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V1557

VEHICLE SAFETY COMPLIANCE TESTING FOR OCCUPANT CRASH PROTECTION,
WINDSHIELD MOUNTING, WINDSHIELD ZONE INTRUSION (PARTIAL)
AND FUEL SYSTEM INTEGRITY

TOYOTA MOTOR COMPANY
1991 TOYOTA CELICA ST
2-DOOR COUPE

NHTSA NUMBER: CM5103

CALSPAN TEST NUMBER: 7853-7

January 28, 1991

CALSPAN CORPORATION
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FINAL REPORT

PREPARED FOR:

U. S. Department of Transportation
National Highway Traffic Safety Administration
ENFORCEMENT
Office of Vehicle Safety Compliance
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Washington, DC 20590

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16. Abstract A 30 mph vehicle safety compliance test was conducted on a 1991 Toyota Celica ST 2-Door Coupe. This test was performed at the Calspan Advanced Technology Center in Buffalo, New York on January 28, 1991. The purpose of this test was to determine compliance with the performance requirements of the following Federal Motor Vehicle Safety Standards: 1. FMVSS No. 208, "Occupant Crash Protection" 2. FMVSS No. 212, "Windshield Mounting" 3. FMVSS No. 219 (partial), "Windshield Zone Intrusion" 4. FMVSS No. 301, "Fuel System Integrity" The test mode was perpendicular (0°) and the impact velocity was 29.5 mph. The ambient temperature at the impact face was 33°F. The subject test vehicle appears to comply with the requirements of FMVSS Nos. 208, 212, 219 (partial) and 301. <u>Type of Restraint System:</u> The test vehicle was equipped with a driver air bag restraint system and passenger 3-point manual belt safety restraint system. The driver side 3-point manual belt was not used for this test.					
17. Key Words 30 mph Vehicle Safety Compliance Testing FMVSS 208, "Occupant Crash Protection" FMVSS 212, "Windshield Mounting" FMVSS 219, "Windshield Zone Intrusion" FMVSS 301, "Fuel System Integrity" Frontal Impact			18. Distribution Statement Copies of this report are available from: Technical Reference Division National Highway Traffic Safety Admin. Nassif Building, Room 5108 (NAD-52) 400 Seventh St., S.W., Washington, DC 20590		
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Section I

PURPOSE AND TEST PROCEDURE

This 30 mph frontal barrier impact test is part of the Federal Motor Vehicle Safety Standard (FMVSS) 208, 212, 219 (partial) and 301 compliance test program conducted for the National Highway Traffic Safety Administration (NHTSA) by Calspan Advanced Technology Center under Contract No. DTNH22-90-C-01003. The purpose of this test was to determine if the subject vehicle, a 1991 Toyota Celica ST 2-Door Coupe, meets the performance requirements of FMVSS 208, "Occupant Crash Protection"; FMVSS No. 212, "Windshield Mounting"; FMVSS No. 219 (partial), "Windshield Zone Intrusion"; and FMVSS No. 301, "Fuel System Integrity". This compliance test was conducted using the requirements found in the OVSC Laboratory Test Procedure No. TP-208-08, dated September 8, 1989.

Section 2

SUMMARY OF TEST NUMBER CM5103

A frontal barrier was impacted by a 1991 Toyota Celica ST 2-Door Coupe at a velocity of 29.5 mph. The test was performed at the Calspan Corporation Advanced Technology Center on January 28, 1991. Pre- and post-test photographs of the vehicle and dummies are presented in Appendix A.

The frontal barrier impact event was documented by one real-time camera and 14 high-speed cameras. Camera locations and other pertinent camera information can be found in this report.

Two Part 572B, 50th percentile male anthropomorphic test devices (ATDs), were placed in the driver and right-front passenger seating positions according to dummy placement instructions specified in the OVSC Laboratory Test Procedure.

Both ATDs were fully instrumented with head and chest triaxial accelerometers and left/right femur load cells. These ATDs had been certified prior to the test.

The 23 channels of data were recorded on three 14-channel FM tape recorders. Appendix B contains the vehicle and dummy response data traces.

The driver's HIC was calculated to be 514. The maximum chest deceleration over 3 milliseconds was 58.9 g's. The maximum force on the driver's left femur was 1622 pounds and 1263 pounds on the right femur.

The right front passenger's HIC value was 417. The maximum chest deceleration over a 3 millisecond duration was 40.0 g's. The maximum force applied to the passenger's left femur was 344 pounds and 647 pounds on the right femur.

Table 1
CRASH TEST SUMMARY

Vehicle NHTSA No.: CM5103 Test Mode: 30 mph Frontal Barrier

Test Date.: January 28, 1991 Time: 12:30 Temperature: 33°F

Vehicle Make/Model/Body Style: 1991 Toyota Celica ST 2-Door Coupe

Vehicle Test Weight: 2980 lbs.

Vehicle/Barrier Impact Angle: 0°

Impact Velocity: 29.5 mph

Maximum Static Crush: 18.7 in.

Vehicle Rebound: 15.1 in.

DUMMIES:

DRIVER

PASSENGER

Type:

Part 572 B

Part 572 B

Restraint System:

Air Bag*

3-Point Manual

Seat Belt Restraint

Number of Data Channels: 23

Number of Cameras: 1 Real Time

14 High Speed

DOOR OPENING DATA:

operable

- Left Front

operable

- Right Front

Front Seat(s) Data:

DRIVER

PASSENGER

Seat Track Failure:

0.0

0.0

inches of shift

Seat Back Failure:

none

none

VISIBLE DUMMY CONTACT POINTS:

DRIVER

PASSENGER

Head:

Airbag, Sunvisor

No Contact

Abdomen

Lower Steering Wheel Rim

No Contact

Chest

Air Bag

No Contact

Knees

Instrument Panel

Glove Box

*The driver's 3-point manual seat belt restraint was not used for this test.

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATATEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 1991 Toyota Celica ST 2-Door Coupe
 NHTSA No. CM5103 ; VIN: JT2AT86F5M0045469 ; Color: Red
 Engine Data: 4 cylinders; - CID; 1.6 Litres; - cc
 Placement - Longitudinal or In-Line; X Transverse or Lateral
 Transmission Data: 4 speeds; - Manual; X Automatic; X Overdrive
 Final Drive: - Rear Wheel Drive; X Front Wheel Drive; - Four Wheel Drive
 Major Options: - A/C; X Pwr. Strg.; X Pwr. Brakes; - Pwr. Windows
- Power Door Locks
 Date Received: 11/29/90 ; Odometer Reading 96 miles
 Selling Dealer: Stateside Toyota
 & Address 839 Foote Ave., Jamestown, NY 14701

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: Toyota Motor Corp.
 Date of Manufacture: 10-90
 GVWR: 3455 lbs.; GAWR: 1980 lbs. FRONT; 1785 lbs. REAR

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load: 28 psi FRONT
26 psi REAR
 Recommended Tire Size: 165SR13 185/70R13 P185/70R13 Load Range: -
 Recommended Cold Tire Pressure: 30 psi FRONT; 29 psi REAR
 Size of Tires on Test Vehicle: 185/70SR13; Manufacturer: Bridgestone
 Vehicle Capacity Data:
 Type of Front Seats: - Bench; X Bucket; - Split Bench
 Number of Occupants: 2 Front; 2 Rear; 4 Total
 Vehicle Capacity Weight (VCW) = 725 lbs.
 No. of Occupants x 150 lbs. = 600 lbs.
 Rated Cargo/Luggage Weight (RCLW) = 125 lbs. (Difference)

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (WITH MAXIMUM FLUIDS) = UDW:

Right Front =	<u>790</u> lbs.	Right Rear =	<u>430</u> lbs.
Left Front =	<u>830</u> lbs.	Left Rear =	<u>480</u> lbs.
TOTAL FRONT =	<u>1620</u> lbs.	TOTAL REAR =	<u>910</u> lbs.
% of Total Vehicle Weight =	<u>64.0</u>	% of Total Weight =	<u>36.0</u>
TOTAL DELIVERED WEIGHT	= <u>2530</u>	lbs.	

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATA (cont.)

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight	=	<u>2530</u>	lbs.
Rated Cargo/Luggage Weight (RCLW)	=	<u>125</u>	lbs.
Weight of 2 P.572 Dummies @ 164 ea.	=	<u>328</u>	lbs.
TARGET TEST WEIGHT	=	<u>2983</u>	lbs. (sum)

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 0 POUNDS OF CARGO WEIGHT:

Right Front =	<u>870</u>	lbs.	Right Rear =	<u>560</u>	lbs.
Left Front =	<u>900</u>	lbs.	Left Rear =	<u>650</u>	lbs.
TOTAL FRONT =	<u>1770</u>	lbs.	TOTAL REAR =	<u>1210</u>	lbs.
% of Total Weight =	<u>59.4</u>	%	% of Total Weight =	<u>40.6</u>	%
TOTAL TEST WEIGHT =	<u>2980</u>	lbs.			
Weight of Ballast Secured in Vehicle Trunk Area =	<u>0</u>	lbs.			
Vehicle Components Removed for Weight Reduction	<u>-</u>				

VEHICLE ATTITUDE (all dimensions in inches):

AS DELIVERED:	RF <u>25.7"</u>	LF <u>25.4"</u>	RR <u>26.2"</u>	LR <u>25.6"</u>
FULLY LOADED:	RF <u>25.0"</u>	LF <u>24.9"</u>	RR <u>24.5"</u>	LR <u>24.1"</u>
AS TESTED:	RF <u>24.5"</u>	LF <u>24.4"</u>	RR <u>24.4"</u>	LR <u>24.1"</u>
Vehicle's Wheel Base:	<u>99.3</u>	in.		
Location of Vehicle's C.G.:	<u>40.3 inches from front wheel center.</u>			

FUEL SYSTEM DATA:

Fuel System Capacity From Owner's Manual =	<u>15.9</u>	gallons
Usable Capacity Figure Furnished by COTR =	<u>15.6</u>	gallons
Test Volume Range (92 to 94% of Usable Capacity) =	<u>14.3</u> to <u>14.7</u>	gallons
ACTUAL TEST VOLUME =	<u>14.5</u>	gallons (with entire fuel system filled)

Table 3

POST IMPACT DATATYPE OF TEST:

Type of Test: Frontal Barrier Impact Angle: 0°
 Test Date: January 28, 1991 Time: 12:30 Temperature: 33 °F
 Vehicle NHTSA No.: CM5103
 Required Impact Velocity Range: 28.9 to 29.9 mph

BARRIER IMPACT VELOCITY: (Speed traps within 5 feet of impact plane.)

Trap No. 1 = 29.5 mph; Trap No. 2 = 29.5 mph
 Distance from vehicle to barrier: (1) entering trap = 52 inches
 (2) exiting trap = 12 inches

VEHICLE STATIC CRUSH: (For frontal and rear impacts only.)

Vehicle Length:

Pre-Test Right = 172.5 ; C/L = 175.7 ; Left = 172.8
 Post-Test Right = 160.2 ; C/L = 157.0 ; Left = 159.6
 Crush Right = 12.3 ; C/L = 18.7 ; Left = 13.2
 AVERAGE = 14.7 inches

VEHICLE REBOUND: (From rigid barrier only.)

Distance from front of test vehicle to impact point:

Right = 16.1 " ; C/L = 14.8 " ; Left = 14.5 "
 AVERAGE = 15.1 inches

DOOR OPENING:

	Left	Right
Front	<u>operable</u>	<u>operable</u>
Rear	<u>-</u>	<u>-</u>

SEAT MOVEMENT:

	Seat Back Failure	Seat Shift
Front	<u>None</u>	<u>0.0</u>
Rear	<u>-</u>	<u>-</u>

Table 3

POST IMPACT DATA (cont.)

GLAZING DAMAGE: None.

OTHER NOTABLE IMPACT FEATURES: None.

Section 3

OCCUPANT AND VEHICLE DATA

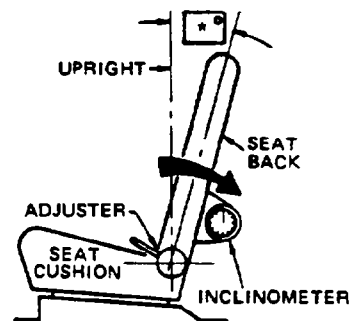
Figure 1

TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year: 1991 Vehicle Model: Toyota Celica ST Body Style: 2-Door Coupe

1. Nominal Design Riding Position for adjustable driver and passenger seat backs. Please describe how to position the inclinometer to measure the seat back angle. Include description of the location of the adjustment latch detent, if applicable



LEFT SIDE VIEW

Seat back angle for driver's seat: *

Measurement instructions: Recline seat in sixth notch rearward from
forward most upright position.

Seat back angle for passenger's seat: *

Measurement instructions: Recline seat in third notch rearward from
forward most upright position.

2. Seat Fore and Aft Positioning

Provide instructions for positioning the driver and front outboard passenger seat(s) in the center of fore and aft travel. For example, provide information to locate the detent in which the seat track is to be locked.

Positioning of the driver's seat: Place seat in 9th notch (mid-position)
from a total of 17 total detents.

Positioning of the passenger's seat (if applicable): Place seat in 9th
notch from a total of 16 total detents.

3. Fuel Tank Capacity Data

A. "Usable Capacity" of the standard equipment fuel tank is 15.6 gallons

B. "Usable Capacity" of the optional equipment fuel tank is - gallons

Additional Instructions: None.

*Seat angle adjusted as requested by manufacturer.

Figure 2

PART 572 DUMMY IN-VEHICLE POSITION

Test No.: CM5103 Vehicle: 1991 Toyota Celica ST 2-Door Coupe

SEAT TYPE:

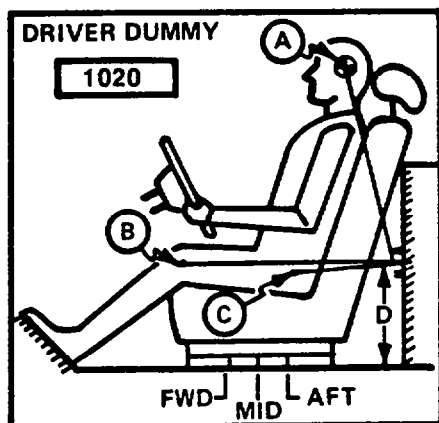
 - Bench
 X Bucket
 - Split Bench

ADJUSTER TYPE:

 X Manual
 - Power

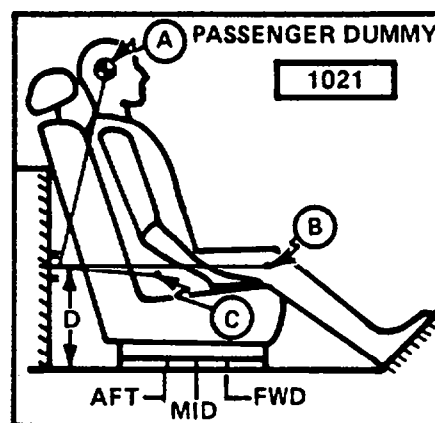
SEAT BACK TYPE:

 - Fixed
 X Adjustable Reclining



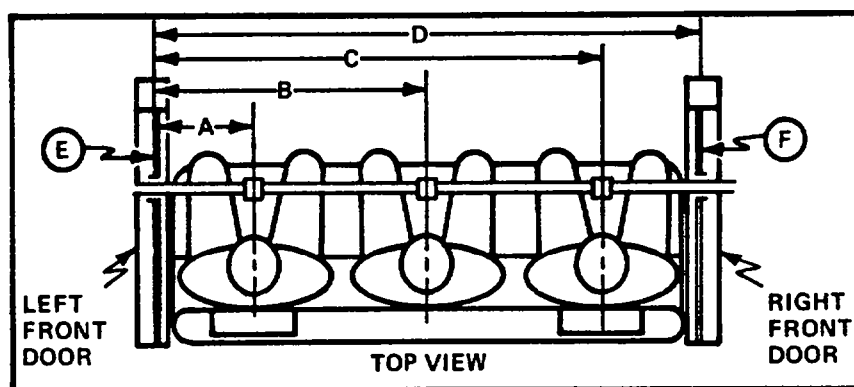
MEASUREMENT LOCATION

- A - Head Target
- B - Knee Joint
- C - Approximate 'H' Point
- D - Sill to Reference Point



A = 19.0 in. 27 Degrees
B = 31.3 in. 103 Degrees
C = 18.3 in. 126 Degrees
D = 15.5 in.

A = 18.3 in. 28 Degrees
B = 32.1 in. 103 Degrees
C = 18.4 in. 122 Degrees
D = 15.5 in.



S/N 1020

DUMMY ID

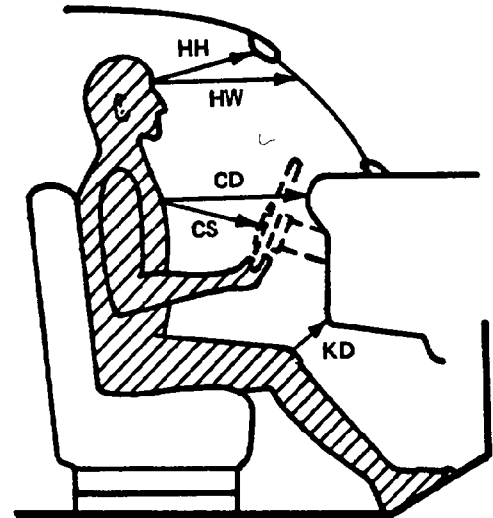
S/N 1021

A = Left Door to Driver Centerline 11.0 in.
B = Left Door to Center Passenger Centerline in.
C = Left Door to Right Passenger Centerline 38.5 in.
D = Left Door to Right Door 49.7 in.
E, F = Window Glass Height (Right and Left Must Be Equal) 8.0 in.

Figure 3

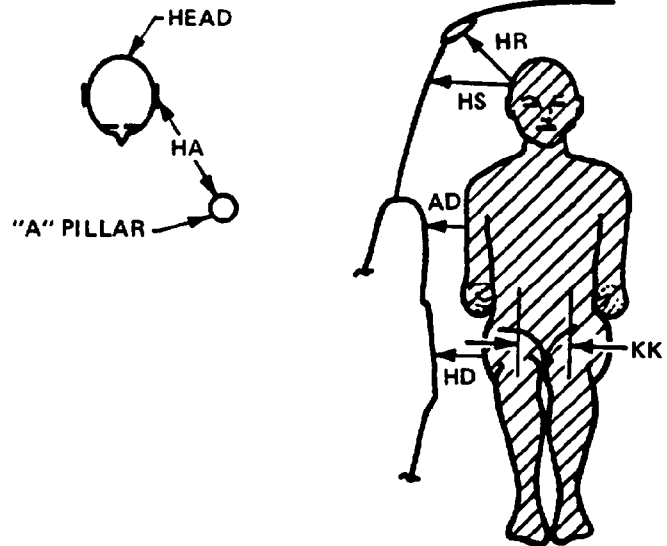
OCCUPANT CLEARANCE DIMENSIONS

	DRIVER	PASSENGER
HH	14.6	14.7
HW	20.2	19.8
CD	22.2	23.5
CS	13.8	-
KDL	6.2	7.1
KDR	5.9	6.5
SA	See Note	See Note
TA	24°	24°



HH = Head to Windshield Header
 HW = Head to Windshield
 CD = Chest to Dash
 CS = Chest to Steering Wheel
 KD(L/R) = Knee to Dash (Left/Right)
 SA = Seat Back Angle
 TA = Torso Angle

HA = Head Target to "A" Pillar
 HR = Head to Side Roof
 HS = Head to Side Window
 AD = Arm to Door
 HD = Hip to Door
 KK = Knee to Knee

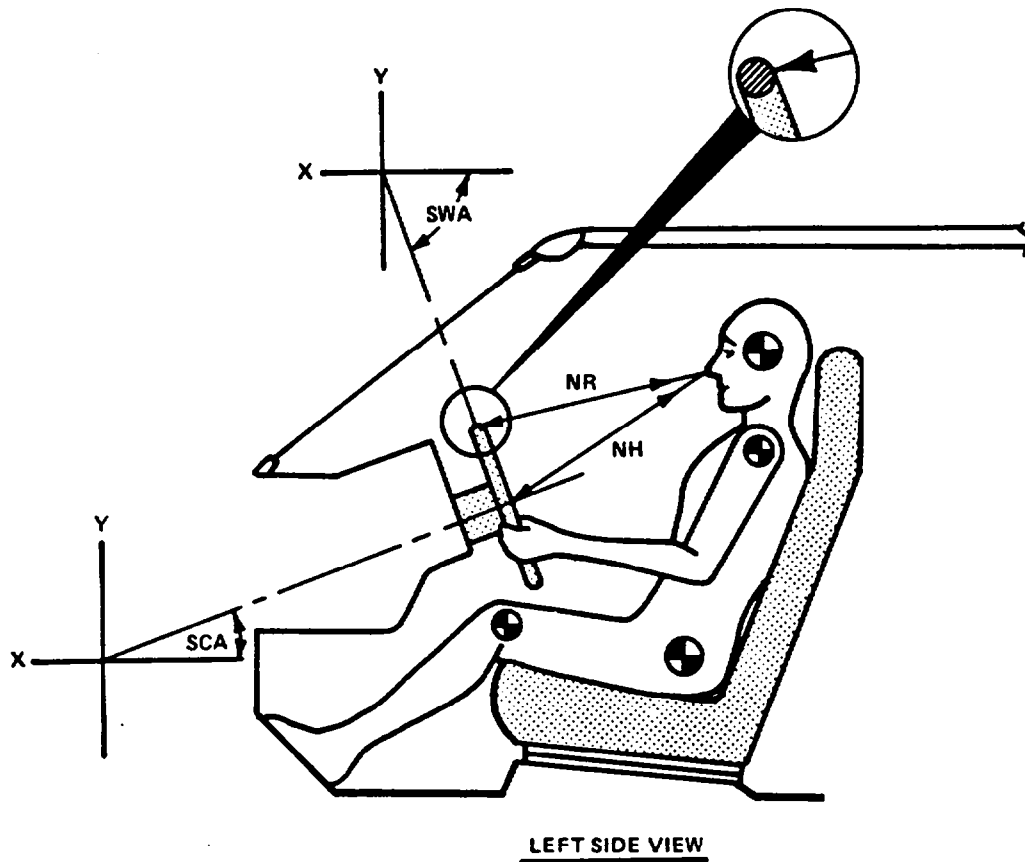


	DRIVER	PASSENGER
HR	4.6	4.5
HS	8.3	8.4
AD	3.4	4.3
HD	7.9	7.4
KK	9.9	6.8
HA	19.3	19.3

Note: Seat back angle was positioned as specified by manufacturer

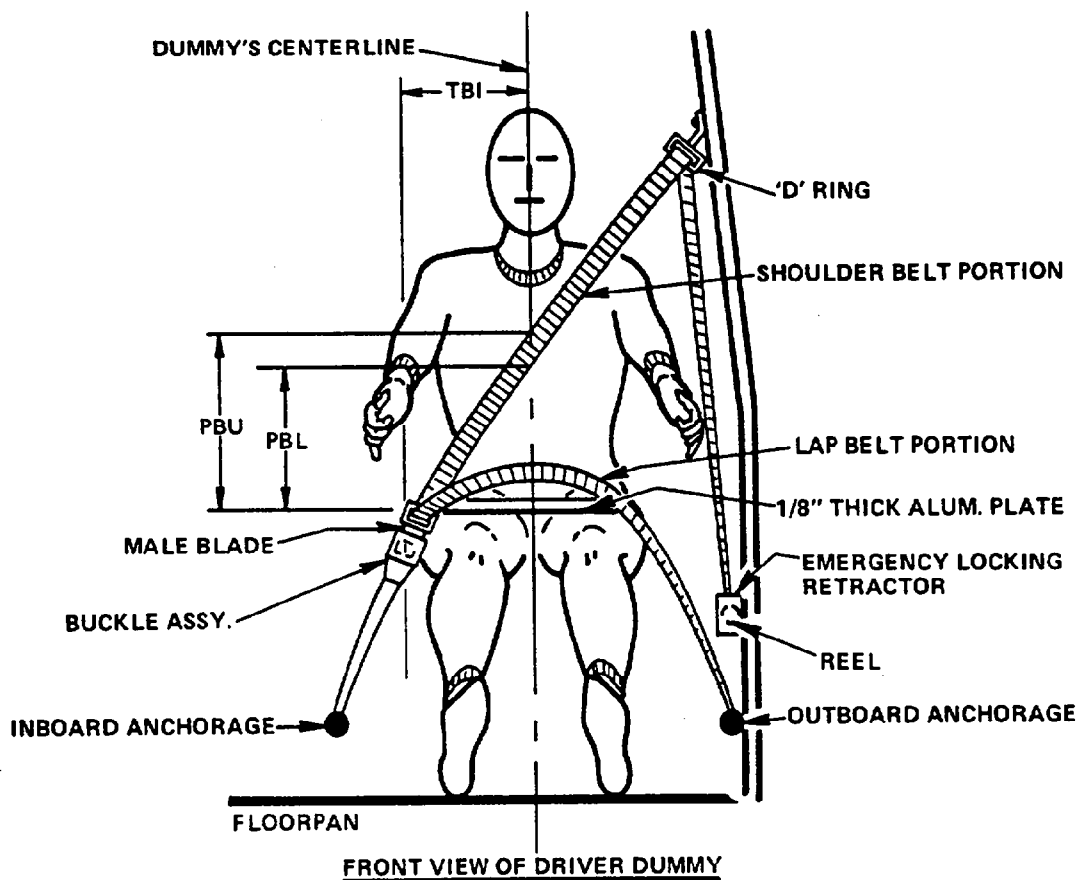
Figure 4

DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSY. REFERENCE DIMENSIONS



		MEASUREMENTS	
<u>NR</u>	-- Distance from tip of dummy's nose to Top Rear surface of steering wheel rim	18.0	Inches
<u>NH</u>	-- Distance from tip of dummy's nose to center of steering wheel hub	18.6	Inches
<u>SCA</u>	-- Angle of steering column relative to the horizontal X axis	19.0	Degrees
<u>SWA</u>	-- Angle of steering wheel relative to the horizontal X axis	-71.0	Degrees

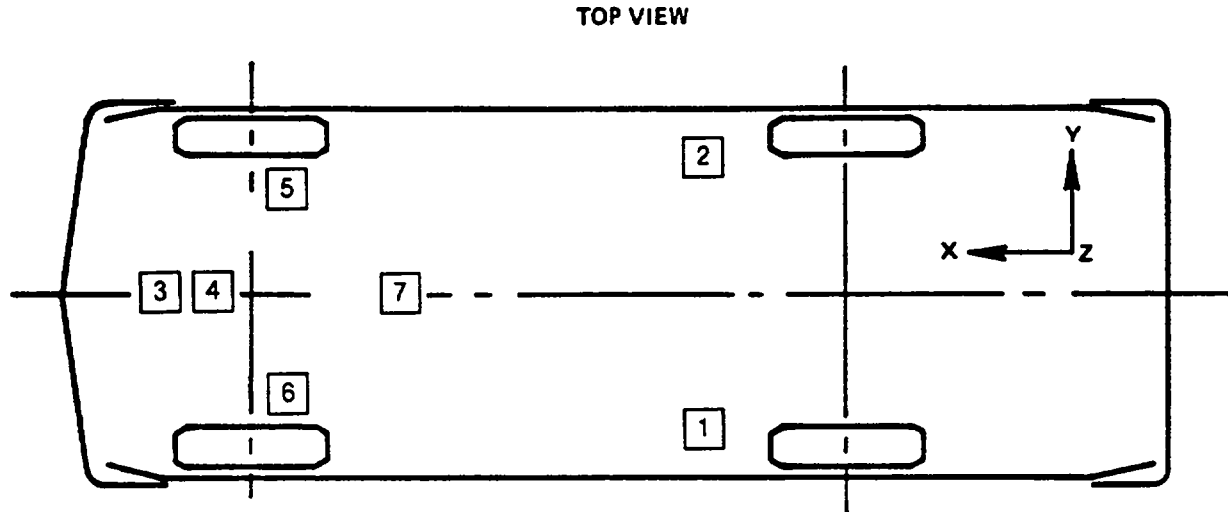
Figure 5
SEAT BELT POSITIONING DATA



	DRIVER DUMMY (inches)	PASSENGER DUMMY (inches)
<u>PBU</u> -- Top surface of alum. plate to upper edge	*	12.0
<u>PBL</u> -- Top surface of alum. plate to belt lower edge	*	15.1
<u>TBI</u> -- Distance from torso centerline to buckle	*	8.9

*Driver side equipped with airbag, seat belt not used.

Figure 6
VEHICLE ACCELEROMETER LOCATIONS



ACCELEROMETER NUMBER*	ACCELEROMETER LOCATION	DIRECTION		
		X	Y	Z
1	Left Rear Seat Crossmember	X		
2	Right Rear Seat Crossmember	X		
3	Top of Engine	X		
4	Bottom of Engine	X		
5	Right Disc Brake Caliper	X		
6	Left Disc Brake Caliper	X		
7	Instrument Panel	X		

*The accelerometer pack number can be correlated with the vehicle response data traces found in Appendix B.

Table 4

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION**		NEGATIVE DIRECTION**	
					MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
1	REAR SEAT X-MEMBER PRE:	63.5	17.0	14.7				
	AT LEFT SIDE POST:	63.2	17.0	14.8				
	LONGITUDINAL ACCELERATION				4	123	-34	47
2	REAR SEAT X-MEMBER PRE:	63.5	-16.7	14.6				
	AT RIGHT SIDE POST:	63.3	-16.8	14.7				
	LONGITUDINAL ACCELERATION				3	141	-31	62
3	TOP OF ENGINE BLOCK PRE:	146.5	-0.5	30.5				
	POST:	142.3	-0.4	29.8				
	LONGITUDINAL ACCELERATION				18	55	-71	41
4	BOTTOM OF ENGINE PRE:	146.7	-15.1	9.0				
	POST:	145.4	-14.3	8.4				
	LONGITUDINAL ACCELERATION				13	52	-84	31
5	BRAKE CALIPER AT PRE:	135.5	-22.2	21.8				
	RIGHT SIDE POST:	134.9	-22.1	21.9				
	LONGITUDINAL ACCELERATION				3	123	-57	54
6	BRAKE CALIPER AT PRE:	135.3	22.2	21.8				
	LEFT SIDE POST:	134.8	21.7	21.5				
	LONGITUDINAL ACCELERATION				11	59	-61	53
7	DASH PANEL PRE:	104.0	-3.5	24.5				
	POST:	103.9	-3.4	24.3				
	LONGITUDINAL ACCELERATION				11	95	-33	27

*X + Forward from rear bumper
 Y + Left from vehicle centerline
 Z + Up from ground

**
 LONGITUDINAL:
 LATERAL:
 VERTICAL:

POSITIVE
 FORWARD
 LEFTWARD
 UPWARD

NEGATIVE
 REARWARD
 RIGHTWARD
 DOWNWARD

DISTANCE MEASUREMENTS IN INCHES

Figure 7
CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information Shown on Table 5.

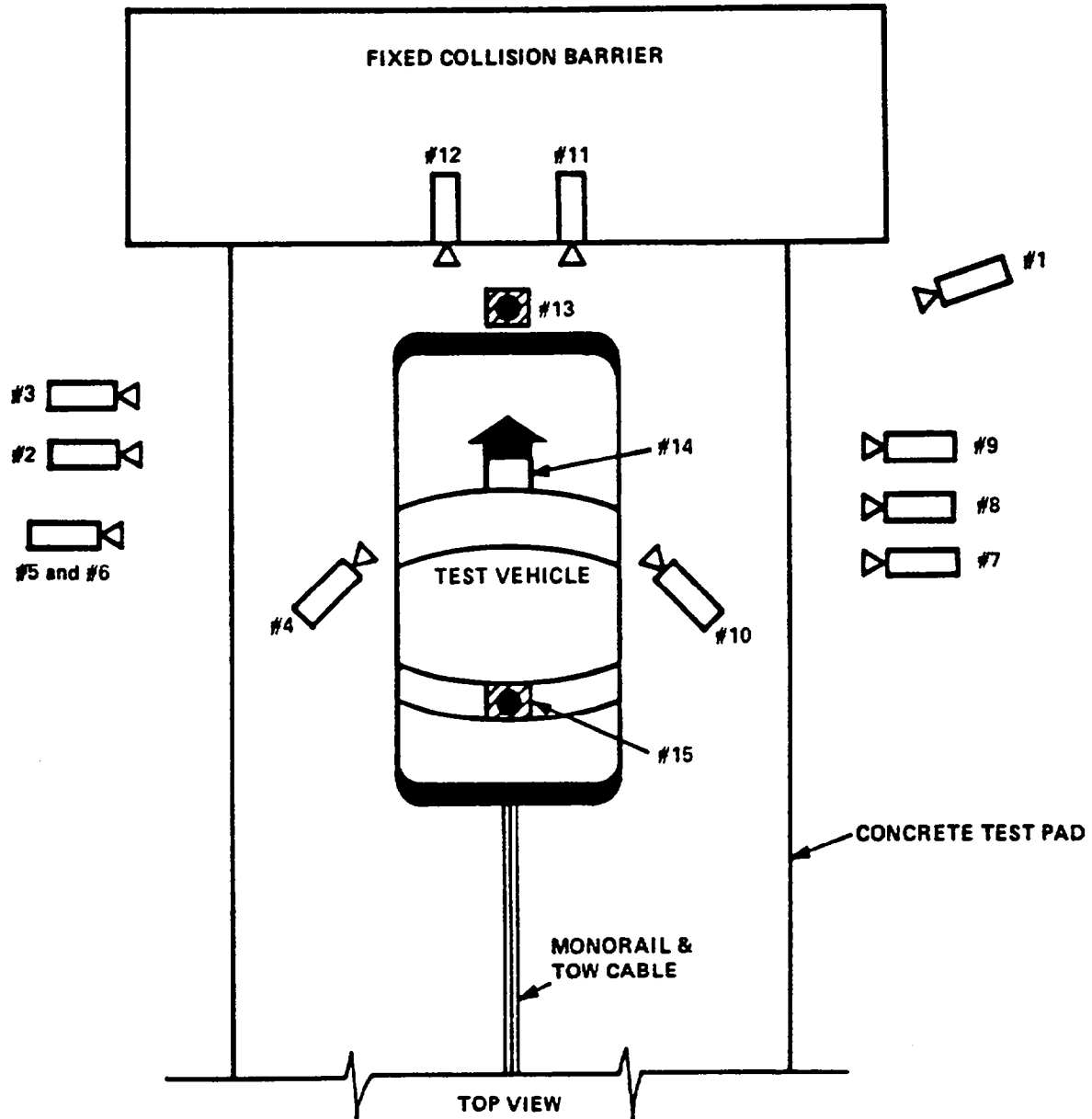


Table 5

HIGH-SPEED CAMERA LOCATIONS

Test No. CM5103 Vehicle: 1991 Toyota Celica ST 2-Door Coupe

CAMERA NO.	VIEW	CAMERA POSITIONS (in)*			ANGLE** (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
1	Real-Time Camera	-	-	-	-	-	-	24
2	Overall Left Side	211	64	40	-6	193.4	13	555
3	Left Side View	308	41	40	-4	290.4	25	545
4	Driver and Interior View	92	112	74	-21	-	13	655
5	Steering Column (Bottom)	263	88	46	-4	245.4	25	555
6	Steering Column (Top)	263	88	70	-10	245.4	25	600
7	Overall Right Side	219	81	42	-2	201.4	25	800
8	Right Side View	302	65	40	-3	284.4	25	805
9	Right Passenger View	288	81	54	-2	270.4	35	680
10	Passenger and Interior View	98	114	70	-22	-	13	440
11	Passenger Front View	24	18	75	-43	-	13	550
12	Driver Front View	24	18	75	-45	-	13	545
13	Windshield View	0	0	130	-47	-	13	560
14	Pit View of Engine	0	36	-120	90	-	13	***
15	Pit View of Fuel Tank	0	91	-120	90	-	13	775

*X = film plane to monorail centerline

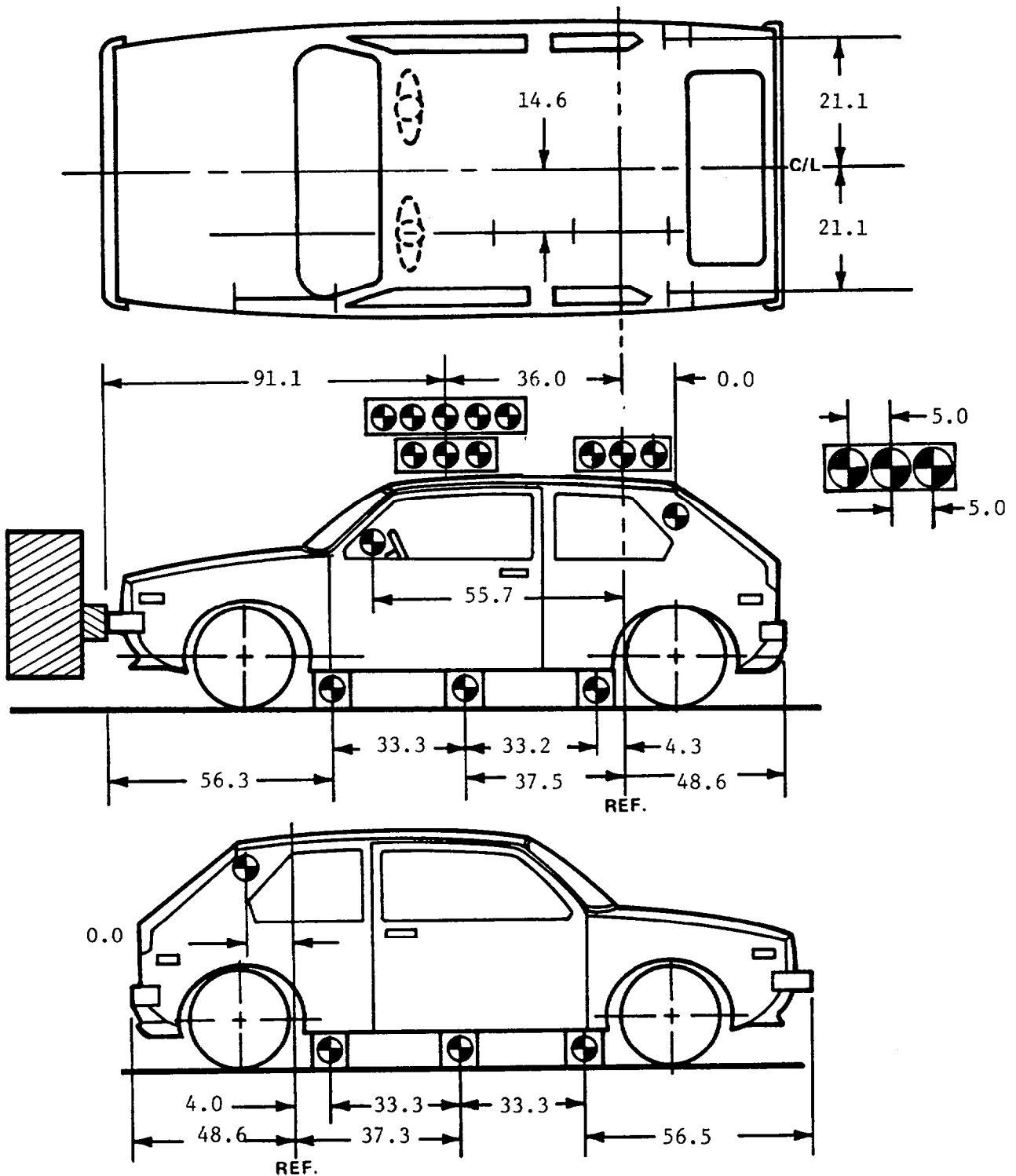
Y = film plane to impact location

Z = film plane to ground

** = referenced to horizontal plane

*** = Timing marks not available on film

Figure 8
VEHICLE TARGET LOCATIONS



(DIMENSIONS IN INCHES)

Figure 9
TEST VEHICLE MEASUREMENTS

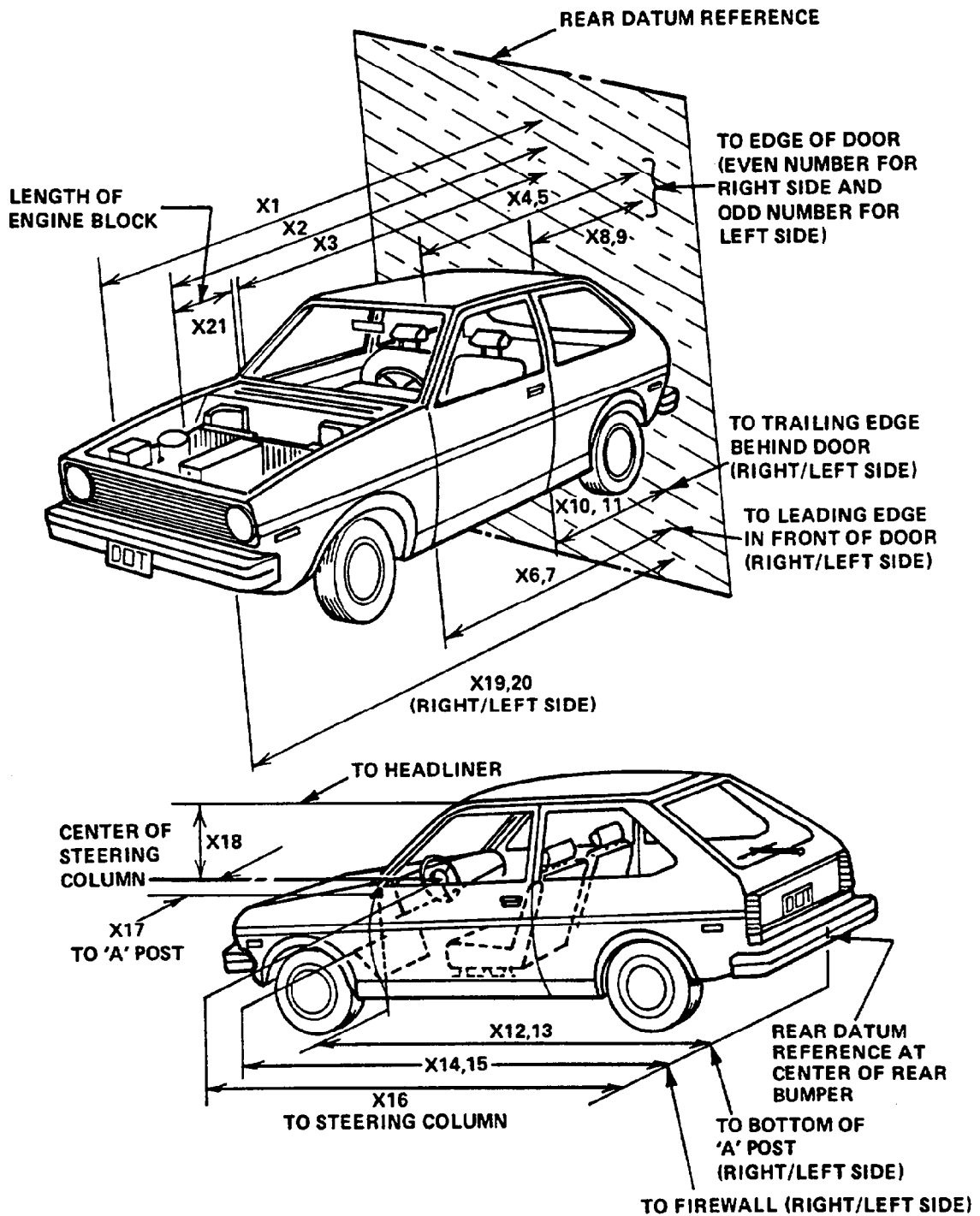


Table 6

VEHICLE MEASUREMENTS

No.		All Dimensions in Inches		
		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	175.7	157.0	18.7
X2	Rear Surface of Vehicle to Front of Engine	147.8	143.5	4.3
X3	Rear Surface of Vehicle to Firewall	126.5	126.8	-0.3
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	112.4	113.0	-0.6
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	113.2	113.8	-0.6
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	114.5	114.8	-0.3
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	115.1	114.9	0.2
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	68.5	69.5	-1.0
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	69.4	69.9	-0.5
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	69.2	69.3	-0.1
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	68.4	68.4	0.0
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	114.3	114.3	0.0
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	115.0	114.9	0.1
X14	Rear Surface of Vehicle to Firewall, Right Side	125.5	126.0	-0.5
X15	Rear Surface of Vehicle to Firewall, Left Side	126.1	125.0	1.1
X16	Rear Surface of Vehicle to Steering Column	99.0	100.3	-1.3
X17	Center of Steering Column to "A" Post	14.4	14.3	0.1
X18	Center of Steering Column to Headliner	15.9	15.4	0.5
X19	Rear Surface of Vehicle to Right Side of Front Bumper	172.5	160.2	12.3
X20	Rear Surface of Vehicle to Left Side of Front Bumper	172.8	159.6	13.2
X21	Length of Engine Block	12.0	12.0	0.0

Section 4

SUMMARY OF RESULTS OF FMVSS NOS. 208, 212, 219 AND 301-75

- "Occupant Crash Protection," FMVSS No. 208 Data
- "Windshield Mounting," FMVSS No. 212 Data
- "Windshield Zone Intrusion," FMVSS No. 219 (Partial) Data
- "Fuel System Integrity," FMVSS No. 301-75

Table 7

DUMMY INJURY CRITERIA VALUESNHTSA No.: CM5103 Vehicle: 1991 Toyota Celica ST 2-Door Coupe

	MAXIMUM ACCELERATION (g's)							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R*
Dummy (1)	-62.6	7.6	24.6	66.8	-59.3	6.4	15.9	58.9
Dummy (2)	-33.6	13.0	49.3	53.2	-41.9	28.7	-17.7	40.0

	MAXIMUM FORCE - FEMUR LOAD (lbs.)	
	LEFT FEMUR	RIGHT FEMUR
Dummy (1)	1622.3	1263.2
Dummy (2)	343.9	647.2

	HEAD INJURY CRITERIA**			
	HIC	36 millisecond Maximum		Avg. Acc. (g) t ₁ TO t ₂
		t ₁ (SEC)	t ₂ (SEC)	
Dummy (1)	513.5	.06804	.09564	51.0
Dummy (2)	416.9	.06756	.10344	42.3

*Defined as exceeding 0.003 sec. duration

**As defined in FMVSS No. 208

Table 8

FMVSS NO. 208 - SEAT BELT WARNING SYSTEM CHECK

With occupant in driver's position, the lap belt in stowed position, and ignition switch placed in "Start/On" position:

Log time duration of audible warning signal = 6.0 sec.

Log time duration of reminder light operation = 6.0 sec.

With occupant in driver's position, lap belt in use, and the ignition switch placed in "Start/On" position:

Log time duration of audible warning signal = - sec.

(audible warning should not operate)

Log time duration of reminder light operation = 6.0 sec.

Note wording of visual warning:

Fasten Seat Belt -

Fasten Belt -

Symbol 101-80 X

Table 9

FMVSS NO. 208 - LABELING AND DRIVER'S MANUAL INFORMATION

Locate label which describes manufacturers maintenance or replacement schedule for crash-deployed occupant protection system.

Describe location: Driver sun visor.

The manufacturers recommended schedule is:

- (1) "After ten years from the data of manufacture noted on the certification regulation label and every two years thereafter. This system requires periodic maintenance by a "Toyota" dealer or qualified service shop."
- (2) See your owner's manual for "SRS airbag" information on system function and maintenance.

Were appropriate instructions concerning maintenance and/or replacement of this system provided? YES X NO -

Was a description of the functional operation of the system provided? YES X NO -

Is there a reference to the instructions and description of the system on the label? YES X NO -

Was an owner's manual provided? YES X NO -

Did the owner's manual contain appropriate information concerning maintenance and/or replacement and a description of the functional operation of the systems? YES X NO -

Table 10

FMVSS NO. 208 - READINESS INDICATOR

An occupant restraint system that deploys in the event of a crash shall have a monitoring system with a readiness indicator. A totally mechanical system is exempt from this requirement.

Is the system totally mechanical? YES _____ NO X _____

Describe the location of the readiness indicator:

Lower left of instrument cluster.

Is the readiness indicator clearly visible to the driver?

YES X _____ NO _____

Is a list of the elements in the occupant restraint system, being monitored by the readiness indicator, provided?

YES X _____ NO _____

Table 11

FMVSS NO. 208 - COMFORT AND CONVENIENCE TEST SUMMARY

Test Vehicle NHTSA No.:	<u>CM5103</u>
Make/Model:	<u>1991 Toyota Celica</u>
Date of Comfort/Convenience Check:	<u>1/24/91</u>
Technician Performing Check:	<u>VMP</u>
GVWR:	<u>3455 lbs.</u>

Seat belt comfort and convenience requirements cover vehicles manufactured on or after September 1, 1986, which have a gross vehicle weight rating of 10,000 pounds or less. Exemptions to this rule are belts installed in a walk-in, van-type vehicle and manual Type 2 belt systems installed in the front outboard seating positions of passenger automobiles. On or after September 1, 1989, the exemption of the type 2 manual seat belts installed in the front outboard seating positions of passenger automobiles will change depending on the states' enactment of mandatory usage laws.

Was vehicle built after or on September 1, 1986, and is it equipped with:

1. Automatic seat belts YES _____ NO X

 If yes, go to requirements D1, D2 and D3

2. Manual seat belts* YES X** NO _____

 a. The seat belts, other than Type 2 lap/shoulder belts, are located in the front outboard seating positions of a passenger automobile.

 YES _____ NO X

 (Go to requirements D3, D4, D5, and D6)

 b. The seat belt system is Type 2 lap/shoulder belt in the front outboard seating positions or the seat belts are located in a walk-in van.

STOP

*If the seat belts are voluntarily installed by the manufacturer they do not have to comply.

**Manual seat belt was used only on passenger dummy. Driver position equipped with an air bag.

Table 11 (cont.)

D1

CONVENIENCE HOOKS

A convenience hook or other device is provided to stow seat belt webbing to facilitate entering or exiting the vehicle.

YES X NO

Check the option which applies to this test vehicle:

1. A convenience hook or other device automatically releases the webbing when the automatic belt system is operational and remains in the released mode as long as the vehicle's ignition switch is moved to the "on" or "start" position and the vehicle's drivetrain is engaged.

YES X NO

2. A convenience hook or other device automatically releases the webbing when the automatic belt system is operational and remains in the released mode as long as the vehicle's ignition switch is moved to the "on" or "start" position and the vehicle's parking brake is in the released mode (nonengaged).

YES X NO

D2

WEBBING TENSION - RELIEVING DEVICE

The seat belt assembly installed in the outboard designated seating position has either manual or automatic tension relieving devices permitting the introduction of slack in the webbing of the shoulder belt ("comfort clips" or "window shade" devices).

YES N/A NO N/A

Check the owner's manual and determine the maximum amount of slack recommended by the manufacturer in inches. The recommended slack is — inches. Introduce this slack into the shoulder belt before testing the vehicle to comply with the requirements of FMVSS 208 S5.1. A warning is included in the owner's manual that introducing slack beyond the amount specified can significantly reduce the effectiveness of the shoulder belt.

YES N/A NO N/A

(If NO, provide explanation.)

Check the option which applies to this test vehicle:

1. This vehicle is equipped with automatic seat belts and the tension relieving device is cancelled each time the adjacent door is opened.

YES N/A NO N/A

(If NO, provide explanation.)

Table 11 (cont.)

2. This vehicle is equipped with manual belts, required to meet FMVSS 208 S4.6, and the tension relieving device is cancelled each time one of the following options occurs:
- a. The adjacent door is opened. YES N/A NO N/A
- b. The latch plate is released from the buckle. YES N/A NO N/A
3. This is an open-body vehicle, without doors. Does the manual mean to cancel any shoulder belt slack introduced by a tension relieving device operate properly? YES N/A NO N/A

(If NO, provide explanation.)

D3

BELT CONTACT FORCE

1. Do not measure the belt contact force if the manual or automatic seat belt assemblies in this vehicle incorporate a webbing tension relieving device. Does the vehicle incorporate a tension relieving device? YES NO X
2. Seats are adjusted according to instructions in Appendix B. YES X NO
3. The test dummies are positioned according to dummy position placement instructions in Appendix B and Appendix C. YES X NO
4. Close the vehicle's adjacent door, pull either 12 inches of belt webbing or the maximum available amount of belt webbing, whichever is less, from the retractor and then release it, allowing the belt webbing to return to the dummy's chest, then fasten the latch. Locate the point where the centerline of the upper torso belt webbing crosses the midsagittal line on the dummy's chest. At that point, pull the belt webbing out 3 inches from the dummy's chest and release until it is within one inch from the dummy's chest. Measure the contact force exerted by the belt webbing on the dummy's chest. The contact force is 0.6 pounds. Contact the COTR if the contact force exceeds 0.7 pounds.

Table 11 (cont.)

D4

LATCHPLATE ACCESS

1. Position the test dummy in the driver's seat or passenger's seat in its forward most adjustment position.

YES X NO

2. Attach the inboard and outboard reach string.

YES X NO

3. Extend each line backward and outboard to generate arcs of the reach envelope of the test dummy's arms. With the latchplate in the normal stowed position, check to assure that the latchplates are within the reach envelope.

YES X NO

4. Using the clearance test block, determine if there is sufficient clearance between the vehicle seat and the side of vehicle interior to allow the test block to move unhindered to the latchplate or buckle.

YES X NO

D5

RETRACTION

1. Seats and seat backs are adjusted according to instructions in Appendix B "General Test Conditions" in TP-208-8.

YES X NO

2. Use anthropomorphic test dummies whose arms have been removed and position the dummies in the front outboard designated seating positions according to instructions in Appendix B and restrain the dummies, using the belt systems for the positions being tested.

YES X NO

3. Outboard armrests which are capable of being stowed on vehicle seats shall be placed in their stowed positions.

YES N/A NO N/A

4. Check the option which applies to this test vehicle:

- a. The torso and lap belt webbing of the seat belt system automatically retract to a stowed position when the adjacent vehicle door is in an open position and the seat belt latch plate is released.

YES — NO —

Table 11 (cont.)

- b. The torso and lap belt webbing of the seat belt system automatically retract when the seat belt latch plate is released.

YES X NO

5. With the webbing and hardware in the stowed position, close the door to assure that the webbing and hardware are prevented from being pinched.

YES X NO

6. If this test vehicle has an open body (without doors) and has a belt system with a tension-relieving device, check to assure that the belt system fully retracts when the tension-relief device is manually deactivated.

YES N/A NO N/A

D6

ACCESSIBILITY

The requirements for accessibility do not apply to:

1. Seats whose seat cushions are removable so that the seat back serves a function other than seating;
2. Seats which are removable;
3. Seats which are movable so that the space formerly occupied by the seat can be used for a secondary function.

If the seats in this vehicle are different than the criteria above, then determine if:

1. Each manual seat belt assembly whose webbing is designed to pass through the seat cushion or between the seat cushion and seat back has one of the following three parts (the seat belt latchplate, the buckle, or the seat belt webbing) on top of or above the seat cushion under normal conditions (i.e., conditions other than when belt hardware is intentionally pushed behind the seat by a vehicle occupant).

YES X NO

2. The remaining two seat belt parts are accessible under normal conditions.

YES X NO

Table 11 (cont.)

3. The buckle and latchplate do not pass through the guides or conduits provided and fall behind the seat when the following events occur in order:

- a. The belt is completely retracted or, if the belt is nonretractable, the belt is unattached.

YES _____ NO X

- b. The seat is moved to any position to which it is designed to be adjusted.

YES _____ NO X

- c. The seat back, if foldable, is folded forward as far as possible and then moved backward into positions.

YES N/A NO N/A

4. Is the inboard receptacle end of the seat belt assembly which is installed in the outboard designated seating position accessible with the center arm rest in any position to which it can be adjusted without moving the armrest?

YES N/A NO N/A

D7

LATCH MECHANISM

A seat belt assembly installed in a passenger car except an automatic belt assembly, shall have a latch mechanism:

1. Whose components are accessible to a seated occupant in both the stowed and operational positions.

YES X NO _____

2. That releases both the upper torso restraint and the lap belt simultaneously, if the assembly has a lap belt and an upper torso restraint that require unlatching for release of the occupant.

YES X NO _____

3. That releases at a single point by a push button action.

YES X NO _____

Figure 10

FMVSS NO. 212 - "WINDSHIELD MOUNTING" DATA SHEET

DETAILS OF WINDSHIELD MOUNTING SUCH AS RETENTION METHOD, TRIM TYPE, ETC.:

Windshield is bonded in place with 0.7" rubber trim on upper and side of windshield, bottom of windshield is covered in a plastic shroud.

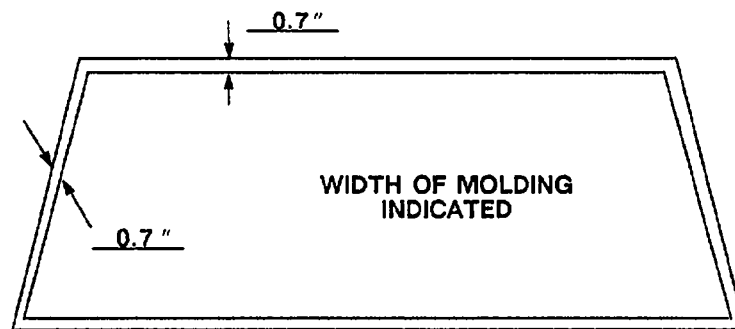
FMVSS 212 REQUIREMENTS:

The Post-Test periphery retention amount must be at least 75% of the Pre-Test periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of windshield for vehicles equipped with automatic restraint systems for front occupants.

FMVSS 212 TEST DATA:

	WINDSHIELD PERIPHERY		PERCENT RETENTION
	PRE-TEST (in.)	POST-TEST (in.)	
RIGHT SIDE	76.3	76.3	100%
LEFT SIDE	76.3	76.3	100%
TOTAL	152.6	152.6	100%

AREA OF RETENTION FAILURE:



FRONT VIEW

FAILURE DETAILS:

None.

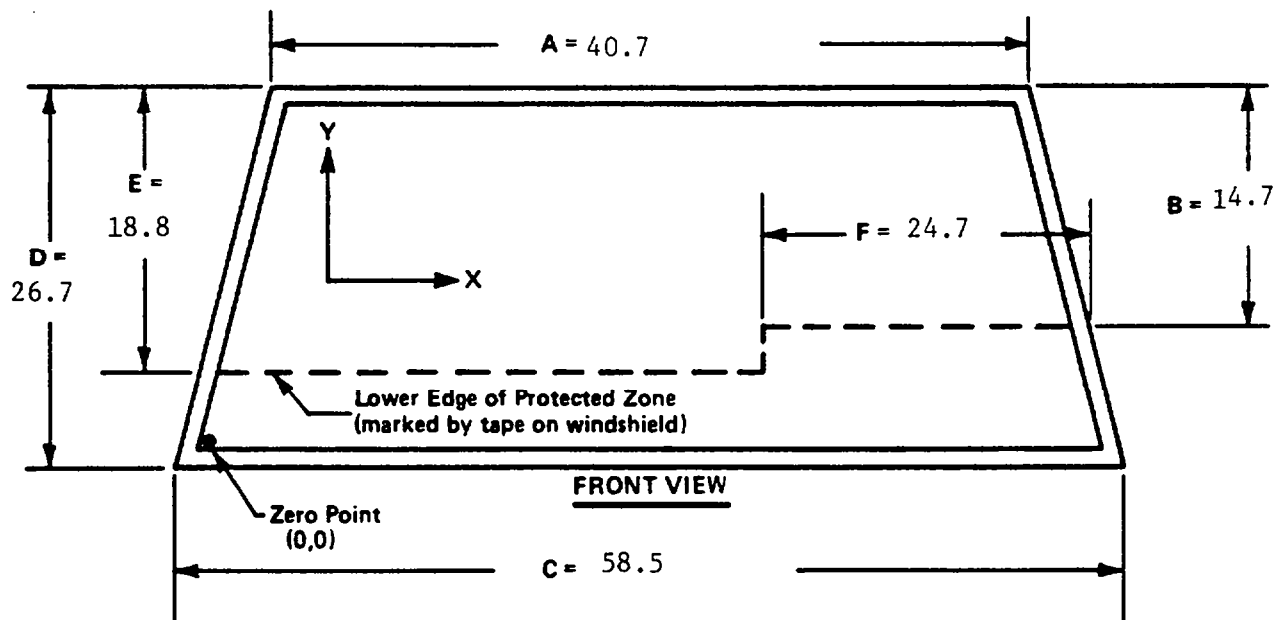
Figure 11

FMVSS NO. 219 (PARTIAL) - "WINDSHIELD ZONE INTRUSION" DATA SHEET

PROTECTED ZONE LOWER EDGE REQUIREMENT:

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

FMVSS 219 TEST DATA: (Dimensions in inches.)



DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 1/4":

(Show location of penetration on above sketch)

None.

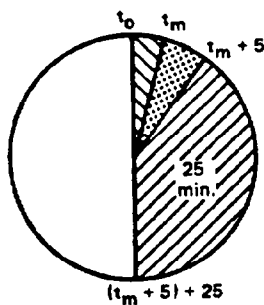
	COORDINATES	
	X	Y
1.		
2.		
3.		
4.		

FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

TEST VEHICLE NHTSA NO.: CM5103 TEST DATE: 1/28/91

Test vehicle fuel tank filled to 92% to 94% of manufacturer's "usable" capacity and with electric fuel pump operating (if it will operate without engine operation). Part 572 test dummies located at each front designated seating position.

FUEL SPILLAGE MEASUREMENT:



1. From impact until vehicle motion ceases
2. For 5 minute period after vehicle motion ceases
3. For next 25 minutes

ACTUAL	MAX ALLOWED
0	1 oz.
0	5 oz.
0	1 oz./1 min.

None.

Table 13

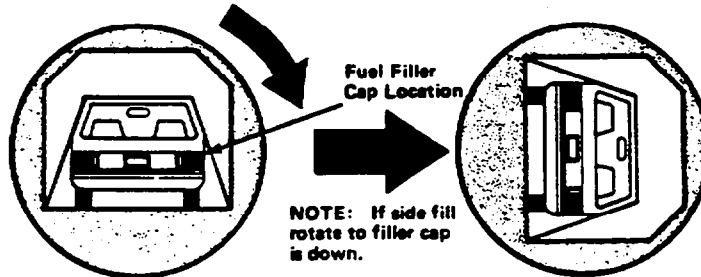
FMVSS NO. 301 STATIC ROLLOVER DATA SHEETTEST PHASE:

0°

90°

Vehicle NHTSA ID No.:

CM5103

I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 3 minutes 00 seconds
 (Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 00 seconds

TOTAL

8 minutes 00 seconds

Next whole minute interval

8 minutesII. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min FROM onset of rotation	6th min.	7th min.	8th min. if reqd.
------------------------------------	----------	----------	----------------------

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
----------	---------	---------	---------

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0
---	---	---	---

Note: Record spillage for whole minute
 intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATION(S):

None

Table 13

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

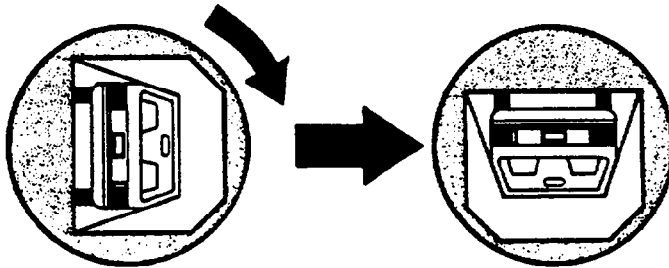
TEST PHASE:

90°

180°

Vehicle NHTSA ID No.:

CM5103



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 3 minutes 00 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 00 seconds

TOTAL 8 minutes 00 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min FROM onset of rotation	6th min.	7th min.	8th min. if reqd.
------------------------------------	----------	----------	----------------------

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
----------	---------	---------	---------

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

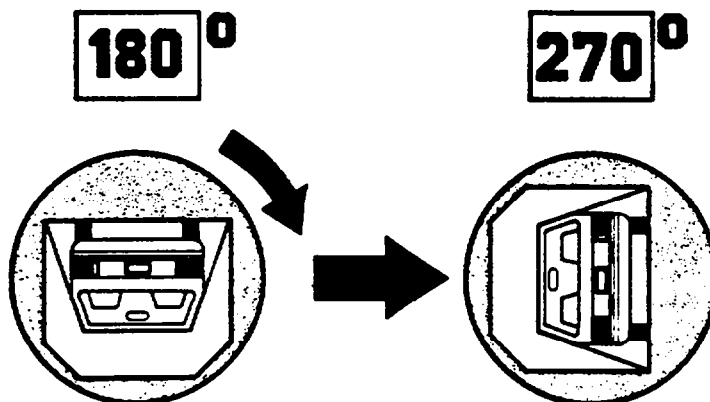
0	0	0	0
---	---	---	---

Note: Record spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATION(S):

None.

Table 13

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)TEST PHASE:

Vehicle NHTSA ID No.:

CM5103I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 3 minutes 00 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 4 minutes 58 seconds

TOTAL

7 minutes 58 seconds

Next whole minute interval

8 minutesII. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min FROM onset of rotation	6th min.	7th min.	8th min. if reqd.
------------------------------------	----------	----------	----------------------

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
----------	---------	---------	---------

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0
---	---	---	---

Note: Record spillage for whole minute
intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATION(S):

None.

Table 13

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

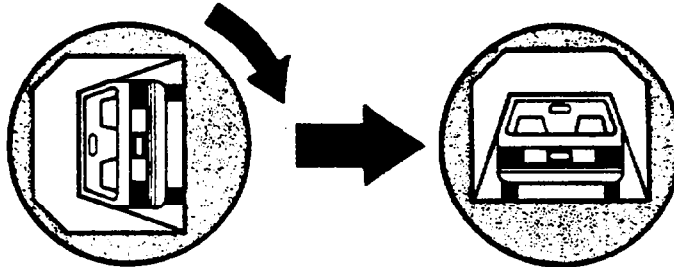
TEST PHASE:

270°

360°

Vehicle NHTSA ID No.:

CM5103



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 3 minutes 00 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 00 seconds

TOTAL

8 minutes 00 seconds

Next whole minute interval

8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min FROM onset of rotation	6th min.	7th min.	8th min. if reqd.
------------------------------------	----------	----------	----------------------

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
----------	---------	---------	---------

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0
---	---	---	---

Note: Record spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATION(S):

None.

Table 14

TEST VEHICLE NONCOMPLIANCE NOTICE

NHTSA Contract Lab: Calspan Advanced Technology Center

Lab. Project Manager & Telephone No.: Walter E. Levan (716) 632-7500

Date of Test: January 28, 1990 Vehicle NHTSA No.: CM5103

Vehicle Manufacturer: Toyota Motor Company

Model Year: 1991 VIN: JT2AT86F5M0045469

Body Style: 2-Door Coupe Build Date: October, 1990

Dummy Stabilized Temperature at Time of Test: 70 °F (Spec. = 69-72°F)

Impact Velocity: 29.5 mph Time of Test: 12:30

Type of Automatic Restraint System: Driver side air bag and passenger 3-point
manual seat belt restraint

Failure Details:

Vehicle appears to comply with the requirements of FMVSS Nos. 208, 212, 219
(Partial), and 301.

Appendix A

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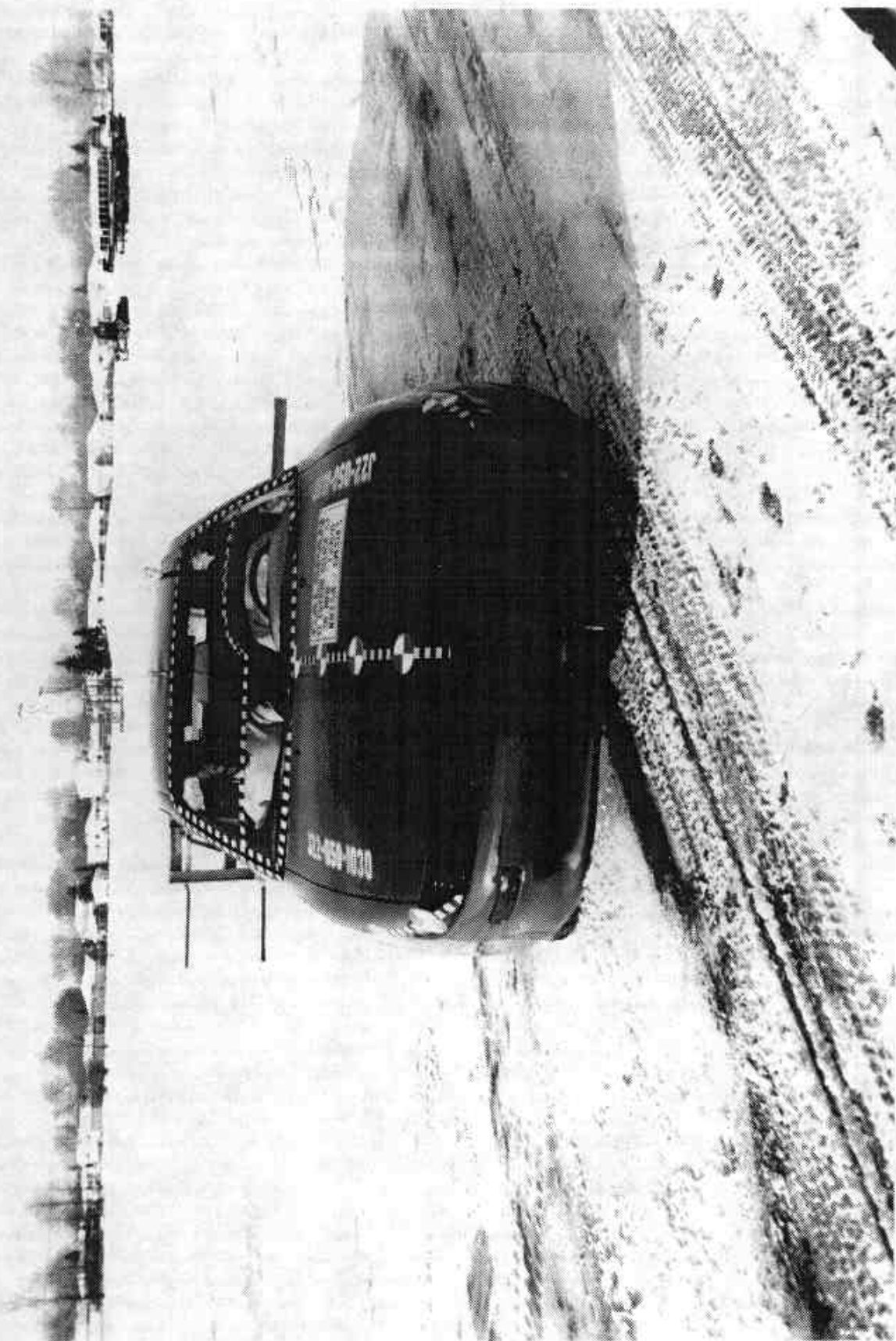


FIGURE A-1 PRE-TEST FRONT VIEW

A-3

7853-7

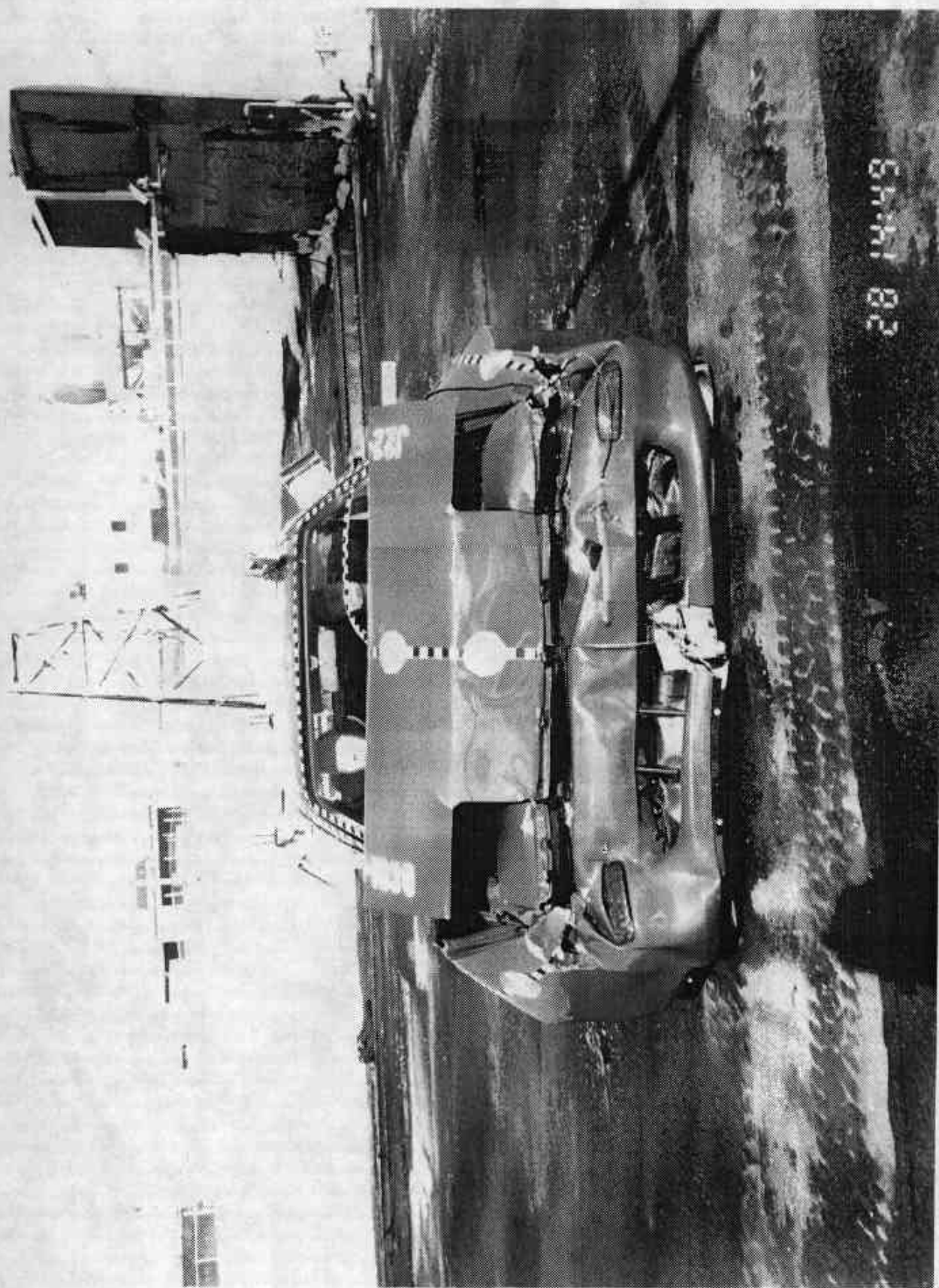


Figure A-2 POST-TEST FRONT VIEW

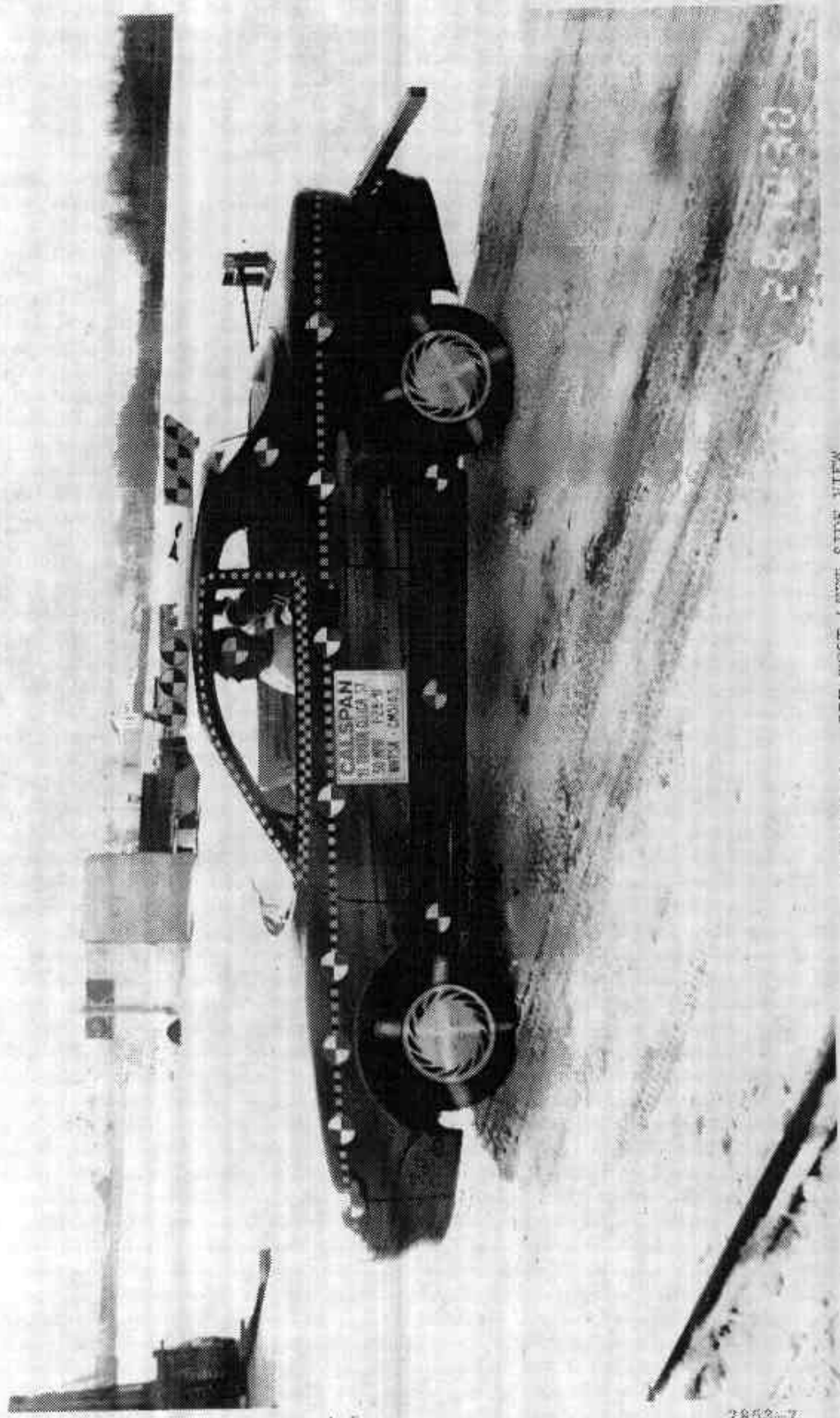


FIGURE A-3 PRE-TEST LEFT SIDE VIEW

A-5

7852-7

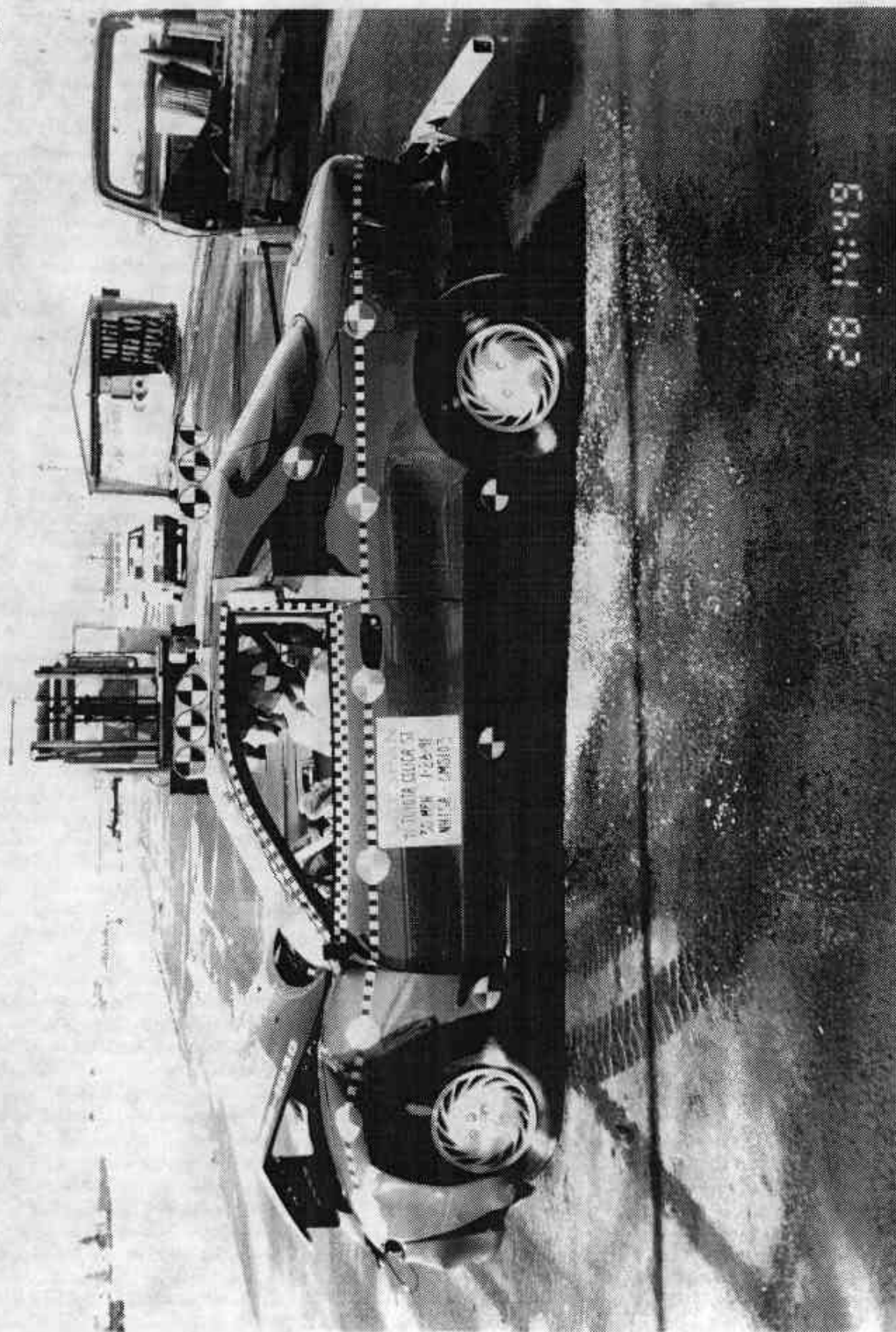
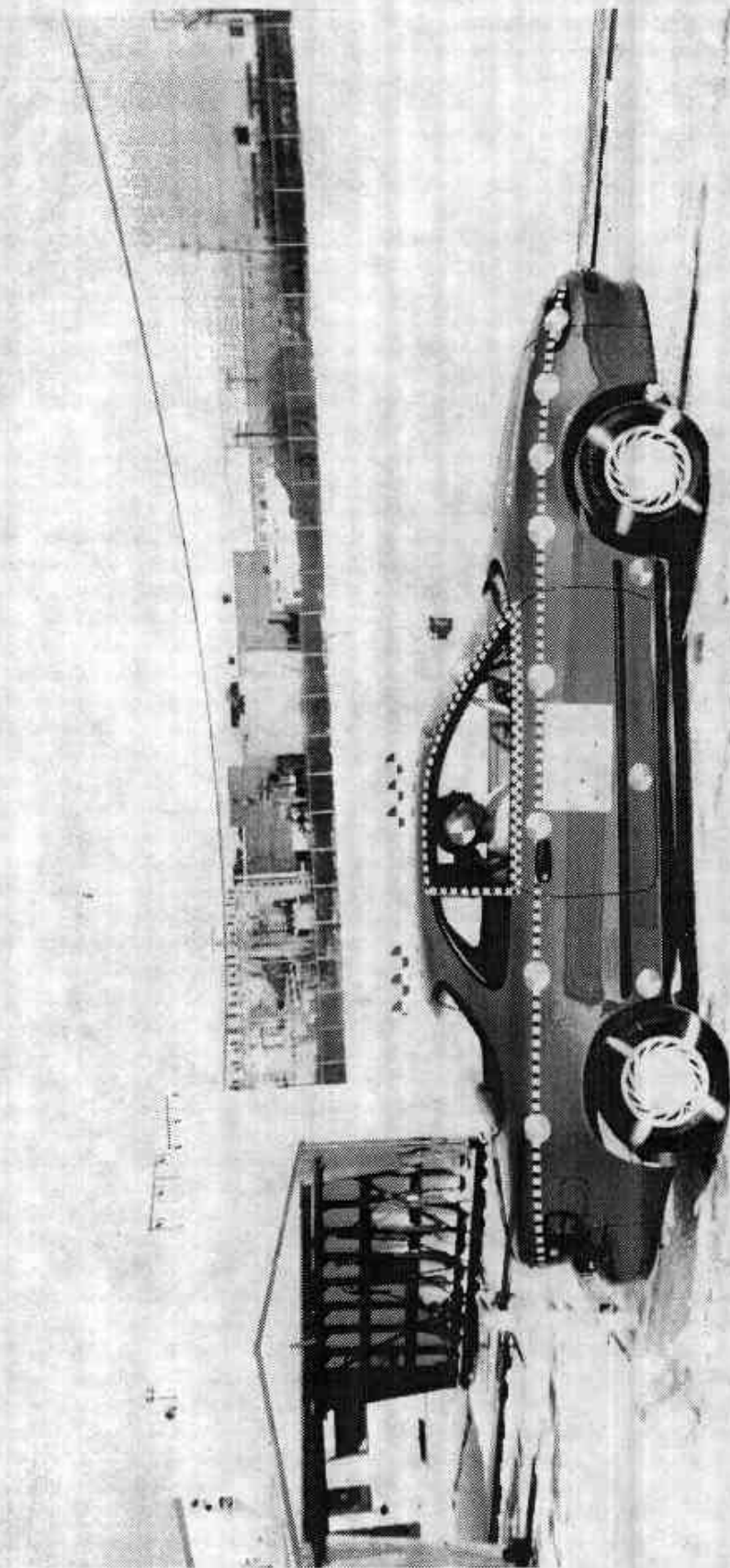


Figure A-4 POST TEST LEFT SIDE VIEW

28 14:49

A-6

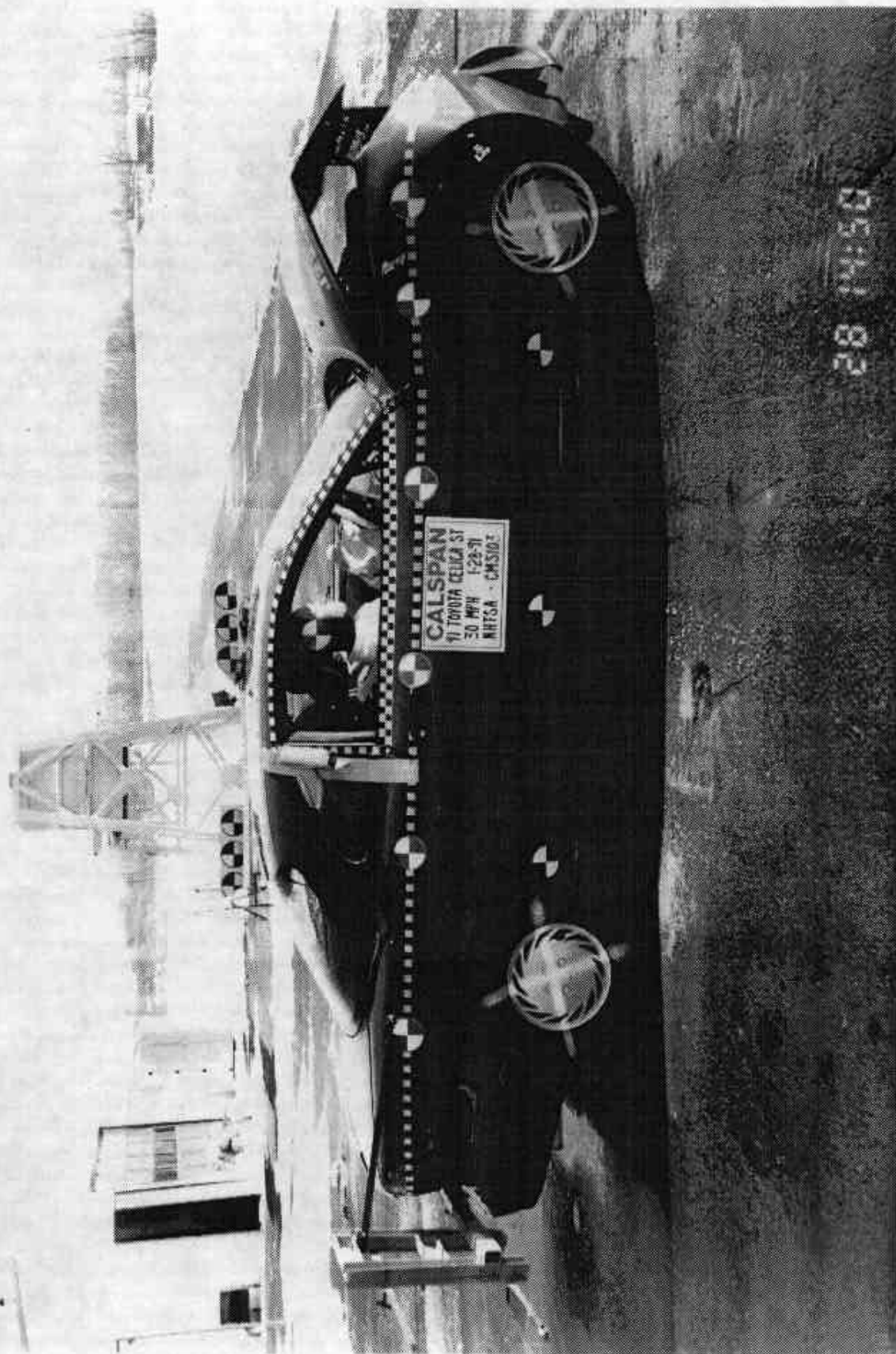
7853-7



A-7

FIGURE A-5 PRE-TEST RIGHT SIDE VIEW

1853 7



28 04:50

Figure A-6 POST-TEST RIGHT SIDE VIEW

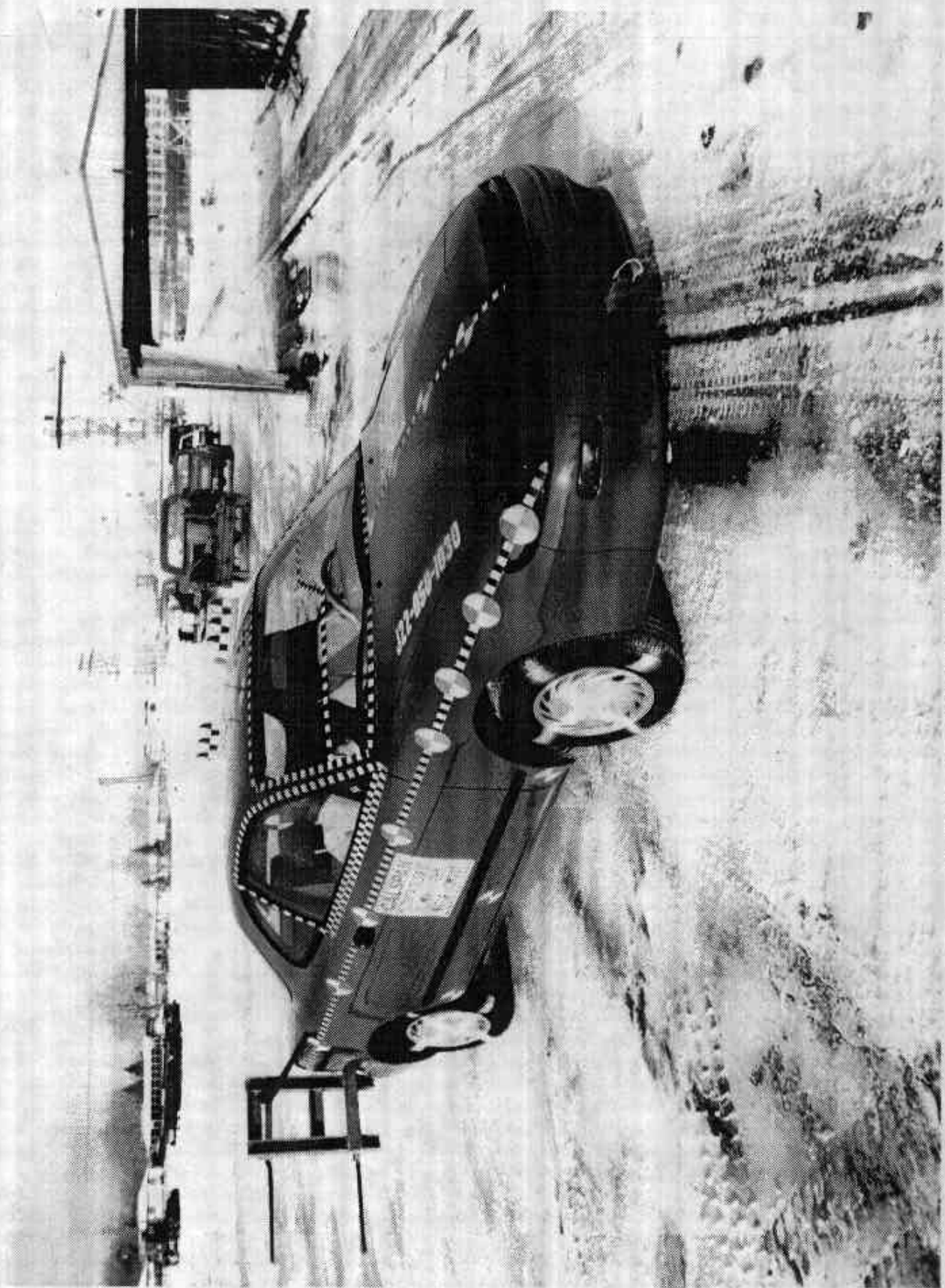


FIGURE A-7 PRE-TEST RIGHT FRONT THREE QUARTER VIEW

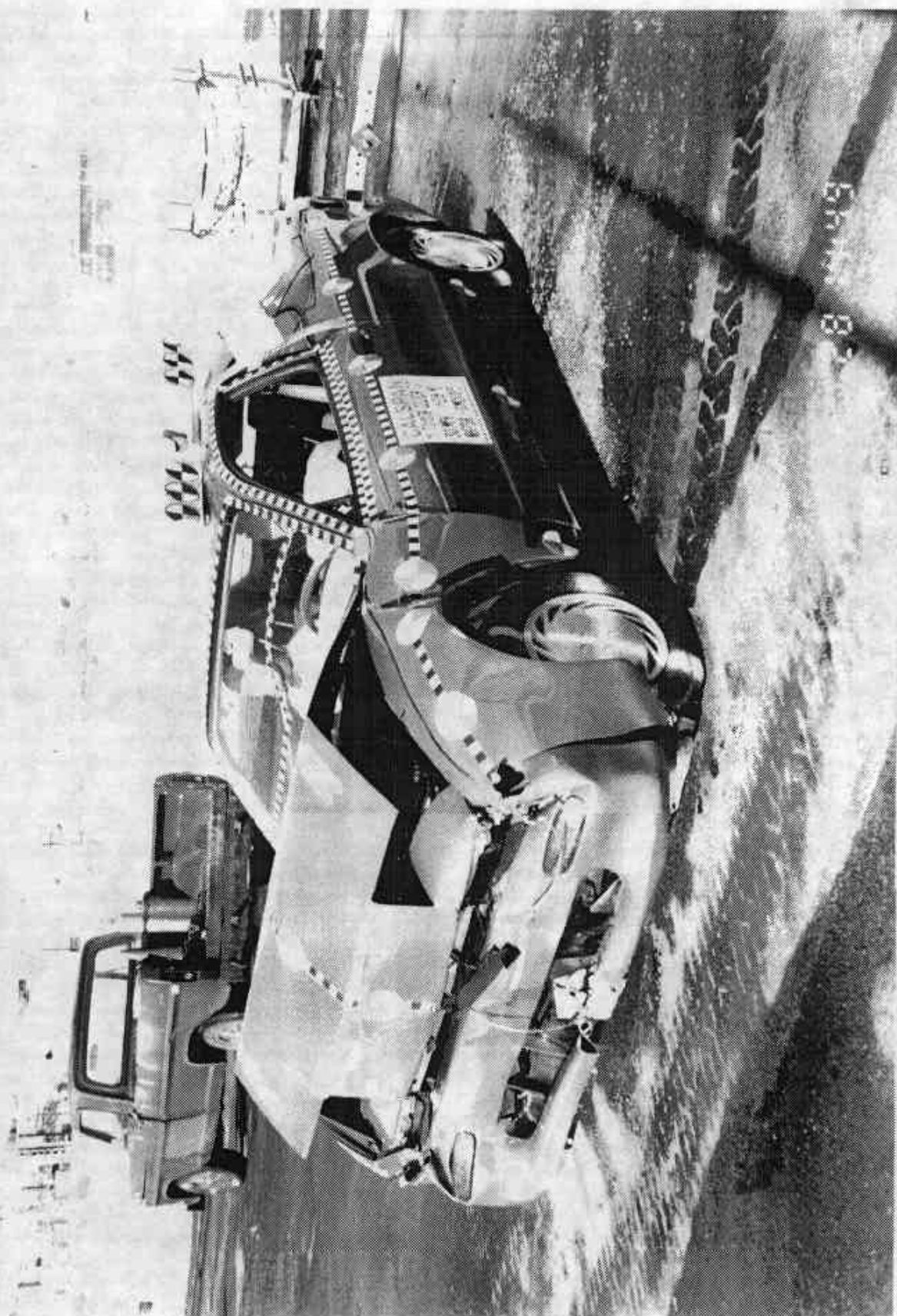


Figure A-8 POST-TEST LEFT FRONT THREE-QUARTER VIEW

A-10

7853-7

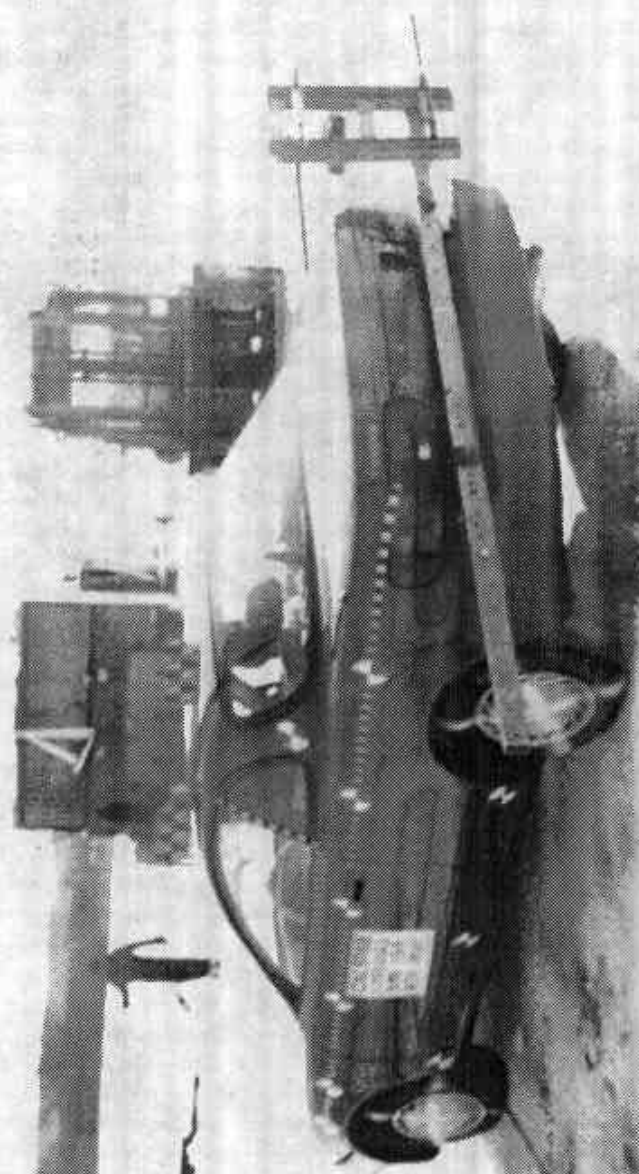


FIGURE A-9 PRE-TEST LEFT REAR THREE-QUARTER VIEW



FIGURE A-10 POST-TEST RIGHT REAR THREE-QUARTER VIEW

A-12

7653-7

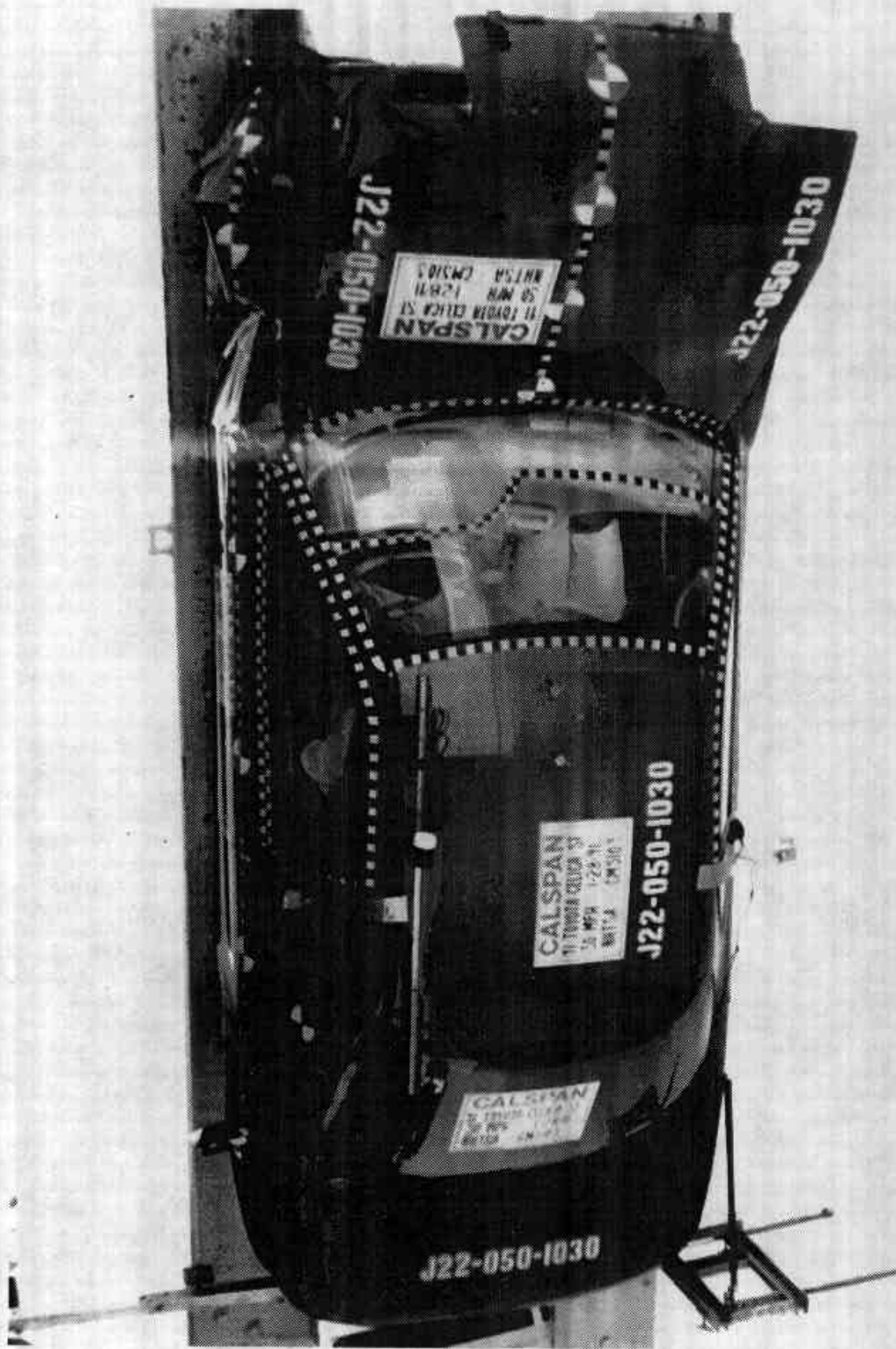


Figure A-11 POST TEST TOP VIEW

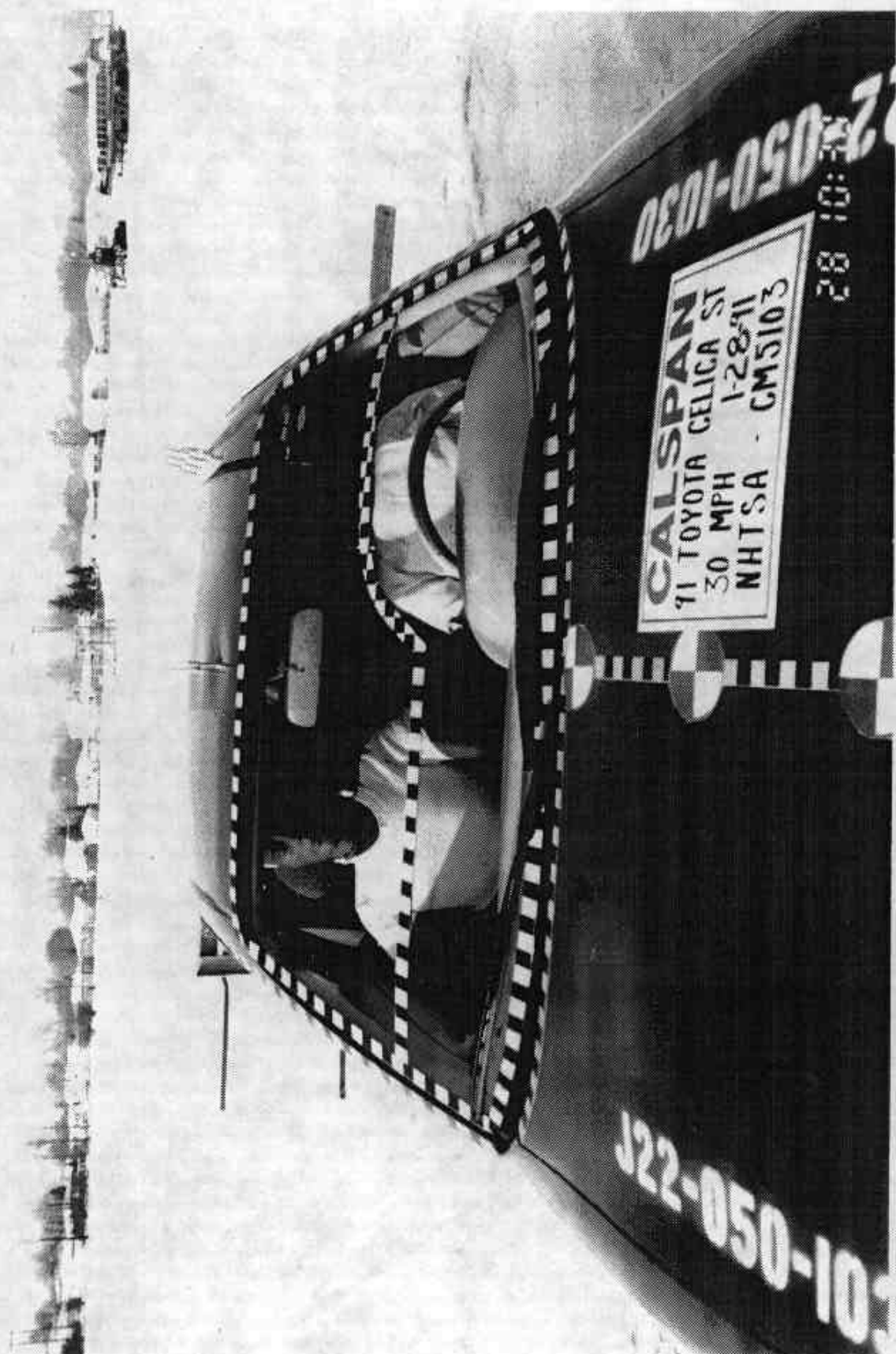


FIGURE A-12 PRE-TEST WINDSHIELD VIEW

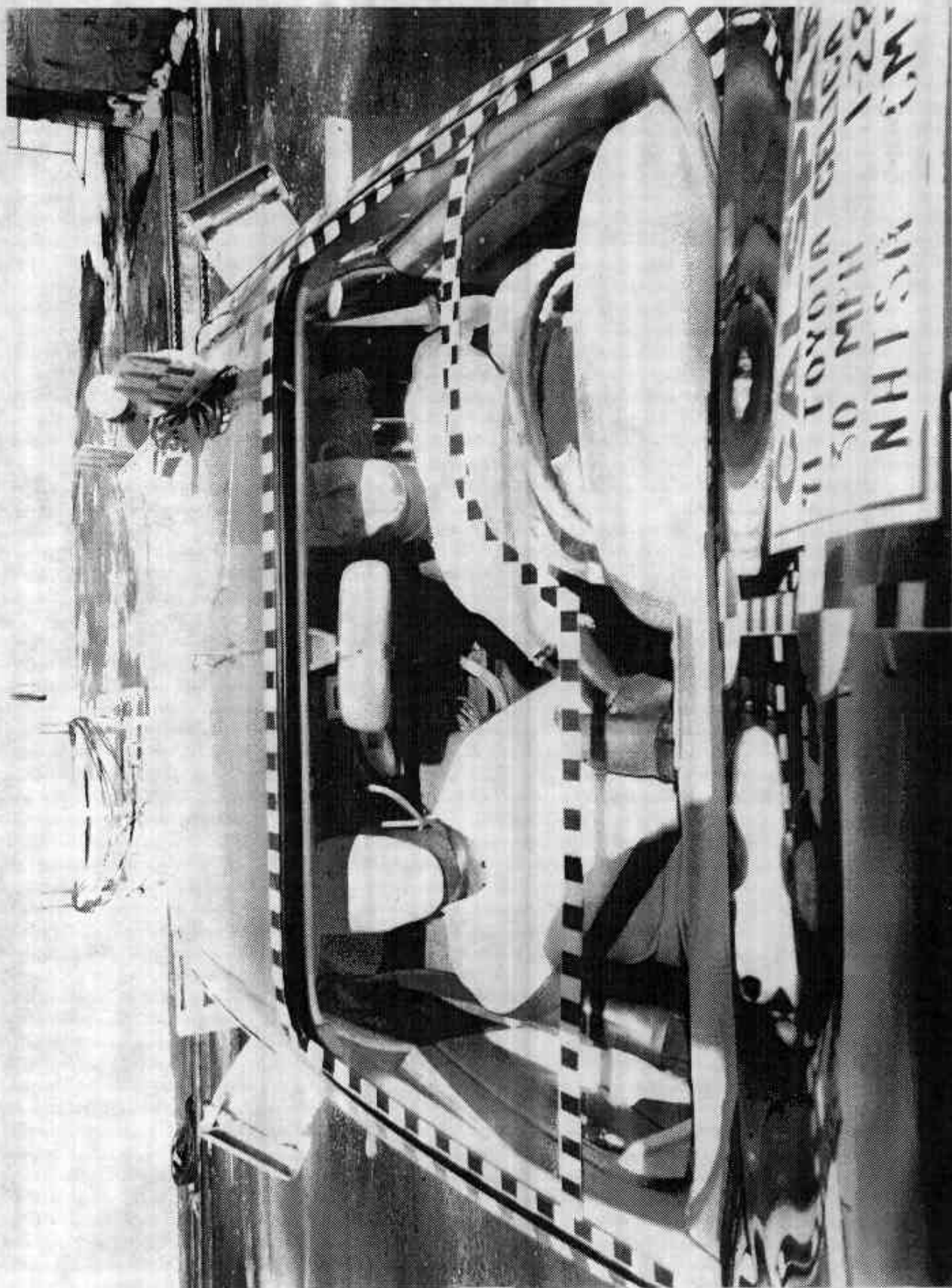


FIGURE A-13 POST-TEST WINDSHIELD VIEW

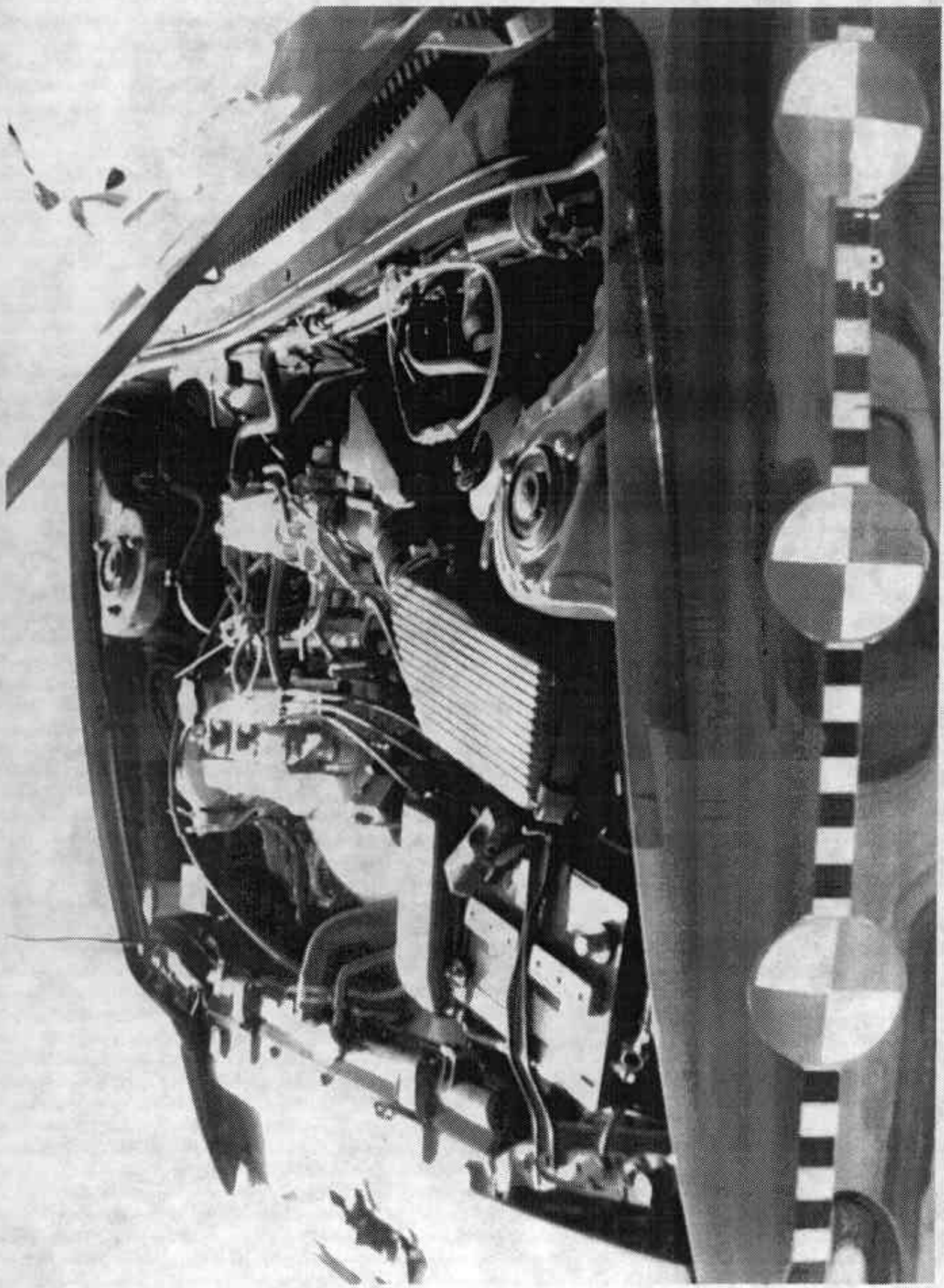


Figure A-14. PRE-TEST ENGINE COMPARTMENT VIEW

A-16

7853-7

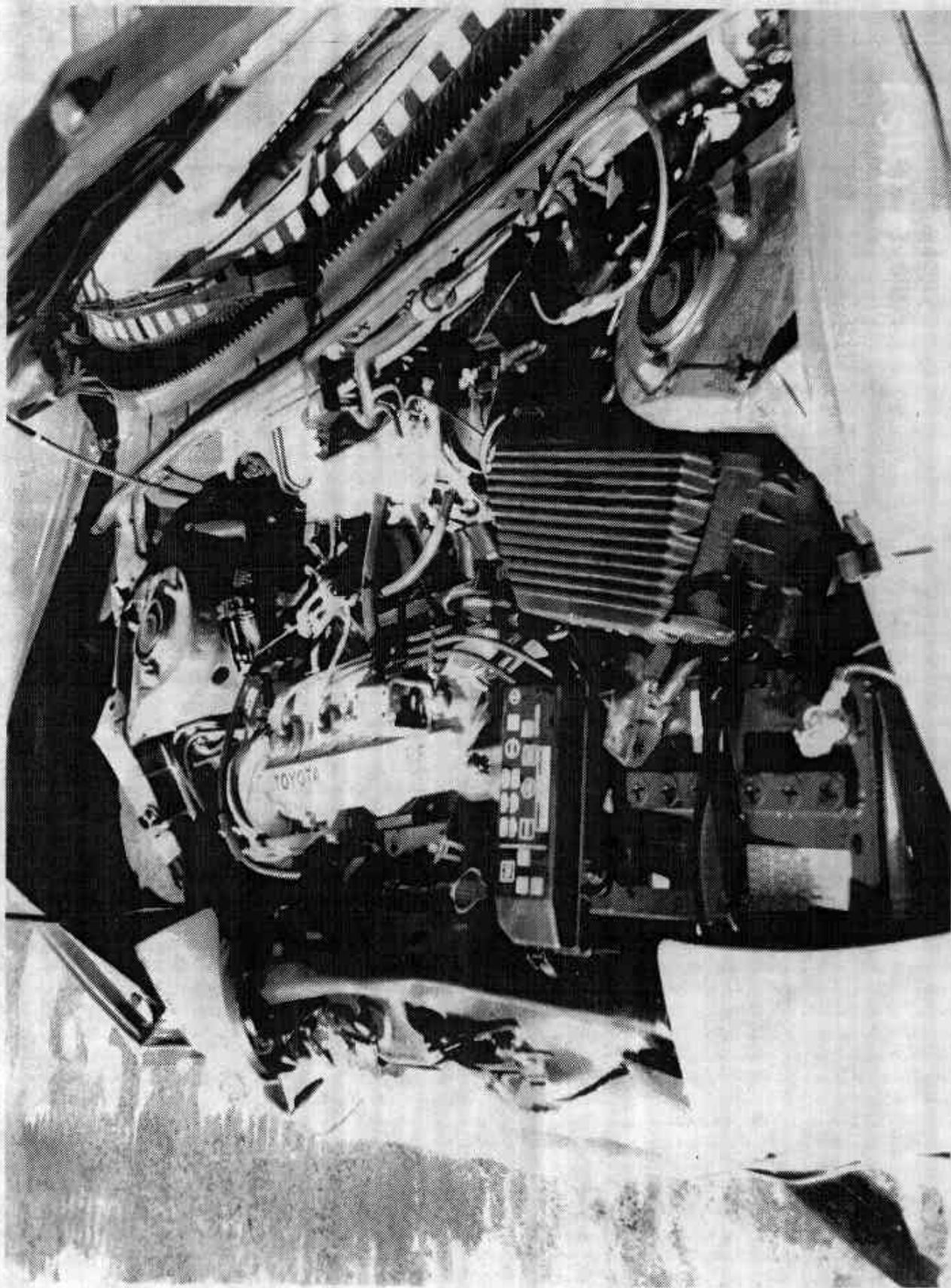


FIGURE A-15 POST-TEST ENGINE COMPARTMENT VIEW

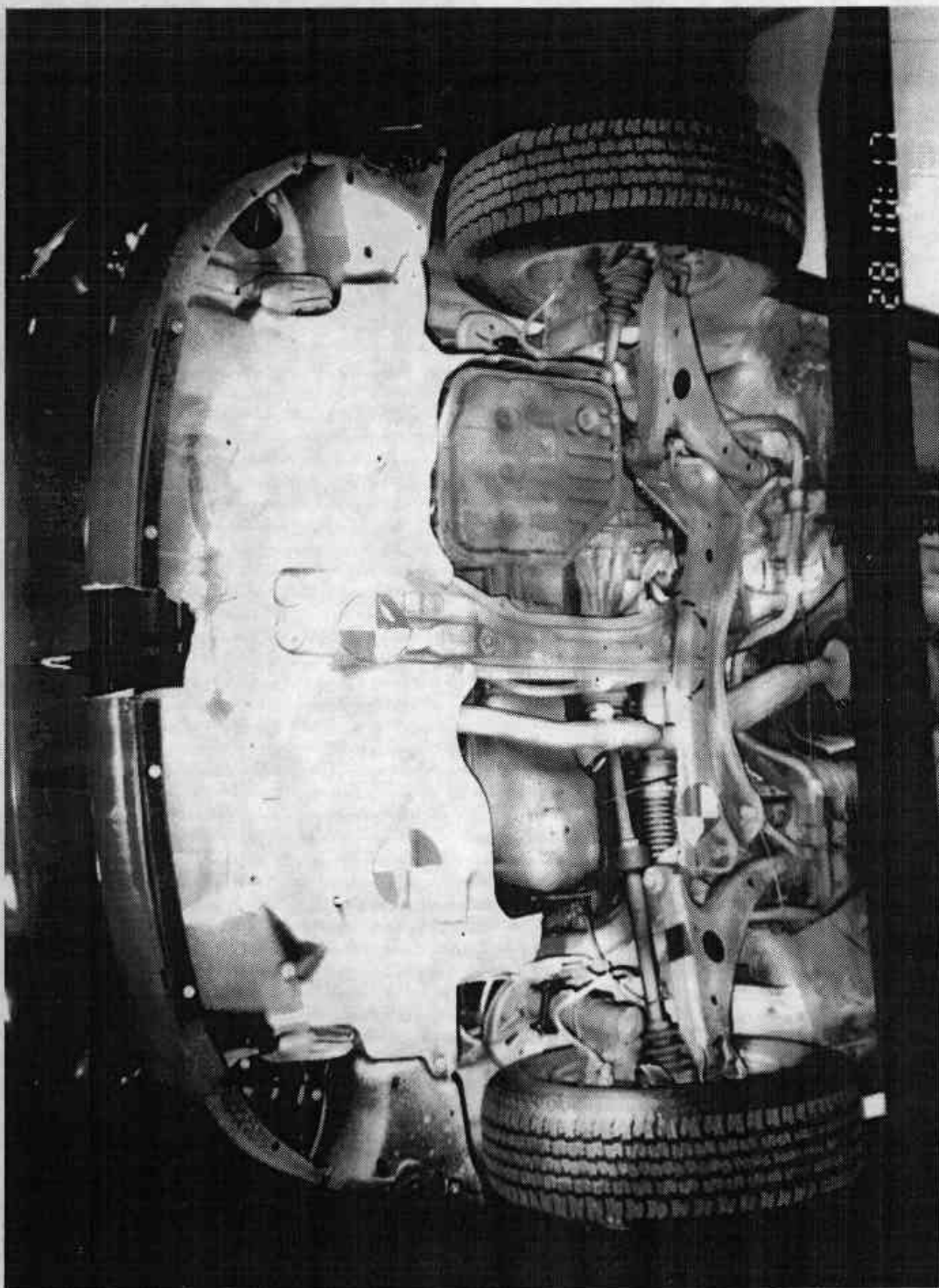


Figure A-16 PRE-TEST FRONT UNDERBODY VIEW

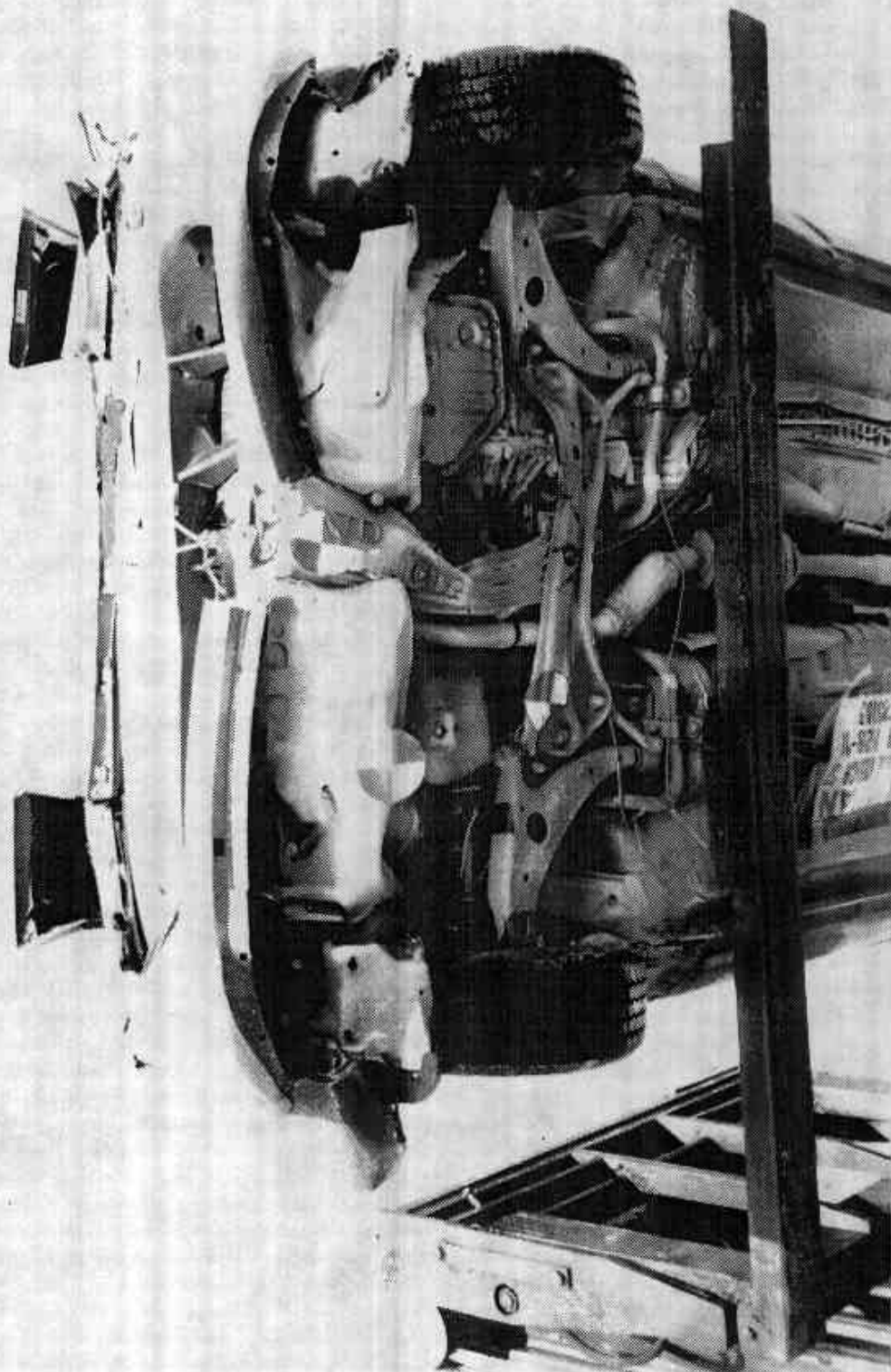


FIGURE A-17 POST-TEST FRONT UNDERBODY VIEW

A-10

7853-7

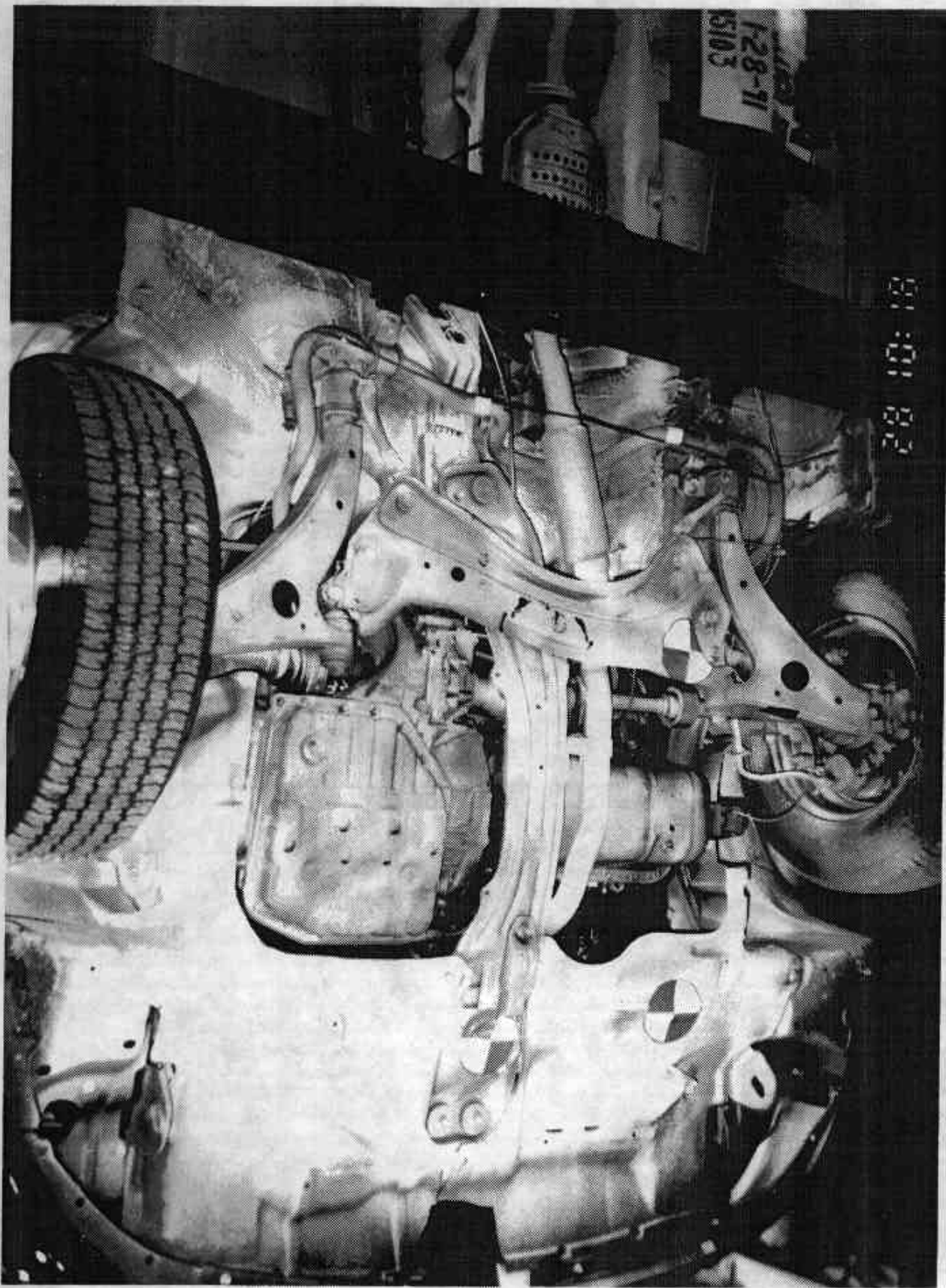


FIGURE A-18 PRE-TEST FRONT SIDE UNDERSIDE VIEW

A-20

7853-7

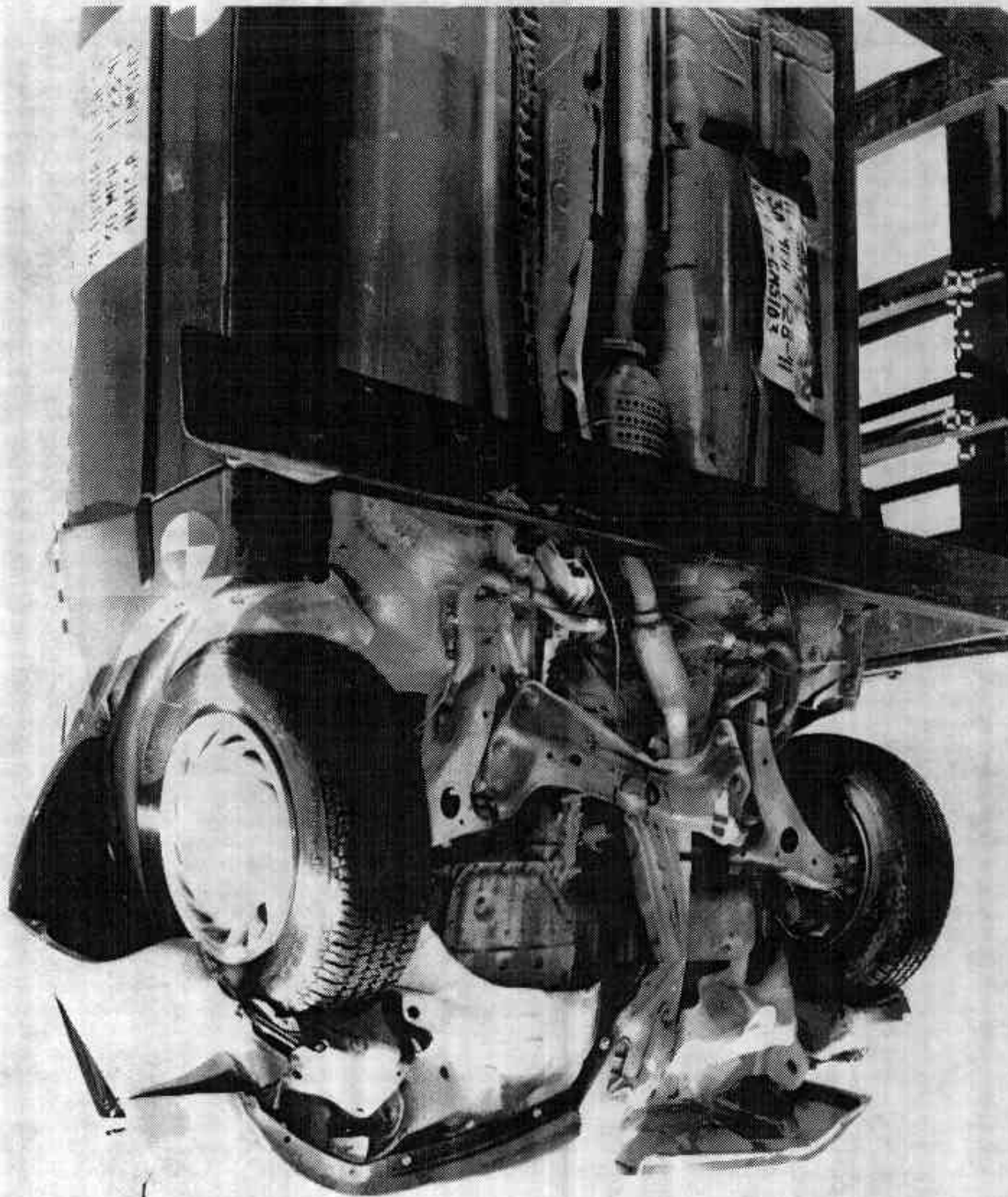


Figure A-19. POST-TEST FRONT SIDE UNDERBODY VIEW

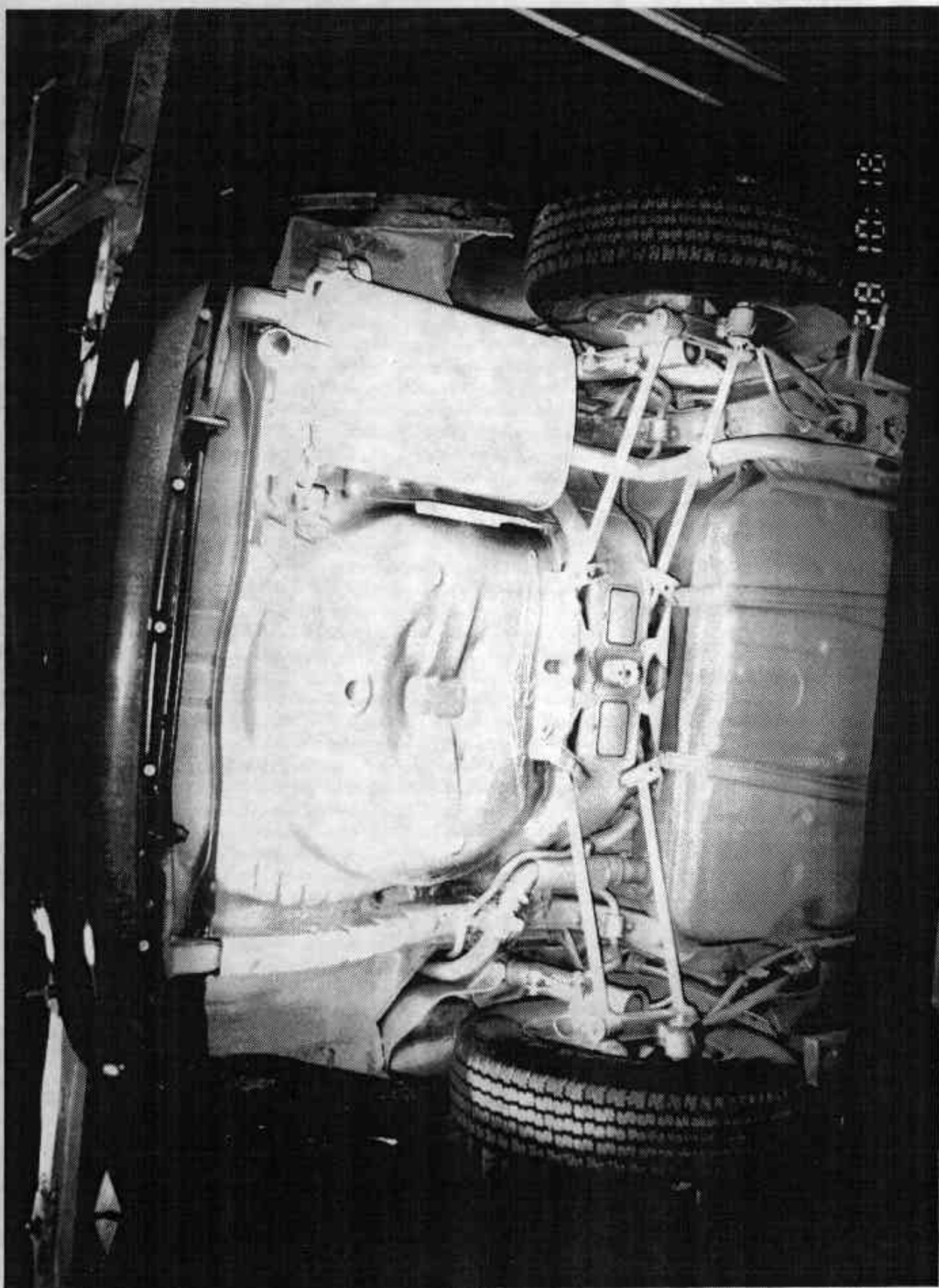


FIGURE A-20 PRE-TEST REAR UNDERBODY VIEW

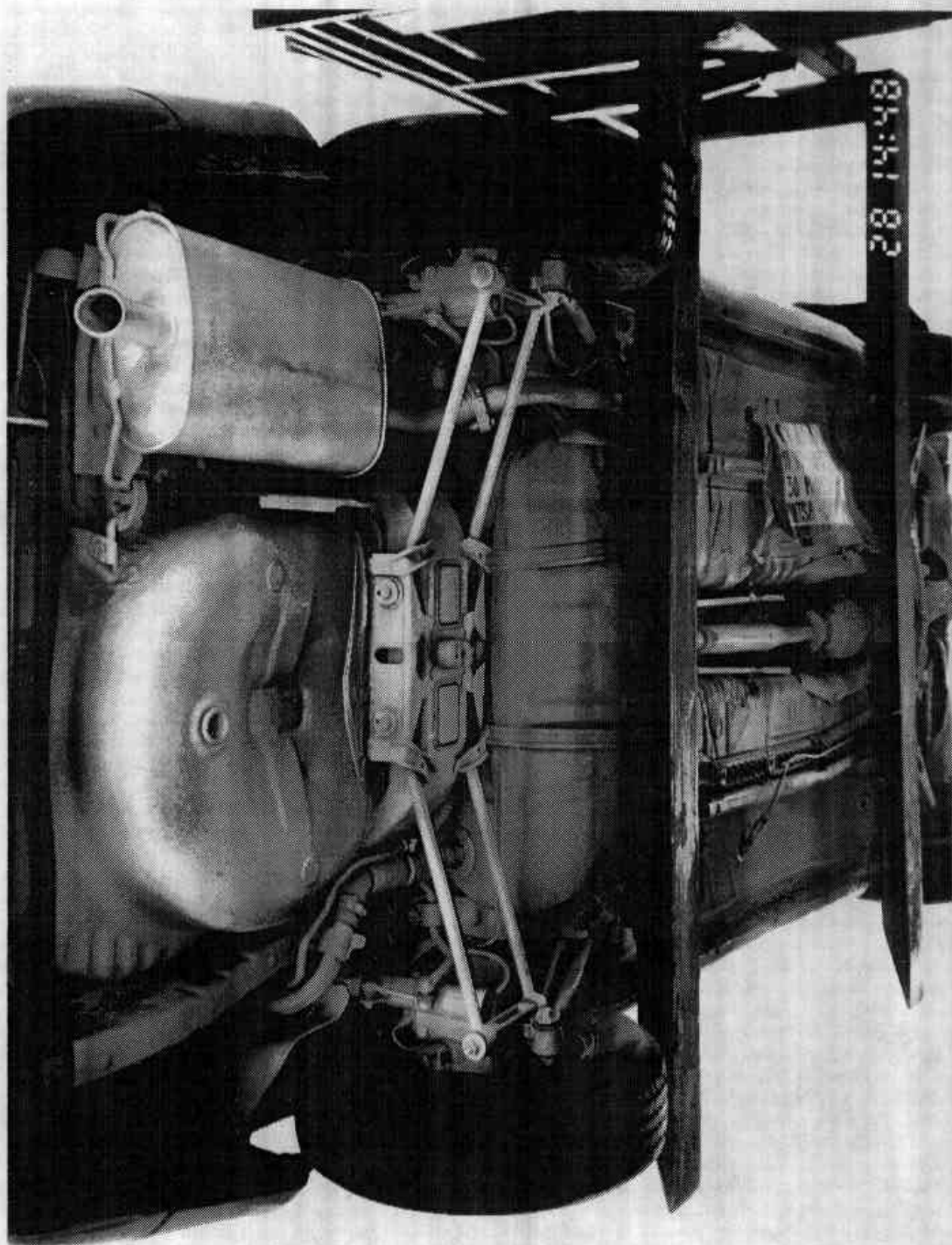


FIGURE A-21 POST-TEST REAR UNDERBODY VIEW

A-23

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FIGURE A-22 PRE-TEST DRIVER DUMMY POSITION

A-24

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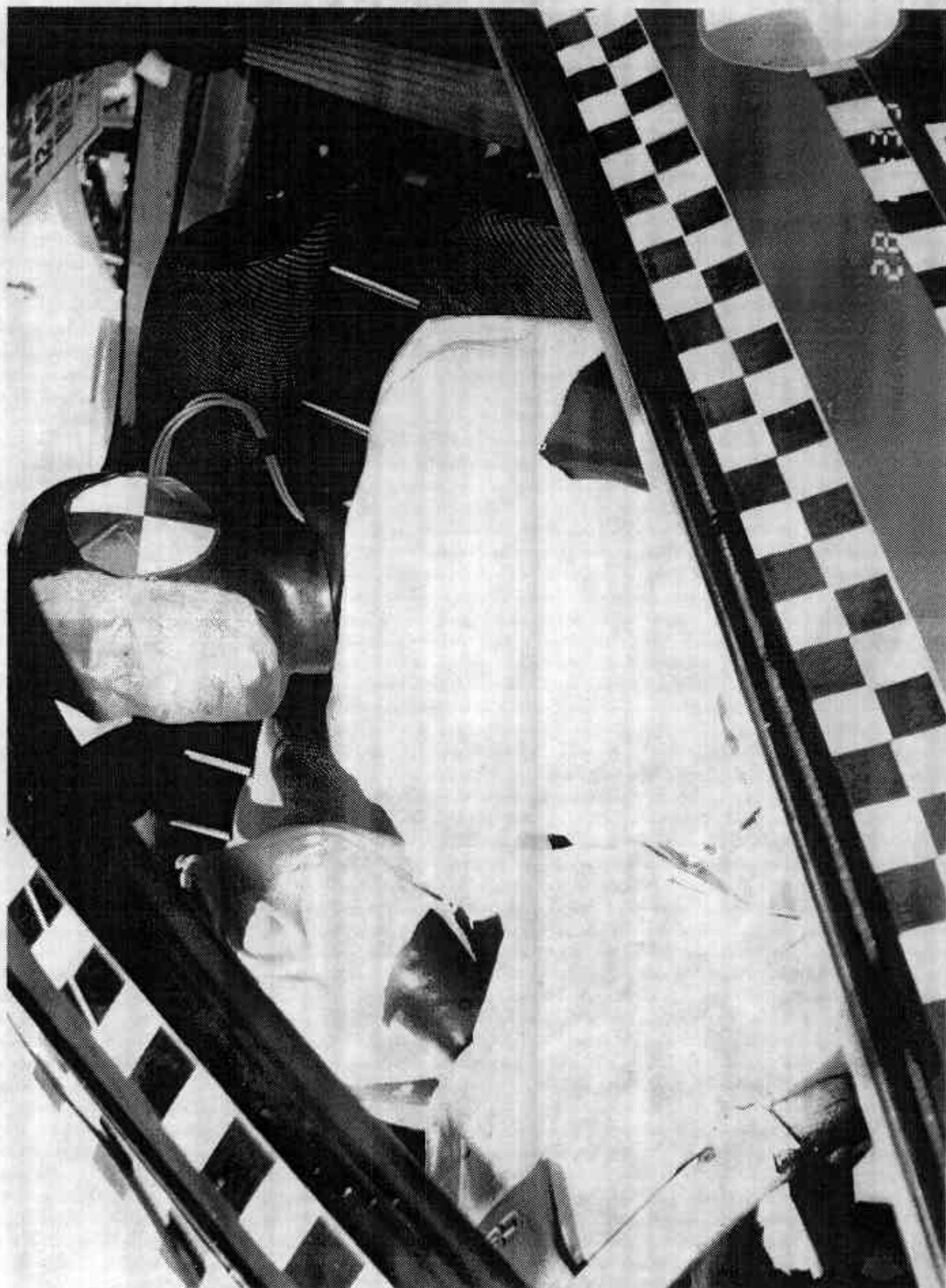


Figure A-23. POST TEST DRIVER DUMMY POSITION

A-25

7853 7



FIGURE A-24 PRE-TEST PASSENGER DUMMY POSITION



FIGURE A-26 POST-TEST PASSENGER DUMMY POSITION

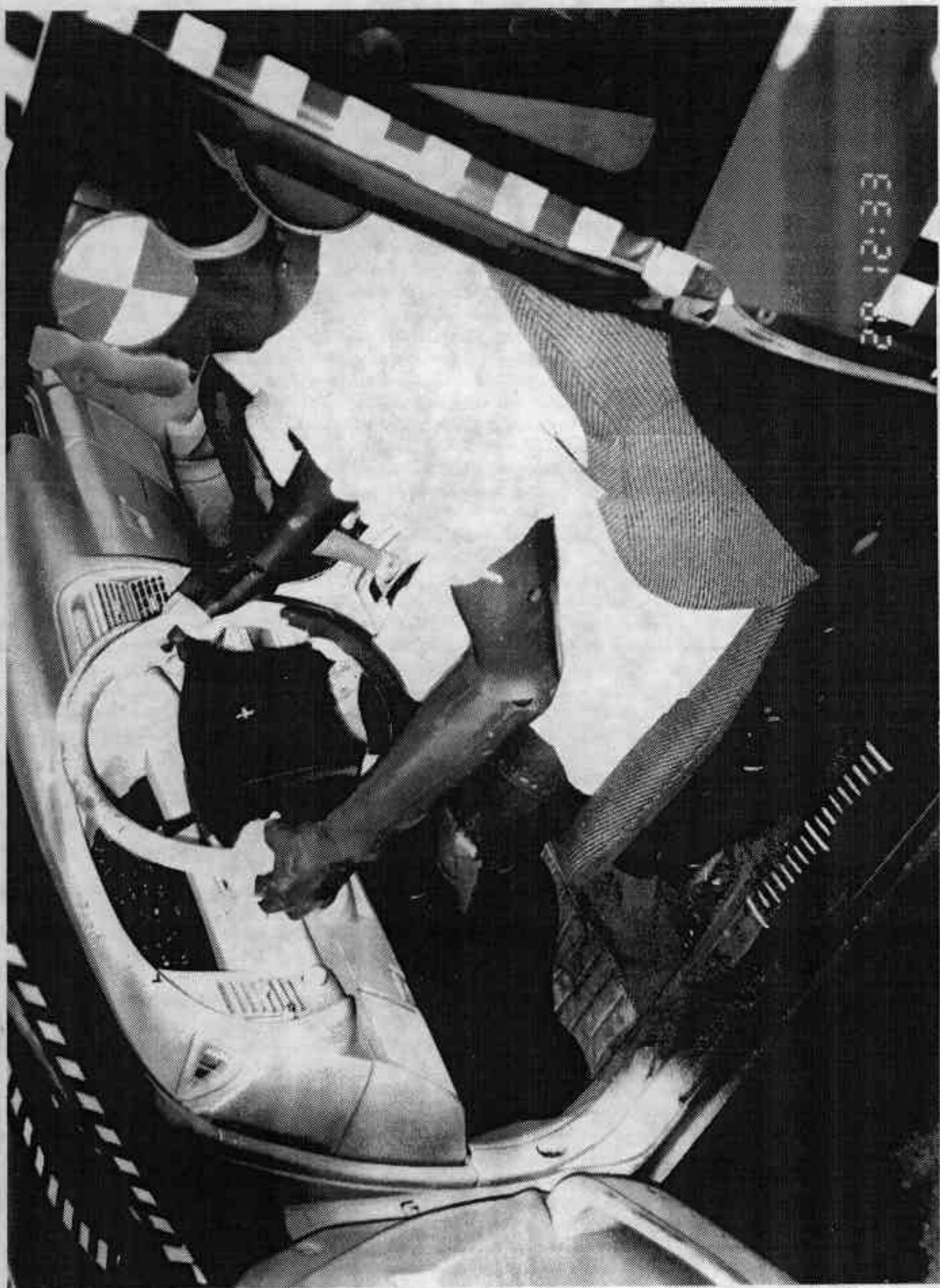


FIGURE A-26 PRE-TEST DRIVER DUMMY AND INTERIOR VIEW

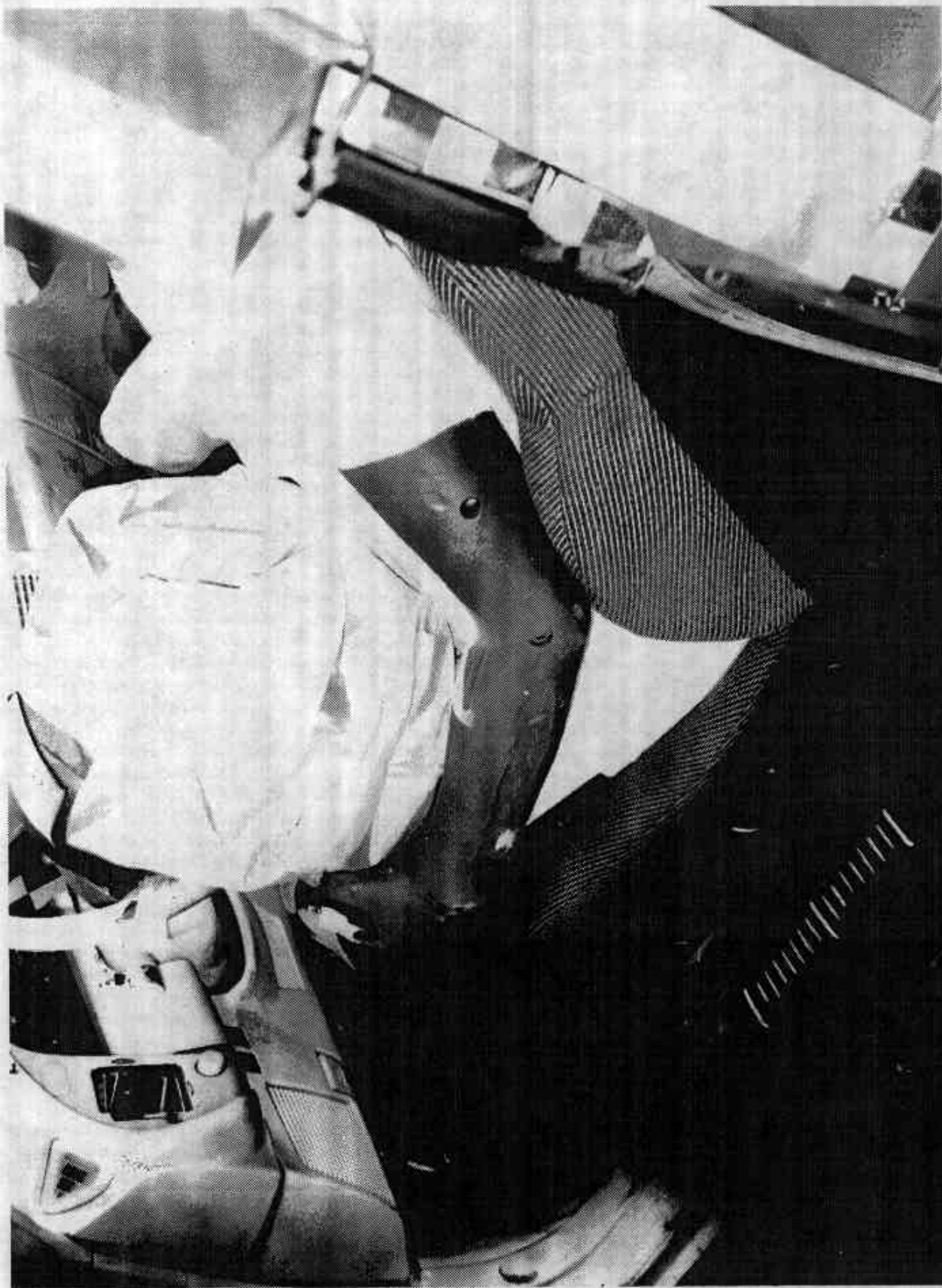


Figure A-27 POST-TEST DRIVER DUMMY AND INTERIOR VIEW

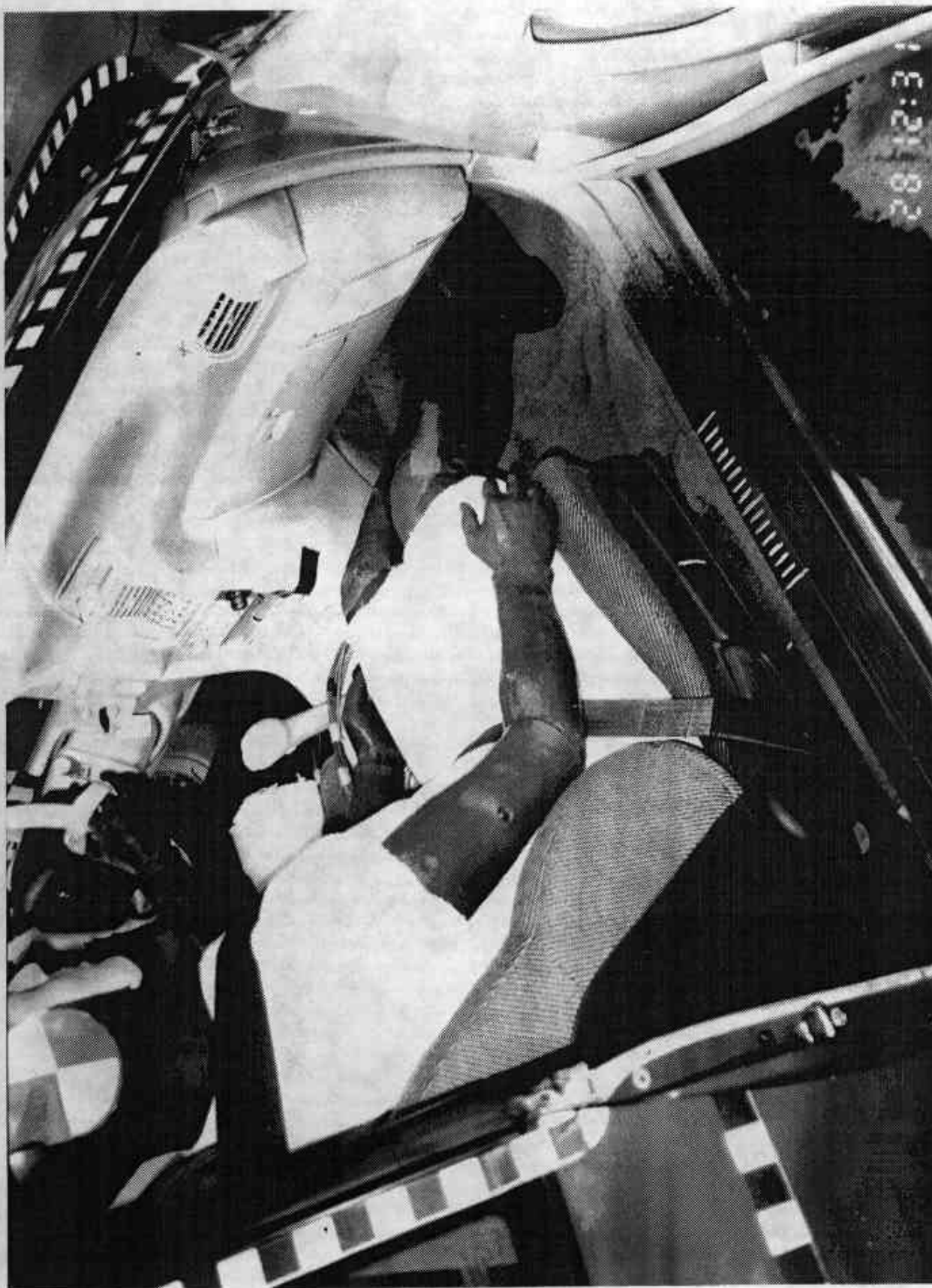
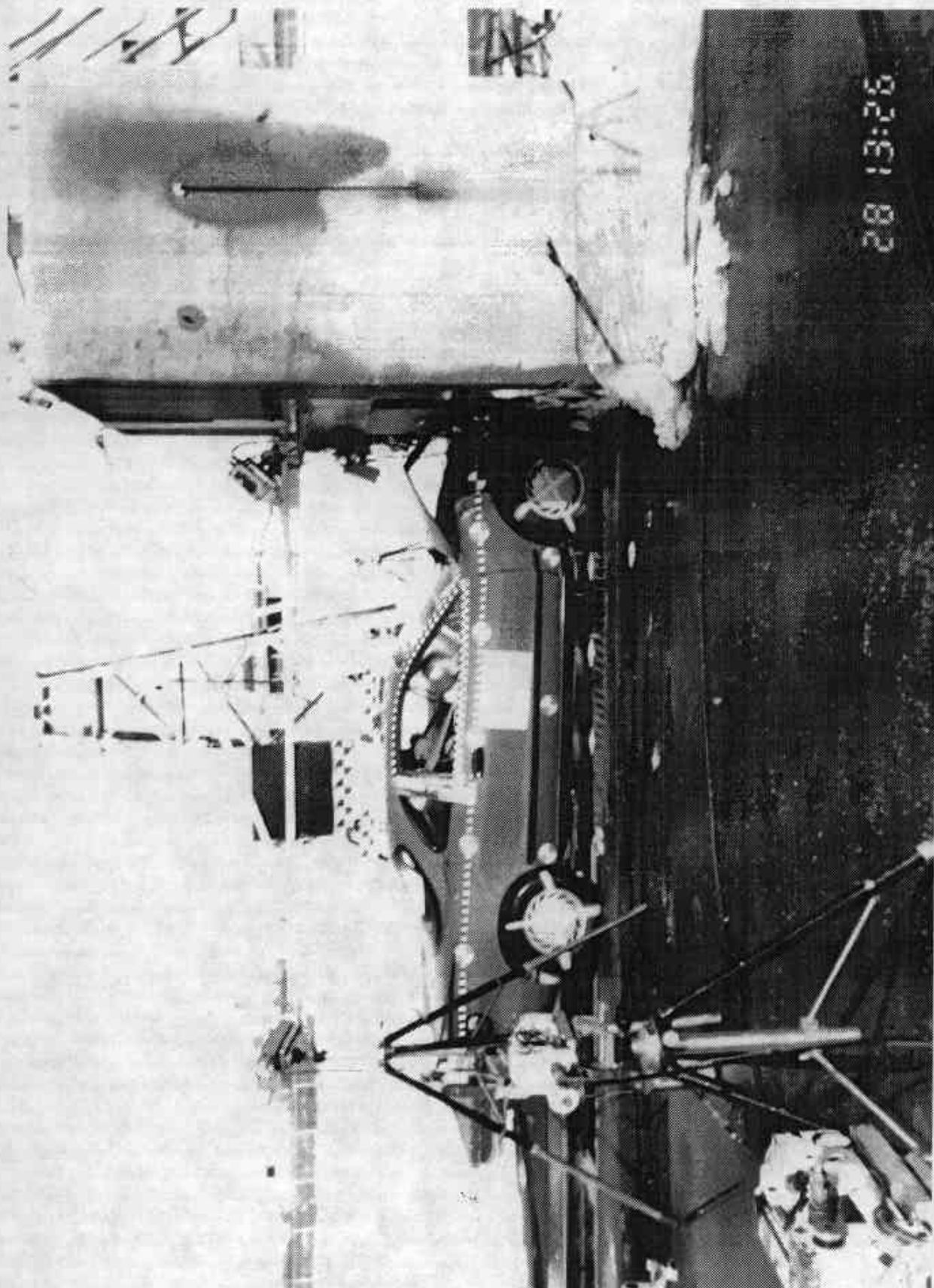


FIGURE A-28 PRE-TEST PASSENGER DUMMY AND INTERIOR VIEW



FIGURE A-29 POST-TEST PASSENGER DUMMY AND INTERIOR VIEW



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Figure A-30 VEHICLE IMPACT

A-32

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Appendix B

VEHICLE AND DUMMY RESPONSE DATA

TEST NO. CM5103

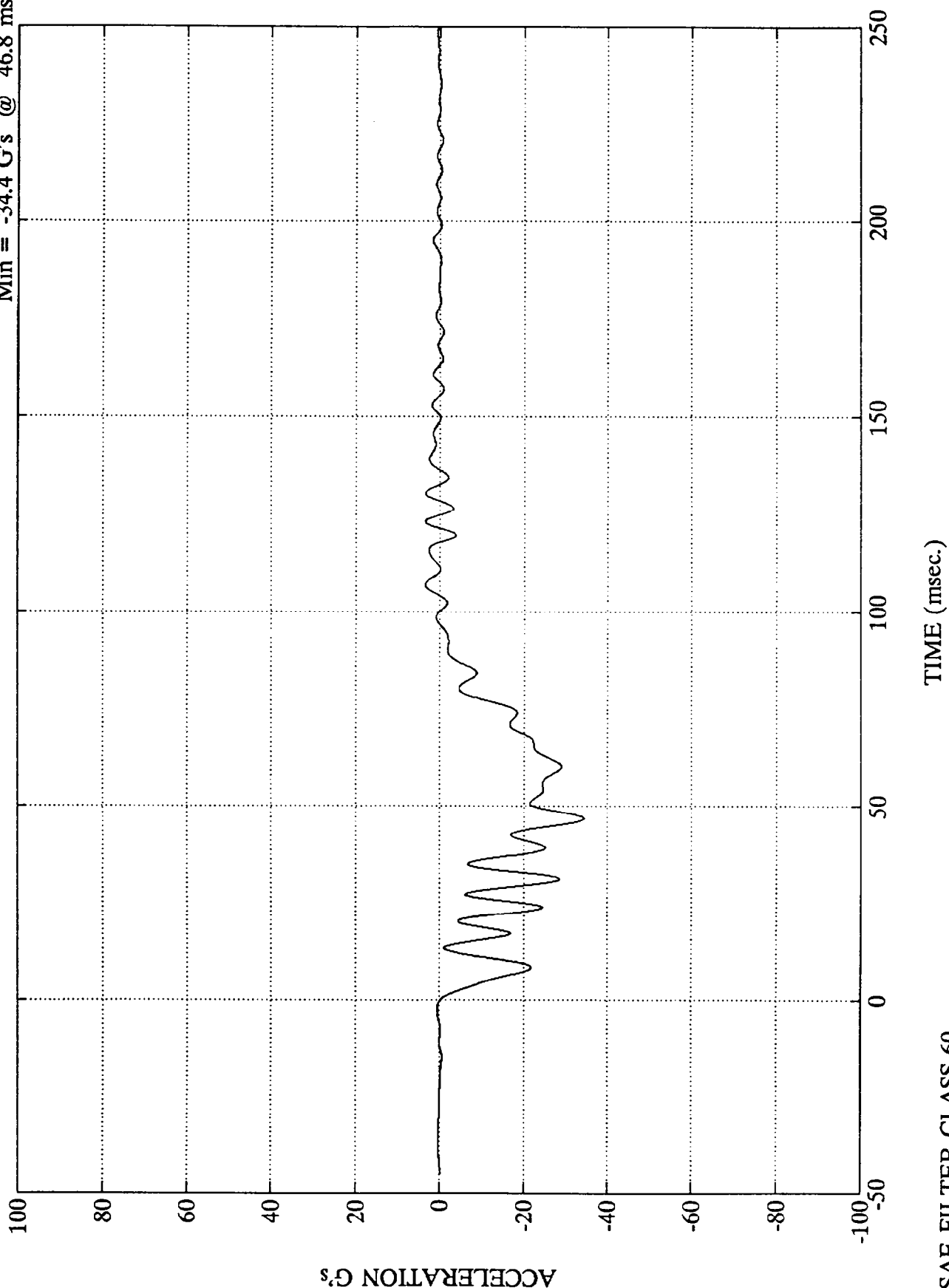
VEHICLE DATA

FILTER CHANNEL CLASS

60

Test 1030
Max = 3.5 G's @ 123.1 msec
Min = -34.4 G's @ 46.8 msec

L REAR X-MEMBER X (ACC #1)

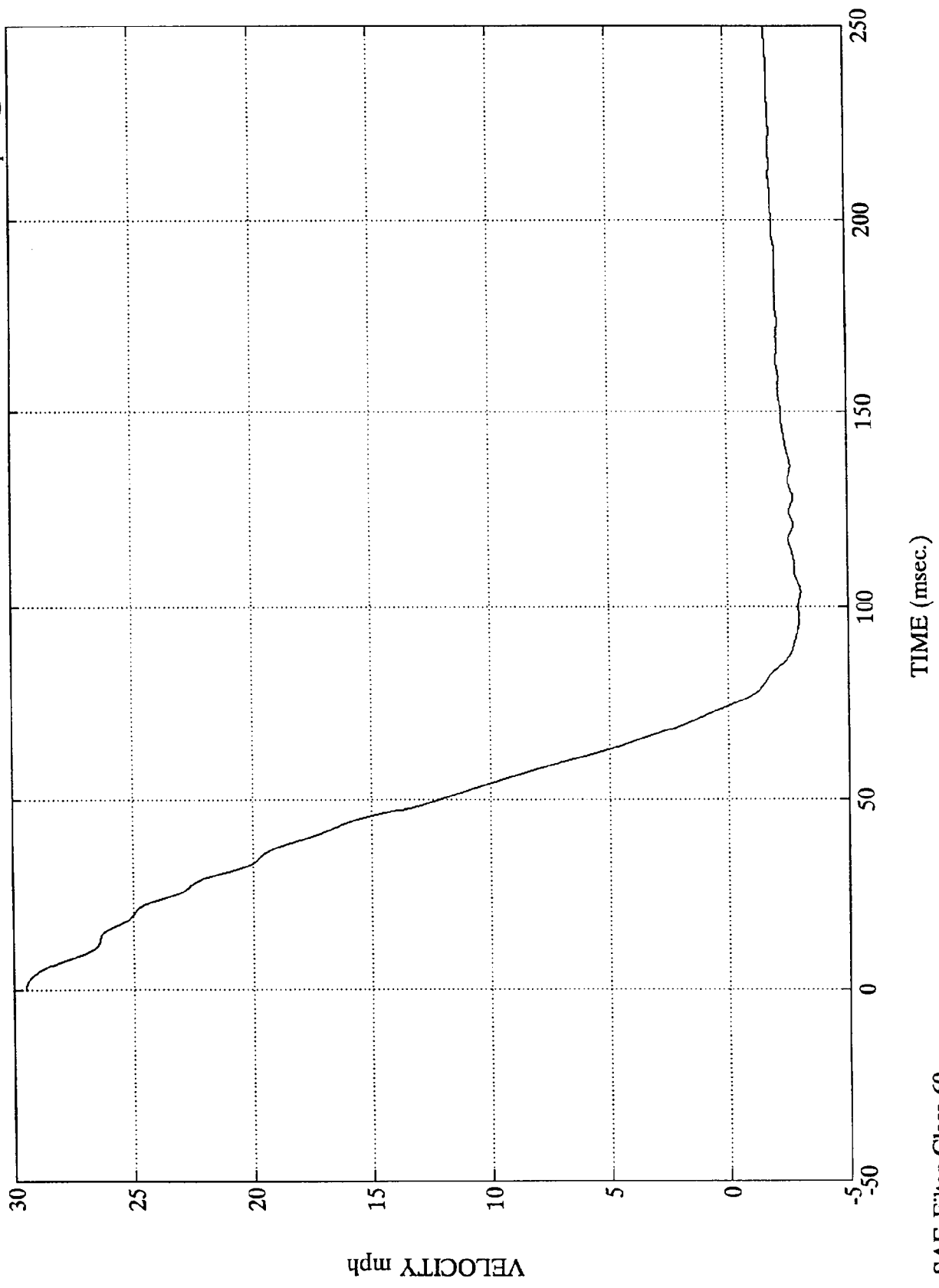


SAE FILTER CLASS 60

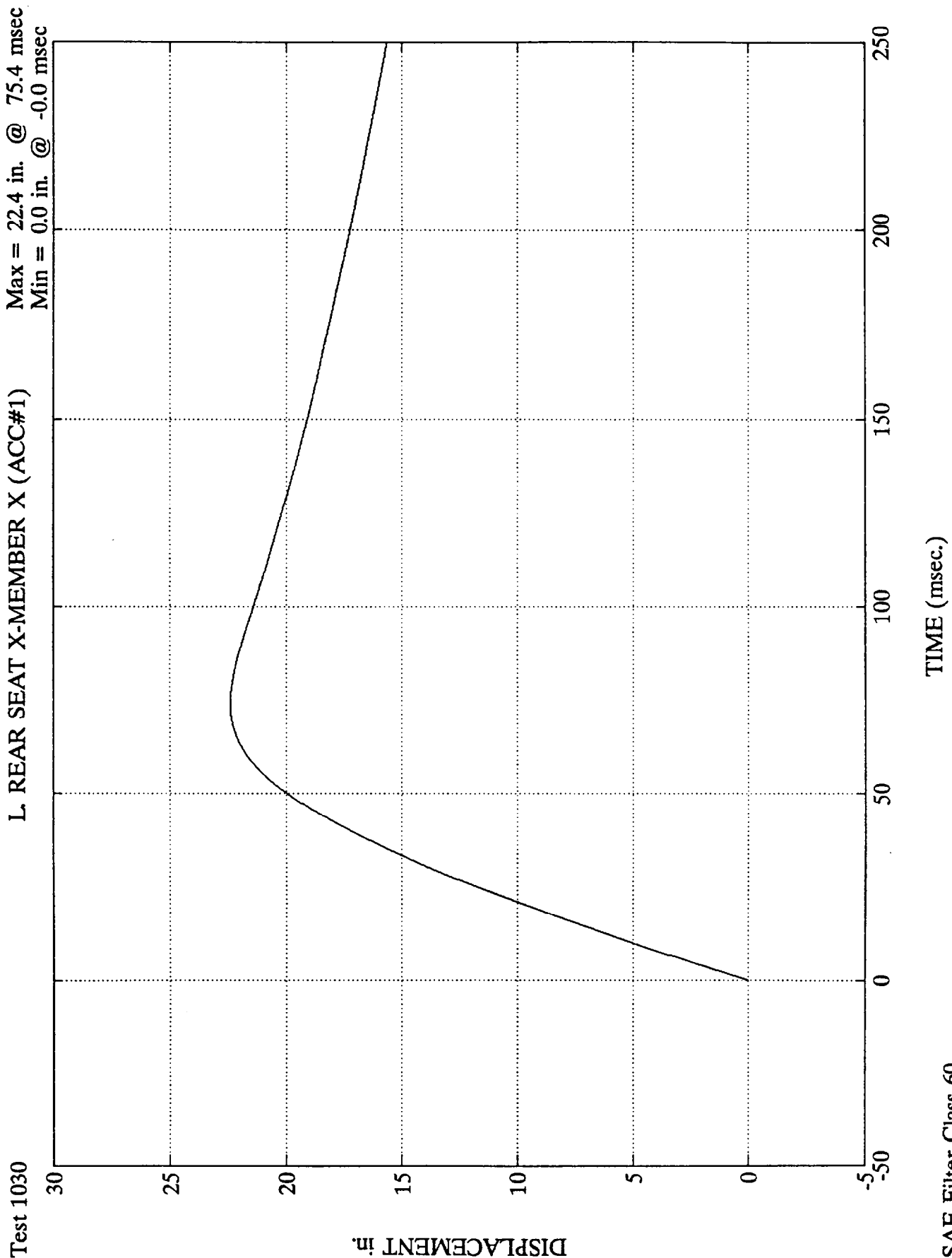
Max = 29.5 mph @ 0.2 msec
Min = -3.0 mph @ 104.2 msec

L REAR SEAT X-MEMBER X (ACC#1)

Test 1030



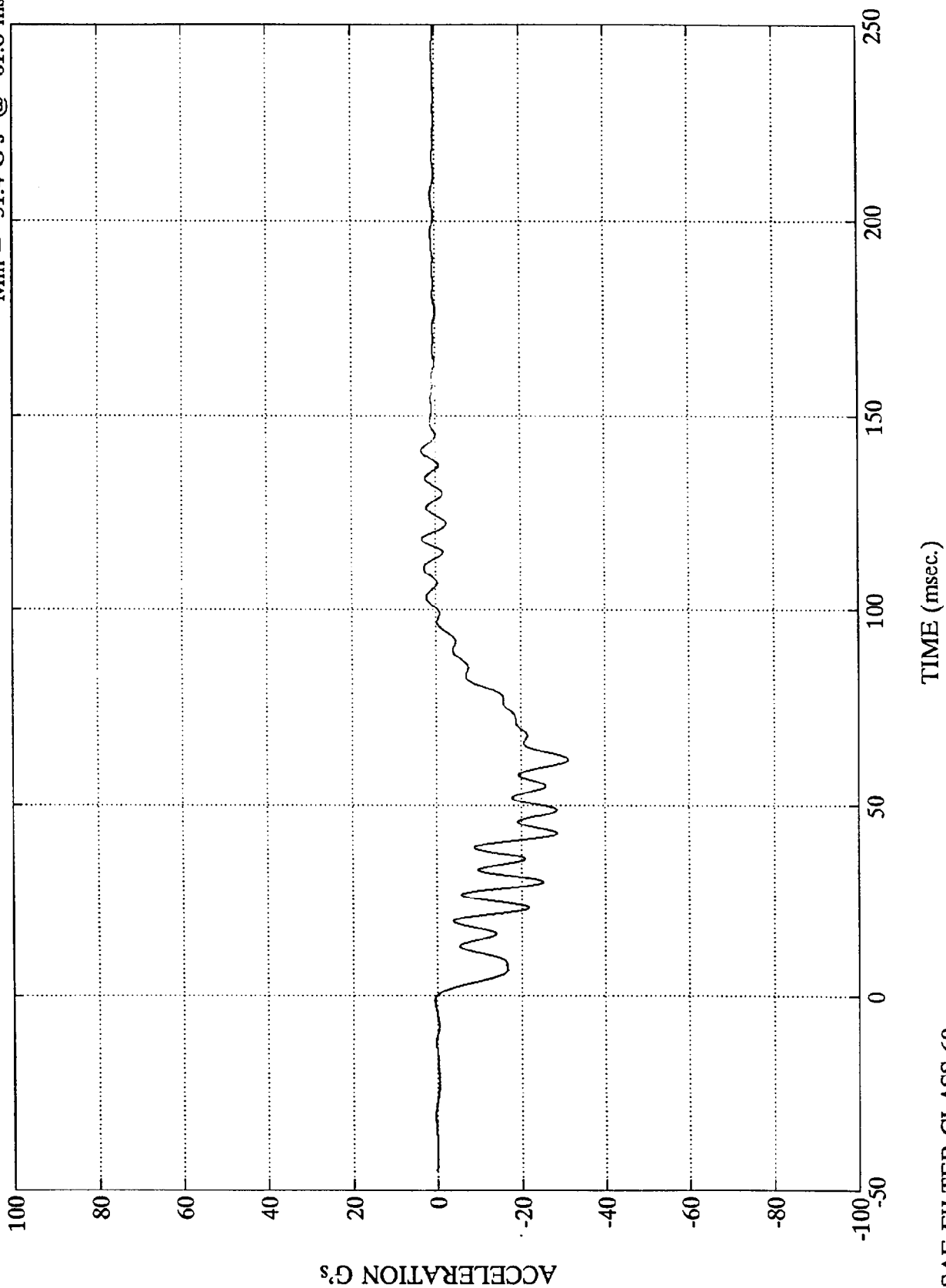
SAE Filter Class 60



Test 1030

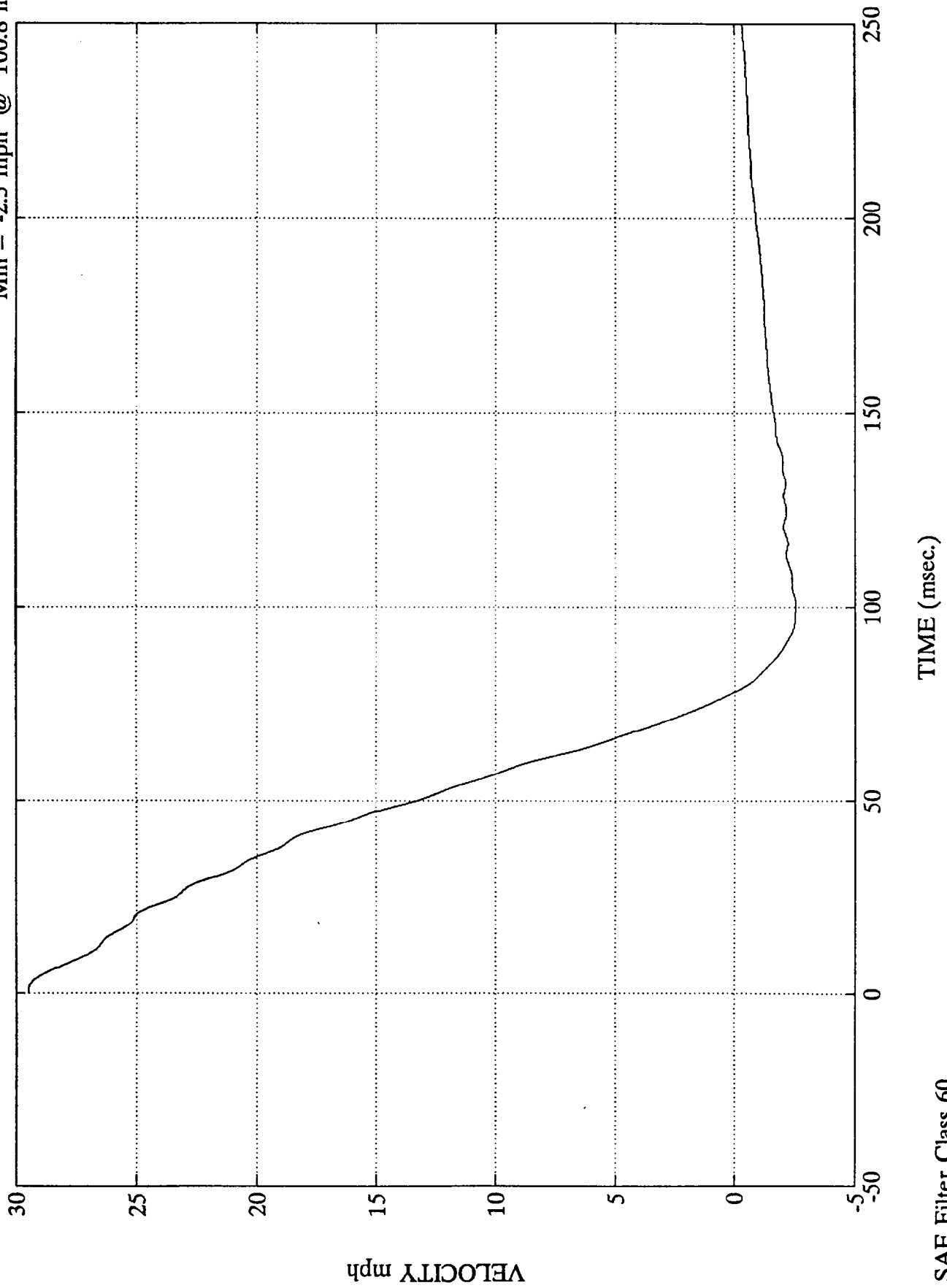
R. REAR X-MEMBER X (ACC #2)

Max = 3.3 G's @ 141.0 msec
Min = -31.4 G's @ 61.8 msec



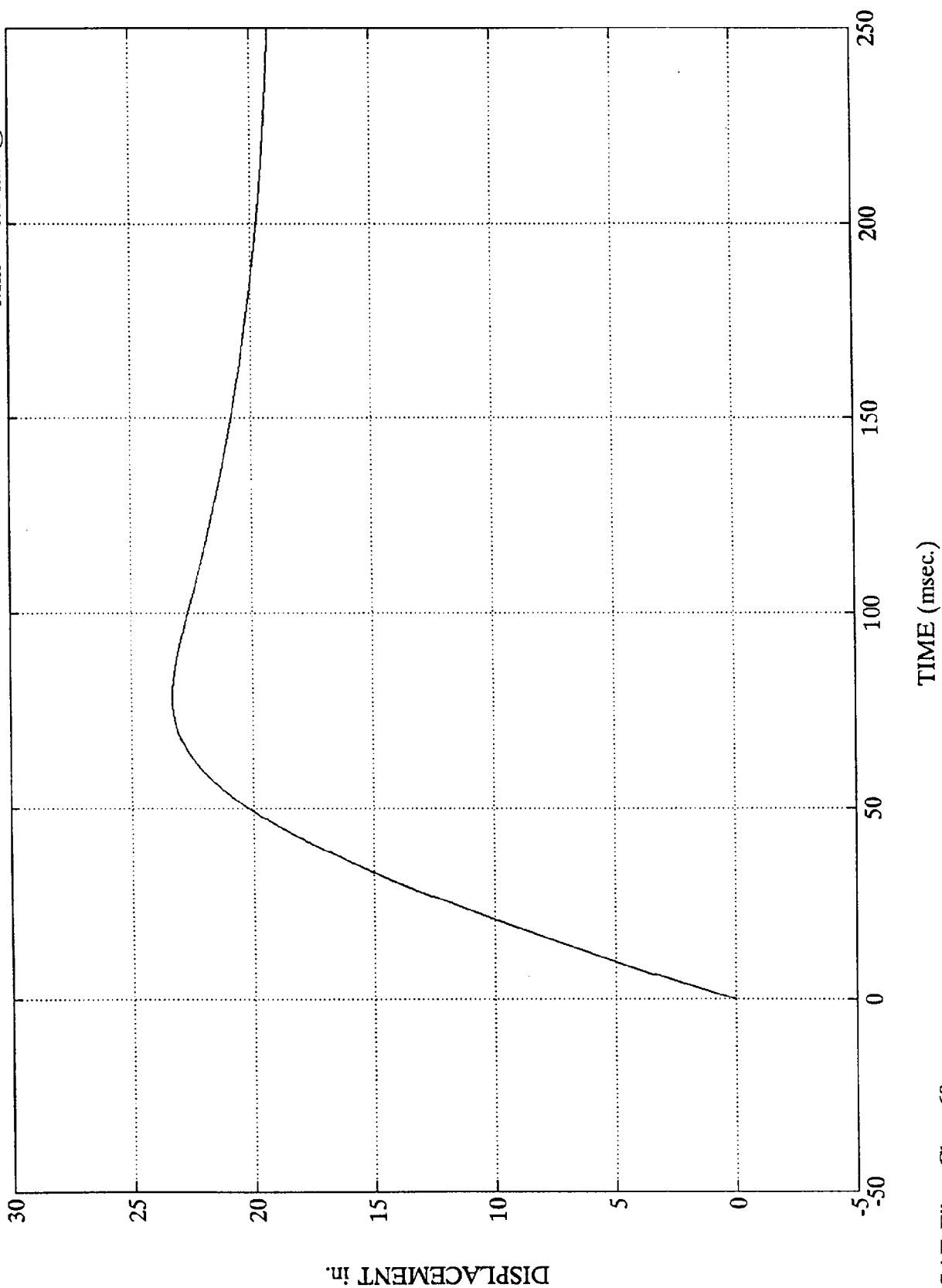
SAE FILTER CLASS 60

Test 1030
R. REAR SEAT X-MEMBER X (ACC#2)
Max = 29.5 mph @ 0.7 msec
Min = -2.5 mph @ 100.8 msec



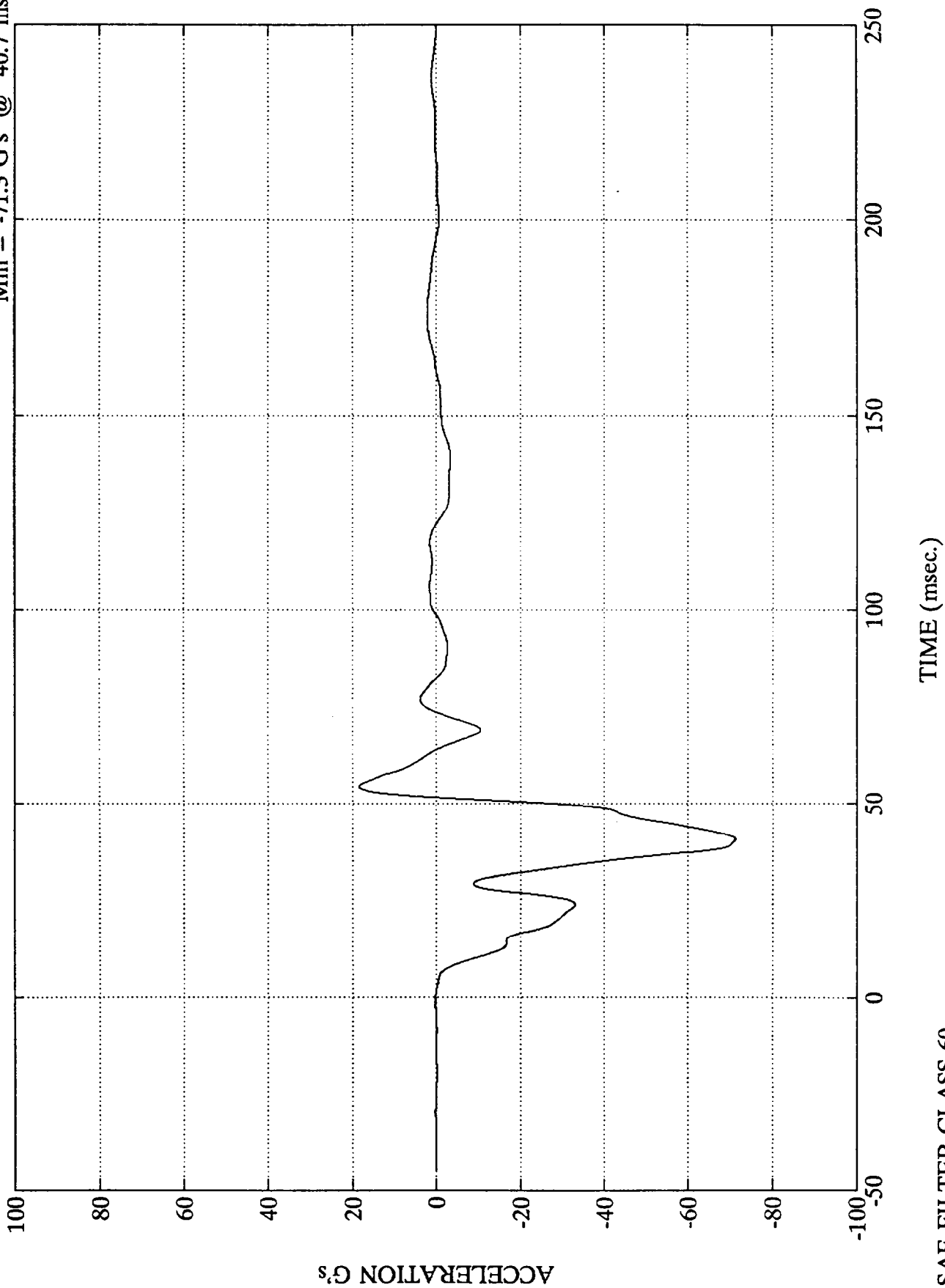
SAE Filter Class 60

Test 1030
R. REAR SEAT X-MEMBER X (ACC#2)
Max = 23.3 in. @ 80.2 msec
Min = 0.0 in. @ -0.0 msec



SAE Filter Class 60

Test 1030
ENGINE TOP X (ACC #3)
Max = 18.4 G's @ 54.5 msec
Min = -71.3 G's @ 40.7 msec

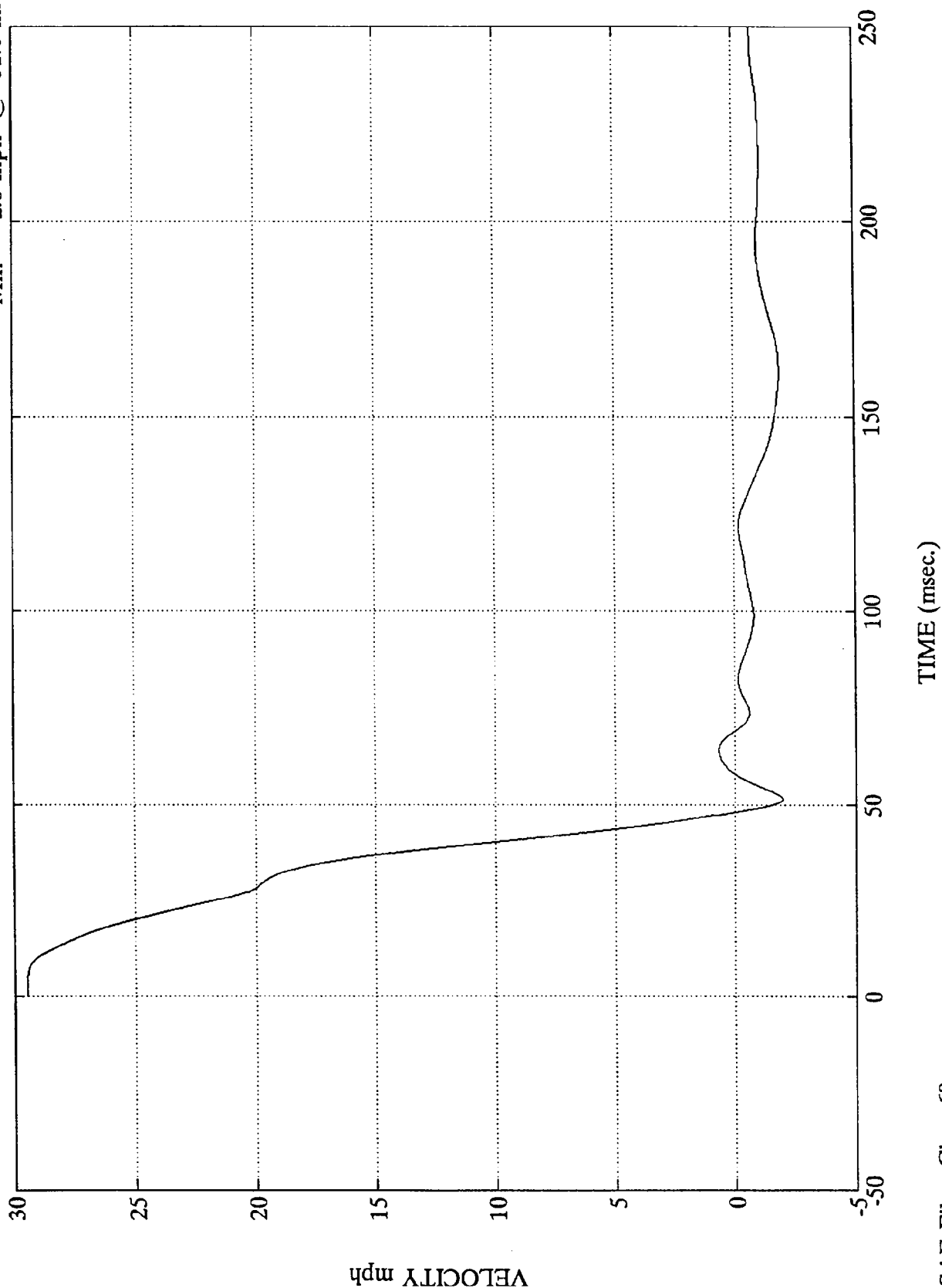


SAE FILTER CLASS 60

Max = 29.5 mph @ 2.4 msec
Min = -2.0 mph @ 51.6 msec

ENGINE TOP X (ACC#3)

Test 1030

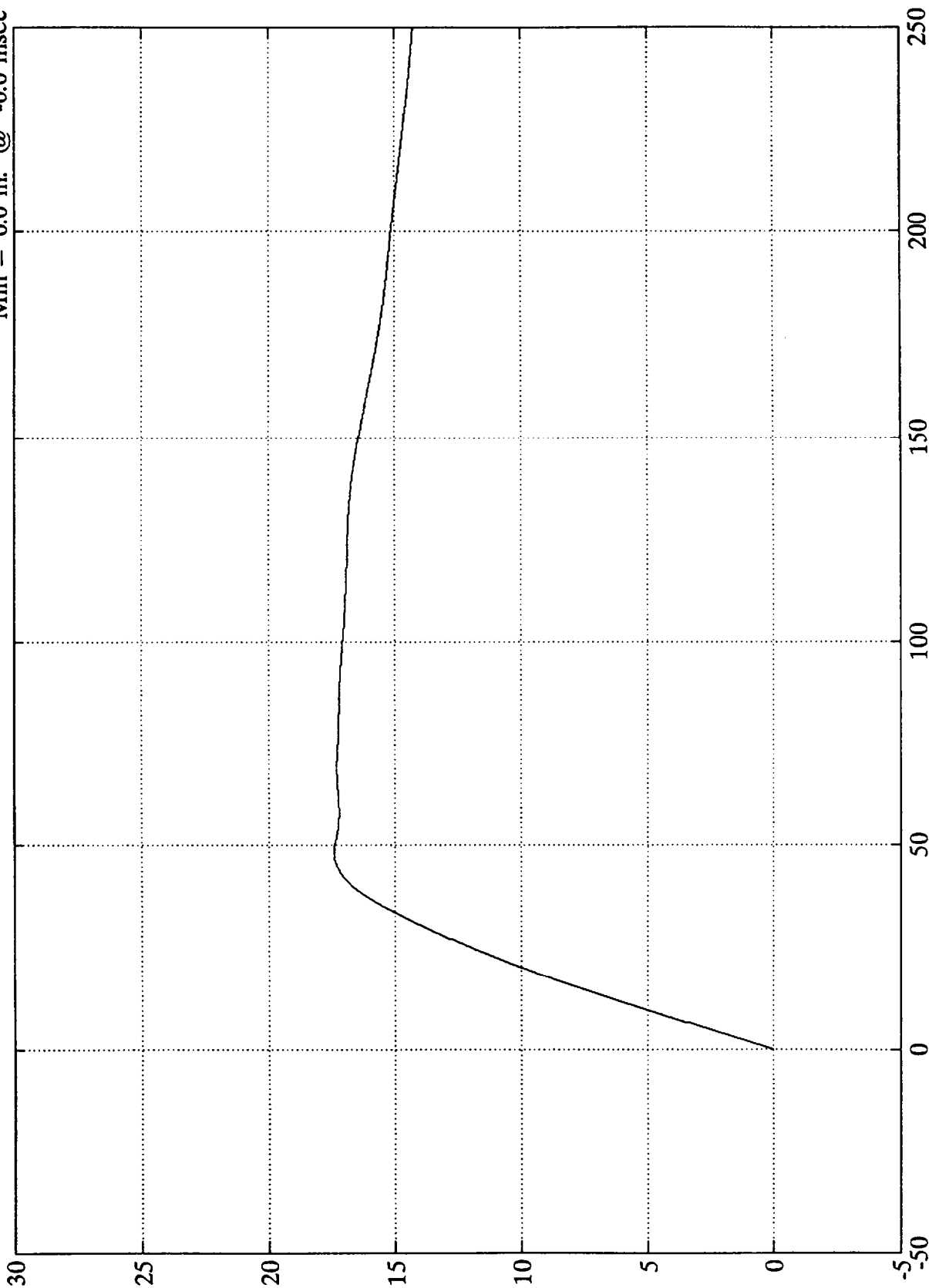


SAE Filter Class 60

Test 1030
ENGINE TOP X (ACC#3)
Max = 17.4 in. @ 49.0 msec
Min = 0.0 in. @ -0.0 msec

DISPLACEMENT in.

TIME (msec.)

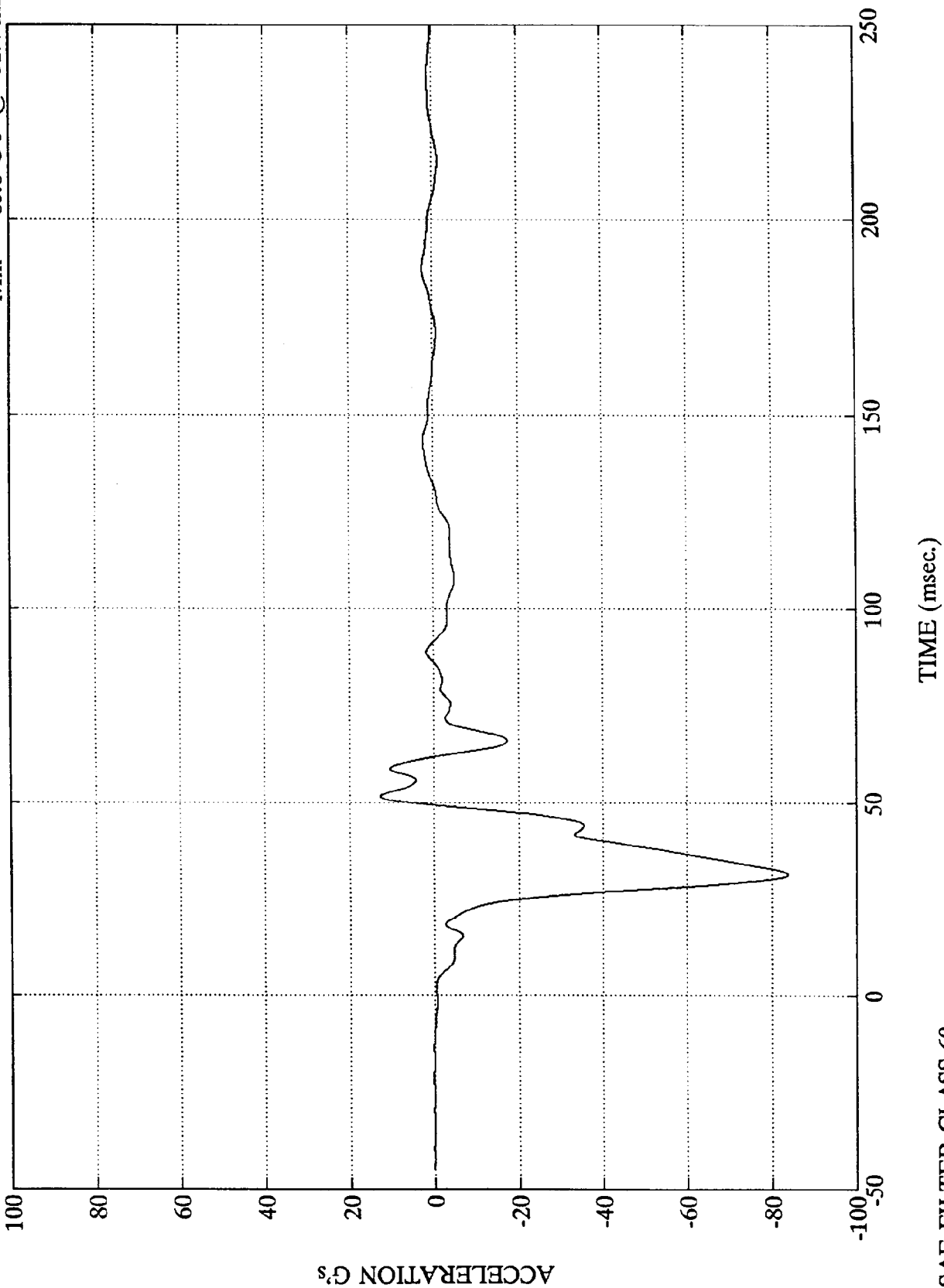


SAE Filter Class 60

Test 1030

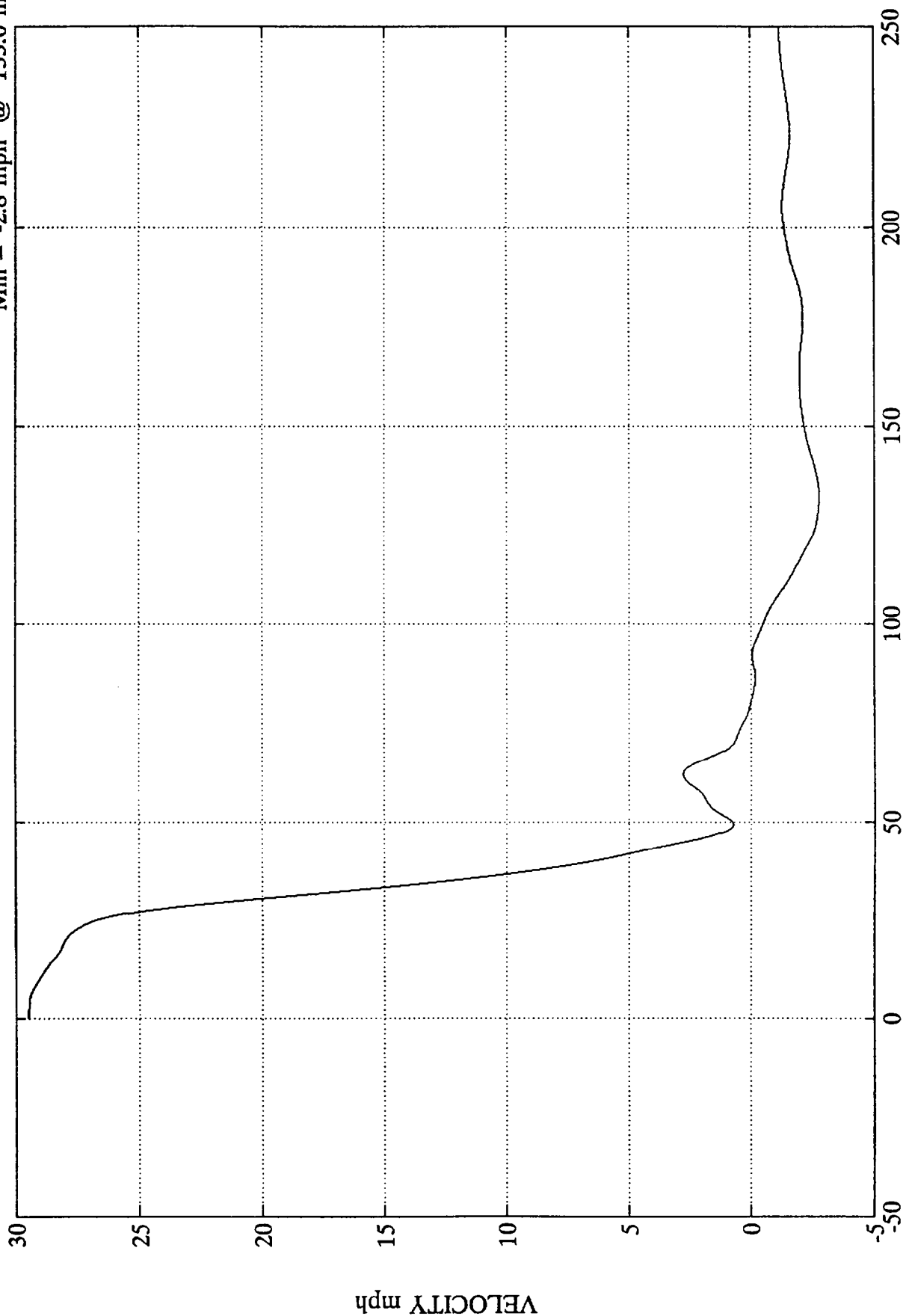
ENGINE BOTTOM X (ACC #4)

Max = 12.8 G's @ 51.8 msec
Min = -83.8 G's @ 31.4 msec



Test 1030
Max = 29.5 mph @ 0.2 msec
Min = -2.8 mph @ 133.0 msec

ENGINE BOTTOM X (ACC#4)



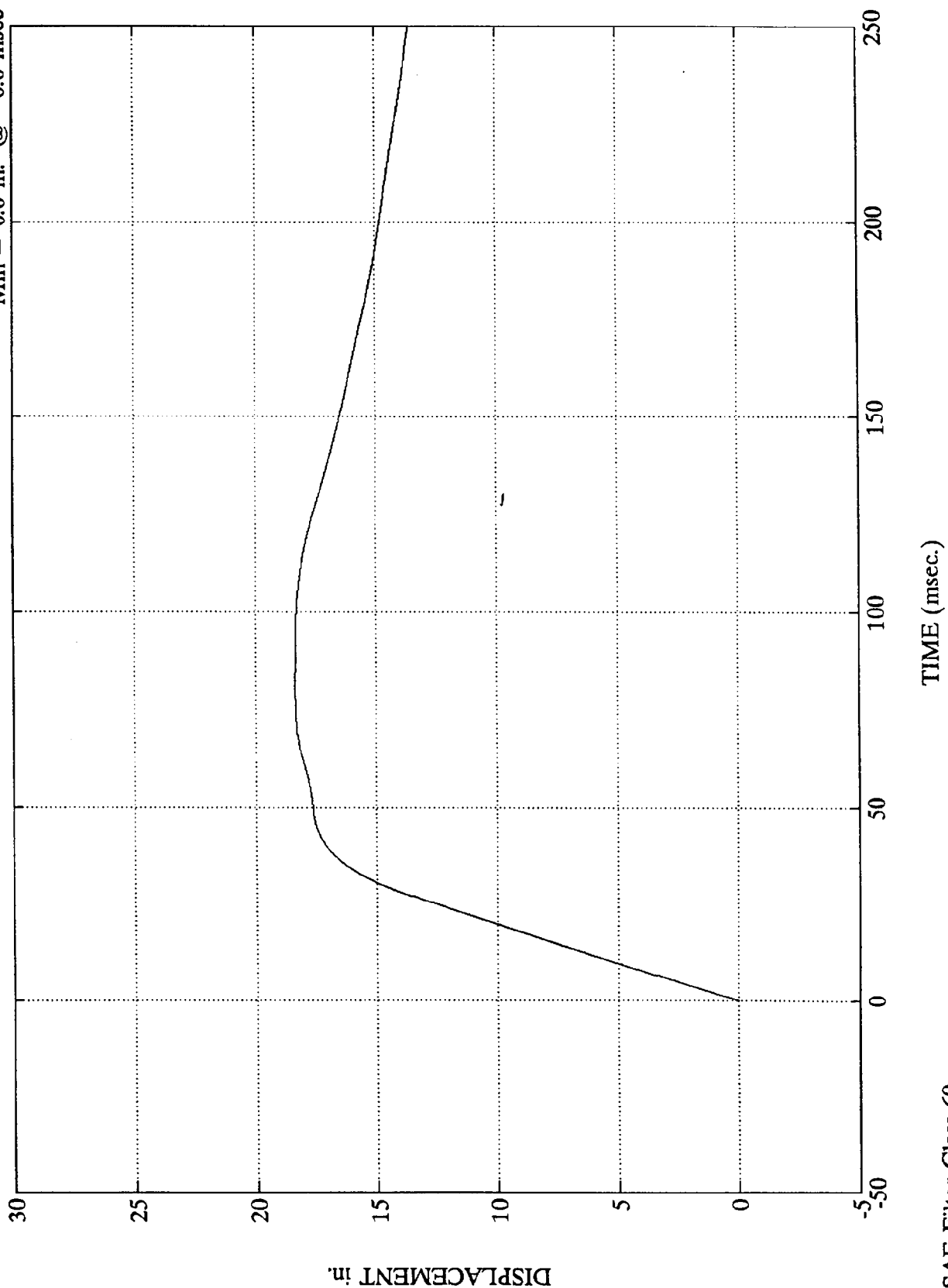
TIME (msec.)

SAE Filter Class 60

Test 1030

ENGINE BOTTOM X (ACC#4)

Max = 18.4 in. @ 84.5 msec
Min = 0.0 in. @ -0.0 msec

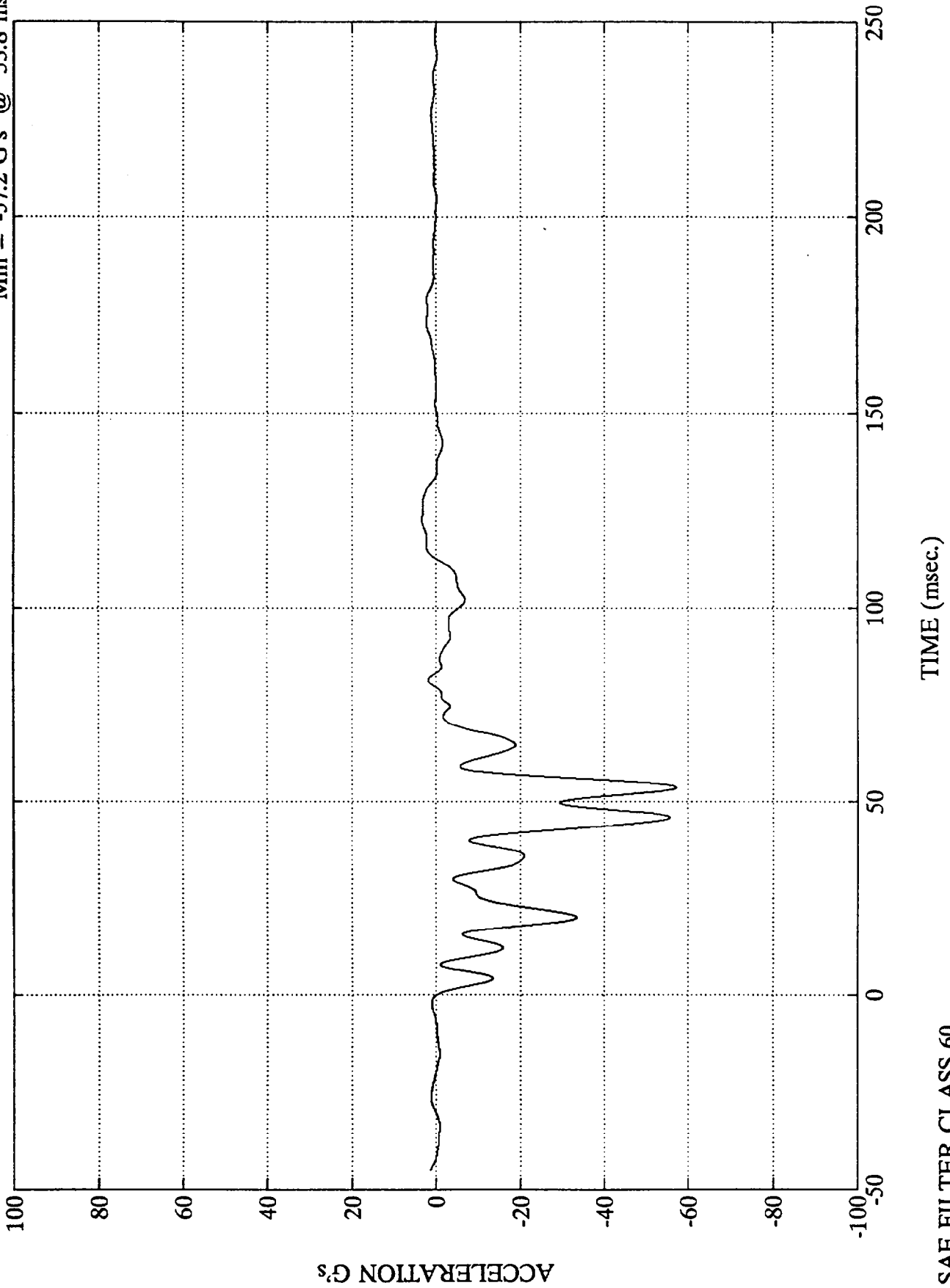


SAE Filter Class 60

Test 1030

R. BRAKE CALIPER X (ACC #5)

Max = 3.4 G's @ 122.6 msec
Min = -57.2 G's @ 53.8 msec

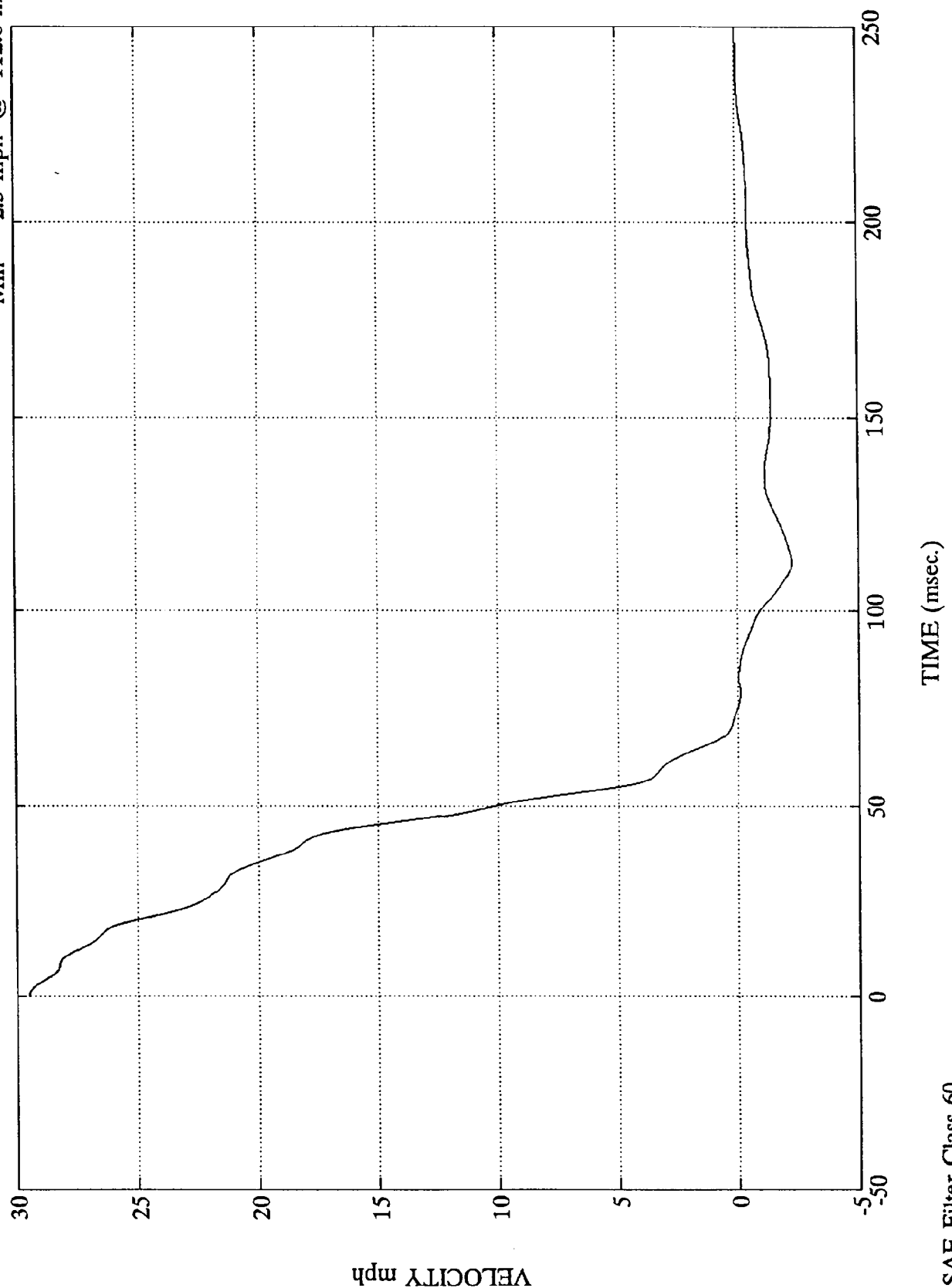


SAE FILTER CLASS 60

Max = 29.5 mph @ 0.2 msec
Min = -2.3 mph @ 112.8 msec

R. BRAKE CALIPER X (ACC#5)

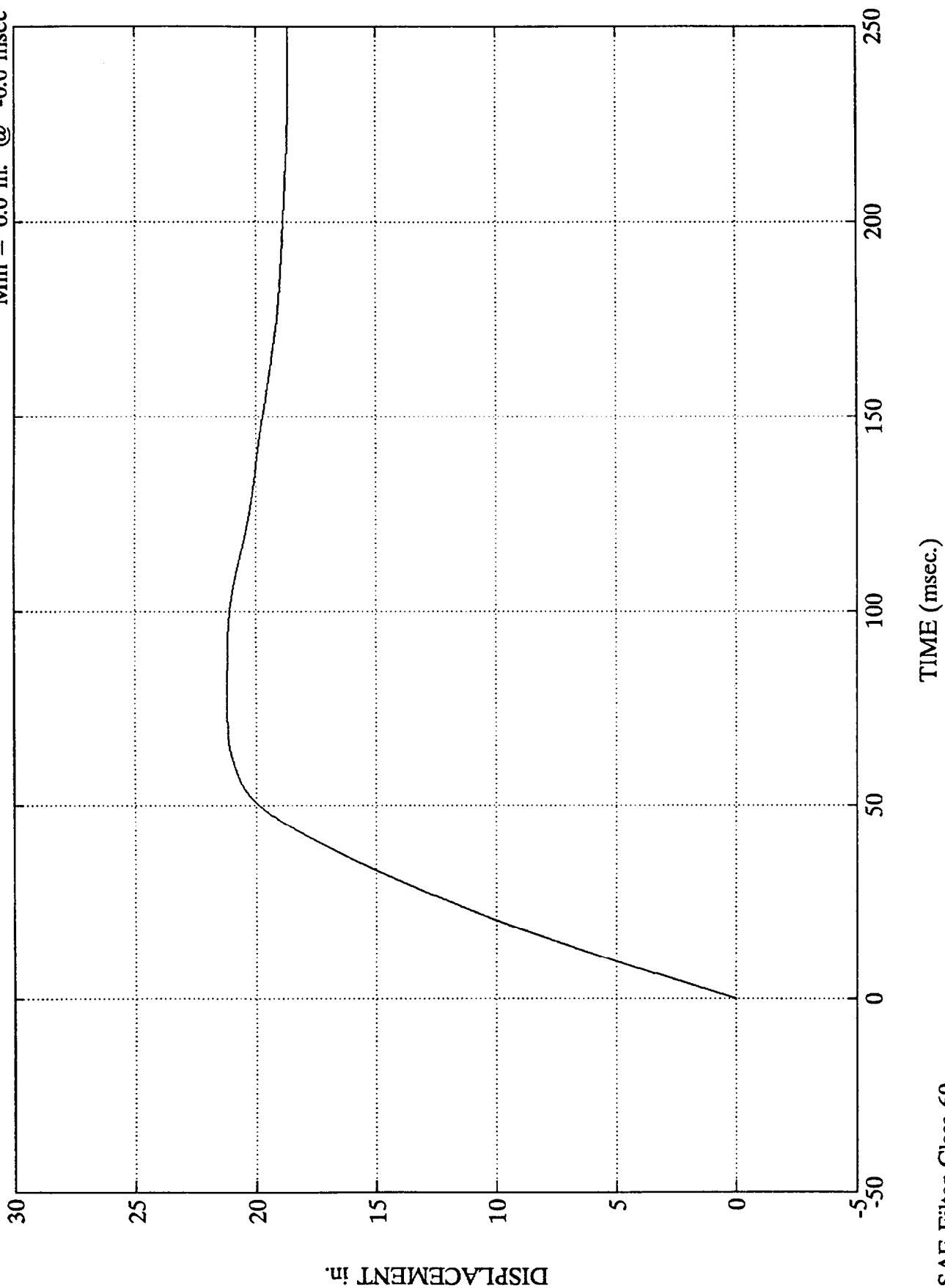
Test 1030



SAE Filter Class 60

Test 1030
Max = 21.2 in. @ 84.5 msec
Min = 0.0 in. @ -0.0 msec

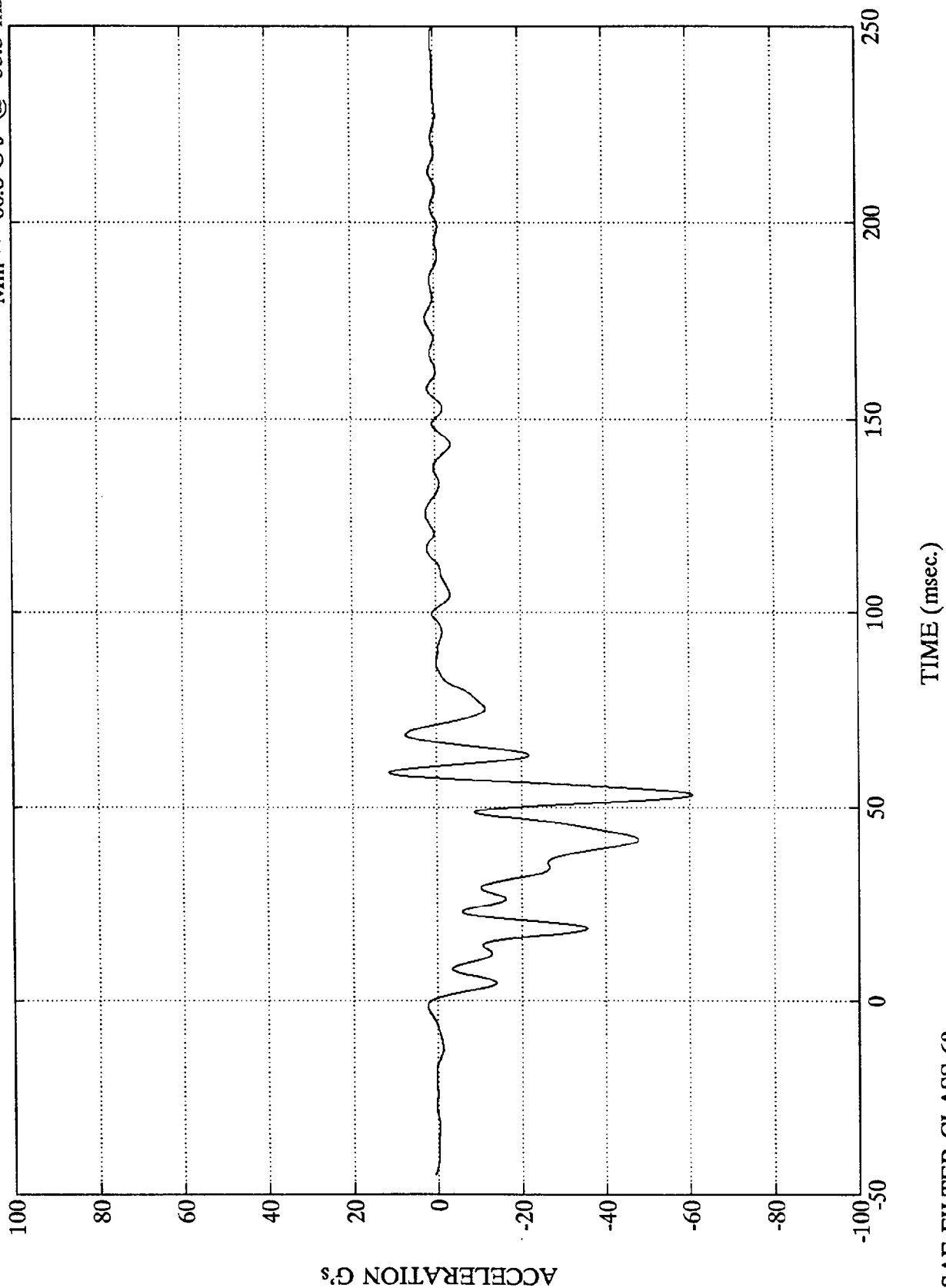
R. BRAKE CALIPER X (ACC#5)



SAE Filter Class 60

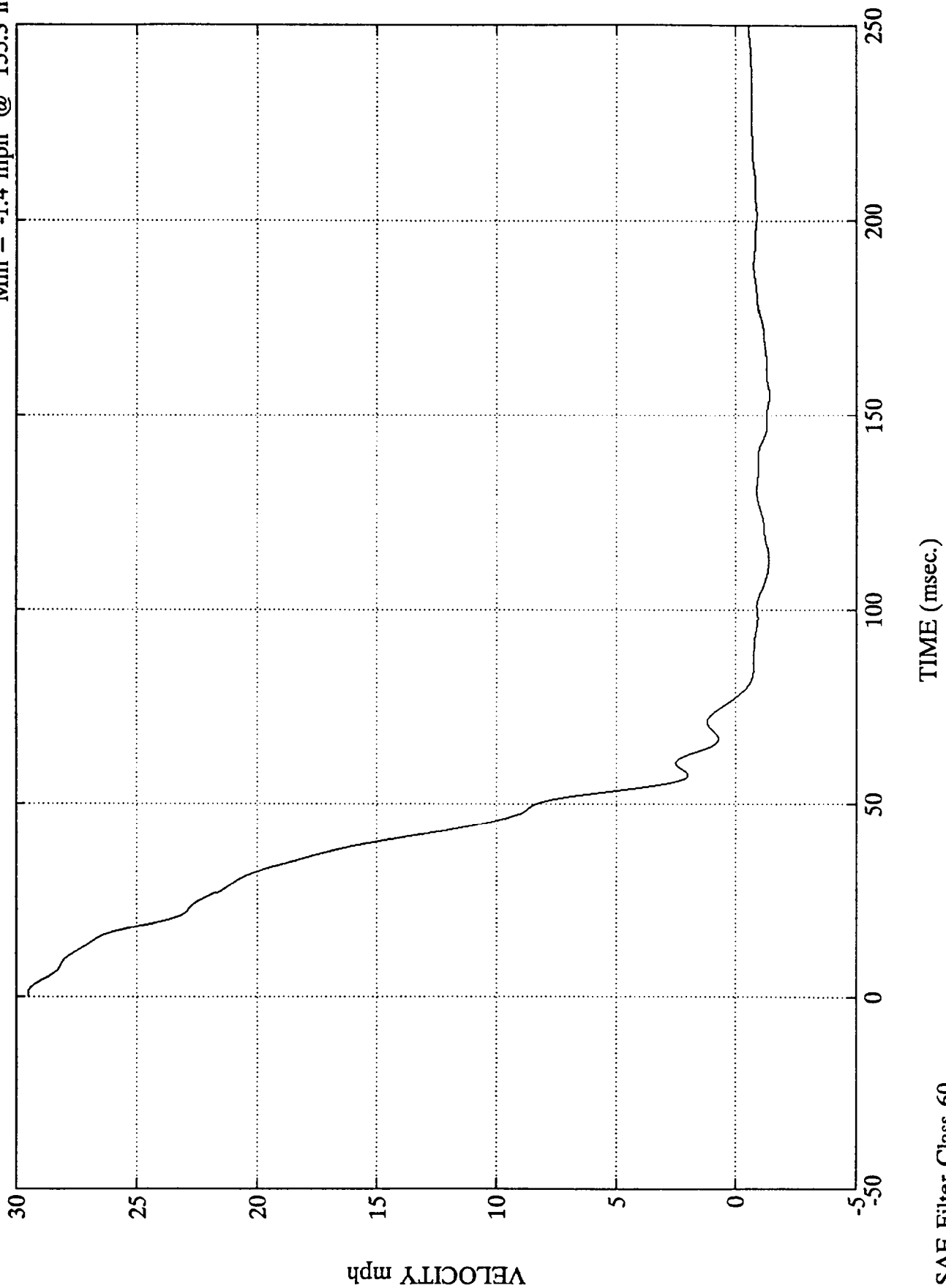
Test 1030
L BRAKE CALIPER X (ACC #6)
Max = 11.3 G's @ 58.9 msec
Min = -60.8 G's @ 53.3 msec

SAE FILTER CLASS 60



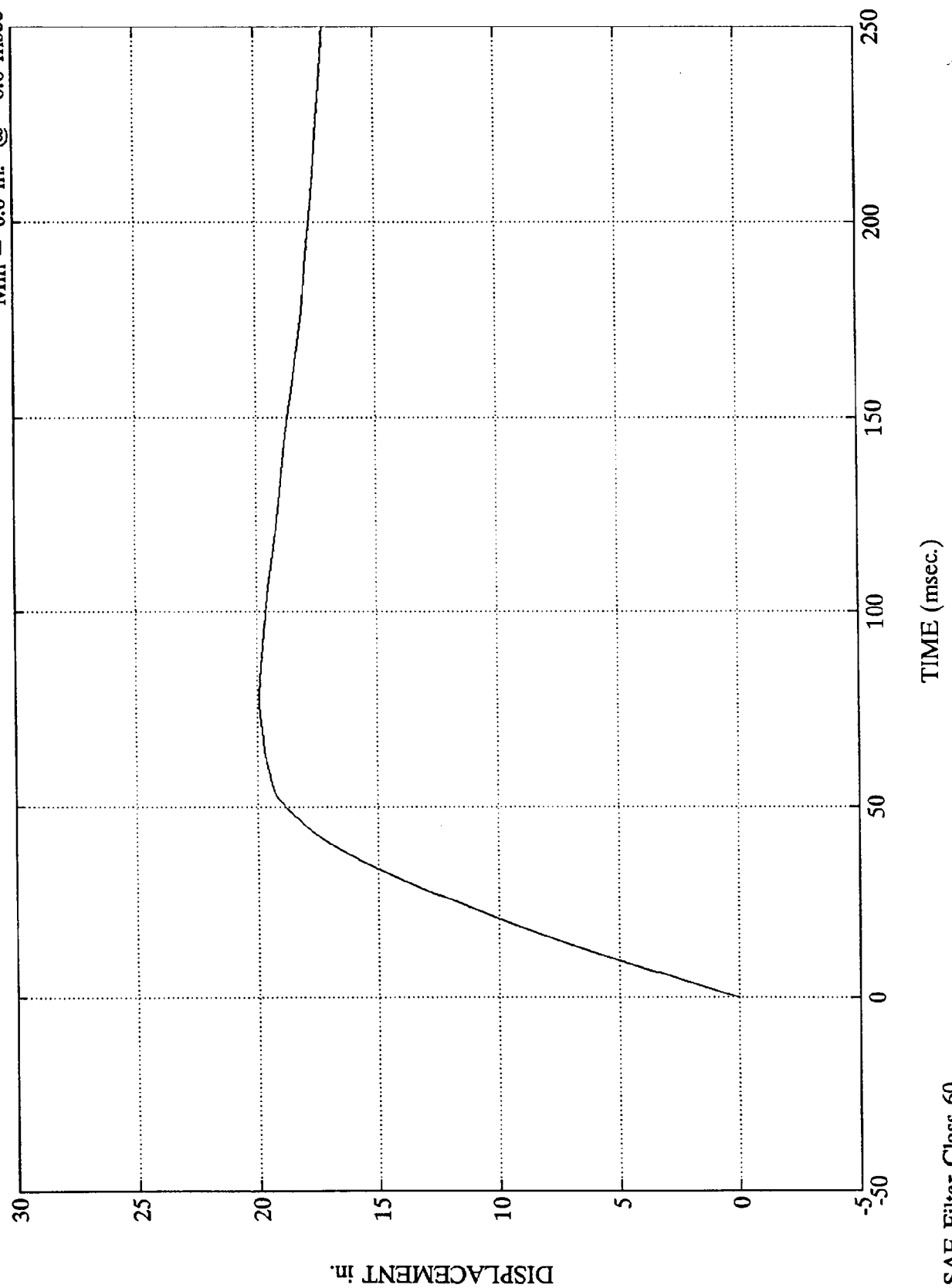
Test 1030
Max = 29.5 mph @ 1.0 msec
Min = -1.4 mph @ 155.3 msec

L BRAKE CALIPER X (ACC#6)



SAE Filter Class 60

Test 1030
L BRAKE CALIPER X (ACC#6)
Max = 19.9 in. @ 79.2 msec
Min = 0.0 in. @ -0.0 msec

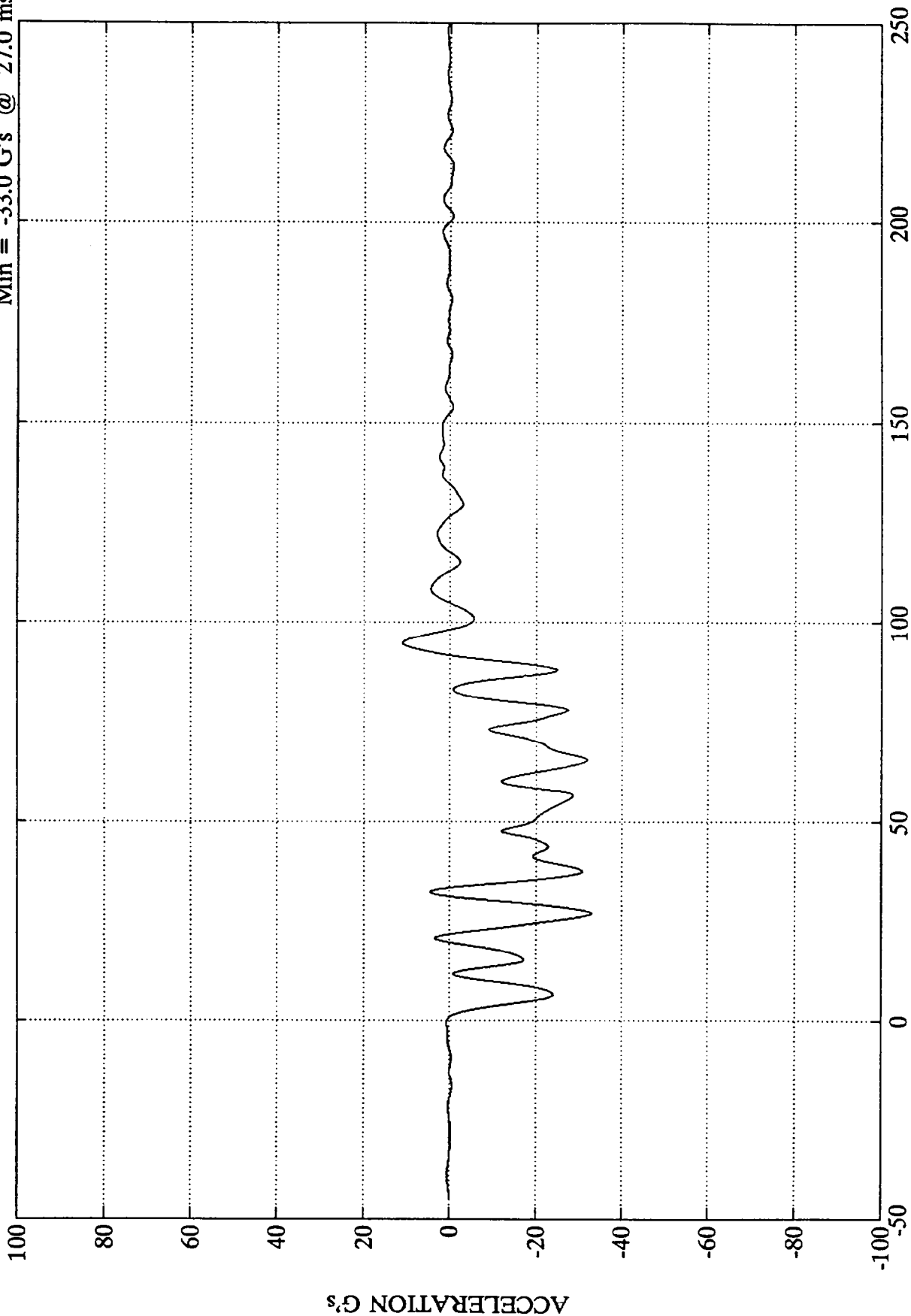


SAE Filter Class 60

Test 1030
Max = 11.0 G's @ 94.8 msec
Min = -33.0 G's @ 27.0 msec

INSTRUMENT PANEL X (ACC#7)

Test 1030

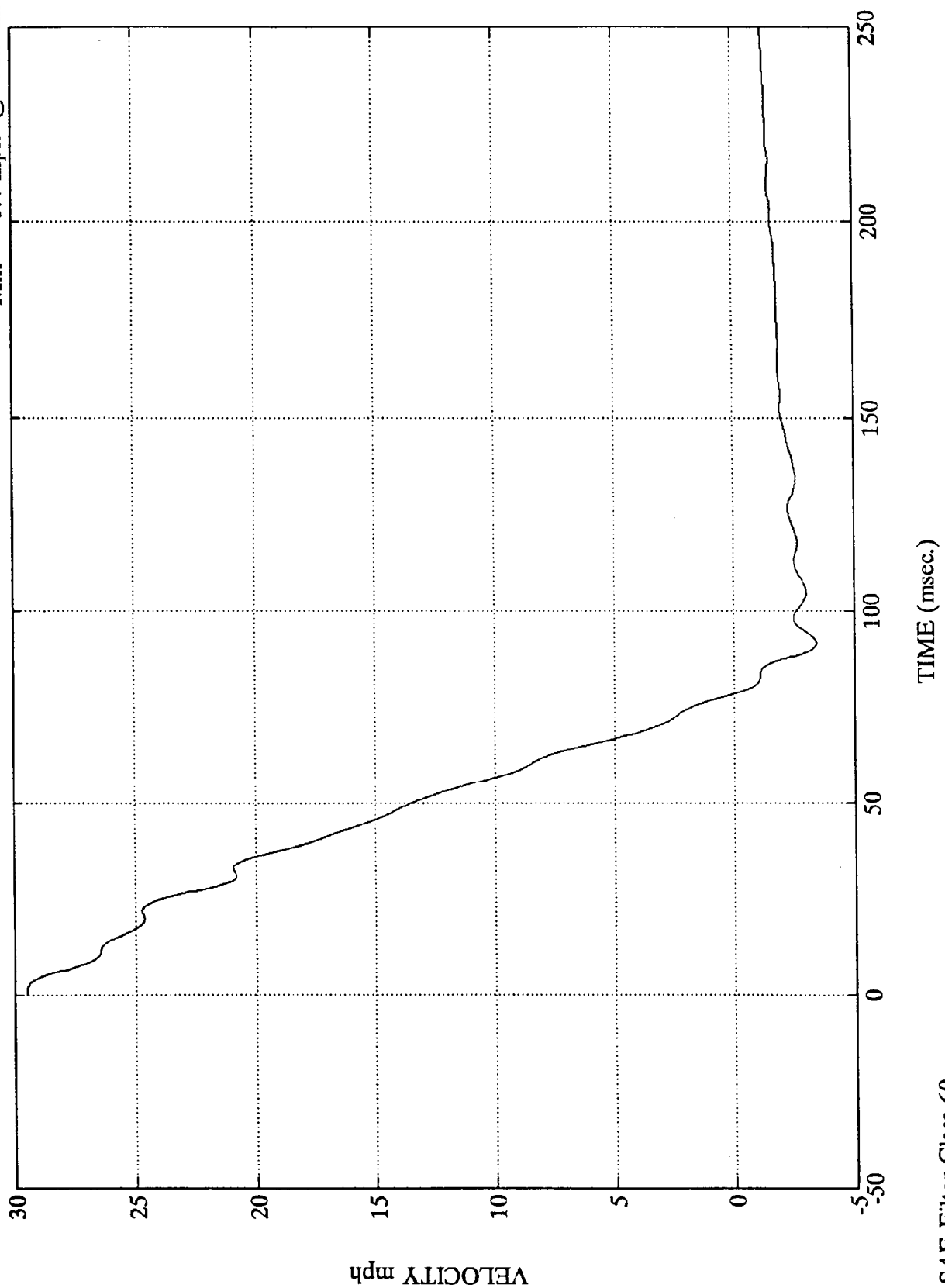


SAE FILTER CLASS 60

Test 1030

Max = 29.5 mph @ 1.2 msec
Min = -3.4 mph @ 91.9 msec

INSTRUMENT PANEL X (ACC#7)

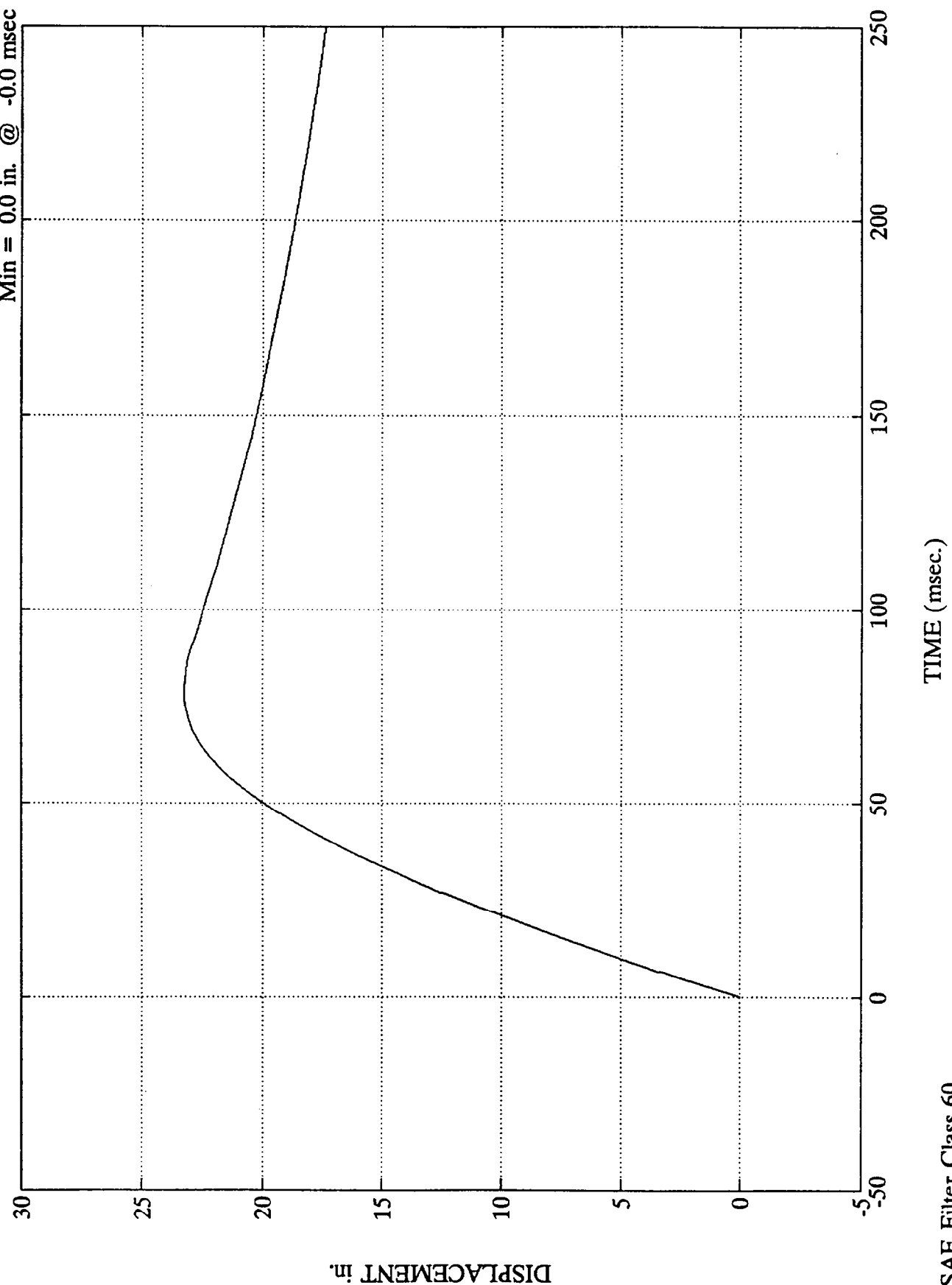


SAE Filter Class 60

Test 1030

Max = 23.2 in. @ 79.0 msec
Min = 0.0 in. @ -0.0 msec

INSTRUMENT PANEL X (ACC#7)



SAE Filter Class 60

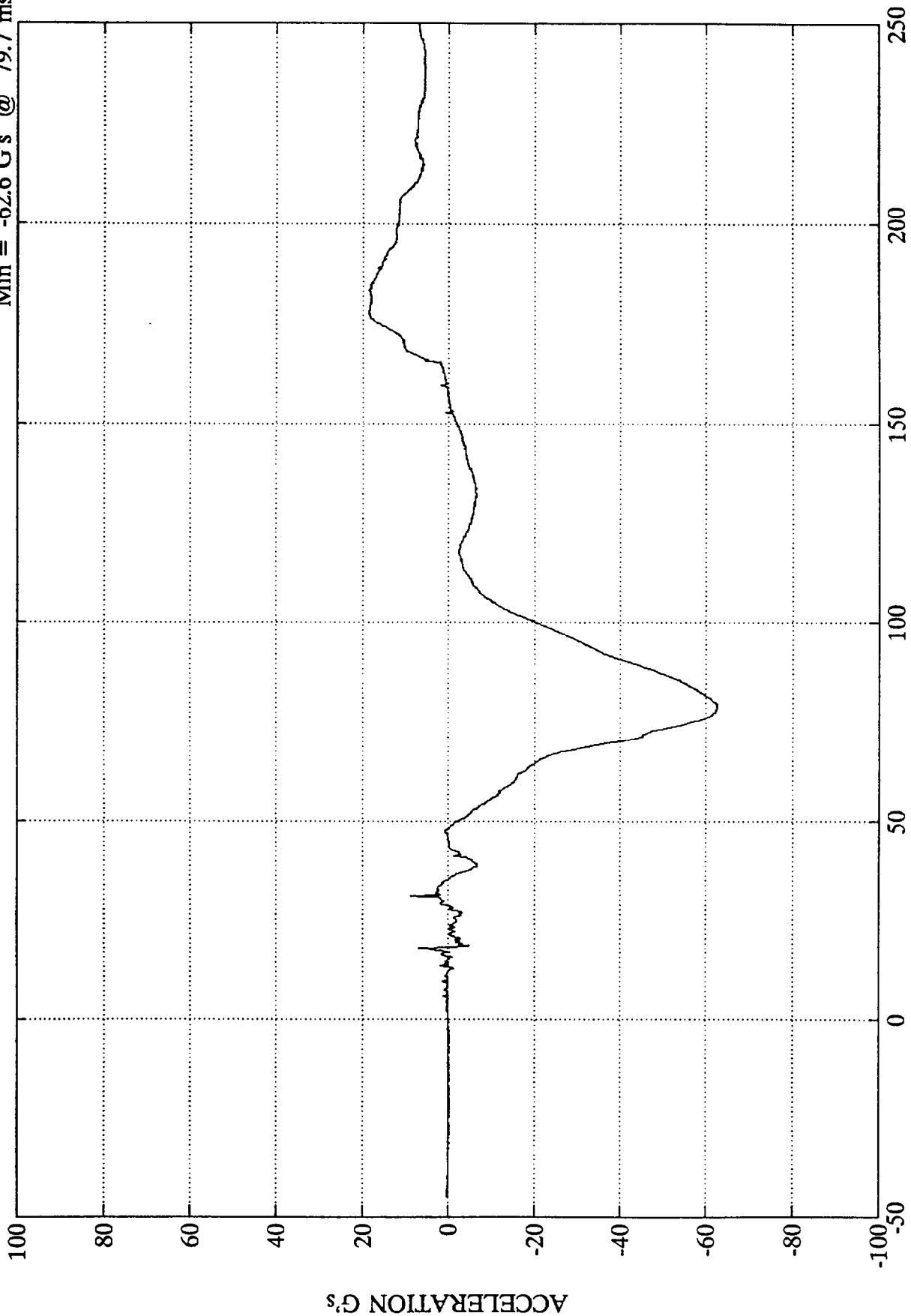
TEST NO. CM5103

DUMMY DATA	FILTER CHANNEL CLASS
Head Accelerations	1000
Chest Accelerations	180
Femur Forces	600

Test 1030
Max = 18.6 G's @ 183.5 msec
Min = -62.6 G's @ 79.7 msec

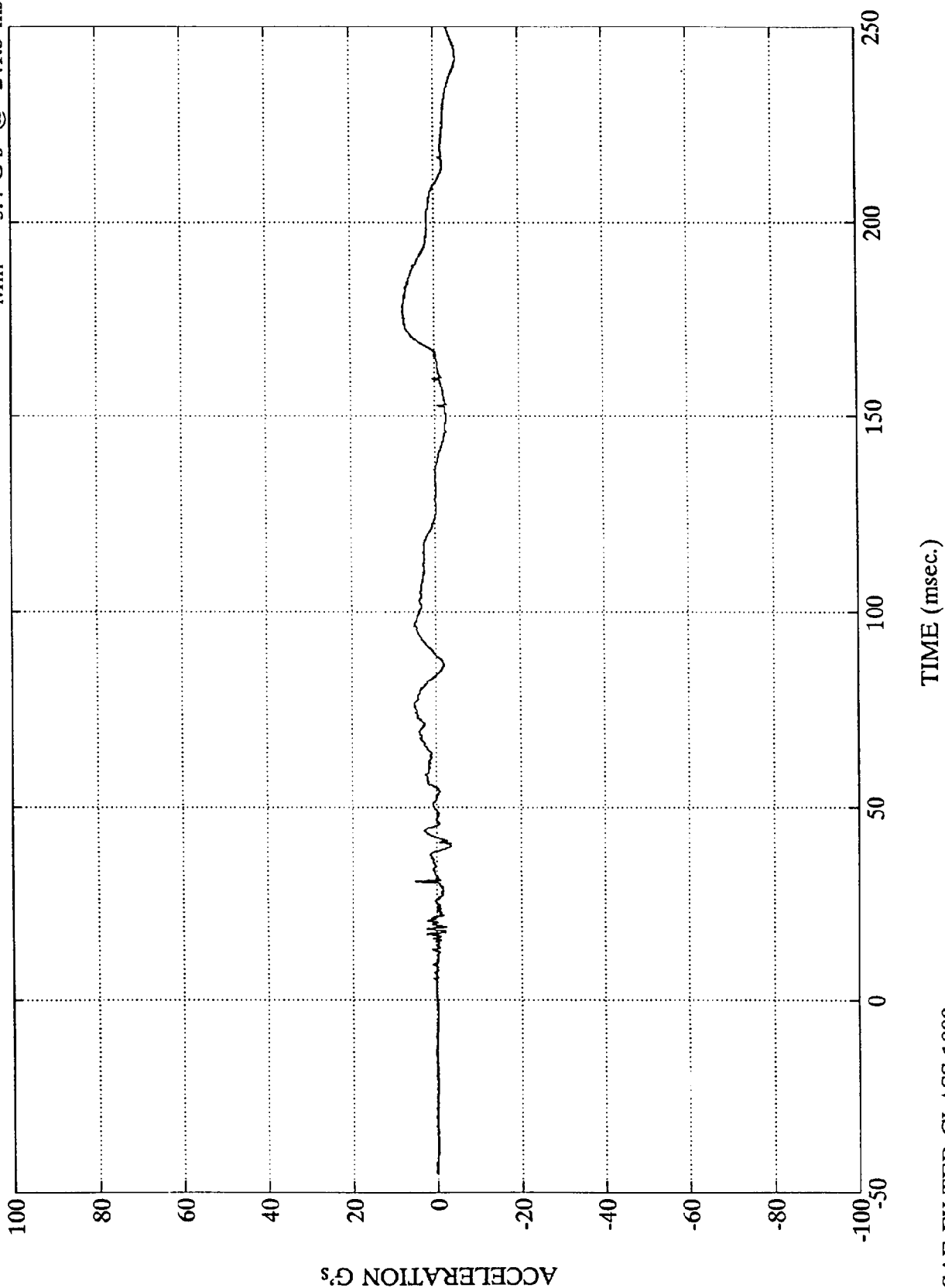
POS #1 HEAD X

SAE FILTER CLASS 1000



Test 1030
Max = 7.6 G's @ 178.6 msec
Min = -5.4 G's @ 241.3 msec

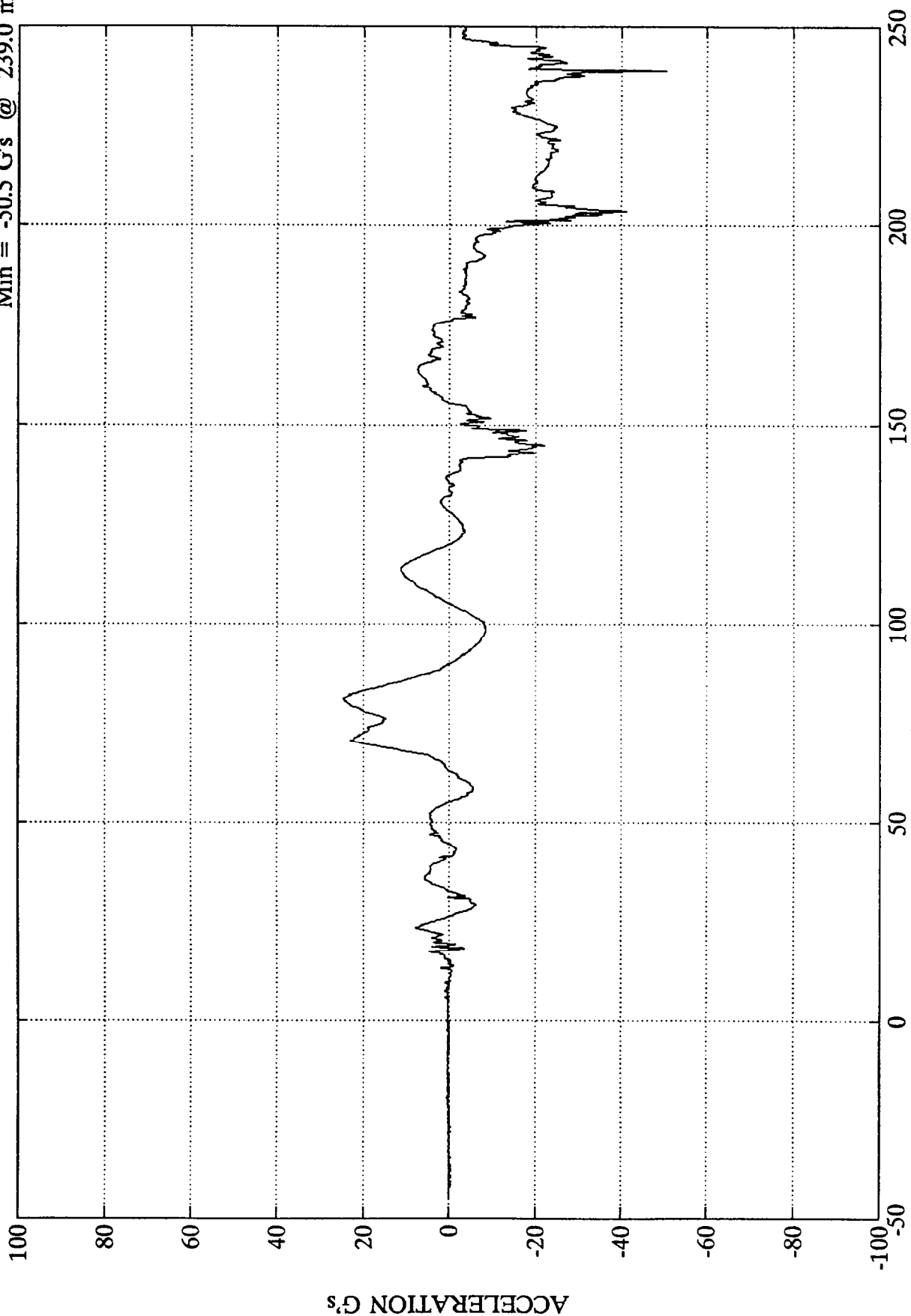
POS #1 HEAD Y



SAE FILTER CLASS 1000

Test 1030
Max = 24.6 G's @ 81.6 msec
Min = -50.5 G's @ 239.0 msec

POS #1 HEAD Z



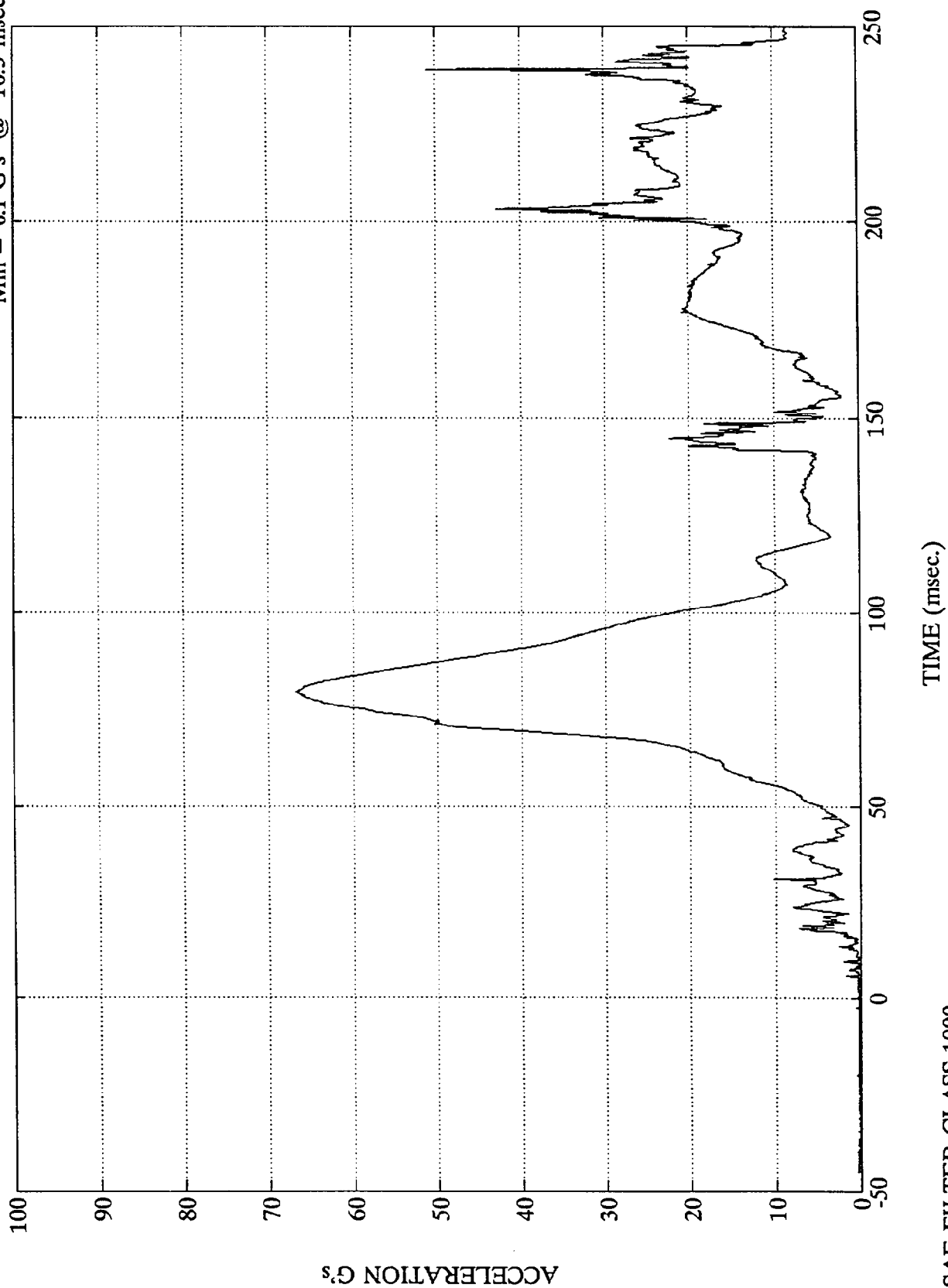
TIME (msec.)

SAE FILTER CLASS 1000

Test 1030

Max = 66.8 G's @ 79.7 msec
Min = 0.1 G's @ 10.3 msec

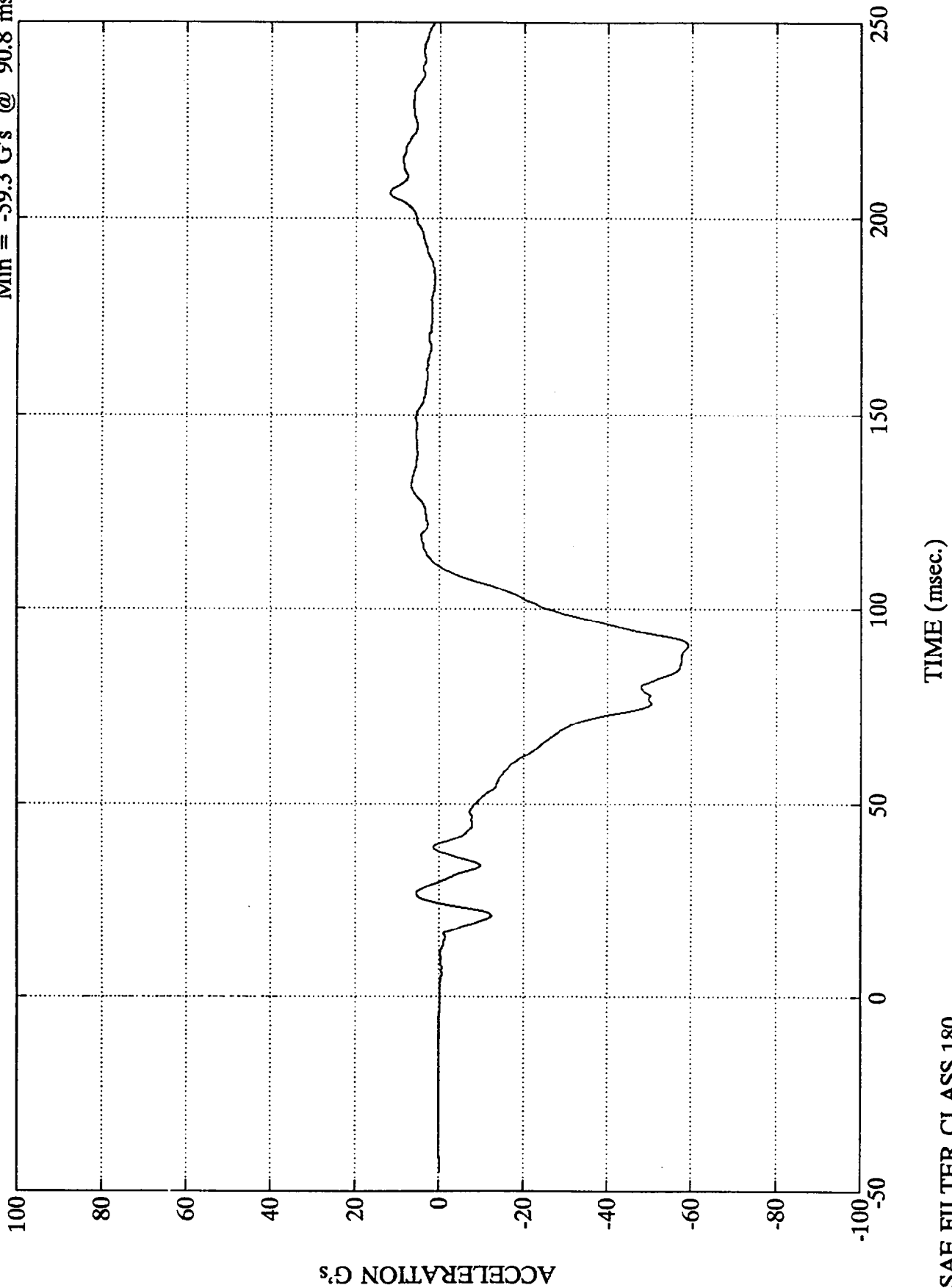
POS #1 HEAD RESULTANT



Test 1030

POS #1 CHEST X

Max = 11.8 G's @ 206.5 msec
Min = -59.3 G's @ 90.8 msec

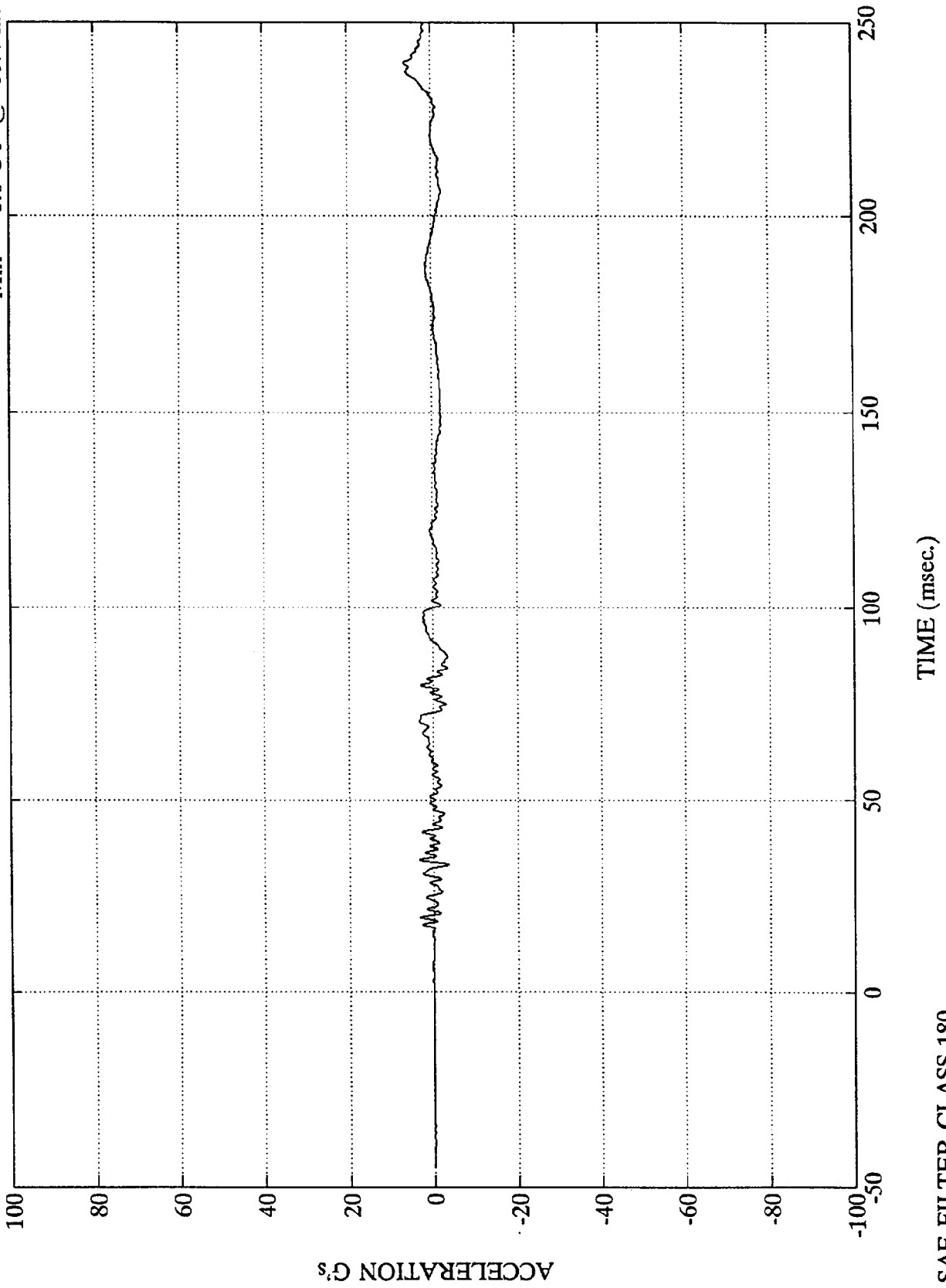


SAE FILTER CLASS 180

Test 1030

Max = 6.4 G's @ 239.4 msec
Min = -3.6 G's @ 33.4 msec

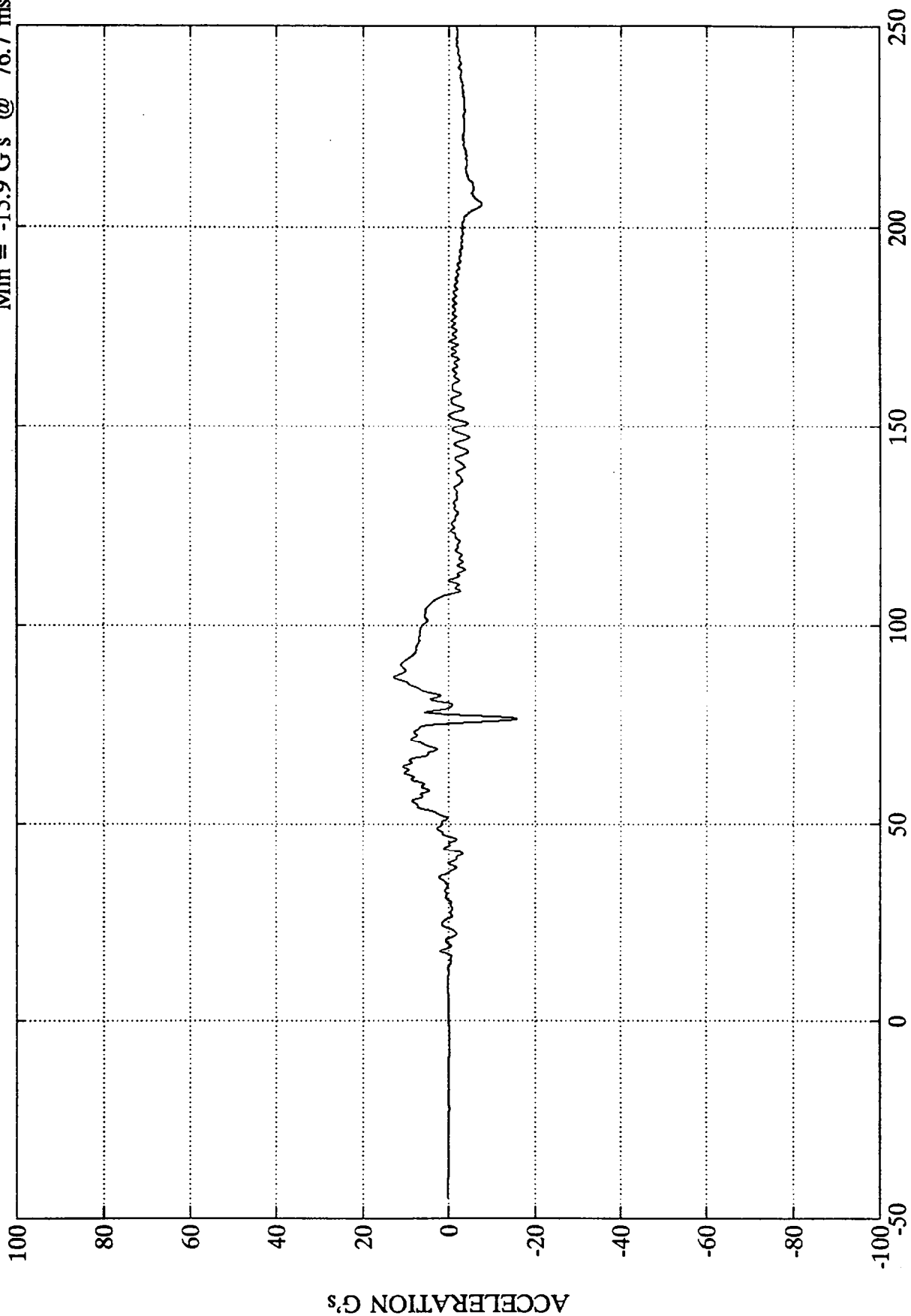
POS #1 CHEST Y



Test 1030
Max = 12.7 G's @ 86.9 msec
Min = -15.9 G's @ 76.7 msec

POS #1 CHEST Z

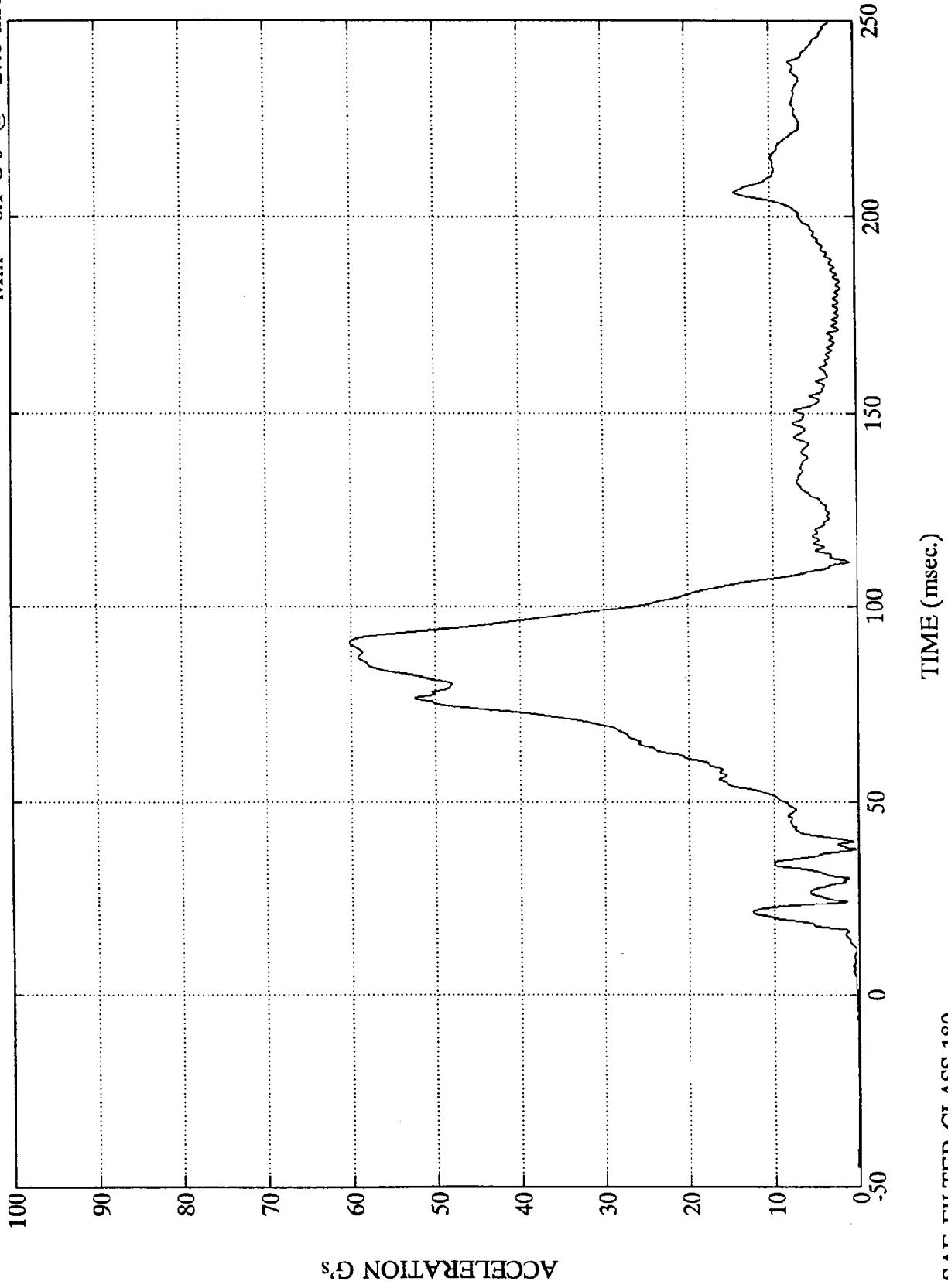
SAE FILTER CLASS 180



Test 1030
Max = 60.2 G's @ 90.6 msec
Min = 0.1 G's @ -27.0 msec

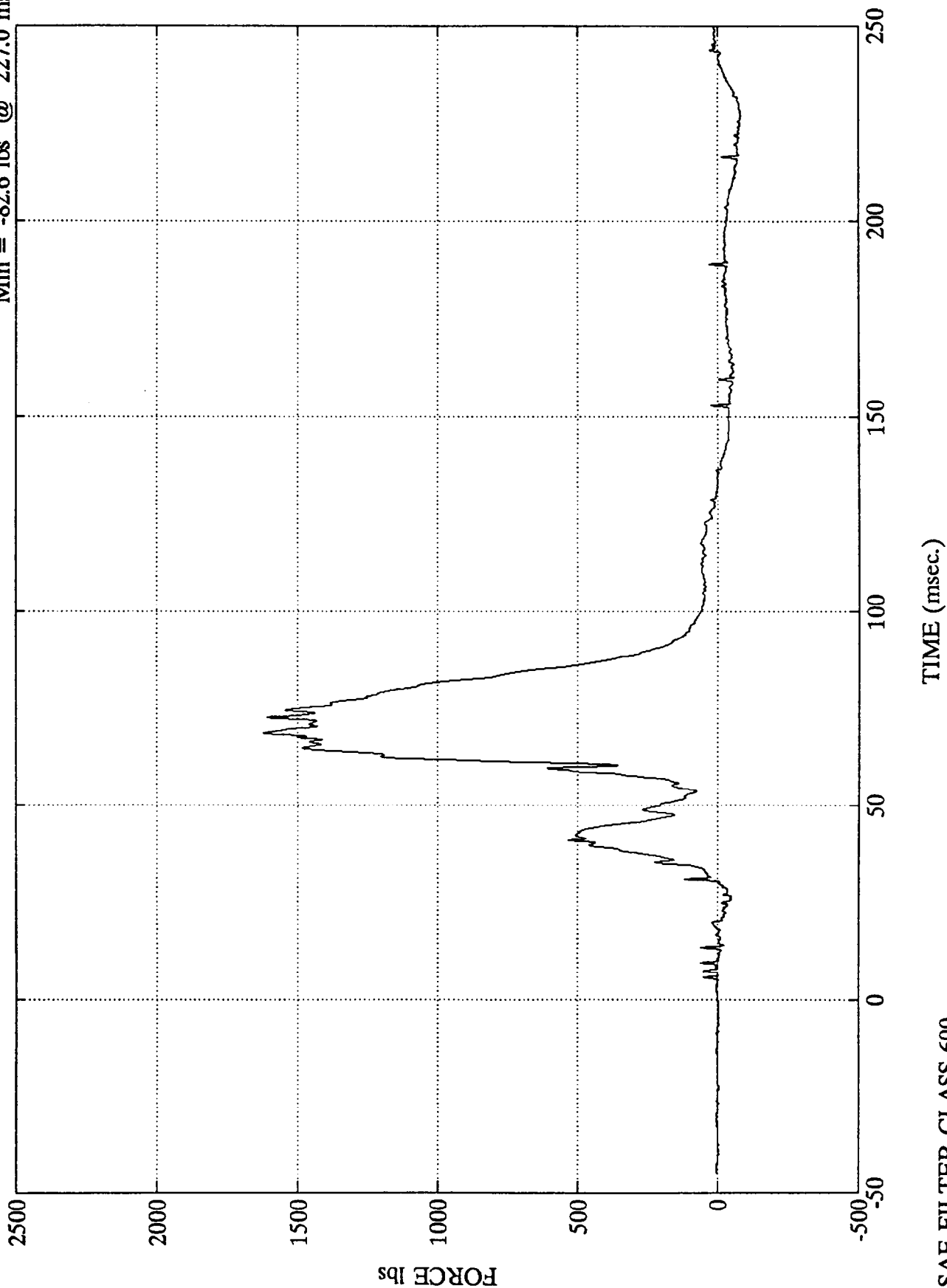
POS #1 CHEST RESULTANT

SAE FILTER CLASS 180



Test 1030
Max = 1622.3 lbs @ 69.0 msec
Min = -82.6 lbs @ 227.0 msec

POS #1 LEFT FEMUR

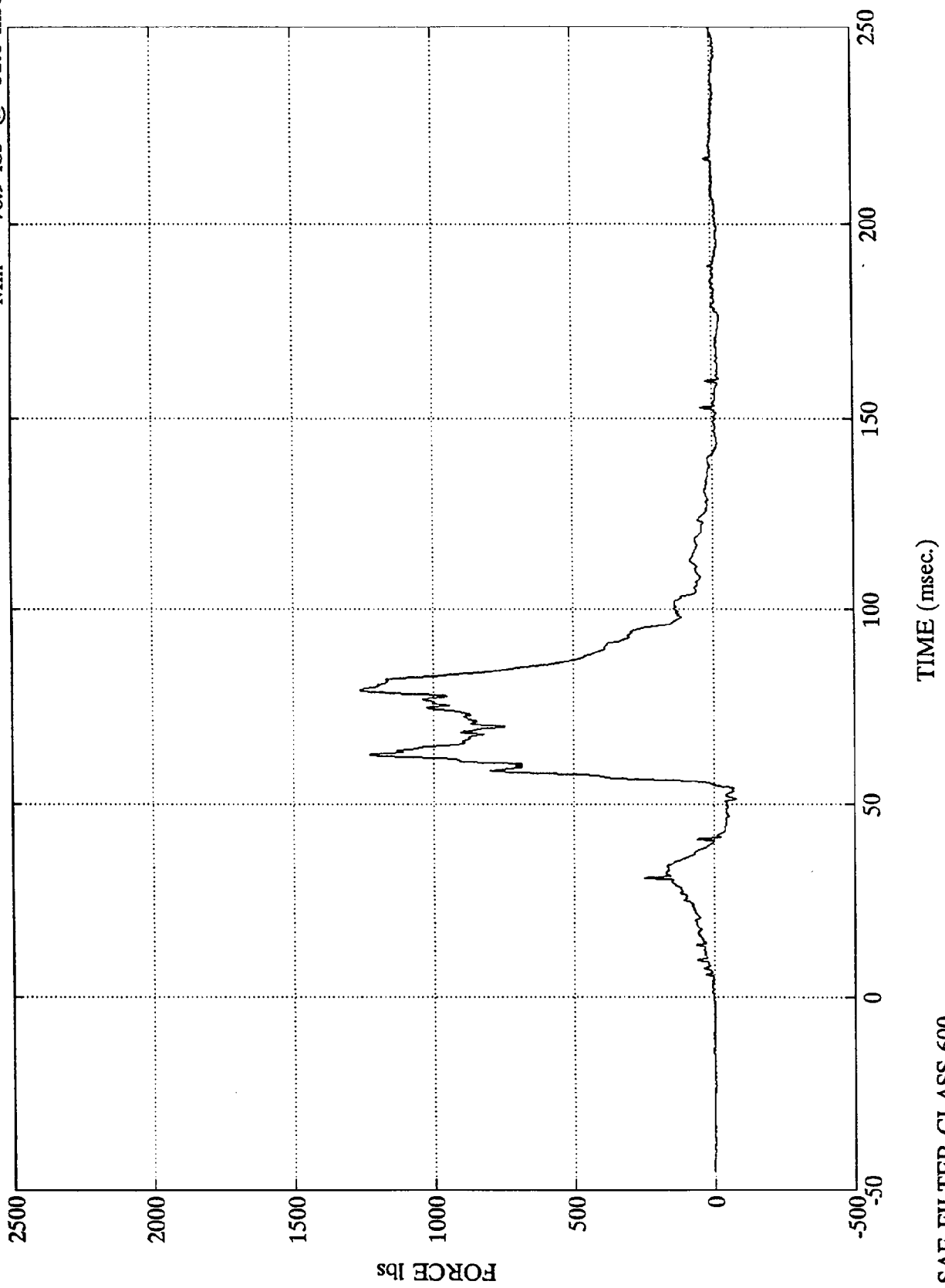


SAE FILTER CLASS 600

Test 1030

POS #1 RIGHT FEMUR

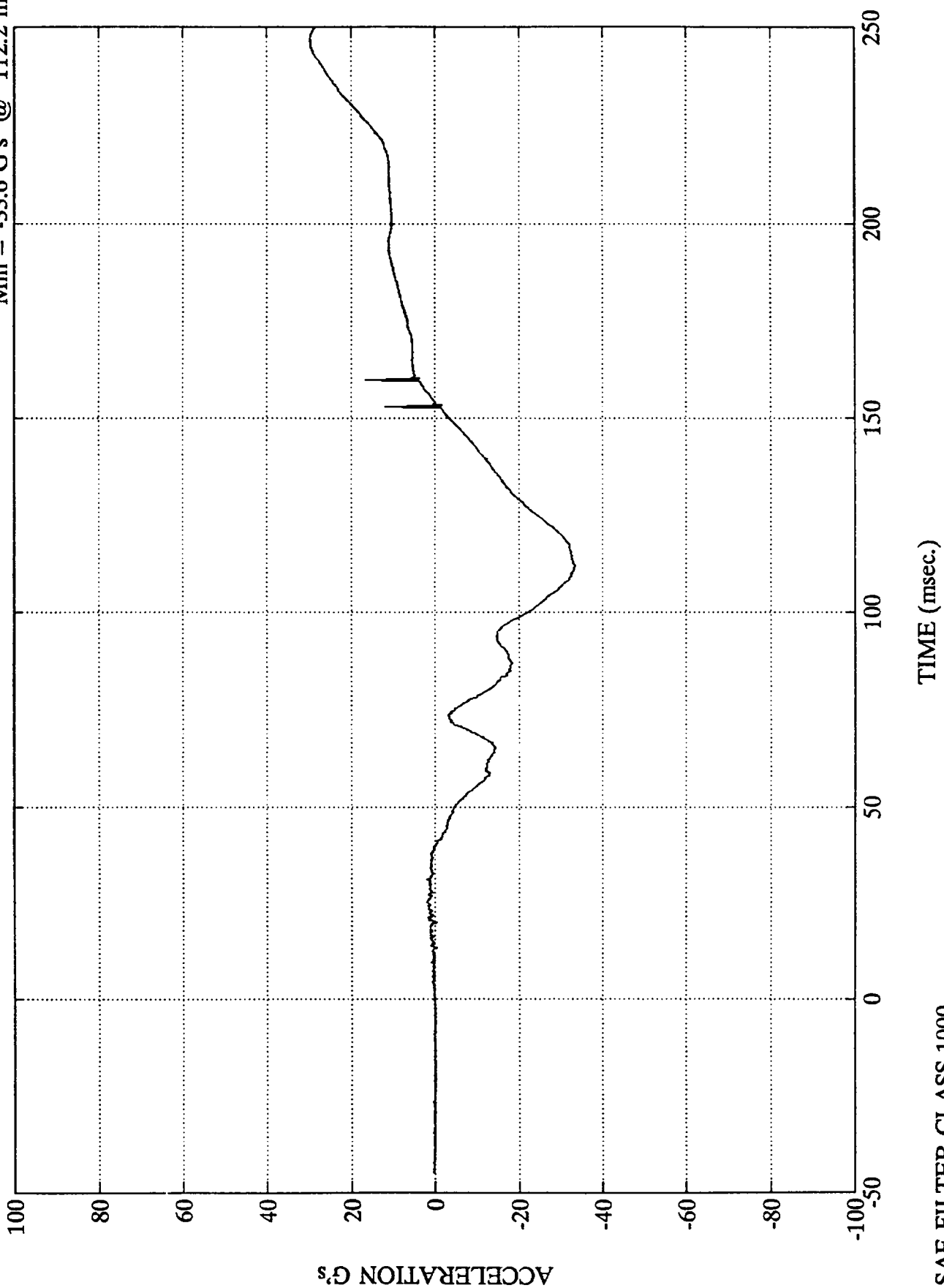
Max = 1263.2 lbs @ 79.2 msec
Min = -78.9 lbs @ 51.6 msec



SAE FILTER CLASS 600

Test 1030
Max = 29.9 G's @ 247.3 msec
Min = -33.6 G's @ 112.2 msec

POS #2 HEAD X

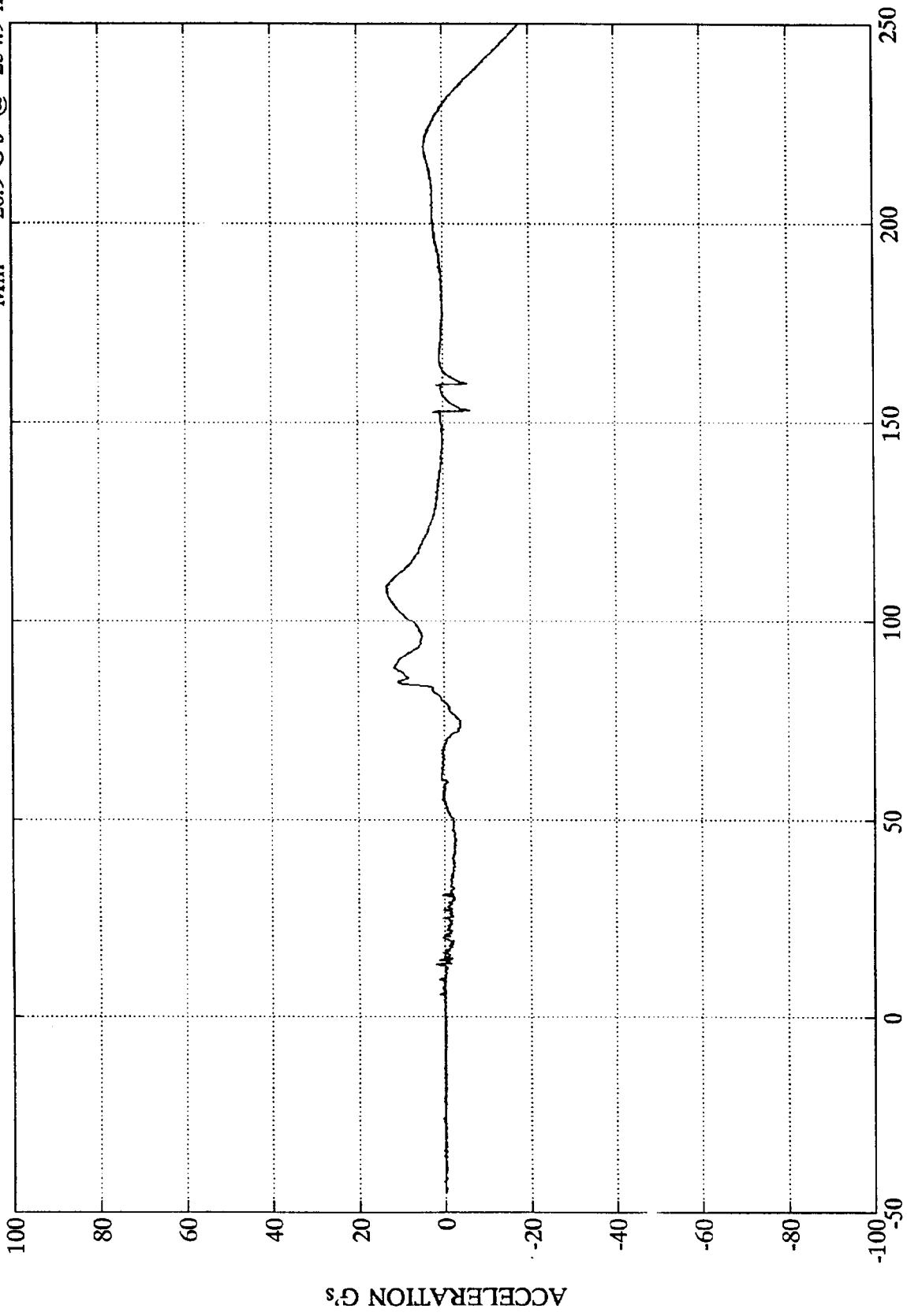


SAE FILTER CLASS 1000

Max = 13.4 G's @ 108.7 msec
Min = -20.9 G's @ 254.9 msec

POS #2 HEAD Y

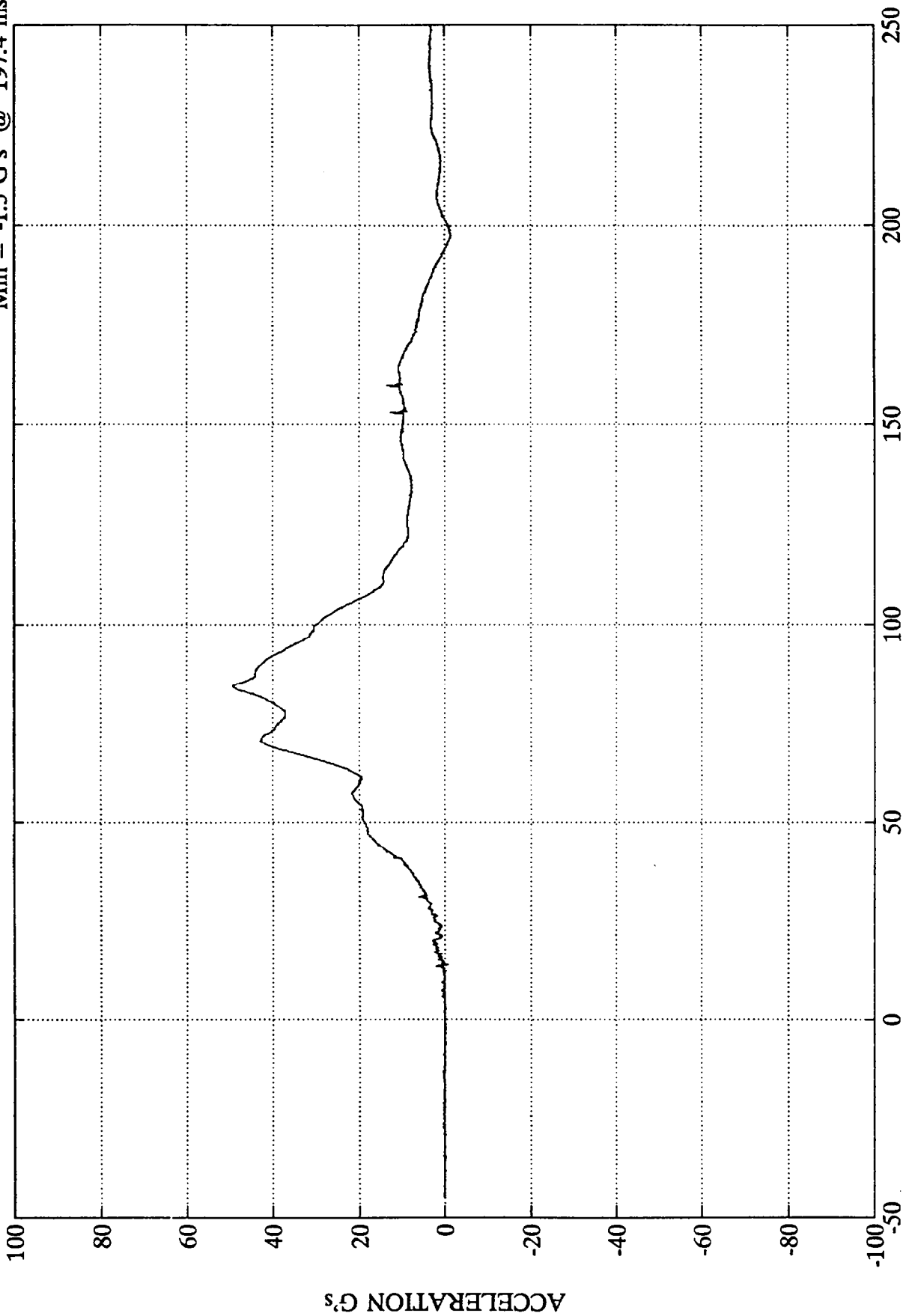
Test 1030



SAE FILTER CLASS 1000

Test 1030
Max = 49.3 G's @ 84.5 msec
Min = -1.5 G's @ 197.4 msec

POS #2 HEAD Z



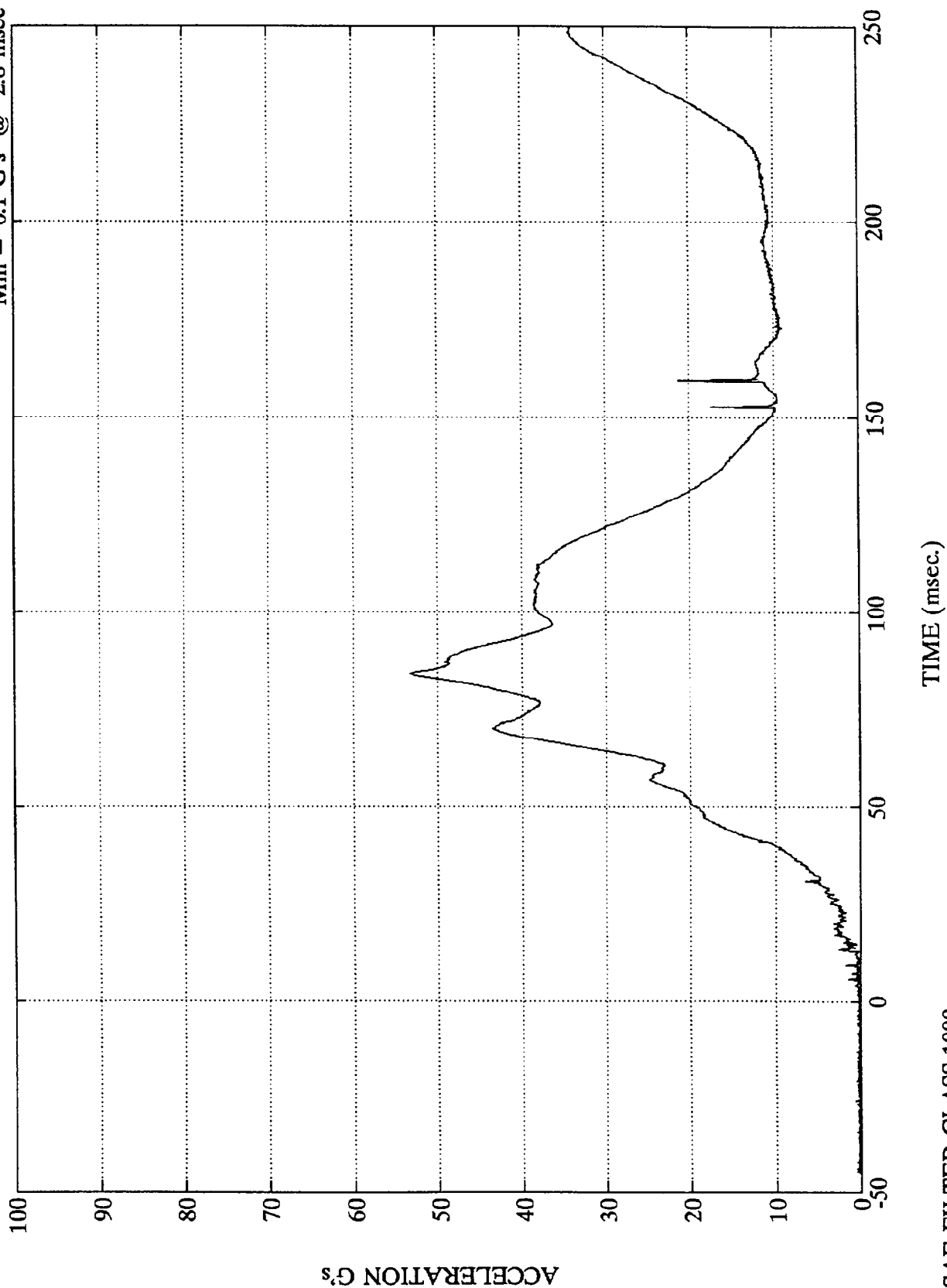
TIME (msec.)

SAE FILTER CLASS 1000

Test 1030

Max = 53.2 G's @ 84.5 msec
Min = 0.1 G's @ 2.8 msec

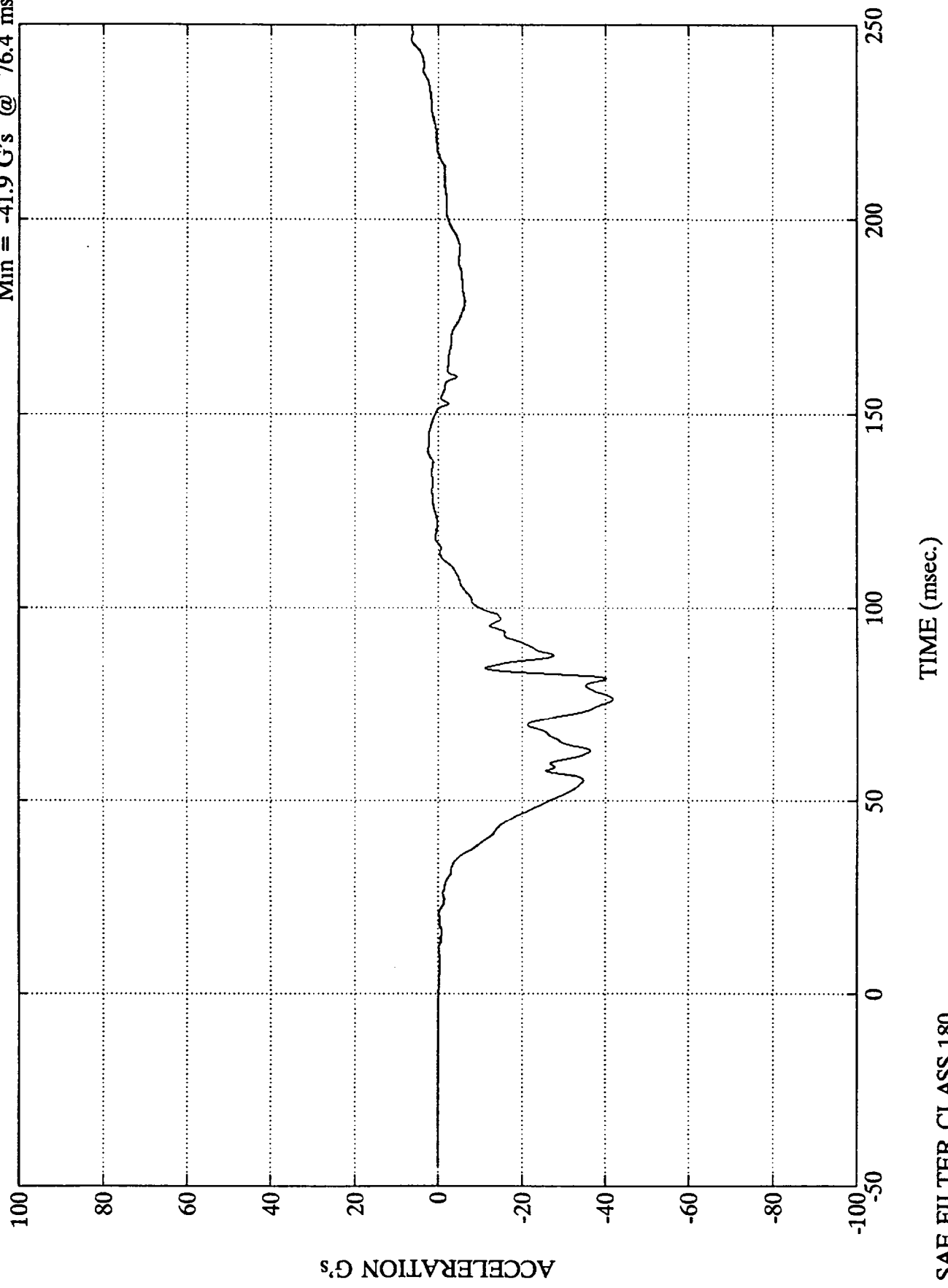
POS #2 HEAD RESULTANT



SAE FILTER CLASS 1000

Test 1030
Max = 6.4 G's @ 246.4 msec
Min = -41.9 G's @ 76.4 msec

POS #2 CHEST X

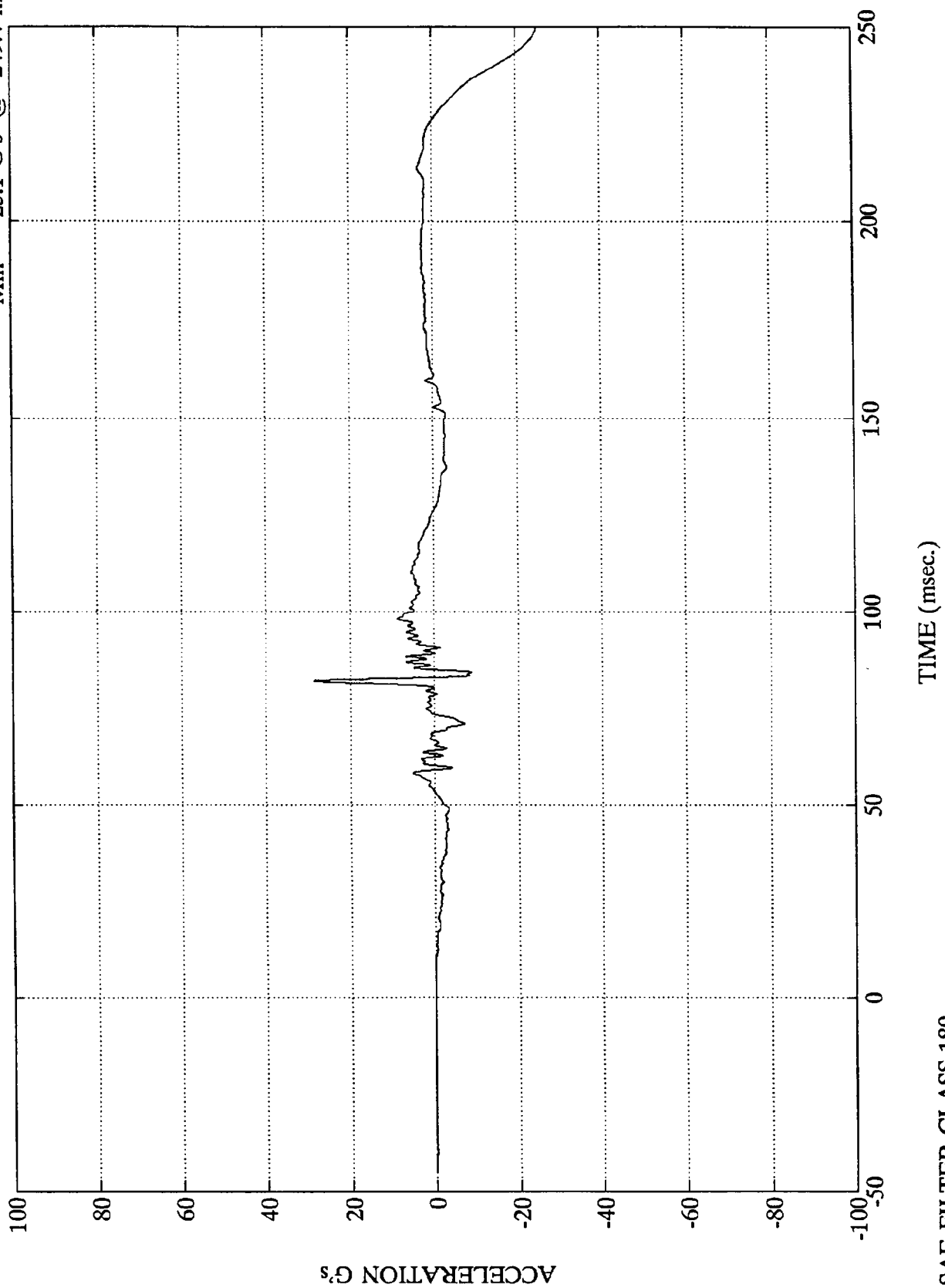


SAE FILTER CLASS 180

Test 1030

Max = 28.7 G's @ 82.2 msec
Min = -25.1 G's @ 249.4 msec

POS #2 CHEST Y

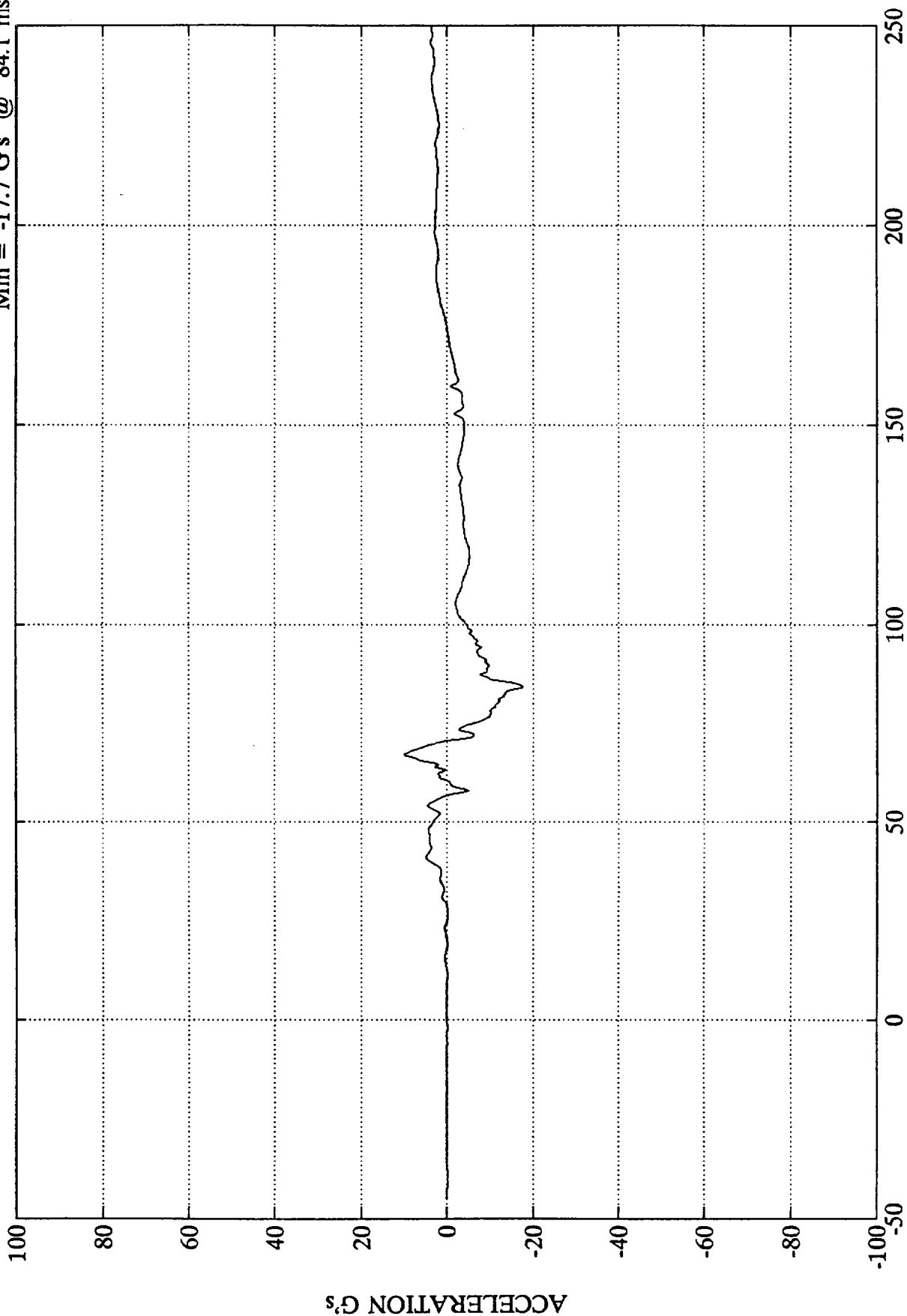


SAE FILTER CLASS 180

Test 1030
Max = 9.8 G's @ 66.8 msec
Min = -17.7 G's @ 84.1 msec

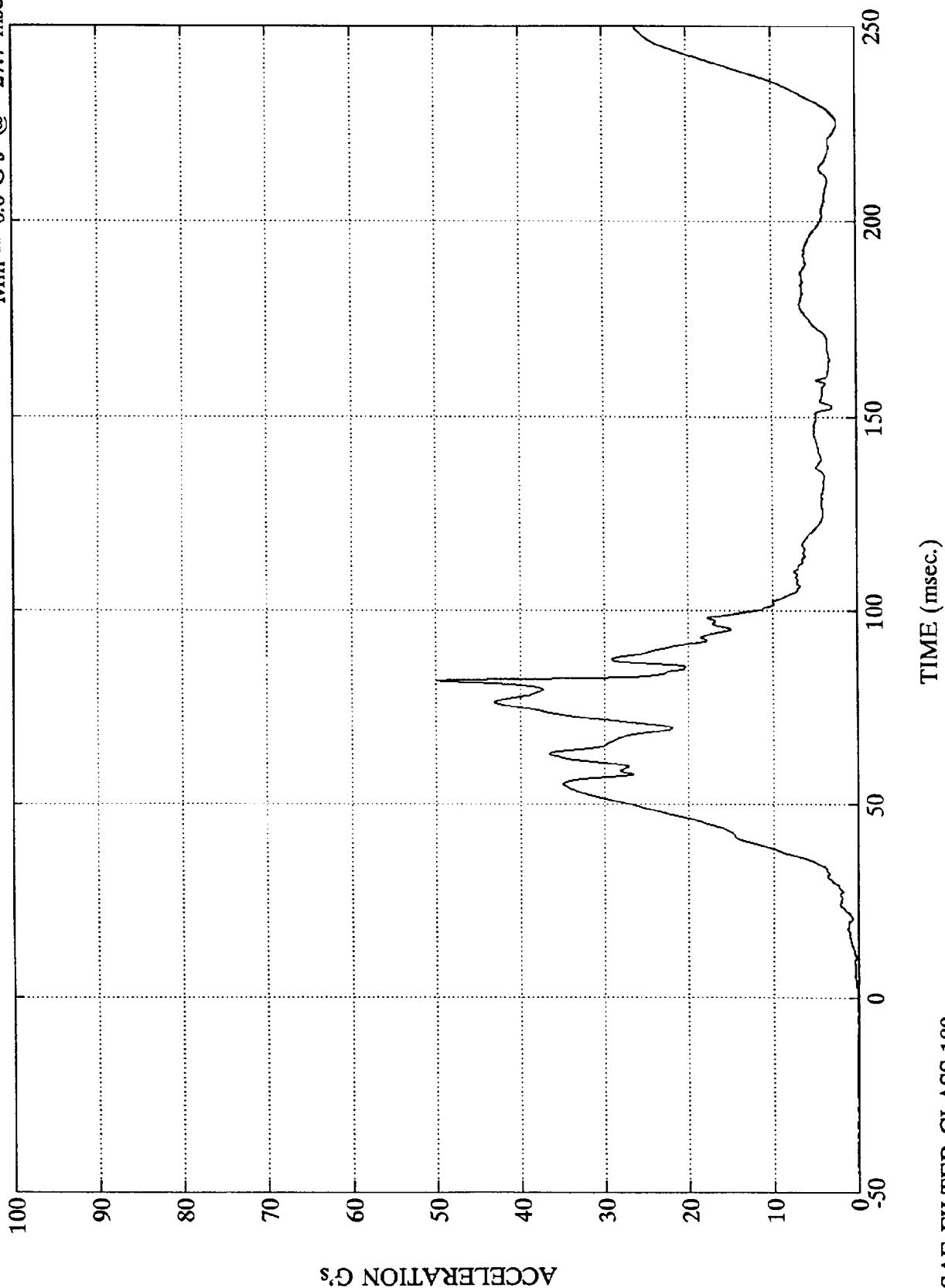
POS #2 CHEST Z

SAE FILTER CLASS 180



Test 1030
Max = 49.9 G's @ 82.1 msec
Min = 0.0 G's @ -27.7 msec

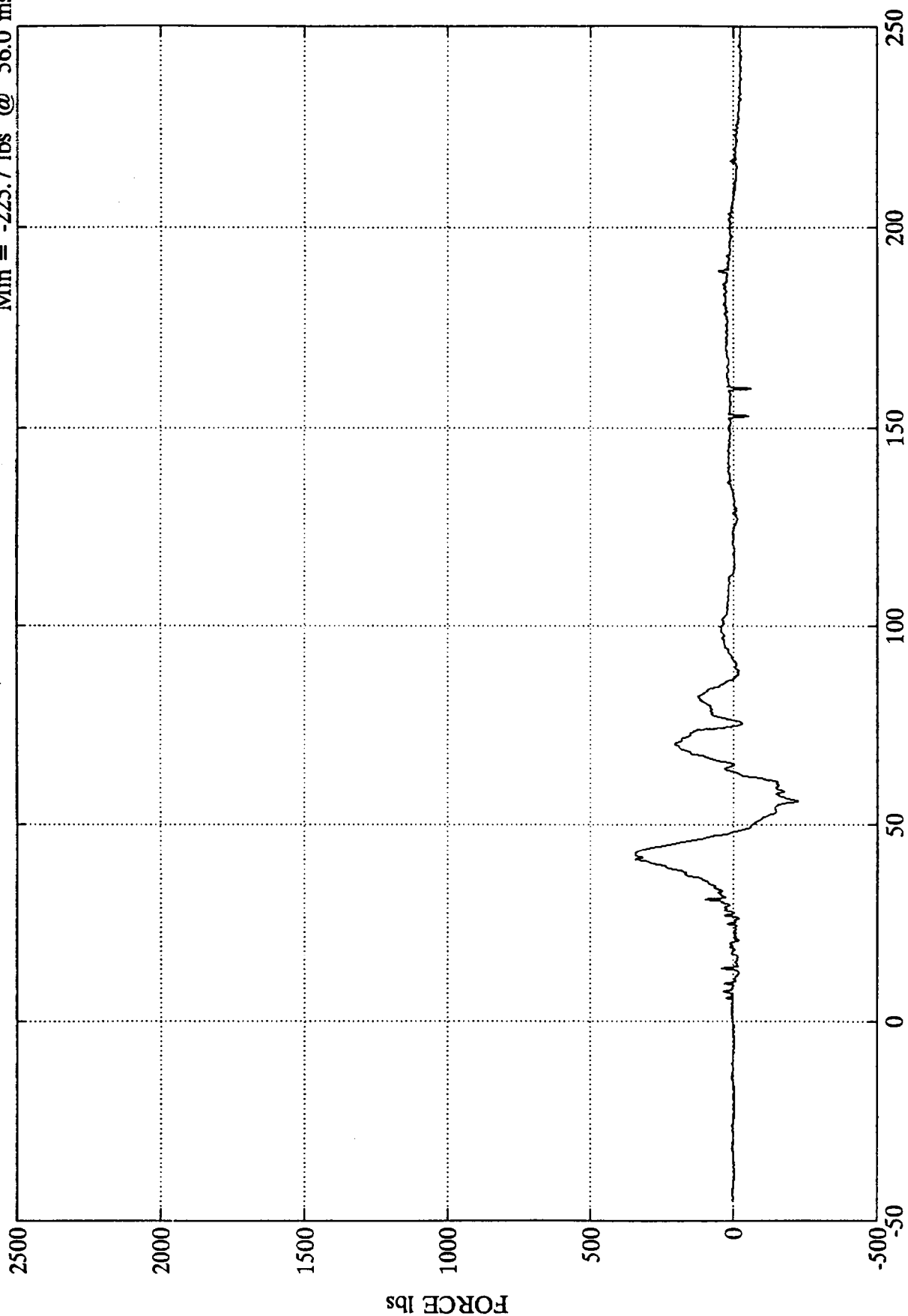
POS #2 CHEST RESULTANT



SAE FILTER CLASS 180

Test 1030
Max = 343.9 lbs @ 42.5 msec
Min = -225.7 lbs @ 56.0 msec

POS #2 LEFT FEMUR

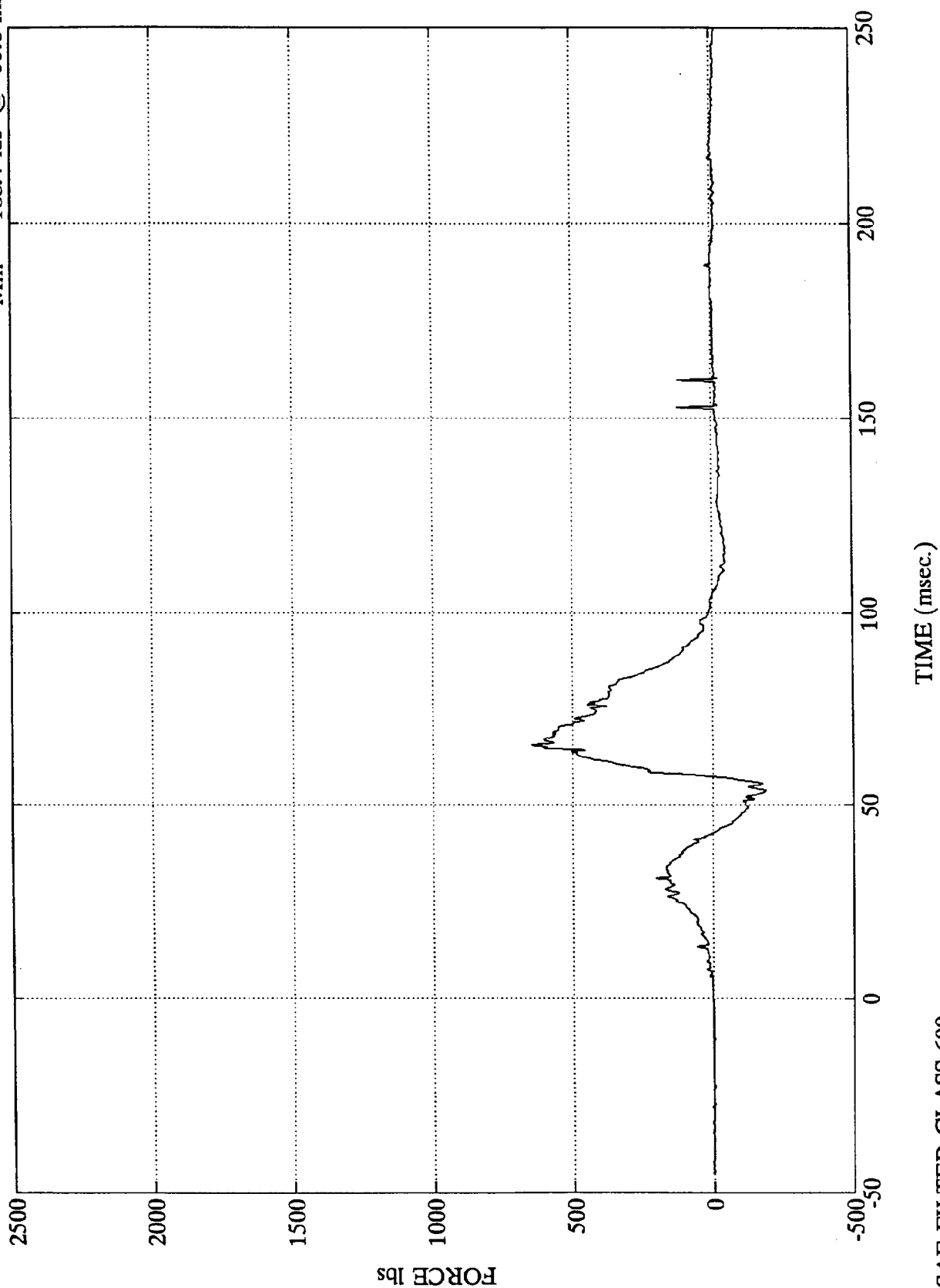


TIME (msec.)

SAE FILTER CLASS 600

Test 1030
Max = 647.2 lbs @ 65.3 msec
Min = -188.4 lbs @ 53.8 msec

POS #2 RIGHT FEMUR

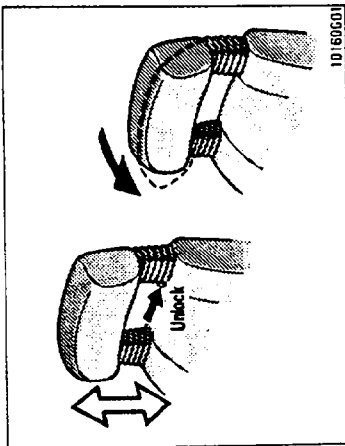


SAE FILTER CLASS 600

Appendix C

VEHICLE OWNERS MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

Headrests (vertically and rotationally adjustable type)

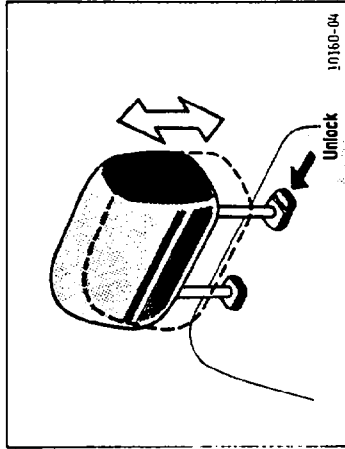


To raise the headrest, press the lock release button and pull the headrest up. To lower it, press the lock release button and push the headrest down. To move the headrest forward, pull on the top.

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.

Headrests (vertically adjustable type)



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

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.

- After adjusting the headrest, make sure it is locked in position.
- Do not drive with the headrests removed.



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.

Children. If they are too big for child restraint systems, they should sit in the rear seat and be restrained with the seat belts. According to accident statistics, children are 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, have the child sit slightly closer to center of the vehicle so that the belt lays across the shoulder.

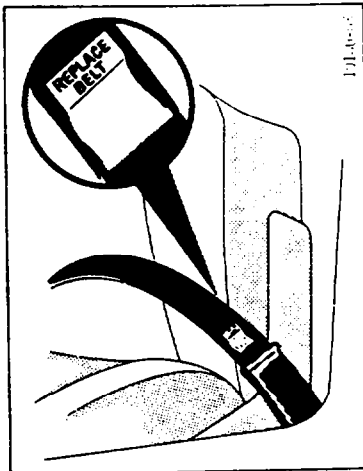
Pregnant woman. Toyota recommends the use of a seat belt. Ask your doctor for specific recommendations. The lap belt should be worn securely and as low as possible over the hips and not on the waist.

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:

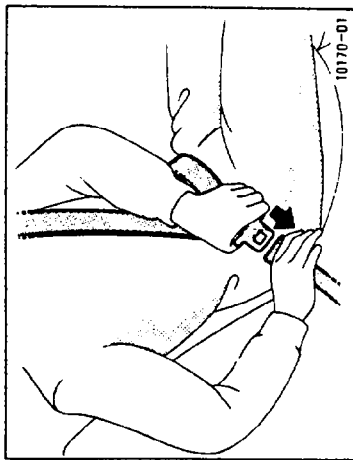
- Use the belt for only one person at a time. Do not use a single belt for two or more people—even children.
- After inserting the tab, make sure that the connection is secure and the belt is not twisted.
- Avoid reclining the seatbacks too much. The seat belts provide maximum protection when the seatbacks 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 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.

~Front and rear seat belts

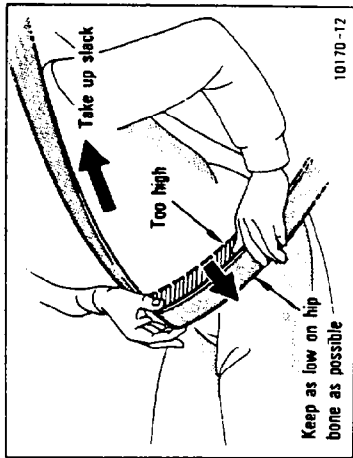


Adjust the seat as needed and sit up straight and well back in the seat. To fasten your belt, pull it out of the retractor and insert the tab into the buckle.

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. At other times you can move around freely.



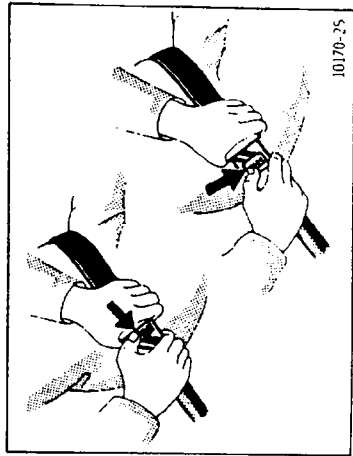
Adjust the position of the lap and shoulder belts.

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.

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



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

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

—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.

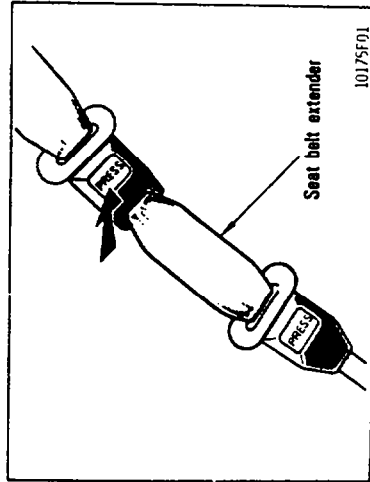
CAUTION:~~~~~

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.

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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.

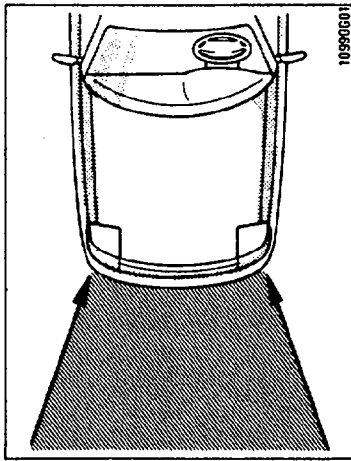
When not in use, remove the extender and store in the vehicle for future use.

**CAUTION:**~~~~~

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

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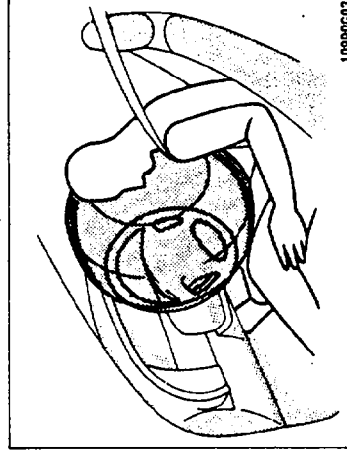
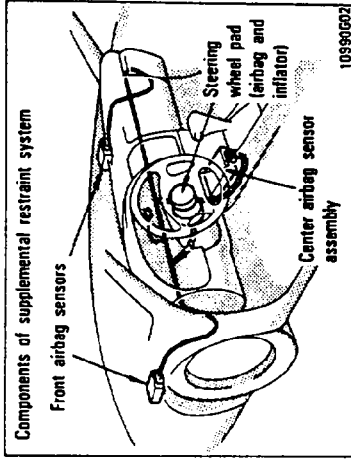
SRS airbag (U.S.A.)



The SRS (Supplemental Restraint System) airbag is designed to be activated in response to a severe frontal impact within the shaded area as shown in the illustration, and to provide the driver with further protection in addition to the protection provided by the driver's seat belt.

The SRS airbag system is not designed to protect the driver from an impact from the side or rear, or if the vehicle overturns. For instructions and precautions concerning the seat belt system, see "Seat belt".

CAUTION: The SRS airbag system is designed only as a supplement to the driver's seat belt system. To obtain maximum protection in an accident, the driver and all passengers in the vehicle should always wear his/her seat belts when driving.



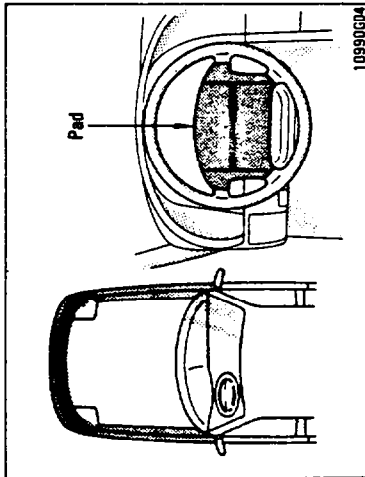
The center airbag sensor assembly consists of a safing sensor and center airbag sensor. In the event of a severe frontal impact, a front airbag sensor and safing sensor, or center airbag sensor and safing sensor detect the shock, the center airbag sensor assembly triggers the inflator, and the inflator fills the bag to restrain the driver's forward motion.

When the SRS airbag inflates, an operating noise will be heard and a small amount of smoke-like gas will be released. This gas is harmless and does not indicate that a fire is occurring.

CAUTION: Do not modify or remove any component or wiring, such as the steering wheel, column cover, center airbag sensor assembly or front airbag sensors. Doing any of these may cause sudden SRS airbag inflation or disable the system, which could result in personal injury.

NOTICE:

Do not perform any of the following changes without prior approval from Toyota dealers. Repairs or service of this kind can interfere with proper operation of the SRS airbag system in some cases.



- The front part of the vehicle (shown in the illustration) was involved in an accident which was not of the extent to cause the SRS airbag to inflate.

- The pad section of the steering wheel is scratched, cracked, or otherwise damaged.

NOTICE:

Do not disconnect the battery cables before contacting your Toyota dealer.

- Installation of electronic items such as a mobile two-way radio, cassette tape player or Compact Disc player.

- Repairs made on or near the front fenders, front console, steering column or steering wheel.

In the following cases, contact your Toyota dealer as soon as possible:

- The SRS airbag system malfunctions. This SRS airbag system has a warning light to indicate operating problems. See "Warning lights and buzzers" in Chapter 1-5.

- The SRS airbag has been inflated.

Warning lights and buzzers

If the light or buzzer comes on...	Do this.
(a)  BRAKE	If parking brake is off, stop and check.
(b)  (Light and buzzer)	Fasten seat belts.
(c) 	Stop and check.
(d) 	Stop and check.
(e)  CHECK	Take vehicle to Toyota dealer.
(f) 	Fill up tank.

If the light or buzzer comes on...	Do this.
(g) ABS	Take vehicle to Toyota dealer.
(h) 	Close all doors and back hatch.
(i) AIR BAG	Take vehicle to Toyota dealer.
(j) Light reminder buzzer	Turn off lights.
(k) Key reminder buzzer	Remove key.

(a) Brake System Warning Light

This light has the following functions:

Parking brake reminder

If this light is on, make sure the parking brake is fully released. The light should go off.

Low brake fluid level warning

If this light comes on and stays on while you are driving, slow down and pull off the road. Then stop the vehicle carefully. There may be a problem somewhere in the brake system. Check the fluid level of the see-through reservoir.

To make sure that the parking brake has not caused the warning light to come on, check to see that the parking brake is fully released.

If the brake fluid level is low...

At a safe place, test your brakes by starting and stopping.

- If you judge that the brakes still work adequately, drive cautiously to your nearest dealer or shop for repairs.
- If the brakes are not working, have the vehicle towed in for repairs. (For towing information, see Part 4.)

CAUTION:Continued normal driving with low brake fluid level is dangerous.

If the brake fluid level is correct...

Have the warning system checked by your Toyota dealer.

(b) Seat Belt Reminder Light and Buzzer

As a reminder to you and your passengers, this light will come on for about 4 to 8 seconds each time the ignition key is placed at "ON" or "START". The buzzer will operate only if the driver's seat belt is not fastened.

(c) Discharge Warning Light

This light warns that the battery is being discharged.

If it comes on while you are driving, there is a problem somewhere in the charging system.

The engine ignition will continue to operate, however, until the battery is discharged. Turn off the air conditioner, blower, radio, etc., and drive directly to the nearest Toyota dealer or repair shop.

(d) Low Oil Pressure Warning Light

This light warns that the engine oil pressure is too low.

If it flickers or stays on while you are driving, pull off the road to a safe place and stop the engine immediately. Call a Toyota dealer or qualified repair shop for assistance.

The light may occasionally flicker when the engine is idling or it may come on briefly after a hard stop. There is no cause for concern if it then goes out when the engine is accelerated slightly.

The light may come on when the oil level is extremely low. It is not designed to indicate low oil level, and the oil level must be checked using the level dipstick.

NOTICE:

Do not drive the vehicle with the warning light on—even for one block—until the cause is fixed. It may ruin the engine.

(e) Engine System Warning Light

This light warns that there is a problem somewhere in your engine electrical system.

If it comes on while you are driving, have your vehicle checked/repared by your Toyota dealer as soon as possible.

(f) Low Fuel Level Warning Light

This light comes on when the fuel level in the tank becomes nearly empty. Fill up the tank as soon as possible.

(g) Anti-lock Brake System Warning Light
This light warns that there is a problem somewhere in your anti-lock brake system. When the anti-lock brake system warning light is on (and the brake system warning light is off), the brake system operates conventionally but without anti-lock function.

If the light comes on while you are driving, have your vehicle checked by your Toyota dealer as soon as possible.

(h) Open Door Warning Light

This light remains on until all the side doors and back hatch are completely closed.

(i) SRS Airbag Warning Light (U.S.A.)

The warning light system monitors the front airbag sensors, center airbag sensor assembly, inflator, warning light, interconnecting wiring and power sources.

If the light comes on while driving, this indicates a malfunction somewhere in the parts monitored by the warning light system. Contact your Toyota dealer as soon as possible to service the vehicle.

(j) Light Reminder Buzzer

This buzzer will sound when the driver's door is opened if the ignition switch is turned to the "LOCK" position with the headlight switch on. Removing the key will not stop the buzzer as long as the headlight switch is on.

(k) Key Reminder Buzzer

This buzzer reminds you to remove the key when you open the driver's door with the ignition key in the "ACC" or "LOCK" position.

CHECKING WARNING LIGHTS (except the low fuel level warning light)

1. Apply the parking brake.
2. Open one of the side doors.
The open door warning light should come on.
3. Close the side door.
The open door warning light should go off.
4. Turn the ignition key to "ACC".
The SRS airbag warning light should come on. It goes off after 6 seconds.
5. Turn the ignition key to "ON", but do not start the engine.

All the warning lights except the open door warning light, SRS airbag warning light and low fuel level warning light should come on. The anti-lock brake system warning light goes off after 3 seconds.

If any warning light or buzzer does not function as described above, either the bulb is burned out or the circuit is in need of repair. Have it checked as soon as possible.