

REPORT NO.: 214D-MGA-99-17

V3035

NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TESTING
PASSENGER CARS

TOYOTA MOTOR CORPORATION

1999 TOYOTA TACOMA XTRA CAB

NHTSA NO: MX5107

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: January 22, 1999

Report Date: February 17, 1999

FINAL REPORT

Prepared For:

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
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OFFICE OF CRASHWORTHINESS STANDARDS
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V3033

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16. Abstract A 90° Moving Deformable Barrier NCAP side impact was conducted on the subject 1999 Toyota Tacoma XTRA CAB 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 22, 1999. The impact velocity of the Moving Deformable Barrier (MDB) was 61.6 kph, and the ambient temperature at the struck side (driver's) of the target vehicle at the time of impact was 22.8 °C. The target vehicle post test maximum crush was 445 mm between levels 1 and 2. The test vehicle's performance follows: <table border="1"> <thead> <tr> <th></th> <th>DRIVER</th> <th>PASS.</th> </tr> </thead> <tbody> <tr> <td>Left Upper Rib (LUR) Accel., g</td> <td>59</td> <td>*</td> </tr> <tr> <td>Left Lower Rib (LLR) Accel., g</td> <td>74</td> <td>*</td> </tr> <tr> <td>Lower Spine (T₁₂) Accel., g</td> <td>138</td> <td>*</td> </tr> <tr> <td>Thoracic Trauma Index (TTI)</td> <td>106</td> <td>*</td> </tr> <tr> <td>Pelvis (PEV) Accel., g</td> <td>145</td> <td>*</td> </tr> </tbody> </table> * Left rear passenger dummy legs were removed for this test. The door on the struck side of the vehicle did not separate from the body at the hinges or latch and the opposite door did not open during the side impact event.							DRIVER	PASS.	Left Upper Rib (LUR) Accel., g	59	*	Left Lower Rib (LLR) Accel., g	74	*	Lower Spine (T ₁₂) Accel., g	138	*	Thoracic Trauma Index (TTI)	106	*	Pelvis (PEV) Accel., g	145	*
	DRIVER	PASS.																					
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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 Tacoma XTRA CAB.

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 Tacoma XTRA CAB was impacted on the left or driver's side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 38.3 mph (61.6 kph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by MGA Research Corporation in Burlington, Wisconsin, on January 22, 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 (T_{12}) 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)	106	*
Pelvis (g)	145	*

Space limitations in the rear seating area did not allow the H-point machine to be properly positioned. The rear passenger's legs were removed from the mid femur down in order to install the dummy in the seat.

* Left rear passenger dummy legs were removed for this test.

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/Tacoma/XTRA CAB
 Vehicle NHTSA No.: MX5107 VIN: 4TAVL521XZ435582
 Vehicle Body Color: White Build Date: 10/98
 Engine Data: 4 Cylinders; CID; 2.4 Liter; cc
 Placement X Longitudinal; Lateral
 Transmission: 4 Speed; Manual; X Automatic; Overdrive
 Final Drive: X Rear Wheel Drive; Frt. Wheel Drive; Four Wheel Drive

Odometer Reading 283 miles

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

DATA FROM TIRE PLACARD:

Tire Pressure (at capacity): 29 Psi FRONT
29 Psi REAR

Recommended Tire Size: P215/70R14

Tires on Test Vehicle: P215/70R14 Manufacturer: Firestone

Vehicle Capacity Data:

Number of Occupants: 3 Front; 2 Rear; 3rd Seat, 5 Total

Type of Front Seats: Bucket; Bench; X Split Bench

Type of Front Seat Back: Fixed; X Adjustable with X Lever

Vehicle Maximum Capacity Loading = 635.2 kg (A)

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

Cargo Capacity (A-B) = 295.0 kg

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)WEIGHT OF TEST VEHICLE WITH MAXIMUM FLUIDS:

Right Front	=	<u>372.0</u> kg	Right Rear	=	<u>283.5</u> kg
Left Front	=	<u>401.4</u> kg	Left Rear	=	<u>283.5</u> kg
TOTAL FRONT	=	<u>773.4</u> kg	TOTAL REAR	=	<u>567.0</u> kg
% of Total Vehicle Weight	=	<u>57.7</u> %;	% of Total Weight	=	<u>42.3</u> %
TOTAL WEIGHT	=	<u>1340.4</u> kg			

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)Year/Make/Model/Body Style: 1999/Toyota/Tacoma/XTRA CABVehicle NHTSA No.: MX5107 Test Date: January 22, 1999CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Test Vehicle Delivered Weight with Maximum Fluids	=	<u>1340.4</u> kg
Cargo Carrying Capacity of Test Vehicle*	=	<u>136.1</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>1637.9</u> kg

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

Right Front	=	<u>391.9</u> kg	Right Rear	=	<u>375.2</u> kg
Left Front	=	<u>468.1</u> kg	Left Rear	=	<u>402.3</u> kg
TOTAL FRONT	=	<u>860.0</u> kg	TOTAL REAR	=	<u>777.5</u> kg
% of Total Weight	=	<u>52.5</u> %	% of Total Weight	=	<u>47.5</u> %
TOTAL WEIGHT	=	<u>1637.5</u> kg			

TEST VEHICLE ATTITUDE:

CURB WEIGHT ATTITUDE:

Right Front 718 mm Left Front 715 mm Right Rear 763 mm Left Rear 744 mm

FULLY LOADED WEIGHT ATTITUDE:

Right Front 705 mm Left Front 697 mm Right Rear 727 mm Left Rear 688 mm

TEST ATTITUDE:

Right Front 708 mm Left Front 698 mm Right Rear 726 mm Left Rear 700 mm* light trucks and MPV's RCW is 136 kgs or manufacturer's value, whichever is less

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

Test Vehicle Wheelbase: 3097 mm

C.G. = 1480 mm rearward of front wheel centerline

TOTAL VEHICLE LENGTH:

Right Side = 4820 mm

Centerline = 5100 mm

Left Side = 4820 mm

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)Year/Make/Model/Body Style: 1999/Toyota/Tacoma/XTRA CABVehicle NHTSA No.: MX5107 Test Date: January 22, 1999FRONT SEAT CUSHION PLACEMENT:Total Length of Adjustment Travel: 296 mmTest Position: 8th detent rearward of 14FRONT SEAT BACK ADJUSTMENT POSITION:Seat Back Angle = 6th notch rearward from full up as "1"SECOND POSITION SEAT:Total Length of Fore/Aft Adjustment Travel: Non-adjustableSeat Back Adjustment Position: Non-adjustableADJUSTABLE STEERING COLUMN POSITION: 5th down from full up as "1"

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

AMOUNT OF STODDARD SOLVENT IN FUEL TANK:Fuel system usable capacity = 14.9 gallonsTest Volume: 13.9 gallons 93 % of capacityLOCATIONS OF IMPACT POINT ON TEST VEHICLE SIDE TO BE IMPACTED:Wheelbase: = 3097 mmImpact Point is 508 mm rearward of front axle centerline

DATA SHEET NO. 2
TEST VEHICLE SUMMARY OF RESULTS

Year/Make/Model/Body Style: 1999/Toyota/Tacoma/XTRA CAB

Vehicle NHTSA No.: MX5107 Test Date: January 22, 1999

Overall Length = 5100 mm; Overall Width = 1652 mm

TEST WEIGHT:

Right Front = 392.8 kg

Right Rear = 380.0 kg

Left Front = 456.8 kg

Left Rear = 399.2 kg

TOTAL FRONT = 849.6 kg

TOTAL REAR = 779.2 kg

% of Total Weight = 52.2 %

% of Total Weight = 47.8 %

TOTAL VEHICLE WEIGHT = 1628.8 kg

Wheelbase = 3097 mm

Longitudinal C.G. from Center of Front Axle = 1480 mm

Impact Angle with Respect to Impactor = 90° degrees

MAXIMUM EXTERIOR STATIC CRUSH:

1. LEVEL 1 (315 mm above ground) = 375 mm

2. LEVEL 2 (615 mm above ground) = 416 mm

3. LEVEL 3 (680 mm above ground) = 428 mm

4. LEVEL 4 (955 mm above ground) = 374 mm

5. LEVEL 5 (1445 mm above ground) = 183 mm

Maximum Post-Test Intrusion = 445 mm

OCCUPANTS:

Type of Dummy

Driver

Left Rear Passenger

SID

SID

Restraints Used

Type II belt and

Type II belt

frontal airbag

TEST VEHICLE SUMMARY OF RESULTS (Cont'd)INSTRUMENTATION:

Number of Vehicle Data Channels:	=	<u>23</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/Tacoma/XTRA CABVehicle NHTSA No.: MX5107 Test Date: January 22, 1999POSITION OF IMPACT (MDB) ON MONORAIL:Crabbed 27° to leftMDB DETAILS:Overall Width of Framework Carriage = 1252 mmOverall Length of MDB (incl. honeycomb impact face) = 4115 mmWheelbase of Framework Carriage = 2591 mmTread of Framework Carriage (Front & Rear) = 1880 mmC.G. Location Rearward of Front Axle = 1098 mmC.G. Location From Center Line = -15 mmC.G. Location Above Ground Level = 485 mmMDB WEIGHT:Left Front = 457.7 kg Left Rear = 235.1 kgRight Front = 328.1 kg Right Rear = 342.6 kgTOTAL FRONT = 785.8 kg TOTAL REAR = 577.7 kgTOTAL MDB WEIGHT = 1363.5 kgImpact Angle (MDB C/L to Target Vehicle C/L) = 90° degreesImpact Speed = Primary: 38.3 mph (61.6 kph) Secondary: 38.4 mph (61.8 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>206</u> mm |
| 2. | Row B Mid Stack (686 mm) | = | <u>161</u> mm |
| 3. | Row C Top of Bumper (533 mm) | = | <u>126</u> mm |
| 4. | Row D Center of Bumper (432 mm) | = | <u>81</u> mm |

INSTRUMENTATION:

Number of MDB Data Channels = 7

DATA SHEET NO. 4
POST-TEST OBSERVATIONS

Year/Make/Model/Body Style: 1999/Toyota/Tacoma/XTRA CAB

Vehicle NHTSA No.: MX5107 Test Date: January 22, 1999

VISIBLE DUMMY CONTACT POINTS:

	<u>LEFT FRONT SID</u>	<u>LEFT REAR SID</u>
Head	<u>To left shoulder and headrest</u>	<u>To side and rear header</u>
Arm	<u>Door panel above armrest</u>	<u>Upper interior panel</u>
Pelvis	<u>Door panel below armrest</u>	<u>Interior panel</u>
Left Knee	<u>Door panel</u>	<u>Interior 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>N/A</u>	<u>N/A</u>

MDB DISTANCE FROM TARGET IMPACT POINT:

Horizontal: 5 mm forward

Vertical: 10 mm high

ARM REST LOCATIONS:

Front: 203 mm from bottom of window

Rear: N/A

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

Front Seat Back: 8 mm Front Seat Cushion: 8 mm
Left Rear Seat Back: 17 mm Rear Seat Cushion: 25 mm

GLAZING DAMAGE:

Both driver's side windows broke

PILLAR PERFORMANCE:

No failure noted

SILL SEPARATION:

None noted

OTHER NOTABLE IMPACT EFFECTS:

Tailgate opened during impact

AIRBAG DEPLOYMENT STATUS:

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

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

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

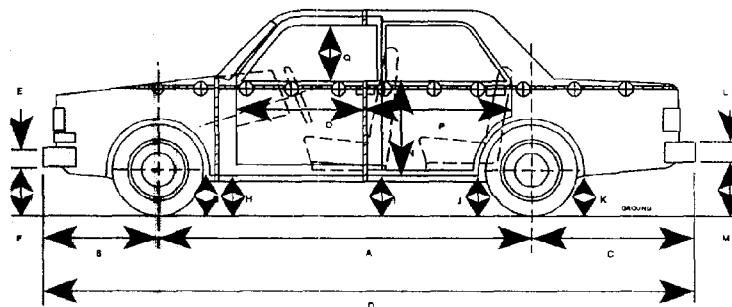
Year/Make/Model/Body Style: 1999/Toyota/Tacoma/XTRA CAB
Vehicle NHTSA No.: MX5107 Test Date: January 22, 1999

	Driver SID ID # 270				Left Passenger SID ID # 269			
	Pos. Direct.		Neg. Direct		Pos. Direct.		Neg. Direct	
	Max (g)	Time (msec)	Max (g)	Time (msec)	Max (g)	Time (msec)	Max (g)	Time (msec)
RIB ACCELERATIONS								
Left Upper Rib (LUR) Y	59.4	36	-12.5	82	*	*	*	*
Left Lower Rib (LLR) Y	73.6	31	-15.7	161	*	*	*	*
SPINE ACCELERATIONS								
Lower Lateral Y	137.6	33	-21.2	52	*	*	*	*
PELVIS ACCELERATIONS								
Lateral Y	145.5	31	-19.4	91	*	*	*	*

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

* Left rear passenger dummy legs were removed for this test.

DATA SHEET NO. 6
VEHICLE PRE AND POST-TEST MEASUREMENTS



LEFT SIDE VIEW

D = Length at Centerline

R = Right Side Length

S = Left Side Length

T = Width at B Post

E & L = Bumper Thickness

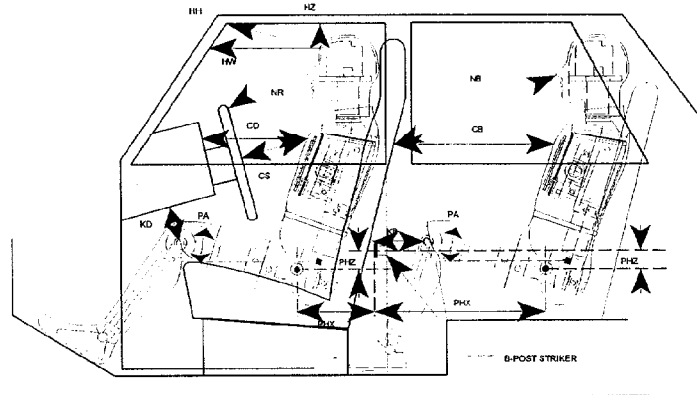
J1 = To Pinch Weld

J2 = To Sill

ALL MEASUREMENTS IN (mm)

	PRE-TEST	POST-TEST	Δ CHANGE
A	3097	3087	-10
B	803	871	68
C	1200	1168	-32
D	5100	5126	26
E	90	90	0
F	465	465	0
G	275	275	0
H	213	185	-28
I	270	295	25
J1/J2	270/206	385/190	115/-16
K	340	390	50
L	125	125	0
M	375	380	15
N	630	595	-35
O	833	755	-78
P	321	322	1
Q	469	465	-4
R	4820	4855	35
S	4820	4790	-30
T	1652	1324	-328

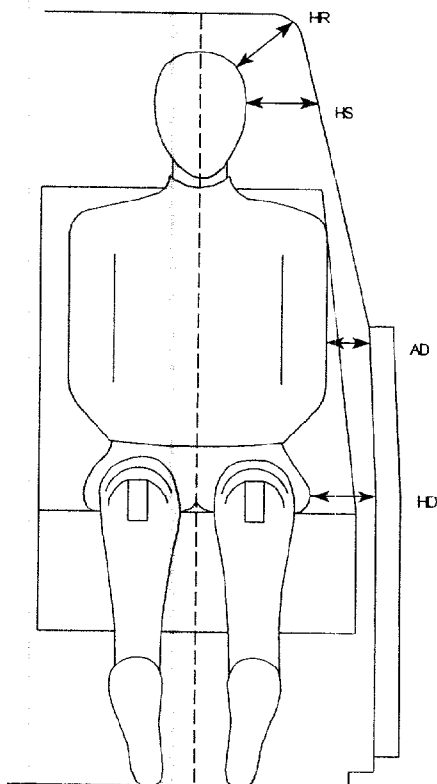
DATA SHEET NO. 7

SIDE IMPACT DUMMY (SID) LONGITUDINAL CLEARANCE DIMENSIONSYear/Make/Model/Body Style: 1999/Toyota/Tacoma/XTRA CABNHTSA NO.: MX5107 Test Date: January 22, 1999NOTE: All dimensions are in mm with tolerance of ± 3 mm

	DRIVER SID ID # 270		LEFT REAR PASSENGER SID ID # 269
HH	461	HZ	182
HW	591	NB	250
HZ	170	CB	168
NR	485	KBL (KBA)	N/A
CD	599	KBR (KBA)	N/A
CS	364	PA°	11.2°
KDL(KDA°)	264 (0.0°)	PHX	379
KDR(KDA°)	296 (0.0°)	PHZ	103
PA°	23.9°		
PHX	298		
PHZ	127		

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/Tacoma/XTRA CABNHTSA NO.: MX5107Test Date: January 22, 1999

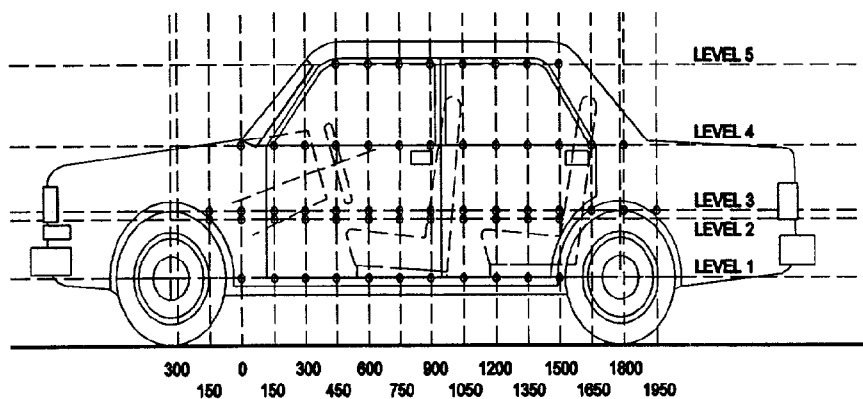
NOTE: All dimensions are in mm

	DRIVER SID ID # 270	LEFT REAR PASSENGER SID ID # 269
HR	205	199
HS	287	285
AD	82	77
HD	147	158

DATA SHEET NO. 9
VEHICLE SIDE MEASUREMENTS

Year/Make/Model/Body Style: 1999/Toyota/Tacoma/XTRA CAB

NHTSA NO.: MX5107 Test Date: January 22, 1999



LEFT SIDE VIEW

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)

= 315 mm

Level 2 @ Occupant H-Point

= 615 mm

Level 3 @ Mid Door

= 680 mm

Level 4 @ Window Sill

= 955 mm

Level 5 @ Window Top

= 1445 mm

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

Longitudinal Distance (mm)	Level 1 - Axle Centerline		
	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1800			
-1650			
-1500			
-1350			
-1200			
-1050			
-900			
-750			
-600			
-450			
-300			
-150			
0 (impact point)	646	762	116
150	648	849	201
300	647	882	235
450	648	912	264
600	649	932	283
750	649	943	294
900	650	963	313
1050	652	986	334
1200	648	1023	375
1350	649	1007	358
1500	649	977	328
1650	649	964	315
1800	652	917	265

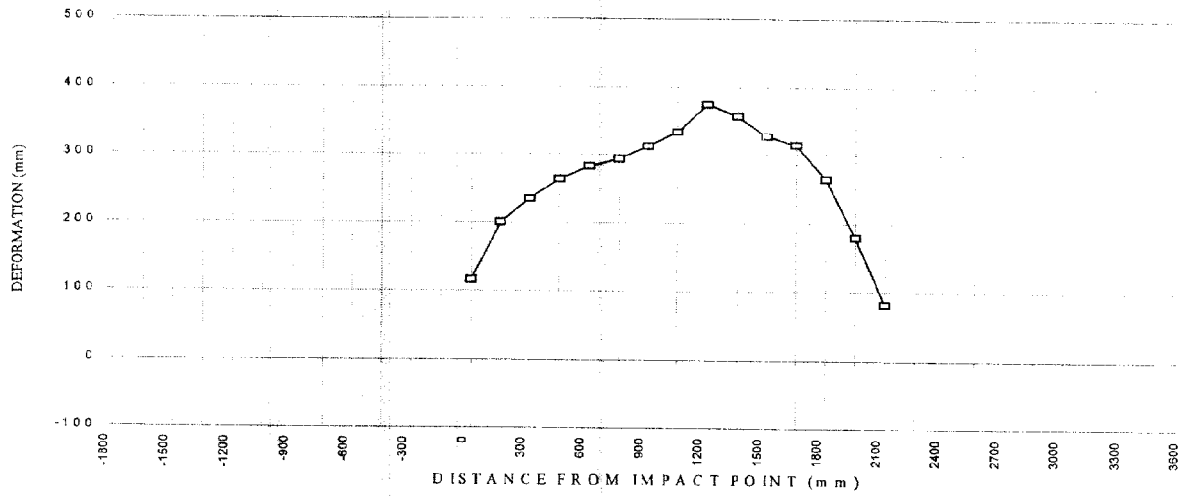
Reference plane is parallel to test vehicle longitudinal centerline.
 Given dimensions = Reference plane to car body

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

Longitudinal Distance (mm)	Level 1 - Axle Centerline		
	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
1950	646	826	180
2100	620	702	82
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	629	648	19
-900	600	636	36
-750			
-600			
-450			
-300			
-150	590	687	97
0 (impact point)	594	693	99
150	594	942	348
300	595	983	388
450	596	994	398
600	597	1007	410
750	597	1003	406
900	597	1004	407
1050	598	998	400
1200	597	1013	416
1350	597	1002	405
1500	595	998	403
1650	597	995	398
1800	598	804	206

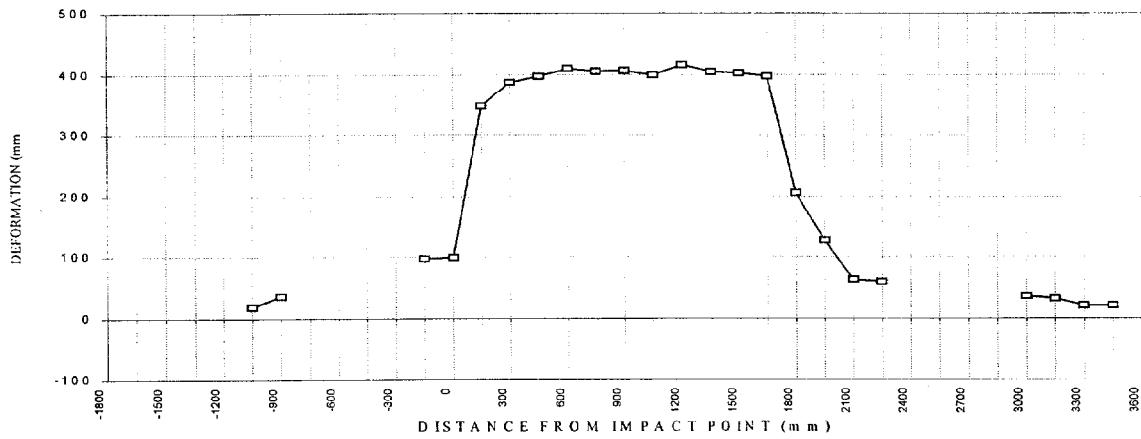
Reference plane is parallel to test vehicle longitudinal centerline.
Given dimensions = Reference plane to car body

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

	Level 2 - Occupant H-Point		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
1950	591	718	127
2100	582	645	63
2250	580	640	60
2400			
2550			
2700			
2850			
3000	586	622	36
3150	591	623	32
3300	599	620	21
3450	604	625	21
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	604	644	40
-750	595	645	50
-600			
-450			
-300			
-150	589	685	96
0 (impact point)	589	699	110
150	591	922	331
300	591	957	366
450	591	968	377
600	592	975	383
750	593	989	396
900	593	988	395
1050	593	1004	411
1200	593	1009	416
1350	593	1021	428
1500	591	1019	428
1650	594	998	404
1800	594	801	207

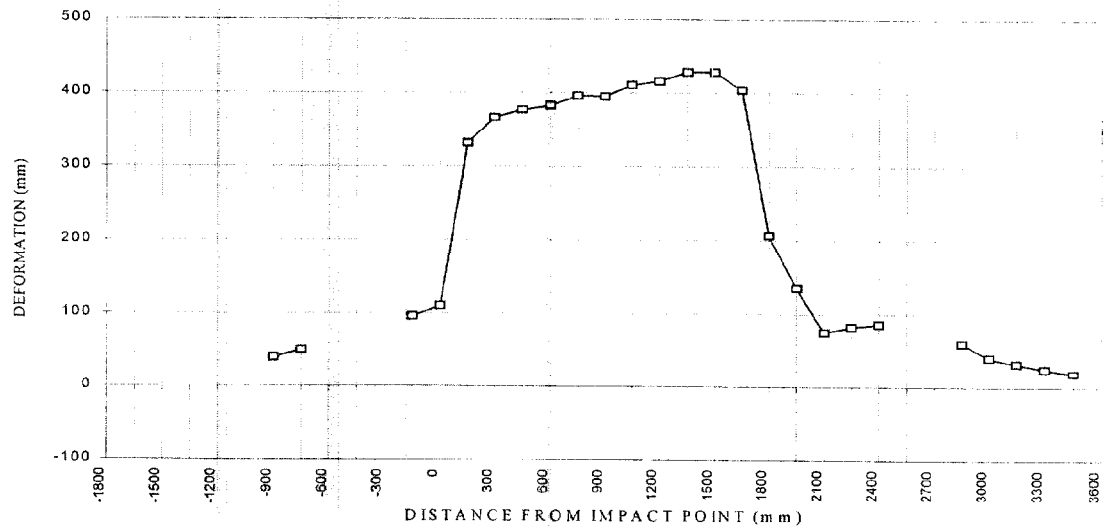
Reference plane is parallel to test vehicle longitudinal centerline.
Given dimensions = Reference plane to car body

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	590	725	135
2100	582	657	75
2250	582	664	82
2400	582	668	86
2550			
2700			
2850	583	643	60
3000	586	627	41
3150	591	624	33
3300	598	624	26
3450	604	624	20
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	696	709	13
-900	672	702	30
-750	659	705	46
-600	652	710	58
-450	648	720	72
-300	645	731	86
-150	638	742	104
0 (impact point)	638	753	115
150	637	828	191
300	635	849	214
450	634	885	251
600	633	896	263
750	633	923	290
900	633	947	314
1050	634	973	339
1200	634	1008	374
1350	638	976	338
1500	634	943	309
1650	633	898	265
1800	638	778	140

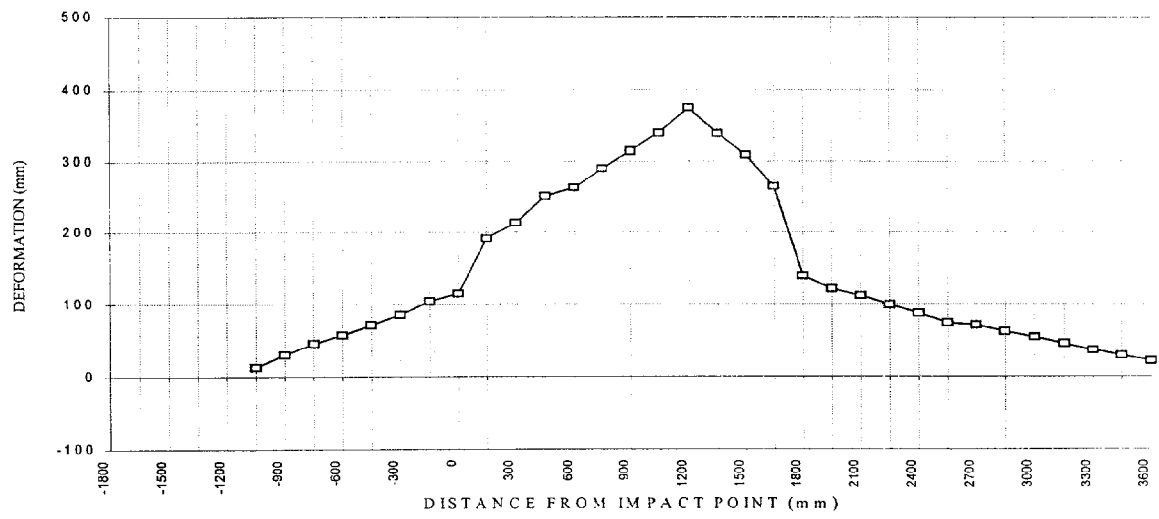
Reference plane is parallel to test vehicle longitudinal centerline.
Given dimensions = Reference plane to car body

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	640	762	122
2100	639	751	112
2250	642	741	99
2400	644	732	88
2550	644	719	75
2700	644	716	72
2850	645	708	63
3000	646	701	55
3150	647	693	46
3300	647	684	37
3450	649	678	29
3600	652	674	22

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

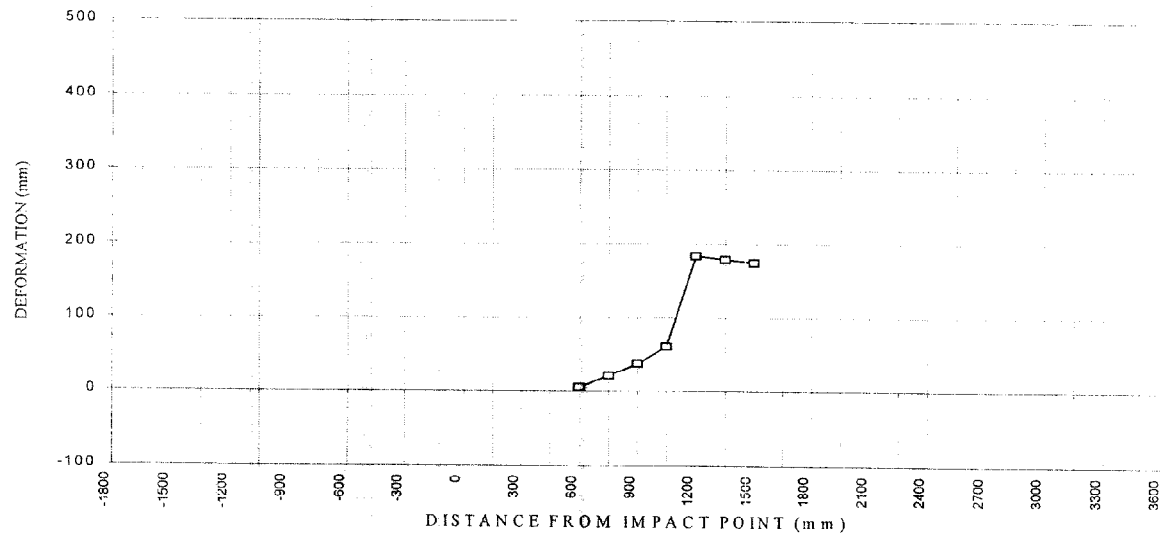
	Level 5 - Window Top		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1800			
-1650			
-1500			
-1350			
-1200			
-1050			
-900			
-750			
-600			
-450			
-300			
-150			
0 (impact point)			
150			
300			
450			
600	804	809	5
750	802	823	21
900	804	842	38
1050	804	865	61
1200	805	988	183
1350	805	983	178
1500	807	981	174
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 5 - Window Top		
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

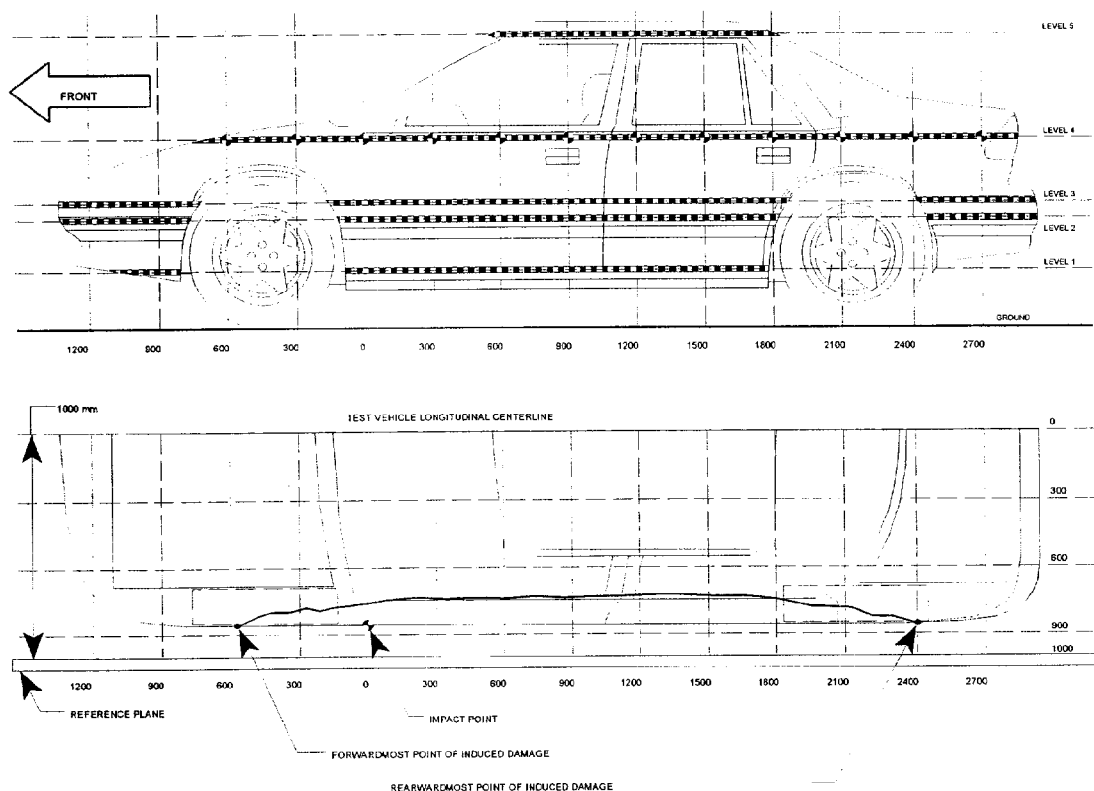
VEHICLE EXTERIOR STATIC CRUSH

LEVEL 5 - WINDOW TOP

DATA SHEET NO. 11
VEHICLE DAMAGE PROFILE DISTANCES

Year/Make/Model/Body Style: 1999/Toyota/Tacoma/XTRA CAB

NHTSA NO.: MX5107 Test Date: January 22, 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)	645	595	50
2. 40 mm	889	646	243
3. 800 mm	1068	623	445
4. 1600 mm	1066	622	444
5. 2370 mm	660	582	78
6. (LR = <u>3150</u> mm)	624	591	33

DATA SHEET NO. 12
EXTERIOR STATIC CRUSH FOR SIDE IMPACTOR

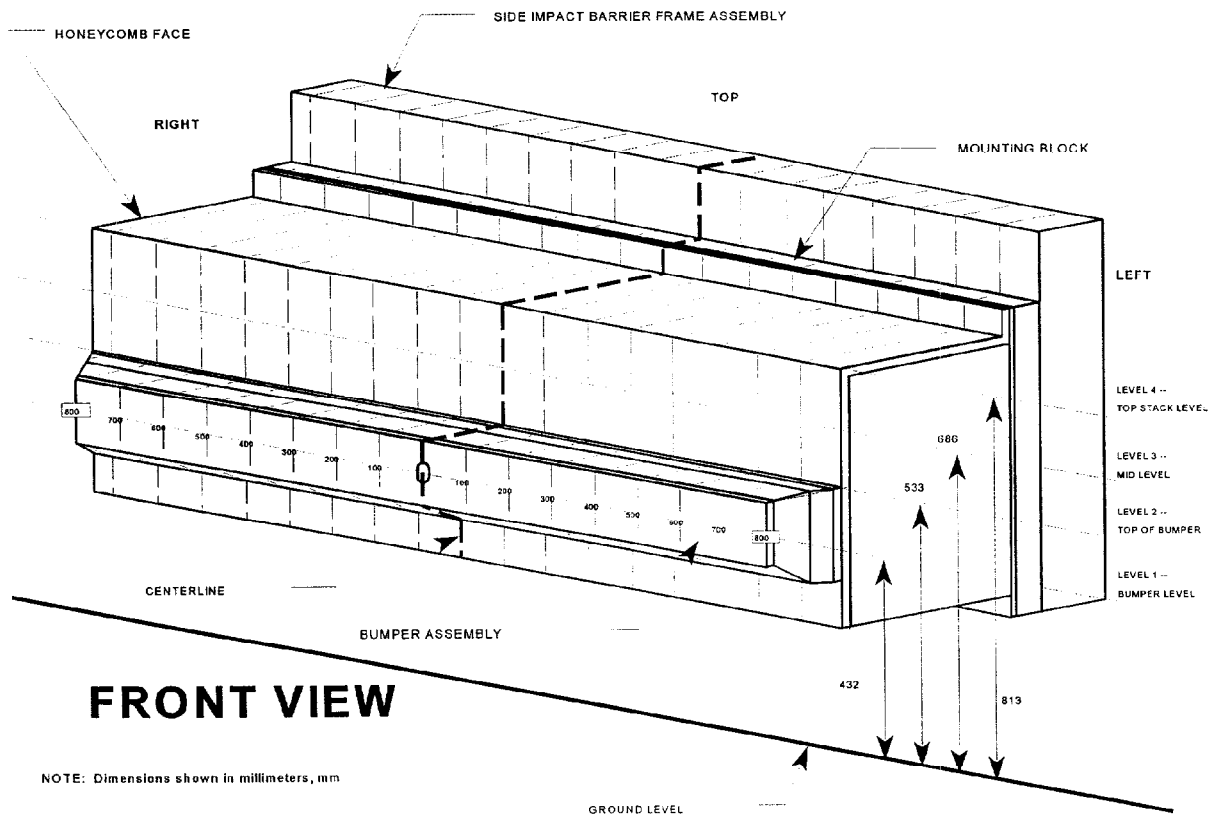
Year/Make/Model/Body Style: 1999/Toyota/Tacoma/XTRA CAB

Vehicle NHTSA No.: MX5107 Test Date: January 22, 1999

		Distance Right of Center (mm)										Distance Left of Center (mm)							
Location	Height at CL	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800	
Top Stack Level 4	813 mm	206	135	105	69	39	25	20	11	11	13	14	19	31	45	65	83	110	
Mid Level Level 3	686 mm	161	75	32	12	9	-1	5	11	2	3	6	7	8	9	15	30	50	
Top Bumper Level 2	533 mm	126	46	26	21	21	17	15	16	18	16	16	16	19	21	22	22	27	
Mid Bumper Level 1	432 mm	81	75	69	59	47	50	48	47	46	43	41	41	41	41	40	41	52	

See next page for Barrier Face Graphic

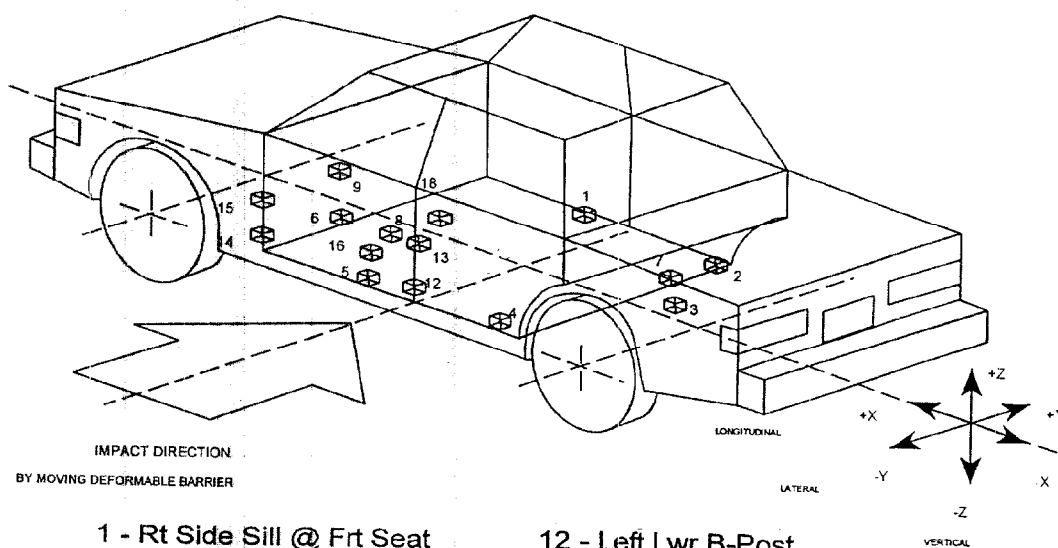
DATA SHEET NO. 12 (Cont'd)



DATA SHEET 13
TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 1999/Toyota/Tacoma/XTRA CAB

Vehicle NHTSA No.: MX5107 Test Date: January 22, 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 Up 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
- 18 - Vehicle C.G.

DATA SHEET NO. 13
TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY
 Year/Make/Model/Body Style: 1999/Toyota/Tacoma/XTRA CAB
 Vehicle NHTSA No.: MX5107 Test Date: January 22, 1999

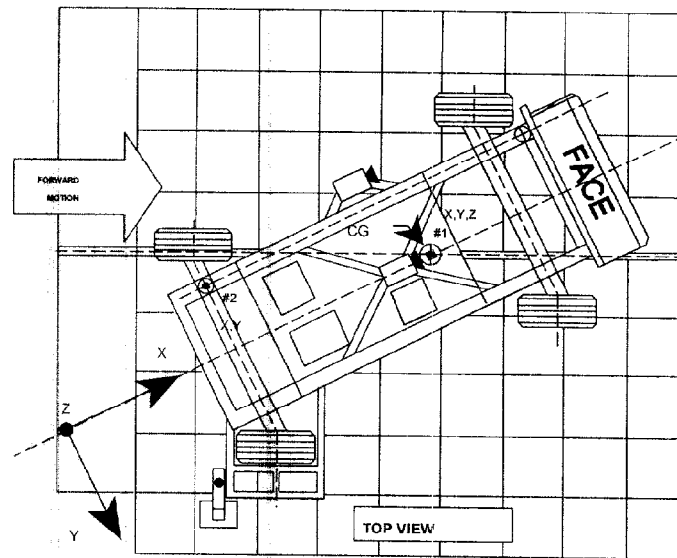
Accel. No.	Description	Coordinates (mm)*			Long. (X) Maximums (g's)		Lat. (Y) Maximums (g's)		Vert. (Z) Maximums (g's)		Resultant (g's)
		X	Y	Z	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	
1	Rt. Side Sill @ Front Seat	3273	682	297	12.3	-16.6	40.5	-9.9	7.4	-8.6	42.6
2	Rt. Side Sill @ Rear Seat	2435	682	308	10.7	-16.2	43.7	-10.8	7.6	-7.8	44.5
3	Rr. Floorpan Above Axle	1230	0	646	2.0	-5.2	21.5	-3.3	15.4	-31.0	35.3
4	Left Side Sill @ Rr. Seat	2436	-710	306	---	---	135.5	-86.2	---	---	---
5	Left Side Sill @ Frt. Seat	3307	-710	295	---	---	216.6	-15.6	---	---	---
6	Left Front Door Centerline	3251	-705	791	---	---	114.9	-54.4	---	---	---
7	Right Rear Occupant Compartment	2632	348	395	---	---	44.7	-9.1	---	---	---
8	Left Front Door Mid Rear	2848	-717	634	---	---	200.7	-36.4	---	---	---
9	Left Front Door Upper Centerline	3227	-705	947	---	---	257.6	-209.4	---	---	---
12	Left Lower B-Post	2651	-684	392	---	---	274.4	-96.9	---	---	---
13	Left Mid B-Post	2703	-673	973	---	---	173.6	-80.5	---	---	---
14	Left Lower A-Post	3799	-684	548	---	---	77.2	-34.0	---	---	---
15	Left Mid A-Post	3809	-751	940	---	---	27.0	-5.4	---	---	---
16	Driver Left Seat Track	2926	-651	441	---	---	126.8	-89.1	---	---	---
18	Vehicle CG	2852	0	480	9.1	-16.4	53.3	-11.1	16.4	-29.3	54.5

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

DATA SHEET NO. 14
MOVING DEFORMABLE BARRIER (MDB) ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 1999/Toyota/Tacoma/XTRA CAB

Vehicle NHTSA No.: MX5107 Test Date: January 22, 1999



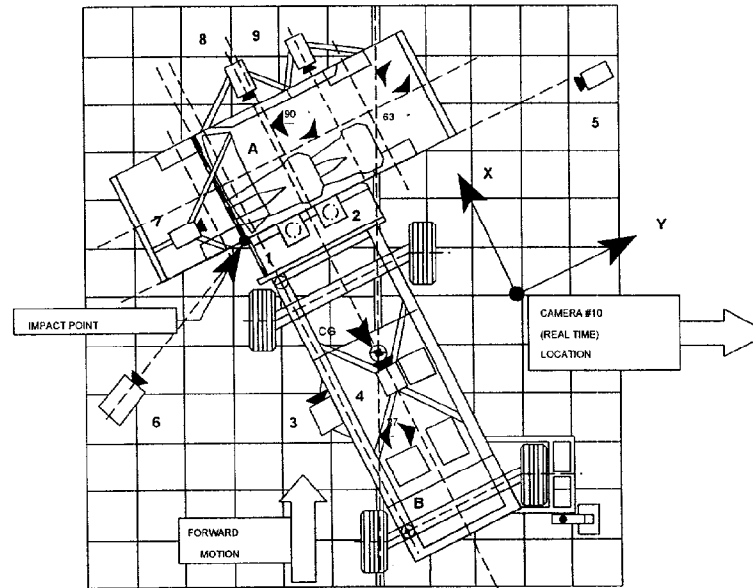
Accel. No.	Description	Coordinates (mm)*			(+) Positive		(-) Negative	
		X	Y	Z	Max. (g)	Time (msec)	Max. (g)	Time (msec)
1	MDB Center of Gravity	-1092	0	483				
	Longitudinal (X)	---	---	---	1.7	169	-18.3	27
	Lateral (Y)	---	---	---	0.2	1	-0.2	44
	Vertical (Z)	---	---	---	25.7	55	-20.0	48
	Resultant (R)	---	---	---	28.2	55	----	----
2	Rear Frame Member	-2501	-625	622				
	Longitudinal (X)	---	---	---	1.7	171	-21.8	32
	Lateral (Y)	---	---	---	6.4	39	-1.8	196

*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/Tacoma/XTRA CAB

Vehicle NHTSA No.: MX5107 Test Date: January 22, 1999



Camera No.	View	Coordinates (mm)*			Lens (mm)	Film Speed (fps)
		X	Y	Z		
	Real Time					
1	Top Overall	145	1210	5000	8	980
2	Top Impact	210	10	5000	13	1020
3	Cart Pointer				35	1000
4	Cart Overall				13	962
5	Right Impact	610	10400	1830	25	1010
6	Left Impact	300	-2400	1680	13	1005
7	Onboard Hood				13	1000
8	Onboard Driver				8	1093
9	Onboard Rear Passenger				8	971

* Reference: (from point of impact)

+X = Forward

+Y = To Right

+Z = Upward

DATA SHEET 16
FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

Vehicle Year/Make/Model/Body Style: 1999/Toyota/Tacoma/XTRA CAB

Vehicle NHTSA No.: MX5107 Test Date: January 22, 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 38.3 mph (61.6 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

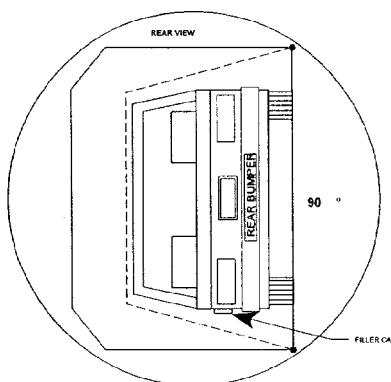
FUEL SPILLAGE LOCATION(S): None

DATA SHEET 16
FMVSS 301 STATIC ROLLOVER TEST DATA

Vehicle Year/Make/Model/Body Style: 1999/Toyota/Tacoma/XTRA CAB

Vehicle NHTSA No.: MX5107 Test Date: January 22, 1999

TEST PHASE: 0° - 90°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 39 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 39 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

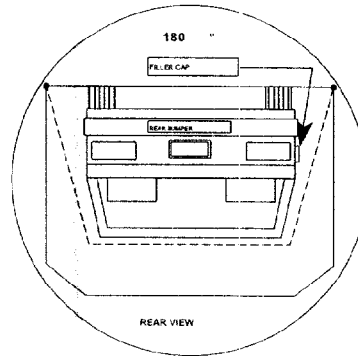
FUEL SPILLAGE LOCATIONS(S): None

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

Vehicle Year/Make/Model/Body Style: 1999/Toyota/Tacoma/XTRA CAB

Vehicle NHTSA No.: MX5107 Test Date: January 22, 1999

TEST PHASE: 90° - 180°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 40 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 40 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

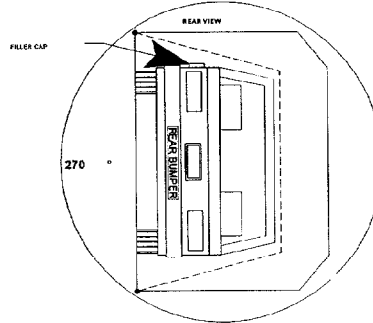
FUEL SPILLAGE LOCATIONS(S): None

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

Vehicle Year/Make/Model/Body Style: 1999/Toyota/Tacoma/XTRA CAB

Vehicle NHTSA No.: MX5107 Test Date: January 22, 1999

TEST PHASE: 180° - 270°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 25 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 25 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

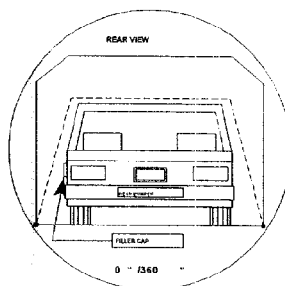
FUEL SPILLAGE LOCATIONS(S): None

DATA SHEET 16
FMVSS 301 STATIC ROLLOVER TEST DATA

Vehicle Year/Make/Model/Body Style: 1999/Toyota/Tacoma/XTRA CAB

Vehicle NHTSA No.: MX5107 Test Date: January 22, 1999

TEST PHASE: 270° - 360°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 50 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 50 seconds

Next Whole Minute Interval = 8 minutes

FUEL SPILLAGE MEASUREMENT:

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

FUEL SPILLAGE LOCATIONS(S): None

APPENDIX A - PHOTOGRAPHS

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

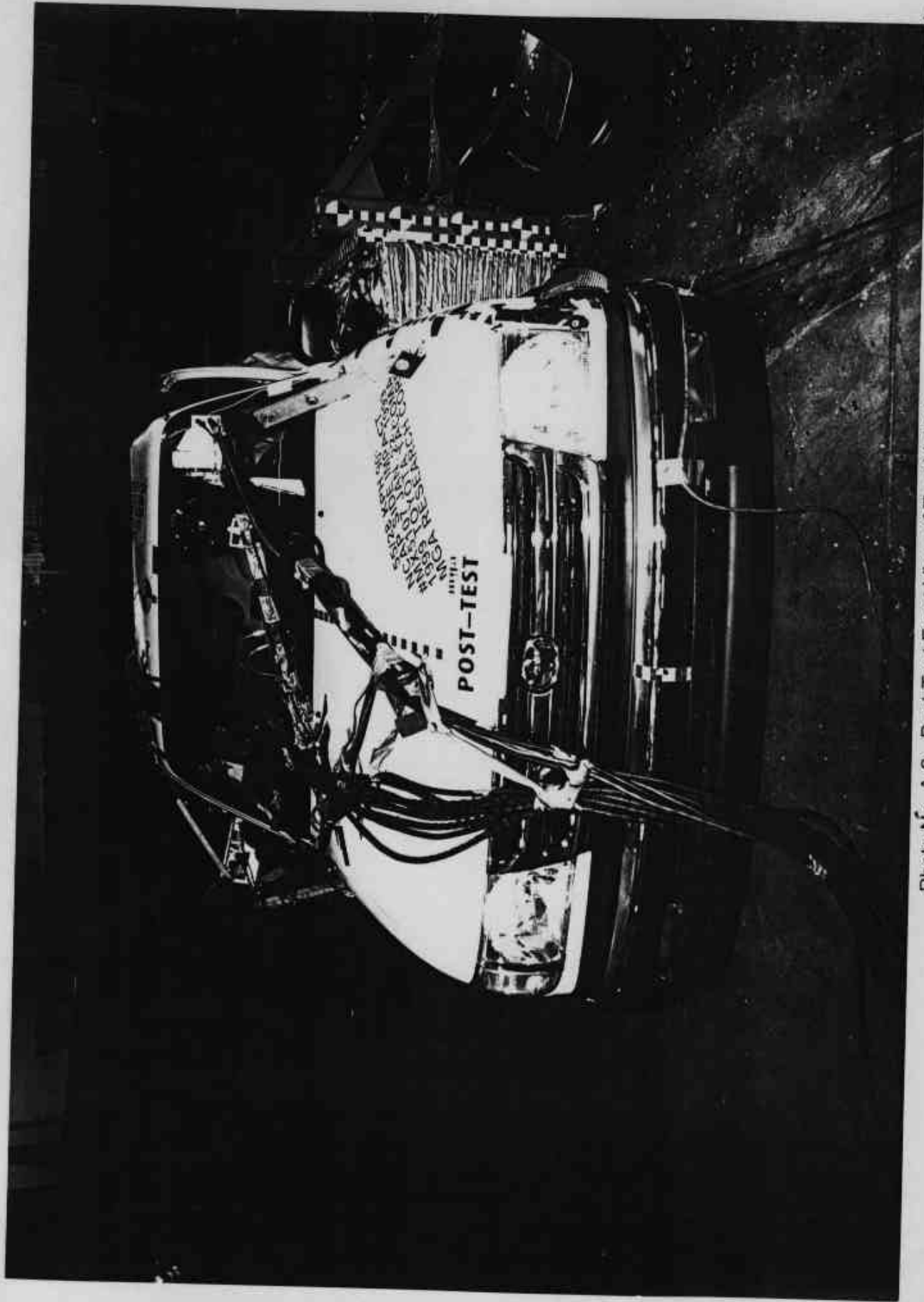


Photo No. A-2 - Post-Test Front View of Test Vehicle



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

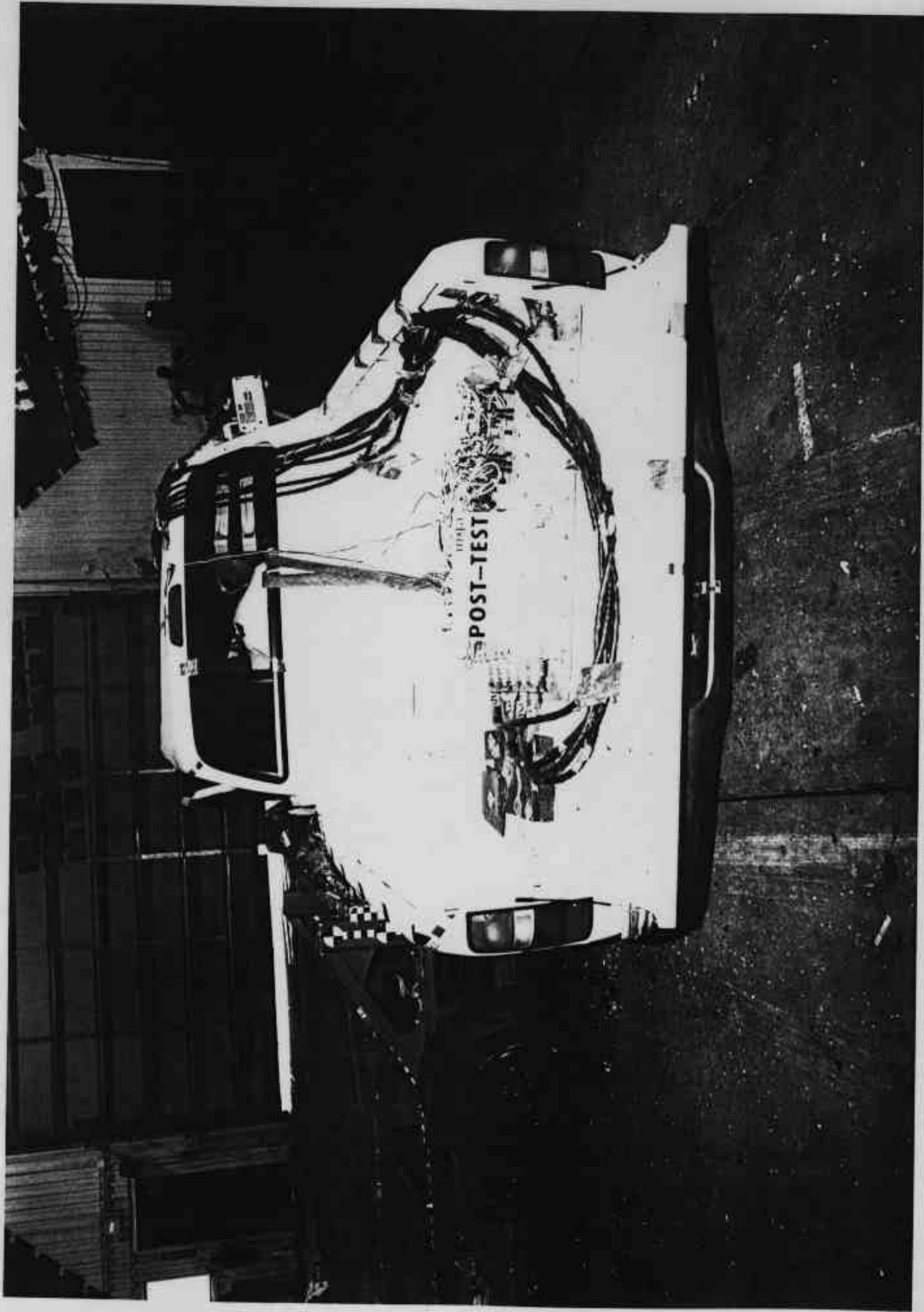


Photo No. A-4 - Post-Test Rear View of Test Vehicle

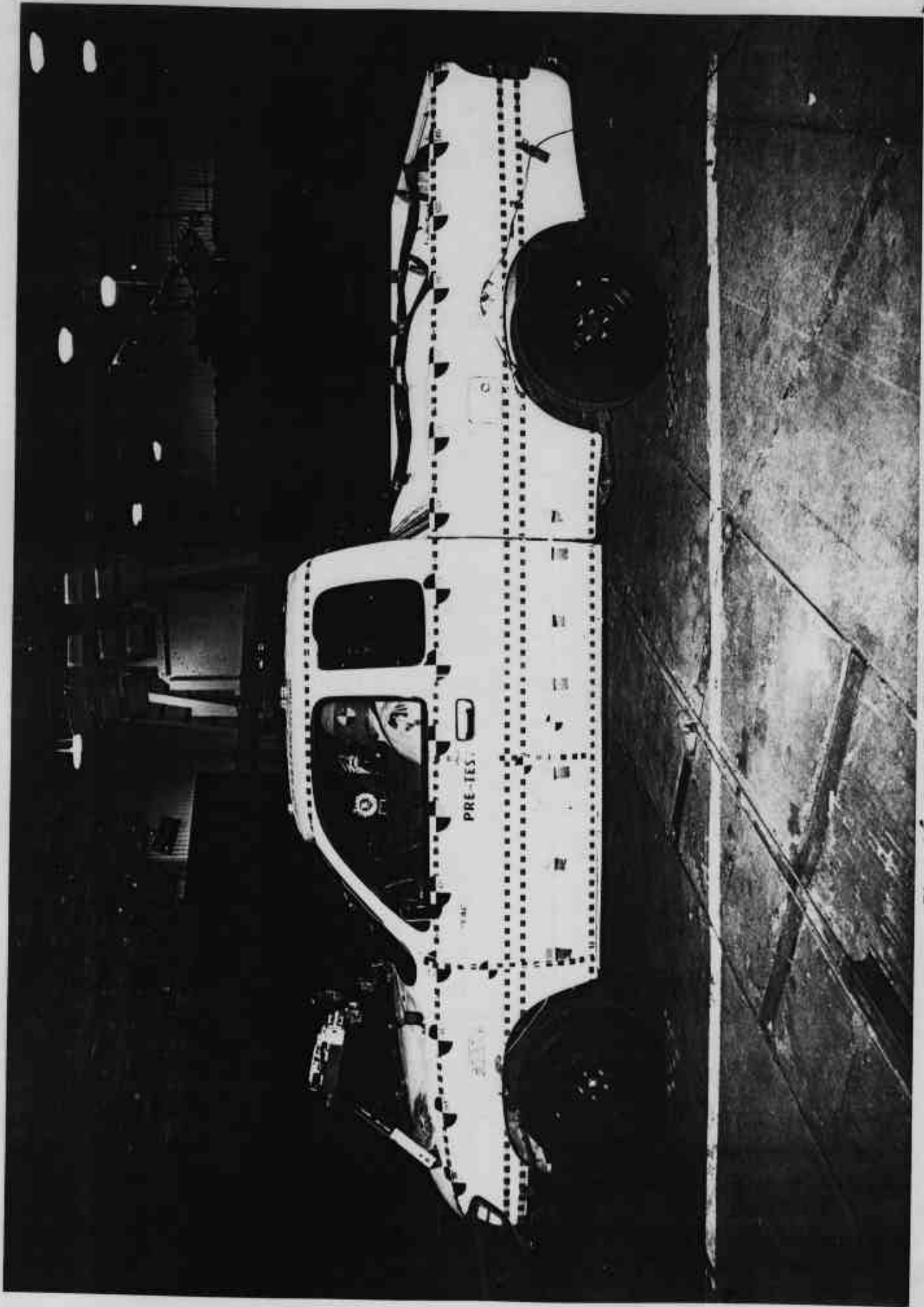


Photo No. A-5 - Pre-Test Left Side View of Test Vehicle

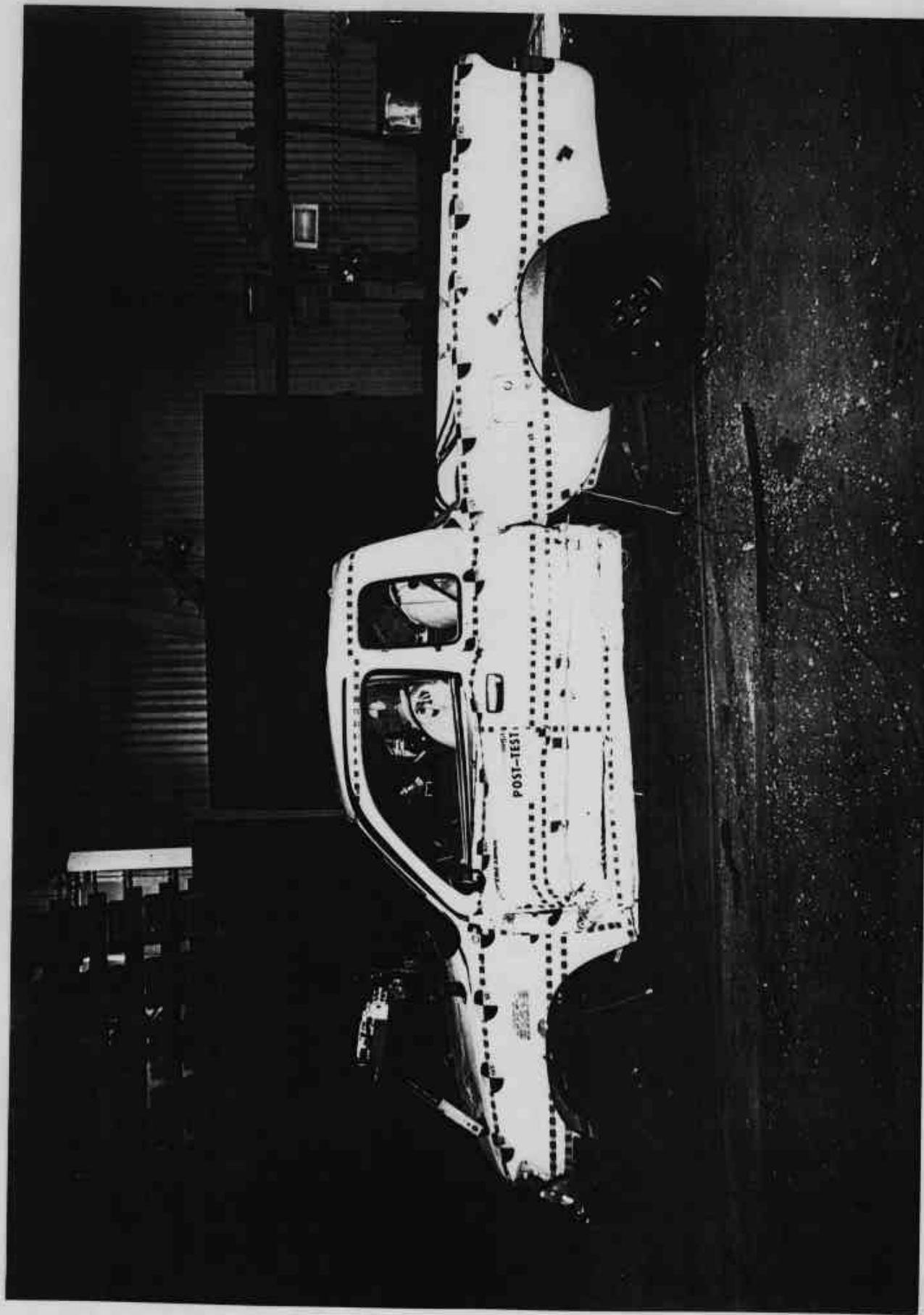
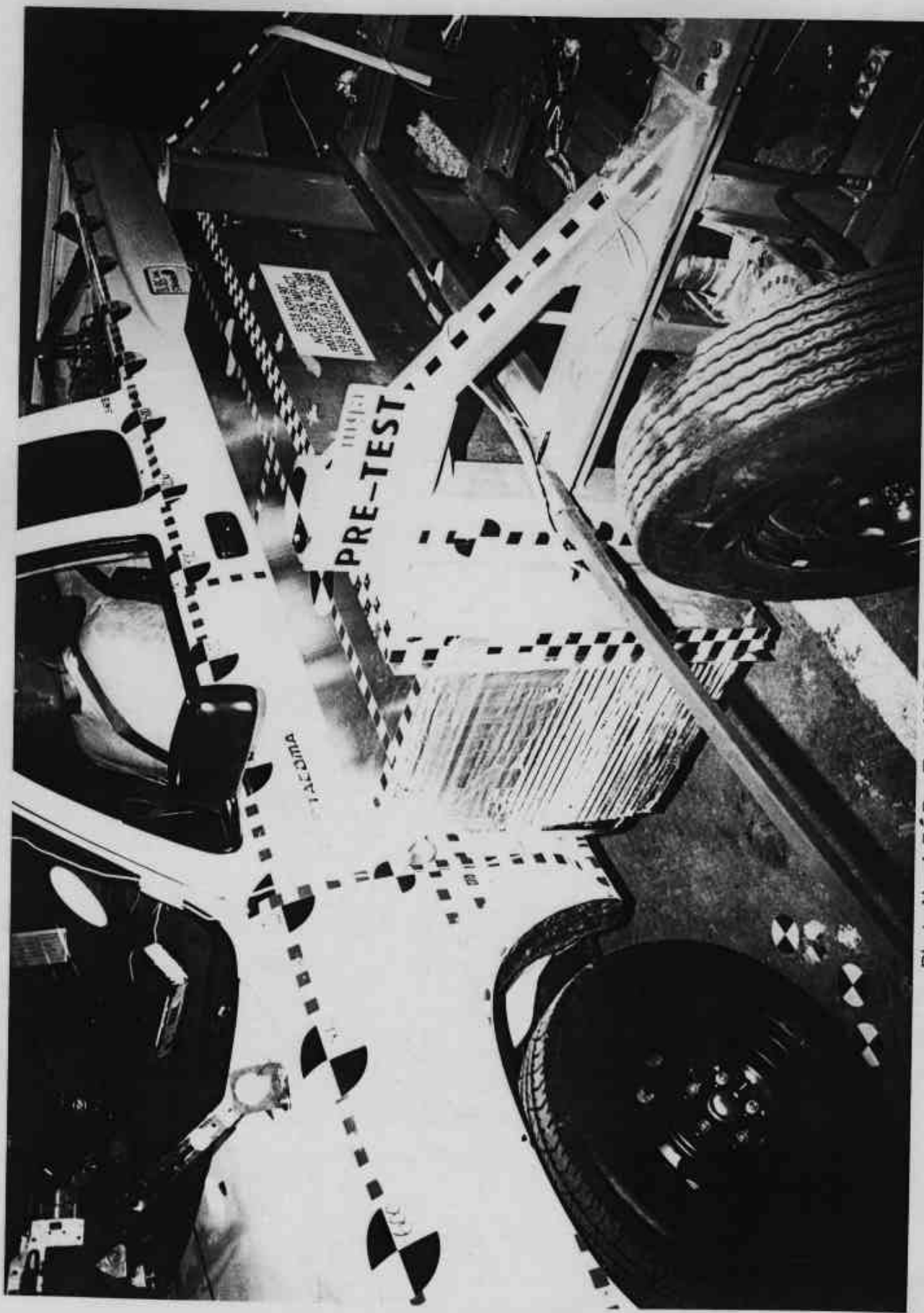
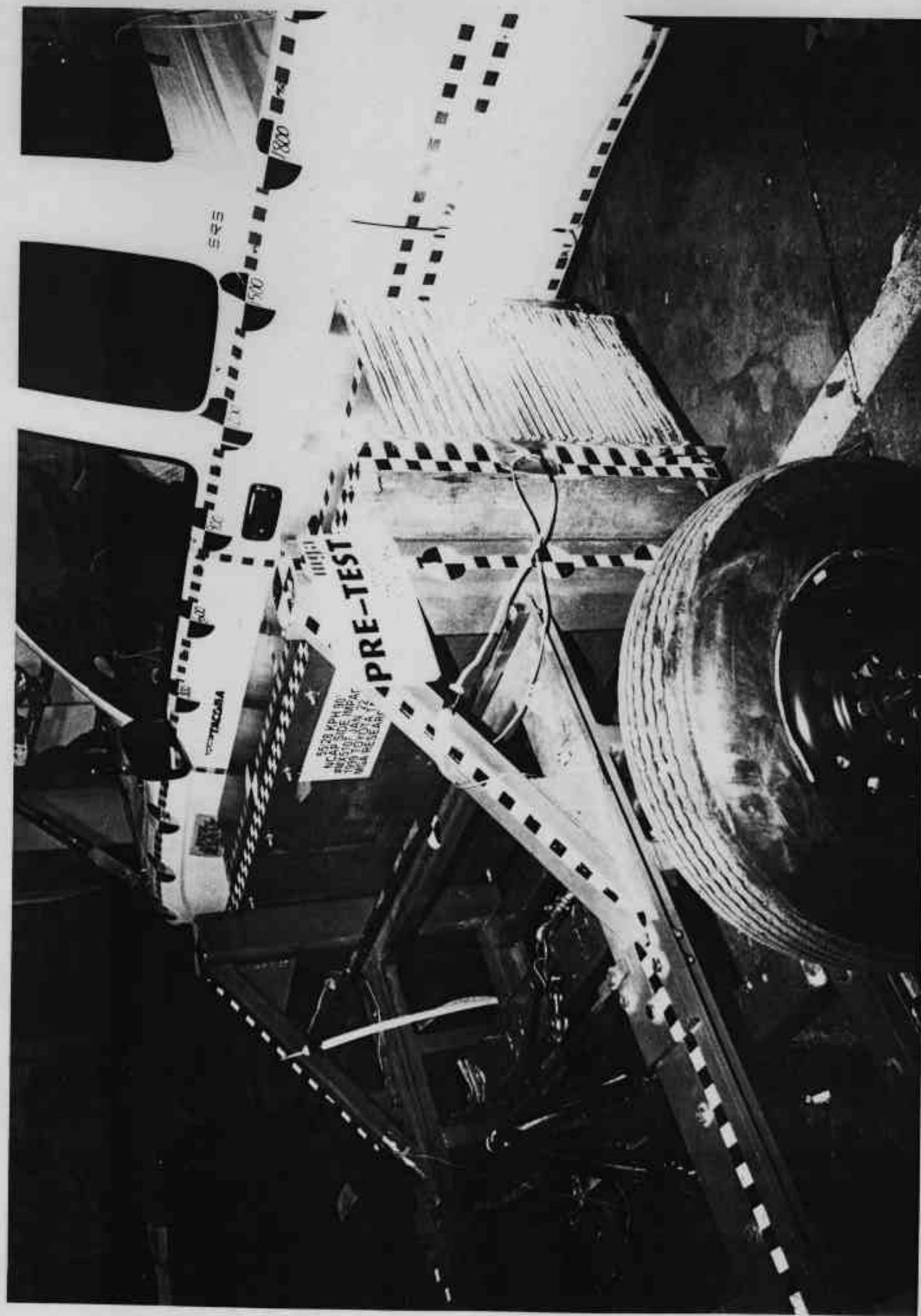


Photo No. A-6 - Post-Test Left Side View of Test Vehicle



A-7

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



A-8

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

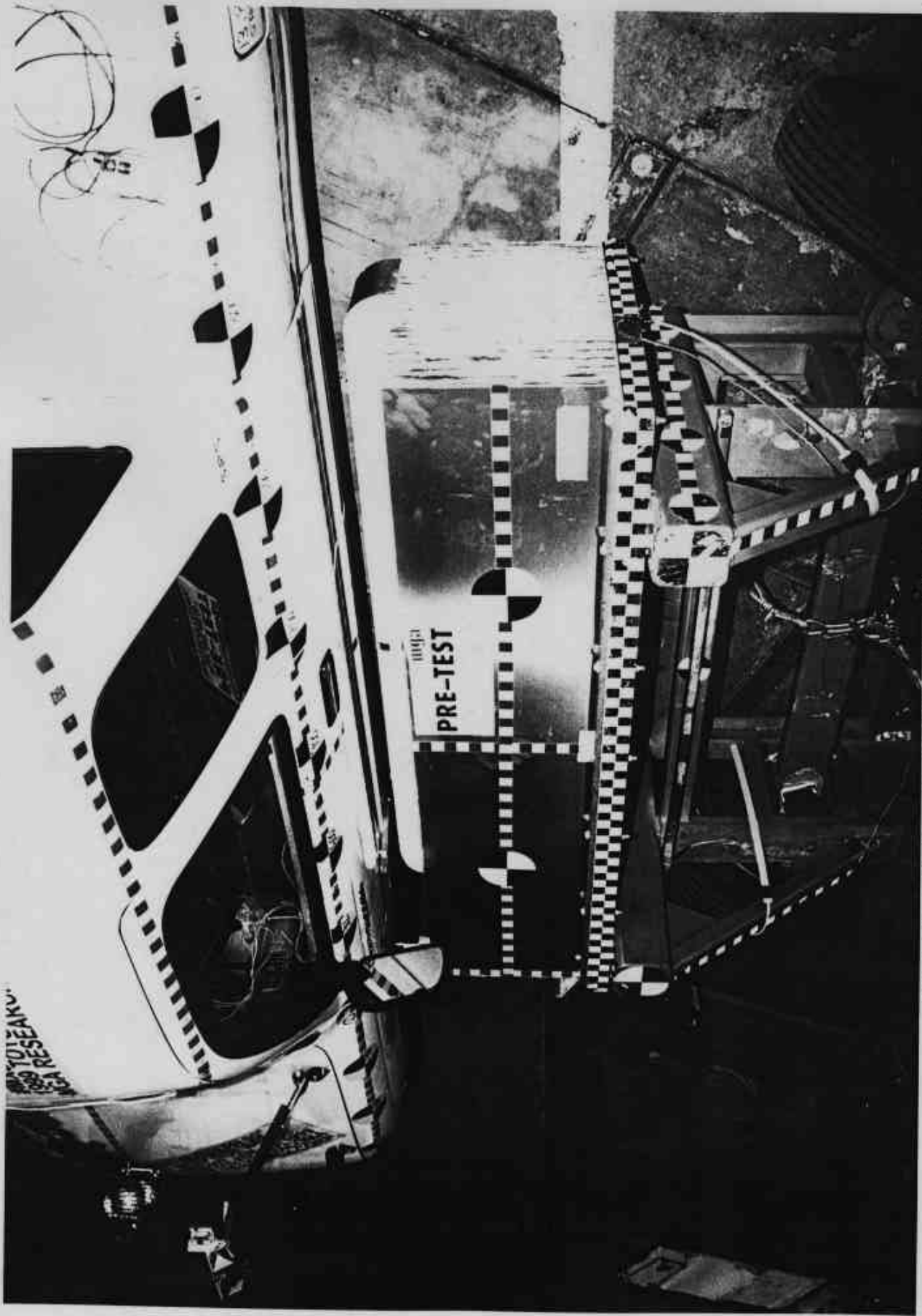


Photo No. A-9 - Pre-Test MDB Positioned Against Vehicle Overhead View

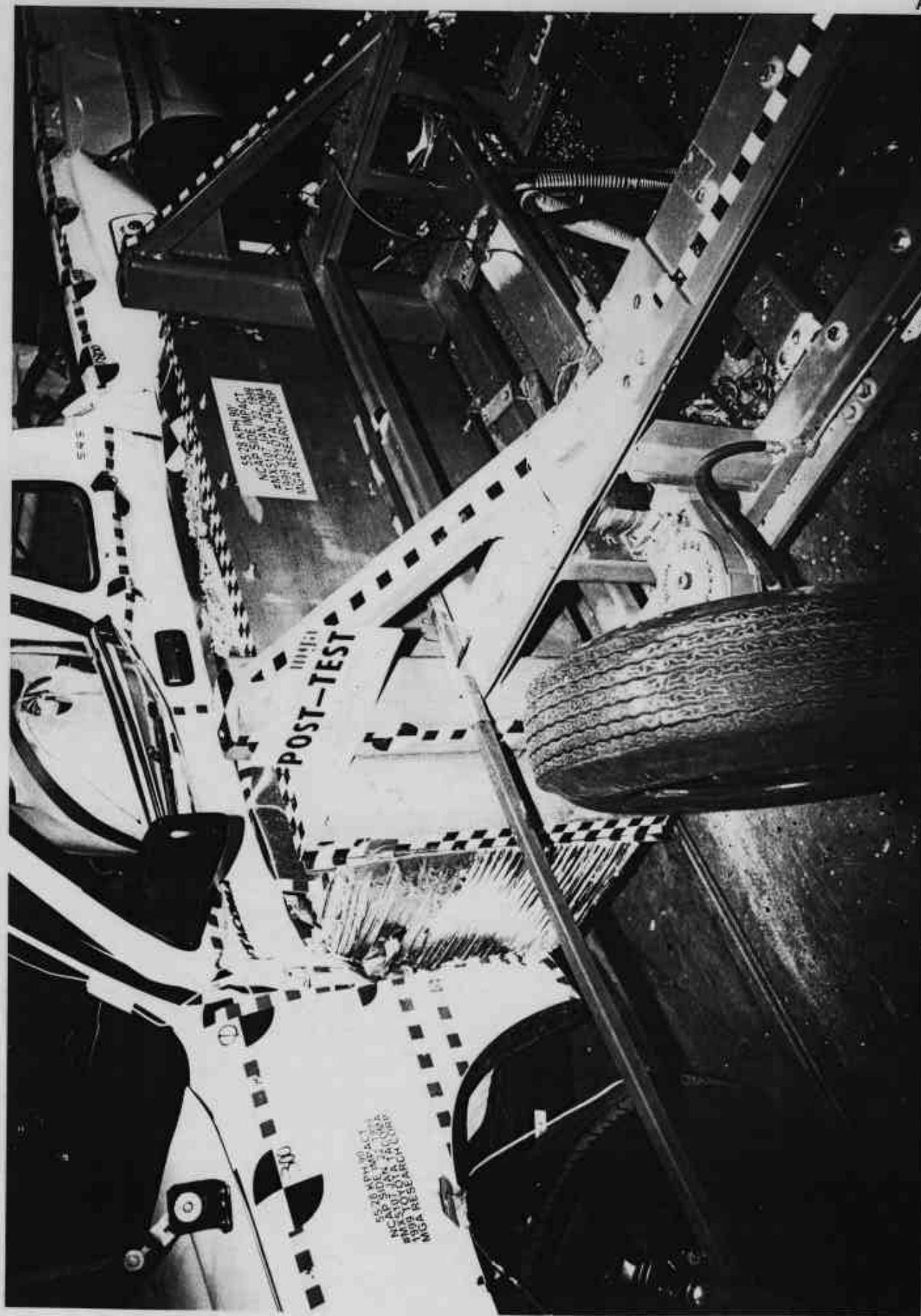


Photo No. A-10 - Post-Test MDB Positioned Against Vehicle (left side)

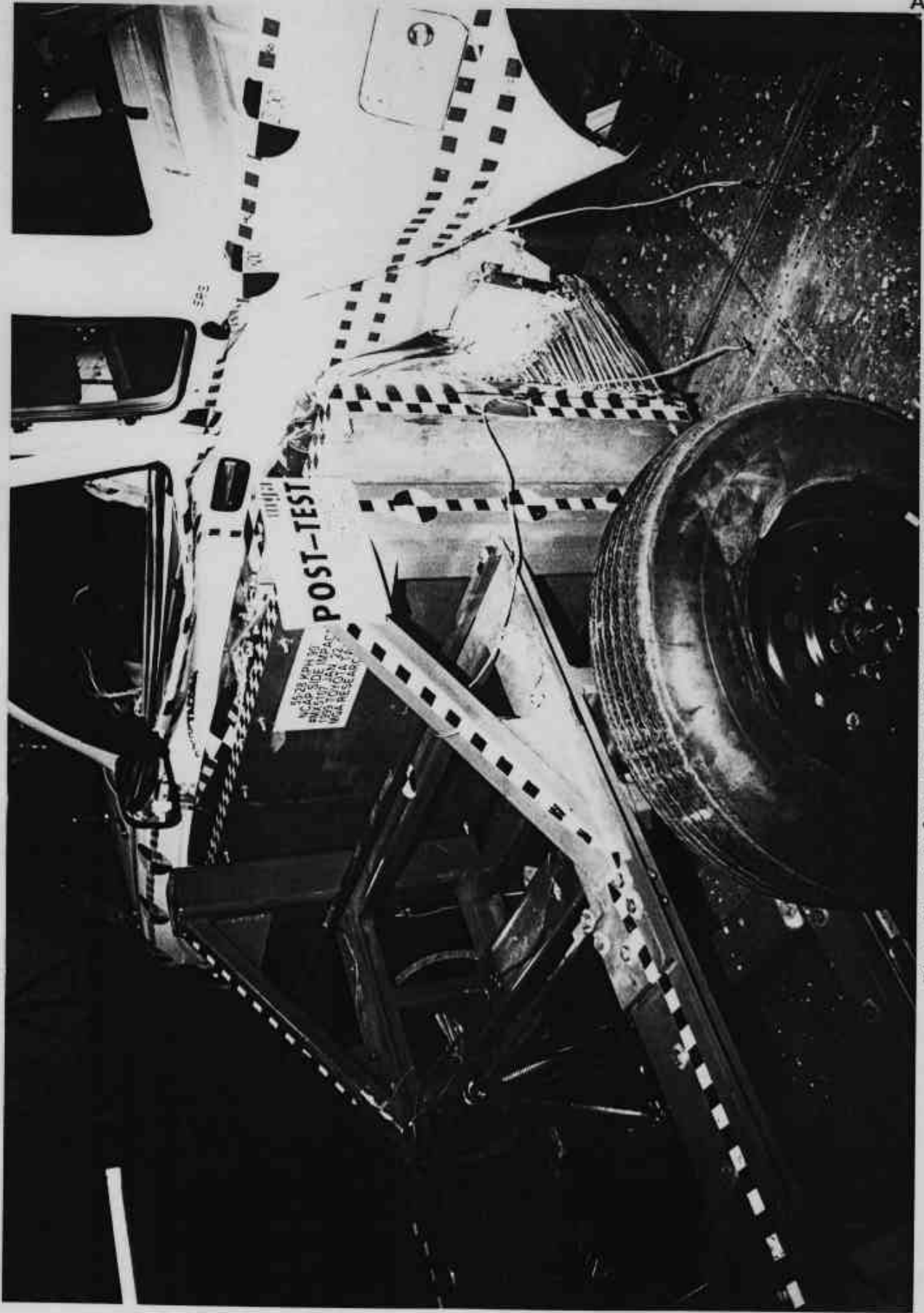


Photo No. A-11 - Post-Test MDB Positioned Against Vehicle (right side)

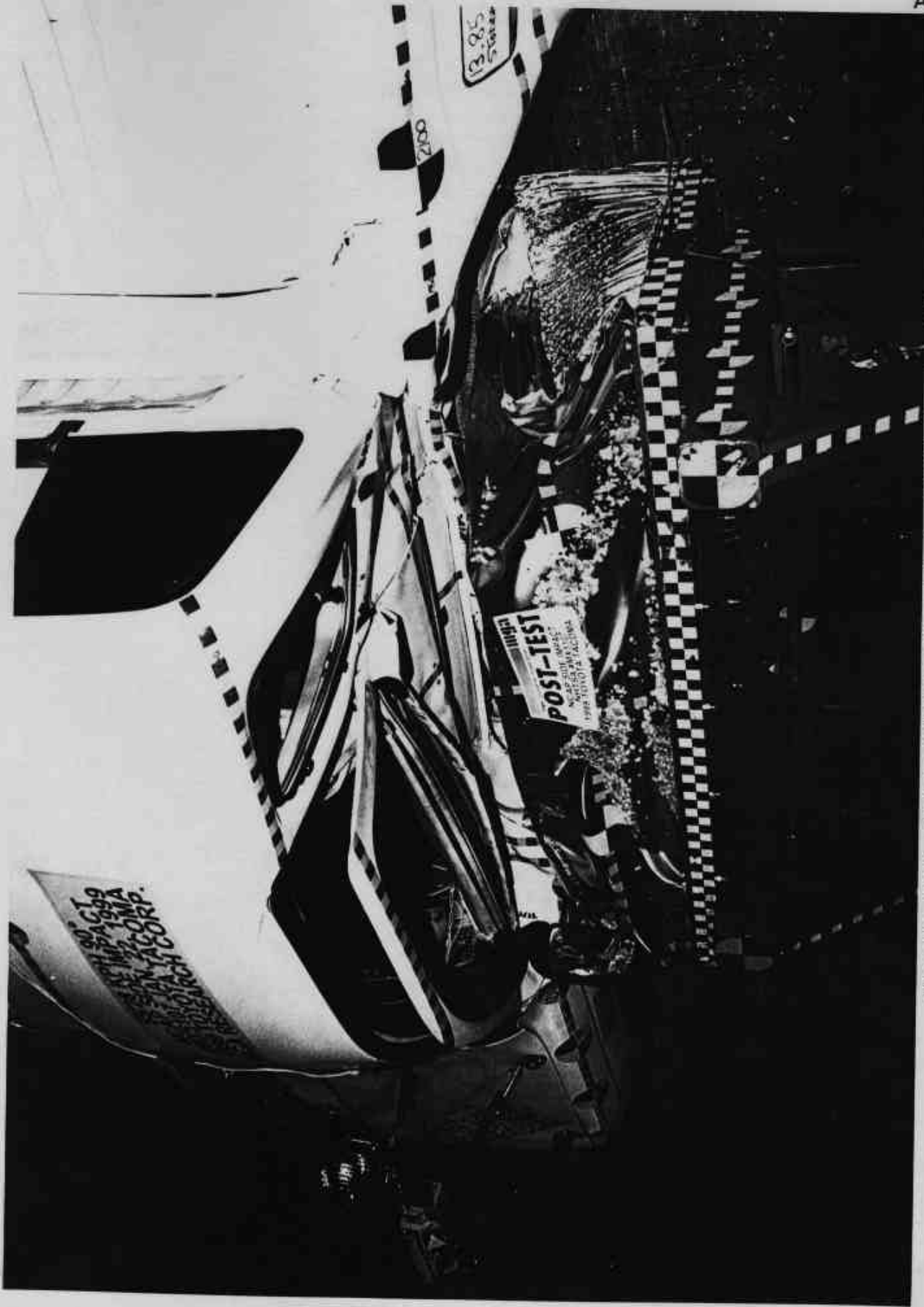


Photo No. A-12 - Post-Test MDB Positioned Against Vehicle Overhead View

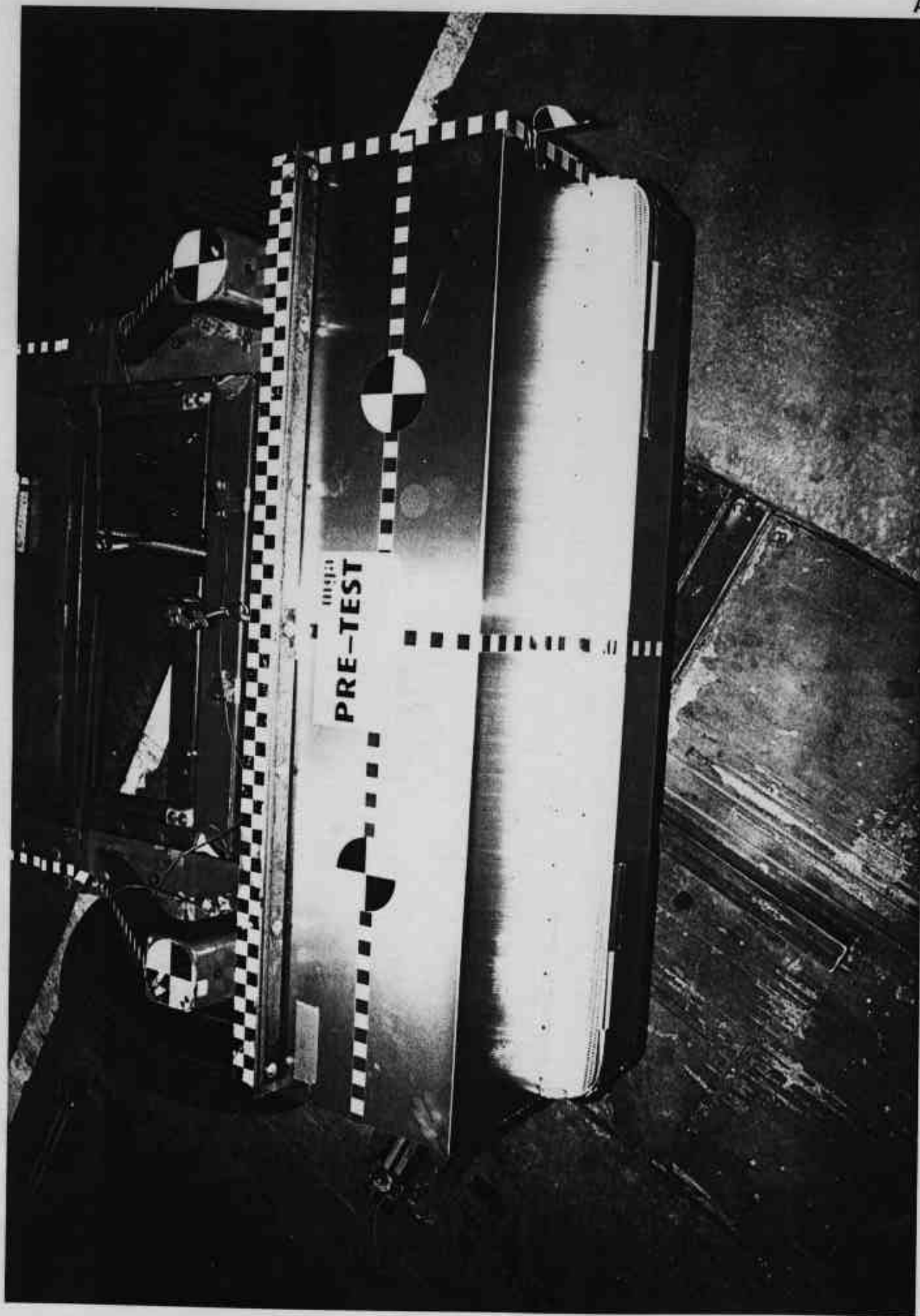


Photo No. A-13 - Pre-Test MDB Top View

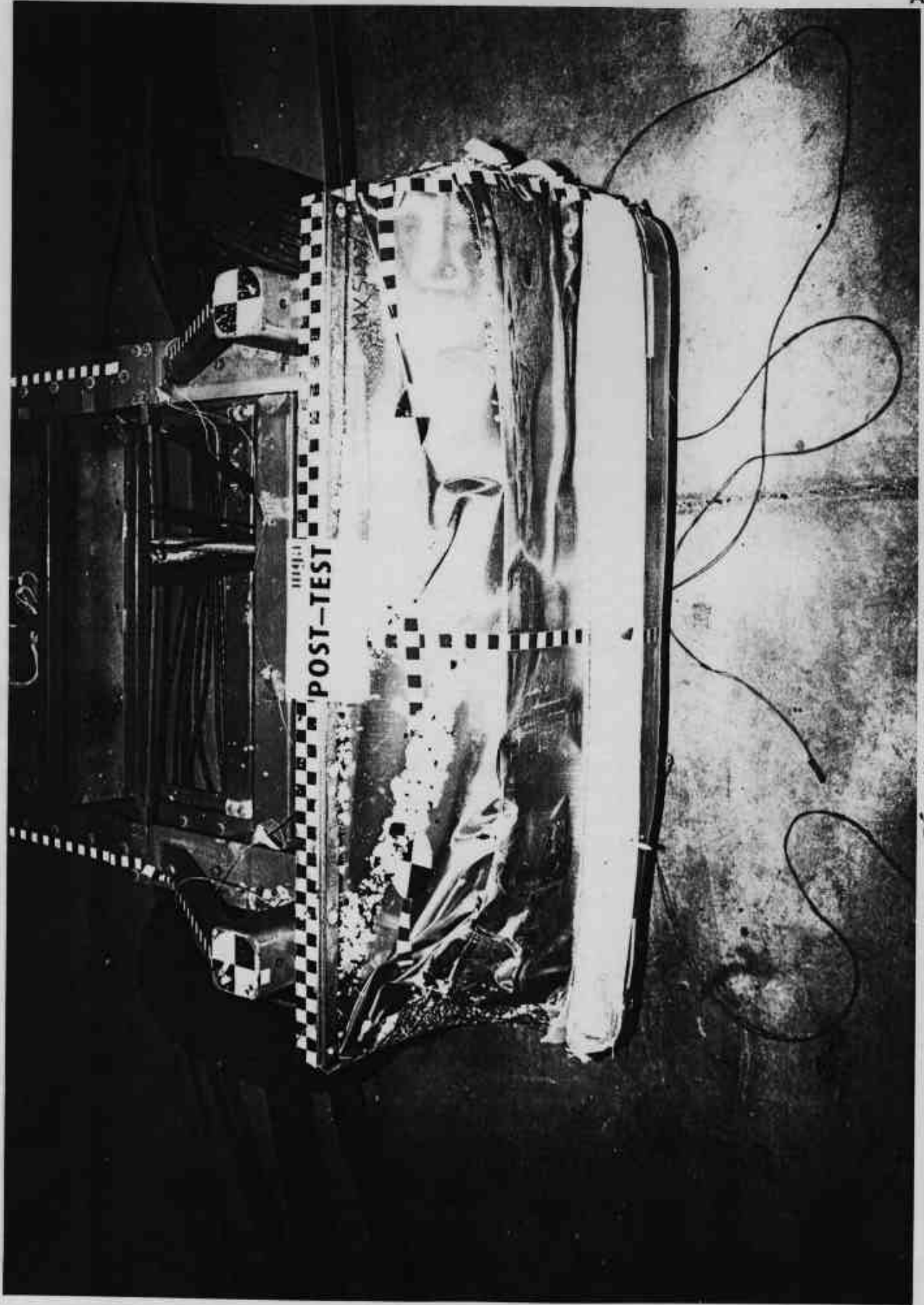


Photo No. A-14 - Post-Test MDB Top View

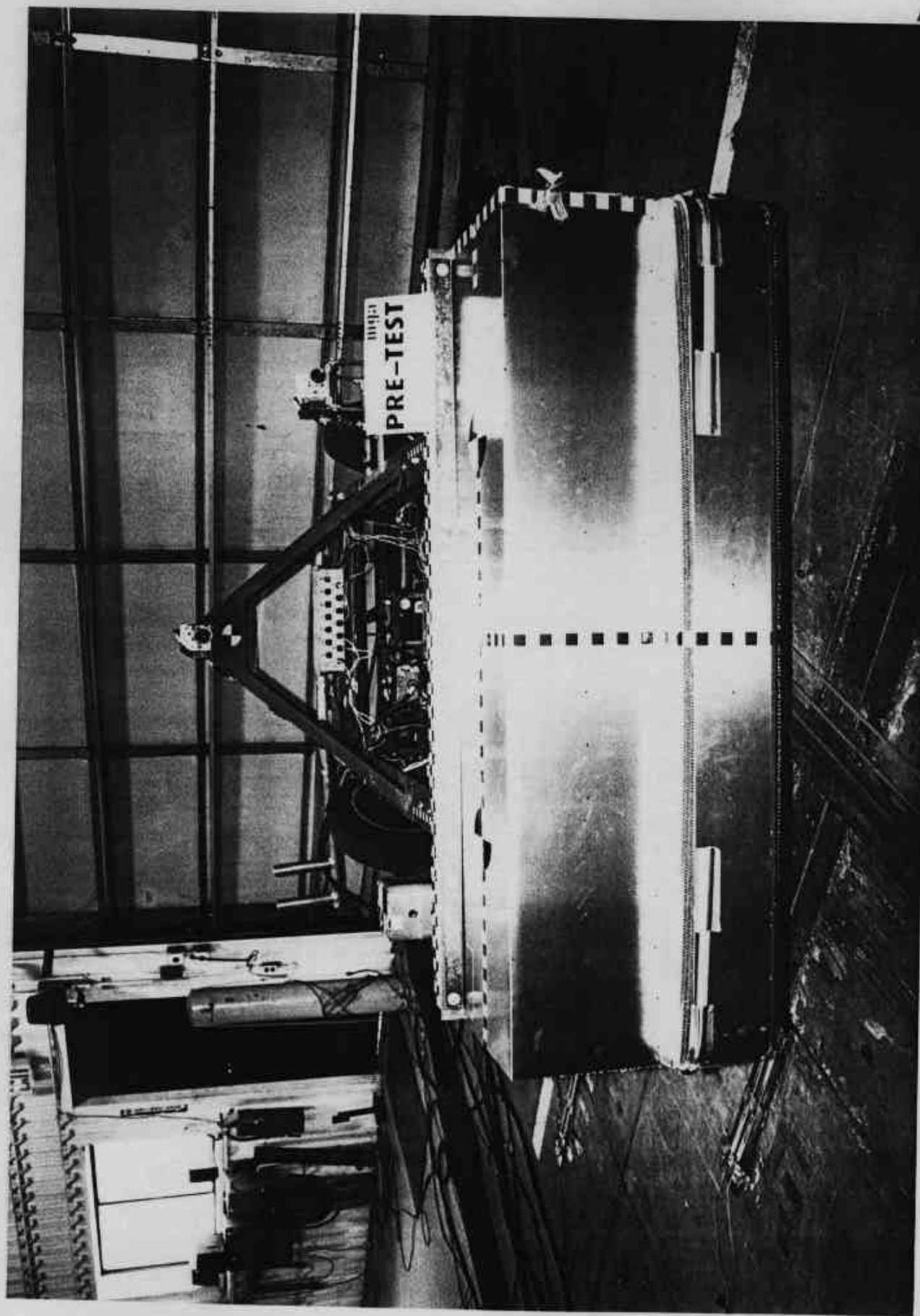


Photo No. A-15 - Pre-Test MDB Front View

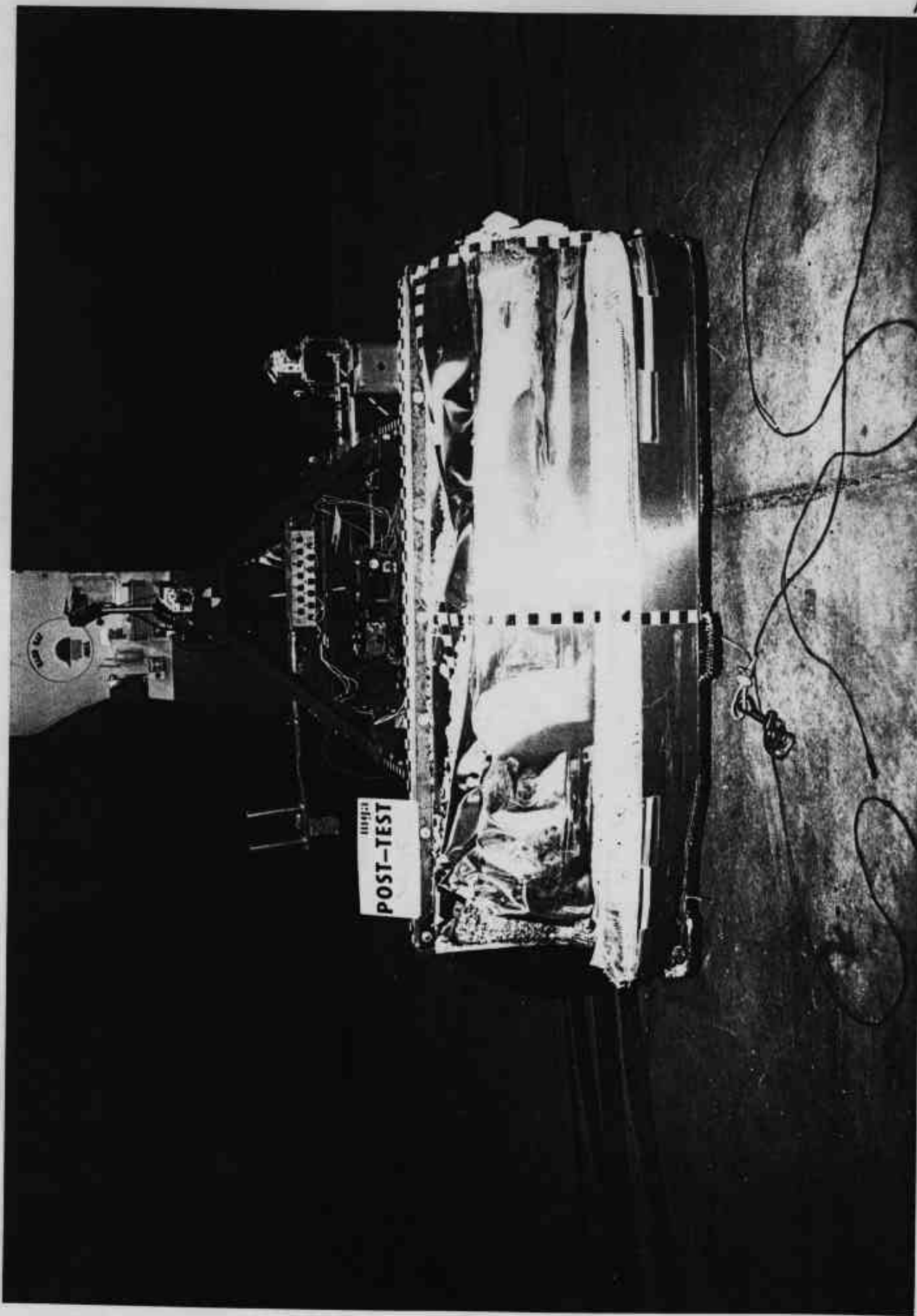


Photo No. A-16 - Post-Test MDB Front View

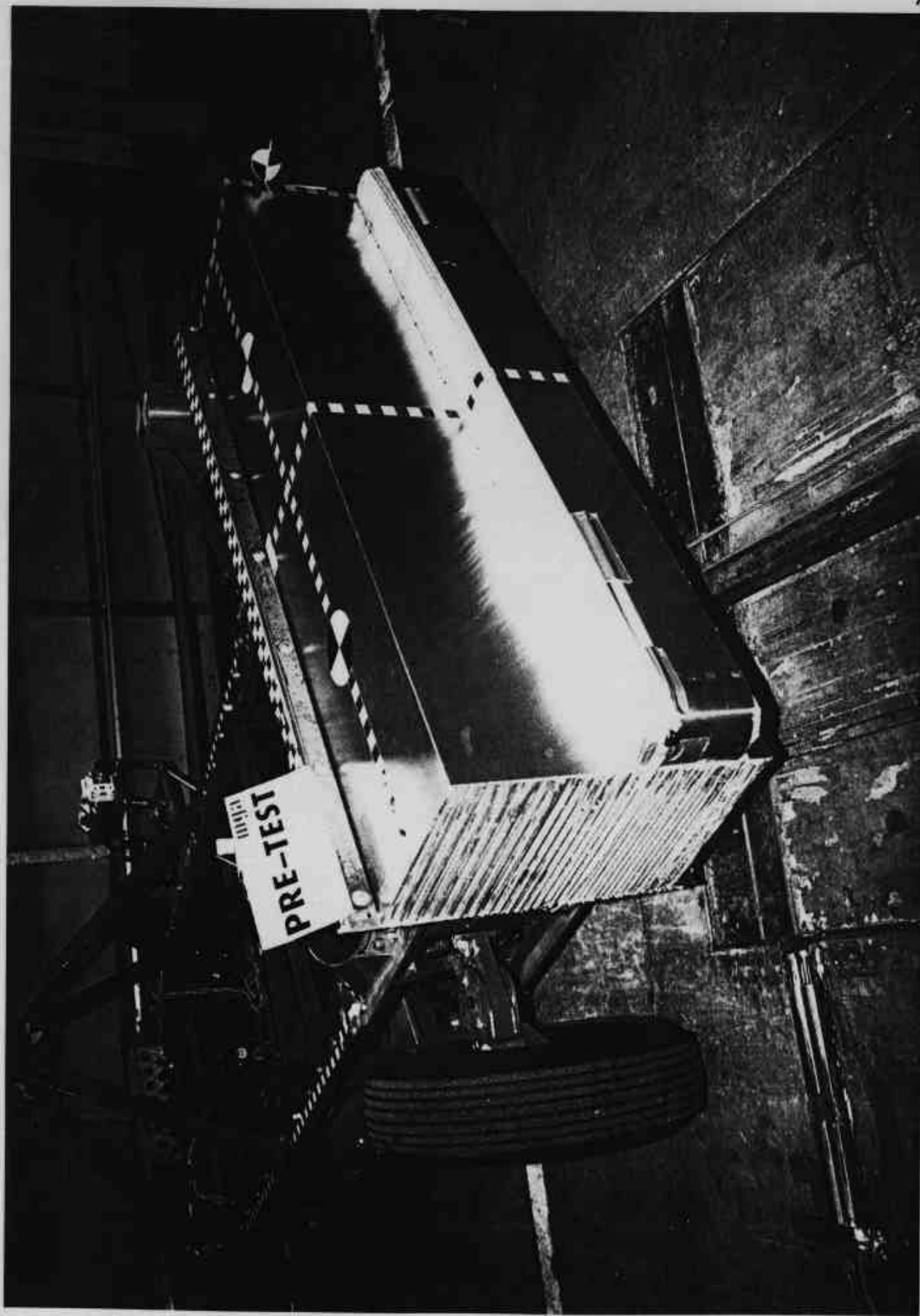


Photo No. A-17 - Pre-Test MDB Right Side View

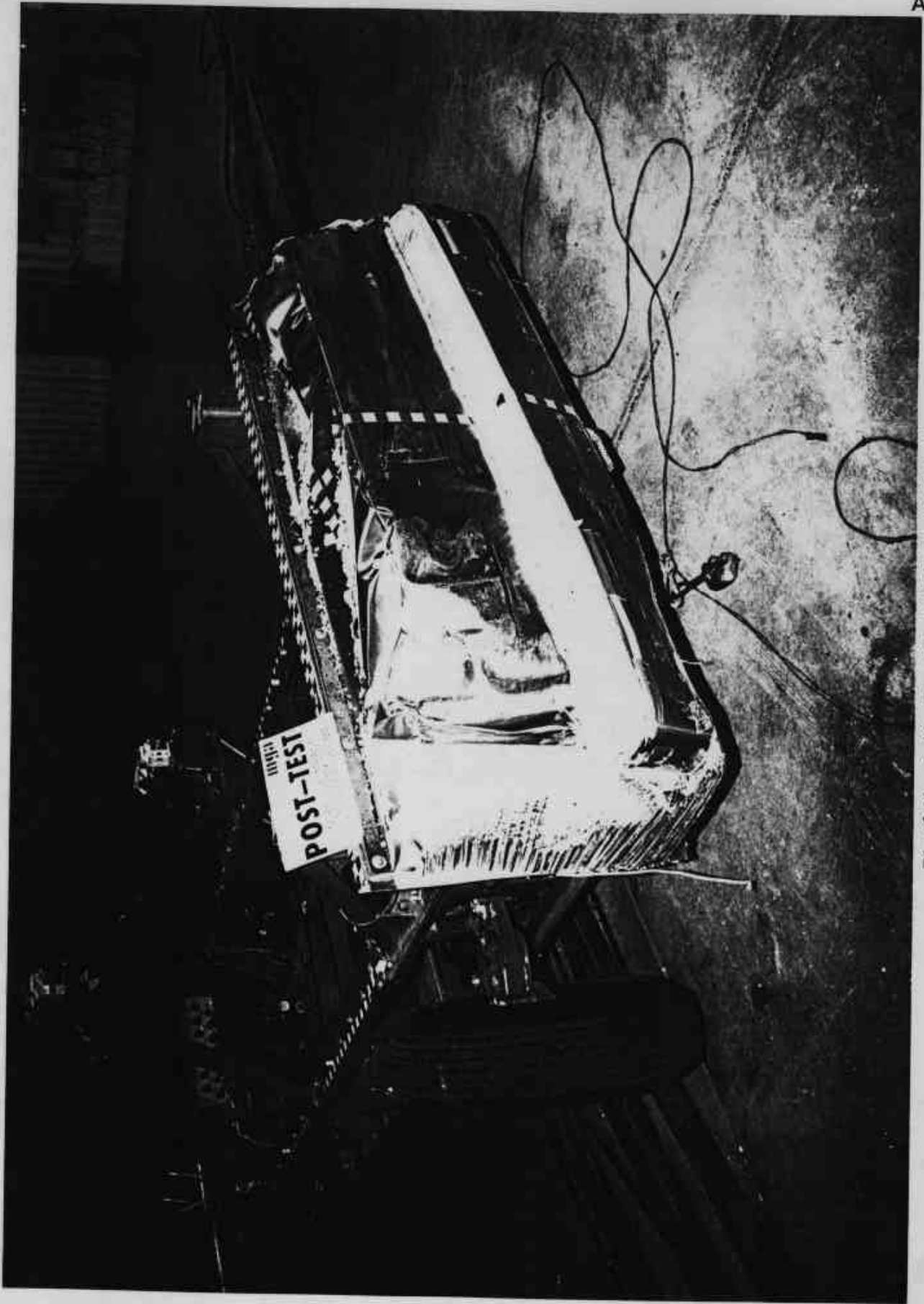


Photo No. A-18 - Post-Test MDB Right Side View

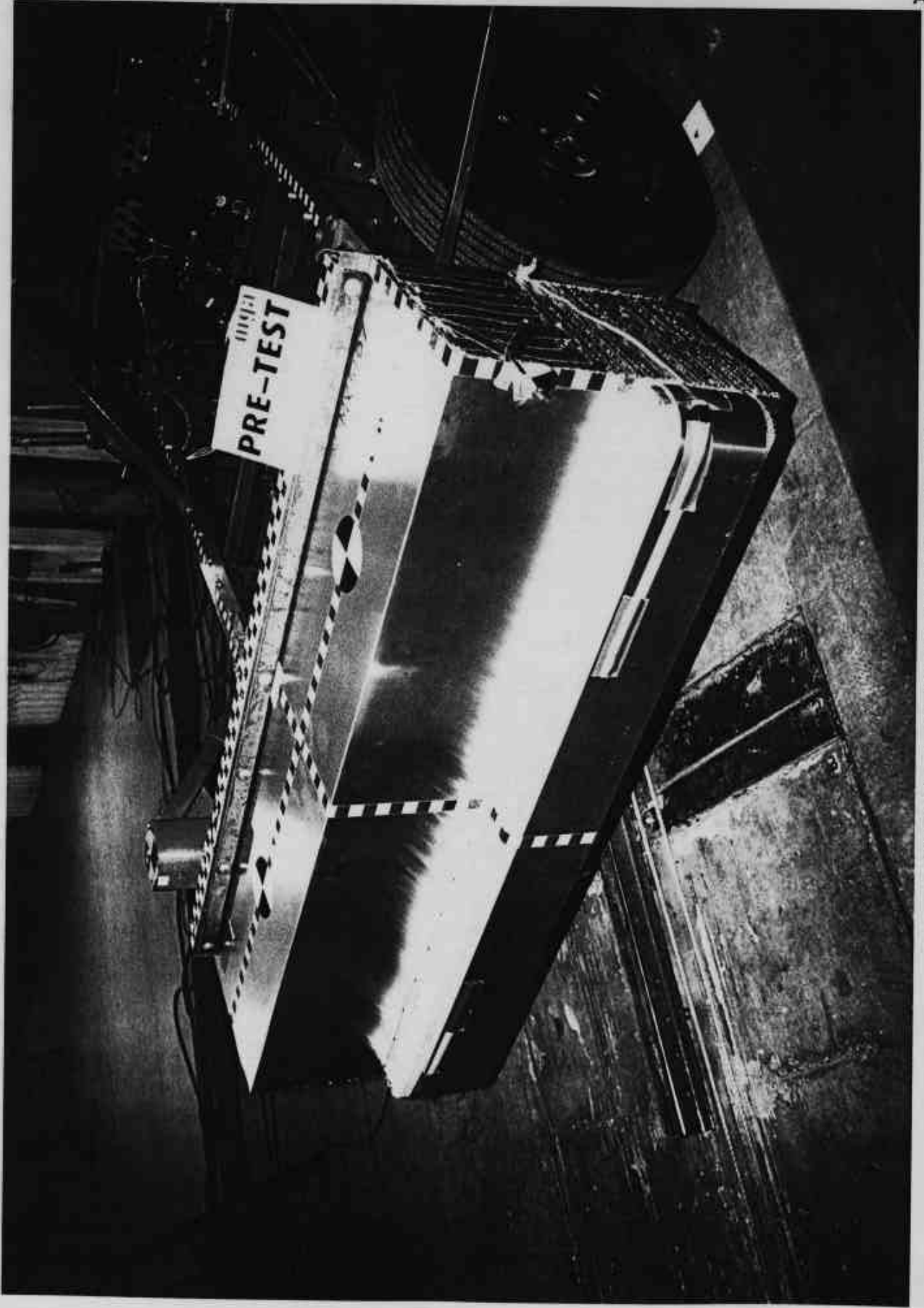


Photo No. A-19 - Pre-Test MDB Left Side View



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

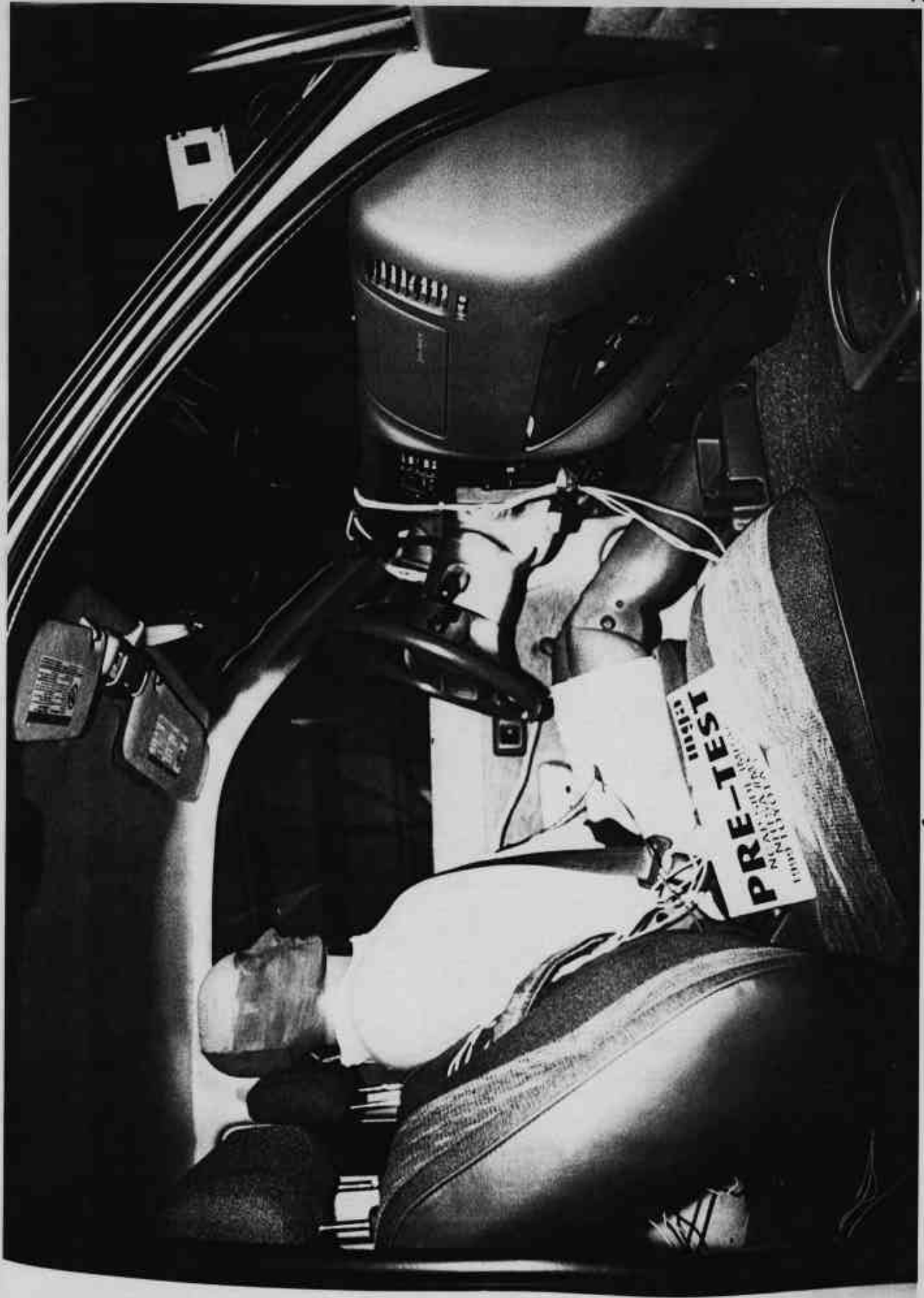


Photo No. A-21 - Pre-Test Driver Dummy Right Side View



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



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



Photo N^o. A-24 - Post-Test Driver Dummy Left Side View



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



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



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



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

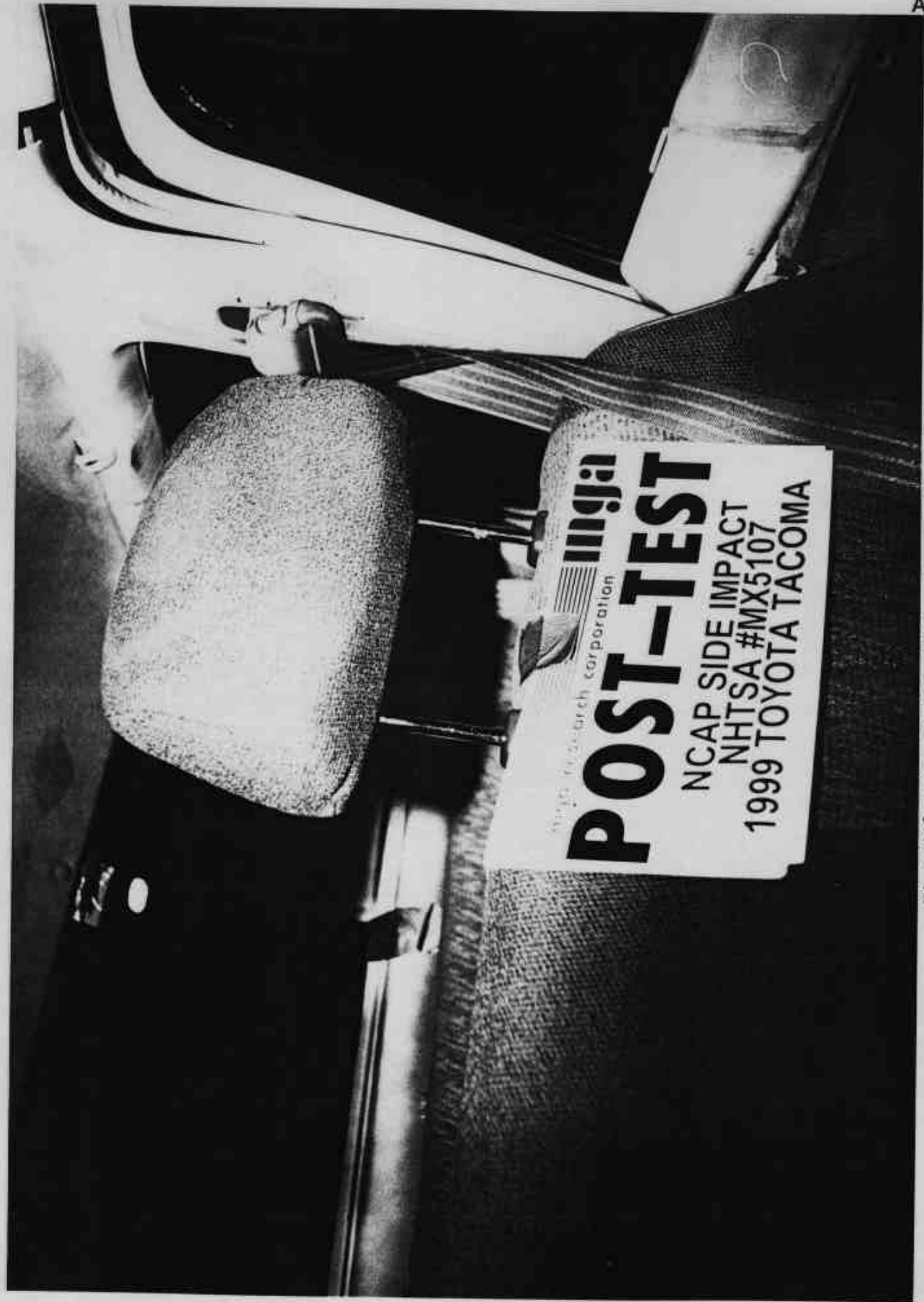
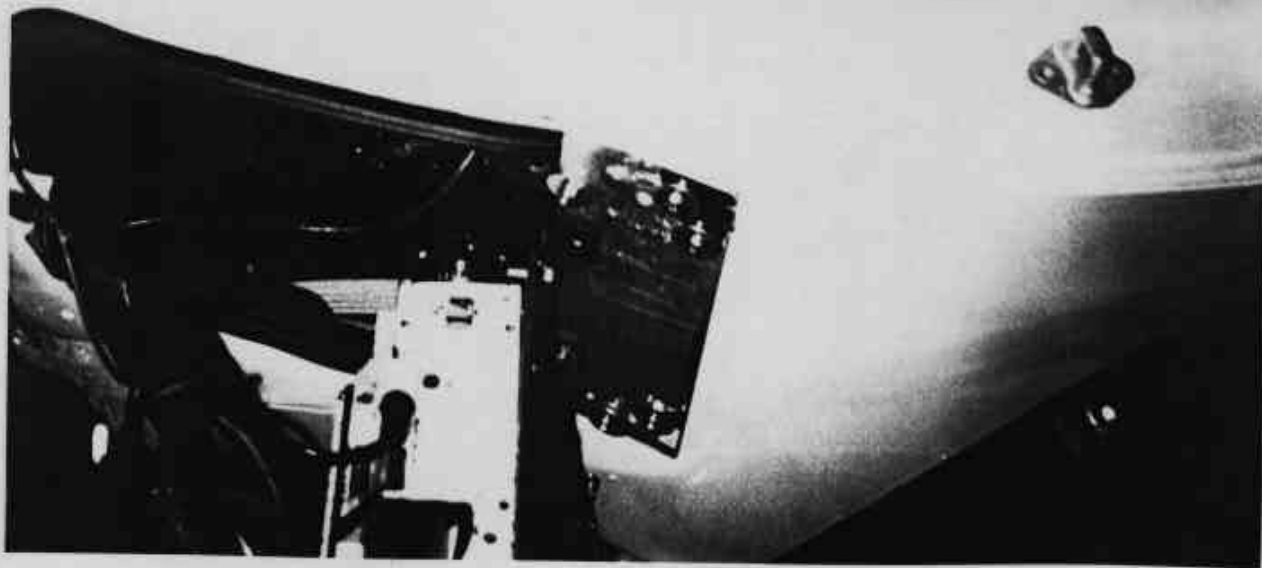


Photo N6. A-29 - Post-Test Driver Dummy Head Contact



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



A-31

Photo No. A-31 - Post-Test Passenger Dummy Right Side View

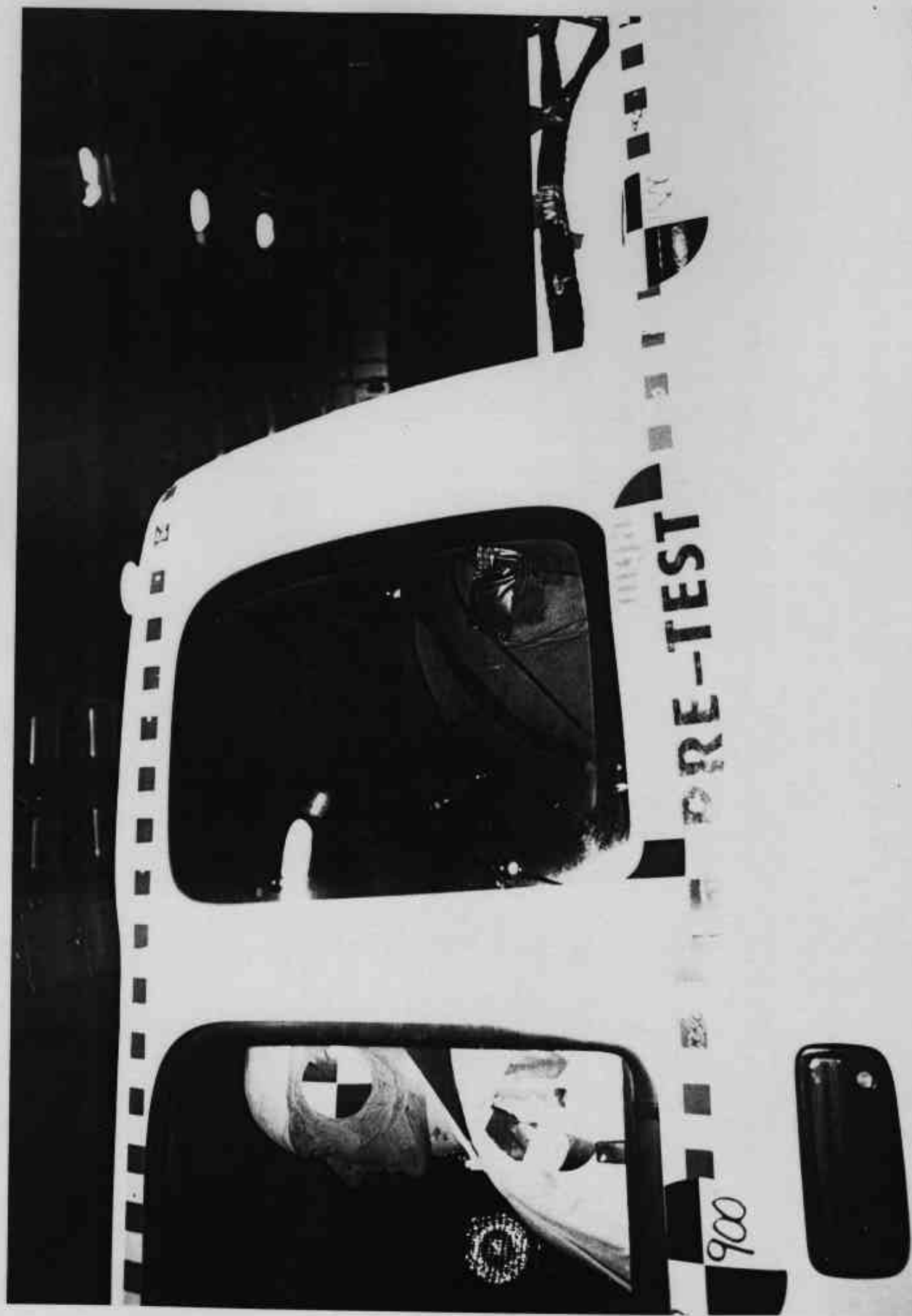


Photo No. A-32 - Pre-Test Passenger Dummy Left Side View

A-32



Photo No. A-33 - Post-Test Passenger Dummy Left Side View



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

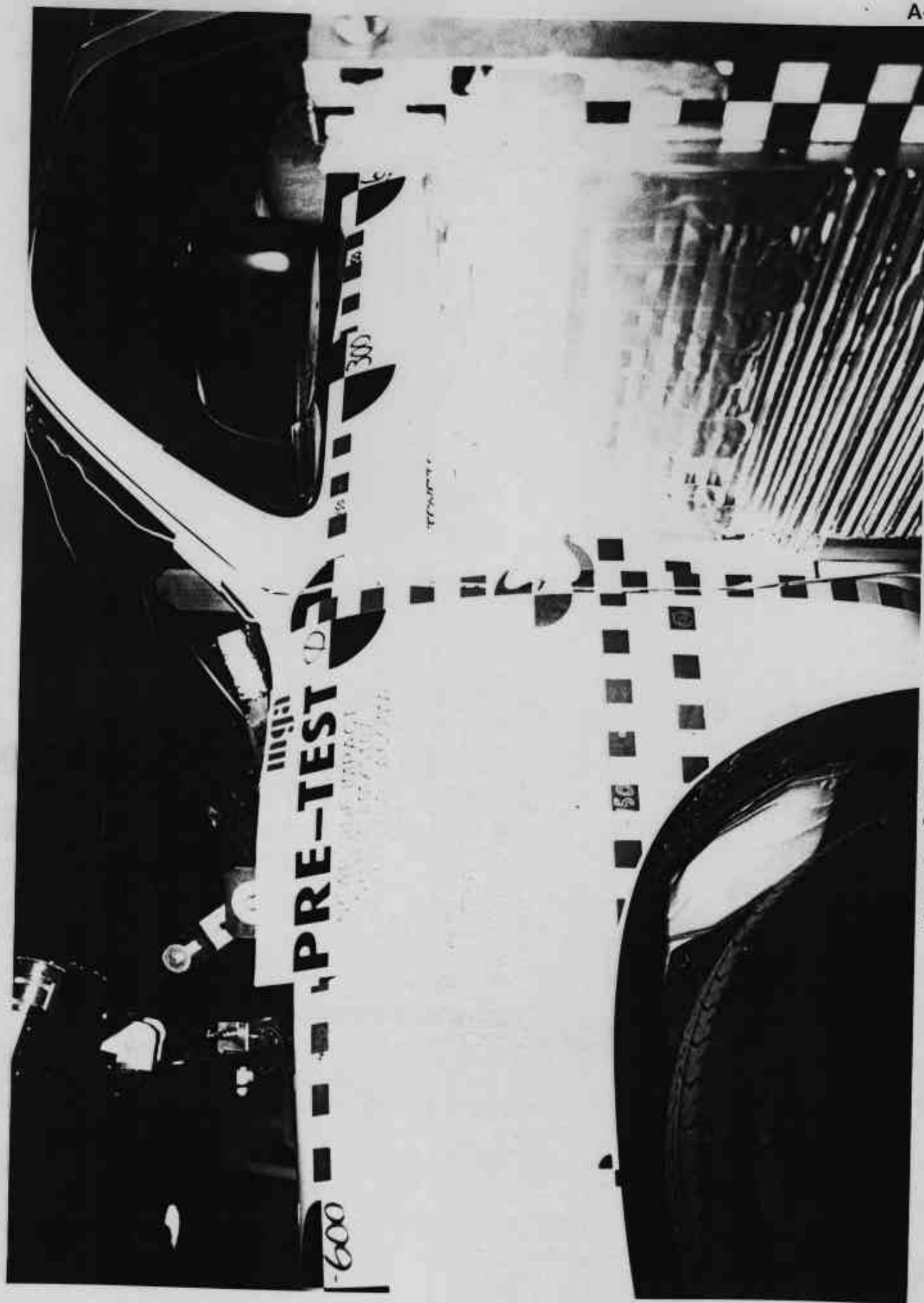


Photo No. A-38 - Pre-Test Left Front Impact Point on Vehicle



mgja

mgja research corporation

POST-TEST

NCAP SIDE IMPACT
NHTSA #MX5107
1999 TOYOTA TACOMA

55/28 KPH 90
NCAP SIDE IMPACT
#MX5107 JAN. 22, 1999
1999 TOYOTA TACOMA
MGA RESEARCH CORP.

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

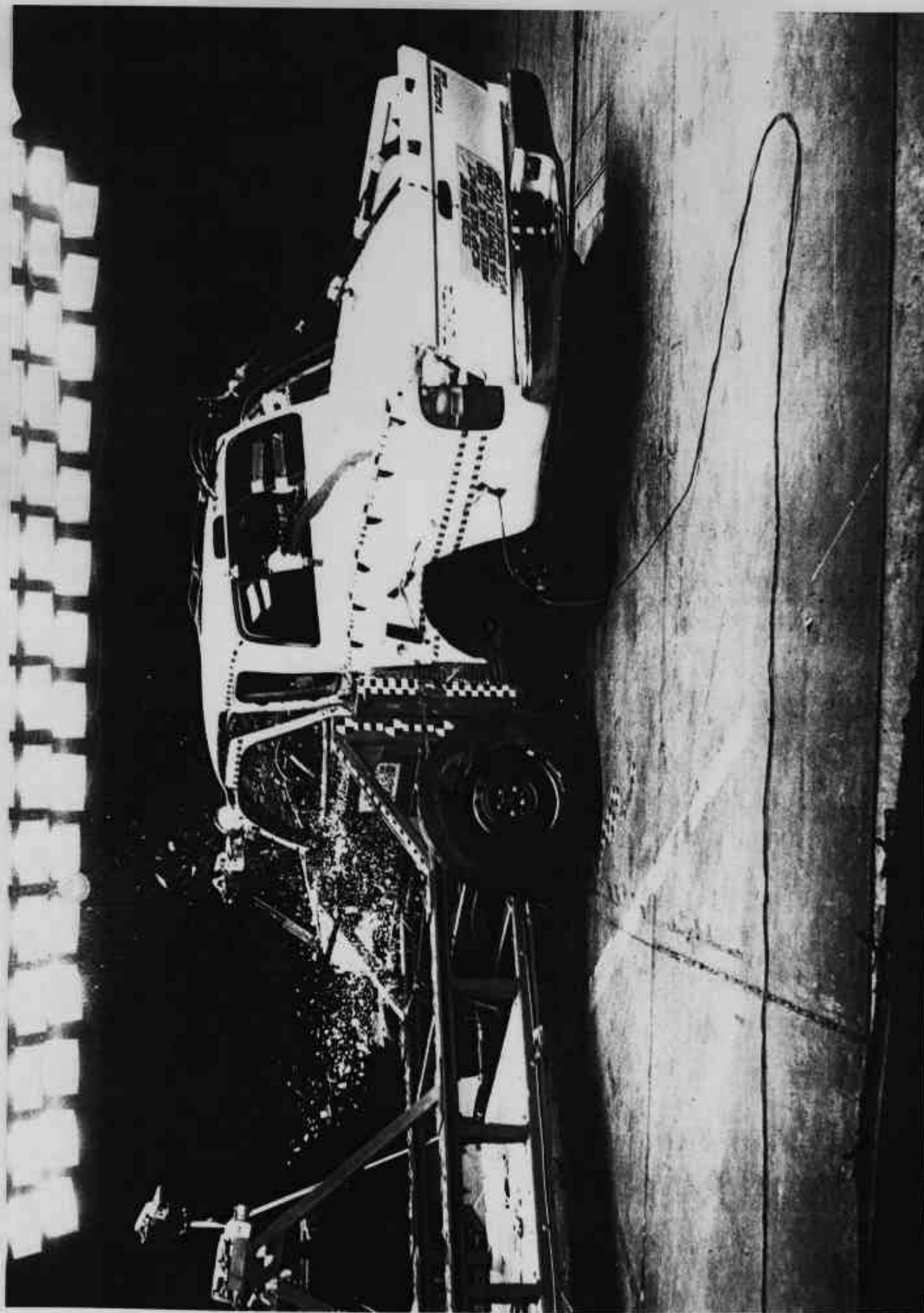


Photo No. A-40 - Impact

Date 10/2/82

MFD BY TABC INC
GVWR (LBS) 4500
GAWR (LBS) FRT

2200 WITH 15X7.50R14
14X6J RIMS AT 4500
2500 WITH 15X7.50R14
14X6J RIMS AT 4500

RR

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

41AVL52N1XZ435582 TRUCK



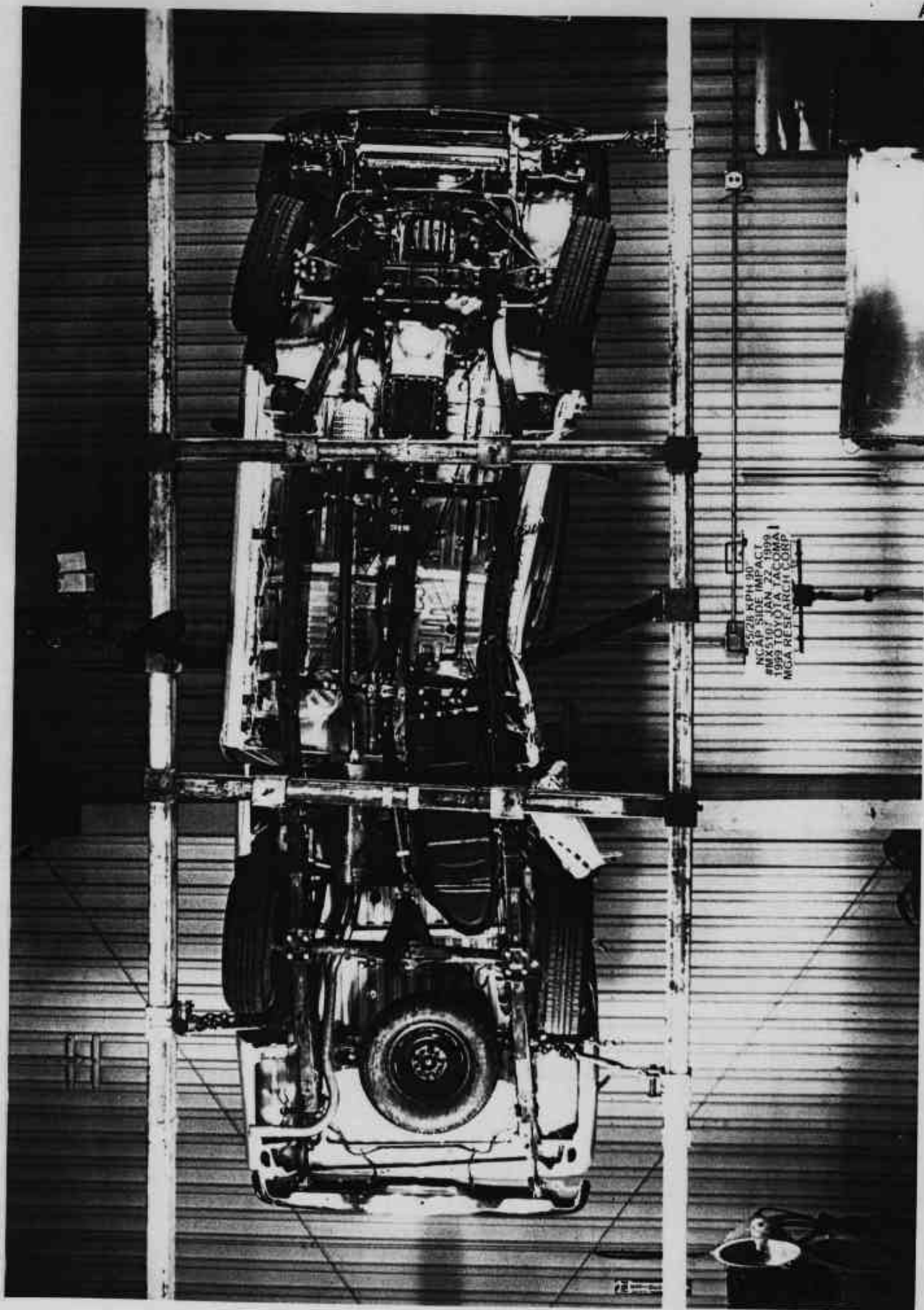


Photo No. A-42 - Rollover 90°

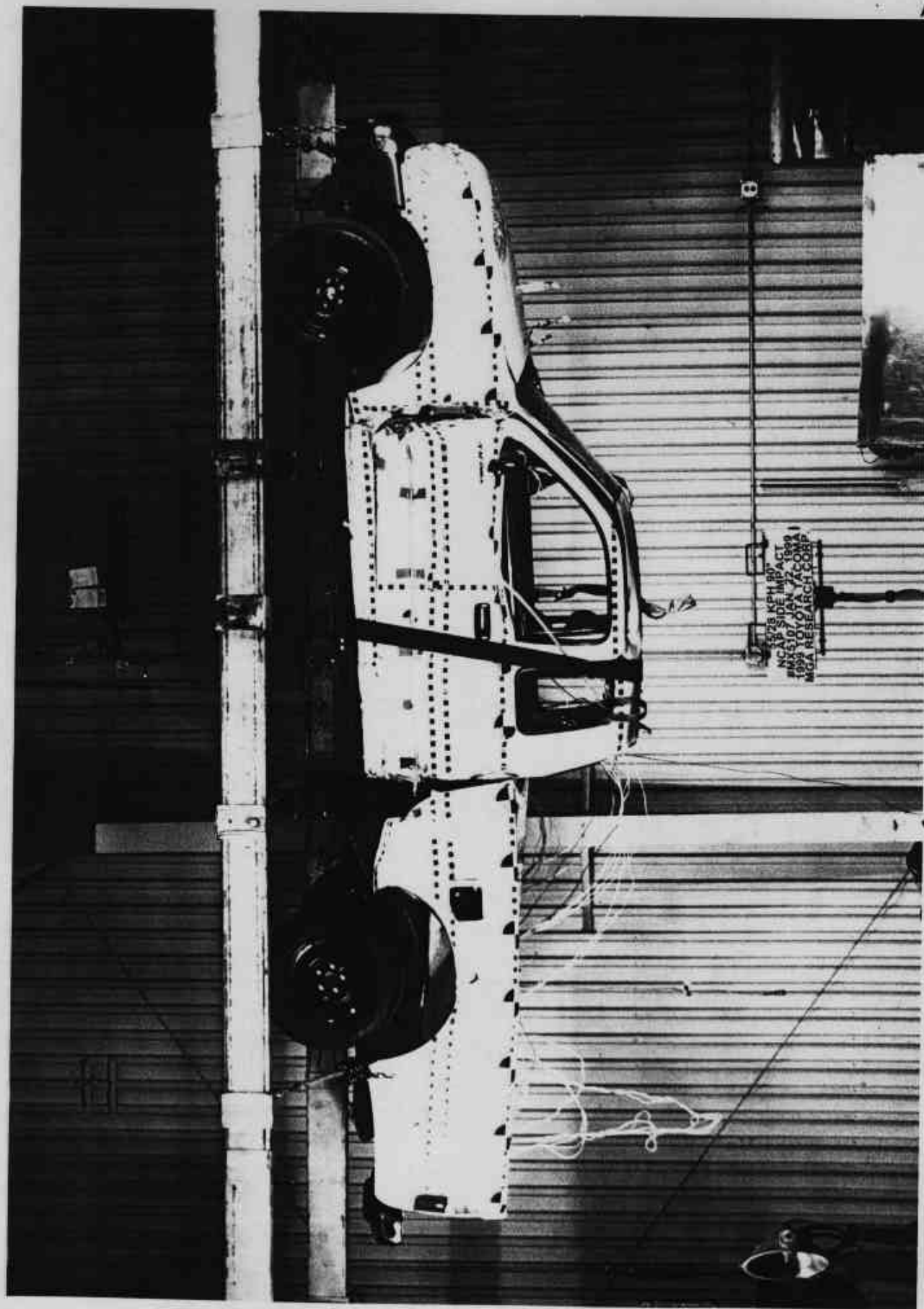


Photo No. A-43 - Rollover 180°

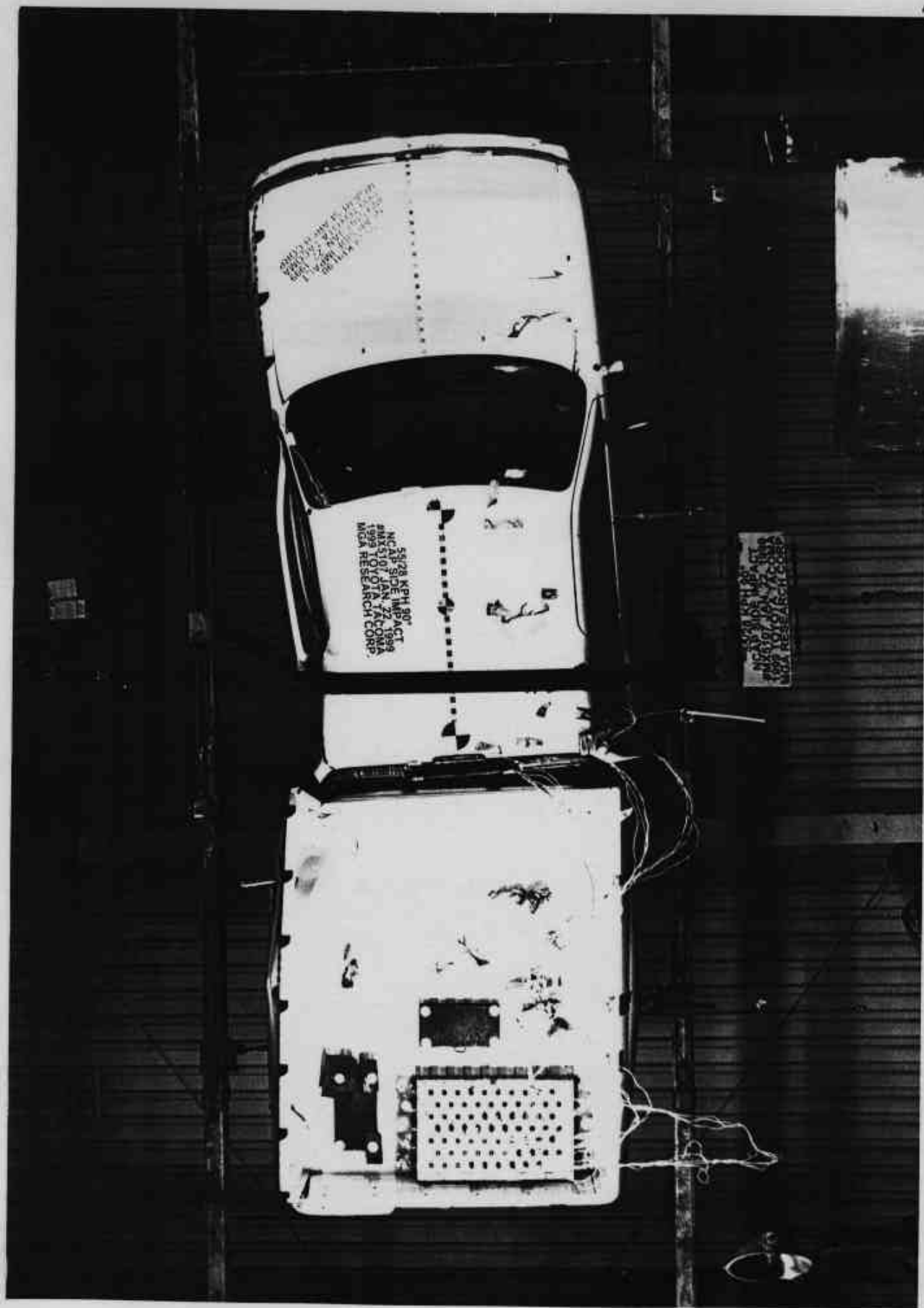


Photo No. A-44 - Rollover 270°



Photo No. A-45 - Rollover 360°

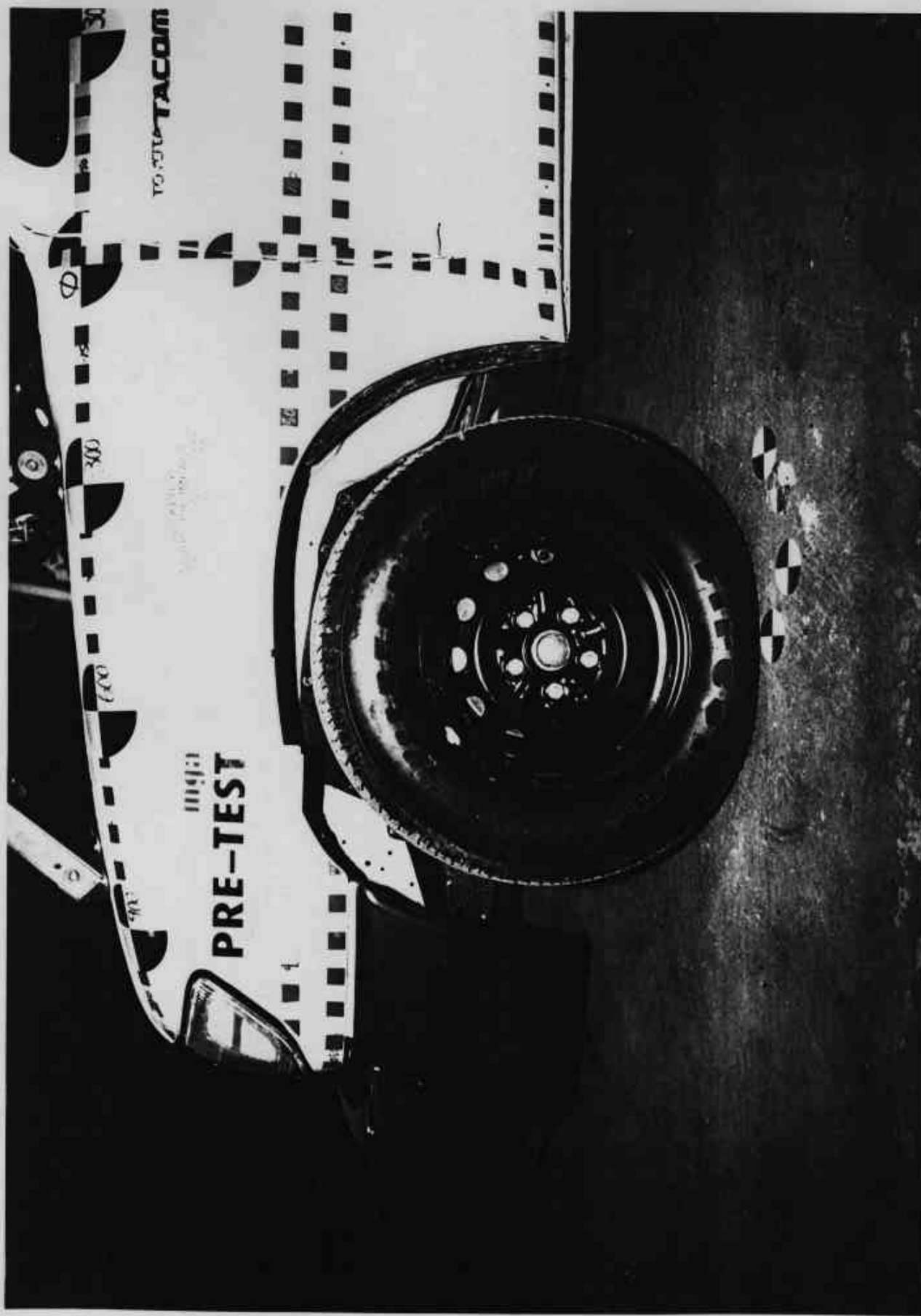


Photo No. A-46 - Left Front Attitude Point

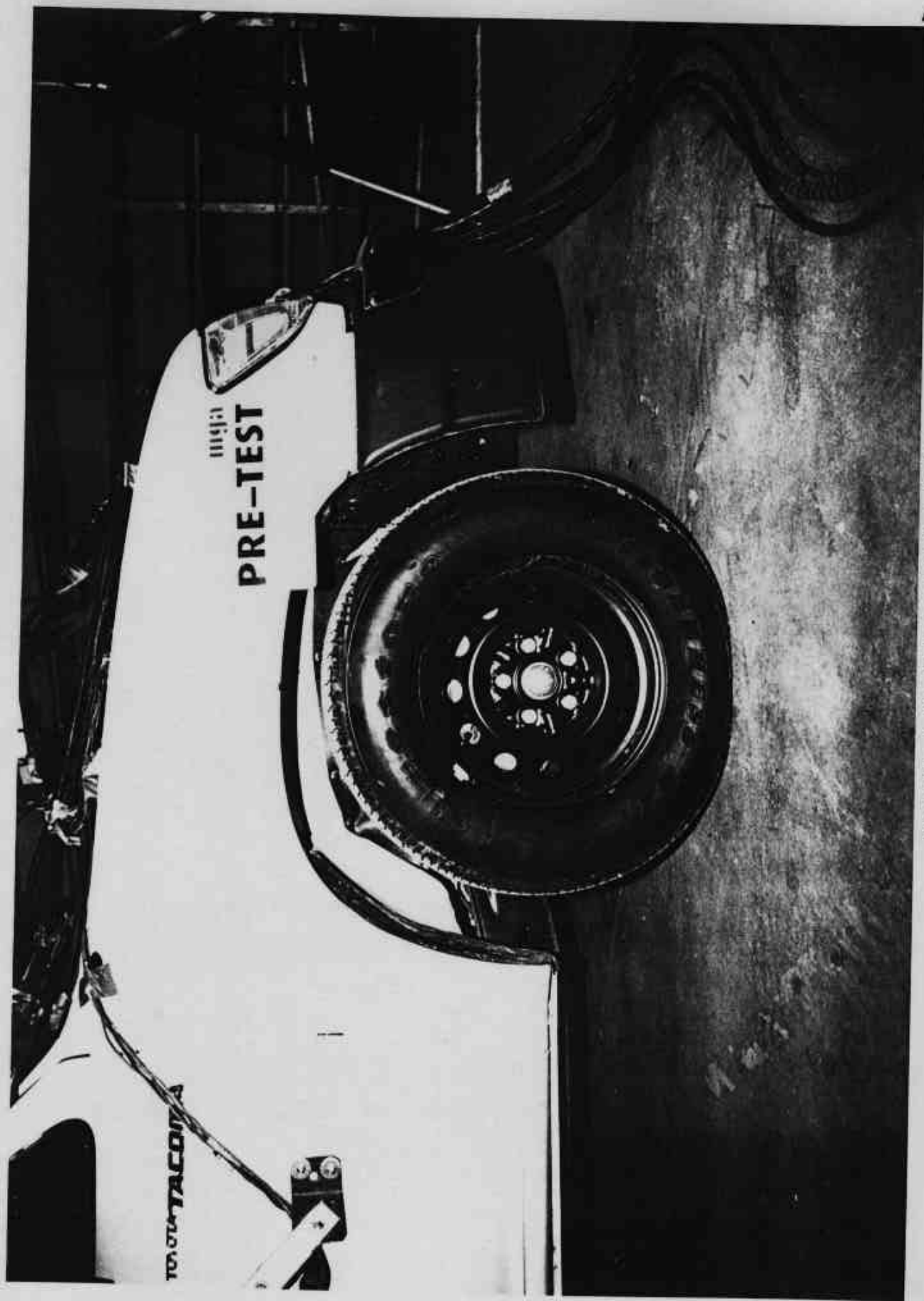
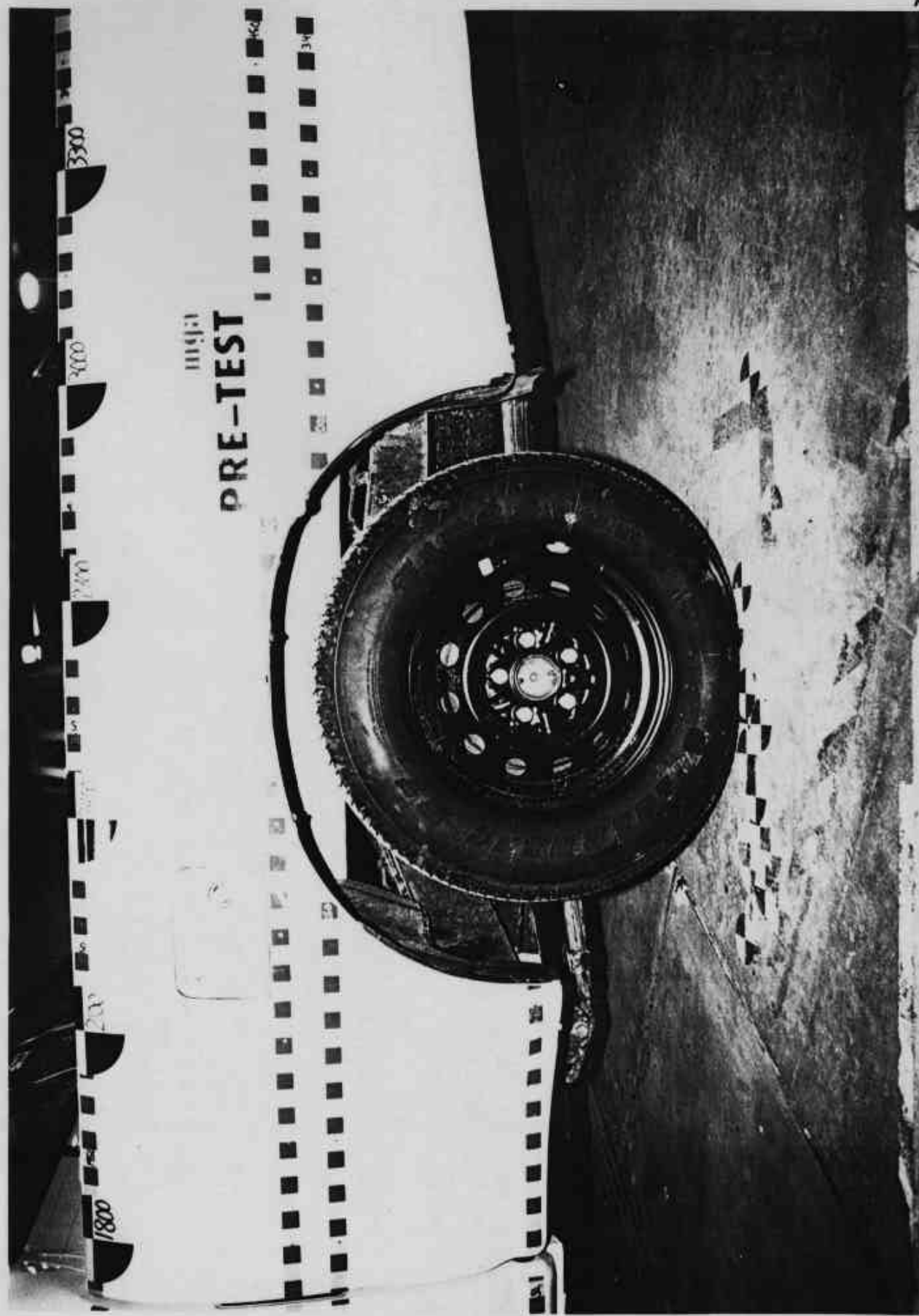


Photo No. A-47 - Right Front Attitude Point



A-48

Photo No. A-48 - Left Rear Attitude Point

PRE-11

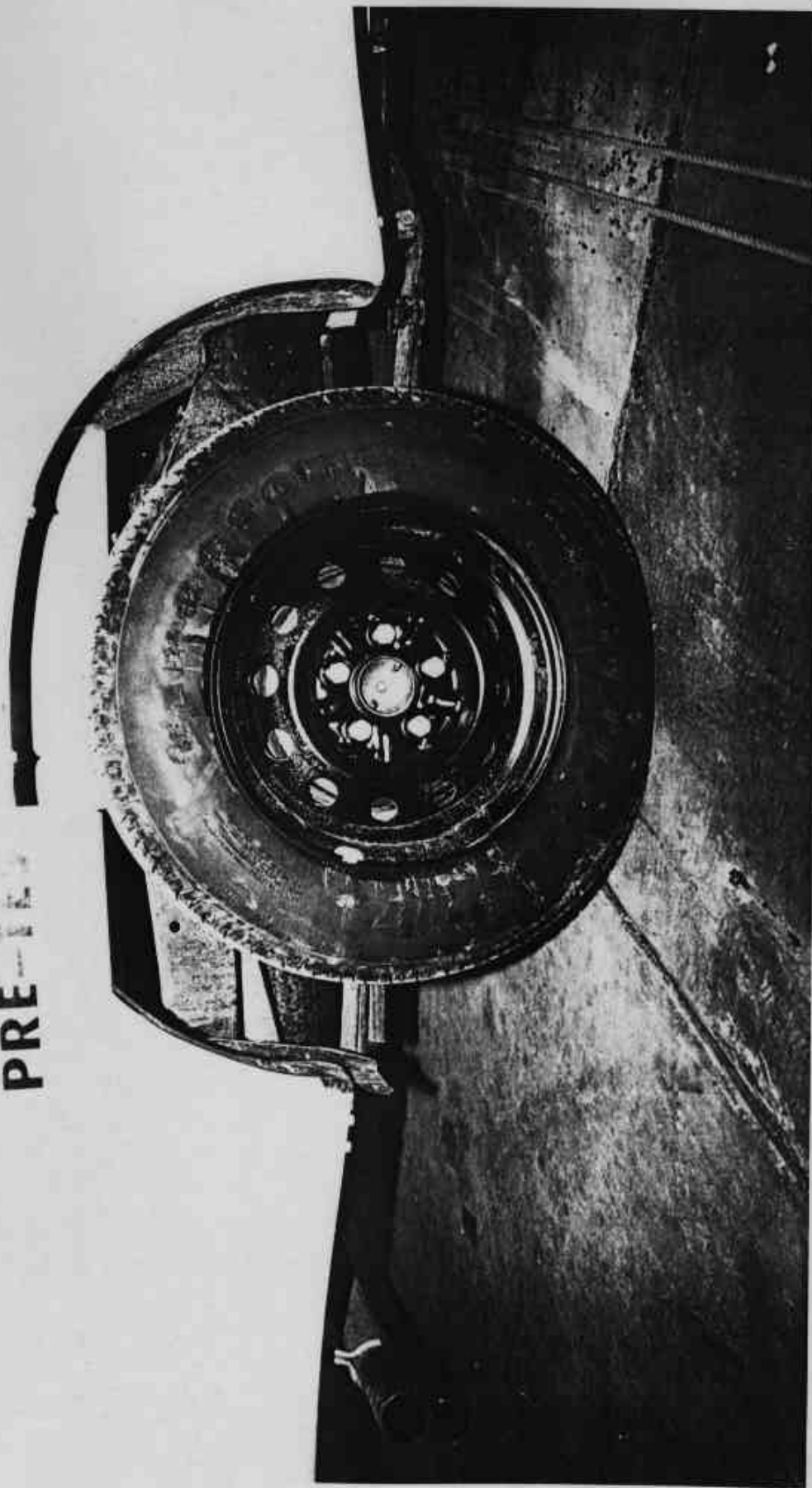


Photo No. A-49 - Right Rear Attitude Point

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FIR Filtered

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TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

Speed: 38.3 MPH 61.6 KPH

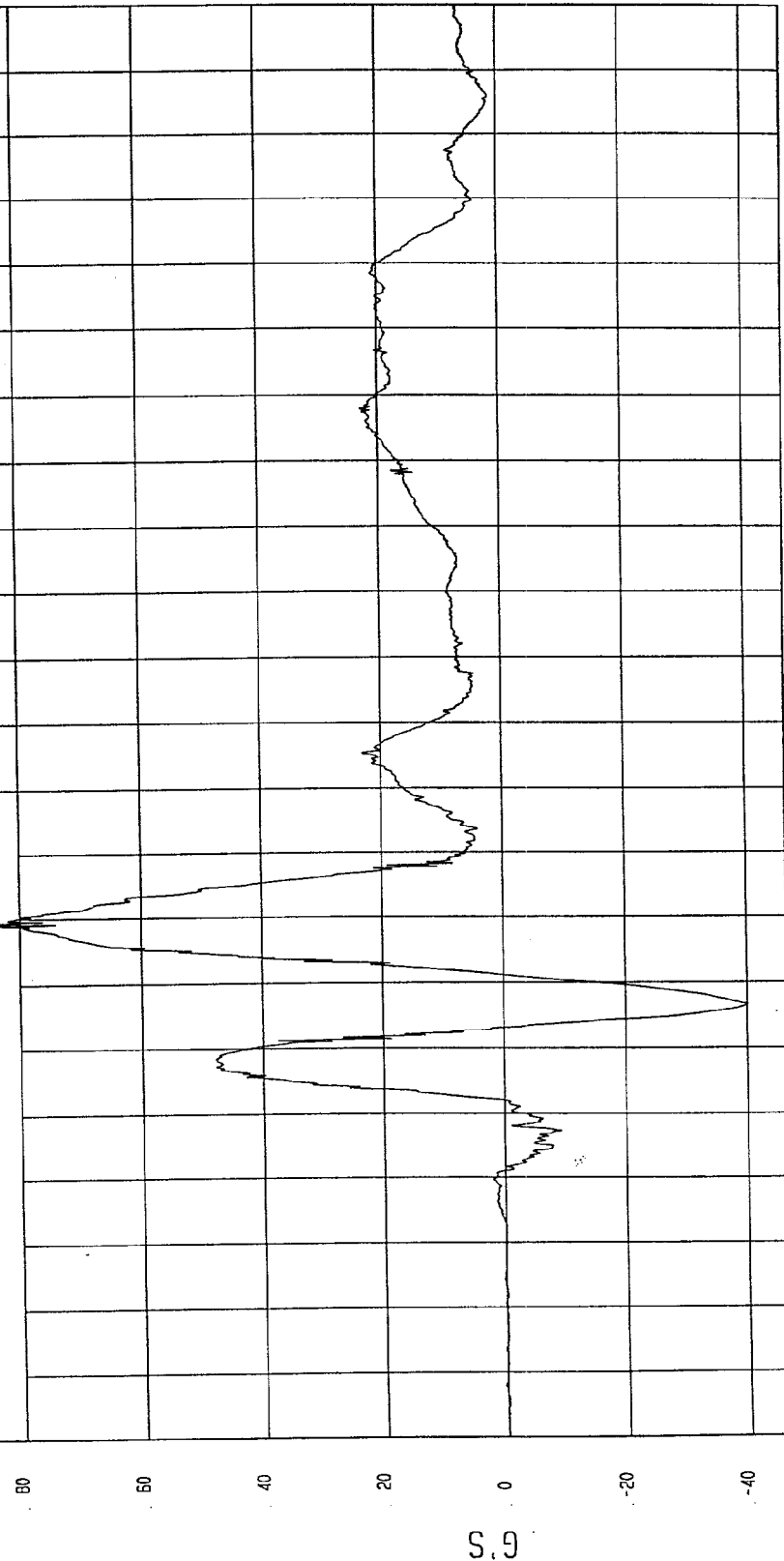
COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Maximum = 88.13 G'S at 59 msec

Minimum = -40.22 G'S at 47 msec

DRIVER HEAD X ACCELERATION

1 899009AT.A12 Filterclass (1000)



TIME (SECONDS)

WCA Research
02-09-1999 13:59

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

SPEED: 38.3 MPH 61.6 KPH

COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Minimum = -1.33 KPH at 32 msec

Maximum = 88.29 KPH at 200 msec

DRIVER HEAD X VELOCITY

1 — B99005A1.V12 Filterclass (180)

90

80

70

60

50

40

30

20

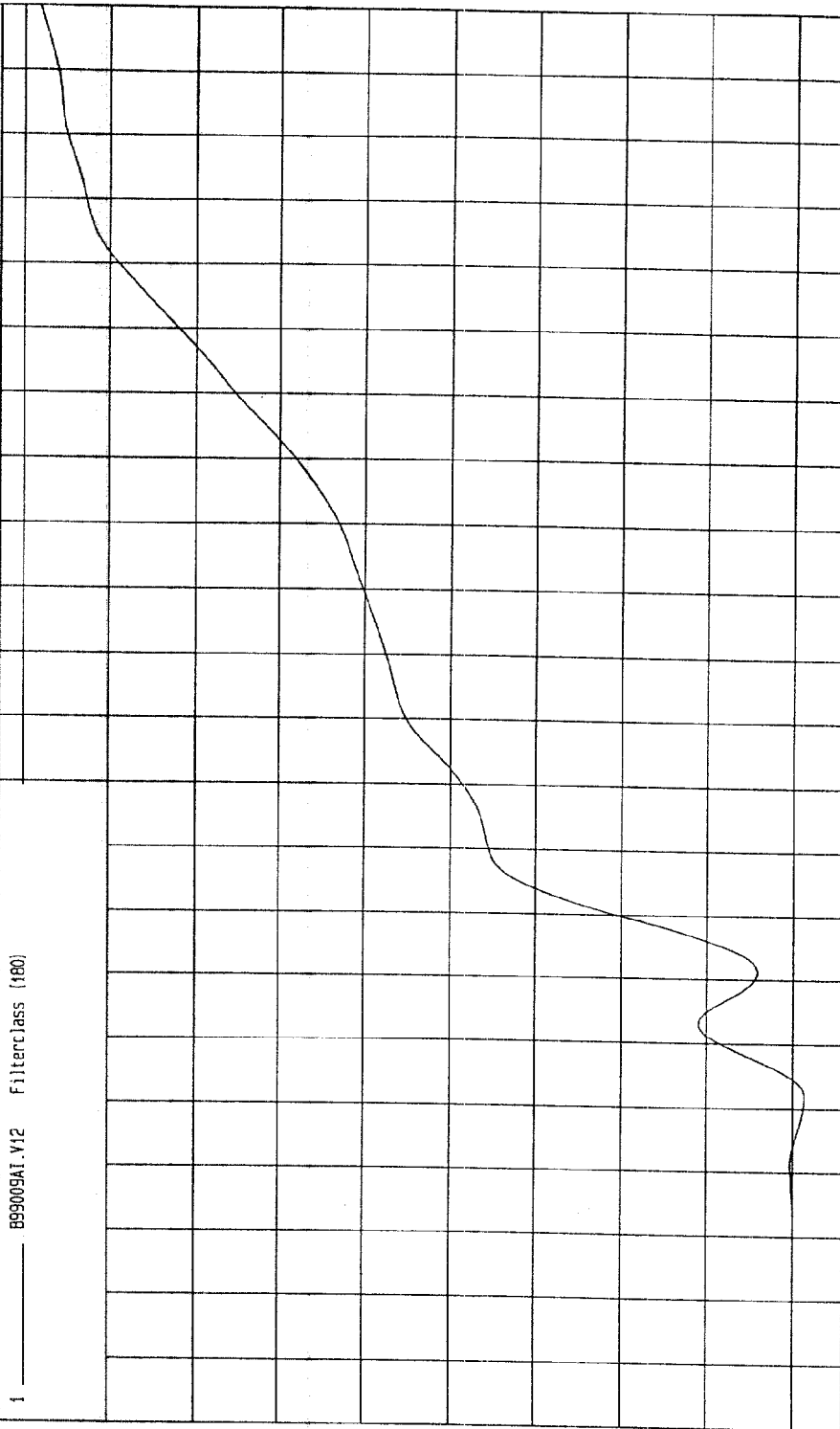
10

0

KPH

TIME Seconds

NIA Research
02-15-1999 14:37

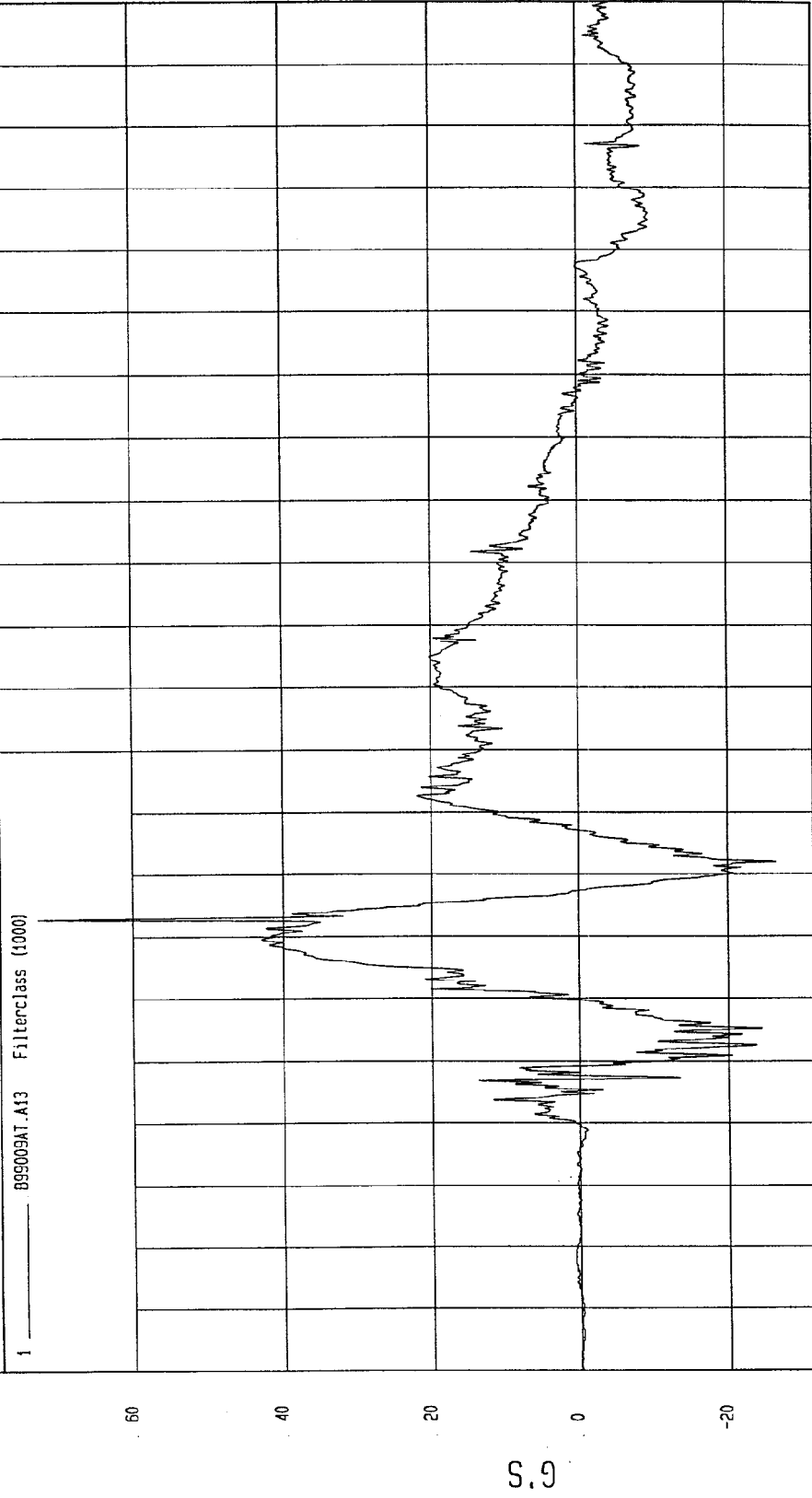


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -26.53 G'S at 62 msec Maximum = 72.97 G'S at 53 msec

DRIVER HEAD Y ACCELERATION



TIME (SECONDS)

MSA Research
02-09-1999 13:57

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107)

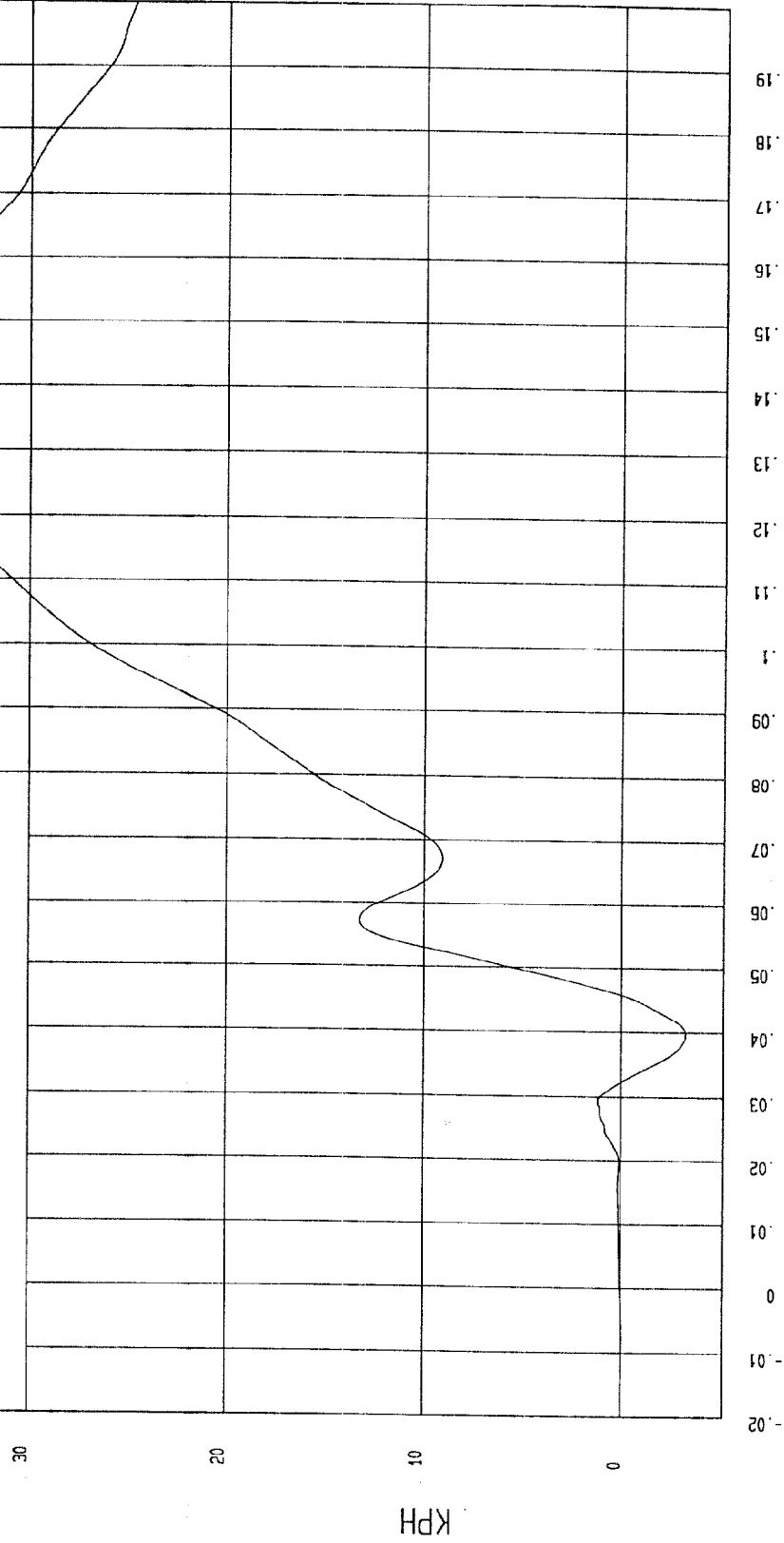
Speed: 38.3 MPH 61.6 KPH

Minimum = -3.25 KPH at 40 msec

Maximum = 35.35 KPH at 138 msec

DRIVER HEAD Y VELOCITY

1 ——— B99009A1.V13 Filterclass (180)



MSA Research
02-15-1999 14:37

TIME Seconds

TEST DATE: 01-22-1999

TEST: HIGH SPEED LATERAL IMPACT

Speed: 38.3 MPH 61.6 KPH

COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Maximum = 16.2 G'S at 170 msec

Minimum = -29.78 G'S at 75 msec

DRIVER HEAD Z ACCELERATION

1 B99009AT.A14 Filterclass (1000)

10
0
-10
-20
-30

G.S

19

18

17

16

15

14

13

12

11

10

09

08

07

06

05

04

03

02

01

00

-01

-02

TIME (SECONDS)

NSA Research
02-05-1999 13:57

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

Speed: 38.3 MPH 61.6 KPH

COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Maximum = .51 KPH at 25 msec

Minimum = -37.25 KPH at 130 msec

DRIVER HEAD Z VELOCITY

1 — 899009A1.V14 Filterclass (180)

0

-10

-20

-30

KPH

.19

.18

.17

.16

.15

.14

.13

.12

.11

.1

.09

.08

.07

.06

.05

.04

.03

.02

.01

0

-.01

-.02

TIME Seconds

NSA Research
02-15-1999 14:37

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

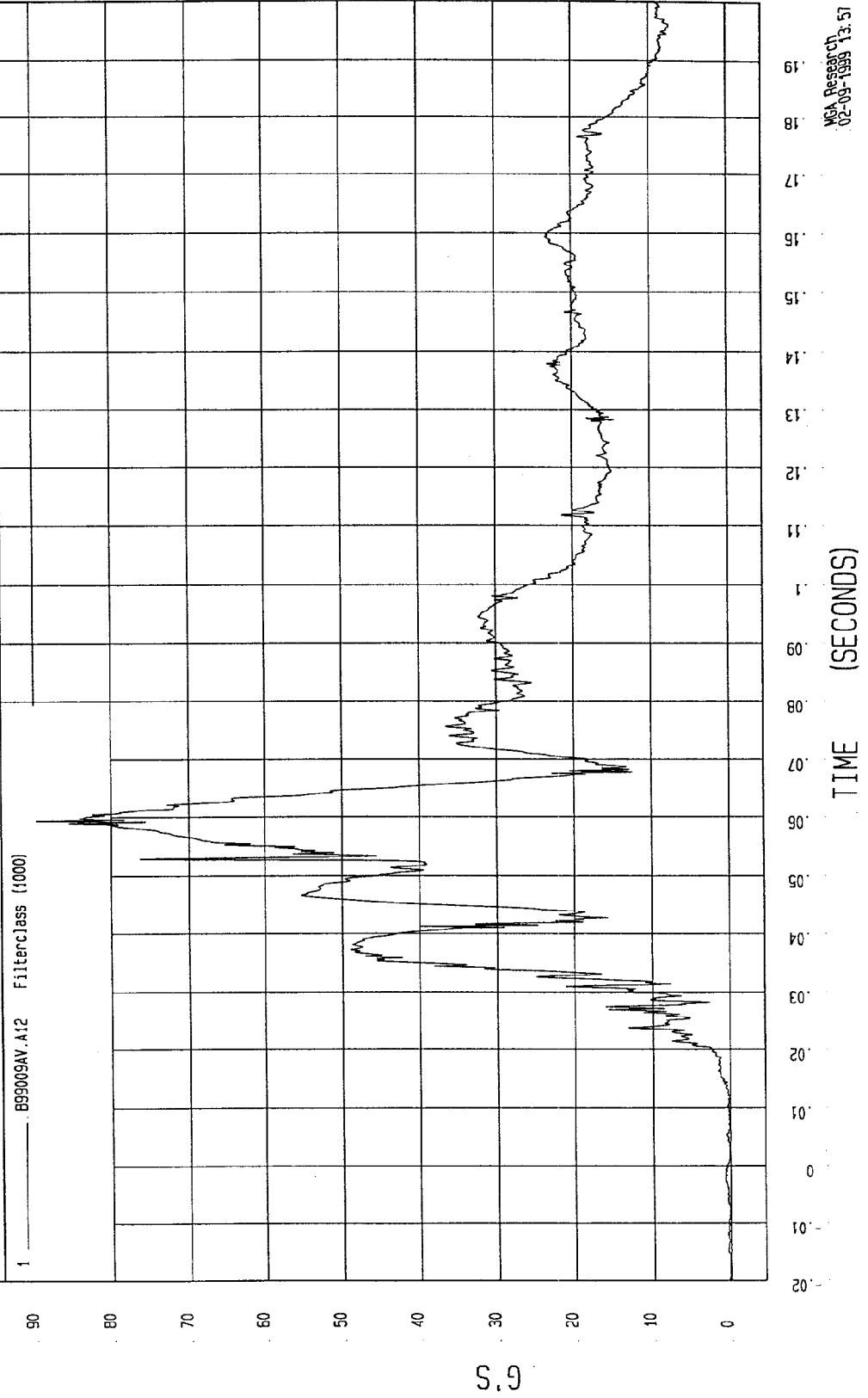
Speed: 38.3 MPH 61.6 KPH

COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Maximum = 89.73 G'S at 59 msec

Minimum = 9.79E-02 G'S at -19 msec

DRIVER HEAD RESULTANT



TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107)

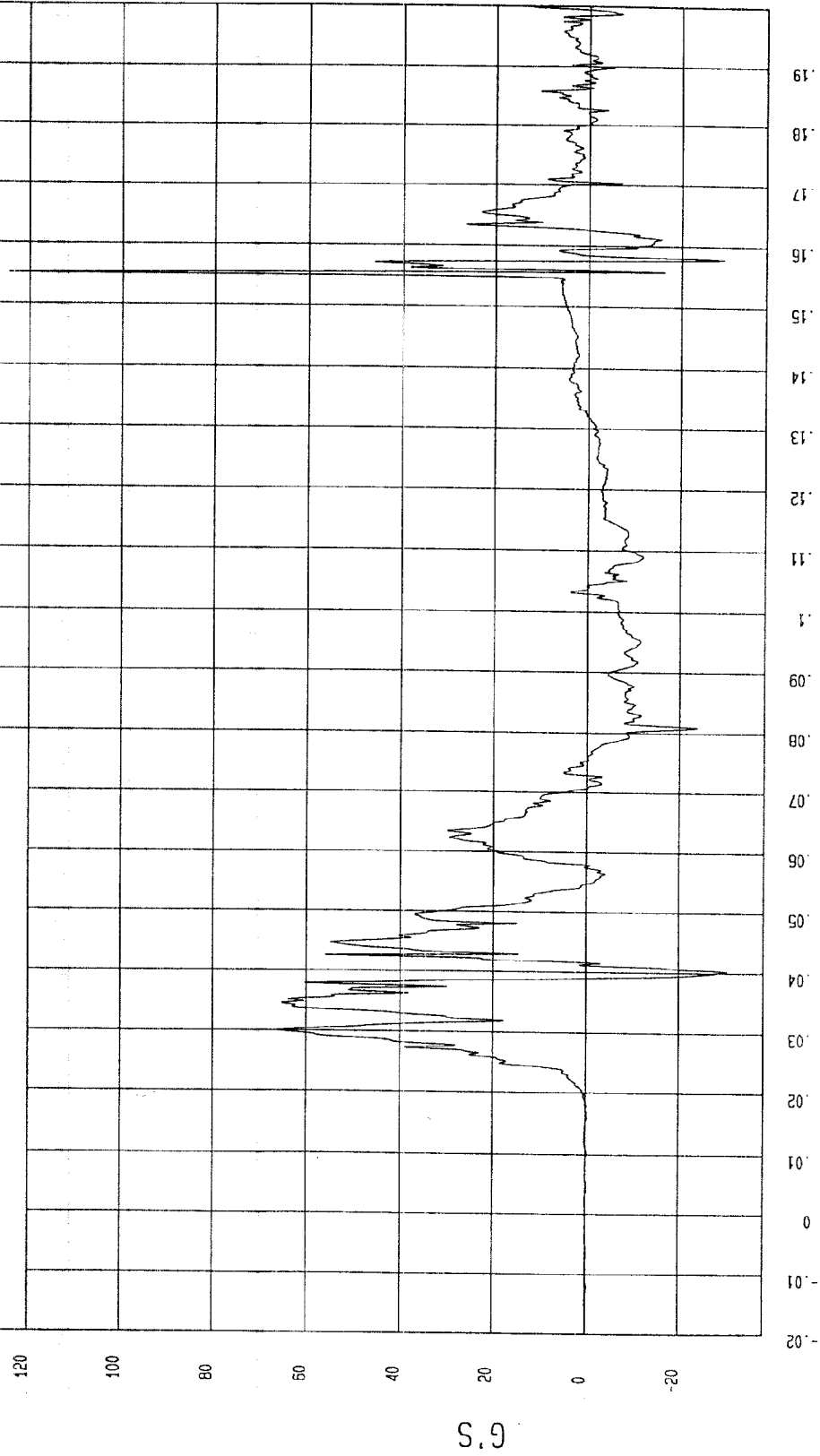
Speed: 38.3 MPH 61.6 KPH

Minimum = -30.24 G'S at 40 msec

Maximum = 124.35 G'S at 155 msec

DRIVER UPPER RIB Y ACCELERATION

1 B99009AT.A15 FilterClass (1000)



MSA Research
02-09-1999 13:57

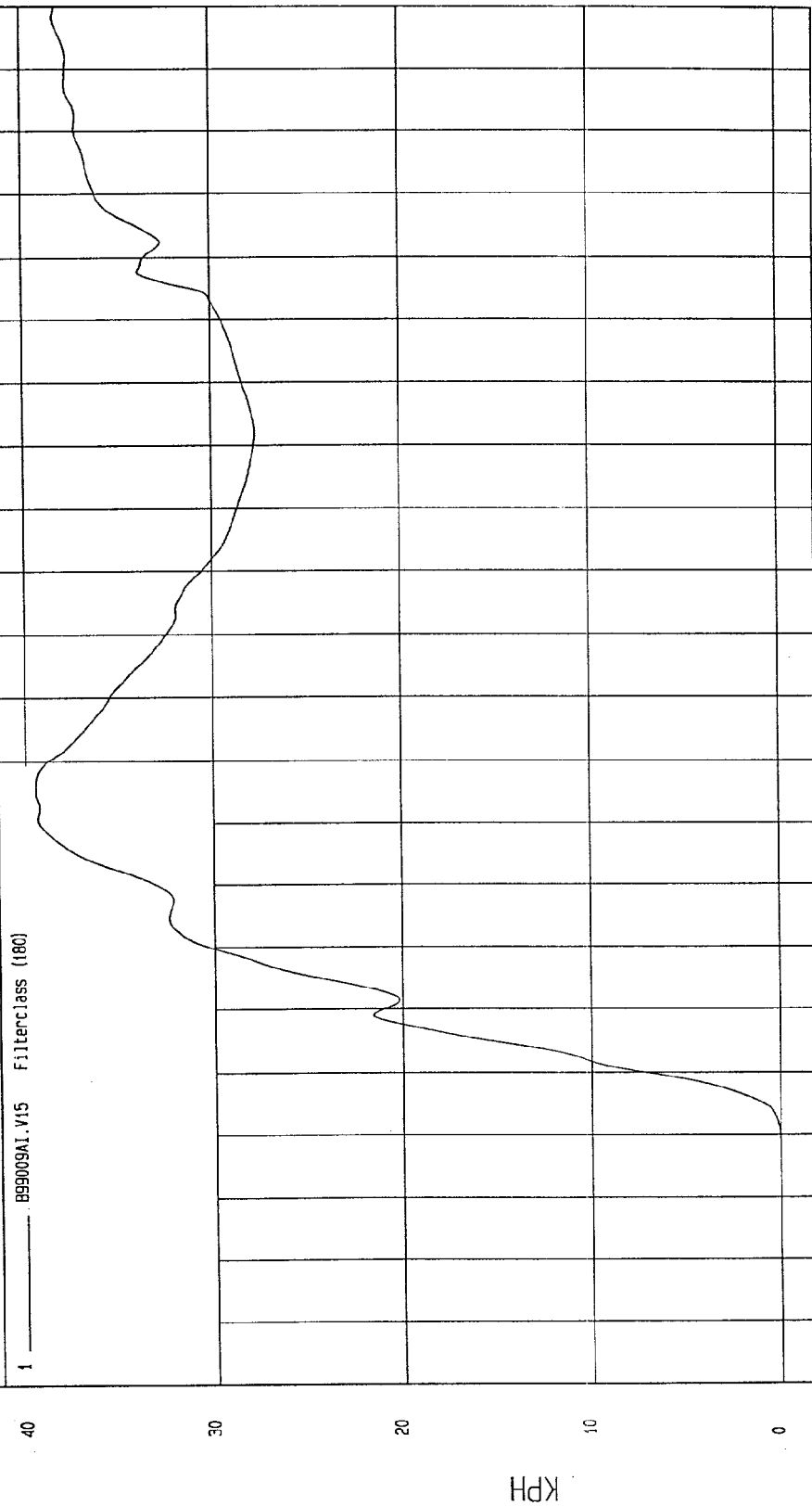
TIME (SECONDS)

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -1.08E-02 KPH at -5 msec Maximum = 39.47 KPH at 76 msec

DRIVER UPPER RIB Y VELOCITY



TIME Seconds

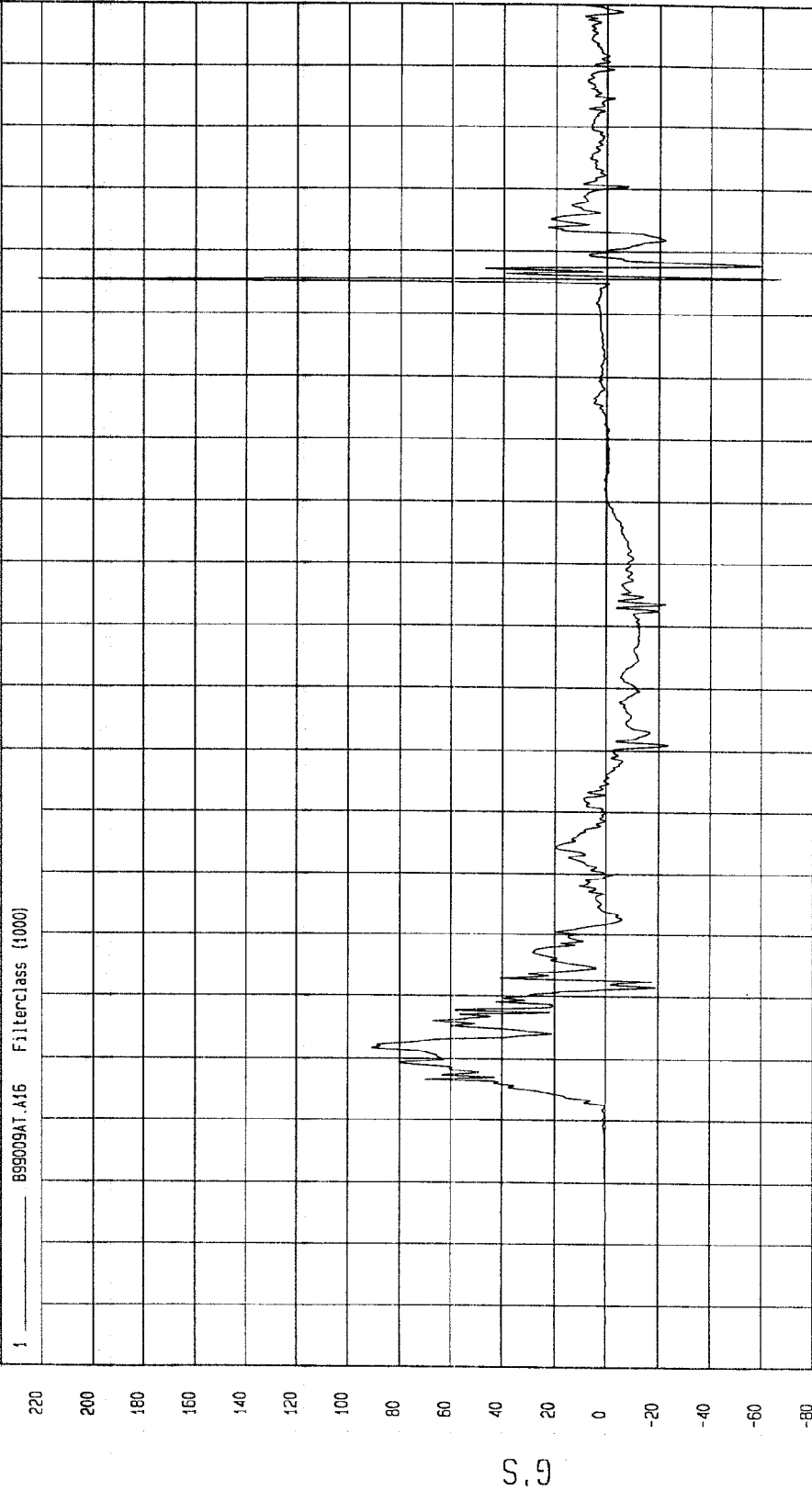
WCA Research
02-15-1999 14:37

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -66.98 G'S at 156 msec Maximum = 221.36 G'S at 155 msec

DRIVER LOWER RIB Y ACCELERATION

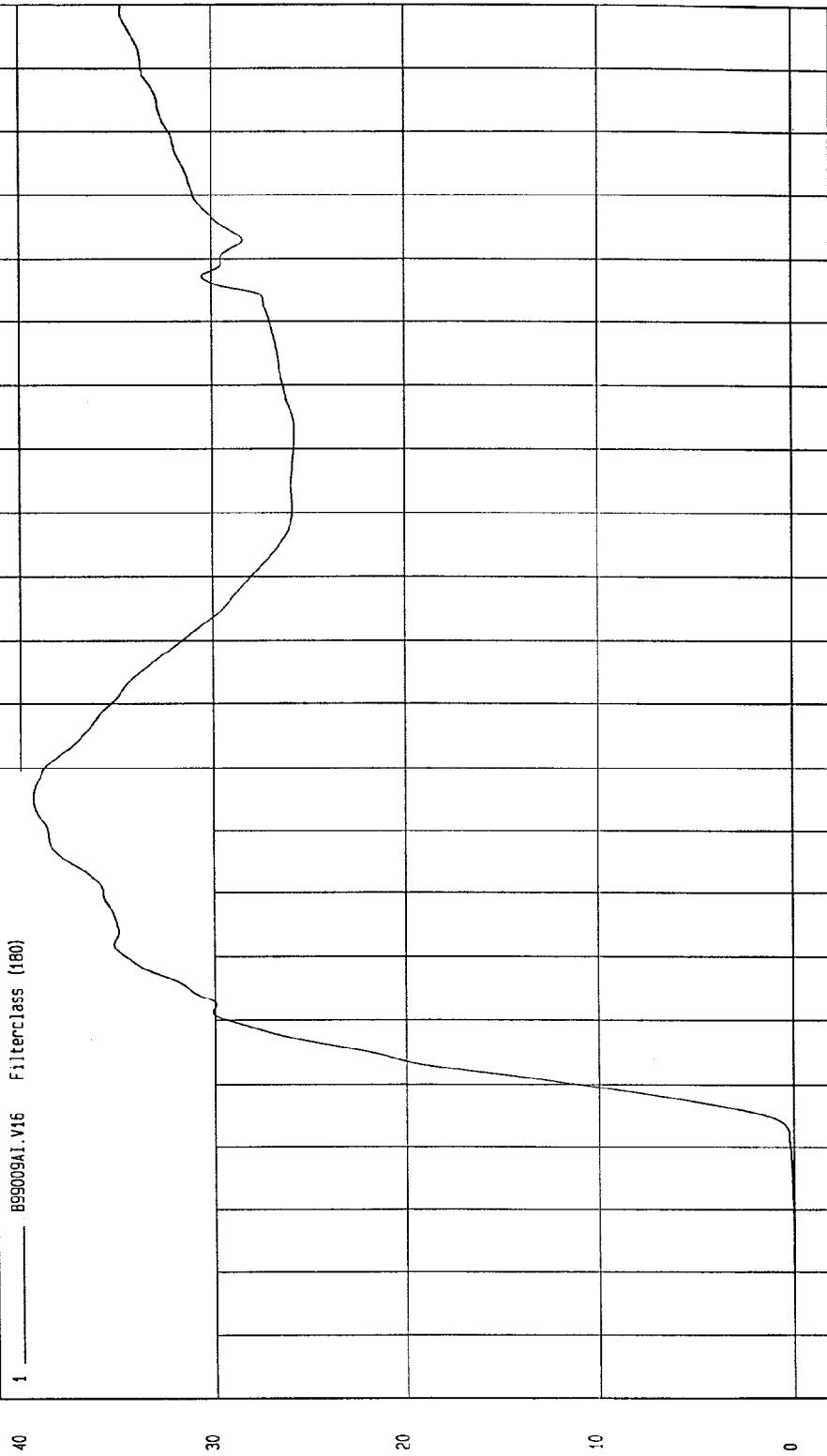


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -8.04E-04 KPH at -5 msec Maximum = 39.34 KPH at 75 msec

DRIVER LOWER RIB Y VELOCITY



TIME Seconds

WCA Research
02-15-1999 14:37

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

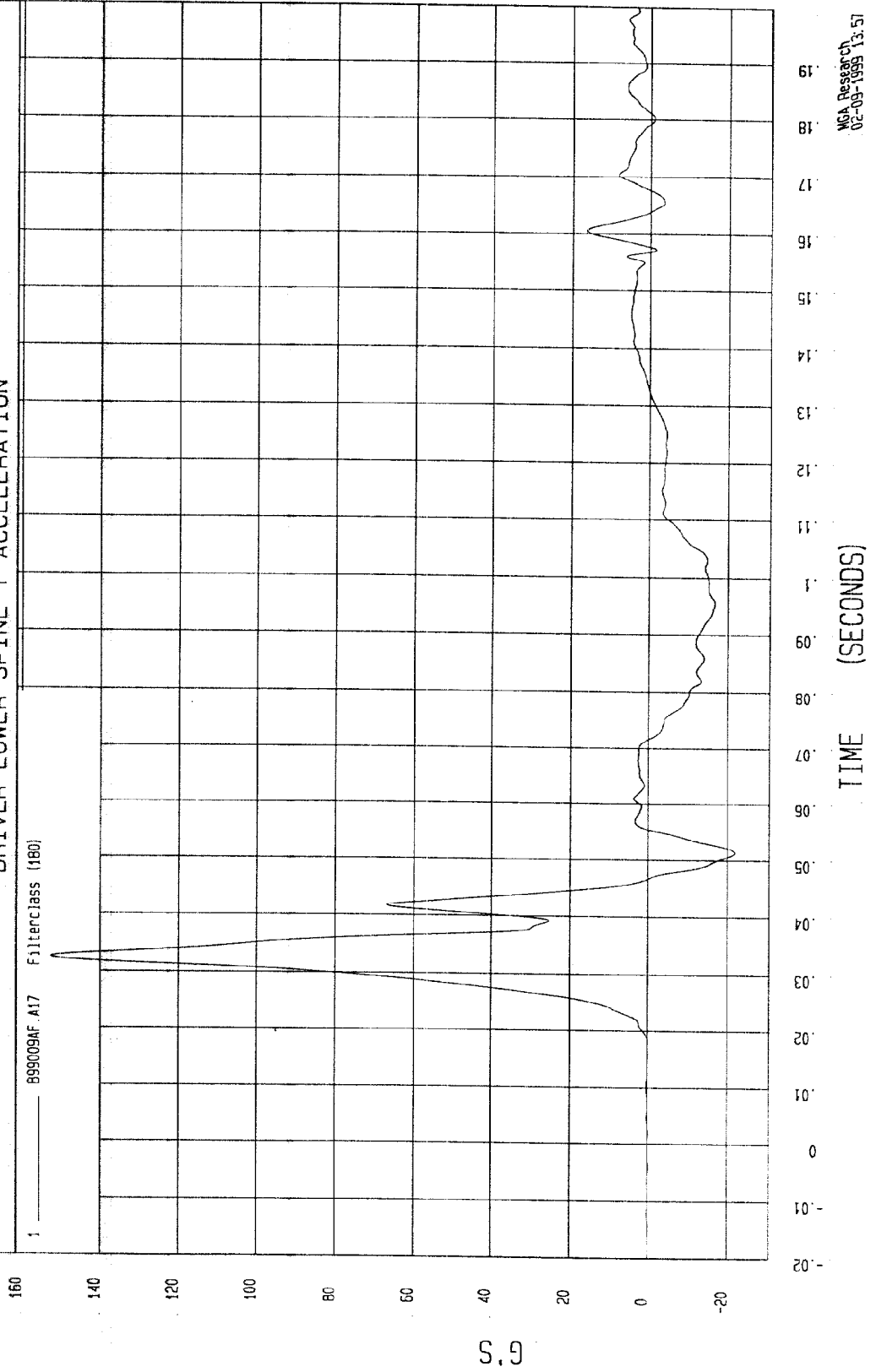
Speed: 38.3 MPH 61.6 KPH

COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Maximum = 152.69 G'S at 32 msec

Minimum = -21.9 G'S at 51 msec

DRIVER LOWER SPINE Y ACCELERATION

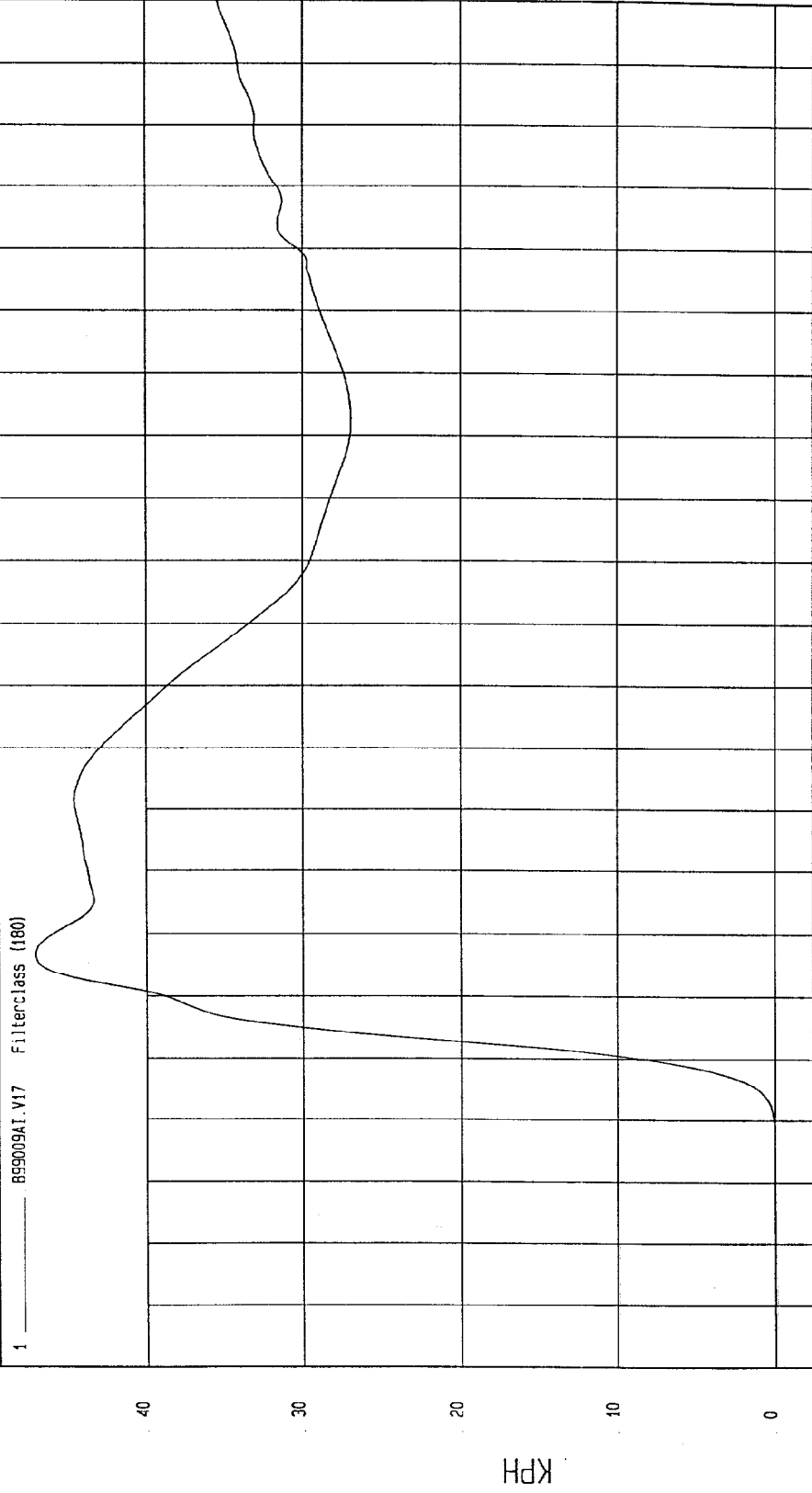


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -.02 KPH at 3 msec Maximum = 47.11 KPH at 47 msec

DRIVER LOWER SPINE Y VELOCITY



TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

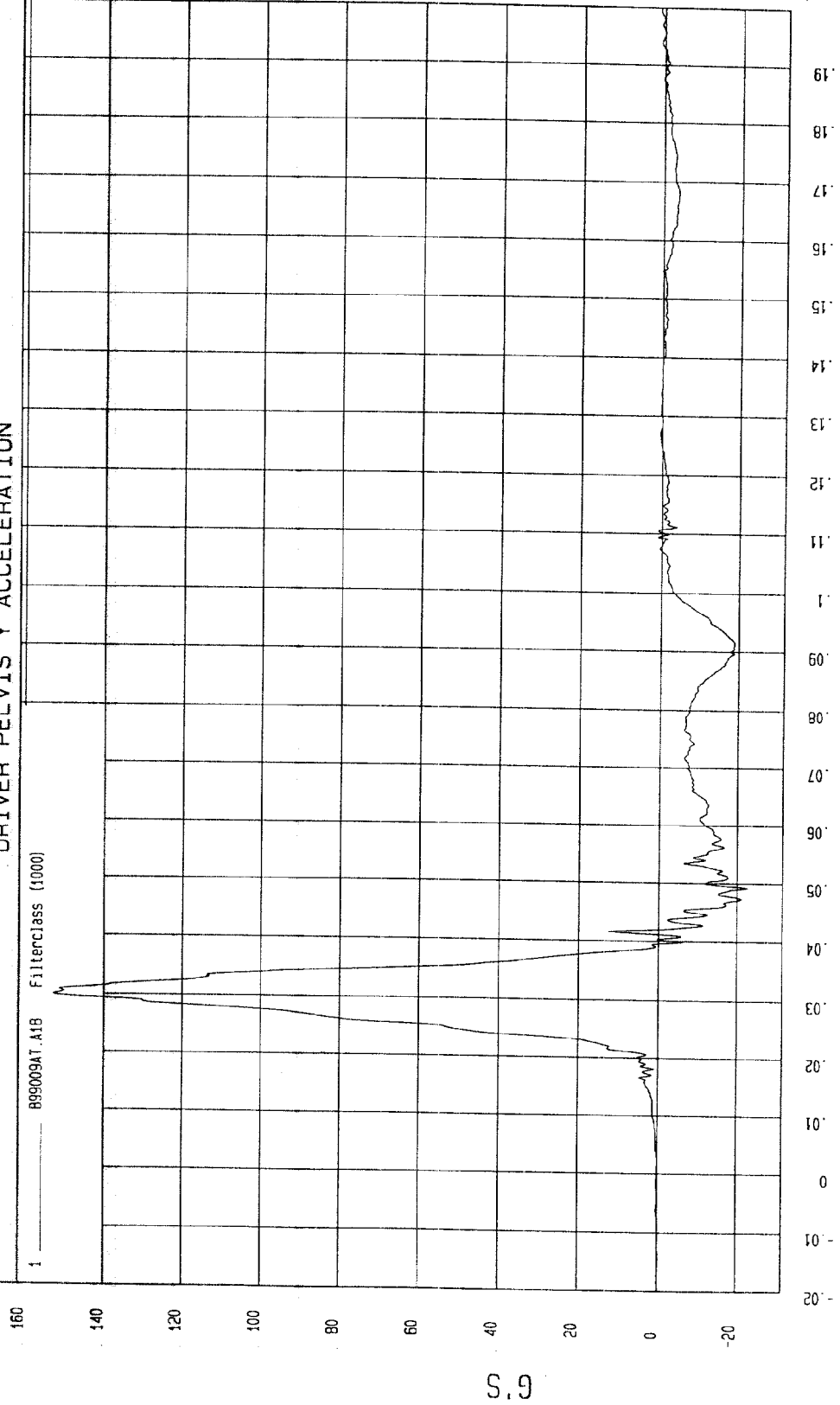
Speed: 38.3 MPH 61.6 KPH

COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Maximum = 152.71 G'S at 30 msec

Minimum = -22.6 G'S at 49 msec

DRIVER PELVIS Y ACCELERATION



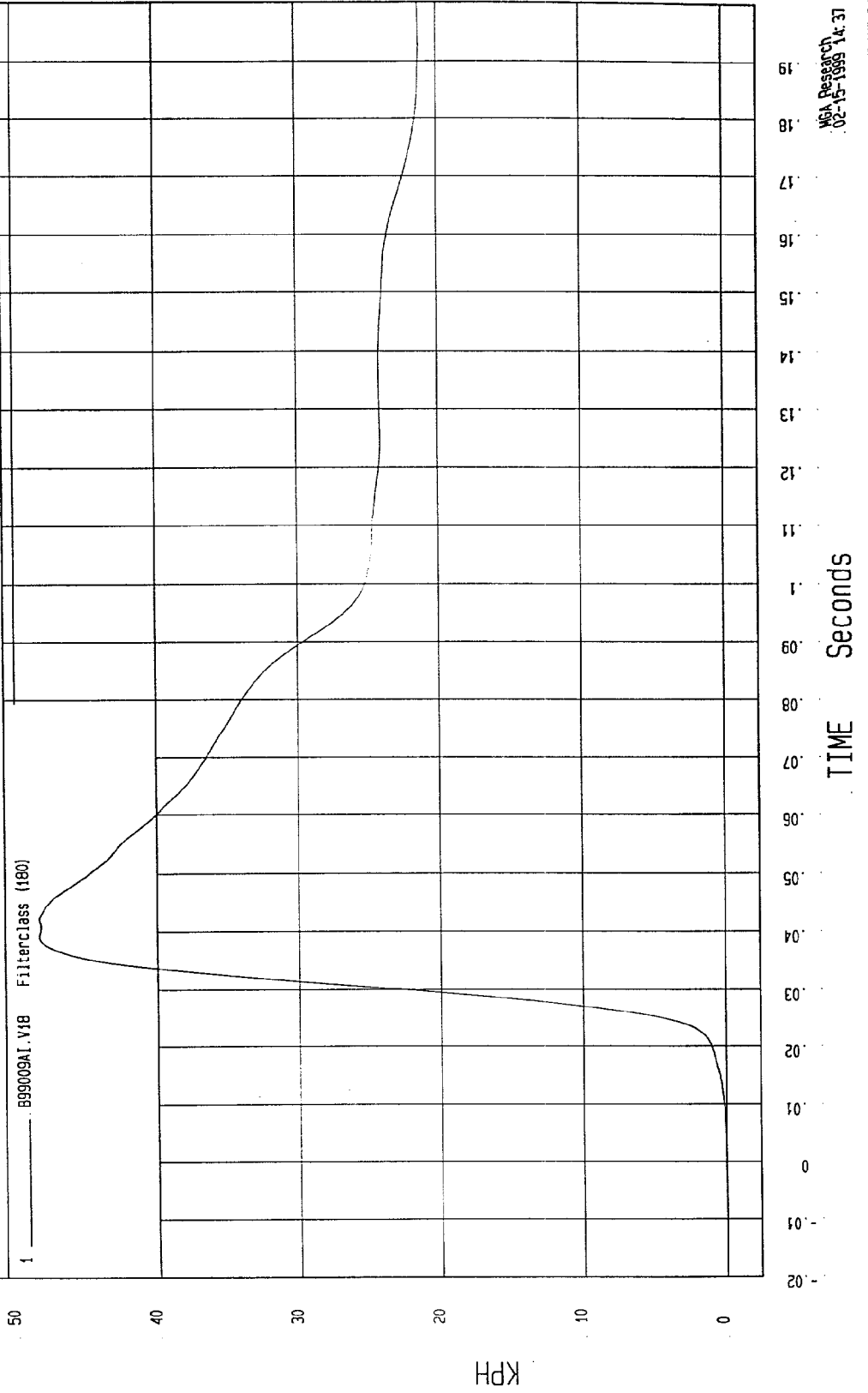
NCA Research
02-09-1999 13:57

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -2.39E-02 KPH at -8 msec Maximum = 48.35 KPH at 42 msec

DRIVER PELVIS Y VELOCITY



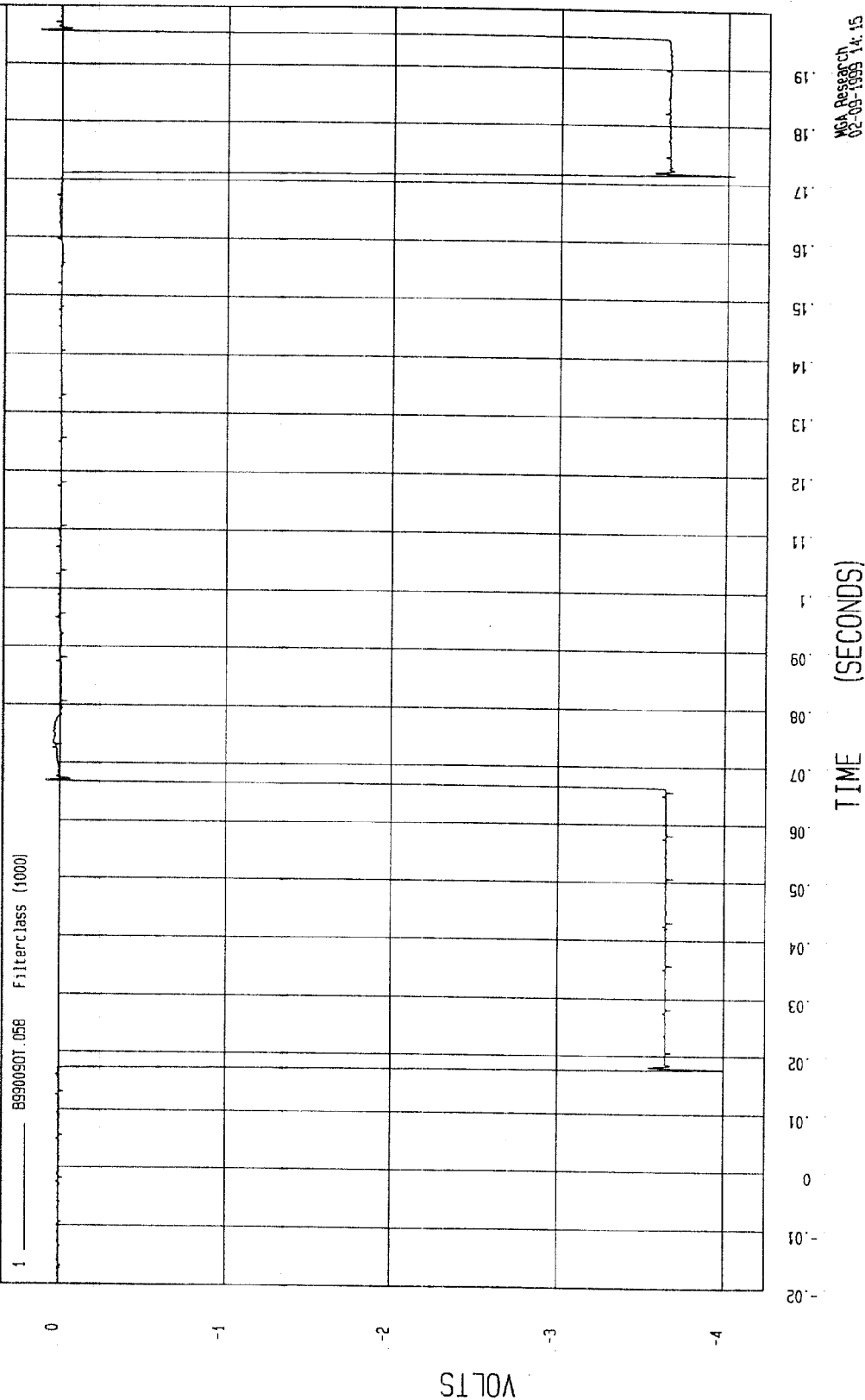
MOA Research
02-15-1999 14:37

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -4.04 VOLTS at .172 msec Maximum = .13 VOLTS at .196 msec

DRIVER SHOULDER CONTACT



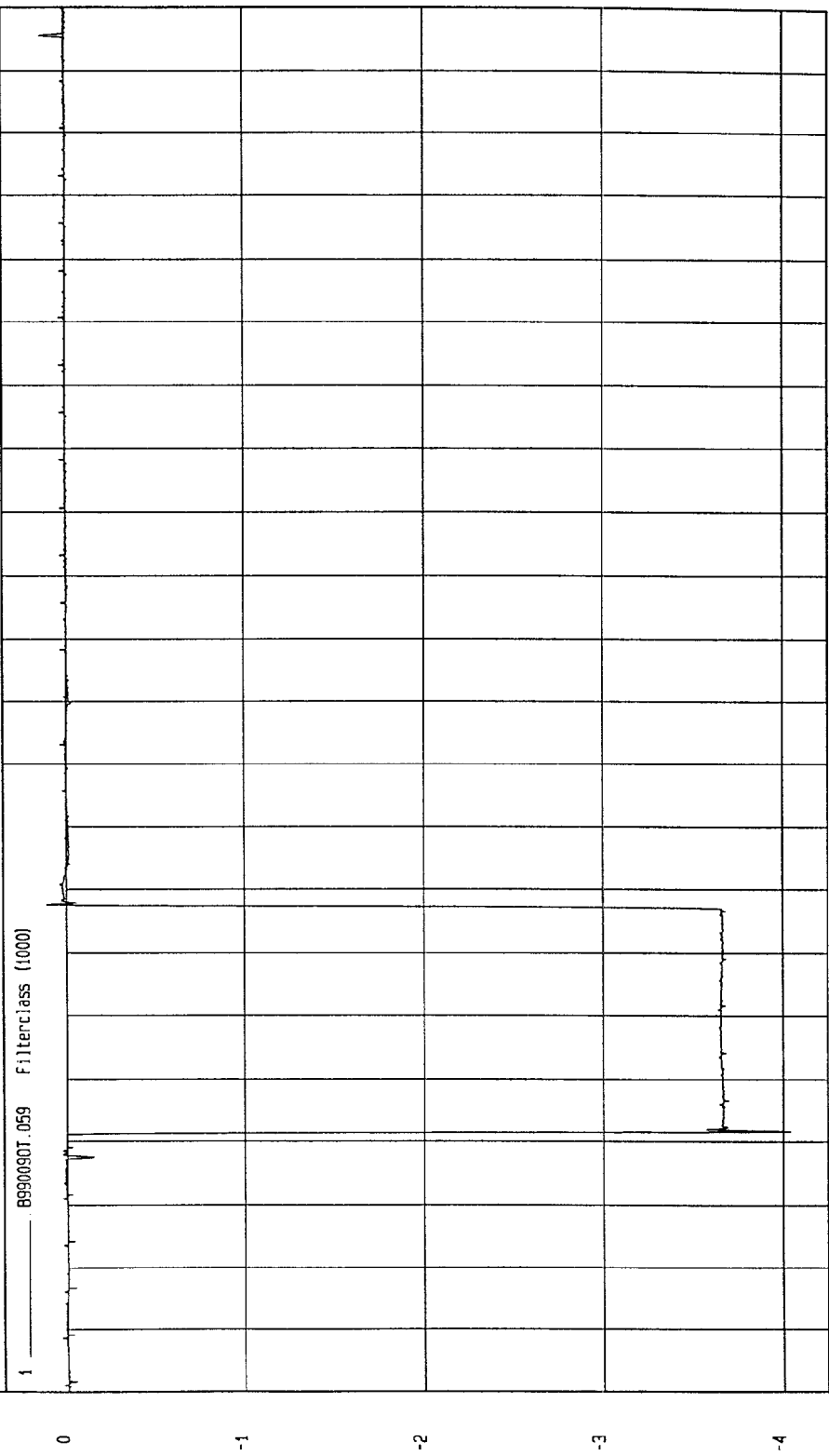
WCA Research
02-03-1999 14:15

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -4.04 VOLTS at 22 msec Maximum = .14 VOLTS at 196 msec

DRIVER PELVIS CONTACT



NSA Research
02-09-1999 14:15

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

SPEED: 38.3 MPH 61.6 KPH

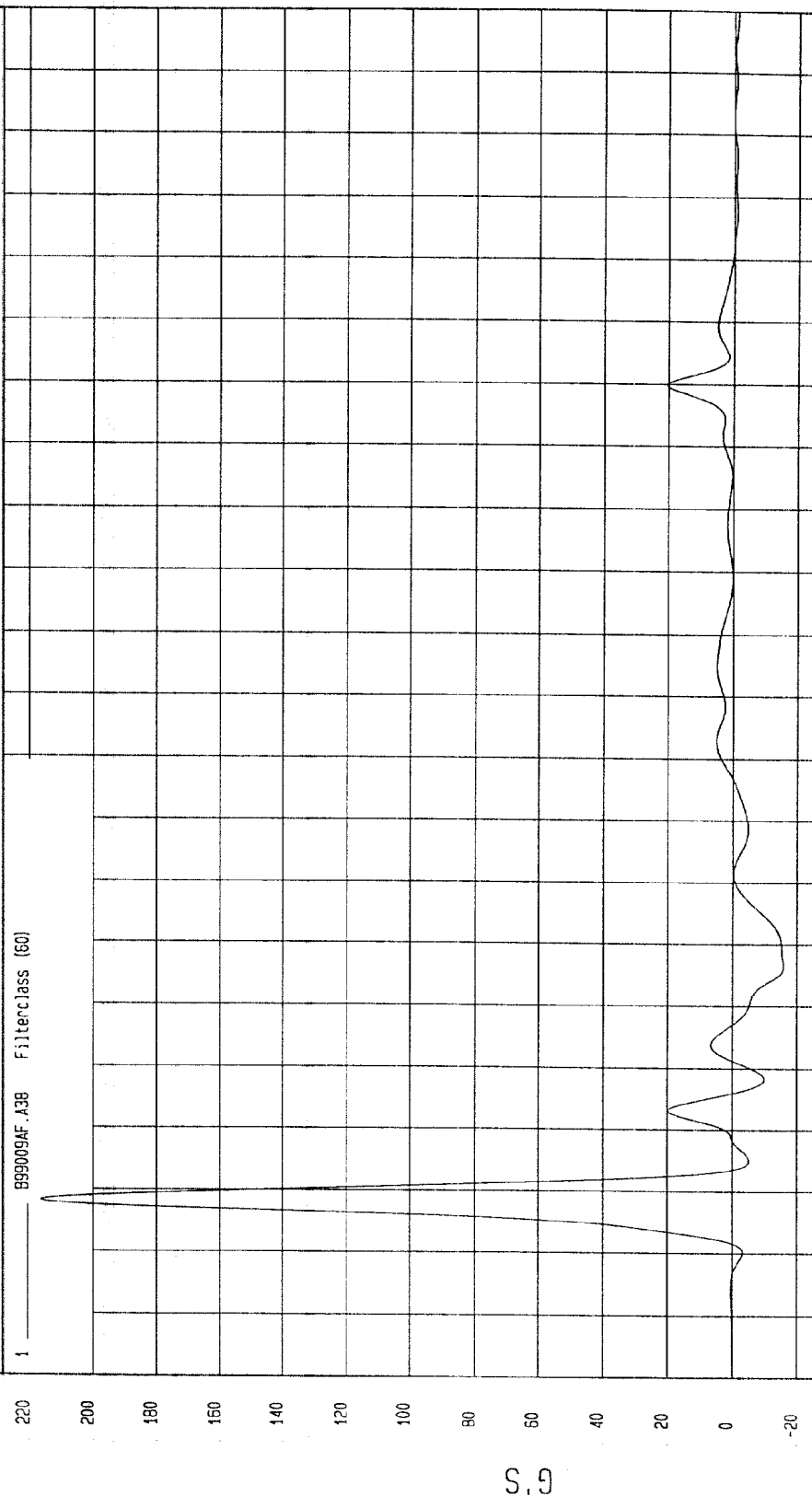
COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Maximum = 216.59 G'S at 8 msec

Minimum = -15.64 G'S at 46 msec

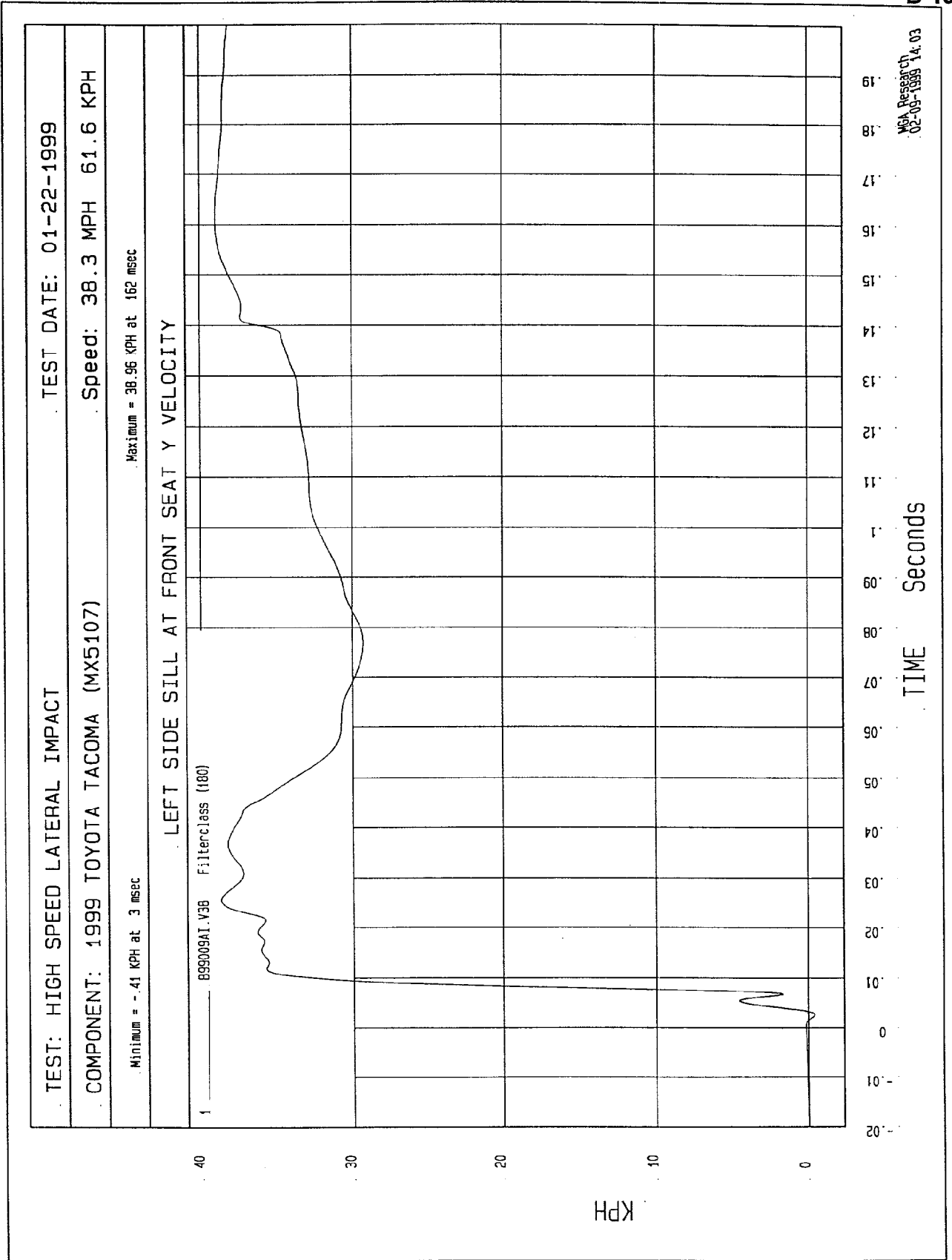
LEFT SIDE SILL AT FRONT SEAT Y ACCELERATION

1 999009AF.A38 Filterclass (60)



MCA Research
02-09-1999 14:02

TIME (SECONDS)



TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

SPEED: 38.3 MPH 61.6 KPH

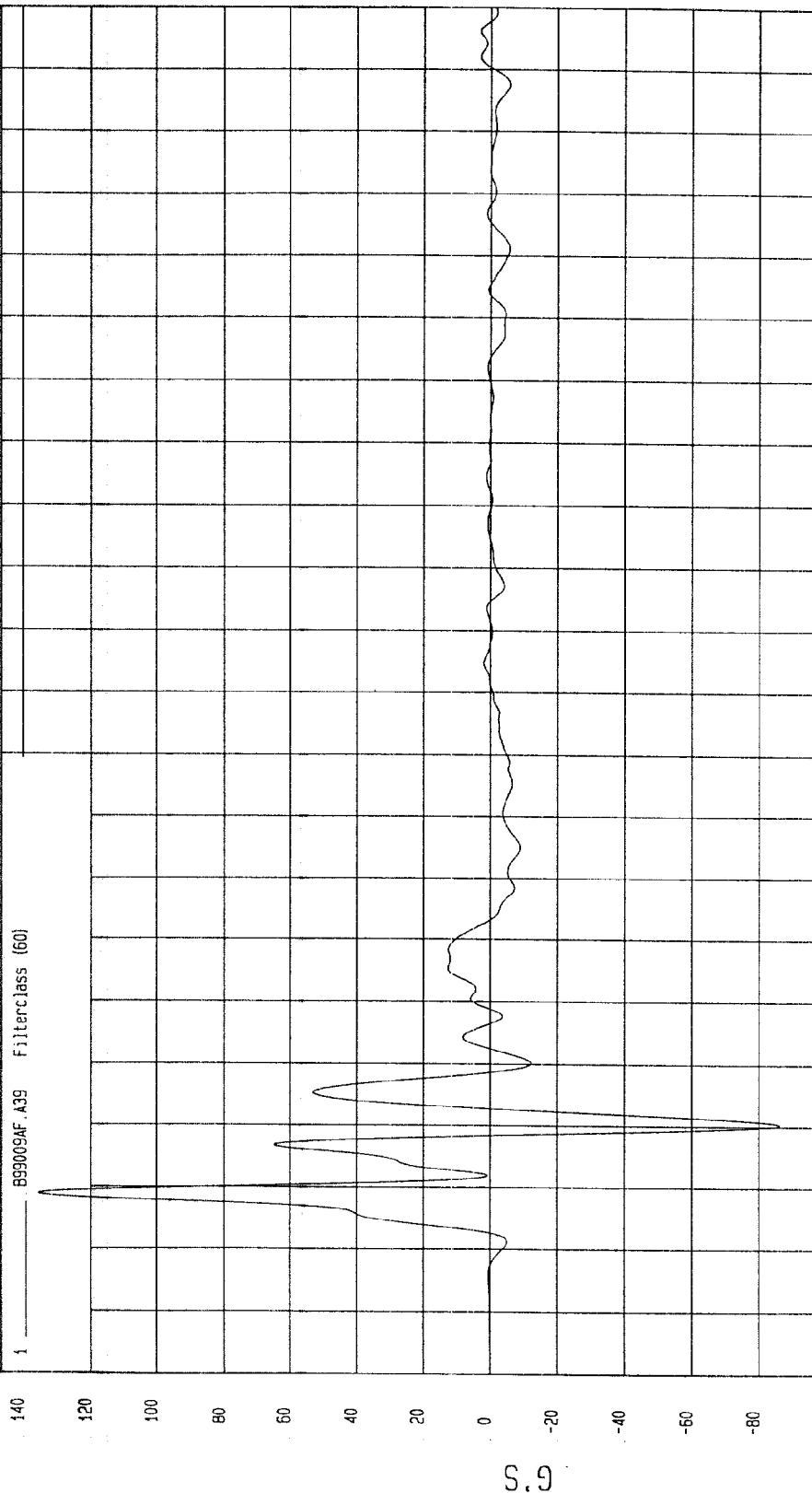
COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Maximum = 135.53 G'S at 9 msec

Minimum = -86.2 G'S at 20 msec

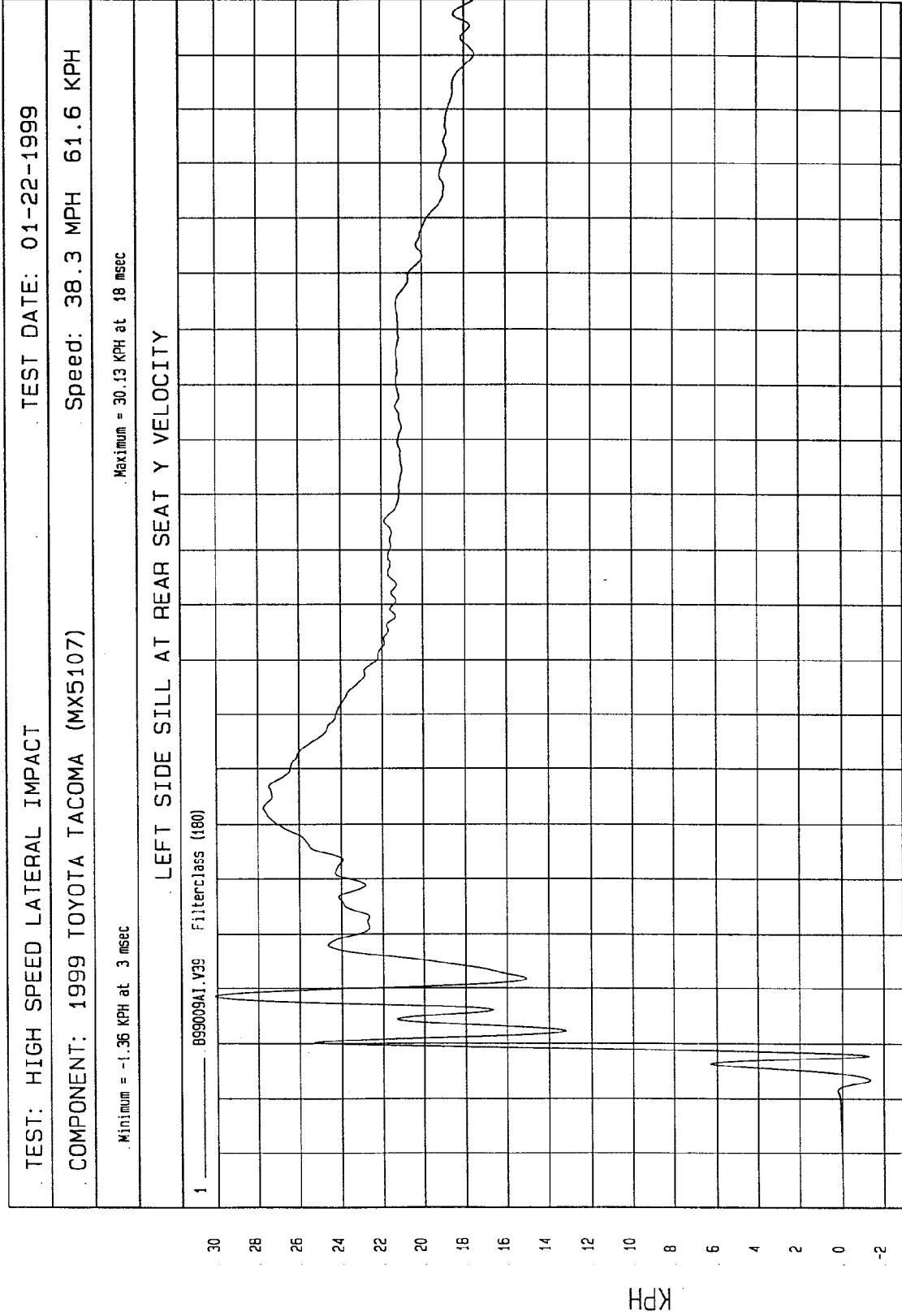
LEFT SIDE SILL AT REAR SEAT Y ACCELERATION

1 B99009AF.A39 Filterclass (60)



TIME (SECONDS)

MCA Research
02-09-1999 14.03

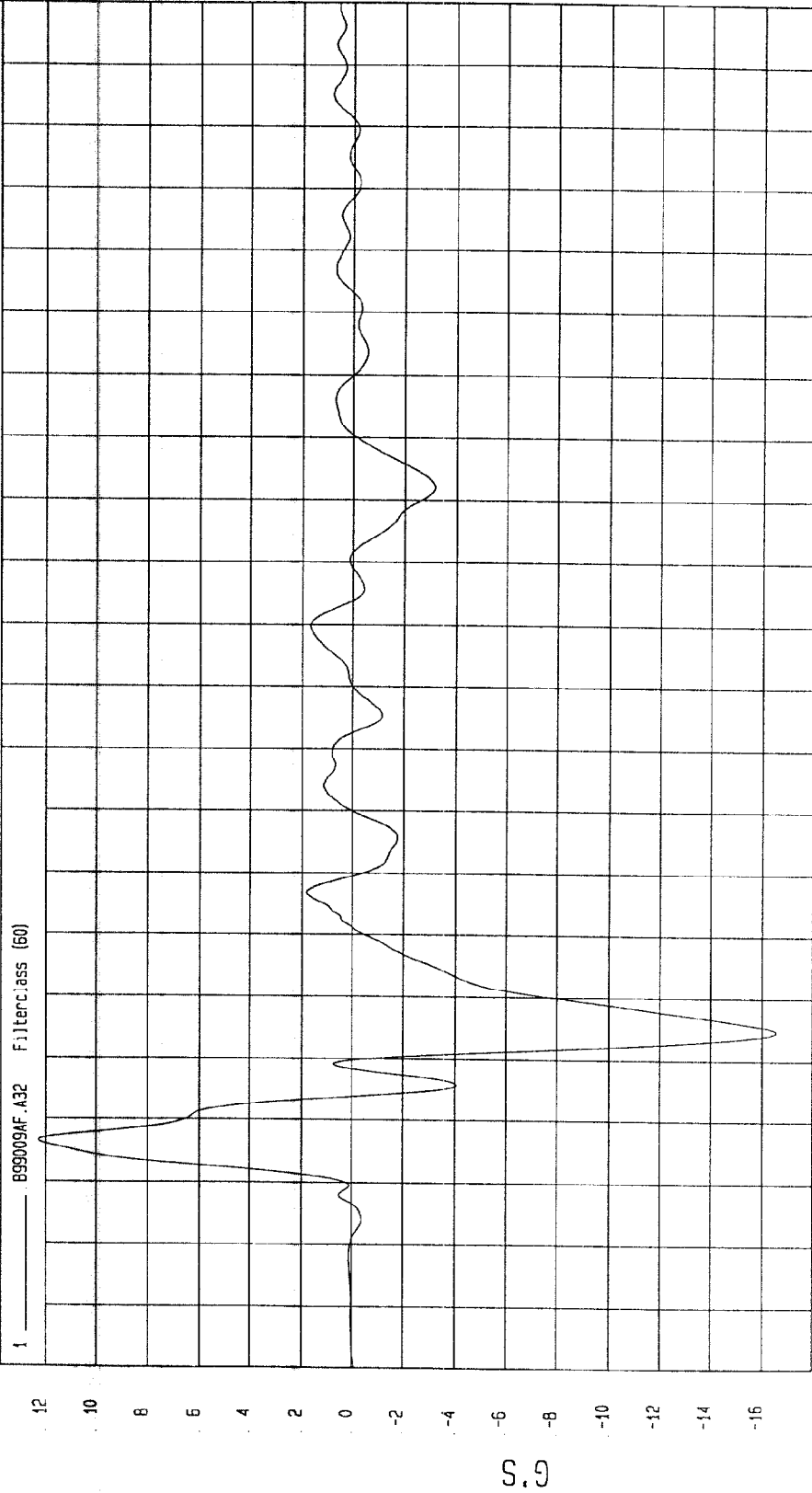


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -16.55 G'S at 35 msec Maximum = 12.28 G'S at 16 msec

RIGHT SIDE SILL AT FRONT SEAT X ACCELERATION



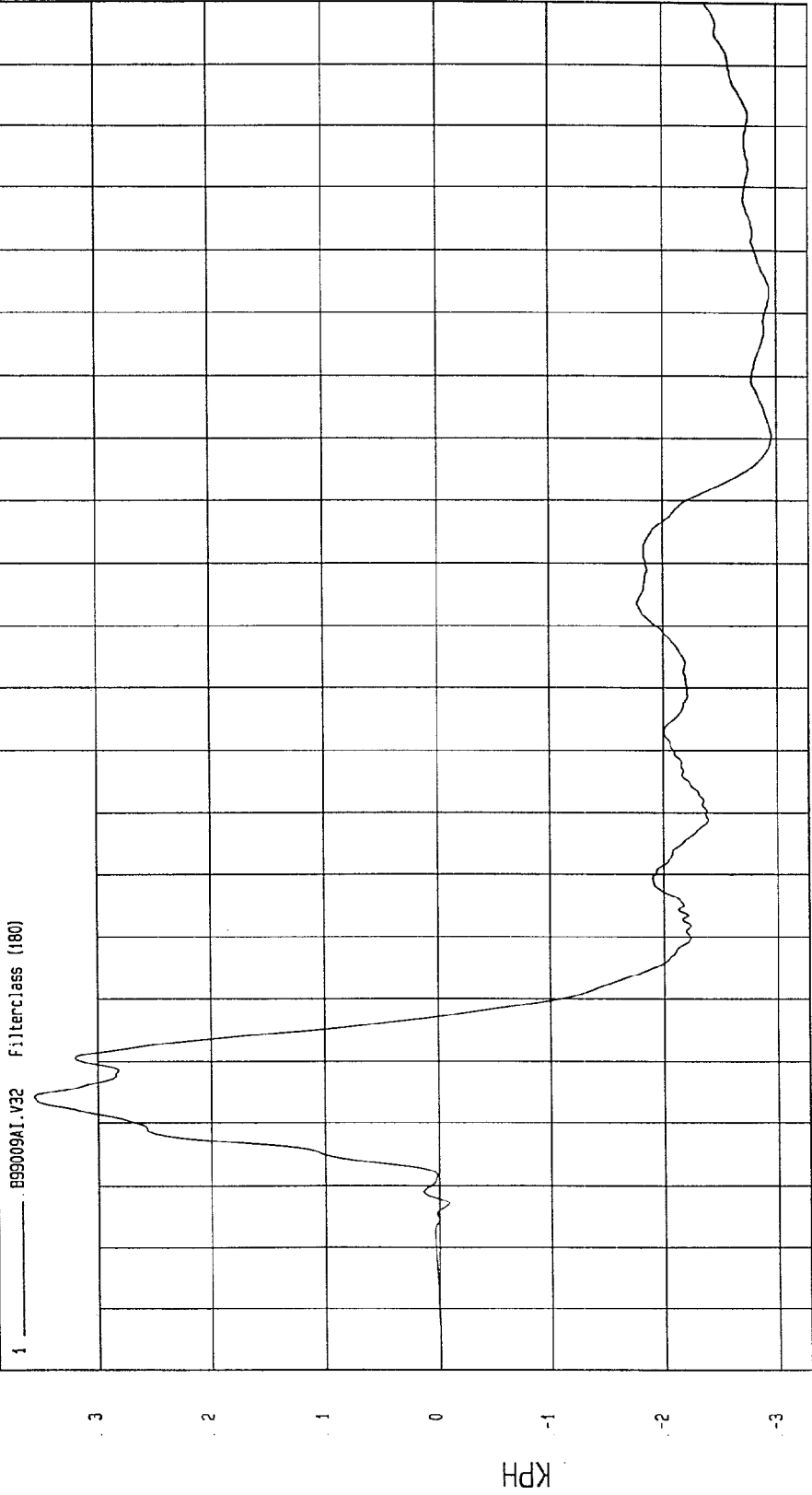
NCA Research
02-09-1999 14.03

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -2.96 KPH at 130 msec Maximum = 3.57 KPH at 24 msec

RIGHT SIDE SILL AT FRONT SEAT X VELOCITY



TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

Speed: 38.3 MPH 61.6 KPH

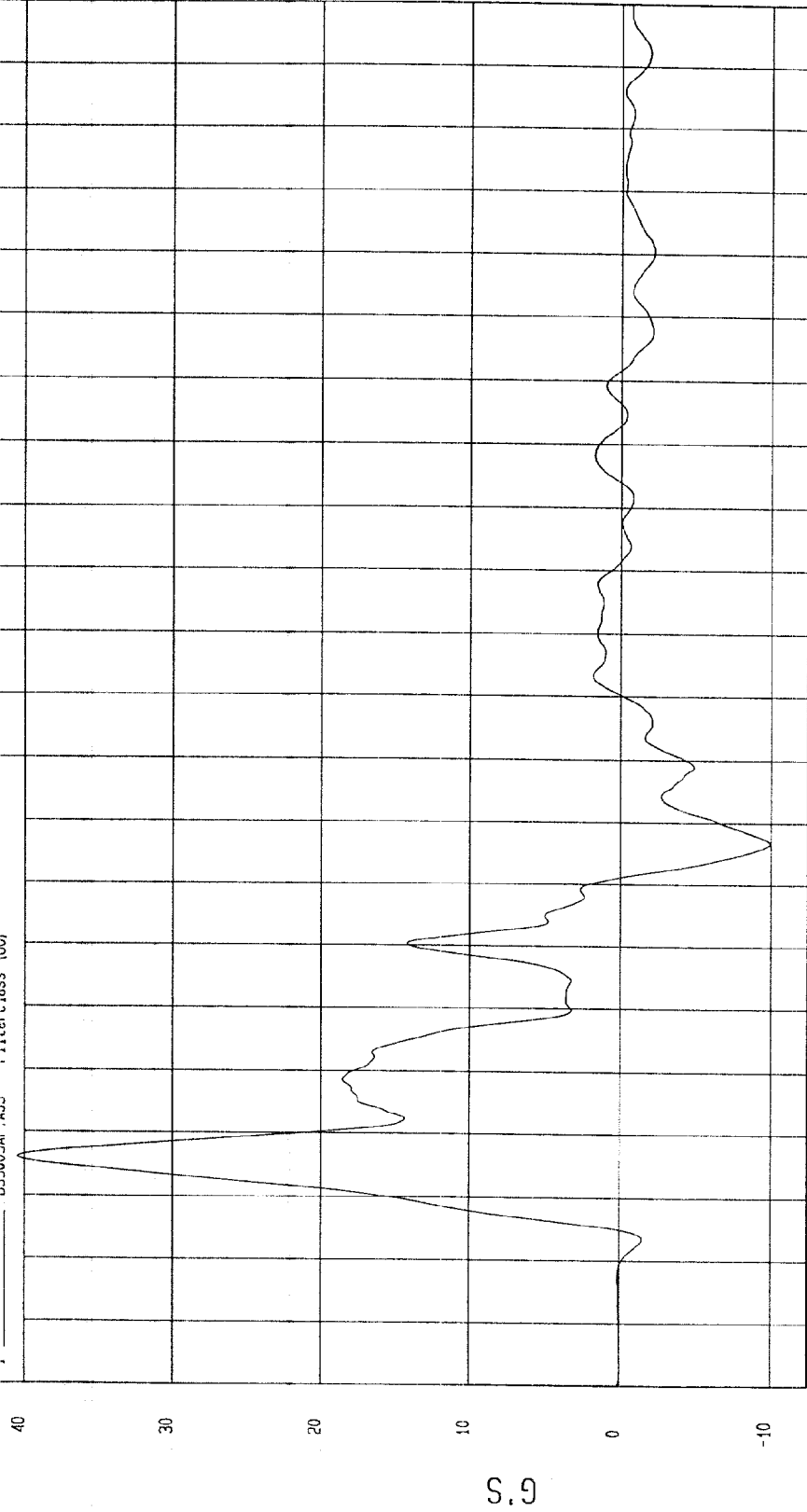
COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Maximum = 40.47 G'S at 16 msec

Minimum = -9.93 G'S at 67 msec

RIGHT SIDE SILL AT FRONT SEAT Y ACCELERATION

1 B99009AF.A33 Filterclass (50)



WGA Research
02-09-1999 14:03

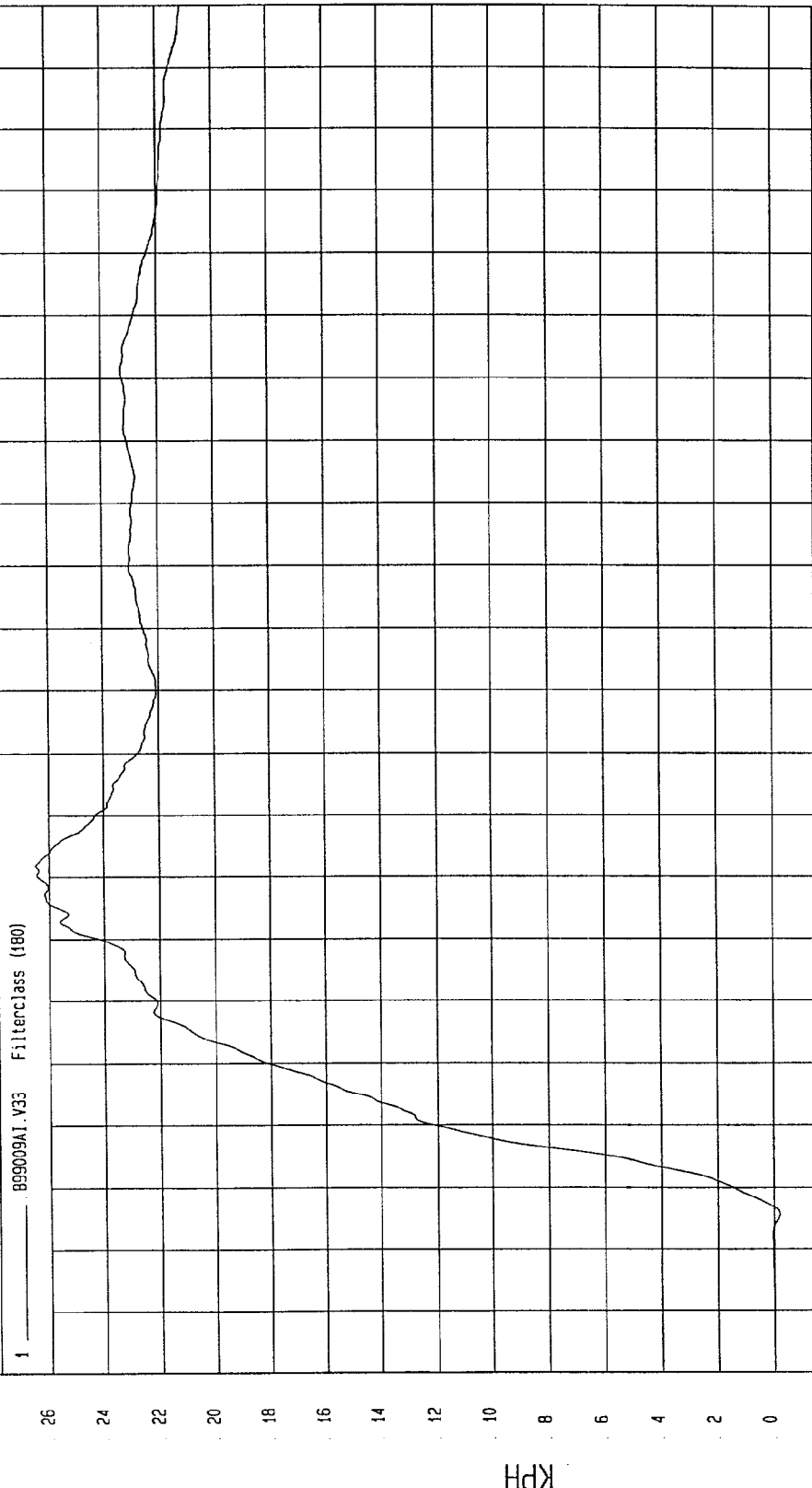
TIME (SECONDS)

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

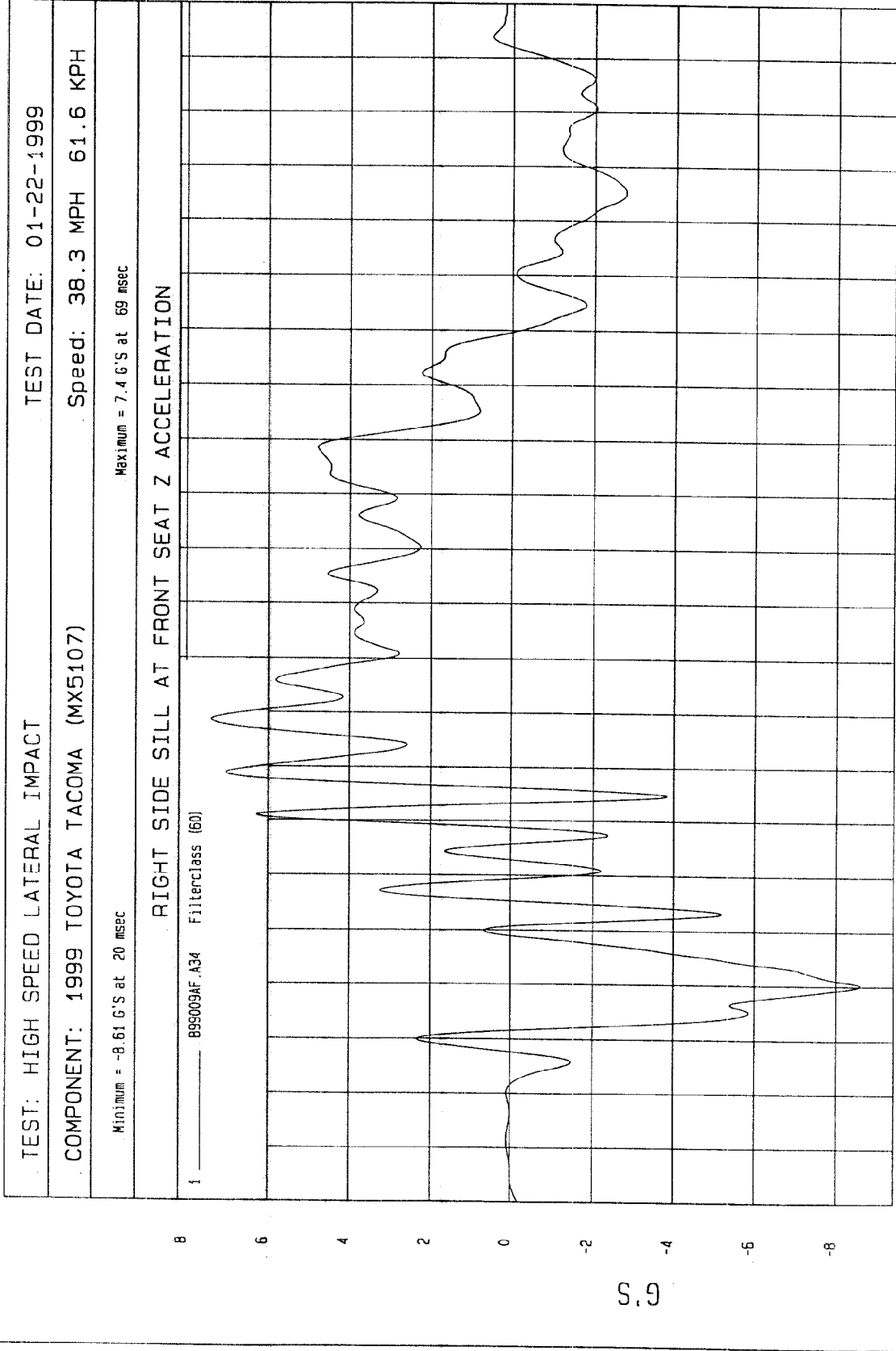
COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = 1.18 KPH at 6 msec Maximum = 26.48 KPH at 62 msec

RIGHT SIDE SILL AT FRONT SEAT Y VELOCITY



MSA Research
02-09-1999 14: 03



MCA Research
 02-09-1999 14:03

TIME (SECONDS)

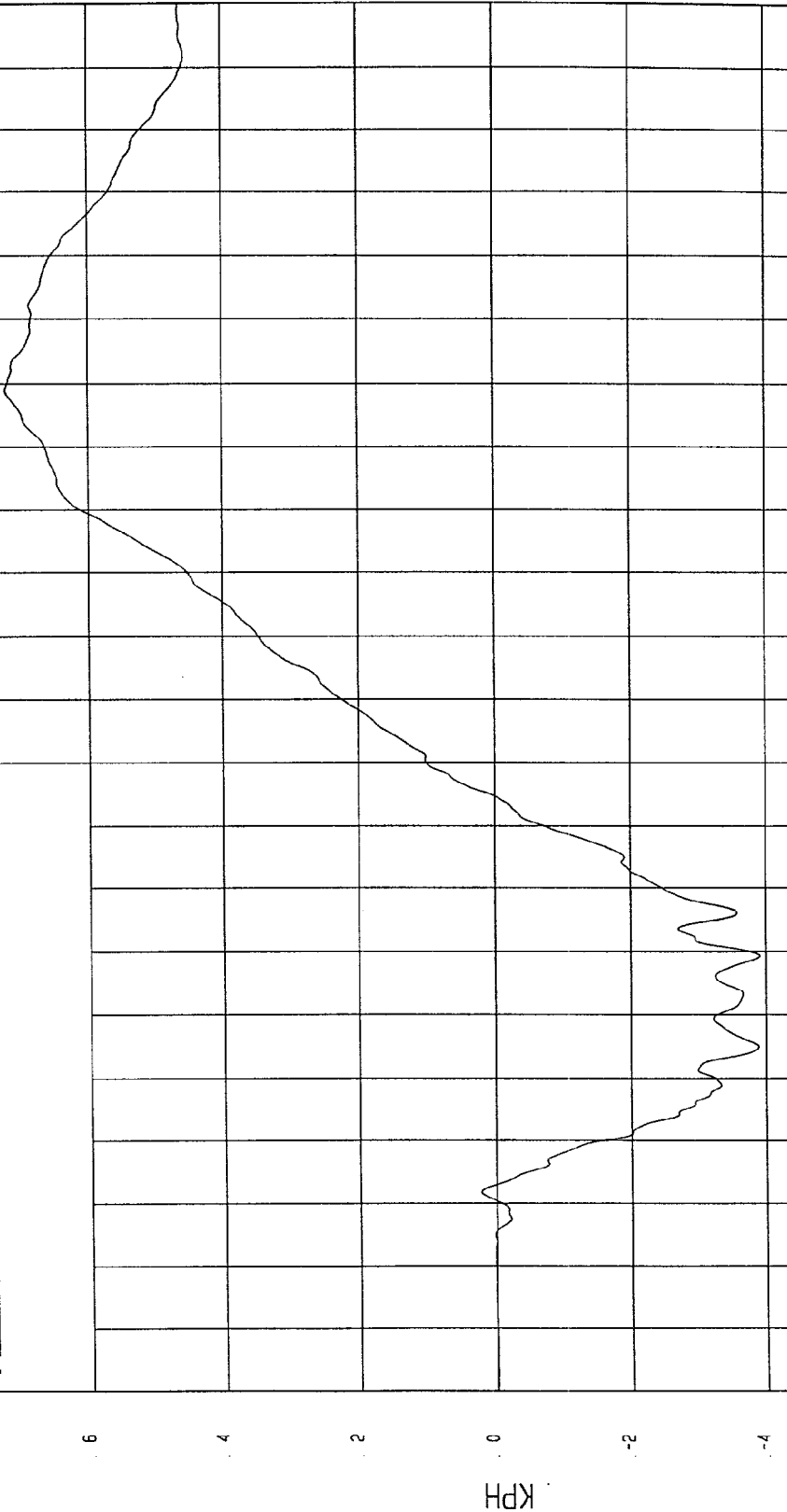
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -3.91 KPH at 49 msec Maximum = 7.25 KPH at 139 msec

RIGHT SIDE SILL AT FRONT SEAT Z VELOCITY

1 ——— .B93009A1.V34 Filterclass (180)



NSA Research
02-09-1999 14.03

TIME Seconds

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

Speed: 38.3 MPH 61.6 KPH

COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Maximum = 42.59 G'S at 16 msec

Minimum = 1.66E-02 G'S at -17 msec

RIGHT SIDE SILL AT FRONT SEAT RESULTANT ACCELERATION

1 899009AV.A32 Filterclass (60)

40

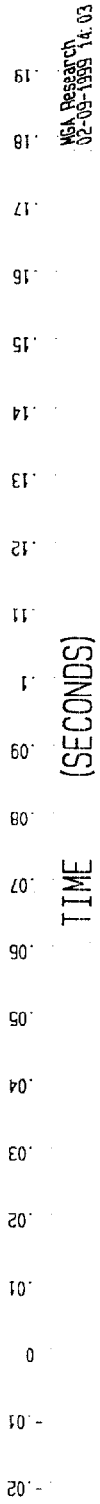
30

20

10

0

G.S.



NSA Research
02-09-1999 14:03

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -16.2 G'S at 34 msec Maximum = 10.68 G'S at 16 msec

RIGHT SIDE SILL AT REAR SEAT X ACCELERATION

1 .B99009AF.A35 Filterclass (60)

12

10

8

6

4

2

0

-2

-4

-6

-8

-10

-12

-14

-16

G.S

19

18

17

16

15

14

13

12

11

10

09

08

07

06

05

04

03

02

01

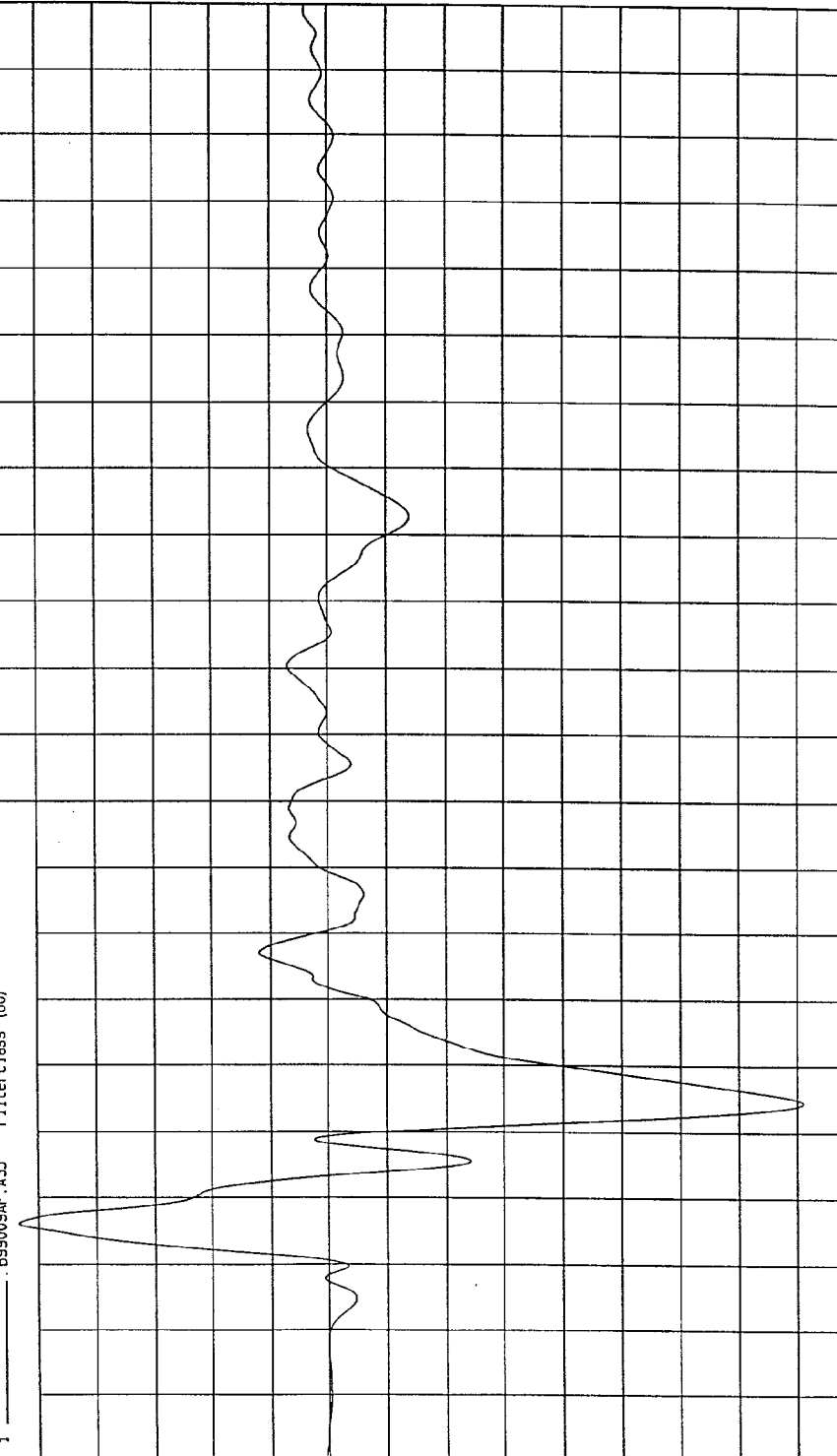
0

-01

-02

NSA Research
02-09-1999 14:03

TIME (SECONDS)



TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107)

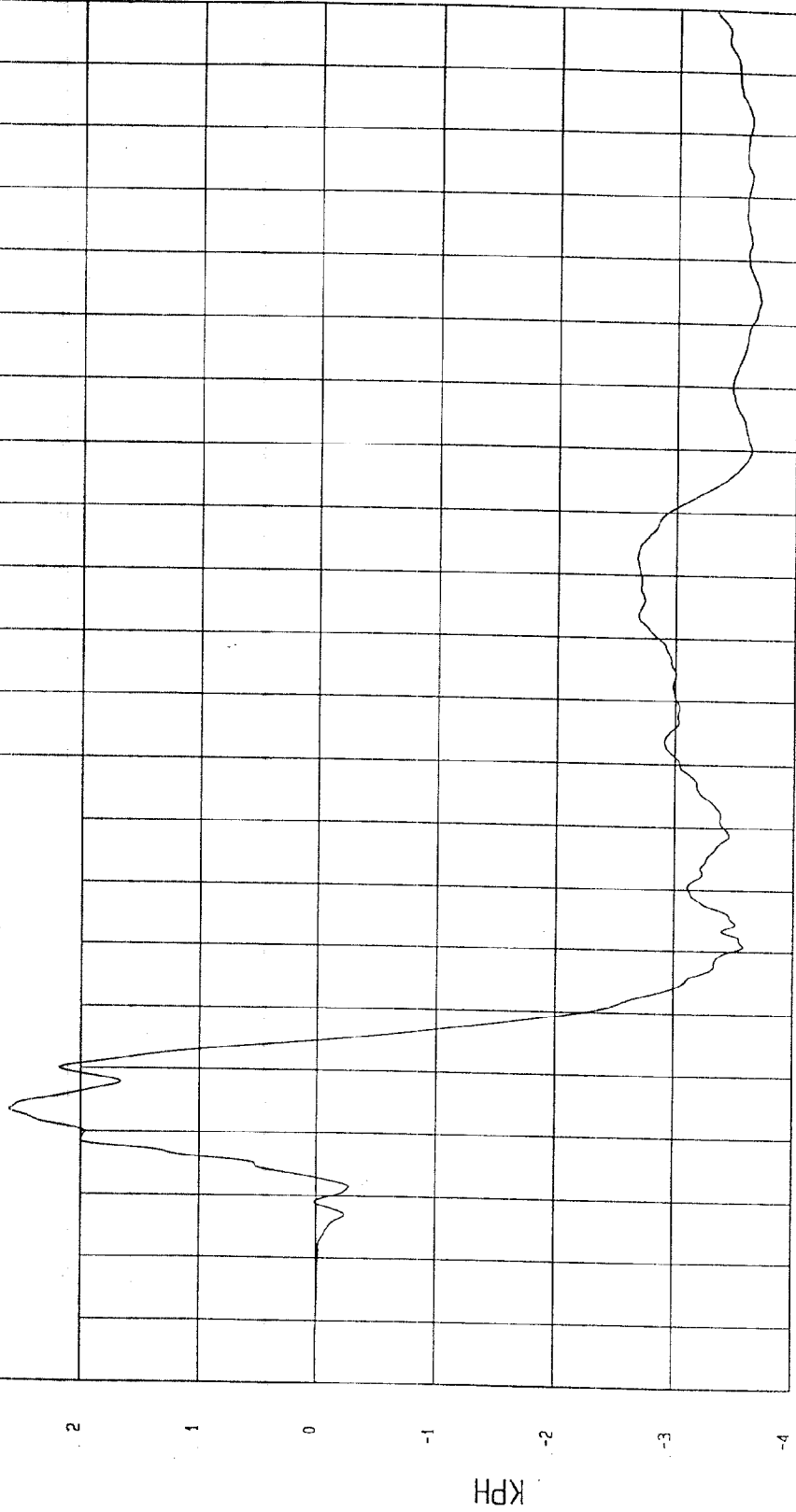
Speed: 38.3 MPH 61.6 KPH

Minimum = -3.69 KPH at 154 msec

Maximum = 2.61 KPH at 23 msec

RIGHT SIDE SILL AT REAR SEAT X VELOCITY

1 ——— B99009A1.V35 FilterClass (180)

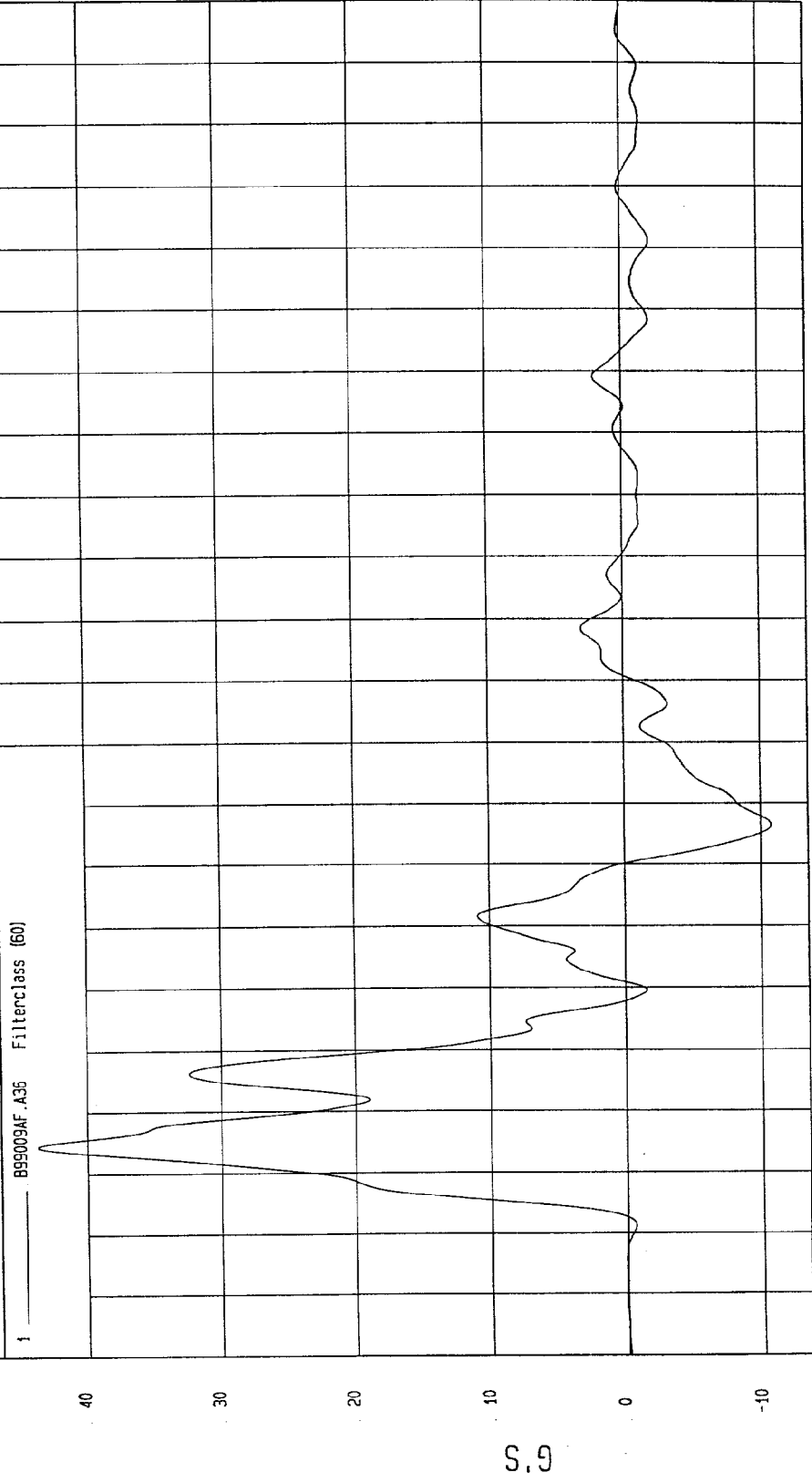


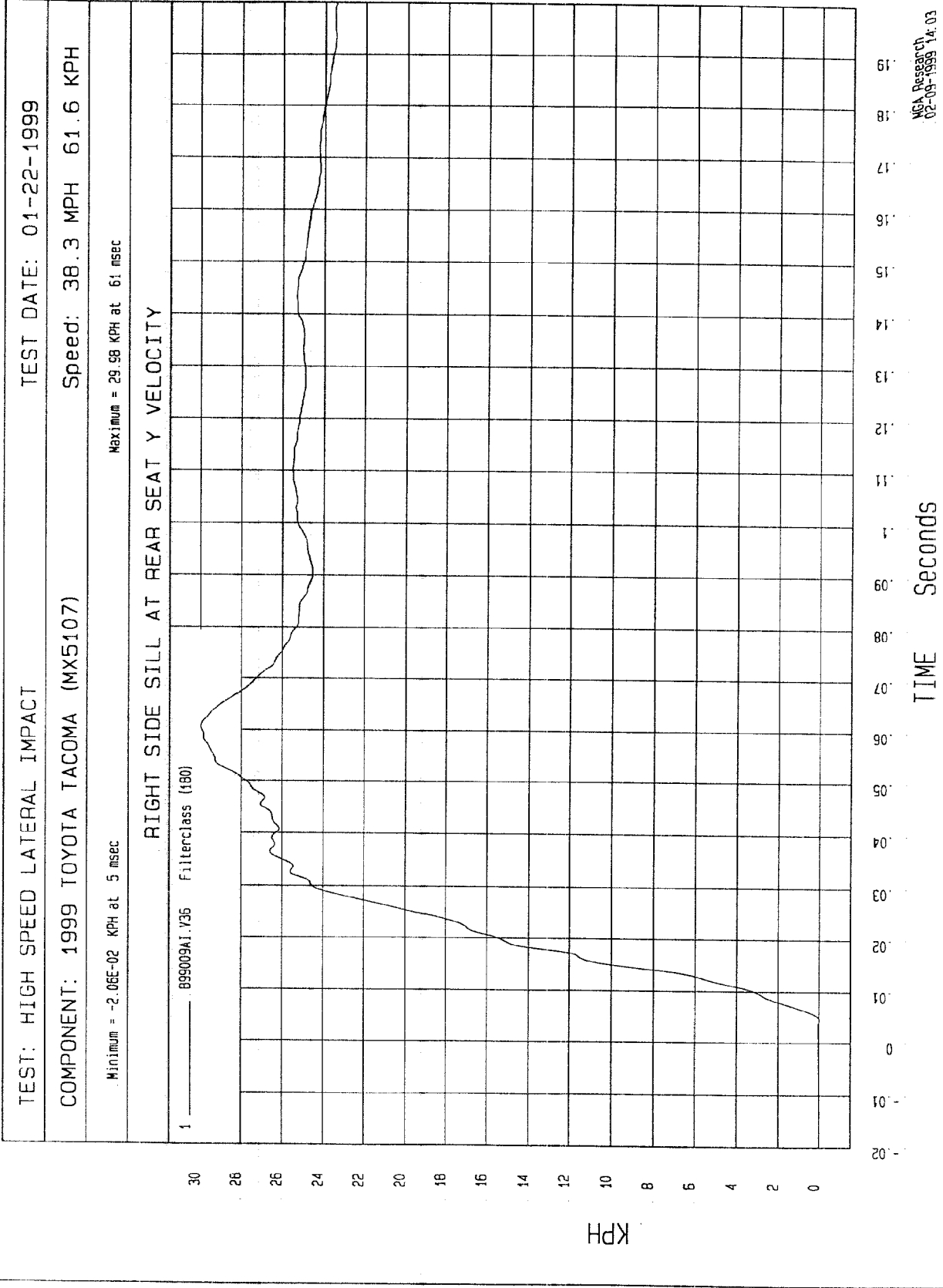
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -10.78 G'S at 56 msec Maximum = 43.67 G'S at 14 msec

RIGHT SIDE SILL AT REAR SEAT Y ACCELERATION





TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

Speed: 38.3 MPH 61.6 KPH

COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Maximum = 7.63 G'S at 50 msec

Minimum = -7.83 G'S at 30 msec

RIGHT SIDE SILL AT REAR SEAT Z ACCELERATION

1 899009AF.A37 Filterclass (60)

8

6

4

2

0

-2

-4

-6

-8

G'S

19

18

17

16

15

14

13

12

11

10

09

08

07

06

05

04

03

02

01

0

-01

-02

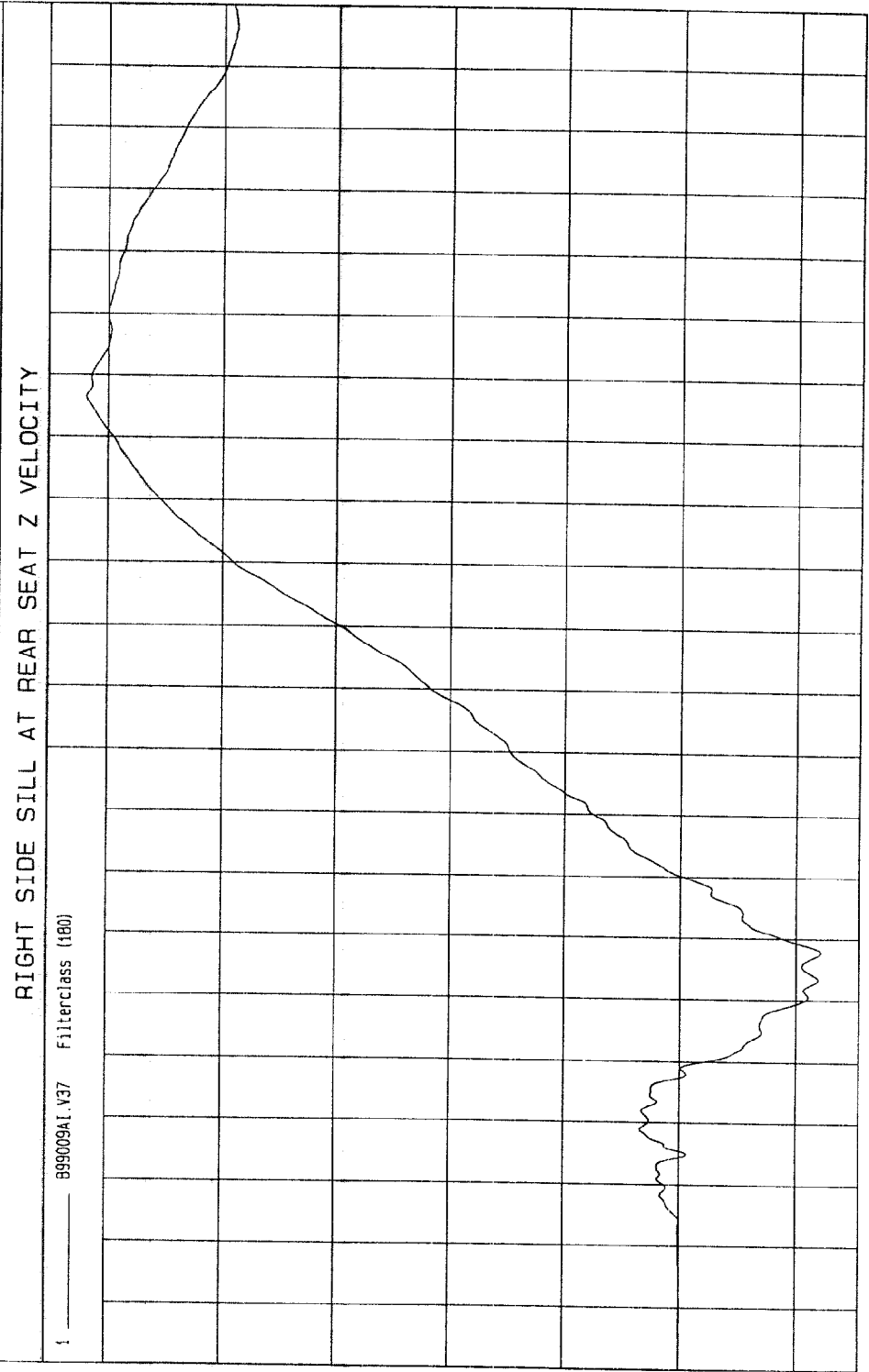
TIME (SECONDS)

WGL Research
02-09-1999 14:15

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

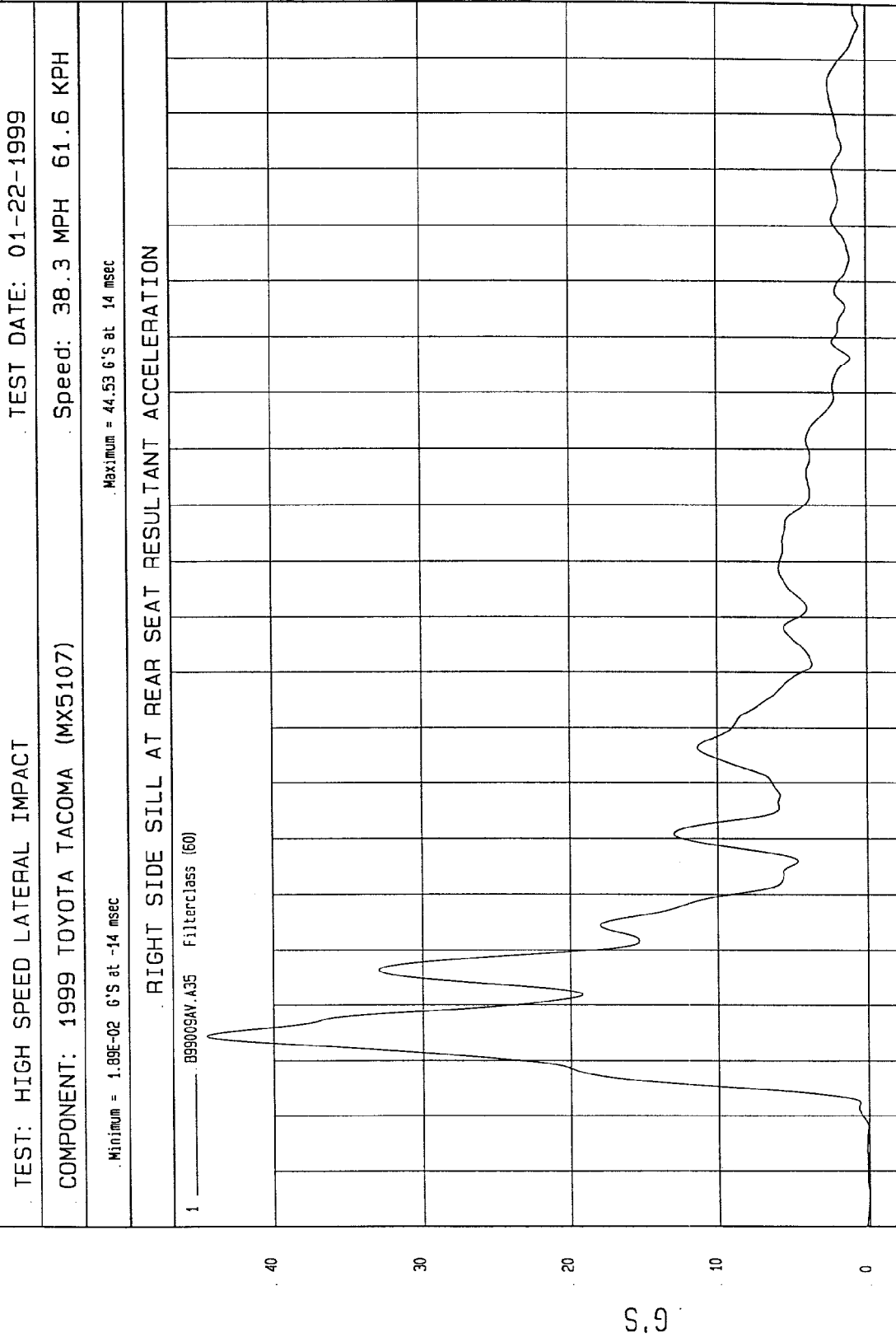
COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -2.43 KPH at 48 msec Maximum = 10.36 KPH at 137 msec



TIME Seconds

MCA Research
02-05-1999 14.13



MCA Research
02-09-1999 14.03

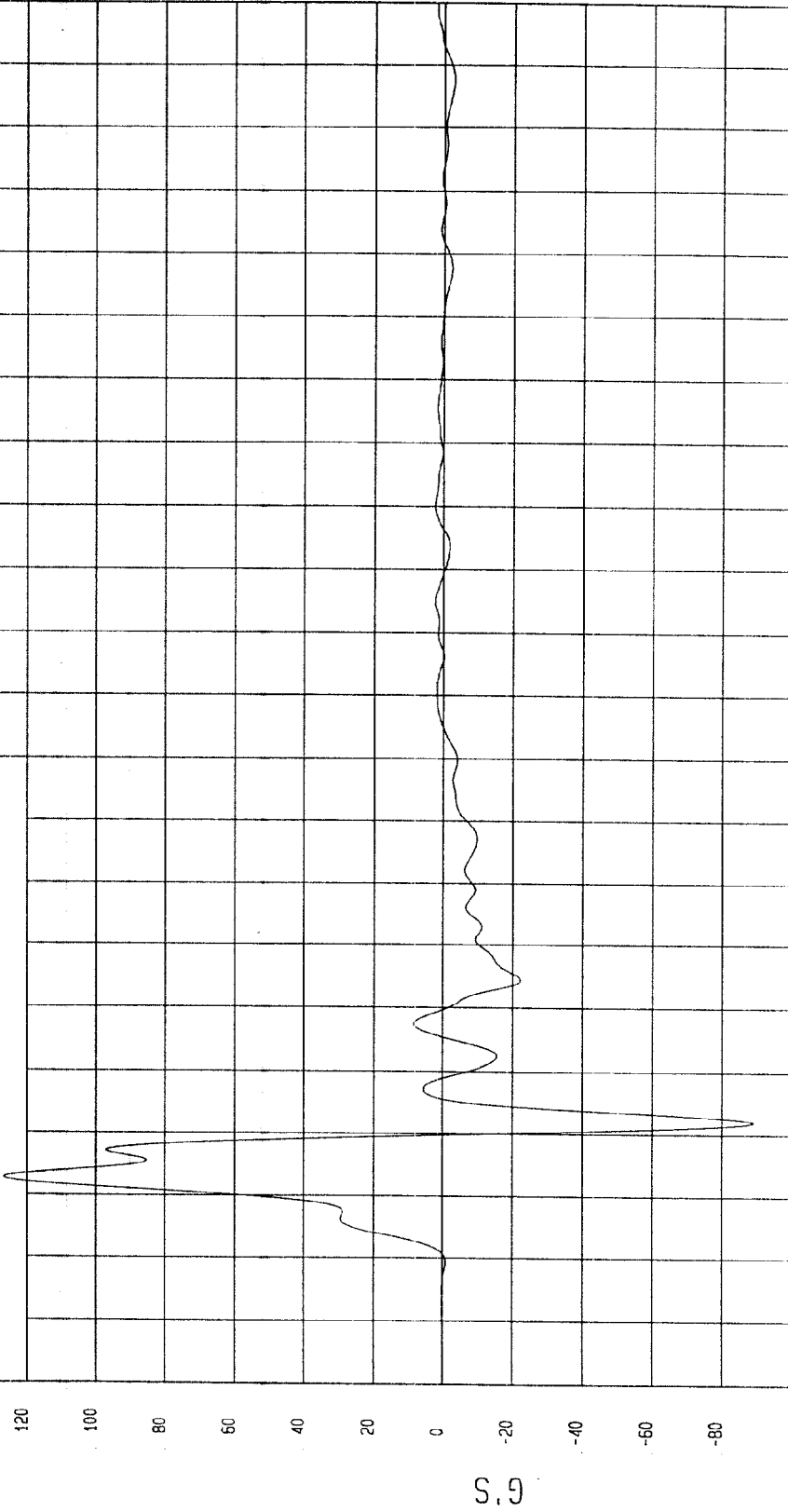
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -89.12 G'S at 22 msec Maximum = 126.76 G'S at 13 msec

DRIVER SEAT TRACK Y ACCELERATION

1 B99009AF.A40 Filterclass (60)



TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

Speed: 38.3 MPH 61.6 KPH

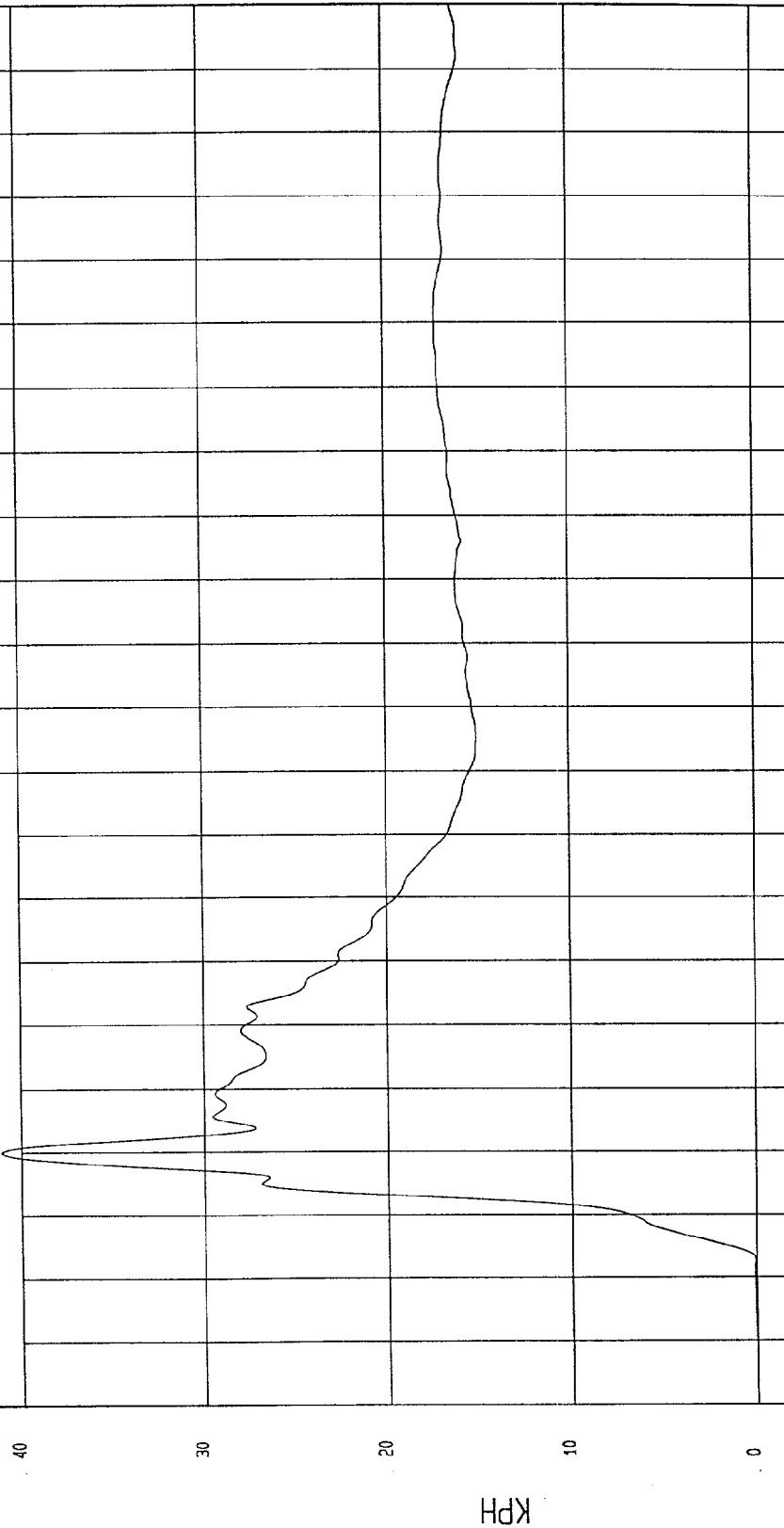
COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Maximum = 41.06 KPH at 20 msec

Minimum = 0 KPH at -20 msec

DRIVER SEAT TRACK Y VELOCITY

1 ——— B99009A1.V40 FilterClass (180)



TIME Seconds

MGA Research
02-09-1999 14:04

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

SPEED: 38.3 MPH 61.6 KPH

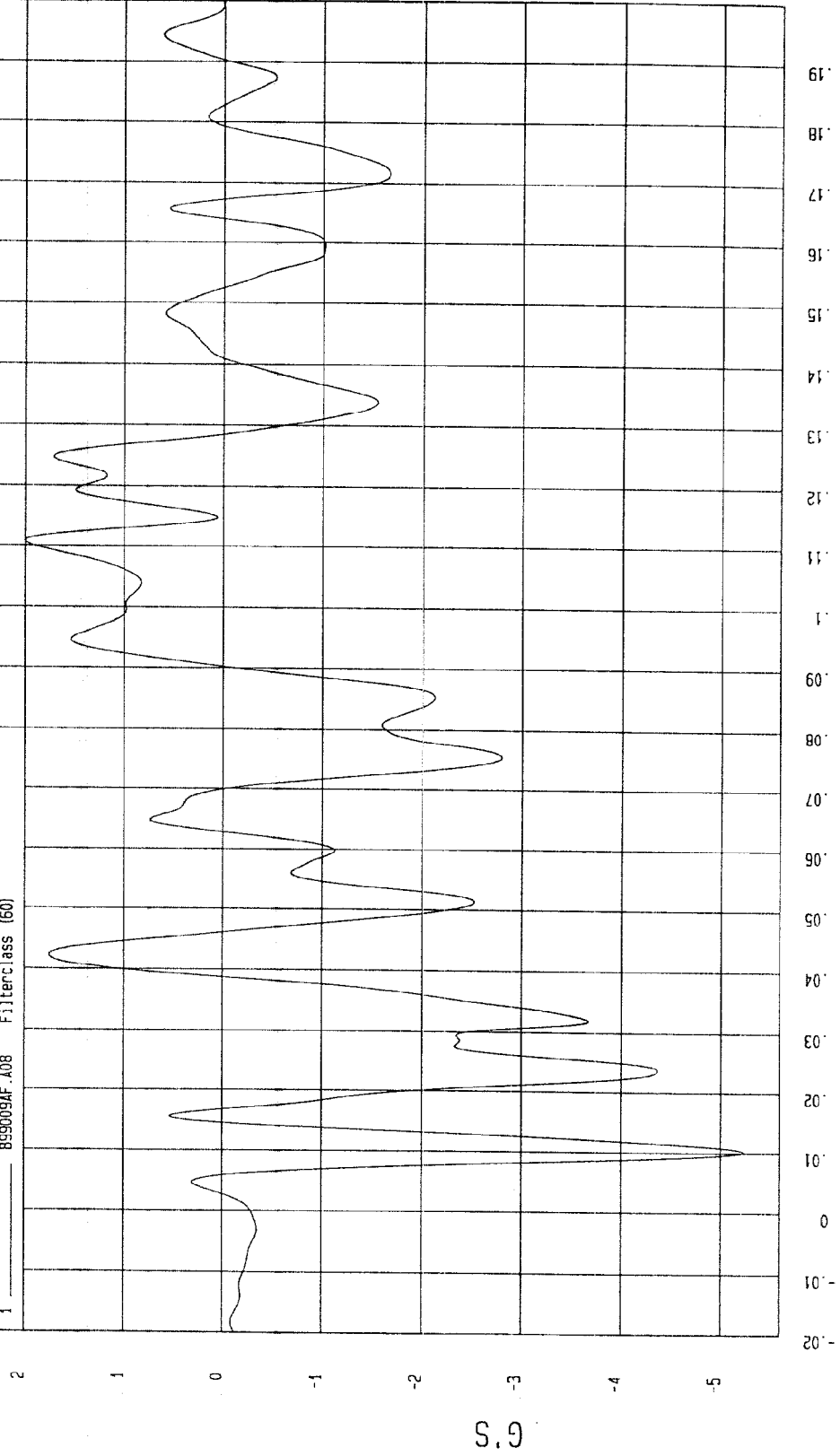
COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Maximum = 2.6'S at 111 msec

Minimum = -5.23 G'S at 10 msec

REAR FLOORPAN ABOVE AXLE X ACCELERATION

1 899009AF.A08 Filterclass (60)



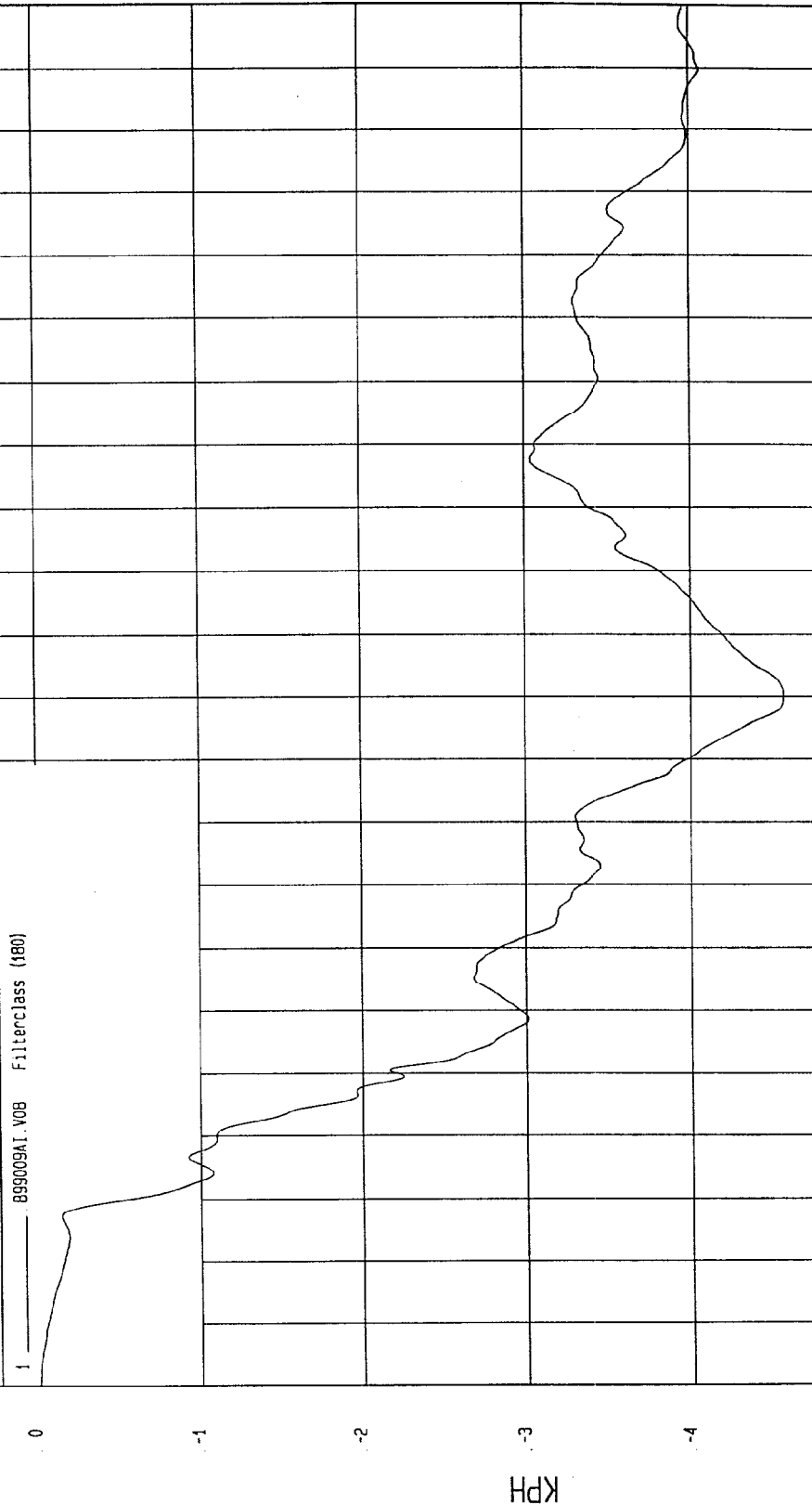
MCA Research
02-09-1999 14:04

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -4.55 KPH at 90 msec Maximum = 0 KPH at -20 msec

REAR FLOORPAN ABOVE AXLE X VELOCITY



TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

SPEED: 38.3 MPH 61.6 KPH

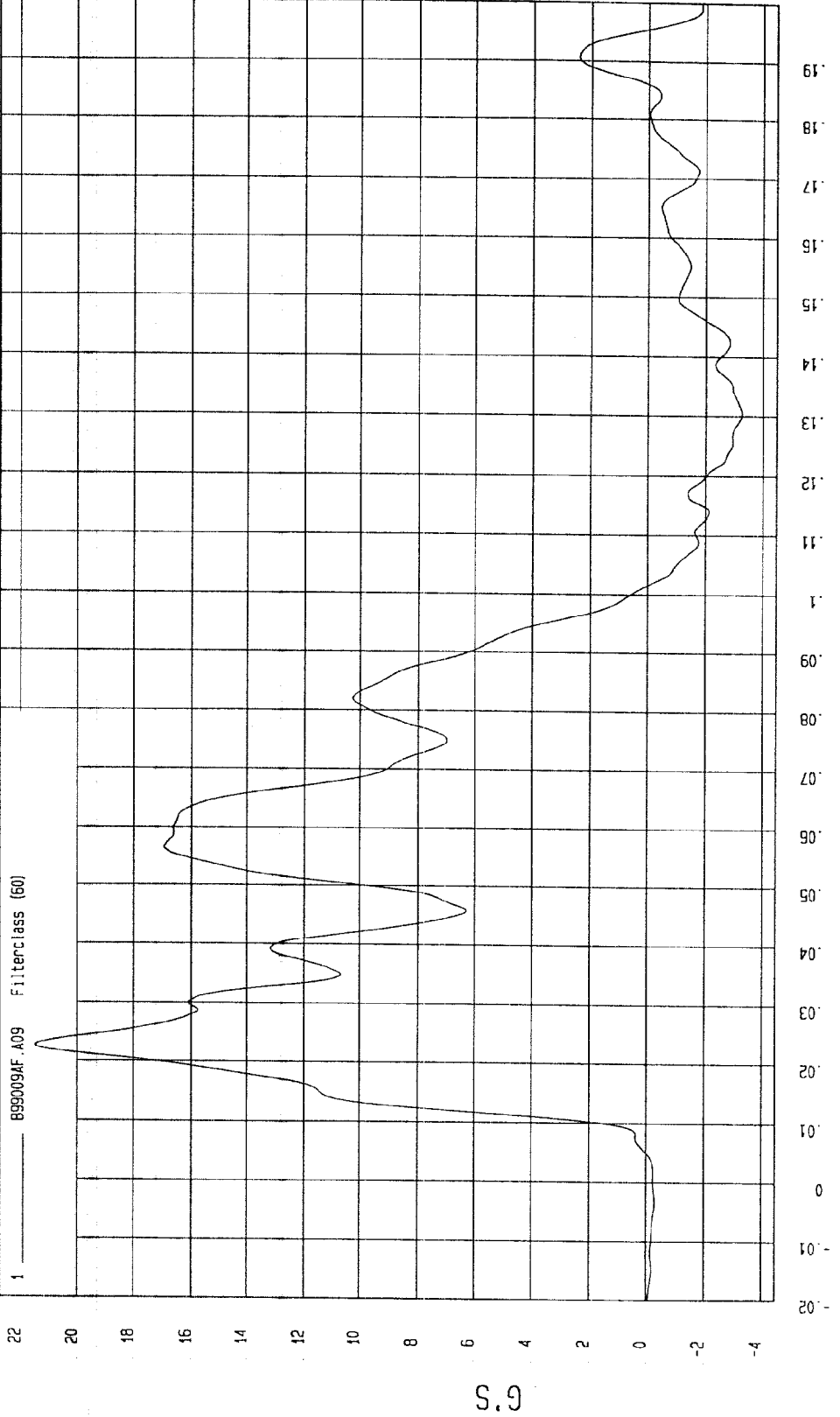
COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Maximum = 21.49 G'S at 23 msec

Minimum = -3.25 G'S at 130 msec

REAR FLOORPAN ABOVE AXLE Y ACCELERATION

1 ——— 899009AF.A09 Filterclass (60)



MCA Research
02-09-1999 14.04

TIME (SECONDS)

G.S.

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

Speed: 38.3 MPH 61.6 KPH

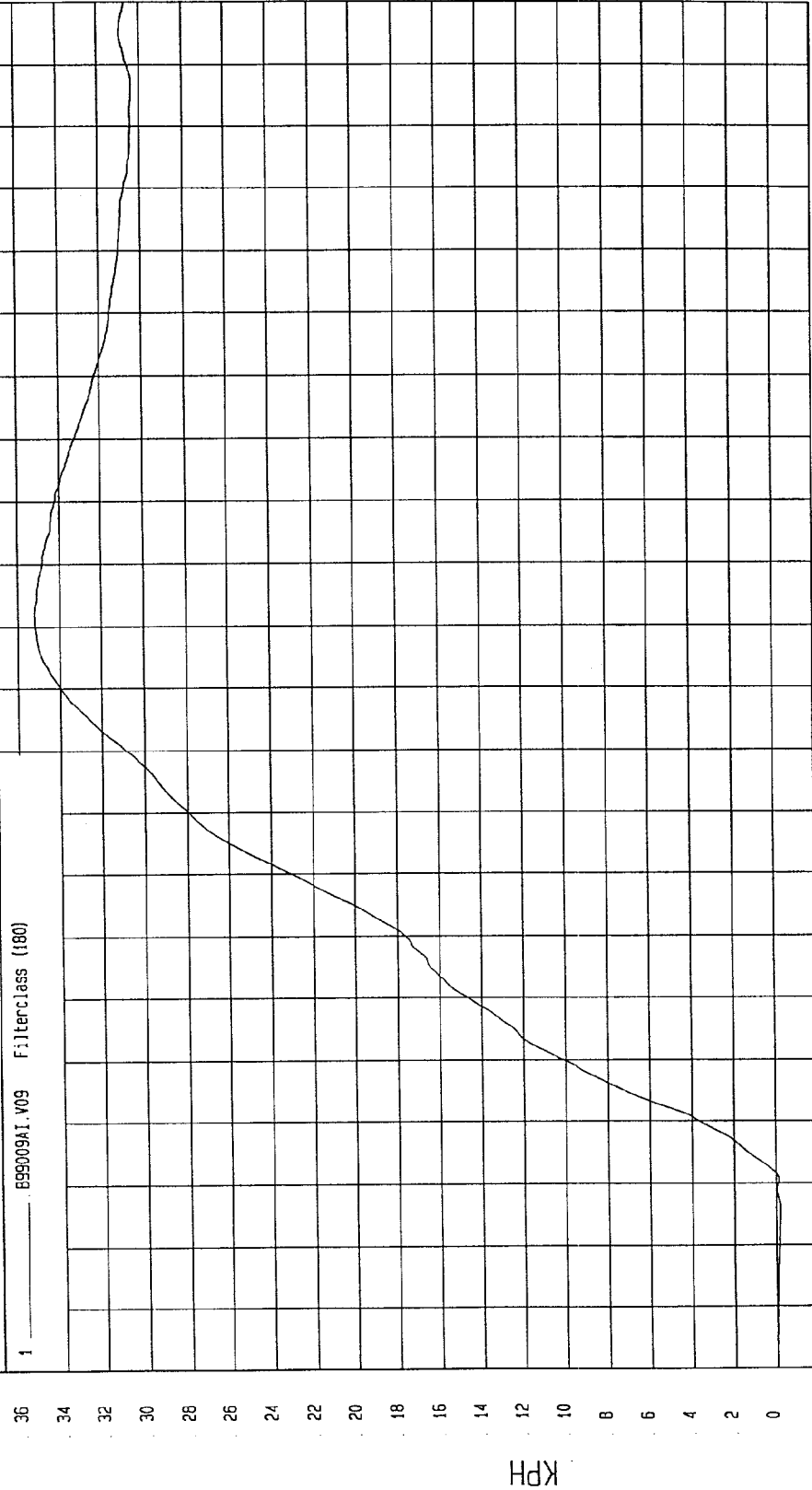
COMPONENT: 1999 TOYOTA TACOMA (MX5107)

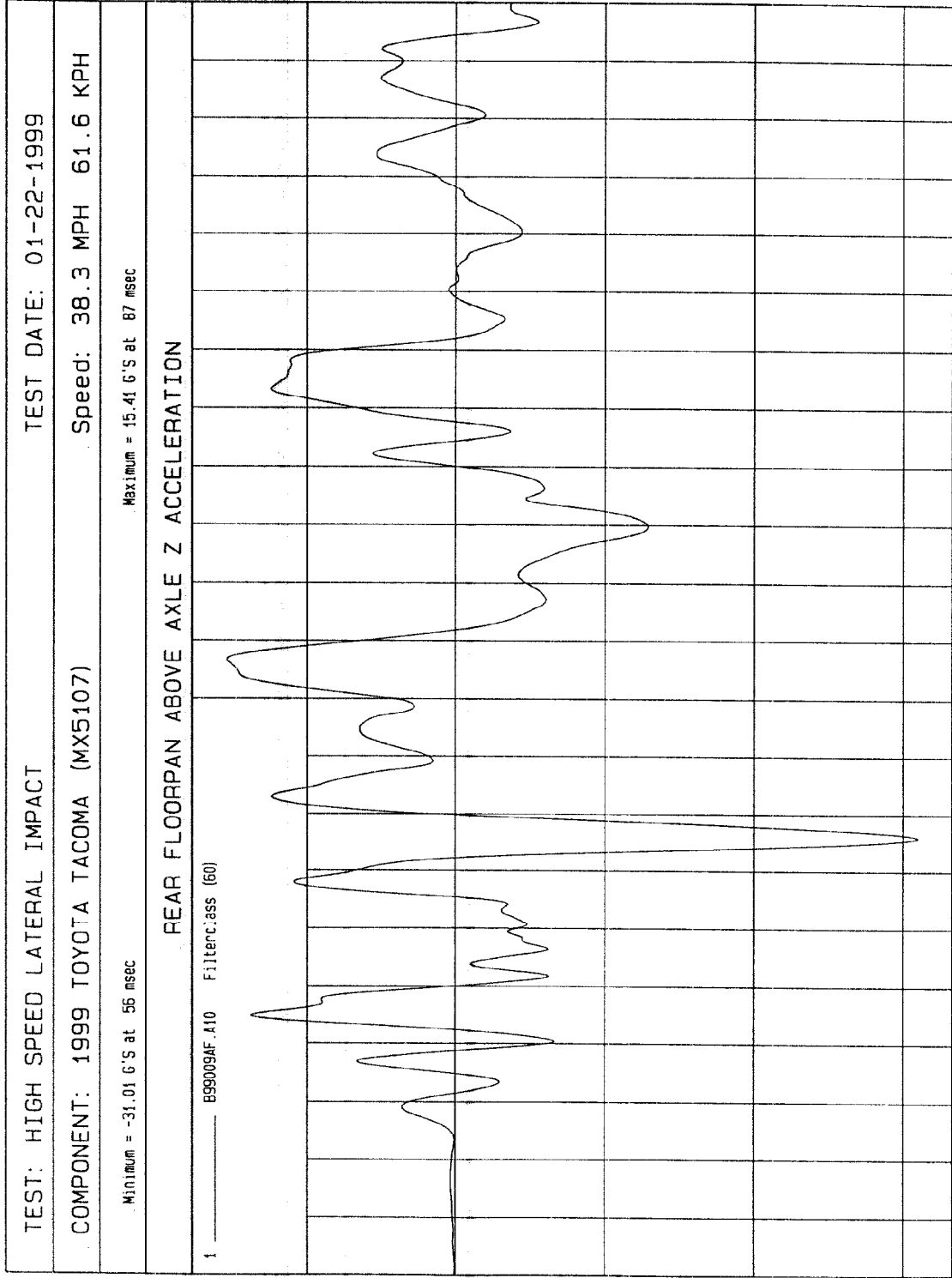
Maximum = 35.22 KPH at 102 msec

Minimum = -.18 KPH at 6 msec

REAR FLOORPAN ABOVE AXLE Y VELOCITY

1 _____ E99009A1.V09 Filterclass (180)





NSA Research
02-09-1999 14.04

TIME (SECONDS)

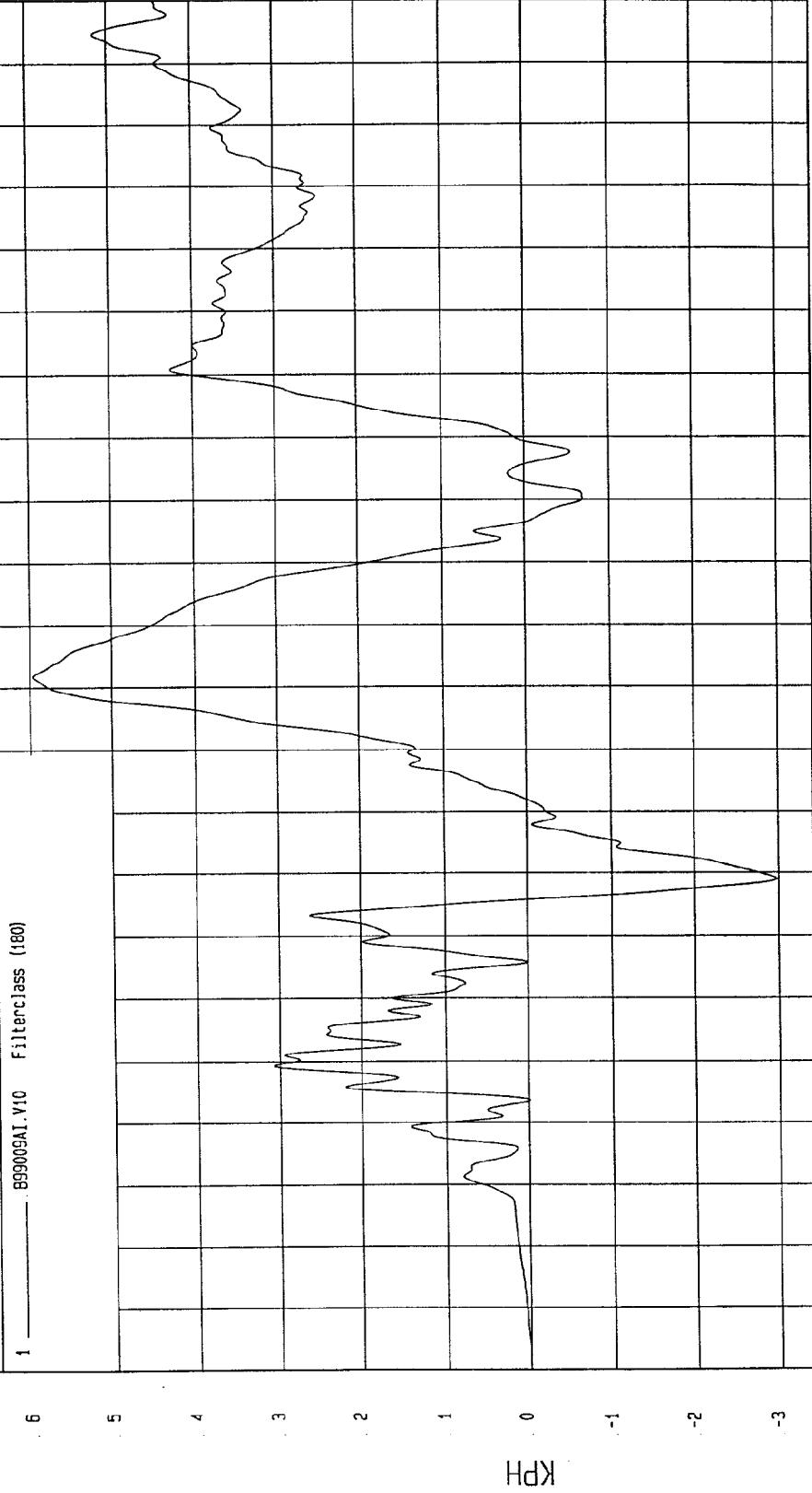
G.S

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -2.98 KPH at 59 msec Maximum = 5.96 KPH at 92 msec

REAR FLOORPAN ABOVE AXLE Z VELOCITY



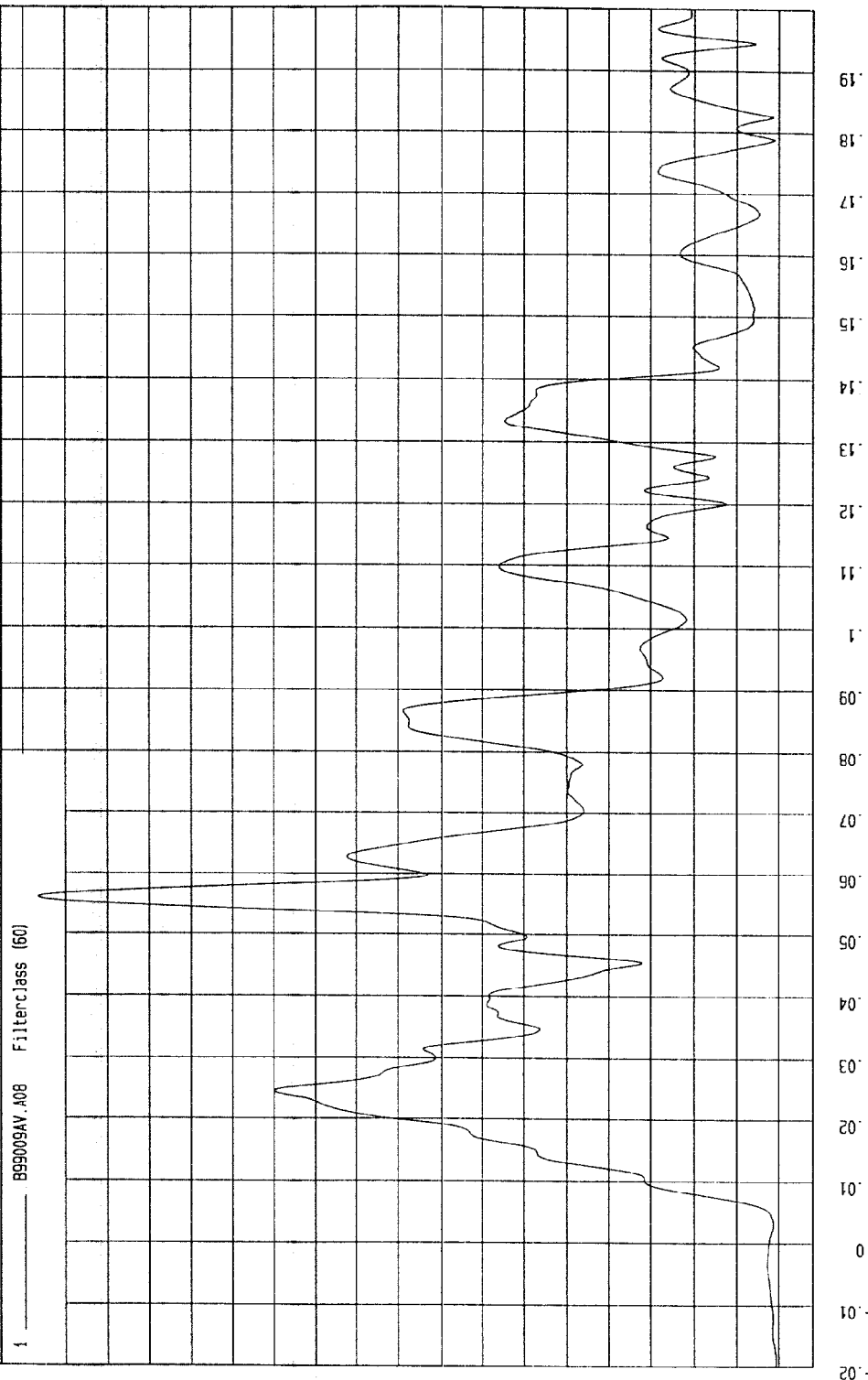
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999
COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = .14 G'S at -.19 msec Maximum = 35.3 G'S at 56 msec

REAR FLOORPAN ABOVE AXLE RESULTANT ACCELERATION

1 B99009AV.A08 FilterClass (60)

S.G



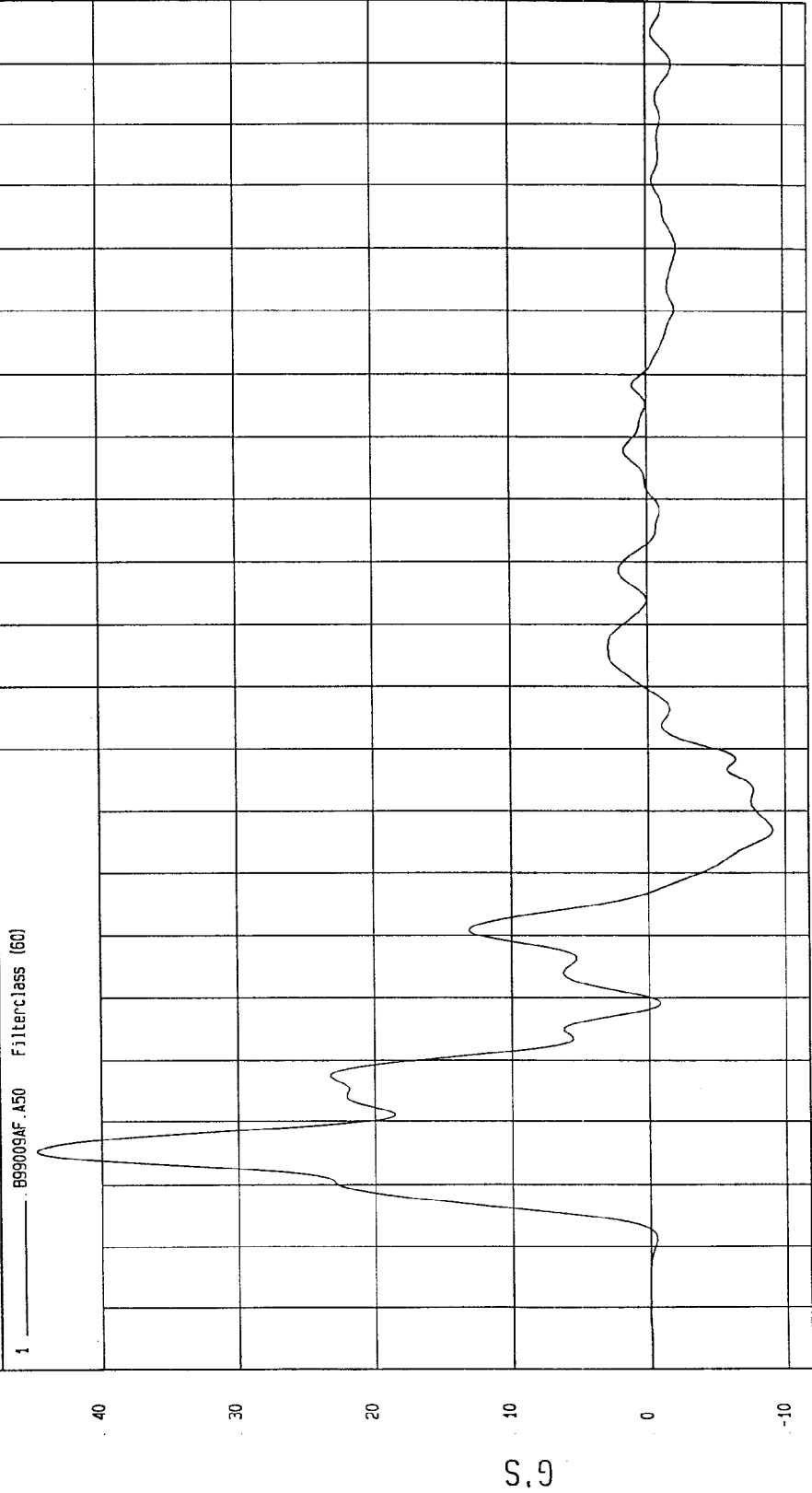
NCA Research
02-09-1999 14.04

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -9.07 G'S at 67 msec Maximum = 44.7 G'S at 15 msec

RIGHT REAR OCCUPANT COMPARTMENT Y ACCELERATION



TIME (SECONDS)

NSA Research
02-09-1999 14: 04

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Speed: 38.3 MPH 61.6 KPH

Minimum = -2.01E-02 KPH at 5 msec

Maximum = 27.83 KPH at 57 msec

RIGHT REAR OCCUPANT COMPARTMENT Y VELOCITY

1 ——— BS9909AI.V50 FilterClass (180)



NSA Research
02-09-1999 14:04

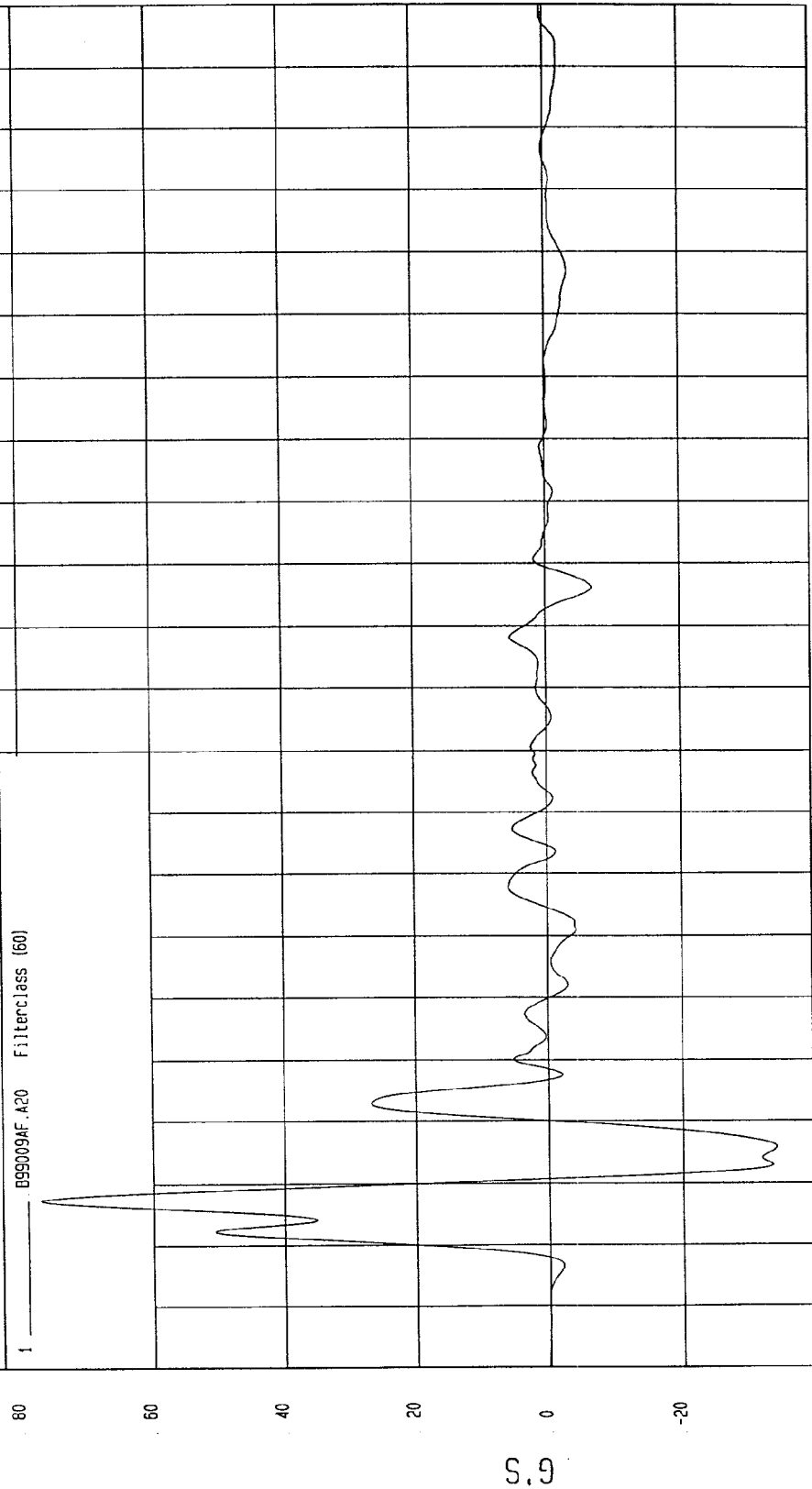
TIME Seconds

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -34.03 G'S at 16 msec Maximum = 77.18 G'S at 7 msec

LEFT LOWER A-POST Y ACCELERATION



WCA Research
02-09-1999 14:04

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107)

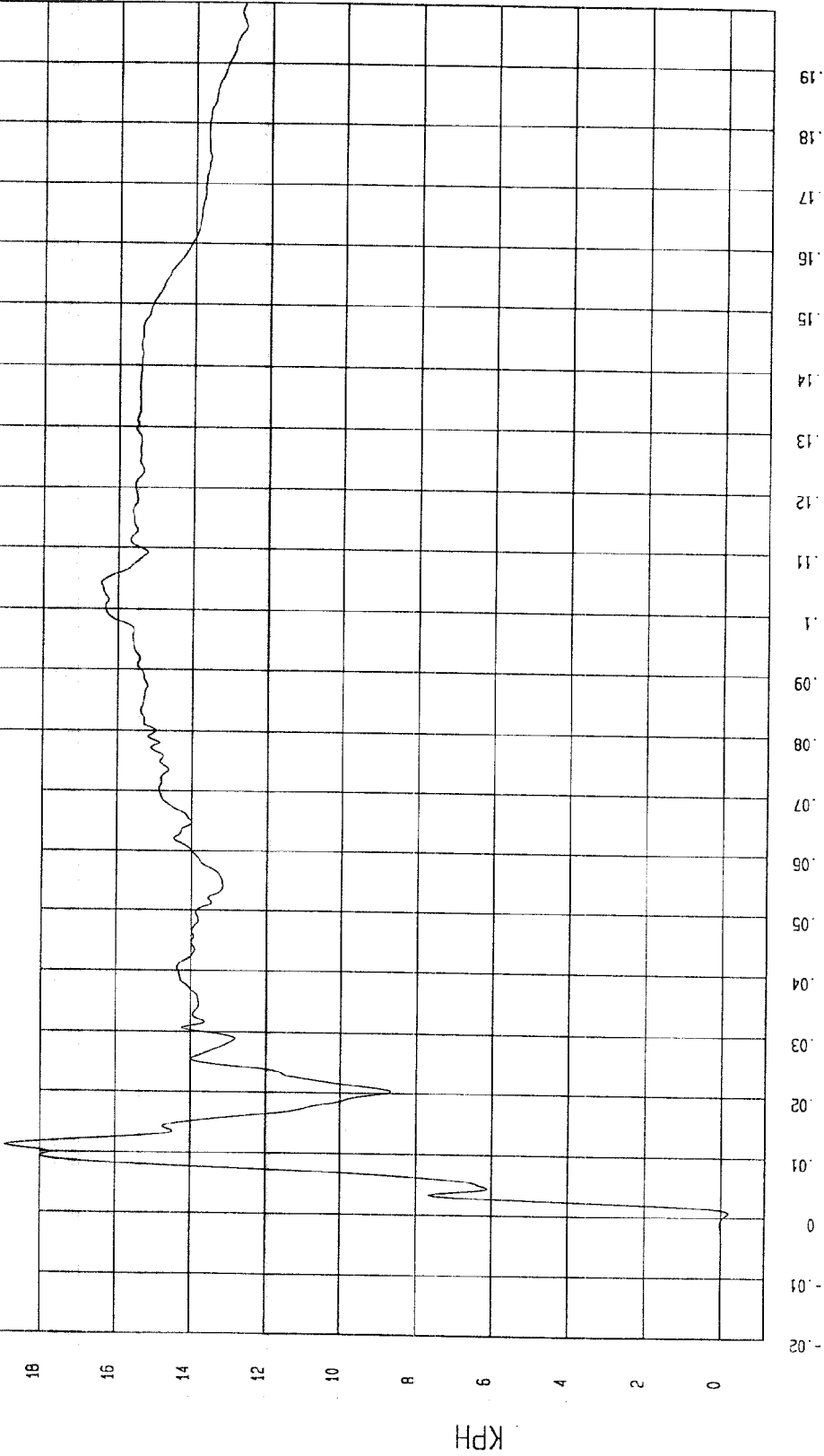
Speed: 38.3 MPH 61.6 KPH

Minimum = -2 KPH at 1 msec

Maximum = 18.94 KPH at 11 msec

LEFT LOWER A-POST Y VELOCITY

1 B9909AI.V20 FilterClass (180)



MCA Research
02-09-1999 14:04

TIME Seconds

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

Speed: 38.3 MPH 61.6 KPH

COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Maximum = 27.02 G's at 9 msec

Minimum = -5.39 G's at 10 msec

LEFT MID A-POST Y ACCELERATION

1 899009AF.A19 Filterclass (50)

G.S

19

18

17

16

15

14

13

12

11

10

09

08

07

06

05

04

03

02

01

0

-01

-02

TIME (SECONDS)

NGA Research
02-09-1999 14:04

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

Speed: 38.3 MPH 61.6 KPH

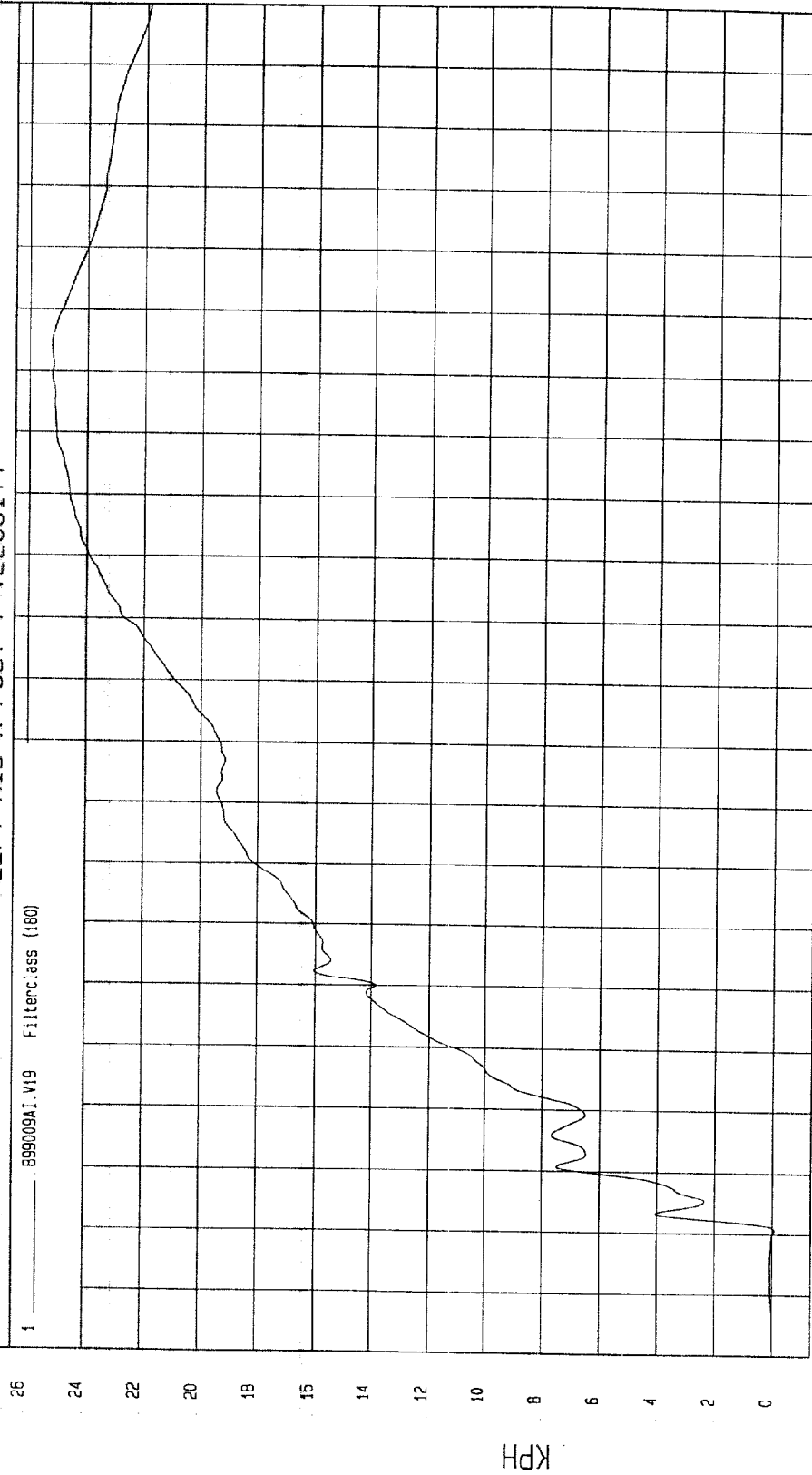
COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Minimum = -7.19E-02 KPH at 1 msec

Maximum = 25.22 KPH at 145 msec

LEFT MID A-POST Y VELOCITY

1 B99009AI.VI9 Filter:ass (180)



MSA Research
02-09-1999 14:04

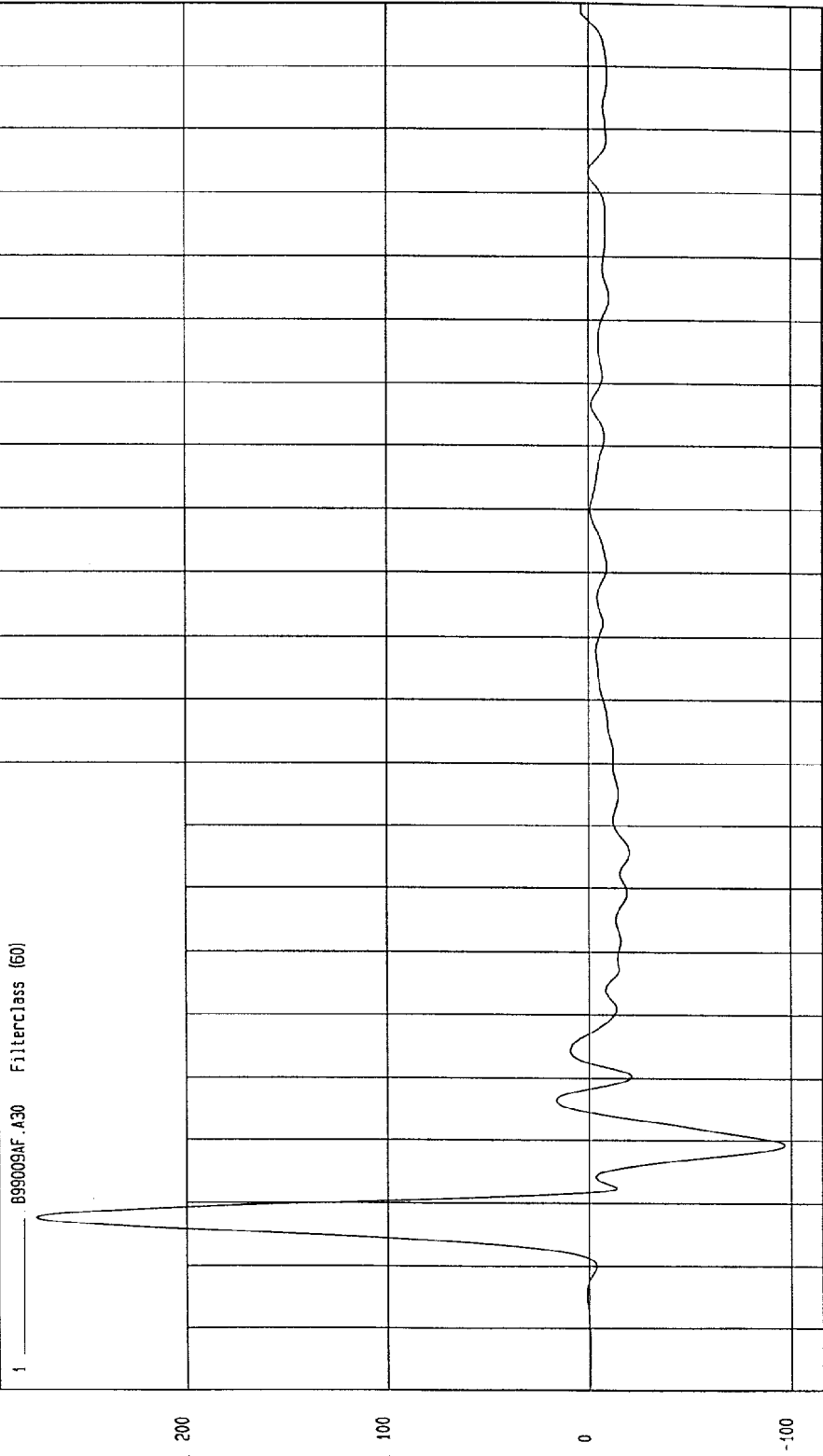
TIME Seconds

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -96.88 G'S at 19 msec Maximum = 274.36 G'S at 8 msec

LEFT LOWER B-POST Y ACCELERATION



TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

SPEED: 38.3 MPH 61.6 KPH

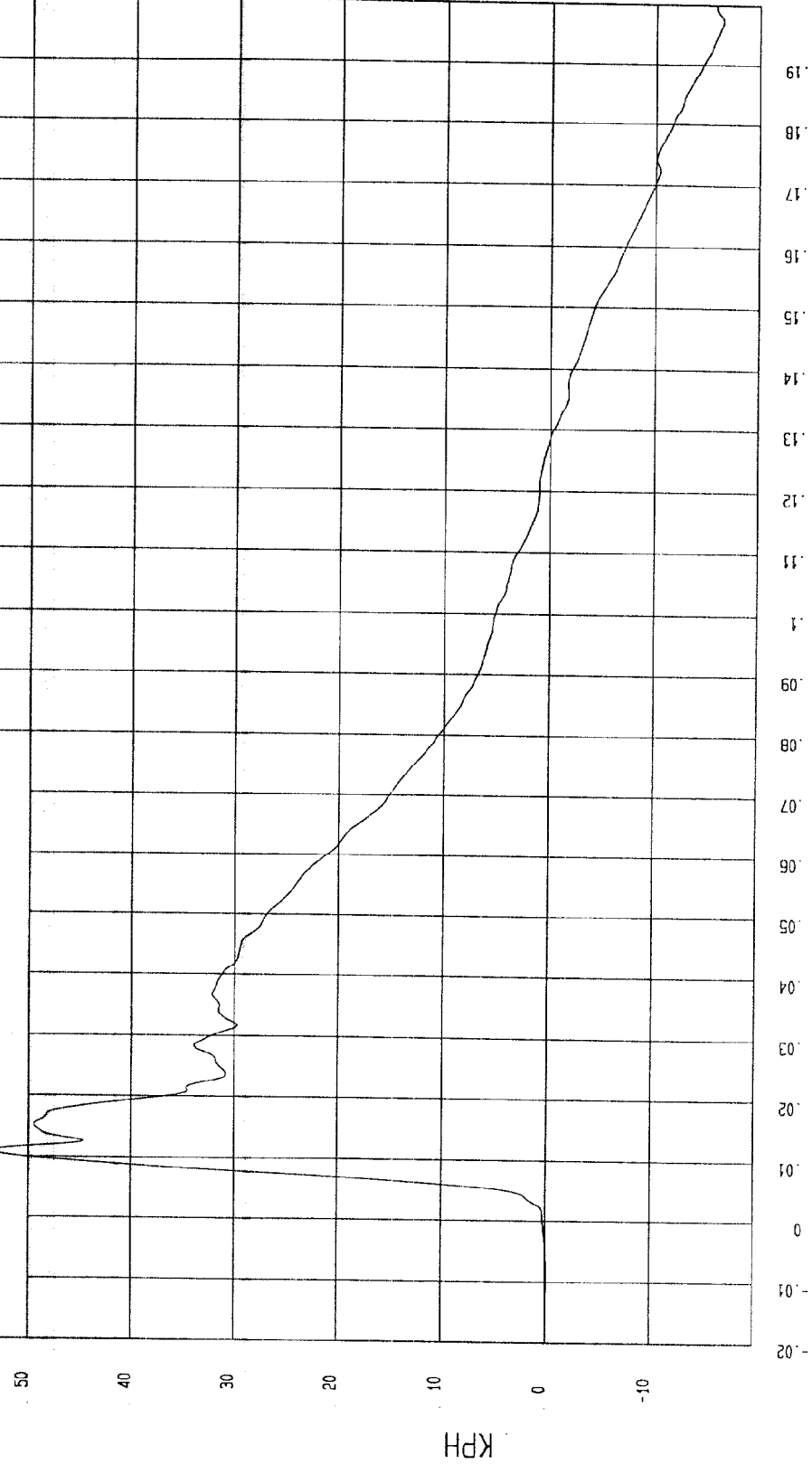
COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Maximum = 53.59 KPH at 11 msec

Minimum = -16.43 KPH at 197 msec

LEFT LOWER B-POST Y VELOCITY

1 B99009A1.V30 Filterclass (180)



MSA Research
02-09-1999 14:04

TIME Seconds

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

Speed: 38.3 MPH 61.6 KPH

COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Maximum = 173.58 G'S at 12 msec

Minimum = -80.51 G'S at 18 msec

LEFT MID B-POST Y ACCELERATION

1 899009AF.A29 Filterclass (60)

180

160

140

120

100

80

60

40

20

0

-20

-40

-60

-80

G'S

61

18

17

16

15

14

13

12

11

1

09

08

07

06

05

04

03

02

01

0

-01

-02

TIME (SECONDS)

NSA Research
02-09-1999 14:04

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

Speed: 38.3 MPH 61.6 KPH

COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Maximum = 48.38 KPH at 27 msec

Minimum = -7.75 KPH at 4 msec

LEFT MID B-POST Y VELOCITY

1 ——— B99009A1.V29 Filterclass (180)

50

40

30

20

10

0

KPH

-02

-01

0

01

02

03

04

05

06

07

08

09

10

11

12

13

14

15

16

17

18

19

TIME Seconds

MSA Research
02-09-1999 14:05

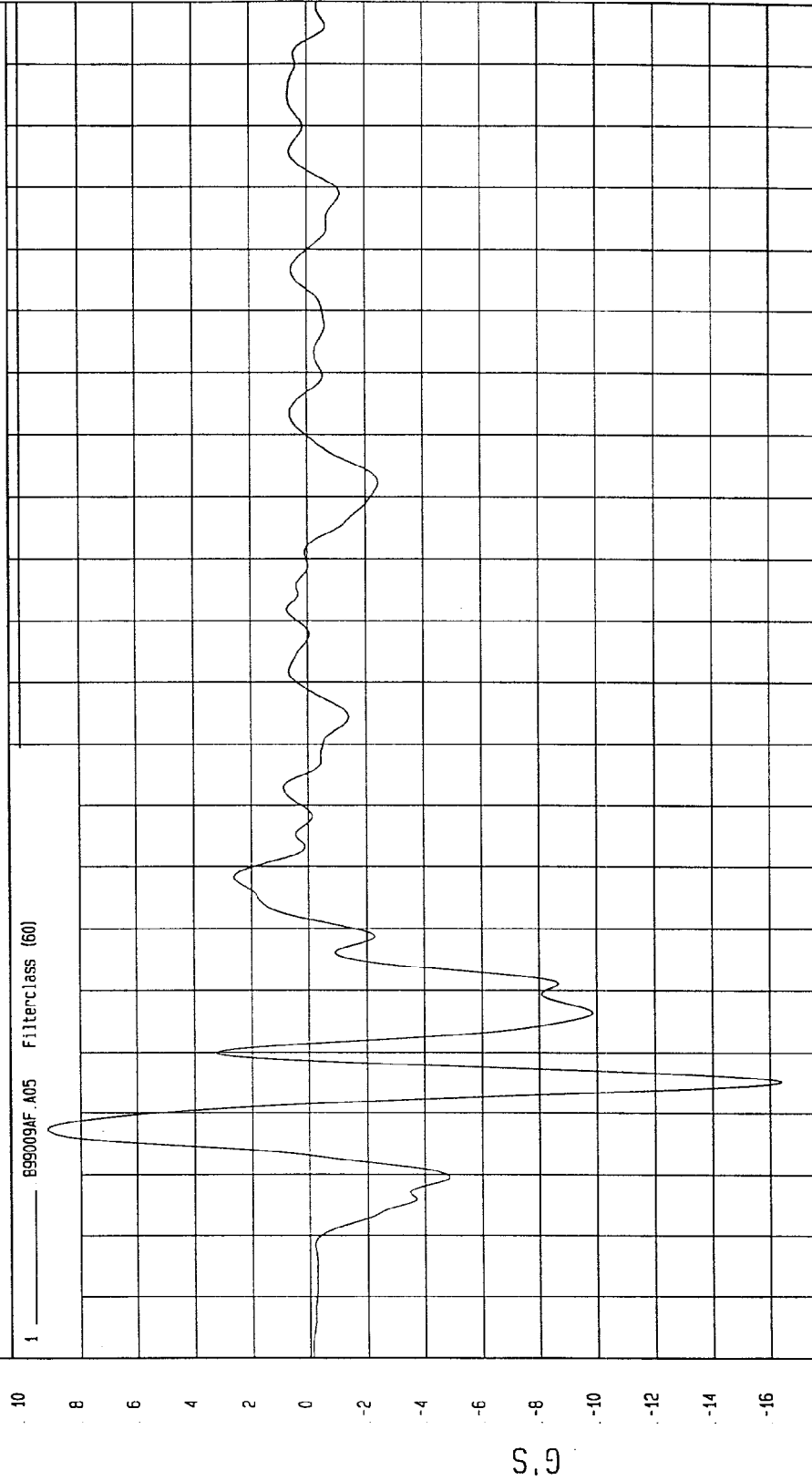
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -16.4 G'S at 25 msec Maximum = 9.1 G'S at 17 msec

VEHICLE CG X ACCELERATION

1 B99009AF.A05 Filterclass (60)



WCA Research
02-09-1999 14:05

TIME (SECONDS)

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

SPEED: 38.3 MPH 61.6 KPH

COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Maximum = .33 KPH at 22 msec

Minimum = -6.14 KPH at 172 msec

VEHICLE CG X VELOCITY

1 899009A1.V05 Filterclass (180)



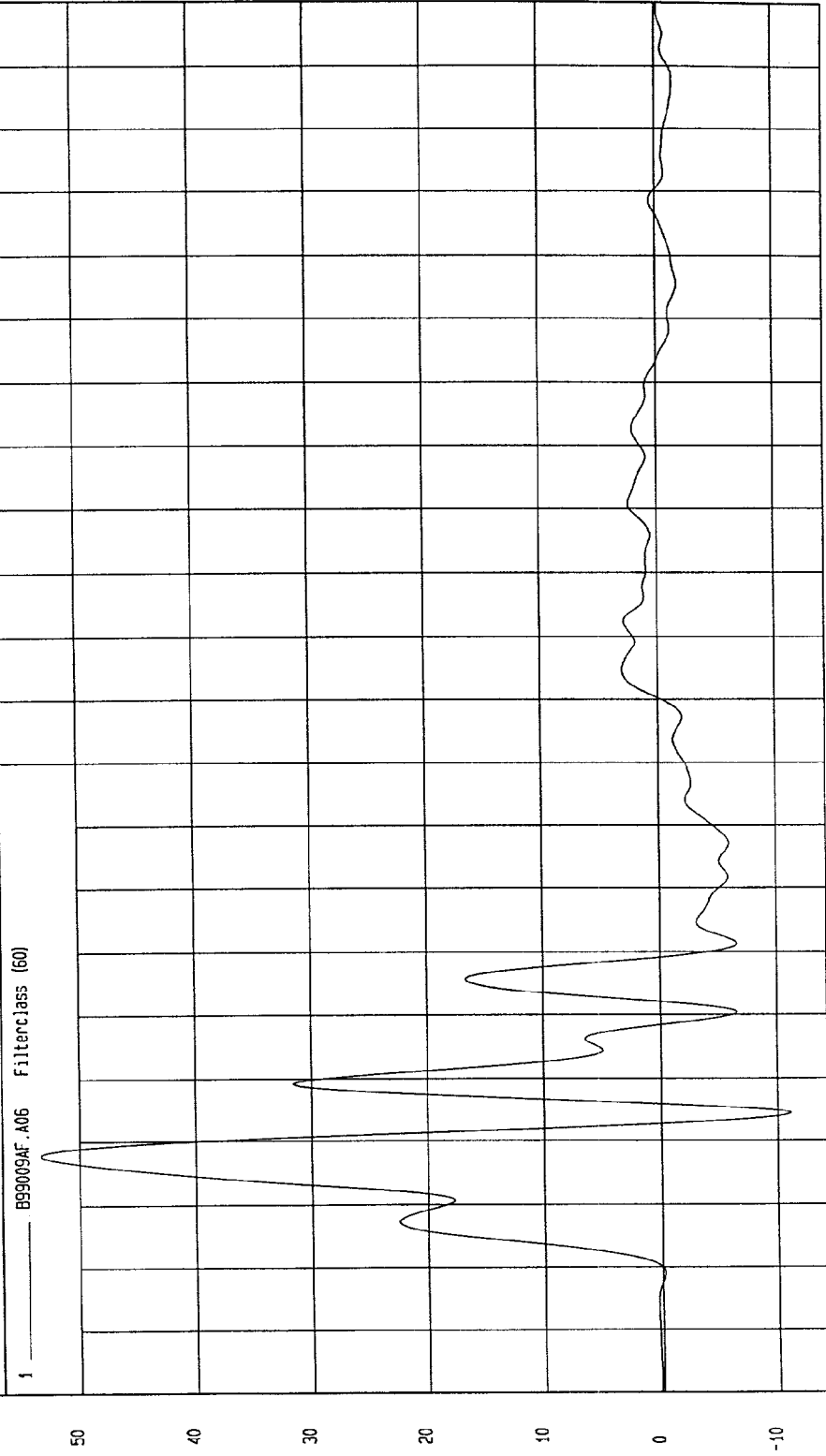
MCA Research
02-09-1999 14:05

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -11.12 G'S at 24 msec Maximum = 53.3 G'S at 18 msec

VEHICLE CG Y ACCELERATION



TIME (SECONDS)

NSA Research
02-09-1999 14:05

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

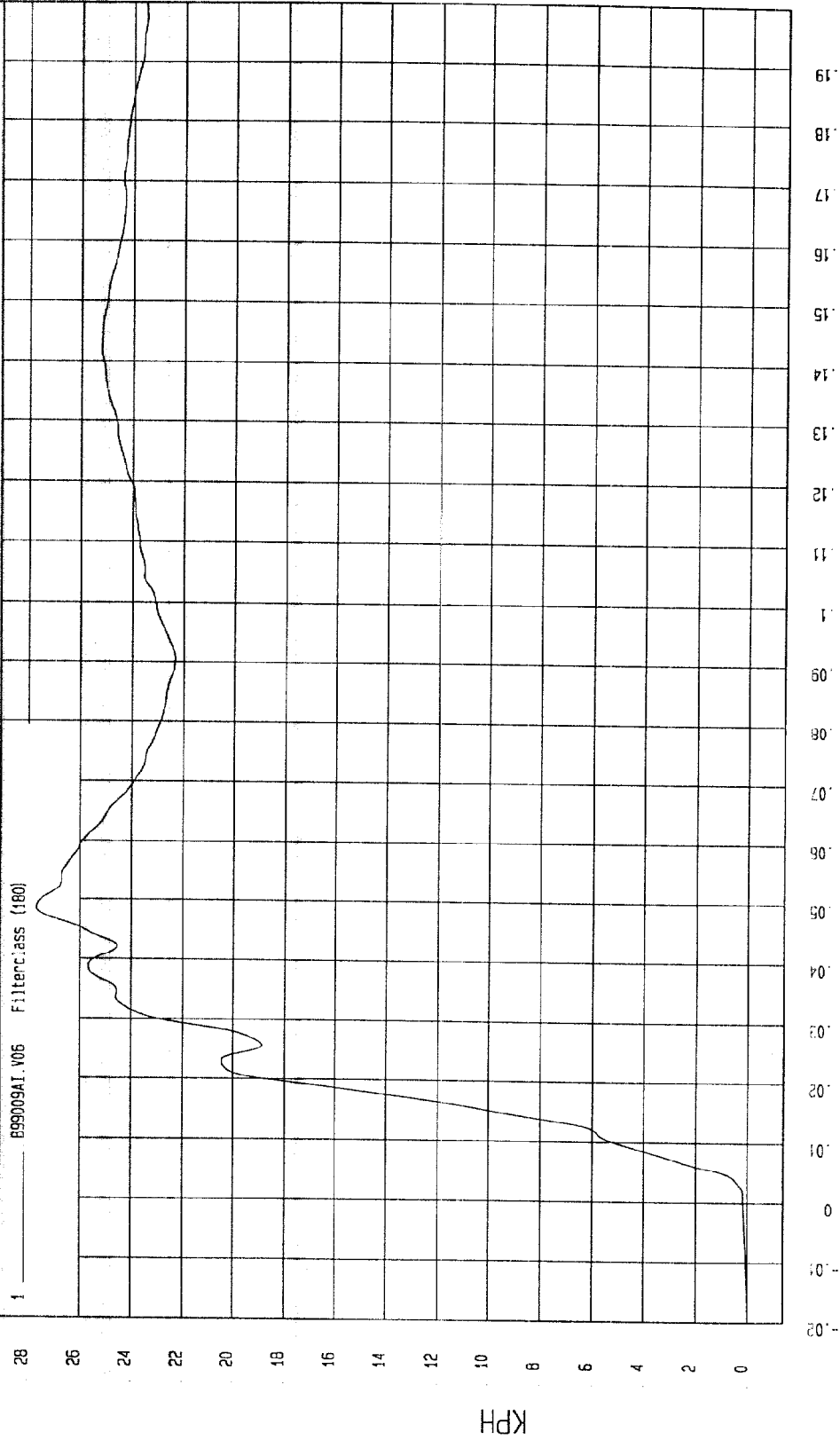
Speed: 38.3 MPH 61.6 KPH

COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Minimum = 0 KPH at -20 msec

Maximum = 27.63 KPH at 49 msec

VEHICLE CG Y VELOCITY



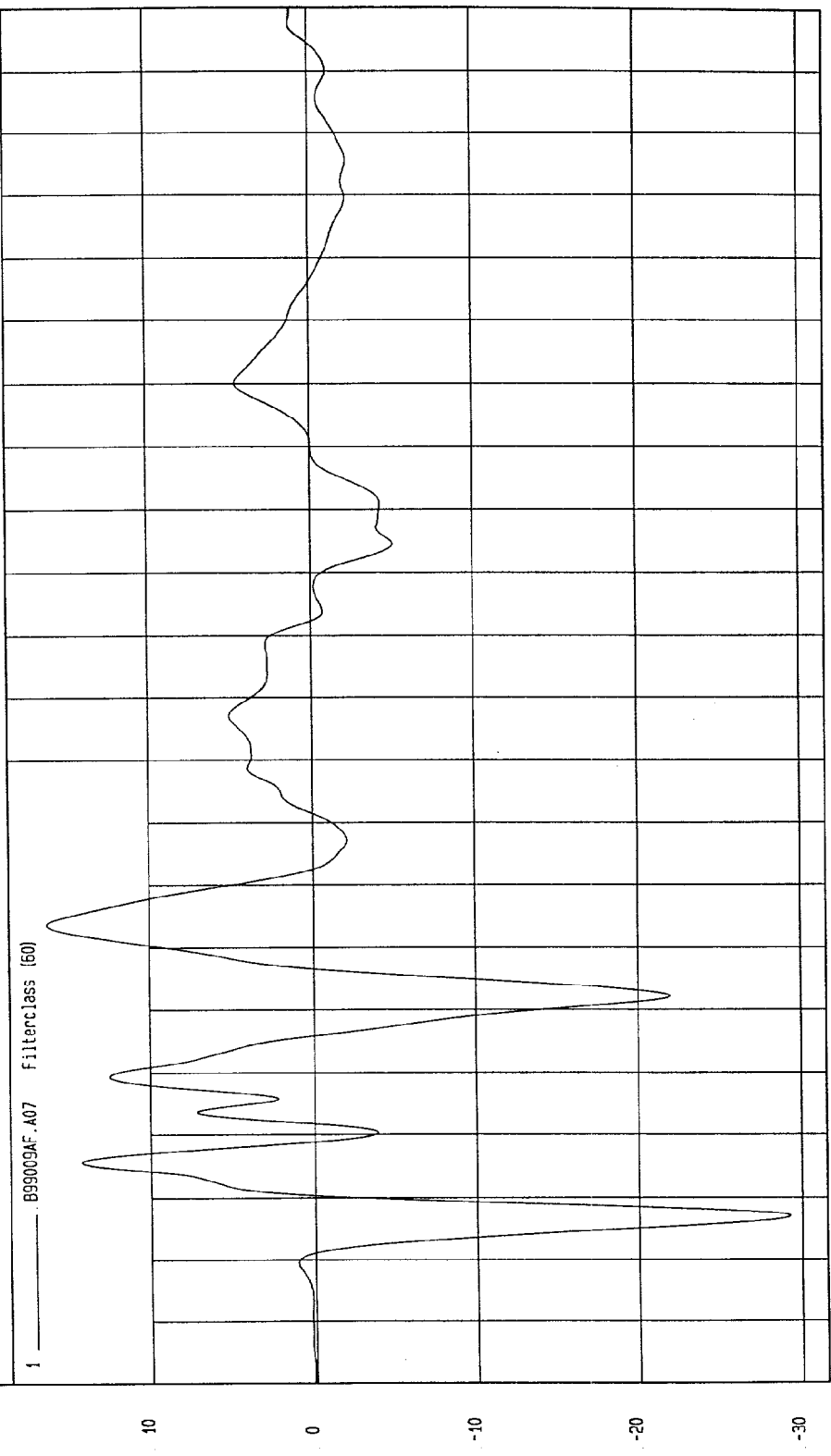
MSA Research
02-09-1999 14:05

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -29.28 G'S at 7 msec Maximum = 16.38 G'S at 54 msec

VEHICLE CG Z ACCELERATION



MGA Research
02-09-1999 14:05

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

Speed: 38.3 MPH 61.6 KPH

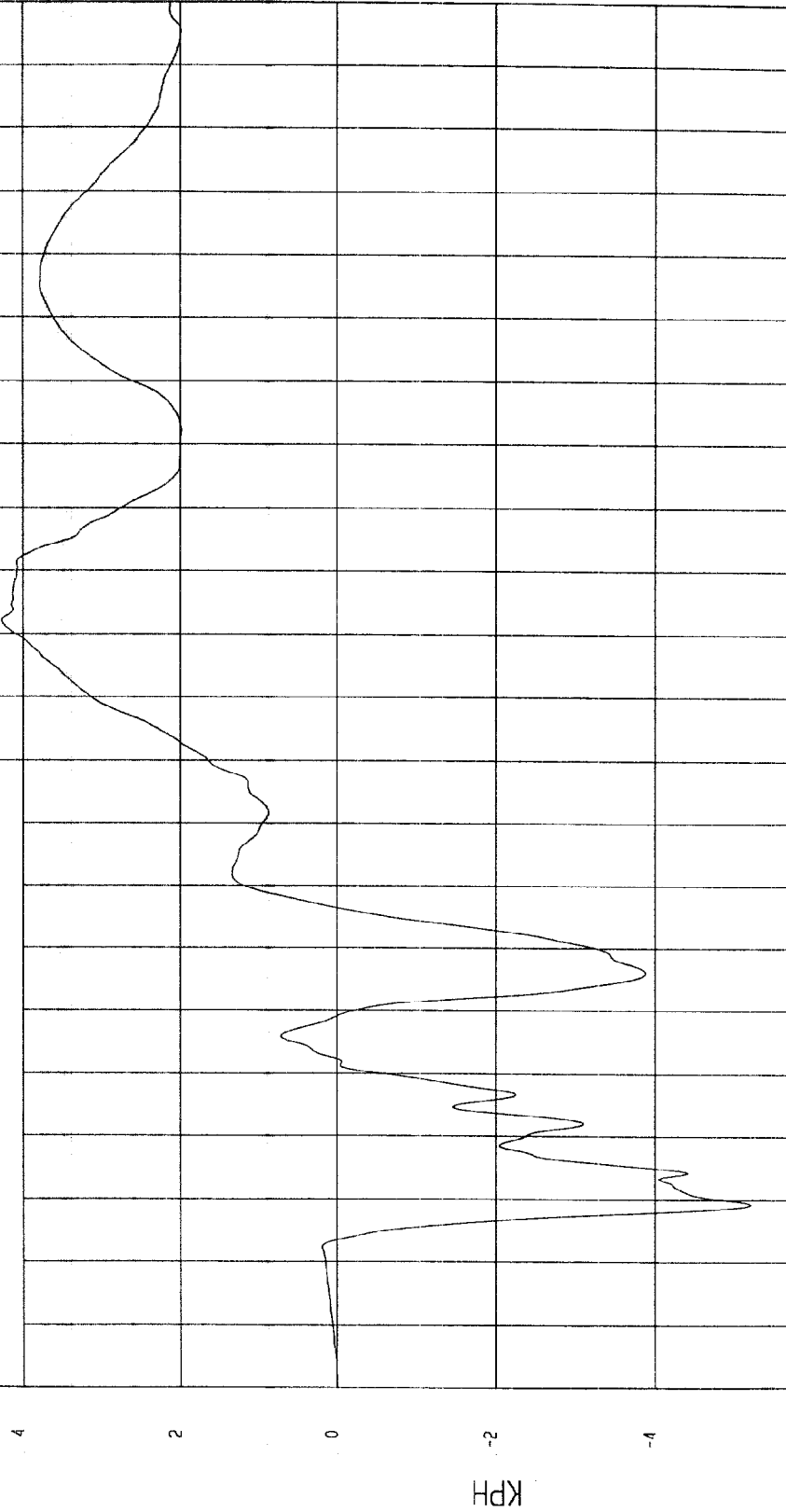
COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Maximum = 4.25 KPH at 102 msec

Minimum = -5.2 KPH at 9 msec

VEHICLE CG Z VELOCITY

1 B99009A1.V07 Filterclass (160)



MGA Research
02-09-1999 14.05

TIME Seconds

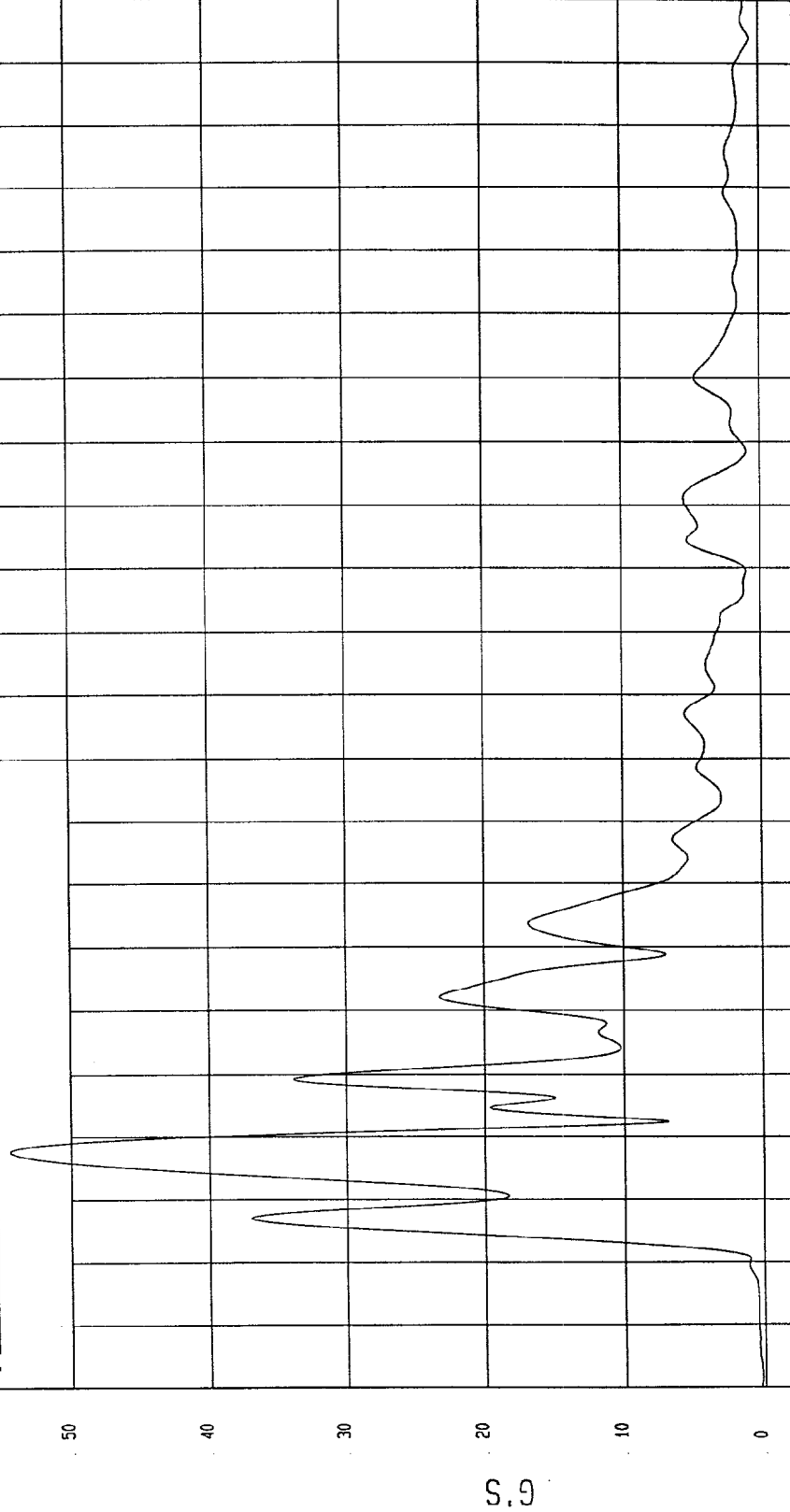
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = .19 G'S at -18 msec Maximum = 54.45 G'S at 18 msec

VEHICLE CG RESULTANT ACCELERATION

1 _____ 899009AV.A05 Filterclass (50)



WSA Research
02-09-1999 14:05

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

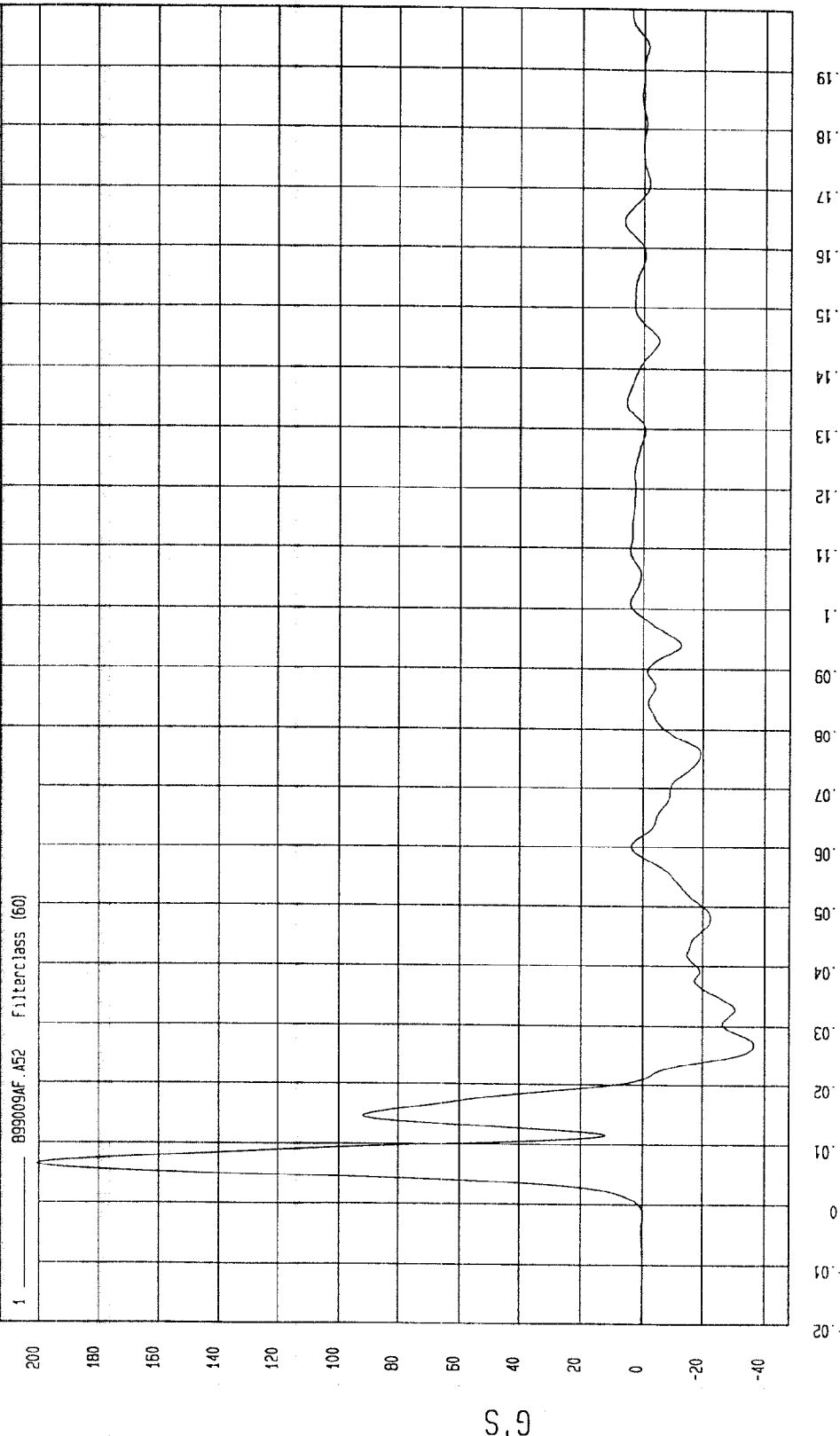
SPEED: 38.3 MPH 61.6 KPH

COMPONENT: 1999 TOYOTA TACOMA (MX5107)

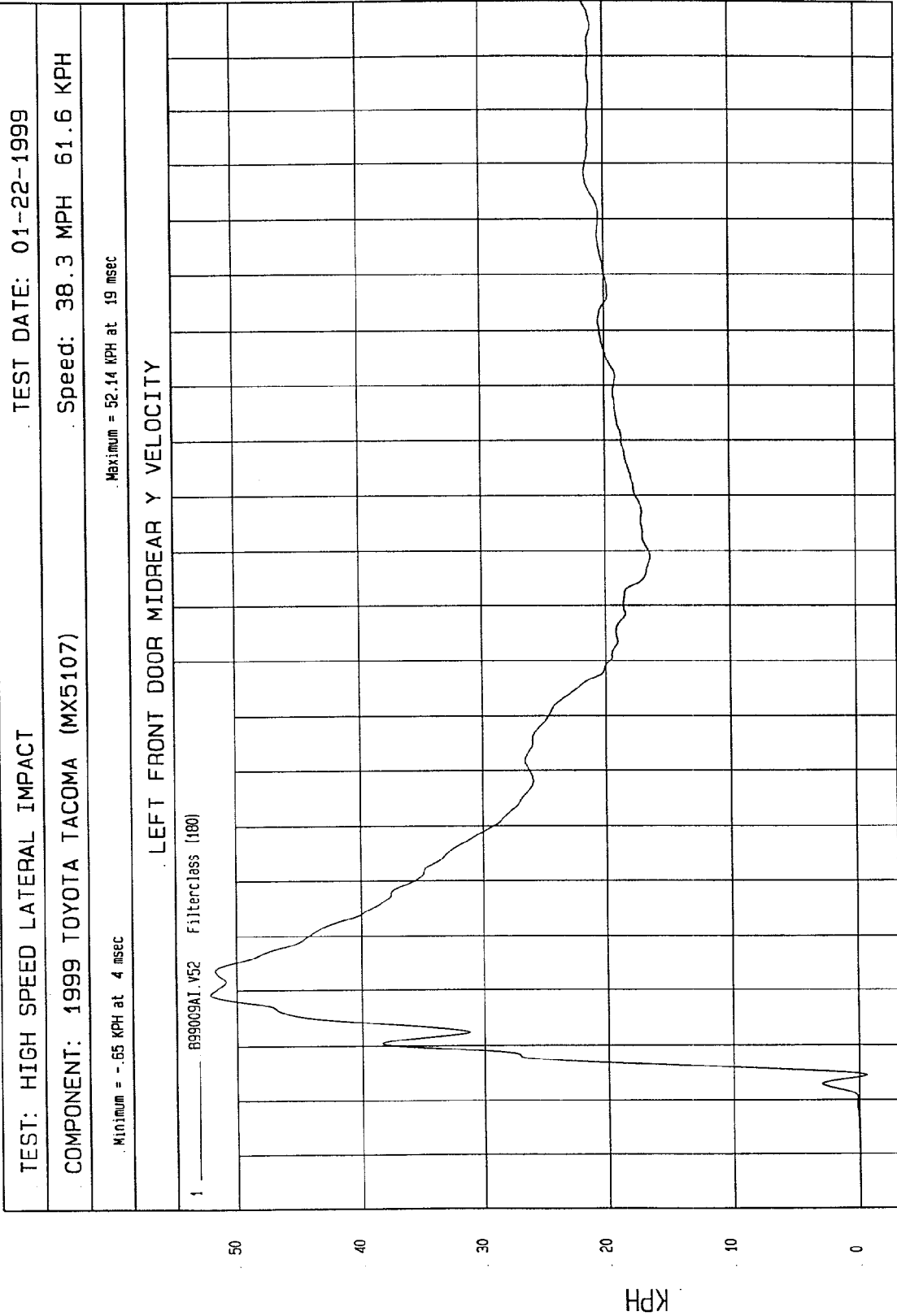
Maximum = 200.66 G'S at 7 msec

Minimum = -36.44 G'S at 27 msec

LEFT FRONT DOOR MIDREAR Y ACCELERATION



MGA Research
02-09-1999 14:05



WCA Research
02-09-1999 14:05

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

Speed: 38.3 MPH 61.6 KPH

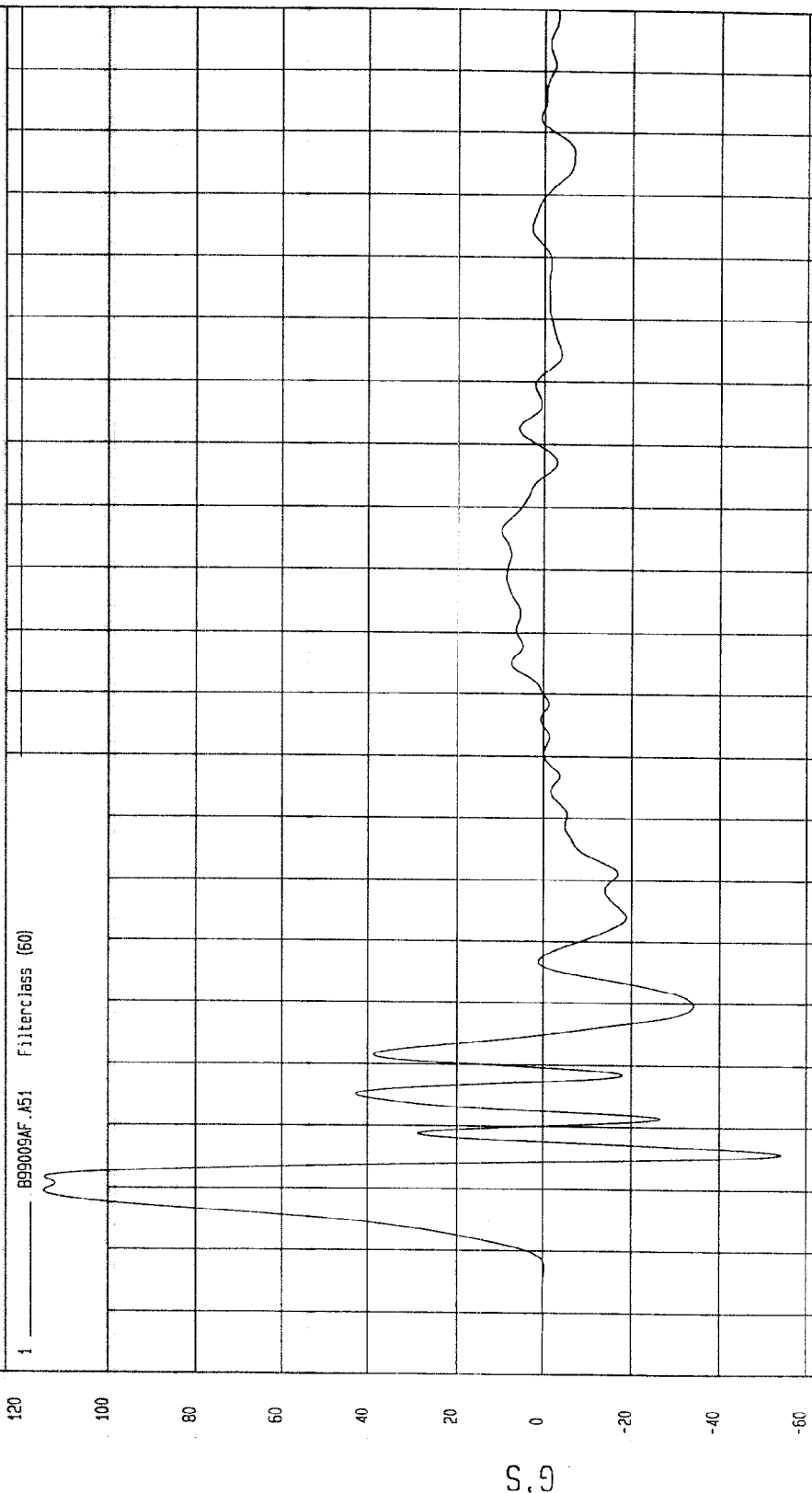
COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Maximum = 114.9 G'S at 9 msec

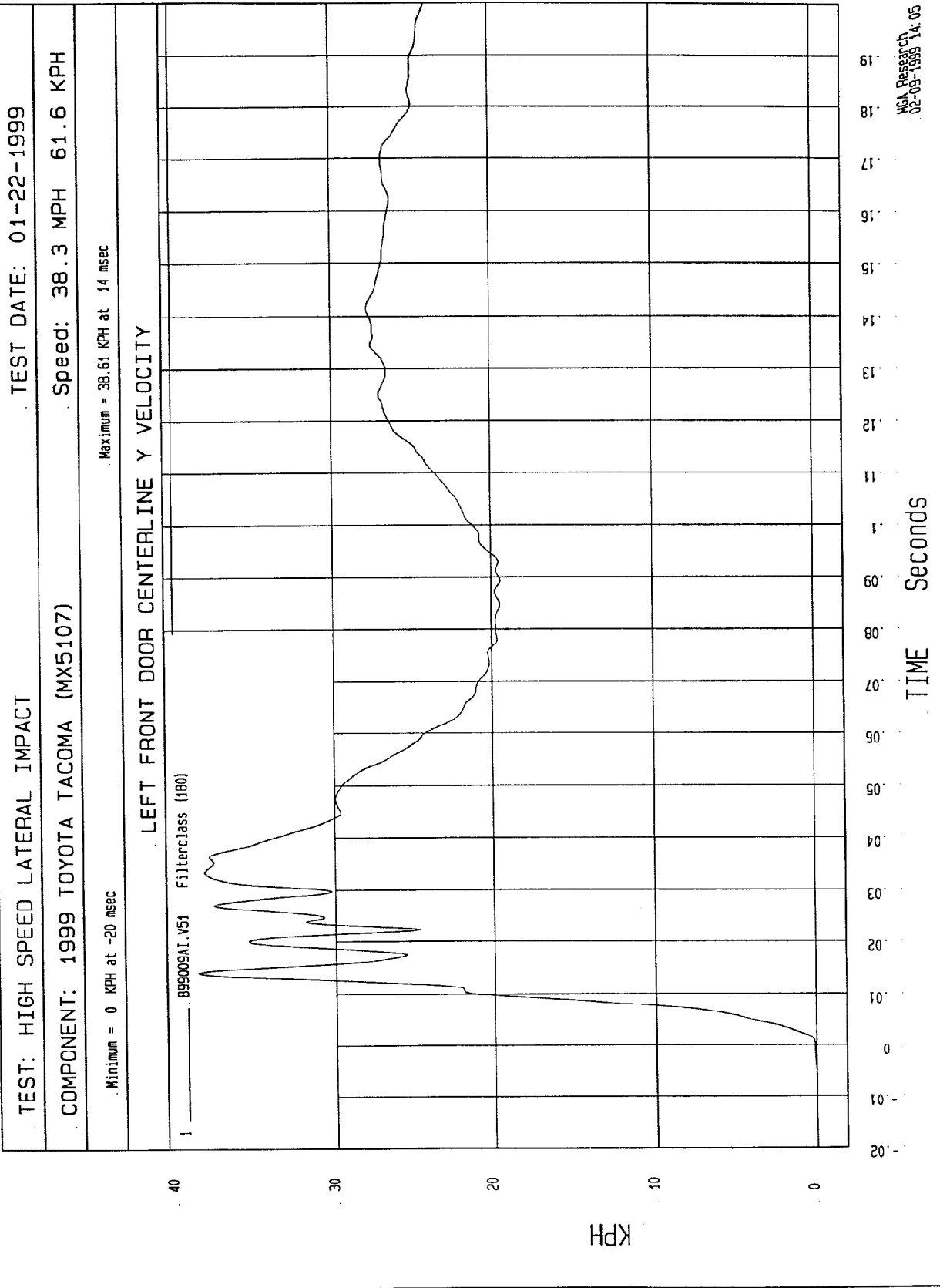
Minimum = -54.37 G'S at 16 msec

LEFT FRONT DOOR CENTERLINE Y ACCELERATION

1 ——— B99009AF.A51 Filterclass (60)



MGA Research
02-09-1999 14:05



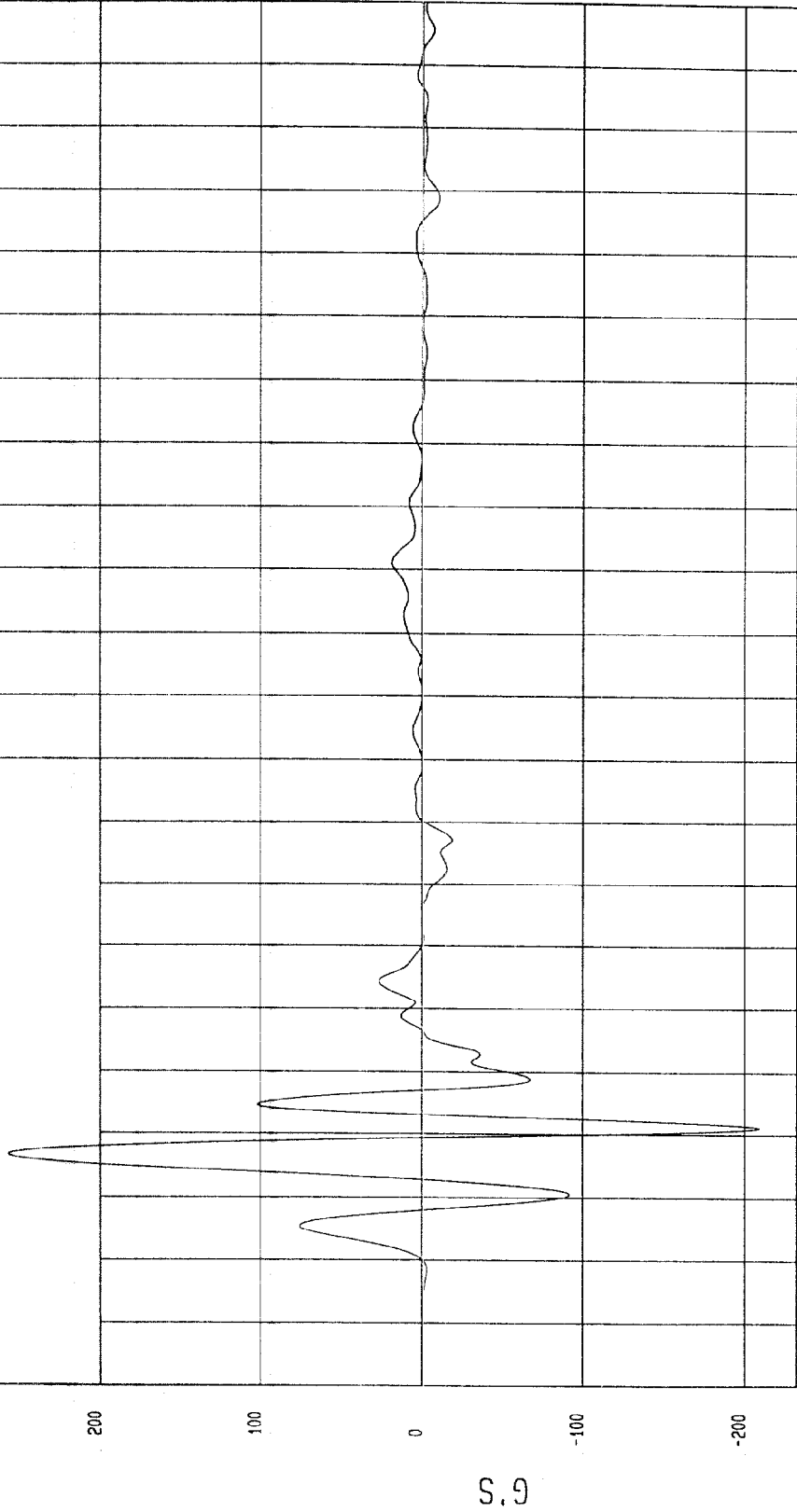
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -209.35 G'S at 21 msec Maximum = 257.55 G'S at 17 msec

LEFT FRONT DOOR UPPER CENTERLINE Y ACCELERATION

1 _____ B99009AF.A53 Filterclass (60)



MCA Research
02-05-1999 14:05

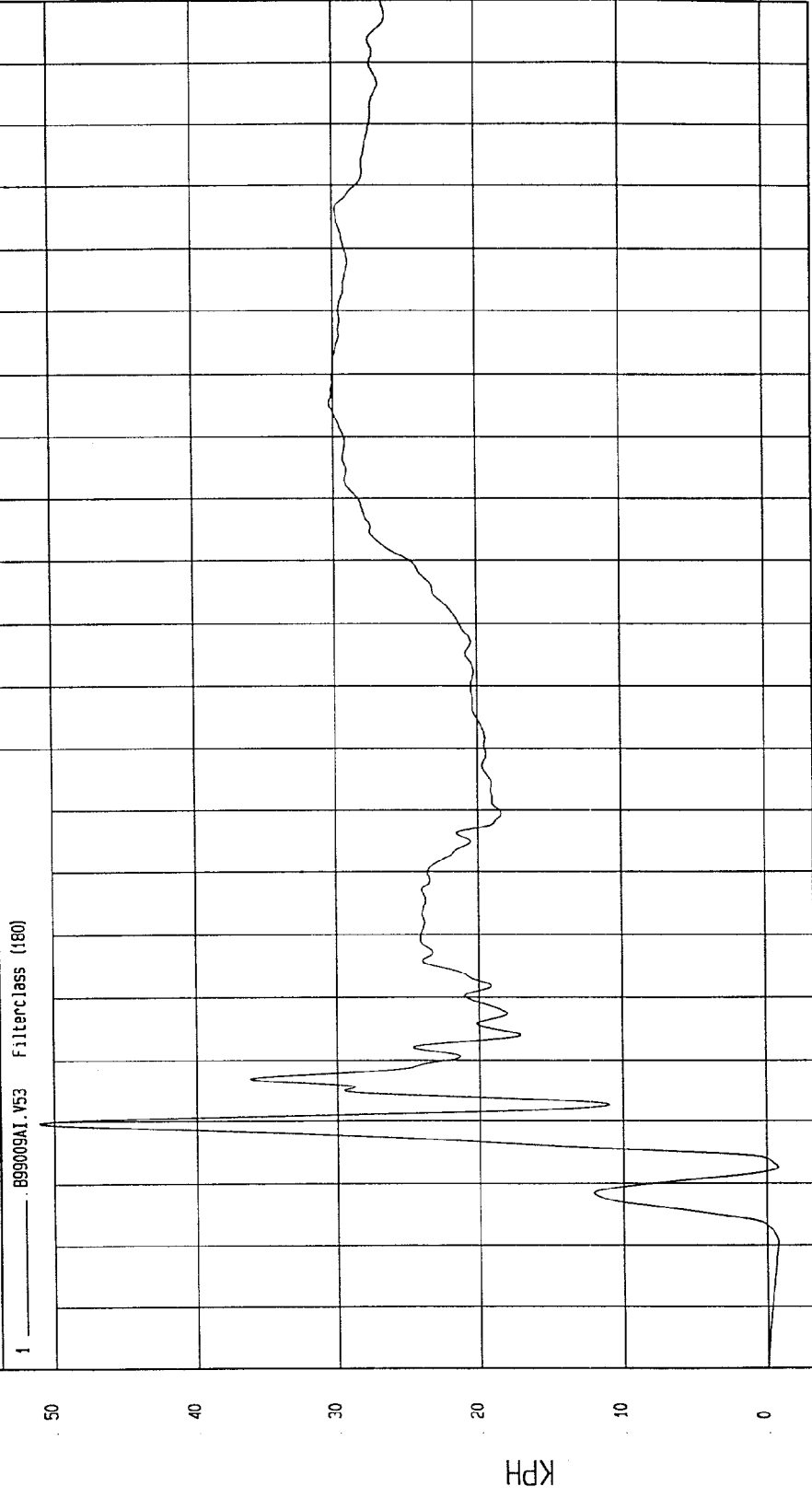
TIME (SECONDS)

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = - .02 KPH at 13 msec Maximum = 51.14 KPH at 20 msec

LEFT FRONT DOOR UPPER CENTERLINE Y VELOCITY



TIME Seconds

NSA Research
02-09-1999 14:05

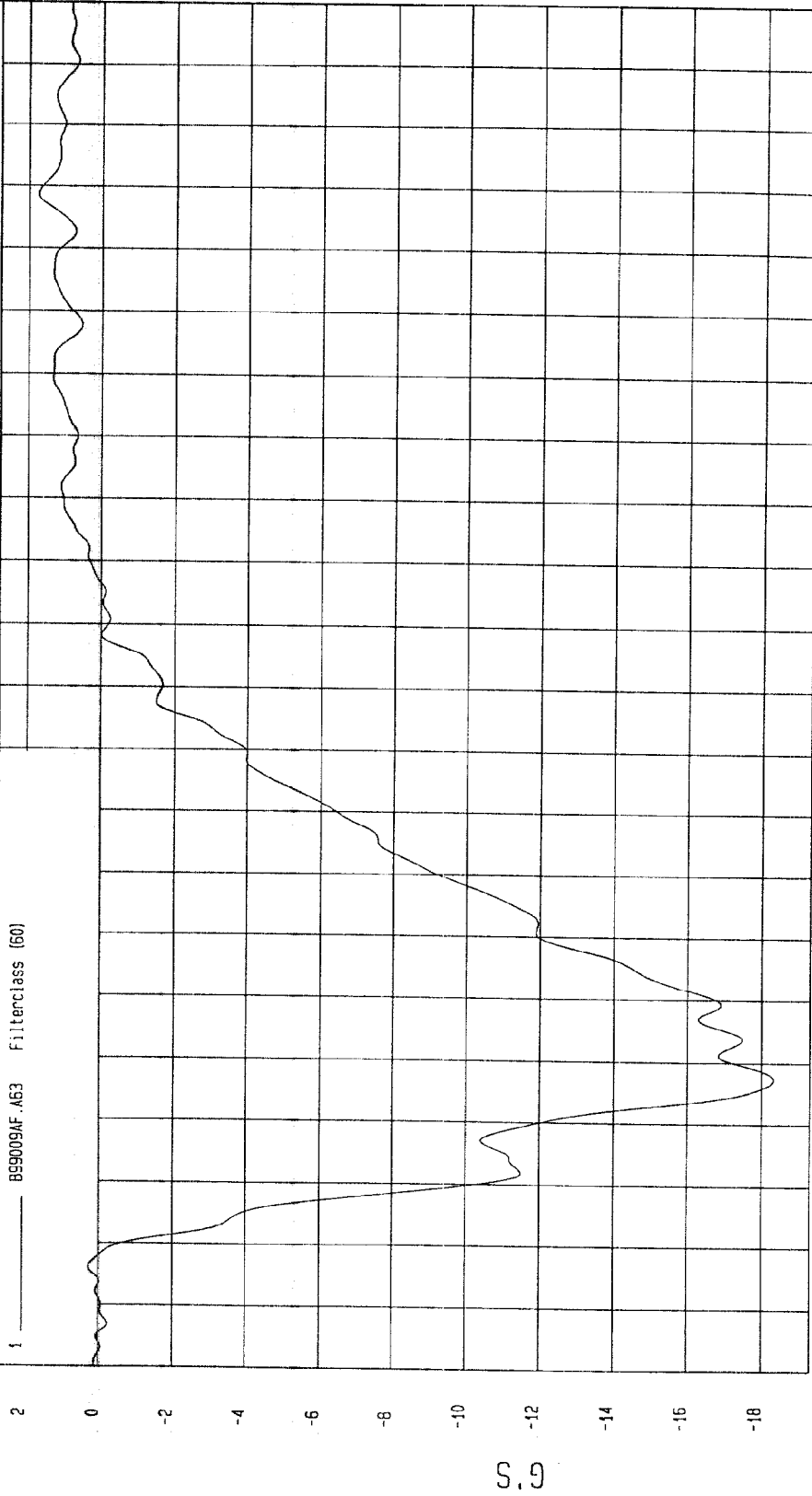
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -18.33 G'S at 27 msec Maximum = 1.74 G'S at 169 msec

MOVING BARRIER CG X ACCELERATION

1 _____ B99009AF.A63 Filterclass (60)



TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

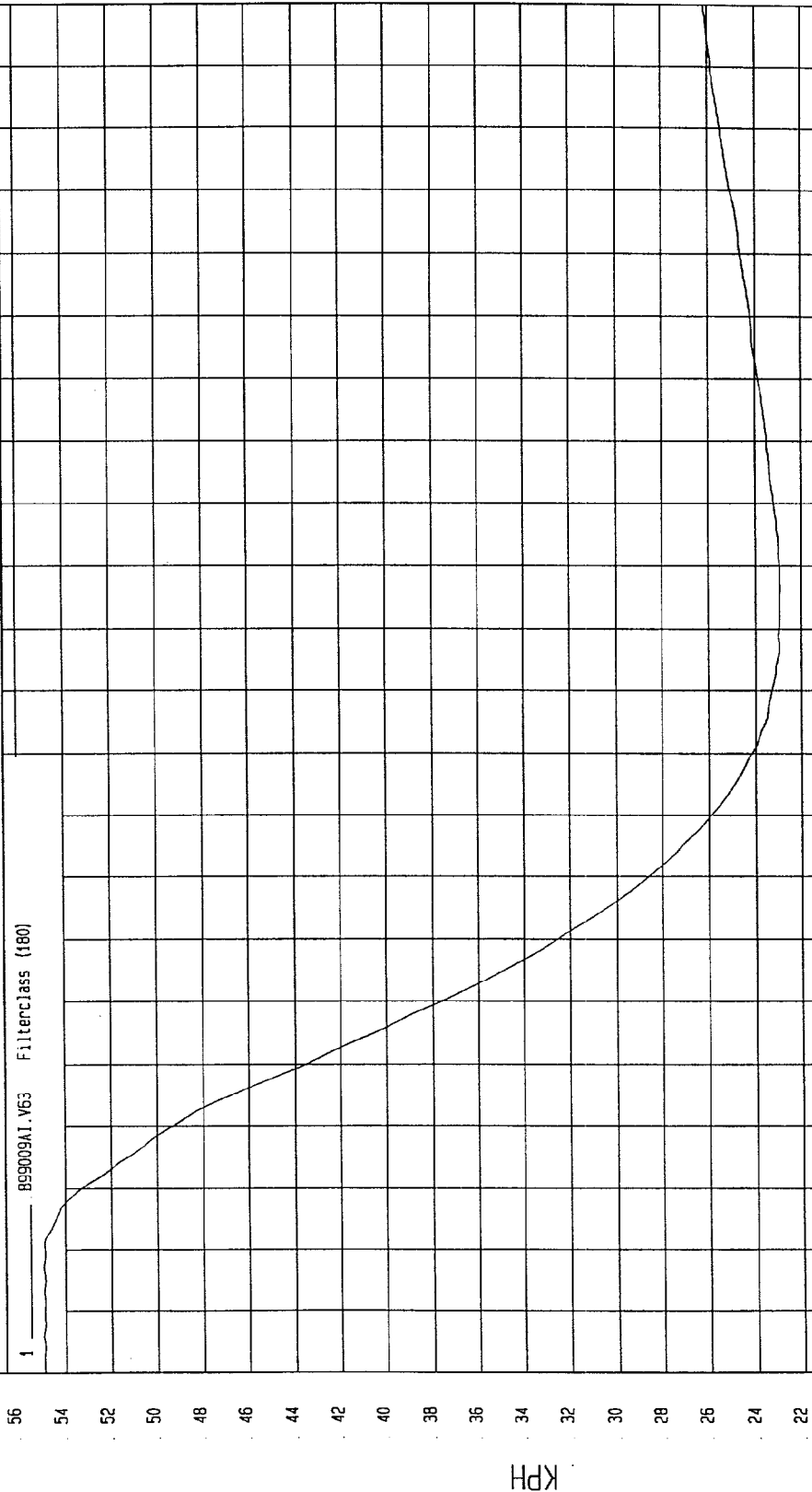
COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Speed: 38.3 MPH 61.6 KPH

Minimum = 22.93 KPH at .106 msec

Maximum = 54.94 KPH at -.14 msec

MOVING BARRIER CG X VELOCITY



TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

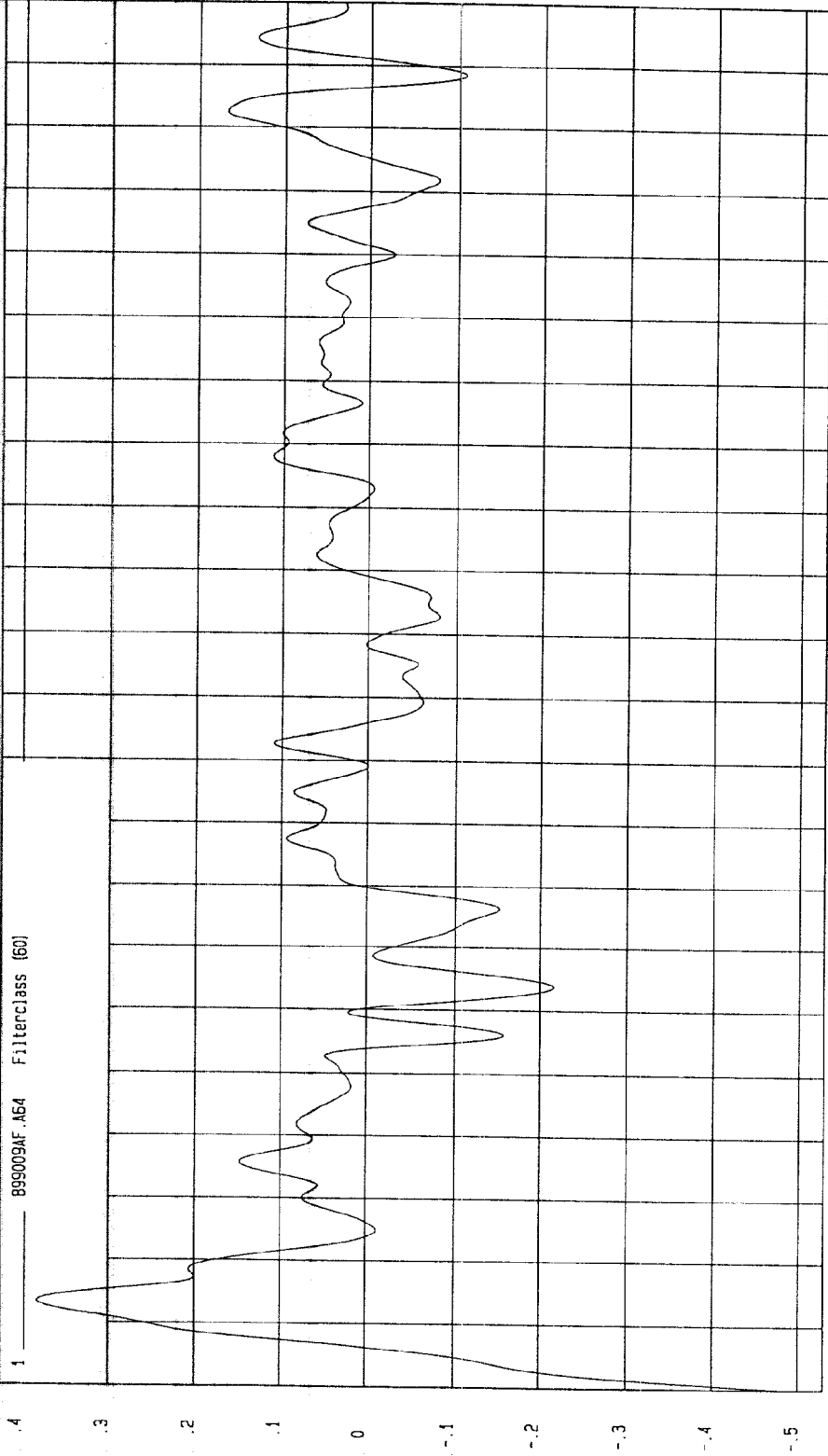
COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -.49 G'S at -20 msec

Maximum = .38 G'S at -7 msec

MOVING BARRIER CG Y ACCELERATION

1 899009AF.A64 Filterclass (60)



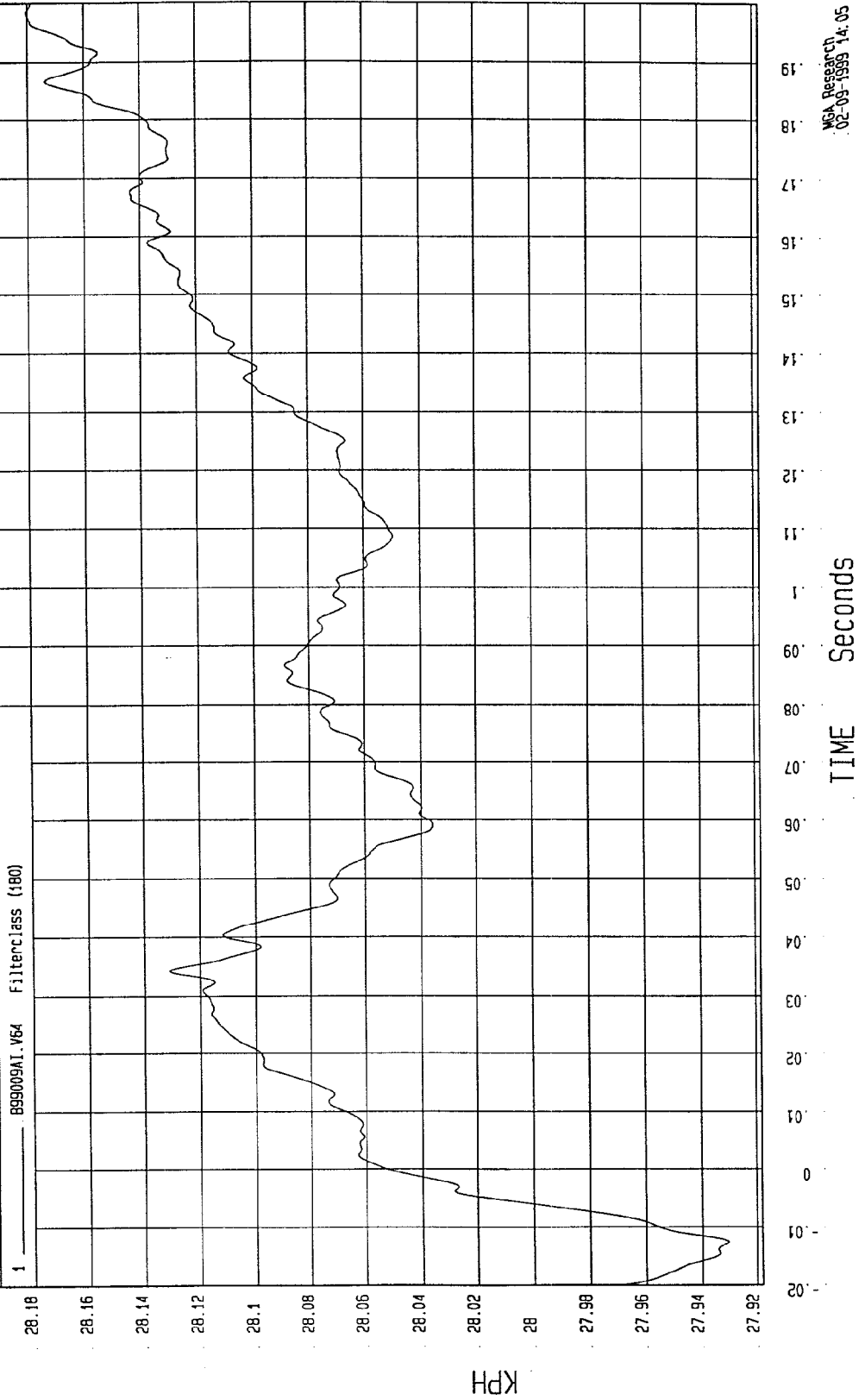
MGA Research
02-09-1999 14:05

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = 27.93 KPH at -13 msec Maximum = 28.18 KPH at 198 msec

MOVING BARRIER CG Y VELOCITY



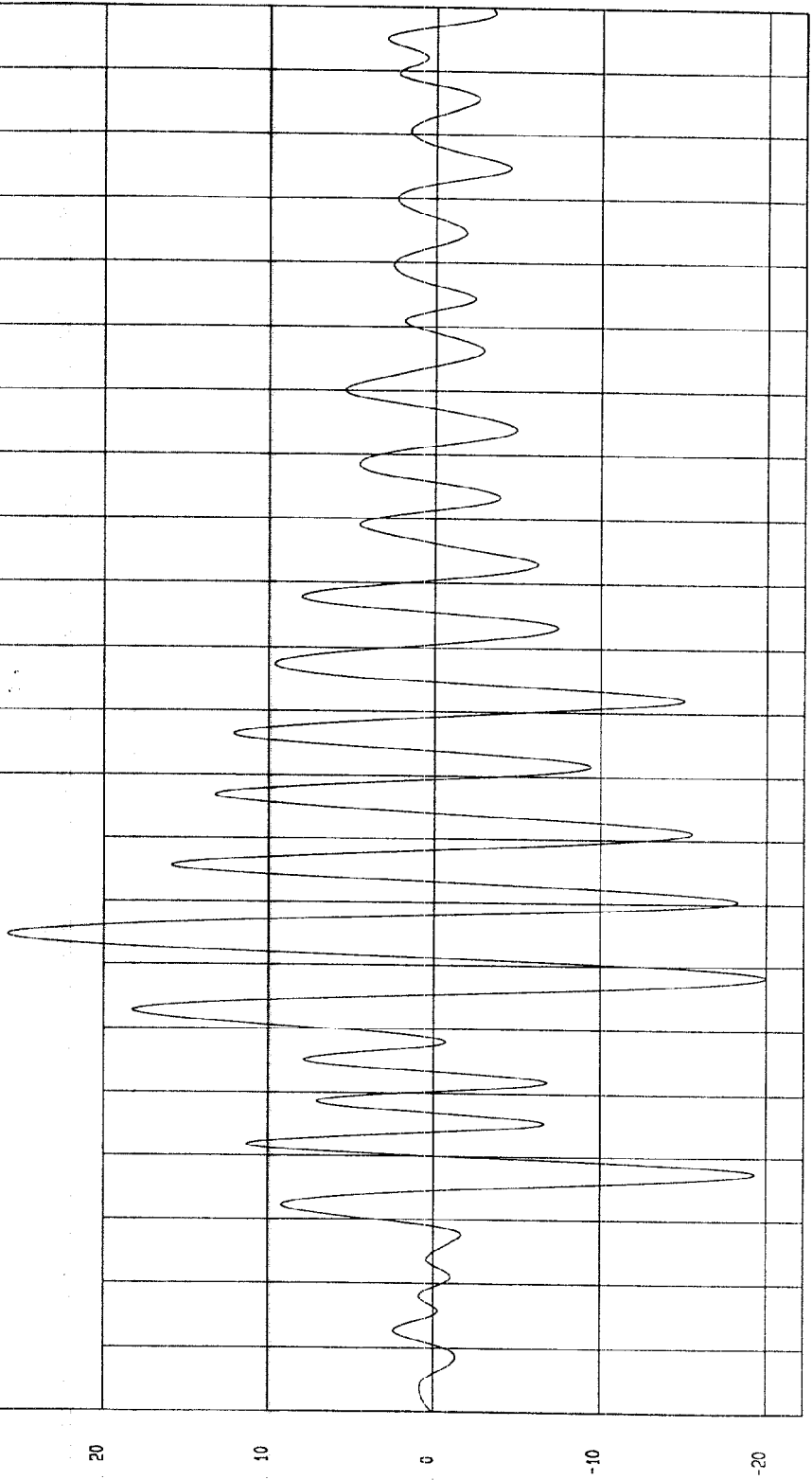
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -19.98 G'S at 48 msec Maximum = 25.73 G'S at 55 msec

MOVING BARRIER CG Z ACCELERATION

1 899009AF.A65 Filterclass (60)



NSA Research
02-09-1999 14:06

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107)

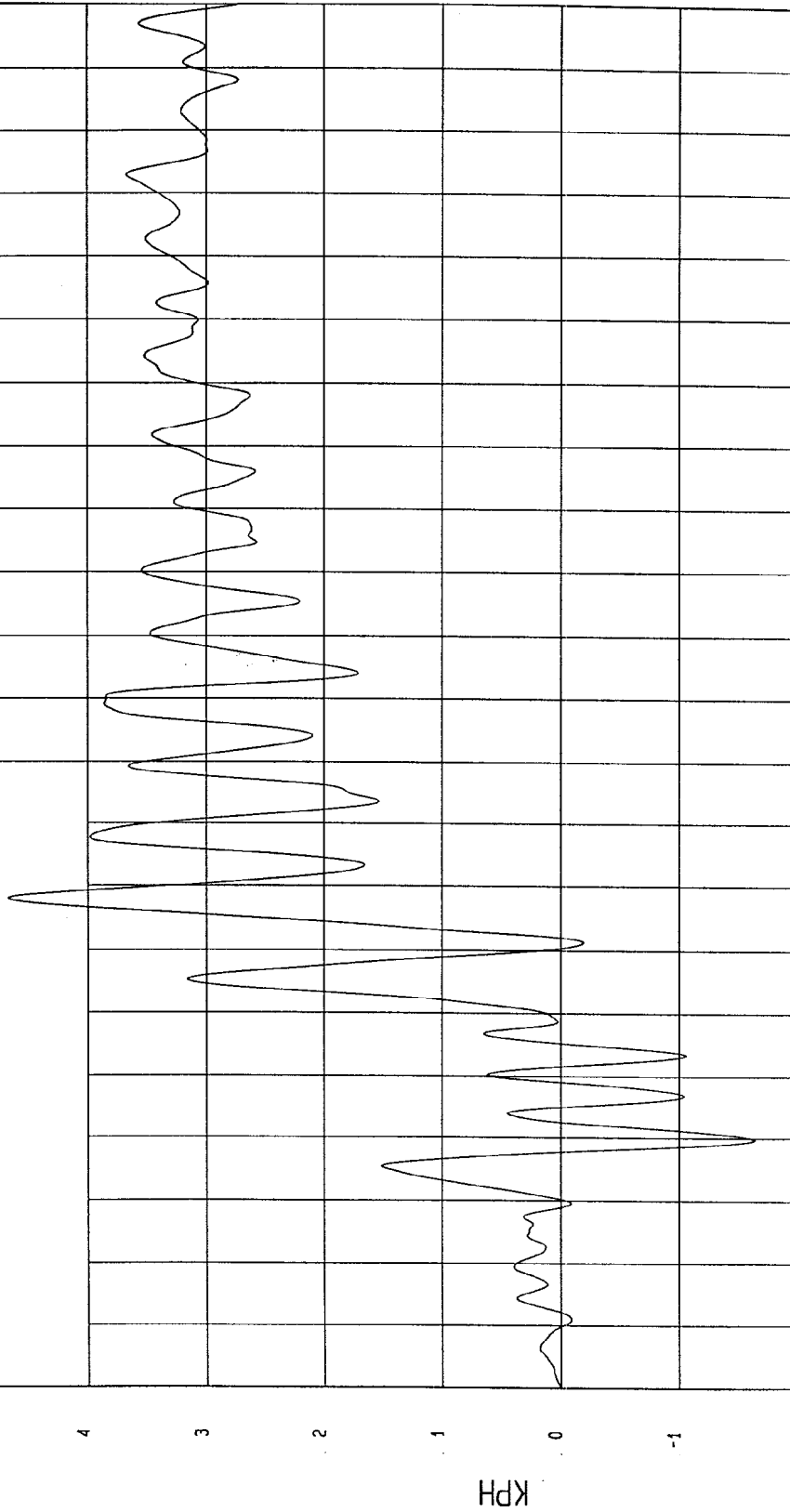
Speed: 38.3 MPH 61.6 KPH

Minimum = -1.65 KPH at 20 msec

Maximum = 4.67 KPH at 58 msec

MOVING BARRIER CG Z VELOCITY

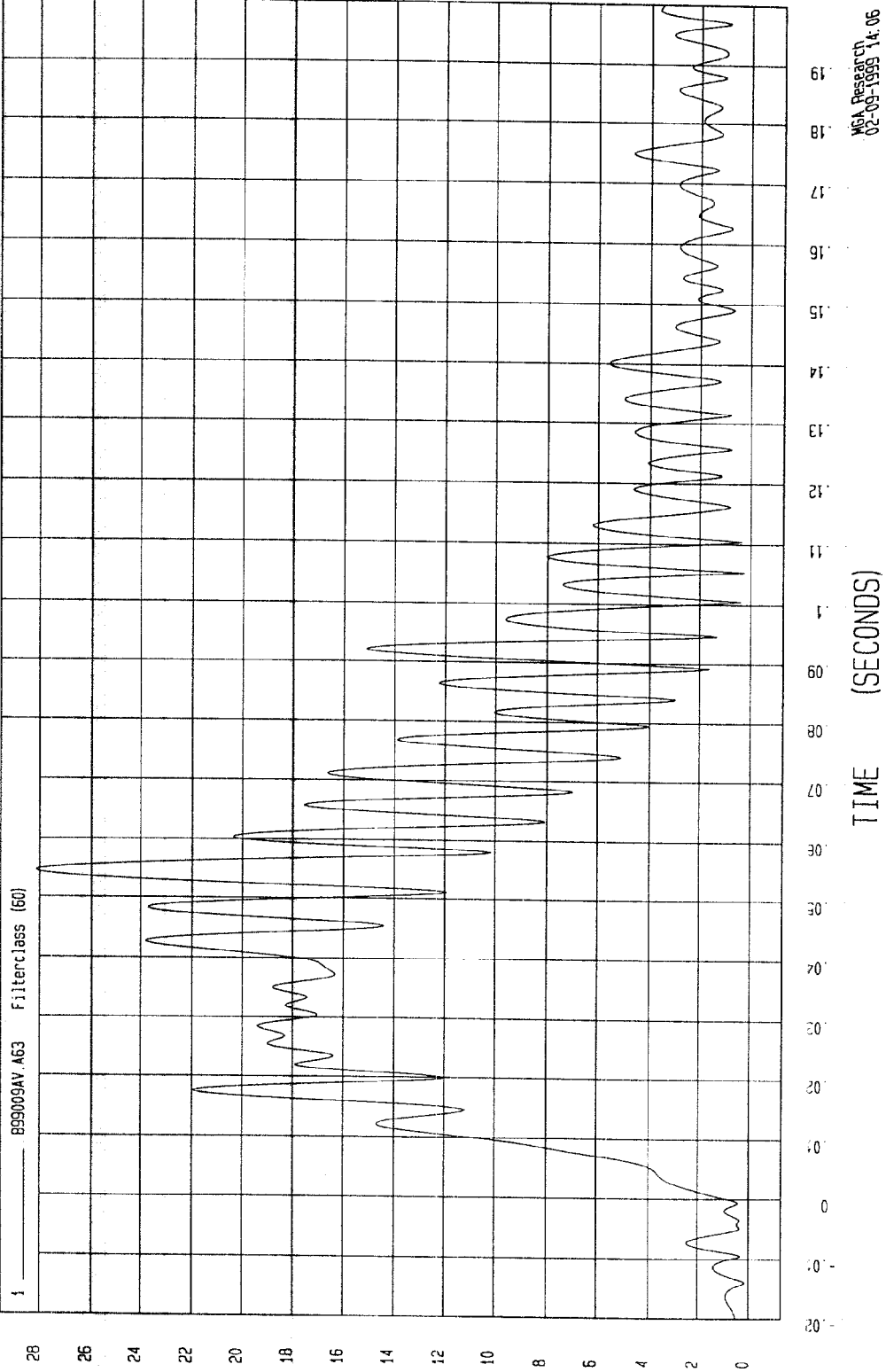
1 B99009A1.V65 Filterclass (180)



TEST: HIGH SPEED LATERAL IMPACT
TEST DATE: 01-22-1999
COMPONENT: 1999 TOYOTA TACOMA (MX5107)
Speed: 38.3 MPH 61.6 KPH

Minimum = .13 G's at -14 msec
Maximum = 28.15 G's at 55 msec

MOVING BARRIER CG RESULTANT ACCELERATION

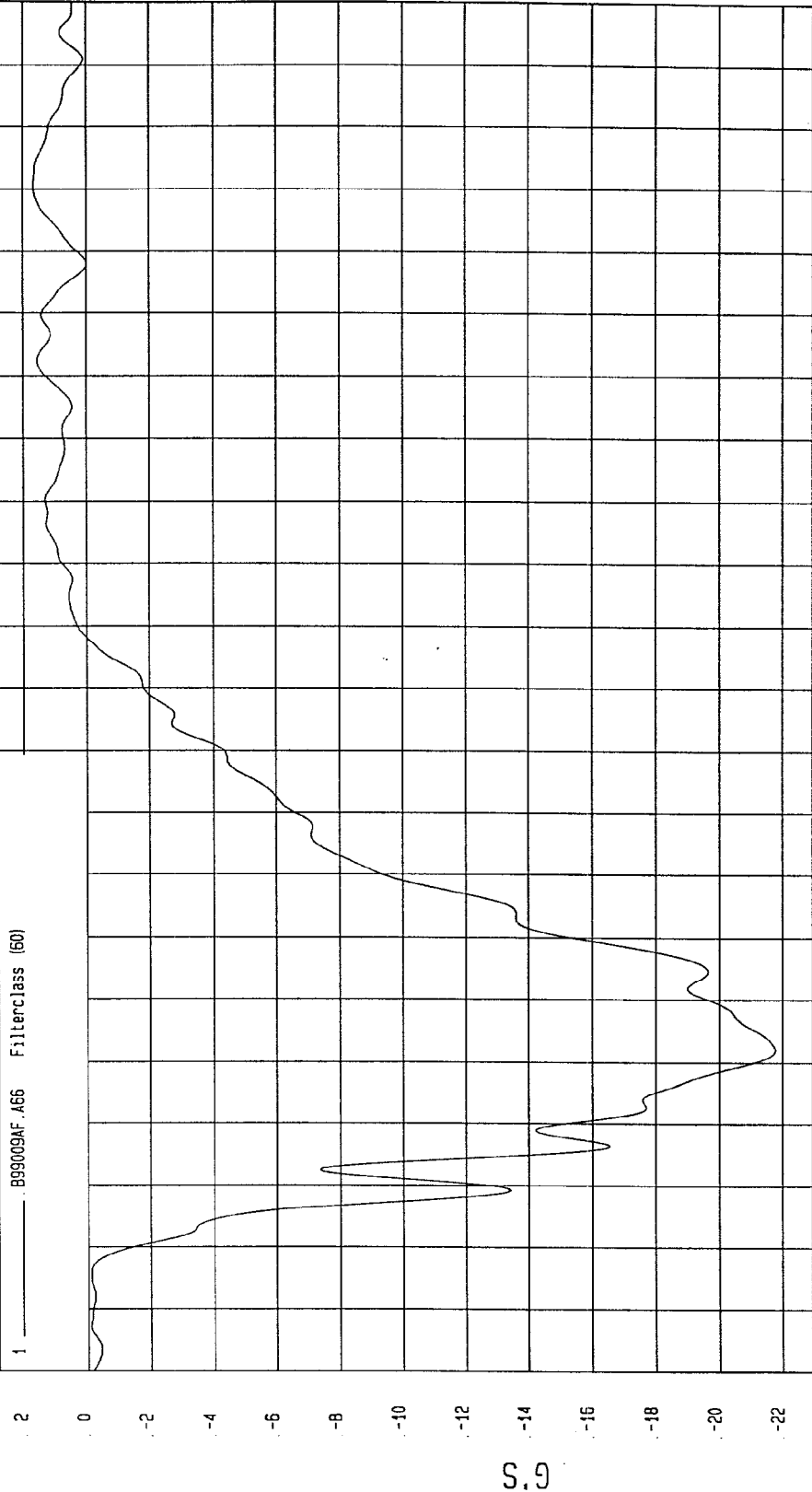


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -21.77 G'S at 32 msec Maximum = 1.67 G'S at 171 msec

MOVING BARRIER REAR AXLE X ACCELERATION



WGA Research
02-09-1999 14: 06

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

Speed: 38.3 MPH 61.6 KPH

COMPONENT: 1999 TOYOTA TACOMA (MX5107)

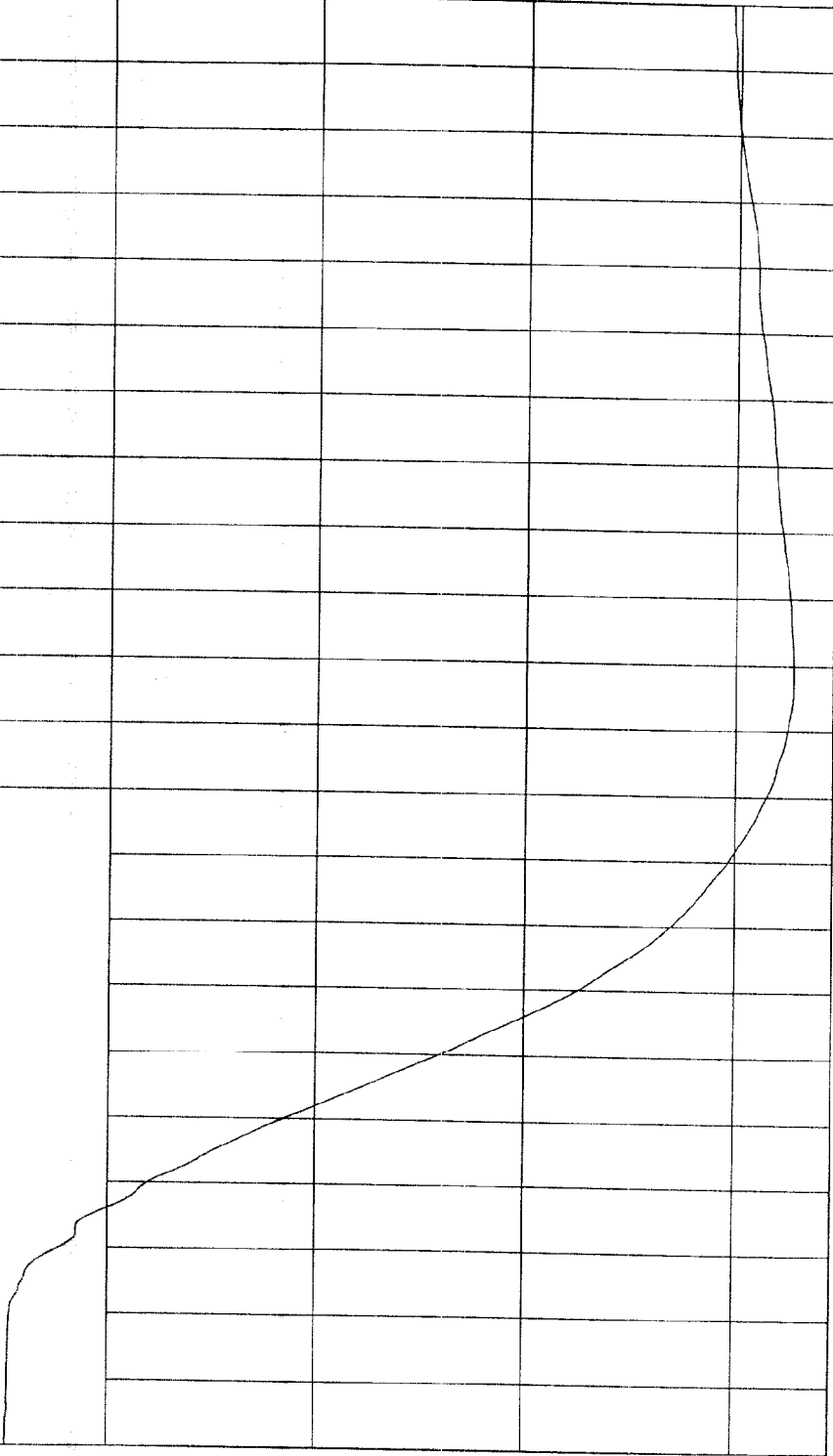
Maximum = 54.89 KPH at -20 msec

Minimum = 17.16 KPH at 98 msec

MOVING BARRIER REAR AXLE X VELOCITY

Filterclass (180)

1



NCA Research
02-09-1999 14.06

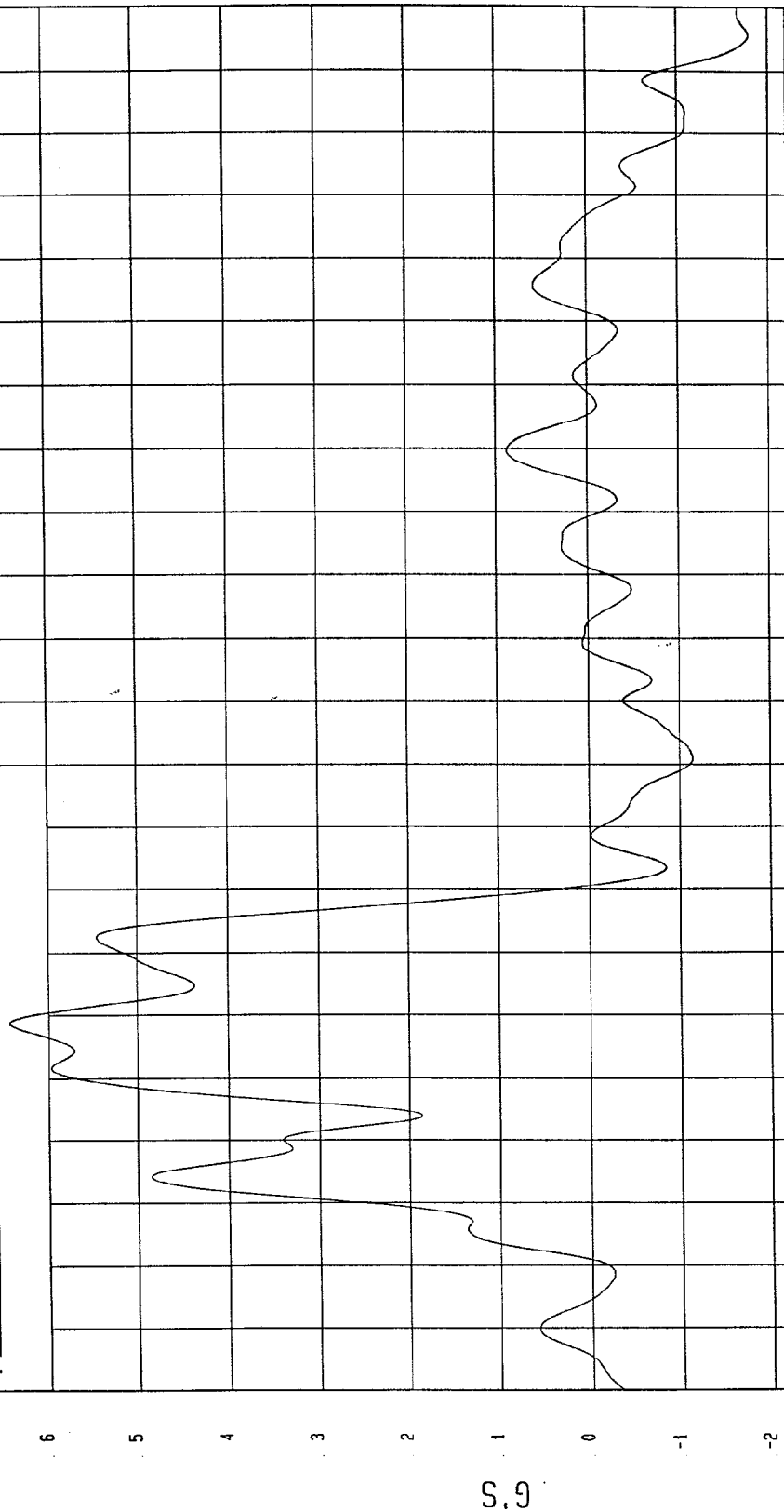
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -1.79 G'S at 196 msec Maximum = 6.42 G'S at 39 msec

MOVING BARRIER REAR AXLE Y ACCELERATION

1 899009AF.A67 Filterclass (60)

NSA Research
02-09-1999 14:06

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

Speed: 38.3 MPH 61.6 KPH

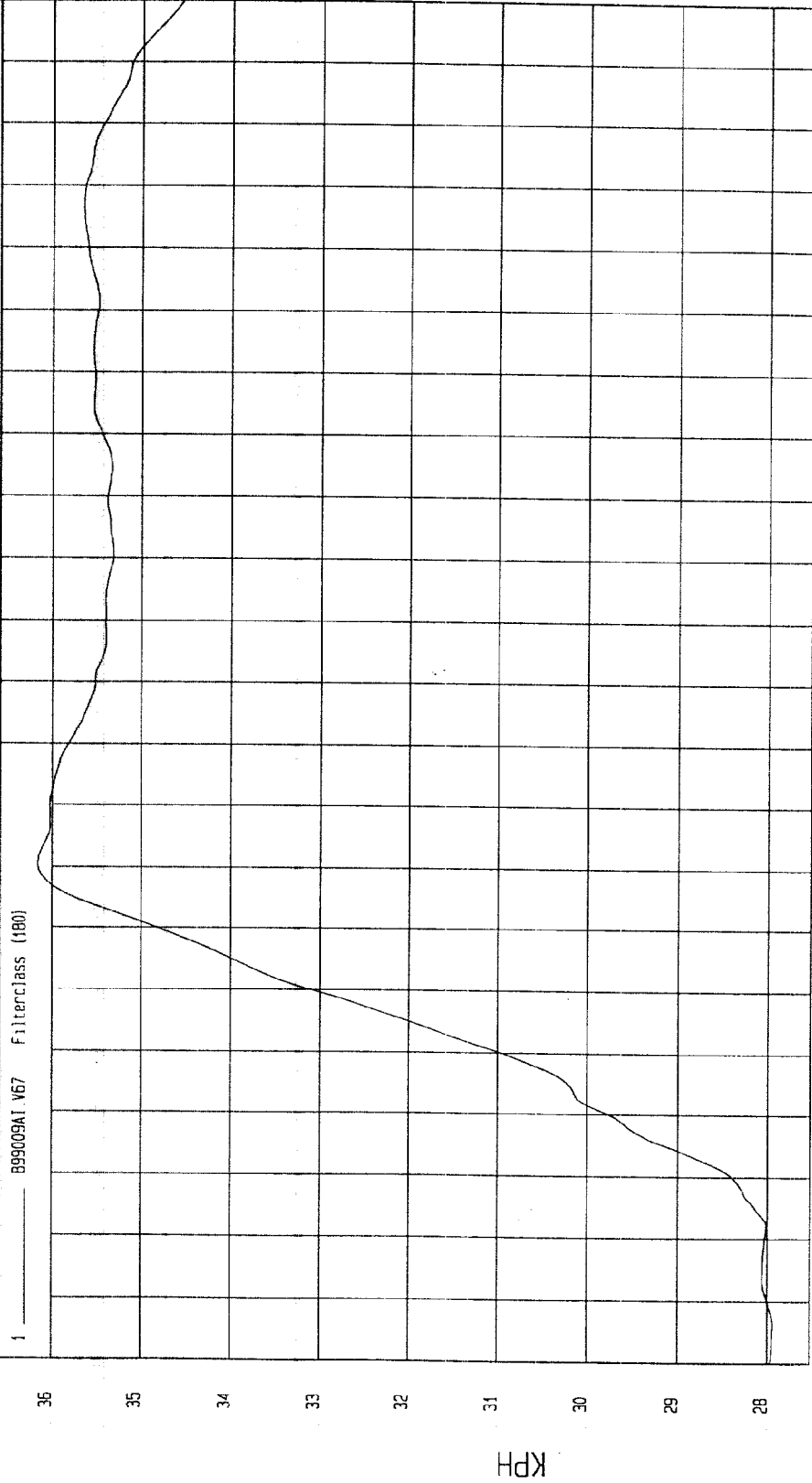
COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Maximum = 35.6 KPH at 61 msec

Minimum = 27.94 KPH at -14 msec

MOVING BARRIER REAR AXLE Y VELOCITY

1 — B99009A1 V67 FilterClass (180)



TIME Seconds

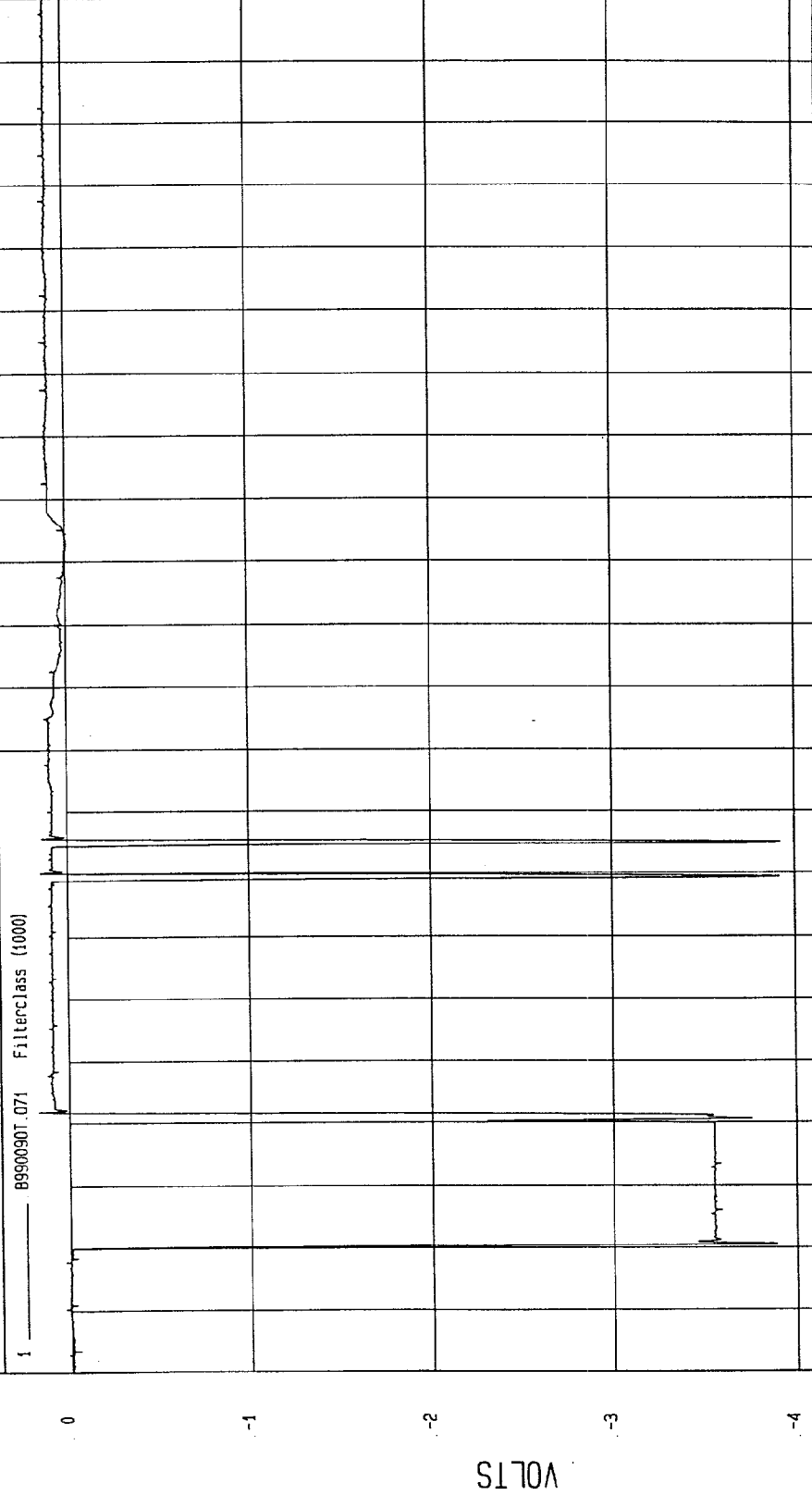
MSA Research
02-03-1999 14:06

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -3.92 VOLTS at 65 msec Maximum = .17 VOLTS at 22 msec

LEFT BARRIER CONTACT

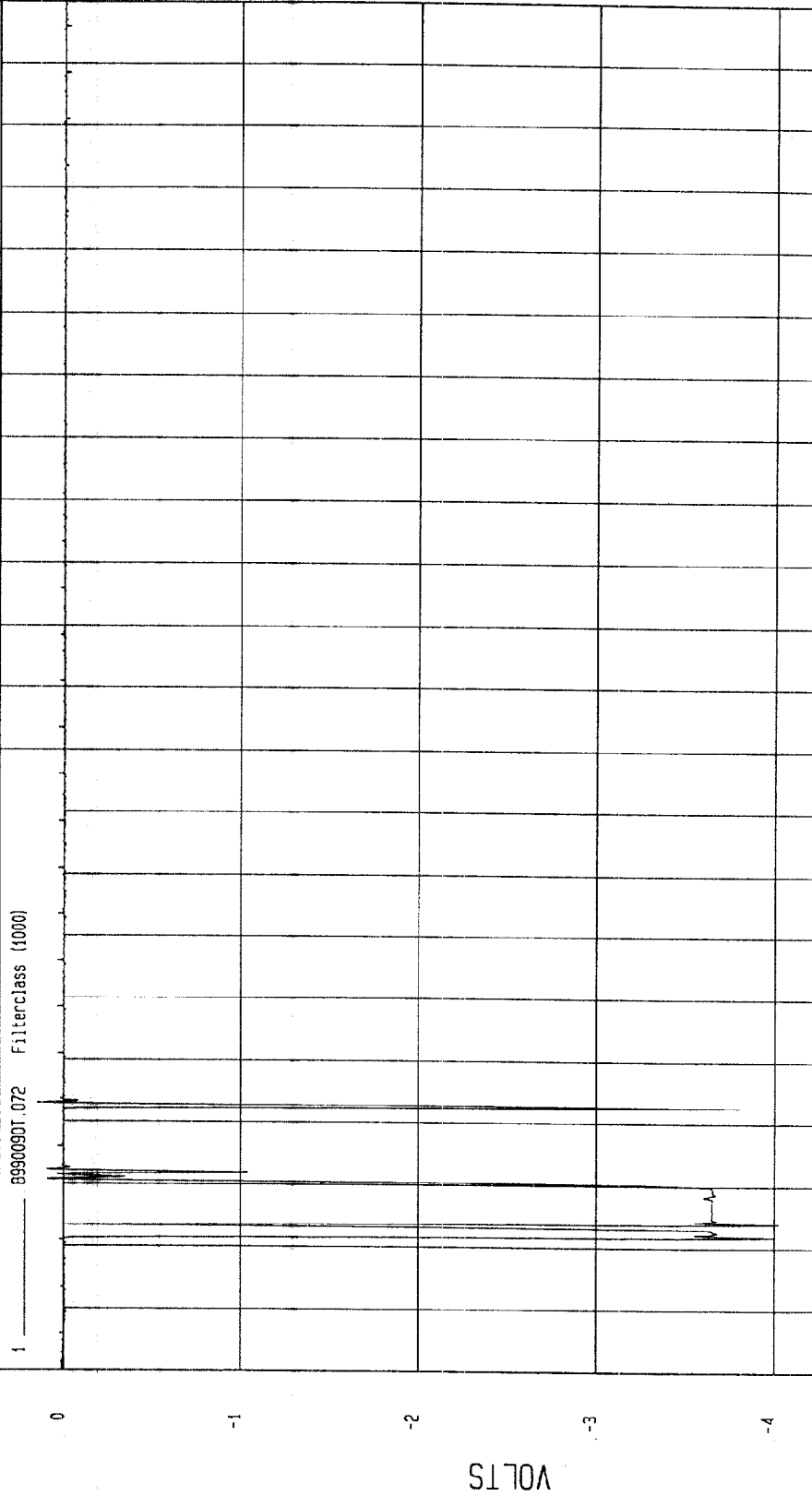


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -4.02 VOLTS at 4 msec Maximum = .15 VOLTS at 23 msec

RIGHT BARRIER CONTACT

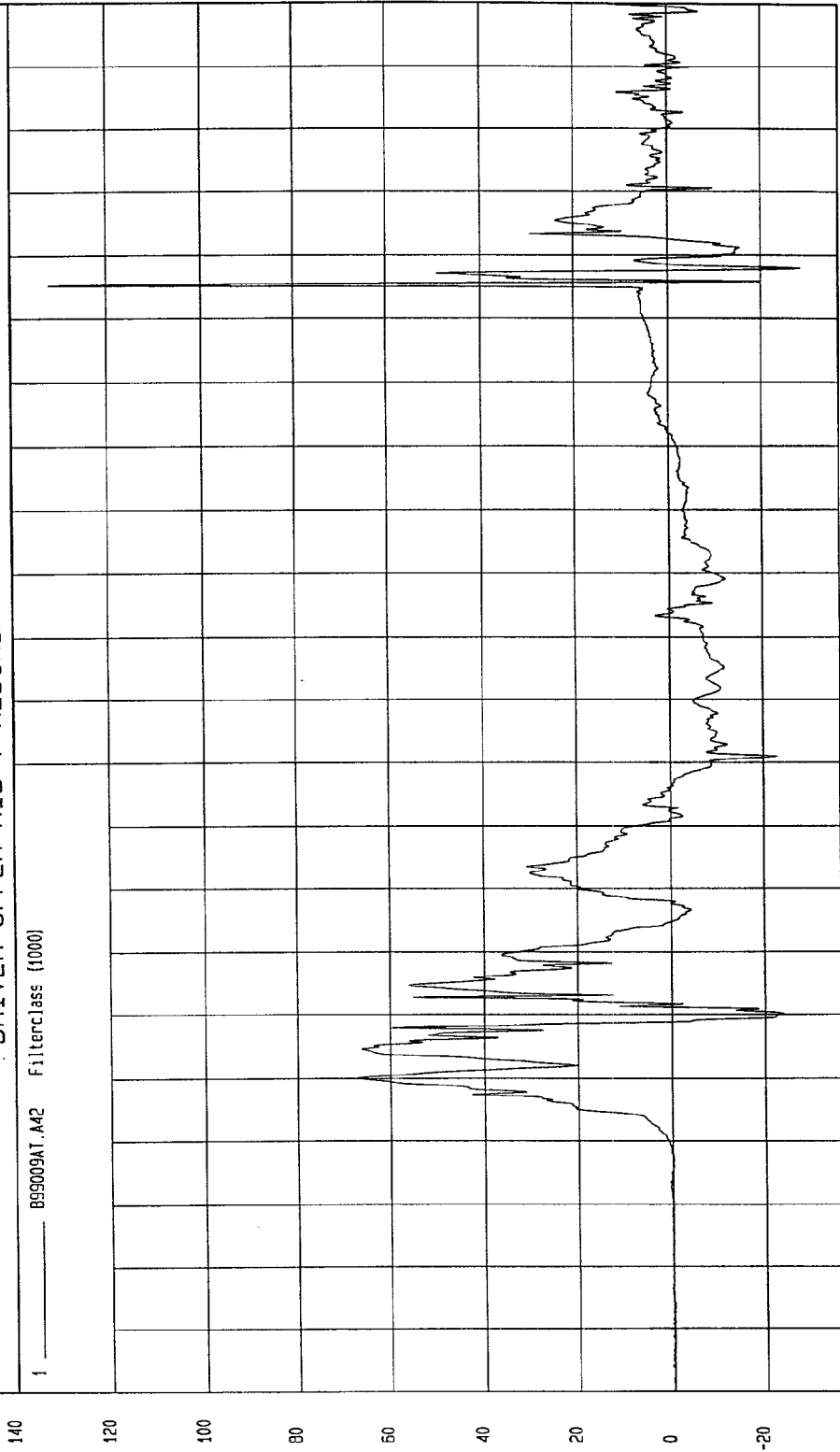


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -26.4 G'S at .158 msec Maximum = 132.17 G'S at .155 msec

DRIVER UPPER RIB Y REDUNDANT ACCELERATION



MCA Research
02-05-1999 13.59

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

SPEED: 38.3 MPH 61.6 KPH

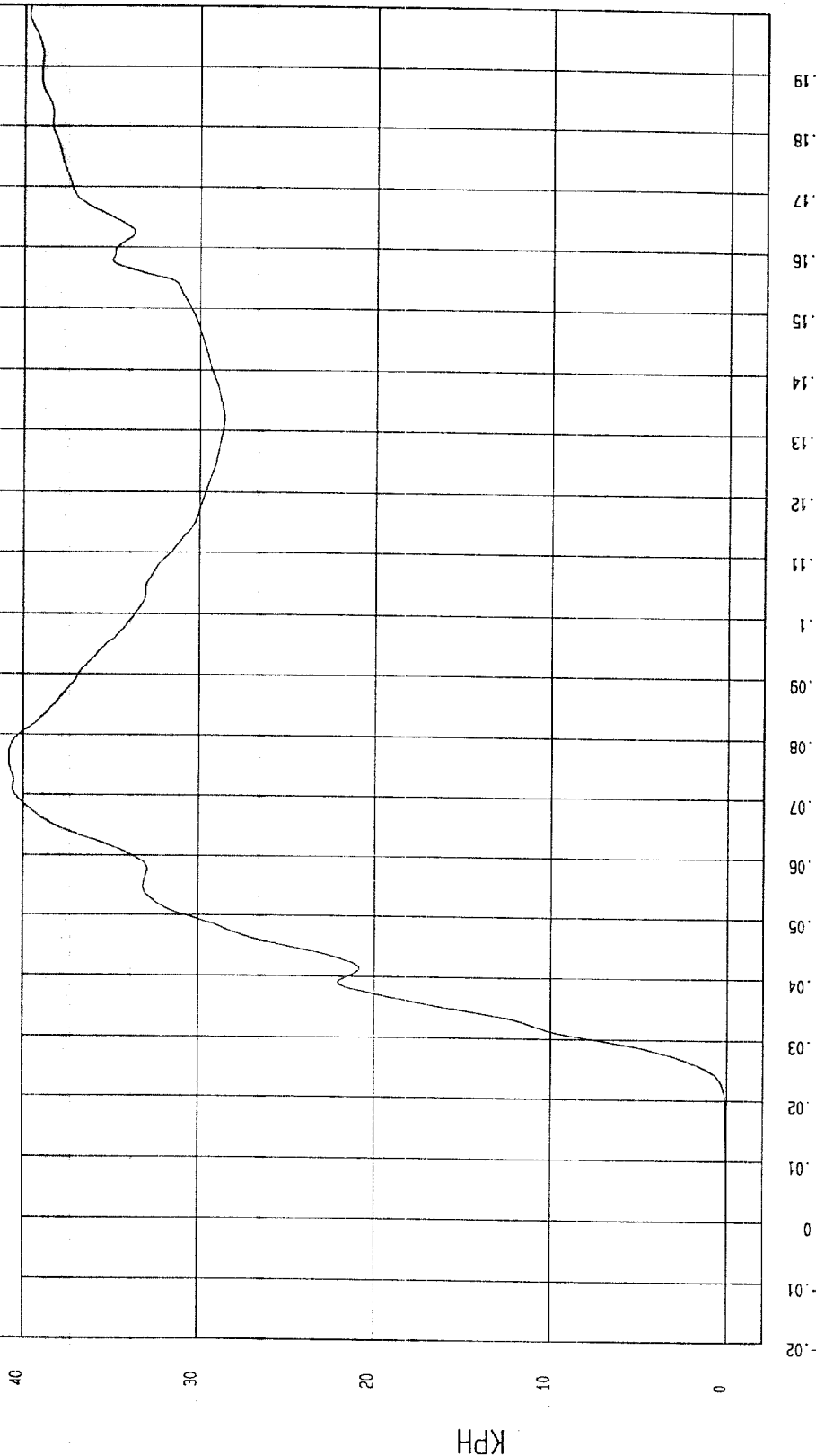
COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Maximum = 40.82 KPH at 76 msec

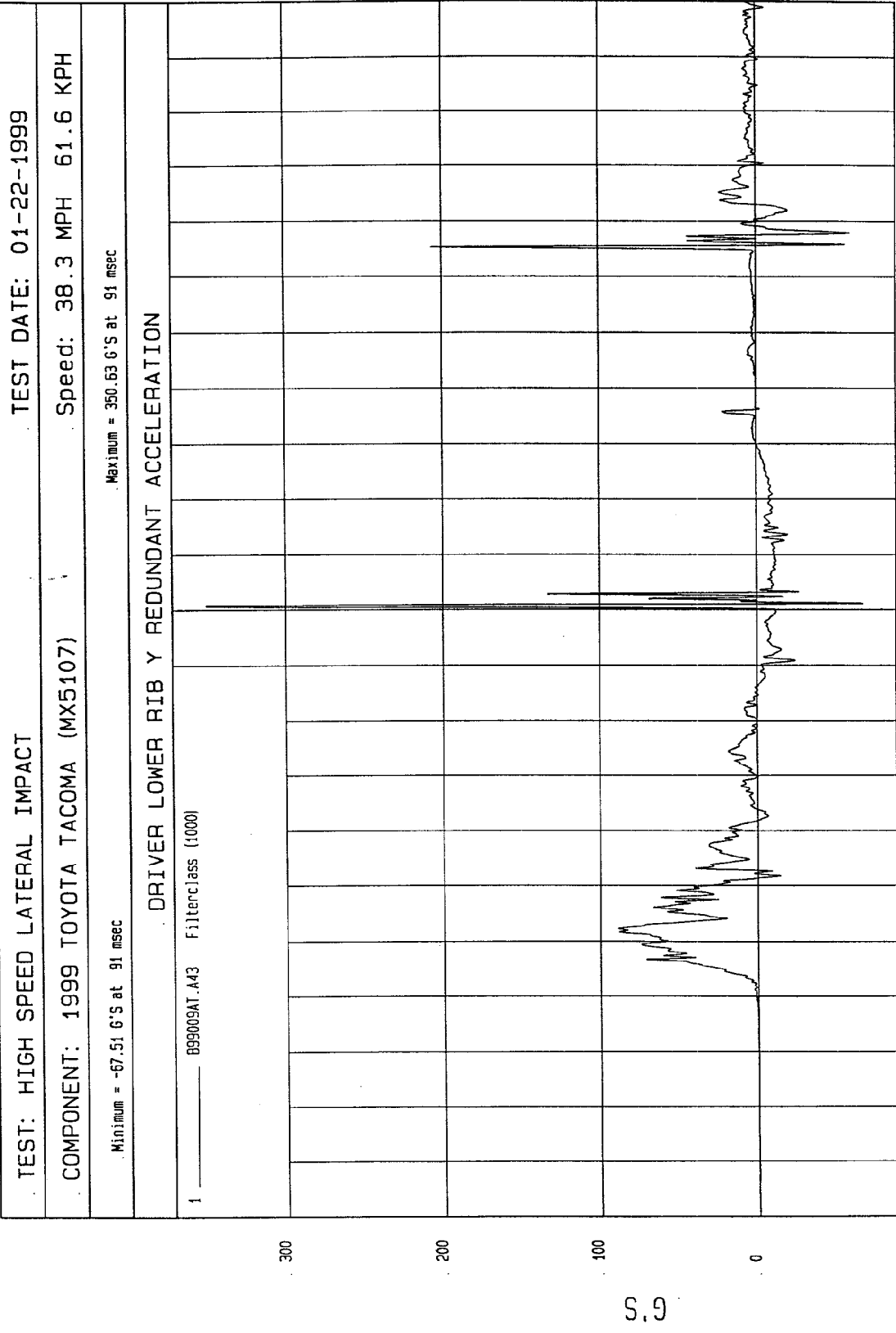
Minimum = 0 KPH at -20 msec

DRIVER UPPER RIB Y REDUNDANT VELOCITY

1 B99009A1.V42 FilterClass (180)



WCA Research
02-15-1999 14:37



TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

Speed: 38.3 MPH 61.6 KPH

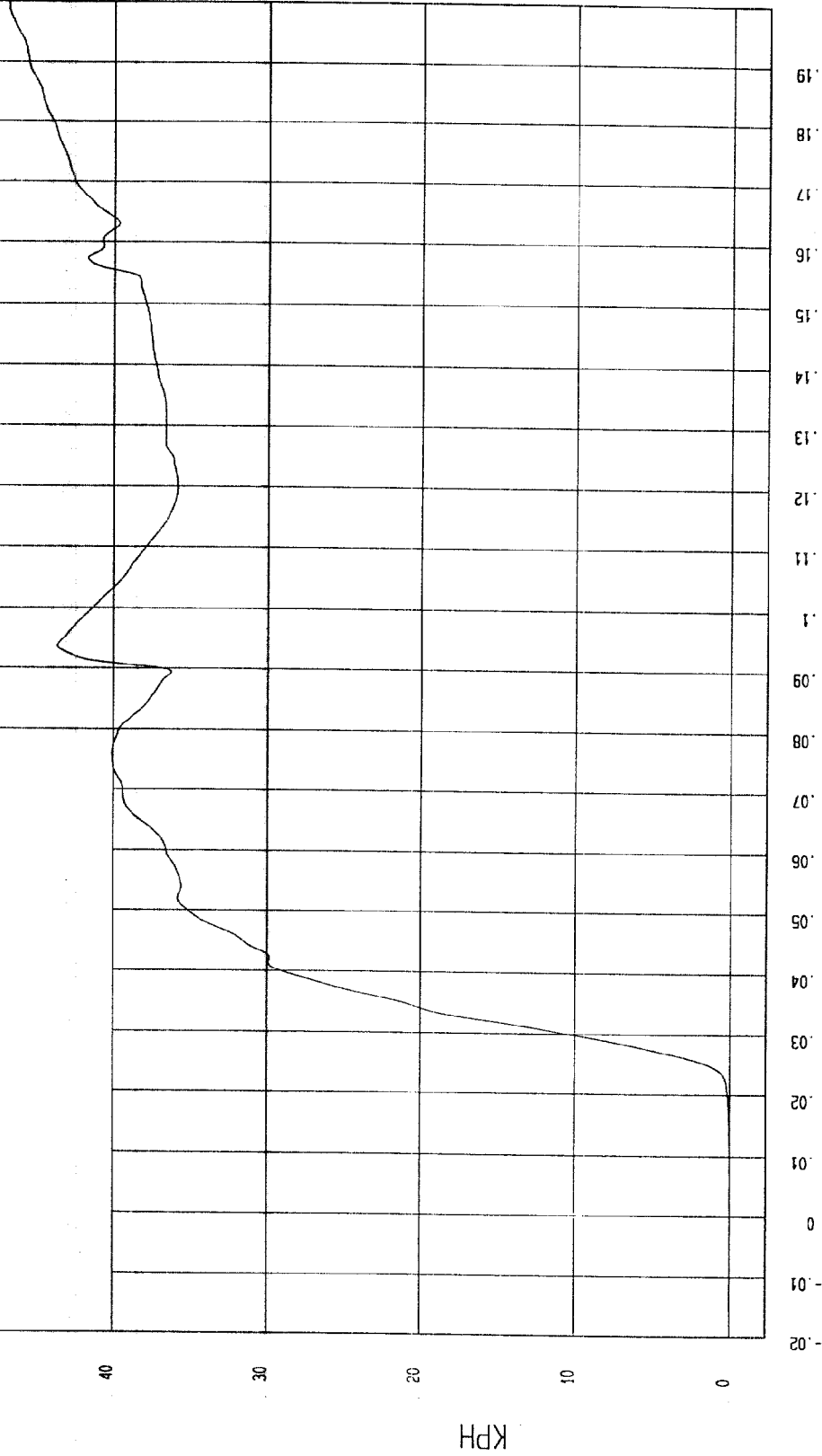
COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Maximum = 46.84 KPH at 199 msec

Minimum = -9.55E-03 KPH at -5 msec

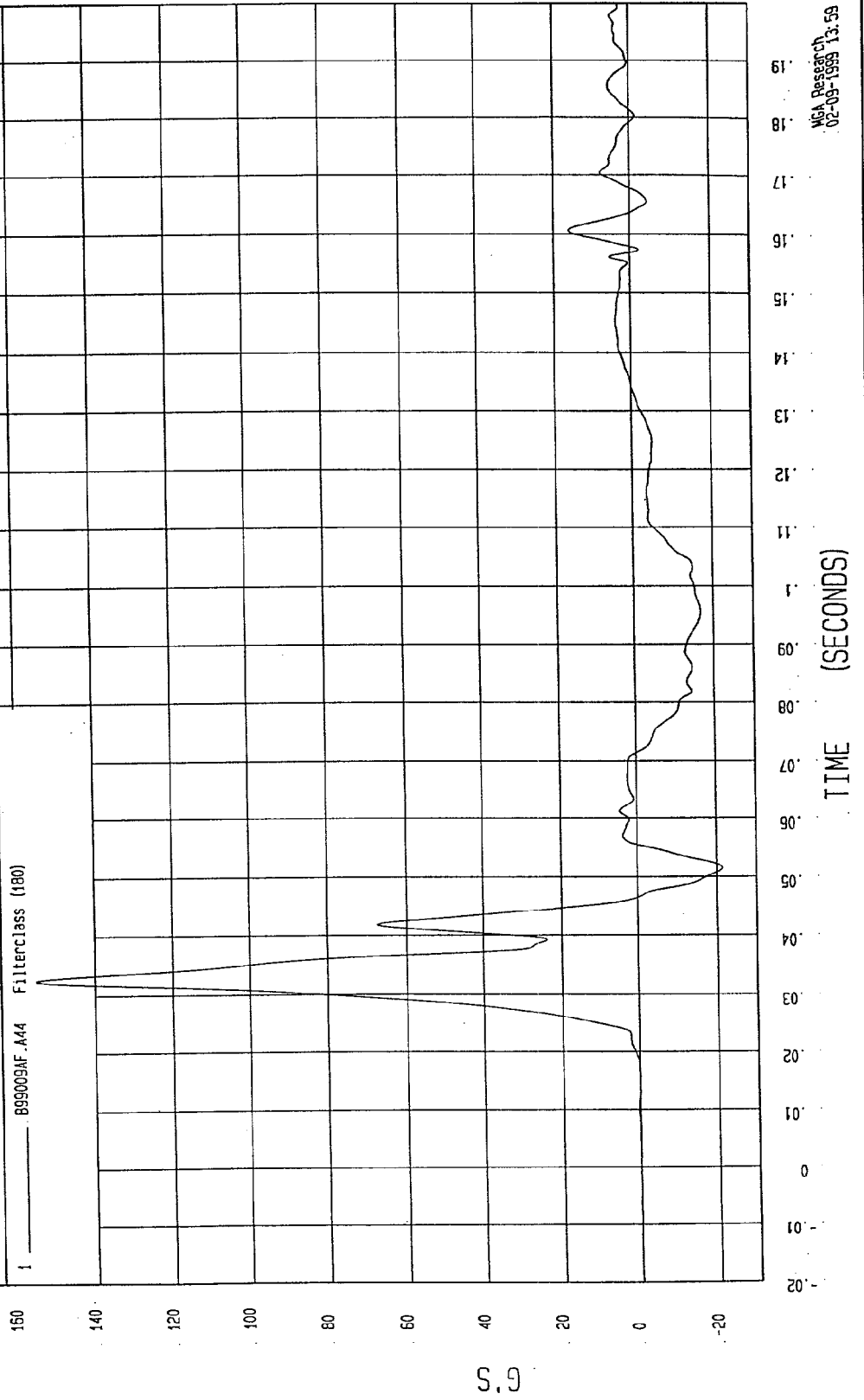
DRIVER LOWER RIB Y REDUNDANT VELOCITY

1 ——— B99009A1.V43 FilterClass (180)



TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999
COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH
Minimum = -21.55 G'S at 52 msec Maximum = 155.01 G'S at 32 msec

DRIVER LOWER SPINE Y REDUNDANT ACCELERATION



TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

SPEED: 38.3 MPH 61.6 KPH

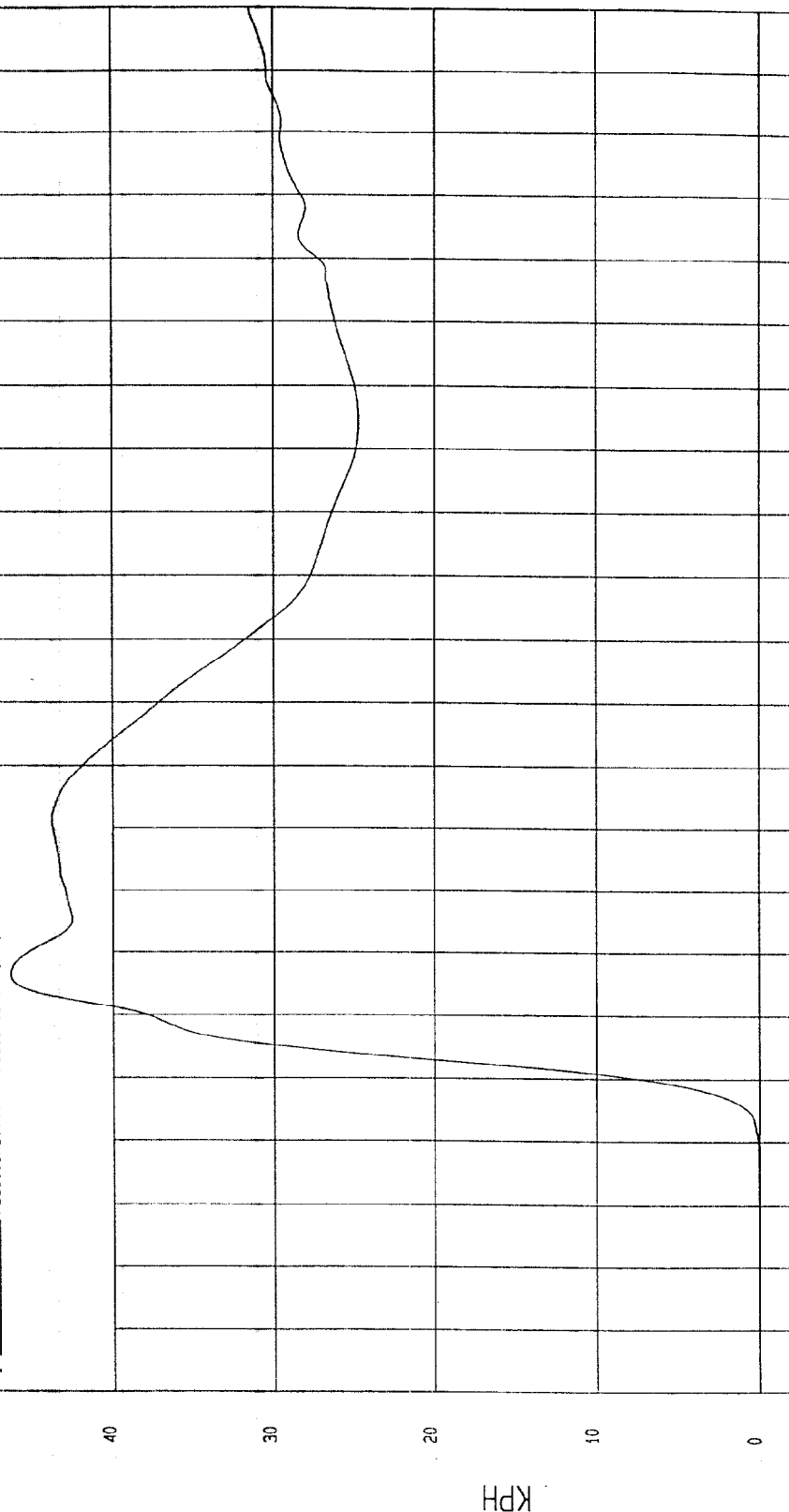
COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Maximum = 46.29 KPH at 46 msec

Minimum = -8.19E-03 KPH at -14 msec

DRIVER LOWER SPINE Y REDUNDANT VELOCITY

1 899009AI.V44 FilterClass (180)

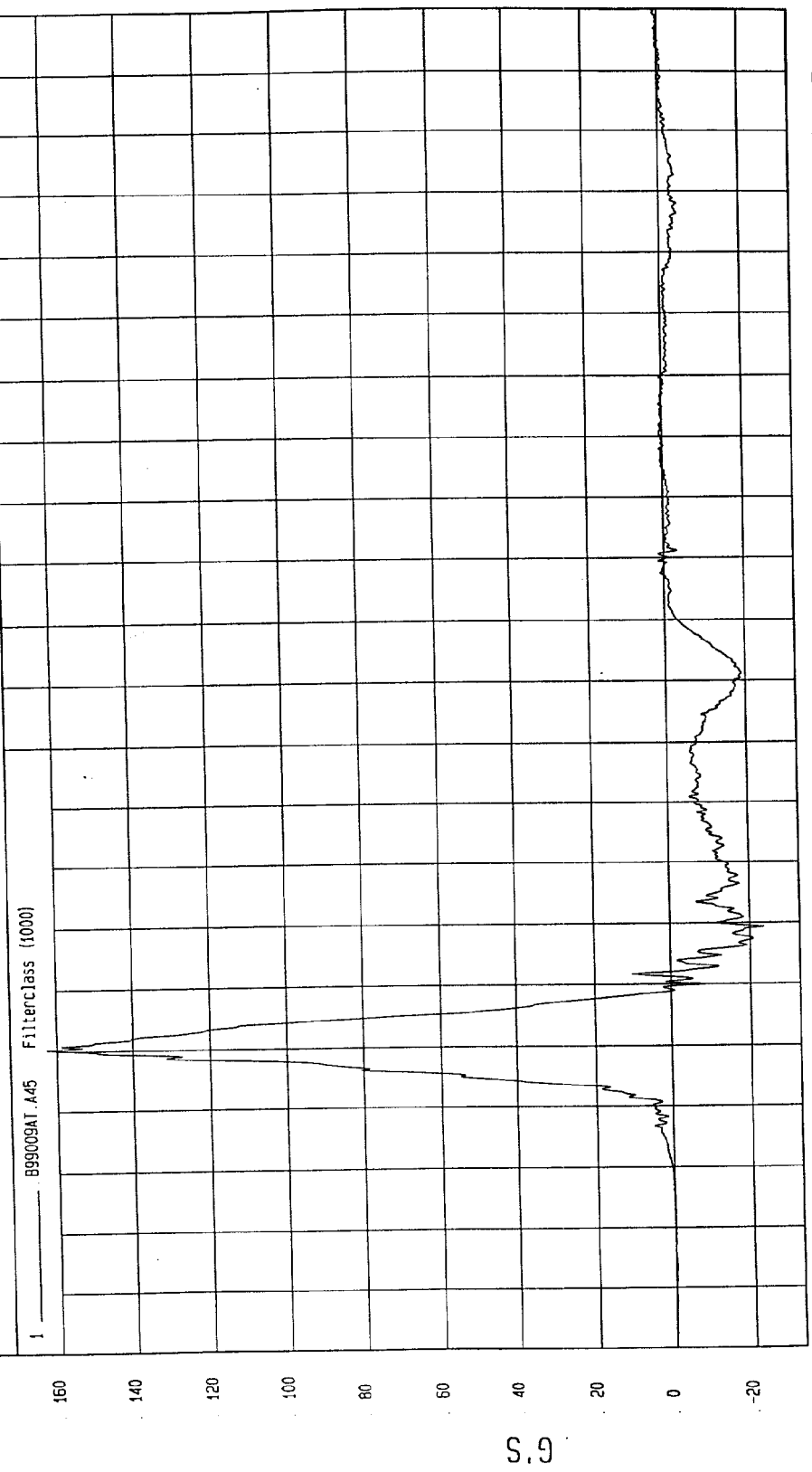


WCA Research
02-15-1999 14:37

TIME Seconds

TEST: HIGH SPEED LATERAL IMPACT
 TEST DATE: 01-22-1999
 COMPONENT: 1999 TOYOTA TACOMA (MX5107)
 Speed: 38.3 MPH 61.6 KPH
 Minimum = -23.95 G'S at 49 msec
 Maximum = 162.62 G'S at 30 msec

DRIVER PELVIS Y REDUNDANT ACCELERATION



TIME (SECONDS)

MCA Research
 02-09-1999 13:59

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107)

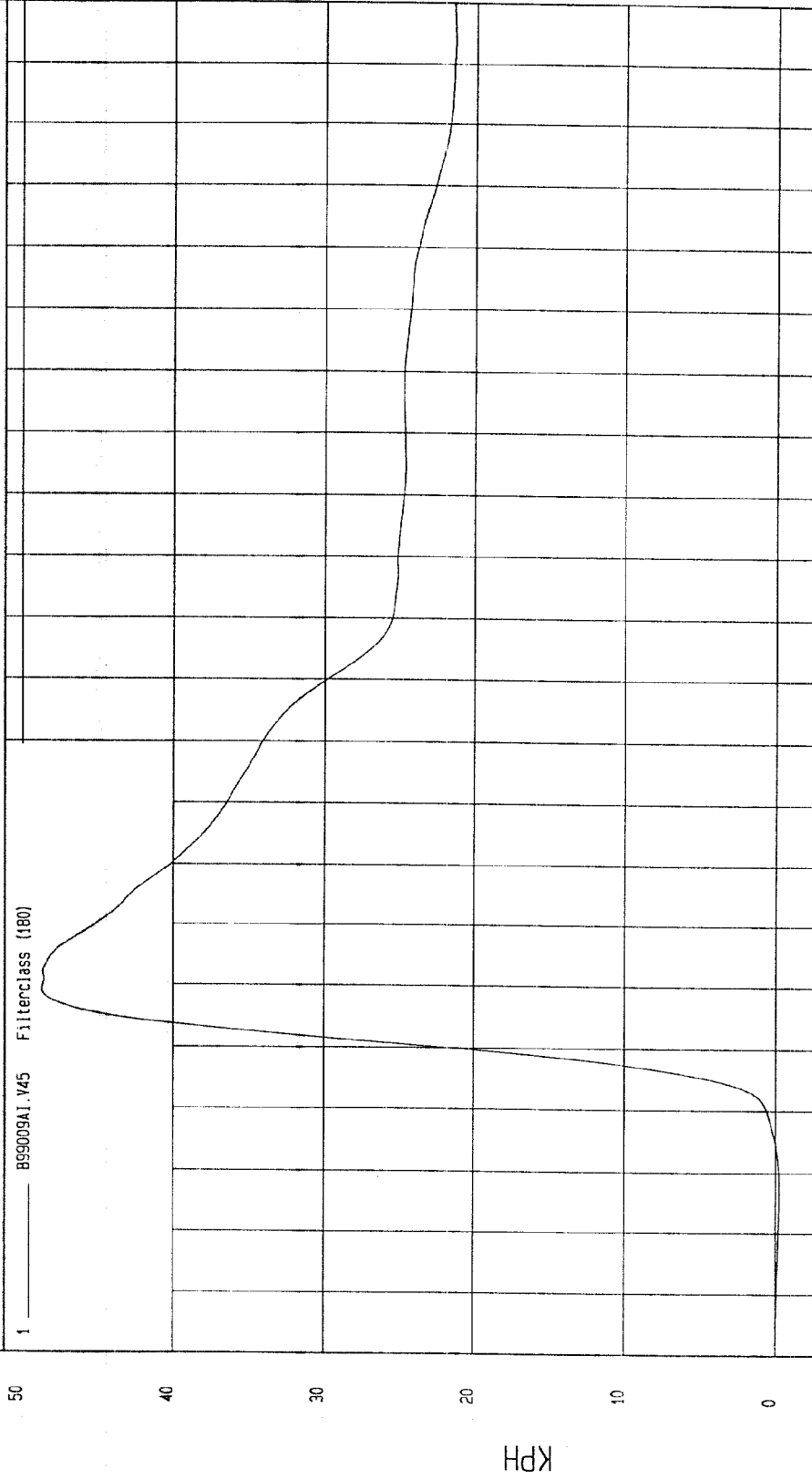
Speed: 38.3 MPH 61.6 KPH

Minimum = -.25 KPH at 6 msec

Maximum = 48.72 KPH at 39 msec

DRIVER PELVIS Y REDUNDANT VELOCITY

1 ——— B99009A1.V45 Filterclass (180)



FINITE IMPULSE RESPONSE (FIR) FILTERED DATA

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

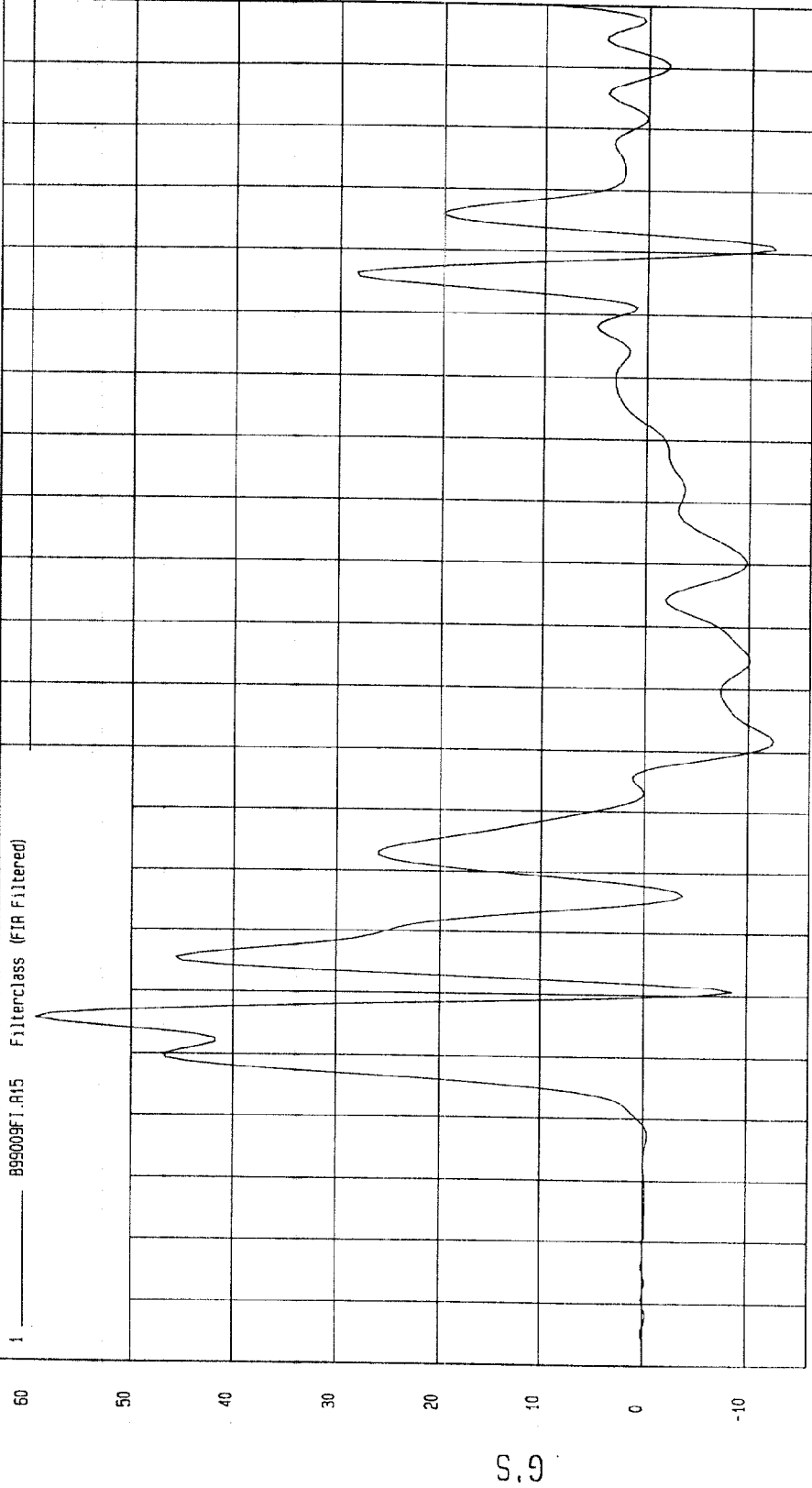
SPEED: 38.3 MPH 61.6 KPH

COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Maximum = 59.37 G'S at 36 msec

Minimum = -12.49 G'S at 82 msec

DRIVER UPPER RIB Y ACCELERATION



MEA Research
02-05-1999 14:14

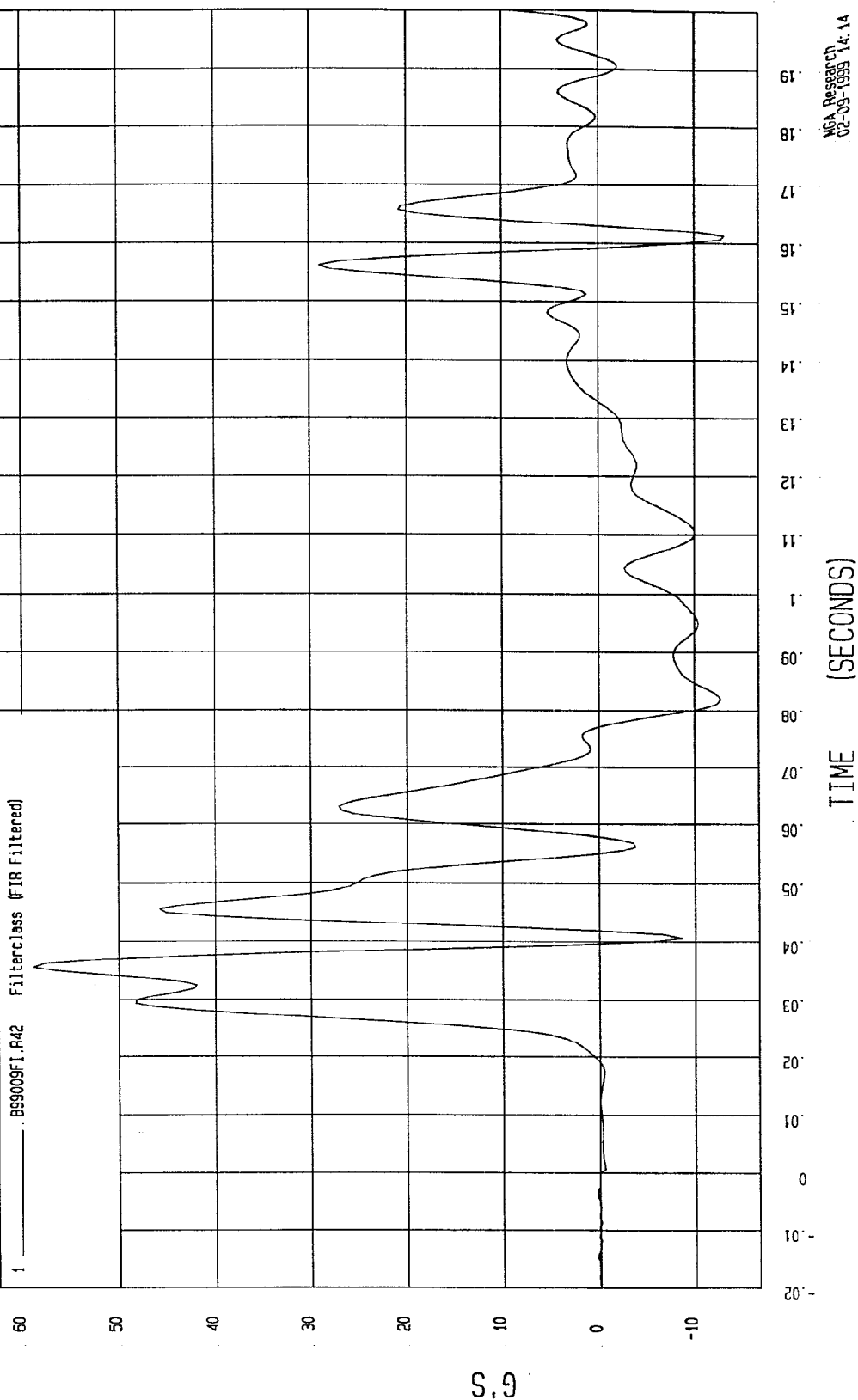
TIME (SECONDS)

TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -13.07 G'S at 161 msec Maximum = 58.93 G'S at 35 msec

DRIVER UPPER RIB Y REDUNDANT ACCELERATION

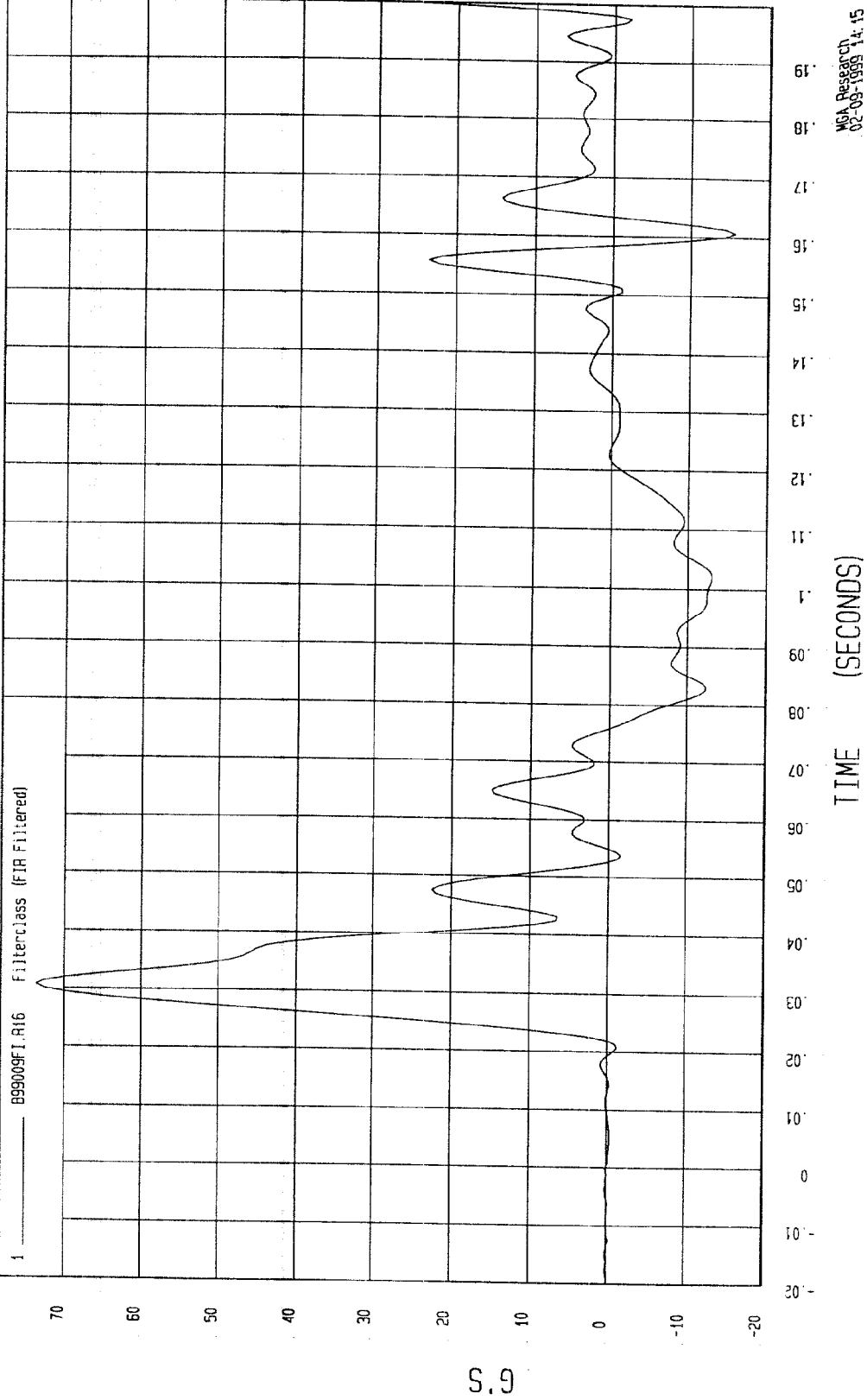


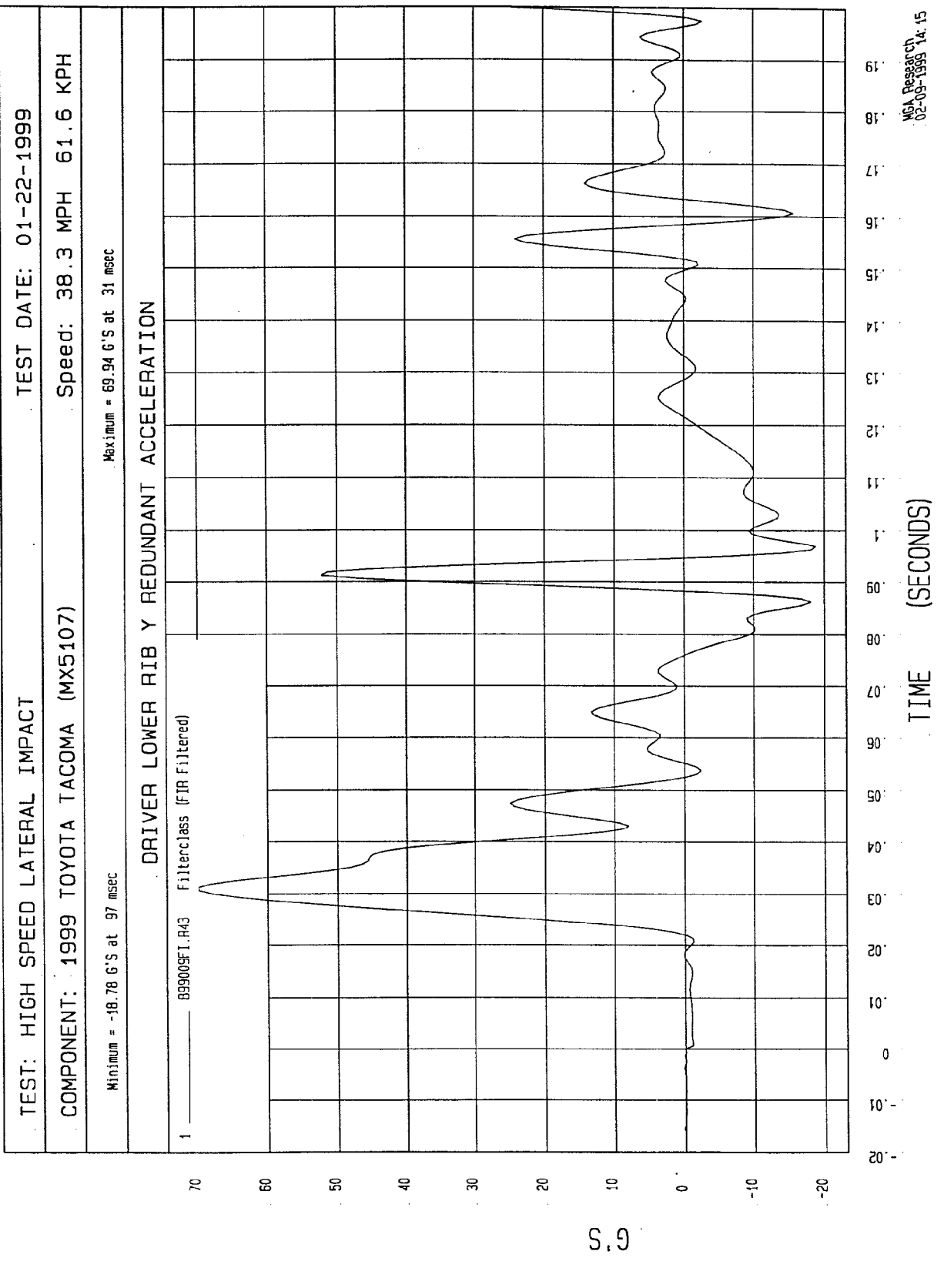
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -15.7 G'S at 161 msec Maximum = 73.57 G'S at 31 msec

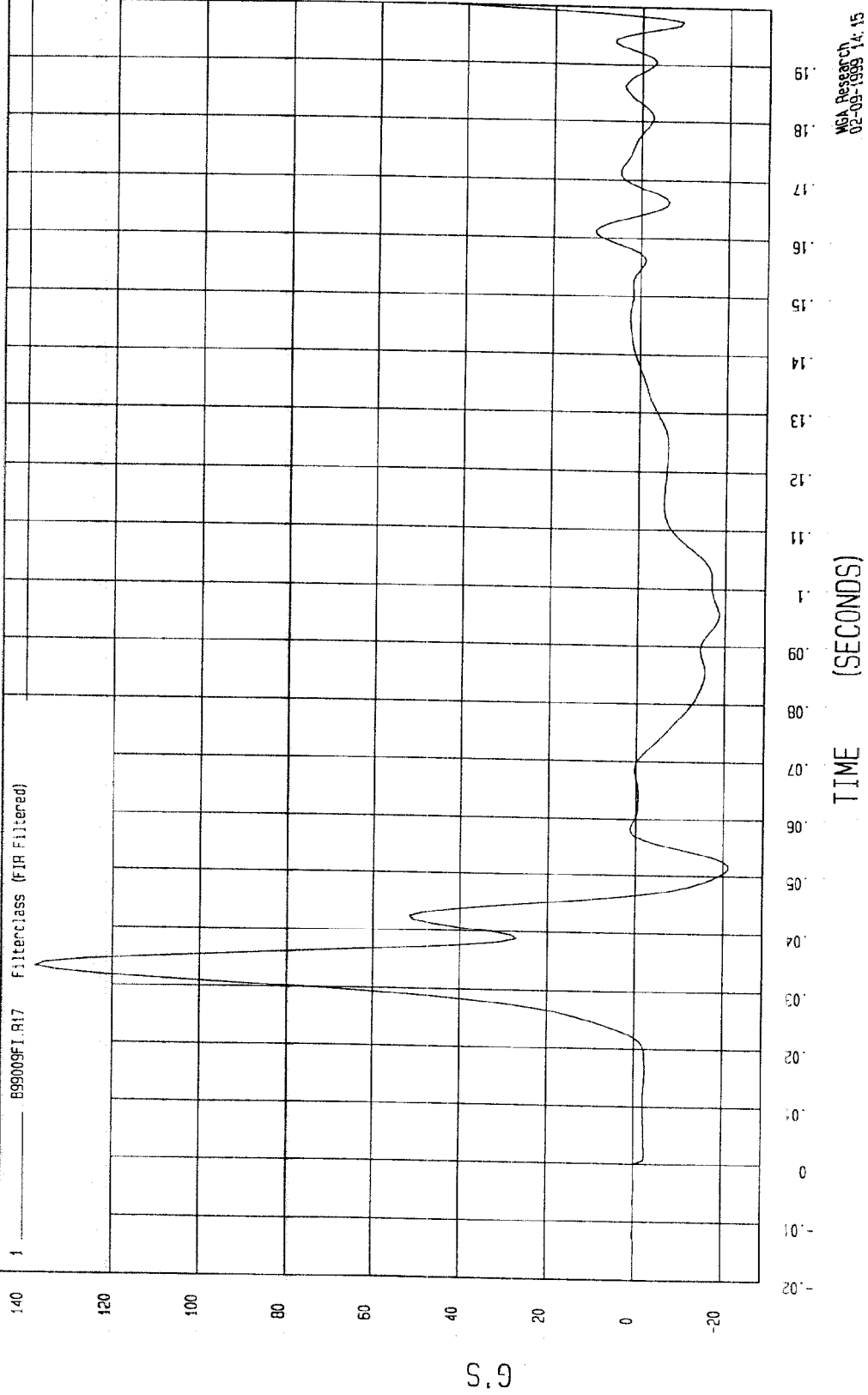
DRIVER LOWER RIB Y ACCELERATION





TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999
COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH
Minimum = -21.15 G'S at 52 msec Maximum = 137.57 G'S at 33 msec

DRIVER LOWER SPINE Y ACCELERATION

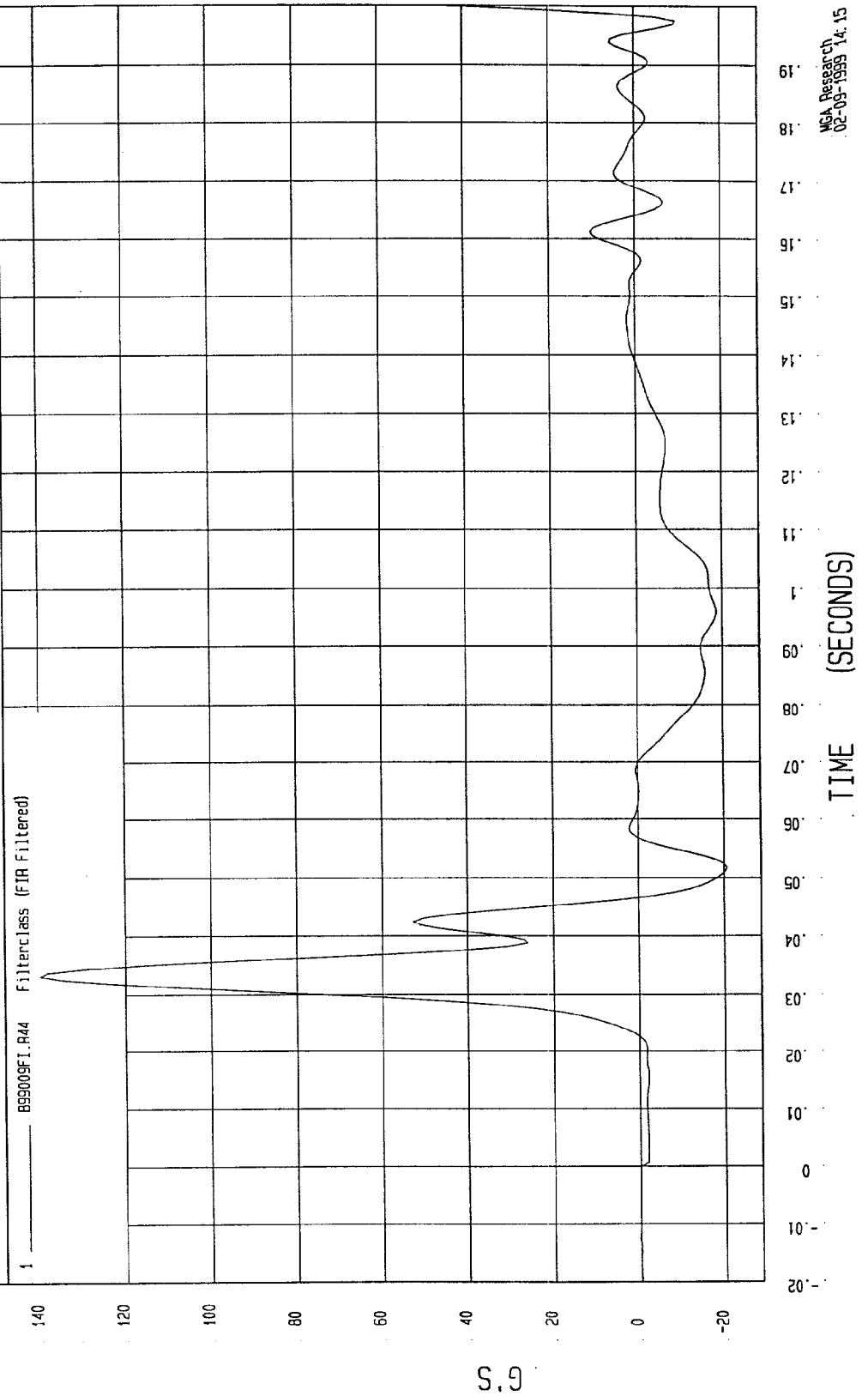


TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -20.62 G'S at 52 msec Maximum = 139.93 G'S at 33 msec

DRIVER LOWER SPINE Y REDUNDANT ACCELERATION



NSA Research
02-09-1999 14:15

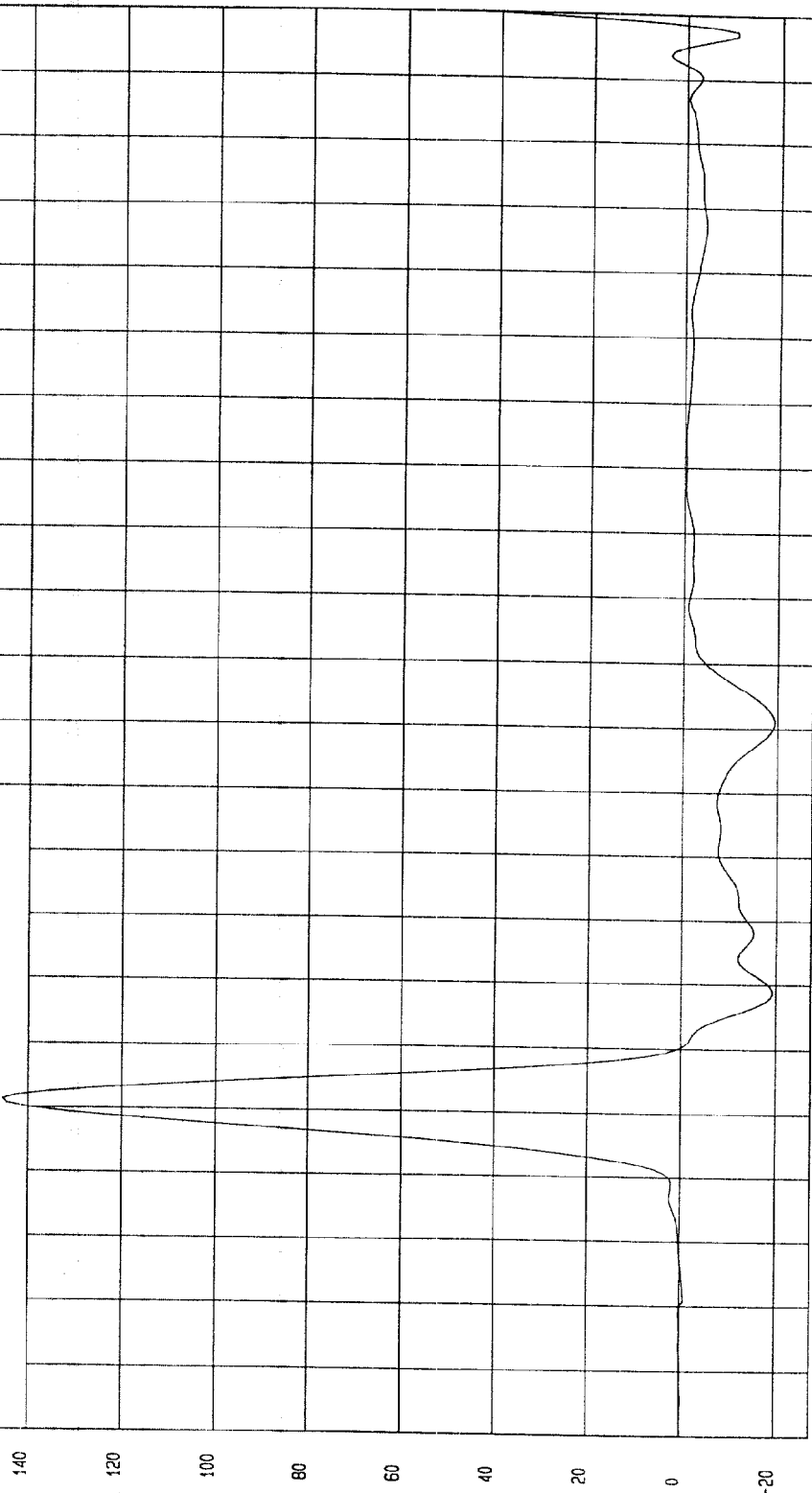
TEST: HIGH SPEED LATERAL IMPACT TEST DATE: 01-22-1999

COMPONENT: 1999 TOYOTA TACOMA (MX5107) Speed: 38.3 MPH 61.6 KPH

Minimum = -19.36 G'S at 91 msec Maximum = 145.46 G'S at 31 msec

DRIVER PELVIS Y ACCELERATION

1 — 893009F1.R18 Filterclass (FIR Filtered)



NSA Research
02-09-1999 14:15

TIME (SECONDS)

TEST: HIGH SPEED LATERAL IMPACT

TEST DATE: 01-22-1999

Speed: 38.3 MPH 61.6 KPH

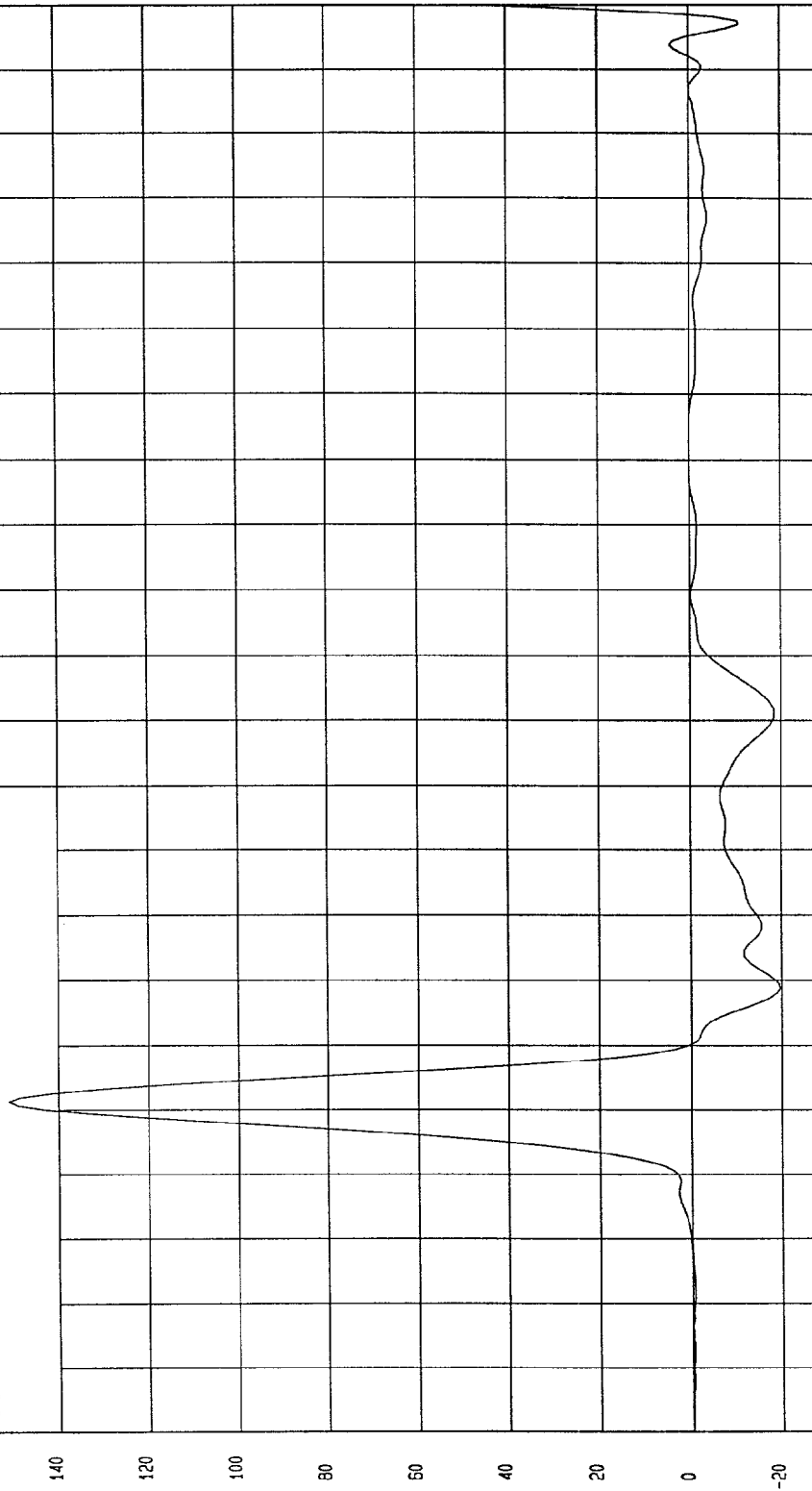
COMPONENT: 1999 TOYOTA TACOMA (MX5107)

Maximum = 151.16 G's at 31 msec

Minimum = -19.56 G's at 49 msec

DRIVER PELVIS Y REDUNDANT ACCELERATION

1 895009F1.R45 Filterclass (FIR Filtered)



MOA Research
02-09-1999 14:15

TIME (SECONDS)

APPENDIX C
SID CONFIGURATION AND PERFORMANCE VERIFICATION

PRE-TEST CERTIFICATION DATA

C-1

Driver Dummy Serial Number: 270

Driver Dummy Serial Number: 270

Pre-Test Calibration

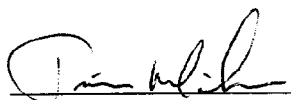
External Dimensions:	The dummy passed all external dimension requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion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

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA C-3

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

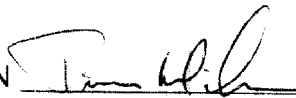
SIDE IMPACT DUMMY (SID)

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

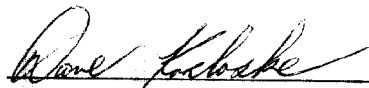
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	13%
PROBE SPEED (m/s)	4.27 - 4.33	4.28
UPPER RIB (g's)	37 - 46 g's	43
LOWER RIB (g's)	37 - 46 g's	41
LOWER SPINE (g's)	15 - 22 g's	22

TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY



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

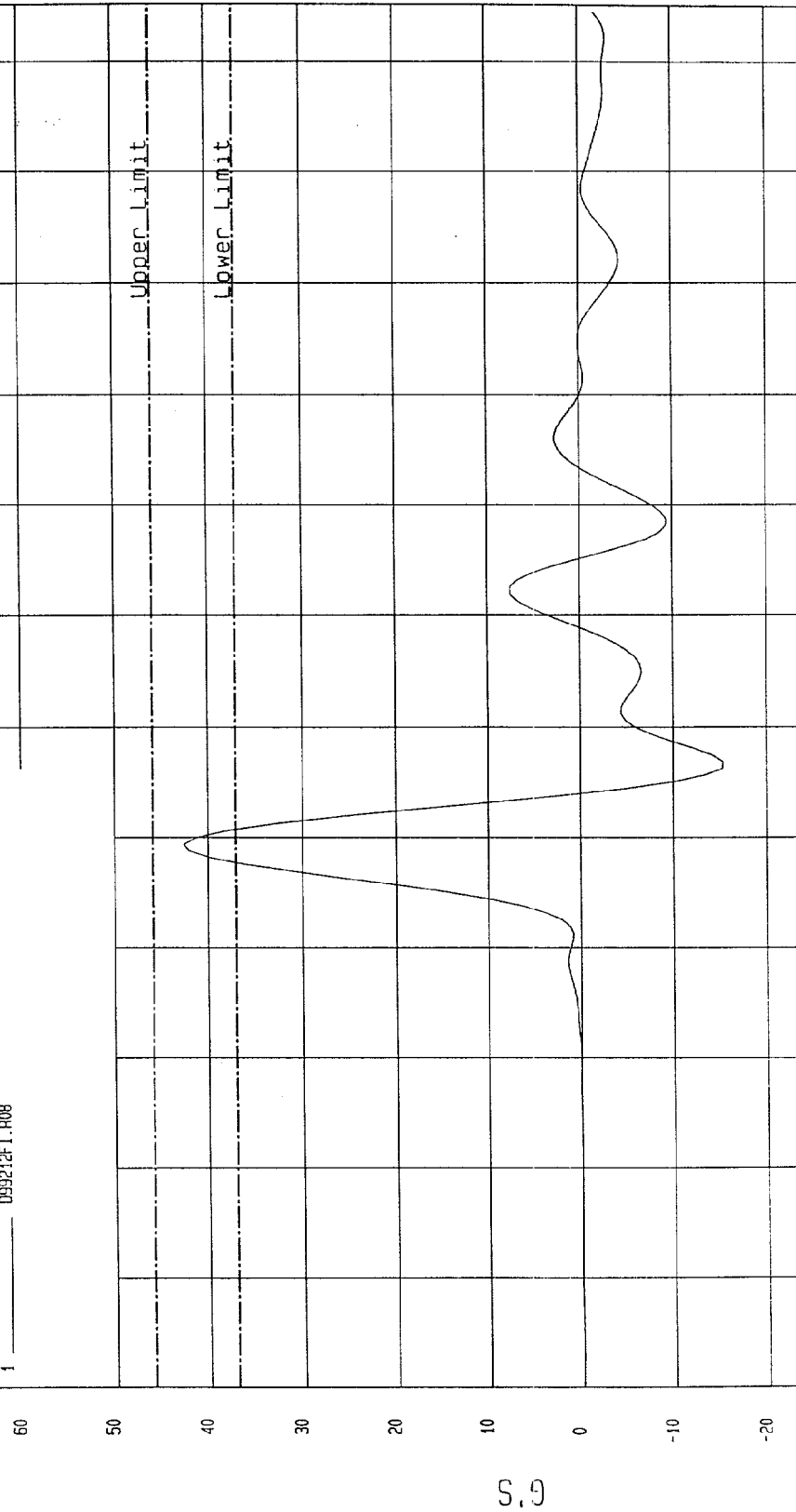
COMPONENT: DUMMY # 270 Velocity: 14.055 FT/SEC 4.28 M/SEC

Minimum = -15.24 G'S at 56.8 msec

Maximum = 42.66 G'S at 49.3 msec

UPPER RIB ACCELERATION

1 099212F1.R08

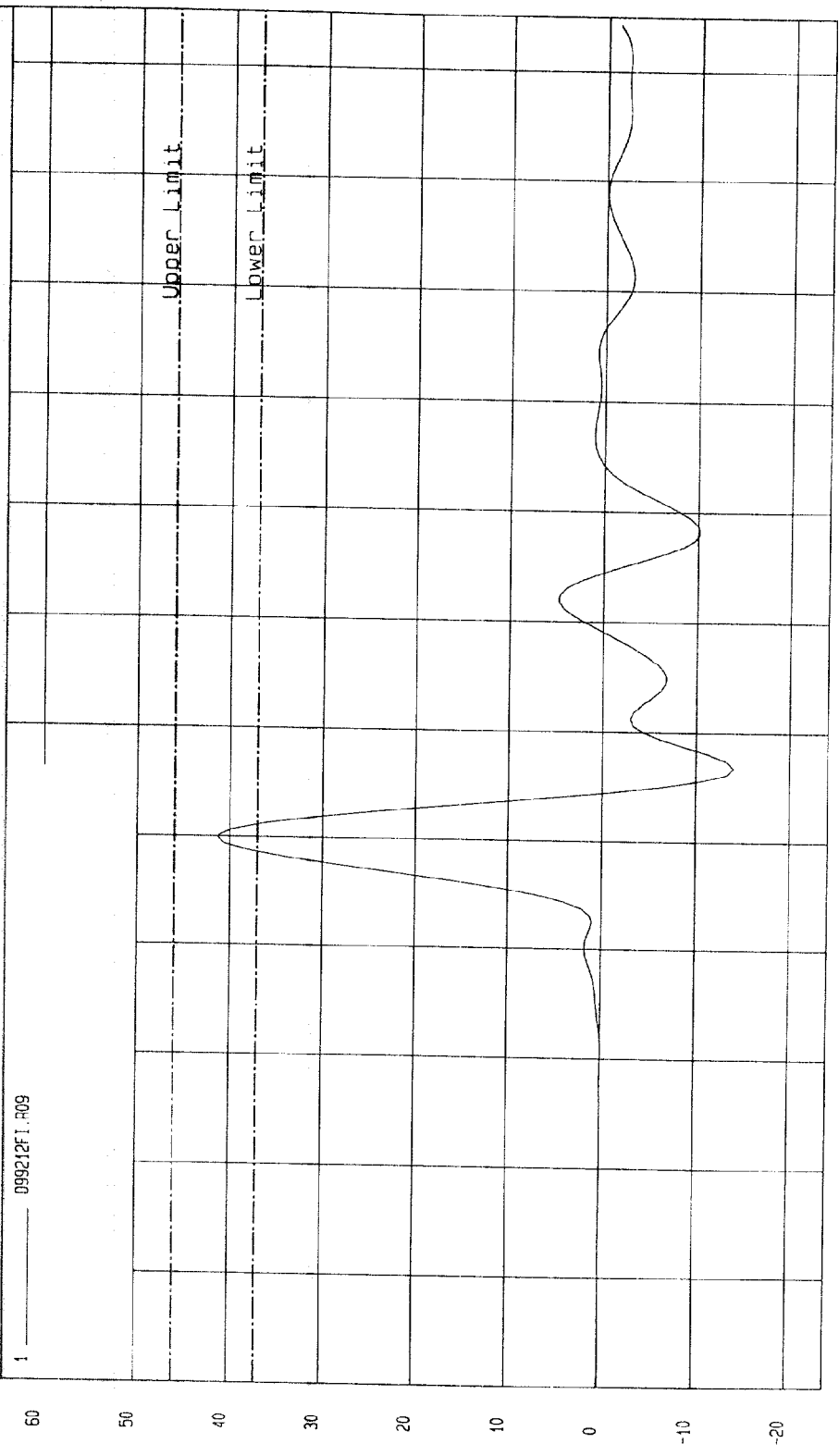


TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-19-1999 - 16:45

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



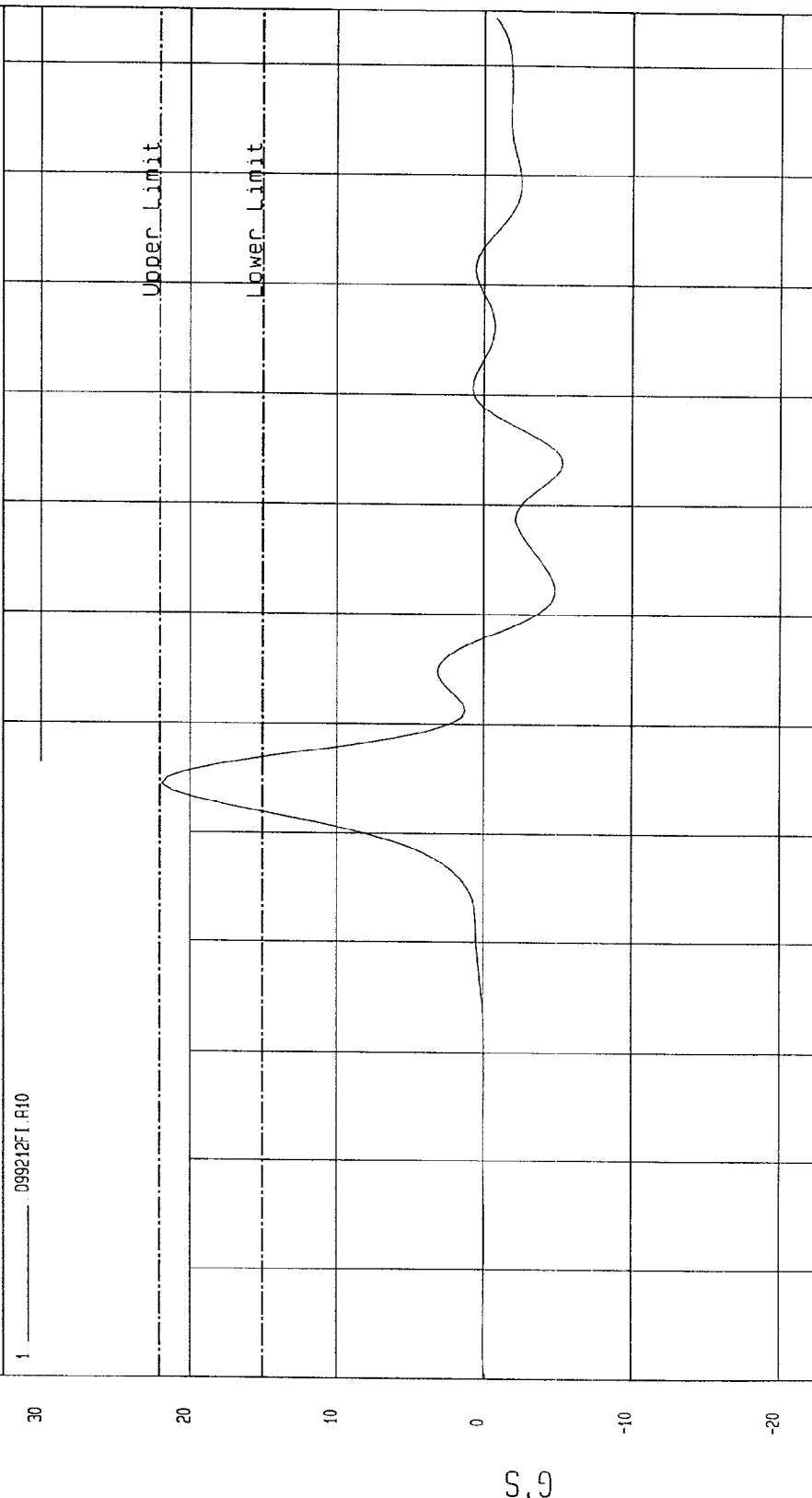
TIME (SECONDS)

WEA Research
02-03-1999 09:55

TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-19-1999 - 16:47:00
COMPONENT: DUMMY # 270 Velocity: 14.055 FT/SEC 4.28 M/SEC

Minimum = -5.38 G'S at 83.7 msec Maximum = 21.83 G'S at 54.3 msec

LOWER SPINE ACCELERATION



TIME (SECONDS)

MCA Research
02-03-1999 09:56

PELVIS IMPACT TEST

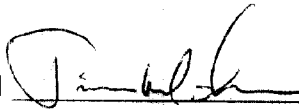
SIDE IMPACT DUMMY (SID)

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

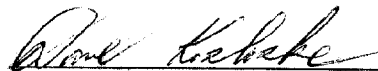
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	13%
PROBE SPEED (m/s)	4.27 - 4.33	4.28
PELVIS ACCELERATION (g's)	40 - 60	40

TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY

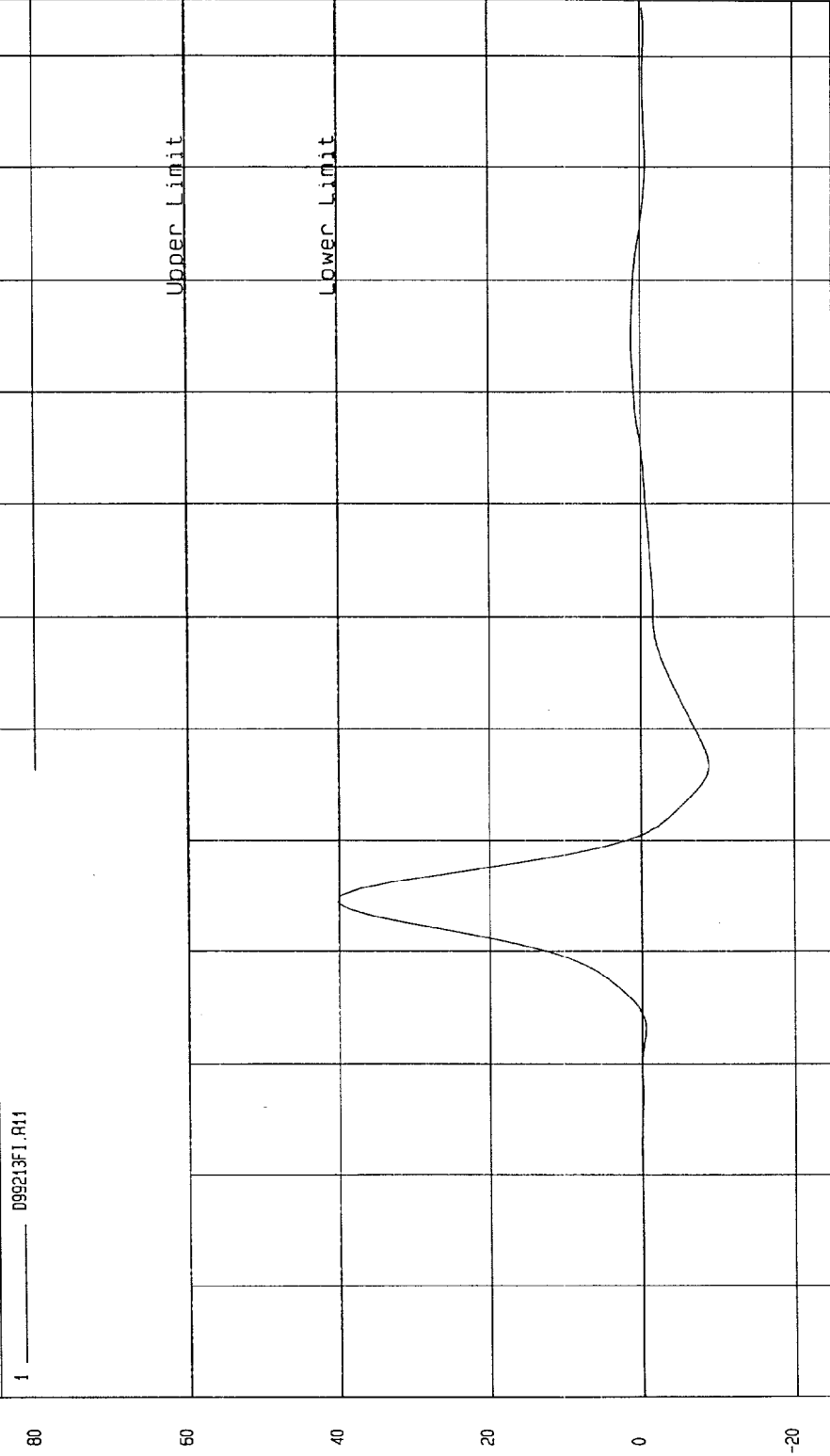


TEST: DUMMY CALIBRATION - PELVIS IMPACT TEST DATE: 01-19-1999 - 16:51

COMPONENT: DUMMY # 270 Velocity: 14.042 FT/SEC 4.28 M/SEC

Minimum = -8.79 G'S at 56.8 msec Maximum = 40.23 G'S at 44.3 msec

PELVIS ACCELERATION



TIME (SECONDS)

MCA Research
02-03-1999 09:56

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

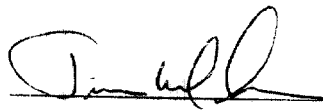
SIDE IMPACT DUMMY (SID)

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

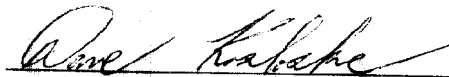
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	13%
FORCE @ 12.7 mm	104 - 162	145
FORCE @ 19.0 mm	163 - 222	204
FORCE @ 25.4 mm	222 - 280	269
FORCE @ 33 mm	325 - 391	381

TEST MEETS SPECIFICATIONS

TECHNICIAN



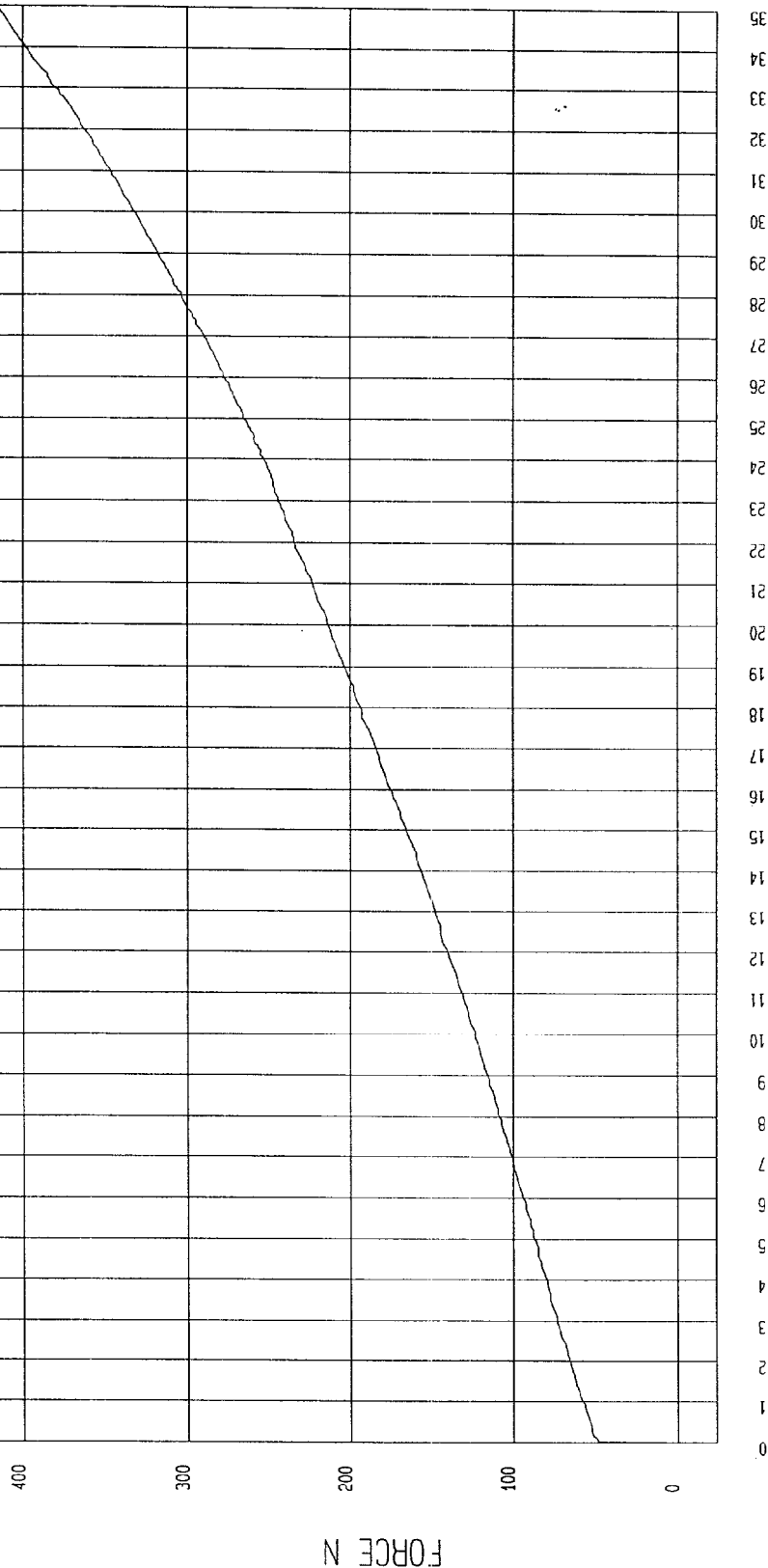
APPROVED BY



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

COMPONENT: DUMMY # 270

FORCE as a function of DISPLACEMENT



NSA Research
02-03-1999 10:11

LUMBAR FLEXION TEST

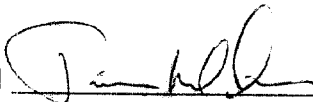
SIDE IMPACT DUMMY (SID)

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



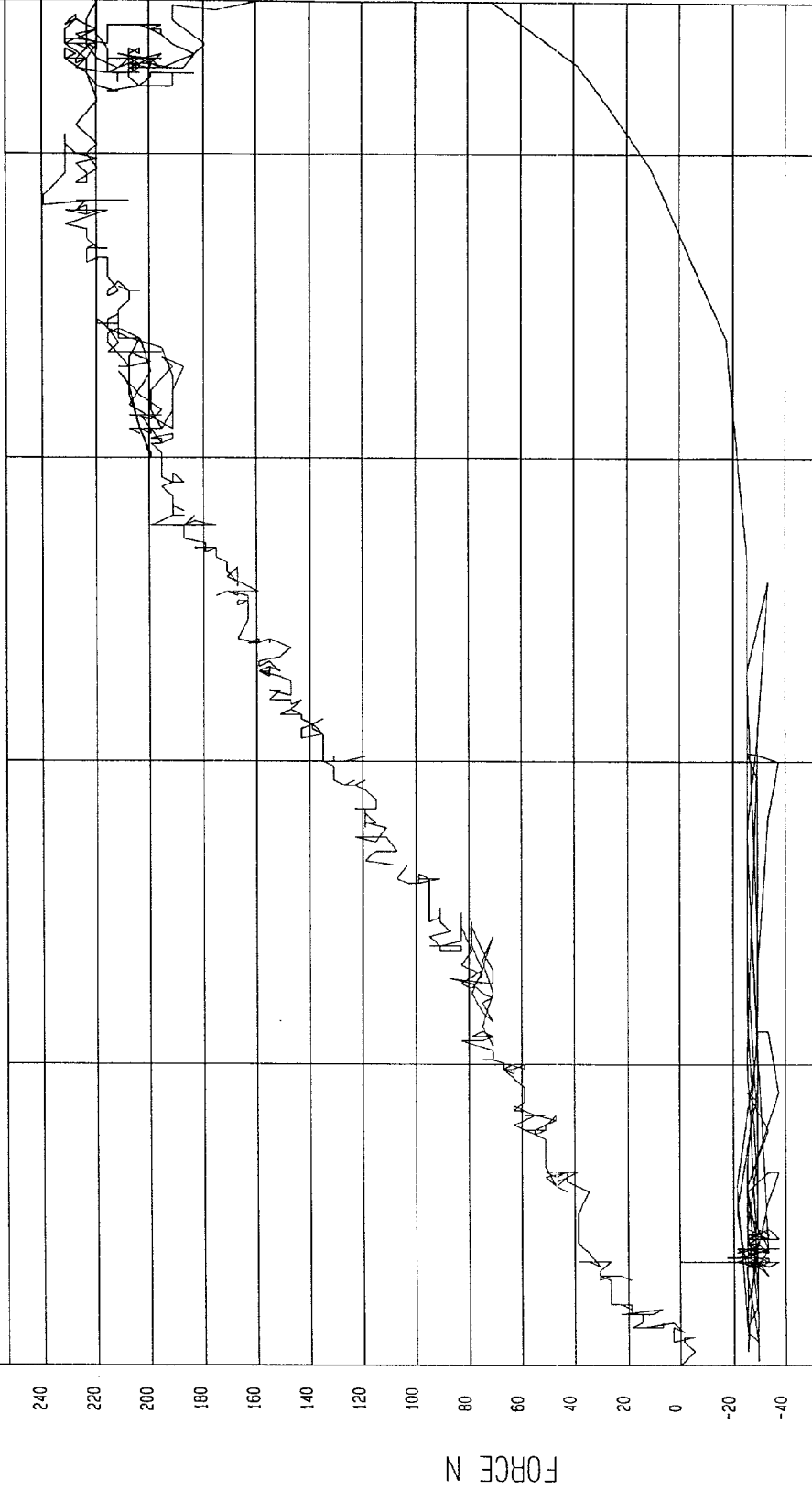
APPROVED BY



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

COMPONENT: DUMMY # 270

FORCE as a function of TORSO ROTATION



TORSO ROTATION DEGREES

WGL Research
02-03-1999 10:11

PRE-TEST CERTIFICATION DATA

C-14

Passenger Dummy Serial Number: 269

Passenger 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.

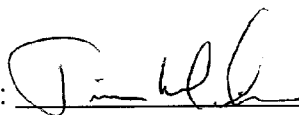
SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA C-16

DUMMY SERIAL NUMBER: 269

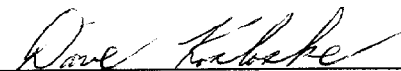
DATE OF VERIFICATION: January 19, 1999

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

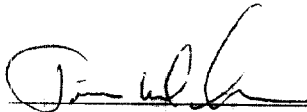
SIDE IMPACT DUMMY (SID)

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

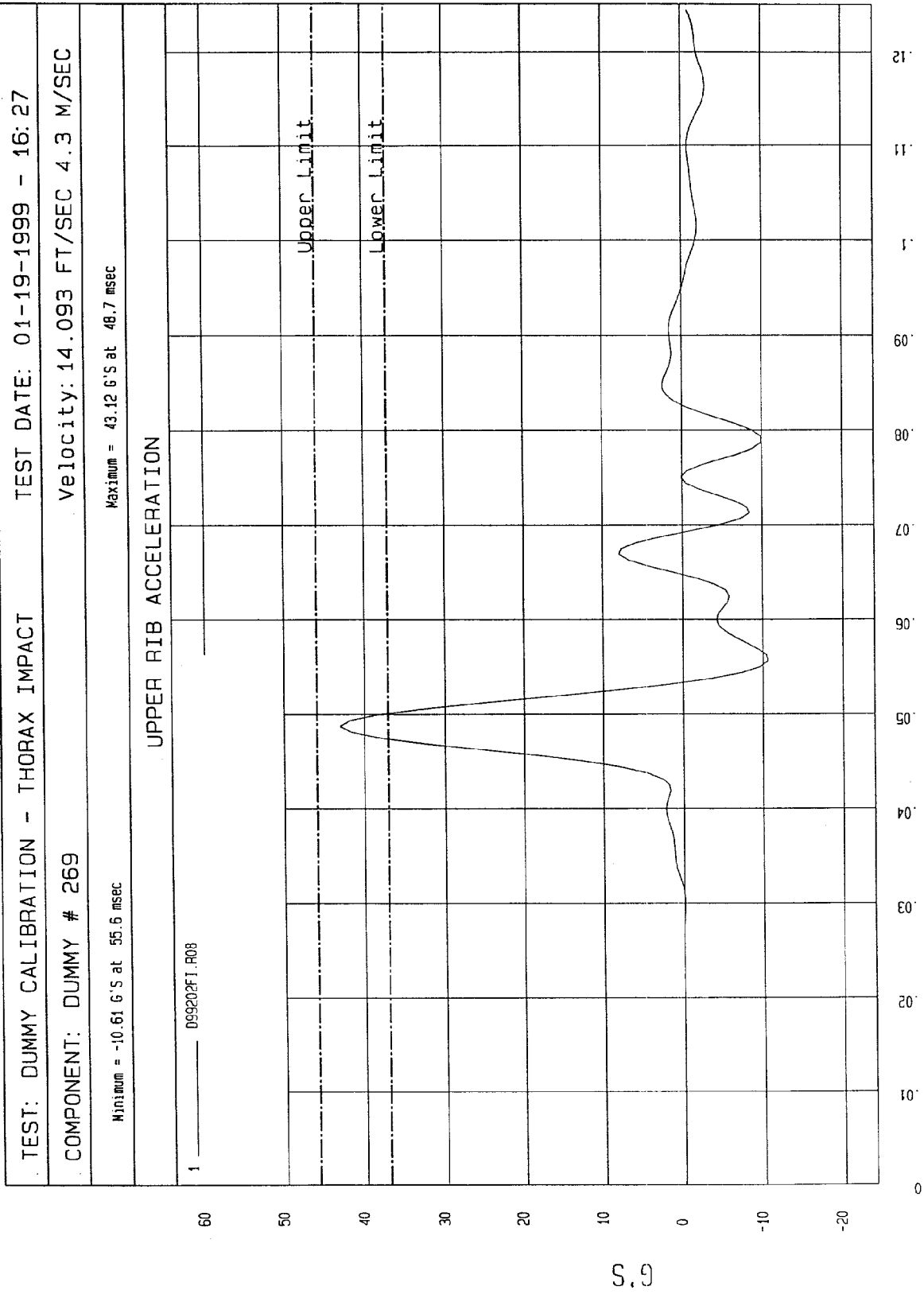
TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY

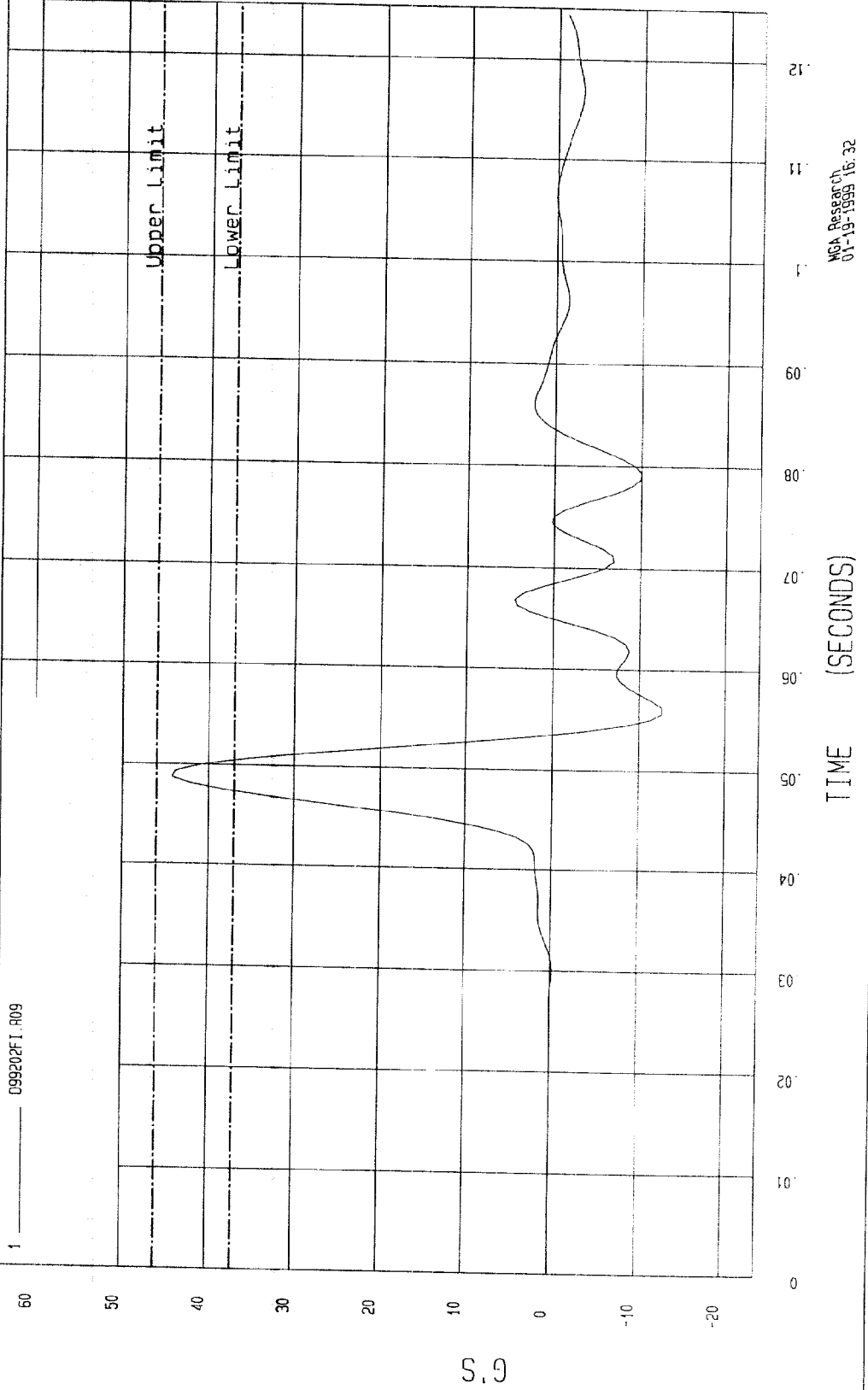




TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-19-1999 - 16:27
COMPONENT: DUMMY # 269 Velocity: 14.093 FT/SEC 4.3 M/SEC

Minimum = -12.71 G'S at 55.6 msec Maximum = 44.23 G'S at 48.7 msec

LOWER RIB ACCELERATION

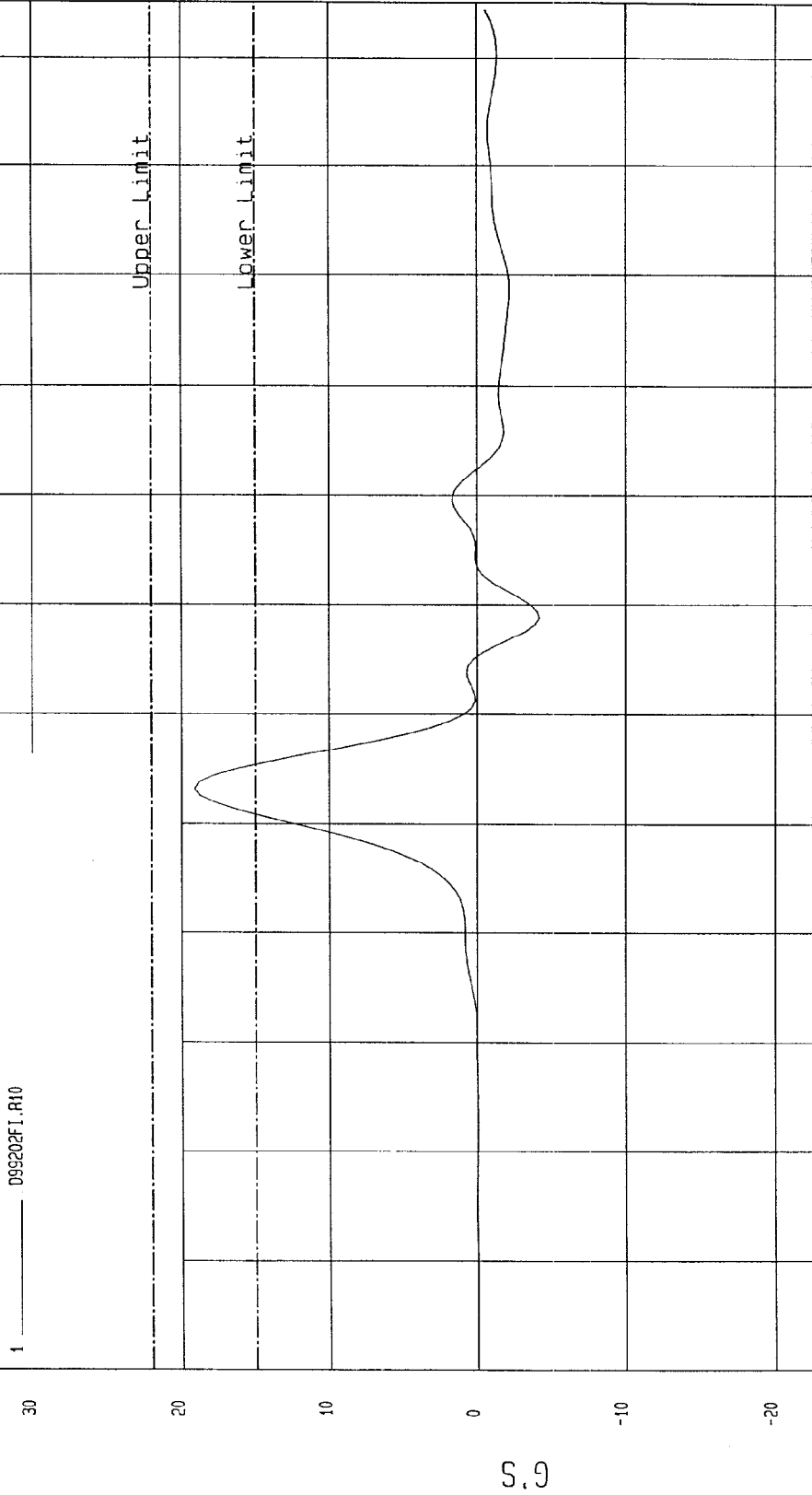


TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-19-1999 - 16:27

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

LOWER SPINE ACCELERATION



PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

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

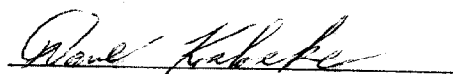
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	13%
PROBE SPEED (m/s)	4.27 - 4.33	4.29
PELVIS ACCELERATION (g's)	40 - 60	42

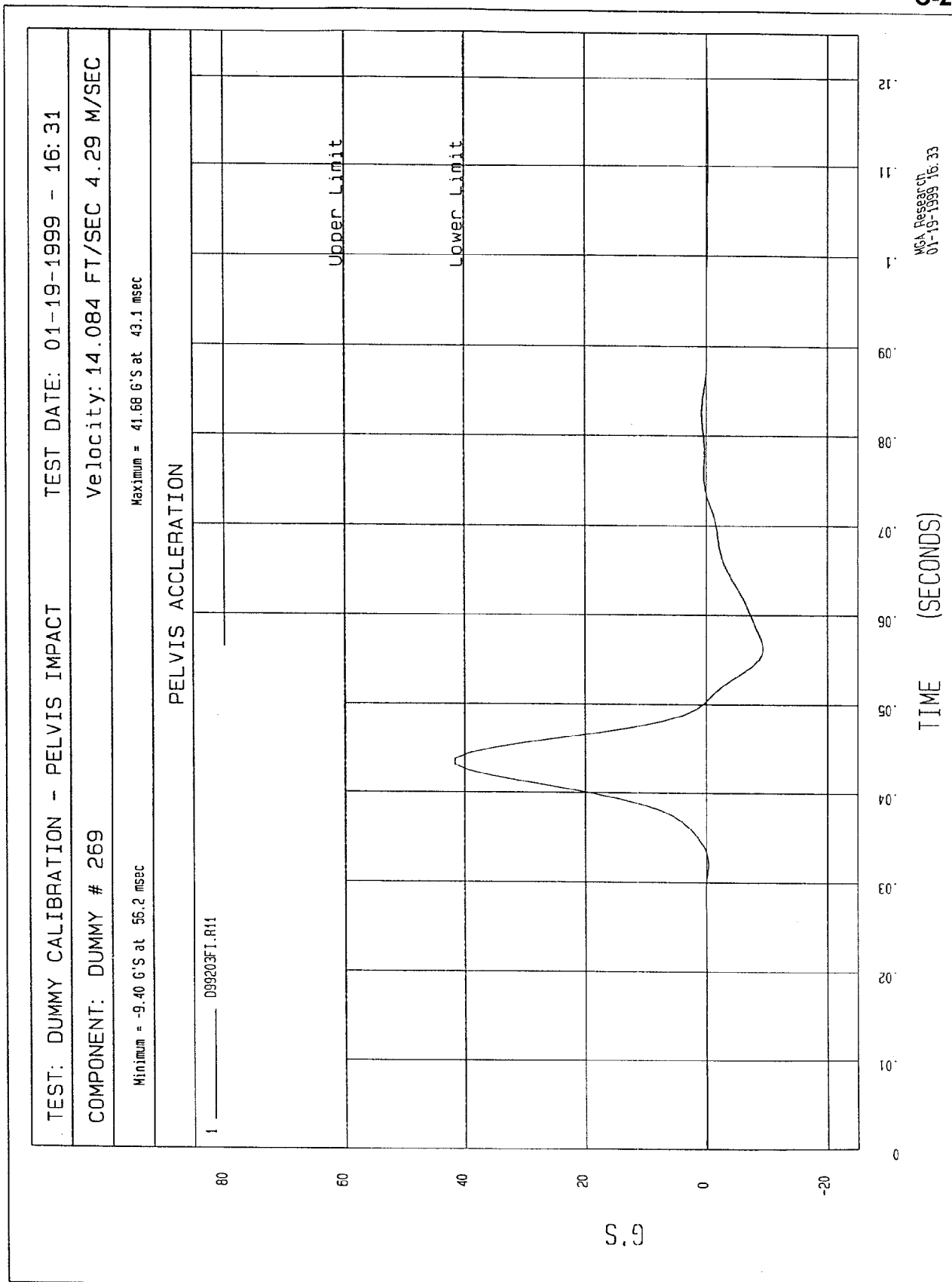
TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY





ABDOMINAL COMPRESSION TEST

(PRELOAD = 10 LBS)

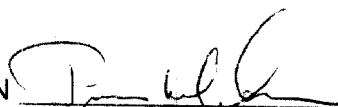
SIDE IMPACT DUMMY (SID)

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

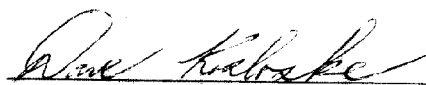
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	13%
FORCE @ 12.7 mm	104 - 162	153
FORCE @ 19.0 mm	163 - 222	212
FORCE @ 25.4 mm	222 - 280	277
FORCE @ 33 mm	325 - 391	381

TEST MEETS SPECIFICATIONS

TECHNICIAN



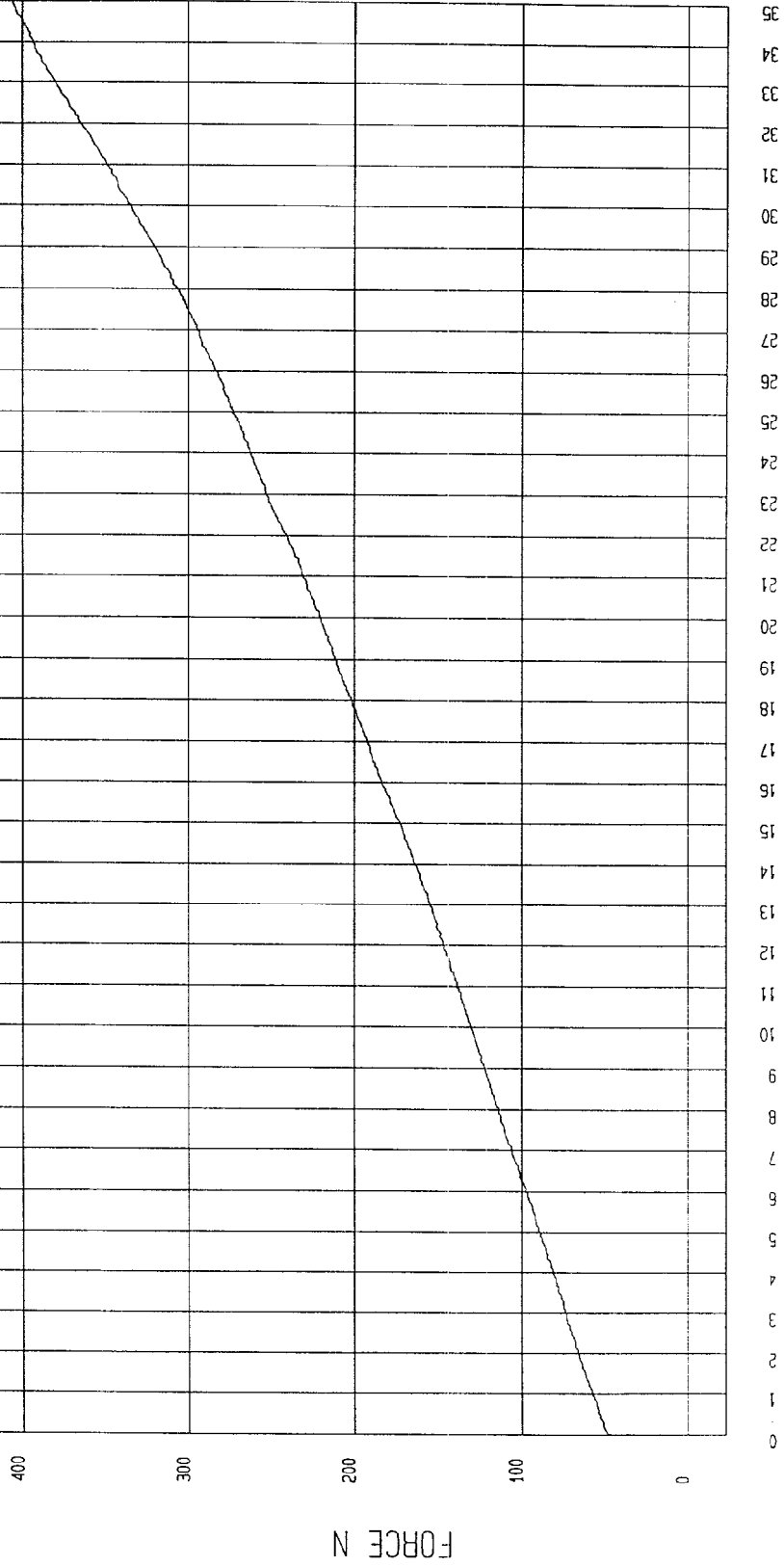
APPROVED BY



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: 269TEST NUMBER: D99205

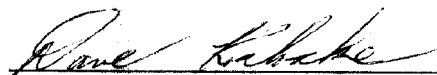
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	13%
FORCE @ 0°	0 - 26.7	0
FORCE @ 20°	97.9 - 151.2	134.1
FORCE @ 30°	151.2 - 204.6	186.3
FORCE @ 40°	204.6 - 258.0	222.4
RETURN ANGLE	12° maximum	3°

TEST MEETS SPECIFICATIONS

TECHNICIAN



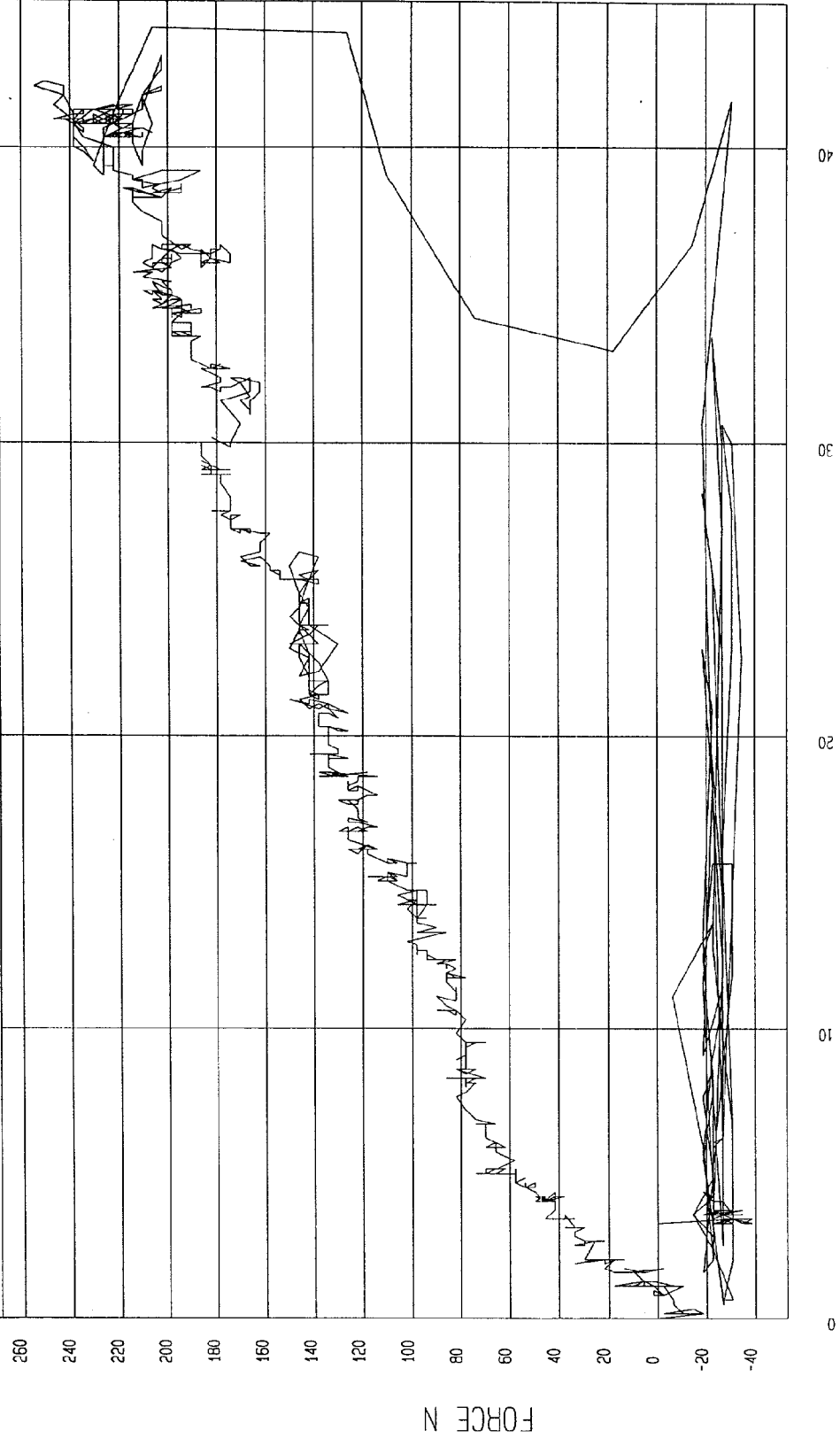
APPROVED BY



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

COMPONENT: DUMMY # 269

FORCE as a function of TORSO ROTATION



NSA Research
01-19-1999 11: 49

POST-TEST CERTIFICATION DATA

C-27

Driver Dummy Serial Number: 270

Driver Dummy Serial Number: 270

Post-Test Calibration

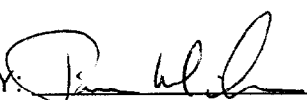
External Dimensions:	The dummy passed all external dimension requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion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

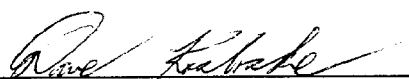
SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA C-29

DUMMY SERIAL NUMBER: 270

DATE OF VERIFICATION: January 27, 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

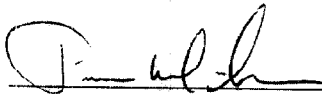
SIDE IMPACT DUMMY (SID)

DATE: January 27, 1999DUMMY SERIAL NUMBER: 270TEST NUMBER: D99312

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	26%
PROBE SPEED (m/s)	4.27 - 4.33	4.30
UPPER RIB (g's)	37 - 46 g's	41
LOWER RIB (g's)	37 - 46 g's	38
LOWER SPINE (g's)	15 - 22 g's	20

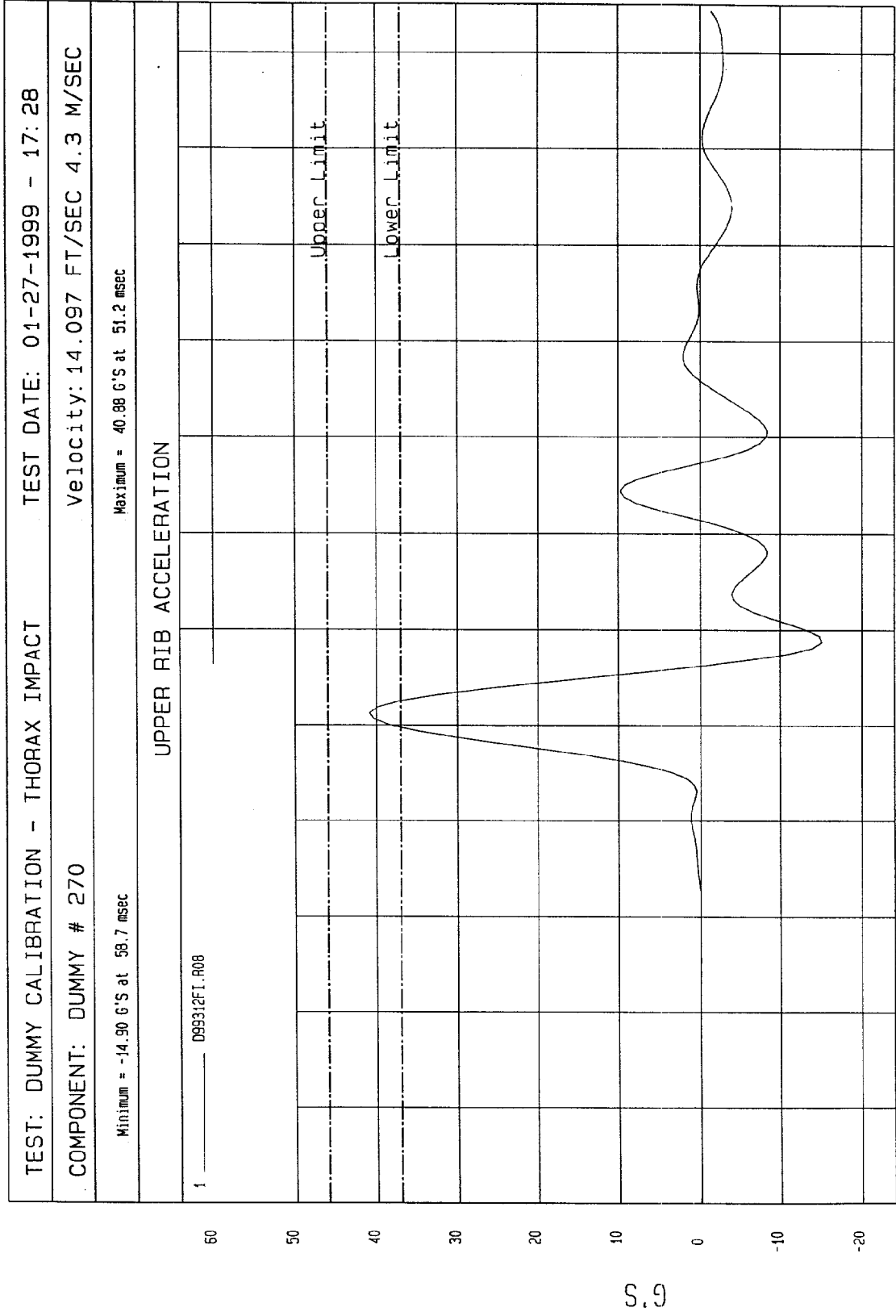
TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY





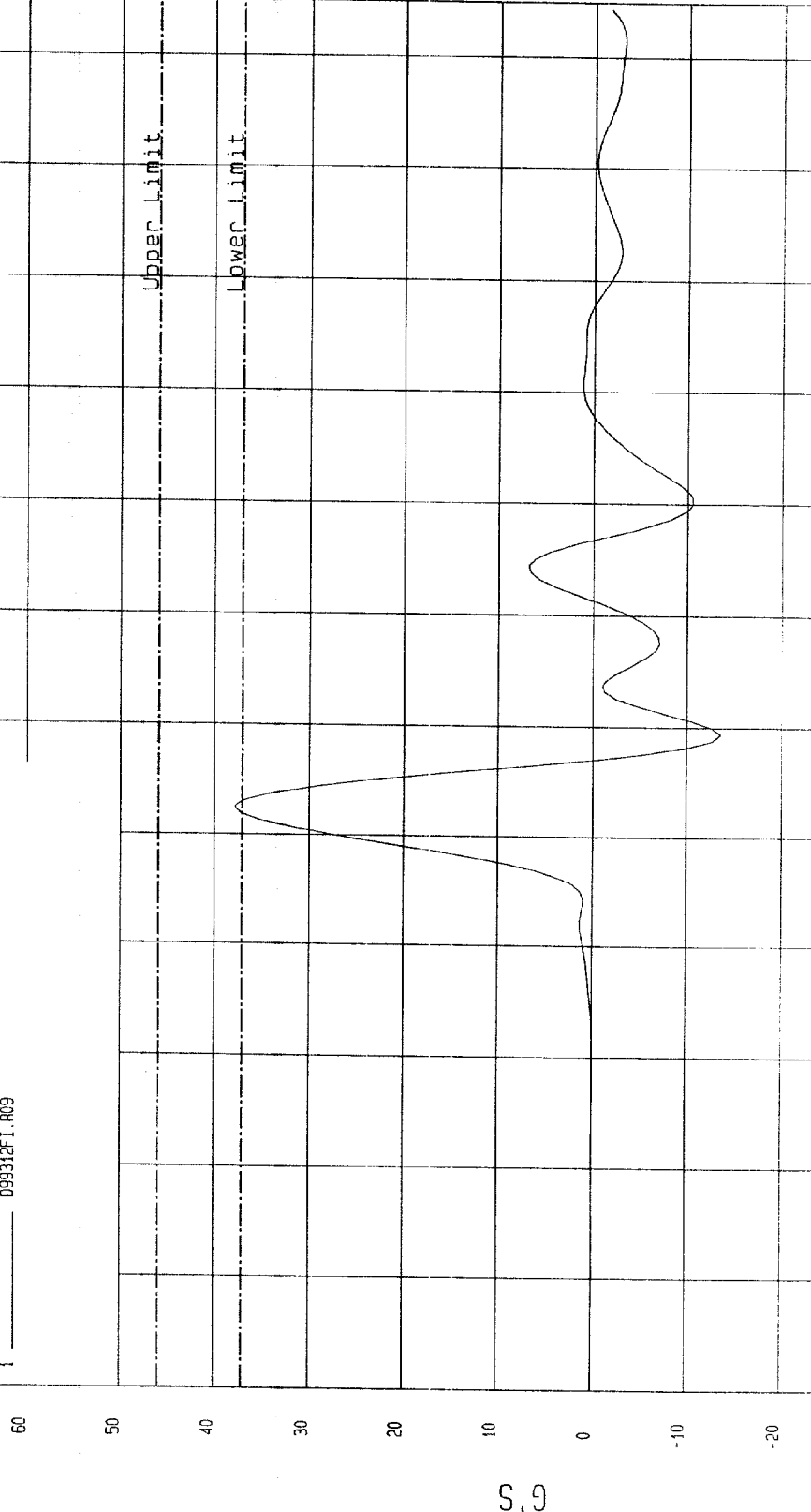
TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-27-1999 - 17:29:59

COMPONENT: DUMMY # 270 Velocity: 14.097 FT/SEC 4.3 M/SEC

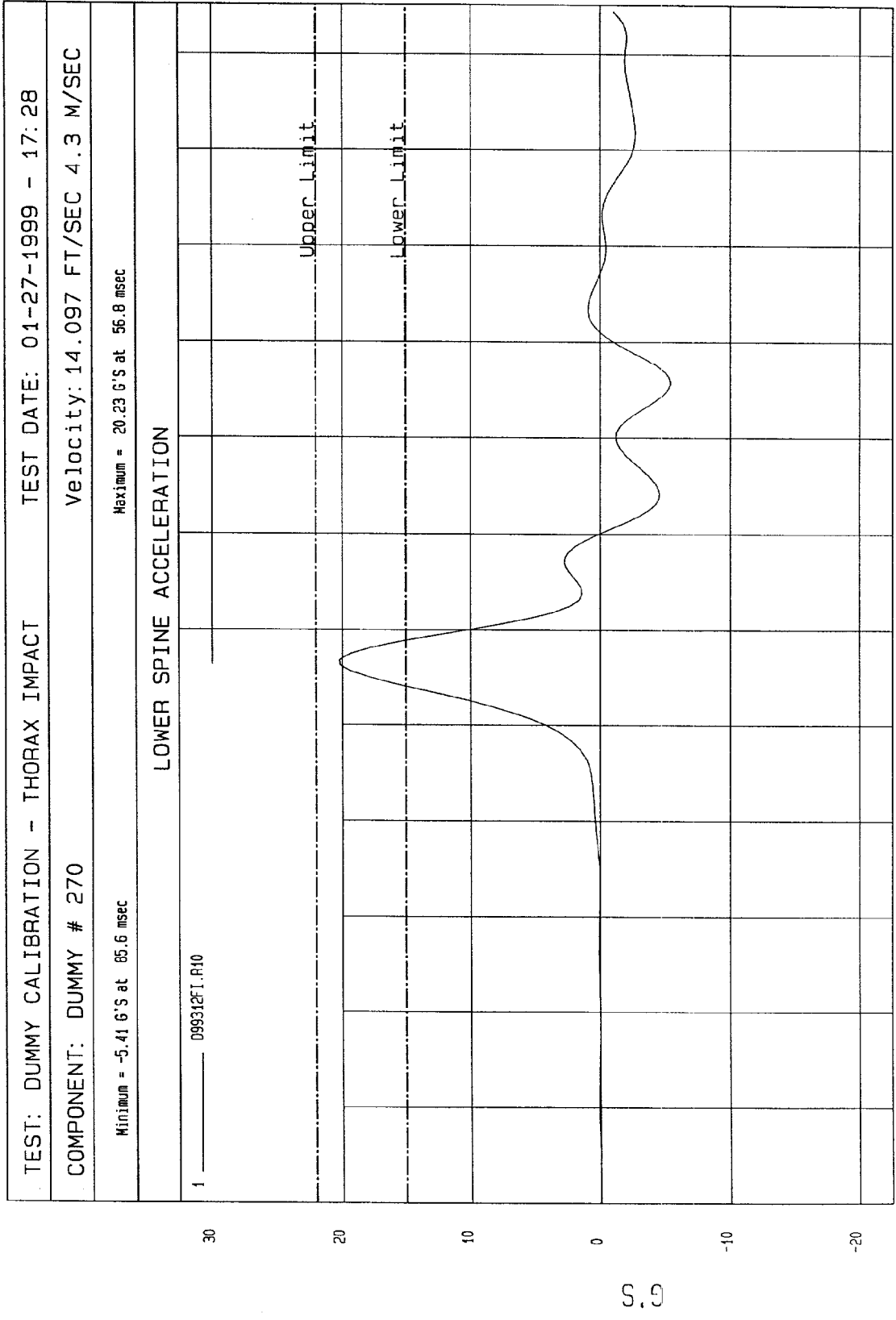
Minimum = -13.44 G'S at 59.3 msec Maximum = 37.79 G'S at 52.5 msec

LOWER RIB ACCELERATION

1 D99312F1.R09



NCA Research
01-28-1999 09:03



PELVIS IMPACT TEST

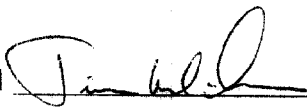
SIDE IMPACT DUMMY (SID)

DATE: January 27, 1999DUMMY SERIAL NUMBER: 270TEST NUMBER: D99313

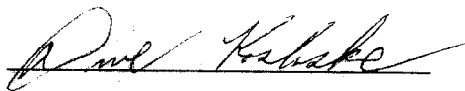
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	26%
PROBE SPEED (m/s)	4.27 - 4.33	4.30
PELVIS ACCELERATION (g's)	40 - 60	44

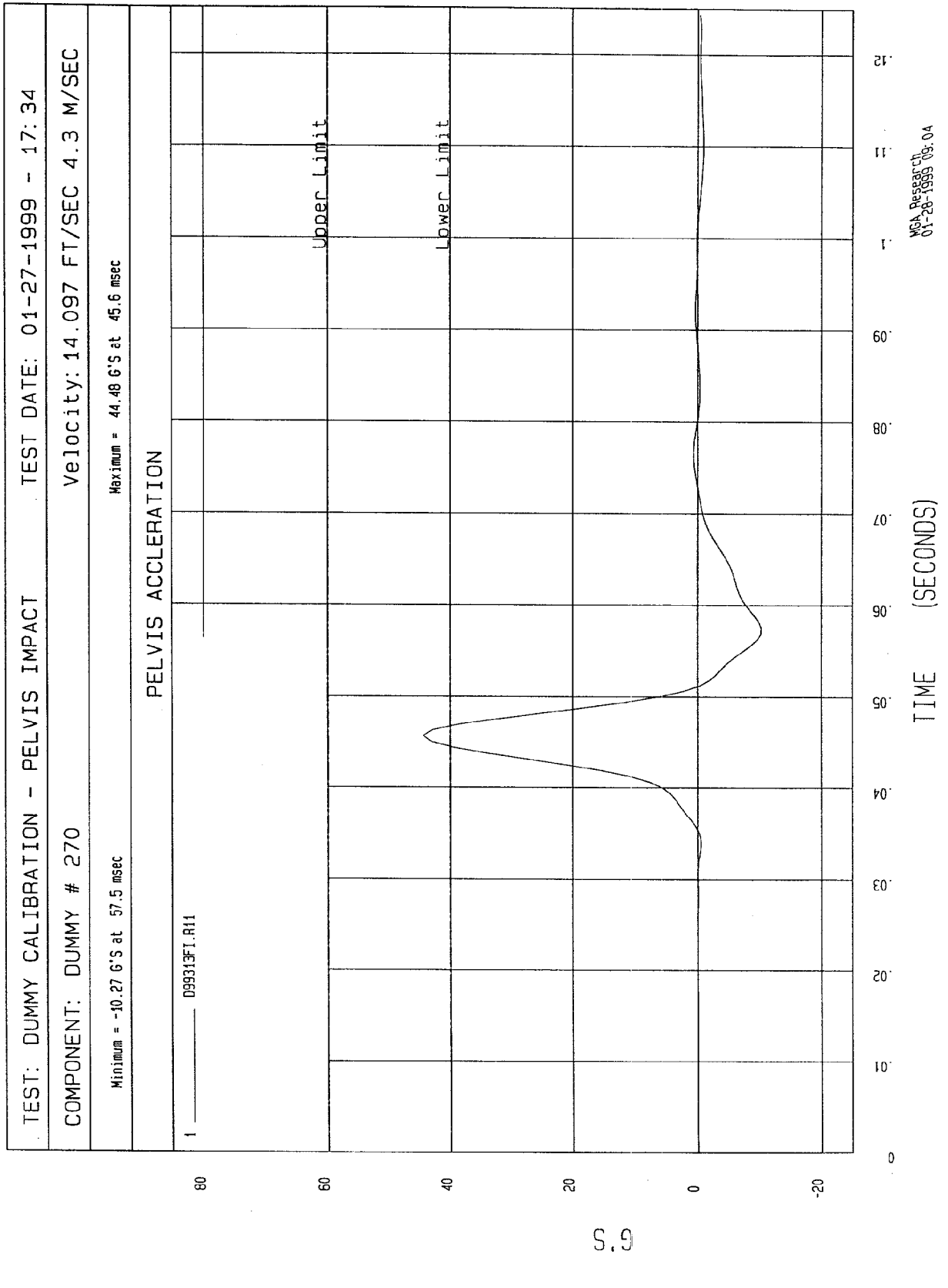
TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY





ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

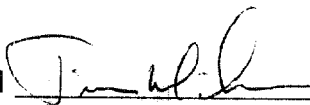
SIDE IMPACT DUMMY (SID)

DATE: January 27, 1999DUMMY SERIAL NUMBER: 270TEST NUMBER: D99314

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	26%
FORCE @ 12.7 mm	104 - 162	145
FORCE @ 19.0 mm	163 - 222	202
FORCE @ 25.4 mm	222 - 280	273
FORCE @ 33 mm	325 - 391	381

TEST MEETS SPECIFICATIONS

TECHNICIAN



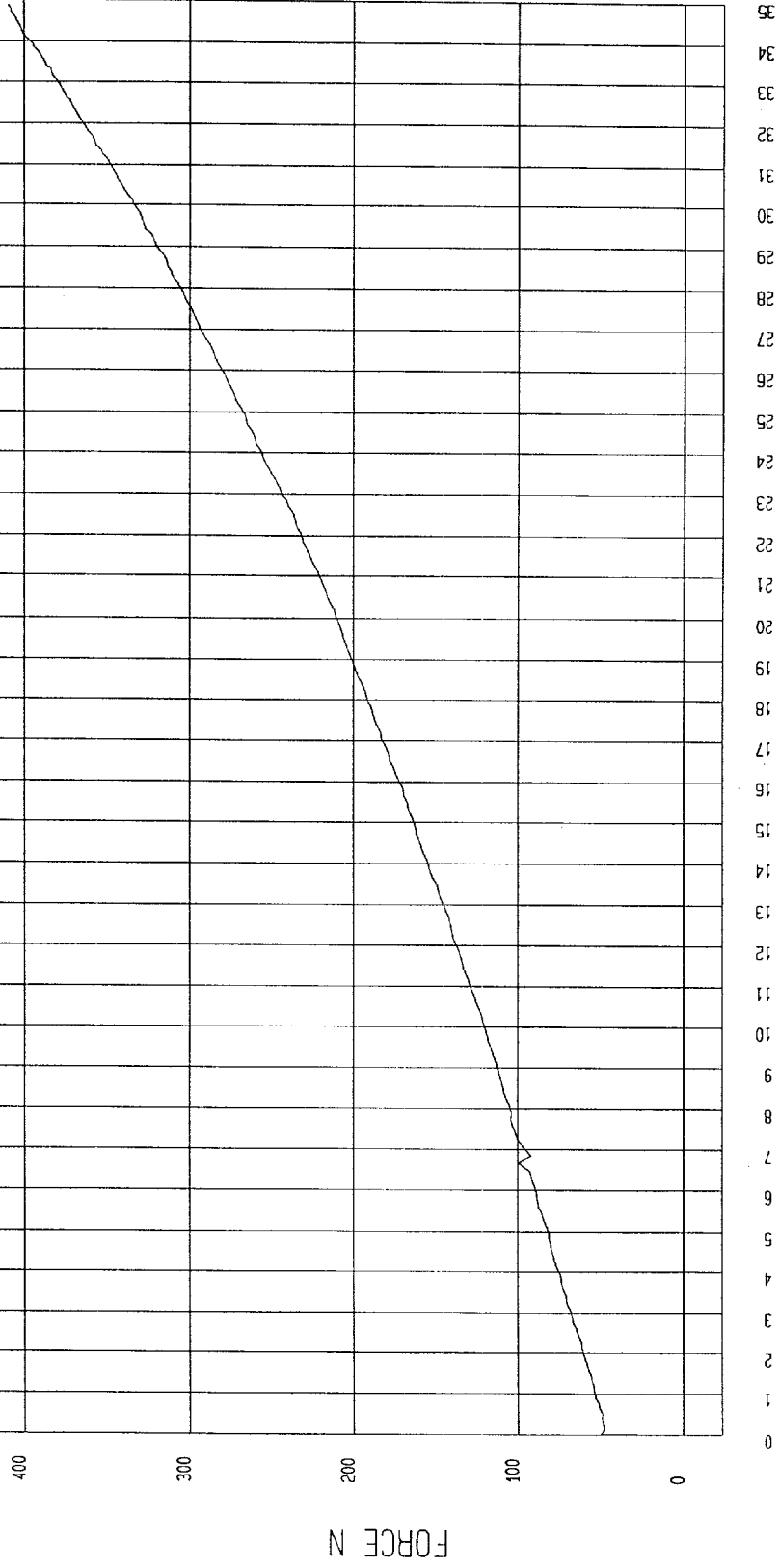
APPROVED BY



TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSION TEST DATE: 01-27-1999 - 16:30:22

COMPONENT: DUMMY # 270

FORCE as a function of DISPLACEMENT



MCA Research
01-28-1999 10:58

DISPLACEMENT mm

FORCE N

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: January 27, 1999DUMMY SERIAL NUMBER: 270TEST NUMBER: D99315

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	26%
FORCE @ 0°	0 - 26.7	0
FORCE @ 20°	97.9 - 151.2	104.9
FORCE @ 30°	151.2 - 204.6	157.1
FORCE @ 40°	204.6 - 258.0	205.2
RETURN ANGLE	12° maximum	1°

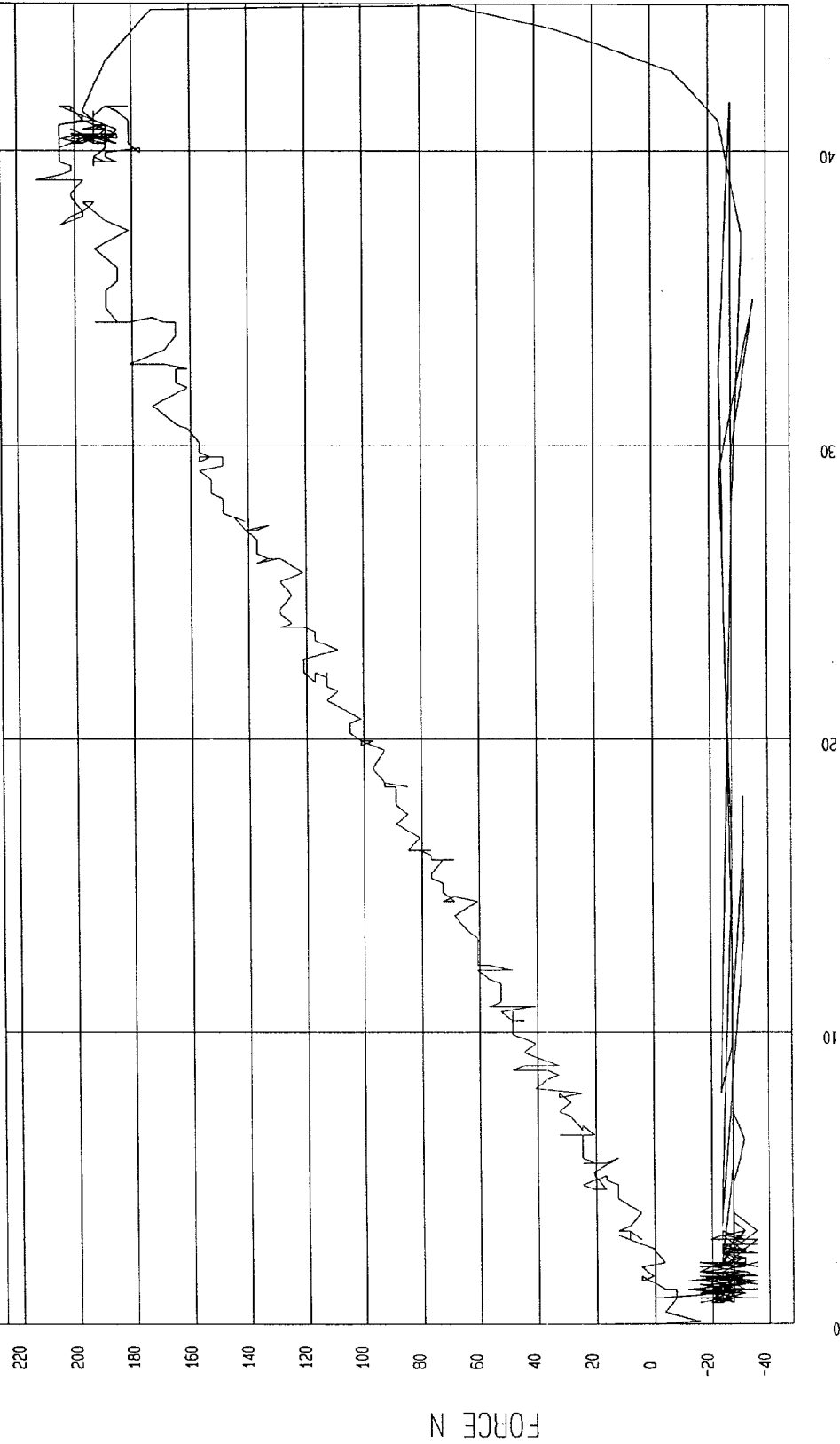
TEST MEETS SPECIFICATIONS

TECHNICIAN Jim WhiteAPPROVED BY Dave Kurbake

TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 01-27-1999 - 15:15:43

COMPONENT: DUMMY # 270

FORCE as a function of TORSO ROTATION



MCA Research
01-28-1999 10:59

TORSO ROTATION DEGREES

POST-TEST CERTIFICATION DATA

C-40

Passenger Dummy Serial Number: 269

Passenger Dummy Serial Number: 269

Post-Test Calibration

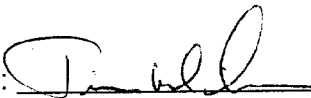
External Dimensions:	The dummy passed all external dimension requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion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

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA C-42

DUMMY SERIAL NUMBER: 269

DATE OF VERIFICATION: January 27, 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

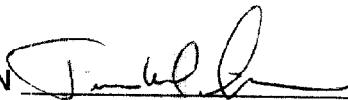
SIDE IMPACT DUMMY (SID)

DATE: January 27, 1999DUMMY SERIAL NUMBER: 269TEST NUMBER: D99302

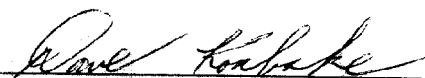
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	26%
PROBE SPEED (m/s)	4.27 - 4.33	4.28
UPPER RIB (g's)	37 - 46 g's	43
LOWER RIB (g's)	37 - 46 g's	43
LOWER SPINE (g's)	15 - 22 g's	20

TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY

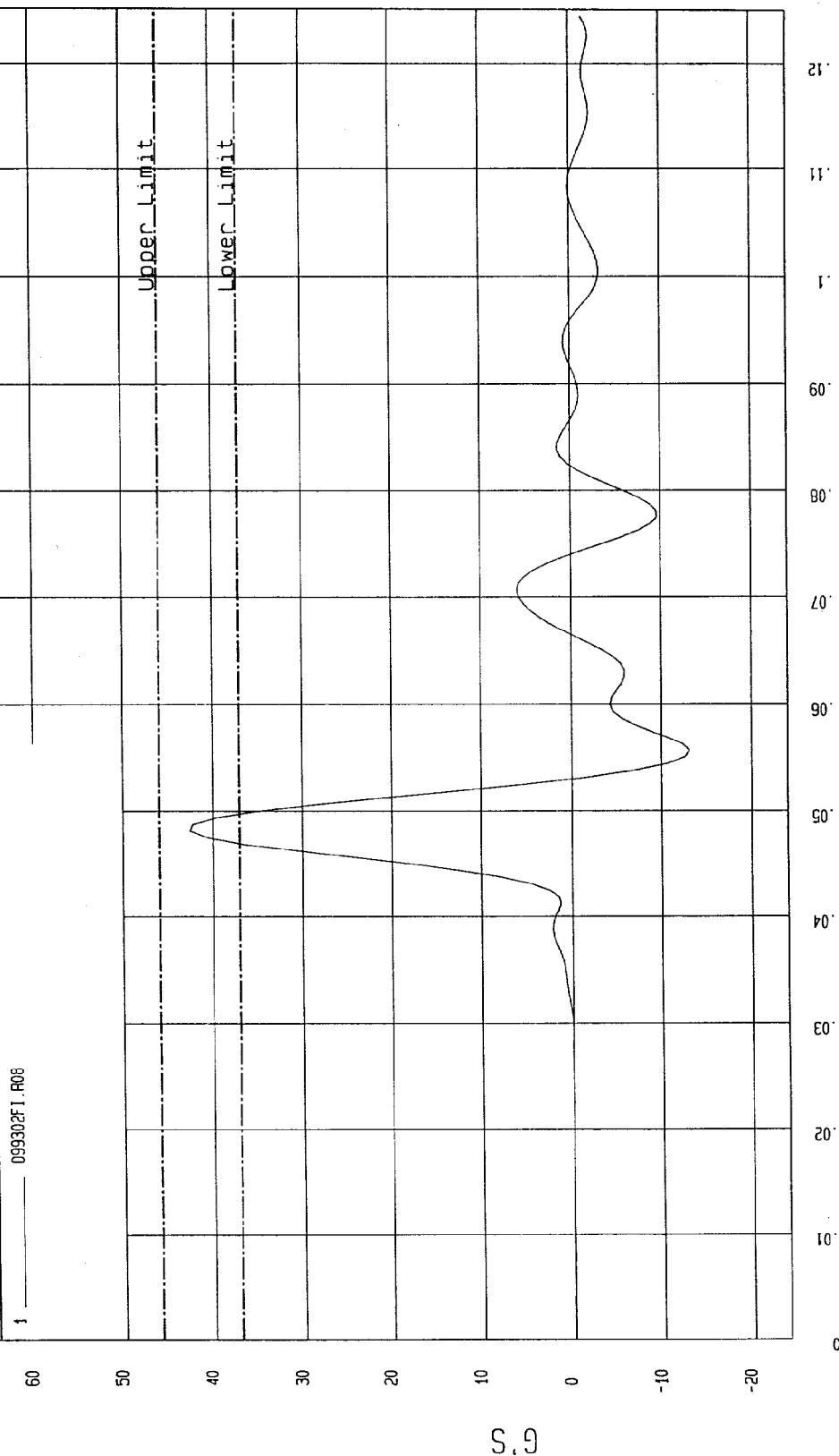


TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-27-1999 - 17:06

COMPONENT: DUMMY # 269 Velocity: 14.036 FT/SEC 4.28 M/SEC

Minimum = -13.08 G'S at 55.6 msec Maximum = 42.60 G'S at 48.1 msec

UPPER RIB ACCELERATION

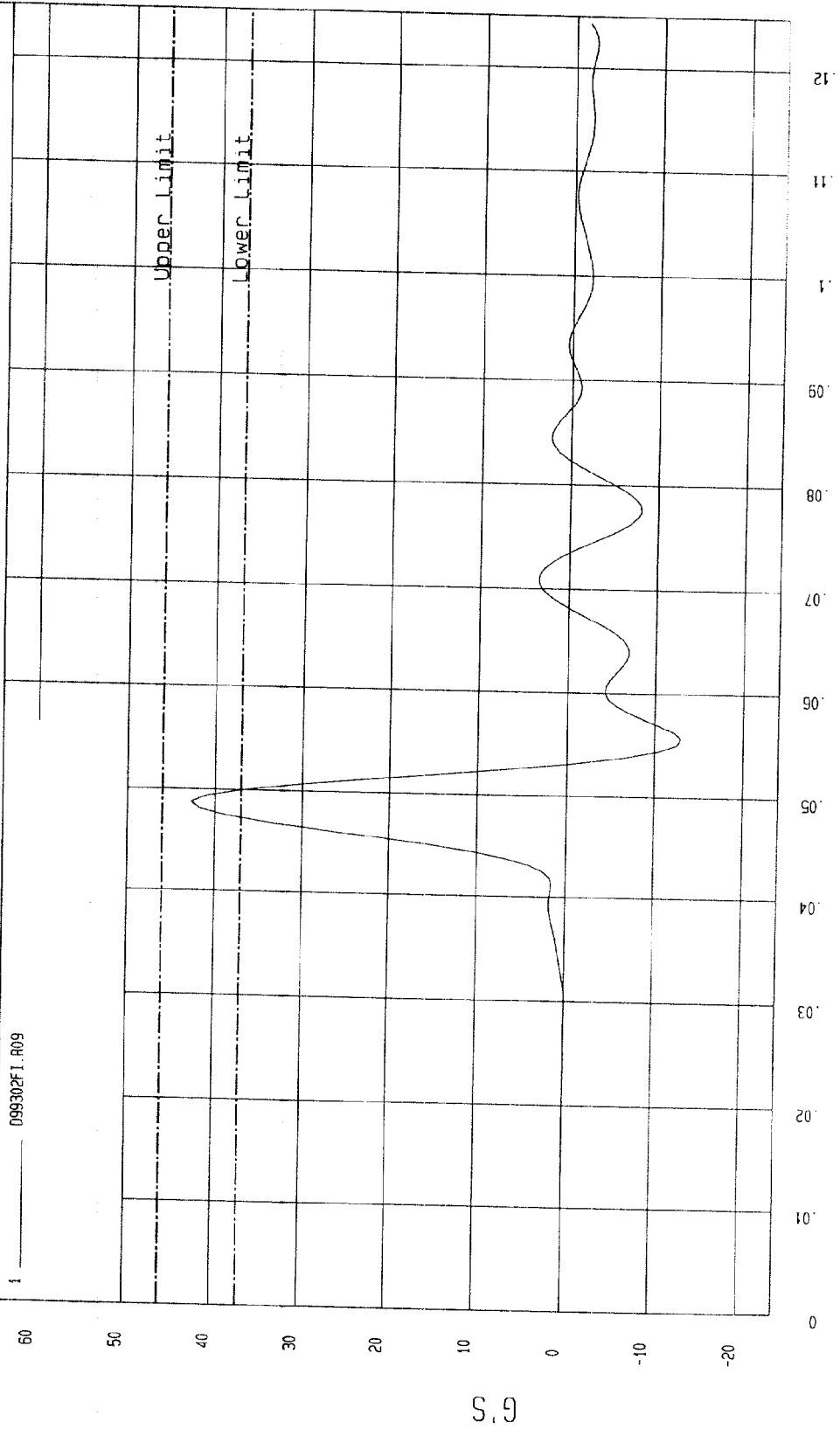


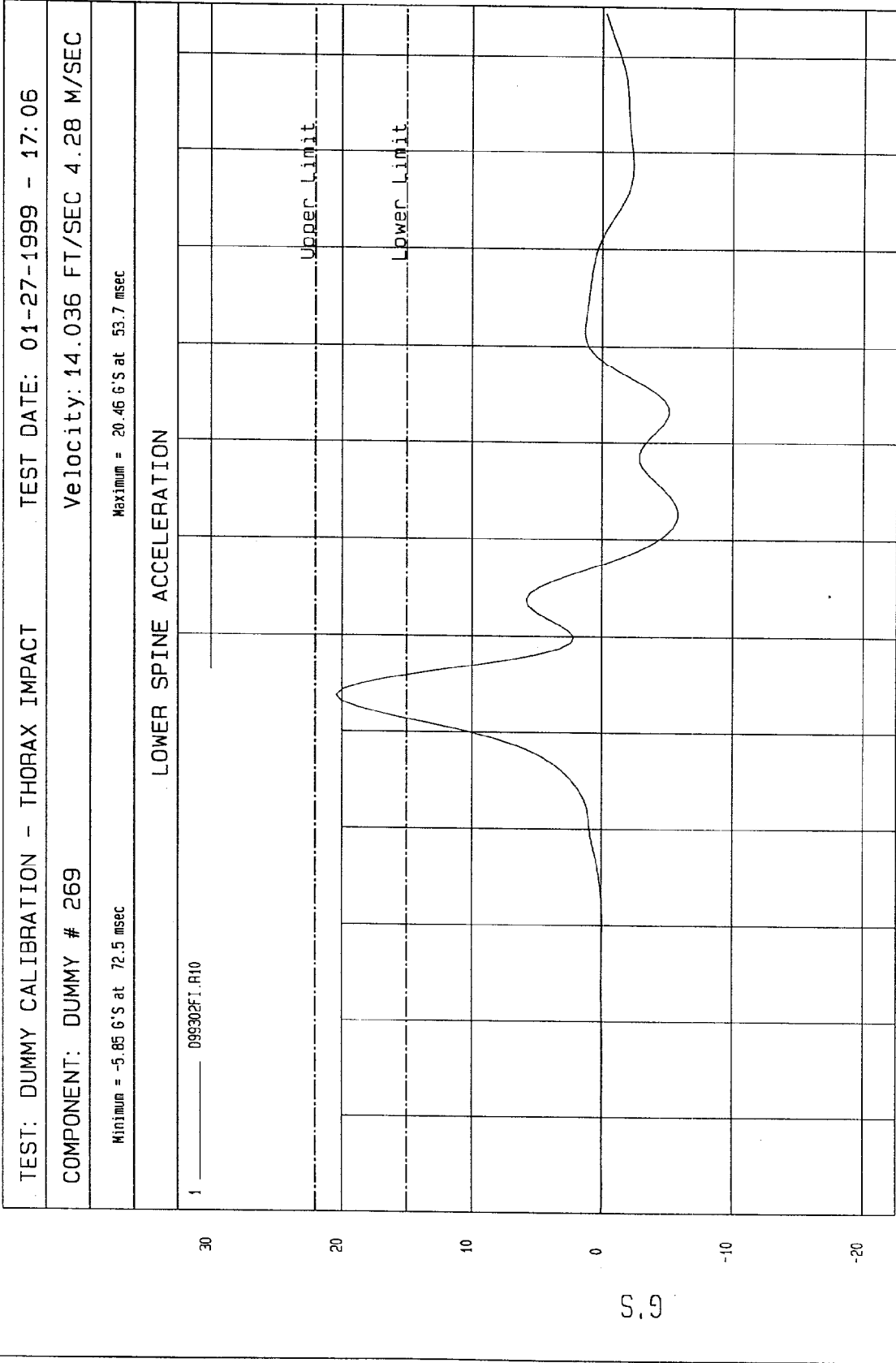
TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 01-27-1999 - 17:06

COMPONENT: DUMMY # 269 Velocity: 14.036 FT/SEC 4.28 M/SEC

Minimum = -12.88 G'S at 55.6 msec Maximum = 42.68 G'S at 48.7 msec

LOWER RIB ACCELERATION





PELVIS IMPACT TEST

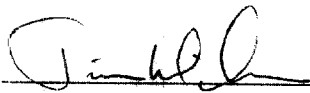
SIDE IMPACT DUMMY (SID)

DATE: January 27, 1999DUMMY SERIAL NUMBER: 269TEST NUMBER: D99303

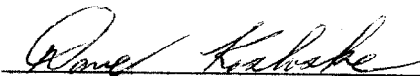
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	26%
PROBE SPEED (m/s)	4.27 - 4.33	4.27
PELVIS ACCELERATION (g's)	40 - 60	46

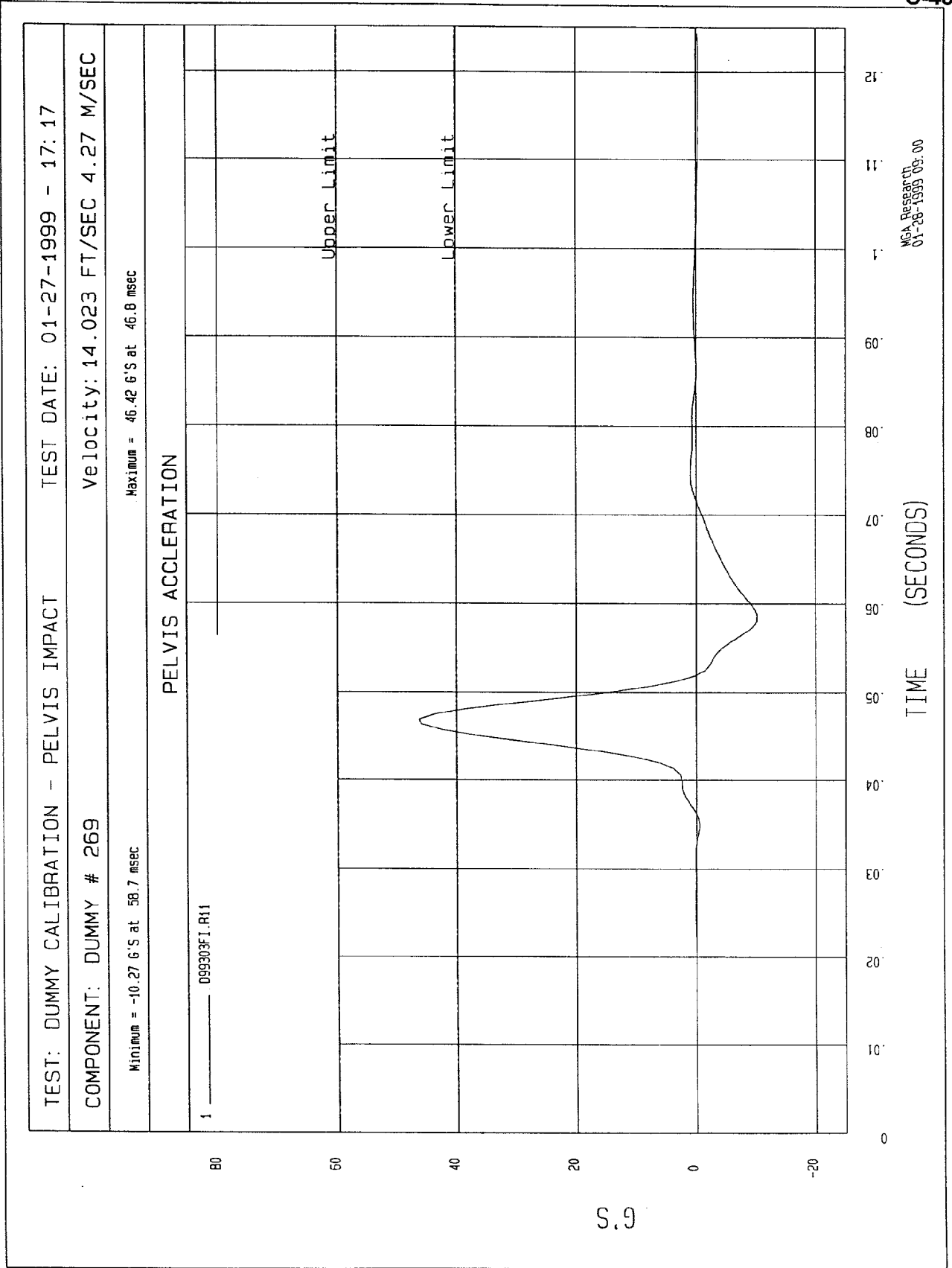
TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY





ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

DATE: January 27, 1999DUMMY SERIAL NUMBER: 269 TEST NUMBER: D99304

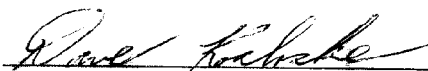
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	26%
FORCE @ 12.7 mm	104 - 162	153
FORCE @ 19.0 mm	163 - 222	210
FORCE @ 25.4 mm	222 - 280	270
FORCE @ 33 mm	325 - 391	366

TEST MEETS SPECIFICATIONS

TECHNICIAN



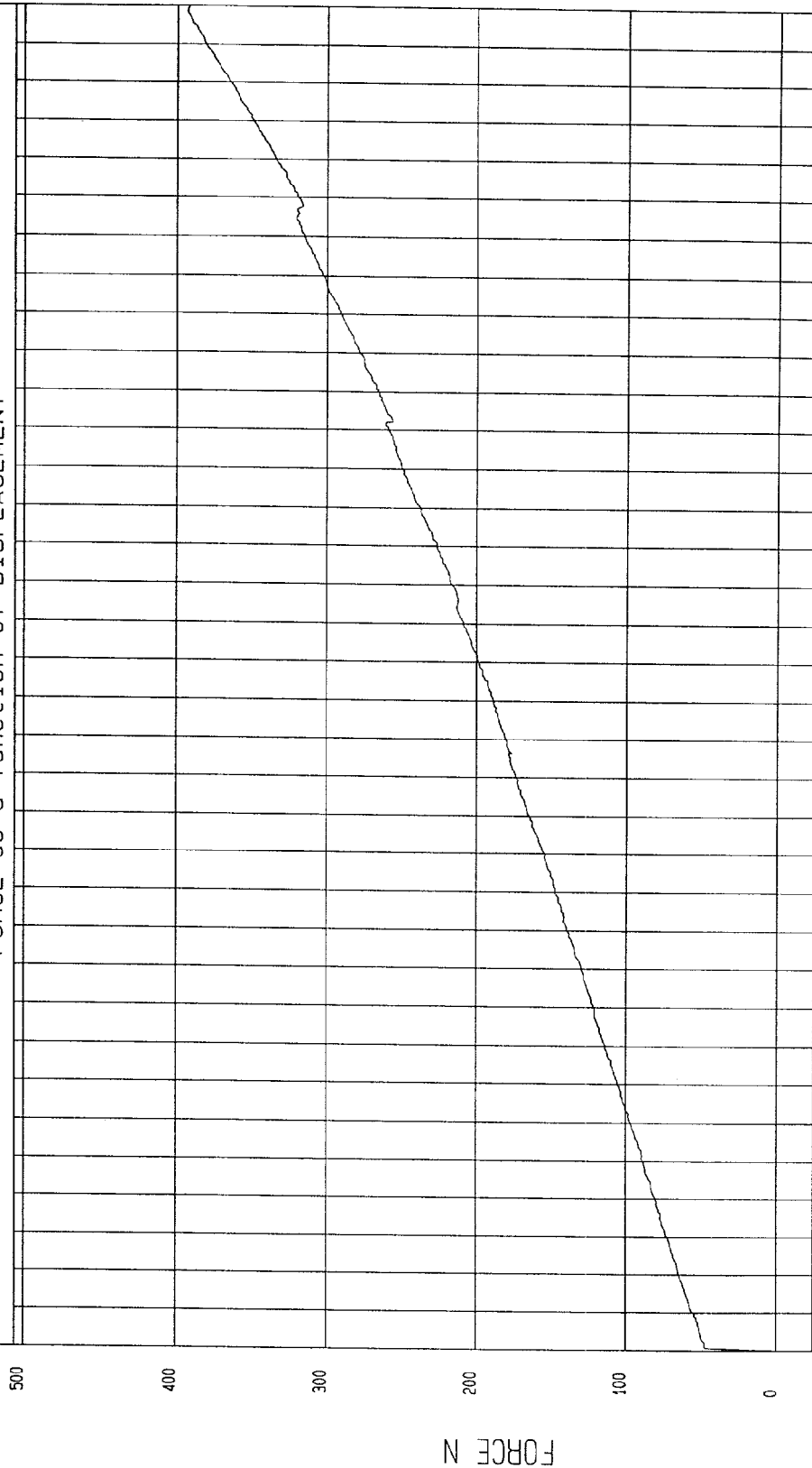
APPROVED BY



TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSION TEST DATE: 01-27-1999 - 16:26:21

COMPONENT: DUMMY # 269

FORCE as a function of DISPLACEMENT



NSA Research
01-28-1999 10:58

DISPLACEMENT mm

FORCE N

LUMBAR FLEXION TEST

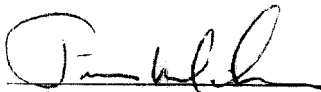
SIDE IMPACT DUMMY (SID)

DATE: January 27, 1999DUMMY SERIAL NUMBER: 269TEST NUMBER: D99315

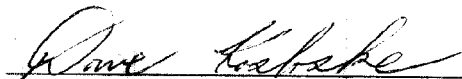
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.0°
RELATIVE HUMIDITY (%)	10 - 70	28%
FORCE @ 0°	0 - 26.7	0
FORCE @ 20°	97.9 - 151.2	123.9
FORCE @ 30°	151.2 - 204.6	184.1
FORCE @ 40°	204.6 - 258.0	228.3
RETURN ANGLE	12° maximum	6°

TEST MEETS SPECIFICATIONS

TECHNICIAN



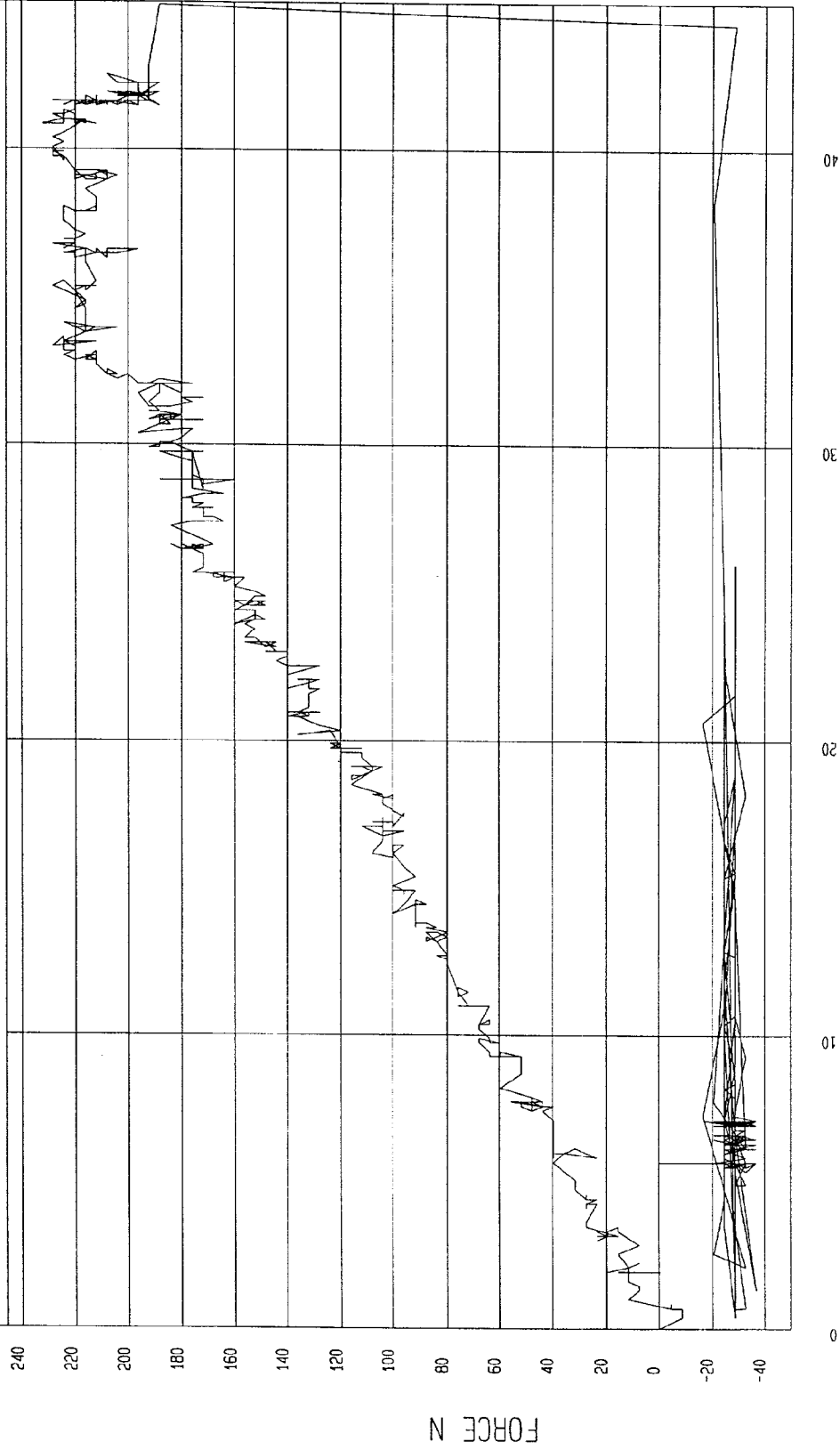
APPROVED BY



TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 01-27-1999 - 15:03:35

COMPONENT: DUMMY # 269

FORCE as a function of DISPLACEMENT



MCA Research
01-28-1999 10:59

POST-TEST DRIVER DUMMY INSPECTION CHECKLIST

C-53

Type: Side Impact Dummy

Serial Number: 270

Inspected By: Tim Michnay

Date: January 27, 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: 269

Inspected By: Tim Michnay

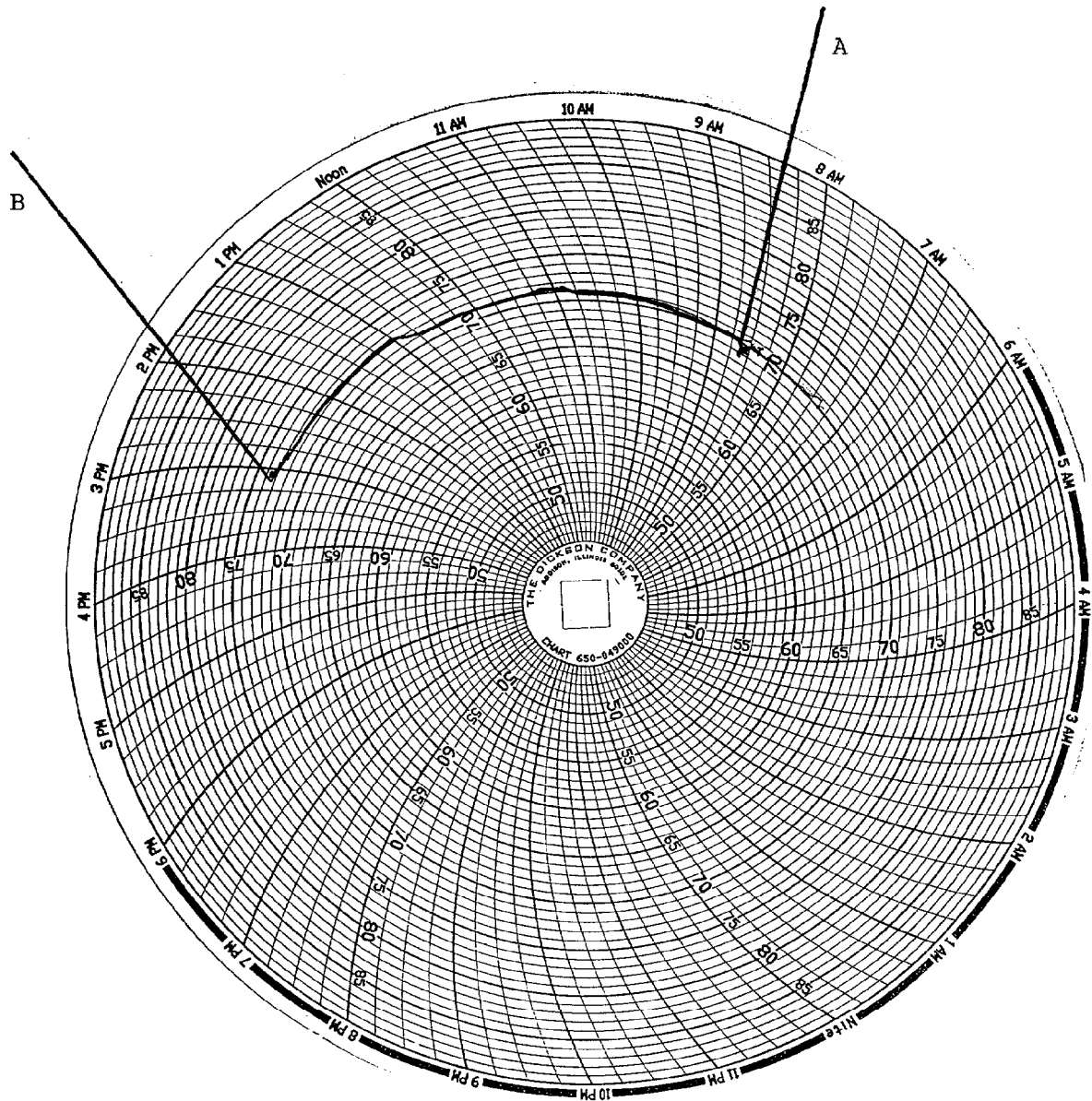
Date: January 27, 1999

<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

C-55



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. 270

	DRIVER		
	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	AP1C6	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

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

	LEFT REAR PASSENGER		
	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

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	G01-J09	Entran	December 21, 1998
Left Lower A-Post Y	F20-G07	Entran	September 24, 1998
Left Mid B-Post Y	F18-G06	Entran	December 16, 1998
Left Lower B-Post Y	I25-J06	Entran	September 24, 1998
Rear Floorpan Above Axle X	B14-R14	Entran	August 26, 1998
Rear Floorpan Above Axle Y	K16-X06	Entran	September 15, 1998
Rear Floorpan Above Axle Z	D05-R13	Entran	December 15, 1998
Driver Seat Track Y	I18-E15	Entran	September 16, 1998
Right Side Sill at Front Seat X	J23-E10	Entran	December 8, 1998
Right Side Sill at Front Seat Y	E10-F17	Entran	January 7, 1999
Right Side Sill at Front Seat Z	F18-G02	Entran	August 28, 1998
Right Side Sill at Rear Seat X	F11-G10	Entran	January 7, 1999
Right Side Sill at Rear Seat Y	F10-D04	Entran	January 7, 1999
Right Side Sill at Rear Seat Z	K11-J11	Entran	August 27, 1998

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO	MANUFACTURER	CALIBRATION DATE
Left Side Sill at Front Seat Y	J06-D20	Entran	January 7, 1999
Left Side Sill at Rear Seat Y	F20-G01	Entran	December 8, 1998
Right Rear Occupant Compartment Y	J10-E03	Entran	January 7, 1999
Vehicle CG X	J04-F14	Entran	December 21, 1998
Vehicle CG Y	E23-R06	Entran	December 21, 1998
Vehicle CG Z	F12-G01	Entran	December 21, 1998
Left Front Door on Centerline	F20-G03	Entran	December 16, 1998
Midrear of Left Front Door	G01-J05	Entran	August 26, 1998
Left Front Door Upper Centerline	I25-J12	Entran	January 7, 1999

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