

REPORT NO.: 214-MGA-97-07
SAFETY COMPLIANCE TESTING FOR
FMVSS 214 "SIDE IMPACT PROTECTION -
PASSENGER CARS"

V24 91

GENERAL MOTORS CORPORATION
1997 CHEVROLET CAVALIER 2 DOOR
NHTSA NO: CV0105

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: November 12, 1996

Report Date: December 18, 1996

FINAL REPORT

Prepared For:

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Contract Technical Manager

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				14. Sponsoring Agency Code NSA-30																			
15. Supplementary Notes																							
16. Abstract A 48/24 kph 90° Impact (Moving Deformable Barrier) Compliance Test was conducted on the subject 1997 Chevrolet Cavalier 4 Door in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-214D-04 for the determination of FMVSS No. 214 Side Impact Protection compliance. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on November 12, 1996. The impact velocity of the Moving Deformable Barrier (MDB) was 53.3 kph, and the ambient temperature at the struck side of the target vehicle at the time of impact was 23 °C. The target vehicle post test maximum crush was 344 mm at level 2. The test vehicle's performance follows: <table border="0"> <thead> <tr> <th></th> <th><u>RIGHT FRONT PASS.</u></th> <th><u>RIGHT REAR PASS.</u></th> </tr> </thead> <tbody> <tr> <td>Right Upper Rib (RUR) Accel., g</td> <td>81</td> <td>60</td> </tr> <tr> <td>Right Lower Rib (RLR) Accel., g</td> <td>84</td> <td>66</td> </tr> <tr> <td>Lower Spine (T₁₂) Accel., g</td> <td>70</td> <td>60</td> </tr> <tr> <td>Thoracic Trauma Index (TTI)</td> <td>77</td> <td>63</td> </tr> <tr> <td>Pelvis (PEV) Accel., g</td> <td>82</td> <td>76</td> </tr> </tbody> </table> 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.							<u>RIGHT FRONT PASS.</u>	<u>RIGHT REAR PASS.</u>	Right Upper Rib (RUR) Accel., g	81	60	Right Lower Rib (RLR) Accel., g	84	66	Lower Spine (T ₁₂) Accel., g	70	60	Thoracic Trauma Index (TTI)	77	63	Pelvis (PEV) Accel., g	82	76
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17. Key Words Compliance Testing Side Impact Protection FMVSS 214 Side Impact Dummy (SID)				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 Telephone No. 202-366-4946 Attn: Robert Hornickle																			
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SECTION 1
PURPOSE AND TEST PROCEDURE

This side impact test is part of the FY 96 FMVSS 214 Side Impact Protection Compliance Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-93-C-02047. The purpose of this test was to evaluate side impact protection of a 1997 Chevrolet Cavalier 2 Door.

This side impact test was conducted in accordance with the Vehicle Safety Compliance's FMVSS 214 test procedure (TP-214D-04, dated September 1, 1995).

MGA does not endorse or certify products. The manufacturer's name appears solely for identification purposes only.

SECTION 2

SUMMARY OF SIDE IMPACT TEST

A 1997 Chevrolet Cavalier 2 Door was impacted on the right 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 33.1 mph (53.3 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 November 12, 1996. 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 right front and rear right designated seating positions according to instructions specified in the OVSC Side Impact Laboratory Test Procedure which is dated September 1, 1995. 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. Right Upper Rib (RUR) uniaxial accelerometer (Y-direction)
2. Right Lower Rib (RLR) uniaxial accelerometer (Y-direction)
3. Lower Thoracic Spine (T₁₂) uniaxial accelerometer (Y-direction)
4. Pelvic (PEV) section uniaxial accelerometer (Y-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 FMVSS 214 Right Side Impact test:

Injury Criteria	Front SID	Rear SID
THI (g)	77	63
Pelvis (g)	82	76

TEST NOTES

1. The following accelerometers were not used for this test:

Right Front Door on Centerline

Midrear of Right Front Door

Right Front Door Upper Centerline

Midrear of Right Rear Door

Right Rear Door Upper Centerline

Rear Seat Track

Vehicle CG

Right Mid B Post

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: 1997/Chevrolet/Cavalier/2 Door

Vehicle NHTSA No.: CV0105 VIN: 1G1JC124XVM101170

Vehicle Body Color: Red Build Date: 7/96

Engine Data: 4 Cylinders; CID; 2.2 Liter; cc

Placement Longitudinal; X Lateral

Transmission: 5 speed; X Manual; Automatic; Overdrive

Final Drive: Rear Wheel Drive; X Frt. Wheel Drive; Four Wheel Drive

Odometer Reading 130 miles

Options: A/C; X Pwr. Steering; X Pwr. Brakes; Pwr. Windows;

 Cruise Control; Tilt Wheel; Power Door Locks;

DATA FROM TIRE PLACARD:

Tire Pressure (at capacity): 30 Psi FRONT

30 Psi REAR

Recommended Tire Size: P195/70R14

Tires on Test Vehicle: P195/70R14 Manufacturer: Goodyear

Vehicle Capacity Data:

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

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

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

Vehicle Maximum Capacity Loading = 400.0 kg (A)

No. of Occupants x 68.04 kg. = 340.0 kg (B)

Cargo Capacity (A-B) = 60.0 kg

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

WEIGHT OF TEST VEHICLE WITH MAXIMUM FLUIDS:

Right Front	=	<u>371.5</u> kg	Right Rear	=	<u>210.0</u> kg
Left Front	=	<u>383.3</u> kg	Left Rear	=	<u>214.5</u> kg
TOTAL FRONT	=	<u>754.8</u> kg	TOTAL REAR	=	<u>424.5</u> kg
% of Total Vehicle Weight = <u>64.0</u> %;		% of Total Weight = <u>36.0</u> %			
TOTAL WEIGHT = <u>1179.3</u> kg					

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

Year/Make/Model/Body Style: 1997/Chevrolet/Cavalier/2 Door

Vehicle NHTSA No.: CV0105 Test Date: November 12, 1996

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Test Vehicle Delivered Weight with Maximum Fluids	= <u>1179.3</u> kg
Cargo Carrying Capacity of Test Vehicle	= <u>60.0</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>1400.7</u> kg

FULLY LOADED WEIGHT OF TEST VEHICLE:

Right Front	= <u>417.3</u> kg	Right Rear	= <u>305.3</u> kg
Left Front	= <u>386.0</u> kg	Left Rear	= <u>275.8</u> kg
TOTAL FRONT	= <u>803.3</u> kg	TOTAL REAR	= <u>581.1</u> kg
% of Total Weight	= <u>58.0</u> %	% of Total Weight	= <u>42.0</u> %
TOTAL TEST WEIGHT	= <u>1384.4</u> kg		

TEST VEHICLE ATTITUDE:

CURB WEIGHT ATTITUDE:

Right Front 686 mm Left Front 676 mm Right Rear 714 mm Left Rear 711 mm

FULLY LOADED WEIGHT ATTITUDE:

Right Front 670 mm Left Front 675 mm Right Rear 661 mm Left Rear 677 mm

TEST ATTITUDE:

Right Front 670 mm Left Front 675 mm Right Rear 666 mm Left Rear 674 mm

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

Test Vehicle Wheelbase: 2642 mm

C.G. = 1071 mm rearward of front wheel centerline

TOTAL VEHICLE LENGTH:

Right Side = 4096 mm

Centerline = 4526 mm

Left Side = 4096 mm

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

Year/Make/Model/Body Style: 1997/Chevrolet/Cavalier/2 Door

Vehicle NHTSA No.: CV0105 Test Date: November 12, 1996

FRONT SEAT CUSHION PLACEMENT:

Total Length of Adjustment Travel: 270 mm

Test Position: 6th position rearward out of 10 total

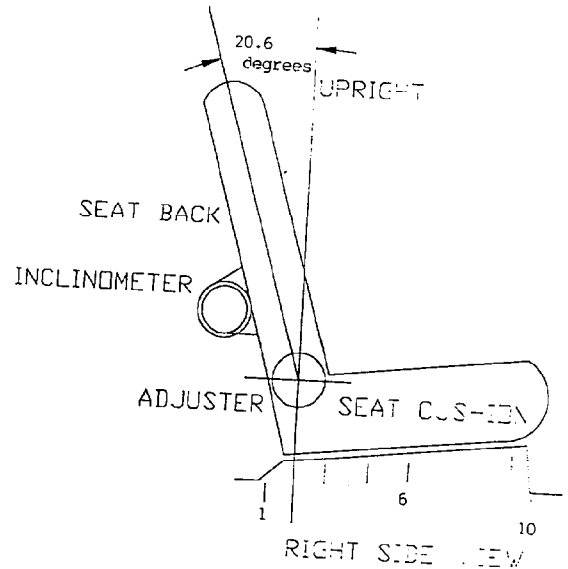
FRONT SEAT BACK ADJUSTMENT POSITION:

Seat Back Angle = 20.6° from the vertical position

REAR POSITION SEAT:

Total Length of Fore/Aft Adjustment Travel: 0

Seat Back Adjustment Position: Non-Adjustable



ADJUSTABLE STEERING COLUMN POSITION: N/A

WINDOW POSITIONS: Left Front Open Left Rear Open

Right Front Closed Right Rear Closed

AMOUNT OF STODDARD SOLVENT IN FUEL TANK:

Fuel system usable capacity = 15.2 liters

Test Volume: 14.14 gallons 93 % of capacity

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

Wheelbase: = 2642 mm

Impact Point is 381 mm rearward of front axle centerline

DATA SHEET NO. 2

TEST VEHICLE SUMMARY OF RESULTS

Year/Make/Model/Body Style: 1997/Chevrolet/Cavalier/2 Door

Vehicle NHTSA No.: CV0105 Test Date: November 12, 1996

Overall Length = 4526 mm; Overall Width = 1737 mm

TEST WEIGHT:

Right Front = 426.4 kg Right Rear = 293.5 kg

Left Front = 403.7 kg Left Rear = 272.6 kg

TOTAL FRONT = 830.1 kg TOTAL REAR = 566.1 kg

% of Total Weight = 59.5 % % of Total Weight = 40.5 %

TOTAL VEHICLE WEIGHT = 1396.2 kg

Wheelbase = 2642 mm

Longitudinal C.G. from Center of Front Axle = 1071 mm

Impact Angle with Respect to Impactor = 0° degrees

MAXIMUM EXTERIOR STATIC CRUSH:

1. LEVEL 1 (256 mm above ground) = 203 mm

2. LEVEL 2 (440 mm above ground) = 344 mm

3. LEVEL 3 (568 mm above ground) = 337 mm

4. LEVEL 4 (839 mm above ground) = 257 mm

5. LEVEL 5 (1268 mm above ground) = 43 mm

Maximum Post-Test Intrusion = 344 mm

OCCUPANTS:

Right Front Passenger

Right Rear Passenger

Type of Dummy

SID

SID

Restraints Used

type II belt

type II belt

TEST VEHICLE SUMMARY OF RESULTS (Cont'd)

INSTRUMENTATION:

Number of Vehicle Data Channels:	=	<u>15</u>
Number of Cameras: Onboard Vehicle	=	<u>3</u>
Offboard Vehicle	=	<u>4</u>
Deformable Barrier	=	<u>2</u>
TOTAL	=	<u>9</u>

DATA SHEET NO. 3

MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS

Year/Make/Model/Body Style: 1997/Chevrolet/Cavalier/2 Door

Vehicle NHTSA No.: CV0105 Test Date: November 12, 1996

POSITION OF IMPACT (MDB) ON MONORAIL:

Crabbed 27° to right

MDB DETAILS:

Overall Width of Framework Carriage	= <u>1252 mm</u>
Overall Length of MDB (incl. honeycomb impact face)	= <u>4115 mm</u>
Wheelbase of Framework Carriage	= <u>2591 mm</u>
Tread of Framework Carriage (Front & Rear)	= <u>1880 mm</u>
C.G. Location Rearward of Front Axle	= <u>1106 mm</u>
C.G. Location From Center Line	= <u>14.7 mm</u>
C.G. Location Above Ground Level	= <u>488 mm</u>

MDB WEIGHT:

Left Front	= <u>434.5 kg</u>	Left Rear	= <u>233.2 kg</u>
Right Front	= <u>342.9 kg</u>	Right Rear	= <u>346.0 kg</u>
TOTAL FRONT	= <u>777.4 kg</u>	TOTAL REAR	= <u>579.2 kg</u>
TOTAL MDB WEIGHT = <u>1356.6 kg</u>			

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

Impact Speed = Primary: 33.11 mph (53.3 kph) Secondary: 33.10 mph (53.3 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>86</u> mm |
| 2. | Row B Mid Stack (686 mm) | = <u>73</u> mm |
| 3. | Row C Top of Bumper (533 mm) | = <u>33</u> mm |
| 4. | Row D Center of Bumper (432 mm) | = <u>78</u> mm |

INSTRUMENTATION:

Number of MDB Data Channels = 5

DATA SHEET NO. 4

POST-TEST OBSERVATIONS

Year/Make/Model/Body Style: 1997/Chevrolet/Cavalier/2 Door

Vehicle NHTSA No.: CV0105 Test Date: November 12, 1996

VISIBLE DUMMY CONTACT POINTS:

	<u>RIGHT FRONT SID</u>	<u>RIGHT REAR SID</u>
Head	<u>to window sill & head rest</u>	<u>to C Post & rear window</u>
Arm	<u>to door</u>	<u>to trim panel</u>
Pelvis	<u>to door</u>	<u>to trim panel</u>
Left Knee	<u>to right knee</u>	<u>to right knee</u>
Right Knee	<u>to door</u>	<u>to trim panel</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: 0 mm Vertical: 6 mm high

ARM REST LOCATIONS:

Front: 247 mm from bottom of window
Rear: 300 mm from bottom of window

POST-TEST OBSERVATIONS (Cont'd)

SEAT CRUSH:

Front Seat Back: 96 mm Front Seat Cushion: 151 mm

Rear Seat Back: 50 mm Rear Seat Cushion: 177 mm

GLAZING DAMAGE:

Door glass broken and windshield cracked

PILLAR PERFORMANCE:

No separation noted

SILL SEPARATION:

None noted

OTHER NOTABLE IMPACT EFFECTS:

Airbags deployed

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 5

SIDE IMPACT DUMMY (SID) INSTRUMENTATION DATA

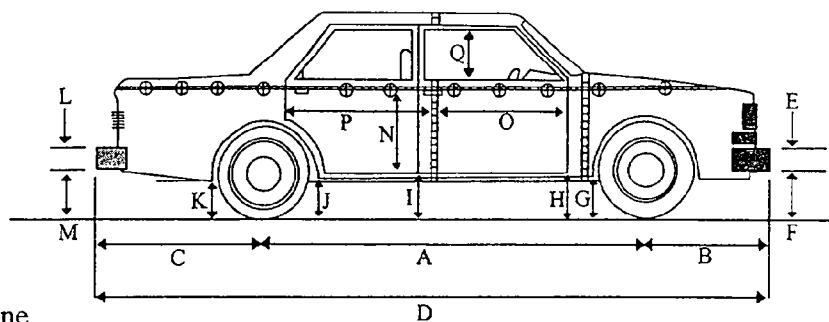
Year/Make/Model/Body Style: 1997/Chevrolet/Cavalier/2 Door

Vehicle NHTSA No.: CV0105 Test Date: November 12, 1996

	Front SID ID #269				Rear SID ID #270			
	Pos. Direct.		Neg. Direct		Pos. Direct.		Neg. Direct	
	Max (g)	Time (msec)	Max (g)	Time (msec)	Max (g)	Time (msec)	Max (g)	Time (msec)
RIB ACCELERATIONS								
Right Upper Rib (RUR) Y	19.2	68	-80.5	36	8.3	70	-59.5	42
Right Lower Rib (RLR) Y	27.9	67	-84.2	36	17.8	69	-66.1	43
SPINE ACCELERATIONS								
Lower Lateral Y	15.3	85	-70.0	36	17.6	74	-60.1	45
PELVIS ACCELERATIONS								
Lateral Y	16.5	47	-81.5	29	11.6	72	-76.4	38

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

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



D = Length at Centerline

R = Right Side Length

S = Left Side Length

T = Width at B Post

E & L = Bumper Thickness

J1 = To Pinch Weld

J2 = To Sill

ALL MEASUREMENTS IN (mm)

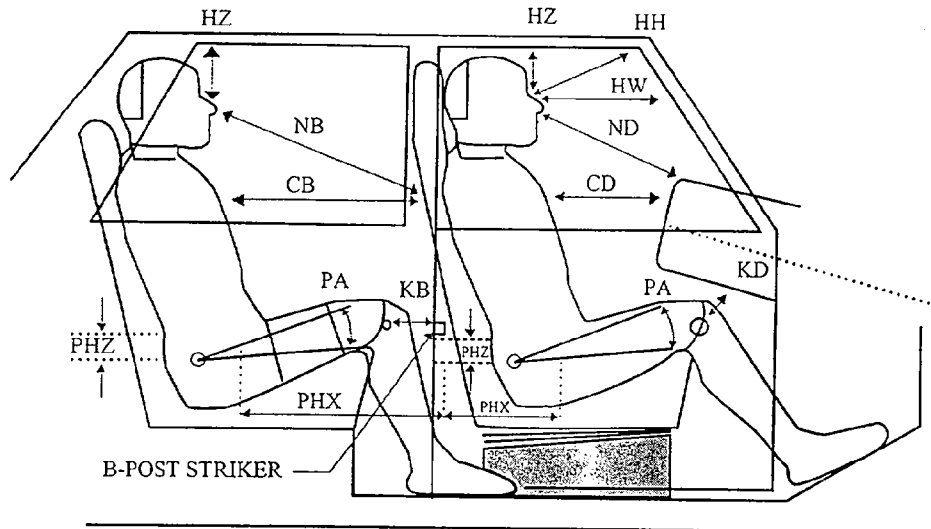
	PRE-TEST	POST-TEST	Δ CHANGE
A	2642	2644	2
B	988	998	10
C	896	889	7
D	4526	4531	5
E	140	140	0
F	408	421	13
G	177	229	52
H	177	227	50
I	182	204	22
J1/J2	184/181	234/223	50/42
K	244	307	63
L	280	280	0
M	329	400	71
N	671	542	129
O	743	744	1
P	653	652	1
Q	434	423	11
R	4096	4031	65
S	4096	4098	2
T	1737	1478	259

DATA SHEET NO. 7

SIDE IMPACT DUMMY (SID) LONGITUDINAL CLEARANCE DIMENSIONS

Year/Make/Model/Body Style: 1997/Chevrolet/Cavalier/2 Door

NHTSA NO.: CV0105 Test Date: November 12, 1996



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

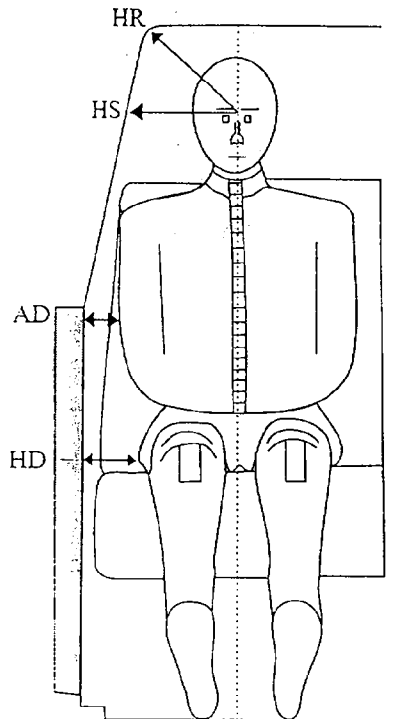
	RIGHT FRONT PASSENGER ID #269		RIGHT REAR PASSENGER SID ID #270
HH	294	HZ	112
HW	495	NB	585
HZ	112	CB	511
ND	566	KBL (KBA)	189 (0°)
CD	471	KBR (KBA)	197 (0°)
CS	N/A	PA°	24.6°
KDL(KDA°)	164 (30.8°)	PHX	344
KDR(KDA°)	157 (35.6°)	PHZ	147
PA°	23.3°		
PHX	503		
PHZ	126		

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

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

Year/Make/Model/Body Style: 1997/Chevrolet/Cavalier/2 Door

NHTSA NO.: CV0105 Test Date: November 12, 1996



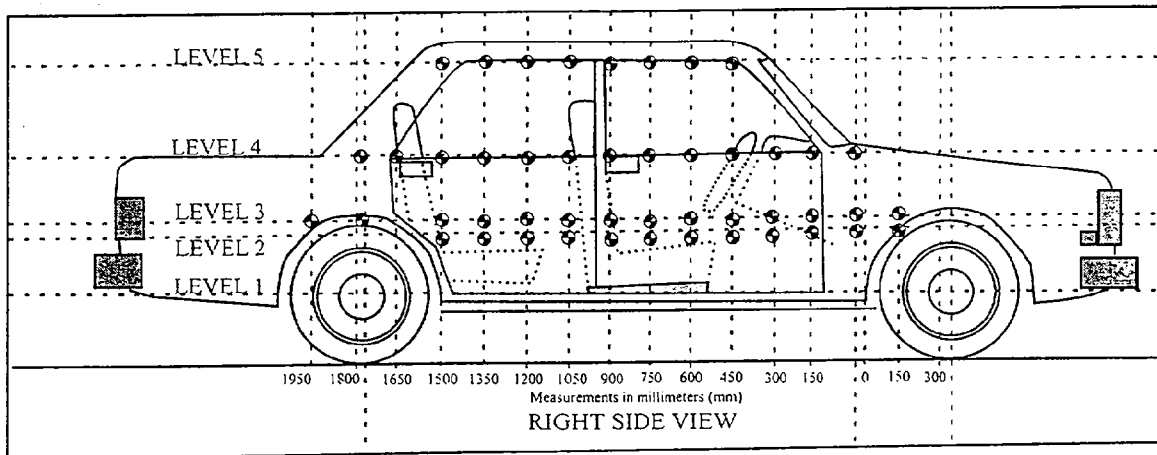
NOTE: All dimensions are in mm

	RIGHT FRONT PASSENGER ID #269	RIGHT REAR PASSENGER ID #270
HR	187	213
HS	290	215
AD	110	133
HD	115	126

DATA SHEET NO. 9
VEHICLE SIDE MEASUREMENTS

Year/Make/Model/Body Style: 1997/Chevrolet/Cavalier/2 Door

NHTSA NO.: CV0105 Test Date: November 12, 1996



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

MEASUREMENTS ALONG THE VERTICAL 750 mm. LINE SHOWN ABOVE

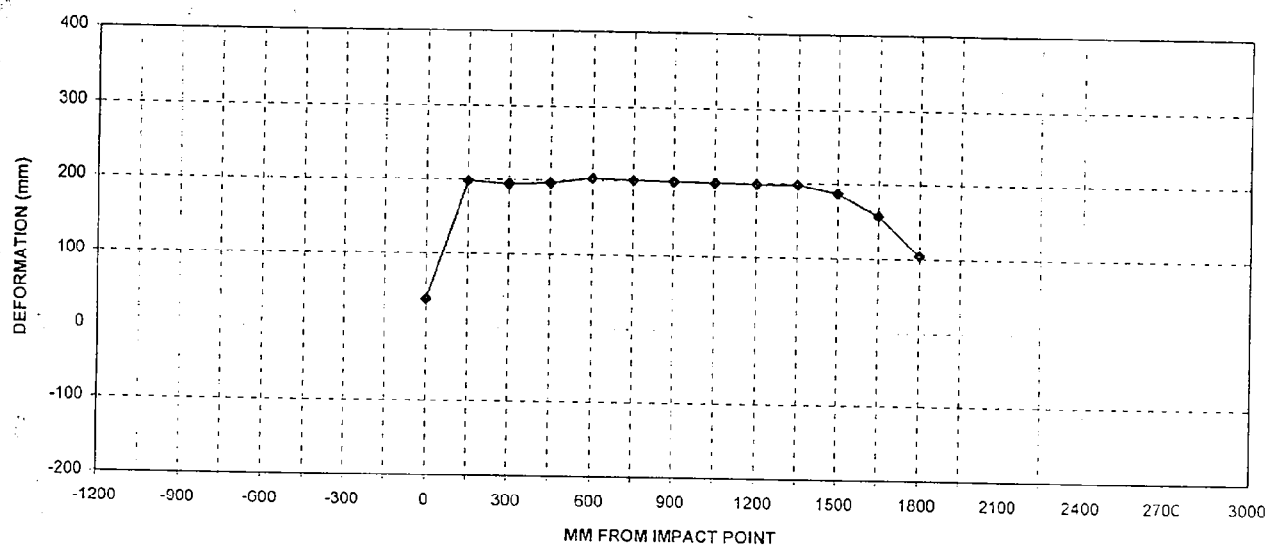
Level 1 @ Axle Centerline Height (or Sill Top Height)	= <u>256</u> mm
Level 2 @ Occupant H-Point	= <u>440</u> mm
Level 3 @ Mid Door	= <u>568</u> mm
Level 4 @ Window Sill	= <u>839</u> mm
Level 5 @ Window Top	= <u>1268</u> mm

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

Longitudinal Distance (mm)	Level 1 - Axle Centerline		
	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1200			
-1050			
-900			
-750			
-600			
-450			
-300			
-150			
0 (impact point)	760	798	38
150	760	958	198
300	762	956	194
450	763	959	196
600	763	966	203
750	764	965	201
900	766	966	200
1050	764	963	199
1200	762	960	198
1350	754	952	198
1500	742	929	187
1650	734	892	158
1800	734	838	104
1950			
2100			
2250			
2400			
2550			
2700			
2850			
3000			

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

VEHICLE EXTERIOR STATIC CRUSH (Cont'd)



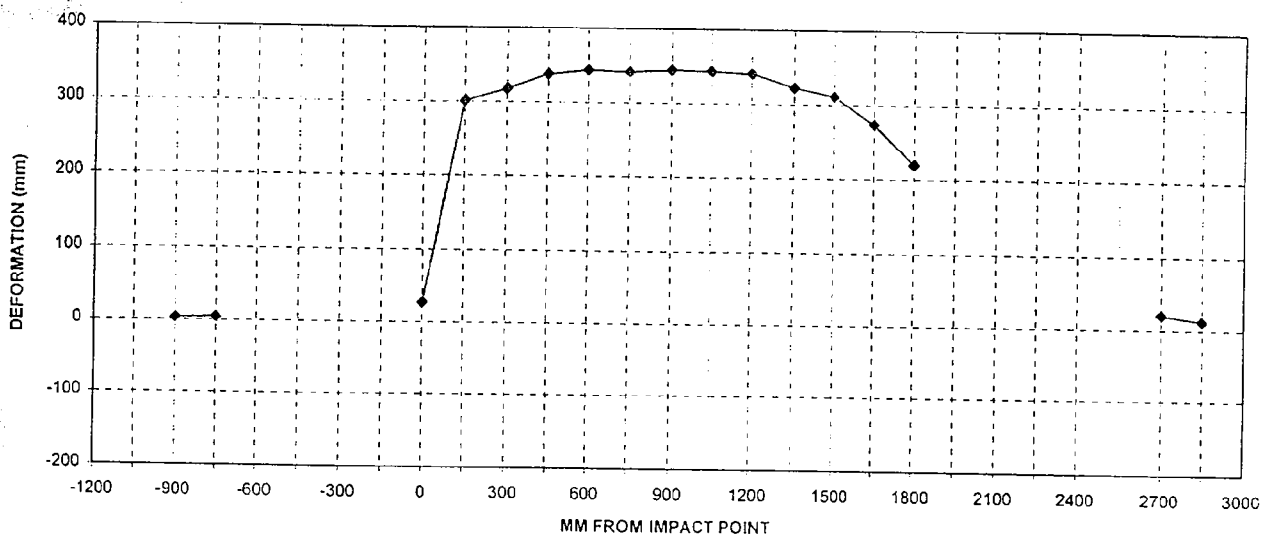
LEVEL 1 - AXLE CENTERLINE

DATA SHEET NO. 10 (Cont'd)
VEHICLE EXTERIOR CRUSH PROFILES

Longitudinal Distance (mm)	Level 2 - Occupant H Point		
	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1200			
-1050			
-900	775	778	3
-750	745	749	4
-600			
-450			
-300			
-150			
0 (impact point)	725	752	27
150	727	1028	301
300	731	1048	317
450	732	1069	337
600	735	1078	343
750	736	1077	341
900	736	1080	344
1050	738	1081	343
1200	736	1076	340
1350	735	1057	322
1500	735	1046	311
1650	730	1004	274
1800	724	944	220
1950			
2100			
2250			
2400			
2550			
2700	764	784	20
2850	794	806	12
3000			

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

VEHICLE EXTERIOR STATIC CRUSH (Cont'd)



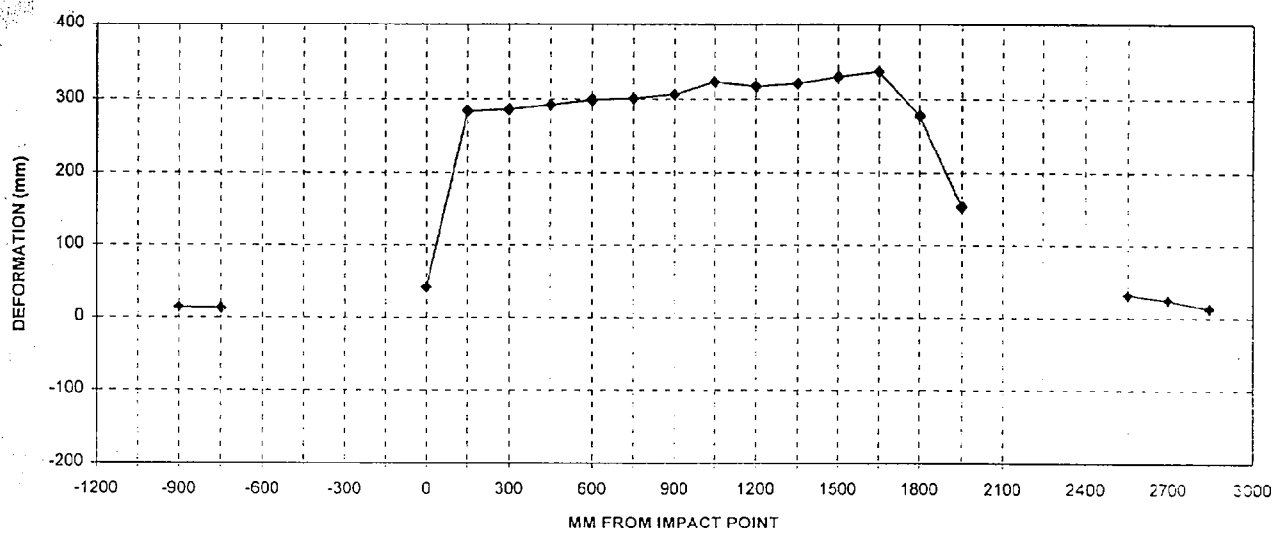
LEVEL 2 - OCCUPANT H-POINT

DATA SHEET NO. 10 (Cont'd)
VEHICLE EXTERIOR CRUSH PROFILES

Longitudinal Distance (mm)	Level 3 - Mid Door		
	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1200			
-1050			
-900	797	811	14
-750	754	767	13
-600			
-450			
-300			
-150			
0 (impact point)	710	751	41
150	712	996	284
300	712	998	286
450	712	1004	292
600	713	1012	299
750	713	1014	301
900	712	1018	306
1050	710	1033	323
1200	708	1025	317
1350	705	1026	321
1500	704	1034	330
1650	703	1040	337
1800	702	980	278
1950	702	855	153
2100			
2250			
2400			
2550	733	764	31
2700	759	783	24
2850	800	813	13
3000			

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

VEHICLE EXTERIOR STATIC CRUSH (Cont'd)



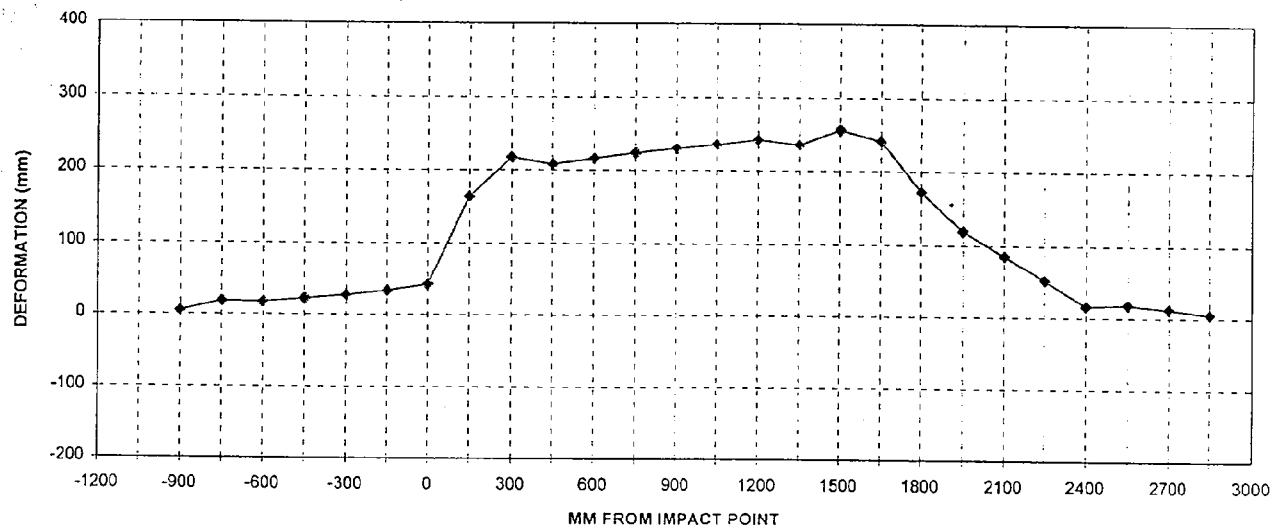
LEVEL 3 - MID DOOR

DATA SHEET NO. 10 (Cont'd)
VEHICLE EXTERIOR CRUSH PROFILES

Longitudinal Distance (mm)	Level 4 - Window Sill		
	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1200			
-1050			
-900	848	853	5
-750	810	828	18
-600	788	805	17
-450	768	790	22
-300	755	782	27
-150	753	786	33
0 (impact point)	752	794	42
150	750	914	164
300	751	968	217
450	754	962	208
600	753	969	216
750	753	977	224
900	753	983	230
1050	754	990	236
1200	752	995	243
1350	756	992	236
1500	754	1011	257
1650	754	996	242
1800	753	825	172
1950	765	884	119
2100	766	851	85
2250	775	826	51
2400	790	806	16
2550	805	823	18
2700	824	836	12
2850	850	855	5
3000			

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

VEHICLE EXTERIOR STATIC CRUSH (Cont'd)



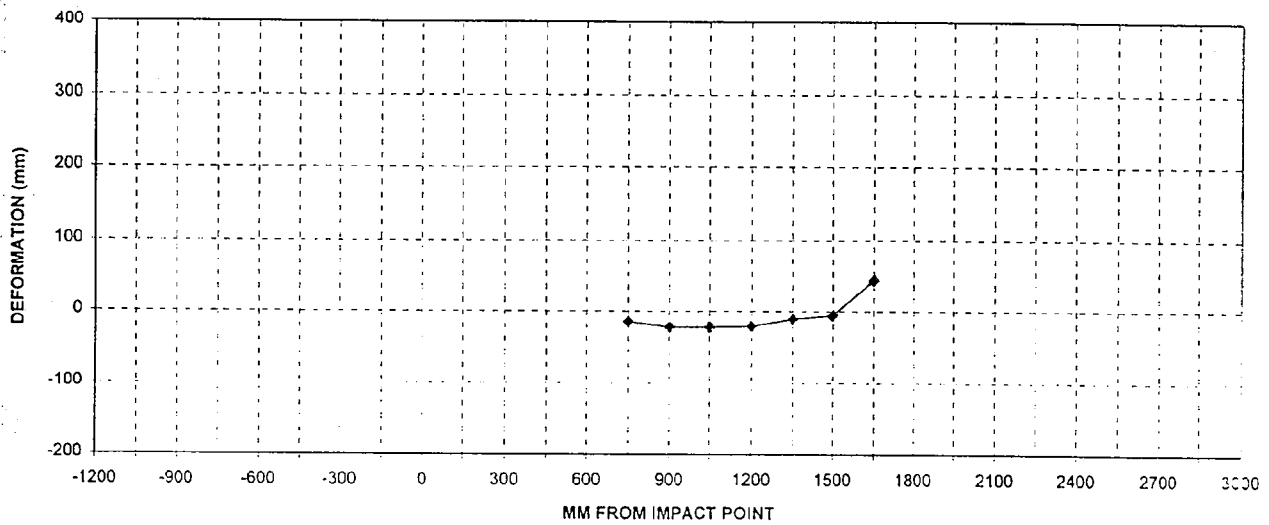
LEVEL 4 - WINDOW SILL

DATA SHEET NO. 10 (Cont'd)
VEHICLE EXTERIOR CRUSH PROFILES

Longitudinal Distance (mm)	Level 5 - Window Top		
	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1200			
-1050			
-900			
-750			
-600			
-450			
-300			
-150			
0 (impact point)			
150			
300			
450			
600			
750	1000	985	-15
900	1002	980	-22
1050	1004	982	-22
1200	1006	985	-21
1350	1000	989	-11
1500	1002	996	-6
1650	1004	1047	43
1800			
1950			
2100			
2250			
2400			
2550			
2700			
2850			
3000			

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

VEHICLE EXTERIOR STATIC CRUSH (Cont'd)

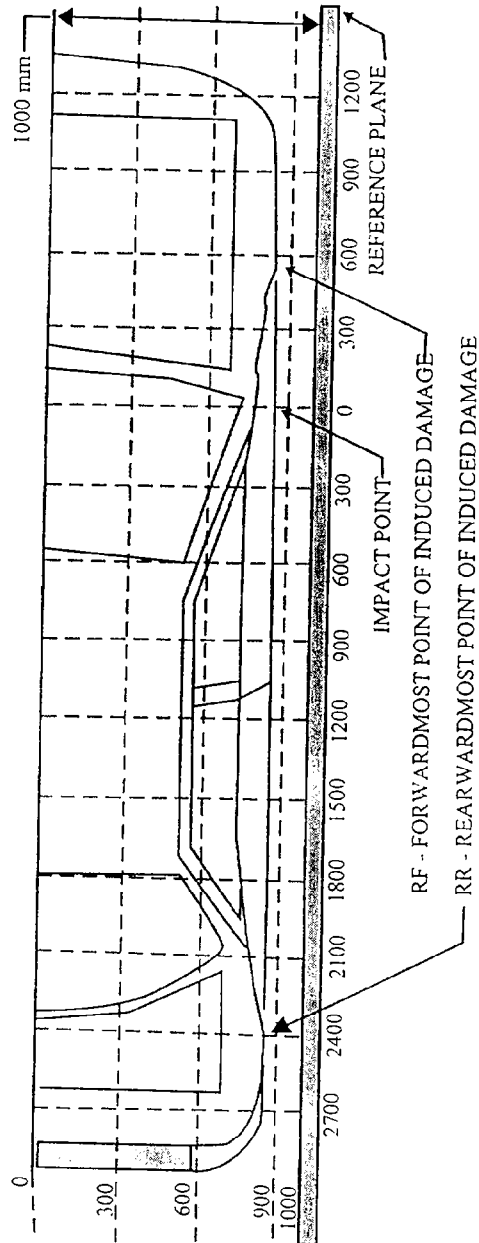


LEVEL 5 - WINDOW TOP

DATA SHEET NO. 11
VEHICLE DAMAGE PROFILE DISTANCES

Year/Make/Model/Body Style: 1997/Chevrolet/Cavalier/2 Door

NHTSA NO.: CV0105 Test Date: November 12, 1996



DPD MEASUREMENTS	POST-TEST (mm)	PRE-TEST (mm)	STATIC CRUSH (mm)
1. (RF = 900 mm)	853	853	0
2. -165 mm	788	753	35
3. 525 mm	1072	734	338
4. 1285 mm	1070	735	335
5. 2125 mm	846	768	78
6. (RR = 2850 mm)	855	855	0

DATA SHEET NO. 12

EXTERIOR STATIC CRUSH FOR SIDE IMPACTOR

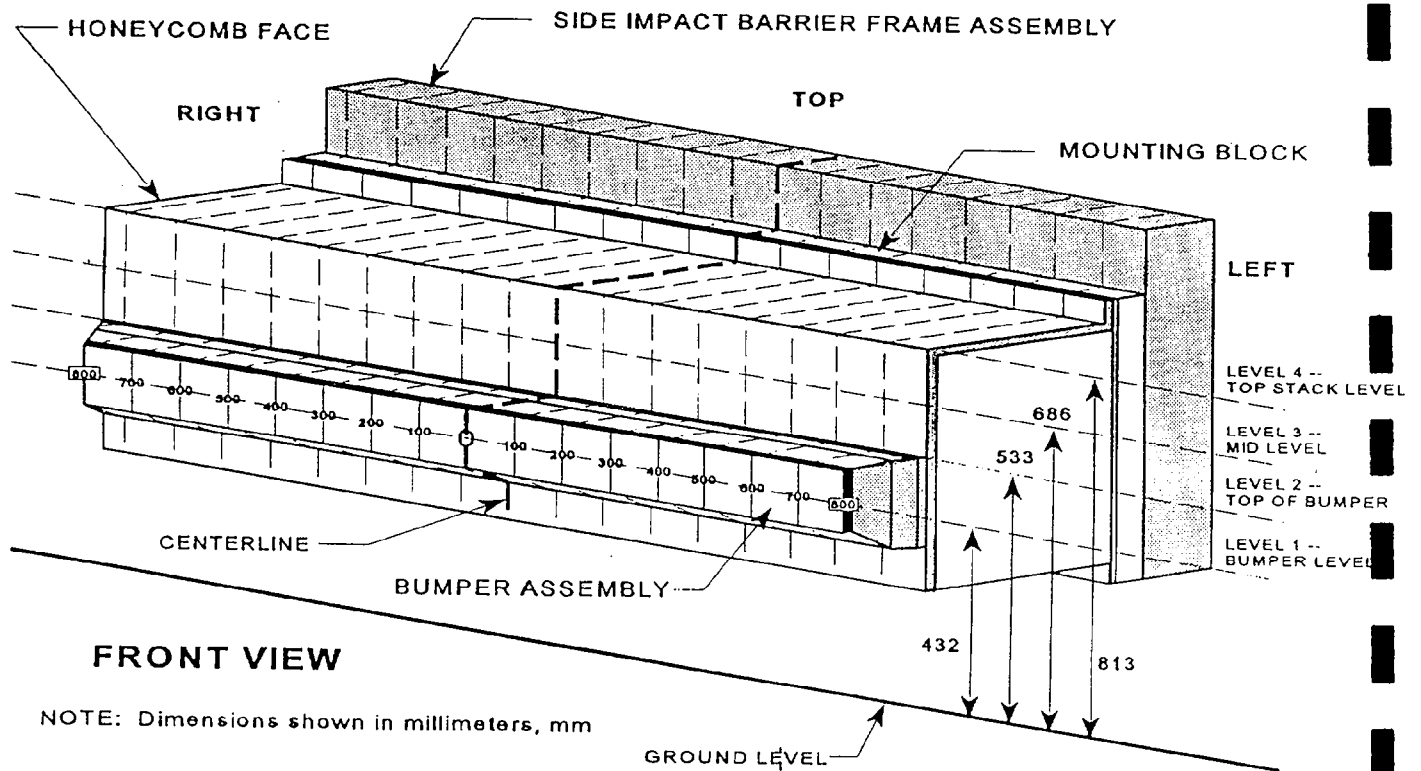
Year/Make/Model/Body Style: 1997/Chevrolet/Cavalier/2 Door

Vehicle NHTSA No.: CV0105 Test Date: November 12, 1996

		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	86	64	33	21	10	9	6	4	3	1	1	1	0	1	1	27	86
Mid Level Level 3	686 mm	73	32	1	0	2	0	1	1	0	1	0	1	1	2	3	3	21
Top Bumper Level 2	533 mm	29	18	15	13	9	6	6	6	4	3	1	0	1	8	16	25	33
Mid Bumper Level 1	432 mm	50	51	19	18	18	18	19	16	16	16	15	18	25	37	49	65	78

See next page for Barrier Face Graphic

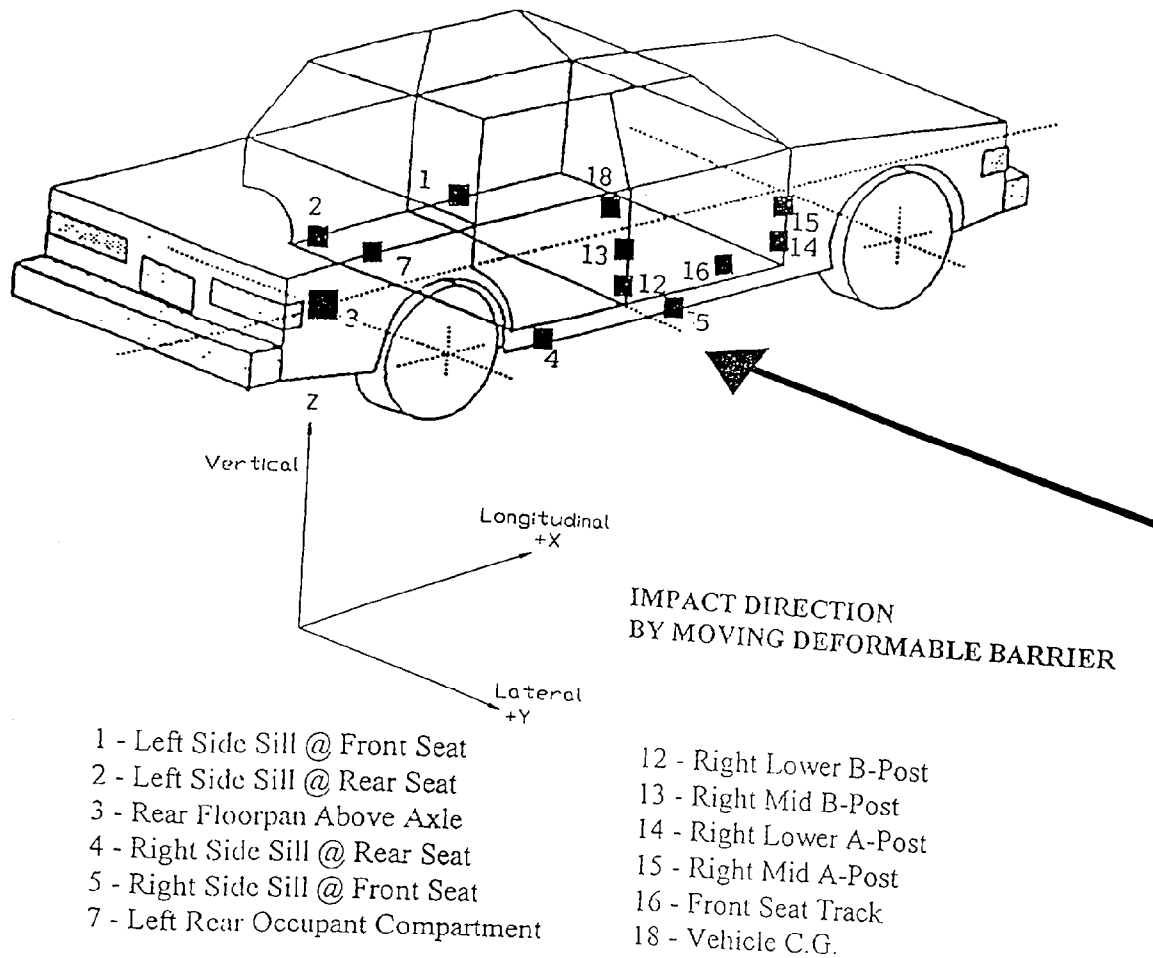
DATA SHEET NO. 12 (Cont'd)



DATA SHEET 13
TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 1997/Chevrolet/Cavalier/2 Door

Vehicle NHTSA No.: CV0105 Test Date: November 12, 1996



DATA SHEET NO. 13

TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 1997/Chevrolet/Cavalier/2 Door

Vehicle NHTSA No.: CV0105 Test Date: November 12, 1996

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	Left Side Sill @ Front Seat	2578	-632	195	3.4	-7.0	2.7	-19.2	5.5	-6.8	19.4
2	Left Side Sill @ Rear Seat	1694	-638	190	2.6	-6.8	3.2	-21.8	4.1	-9.6	21.9
3	Rr. Floorpan Above Axle	1060	12	430	11.0	-8.1	2.8	-22.5	12.4	-11.0	26.1
4	Right Side Sill @ Rr. Seat	1750	638	195	---	---	16.1	-37.5	---	---	---
5	Right Side Sill @ Frt. Seat	2585	642	190	---	---	15.4	-31.7	---	---	---
7	Left Rear Occupant Compartment	1803	-330	265	---	---	2.9	-21.2	---	---	---
12	Right Lower B-Post	1792	610	288	---	---	24.3	-70.7	---	---	---
14	Right Lower A-Post**	3047	600	340	---	---	33.7	-77.2	---	---	---
15	Right Mid A-Post	3033	703	840	---	---	11.0	-51.0	---	---	---
16	Right Front Passenger Seat Track	2222	577	250	---	---	12.6	-28.4	---	---	---

*Reference: X - Rear Bumper (+ Forward)

Y - Vehicle Centerline (+ To right)

Z - Ground Level (+ Up)

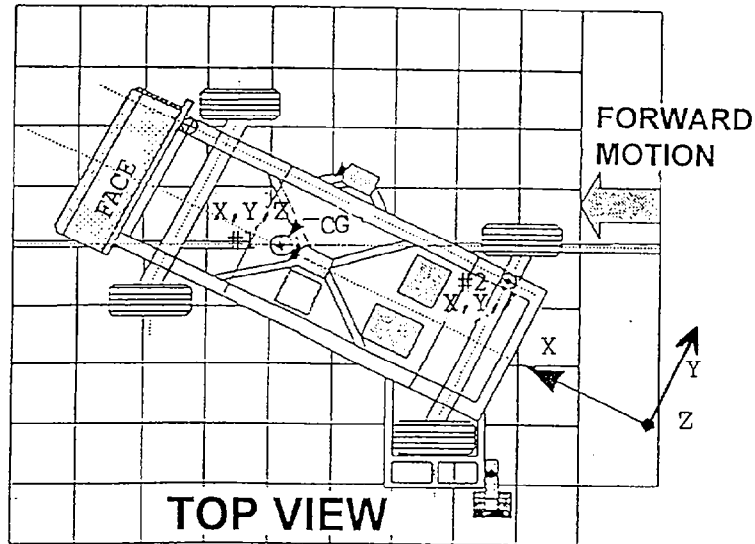
** Accelerometer detached during impact

DATA SHEET NO. 14

MOVING DEFORMABLE BARRIER (MDB) ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 1997/Chevrolet/Cavalier/2 Door

Vehicle NHTSA No.: CV0105 Test Date: November 12, 1996

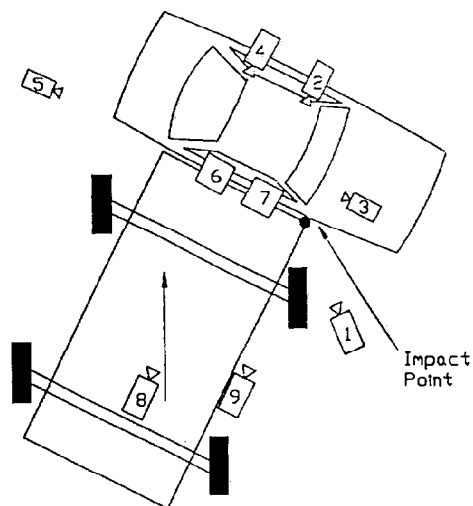


Accel. No.	Description	Coordinates (mm)*			(+) Positive		(-) Negative	
		X	Y	Z	Max. (g)	Time (msec)	Max. (g)	Time (msec)
1	MDB Center of Gravity	-1092	0	483				
	Longitudinal (X)	---	---	---	1.7	138	-15.2	33
	Lateral (Y)	---	---	---	7.2	33	-.5	62
	Vertical (Z)	---	---	---	17.8	38	-20.3	23
	Resultant (R)	---	---	---	25.3	33	---	---
2	Rear Frame Member	-2591	625	622				
	Longitudinal (X)	---	---	---	1.9	104	-19.3	32
	Lateral (Y)	---	---	---	1.3	112	-5.3	34

*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: 1997/Chevrolet/Cavalier/2 Door
Vehicle NHTSA No.: CV0105 Test Date: November 12, 1996



Camera No.	View	Coordinates (mm)*			Angle	Lens (mm)	Film Speed (fps)
		X	Y	Z			
	Real Time					13	24
1	Right Impact	-1200	-2150	1685	90°	13	1000
2	Onboard Front Passenger					8	909
3	Onboard Hood					13	1000
4	Onboard Rear Passenger					8	1000
5	Left Impact	50	9230	1940	90°	25	1015
6	Top Wide	-130	1200	5200		8	1031
7	Top Impact	-80	-10	5200		13	909
8	Cart Wide					13	1020
9	Cart Impact					35	926

* Reference: (from impact point)
+X = Forward
+Y = To Right
+Z = Upward from floor level

DATA SHEET 16
FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

Vehicle Year/Make/Model/Body Style: 1997/Chevrolet/Cavalier/2 Door

Vehicle NHTSA No.: CV0105 Test Date: November 12, 1996

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 33.1 mph (53.3 kph)

FUEL SPILLAGE MEASUREMENT:

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

FUEL SPILLAGE LOCATION(S): None

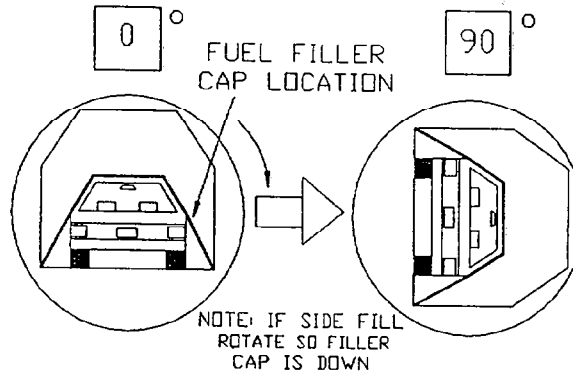
DATA SHEET 16

FMVSS 301 STATIC ROLLOVER TEST DATA

Vehicle Year/Make/Model/Body Style: 1997/Chevrolet/Cavalier/2 Door

Vehicle NHTSA No.: CV0105 Test Date: November 12, 1996

TEST PHASE: 0° - 90°



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:

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

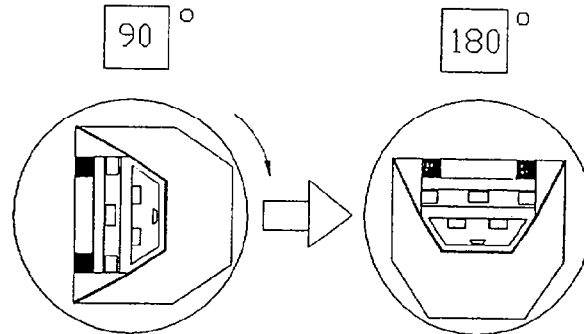
DATA SHEET 16

FMVSS 301 STATIC ROLLOVER TEST DATA (Cont'd)

Vehicle Year/Make/Model/Body Style: 1997/Chevrolet/Cavalier/2 Door

Vehicle NHTSA No.: CV0105 Test Date: November 12, 1996

TEST PHASE: 90° - 180°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 35 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 35 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

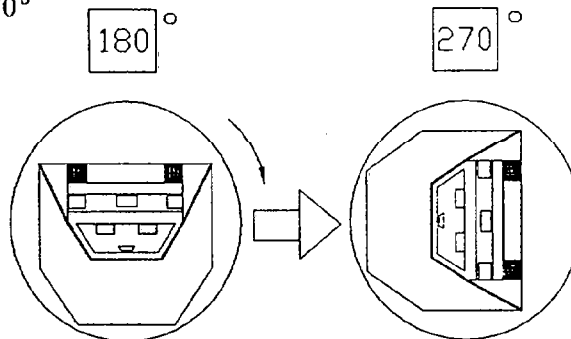
DATA SHEET 16

FMVSS 301 STATIC ROLLOVER TEST DATA (Cont'd)

Vehicle Year/Make/Model/Body Style: 1997/Chevrolet/Cavalier/2 Door

Vehicle NHTSA No.: CV0105 Test Date: November 12, 1996

TEST PHASE: 180° - 270°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 45 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 45 seconds

Next Whole Minute Interval = 8 minutes

FUEL SPILLAGE MEASUREMENT:

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

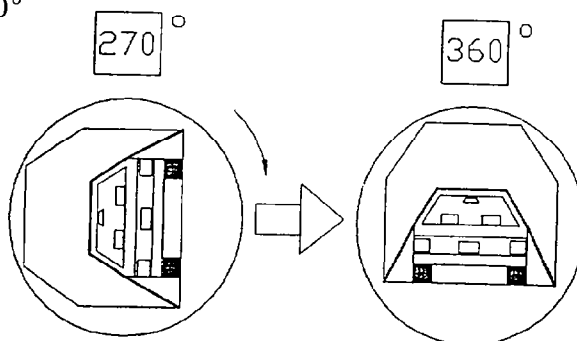
DATA SHEET 16

FMVSS 301 STATIC ROLLOVER TEST DATA

Vehicle Year/Make/Model/Body Style: 1997/Chevrolet/Cavalier/2 Door

Vehicle NHTSA No.: CV0105 Test Date: November 12, 1996

TEST PHASE: 270° - 360°



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:

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-49 - Left Front Attitude Point	A-49
Photo No. A-50 - Right Rear Attitude Point	A-50
Photo No. A-51 - Left Rear Attitude Point	A-51

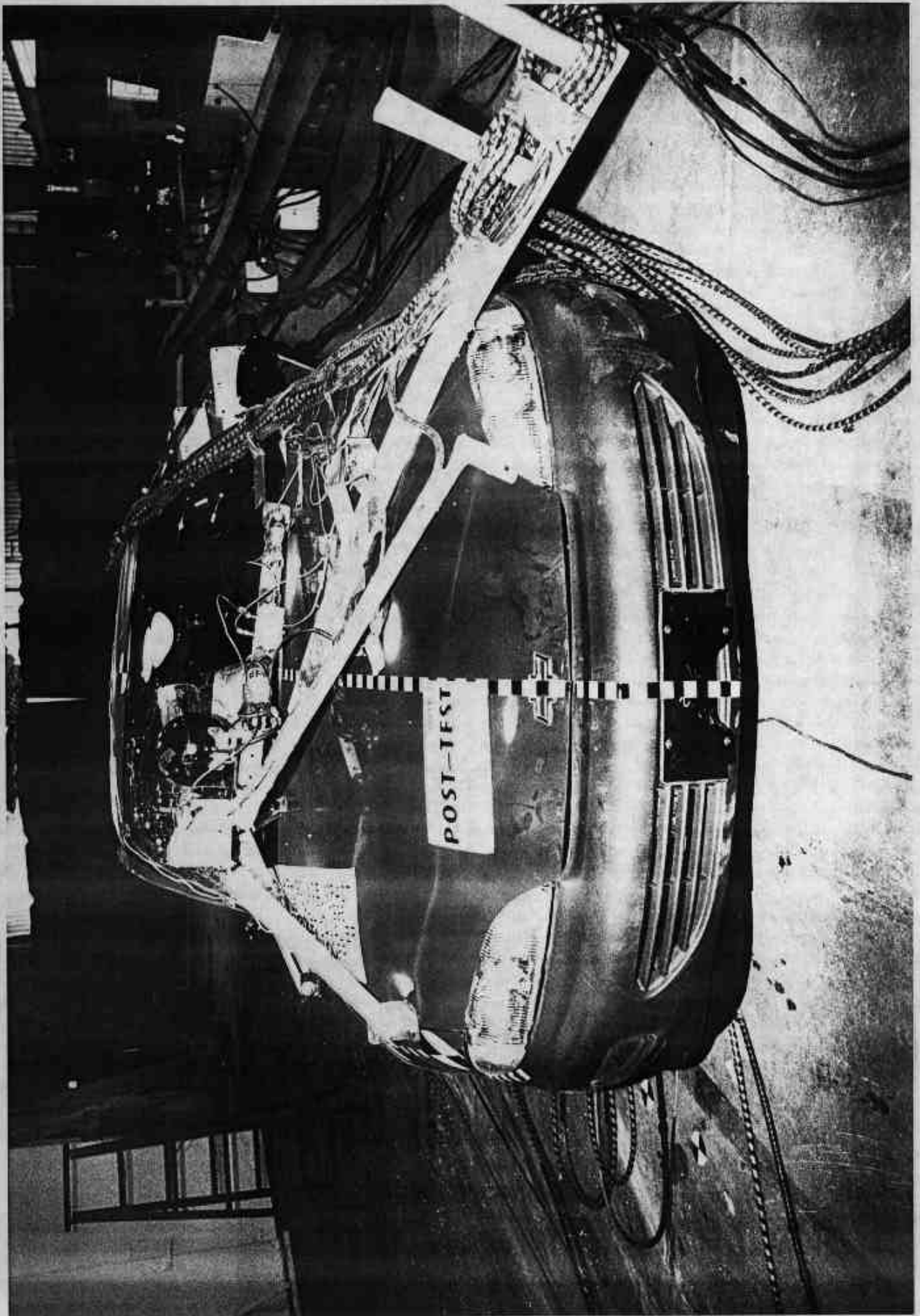


Photo No. A-2 - Post-Test Front View of Test Vehicle

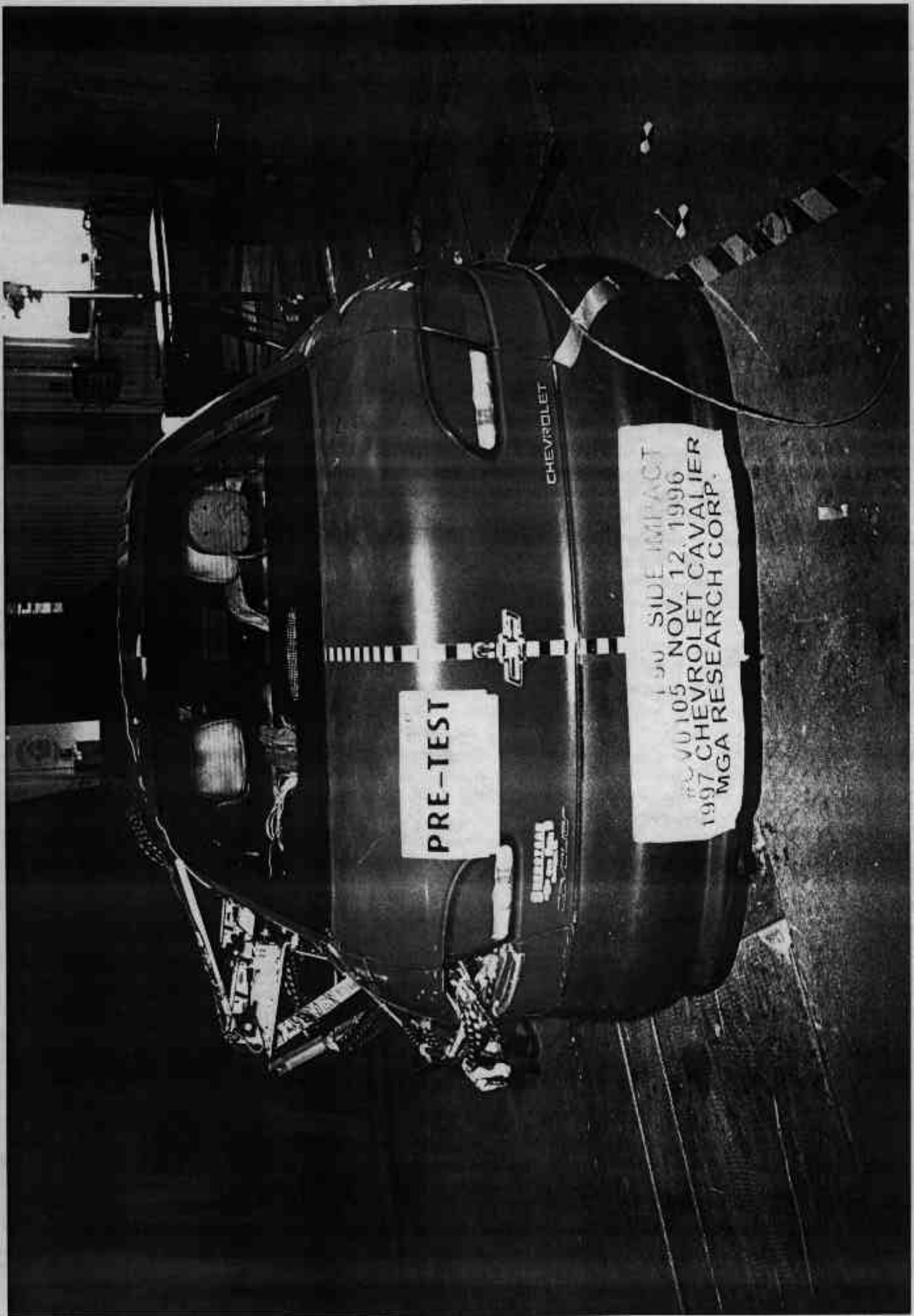


Photo No. A-3 - Pre-Test Rear View of Test Vehicle

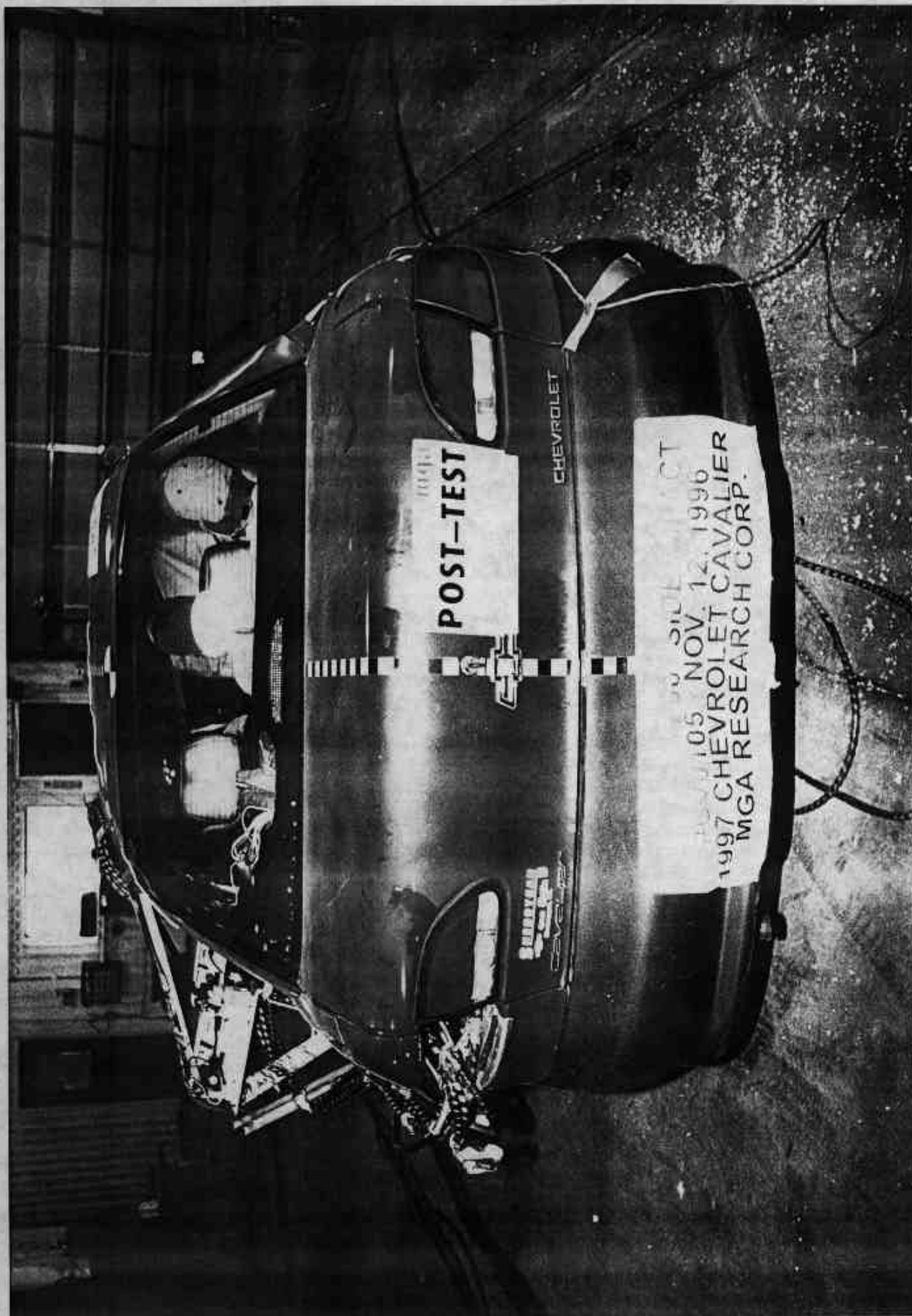


Photo No. A-4 - Post-Test Rear View of Test Vehicle

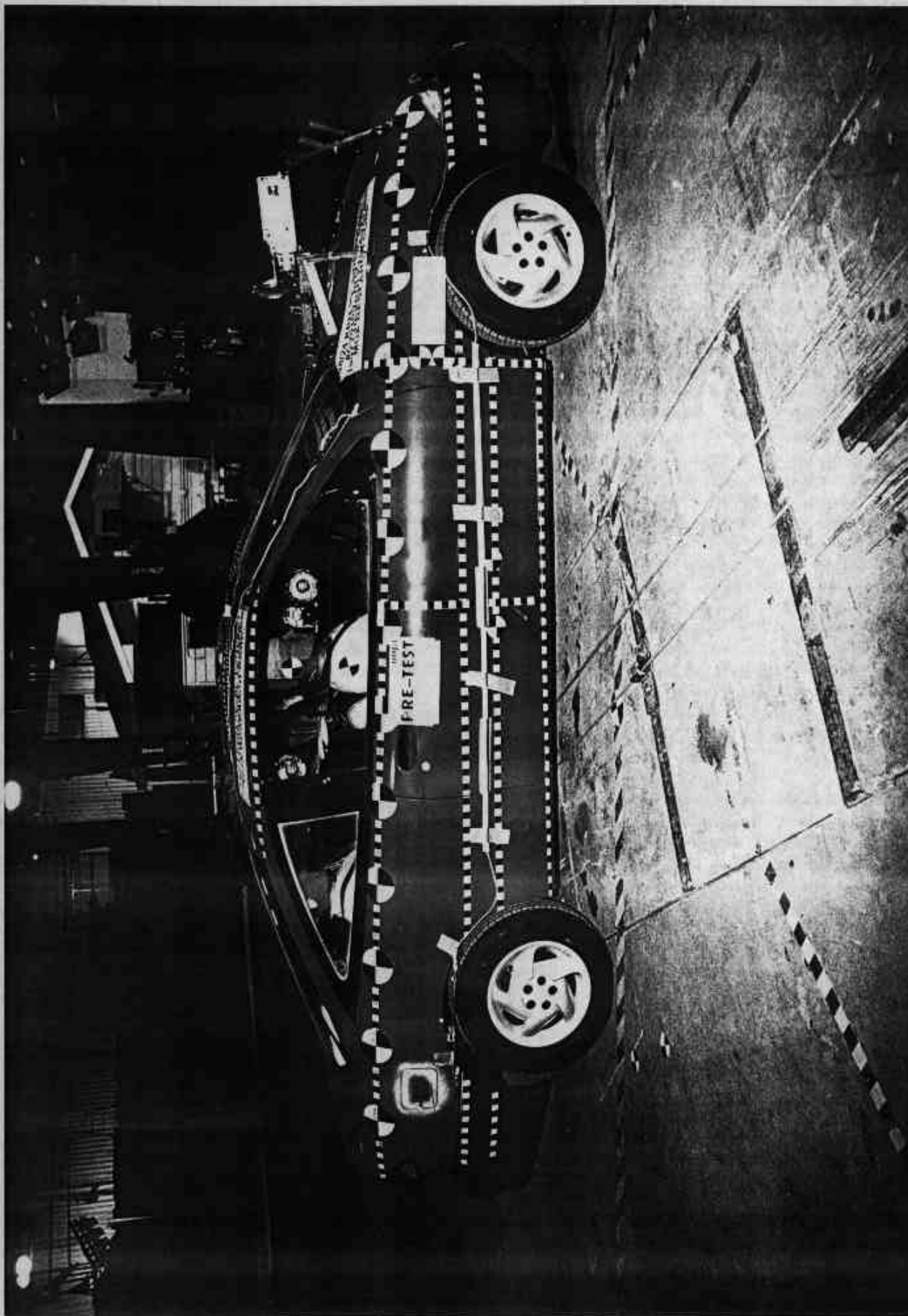


Photo No. A-5 - Pre-Test Right Side View of Test Vehicle

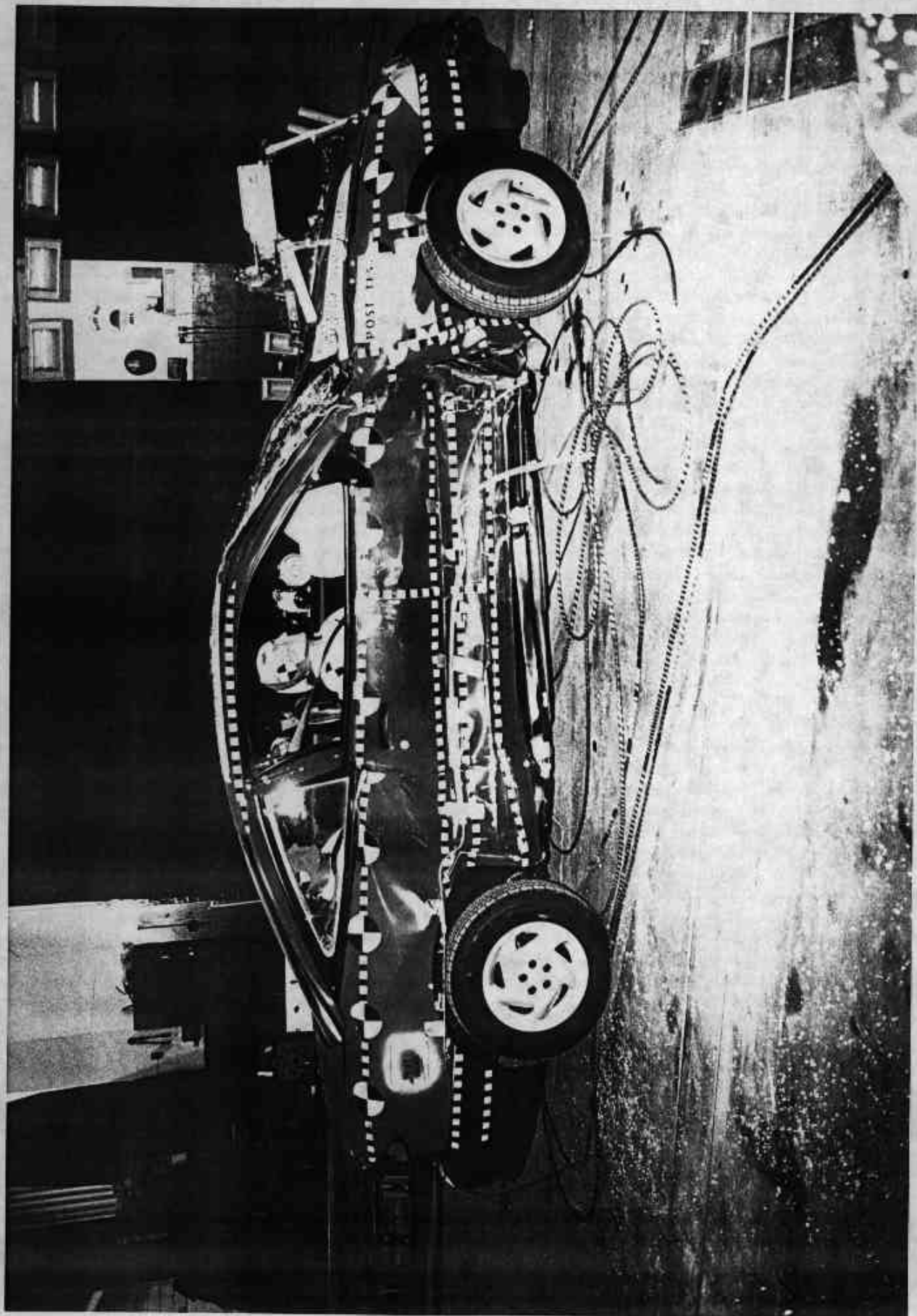


Photo No. A-6 - Post-Test Right Side View of Test Vehicle

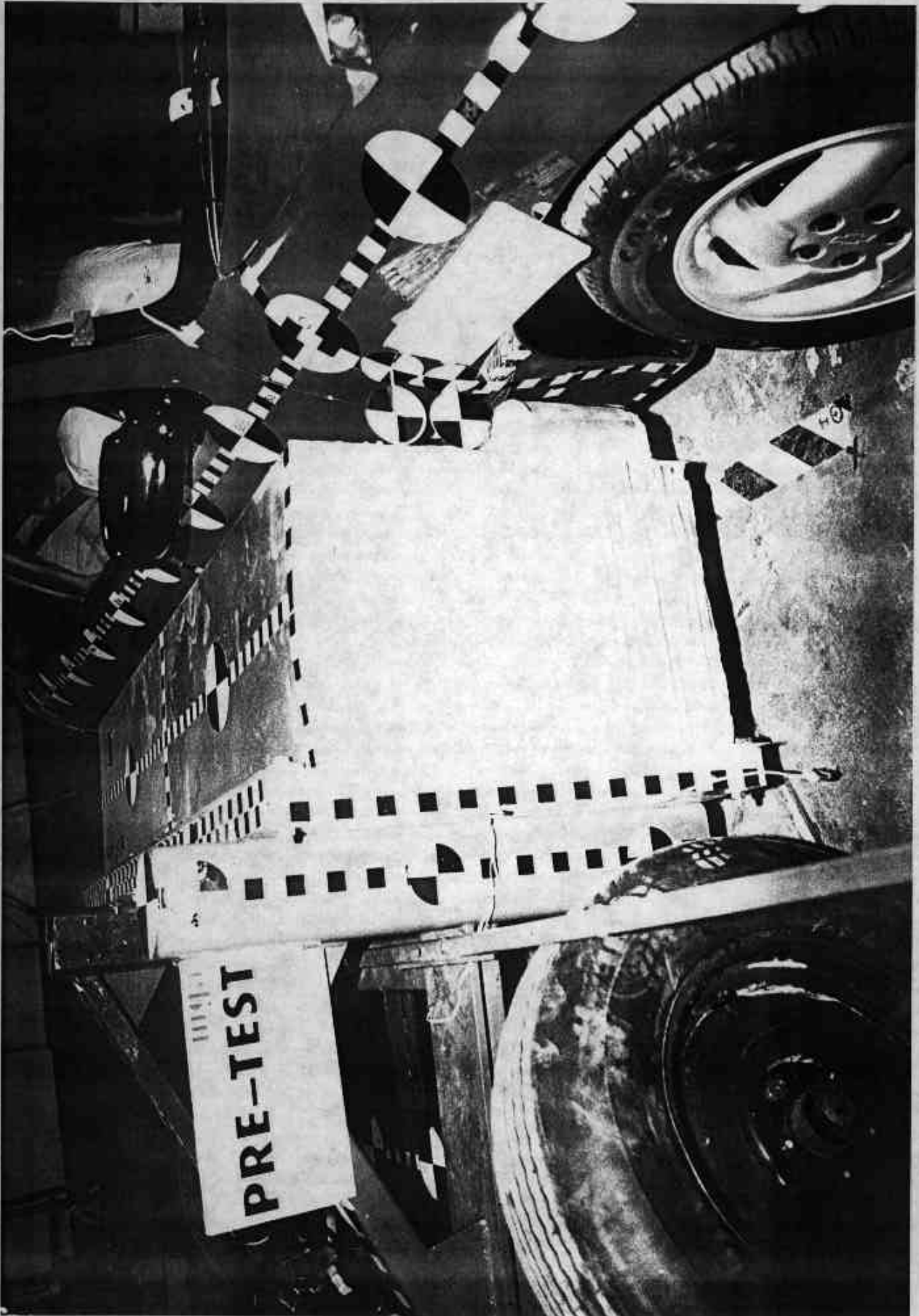


Photo No. A-7 - Pre-Test MDB Positioned Against Vehicle (right side)

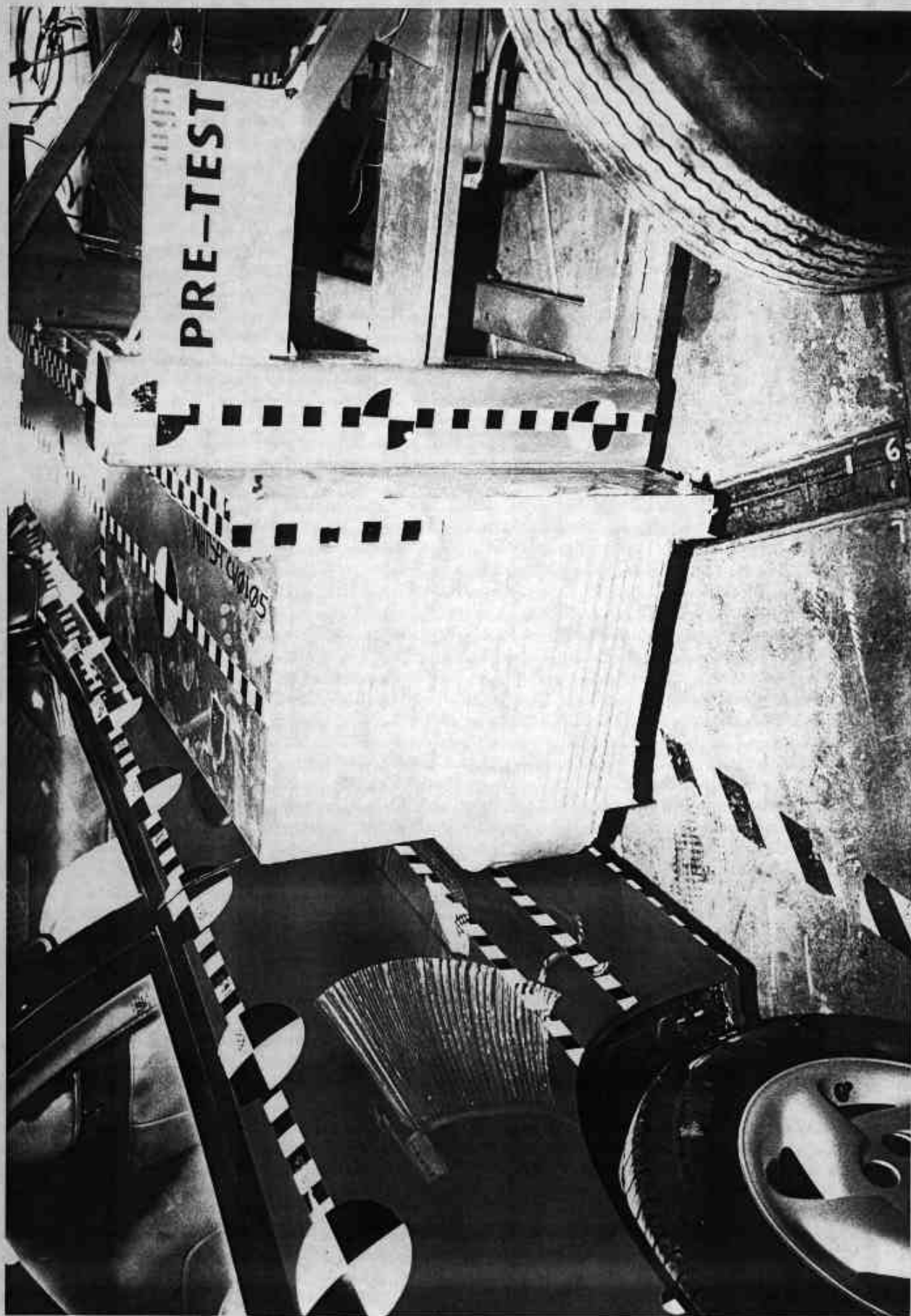


Photo No. A-8 - Pre-Test MDB Positioned Against Vehicle (left side)

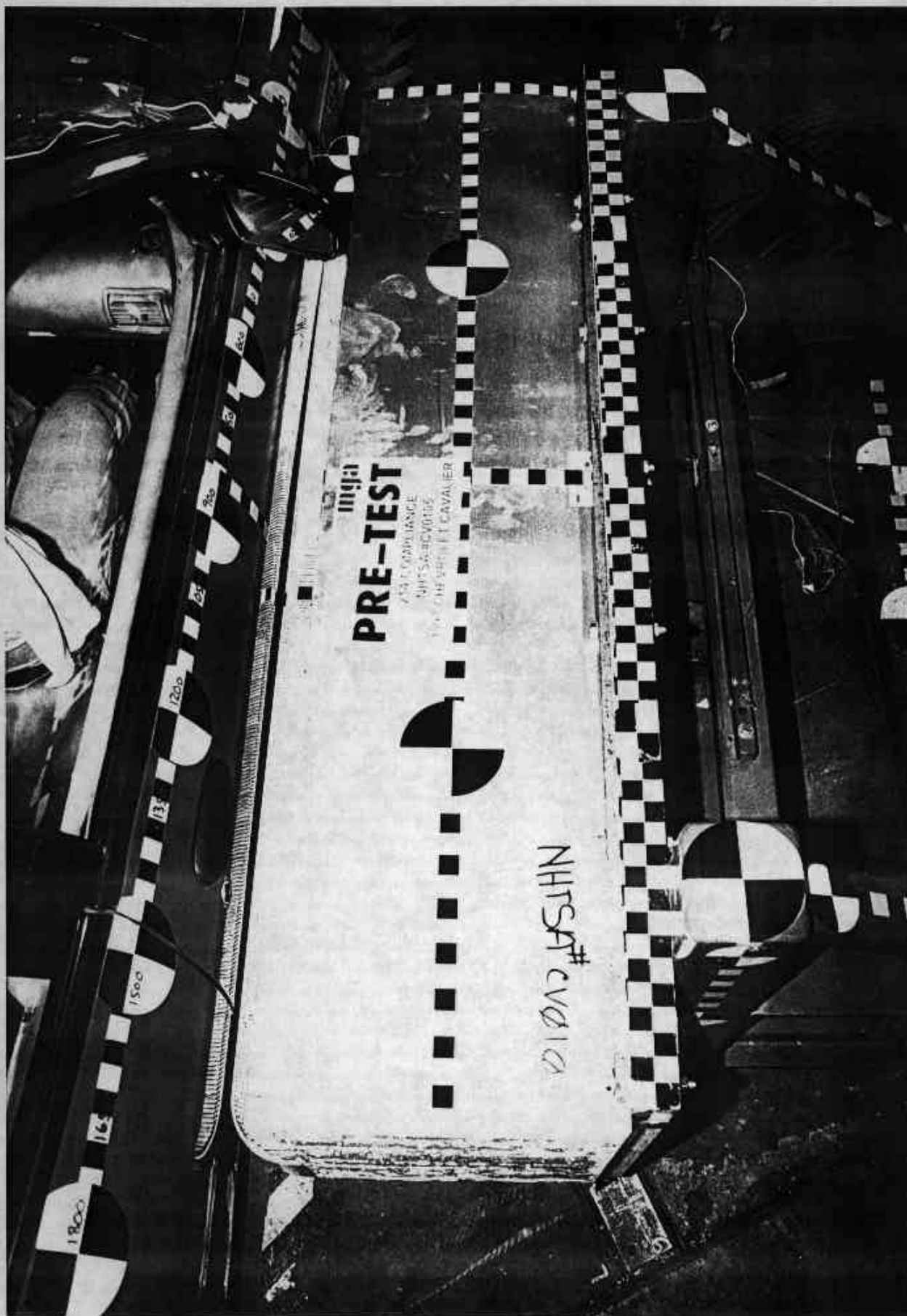


Photo No. A-9 - Pre-Test MDB Positioned Against Vehicle Overhead View

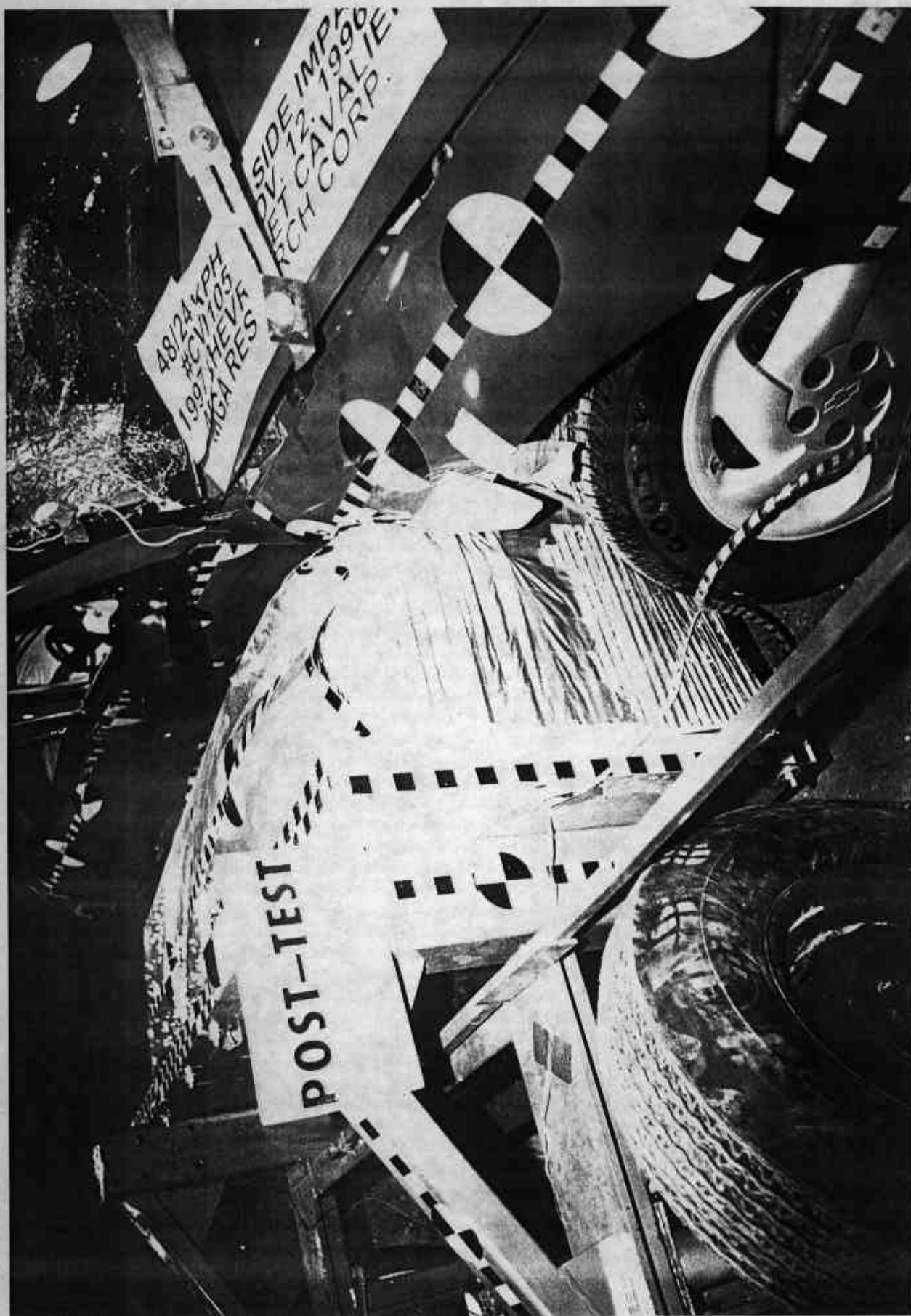


Photo No. A-10 - Post-Test MDB Positioned Against Vehicle (right side)

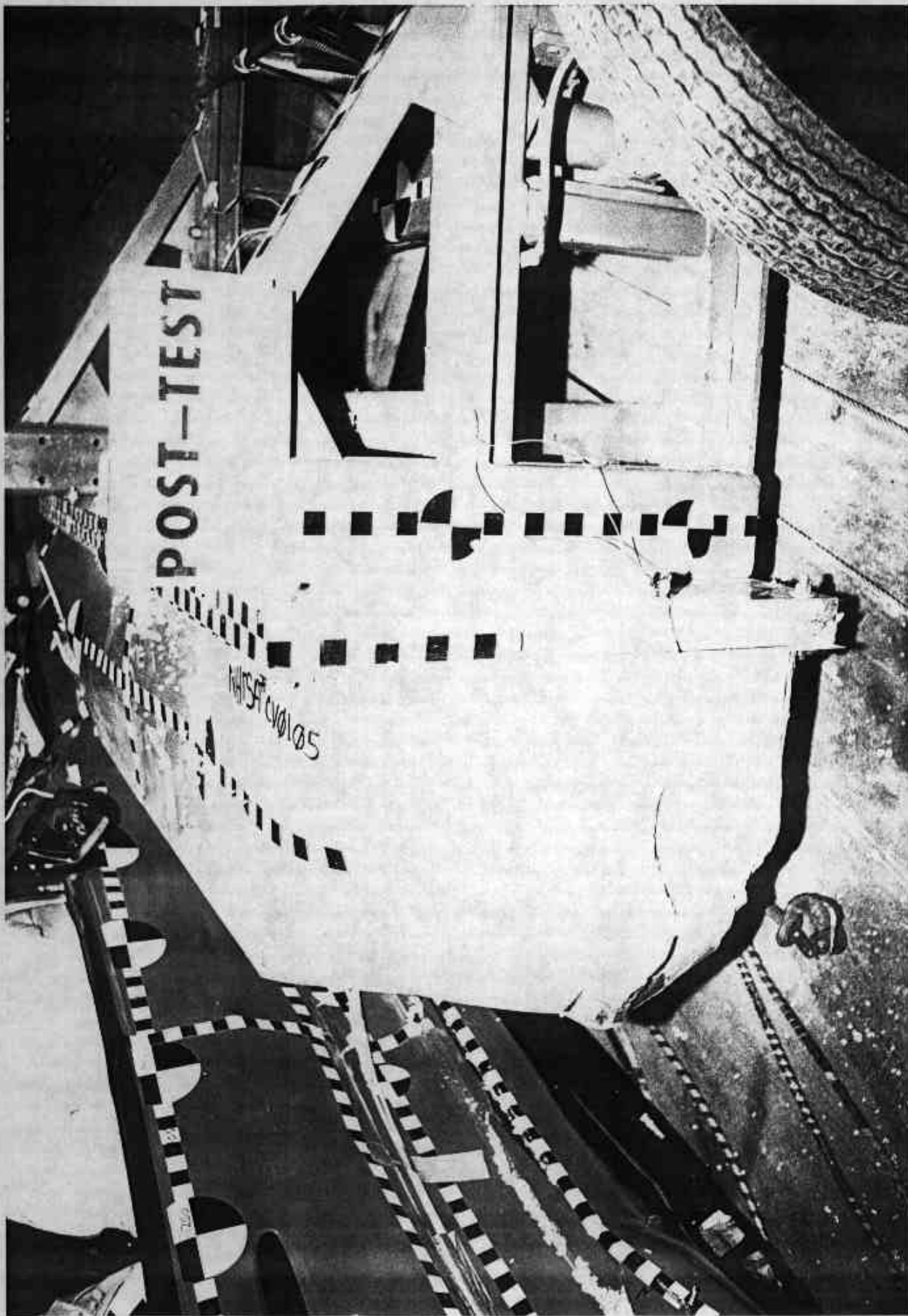


Photo No. A-11 - Post-Test MDB Positioned Against Vehicle (left side)

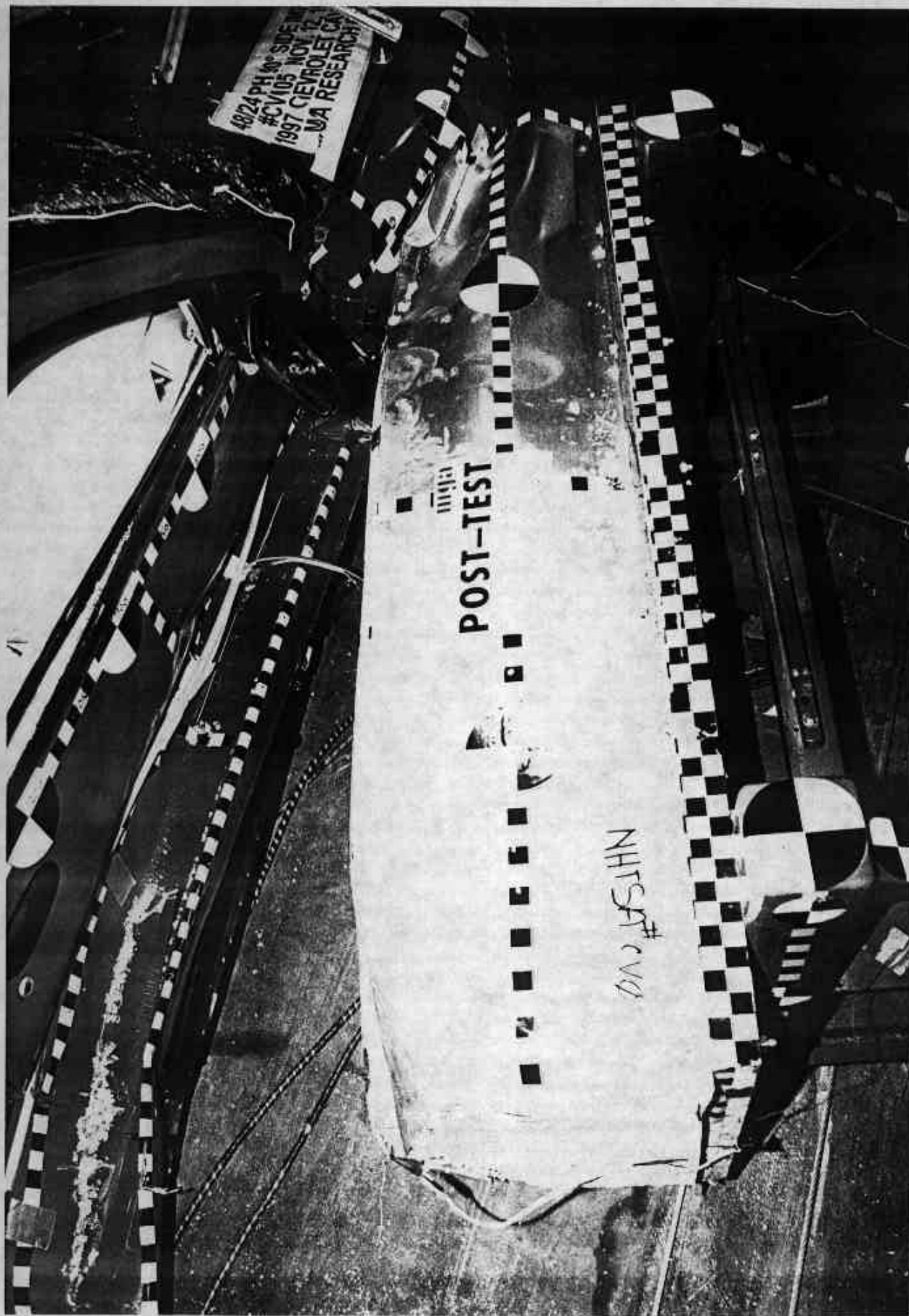


Photo No. A-12 - Post-Test MDB Positioned Against Vehicle Overhead View

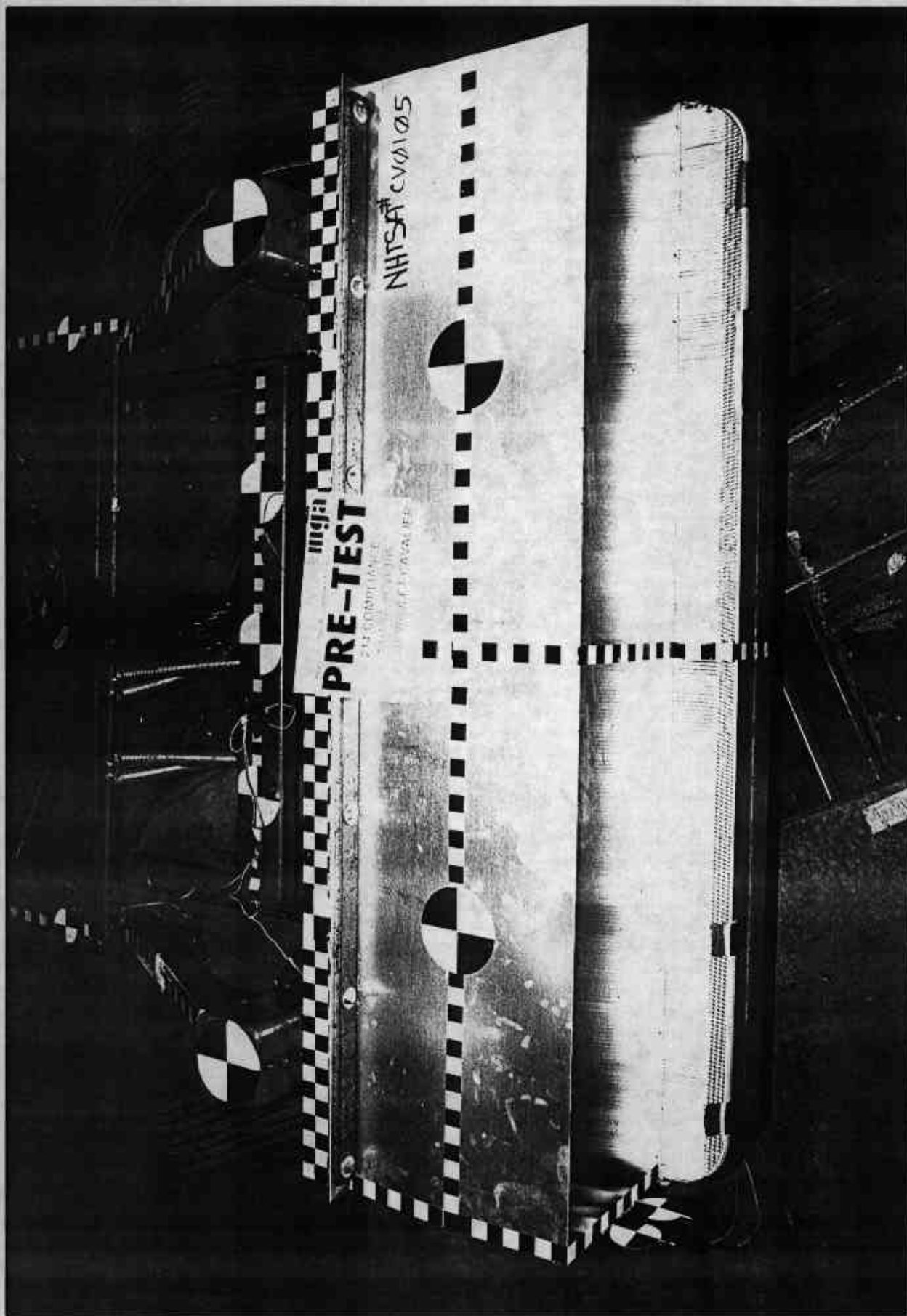


Photo No. A-13 - Pre-Test MDB Top View

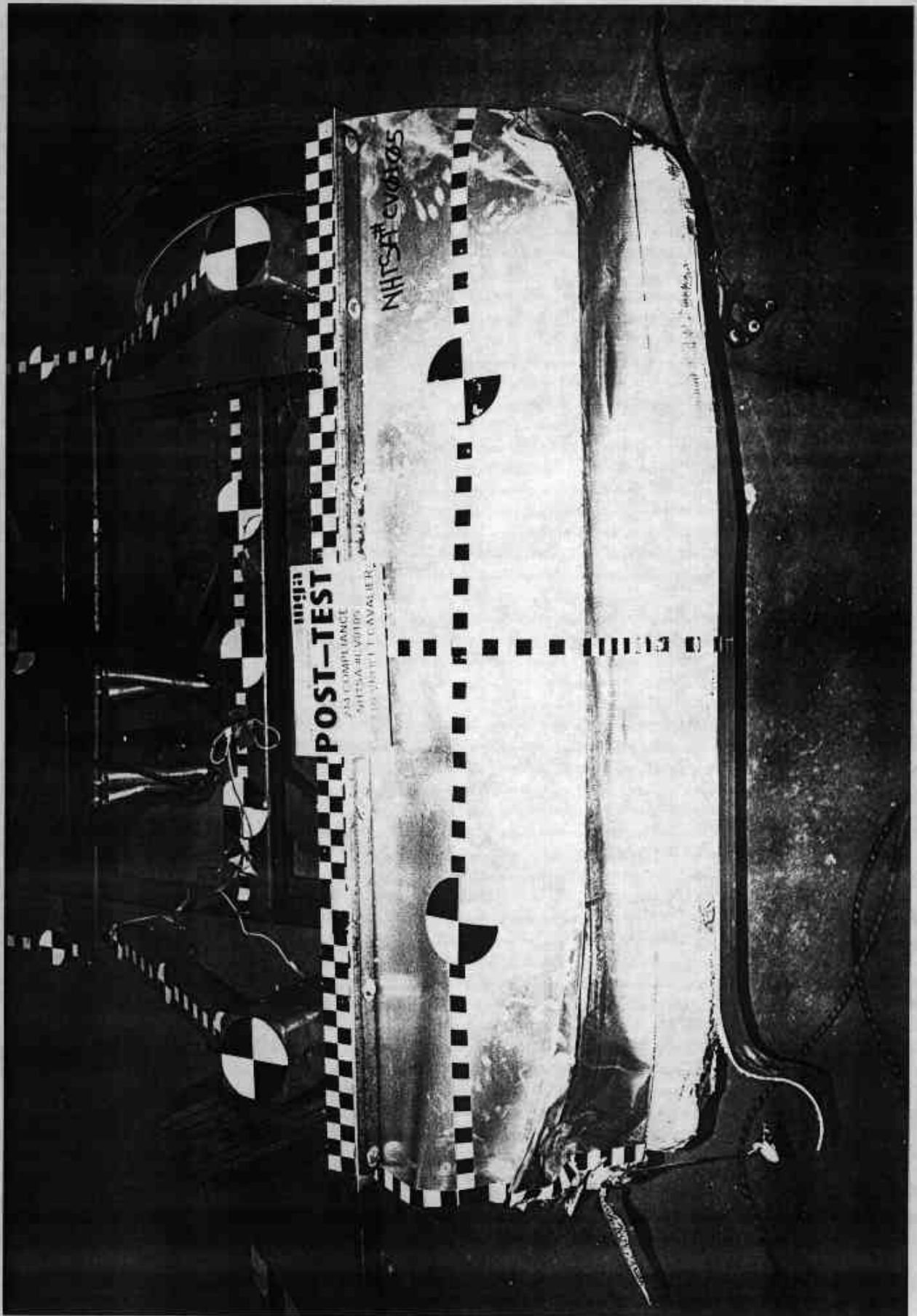


Photo No. A-14 - Post-Test MDB Top View

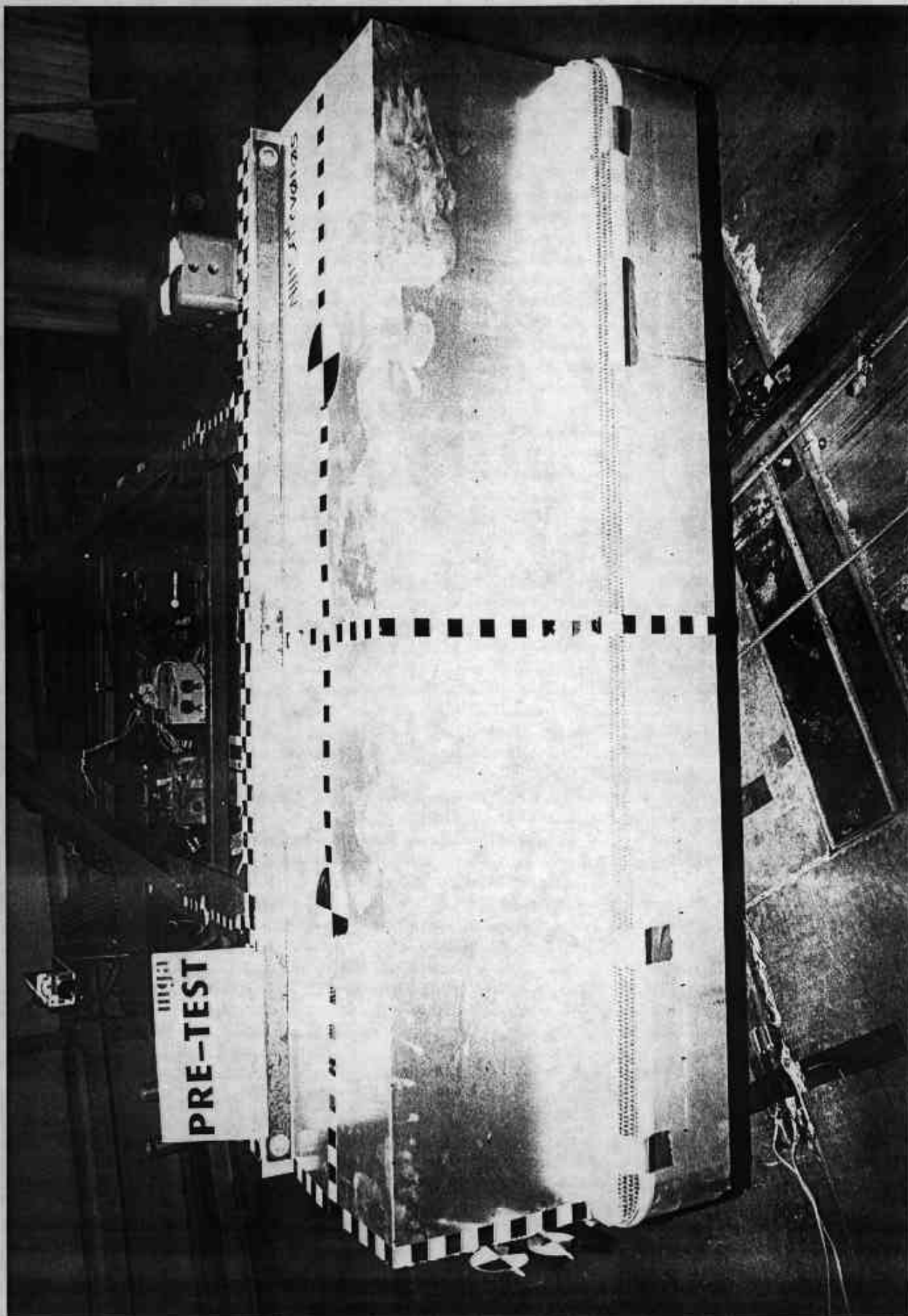


Photo No. A-15 - Pre-Test MDB Front View

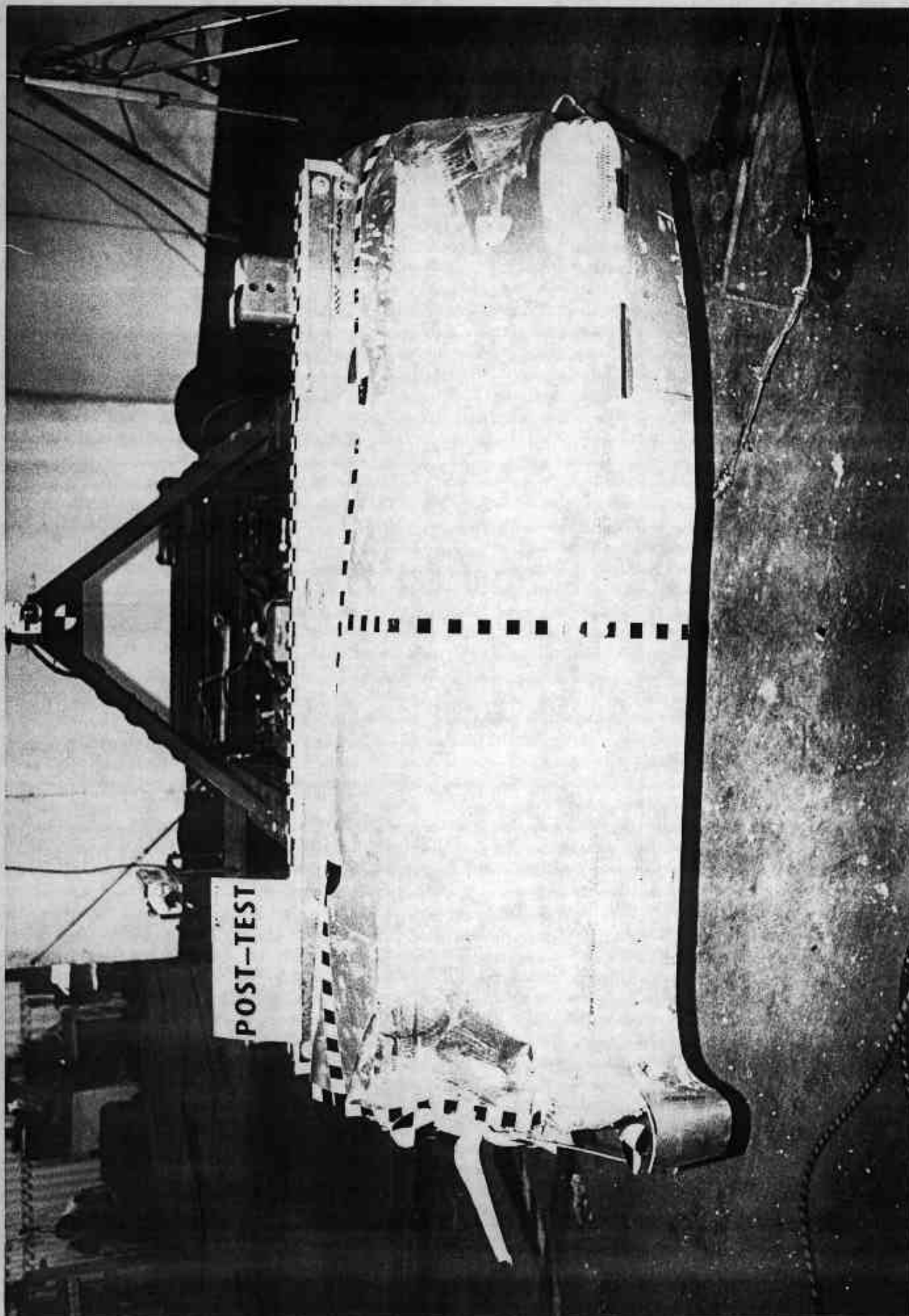


Photo No. A-16 - Post-Test MDB Front View

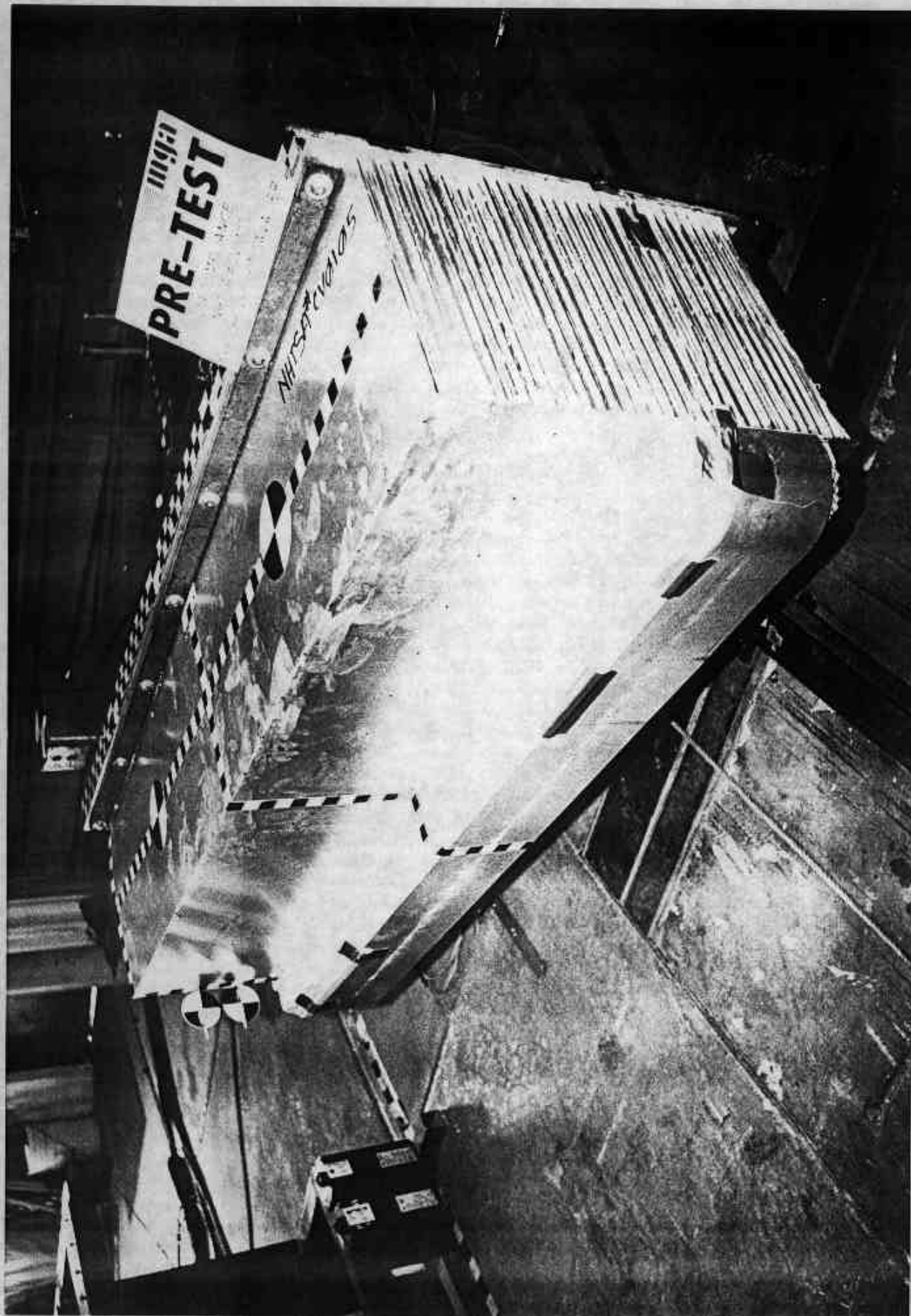


Photo No. A-17 - Pre-Test MDB Left Side View

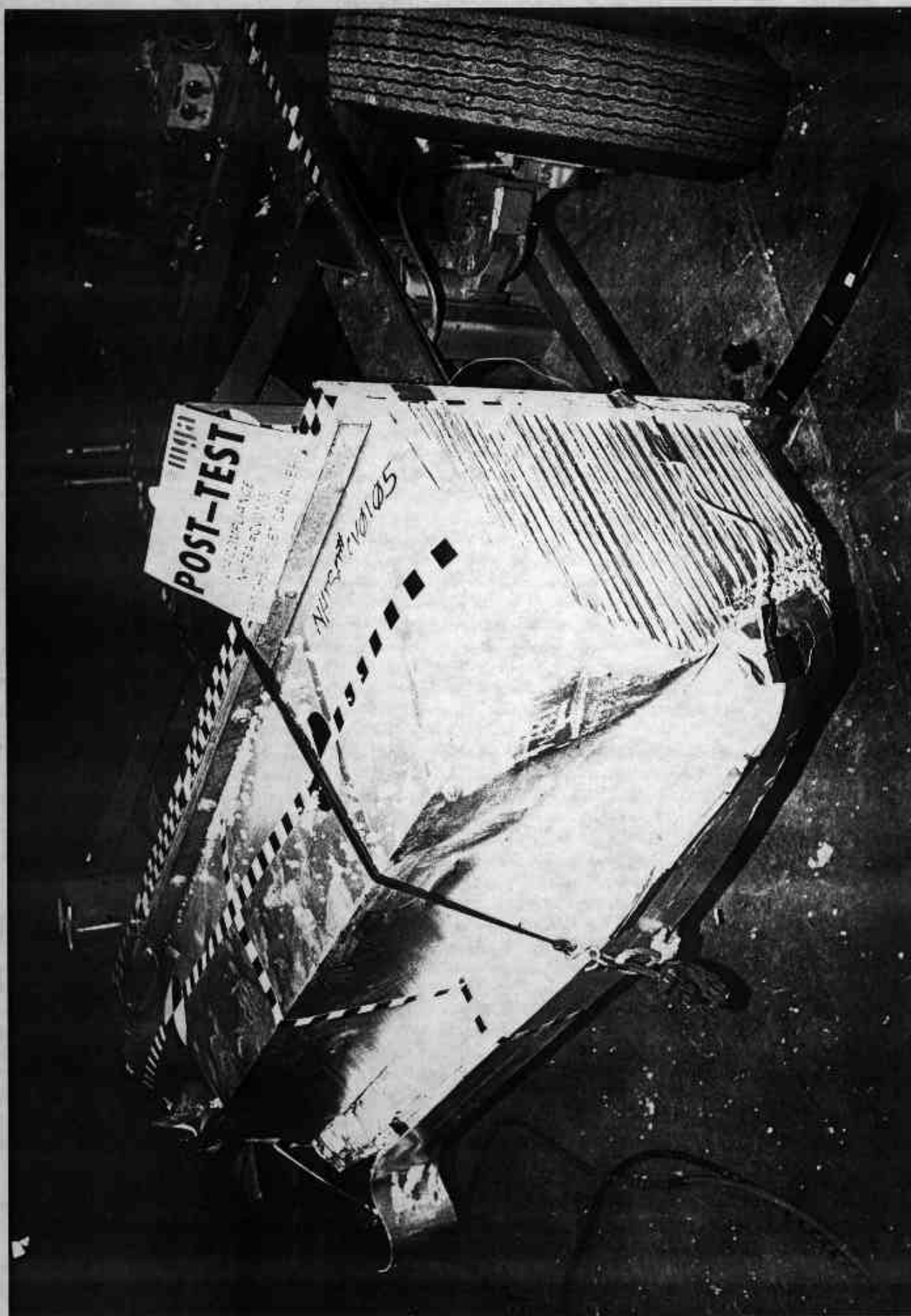


Photo No. A-18 - Post-Test MDB Left Side View

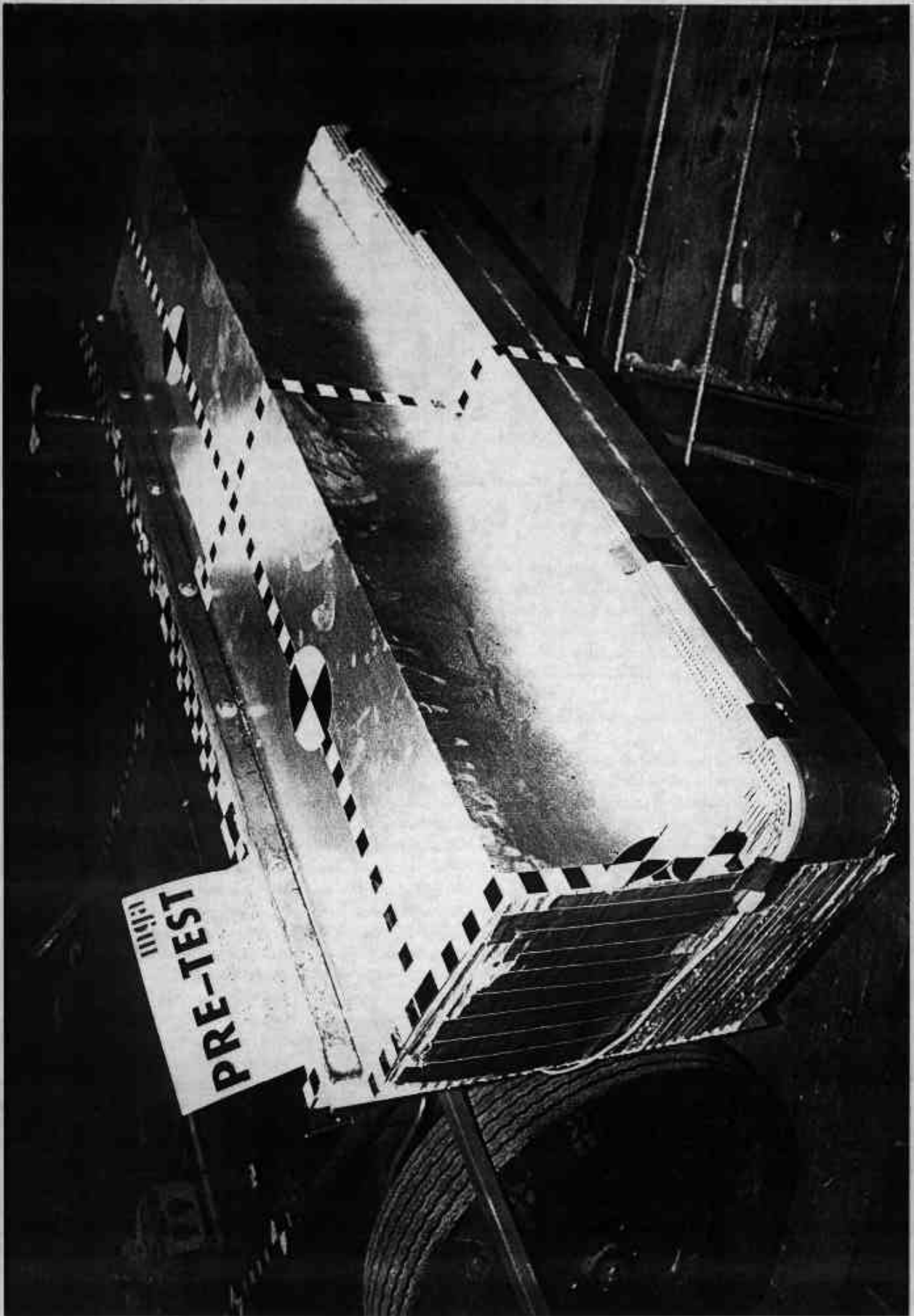


Photo No. A-19 - Pre-Test MDB Right Side View

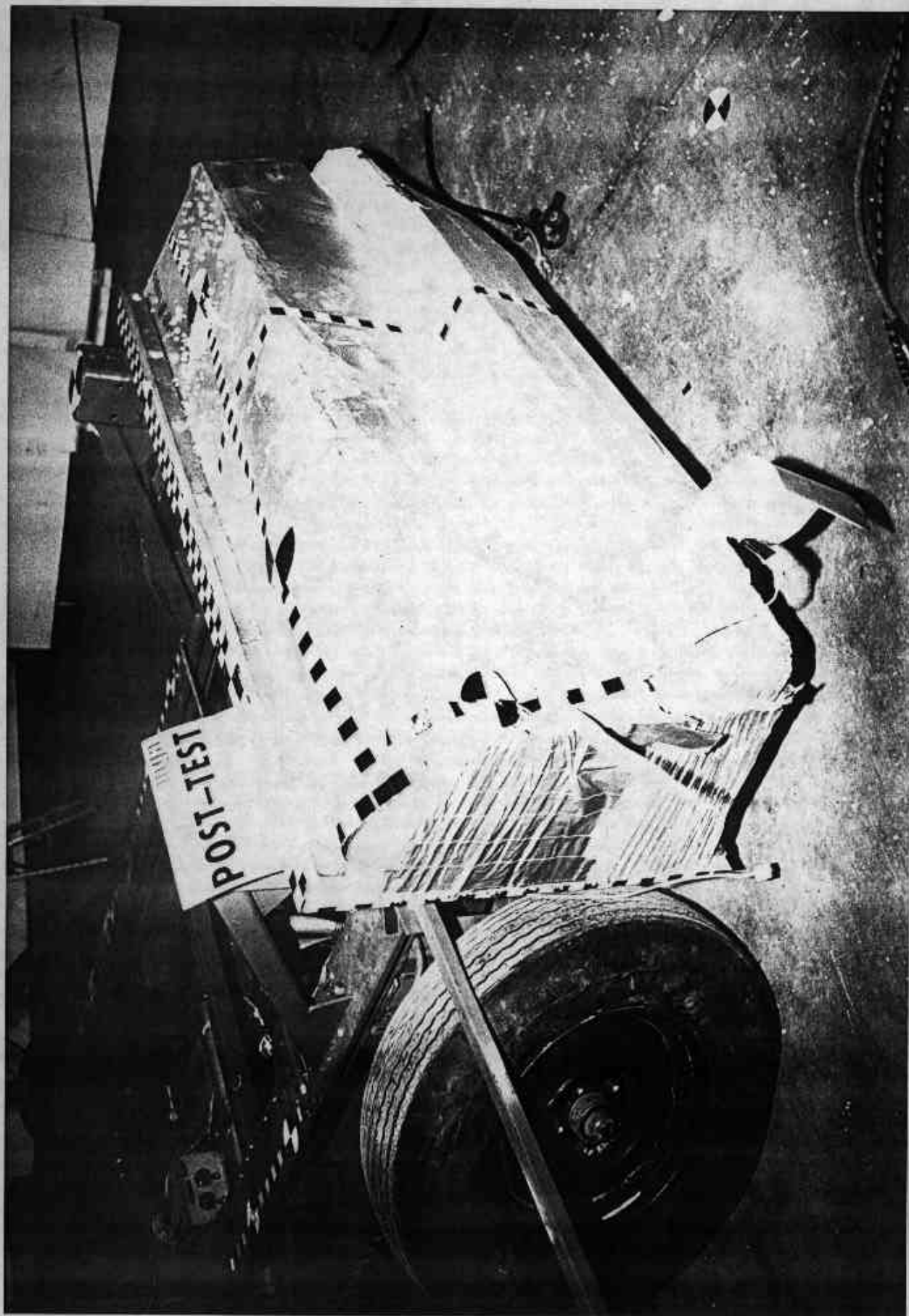


Photo No. A-20 - Post-Test MDB Right Side View

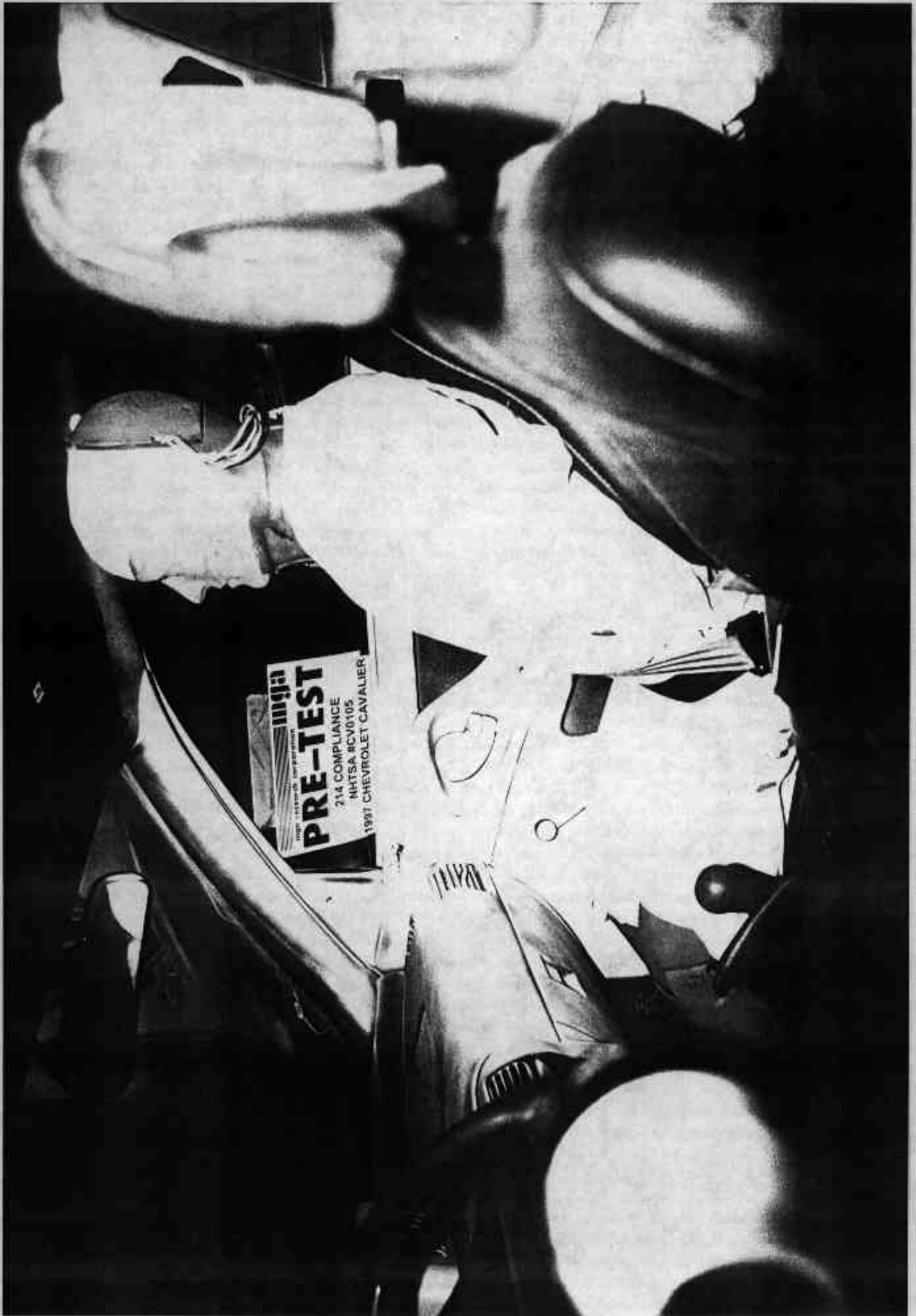
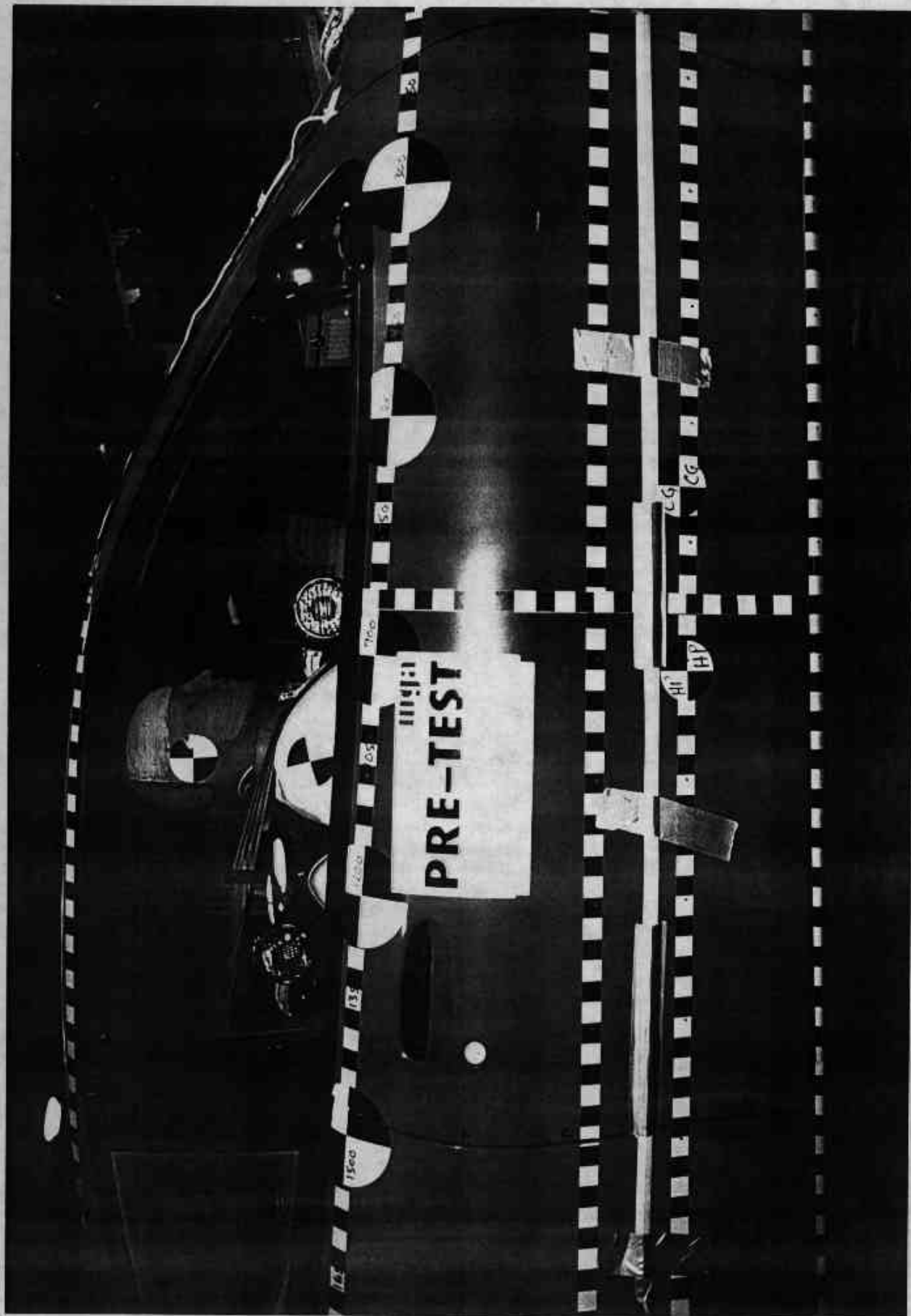


Photo No. A-21 - Pre-Test Front Passenger Dummy Left Side View

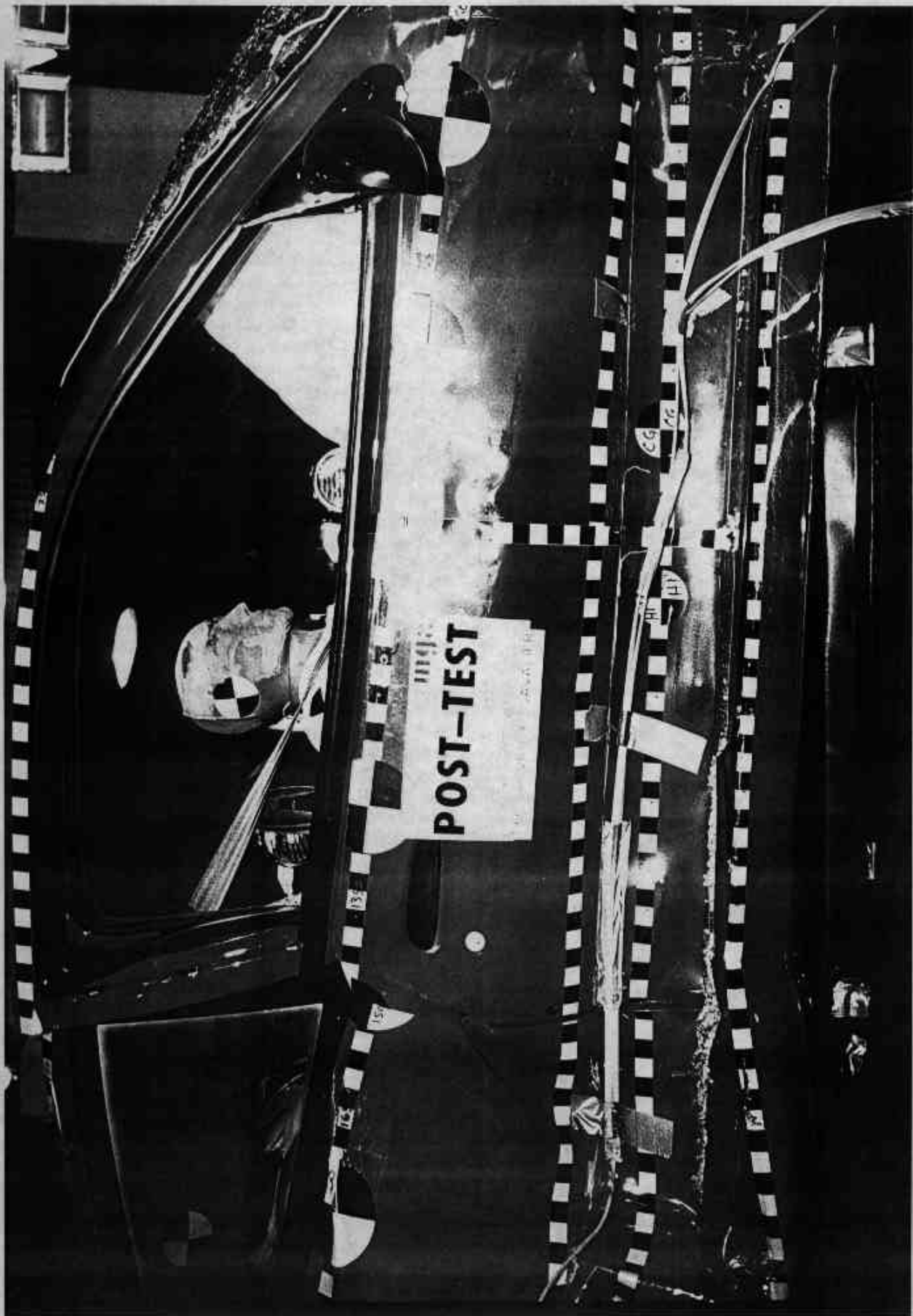


Photo No. A-22 - Post-Test Front Passenger Dummy Left Side View



A-23

Photo No. A-23 - Pre-Test Front Passenger Dummy Right Side View



A-24

Photo No. A-24 - Post-Test Front Passenger Dummy Right Side View



Photo No. A-25 - Pre-Test Front Passenger Dummy Right Side View (Door Open)



Photo No. A-26 - Pre-Test Front Passenger Shoulder and Door Top View

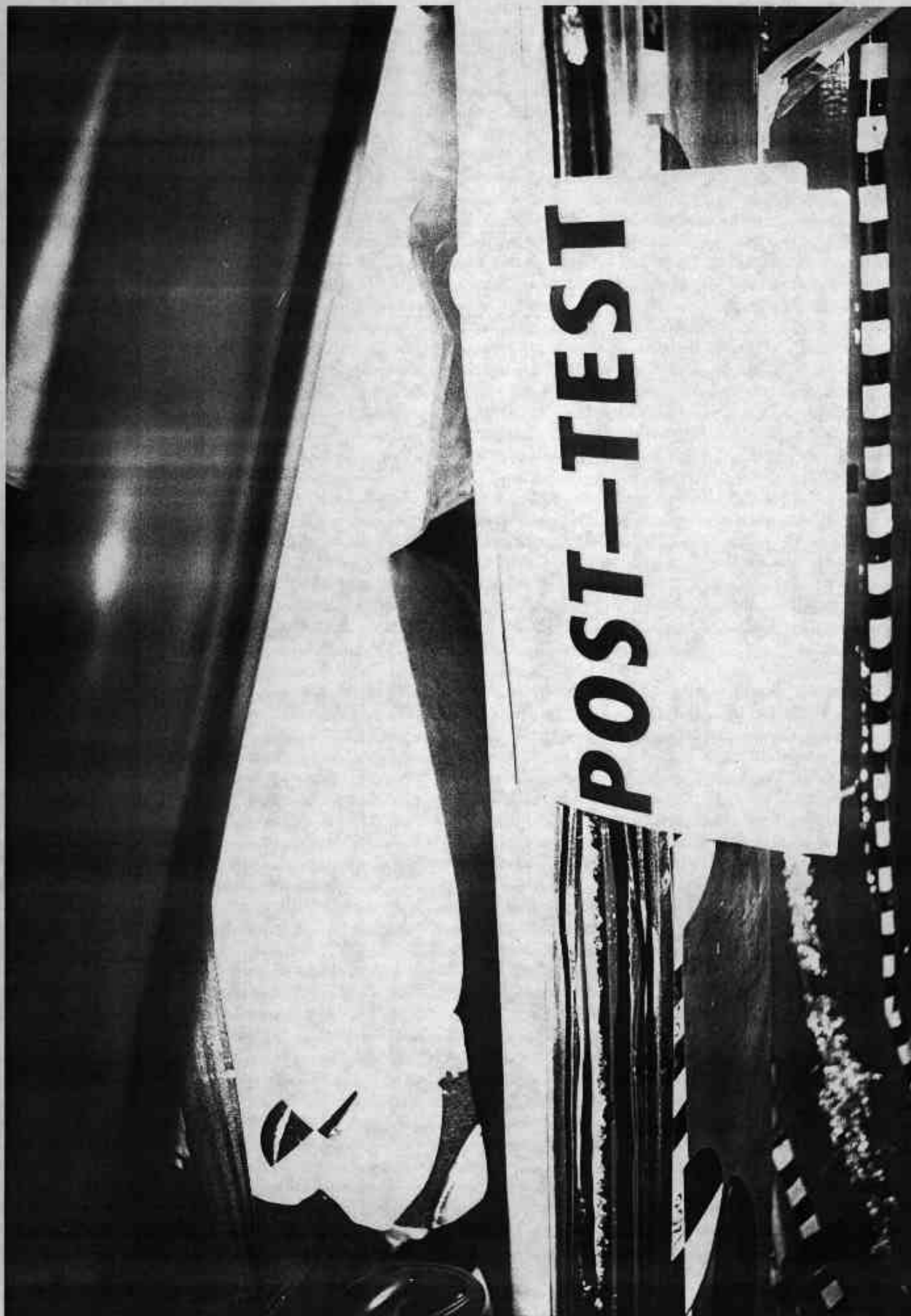


Photo No. A-27 - Post-Test Front Passenger Dummy Shoulder and Door Top View

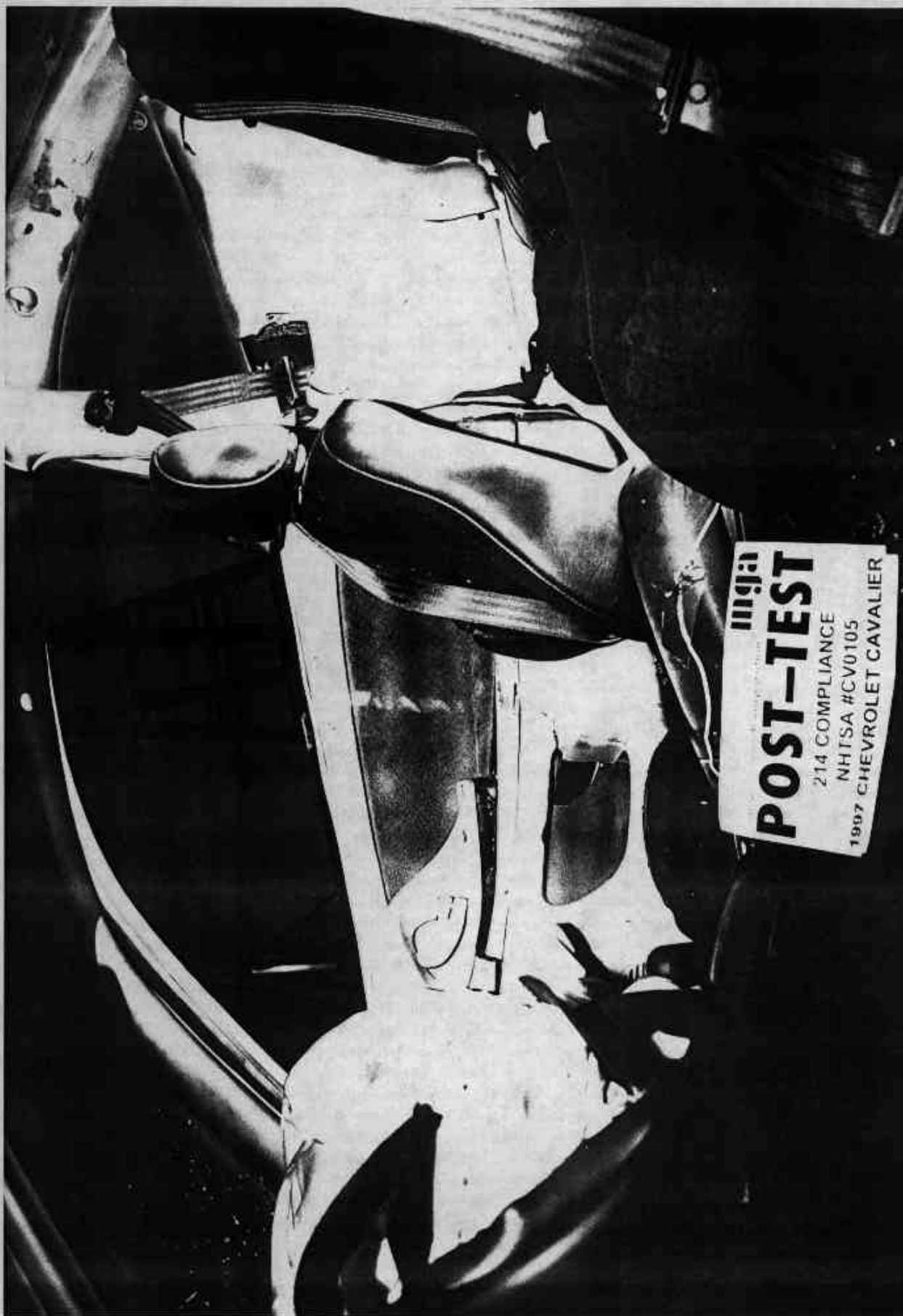


Photo No. A-28 - Post-Test Front Passenger Dummy Contact

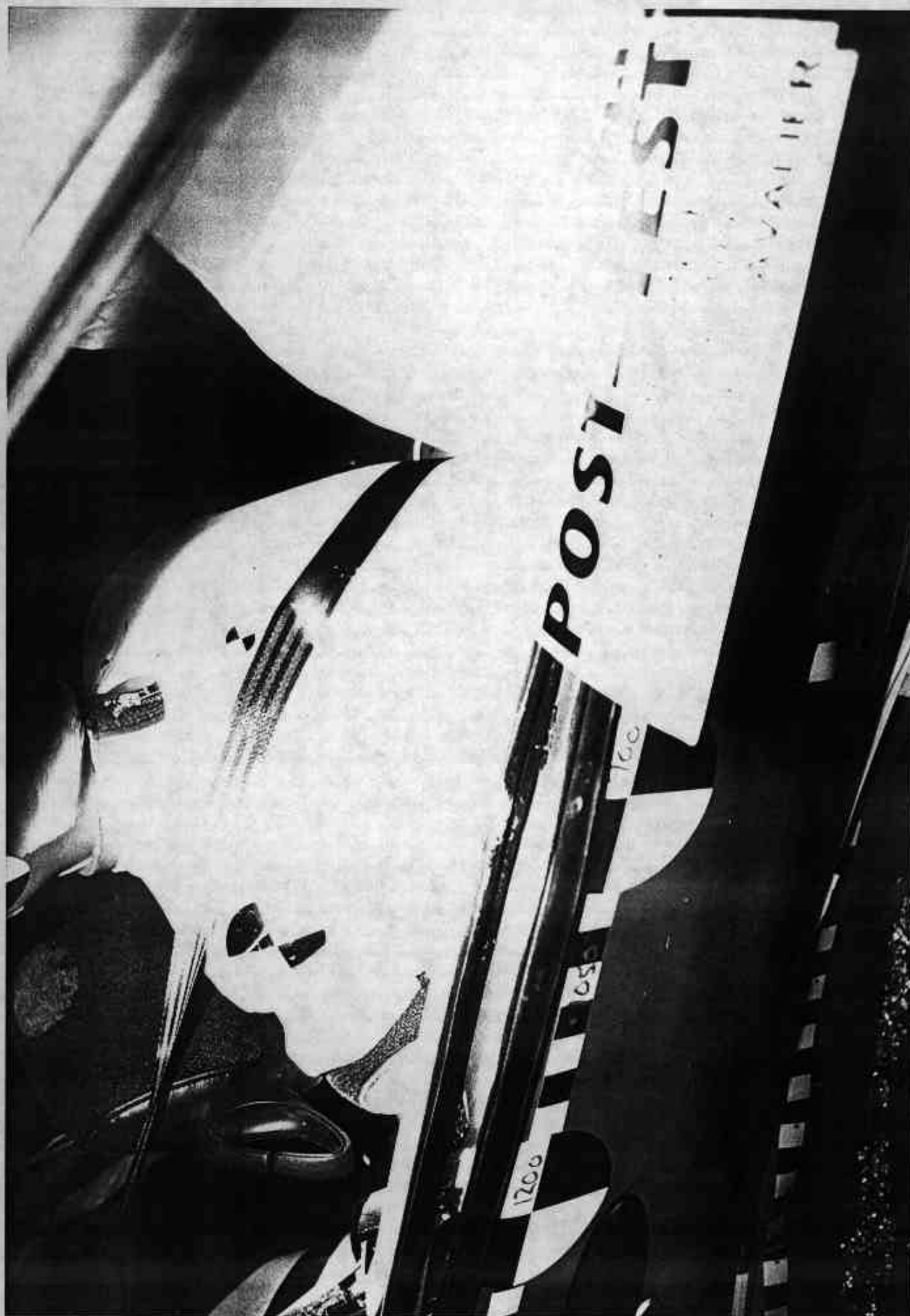
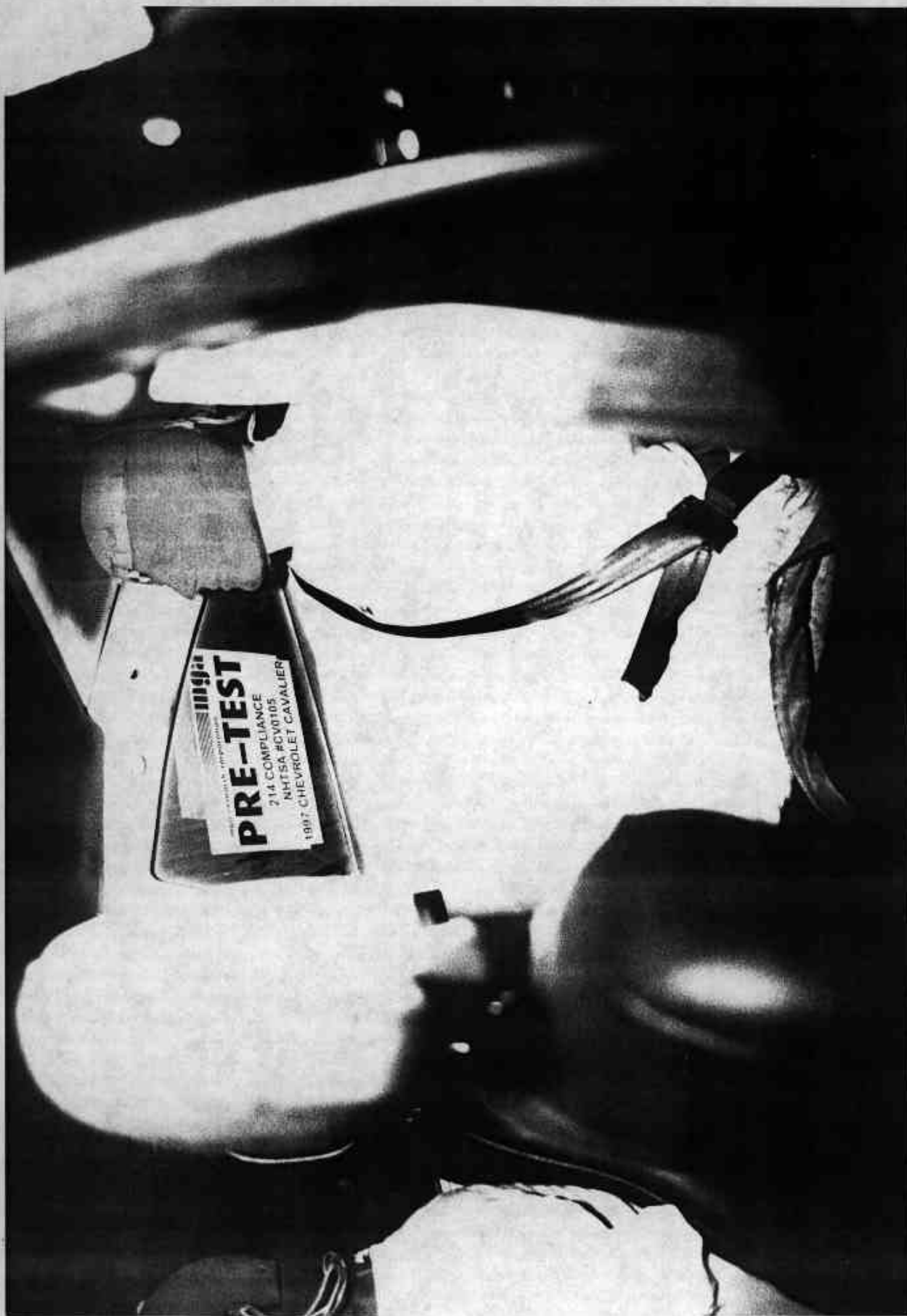


Photo No. A-29 - Post-Test Front Passenger Head Contact



A-30

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

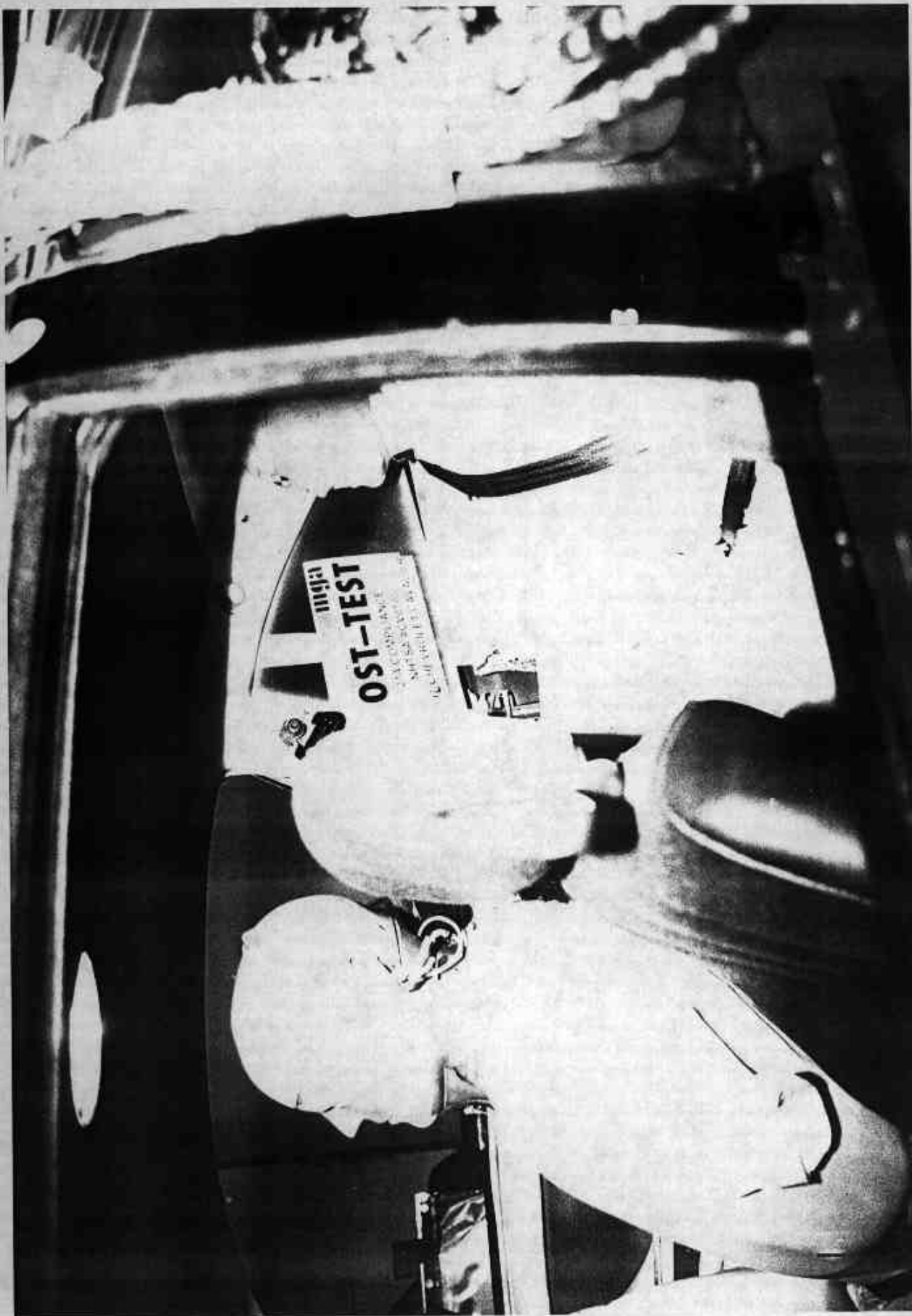


Photo No. A-31 - Post-Test Rear Passenger Dummy Left Side View

A-31



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

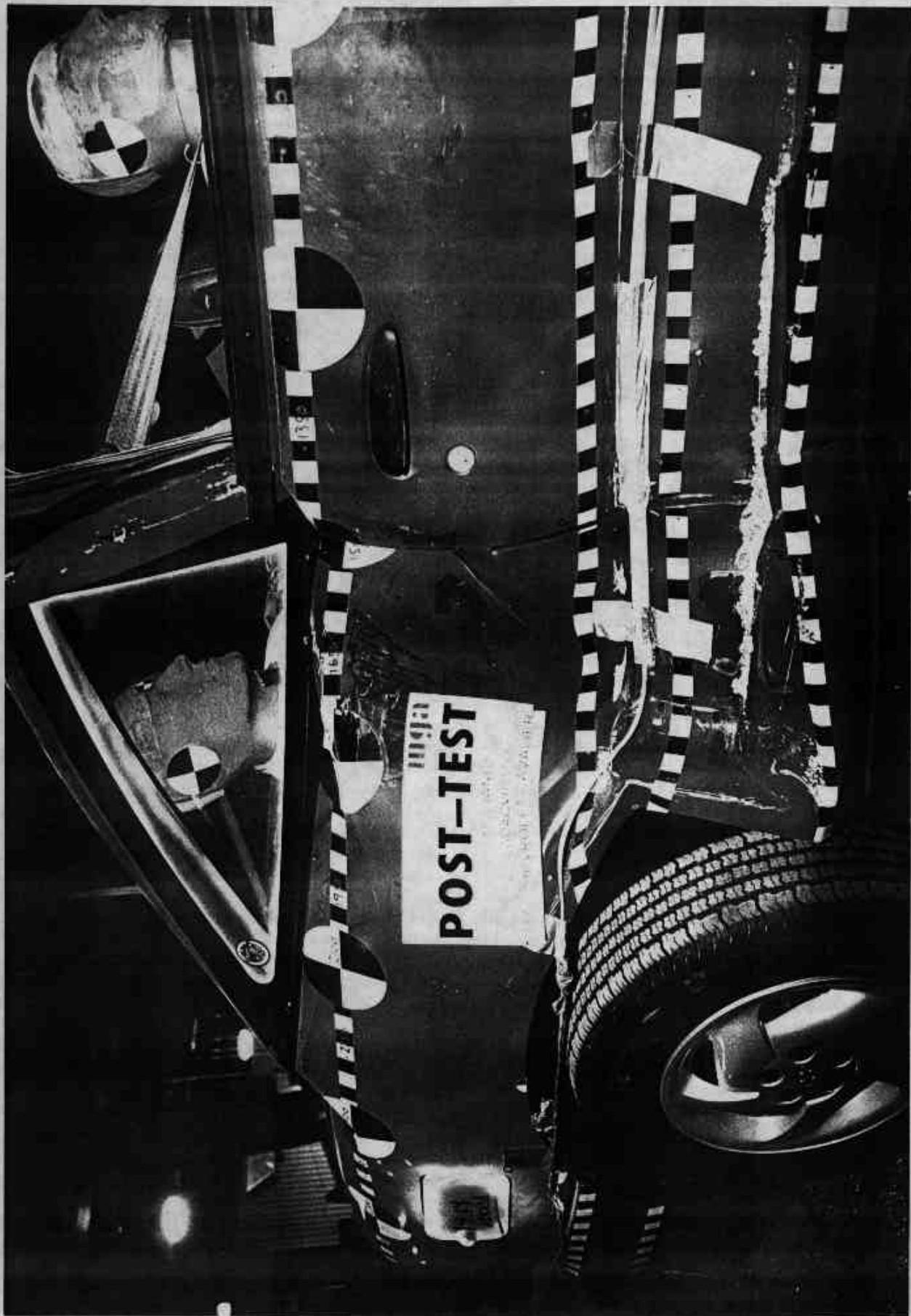
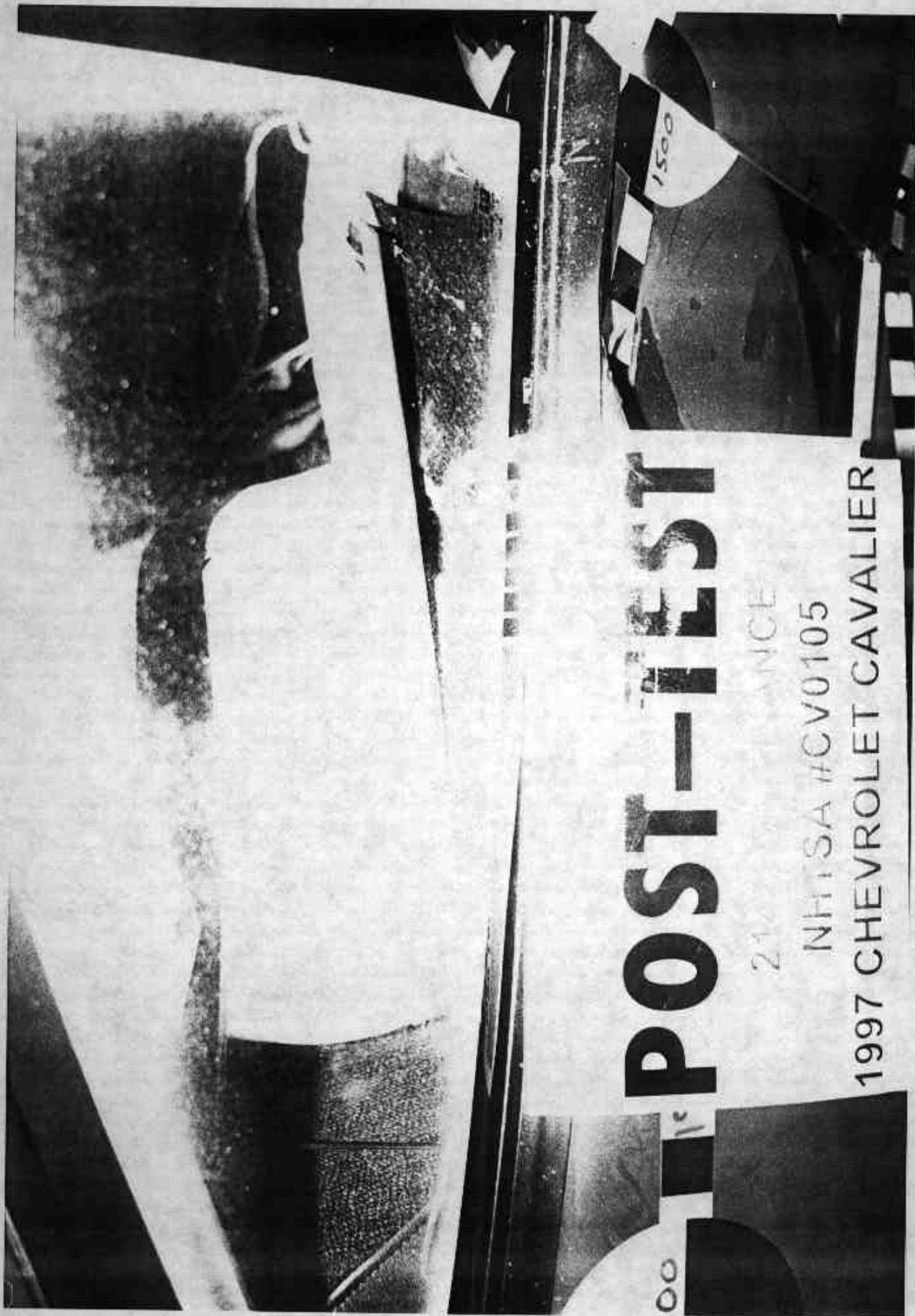


Photo No. A-33 - Post-Test Rear Passenger Dummy Right Side View



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



A-35

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

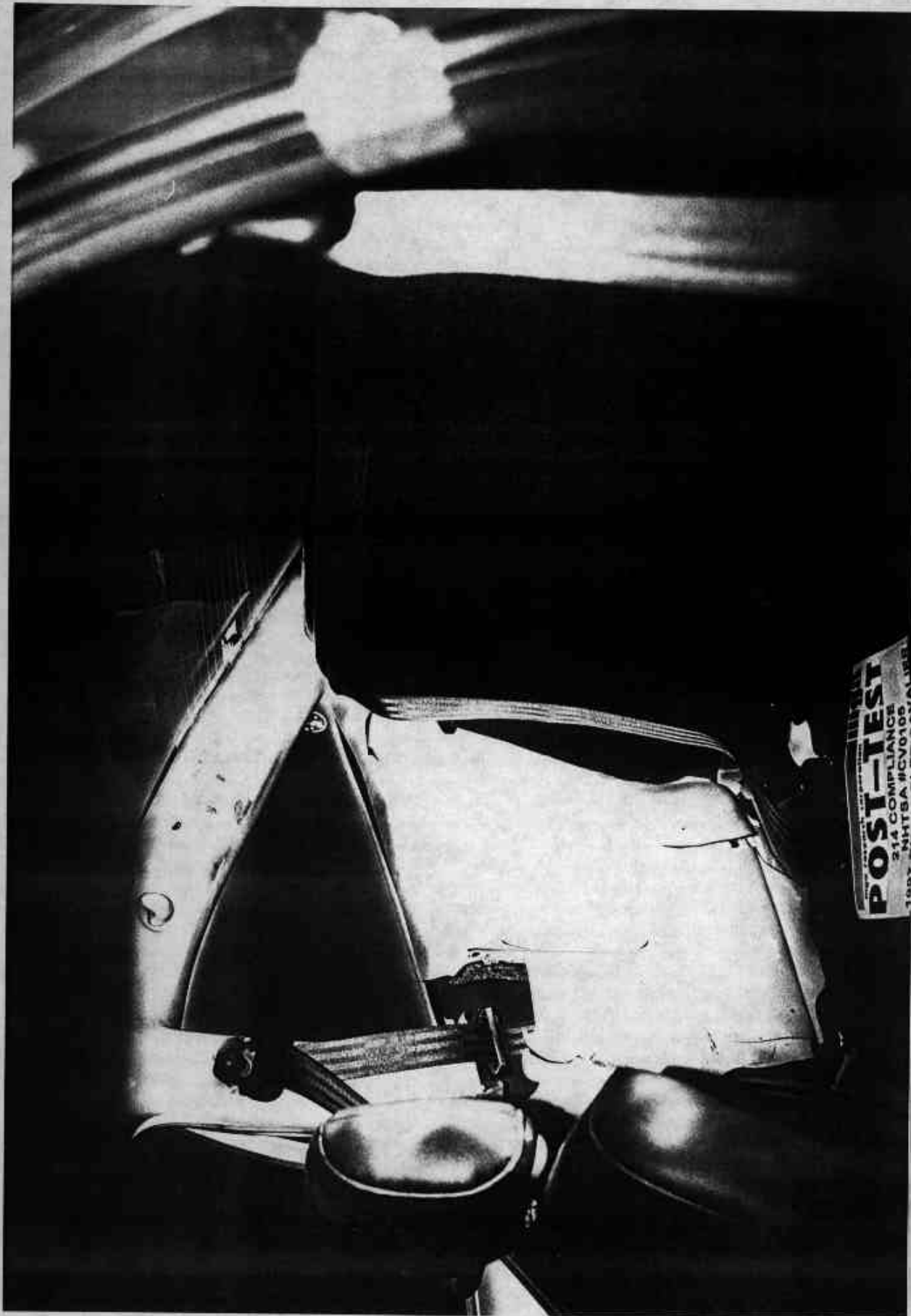


Photo No. A-36 - Post-Test Rear Passenger Dummy Contact



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



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



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

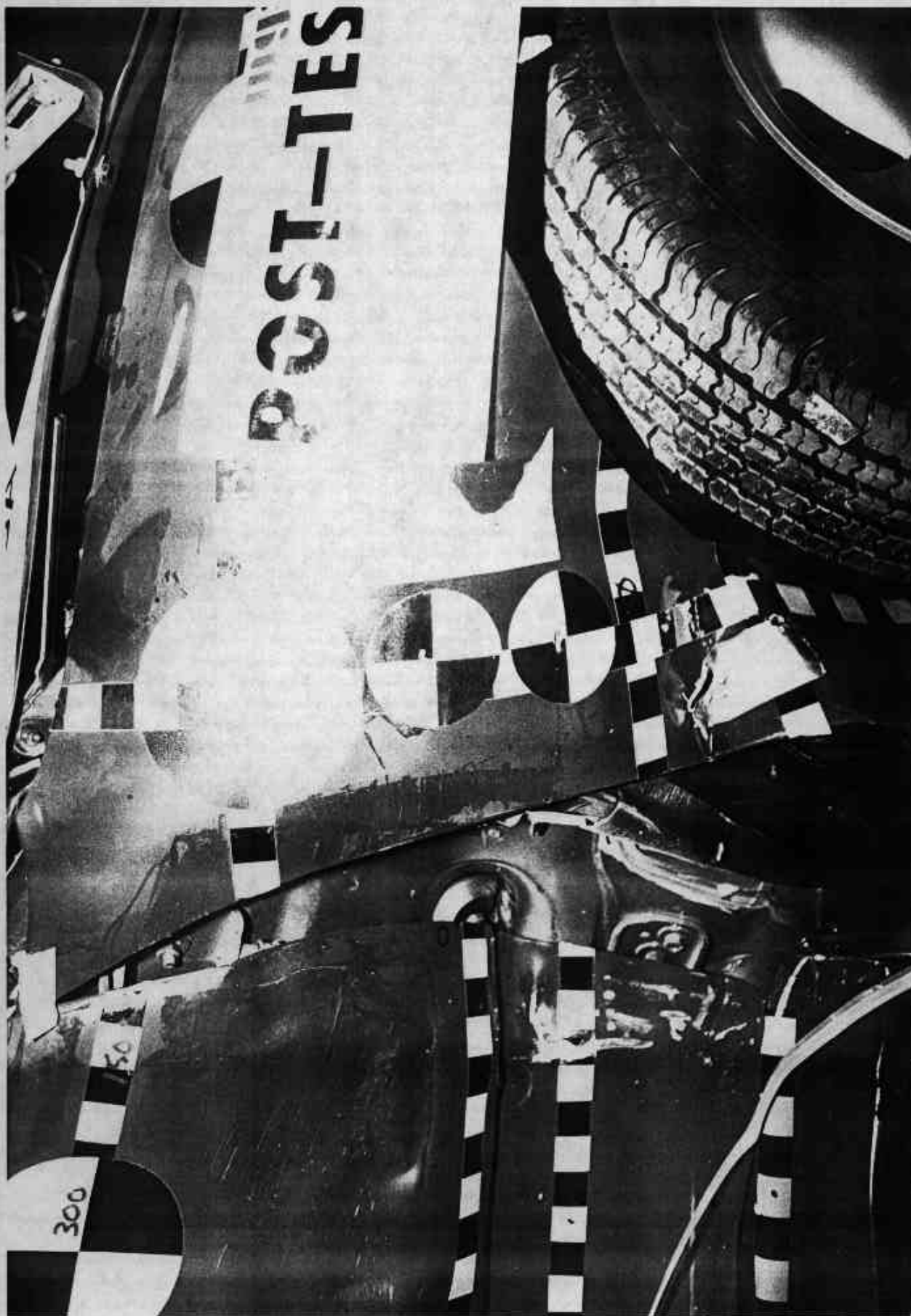


Photo No. A-40 - Post-Test Right Front Impact Point on Vehicle

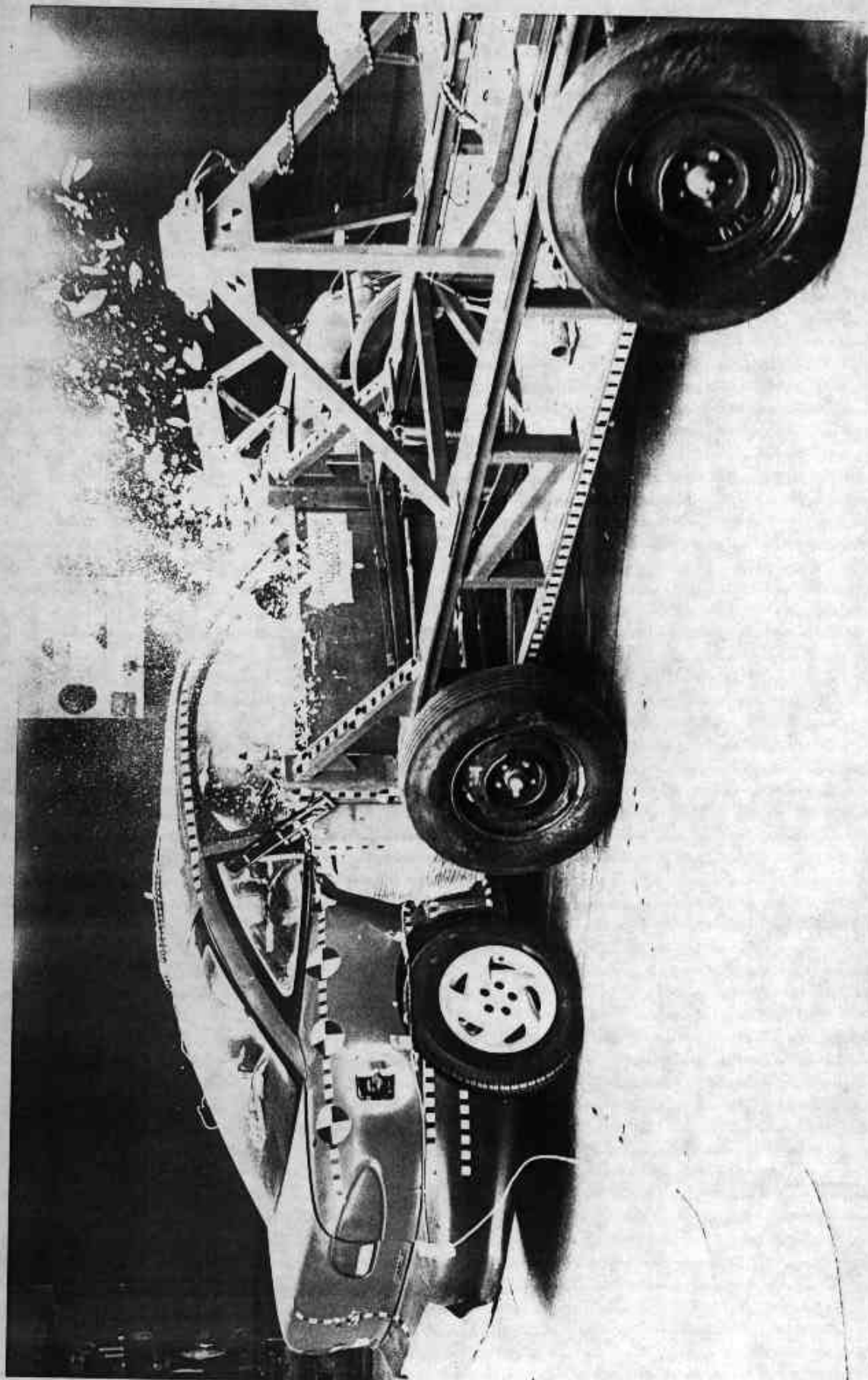
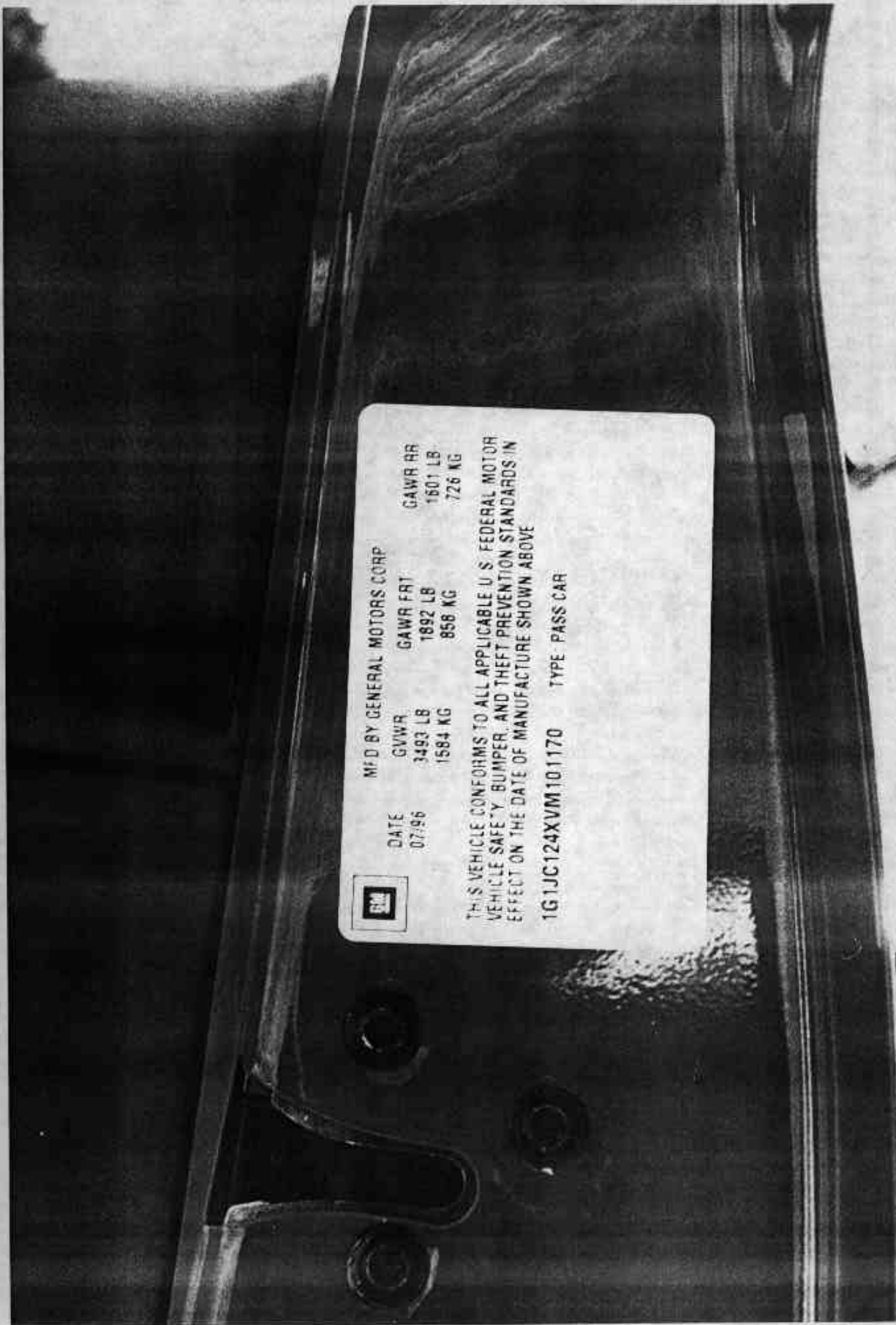


Photo No. A-41 - Impact

A-41



DATE 07/96
GVWR 3493 LB
GAWR FR 1892 LB
GVWR 1584 KG
GAWR RR 1601 LB
GAWR KG 726 KG

M/D BY GENERAL MOTORS CORP



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

1G1JC124XVM101170 TYPE PASS CAR

Photo No. A-42 - Vehicle Certification Label



TIRE - LOADING INFORMATION

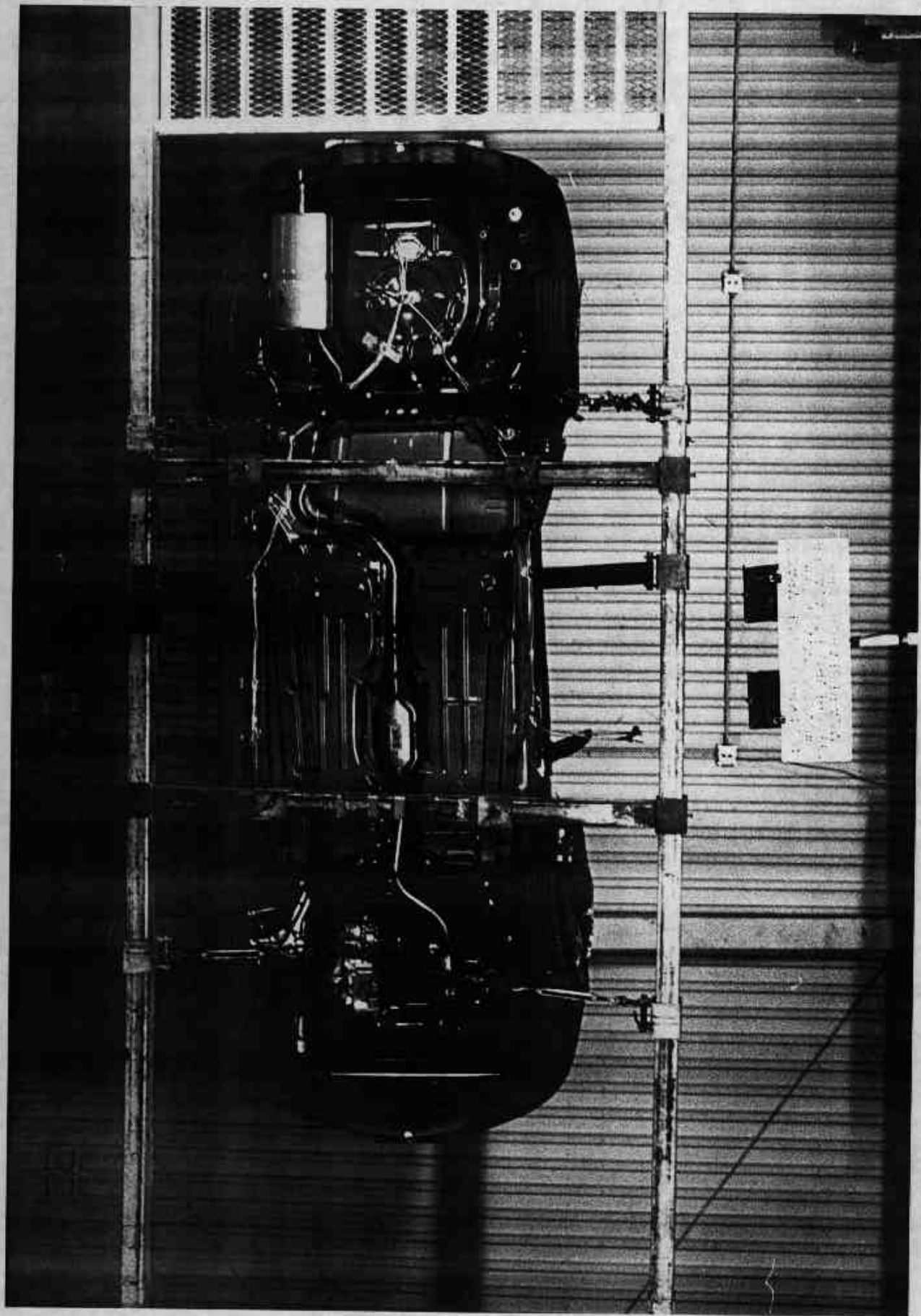
OCCUPANTS			VEHICLE CAP. WT.	
FRT.	CTR.	RR.	TOTAL	LBS
2	0	3	5	882
				400

MAX. LOADING @ GVWR SAME AS VEHICLE CAPACITY WEIGHT.
 1G1JC124XVM101170
 MODEL: JC37 JAA

TIRE SIZE		SPEED RTG	COLD TIRE PRESSURE
FRT	P195/70R14	S	30/210 PSI/KPA
RR	P195/70R14	S	30/210 PSI/KPA
SPA	T115/70D14	M	60/420 PSI/KPA

IF TIRES ARE HOT, ADD 4 PSI / 28 KPA
 SEE OWNER'S MANUAL FOR MORE INFORMATION

Photo No. A-43 - Tire Placard



A-44

Photo No. A-44 - Rollover 90°

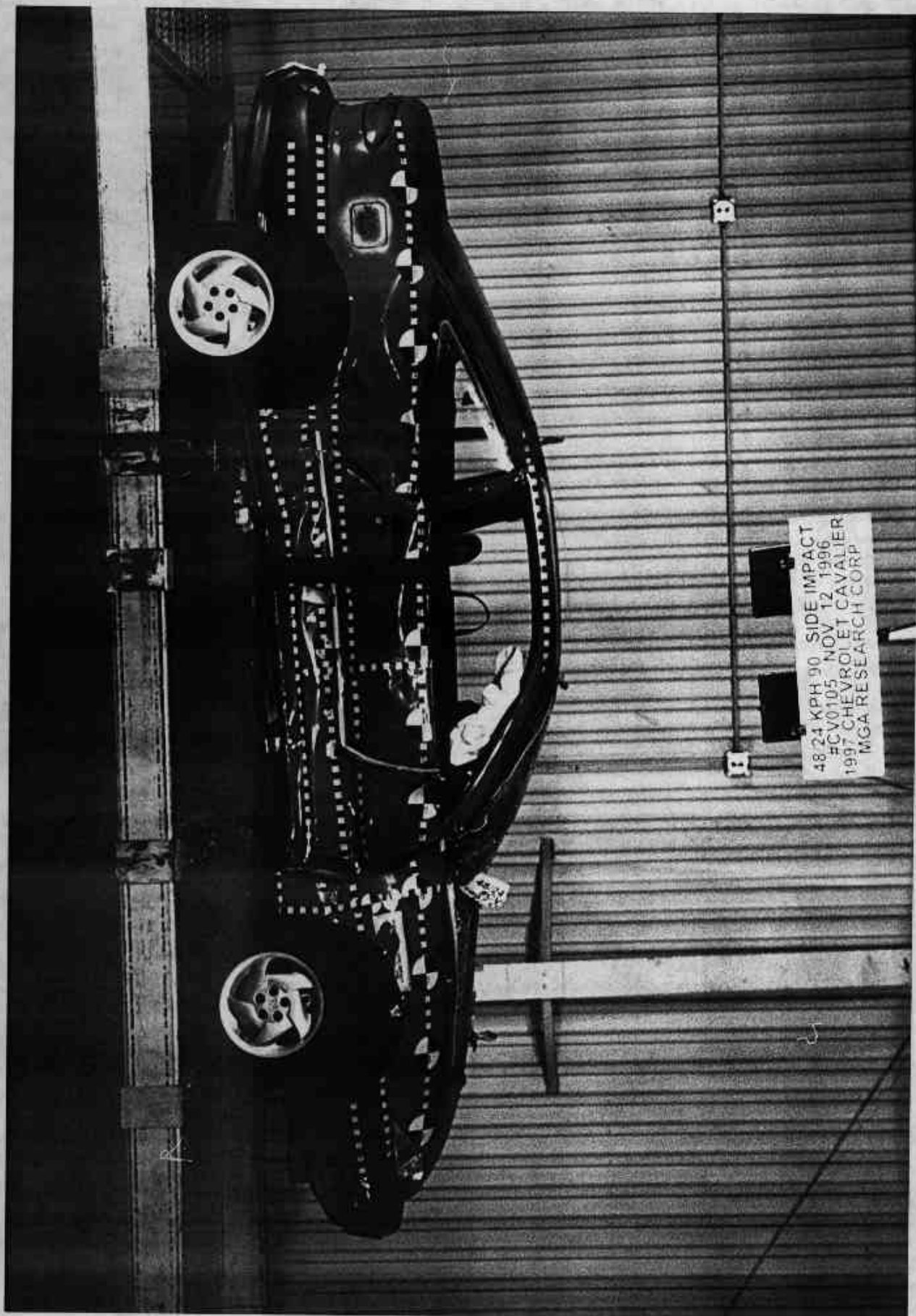


Photo No. A-45 - Rollover 180°

A-45



Photo No. A-46 - Rollover 270°

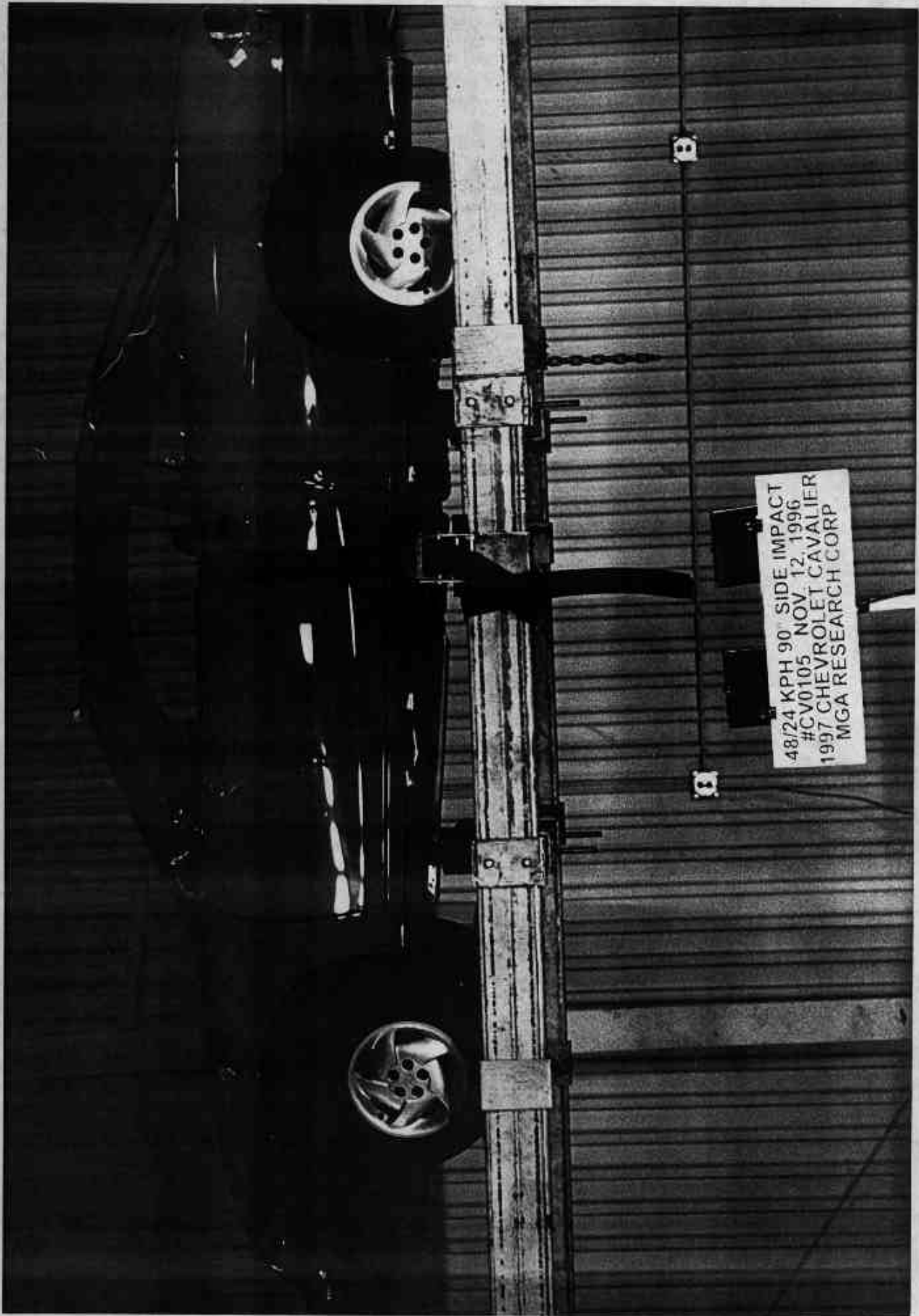


Photo No. A-47 - Rollover 360°



A-48

Photo No. A-48 - Right Front Attitude Point



Photo No. A-49 - Left Front Attitude Point

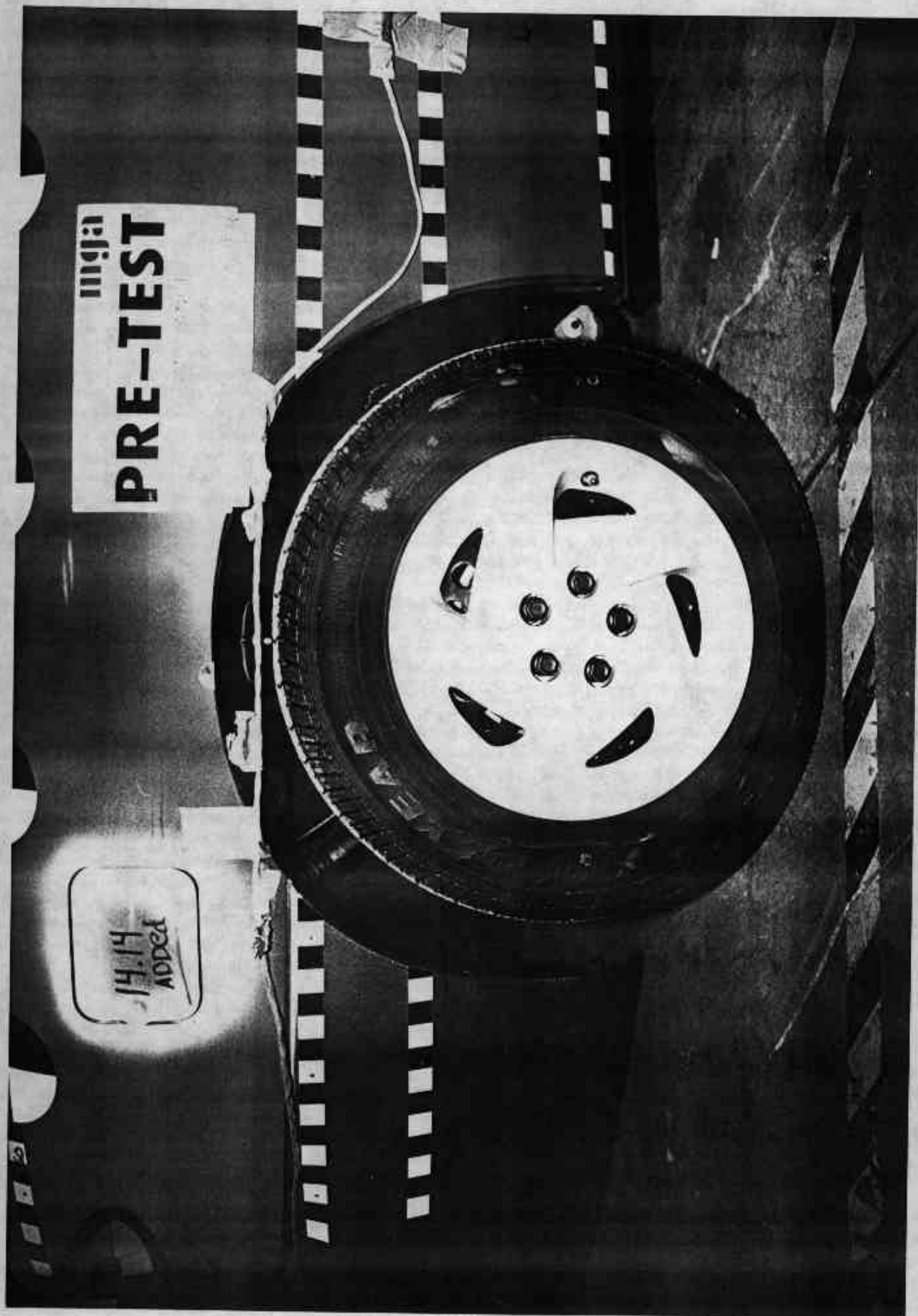


Photo No. A-50 - Right Rear Attitude Point

A-50

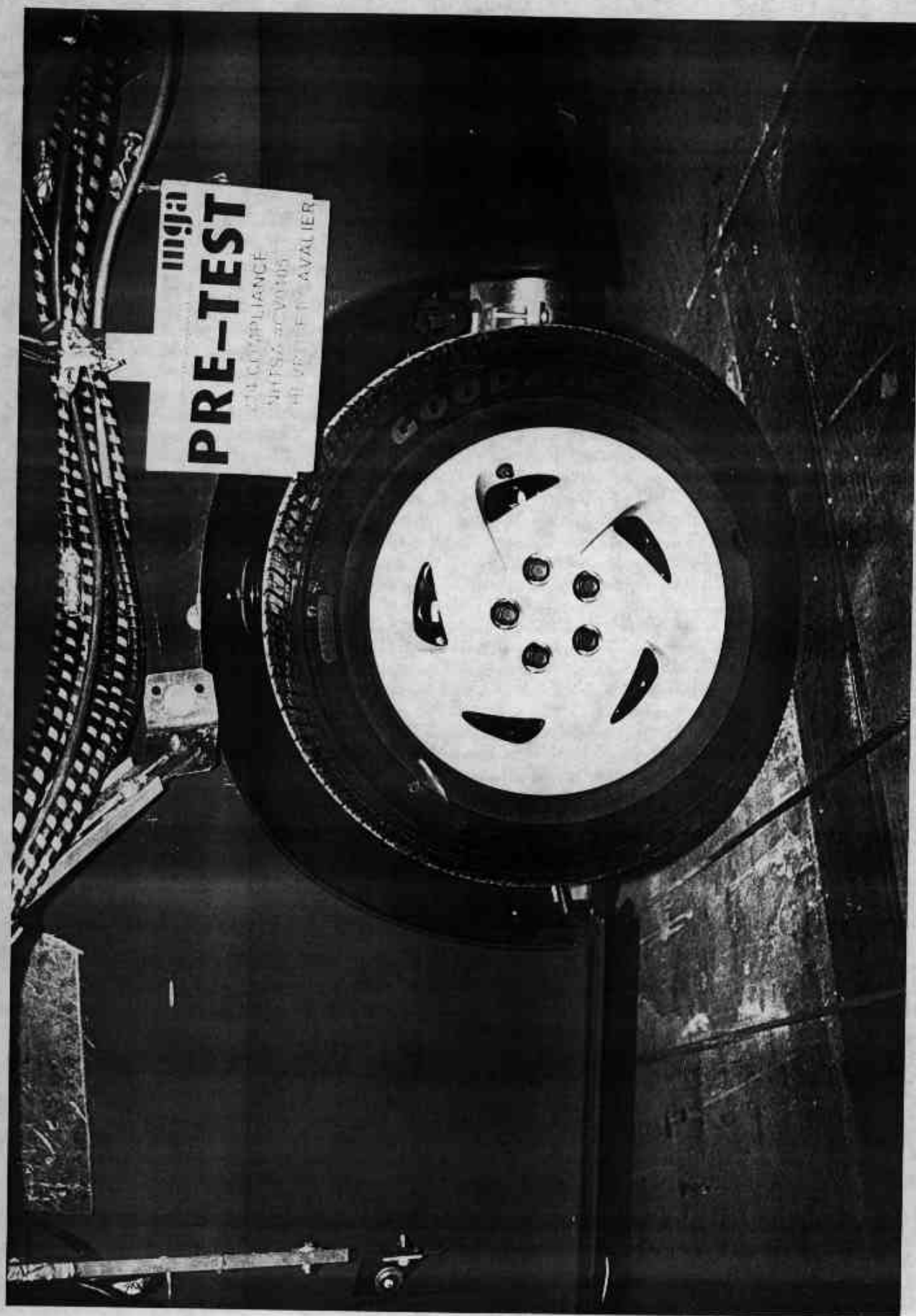


Photo No. A-51 - Left Rear Attitude Point

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Redundant:

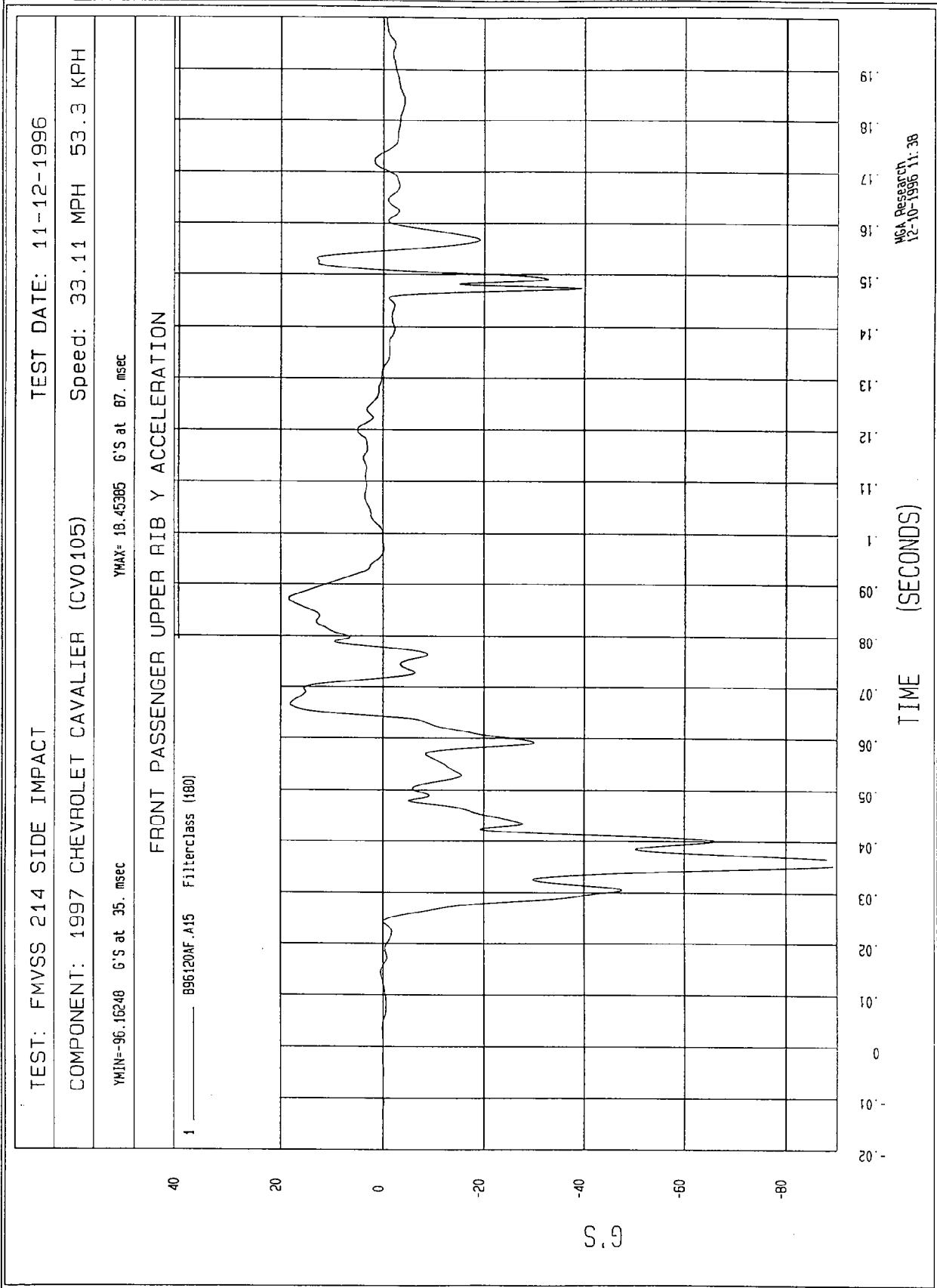
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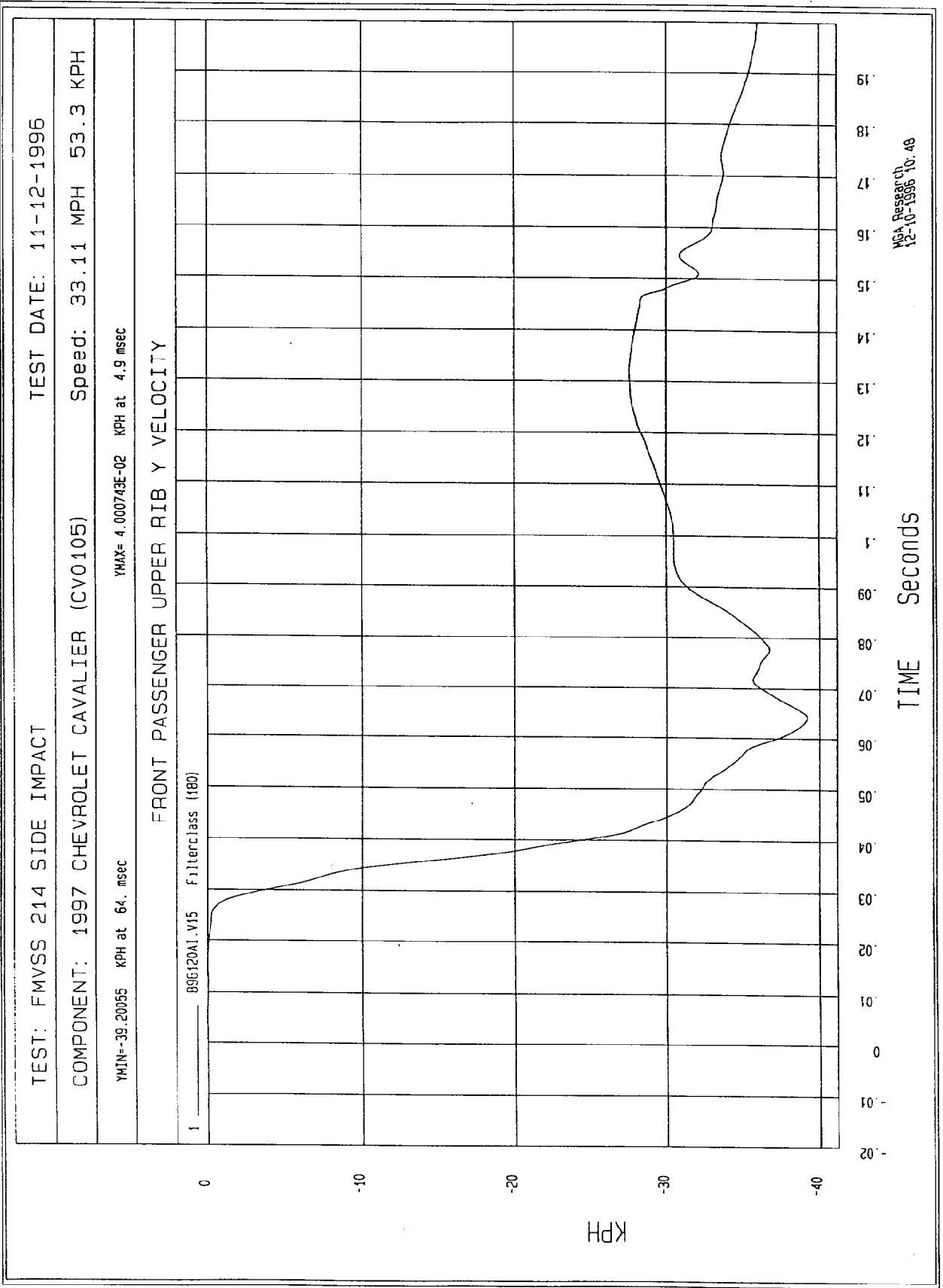
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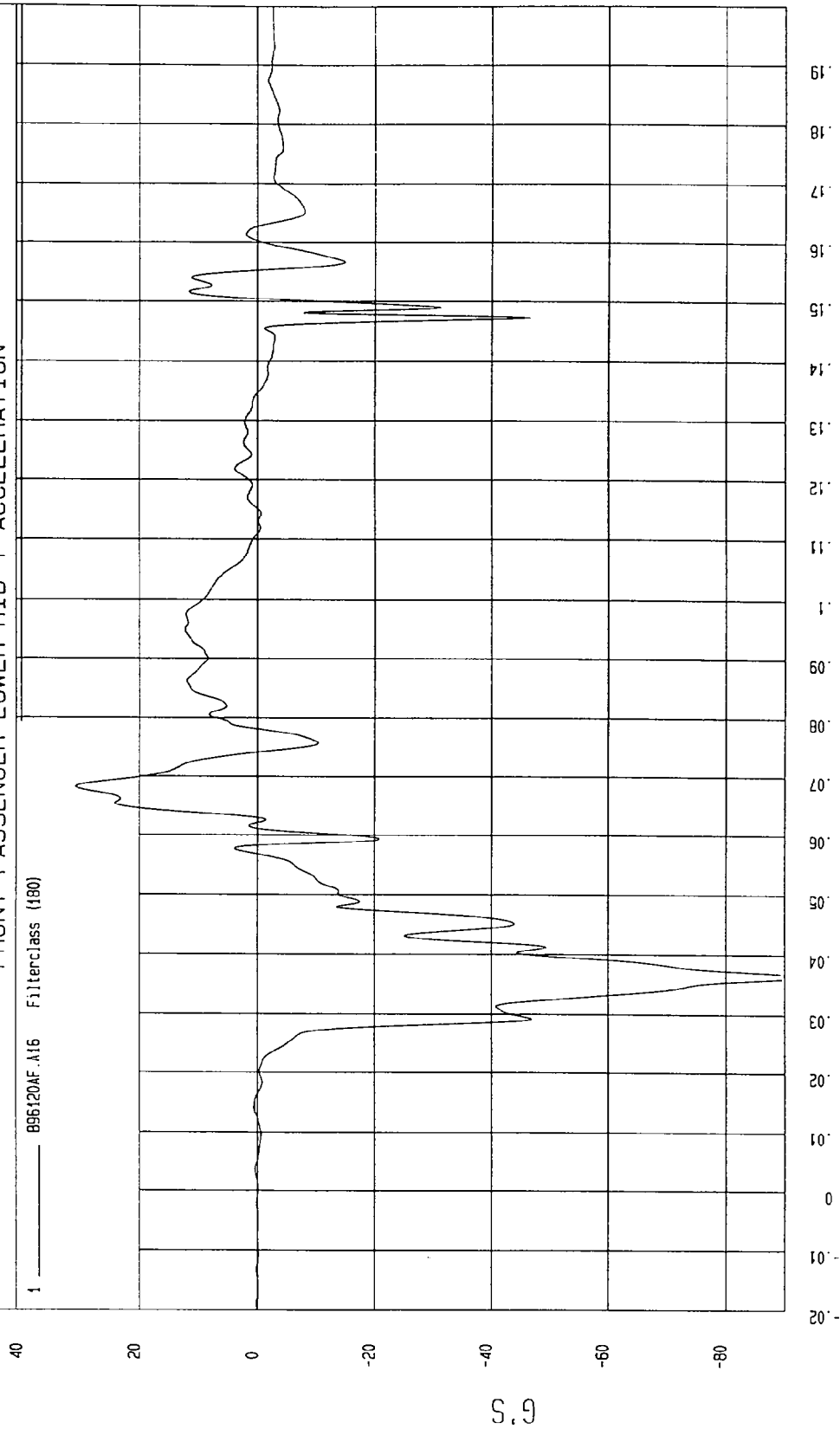


TEST: FMVSS 214 SIDE IMPACT TEST DATE: 11-12-1996
COMPONENT: 1997 CHEVROLET CAVALIER (CV0105) Speed: 33.11 MPH 53.3 KPH

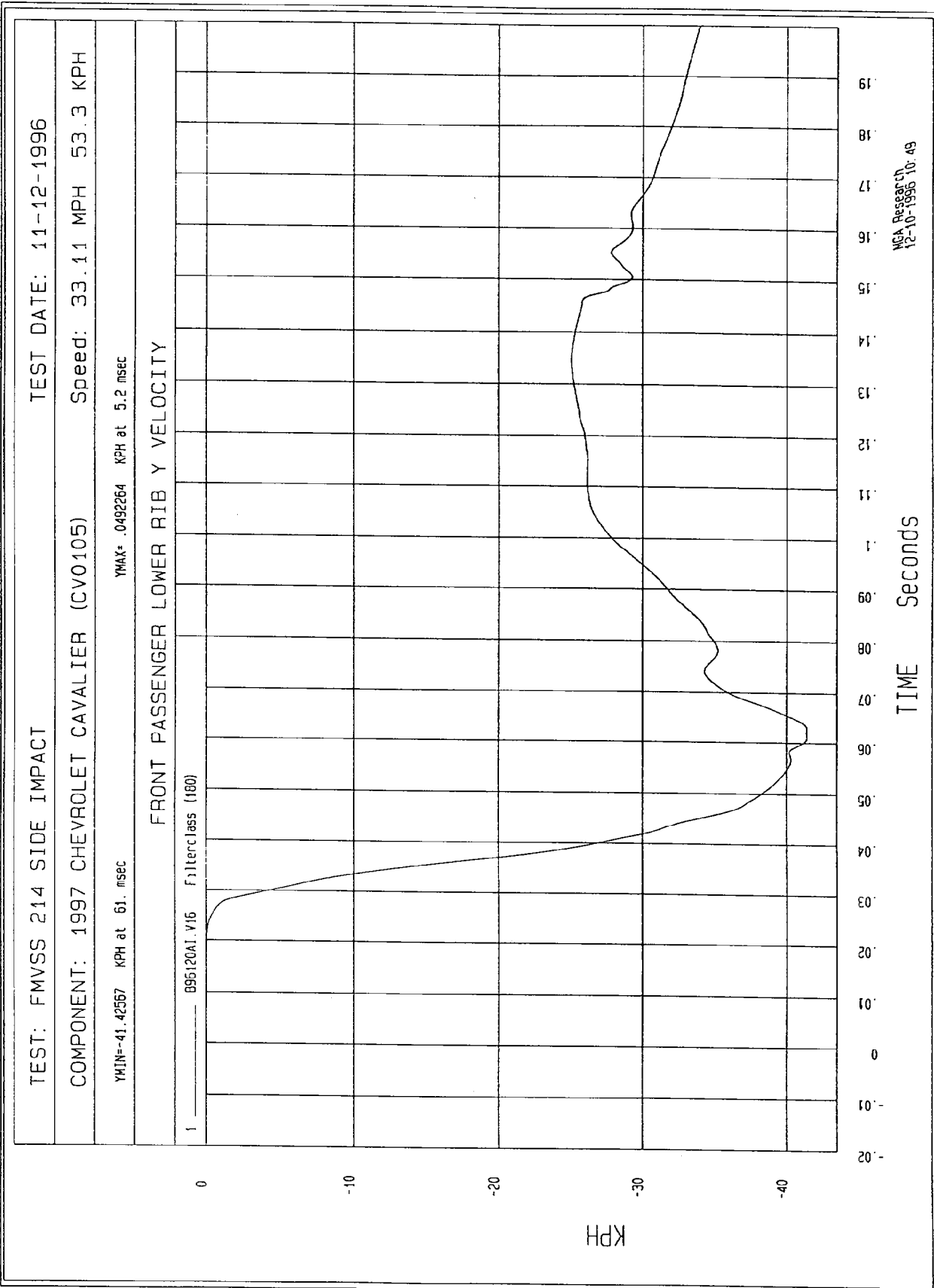
YMIN=-93.39739 G'S at 36. msec YMAX= 30.88099 G'S at 68. msec

FRONT PASSENGER LOWER RIB Y ACCELERATION

1 ——— B96120AF.M16 Filterclass (180)



MCA Research
12-10-1996 11:38

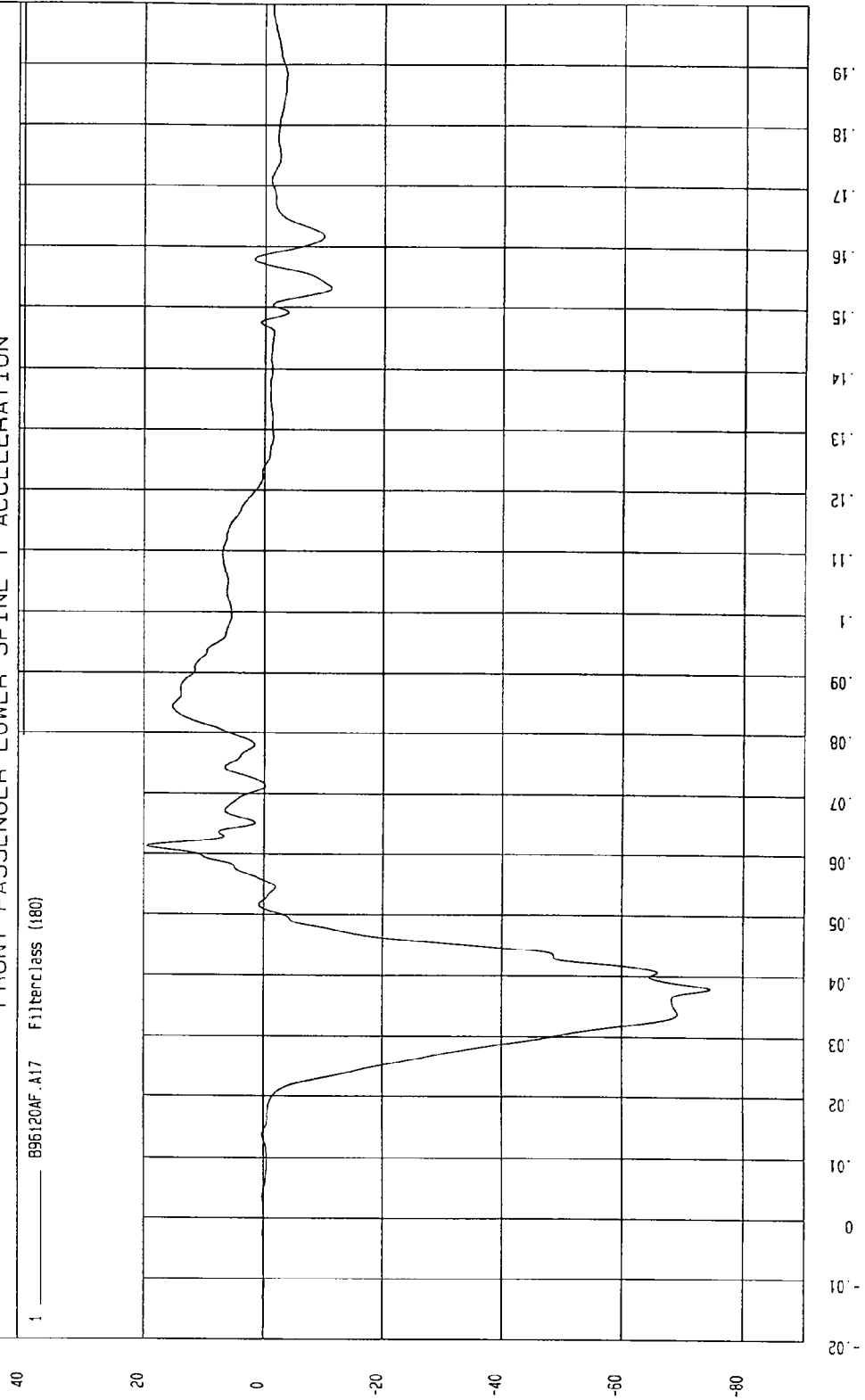


TEST: FMVSS 214 SIDE IMPACT TEST DATE: 11-12-1996
COMPONENT: 1997 CHEVROLET CAVALIER (CV0105) Speed: 33.11 MPH 53.3 KPH

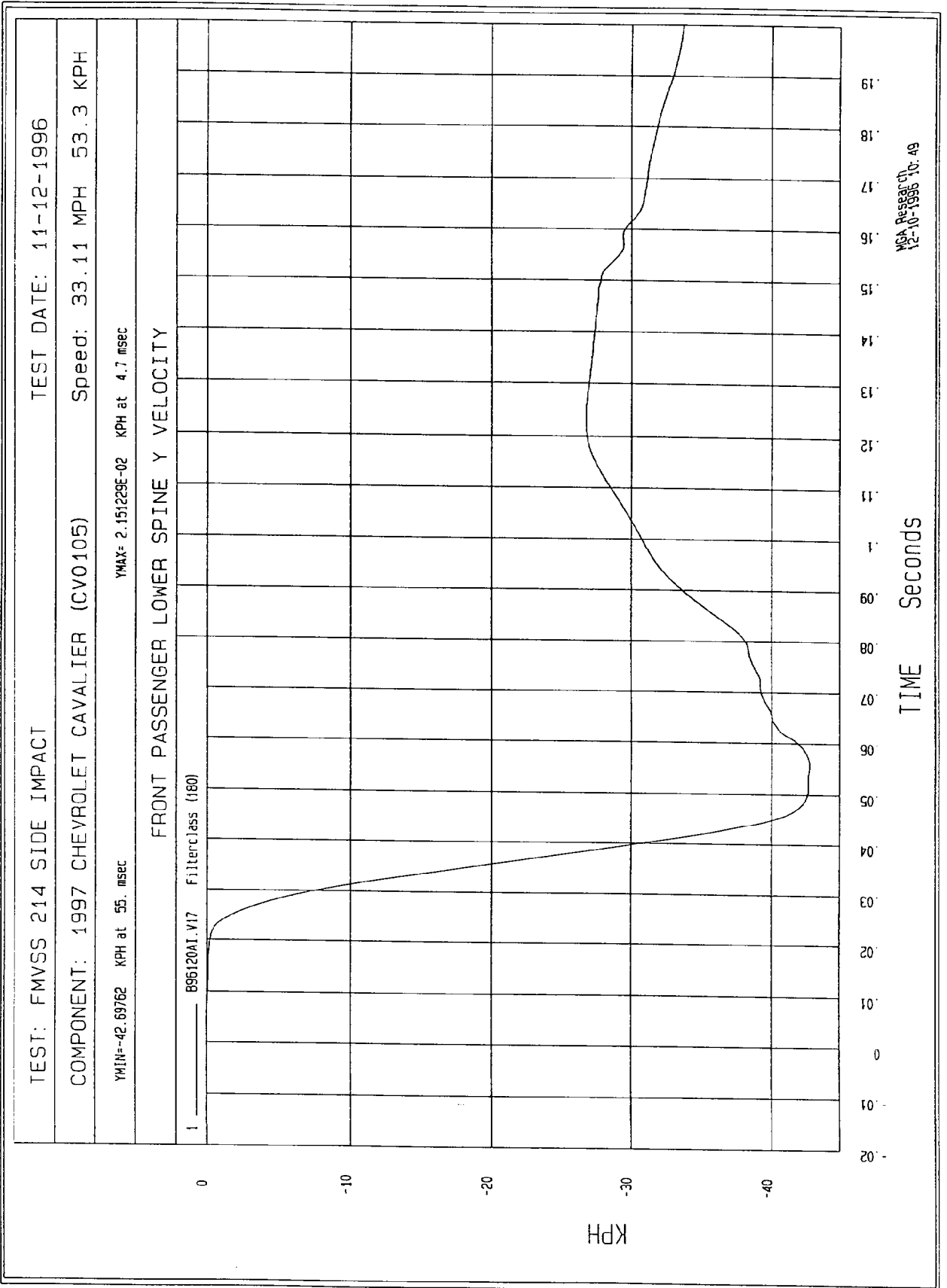
YMIN=-74.50877 G'S at 37. msec YMAX= 19.45852 G'S at 61. msec

FRONT PASSENGER LOWER SPINE Y ACCELERATION

1 ——— B96120AF.A17 Filterclass (180)



MGA Research
12-10-1996 11:39

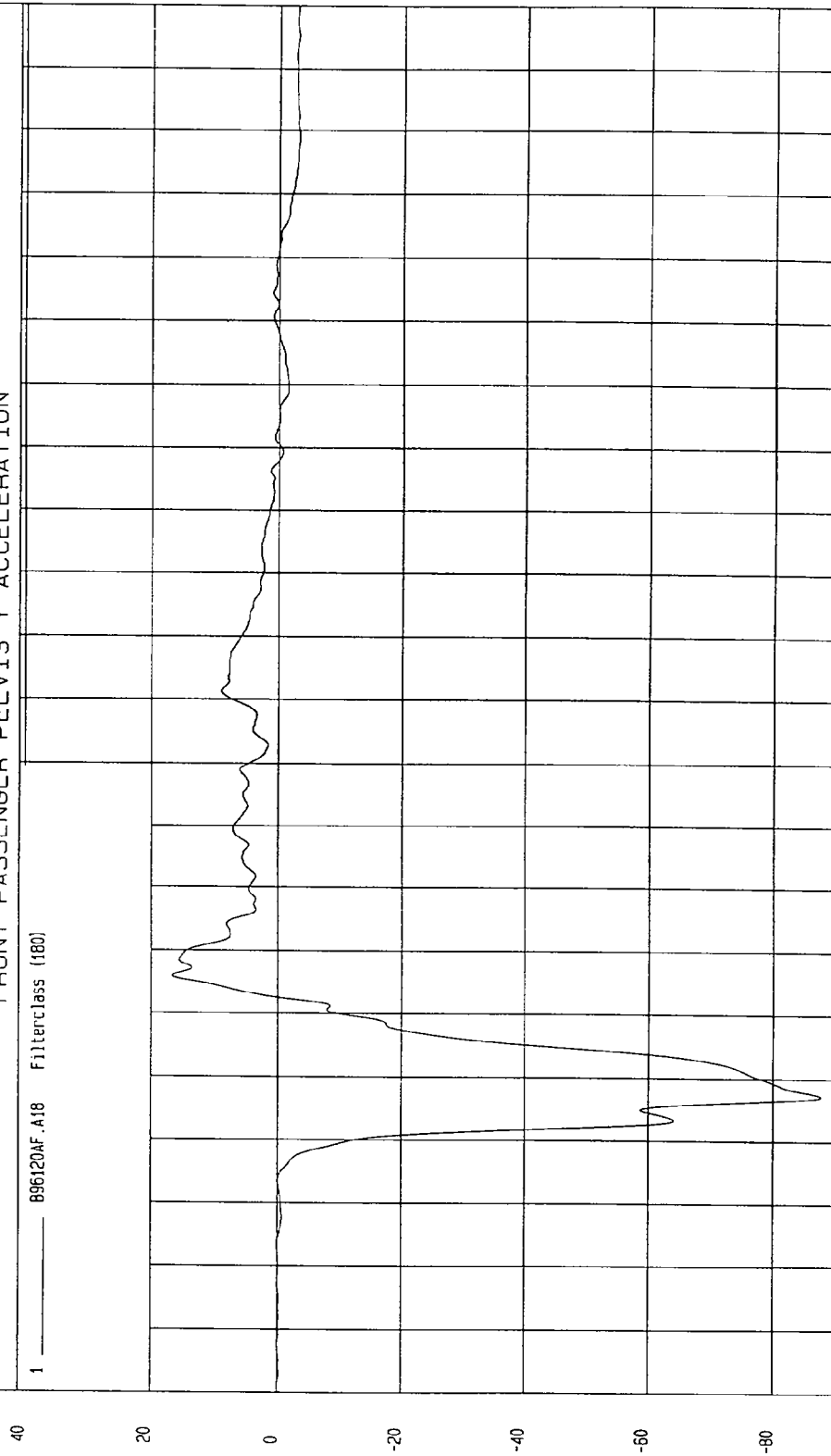


TEST: FMVSS 214 SIDE IMPACT
TEST DATE: 11-12-1996
COMPONENT: 1997 CHEVROLET CAVALIER (CV0105) Speed: 33.11 MPH 53.3 KPH

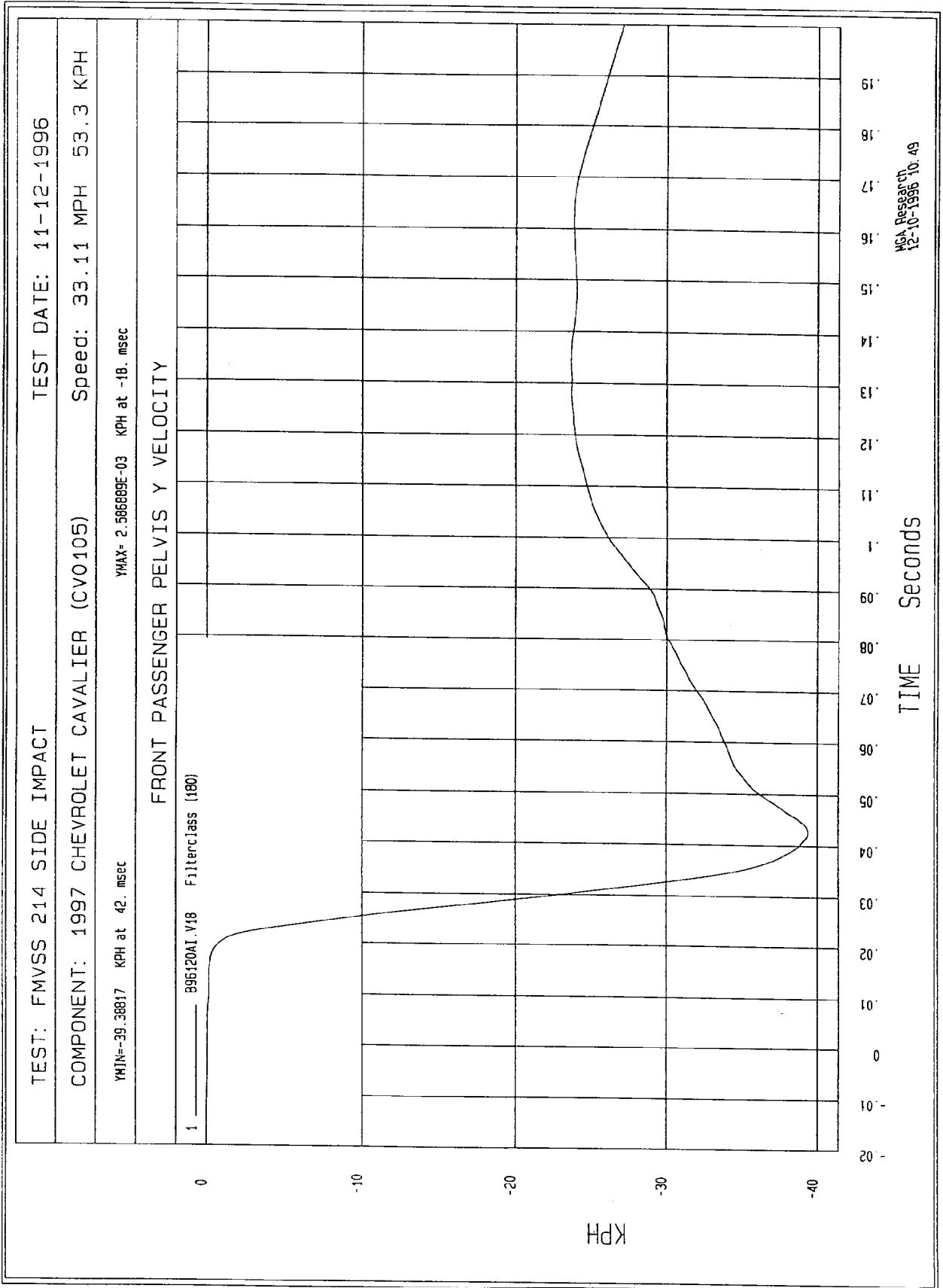
YMIN=-87.7309 G'S at 27. msec
YMAX= 15.5477 G'S at 46 msec

FRONT PASSENGER PELVIS Y ACCELERATION

1 ——— 896120AF.A18 Filterclass (180)



NCA Research
12-10-1996 11:39

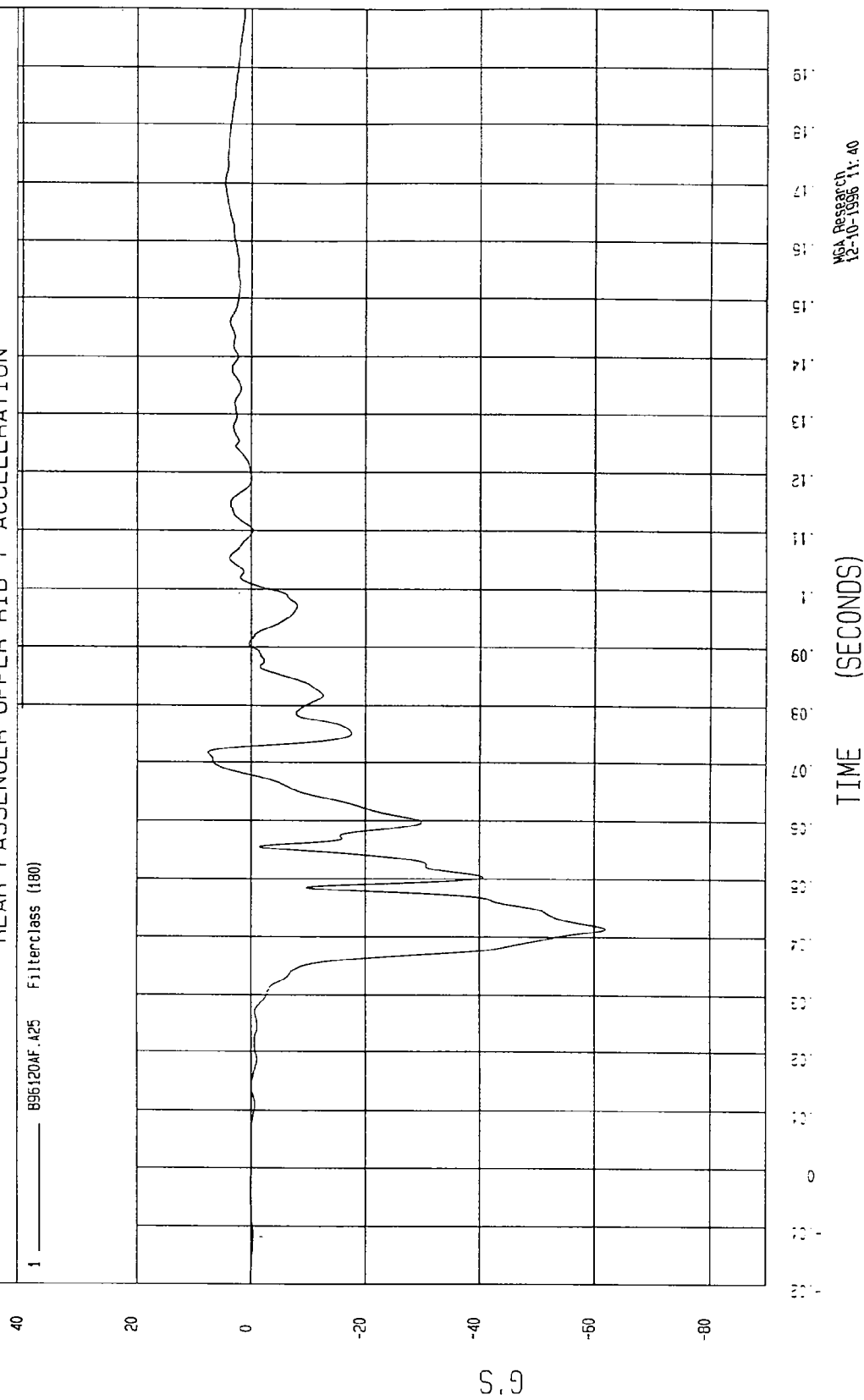


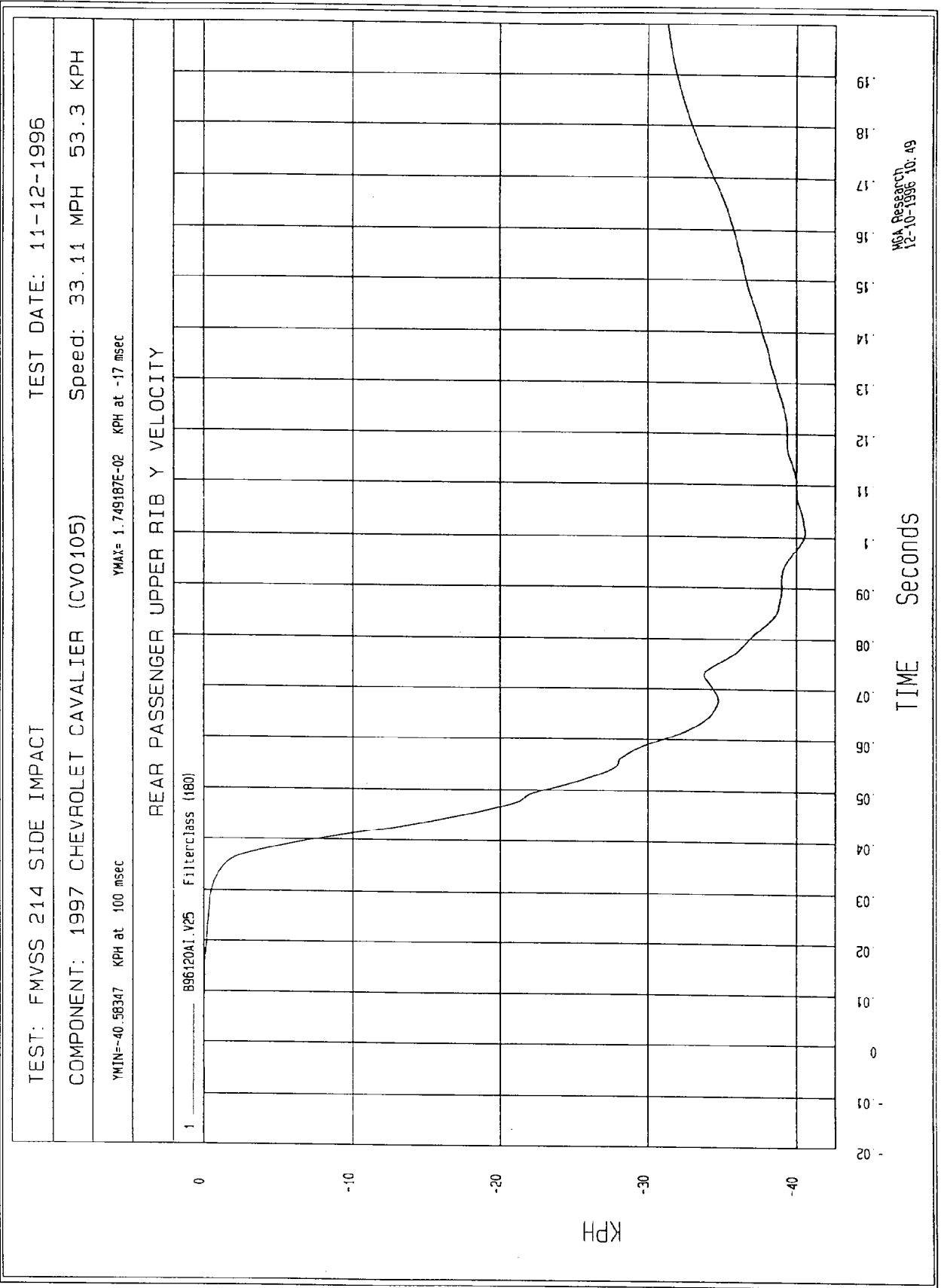
TEST: FMVSS 214 SIDE IMPACT TEST DATE: 11-12-1996

COMPONENT: 1997 CHEVROLET CAVALIER (CV0105) Speed: 33.11 MPH 53.3 KPH

YWIN=-61.95981 G'S at 41. msec YMAX= 7.737364 G'S at 71. msec

REAR PASSENGER UPPER RIB Y ACCELERATION



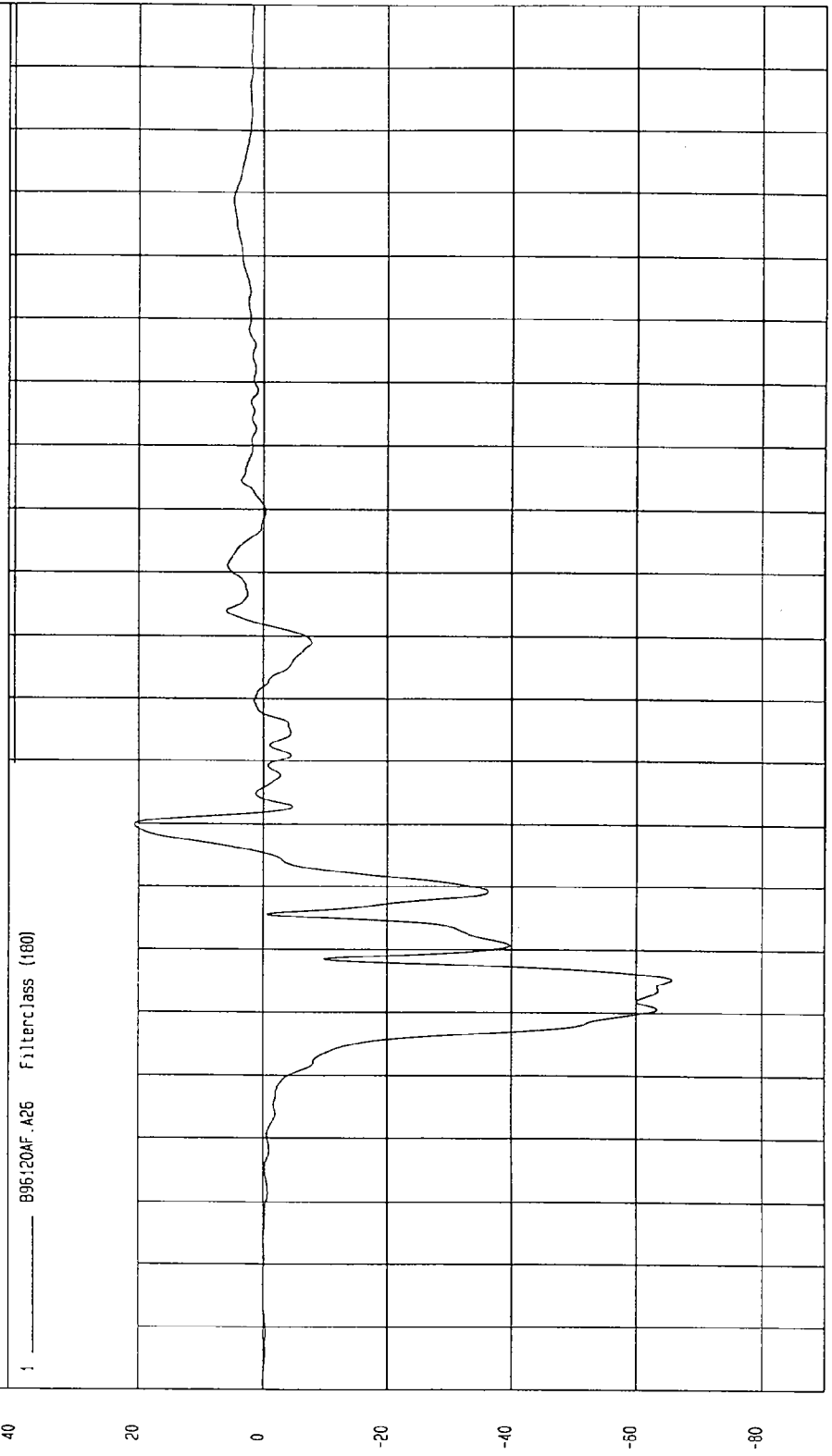


TEST: FMVSS 214 SIDE IMPACT TEST DATE: 11-12-1996

COMPONENT: 1997 CHEVROLET CAVALIER (CV0105) Speed: 33.11 MPH 53.3 KPH

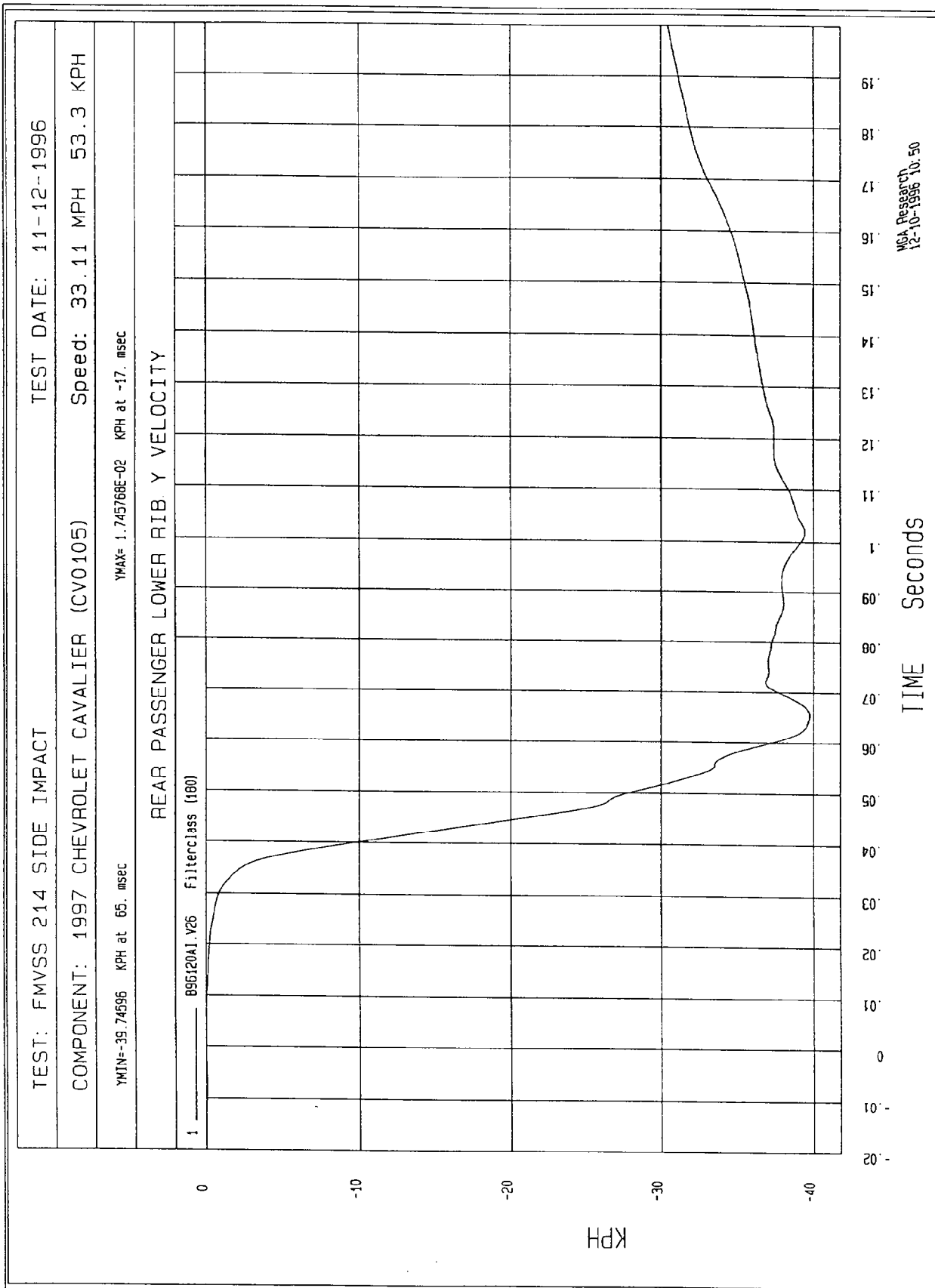
YMIN=-65.66766 G'S at 45. msec YMAX= 20.60456 G'S at 69. msec

REAR PASSENGER LOWER RIB Y ACCELERATION



TIME (SECONDS)

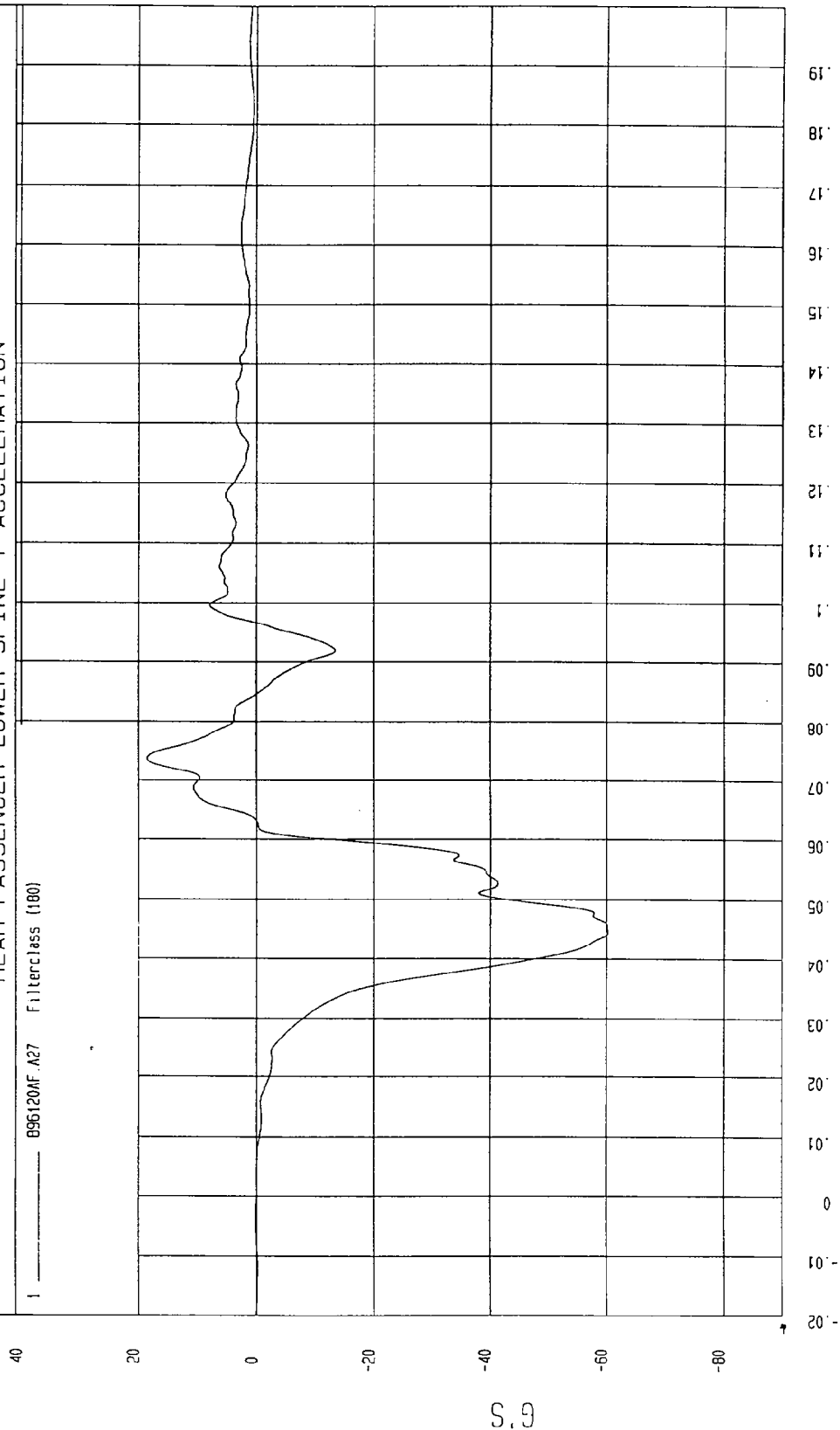
NCA Research
12-10-1996 11:40



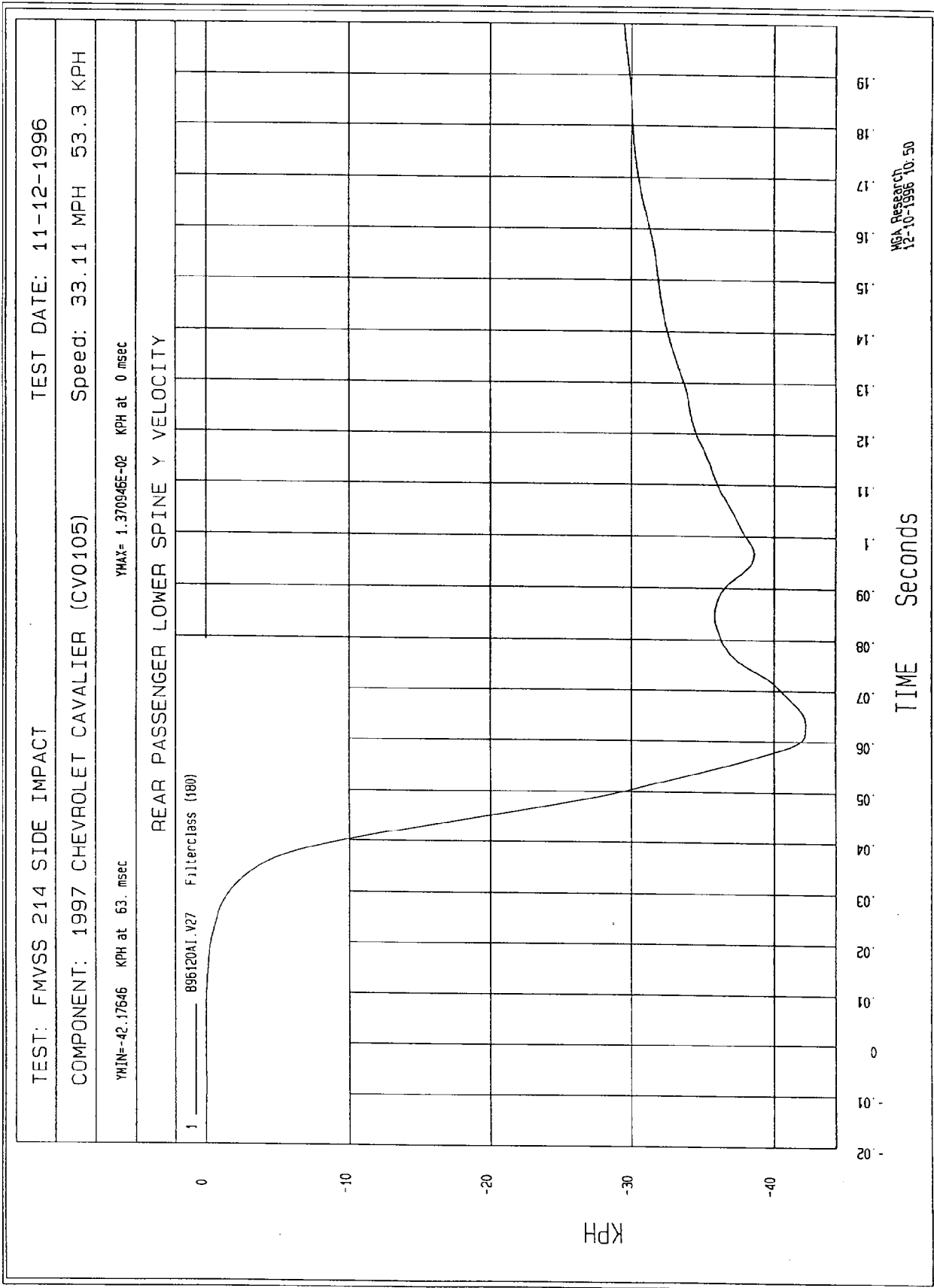
TEST: FMVSS 214 SIDE IMPACT TEST DATE: 11-12-1996
COMPONENT: 1997 CHEVROLET CAVALIER (CV0105) Speed: 33.11 MPH 53.3 KPH
YMIN=-60.26393 G'S at 44. msec YMAX= 18.48495 G'S at 73. msec

REAR PASSENGER LOWER SPINE Y ACCELERATION

1 ——— B96120MF.A27 Filterclass (100)



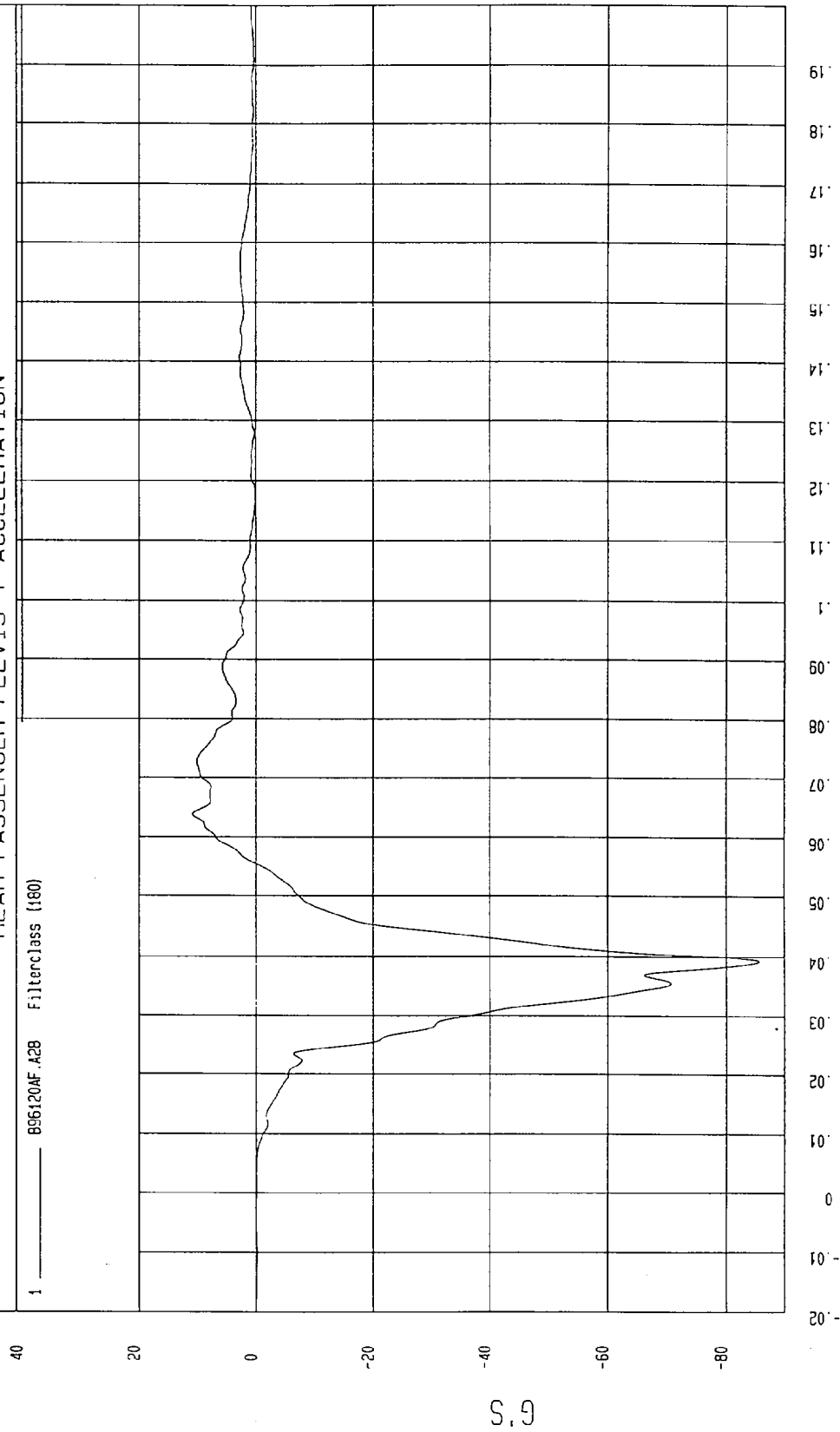
MGA Research
12-10-1996 11:40



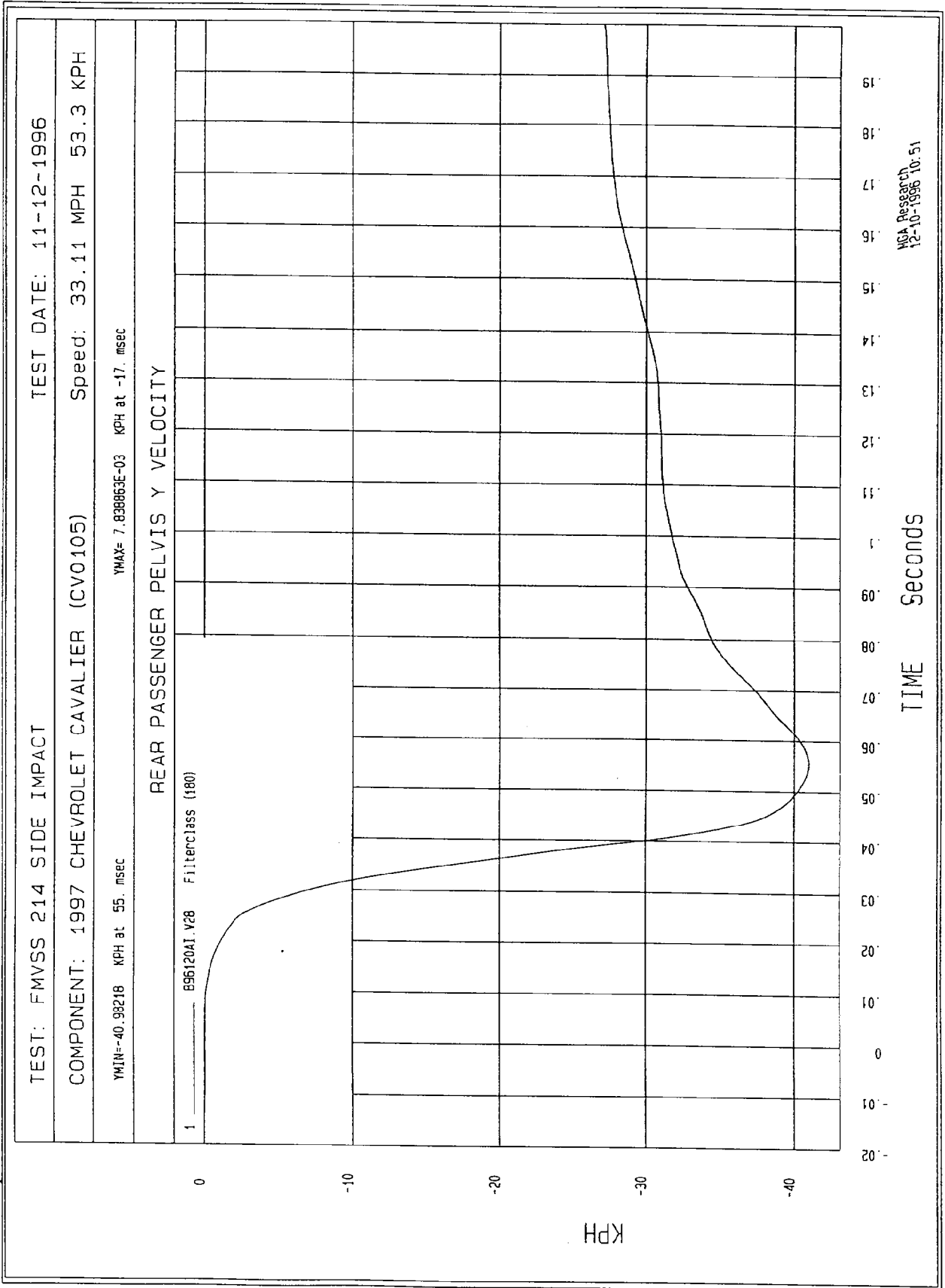
TEST: FMVSS 214 SIDE IMPACT
TEST DATE: 11-12-1996
COMPONENT: 1997 CHEVROLET CAVALIER (CV0105) Speed: 33.11 MPH 53.3 KPH
YMIN=-85.72082 G'S at 39. msec YMAX= 10.88206 G'S at 63. msec

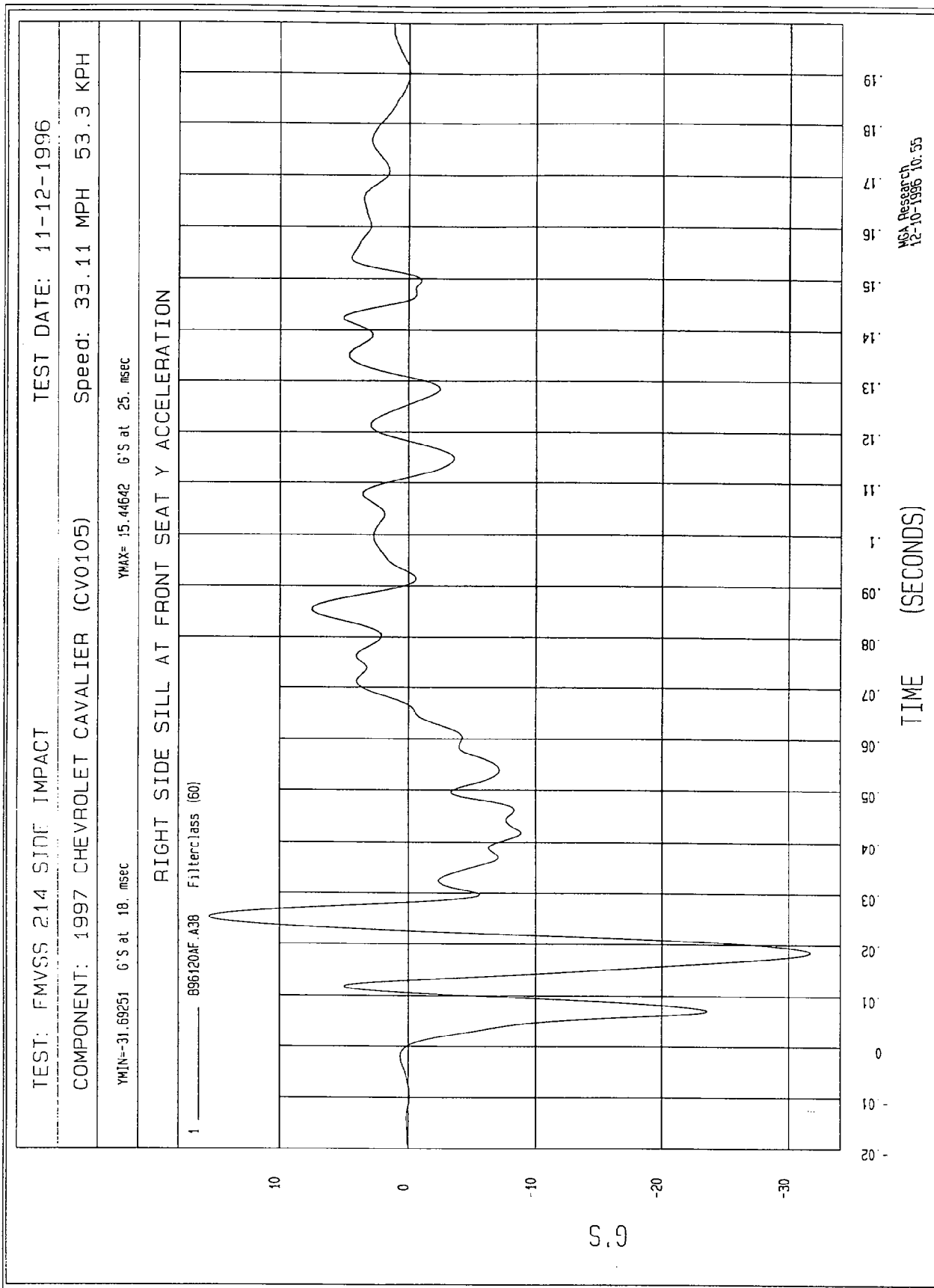
REAR PASSENGER PELVIS Y ACCELERATION

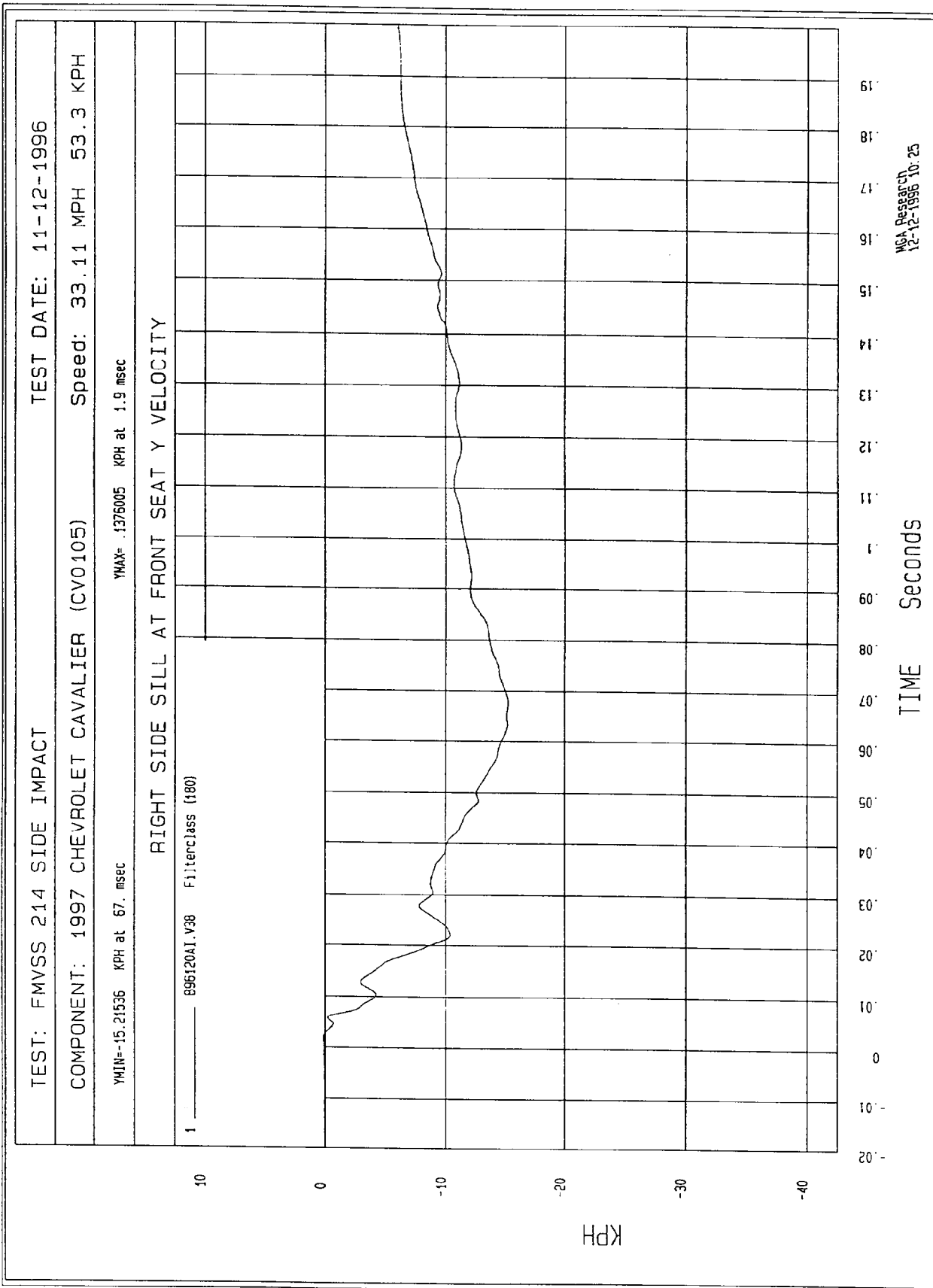
1 ——— B96120AF.A28 Filterclass (180)



MGA Research
12-10-1996 11:41

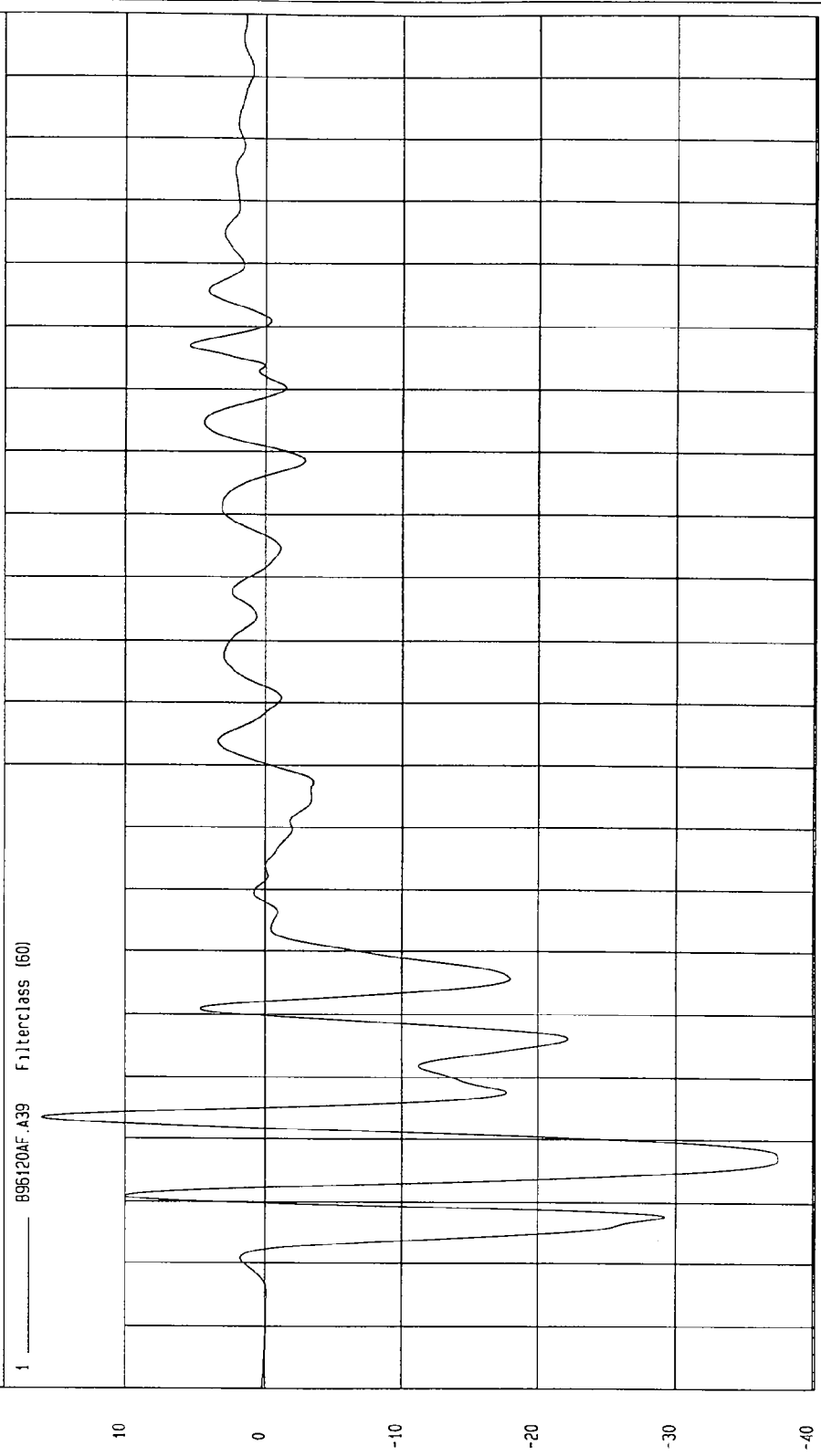




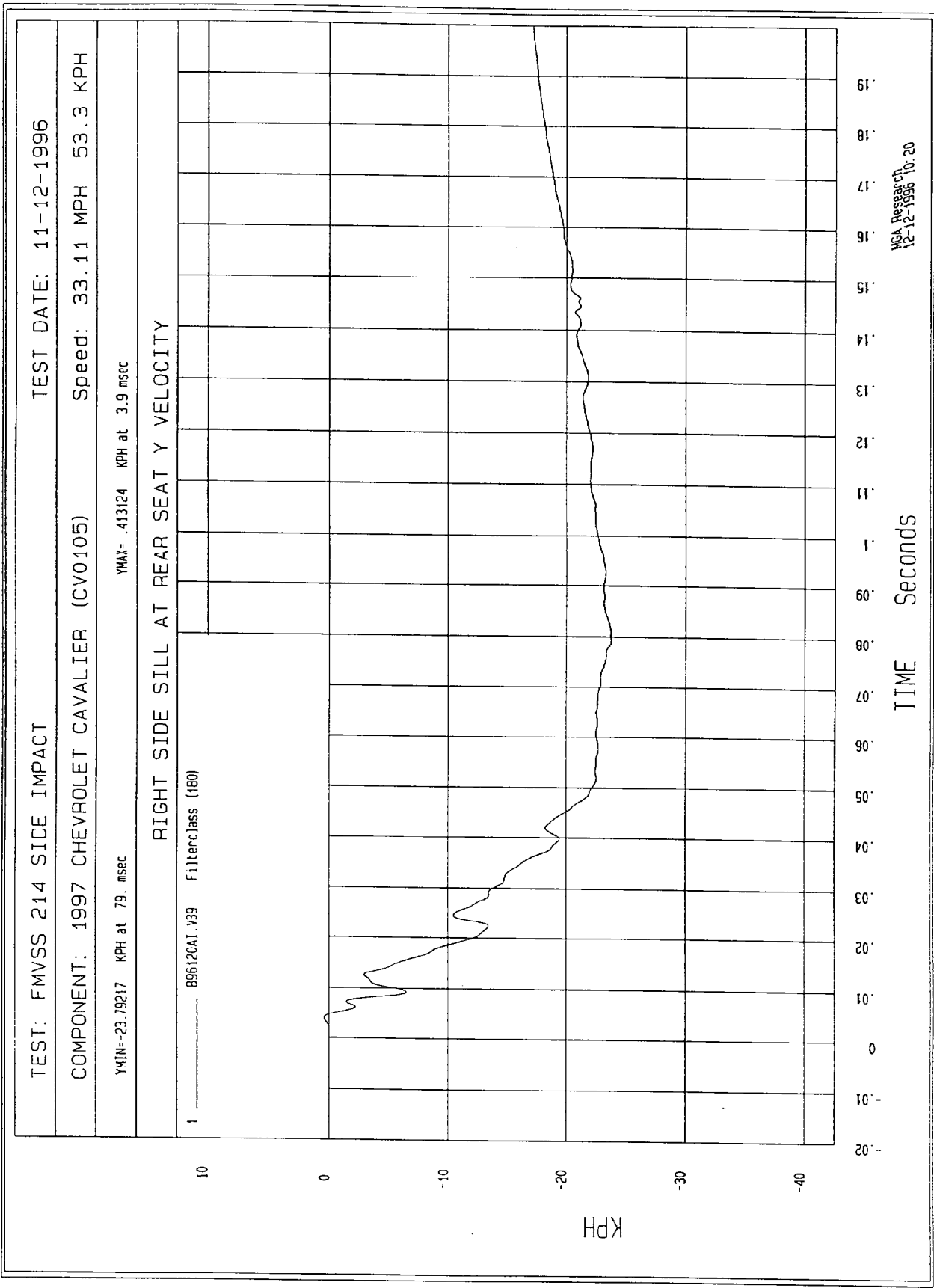


TEST: FMVSS 214 SIDE IMPACT TEST DATE: 11-12-1996
COMPONENT: 1997 CHEVROLET CAVALIER (CV0105) Speed: 33.11 MPH 53.3 KPH
YMIN=-37.45714 G'S at 17 msec YMAX= 16.05565 G'S at 23. msec

RIGHT SIDE SILL AT REAR SEAT Y ACCELERATION



WCA Research
12-10-1996 10:55

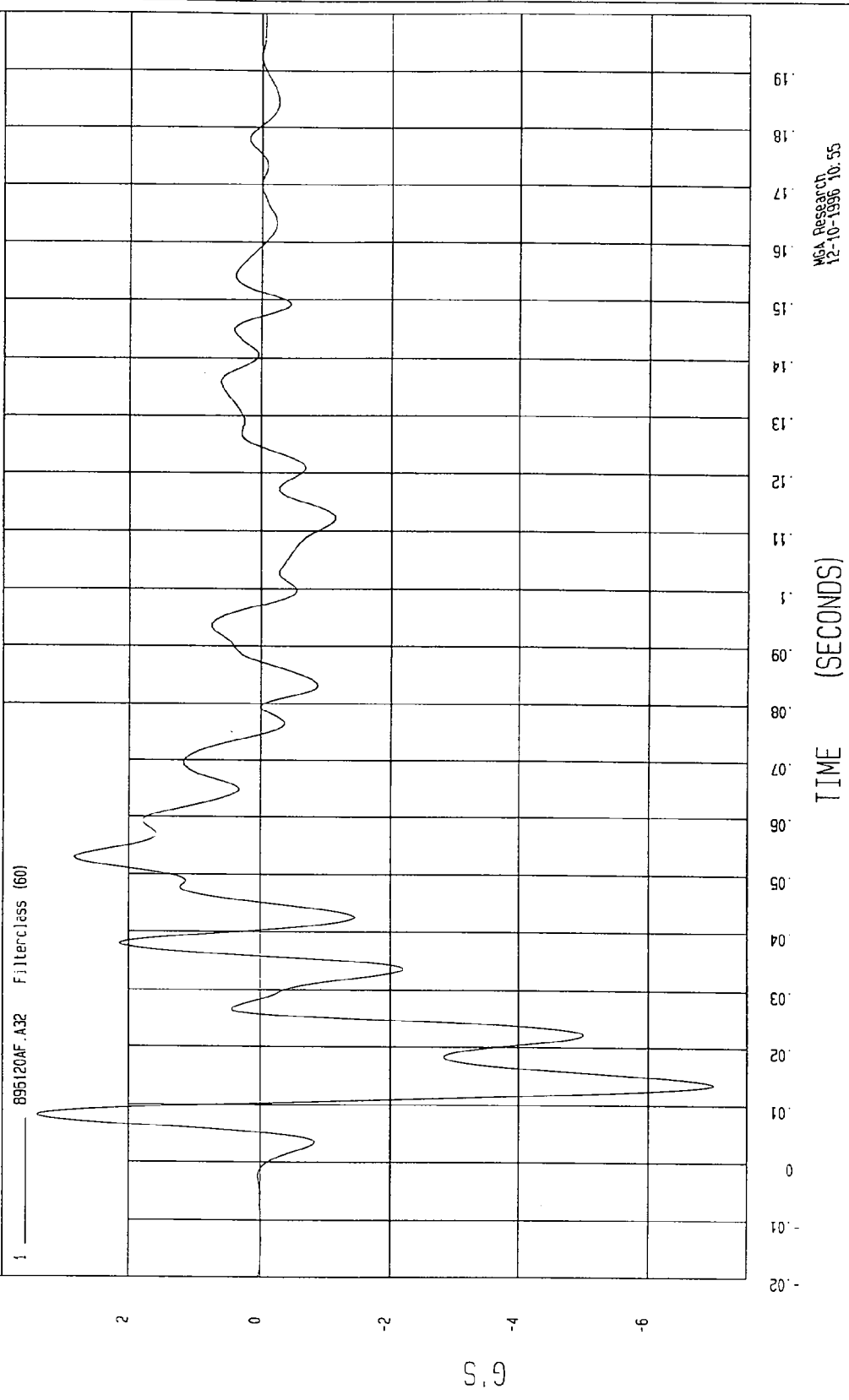


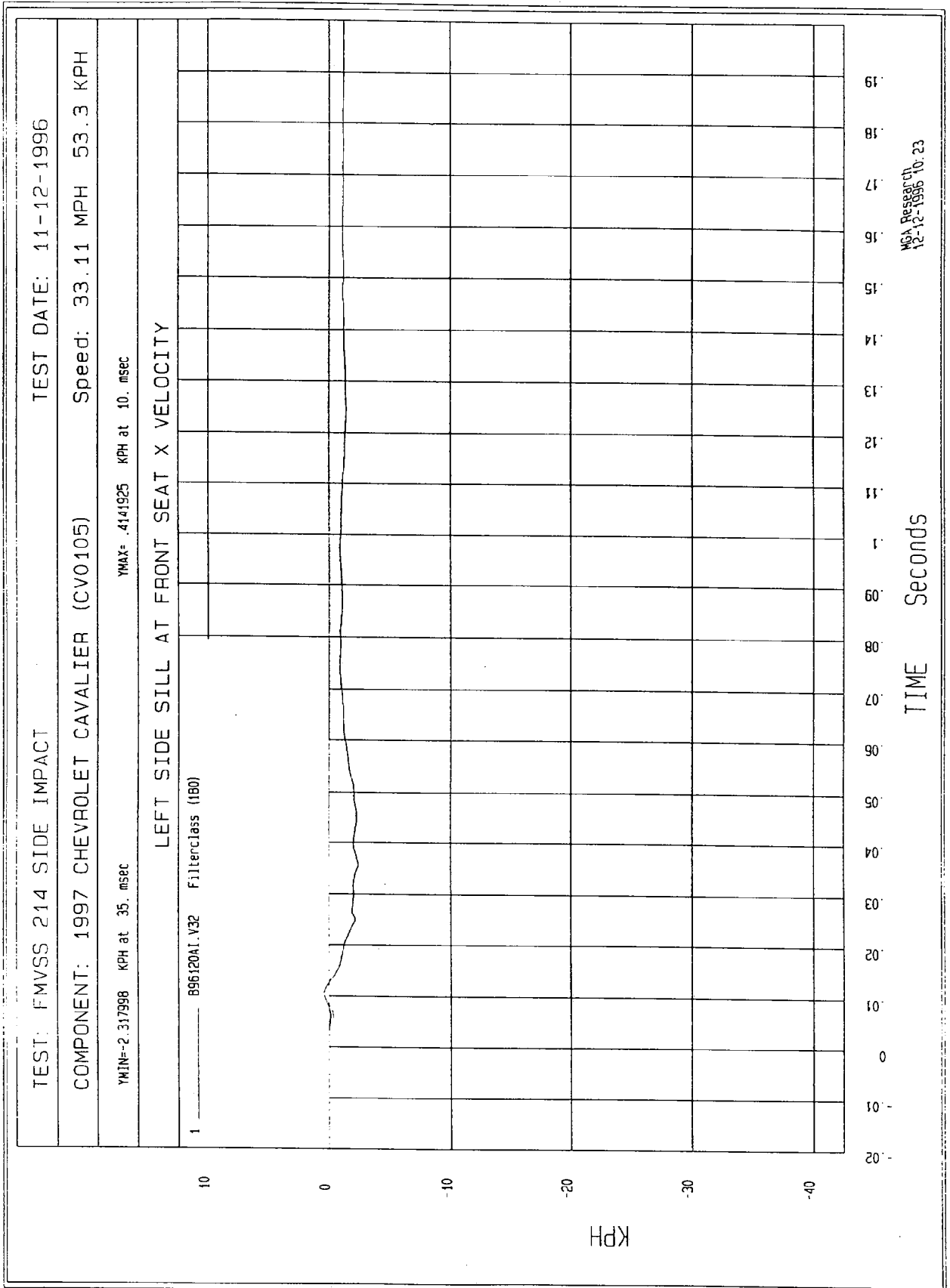
TEST: FMVSS 214 SIDE IMPACT TEST DATE: 11-12-1996

COMPONENT: 1997 CHEVROLET CAVALIER (CV0105) Speed: 33.11 MPH 53.3 KPH

YMIN=-6.986807 G'S at 13. msec YMAX= 3.394072 G'S at 8.1 msec

LEFT SIDE SILL AT FRONT SEAT X ACCELERATION





TEST: FMVSS 214 SIDE IMPACT

TEST DATE: 11-12-1996

COMPONENT: 1997 CHEVROLET CAVALIER (CV0105)

Speed: 33.11 MPH 53.3 KPH

YMIN=-19.24815 G'S at 9.2 msec

YMAX= 2.69957 G'S at 151 msec

LEFT SIDE SILL AT FRONT SEAT Y ACCELERATION

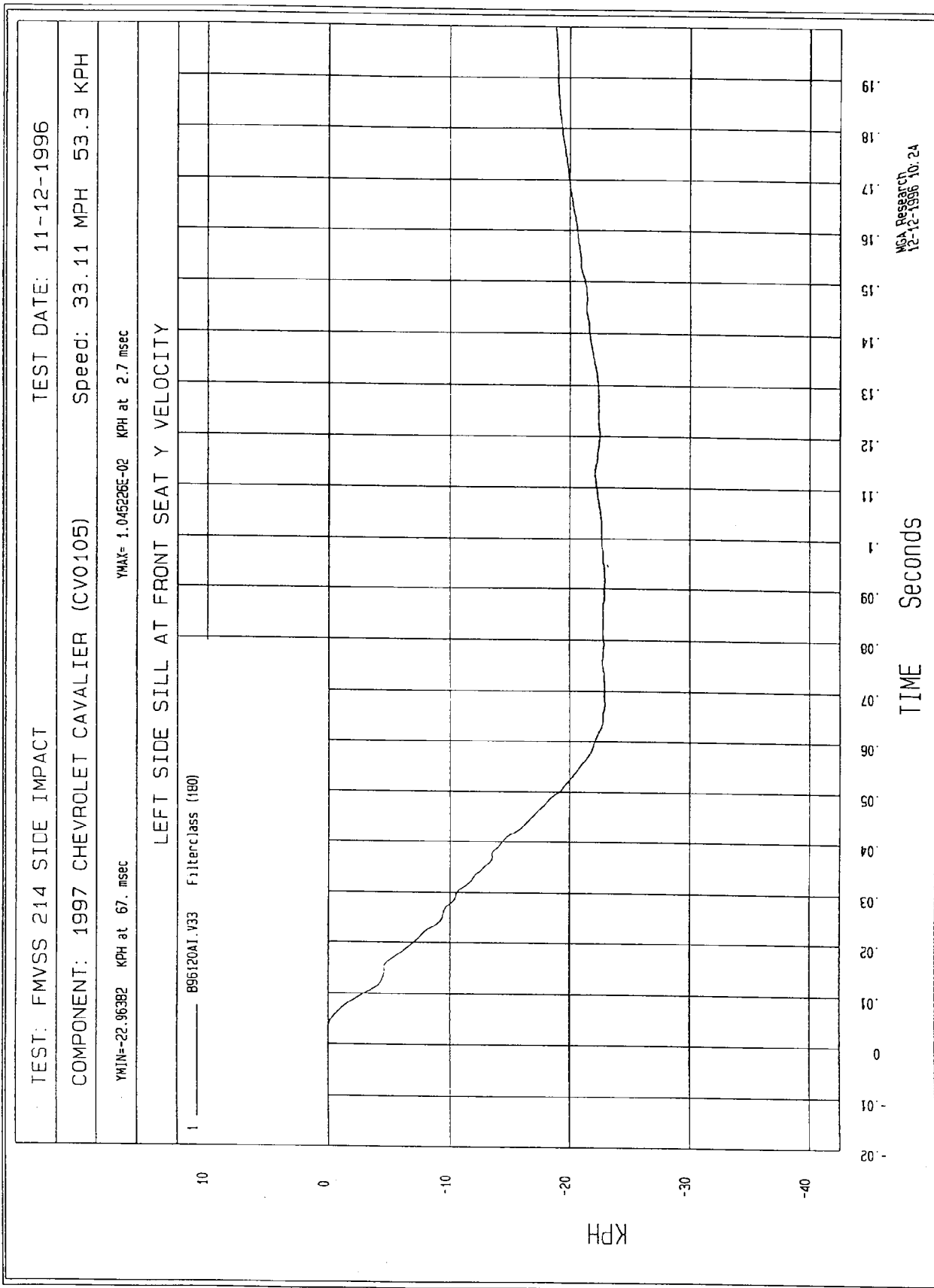
1 ——— 896120AF A33 Filterclass (60)

2
0
-2
4
-6
-8
-10
-12
-14
-16
-18
-20

G.S

TIME (SECONDS)

MCA Research
12-10-1996 10:56

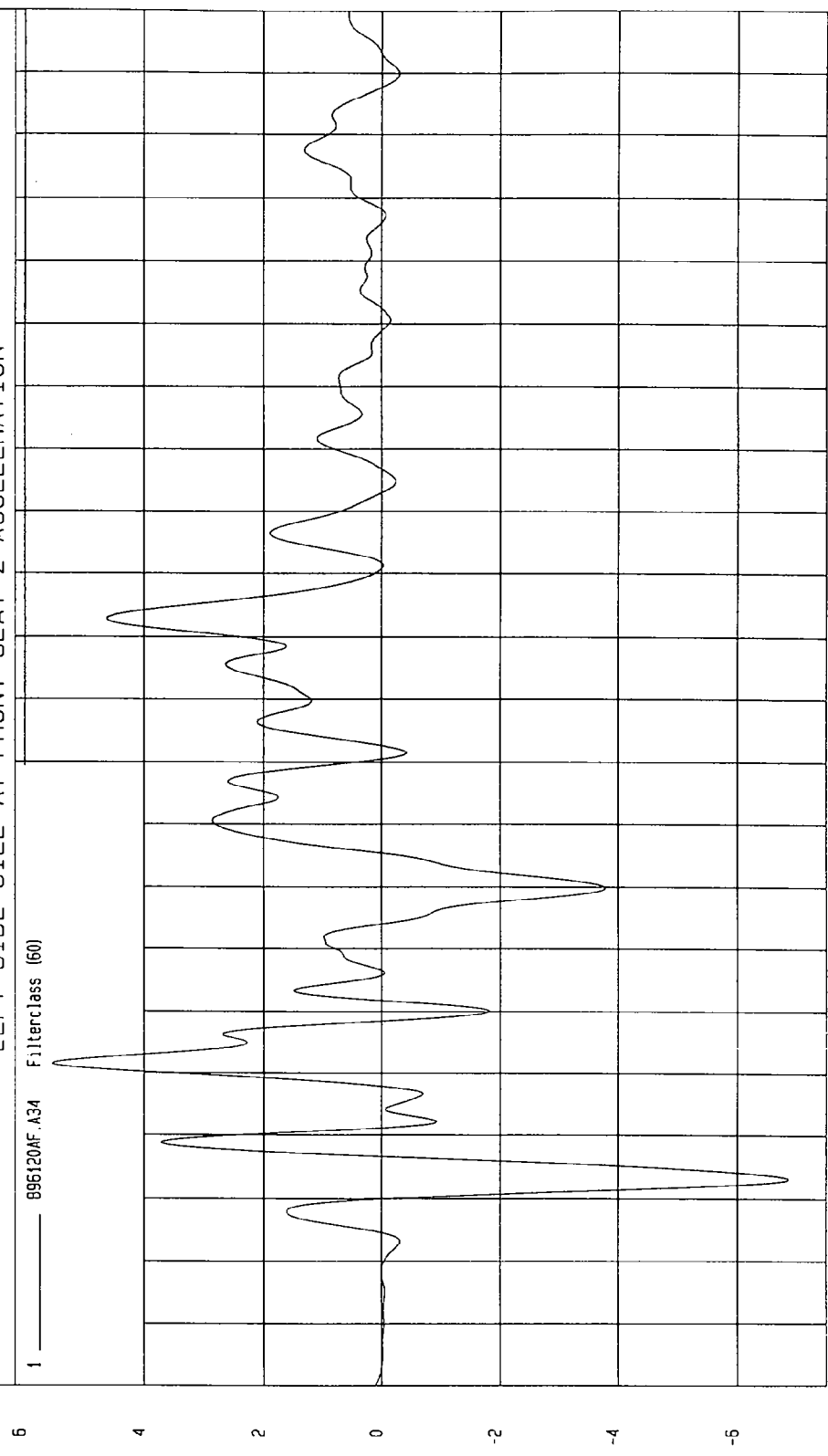


TEST: FMVSS 214 SIDE IMPACT TEST DATE: 11-12-1996

COMPONENT: 1997 CHEVROLET CAVALIER (CV0105) Speed: 33.11 MPH 53.3 KPH

YMIN=-6.845194 G'S at 13. msec YMAX= 5.543339 G'S at 31. msec

LEFT SIDE SILL AT FRONT SEAT Z ACCELERATION

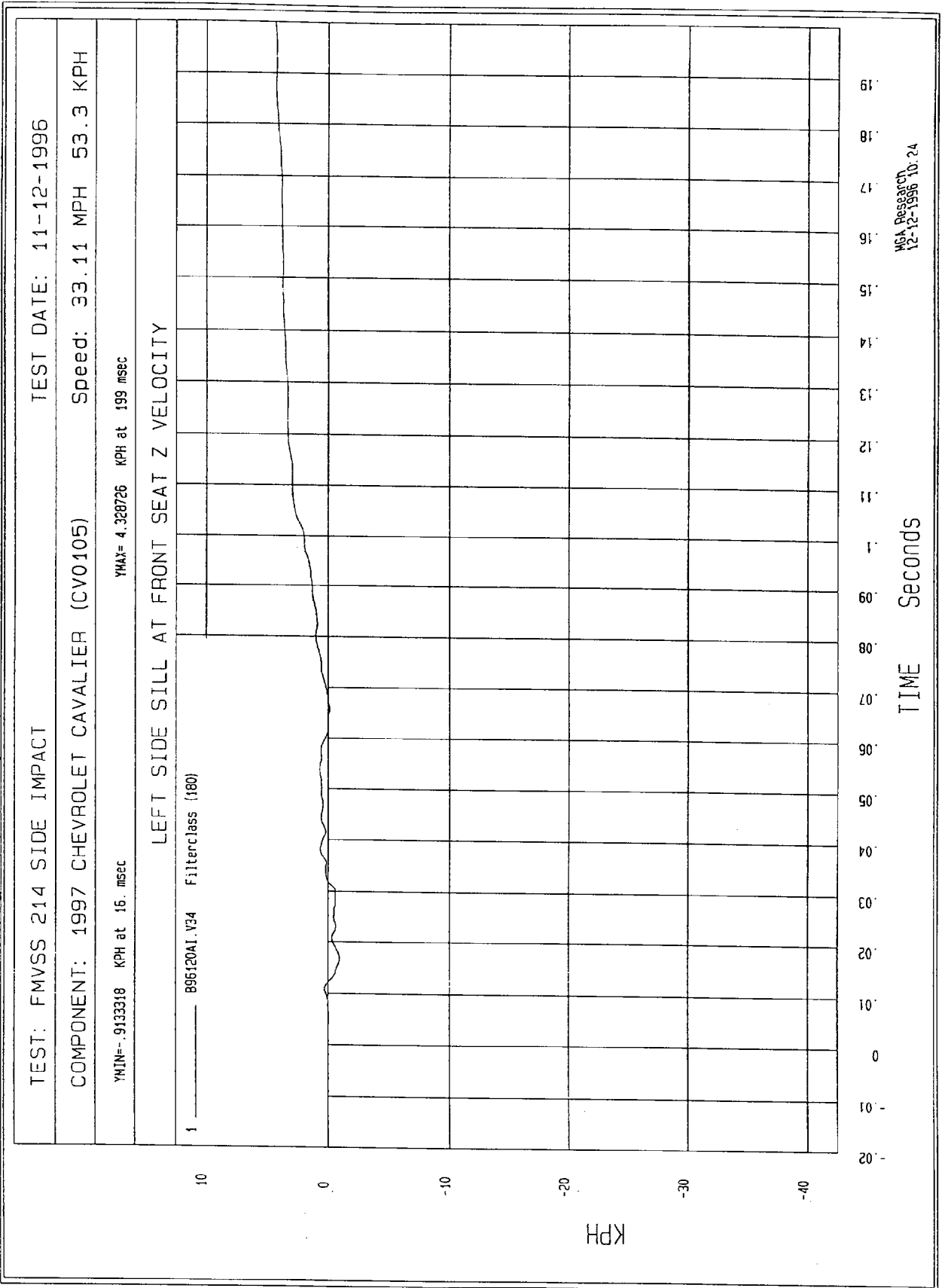


TIME (SECONDS)

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

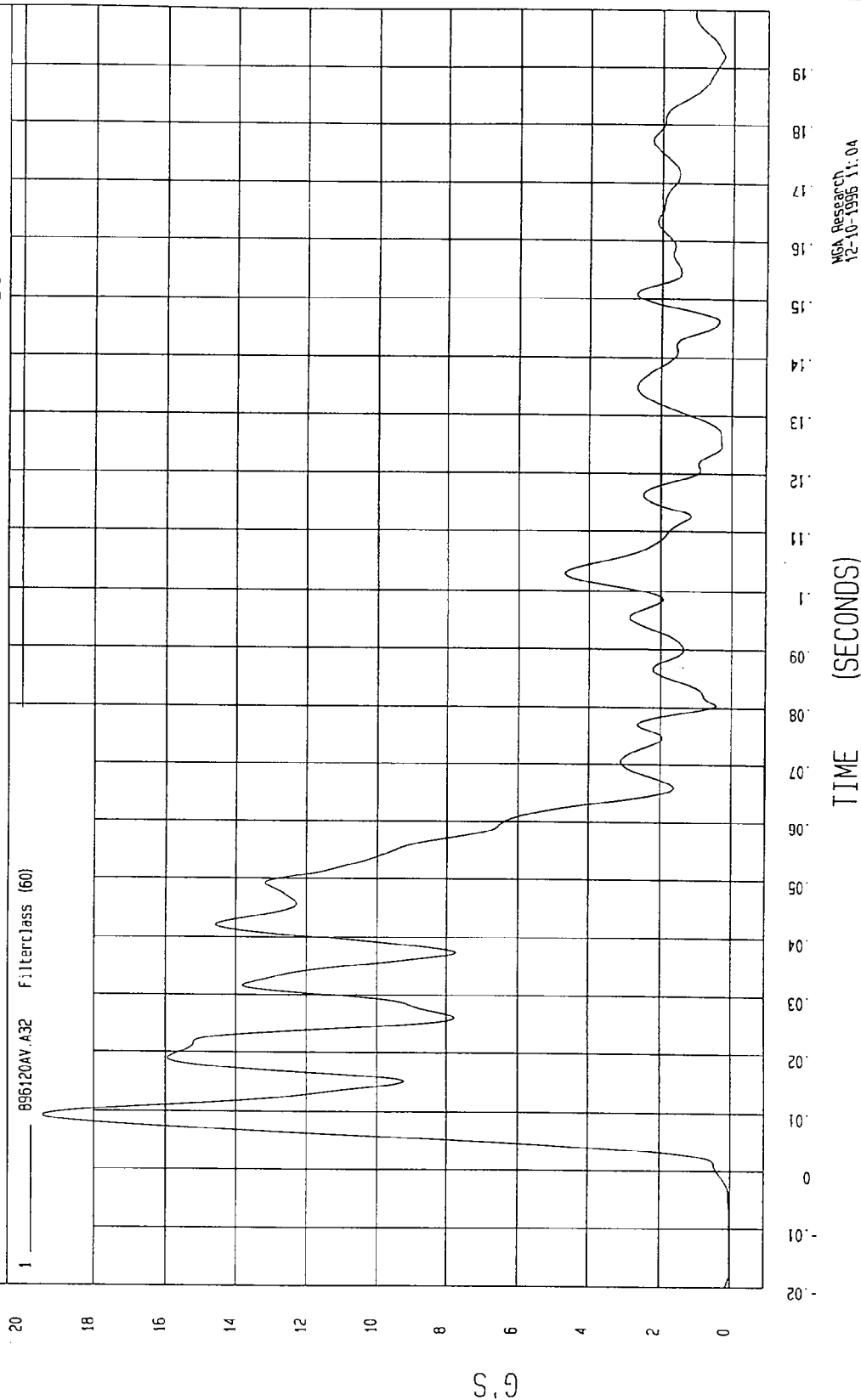
0.19
0.18
0.17
0.16
0.15
0.14
0.13
0.12
0.11
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02

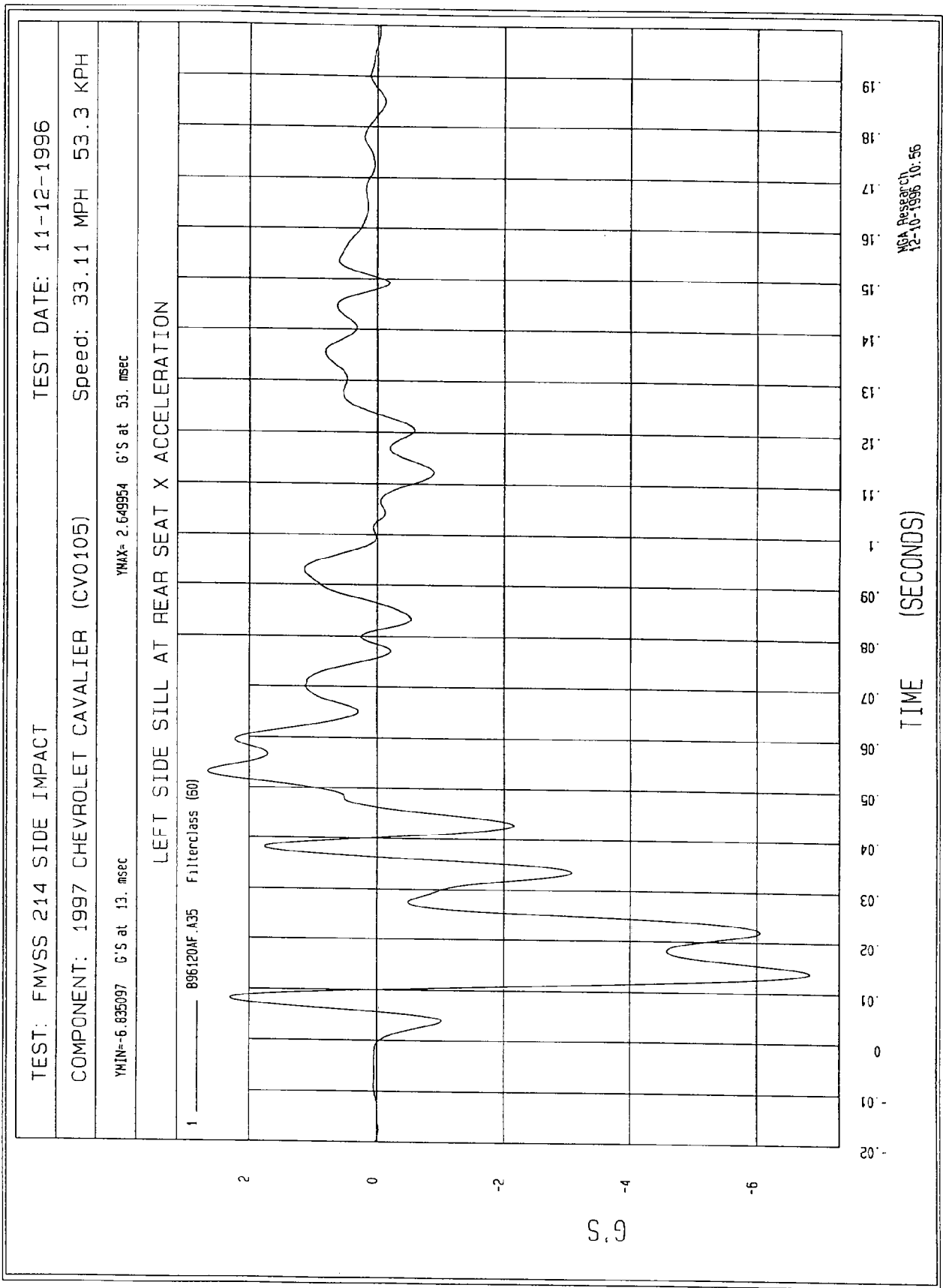
NGA Research
12-10-1996 10:56

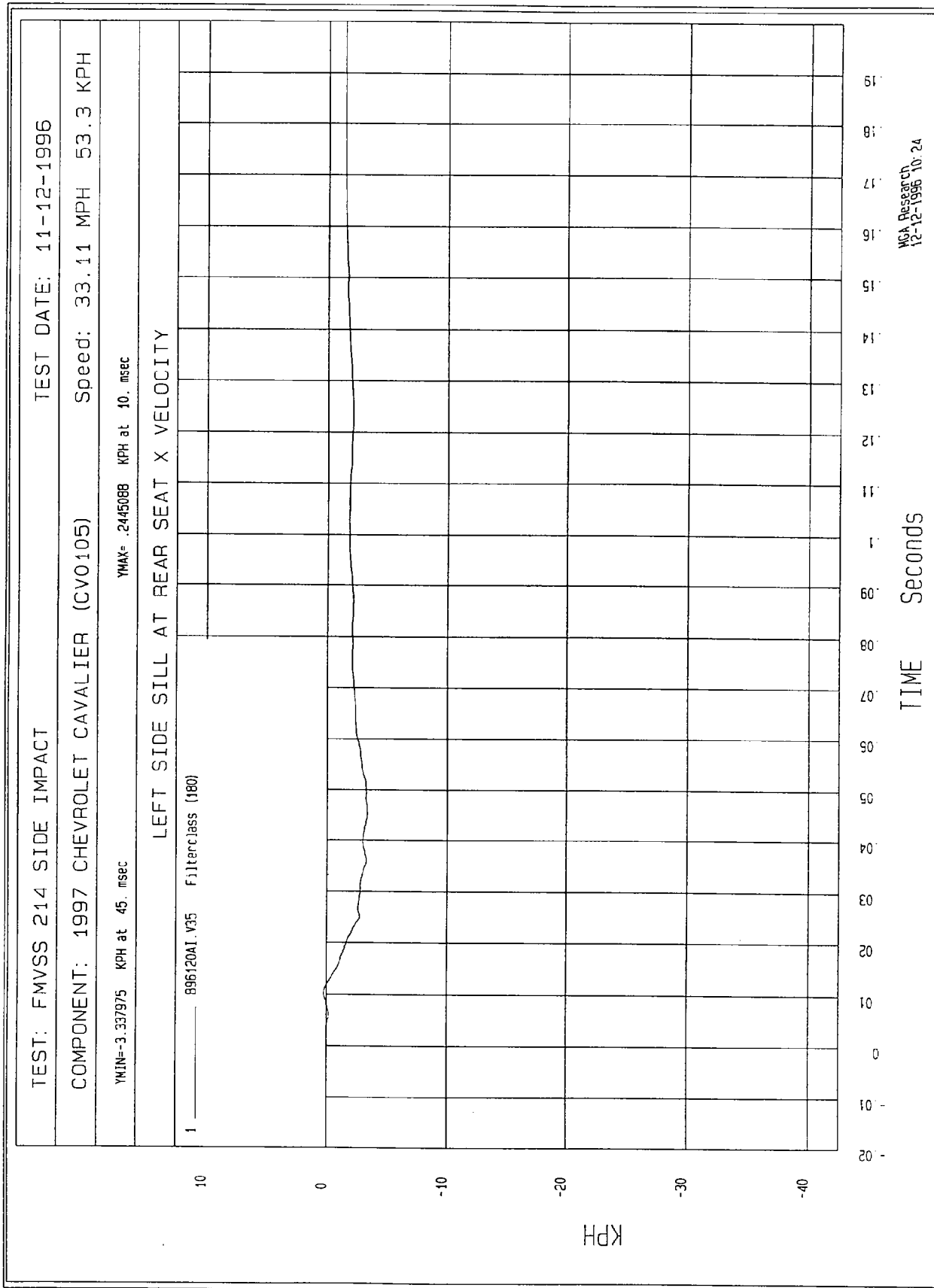


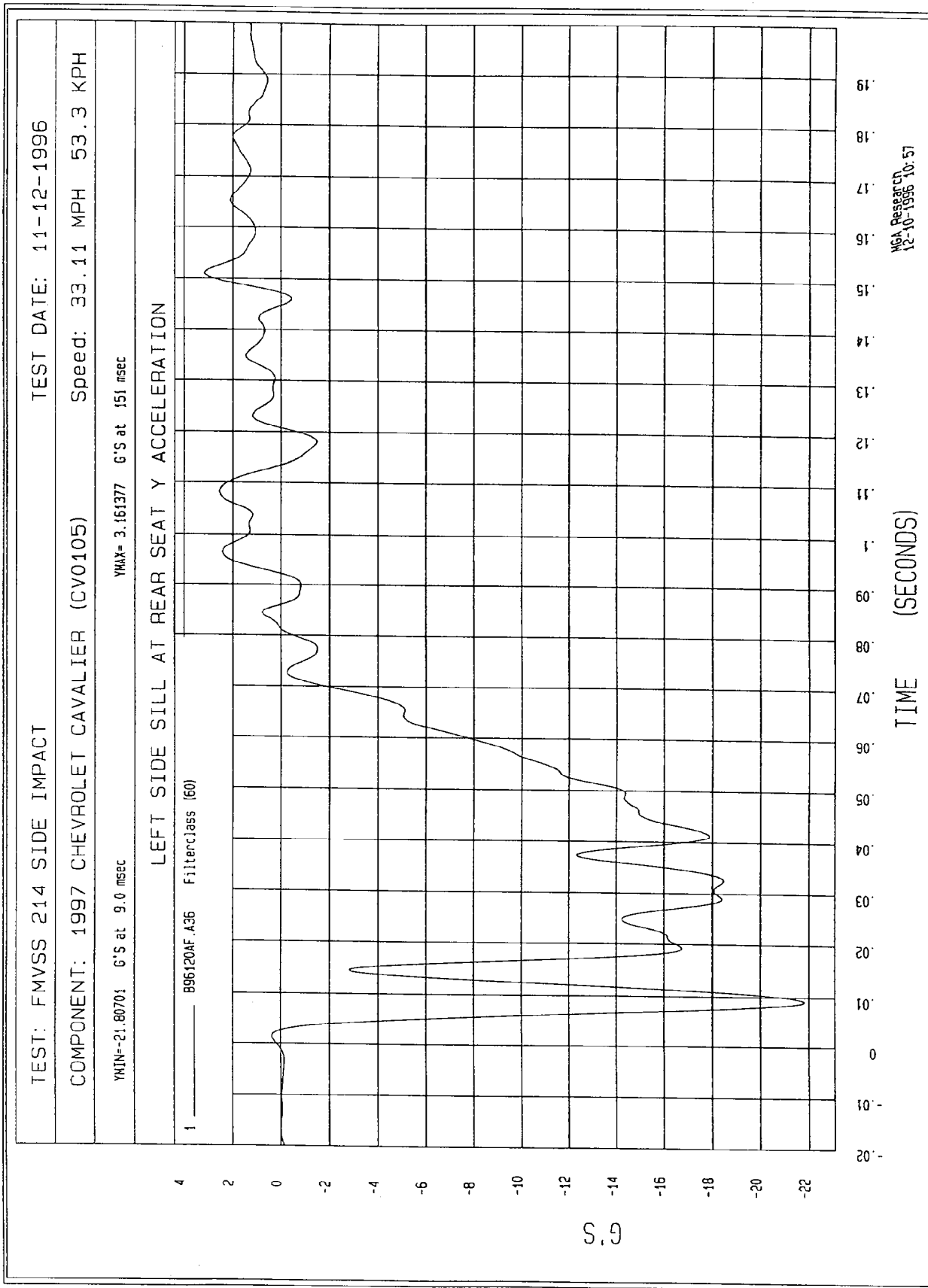
TEST: FMVSS 214 SIDE IMPACT TEST DATE: 11-12-1996
COMPONENT: 1997 CHEVROLET CAVALIER (CV0105) Speed: 33.11 MPH 53.3 KPH
YMIN= 1.524237E-02 G'S at -17. msec YMAX= 19.43484 G'S at 9.1 msec

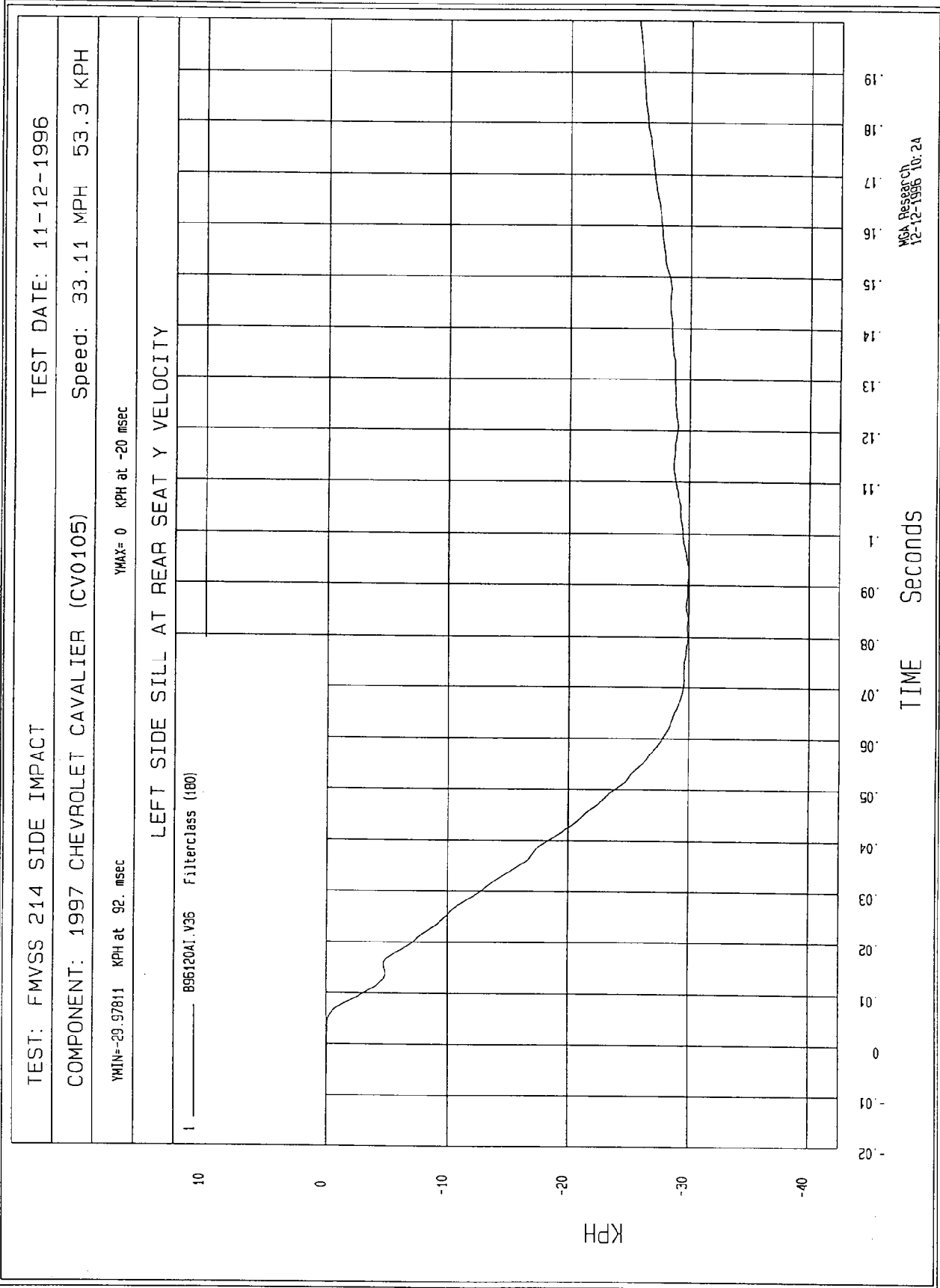
LEFT SIDE SILL AT FRONT SEAT RESULTANT ACCELERATION

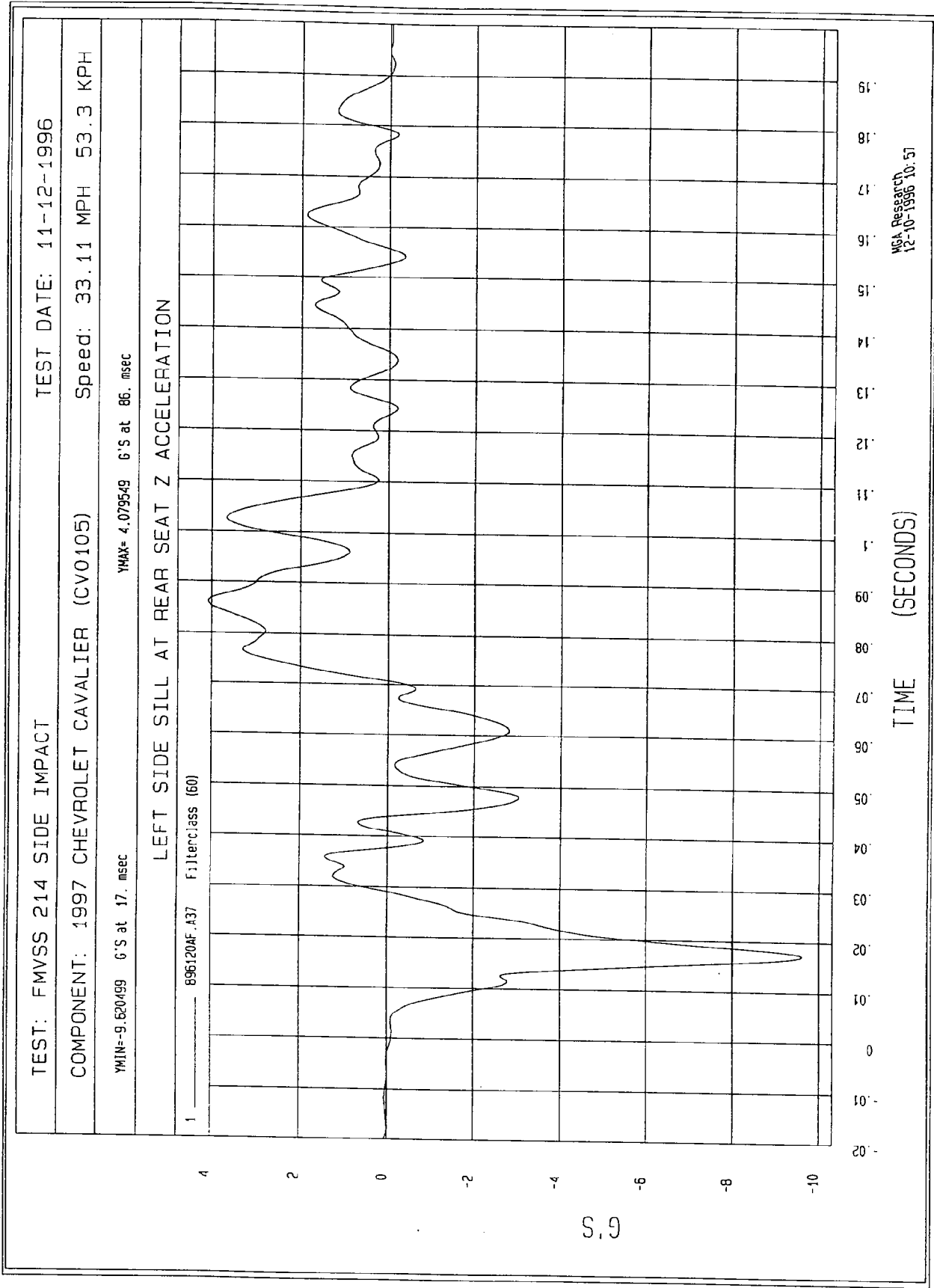












TEST: FMVSS 214 SIDE IMPACT

TEST DATE: 11-12-1996

COMPONENT: 1997 CHEVROLET CAVALIER (CV0105)

Speed: 33.11 MPH 53.3 KPH

YMIN=-4.135466 KPH at 70. msec

YMAX= 1.218155 KPH at 189 msec

LEFT SIDE SILL AT REAR SEAT Z VELOCITY

1 ——— B96120A1.V37 Filterclass (180)

10

0

-10

-20

-30

-40

KPH

- 02

- 01

0

01

02

03

04

05

06

07

08

09

1

11

12

13

14

15

16

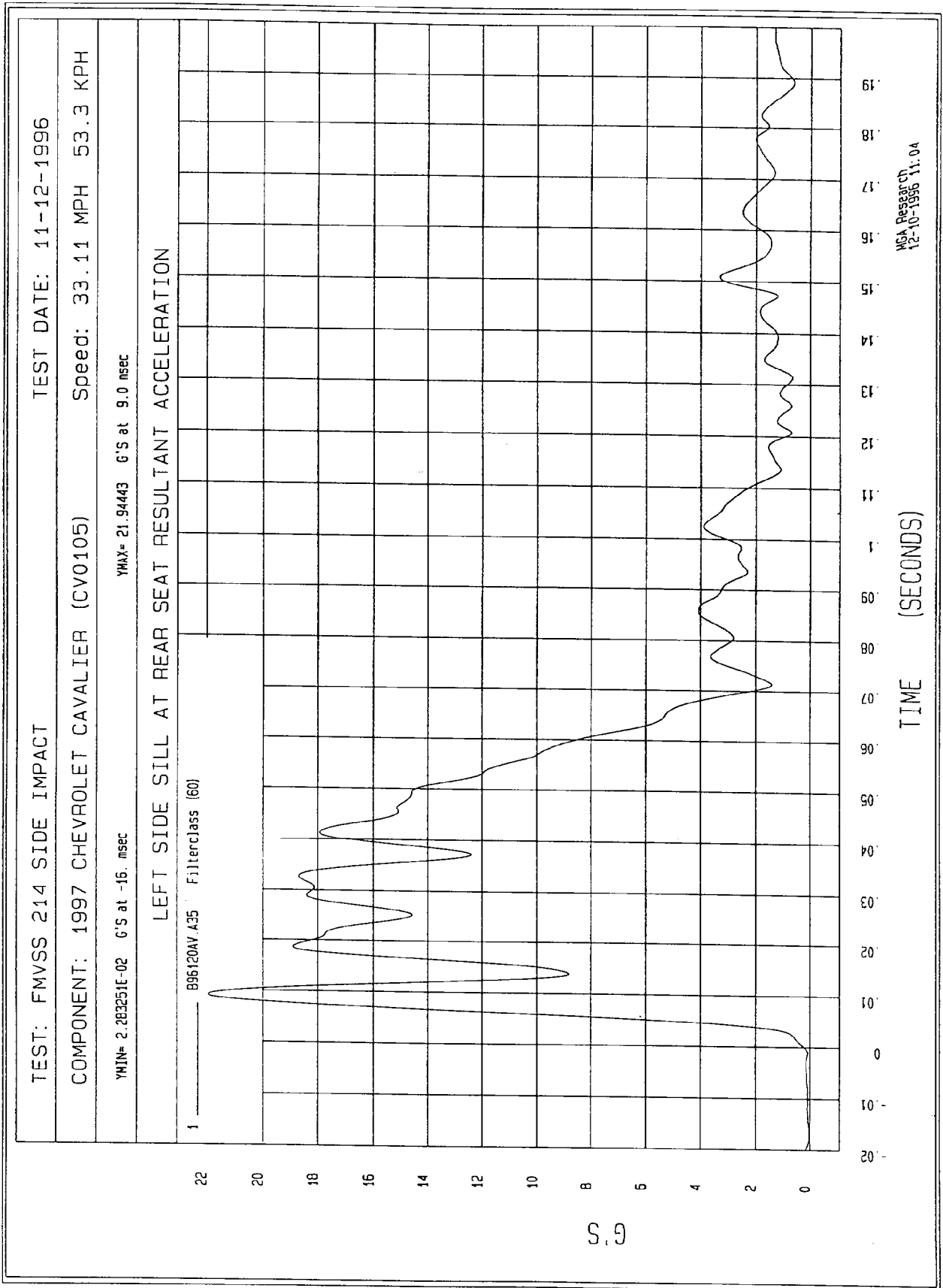
17

18

19

TIME Seconds

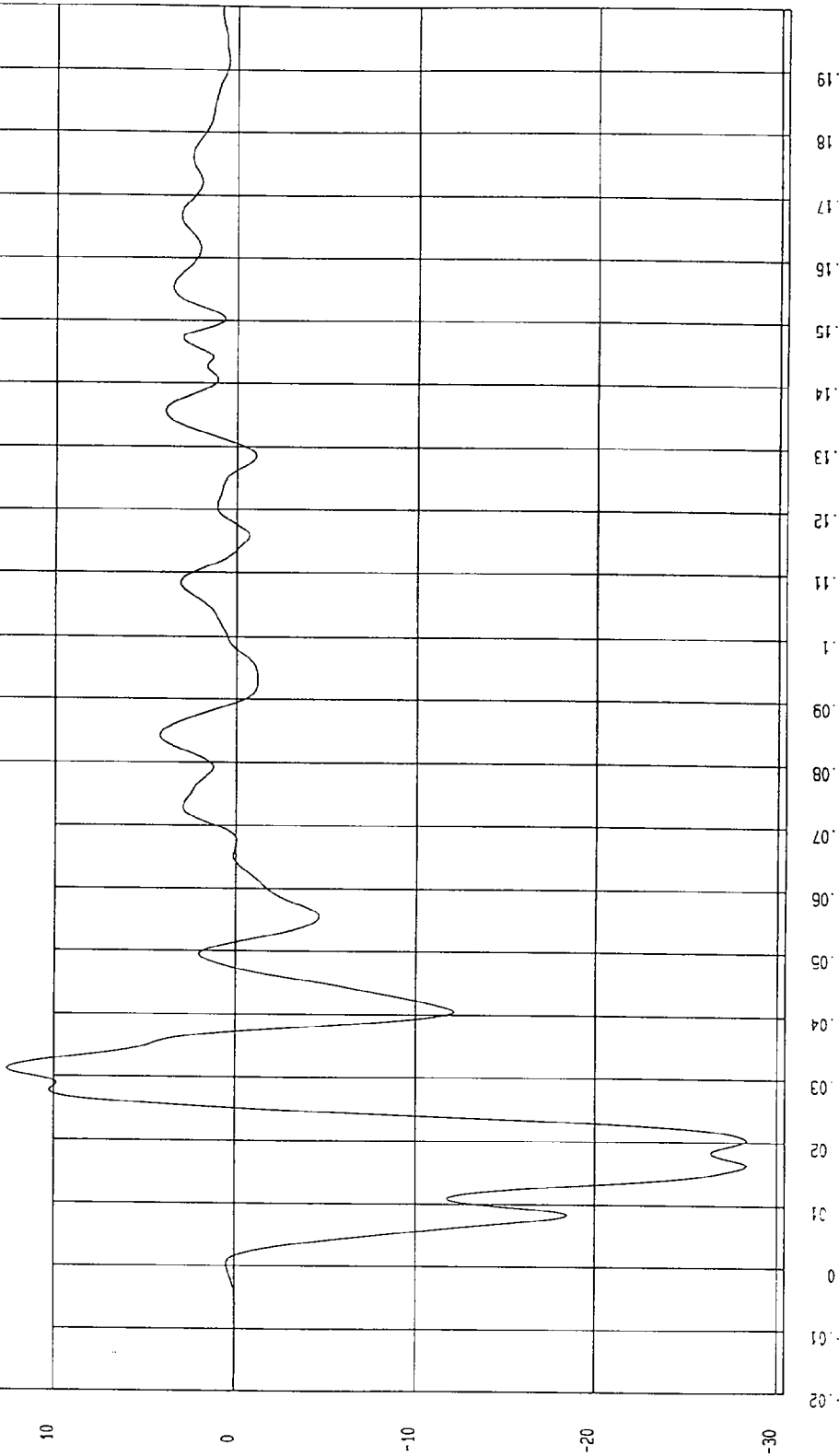
WGA Research
12-12-1996 10:25



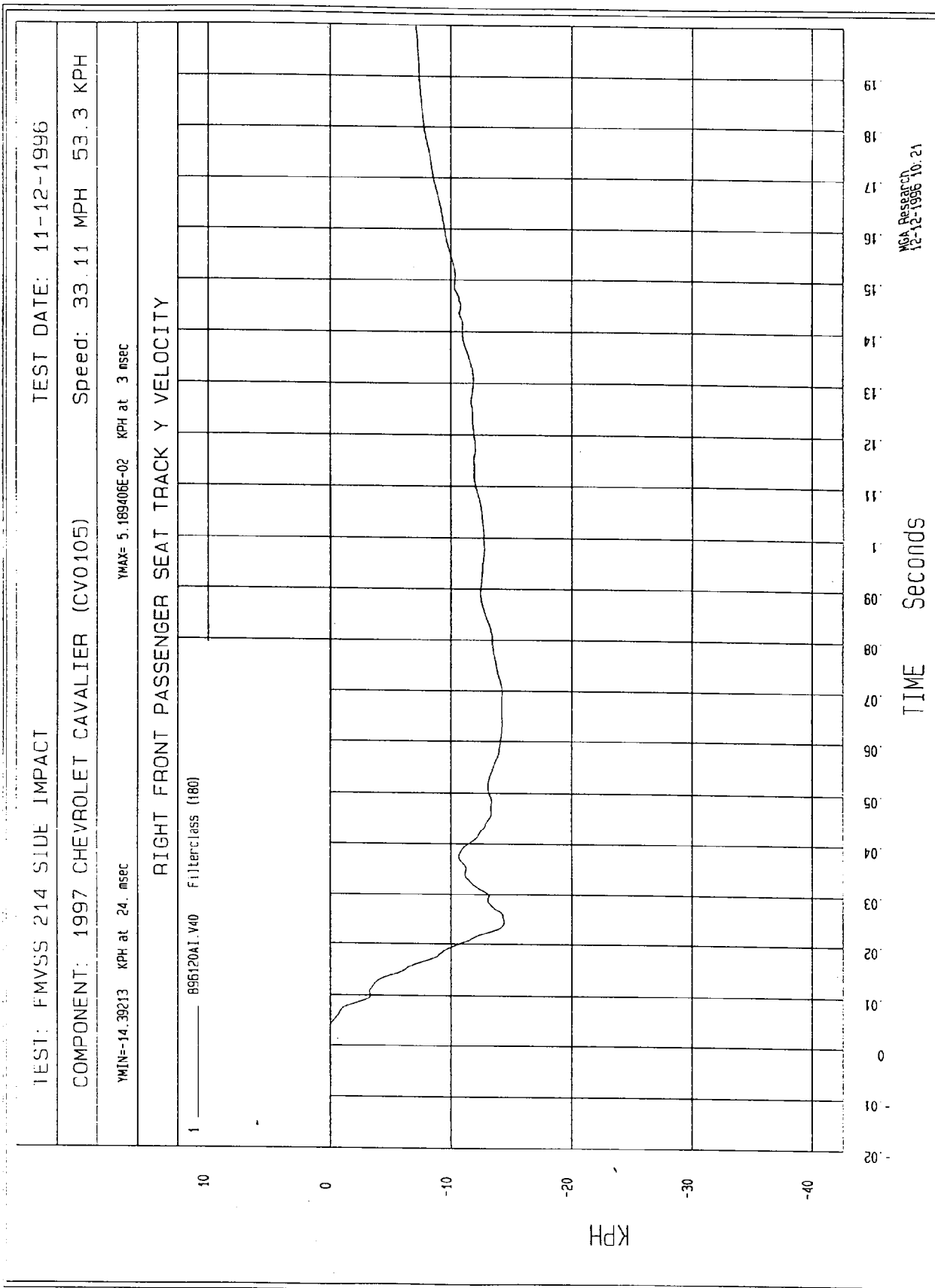
TEST: FMVSS 214 SIDE IMPACT TEST DATE: 11-12-1996
COMPONENT: 1997 CHEVROLET CAVALIER (CV0105) Speed: 33.11 MPH 53.3 KPH
YMIN=-28.36662 G'S at 20. msec YMAX= 12.62807 G'S at 31. msec

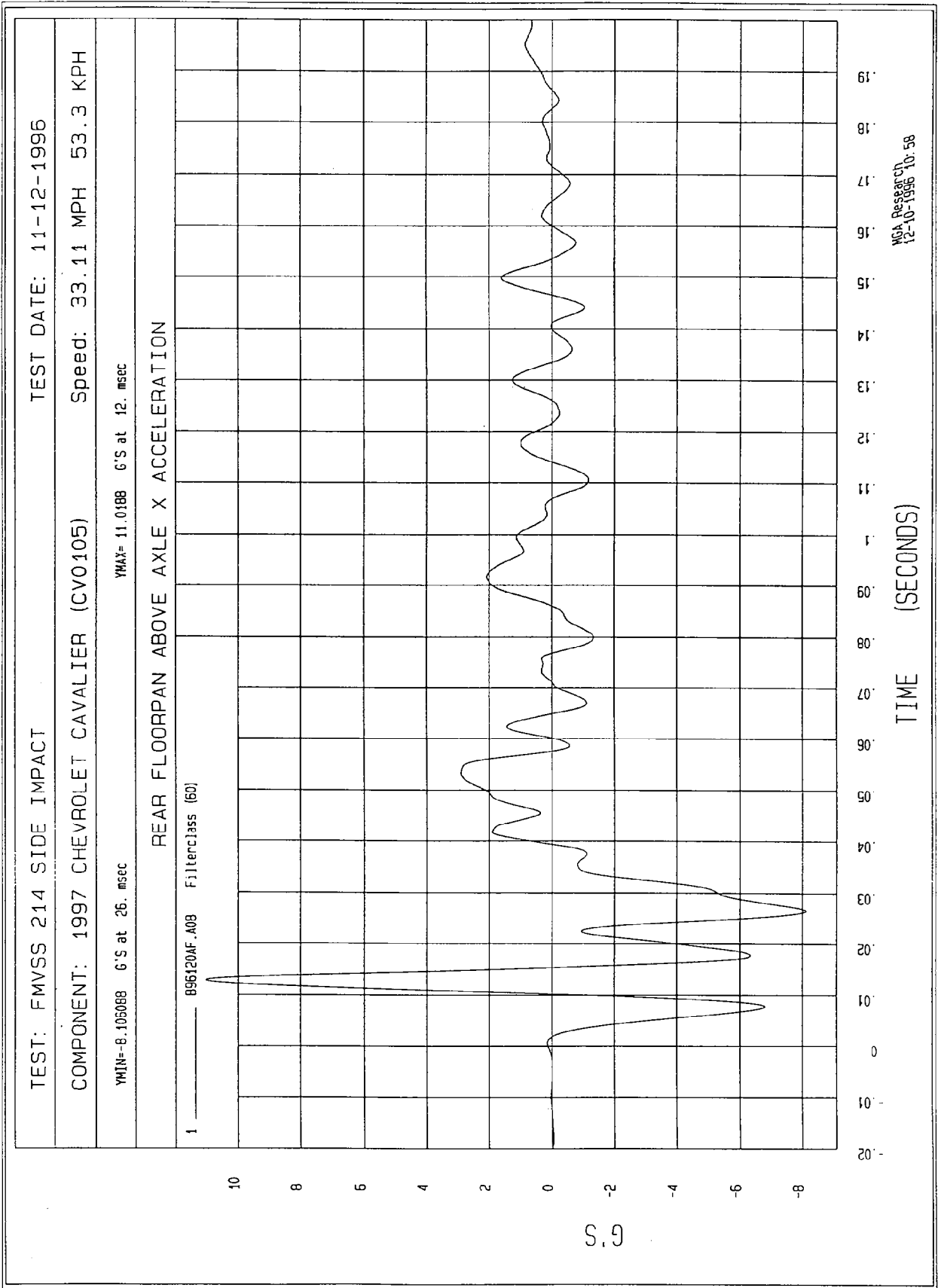
RIGHT FRONT PASSENGER SEAT TRACK Y ACCELERATION

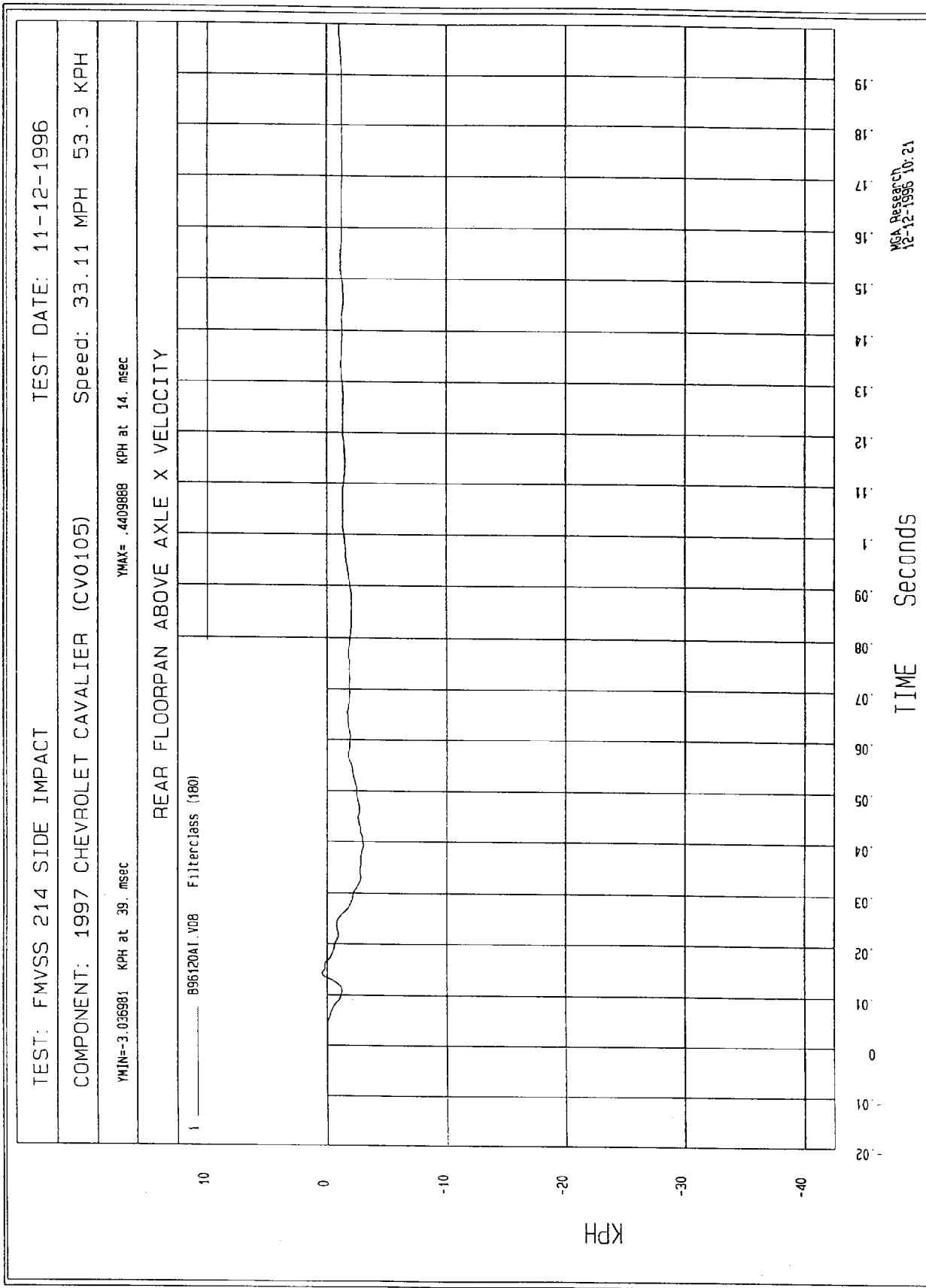
1 ——— B961204F.A40 Filterclass (60)



MOA Research
12-10-1996 10:58





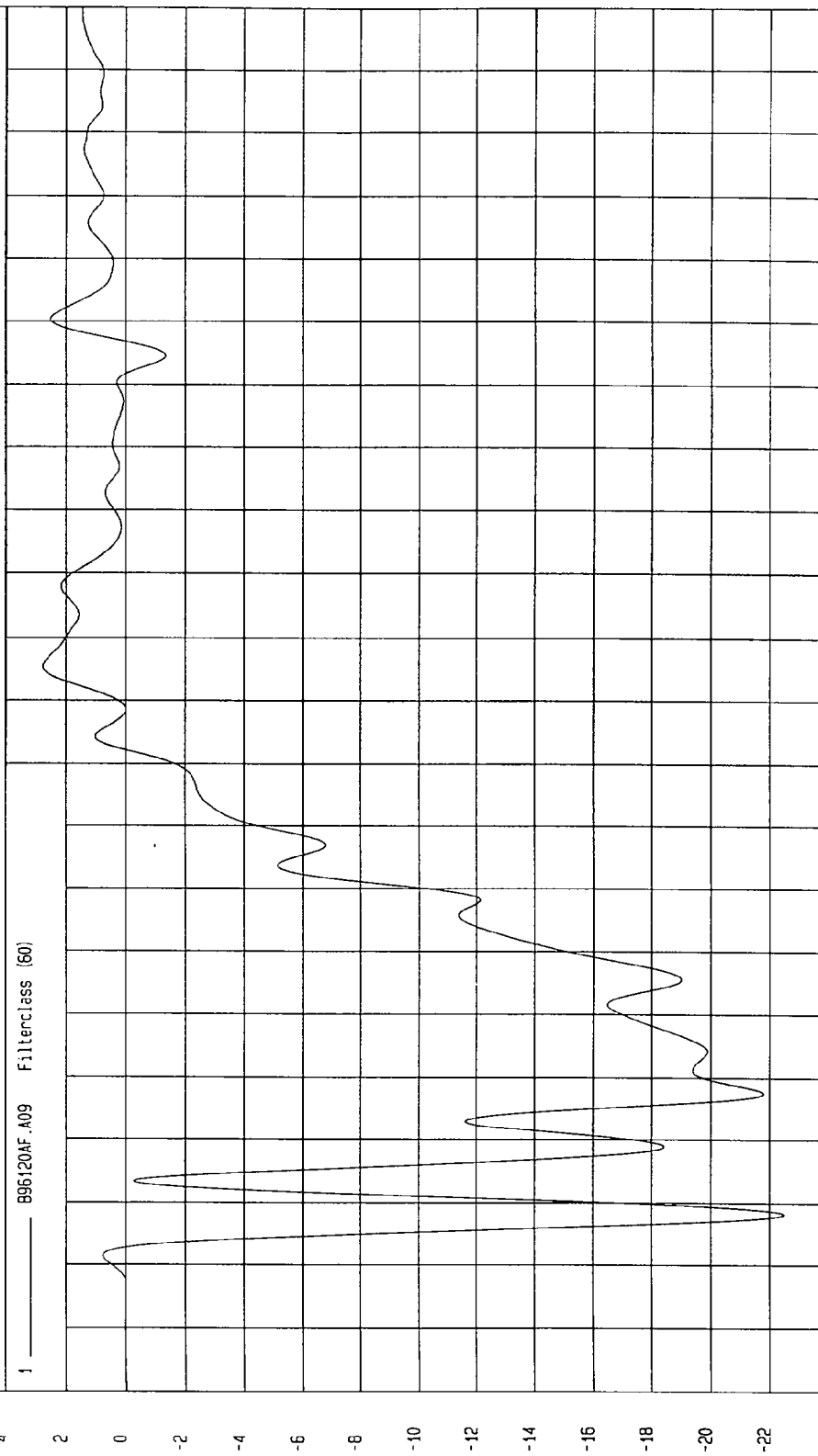


TEST: FMVSS 214 SIDE IMPACT TEST DATE: 11-12-1996

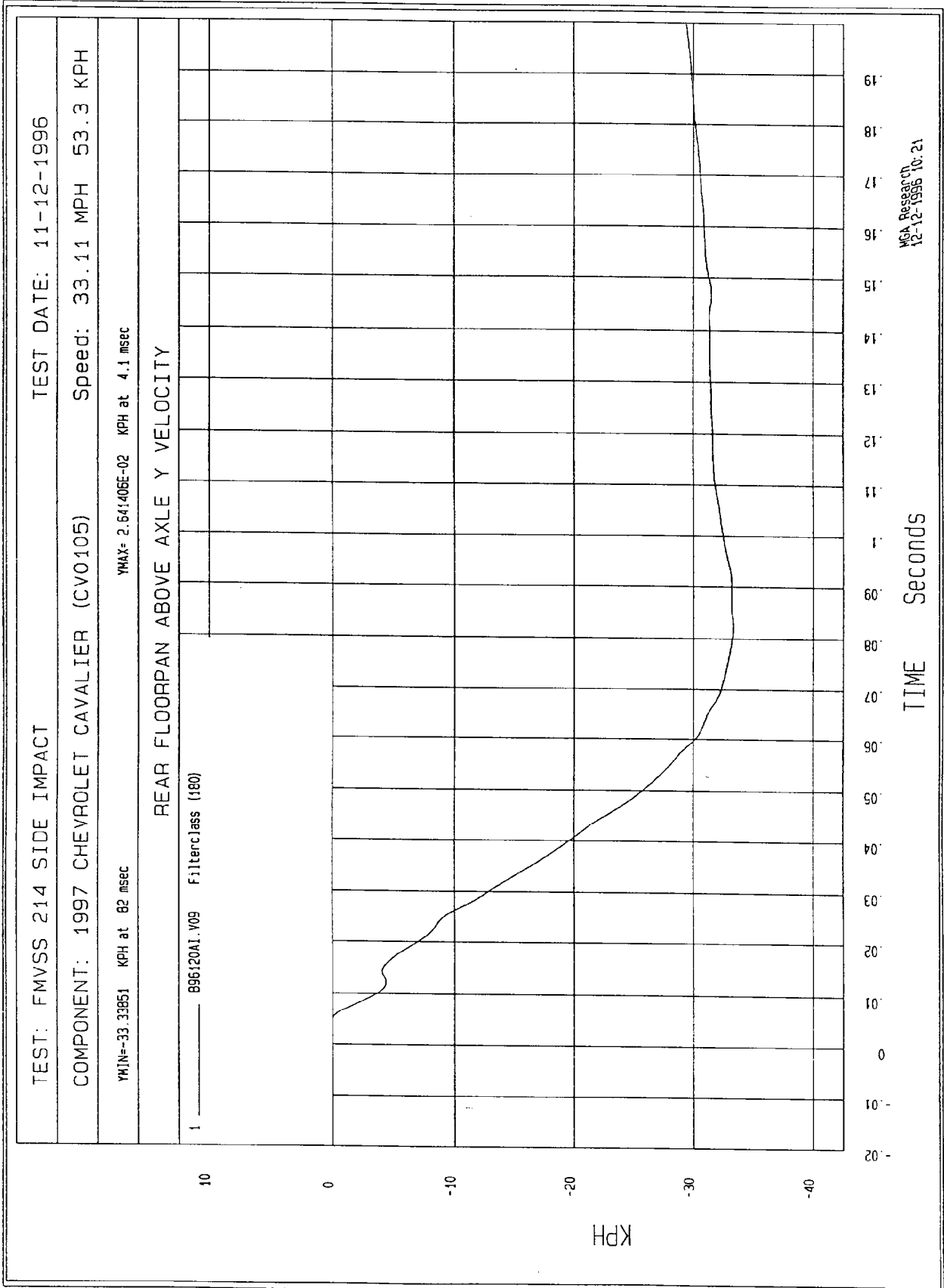
COMPONENT: 1997 CHEVROLET CAVALIER (CV0105) Speed: 33.11 MPH 53.3 KPH

YMIN=-22.51975 G'S at 8.1 msec YMAX= 2.761832 G'S at 95. msec

REAR FLOORPAN ABOVE AXLE Y ACCELERATION



MGA Research
12-10-1996 10:59

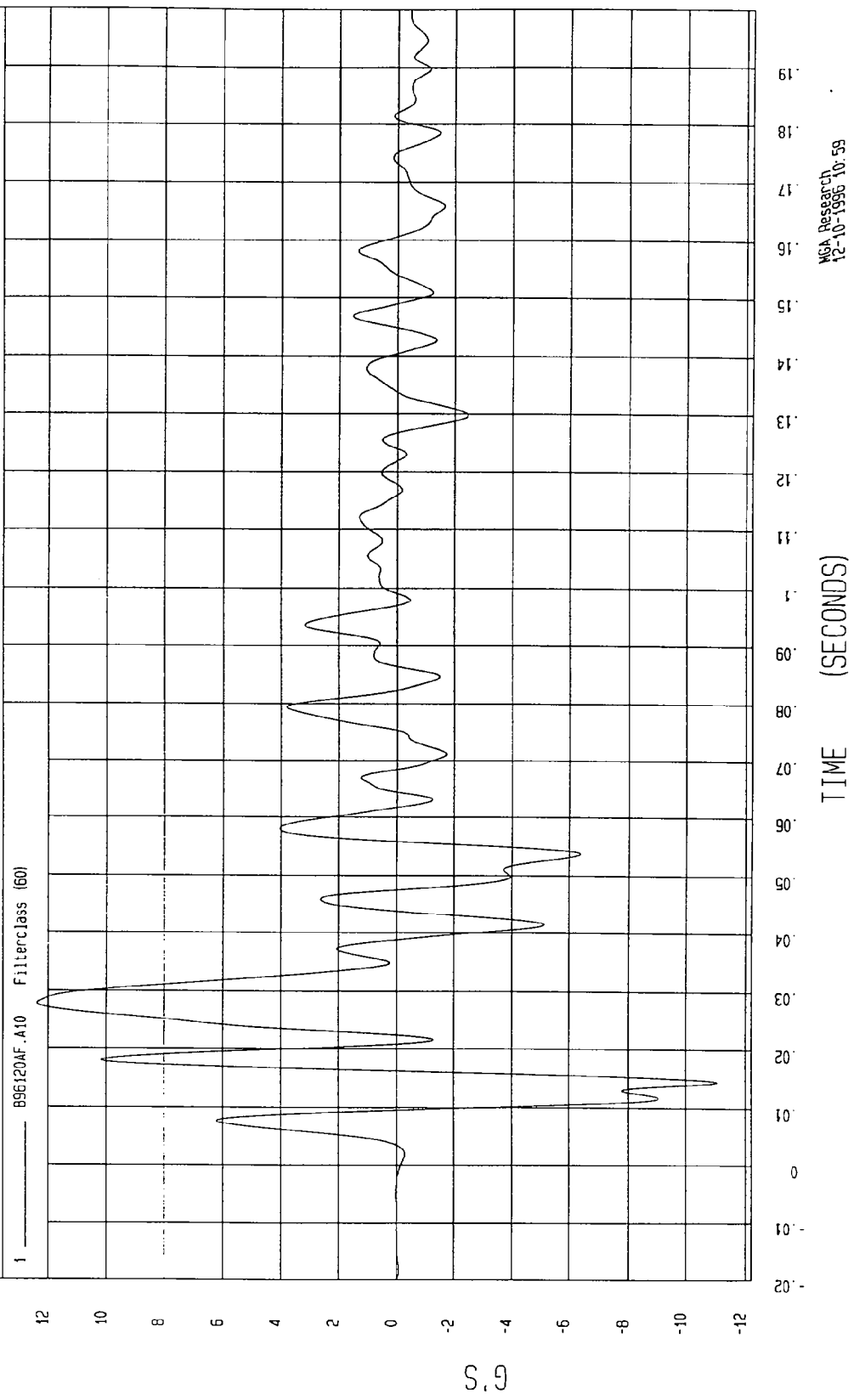


TEST: FMVSS 214 SIDE IMPACT TEST DATE: 11-12-1996

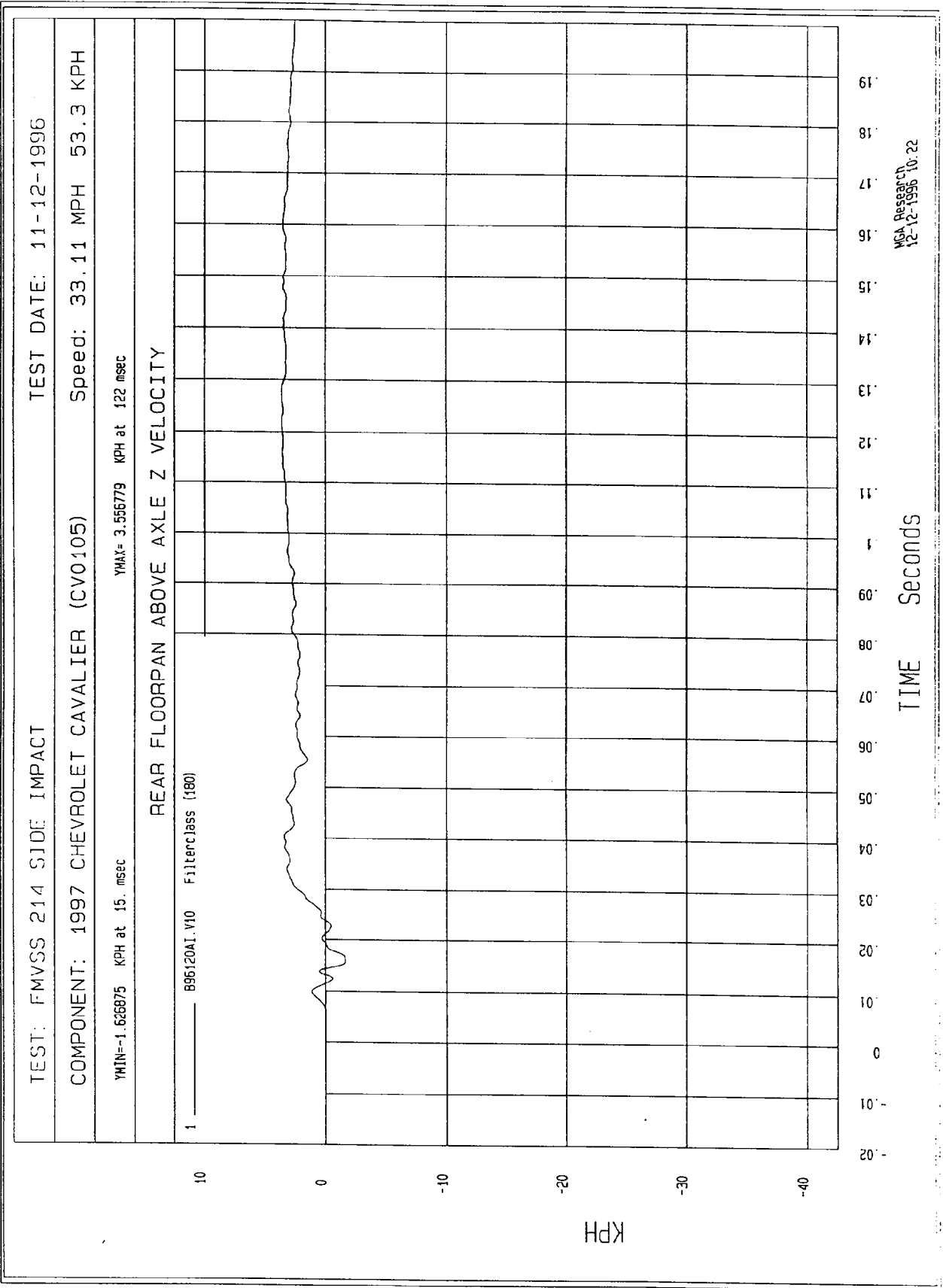
COMPONENT: 1997 CHEVROLET CAVALIER (CV0105) Speed: 33.11 MPH 53.3 KPH

YMIN=-11.03874 G'S at 14. msec YMAX= 12.37847 G'S at 27. msec

REAR FLOORPAN ABOVE AXLE Z ACCELERATION



WCA Research
12-10-1996 10:59

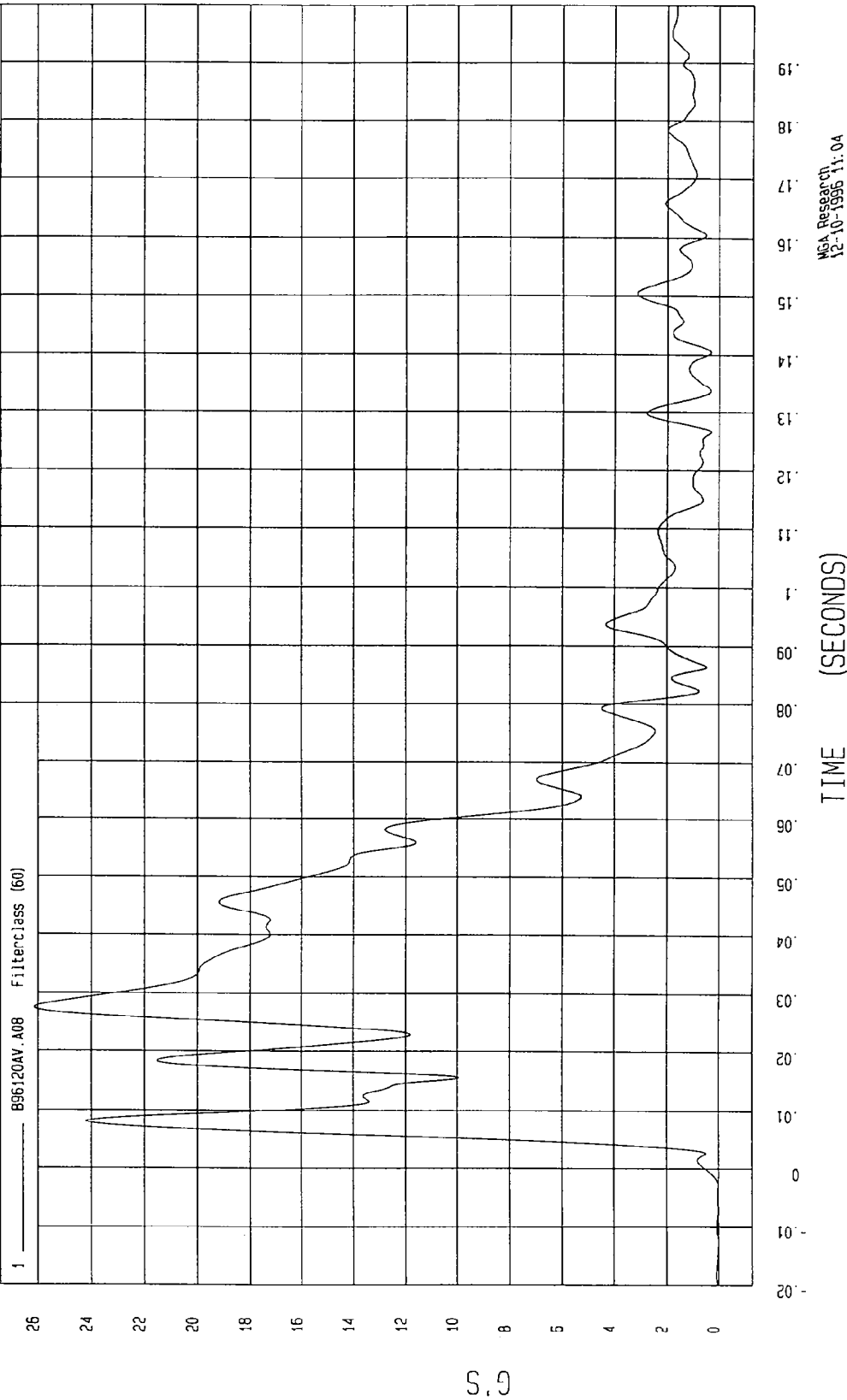


TEST: FMVSS 214 SIDE IMPACT TEST DATE: 11-12-1996

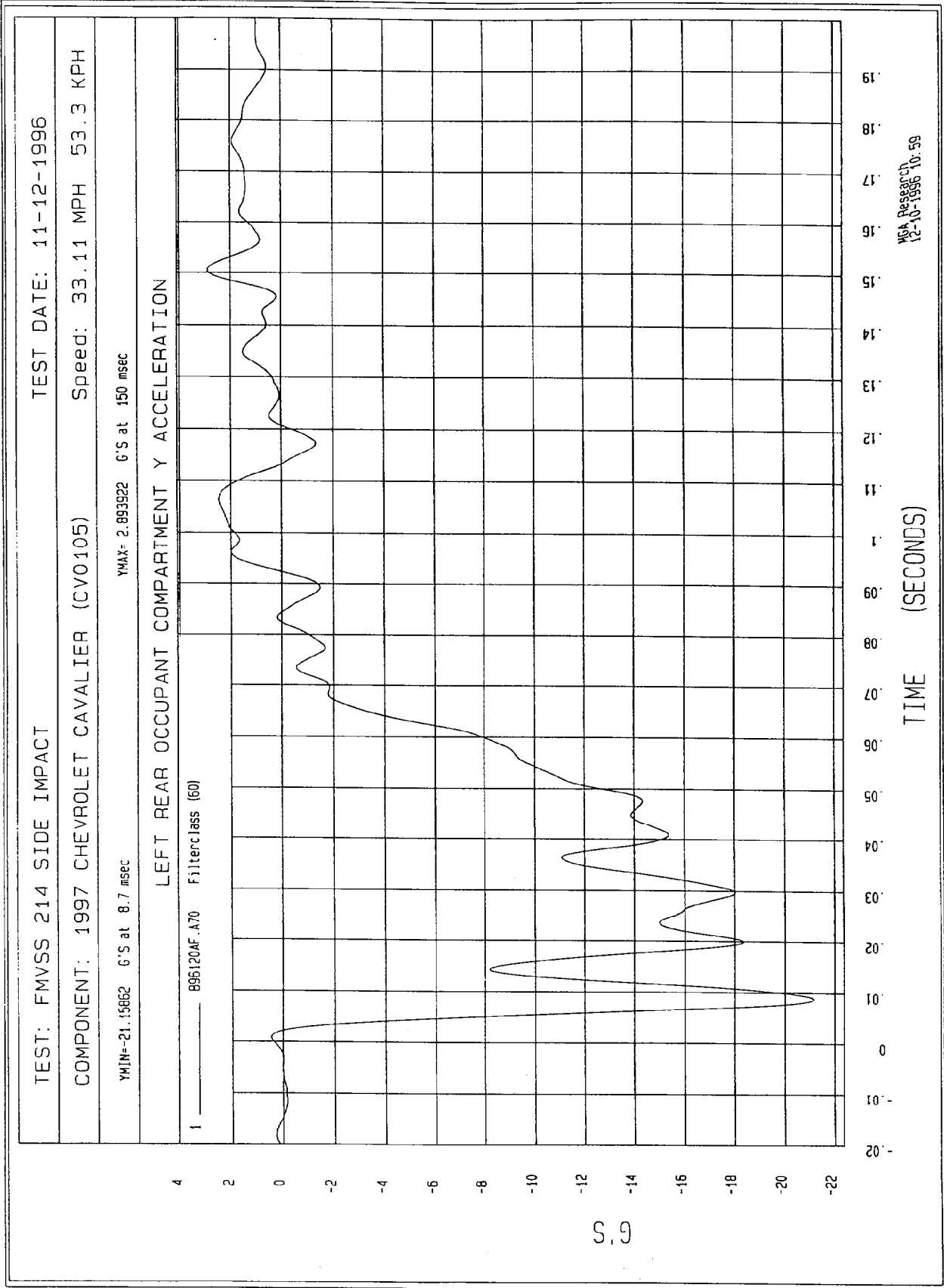
COMPONENT: 1997 CHEVROLET CAVALIER (CV0105) Speed: 33.11 MPH 53.3 KPH

YMIN= 1.104719E-02 G'S at -2.7 msec YMAX= 26.12593 G'S at 27. msec

REAR FLOORPAN ABOVE AXLE RESULTANT ACCELERATION



NCA Research
12-10-1996 11:04

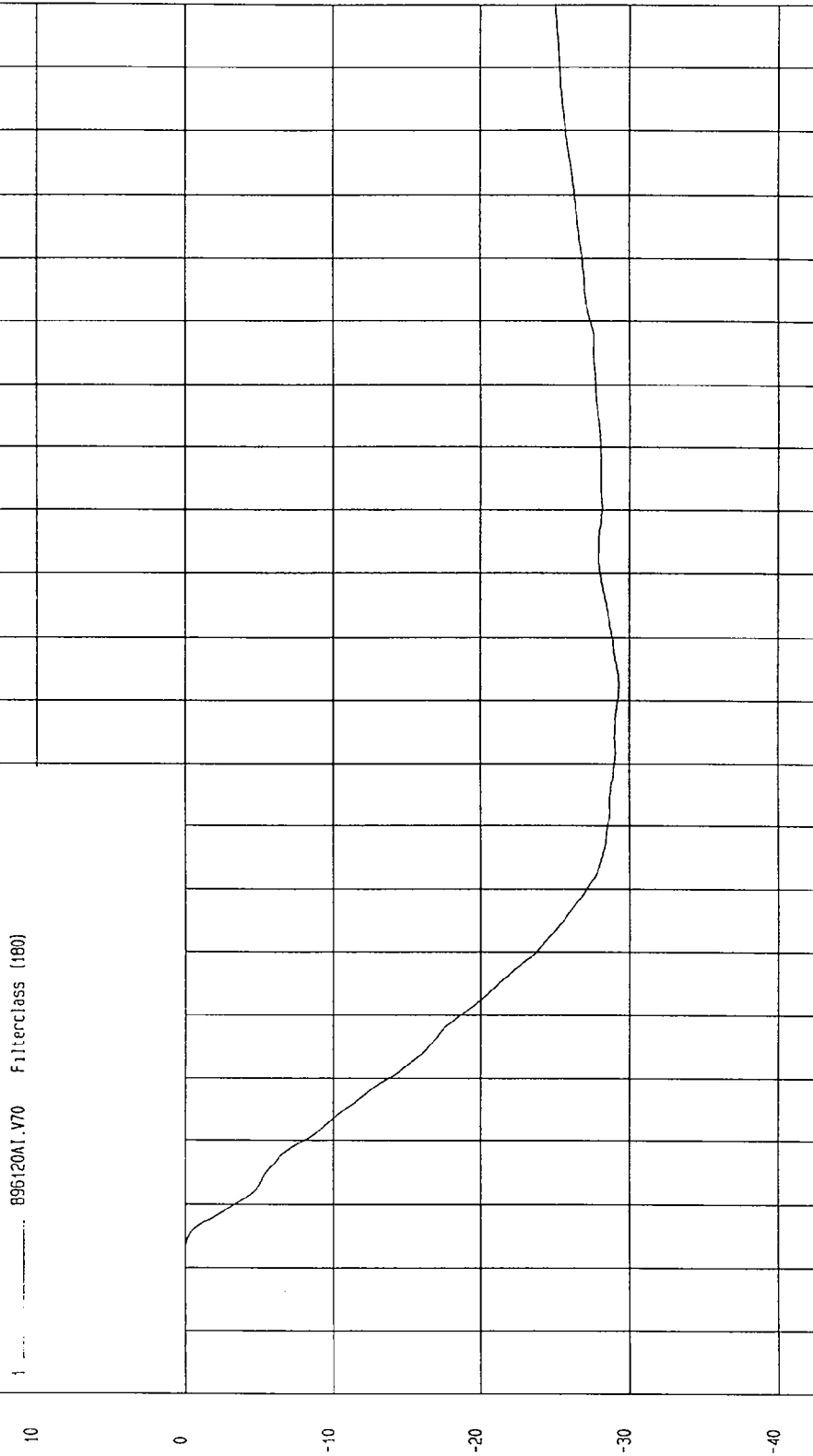


TEST: FMVSS 214 SIDE IMPACT TEST DATE: 11-12-1996
COMPONENT: 1997 CHEVROLET CAVALIER (CV0105) Speed: 33.11 MPH 53.3 KPH

YMIN=-29.31869 KPH at 92. msec YMAX= 4.912284E-02 KPH at -15. msec

LEFT REAR OCCUPANT COMPARTMENT Y VELOCITY

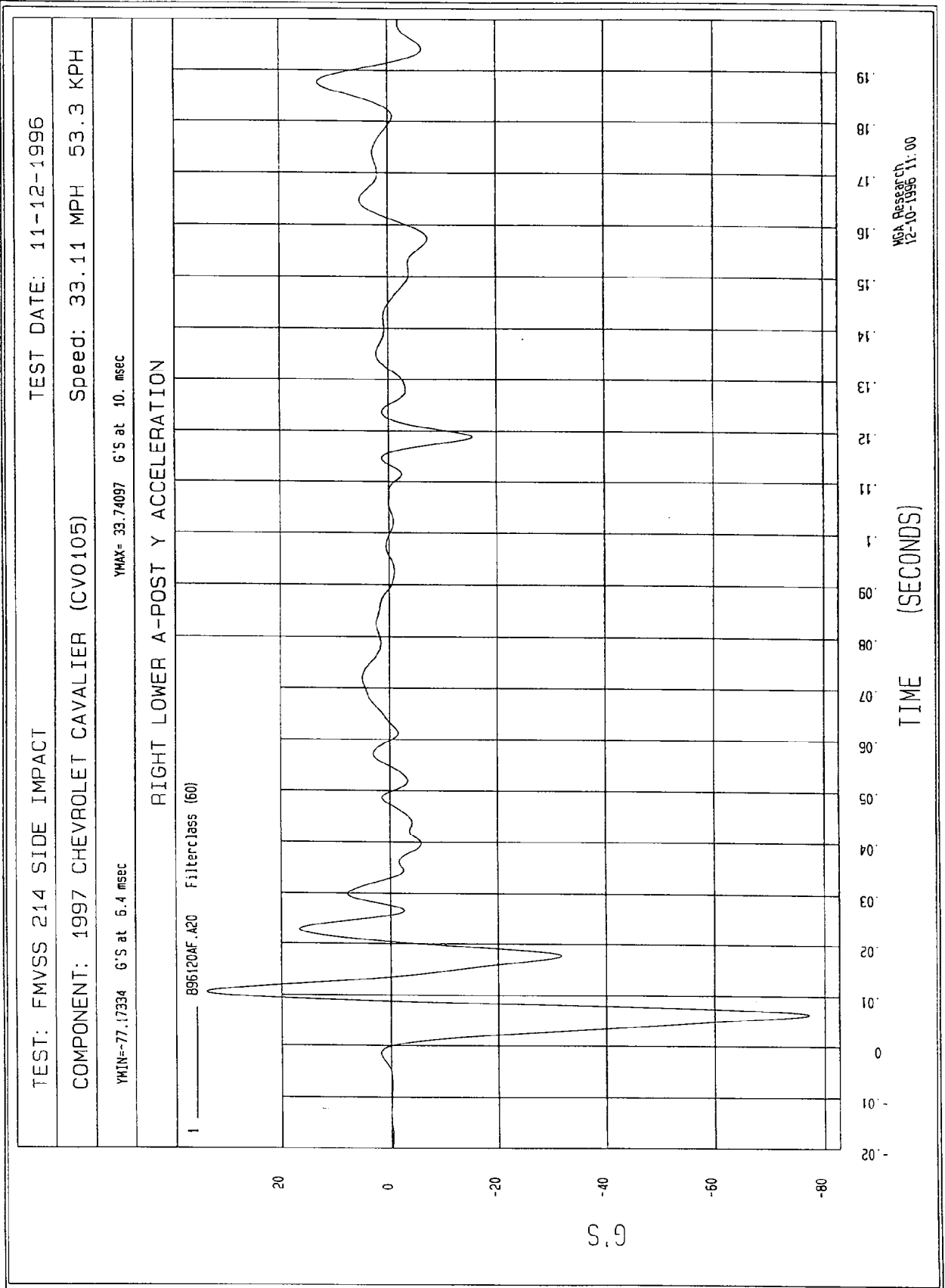
1 895120A1.V70 Filterclass (180)



MCA Research
12-12-1996 10:21

TIME Seconds

KPH

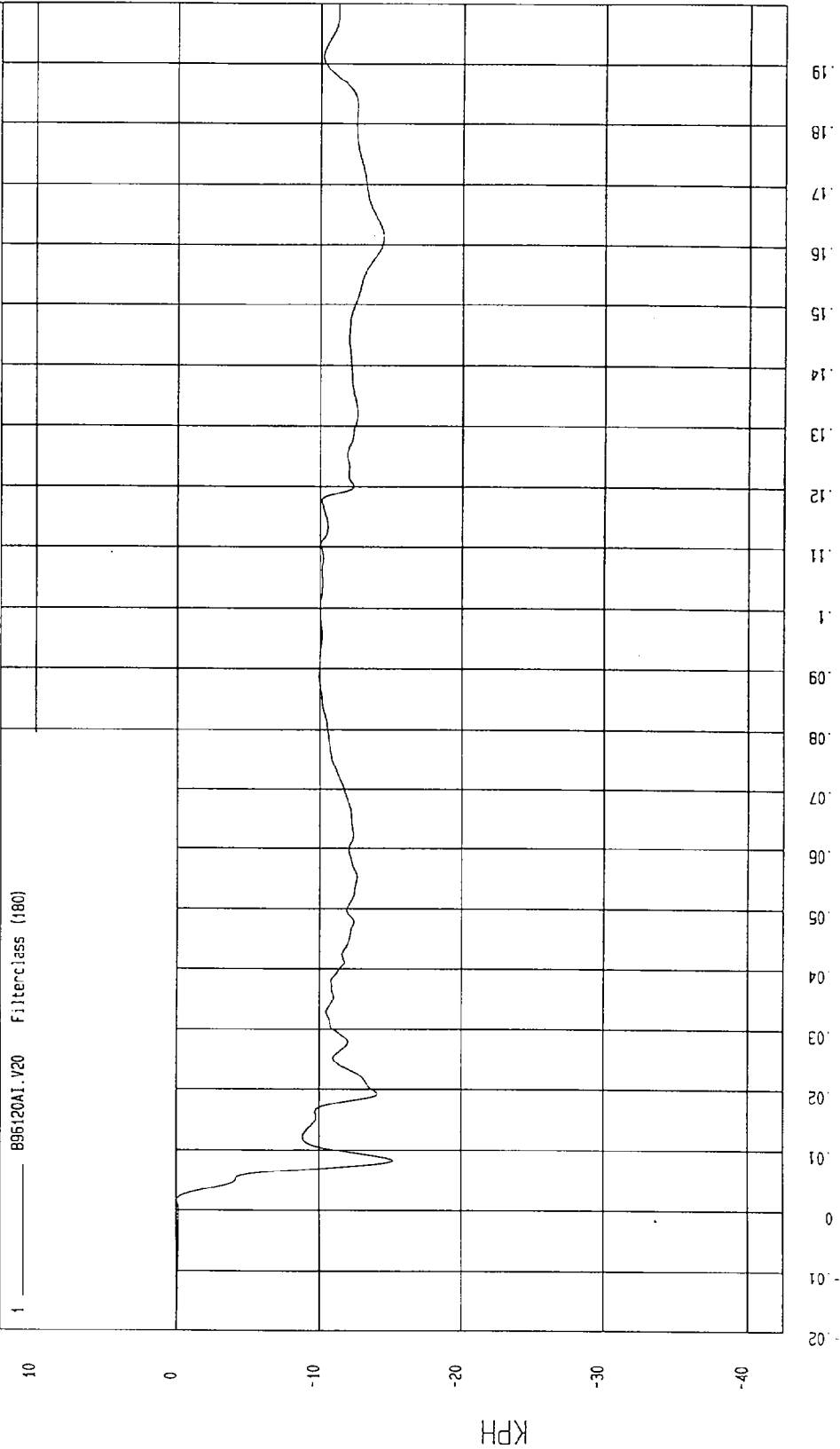


TEST: FMVSS 214 SIDE IMPACT TEST DATE: 11-12-1996

COMPONENT: 1997 CHEVROLET CAVALIER (CV0105) Speed: 33.11 MPH 53.3 KPH

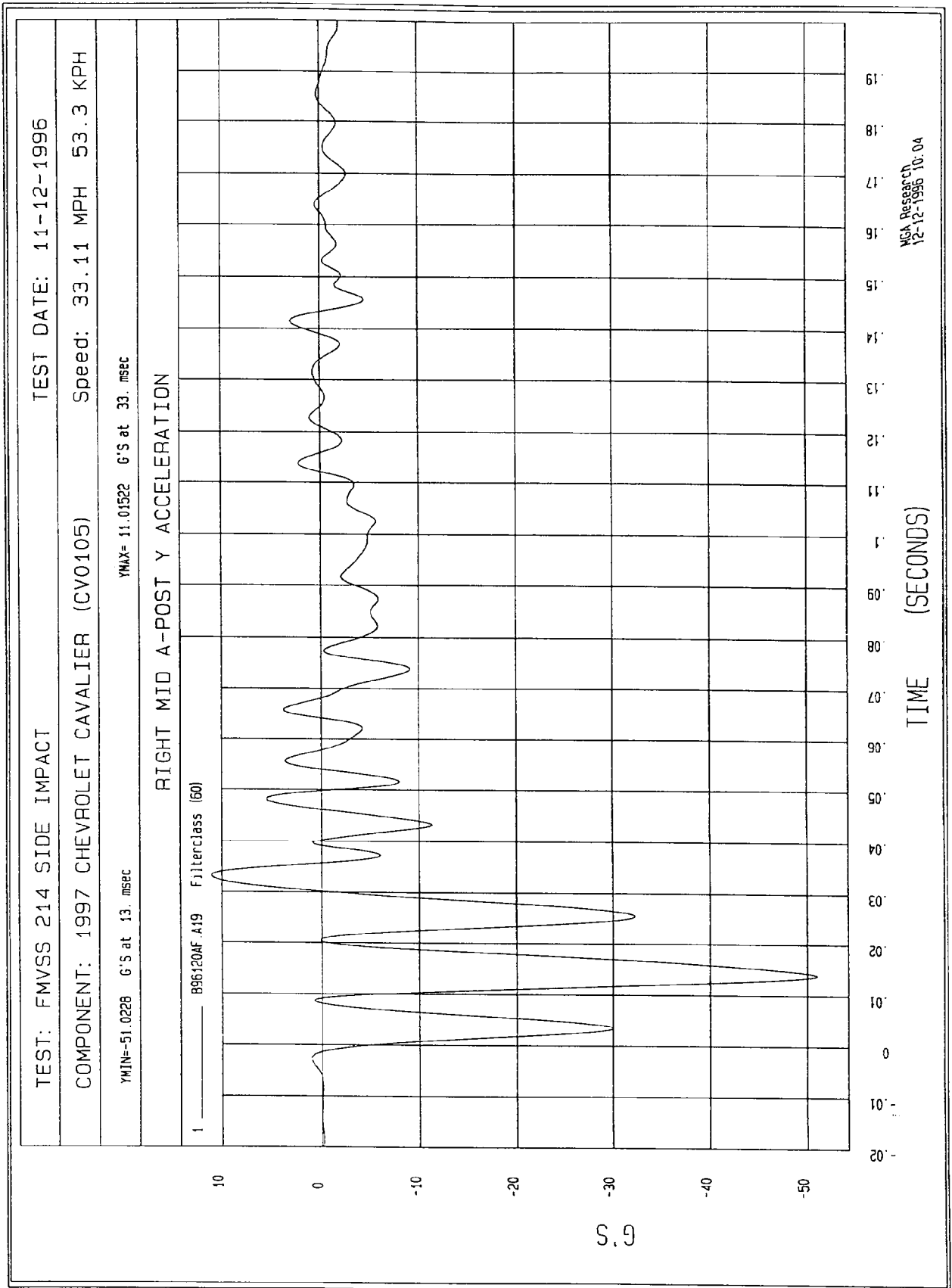
YMIN=-15.22001 KPH at 8.2 msec YMAX= 0 KPH at -20 msec

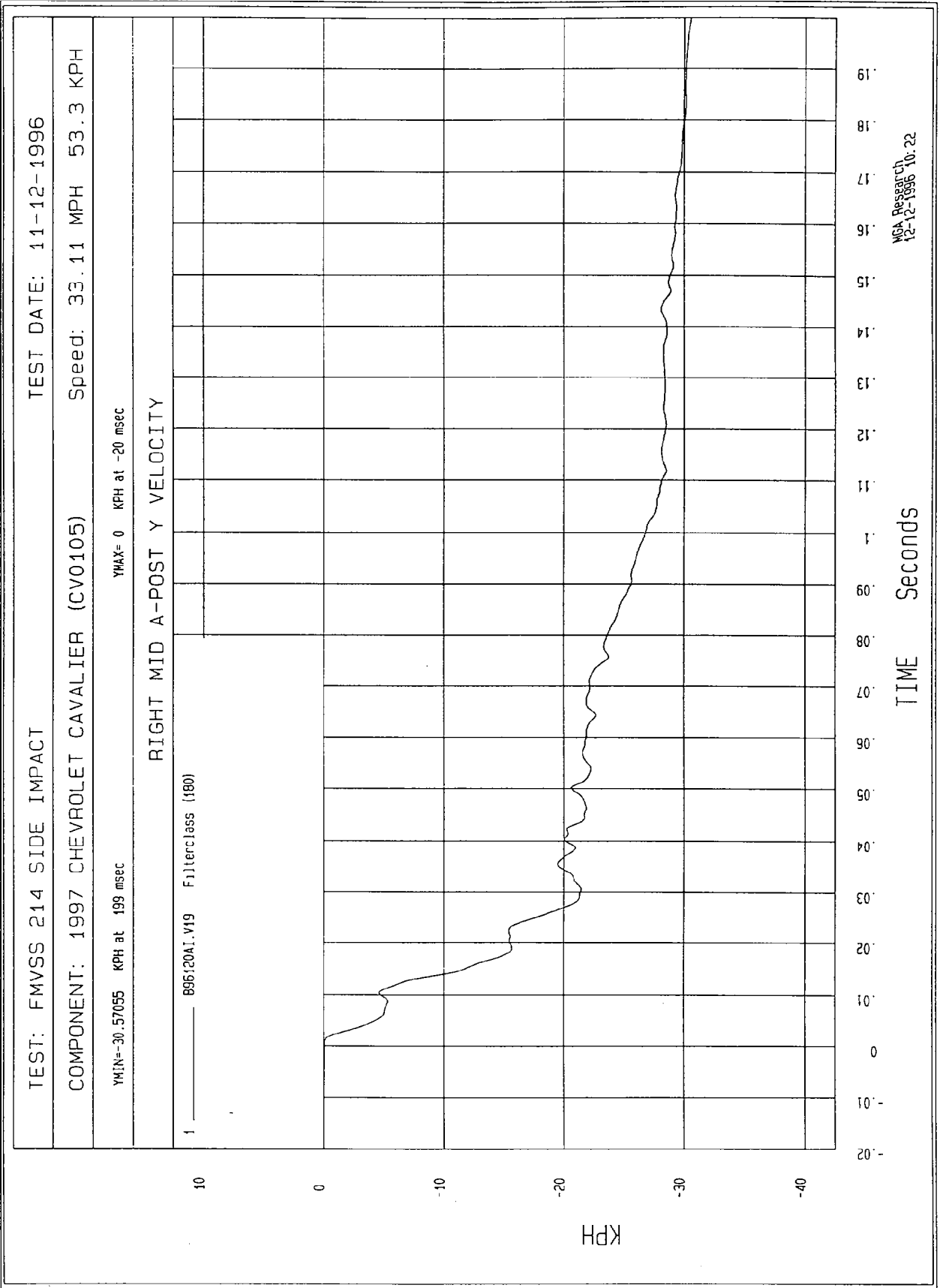
RIGHT LOWER A-POST Y VELOCITY

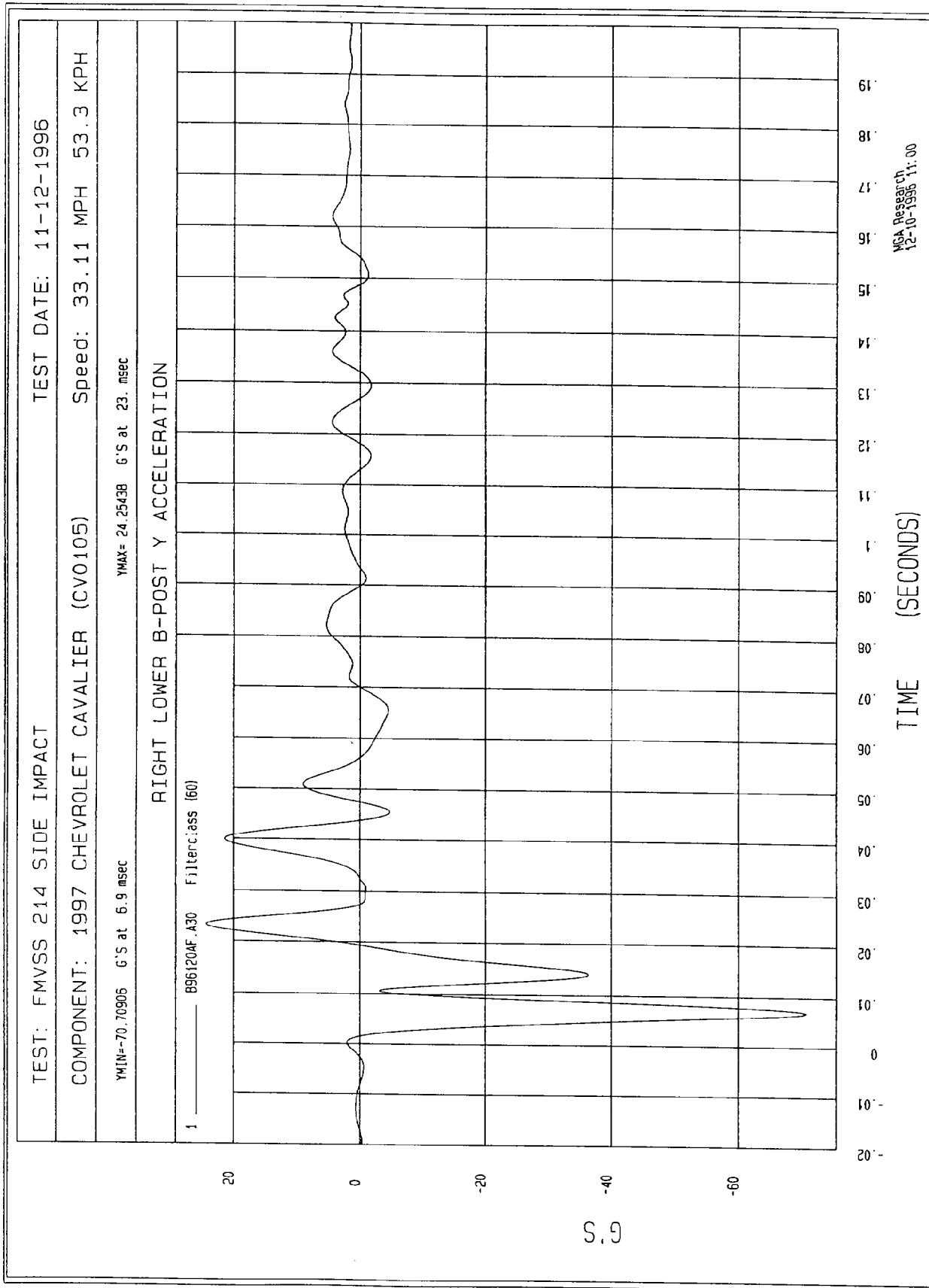


WCA Research
12-12-1996 10:22

TIME Seconds







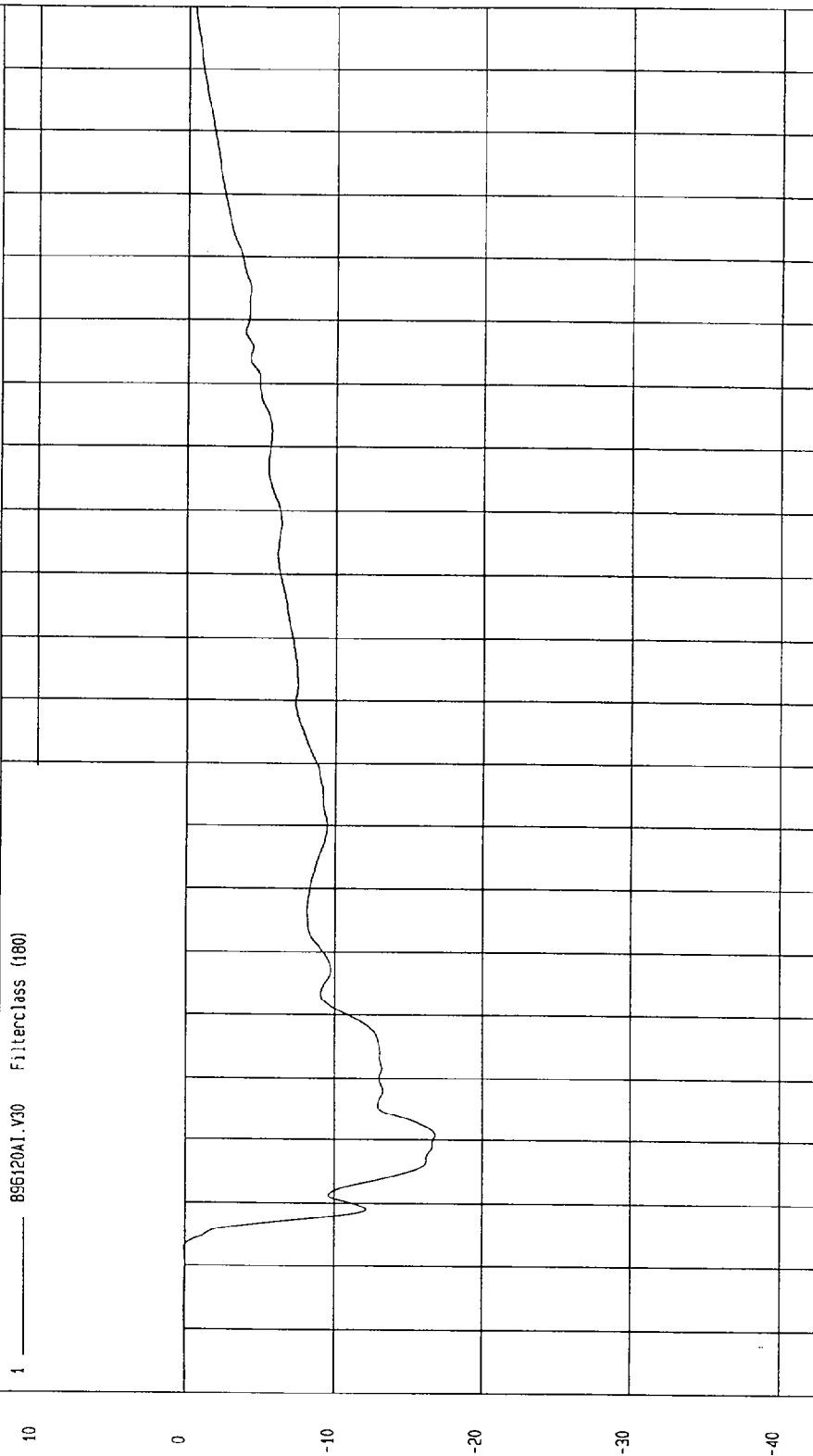
TEST: FMVSS 214 SIDE IMPACT TEST DATE: 11-12-1996

COMPONENT: 1997 CHEVROLET CAVALIER (CV0105) Speed: 33.11 MPH 53.3 KPH

YMIN=-16.72802 KPH at 20. msec YMAX= .1232033 KPH at -7.6 msec

RIGHT LOWER B-POST Y VELOCITY

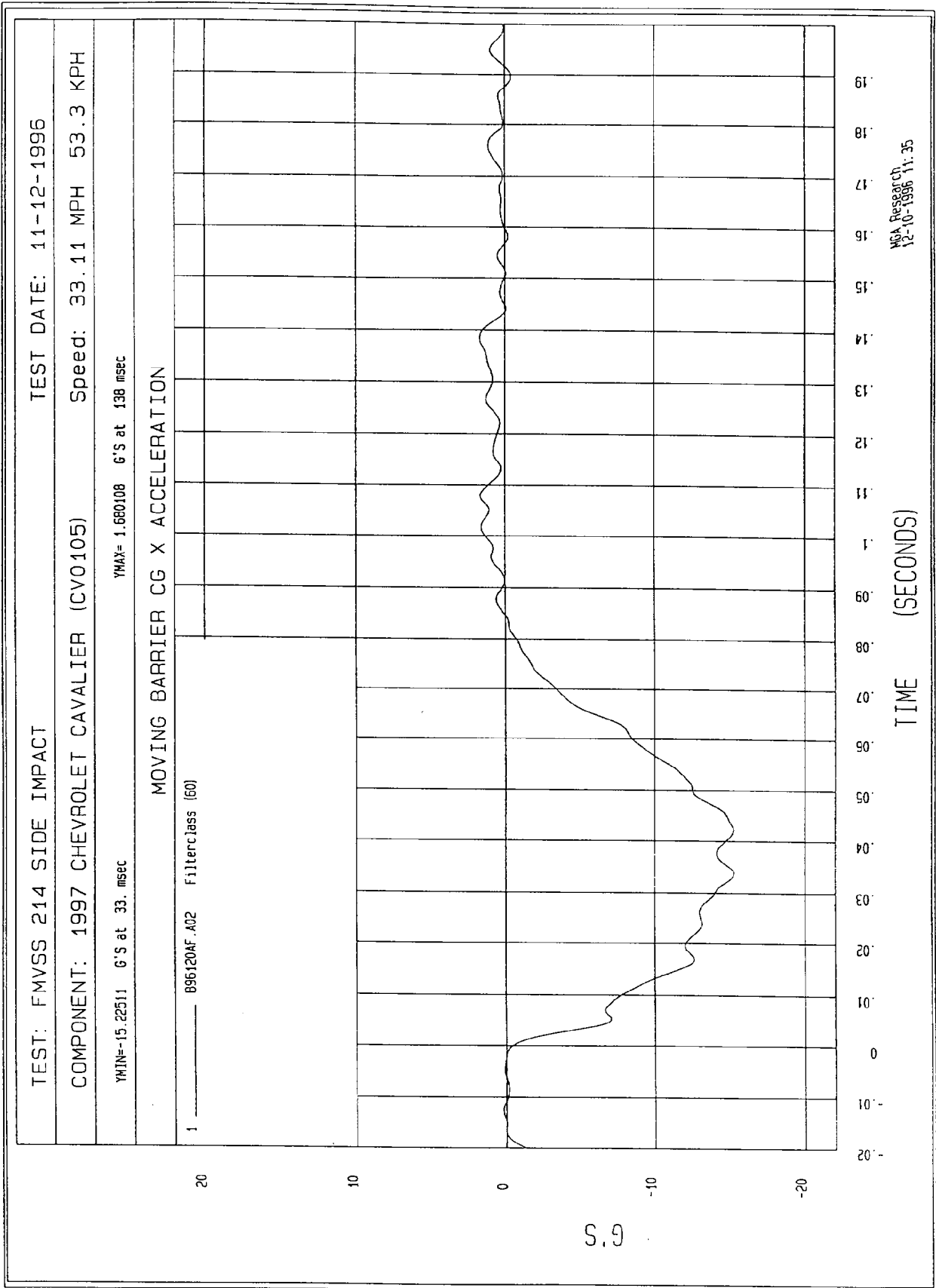
1 ——— 895120A1.V30 Filterclass (180)



MSA Research
12-12-1996 10:23

TIME Seconds

KPH

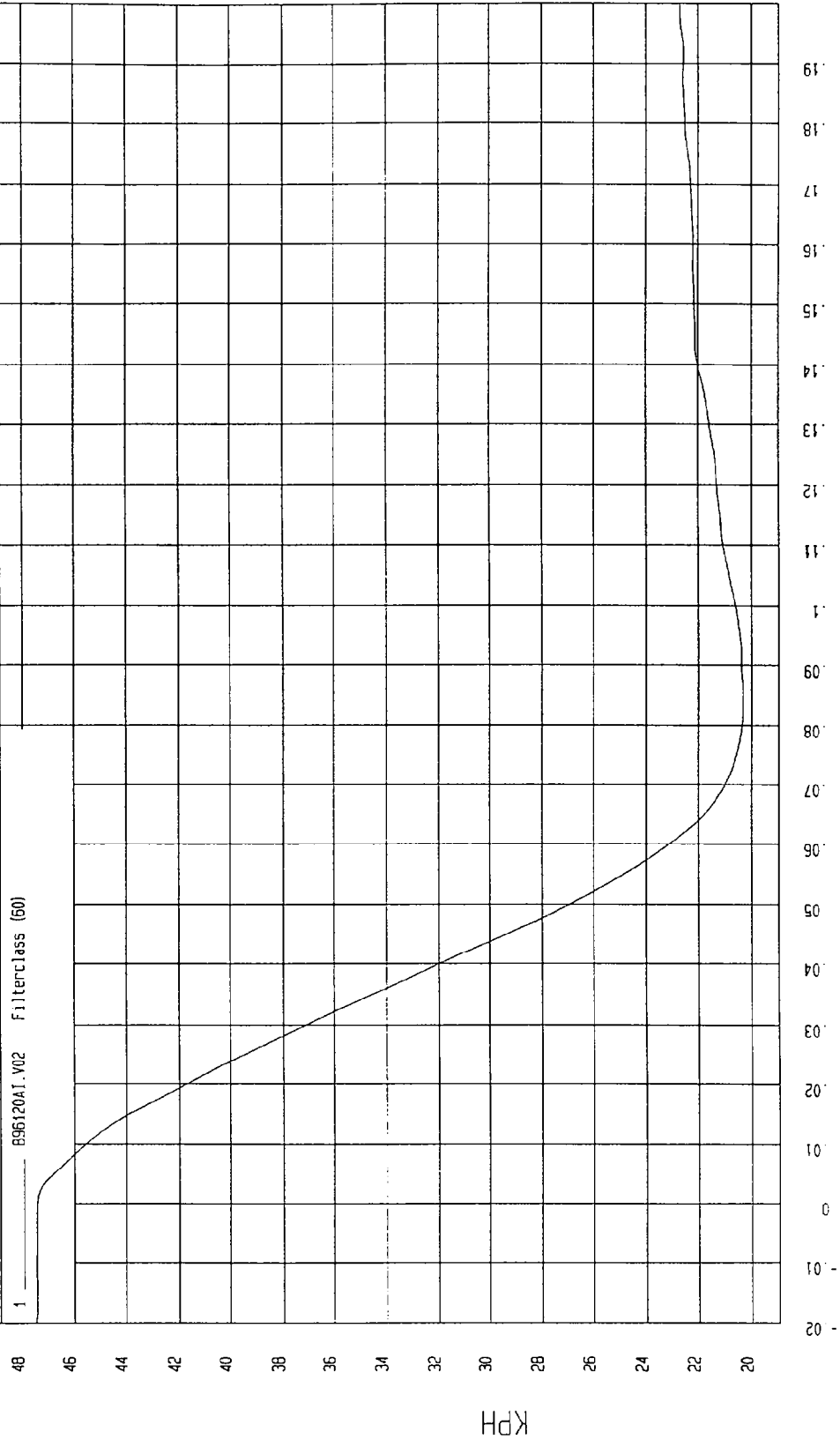


TEST: FMVSS 214 SIDE IMPACT TEST DATE: 11-12-1996

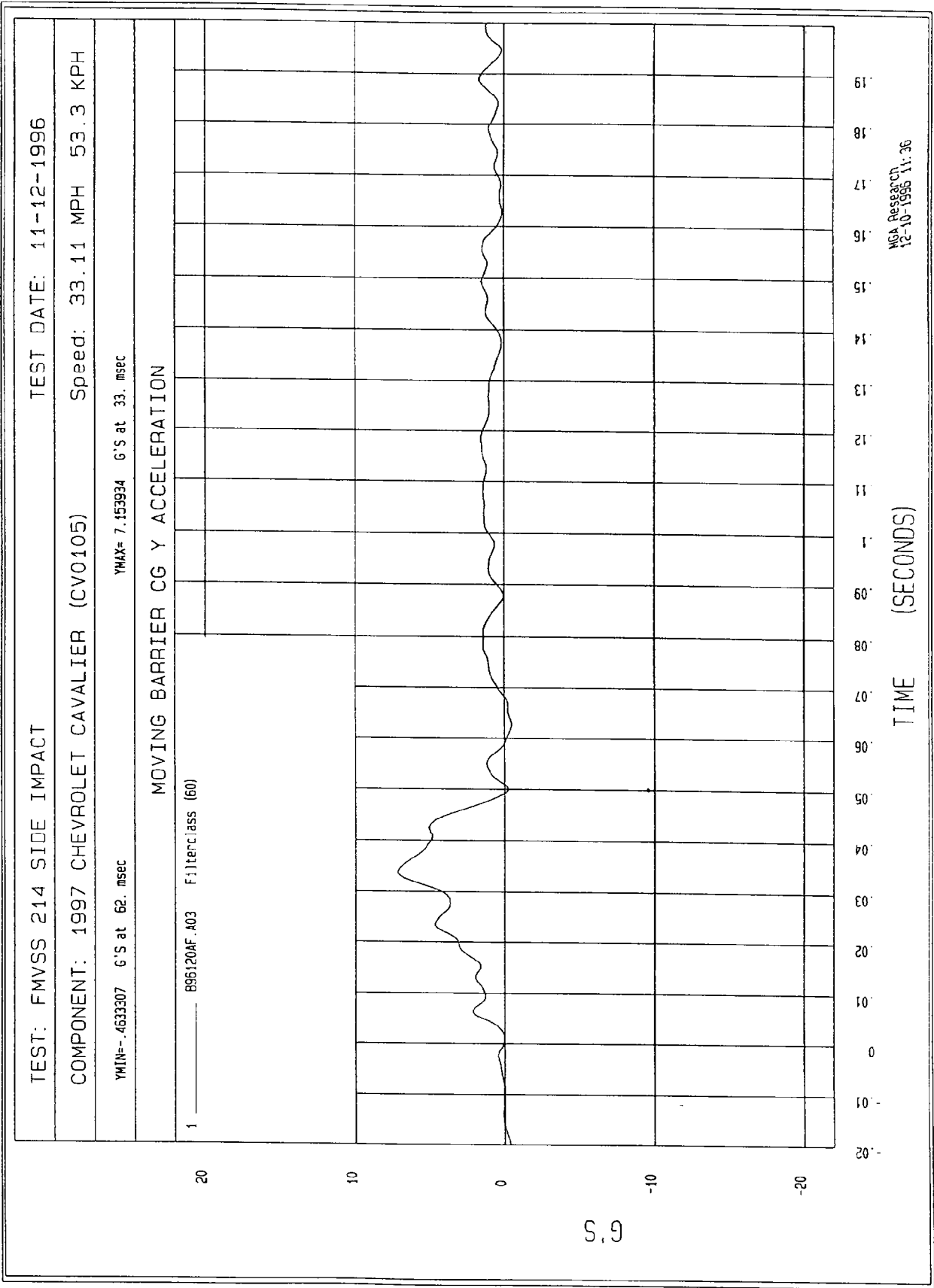
COMPONENT: 1997 CHEVROLET CAVALIER (CV0105) Speed: 33.11 MPH 53.3 KPH

YMIN= 20.31118 KPH at 84. msec YMAX= 47.5 KPH at -20 msec

MOVING BARRIER CG X VELOCITY



WCA Research
12-12-1996 10:12

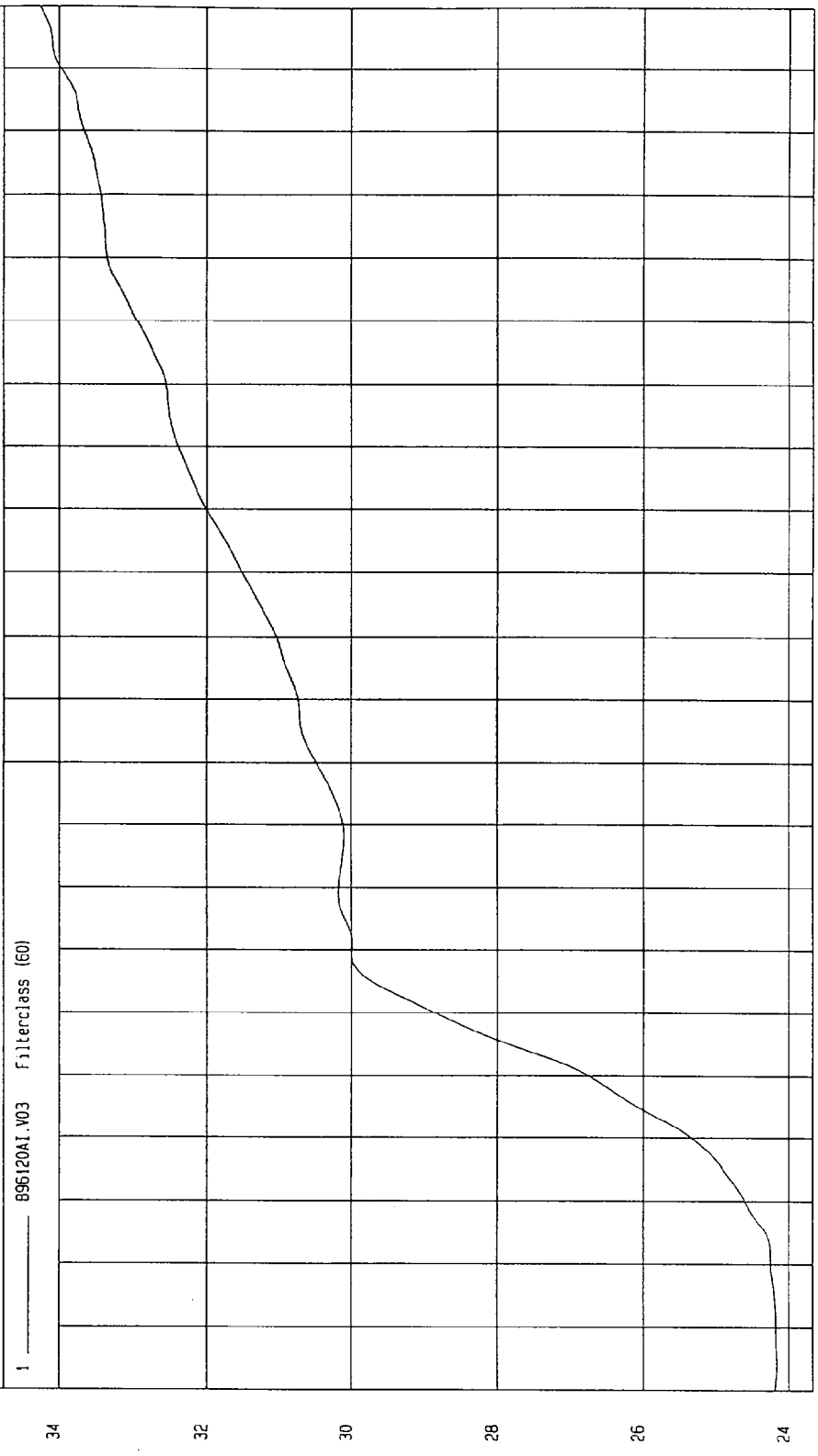


TEST: FMVSS 214 SIDE IMPACT TEST DATE: 11-12-1996

COMPONENT: 1997 CHEVROLET CAVALIER (CV0105) Speed: 33.11 MPH 53.3 KPH

YMIN= 24.17299 KPH at -16. msec YMAX= 34.25514 KPH at 199 msec

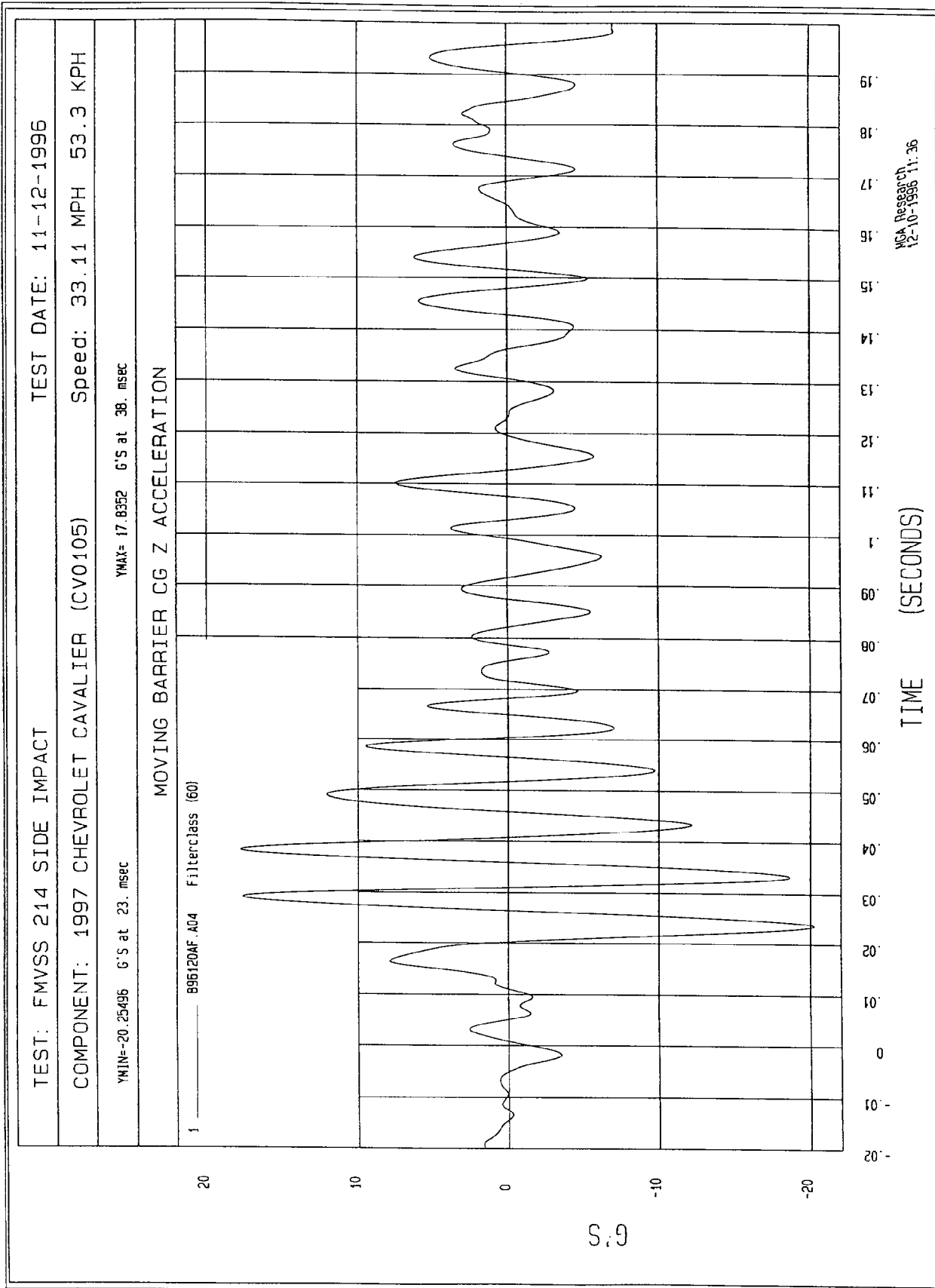
MOVING BARRIER CG Y VELOCITY



NSA Research
12-12-1996 10:12

TIME Seconds

KPH

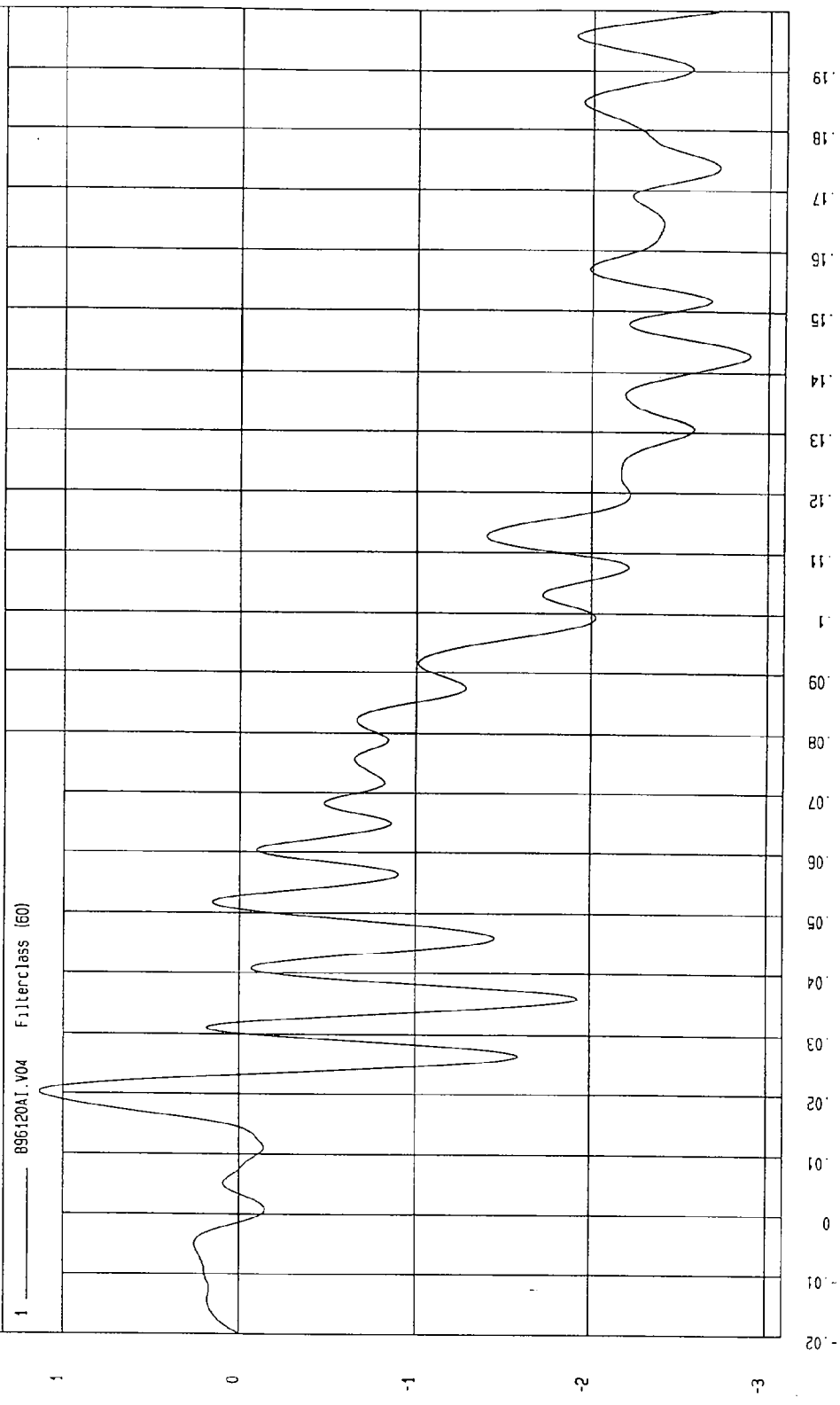


TEST: FMVSS 214 SIDE IMPACT TEST DATE: 11-12-1996

COMPONENT: 1997 CHEVROLET CAVALIER (CV0105) Speed: 33.11 MPH 53.3 KPH

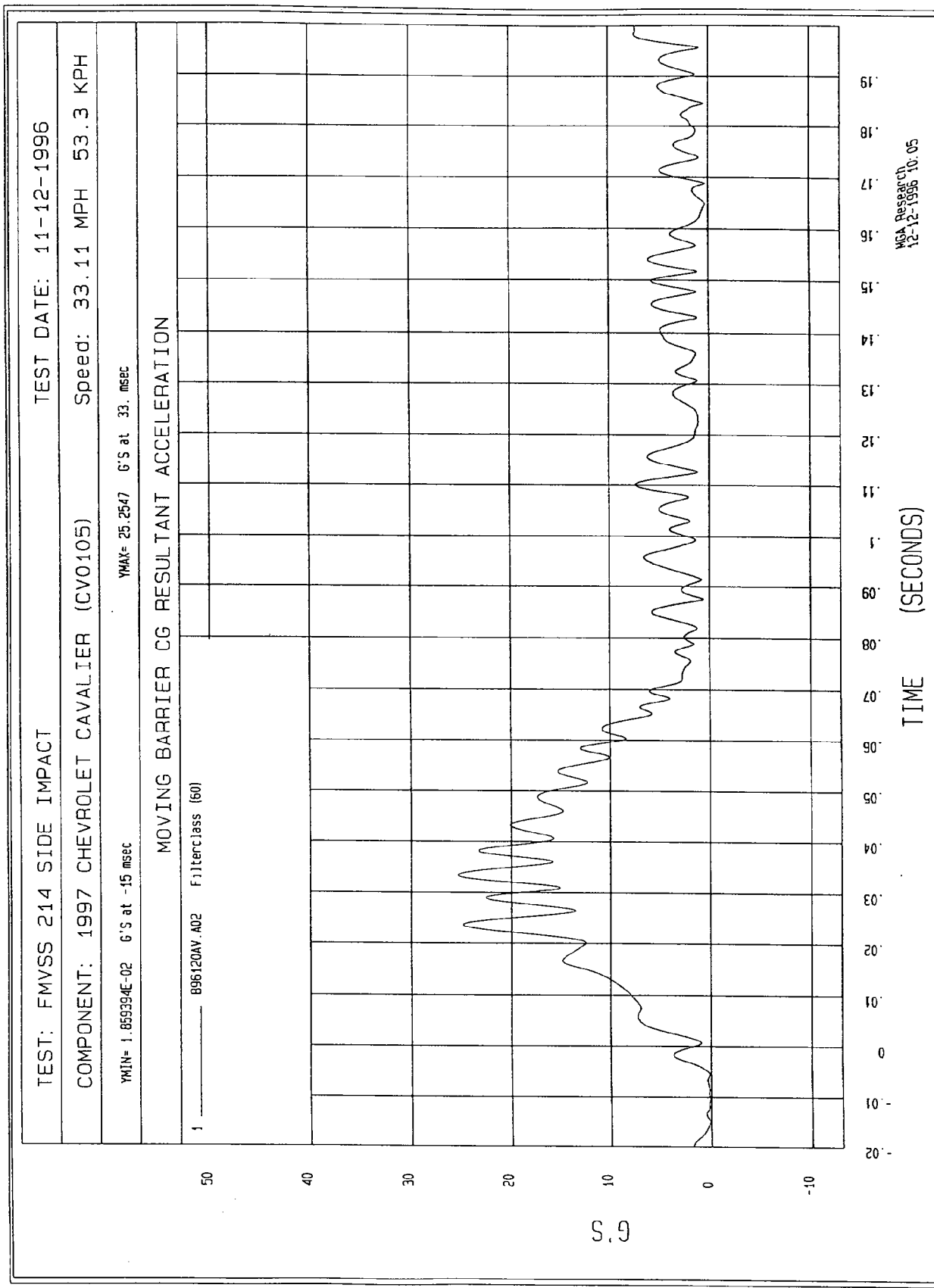
YMIN=-2.893146 KPH at 142 msec YMAX= 1.136647 KPH at 20. msec

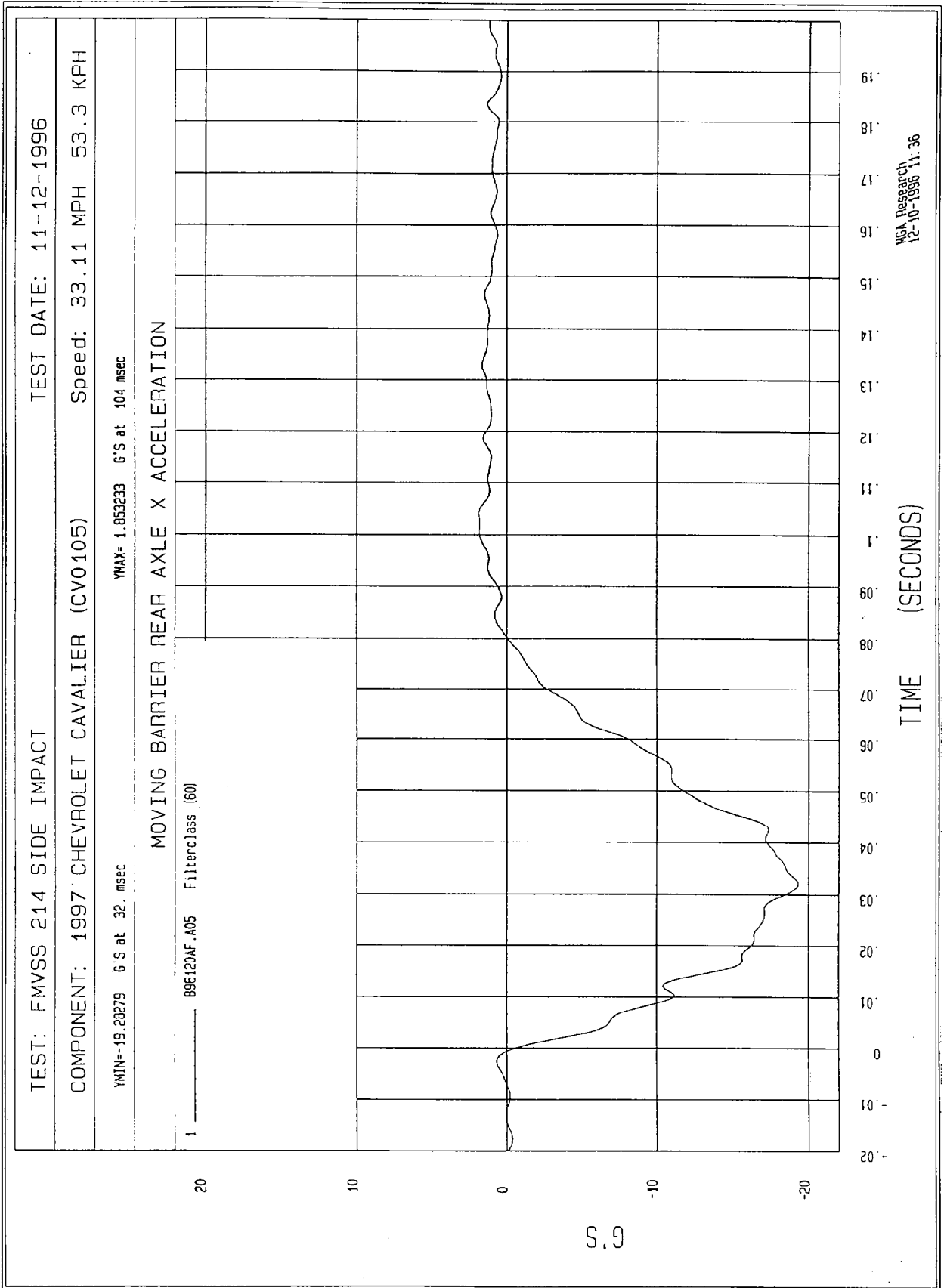
MOVING BARRIER CG Z VELOCITY



TIME Seconds

MCA Research
12-12-1996 10:12



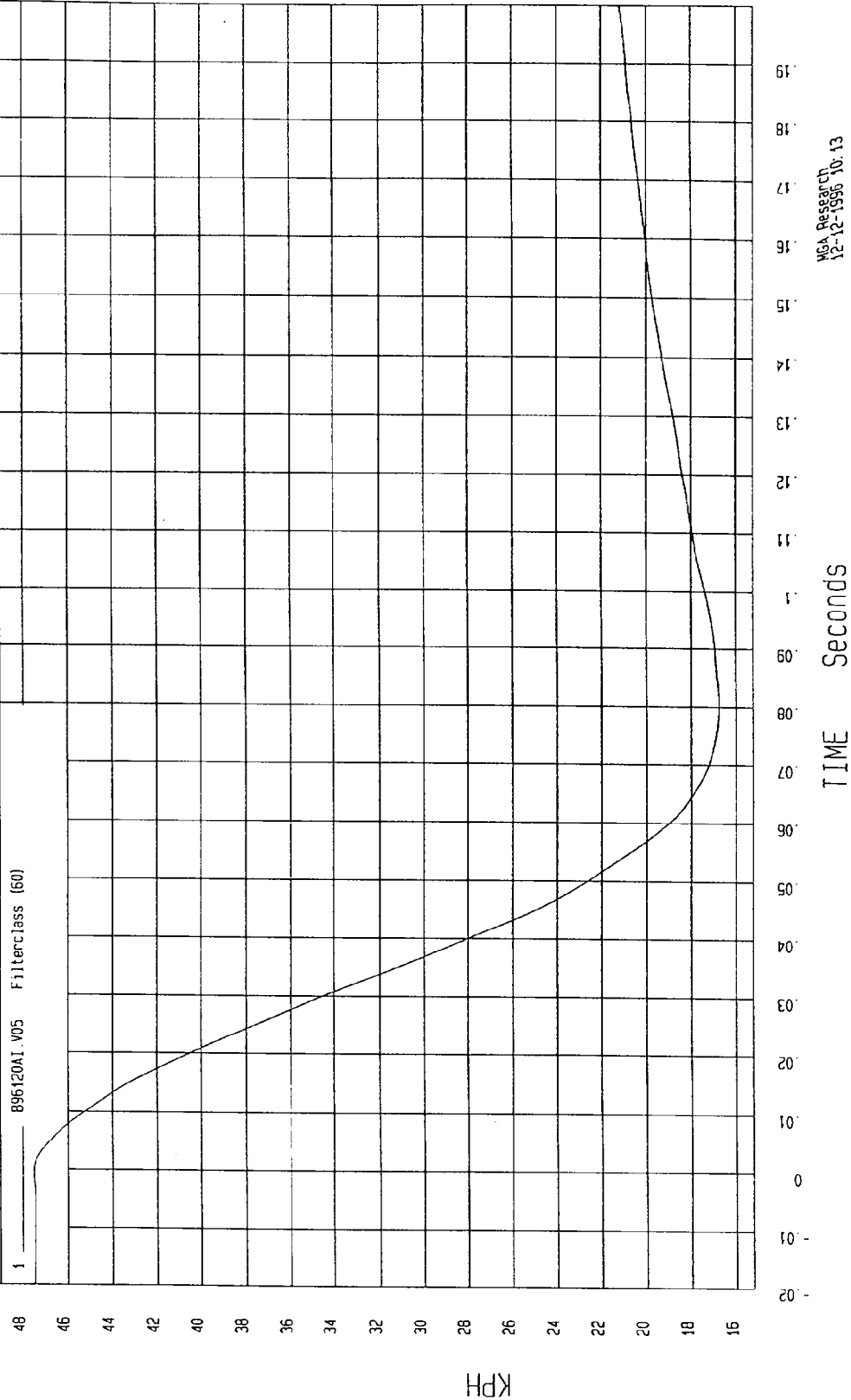


TEST: FMVSS 214 SIDE IMPACT TEST DATE: 11-12-1996

COMPONENT: 1997 CHEVROLET CAVALIER (CV0105) Speed: 33.11 MPH 53.3 KPH

YMIN= 16.16602 KPH at 80. msec YMAX= 47.52729 KPH at -.70 msec

MOVING BARRIER REAR AXLE X VELOCITY



TEST: FMVSS 214 SIDE IMPACT

TEST DATE: 11-12-1996

Speed: 33.11 MPH 53.3 KPH

COMPONENT: 1997 CHEVROLET CAVALIER (CV0105)

Maximum = 1.33 G'S at 112 msec

Minimum = -5.28 G'S at 34 msec

MOVING BARRIER REAR AXLE Y ACCELERATION

1 ——— B96120AF.A06 Filterclass (60)

20

10

0

-10

-20

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)

Web: Reseat.clt
01-28-1997 09:52

TEST: FMVSS 214 SIDE IMPACT

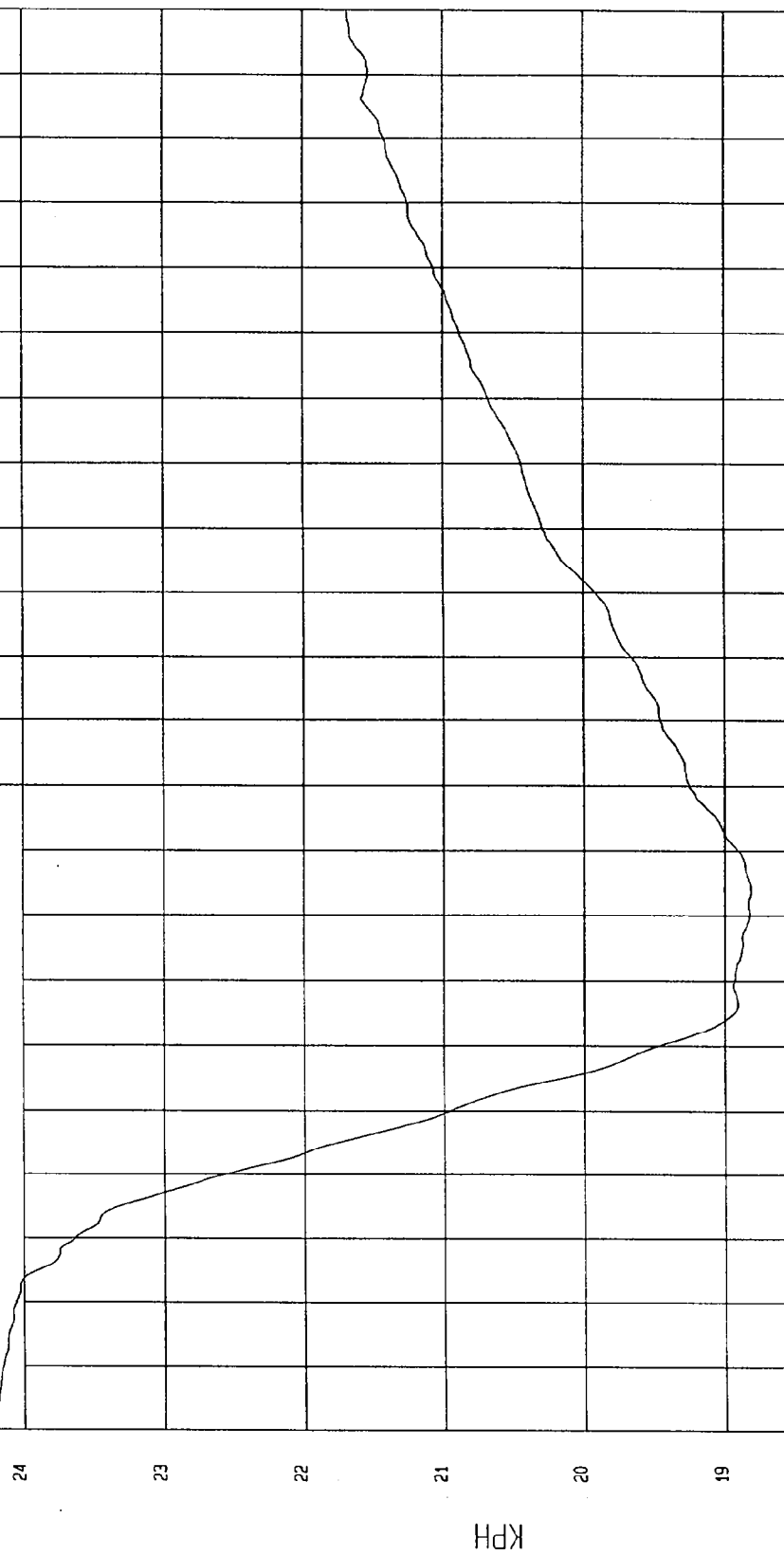
TEST DATE: 11-12-1996

COMPONENT: 1997 CHEVROLET CAVALIER (CV0105) Speed: 33.11 MPH 53.3 KPH

Minimum = 18.81 KPH at 64 msec Maximum = 24.2 KPH at -20 msec

MOVING BARRIER REAR AXLE Y VELOCITY

1 895120A1.V06 Filterclass (180)



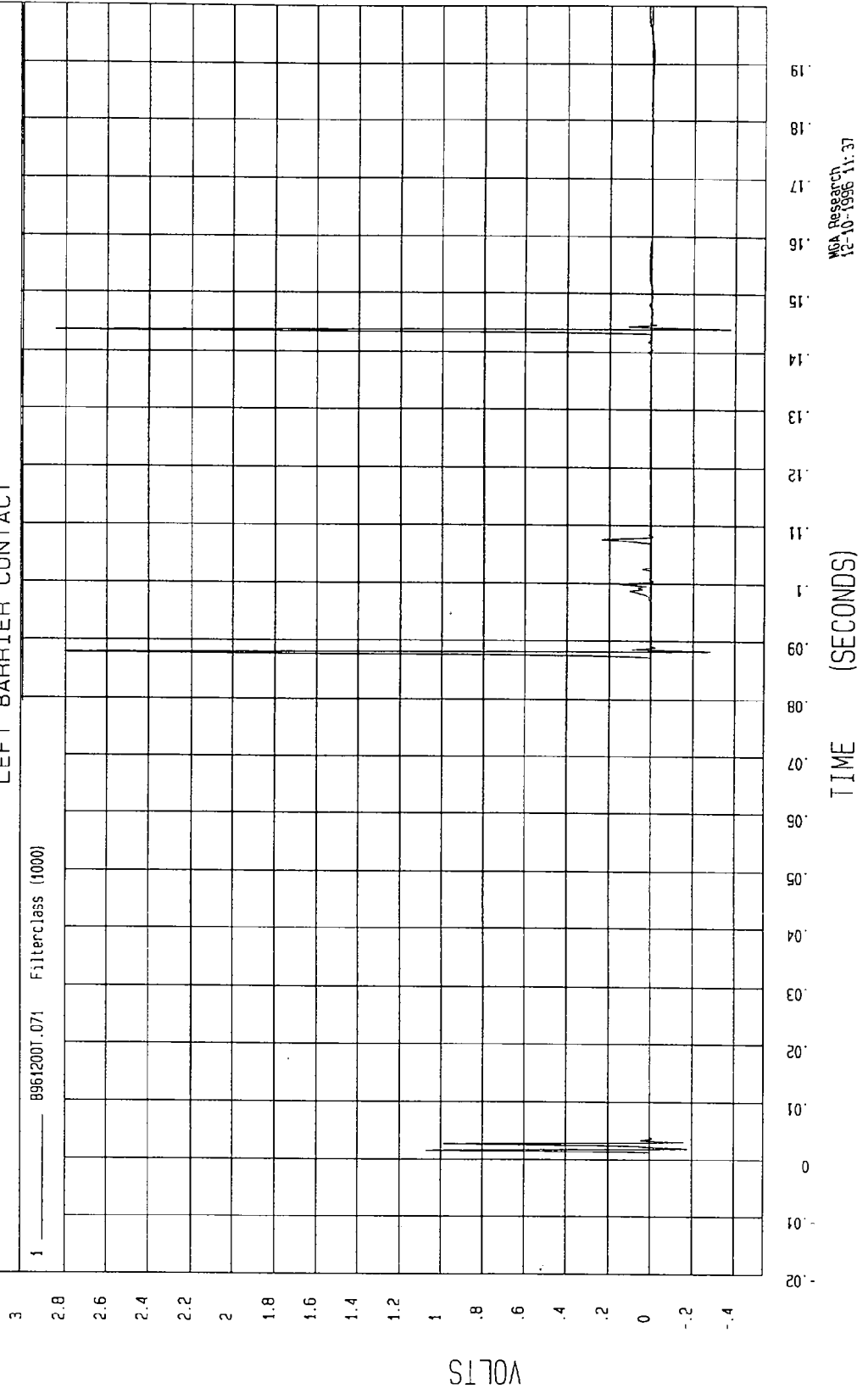
NCA Research
01-26-1997 09:52

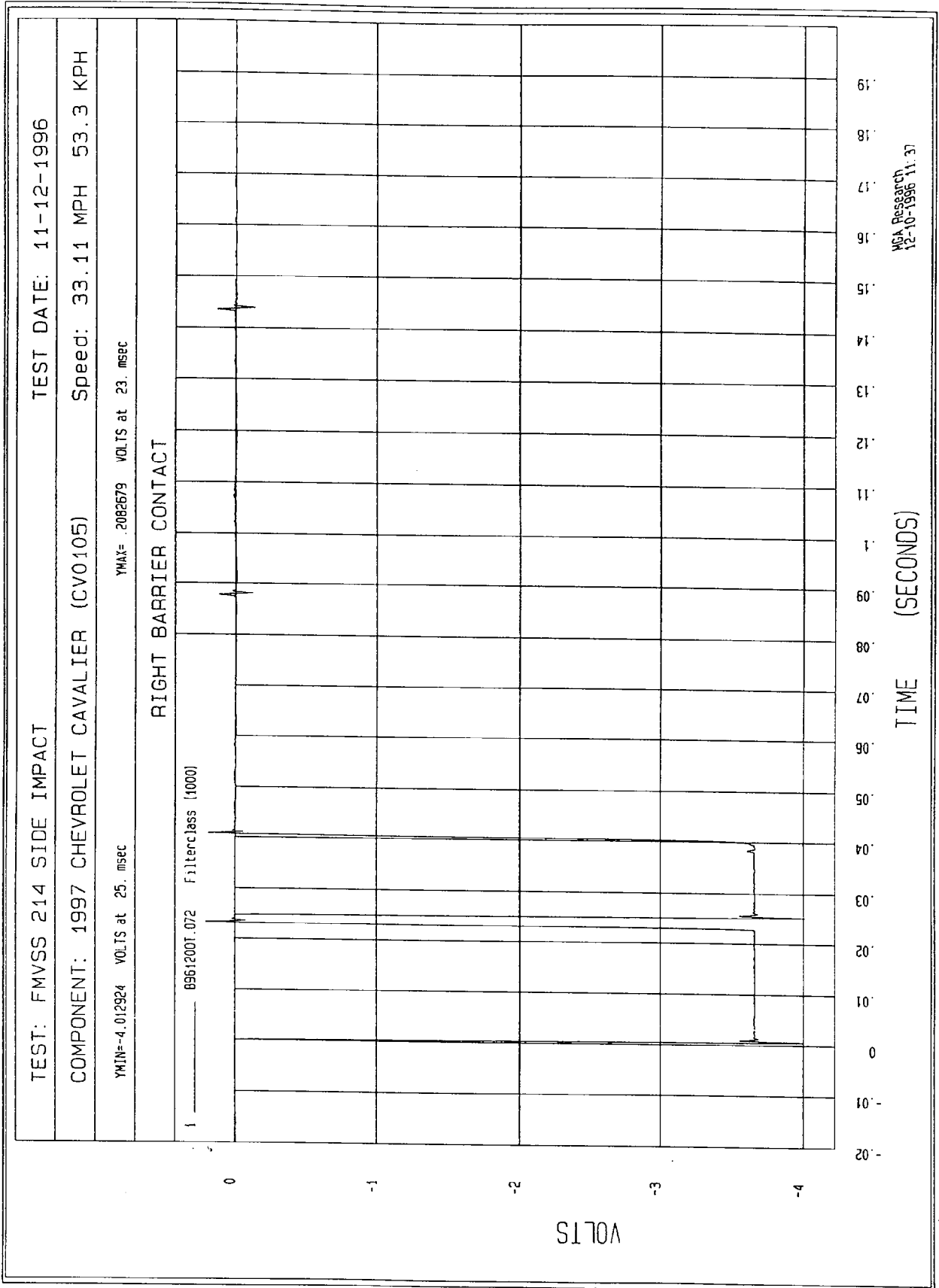
TEST: FMVSS 214 SIDE IMPACT TEST DATE: 11-12-1996

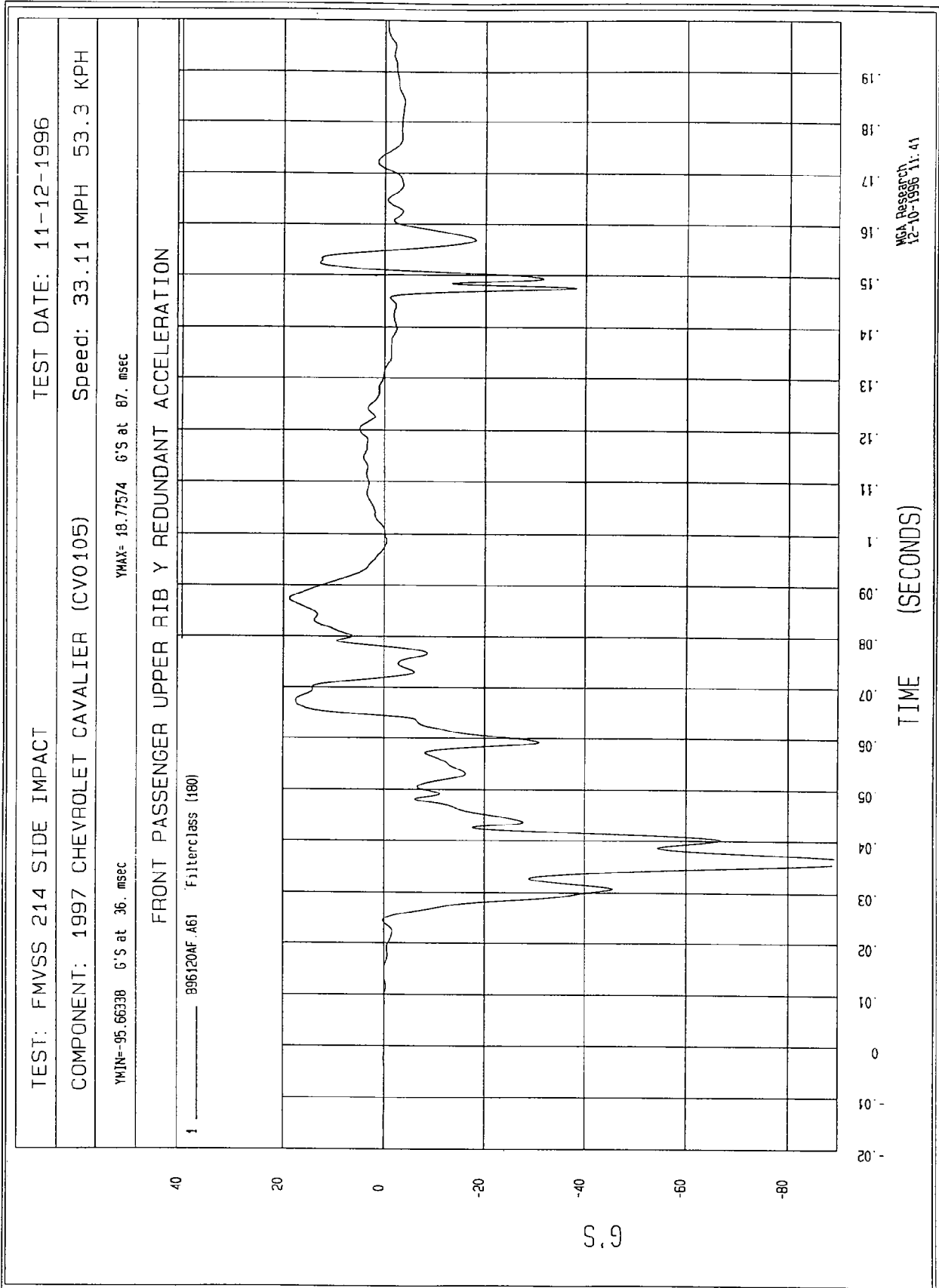
COMPONENT: 1997 CHEVROLET CAVALIER (CV0105) Speed: 33.11 MPH 53.3 KPH

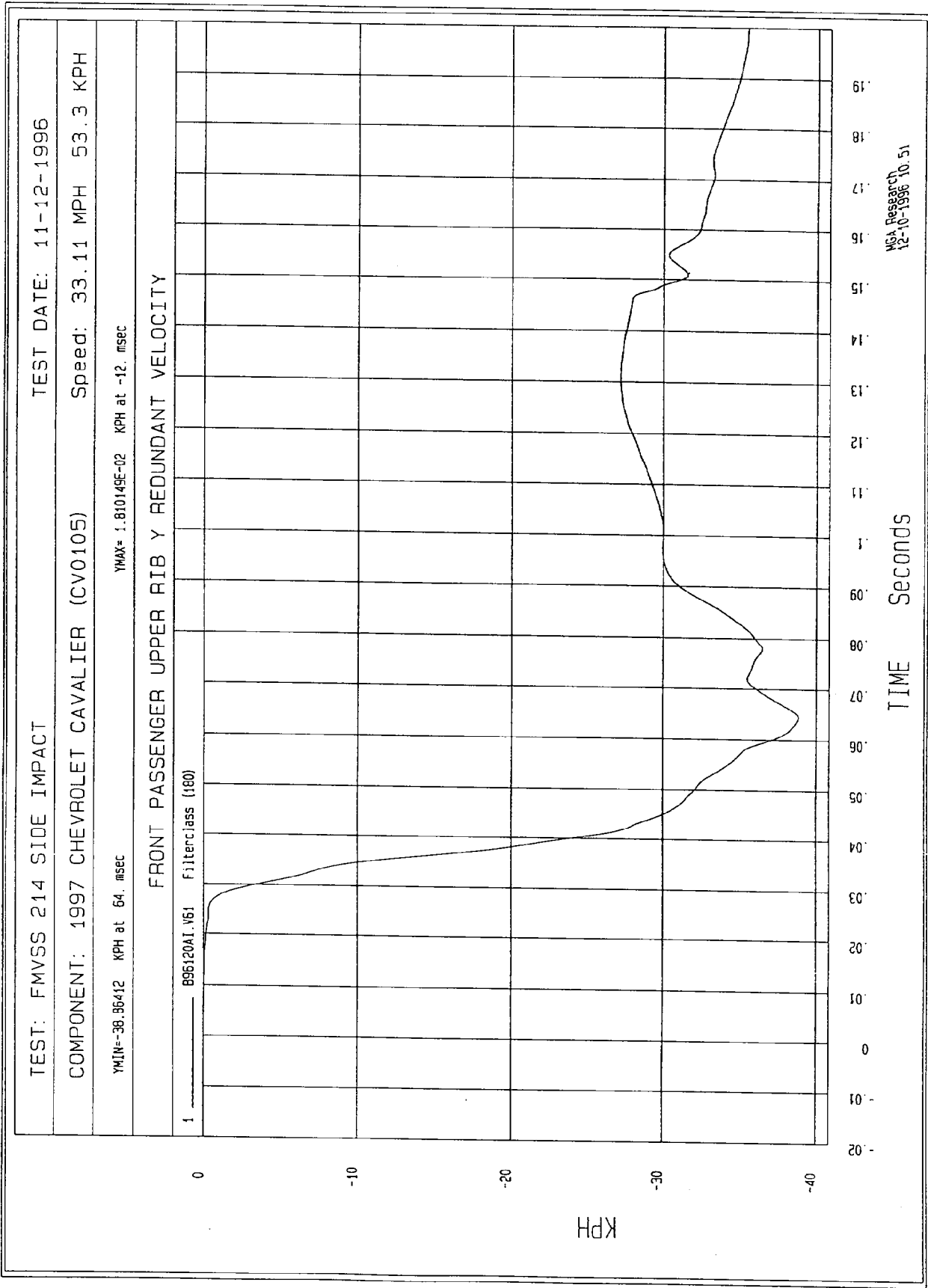
YMIN=-.3789010 VOLTS at 144 msec YMAX= 2.848637 VOLTS at 143 msec

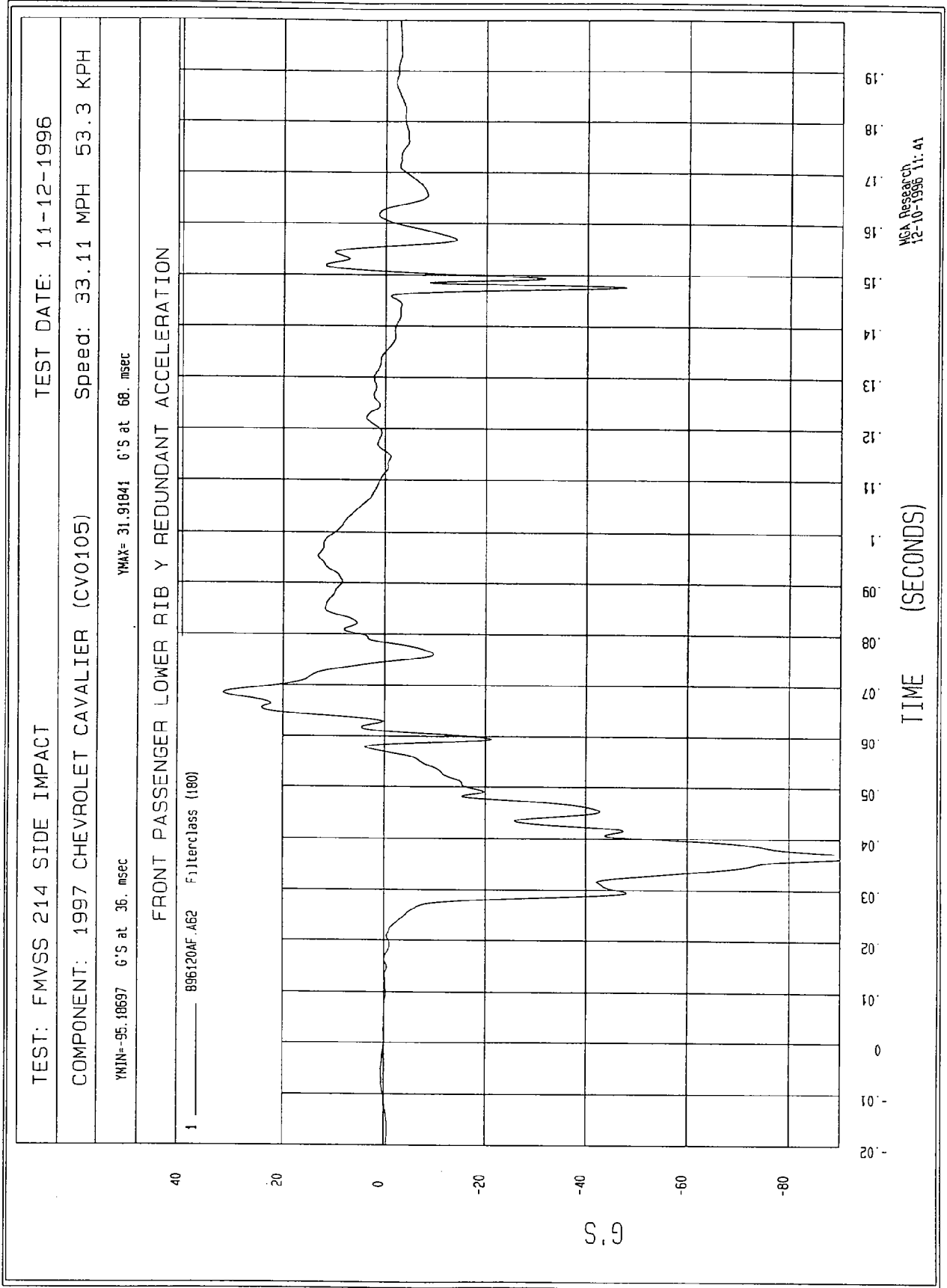
LEFT BARRIER CONTACT

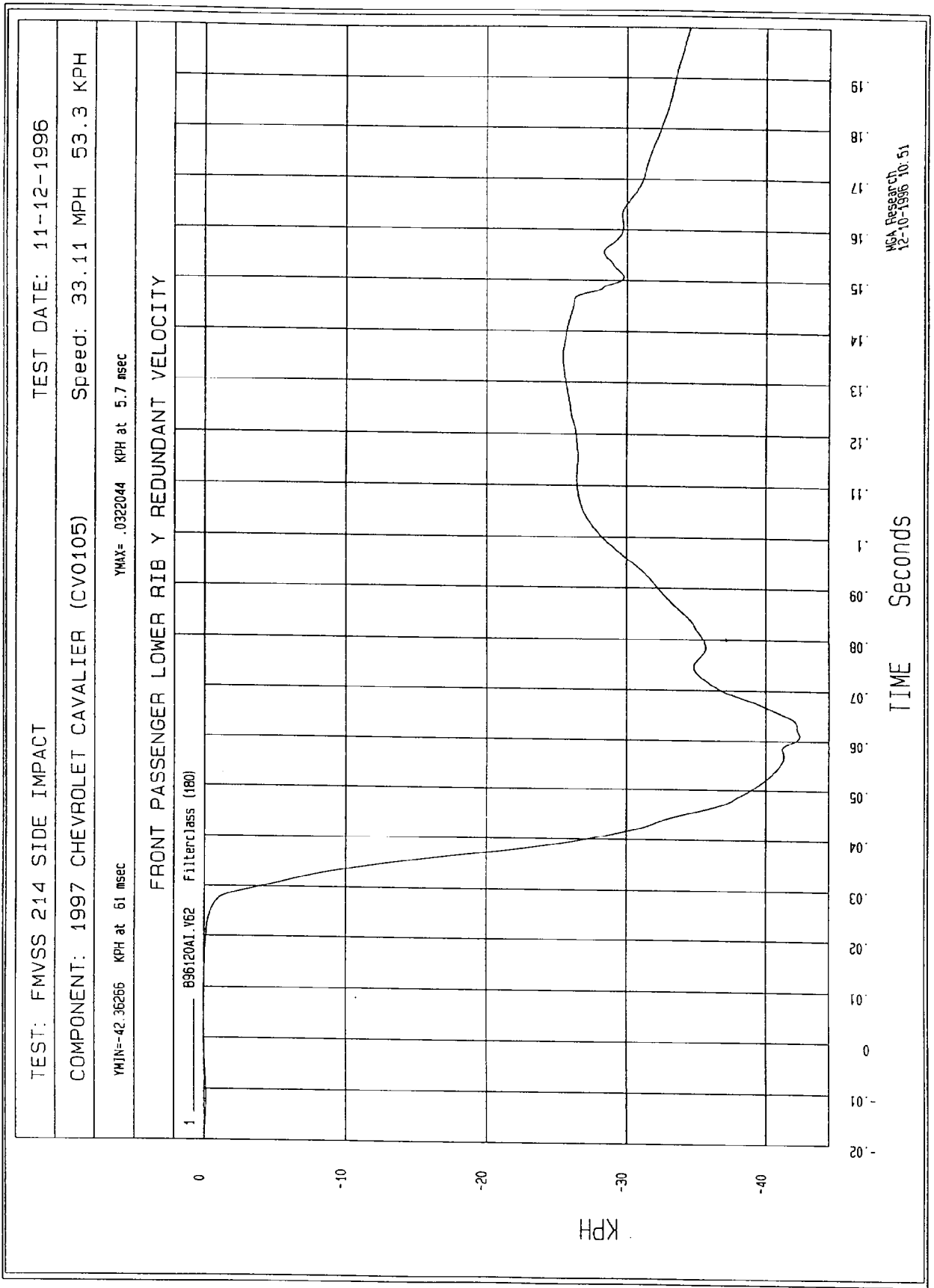


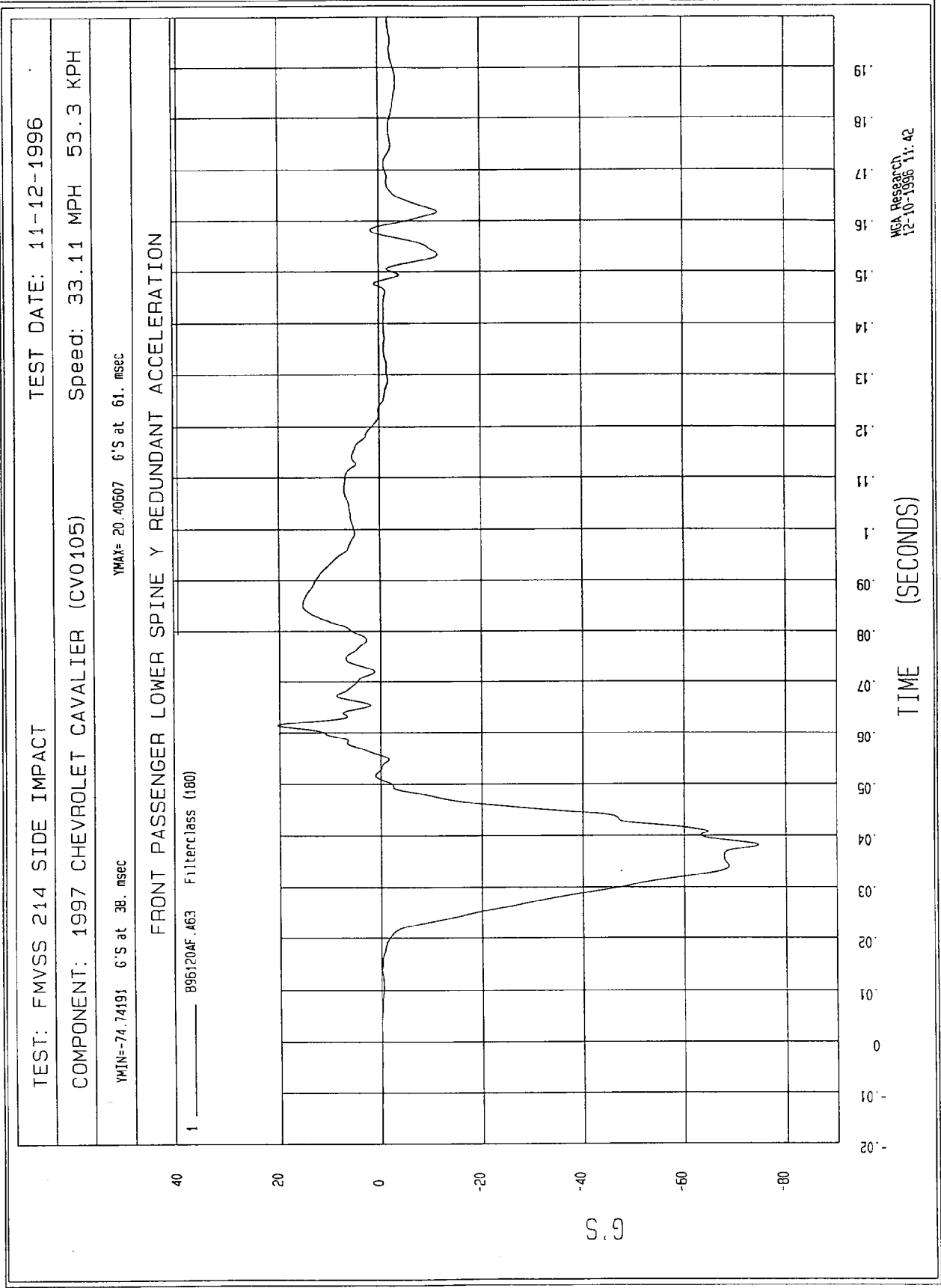


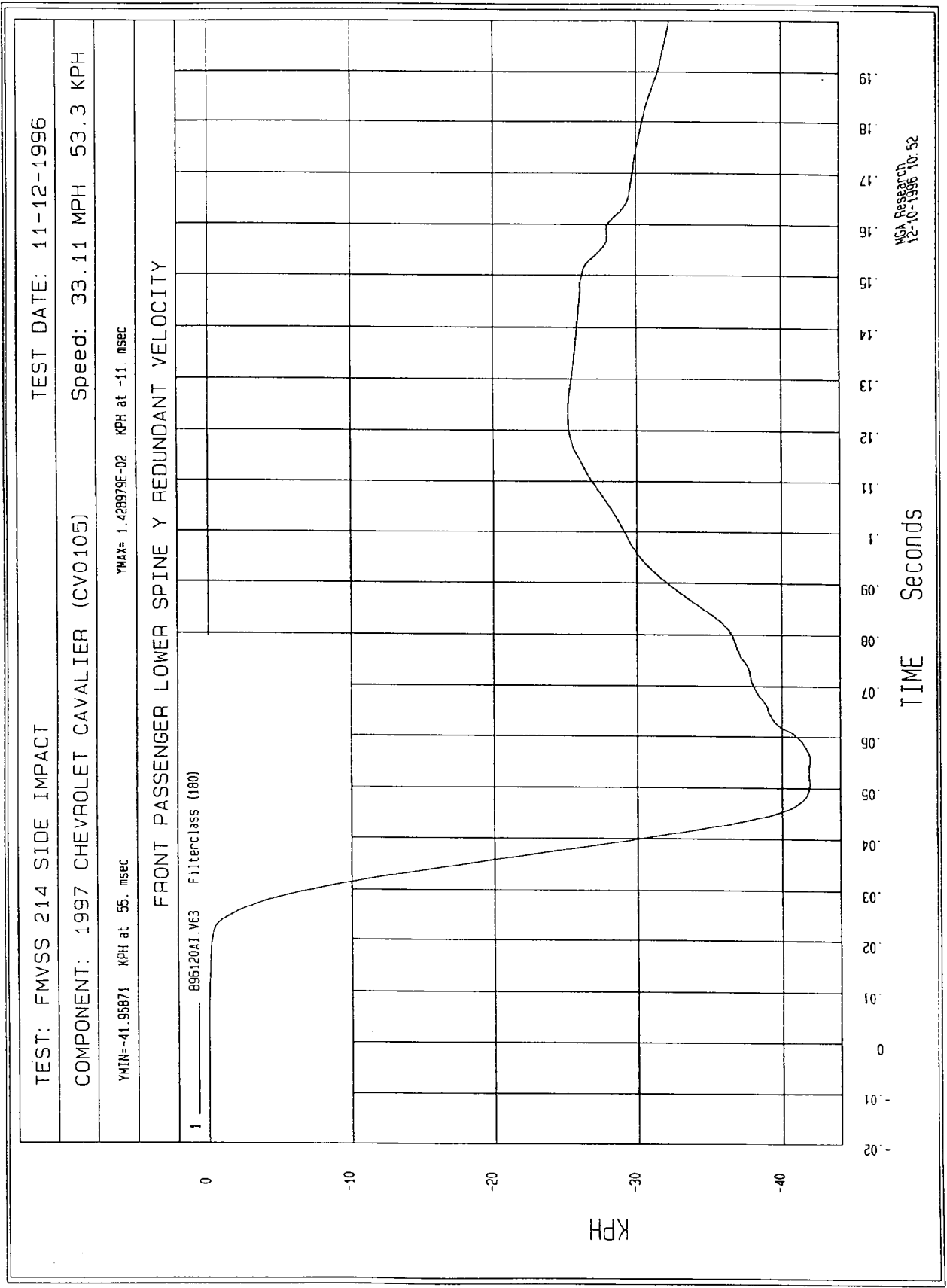












TEST: FMVSS 214 SIDE IMPACT

TEST DATE: 11-12-1996

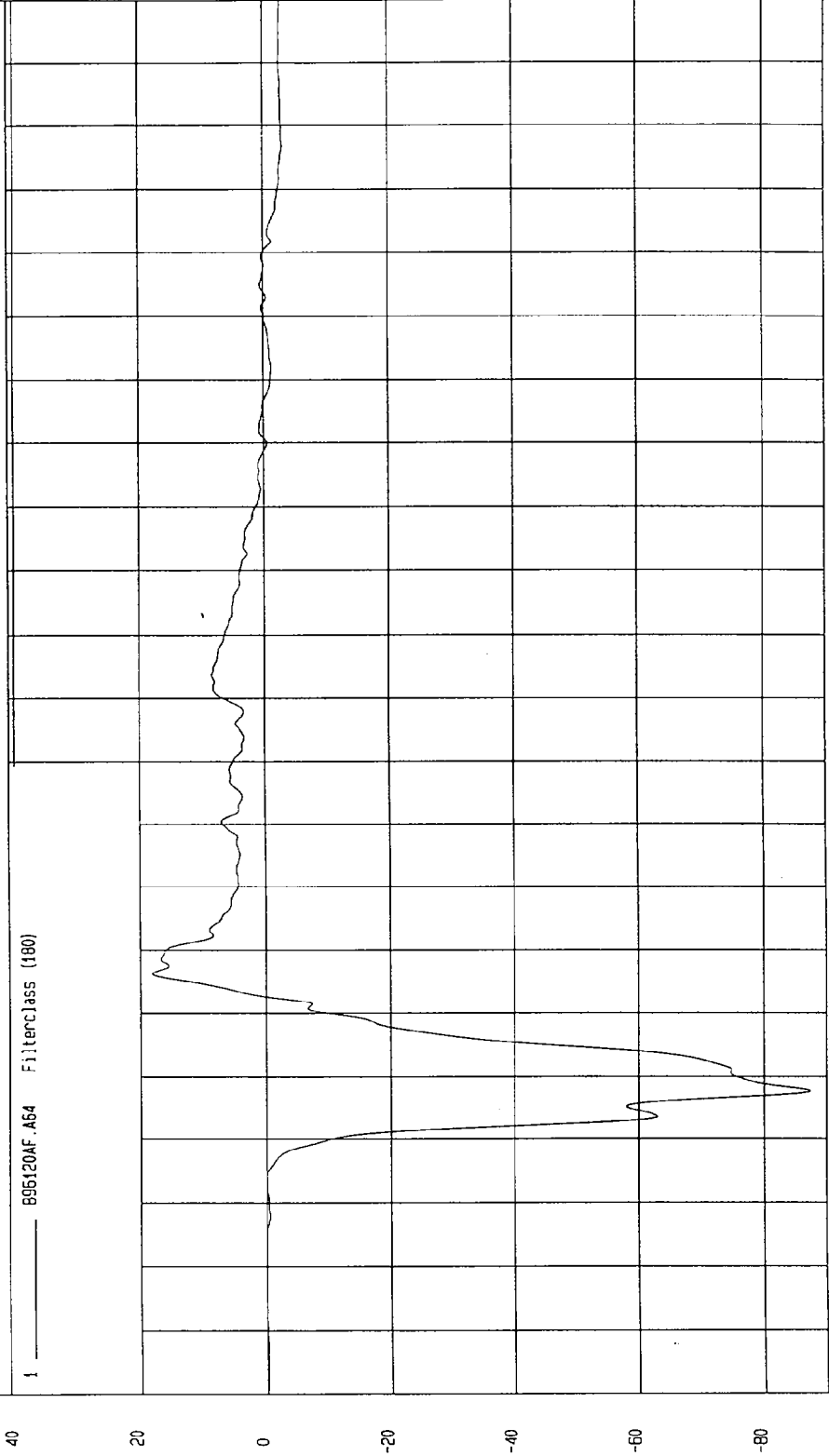
COMPONENT: 1997 CHEVROLET CAVALIER (CV0105)

Speed: 33.11 MPH 53.3 KPH

YMIN=-87.42645 G'S at 27. msec

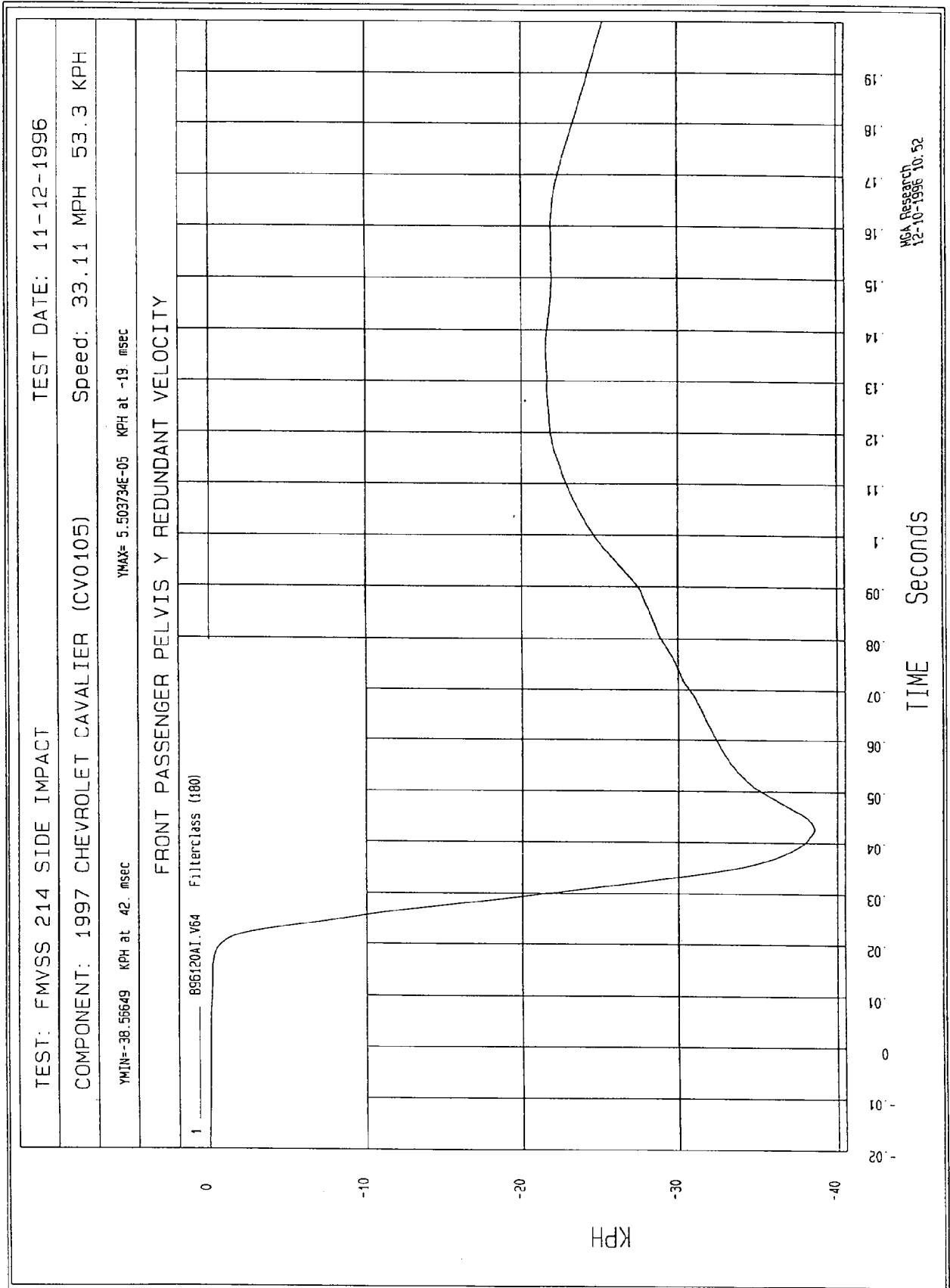
YMAX= 18.12554 G'S at 46. msec

FRONT PASSENGER PELVIS Y REDUNDANT ACCELERATION



TIME (SECONDS)

MCA Research
12-10-1996 11:42

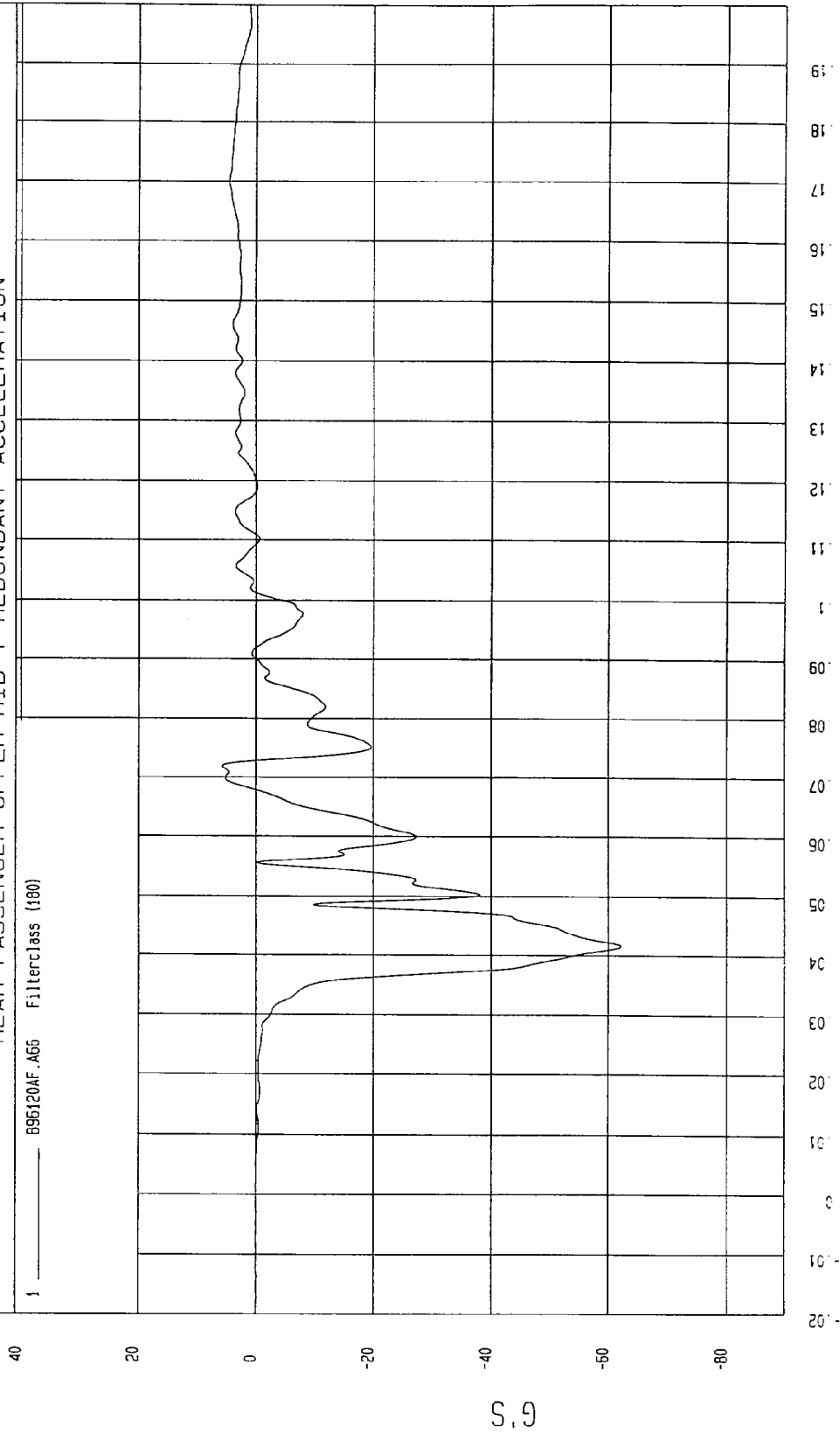


TEST: FMVSS 214 SIDE IMPACT TEST DATE: 11-12-1996
COMPONENT: 1997 CHEVROLET CAVALIER (CV0105) Speed: 33.11 MPH 53.3 KPH

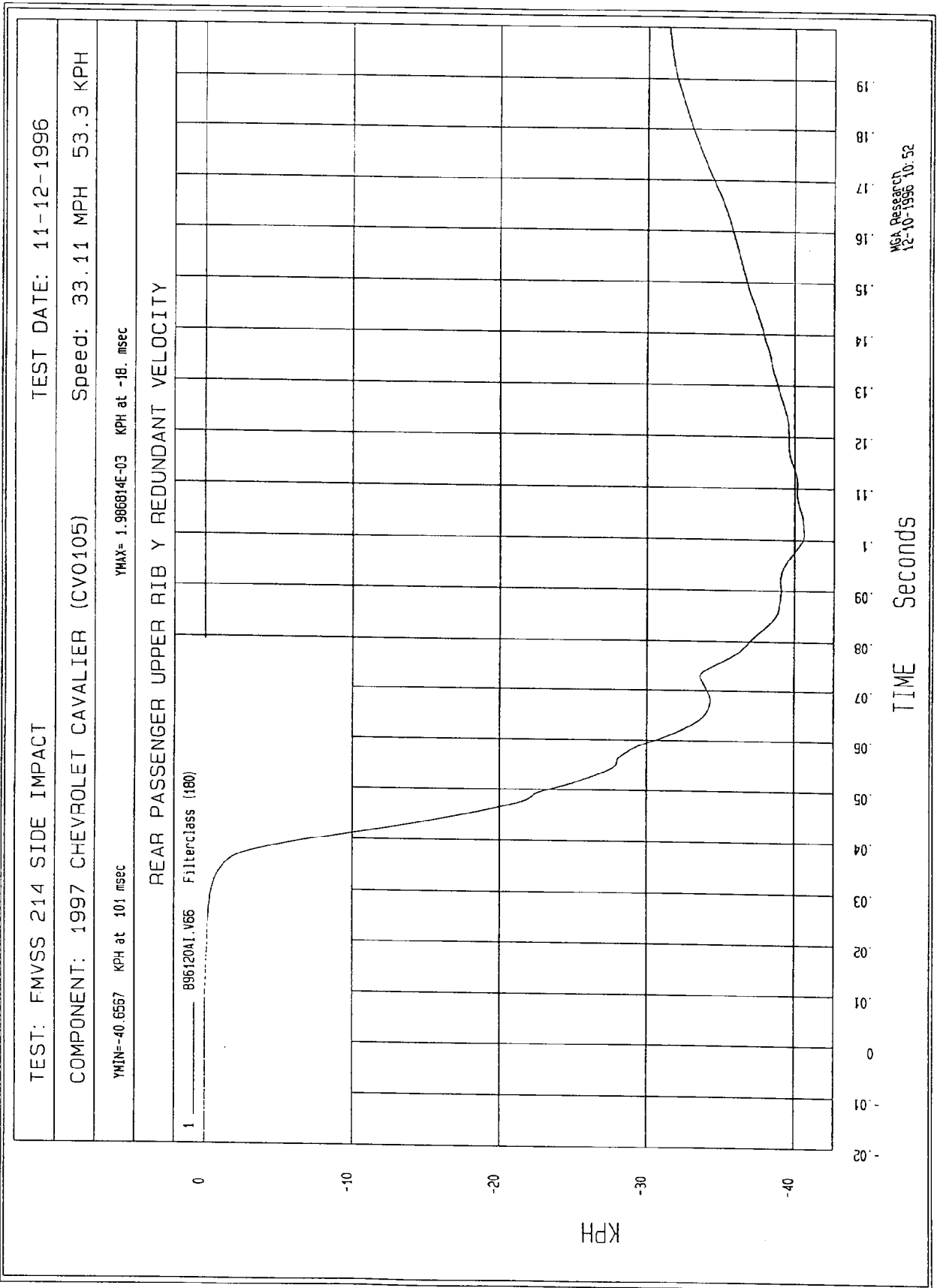
YMIN=-62.1237 G'S at 41. msec YMAX= 5.859997 G'S at 71. msec

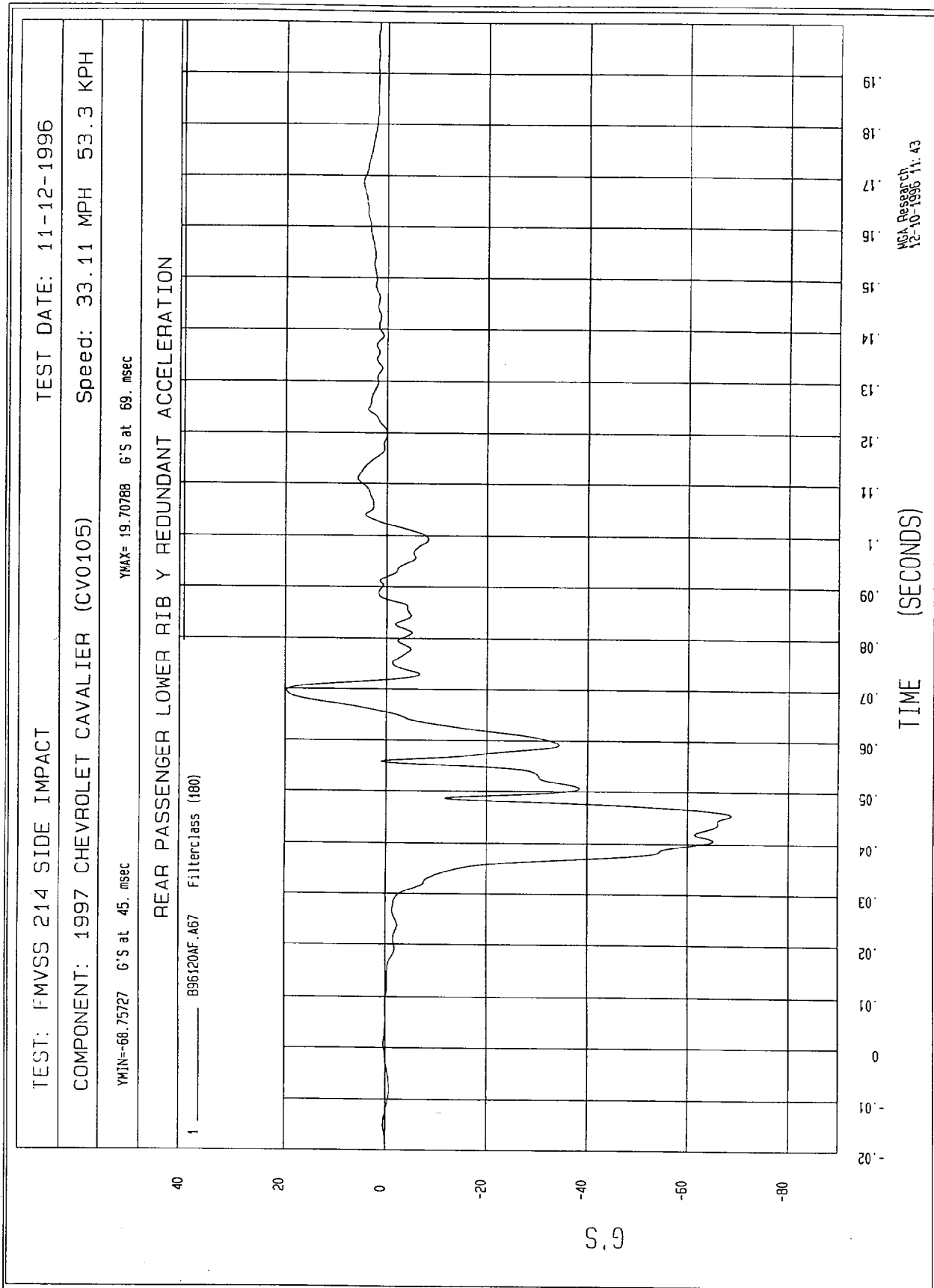
REAR PASSENGER UPPER RIB Y REDUNDANT ACCELERATION

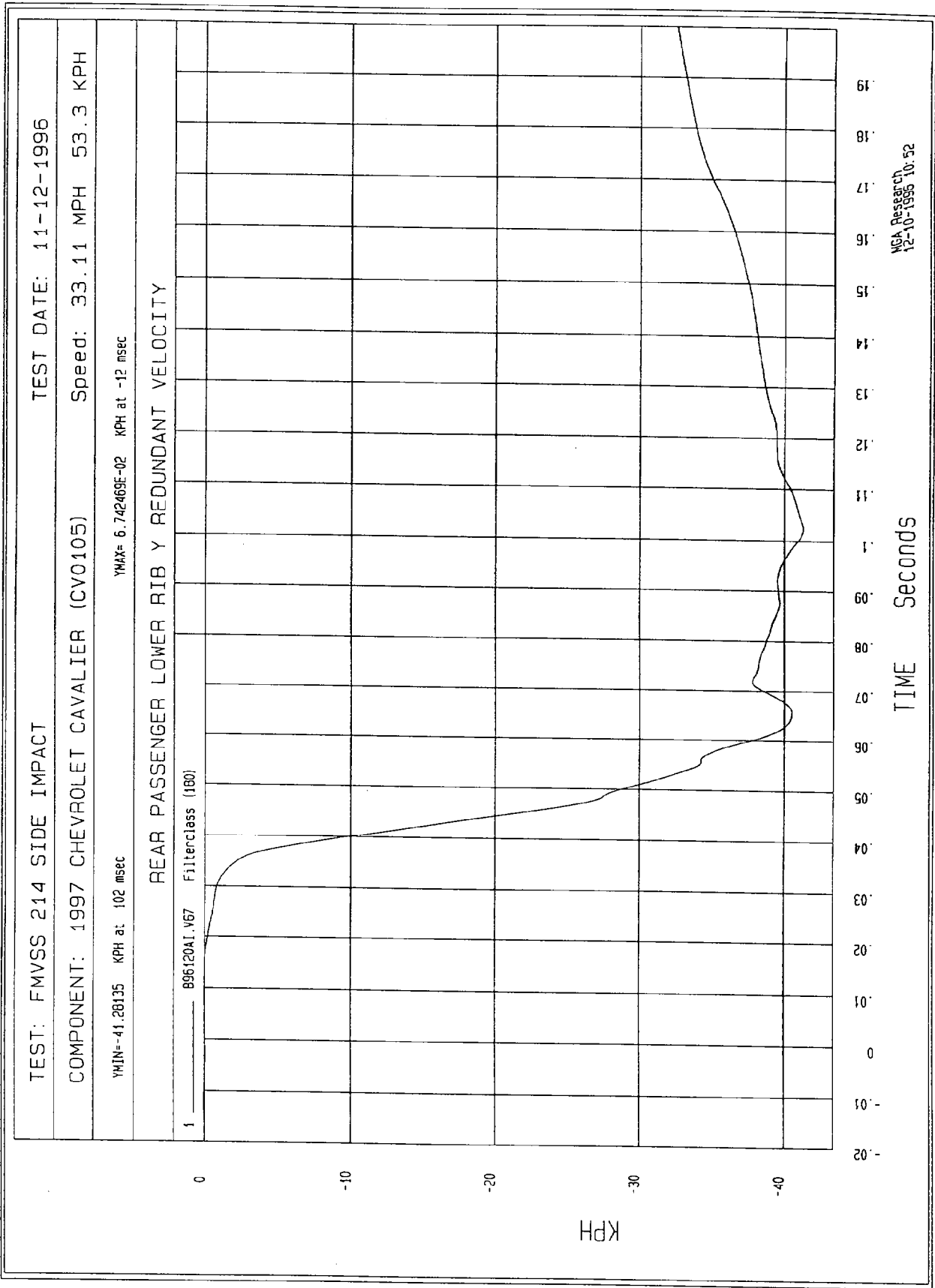
1 ——— B96120AF.A65 FilterClass (180)



MCA Research
12-10-1996 11: 43

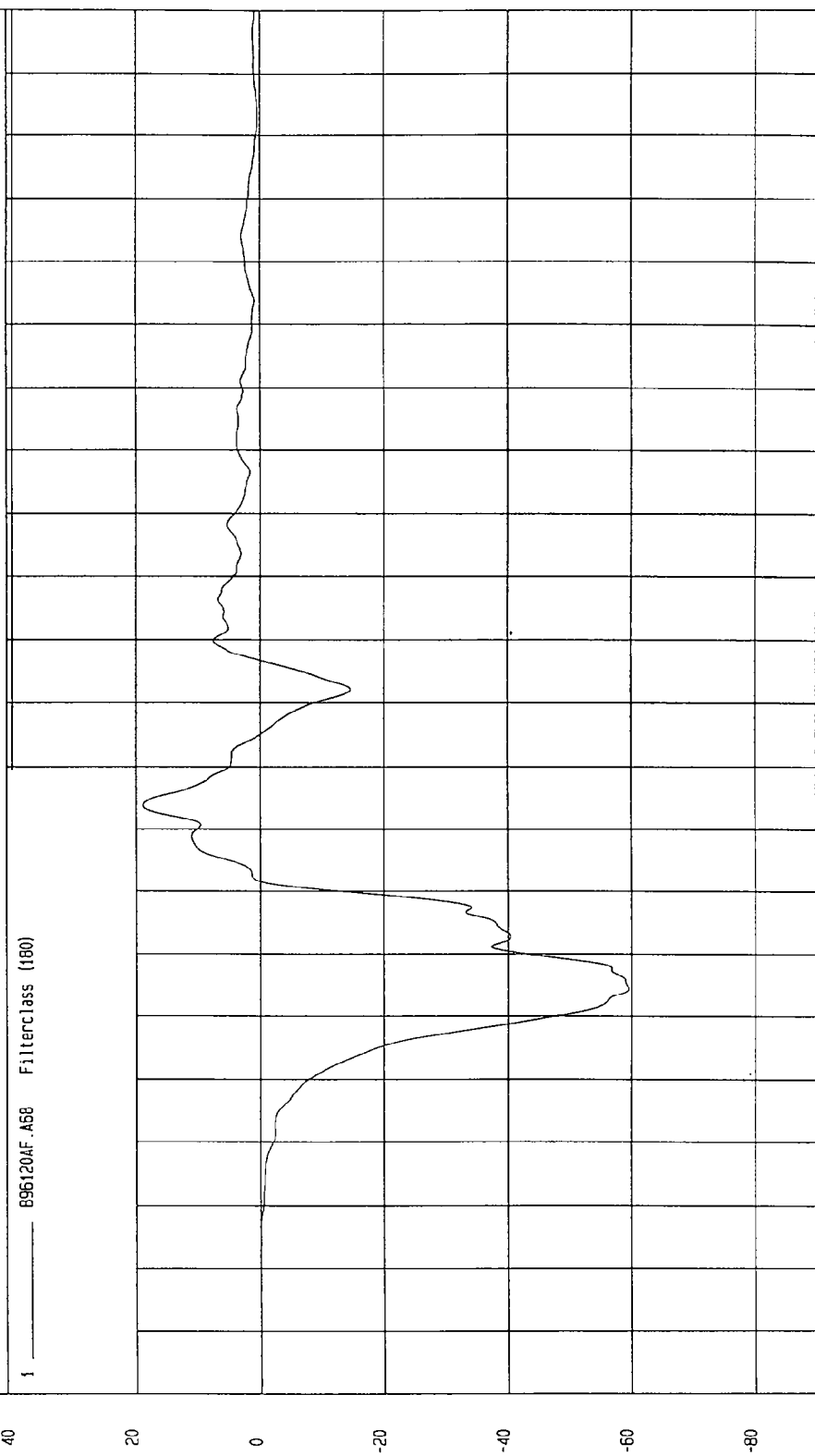




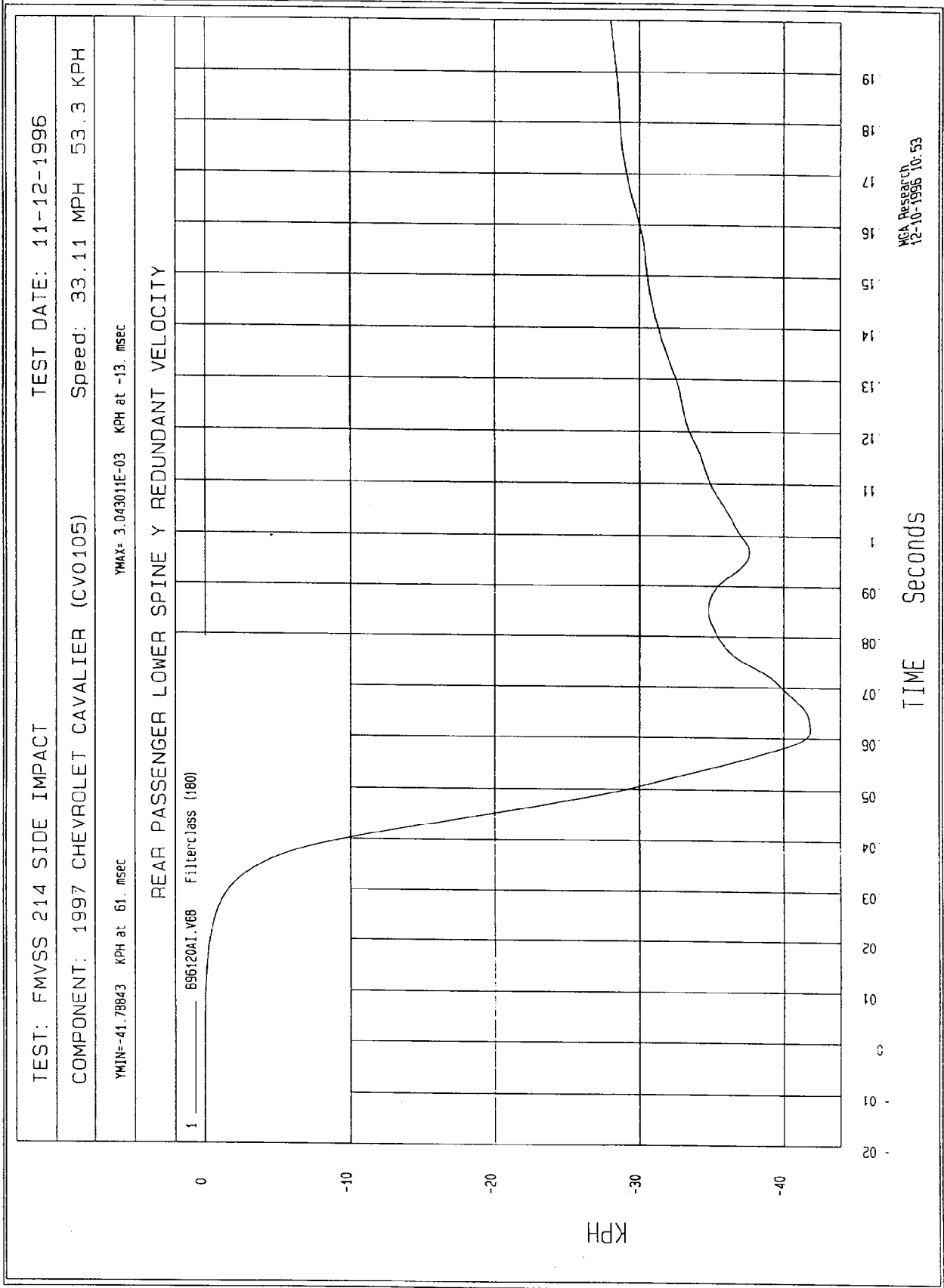


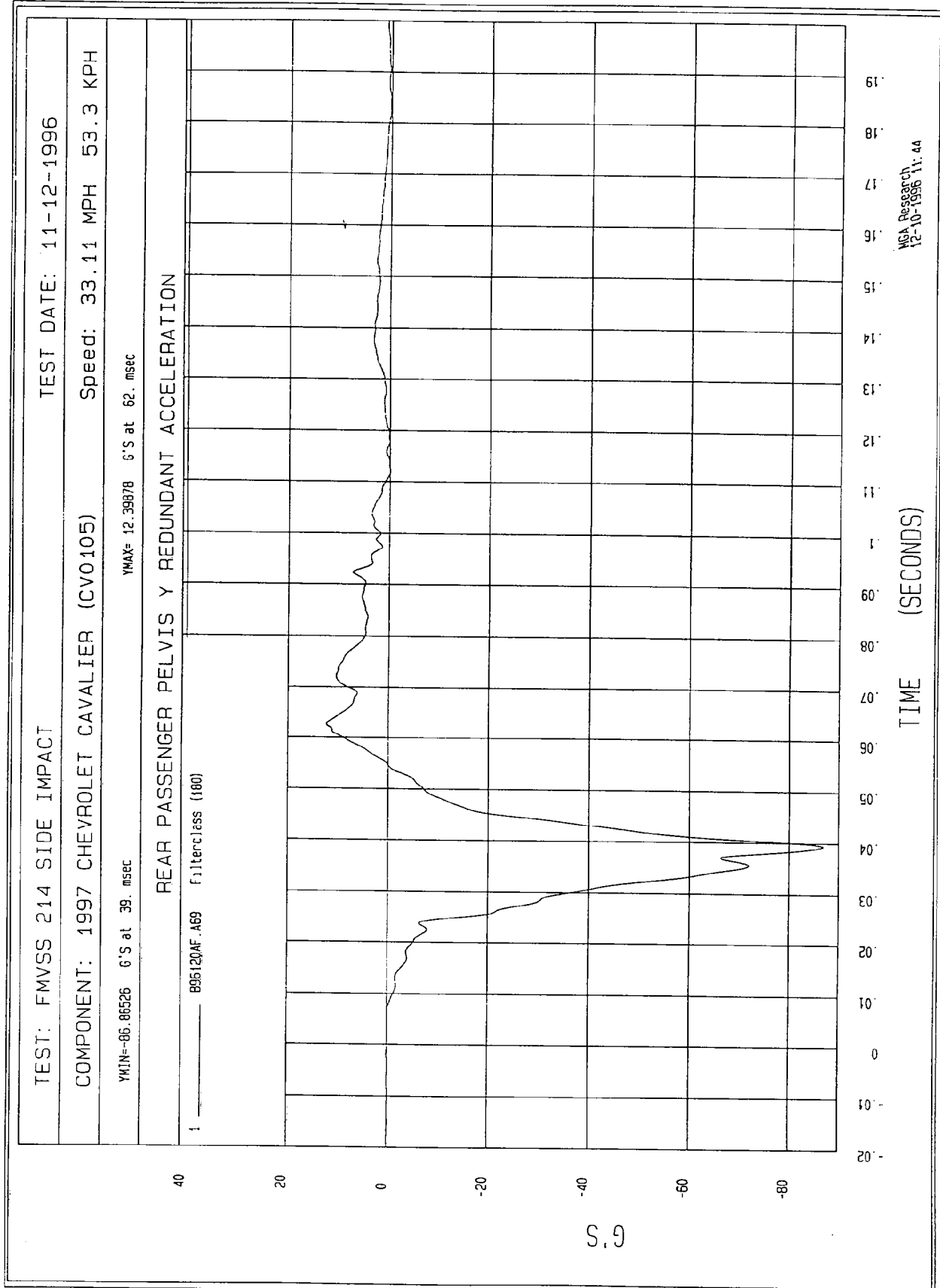
TEST: FMVSS 214 SIDE IMPACT TEST DATE: 11-12-1996
COMPONENT: 1997 CHEVROLET CAVALIER (CV0105) Speed: 33.11 MPH 53.3 KPH
YMIN=-59.57598 G'S at 44. msec YMAX= 18.86039 G'S at 73. msec

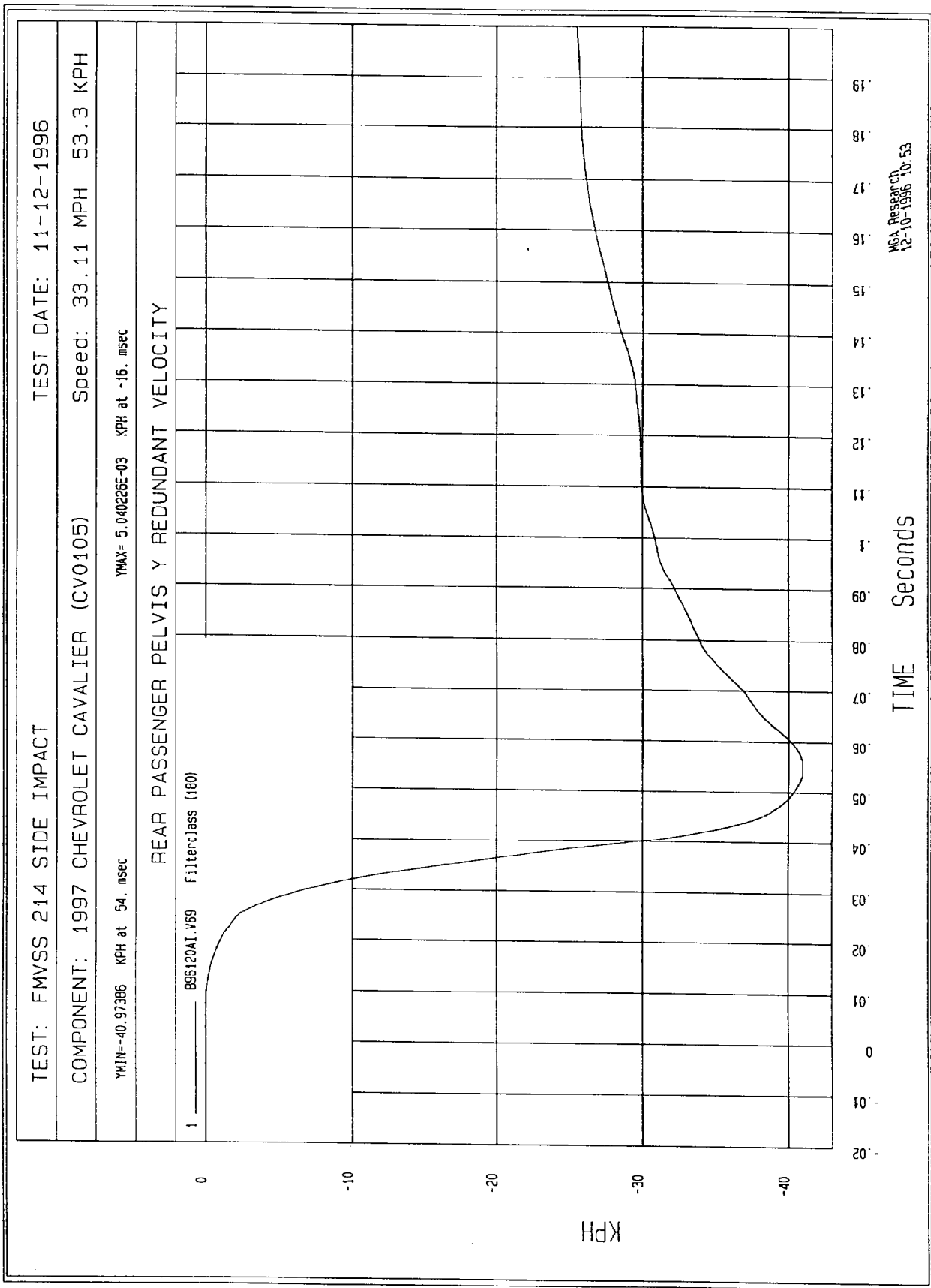
REAR PASSENGER LOWER SPINE Y REDUNDANT ACCELERATION



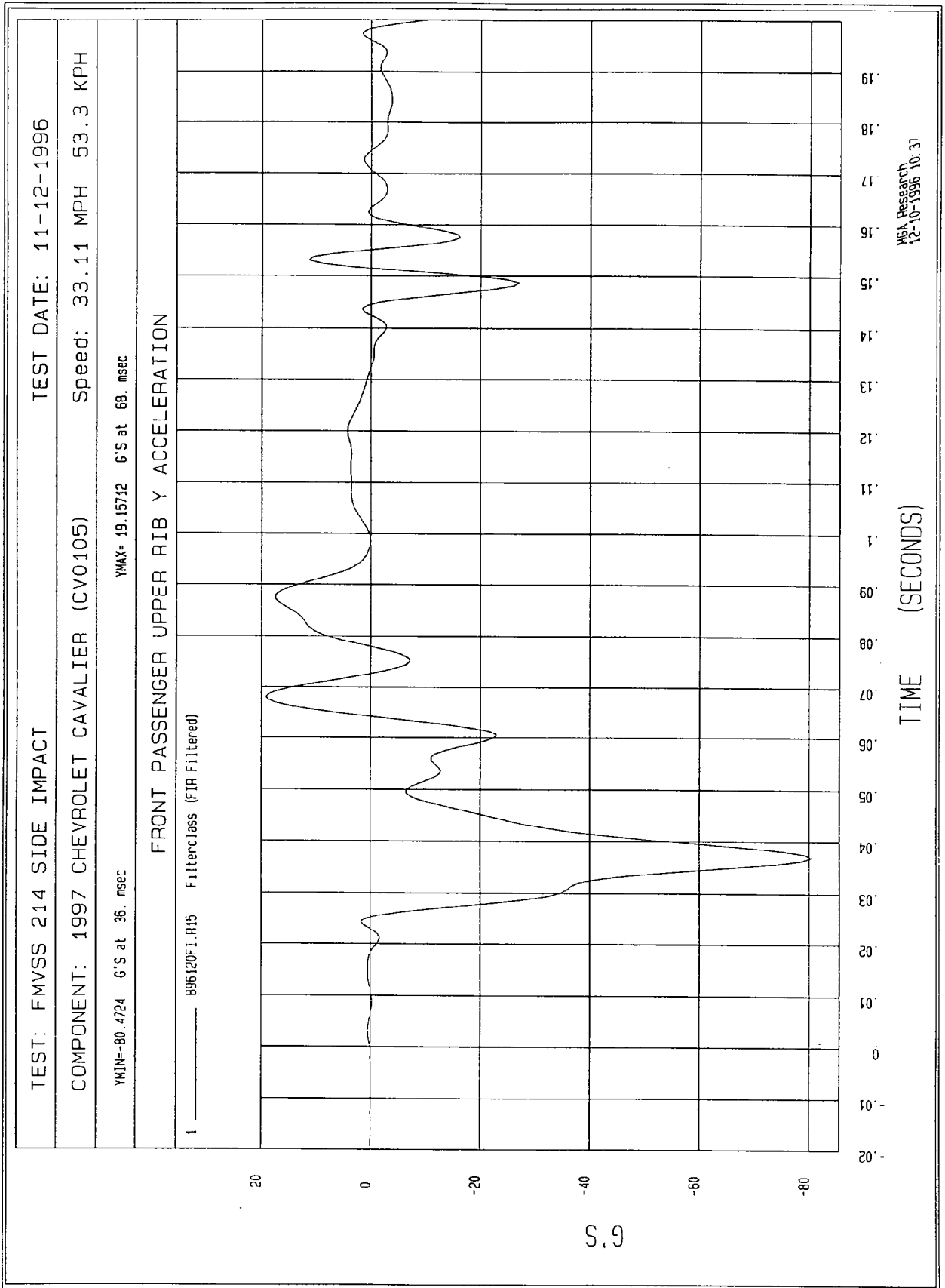
MSA Research
12-10-1996 11:44

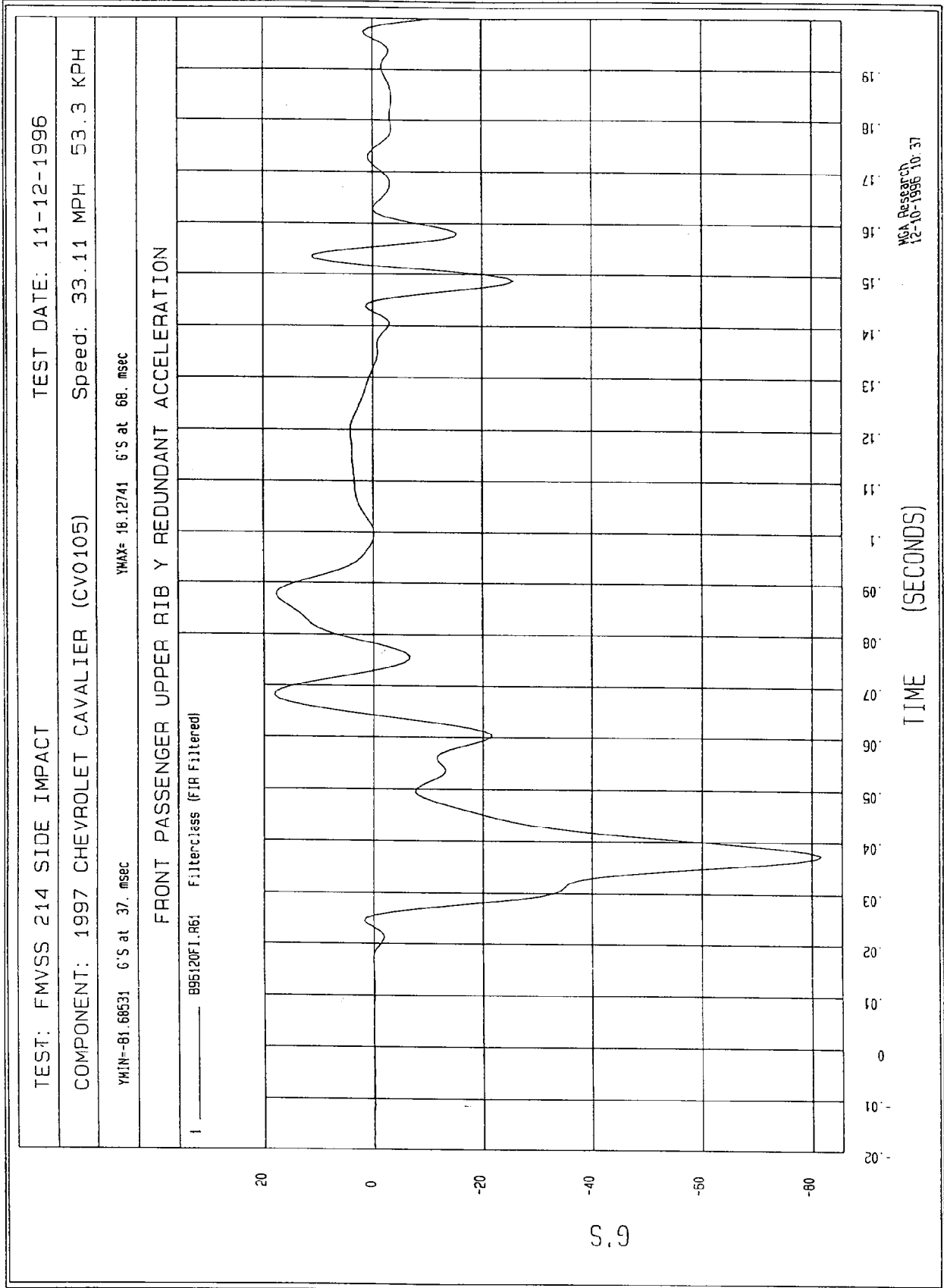






FINITE IMPULSE RESPONSE (FIR) FILTERED DATA





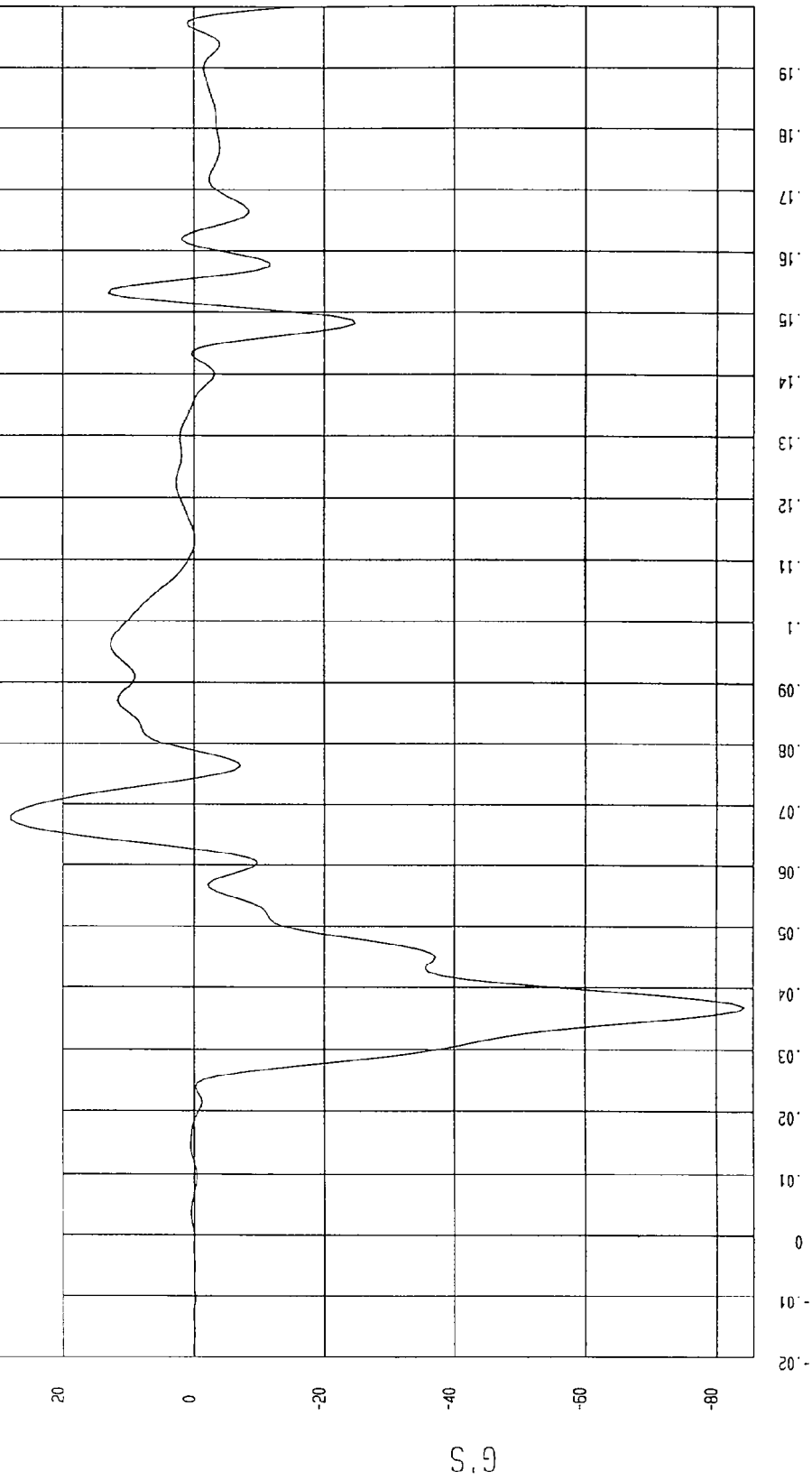
TEST: FMVSS 214 SIDE IMPACT TEST DATE: 11-12-1996

COMPONENT: 1997 CHEVROLET CAVALIER (CV0105) Speed: 33.11 MPH 53.3 KPH

YMIN=-84.21754 G'S at 35. msec YMAX= 27.93346 G'S at 67. msec

FRONT PASSENGER LOWER RIB Y ACCELERATION

1 ——— B96120F1.R16 Filterclass (FIR Filtered)



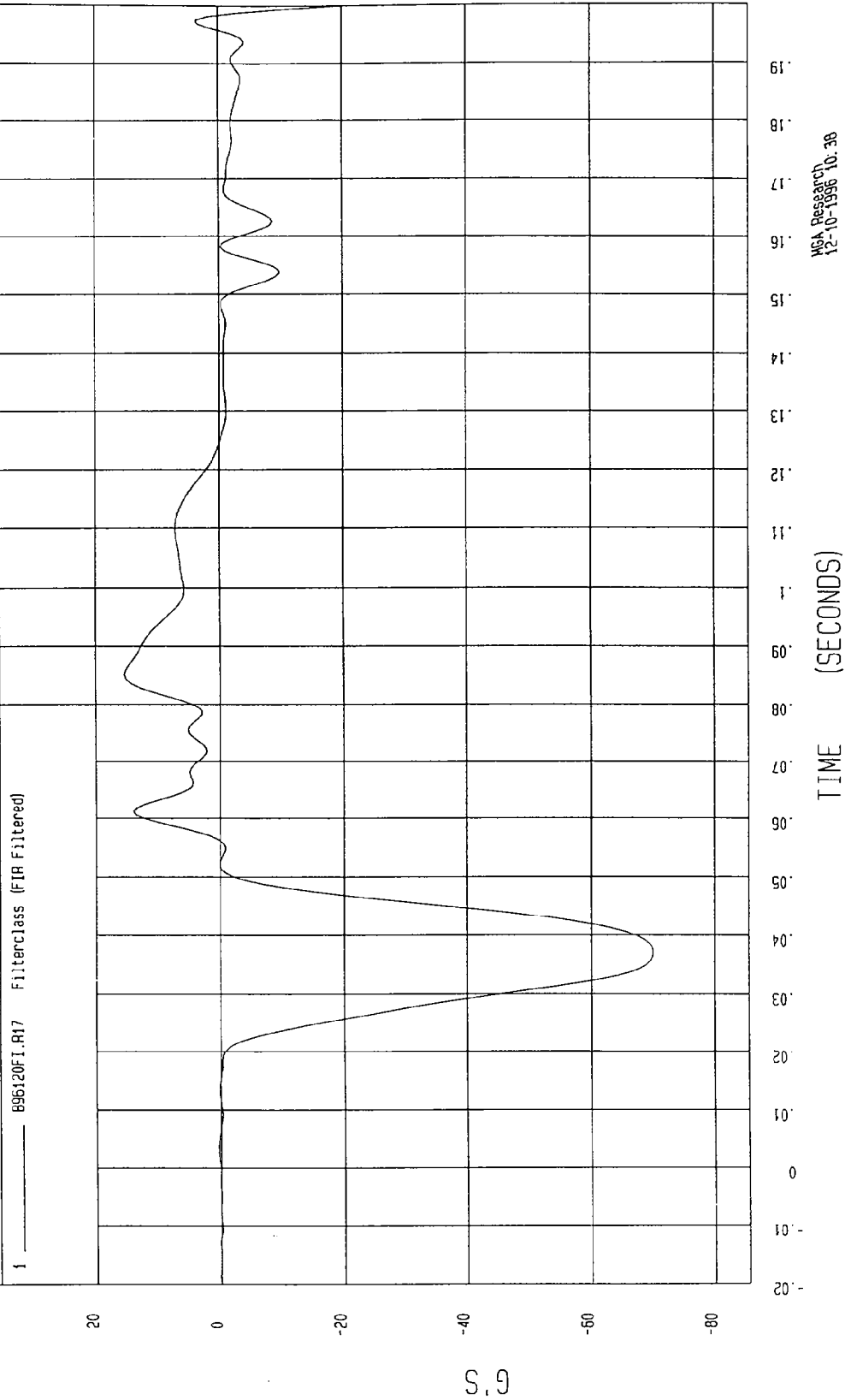
MSA Research
12-10-1996 10:30

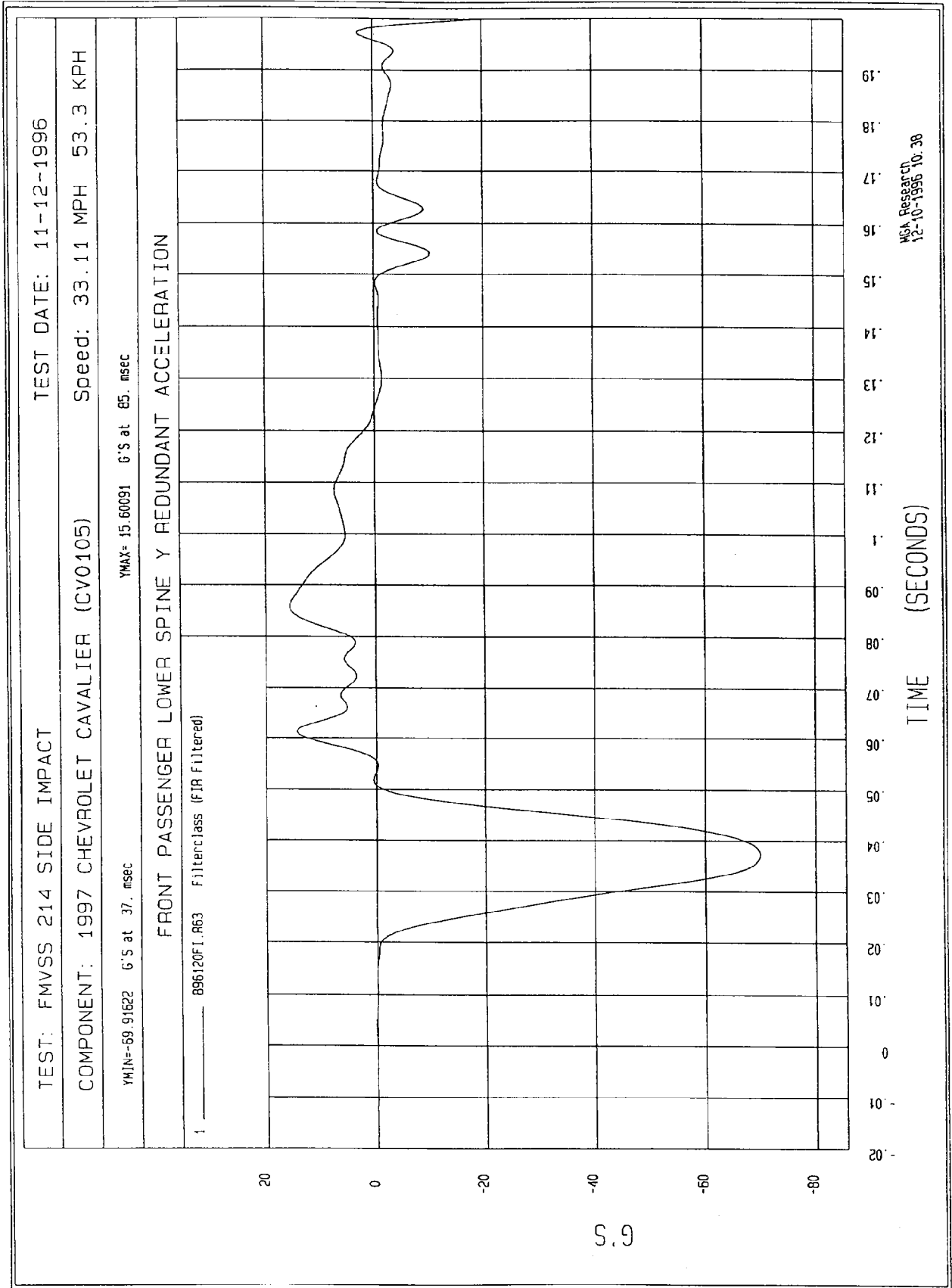
TEST: FMVSS 214 SIDE IMPACT TEST DATE: 11-12-1996

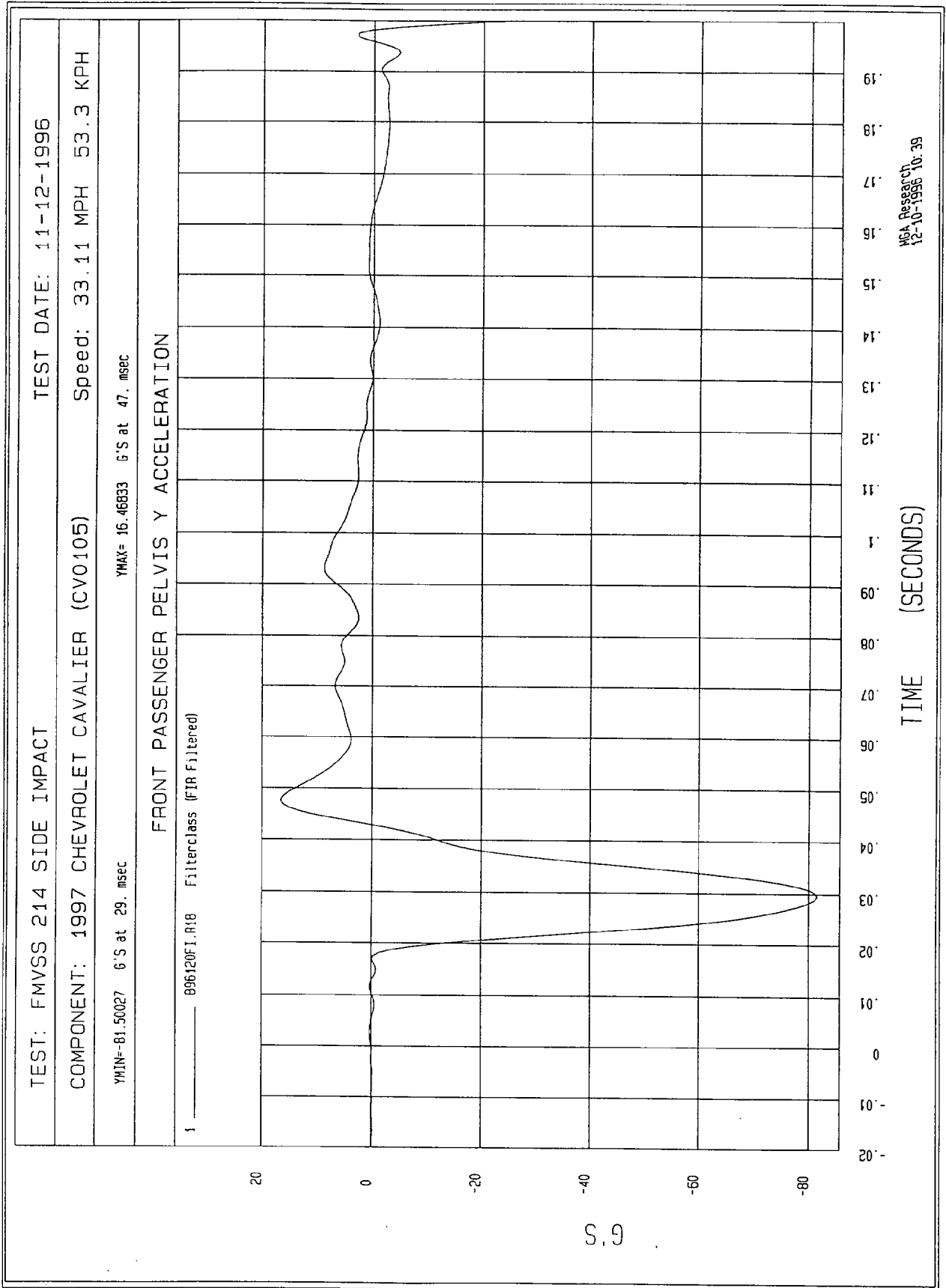
COMPONENT: 1997 CHEVROLET CAVALIER (CV0105) Speed: 33.11 MPH 53.3 KPH

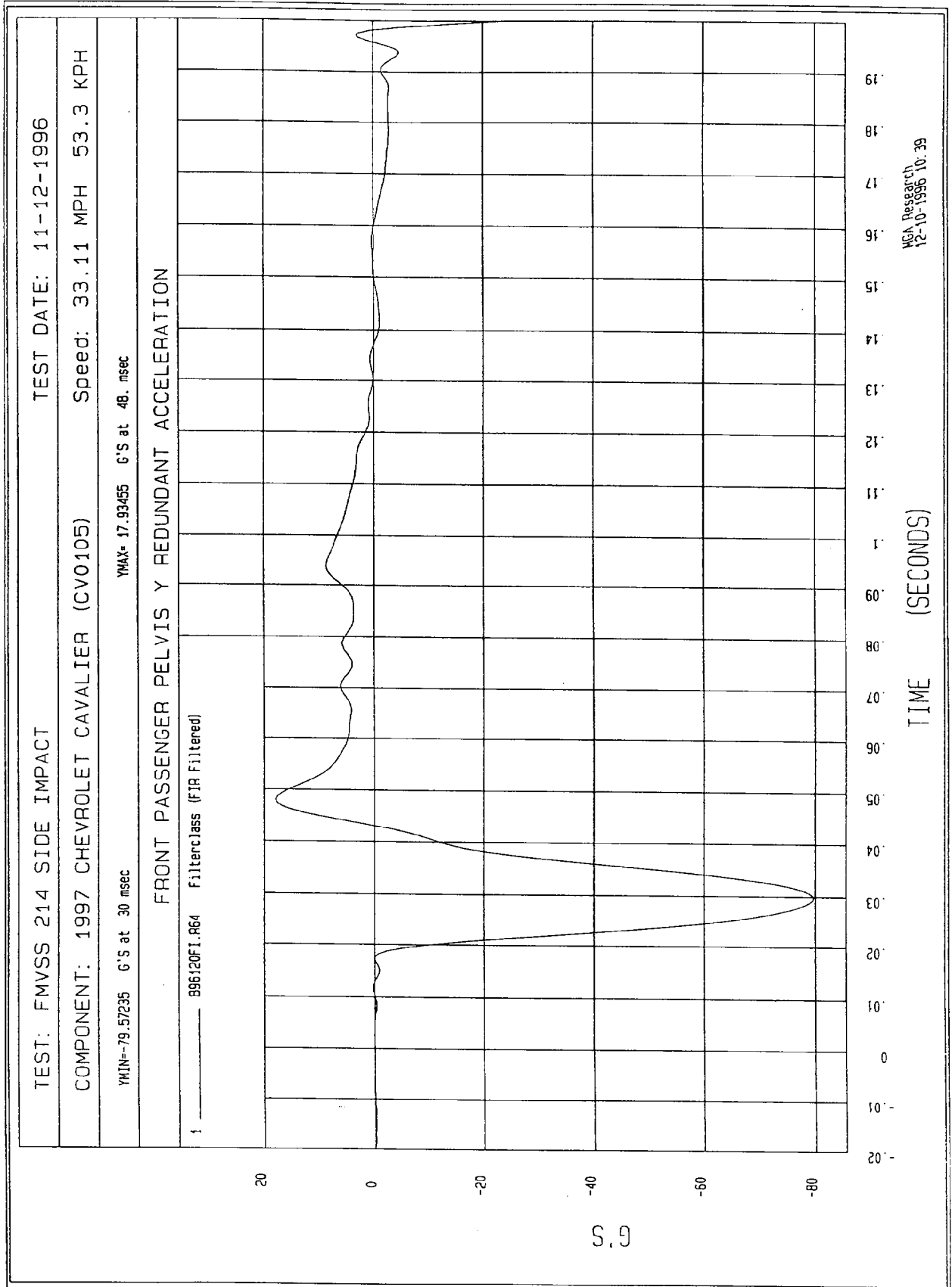
YMIN=-69.98453 G'S at 36. msec YMAX= 15.33912 G'S at 85 msec

FRONT PASSENGER LOWER SPINE Y ACCELERATION



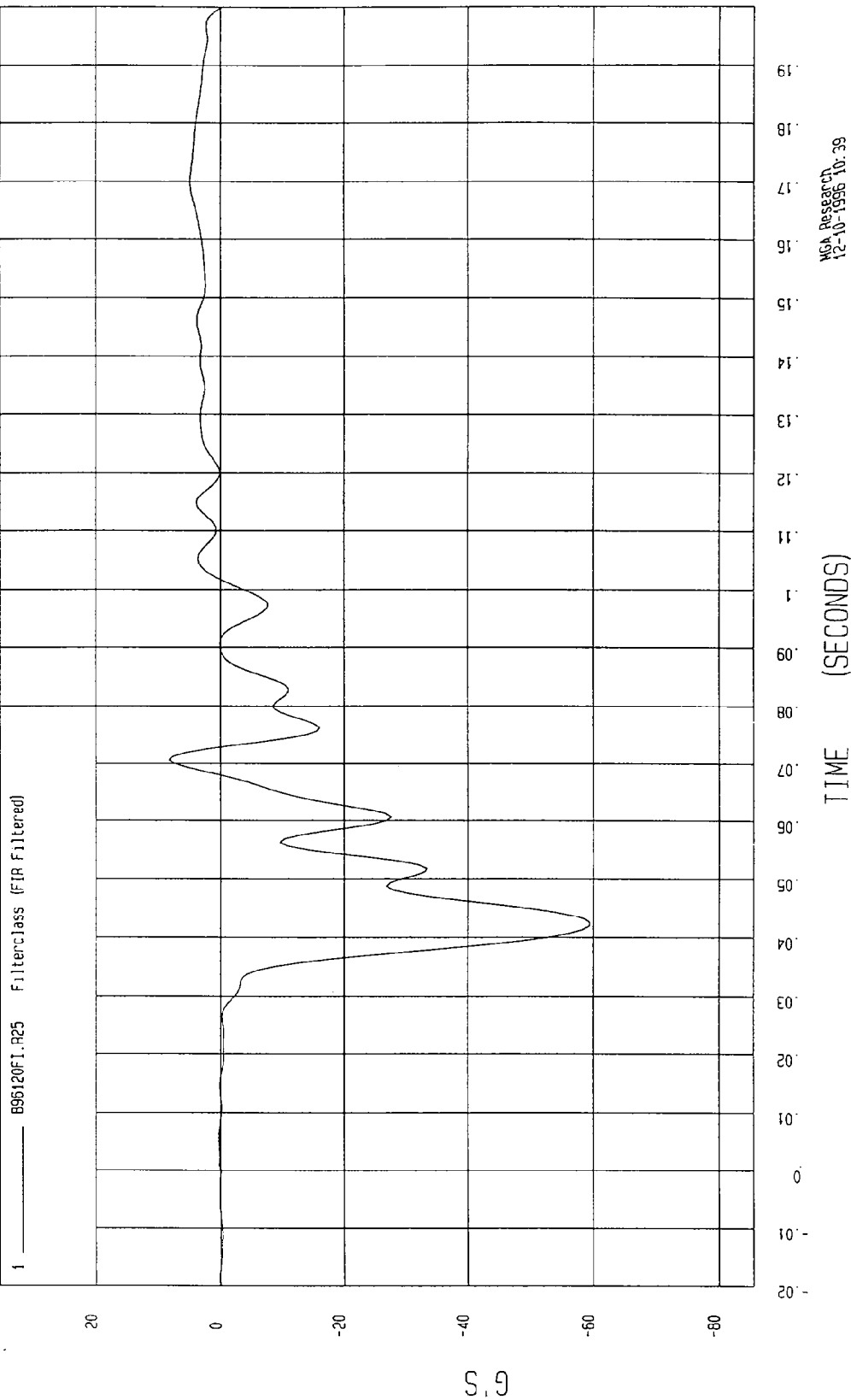


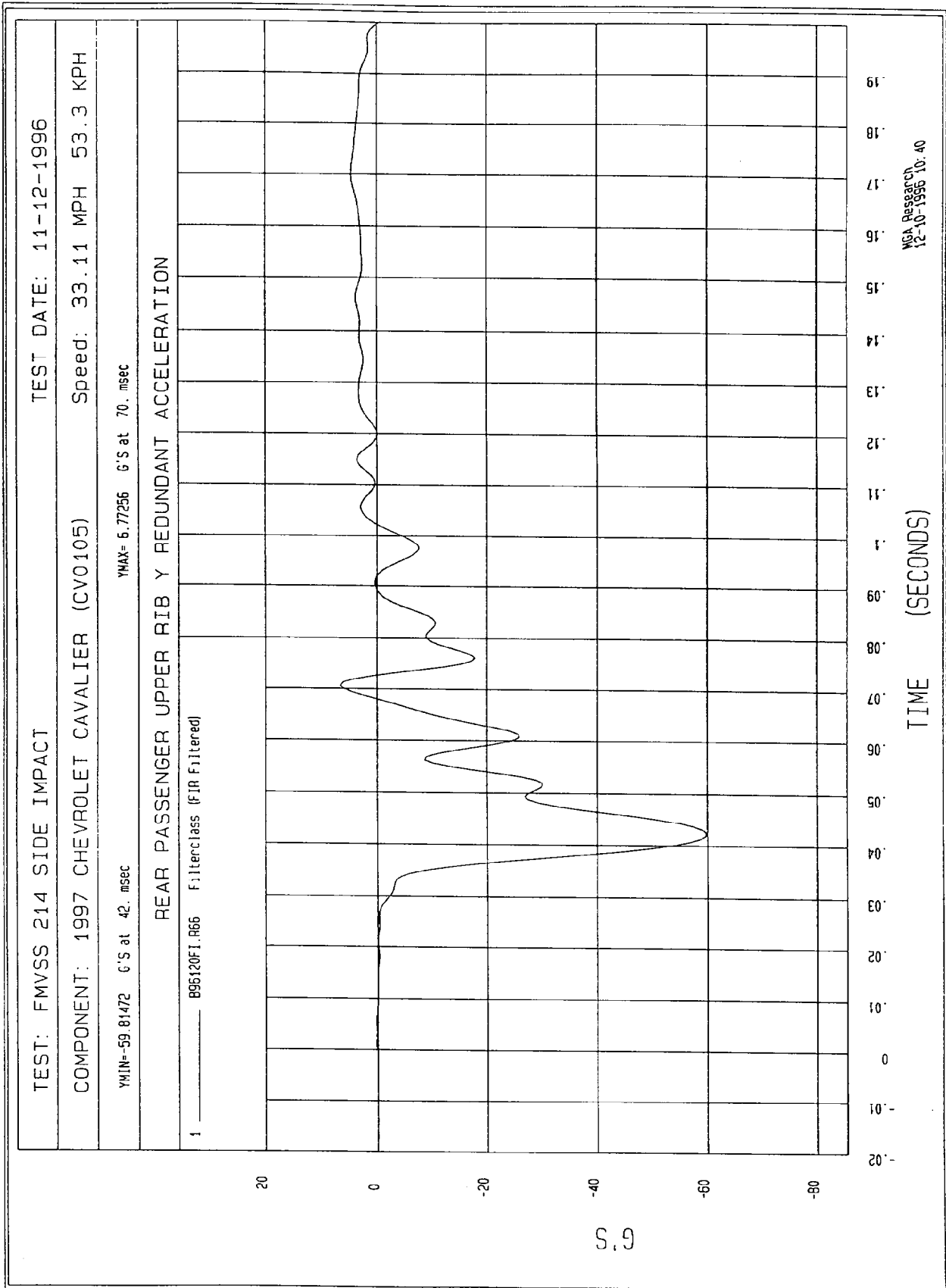




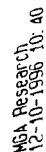
TEST: FMVSS 214 SIDE IMPACT	TEST DATE: 11-12-1996
COMPONENT: 1997 CHEVROLET CAVALIER (CV0105)	Speed: 33.11 MPH 53.3 KPH
YIN=-59.47628 G'S at 42. msec	YMAX= 8.266268 G'S at 70. msec

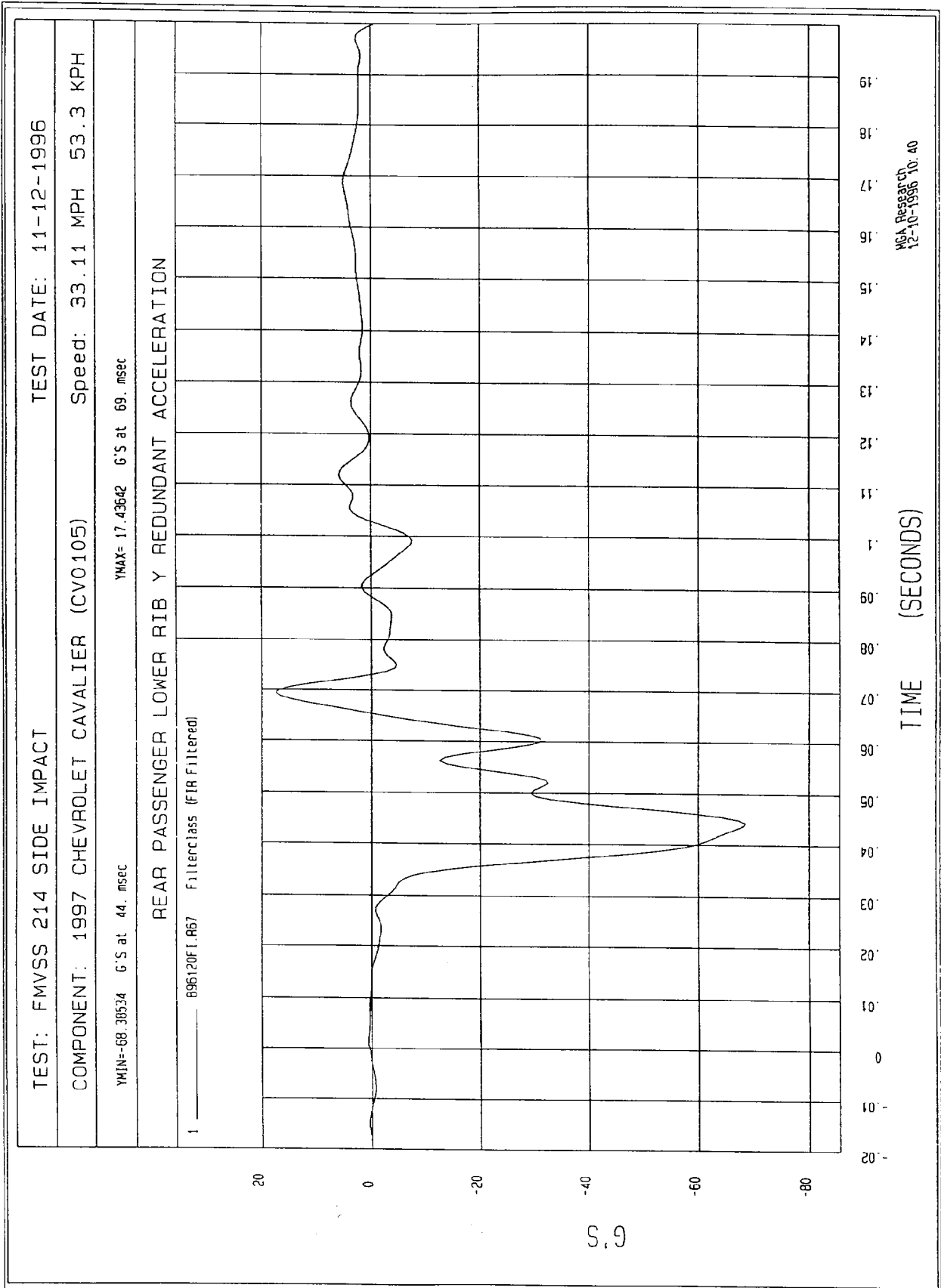
REAR PASSENGER UPPER RIB Y ACCELERATION

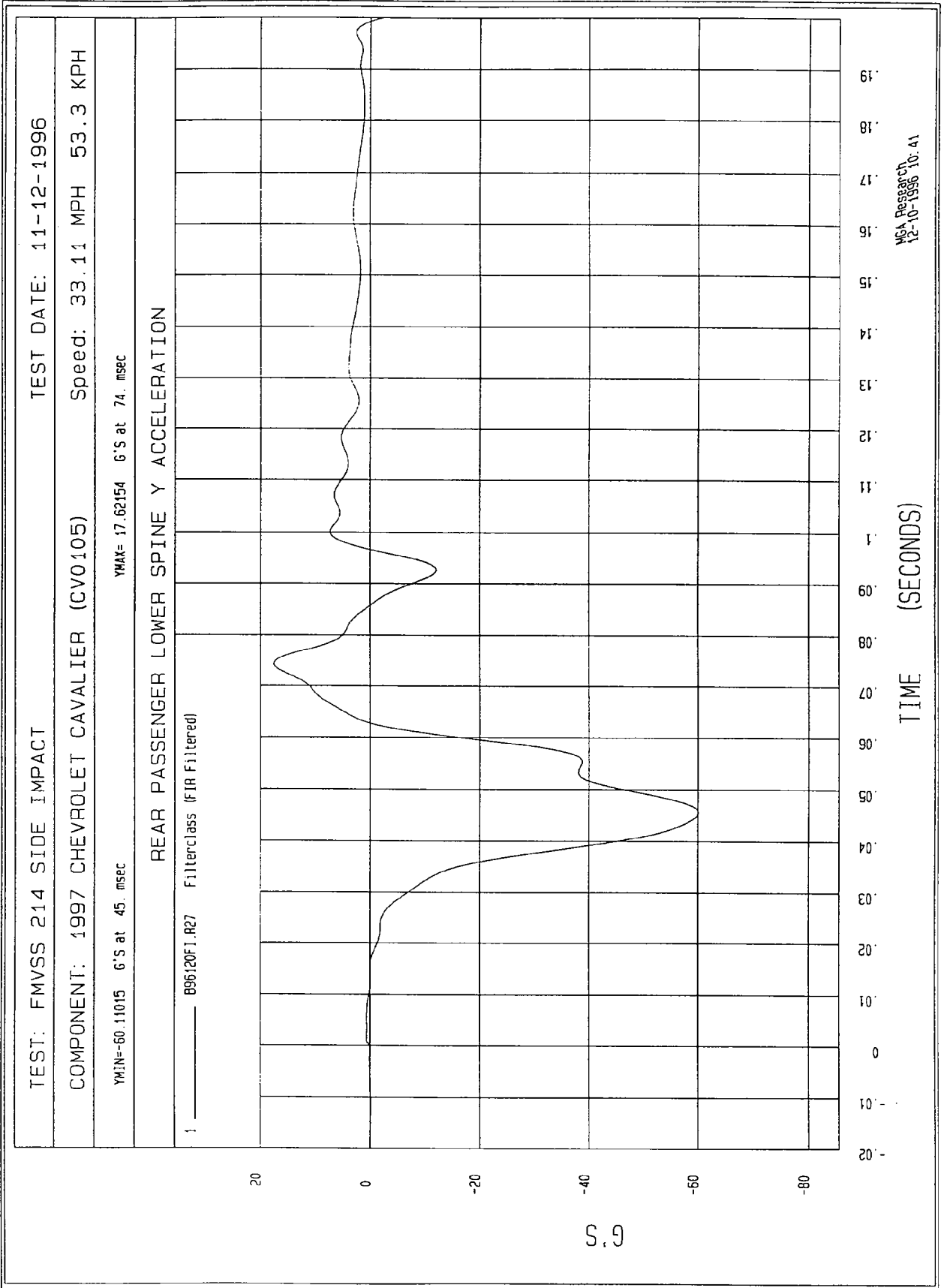


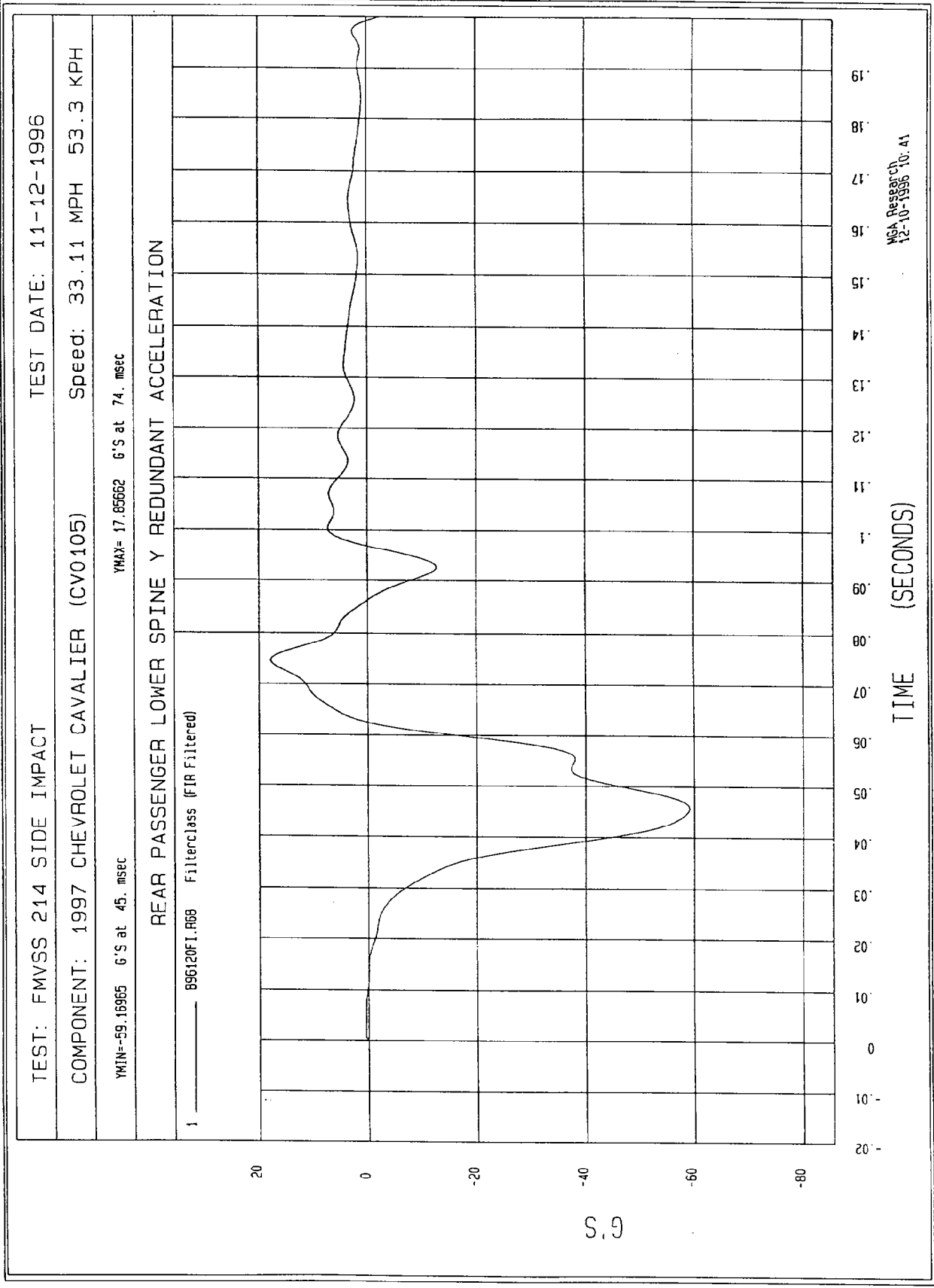


REAR PASSENGER LOWER RIB Y ACCELERATION

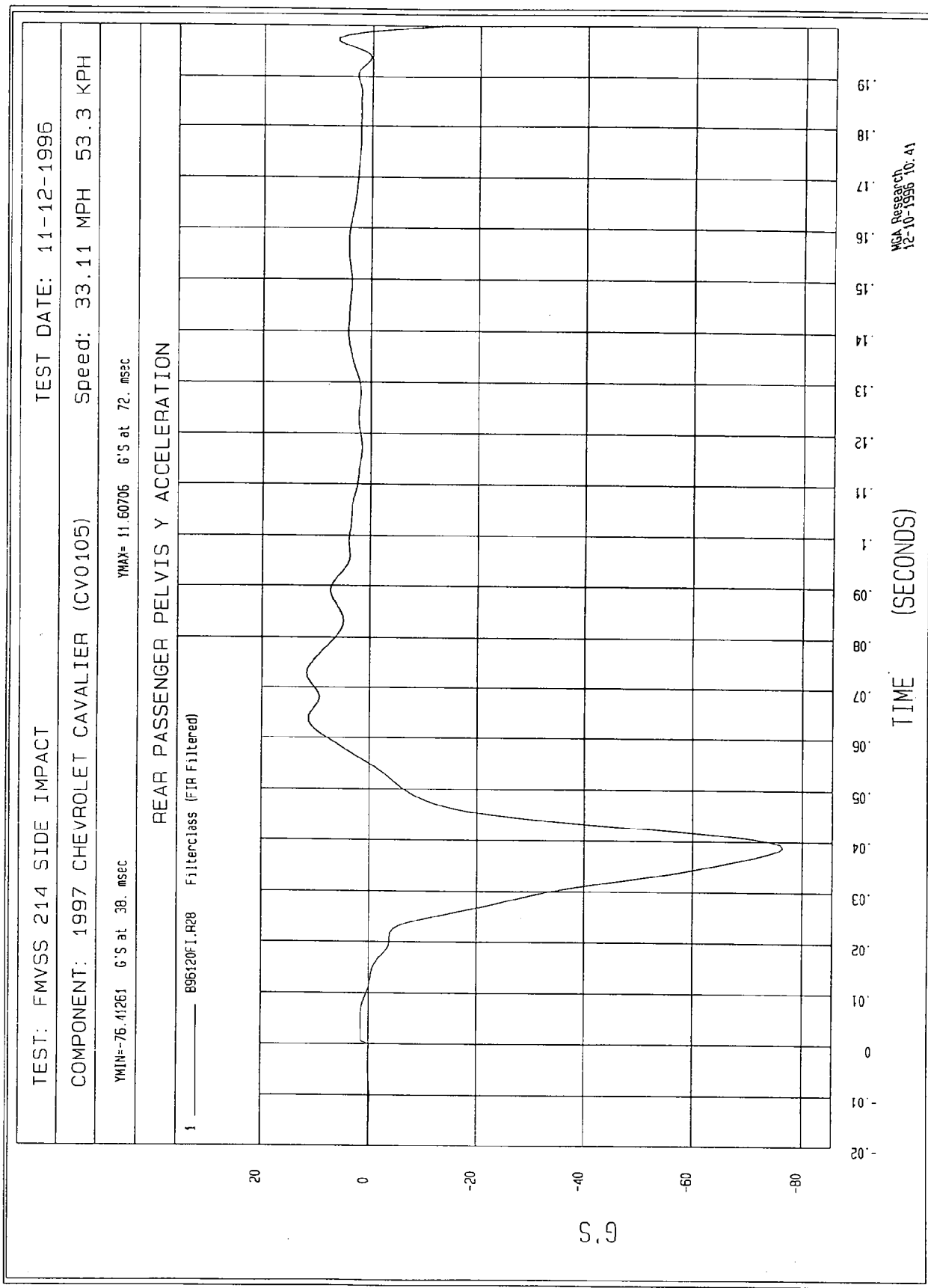


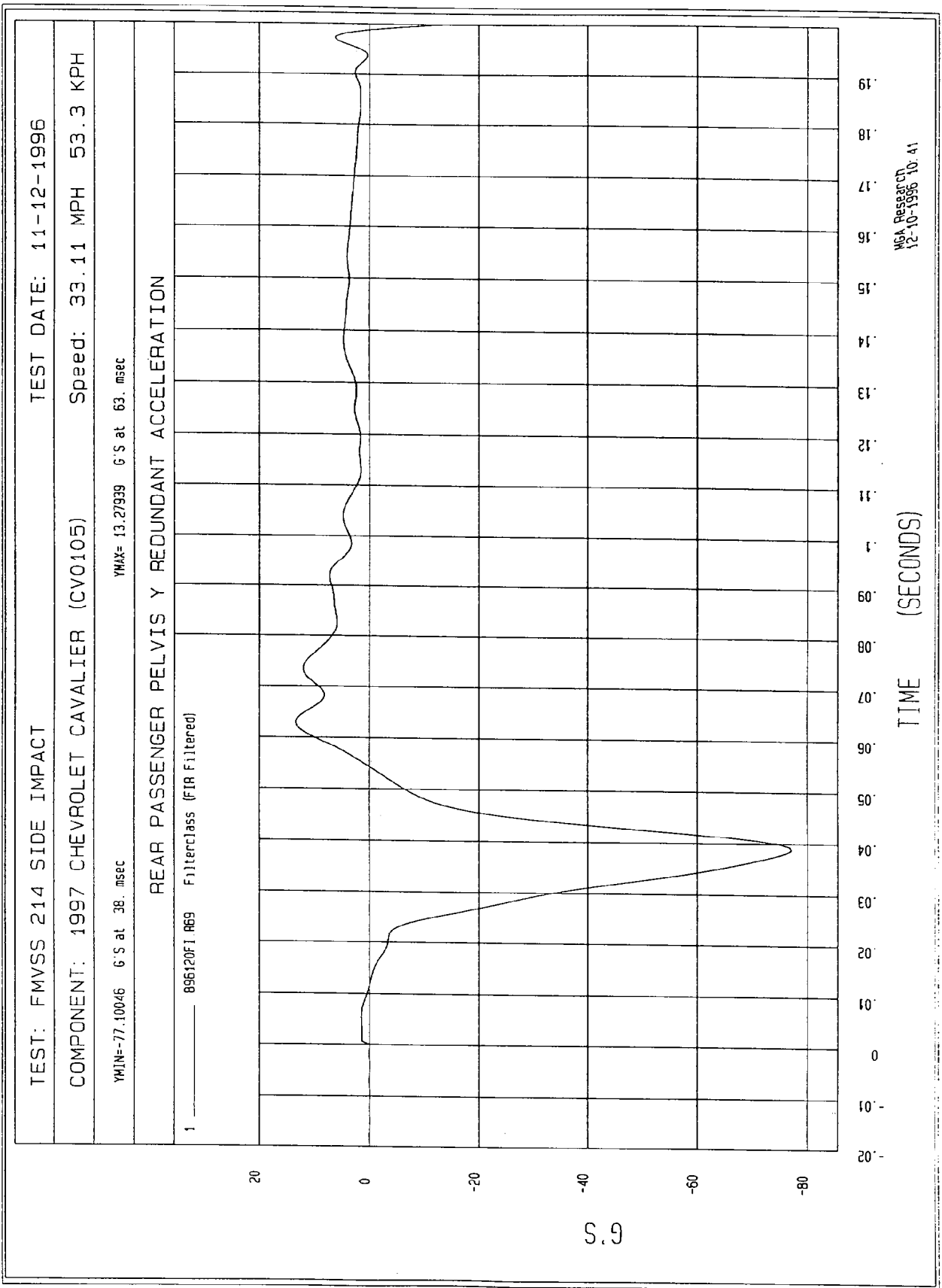






MCA Research
12-10-1996 10:41





APPENDIX C

SID CONFIGURATION AND PERFORMANCE VERIFICATION

REPORT NO. MGA-96-DC07

DUMMY PERFORMANCE CALIBRATIONS

FMVSS 214 - SIDE IMPACT TEST

GENERAL MOTORS CORPORATION
1997 CHEVROLET CAVALIER 2 DOOR
NHTSA NO. CV0105

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: November 12, 1996

Report Date: December 18, 1996

FINAL REPORT

Prepared For:

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
MAIL CODE: NEF-30
400 SEVENTH STREET, S.W., ROOM 6115
Washington, D.C. 20590

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DUMMY S/N: 269	PRE-TEST CERTIFICATION DATA	1-1
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DUMMY S/N: 269	POST-TEST CERTIFICATION DATA	3-1
DUMMY S/N: 270	POST-TEST CERTIFICATION DATA	4-1
DUMMY S/N: 269	POST-TEST INSPECTION CHECKLIST	5-1
DUMMY S/N: 270	POST-TEST INSPECTION CHECKLIST	6-1
	VEHICLE AND DUMMY TEMPERATURE	7-1

PRE-TEST CERTIFICATION DATA

Front Dummy Serial Number: 269

Calibration Test Results Summary

Dummy Serial Number: 269

Pre-Test Calibration

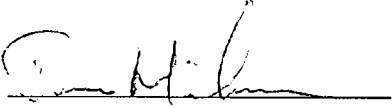
External Dimensions:	The dummy passed all external dimension requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion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

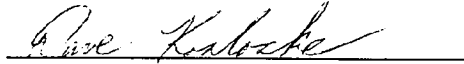
SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 269

DATE OF VERIFICATION: November 07, 1996

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.1
RH - Rib Height	19.75" - 20.50"	20.00
HP - Hip Pivot Height	3.9" ref.	3.9
RD - Rib From Back Line	9.0" to 9.5"	9.3
KV - Knee Pivot From Back Line	20.1" - 20.7"	20.4
SW - Knee Pivot to Floor	19.3" - 19.9"	19.4
HW - Hip Width	14.0" - 15.4"	15.1

MEASUREMENTS BY: 

APPROVED BY: 

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: November 07, 1996

DUMMY NUMBER: 269

TEST NUMBER: D961582

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	30%
PROBE SPEED	13.8 - 14.2 fps	14.0
UPPER RIB	37 - 46 g's	45
LOWER RIB	37 - 46 g's	39
LOWER SPINE	15 - 22 g's	22

TEST MEETS SPECIFICATIONS

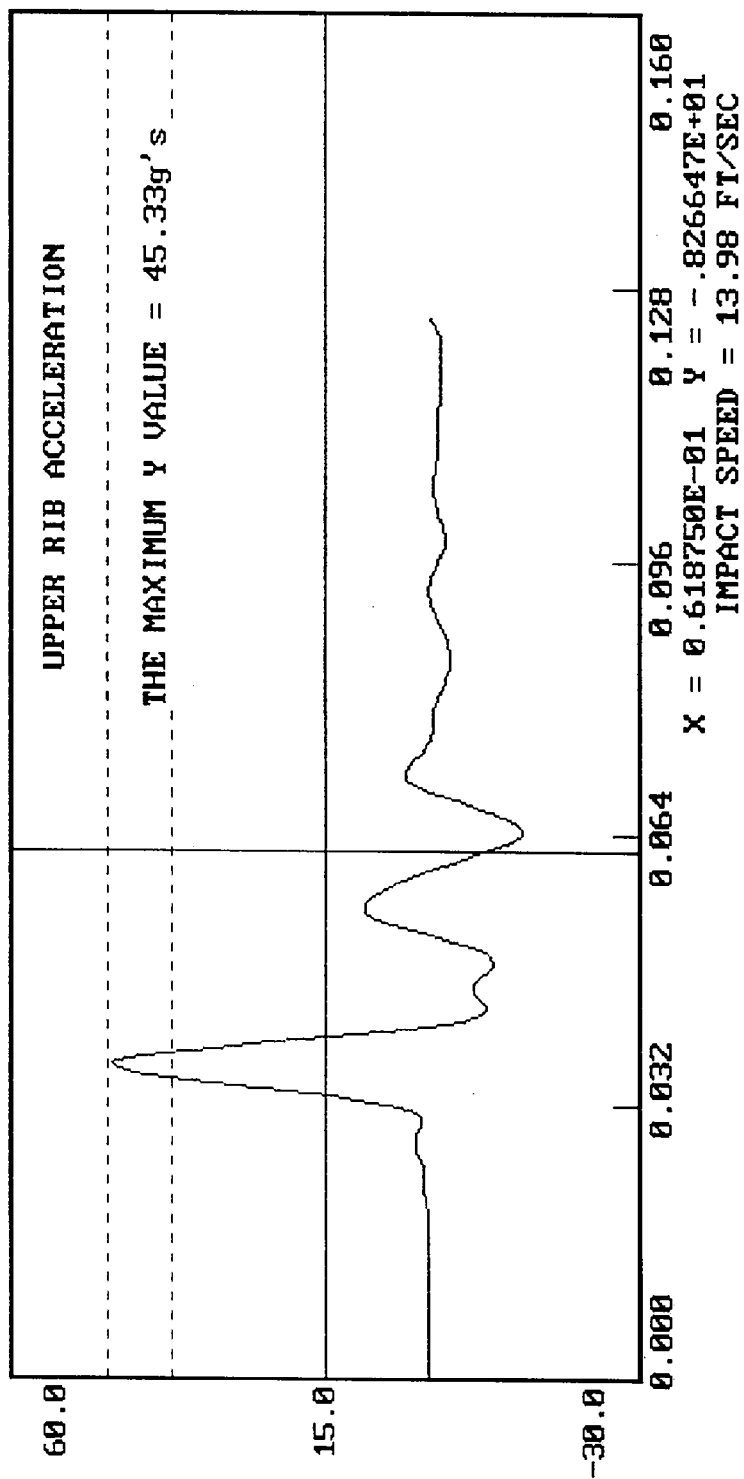
TECHNICIAN

Jim White

APPROVED BY

Don Kabeke

DUMMY CALIBRATION - THORAX IMPACT
 DUMMY # 269
 11-07-1996 15:04
 ACCELERATION (G'S) VS. TIME ((SECONDS))

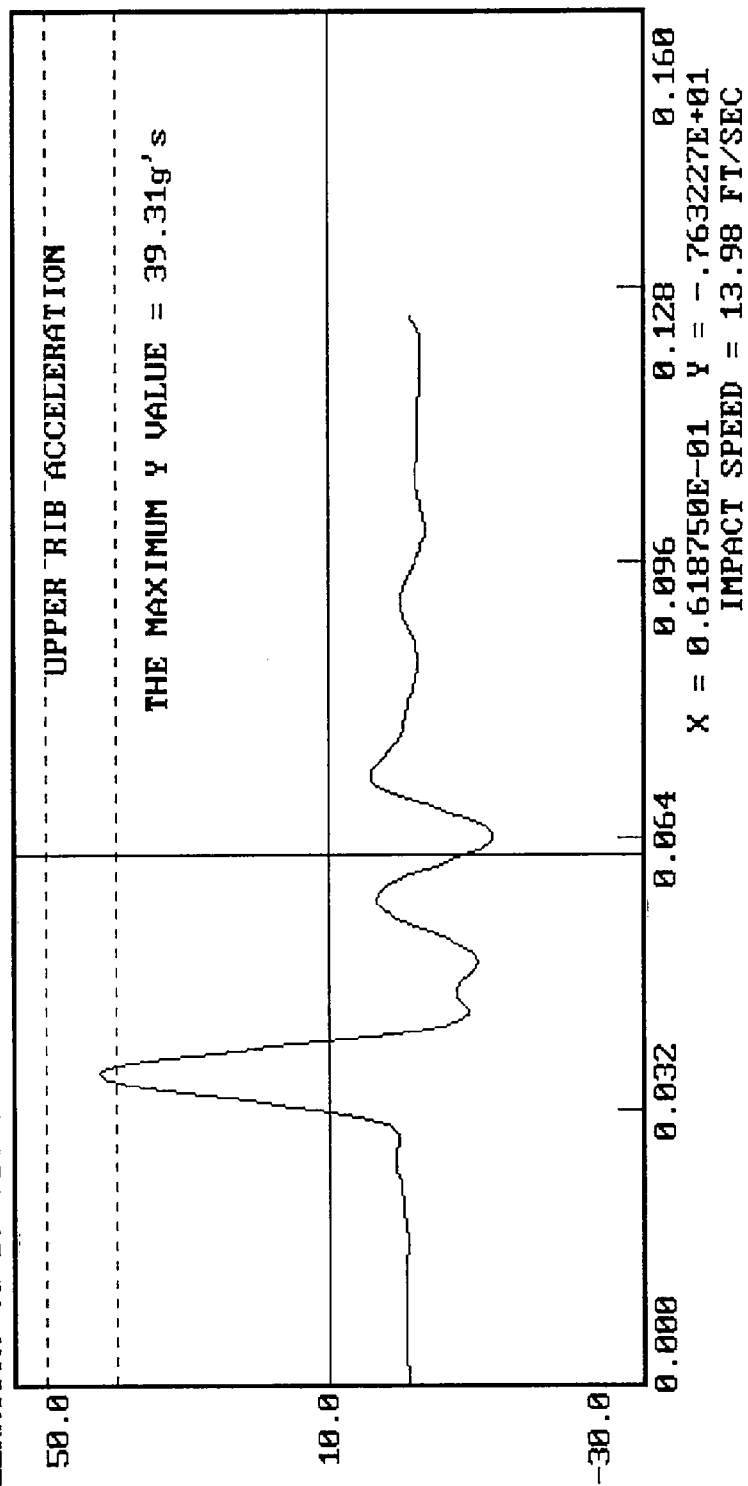


11-07-1996 15:04

DUMMY CALIBRATION - THORAX IMPACT

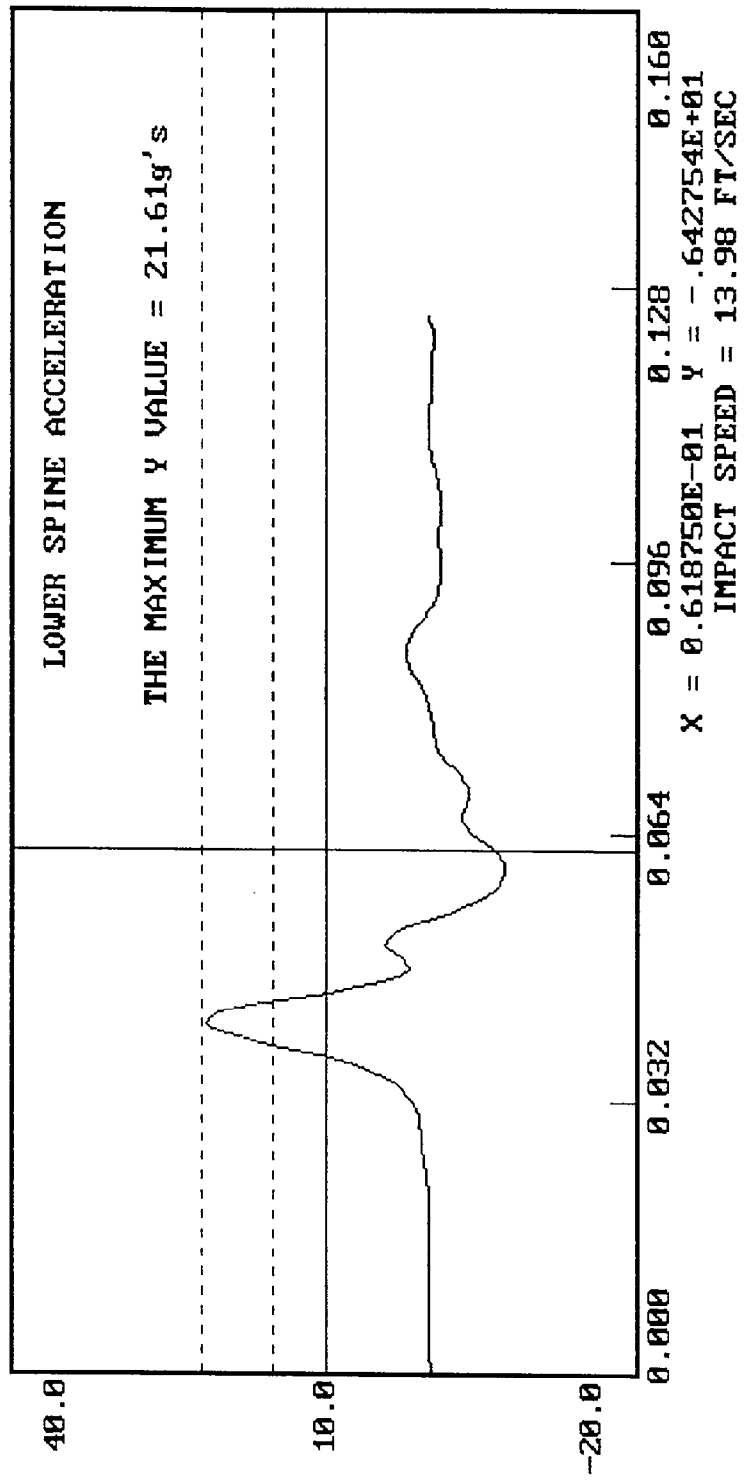
DUMMY # 269

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



11-07-1996 15:04

DUMMY CALIBRATION - THORAX IMPACT
DUMMY # 269
ACCELERATION (G'S) VS. TIME ((SECONDS))



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: November 07, 1996

DUMMY NUMBER: 269

TEST NUMBER: D961583

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	30%
PROBE SPEED	13.8 - 14.2 f/s	13.9
PELVIS ACCELERATION	40 - 60 g's	51

TEST MEETS SPECIFICATIONS

TECHNICIAN

Jim Wilson

APPROVED BY

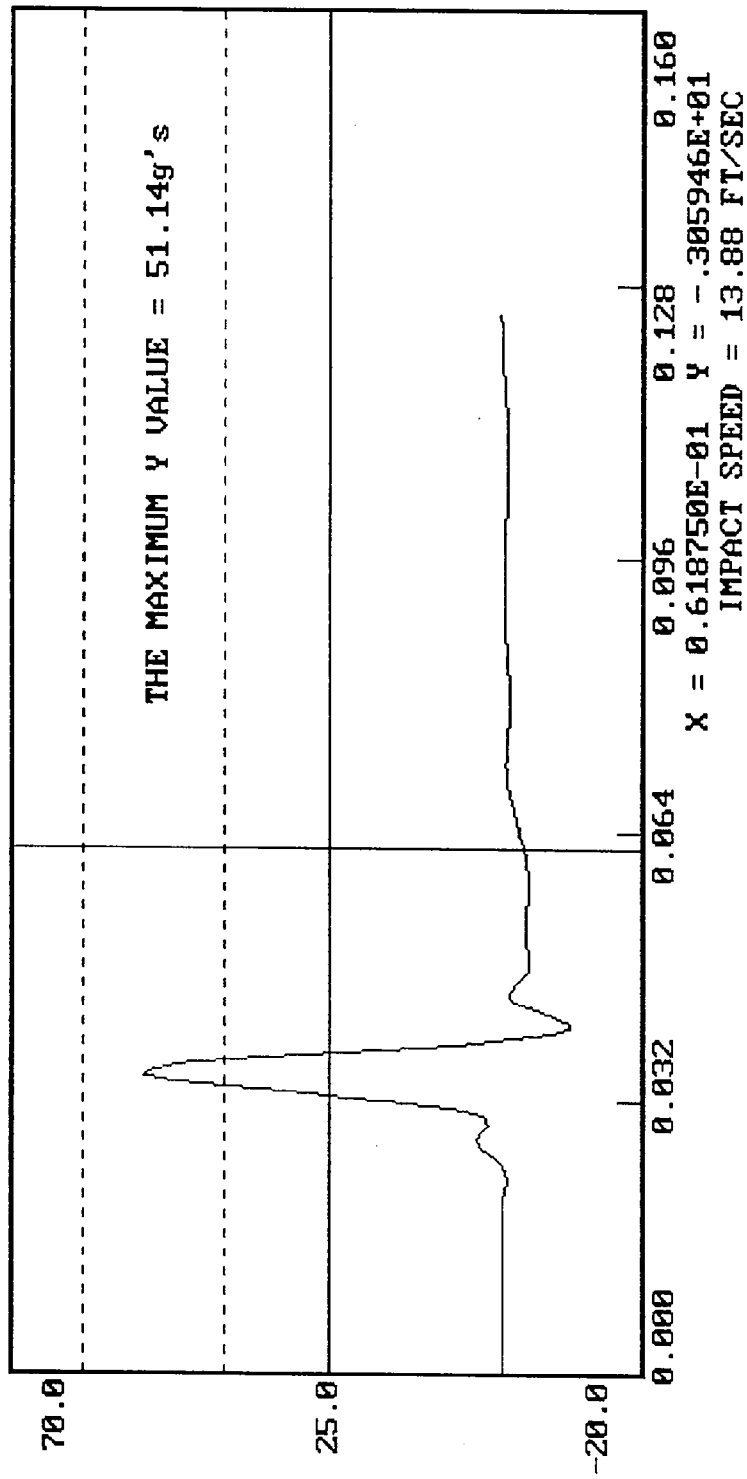
Dave Kibbe

11-07-1996 15:11

DUMMY CALIBRATION - PELVIS IMPACT

DUMMY # 269

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



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

DATE: October 31, 1996

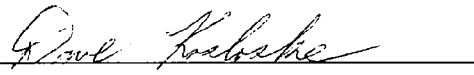
DUMMY NUMBER: 269

TEST NUMBER: D961584

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	18%
FORCE @ 0.5 in	23.3 - 36.5 lbs	34.3
FORCE @ 0.75 in	36.7 - 49.8 lbs	48.1
FORCE @ 1.0 in	50 - 63 lbs	62
FORCE @ 1.3 in	73 - 88 lbs	84

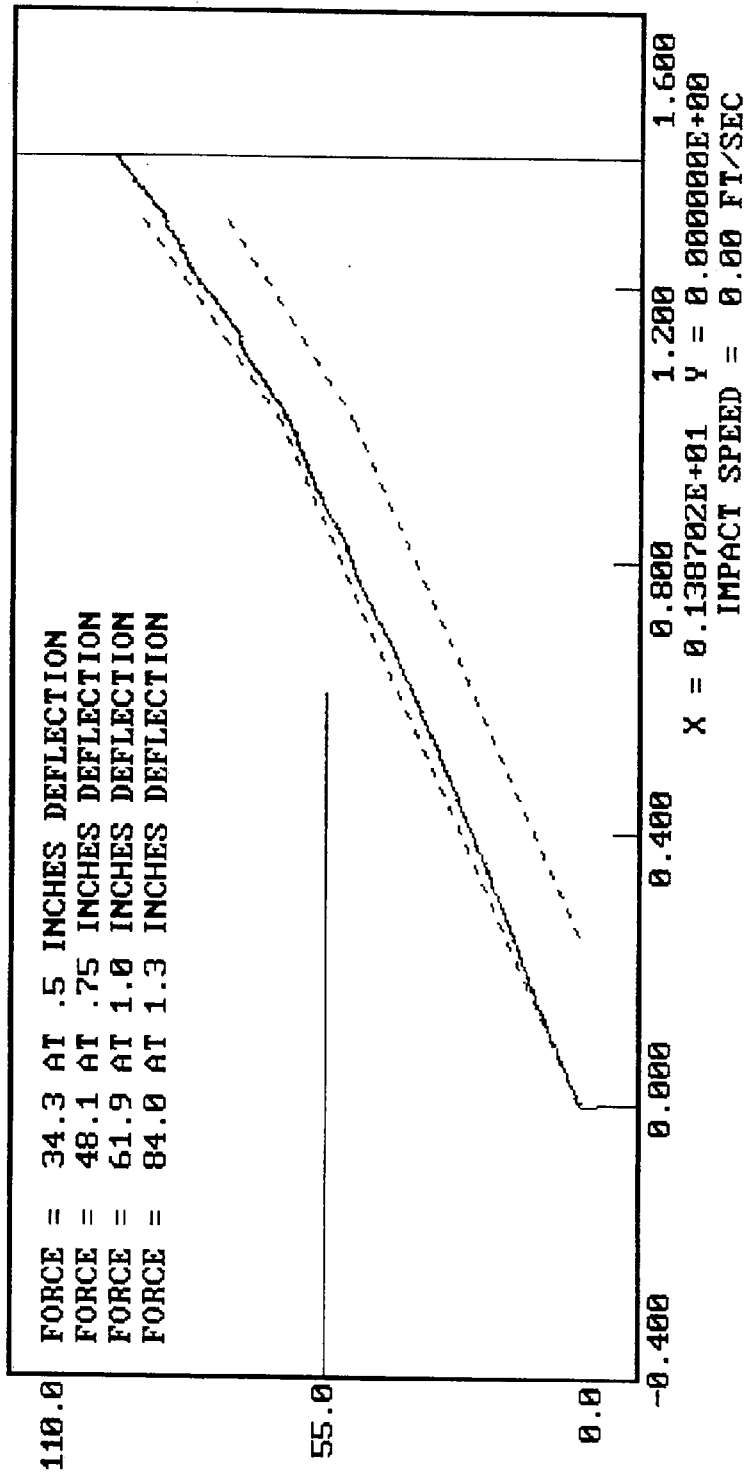
TEST MEETS SPECIFICATIONS

TECHNICIAN 

APPROVED BY 

DUMMY CALIBRATION - ABDOMEN COMPRESSION
 DUMMY # 269
 10-31-1996 15:00

ABDOMEN FORCE (LBS) VS. ABDOMEN DISPLACEMENT (INCHES)



MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: October 31, 1996

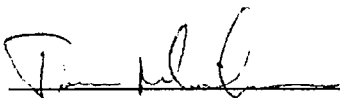
DUMMY NUMBER: 269

TEST NUMBER: D961585

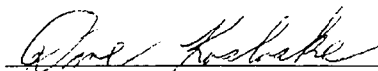
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	18%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	32
FORCE @ 30°	34 - 46 lbs	44
FORCE @ 40°	46 - 58 lbs	47
RETURN ANGLE	12° maximum	6°

TEST MEETS SPECIFICATIONS

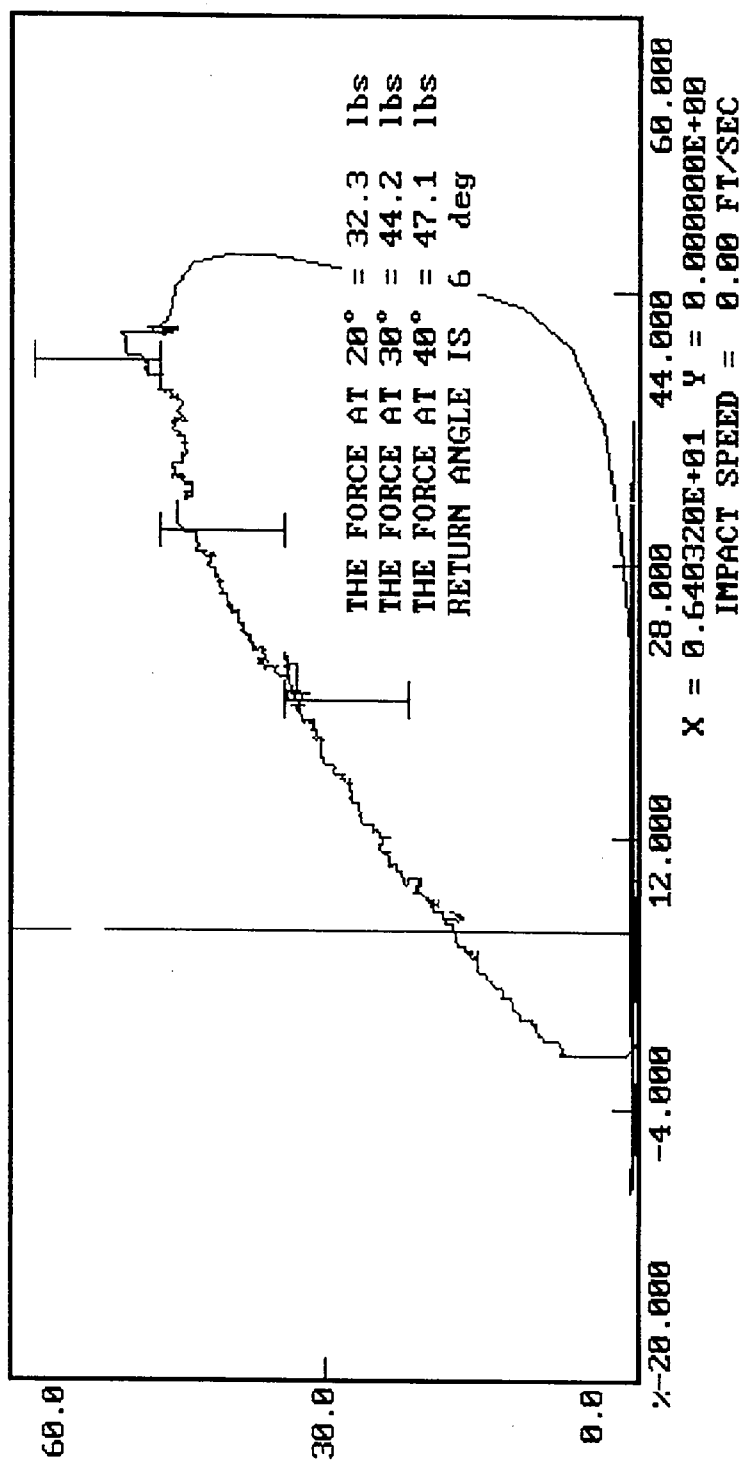
TECHNICIAN



APPROVED BY



DUMMY CALIBRATION - LUMBAR FLEXION
 DUMMY # 269
 10-31-1996 12:28
 FORCE (LBS) VS. TORSO ROTATION (DEGREES)



PRE-TEST CERTIFICATION DATA

Rear Dummy Serial Number: 270

Calibration Test Results Summary

Passenger Serial Number: 270

Pre-Test Calibration

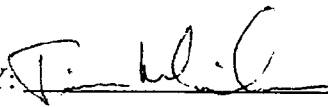
External Dimensions:	The dummy passed all external dimension requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion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

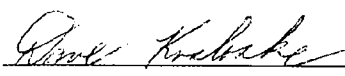
SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 270

DATE OF VERIFICATION: November 08, 1996

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.2
RH - Rib Height	19.75" - 20.50"	20.50
HP - Hip Pivot Height	3.9" ref.	3.9
RD - Rib From Back Line	9.0" to 9.5"	9.5
KV - Knee Pivot From Back Line	20.1" - 20.7"	20.6
SW - Knee Pivot to Floor	19.3" - 19.9"	19.5
HW - Hip Width	14.0" - 15.4"	15.0

MEASUREMENTS BY: 

APPROVED BY: 

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: November 07, 1996

DUMMY NUMBER: 270

TEST NUMBER: D961592

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	30%
PROBE SPEED	13.8 - 14.2 fps	13.9
UPPER RIB	37 - 46 g's	37
LOWER RIB	37 - 46 g's	41
LOWER SPINE	15 - 22 g's	18

TEST MEETS SPECIFICATIONS

TECHNICIAN

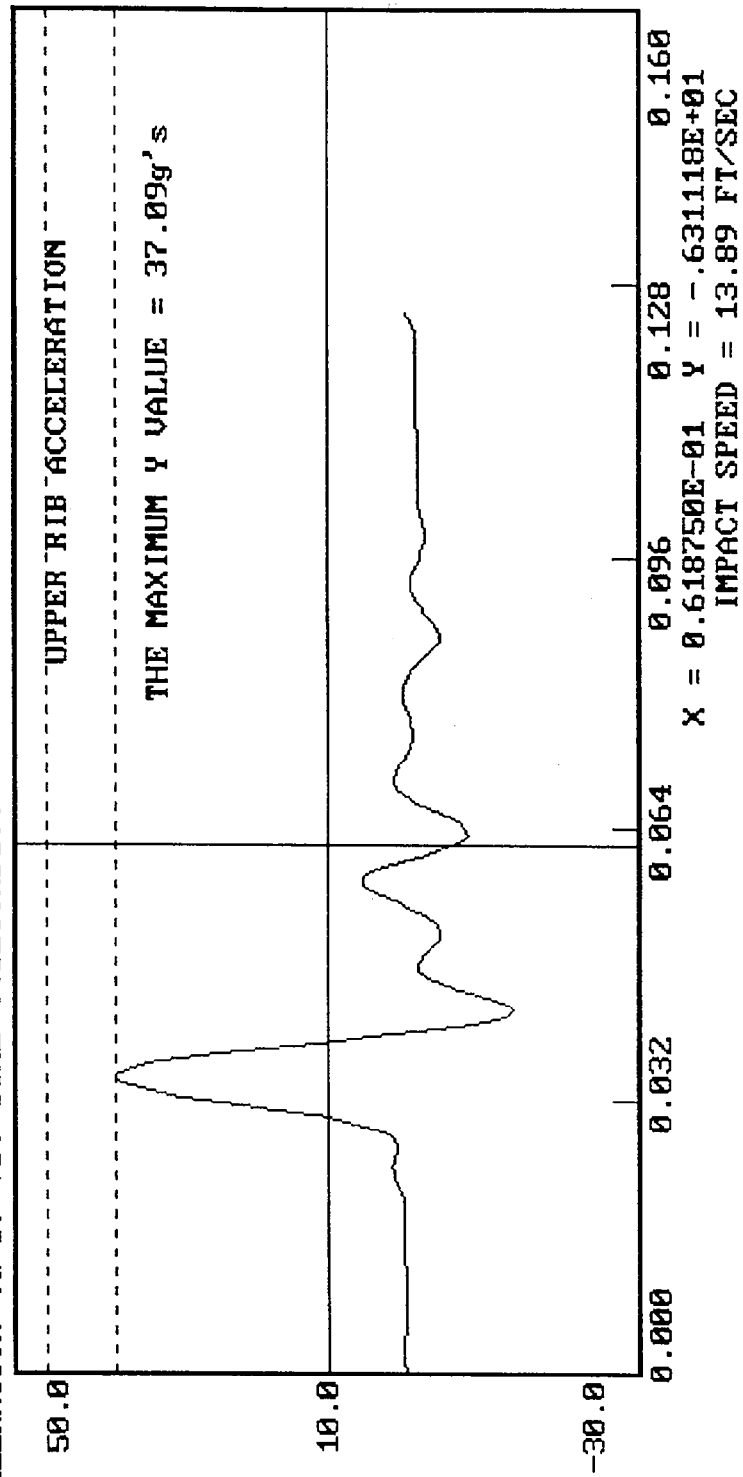
Jim White

APPROVED BY

Rene K. K. K.

11-07-1996 16:00

DUMMY CALIBRATION - THORAX IMPACT
DUMMY # 270
ACCELERATION (G'S) VS. TIME ((SECONDS))

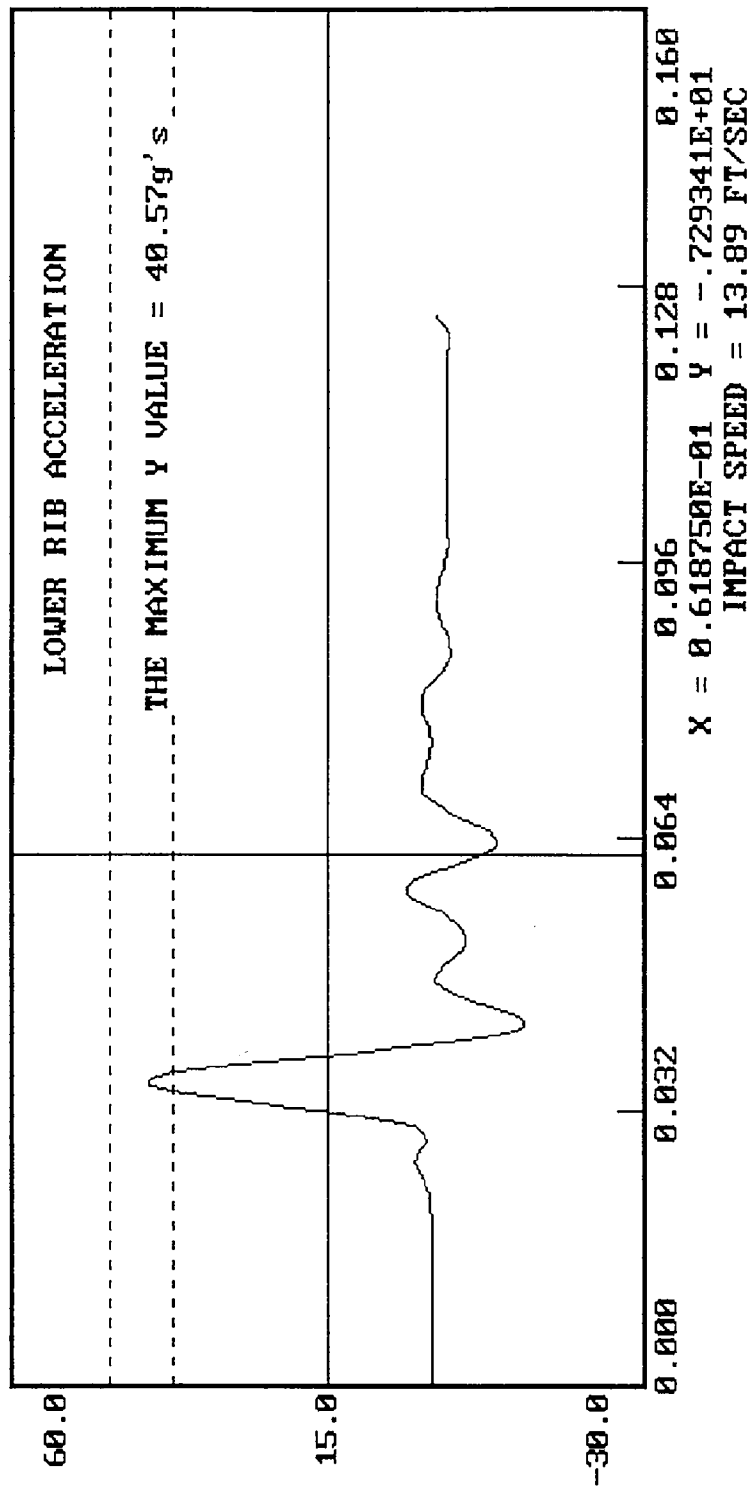


11-07-1996 16:00

DUMMY CALIBRATION - THORAX IMPACT

DUMMY # 270

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

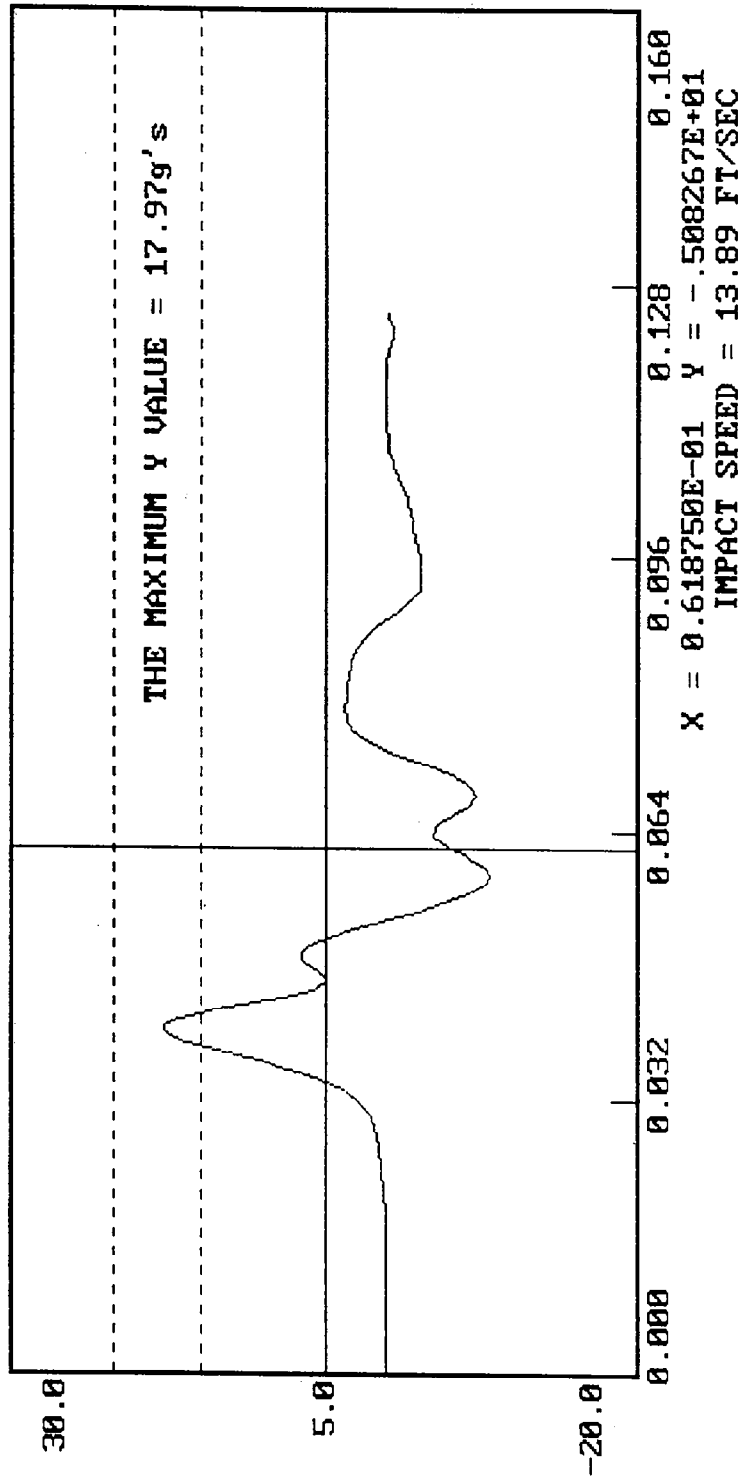


11-07-1996 16:05

DUMMY CALIBRATION - THORAX IMPACT

DUMMY # 270

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



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

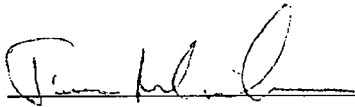
DATE: November 08, 1996

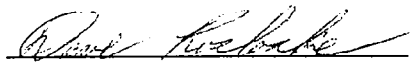
DUMMY NUMBER: 270

TEST NUMBER: D961593

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	28%
PROBE SPEED	13.8 - 14.2 f/s	13.9
PELVIS ACCELERATION	40 - 60 g's	46

TEST MEETS SPECIFICATIONS

TECHNICIAN 

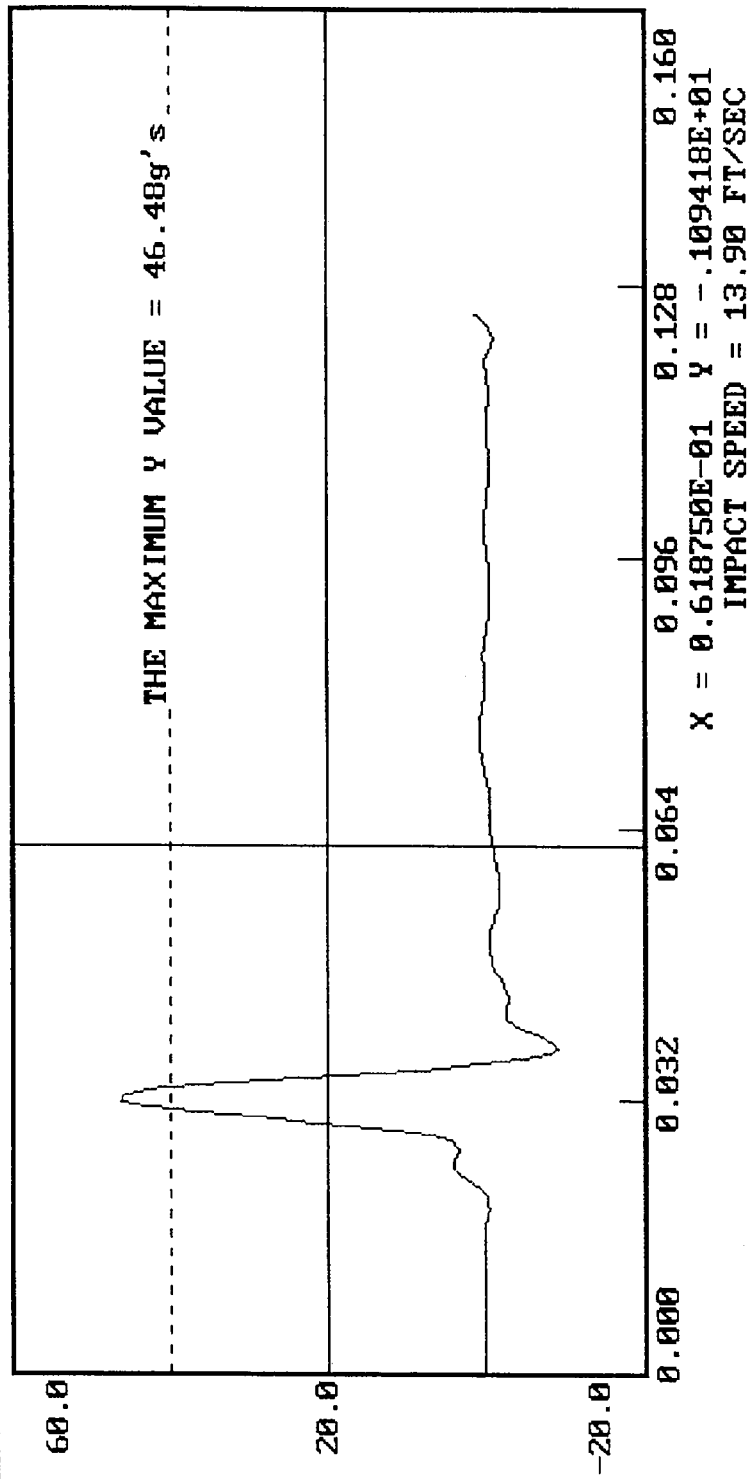
APPROVED BY 

11-08-1996 08:17

DUMMY CALIBRATION - PELVIS IMPACT

DUMMY # 270

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



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

DATE: November 07, 1996

DUMMY NUMBER: 270

TEST NUMBER: D961594

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	35%
FORCE @ 0.5 in	23.3 - 36.5 lbs	33.1
FORCE @ 0.75 in	36.7 - 49.8 lbs	46.2
FORCE @ 1.0 in	50 - 63 lbs	60
FORCE @ 1.3 in	73 - 88 lbs	84

TEST MEETS SPECIFICATIONS

TECHNICIAN

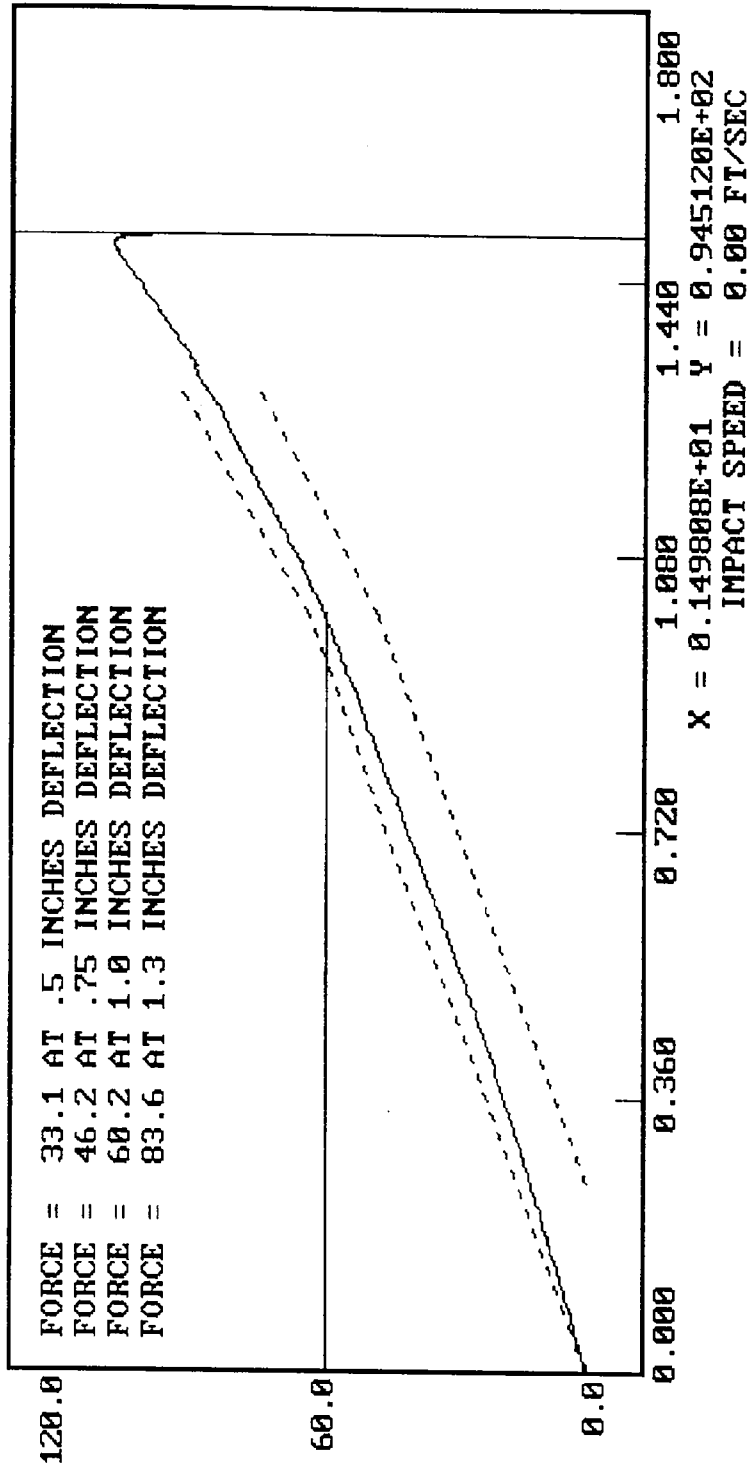
Tim White

APPROVED BY

Steve Kurbatov

DUMMY CALIBRATION - ABDOMEN COMPRESSION
 DUMMY # 270
 11-07-1996 12:32

ABDOMEN FORCE (LBS) VS. ABDOMEN DISPLACEMENT (INCHES)



MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: October 31, 1996

DUMMY NUMBER: 270

TEST NUMBER: D961595

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	18%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	30
FORCE @ 30°	34 - 46 lbs	39
FORCE @ 40°	46 - 58 lbs	51
RETURN ANGLE	12° maximum	4°

TEST MEETS SPECIFICATIONS

TECHNICIAN

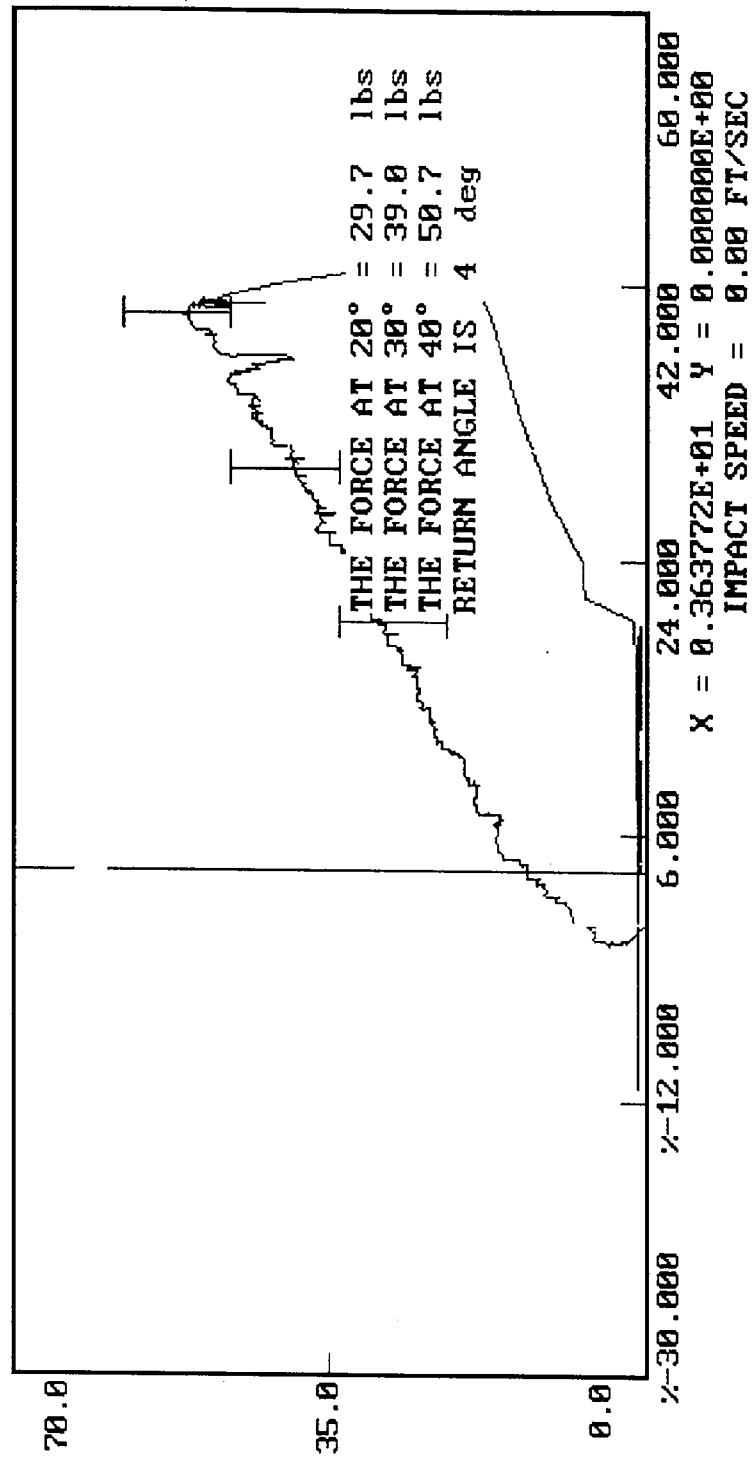
Jim White

APPROVED BY

Dave Kurbaske

10-31-1996 11:38

DUMMY CALIBRATION - LUMBAR FLEXION
DUMMY # 270
FORCE (LBS) VS. TORSO ROTATION (DEGREES)



POST-TEST CERTIFICATION DATA

Front Dummy Serial Number: 269

Calibration Test Results Summary

Dummy Serial Number: 269

Post-Test Calibration

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

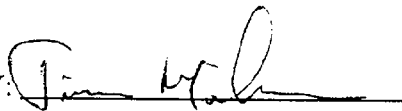
SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 269

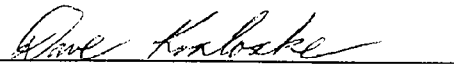
DATE OF VERIFICATION: November 13, 1996

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.1
RH - Rib Height	19.75" - 20.50"	20.00
HP - Hip Pivot Height	3.9" ref.	3.9
RD - Rib From Back Line	9.0" to 9.5"	9.3
KV - Knee Pivot From Back Line	20.1" - 20.7"	20.4
SW - Knee Pivot to Floor	19.3" - 19.9"	19.4
HW - Hip Width	14.0" - 15.4"	15.1

MEASUREMENTS BY:



APPROVED BY:



MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: November 13, 1996

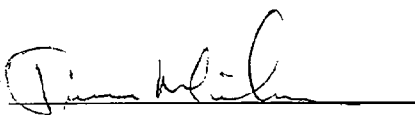
DUMMY NUMBER: 269

TEST NUMBER: D961762

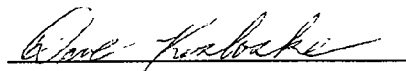
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	18%
PROBE SPEED	13.8 - 14.2 fps	14.0
UPPER RIB	37 - 46 g's	38
LOWER RIB	37 - 46 g's	37
LOWER SPINE	15 - 22 g's	19

TEST MEETS SPECIFICATIONS

TECHNICIAN

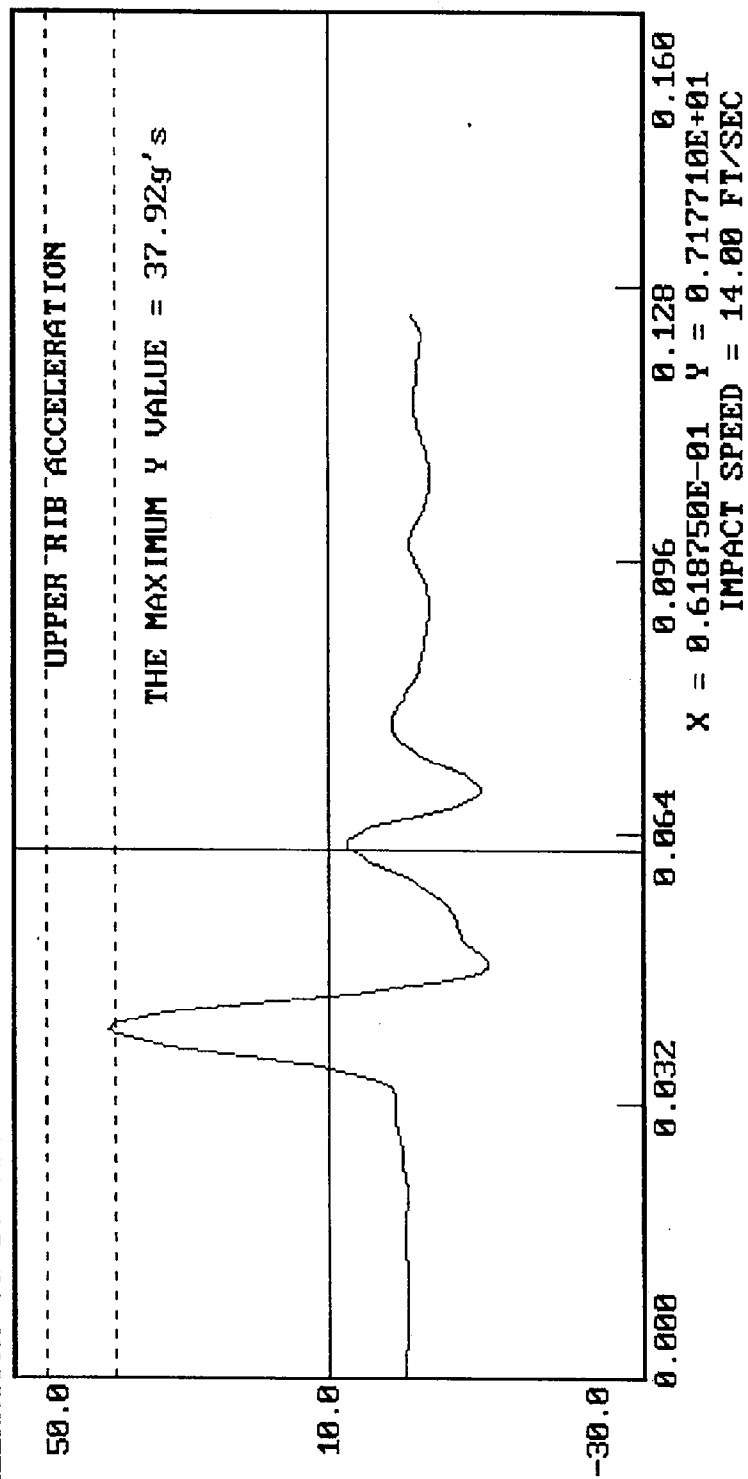


APPROVED BY



11-13-1996 14:29

DUMMY CALIBRATION - THORAX IMPACT
DUMMY # 269
ACCELERATION (G'S) VS. TIME ((SECONDS))

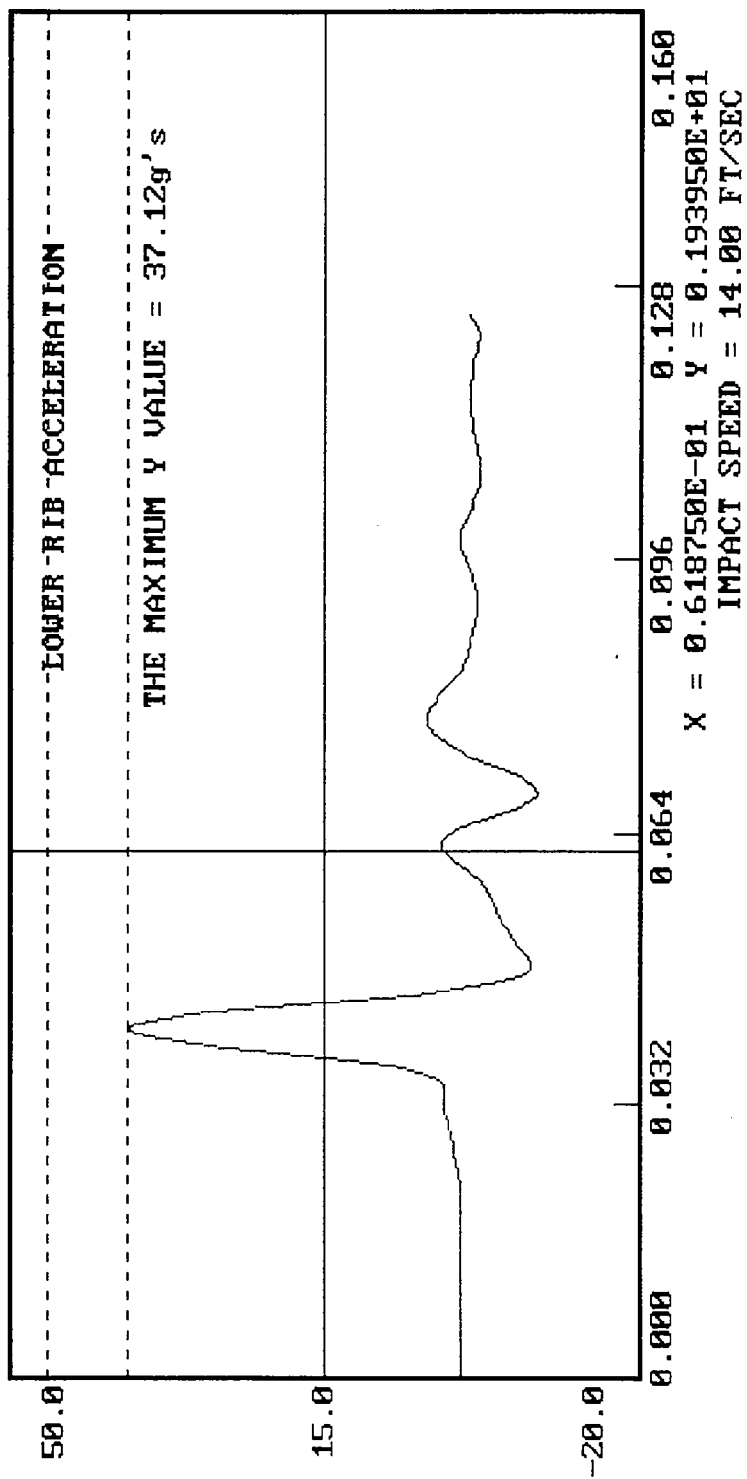


11-13-1996 14:29

DUMMY CALIBRATION - THORAX IMPACT

DUMMY # 269

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

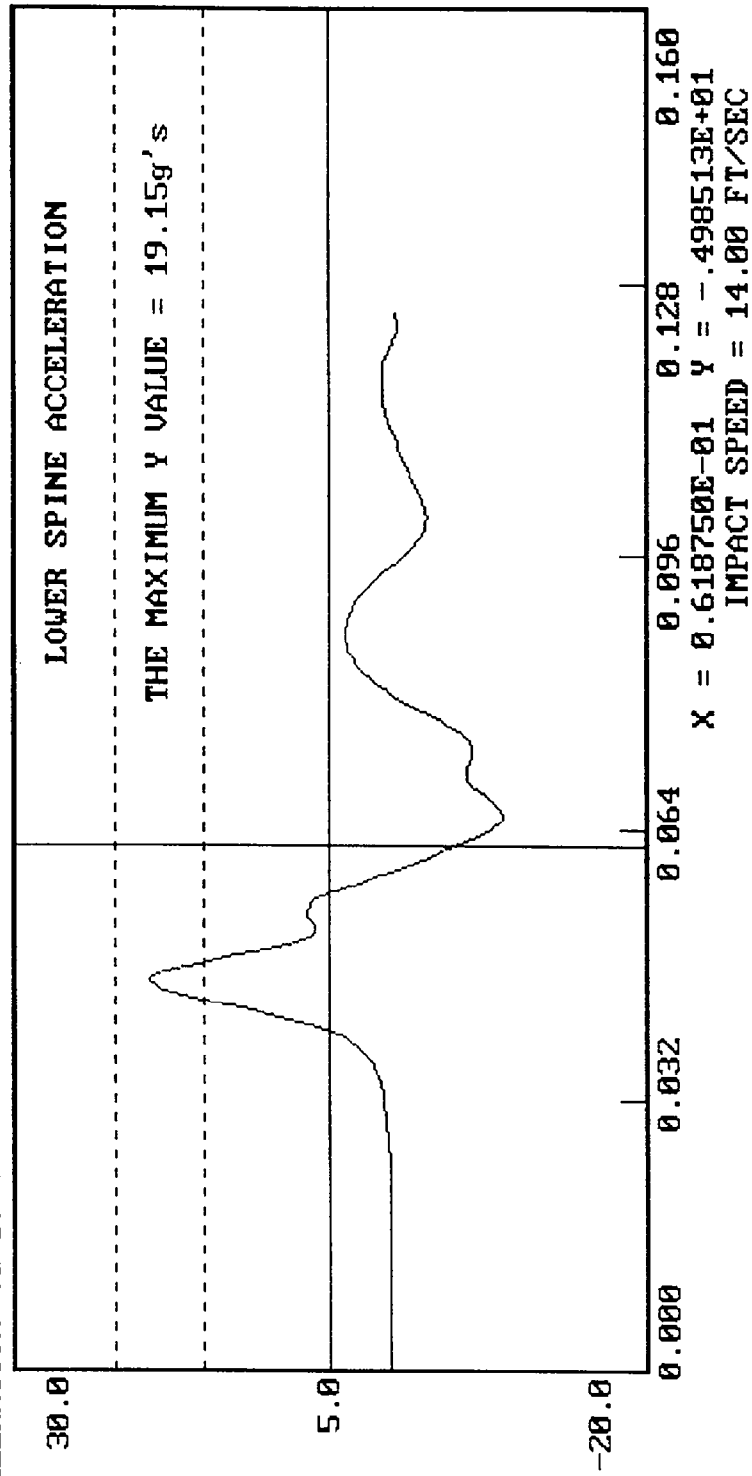


11-13-1996 14:29

DUMMY CALIBRATION - THORAX IMPACT

DUMMY # 269

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



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: November 13, 1996

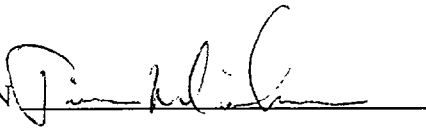
DUMMY NUMBER: 269

TEST NUMBER: D961763

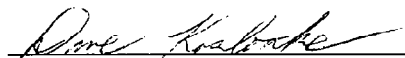
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	15%
PROBE SPEED	13.8 - 14.2 f/s	14.0
PELVIS ACCELERATION	40 - 60 g's	60

TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY

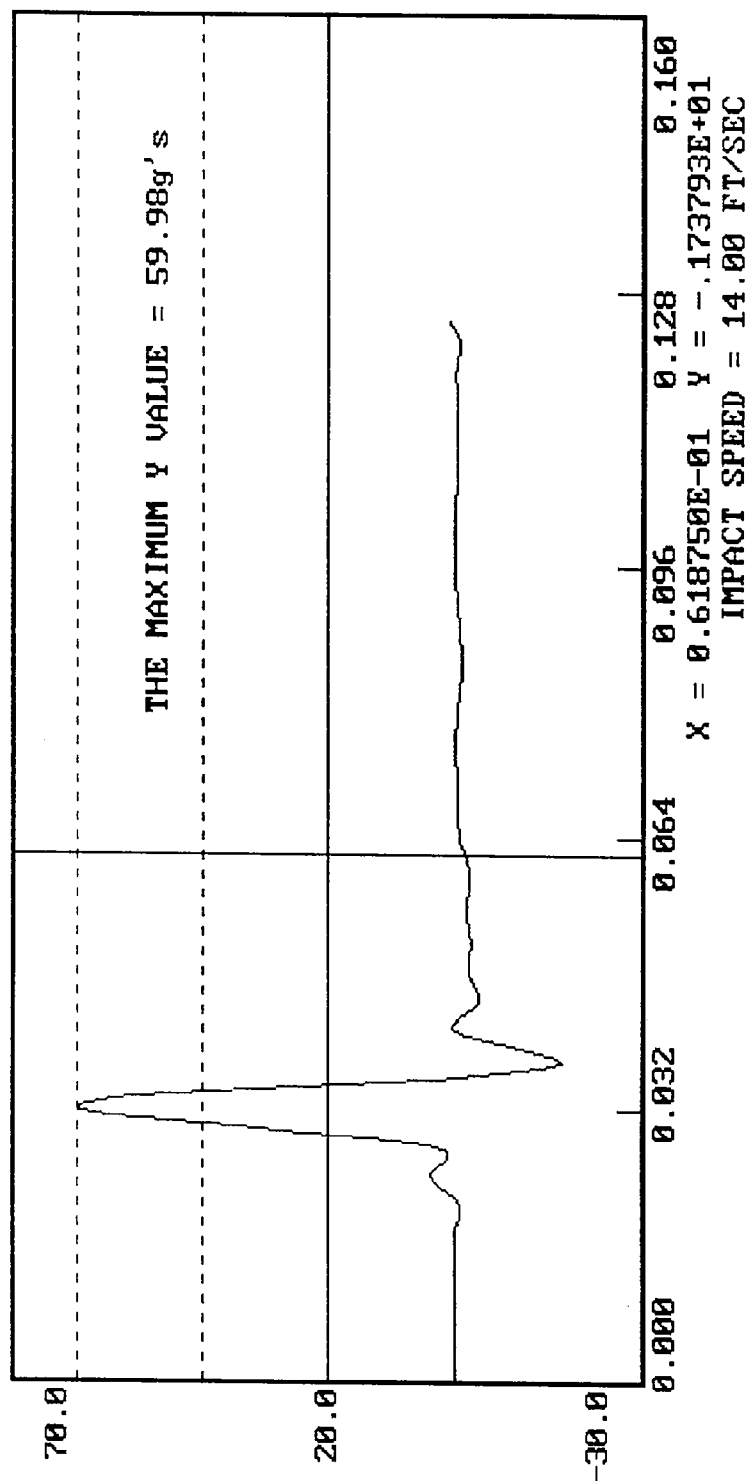


11-13-1996 14:43

DUMMY CALIBRATION - PELVIS IMPACT

DUMMY # 269

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



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

DATE: November 13, 1996

DUMMY NUMBER: 269

TEST NUMBER: D961764

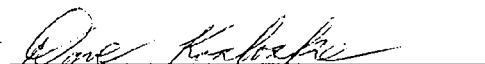
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	15%
FORCE @ 0.5 in	23.3 - 36.5 lbs	30.8
FORCE @ 0.75 in	36.7 - 49.8 lbs	42.2
FORCE @ 1.0 in	50 - 63 lbs	55
FORCE @ 1.3 in	73 - 88 lbs	73

TEST MEETS SPECIFICATIONS

TECHNICIAN



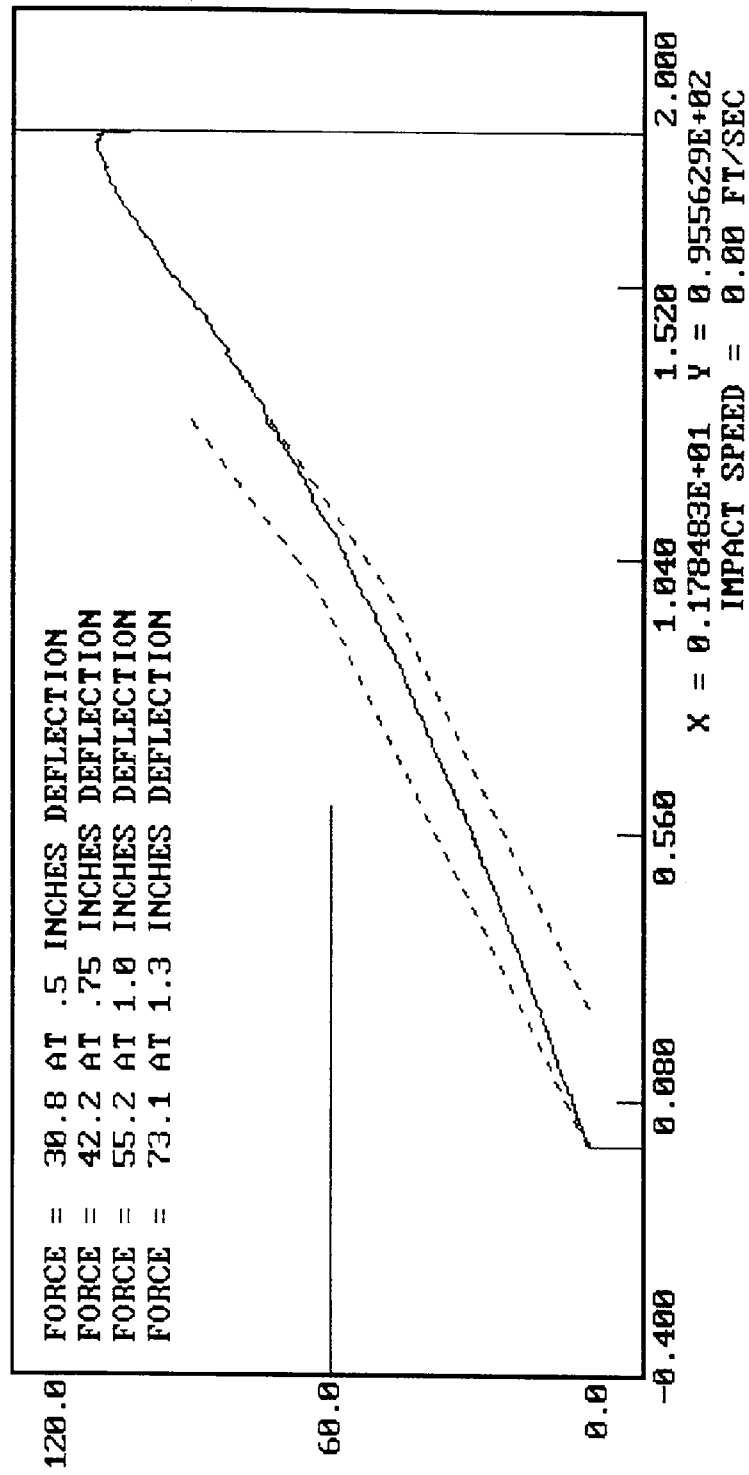
APPROVED BY



DUMMY CALIBRATION - ABDOMEN COMPRESSION
 DUMMY # 269

11-13-1996 11:07

ABDOMEN FORCE (LBS) VS. ABDOMEN DISPLACEMENT (INCHES)



MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: November 13, 1996

DUMMY NUMBER: 269

TEST NUMBER: D961765

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	15%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	27
FORCE @ 30°	34 - 46 lbs	36
FORCE @ 40°	46 - 58 lbs	48
RETURN ANGLE	12° maximum	2°

TEST MEETS SPECIFICATIONS

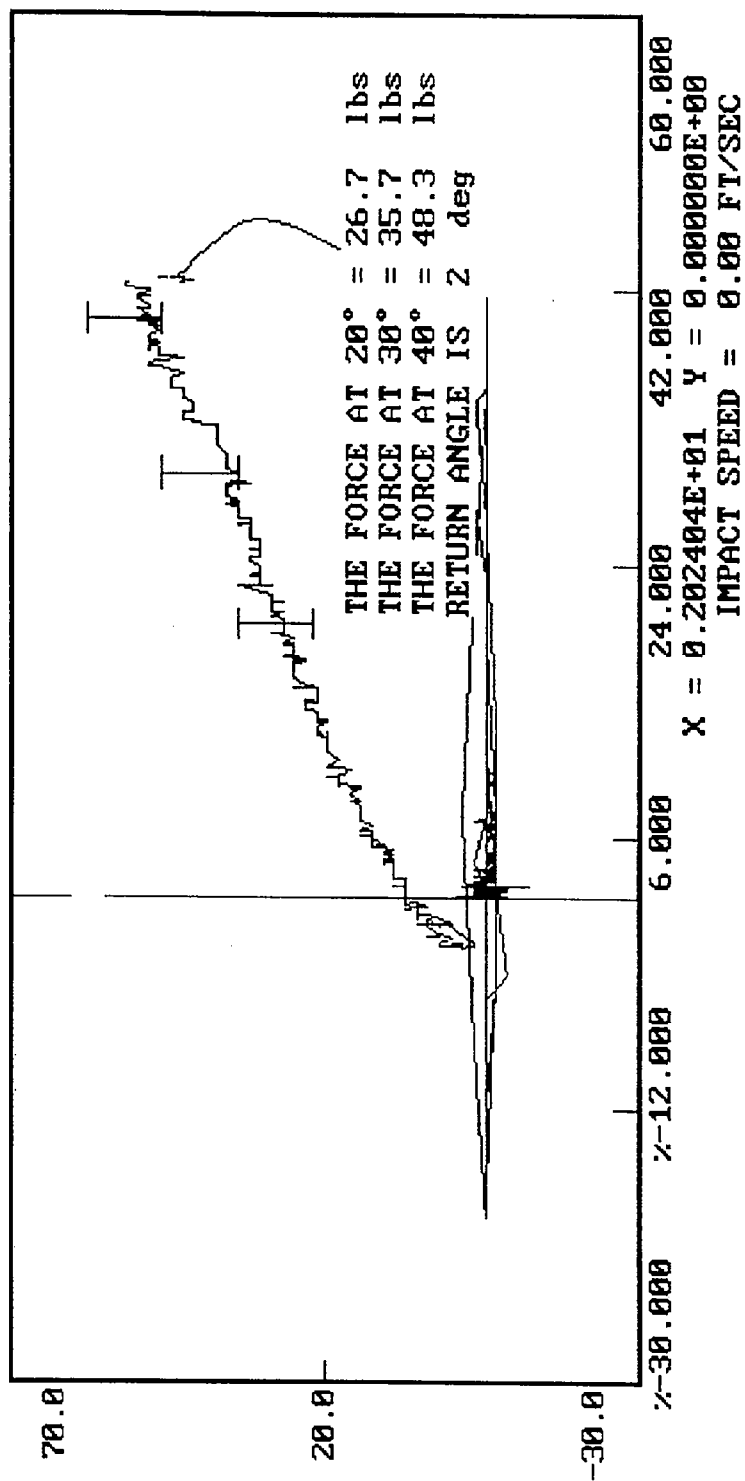
TECHNICIAN

Tim H. L.

APPROVED BY

Dave K. K.

DUMMY CALIBRATION - LUMBAR FLEXION
 DUMMY # 269
 11-13-1996 12:51
 FORCE (LBS) VS. TORSO ROTATION (DEGREES)



POST-TEST CERTIFICATION DATA

Rear Dummy Serial Number: 270

Calibration Test Results Summary

Dummy Serial Number: 270

Post-Test Calibration

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

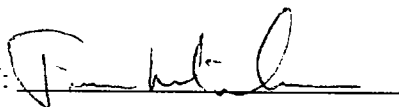
SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 270

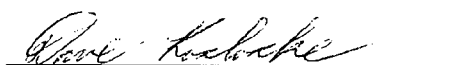
DATE OF VERIFICATION: November 13, 1996

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.2
RH - Rib Height	19.75" - 20.50"	20.50
HP - Hip Pivot Height	3.9" ref.	3.9
RD - Rib From Back Line	9.0" to 9.5"	9.5
KV - Knee Pivot From Back Line	20.1" - 20.7"	20.6
SW - Knee Pivot to Floor	19.3" - 19.9"	19.5
HW - Hip Width	14.0" - 15.4"	15.0

MEASUREMENTS BY:



APPROVED BY:



MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: November 13, 1996

DUMMY NUMBER: 270

TEST NUMBER: D961772

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	15%
PROBE SPEED	13.8 - 14.2 fps	14.0
UPPER RIB	37 - 46 g's	41
LOWER RIB	37 - 46 g's	45
LOWER SPINE	15 - 22 g's	21

TEST MEETS SPECIFICATIONS

TECHNICIAN

Jim White

APPROVED BY

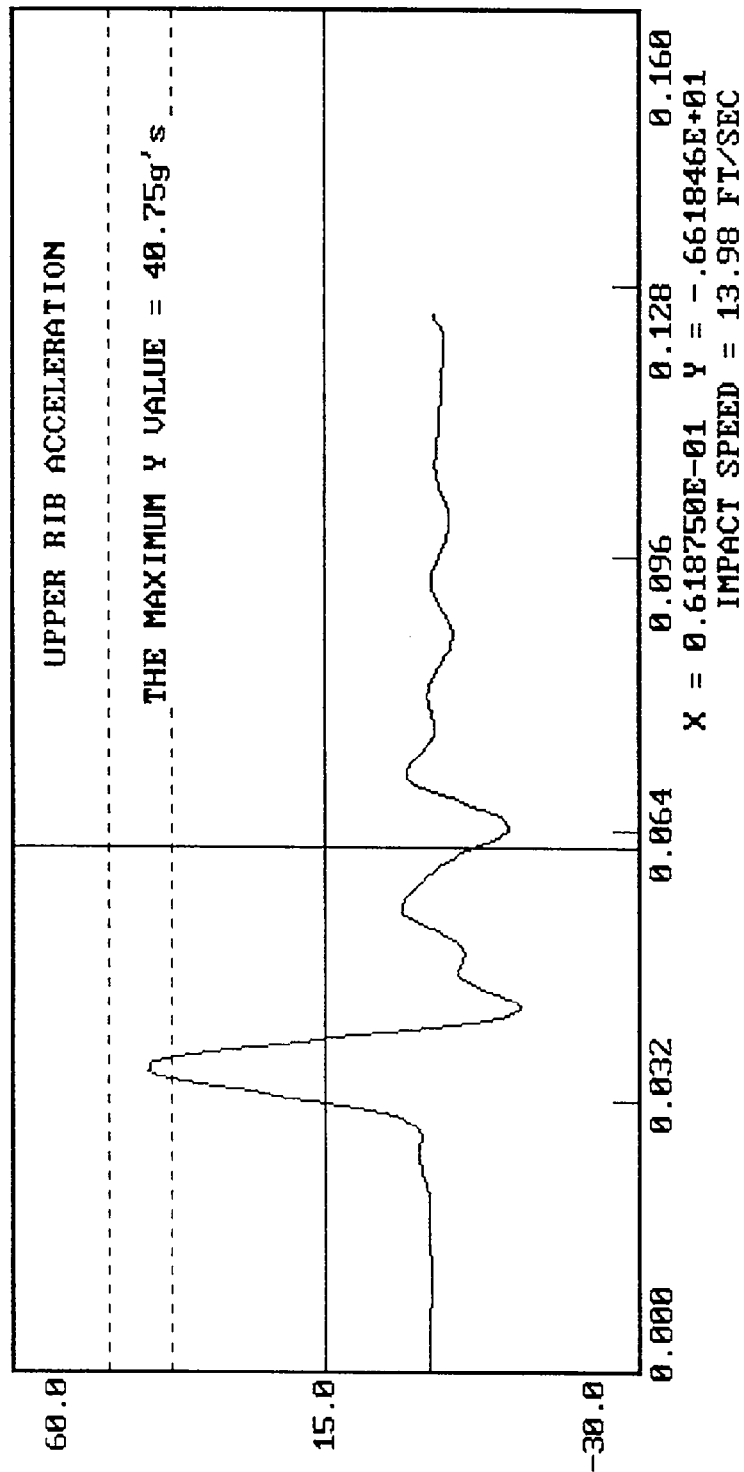
Steve Kachake

11-13-1996 15:11

DUMMY CALIBRATION - THORAX IMPACT

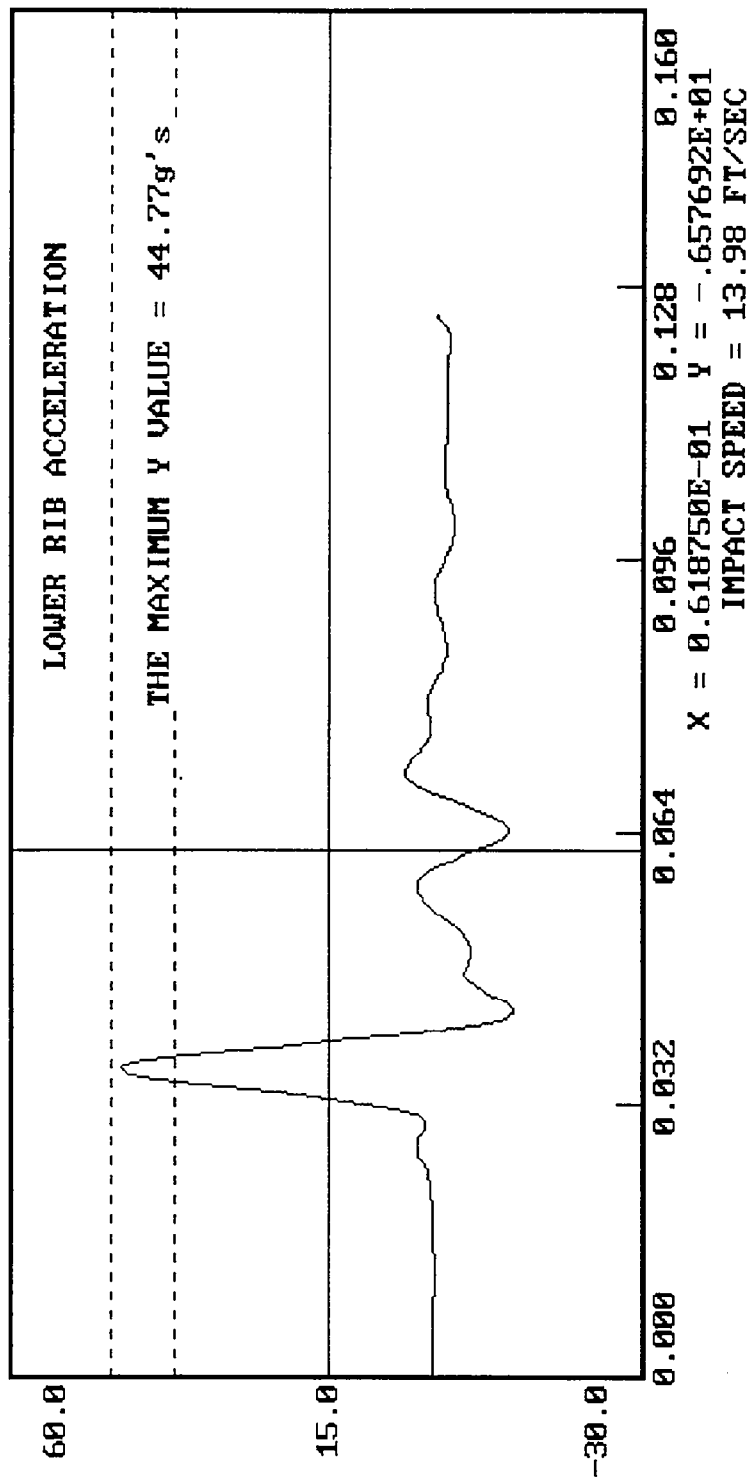
DUMMY # 270

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



11-13-1996 15:11

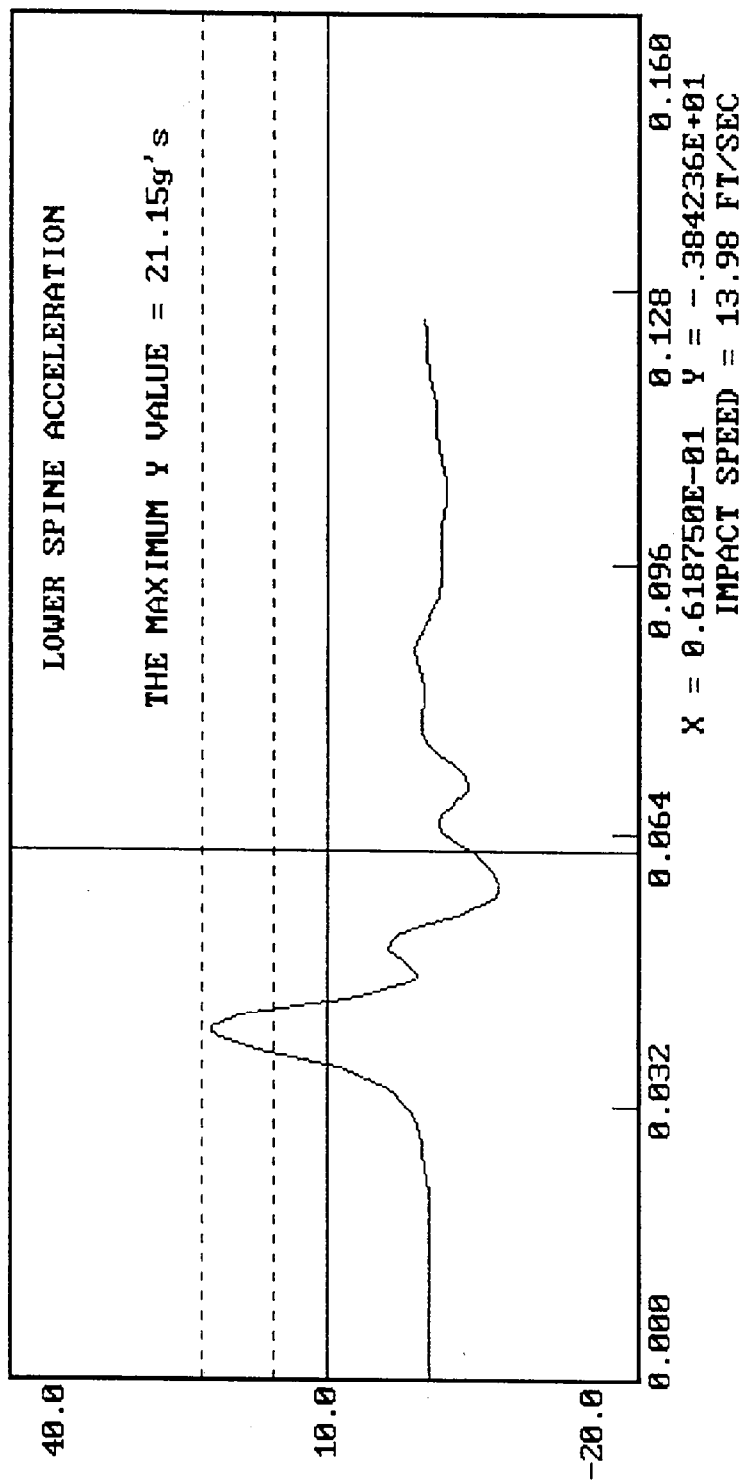
DUMMY CALIBRATION - THORAX IMPACT
DUMMY # 270
ACCELERATION (G'S) VS. TIME ((SECONDS))



DUMMY CALIBRATION - THORAX IMPACT
 DUMMY # 270

11-13-1996 15:27

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



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: November 13, 1996

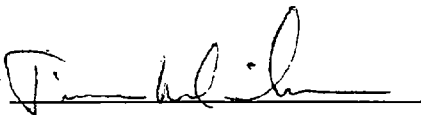
DUMMY NUMBER: 270

TEST NUMBER: D961773

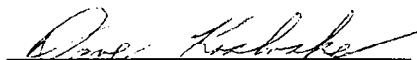
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	16%
PROBE SPEED	13.8 - 14.2 f/s	14.0
PELVIS ACCELERATION	40 - 60 g's	56

TEST MEETS SPECIFICATIONS

TECHNICIAN



APPROVED BY

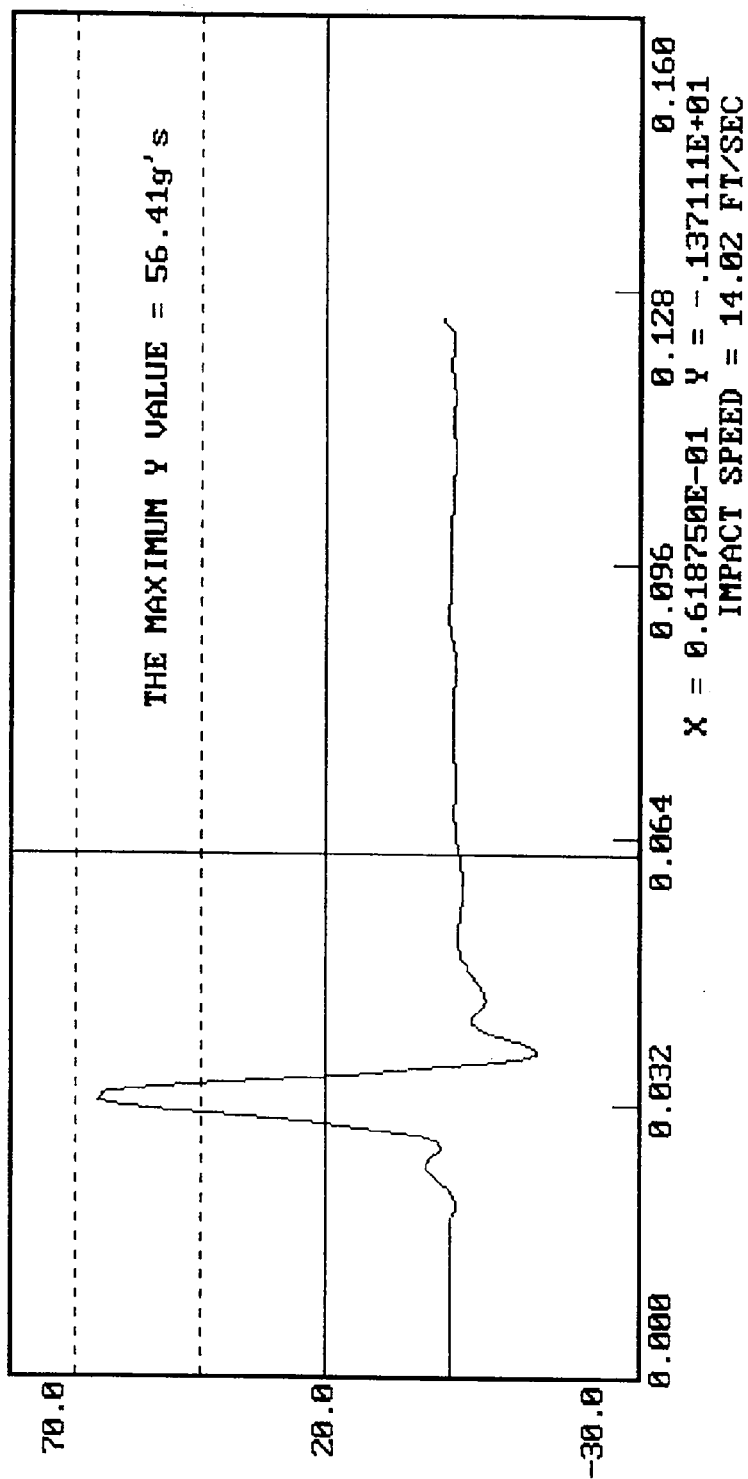


11-13-1996 15:02

DUMMY CALIBRATION - PELVIS IMPACT

DUMMY # 270

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



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

DATE: November 13, 1996

DUMMY NUMBER: 270

TEST NUMBER: D961774

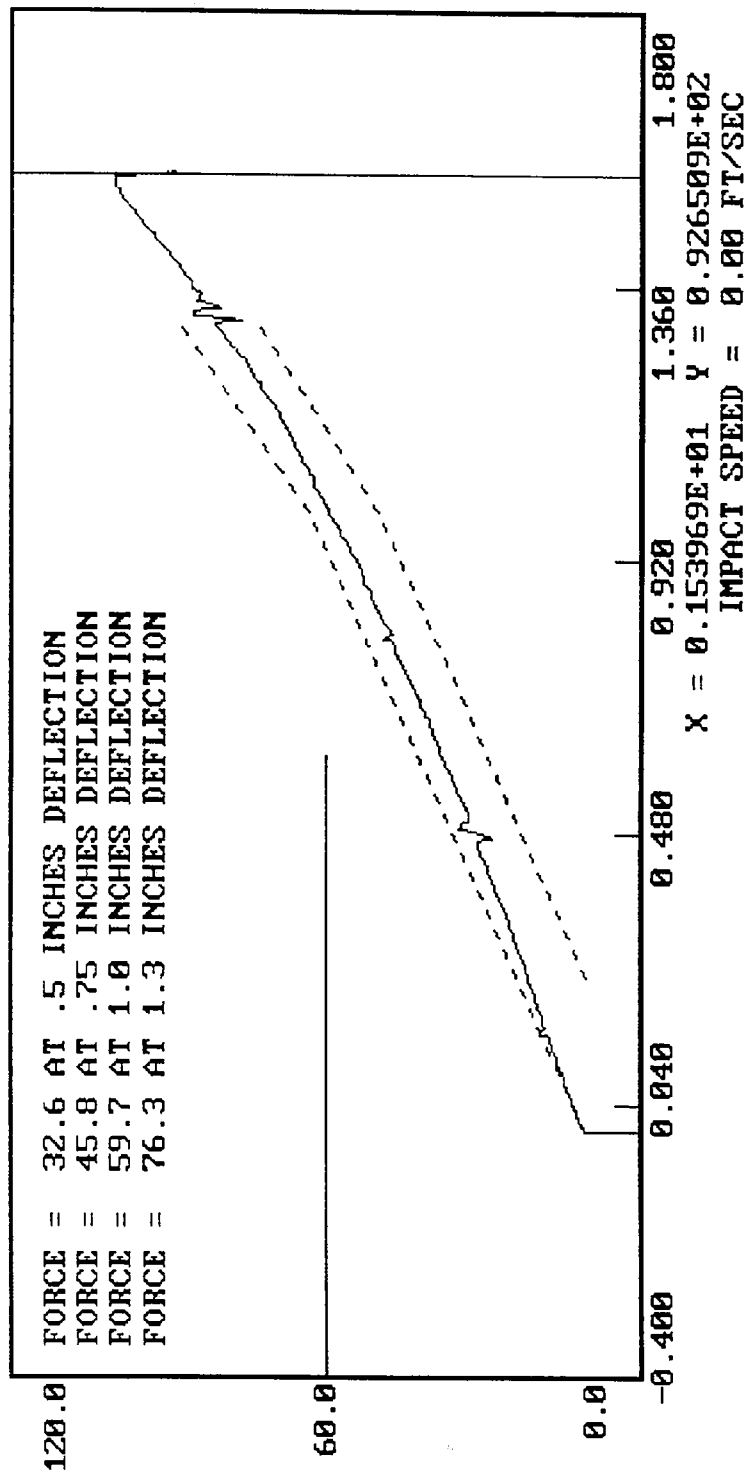
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	15%
FORCE @ 0.5 in	23.3 - 36.5 lbs	32.6
FORCE @ 0.75 in	36.7 - 49.8 lbs	45.8
FORCE @ 1.0 in	50 - 63 lbs	60
FORCE @ 1.3 in	73 - 88 lbs	76

TEST MEETS SPECIFICATIONS

TECHNICIAN Tim Melillo

APPROVED BY Steve Korbak

DUMMY CALIBRATION - ABDOMEN COMPRESSION
 DUMMY # 270
 11-13-1996 11:02
 ABDOMEN FORCE (LBS) VS. ABDOMEN DISPLACEMENT (INCHES)



MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

DATE: November 13, 1996

DUMMY NUMBER: 270

TEST NUMBER: D961775

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	15%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	23
FORCE @ 30°	34 - 46 lbs	38
FORCE @ 40°	46 - 58 lbs	47
RETURN ANGLE	12° maximum	3°

TEST MEETS SPECIFICATIONS

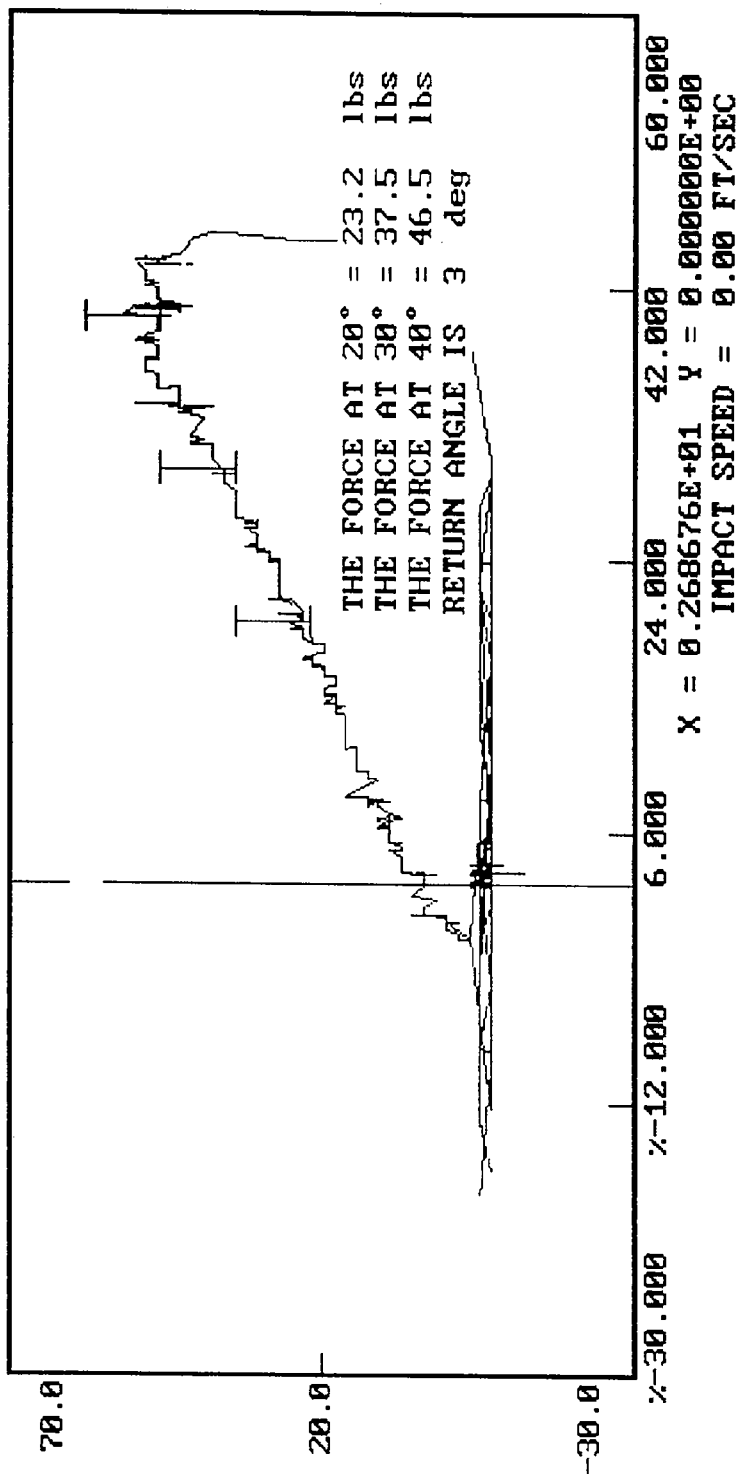
TECHNICIAN

Tim W. L.

APPROVED BY

Steve Kraloske

DUMMY CALIBRATION - LUMBAR FLEXION
 DUMMY # 270
 11-13-1996 12:27
 FORCE (LBS) VS. TORSO ROTATION (DEGREES)



POST-TEST DRIVER DUMMY INSPECTION CHECKLIST

Type: Side Impact Dummy

Serial Number: 269

Inspected By: Tim Michnay

Date: November 13, 1996

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

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

POST-TEST PASSENGER DUMMY INSPECTION CHECKLIST

Type: Side Impact Dummy

Serial Number: 270

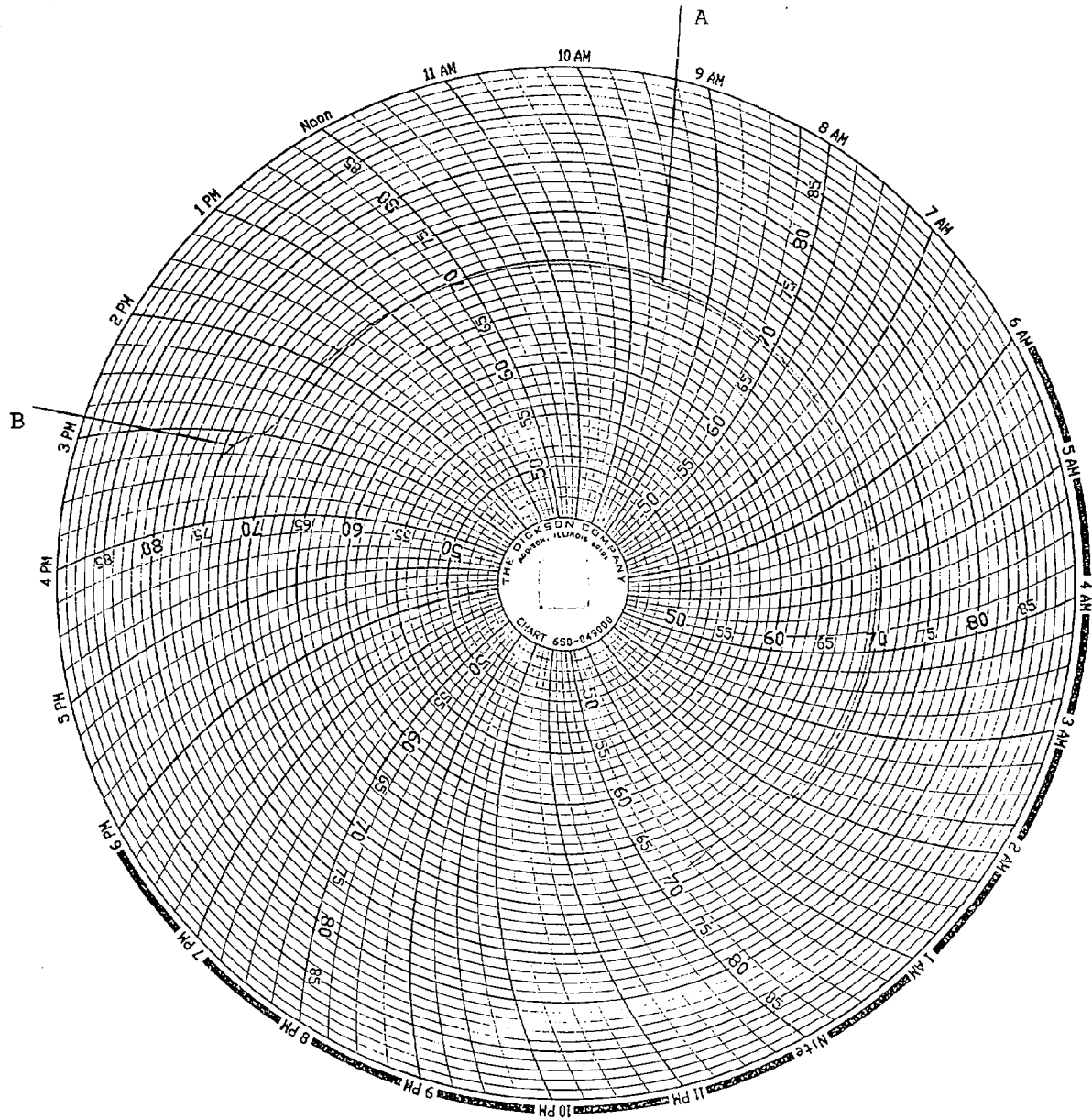
Inspected By: Tim Michnay

Date: November 13, 1996

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

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

VEHICLE AND DUMMY TEMPERATURE



A = Dummies installed in vehicle
B = Test conducted

APPENDIX D

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

DUMMY AND VEHICLE CALIBRATION DATA

INSTRUMENTS FOR RIGHT FRONT PASSENGER DUMMY NO. 269

	RIGHT FRONT PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y	AGTM2	Endevco	September 10, 1996
Lower Rib Y	ACEC1	Endevco	September 11, 1996
Lower Spine Y	AH1G2	Endevco	September 11, 1996
Pelvis Y	ACCN9	Endevco	September 10, 1996
Upper Rib Redundant Y	AGT85	Endevco	September 10, 1996
Lower Rib Redundant Y	J10411	Endevco	September 16, 1996
Lower Spine Redundant Y	AM751	Endevco	September 11, 1996
Pelvis Redundant Y	AKAF3	Endevco	September 10, 1996

INSTRUMENTS FOR RIGHT REAR PASSENGER DUMMY NO. 270

	RIGHT REAR PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y	APIH2	Endevco	September 10, 1996
Lower Rib Y	AJ9C2	Endevco	September 09, 1996
Lower Spine Y	AP2D7	Endevco	September 10, 1996
Pelvis Y	ALCH7	Endevco	September 09, 1996
Upper Rib Redundant Y	AH0B0	Endevco	September 10, 1996
Lower Rib Redundant Y	AHTT2	Endevco	September 9, 1996
Lower Spine Redundant Y	AP1T8	Endevco	September 10, 1996
Pelvis Redundant Y	AJ420	Endevco	September 09, 1996

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE AND MDB ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Moving Barrier CG X	C14-Z10	Entran	July 12, 1996
Moving Barrier CG Y	B14-R01	Entran	July 15, 1996
Moving Barrier CG Z	B14-R16	Entran	July 11, 1996
Moving Barrier Rear Axle X	B14-R03	Entran	July 11, 1996
Moving Barrier Rear Axle Y	A10-G01	Entran	June 04, 1996
Right Mid A-Post Y	D05-R24	Entran	June 04, 1996
Right Lower A-Post Y	E13-D07	Entran	July 10, 1996
Right Lower B-Post Y	C05-Z10	Entran	July 11, 1996
Rear Floorpan Above Axle X	A09-G08	Entran	July 11, 1996
Rear Floorpan Above Axle Y	J06-D23	Entran	July 03, 1996
Rear Floorpan Above Axle Z	D05-R14	Entran	July 11, 1996
Right Front Passenger Seat Track Y	J23-E04	Entran	July 11, 1996
Left Side Sill at Front Seat X	J23-E01	Entran	July 10, 1996
Left Side Sill at Front Seat Y	L18-E01	Entran	October 02, 1996
Left Side Sill at Front Seat Z	C14-Z12	Entran	July 11, 1996
Left Side Sill at Rear Seat X	A09-G01	Entran	July 15, 1996
Left Side Sill at Rear Seat Y	L15-G03	Entran	October 02, 1996
Left Side Sill at Rear Seat Z	A09-G06	Entran	July 11, 1996
Right Side Sill at Front Seat Y	G06-G09	Entran	October 02, 1996

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE AND MDB ACCELEROMETERS		
	SERIAL NO	MANUFACTURER	CALIBRATION DATE
Right Side Sill at Rear Seat Y	B13-Z05	Entran	July 11, 1996
Left Rear Occupant Compartment Y	D05-R18	Entran	July 11, 1996

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