

V2054

REPORT NO. MSE-94-N03

R93030-03

NEW CAR ASSESSMENT PROGRAM

FRONTAL BARRIER IMPACT TEST

GENERAL MOTORS CORPORATION
1994 CHEVROLET S-10 PICKUP
NHTSA No. MR0104

MOBILITY SYSTEMS AND EQUIPMENT COMPANY
9920 LaCienega Boulevard, Suite 708
Inglewood, California 90301



16 March, 1994

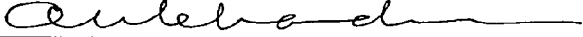
FINAL REPORT

Prepared For:

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NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
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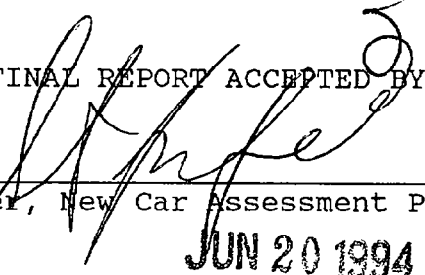
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Approved by: 
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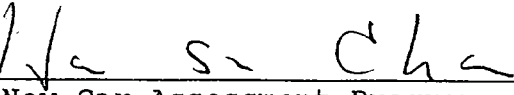
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FINAL REPORT ACCEPTED BY:


Manager, New Car Assessment Program

JUN 20 1994

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COTR, New Car Assessment Program

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Technical Report Documentation Page

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16. Abstract A 56 kph Frontal barrier impact test using a load cell barrier was conducted on a 1994 Chevrolet S-10 Pickup at the Mobility Systems and Equipment Company (MSE) crash test facility in San Bernardino, CA, on February 16, 1994. The impact velocity was 56.4 km/h, and the ambient temperature at the barrier face at the time of impact was 22 degrees C. The vehicle's maximum post-test static crush was 642 mm. The test vehicle satisfied the requirements of FMVSS No.'s 212, 219 and 301-75. Occupant injury response data summary is as follows: <table border="1"> <thead> <tr> <th>Injury Criteria Threshold Value</th> <th>Driver Dummy</th> <th>Passenger Dummy</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criterion HIC = 1000</td> <td>1115.5</td> <td>1115.3</td> </tr> <tr> <td>Chest Resultant Peak 60 G's (3 msec clip)</td> <td>57.2</td> <td>49.3</td> </tr> <tr> <td>Femur Force Left 10009 N Right</td> <td>2020.5 2156.2</td> <td>1351.1 1601.7</td> </tr> </tbody> </table> Type of occupant restraint system: A 3 point continuous webbing belt system at the driver seating position. A 3 point continuous webbing belt system outboard passenger seating position.						Injury Criteria Threshold Value	Driver Dummy	Passenger Dummy	Head Injury Criterion HIC = 1000	1115.5	1115.3	Chest Resultant Peak 60 G's (3 msec clip)	57.2	49.3	Femur Force Left 10009 N Right	2020.5 2156.2	1351.1 1601.7
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SECTION 1

PURPOSE AND TEST PROCEDURE

This 56.32 km/h (35 mph) frontal barrier impact test is a part of the FY'94 Vehicle Barrier Impact and Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-90-D-32121. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 48.27 km/h (30 mph) FMVSS 208/212/219/301-75 requirements.

This 56.32 km/h (35 mph) frontal barrier impact test was conducted in accordance with the Office of Marketing Incentives (OMI) Laboratory Indicant Test Procedure, dated 01 January 1990.

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SECTION 2

SUMMARY OF FRONTAL BARRIER IMPACT TEST

A load cell barrier was impacted by a 1994 Chevrolet S-10 Pickup, NHTSA No. MR0104, at a velocity of 56.4 km/h. The frontal impact test was conducted by Mobility Systems and Equipment Company (MSE) on 16 February 1994. The general test and vehicle description information are presented in Tables 1 and 2. Pretest and posttest photographs of the test vehicle and dummies are shown in Appendix A.

Two (2) Hybrid III, Part 572, Subpart E, 50th percentile adult male Anthropomorphic Test Devices (ATD's) were placed in the driver and front outboard passenger designated seating positions (DSP's) according to the NHTSA test requirements.

The ATD's, serial Nos. 34 and 35 were previously used for NCAP testing on the Toyota Corolla and the Dodge Dakota. They were instrumented with head, neck and chest triaxial accelerometers, chest displacement gauge, upper neck load/moment sensors and right and left femur load cells. In addition, load cells were placed on both lap and shoulder seat belts to measure ATD upper torso and pelvic section belt loading. Displacement transducers were attached to the shoulder belts to measure seat belt elongation and belt spoolout. A summary of ATD data is presented in Table 3. A summary of ATD configuration and performance verification test data is presented in Appendix C.

The frontal impact event was documented by one (1) real time camera and sixteen (16) high-speed cameras. Camera location data and film speeds are presented in Table 7.

Eighty-three (83) channels of crash parameters were recorded using three (3) FM tape recorders and three (3) data acquisition computers with direct analog to digital acquisition units. Time history plots of all recorded data channels are presented in Appendix B. Channels not used were 19 and 38, channels that failed were 15 and 34. The cause of the failure is unknown.

2.1 GENERAL COMMENTS

The 1994 Chevrolet S-10 Pickup was equipped with a 4302 cc, 6 cylinder engine and a 4 speed automatic transmission. The test weight of the 1994 Chevrolet S-10 Pickup with two (2) 50th percentile male ATD's, instrumentation and cameras was 1811 kg.

The 1994 Chevrolet S-10 Pickup was involved in a frontal barrier crash at a velocity of 56.4 km/h.

The maximum static crush for the vehicle of 642 mm occurred 150 mm to the left of the centerline of the bumper. The windshield was cracked, but otherwise the vehicle glazing remained intact. All doors were opened without the aid of tools.

The driver ATD's face hit the steering rim and hub. The driver's left and right knees hit the dash panel. The driver ATD had a Head Injury Criteria (HIC) value of 1115.5, the maximum chest acceleration (resultant clipped) was 57.2 g's and the maximum femur loads were 3929 newtons (left) and 4615.7 newtons (right).

The passenger ATD's head hit his right knee. Both of the passenger ATD's knees hit the instrument panel. The passenger ATD had a HIC value of 1115.3, the maximum chest acceleration (resultant clipped) was 49.3 g's and the maximum femur loads were 1143.3 newtons (left) and 1970.7 newtons (right).

Shoulder seat belt spoolout, measured by mechanical analysis, was 110 mm for the driver and 90 mm for the passenger. Seat belt spoolout and strain data are presented in Table 6.

The 1994 Chevrolet S-10 Pickup passed the requirements of FMVSS 212, FMVSS 219 and FMVSS 301-75. Data pertaining to these standards are presented in Section 4, in Tables 13, 14 and 15, respectively.

Appendix D contains the manufacturer's occupant restraint system instructions as presented in the owner's manual. Appendix E contains the instrumentation calibration data.

DATA TABLE No. 1
TEST VEHICLE DATA

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1994/Chevrolet/S-10/Pickup

VEHICLE NHTSA No.: M R 0 1 0 4 ; VIN: 1 G C C S 1 4 Z 4 R 8 1 2 5 6 8 4

VEHICLE BODY COLOR: White ; MONTH AND YEAR OF MANUFACTURE: 10/93

ENGINE: 6 Cylinders; 262.4 cu in; 4.3 Liters; 4302 cc
X Gas; Diesel; Turbocharged
PLACEMENT: X Longitudinal; Transverse (Lateral)

TRANSMISSION: 3 Speed; Manual; X Automatic; X Overdrive

FINAL DRIVE: Front Wheel Drive; X Rear Wheel Drive; Four Wheel Drive

DATE VEHICLE AVAILABLE FOR 35 MPH CRASH TESTING: 01/29/94

ODOMETER READING: 102 km; OPTIONS : A/C; X P/S; P/Window;
 Tilt Whl.; Cruise Control

DATA RECORD FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): 240 kPa Front; 240 kPa Rear

Recommended Tire Size: P205/75R15

Tires on Vehicle: P205/75R15 ; Manufacturer: Uniroyal

Number of Occupants: 3 Front; Rear; Third Seat; TOTAL

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

Type of Front Seat Back: X Fixed; Adj. Lever; Adj. Rotating Knob

Vehicle Maximum Capacity Loading: -- kg

No. of Occupants x 68 kg: -- kg

Cargo Capacity (Max - Occupants): 136 kg

TEST VEHICLE DELIVERED WEIGHT WITH MAXIMUM FLUIDS:

Right Front: 513 kg

Left Front: 453 kg

Right Rear: 281 kg

Left Rear: 285 kg

Total Front: 966 kg (63% of Total)

Total Rear: 566 kg (37% of Total)

Total Weight: 1532 kg

CALCULATION OF TEST VEHICLE TARGET WEIGHT:

Total Test Vehicle Delivered Weight with Maximum Fluids: 1532 kg

Maximum Cargo Carrying Capacity of Test Vehicle: 136 kg*

Weight of Two Part 572 ATD;s (2*74.5 kg): 151 kg

TEST VEHICLE TARGET WEIGHT: 1819 kg

* 136 kg for light trucks and MPV's

DATA TABLE No. 1 (Cont.)
TEST VEHICLE DATA

ACTUAL WEIGHT OF TEST VEHICLE WITH 2 ATD's AND CARGO:

Right Front:	<u>493</u> kg		
Left Front:	<u>511</u> kg	Total Front:	<u>1004</u> kg (55% of Total)
Right Rear:	<u>409</u> kg		
Left Rear:	<u>399</u> kg	Total Rear:	<u>808</u> kg (45% of Total)

Total Weight: 1812 kg (includes 95 kg of ballast secured in the cargo / luggage area)

VEHICLE COMPONENTS REMOVED TO MEET TARGET WEIGHT:

1. Jack

TEST VEHICLE ATTITUDE:

As Delivered - Right Front:	<u>775</u> mm	Ready for Test - Right Front:	<u>755</u> mm
Left Front:	<u>762</u> mm	Left Front:	<u>745</u> mm
Right Rear:	<u>838</u> mm	Right Rear:	<u>785</u> mm
Left Rear:	<u>838</u> mm	Left Rear:	<u>782</u> mm

TEST VEHICLE DIMENSIONS:

Total Vehicle Length:	Right Side:	<u>4485</u> mm
	Left Side:	<u>4459</u> mm
	Centerline:	<u>4665</u> mm

Wheelbase: 2755 mm

C. G. is 1228 mm rearward of front axle centerline.

DATA TABLE No. 2
POST CRASH TEST DATA

DATE OF 35 MPH FRONTAL BARRIER IMPACT RATING TEST: 02/16/94

TIME OF TEST: 1600 Hrs; AMBIENT TEMPERATURE AT BARRIER FACE: 22.0° C

VEHICLE OCCUPANT COMPARTMENT TEMPERATURE: 21.4° C (Req. Range 19° C to 26° C)

VEHICLE WINDSHIELD MOLDING TEMPERATURE: 21.4° C

VEHICLE IMPACT VELOCITY: (Req. Range 55.52 to 57.13 km/h)
Primary Speed Trap: 56.4 km/h
Secondary Speed Trap: 56.1 km/h
Distance from vehicle leading edge to barrier face when:
Entering Speed Trap: 1524 mm
Exiting Speed Trap: 305 mm

VEHICLE STATIC CRUSH:	Pretest	Posttest	Static Crush
Right Side (mm)	<u>4485</u>	<u>3988</u>	<u>497</u>
Centerline (mm)	<u>4665</u>	<u>4051</u>	<u>614</u>
Left Side (mm)	<u>4459</u>	<u>4001</u>	<u>458</u>

VEHICLE REBOUND FROM BARRIER: Right Side: 230 mm
Centerline: 205 mm
Left Side: 270 mm

ATD CONTACT POINTS:

	Driver ATD (ID# 34)	Pass. ATD (ID# 830)
Head	Steering Wheel & Hub	Right Knee
Chest	No Contact	No Contact
Abdomen	No Contact	No Contact
Right Knee	Instrument Panel	Instrument Panel
Left Knee	Instrument Panel	Instrumetn Panel

VEHICLE DOOR OPENING INFORMATION:

Door	Opened	Jammed
Right Front	Yes	No
Left Front	Yes	No
Right Rear	N/A	N/A
Left Rear	N/A	N/A

VEHICLE FRONT SEAT MOVEMENT DURING IMPACT EVENT:

Seat Cushion Shift - Driver = 15 mm Passenger = 18 mm
Seat Adjustor Failure - Driver: No Passenger: No
Details of Any Failure: None

OTHER NOTABLE IMPACT EFFECTS: None , Vehicle front seat movement was forward

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SECTION 3

OCCUPANT AND VEHICLE INFORMATION

I. OMI DATA

Dummy Injury Criteria Data Summary
Dummy Positioning Data
Seat Belt Positioning Data
Seat Belt Performance Assessment Data
Camera Locations

II. OVR DATA

Load Cell Barrier Data
Vehicle Accelerometer Data

TABLE No. 3
FMVSS No. 208 OCCUPANT CRASH PROTECTION DATA SHEET

VEH. YEAR/MAKE/MODEL/BODY STYLE: 1994/Chevrolet/S-10/Pickup

VEH. NHTSA NO.: MR0104

TEST DATE: 02/16/94

MAXIMUM ACCELERATION VALUES:

	DRIVER ATD No. 34	PASSENGER ATD No. 830
Head X	-129.7	-98.9
Head Y	-11.9	-14.3
Head Z	42.6	60.9
HEAD RESULTANT	136.3	103.4
Chest X	-59.0	-47.6
Chest Y	-8.2	-13.3
Chest Z	21.1	17.2
CHEST RESULTANT (3msec clip)	57.2	49.3
TIME INTERVAL (msec)	61.0 to 64.0	63.0 to 66.0

HEAD INJURY CRITERIA (HIC) VALUES:

HIC	1115.5	1115.3
t ¹ (msec)	63.6	71.1
t ² (msec)	96.7	107.1
Avg. Acceleration t ¹ to t ²	64.7	62.5

MAXIMUM FEMUR FORCES:

Left Femur (N)	-3929.6	-1143.3
Right Femur (N)	-4615.7	-1970.7

MAXIMUM SEAT BELT FORCES:

Lap Belt (N)	7696.0	10357.0
Shoulder Belt (N)	8069.2	7479.7

MAXIMUM SEAT BELT WEBBING SPOOLOUT: mm (film analysis)

Lap/Shoulder Belt Combination	102	102
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TABLE No. 3 (Continued)
FMVSS No. 208 OCCUPANT CRASH PROTECTION DATA SHEET

VEH. YEAR/MAKE/MODEL/BODY STYLE: 1994/Chevrolet/S-10/Pickup

VEH. NHTSA NO.: MR0104

TEST DATE: 02/16/94

MAXIMUM ACCELERATION VALUES:	DRIVER ATD No. 34	PASSENGER ATD No. 35
Neck Force X (N)	2005.7	1845.8
Neck Force Y (N)	383.4	340.6
Neck Force Z (N)	3105.8	2498.5
Neck Moment X (JOULES)	27.9	-25.5
Neck Moment Y (JOULES)	-149.6	96.2
Neck Moment Z (JOULES)	-19.2	9.4
Neck Moment Resultant (JOULES)	150.9	96.4
Chest Displacement (mm)	N/D	N/D
Time of Max. Occurrence (msec)	0	0

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DATA TABLE No. 4
TEST ATD POSITIONING DATA

PRE - IMPACT DATA:

Make / Model: Chevrolet/S-10
Body Style: Pickup
Model Year: 1994
Color: White
NHTSA No.: MR0104

DATA FROM CERTIFICATION LABEL:

Vehicle Manufacturer: General Motors Corporation
Date of Manufacture: 10/93
VIN: 1 G C C S 1 4 Z 4 R 8 1 2 5 6 8 4
GVWR: 2087 kg
GAWR Front: 1134 kg
GAWR Rear: 1225 kg

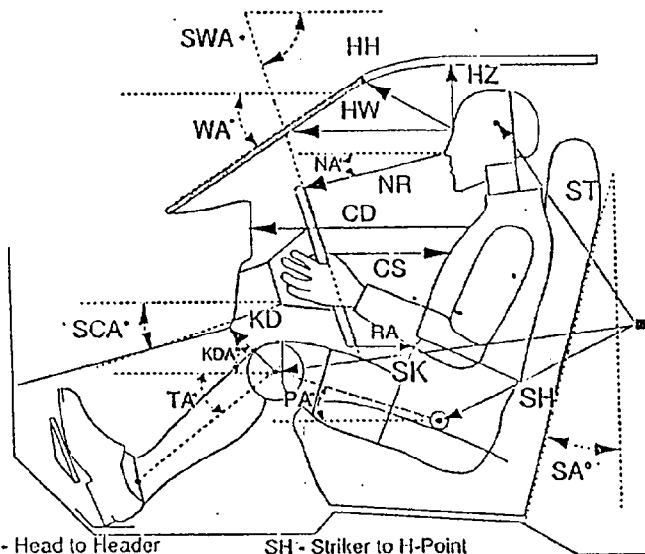
POST IMPACT DATA:

Date of Test: 02/16/94
Time: 1600 Hrs.
Temperature: 22° C
Required Impact Velocity Range: 55.52 to 57.13 km/h
Impact Velocity - Primary: 56.4 km/h
Secondary: 56.1 km/h
Seat Type: Bench
Adjustor Type: None
Bucket Seat Back Type: N/A

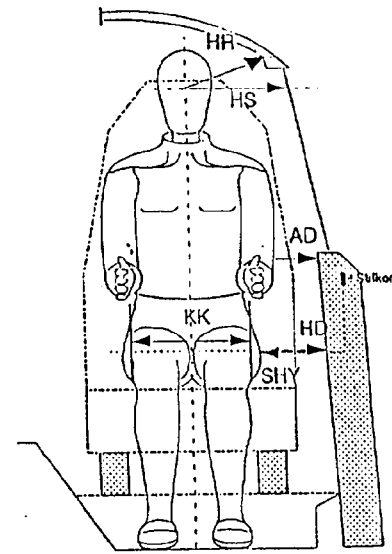
ATD POSITIONING TECHNICIANS: Brian O'Keefe

DATA TABLE No. 4 (Cont.)
TEST ATD POSTIONING DATA

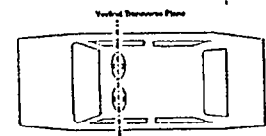
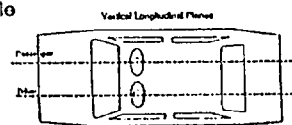
DUMMY MEASUREMENTS FOR FRONT SEAT PASSENGERS



HH - Head to Header
HW - Head to Windshield
HZ - Head to Roof
NR - Nose to Rim
CS - Steering Wheel to Chest
CD - Chest to Dash
RA - Rim to Abdomen
KDL/KDR - Knee to Dash
KDA - Knee to Dash Angle
SH - Striker to H-Point
SK - Striker to Knee
ST - Striker to Head
NA - Nose to Rim Angle
TA - Tibial Angle
PA - Pelvic Angle
SA - Seat Back Angle
SCA - Steering Column Angle
SWA - Steering Wheel Angle
WA - Windshield Angle



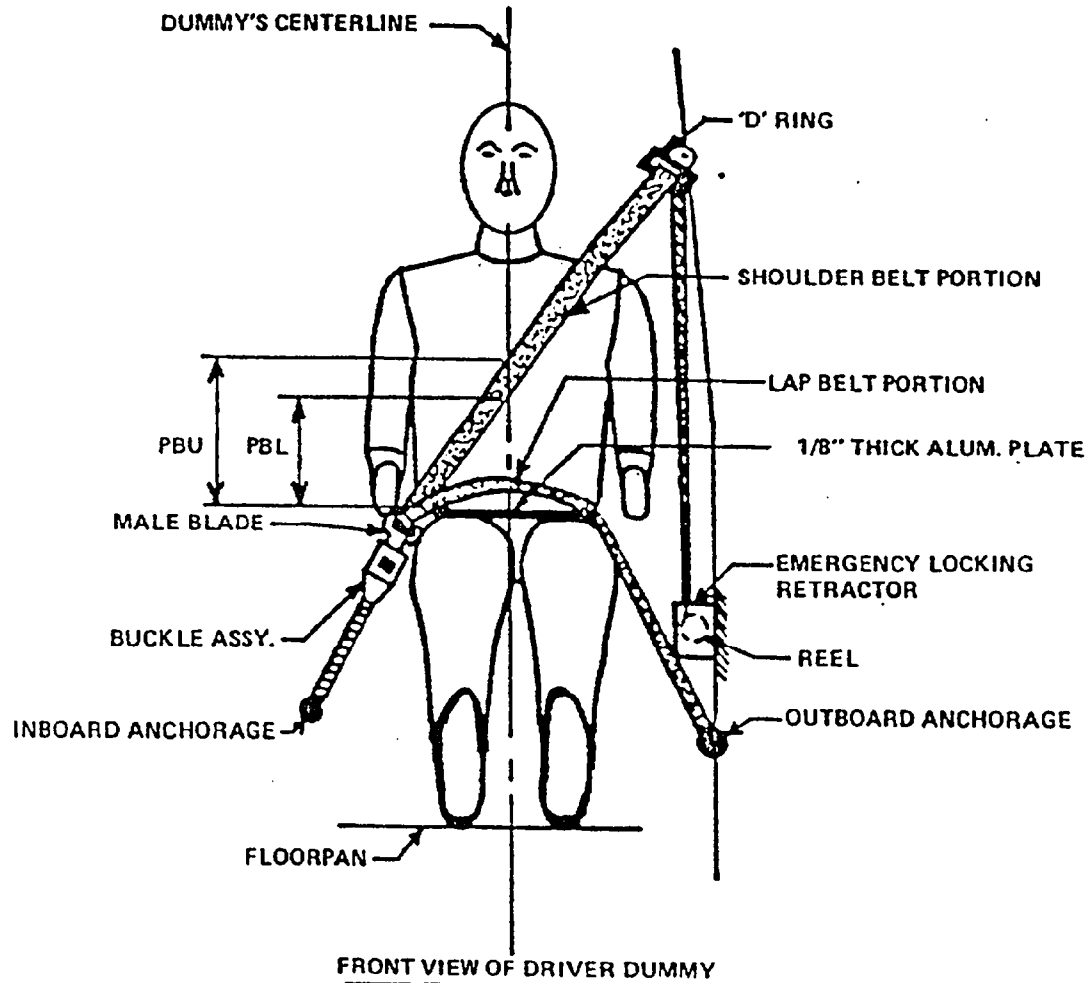
HR - Head to Side Header
HS - Head to Side Window
AD - Arm to Door
HD - H-Point to Door
SHY - Striker to H-Point (Y Dir.)
KK - Knee to Knee



DATA TABLE No. 4 (Cont.)
TEST ATD POSITIONING DATA

Measurement	Driver (Serial No. 34)		Passenger (Serial No. 35)	
	Length (mm)	Angle (Degrees)	Length (mm)	Angle (Degrees)
WA	---	35	---	---
SWA	---	69	---	---
SCA	---	21	---	---
HZ	200	90	225	90
HH	450	0	490	0
HW	610	0	640	0
HR	250	---	275	---
NR	350	18	---	---
CD	515	---	575	---
CS	275	0	---	---
RA	165	0	---	---
KDL	200	37	140	---
KDR	195	---	75	45
PA	---	25	---	25
TA	---	39	---	43
KK	255	---	270	---
ST	588	72	572	76
SK	680	2	710	3
SH	288	-14	328	-13
SHY	230	0	200	0
HS	385	0	385	0
HD	150	0	115	0
AD	100	0	15	0

DATA TABLE No. 5
SEAT BELT POSITIONING DATA



Measurement	Driver ATD	Passenger ATD
PBU - Top Surface of alum. plate to belt upper edge (mm)	315	350
PBL - Top Surface of alum. plate to belt lower edge (mm)	245	280
Lap Belt Tension (N)	N/D	N/D
Shoulder Belt Tension (N)	N/D	N/D

DATA TABLE 6
SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

BELT LENGTH DATA:

Total belt length from retractor reel to bolt hole anchor point for continuous webbing systems (mm) _____

Retractor reel to 'D' ring as measured on Part 572 ATD (mm) _____

Shoulder belt length as measured on Part 572 ATD (mm) _____

Lap belt length as measured on Part 572 ATD (mm) _____

Remainder of belt webbing left on the retractor reel (mm) _____

DRIVER SIDE		PASSENGER SIDE	
PRETEST	POSTTEST	PRETEST	POSTTEST
1965	1965	1935	1985
310	310	310	310
890	1905	850	910
765	750	775	765
700	700	600	550

BELT SPOOL-OFF DATA:

As determined by film analysis (mm) _____

As determined electronically (mm) _____

As determined mechanically (mm) _____

102	102
N/D	N/D
110	90

BELT STRAIN DATA: Measured on the shoulder belt

As determined electronically (%) _____

As determined mechanically (%) _____

3.8	3.6
0	0

DATA TABLE No. 7
FMVSS No. 208 CAMERA LOCATION DATA

VEH. YEAR/MAKE/MODEL/BODY STYLE: 1994/Chevrolet/S-10/Pickup

VEH. NHTSA NO.: MR0104

TEST DATE: 02/16/94

TIME: 1600 Hrs.

CAMERA NO.	VIEW	CAMERA POS. (mm)			ANGLE (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Left Side View	5900	14350	3400	-20	14576	15-70 Zoom	24
2	Right Side View	3460	18400	3700	-11	18212	28	N/D
3	Left Side View	3770	13120	5190	-13	13044	28	540
4	Overhead	-410	0	-1605	-77	4751	13	870
5	Pit - Engine	600	60	-1550	87	3377	13	615
6	Pit - Fuel Tank	4455	0	-2510	90	3600	13	720
7	Front - Passenger	-530	370	2510	-48	3070	13	740
8	Front - Driver	-530	330	1610	-48	3070	13	770
9	Left Side - Driver	3310	2405	1810	-5	2285	13	420
10	Right Side - Pass.	3370	2440	1120	-14	2377	13	740
11	Right Side - A-Post	1530	5760	2460	4	5432	19	730
12	Left Side - A-Post	1825	9510	1320	-7	9178	13	615
13	Onboard - Left Side	2970	-290	1310	4	959	35	N/D
14	Onboard - Right Side	2970	280	1310	3	689	13	N/D
15	Left Side - St. Col.	2205	9960	3140	-10	9751	28	600
16	Left Side - St. Col.	2265	9960	2390	-16	9637	28	600
17	Right Side - Pass.	1960	5900	1100	1	5529	19	920

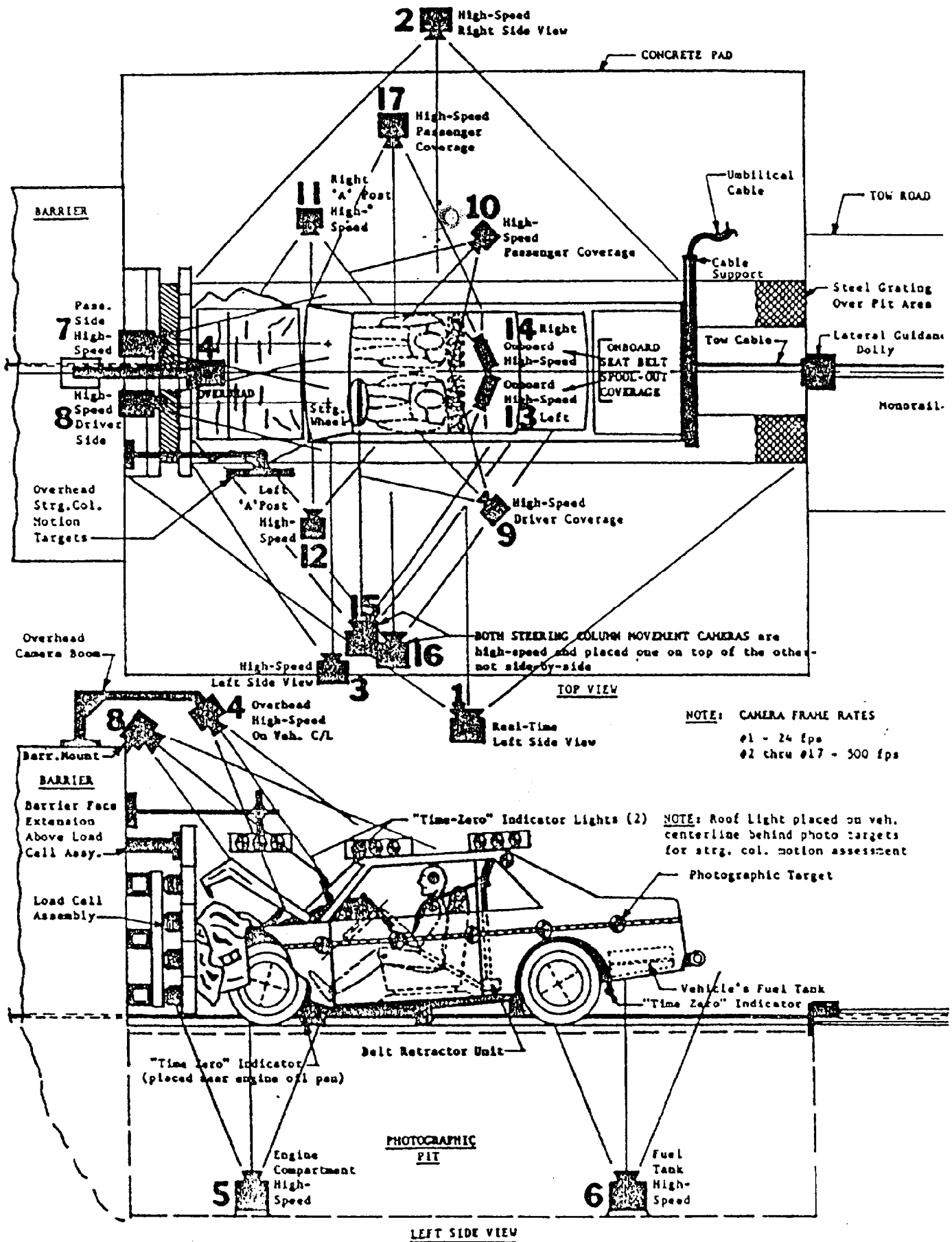
REFERENCE: X - Film plane to barrier face

Y - Film plane to monorail centerline

Z - Film plane to ground

NOTES: * Film is good but film speed could not be determined.

** Film was destroyed during test *** Film was destroyed during processing



DATA TABLE No. 8
VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

No.	Description	Location			Maximum Value (g's)			
		X	Y	Z	-X	msec	+X	msec
1	Left rear seat cross member	3640	-650	965	28.3	60.4	6.4	150.1
2	Right rear seat cross member	3640	650	965	32.7	48.2	10.1	27.7
3	Top of engine block	850	-220	800	84.2	33.7	7.4	54.6
4	Bottom of engine	1530	0	275	83.5	33.7	11.4	54.7
5	Right brake caliper	1000	600	310	81.5	47.0	30.8	58.9
6	Instrument panel	1560	50	1150	54.5	9.5	13.7	56.5
7	Left brake caliper	1000	600	310	72.7	37.2	26.3	61.1
8	Left rear seat cross member Redun.	3640	-650	965	27.3	51.3	6.2	150.2
9	Right rear seat cross member Redun.	3640	650	965	32.0	48.3	9.2	27.8

REFERENCE: X - Front bumper leading edge
Y - Vehicle centerline (Right Pos., Left Neg.)
Z - Ground level

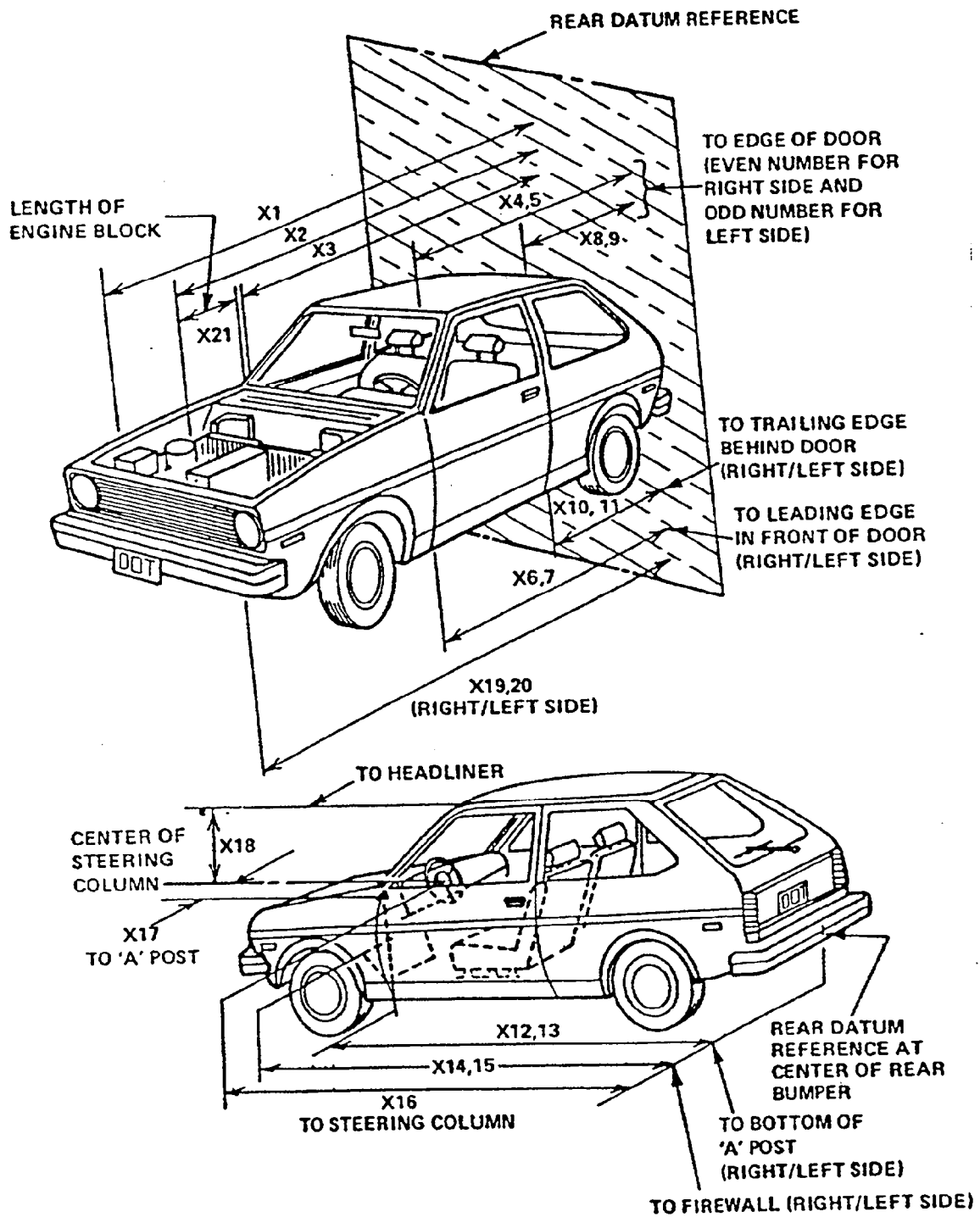
All dimensions in mm

DATA TABLE No. 9
TEST VEHICLE MEASUREMENTS

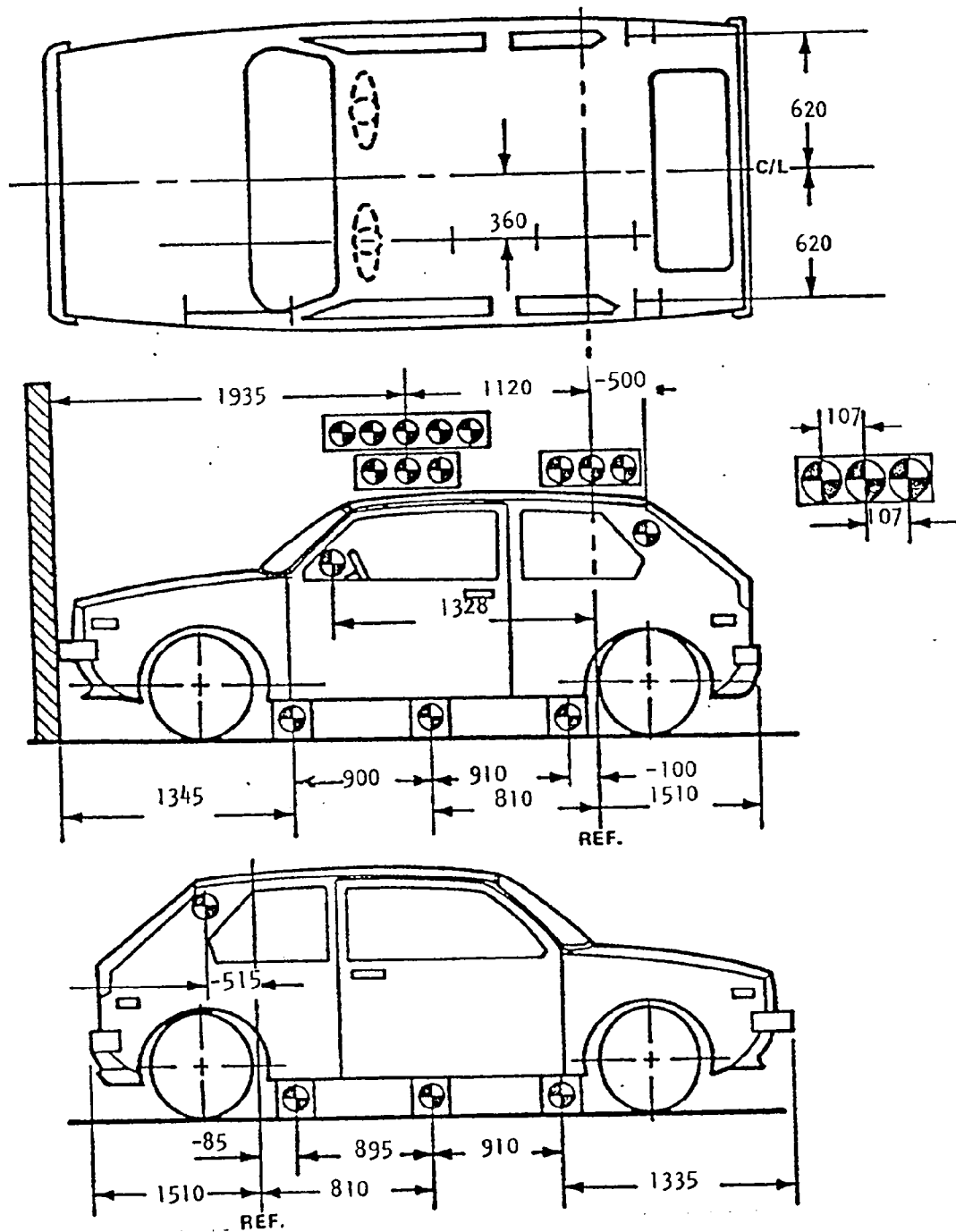
No.	Measurement Description	Pretest	Posttest	Change
1	Length of test vehicle at centerline	4665	4051	614
2	Rear surface of vehicle to front of engine	3945	3801	144
3	Rear of vehicle to firewall centerline	3555	3390	165
4	Rear to upper leading edge of right door	2735	2662	73
5	Rear to upper leading edge of left door	2730	2642	88
6	Rear to lower leading edge of right door	3252	3175	77
7	Rear to lower leading edge of left door	3263	3175	88
8	Rear to upper trailing edge of right door	2180	2108	72
9	Rear to upper trailing edge of left door	2180	2083	97
10	Rear to lower trailing edge of right door	2140	2057	83
11	Rear to lower trailing edge of left door	2150	2070	80
12	Rear to bottom of right 'A' pillar	3320	3213	107
13	Rear to bottom of left 'A' pillar	3325	3200	125
14	Rear surface to firewall on right side	3505	3302	203
15	Rear surface to firewall on left side	3520	3302	218
16	Rear surface to steering column	2785	2667	118
17	Center of steering column to left 'A' pillar	430	368	62
18	Center of steering column to headlining	500	584	-84
19	Rear surface to right side of front bumper	4485	3988	497
20	Rear surface to left side of front bumper	4459	4001	458
21	Length of engine block	360	360	0

All measurements in mm

DATA TABLE No. 9 (Continued)
TEST VEHICLE MEASUREMENTS



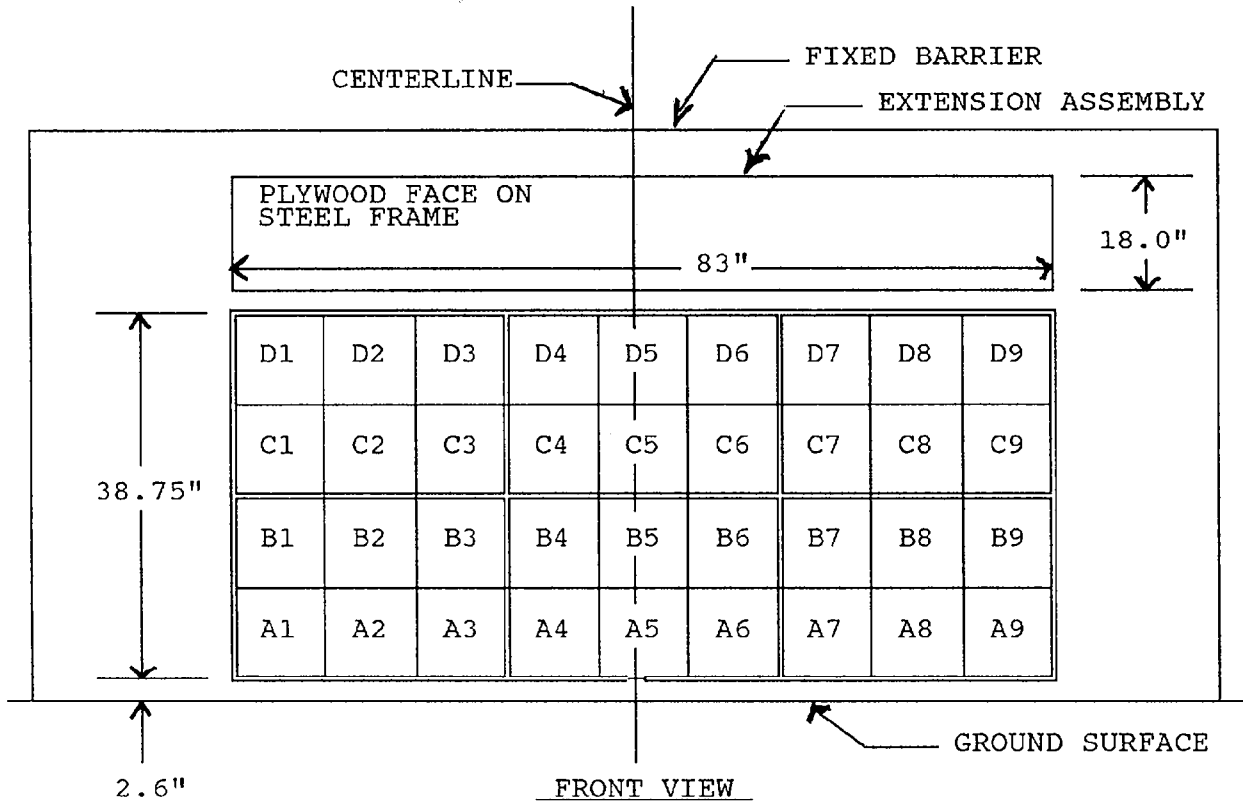
DATA TABLE No. 10
VEHICLE TARGET LOCATIONS



all measurements in mm

DATA TABLE No. 11
LOAD CELL LOCATIONS ON FIXED BARRIER

36 Load cells
4 Rows
9 Columns
6 Groupings (6 cells/group)



6 GROUPS OF LOAD CELLS EACH

Group 4 C1 thru D3	Group 5 C4 thru D6	Group 6 C7 thru D9
Group 1 A1 thru B3	Group 2 A4 thru B6	Group 3 A7 thru B9

DATA REQUIREMENTS:

- (1) Data from 36 individual load cells
- (2) Total or sum of 36 individual load cells
- (3) Data from 6 groupings shown above (6 cells/group)
- (4) Total load vs. vehicle dynamic crush

DATA TABLE No. 12
ACCIDENT INVESTIGATION DIVISION DATA FOR 35 MPH FRONTAL BARRIER IMPACT

Vehicle Make/Model/Body Style: Chevrolet/S-10/Pickup

Veh. NHTSA No.: MR0104 ; VIN: 1GCCS14Z4R8125684

Model Year: 1994 ; Build Date: 10/93 ; Test Date: 02/16/94

Veh. Size Category: N/A ; Test Weight: 1811 kg

Veh. Wheelbase: 2755 mm ; Front Overhang: 885 mm ; Overall Width: 1735 mm

ACCELEROMETER DATA:

Location: Left and right side passenger compartment

Calibration Procedure: 6 months / Drop test

Linearity: Good ; Integration Algorithm: NHTSA Standard

Veh. Impact Speed: 56.40 km/h ; Time of separation: 101.9 msec

Velocity Change: 66.5 km/h (Left); 65.5 km/h (Right)

Collision Deformation Classification (CDC) Code: F (Frontal)

Crush Depth Dimensions:

C1 = 477 mm

C2 = 577 mm

C3 = 642 mm

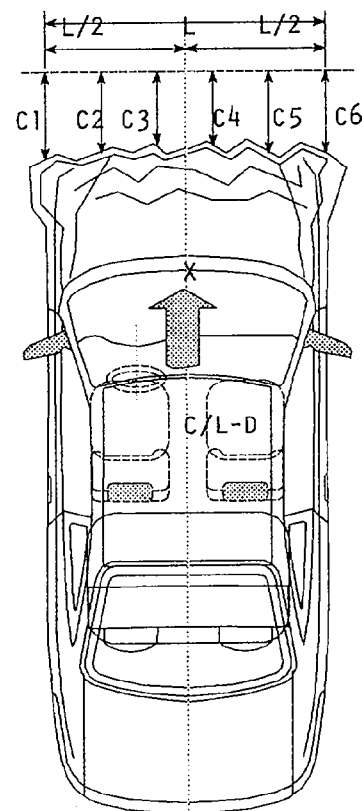
C4 = 629 mm

C5 = 565 mm

C6 = 477 mm

Midpoint of Damage: Vehicle Centerline

Length of Damaged Region: L = 1500 mm



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SECTION 4

SUMMARY OF RESULTS FOR:

FMVSS 212, "Windshield Mounting"
FMVSS 219, "Windshield Zone Intrusion"
FMVSS 301-75, "Fuel System Integrity"

DATA TABLE No. 13
FMVSS No. 212, WINDSHIELD MOUNTING

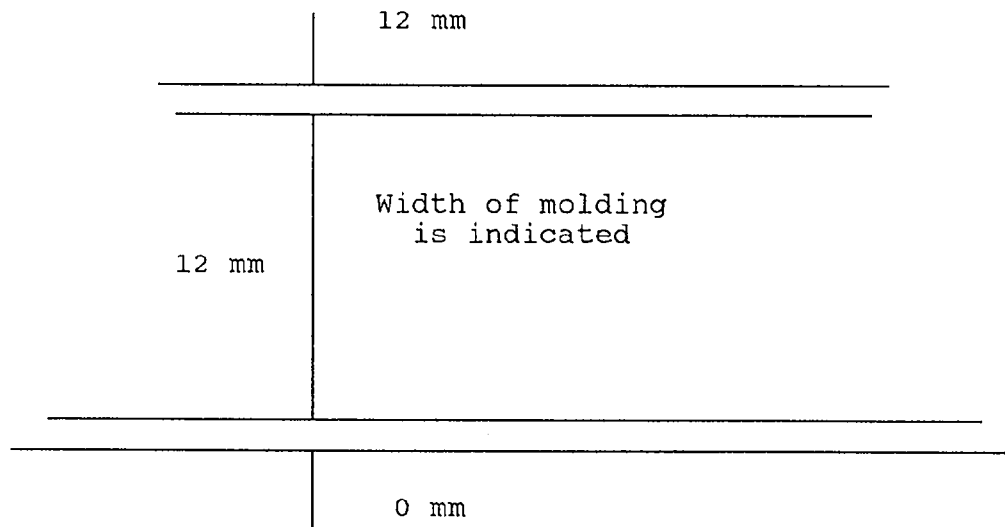
Details of windshield mounting: Glass is secured to the vehicle frame with a rubber type adhesive with rubber molding along the top and sides and rubber and plastic molding along the bottom.

FMVSS 212 Requirements: The post-test periphery retention amount must be at least 75% of the pretest periphery measurement for vehicles not equipped with automatic restraints and 50% for each side of the windshield for vehicles equipped with automatic restraint systems for front occupants.

FMVSS 212 Test Data:

	Windshield Periphery Retention		
	Pretest (mm)	Posttest (mm)	Percent Retention
Right Side	2145	2145	100
Left Side	2145	2145	100
Total	4290	4290	100

AREA OF RETENTION FAILURE:



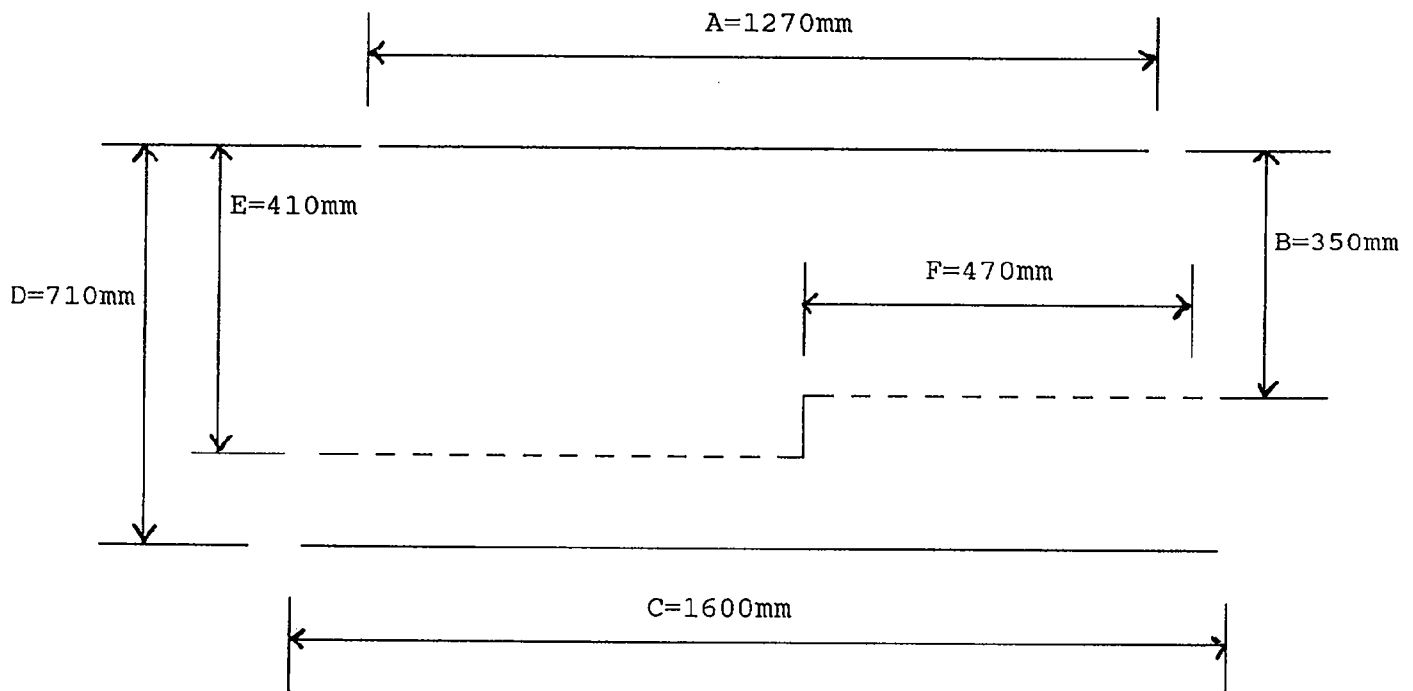
FAILURE DETAILS: None

DATA TABLE No. 14
FMVSS No. 219 WINDSHIELD ZONE INTRUSION

PROTECTED ZONE LOWER EDGE REQUIREMENT

The lower edge of the protected zone is determined by placing a 6.5 inch diameter rigid sphere weighing 15 pounds in a position such that it simultaneously contacts the inner surface of the windshield and the top surface of the instrument panel including padding. Draw the locus of points on the inner surface of the windshield contactable by the sphere across the width of the instrument panel. From the outermost contactable points, extend the locus line horizontally to the edges of the windshield and then draw a line on the inner surface of the windshield below and 1/2 inch distant from the locus line. The lower edge of the protected zone is the longitudinal projection onto the outer surface of the windshield of this line.

FMVSS 219 TEST DATA:



DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 1/4": None
(Location shown on above sketch)

Data Table No. 15
FMVSS No. 301-75, Fuel System Integrity

VEH. YEAR/MAKE/MODEL/BODY STYLE: 19 94/Chevrolet/S-10/Pickup

VEH. NHTSA NO.: MR0104 TEST DATE: 02/16/94

USABLE CAPACITY OF VEHICLE'S FUEL TANK: 76.0 Liters (furnished by Mfr.)

TEST REQUIREMENTS:

Vehicle's engine operated to "run dry" condition and a small amount of Stoddard solvent, dyed red, was added to the vehicle's fuel tank. Fuel pump was operated to fill the fuel system ahead of the fuel tank, then added 92% to 94% of the stated usable capacity to the fuel tank.

AMOUNT OF STODDARD SOLVENT ADDED TO THE VEHICLE'S FUEL TANK:

70.8 Liters, which is 93.5% of the stated usable capacity

SOLVENT SPILLAGE MEASUREMENT AFTER 35 MPH FRONTAL BARRIER IMPACT TEST:

	Actual	Max. Allowed
From impact until vehicle motion ceases	<u>0 oz.</u>	1 oz.
For 5 min. period after vehicle motion ceases	<u>0 oz.</u>	5 oz.
For next 25 min. at barrier face	<u>0 oz.</u>	1 oz./min.

SOLVENT SPILLAGE DETAILS: None

STATIC ROLLOVER MACHINE ROTATION TIME INFORMATION: (Spec. range = 1 to 3 min)

Time reqd. for machine to rotate 90°	<u>1</u> minutes, <u>20</u> seconds
FMVSS 301-75 position hold time	<u>5</u> minutes, <u>00</u> seconds
Total	<u>6</u> minutes, <u>20</u> seconds
Next whole minute interval	<u>7</u> minutes

VEHICLE STATIC ROLLOVER DATA:

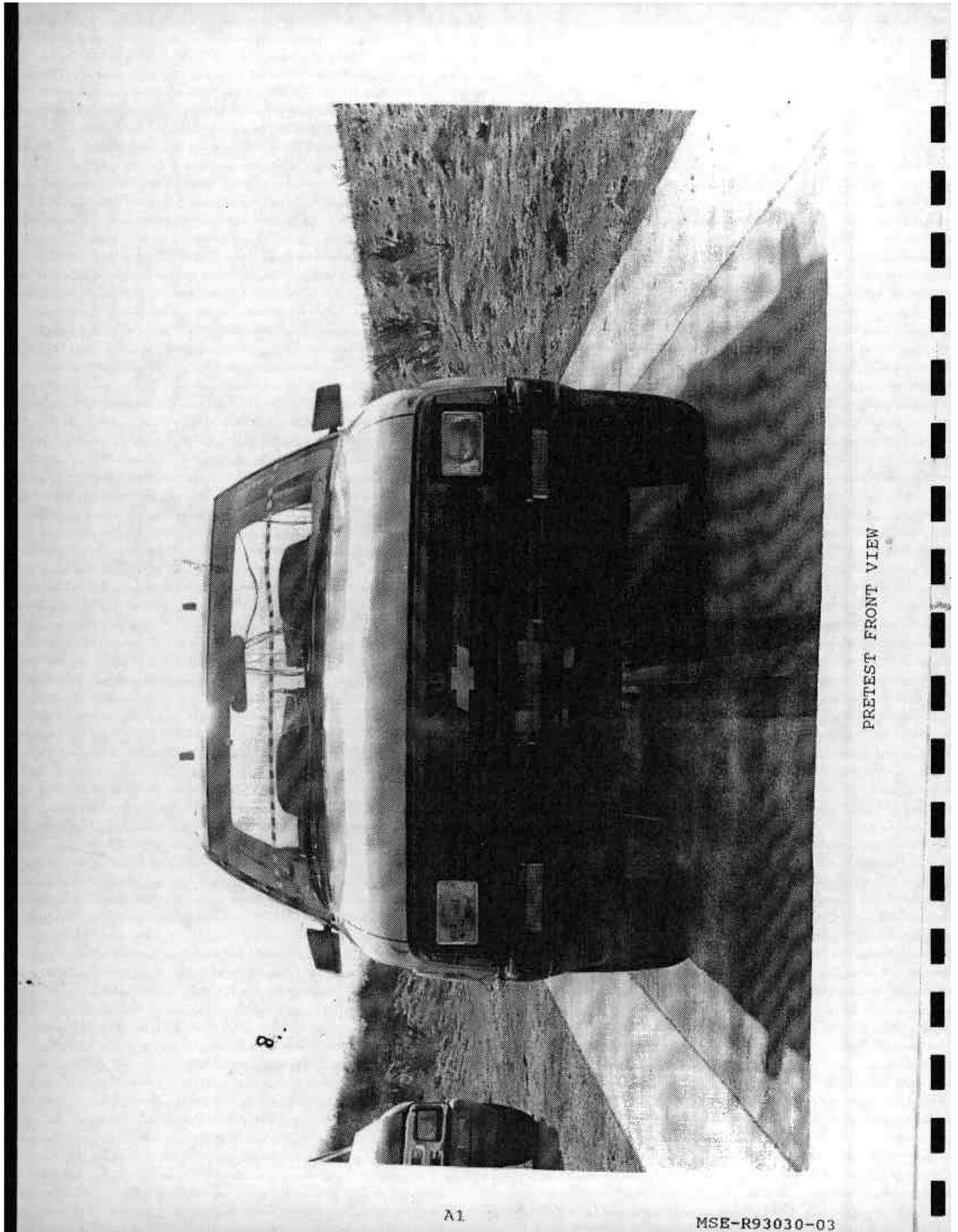
	1st 5 Min.	6th min.	7th min.	8th min.
Max allowable solvent spillage	5 oz.	1 oz.	1 oz.	1 oz.
0° to 90° (filler cap down)	0 oz.	0 oz.	0 oz.	N/A
90° to 180°	0 oz.	0 oz.	0 oz.	N/A
180° to 270°	0 oz.	0 oz.	0 oz.	N/A
270° to 360°	0 oz.	0 oz.	0 oz.	N/A

SOLVENT SPILLAGE LOCATIONS: None

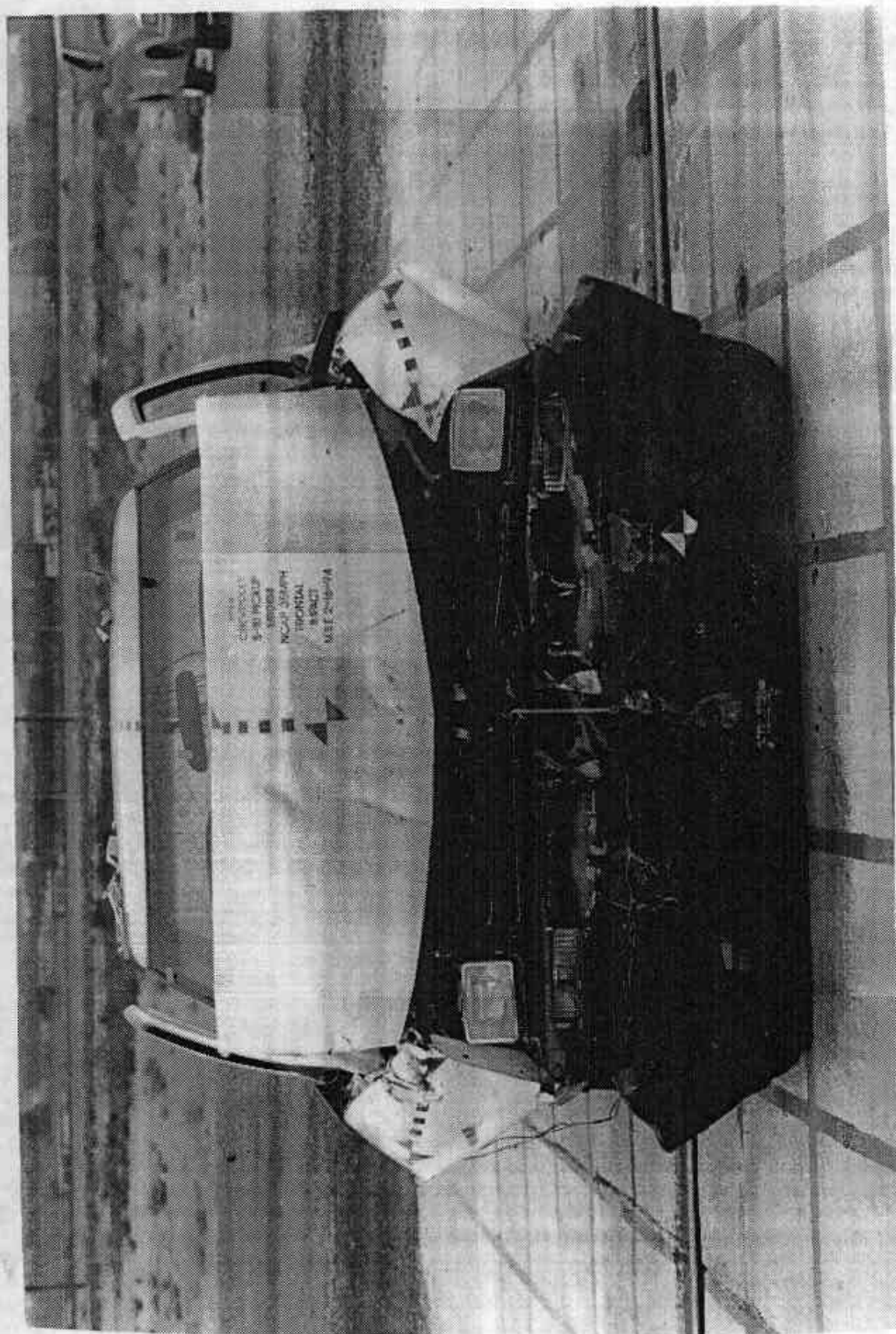
APPENDIX A

PHOTOGRAPHS

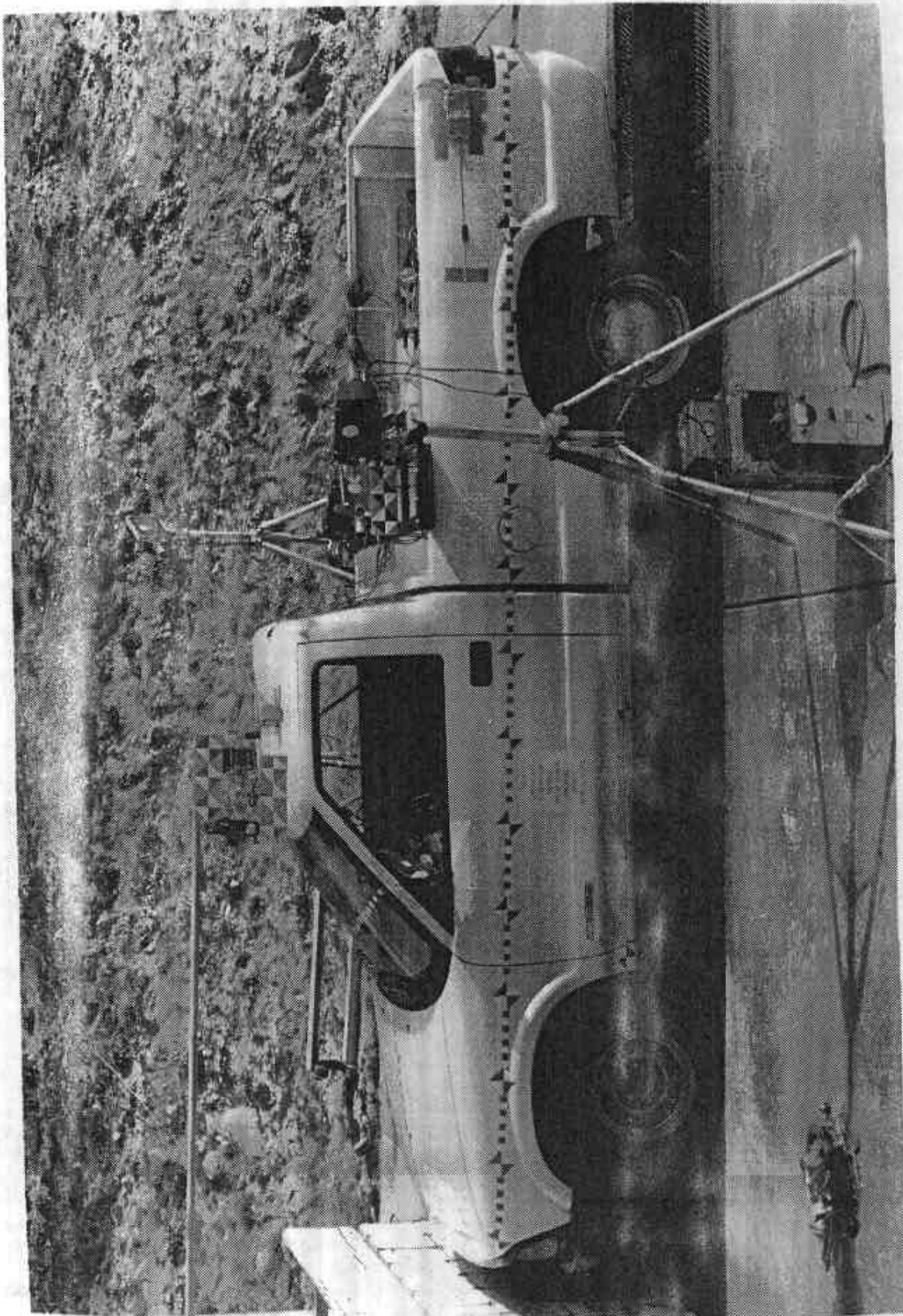
Pretest Front View
Posttest Front View
Pretest Left Side View
Posttest Left Side View
Pretest Right Side View
Posttest Right Side View
Pretest Right Front 3/4 View
Posttest Right Front 3/4 View
Pretest Left Rear 3/4 View
Posttest Left Rear 3/4 View
Pretest Windshield View
Posttest Windshield View
Pretest Engine Compartment View
Posttest Engine Compartment View
Pretest Front Underbody View
Posttest Front Underbody View
Pretest Rear Underbody View
Posttest Rear Underbody View
Pretest Driver Dummy Position View
Posttest Driver Dummy Position View
Pretest Passenger Dummy Position View
Posttest Passenger Dummy Position View
Pretest Driver Dummy and Vehicle Interior View (Door Open)
Posttest Driver Dummy and Vehicle Interior View (Door Open)
Pretest Passenger Dummy and Vehicle Interior View (Door Open)
Posttest Passenger Dummy and Vehicle Interior View (Door Open)
Posttest Driver Dummy Knee Contact Area
Posttest Passenger Dummy Knee Contact Area



PRETEST FRONT VIEW



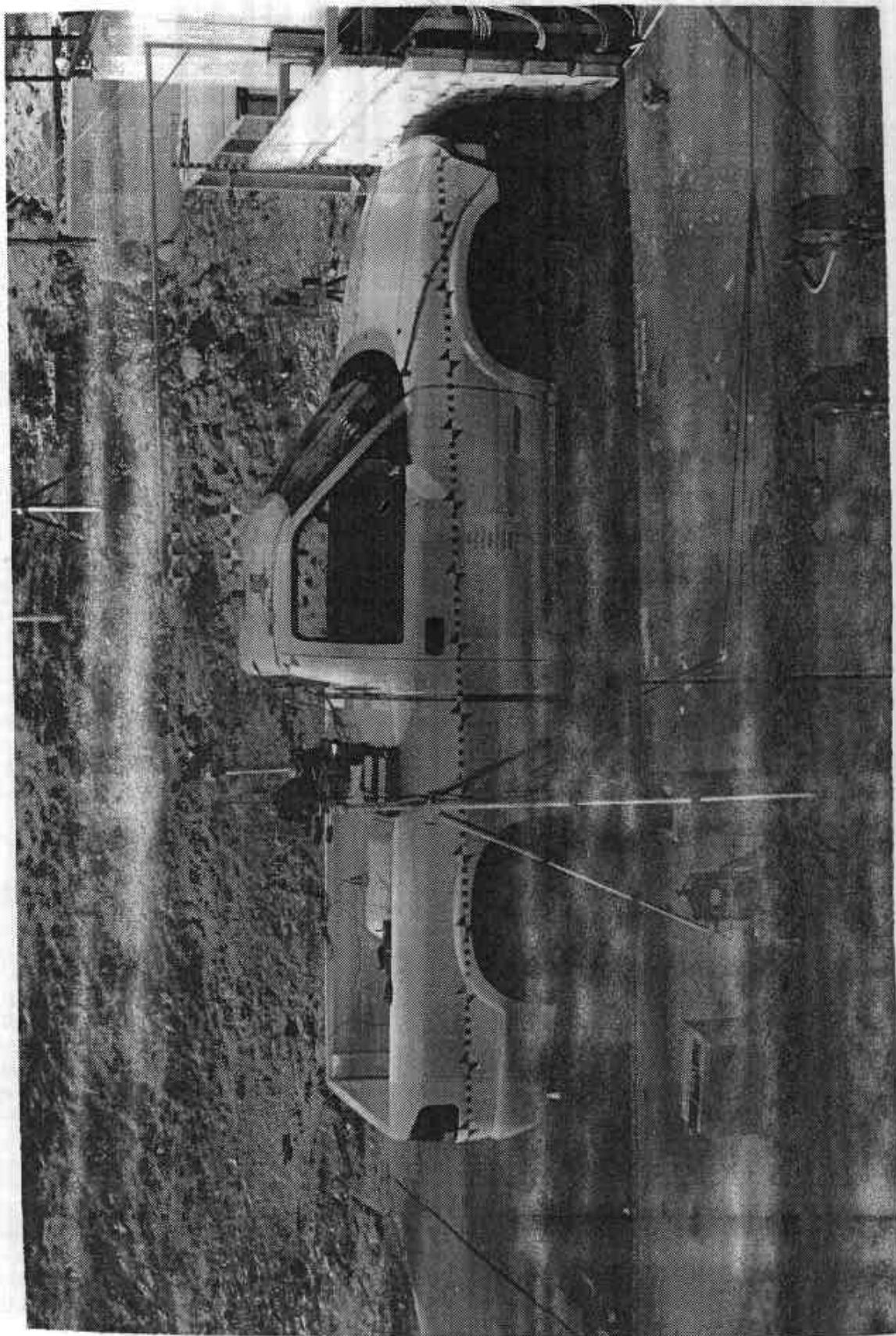
POSTTEST FRONT VIEW



PRETEST LEFT SIDE VIEW



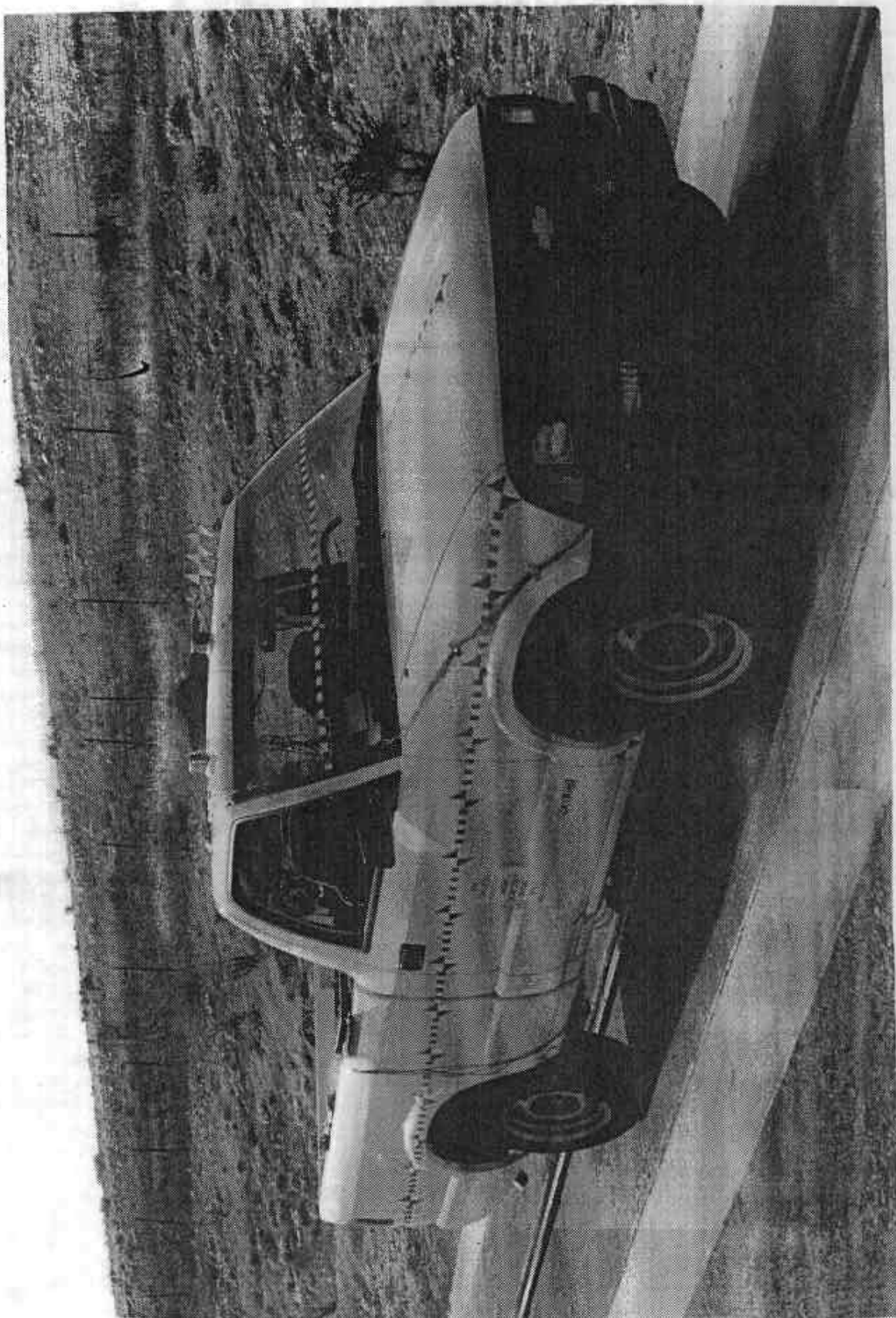
POSTTEST LEFT SIDE VIEW



PRETEST RIGHT SIDE VIEW

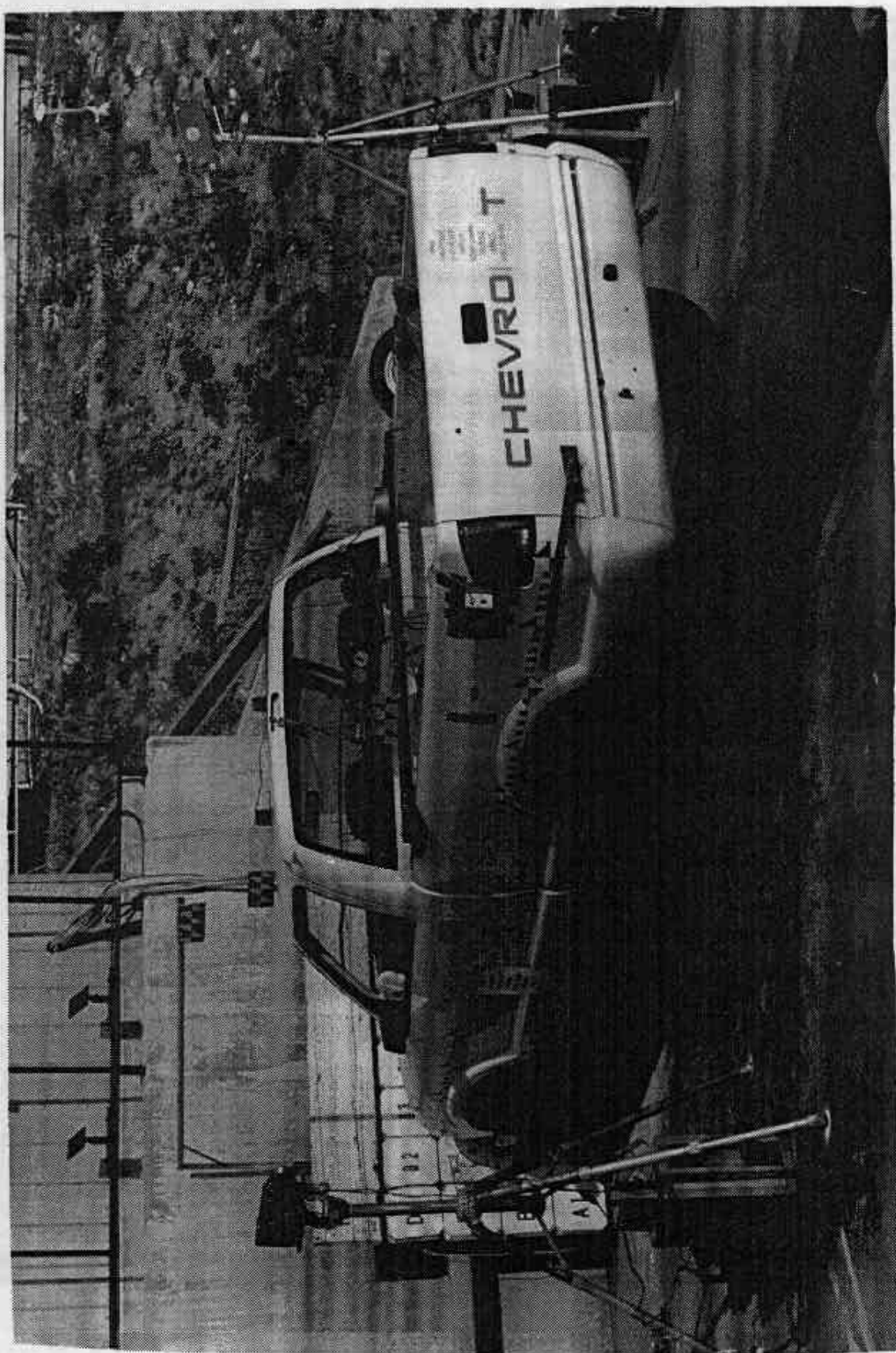


POSTTEST RIGHT SIDE VIEW



PRETEST RIGHT FRONT 3/4 VIEW

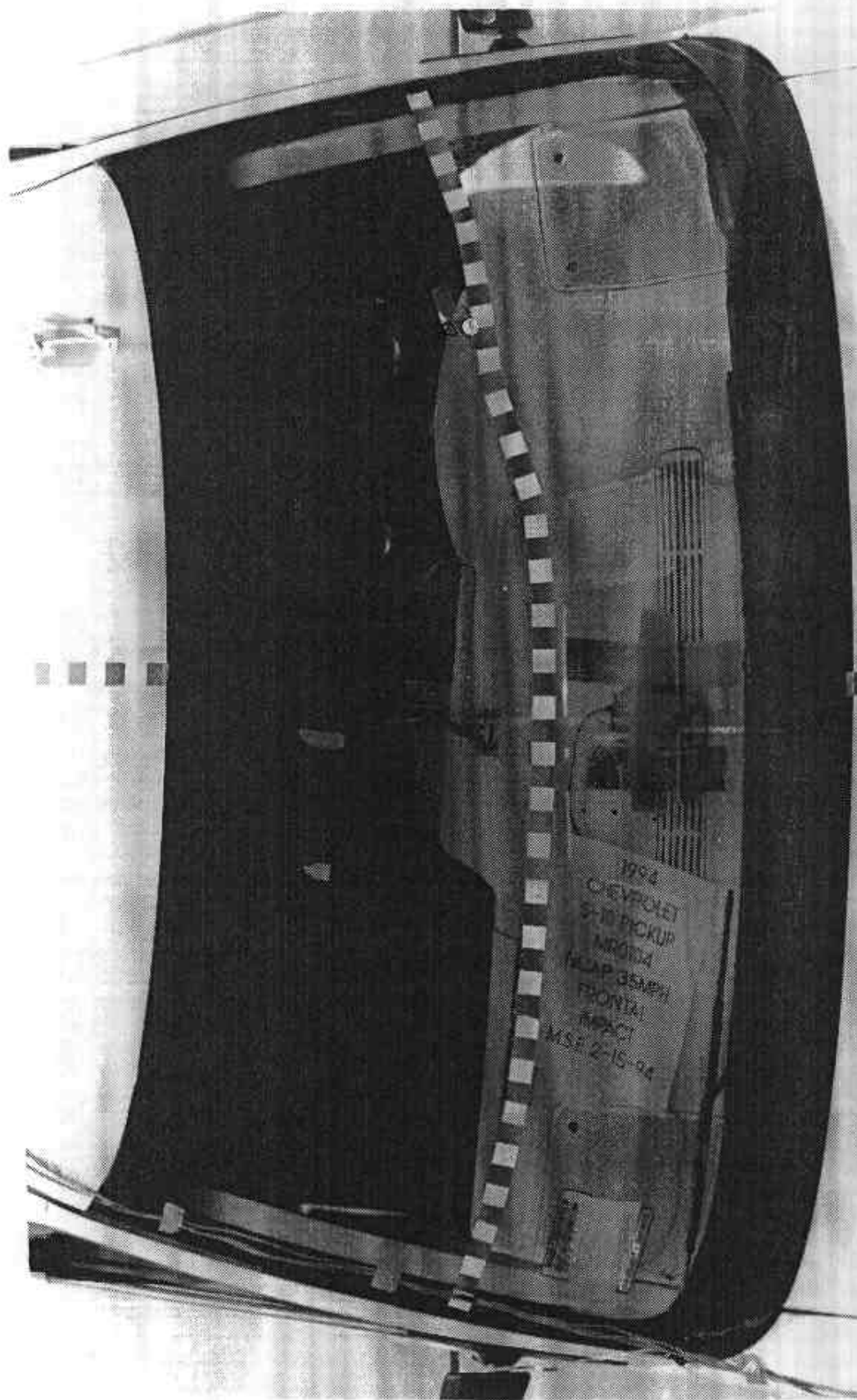
FIGURE A8
POSTTEST RIGHT FRONT 3/4 VIEW
PHOTOGRAPH NOT AVAILABLE



PRETEST LEFT REAR 3/4 VIEW

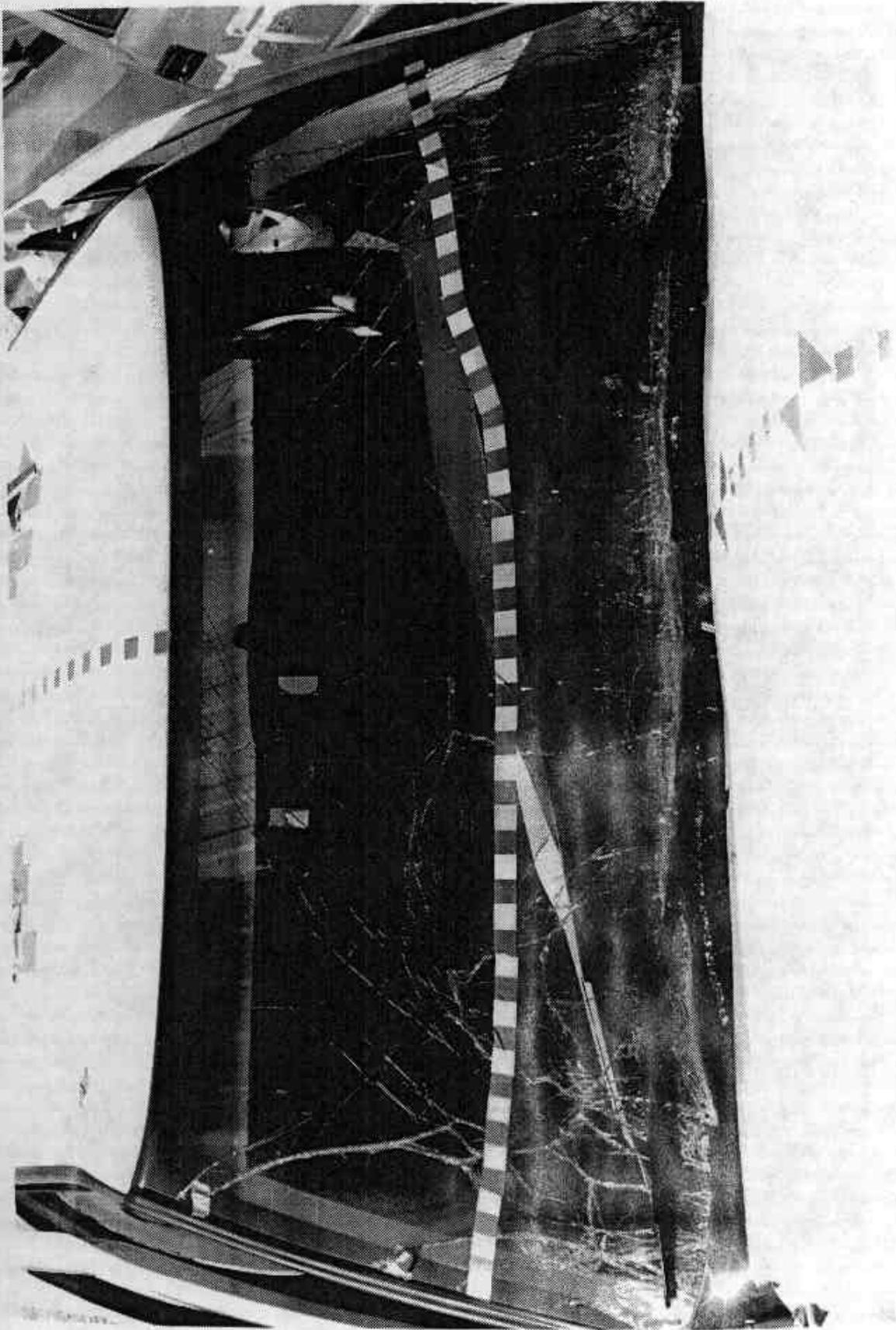


POSTTEST LEFT REAR 3/4 VIEW

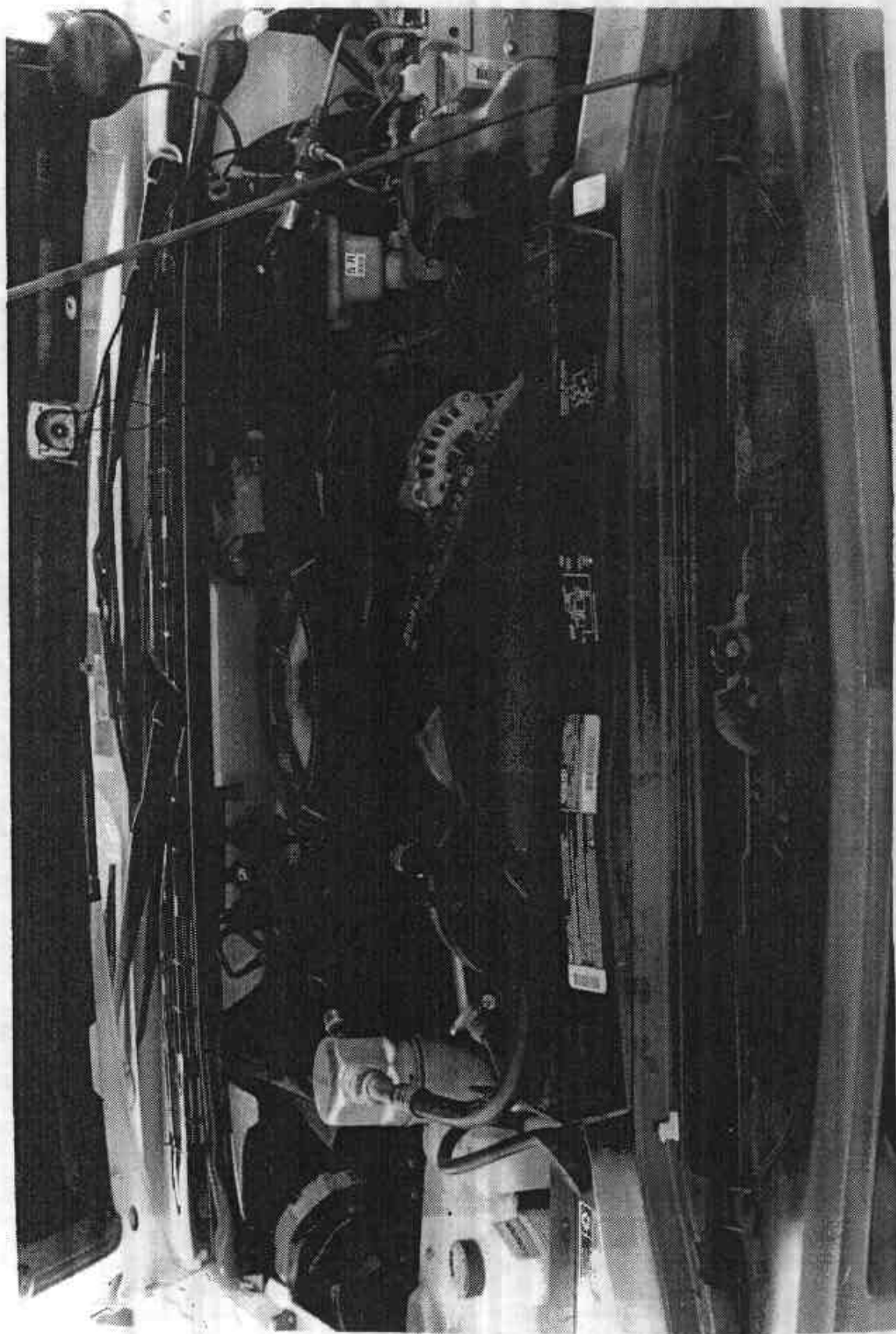


PRETEST WINDSHIELD VIEW

1994
CHEVROLET
S-10 PICKUP
NR0104
HUMP 35AMP
FRONTAL
IMPACT
MSE 2-15-94



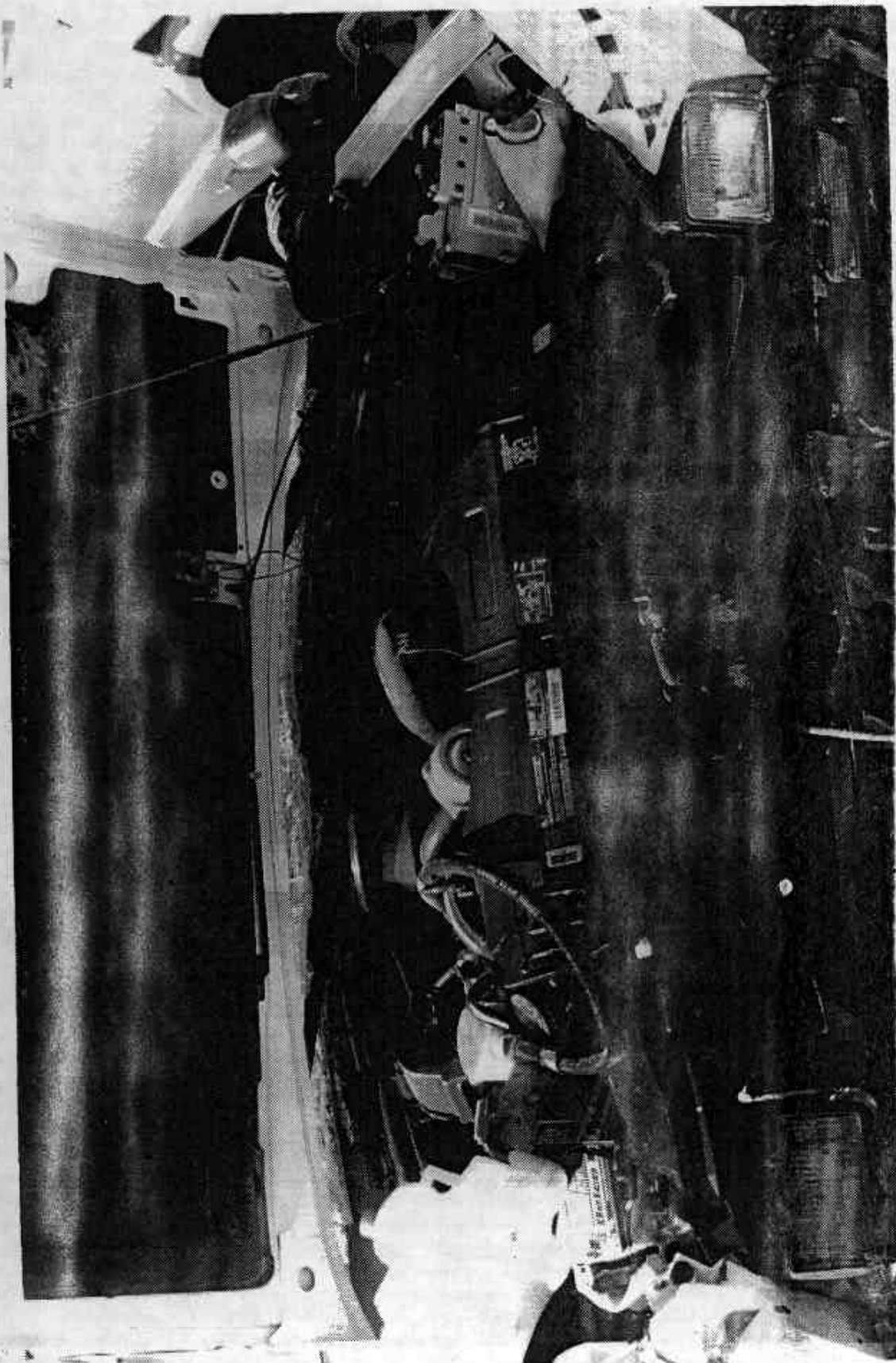
POSTTEST WINDSHIELD VIEW



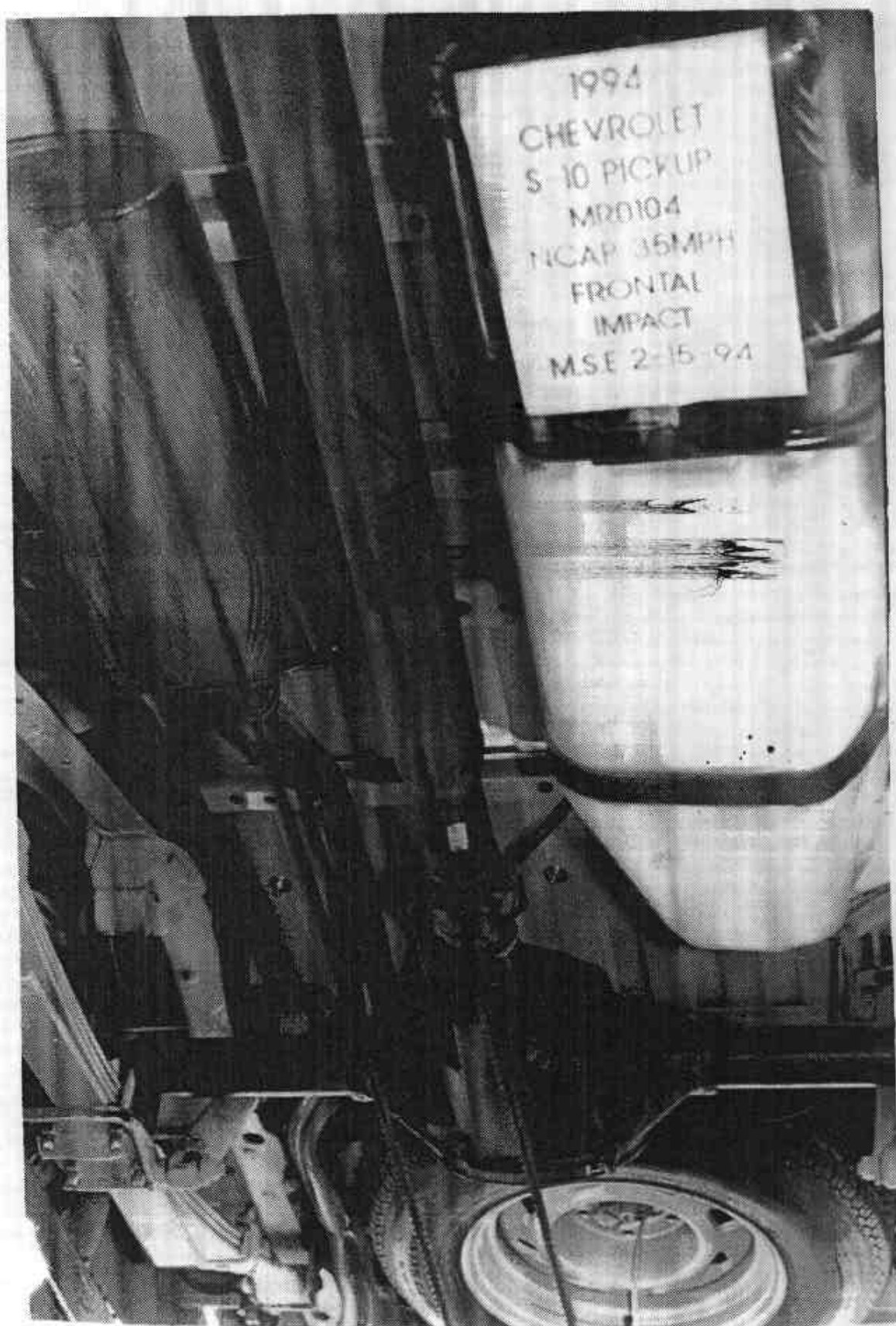
PRETEST ENGINE COMPARTMENT VIEW

A13

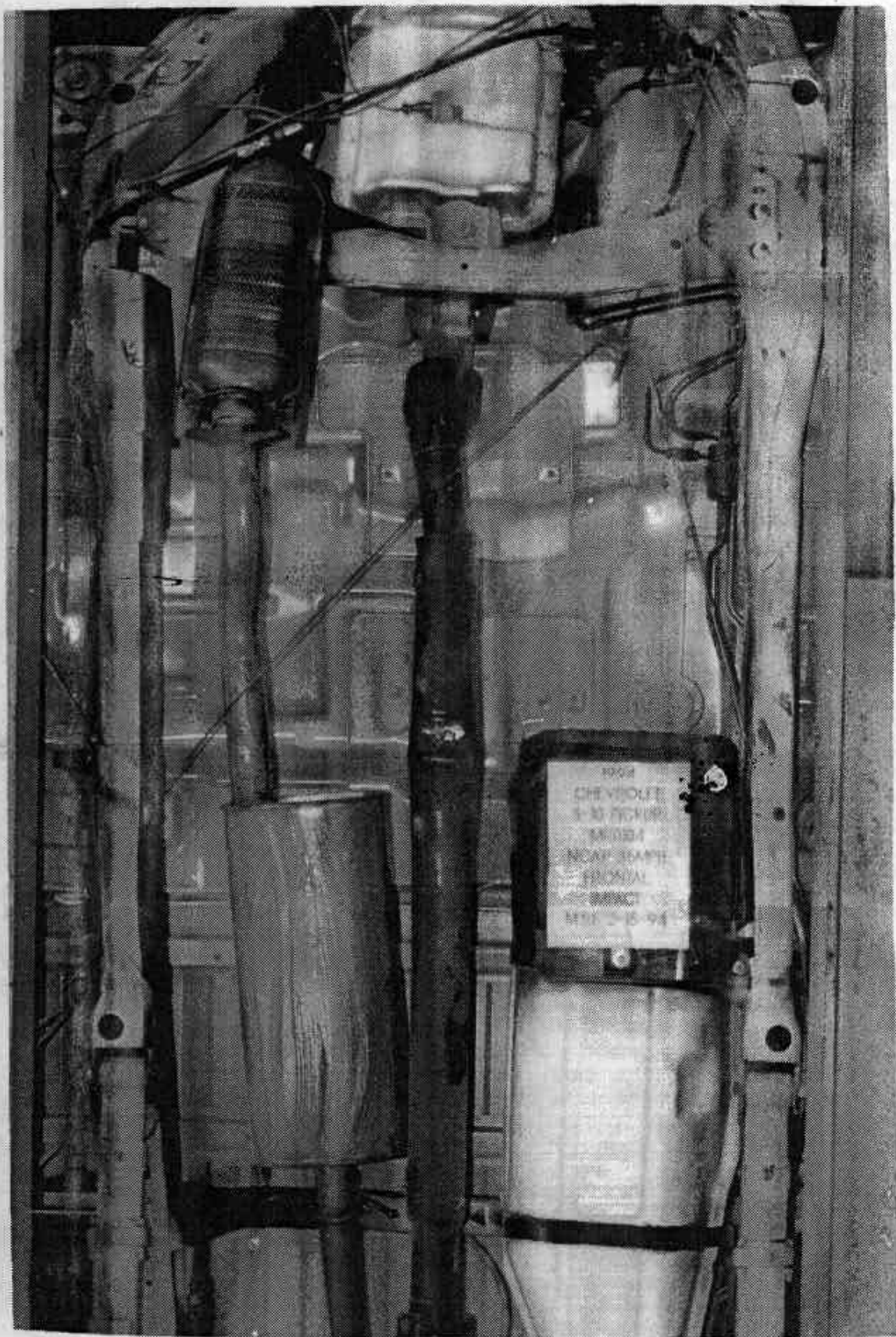
MSE-R93030-03



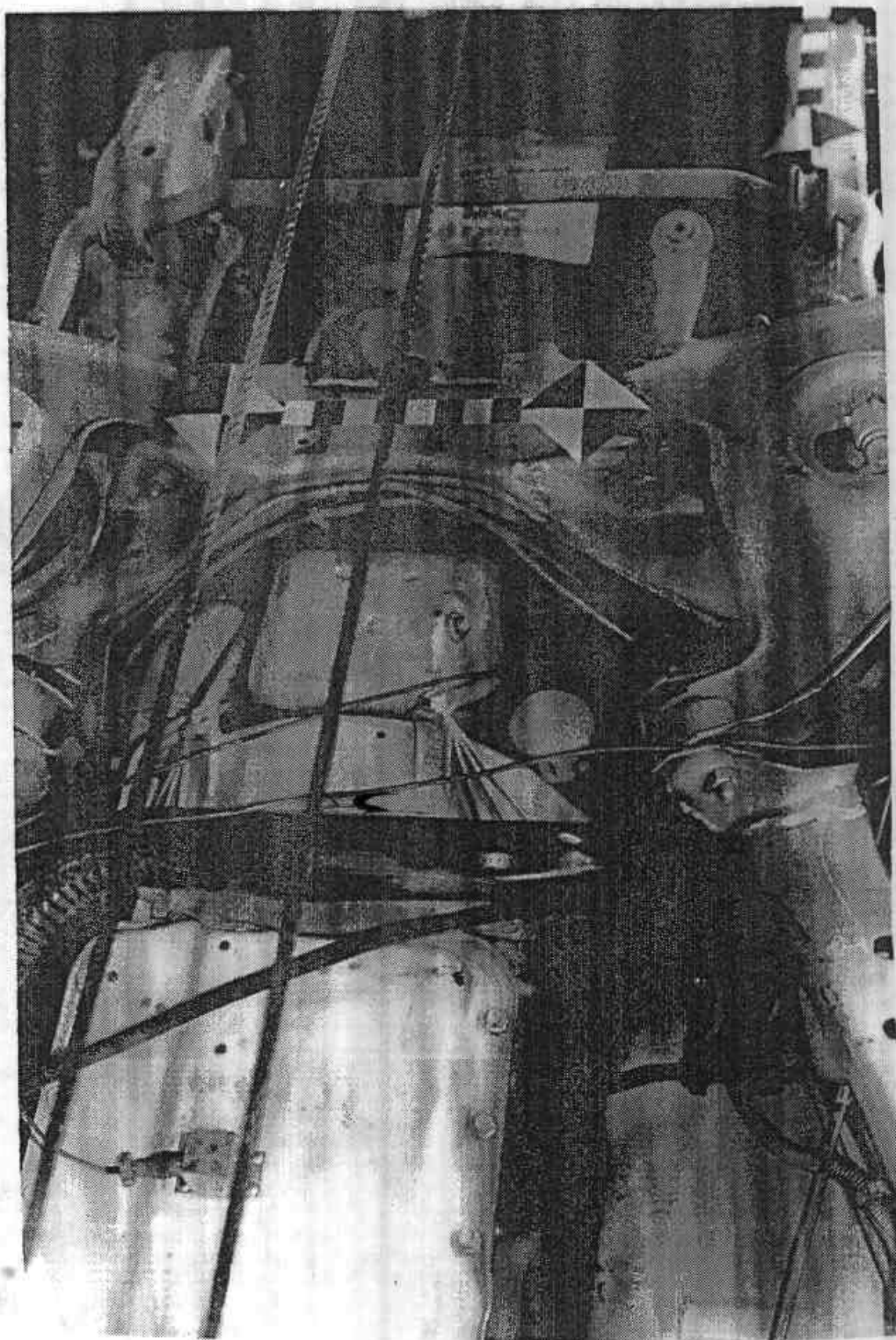
POSTTEST ENGINE COMPARTMENT VIEW



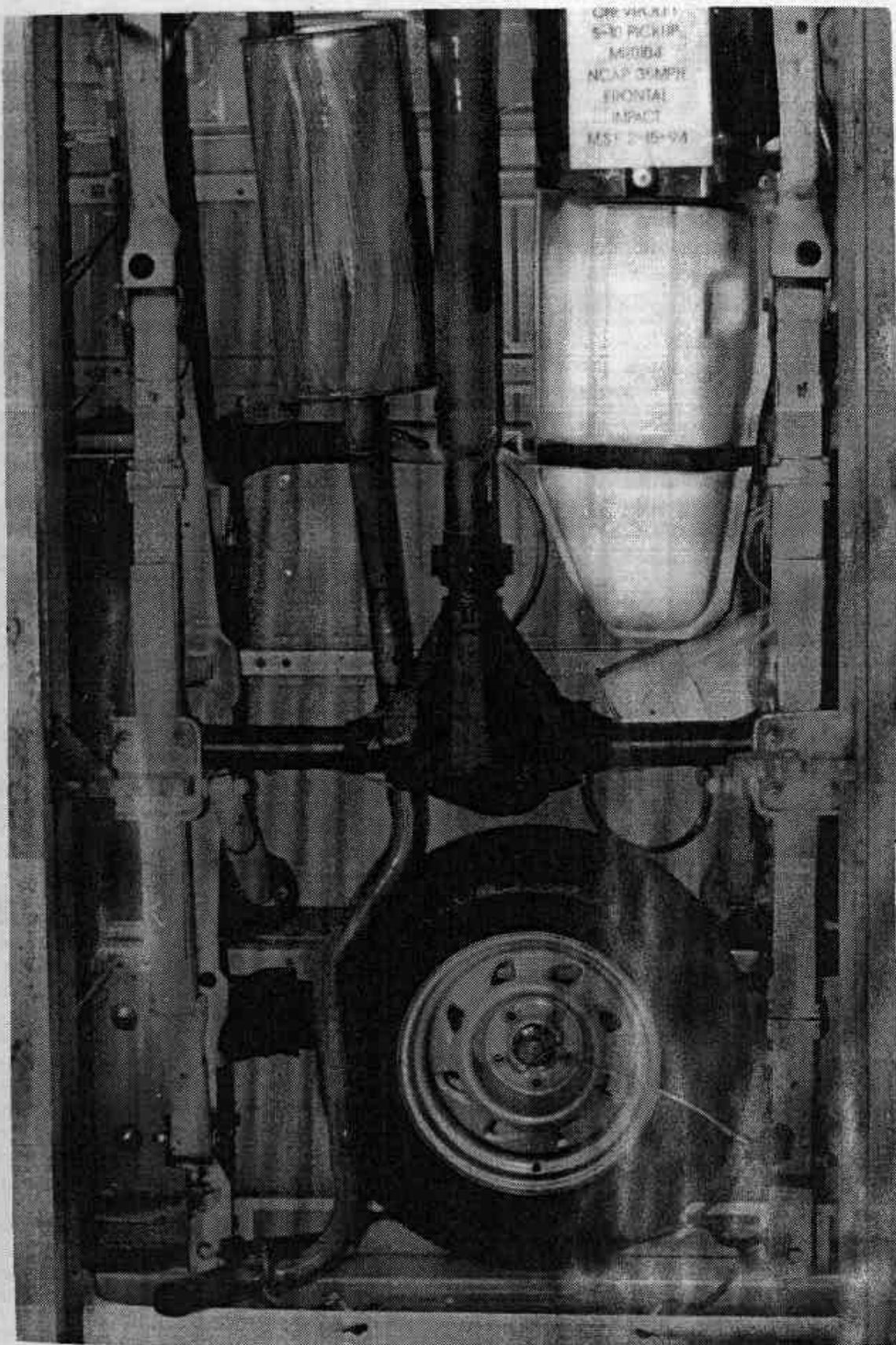
PRETEST FRONT UNDERBODY VIEW



POSTTEST FRONT UNDERBODY VIEW



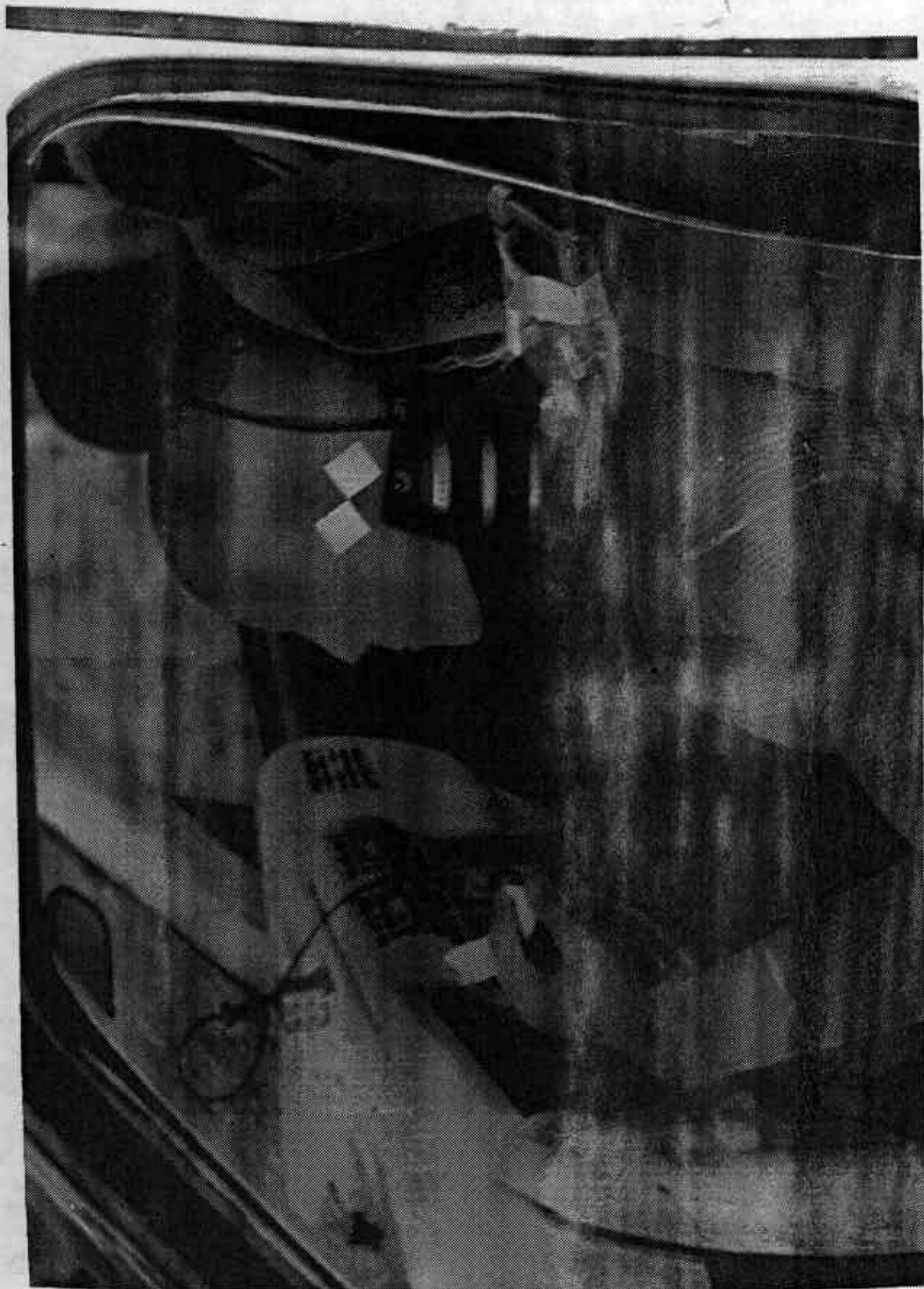
PRETEST REAR UNDERBODY VIEW



POSTTEST REAR UNDERBODY VIEW



PRETEST DRIVER DUMMY POSITION VIEW



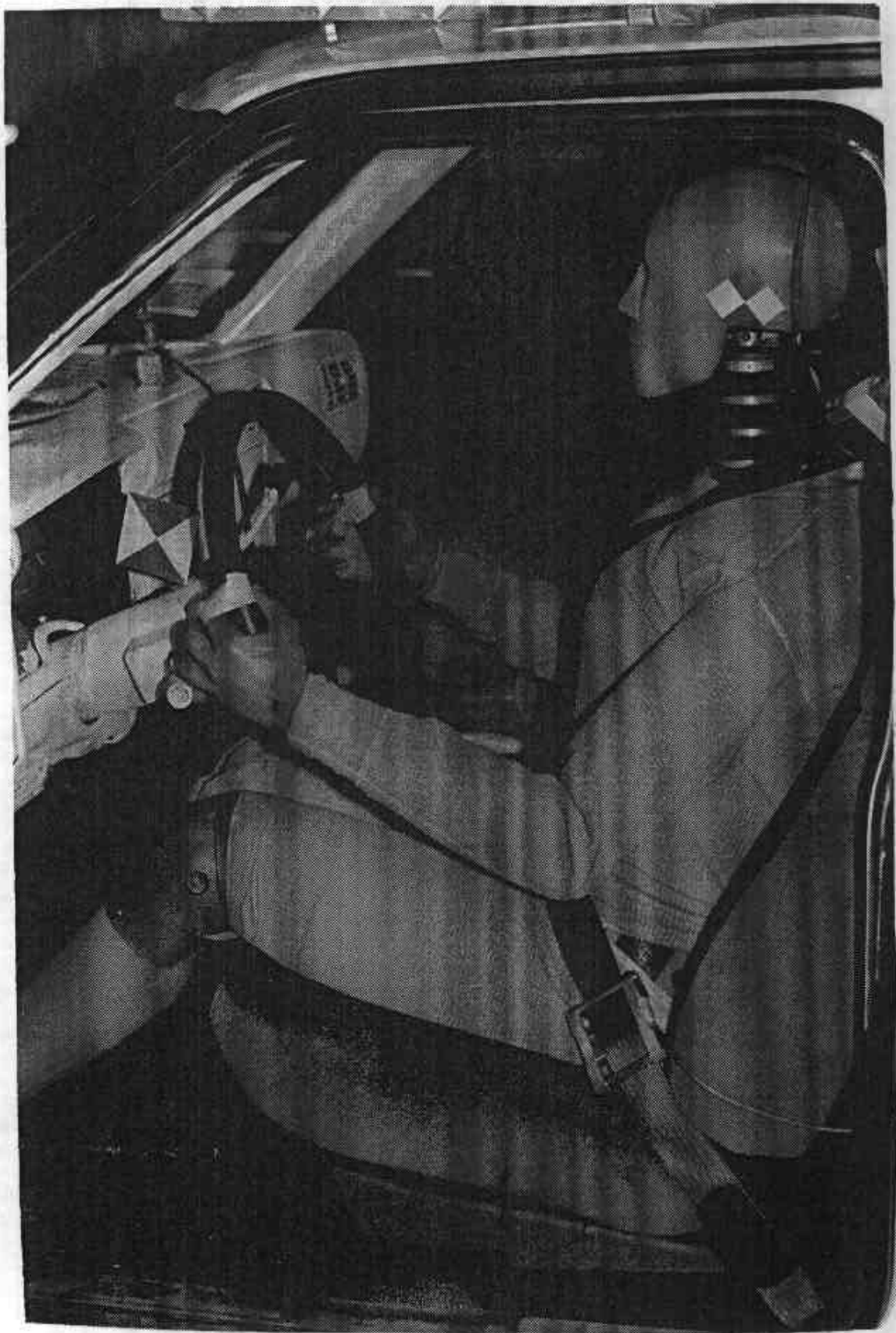
POSTTEST DRIVER DUMMY POSITION VIEW



PRETEST PASSENGER DUMMY POSITION VIEW



POSTTEST PASSENGER DUMMY POSITION VIEW



PRETEST DRIVER DUMMY and VEHICLE INTERIOR VIEW (DOOR OPEN)

I RICHIE DOC PENT



POSTTEST DRIVER DUMMY AND VEHICLE
INTERIOR VIEW (DOOR OPEN)



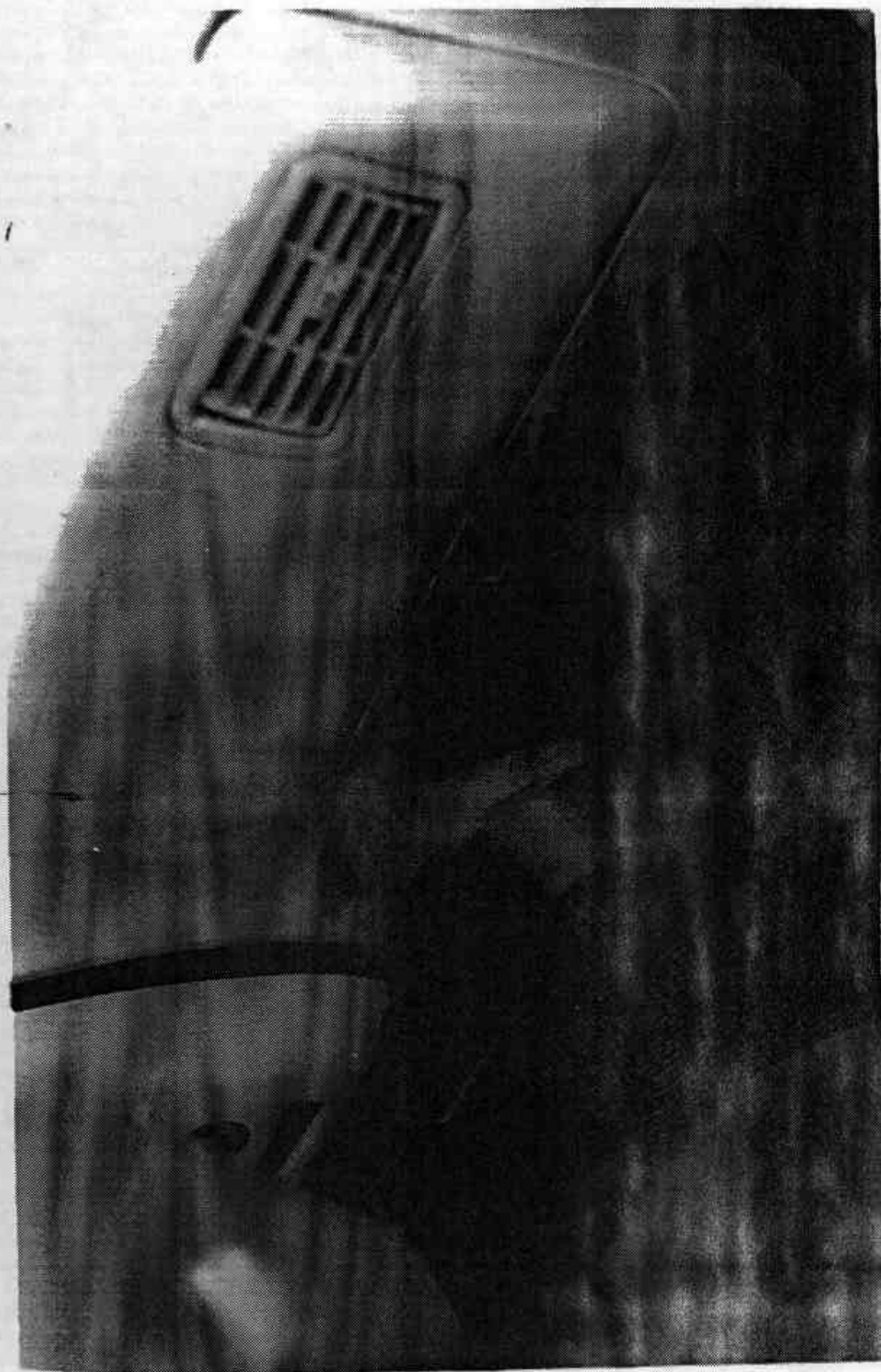
PRETEST PASSENGER DUMMY AND VEHICLE INTERIOR VIEW (DOOR OPEN)



POSTTEST PASSENGER DUMMY AND
VEHICLE INTERIOR VIEW (DOOR OPEN)



POSTTEST DRIVER DUMMY KNEE CONTACT AREA



POSTTEST PASSENGER DUMMY
KNEE CONTACT AREA

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APPENDIX B - 1

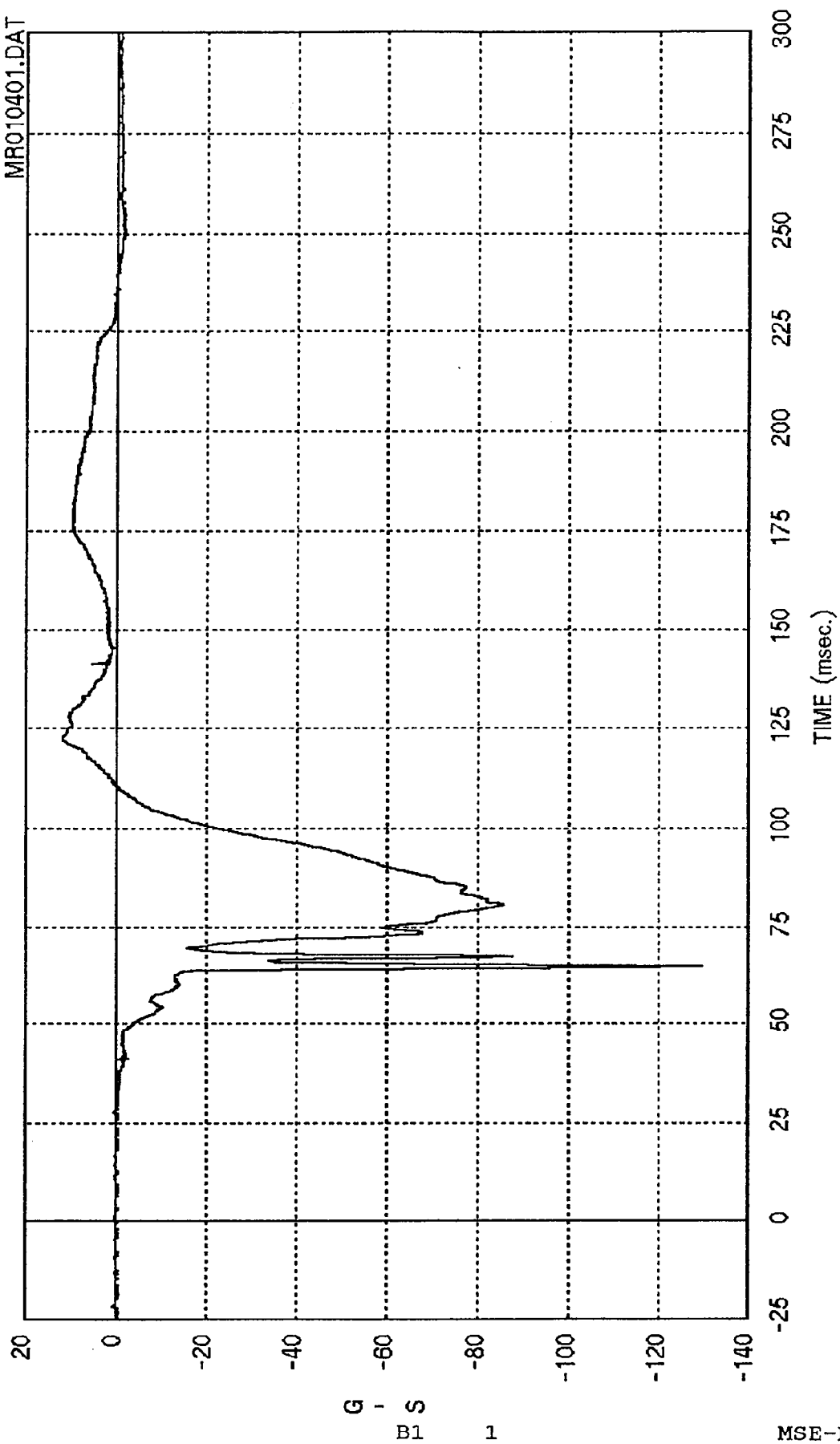
VEHICLE AND DUMMY (ATD) RESPONSE DATA

DATA FILTERING:

ATD Head Channels	-Class 1000
ATD Chest Channels	-Class 180
ATD Femur Channels	-Class 600
Vehicle Channels	-Class 60

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MR010401.DAT



Curve: Driver head acceleration -- X axis Filter: SAE CLASS 1000 Max = 11.976 Min = -129.74

MSE Date: 02/16/94 Program: 1994 New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010401.IN1

60

50

40

30

20

10

0

-10

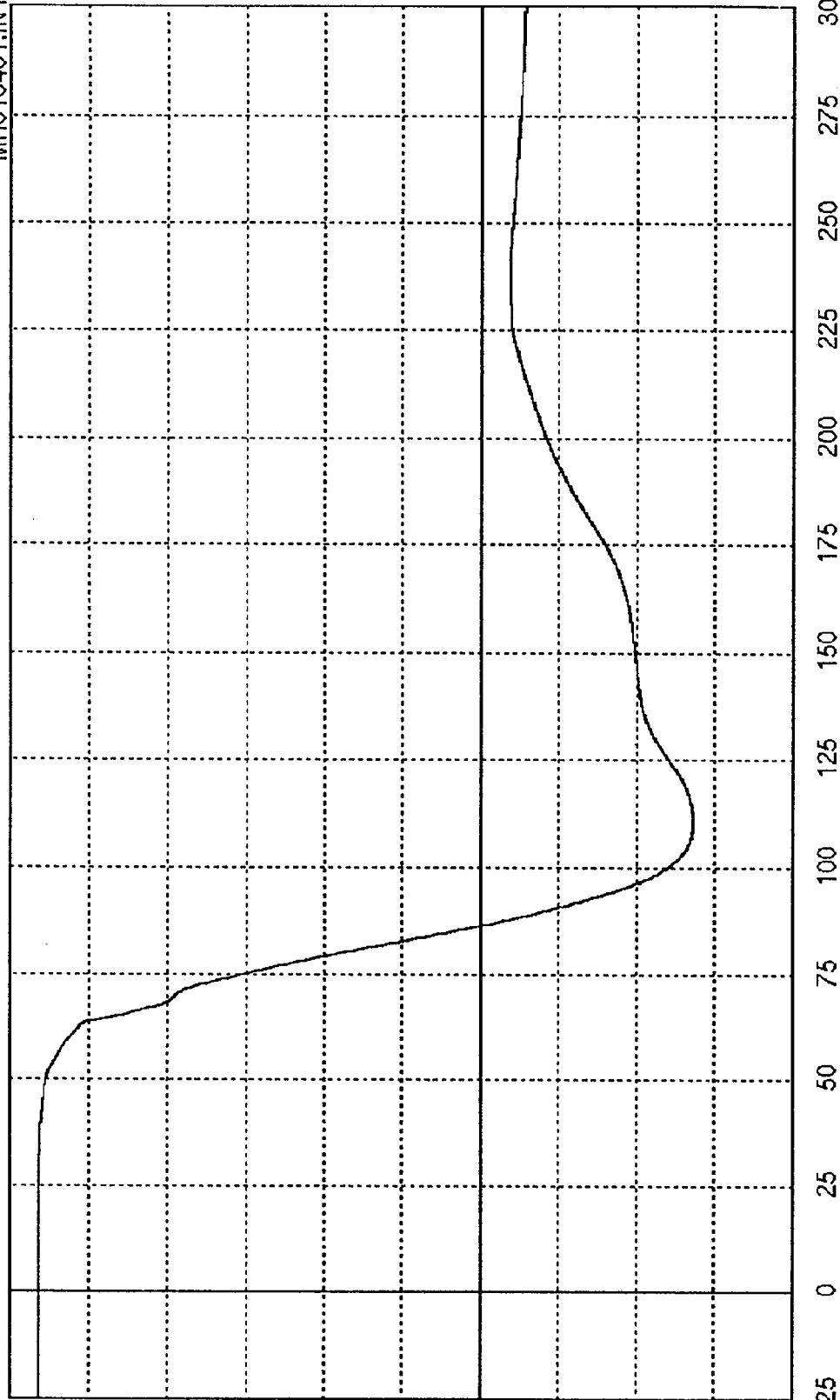
-20

-30

-40

K
M
H
B1

2



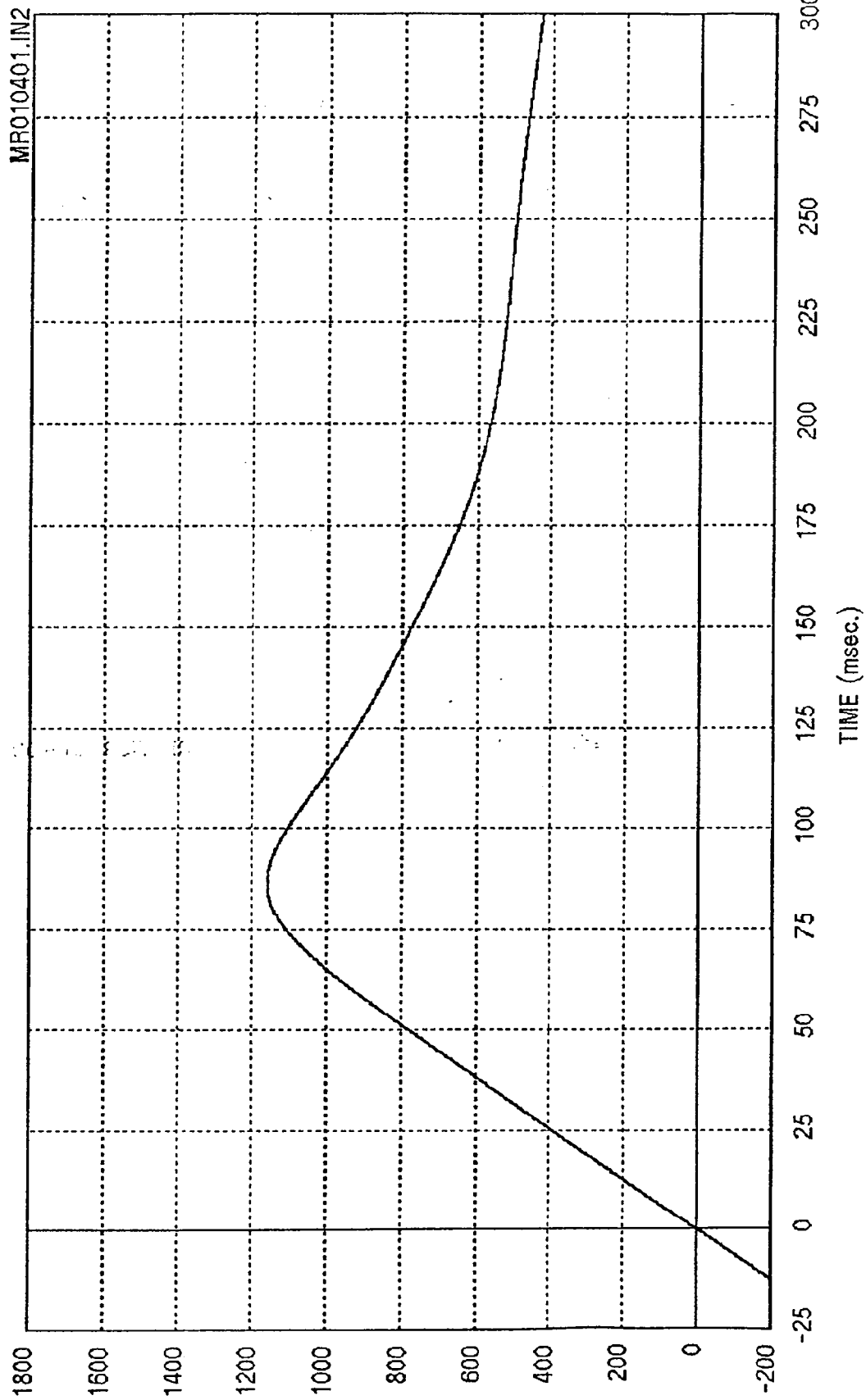
TIME (msec.)

Curve: Driver head delta V -- X axis Filter: SAE CLASS 180 Max = 56.454 Min = -27.284

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MSE-R93030-03

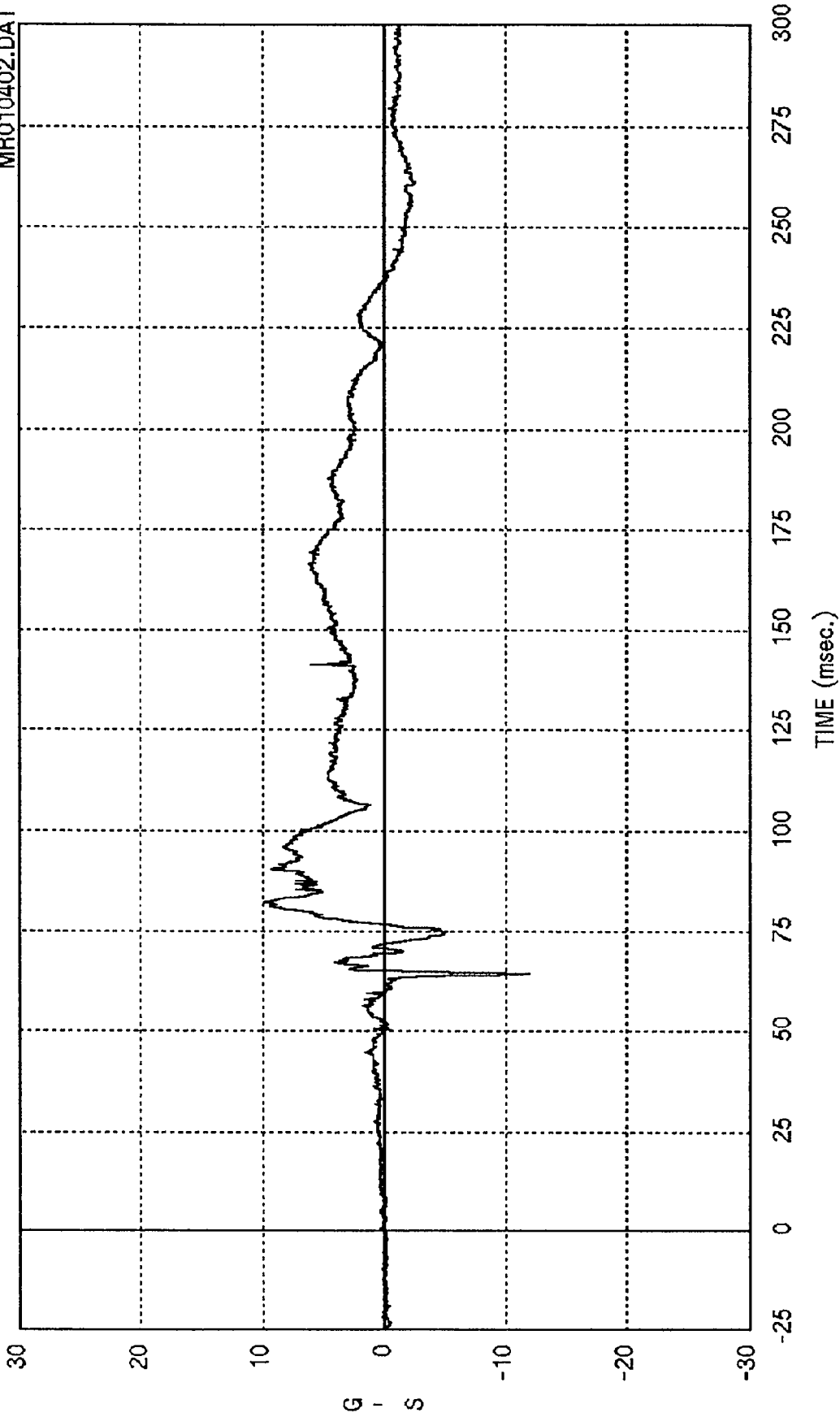
MR010401.IN2



Curve: Driver head displacement -- X axis Filter: SAE CLASS 180 Max = 1159.2 Min = -427.92

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MIR010402.DAT

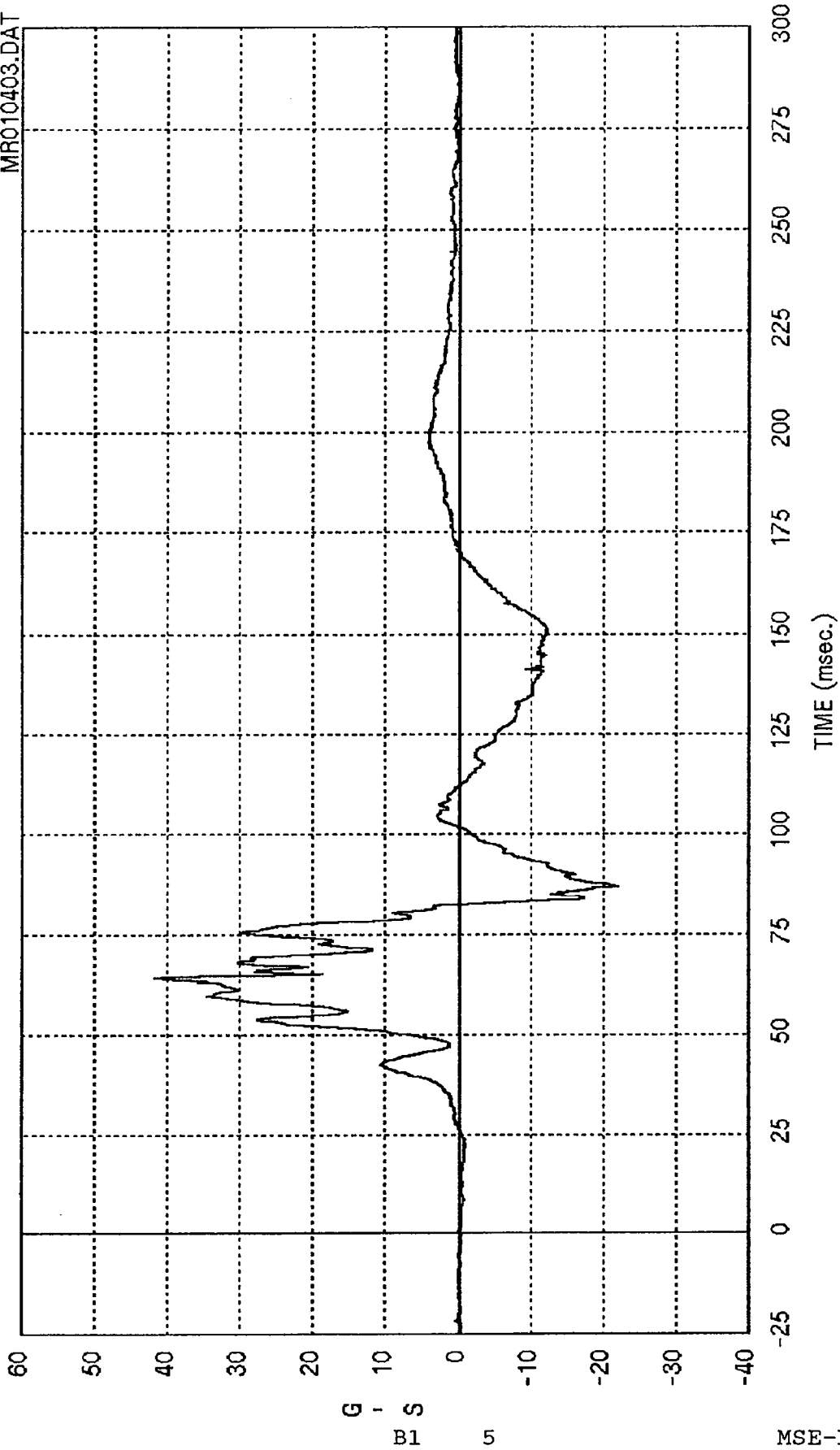


Curve: Driver head acceleration -- Y axis Filter: SAE CLASS 1000 Max = 9.9481 Min = -11.904

MSE Date: 02/16/94 Program: 1994 New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

G - S
B1

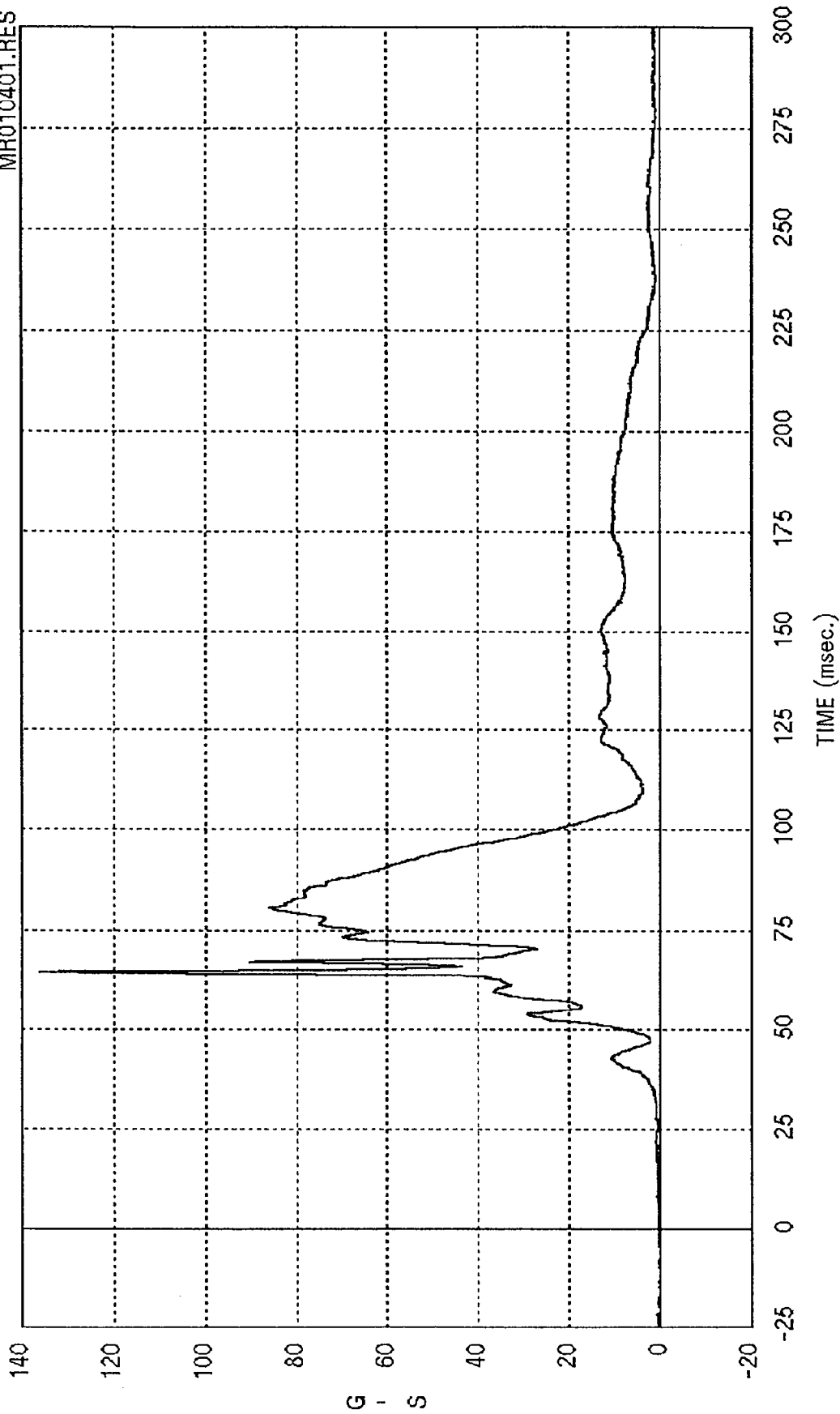
MR010403.DAT



Curve: Driver head acceleration -- Z axis Filter: SAE CLASS 1000 Max = 42.583 Min = -22.072

MSE Date: 02/16/94 Program: 1994 New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010401.RES



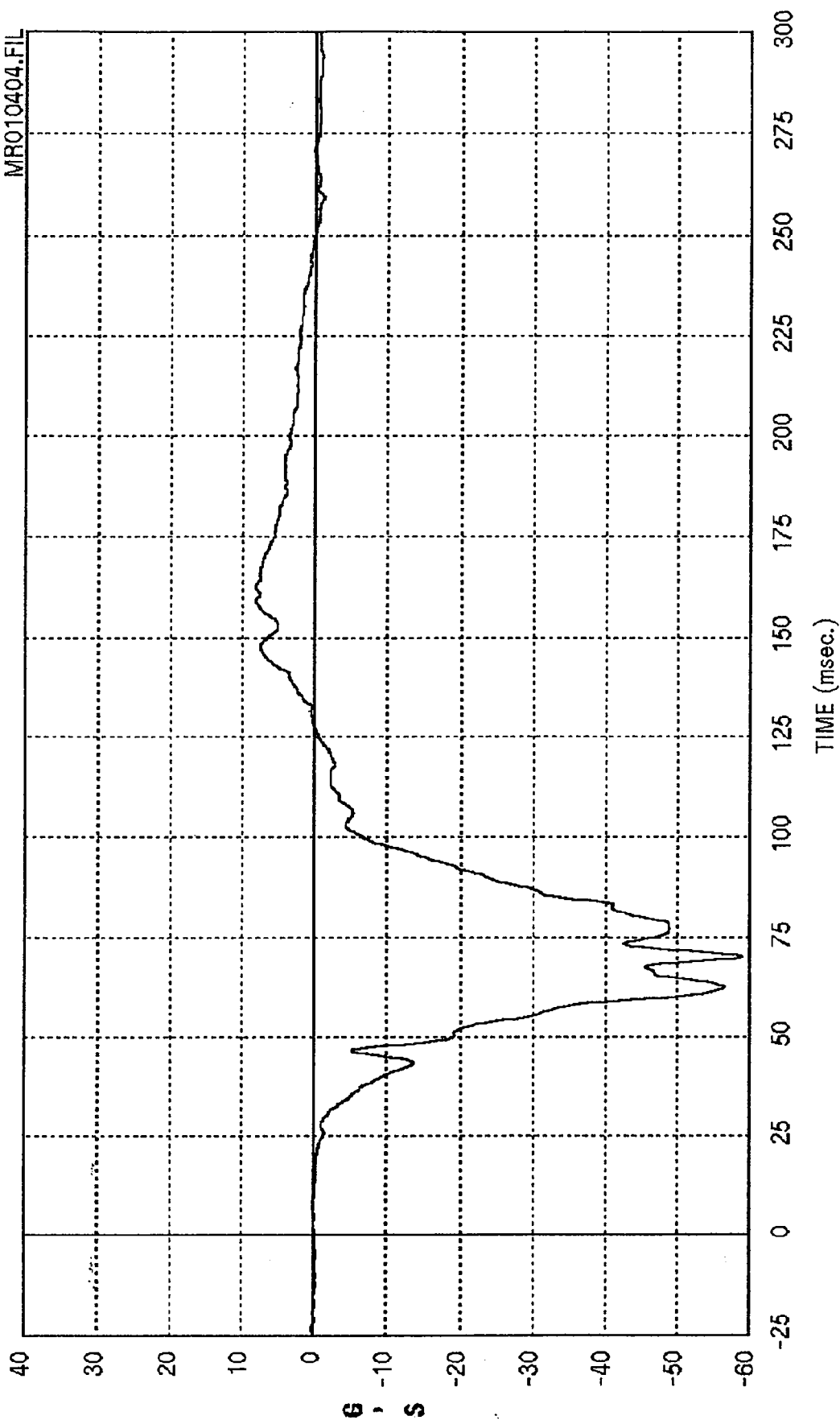
Curve: Driver head acceleration -- Resultant Filter: SAE CLASS 1000 Max = 136.29 Min = .24795

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

G - S
B1 6

MSE-R93030-03

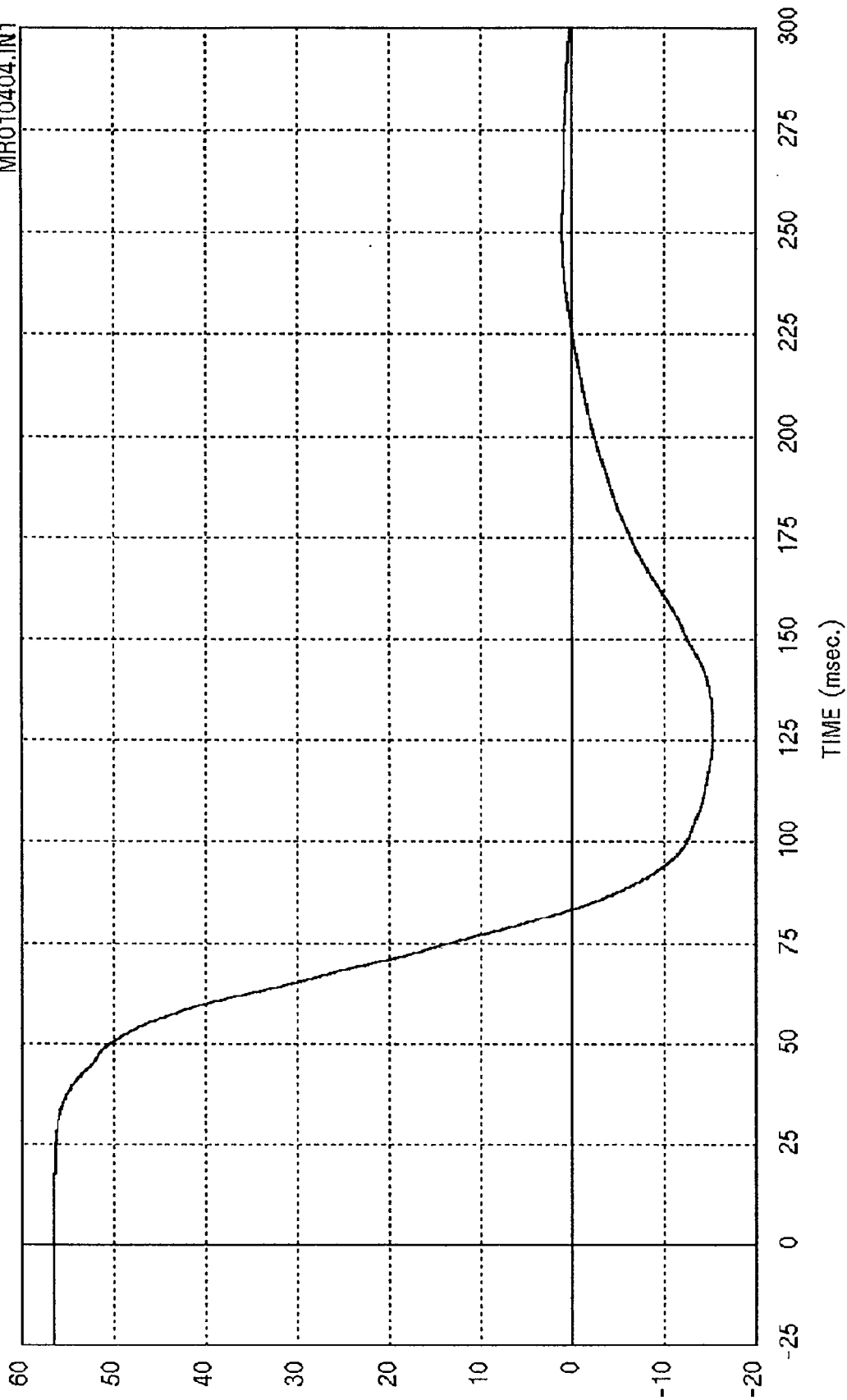
MR010404.FIL



Curve: Driver chest acceleration -- X axis Filter: SAE CLASS.180 Max = 8.2365 Min = -59.039

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

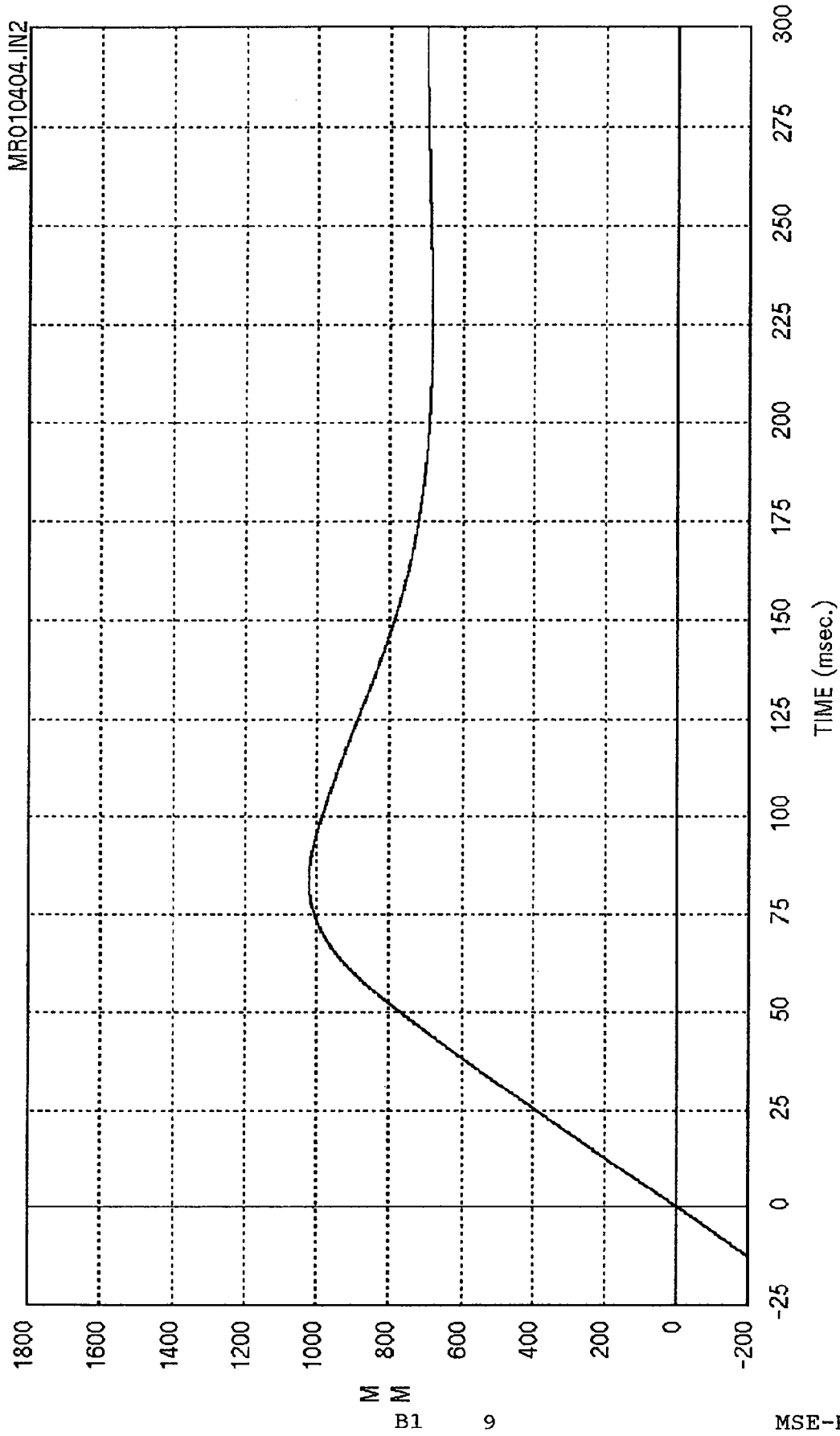
MR010404.IN1



Curve: Driver chest delta V -- X axis Filter: SAE CLASS 180 Max = 56.469 Min = -15.260

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

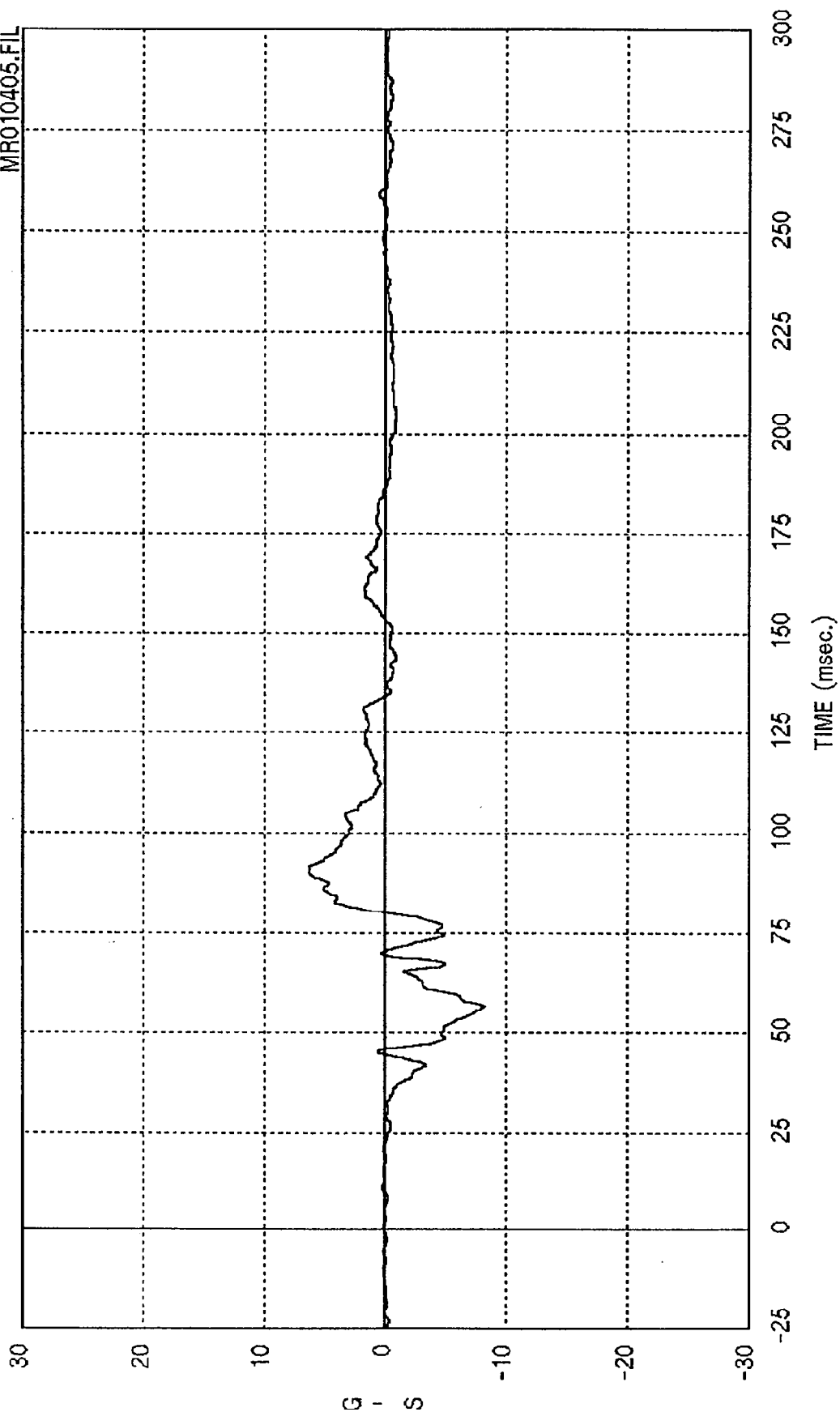
K M H
B1



Curve: Driver chest displacement -- X axis Filter: SAE CLASS-180 Max = 1023.4 Min = 685.66

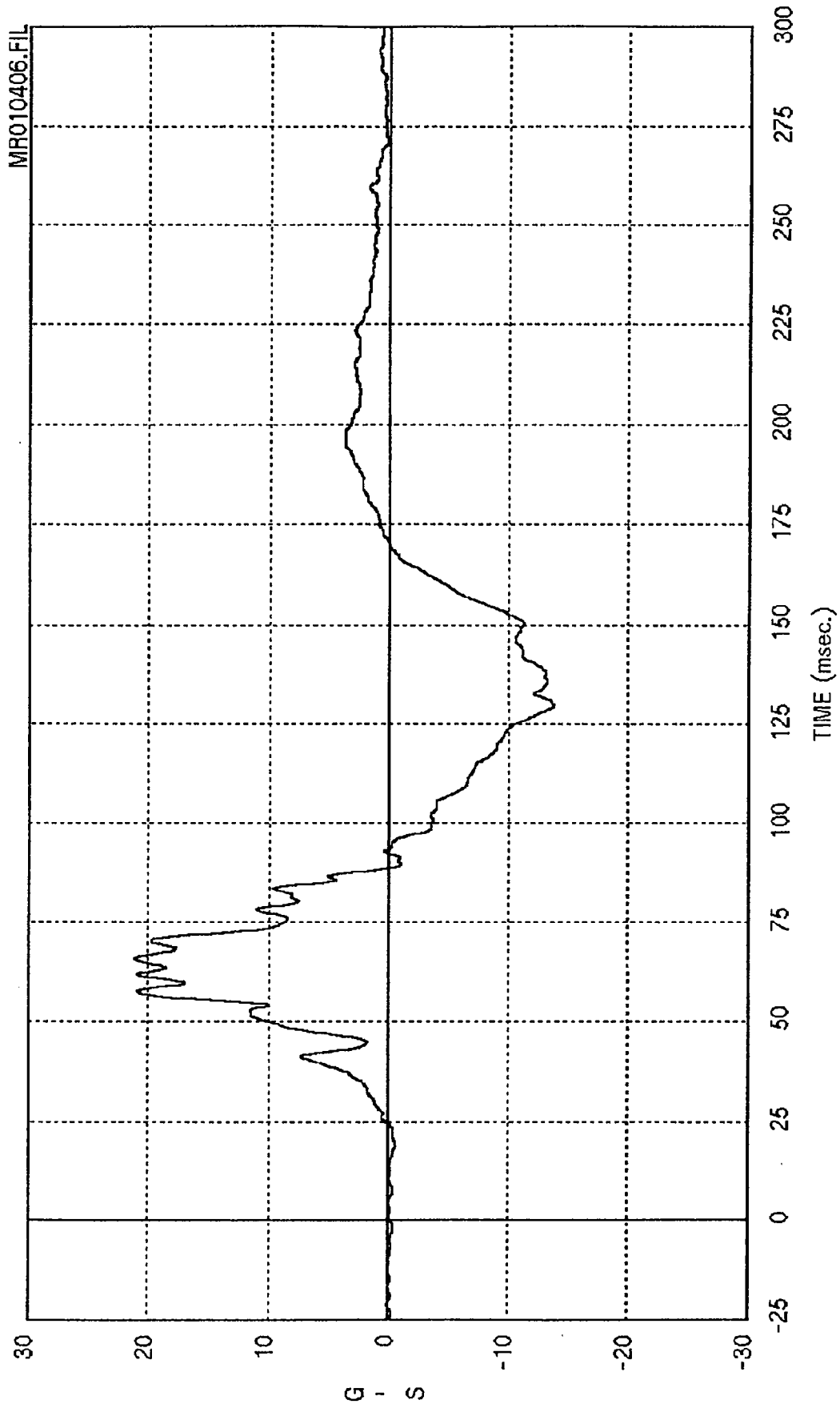
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010405.FIL



Curve: Driver chest acceleration -- Y axis Filter: SAE CLASS 180 Max = 6.3856 Min = -8.2147

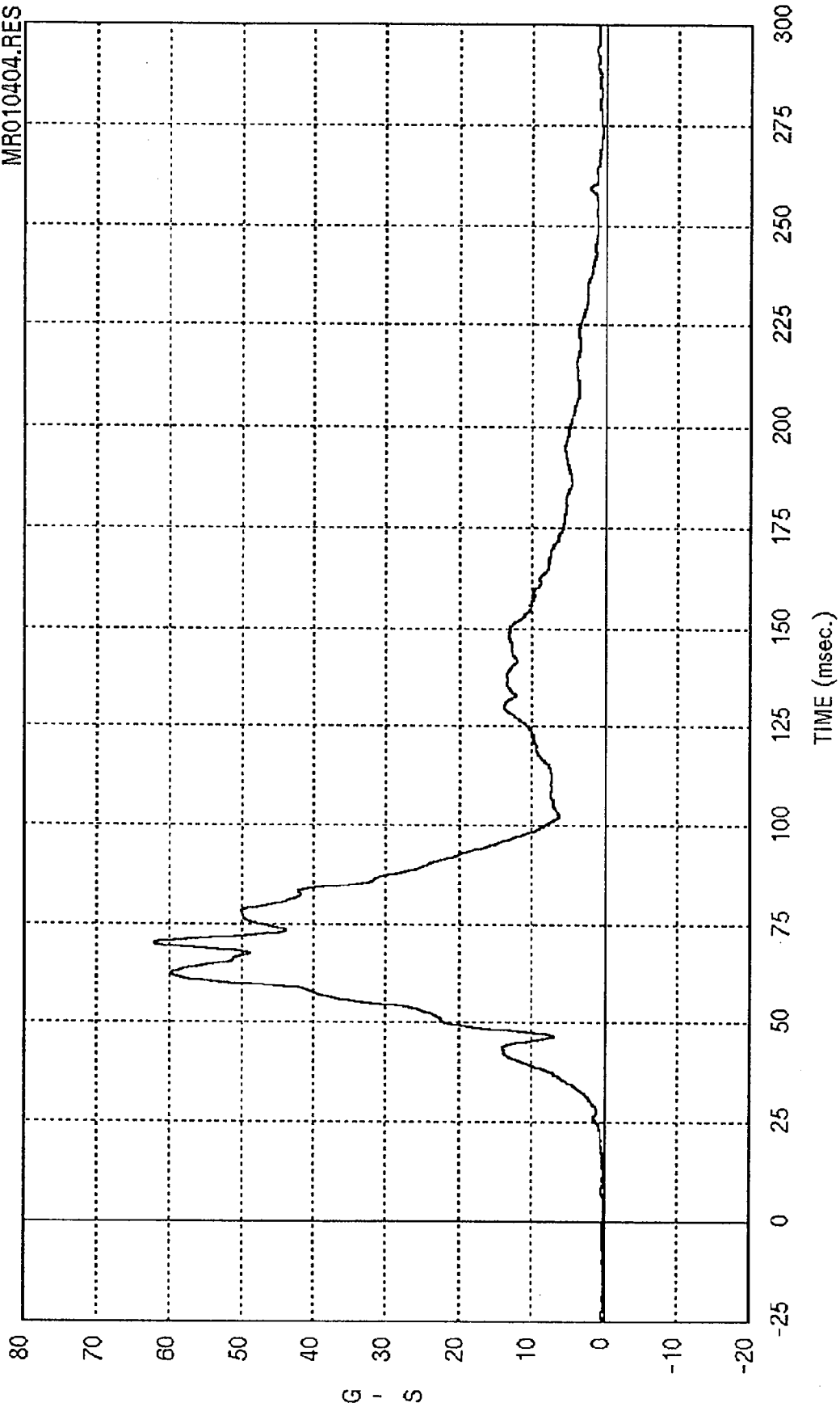
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Driver chest acceleration -- Z axis Filter: SAE CLASS 180 Max = 21.137 Min = -13.747

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

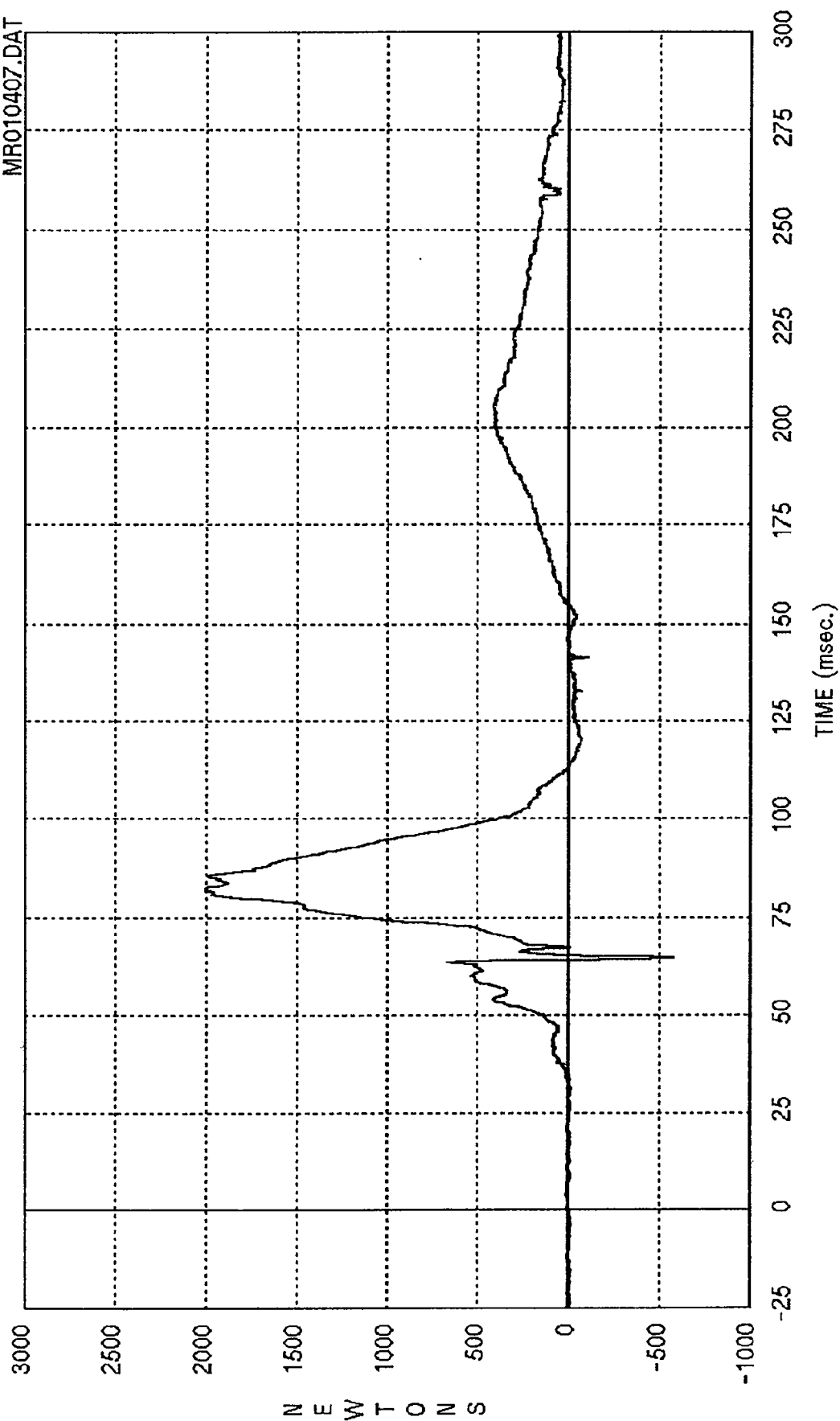
MP010404.RES



Curve: Driver chest acceleration -- Resultant Filter: SAE CLASS 180 Max = 62.256 Min = .60594E-01

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

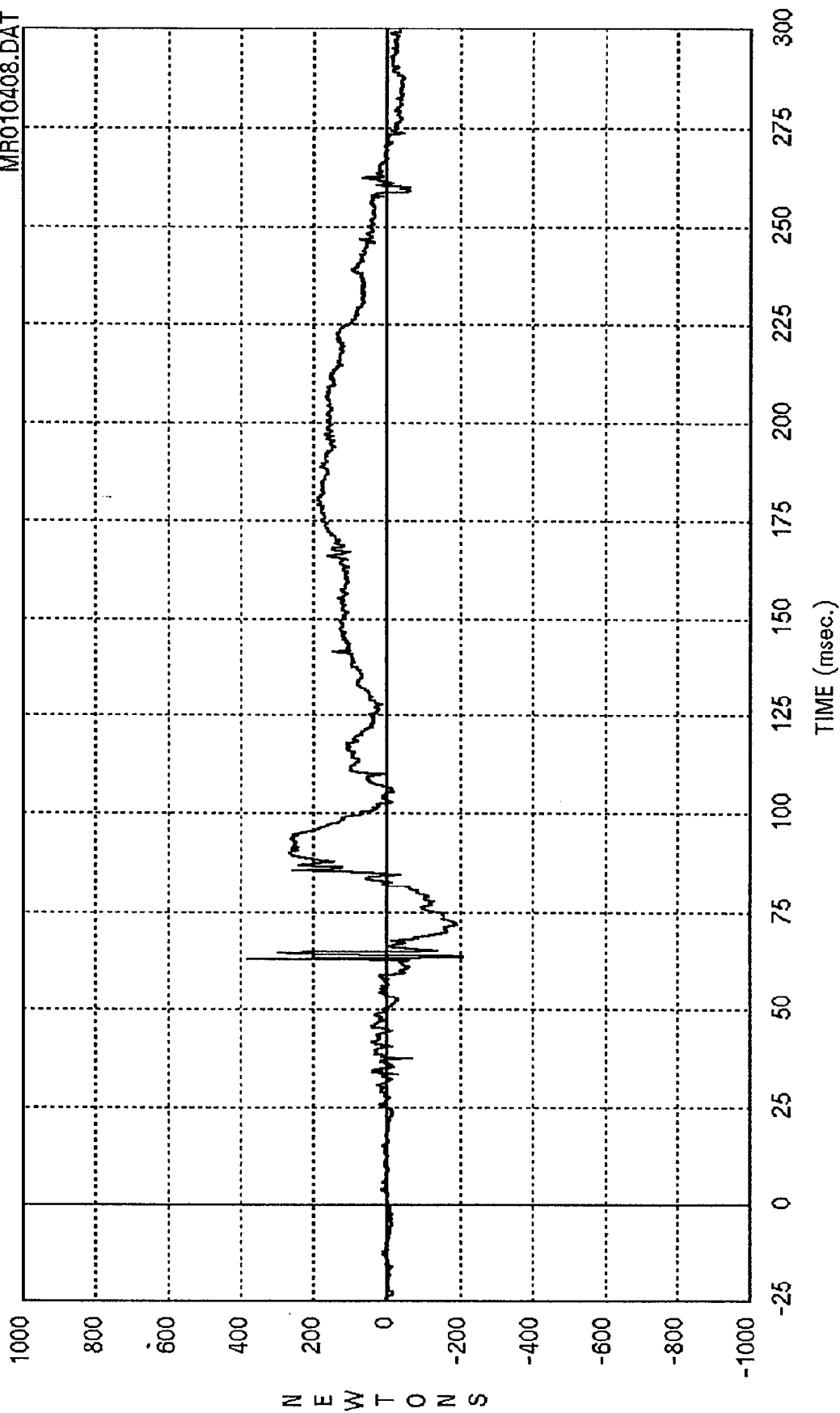
MR010407.DAT



Curve: Driver neck force -- X axis Filter: SAE CLASS 1000 Max = 2005.7 Min = -611.11

MSE Date: 02/16/94 Program: 1994 New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

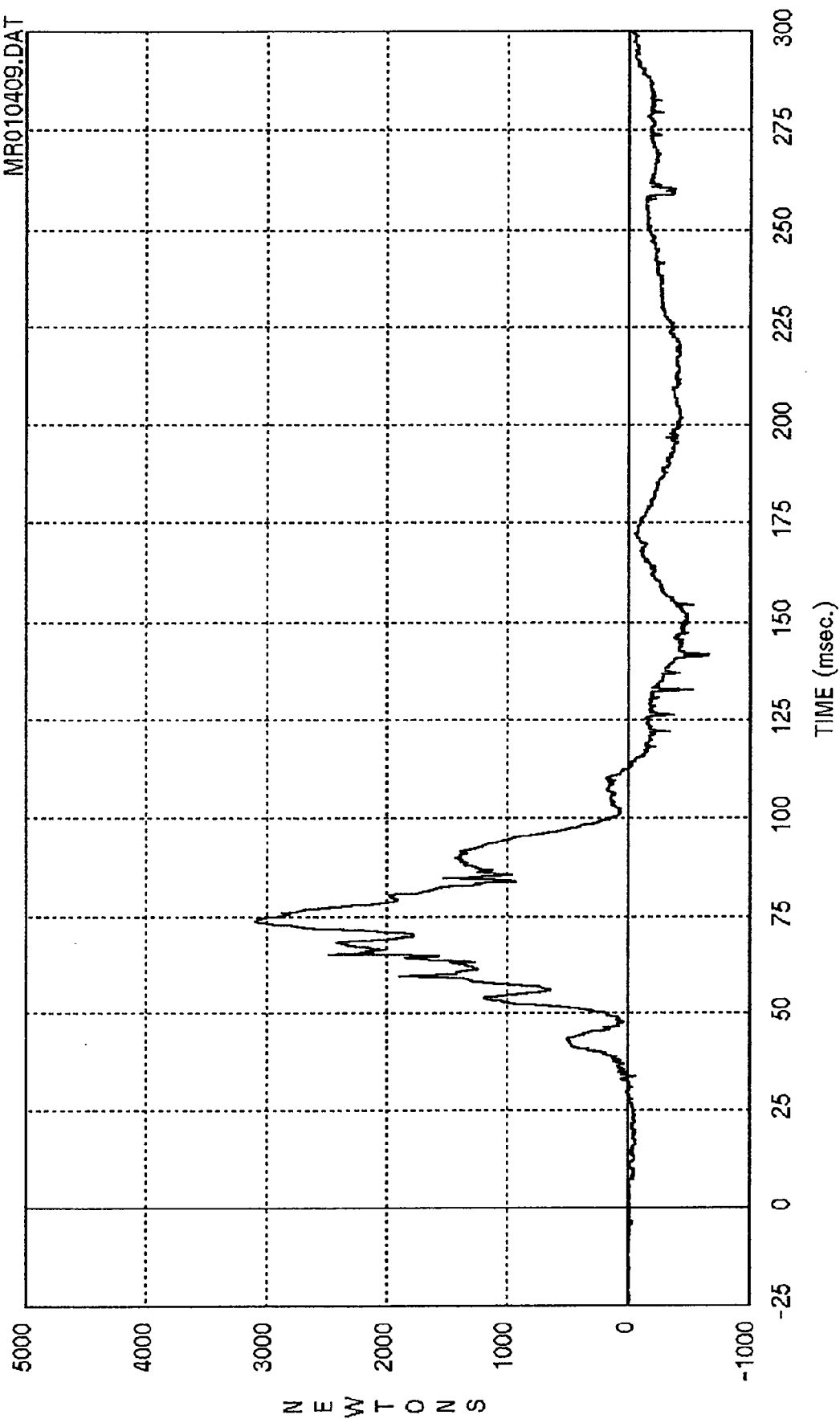
MR010408.DAT



Curve: Driver neck force -- Y axis Filter: SAE CLASS 1000 Max = 383.38 Min = -215.11

MSE Date: 02/16/94 Program: 1994 New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

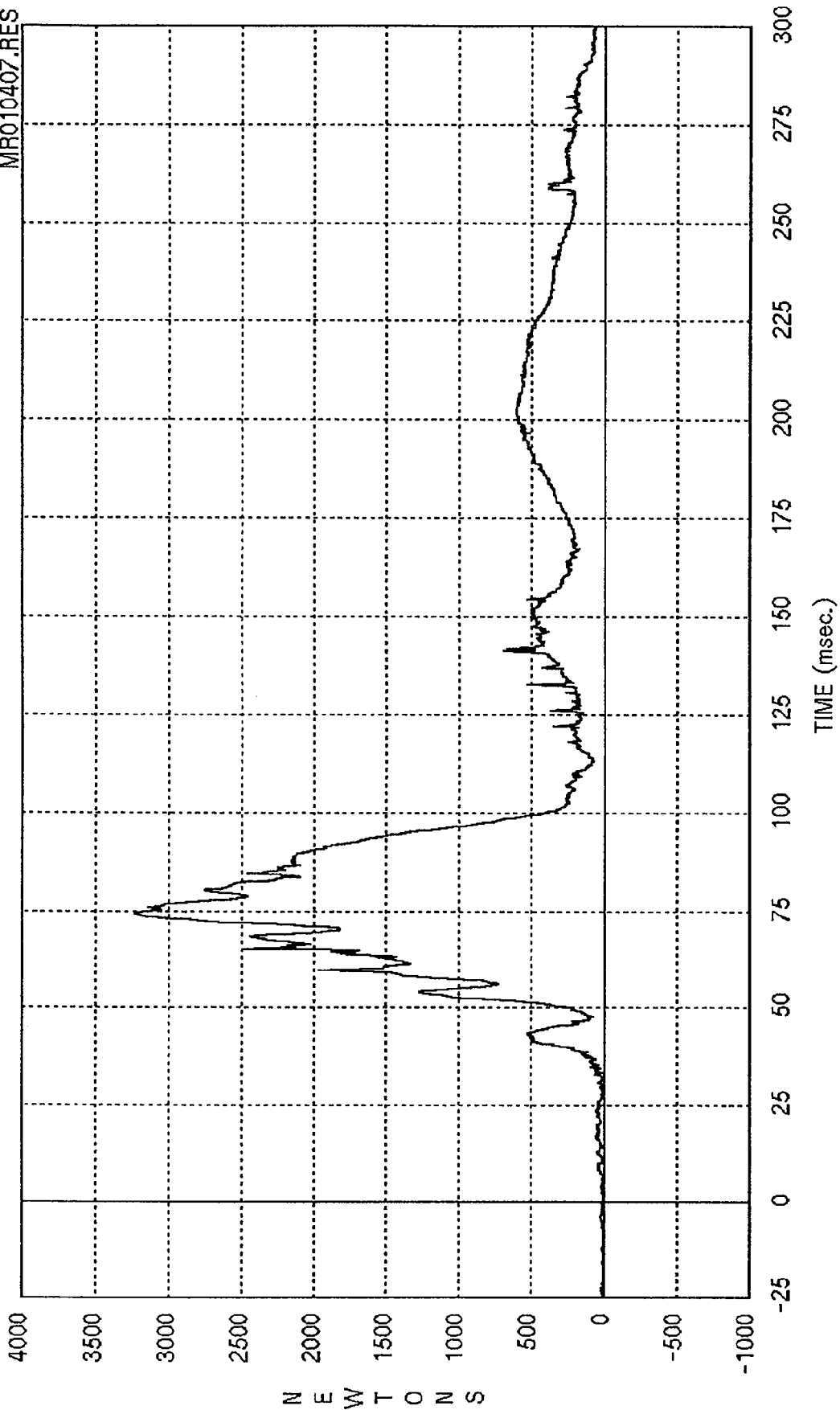
MR010409.DAT



Curve: Driver neck force -- Z axis Filter: SAE CLASS 1000 Max = 3105.8 Min = -661.50

MSE Date: 02/16/94 Program: 1994 New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010407.RES

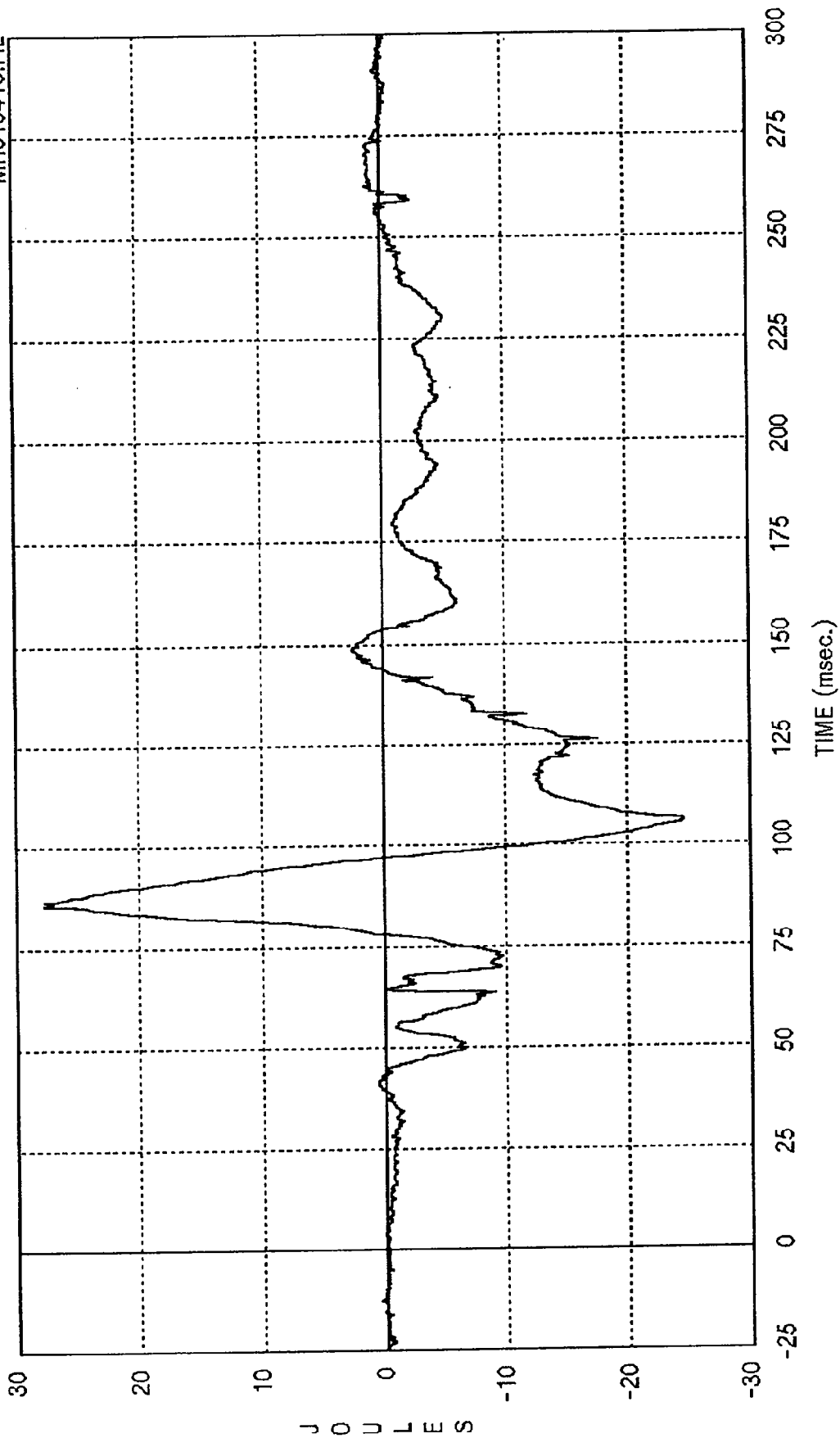


Curve: Driver neck force -- Resultant

Filter: SAE CLASS 1000... Max = 3235.9 Min = 4.8271

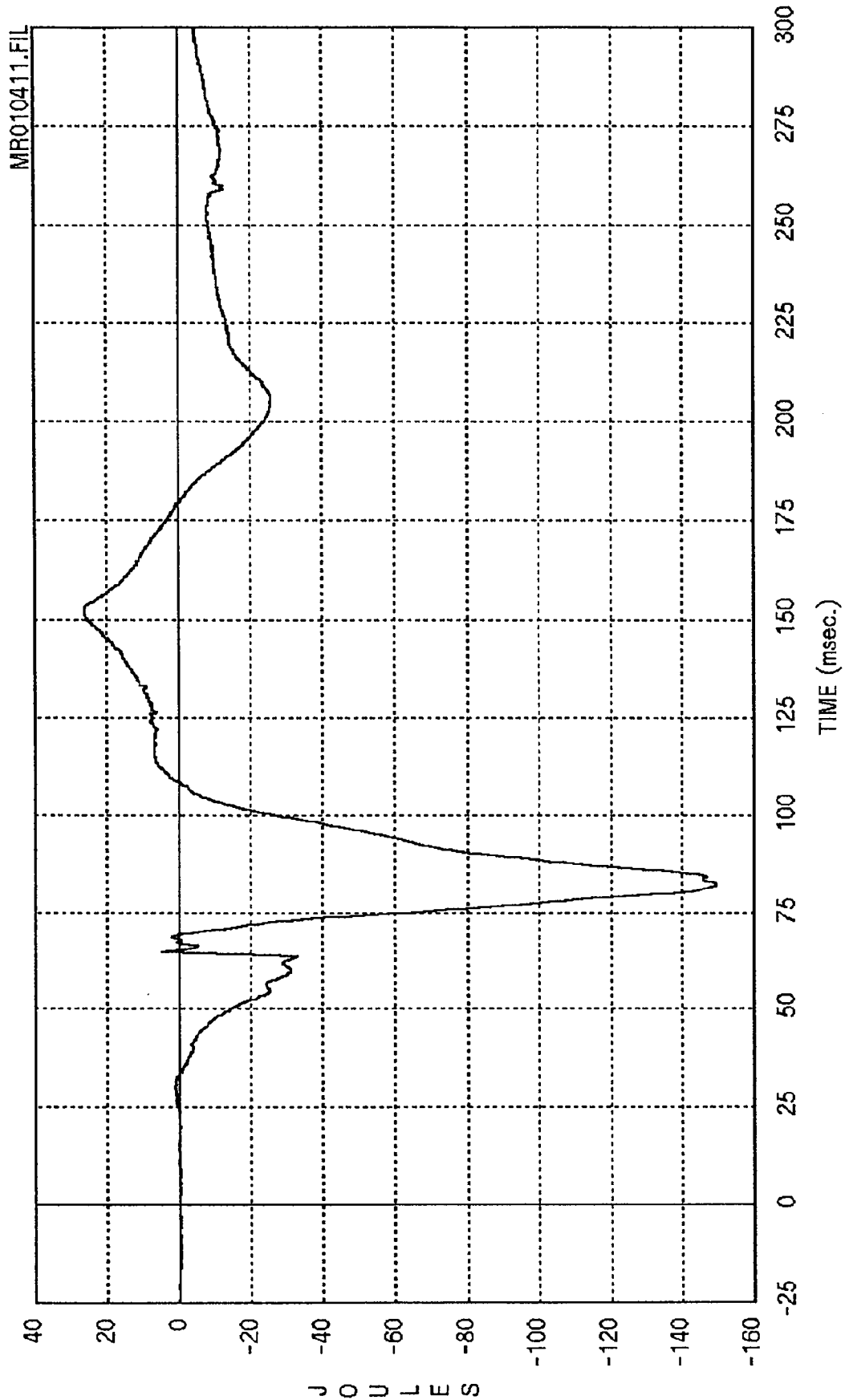
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010410.FIL

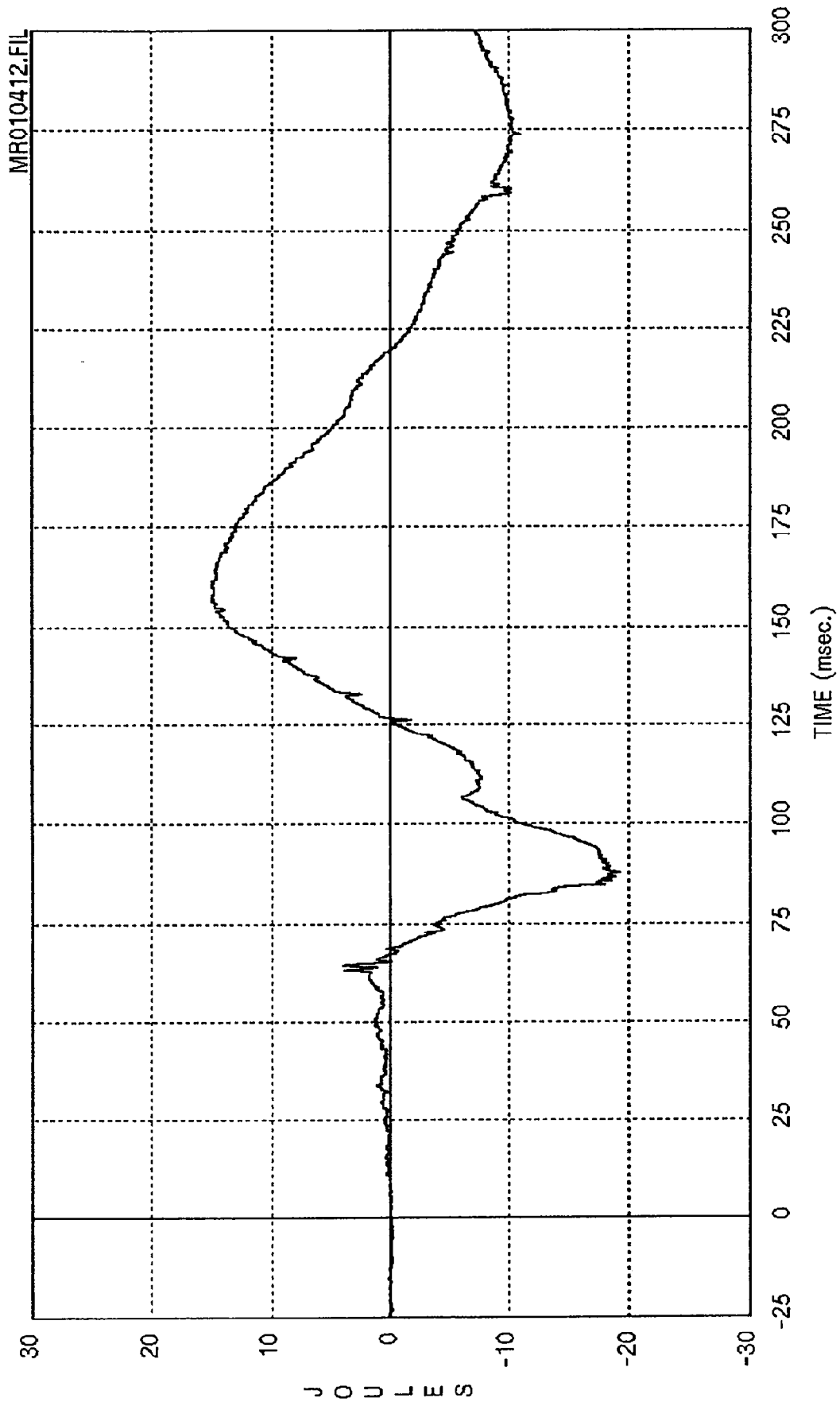


Curve: Driver neck moment -- X axis Filter: SAE CLASS 600 . Max = 27.923 Min = -24.653

MSE Date: 02/16/94 Program: 1994 New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



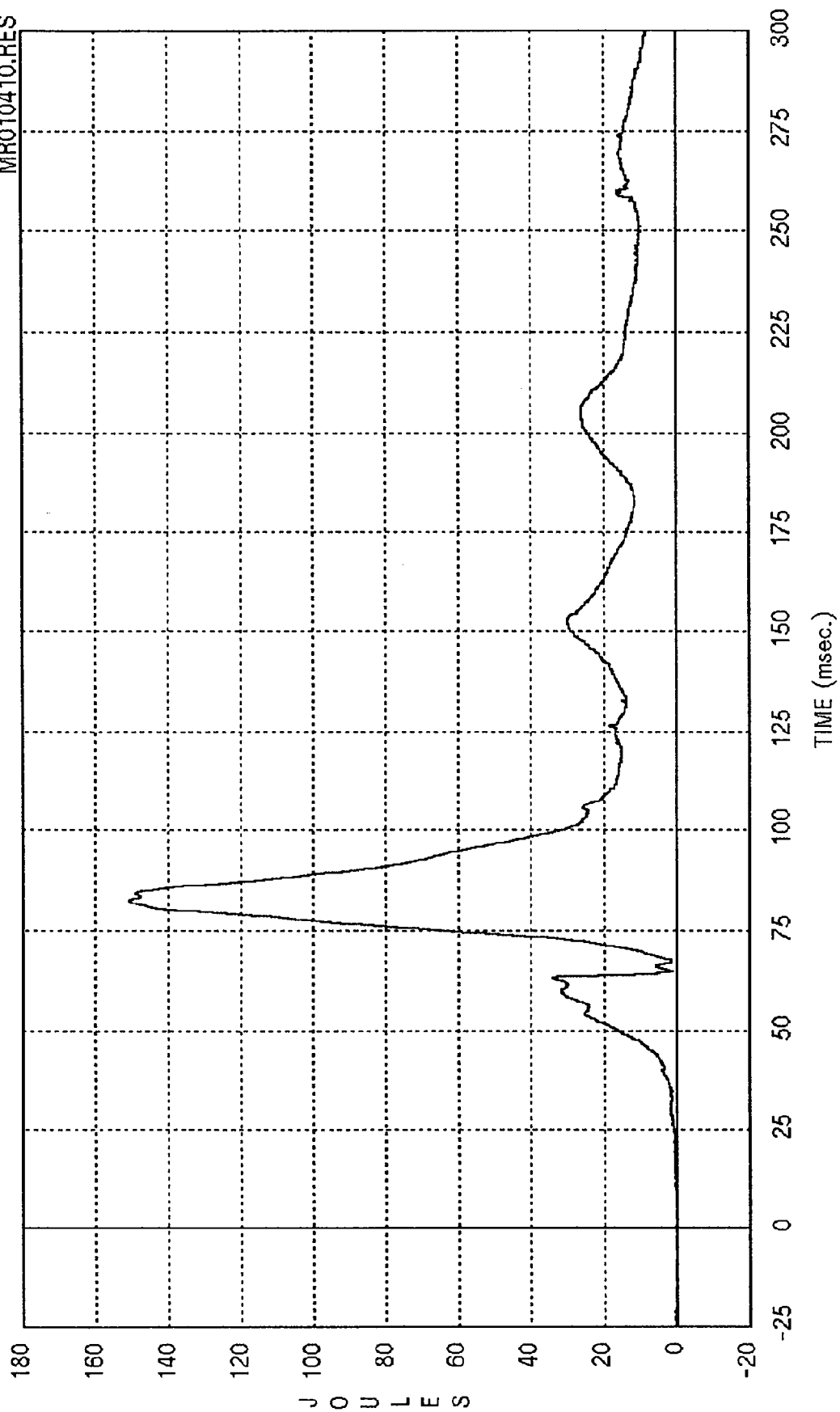
Curve: Driver neck moment -- Y axis Filter: SAE CLASS 600 Max = 26.199 Min = -149.63
MSE Date: 02/16/94 Program: 1994 New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



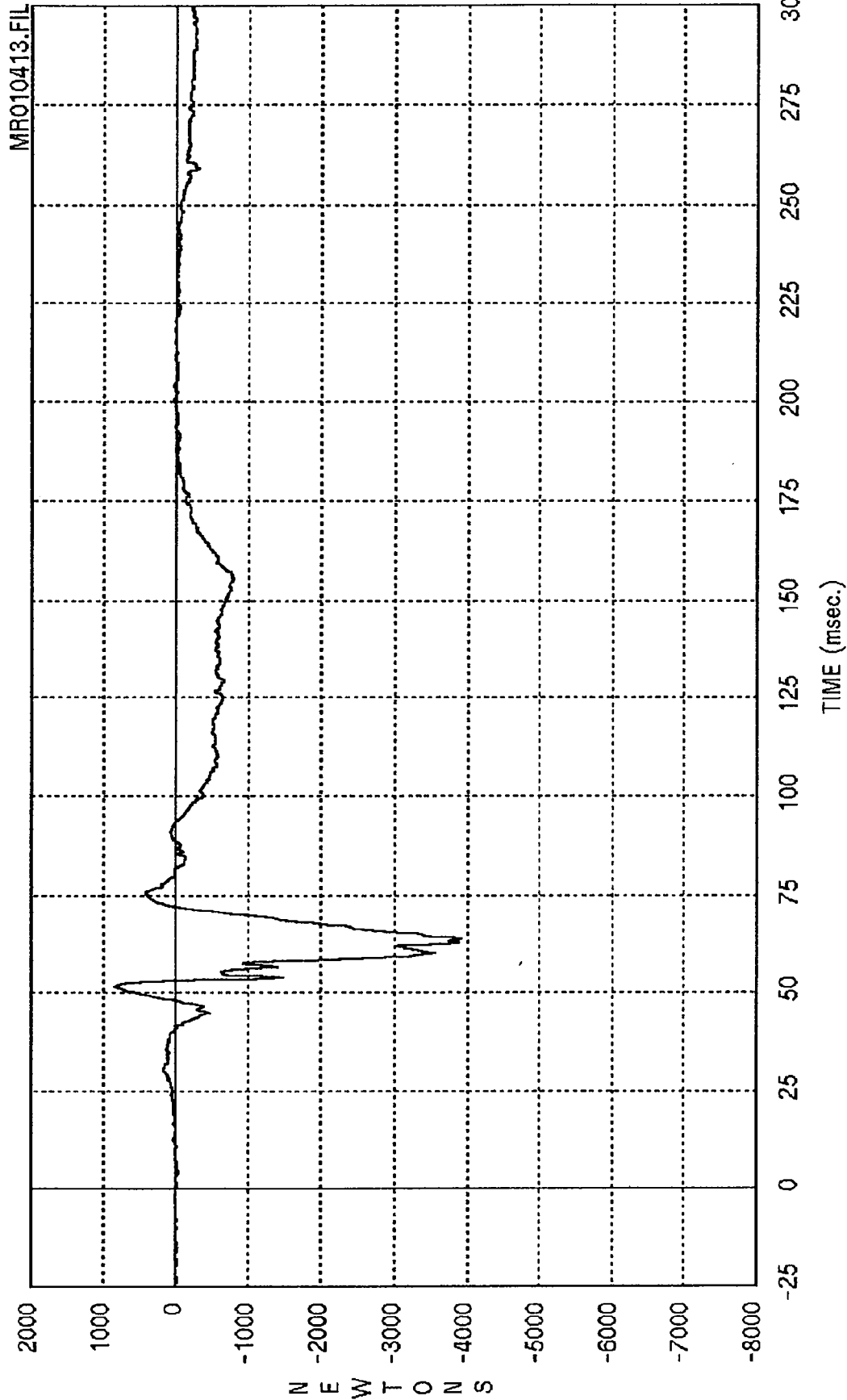
Curve: Driver neck moment -- Z axis Filter: SAE CLASS 600 Max = 15.007 Min = -19.171

MSE Date: 02/16/94 Program: 1994 New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010410.RES



Curve: Driver neck moment -- Resultant Filter: SAE CLASS 600 Max = 150.97 Min = 79489E-01
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

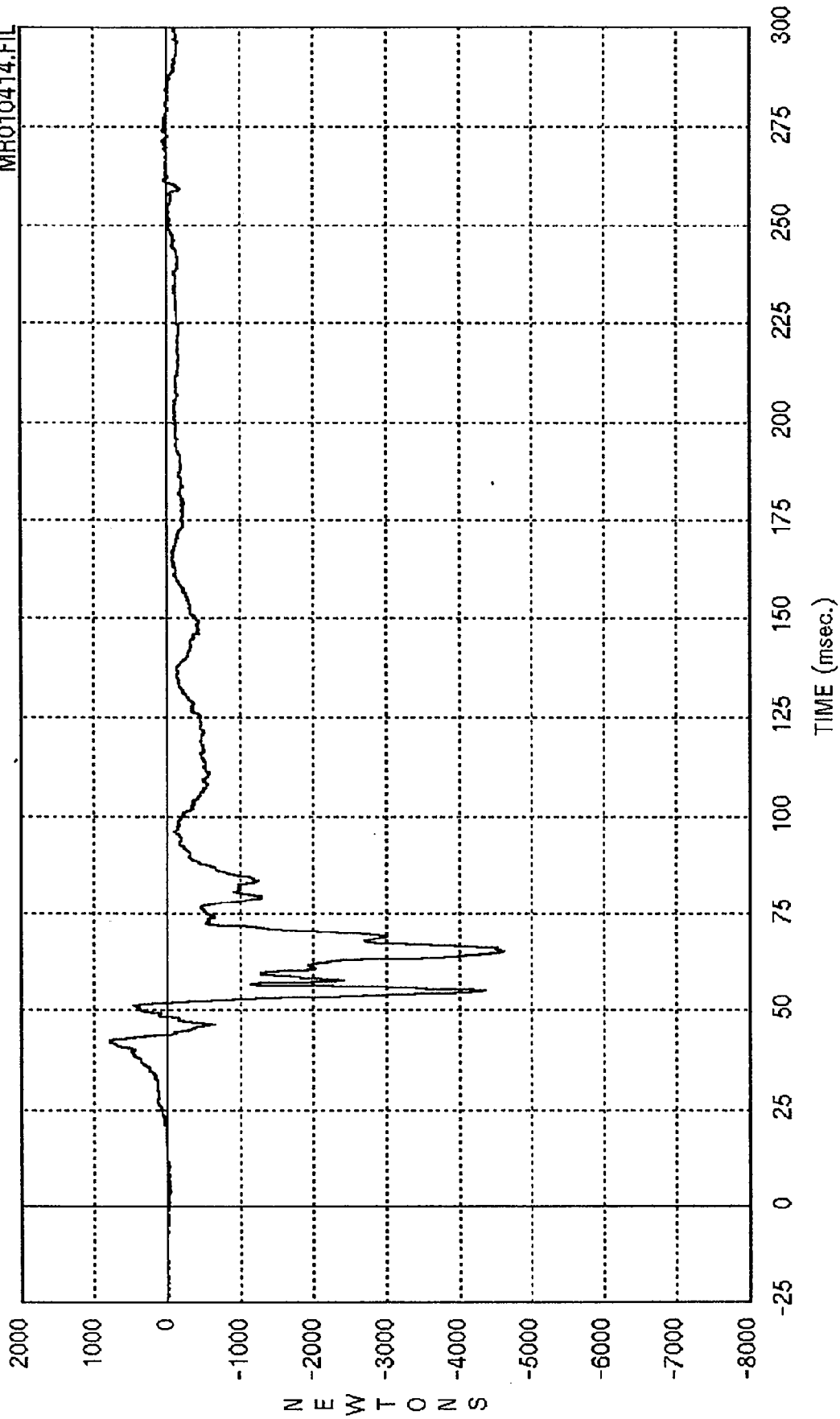


Curve: Driver left femur

Filter: SAE CLASS 600 Max = 858.30 Min = -3929.6

MSE Date: 02/16/94 Program: 1994 New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

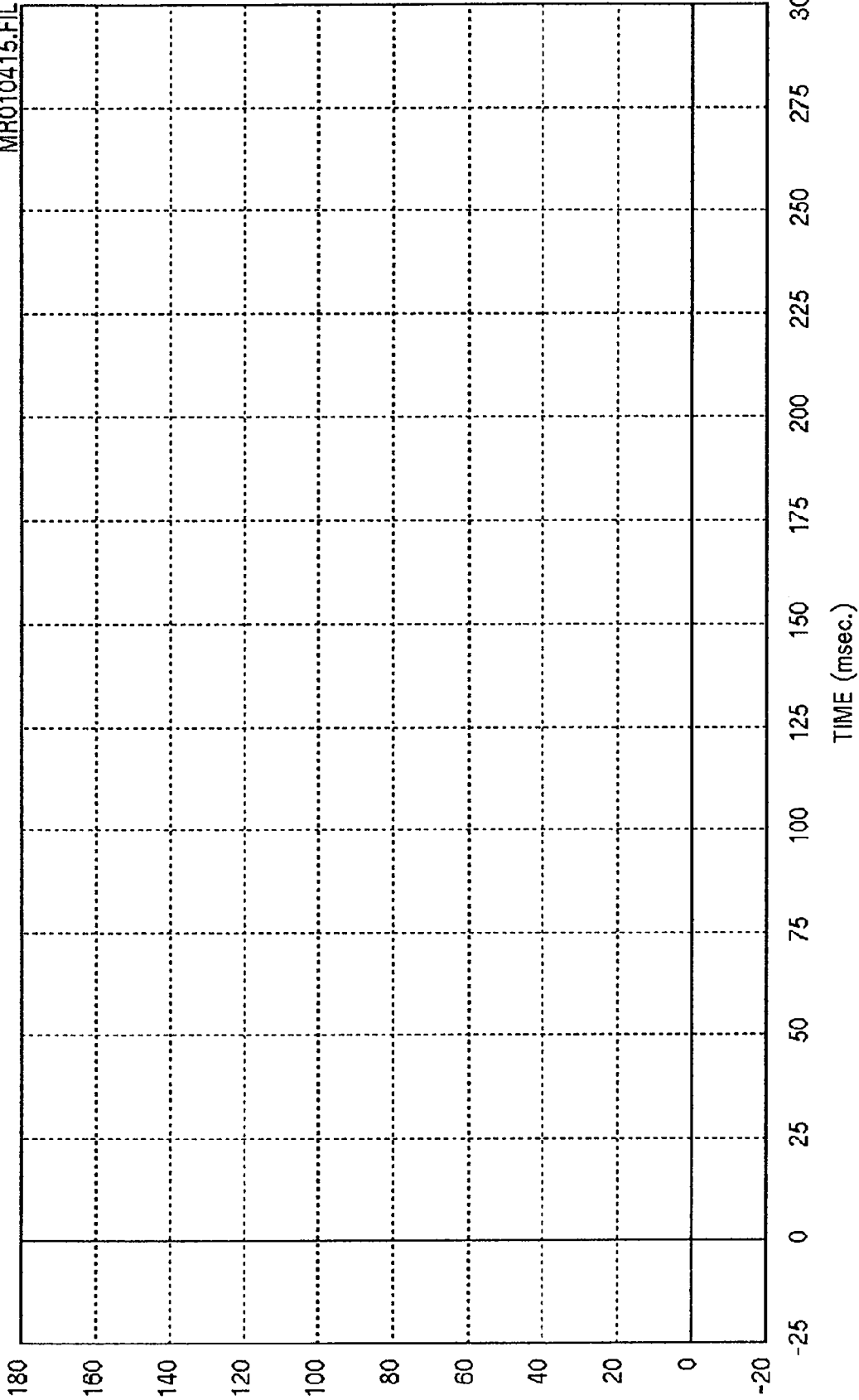
MR010414.FIL



Curve: Driver right femur Filter: SAE CLASS 600 Max = 787.22 Min = -4615.7

MSE Date: 02/16/94 Program: 1994 New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010415.FIL

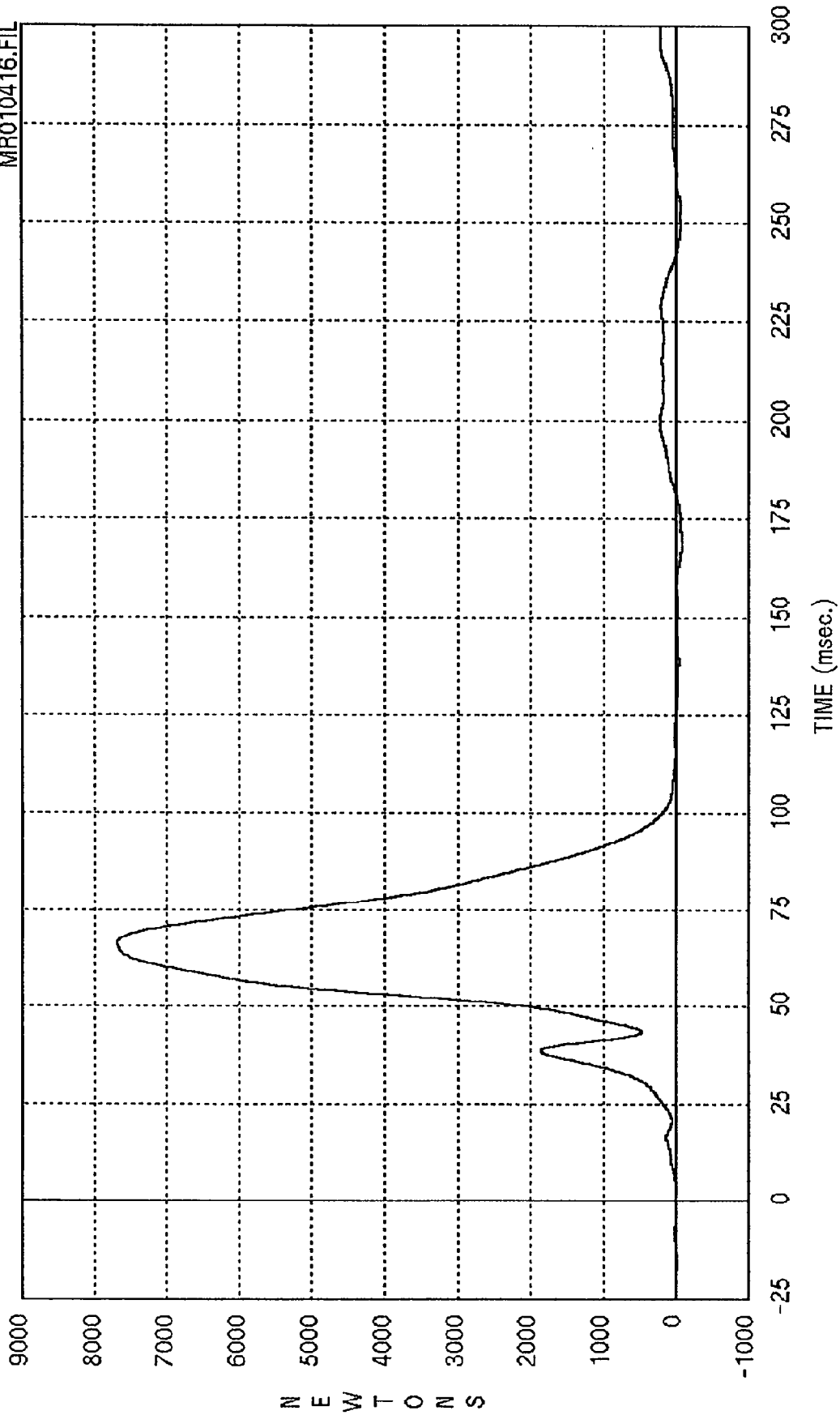


Curve: Driver chest displacement (No data)

Filter: SAE CLASS-180 Max = .00000 Min = .00000

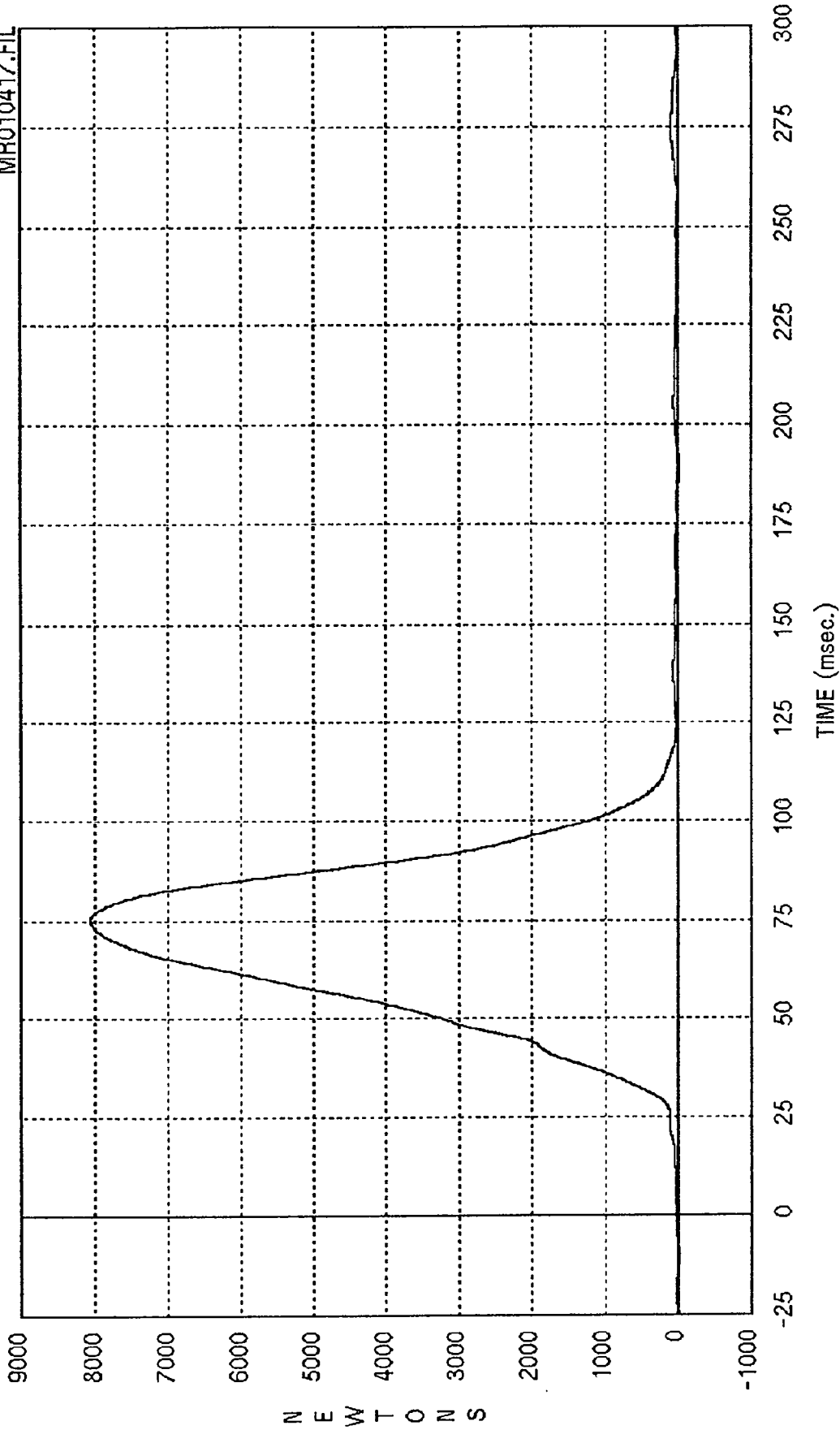
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010416.FIL



Curve: Driver lap belt load Filter: SAE CLASS 60 Max = 7695.9 Min = -82.139
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010417.FIL



Curve: Driver shoulder belt load Filter: SAE CLASS 60 Max = 8069.2 Min = -16.060

MSE Date: 02/16/94 Program: 1994 New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010418.FIL

0.12

0.1

0.08

0.06

0.04

0.02

0

-0.02

-0.04

P E R C E N T

-25 0 25 50 75 100 125 150 175 200 225 250 275 300

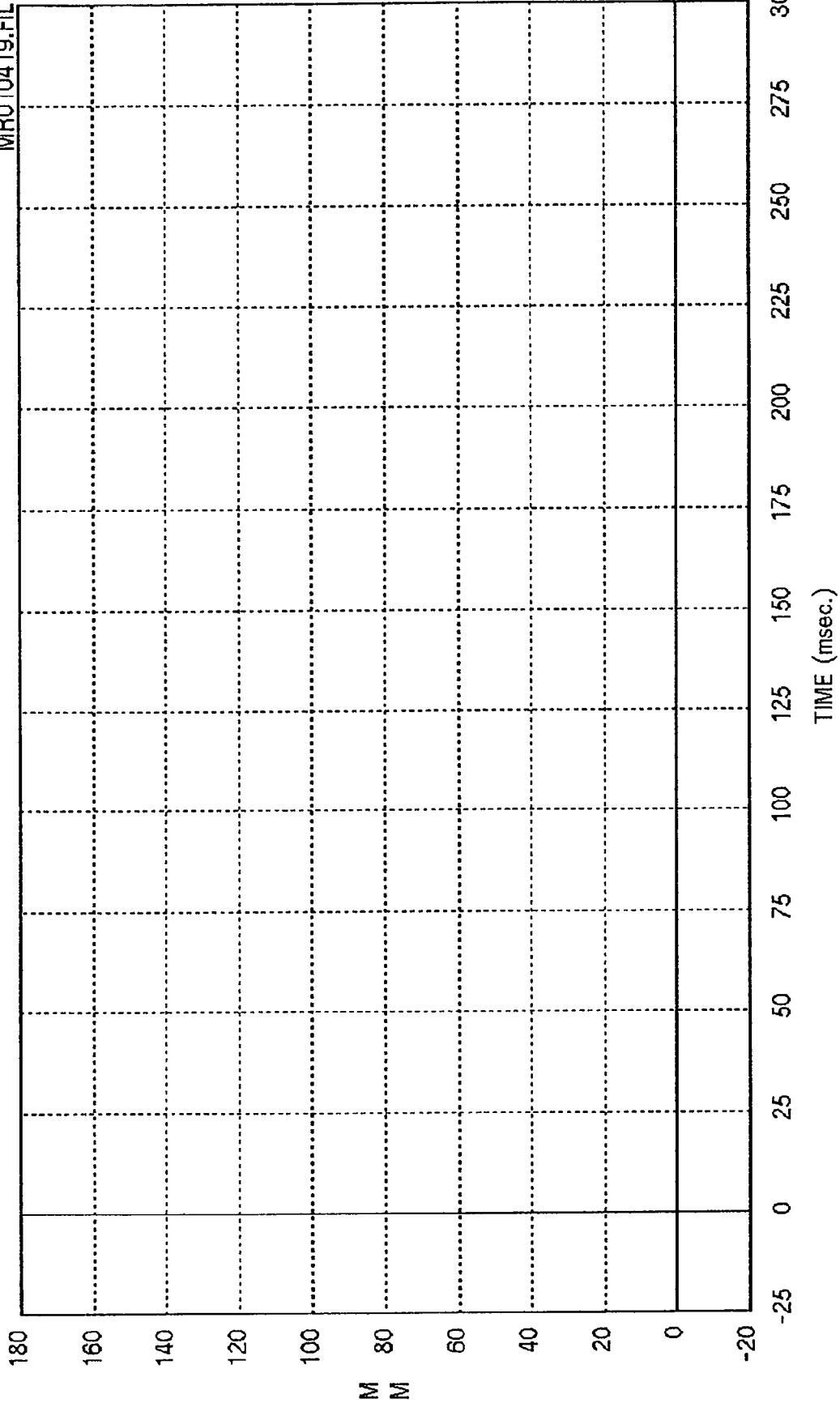
TIME (msec.)

Curve: Driver shoulder belt elongation

Filter: SAE CLASS 60 Max = .38193E-01 Min = .47721E-04

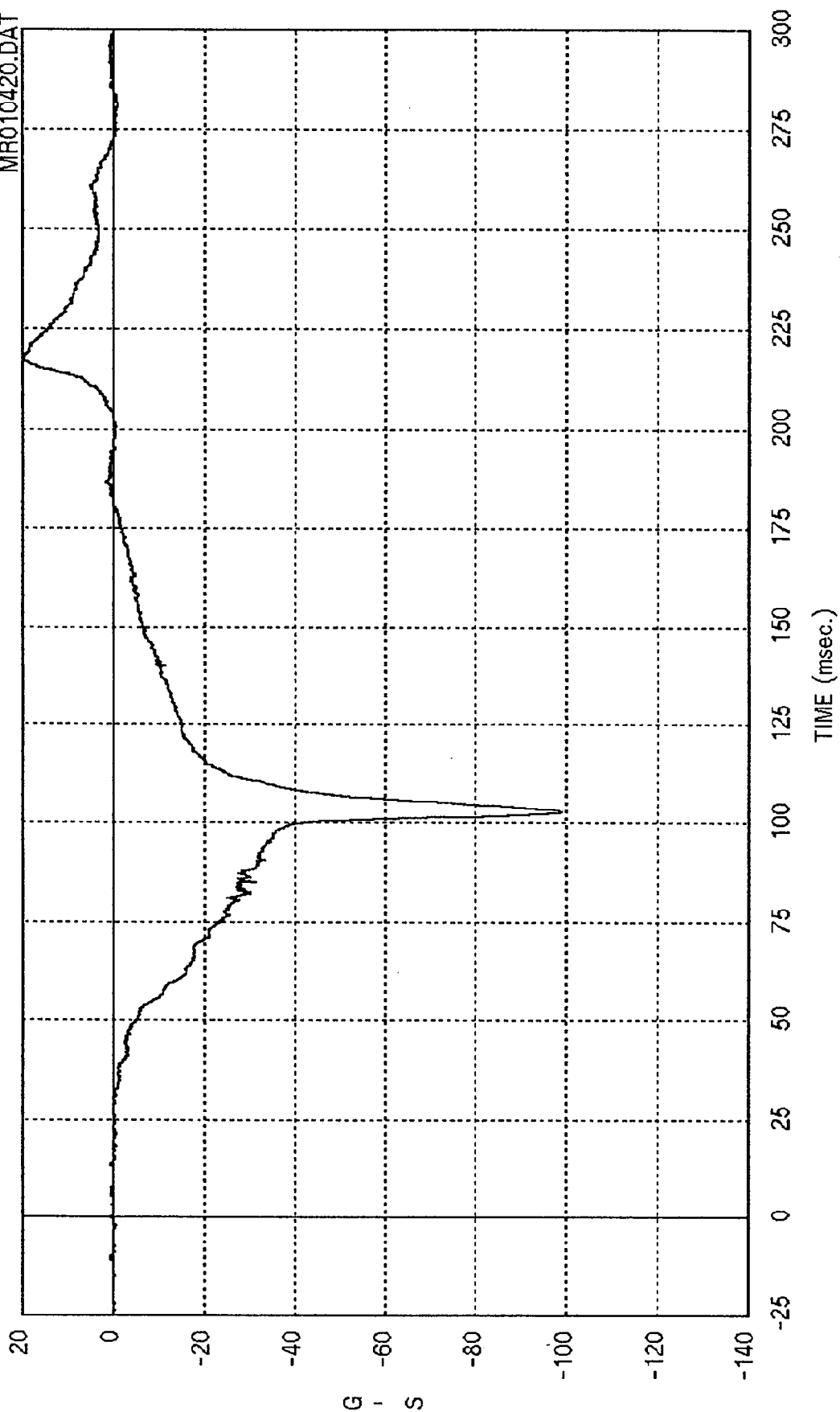
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010419.FIL



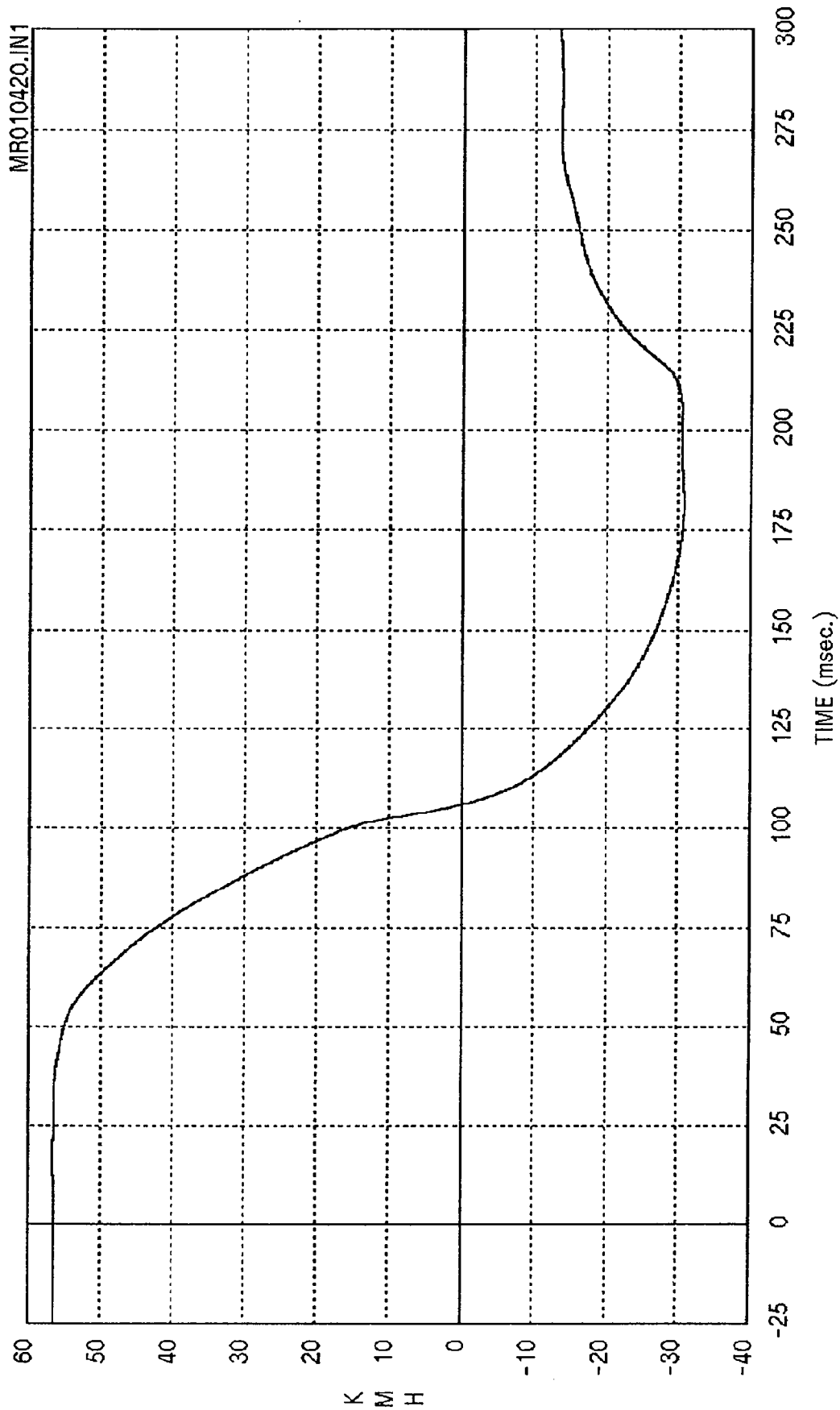
Curve: Driver seat belt pullout (Not used) Filter: SAE CLASS 60 Max = .00000 Min = .00000
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010420.DAT



Curve: Passenger head acceleration -- X axis Filter: SAE CLASS 1000 Max = 19.954 Min = -98.876

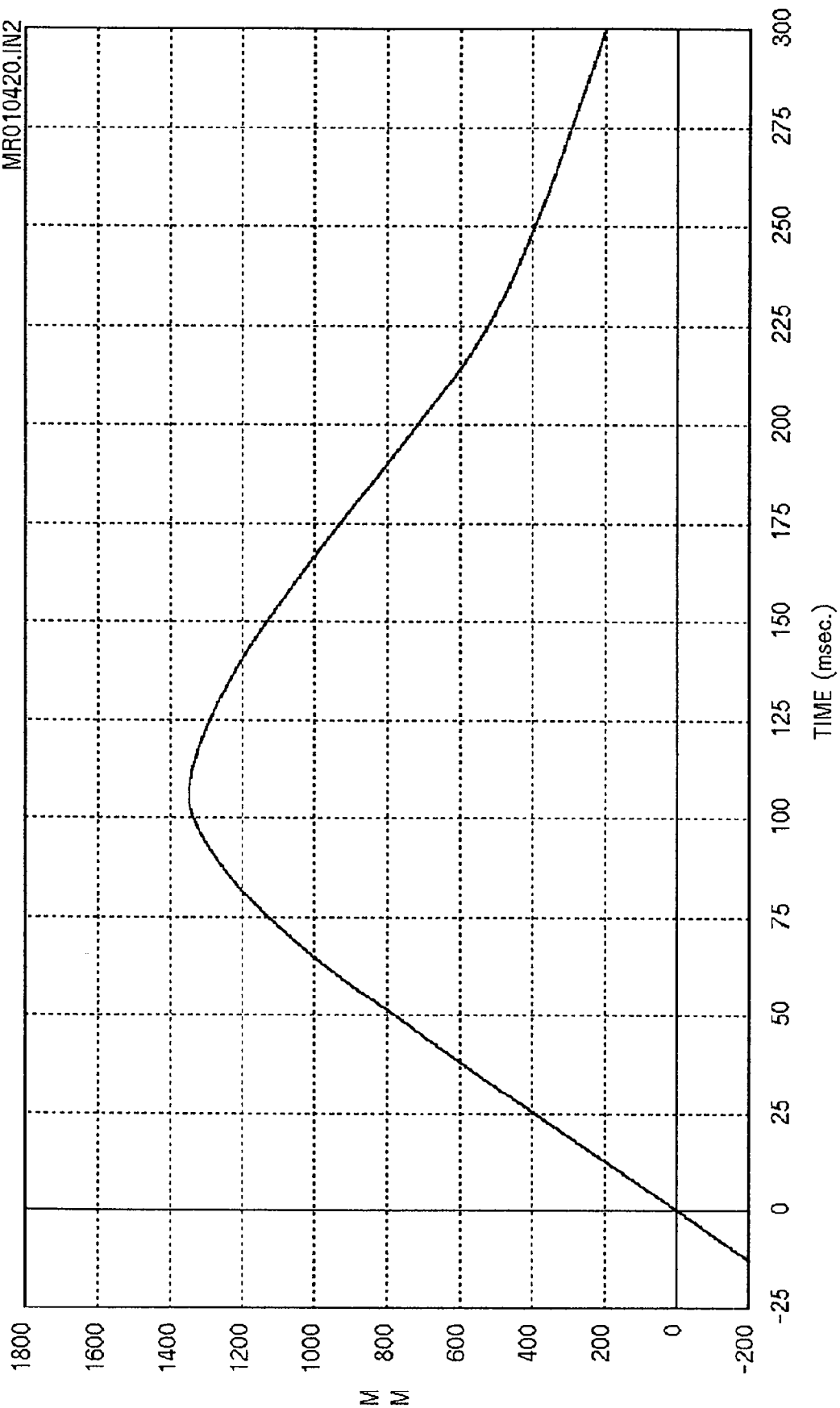
MSE Date: 02/16/94 Program: 1994 New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Passenger head delta V -- X axis Filter: SAE CLASS 180 Max = 56.571 Min = -30.790

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

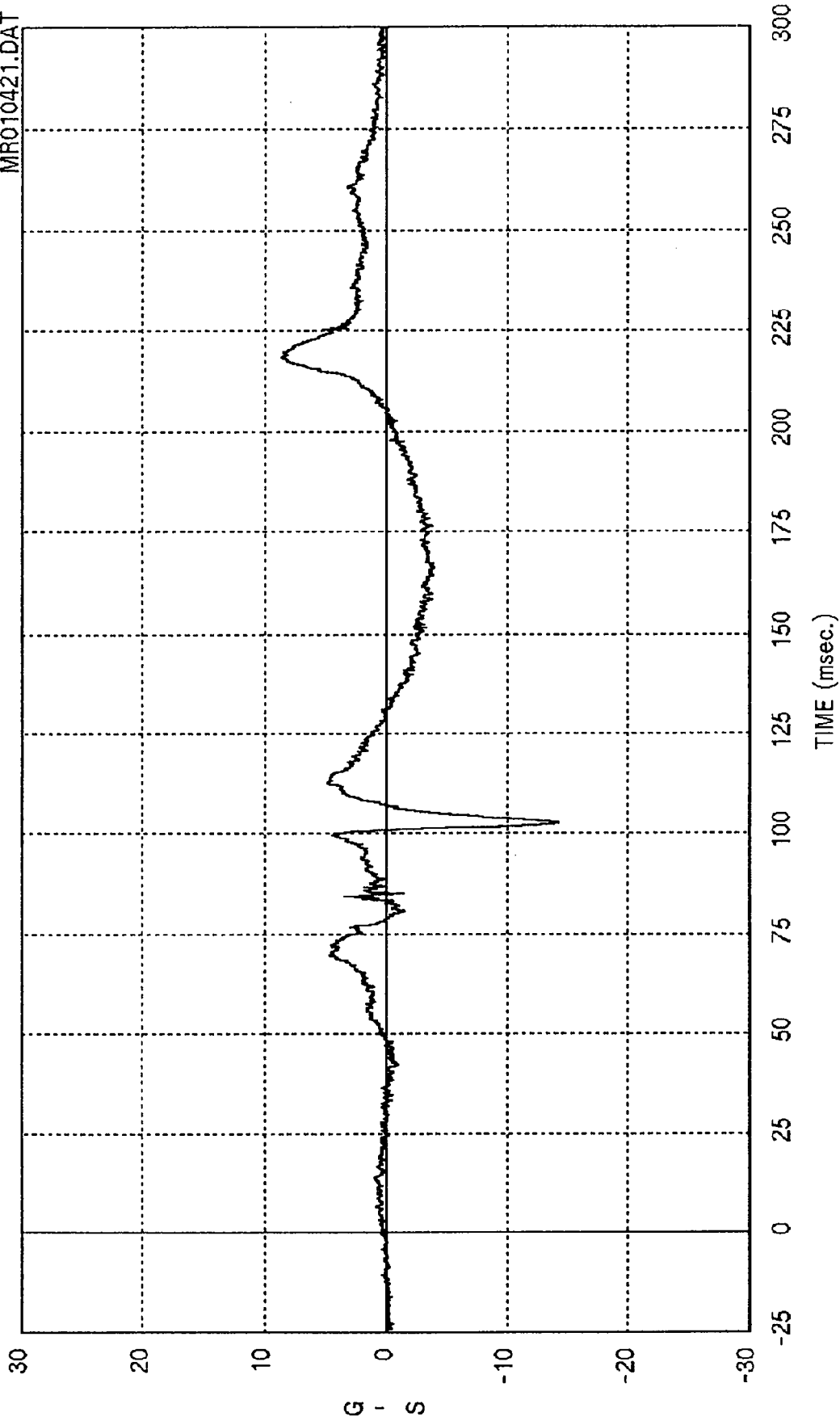
MR010420.IN2



Curve: Passenger head displacement -- X axis Filter: SAE CLASS 180 Max = 1350.8 Min = 198.22

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

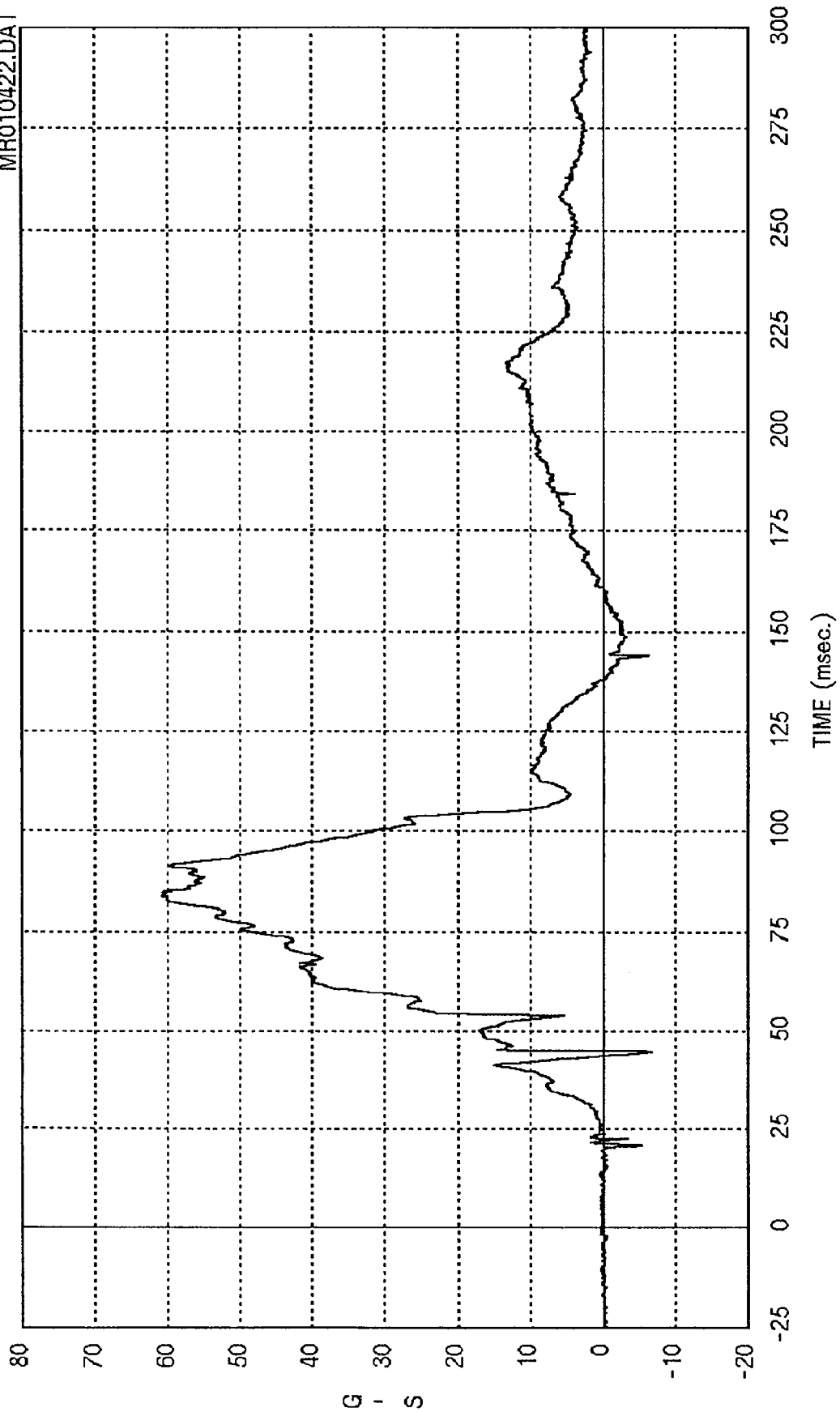
MR010421.DAT



Curve: Passenger head acceleration -- Y axis Filter: SAE CLASS 1000 Max = 8.6838 Min = -14.260

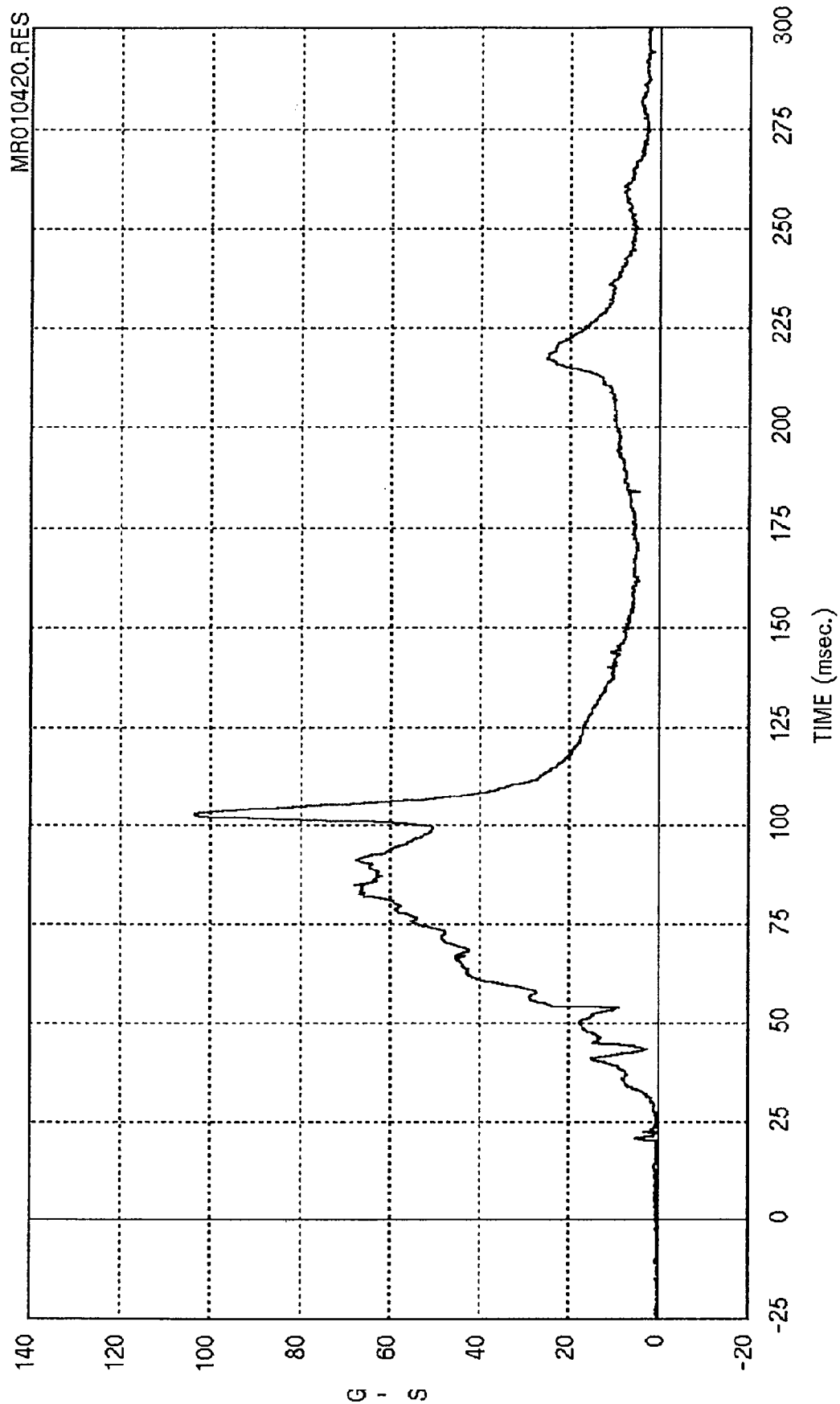
MSE Date: 02/16/94 Program: 1994 New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010422.DAT



Curve: Passenger head acceleration -- Z axis Filter: SAE CLASS 1000 Max = 60.885 Min = -9.1959

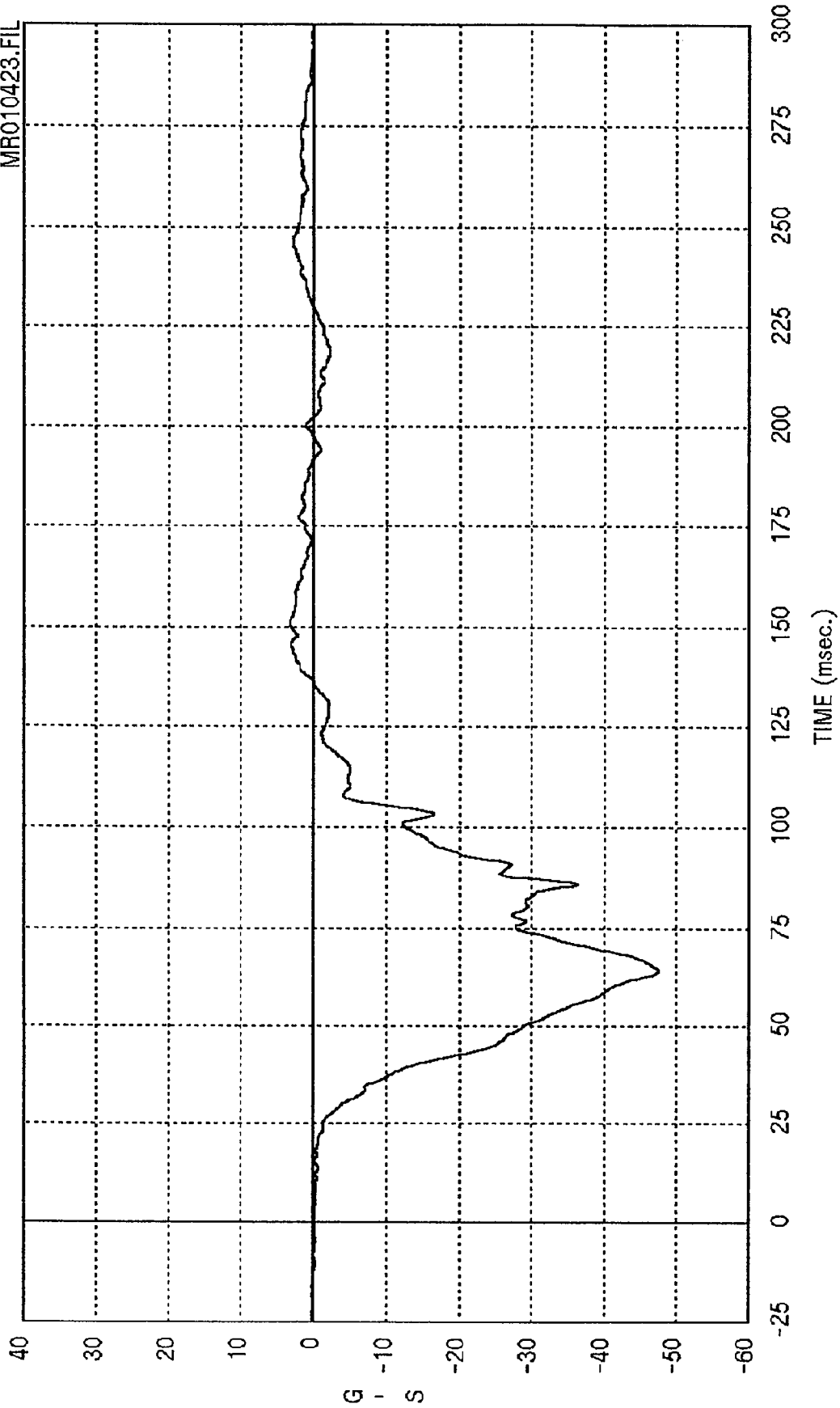
MSE Date: 02/16/94 Program: 1994 New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

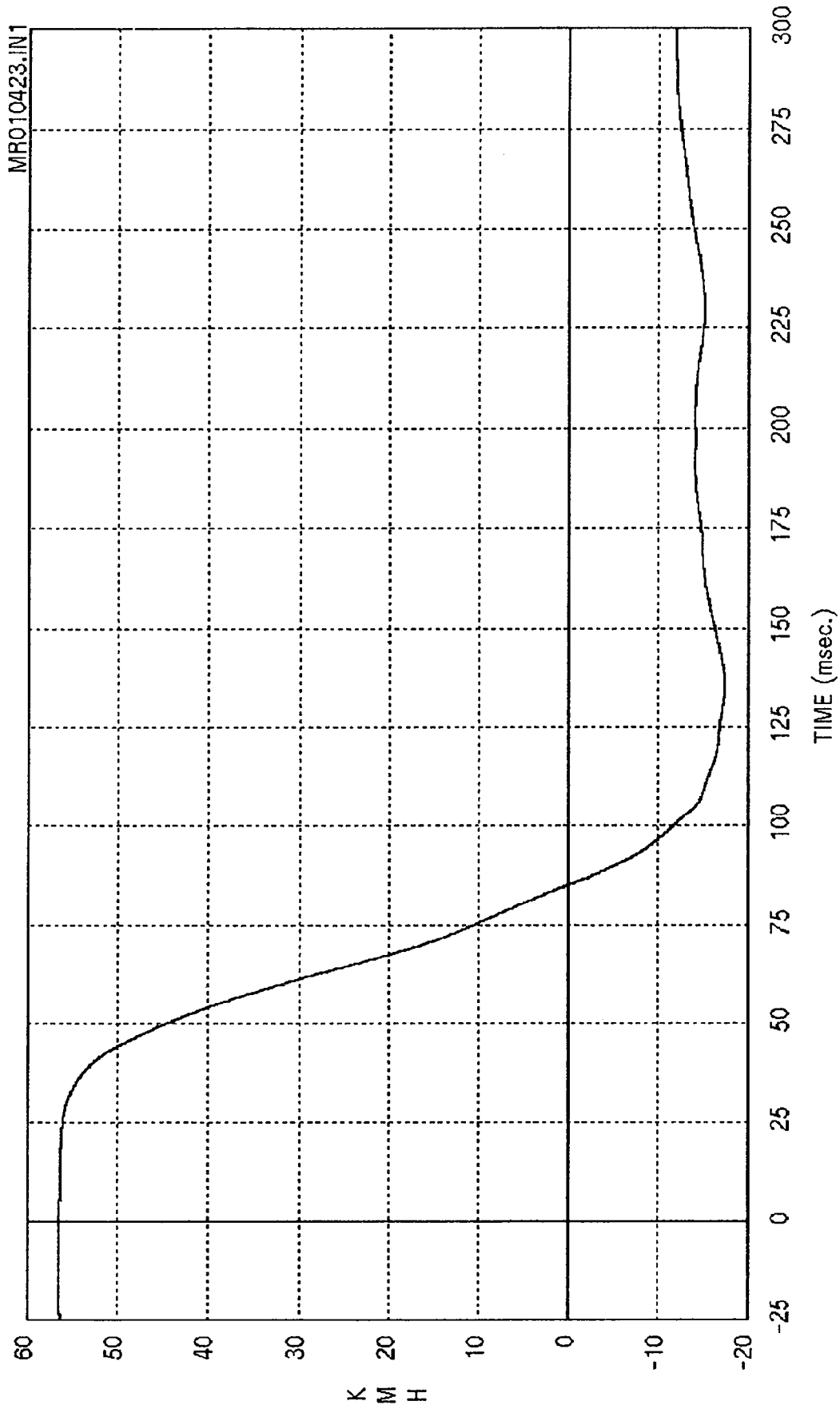


Curve: Passenger head acceleration -- Resultant Filter: SAE CLASS 1000 Max = 103.39 Min = .31641

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010423.FIL

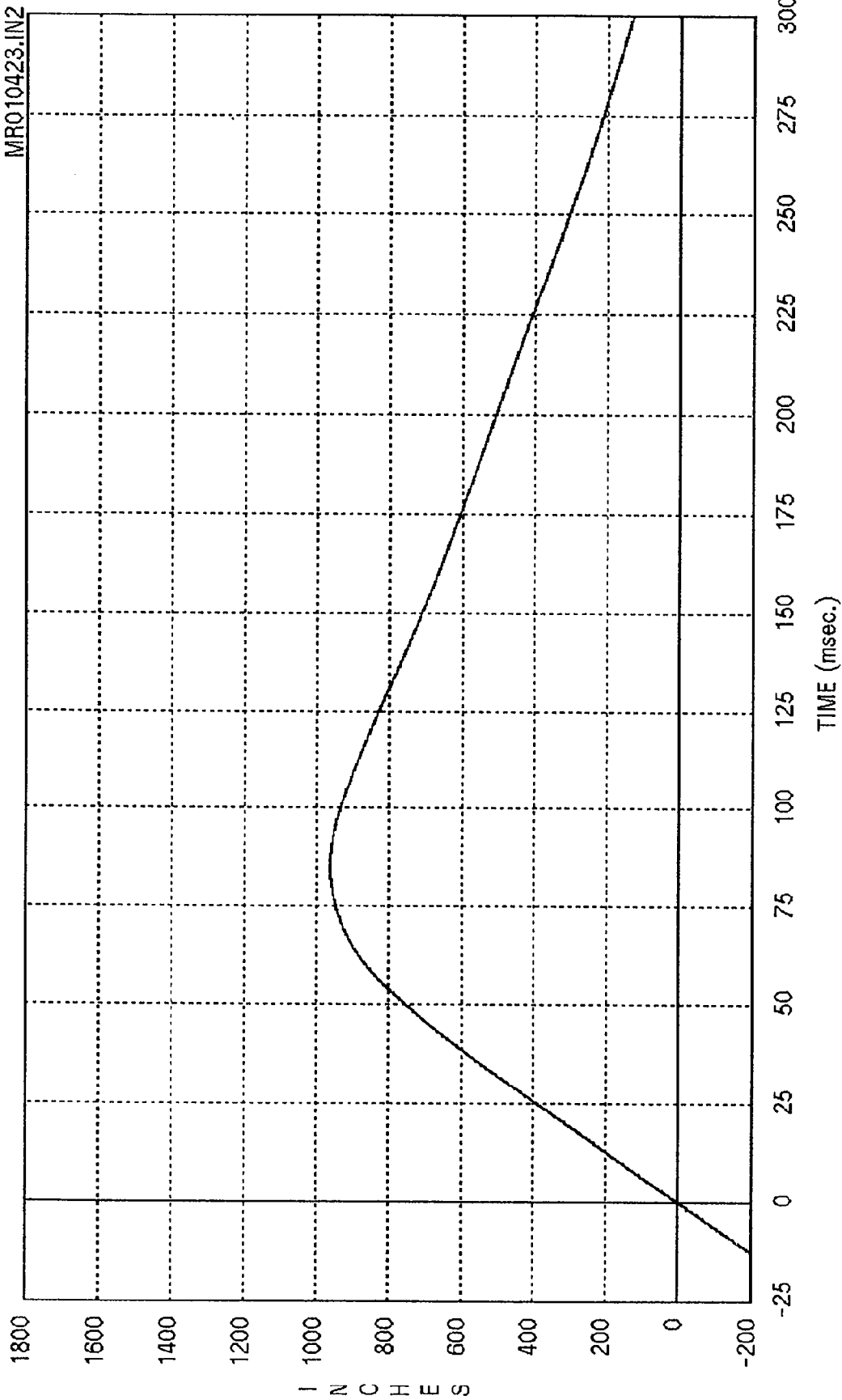




Curve: Passenger chest delta V -- X axis Filter: SAE CLASS 180 Max = 56.447 Min = -17.392

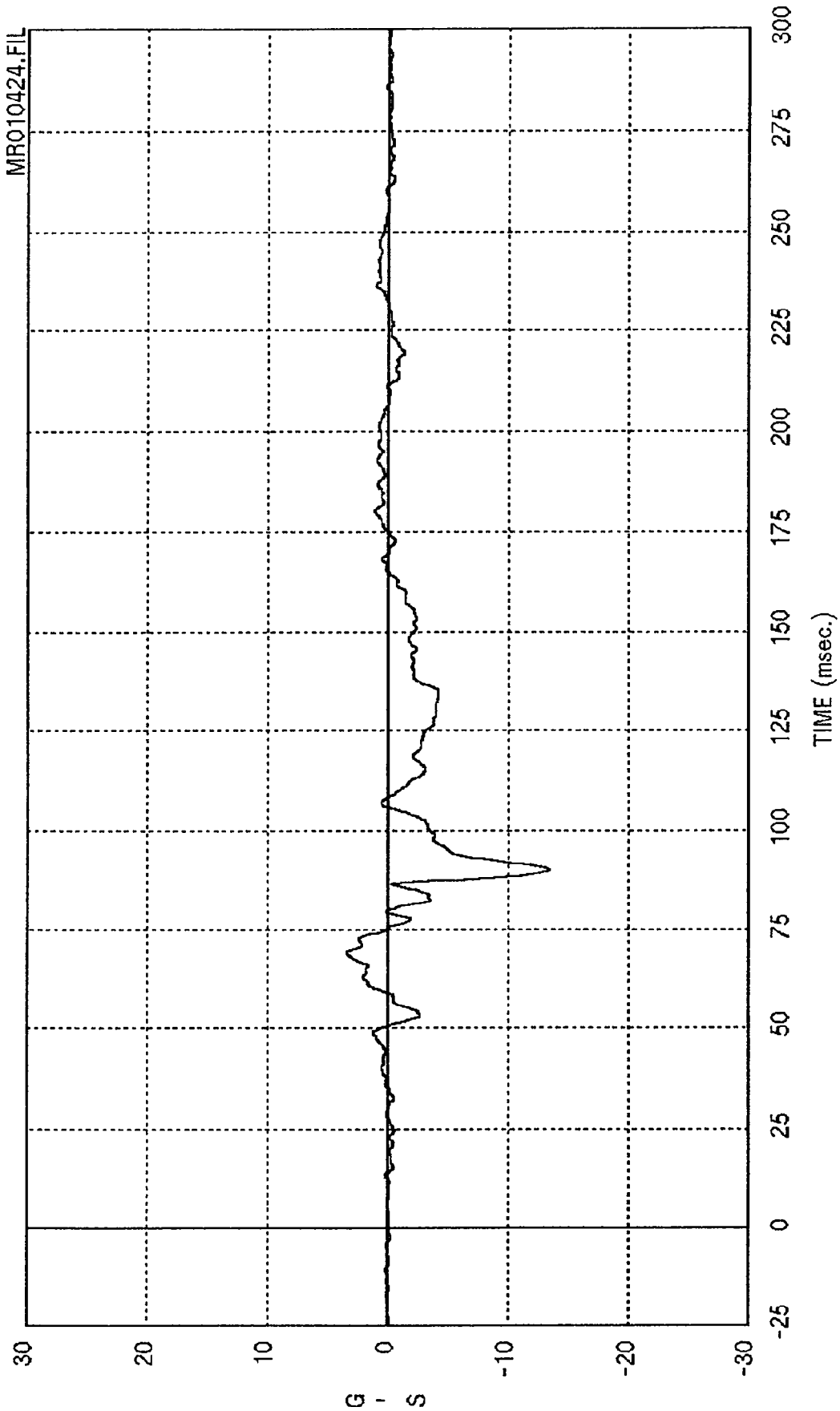
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010423.IN2



Curve: Passenger chest displacement -- X axis: Filter: SAE CLASS 180 Max = 964.52 Min = 130.13

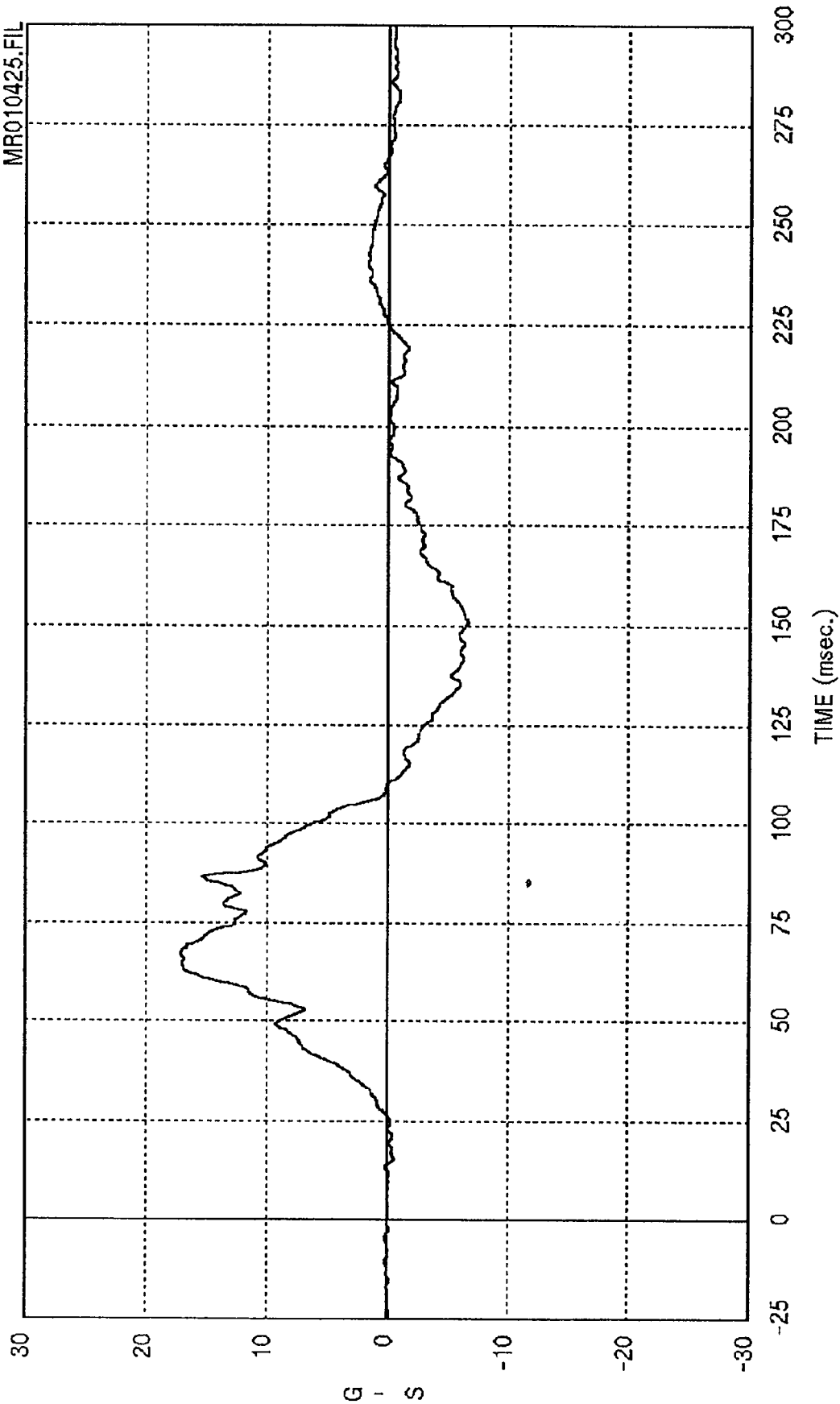
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Passenger chest acceleration -- Y axis Filter: SAE CLASS 180 Max = 3.5346 Min = -13.325

MSE Date: 02/16/94 Program: 1994 New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

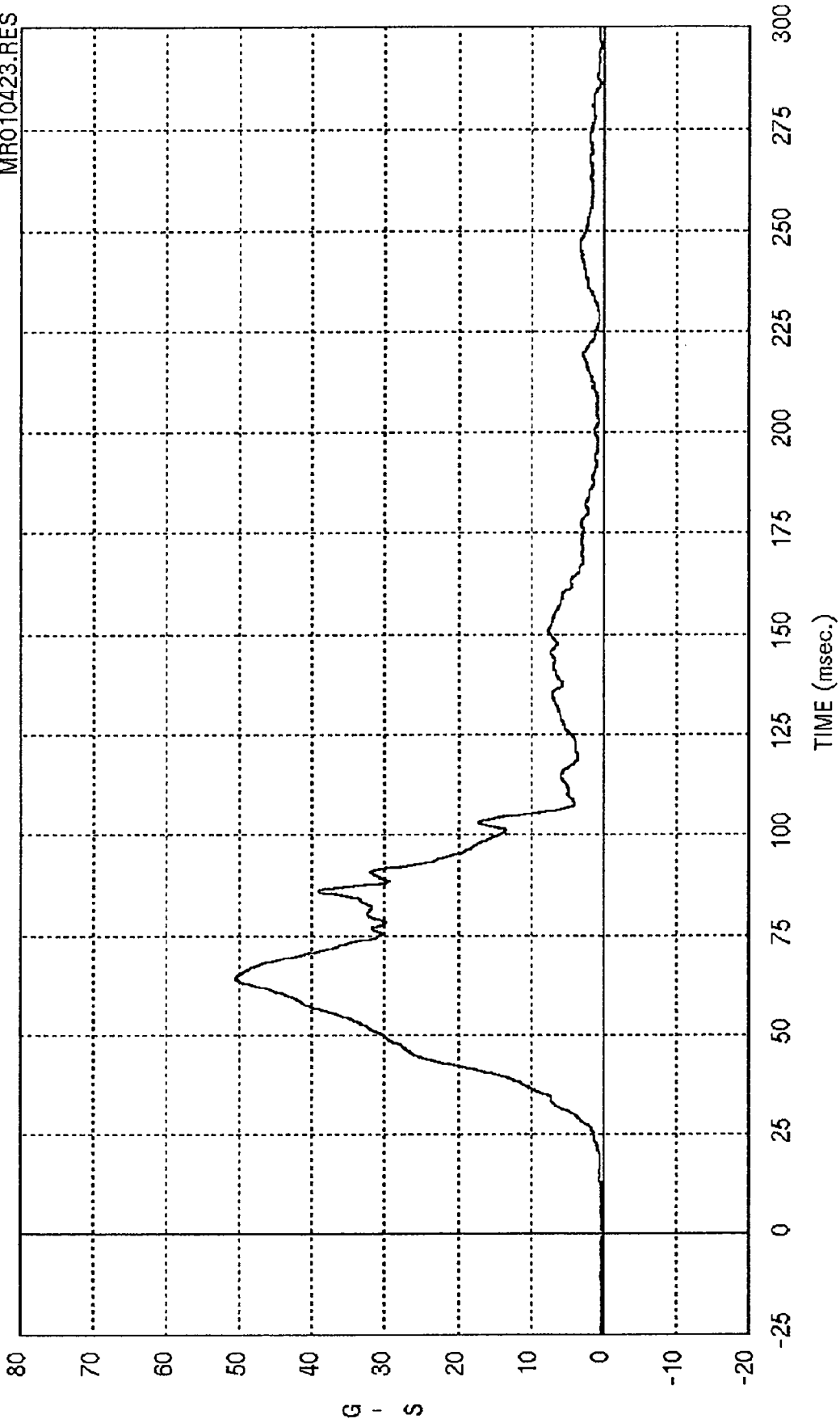
MR010425.FIL



Curve: Passenger chest acceleration -- Z axis Filter: SAE CLASS 180 Max = 17.181 Min = -6.5921

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

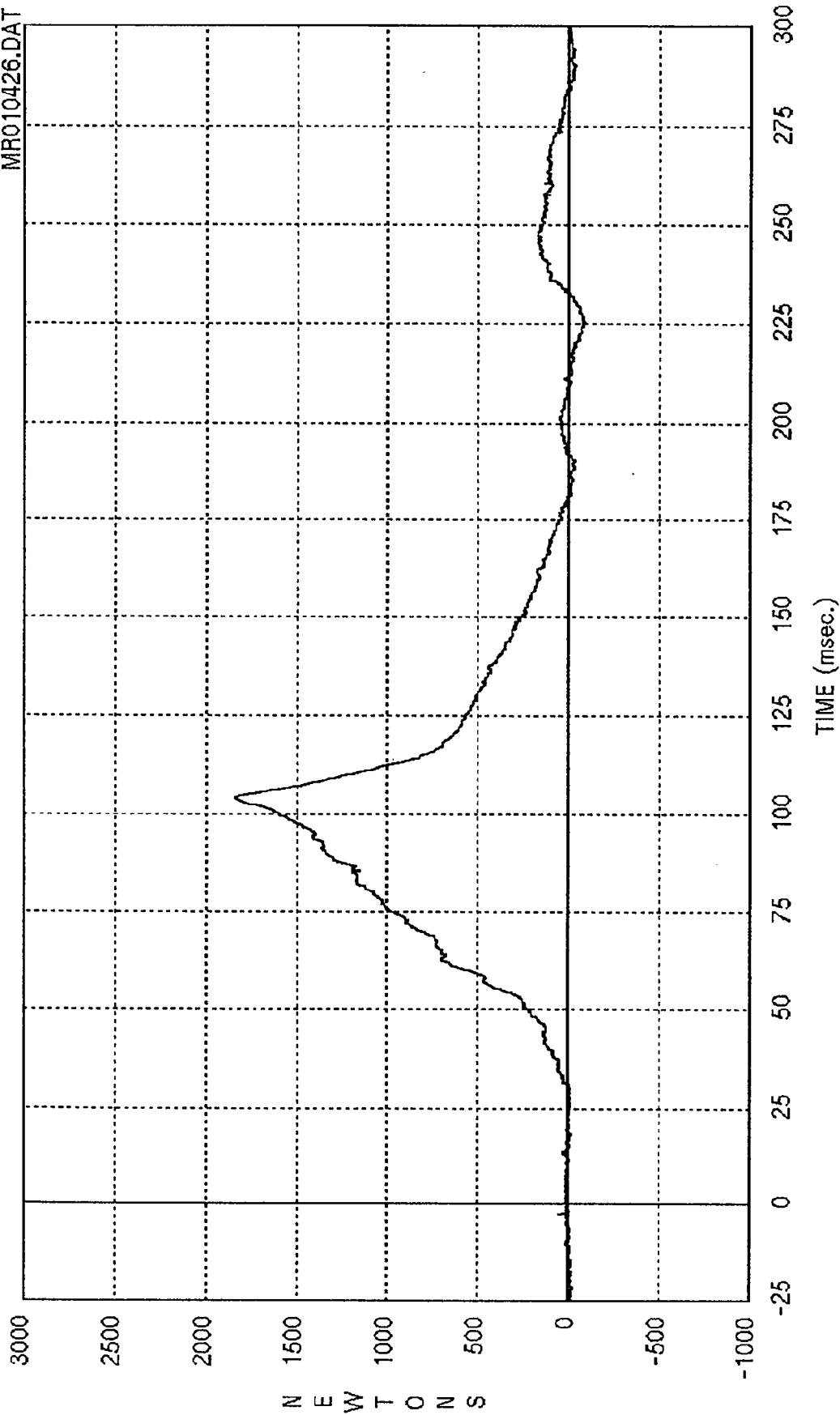
MR010423.RES



Curve: Passenger chest acceleration -- Resultant: Filter: SAE CLASS 180 Max = 50.545 Min = .91410E-01

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

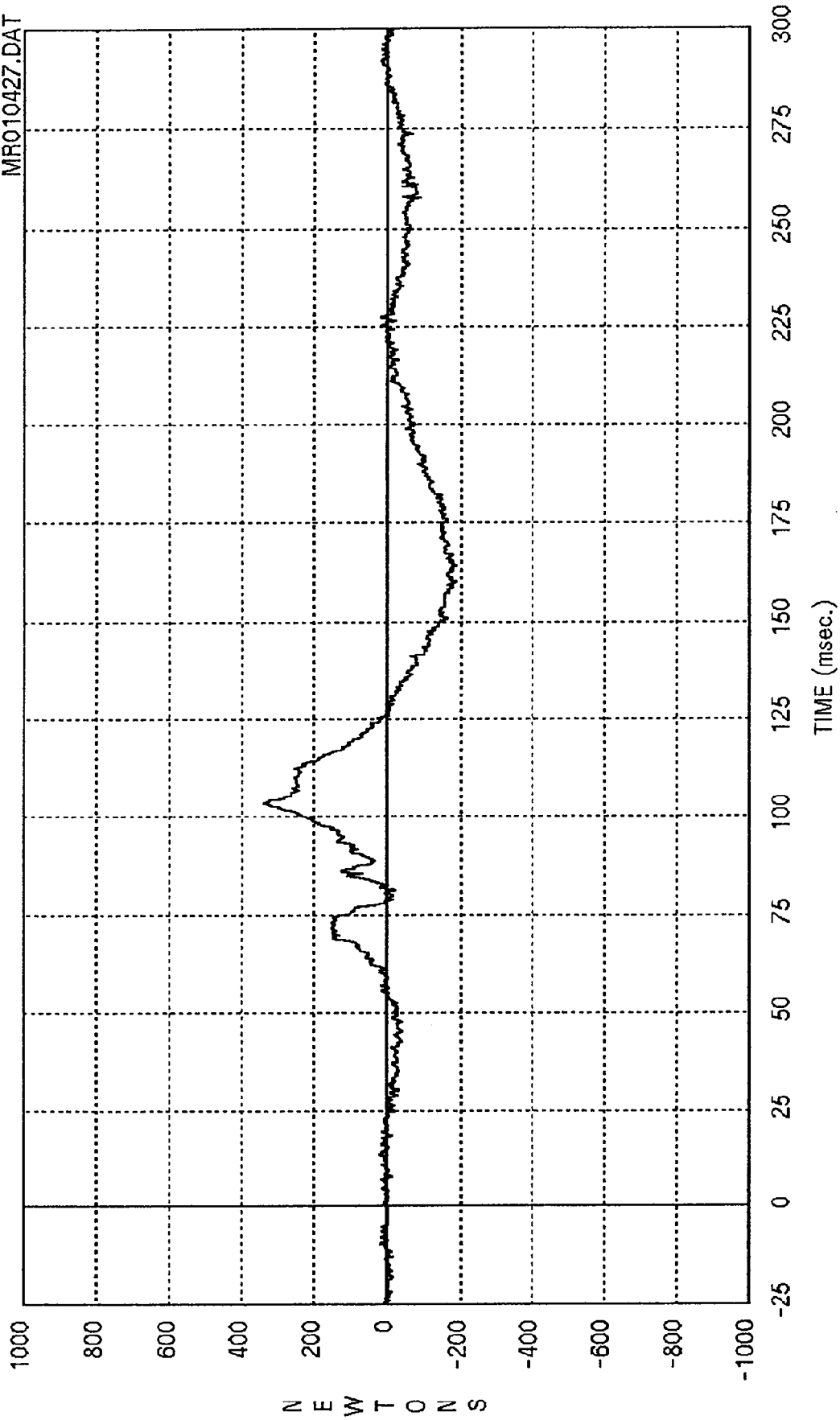
MR010426.DAT



Curve: Passenger neck force -- X axis Filter: SAE CLASS 1000 Max = 1845.8 Min = -86.371

MSE Date: 02/16/94 Program: 1994 New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

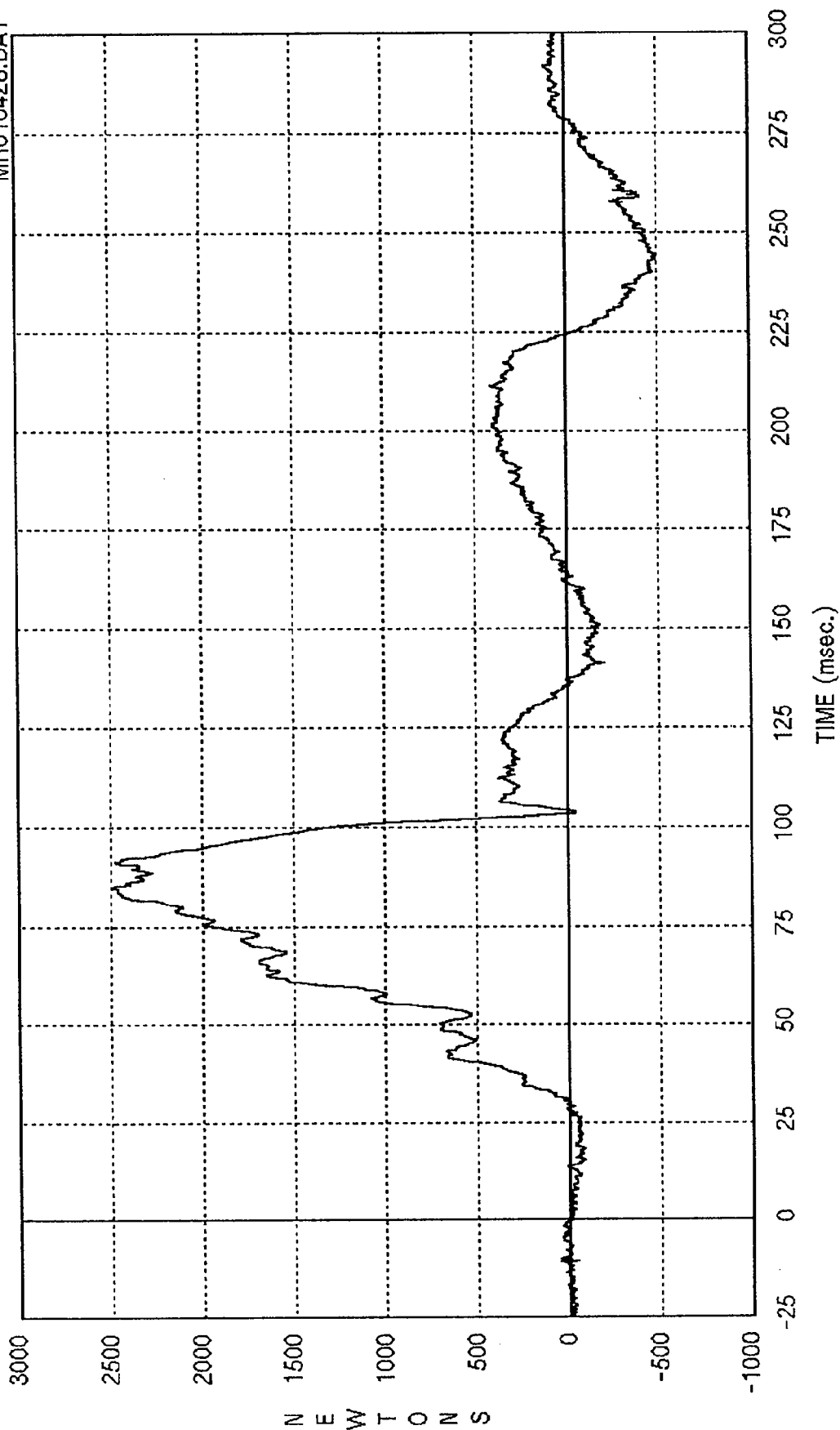
MR010427.DAT



Curve: Passenger neck force -- Y axis Filter: SAE CLASS 1000 Max = 340.56 Min = -188.05

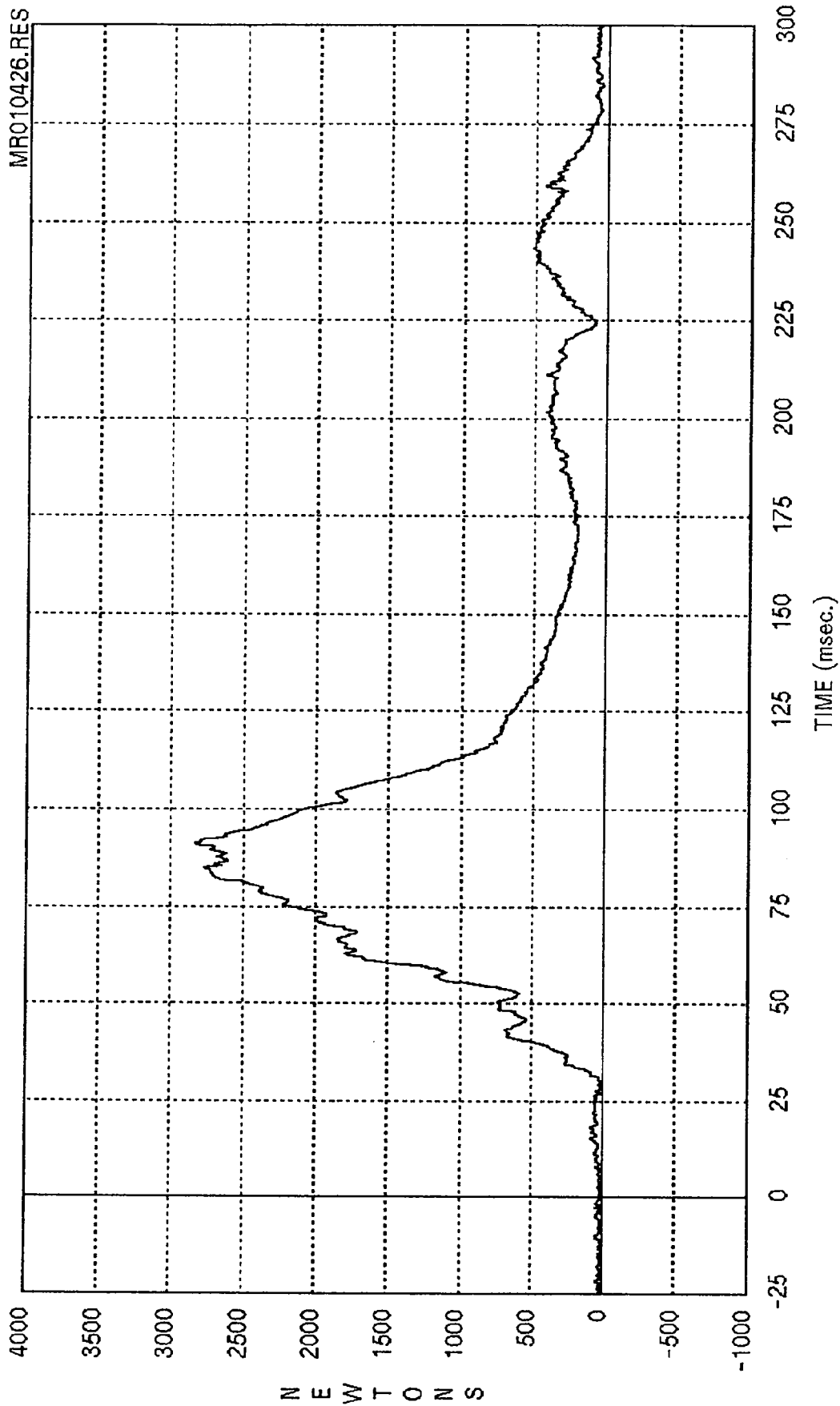
MSE Date: 02/16/94 Program: 1994 New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010428.DAT



Curve: Passenger neck force -- Z axis Filter: SAE CLASS 1000 Max = 2498.5 Min = -488.40

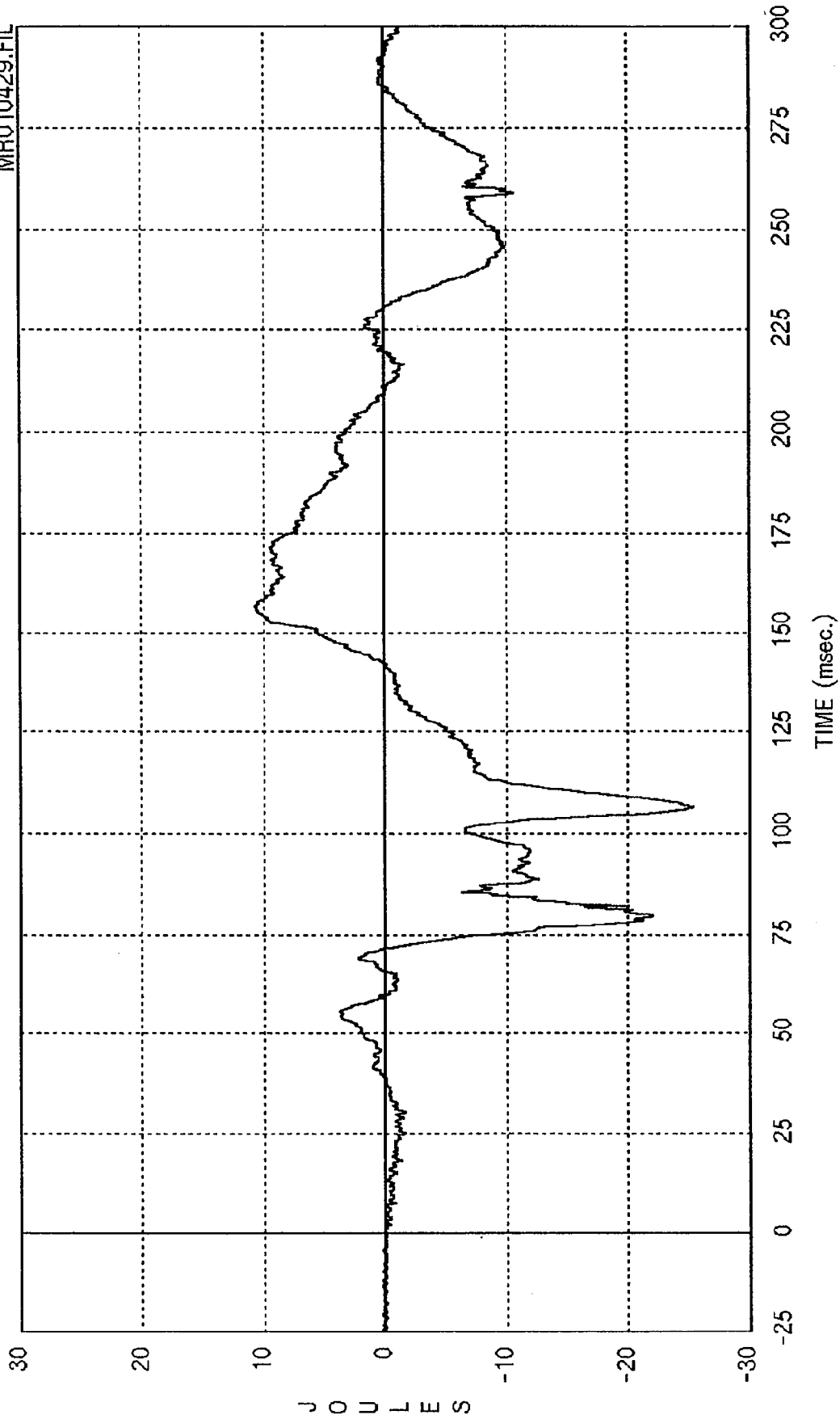
MSE Date: 02/16/94 Program: 1994 New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Passenger neck force -- Resultant

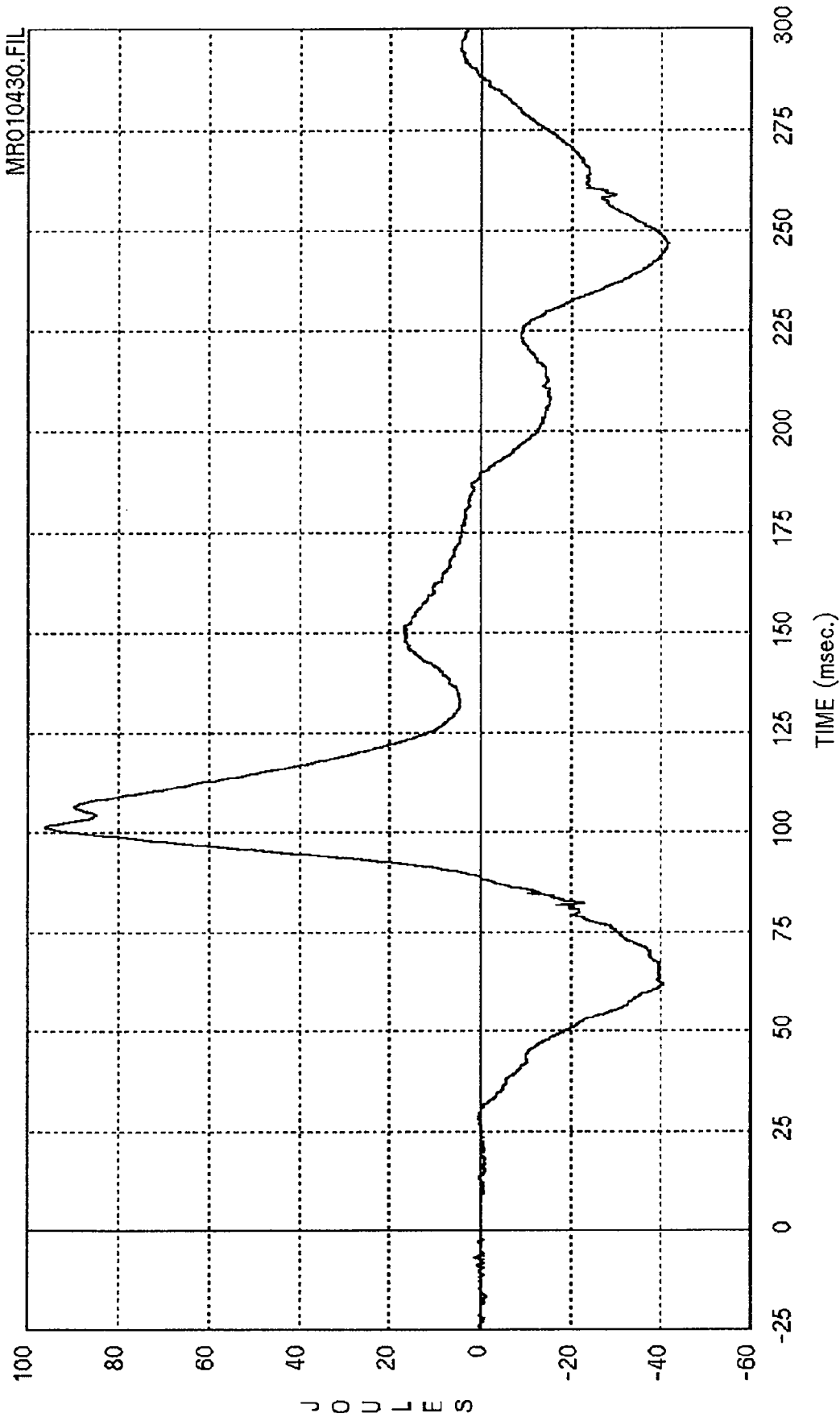
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010429.FIL



Curve: Passenger neck moment -- X axis Filter: SAE CLASS 600 Max = 10.861 Min = -25.465

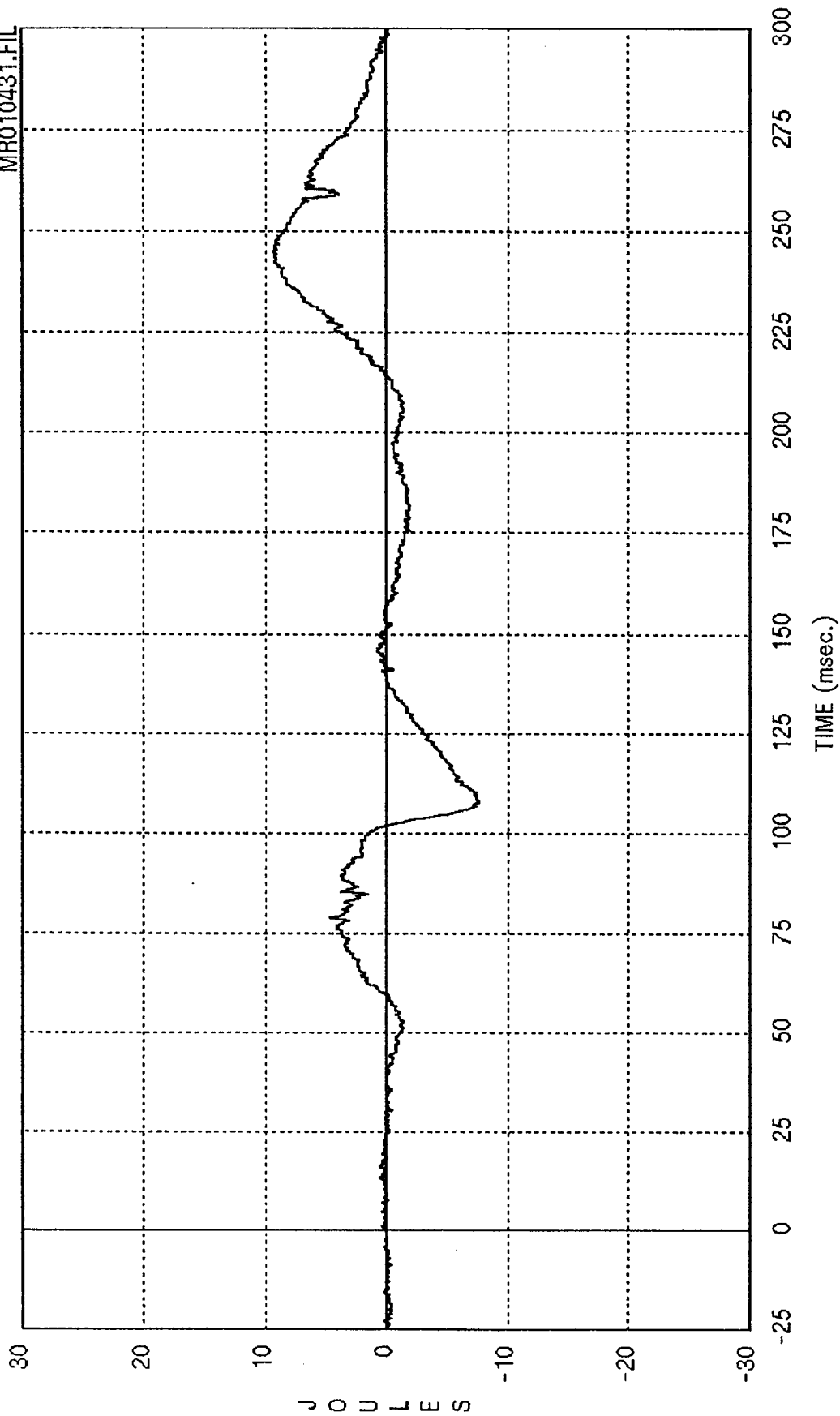
MSE Date: 02/16/94 Program: 1994 New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Passenger neck moment -- Y axis Filter: SAE CLASS 600 Max = 96.191 Min = -41.433

MSE Date: 02/16/94 Program: 1994 New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

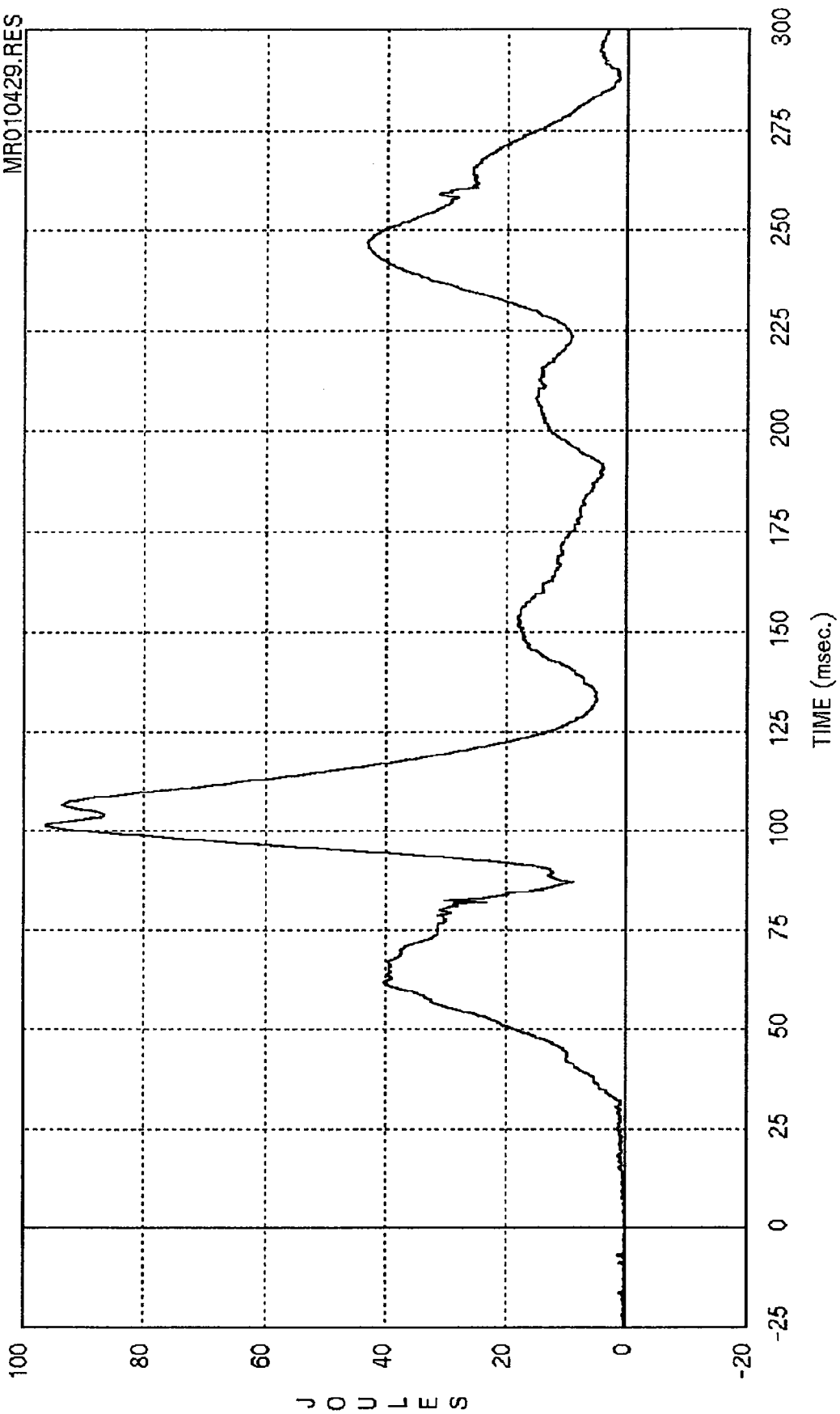
MR010431.FIL



Curve: Passenger neck moment -- Z axis Filter: SAE CLASS 600 Max = 9.3594 Min = -7.5562

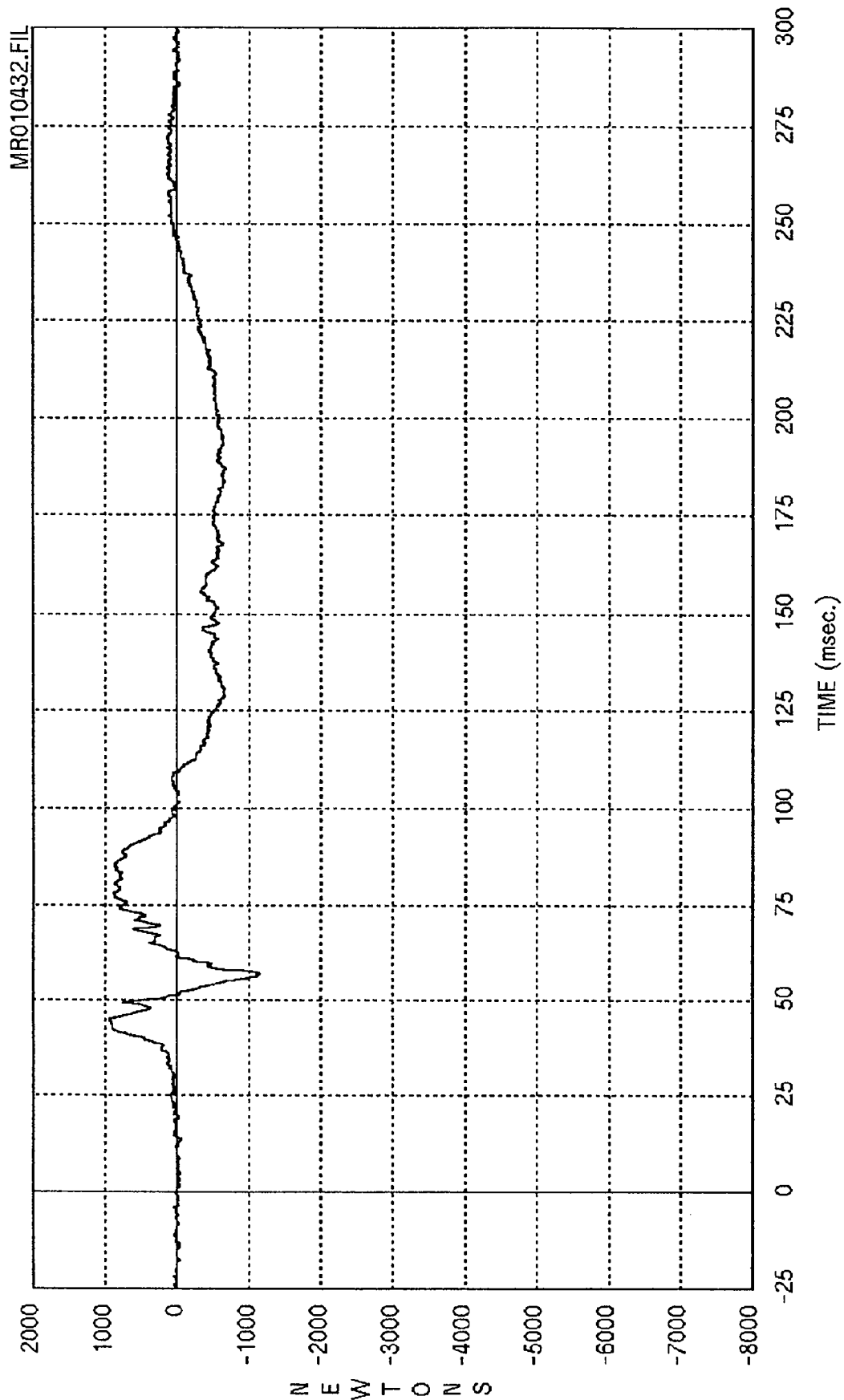
MSE Date: 02/16/94 Program: 1994 New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010429.RES



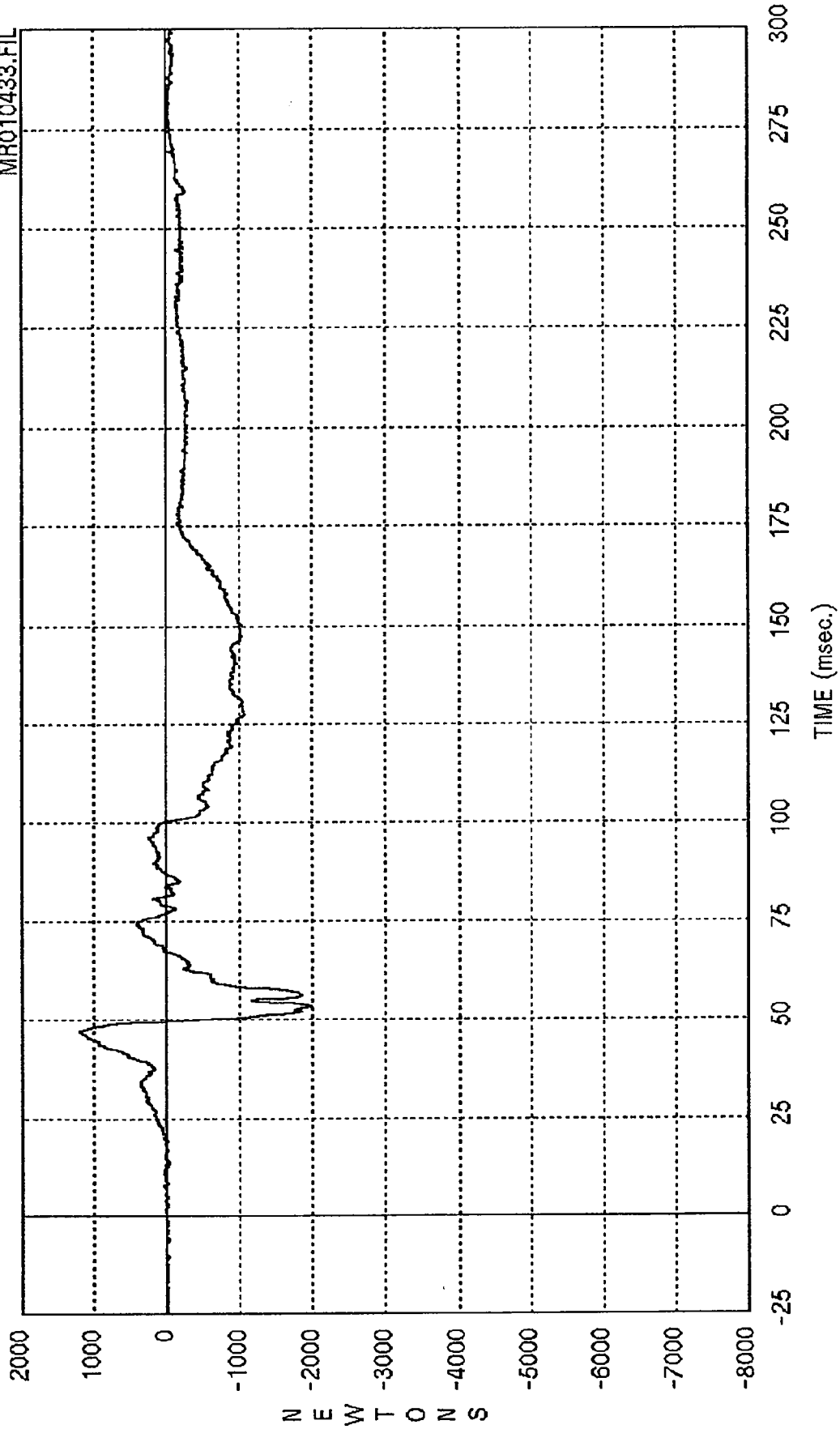
Curve: Passenger neck moment -- Resultant Filter: SAE CLASS 600 Max = 96.421 Min = .15301

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Passenger left femur Filter: SAE CLASS 600 Max = 934.37 Min = -1143.3
MSE Date: 02/16/94 Program: 1994 New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

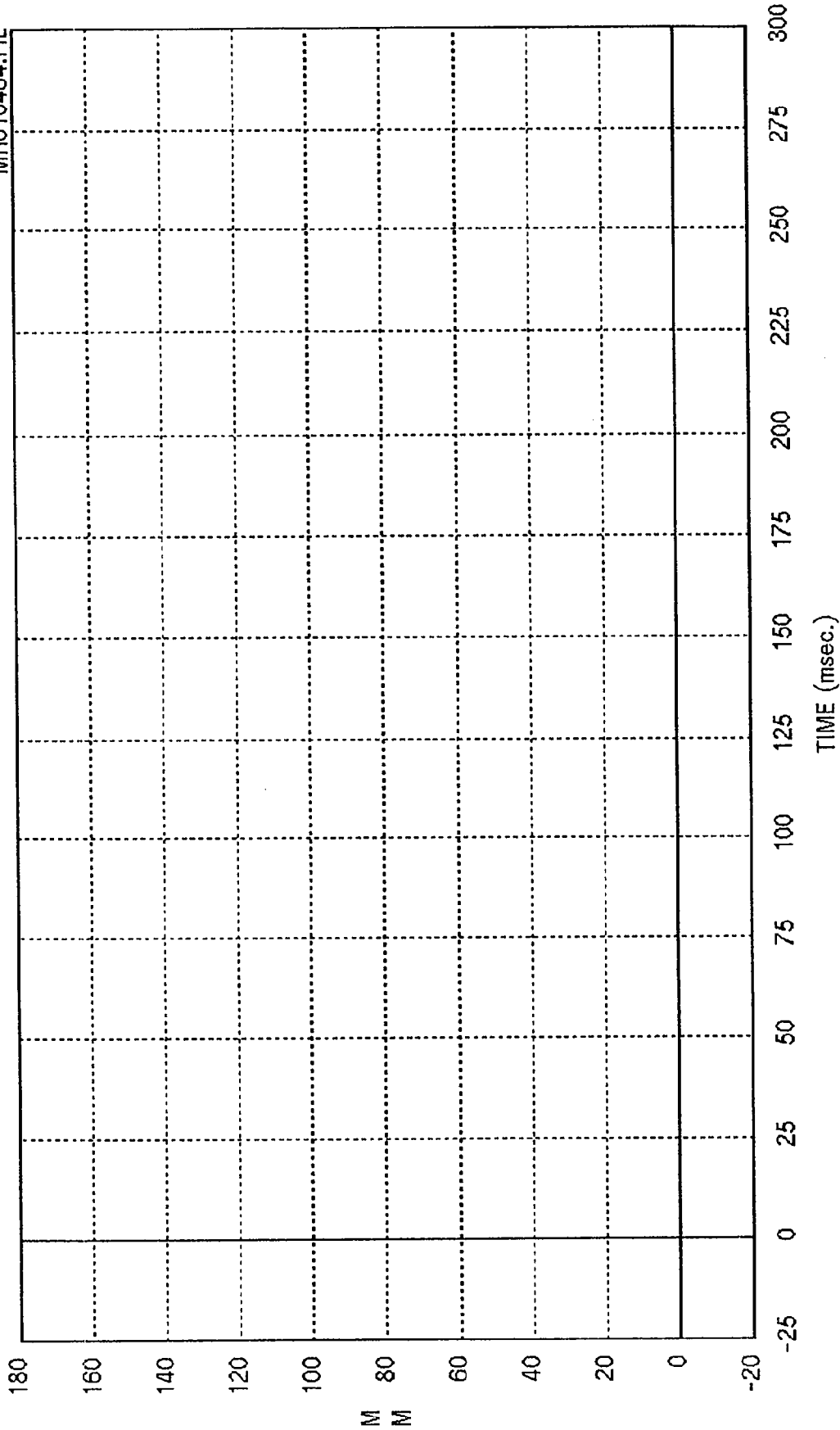
MRQ10433.FIL



Curve: Passenger right femur Filter: SAE CLASS 600 Max = 1183.1 Min = -1970.7

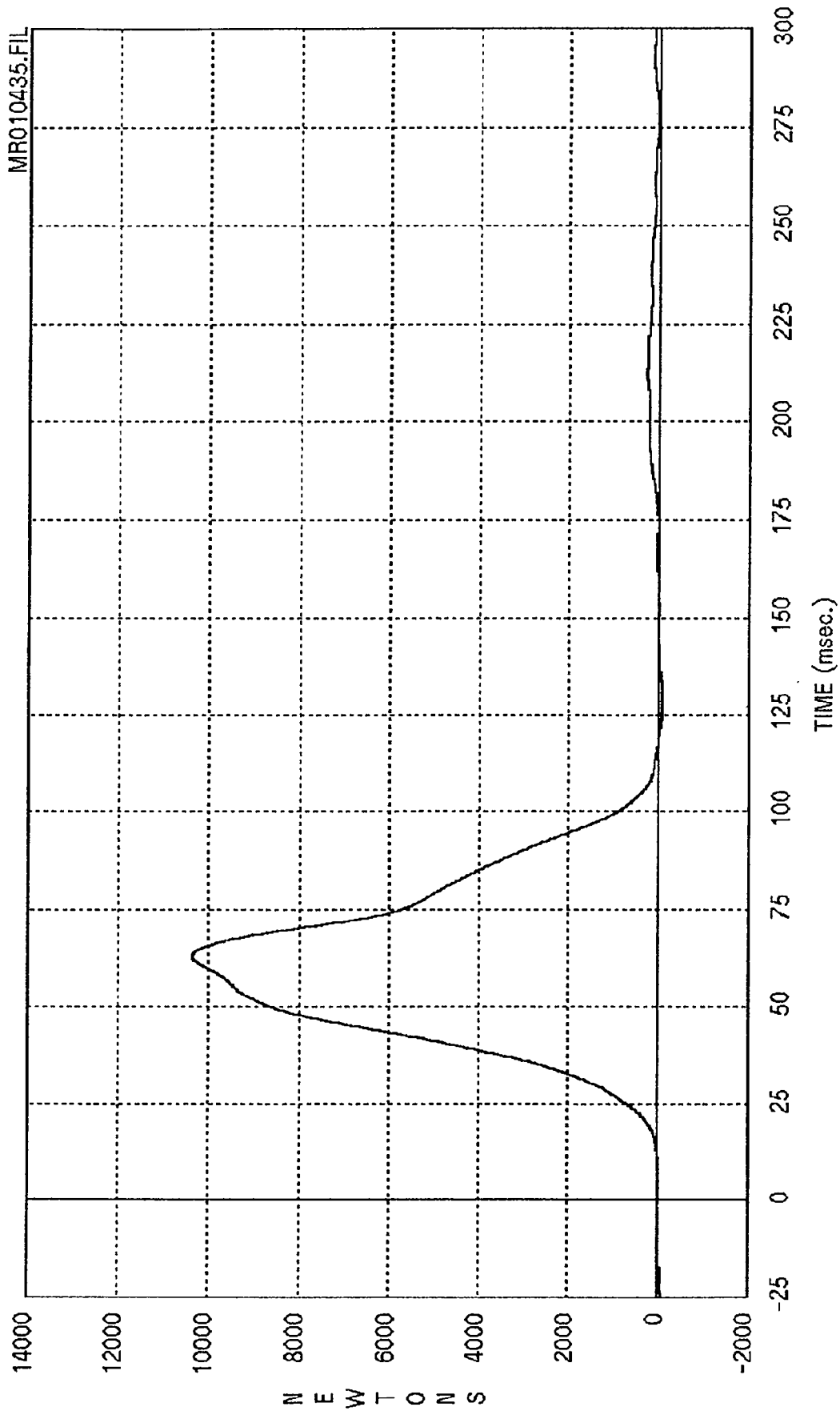
MSE Date: 02/16/94 Program: 1994 New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010434.FIL



Curve: Passenger chest displacement (No data) Filter: SAE CLASS 180 Max = .00000 Min = .00000

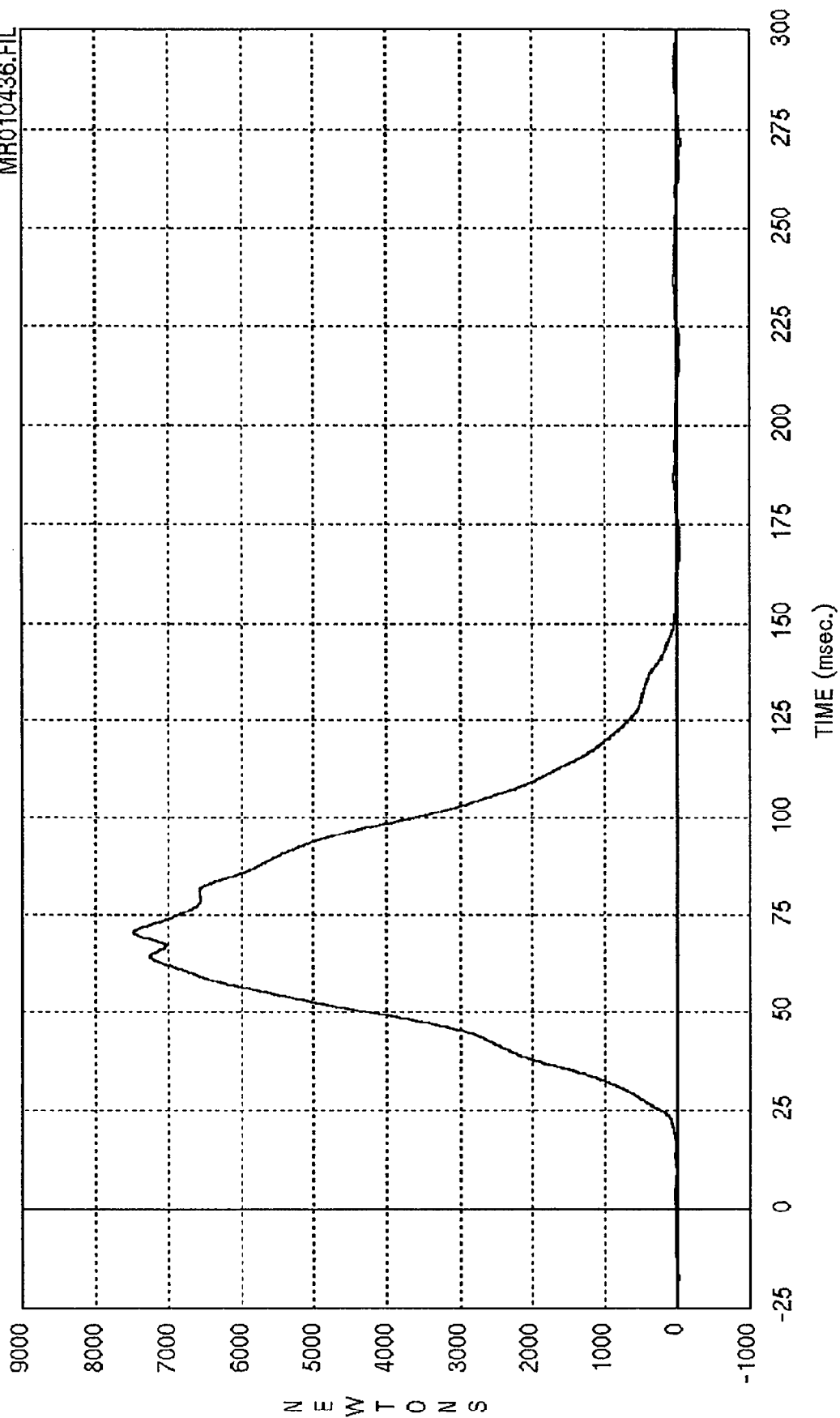
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Passenger lap belt load Filter: SAE CLASS 60 Max = 10357. Min = -81.006

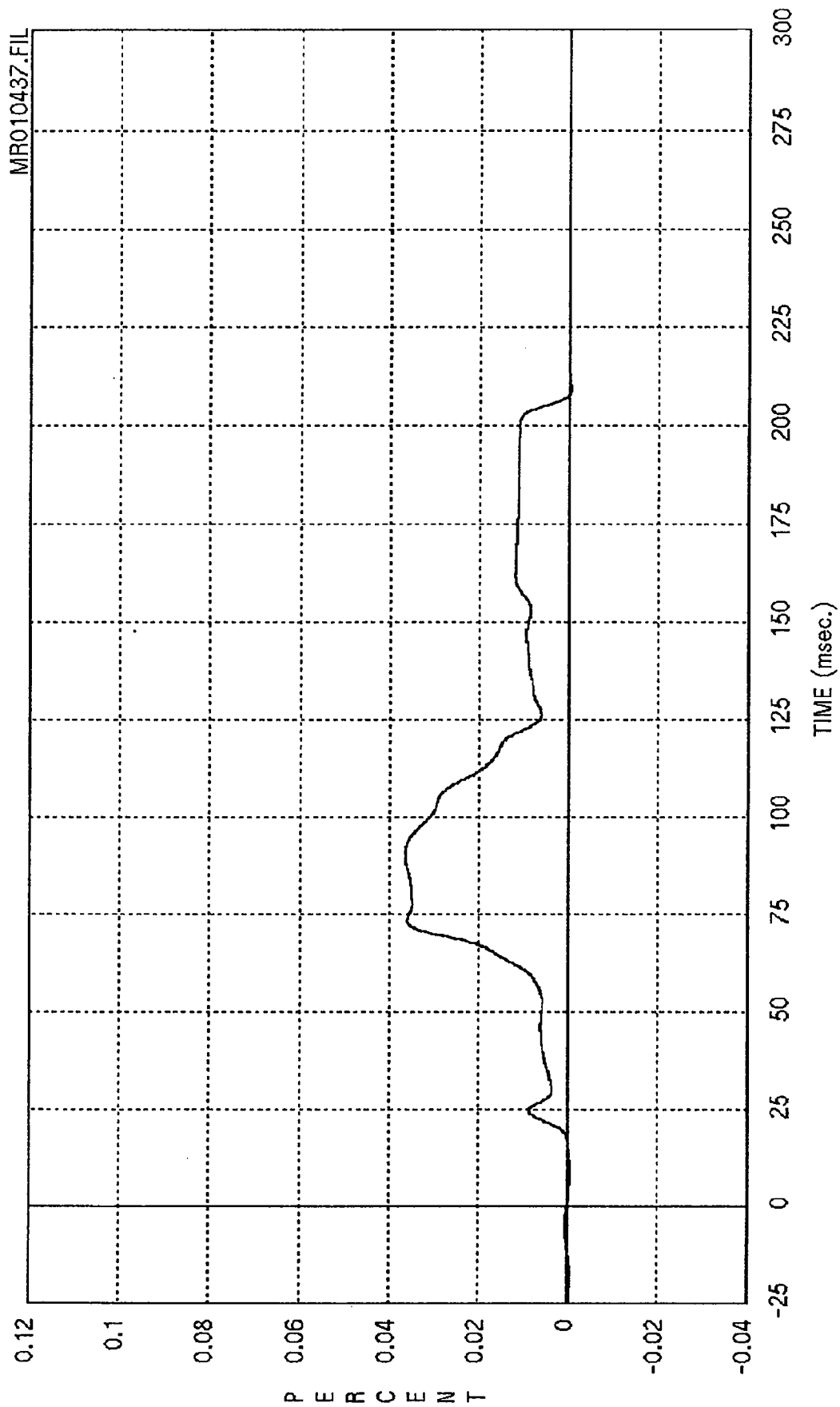
MSE Date: 02/16/94 Program: 1994 New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010436.FIL



Curve: Passenger shoulder belt load Filter: SAE CLASS 60 Max = 7479.7 Min = -45.001

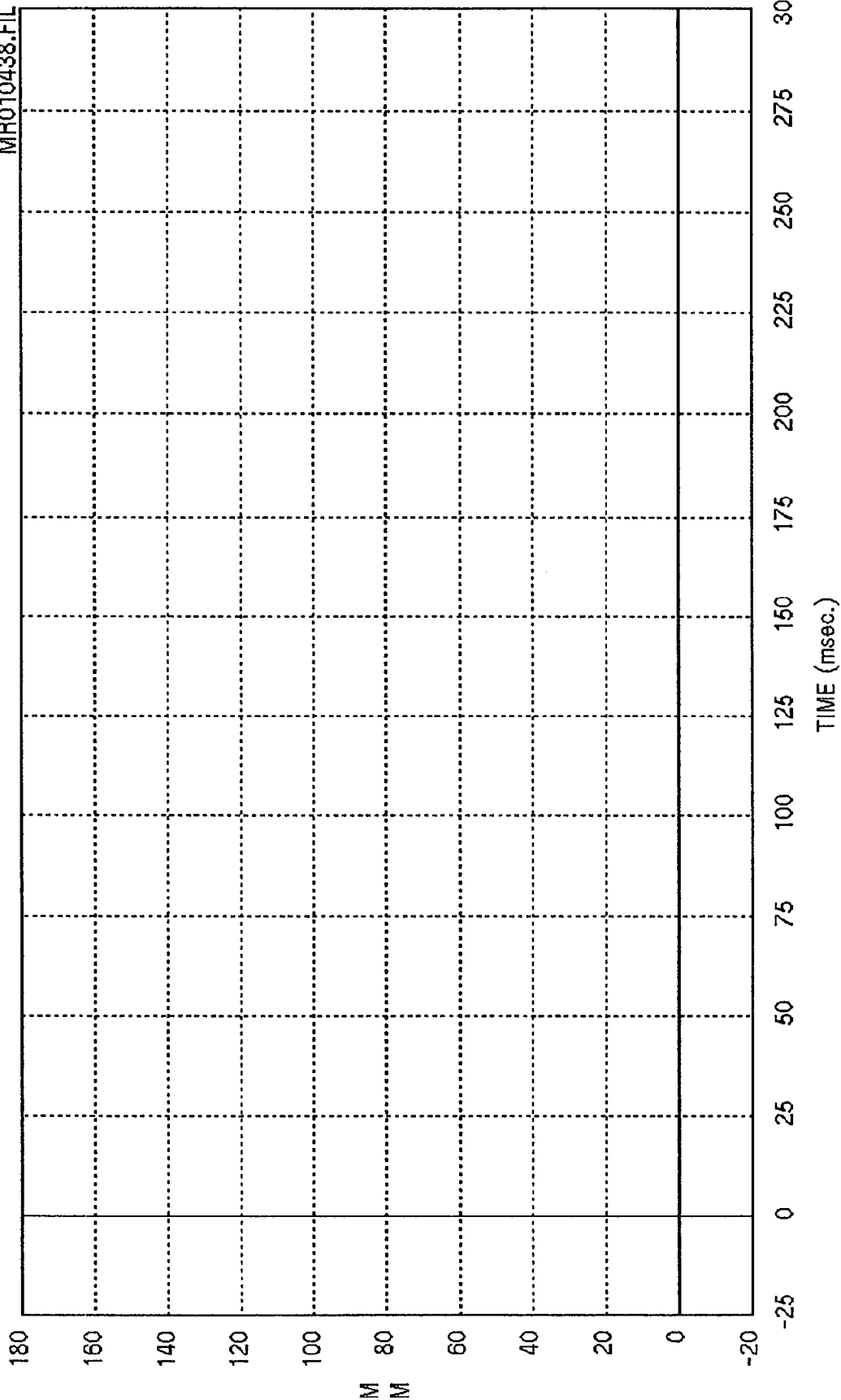
MSE Date: 02/16/94 Program: 1994 New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Passenger shoulder belt elongation Filter: SAE CLASS 60 Max = .36623E-01 Min = -.45433E-03

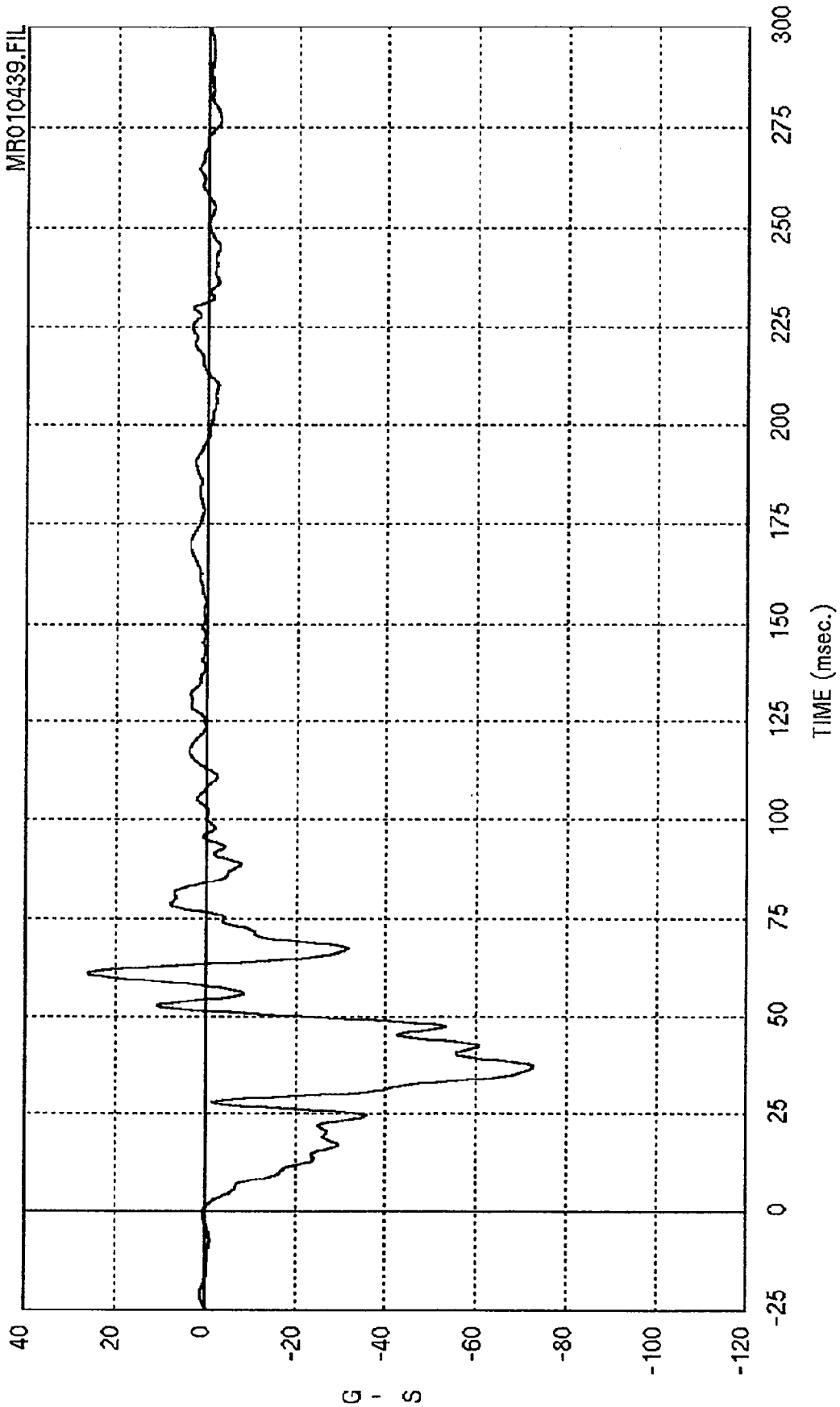
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010438.FIL



Curve: Passenger seat belt pullout (Not used) Filter: SAE CLASS 60 Max = .00000 Min = .00000

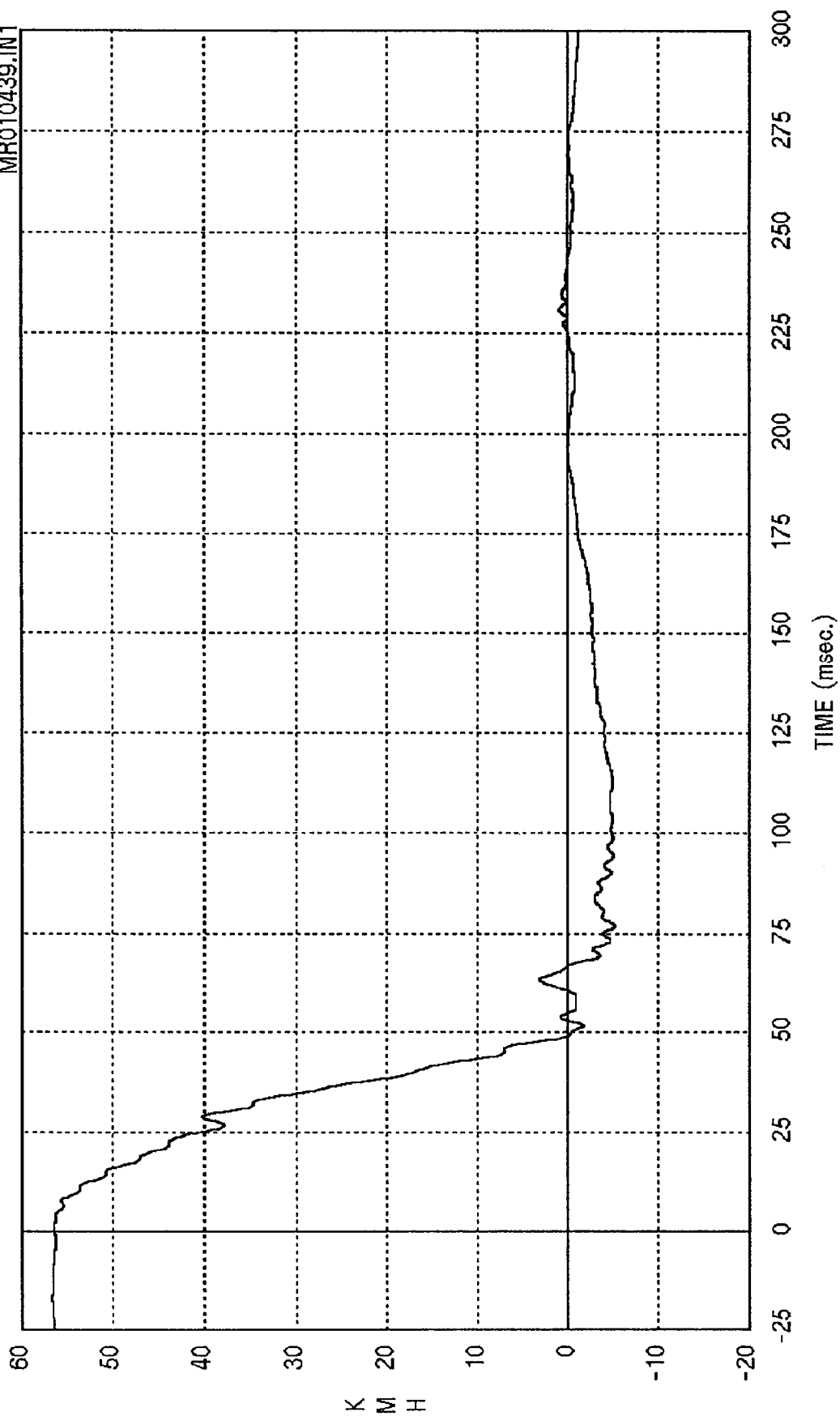
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Vehicle left front caliper accel. -- X axis Filter: SAE CLASS 60 Max = 26.345 Min = -72.685

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

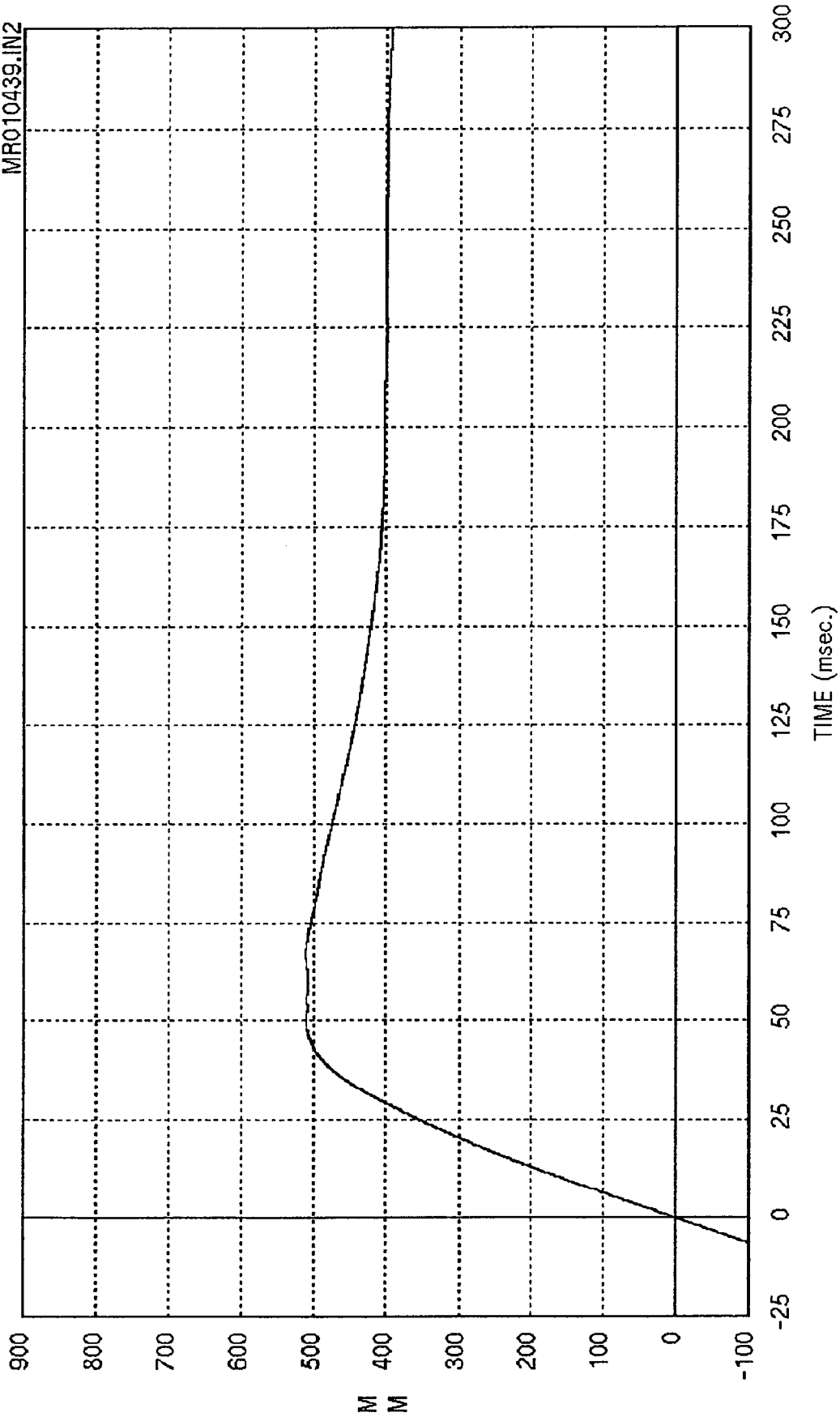
MR010439.IN1



Curve: Vehicle left front caliper -- delta V Filter: SAE CLASS 180 Max = 56.473 Min = -5.2838

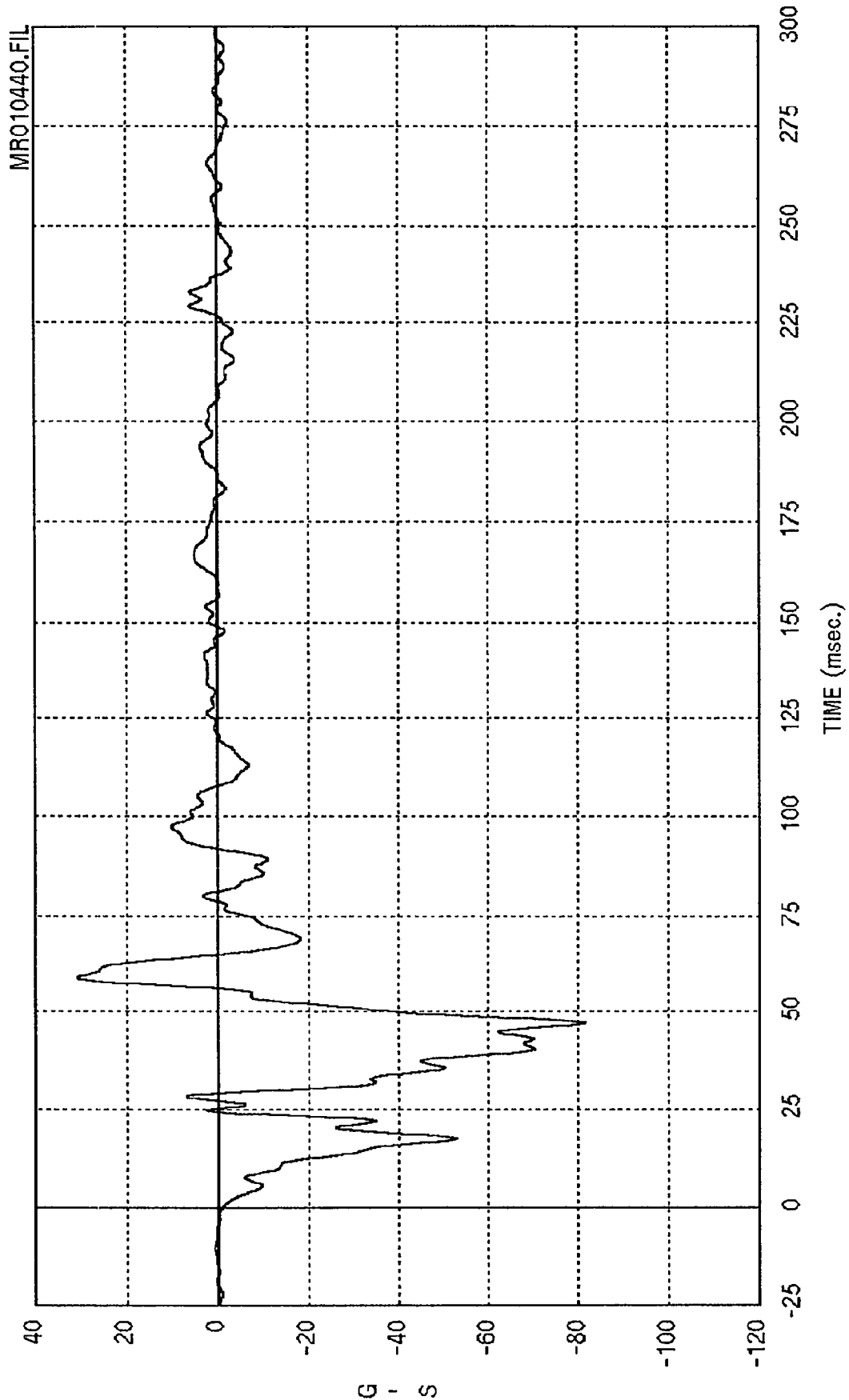
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010439.IN2



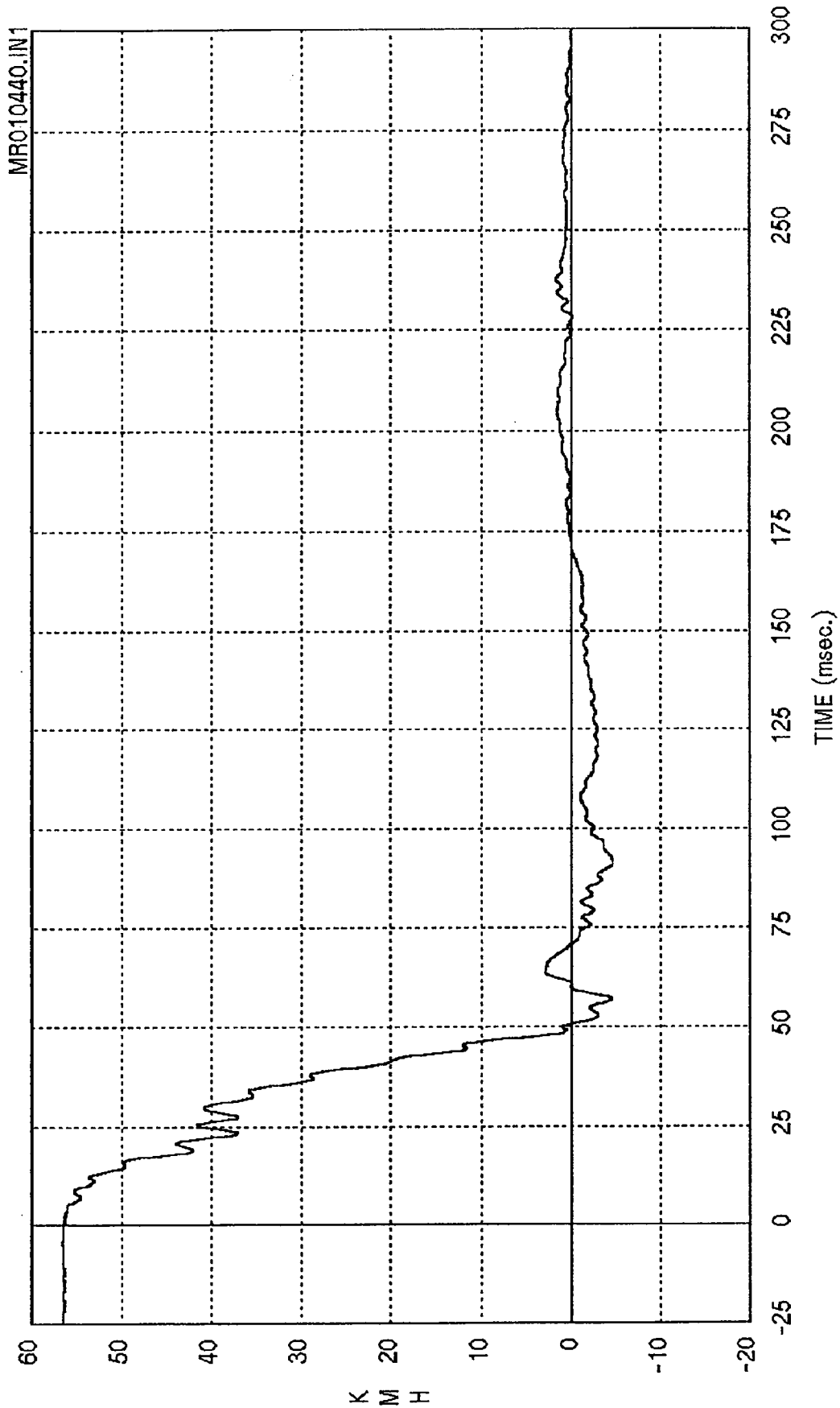
Curve: Vehicle left front caliper displacement - X axis Filter: SAE CLASS 180 Max = 512.01 Min = 393.42

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



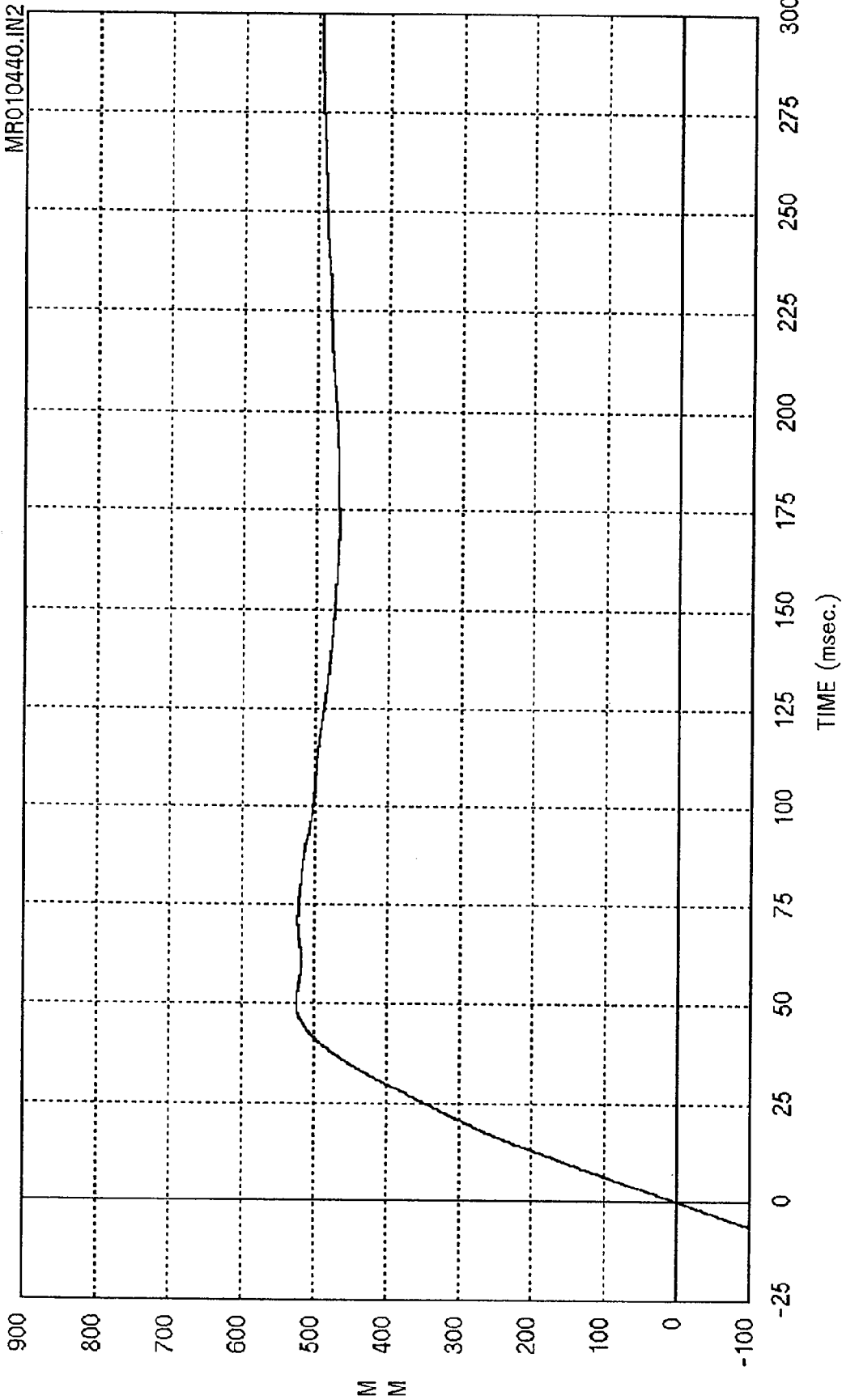
Curve: Vehicle right front calliper accel. -- X axis Filter: SAE CLASS 60 Max = 30.792 Min = -81.530

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



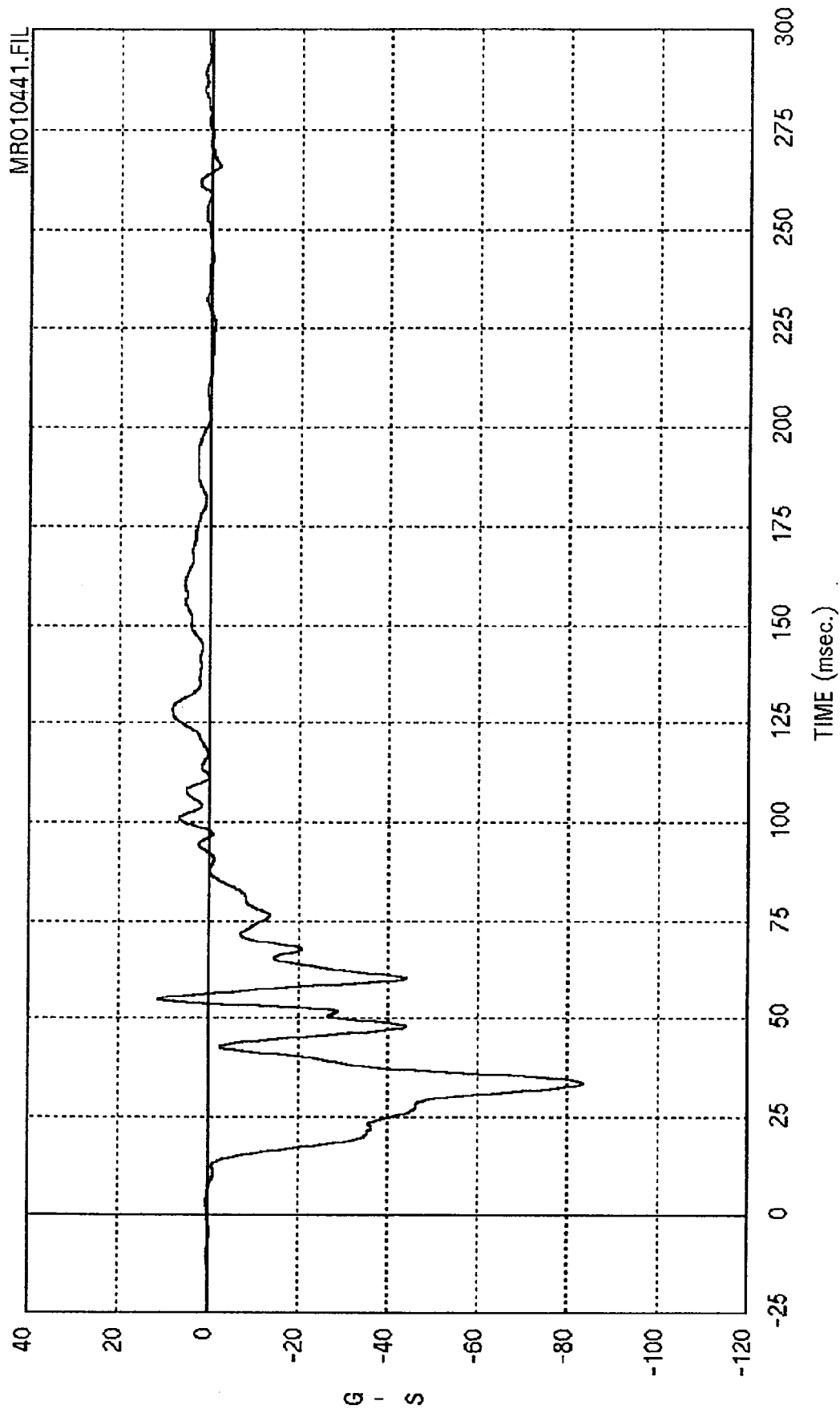
Curve: Vehicle right front caliper -- delta V Filter: SAE CLASS 180 Max = 56.440 Min = -4.6047

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Vehicle right front caliper displacement - X axis Filter: SAE CLASS 180 Max = 524.97 Min = 469.36

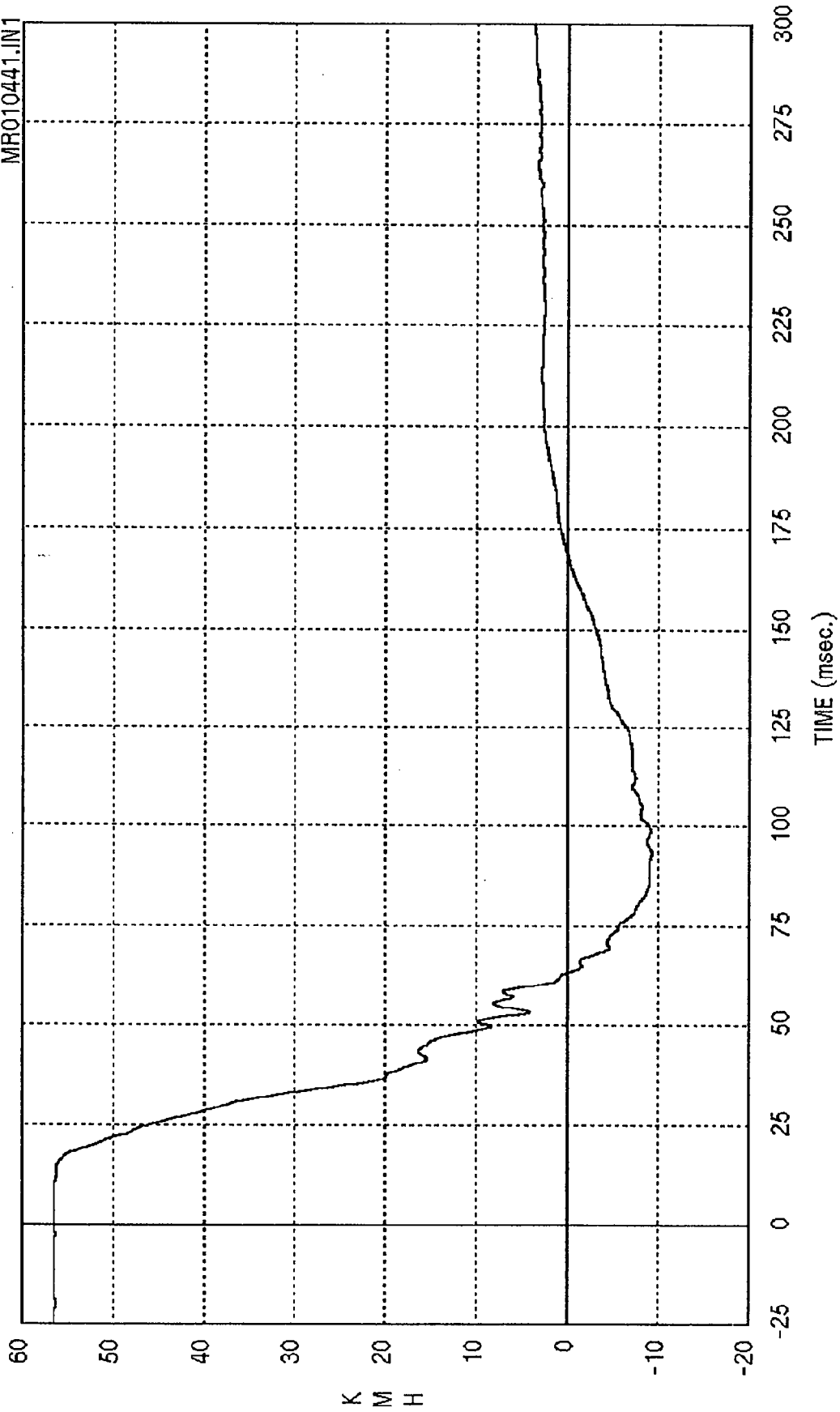
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Vehicle engine bottom acceleration -- X axis: Filter: SAE CLASS 60 Max = 11.440 Min = -83.487

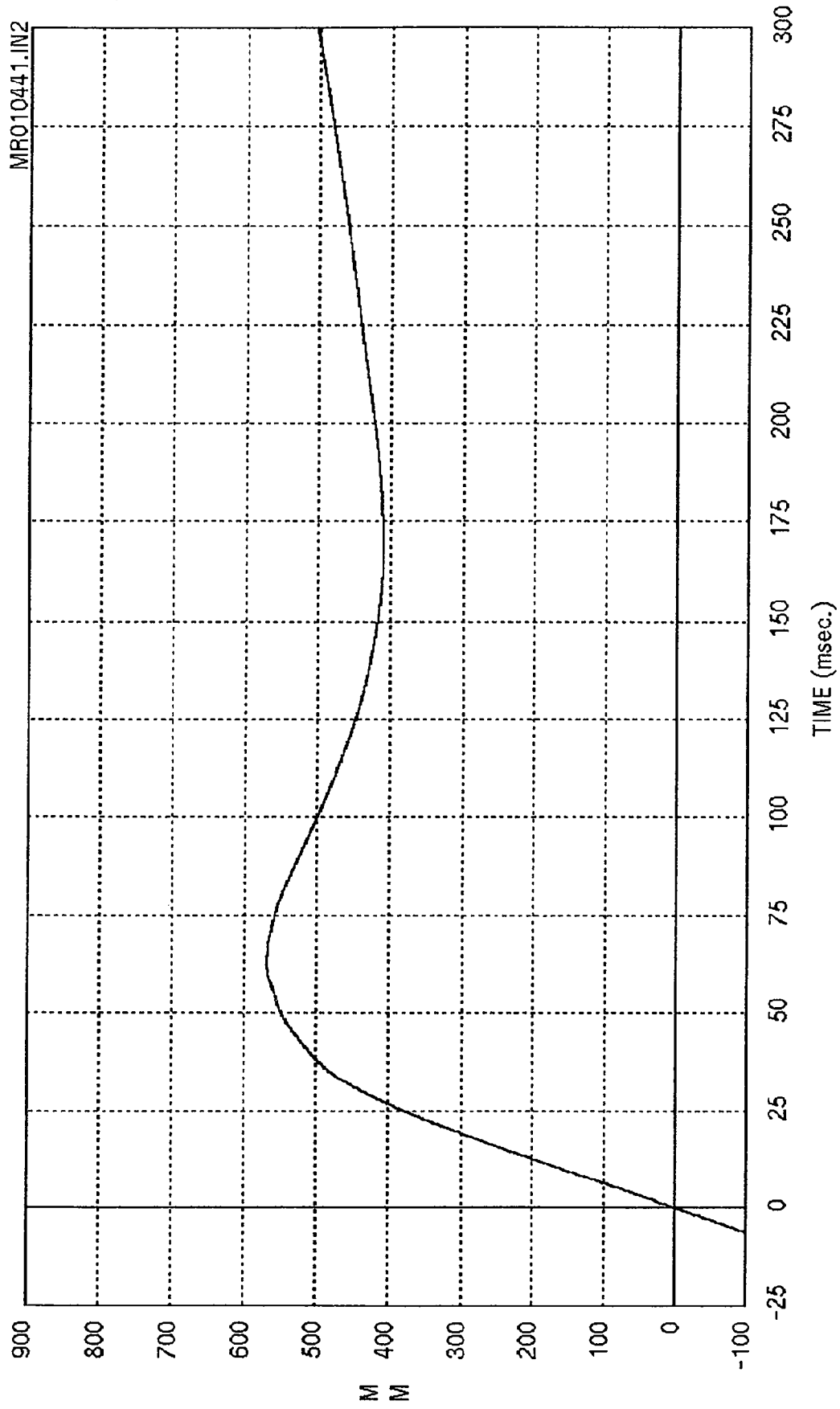
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010441.IN1



Curve: Vehicle engine bottom -- delta V Filter: SAE CLASS 180 Max = 56.524 Min = -9.2436

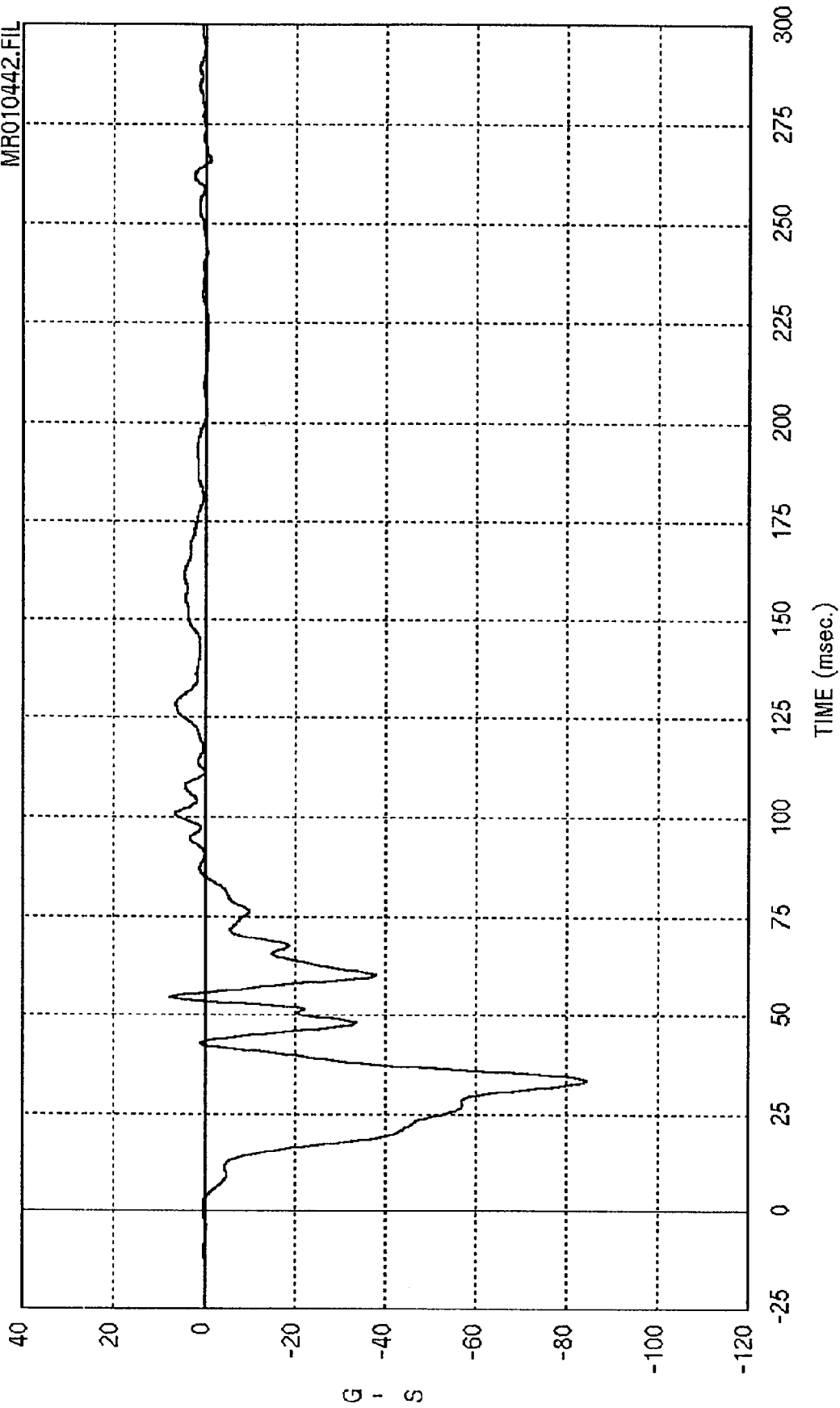
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Vehicle engine bottom displacement -- X axis Filter: SAE CLASS 180 Max = 569.67 Min = 410.88

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

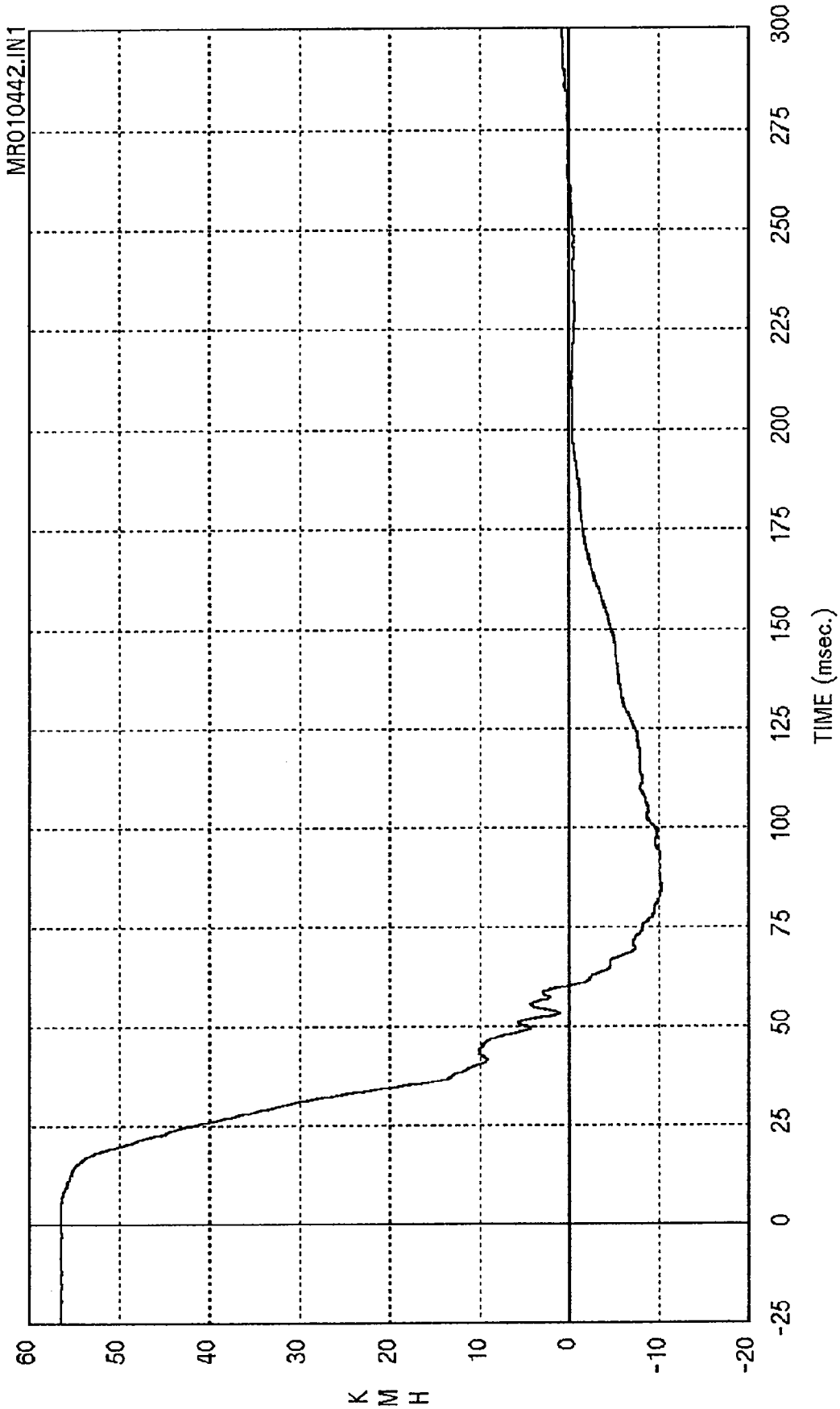
MR010442.FIL



Curve: Vehicle engine top acceleration

Filter: SAE CLASS 60 Max = 7.4198 Min = -84.225

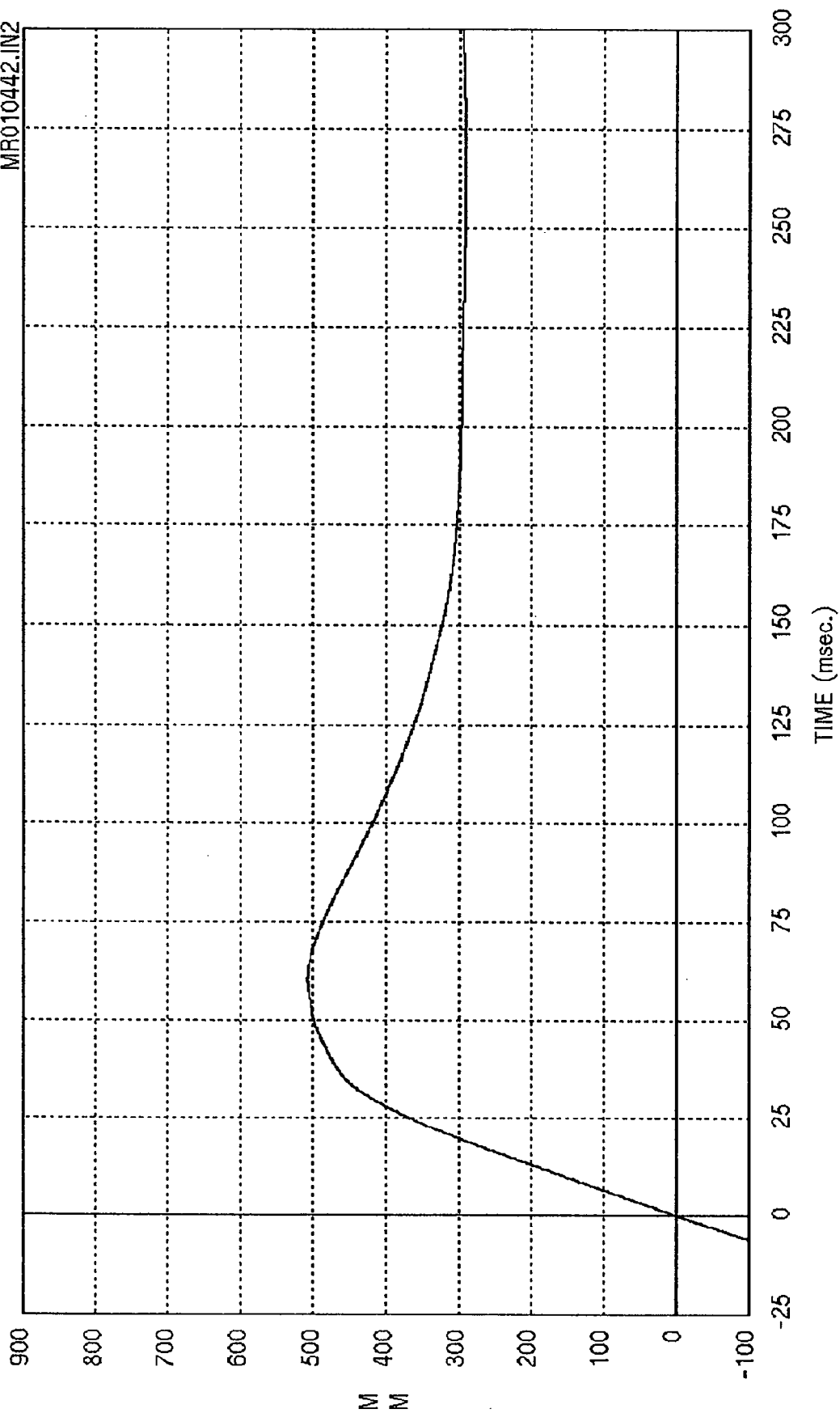
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Vehicle engine top -- delta V Filter: SAE CLASS 180 Max = 56.478 Min = -10.204

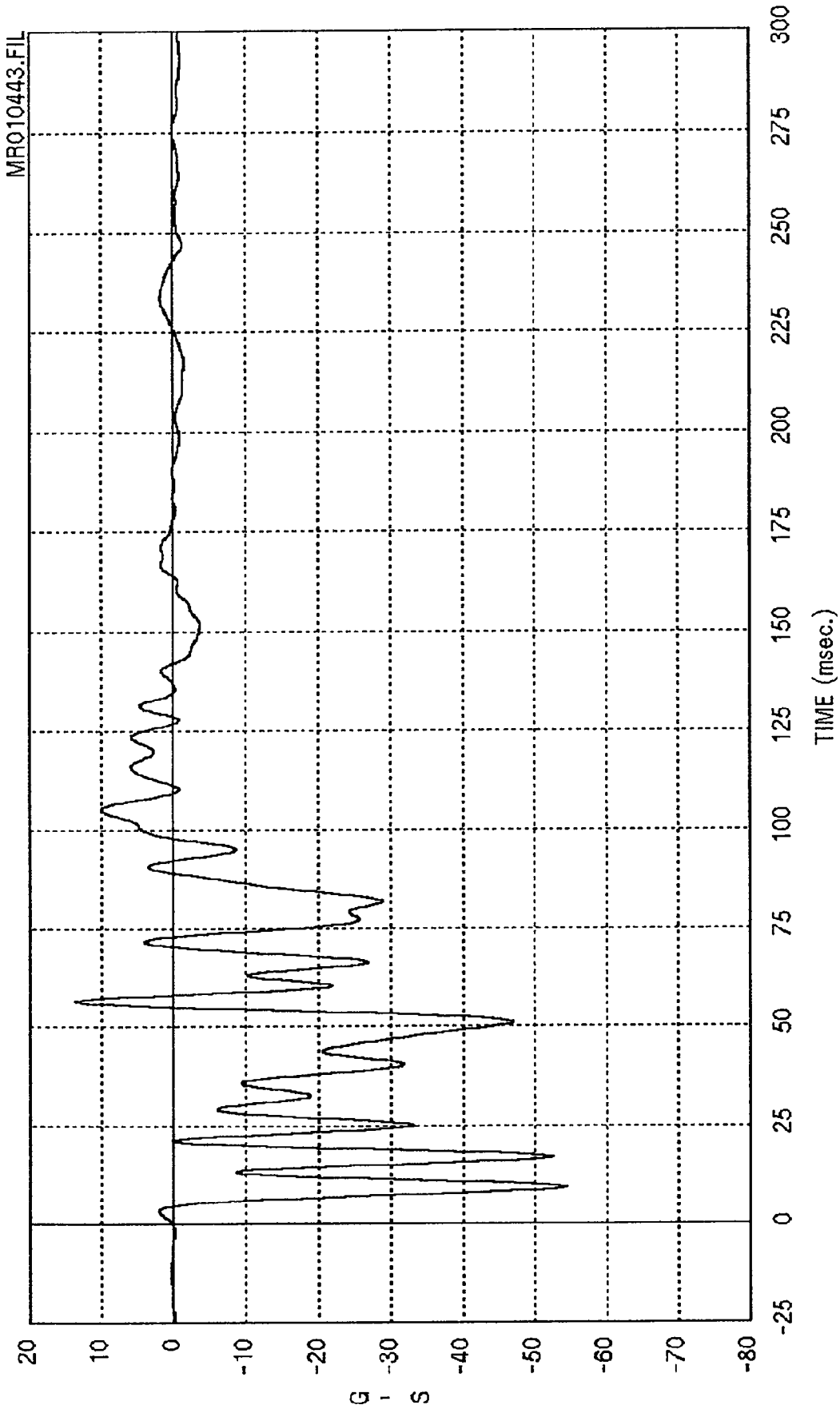
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010442.IN2



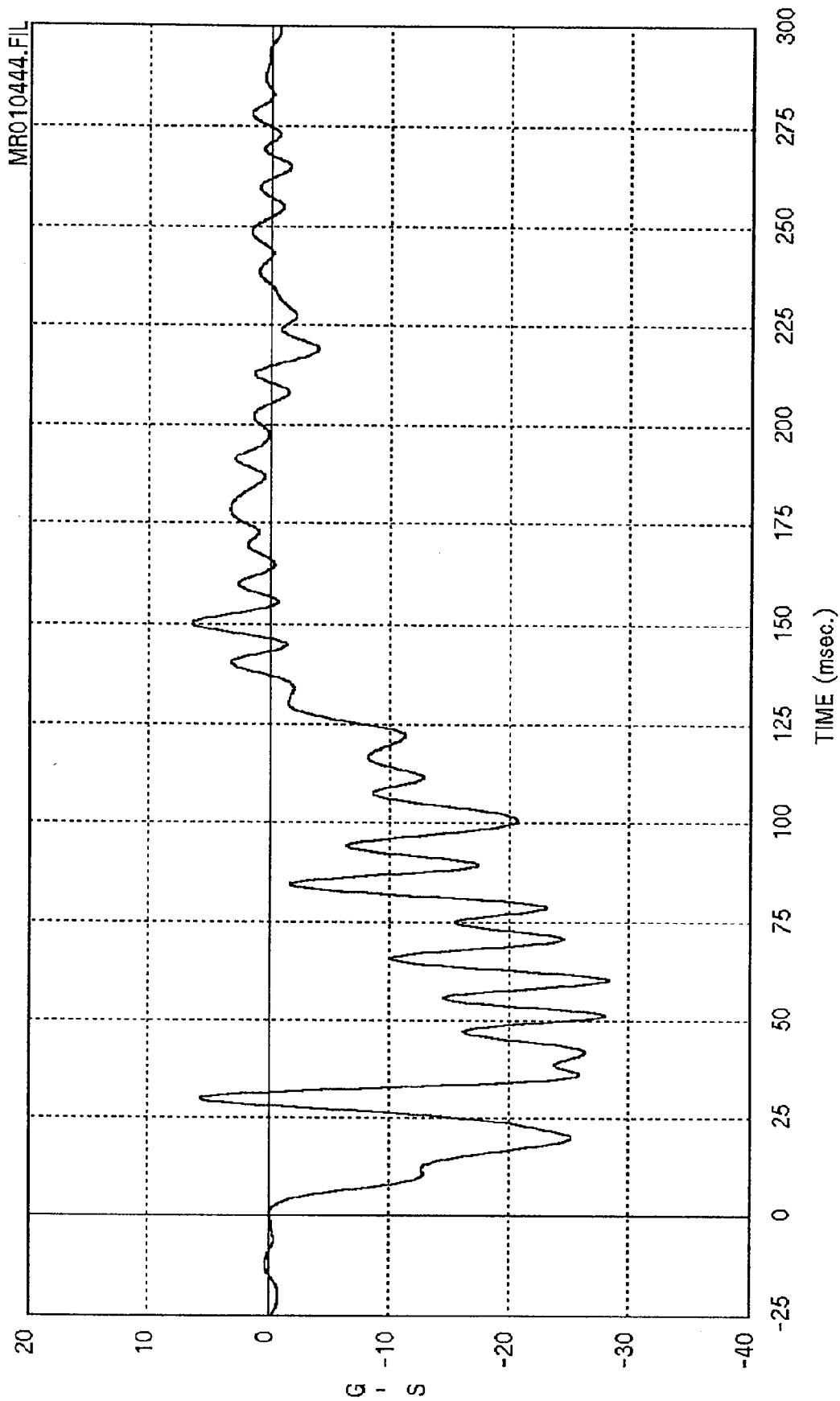
Curve: Vehicle engine top displacement -- X axis Filter: SAE CLASS 180 Max = 508.54 Min = 290.76

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



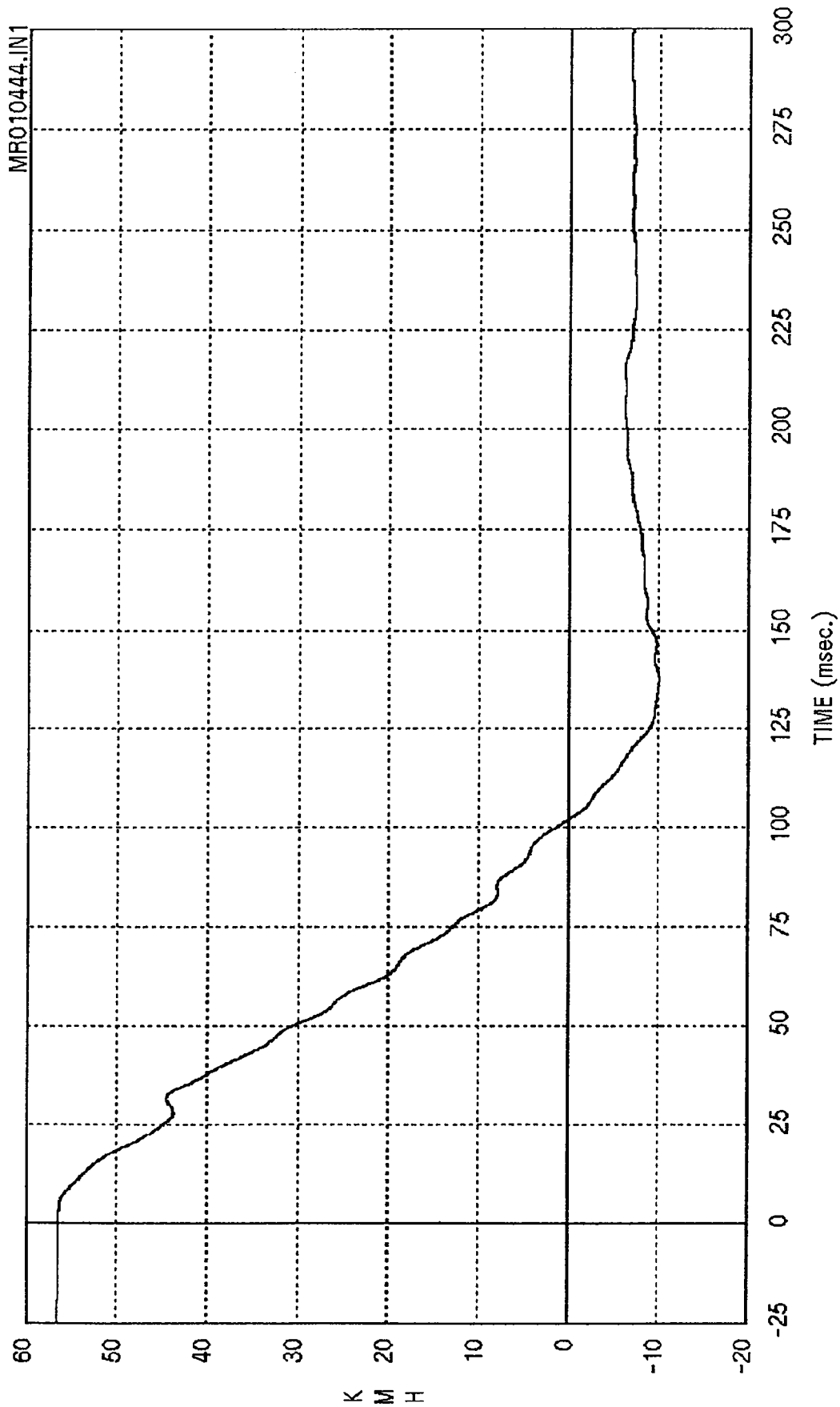
Curve: Vehicle Instrument panel acceleration Filter: SAE CLASS 60 Max = 13.721 Min = -54.512

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Vehicle left rear X-member accel.(Pri) - X axis Filter: SAE CLASS 60 Max.= 6.4294 Min = -28.264

MSE Date: 02/16/94 Program:1994 New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Vehicle left rear X-member -- delta V (Pri.) Filter: SAE CLASS 180 Max = 56.451 Min = -10.094

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MRC10444.IN2

900

800

700

600

500

400

300

200

100

0

-100

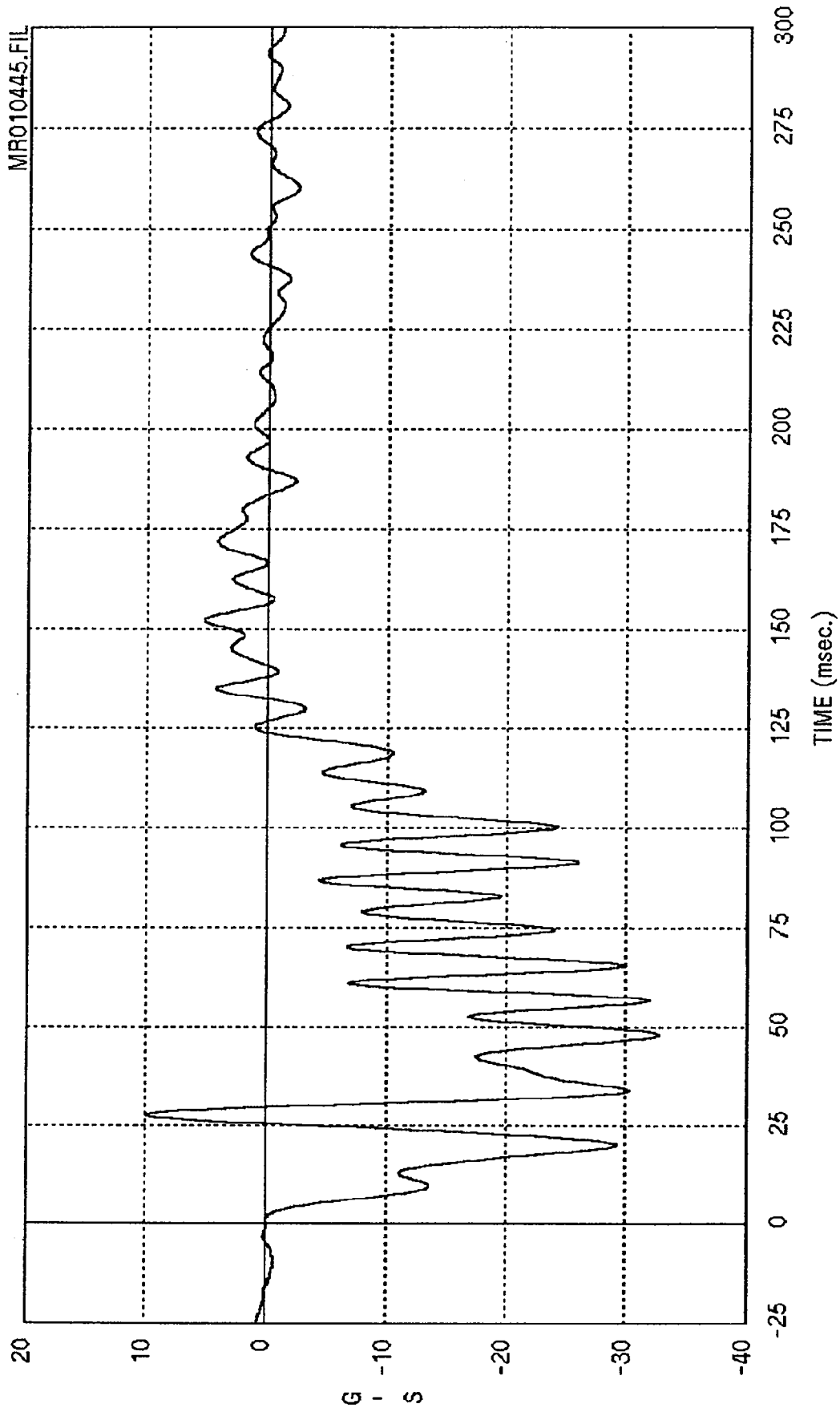
M
M

-25 0 25 50 75 100 125 150 175 200 225 250 275 300

TIME (msec.)

Curve: Vehicle left rear X-member - displacement (Pri.) Filter: SAE CLASS 180 Max = 832.69 Min = 435.66

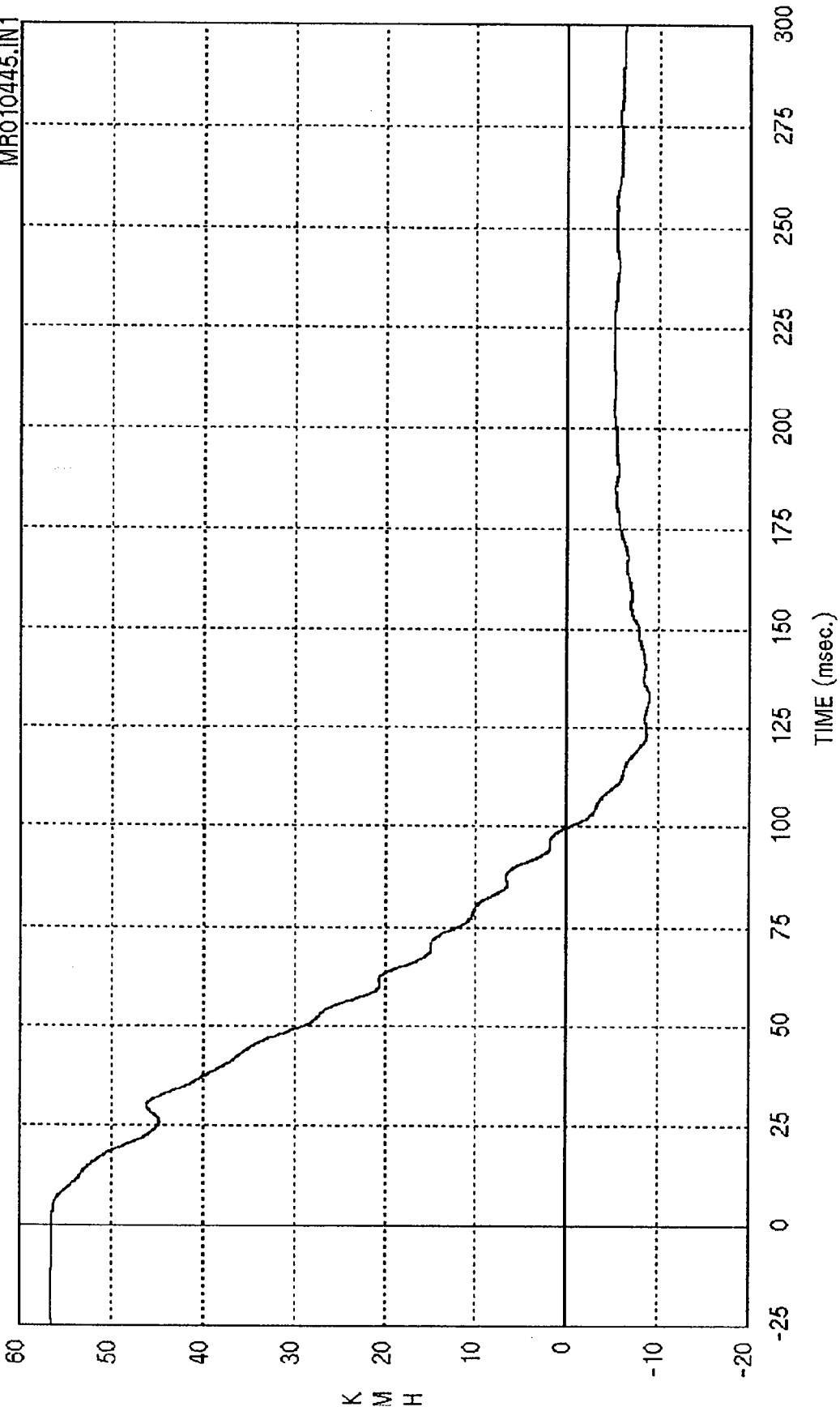
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Vehicle right rear X-member accel.(Pri) - X axis Filter: SAE CLASS 60 Max = 10.101 Min = -32.682

MSE Date: 02/16/94 Program: 1994 New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

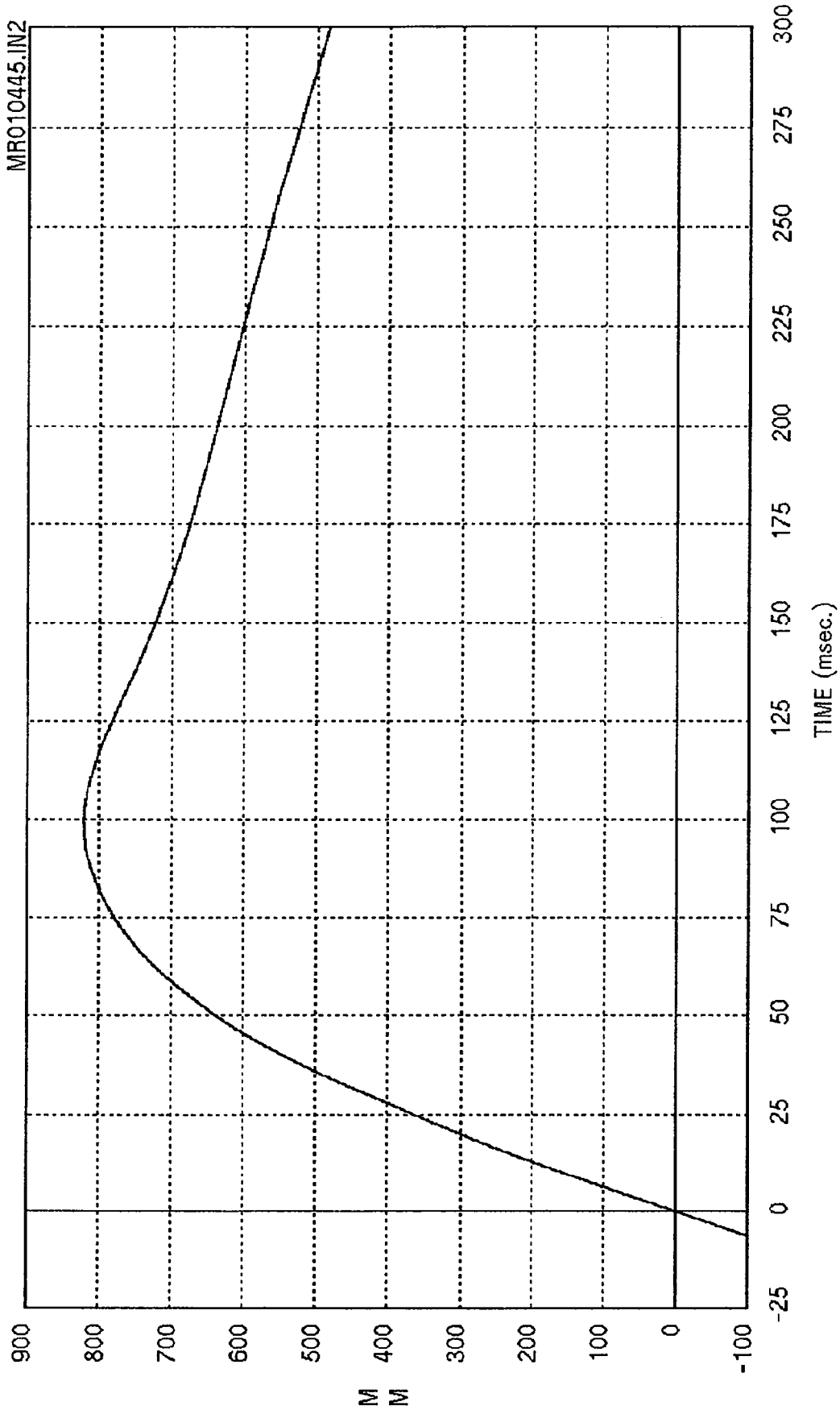
MR010445.IN1



Curve: Vehicle right rear X-member -- delta V (Pri.) Filter: SAE CLASS 180 Max = 56.445 Min = -9.0320

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

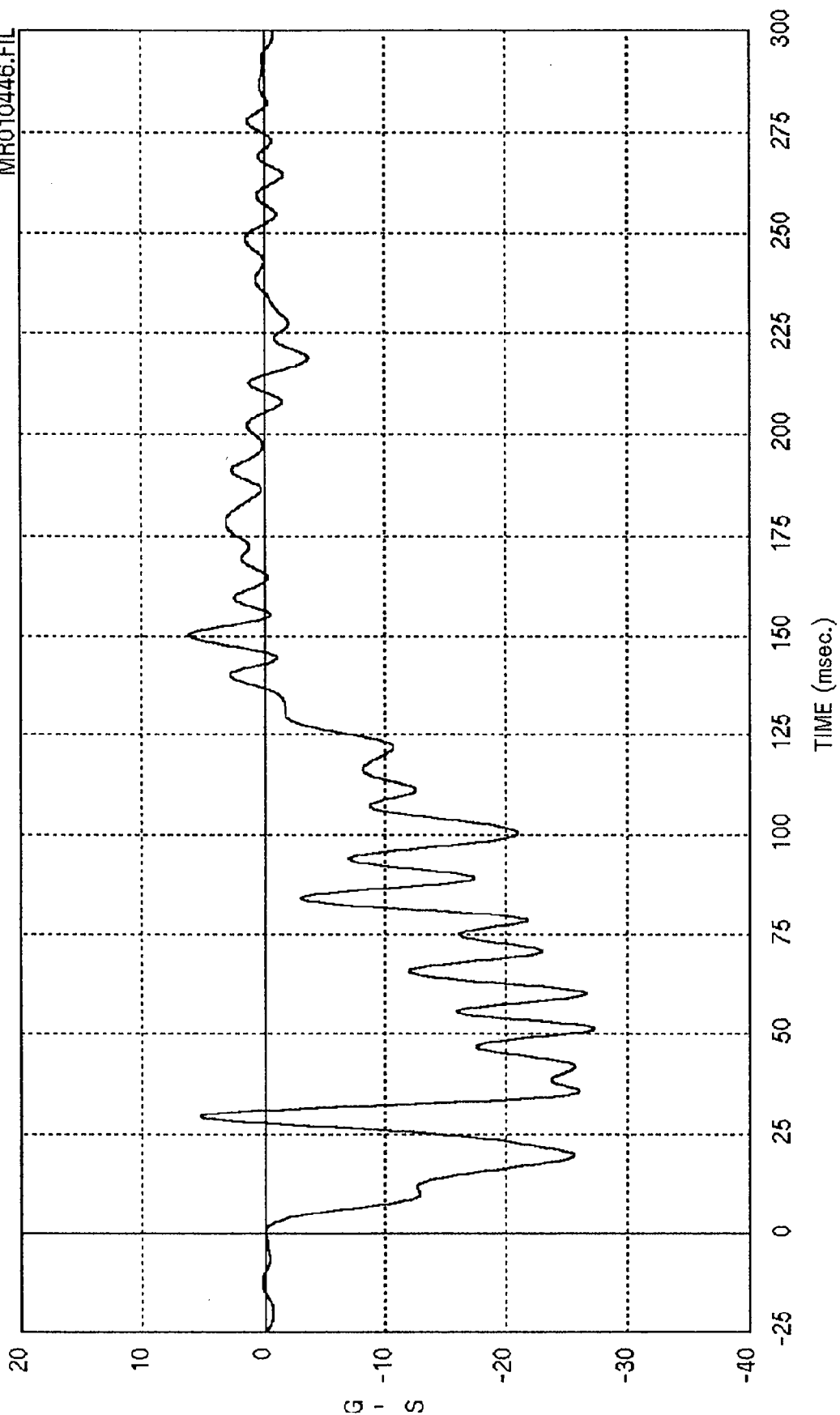
MRO10445.IN2



Curve: Vehicle right rear X-member - displacement-(Pri.) Filter: SAE CLASS 180 Max = 821.48 Min = 484.35

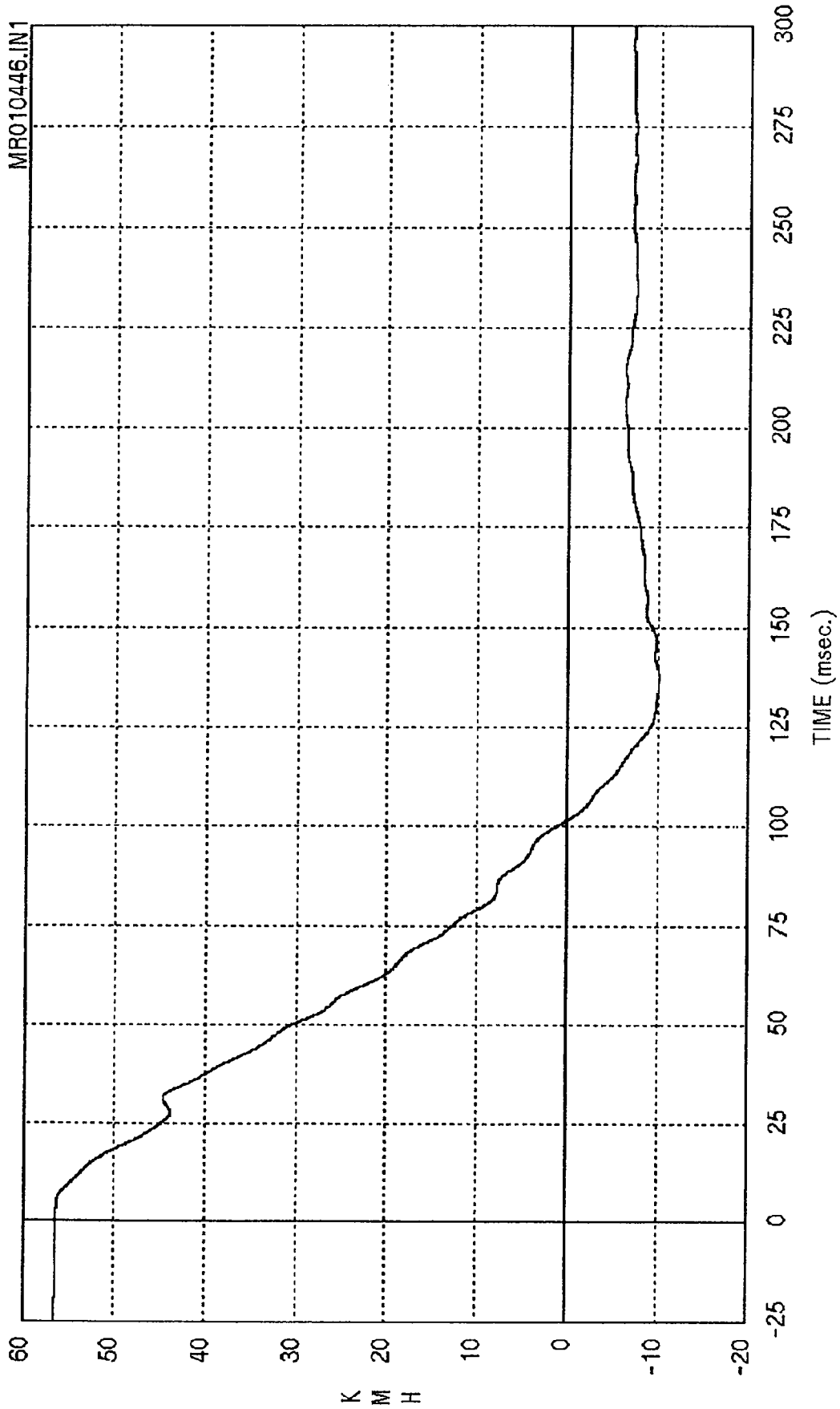
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010446.FIL



Curve: Vehicle left rear X-member acceleration (Sec.) Filter: SAE CLASS 60 Max = 6.1539 Min = -27.323

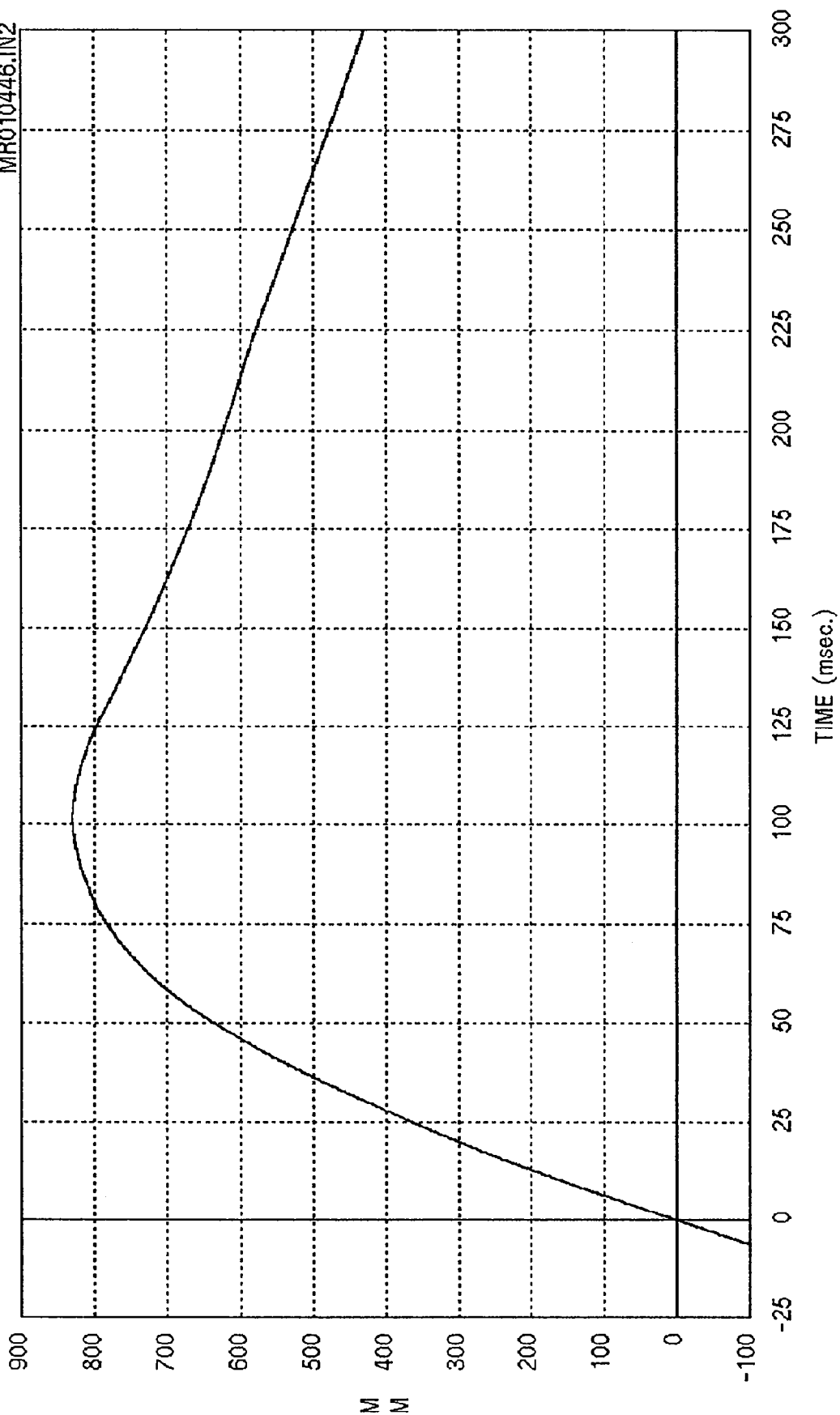
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Vehicle left rear X-member -- delta V (Sec.) Filter: SAE CLASS 180 Max = 56.450 Min = -10.069

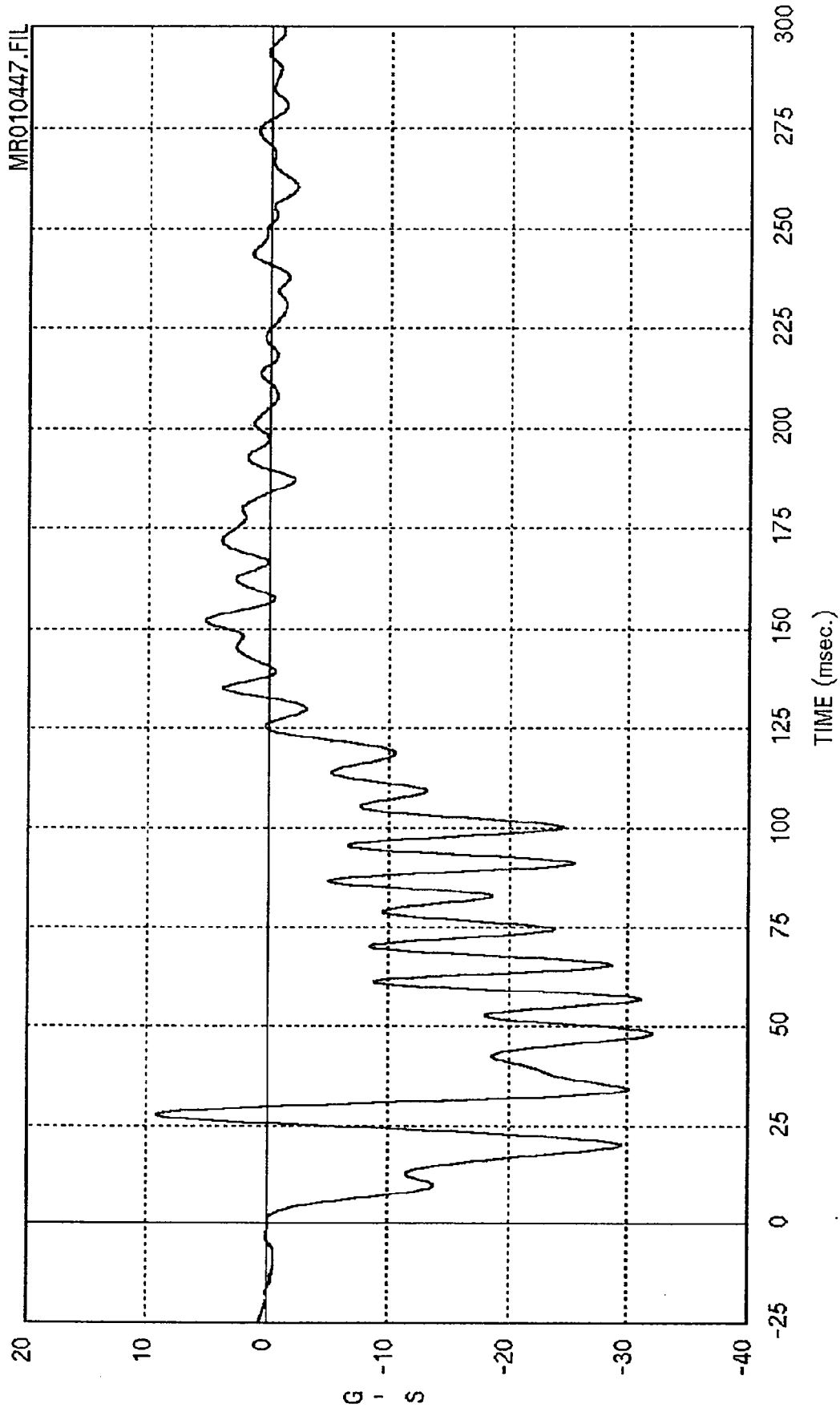
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010446.IN2



Curve: Vehicle left rear X-member - displacement (Sec.) Filter: SAE CLASS 180 Max = 830.13 Min = 431.79

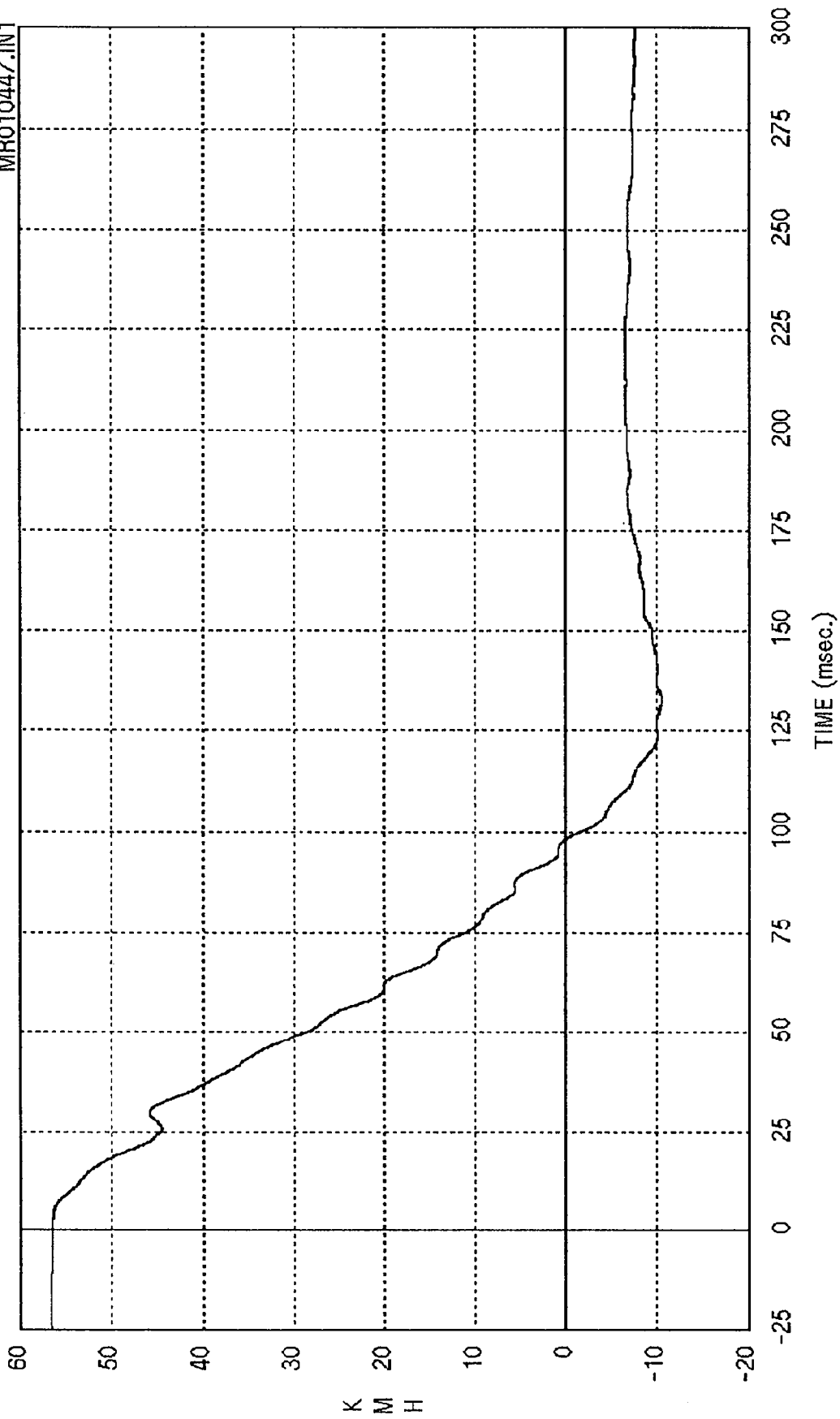
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Vehicle right rear X-member acceleration (Sec.) Filter: SAE CLASS 60 Max = 9.2899 Min = -32.027

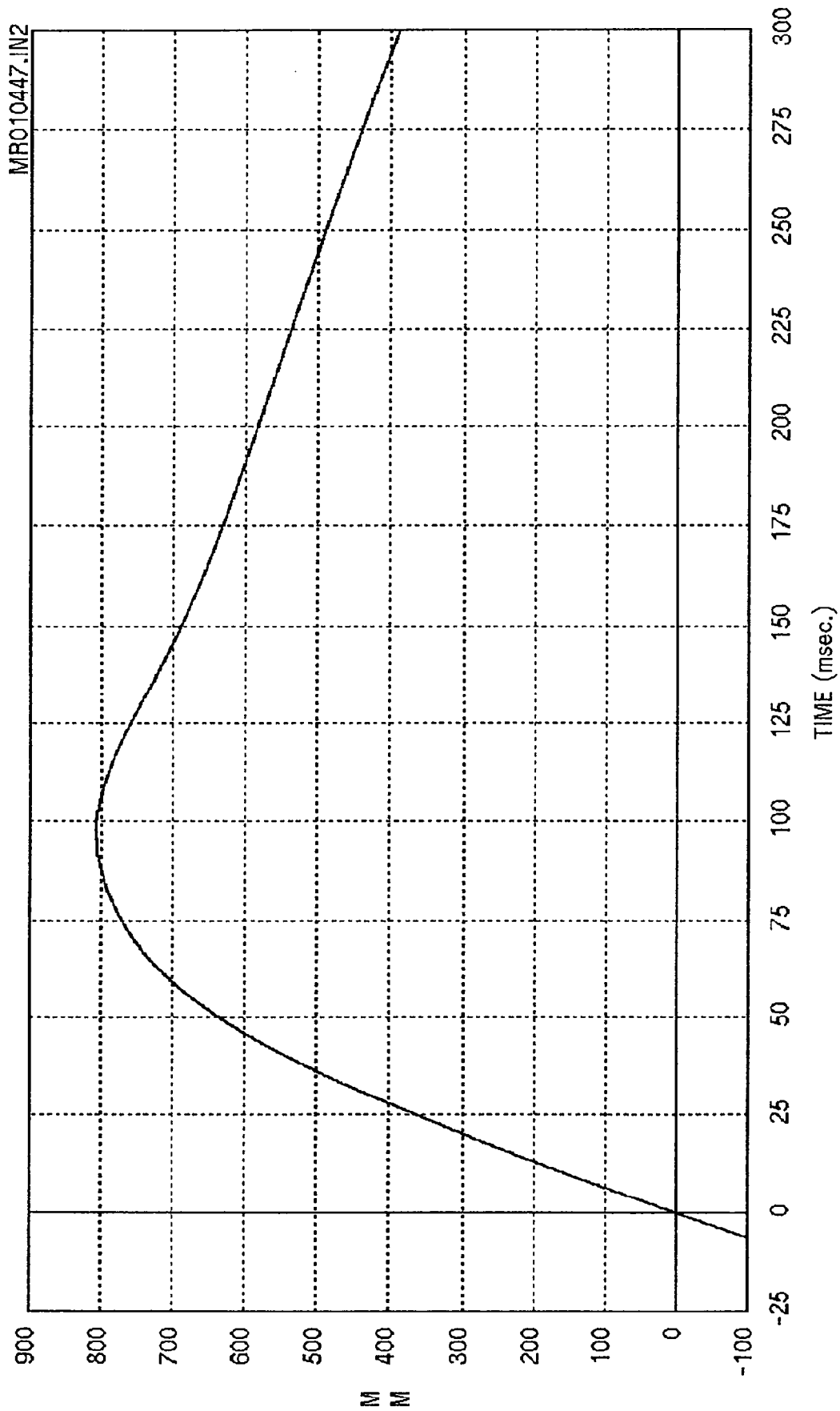
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010447.IN1



Curve: Vehicle right rear X-member -- delta V (Sec.) Filter: SAE CLASS 180 Max = 56.445 Min = -10.518

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



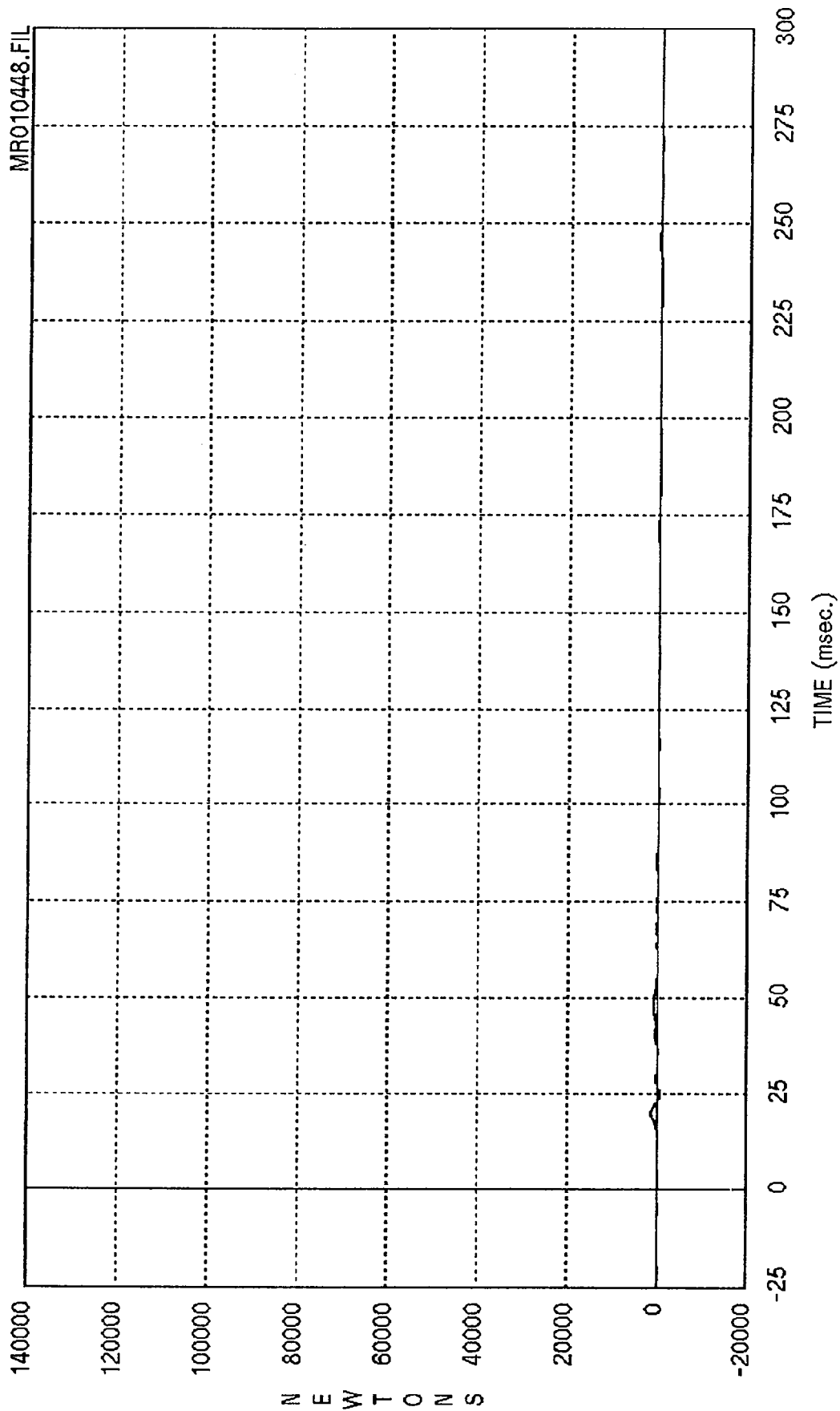
Curve: Vehicle right rear X-member - displacement (Sec.) Filter: SAE CLASS:180 Max = 806.71 Min = 388.80

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

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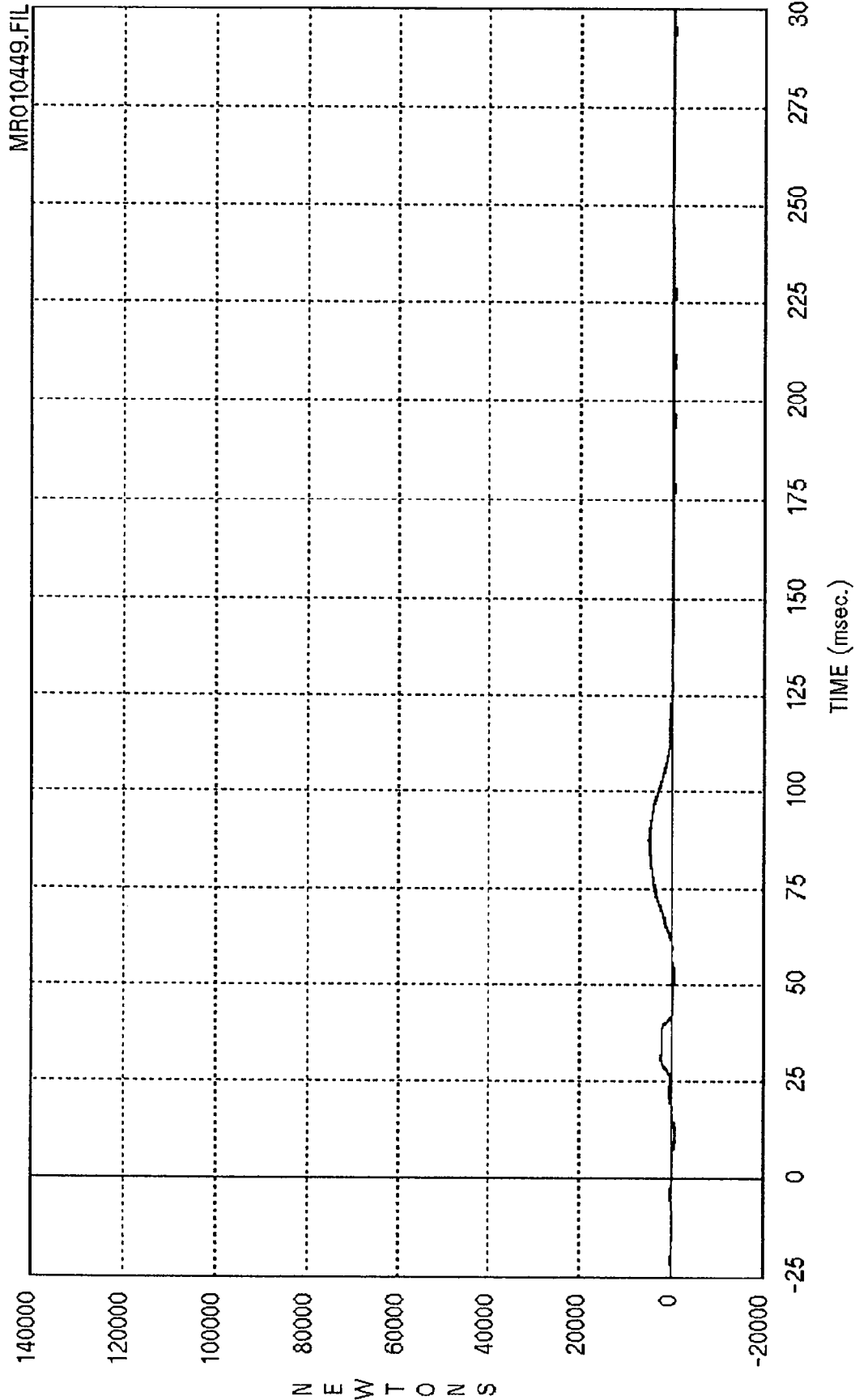
APPENDIX B - 2
LOAD CELL BARRIER DATA

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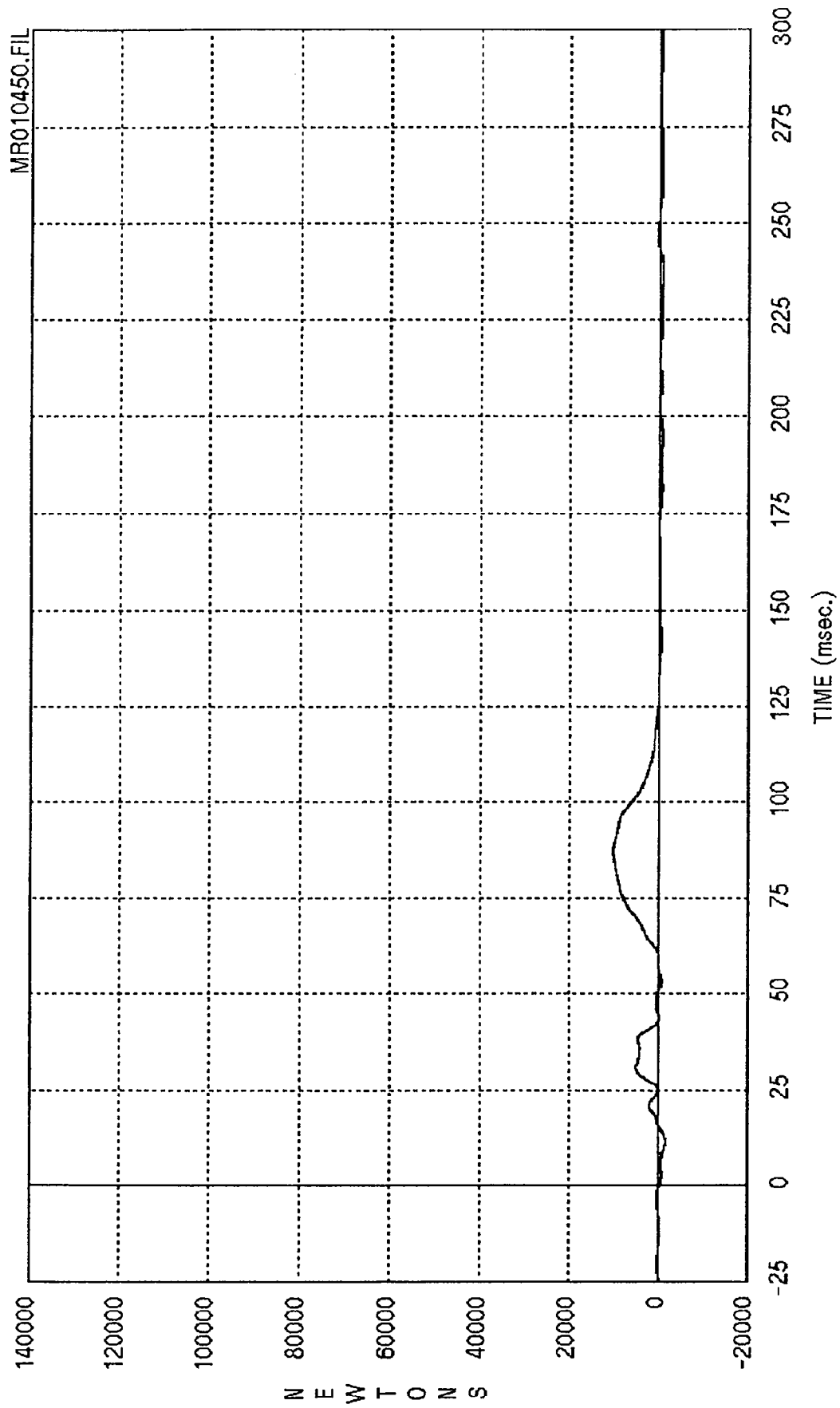
Curve: Force on barrier location A1 Filter: SAE CLASS 60 Max = 1384.5 Min = -543.05

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



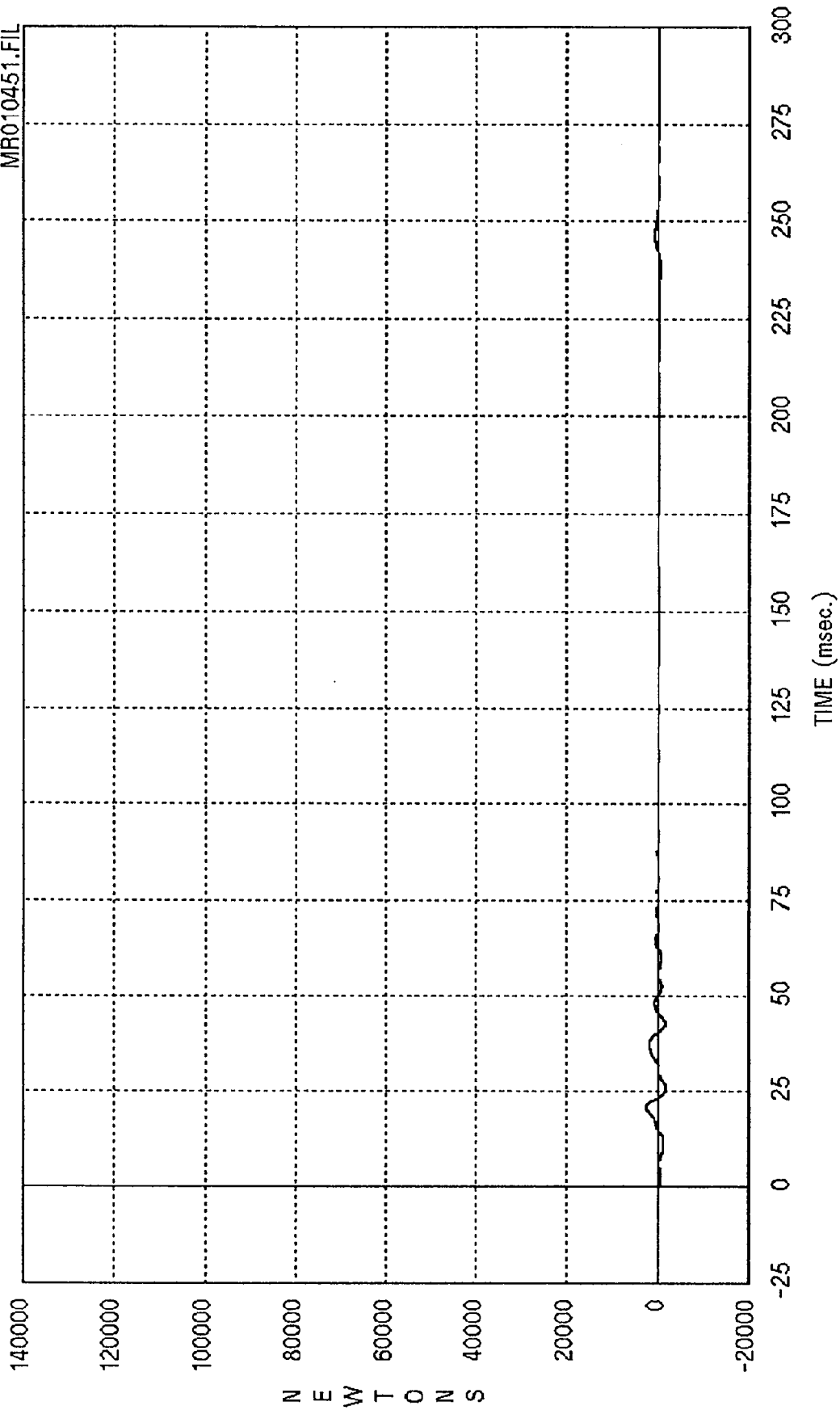
Curve: Force on barrier location A2 Filter: SAE CLASS 60 Max = 5085.0 Min = -772.98

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



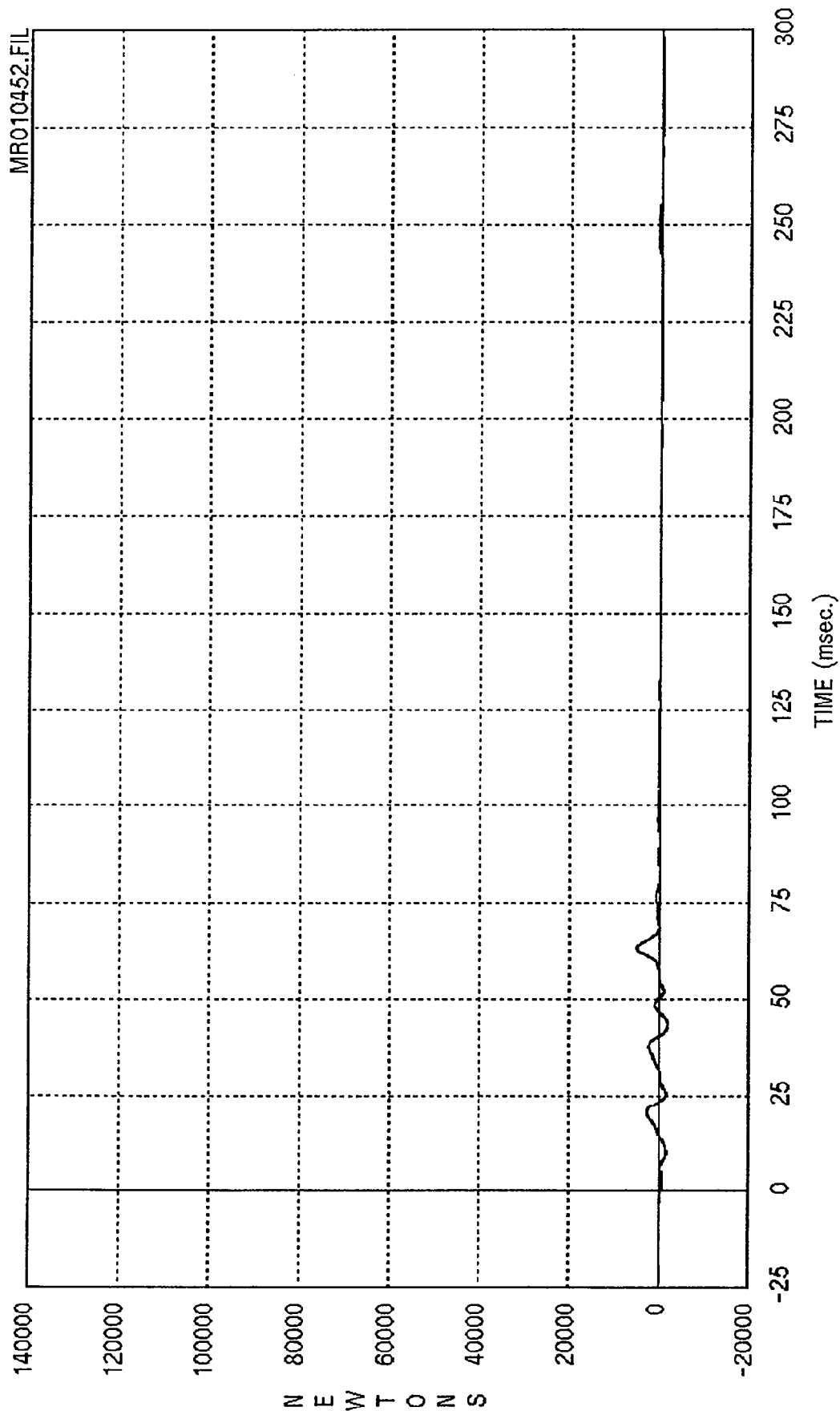
Curve: Force on barrier location A3 Filter: SAE CLASS 60 Max = 10282. Min = -1439.2
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010451.FIL



Curve: Force on barrier location A4 Filter: SAE CLASS 60 Max = 2738.1 Min = -1658.1

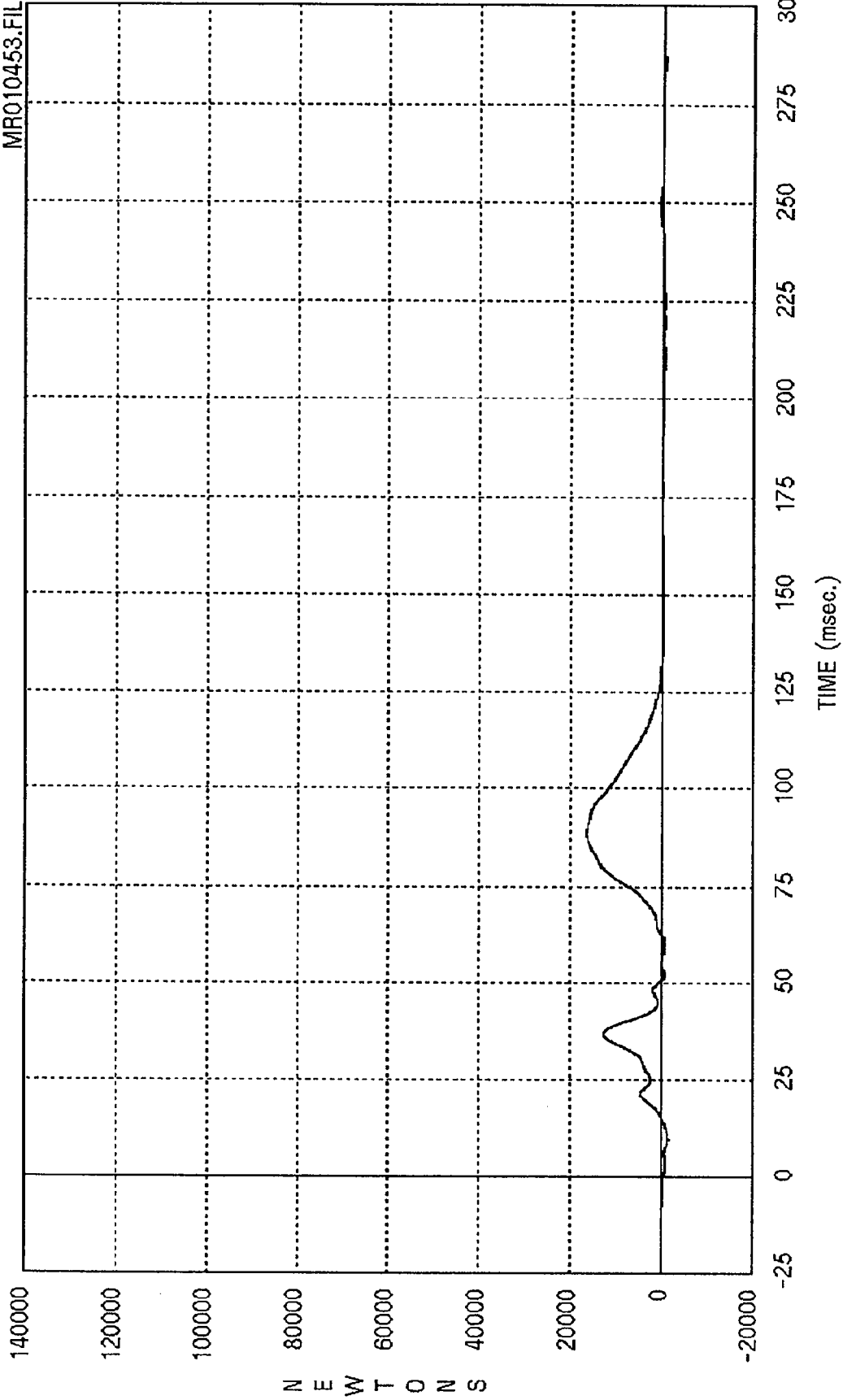
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Force on barrier location A5 Filter: SAE CLASS.60 Max = 5169.3 Min = -1820.1

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010453.FIL



Curve: Force-on barrier location A6

Filter: SAE CLASS 60

Max = 16534.

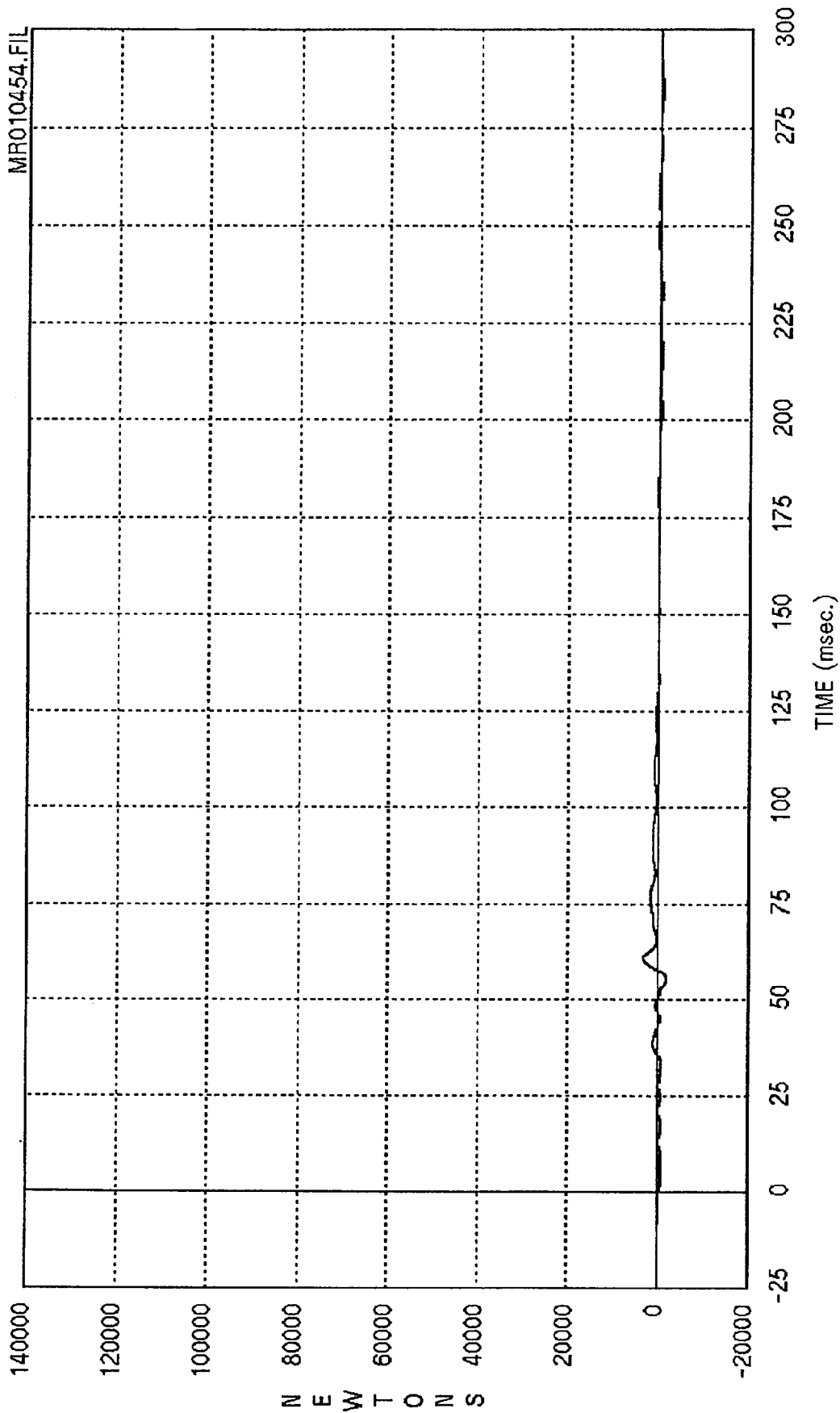
Min = -1414.6

MSE

Date: 02/16/94

Program: New Car Assessment Program

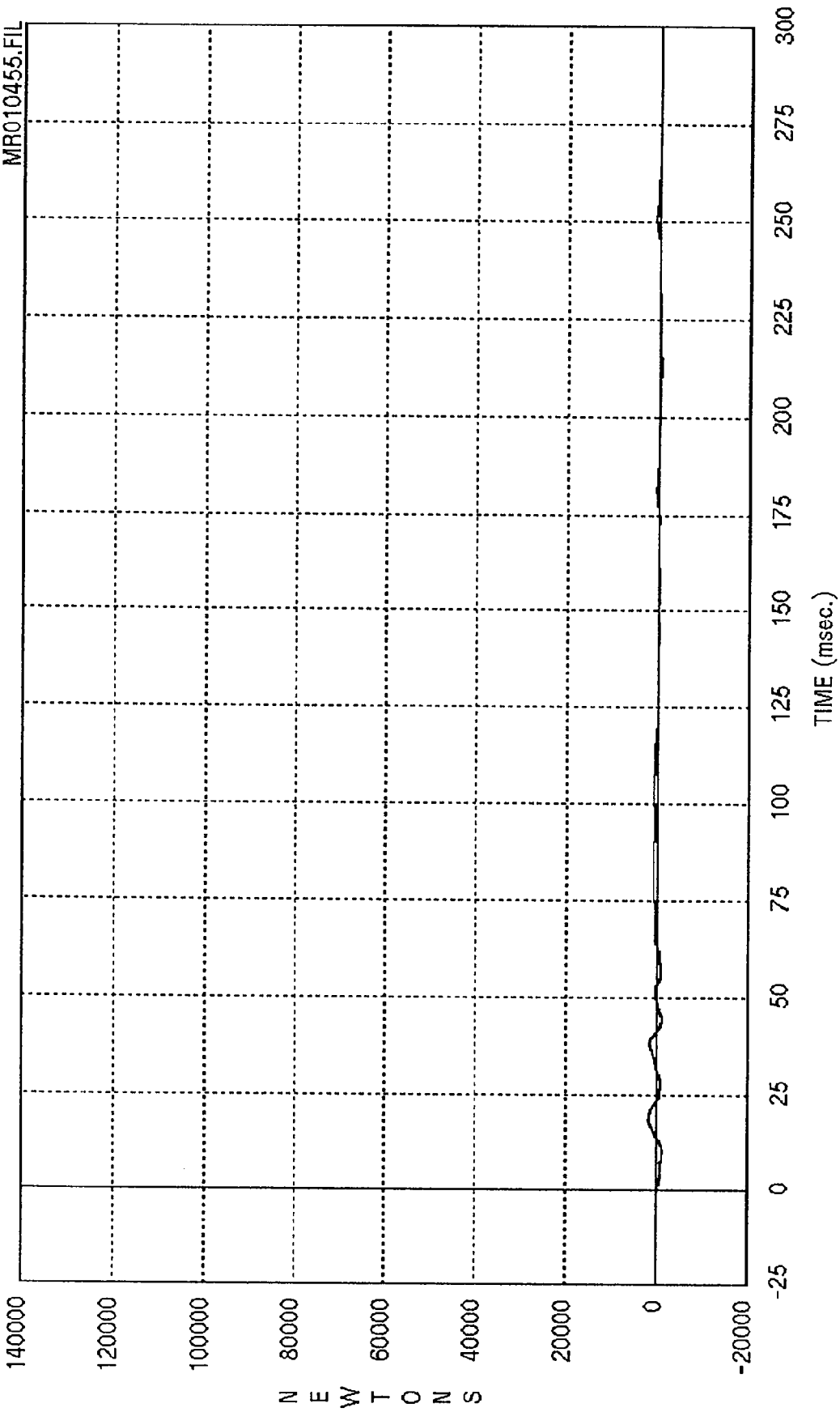
Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Force on barrier location A7 Filter: SAE CLASS 60 Max = 3283.6 Min = -1923.3

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010455.FIL



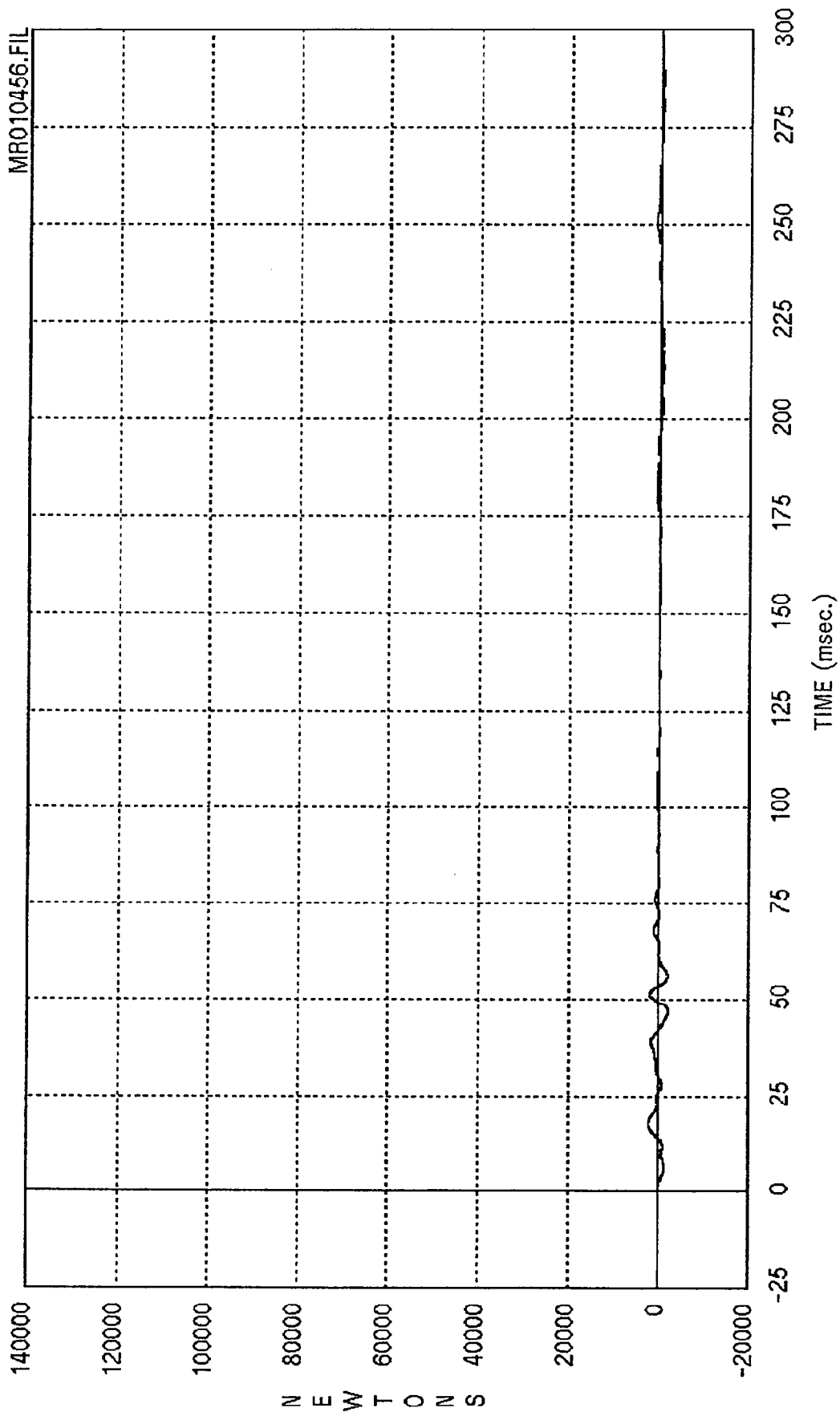
Curve: Force on barrier location A8

Filter: SAE CLASS 60

Max = 1844.3

Min = -1154.3

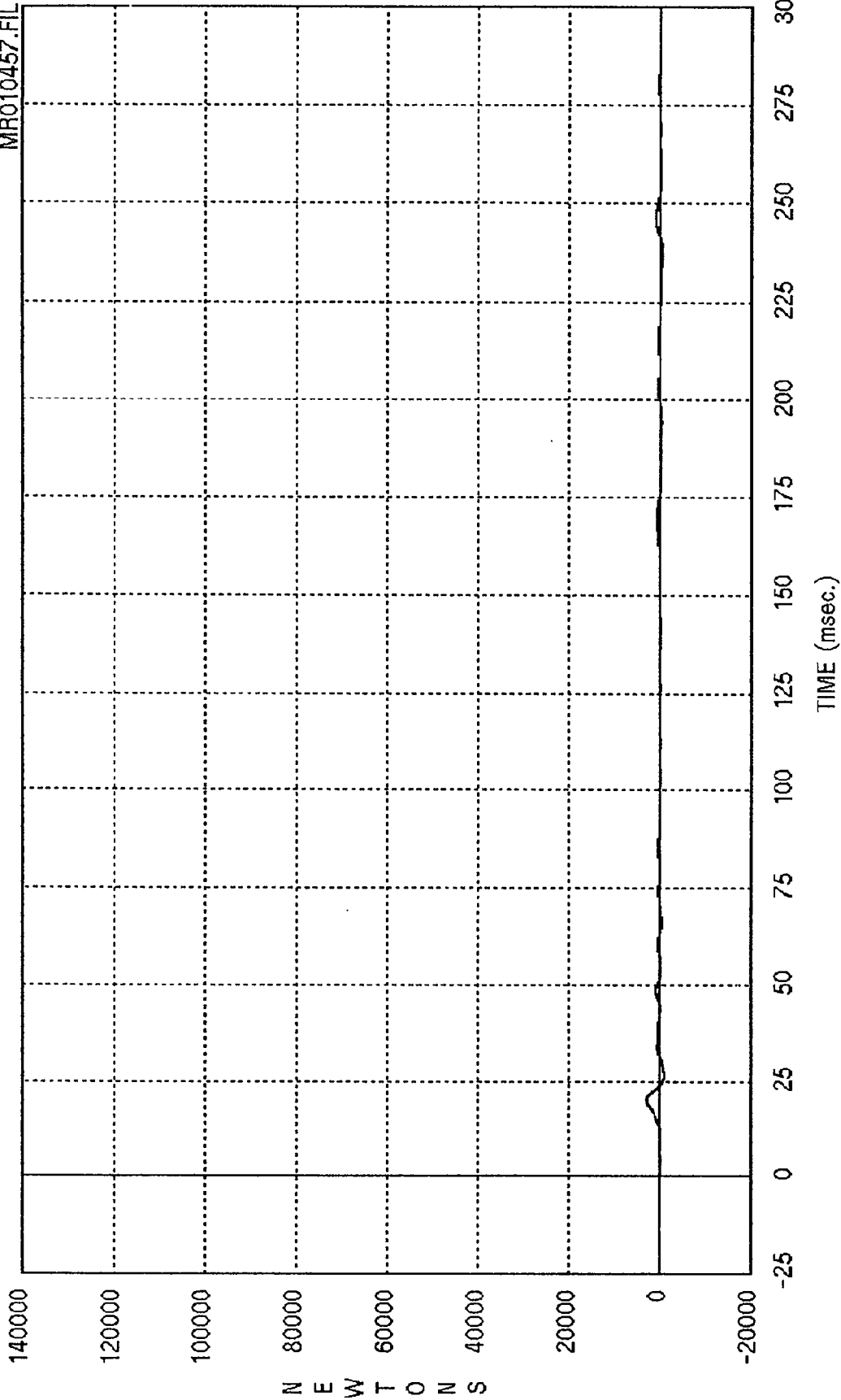
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Force on barrier location A9 Filter: SAE CLASS 60 Max = 2205.7 Min = -2177.9

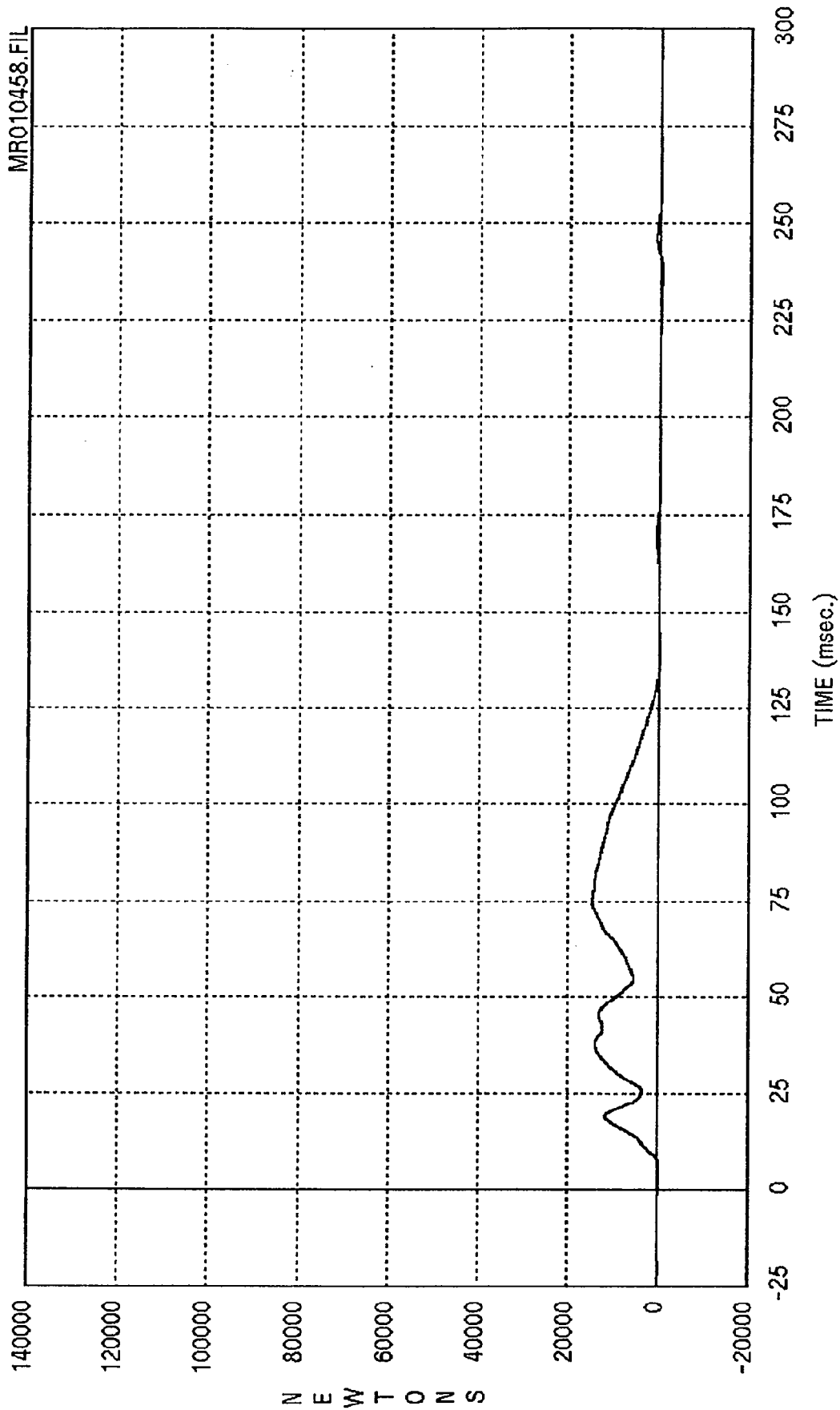
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010457.FIL



Curve: Force on barrier location B1 Filter: SAE CLASS 60 Max = 2922.6 Min = -929.71

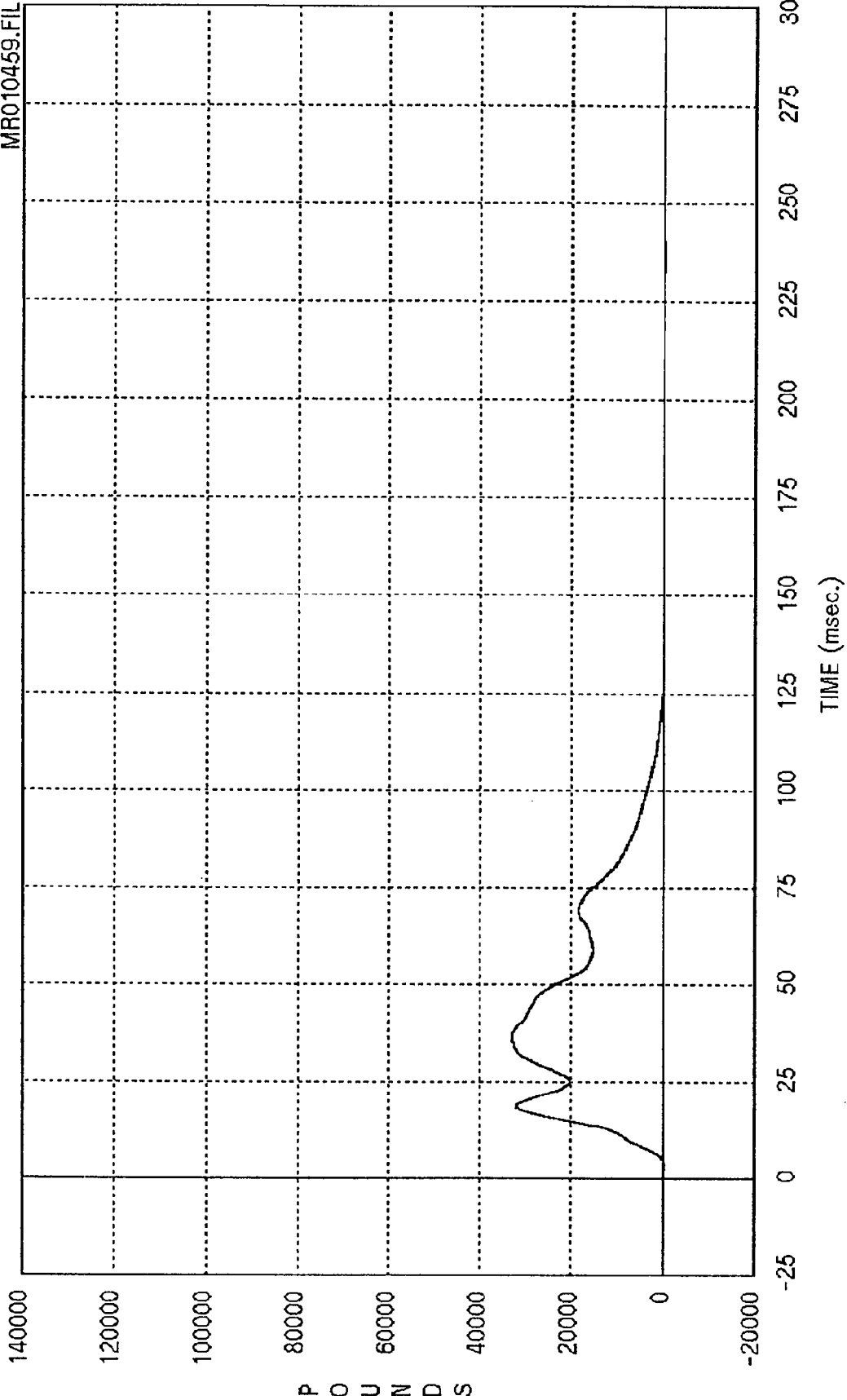
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Force on barrier location B2 Filter: SAE CLASS 60 Max = 14637. Min = -422.79

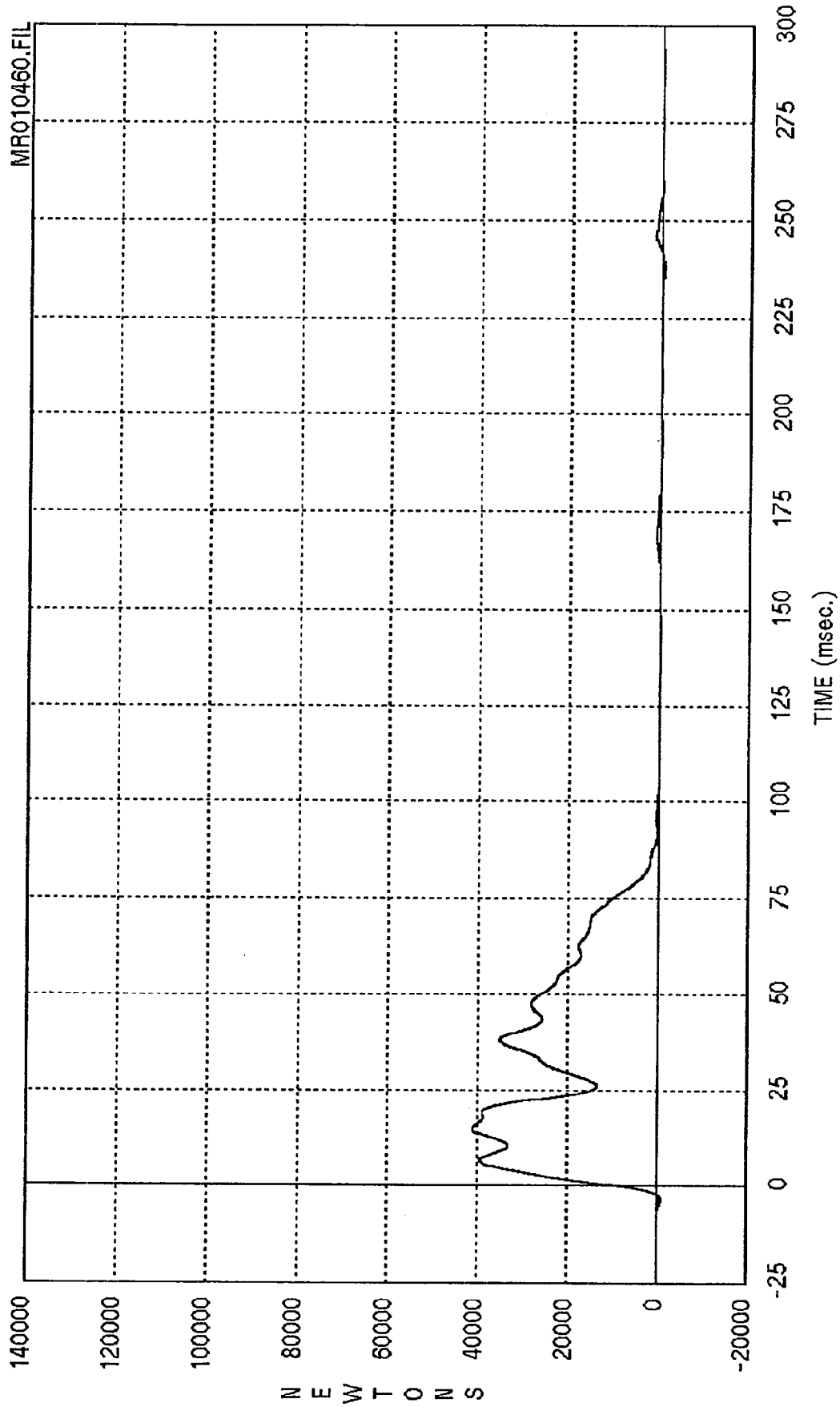
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010459.FIL



Curve: Force on barrier location B3 Filter: SAE CLASS 60 Max = 32844. Min = -91.227

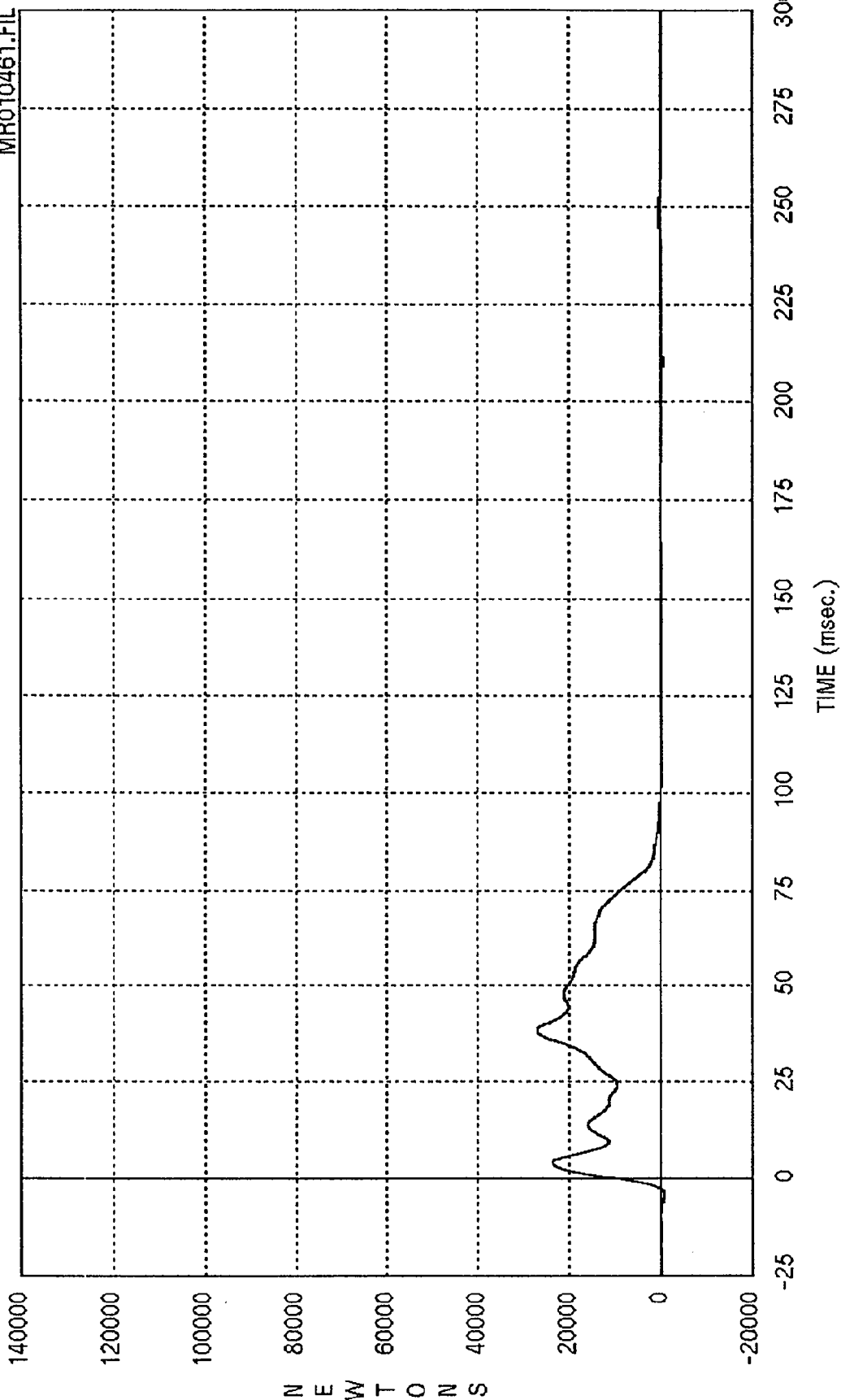
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Force on barrier location B4 Filter: SAE CLASS 60 Max = 41238. Min = -400.76

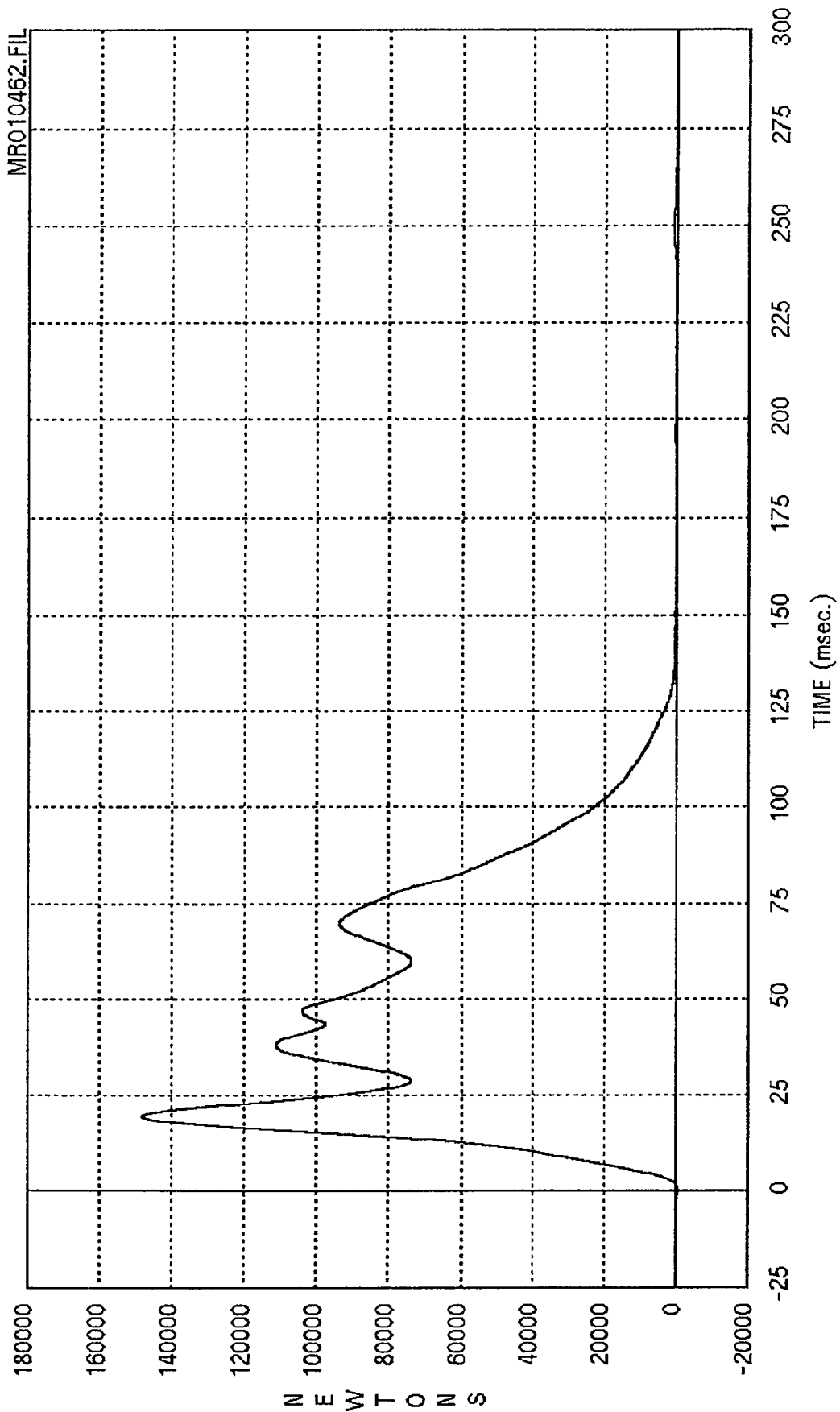
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010461.FIL



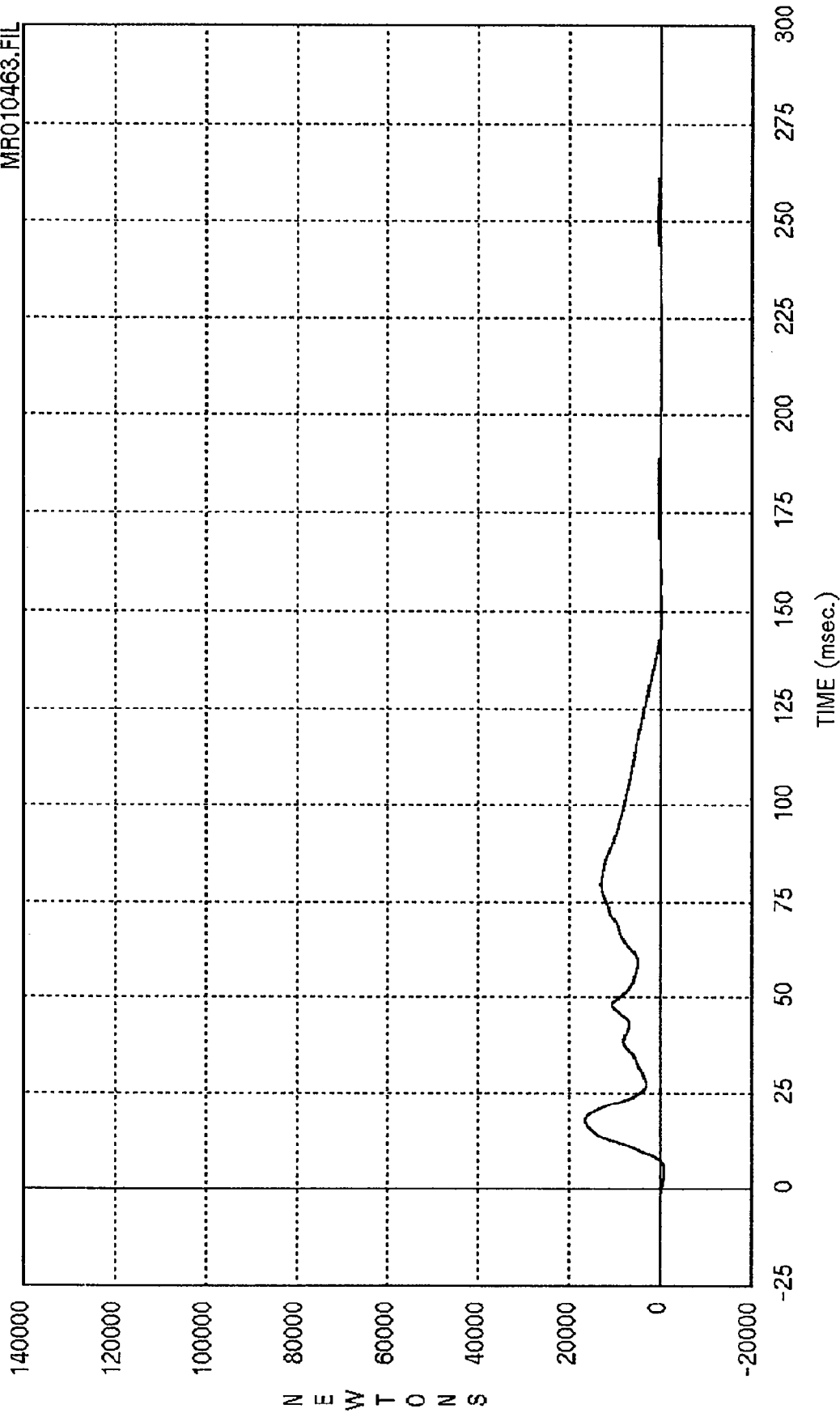
Curve: Force on barrier location B5 Filter: SAE CLASS 60 Max = 26936. Min = -356.78

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



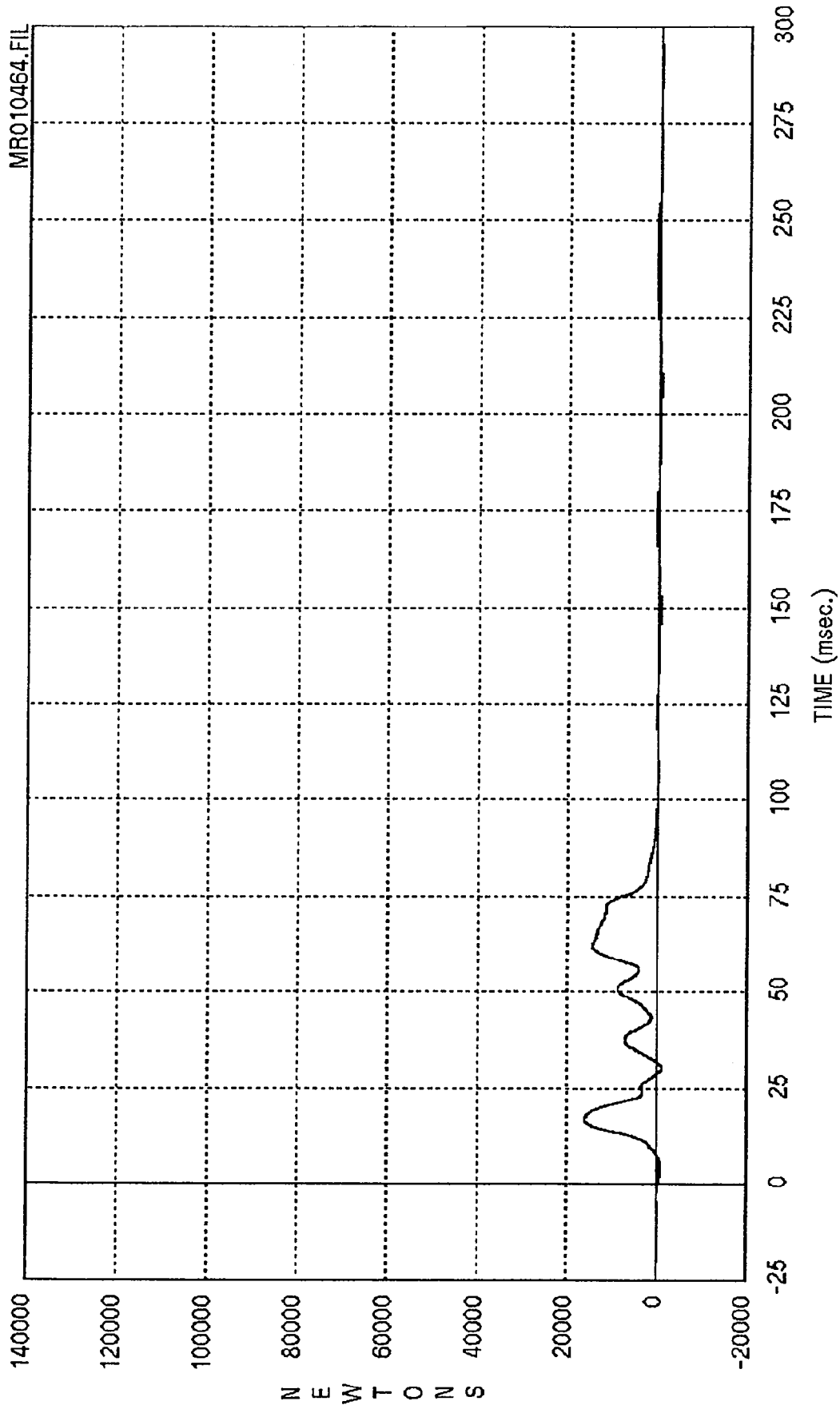
Curve: Force on barrier location B6 Filter: SAE CLASS 60 Max = .14809E+06 Min = -670.24
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010463.FIL



Curve: Force on barrier location B7 Filter: SAE CLASS 60 Max. = 16646. Min = -802.95

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

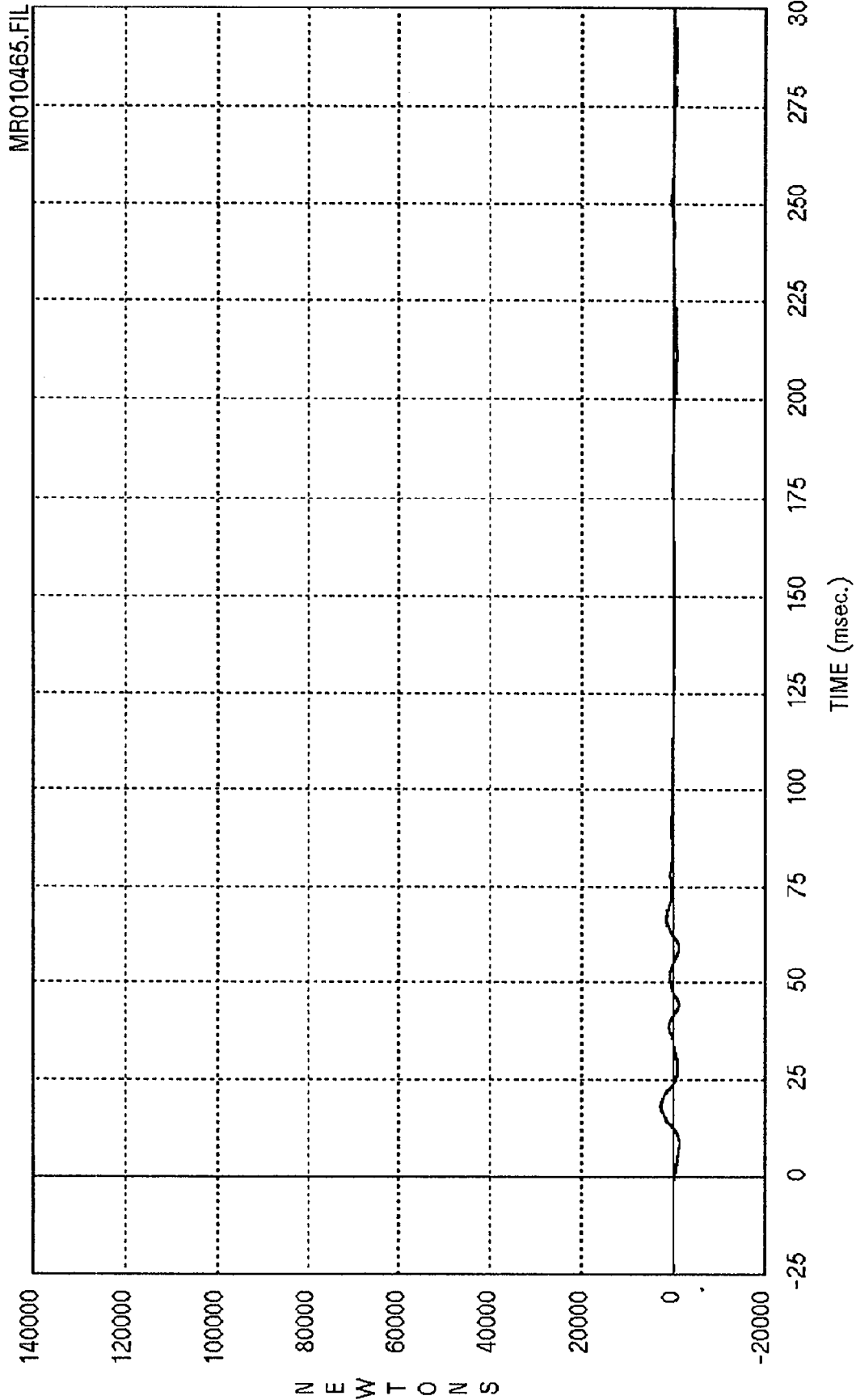


Curve: Force on barrier location B8

Filter: SAE CLASS 60 Max = 16079.

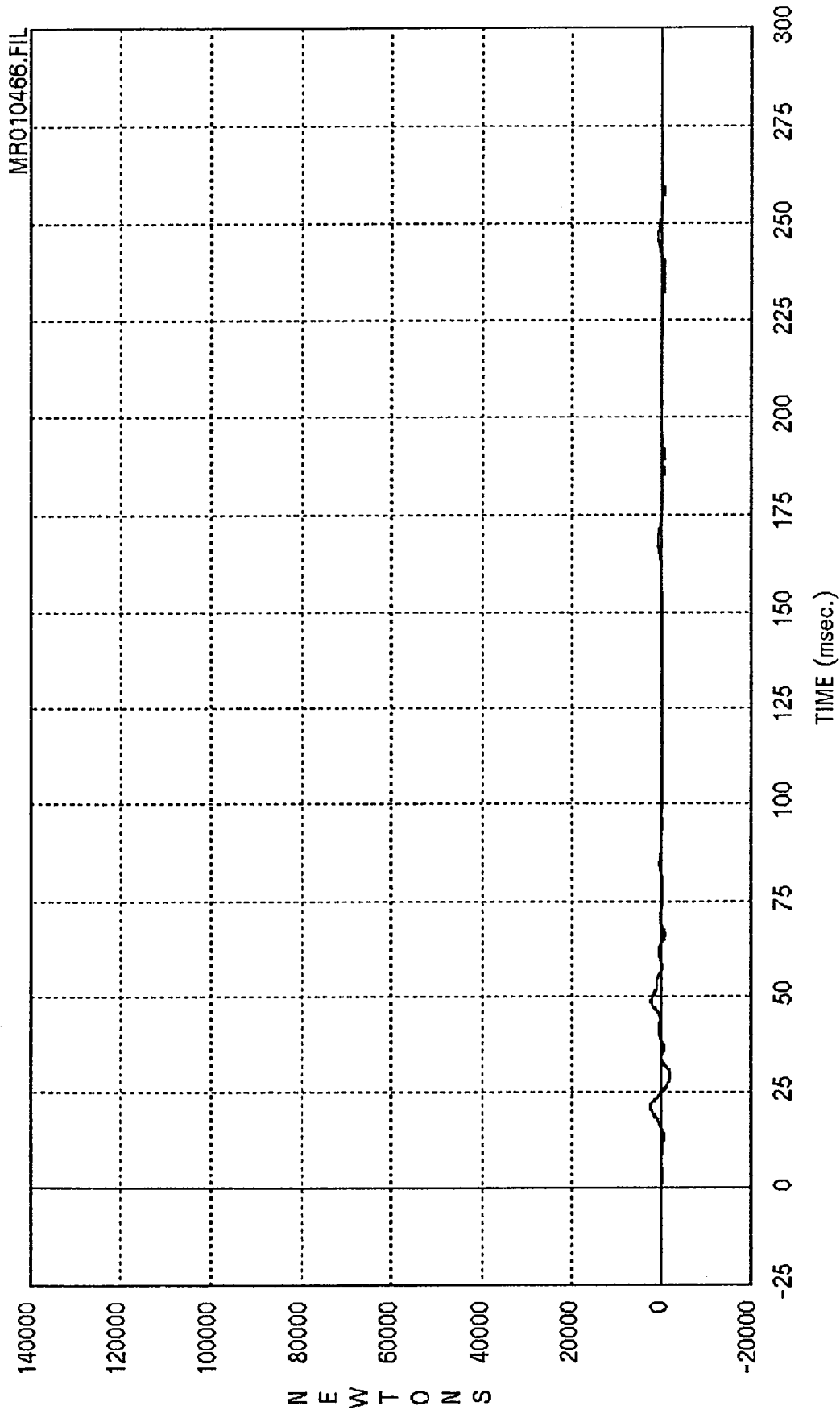
Min = -1031.2

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Force on barrier location B9 Filter: SAE:CLASS 60 Max = 2950.5 Min = -1198.0

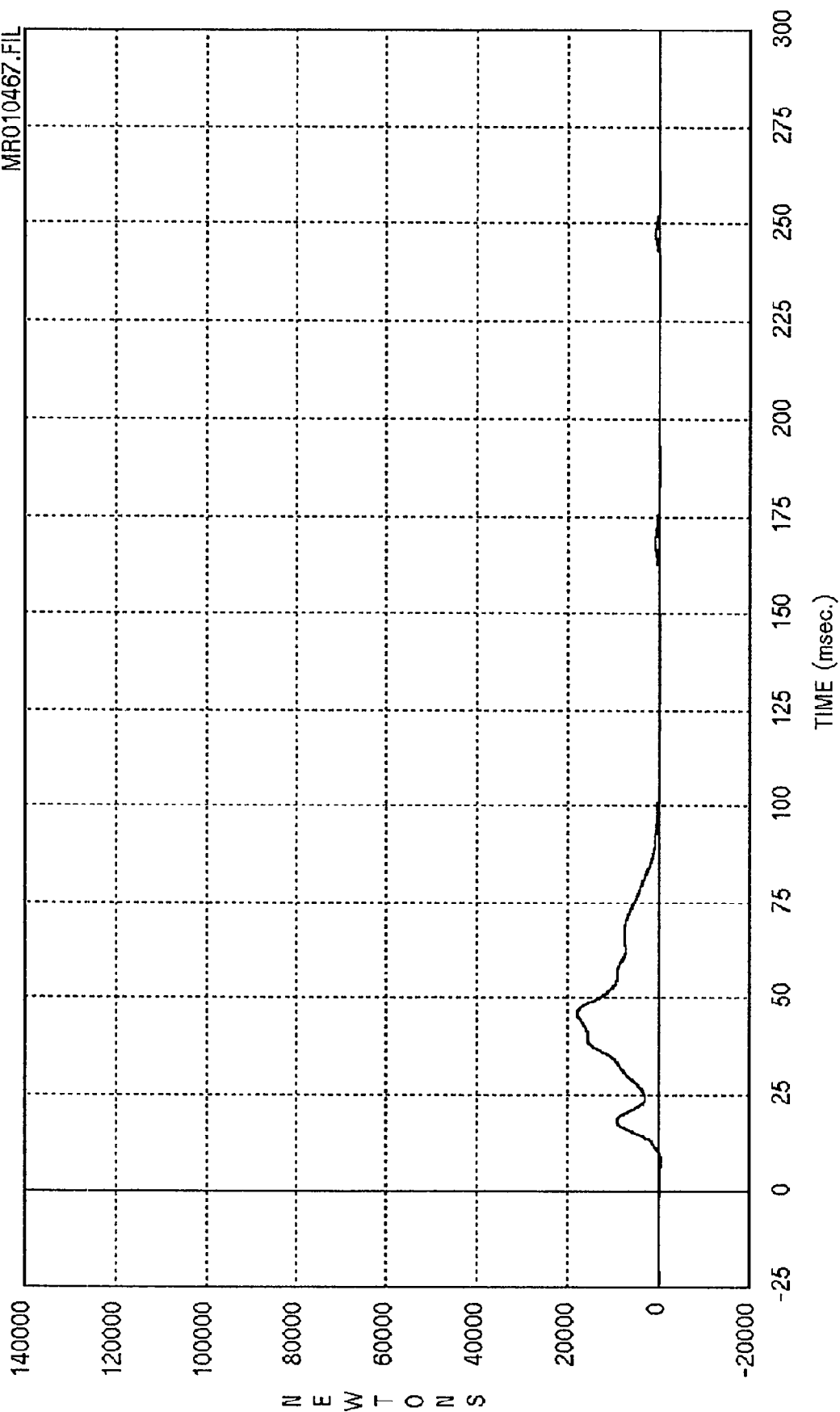
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Force on barrier location C1 Filter: SAE CLASS 60 Max = 2516.2 Min = -1804.8

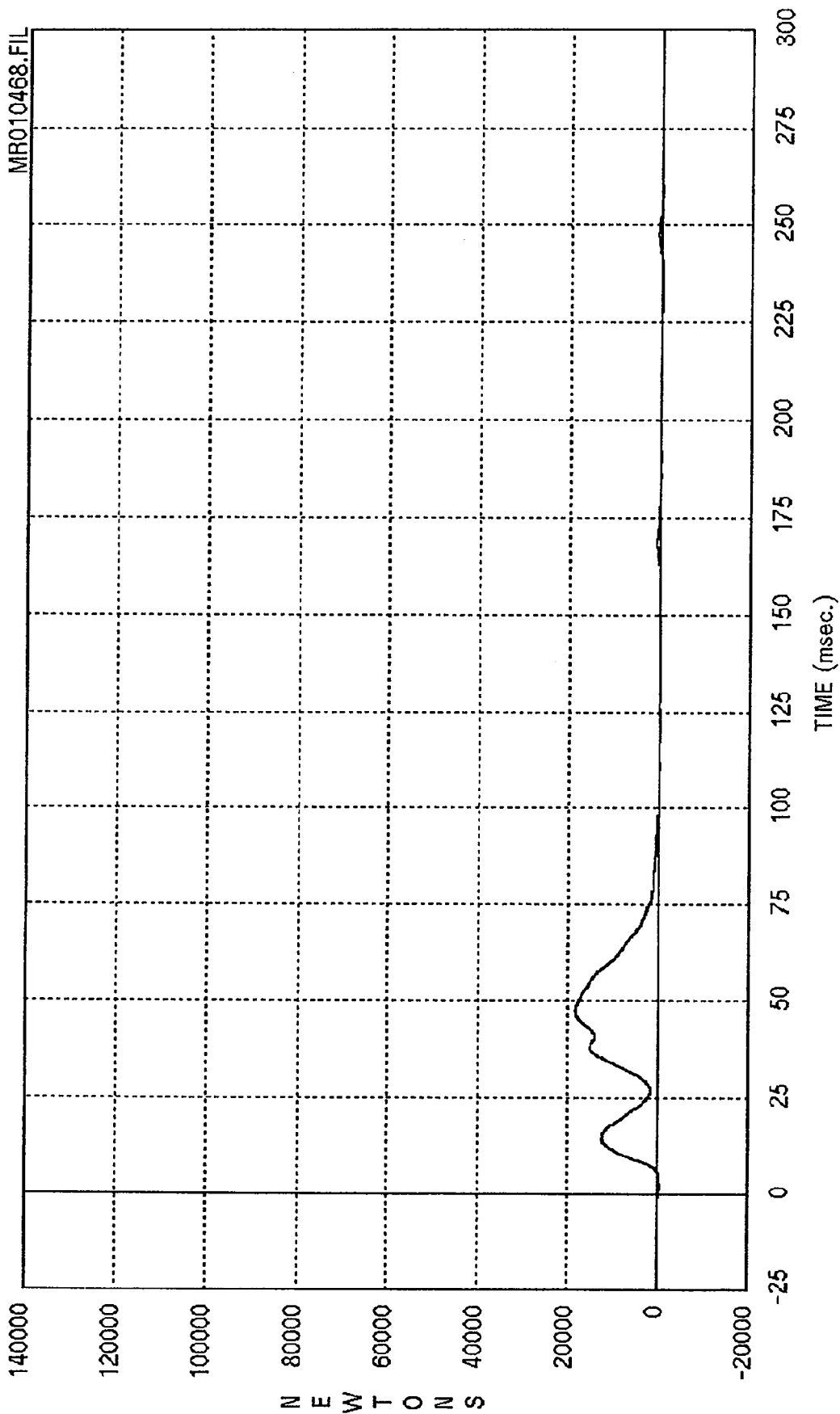
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010467.FIL



Curve: Force on barrier location C2 Filter: SAE CLASS 60 Max = 17979. Min = -411.56

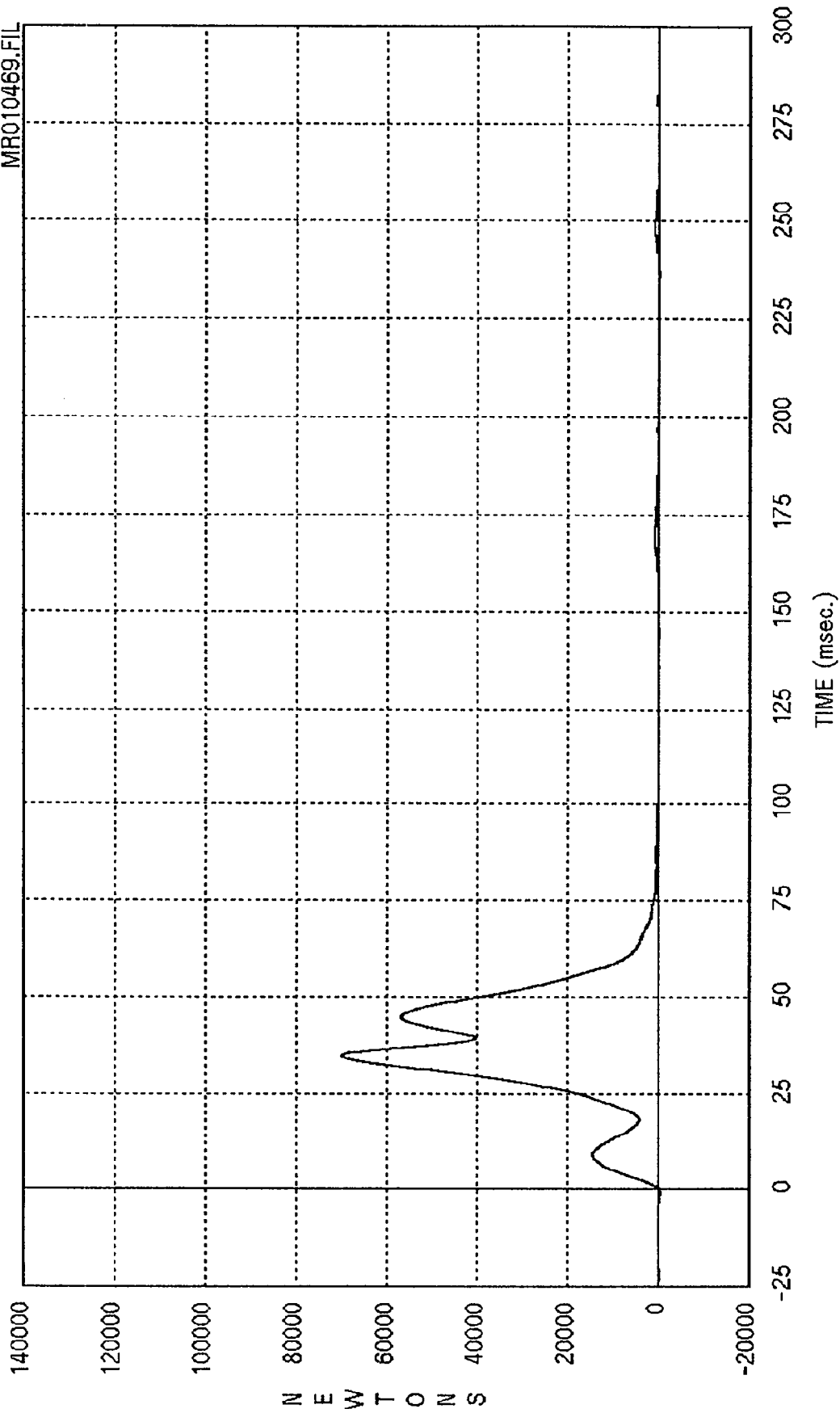
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Force on barrier location C3 Filter: SAE CLASS 60 Max = 18345, Min = -355.20

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010469.FIL



Curve: Force on barrier location C4

Filter: SAE CLASS 60

Max = 70141.

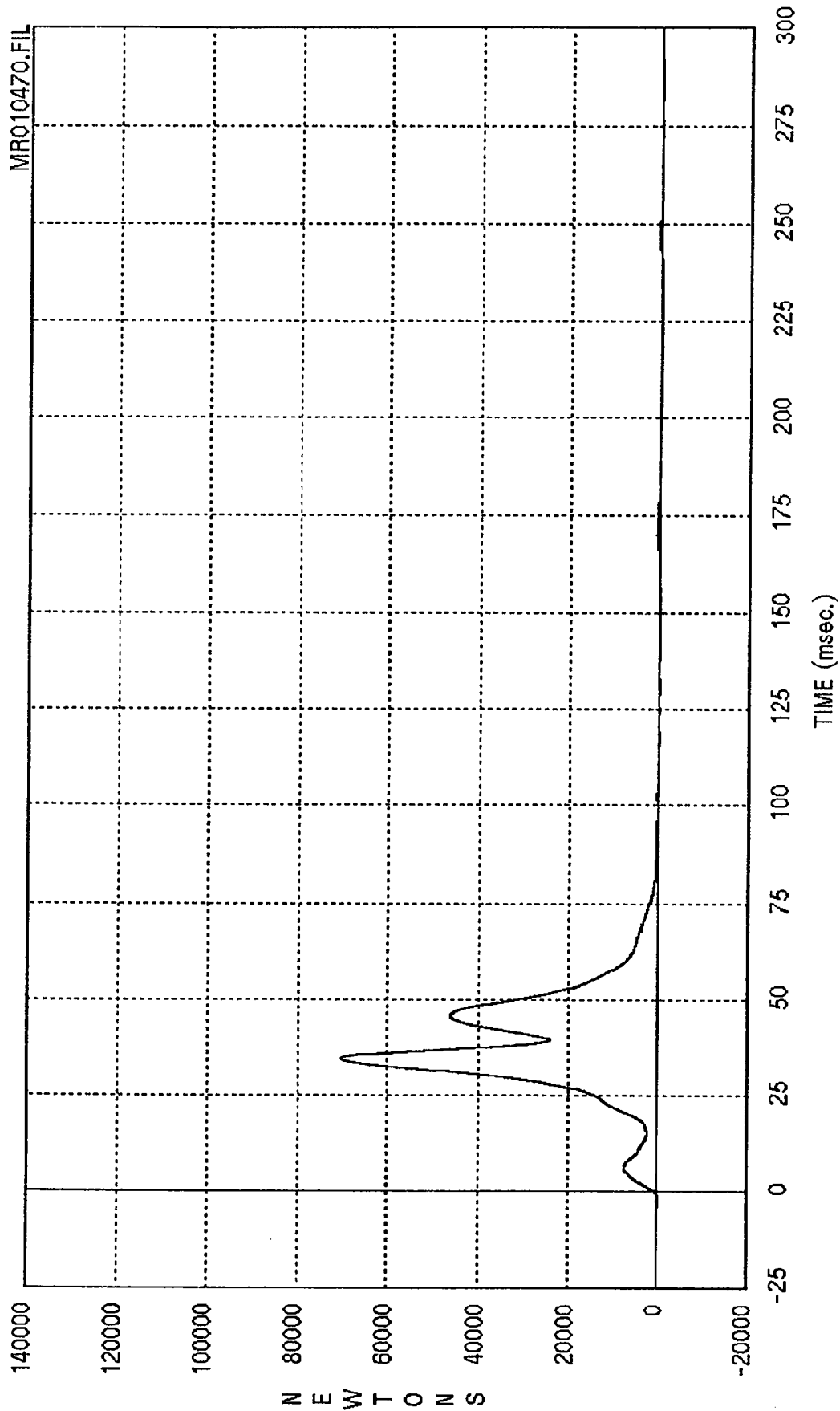
Mln = -79.601

MSE

Date: 02/16/94

Program: New Car Assessment Program

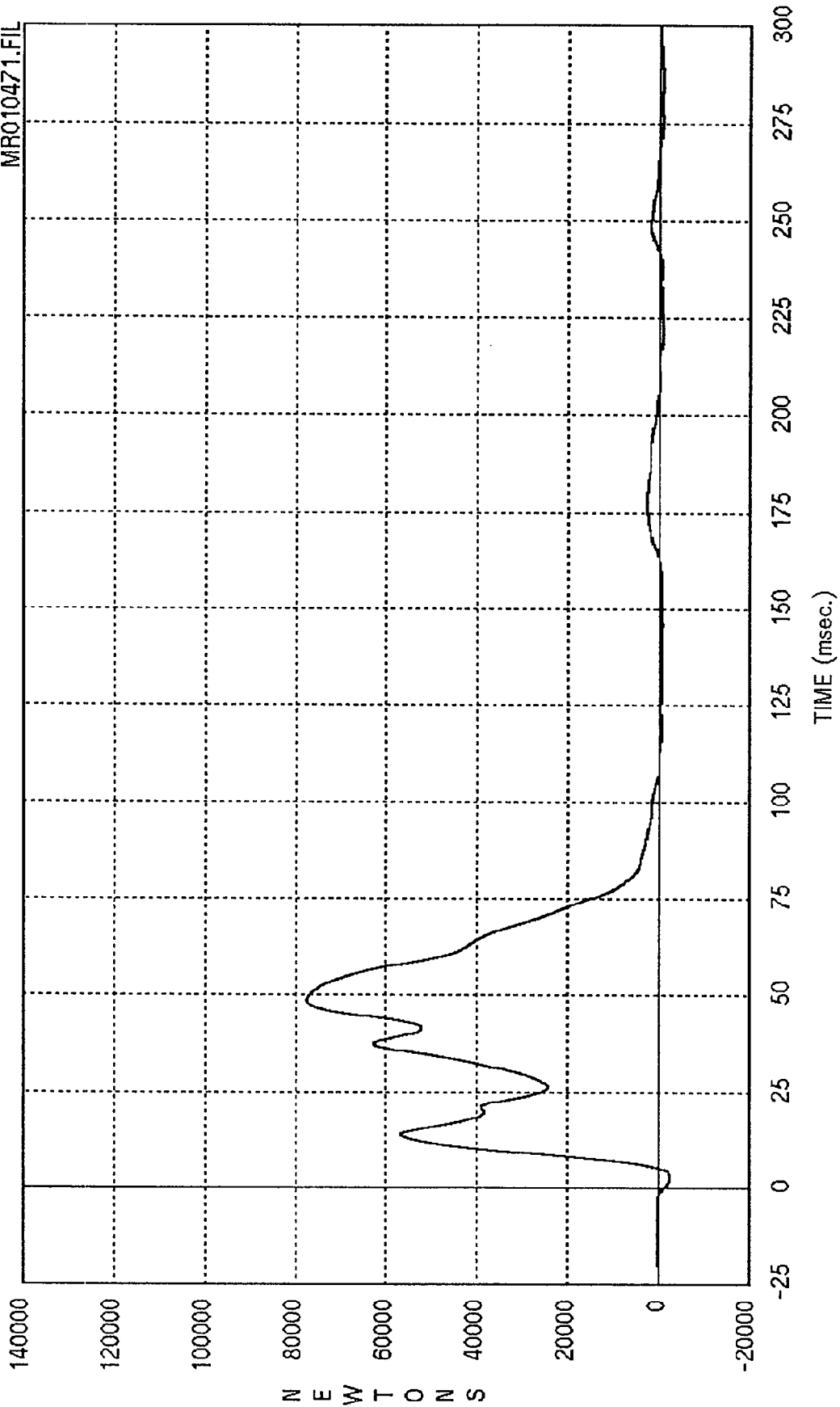
Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Force on barrier location C5 Filter: SAE-CLASS 60 Max = 70501. Min = -155.51

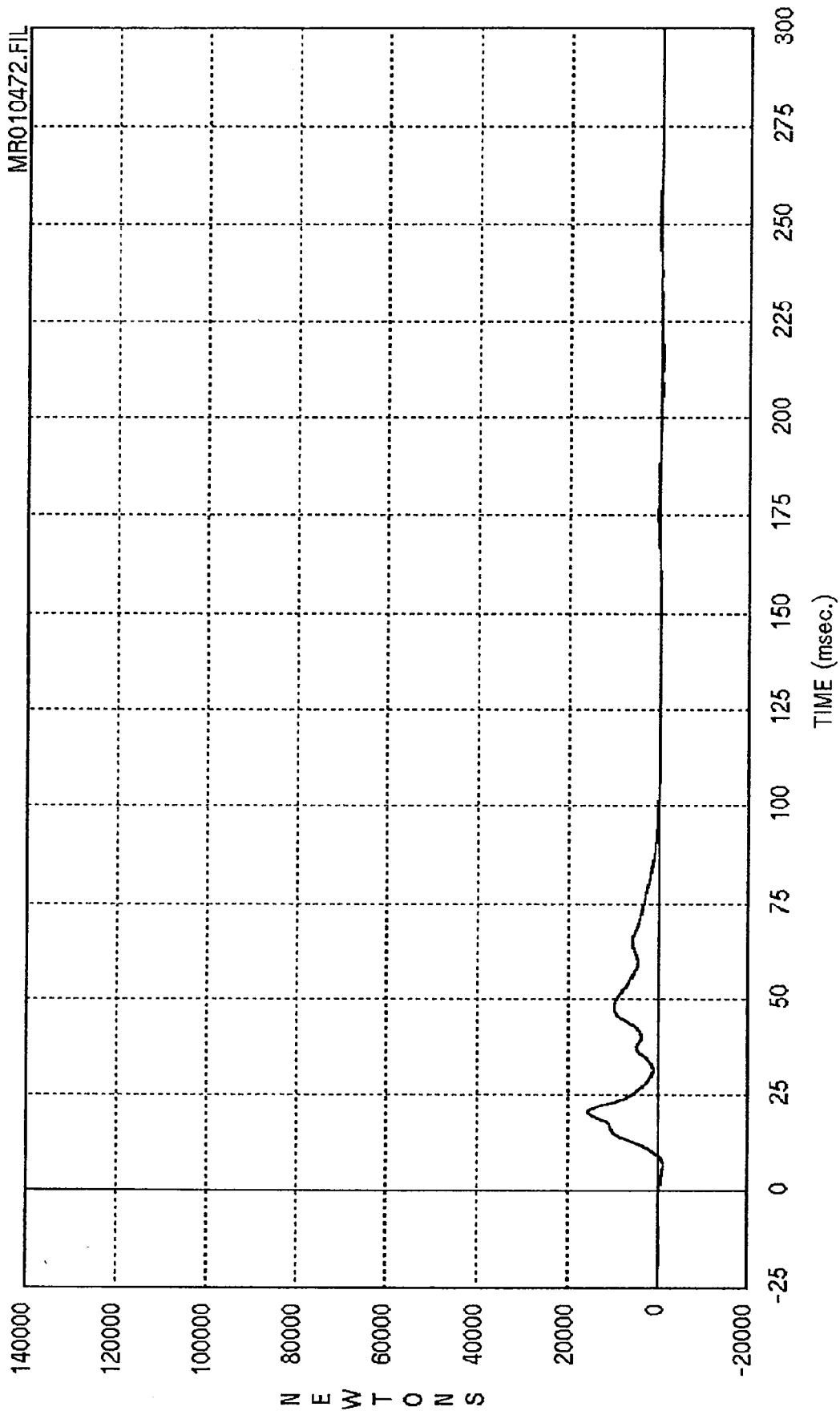
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010471.FIL



Curve: Force on barrier location C6 Filter: SAE CLASS 60 Max = 77650. Min = -2442.0

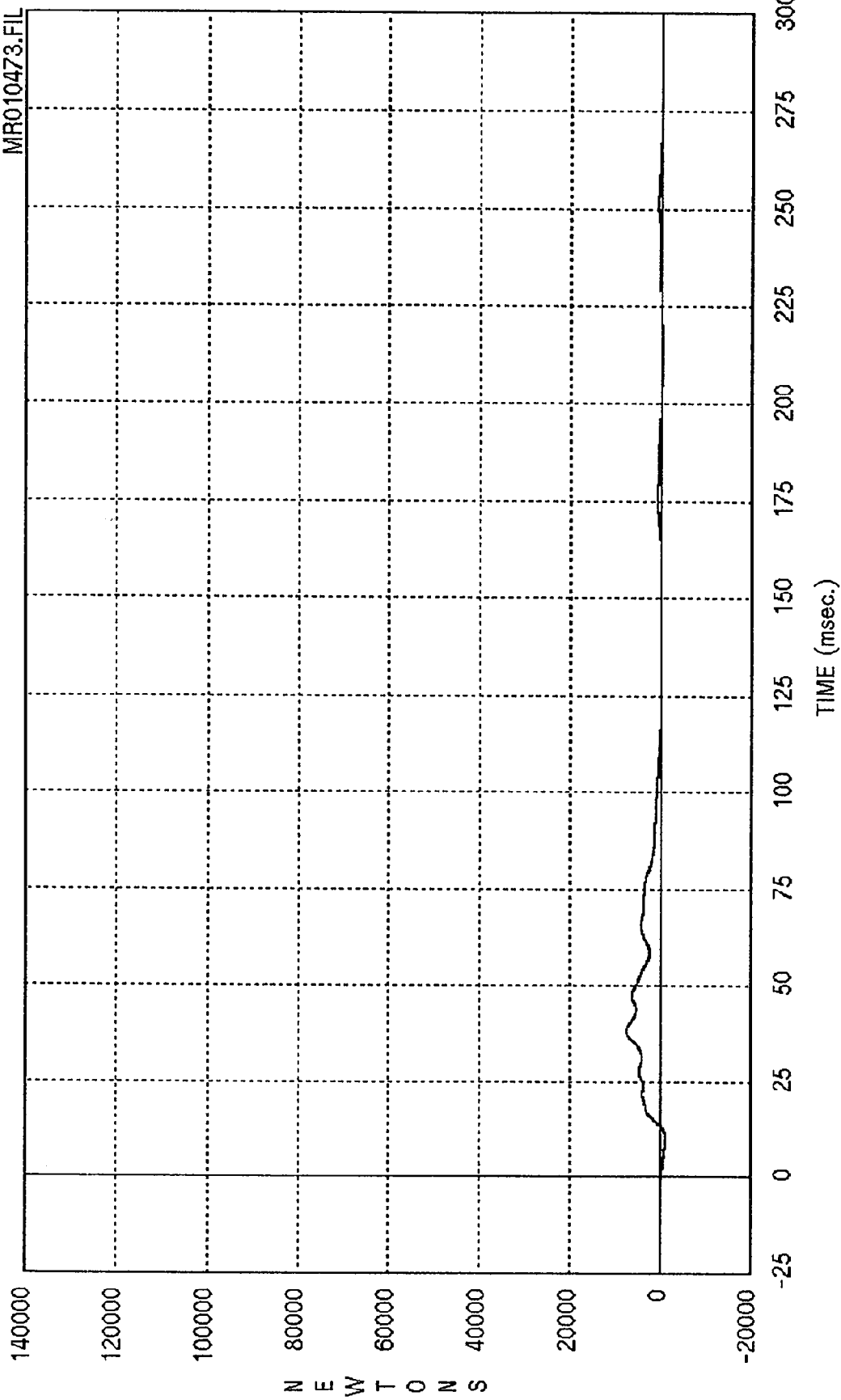
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Force on barrier location C7 Filter: SAE CLASS 60 Max = 15814. Min = -920.35

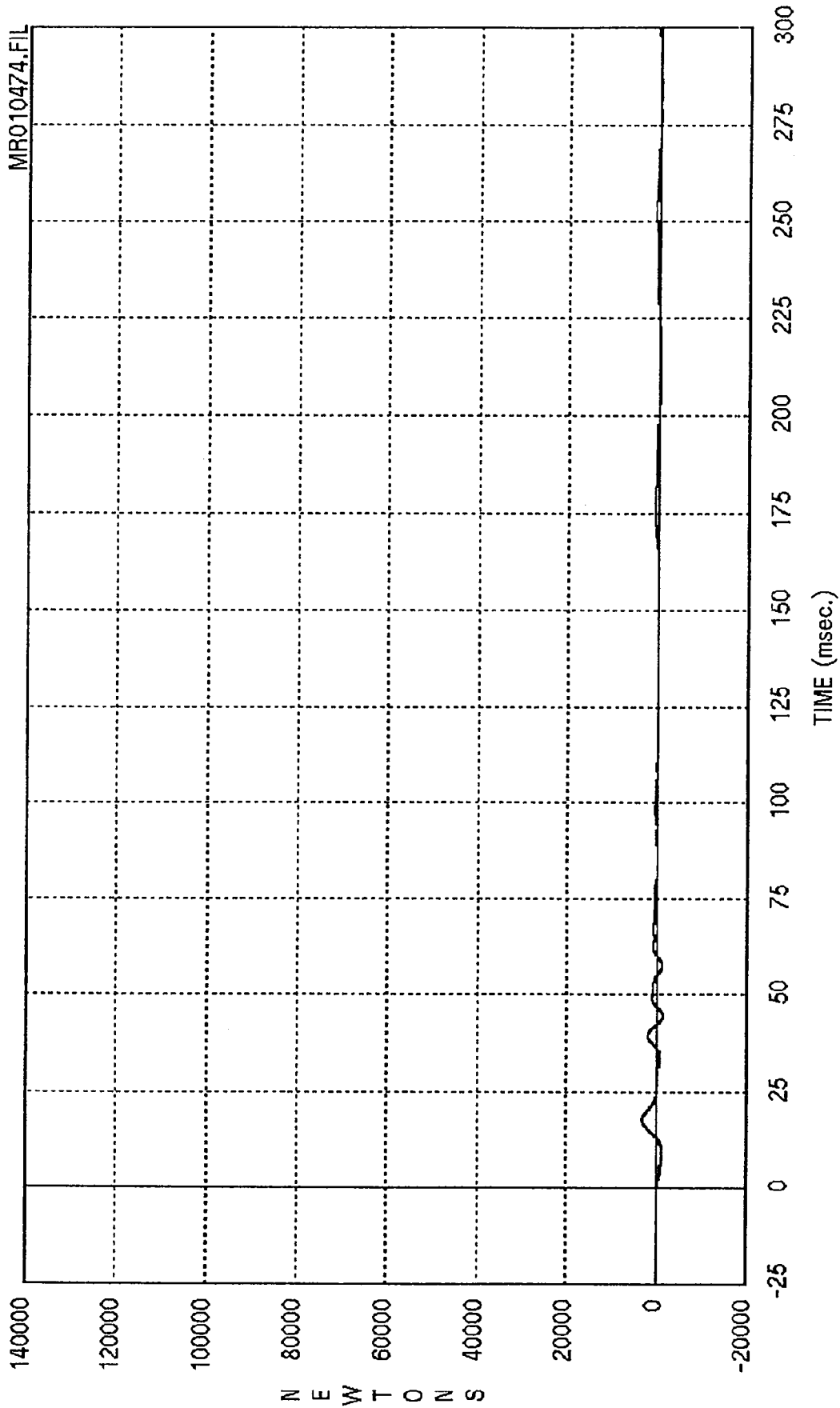
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010473.FIL



Curve: Force on barrier location C8 Filter: SAE CLASS 60 Max = 7567.6 Min = -1115.7

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Force on barrier location C9 Filter: .SAE.CLASS 60 Max = 3211.8 Min = 1292.7

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010475.FIL

140000

120000

100000

80000

60000

40000

20000

0

-20000

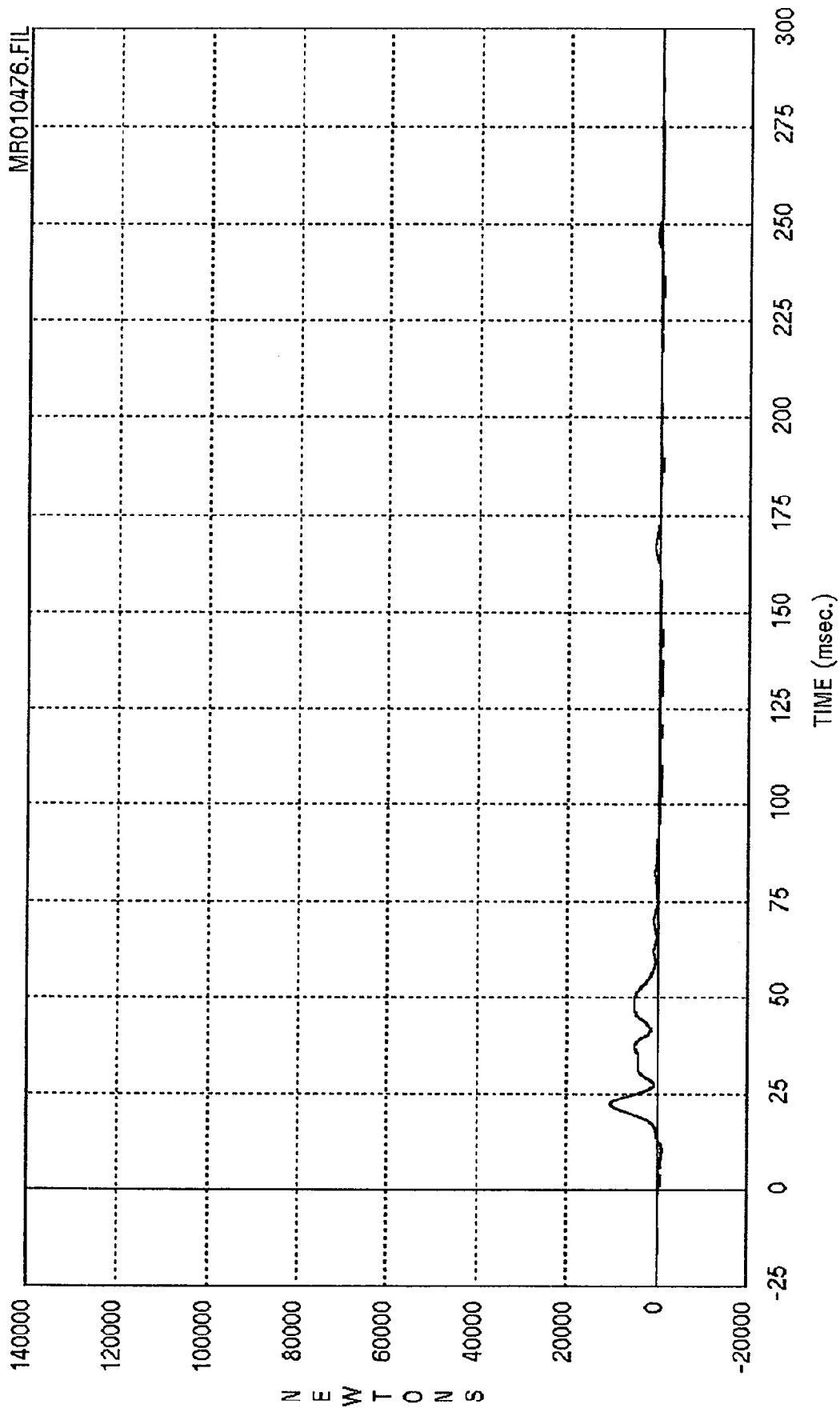
N E W T O N S

-25 0 25 50 75 100 125 150 175 200 225 250 275 300

TIME (msec.)

Curve: Force on barrier location D1 Filter: SAE CLASS 60 Max = 2737.3 Min = -1802.4

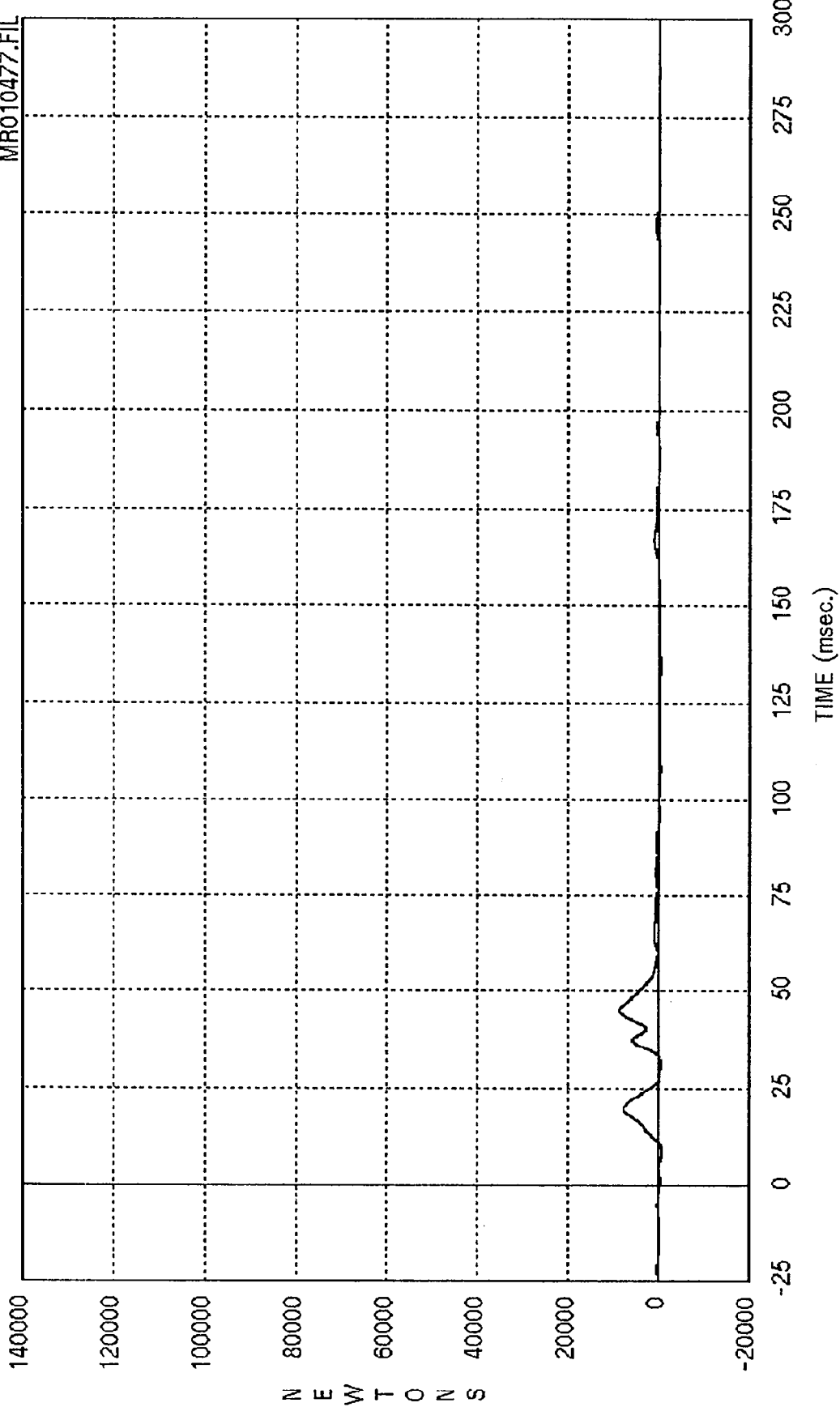
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Force on barrier location D2 Filter: SAE CLASS 60 Max = 10605. Min = -890.16

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010477.FIL



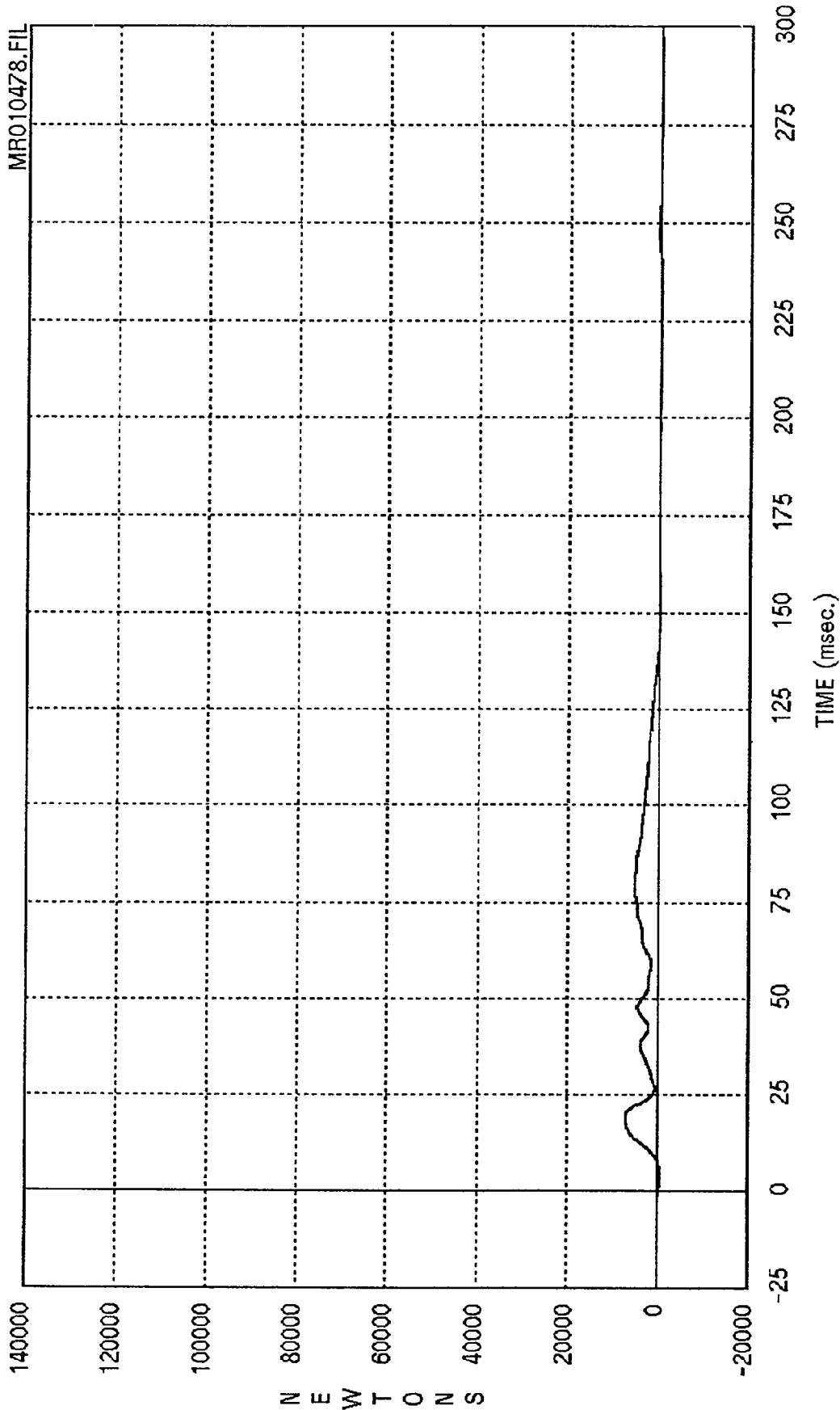
Curve: Force on barrier location D3

Filter: SAE GLASS 60

Max = 8683.7

Min = -755.44

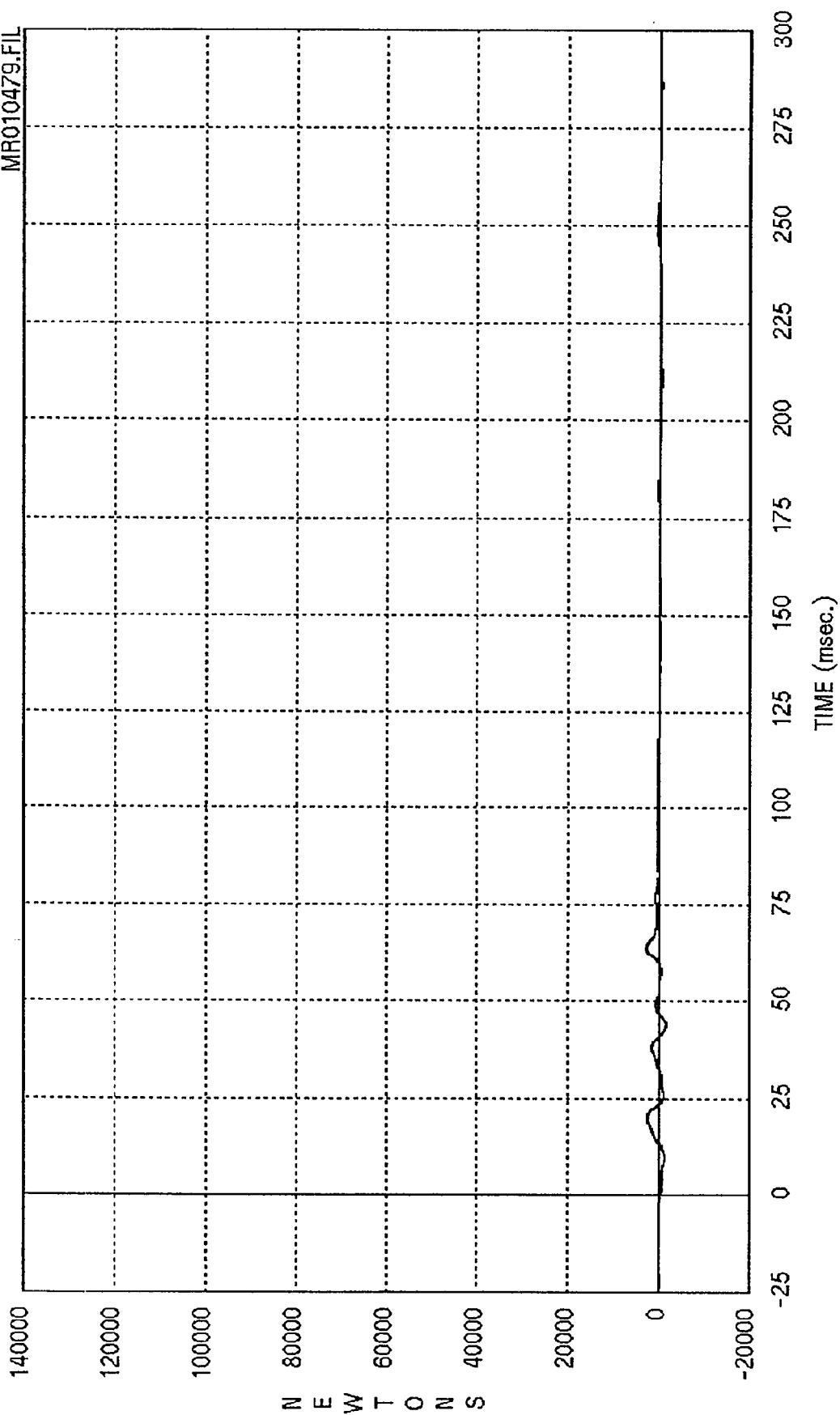
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Force on barrier location D4 Filter: SAE_CLASS 60 Max = 7167.8 Min = -458.66

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010479.FIL



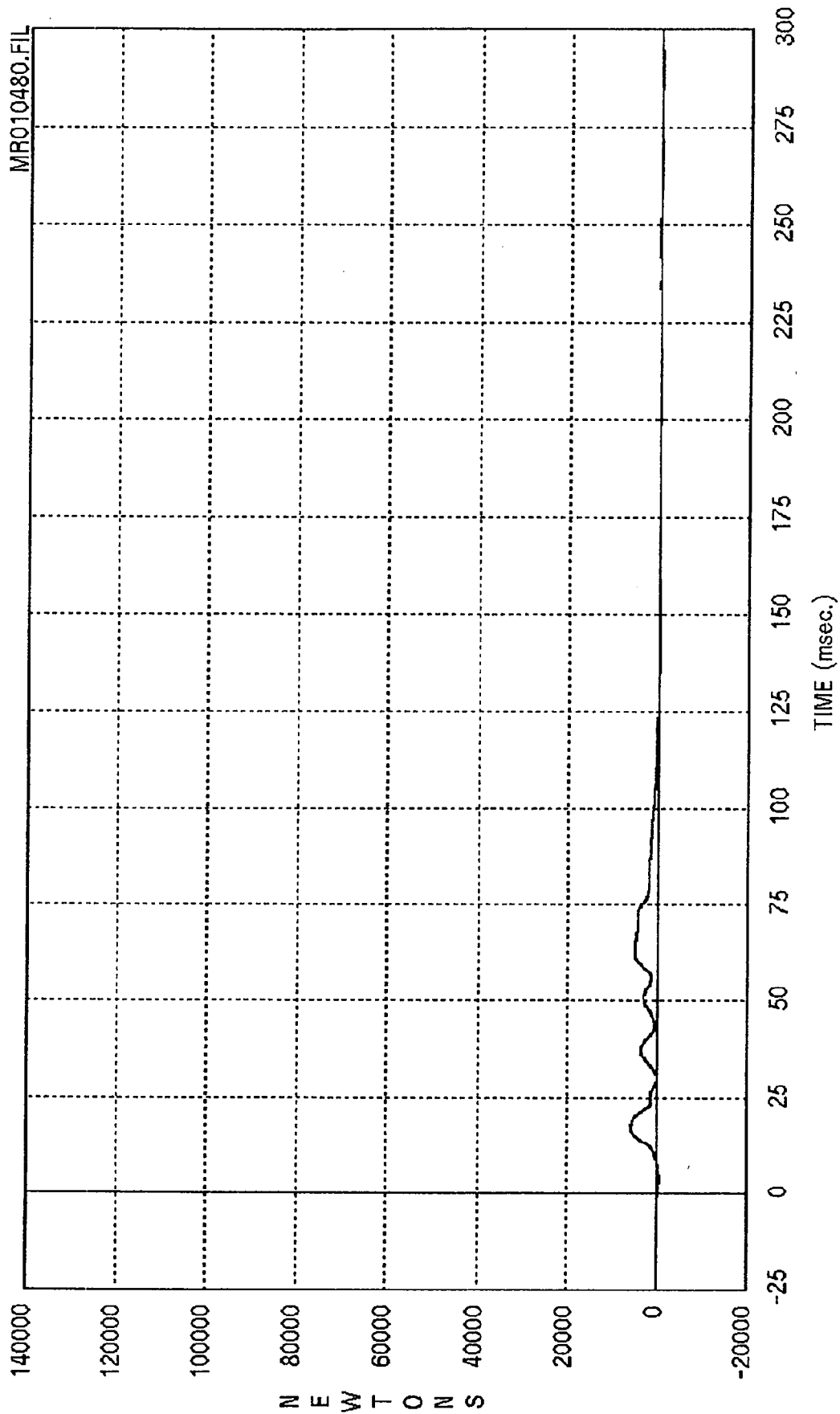
Curve: Force on barrier location D5

Filter: SAE CLASS 60

Max = 2958.1

Min = -1470.0

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Force on barrier location D6 Filter: SAE CLASS 60 Max = 5727.8 Min = -364.60

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010481.FIL

140000

120000

100000

80000

60000

40000

20000

0

-20000

N
E
W
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O
N
S

-25 0 25 50 75 100 125 150 175 200 225 250 275 300

TIME (msec.)

Curve: Force on barrier location D7

Filter: SAE CLASS 60

Max = 7831.7

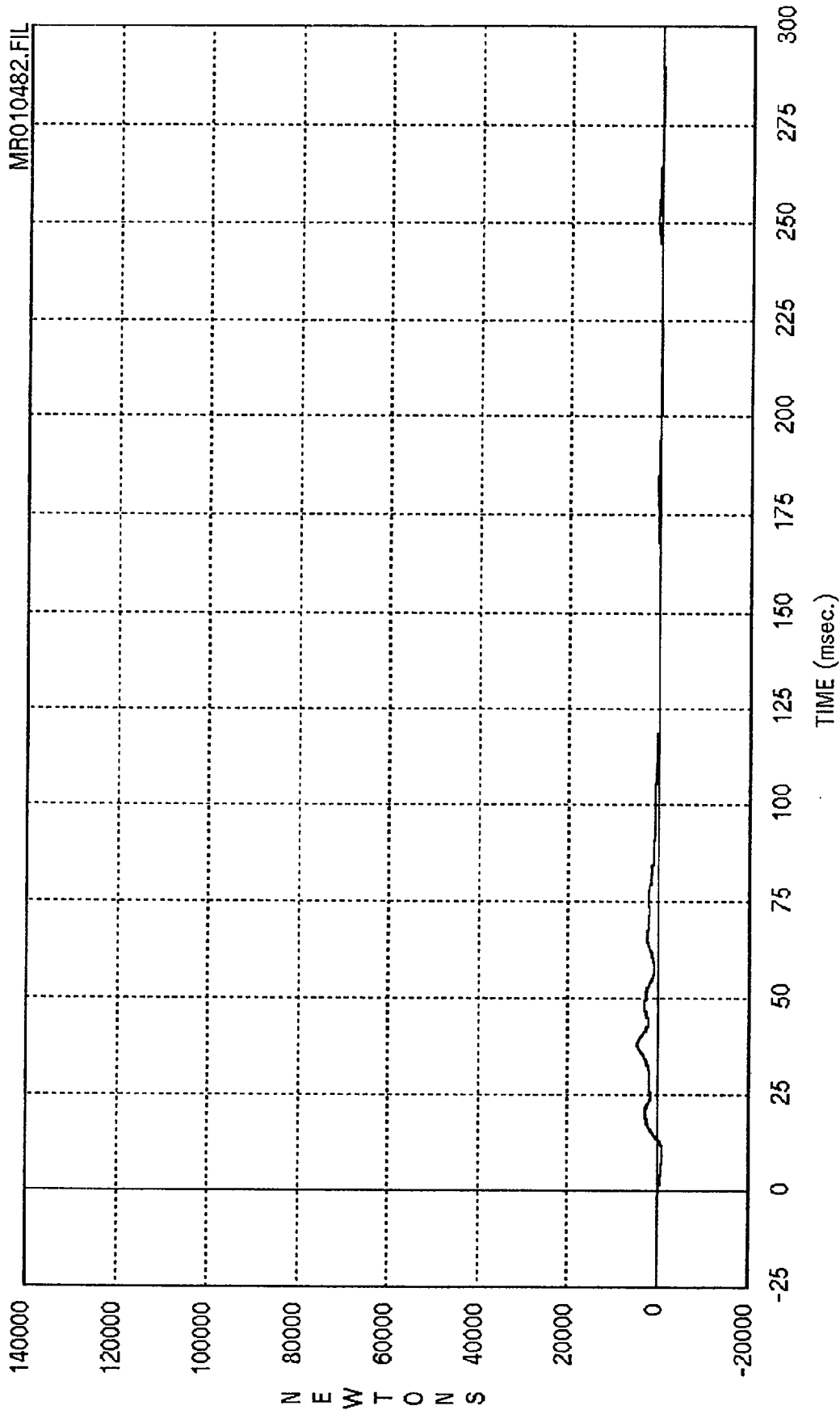
Min = -816.47

MSE

Date: 02/16/94

Program: New Car Assessment Program

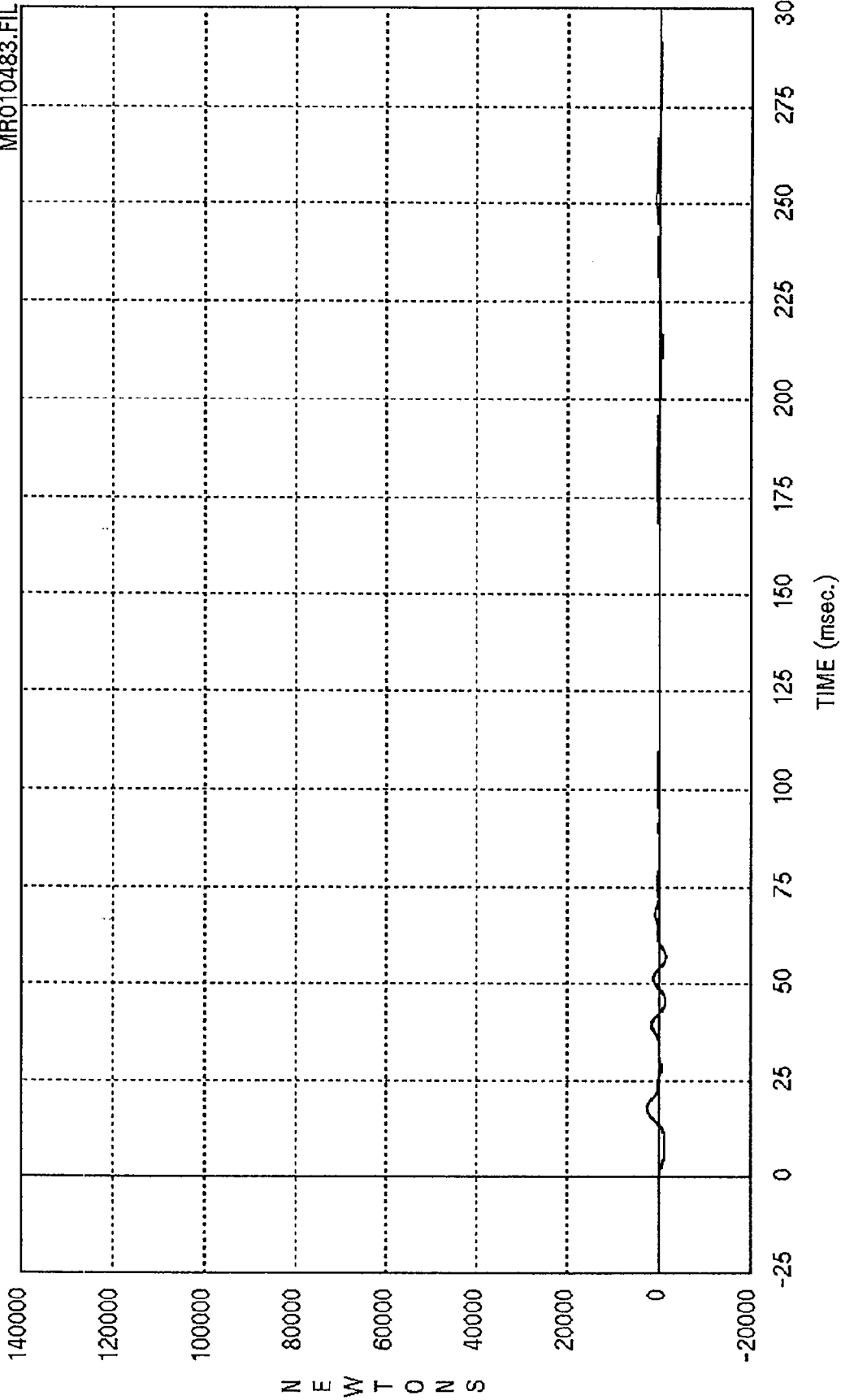
Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Force on barrier location D8 Filter: SAE CLASS 60 Max = 4599.0 Min = -1129.5

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010483.FIL



Curve: Force on barrier location D9

Filter: SAE CLASS 60

Max = 2706.8

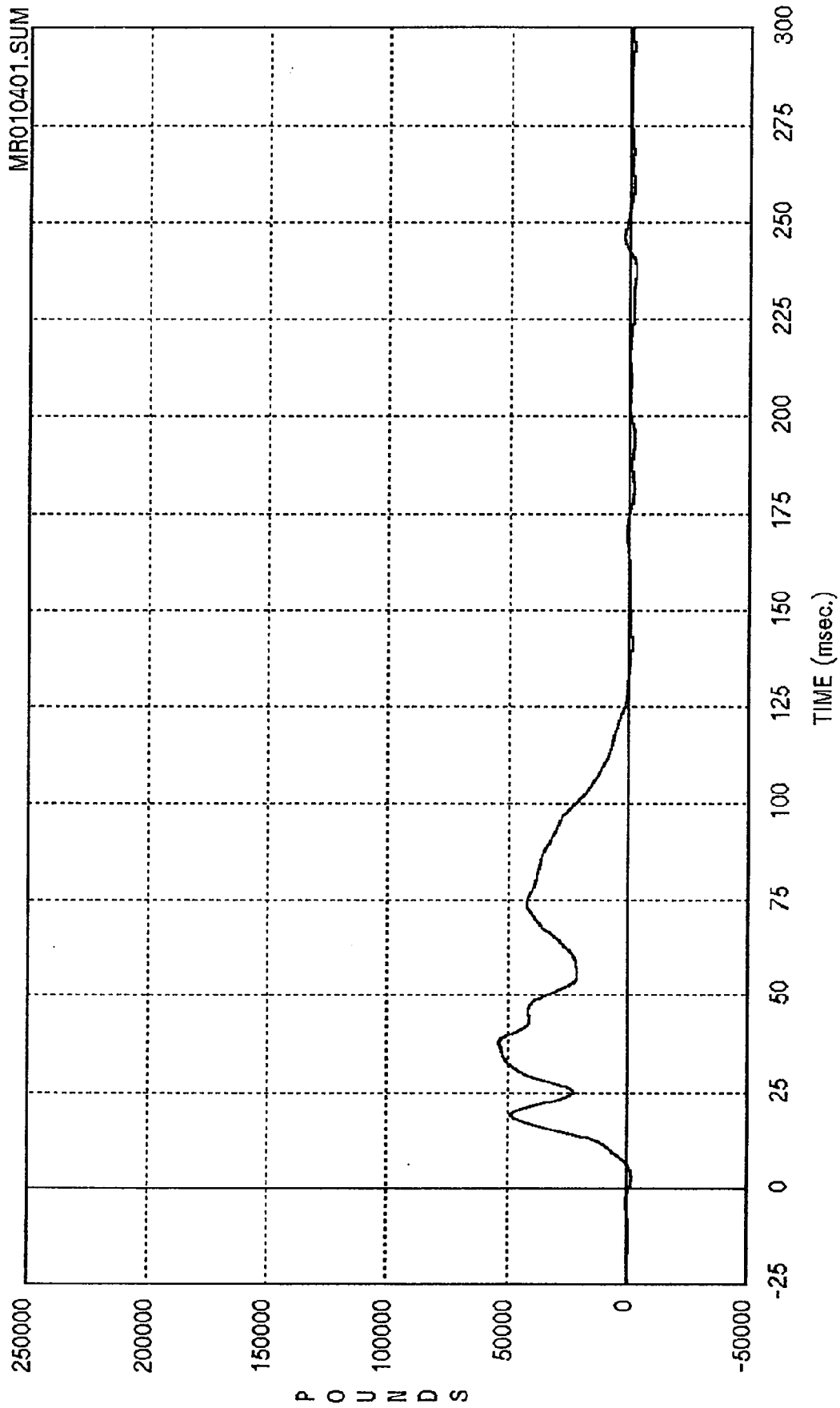
Min = -1419.2

MSE

Date: 02/16/94

Program: New Car Assessment Program

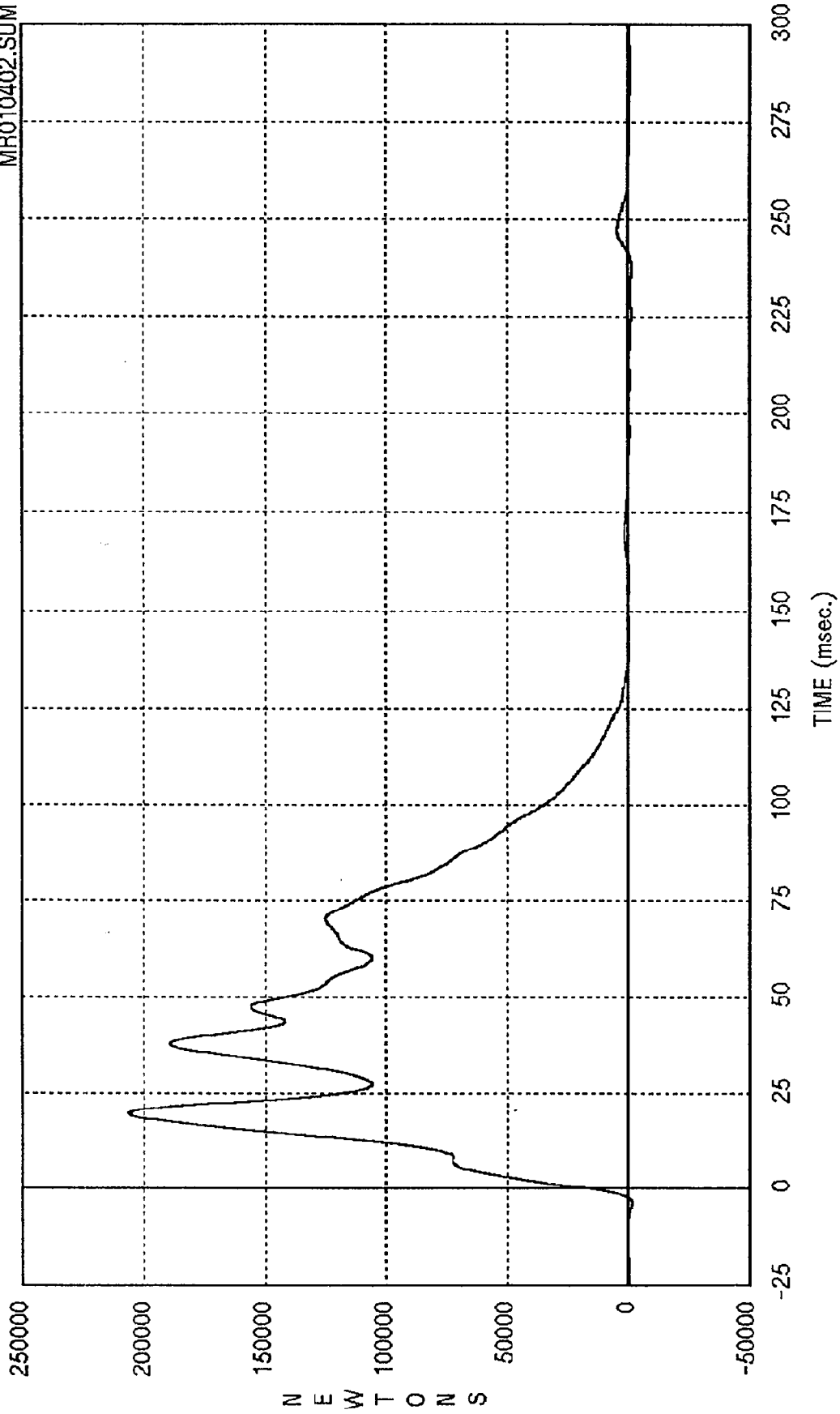
Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Barrier sum force A1,A2,A3,B1,B2,B3 -- Group 1 Filter: SAE CLASS 60 Max = 53964. Min = -2160.1

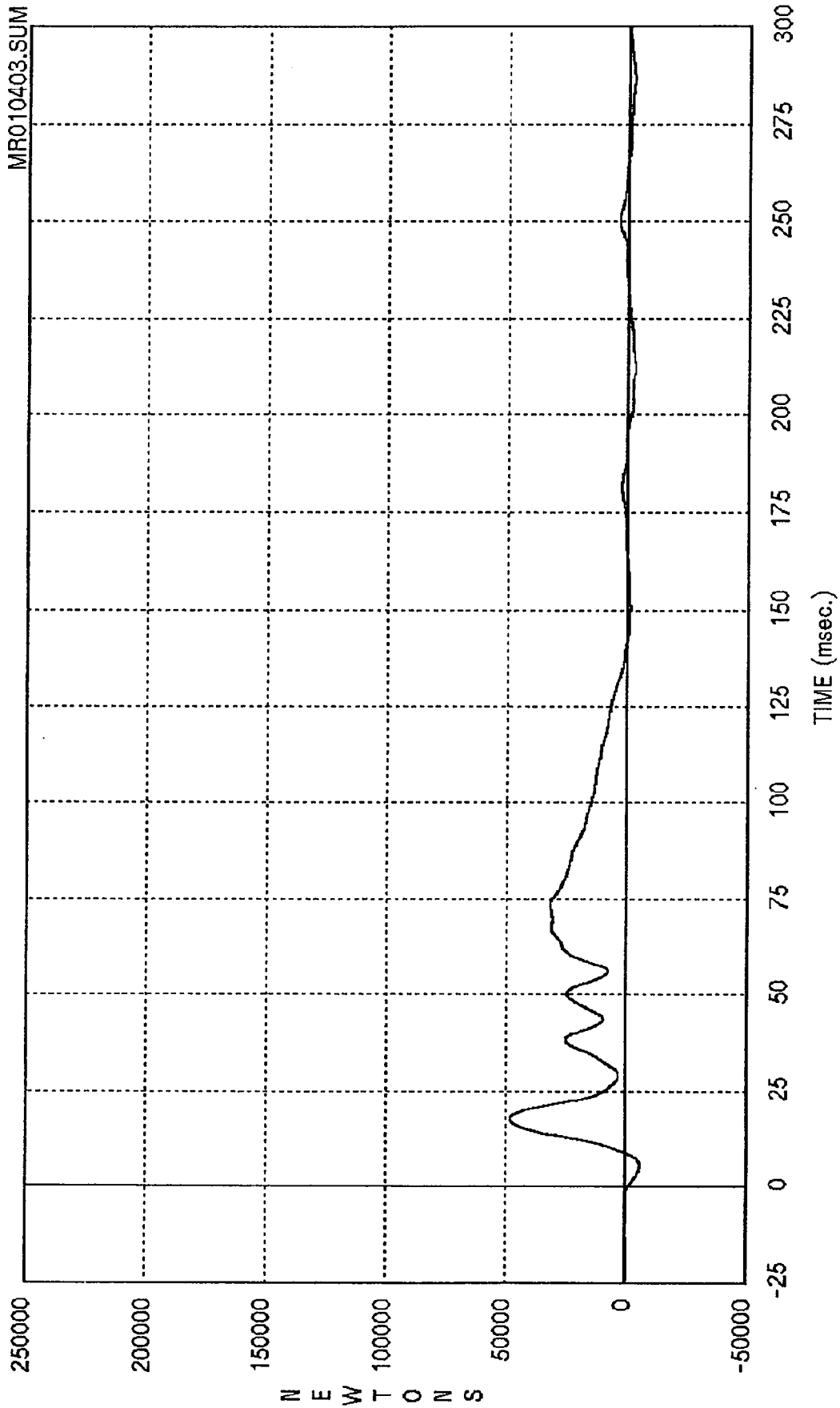
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010402.SUM



Curve: Barrier sum force A4,A5,A6,B4,B5,B6 -- Group 2 -- Filter: SAE CLASS 60 Max = .20679E+06 Min = -1054.8

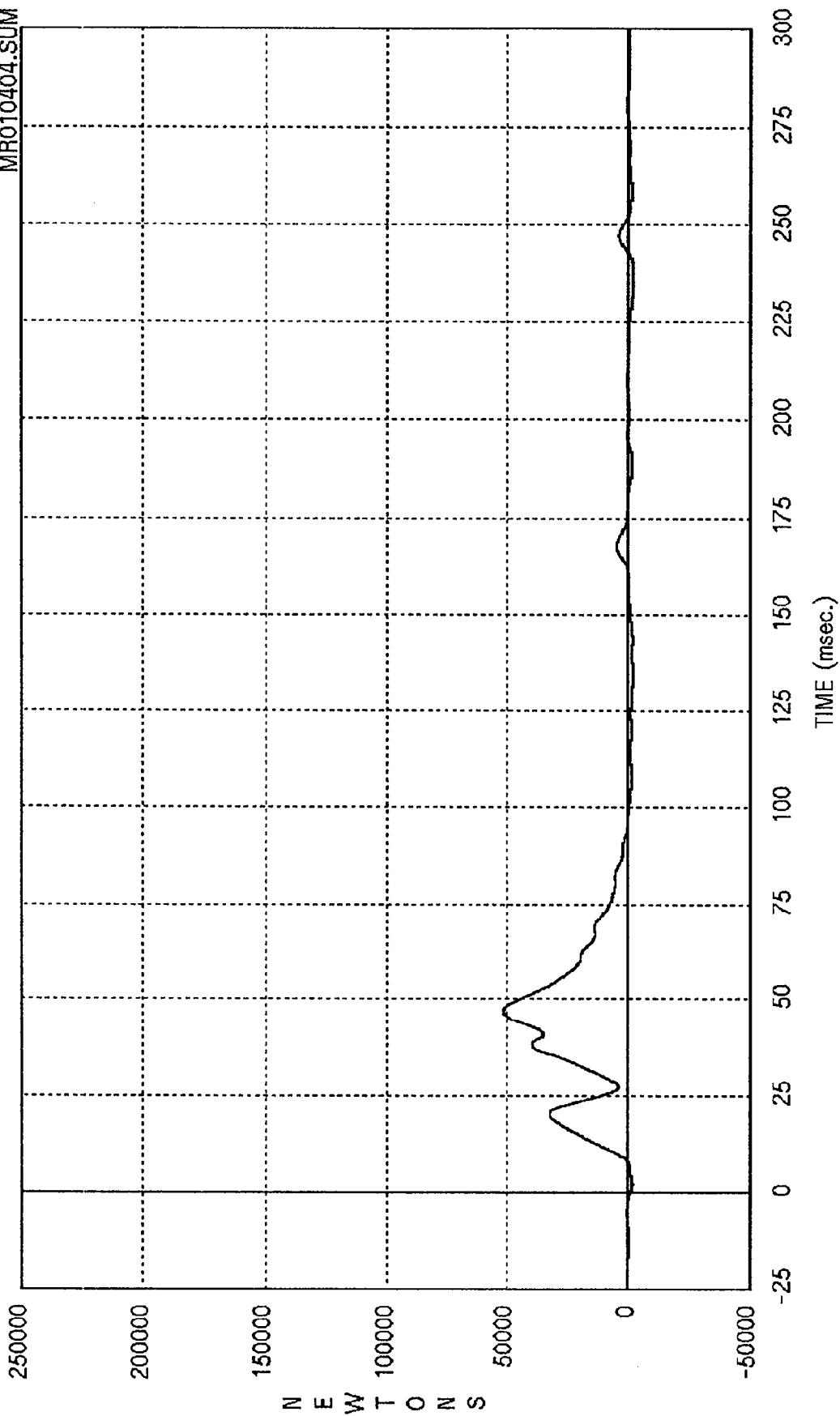
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



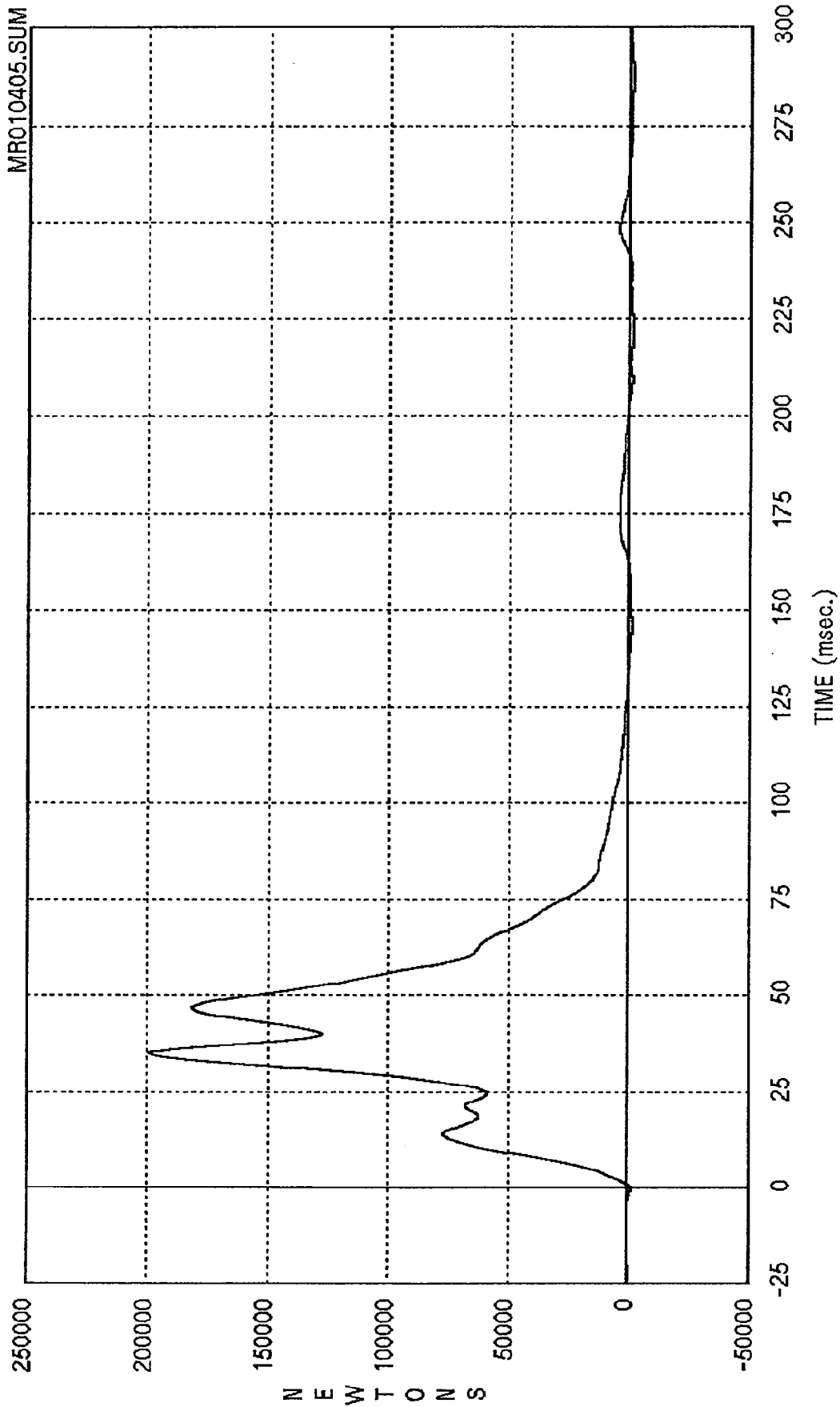
Curve: Barrier sum force A7,A8,A9,B7,B8,B9 -- Group 3 Filter: SAE CLASS 60 Max = 48649. Min = -5724.3

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010404.SUM



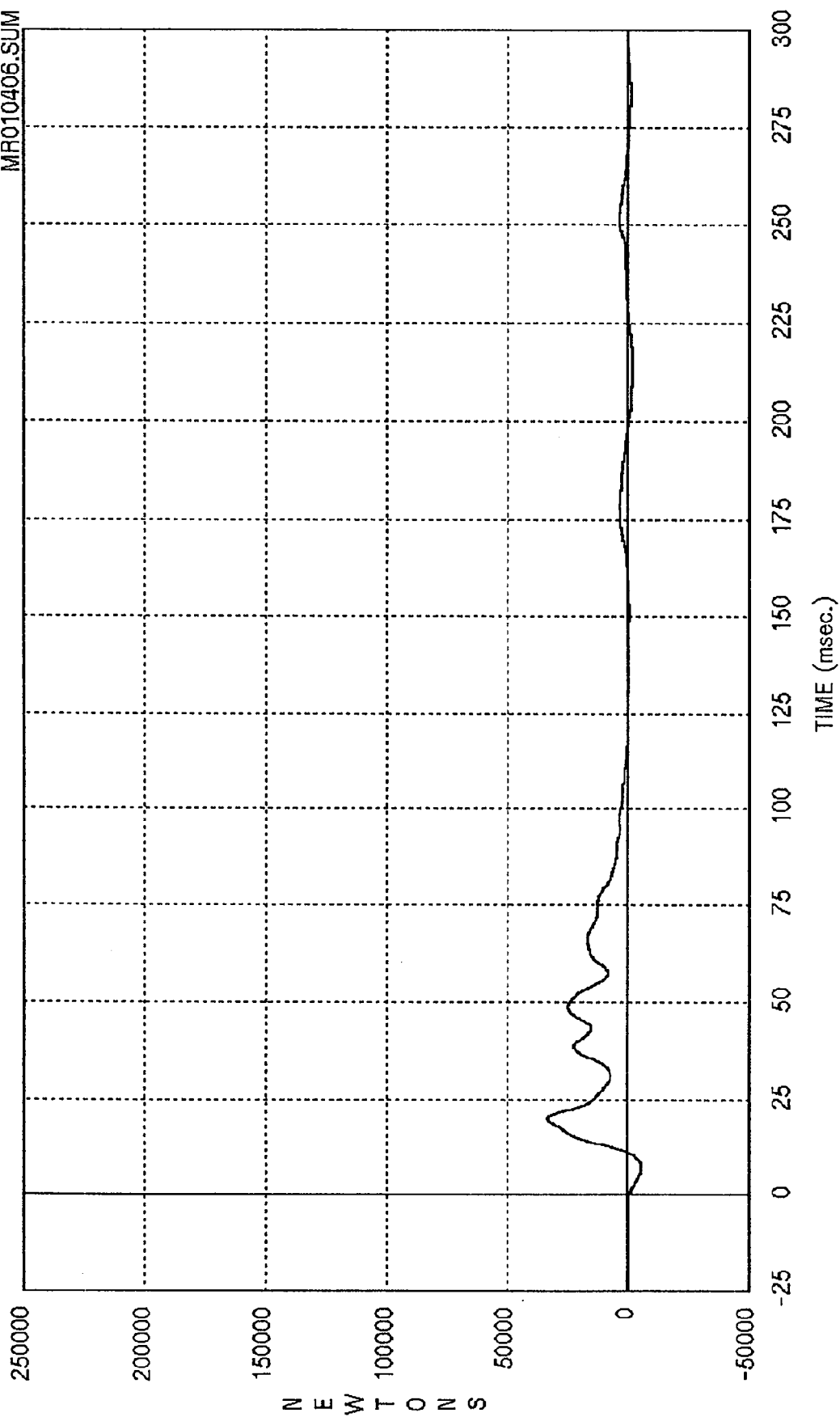
Curve: Barrier sum force C1,C2,C3,D1,D2,D3 -- Group 4 Filter: SAE CLASS.60 Max = 51591. Min = -1765.2
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Barrier sum force C4,C5,C6,D4,D5,D6 -- Group 5 Filter: SAE_CLASS 60 Max = .19905E+06 Min = -1284.1

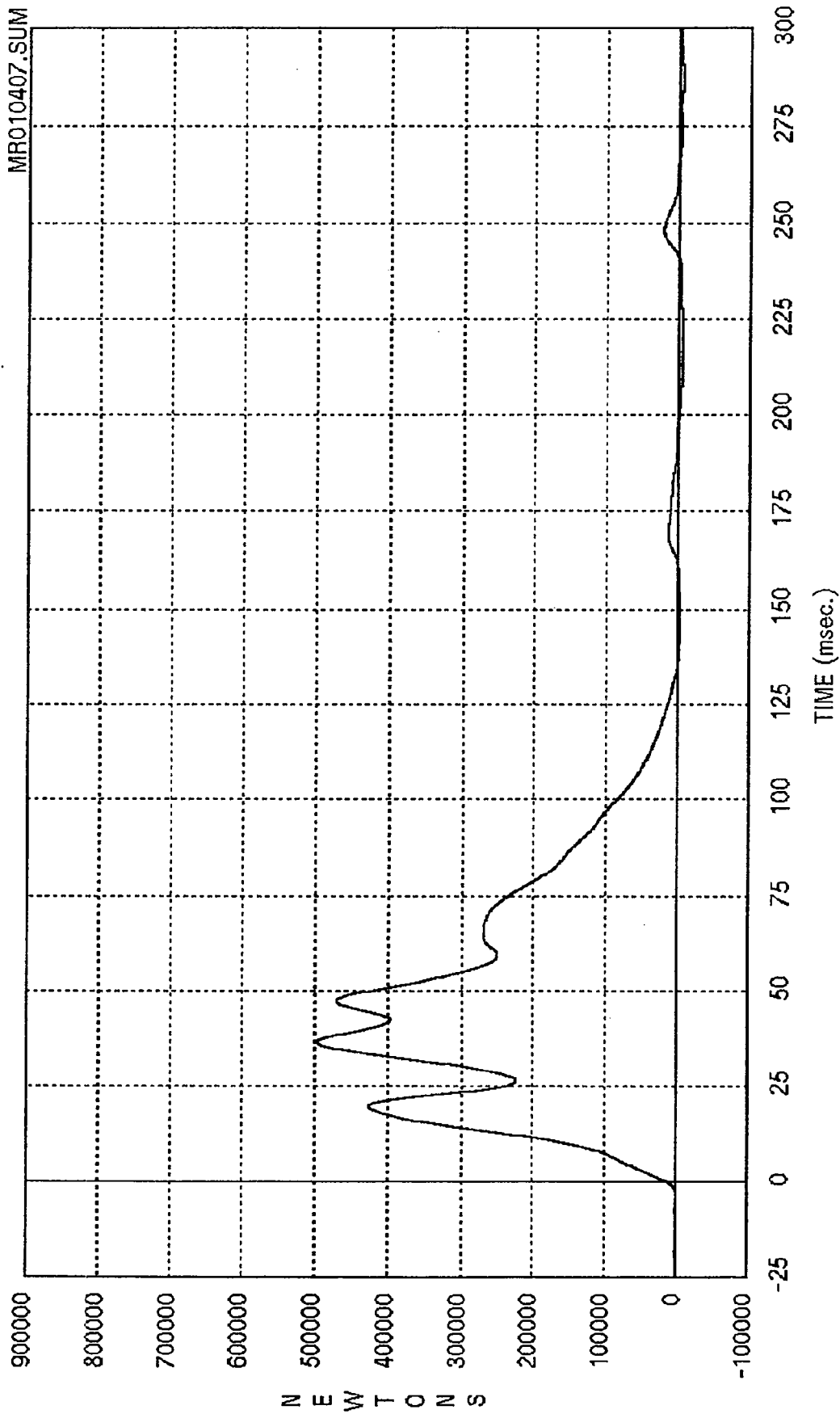
MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

MR010406.SUM



Curve: Barrier sum force C7,C8,C9,D7,D8,D9 -- Group 6 Filter: SAE CLASS 60 Max = 33765. Min = -5428.2

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup



Curve: Barrier sum force -- Total Filter: SAE CLASS 60 Max = .49867E+06 Min = -5598.4

MSE Date: 02/16/94 Program: New Car Assessment Program Vehicle: 1994 Chevrolet S-10 Pickup

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APPENDIX C

PART 572 DUMMY CONFIGURATION AND
PERFORMANCE VERIFICATION TABLES

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HYBRID III ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA

NHTSA ATD I.D. NUMBER: 34

LAB TECHNICIAN: Patrick Puzzuto

CALIBRATION SEQUENCE: 01

CALIBRATION DATE: 12/01/93 to 12/03/93

I. CONFIGURATION VERIFICATION DATA, PRETEST

TESTED PARAMETER	UNIT	SPECIFICATION	TEST RESULTS
AA - Location for Chest Circ.	MM	429.3 to 434.3	431.8
BB - Location for Waist Circ.	MM	226.1 to 231.1	228.6
Y - Chest Circumference	MM	970.3 to 1000.8	985.5
Z - Waist Circumference	MM	815.3 to 866.1	863.6
O - Chest Depth	MM	213.4 to 228.6	215.9
C - "H" Point Height	MM	83.8 to 88.9	88.9
D - "H" Point from Seat Back	MM	134.6 to 139.7	137.2
H - Skull Cap to Back Line	MM	40.6 to 45.7	43.2
A - Total Sitting Height	MM	878.8 to 889.0	881.4
F - Thigh Clearance	MM	139.7 to 154.9	147.3
K - Buttock to Knee Length	MM	579.1 to 604.5	594.4
N - Buttock Popliteal Length	MM	452.1 to 477.5	475.0
L - Popliteal Length	MM	429.3 to 454.7	431.8
M - Knee Pivot Height	MM	485.1 to 500.4	495.3
P - Foot Length	MM	251.5 to 266.7	259.1
W - Foot Breadth	MM	91.4 to 106.7	106.7
E - Shoulder Pivot from Back	MM	84.0 to 94.0	88.9
V - Shoulder Breadth	MM	421.6 to 436.9	421.6
B - Shoulder Pivot Height	MM	505.5 to 520.7	515.6
J - Elbow Rest Height	MM	190.5 to 210.8	198.1
I - Shoulder to Elbow Length	MM	330.2 to 345.4	332.7
G - Elbow Back to Wrist Pivot	MM	330.2 to 345.4	338.6

PART 572E ATD PERFORMANCE AND CALIBRATION DATA

NHTSA ATD I.D. NUMBER: 34

CALIBRATION SEQUENCE: 01

CALIBRATION DATE: 12/03/93

HEAD DROP TEST			
TESTED PARAMETER	UNITS	SPECIFICATION	TEST RESULTS
Temperature in laboratory	Deg C	20.6 - 22.2	21.7
Humidity in laboratory	%	10 - 70	45
Peak resultant acceleration	G's	225 - 275	239.8
Peak lateral acceleration	G's	15 max	10.9
Is acceleration curve unimodal ?		YES	YES

LAB TECHNICIAN: Patrick J. Puzzuto

PART 572 ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA (Cont.)

NHTSA ATD I.D. NUMBER: 34

CALIBRATION SEQUENCE: 01

CALIBRATION DATE: 12/03/93

THORAX IMPACT TEST			
TESTED PARAMETER	UNITS	SPECIFICATION	TEST RESULTS
Temperature in laboratory	Deg C	20.6 - 22.2	21.1
Humidity in laboratory	%	10 - 70	54
Probe speed	MPS	6.58 - 6.83	6.71
Peak deflection	MM	63.5 - 72.6	66.29
Peak resistive force	Kgs	526.6 - 601.6	559.65
Internal hysteresis	%	69 - 89	74.3

LAB TECHNICIAN: P. Puzzuto

PART 572E ATD PERFORMANCE AND CALIBRATION DATA

NECK FLEXION TEST

NHTSA ATD I.D. NUMBER: 34

CALIBRATION SEQUENCE: 01

CALIBRATION DATE: 12/01/93

TESTED PARAMETER		UNITS	SPECIFICATION	TEST RESULTS
Lab temperature		Deg C	20.6 - 22.2	21.1
Lab relative humidity		%	10 - 70	35
Pendulum speed		MPS	6.89 - 7.13	6.90
Pendulum deceleration	10 msec	G's	22.50 - 27.50	24.61
	20 msec	G's	17.60 - 22.60	20.12
	30 msec	G's	12.50 - 18.50	15.24
Max decel. above 30 msec		G's	29.00 max	15.18
Deceleration decay time to first cross 5 G's		msec	34.0 - 42.0	38.90
"D" Plane Rotation	Maximum	Deg.	64.0 - 78.0	64.69
	Time	msec	57.0 - 64.0	63.80
Moment About Occipital Condyle	Maximum	Mt.Kgs	9.0 - 11.1	9.14
	Time	msec	47.0 - 58.0	57.80
Rotation angle decay time to cross zero		msec	113.0 - 128.0	123.90
Positive moment decay time to cross zero		msec	97.0 - 107.0	105.90

LAB TECHNICIAN: P. Puzzuto

PART 572E ATD PERFORMANCE AND CALIBRATION DATA

NECK EXTENSION TEST

NHTSA ATD I.D. NUMBER: 34

CALIBRATION SEQUENCE: 01

CALIBRATION DATE: 12/02/93

TESTED PARAMETER		UNITS	SPECIFICATION	TEST RESULTS
Lab temperature		Deg C	20.6 - 22.2	20.6
Lab relative humidity		%	10 - 70	40
Pendulum speed		MPS	5.94 - 6.19	6.11
Pendulum deceleration	10 msec	G's	17.20 - 21.20	19.64
	20 msec	G's	14.00 - 19.00	17.30
	30 msec	G's	11.00 - 16.00	14.56
Max decel. above 30 msec		G's	22.00 max	14.51
Deceleration decay time to first cross 5 G's		msec	38.0 - 46.0	45.80
"D" Plane	Rotation	Deg.	81.0 - 106.0	94.37
	Time	msec	72.0 - 82.0	74.20
Occipital Condyle	Moment	Mt.Kgs	-8.2 to -5.4	8.01
	Time	msec	65.0 - 79.0	68.90
Rotation angle decay time to cross zero		msec	147.0 - 174.0	159.30
Negative moment decay time to cross zero		msec	120.0 - 148.0	133.30

LAB TECHNICIAN: P. Puzzuto

PART 572E ATD PERFORMANCE AND CALIBRATION DATA

NHTSA ATD I.D. NUMBER: 34

CALIBRATION SEQUENCE: 01

CALIBRATION DATE: 12/02/93

LEFT KNEE IMPACT TEST			
TESTED PARAMETER	UNITS	SPECIFICATION	TEST RESULTS
Lab temperature	Deg C	18.9 - 25.6	22.2
Lab relative humidity	%	10 - 70	27
Probe velocity	MPS	2.07 - 2.13	2.11
Peak impact force (Probe mass x deceleration)	Kgs	481.2- 590.2	545.8

LAB TECHNICIAN: P. Puzzuto

RIGHT KNEE IMPACT TEST			
TESTED PARAMETER	UNITS	SPECIFICATION	TEST RESULTS
Lab temperature	Deg C	18.9 - 25.6	22.2
Lab relative humidity	%	10 - 70	27
Probe velocity	MPS	2.07 - 2.13	2.09
Peak impact force (Probe mass x deceleration)	Kgs	481.2 - 590.2	510.3

LAB TECHNICIAN: P. Puzzuto

HYBRID III ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA

NHTSA ATD I.D. NUMBER: 35

LAB TECHNICIAN: Patrick Puzzuto

CALIBRATION SEQUENCE: 01

CALIBRATION DATE: 12/01/93 to 12/03/93

I. CONFIGURATION VERIFICATION DATA, PRETEST

TESTED PARAMETER	UNIT	SPECIFICATION	TEST RESULTS
AA - Location for Chest Circ.	MM	429.3 to 434.3	431.8
BB - Location for Waist Circ.	MM	226.1 to 231.1	228.6
Y - Chest Circumference	MM	970.3 to 1000.8	985.6
Z - Waist Circumference	MM	815.3 to 866.1	863.6
O - Chest Depth	MM	213.4 to 228.6	215.9
C - "H" Point Height	MM	83.8 to 88.9	88.9
D - "H" Point from Seat Back	MM	134.6 to 139.7	137.2
H - Skull Cap to Back Line	MM	40.6 to 45.7	43.2
A - Total Sitting Height	MM	878.8 to 889.0	881.4
F - Thigh Clearance	MM	139.7 to 154.9	147.3
K - Buttock to Knee Length	MM	579.1 to 604.5	594.4
N - Buttock Popliteal Length	MM	452.1 to 477.5	475.0
L - Popliteal Length	MM	429.3 to 454.7	431.8
M - Knee Pivot Height	MM	485.1 to 500.4	495.3
P - Foot Length	MM	251.5 to 266.7	259.1
W - Foot Breadth	MM	91.4 to 106.7	106.7
E - Shoulder Pivot from Back	MM	84.0 to 94.0	88.9
V - Shoulder Breadth	MM	421.6 to 436.9	421.6
B - Shoulder Pivot Height	MM	505.5 to 520.7	515.6
J - Elbow Rest Height	MM	190.5 to 210.8	198.1
I - Shoulder to Elbow Length	MM	330.2 to 345.4	332.7
G - Elbow Back to Wrist Pivot	MM	330.2 to 345.4	338.6

PART 572E ATD PERFORMANCE AND CALIBRATION DATA

NHTSA ATD I.D. NUMBER: 35

CALIBRATION SEQUENCE: 01

CALIBRATION DATE: 12/03/93

HEAD DROP TEST			
TESTED PARAMETER	UNITS	SPECIFICATION	TEST RESULTS
Temperature in laboratory	Deg C	20.6 - 22.2	21.1
Humidity in laboratory	%	10 - 70	47
Peak resultant acceleration	G's	225 - 275	230.2
Peak lateral acceleration	G's	15 max	4.7
Is acceleration curve unimodal ?		YES	YES

LAB TECHNICIAN: Patrick J. Puzzuto

PART 572 ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA (Cont.)

NHTSA ATD I.D. NUMBER: 35

CALIBRATION SEQUENCE: 01

CALIBRATION DATE: 12/03/93

THORAX IMPACT TEST			
TESTED PARAMETER	UNITS	SPECIFICATION	TEST RESULTS
Temperature in laboratory	Deg C	20.6 - 22.2	21.7
Humidity in laboratory	%	10 - 70	49
Probe speed	MPS	6.58 - 6.83	6.67
Peak deflection	MM	63.5 - 72.6	65.28
Peak resistive force	Kgs	526.6 - 601.6	568.32
Internal hysteresis	%	69 - 89	72.9

LAB TECHNICIAN: P. Puzzuto

PART 572E ATD PERFORMANCE AND CALIBRATION DATA

NECK FLEXION TEST

NHTSA ATD I.D. NUMBER: 35

CALIBRATION SEQUENCE: 01

CALIBRATION DATE: 12/01/93

TESTED PARAMETER		UNITS	SPECIFICATION	TEST RESULTS
Lab temperature		Deg C	20.6 - 22.2	21.1
Lab relative humidity		%	10 - 70	35
Pendulum speed		MPS	6.89 - 7.13	6.89
Pendulum deceleration	10 msec	G's	22.50 - 27.50	23.28
	20 msec	G's	17.60 - 22.60	19.42
	30 msec	G's	12.50 - 18.50	16.50
Max decel. above 30 msec		G's	29.00 max	16.40
Deceleration decay time to first cross 5 G's		msec	34.0 - 42.0	41.50
"D" Plane Rotation	Maximum	Deg.	64.0 - 78.0	72.28
	Time	msec	57.0 - 64.0	60.00
Moment About Occipital Condyle	Maximum	Mt.Kgs	9.0 - 11.1	10.44
	Time	msec	47.0 - 58.0	55.20
Rotation angle decay time to cross zero		msec	113.0 - 128.0	115.10
Positive moment decay time to cross zero		msec	97.0 - 107.0	99.58

LAB TECHNICIAN: P. Puzzuto

PART 572E ATD PERFORMANCE AND CALIBRATION DATA

NECK EXTENSION TEST

NHTSA ATD I.D. NUMBER: 35

CALIBRATION SEQUENCE: 01

CALIBRATION DATE: 12/02/93

TESTED PARAMETER		UNITS	SPECIFICATION	TEST RESULTS
Lab temperature		Deg C	20.6 - 22.2	20.6
Lab relative humidity		%	10 - 70	38
Pendulum speed		MPS	5.94 - 6.19	6.18
Pendulum deceleration	10 msec	G's	17.20 - 21.20	20.97
	20 msec	G's	14.00 - 19.00	18.84
	30 msec	G's	11.00 - 16.00	15.82
Max decel. above 30 msec		G's	22.00 max	15.77
Deceleration decay time to first cross 5 G's		msec	38.0 - 46.0	42.40
"D" Plane	Rotation	Deg.	81.0 - 106.0	99.70
	Time	msec	72.0 - 82.0	72.60
Occipital Condyle	Moment	Mt.Kgs	-8.2 to -5.4	8.04
	Time	msec	65.0 - 79.0	65.30
Rotation angle decay time to cross zero		msec	147.0 - 174.0	151.90
Negative moment decay time to cross zero		msec	120.0 - 148.0	123.20

LAB TECHNICIAN: P. Puzzuto

PART 572E ATD PERFORMANCE AND CALIBRATION DATA

NHTSA ATD I.D. NUMBER: 35

CALIBRATION SEQUENCE: 01

CALIBRATION DATE: 12/02/93

LEFT KNEE IMPACT TEST			
TESTED PARAMETER	UNITS	SPECIFICATION	TEST RESULTS
Lab temperature	Deg C	18.9 - 25.6	22.2
Lab relative humidity	%	10 - 70	27
Probe velocity	MPS	2.07 - 2.13	2.10
Peak impact force (Probe mass x deceleration)	Kgs	481.2- 590.2	557.4

LAB TECHNICIAN: P. Puzzuto

RIGHT KNEE IMPACT TEST			
TESTED PARAMETER	UNITS	SPECIFICATION	TEST RESULTS
Lab temperature	Deg C	18.9 - 25.6	22.2
Lab relative humidity	%	10 - 70	27
Probe velocity	MPS	2.07 - 2.13	2.10
Peak impact force (Probe mass x deceleration)	Kgs	481.2 - 590.2	553.7

LAB TECHNICIAN: P. Puzzuto

APPENDIX D

VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTION

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Safety Belts: They're For Everyone

This part of the manual tells you how to use safety belts properly. It also tells you some things you should not do with safety belts.



CAUTION:

Don't let anyone ride where they can't wear a safety belt properly. If you are in a crash and you're not wearing a safety belt, your injuries can be *much* worse. You can hit things inside the vehicle or be ejected from it. You can be seriously injured or killed. In the same crash, you might not be if you are buckled up. Always fasten your safety belt, and check that your passengers' belts are fastened properly too.



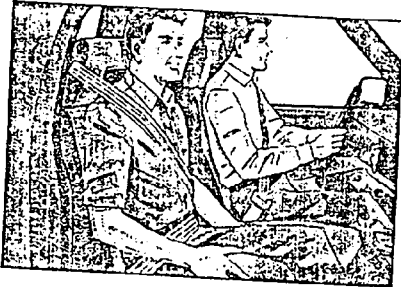
This figure lights up as a reminder to buckle up. (See "Safety Belt Reminder Light" in the Index.)

In many states and Canadian provinces, the law says to wear safety belts. Here's why: *They work.*

You never know if you'll be in a crash. If you do have a crash, you don't know if it will be a bad one.

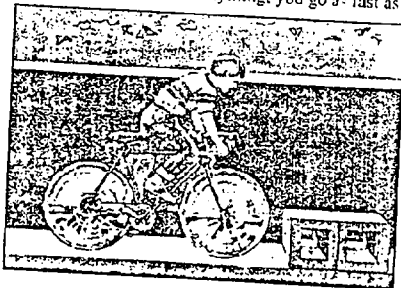
A few crashes are mild, and some crashes can be so serious that even buckled up a person wouldn't survive. But most crashes are in between. In many of them, people who buckle up can survive and sometimes walk away. Without belts they could have been badly hurt or killed.

After more than 25 years of safety belts in vehicles, the facts are clear. In most crashes buckling up does matter ... a lot!

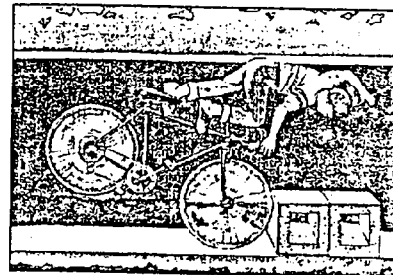


Why Safety Belts Work

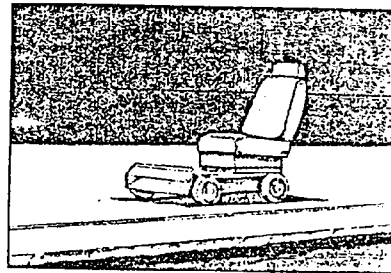
When you ride in or on anything, you go as fast as it goes.



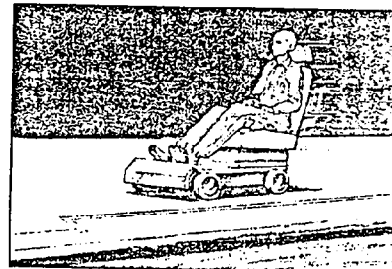
For example, if the bike is going 10 mph (16 km/h), so is the child.



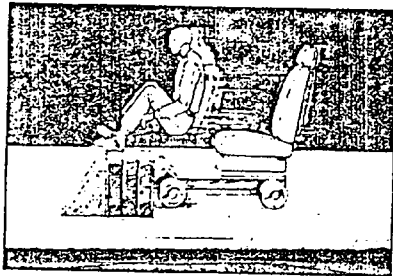
When the bike hits the block, it stops. But the child keeps going!



Take the simplest "vehicle." Suppose it's just a seat on wheels.



Put someone on it.

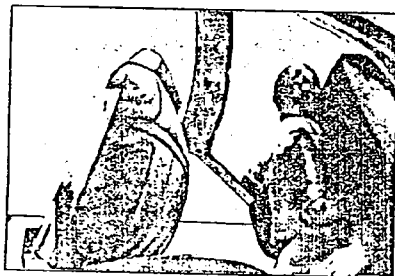


Get it up to speed.
Then stop the
"vehicle." The rider
doesn't stop.



The person keeps
going until stopped by
something.

In a real vehicle, it
could be the
windshield ...



or the instrument
panel ...



or the safety belts!

With safety belts, you slow down as the vehicle does. You get more time to stop. You stop over more distance, and your strongest bones take the forces. That's why safety belts make such good sense.

Here Are Questions Many People Ask About Safety Belts — and the Answers

Q: *Won't I be trapped in the vehicle after an accident if I'm wearing a safety belt?*

A: You *could* be — whether you're wearing a safety belt or not. But you can easily unbuckle a safety belt, even if you're upside down. And your chance of being conscious during and after an accident, so you can unbuckle and get out, is *much* greater if you are belted.

Q: *Why don't they just put in air bags so people won't have to wear safety belts?*

A: Air bags are in some vehicles today and will be in more of them in the future. But they are supplemental systems only — so they work *with* safety belts, not instead of them. Every air bag system ever offered for sale has required the use of safety belts. Even if you're in a vehicle that has air bags, you still have to buckle up to get the most protection. That's true not only in frontal collisions, but especially in side and other collisions.

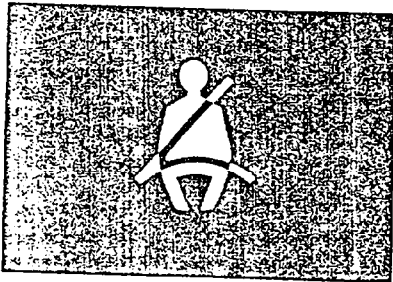
Q: *If I'm a good driver, and I never drive far from home, why should I wear safety belts?*

A: You may be an excellent driver, but if you're in an accident — even one that isn't your fault — you and your passengers can be hurt. Being a good driver doesn't protect you from things beyond your control, such as bad drivers.

Most accidents occur within 25 miles (40 km) of home. And the greatest number of serious injuries and deaths occur at speeds of less than 40 mph (65 km/h).

Safety belts are for everyone.

Safety Belt Reminder Light



When the key is turned to "Run" or "Start," a light will come on for about eight seconds to remind people to fasten their safety belts. Unless the driver's safety belt is already buckled, a tone will also sound.

How To Wear Safety Belts Properly

Adults

This section is only for people of adult size.

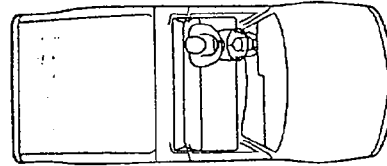
Be aware that there are special things to know about safety belts and children. And there are different rules for smaller children and babies. If a child will be riding in your vehicle, see the section after this one, called "Children." Follow those rules for everyone's protection.

First, you'll want to know which restraint systems your vehicle has.

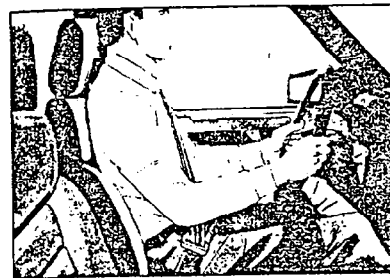
We'll start with the driver position.

Driver Position

This section describes the driver's restraint system.

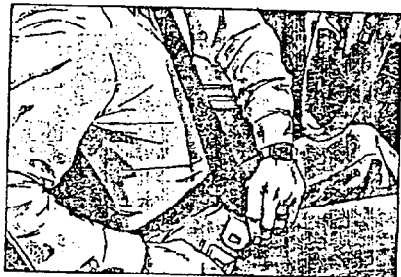


Lap-Shoulder Belt



The driver has a lap-shoulder belt. Here's how to wear it properly.

1. Close and lock the door.
2. Adjust the seat (to see how, see "Seats" in the Index) so you can sit up straight.



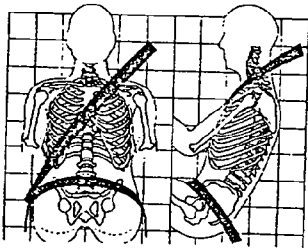
3. Pick up the latch plate and pull the belt across you. Don't let it get twisted.

4. Push the latch plate into the buckle until it clicks.

Pull up on the latch plate to make sure it is secure.

If the belt isn't long enough, see "Safety Belt Extender" at the end of this section.

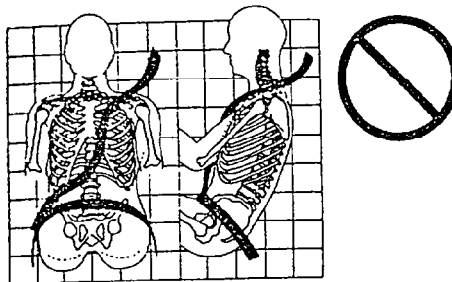
Make sure the release button on the buckle is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.



The lap part of the belt should be worn low and snug on the hips, just touching the thighs. In a crash, this applies force to the strong pelvic bones. And you'd be less likely to slide under the lap belt. If you slid under it, the belt would apply force at your abdomen. This could cause serious or even fatal injuries. The shoulder belt should go over the shoulder and across the chest. These parts of the body are best able to take belt restraining forces.

The safety belt locks if there's a sudden stop or a crash.

Q: What's wrong with this?

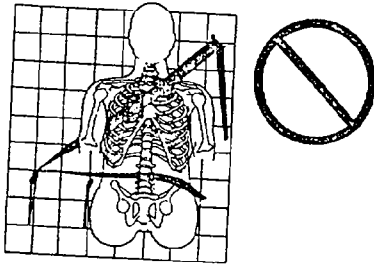


A: The shoulder belt is too loose. It won't give nearly as much protection this way.

⚠ CAUTION:

You can be seriously hurt if your shoulder belt is too loose. In a crash you would move forward too much, which could increase injury. The shoulder belt should fit against your body.

Q: What's wrong with this?



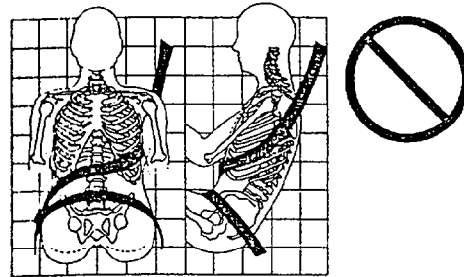
A: The belt is buckled in the wrong place.

⚠ CAUTION:

You can be seriously injured if your belt is buckled in the wrong place like this. In a crash, the belt would go up over your abdomen. The belt forces would be there, not at the pelvic bones. This could cause serious internal injuries. Always buckle your belt into the buckle nearest you.

1-16

Q: What's wrong with this?

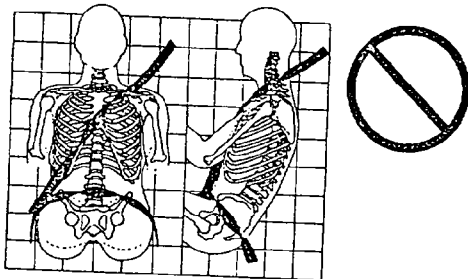


A: The shoulder belt is worn under the arm. It should be worn over the shoulder at all times.

⚠ CAUTION:

You can be seriously injured if you wear the shoulder belt under your arm. In a crash, your body would move too far forward, which would increase the chance of head and neck injury. Also, the belt would apply too much force to the ribs, which aren't as strong as shoulder bones. You could also severely injure internal organs like your liver or spleen.

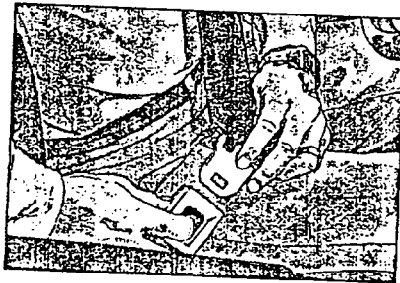
Q: What's wrong with this?



A: The belt is twisted across the body.

⚠ CAUTION:

You can be seriously injured by a twisted belt. In a crash, you wouldn't have the full width of the belt to spread impact forces. If a belt is twisted, make it straight so it can work properly, or ask your dealer to fix it.



To unlatch the belt, just push the button on the buckle. The belt should go back out of the way.

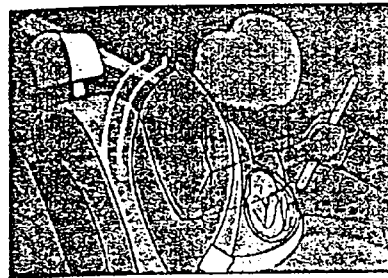
Before you close the door, be sure the belt is out of the way. If you slam the door on it, you can damage both the belt and your vehicle.

1-18

Safety Belt Use During Pregnancy

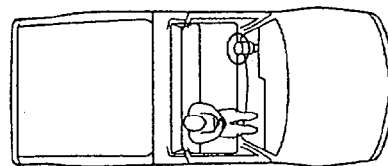
Safety belts work for everyone, including pregnant women. Like all occupants, they are more likely to be seriously injured if they don't wear safety belts.

A pregnant woman should wear a lap-shoulder belt, and the lap portion should be worn as low as possible throughout the pregnancy.



The best way to protect the fetus is to protect the mother. When a safety belt is worn properly, it's more likely that the fetus won't be hurt in a crash. For pregnant women, as for anyone, the key to making safety belts effective is wearing them properly.

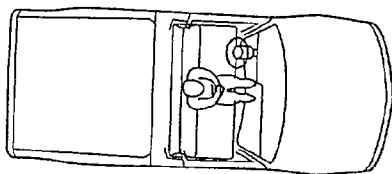
Right Front Passenger Position



The right front passenger's safety belt works the same way as the driver's safety belt. See "Driver Position," earlier in this part.

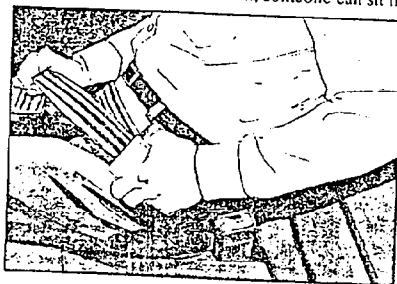
When the shoulder belt is pulled out all the way, it will lock. If it does, let it go back all the way and start again.

Center Passenger Position (Bench Seat)



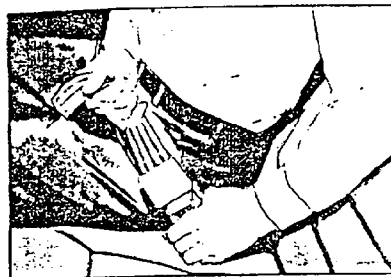
Lap Belt

If your vehicle has a bench seat, someone can sit in the center position.



When you sit in a center seating position, you have a lap safety belt, which has no retractor. To make the belt longer, tilt the latch plate and pull it along the belt.

1-20

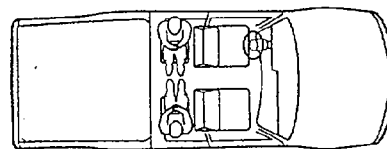


To make the belt shorter, pull its free end as shown until the belt is snug.

Buckle, position and release it the same way as the lap part of a lap-shoulder belt. If the belt isn't long enough, see "Safety Belt Extender" at the end of this section.

Make sure the release button on the buckle is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.

Rear Seat Passengers (Extended Cab Jump Seats)



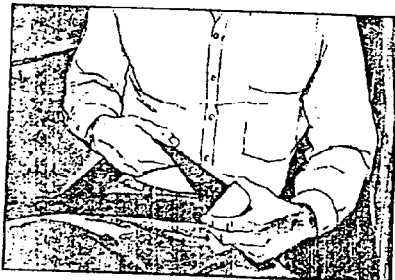
Lap Belt

These are reserve seating positions equipped with lap belts only.

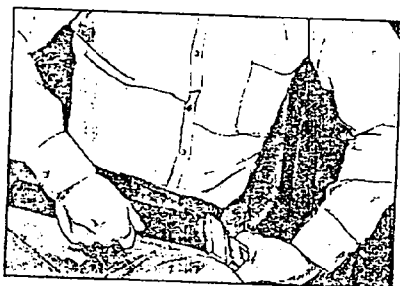
It's very important for rear seat passengers to buckle up! Accident statistics show that unbelted people in the rear seat are hurt more often in crashes than those who are wearing safety belts.

1-21

Rear passengers who aren't safety belted can be thrown out of the vehicle in a crash. And they can strike others in the vehicle who are wearing safety belts.



Each jump seat has a lap belt with no retractor. To make the belt longer, tilt the latch plate a little and pull the belt.



To make it shorter, pull the belt as shown until it is snug.

Buckle, position and release it the same way as the lap part of the driver's safety belt (see "Driver Position" in the Index). Make sure the buckle is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.

Don't use child restraints on these seats. They won't work properly.

1-22

Children



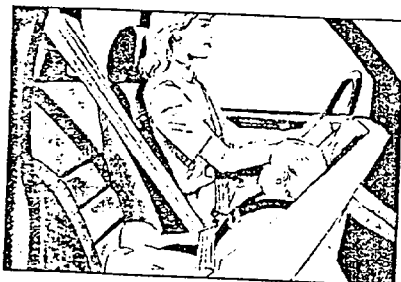
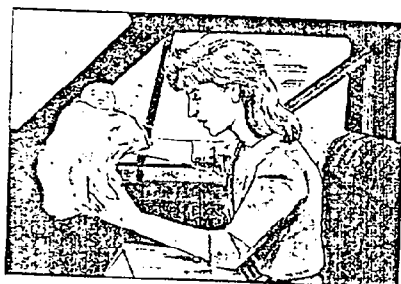
Everyone in a vehicle needs protection! That includes infants and all children smaller than adult size. In fact, the law in every state in the United States and in every Canadian province says children up to some age must be restrained while in a vehicle.

Smaller Children and Babies

CAUTION:

Smaller children and babies should always be restrained in a child or infant restraint. The instructions for the restraint will say whether it is the right type and size for your child. A very young child's hip bones are so small that a regular belt might not stay low on the hips, as it should. Instead, the belt will likely be over the child's abdomen. In a crash the belt would apply force right on the child's abdomen, which could cause serious or fatal injuries. So, be sure that any child small enough for one is always properly restrained in a child or infant restraint.

1-23



CAUTION:

Never hold a baby in your arms while riding in a vehicle. A baby doesn't weigh much — until a crash. During a crash a baby will become so heavy you can't hold it. For example, in a crash at only 25 mph (40 km/h), a 12-pound (5.5 kg) baby will suddenly become a 240-pound (110 kg) force on your arms. The baby would be almost impossible to hold.

Secure the baby in an infant restraint.

1-24

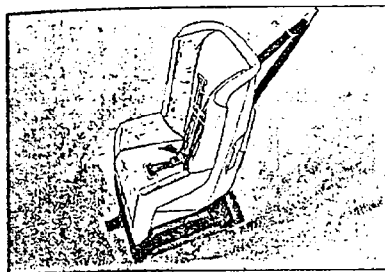
Child Restraints

Be sure to follow the instructions for the restraint. You may find these instructions on the restraint itself or in a booklet, or both. These restraints use the belt system in your vehicle, but the child also has to be secured within the restraint to help reduce the chance of personal injury. The instructions that come with the infant or child restraint will show you how to do that.

The child restraint must be secured properly in the center (except 60/40 bench seat) or right front passenger seat. If you have a 60/40 split bench seat, you must use the right front passenger seat.

Keep in mind that an unsecured child restraint can move around in a collision or sudden stop and injure people in the vehicle. Be sure to properly secure any child restraint in your vehicle — even when no child is in it.

Top Strap



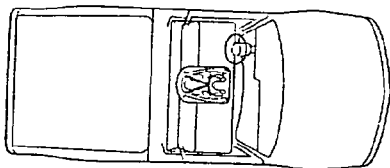
If your child restraint has a top strap, it should be anchored.

If you need to have an anchor installed, you can ask your vehicle dealer to put it in for you. If you want to install an anchor yourself, your dealer can tell you how to do it.

1-25

Securing a Child Restraint in the Center Front Seat Position (Bench Seat – Except 60/40 Bench Seat)

Don't use child restraints in the center position of a 60/40 bench seat.



When you secure a child restraint in a center seating position, you'll be using the lap belt.

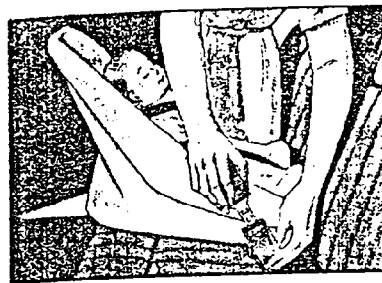
See the earlier section about the top strap if the child restraint has one.



1. Make the belt as long as possible by tilting the latch plate and pulling it along the belt.

2. Put the restraint on the seat. Follow the instructions for the child restraint.
3. Secure the child in the child restraint as the instructions say.
4. Run the vehicle's safety belt through or around the restraint. The child restraint instructions will show you how.

1-26



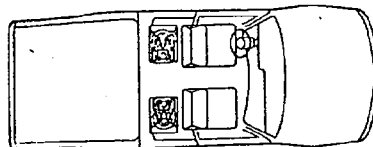
5. Buckle the belt. Make sure the release button is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.

6. To tighten the belt, pull its free end while you push down on the child restraint.
7. Push and pull the child restraint in different directions to be sure it is secure. If the child restraint isn't secure, turn the latch plate over and buckle it again. Then see if it is secure. If it isn't, secure the restraint in a different place in the vehicle and contact the child restraint maker for their advice about how to attach the child restraint properly.

To remove the child restraint, just unbuckle the vehicle's safety belt. It will be ready to work for an adult or larger child passenger.

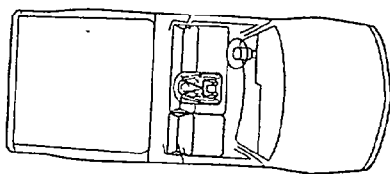
Jump Seats (Extended Cab)

Don't use child restraints in these positions. The restraints won't work properly.



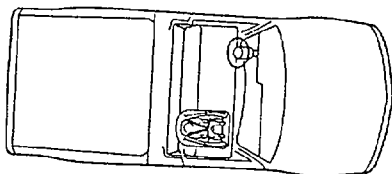
1-27

60/40 Split Bench Seats



Don't use a child restraint in this position. The restraint won't work properly.

Securing a Child Restraint in the Right Front Seat Position

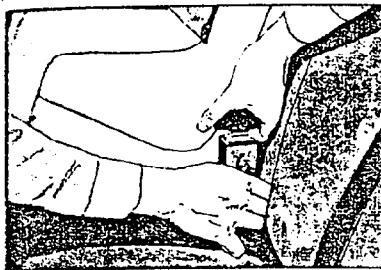


You'll be using the lap-shoulder belt. See the earlier section about the top strap if the child restraint has one.

1. Put the restraint on the seat. Follow the instructions for the child restraint.
2. Secure the child in the child restraint as the instructions say.
3. Pick up the latch plate, and run the lap and shoulder portions of the vehicle's safety belt through or around the restraint. The child restraint instructions will show you how.

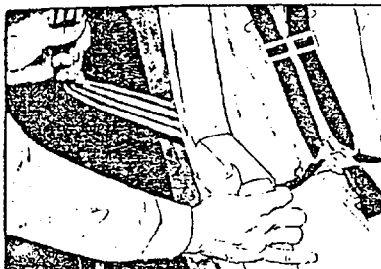
1-28

If the shoulder belt goes in front of the child's face or neck, put it behind the child restraint.

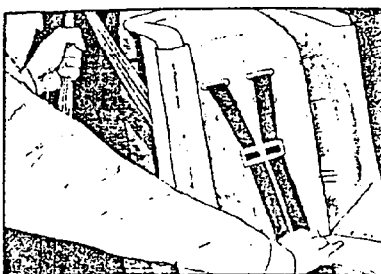


4. Buckle the belt.

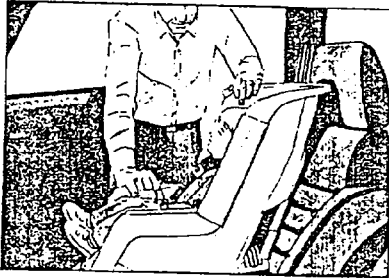
Make sure the release button is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.



5. Pull the rest of the shoulder belt all the way out of the retractor to set the lock.



6. To tighten the belt, feed the shoulder belt back into the retractor while you push down on the child restraint.



7. Push and pull the child restraint in different directions to be sure it is secure.

To remove the child restraint, just unbuckle the vehicle's safety belt and let it go back all the way.

The safety belt will move freely again and be ready to work for an adult or larger child passenger.

Larger Children

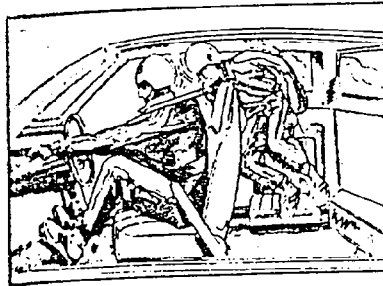


Children who have outgrown child restraints should wear the vehicle's safety belts.

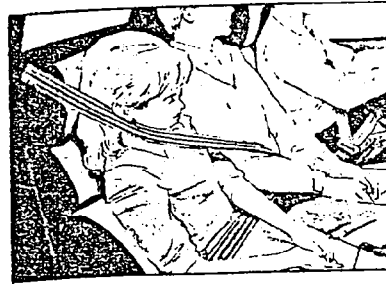
If you have the choice, a child should sit next to a window so the child can wear a lap-shoulder belt and get the additional restraint a shoulder belt can provide.

- Children who aren't buckled up can be thrown out in a crash.

1-30



- Children who aren't buckled up can strike other people who are.



⚠ CAUTION:

Never do this.

Here two children are wearing the same belt. The belt can't properly spread the impact forces. In a crash, the two children can be crushed together and seriously injured. A belt must be used by only one person at a time.

1-31

Q: What if a child is wearing a lap-shoulder belt, but the child is so small that the shoulder belt is very close to the child's face or neck?

A: Move the child toward the center of the vehicle, but be sure that the shoulder belt still is on the child's shoulder, so that in a crash the child's upper body would have the restraint that belts provide. If the child is so small that the shoulder belt is still very close to the child's face or neck, you might want to place the child in a seat that has a lap belt, if your vehicle has one.



⚠ CAUTION:

Never do this.

Here a child is sitting in a seat that has a lap-shoulder belt, but the shoulder part is behind the child. If the child wears the belt in this way, in a crash the child might slide under the belt. The belt's force would then be applied right on the child's abdomen. That could cause serious or fatal injuries.

Wherever the child sits, the lap portion of the belt should be worn low and snug on the hips, just touching the child's thighs. This applies belt force to the child's pelvic bones in a crash.

Safety Belt Extender

If the vehicle's safety belt will fasten around you, you should use it.

But if a safety belt isn't long enough to fasten, your dealer will order you an extender. It's free. When you go in to order it, take the heaviest coat you will wear, so the extender will be long enough for you. The extender will be just for you, and just for the seat in your vehicle that you choose. Don't let someone else use it, and use it only for the seat it is made to fit. To wear it, just attach it to the regular safety belt.

Checking Your Restraint Systems

Now and then, make sure all your belts, buckles, latch plates, retractors, air bag(s) and reminder systems are working properly. Look for any loose parts or damage. If you see anything that might keep a restraint system from doing its job, have it repaired.

Replacing Safety Belts After a Crash

If you've had a crash, do you need new belts?

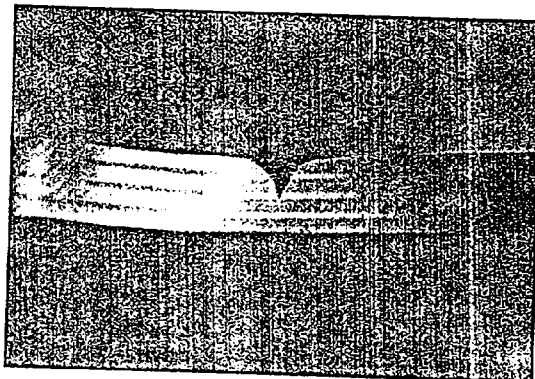
After a very minor collision, nothing may be necessary. But if the belts were stretched, as they would be if worn during a more severe crash, then you need new belts.

If you ever see a label on the driver's safety belt that says to replace the belt, be sure to do so. Then the new belt will be there to help protect you in an accident. You would see this label on the belt near the door opening.



If belts are cut or damaged, replace them. Collision damage also may mean you will need to have safety belt or seat parts repaired or replaced. New parts and repairs may be necessary even if the belt wasn't being used at the time of the collision.

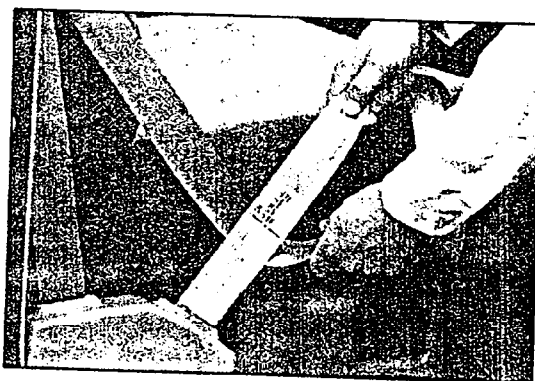
Q: What's wrong with this?



A: The belt is torn.

Torn or frayed belts may not protect you in a crash. They can rip apart under impact forces. If a belt is torn or frayed, get a new one right away.

Before replacing any safety belt, see your dealer for the correct part number. You'll need the model year and model number for your vehicle. The model year is on your title and registration. And you can find the model number on the Certification/Tire label of your vehicle. See "Certification/Tire Label" in the Index.



The model number on the replacement belt must be listed on the safety belt you want to replace.

Pull shoulder belt all the way out to see this label.

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APPENDIX E
INSTRUMENTATION AND CALIBRATION DATA

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INSTRUMENTATION AND CALIBRATION DATA

DRIVER ATD SN 34

CH#	TYP	LOCATION/AXIS		MAKE	MODEL/SERIAL No	CAL DATE
01	AC	HEAD C.G.	X	ENDEVCO	7264-2000/ACC59	11/01/93
02	AC	HEAD C.G.	Y	ENDEVCO	7264-2000/ACCD1	11/01/93
03	AC	HEAD C.G.	Z	ENDEVCO	7264-2000/ACC62	11/01/93
04	AC	CHEST	X	ENDEVCO	7264-2000/ACC65	11/01/93
05	AC	CHEST	Y	ENDEVCO	7264-2000/ACC66	11/01/93
06	AC	CHEST	Z	ENDEVCO	7264-2000/ACC67	11/01/93
07	LC	NECK FORCE	X	R.A. DENTON	1716A/0400FX	11/02/93
08	LC	NECK FORCE	Y	R.A. DENTON	1716A/0440FY	11/02/93
09	LC	NECK FORCE	Z	R.A. DENTON	1716A/0440FZ	11/02/93
10	LC	NECK MOMENT	X	R.A. DENTON	1716A/0440MX	11/02/93
11	LC	NECK MOMENT	Y	R.A. DENTON	1716A/0440MY	11/02/93
12	LC	NECK MOMENT	Z	R.A. DENTON	1716A/0440MZ	11/02/93
13	LC	LEFT FEMUR	X	R.A. DENTON	2121A/0255	11/09/93
14	LC	RIGHT FEMUR	X	R.A. DENTON	2121A/0256	11/09/93
15	DS	CHEST DISP.	X	SERVO	14CBI-2897/9241	12/02/93
16	LC	LAP BELT	OT	LEBOW	3371/330	11/09/93
17	LC	SHOULDER BELT	OT	LEBOW	3371/308	11/09/93
18	DS	BELT ELONG.	OT	ETI	LPC 12A-12/001	02/16/94
19	DS	BELT PULLOUT	OT	MSE	701-36/113	02/16/94

INSTRUMENTATION AND CALIBRATION DATA

PASSENGER ATD SN 35

CH#	TYP	LOCATION/AXIS		MAKE	MODEL/SERIAL No	CAL DATE
20	AC	HEAD C.G.	X	ENDEVCO	7264-2000/ACC63	11/01/93
21	AC	HEAD C.G.	Y	ENDEVCO	7264-2000/ACCC9	11/01/93
22	AC	HEAD C.G.	Z	ENDEVCO	7264-2000/ACCY2	11/01/93
23	AC	CHEST	X	ENDEVCO	7264-2000/ACCF3	11/01/93
24	AC	CHEST	Y	ENDEVCO	7264-2000/ACC02	11/01/93
25	AC	CHEST	Z	ENDEVCO	7264-2000/ACC67	11/01/93
26	LC	NECK FORCE	X	R.A. DENTON	1716A/0400FX	11/02/93
27	LC	NECK FORCE	Y	R.A. DENTON	1716A/0440FY	11/02/93
28	LC	NECK FORCE	Z	R.A. DENTON	1716A/0440FZ	11/02/93
29	LC	NECK MOMENT	X	R.A. DENTON	1716A/0440MX	11/02/93
30	LC	NECK MOMENT	Y	R.A. DENTON	1716A/0440MY	11/02/93
31	LC	NECK MOMENT	Z	R.A. DENTON	1716A/0440MZ	11/02/93
32	LC	LEFT FEMUR	X	R.A. DENTON	2121A/0263	11/09/93
33	LC	RIGHT FEMUR	X	R.A. DENTON	2121A/0264	11/09/93
34	DS	CHEST DISP.	X	SERVO	14CBI-2897/9242	12/02/93
35	LC	LAP BELT	OT	LEBOW	3371/333	11/09/93
36	LC	SHOULDER BELT	OT	LEBOW	3371/327	11/09/93
37	DS	BELT ELONG.	OT	ETI	LCP-12A-12/002	02/16/94
38	DS	BELT PULLOUT	OT	CELESCO	PT0620	02/16/94

INSTRUMENTATION AND CALIBRATION DATA

VEHICLE

CH#	TYP	LOCATION/AXIS	MAKE	MODEL/SERIAL No	CAL DATE
39	AC	Lt. Fr. Caliper X	I. C. Sensor	3031-200/23-200	11/02/93
40	AC	Rt. Fr. Caliper X	I. C. Sensor	3031-200/34-200	11/02/93
41	AC	Engine Bottom X	I. C. Sensor	3031-200/21-200	11/02/93
42	AC	Engine Top X	I. C. Sensor	3031-200/29-200	11/02/93
43	AC	Instr. Panel X	I. C. Sensor	3031-200/27-200	11/02/93
44	AC	LfRr X-mbr Pri X	I. C. Sensor	3031-200/25-200	11/02/93
45	AC	RtRr X-mbr Pri X	I. C. Sensor	3031-200/26-200	11/02/93
46	AC	LfRr X-mbr Sec X	I. C. Sensor	3031-200/28-200	11/02/93
47	AC	RtRr X-mbr Sec X	I. C. Sensor	3031-200/26-200	11/02/93

INSTRUMENTATION AND CALIBRATION DATA

LOAD CELL BARRIER

CH#	TYP	LOCATION/AXIS	MAKE	MODEL/SERIAL No	CAL DATE
48	LC	A1 XG	Interface	1220-F3/19349	05/14/85
49	LC	A2 XG	Interface	1220-F3/19349	05/14/85
50	LC	A3 XG	Interface	1220-F3/19349	05/14/85
51	LC	A4 XG	Interface	1220-F3/19349	05/14/85
52	LC	A5 XG	Interface	1220-F3/19349	05/14/85
53	LC	A6 XG	Interface	1220-F3/19349	05/14/85
54	LC	A7 XG	Interface	1220-F3/19349	05/14/85
55	LC	A8 XG	Interface	1220-F3/19349	05/14/85
56	LC	A9 XG	Interface	1220-F3/19349	05/14/85
57	LC	B1 XG	Interface	1220-F3/19349	05/14/85
58	LC	B2 XG	Interface	1220-F3/19349	05/14/85
59	LC	B3 XG	Interface	1220-F3/19349	05/14/85
60	LC	B4 XG	Interface	1220-F3/19349	05/14/85
61	LC	B5 XG	Interface	1220-F3/19349	05/14/85
62	LC	B6 XG	Interface	1220-F3/19349	05/14/85
63	LC	B7 XG	Interface	1220-F3/19349	05/14/85
64	LC	B8 XG	Interface	1220-F3/19349	05/14/85
65	LC	B9 XG	Interface	1220-F3/19349	05/14/85

INSTRUMENTATION AND CALIBRATION DATA

LOAD CELL BARRIER

CH#	TYP	LOCATION/AXIS	MAKE	MODEL/SERIAL No	CAL DATE
66	LC	C1 XG	Interface	1220-F3/19349	05/14/85
67	LC	C2 XG	Interface	1220-F3/19349	05/14/85
68	LC	C3 XG	Interface	1220-F3/19349	05/14/85
69	LC	C4 XG	Interface	1220-F3/19349	05/14/85
70	LC	C5 XG	Interface	1220-F3/19349	05/14/85
71	LC	C6 XG	Interface	1220-F3/19349	05/14/85
72	LC	C7 XG	Interface	1220-F3/19349	05/14/85
73	LC	C8 XG	Interface	1220-F3/19349	05/14/85
74	LC	C9 XG	Interface	1220-F3/19349	05/14/85
75	LC	D1 XG	Interface	1220-F3/19349	05/14/85
76	LC	D2 XG	Interface	1220-F3/19349	05/14/85
77	LC	D3 XG	Interface	1220-F3/19349	05/14/85
78	LC	D4 XG	Interface	1220-F3/19349	05/14/85
79	LC	D5 XG	Interface	1220-F3/19349	05/14/85
80	LC	D6 XG	Interface	1220-F3/19349	05/14/85
81	LC	D7 XG	Interface	1220-F3/19349	05/14/85
82	LC	D8 XG	Interface	1220-F3/19349	05/14/85
83	LC	D9 XG	Interface	1220-F3/19349	05/14/85

CALIBRATION DATA FOR INSTRUMENTATION
USED IN ATD CALIBRATION

ATD INSTRUMENTS	MANUFACTURER	MODEL/SERIAL No	CAL DATE	DUE
Chest Deflection Pot	BECKMAN	5311 / N/A	EACH USE	EACH USE
Chest Impactor Accelerometer	ENTRAN	EGV-1/14N3N-V13-1	09/14/93	03/14/94
Neck Pendulum Accelerometer	ENTRAN	EGV-1/14N3N-V13-1	09/14/93	03/14/94
Neck Rotation No. 2	BECKMAN	5311 / N/A	EACH USE	EACH USE
Neck Rotation No. 1	BECKMAN	5311 / N/A	EACH USE	EACH USE
Neck Extension Pot	BOURNS	80294-20518 184020/1684-067	EACH USE	EACH USE
Abdominal Compression Load	LEBOW/EATON	3167 /1573	09/14/93	03/14/94
Lumbar Flexion Load	LEBOW/EATON	3167 / 1573	09/14/93	03/14/94
Lumbar Rotation	BOURNS	3590S-2-102/ N/A	EACH USE	EACH USE
Abdominal Displacement	CELESCO	PT-101-158/0786551	EACH USE	EACH USE
Timer	MSE	MSE TIM/1	02/11/94	08/11/94
Time Trap	MSE	1 IN./1	02/11/94	08/11/94