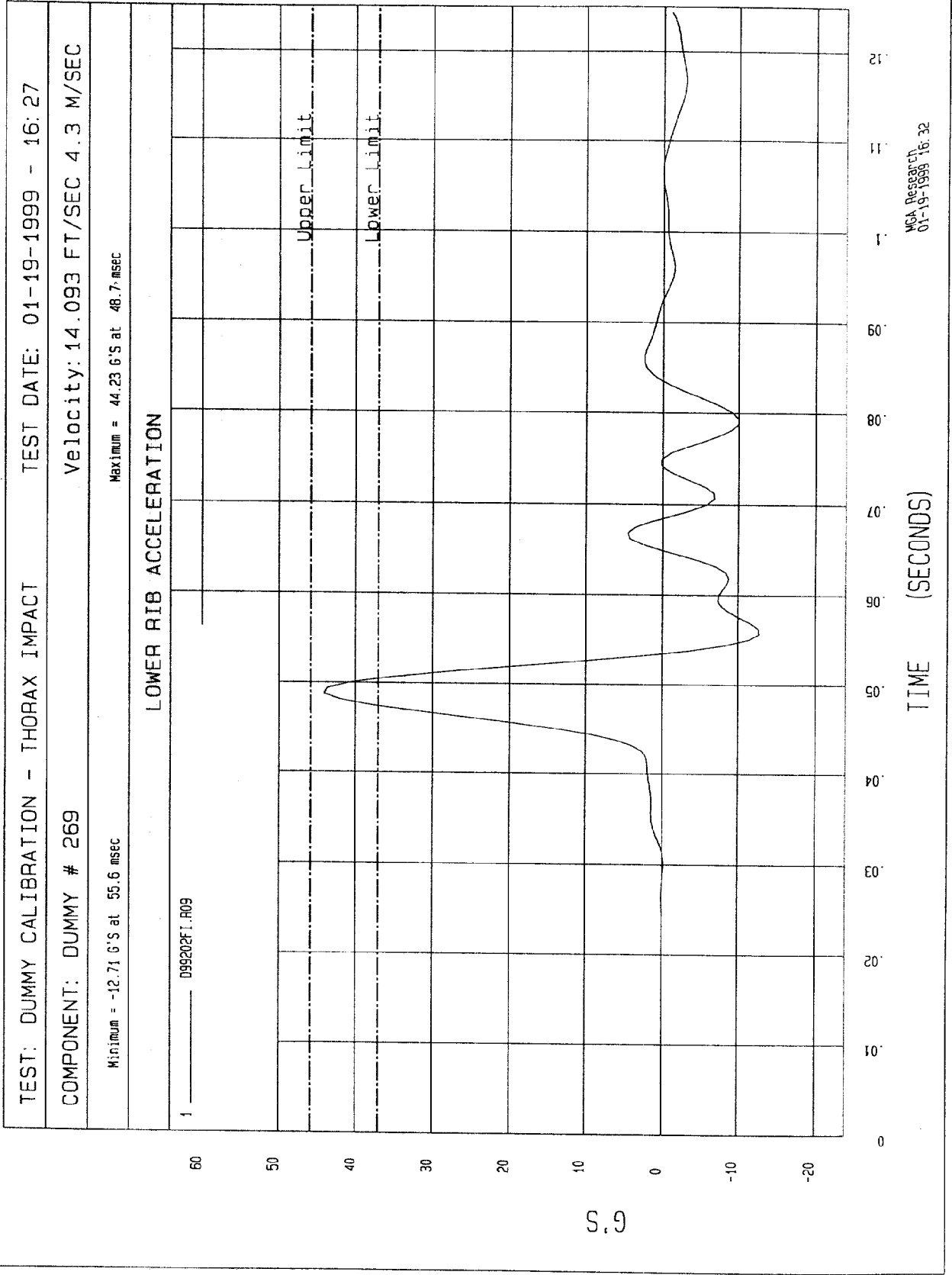
TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-19-1999 - 16:27

COMPONENT: DUMMY # 269 Velocity: 14.093 FT/SEC 4.3 M/SEC

Minimum = -10.61 G'S at 55.6 msec Maximum = 43.12 G'S at 48.7 msec

UPPER RIB ACCELERATION

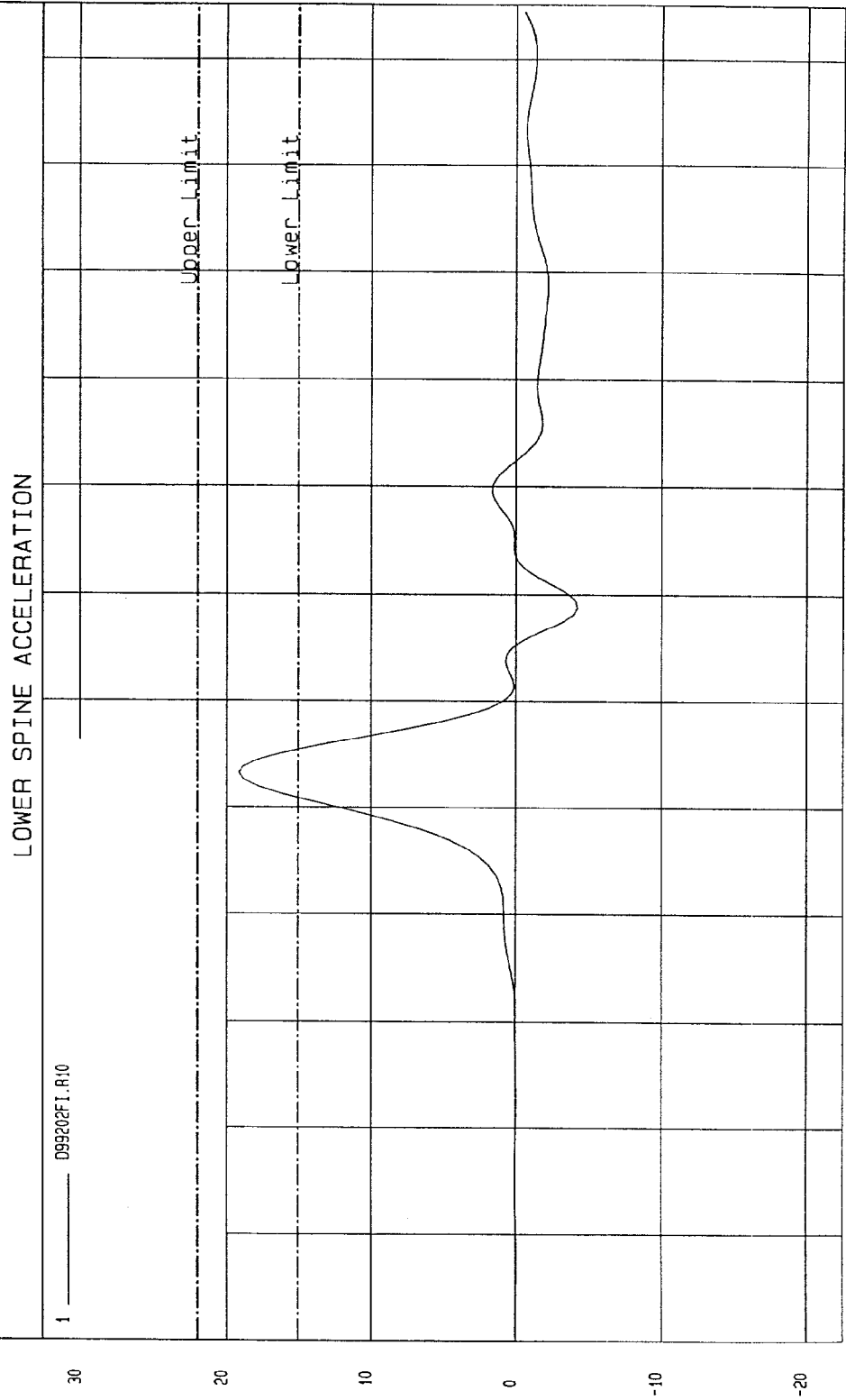




TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-19-1999 - 16:27

COMPONENT: DUMMY # 269 Velocity: 14.093 FT/SEC 4.3 M/SEC

Minimum = -4.23 G'S at 68.7 msec Maximum = 19.15 G'S at 53.1 msec



TIME (SECONDS)

MSA Research
01-19-1999 16:32

PELVIS IMPACT TEST

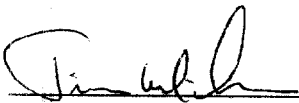
SIDE IMPACT DUMMY (SID)

DATE: January 19, 1999DUMMY SERIAL NUMBER: 269TEST NUMBER: D99203

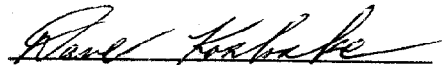
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	13%
PROBE SPEED (m/s)	4.27 - 4.33	4.29
PELVIS ACCELERATION (g's)	40 - 60	42

TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY

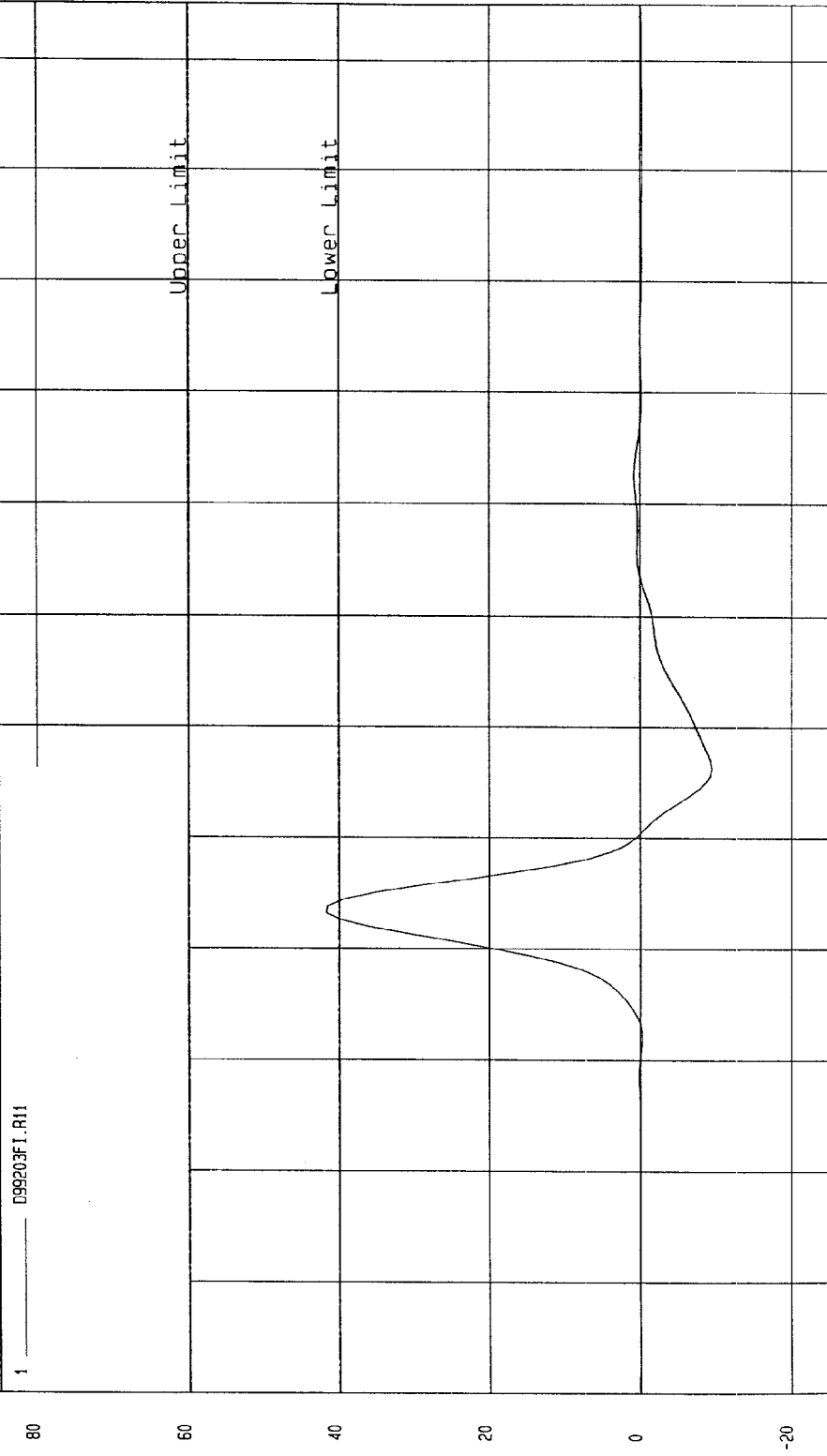


TEST: DUMMY CALIBRATION - PELVIS IMPACT TEST DATE: 01-19-1999 - 16:31

COMPONENT: DUMMY # 269 Velocity: 14.084 FT/SEC 4.29 M/SEC

Minimum = -9.40 G'S at 56.2 msec Maximum = 41.68 G'S at 43.1 msec

PELVIS ACCELERATION



TIME (SECONDS)

WCA Research
01-19-1999 16:33

G.S

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

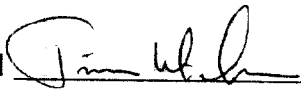
SIDE IMPACT DUMMY (SID)

DATE: January 19, 1999DUMMY SERIAL NUMBER: 269TEST NUMBER: D99204

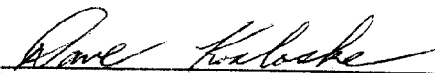
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	13%
FORCE @ 12.7 mm	104 - 162	153
FORCE @ 19.0 mm	163 - 222	212
FORCE @ 25.4 mm	222 - 280	277
FORCE @ 33 mm	325 - 391	381

TEST MEETS SPECIFICATIONS

TECHNICIAN



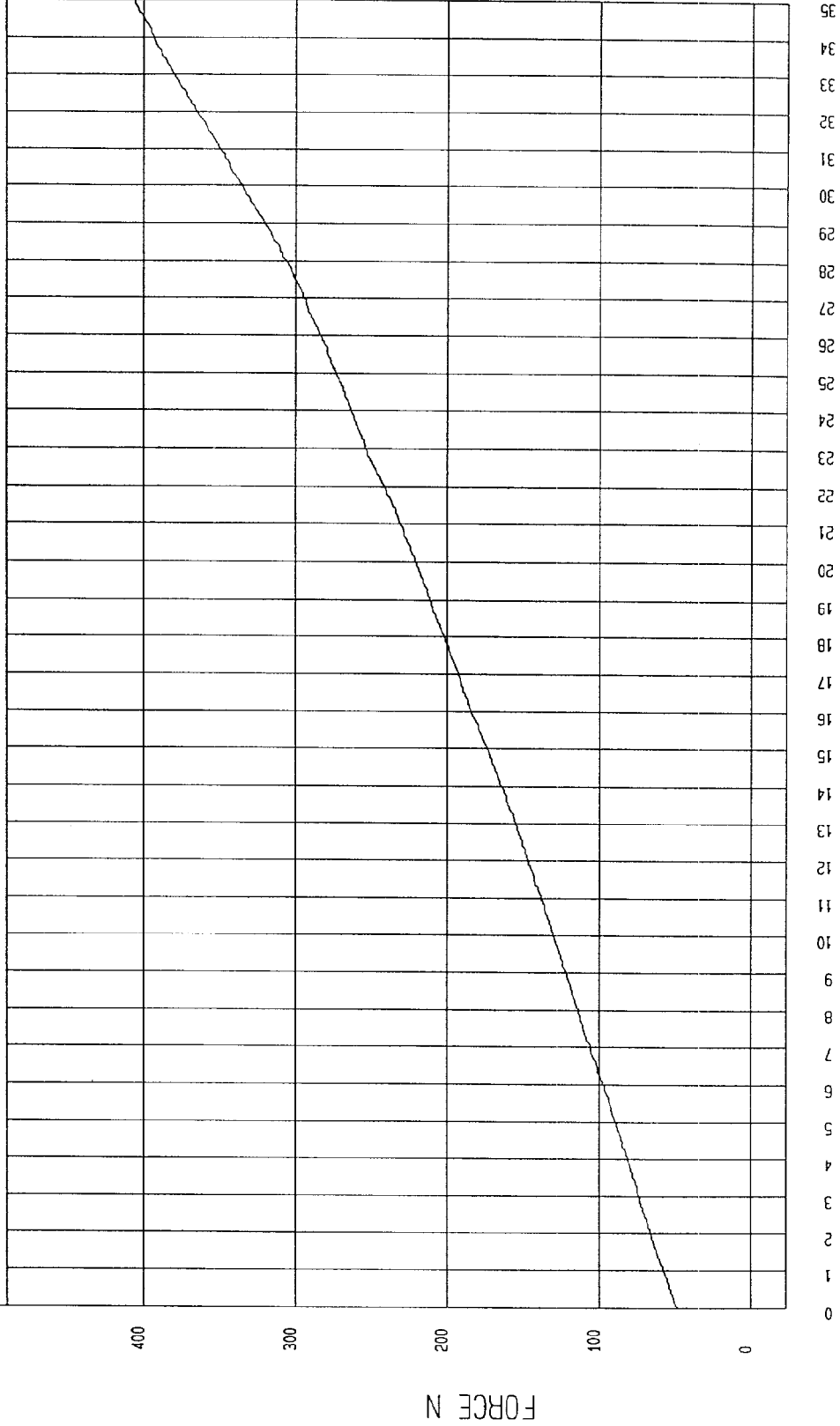
APPROVED BY



TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSION TEST DATE: 01-19-1999 - 12:23:21

COMPONENT: DUMMY # 269

FORCE as a function of DISPLACEMENT



MCA Research
01-19-1999 12:23

LUMBAR FLEXION TEST

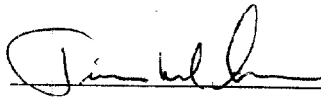
SIDE IMPACT DUMMY (SID)

DATE: January 19, 1999DUMMY SERIAL NUMBER: 269 TEST NUMBER: D99205

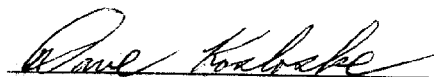
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	13%
FORCE @ 0°	0 - 26.7	0
FORCE @ 20°	97.9 - 151.2	134.1
FORCE @ 30°	151.2 - 204.6	186.3
FORCE @ 40°	204.6 - 258.0	222.4
RETURN ANGLE	12° maximum	3°

TEST MEETS SPECIFICATIONS

TECHNICIAN



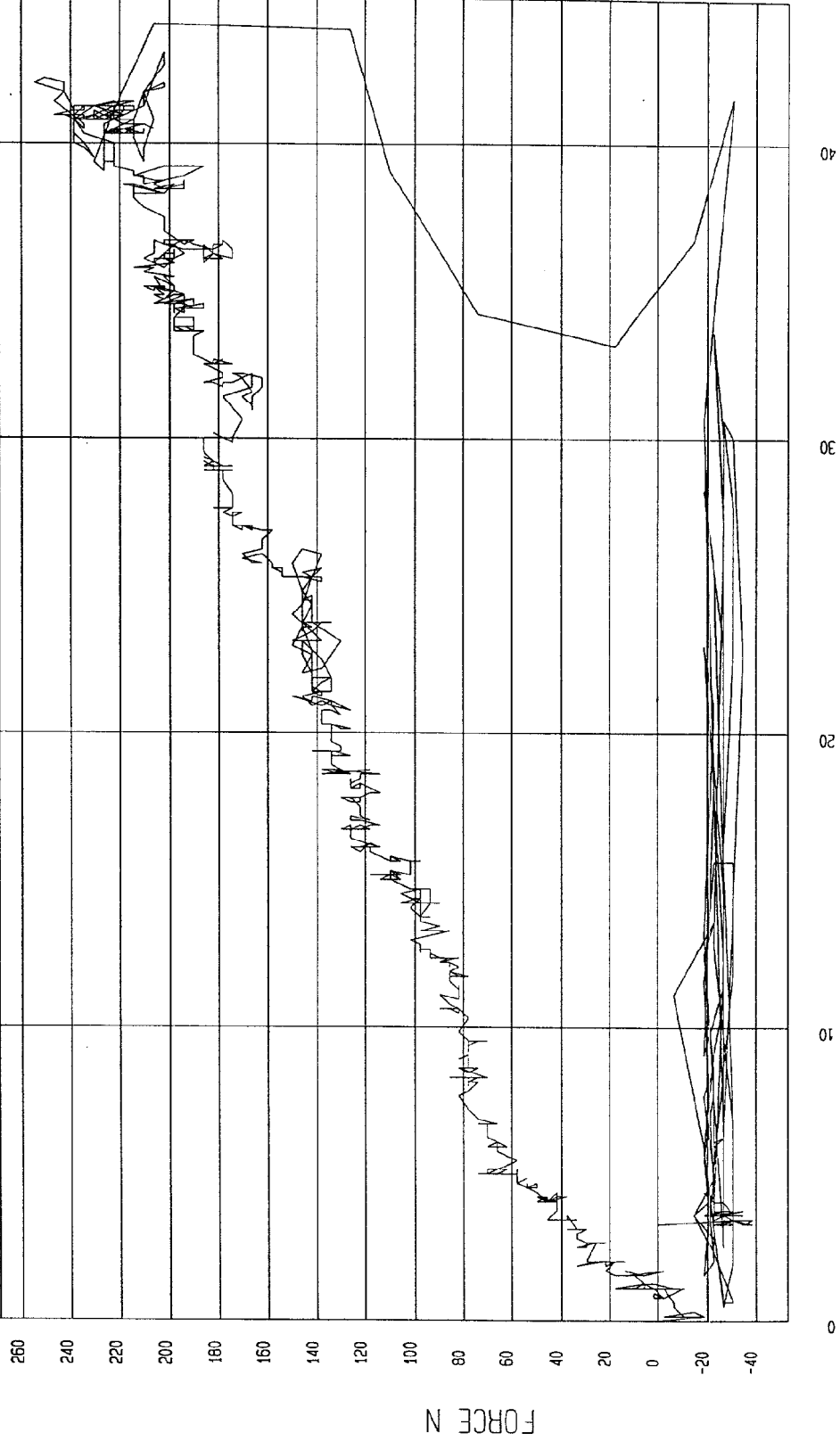
APPROVED BY



TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 01-19-1999 - 11:49:09

COMPONENT: DUMMY # 269

FORCE as a function of TORSO ROTATION



MCA Research
01-19-1999 11:49

POST-TEST CERTIFICATION DATA

C-40

Passenger Dummy Serial Number: 270

Passenger Dummy Serial Number: 270

Post-Test Calibration

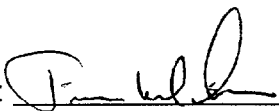
External Dimensions:	The dummy passed all external dimension requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion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

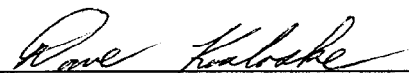
SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA ^{C-42}

DUMMY SERIAL NUMBER: 270

DATE OF VERIFICATION: January 19, 1999

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height (mm)	889 - 909	894
RH - Rib Height (mm)	501 - 521	514
HP - Hip Pivot Height (mm)	99 ref.	99
RD - Rib From Back Line (mm)	229 - 241	238
KV - Knee Pivot From Back Line (mm)	511 - 526	519
SW - Knee Pivot to Floor (mm)	490 - 505	494
HW - Hip Width (mm)	356 - 391	371

MEASUREMENTS BY: 

APPROVED BY: 

THORAX IMPACT TEST

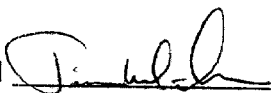
SIDE IMPACT DUMMY (SID)

DATE: January 19, 1999DUMMY SERIAL NUMBER: 270TEST NUMBER: D99212

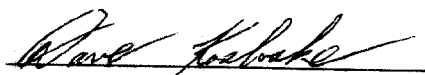
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	13%
PROBE SPEED (m/s)	4.27 - 4.33	4.28
UPPER RIB (g's)	37 - 46 g's	43
LOWER RIB (g's)	37 - 46 g's	41
LOWER SPINE (g's)	15 - 22 g's	22

TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY



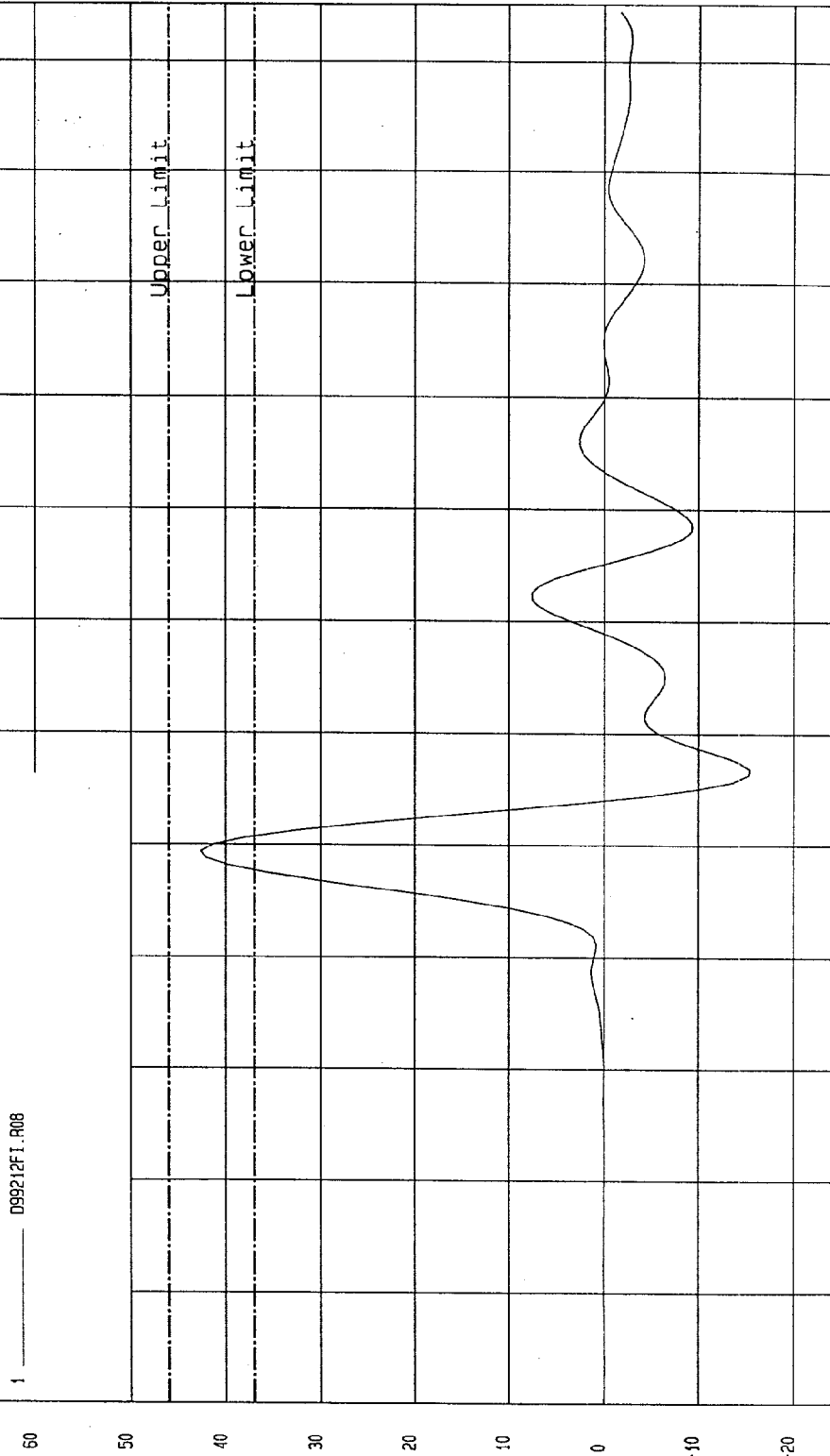
TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-19-1999 - 16:45

COMPONENT: DUMMY # 270 Velocity: 14.055 FT/SEC 4.28 M/SEC

Minimum = -15.24 G'S at 56.8 msec

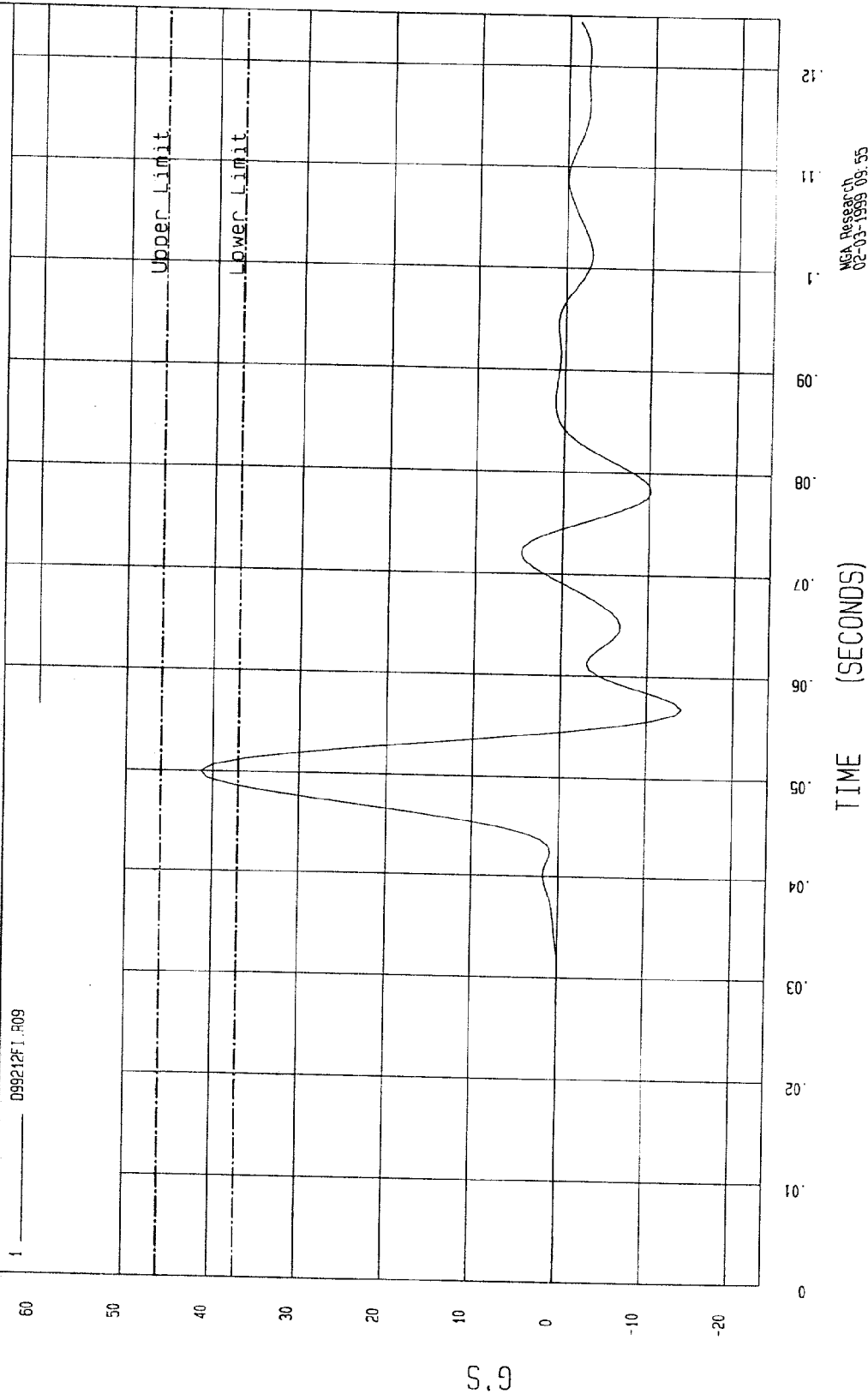
Maximum = 42.66 G'S at 49.3 msec

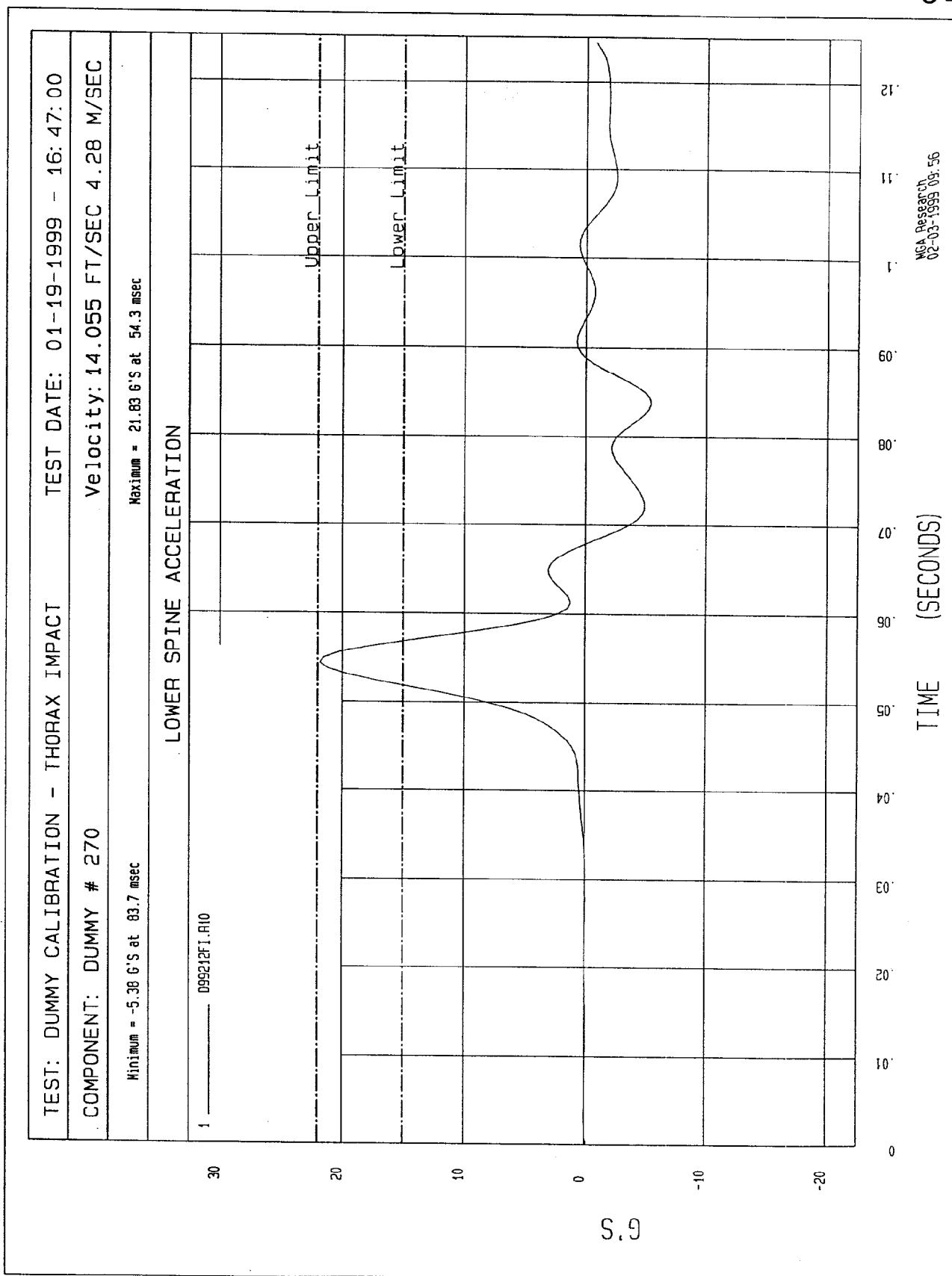
UPPER RIB ACCELERATION



TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-19-1999 - 16:45
COMPONENT: DUMMY # 270 Velocity: 14.055 FT/SEC 4.28 M/SEC
Minimum = -13.97 G'S at 56.8 msec Maximum = 41.41 G'S at 50 msec

LOWER RIB ACCELERATION





PELVIS IMPACT TEST

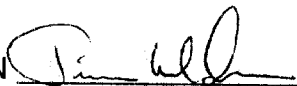
SIDE IMPACT DUMMY (SID)

DATE: January 19, 1999DUMMY SERIAL NUMBER: 270TEST NUMBER: D99213

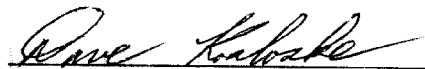
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	13%
PROBE SPEED (m/s)	4.27 - 4.33	4.28
PELVIS ACCELERATION (g's)	40 - 60	40

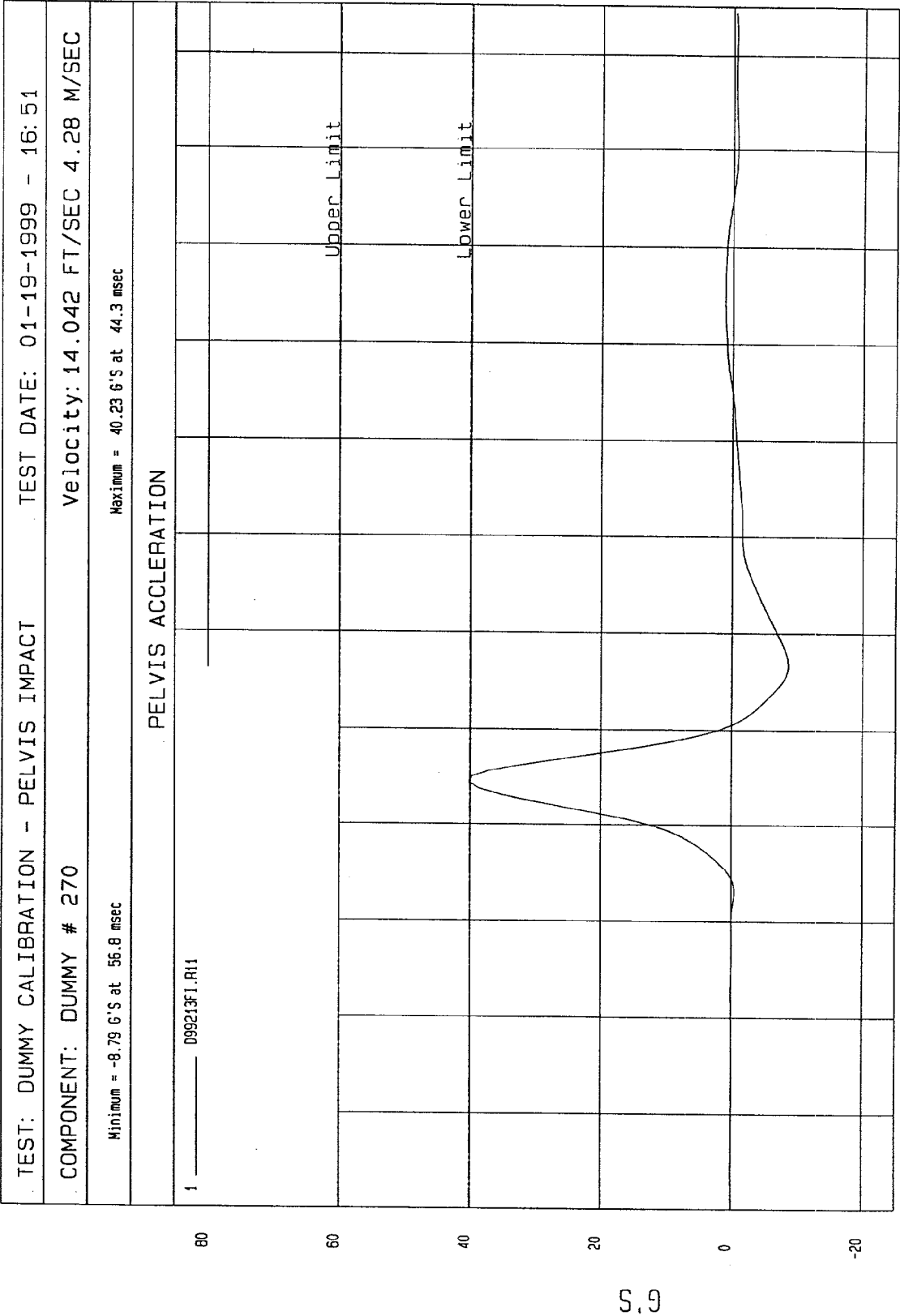
TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY





MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

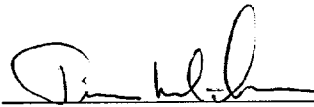
SIDE IMPACT DUMMY (SID)

DATE: January 19, 1999DUMMY SERIAL NUMBER: 270 TEST NUMBER: D99214

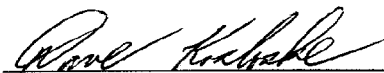
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	13%
FORCE @ 12.7 mm	104 - 162	145
FORCE @ 19.0 mm	163 - 222	204
FORCE @ 25.4 mm	222 - 280	269
FORCE @ 33 mm	325 - 391	381

TEST MEETS SPECIFICATIONS

TECHNICIAN



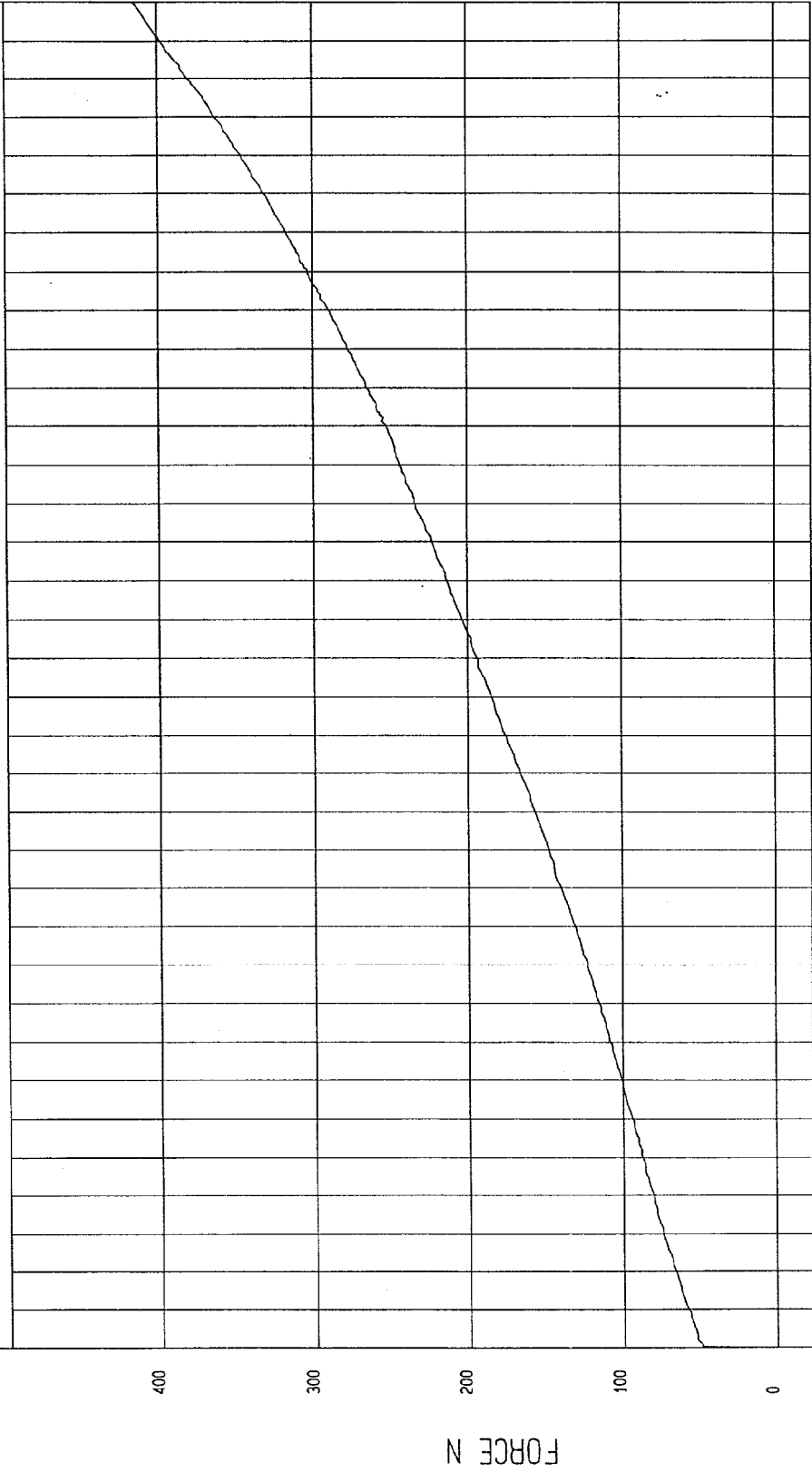
APPROVED BY



TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSION TEST DATE: 01-19-1999 - 12:14:48

COMPONENT: DUMMY # 270

FORCE as a function of DISPLACEMENT



MCA Research
02-03-1999 10:11

DISPLACEMENT mm

LUMBAR FLEXION TEST

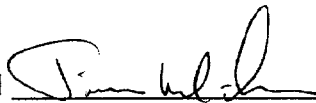
SIDE IMPACT DUMMY (SID)

DATE: January 19, 1999DUMMY SERIAL NUMBER: 270TEST NUMBER: D99215

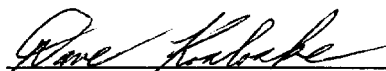
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	13%
FORCE @ 0°	0 - 26.7	0
FORCE @ 20°	97.9 - 151.2	119.1
FORCE @ 30°	151.2 - 204.6	195.3
FORCE @ 40°	204.6 - 258.0	231.4
RETURN ANGLE	12° maximum	3°

TEST MEETS SPECIFICATIONS

TECHNICIAN



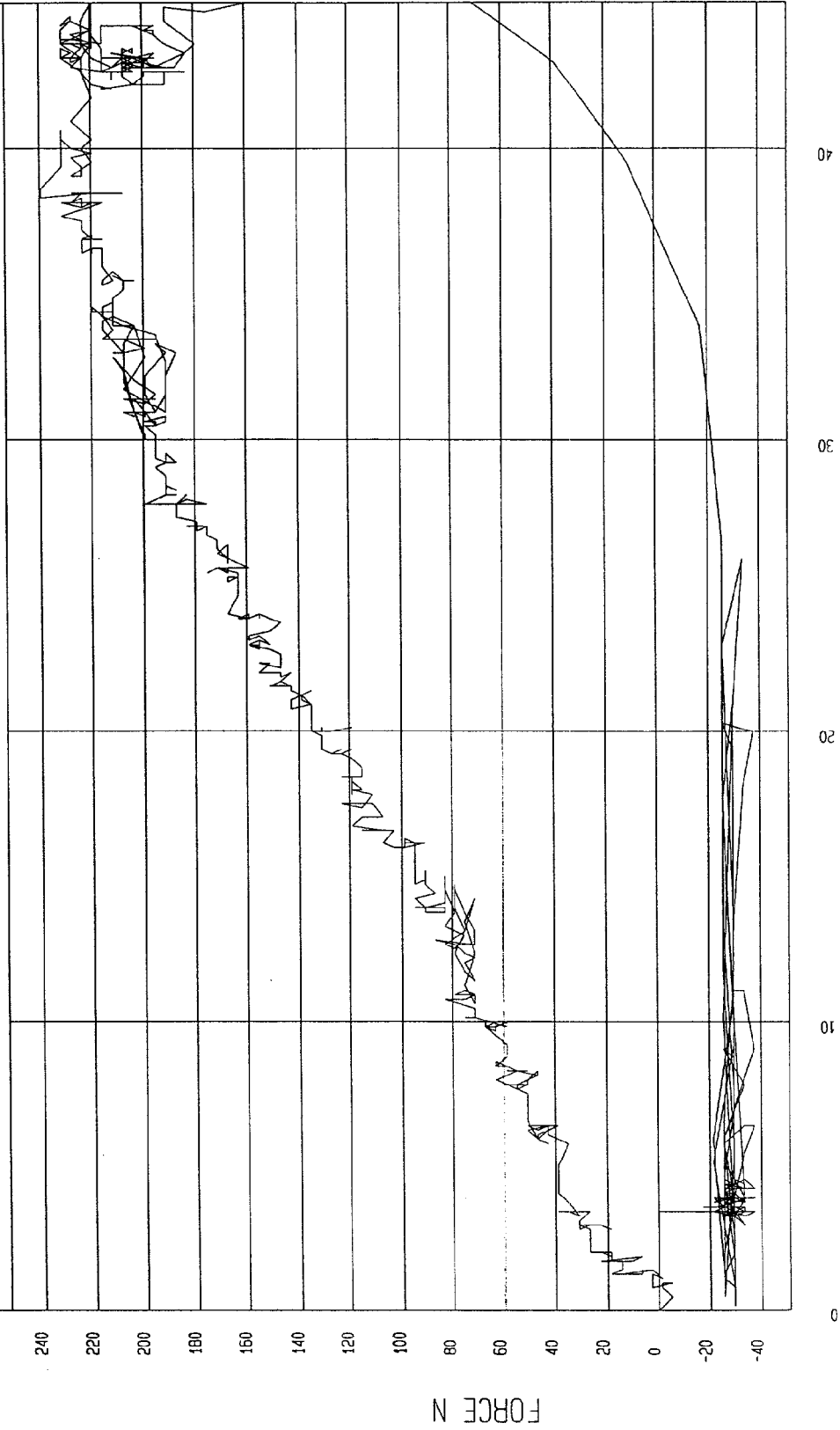
APPROVED BY



TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 01-19-1999 - 10:10:18

COMPONENT: DUMMY # 270

FORCE as a function of TORSO ROTATION



MGA Research
02-03-1999 10:11

POST-TEST DRIVER DUMMY INSPECTION CHECKLIST

C-53

Type: Side Impact Dummy

Serial Number: 269

Inspected By: Tim Michnay

Date: January 19, 1999

<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

C-54

Type: Side Impact Dummy

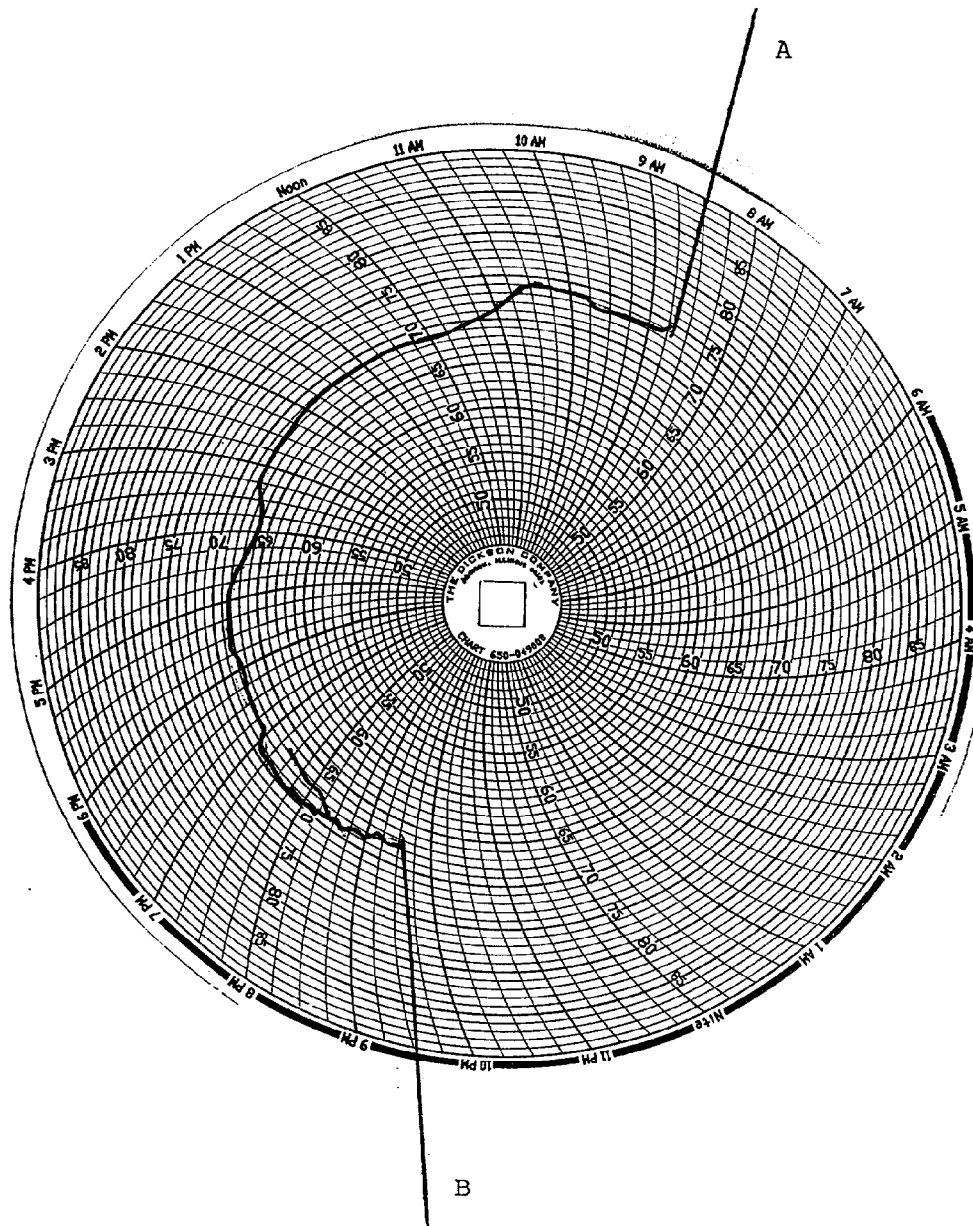
Serial Number: 270

Inspected By: Tim Michnay

Date: January 19, 1999

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

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

VEHICLE AND DUMMY TEMPERATURE

A = dummies installed in vehicle
B = test conducted

APPENDIX D
TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

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

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y	ALFJ7	Endevco	October 20, 1998
Lower Rib Y	APYN0	Endevco	October 20, 1998
Lower Spine Y	ANAP1	Endevco	October 20, 1998
Pelvis Y	AP0G2	Endevco	October 20, 1998
Upper Rib Redundant Y	ALDD6	Endevco	October 20, 1998
Lower Rib Redundant Y	APYN3	Endevco	October 20, 1998
Lower Spine Redundant Y	ANAT6	Endevco	October 20, 1998
Pelvis Redundant Y	AP138	Endevco	October 20, 1998
Head Center of Gravity X	J13990	Endevco	September 27, 1998
Head Center of Gravity Y	J13631	Endevco	September 27, 1998
Head Center of Gravity Z	J13930	Endevco	September 27, 1998

DUMMY AND VEHICLE CALIBRATION DATA
INSTRUMENTS FOR PASSENGER DUMMY NO. 270

LEFT REAR PASSENGER			
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y	AP2D8	Endevco	October 20, 1998
Lower Rib Y	AP170	Endevco	October 14, 1998
Lower Spine Y	AGTP7	Endevco	October 20, 1998
Pelvis Y	ANBP7	Endevco	October 20, 1998
Upper Rib Redundant Y	AP2A4	Endevco	October 20, 1998
Lower Rib Redundant Y	AP2G9	Endevco	October 14, 1998
Lower Spine Redundant Y	AGT04	Endevco	October 20, 1998
Pelvis Redundant Y	ANBP7	Endevco	October 20, 1998
Head Center of Gravity X	AP179	Endevco	October 20, 1998
Head Center of Gravity Y	ALFP1	Endevco	October 20, 1998
Head Center of Gravity Z	AHTY4	Endevco	October 20, 1998

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Moving Barrier CG X	K19-A11	Entran	August 27, 1998
Moving Barrier CG Y	K19-A15	Entran	August 27, 1998
Moving Barrier CG Z	K11-J17	Entran	August 28, 1998
Moving Barrier Rear Axle X	H02-J02	Entran	December 15, 1998
Moving Barrier Rear Axle Y	J04-F16	Entran	December 15, 1998
Left Mid A-Post Y	C25-A22	Entran	December 15, 1998
Left Lower A-Post Y	C25-A06	Entran	December 8, 1998
Left Mid B-Post Y	F20-G01	Entran	December 8, 1998
Left Lower B-Post Y	F20-G03	Entran	December 16, 1998
Rear Floorpan Above Axle X	C05-Z13	Entran	January 7, 1999
Rear Floorpan Above Axle Y	C06-G08	Entran	August 26, 1998
Rear Floorpan Above Axle Z	F07-A14	Entran	December 21, 1998
Driver Seat Track Y	F10-D02	Entran	December 16, 1998
Right Side Sill at Front Seat X	K16-X04	Entran	August 28, 1998
Right Side Sill at Front Seat Y	J13-F22	Entran	August 28, 1998
Right Side Sill at Front Seat Z	K16-X08	Entran	August 28, 1998
Right Side Sill at Rear Seat X	J10-E12	Entran	December 8, 1998
Right Side Sill at Rear Seat Y	B14-R16	Entran	September 16, 1998
Right Side Sill at Rear Seat Z	F18-G11	Entran	September 15, 1998

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO	MANUFACTURER	CALIBRATION DATE
Left Side Sill at Front Seat Y	I26-D02	Entran	December 15, 1998
Left Side Sill at Rear Seat Y	J04-F12	Entran	December 16, 1998
Right Rear Occupant Compartment Y	J10-E14	Entran	December 21, 1998
Vehicle CG X	I18-G01	Entran	January 7, 1999
Vehicle CG Y	F18-G08	Entran	September 16, 1998
Vehicle CG Z	J04-F10	Entran	December 16, 1998
Left Front Door on Centerline	F18-G03	Entran	January 7, 1999
Midrear of Left Front Door	G08-B04	Entran	January 7, 1999
Left Front Door Upper Centerline	J06-D20	Entran	January 7, 1999
Midrear of Left Rear Door	F18-G01	Entran	September 15, 1998
Left Rear Door Upper Centerline	G01-J05	Entran	August 26, 1998

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