

**NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST**

TOYOTA MOTOR CORPORATION
1993 TOYOTA 4 RUNNER
4 WHEEL DRIVE, 4 DOOR WAGON
NHTSA NO. MP5103

MOBILITY SYSTEMS AND EQUIPMENT COMPANY
9920 LA CIENEGA BOULEVARD SUITE 708
INGLEWOOD, CALIFORNIA 90301



DECEMBER 24, 1992

FINAL REPORT

Prepared For:

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF MARKET INCENTIVES
400 Seventh Street, S.W.
Room No. 5313 (NRM-22)
Washington, DC 20590

This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

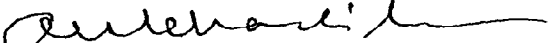
Prepared by: Dr. Anil V. Khadilkar, Program Manager

Mr. Brian O'Keefe, Test Engineer

Mr. Jerry Kratzke, Test Engineer

Mr. Patrick Puzzuto, Instrumentation

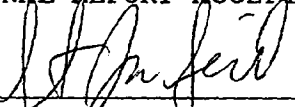
MOBILITY SYSTEMS AND EQUIPMENT COMPANY

Approved by: 

Dr. Anil V. Khadilkar

Date: 24 December 1992

FINAL REPORT ACCEPTED BY:


Manager, New Car Assessment Program

MAR 08 1993

Date of Report Acceptance


COTR, New Car Assessment Program

MAR 08 1993

Date of Report Acceptance

Technical Report Documentation Page

1. Report No. MSE-93-N04		2. Government Accession No.		3. Recipient's Catalog No.													
4. Title and Subtitle New Car Assessment Program Frontal Barrier Impact Test 1993 Toyota 4Runner 4WD Wagon NHTSA No. MP5103				5. Report Date December 24, 1992													
				6. Performing Organization Code MSE													
7. Author(s) Dr. A. V. Khadilkar / Mr. Brian O'Keefe / Mr. Patrick Puzzuto / Mr. Jerry Kratzke				8. Performing Organization Report No. R92083-04													
9. Performing Organization Name and Address Mobility Systems and Equipment Company 9920 La Cienega Boulevard, Suite 708 Inglewood, California, 90301				10. Work unit No.													
				11. Contract or Grant No. DTNH22-90-D-32121,D.O.#5													
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Market Incentives (NRM-20) 400 Seventh Street, S.W., Room 5313 Washington, D.C., 20590				13. Type of Report and Period Covered FINAL													
				14. Sponsoring Agency Code DOT/NHTSA/RM/OMI													
15. Supplementary Notes																	
16. Abstract A 35 MPH Frontal barrier impact test using a load cell barrier was conducted on a 1993 Toyota 4Runner 4WD Wagon at the Mobility Systems and Equipment Company (MSE) crash test facility in San Bernardino, CA, on December 9, 1992. The impact velocity was 56.55 km/h, and the ambient temperature at the barrier face at the time of impact was 13 degrees C. The vehicle's maximum post-test static crush was 521 mm. 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>1267.0</td> <td>581.8</td> </tr> <tr> <td>Chest Resultant Peak 60 G's (3 msec clip)</td> <td>59.9</td> <td>45.6</td> </tr> <tr> <td>Femur Force Left 10009 N Right</td> <td>7371.6 6807.0</td> <td>2333.5 2543.4</td> </tr> </tbody> </table>						Injury Criteria Threshold Value	Driver Dummy	Passenger Dummy	Head Injury Criterion HIC = 1000	1267.0	581.8	Chest Resultant Peak 60 G's (3 msec clip)	59.9	45.6	Femur Force Left 10009 N Right	7371.6 6807.0	2333.5 2543.4
Injury Criteria Threshold Value	Driver Dummy	Passenger Dummy															
Head Injury Criterion HIC = 1000	1267.0	581.8															
Chest Resultant Peak 60 G's (3 msec clip)	59.9	45.6															
Femur Force Left 10009 N Right	7371.6 6807.0	2333.5 2543.4															
Type of occupant restraint system: 3 point continuous webbing manual active belt system at each front outboard seating position.																	
17. Key Words 35 MPH Frontal Barrier Impact Test New Car Assessment Program (NCAP) 1993 Toyota 4Runner 4WD Wagon				18. Distribution Statement <u>Copies of this report are available from:</u> Technical Reference Division Nat'l Highway Traffic Safety Admin. Room 5108, Nassif Building 400 7th St., S.W., Wash. D.C. 20590													
19. Security Classif.(of this report) UNCLASSIFIED		20. Security Classif.(of this page) UNCLASSIFIED		21. No. of Pages 54													
				22. Price													

Form DOT F1700.7 (8-72)

TABLE OF CONTENTS

<u>SECTIONS</u>		<u>PAGES</u>
1	Purpose and Test Procedure	1
2	Summary of Frontal Barrier Impact Test	3
3	Occupant and Vehicle Information	9
4	Test Equipment List and Calibration Information	25
<u>DATA TABLES</u>		
1	Test Vehicle Data	5
2	Post Crash Test Data	7
3	FMVSS 208 Occupant Crash Protection Data	10
4	Test Dummy Positioning Data	11
5	Seat Belt Positioning Data	14
6	Seat Belt Performance Assessment Test Data	15
7	Camera Location Data	16
8	Vehicle Accelerometer Locations and Data Summary	18
9	Test Vehicle Measurements	19
10	Pretest Vehicle Target Locations	21
11	Load Cell Locations on Fixed Barrier	22
12	Accident Investigation Division Data	23
<u>APPENDICES</u>		
A	Photographs	45
B-1	Vehicle and Dummy Response Data	46
B-2	Load Cell Barrier Data	48
C	Dummy Configuration and Performance Verification Data	50
D	Vehicle Owner's Manual Occupant Restraint	52
E	Instrumentation and Calibration Data	54

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 1

PURPOSE AND TEST PROCEDURE

This 35 mph frontal barrier impact test is a part of the FY'93 Vehicle Barrier Impact 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 30 mph (48.27 km/h) FMVSS 208/212/219/301-75 requirements.

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

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 2

SUMMARY OF FRONTAL BARRIER IMPACT TEST

A barrier was impacted by a 1993 Toyota 4 Runner, 4 Wheel Drive Wagon, NHTSA No. MP5103, at a velocity of 56.55 km/h. The frontal impact test was conducted by Mobility Systems and Equipment Company (MSE) on 09 December 1992. 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) Part 572 50th percentile adult male Anthropomorphic Test Devices (ATDs) were placed in the driver and right front passenger designated seating positions (DSP's) according to the NHTSA test requirements.

The ATD's were instrumented with head and chest triaxial accelerometers and right/left femur load cells. In addition, load cells were placed on the driver's and passenger's lap and shoulder belts to measure dummy upper torso and pelvic section belt loading. A summary of dummy configuration and performance verification test data is presented in Appendix C.

The frontal impact event was documented by one (1) real time camera and fifteen (15) high-speed cameras. The camera location data are presented in Table 7.

Thirty-three (33) channels of crash parameters were recorded using two (2) FM tape recorders. Time history plots of all recorded channels are presented in Appendix B. No load cell barrier data was acquired due to a malfunctioning power supply.

2.1 GENERAL COMMENTS

The 1993 Toyota 4 Runner, 4 Wheel Drive, 4 Door Wagon was equipped with a 225.75 cubic in, 6 cylinder engine and 4 speed automatic transmission. The test weight of the 1993 Toyota 4 Runner, with two (2) 50th percentile male dummies, instrumentation and cameras was 2145 kg.

The 1993 Toyota 4 Runner, was involved in a frontal barrier crash at a velocity of 56.55 km/h.

The maximum static crush for the vehicle of 521 mm occurred 150 mm to the right 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 wheel center hub. The top of his head hit the top of the steering wheel. The driver's left and right knees hit the dash panel. The driver ATD had

a HIC value of 1267, the maximum femur loads were 7372 (left) and 6807 (right) Newtons.

The passenger ATD's head made no contact, other than the chin contacting his chest. Both of his knees hit the glove box door. The HIC value for the passenger ATD was 582, the maximum chest acceleration (resultant clipped) was 46 g's and the maximum femur loads were 2334 (left) and 2543 (right) Newtons.

Seat belt spoolout, measured by high-speed film analysis, was 70 mm for the driver and 51 mm for the passenger.

There were no apparent visual indications of any standard solvent leaks, windshield penetration or windshield periphery separations.

Appendix D shows occupant restraint system instructions by the manufacturer and Appendix E shows the instrumentation and calibration data.

DATA TABLE No. 1
TEST VEHICLE DATA

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1993/Toyota/4Runner/4WD Wagon

VEHICLE NHTSA No.: M P 5 1 0 3; VIN: J T 3 V N 3 9 W 4 P 0 0 9 5 9 6 7

VEHICLE BODY COLOR: Maroon; MONTH AND YEAR OF MANUFACTURE: 08/92

ENGINE: 6 Cylinders; 225.75 cu in; Liters; cc
X Gas; Diesel; Turbocharged
PLACEMENT: X Longitudinal; Transverse (Lateral)

TRANSMISSION: 4 Speed; Manual; X Automatic; X Overdrive

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

DATE VEHICLE AVAILABLE FOR 35 MPH CRASH TESTING: 11/19/92

ODOMETER READING: 200 km; OPTIONS: X A/C; X P/S; X P/Window;
X Tilt Whl.; X Cruise Control

DATA RECORD FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): 180 kPa Front; 240 kPa Rear

Recommended Tire Size: P225/75R14

Tires on Vehicle: 31x10.50R15; Manufacturer: Goodyear

Number of Occupants: 2 Front; 3 Rear; Third Seat; 5 TOTAL

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

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

Vehicle Maximum Capacity Loading: N/A kg

No. of Occupants x 68 kg: N/A kg

Cargo Capacity (Max - Occupants): 136 kg *

TEST VEHICLE DELIVERED WEIGHT WITH MAXIMUM FLUIDS:

Right Front: 521 kg

Left Front: 496 kg

Right Rear: 426 kg

Left Rear: 423 kg

Total Front: 1017 kg (55% of Total)

Total Rear: 849 kg (45% of Total)

Total Weight: 1866 kg

CALCULATION OF TEST VEHICLE TARGET WEIGHT:

Total Test Vehicle Delivered Weight With Maximum Fluids: 1866 kg

Maximum Cargo Carrying Capacity of Test Vehicle: 136 kg *

Weight of Two Part 572 ATD's (2 * 74.5 kg): 149 kg

TEST VEHICLE TARGET WEIGHT:

2151 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>552</u> kg		
Left Front:	<u>534</u> kg	Total Front:	<u>1086</u> kg (51% of Total)
Right Rear:	<u>540</u> kg		
Left Rear:	<u>519</u> kg	Total Rear:	<u>1059</u> kg (49% of Total)
Total Weight: <u>2145</u> kg (includes <u>86</u> kg of ballast secured in the cargo / luggage area)			

VEHICLE COMPONENTS REMOVED TO MEET TARGET WEIGHT:

- | | |
|-----------------------|---------------------------------|
| 1. Jack | 3. Spare tire (rim not removed) |
| 2. Rear seat assembly | |

TEST VEHICLE ATTITUDE:

As Delivered - Right Front:	<u>924</u> mm	Ready for Test - Right Front:	<u>908</u> mm
Left Front:	<u>929</u> mm	Left Front:	<u>916</u> mm
Right Rear:	<u>885</u> mm	Right Rear:	<u>846</u> mm
Left Rear:	<u>897</u> mm	Left Rear:	<u>846</u> mm

TEST VEHICLE DIMENSIONS:

Total Vehicle Length:	Right Side:	<u>4460</u> mm
	Left Side:	<u>4440</u> mm
	Centerline:	<u>4490</u> mm

Wheelbase: 2625 mm

C. G. is 1296 mm rearward of front axle centerline.

DATA TABLE No. 2
POST CRASH TEST DATA

DATE OF 35 MPH FRONTAL BARRIER IMPACT RATING TEST: 12/09/92

TIME OF TEST: 1505 Hrs; AMBIENT TEMPERATURE AT BARRIER FACE: 13° C

VEHICLE OCCUPANT COMPARTMENT TEMPERATURE: 22° C (Req. Range 19° C to 26° C)

VEHICLE WINDSHIELD MOLDING TEMPERATURE: 22° C

VEHICLE IMPACT VELOCITY: (Req. Range 55.52 to 57.13 km/h)
Primary Speed Trap: 56.55 km/h
Secondary Speed Trap: 56.44 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>4460</u>	<u>3970</u>	<u>490</u>
Centerline (mm)	<u>4490</u>	<u>4044</u>	<u>446</u>
Left Side (mm)	<u>4440</u>	<u>3955</u>	<u>485</u>

VEHICLE REBOUND FROM BARRIER: Right Side: 1320 mm
Centerline: 1375 mm
Left Side: 1385 mm

ATD CONTACT POINTS:

	Driver ATD (ID# 830)	Pass. ATD (ID# 814)
Head	Steering Wheel Hub	No Contact
Chest	No Contact	No Contact
Abdomen	Lower St. Wh. Rim	No Contact
Left Knee	Instrument Panel	Glove Box Door
Right Knee	Instrument Panel	Glove Box Door, Dash

VEHICLE DOOR OPENING INFORMATION:

Door	Opened	Jammed
Right Front	Yes	No
Left Front	Yes	No
Right Rear	Yes	No
Left Rear	Yes	No

VEHICLE FRONT SEAT MOVEMENT DURING IMPACT EVENT:

Seat Cushion Shift - Driver = 0 mm Passenger = 0 mm
Seat Adjustor Failure - Driver: No Passenger No
Details of Any Failure: None

OTHER NOTABLE IMPACT EFFECTS: None

INTENTIONALLY LEFT BLANK

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
Driver Dummy to Steering Column Dimensions
Camera Locations

II. OVR DATA

Load Cell Barrier Data
Vehicle Accelerometer Data

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

VEH. YEAR/MAKE/MODEL/BODY STYLE: 1993 Toyota/4Runner/4WD Wagon

VEH. NHTSA NO.: MP5103

TEST DATE: 12/09/92

MAXIMUM ACCELERATION VALUES:	DRIVER ATD No. 830	PASSENGER ATD No. 814
Head X	-131.8	-27.6
Head Y	-53.6	-26.8
Head Z	111.8	59.0
HEAD RESULTANT	144.7	66.6
Chest X	-65.7	-50.0
Chest Y	-12.0	32.0
Chest Z	15.4	19.4
CHEST RESULTANT (3msec clip)	59.9	45.6
TIME INTERVAL (msec)	61.0 to 64.0	67.0 to 70.0

HEAD INJURY CRITERIA (HIC) VALUES:

HIC	1267.0	581.8
t_1 (msec)	63.7	52.9
t_2 (msec)	87.1	86.0
Avg. Acceleration t_1 to t_2	78.1	49.8

MAXIMUM FEMUR FORCES:

Left Femur (N)	-7371.6	-2333.5
Right Femur (N)	-6807.0	-2543.4

MAXIMUM SEAT BELT FORCES:

Lap Belt (N)	8071.4	10197.0
Shoulder Belt (N)	10204.0	10067.0

MAXIMUM SEAT BELT WEBBING SPOOLOUT: (FILM ANALYSIS) (ELECTRONIC DATA)

Lap/Shoulder Belt Combination	70 mm	70 mm
-------------------------------	-------	-------

DATA TABLE No. 4
TEST ATD POSITIONING DATA

PRE - IMPACT DATA:

Make / Model: Toyota 4Runner
Body Style: 4WD Wagon
Model Year: 1993
Color: Maroon
NHTSA No.: MP5103

DATA FROM CERTIFICATION LABEL:

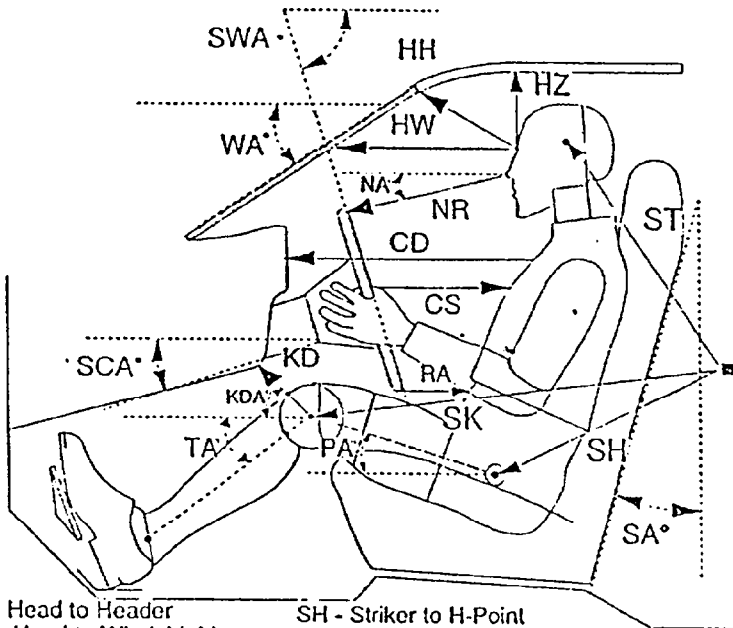
Vehicle Manufacturer: Toyota
Date of Manufacture: 08/92
VIN: JT3VN39W4P0095967
GVWR: 2429 kg
GAWR Front: 1180 kg
GAWR Rear: 1362 kg

POST IMPACT DATA:

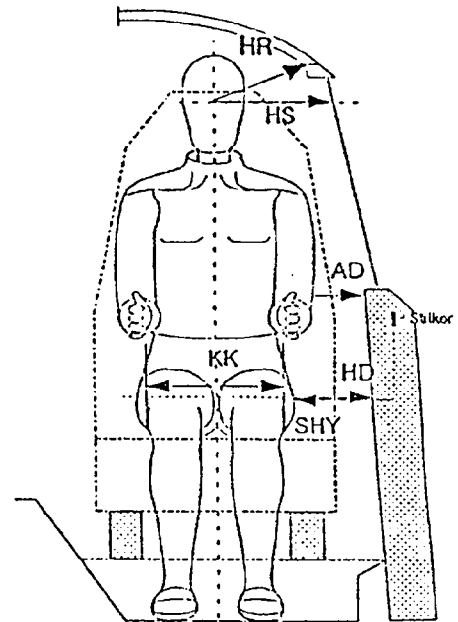
Date of Test: 12/09/92
Time: 1505 Hrs.
Temperature: 13° C
Required Impact Velocity Range: 55.52 to 57.13 km/h
Impact Velocity - Primary: 56.55 km/h
Secondary: 56.44 km/h
Seat Type: Bucket
Adjustor Type: Lever
Bucket Seat Back Type: Adjustable Head Restraint

ATD POSITIONING TECHNICIANS: Brian O'Keefe, Jimmy Negrete

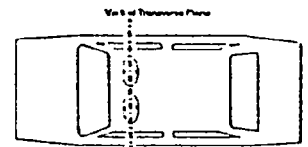
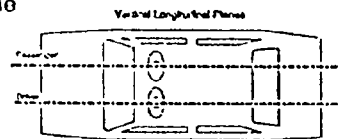
DATA TABLE No. 4 (Cont.)
TEST ATD POSITIONING DATA



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



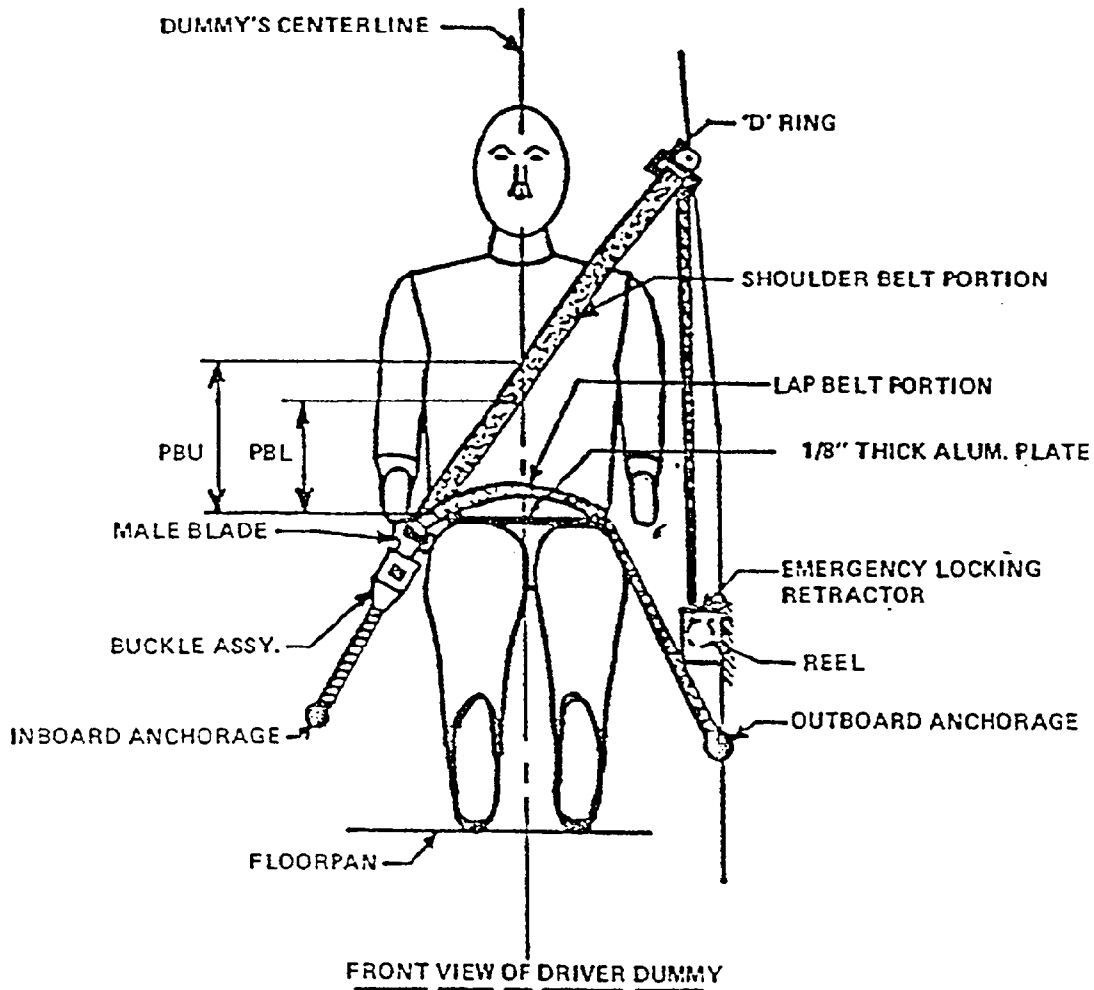
HR - Head to Side Header
HS - Head to Side Window
AD - Arm to Door
HD - H-Point to Door
SHY - Striker to H-Point (Y Dir.)
KK - Knee to Knee



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

Measurement	Driver (Serial No. 830)		Passenger (Serial No. 814)	
	Length (mm)	Angle (Degrees)	Length (mm)	Angle (Degrees)
WA	---	37	---	---
SWA	---	65	---	---
SCA	---	25	---	---
HZ	170	90	160	90
HH	380	---	375	---
HW	495	0	490	0
HR	435	---	205	---
NR	395	-12	---	---
CD	565	---	580	---
CS	345	0	---	---
RA	200	0	---	---
KDL	210	21	240	---
KDR	210	---	245	37
PA	---	22	---	19
TA	---	-32	---	-37
KK	365	---	290	---
ST	550	80	530	85
SK	565	0	580	1
SH	225	-35	240	-29
SHY	195	0	195	0
HS	290	0	260	0
HD	150	0	150	0
AD	65	0	80	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)	335	310
PBL - Top Surface of alum. plate to belt lower edge (mm)	245	220
Lap Belt Tension (N)	-	-
Shoulder Belt Tension (N)	-	-

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
1885	1990	1940	2000
280	280	290	290
805	805	830	820
800	905	820	890
665	650	630	595

BELT SPOOL-OFF DATA:

As determined by film analysis (mm) _____

As determined electronically (mm) _____

As determined mechanically (mm) _____

70	51
53	70
54	64

BELT STRAIN DATA: Measured on the shoulder belt

As determined electronically (%) _____

As determined mechanically (%) _____

4.9	4.0
0.0	0.0

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

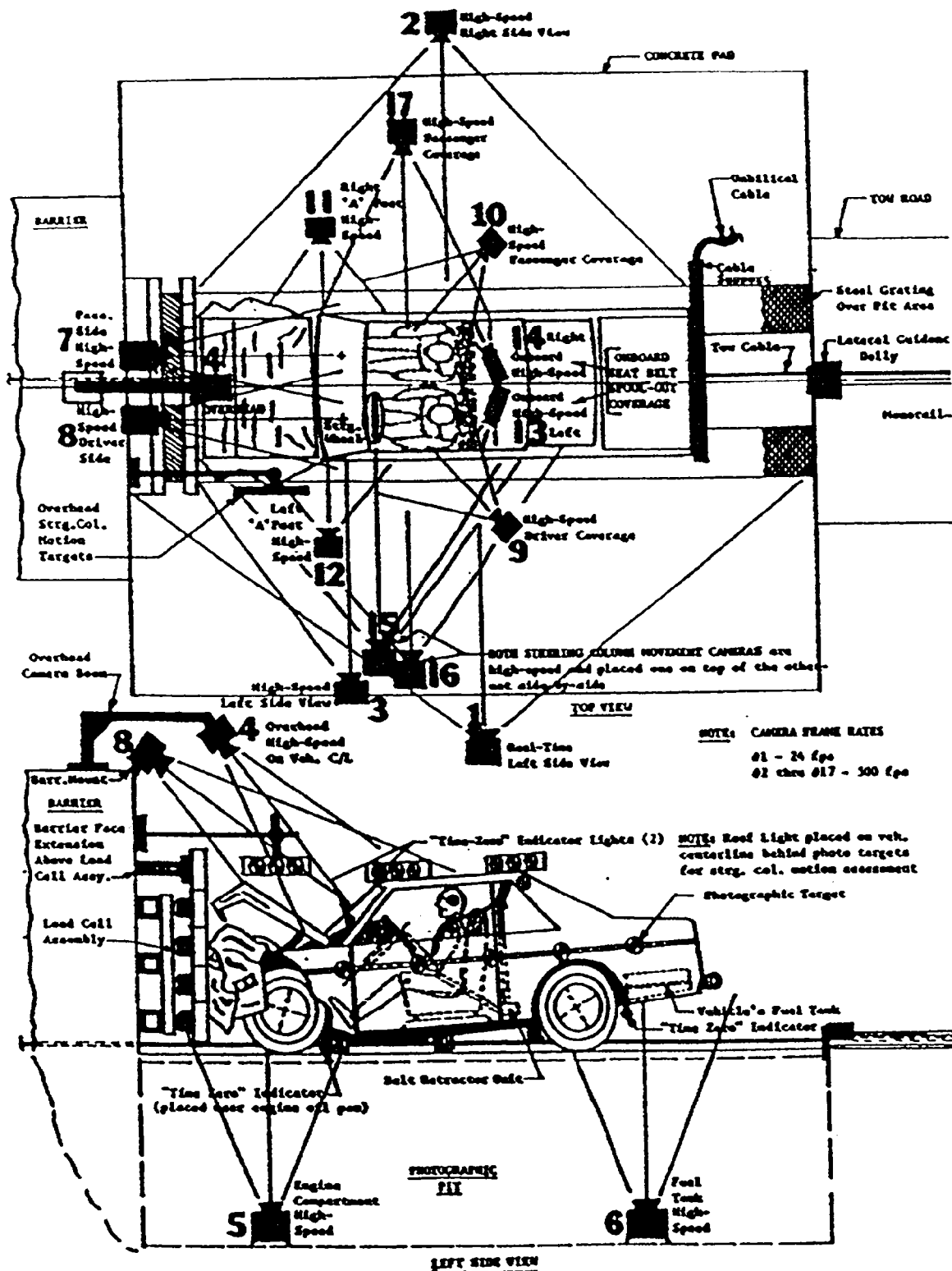
VEH. YEAR/MAKE/MODEL/BODY STYLE: 1993/Toyota/4Runner/4WD Wagon

VEH. NHTSA NO.: MP5103 TEST DATE: 12/09/92 TIME: 1505 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	5867	14350	3404	-20	14521	15-70 Zoom	24
2	Right Side View	1305	7785	1270	-4	7398	13	590
3	Left Side View	1219	9906	1727	-5	9515	25	390
4	Overhead	-152	0	4039	-65	3451	13	590
5	Pit - Engine	635	25	-1829	90	3692	13	560
6	Pit - Fuel Tank	N/R	N/R	N/R	N/R	N/R	N/R	N/R
7	Front - Passenger	-406	406	2438	-40	2724	16	600
8	Front - Driver	-406	-305	2438	-37	2727	16	510
9	Left Side - Driver	2490	2920	1985	-14	2547	16	610
10	Right Side - Pass.	2260	3310	1930	-9	2902	16	600
11	Right Side - A-Post	170	4870	1150	+3	4867	28	630
12	Left Side - A-Post	635	9825	2127	-4	9527	50	700
13	Onboard - Left Side	3015	250	980	+11	1028	13	700
14	Onboard - Right Side	3015	250	980	+12	1028	13	700
15	Left Side - St. Col.	1422	9576	3277	-17	9334	28	610
16	Left Side - St. Col.	1422	9576	2896	-14	9270	28	600
17	Right Side - Pass.	1990	3550	1385	-1	3117	16	570

REFERENCE: X - Film plane to barrier face
Y - Film plane to monorail centerline
Z - Film plane to ground

Data Table No. 7 (Cont'd) Camera Location Data



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	3485	-410	790	40.7	23.8	3.4	120.6
2	Right rear seat cross member	3485	410	790	37.8	35.4	3.4	113.7
3	Top of Engine Block	785	110	1180	119.5	26.6	24.2	43.4
4	Bottom of engine	1280	0	400	93.6	29.4	43.7	40.2
5	Right Brake Caliper	890	630	310	83.2	13.2	43.3	59.3
6	Instrument Panel	1455	60	1300	76.7	34.5	54.1	55.7
7	Left Brake Caliper	890	-600	310	96.8	15.1	13.8	22.5
8	Left rear seat cross member Redun.	3485	-410	790	40.8	23.8	3.4	120.9
9	Right rear seat cross member Redun.	3485	410	790	38.2	35.4	3.5	113.7

REFERENCE: X - Front Bumper Leading Edge
Y - Vehicle Centerline (Right Pos., Left Neg.)
Z - Ground Level

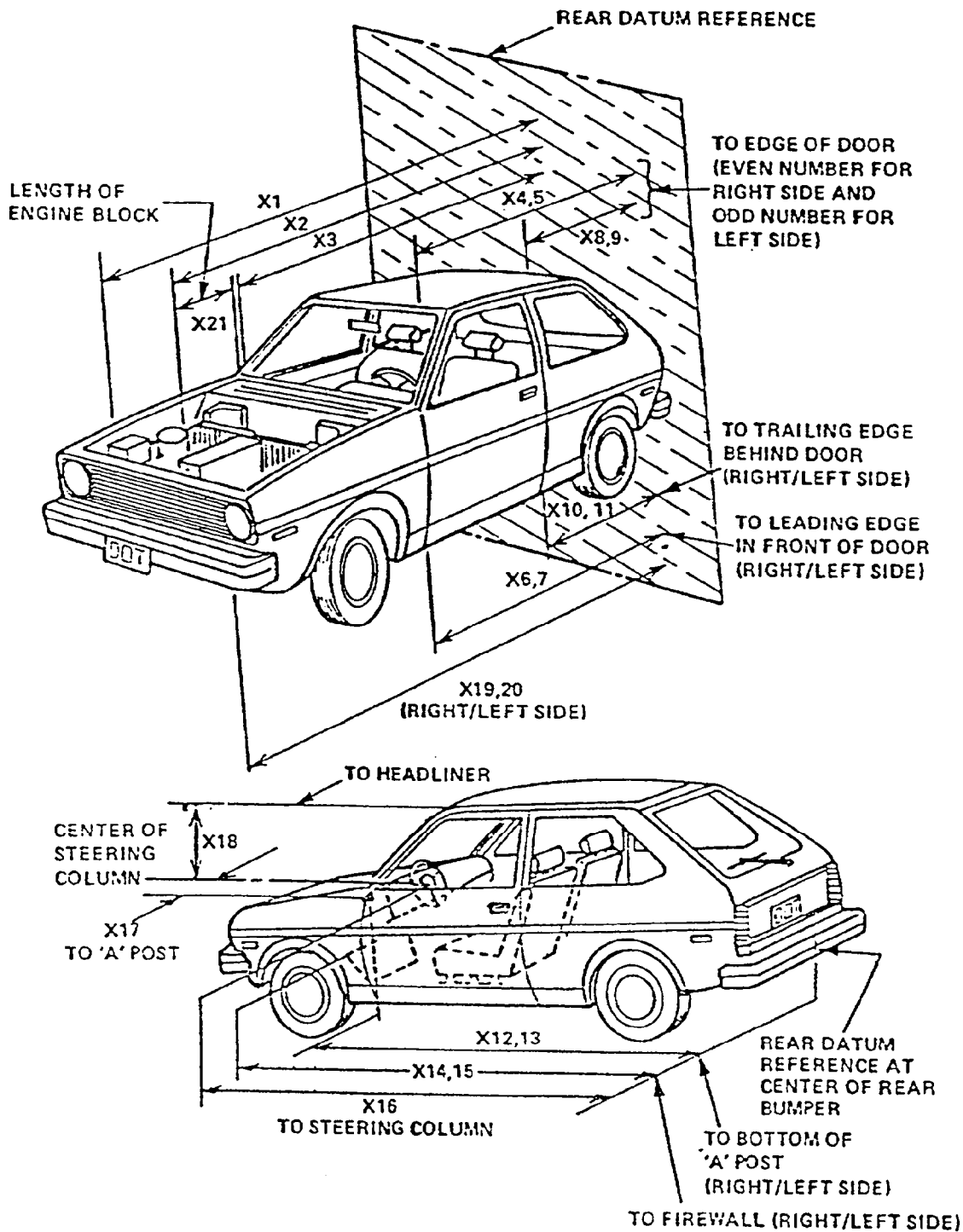
All dimensions in mm

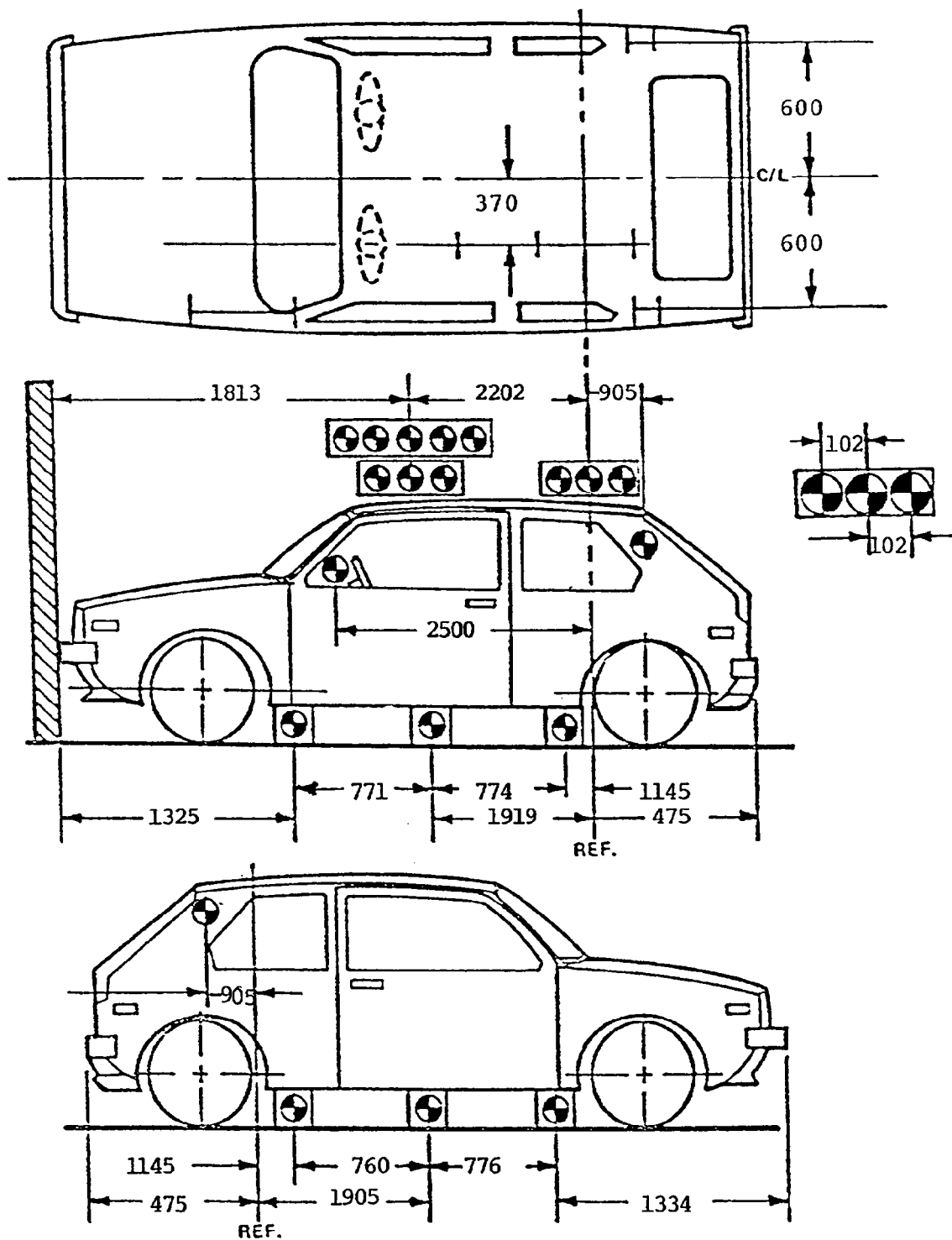
DATA TABLE No. 9
TEST VEHICLE MEASUREMENTS

No.	Measurement Description	Pretest	Posttest	Change
1	Length of test vehicle at centerline	4490	4044	446
2	Rear surface of vehicle to front of engine	3900	3684	216
3	Rear of vehicle to firewall centerline	3455	3309	146
4	Rear to upper leading edge of right door	2685	2720	-35
5	Rear to upper leading edge of left door	2675	2695	-20
6	Rear to lower leading edge of right door	3145	3110	35
7	Rear to lower leading edge of left door	3135	3100	35
8	Rear to upper trailing edge of right door	2130	2135	-5
9	Rear to upper trailing edge of left door	2112	2135	-23
10	Rear to lower trailing edge of right door	2140	2110	30
11	Rear to lower trailing edge of left door	2155	2110	45
12	Rear to bottom of right 'A' pillar	3195	3205	-10
13	Rear to bottom of left 'A' pillar	3210	3190	20
14	Rear surface to firewall on right side	3430	3440	-10
15	Rear surface to firewall on left side	3450	3385	65
16	Rear surface to steering column	2738	2735	3
17	Center of steering column to left 'A' pillar	390	335	55
18	Center of steering column to headlining	475	385	90
19	Rear surface to right side of front bumper	4460	3970	490
20	Rear surface to left side of front bumper	4440	3955	485
21	Length of engine block	365	365	0

All measurements in mm

DATA TABLE No. 9 (Cont.)
TEST VEHICLE MEASUREMENTS

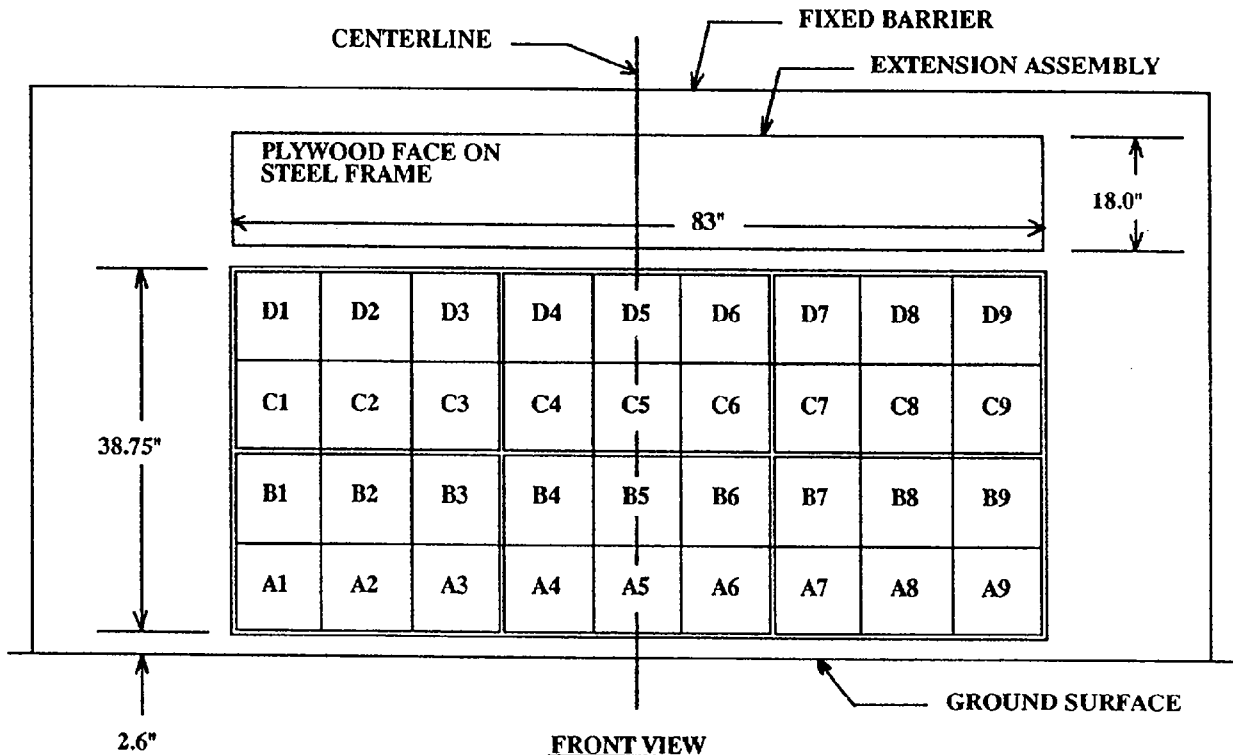




Dimensions in mm

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 6 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: Toyota/4Runner/4WD Wagon

Veh. NHTSA No.: MP5103 ; VIN: JT3VN39W4P0095967

Model Year: 1993 ; Build Date: 08/92 ; Test Date: 12/09/92

Veh. Size Category: N/A ; Test Weight: 2145 kg

Veh. Wheelbase: 2625 mm ; Front Overhang: 755 mm ; Overall Width: 1715 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: 56.55 km/h ; Time of separation: 65.8 msec

Velocity Change: 66.2 km/h (Left) ; 65.3 km/h (Right)

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

Crush Depth Dimensions:

C1 = 459 mm

C2 = 506 mm

C3 = 521 mm

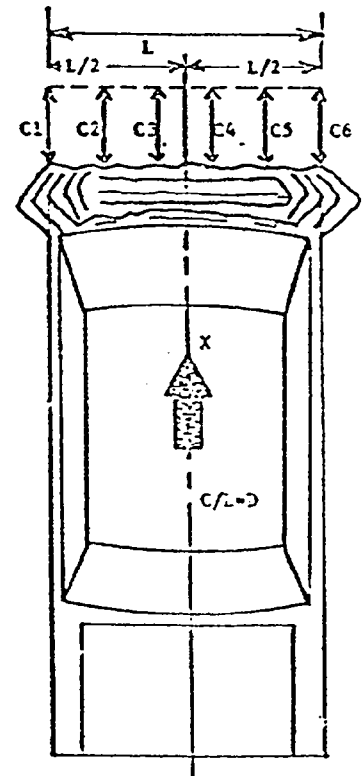
C4 = 518 mm

C5 = 500 mm

C6 = 462 mm

Midpoint of Damage: Vehicle Centerline

Length of Damaged Region: L = 1500 mm



INTENTIONALLY LEFT BLANK

SECTION 4

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

This section shows full list of Test Equipment and the calibration dates.

General Test Information

VERSNO: V2 TGID: 1
TITLE: 1993 56.35 KM/H NCAP FRONTAL BARRIER IMPACT
TSTOBJ: ACQUIRE NCAP DATA USING TWO INSTR. DUMMIES AND LOAD CELL BARRIER
TSTDAT: 09/DEC/92 TSTPRF: MSE CONNO: DTNH22-90-D-32121
TSTREF: MP5103 TSTTYP: NCA TSTCFN: VTB
TKSURF: CON TKCOND: DRY TEMP: 13 RECTYP: FMT
LINK: UMB CLSSPD: 56.6 IMPANG: 0 OFFSET: 0.0
IMPPNT: 9999.9 MEASUR: MET TOTCRV: 69
TSTCOM: NO COMMENTS

Vehicle Information

VGID: 2 VEHNO: 1 MAKE: 16 MODEL: 13 YEAR: 93 BODY: TR
 VIN: JT3VN39W4P0095967 ENGINE: V6IF ENGDSP: 3 LITER TRANSM: A4
 VEHTWT: 2145 WHLBAS: 262.5 VEHLLEN: 449.0 VEHWID: 169.0
 VEHCG: 126.8 STRSEP: NO COLMEC: BWU MODIND: P

MODDSC: UNMODIFIED

BX

1: 449.0
 2: 390.0
 3: 345.5
 4: 268.5
 5: 267.5
 6: 314.5
 7: 313.5
 8: 213.0
 9: 211.2
 10: 214.0
 11: 215.5
 12: 319.5
 13: 321.0
 14: 343.0
 15: 345.0
 16: 273.8
 17: 39.0
 18: 42.5
 19: 446.0
 20: 444.0
 21: 36.5

VEHSPD: 56.6

CRBANG: 0

PDOF: 0

BMPENG: NA

SILENG: NA

APLENG: NA

DPD

1: 45.9
 2: 50.6
 3: 52.1
 4: 51.8
 5: 50.0
 6: 46.2

VDI: 12FCAW9

LENCNT: 150.0

DAMDST: 0.0

CRHDST: 52.1

AX

1: 404.4
 2: 368.4
 3: 330.9
 4: 272.0
 5: 269.5
 6: 311.0
 7: 310.0
 8: 213.5
 9: 213.5
 10: 211.0
 11: 211.0
 12: 320.5
 13: 319.0
 14: 344.0
 15: 338.5
 16: 273.5
 17: 33.5
 18: 38.5
 19: 397.0
 20: 395.5
 21: 36.5

CARANG: 999

VEHOR: 999

VEHCOM: NO COMMENTS

Barrier Information

Barrier ID: 3
BARRIG: R
BARSHP: LCB
BARANG: 0
BARDIA: 999.9
BARCOM: BARRIER INSRAT FIELDS ARE IN KILONEWTONS

Occupant Information

Occupant Group ID: 4 VEHNO: 1
OCCLOC: 01 OCCTYP: P5 OCCAGE: 99 OCCSEX: M OCCHT: 999 OCCWT: 999
MTHCAL: P5 DUMSIZ: 50
DUMMAN: MFG: HUMANOID SYSTEMS, S/N: 830
DUMMOD: UNMODIFIED
DUMDSC: NO COMMENT
HH: 38.0 HW: 49.5 HR: 43.5 HS: 29.0 CD: 56.5 CS: 34.5 AD: 6.5 HD: 15.0
KD: 21.0 HB:999.9 NB:999.9 CB:999.9 KB:999.9
RESTR1: 3PT RESTR2: SWE
RESTXT: NO COMMENTS
SEPOSN: CN AIRDEP: NA
CNTRH1: SR CNTRH2: SH CNTRC1: SW CNTRC2: NO CNTRL1: DP CNTRL2: NO
HIC: 1267. T1: 63.700 T2: 87.100
CLIP3M: 59.9 LFEM: 7372 RFEM: 6807 CSI: 604. LBELT: 8071 SBELT: 10204
OCCCOM: NO COMMENT

Occupant Information

Occupant Group ID: 4 VEHNO: 1
OCCLOC: 02 OCCTYP: P5 OCCAGE: 99 OCCSEX: M OCCHT: 999 OCCWT: 999
MTHCAL: P5 DUMSIZ: 50
DUMMAN: MFG: HUMANOID SYSTEMS, S/N: 814
DUMMOD: UNMODIFIED
DUMDSC: NO COMMENT
HH: 37.5 HW: 49.0 HR: 20.5 HS: 26.0 CD: 58.0 CS:999.9 AD: 8.0 HD: 15.0
KD: 24.0 HB:999.9 NB:999.9 CB:999.9 KB:999.9
RESTR1: 3PT RESTR2: DPL
RESTXT: NO COMMENTS
SEPOSN: CN AIRDEP: NA
CNTRH1: OT CNTRH2: NO CNTRC1: NO CNTRC2: NO CNTRL1: DP CNTRL2: OT
HIC: 582. T1: 52.900 T2: 86.000
CLIP3M: 45.6 LFEM: 2334 RFEM: 2543 CSI: 462. LBELT: 10197 SBELT: 10067
OCCCOM: CNTRH1: HEAD CONTACTED CHIN TO CHEST

Instrumentation Information

Inst. Group ID: 5	VEHNO: 1	CURNO: 001	
SENTYP: AC	SENLOC: 01	SENATT: HDCG	
AXIS: XL	UNITS: G'S	PREFIL: 1650	
INSMAN: MFG: ENDEVCO,	MODEL: 7264-200,	S/N: BJ28H	
CALDAT: 02/OCT/92	INSRAT: 200	CHLMAX: 66	INIVEL: 56.6
NFP: -300	NLP: 2999	DELT: 100	DASTAT: AM
INSCOM: NO COMMENT			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 1	CURNO: 002	
SENTYP: AC	SENLOC: 01	SENATT: HDCG	
AXIS: YL	UNITS: G'S	PREFIL: 1650	
INSMAN: MFG: ENDEVCO,	MODEL: 7264-200,	S/N: BT28H	
CALDAT: 02/OCT/92	INSRAT: 200	CHLMAX: 27	INIVEL: 0.0
NFP: -300	NLP: 2999	DELT: 100	DASTAT: AM
INSCOM: NO COMMENT			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 1	CURNO: 003	
SENTYP: AC	SENLOC: 01	SENATT: HDCG	
AXIS: ZL	UNITS: G'S	PREFIL: 1650	
INSMAN: MFG: ENDEVCO,	MODEL: 7264-200,	S/N: AE29	
CALDAT: 02/OCT/92	INSRAT: 200	CHLMAX: 56	INIVEL: 0.0
NFP: -300	NLP: 2999	DELT: 100	DASTAT: AM
INSCOM: NO COMMENT			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 1	CURNO: 004	
SENTYP: AC	SENLOC: 01	SENATT: CHST	
AXIS: XL	UNITS: G'S	PREFIL: 1650	
INSMAN: MFG: ENDEVCO,	MODEL: 7264-200,	S/N: BI14H	
CALDAT: 02/OCT/92	INSRAT: 200	CHLMAX: 37	INIVEL: 56.6
NFP: -300	NLP: 2999	DELT: 100	DASTAT: AM
INSCOM: NO COMMENT			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 1	CURNO: 005	
SENTYP: AC	SENLOC: 01	SENATT: CHST	
AXIS: YL	UNITS: G'S	PREFIL: 1650	
INSMAN: MFG: ENDEVCO,	MODEL: 7264-200,	S/N: BI19H	
CALDAT: 02/OCT/92	INSRAT: 200	CHLMAX: 14	INIVEL: 0.0
NFP: -300	NLP: 2999	DELT: 100	DASTAT: AM
INSCOM: NO COMMENT			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 1	CURNO: 006	
SENTYP: AC	SENLOC: 01	SENATT: CHST	
AXIS: ZL	UNITS: G'S	PREFIL: 1650	
INSMAN: MFG: ENDEVCO,	MODEL: 7264-200,	S/N: BI92H	
CALDAT: 02/OCT/92	INSRAT: 200	CHLMAX: 11	INIVEL: 0.0
NFP: -300	NLP: 2999	DELT: 100	DASTAT: AM
INSCOM: NO COMMENT			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 1	CURNO: 007	
SENTYP: LC	SENLOC: 01	SENATT: FMRL	
AXIS: XL	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: GSE INC.	MODEL: 2430,	S/N: 735	
CALDAT: 09/OCT/92	INSRAT: 13350	CHLMAX: 7	INIVEL: 0.0
NFP: -300	NLP: 2999	DELT: 100	DASTAT: AM
INSCOM: NO COMMENT			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 1	CURNO: 008	
SENTYP: LC	SENLOC: 01	SENATT: FMRR	
AXIS: XL	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: GSE INC,	MODEL: 2430,	S/N: 710	
CALDAT: 09/OCT/92	INSRAT: 13350	CHLMAX: 11	INIVEL: 0.0
NFP: -300	NLP: 2999	DELT: 100	DASTAT: AM
INSCOM: NO COMMENT			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 1	CURNO: 009	
SENTYP: AC	SENLOC: 02	SENATT: HDCG	
AXIS: XL	UNITS: G'S	PREFIL: 1650	
INSMAN: MFG: ENDEVCO,	MODEL: 7264-200,	S/N: BJ61H	
CALDAT: 02/OCT/92	INSRAT: 200	CHLMAX: 14	INIVEL: 56.6
NFP: -300	NLP: 2999	DELT: 100	DASTAT: AM
INSCOM: NO COMMENT			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 1	CURNO: 010	
SENTYP: AC	SENLOC: 02	SENATT: HDCG	
AXIS: YL	UNITS: G'S	PREFIL: 1650	
INSMAN: MFG: ENDEVCO,	MODEL: 7264-200,	S/N: BG95H	
CALDAT: 02/OCT/92	INSRAT: 200	CHLMAX: 13	INIVEL: 0.0
NFP: -300	NLP: 2999	DELT: 100	DASTAT: AM
INSCOM: NO COMMENT			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 1	CURNO: 011	
SENTYP: AC	SENLOC: 02	SENATT: HDCG	
AXIS: ZL	UNITS: G'S	PREFIL: 1650	
INSMAN: MFG: ENDEVCO,	MODEL: 7264-200,	S/N: BJ54H	
CALDAT: 02/OCT/92	INSRAT: 200	CHLMAX: 29	INIVEL: 0.0
NFP: -300	NLP: 2999	DELT: 100	DASTAT: AM
INSCOM: NO COMMENT			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 1	CURNO: 012	
SENTYP: AC	SENLOC: 02	SENATT: CHST	
AXIS: XL	UNITS: G'S	PREFIL: 1650	
INSMAN: MFG: ENDEVCO,	MODEL: 7264-200,	S/N: BJ27H	
CALDAT: 02/OCT/92	INSRAT: 200	CHLMAX: 30	INIVEL: 56.6
NFP: -300	NLP: 2999	DELT: 100	DASTAT: AM
INSCOM: NO COMMENT			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 1	CURNO: 013	
SENTYP: AC	SENLOC: 02	SENATT: CHST	
AXIS: YL	UNITS: G'S	PREFIL: 1650	
INSMAN: MFG: ENDEVCO,	MODEL: 7264-200,	S/N: BG78H	
CALDAT: 02/OCT/92	INSRAT: 200	CHLMAX: 19	INIVEL: 0.0
NFP: -300	NLP: 2999	DELT: 100	DASTAT: AM
INSCOM: NO COMMENT			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 1	CURNO: 014	
SENTYP: AC	SENLOC: 02	SENATT: CHST	
AXIS: ZL	UNITS: G'S	PREFIL: 1650	
INSMAN: MFG: ENDEVCO,	MODEL: 7264-200,	S/N: AR39	
CALDAT: 02/OCT/92	INSRAT: 200	CHLMAX: 20	INIVEL: 0.0
NFP: -300	NLP: 2999	DELT: 100	DASTAT: AM
INSCOM: NO COMMENT			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 1	CURNO: 015	
SENTYP: LC	SENLOC: 02	SENATT: FMRL	
AXIS: XL	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: GSE INC,	MODEL: 2430,	S/N: 634	
CALDAT: 09/OCT/92	INSRAT: 13350	CHLMAX: 18	INIVEL: 0.0
NFP: -300	NLP: 2999	DELT: 100	DASTAT: AM
INSCOM: NO COMMENT			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 1	CURNO: 016	
SENTYP: LC	SENLOC: 02	SENATT: FMRR	
AXIS: XL	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: GSE INC,	MODEL: 2430, S/N: 550		
CALDAT: 09/OCT/92	INSRAT: 13350	CHLMAX: 21	INIVEL: 0.0
NFP: -300	NLP: 2999	DELT: 100	DASTAT: AM
INSCOM: NO COMMENT			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 1	CURNO: 017	
SENTYP: LC	SENLOC: 01	SENATT: LPBO	
AXIS: OT	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: LEBOW,	MODEL: 3371, S/N: 333		
CALDAT: 13/OCT/92	INSRAT: 15575	CHLMAX: 54	INIVEL: 0.0
NFP: -300	NLP: 2999	DELT: 100	DASTAT: AM
INSCOM: NO COMMENT			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 1	CURNO: 018	
SENTYP: LC	SENLOC: 01	SENATT: SHBT	
AXIS: OT	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: LEBOW,	MODEL: 3371, S/N: 327		
CALDAT: 13/OCT/92	INSRAT: 15575	CHLMAX: 66	INIVEL: 0.0
NFP: -300	NLP: 2999	DELT: 100	DASTAT: AM
INSCOM: NO COMMENT			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 1	CURNO: 019	
SENTYP: LC	SENLOC: 02	SENATT: LPBO	
AXIS: OT	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: LEBOW,	MODEL: 3371, S/N: 330		
CALDAT: 13/OCT/92	INSRAT: 15575	CHLMAX: 67	INIVEL: 0.0
NFP: -300	NLP: 2999	DELT: 100	DASTAT: AM
INSCOM: NO COMMENT			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 1	CURNO: 020	
SENTYP: LC	SENLOC: 02	SENATT: SHBT	
AXIS: OT	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: LEBOW,	MODEL: 3371, S/N: 308		
CALDAT: 13/OCT/92	INSRAT: 15575	CHLMAX: 65	INIVEL: 0.0
NFP: -300	NLP: 2999	DELT: 100	DASTAT: AM
INSCOM: NO COMMENT			

Instrumentation Information

Inst. Group ID: 5 VEHNO: 1 CURNO: 021
SENTYP: DS SENLOC: 01 SENATT: SHBT
AXIS: OT UNITS: OTH PREFIL: 1650
INSMAN: MFG: ETI, MODEL: LCP12A-12, S/N: 1
CALDAT: 10/NOV/92 INSRAT: 50 CHLMAX: 10 INIVEL: 0.0
NFP: -300 NLP: 2999 DELT: 100 DASTAT: AM
INSCOM: PERCENT OF TOTAL BELT STRETCH

Instrumentation Information

Inst. Group ID: 5 VEHNO: 1 CURNO: 022
SENTYP: DS SENLOC: 02 SENATT: SHBT
AXIS: OT UNITS: OTH PREFIL: 1650
INSMAN: MFG: ETI, MODEL: LCP12A-12, S/N: 2
CALDAT: 10/NOV/92 INSRAT: 50 CHLMAX: 8 INIVEL: 0.0
NFP: -300 NLP: 2999 DELT: 100 DASTAT: AM
INSCOM: PERCENT OF TOTAL BELT STRETCH

Instrumentation Information

Inst. Group ID: 5 VEHNO: 1 CURNO: 023
SENTYP: DS SENLOC: 01 SENATT: SHBE
AXIS: OT UNITS: CMS PREFIL: 1650
INSMAN: MFG: CELESCO, MODEL: 20 IN., S/N: NA
CALDAT: 10/NOV/92 INSRAT: 51 CHLMAX: 10 INIVEL: 0.0
NFP: -300 NLP: 2999 DELT: 100 DASTAT: AM
INSCOM: NO COMMENT

Instrumentation Information

Inst. Group ID: 5 VEHNO: 1 CURNO: 024
SENTYP: DS SENLOC: 02 SENATT: SHBE
AXIS: OT UNITS: CMS PREFIL: 1650
INSMAN: MFG: MSE, MODEL: 24 IN. LIN., S/N: 112
CALDAT: 10/NOV/92 INSRAT: 61 CHLMAX: 11 INIVEL: 0.0
NFP: -300 NLP: 2999 DELT: 100 DASTAT: AM
INSCOM: NO COMMENT

Instrumentation Information

Inst. Group ID: 5 VEHNO: 1 CURNO: 025
SENTYP: AC SENLOC: NA SENATT: SULF
AXIS: XG UNITS: G'S PREFIL: 1650
INSMAN: MFG: I.C. SENSOR, MODEL: 3031-200, S/N: 29-200
CALDAT: 09/OCT/92 INSRAT: 200 CHLMAX: 94 INIVEL: 56.6
NFP: -300 NLP: 2999 DELT: 100 DASTAT: CF
INSCOM: CHANNEL FAILED AT 48.1 MSEC

Instrumentation Information

Inst. Group ID: 5	VEHNO: 1	CURNO: 026	
SENTYP: AC	SENLOC: NA	SENATT: SURF	
AXIS: XG	UNITS: G'S	PREFIL: 1650	
INSMAN: MFG: I.C. SENSOR, MODEL: 3031-200, S/N: 25-200			
CALDAT: 09/OCT/92	INSRAT: 200	CHLMAX: 109	INIVEL: 56.6
NFP: -300	NLP: 2999	DELT: 100	DASTAT: AM
INSCOM: NO COMMENT			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 1	CURNO: 027	
SENTYP: AC	SENLOC: NA	SENATT: ENGN	
AXIS: XG	UNITS: G'S	PREFIL: 1650	
INSMAN: MFG: I.C. SENSOR, MODEL: 3031-200, S/N: 33-200			
CALDAT: 09/OCT/92	INSRAT: 200	CHLMAX: 94	INIVEL: 56.6
NFP: -300	NLP: 2999	DELT: 100	DASTAT: AM
INSCOM: NO COMMENT			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 1	CURNO: 028	
SENTYP: AC	SENLOC: NA	SENATT: ENGN	
AXIS: XG	UNITS: G'S	PREFIL: 1650	
INSMAN: MFG: I.C. SENSOR, MODEL: 3031-200, S/N: 27-200			
CALDAT: 09/OCT/92	INSRAT: 200	CHLMAX: 104	INIVEL: 56.6
NFP: -300	NLP: 2999	DELT: 100	DASTAT: AM
INSCOM: NO COMMENT			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 1	CURNO: 029	
SENTYP: AC	SENLOC: NA	SENATT: DPLC	
AXIS: XG	UNITS: G'S	PREFIL: 1650	
INSMAN: MFG: I.C. SENSOR, MODEL: 3031-200, S/N: 28-200			
CALDAT: 09/OCT/92	INSRAT: 200	CHLMAX: 82	INIVEL: 56.6
NFP: -300	NLP: 2999	DELT: 100	DASTAT: AM
INSCOM: NO COMMENT			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 1	CURNO: 030	
SENTYP: AC	SENLOC: NA	SENATT: FLLR	
AXIS: XG	UNITS: G'S	PREFIL: 1650	
INSMAN: MFG: I.C. SENSOR, MODEL: 3031-200, S/N: 23-200			
CALDAT: 09/OCT/92	INSRAT: 200	CHLMAX: 35	INIVEL: 56.6
NFP: -300	NLP: 2999	DELT: 100	DASTAT: AM
INSCOM: NO COMMENT			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 1	CURNO: 031	
SENTYP: AC	SENLOC: NA	SENATT: FLRR	
AXIS: XG	UNITS: G'S	PREFIL: 1650	
INSMAN: MFG: I.C. SENSOR,	MODEL: 3031-200,	S/N:	
CALDAT: 09/OCT/92	INSRAT: 200	CHLMAX: 24	INIVEL: 56.6
NFP: -300	NLP: 2999	DELT: 100	DASTAT: AM
INSCOM: NO COMMENT			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 1	CURNO: 032	
SENTYP: AC	SENLOC: NA	SENATT: OTHR	
AXIS: XG	UNITS: G'S	PREFIL: 1650	
INSMAN: MFG: BELL & HOWELL,	MODEL: 4-202-0001,	S/N: 20839	
CALDAT: 19/OCT/92	INSRAT: 200	CHLMAX: 35	INIVEL: 56.6
NFP: -300	NLP: 2999	DELT: 100	DASTAT: AM
INSCOM: NO COMMENT			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 1	CURNO: 033	
SENTYP: AC	SENLOC: NA	SENATT: TRFC	
AXIS: XG	UNITS: G'S	PREFIL: 1650	
INSMAN: MFG: BELL & HOWELL,	MODEL: 4-202-0001,	S/N: 19428	
CALDAT: 19/OCT/92	INSRAT: 200	CHLMAX: 24	INIVEL: 56.6
NFP: -300	NLP: 2999	DELT: 100	DASTAT: AM
INSCOM: NO COMMENT			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 034	
SENTYP: LC	SENLOC: NA	SENATT: LCA1	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE,	MODEL: 1220-FS,	S/N: 19349	
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 035	
SENTYP: LC	SENLOC: NA	SENATT: LCA2	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE,	MODEL: 1220-FS,	S/N: 19324	
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 036	
SENTYP: LC	SENLOC: NA	SENATT: LCA3	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19283		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 037	
SENTYP: LC	SENLOC: NA	SENATT: LCA3	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19263		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 038	
SENTYP: LC	SENLOC: NA	SENATT: LCA5	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19265		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 039	
SENTYP: LC	SENLOC: NA	SENATT: LCA6	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19266		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 040	
SENTYP: LC	SENLOC: NA	SENATT: LCA7	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19317		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 041	
SENTYP: LC	SENLOC: NA	SENATT: LCA8	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19270		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 042	
SENTYP: LC	SENLOC: NA	SENATT: LCA9	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19428		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 9	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 043	
SENTYP: LC	SENLOC: NA	SENATT: LCB1	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19273		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 044	
SENTYP: LC	SENLOC: NA	SENATT: LCB1	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19276		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 045	
SENTYP: LC	SENLOC: NA	SENATT: LCB3	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19258		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 046	
SENTYP: LC	SENLOC: NA	SENATT: LCB4	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19278		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 047	
SENTYP: LC	SENLOC: NA	SENATT: LCB5	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19279		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 048	
SENTYP: LC	SENLOC: NA	SENATT: LCB6	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19282		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 049	
SENTYP: LC	SENLOC: NA	SENATT: LCB7	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19262		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 050	
SENTYP: LC	SENLOC: NA	SENATT: LCB8	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19285		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 051	
SENTYP: LC	SENLOC: NA	SENATT: LCB9	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19286		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 052	
SENTYP: LC	SENLOC: NA	SENATT: LCC1	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19287		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 053	
SENTYP: LC	SENLOC: NA	SENATT: LCC2	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19288		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 054	
SENTYP: LC	SENLOC: NA	SENATT: LCC3	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19289		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 055	
SENTYP: LC	SENLOC: NA	SENATT: LCC4	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19291		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 056	
SENTYP: LC	SENLOC: NA	SENATT: LCC5	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19324		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 057	
SENTYP: LC	SENLOC: NA	SENATT: LCC6	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19313		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 058	
SENTYP: LC	SENLOC: NA	SENATT: LCC7	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19314		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 059	
SENTYP: LC	SENLOC: NA	SENATT: LCC8	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19315		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 060	
SENTYP: LC	SENLOC: NA	SENATT: LCC9	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19316		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 061	
SENTYP: LC	SENLOC: NA	SENATT: LCD1	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19317		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 062	
SENTYP: LC	SENLOC: NA	SENATT: LCD2	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19318		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 063	
SENTYP: LC	SENLOC: NA	SENATT: LCD3	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19322		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 064	
SENTYP: LC	SENLOC: NA	SENATT: LCD4	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19323		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 065	
SENTYP: LC	SENLOC: NA	SENATT: LCD5	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19260		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 066	
SENTYP: LC	SENLOC: NA	SENATT: LCD6	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19325		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 067	
SENTYP: LC	SENLOC: NA	SENATT: LCD7	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19332		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

Inst. Group ID: 5	VEHNO: 0	CURNO: 068	
SENTYP: LC	SENLOC: NA	SENATT: LCD8	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19333		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

Instrumentation Information

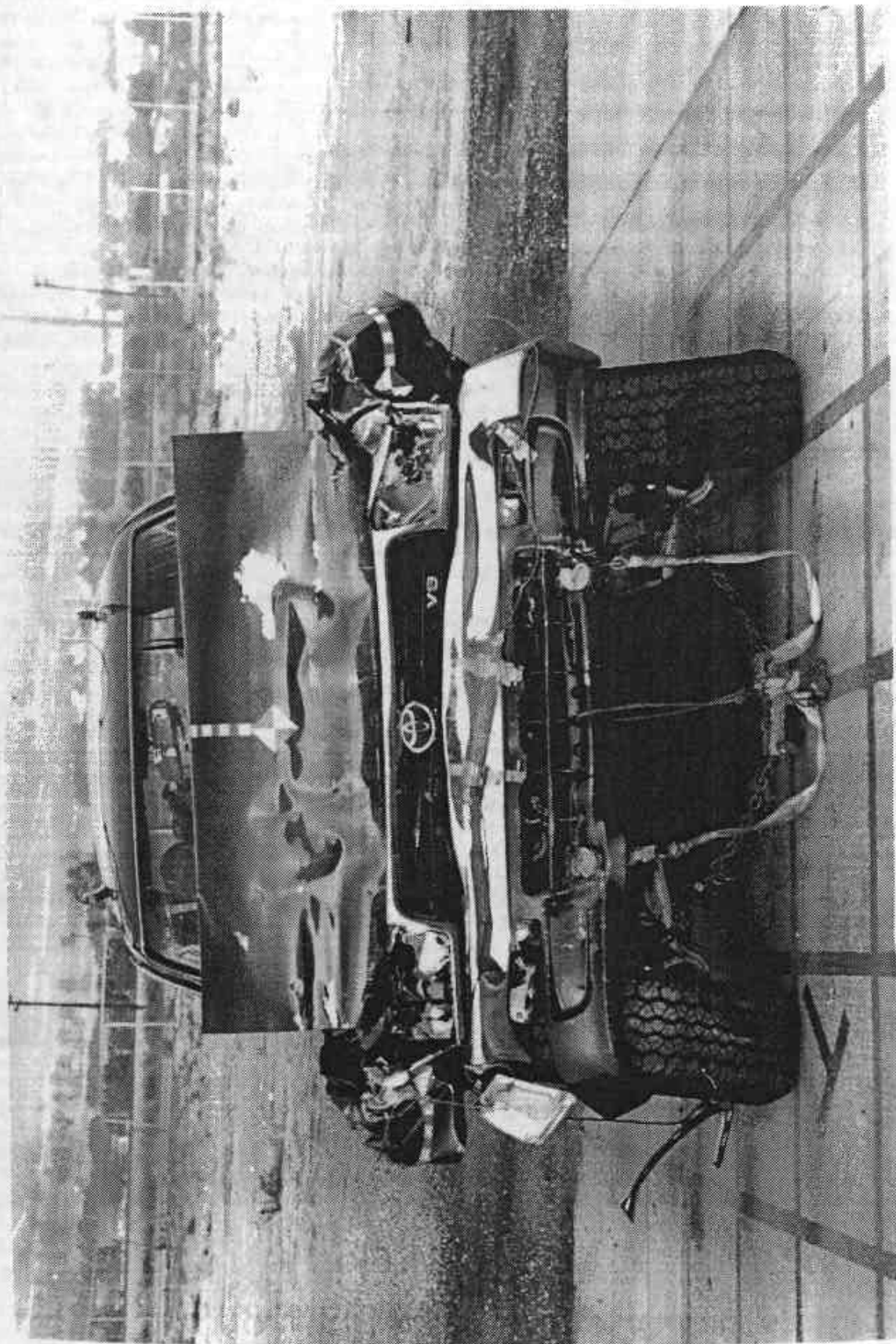
Inst. Group ID: 5	VEHNO: 0	CURNO: 069	
SENTYP: LC	SENLOC: NA	SENATT: LCD9	
AXIS: XG	UNITS: NWT	PREFIL: 1650	
INSMAN: MFG: INTERFACE, MODEL: 1220-FS,	S/N: 19338		
CALDAT: 14/MAY/85	INSRAT: 222	CHLMAX: 0	INIVEL: 0.0
NFP: -250	NLP: 2499	DELT: 120	DASTAT: MN
INSCOM: MEANINGLESS DATA DUE TO POWER FAILURE			

APPENDIX A
PHOTOGRAPHS

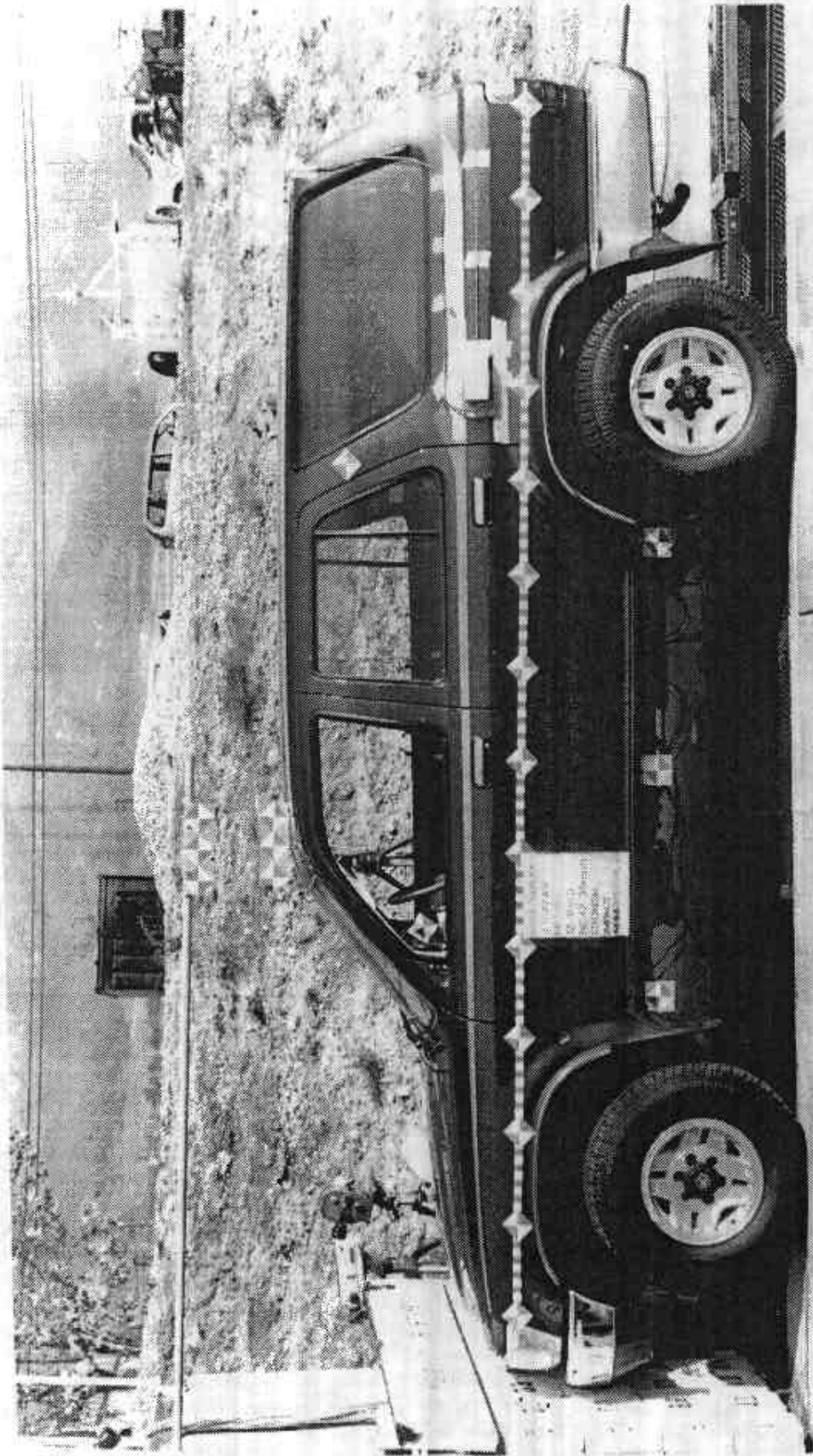
PRETEST FRONT VIEW
POSTTEST FRONT VIEW
PRETEST LEFT SIDE VIEW
POSTTEST LEFT SIDE VIEW
PRETEST RIGHT SIDE VIEW
POSTTEST RIGHT SIDE VIEW
PRETEST RIGHT FRONT 3/4 VIEW
POSTTEST RIGHT FRONT 3/4 VIEW
PRETEST LEFT REAR 3/4 VIEW
POSTTEST LEFT REAR 3/4 VIEW
PRETEST WINDSHIELD VIEW
POSTTEST WINDSHIELD VIEW
PRETEST 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 & VEHICLE INTERIOR VIEW (Door Open)
POSTTEST DRIVER DUMMY & VEHICLE INTERIOR VIEW (Door Open)
PRETEST PASSENGER DUMMY & VEHICLE INTERIOR VIEW (Door Open)
POSTTEST PASSENGER DUMMY & VEHICLE INTERIOR VIEW (Door Open)
POSTTEST DRIVER ATD HEAD AND KNEE CONTACT AREA
POSTTEST PASSENGER ATD KNEE CONTACT AREA



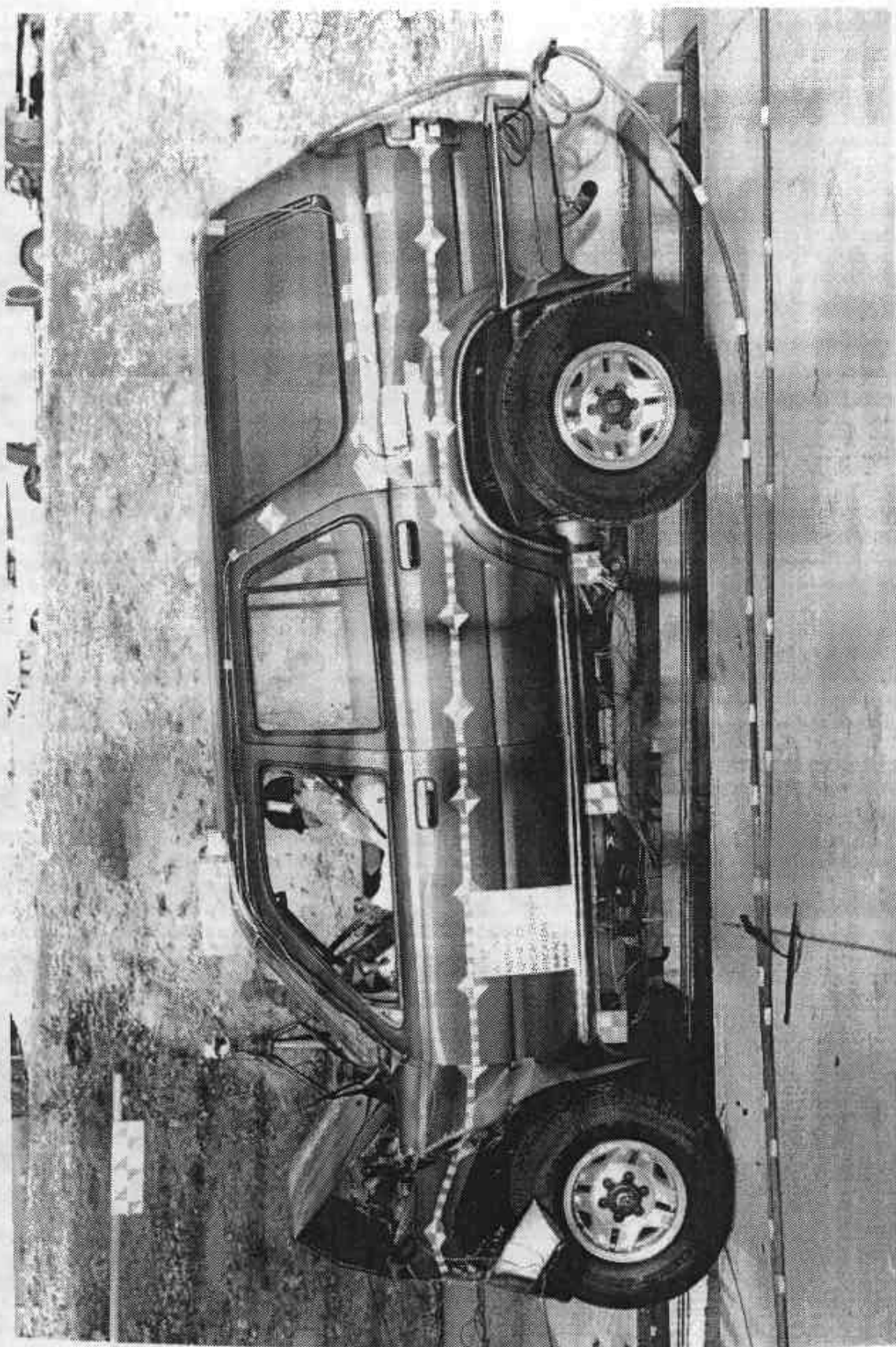
PRETEST FRONT VIEW



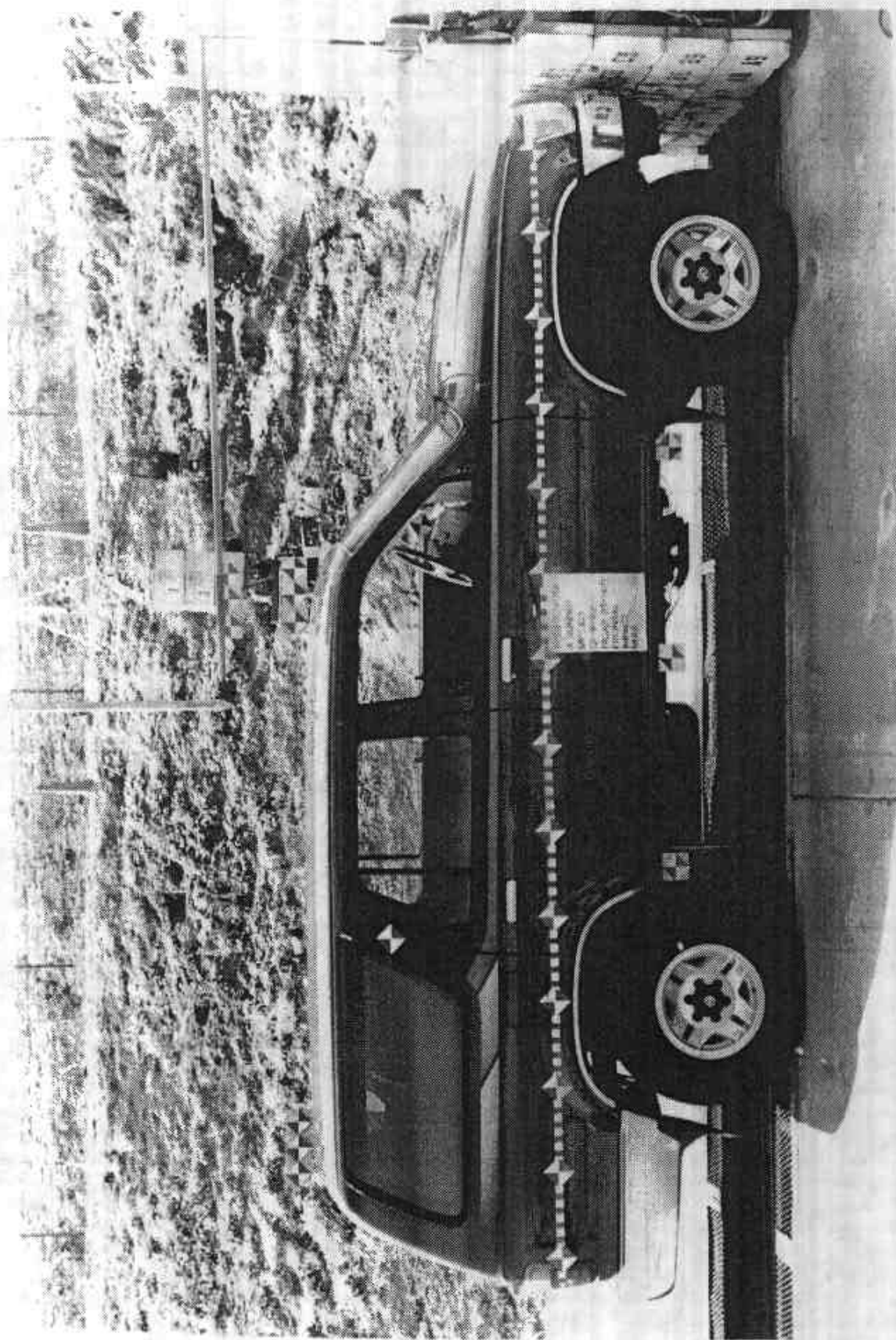
POSTTEST FRONT VIEW



PRETEST LEFT SIDE VIEW



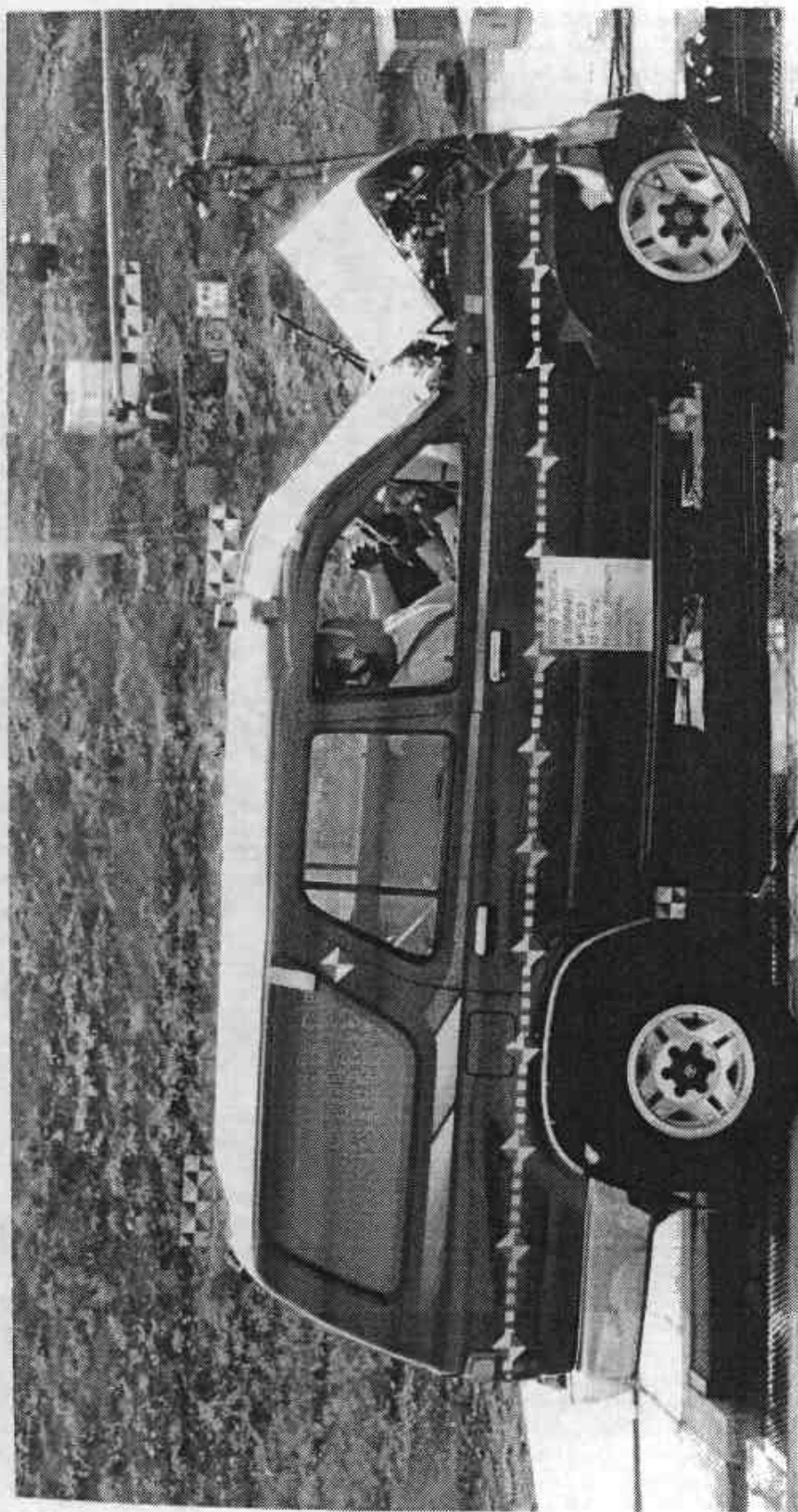
POSTTEST LEFT SIDE VIEW



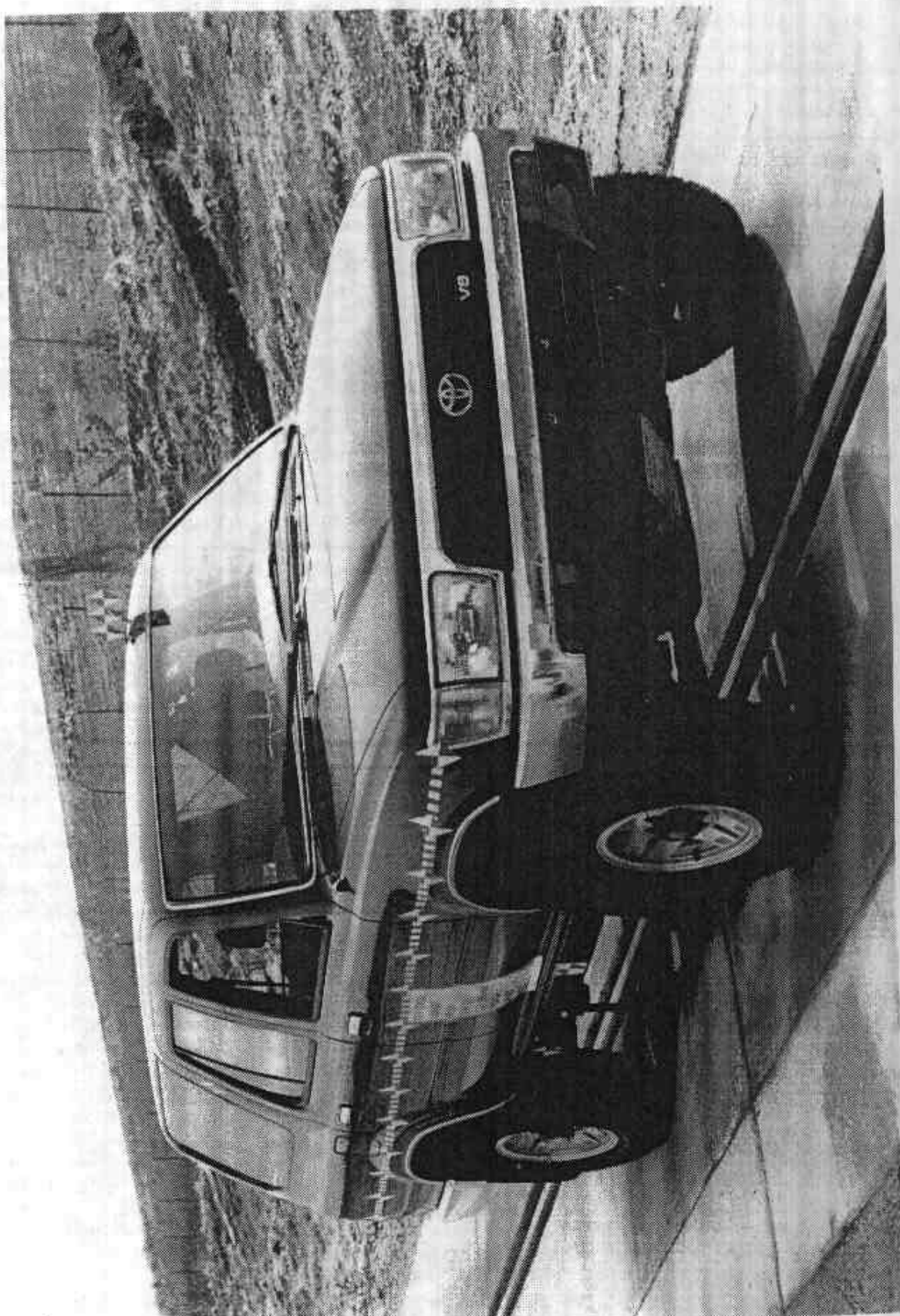
PRETEST RIGHT SIDE VIEW

A-5

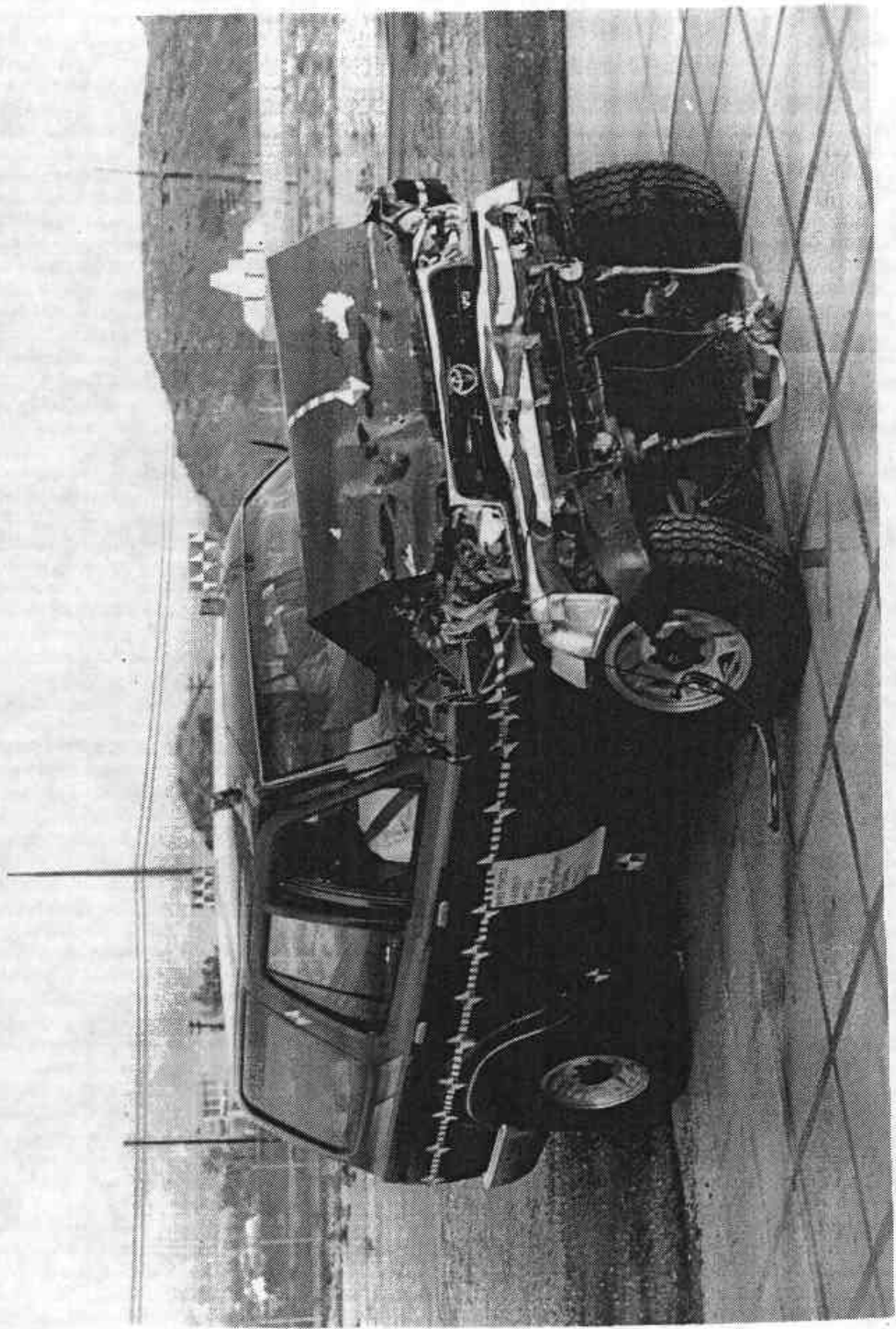
MSE-93-R92083-N04



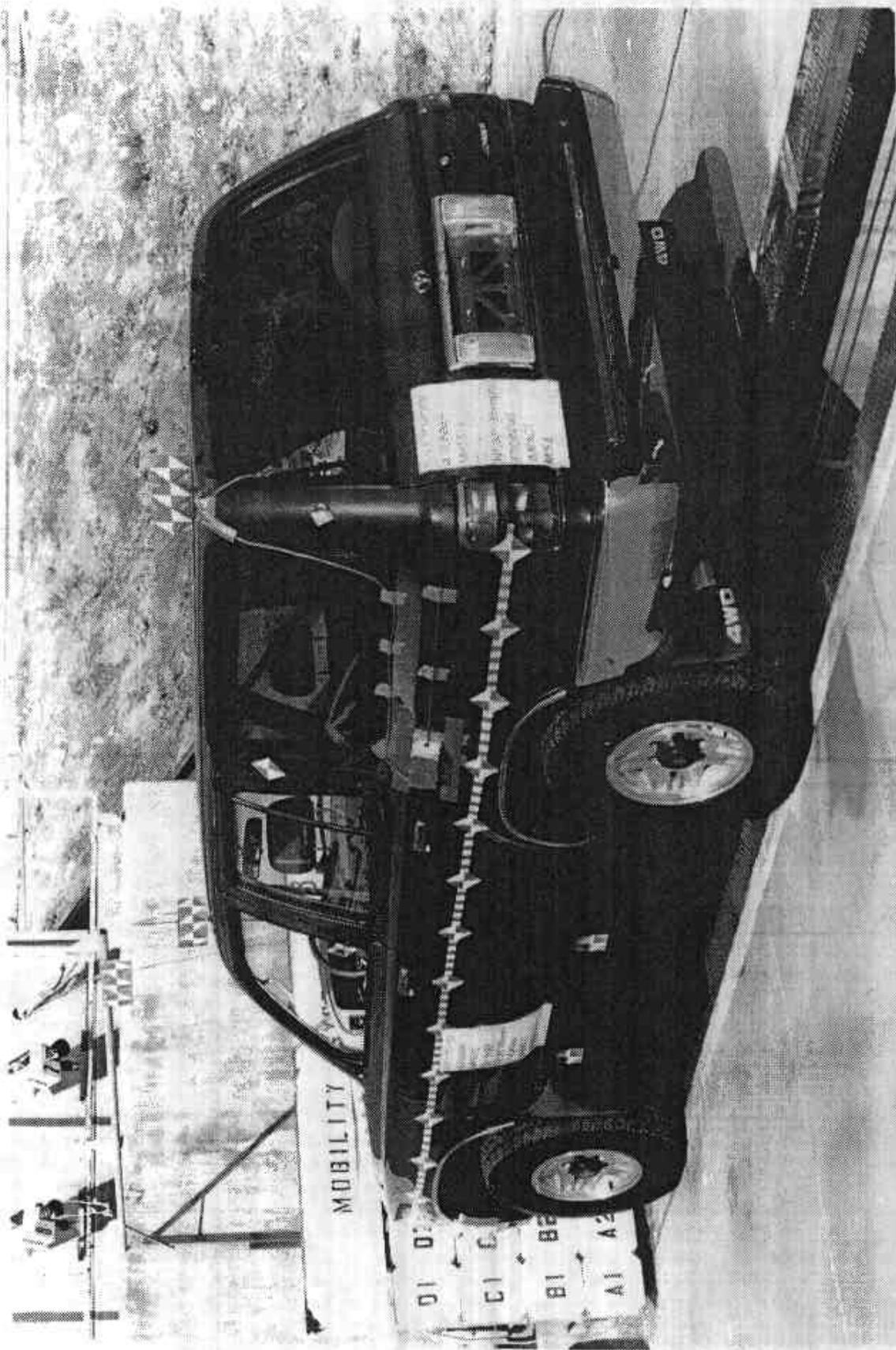
POSTTEST RIGHT SIDE VIEW



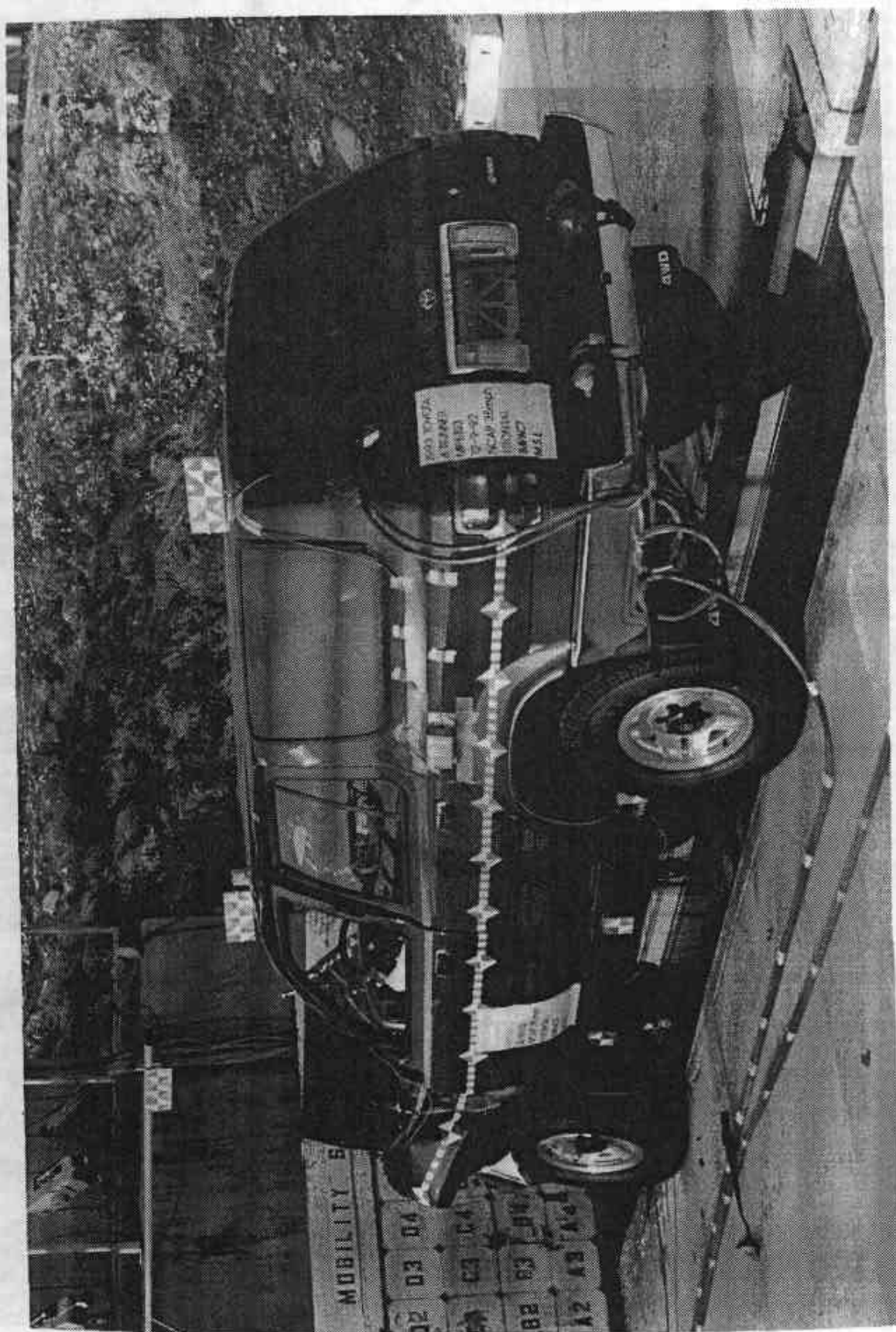
PRETEST RIGHT FRONT 3/4 VIEW



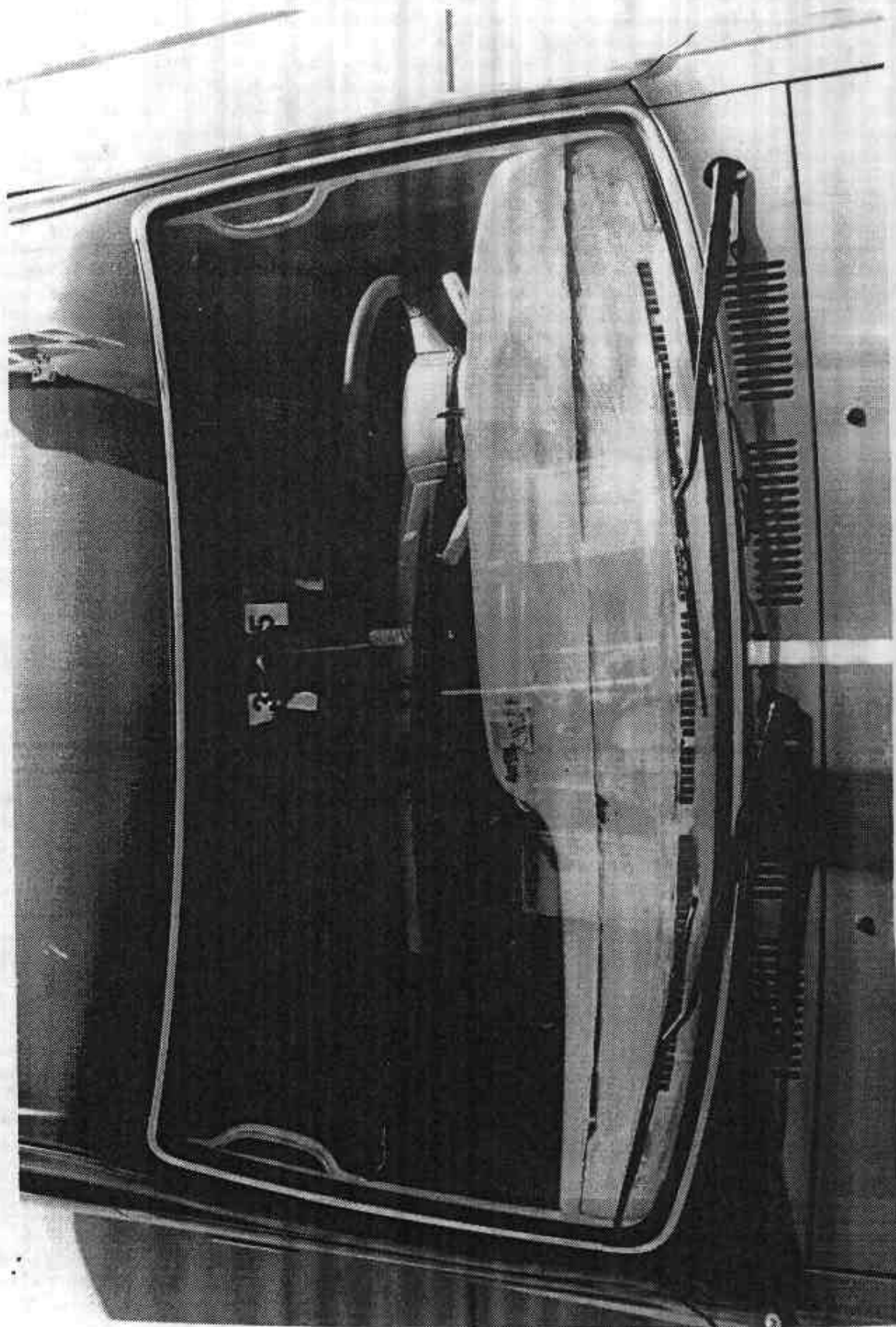
POSTTEST RIGHT FRONT 3/4 VIEW



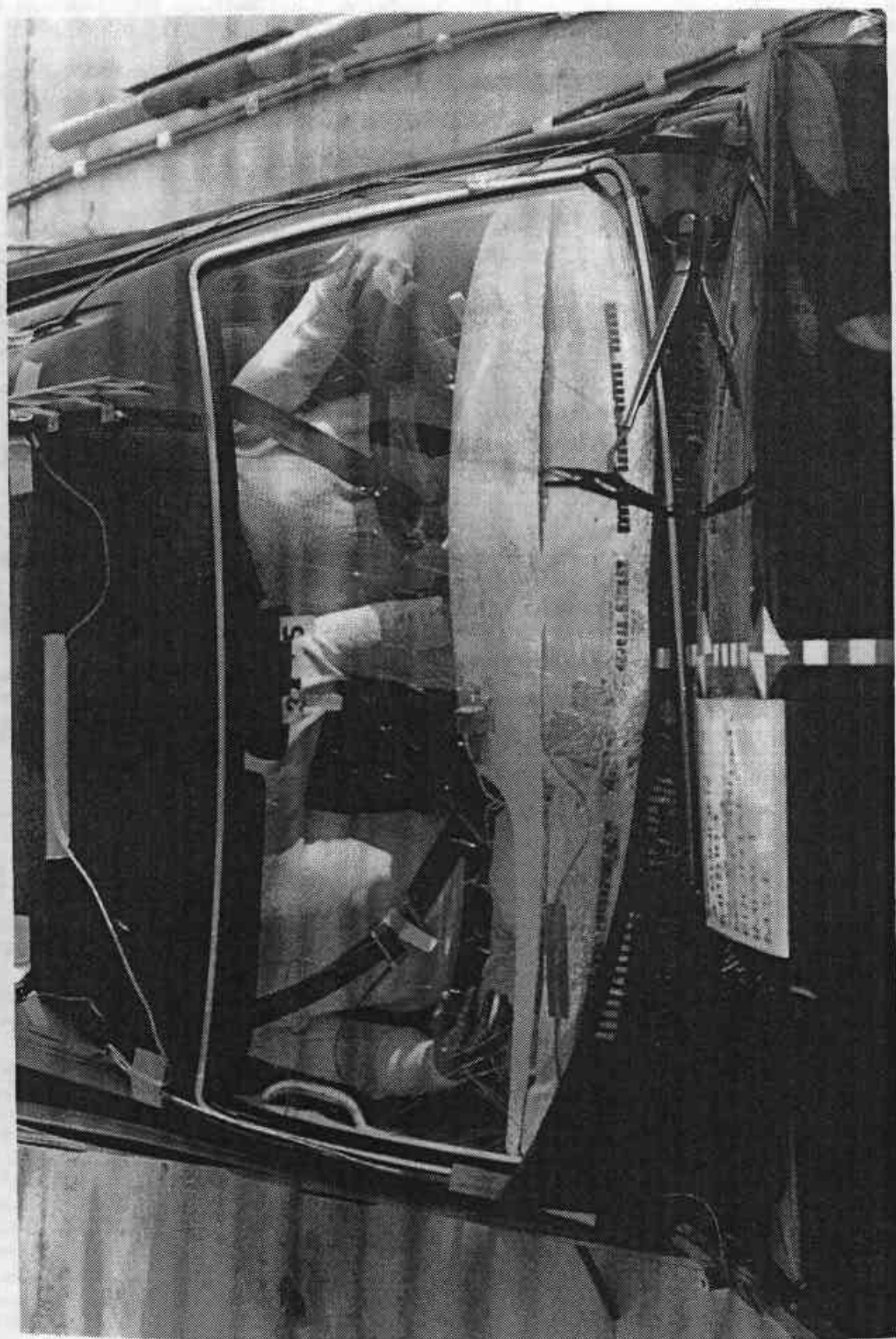
PRETEST LEFT REAR 3/4 VIEW



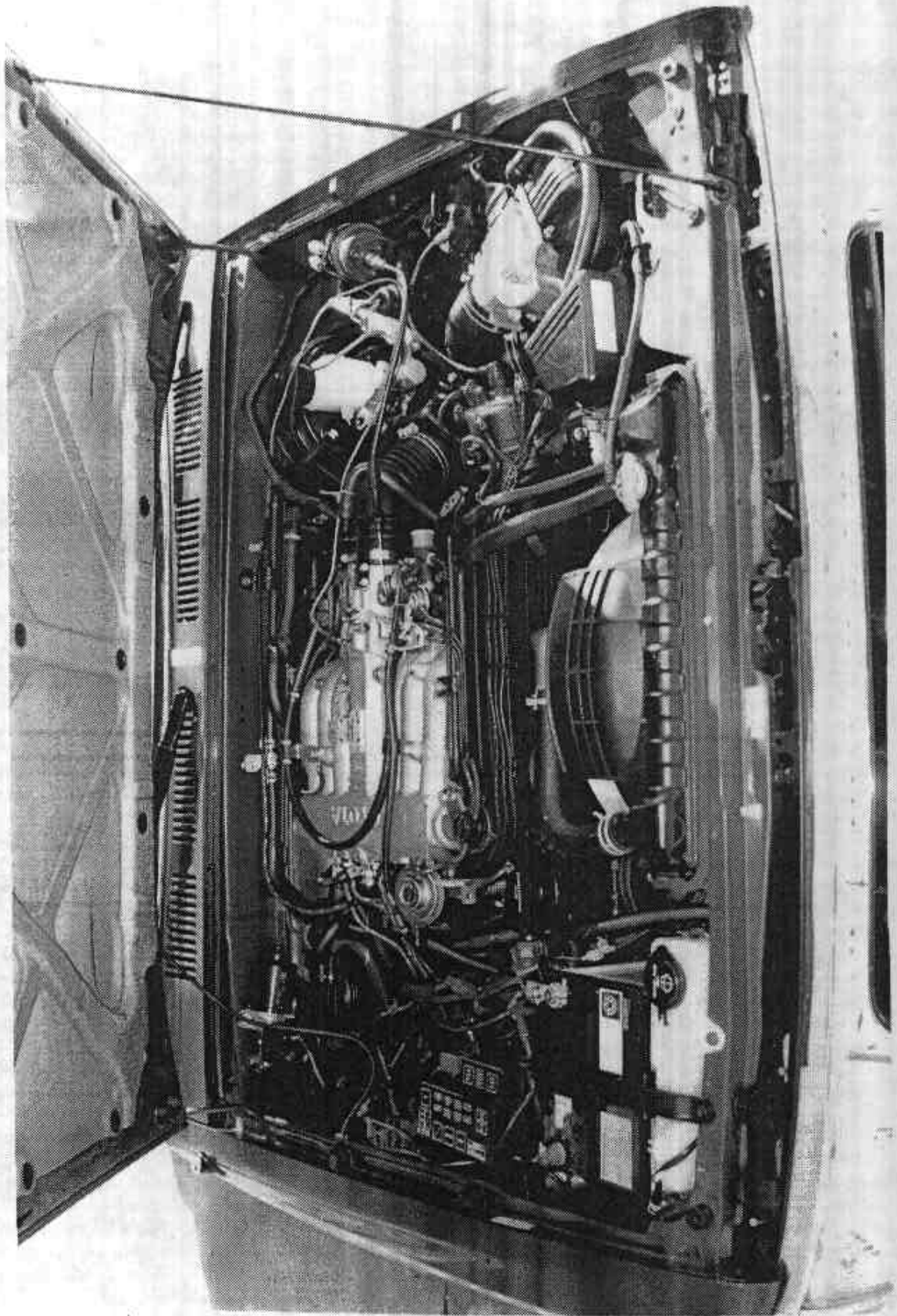
POSTTEST LEFT REAR 3/4 VIEW



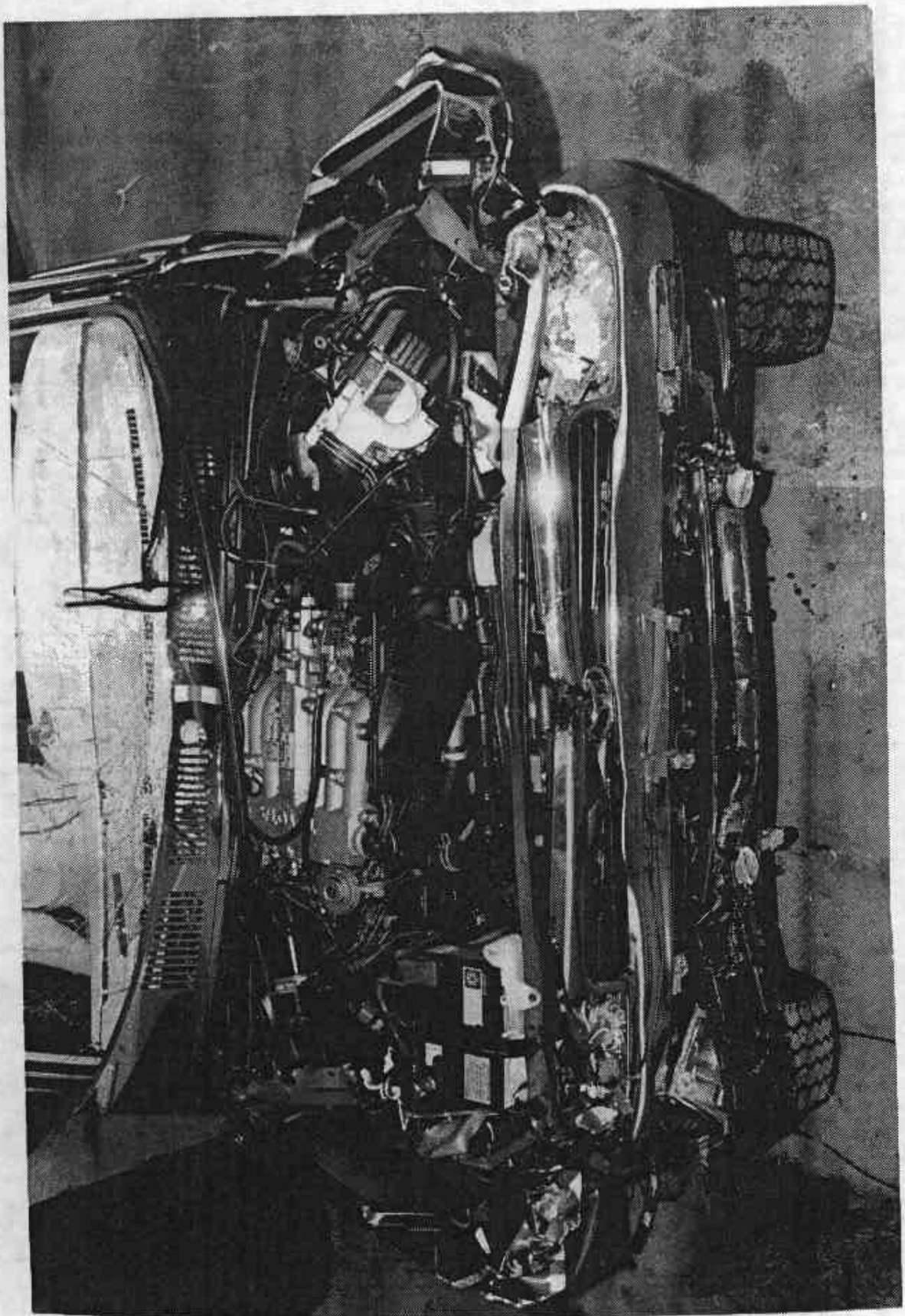
PRETEST WINDSHIELD VIEW



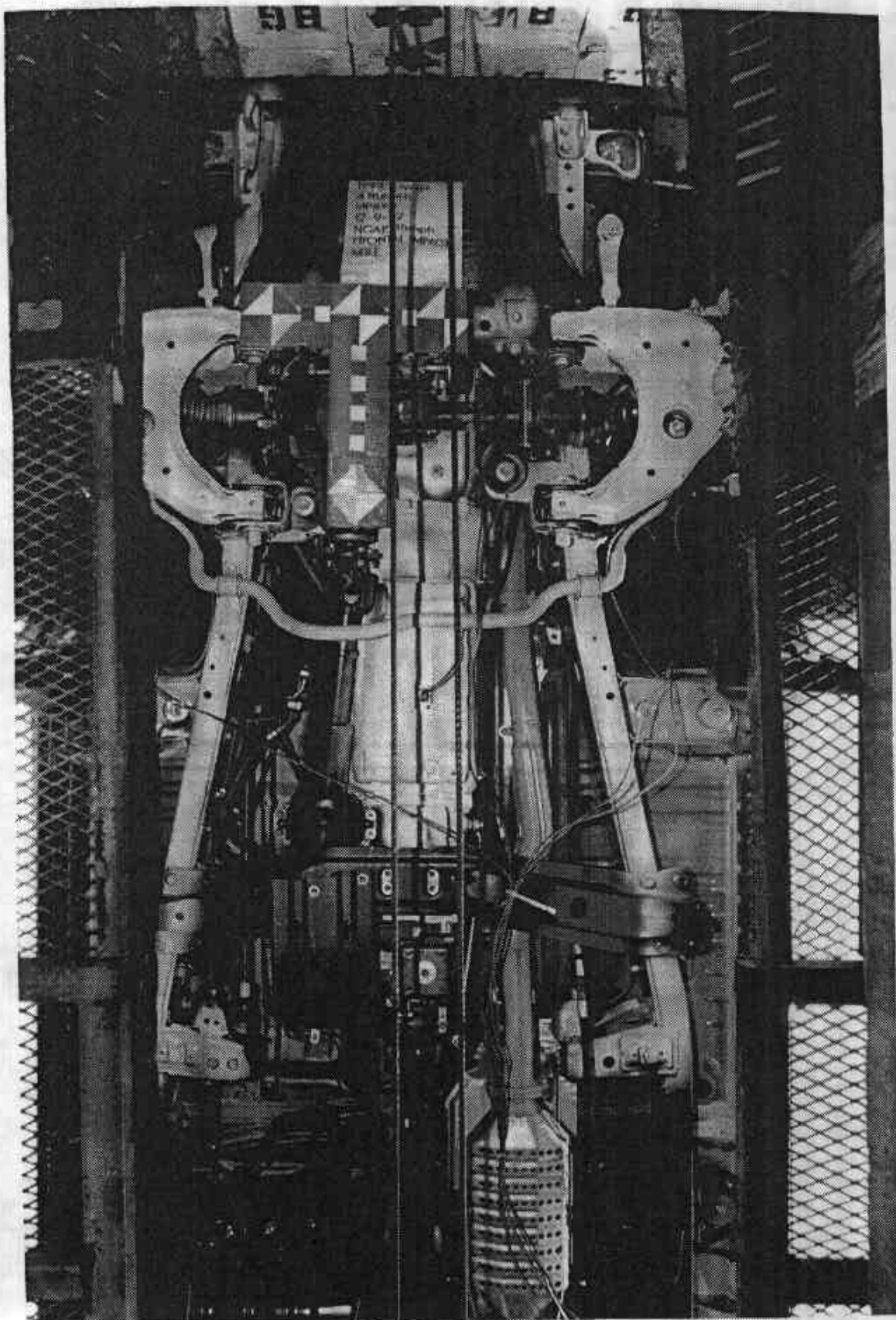
POSTTEST WINDSHIELD VIEW



PRETEST ENGINE COMPARTMENT VIEW



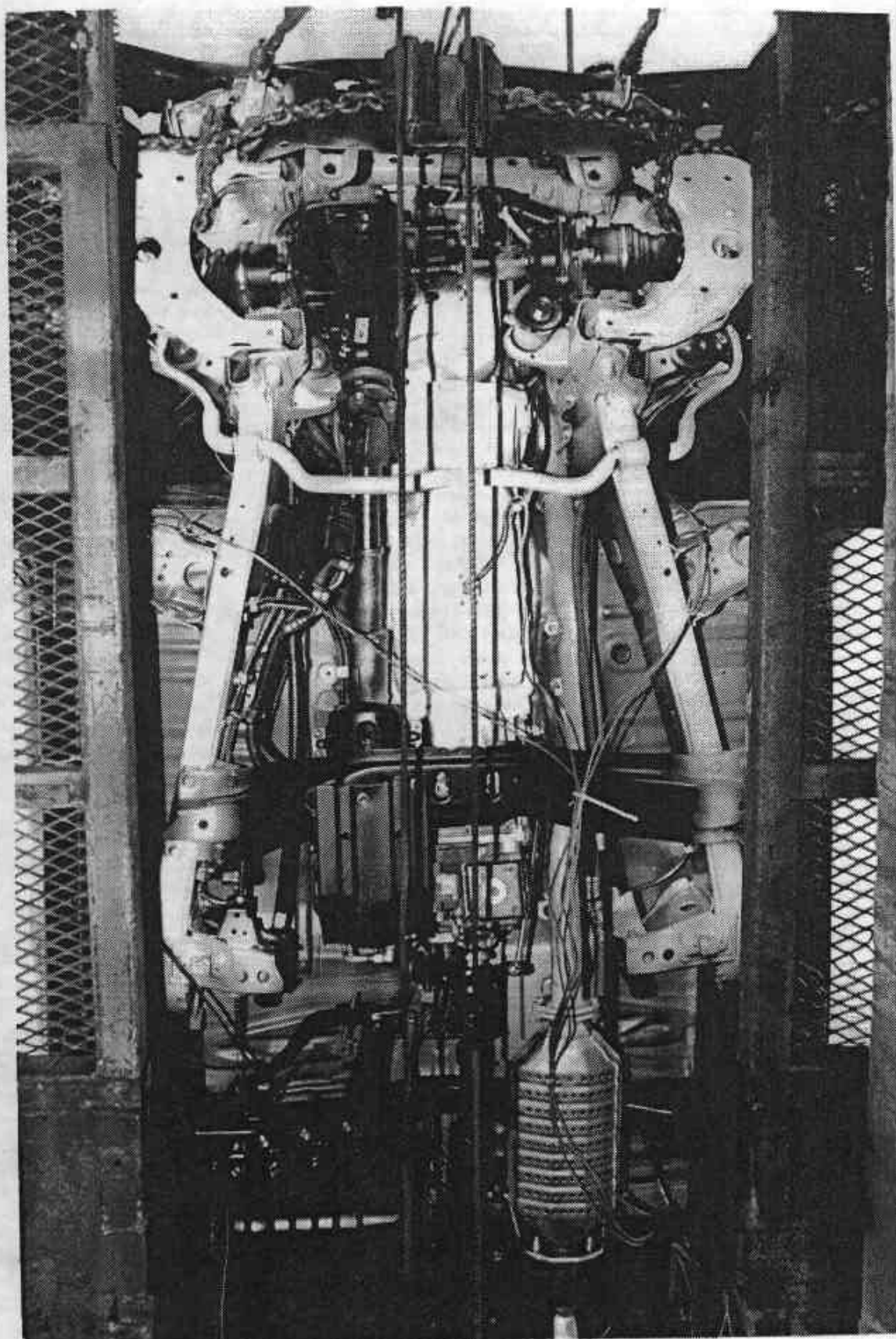
POSTTEST ENGINE COMPARTMENT VIEW



PRETEST FRONT UNDERBODY VIEW

A-15

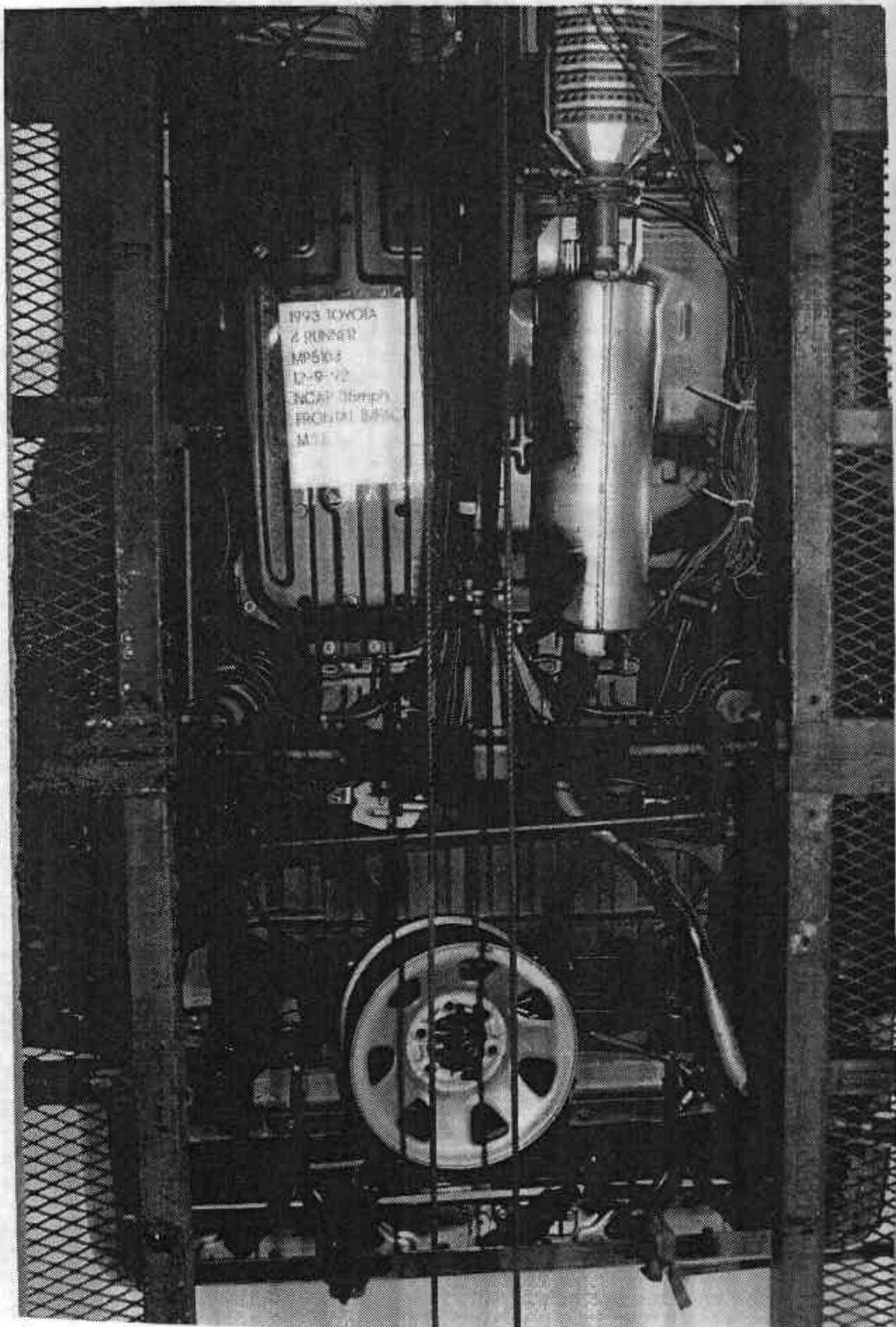
MSE-93-R92083-N04



POSTTEST FRONT UNDERBODY VIEW

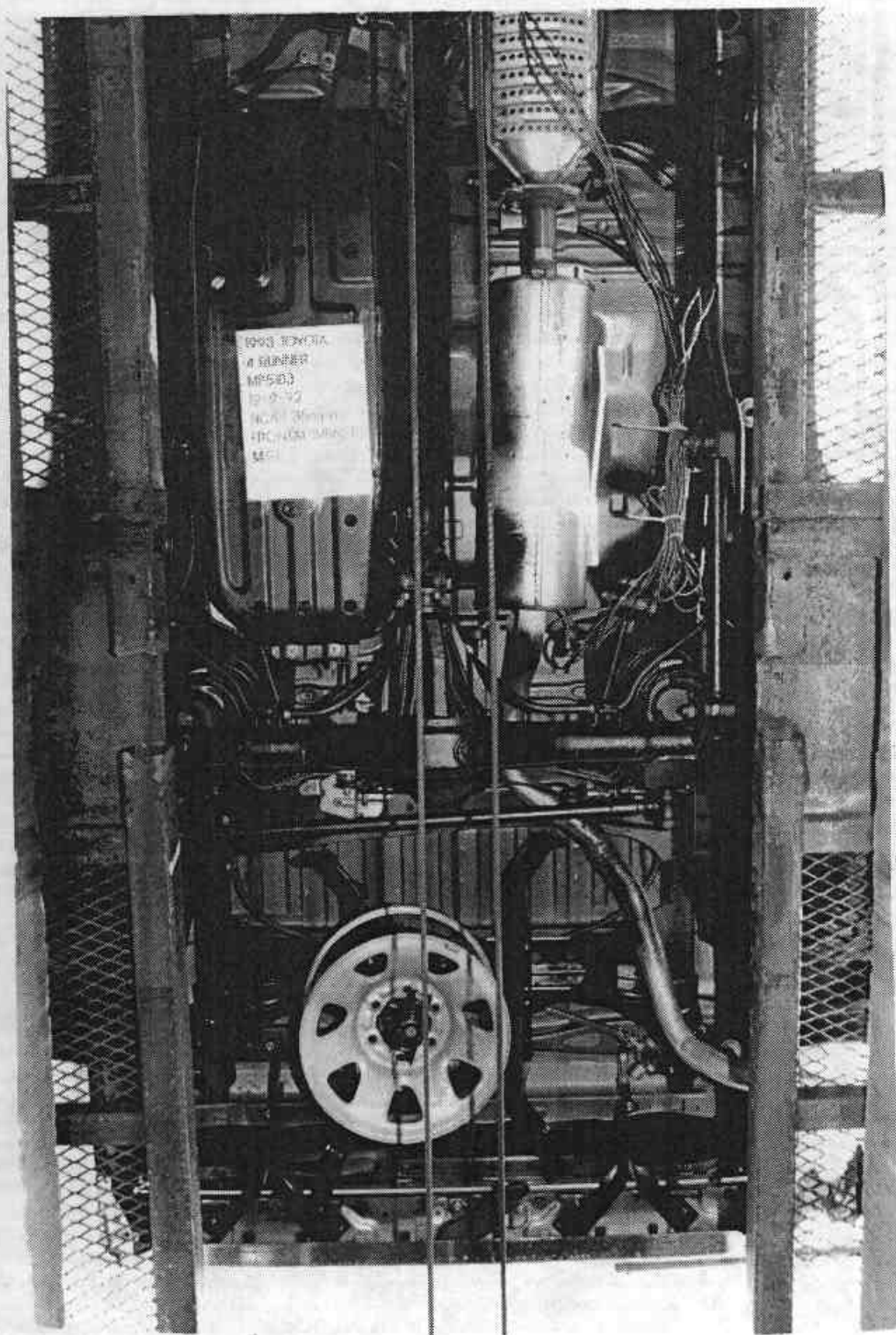
A-16

MSE-93-R92083-N04



PRETEST REAR UNDERBODY VIEW
A-17

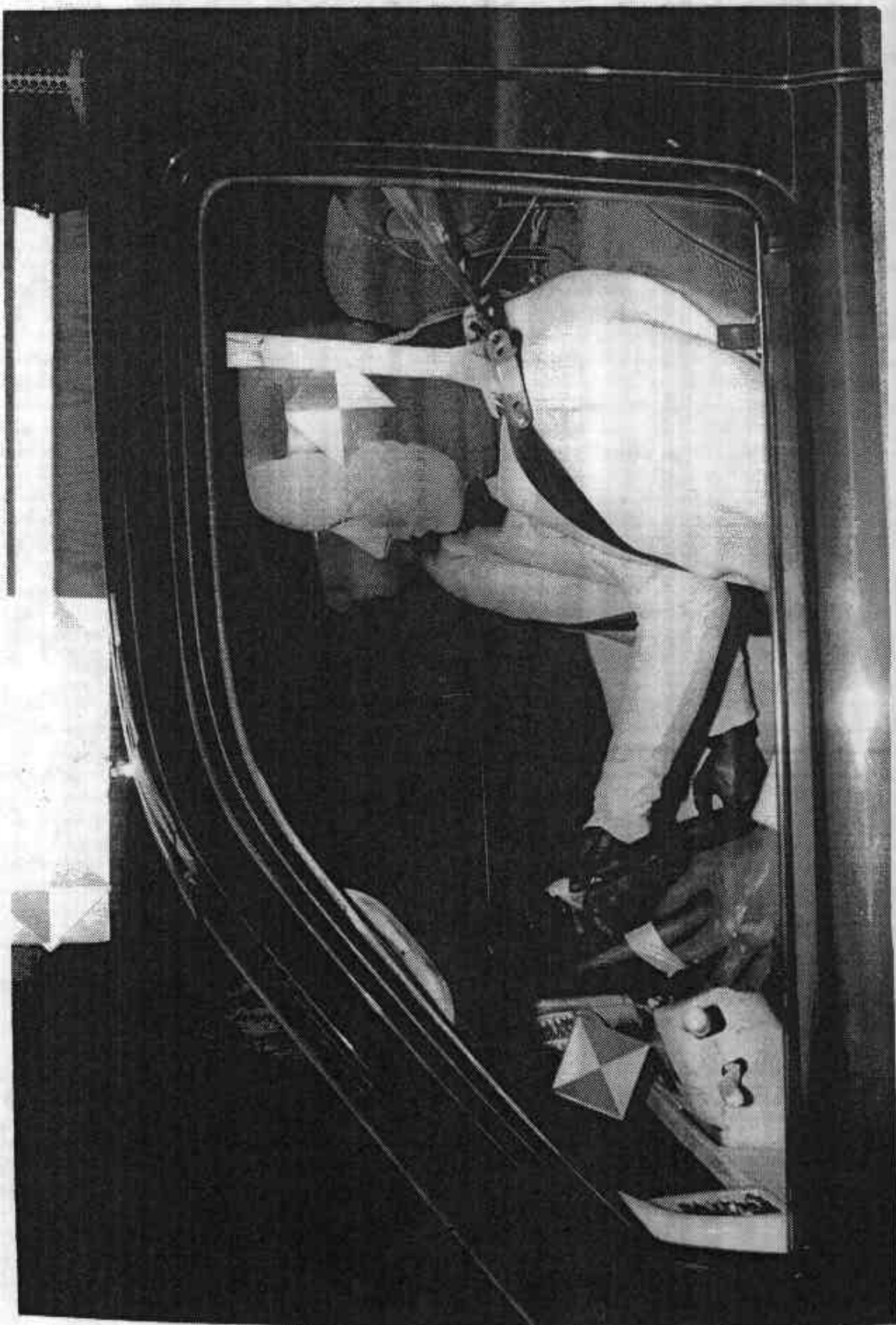
MSE-93-R92083-N04



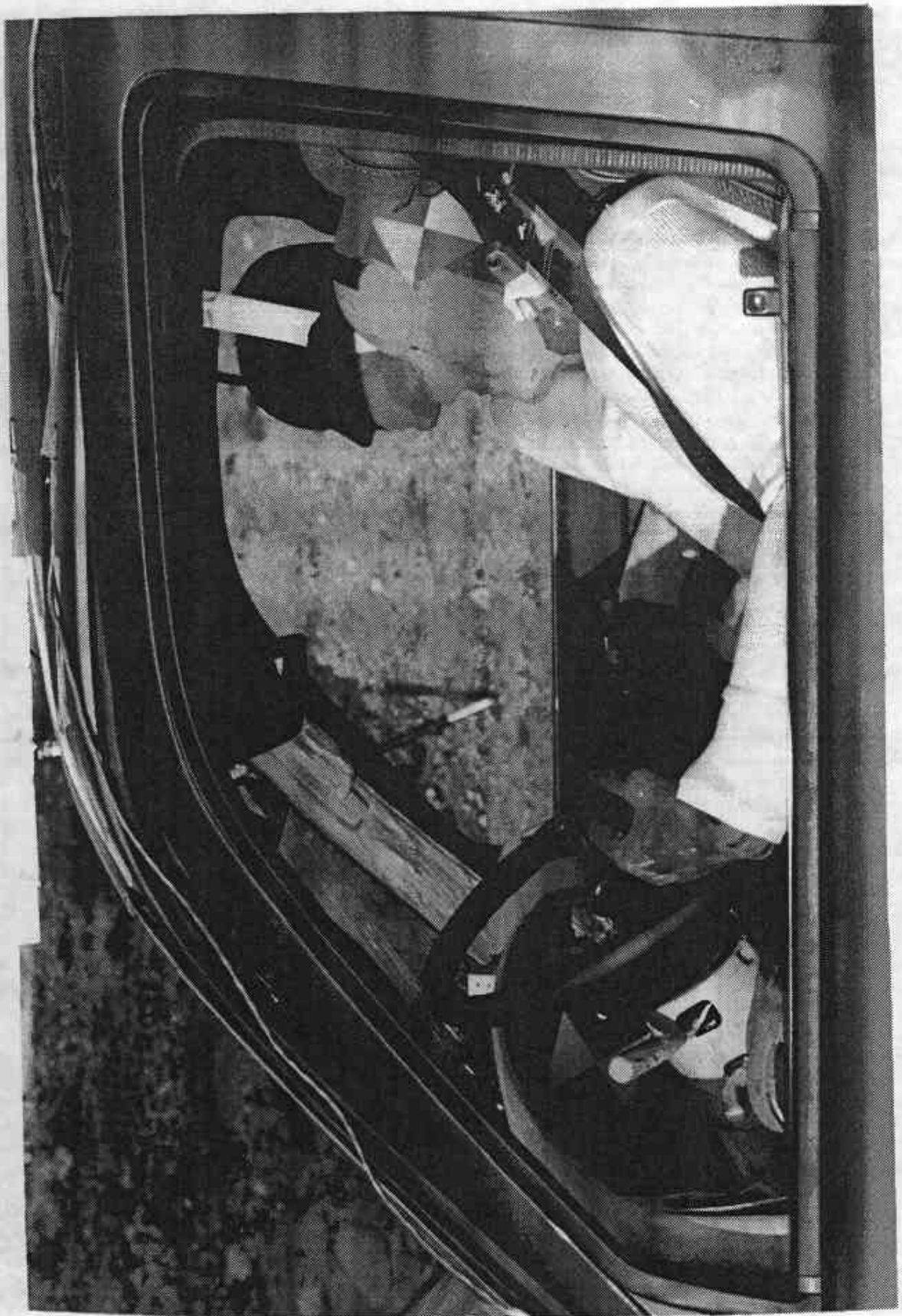
POSTTEST REAR UNDERBODY VIEW

A-18

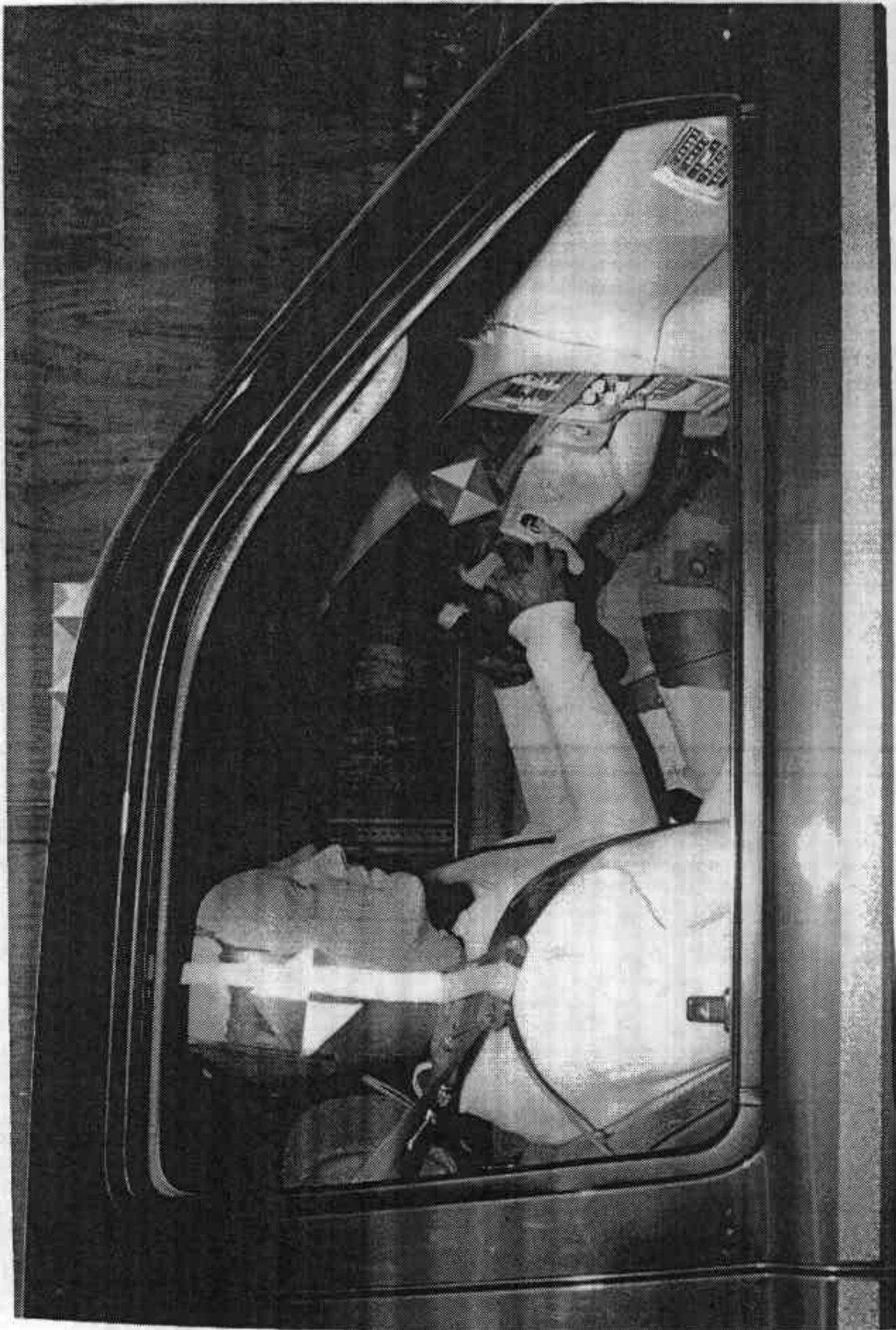
MSE-93-R92083-N04



PRETEST DRIVER DUMMY POSITION VIEW



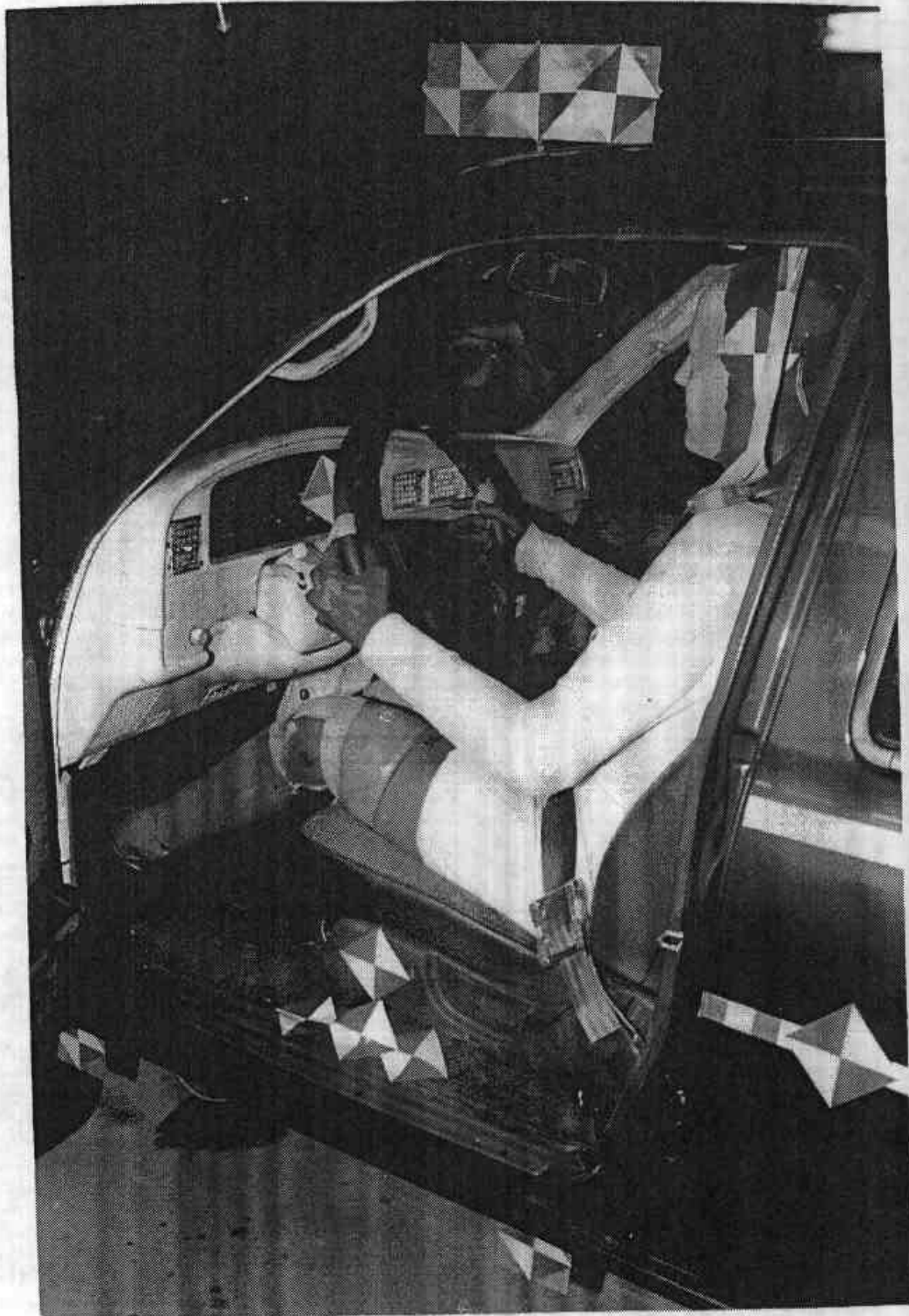
POSTTEST DRIVER DUMMY POSITION VIEW



PRETEST PASSENGER DUMMY POSITION VIEW



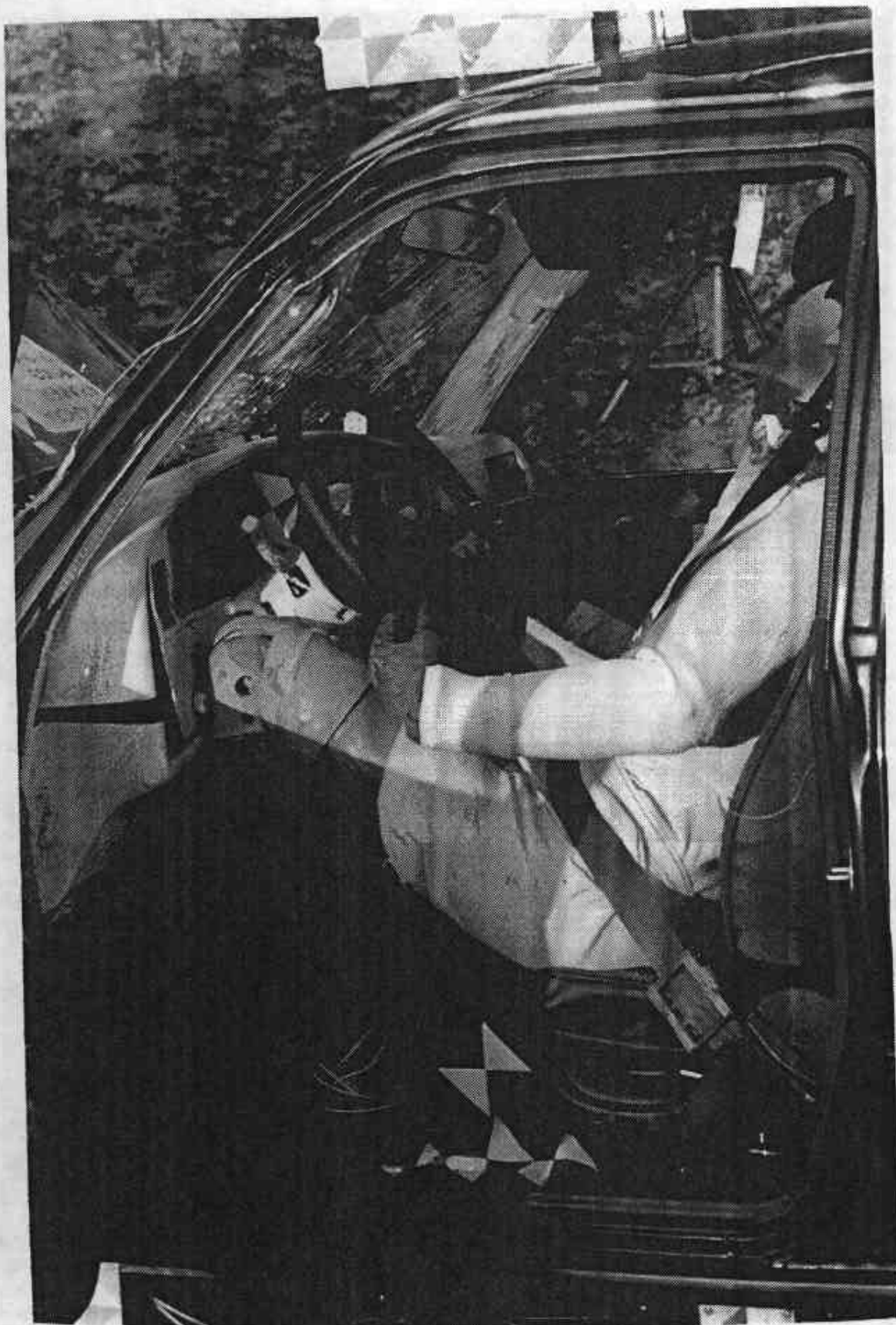
POSTTEST PASSENGER DUMMY POSITION VIEW



PRETEST DRIVER DUMMY & VEHICLE INTERIOR VIEW (Door Open)

A-23

MSE-93-R92083-N04



POSTTEST DRIVER DUMMY & VEHICLE INTERIOR VIEW (Door Open)

A-24

MSE-93-R92083-N04



PRETEST PASSENGER DUMMY & VEHICLE INTERIOR VIEW (Door Open)

A-25

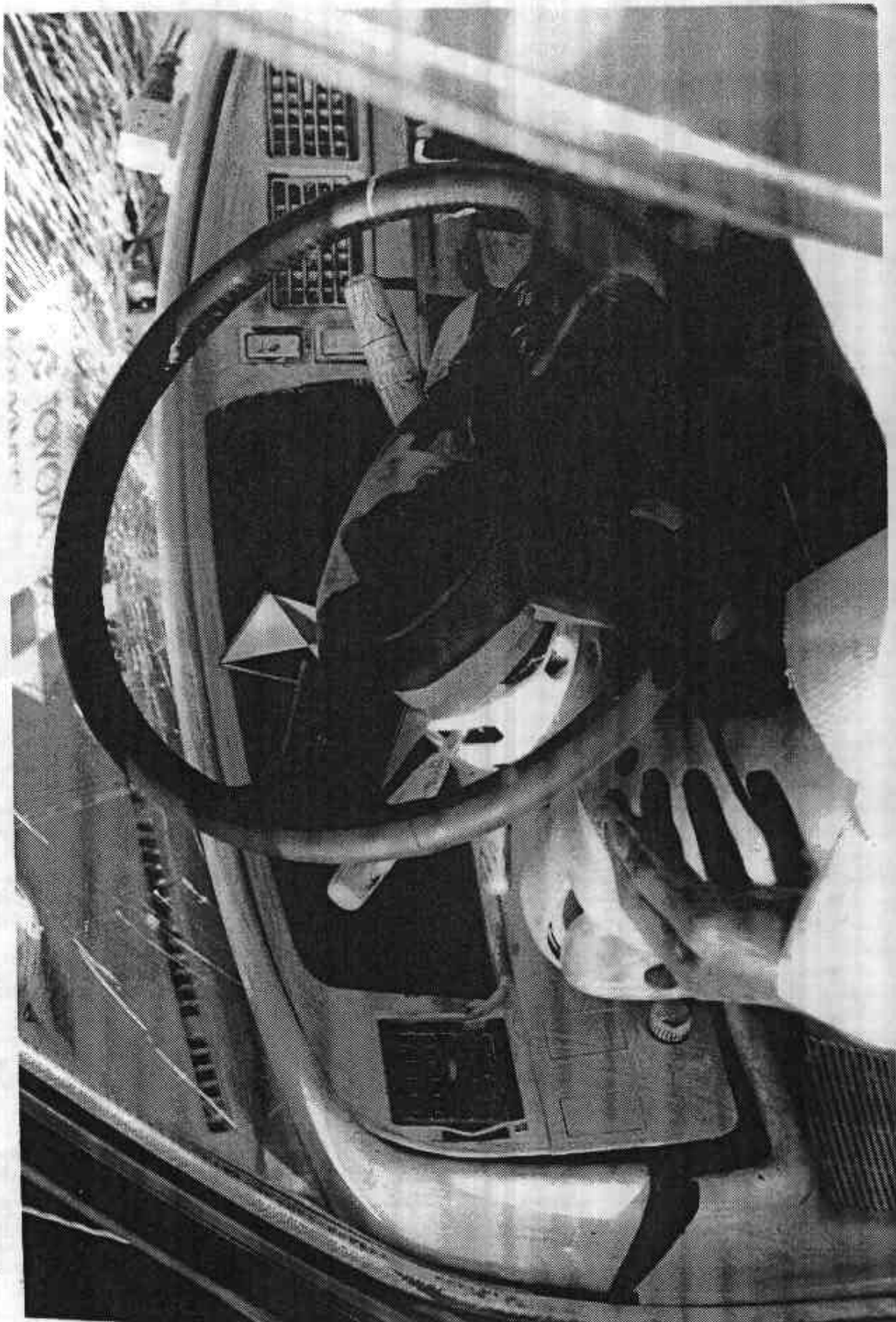
MSE-93-R92083-N04



POSTTEST PASSENGER DUMMY & VEHICLE INTERIOR VIEW (Door Open)

A-26

MSE-93-R92083-N04



POSTTEST DRIVER ATD HEAD AND KNEE CONTACT AREA



POSTTEST PASSENGER ATD KNEE CONTACT AREA

THIS PAGE INTENTIONALLY LEFT BLANK

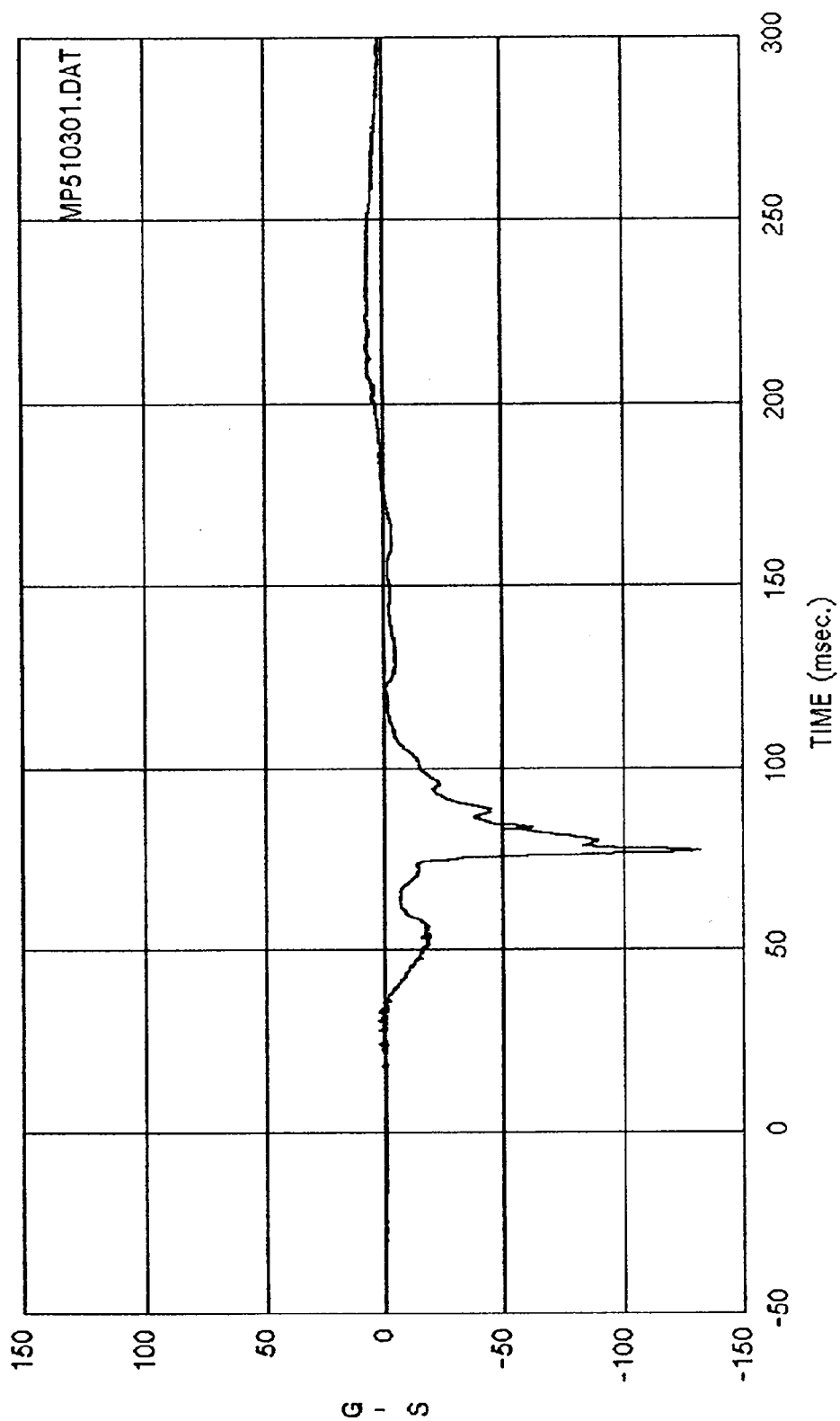
APPENDIX B-1

VEHICLE AND DUMMY (ATD) RESPONSE DATA

DATA FILTERING:

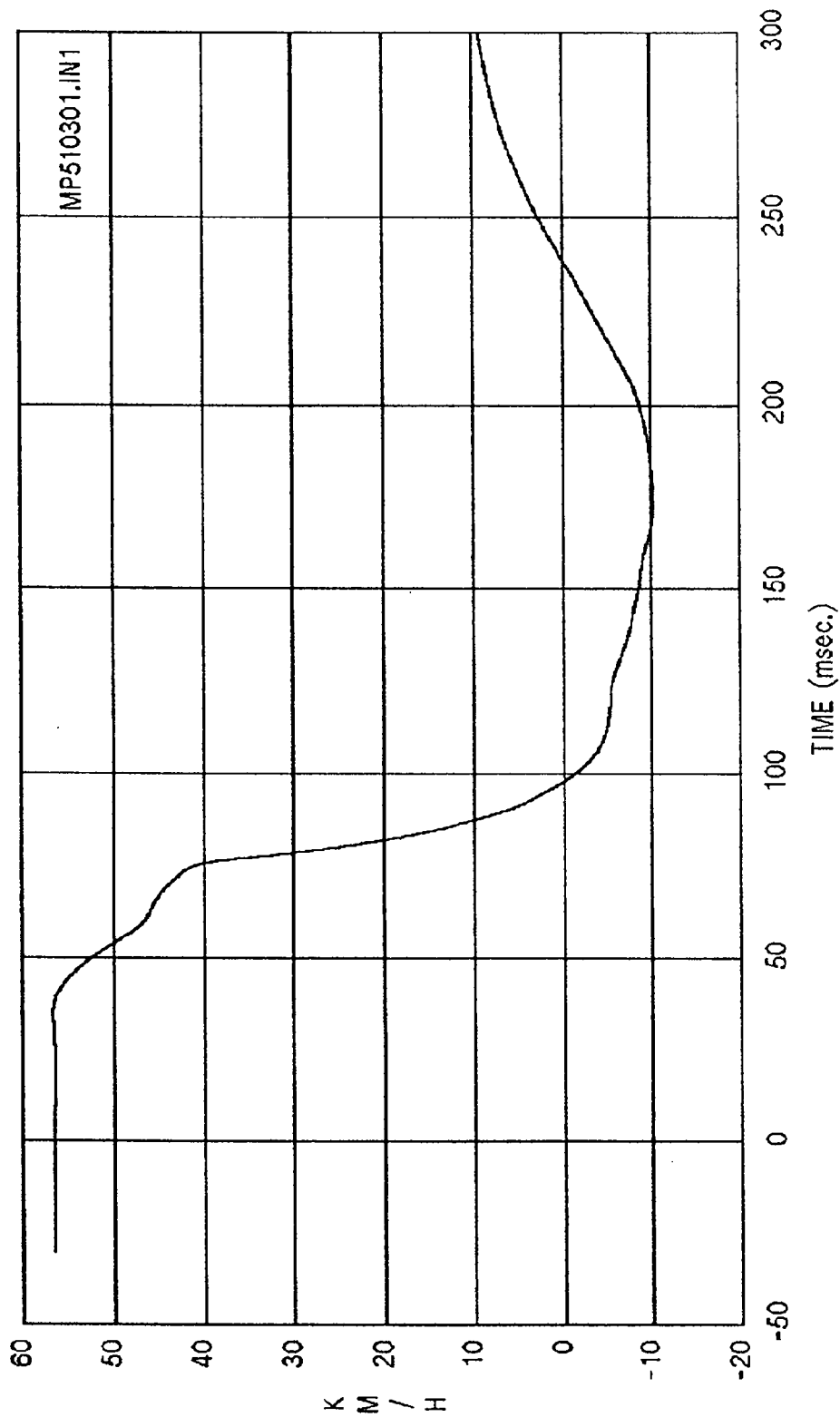
ATD Head Channels	- Class 1000
ATD Chest Channels	- Class 180
ATD Femur Channels	- Class 600
Vehicle Channels	- Class 60

THIS PAGE INTENTIONALLY LEFT BLANK

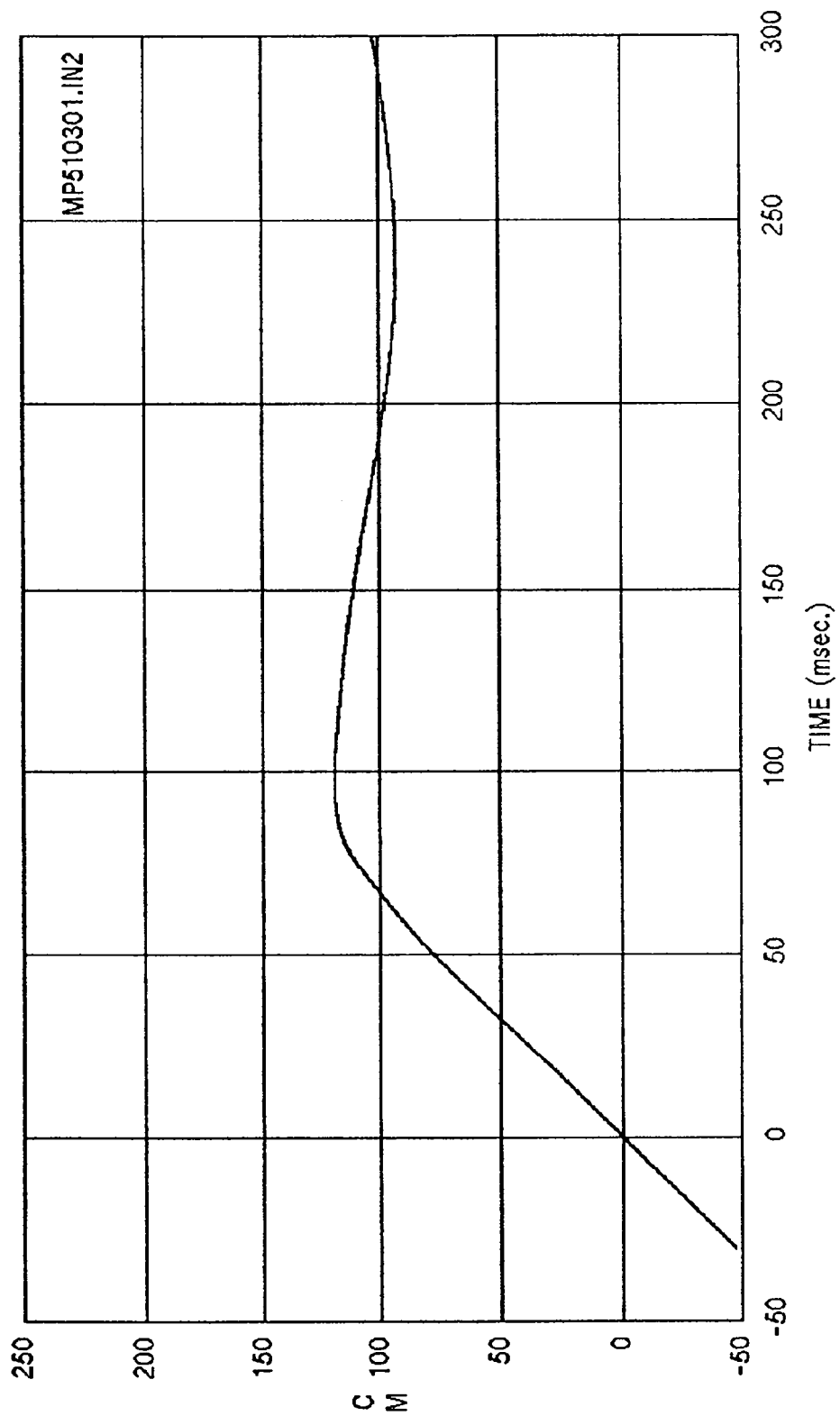


Curve: Driver head acceleration -- X axis Filter: SAE CLASS 1000 Max = 8.4016 Min = -131.75

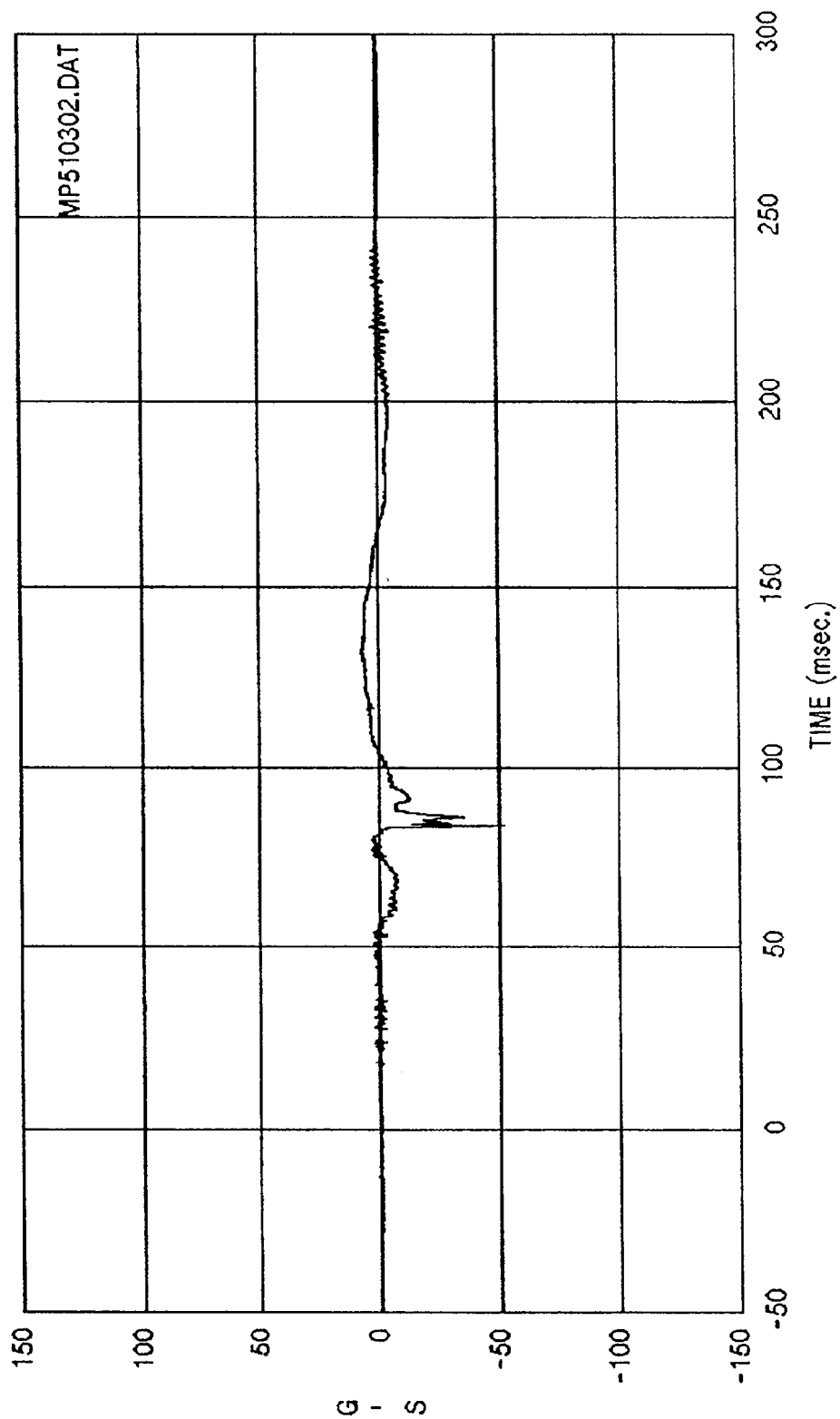
MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner



Curve: Driver head delta V -- X axis Filter: SAE CLASS 180 Max = 56.689 Min = -10.399
MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner

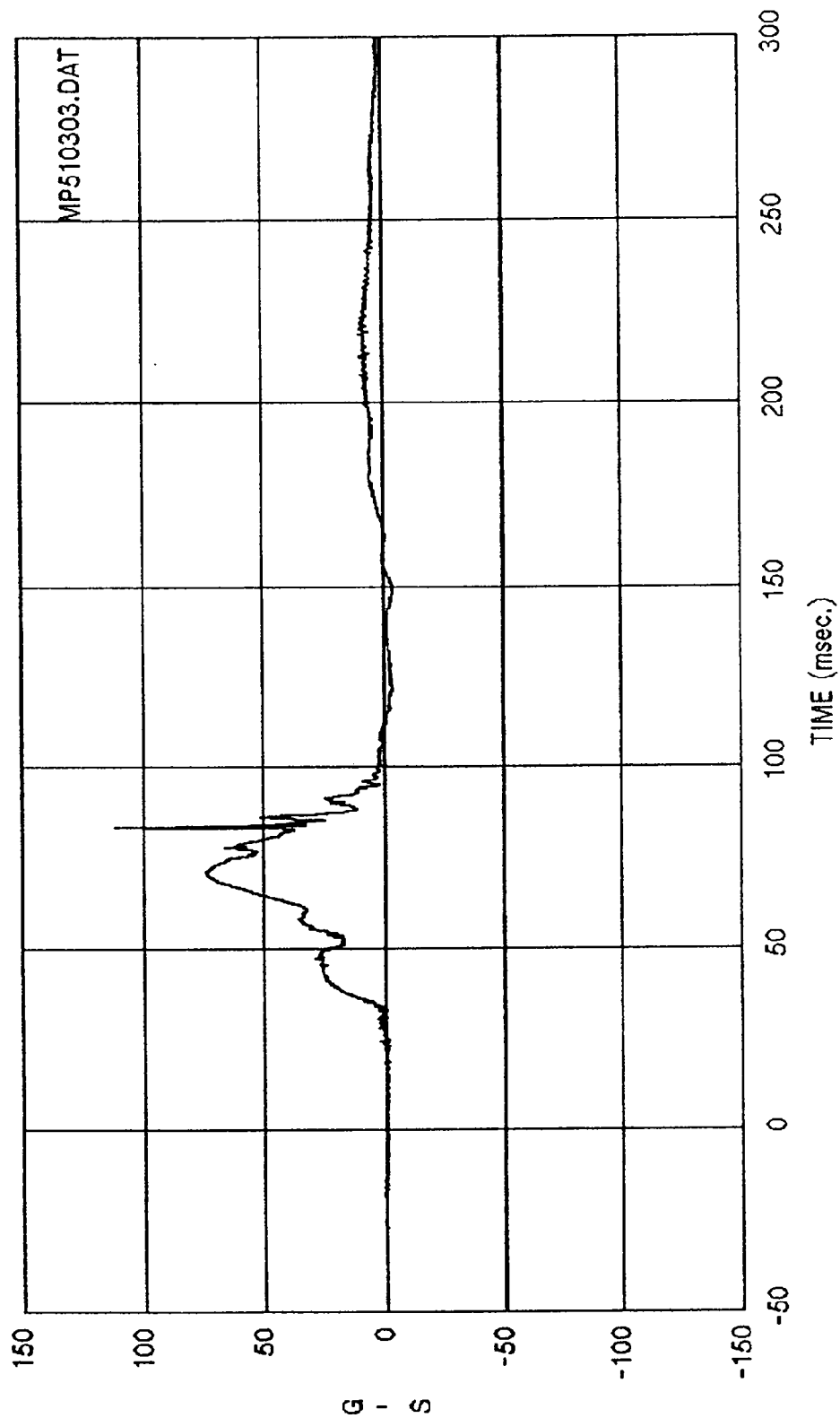


Curve: Driver head displacement -- X axis Filter: SAE CLASS 180 Max = 119.48 Min = 92.836
MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner

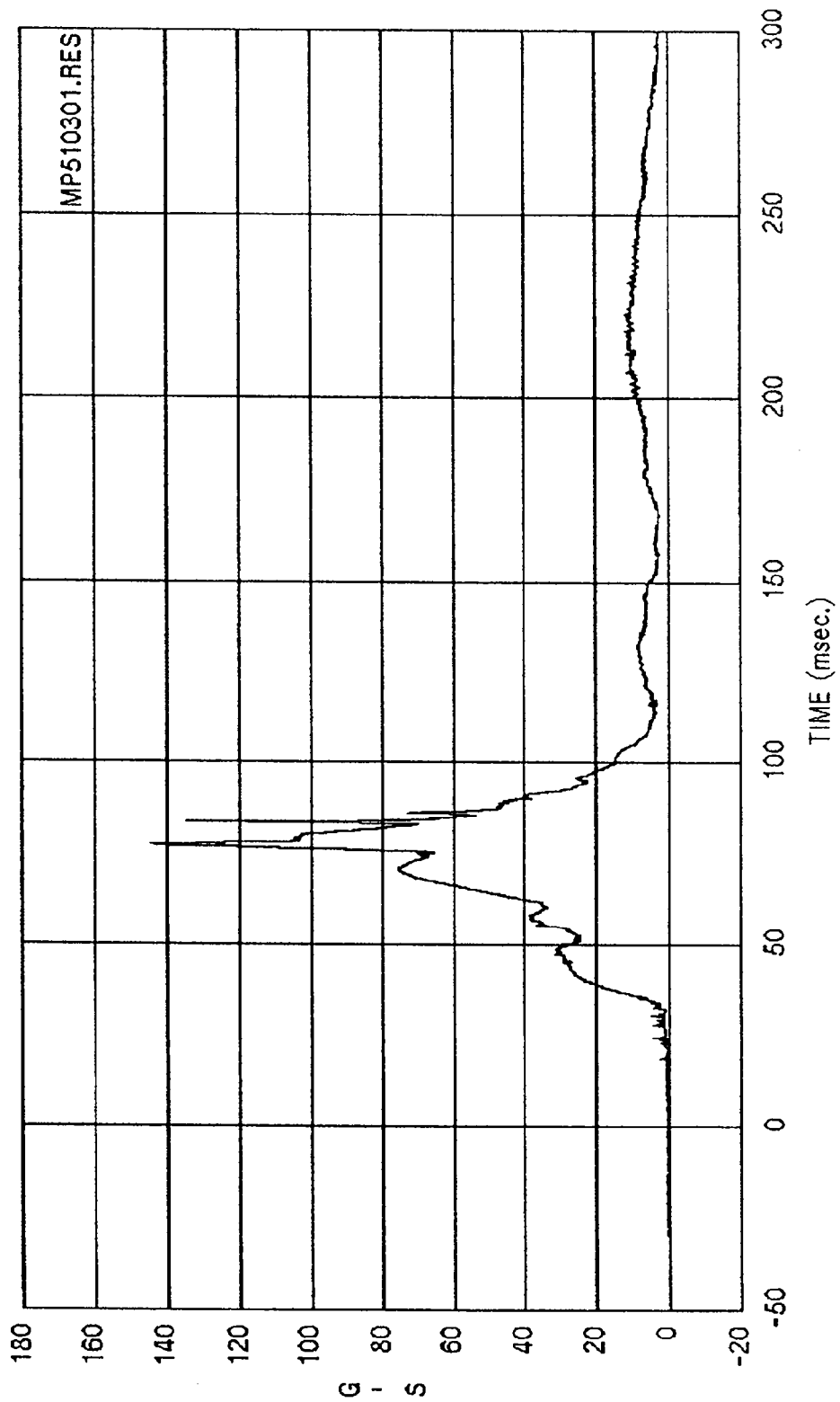


Curve: Driver head acceleration -- Y axis Filter: SAE CLASS 1000 Max = 6.9474 Min = -53.594

MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner

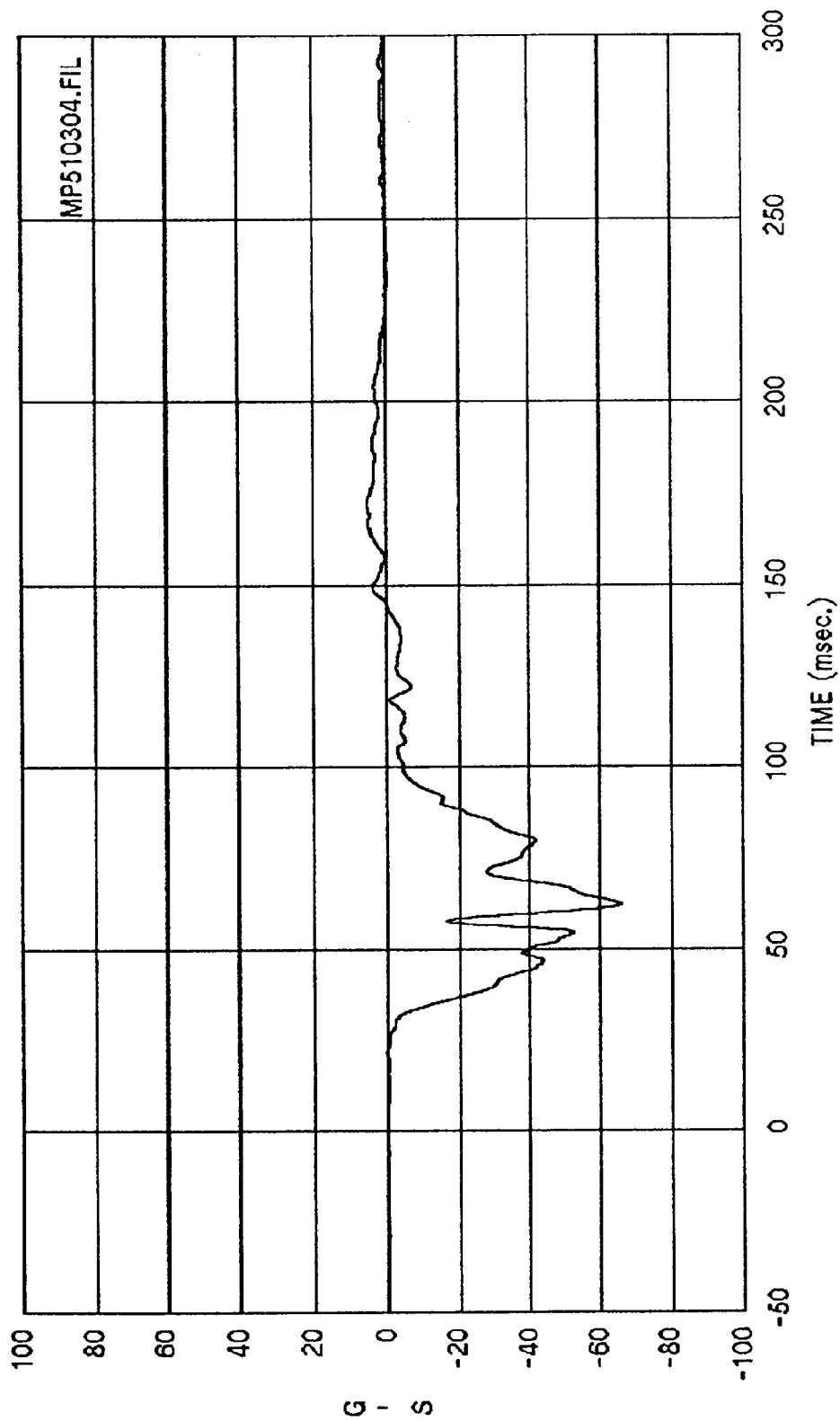


Curve: Driver head acceleration -- Z axis Filter: SAE CLASS 1000 Max = 111.77 Min = -3.8852
MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner

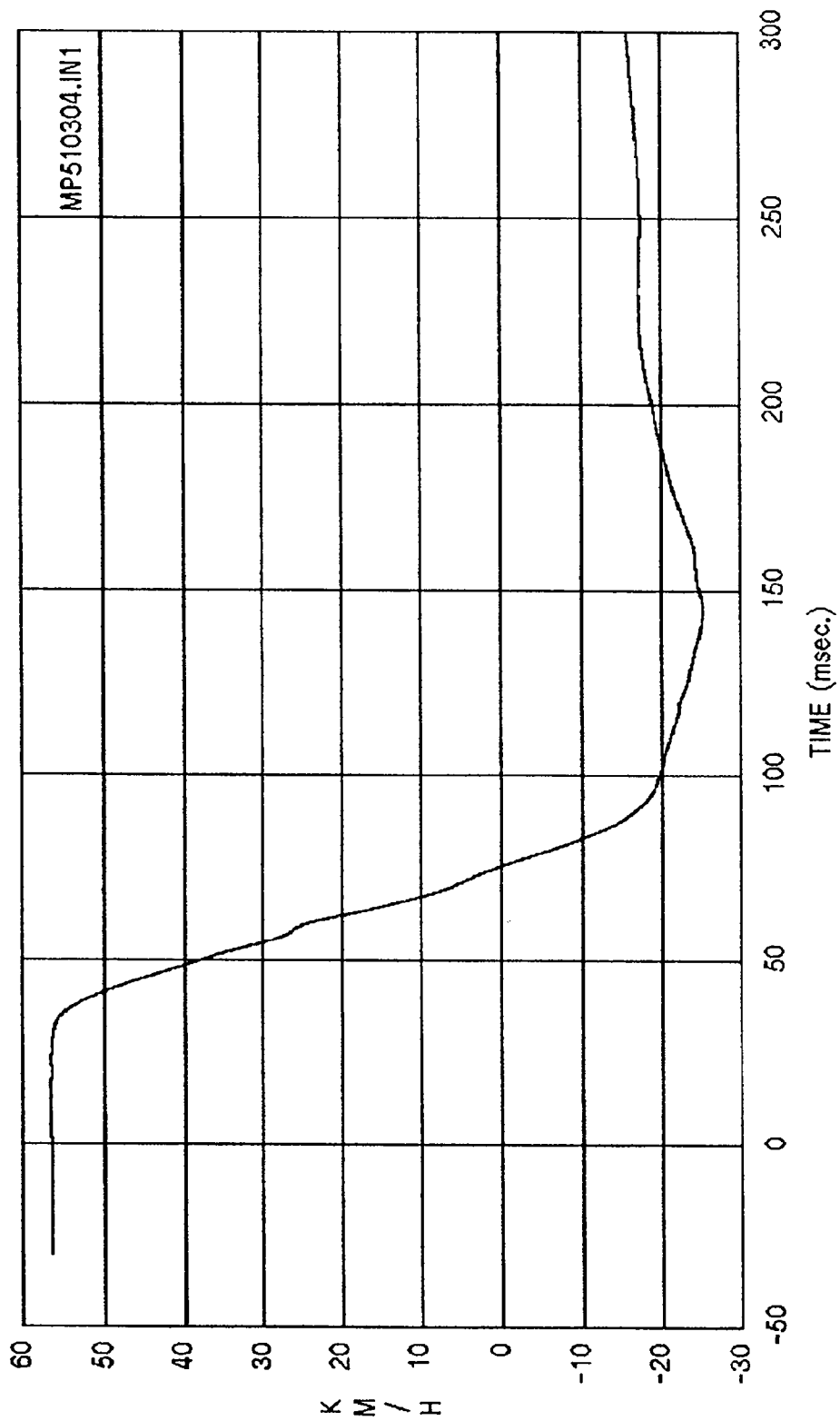


Curve: Driver head acceleration -- Resultant Filter: SAE CLASS 1000 Max = 144.67 Min = .00000

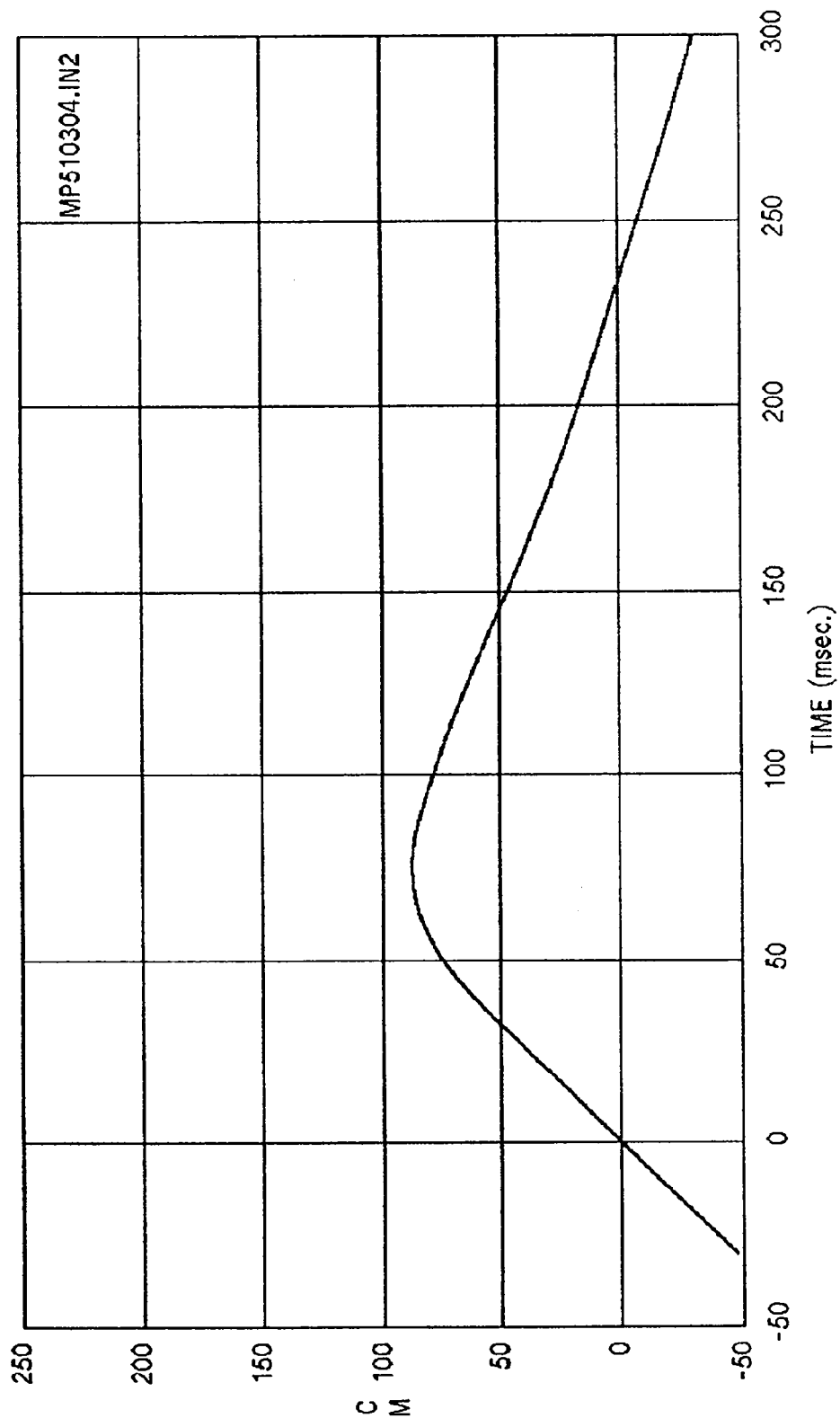
MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner



Curve: Driver chest acceleration -- X axis Filter: SAE CLASS 180 Max = 5.3733 Min = -65.686
MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner

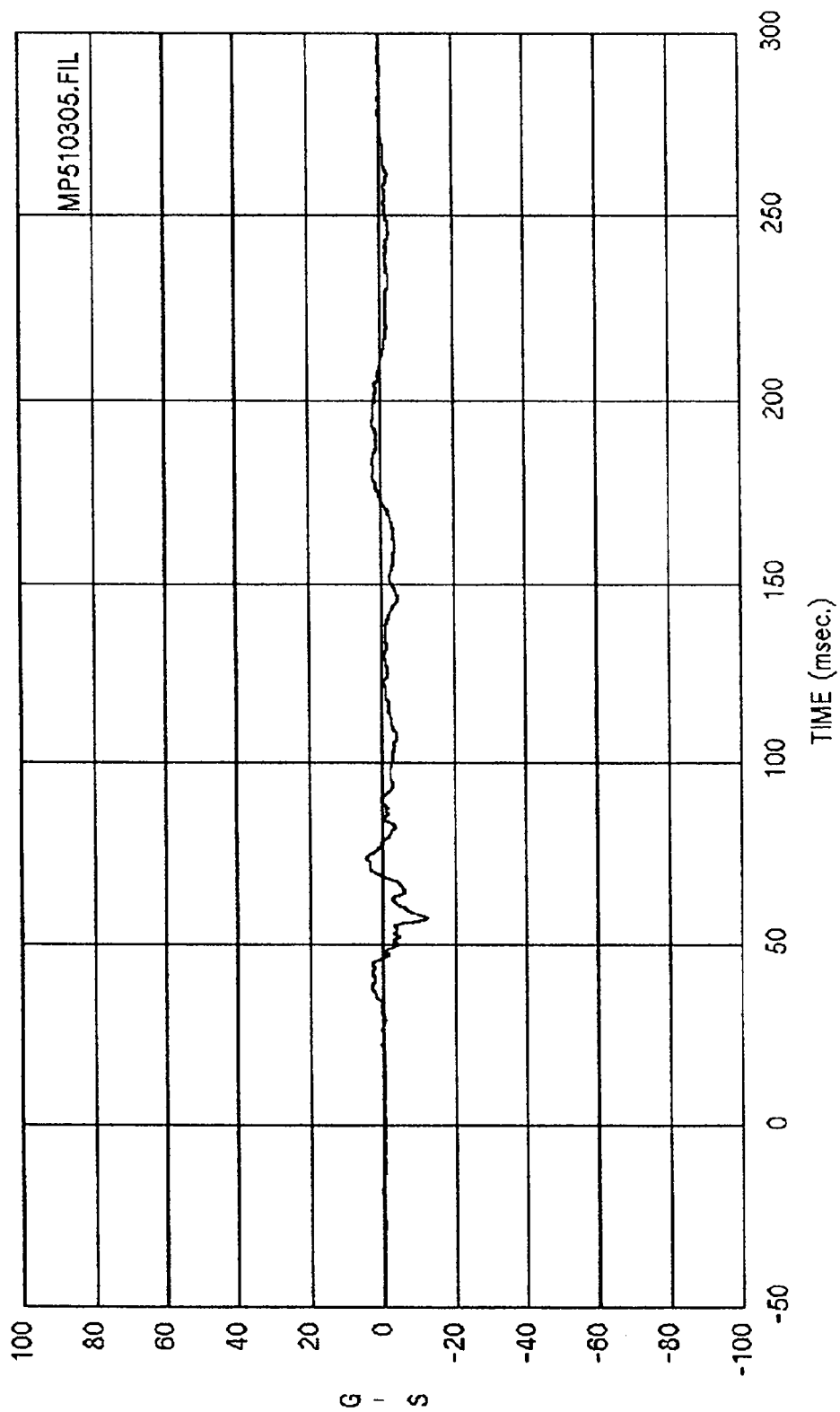


Curve: Driver chest delta V -- X axis Filter: SAE CLASS 180 Max = 56.615 Min = -25.162
MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner



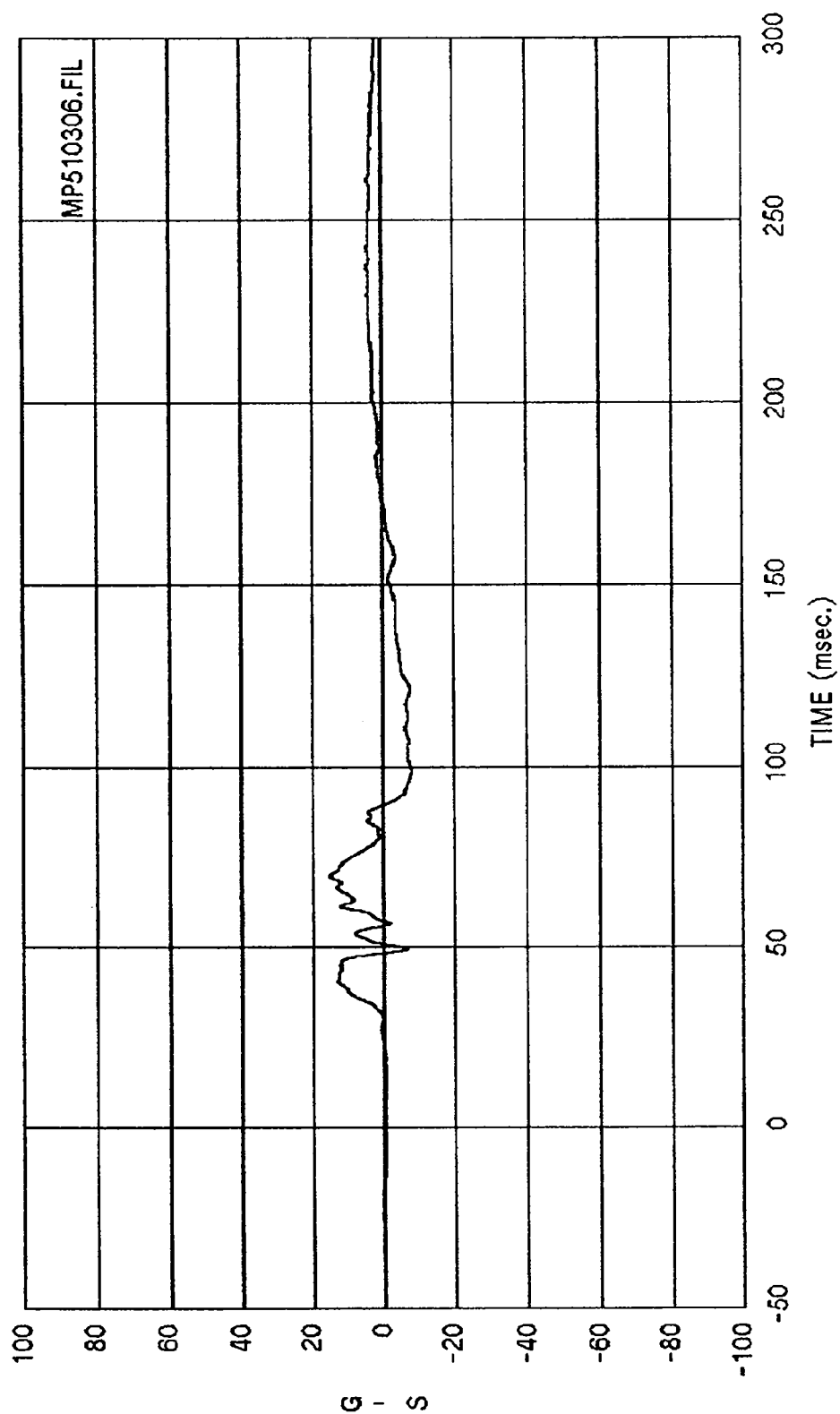
Curve: Driver chest displacement -- X axis Filter: SAE CLASS 180 Max = 87.664 Min = -30.941

MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner

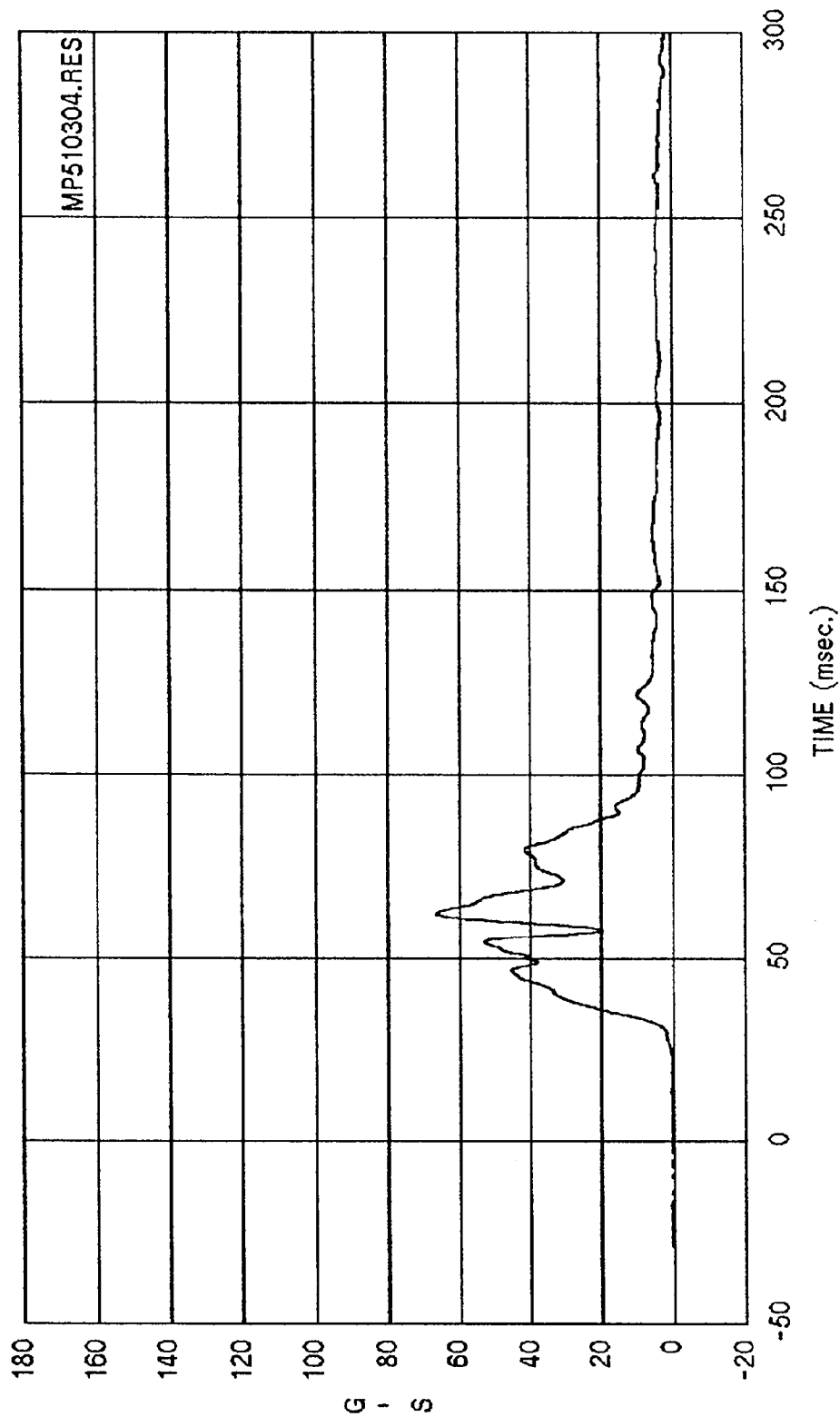


Curve: Driver chest acceleration -- Y axis Filter: SAE CLASS 180 Max = 4.5546 Min = -12.049

MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner

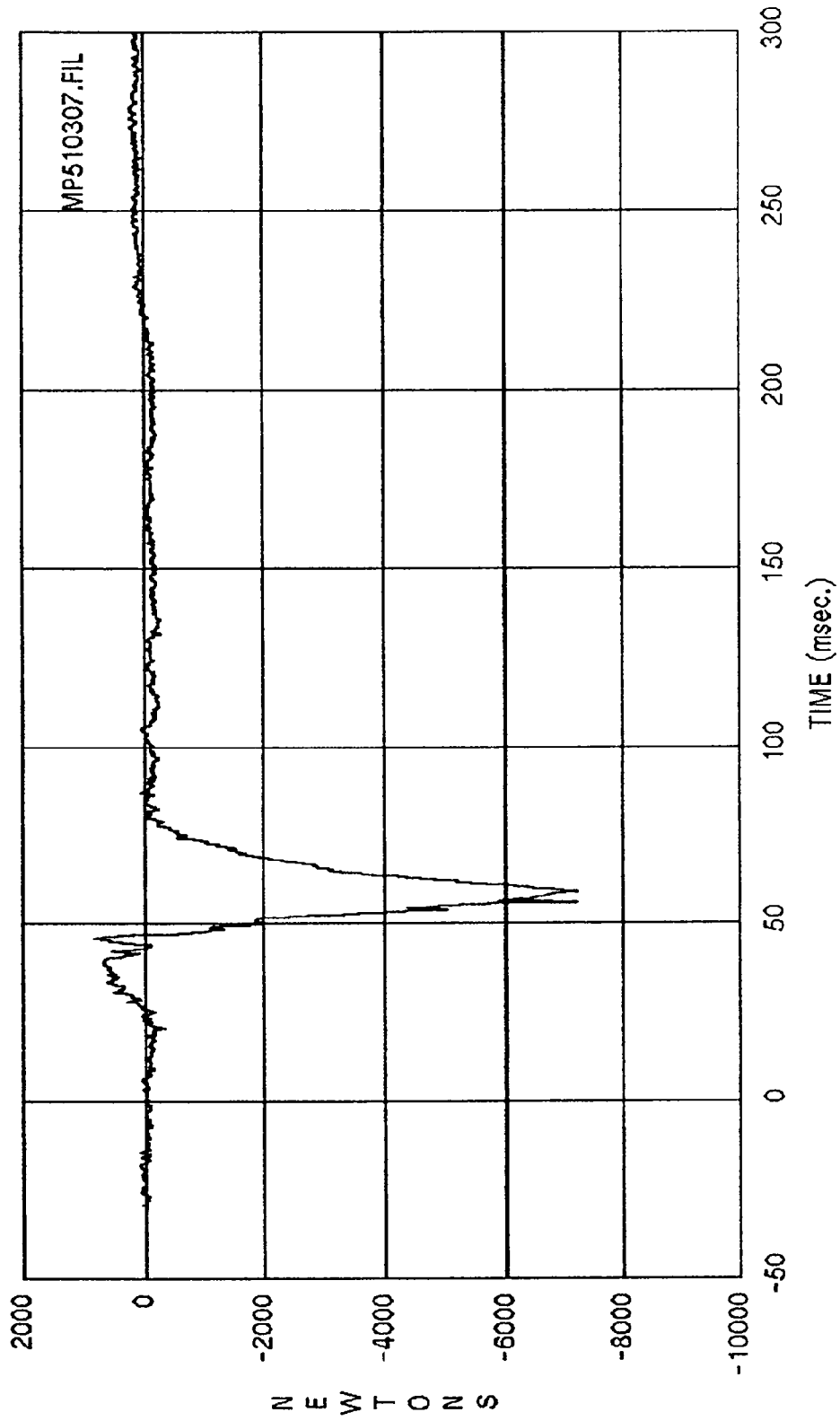


Curve: Driver chest acceleration -- Z axis Filter: SAE CLASS 180 Max = 15.415 Min = -7.9730
MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner

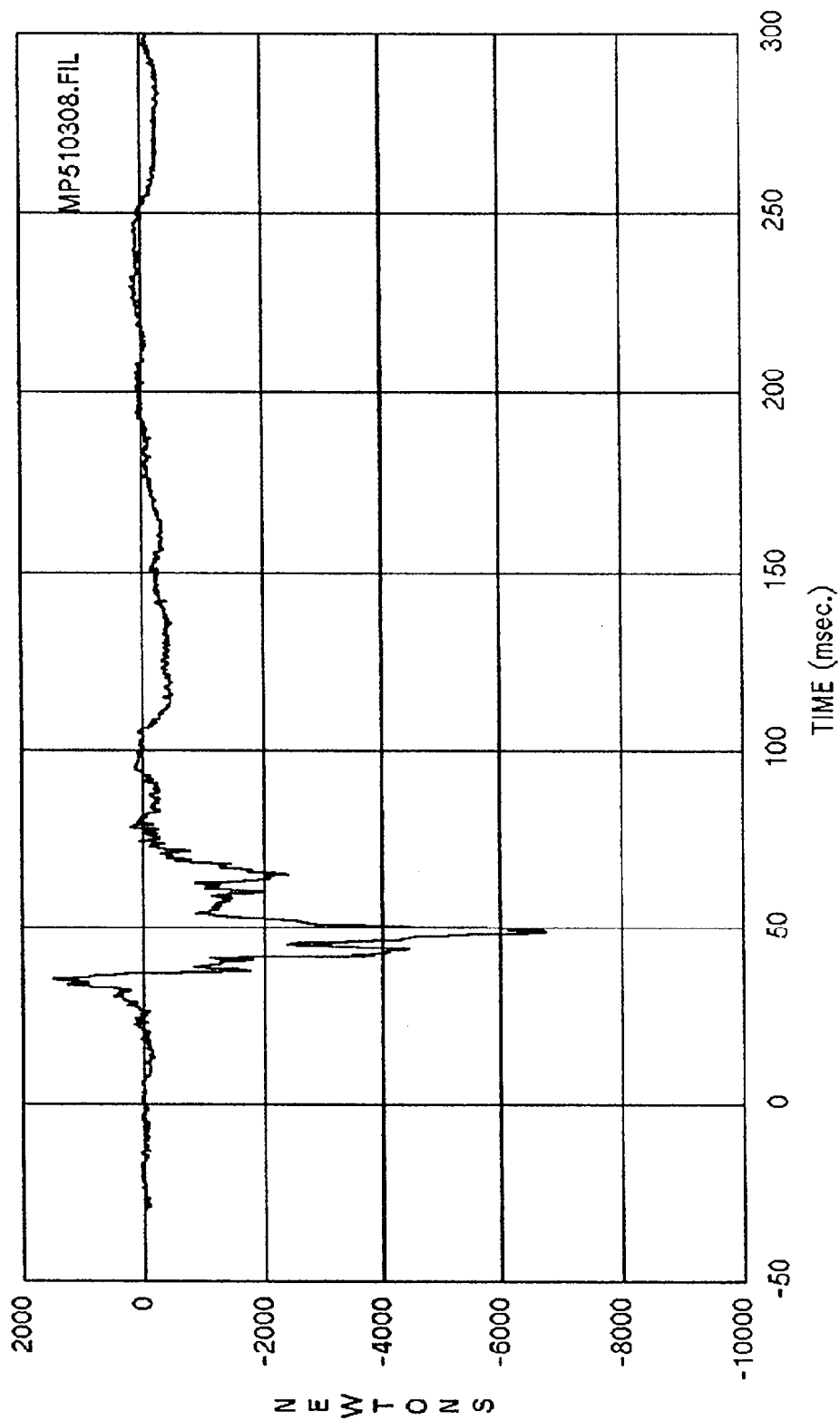


Curve: Driver chest acceleration -- Resultant Filter: SAE CLASS 180 Max = 66.423 Min = .20961

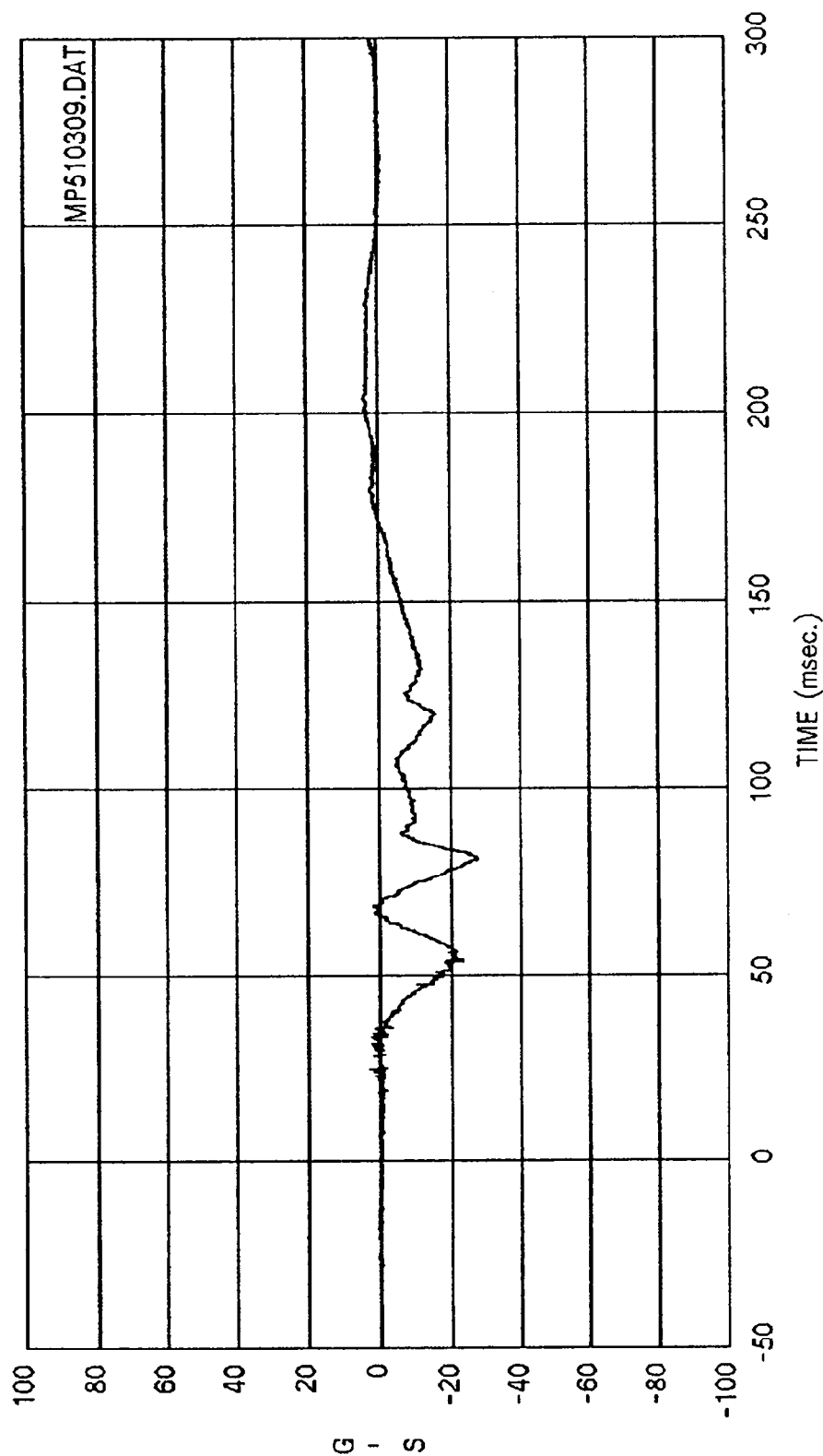
MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner

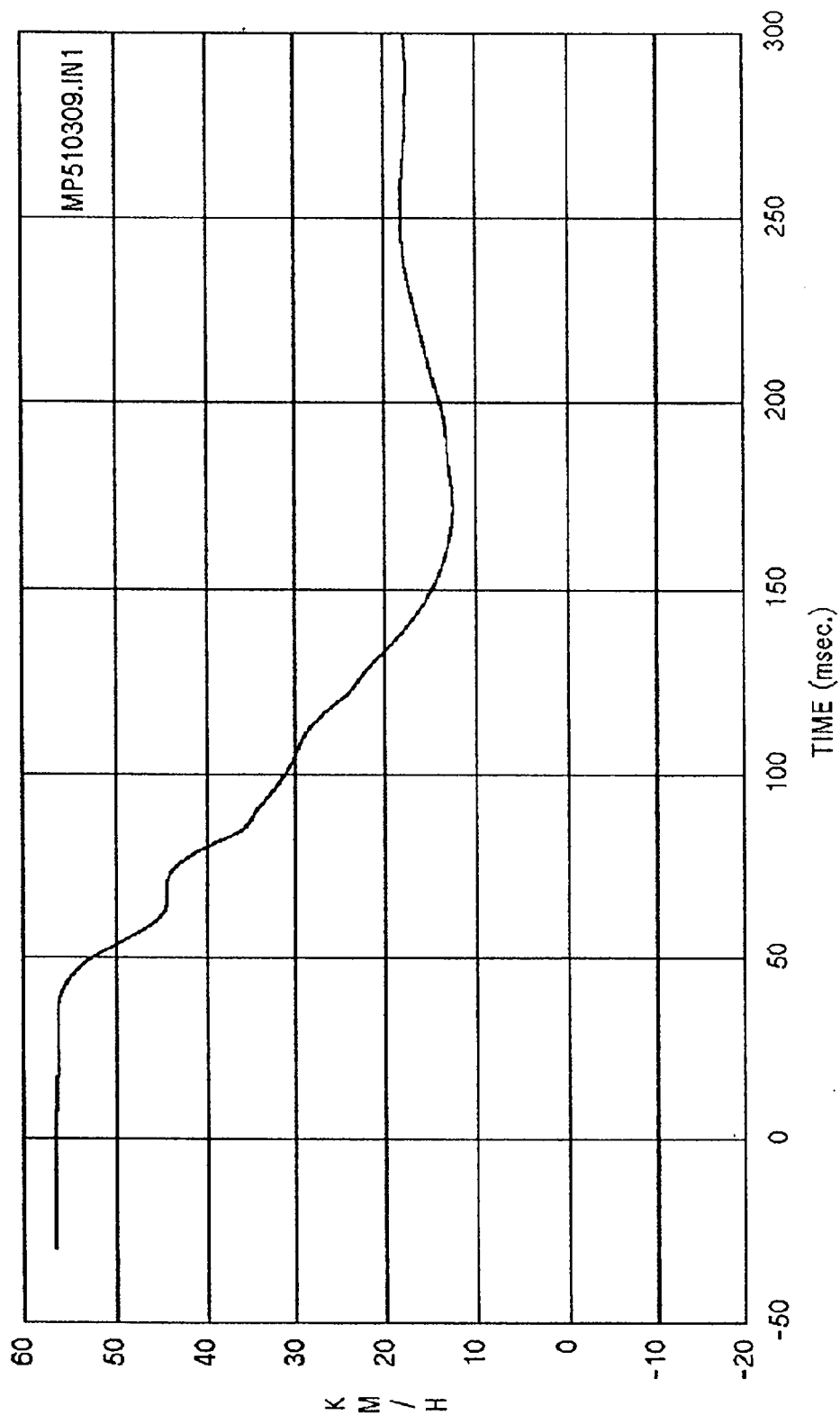


Curve: Driver left femur force Filter: SAE CLASS 600 Max = 854.11 Min = -7371.6
MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner



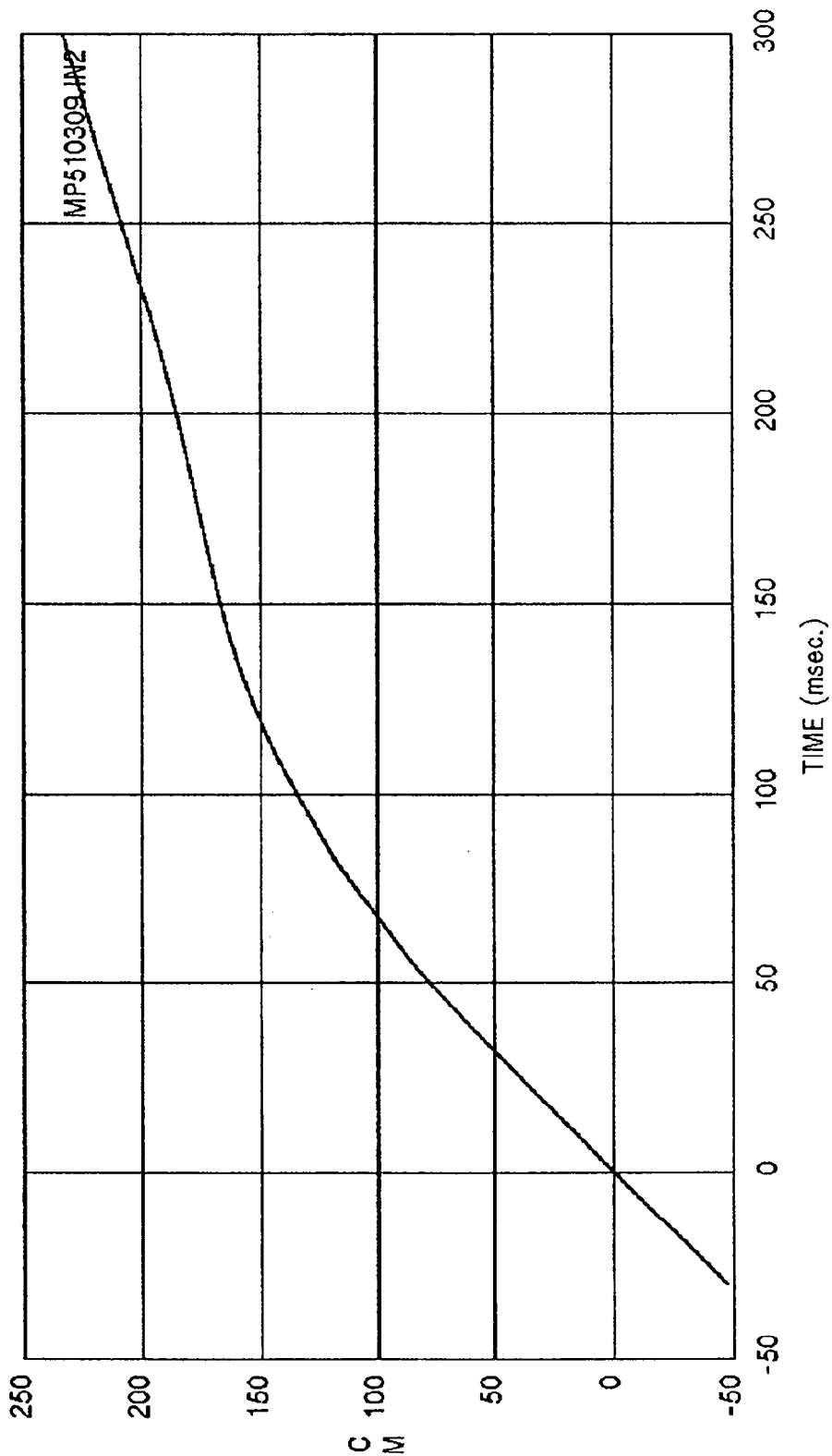
Curve: Driver right femur force Filter: SAE CLASS 600 Max = 1499.3 Min = -6807.0
MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner





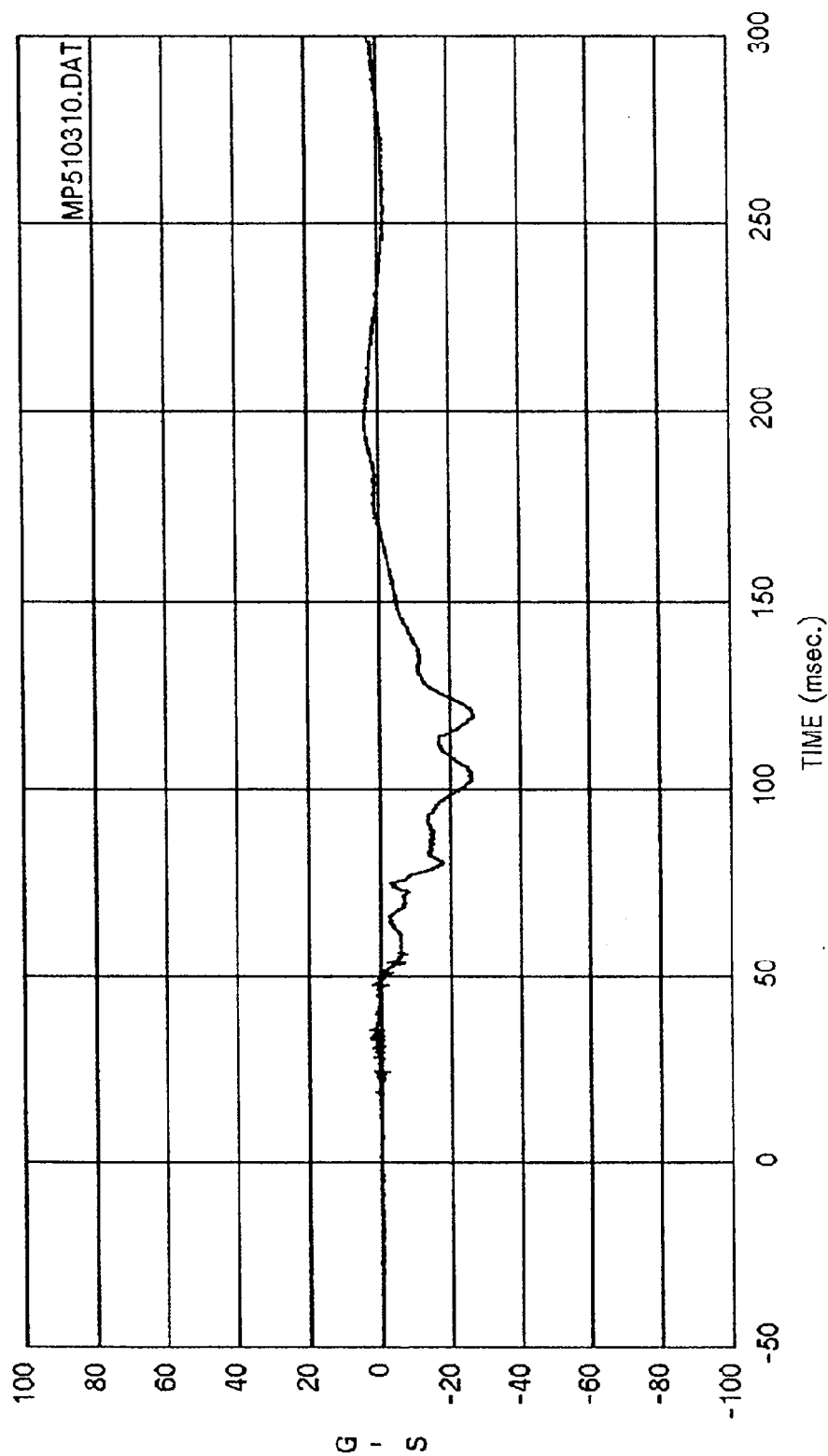
Curve: Passenger head delta V -- X axis Filter: SAE CLASS 180 Max = 56.575 Min = 12.488

MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner



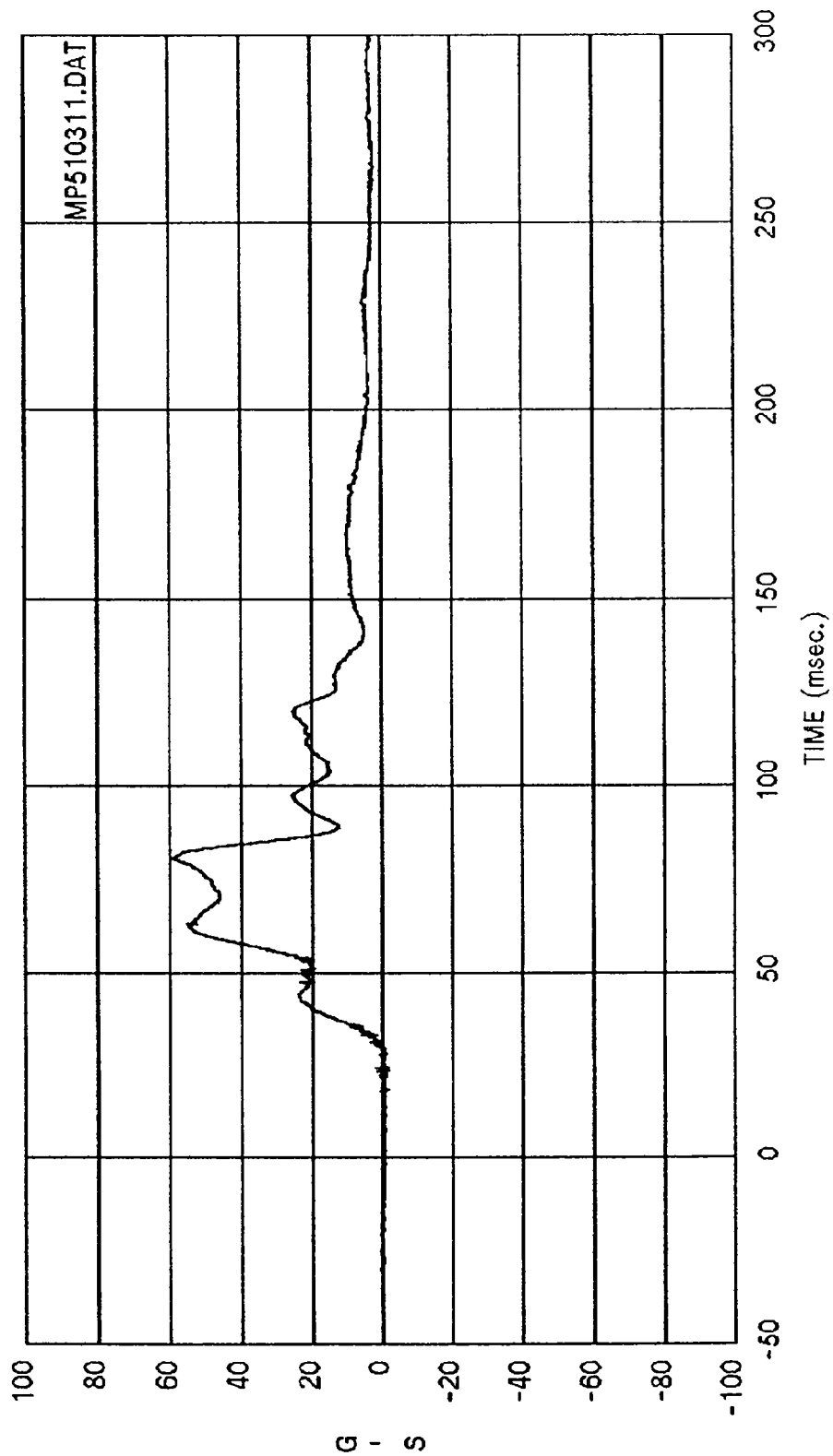
Curve: Passenger head displacement -- X axis Filter: SAE CLASS 180 Max = 232.83 Min = .10000E+11

MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner



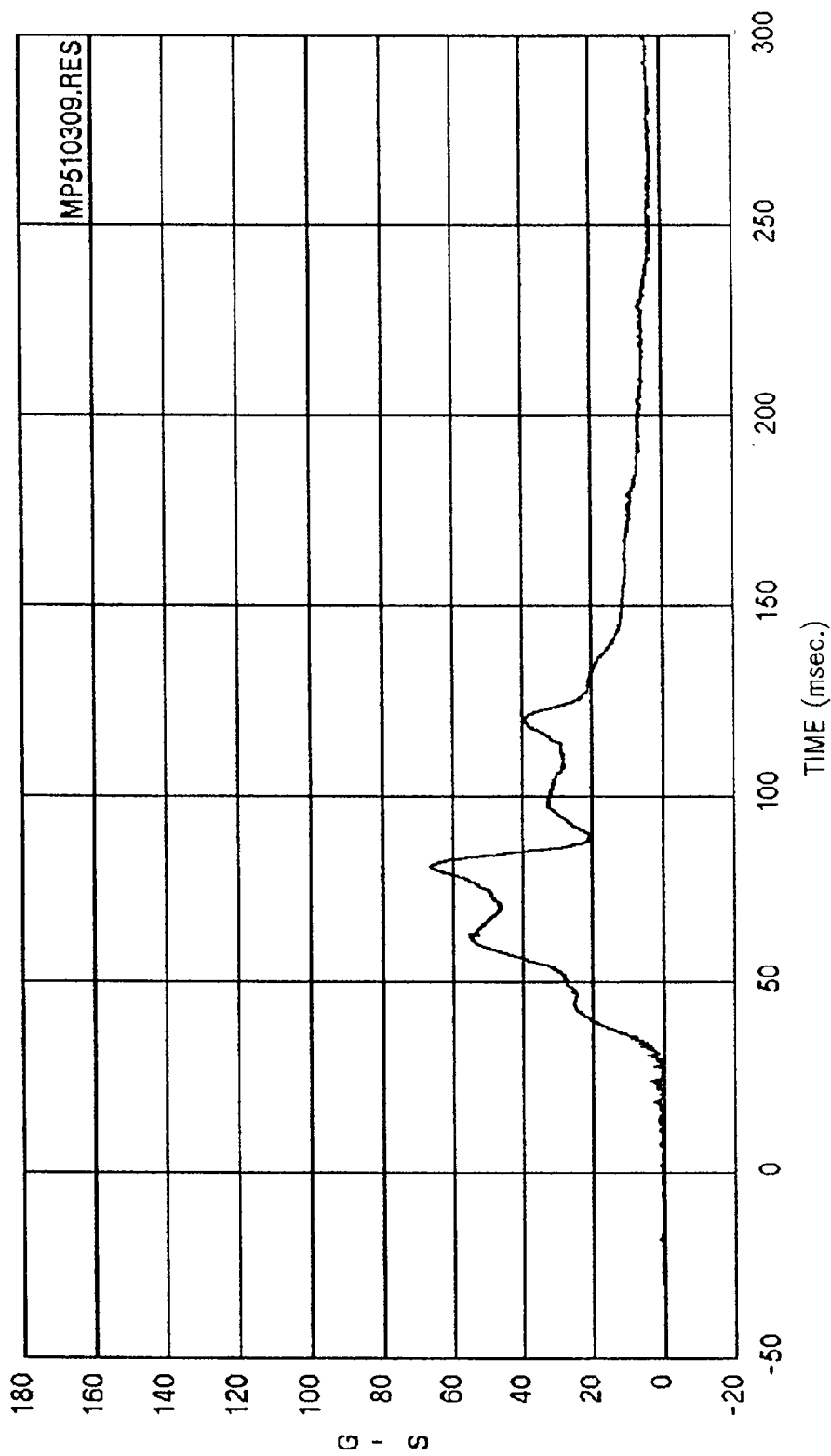
Curve: Passenger head acceleration -- Y axis Filter: SAE CLASS 1000 Max = 4.0526 Min = -26.813

MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner



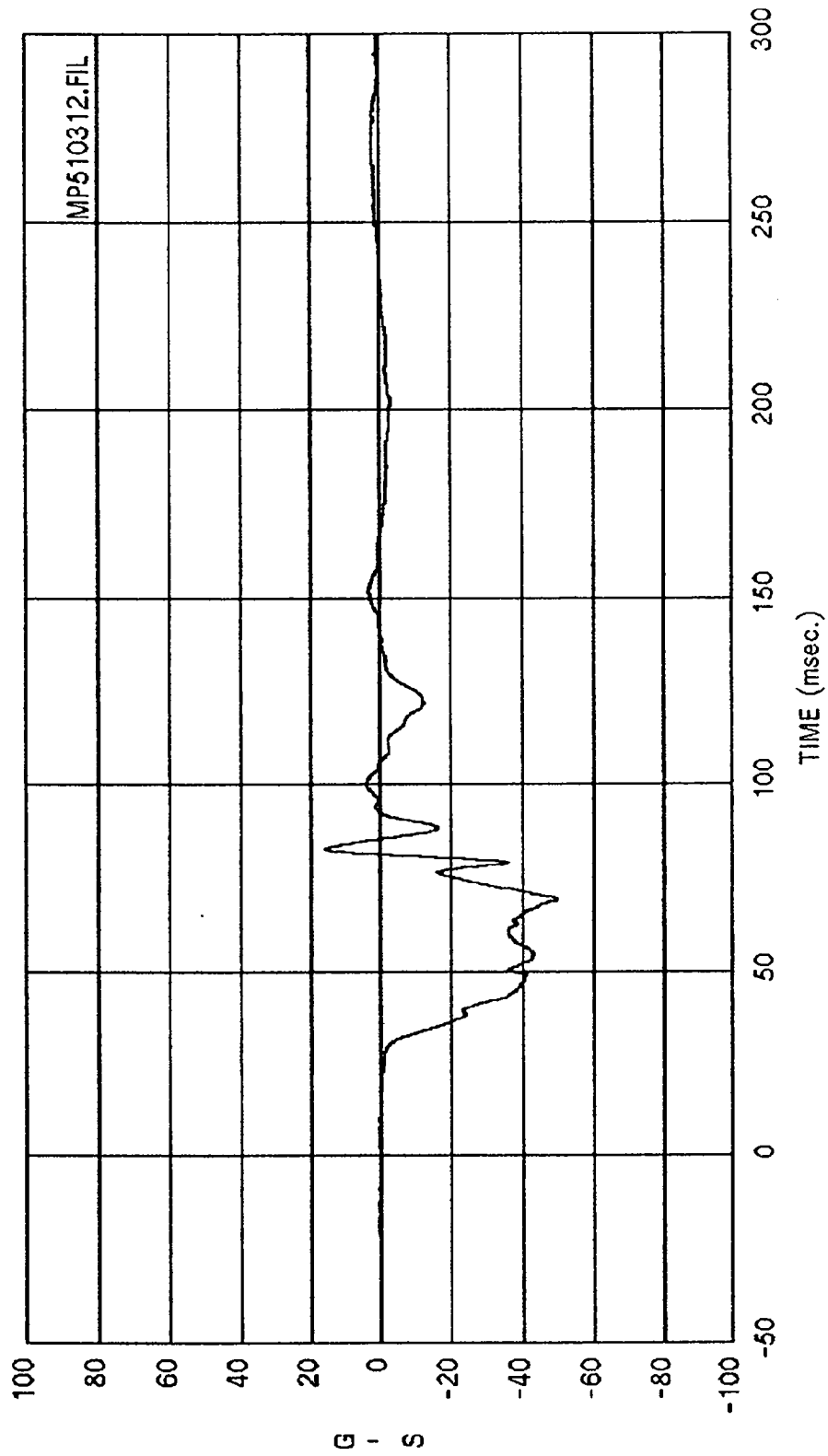
Curve: Passenger head acceleration -- Z axis Filter: SAE CLASS 1000 Max = 58.996 Min = -2.0084

MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner



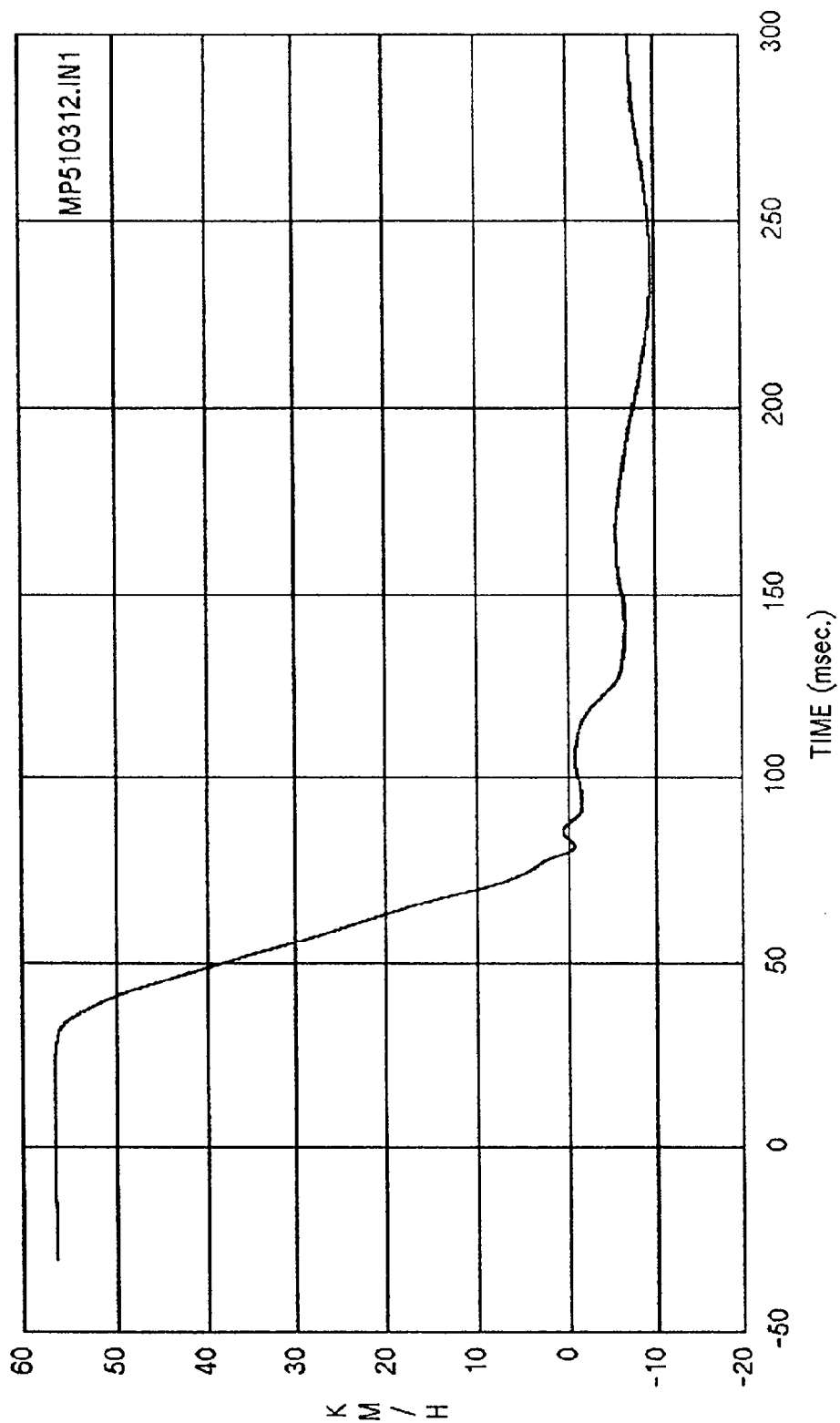
Curve: Passenger head acceleration -- Resultant Filter: SAE CLASS 1000 Max = 66.606 Min = .12552

MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner



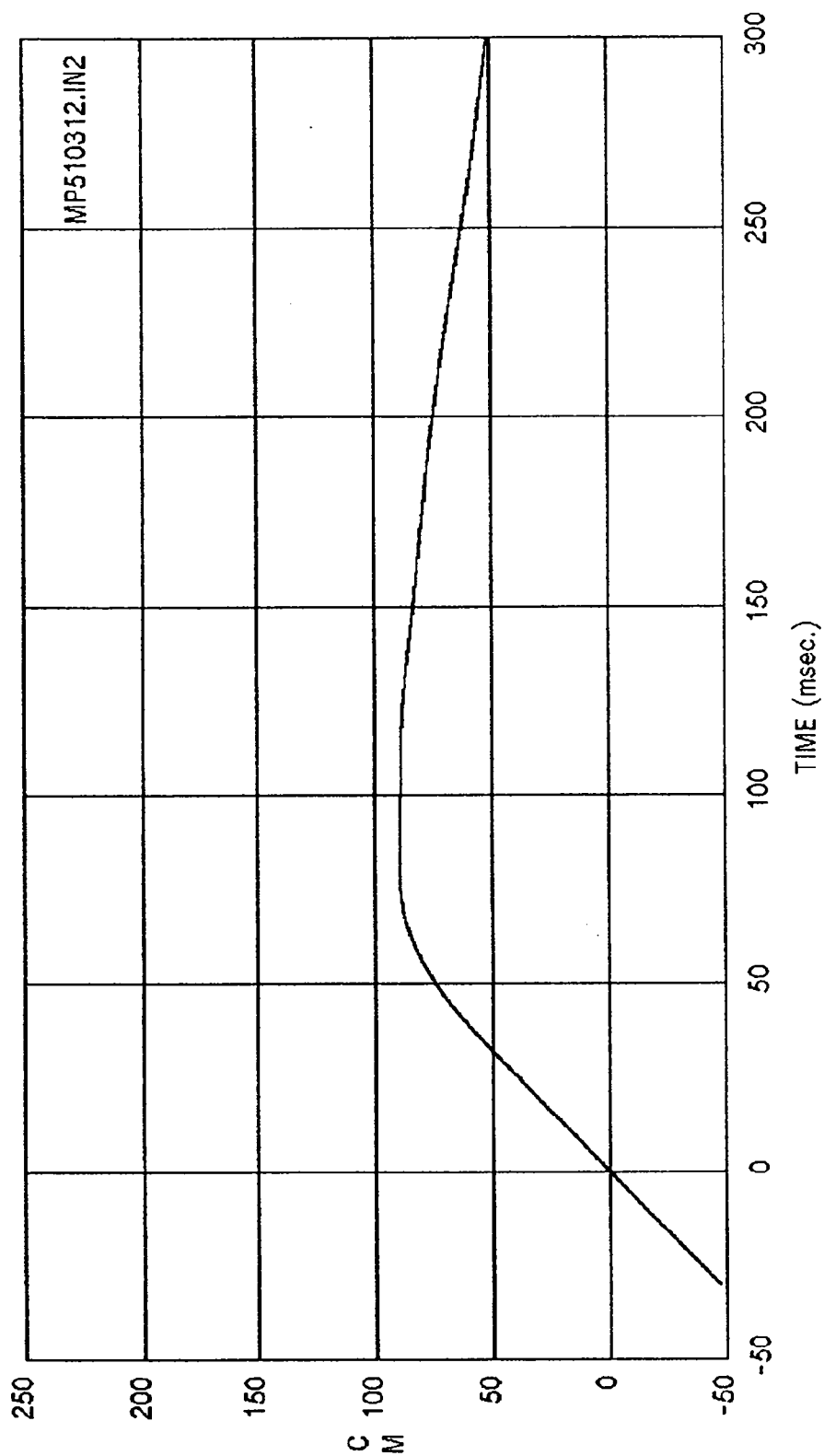
Curve: Passenger chest acceleration -- X axis Filter: SAE CLASS 180 Max = 15.745 Min = -50.032

MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner

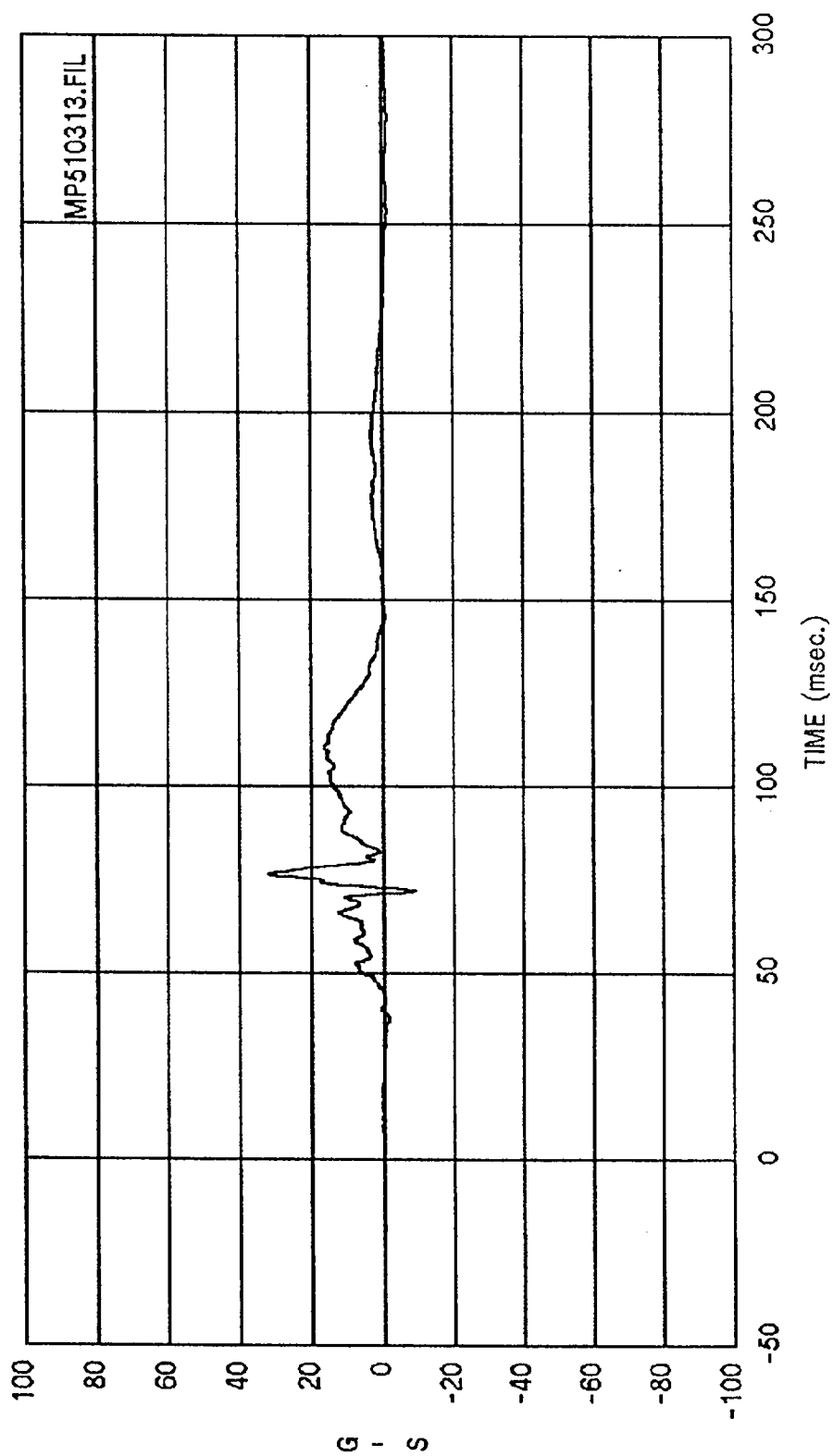


Curve: Passenger chest delta V -- X axis Filter: SAE CLASS 180 Max = 56.646 Min = -9.6139

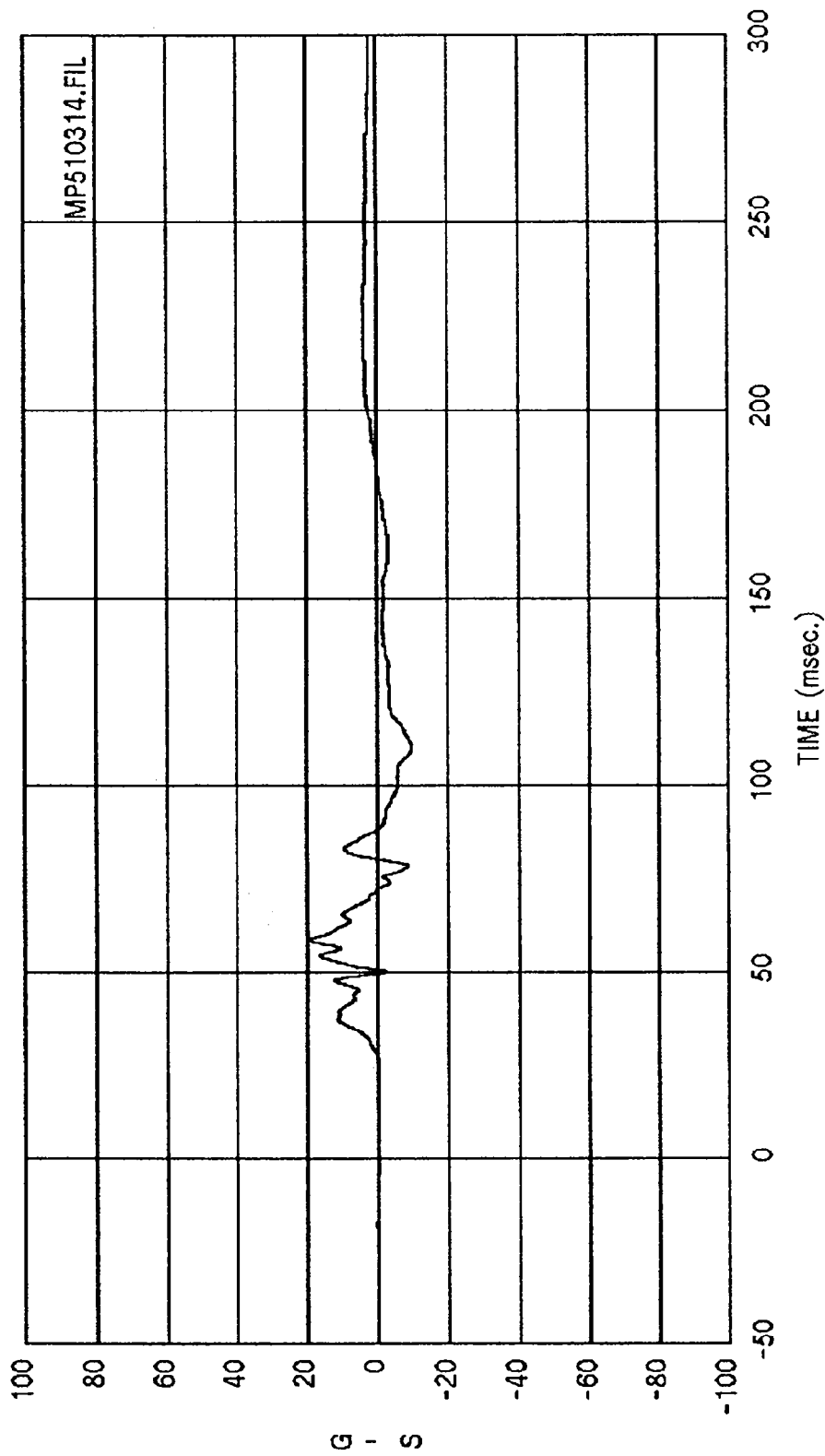
MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner



Curve: Passenger chest displacement -- X axis Filter: SAE CLASS 180 Max = 89.460 Min = 51.069
MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner

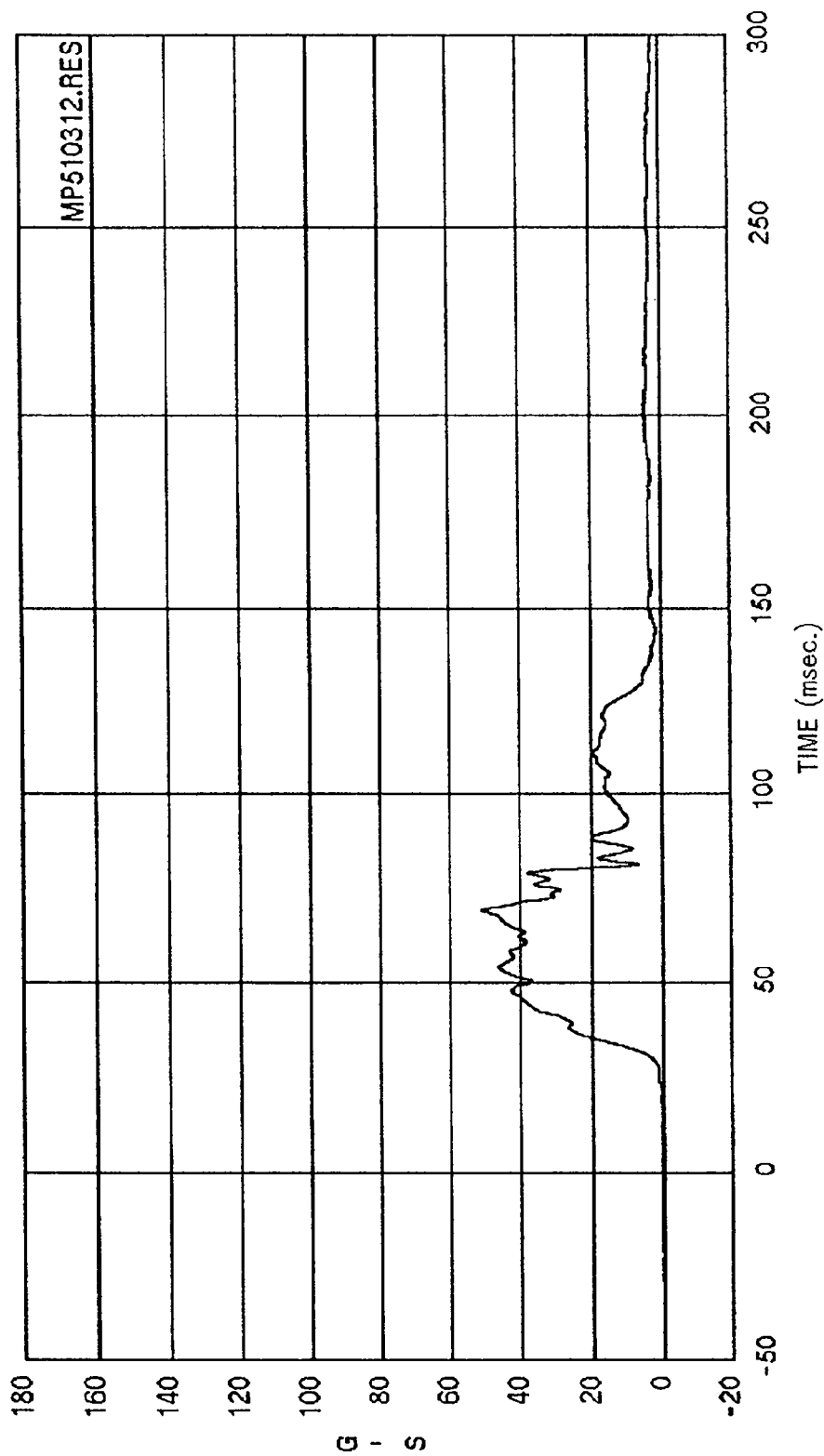


Curve: Passenger chest acceleration -- Y axis Filter: SAE CLASS 180 Max = 31.954 Min = -8.9082
MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner



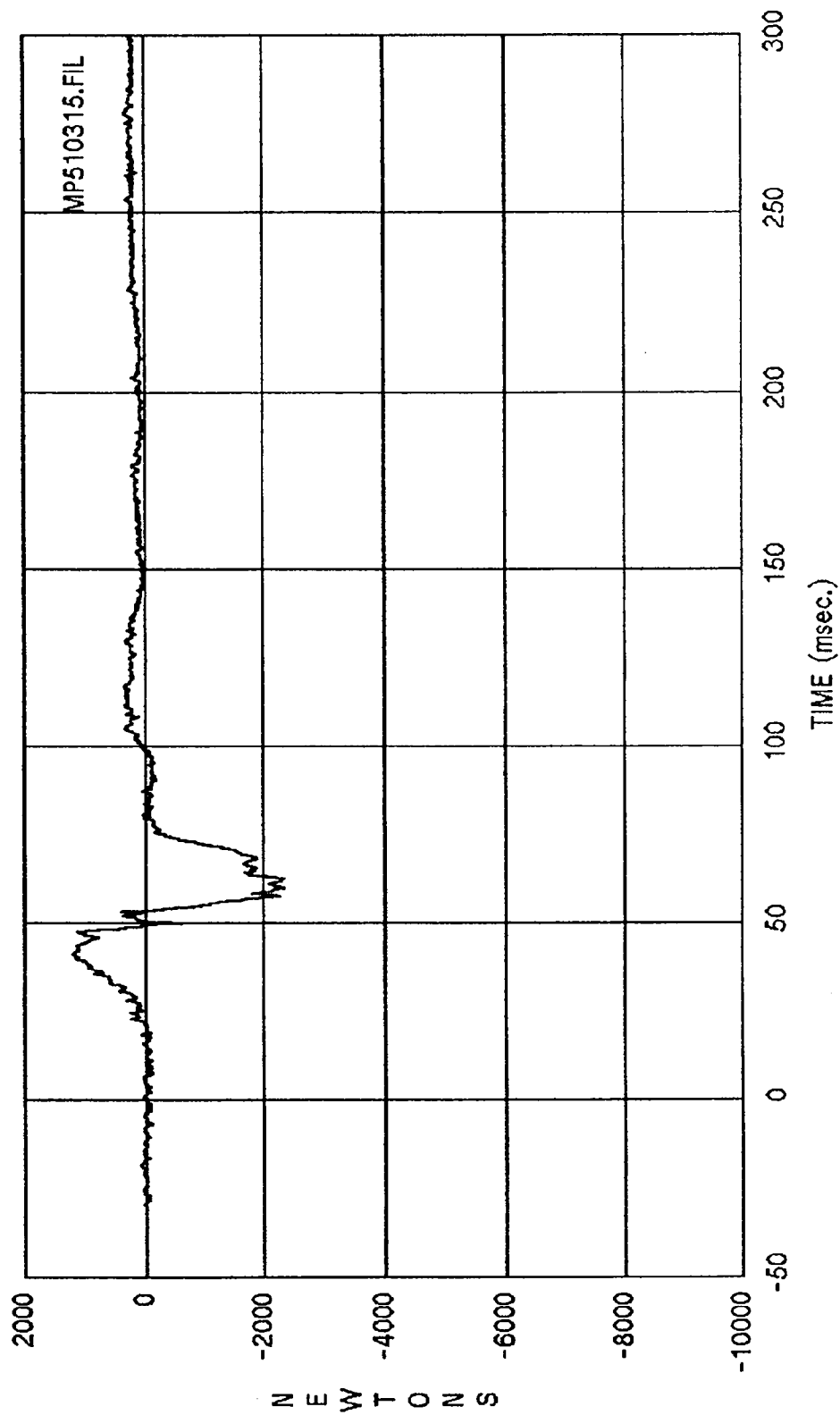
Curve: Passenger chest acceleration -- Z axis Filter: SAE CLASS 180 Max = 19.432 Min = -9.8264

MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner

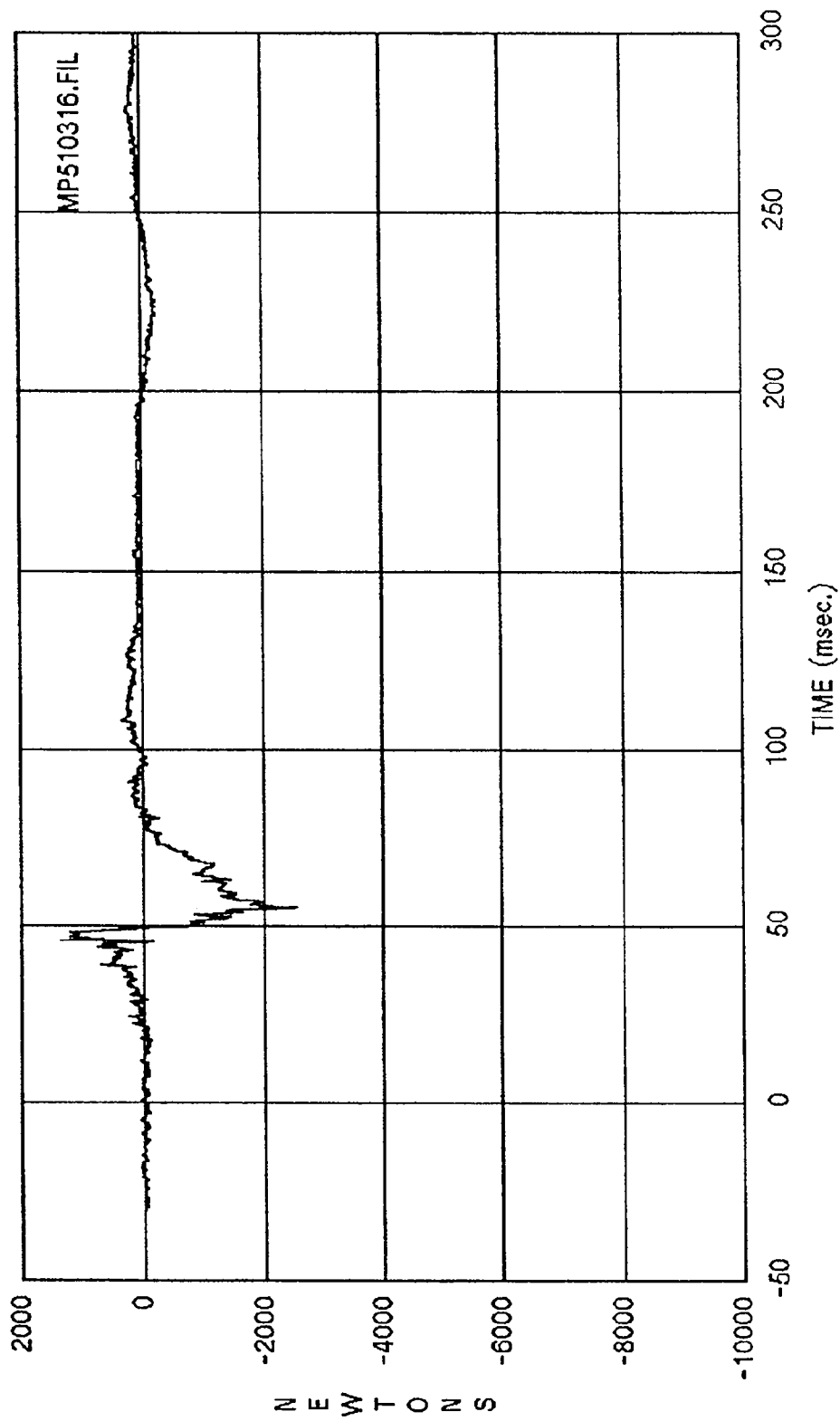


Curve: Passenger chest acceleration -- Resultant Filter: SAE CLASS 180 Max = 50.801 Min = .29984

MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner

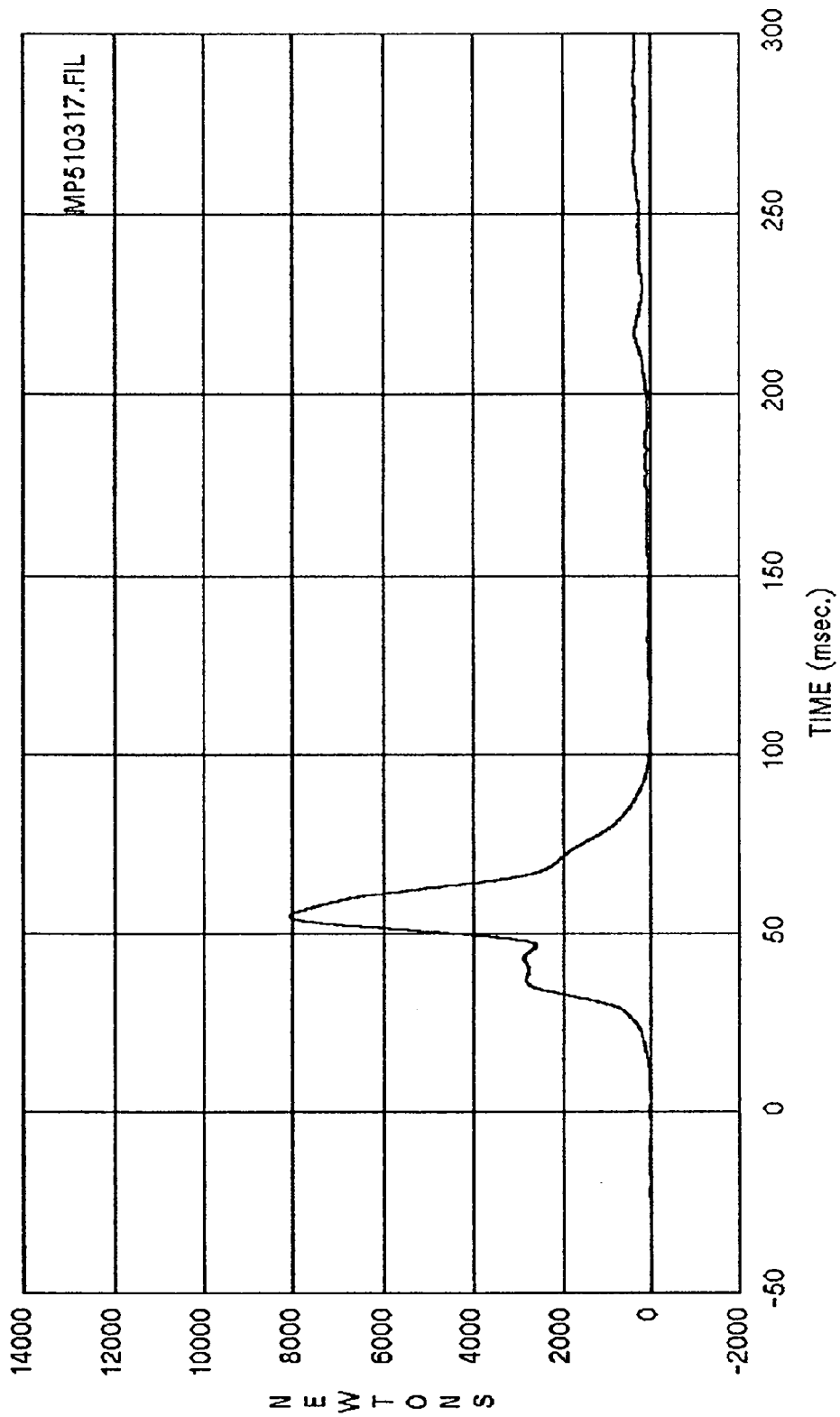


Curve: Passenger left femur force Filter: SAE CLASS 600 Max = 1186.3 Min = -2333.5
MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner



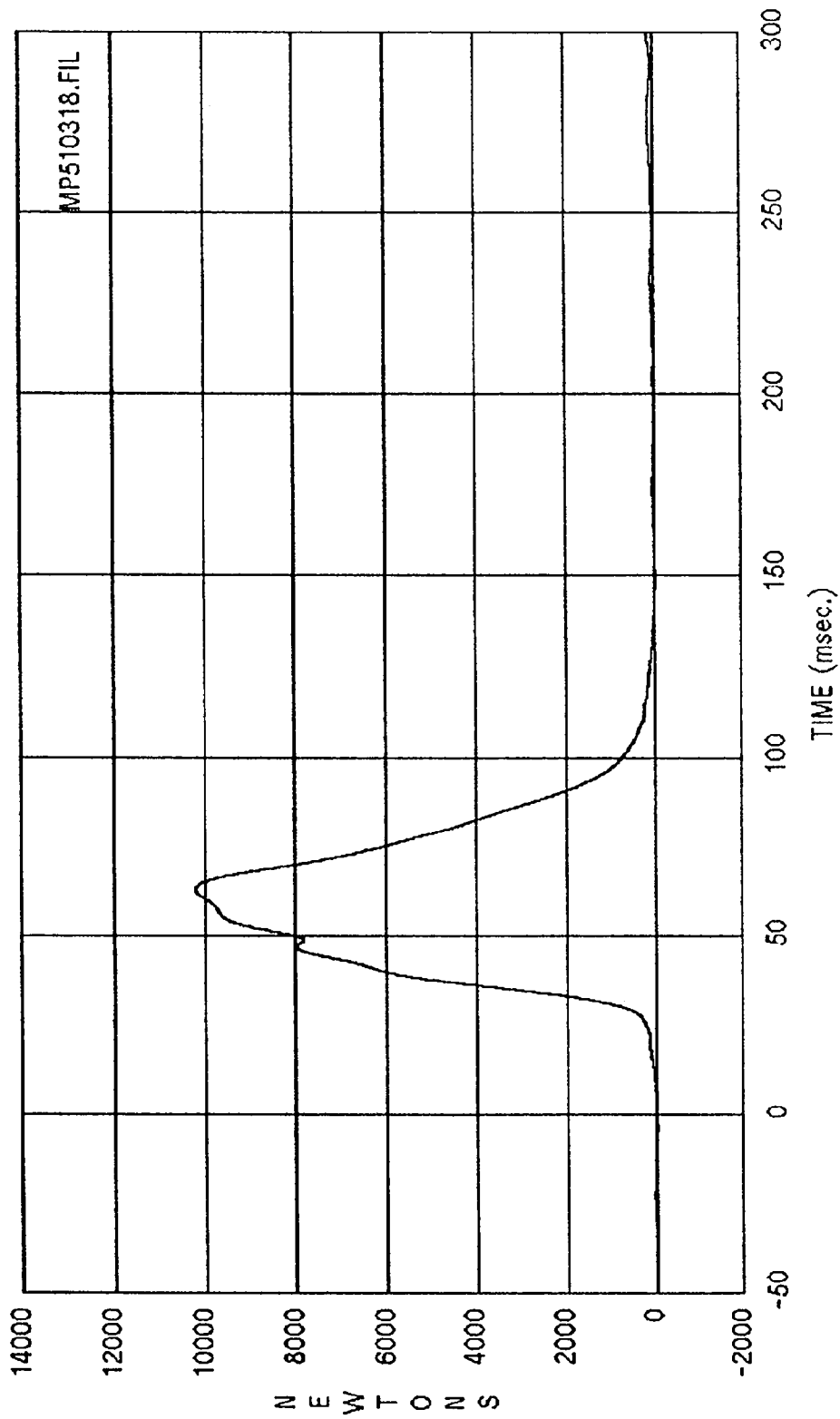
Curve: Passenger right femur force Filter: SAE CLASS 600 Max = 1345.9 Min = -2543.4

MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner



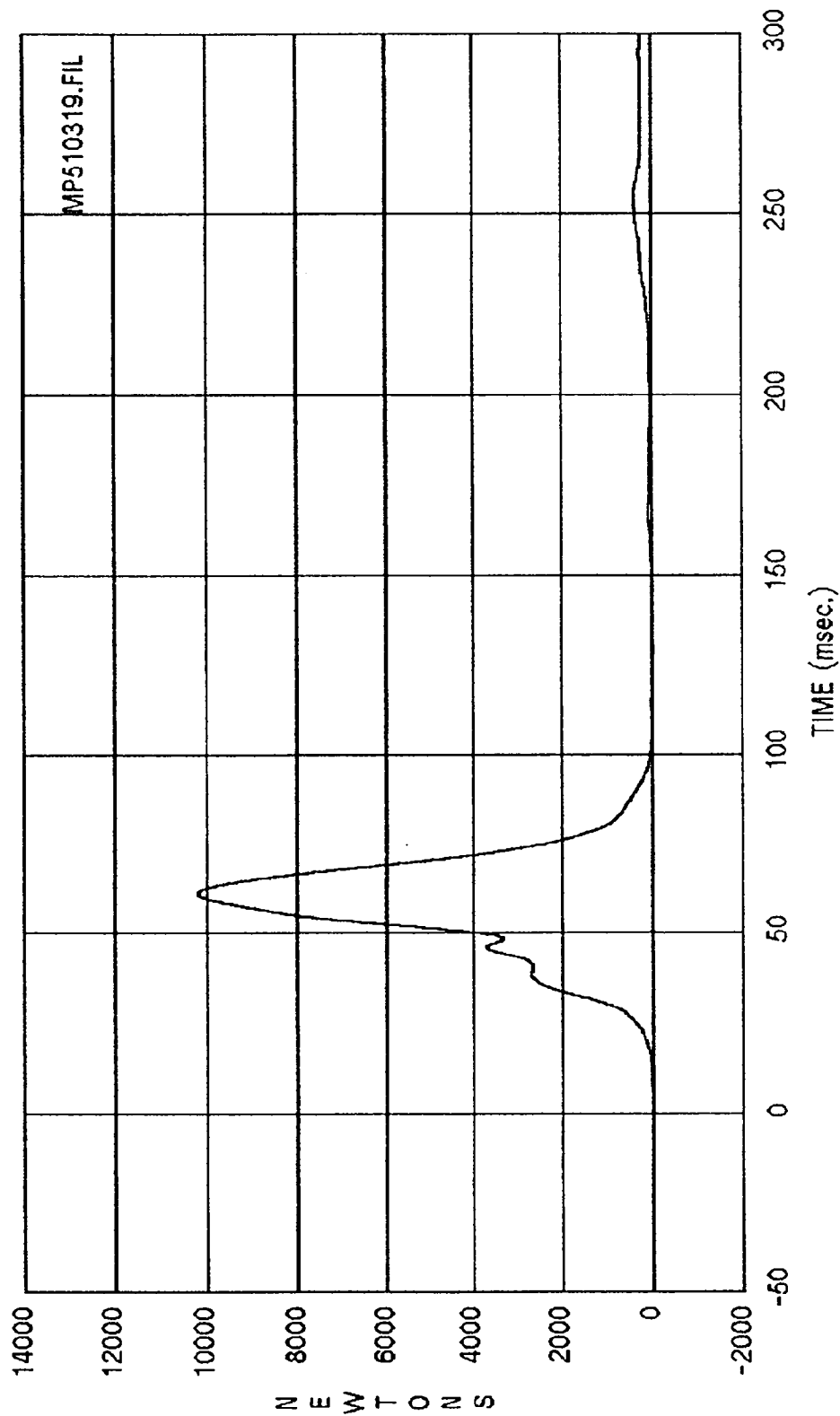
Curve: Driver lap belt load Filter: SAE CLASS 60 Max = 8071.4 Min = -.69934

MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner

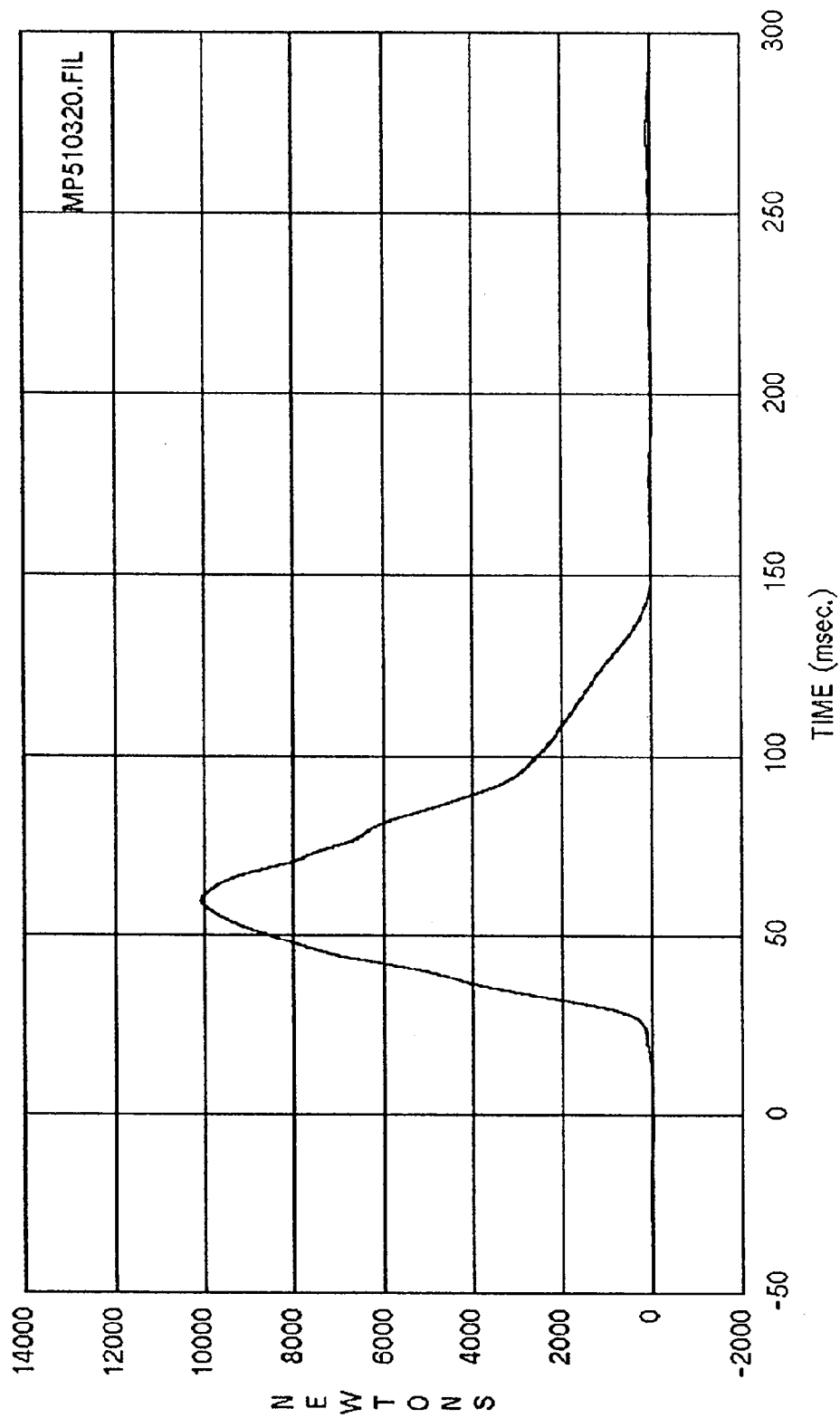


Curve: Driver shoulder belt load Filter: SAE CLASS 60 Max = 10204. Min = -32.040

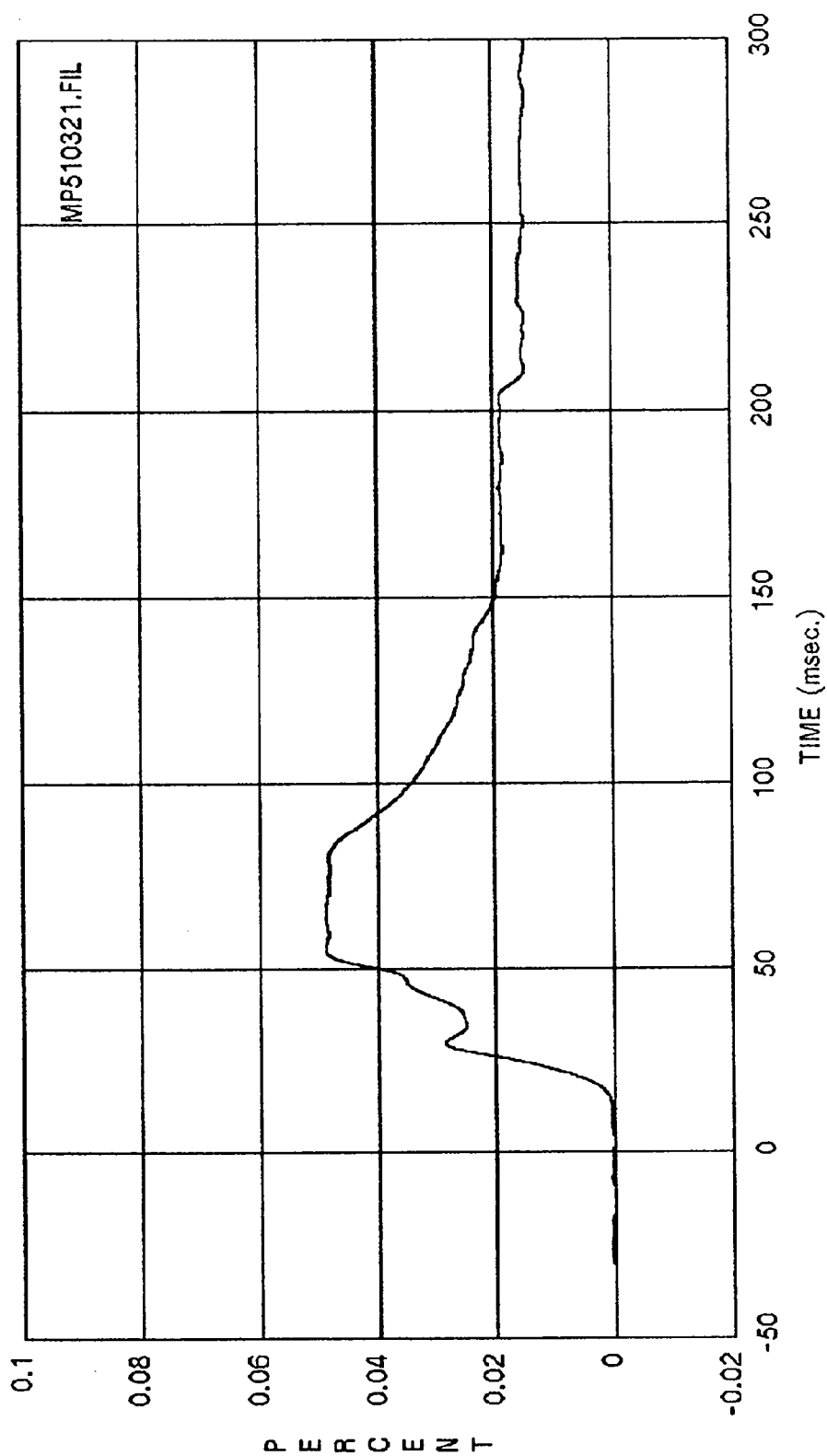
MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner



Curve: Passenger lap belt load Filter: SAE CLASS 60 Max = 10197. Min = -28.429
MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner



Curve: Passenger shoulder belt load Filter: SAE CLASS 60 Max = 10067. Min = -48.992
MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner



Curve: Driver shoulder belt elongation

Filter: SAE CLASS 60

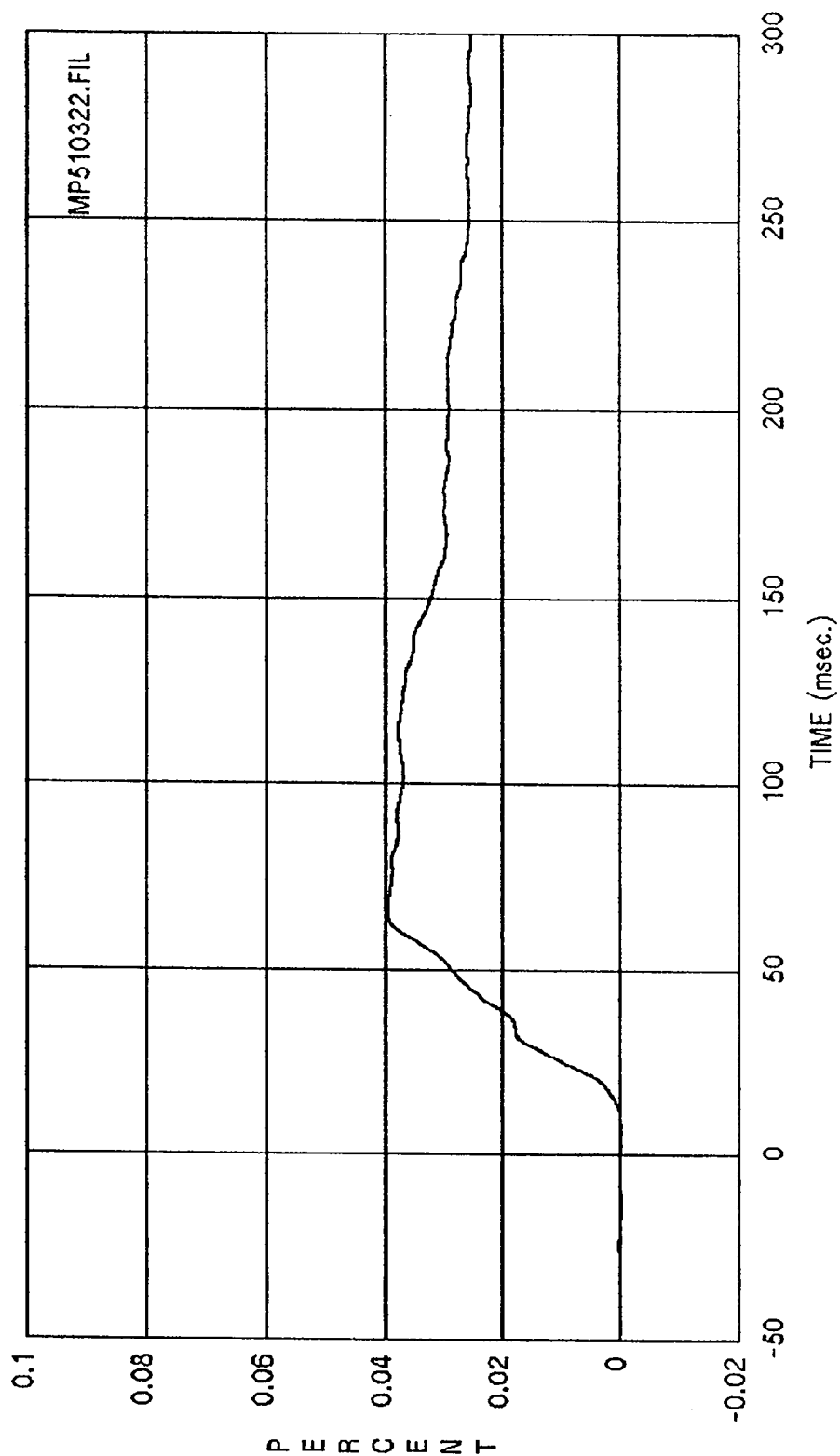
Max = .48971E-01 Min = .17344E-

Vehicle: 1993 Toyota 4 Runner

Program: 1993 NCAP, test number 4

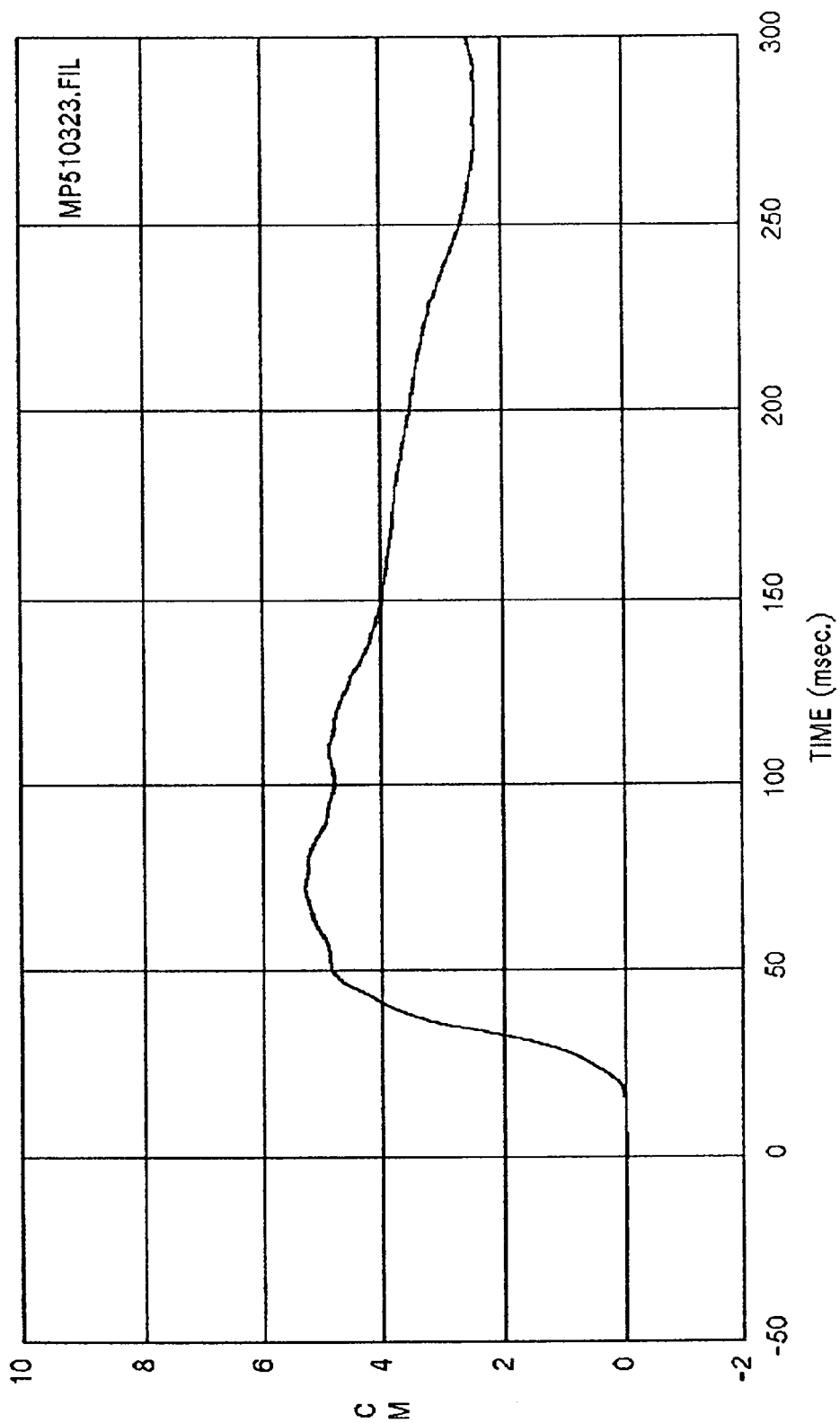
Date: 12/09/92

MSE



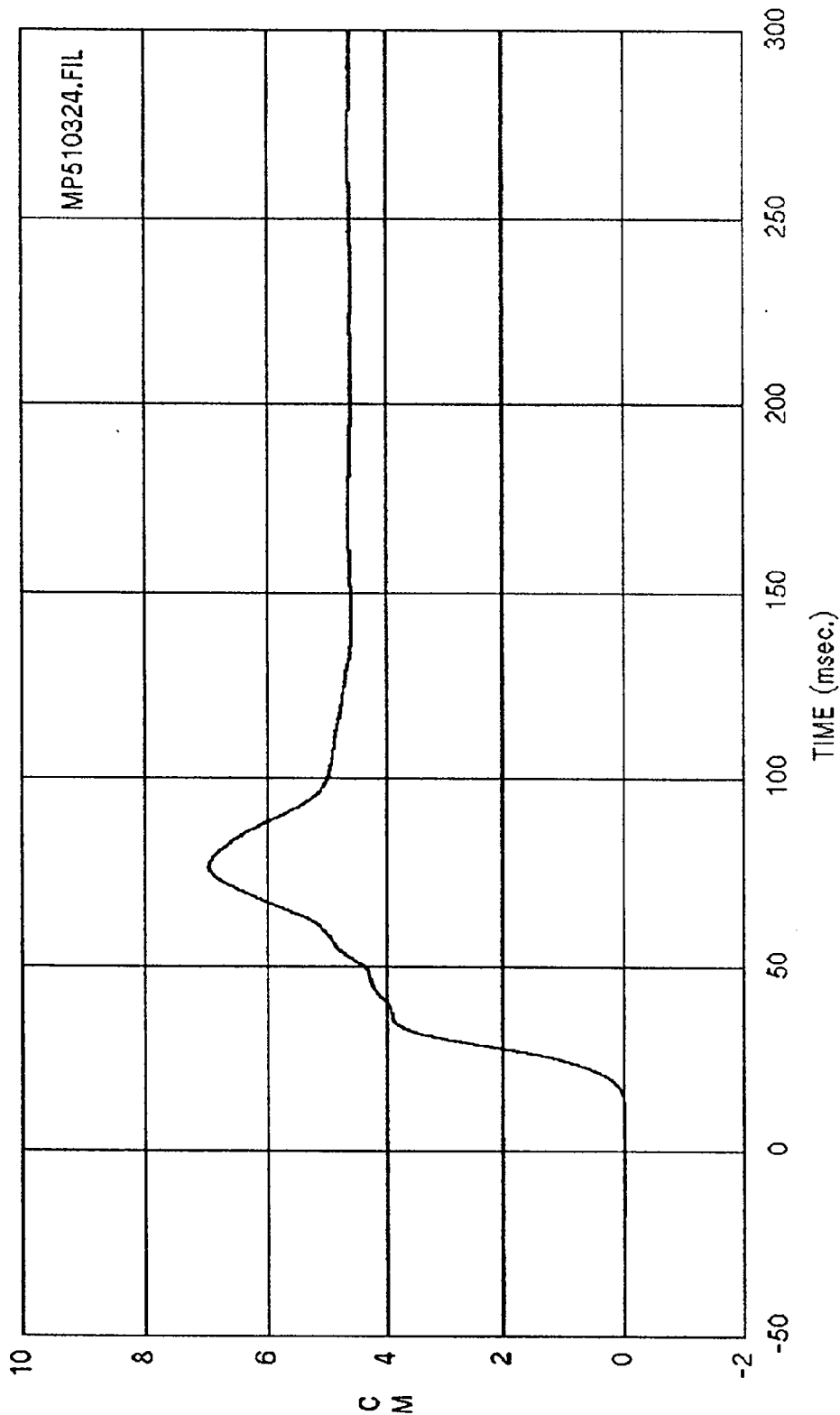
Curve: Passenger shoulder belt elongation Filter: SAE CLASS 60 Max = .39601E-01 Min = -.2764E-03

MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner

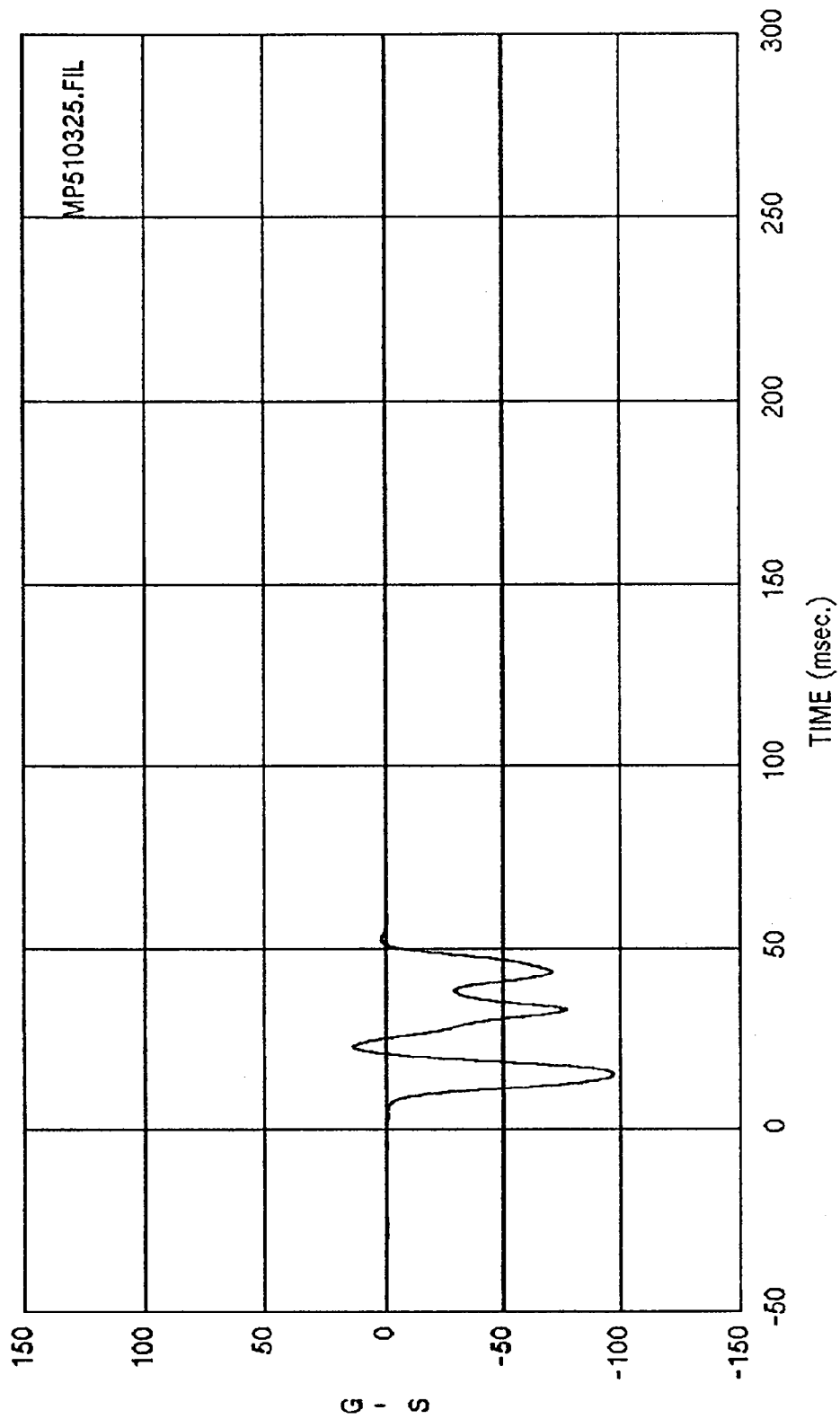


Curve: Driver shoulder belt spoolout Filter: SAE CLASS 60 Max = 5.3025 Min = -.11435E-0

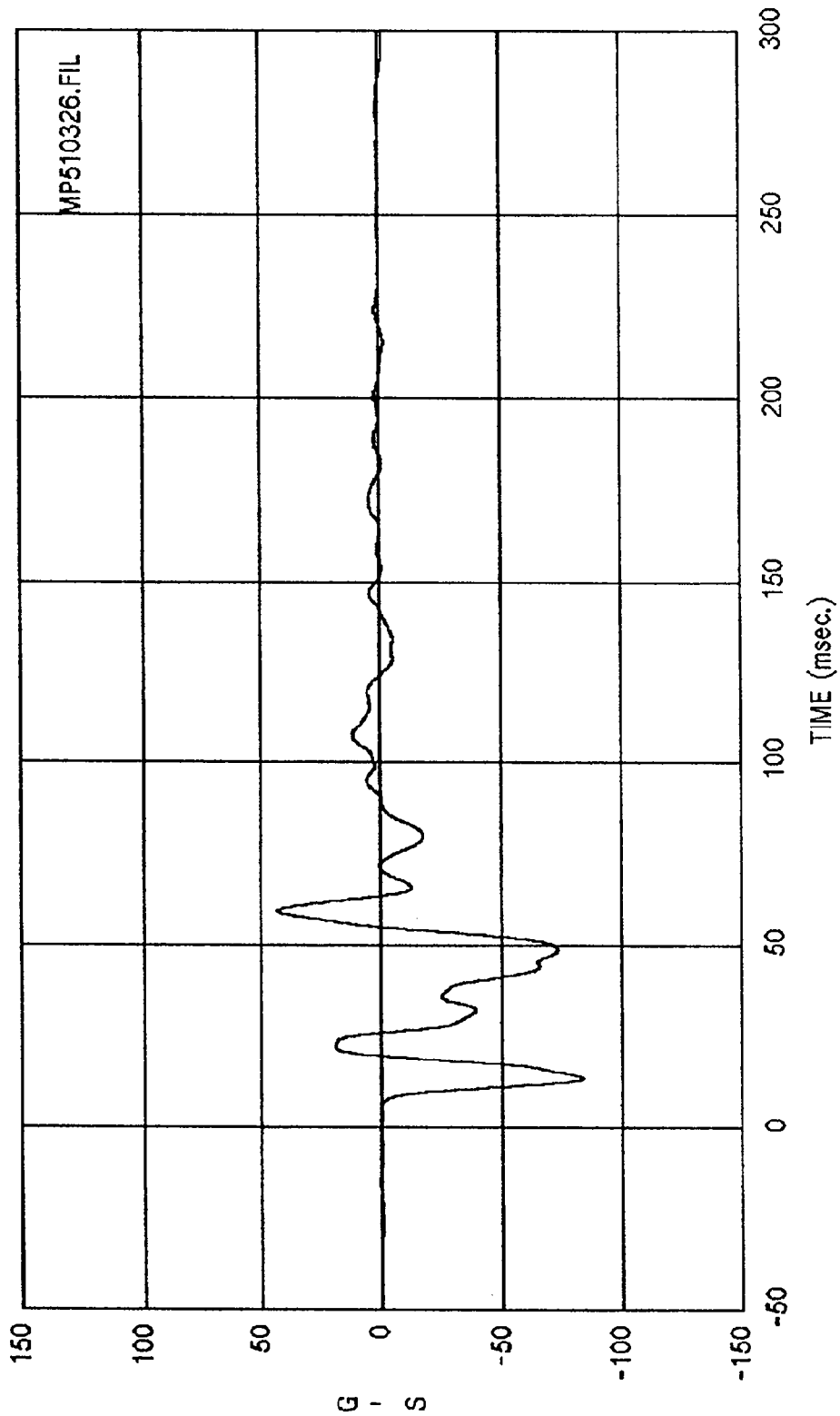
MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner



Curve: Passenger shoulder belt spoolout Filter: SAE CLASS 60 Max = 6.9660 Min = -.14089E-04
MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner

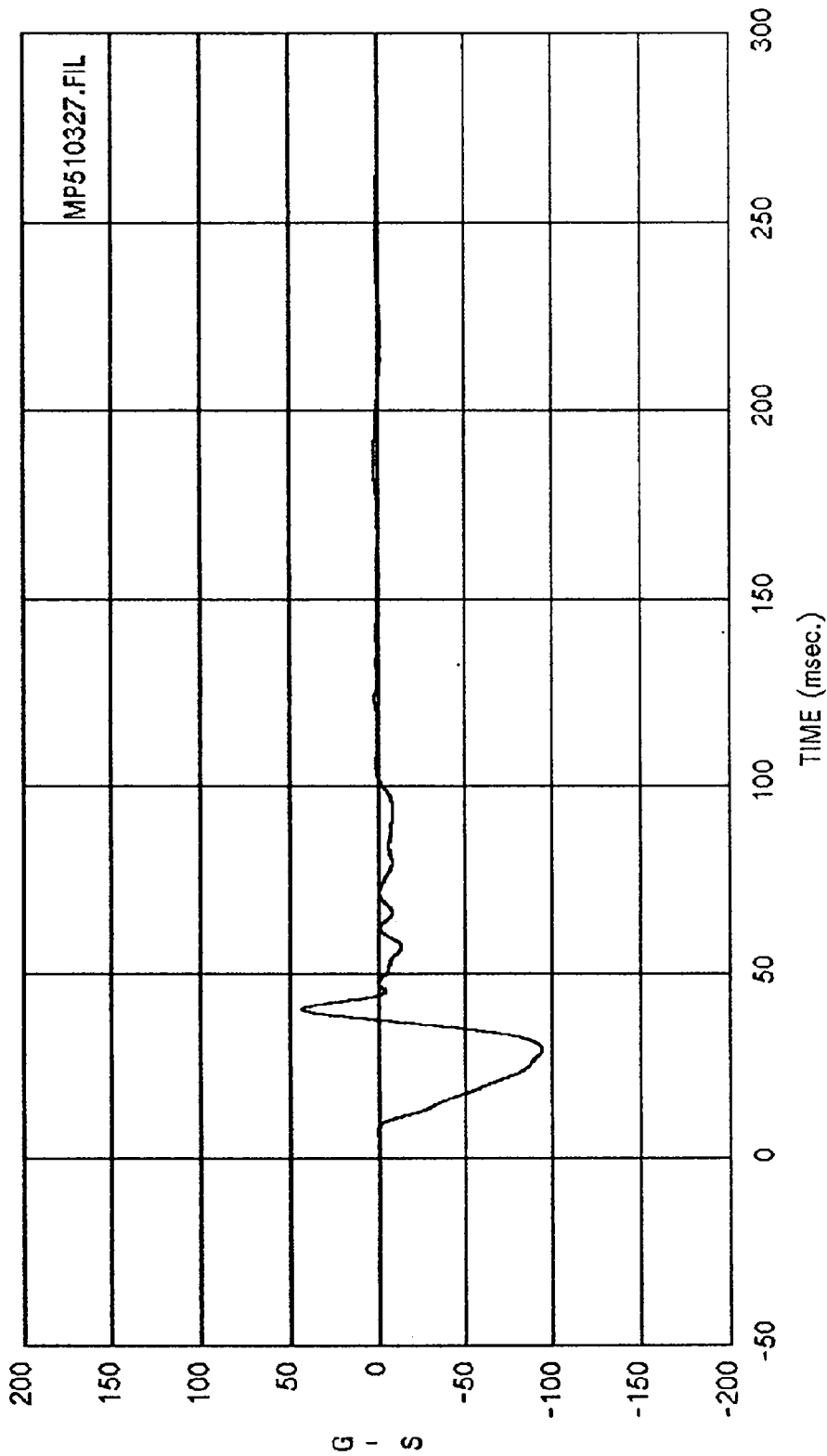


Curve: Left front callper acceleration -- X axis Filter: SAE CLASS 60 Max = 13.765 Min = -96.835
MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner



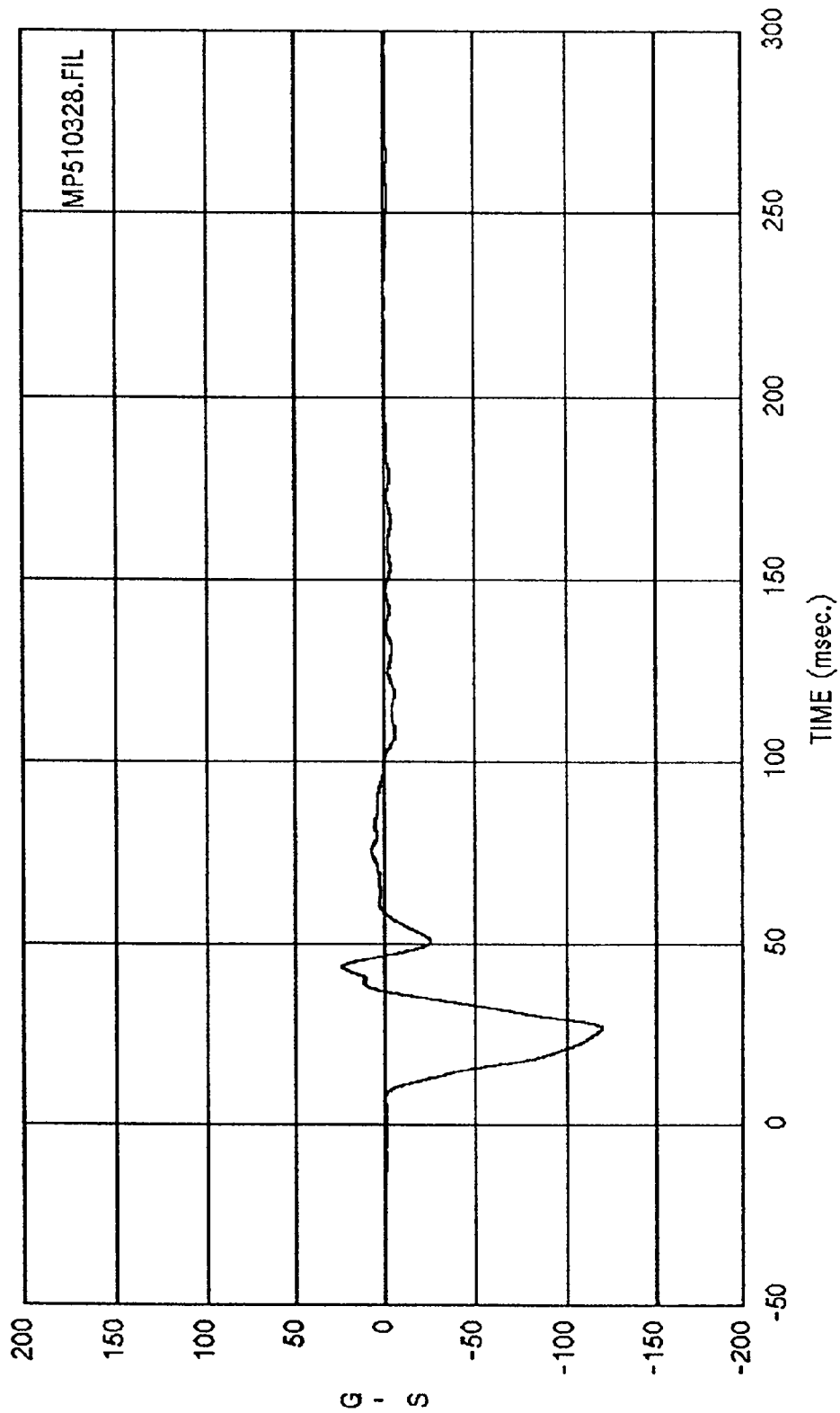
Curve: Right front caliper acceleration -- X axis Filter: SAE CLASS 60 Max = 43.318 Min = -83.176

MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner



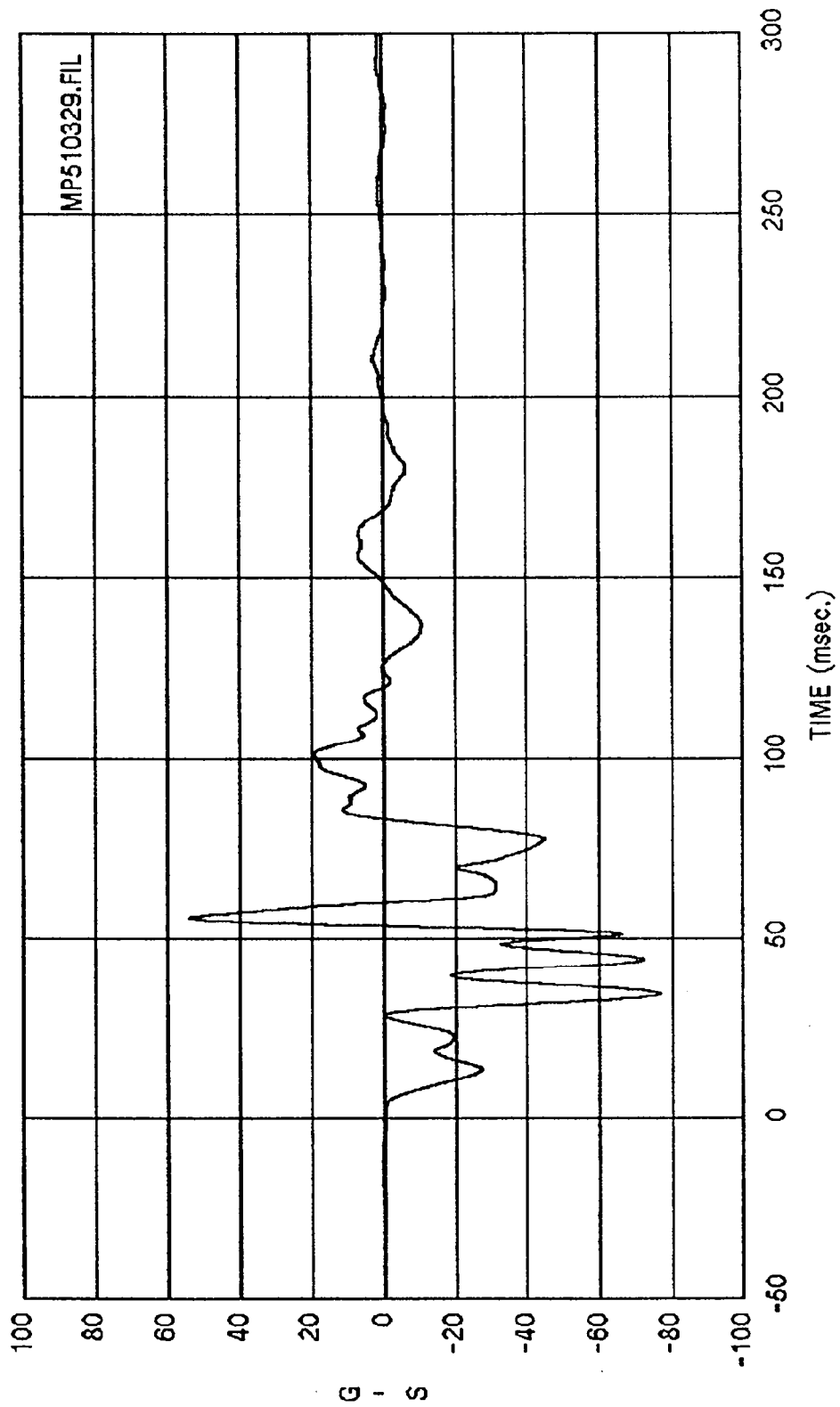
Curve: Engine bottom acceleration -- X axis Filter: SAE CLASS 60 Max = 43.697 Min = -93.603

MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner

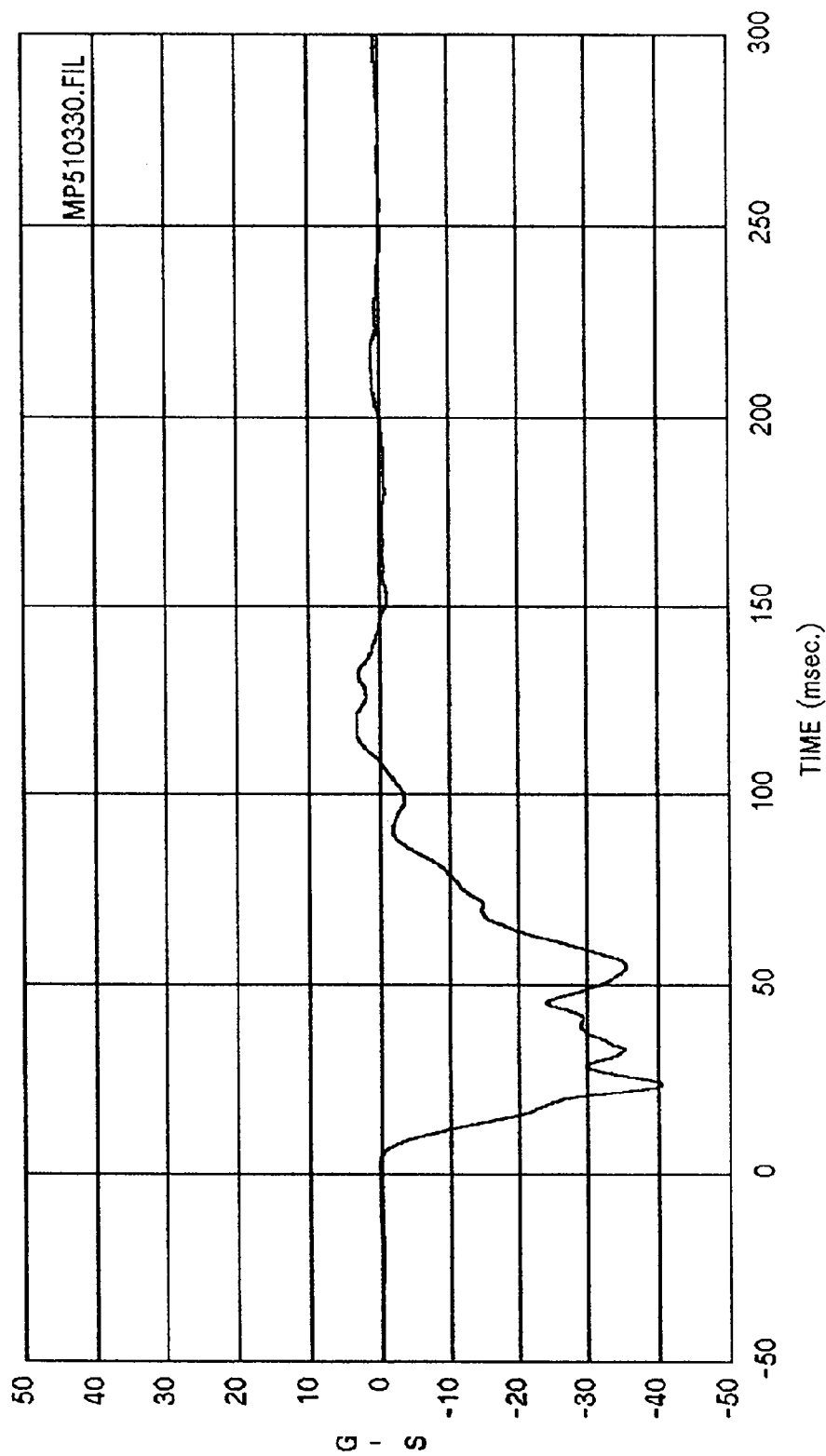


Curve: Engine top acceleration -- X axis Filter: SAE CLASS 60 Max = 24.185 Min = -119.50

MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner

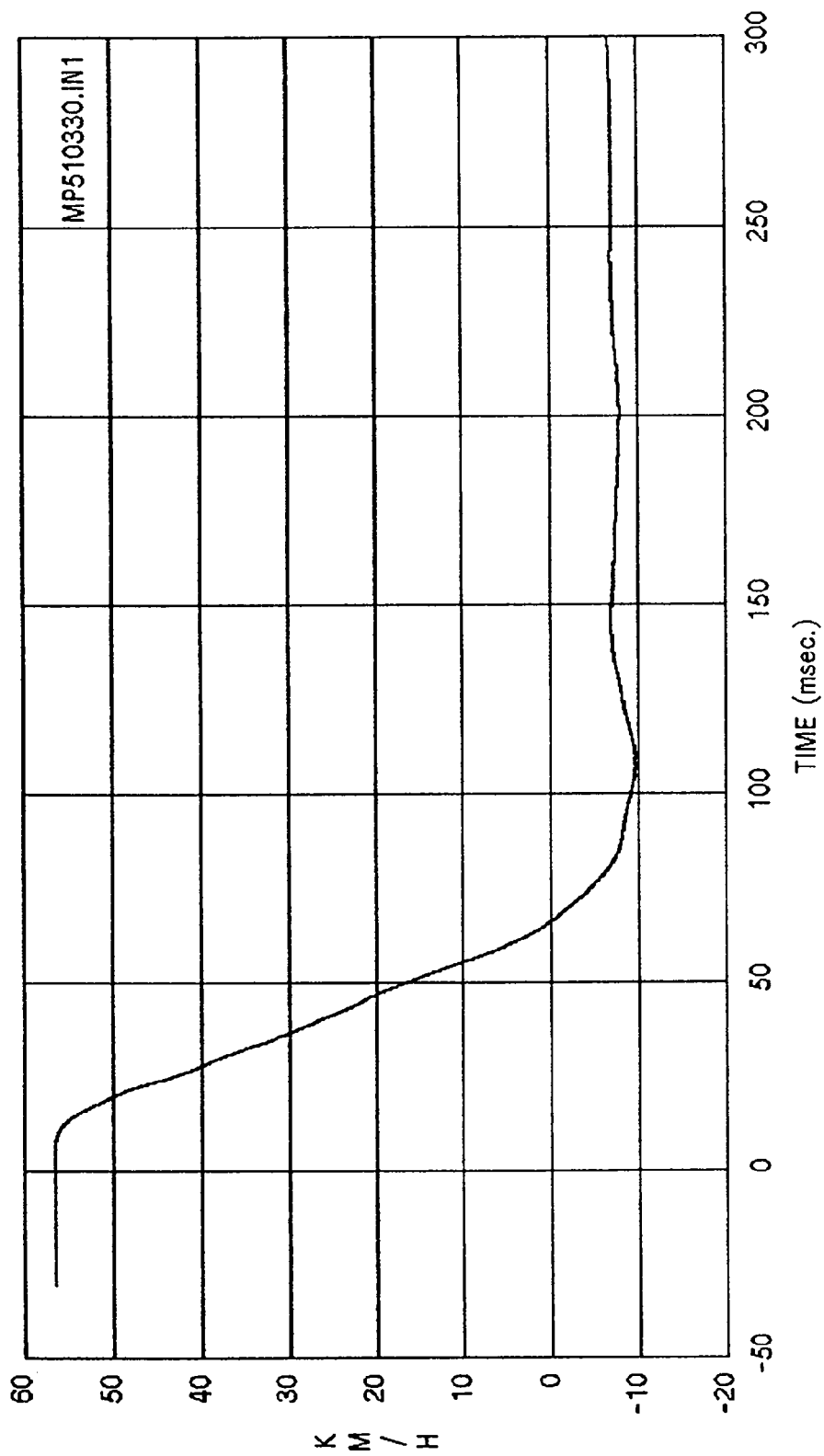


Curve: Dashpanel acceleration -- X axis Filter: SAE CLASS 60 Max = 54.110 Min = -76.710
MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner



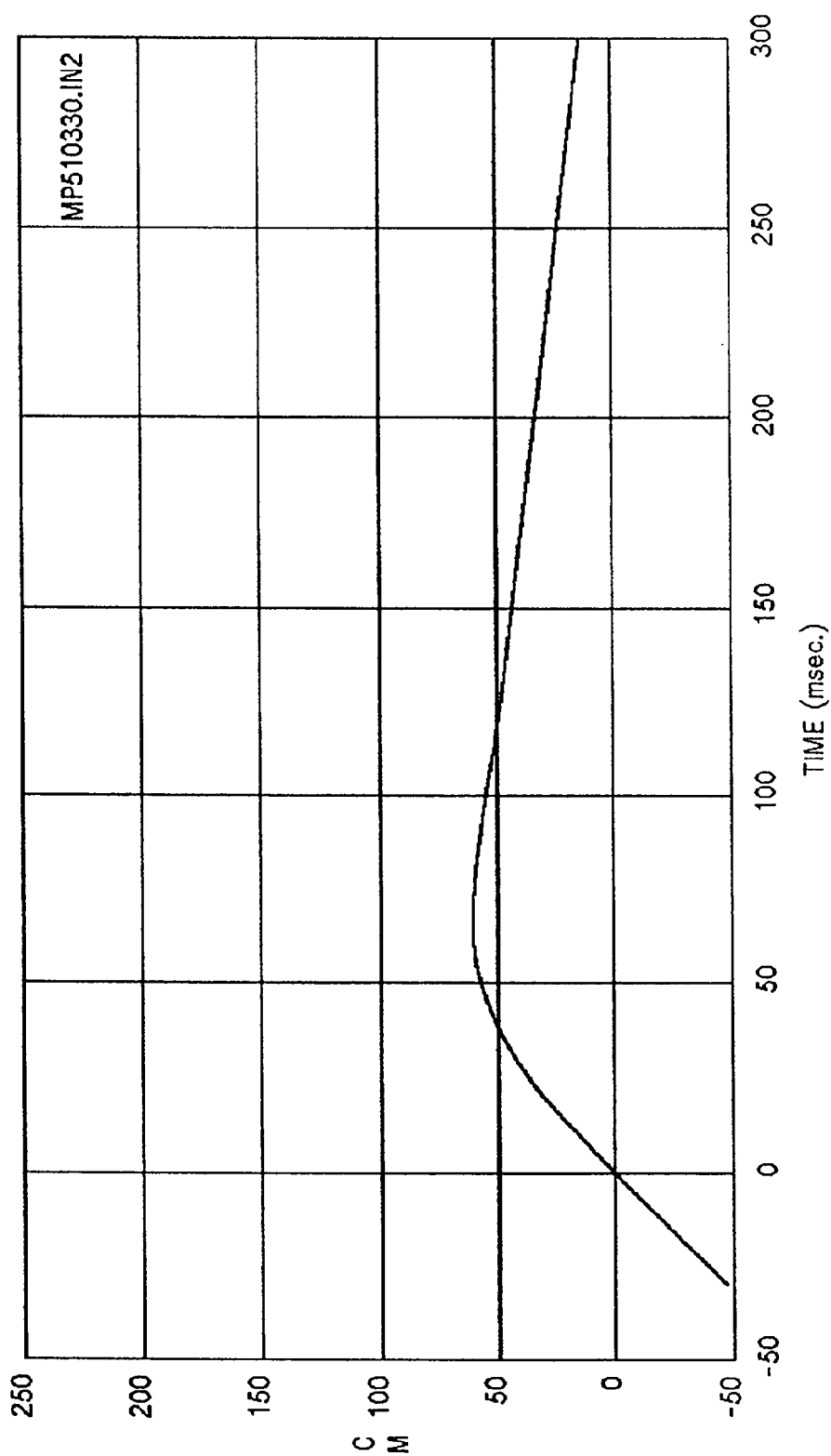
Curve: Left rear cross-member accel. - X axis (primary) Filter: SAE CLASS 60 Max = 3.4011 Min = -40.7

MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner

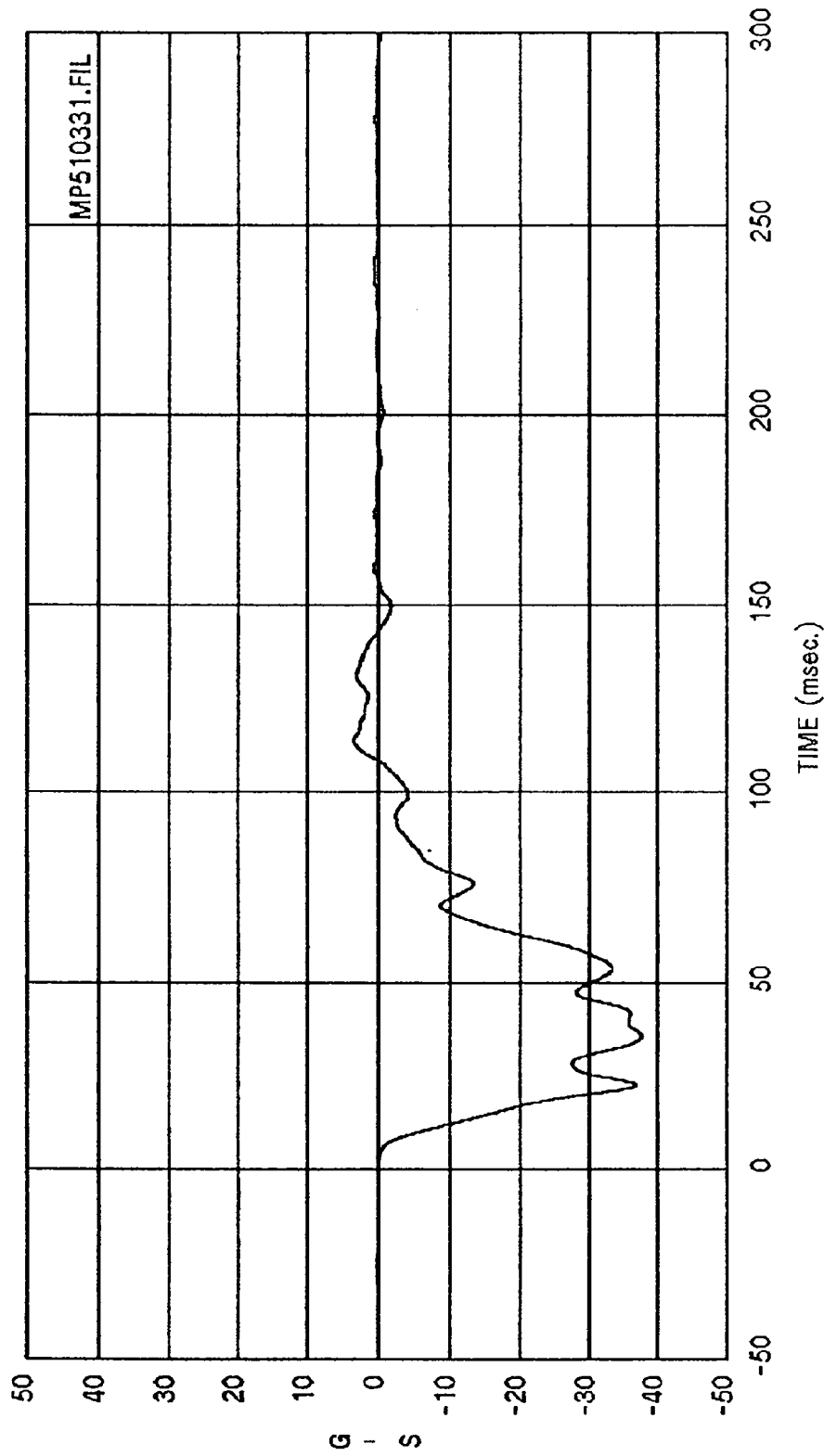


Curve: Left rear cross-member delta V -- X axis (Pri) Filter: SAE CLASS 180 Max = 56.609 Min = -9.608

MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner

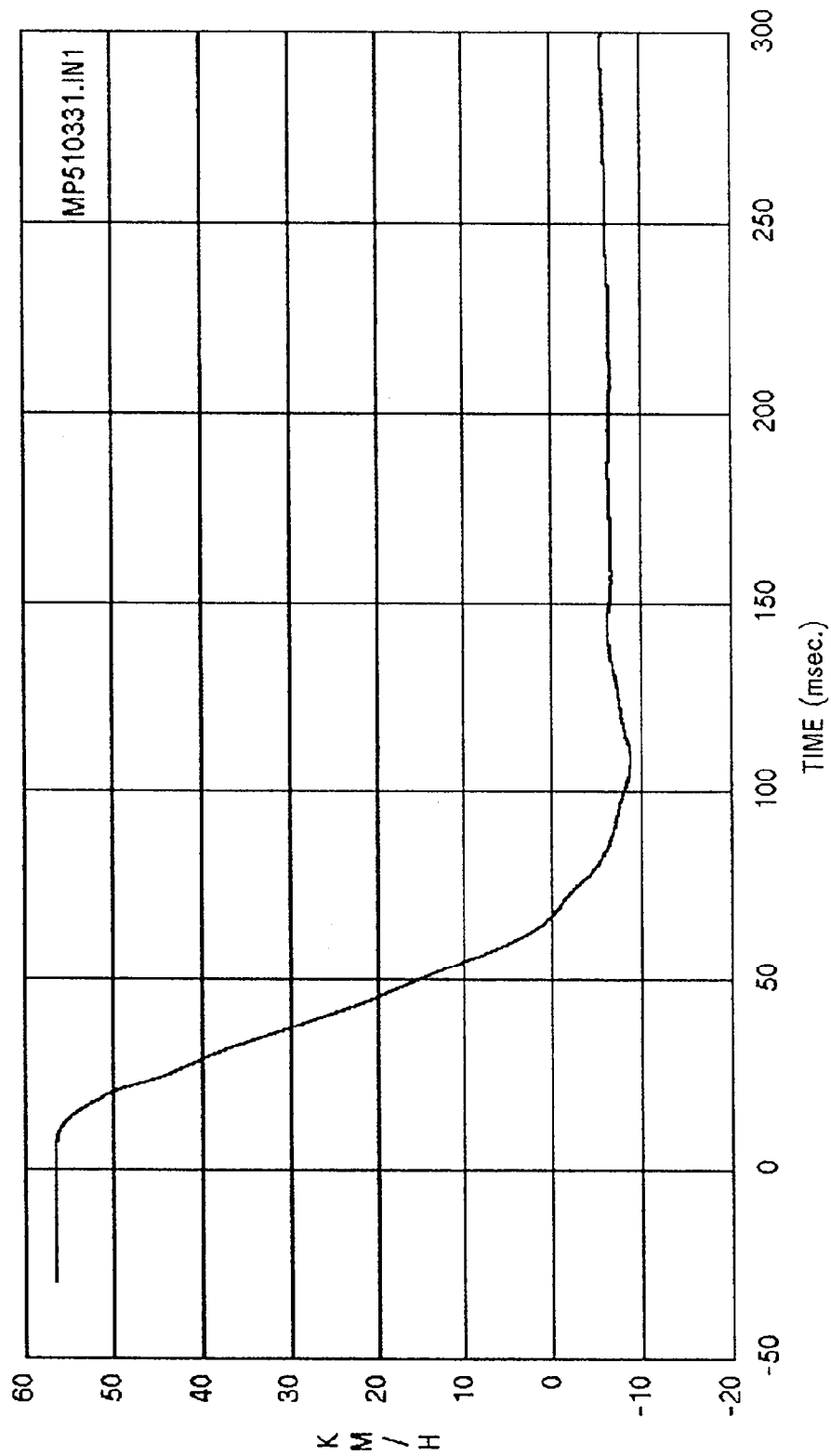


Curve: Left rear cross-member disp. - X axis (primary) Filter: SAE CLASS 180 Max = 60.652 Min = 13.320
MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner



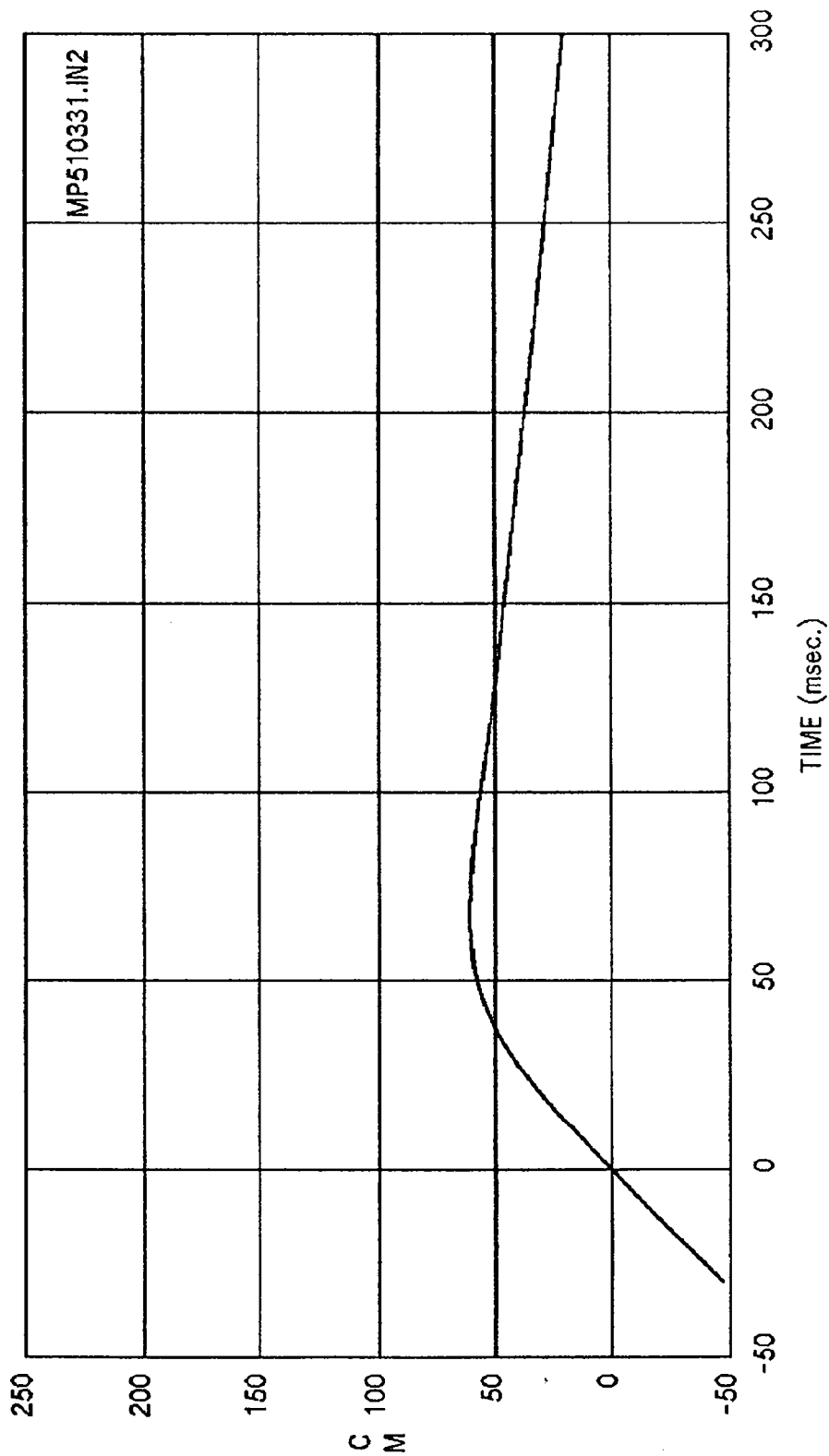
Curve: Right rear cross-member acc. - X axis (primary) Filter: SAE CLASS 60 Max = 3.4457 Min = -37.85

MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner



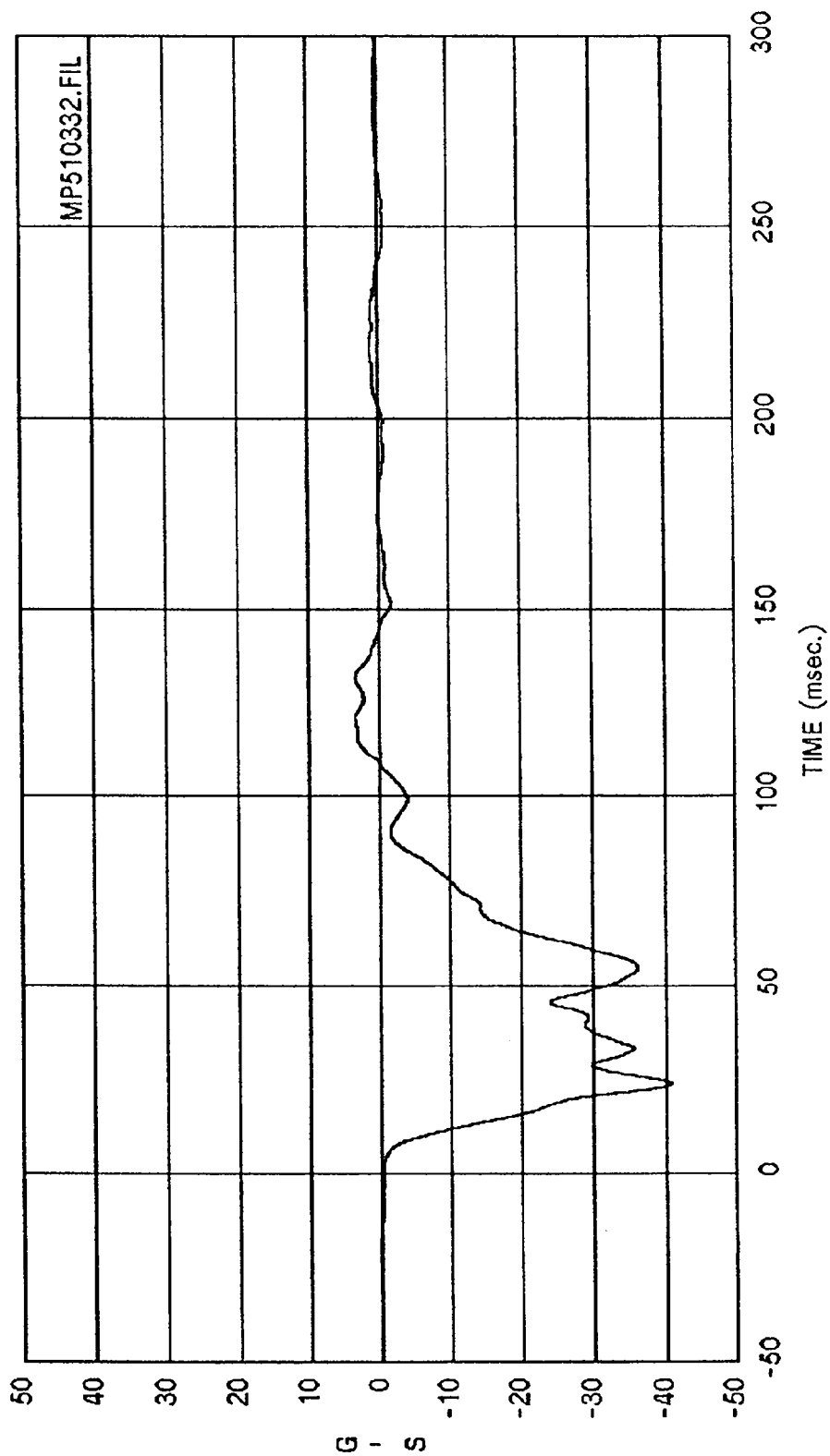
Curve: Right rear cross-member delta V -- X axis(Pri) Filter: SAE CLASS 180 Max = 56.585 Min = -8.746

MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner



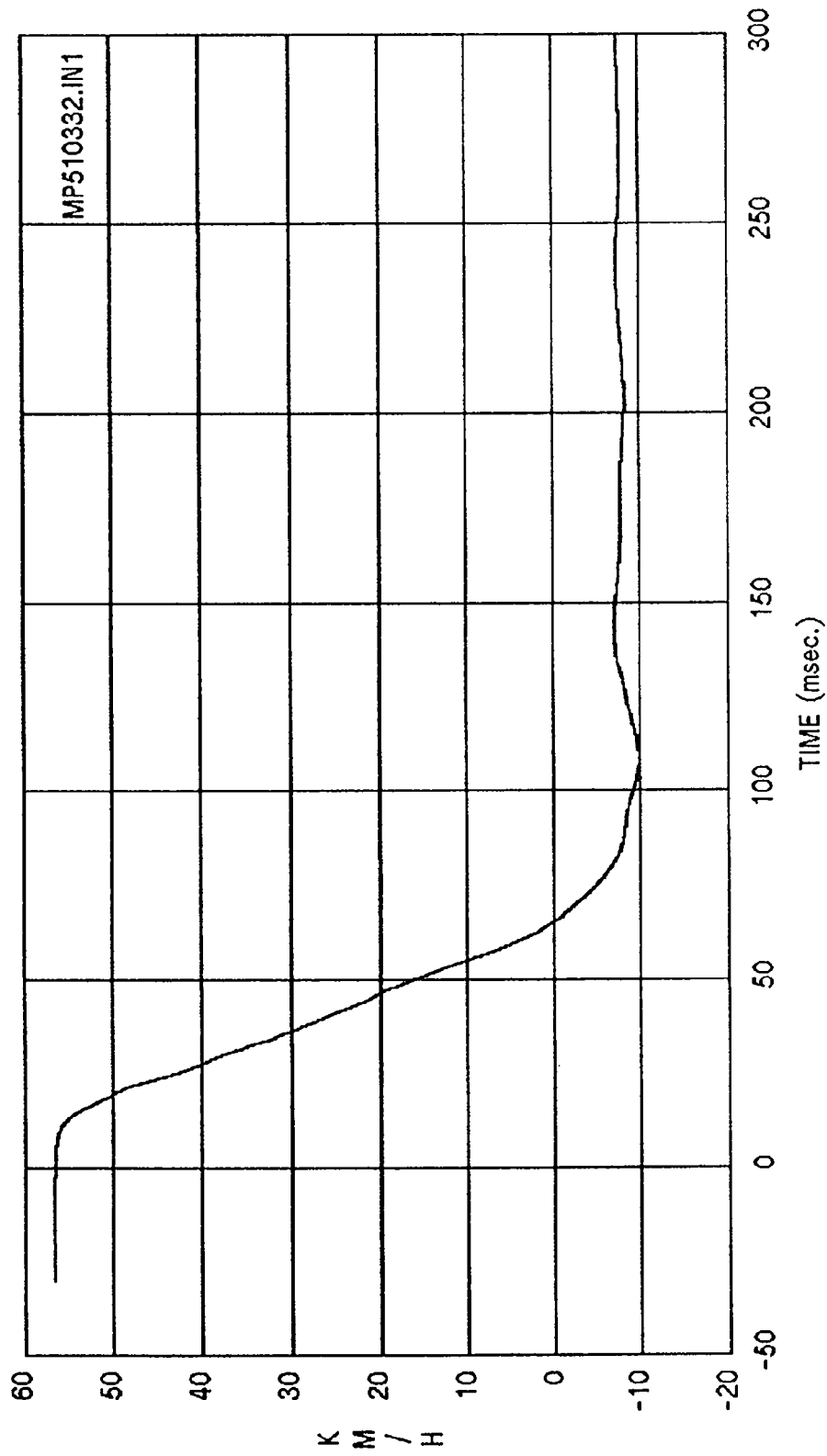
Curve: Right rear cross-member disp. - X axis (primary) Filter: SAE CLASS 180 Max = 60.891 Min = 20.135

MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner



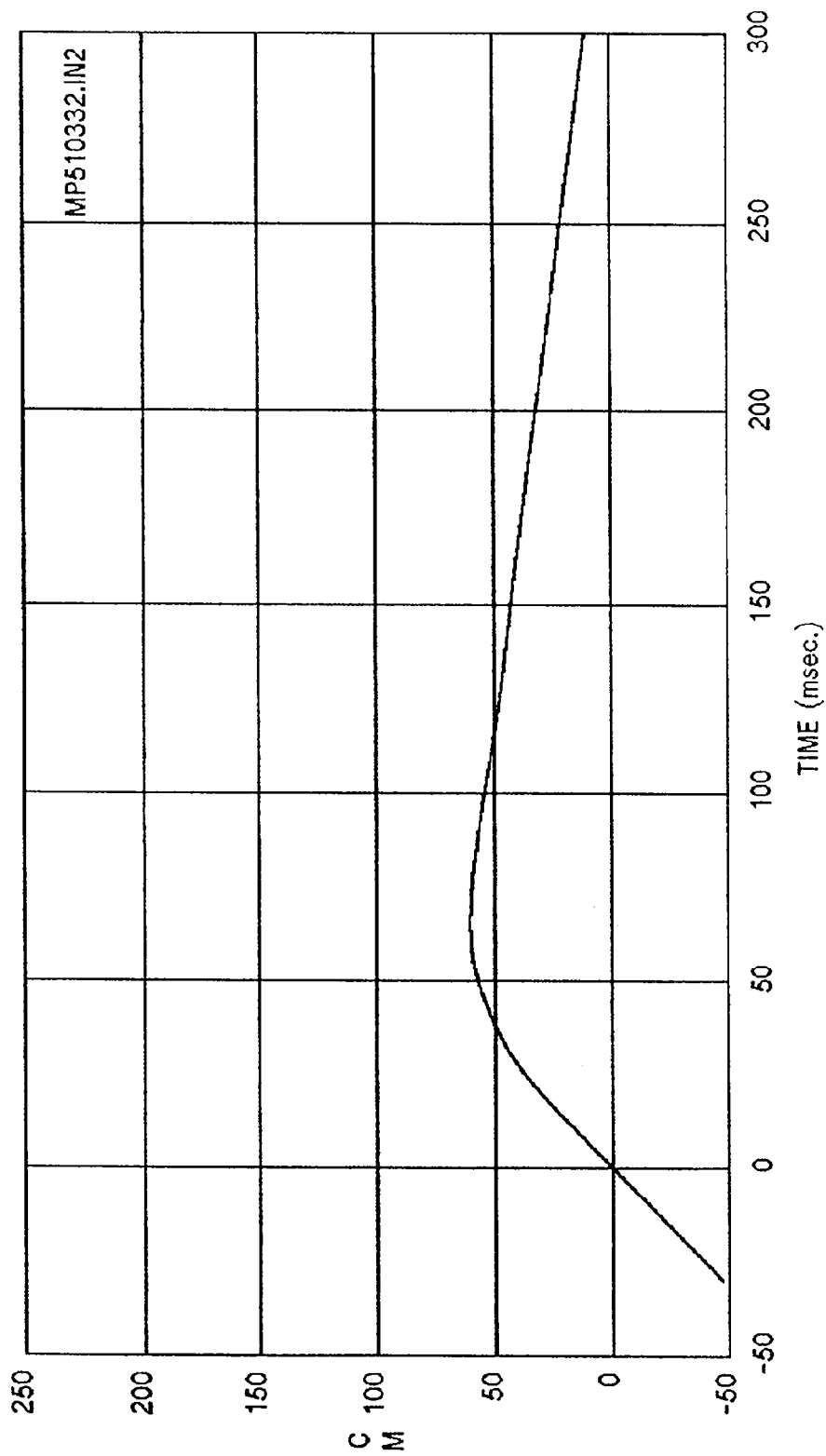
Curve: Left rear cross-member accel. - X axis(secondary) Filter: SAE CLASS 60 Max = 3.4418 Min = -40.8

MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner



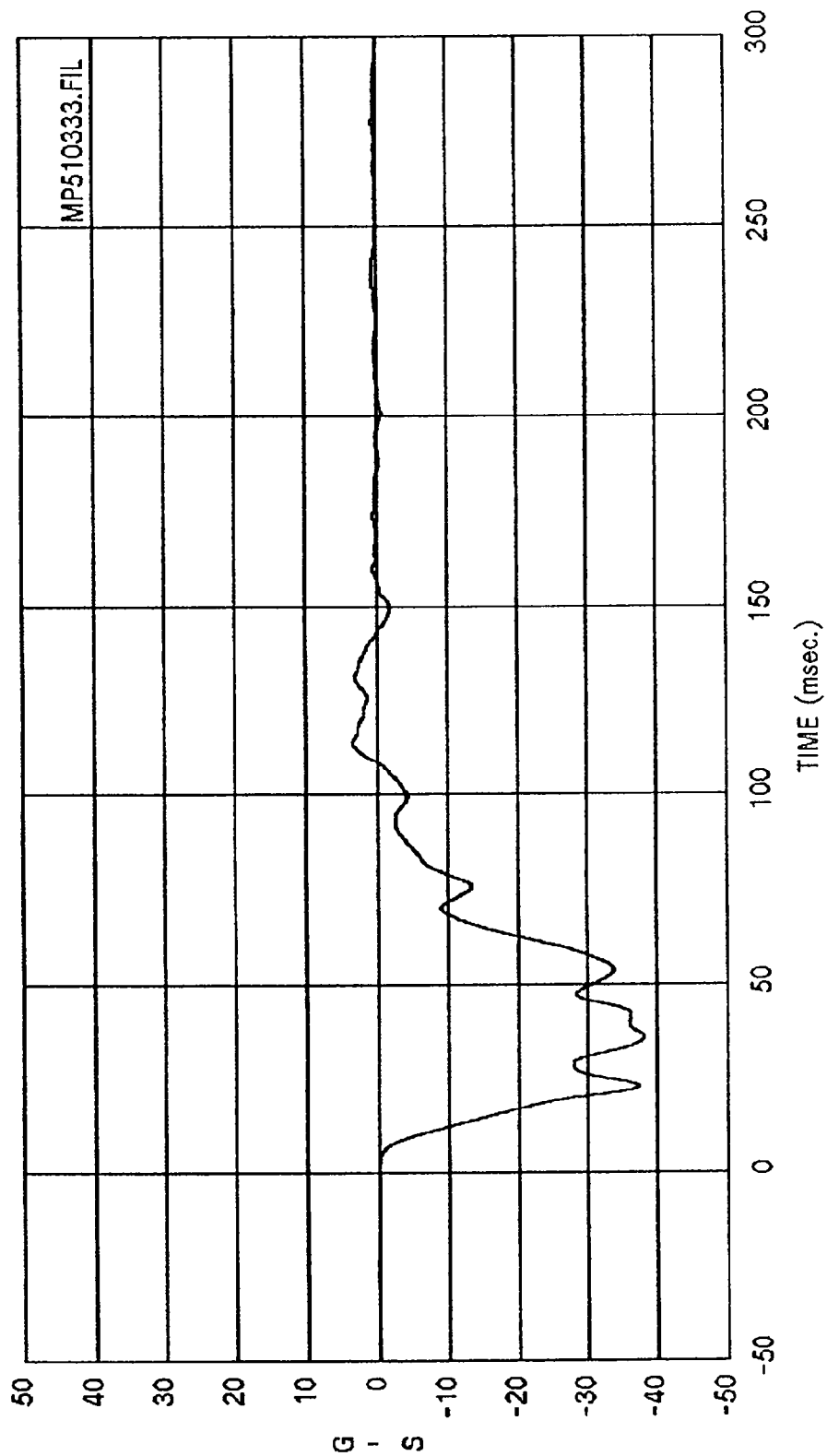
Curve: Left rear cross-member delta V -- X axis (Sec) Filter: SAE CLASS 180 Max = 56.574 Min = -9.78

MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner



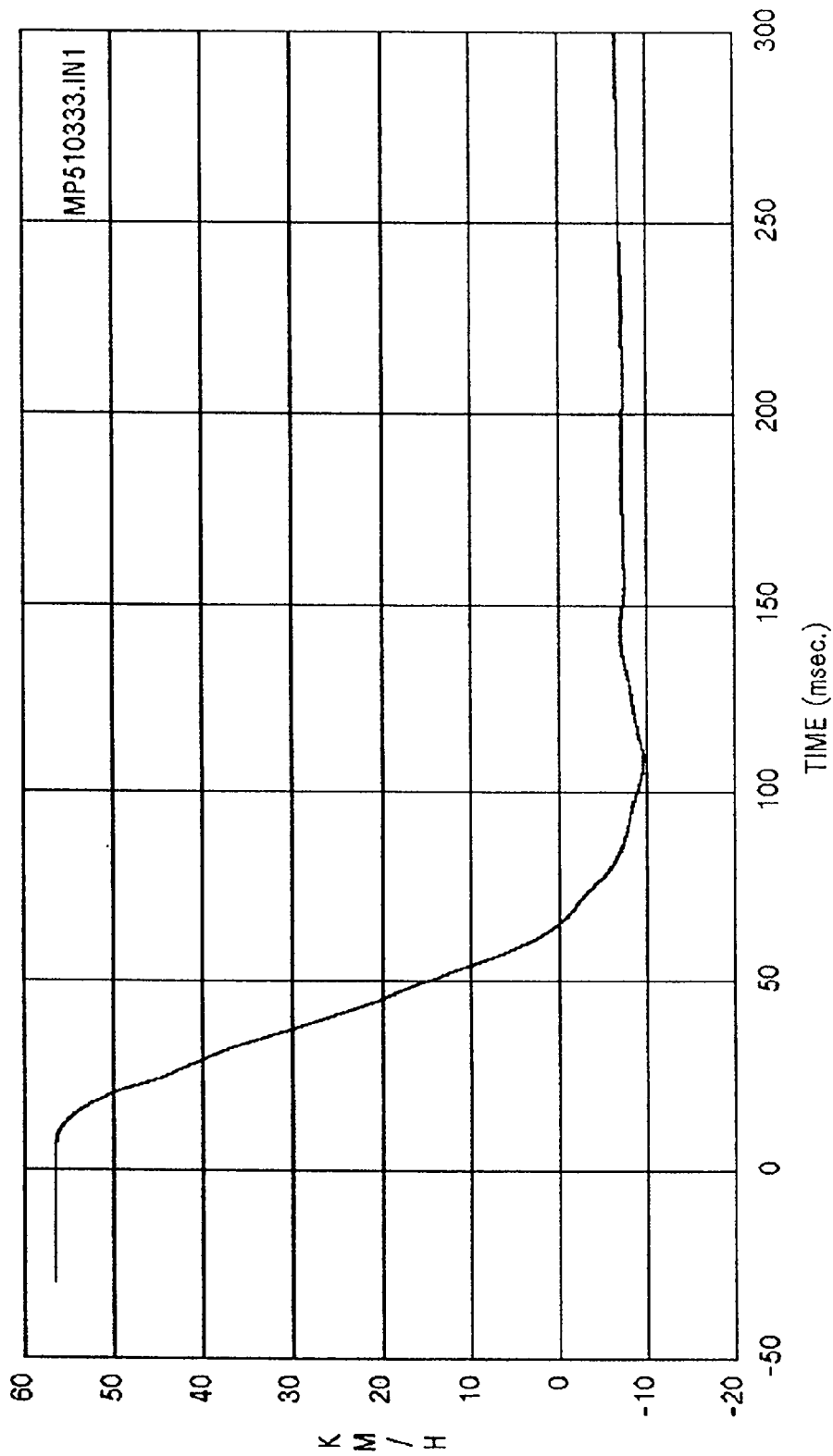
Curve: Left rear cross-member disp. - X axis(secondary) Filter: SAE CLASS 180 Max = 60.253 Min = 10.5,

MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner



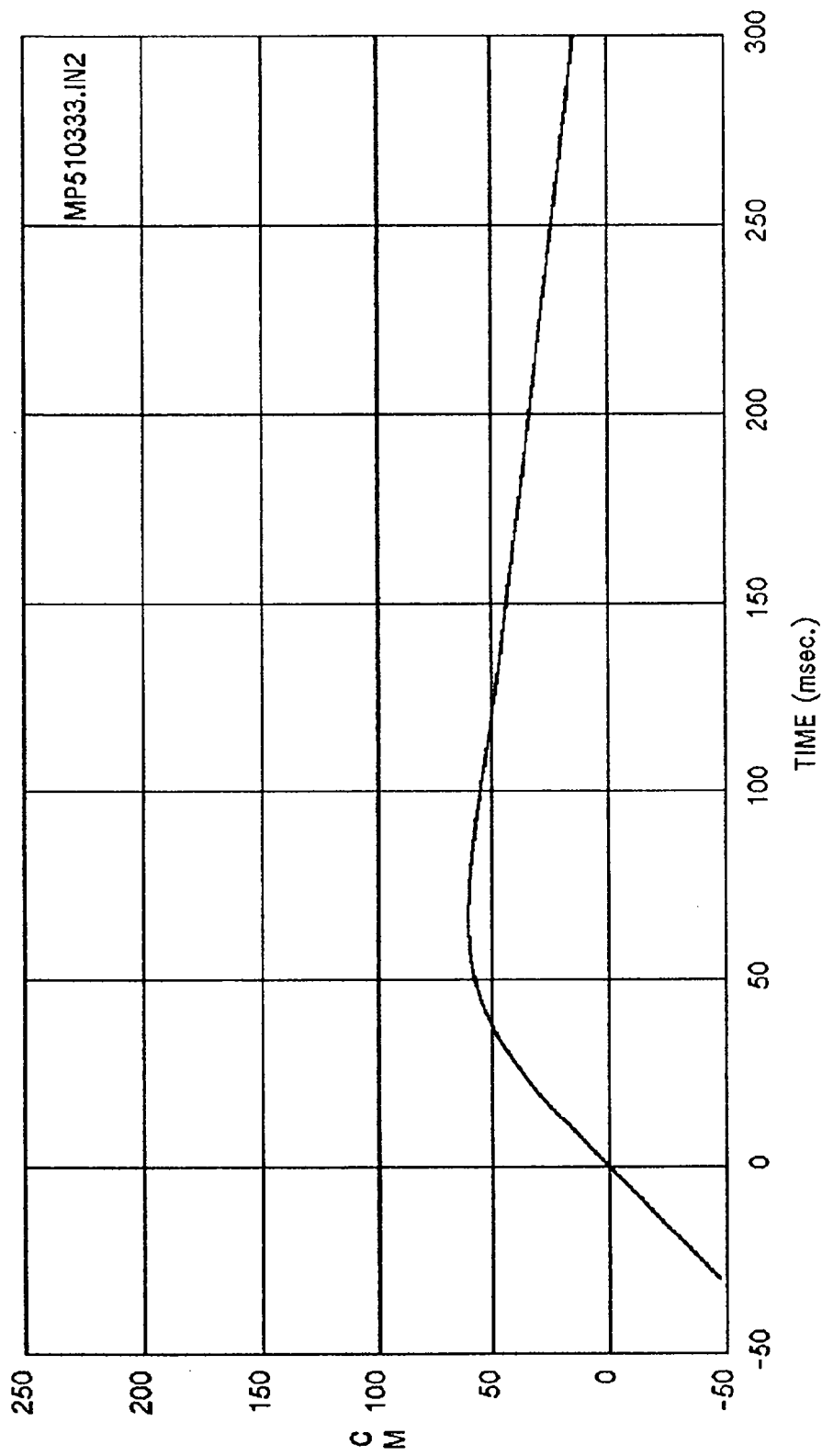
Curve: Right rear cross-member acc. - X axis (secondary) Filter: SAE CLASS 60 Max = 3.4727 Min = -38.1

MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner



Curve: Right rear cross-member delta V -- X axis(Sec) Filter: SAE CLASS 180 Max = 56.585 Min = -9.59

MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner



Curve: Right rear cross-member disp. - X axis(secondary) Filter: SAE CLASS 180 Max = 60.340 Min = 14.2

MSE Date: 12/09/92 Program: 1993 NCAP, test number 4 Vehicle: 1993 Toyota 4 Runner

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX B-2

LOAD CELL BARRIER DATA

DATA FILTERING:

Load Cell Barrier Channels - Class 60

NO DATA

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX C

PART 572 DUMMY CONFIGURATION AND
PERFORMANCE VERIFICATION TESTS

THIS PAGE INTENTIONALLY LEFT BLANK

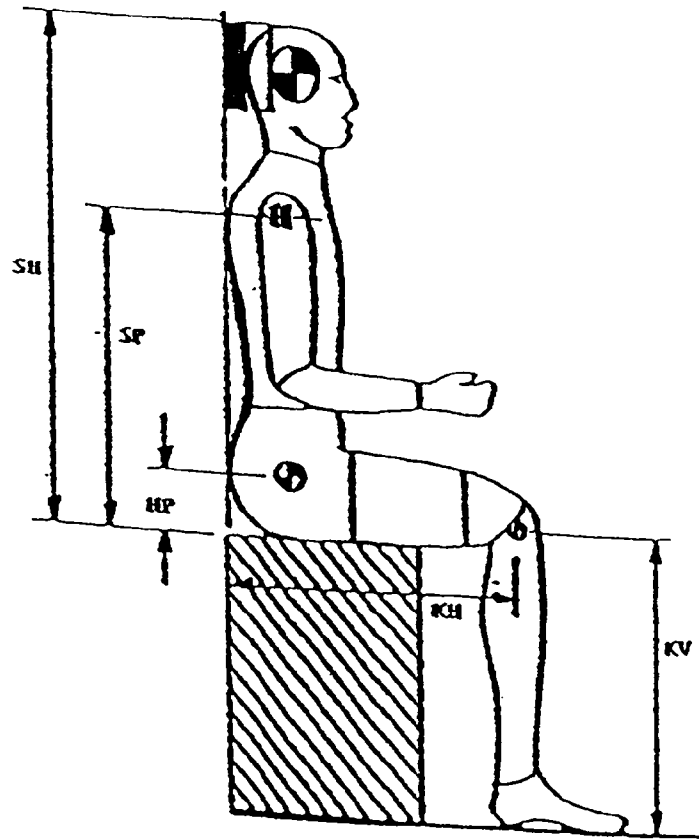
PART 572 ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA

NHTSA ATD I.D. NUMBER: 830

LAB TECHNICIAN: P. Puzzuto/L. Rawlings

CALIBRATION SEQUENCE: 02

CALIBRATION DATE: 11/19/92 to 11/25/92



I. CONFIGURATION VERIFICATION DATA, PRETEST			
TESTED PARAMETER	UNITS	SPECIFICATION	TEST RESULTS
SH - Seated height	mm	904 - 909	906
SP - Shoulder pivot height	mm	554 - 569	556
HP - Hip pivot height	mm	99 reference	99
KH - Knee pivot from back	mm	511 - 526	522
KV - Knee pivot from floor	mm	490 - 505	504
SW - Shoulder width	mm	452 - 467	461
HW - Hip width	mm	356 - 391	381

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

NHTSA ATD I.D. NUMBER: 830

LAB TECHNICIAN: P. PUZZUTO/L. RAWLINGS

CALIBRATION SEQUENCE: 02

CALIBRATION DATE: 11/19/92 to 11/25/92

II. PERFORMANCE VERIFICATION DATA, PRETEST			
TESTED PARAMETER	UNITS	SPECIFICATION	TEST RESULTS
Temperature in laboratory	Deg C	18.9 - 25.6	22.2
Humidity in laboratory	%	10 - 70	45
HEAD DROP TEST			
Peak resultant acceleration	G's	210 - 260	251.8
Peak lateral acceleration	G's	less than 10	4.9
Time above 100 G's	msec	0.9 to 1.5	1.1
ABDOMINAL COMPRESSION TEST			
Force at 12mm displacement	kg	10.5 - 16.4	12.7
Force at 19mm displacement	kg	16.4 - 22.7	19.2
Force at 25mm displacement	kg	22.7 - 28.6	27.2
Force at 33mm displacement	kg	23.2 - 40.0	39.1
CHEST IMPACT TEST, HIGH ENERGY			
Probe speed	mps	6.64 - 6.77	6.71
Peak deflection	mm	43.2 maximum	42.0
Peak resistive force	kg	1023 maximum	907
Internal hysteresis	%	50 - 70	57
CHEST IMPACT TEST, LOW ENERGY			
Probe speed	mps	4.22 - 4.31	4.26
Peak deflection	mm	27.9 maximum	27.5
Peak resistive force	kg	659 maximum	564
Internal hysteresis	%	50 - 70	52

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

NHTSA ATD I.D. NUMBER: 830

LAB TECHNICIAN: P. Puzzuto/L. Rawlings

CALIBRATION SEQUENCE: 02

CALIBRATION DATE: 11/19/92 to 11/25/92

II. PERFORMANCE VERIFICATION DATA, PRETEST				
TESTED PARAMETER		UNITS	SPECIFICATION	TEST RESULTS
NECK BEND TEST				
Pendulum speed		mps	6.55 - 7.77	6.61
Pendulum avg. decel. ($T_1 - T_2$)		G's	20 - 24	22.3
Pendulum decel. ($T_2 - T_1$)		msec	less than 3	2.6
Pendulum decel. ($T_3 - T_2$)		msec	25 - 30	29.4
Pendulum decel. ($T_4 - T_3$)		msec	less than 10	6.8
Resultant head acceleration		G's	less than 26	25.1
Maximum head rotation		deg.	63 - 73	63.9
CHORDAL DISPLACEMENT / HEAD ROTATION ANGLE				
0 deg.	Time	msec	-2.0 - 2.0	0.0
	Displ.	mm	-13 - 13	0
30 deg.	Time	msec	25.6 - 34.4	27.1
	Displ.	mm	53 - 79	58
60 deg.	Time	msec	40.3 - 51.7	44.2
	Displ.	mm	109 - 135	119
Maximum	Time	msec	53.2 - 66.8	57.1
	Displ.	mm	127 - 152	135
60 deg.	Time	msec	67.0 - 83.0	68.9
	Displ.	mm	109 - 135	122
30 deg.	Time	msec	85.4 - 104.6	89.6
	Displ.	mm	53 - 79	60
0 deg.	Time	msec	101.0 - 123.0	101.9
	Displ.	mm	-13 - 13	2

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

NHTSA ATD I.D. NUMBER: 830

LAB TECHNICIAN: P. Puzzuto/L. Rawlings

CALIBRATION SEQUENCE: 02

CALIBRATION DATE: 11/19/92 to 11/25/92

II. PERFORMANCE VERIFICATION DATA, PRETEST			
TESTED PARAMETER	UNITS	SPECIFICATION	TEST RESULTS
KNEE IMPACT TEST, LEFT			
Probe speed	mps	2.06 to 2.15	2.10
Maximum force	kg	841 to 1136	1103
Time above 455 kg	msec	1.7 minimum	1.7
KNEE IMPACT TEST, RIGHT			
Probe speed	mps	2.06 to 2.15	2.12
Maximum force	kg	841 to 1136	1130
Time above 455 kg	msec	1.7 minimum	1.8
LUMBAR FLEXION TEST			
Force at 20 degrees	kg	10.0 to 15.5	13.4
Force at 30 degrees	kg	15.5 to 20.9	18.7
Force at 40 degrees	kg	20.9 to 26.4	25.0
Lumbar return angle	deg	12 maximum	10

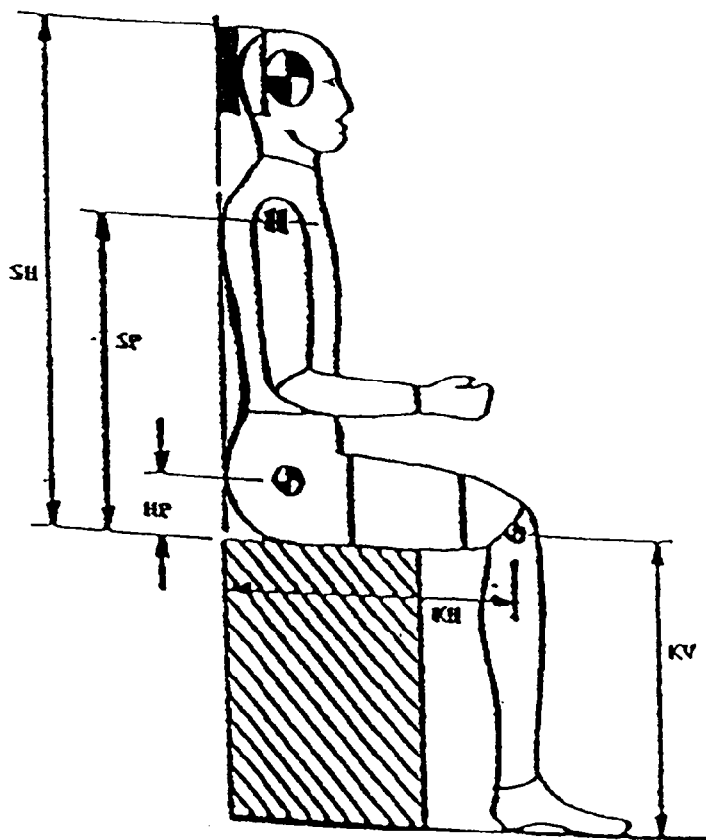
PART 572 ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA

NHTSA ATD I.D. NUMBER: 814

LAB TECHNICIAN: P. Puzzuto/L. Rawlings

CALIBRATION SEQUENCE: 02

CALIBRATION DATE: 11/19/92 to 11/25/92



I. CONFIGURATION VERIFICATION DATA, PRETEST			
TESTED PARAMETER	UNITS	SPECIFICATION	TEST RESULTS
SH - Seated height	mm	904 - 909	907
SP - Shoulder pivot height	mm	554 - 569	560
HP - Hip pivot height	mm	99 reference	99
KH - Knee pivot from back	mm	511 - 526	520
KV - Knee pivot from floor	mm	490 - 505	503
SW - Shoulder width	mm	452 - 467	460
HW - Hip width	mm	356 - 391	369

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

NHTSA ATD I.D. NUMBER: 814

LAB TECHNICIAN: P. PUZZUTO/L. RAWLINGS

CALIBRATION SEQUENCE: 02

CALIBRATION DATE: 11/19/92 to 11/25/92

II. PERFORMANCE VERIFICATION DATA, PRETEST			
TESTED PARAMETER	UNITS	SPECIFICATION	TEST RESULTS
Temperature in laboratory	Deg C	18.9 - 25.6	22.2
Humidity in laboratory	%	10 - 70	45
HEAD DROP TEST			
Peak resultant acceleration	G's	210 - 260	244.7
Peak lateral acceleration	G's	less than 10	6.2
Time above 100 G's	msec	0.9 to 1.5	1.3
ABDOMINAL COMPRESSION TEST			
Force at 12mm displacement	kg	10.5 - 16.4	15.2
Force at 19mm displacement	kg	16.4 - 22.7	21.9
Force at 25mm displacement	kg	22.7 - 28.6	27.9
Force at 33mm displacement	kg	23.2 - 40.0	39.2
CHEST IMPACT TEST, HIGH ENERGY			
Probe speed	mps	6.64 - 6.77	6.67
Peak deflection	mm	43.2 maximum	41.9
Peak resistive force	kg	1023 maximum	981
Internal hysteresis	%	50 - 70	61
CHEST IMPACT TEST, LOW ENERGY			
Probe speed	mps	4.22 - 4.31	4.29
Peak deflection	mm	27.9 maximum	27.6
Peak resistive force	kg	659 maximum	631
Internal hysteresis	%	50 - 70	62

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

NHTSA ATD I.D. NUMBER: 814

LAB TECHNICIAN: P. Puzzuto/L. Rawlings

CALIBRATION SEQUENCE: 02

CALIBRATION DATE: 11/19/92 to 11/25/92

II. PERFORMANCE VERIFICATION DATA, PRETEST				
TESTED PARAMETER		UNITS	SPECIFICATION	TEST RESULTS
NECK BEND TEST				
Pendulum speed		mps	6.55 - 7.77	6.92
Pendulum avg. decel. ($T_1 - T_2$)		G's	20 - 24	21.0
Pendulum decel. ($T_2 - T_1$)		msec	less than 3	1.9
Pendulum decel. ($T_3 - T_2$)		msec	25 - 30	27.6
Pendulum decel. ($T_4 - T_3$)		msec	less than 10	8.5
Resultant head acceleration		G's	less than 26	24.4
Maximum head rotation		deg.	63 - 73	66.2
CHORDAL DISPLACEMENT / HEAD ROTATION ANGLE				
0 deg.	Time	msec	-2.0 - 2.0	0.1
	Displ.	mm	-13 - 13	1
30 deg.	Time	msec	25.6 - 34.4	32.1
	Displ.	mm	53 - 79	69
60 deg.	Time	msec	40.3 - 51.7	45.1
	Displ.	mm	109 - 135	129
Maximum	Time	msec	53.2 - 66.8	60.7
	Displ.	mm	127 - 152	141
60 deg.	Time	msec	67.0 - 83.0	71.9
	Displ.	mm	109 - 135	123
30 deg.	Time	msec	85.4 - 104.6	93.8
	Displ.	mm	53 - 79	72
0 deg.	Time	msec	101.0 - 123.0	101.6
	Displ.	mm	-13 - 13	3

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

NHTSA ATD I.D. NUMBER: 814

LAB TECHNICIAN: P. Puzzuto/L. Rawlings

CALIBRATION SEQUENCE: 02

CALIBRATION DATE: 11/19/92 to 11/25/92

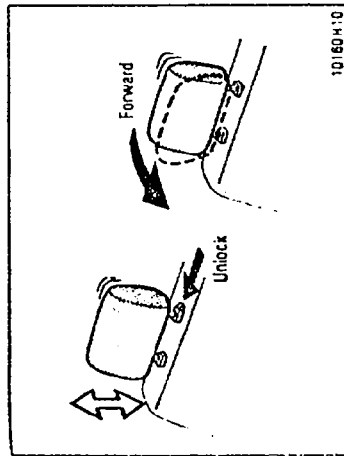
II. PERFORMANCE VERIFICATION DATA, PRETEST			
TESTED PARAMETER	UNITS	SPECIFICATION	TEST RESULTS
KNEE IMPACT TEST, LEFT			
Probe speed	mps	2.06 to 2.15	2.12
Maximum force	kg	841 to 1136	1006
Time above 455 kg	msec	1.7 minimum	1.8
KNEE IMPACT TEST, RIGHT			
Probe speed	mps	2.06 to 2.15	2.10
Maximum force	kg	841 to 1136	929
Time above 455 kg	msec	1.7 minimum	1.7
LUMBAR FLEXION TEST			
Force at 20 degrees	kg	10.0 to 15.5	11.2
Force at 30 degrees	kg	15.5 to 20.9	18.3
Force at 40 degrees	kg	20.9 to 26.4	23.9
Lumbar return angle	deg	12 maximum	11

APPENDIX D

VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

THIS PAGE INTENTIONALLY LEFT BLANK

Headrests (vertically and rotationally adjustable type)



To raise the headrest, pull it up. To lower it, press the lock release button and push the headrest down. To move the headrest forward, pull on the top.

Pulling the top of the headrest as far as it can go will return it to the upright position.

The headrest is most effective when it is close to your head. Therefore, using a cushion on the seatback is not recommended.

CAUTION

- Adjust the top of the headrest so that it is closest to the top of your ears.

Seat belts—

—Seat belt precautions

Toyota recommends that the driver and passengers in the vehicle be properly restrained at all times with the seat belts provided. Failure to do so could increase the chance of injury and/or the severity of injury in accidents.

Baby or small child. Use a child restraint system which fits your vehicle. See "Child restraint" for details.

Child. If a child is too big for a child restraint system, the child should sit in the rear seat and must be restrained with the seat belt. According to accident statistics, the child is safer when properly restrained in the rear seat than in the front seat. Do not allow the child to stand up or kneel on the seat. If the shoulder belt falls across the child's neck or face, move the child to the center position and use the center lap belt.

Small-framed person or youth in a 3-point type seat belt. If the shoulder belt falls across the neck or face, move the seat fully backward so that the belt lays across the shoulder.

Pregnant woman. Toyota recommends the use of a seat belt. Ask your doctor for specific recommendations. The lap belt should be worn securely and as low as possible over the hips and not on the waist.

- After adjusting the headrest, make sure it is locked in position.

- Do not drive with the headrests removed.

~~~~~

Injured person. Toyota recommends the use of a seat belt. Depending on the injury, however, first check with your doctor.

**CAUTION:**~~~~~

Persons should ride in their seats properly wearing their seat belts whenever the vehicle is moving. Otherwise, they are much more likely to suffer serious bodily injury in the event of sudden braking or a collision.

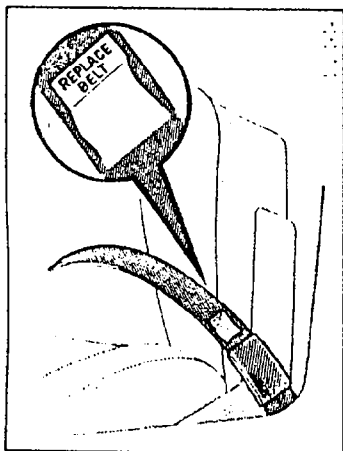
When using the seat belts, observe the following:

- Use the belt for only one person at a time. Do not use a single belt for two or more people—even children.
- After inserting the tab, make sure that the connection is secure and the belt is not twisted.
- Avoid reclining the seatbacks too much. The seat belts provide maximum protection when the seatbacks are in the upright position. (See the seat adjustment instructions.)
- Be careful not to damage the belt webbing or hardware, and take care that they do not get caught or pinched in the seat or doors.

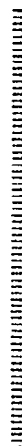
- Inspect the belt system periodically. Check for cuts, frays, and loose parts. Damaged parts should be replaced. Do not disassemble or modify the system.

- Keep the belts clean and dry. If they need cleaning, use a mild soap solution or lukewarm water. Never use bleach, dye, or abrasive cleaners—they may severely weaken the belts.

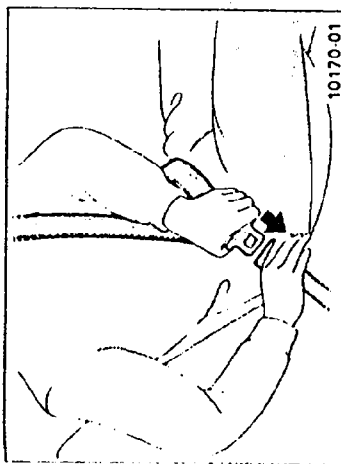
- Replace the belt assembly if it has been used in a severe impact. The entire assembly should be replaced even if damage is not obvious.



- Replace the seat belt if the warning label under the sleeve can be seen. The warning label, "REPLACE BELT", will appear if the belt receives a severe impact or other force.



### -3-point type

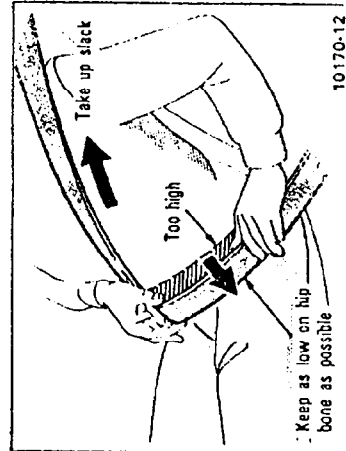


Adjust the seat as needed and sit up straight and well back in the seat. To fasten your belt, pull it out of the retractor and insert the tab into the buckle.

You will hear a click when the tab locks into the buckle.

The seat belt length automatically adjusts to your size and the seat position.

The retractor will lock the belt during a sudden stop or on impact. It also may lock if you lean forward too quickly. A slow, easy motion will allow the belt to extend, and you can move around freely.



Adjust the position of the lap and shoulder belts.

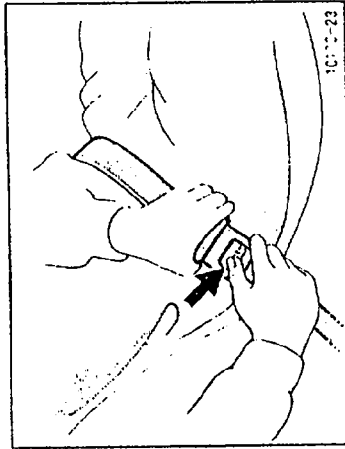
Position the lap belt as low as possible on your hips—not on your waist; then adjust it to a snug fit by pulling the shoulder portion upward through the latch plate.

**CAUTION:** High-positioned lap belts and loose-fitting shoulder belts both could increase the chance of injury due to sliding under the lap belt during an accident.

- High-positioned lap belts and loose-fitting shoulder belts both could increase the chance of injury due to sliding under the lap belt during an accident.

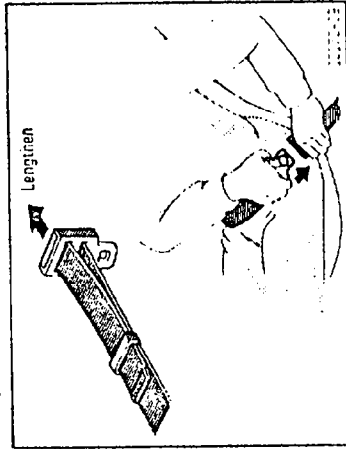
- For your safety, do not place the shoulder belt under your arm.

—2-point type



To release the belt, press the buckle-release button and allow the belt to retract.

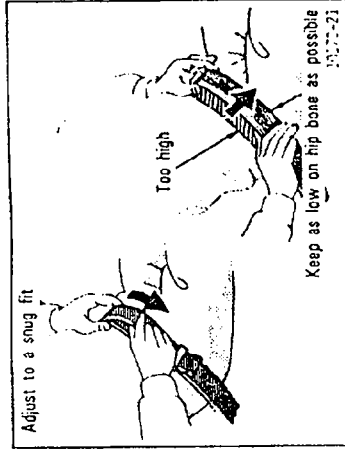
If the belt does not retract smoothly, pull it out and check for kinks or twists. Then make sure that it remains untwisted as it retracts.



Sit up straight and well back in the seat. To fasten your belt, insert the tab into the buckle.

You will hear a click when the tab locks into the buckle.

If the belt is not long enough for you, hold the tab at a right angle to the belt and pull on the tab.



Remove excess length of the belt and adjust the belt position.

To shorten the belt, pull the free end of the belt.

Position the lap belt as low as possible on your hips—not on your waist, then adjust it to a snug fit.

**CAUTION:** High-positioned lap belts could increase the chance of injury due to sliding under the lap belt during an accident.

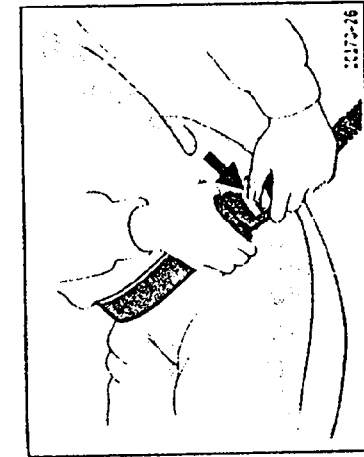
### —Seat belt extender

If your seat belt cannot be fastened securely because it is not long enough, a personalized seat belt extender is available from your Toyota dealer free of charge.

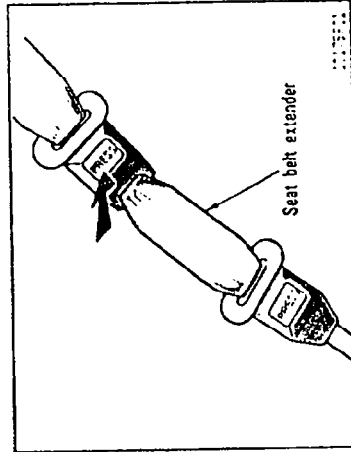
Please contact your local Toyota dealer so that the dealer can order the proper required length for the extender. Bring the heaviest coat you expect to wear for proper measurement and selection of length. Additional ordering information is available at your Toyota dealer.

**CAUTION:** When using the seat belt extender, observe the following. Failure to follow these instructions could result in less effectiveness of the seat belt restraint system in case of vehicle accident, increasing the chance of personal injury.

- Never use the seat belt extender if you can fasten the seat belt without it.
- Remember that the extender provided for you may not be safe when used on a different vehicle, or for another person and at different seating position than specified.



To release the belt, press the buckle-release button.



To connect the extender to the seat belt, insert the tab into the seat belt buckle so that the buckle-release buttons of the extender and the seat belt are located on the same side as shown.

You will hear a click when the tab locks into the buckle.

When releasing the seat belt, press on the buckle-release button on the extender, not on the seat belt. This helps prevent damage to the vehicle interior and extender itself.

When not in use, remove the extender and store in the vehicle for future use.

Child restraint—

—Child restraint precautions

Toyota strongly urges the use of child restraint systems for children small enough for the child restraint system.

The laws of all fifty states in the U.S.A. and Canada now require the use of a child restraint system.

**CAUTION:**  
For effective protection in automobile accidents and sudden stops, children must not be transported unrestrained. Holding a child in your arms is not a substitute for a child restraint system. In an accident, a child held in a person's arms can be crushed between the vehicle's interior and an unrestrained person.

**CAUTION:**  
After inserting the tab, make sure that the connection is secure and the seat belt extender is not twisted.

—Child restraint system

A child restraint system for a small child or baby must be restrained on the seat with either the lap belt or the lap portion of the lap/shoulder belt.

The child restraint system should conform to the size of the child and properly fit the vehicle seat. For a higher degree of safety, the child restraint system should be installed in the rear seat if your vehicle is equipped with rear seats. According to accident statistics, children are safer when properly restrained in the rear seat than in the front seat.

When installing a child restraint system, you must use a locking clip except for the rear seat belts.

When installing a child restraint system, refer to the instructions provided by the manufacturer of the system and follow the directions listed under the following illustrations.

Your vehicle is provided with anchors for securing the top strap of a child restraint system. The anchor nuts are welded beneath the sheet metal to permit installation of an anchor bracket for a child restraint system.

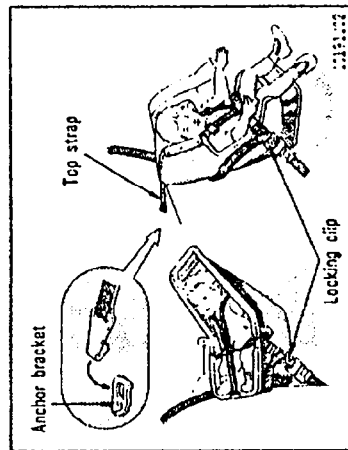
To install an anchor bracket, use an 8 mm X 30 mm X 1.25 mm coarse thread metric bolt. Note that the bolts accompanying many child restraint systems are not metric. You can damage the anchor nuts on your vehicle if you force bolts with different thread into the anchor nuts.

If any of the necessary parts do not come with your child restraint system, you can purchase them from your Toyota dealer. Details are as follows:

- Bolt (Part No. 91511-60830)
- Locking clip (Part No. 73119-22010)

**CAUTION:** After installation, make sure the child restraint system is secure in place. If the child restraint system is not restrained securely, it may cause injury to the child in case of vehicle accident and sudden stops.

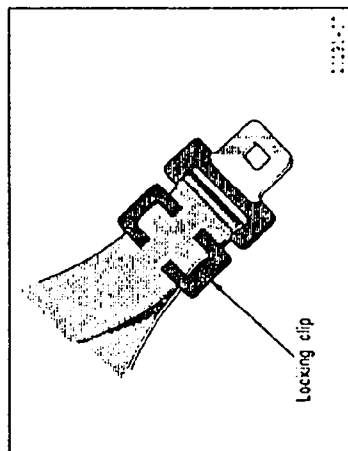
When not using the child restraint system, keep it secured with the seat belt or remove it and place it somewhere other than in the vehicle to prevent injury to passengers in event of a sudden stop or accident.



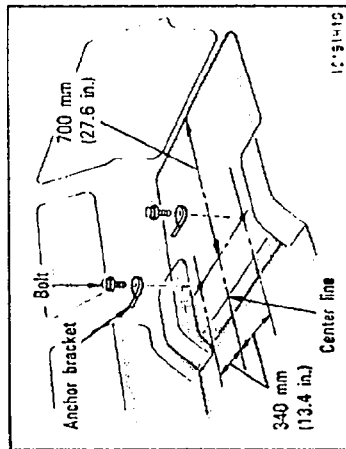
#### INSTALLATION ON REAR SEAT

On rear seat outside

1. Fasten the lap and shoulder belt over the child restraint system.
2. Take up the slack in the lap portion of the belt.
3. Holding the tab in that position, release the buckle.
4. Install a locking clip near the tab of the lap and shoulder belt. (See instructions in the next column.)
5. Buckle the belt again.
6. Place the shoulder portion of the belt between the vehicle seatback and the child restraint system.

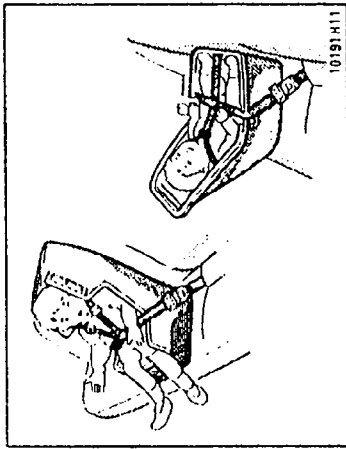


If your child restraint system requires the use of a top strap, latch the hook onto the anchor bracket and tighten the top strap. To install the locking clip, insert the lap and shoulder webbing through the recesses of the locking clip. Always remove the locking clip when the child restraint system is not installed.



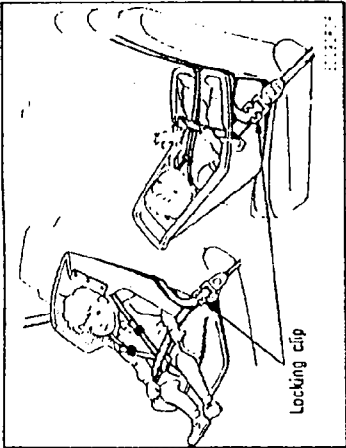
#### Top strap anchors and locations—On the rear cargo floor

- Using the illustration as a guide, cut the cargo floor carpet. The anchor holes are sealed.
  - Remove the seal of the anchor you wish to use and tighten down the anchor bracket for your child restraint system with a bolt.
- If you remove the anchor brackets when the child restraint system is necessary no longer, replace the bolts in the holes to prevent entry of exhaust emissions, water or dirt.



#### On rear seat center

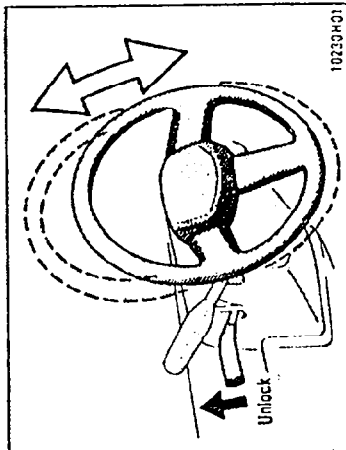
- Fasten the center lap belt over the child restraint system.
- Tighten the lap belt.



#### INSTALLATION ON FRONT SEAT

- Fasten the lap and shoulder belt over the child restraint system.
- Take up the slack in the lap portion of the belt.
- Holding the tab in that position, release the buckle.
- Install a locking clip near the tab of the lap and shoulder belt. (See instructions in the next column.)
- Buckle the belt again. If necessary, slide the seat forward and remove any slack.
- Place the shoulder portion of the belt between the vehicle seatback and the child restraint system.

## Tilt steering wheel

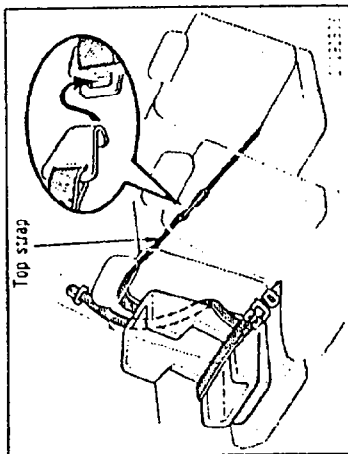


To change the steering wheel angle, hold the steering wheel, pull up the lock release lever, tilt the steering wheel to the desired angle and release the lever.

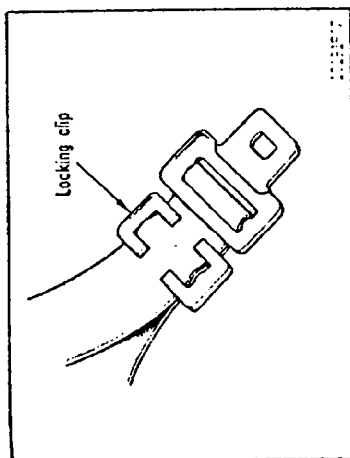
The steering wheel will spring up to the highest position when the lock release lever is pulled up.

### CAUTION:

- This adjustment should not be made while the vehicle is moving.
- After adjusting the steering wheel, try moving it up and down to make sure it is locked in position.



If your child restraint system requires the use of a top strap, latch the hook onto the tab of the rear center seat belt and tighten the top strap.



To install the locking clip, insert the lap and shoulder webbing through the recesses of the locking clip.

Always remove the locking clip when the child restraint system is not installed.

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX E  
INSTRUMENTATION AND CALIBRATION DATA

THIS PAGE INTENTIONALLY LEFT BLANK

CALIBRATION DATA FOR INSTRUMENTATION USED IN ATD CALIBRATION

| DUMMY INSTRUMENTS            | MANUFACTURER | MODEL               | SERIAL No.  | CAL DATE | DUE DATE |
|------------------------------|--------------|---------------------|-------------|----------|----------|
| CHEST DEFLECTION POT         | BECKMAN      | 5311                | N/A         | EACH USE | EACH USE |
| CHEST IMPACTOR ACCELEROMETER | ENTRAN       | EGV-1               | 14N3N-V13-1 | 09/14/92 | 03/14/93 |
| NECK PENDULUM ACCELEROMETER  | ENTRAN       | EGV-1               | 14N3N-V13-1 | 09/14/92 | 03/14/93 |
| 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       | 80294-20518-1840202 | 1684-067    | EACH USE | EACH USE |
| ABDOMINAL COMPRESSION LOAD   | LEBOW/EATON  | 3167                | 1573        | 09/14/92 | 03/14/93 |
| LUMBAR FLEXION LOAD          | LEBOW/EATON  | 3167                | 1573        | 09/14/92 | 03/14/93 |
| LUMBAR ROTATION              | BOURNS       | 3590S-2-102         | N/A         | EACH USE | EACH USE |
| ABDOMINAL DISPLACEMENT       | CELESCO      | PT-101-15B          | 0786551     | EACH USE | EACH USE |
| TIMER                        | MSE          | MSE TIM             | 1           | 08/17/92 | 02/17/93 |
| TIME TRAP                    | MSE          | 1 in.               | 1           | 08/17/92 | 02/17/93 |