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

**FORD MOTOR COMPANY
1990 THUNDERBIRD STANDARD
2-DOOR COUPE**

NHTSA NUMBER: CLO205

CALSPAN TEST NUMBER: 7804-1

December 6, 1989

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FINAL REPORT

PREPARED FOR:

U. S. Department of Transportation
National Highway Traffic Safety Administration
Office of Vehicle Safety Compliance
400 Seventh Street, S.W.
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Washington, DC 20590

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15. Supplementary Notes					
16. Abstract A 30 mph vehicle safety compliance test was conducted on a 1990 Ford Thunderbird Standard 2-Door Coupe. This test was performed at the Calspan Advanced Technology Center in Buffalo, New York on December 6, 1989. 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 29.4 mph. The ambient temperature at the impact face was 38°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 both a driver side and passenger side automatic torso belt. The vehicle was also equipped with a manual lap belt which 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 <u>Copies of this report are available from:</u> Technical Reference Division National Highway Traffic Safety Admin. Nassif Building, Room 5108 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. DTNH22-88-C-01038. The purpose of this test was to determine if the subject vehicle, a 1990 Ford Thunderbird Standard 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-208-07.

Section 2

SUMMARY OF TEST NUMBER CLO205

A frontal barrier was impacted by a 1990 Ford Thunderbird 2-Door Coupe at a velocity of 29.4 mph. The test was performed at the Calspan Corporation Advanced Technology Center on December 6, 1989. Pre- and post-test photographs of the vehicle and dummies can be found 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 572, 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 27 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 208. The maximum chest deceleration over 3 milliseconds was 35.1 g's. The maximum force on the driver's left femur was 1983 pounds and 1148 pounds on the right femur.

The right front passenger's HIC was 222. The maximum chest deceleration over 3 milliseconds was 32.6 g's and loads were 1885 and 1175 pounds on the left and right femurs respectively.

Table 1
CRASH TEST SUMMARY

Vehicle NHTSA No.: CLO205 Test Mode: 30 mph Frontal Barrier

Test Date.: December 6, 1989 Time: 12:40 Temperature: 38°F

Vehicle Make/Model/Body Style: 1990 Ford Thunderbird Standard 2-Door Coupe

Vehicle Test Weight: 4090 lbs.

Vehicle/Barrier Impact Angle: 0°

Impact Velocity: 29.4 mph

Maximum Static Crush: 19.7"

Vehicle Rebound: 10.0"

<u>DUMMIES:</u>	<u>DRIVER</u>	<u>PASSENGER</u>
Type:	<u>Part 572</u>	<u>Part 572</u>
Restraint System:	<u>Automatic Torso Belt</u>	<u>Automatic Torso Belt</u>

Number of Data Chnnels: 27

Number of Cameras: 1 Real Time
14 High Speed

DOOR OPENING DATA: closed operable - Left Front
closed operable - Right Front

Front Seat(s) Data:	<u>DRIVER</u>	<u>PASSENGER</u>
Seat Track Failure:	<u>0.0</u>	<u>0.0</u>
	inches of shift	

Seat Back Failure:	<u>None</u>	<u>None</u>
--------------------	-------------	-------------

<u>VISIBLE DUMMY CONTACT POINTS:</u>	<u>DRIVER</u>	<u>PASSENGER</u>
Head:	<u>upper steering wheel rim</u>	<u>sunvisor</u>
Abdomen	<u>lower steering wheel rim</u>	<u>no contact</u>
Chest	<u>no contact</u>	<u>no contact</u>
Knees	<u>dash panel</u>	<u>glove box</u>

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATATEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 1990 Ford Thunderbird Std. 2-Door
 NHTSA No. CL0205 ; VIN: 1FAPP6049LH103784 ; Color: Silver
 Engine Data: 6 cylinders; - CID; 3.8 Litres; - cc
 Placement X Longitudinal or In-Line; - Transverse or Lateral
 Transmission Data: 4 speeds; - Manual; X Automatic; X Overdrive
 Final Drive: X Rear Wheel Drive; - Front Wheel Drive; - Four Wheel Drive
 Major Options: X A/C; X Pwr. Strg.; X Pwr. Brakes; X Pwr. Windows
X Power Door Locks
 Date Received: November 1989 ; Odometer Reading 103 miles
 Selling Dealer: West-Herr Ford, Inc.
 & Address S-5025 Camp Road, Hamburg, NY

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: Ford Motor Company
 Date of Manufacture: 8-89
 GVWR: 4885 lbs.; GAWR: 2563 lbs. FRONT; 2345 lbs. REAR

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load: 30 psi FRONT
30 psi REAR
 Recommended Tire Size: P205/70R15, P215/70R15, P225/60R16 Load Range: Std.
 Recommended Cold Tire Pressure: 30 psi FRONT; 30 psi REAR
 Size of Tires on Test Vehicle: P215/70R15 ; Manufacturer: Firestone
 Vehicle Capacity Data:
 Type of Front Seats: - Bench; X Bucket; - Split Bench
 Number of Occupants: 2 Front; 3 Rear; 5 Total
 Vehicle Capacity Weight (VCW) = 900 lbs.
 No. of Occupants x 150 lbs. = 750 lbs.
 Rated Cargo/Luggage Weight (RCLW) = 150 lbs. (Difference)

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

Right Front = 1010 lbs. Right Rear = 760 lbs.
 Left Front = 1010 lbs. Left Rear = 830 lbs.
 TOTAL FRONT = 2020 lbs. TOTAL REAR = 1590 lbs.
 % of Total Vehicle Weight = 56% % of Total Weight = 44%
 TOTAL DELIVERED WEIGHT = 3610 lbs.

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATA (cont.)

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight	=	<u>3610</u>	lbs.
Rated Cargo/Luggage Weight (RCLW)	=	<u>150</u>	lbs.
Weight of 2 P.572 Dummies @ 164 ea.	=	<u>328</u>	lbs.
TARGET TEST WEIGHT	=	<u>4088</u>	lbs. (sum)

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

Right Front =	<u>1110</u>	lbs.	Right Rear =	<u>960</u>	lbs.
Left Front =	<u>1100</u>	lbs.	Left Rear =	<u>920</u>	lbs.
TOTAL FRONT =	<u>2210</u>	lbs.	TOTAL REAR =	<u>1880</u>	lbs.
% of Total Weight =	<u>54</u>	%	% of Total Weight =	<u>46</u>	%
TOTAL TEST WEIGHT =	<u>4090</u>	lbs.			
Weight of Ballast Secured in Vehicle Trunk Area =	<u>39</u>	lbs.			
Vehicle Components Removed for Weight Reduction	<u>None</u>				

VEHICLE ATTITUDE (all dimensions in inches):

AS DELIVERED:	RF <u>29.6"</u>	LF <u>29.3"</u>	RR <u>29.7"</u>	LR <u>29.5"</u>
FULLY LOADED:	RF <u>28.6"</u>	LF <u>28.2"</u>	RR <u>26.9"</u>	LR <u>26.5"</u>
AS TESTED:	RF <u>28.7"</u>	LF <u>28.7"</u>	RR <u>28.0"</u>	LR <u>28.0"</u>
Vehicle's Wheel Base:	<u>100.6</u>	in.		
Location of Vehicle's C.G.:	<u>52.0 inches from front wheel center</u>			

FUEL SYSTEM DATA:

Fuel System Capacity From Owner's Manual =	<u>19.0</u>	gallons
Usable Capacity Figure Furnished by COTR =	<u>19.0</u>	gallons
Test Volume Range (92 to 94% of Usable Capacity) =	<u>17.5</u>	to <u>17.9</u> gallons
ACTUAL TEST VOLUME =	<u>17.7</u>	gallons (with entire fuel system filled)

Table 3

POST IMPACT DATATYPE OF TEST:

Type of Test: Frontal Barrier Impact Angle: 0°
 Test Date: December 6, 1989 Time: 12:40 Temperature: 38 °F
 Vehicle NHTSA No.: CL0205
 Required Impact Velocity Range: 28.9 to 29.9 mph

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

Trap No. 1 = 29.4 mph; Trap No. 2 = 29.4 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 = 194.5 "; C/L = 198.7 "; Left = 194.4 "
 Post-Test Right = 178.1 "; C/L = 179.0 "; Left = 178.2 "
 ** Crush Right = 16.4 "; C/L = 19.7 "; Left = 16.2 "
 AVERAGE = 17.4 inches

VEHICLE REBOUND: (From rigid barrier only.)

Distance from front of test vehicle to impact point:

Right = 8.1 "; C/L = 12.6 "; Left = 9.2 "
 AVERAGE = 10.0 inches

DOOR OPENING:

	Left	Right
Front	<u>closed operable</u>	<u>closed operable</u>
Rear	<u>N/A</u>	<u>N/A</u>

SEAT MOVEMENT:

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

**Front bumper fell from vehicle as a result of crash, measurements are from existing structure in approximate locations as pre-test measurements.

Table 3

POST IMPACT DATA (cont.)

GLAZING DAMAGE: None _____

OTHER NOTABLE IMPACT FEATURES: None _____

Section 3
OCCUPANT AND VEHICLE DATA

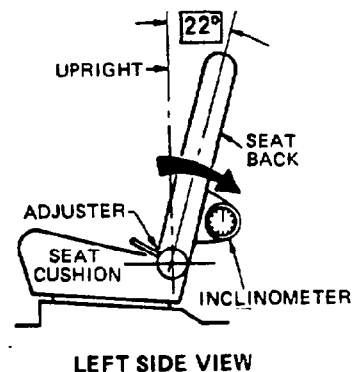
Figure 1

TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year: 1990 Vehicle Model: Thunderbird 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



Seat back angle for driver's seat 22°

Measurement instructions: Measure on seat back frame 13.0 inches up from hinge point.

Seat back angle for passenger's seat 22°

Measurement instructions: Same as driver.

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: Located in midpoint of fore and aft travel (power seat).

Positioning of the passenger's seat (if applicable): Same as driver.

3. Fuel Tank Capacity Data

A. "Usable Capacity" of the standard equipment fuel tank is 19 gallons

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

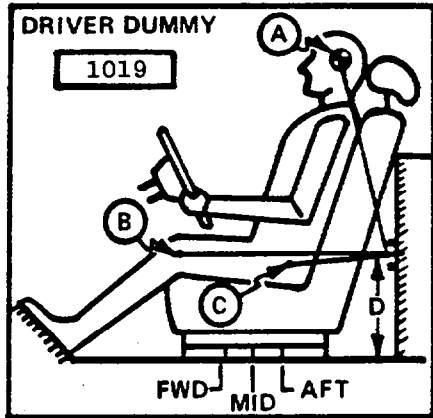
Additional Instructions: None

Figure 2

PART 572 DUMMY IN-VEHICLE POSITION

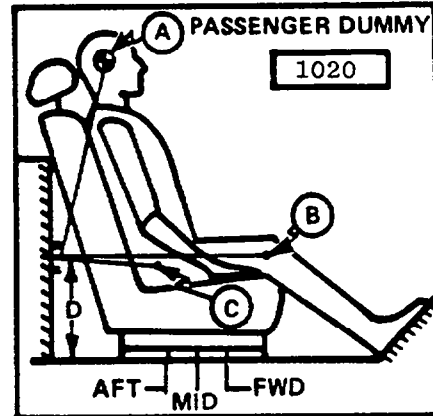
Test No.: CL0205 Vehicle: 1990 Ford Thunderbird

<u>SEAT TYPE:</u>	<u>ADJUSTER TYPE:</u>	<u>BUCKET SEAT BACK TYPE:</u>
<u>-</u> Bench	<u>-</u> Manual	<u>-</u> Fixed
<u>X</u> Bucket	<u>X</u> Power	<u>X</u> Adjustable Reclining
<u>-</u> Split Bench		



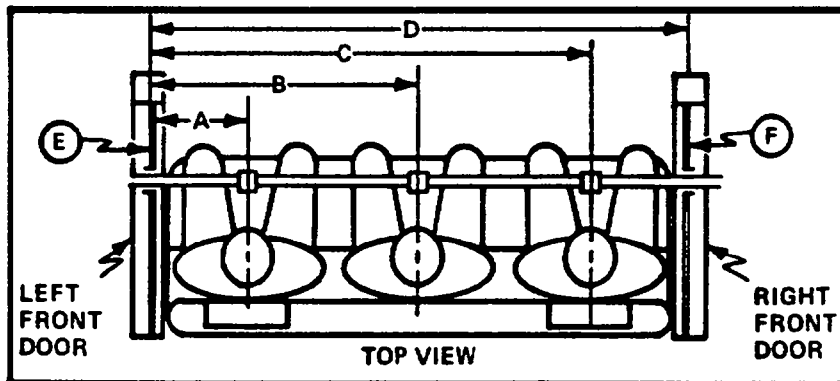
MEASUREMENT LOCATION

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



A = 24.7 in. 34 Degrees
 B = 35.0 in. 96 Degrees
 C = 21.0 in. 111 Degrees
 D = 14.1 in.

A = 24.3 in. 34 Degrees
 B = 35.2 in. 98 Degrees
 C = 21.0 in. 110 Degrees
 D = 14.1 in.



DUMMY ID

S/N 1019

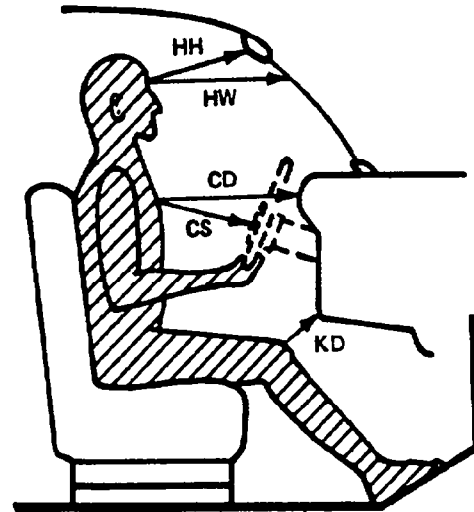
1020

A = Left Door to Driver Centerline	<u>13.3</u> in.
B = Left Door to Center Passenger Centerline	<u>-</u> in.
C = Left Door to Right Passenger Centerline	<u>43.5</u> in.
D = Left Door to Right Door	<u>56.7</u> in.
E,F = Window Glass Height (Right and Left Must Be Equal)	<u>12.5</u> in.

Figure 3

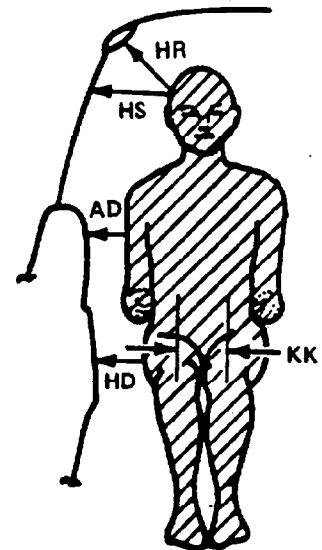
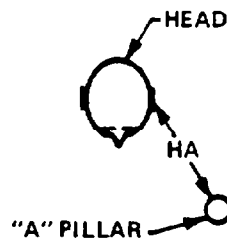
OCCUPANT CLEARANCE DIMENSIONS

	DRIVER	PASSENGER
HH	13.2	13.5
HW	19.1	19.2
CD	21.2	21.5
CS	12.5	-
KDL	5.3	5.6
KDR	4.7	5.5
SA	22°	22°
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

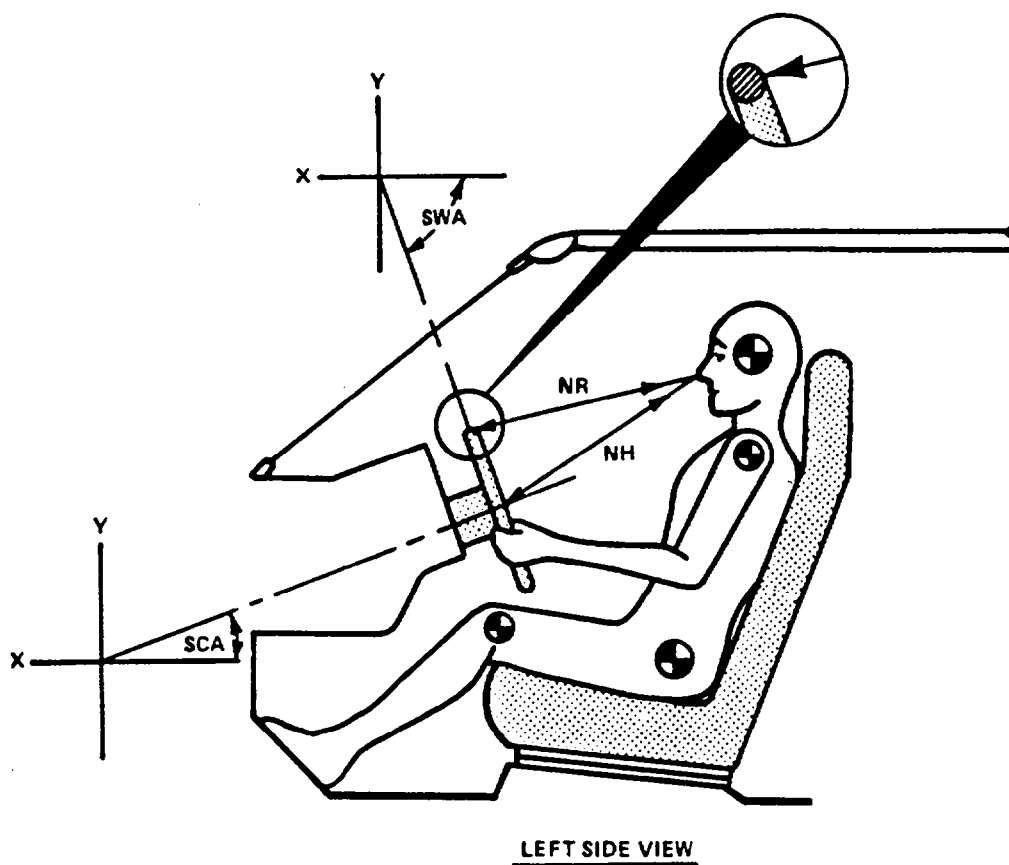


	DRIVER	PASSENGER
HR	4.7	5.1
HS	9.7	10.1
AD	5.0	5.1
HD	8.3	8.2
KK	8.8	7.5
HA	15.5	15.3

Note: Seat back angle was positioned as specified by manufacturer.

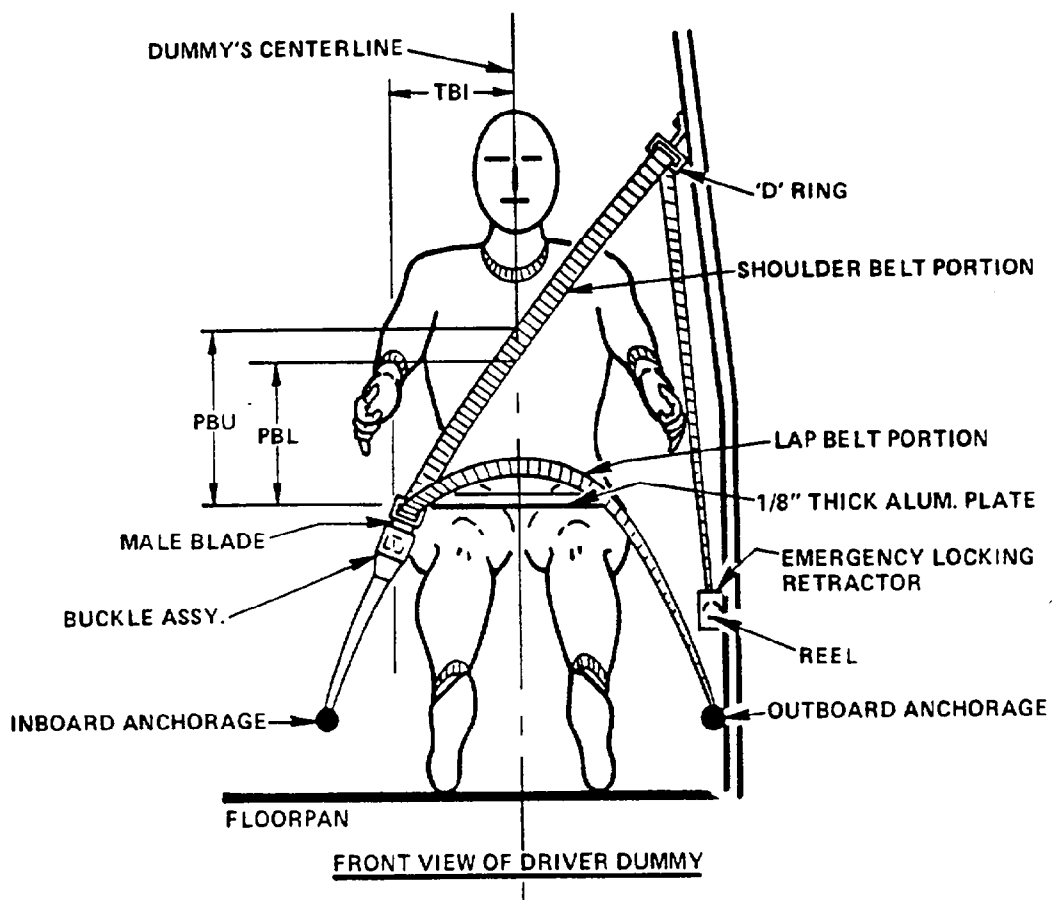
Figure 4

DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSY. REFERENCE DIMENSIONS



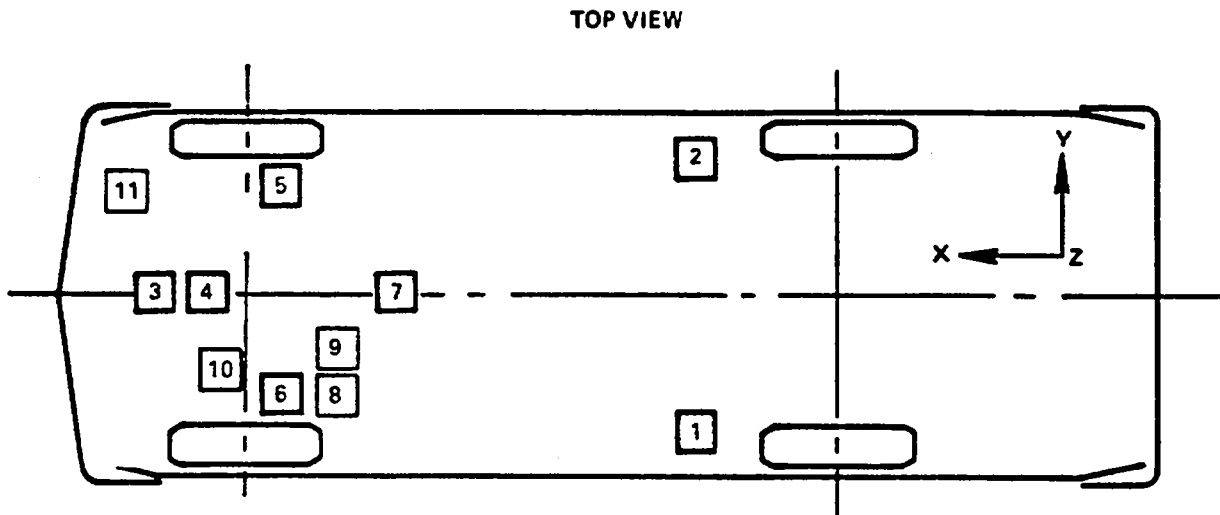
		MEASUREMENTS	
<u>NR</u>	-- Distance from tip of dummy's nose to Top Rear surface of steering wheel rim	17.0	Inches
<u>NH</u>	-- Distance from tip of dummy's nose to center of steering column hub	18.9	Inches
<u>SCA</u>	-- Angle of steering column relative to the horizontal X axis	18.0	Degrees
<u>SWA</u>	-- Angle of steering wheel relative to the horizontal X axis	-72.0	Degrees

Figure 5
SEAT BELT POSITIONING DATA



	DRIVER DUMMY (inches)	PASSENGER DUMMY (inches)
<u>PBU</u> -- Top surface of alum. plate to upper edge	15.3	14.8
<u>PBL</u> -- Top surface of alum. plate to belt lower edge	11.7	11.1
<u>TBI</u> -- Distance from torso centerline to buckle	-	-

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		
8	Front Shock Tower	X		
9	Firewall	X		
10	Cradle Frame	X		
11	Radiator Support	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:	79.1	21.1	18.5				
	AT LEFT SIDE POST:	79.5	21.1	18.4				
	LONGITUDINAL ACCELERATION				2	146	-28	46
2	REAR SEAT X-MEMBER PRE:	78.7	-21.5	18.5				
	POST:	79.1	-21.4	18.3				
	LONGITUDINAL ACCELERATION				2	115	-26	22
3	TOP OF ENGINE BLOCK PRE:	150.9	7.5	34.8				
	POST:	149.0	7.3	34.5				
	LONGITUDINAL ACCELERATION				6	71	-38	49
4	BOTTOM OF ENGINE PRE:	148.1	-5.3	11.4				
	POST:	146.3	-5.2	11.2				
	LONGITUDINAL ACCELERATION				12	77	-62	56
5	BRAKE CALIPER AT PRE:	154.6	-20.8	17.3				
	POST:	150.2	-20.3	17.1				
	LONGITUDINAL ACCELERATION				39	74	-95	48
6	BRAKE CALIPER AT PRE:	154.1	20.9	17.1				
	POST:	150.4	20.4	16.9				
	LONGITUDINAL ACCELERATION				15	78	-47	47
7	DASH PANEL PRE:	120.4	6.3	31.5				
	POST:	120.6	6.2	31.3				
	LONGITUDINAL ACCELERATION				15	75	-66	83

*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

Table 4

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY (cont.)

NO.	LOCATION		X*	Y*	Z*	POSITIVE DIRECTION**		NEGATIVE DIRECTION**	
						MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
8	FRONT SHOCK TOWER	PRE:	160.7	17.4	33.8				
		POST:	158.4	15.1	33.9				
	LONGITUDINAL ACCELERATION					2	119	-45	45
9	FIREWALL	PRE:	145.9	-12.3	36.4				
		POST:	143.7	-12.4	35.5				
	LONGITUDINAL ACCELERATION					15	20	-41	16
10	CRADLE FRAME	PRE:	151.1	6.9	11.2				
		POST:	149.7	7.0	11.0				
	LONGITUDINAL ACCELERATION					72	70	-52	55
11	RADIATOR-SUPPORT	PRE:	180.6	-17.9	27.9				
		POST:	171.8	-18.0	28.8				
	LONGITUDINAL ACCELERATION					107	39	-117	50

*X + Forward from rear bumper	** LONGITUDINAL:	<u>POSITIVE</u>	<u>NEGATIVE</u>
Y + Left from vehicle centerline	LATERAL:	FORWARD	REARWARD
Z + Up from ground	VERTICAL:	LEFTWARD	RIGHTWARD
		UPWARD	DOWNWARD

DISTANCE MEASUREMENTS IN INCHES

Figure 7
CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information Shown on Table 5.

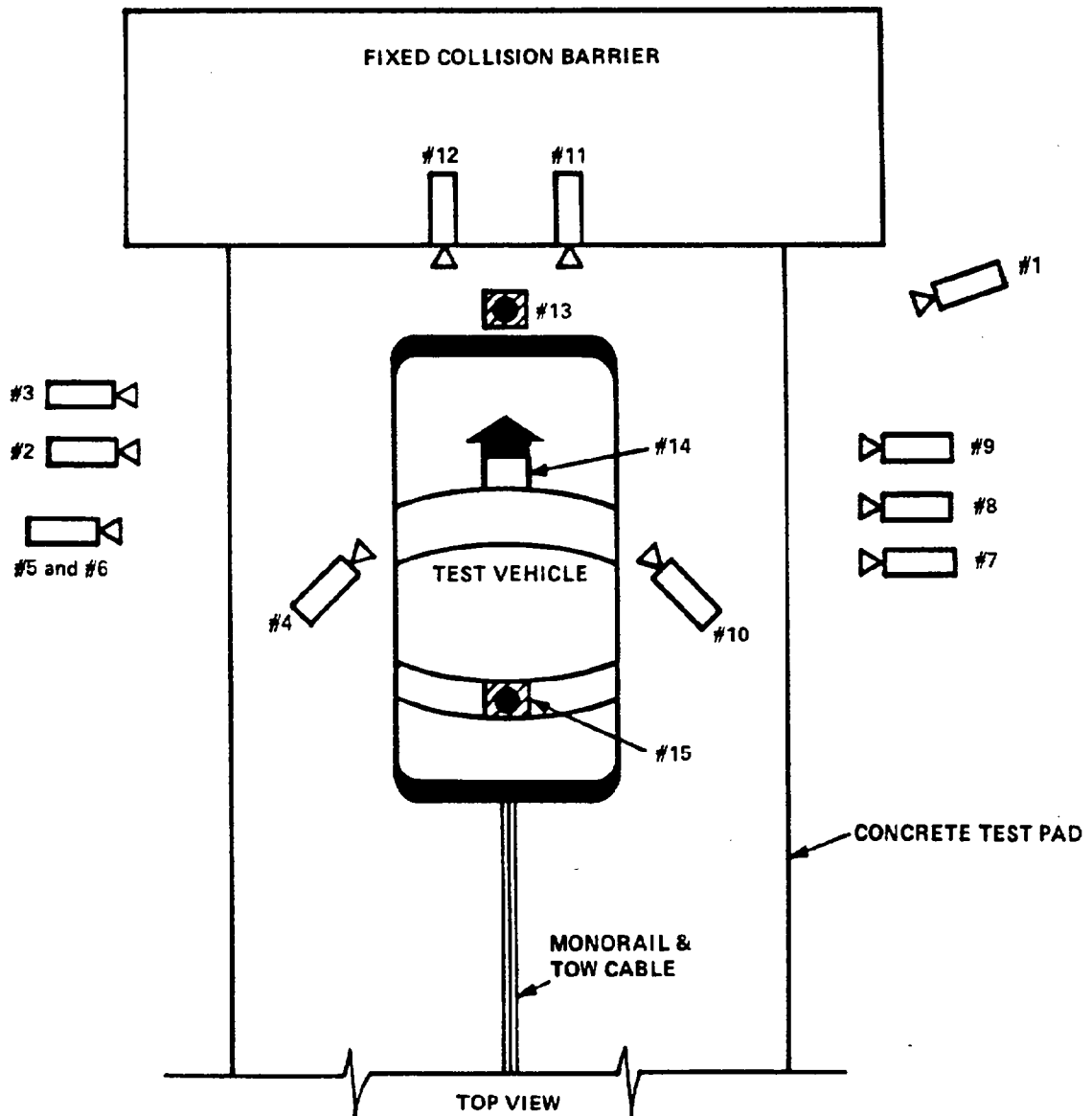


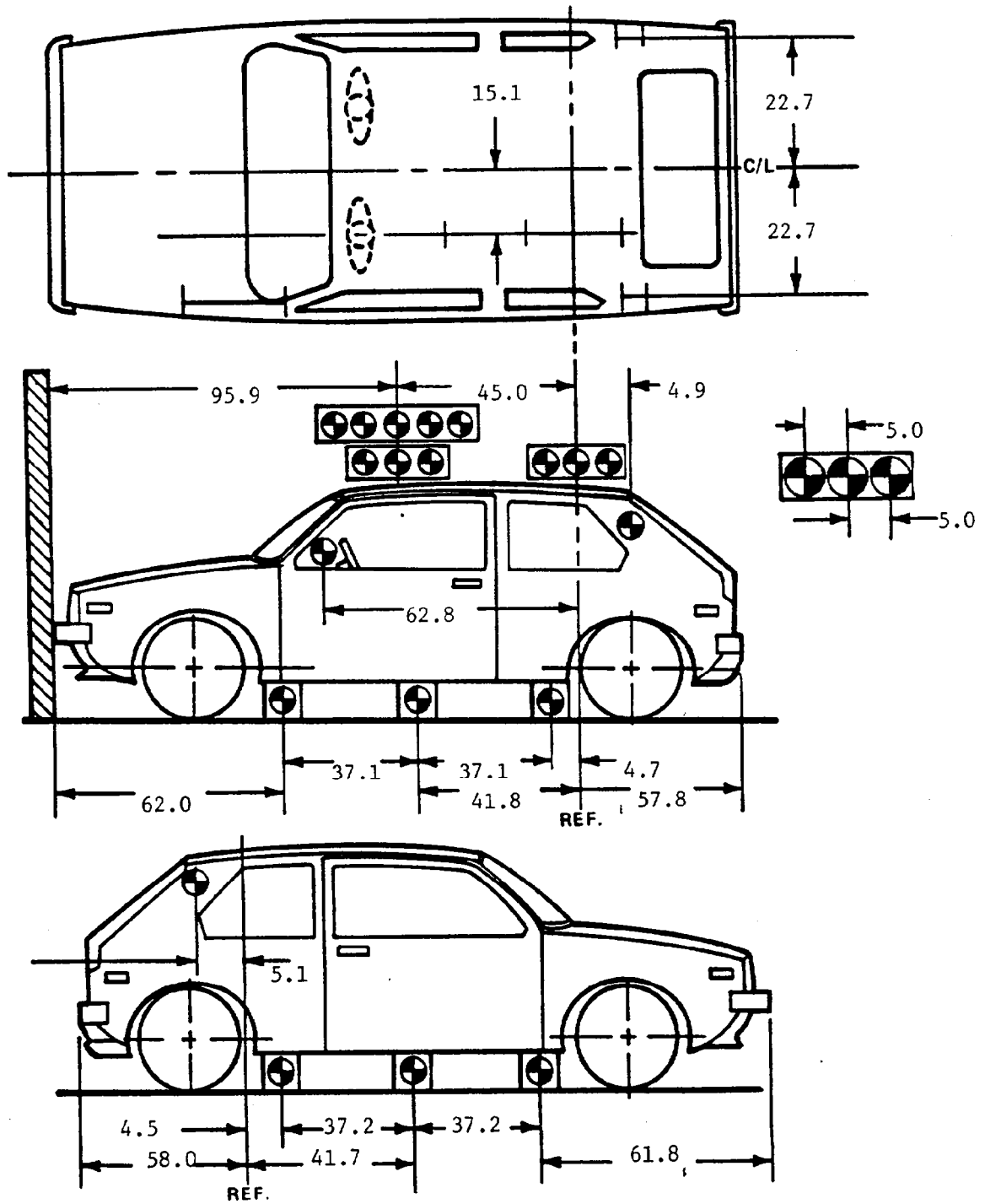
Table 5

HIGH-SPEED CAMERA LOCATIONS

CAMERA NO.	VIEW	CAMERA POSITIONS (in)*			ANGLE** (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Real-Time Camera	-	-	-	-	-	-	24
2	Overall Left Side	240.0	61.5	41.0	-4	221.9	13	***
3	Left Side View	319.0	39.0	40.5	-4	300.9	25	***
4	Driver and Interior View	115.0	125.0	76.5	-23	-	13	875
5	Steering Column (Bottom)	302.0	89.5	45.5	-3	283.9	25	560
6	Steering Column (Top)	301.0	90.0	69.5	-10	282.9	25	560
7	Overall Right Side	237.0	82.0	41.0	-6	218.9	13	***
8	Right Side View	328.0	67.0	41.5	-2	309.9	25	770
9	Right Passenger View	303.0	86.0	54.0	-3	284.9	35	610
10	Passenger and Interior View	111.0	129.0	74.0	-22	-	13	620
11	Passenger Front View	24.5	18.0	75.0	-46	-	13	600
12	Driver Front View	21.5	16.5	74.5	-49	-	13	***
13	Windshield View	0.0	0.0	130.0	-49	-	25	510
14	Pit View of Engine	0.0	36.0	-120.0	90	-	13	875
15	Pit View of Fuel Tank	0.0	124.0	-120.0	90	-	13	770

*X = film plane to monorail centerline
 Y = film plane to impact location
 Z = film plan to ground
 ** = referenced to horizontal plane

Figure 8
VEHICLE TARGET LOCATIONS



(DIMENSIONS IN INCHES)

Figure 9
TEST VEHICLE MEASUREMENTS

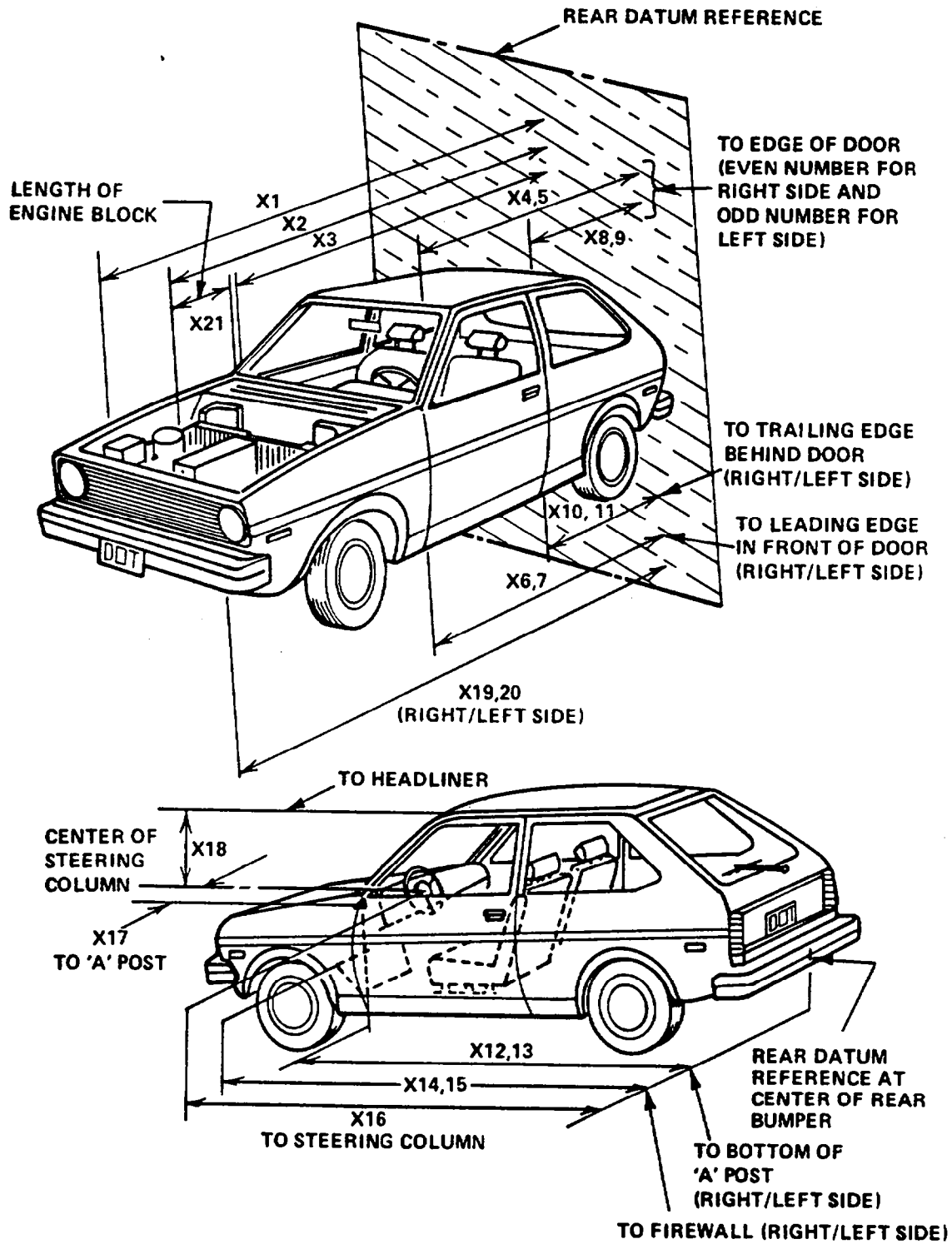


Table 6

VEHICLE MEASUREMENTS

No.		All Dimensions in Inches		
		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	198.7	179.0	19.7*
X2	Rear Surface of Vehicle to Front of Engine	169.4	165.6	3.8
X3	Rear Surface of Vehicle to Firewall	144.1	141.0	3.1
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	135.7	135.9	-0.2
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	135.7	135.8	-0.1
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	133.8	133.8	0.0
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	133.6	133.5	0.1
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	79.8	80.0	-0.2
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	79.8	80.0	-0.2
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	79.5	79.5	0.0
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	79.3	79.3	0.0
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	133.2	133.2	0.0
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	133.3	133.0	0.3
X14	Rear Surface of Vehicle to Firewall, Right Side	143.7	145.0	-1.3
X15	Rear Surface of Vehicle to Firewall, Left Side	140.9	140.6	0.3
X16	Rear Surface of Vehicle to Steering Column	113.7	113.6	0.1
X17	Center of Steering Column to "A" Post	17.3	17.1	0.2
X18	Center of Steering Column to Headliner	17.0	17.4	-0.4
X19	Rear Surface of Vehicle to Right Side of Front Bumper	194.5	178.1	16.4*
X20	Rear Surface of Vehicle to Left Side of Front Bumper	194.4	178.2	16.2*
X21	Length of Engine Block	25.0	25.0	0.0

*Front bumper fell from vehicle as a result of the crash, measurements given are from existing structure in approximate locations as pre-test measurements.

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.: CL0205 Vehicle: 1990 Thunderbird Std. 2-Door Coupe

	MAXIMUM HEAD ACCELERATION (g's)							
	X	Y	Z	R	X	Y	Z	R*
Dummy (1)	-52	17	38	66	-36	-10	-7	35.1
Dummy (2)	-30	20	55	61	-32	13	11	32.6

	MAXIMUM FORCE - FEMUR LOAD (lbs.)	
	LEFT FEMUR	RIGHT FEMUR
Dummy (1)	1983	1148
Dummy (2)	1885	1175

	HEAD INJURY CRITERIA**			
	HIC	36 millisecond Maximum		Avg. Acc. (g) t ₁ TO t ₂
		t ₁ (SEC)	t ₂ (SEC)	
Dummy (1)	208	0.08955	0.12555	31.9
Dummy (2)	222	0.06270	0.09870	32.8

*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 = 6.4 sec.

Log time duration of reminder light operation = 6.4 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 = 0.0 sec.

(audible warning should not operate)

Log time duration of reminder light operation = 6.4 sec.

Note wording of visual warning:

Fasten Seat Belt -

Fasten Belt -

Symbol 101-80 X

*Continuous if shoulder belts are not used.

Table 9

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 X NO

Table 10

FMVSS NO. 208 - COMFORT AND CONVENIENCE TEST SUMMARY

Test Vehicle NHTSA No.: CL0205

Make/Model: 1990 Ford Thunderbird

Date of Comfort/Convenience Check: December 4, 1989

Technician Performing Check: DJT

GVWR: 4885 lbs.

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 X NO

If yes, go to requirements D1, D2 and D3

2. Manual seat belts* YES NO X**

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

(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 lap belt not used for test.

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 _____ NO X

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 for is 0.5 pounds. Contact the COTR if the contact force exceeds 0.7 pounds.

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 1.0 inch rubber trim along top, 0.8 inch metal trim along sides, and plastic shield covering bottom of windshield.

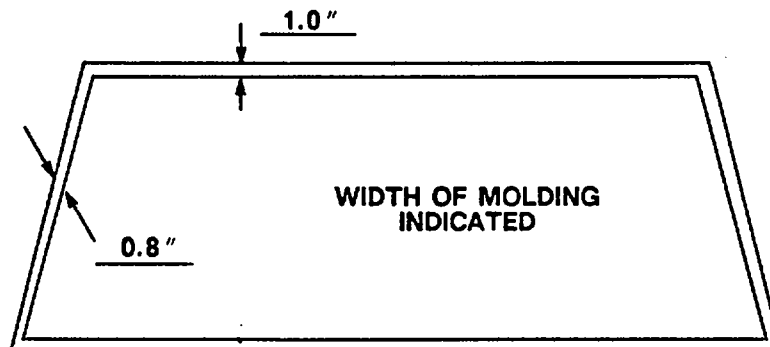
FMVSS 212 REQUIREMENTS:

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		
	PRE-TEST (in.)	POST-TEST (in.)	PERCENT RETENTION
RIGHT SIDE	91.15	91.15	100%
LEFT SIDE	91.15	91.15	100%
TOTAL	182.03	182.03	100%

AREA OF RETENTION FAILURE:



FRONT VIEW

FAILURE DETAILS:

None

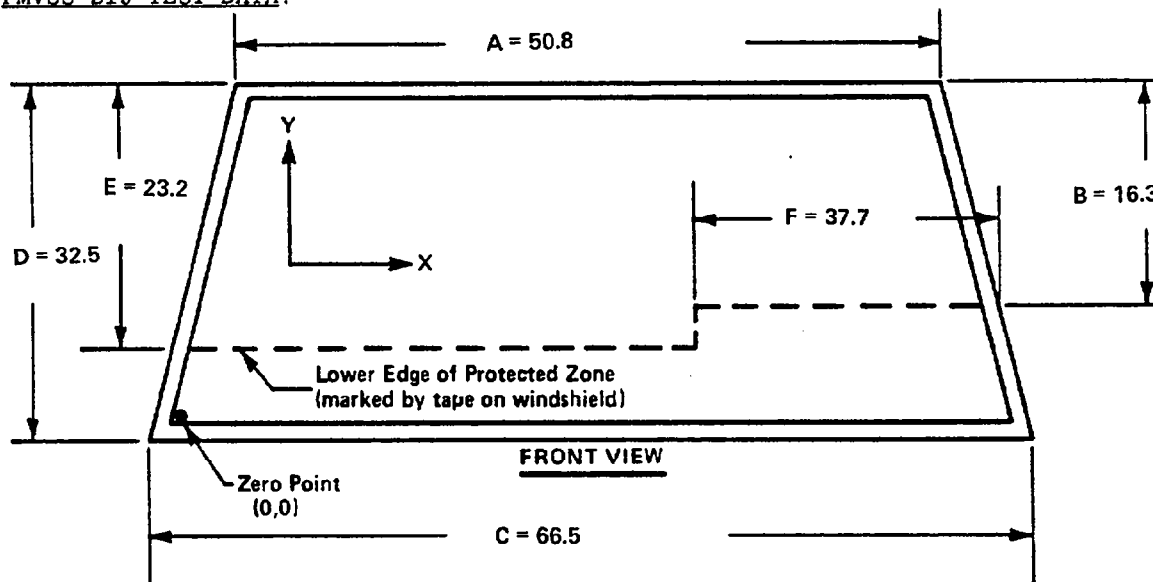
Figure 11

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:



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.: C L 0 2 0 5 TEST DATE: December 6, 1989

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:

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

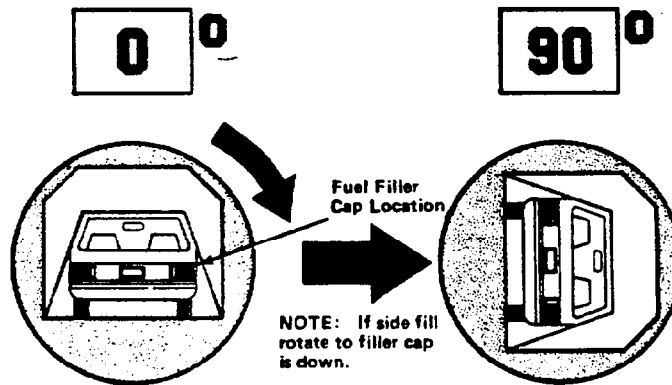
None

Table 12

FMVSS NO. 301 STATIC ROLLOVER DATA SHEETTEST PHASE:

Vehicle NHTSA ID No.:

CL0205

I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 02 minutes 55 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 05 minutes 00 seconds

TOTAL

07 minutes 55 seconds

Next whole minute interval

08 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.

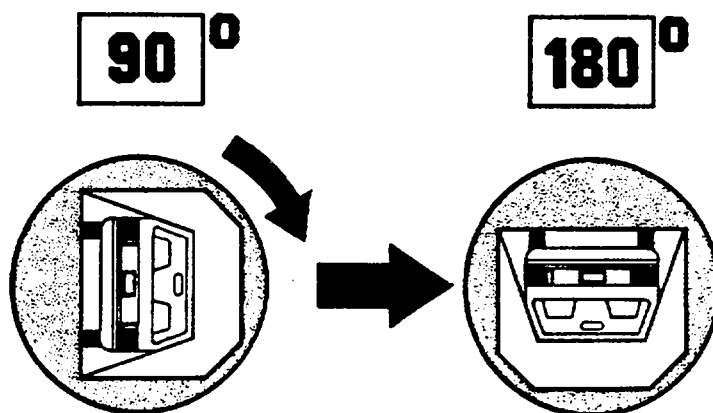
IV. SOLVENT SPILLAGE LOCATION(S):

None

Table 12

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

Vehicle NHTSA ID No.:

CLO205I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 02 minutes 50 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 05 minutes 00 seconds

TOTAL

07 minutes 50 seconds

Next whole minute interval

08 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

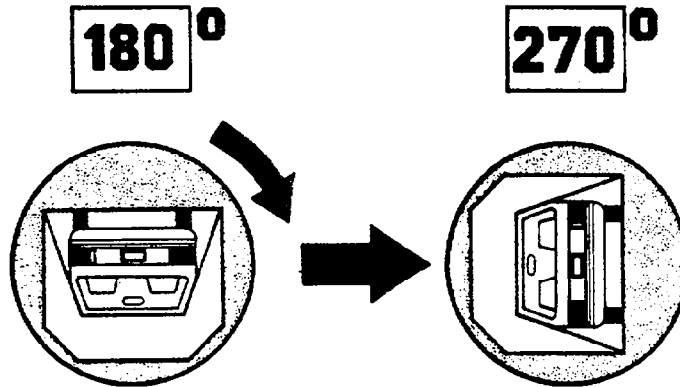
Table 12

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

TEST PHASE:

Vehicle NHTSA ID No.:

CL0205



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes) 03 minutes 00 seconds

FMVSS 301 Position Hold Time + 05 minutes 00 seconds

TOTAL

08 minutes 00 seconds

Next whole minute interval

08 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):

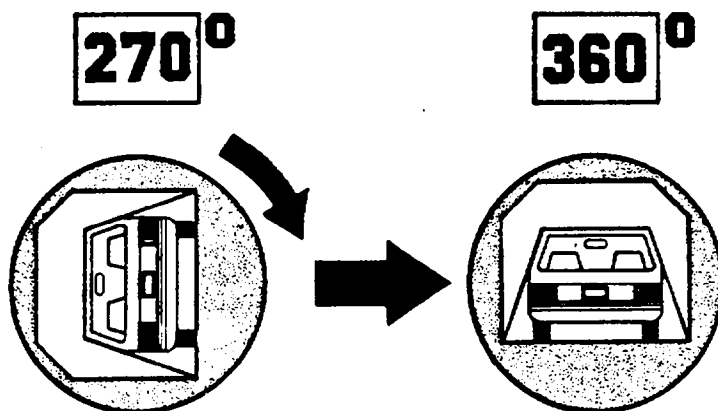
None

Table 12

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

TEST PHASE:

Vehicle NHTSA ID No.:

CL0205I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 03 minutes 00 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 05 minutes 00 seconds

TOTAL

08 minutes 00 seconds

Next whole minute interval

08 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

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: December 6, 1989 Vehicle NHTSA No.: CL0205

Vehicle Manufacturer: Ford Motor Company

Model Year: 1990 VIN: 1FAPP6049LH103784

Body Style: 2-Door Coupe Build Date: August 1989

Dummy Stabilized Temperature at Time of Test: 70 °F (Spec. = 66-78°F)

Impact Velocity: 29.4 mph Time of Test: 12:40

Type of Automatic Restraint System: Automatic Torso Belt

Failure Details:

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

Appendix A

PHOTOGRAPHS

LIST OF PHOTOGRAPHS

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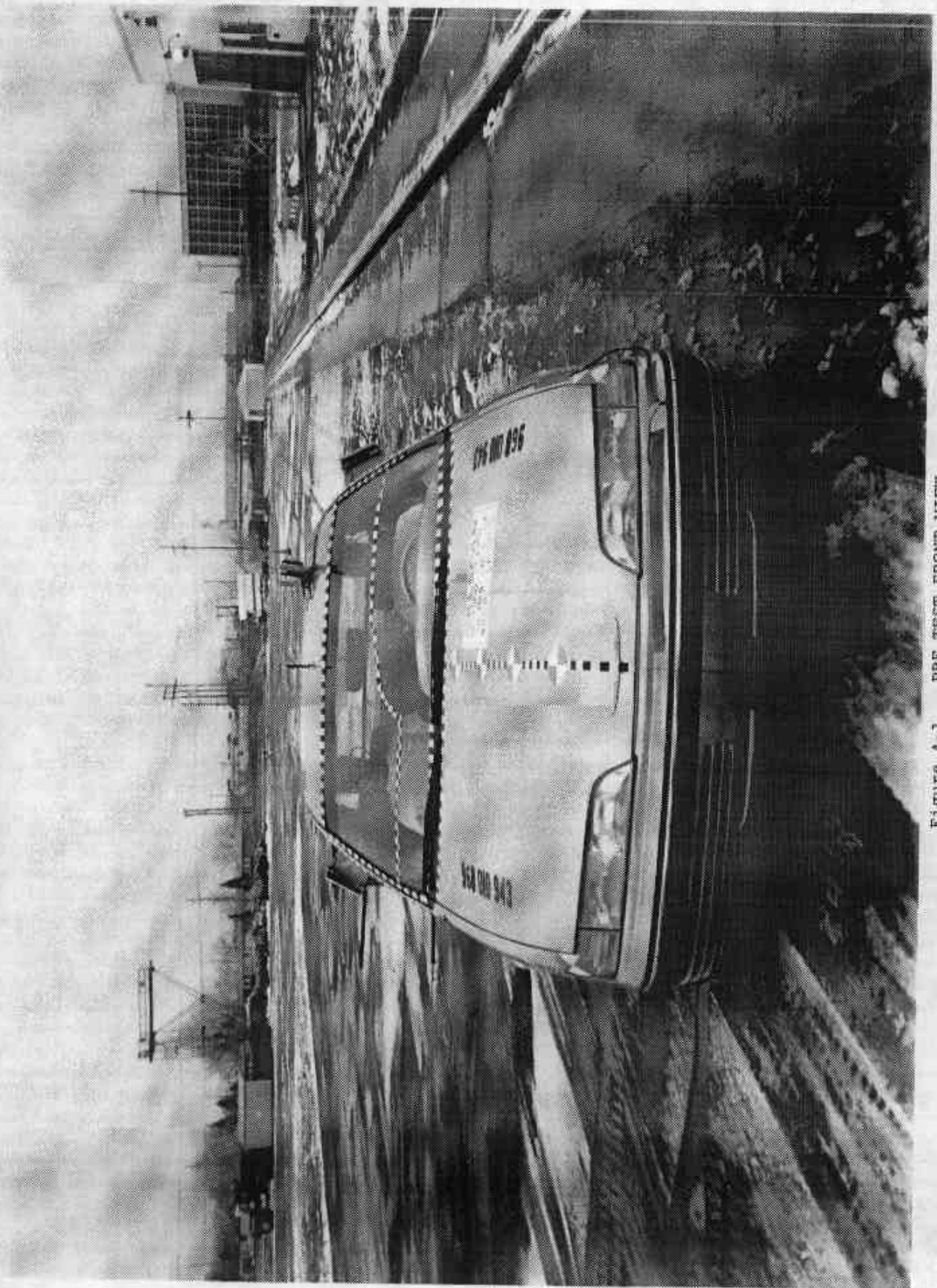


Figure A-1 PRE-TEST FRONT VIEW

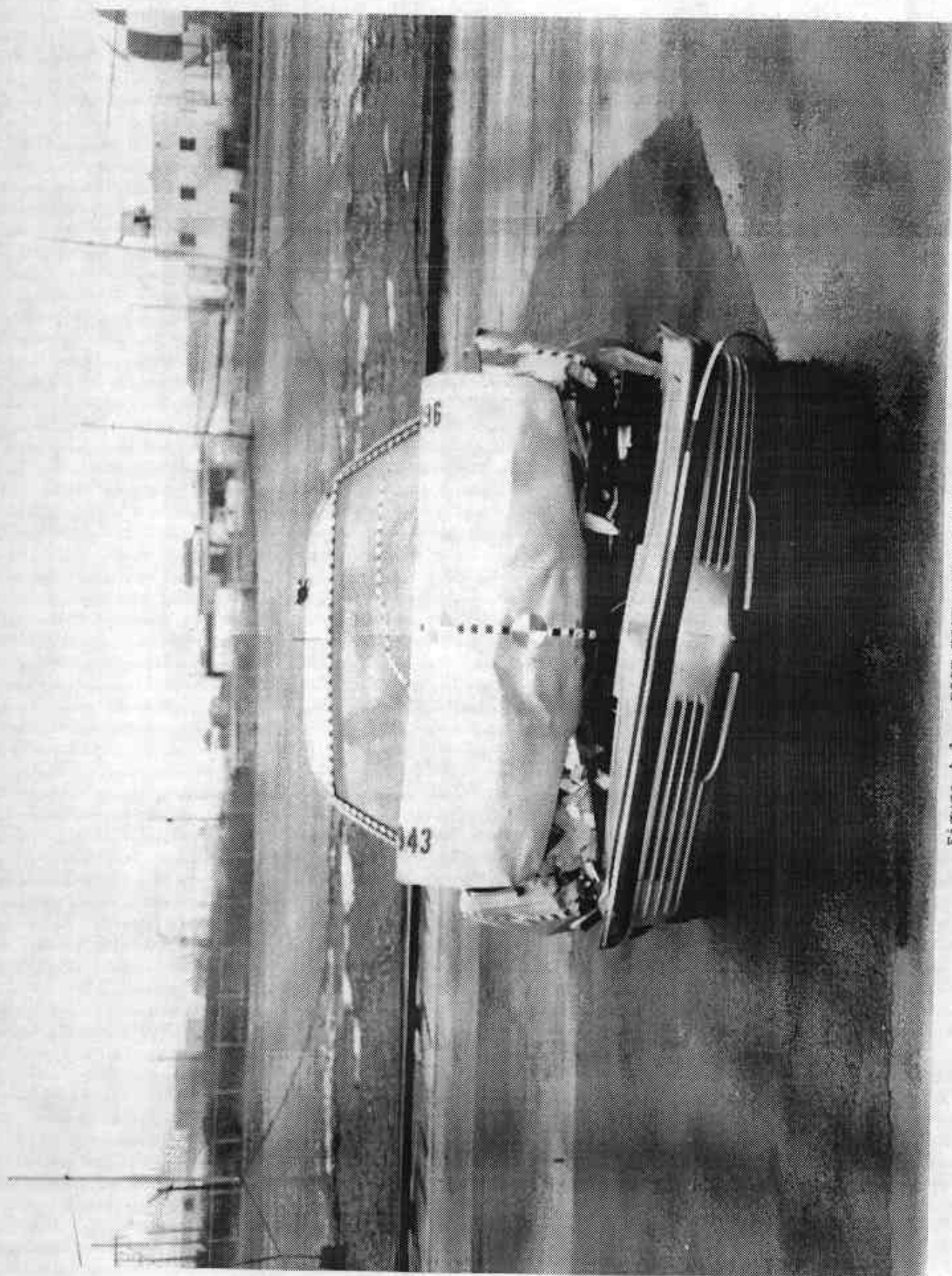


Figure A-1 POST TEST FRONT VIEW

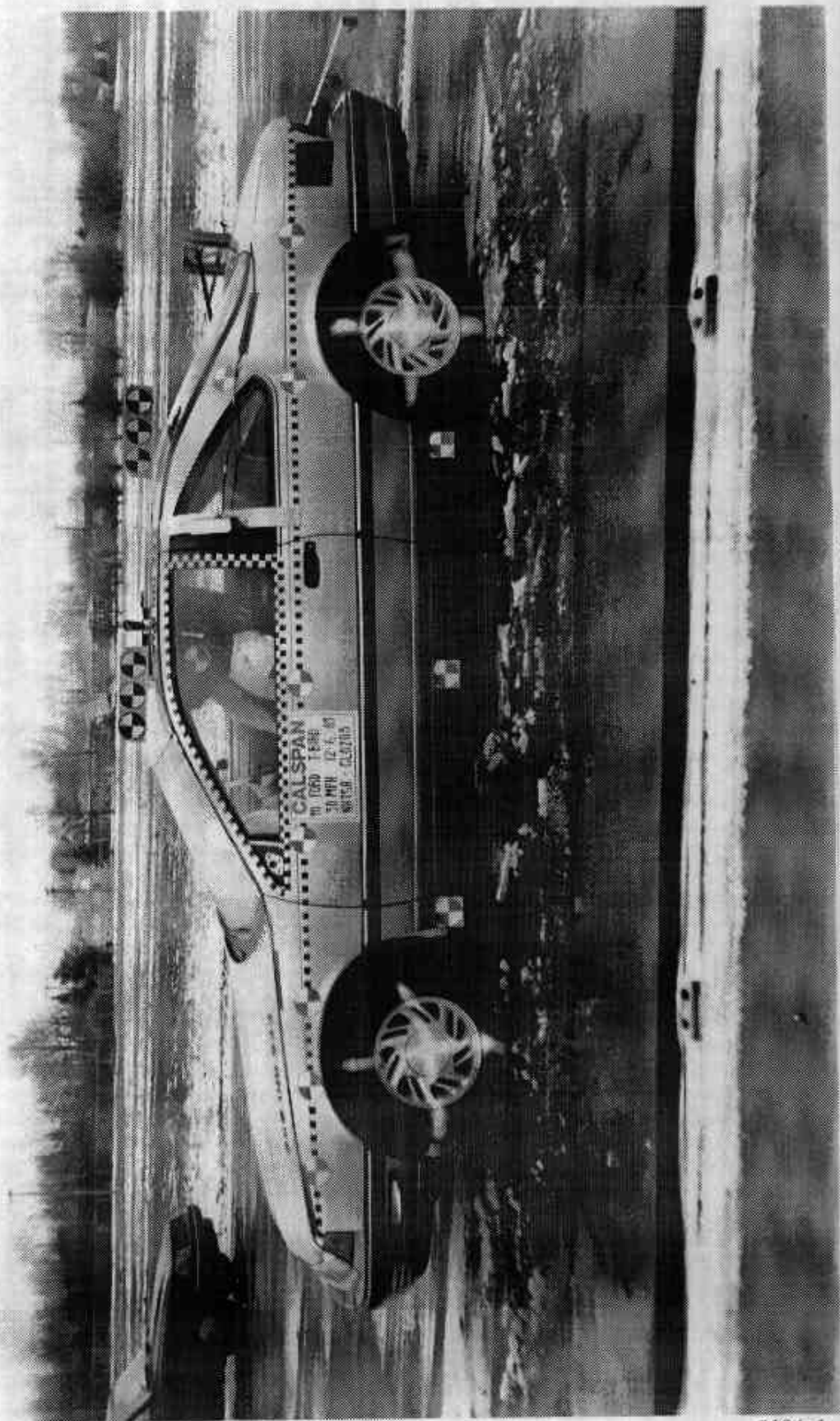


Figure A-3 PRE-TEST LEFT SIDE VIEW

A-5

7804-1

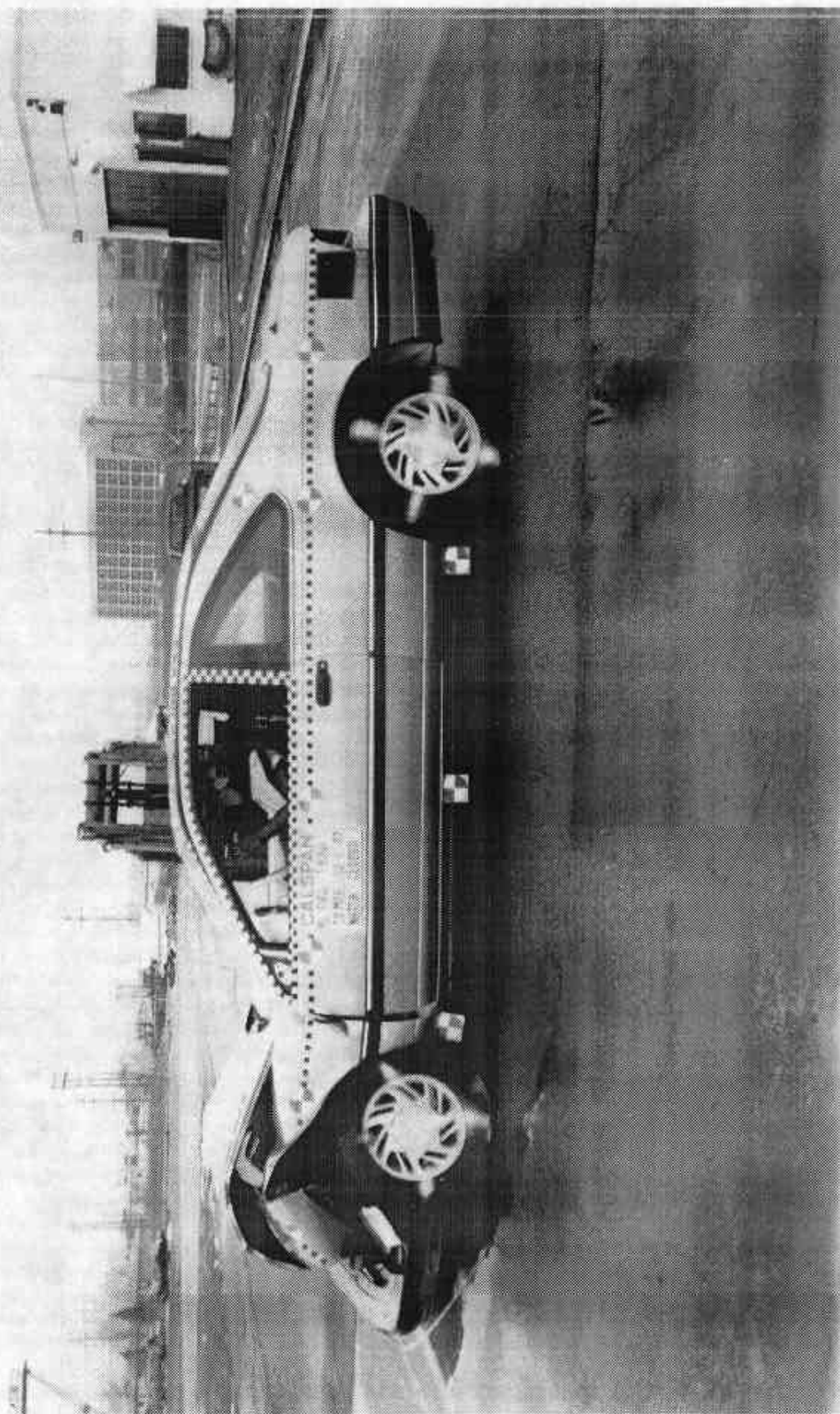


Figure A-4 POST TEST LEFT SIDE VIEW

A-6

7804-1

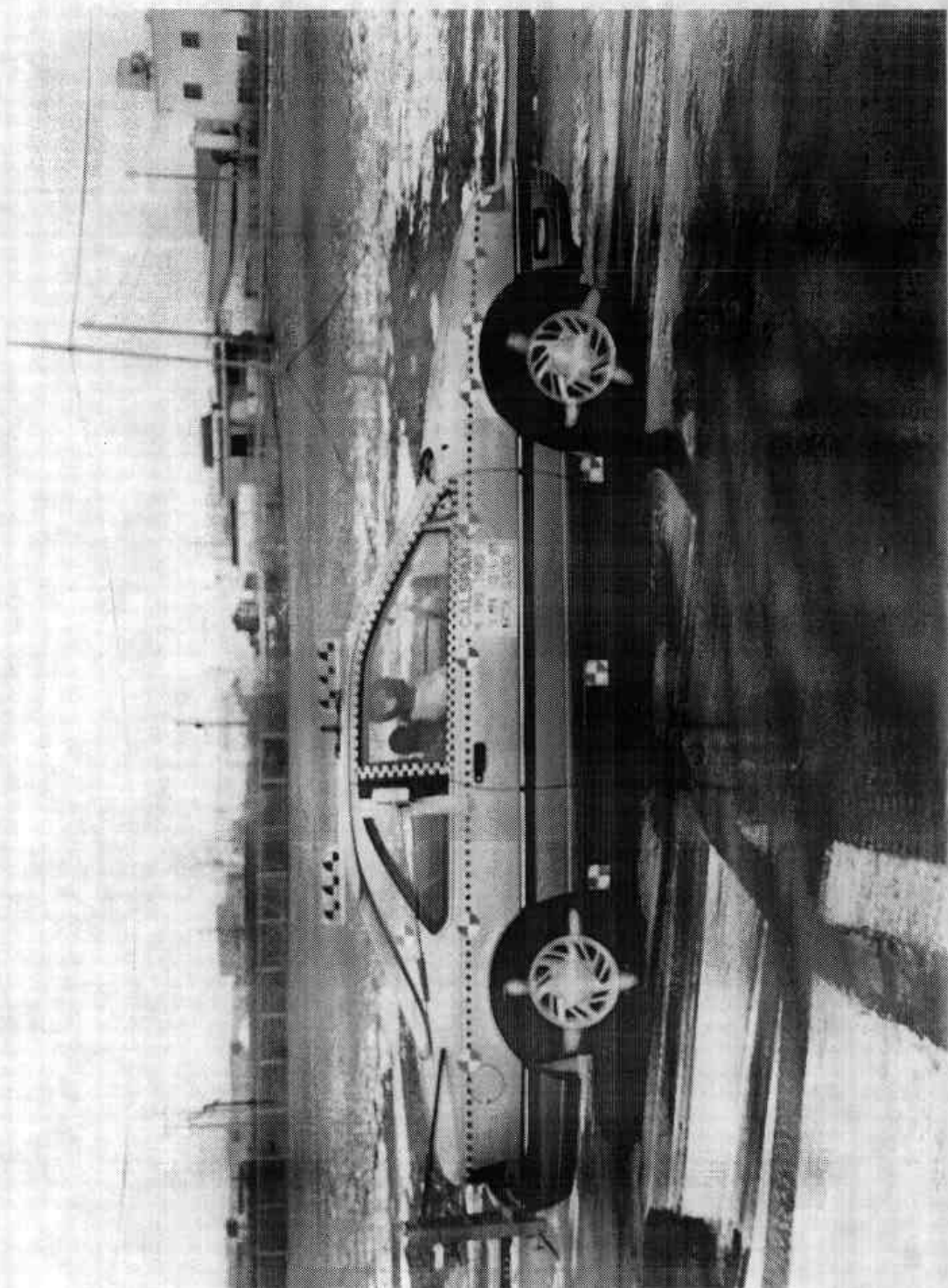


Figure A-5 PRE-TEST RIGHT SIDE VIEW

A-7

7804-1



A-9

7804-1

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

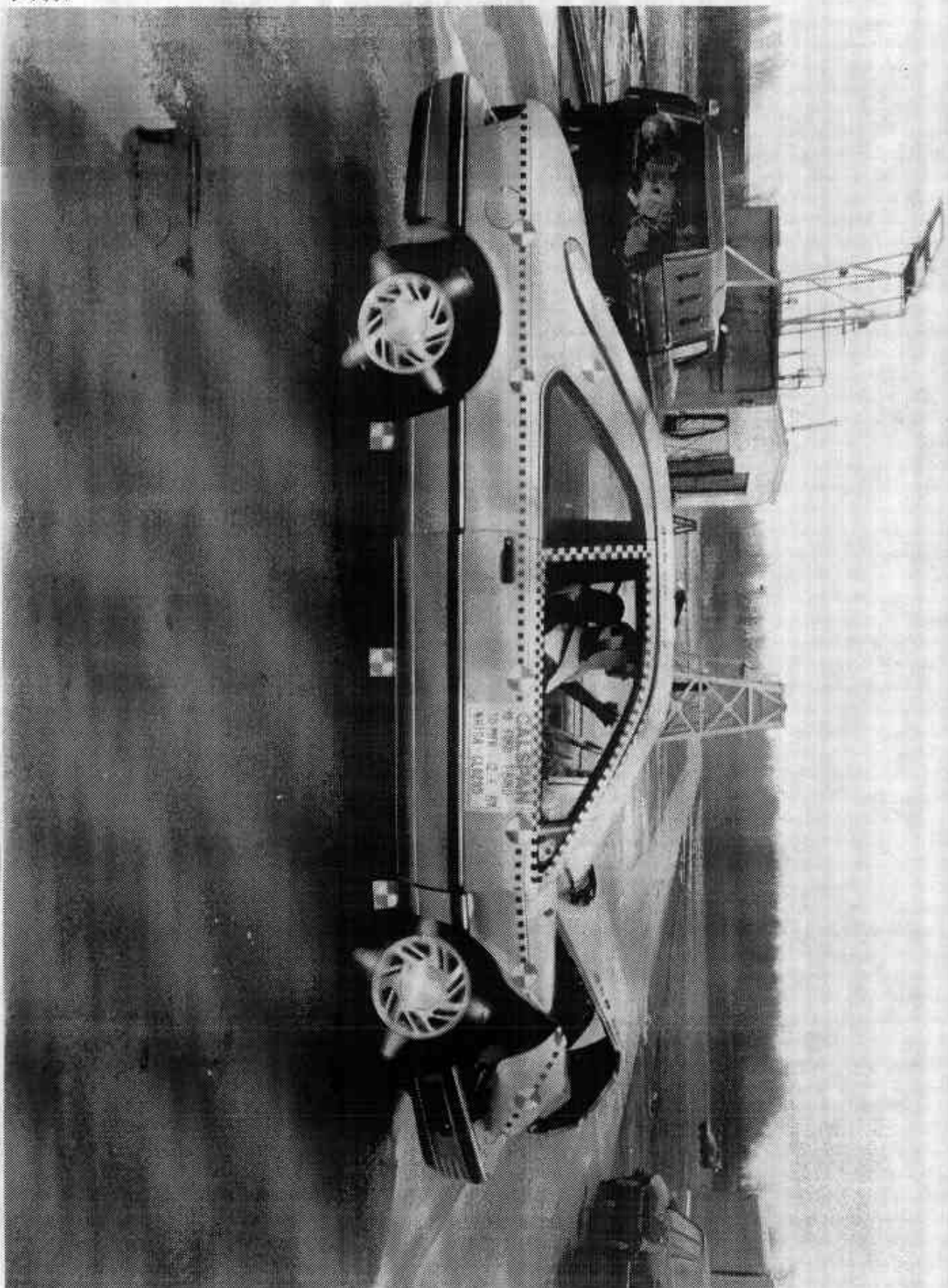


Figure A-6 POST-TEST RIGHT SIDE VIEW

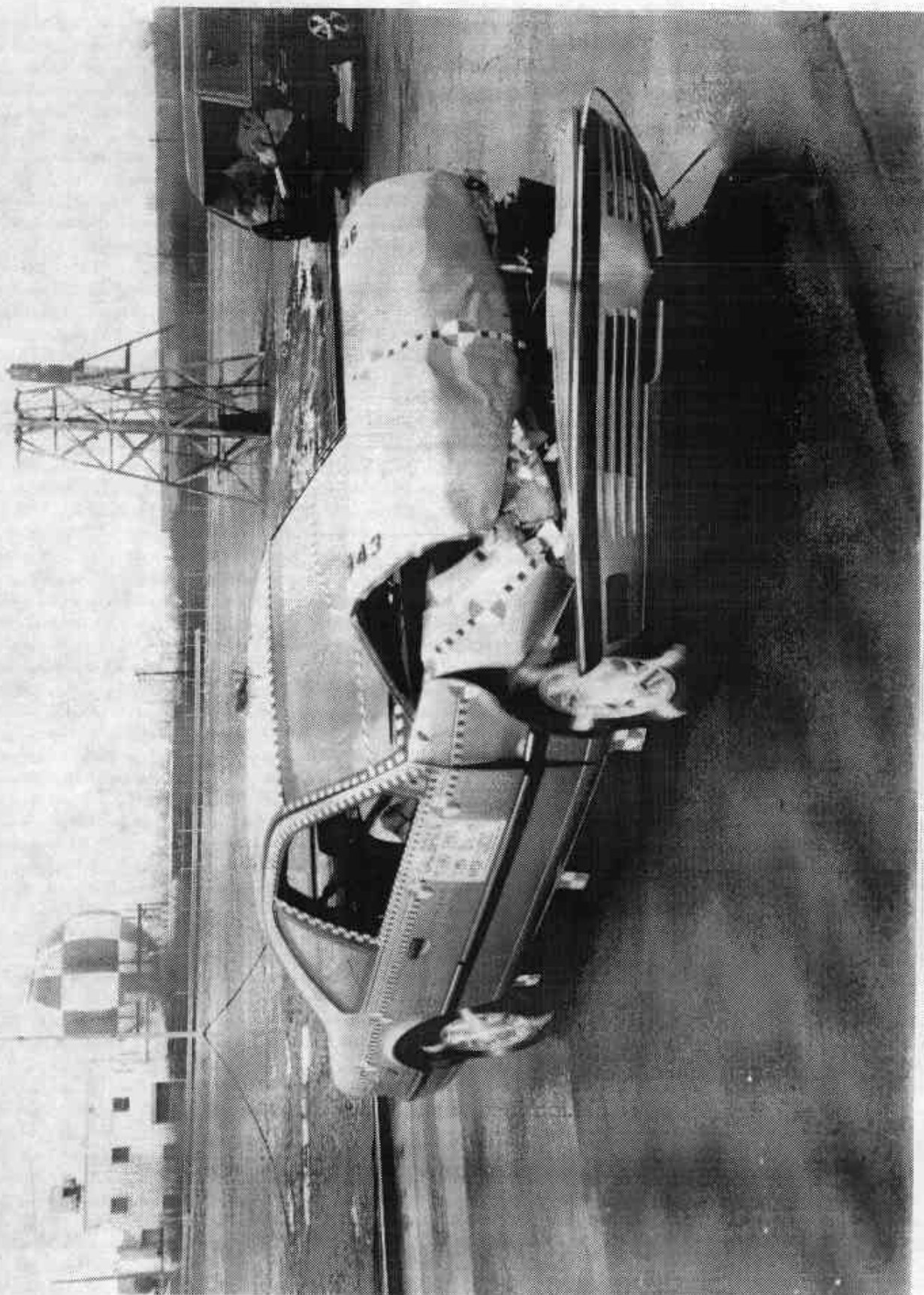


Figure A-8 POST-TEST RIGHT FRONT THREE-QUARTER VIEW

A-10

7804-1

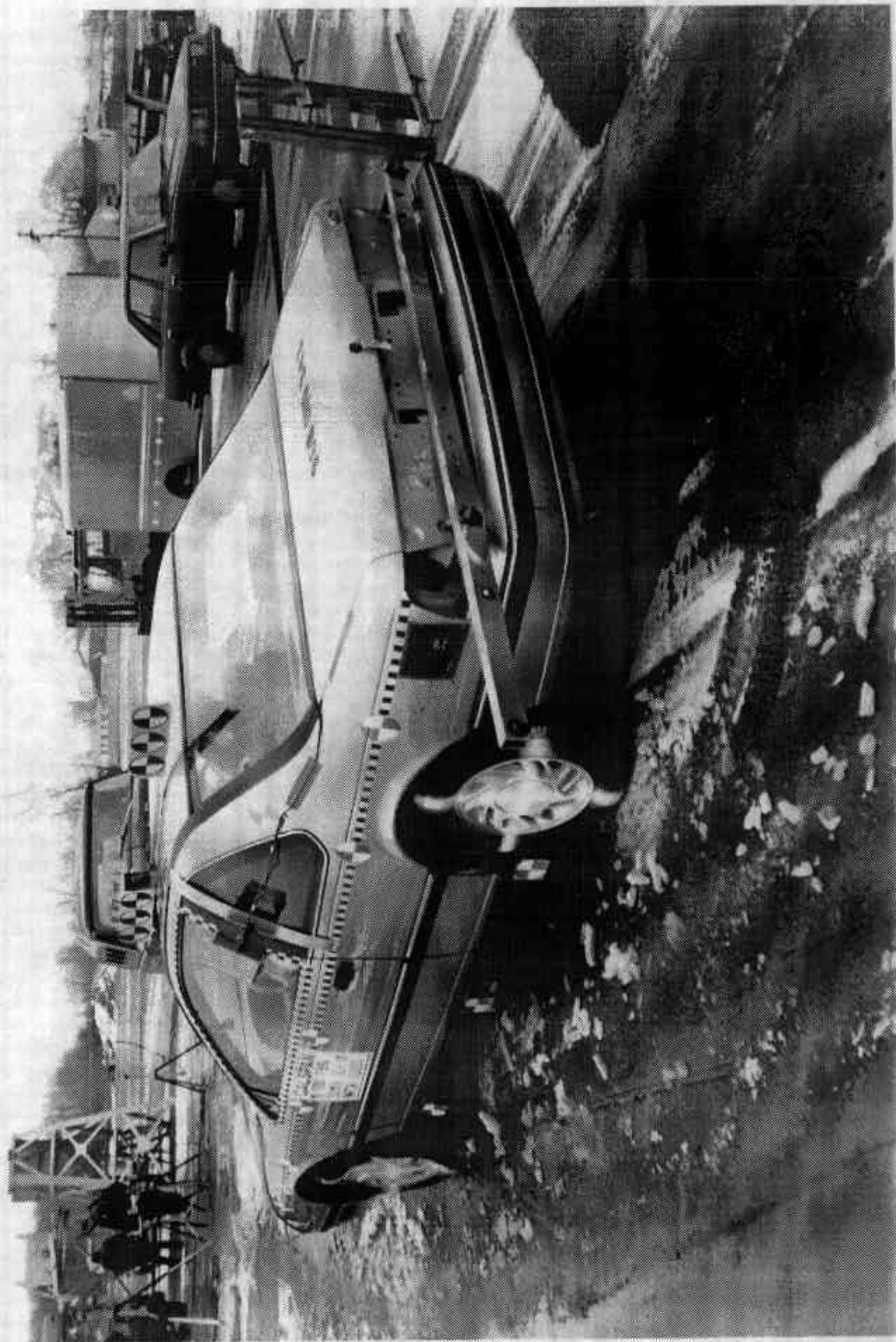


Figure A-9 PRE-TEST LEFT REAR THREE-QUARTER VIEW

A-11

7804-1



Figure A-10 POST-TEST LEFT REAR THREE-QUARTER VIEW

A-12

7804-1

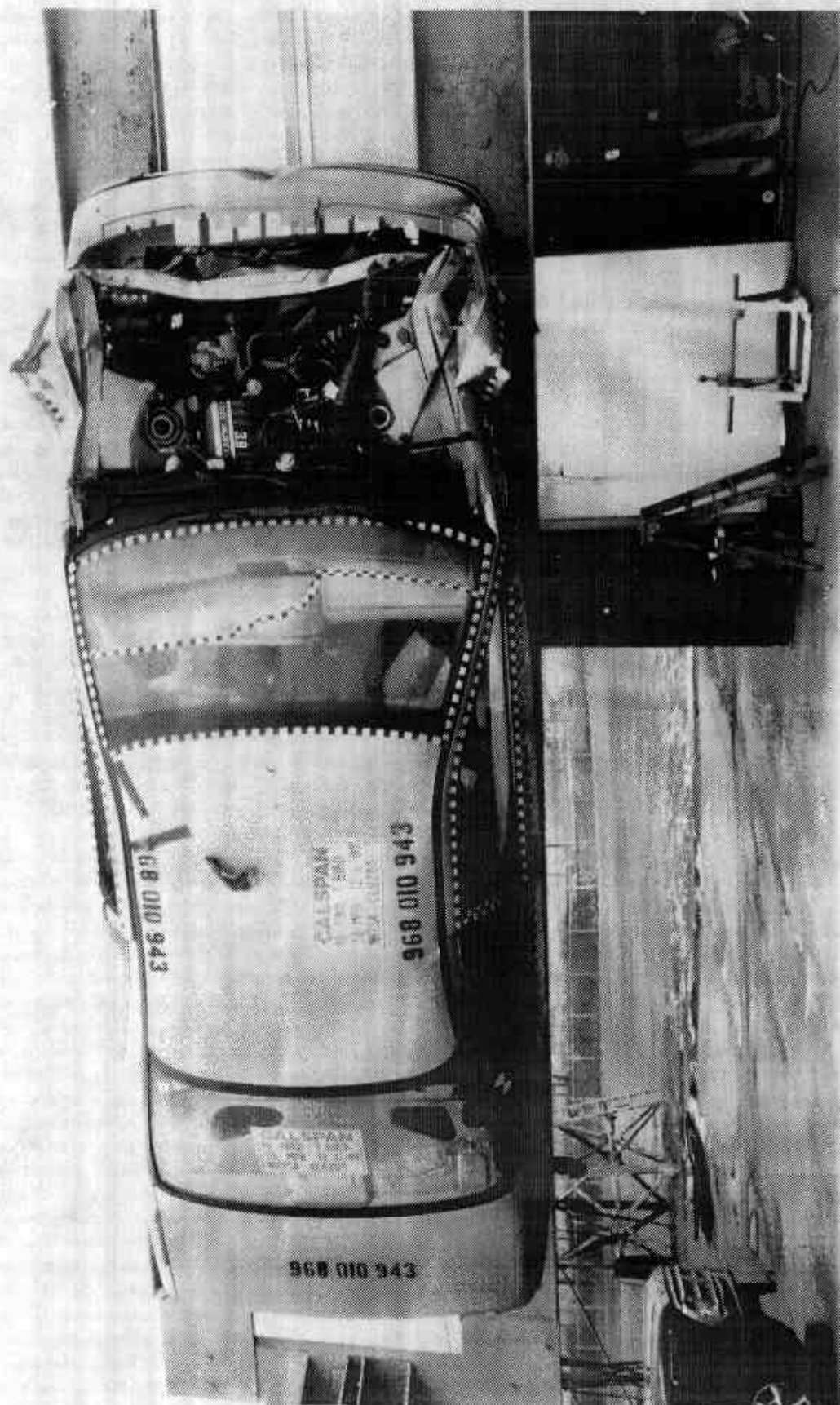


Figure A-11 POST TEST TOP VIEW

A-13

7804-1

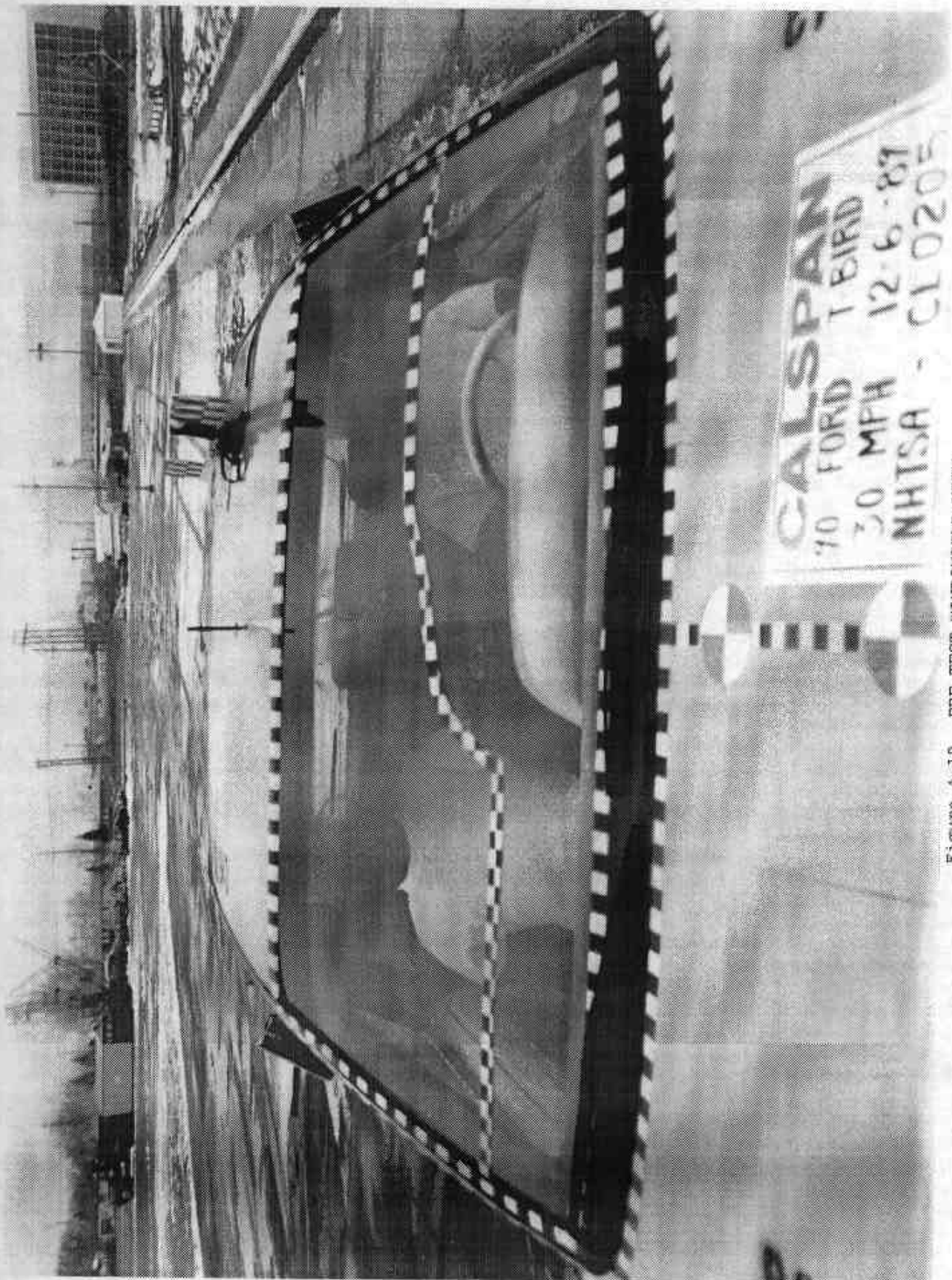


Figure A-12 PRE-TEST WINDSHIELD VIEW

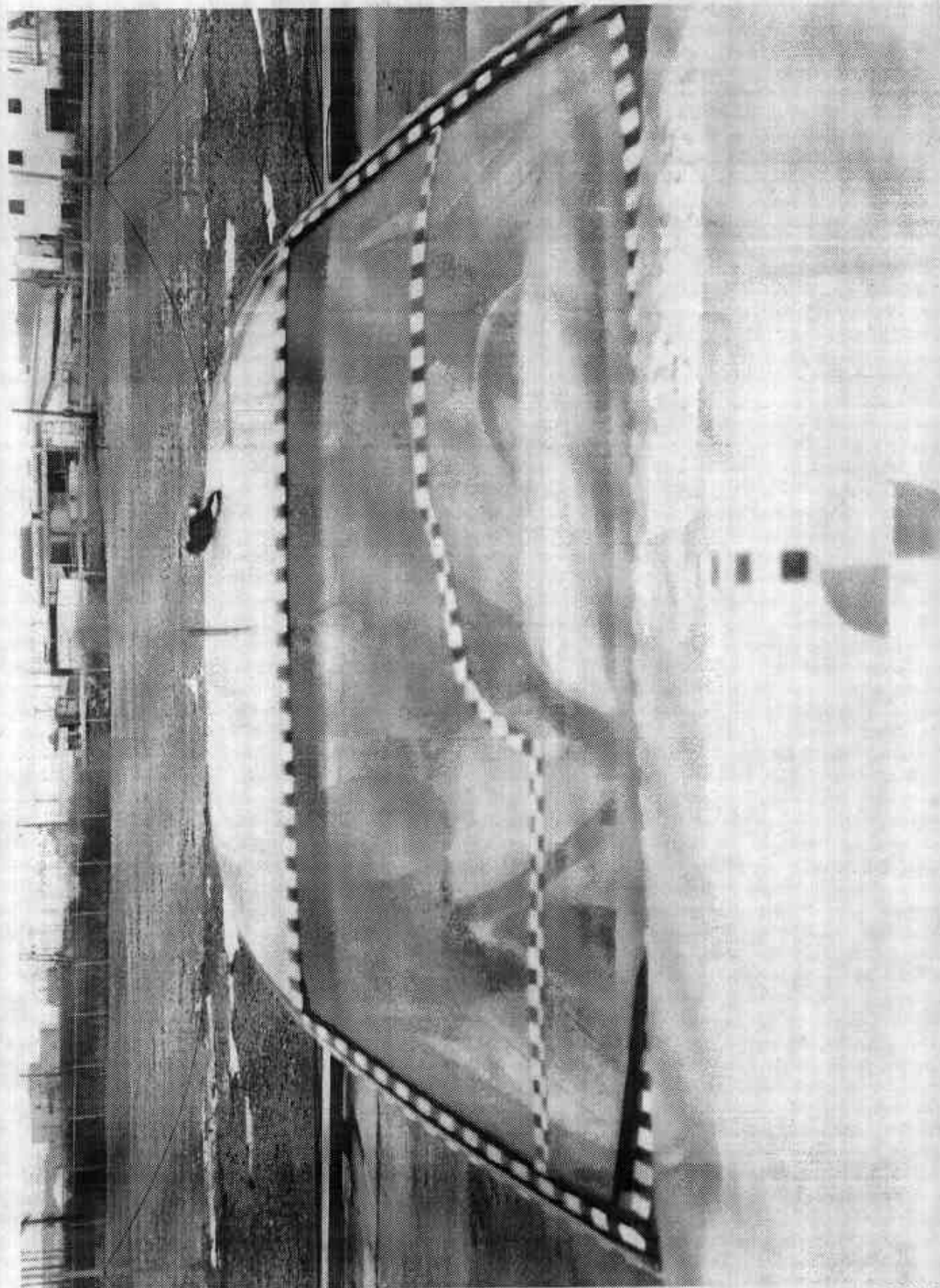


Figure A-13 POST-TEST WINDSHIELD VIEW

A-15

7804-1

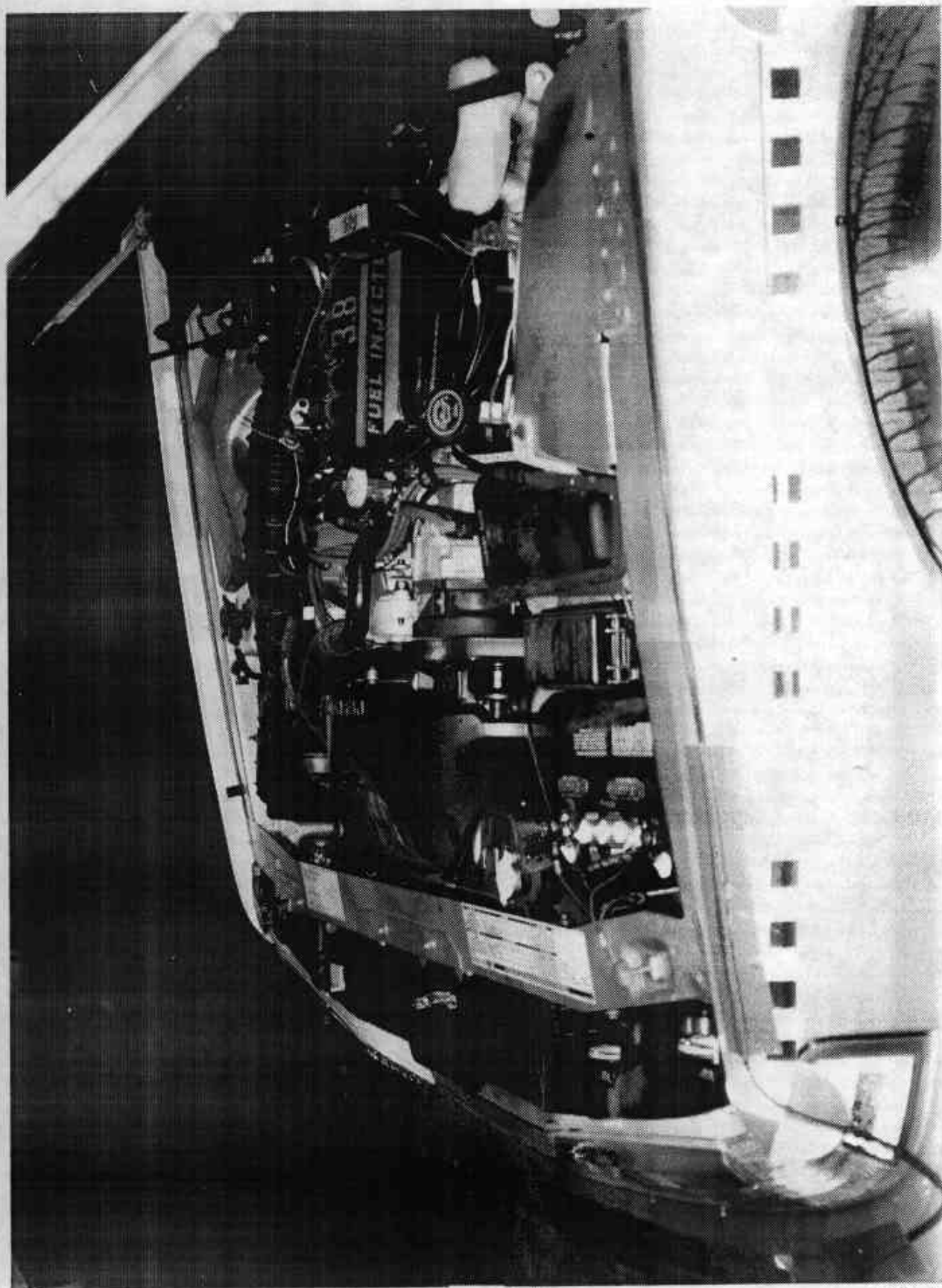


Figure A-14 PRE-TEST ENGINE COMPARTMENT VIEW

A-16

7804-1

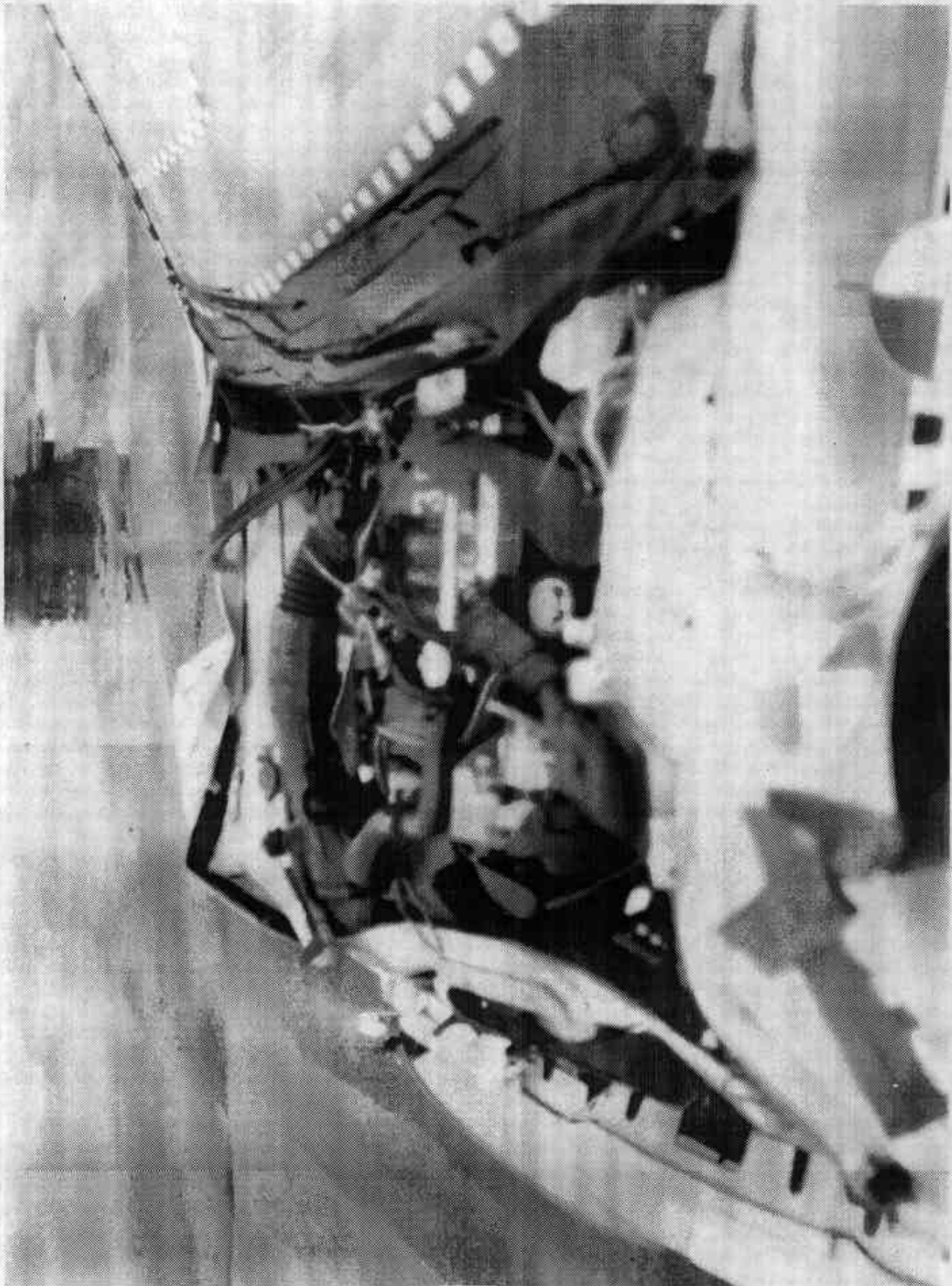


Figure A-15 POST-TEST ENGINE COMPARTMENT VIEW

A-17

7804-1

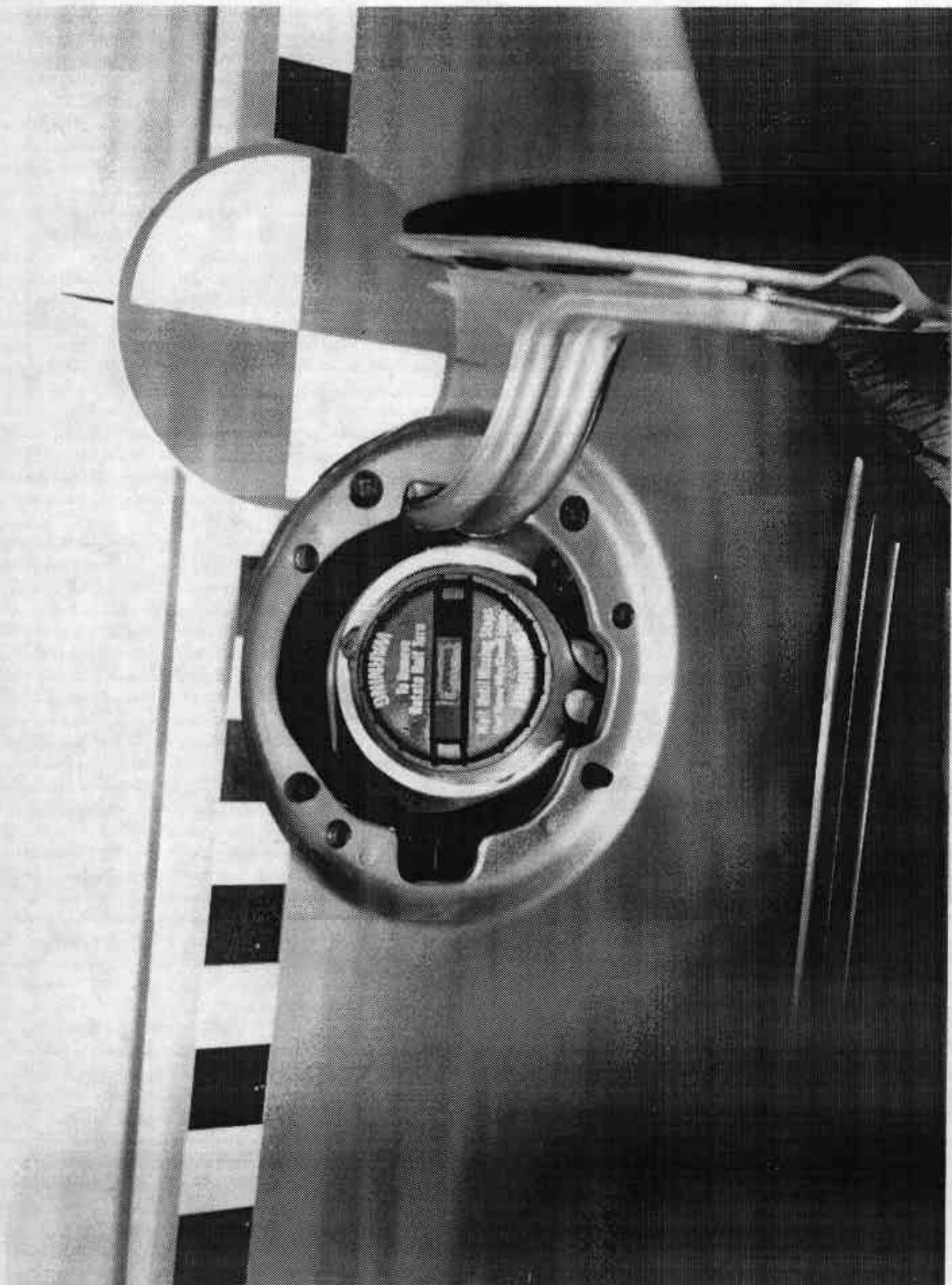


Figure A-16 PRE-TEST FUEL FILLER CAP VIEW



Figure A-17 POST-TEST FUEL FILLER CAP VIEW

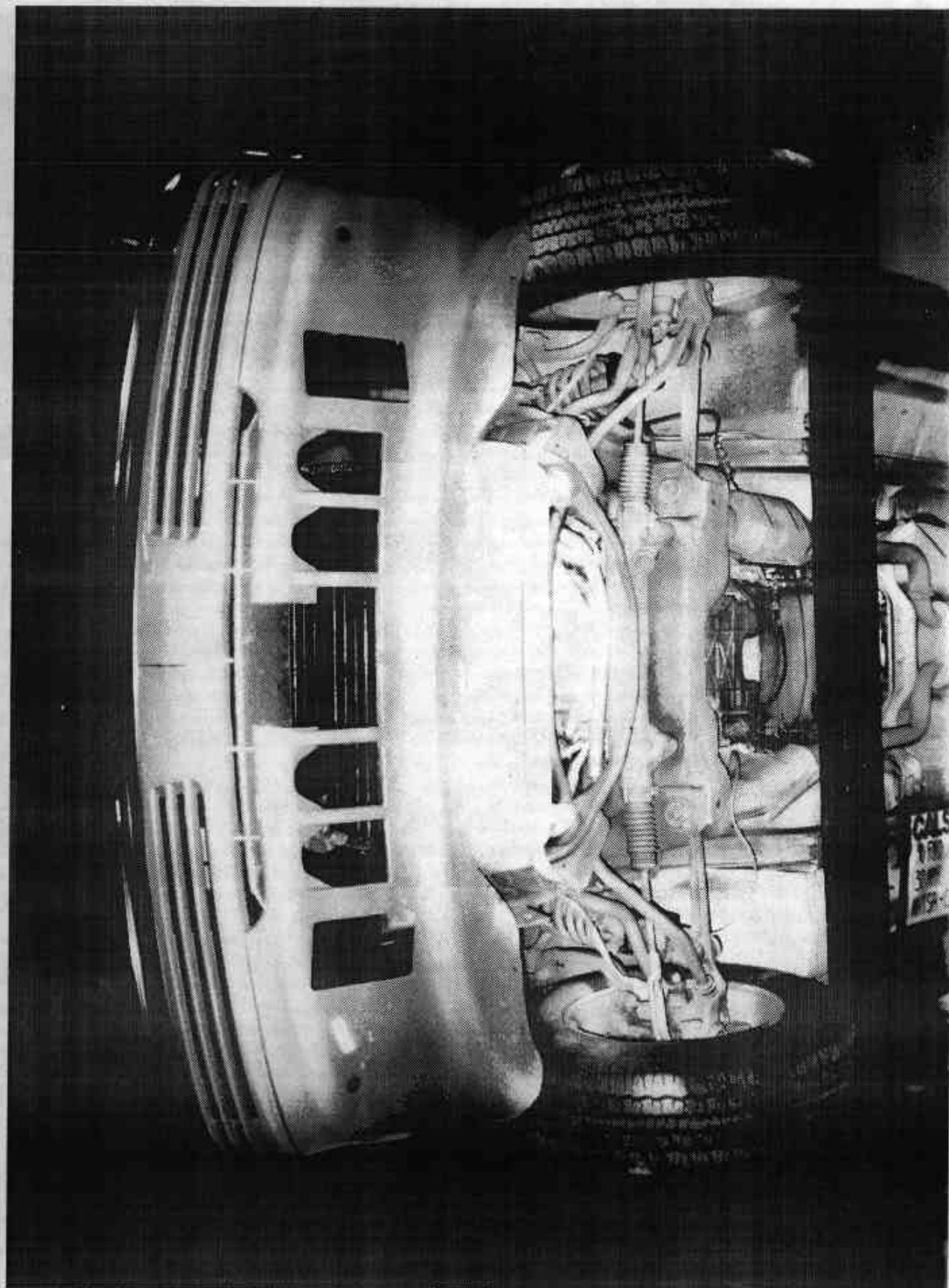


Figure A-18 PRE-TEST FRONT UNDERBODY VIEW

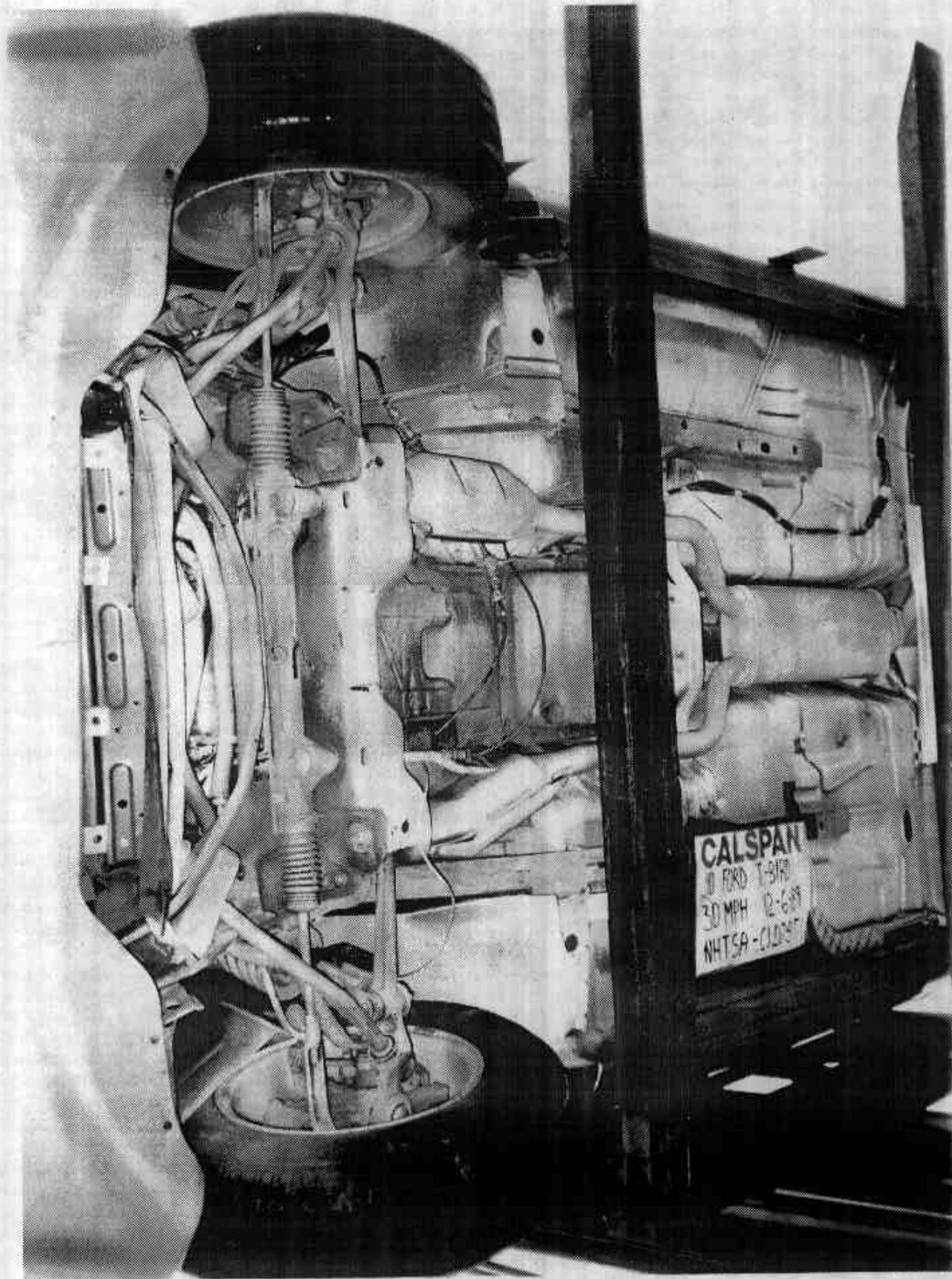


Figure A-19 POST-TEST FRONT UNDERBODY VIEW

A-21

7804-1

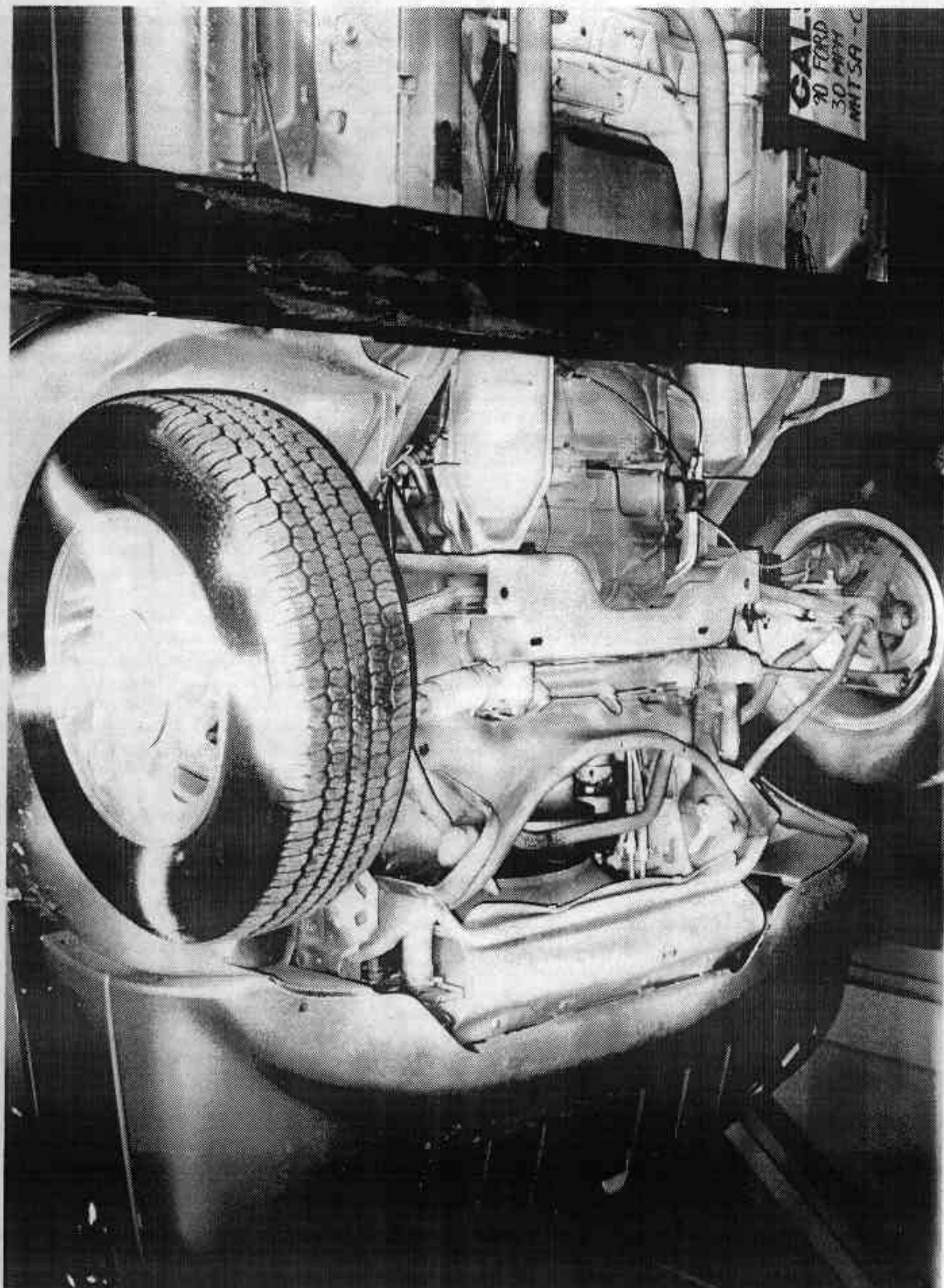


Figure A-20 PRE-TEST FRONT SIDE UNDERBODY VIEW

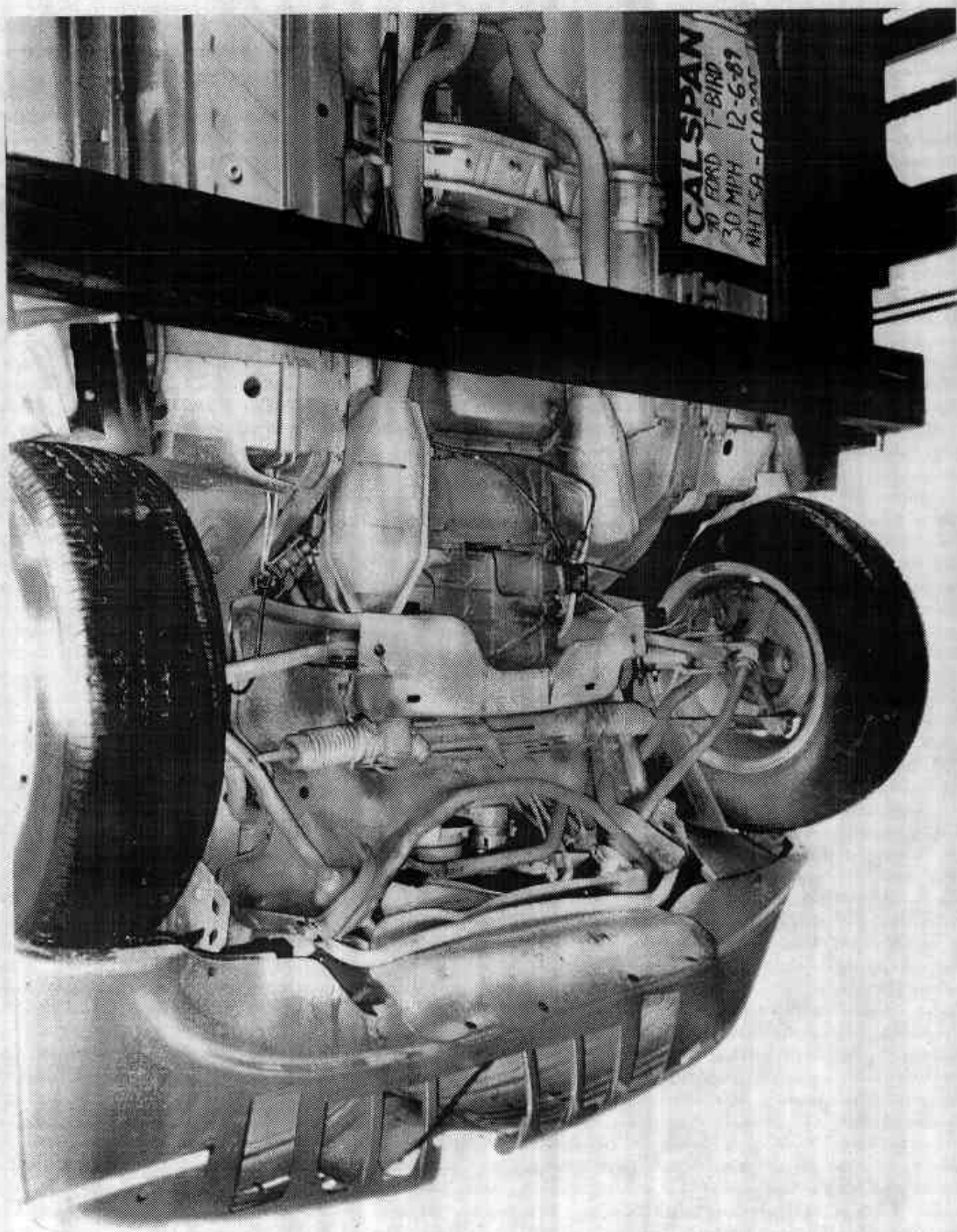


Figure A-21 POST-TEST FRONT SIDE UNDERBODY VIEW

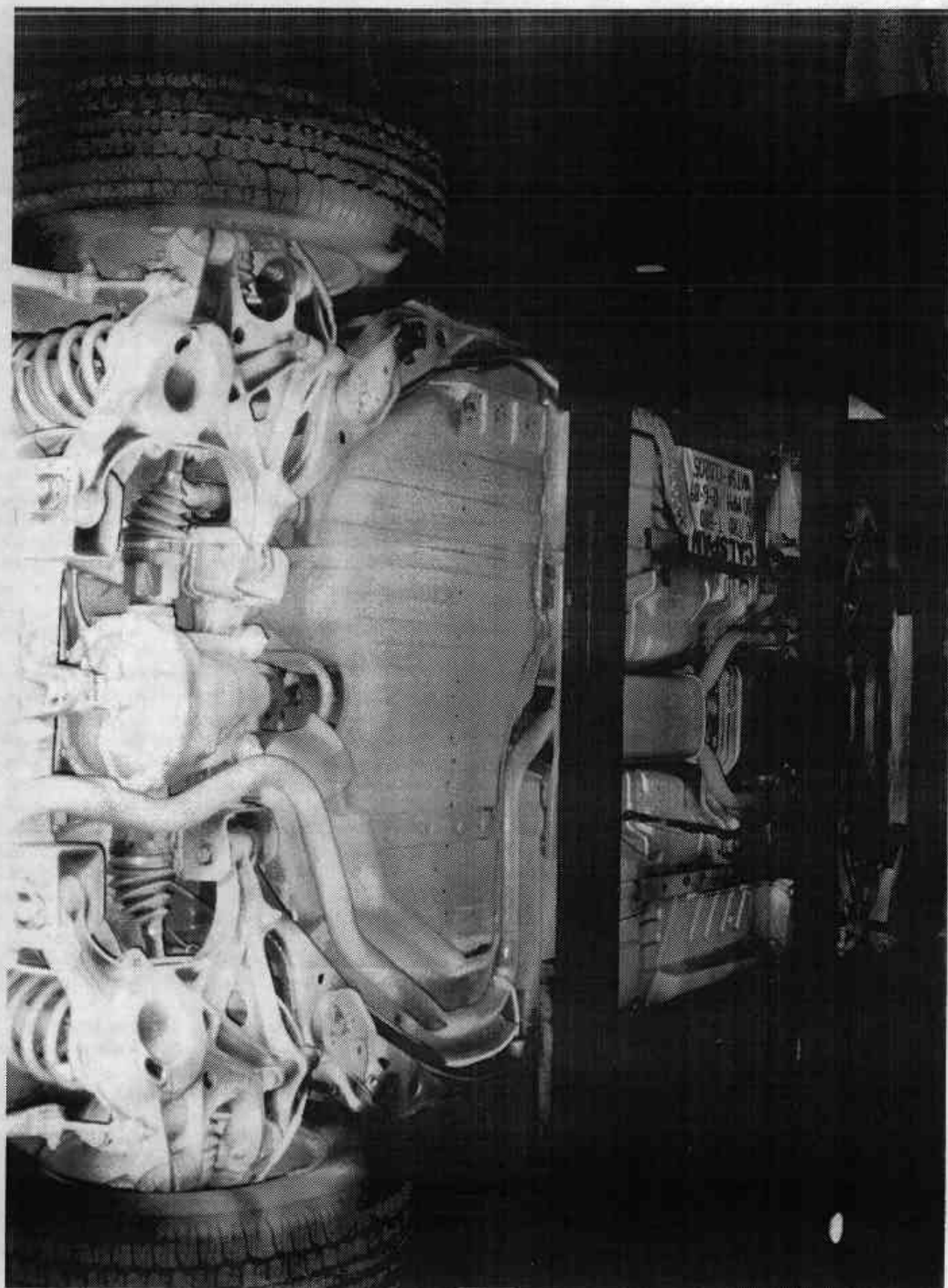


Figure A-22 PRE-TEST REAR UNDERBODY VIEW

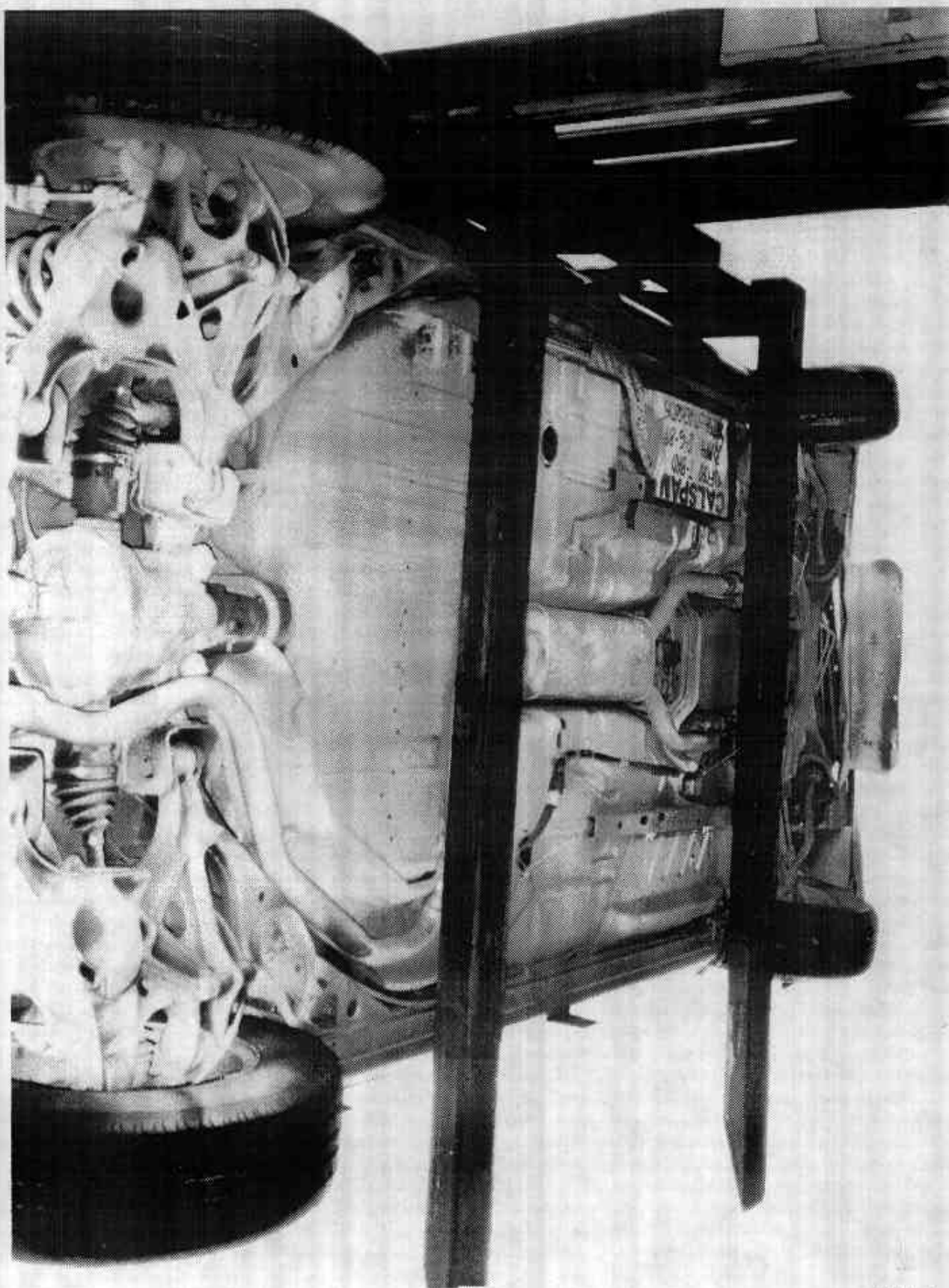


Figure A-23 POST-TEST REAR UNDERBODY VIEW

A-25

7804-1

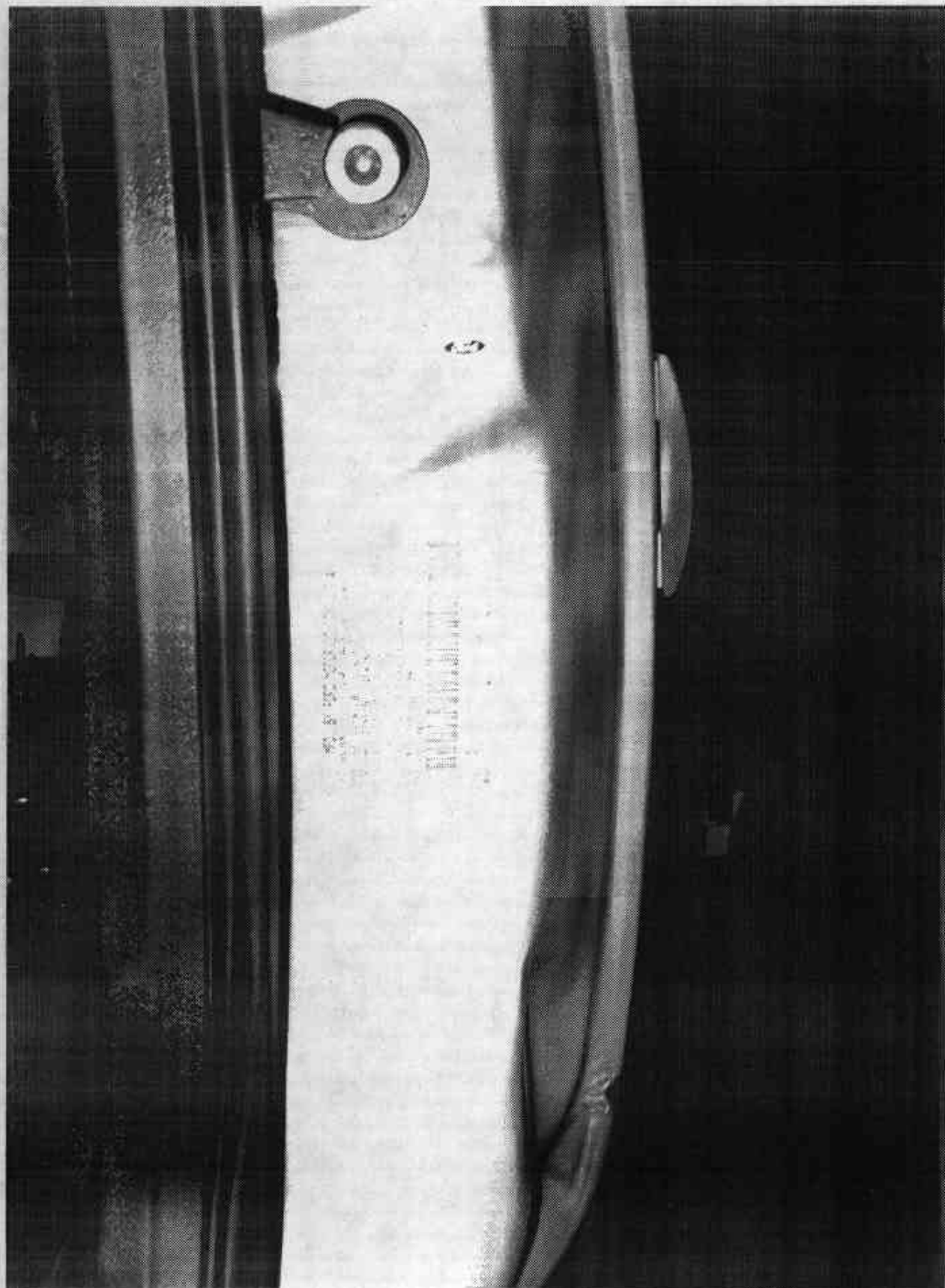
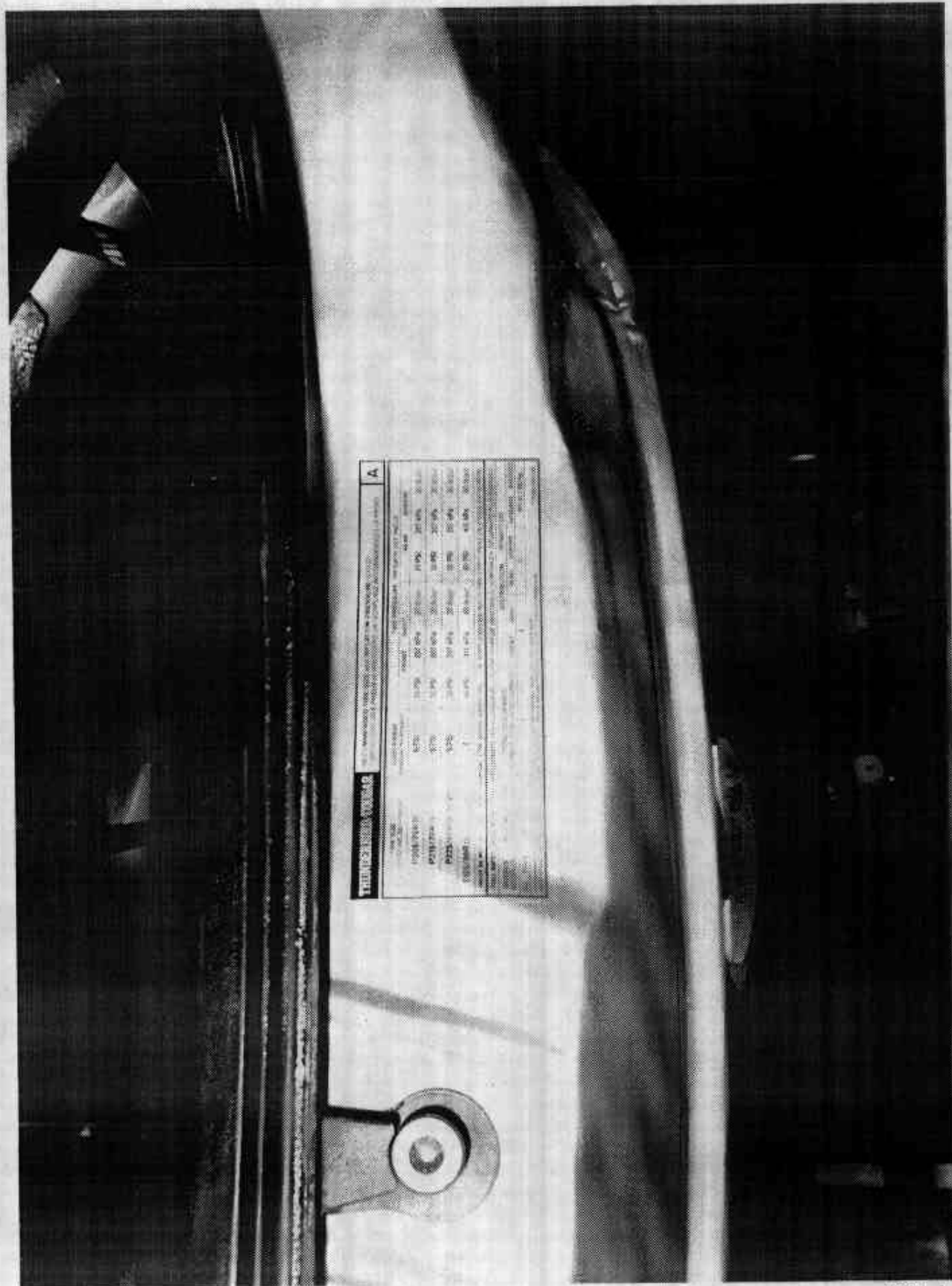


Figure A-24 CERTIFICATION LABEL



TIRE LOAD LIMIT			A	
WEIGHT	TIRE LOAD	TIRE TYPE		
10,000	1,000	1150	1150	1150
11,000	1,100	1150	1150	1150
12,000	1,200	1150	1150	1150
13,000	1,300	1150	1150	1150
14,000	1,400	1150	1150	1150
15,000	1,500	1150	1150	1150
16,000	1,600	1150	1150	1150
17,000	1,700	1150	1150	1150
18,000	1,800	1150	1150	1150
19,000	1,900	1150	1150	1150
20,000	2,000	1150	1150	1150
21,000	2,100	1150	1150	1150
22,000	2,200	1150	1150	1150
23,000	2,300	1150	1150	1150
24,000	2,400	1150	1150	1150
25,000	2,500	1150	1150	1150
26,000	2,600	1150	1150	1150
27,000	2,700	1150	1150	1150
28,000	2,800	1150	1150	1150
29,000	2,900	1150	1150	1150
30,000	3,000	1150	1150	1150
31,000	3,100	1150	1150	1150
32,000	3,200	1150	1150	1150
33,000	3,300	1150	1150	1150
34,000	3,400	1150	1150	1150
35,000	3,500	1150	1150	1150
36,000	3,600	1150	1150	1150
37,000	3,700	1150	1150	1150
38,000	3,800	1150	1150	1150
39,000	3,900	1150	1150	1150
40,000	4,000	1150	1150	1150
41,000	4,100	1150	1150	1150
42,000	4,200	1150	1150	1150
43,000	4,300	1150	1150	1150
44,000	4,400	1150	1150	1150
45,000	4,500	1150	1150	1150
46,000	4,600	1150	1150	1150
47,000	4,700	1150	1150	1150
48,000	4,800	1150	1150	1150
49,000	4,900	1150	1150	1150
50,000	5,000	1150	1150	1150
51,000	5,100	1150	1150	1150
52,000	5,200	1150	1150	1150
53,000	5,300	1150	1150	1150
54,000	5,400	1150	1150	1150
55,000	5,500	1150	1150	1150
56,000	5,600	1150	1150	1150
57,000	5,700	1150	1150	1150
58,000	5,800	1150	1150	1150
59,000	5,900	1150	1150	1150
60,000	6,000	1150	1150	1150
61,000	6,100	1150	1150	1150
62,000	6,200	1150	1150	1150
63,000	6,300	1150	1150	1150
64,000	6,400	1150	1150	1150
65,000	6,500	1150	1150	1150
66,000	6,600	1150	1150	1150
67,000	6,700	1150	1150	1150
68,000	6,800	1150	1150	1150
69,000	6,900	1150	1150	1150
70,000	7,000	1150	1150	1150
71,000	7,100	1150	1150	1150
72,000	7,200	1150	1150	1150
73,000	7,300	1150	1150	1150
74,000	7,400	1150	1150	1150
75,000	7,500	1150	1150	1150
76,000	7,600	1150	1150	1150
77,000	7,700	1150	1150	1150
78,000	7,800	1150	1150	1150
79,000	7,900	1150	1150	1150
80,000	8,000	1150	1150	1150
81,000	8,100	1150	1150	1150
82,000	8,200	1150	1150	1150
83,000	8,300	1150	1150	1150
84,000	8,400	1150	1150	1150
85,000	8,500	1150	1150	1150
86,000	8,600	1150	1150	1150
87,000	8,700	1150	1150	1150
88,000	8,800	1150	1150	1150
89,000	8,900	1150	1150	1150
90,000	9,000	1150	1150	1150
91,000	9,100	1150	1150	1150
92,000	9,200	1150	1150	1150
93,000	9,300	1150	1150	1150
94,000	9,400	1150	1150	1150
95,000	9,500	1150	1150	1150
96,000	9,600	1150	1150	1150
97,000	9,700	1150	1150	1150
98,000	9,800	1150	1150	1150
99,000	9,900	1150	1150	1150
100,000	10,000	1150	1150	1150

Figure A-25 TIRE PLACARD

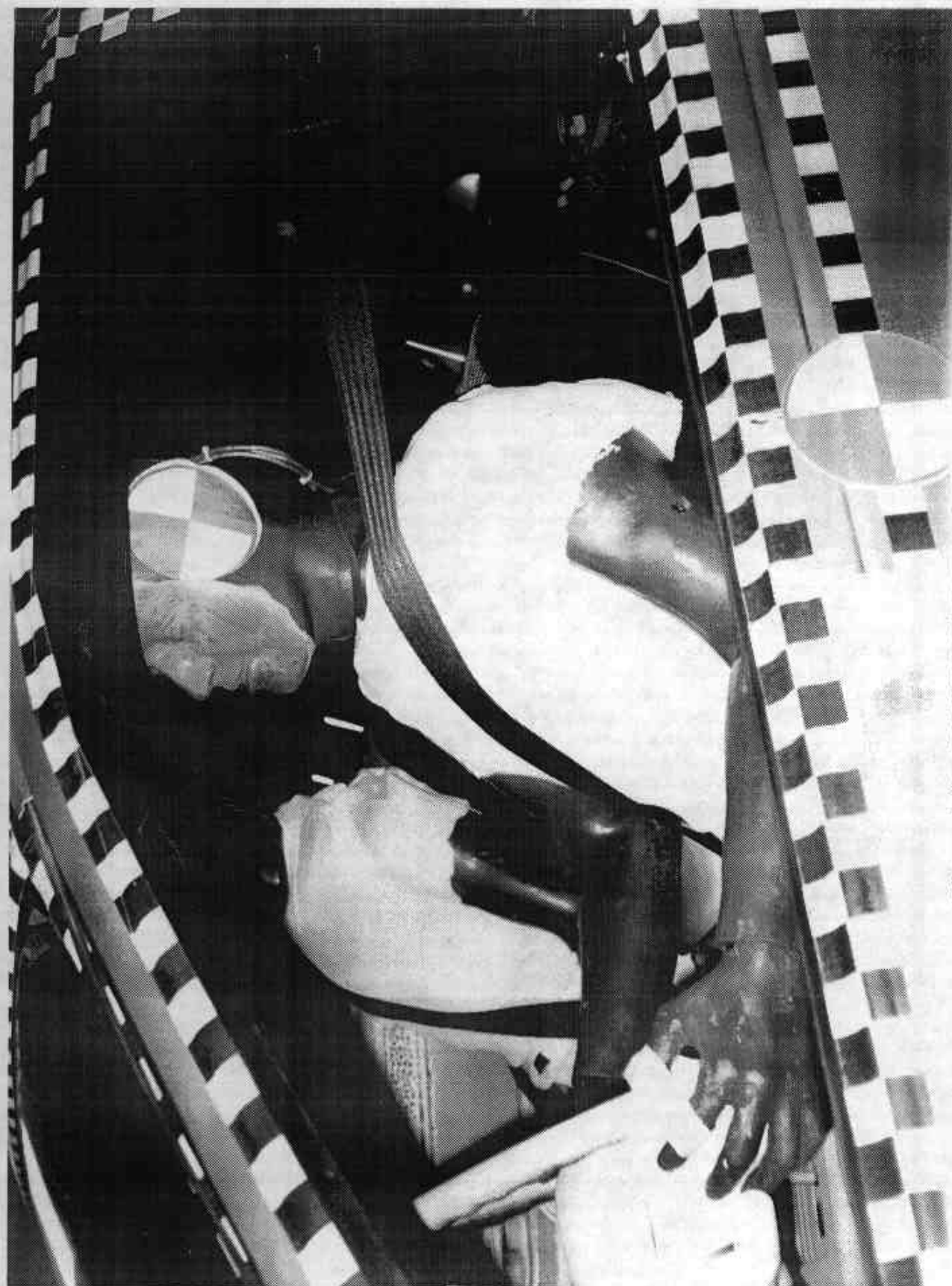


Figure A-26 PRE-TEST DRIVER DUMMY POSITION



Figure A-27 POST-TEST DRIVER DUMMY POSITION

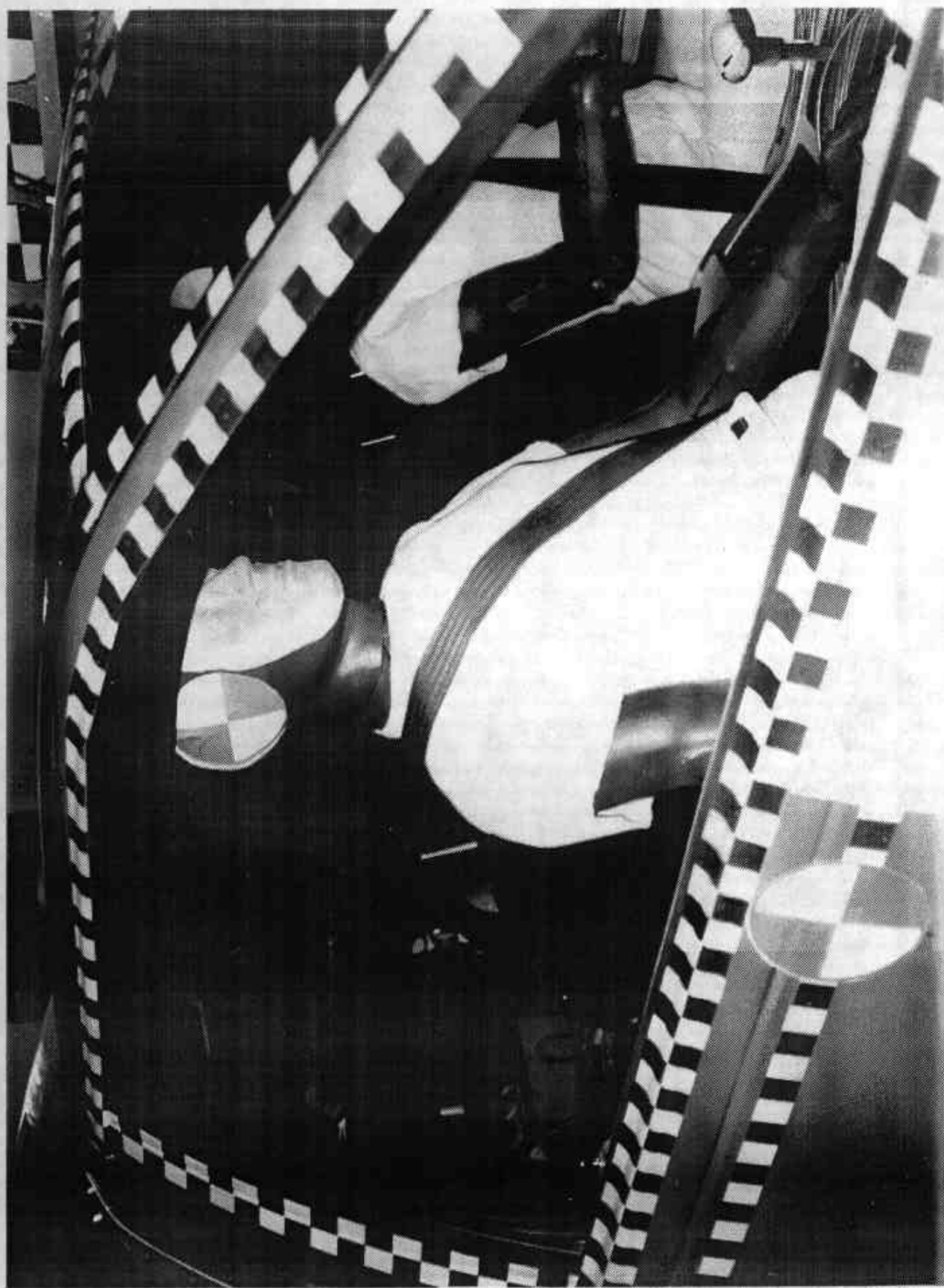


Figure A-28 PRE-TEST PASSENGER DUMMY POSITION

A-30

7804-1

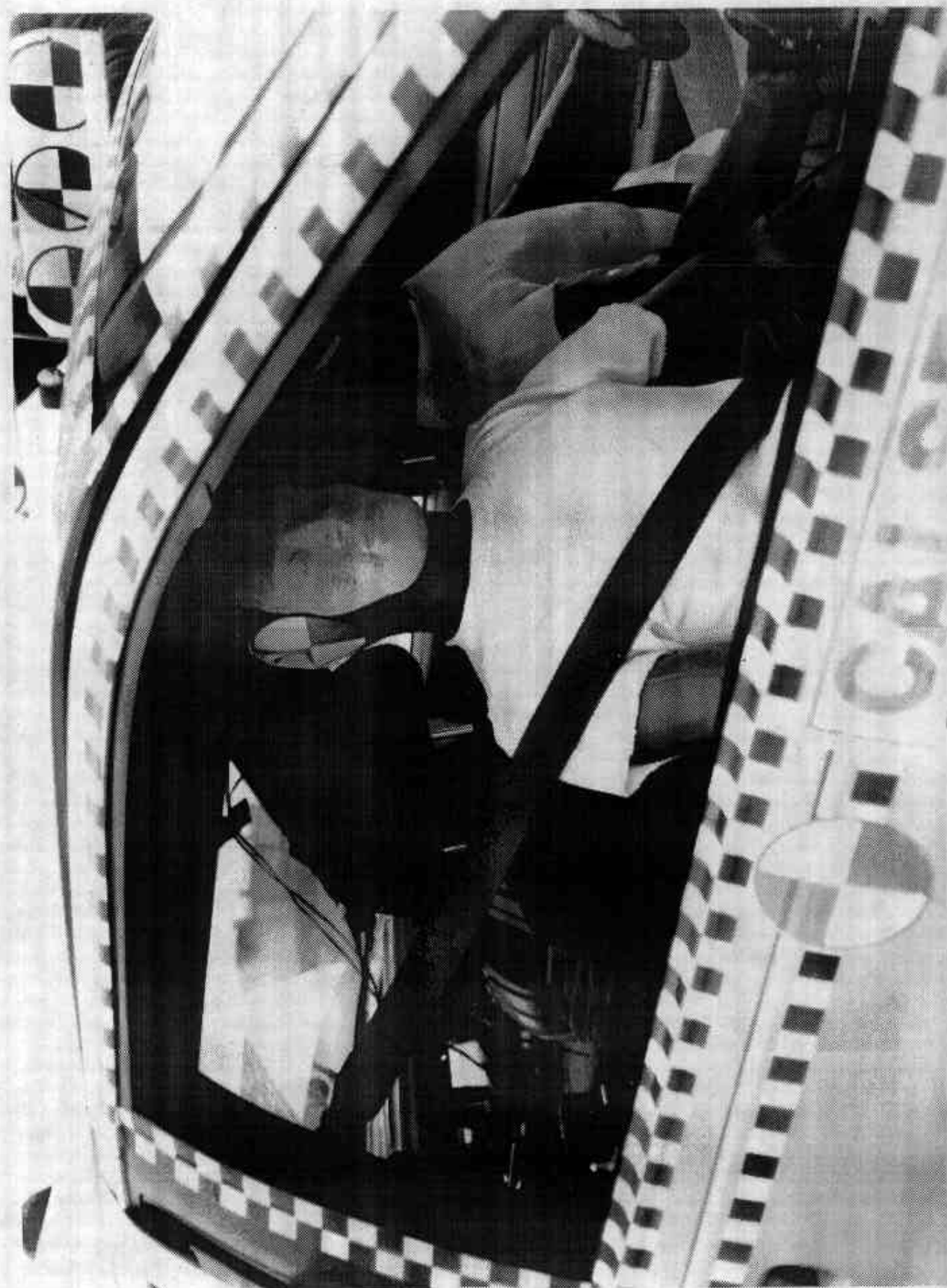


Figure A-29 POST-TEST PASSENGER DUMMY POSITION

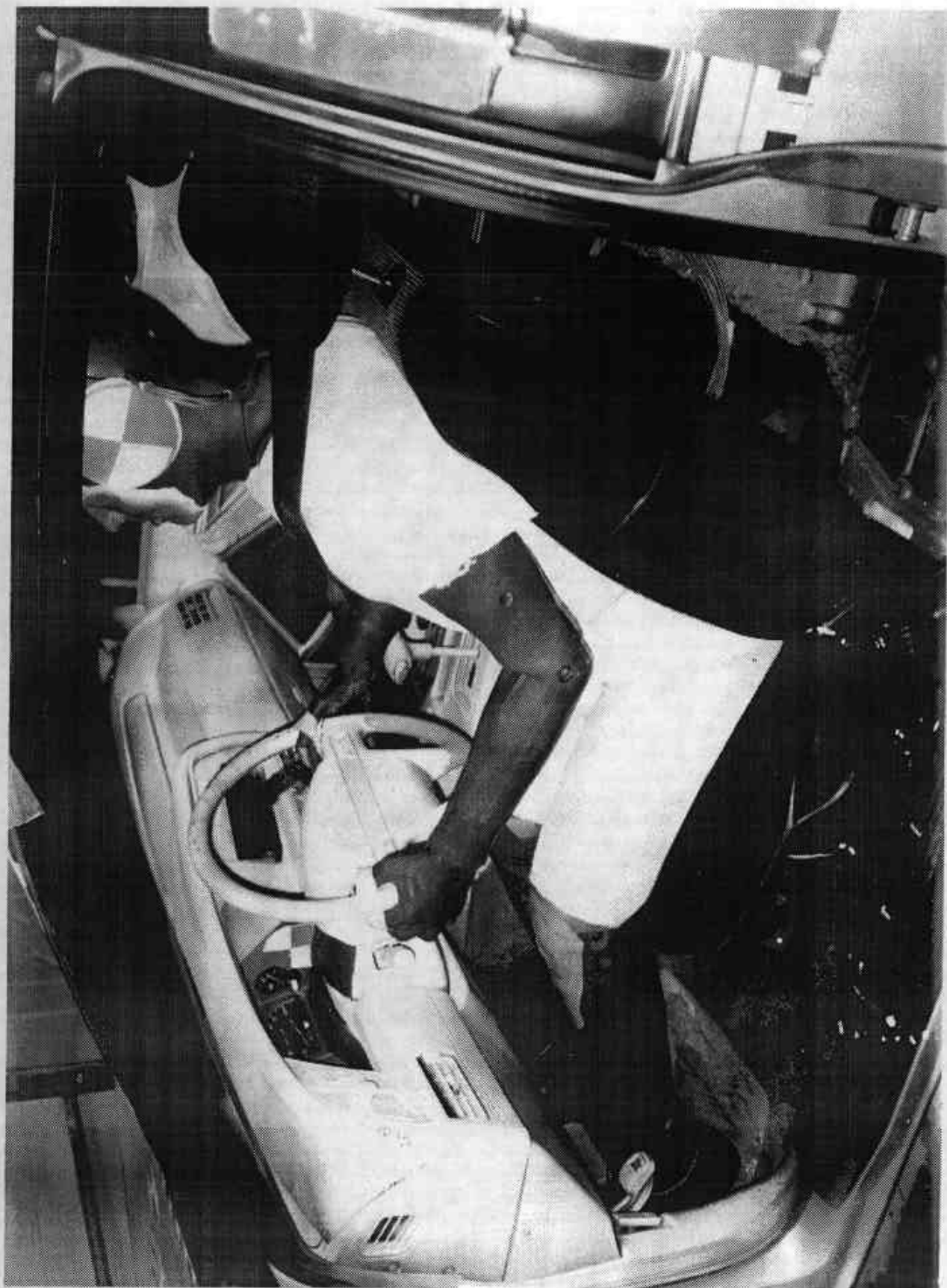


Figure A-30 PRE-TEST DRIVER DUMMY AND INTERIOR VIEW

A-32

7804-1



Figure A-31 POST-TEST DRIVER DUMMY AND INTERIOR VIEW

A-33

7804-1



Figure A-32 PRE-TEST PASSENGER DUMMY AND INTERIOR VIEW

A-34

7804-1



FIGURE A-33 POST-TEST PASSENGER DUMMY AND INTERIOR VIEW

A-35

7804-1

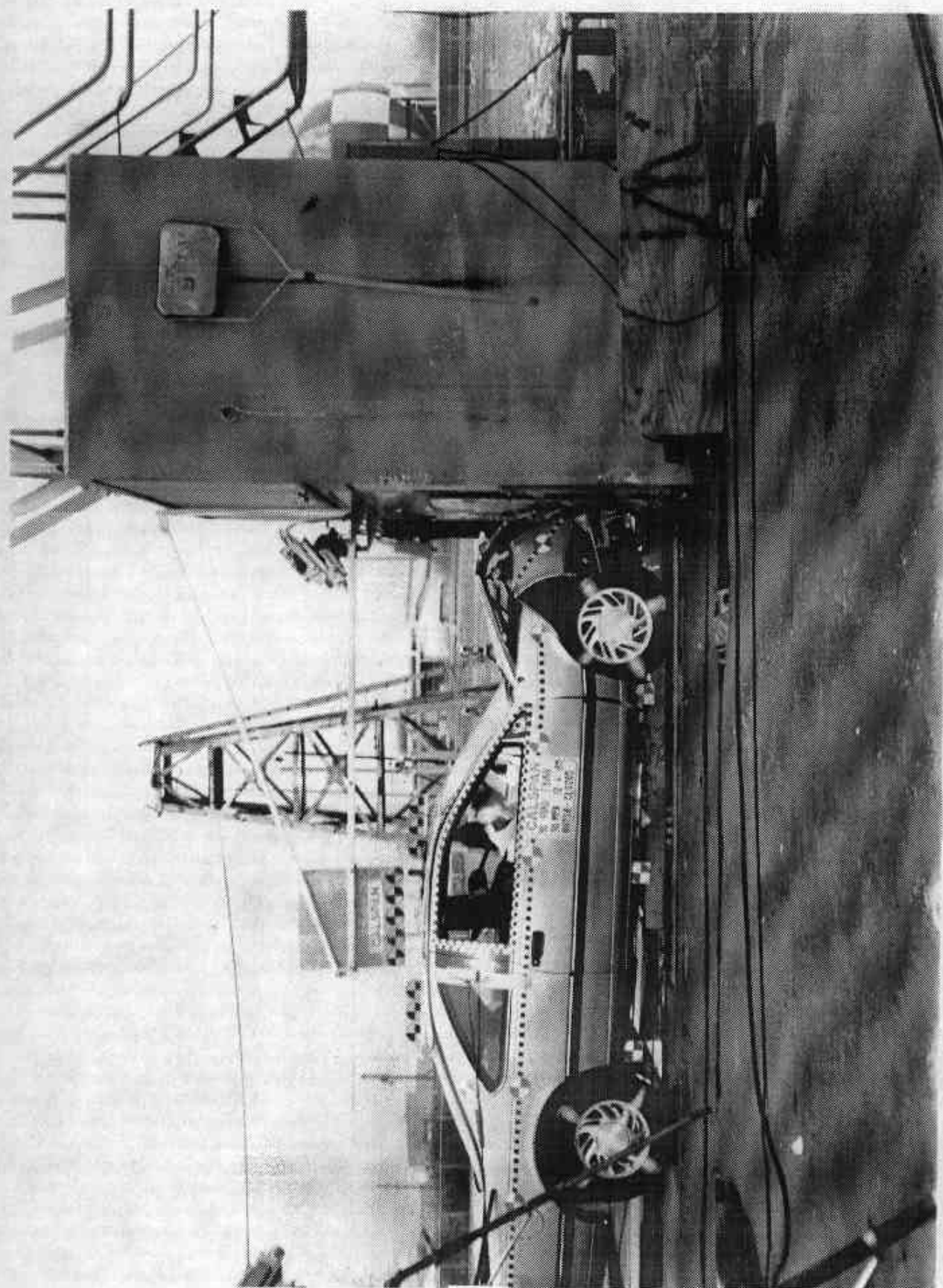


FIGURE A-34 VEHICLE IMPACT

A-36

7804-1

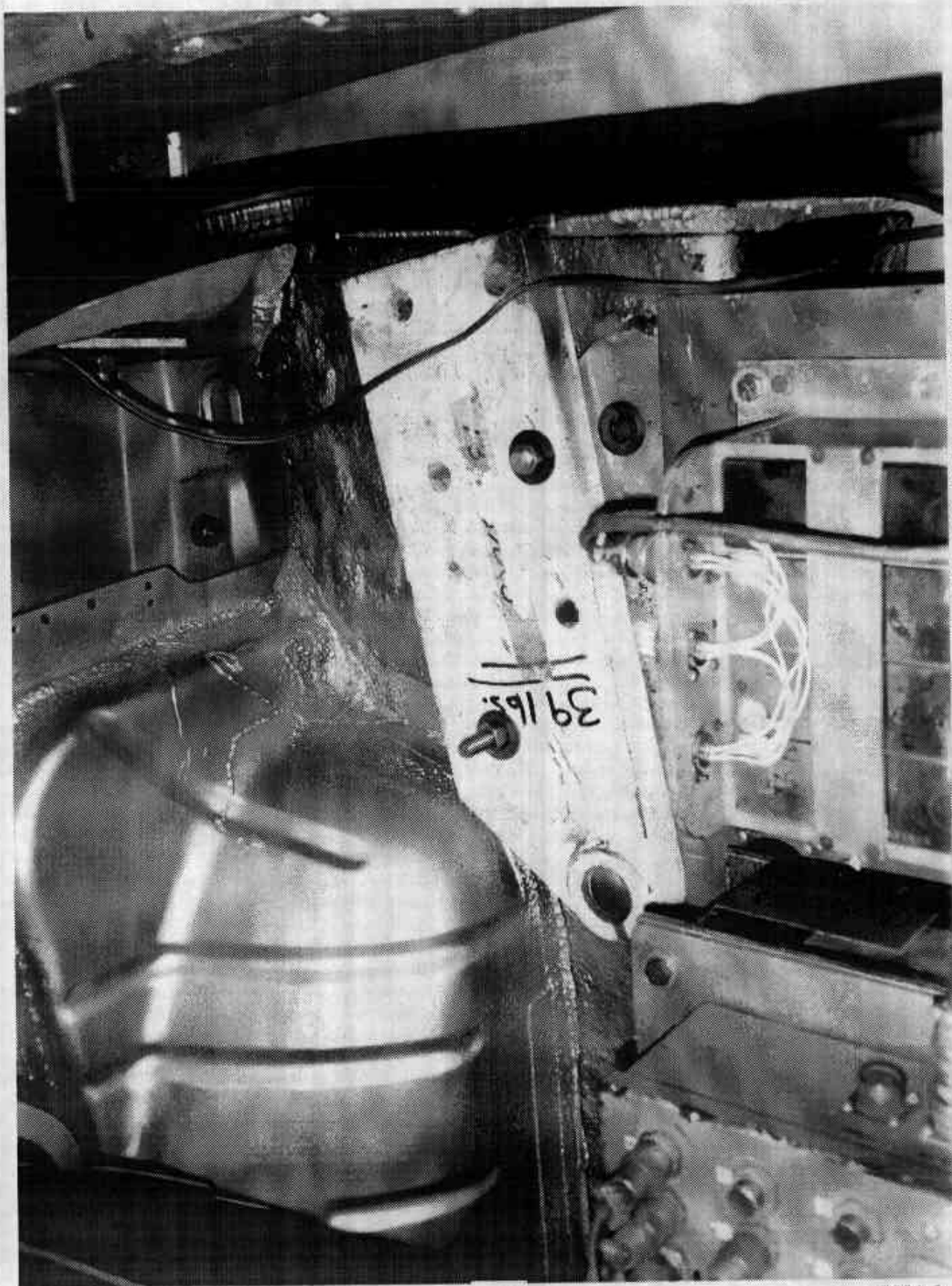


Figure A-35 BALLAST LOCATED IN RIGHT REAR TRUNK COMPARTMENT

Appendix B

VEHICLE AND DUMMY RESPONSE DATA

TEST NO. CLO205

VEHICLE DATA

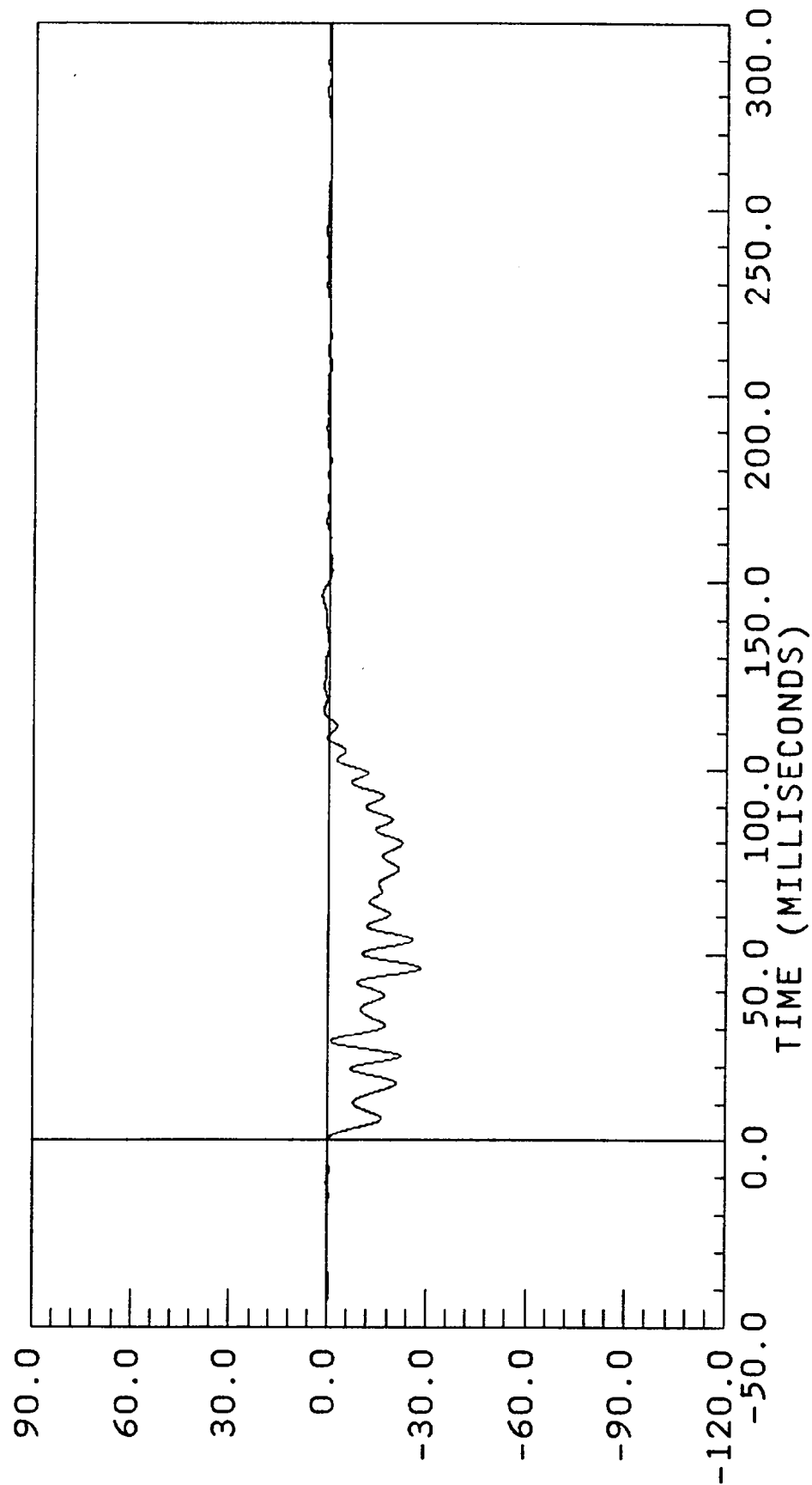
FILTER CHANNEL CLASS

60

29.40 mph

ACC PACK #1(X)
 FILTERED
 FILTER CUTOFF: 100Hz

XL AXIS
 YMIN = -28.16798 at 46.27500
 YMAX = 2.317014 at 146.4750

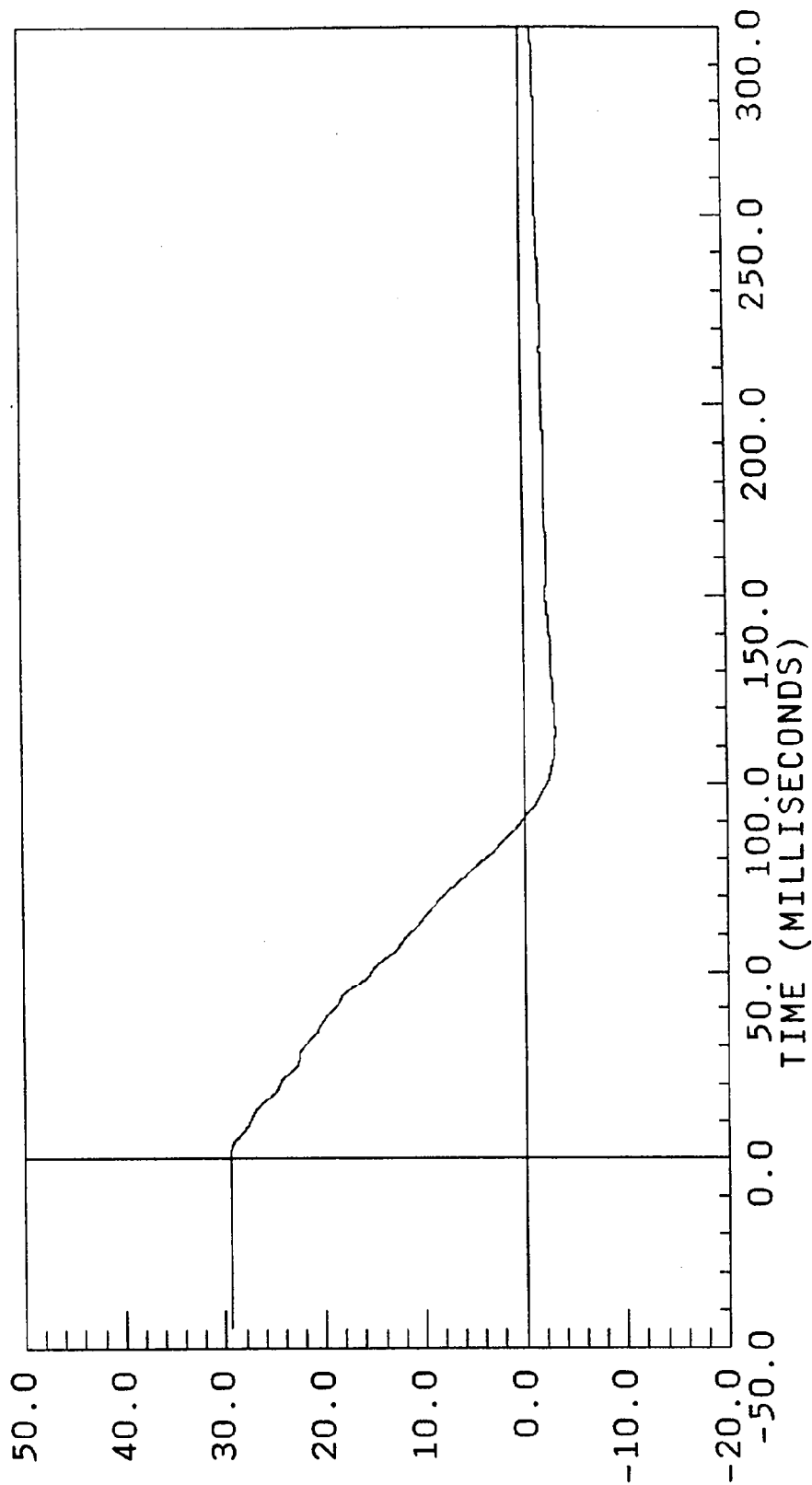


ACCELERATION * G, S *

V943-17.DAT

29.40 mph

ACC PACK #1(X)
COMPUTED
FILTER CUTOFF: 100Hz
XL AXIS
YMIN = -3.142985 at 113.8500
YMAX = 29.41422 at 146.4750

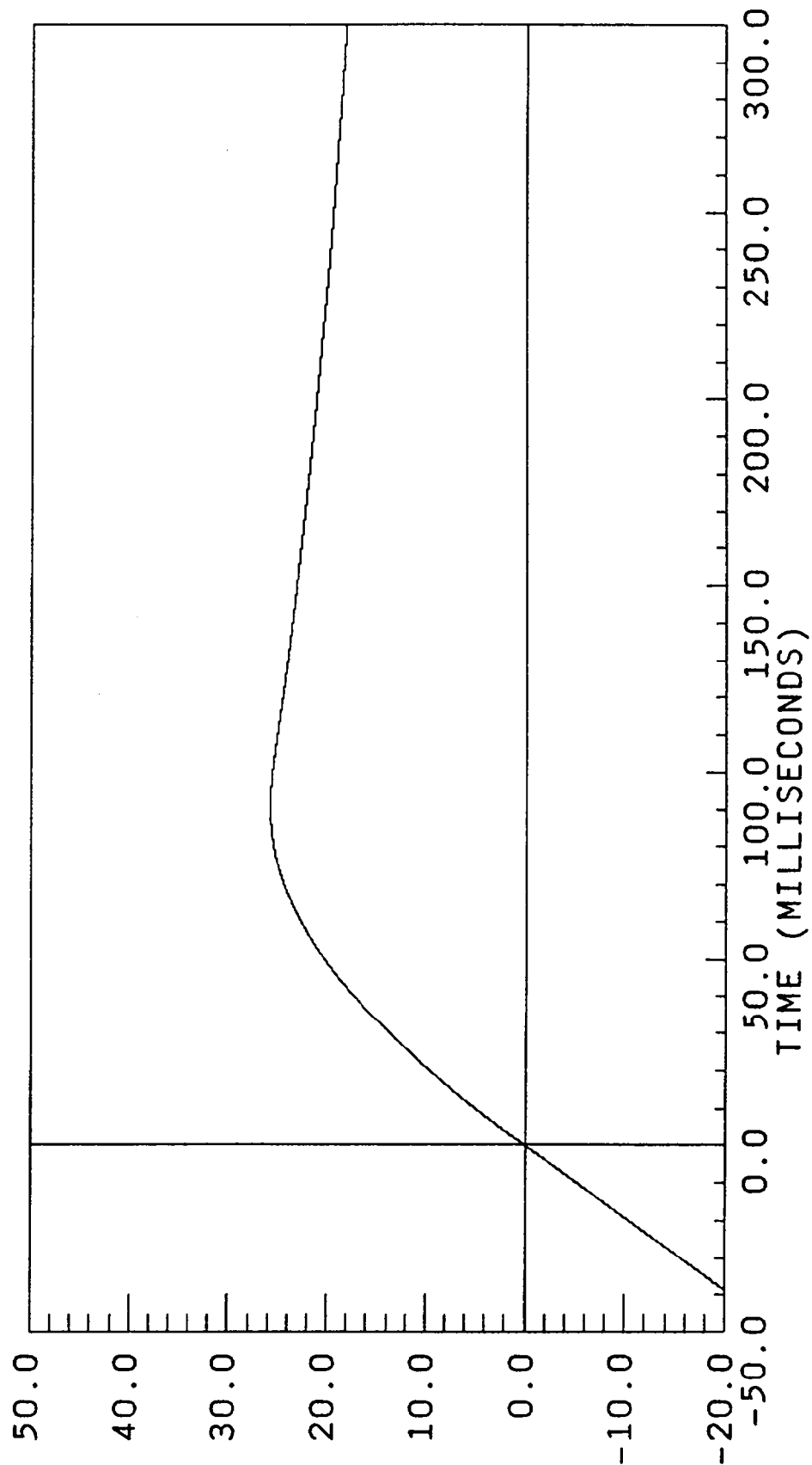


VELOCITY * MILES / HOUR

29.40 mph

ACC PACK #1(X)
COMPUTED
FILTER CUTOFF: 100Hz

XL AXIS
YMIN = -23.23500 at 113.8500
YMAX = 25.77669 at 90.90000

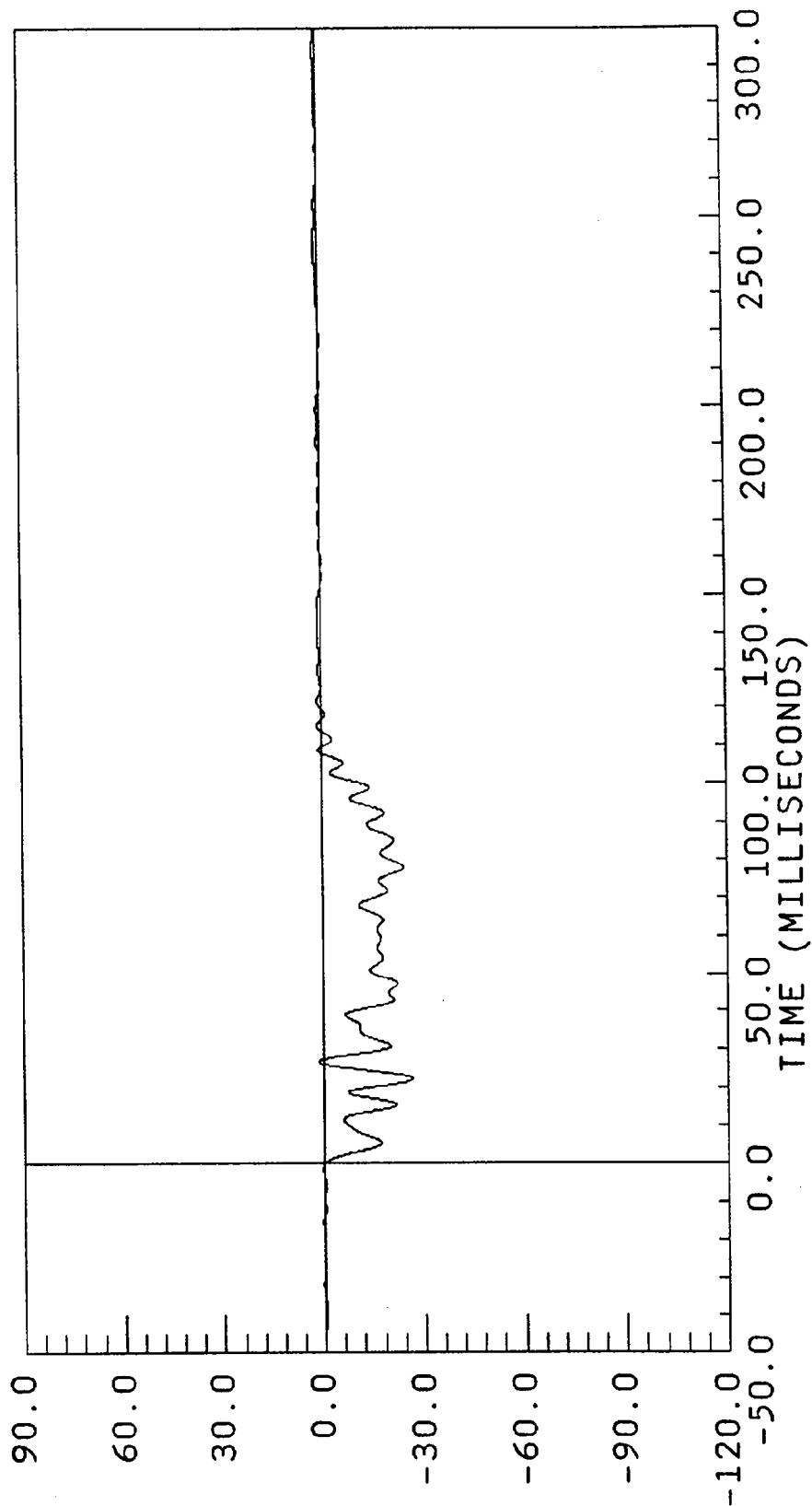


D I S P L A C E M E N T * I N C H E S

BW943-18.DAT

29.40 mph

ACC PACK #2(X)
FILTERED
FILTER CUTOFF: 100HZ
XL AXIS
YMIN = -26.48170 at 22.27500
YMAX = 1.625971 at 115.2000

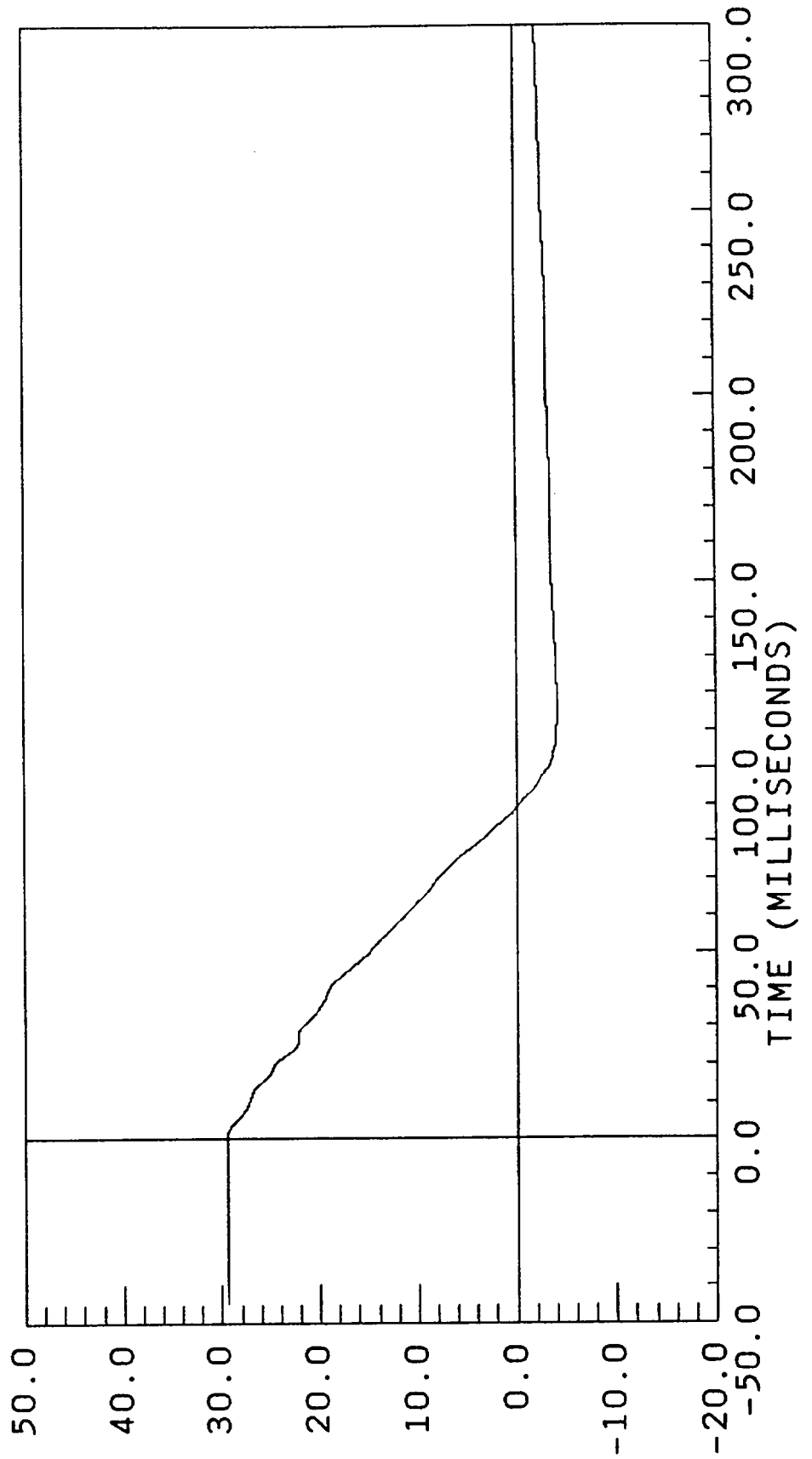


ACCELERATION * G, S *

29.40 mph

ACC PACK #2(X)
COMPUTED
FILTER CUTOFF: 100Hz

XL AXIS
YMIN = -4.213403 at 113.7000
YMAX = 29.40645 at -13.72500



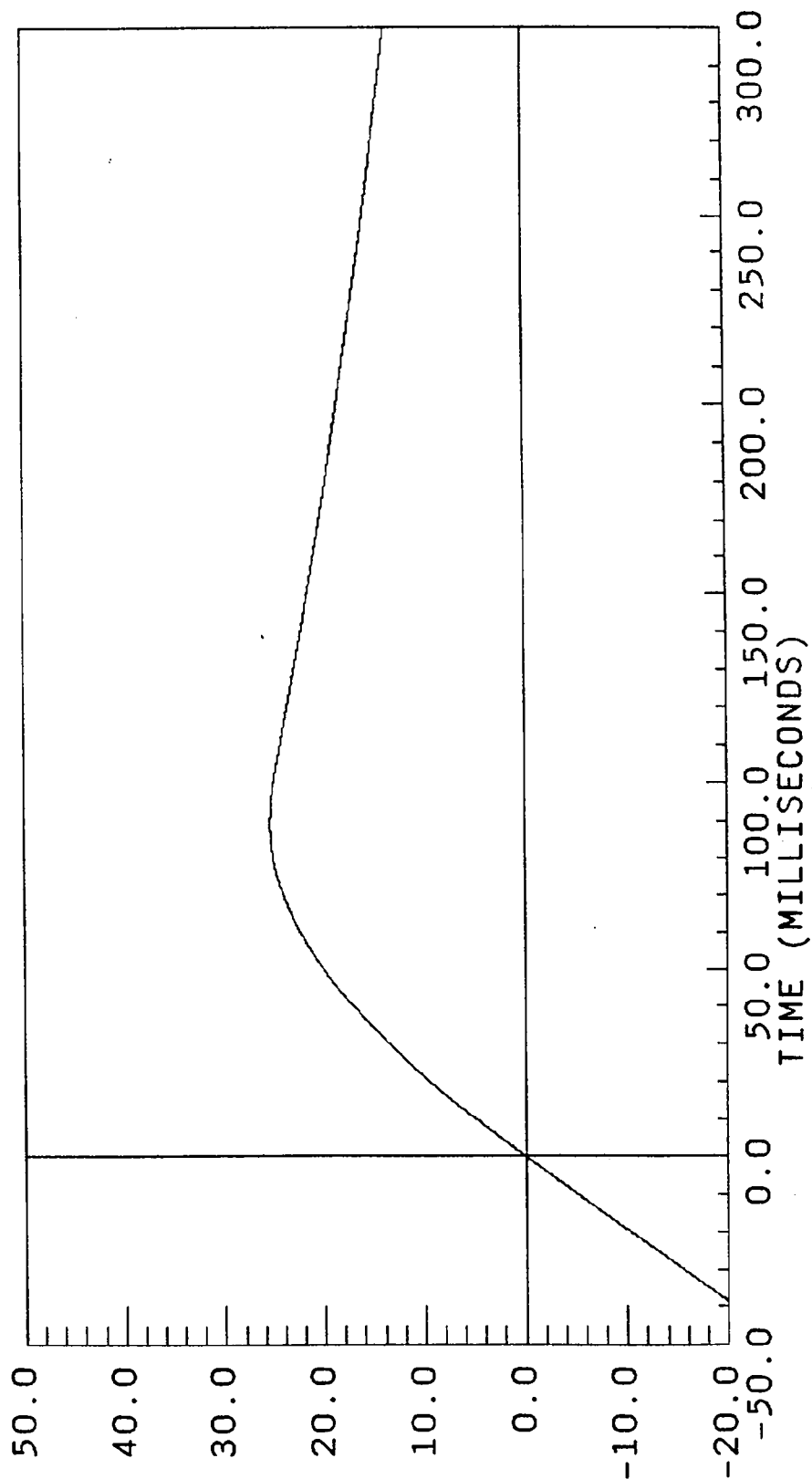
VELOCITY * MILES / HOUR

D943-18.DAT

29.40 mph

ACC PACK #2(X)
COMPUTED
FILTER CUTOFF: 100Hz

XL AXIS
YMIN = -23.23570 at 113.7000
YMAX = 25.38659 at 88.95000



DISPLACEMENT * INCHES

29.40 mph

ACC PACK #3(X)

FILTERED

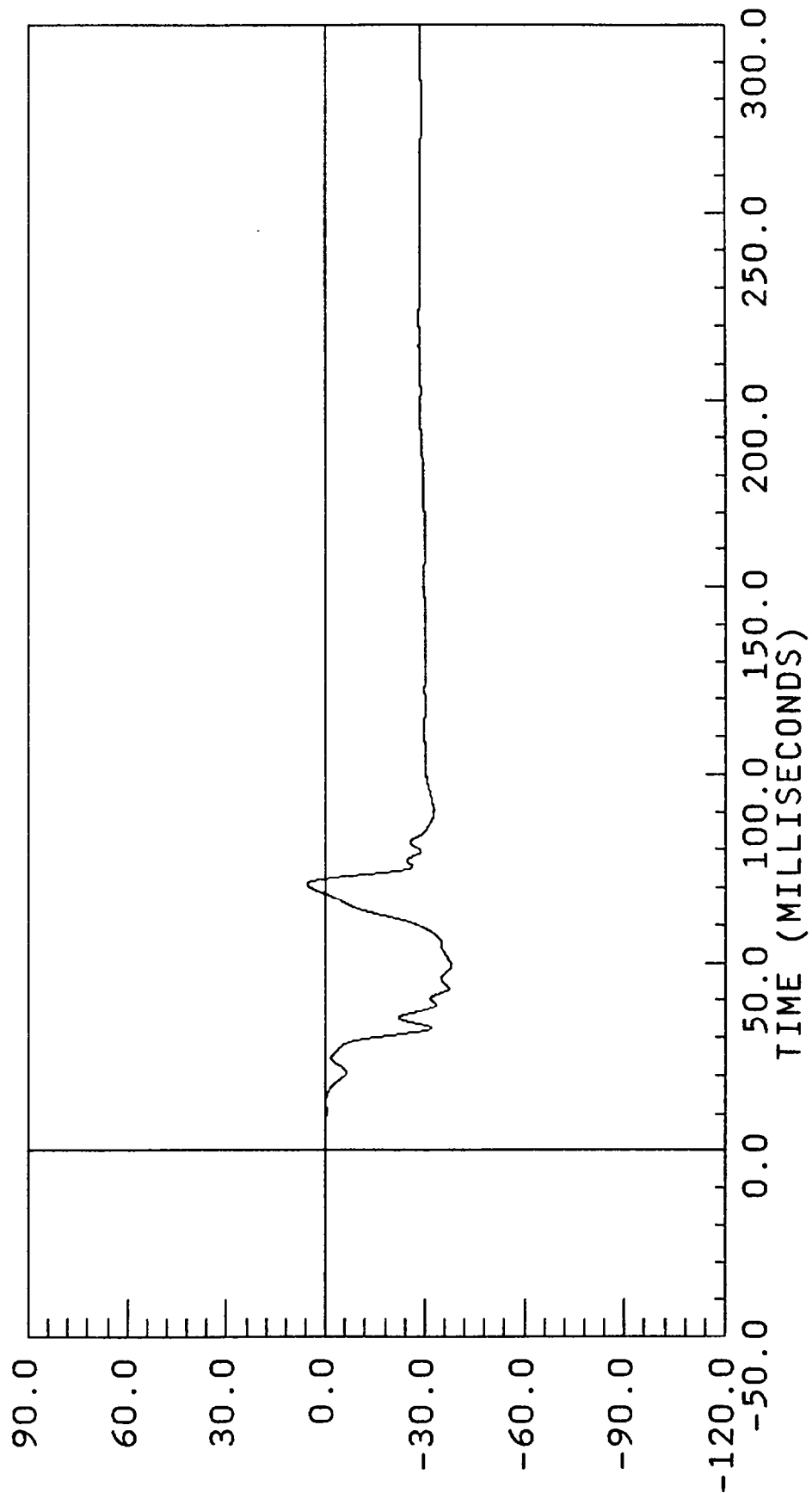
FILTER CUTOFF: 100HZ

QUESTIONABLE DATA AFTER APPROXIMATELY 73 MSEC.

XL AXIS

YMIN = -38.17426 at 49.27500

YMAX = 5.728837 at 70.95000



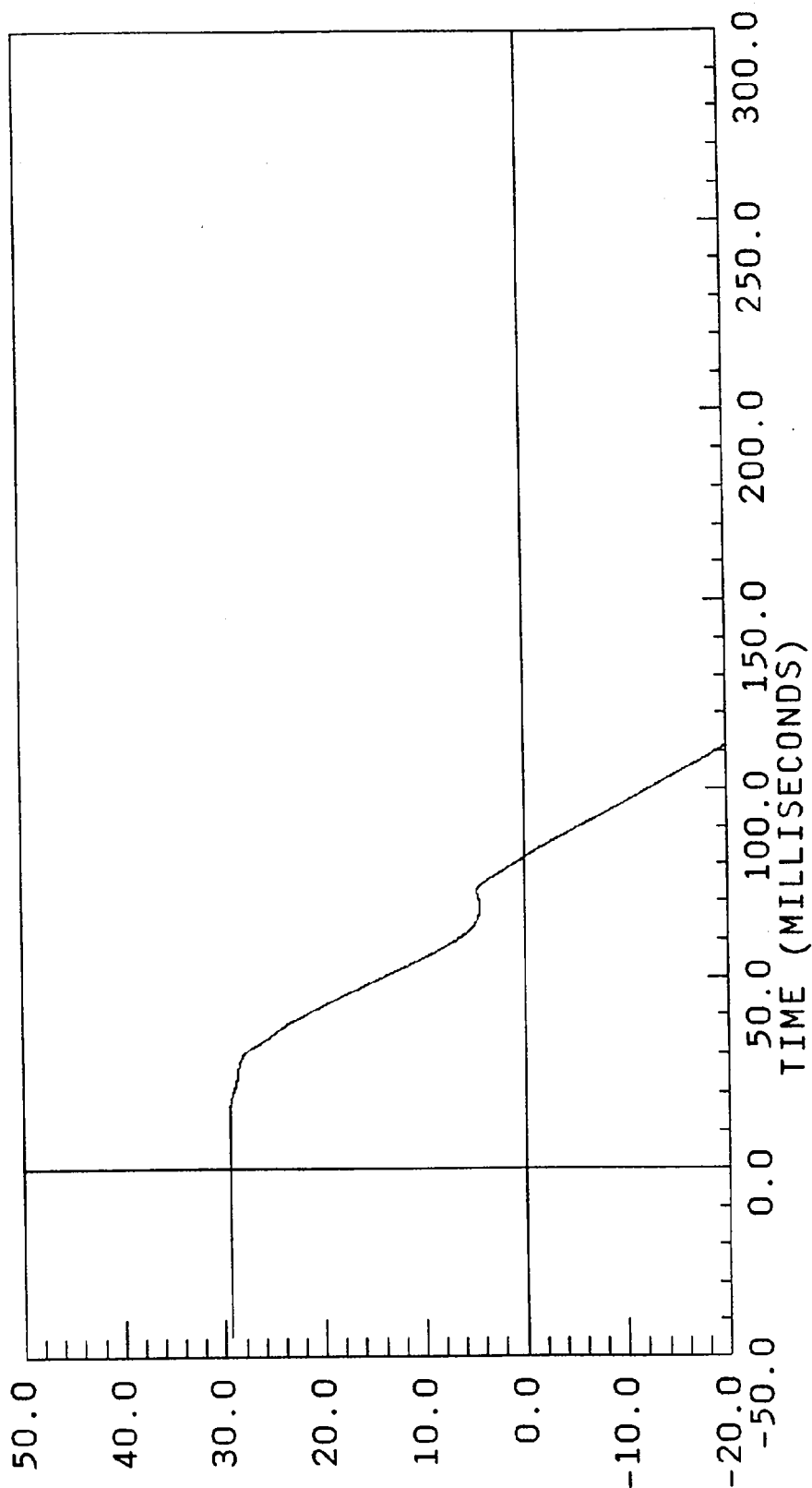
ACCELERATION * G, S *

V943-19.DAT

29.40 mph

ACC PACK #3(X)
COMPUTED
FILTER CUTOFF: 100Hz
QUESTIONABLE DATA AFTER APPROXIMATELY 73 MSEC.

XL AXIS
YMIN = -140.5487 at 300.0000
YMAX = 29.40148 at 1.425000



29.40 mph

ACC PACK #3(X)

COMPUTED

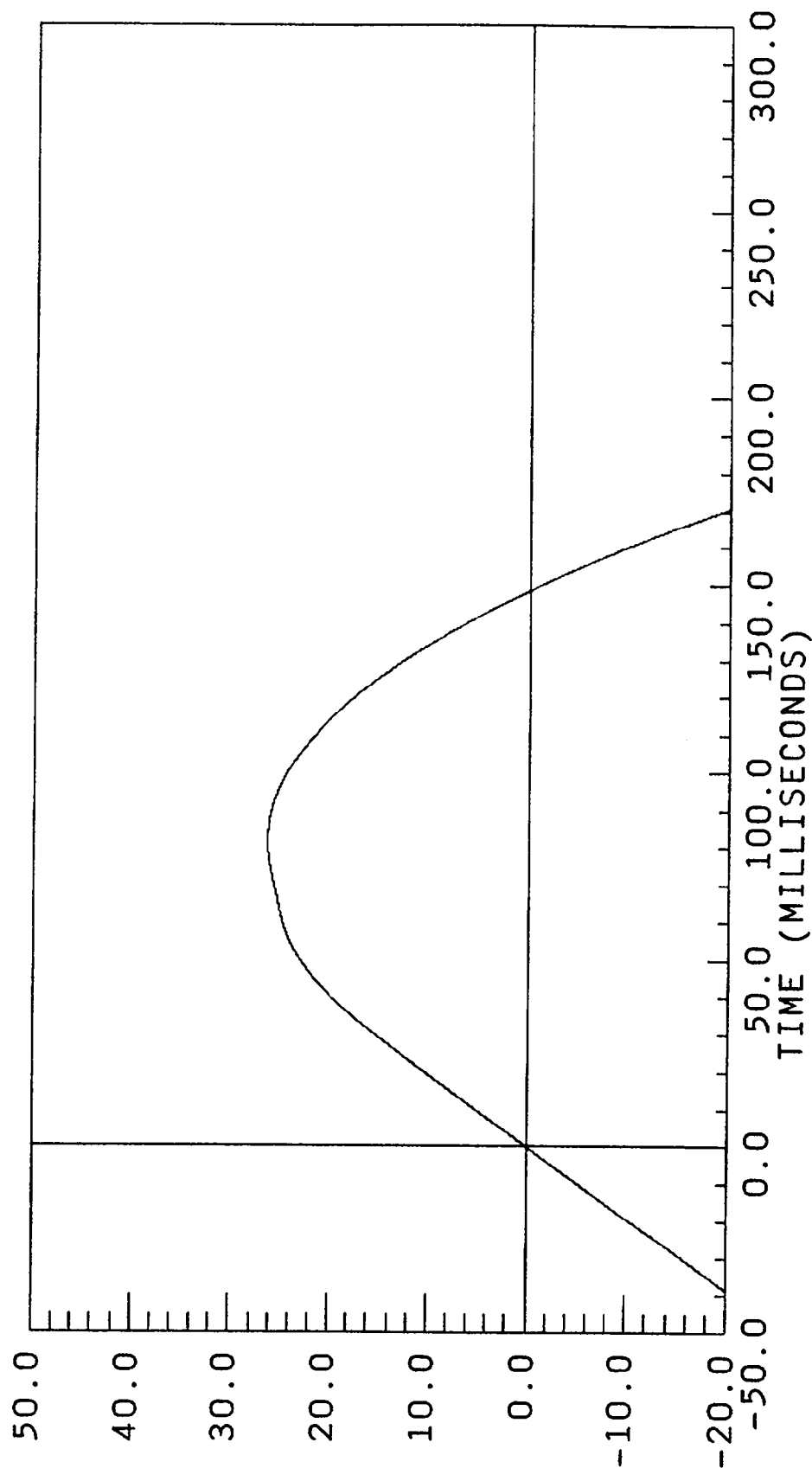
FILTER CUTOFF: 100HZ

QUESTIONABLE DATA AFTER APPROXIMATELY 73 MSEC.

XL AXIS

YMIN = -247.1735 at 300.0000

YMAX = 26.24735 at 81.67500

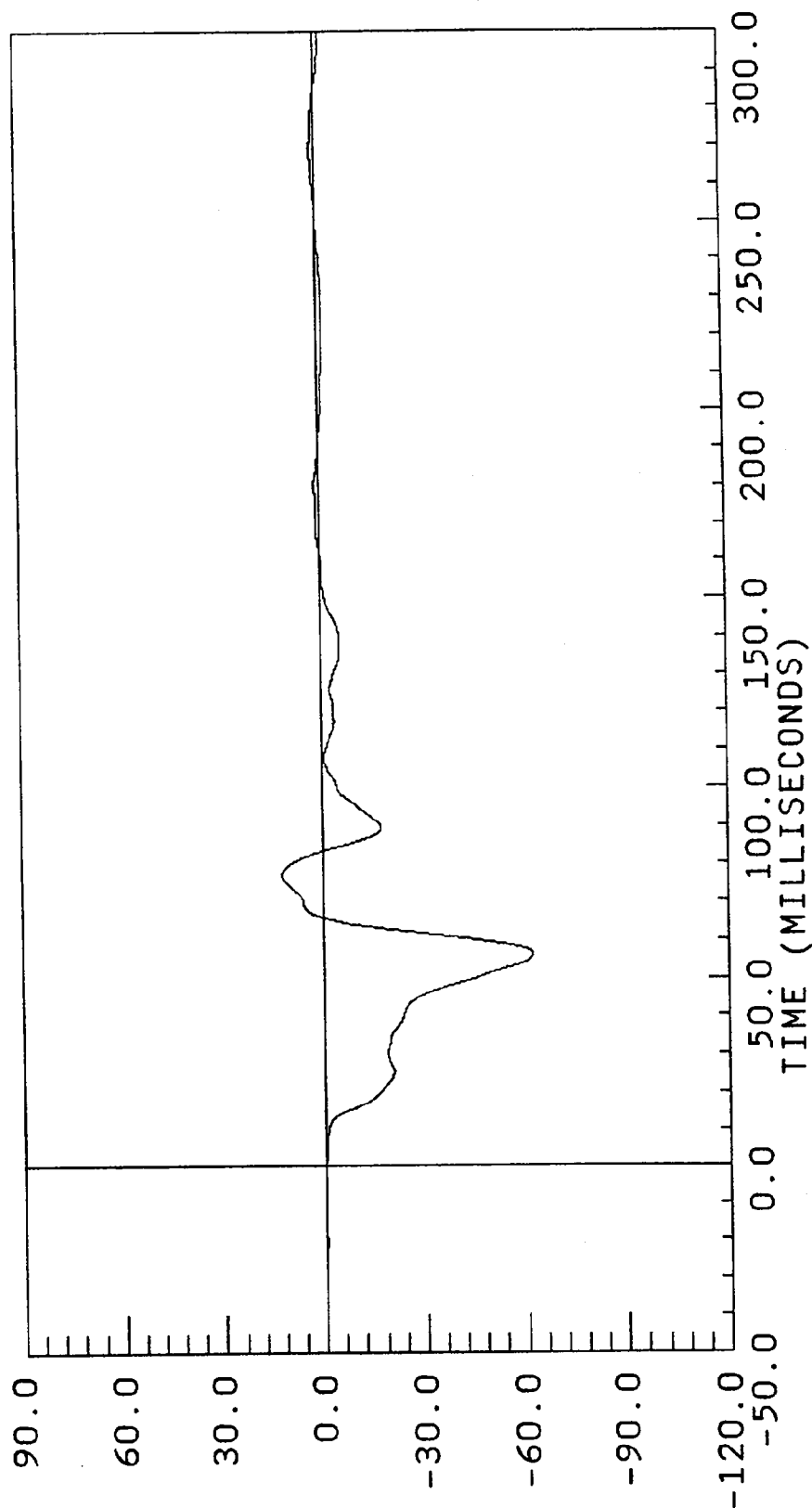


DISPLACEMENT * INCHES

BW943-20.DAT

29.40 mph

ACC PACK #4(X)
FILTERED
FILTER CUTOFF: 100HZ
XL AXIS
YMIN = -62.14096 at 56.25000
YMAX = 12.40007 at 76.87500

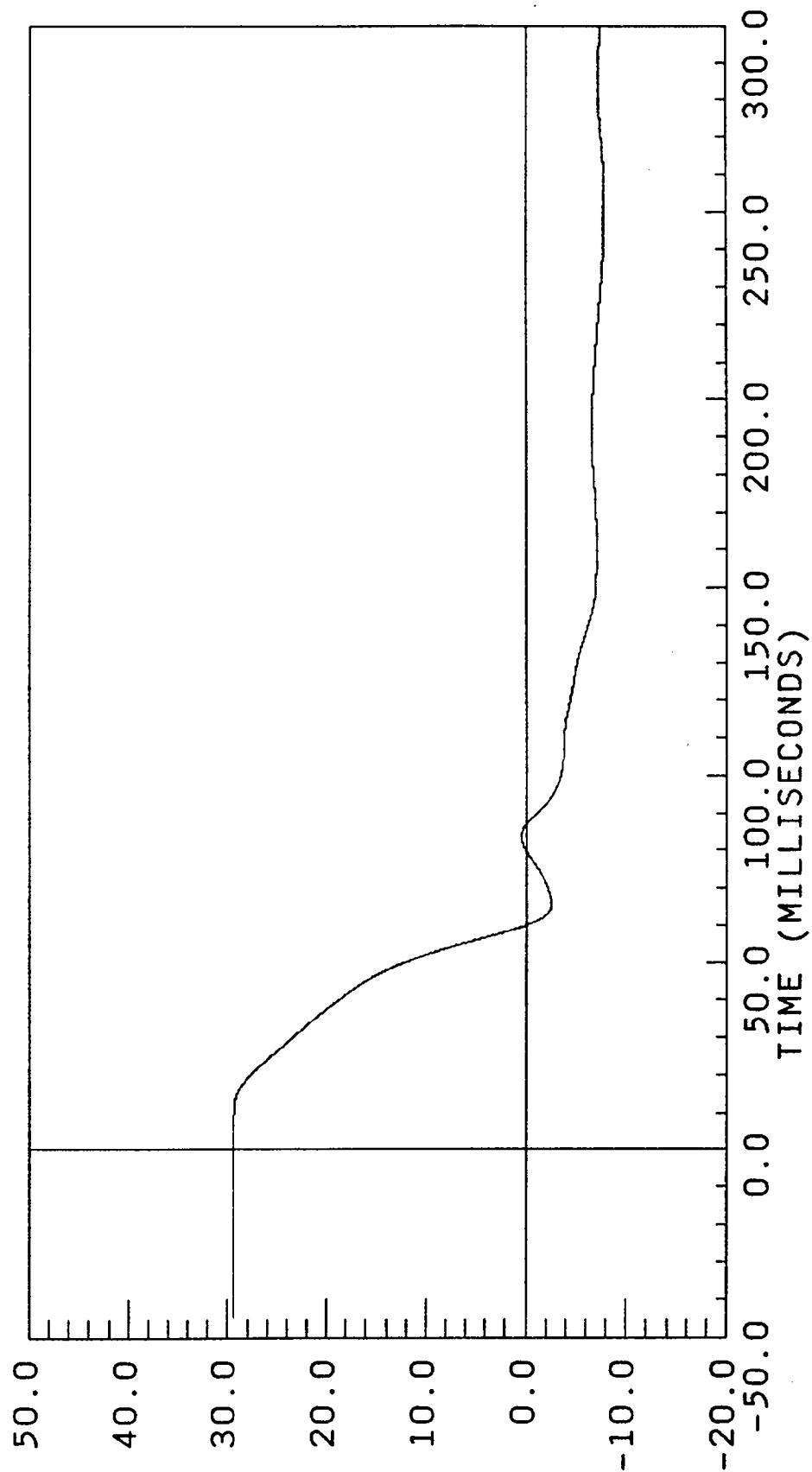


ACCELERATION * G, S *

29.40 mph

ACC PACK #4(X)
COMPUTED
FILTER CUTOFF: 100Hz

XL AXIS
YMIN = -7.881739 at 250.4250
YMAX = 29.43760 at -23.85000

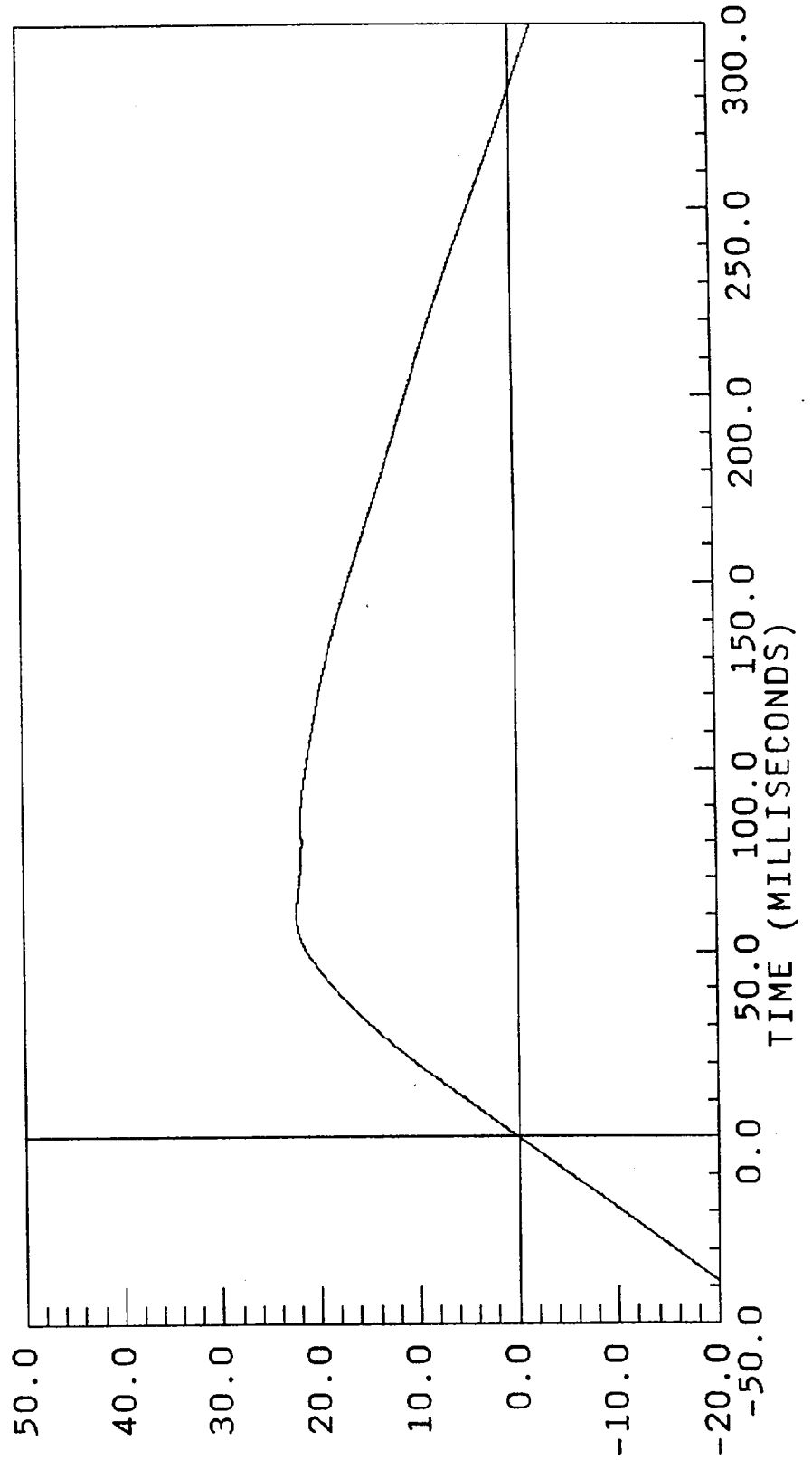


D943-20.DAT

29.40 mph

ACC PACK #4(X)
COMPUTED
FILTER CUTOFF: 100HZ

XL AXIS
YMIN = -23.27484 at 250.4250
YMAX = 22.32957 at 59.85000



D I S P L A C E M E N T * I N C H E S

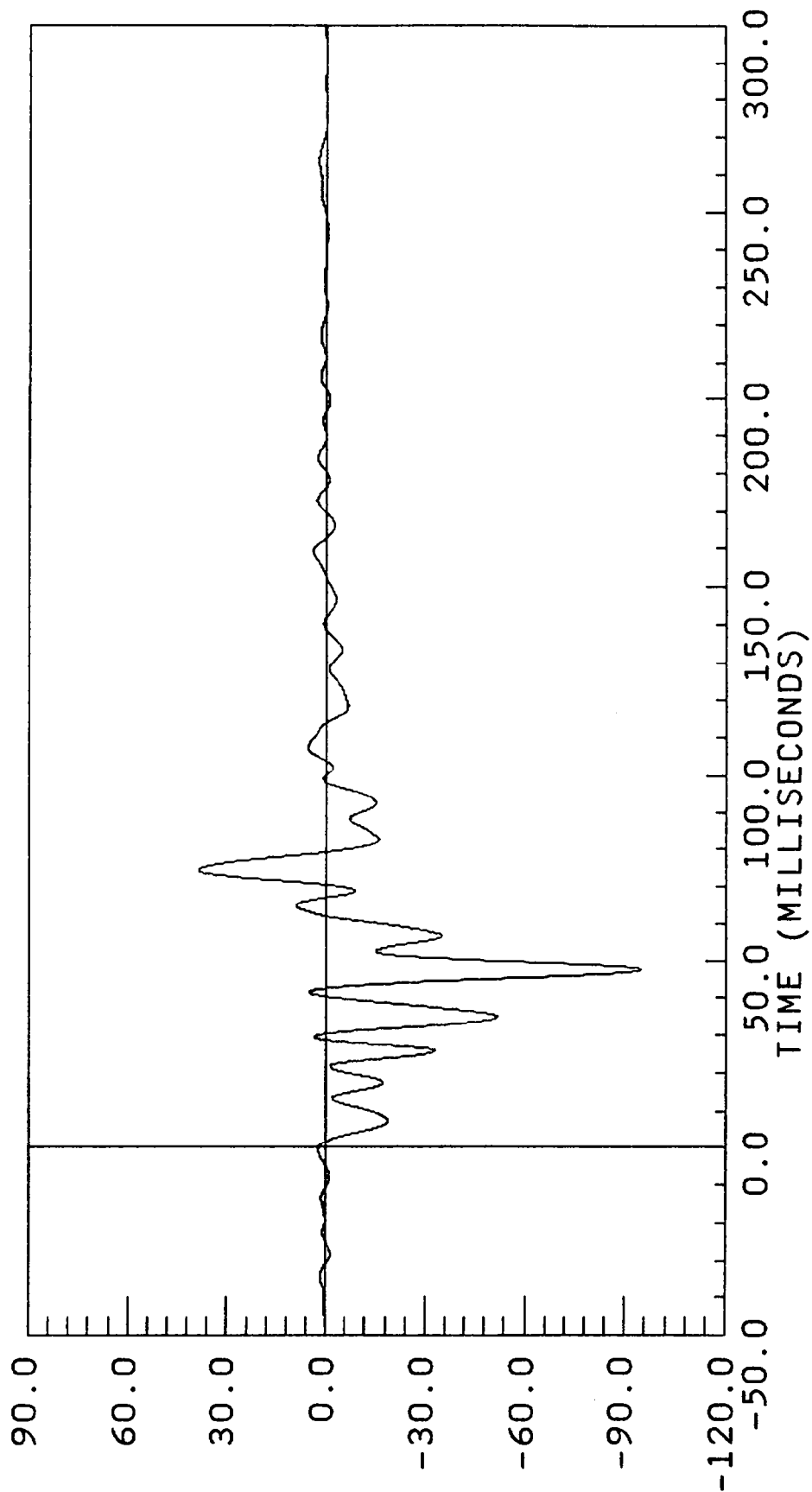
29.40 mph

ACC PACK #5(X)
 FILTERED
 FILTER CUTOFF: 100HZ

XL AXIS

YMIN = -94.72331 at 47.55000

YMAX = 38.80682 at 74.47501

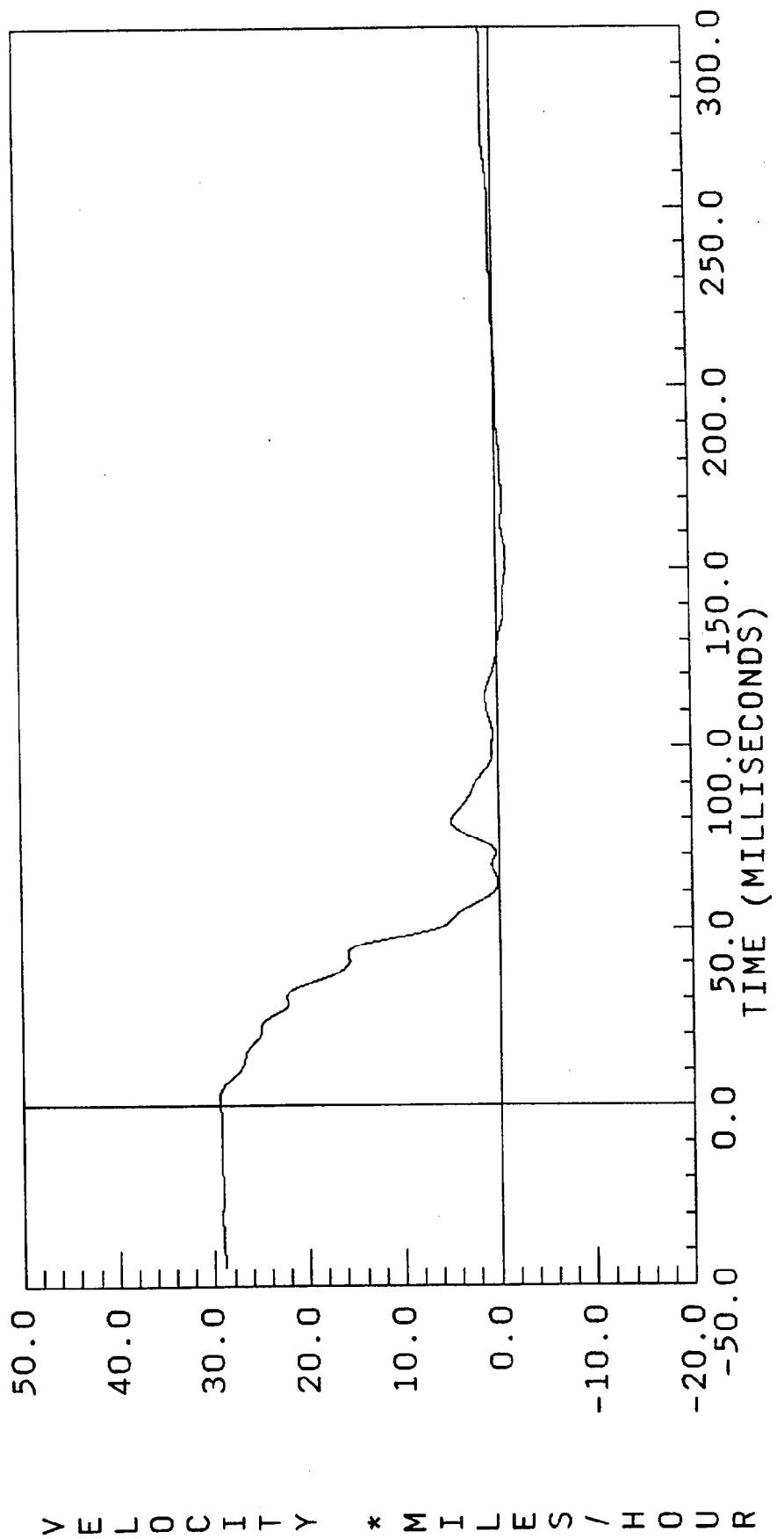


ACCELERATION * G, S *

V943-21.DAT

29.40 mph

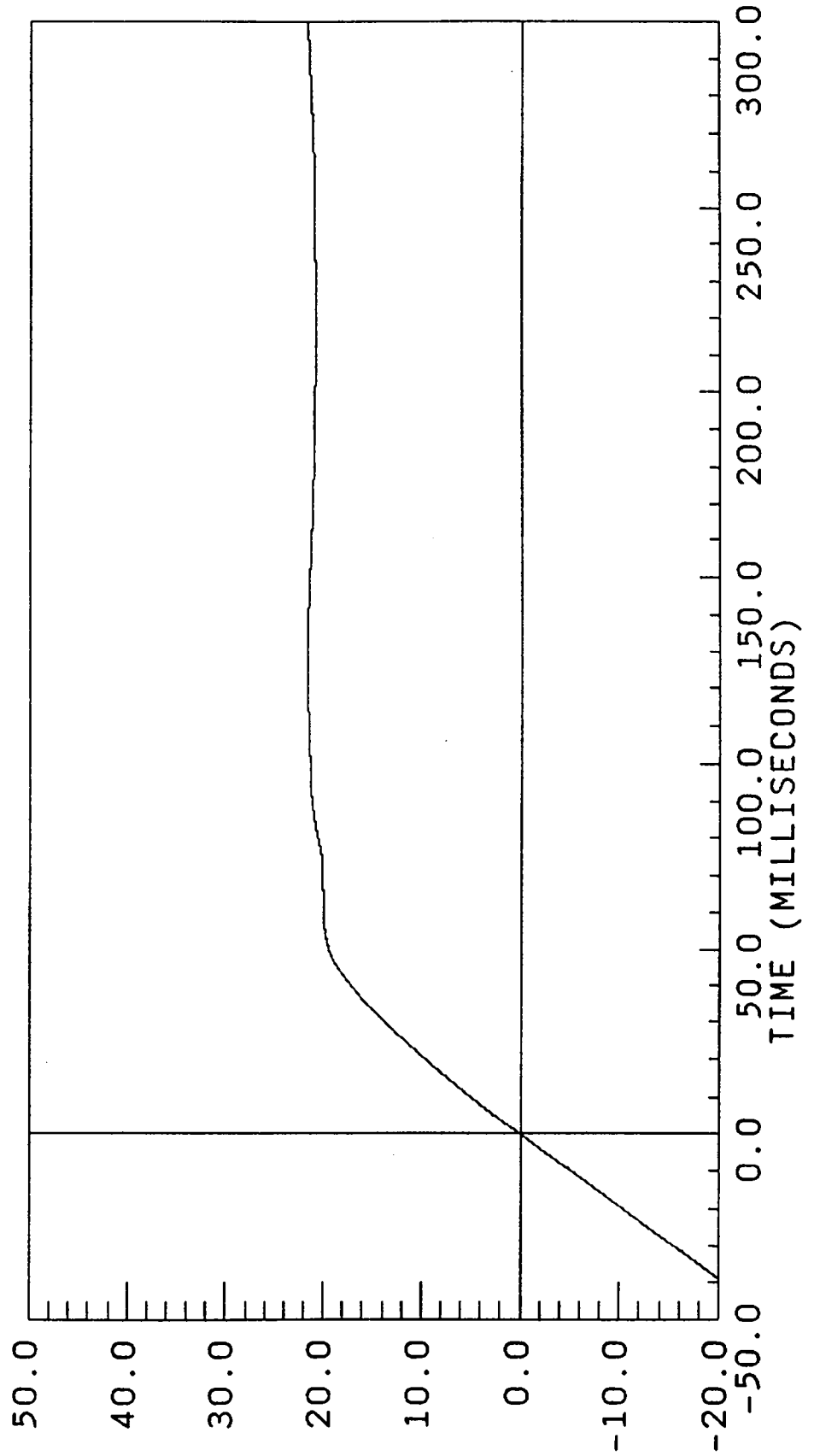
ACC PACK #5(X)
COMPUTED
FILTER CUTOFF: 100Hz
XL AXIS
YMIN = -1.092142 at 152.4000
YMAX = 29.45138 at 1.800000



29.40 mph

ACC PACK #5(X)
COMPUTED
FILTER CUTOFF: 100HZ

XL AXIS
YMIN = -23.06028 at 152.4000
YMAX = 21.71532 at 125.1000

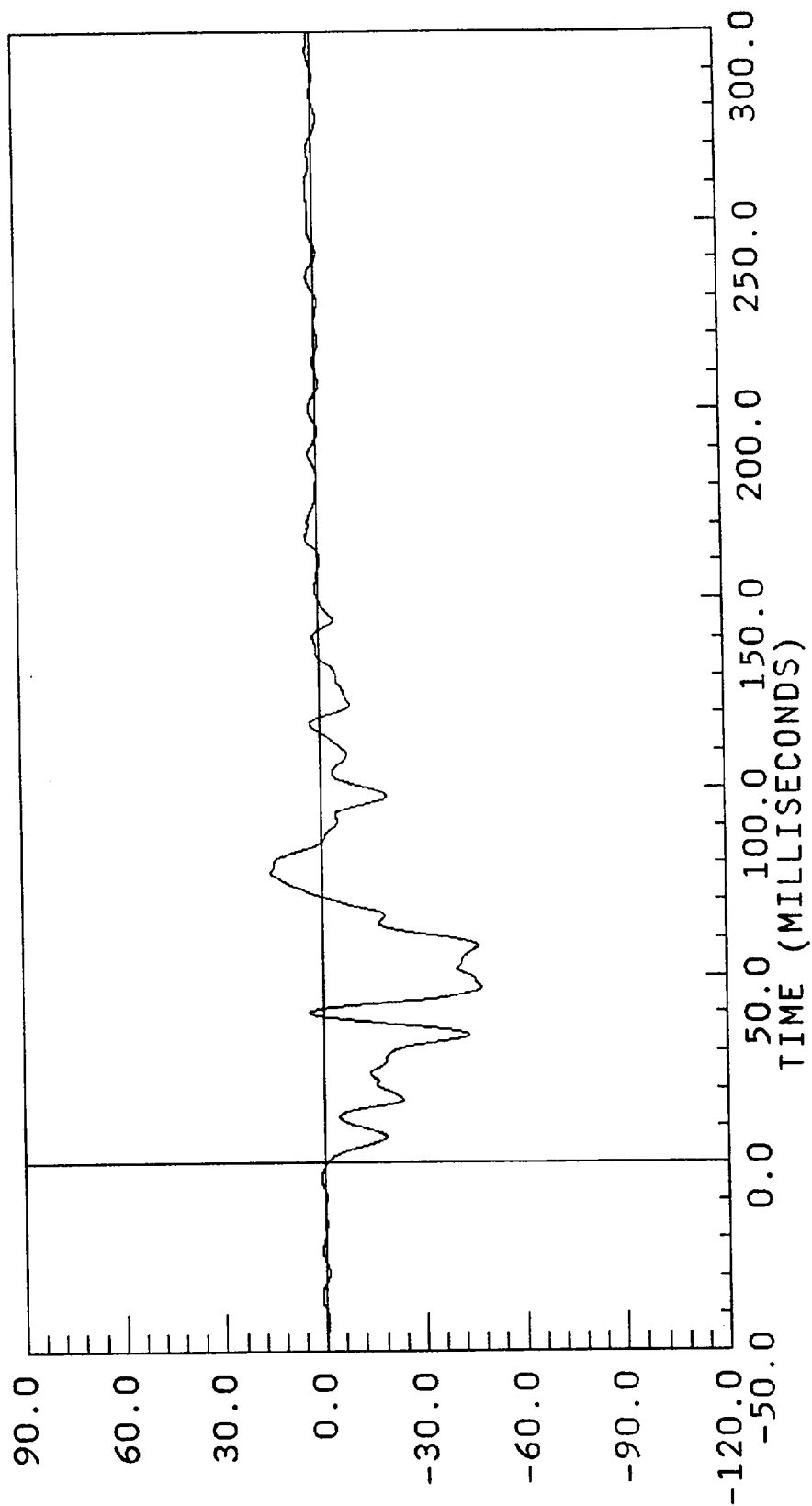


D I S P L A C E M E N T * I N C H E S

BW943-22.DAT

29.40 mph

ACC PACK #6(X) XL AXIS
FILTERED YMIN = -47.18413 at 47.02500
FILTER CUTOFF: 100Hz YMAX = 15.43384 at 77.62500

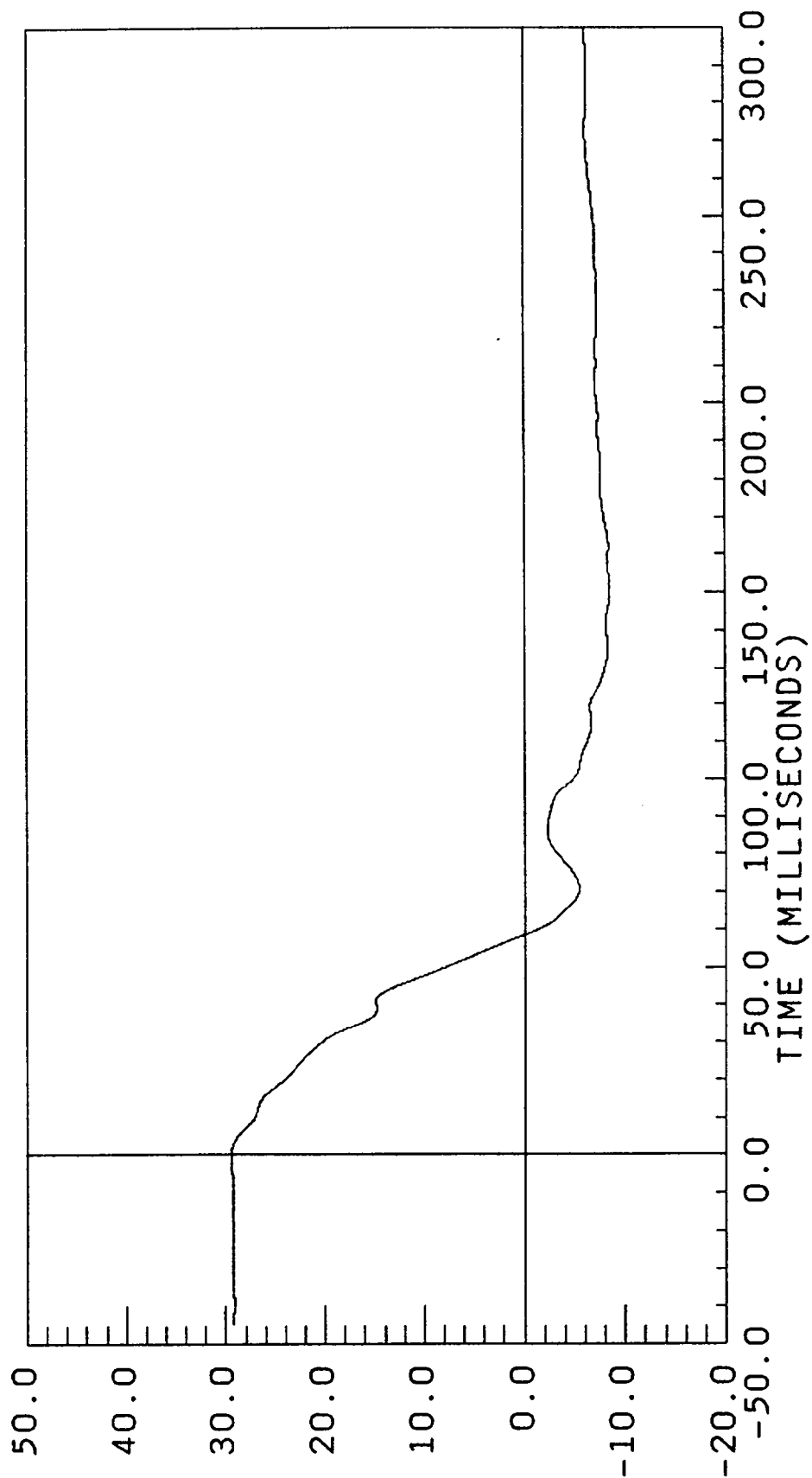


ACCELERATION * G, S *

29.40 mph

ACC PACK #6(X)
COMPUTED
FILTER CUTOFF: 100Hz

XL AXIS
YMIN = -8.478850 at 150.0750
YMAX = 29.19604 at -0.900000

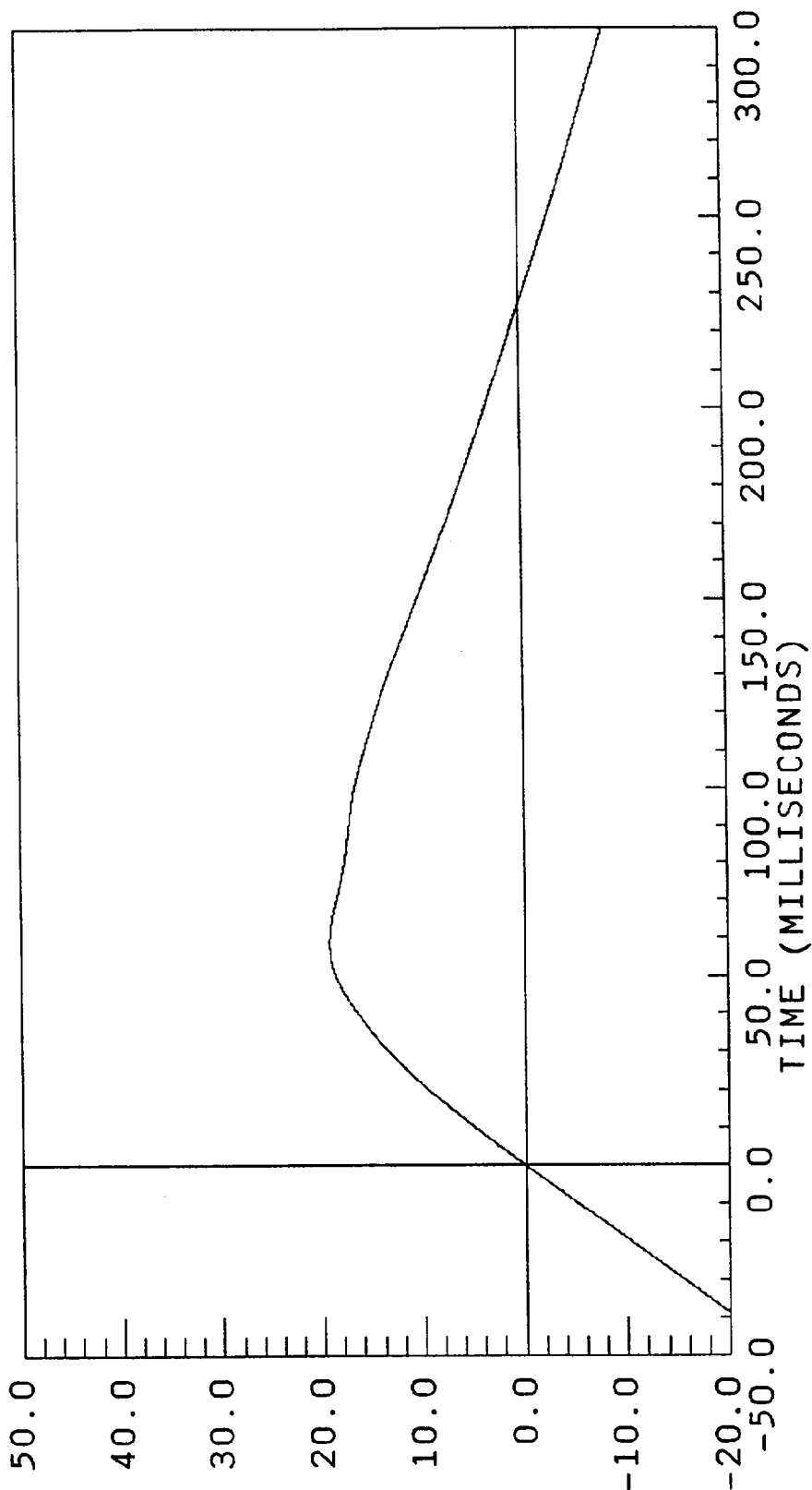


VELOCITY * MILES / HOUR

D943-22.DAT

29.40 mph

ACC PACK #6(X)
COMPUTED
FILTER CUTOFF: 100Hz
XL AXIS
YMIN = -23.14522 at 150.0750
YMAX = 19.29732 at 58.42500

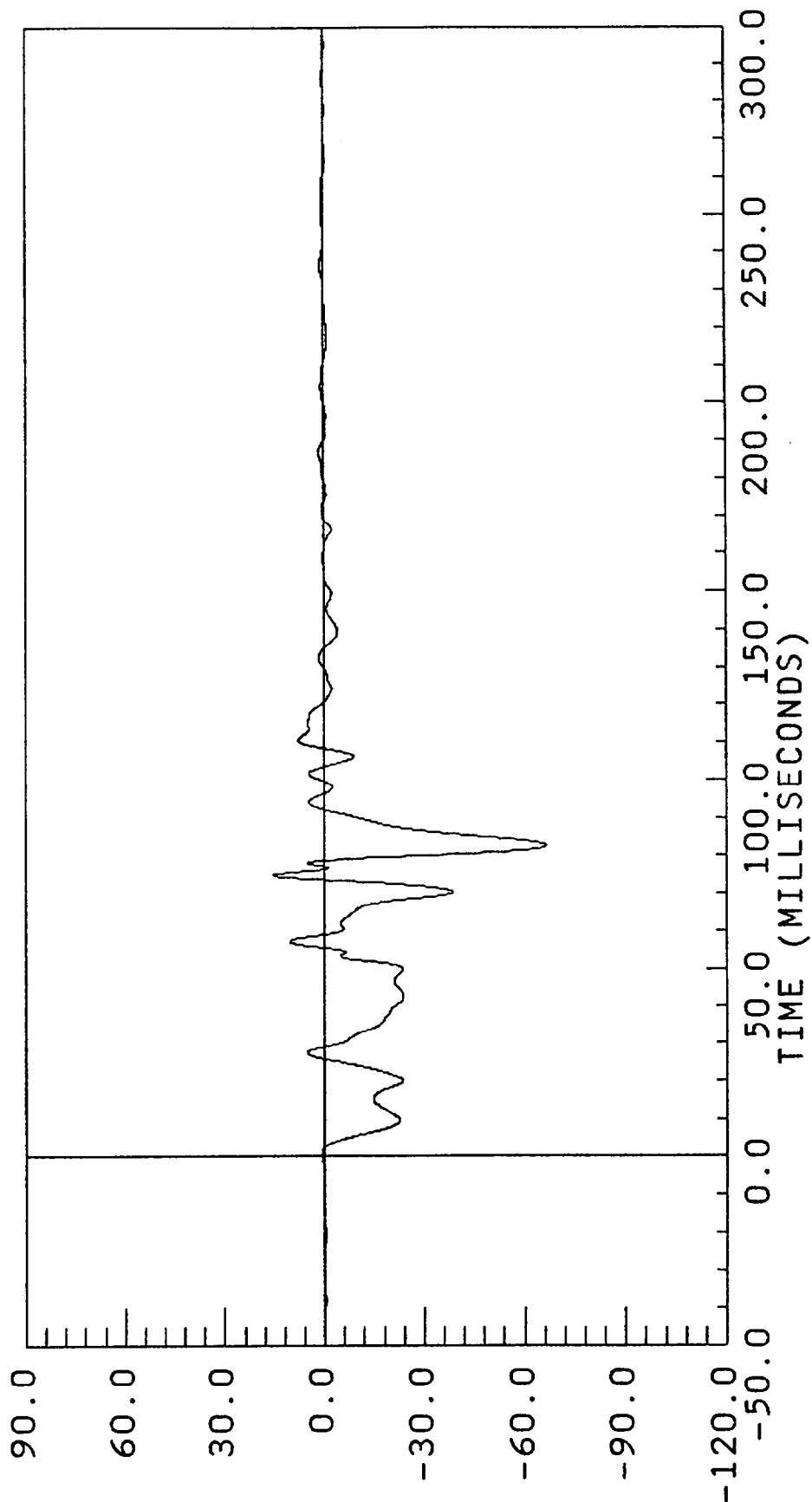


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29.40 mph

ACC PACK #7(X)
FILTERED
FILTER CUTOFF: 100HZ

XL AXIS
YMIN = -66.47414 at 82.72501
YMAX = 15.48604 at 75.00000



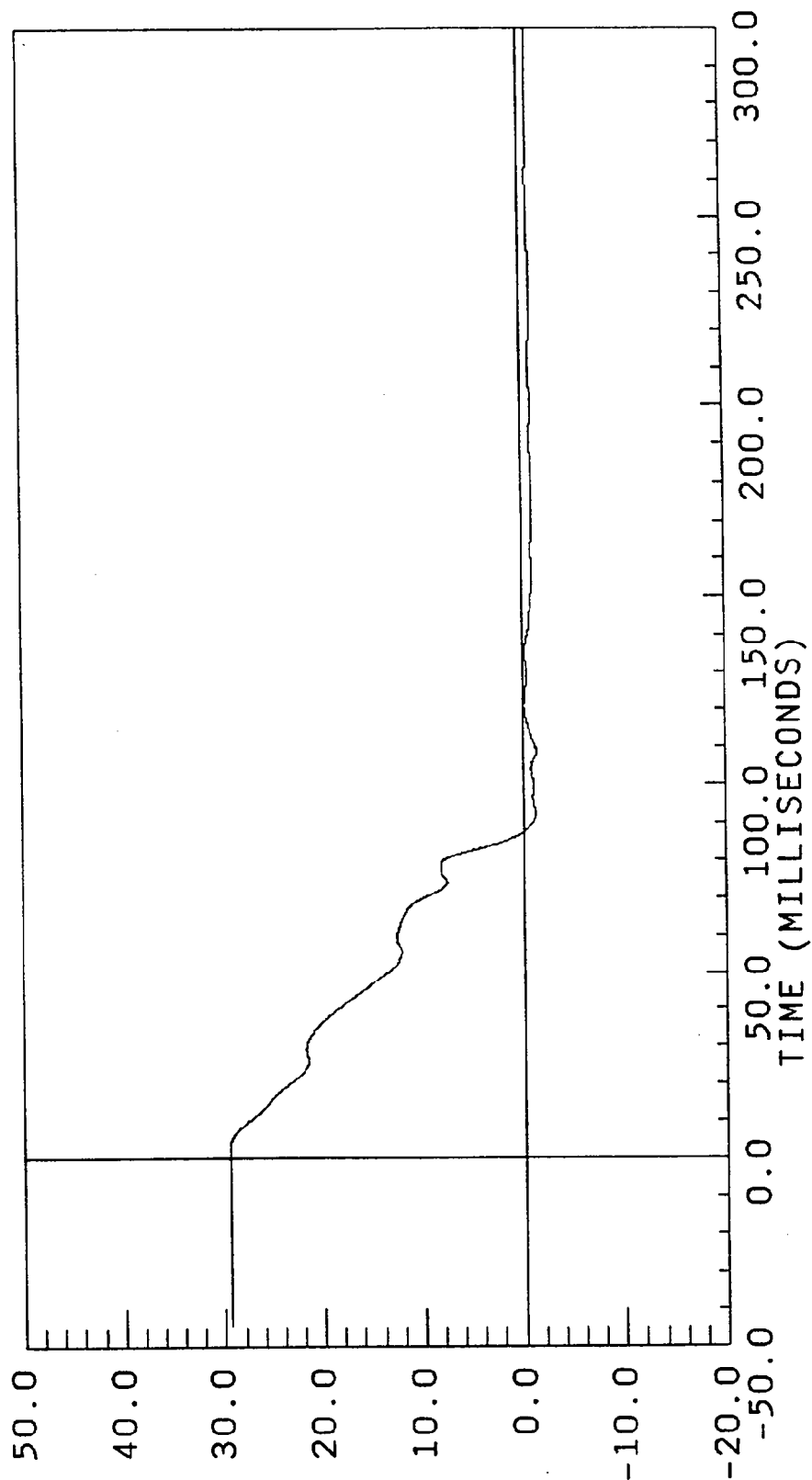
ACCELERATION * G, S *

V943-23.DAT

29.40 mph

ACC PACK #7(X)
COMPUTED
FILTER CUTOFF: 100HZ

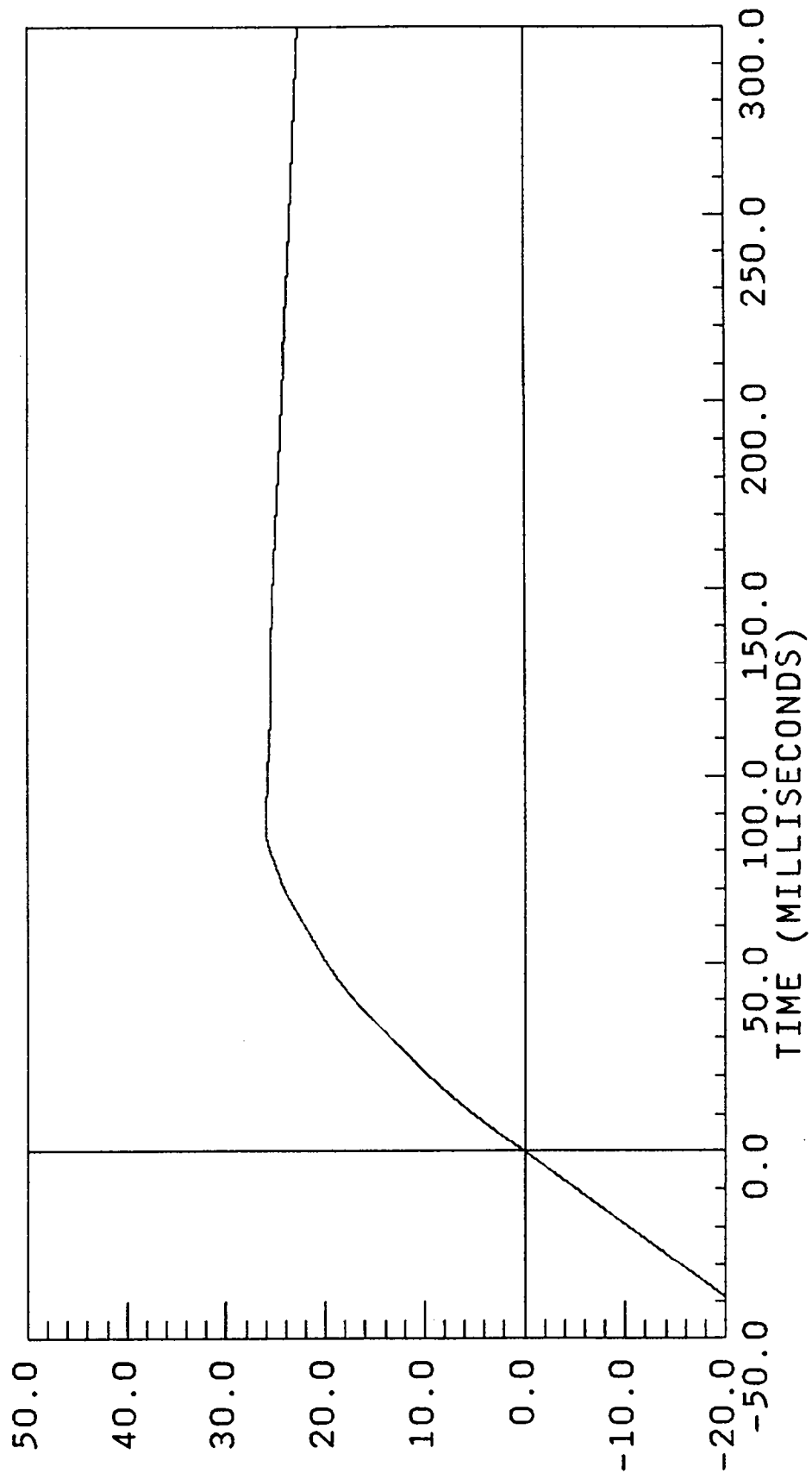
XL AXIS
YMIN = -1.384661 at 108.5250
YMAX = 29.42954 at 2.400000



29.40 mph

ACC PACK #7(X)
COMPUTED
FILTER CUTOFF: 100Hz

XL AXIS
YMIN = -23.21544 at 108.5250
YMAX = 25.99511 at 87.22501

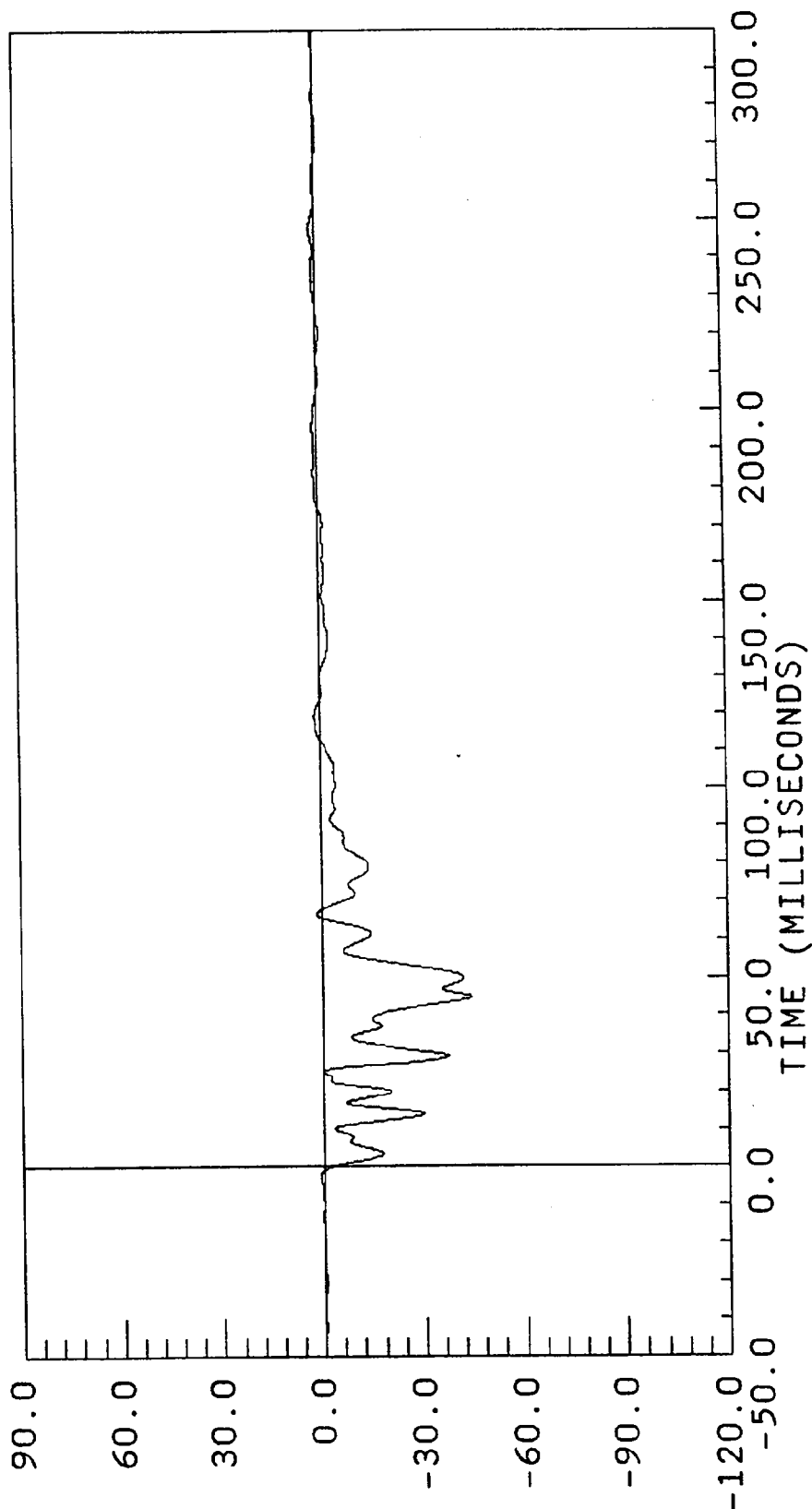


DISPLACEMENT * INCHES

BW943-24.DAT

29.40 mph

ACC PACK #8(X) XL AXIS
FILTERED YMIN = -44.53816 at 44.77500
FILTER CUTOFF: 100HZ YMAX = 1.809166 at 119.3250



ACCELERATION * G * S *

29.40 mph

ACC PACK #8(X)

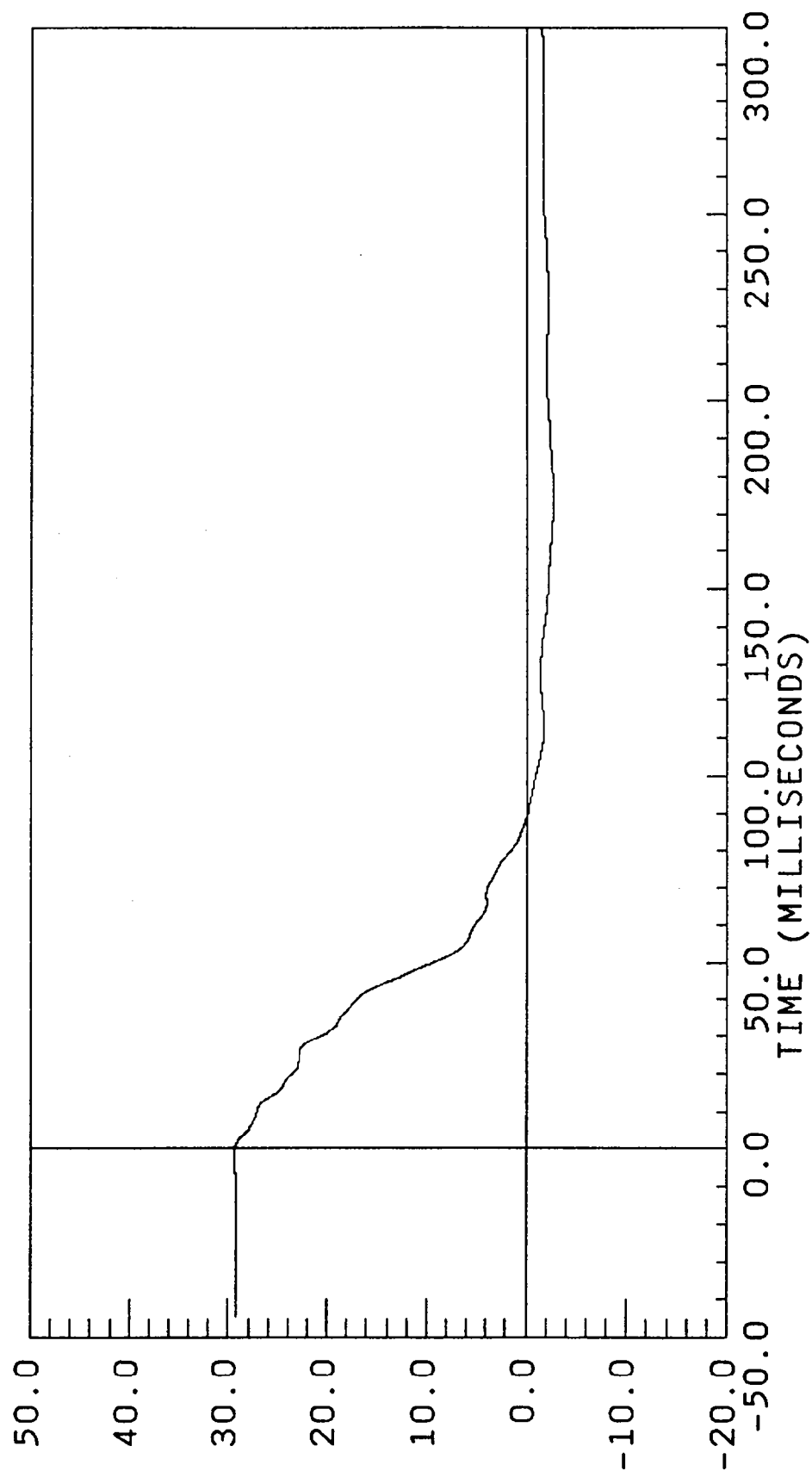
COMPUTED

FILTER CUTOFF: 100Hz

XL AXIS

YMIN = -2.750840 at 174.7500

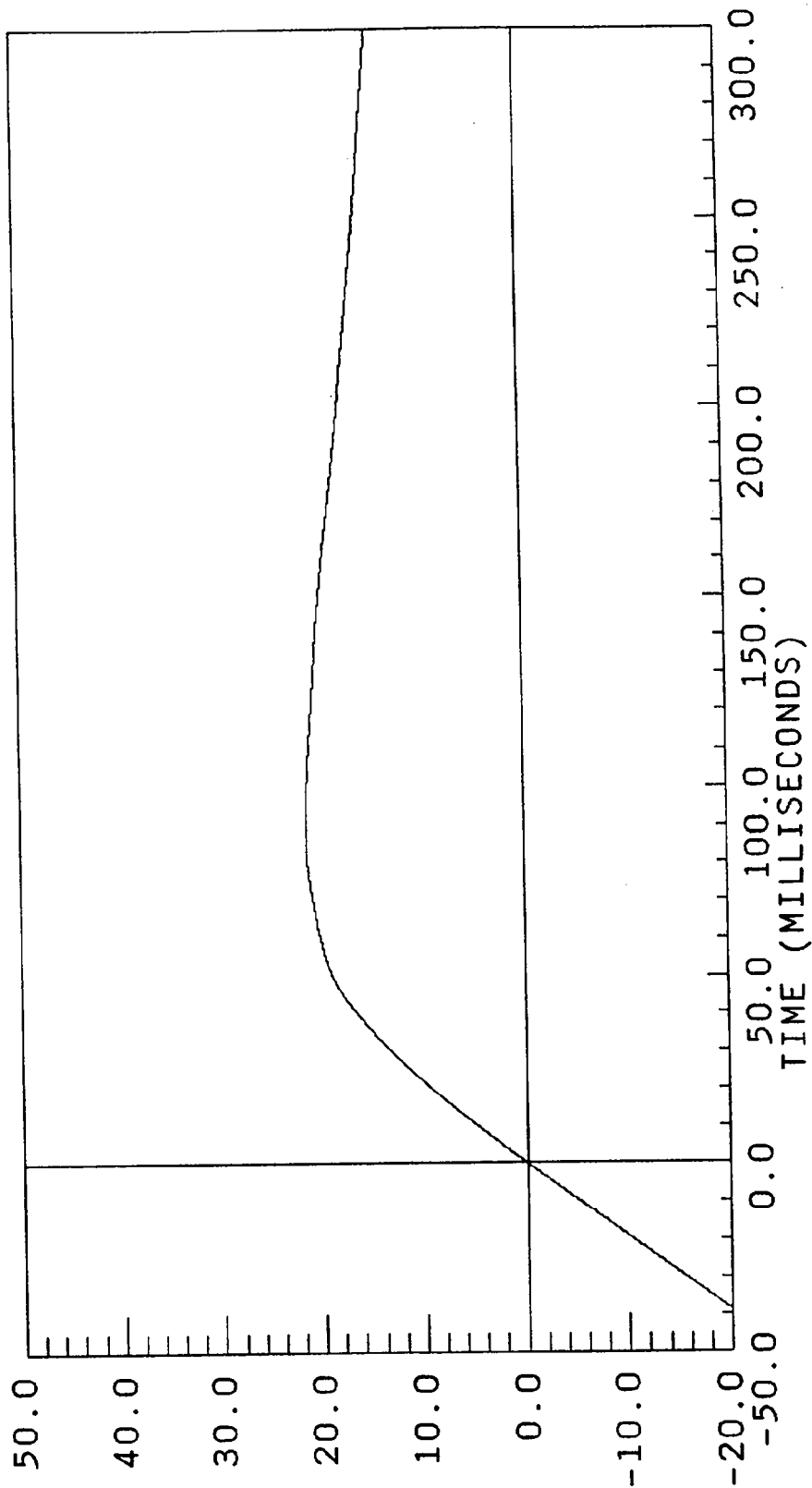
YMAX = 29.30016 at -1.050000



D943-24.DAT

29.40 mph

ACC PACK #8(X) XL AXIS
COMPUTED YMIN = -23.15986 at 174.7500
FILTER CUTOFF: 100Hz YMAX = 21.54248 at 88.42500



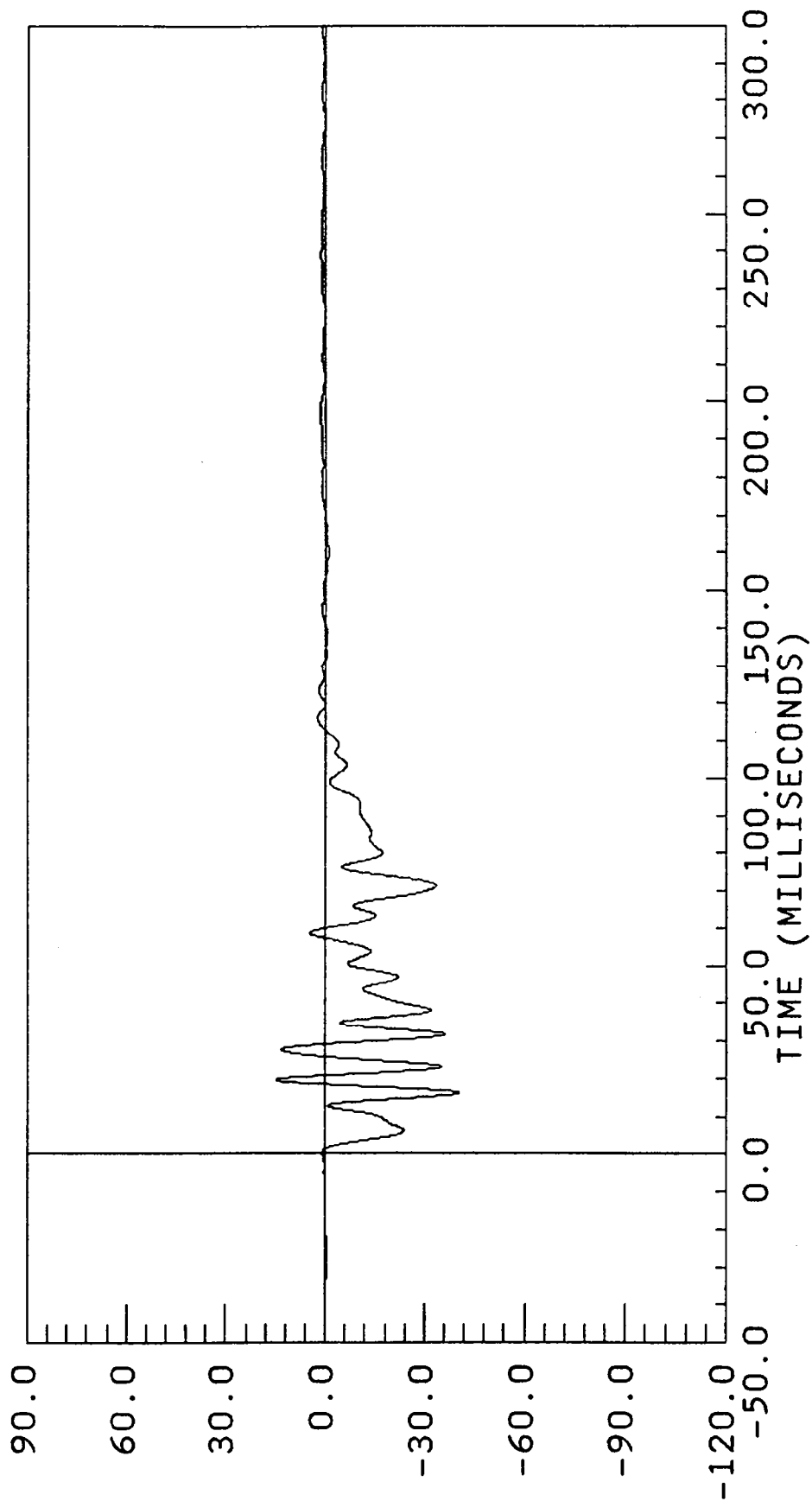
DISPLACEMENT * INCHES

29.40 mph

ACC PACK #9(X)
 FILTERED
 FILTER CUTOFF: 100Hz

XL AXIS

YMIN = -40.63855 at 16.12500
 YMAX = 14.84320 at 19.57500

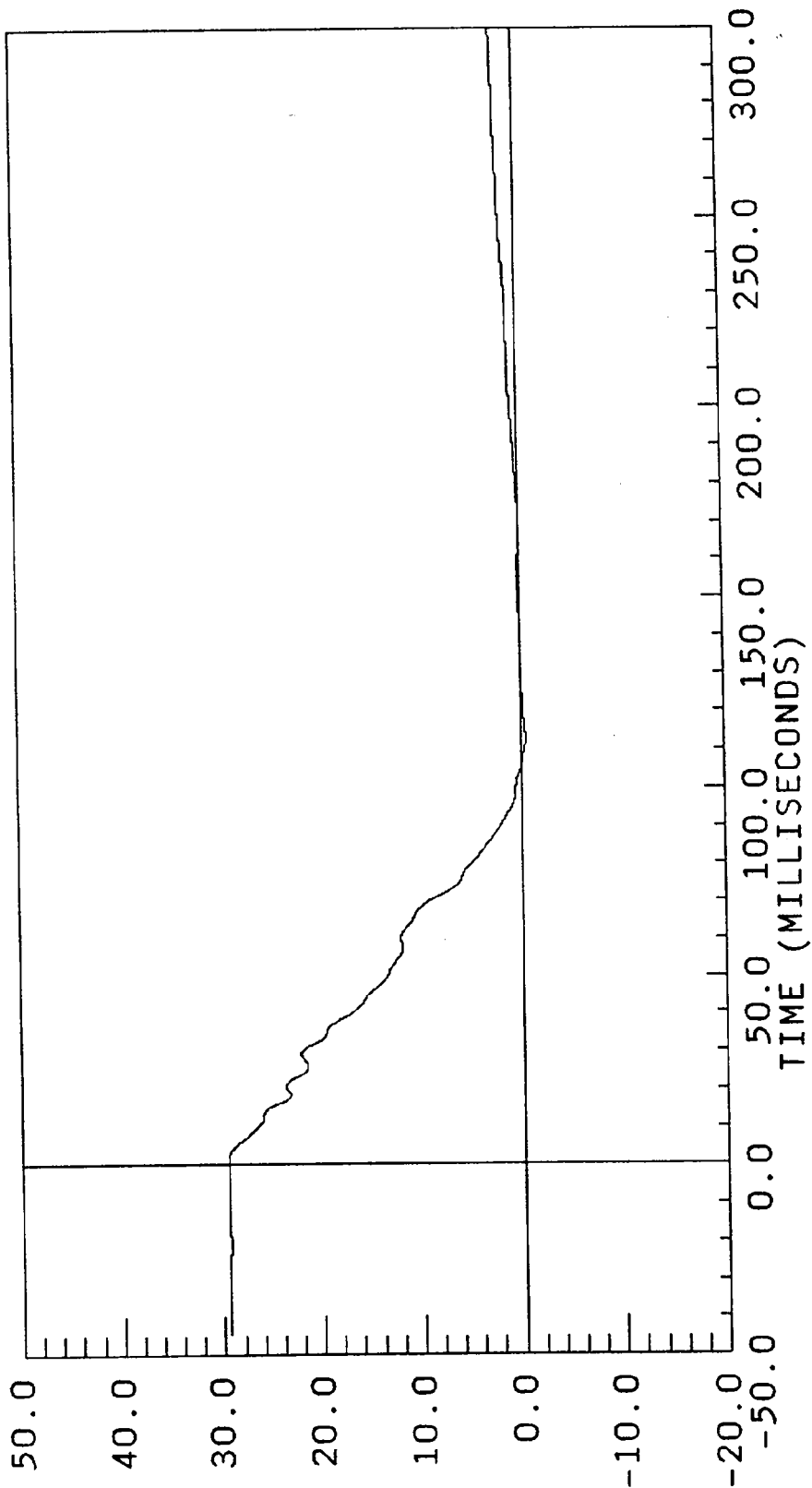


ACCELERATION * G, S *

V943-25.DAT

29.40 mph

ACC PACK #9(X)
COMPUTED
FILTER CUTOFF: 100Hz
XL AXIS
YMIN = -0.523918 at 112.7250
YMAX = 29.39838 at -34.80000



VELOCITY * MILES / HOUR

29.40 mph

ACC PACK #9(X)

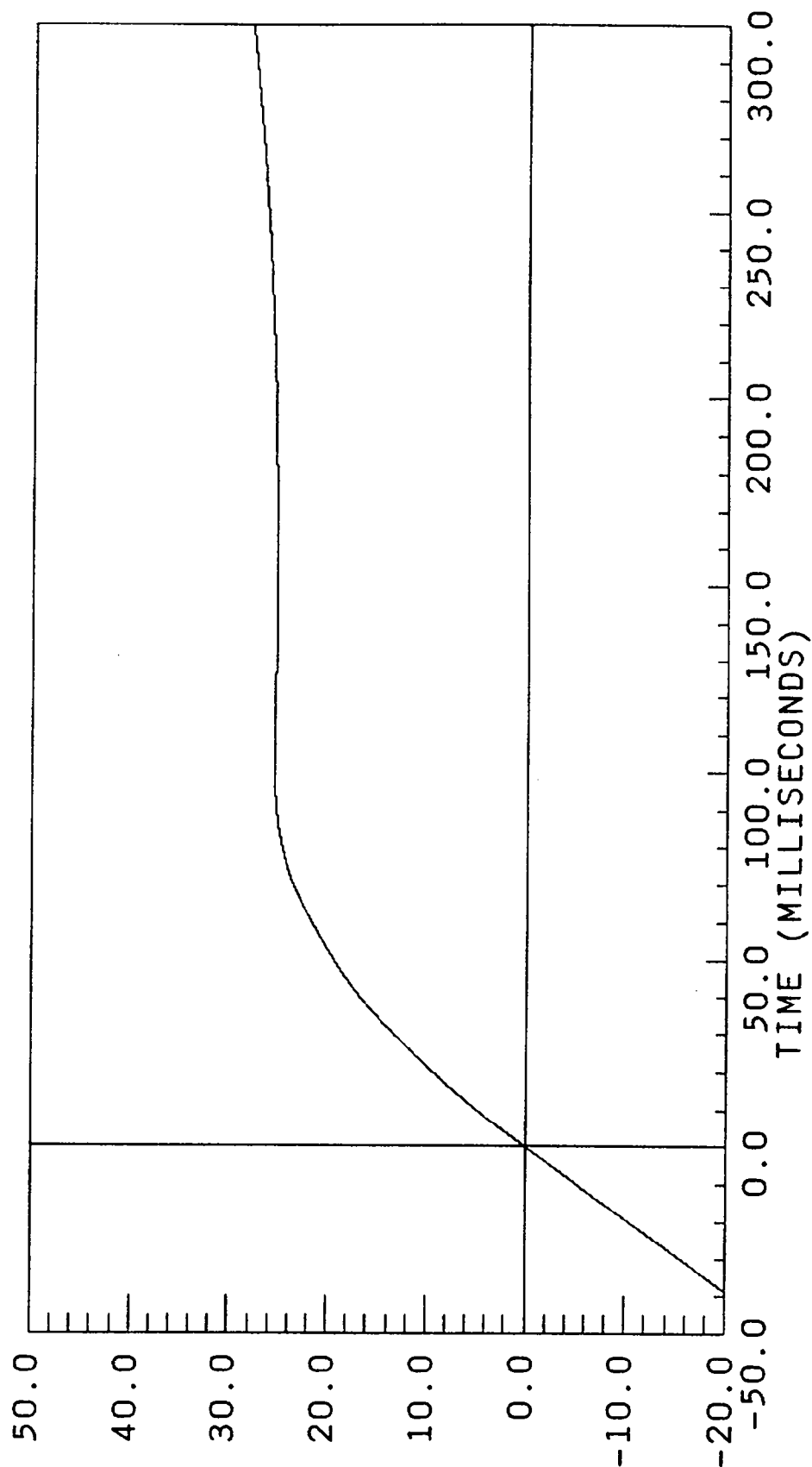
COMPUTED

FILTER CUTOFF: 100Hz

XL AXIS

YMIN = -23.21951 at 112.7250

YMAX = 27.95770 at 300.0000

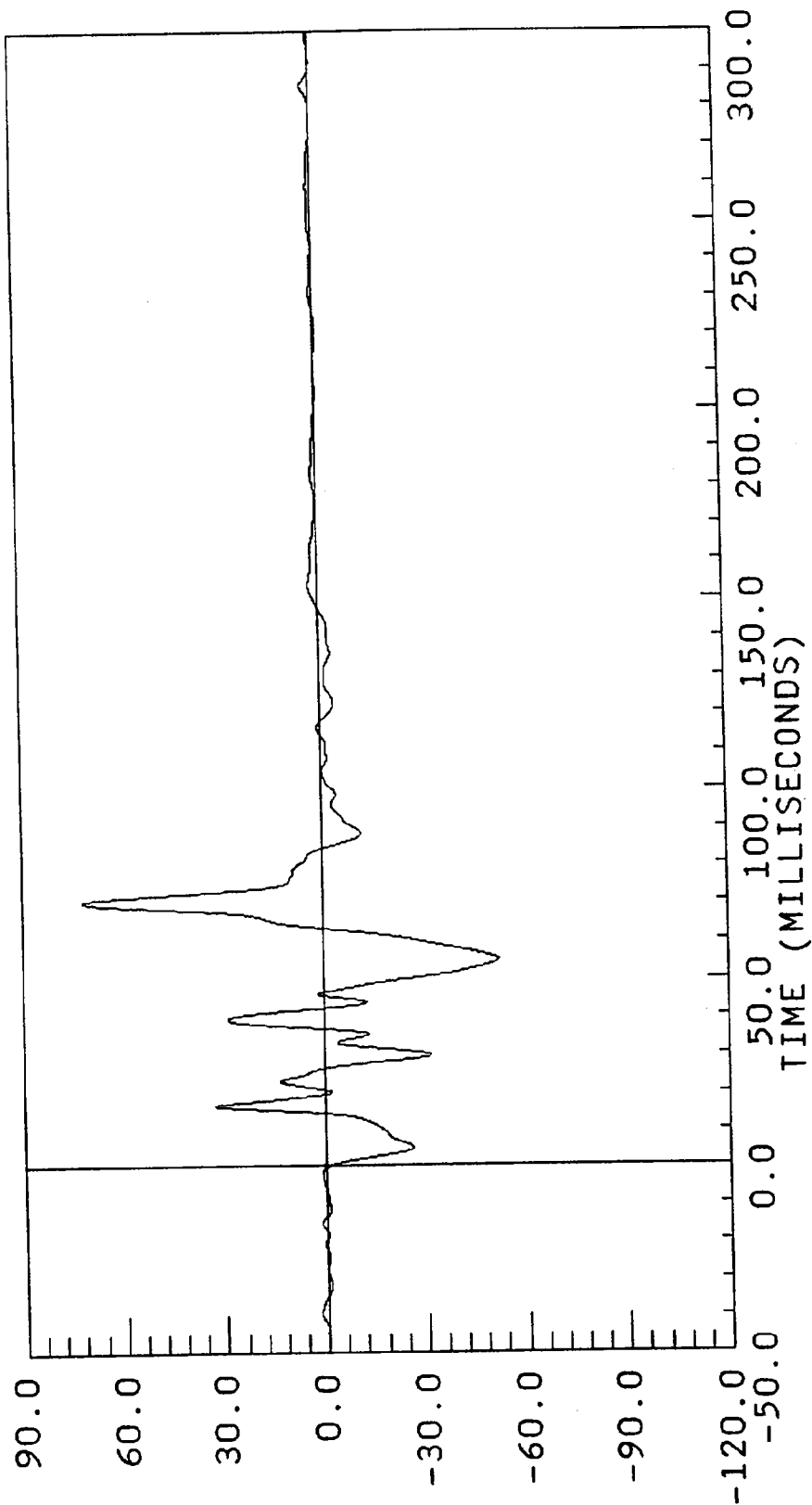


D I S P L A C E M E N T * I N C H E S

BW943-26.DAT

29.40 mph

ACC PACK #10(X) XL AXIS
FILTERED YMIN = -52.19204 at 54.67500
FILTER CUTOFF: 100HZ YMAX = 72.01106 at 70.12500

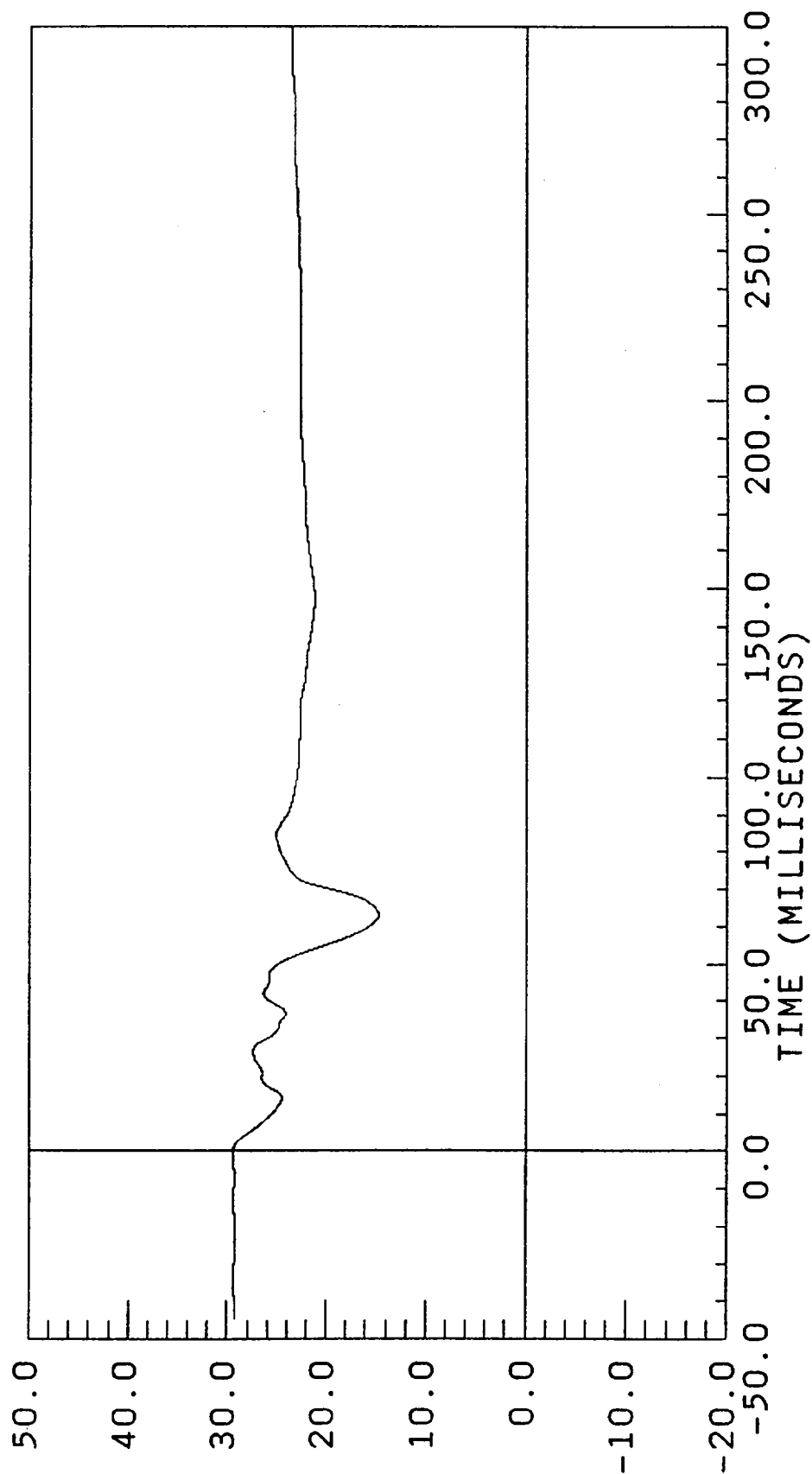


ACCELERATION * G, S *

29.40 mph

ACC PACK #10(X)
COMPUTED
FILTER CUTOFF: 100Hz

XL AXIS
YMIN = 14.72648 at 63.00000
YMAX = 29.19350 at -34.80000

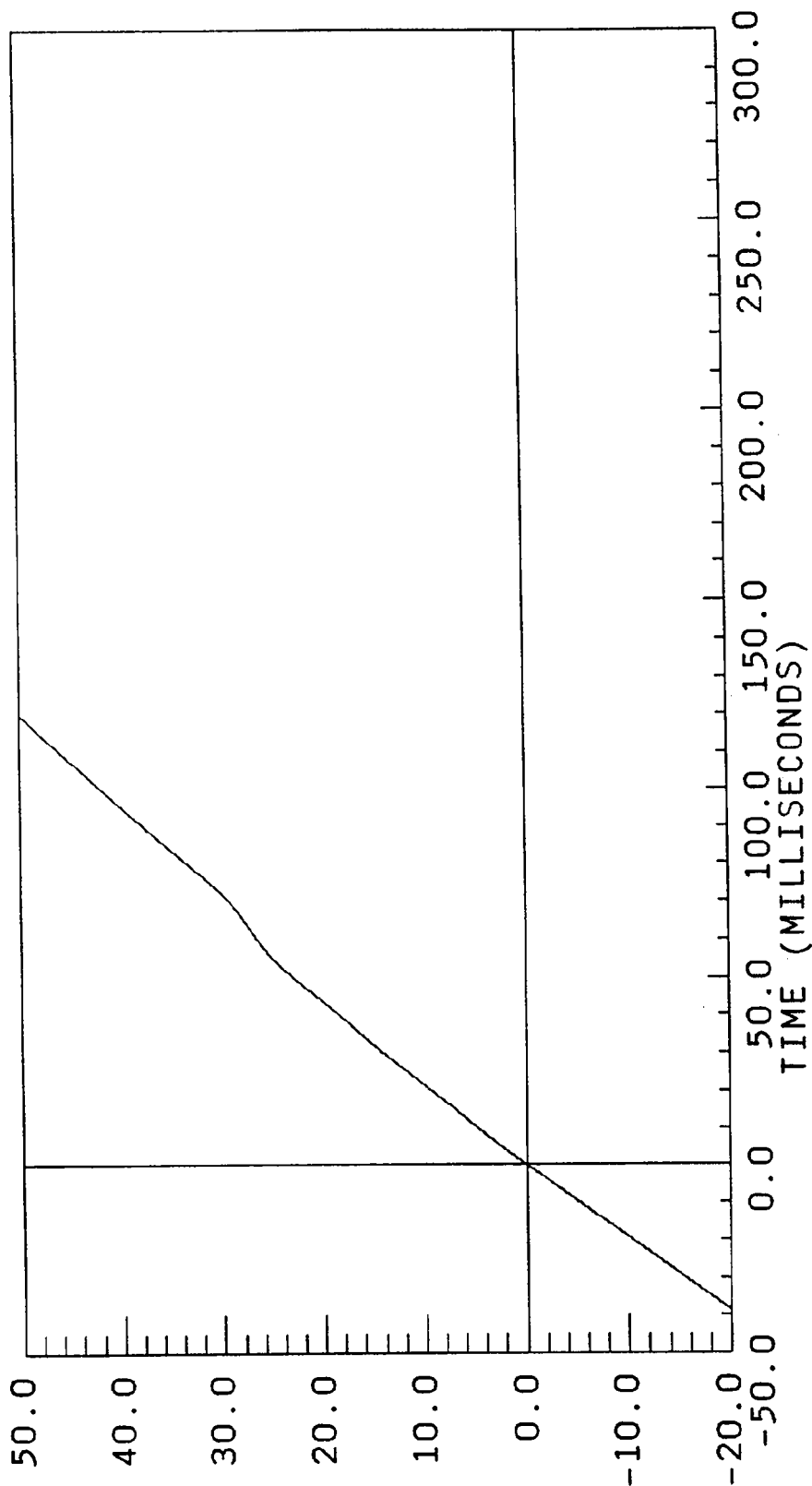


VELOCITY * MILES / HOUR

D943-26.DAT

29.40 mph

ACC PACK #10(X)
COMPUTED
FILTER CUTOFF: 100Hz
XL AXIS
YMIN = -23.18925 at 63.00000
YMAX = 121.5185 at 300.0000



29.40 mph

ACC PACK #11(X)

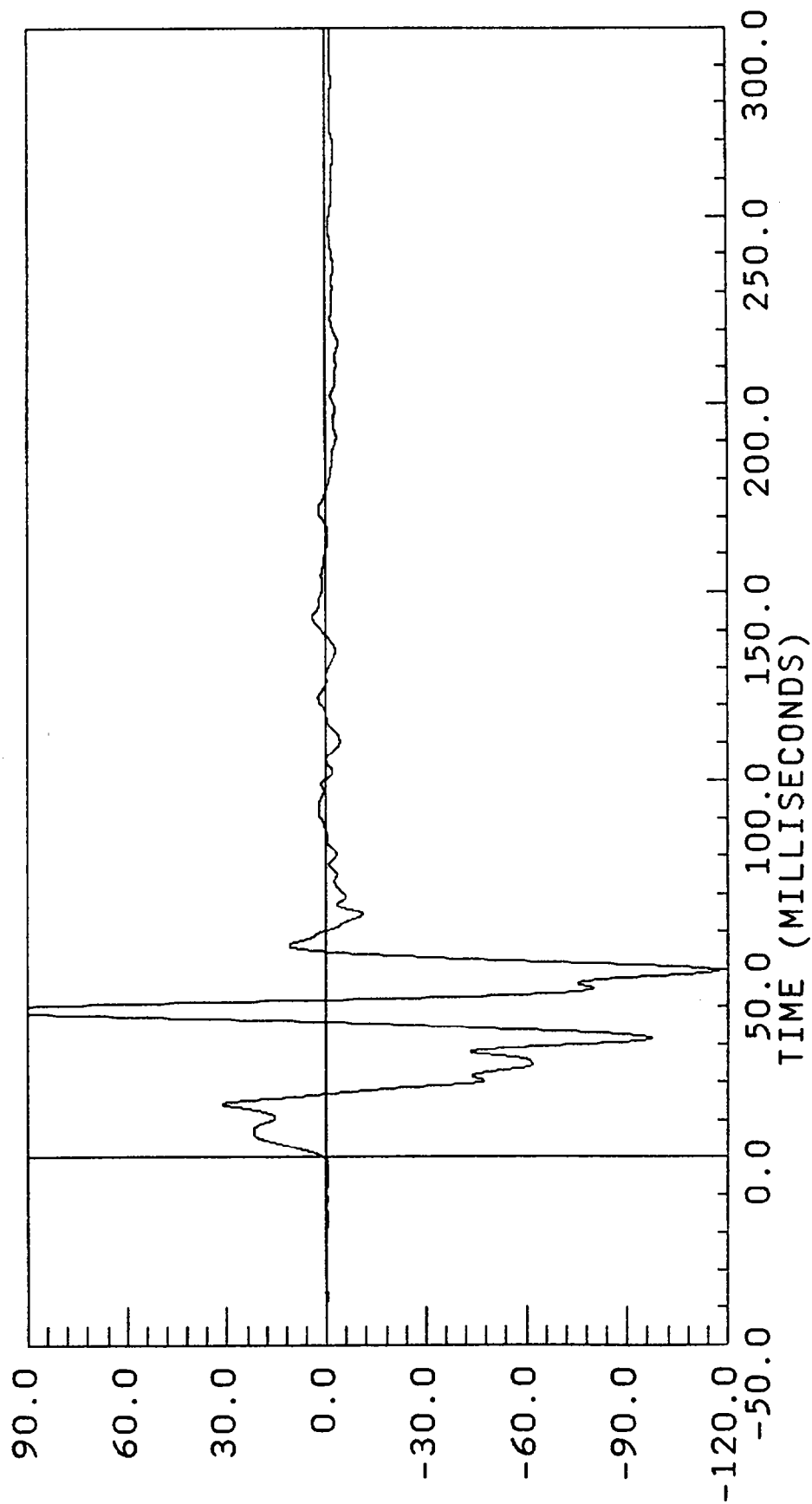
FILTERED

FILTER CUTOFF: 100Hz

XL AXIS

YMIN = -117.3012 at 49.57500

YMAX = 107.2237 at 39.37500

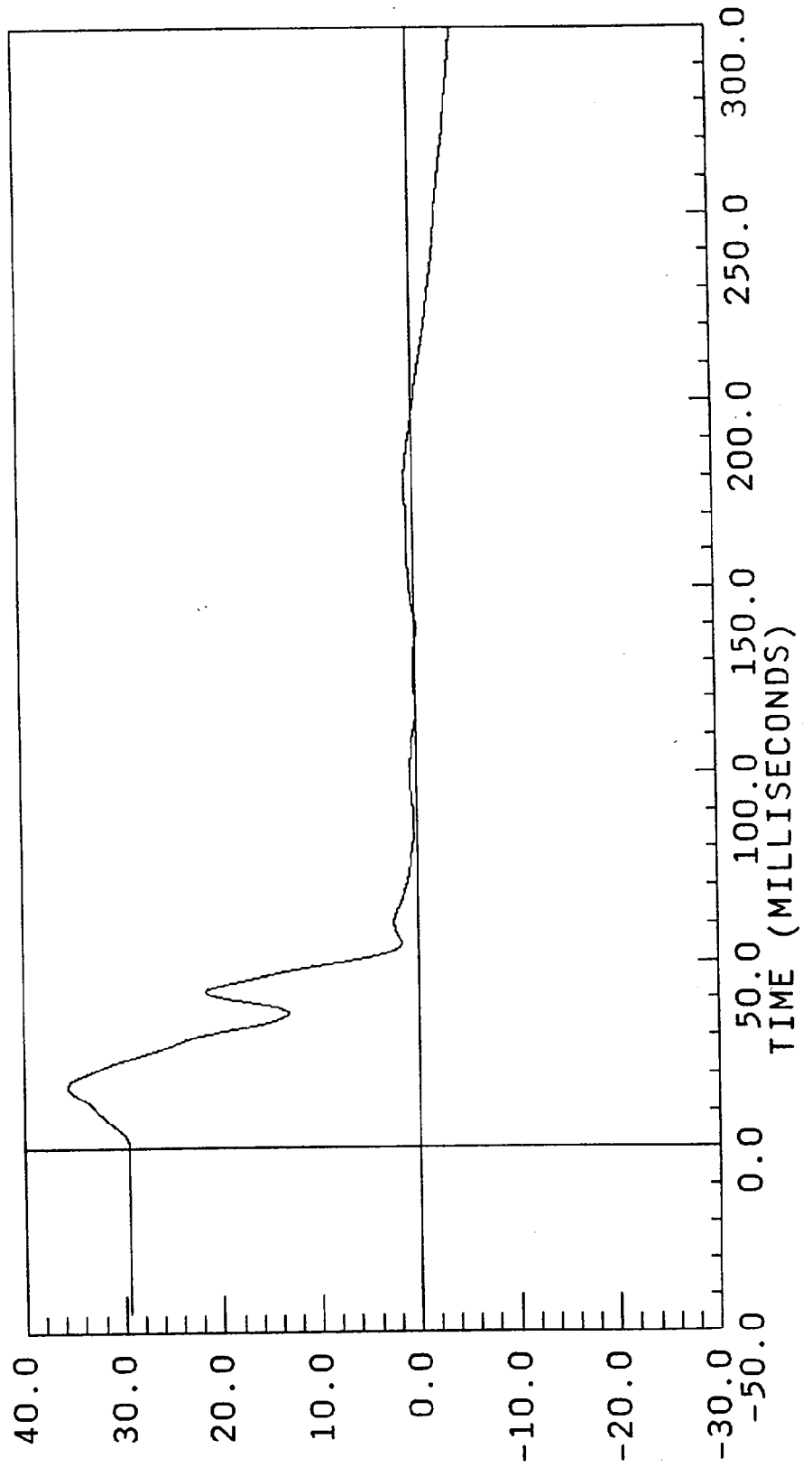


ACCELERATION * G, S *

V943-27.DAT

29.40 mph

ACC PACK #11(X) XL AXIS
COMPUTED YMIN = -4.504573 at 300.0000
FILTER CUTOFF: 100Hz YMAX = 35.54527 at 16.72500

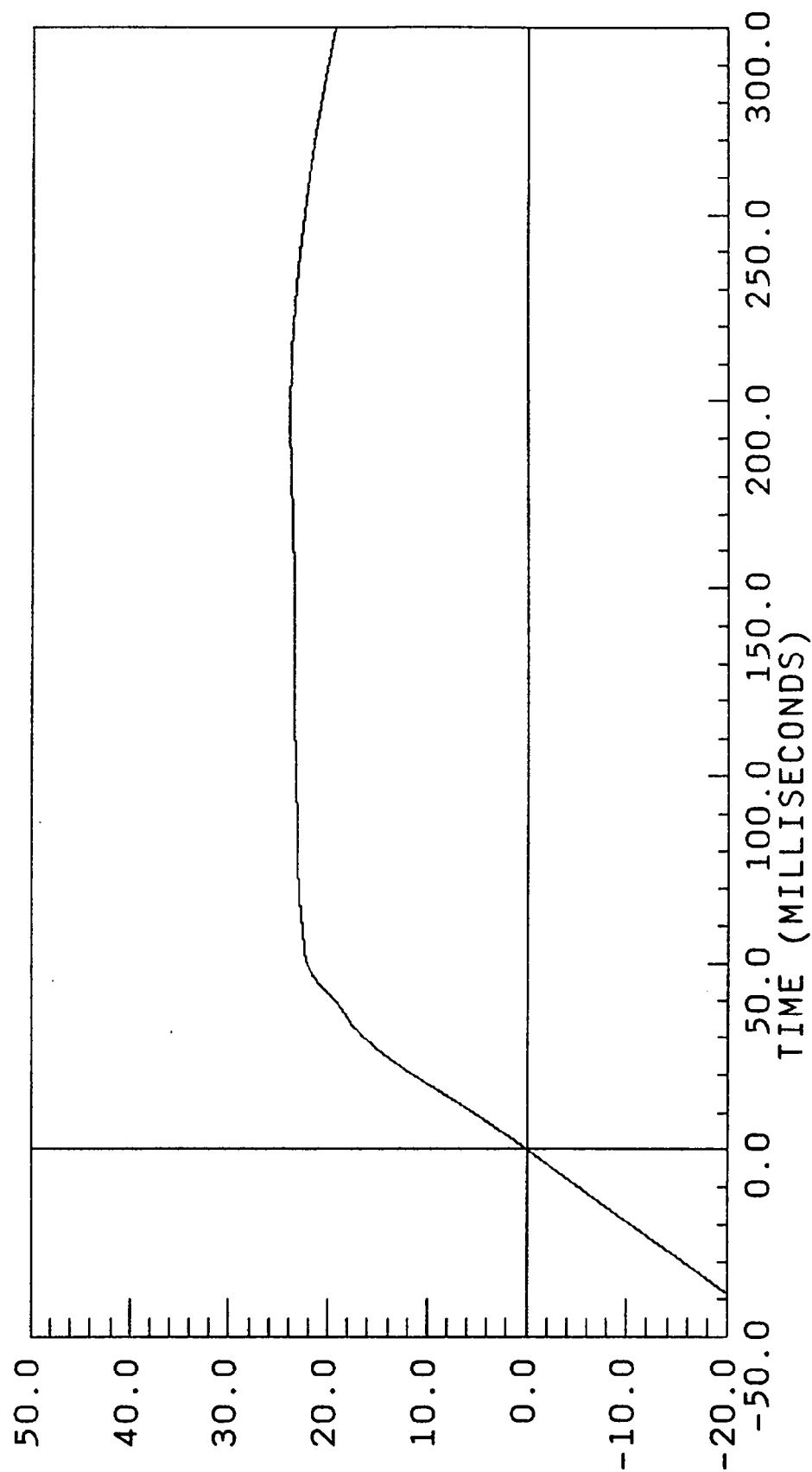


VELOCITY * MILES / HOUR

29.40 mph

ACC PACK #11(X)
COMPUTED
FILTER CUTOFF: 100Hz

XL AXIS
YMIN = -23.30739 at 300.0000
YMAX = 23.92655 at 195.9750



DISPLACEMENT * INCHES

TEST NO. CL0205

DUMMY DATA

CLASS	FILTER CHANNEL
Head Accelerations	1000
Chest Accelerations	180
Femur Forces	600
Belt Loads	60

HEAD INJURY CRITERION
HEAD SEVERITY INDEX
36MS. MAXIMUM DURATION

NHTSA CRASH TEST - PROC 208

PUN= 943

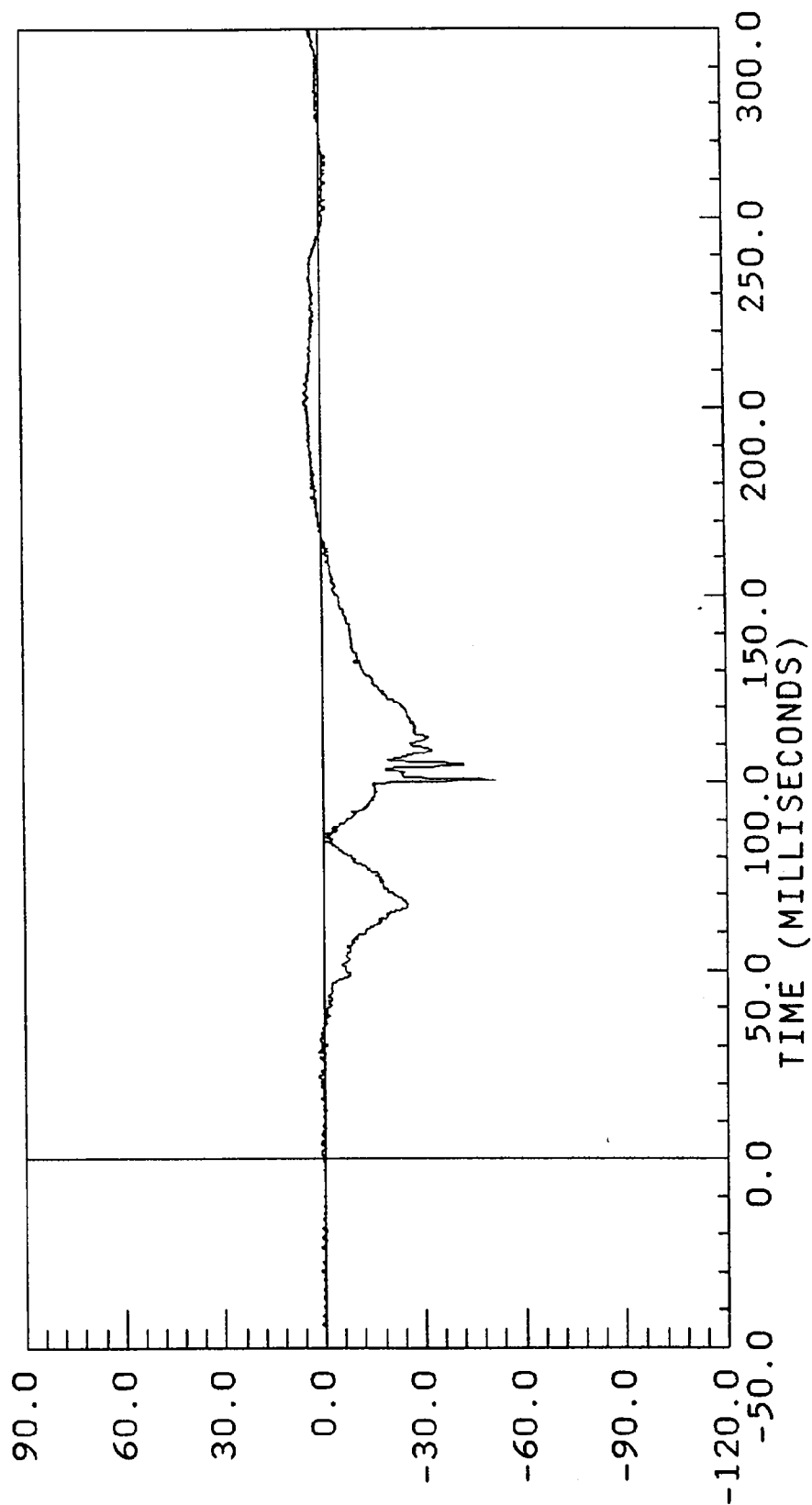
POS#1 HEAD R

HIC= 207.7 FROM T1= .09955 TO T2= 12555
AVERAGE ACCELERATION BETWEEN T1 AND T2= 71.9G'S
EVENT TIME= 300.0 MSEC
SEVERITY INDEX= 348.4

UDS\$943-1.DAT

29.40 mph

POS#1 HEAD X
XL AXIS
YMIN = -51.73800 at 100.4250
YMAX = 5.111200 at 200.9250
FILTER CUTOFF: 0Hz



ACCELERATION * G, S *

0.00 mph

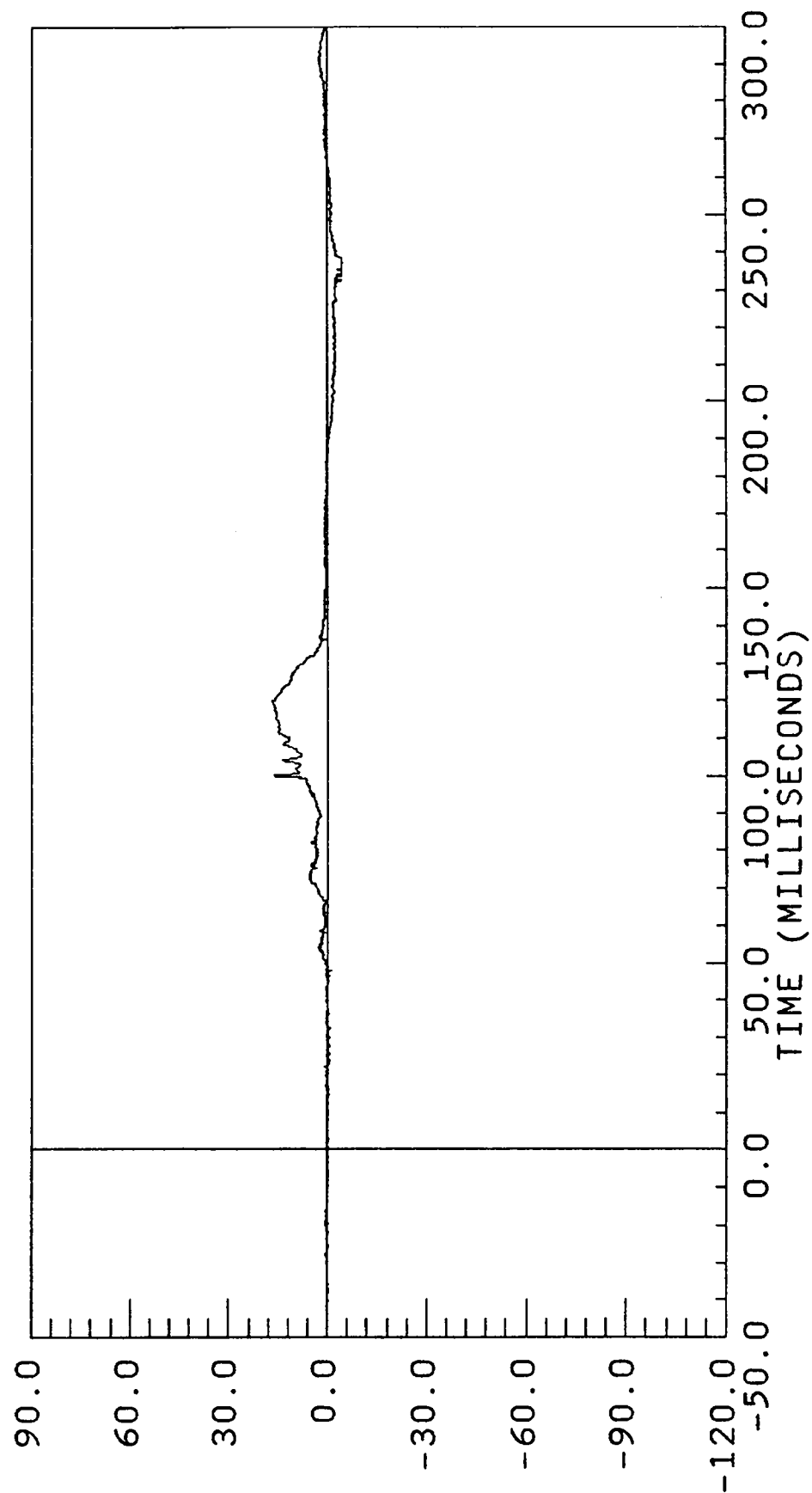
POS#1 HEAD Y

YL AXIS

YMIN = -4.681500 at 237.6000

YMAX = 16.88500 at 119.5500

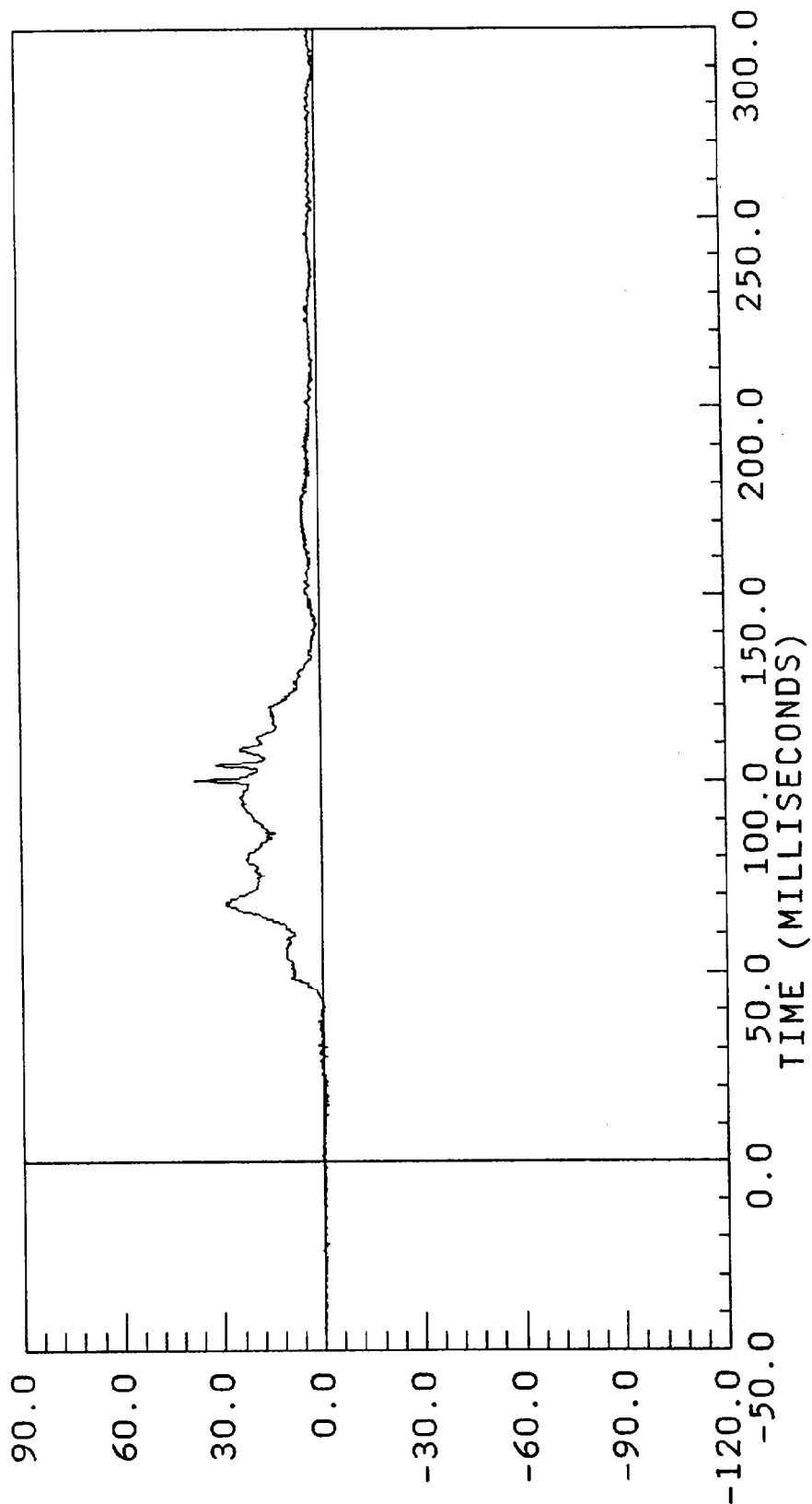
FILTER CUTOFF: 0Hz



UDS\$943-3.DAT

0.00 mph

POS#1 HEAD Z ZL AXIS
YMIN = -0.298200 at -21.90000
YMAX = 38.27300 at 100.3500
FILTER CUTOFF: 0HZ



ACCELERATION * G * S

0.00 mph

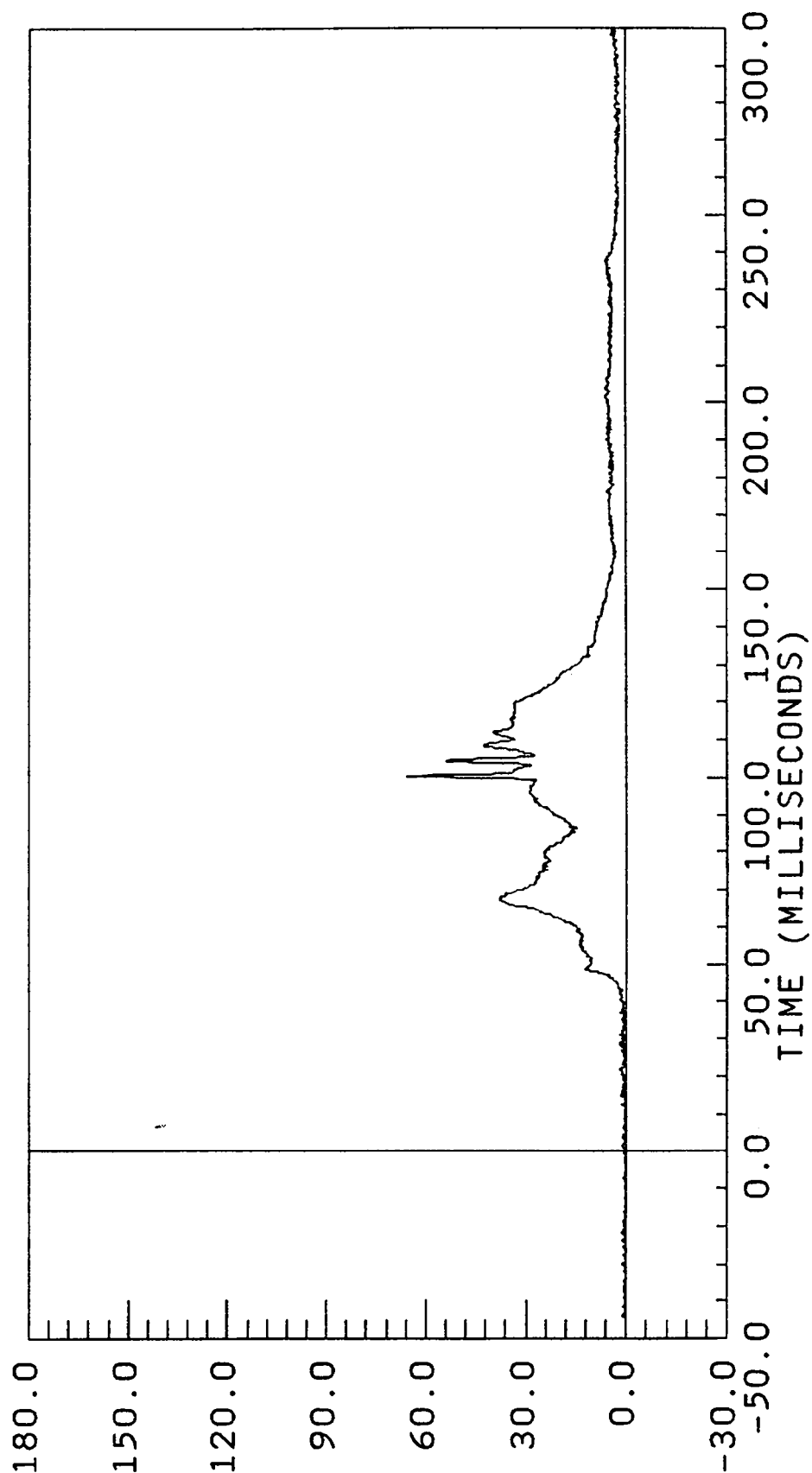
POS#1 HEAD
NONSTANDARD
FILTER CUTOFF:

OHZ

RS AXIS

YMIN = 0.320269 at -44.62500

YMAX = 65.73462 at 100.4250



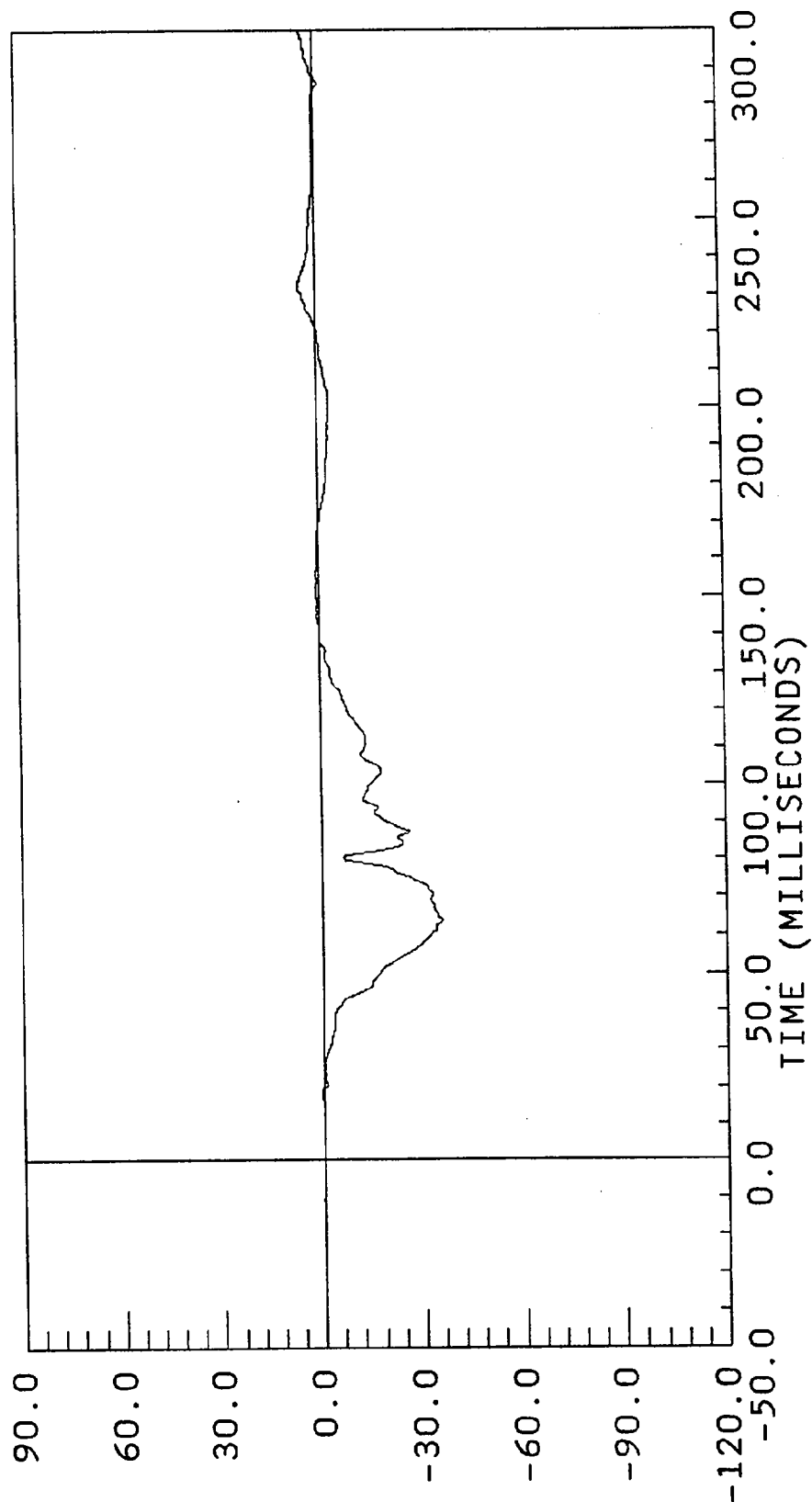
ACCELERATION * G, S *

BW943-4.DAT

29.40 mph

POS#1 CHEST X
FILTERED
FILTER CUTOFF: 300Hz

XL AXIS
YMIN = -35.81614 at 63.60000
YMAX = 5.019477 at 232.3500

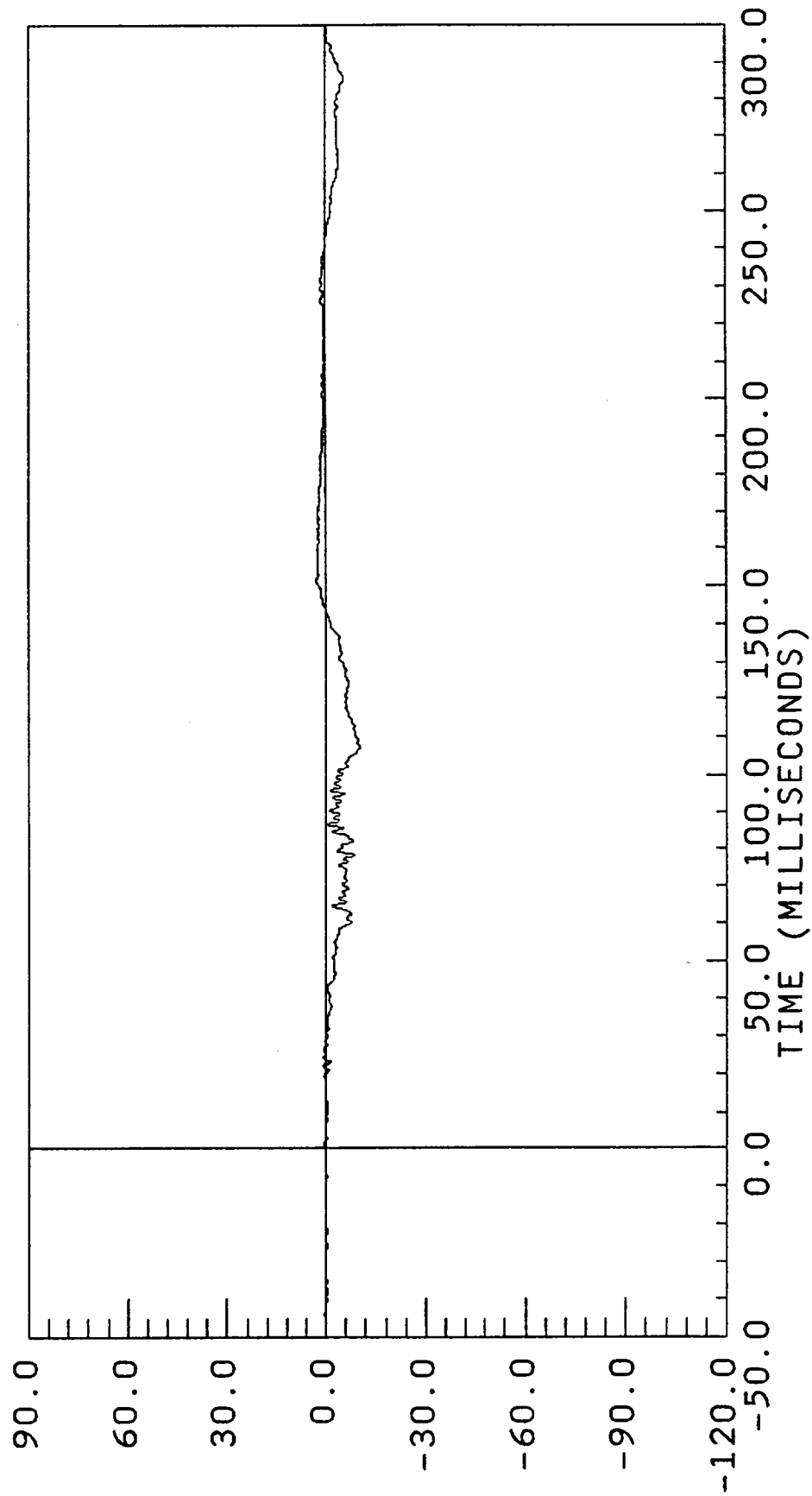


ACCELERATION * G, S *

0.00 mph

POS#1 CHEST Y
 FILTERED
 FILTER CUTOFF: 300Hz

YL AXIS
 YMIN = -10.41411 at 107.5500
 YMAX = 2.882354 at 151.3500

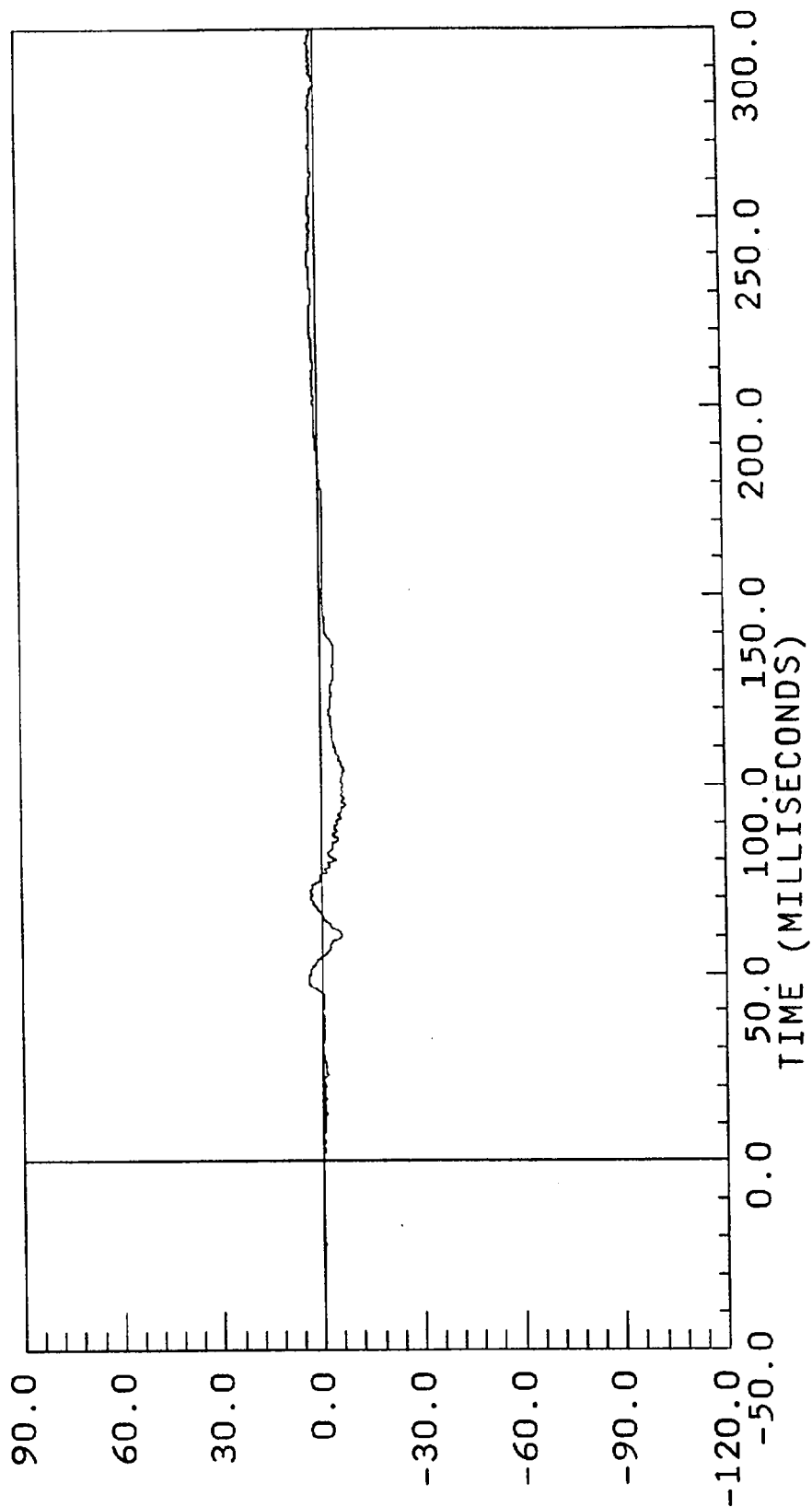


ACCELERATION * G, S *

BW943-6.DAT

0.00 mph

POS#1 CHEST Z
FILTERED
FILTER CUTOFF: 300Hz
ZL AXIS
YMIN = -7.374501 at 94.95000
YMAX = 4.128303 at 48.60000



ACCELERATION * G, S *

0.00 mph

POS#1 CHEST

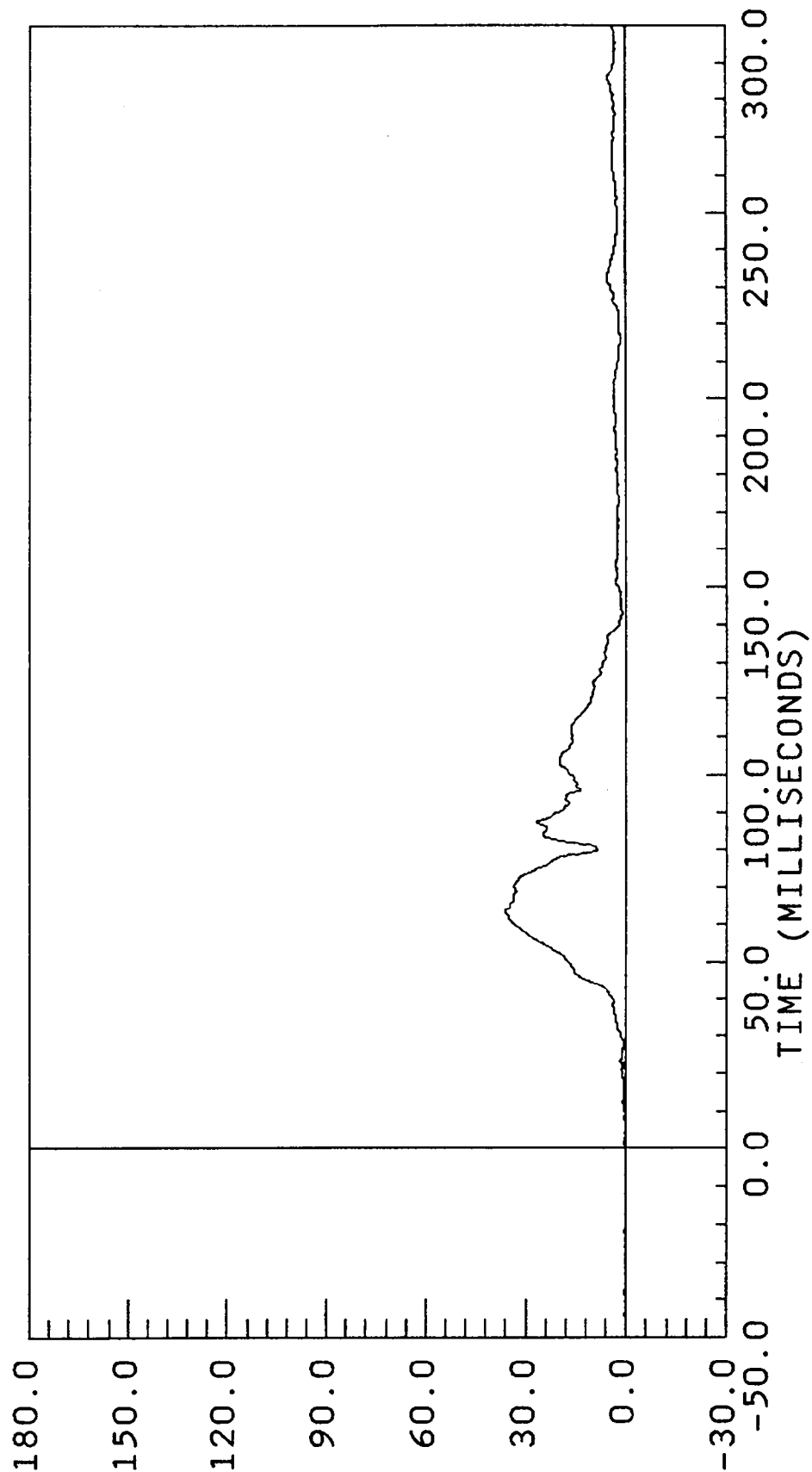
COMPUTED

FILTER CUTOFF: 300HZ

RS AXIS

YMIN = 0.0760930 at -29.62500

YMAX = 36.26789 at 63.45000



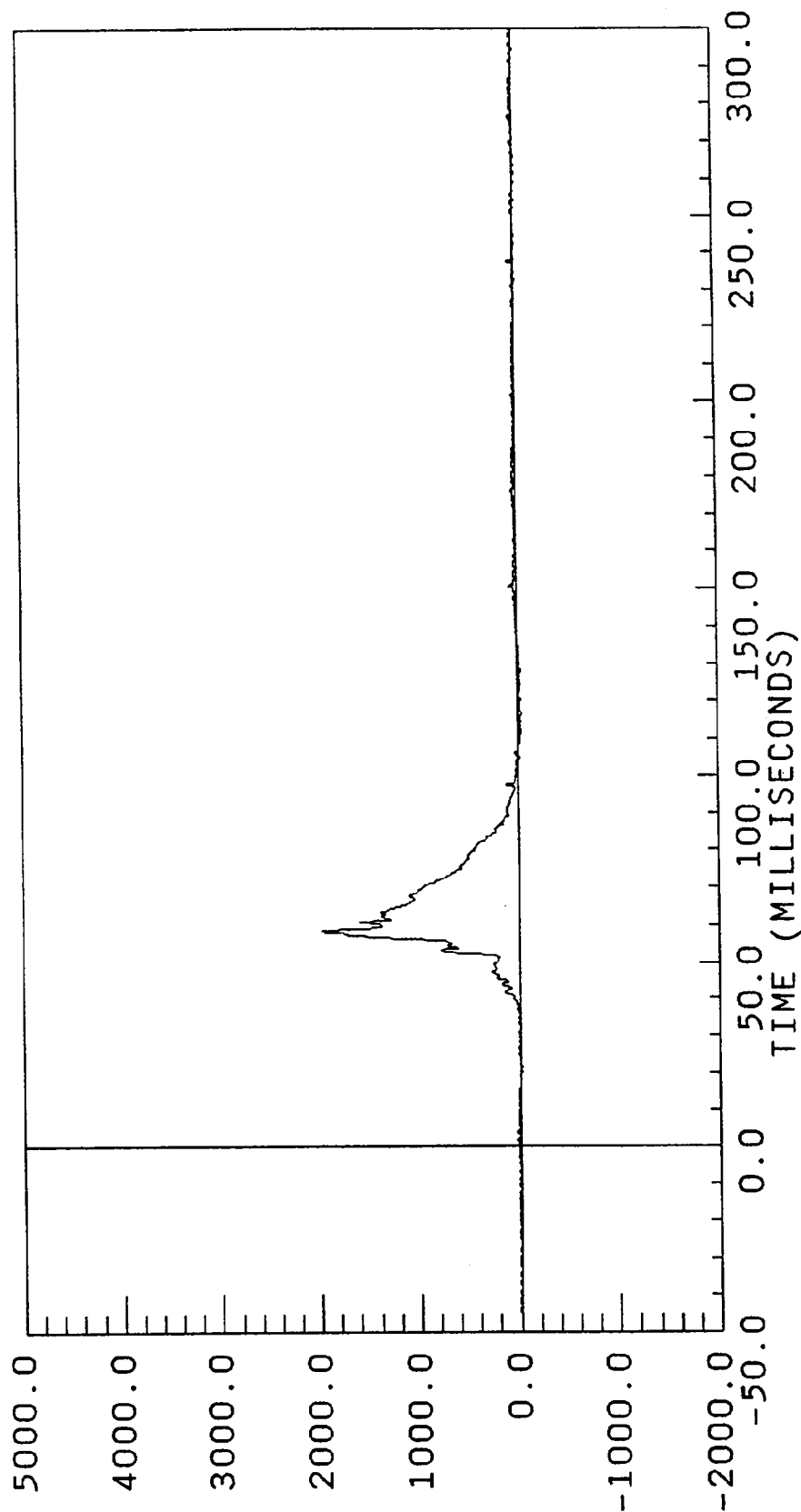
ACCELERATION * G, S *

BW943-7.DAT

0.00 mph

POS#1 LEFT FEMUR
FILTERED
FILTER CUTOFF: 1000HZ

NA AXIS
YMIN = -39.79746 at 128.1750
YMAX = 1982.928 at 58.50000

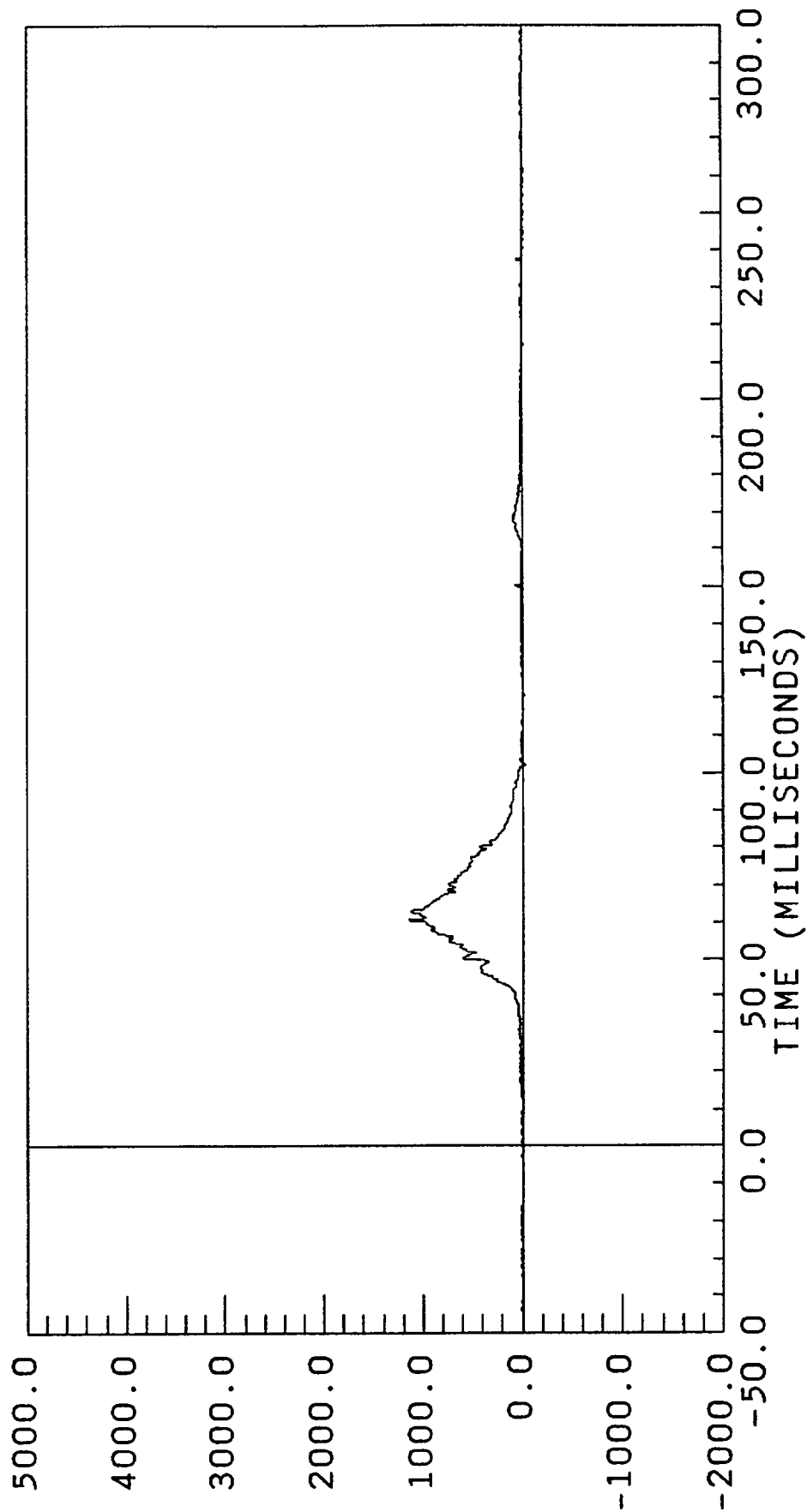


F O R C E * L B S *

0.00 mph

POS#1 RIGHT FEMUR
 FILTERED
 FILTER CUTOFF: 1000HZ

NA AXIS
 YMIN = -33.46471 at 102.2250
 YMAX = 1147.943 at 60.67500



FORCE * LBS *

HEAD INJURY CRITERION
HEAD SEVERITY INDEX
25MS. MAXIMUM DURATION

NHTSA CRASH TEST - PROC. 208

PUN= 943

P03#2 HEAD R

HIC= 222.1 FROM T1= .06270 TO T2= .09870
AVERAGE ACCELERATION BETWEEN T1 AND T2= 32.06G'S
EVENT TIME= 300 0 MSEC
SEVERITY INDEX= 480.5

29.40 mph

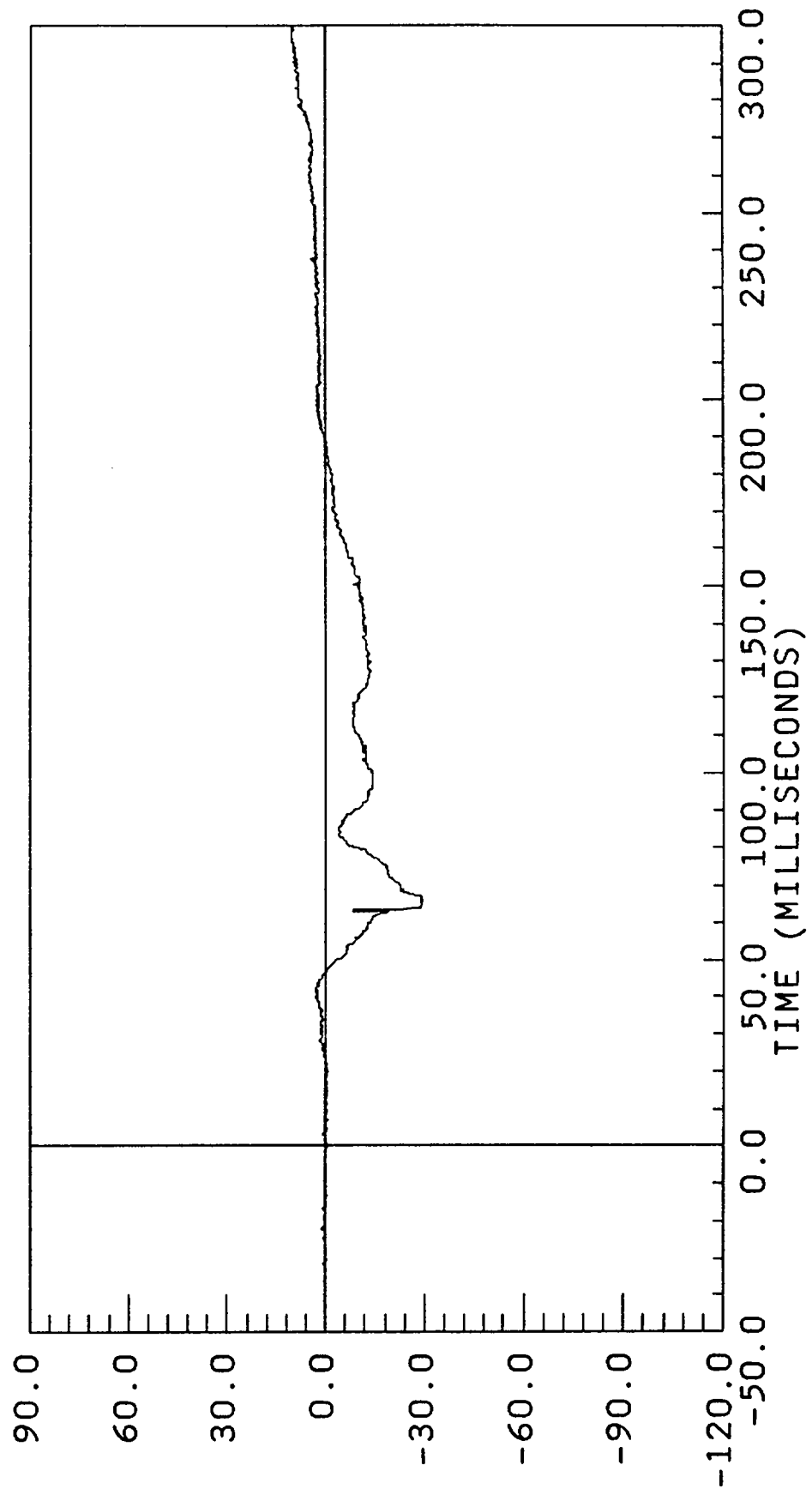
POS#2 HEAD X

XL AXIS

YMIN = -29.63900 at 66.15000

YMAX = 10.33800 at 295.5750

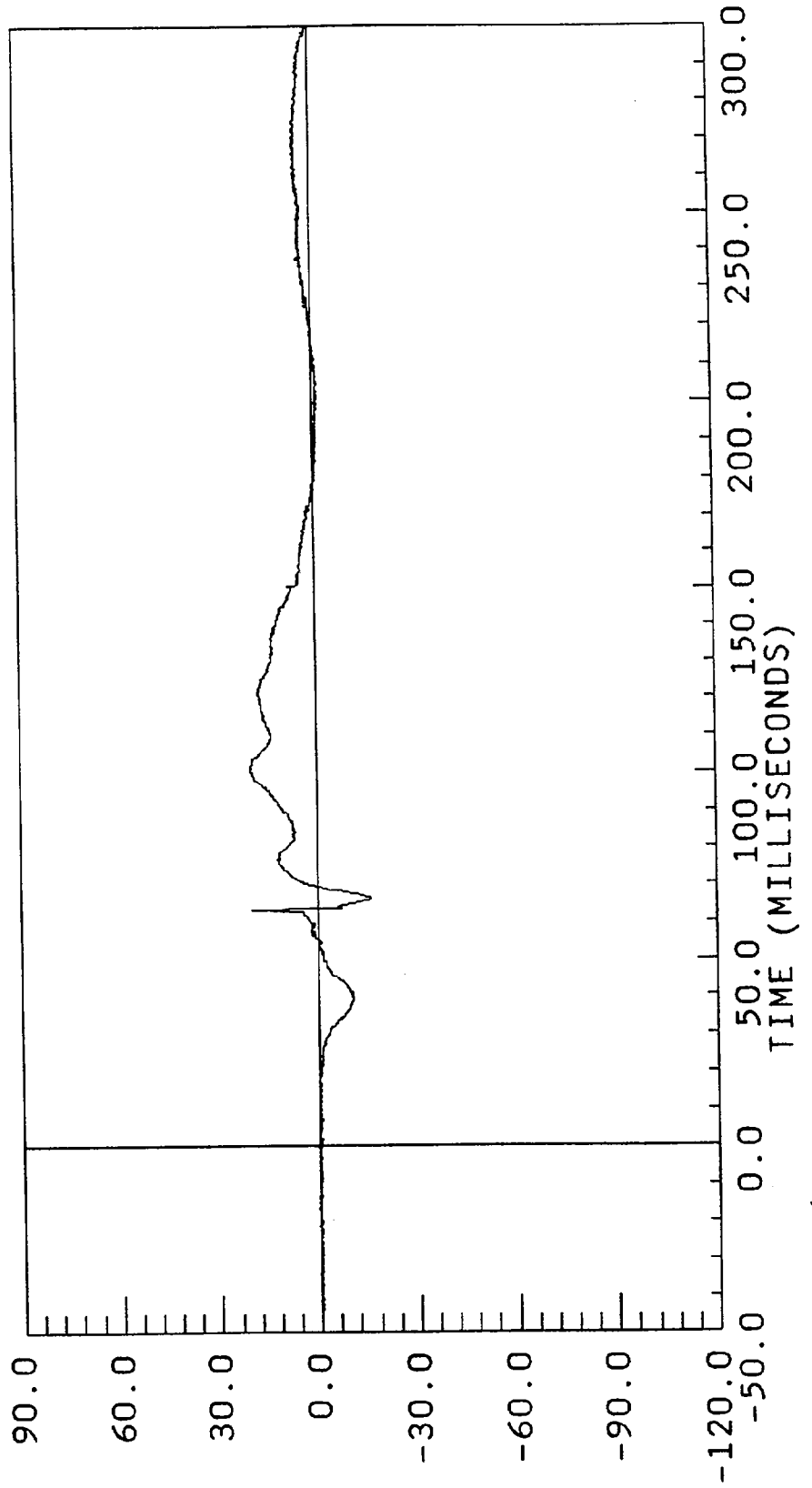
FILTER CUTOFF: 0HZ



UDS\$943-12.DA

0.00 mph

POS#2 HEAD Y
YL AXIS
YMIN = -16.02500 at 66.00000
YMAX = 20.18100 at 62.92500
FILTER CUTOFF: 0HZ



0.00 mph

POS#2 HEAD Z

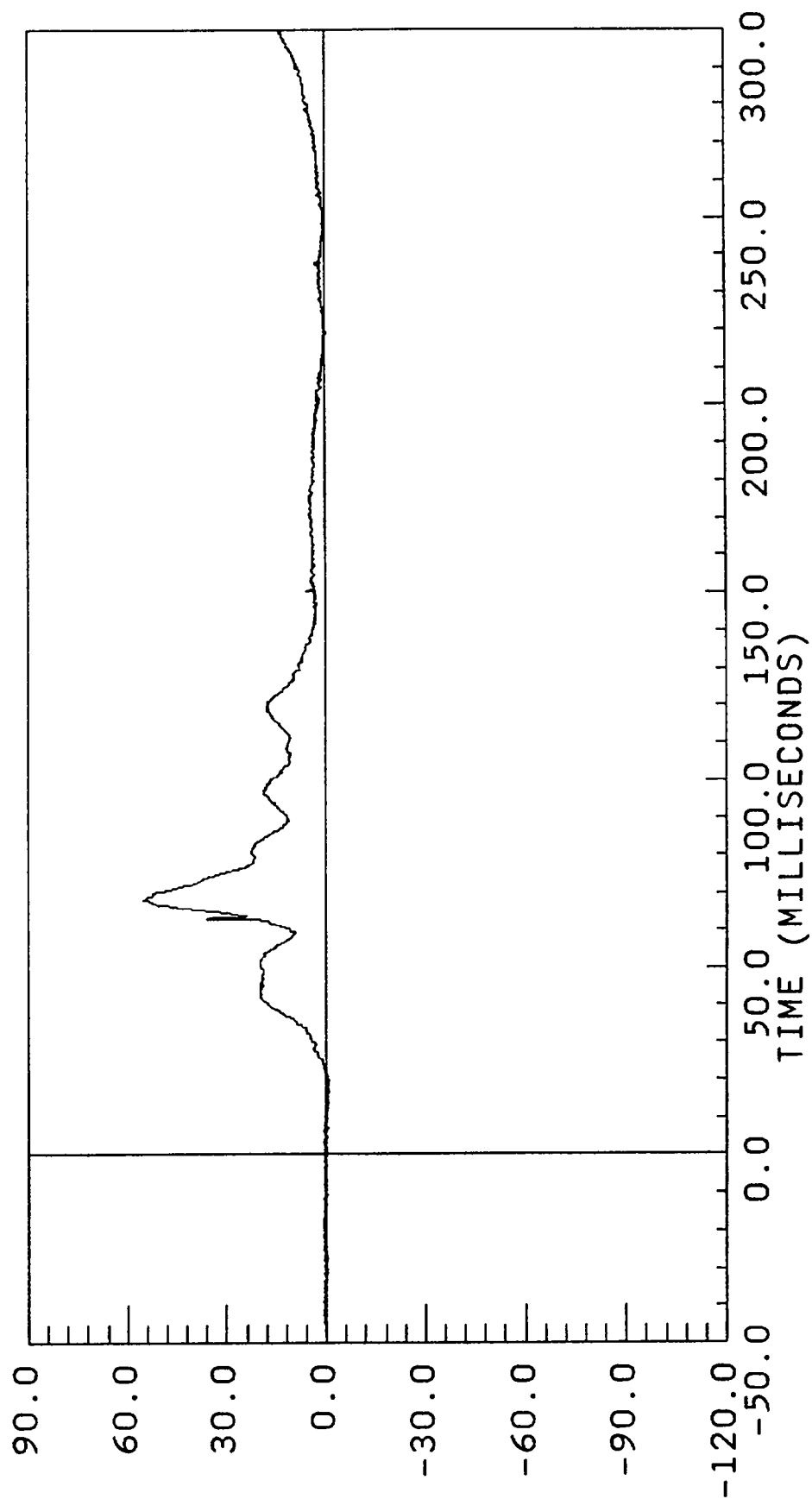
ZL AXIS

YMIN = -1.117200 at 7.050000

YMAX = 55.22700 at 68.32500

OHZ

FILTER CUTOFF:

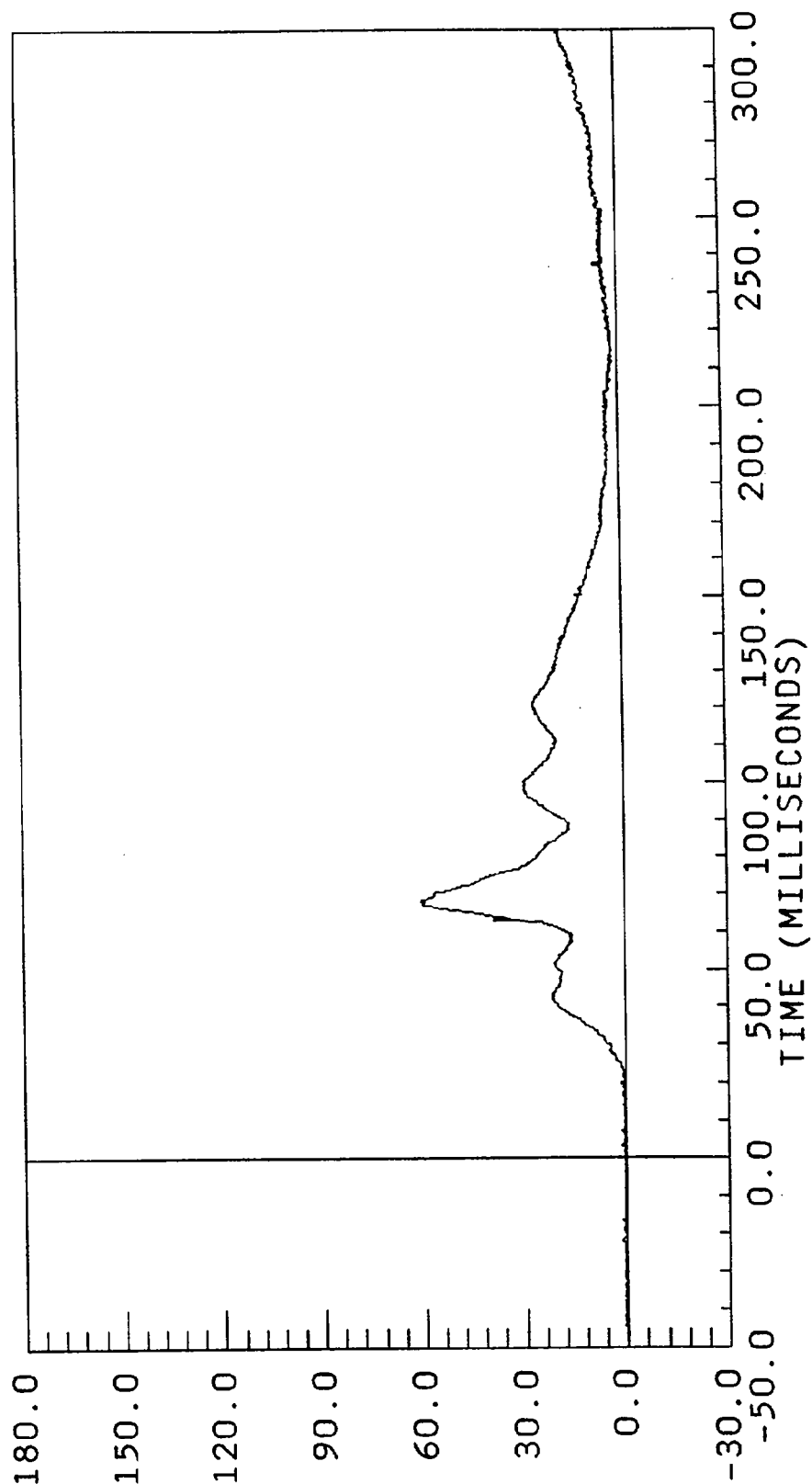


ACCELERATION * G, S *

HRES943-2.DAT

0.00 mph

POS#2 HEAD RS AXIS
NONSTANDARD YMIN = 0.441731 at -43.50000
FILTER CUTOFF: 0Hz YMAX = 60.67573 at 68.32500

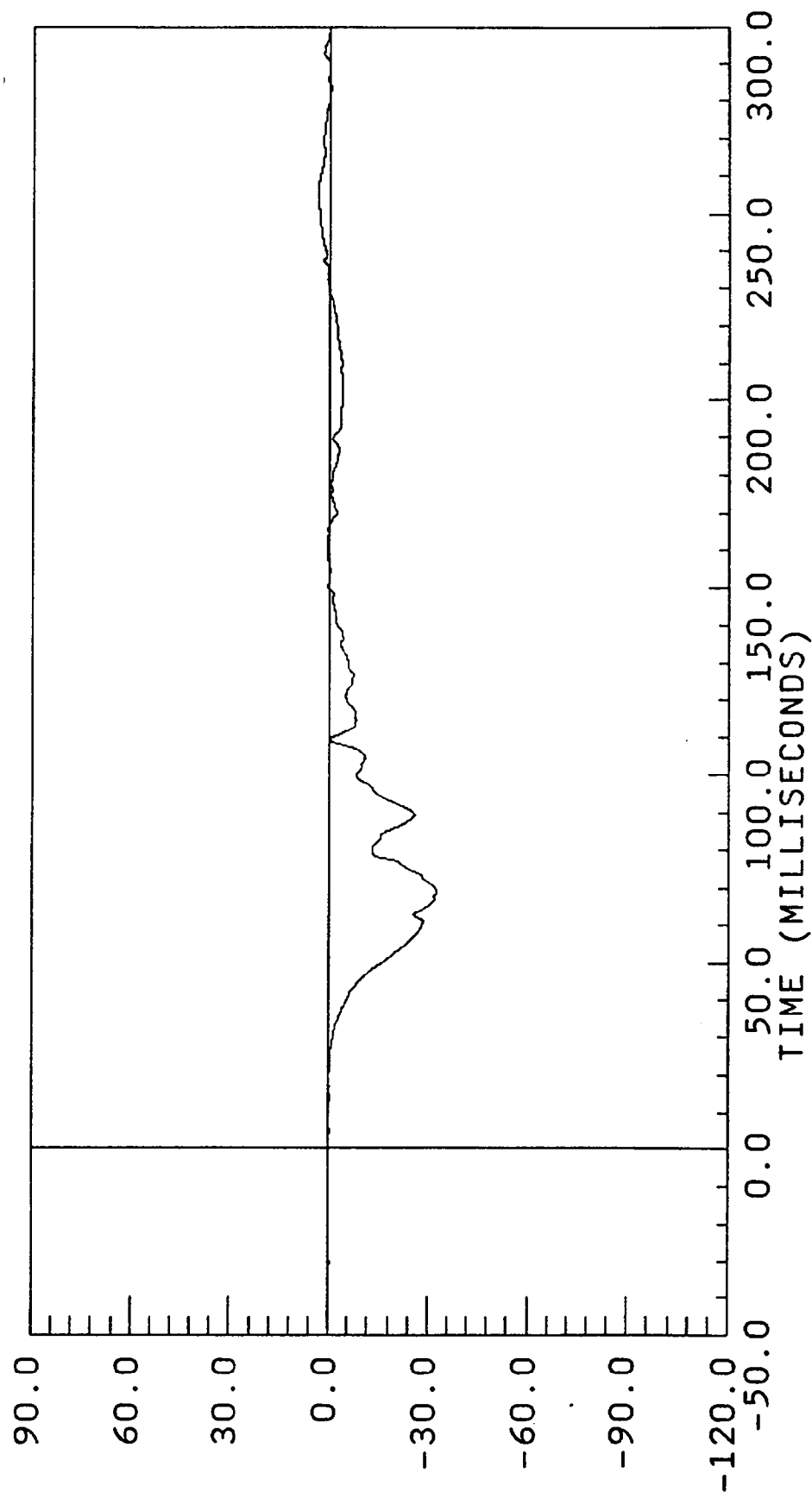


ACCELERATION * G, S *

29.40 mph

POS#2 CHEST X
 FILTERED
 FILTER CUTOFF: 300HZ

XL AXIS
 YMIN = -32.46915 at 68.77500
 YMAX = 3.741338 at 252.9000



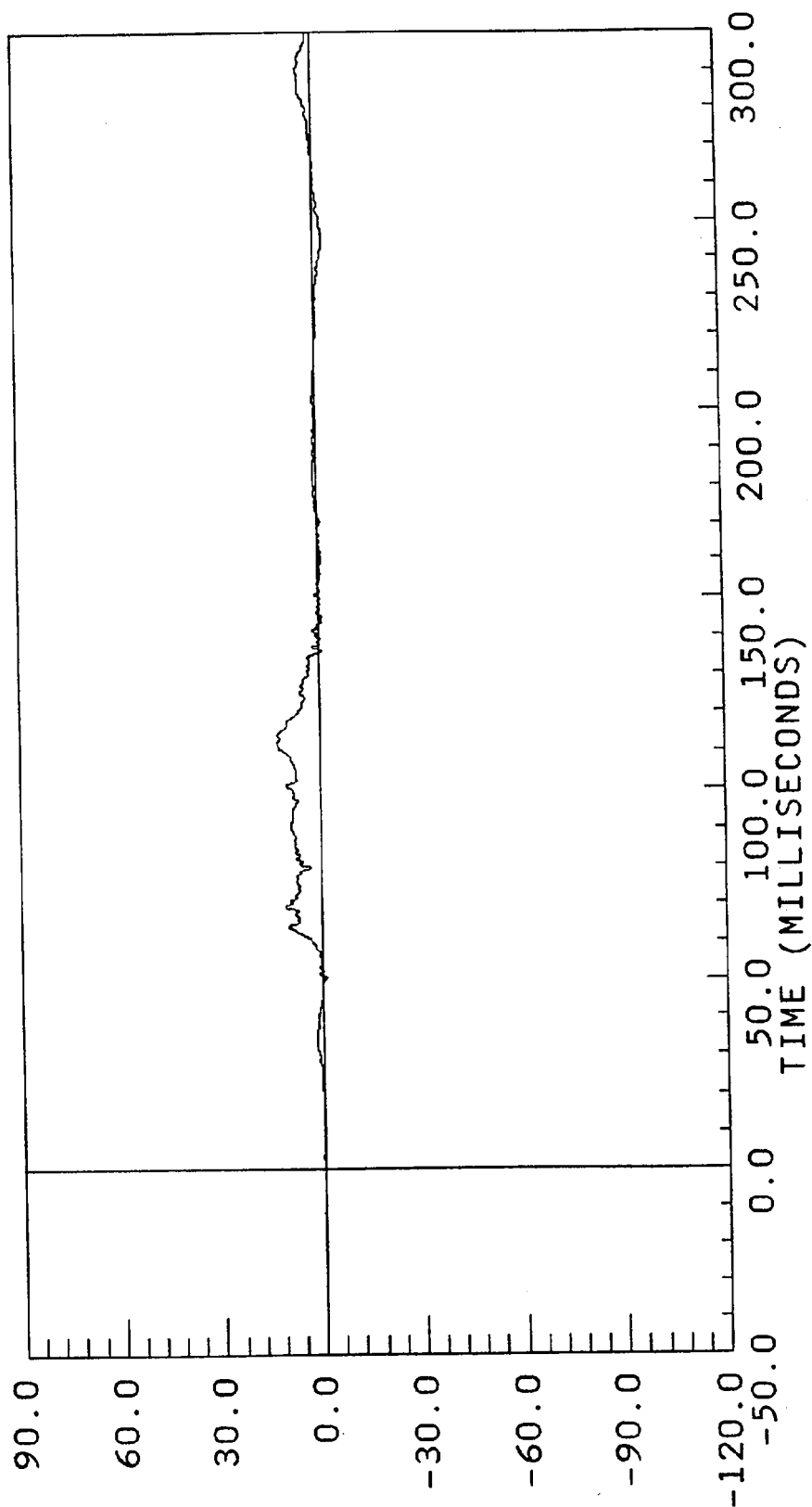
ACCELERATION * G, S *

BW943-15.DAT

0.00 mph

POS#2 CHEST Y
FILTERED
FILTER CUTOFF: 300HZ

YL AXIS
YMIN = -2.427243 at 245.4000
YMAX = 13.06308 at 112.2000

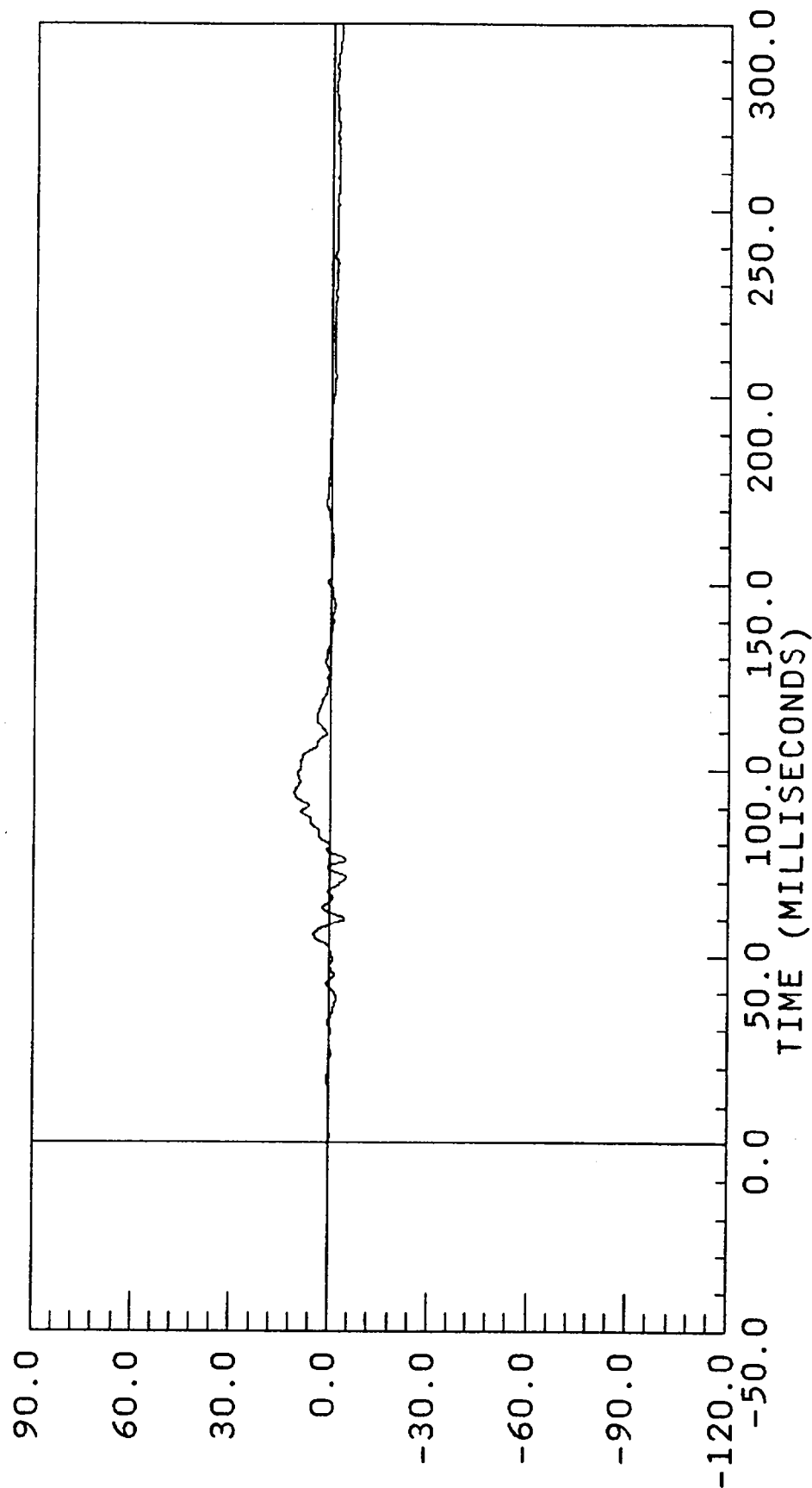


ACCELERATION * G, S *

0.00 mph

POS#2 CHEST Z
 FILTERED
 FILTER CUTOFF: 300Hz

ZL AXIS
 YMIN = -4.994341 at 75.90000
 YMAX = 11.11924 at 93.75000



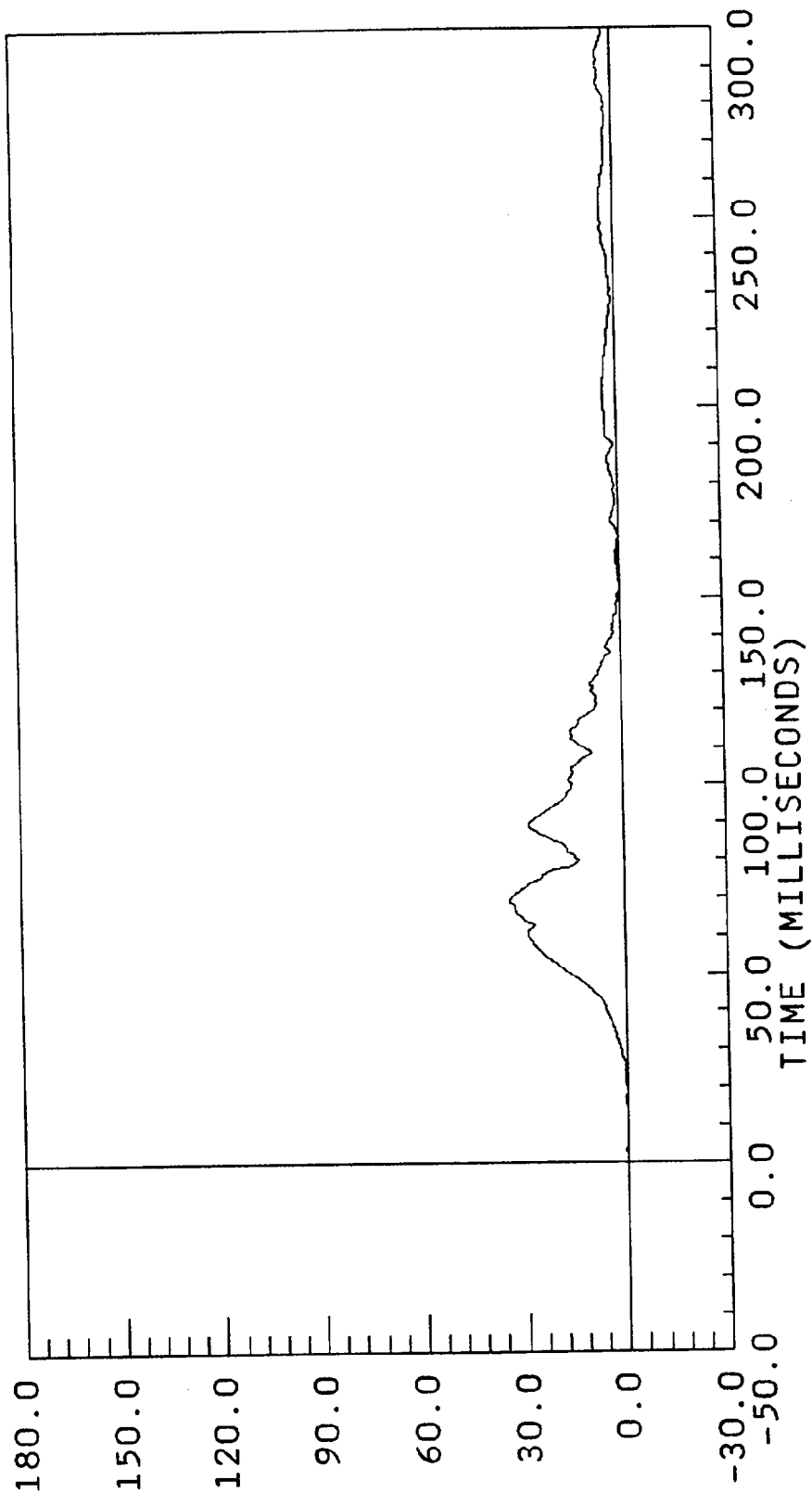
ACCELERATION * G, S *

CHST943-2.DAT

0.00 mph

POS#2 CHEST
COMPUTED
FILTER CUTOFF: 300HZ

RS AXIS
YMIN = 0.0455826 at -38.85000
YMAX = 34.30231 at 69.15000

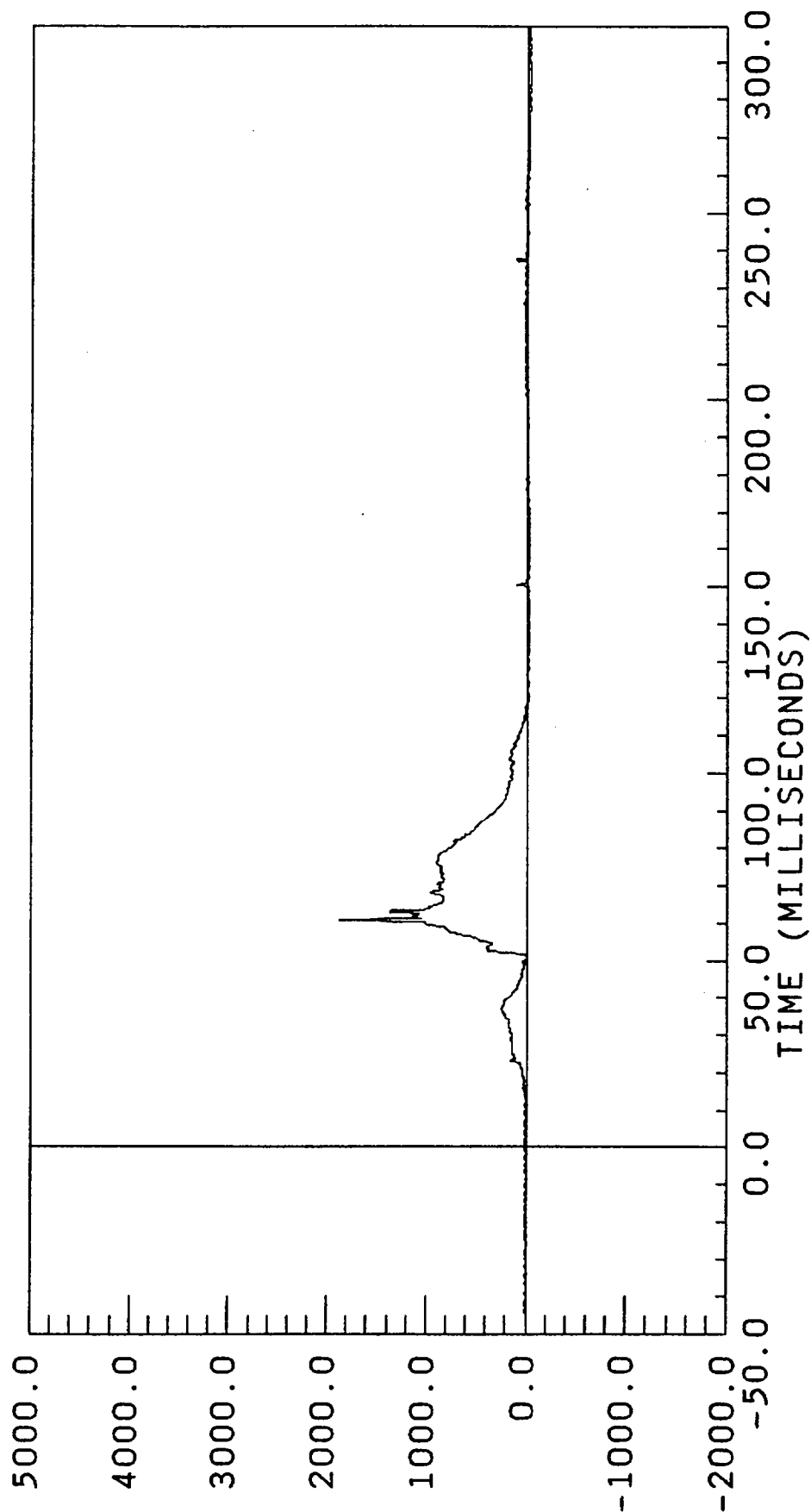


ACCELERATION * G, S *

0.00 mph

POS#2 LEFT FEMUR
 FILTERED
 FILTER CUTOFF: 1000HZ

NA AXIS
 YMIN = -50.39949 at 285.0000
 YMAX = 1884.601 at 60.82500

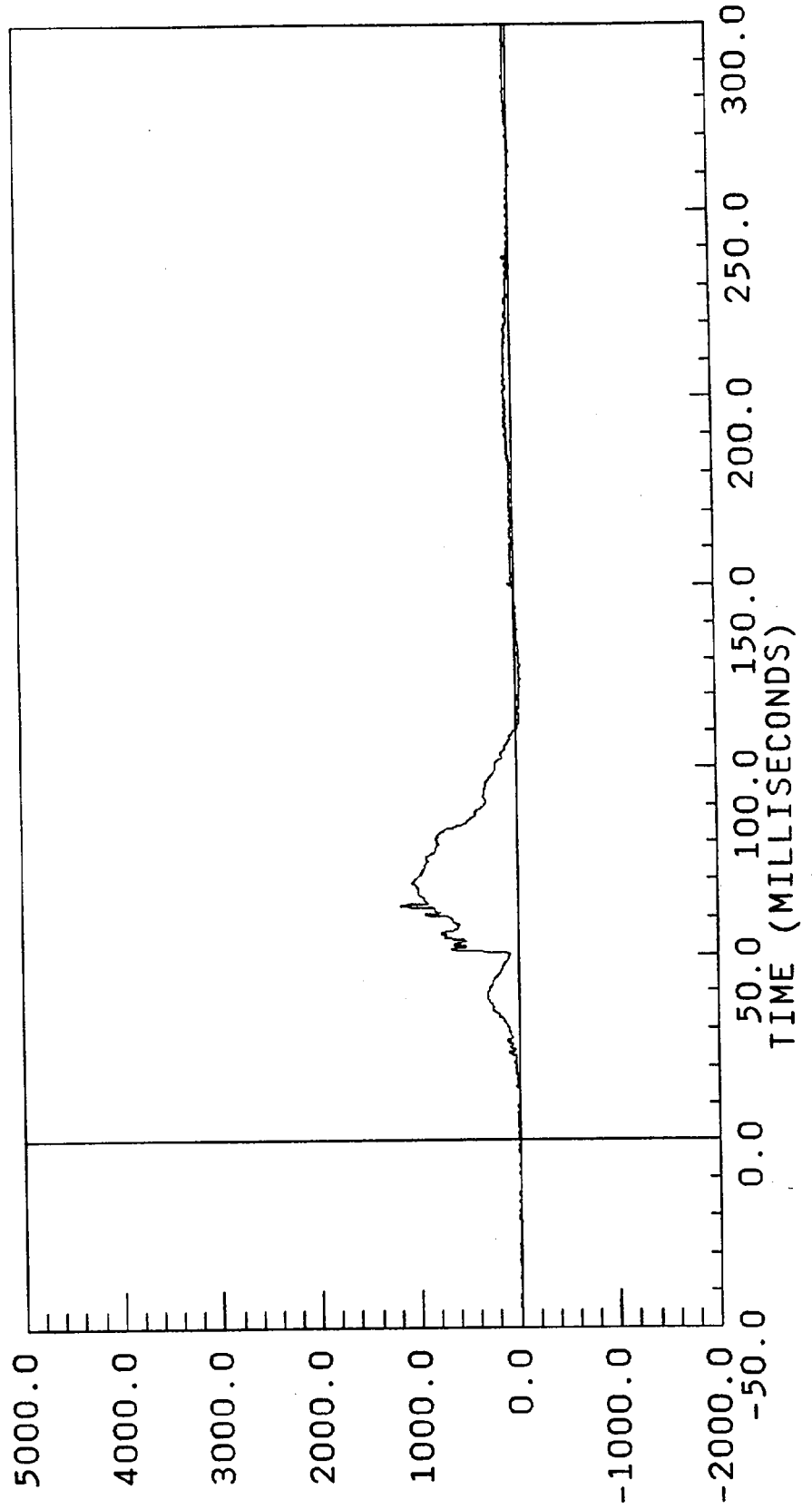


* L B S *

BW943-10.DAT

0.00 mph

POS#2 RIGHT FEMUR
FILTERED
FILTER CUTOFF: 1000HZ
NA AXIS
YMIN = -58.22579 at 128.1750
YMAX = 1174.961 at 63.00000



FORCE * LBS *

Appendix C

VEHICLE OWNERS MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

Using Safety Restraints Properly

Safety Belts

Safety belts help protect you and your passengers in case of a collision. In most states, the law requires their use. We strongly recommend that you use them every time you travel in your vehicle.

Warning: Always drive and ride with your seat back upright and the lap belt snug across the hips to reduce the risk of serious injury to the abdomen or neck that could be caused by sliding under the safety belts in a collision.

Safety belts provide best restraint when:

- ☐ the seat back is upright
- ☐ the occupant is sitting upright (not slouched)
- ☐ the lap belt is snug and low on the hips
- ☐ the shoulder belt is snug against the chest
- ☐ the knees are straight forward

22 Pushing

For your safety, your vehicle has different types of safety belts:

- ☐ Rear lap and shoulder belts — for people who sit next to the side windows in the rear seats.
- ☐ Lap and shoulder belts (Canadian active belts) — for people who sit next to the side windows in either the front or rear seats.
- ☐ Lap belts — for people who use the middle seat in the back seat.
- ☐ Manual front lap and shoulder belts (Canadian vehicles only) — for people who sit in the front seat.
- ☐ Motorized passive restraint (U.S. only) — an automatic shoulder belt for people who sit in the front seat.
- ☐ Manual front lap belts (U.S. only) — for people who sit in the front seat and have an automatic shoulder belt.

See the following sections for directions on how to properly use these safety belts. Also see *Safety restraints for children* in this chapter for special instructions about using safety belts for children.

Warning: Make sure that you and your passengers, including pregnant women, wear safety belts. Be sure that lap belts fit snugly and as low as possible around the hips. Do not wear them around the waist. If safety belts are not used properly, the chances of you or your passengers being injured in a collision greatly increase.

Safety Belts 23

Warning: Use the shoulder belt on the outside shoulder only. Never wear the shoulder belt under the arm. Never swing it around your neck over the inside shoulder. Never use a single belt for more than one person. Failure to follow these precautions could increase the chance and/or severity of injury in an accident.

Do not allow people to ride in the cargo area of your vehicle. People who are not riding in a seat with a fastened safety belt are much more likely to be injured if you have a collision.

Never let a passenger hold a child on his or her lap while the vehicle is moving. The passenger cannot protect the child from injury in a collision.

Never use a single belt for more than one person or across seating positions. This greatly increases the chance that one or both of the people will be injured in a collision. Each seating position in your vehicle has a specific safety belt assembly which is made up of one buckle and one tongue. Each assembly is designed to be used as a pair.

Warning: Be sure to lock all doors before you drive away. This will lessen the risk of your being thrown from the vehicle in a collision.

Safety Belt Maintenance

Also, check the safety belt systems periodically to make sure that they work properly and are not damaged.

Warning: All safety belt assemblies including retractors and attaching hardware should be inspected after any collision. Ford recommends that all safety belt assemblies used during a collision be replaced unless the collision was minor and a qualified technician finds that the belts do not show damage and continue to operate properly. Safety belt assemblies not in use during a collision should also be inspected and replaced if either damage or improper operation is noted.

Combination Front Lap and Shoulder Belts (Canadian Models Only) and Combination Rear Lap and Shoulder Belts (All U.S. and Canadian Models)

While your vehicle is in motion, the front and rear combination lap and shoulder belts adjust to your movement. However, if you brake hard, corner hard or if your vehicle receives an impact of 5 mph (8 km/h) or more, the lap and shoulder belt locks and prevents you from moving.

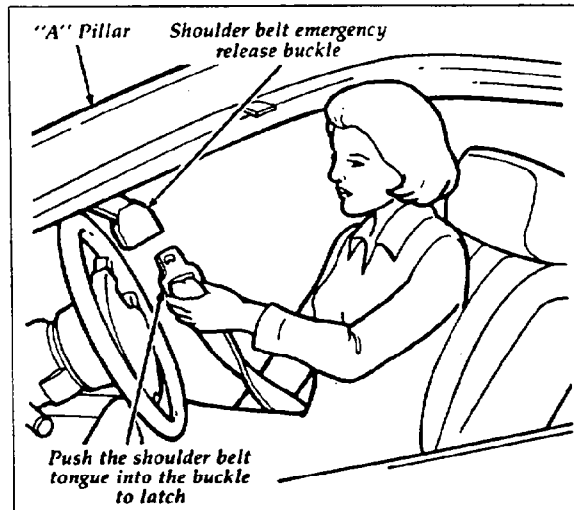
After you get into your vehicle, close the door and lock it. Then adjust the seat to the position that suits you best.

Motorized Passive Restraint System (Not Available On Models Sold in Canada)

The automatic passive shoulder belt restraint system operates electrically. The automatic shoulder belt, in conjunction with the manual lap belt, and knee bolsters, help provide added restraint for the front seat occupants.

Warning: The lap safety belt is to be manually buckled by the driver/passenger and should always be worn with the shoulder belt. Be sure the lap belt is on your hips as low as possible.

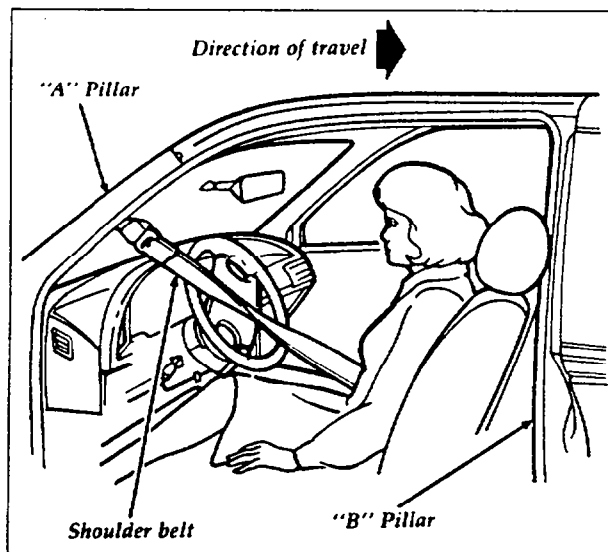
After entering the vehicle and closing the door, check to ensure the shoulder belt is latched to the emergency release buckle.



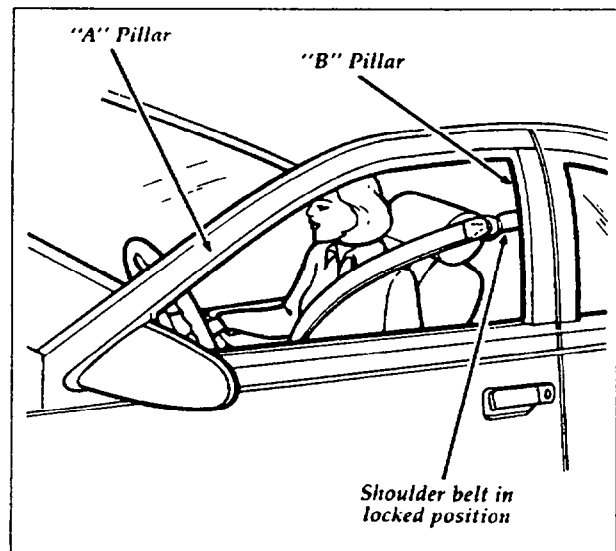
Fastening the shoulder belt to the emergency release buckle

To latch the shoulder belt to the emergency release buckle at the "A" pillar, pull the shoulder belt from the retractor between the seat and console, and buckle it to the emergency release buckle.

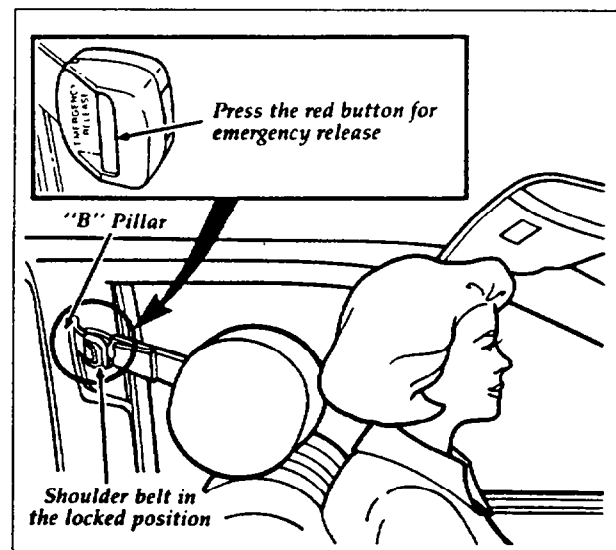
Insert the ignition key and turn it to the ON position. A motor will slide the shoulder belt along its track starting at the front "A" pillar and moving rearward to its locked position at the "B" pillar.



Shoulder belt movement



Shoulder belt in locked position



Shoulder belt in locked position

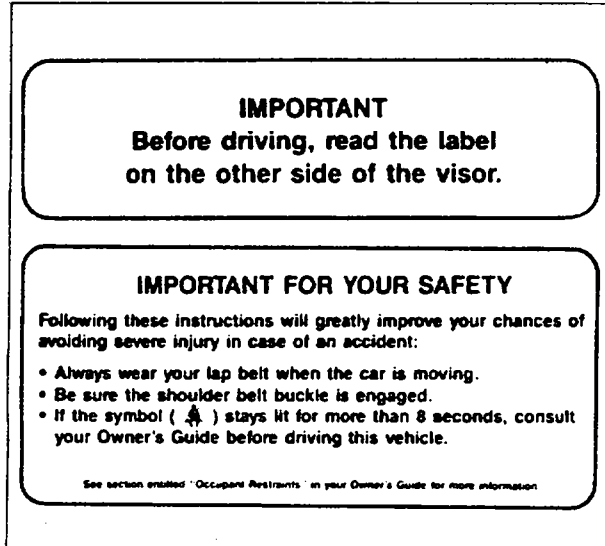
The safety belt warning indicator lamp in the instrument cluster will illuminate four (4) to eight (8) seconds. In the unlikely event the shoulder belt should stall before it reaches the "B" pillar, the indicator lamp will remain illuminated and the chime will be heard after nine (9) seconds until the shoulder belt is in its locked position at the "B" pillar. There will be a short delay between the lap belt usage warning chime and the shoulder belt warning chime coming on if the shoulder belt stalls before reaching the "B" pillar lock position. If only the indicator lamp remains illuminated, check to ensure both shoulder belts are latched to the emergency release buckle. If the indicator lamp remains illuminated and the chime remains ON with both front seat shoulder belts latched to the emergency release buckles, refer to the *Manual Override System* in this section before driving the vehicle.

The shoulder belt will automatically adjust itself to allow for comfortable wear and freedom of movement by the occupant. It will lock tight only on extremely hard braking, or hard cornering or impacts of approximately 5 mph (8 km/h) or more.

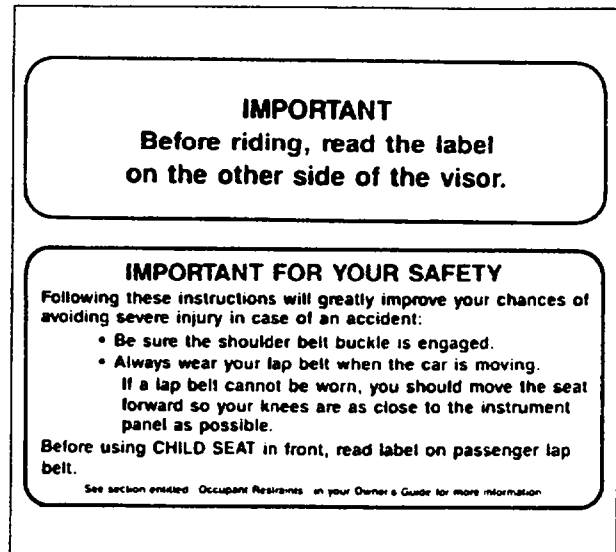
Warning: Use the shoulder belt on the outside shoulder only. Never wear the shoulder belt under the arm. Never swing it around your neck over the inside shoulder. Never use a single belt for more than one person. Failure to follow these precautions could increase the chance and/or severity of injury in an accident. When the ignition is in any position and the door is opened, the shoulder belt will move forward to the "A" pillar. This will allow ample room for exit from the vehicle by the driver or passenger. DO NOT use the belt as an assist handle when entering or exiting the vehicle. The door should not be opened while the vehicle is in motion.

Important For Your Safety

Before driving the vehicle, read the label on the back of the sun visor.



Labels located on the driver's sun visor



Labels located on the passenger's sun visor

Door Ajar Indicator Lamp

If the door is ajar, the shoulder belt will remain in the forward position at the "A" pillar. The door ajar indicator lamp located in the instrument panel will illuminate until the door is fully closed.