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

**VOLKSWAGEN D.O. BRASIL S.A.
1990 VOLKSWAGEN FOX
2-DOOR COUPE**

NHTSA NUMBER: CL5801

CALSPAN TEST NUMBER: 7804-10

March 21, 1990

CALSPAN CORPORATION
ADVANCED TECHNOLOGY CENTER
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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.
Room No. 6115 (NEF-31)
Washington, DC 20590

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16. Abstract A 30 mph vehicle safety compliance test was conducted on a 1990 Volkswagen Fox 2-Door Coupe. This test was performed at the Calspan Advanced Technology Center in Buffalo, New York on March 21, 1990. 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 29.6 mph. The ambient temperature at the impact face was 37°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 and passenger automatic torso belt. The manual lap belts were not used in 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 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 Volkswagen Fox 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.

Section 2

SUMMARY OF TEST NUMBER CL5803

A frontal barrier was impacted by a 1990 Volkswagen Fox 2-Door Coupe at a velocity of 29.6 mph. The test was performed at the Calspan Corporation Advanced Technology Center on March 21, 1990. 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.

Accelerometer pack #9, located on the firewall, contained a 60 Hz interference and was not included in this test report. Accelerometer passed pre-test inspection.

The driver's HIC was 572. The maximum chest deceleration over 3 milliseconds was 38.2 g's. The maximum force on the driver's left femur was 1350 pounds and 1310 pounds on the right femur.

The right front passenger's HIC was 305. The maximum chest deceleration over 3 milliseconds was 36.2 g's and loads were 810 and 1226 pounds on the left and right femurs respectively.

Table 1
CRASH TEST SUMMARY

Vehicle NHTSA No.: CL5801 Test Mode: 30 mph Frontal Barrier

Test Date.: March 21, 1990 Time: 11:45 Temperature: 37°F

Vehicle Make/Model/Body Style: 1990 Volkswagen Fox 2-Door Coupe

Vehicle Test Weight: 2660 lbs.

Vehicle/Barrier Impact Angle: 0°

Impact Velocity: 29.6 mph

Maximum Static Crush: 16.1"

Vehicle Rebound: 11.4"

DUMMIES:

DRIVER

PASSENGER

Type:

Part 572

Part 572

Restraint System:

Automatic Torso

Automatic Torso

Belt

Belt

Number of Data Channels: 27

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:

steering hub

no contact

Abdomen

no contact

no contact

Chest

lower steering wheel rim

no contact

Knees

dash panel

dash panel

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATATEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 1990 Volkswagen Fox 2-Door Sedan
 NHTSA No. CL5801 ; VIN: 9BWBA2305LP005659 ; Color: Silver
 Engine Data: 4 cylinders; 109 CID; 1.8 Litres; - cc
 Placement X Longitudinal or In-Line; - Transverse or Lateral
 Transmission Data: 4 speeds; X Manual; - Automatic; - Overdrive
 Final Drive: - Rear Wheel Drive; X Front Wheel Drive; - Four Wheel Drive
 Major Options: - A/C; - Pwr. Strg.; X Pwr. Brakes; - Pwr. Windows
- Power Door Locks
 Date Received: 12-05-89 ; Odometer Reading 50 miles
 Selling Dealer: Lockport Volkswagen, Inc.
 & Address 6145 South Transit Road, Lockport, NY 14094

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: Volkswagen D.O. Brasil S.A.
 Date of Manufacture: 9-89
 GVWR: 2886 lbs.; GAWR: 1520 lbs. FRONT; 1432 lbs. REAR

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load: 26 psi FRONT
32 psi REAR
 Recommended Tire Size: 155SR13 or 175/70SR13 Load Range: -
 Recommended Cold Tire Pressure: 26 psi FRONT; 32 psi REAR
 Size of Tires on Test Vehicle: 155R13 ; Manufacturer: Pirelli
 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) = 714 lbs.
 No. of Occupants x 150 lbs. = 600 lbs.
 Rated Cargo/Luggage Weight (RCLW) = 114 lbs. (Difference)

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

Right Front = 670 lbs. Right Rear = 410 lbs.
 Left Front = 670 lbs. Left Rear = 440 lbs.
 TOTAL FRONT = 1340 lbs. TOTAL REAR = 850 lbs.
 % of Total Vehicle Weight = 61 % of Total Weight = 39
 TOTAL DELIVERED WEIGHT = 2190 lbs.

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATA (cont.)

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight	=	<u>2190</u>	lbs.
Rated Cargo/Luggage Weight (RCLW)	=	<u>114</u>	lbs.
Weight of 2 P.572 Dummies @ 164 ea.	=	<u>328</u>	lbs.
TARGET TEST WEIGHT	=	<u>2632</u>	lbs. (sum)

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

Right Front =	<u>730</u>	lbs.	Right Rear =	<u>620</u>	lbs.
Left Front =	<u>730</u>	lbs.	Left Rear =	<u>580</u>	lbs.
TOTAL FRONT =	<u>1460</u>	lbs.	TOTAL REAR =	<u>1200</u>	lbs.
% of Total Weight =	<u>55</u>	%	% of Total Weight =	<u>45</u>	%
TOTAL TEST WEIGHT =	<u>2660</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>25.1</u>	LF <u>24.8</u>	RR <u>24.9</u>	LR <u>24.7</u>
FULLY LOADED:	RF <u>23.9</u>	LF <u>23.7</u>	RR <u>23.2</u>	LR <u>23.0</u>
AS TESTED:	RF <u>24.3</u>	LF <u>24.8</u>	RR <u>23.4</u>	LR <u>23.6</u>
Vehicle's Wheel Base:	<u>93.1</u>	in.		
Location of Vehicle's C.G.:	<u>42.0 inches rearward from front wheel center</u>			

FUEL SYSTEM DATA:

Fuel System Capacity From Owner's Manual =	<u>12.4</u>	gallons
Usable Capacity Figure Furnished by COTR =	<u>12.4</u>	gallons
Test Volume Range (92 to 94% of Usable Capacity) =	<u>11.4</u>	to <u>11.7</u> gallons
ACTUAL TEST VOLUME =	<u>11.5</u>	gallons (with entire fuel system filled)

Table 3

POST IMPACT DATATYPE OF TEST:

Type of Test: Frontal Impact Impact Angle: 0°
 Test Date: March 21, 1990 Time: 11:45 Temperature: 37°F
 Vehicle NHTSA No.: CL5801
 Required Impact Velocity Range: 28.9 to 29.9 mph

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

Trap No. 1 = 29.6 mph; Trap No. 2 = 29.6 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 = 161.8 "; C/L = 163.2 "; Left = 161.8 "
 Post-Test Right = 145.7 "; C/L = 147.6 "; Left = 148.0 "
 Crush Right = 16.1 "; C/L = 15.6 "; Left = 13.6 "
 AVERAGE = 15.1 inches

VEHICLE REBOUND: (From rigid barrier only.)

Distance from front of test vehicle to impact point:

Right = 12.8 "; C/L = 10.7 "; Left = 10.6 "
 AVERAGE = 11.4 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

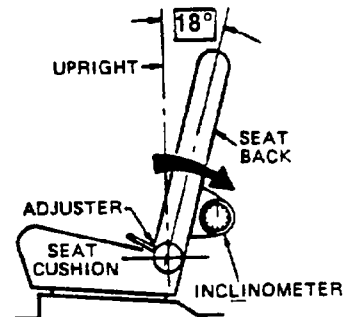
Figure 1

TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year: 1990 Vehicle Model: Volkswagen Fox 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 18°

Measurement instructions: Measurement with a three-dimensional H-point machine as per SAE J 826.

Seat back angle for passenger's seat 18°

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: Seat placed in mid-position 7th detent out of 13 total detents.

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 12.4 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.: CL5801 Vehicle: 1990 Volkswagen Fox 2-Door Coupe

SEAT TYPE:

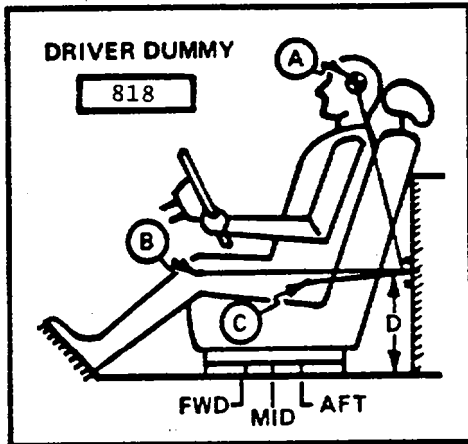
 Bench
 X Bucket
 Split Bench

ADJUSTER TYPE:

 X Manual
 Power

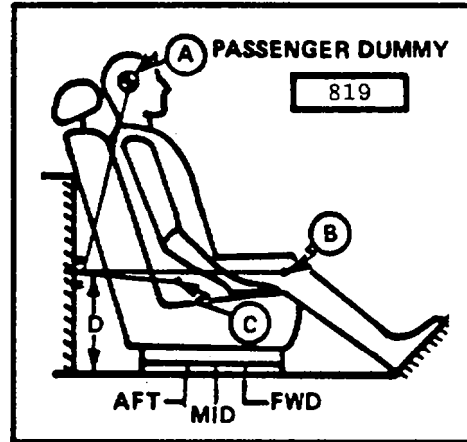
SEAT BACK TYPE:

 Fixed
 X Adjustable Reclining



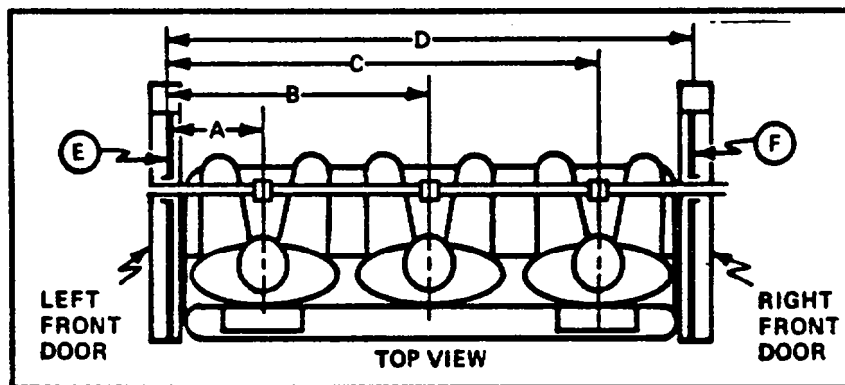
MEASUREMENT LOCATION

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



A = 18.0 in. 35 Degrees
 B = 31.8 in. 103 Degrees
 C = 19.1 in. 130 Degrees
 D = 18.3 in.

A = 18.3 in. 33 Degrees
 B = 31.7 in. 106 Degrees
 C = 18.8 in. 128 Degrees
 D = 18.3 in.



S/N 818

DUMMY ID

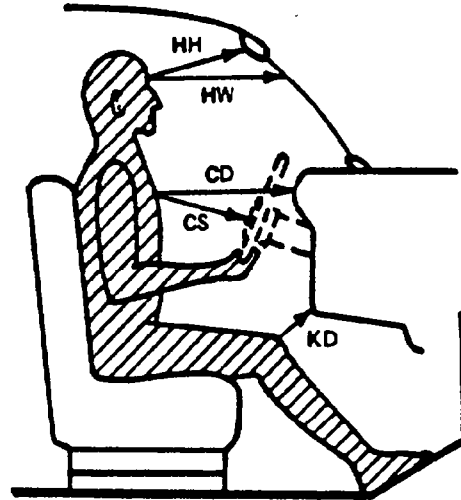
S/N 819

A = Left Door to Driver Centerline 10.7 in.
 B = Left Door to Center Passenger Centerline in.
 C = Left Door to Right Passenger Centerline 37.2 in.
 D = Left Door to Right Door 47.5 in.
 E,F = Window Glass Height (Right and Left Must Be Equal) 10.5 in.

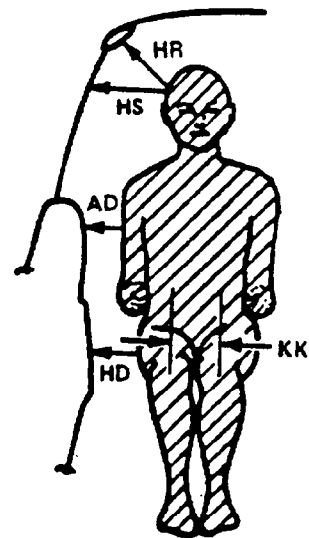
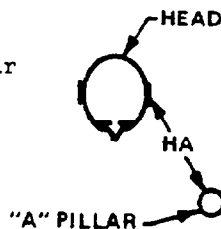
Figure 3

OCCUPANT CLEARANCE DIMENSIONS

	DRIVER	PASSENGER
HH	14.8	14.6
HW	17.9	17.8
CD	19.9	22.2
CS	15.3	-
KDL	4.3	5.3
KDR	4.9	5.2
SA	See Note	See Note
TA	18°	19°



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

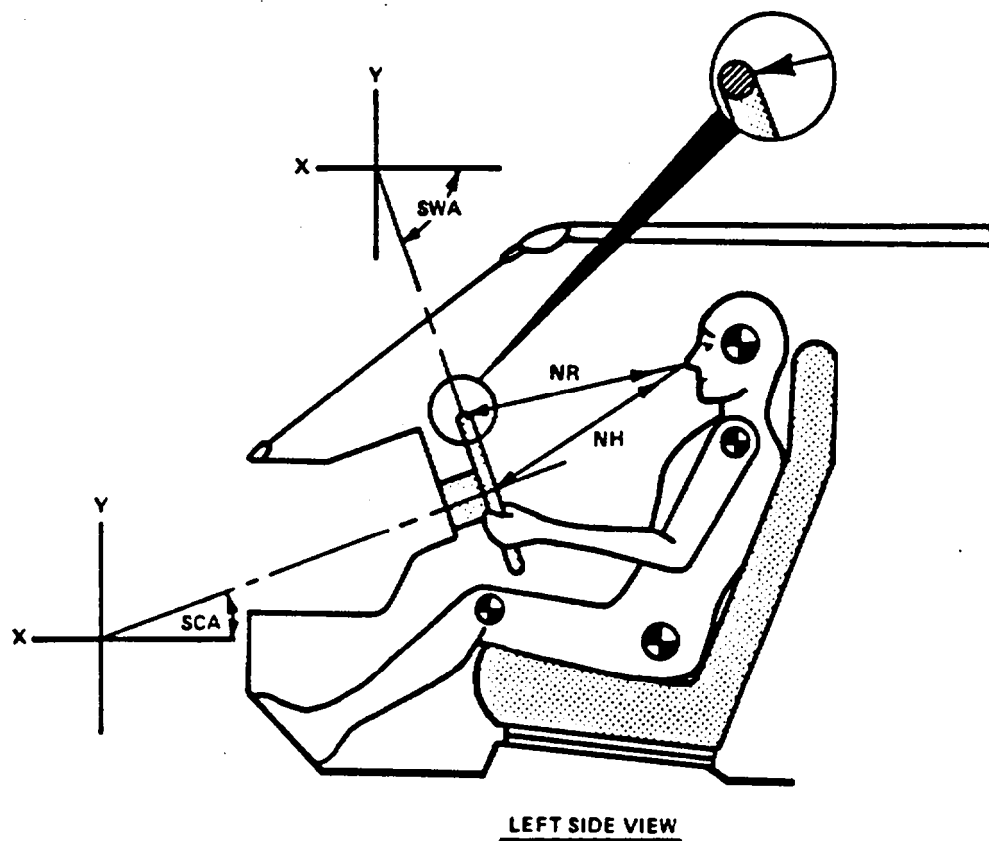


	DRIVER	PASSENGER
HR	5.5	5.0
HS	7.3	7.5
AD	3.4	3.5
HD	6.8	6.2
KK	10.2	8.3
HA	18.2	18.2

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

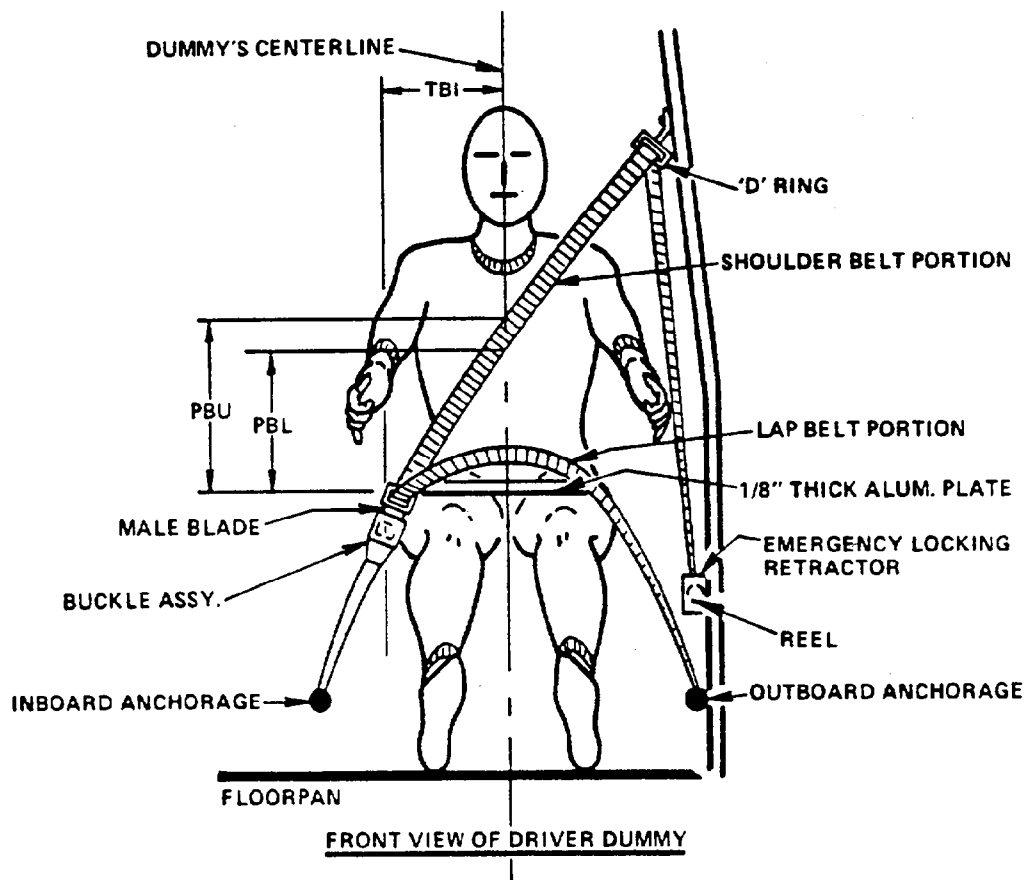
Figure 4

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	17.9	Inches
<u>NH</u>	-- Distance from tip of dummy's nose to center of steering column hub	18.7	Inches
<u>SCA</u>	-- Angle of steering column relative to the horizontal X axis	23.0	Degrees
<u>SWA</u>	-- Angle of steering wheel relative to the horizontal X axis	-67.0	Degrees

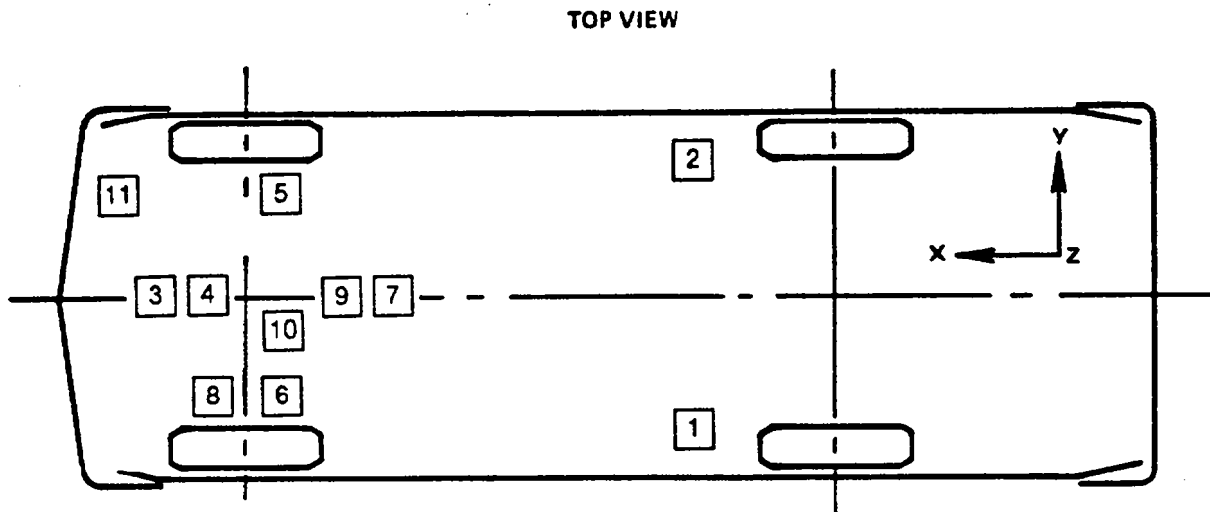
Figure 5
SEAT BELT POSITIONING DATA



	DRIVER DUMMY (inches)	PASSENGER DUMMY (inches)
<u>PBU</u> -- Top surface of alum. plate to upper edge	12.7	12.6
<u>PBL</u> -- Top surface of alum. plate to belt lower edge	9.4	9.3
<u>TBI</u> -- Distance from torso centerline to buckle	*	*

*Automatic torso belt used, no inboard 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 AT LEFT SIDE	PRE:	65.3	21.2	17.9				
		POST:	65.2	21.2	17.9				
	LONGITUDINAL ACCELERATION					2	136	-31	45
2	REAR SEAT X-MEMBER AT RIGHT SIDE	PRE:	65.1	-21.1	17.9				
		POST:	65.1	-21.1	17.9				
	LONGITUDINAL ACCELERATION					2	124	-32	41
3	TOP OF ENGINE BLOCK	PRE:	143.2	-7.5	31.7				
		POST:	139.8	-5.7	31.8				
	LONGITUDINAL ACCELERATION					8	28	-104	21
4	BOTTOM OF ENGINE	PRE:	146.7	-6.3	11.3				
		POST:	145.1	-5.7	10.9				
	LONGITUDINAL ACCELERATION					11	37	-102	15
5	BRAKE CALIPER AT RIGHT SIDE	PRE:	126.8	-20.4	19.3				
		POST:	125.5	-20.1	18.9				
	LONGITUDINAL ACCELERATION					11	32	-67	26
6	BRAKE CALIPER AT LEFT SIDE	PRE:	126.6	20.5	19.4				
		POST:	125.8	20.4	19.3				
	LONGITUDINAL ACCELERATION					14	39	-68	29
7	DASH PANEL	PRE:	103.9	-0.3	28.9				
		POST:	104.1	-0.3	28.4				
	LONGITUDINAL ACCELERATION					55	50	-89	58

*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:	131.5	24.5	33.2				
		POST:	130.1	21.2	33.3				
	LONGITUDINAL ACCELERATION					28	20	-64	13
9	FIREWALL	PRE:	128.3	2.6	34.4				
		POST:	126.7	1.1	33.8				
	LONGITUDINAL ACCELERATION					**	**	**	**
10	CRADLE FRAME	PRE:	124.7	9.7	8.4				
		POST:	123.9	9.3	8.2				
	LONGITUDINAL ACCELERATION					18	3	-51	52
11	RADIATOR-SUPPORT	PRE:	153.1	8.3	30.8				
		POST:	142.3	7.6	31.0				
	LONGITUDINAL ACCELERATION					192	20	-108	14

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

DISTANCE MEASUREMENTS IN INCHES

**Data contained a 60 Hz interference, accelerometer passed pre-test inspection.

Figure 7
CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information Shown on Table 5.

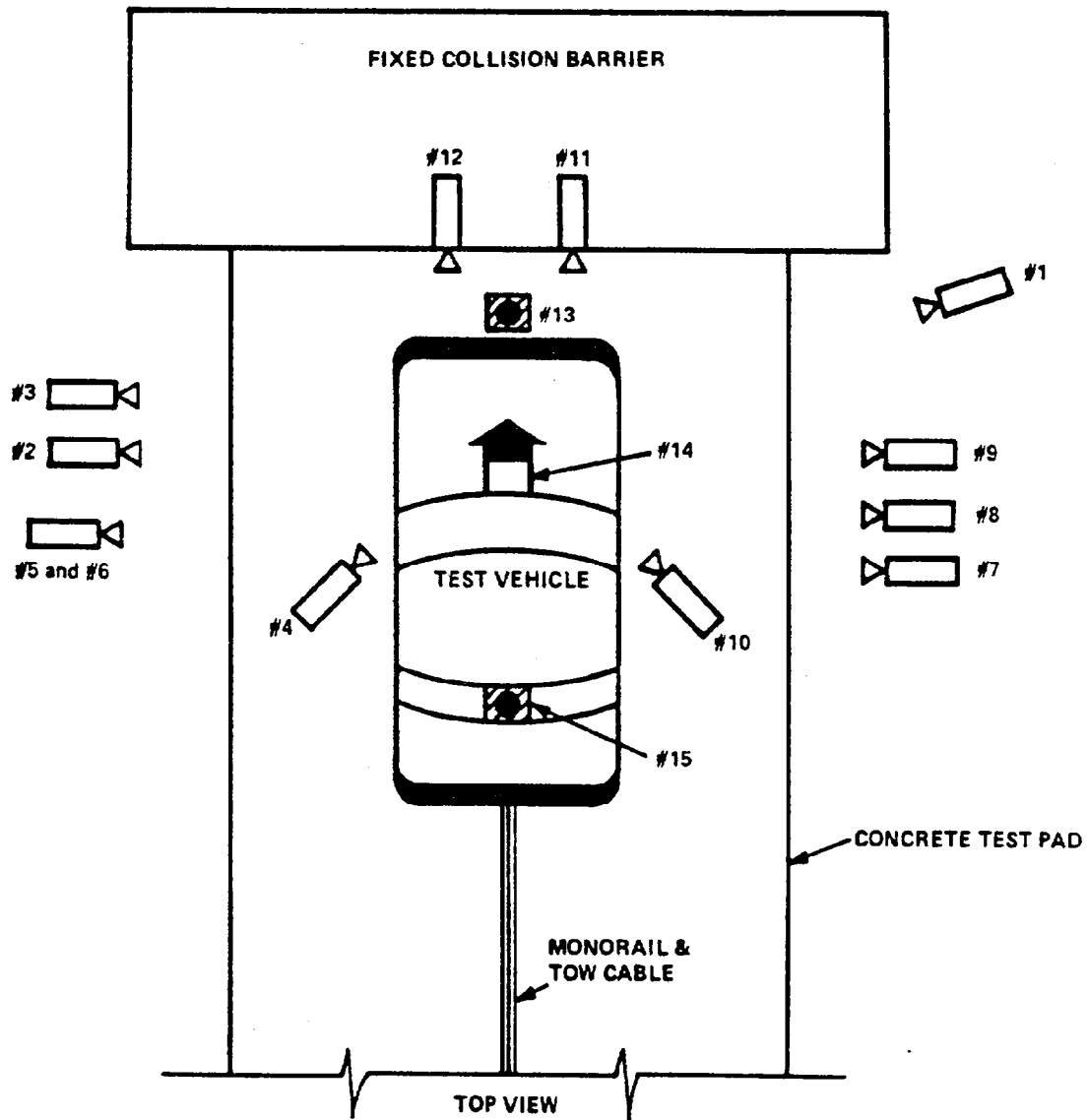


Table 5

HIGH-SPEED CAMERA LOCATIONS

Test No. CL5801

Vehicle: 1990 Volkswagen Fox 2-Door Coupe

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	218.0	62.0	41.0	-4.0	203.5	13	540
3	Left Side View	303.0	33.0	41.0	-3.0	288.5	25	540
4	Driver and Interior View	107.0	101.0	74.0	-19.0	-	13	760
5	Steering Column (Bottom)	274.0	76.0	48.0	-3.0	259.5	25	570
6	Steering Column (Top)	274.0	76.0	70.0	-10.0	259.5	25	570
7	Overall Right Side	216.0	73.0	42.0	-3.0	201.5	13	790
8	Right Side View	294.0	49.0	41.0	-2.0	279.5	25	755
9	Right Passenger View	293.0	65.0	56.0	-4.0	278.5	35	680
10	Passenger and Interior View	103.0	103.0	75.0	-15.0	-	13	610
11	Passenger Front View	24.5	18.0	75.0	-50.0	-	13	600
12	Driver Front View	21.5	16.5	74.5	-47.0	-	13	535
13	Windshield View	0.0	0.0	130.0	-49.0	-	25	505
14	Pit View of Engine	0.0	36.0	-120.0	90.0	-	13	810
15	Pit View of Fuel Tank	0.0	96.	-120.0	90.0	-	13	690

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

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Figure 9
TEST VEHICLE MEASUREMENTS

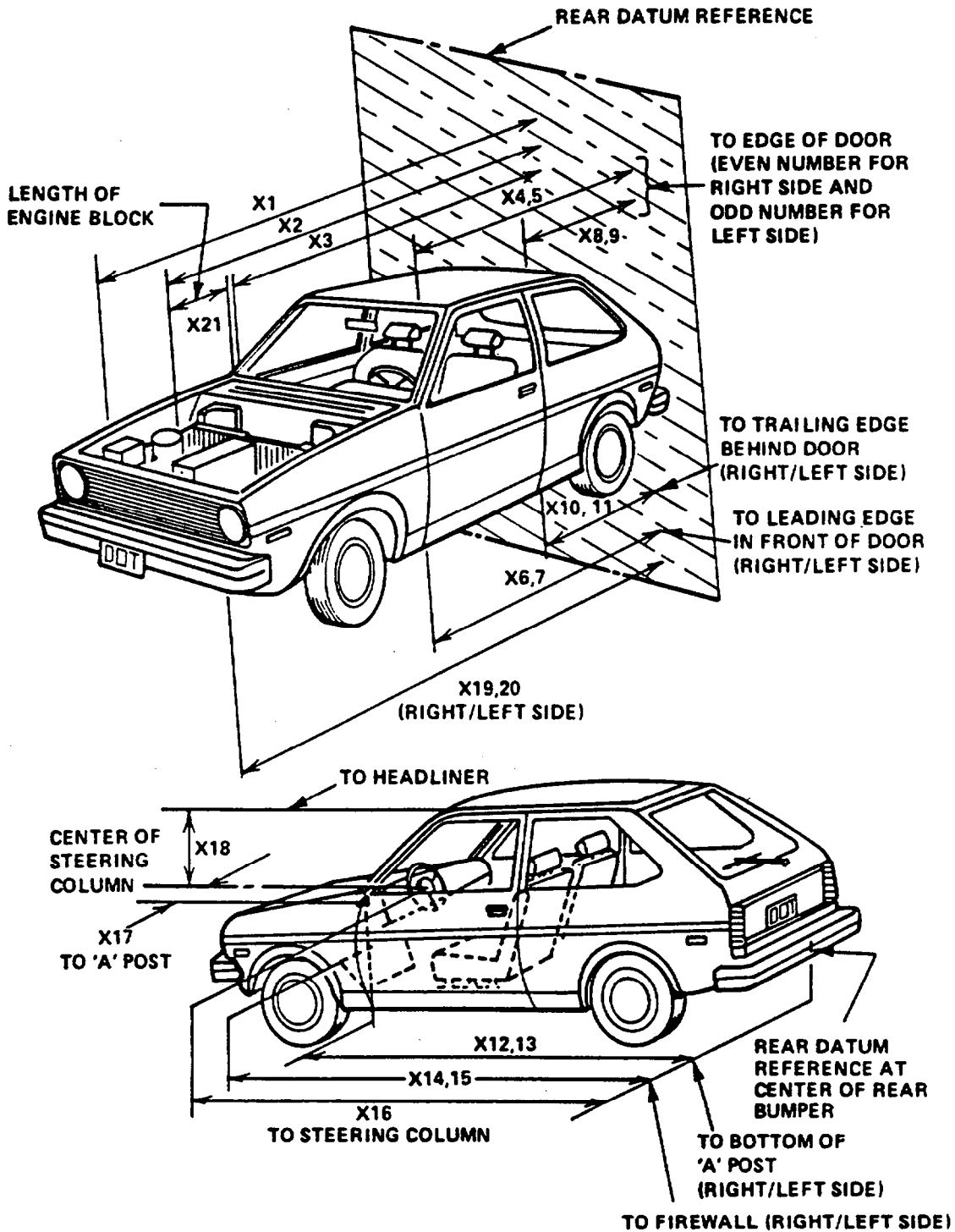


Table 6

VEHICLE MEASUREMENTS

No.		All Dimensions in Inches		
		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	163.2	147.6	15.6
X2	Rear Surface of Vehicle to Front of Engine	151.2	143.3	7.9
X3	Rear Surface of Vehicle to Firewall	126.9	123.0	3.9
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	113.2	113.0	-0.2
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	112.9	113.3	-0.4
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	112.3	111.5	0.8
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	111.9	112.0	-0.1
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	66.9	67.0	-0.1
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	66.9	67.4	-0.5
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	67.2	66.6	0.6
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	66.9	67.0	-0.1
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	112.3	111.5	0.8
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	111.9	112.2	0.7
X14	Rear Surface of Vehicle to Firewall, Right Side	113.4	113.2	0.2
X15	Rear Surface of Vehicle to Firewall, Left Side	112.8	113.5	-0.7
X16	Rear Surface of Vehicle to Steering Column	97.8	97.0	0.8
X17	Center of Steering Column to "A" Post	16.4	16.8	-0.4
X18	Center of Steering Column to Headliner	16.2	13.9	2.3
X19	Rear Surface of Vehicle to Right Side of Front Bumper	161.8	145.7	16.1
X20	Rear Surface of Vehicle to Left Side of Front Bumper	161.8	148.0	13.6
X21	Length of Engine Block	18.0	18.0	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.: CL5801 Vehicle: 1990 Volkswagen Fox 2-Door Coupe

	MAXIMUM ACCELERATION (g's)							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R*
Dummy (1)	-56	-249	47	251	-39	-19	8	38.2
Dummy (2)	23	21	43	44	-36	21	16	36.2

	MAXIMUM FORCE - FEMUR LOAD (lbs.)	
	LEFT FEMUR	RIGHT FEMUR
Dummy (1)	1350	1310
Dummy (2)	810	1226

	HEAD INJURY CRITERIA**			
	HIC	36 millisecond Maximum		Avg. Acc. (g) t ₁ TO t ₂
		t ₁ (SEC)	t ₂ (SEC)	
Dummy (1)	572	.06180	.09780	47.9
Dummy (2)	305	.06135	.09735	37.3

*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

*The audible warning signal will come on only if driver does not fasten the automatic torso belt.

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.: CL5801

Make/Model: 1990 Volkswagen Fox

Date of Comfort/Convenience Check: March 19, 1990

Technician Performing Check: VMP

GVWR: 2886 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 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.

**Driver and passenger manual lap belts were not used for this test.

Table 10 (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 _____ NO X

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

Table 10 (cont.)

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 0.4" rubber and 0.3" metal trim along the entire outer windshield.

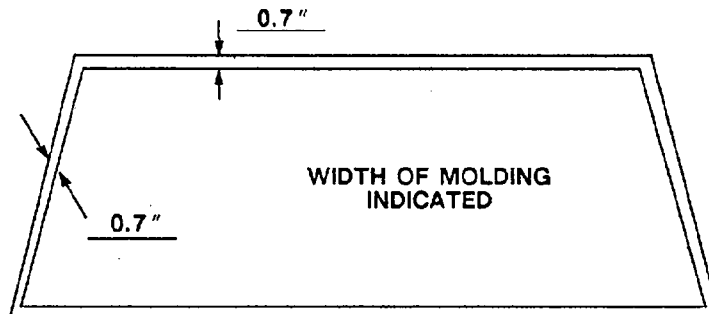
FMVSS 212 REQUIREMENTS:

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		PERCENT RETENTION
	PRE-TEST (in.)	POST-TEST (in.)	
RIGHT SIDE	72.8	72.8	100%
LEFT SIDE	72.8	72.8	100%
TOTAL	145.6	145.6	100%

AREA OF RETENTION FAILURE:



FAILURE DETAILS: None. FRONT VIEW

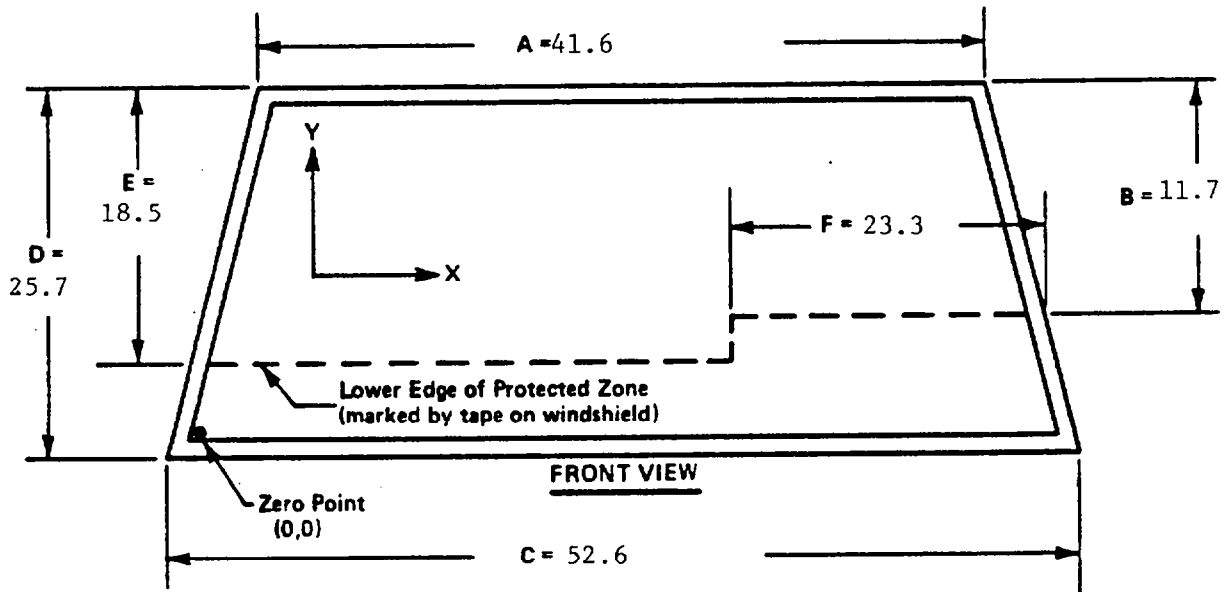
Figure 11

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

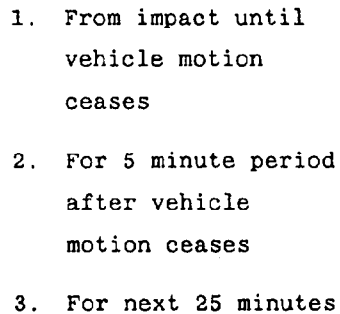
COORDINATES		
	X	Y
1.		
2.		
3.		
4.		

FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

TEST VEHICLE NHTSA NO.: CL5801 TEST DATE: March 21, 1990

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:



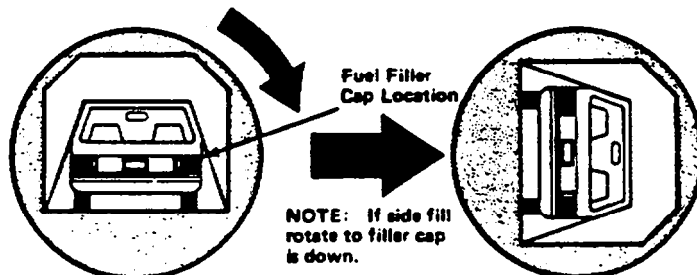
ACTUAL	MAX ALLOWED
0	1 oz.
0	5 oz.
0	1 oz./1 min.

None

Table 12`

FMVSS NO. 301 STATIC ROLLOVER DATA SHEETTEST PHASE:**0**⁰**90**⁰

Vehicle NHTSA ID No.:

CL5801I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 02 minutes 57 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 05 minutes 00 seconds

TOTAL

07 minutes 57 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.)

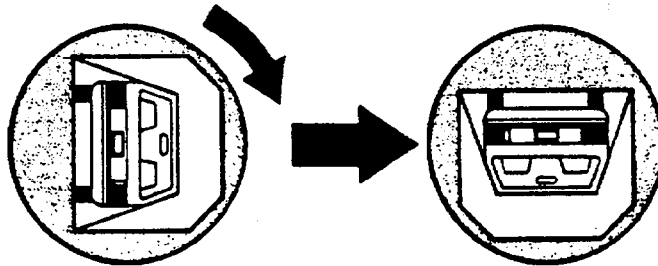
TEST PHASE:

90°

180°

Vehicle NHTSA ID No.:

CL58Q1



I. 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 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

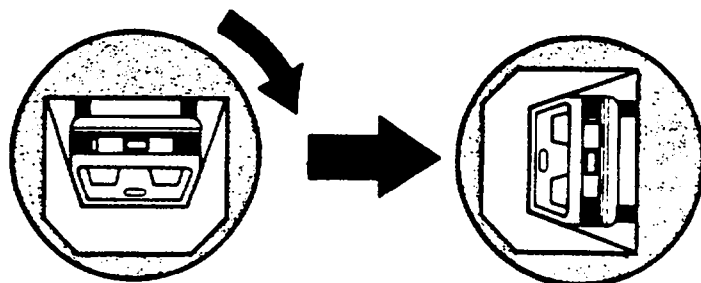
Table 12

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

TEST PHASE:

180°**270°**

Vehicle NHTSA ID No.:

CL5801I. 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 12

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

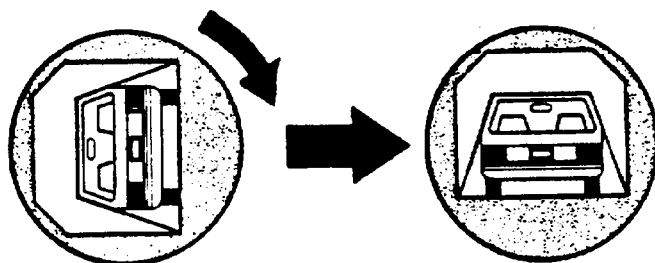
TEST PHASE:

270°

360°

Vehicle NHTSA ID No.:

CL5801



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 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: March 21, 1990 Vehicle NHTSA No.: CL5801

Vehicle Manufacturer: Volkswagen D.O. Brasil S.A.

Model Year: 1990 VIN: 9BWBA2305LP005659

Body Style: Fox Build Date: September 1989

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

Impact Velocity: 29.6 mph Time of Test: 11:45

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

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Figure A-1 PRE-TEST FRONT VIEW

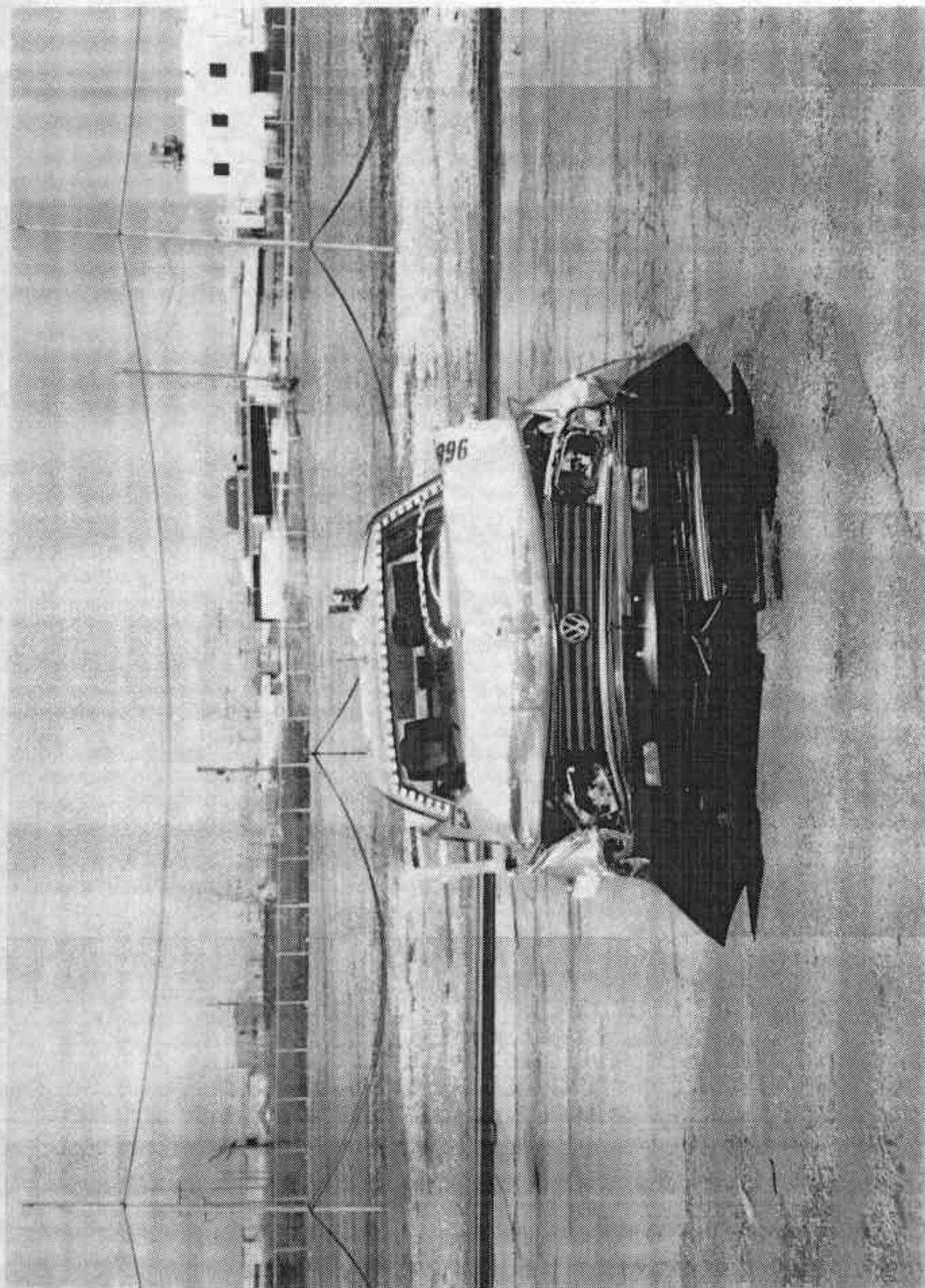


Figure A-2 POST TEST FRONT VIEW

A-4

7804-10

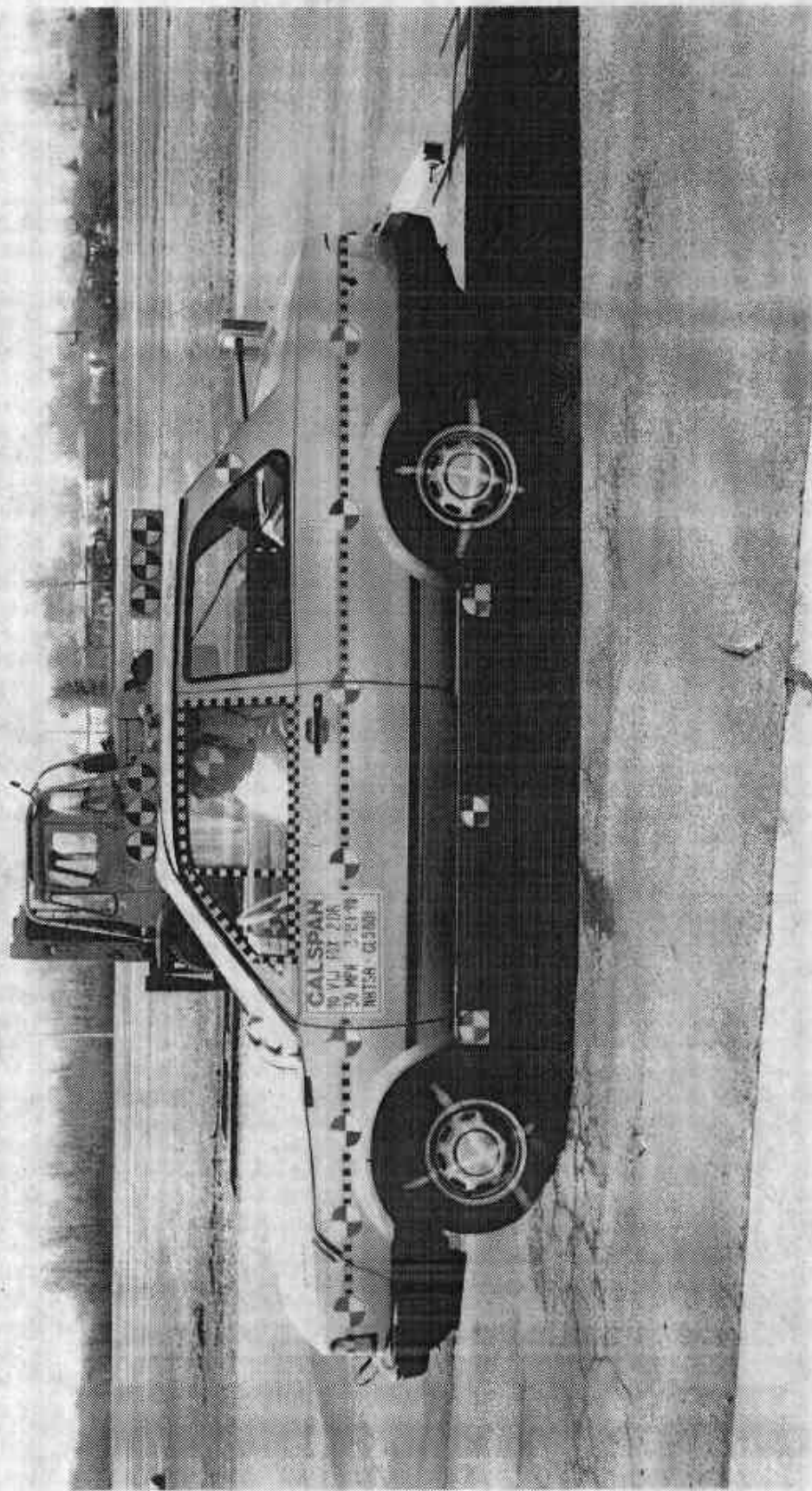


Figure A-3 PRE-TEST LEFT SIDE VIEW

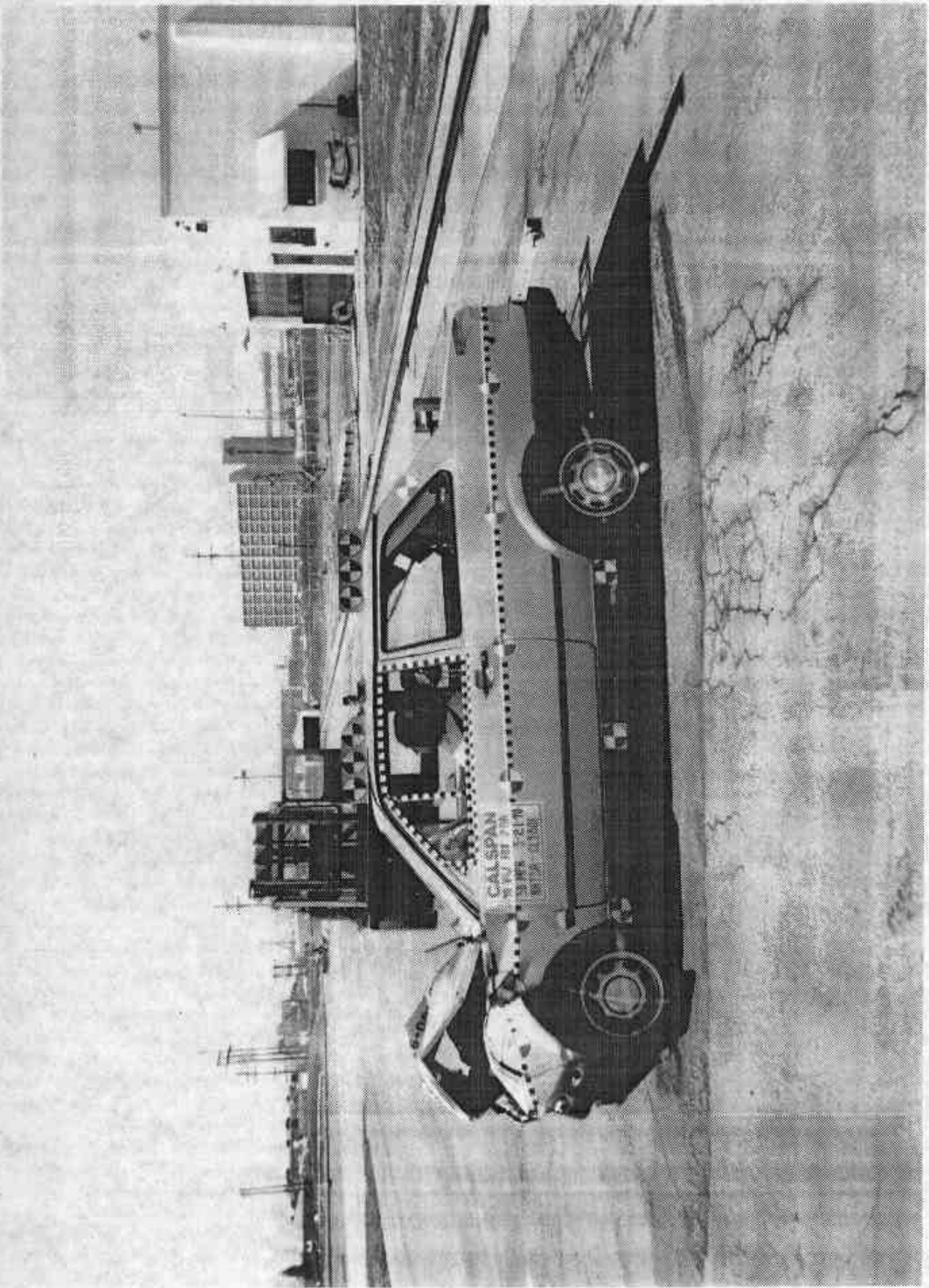


Figure A-4 POST TEST LEFT SIDE VIEW

A-6

7804-10

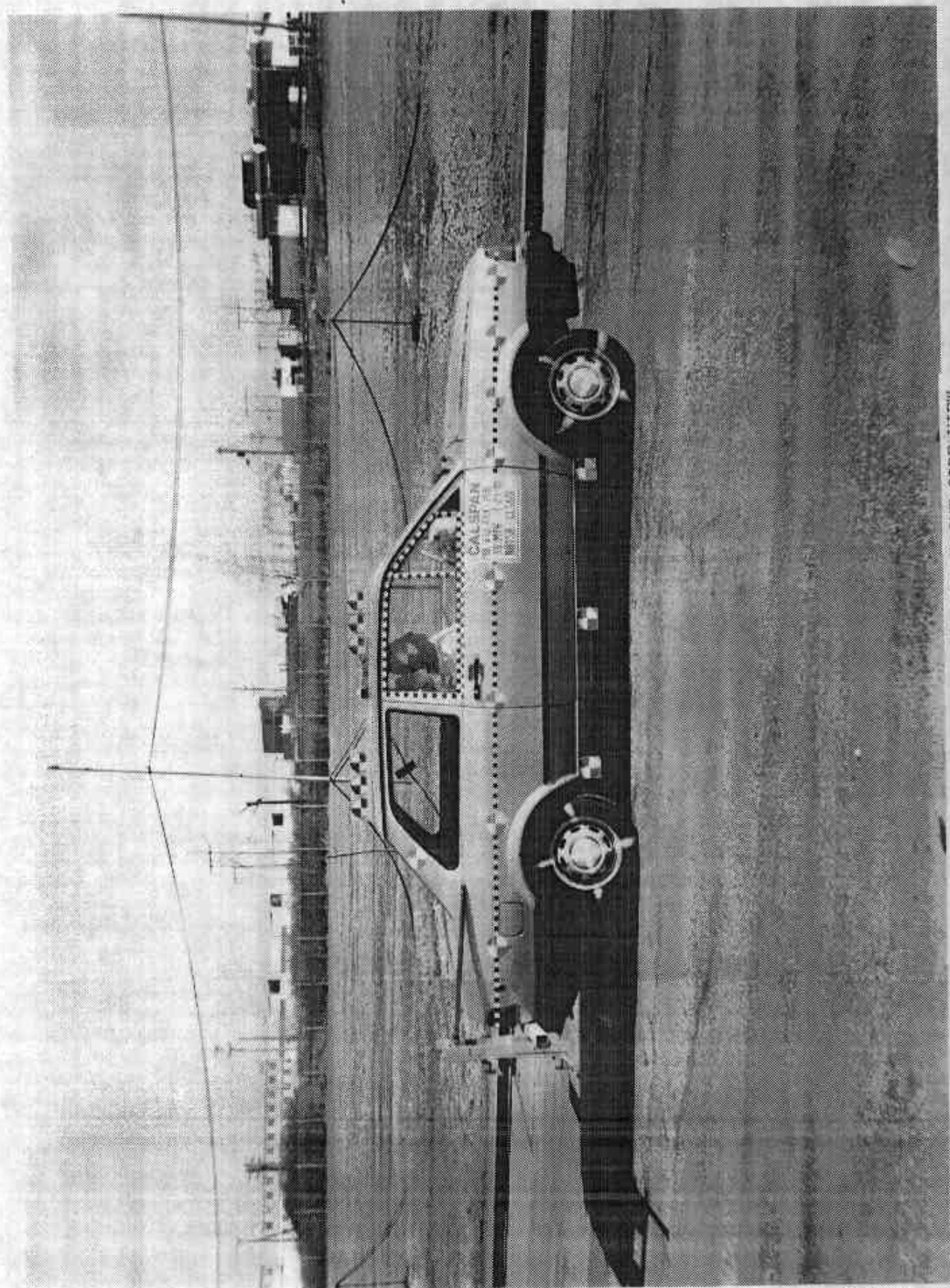


FIGURE A-5. PRE-TEST RIGHT SIDE VIEW

A-7

7804-10

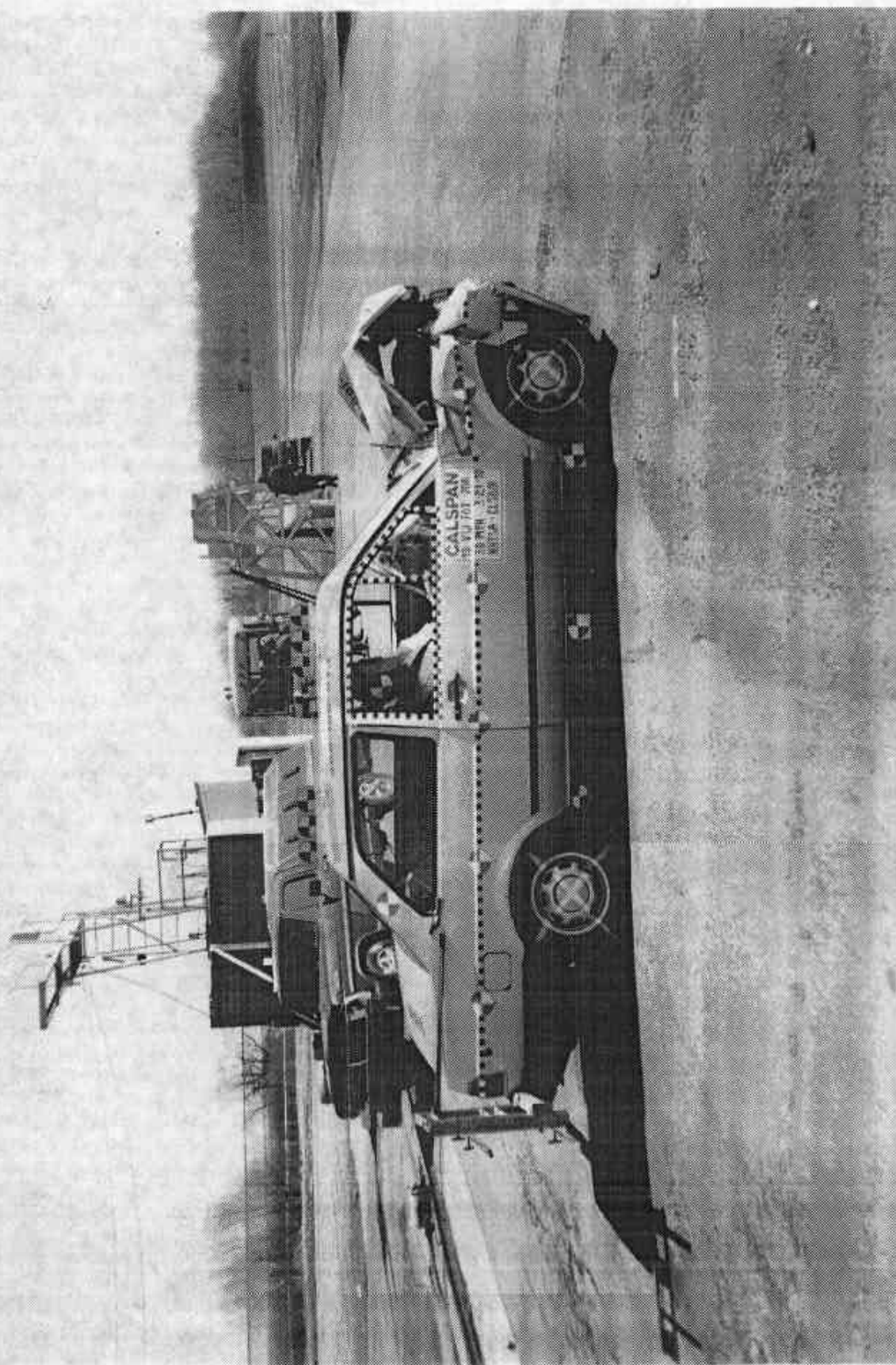


Figure A-6 POST-TEST RIGHT SIDE VIEW

A-8

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

A-9

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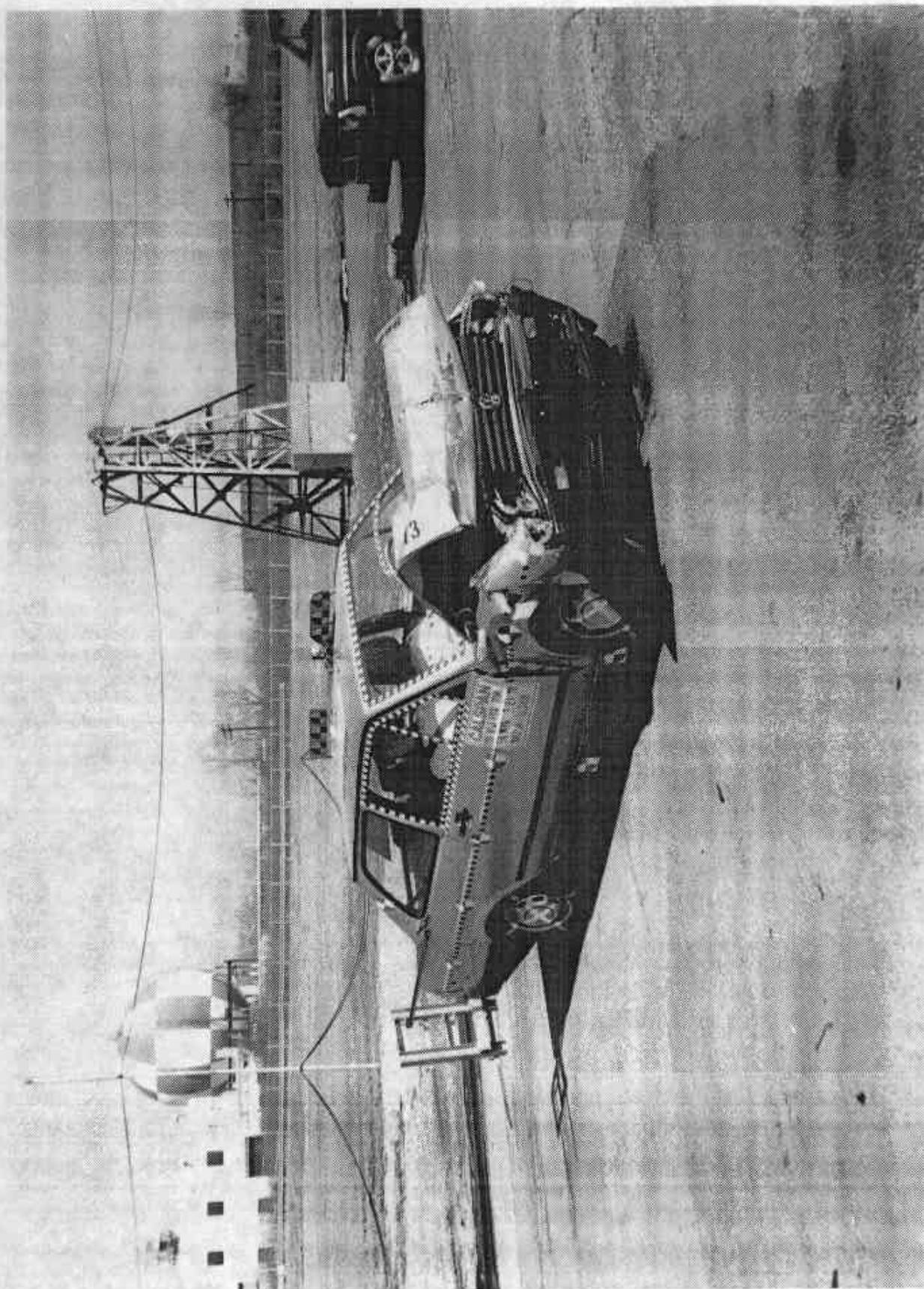


Figure A-8 POST-TEST RIGHT FRONT THREE-QUARTER VIEW

A-10

7804-10



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

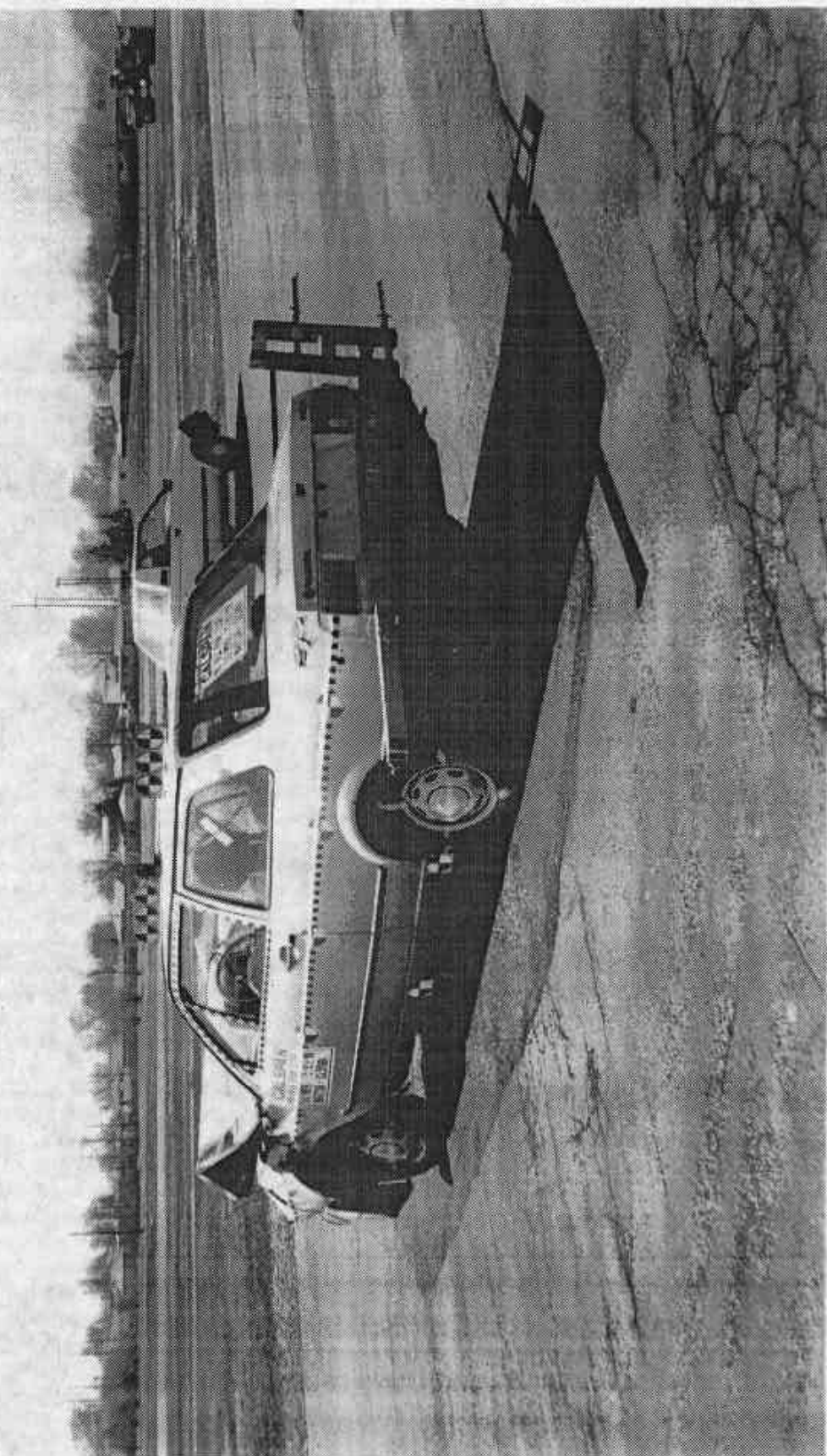


Figure A-10 POST-TEST LEFT REAR THREE-QUARTER VIEW

A-12

7804-10



Figure A-11 POST TEST TOP VIEW

A-13

7804-10

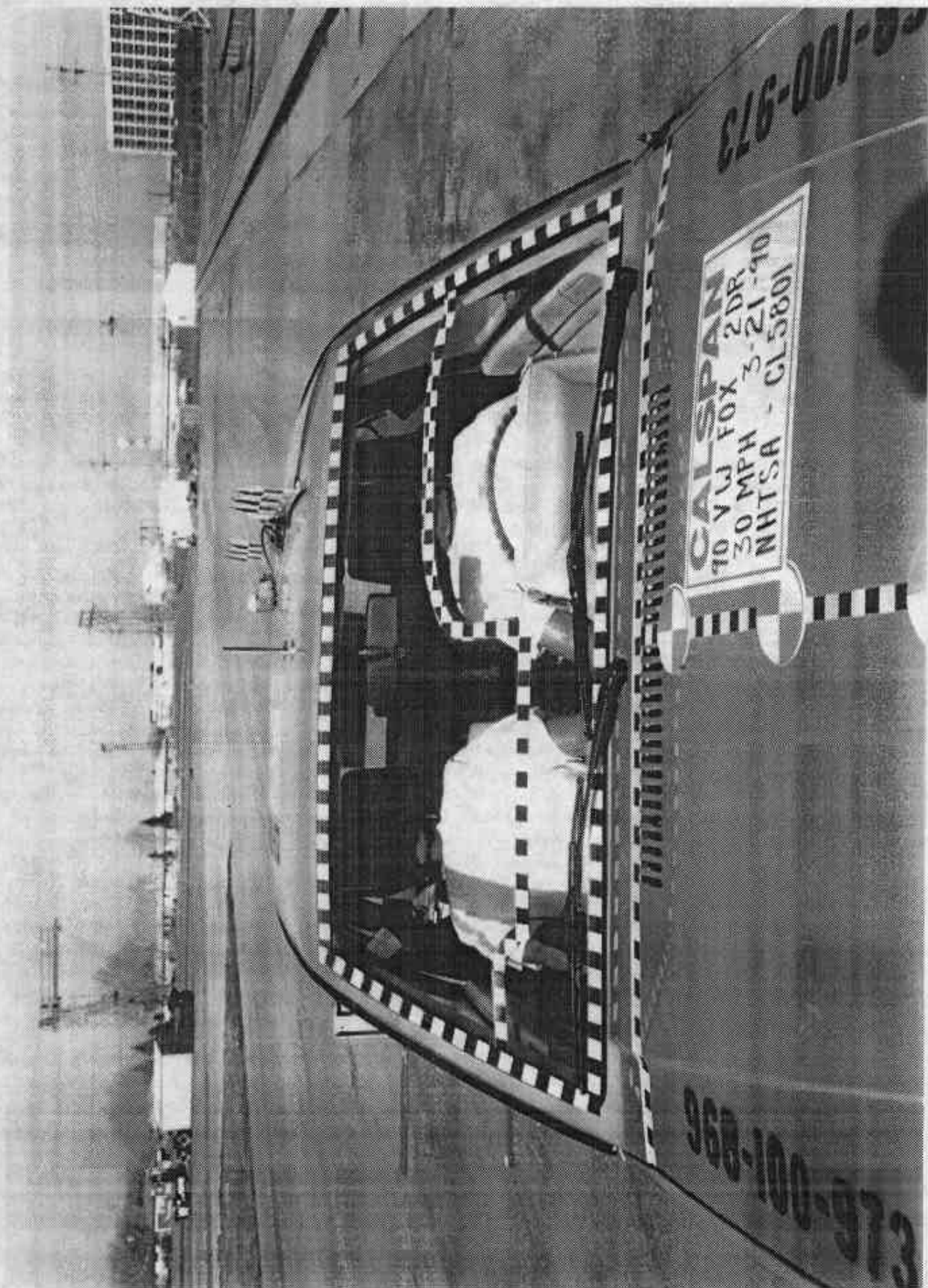


Figure A-12 PRE-TEST WINDSHIELD VIEW

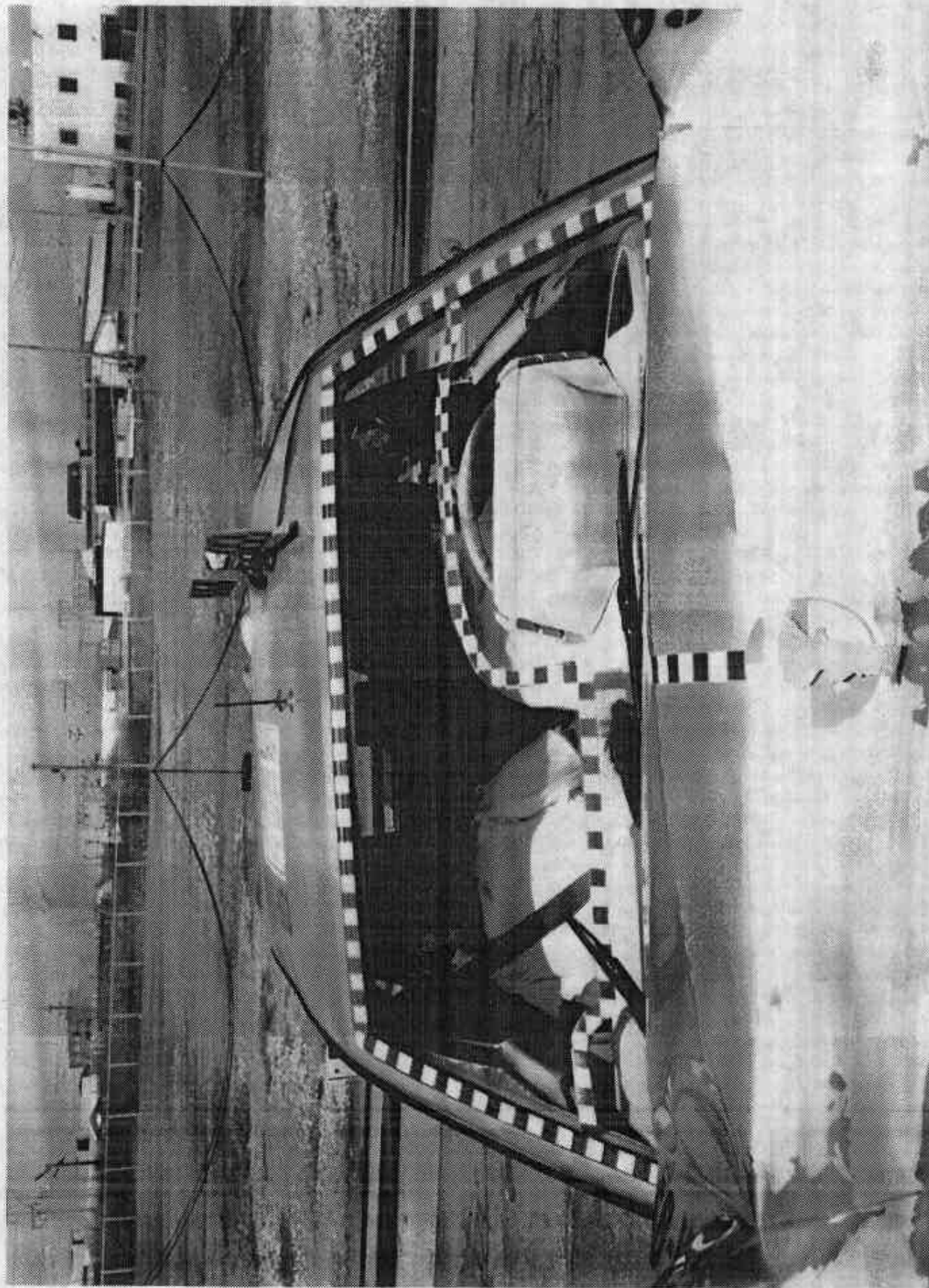


Figure A-13 POST-TEST WINDSHIELD VIEW

A-15

7804-10

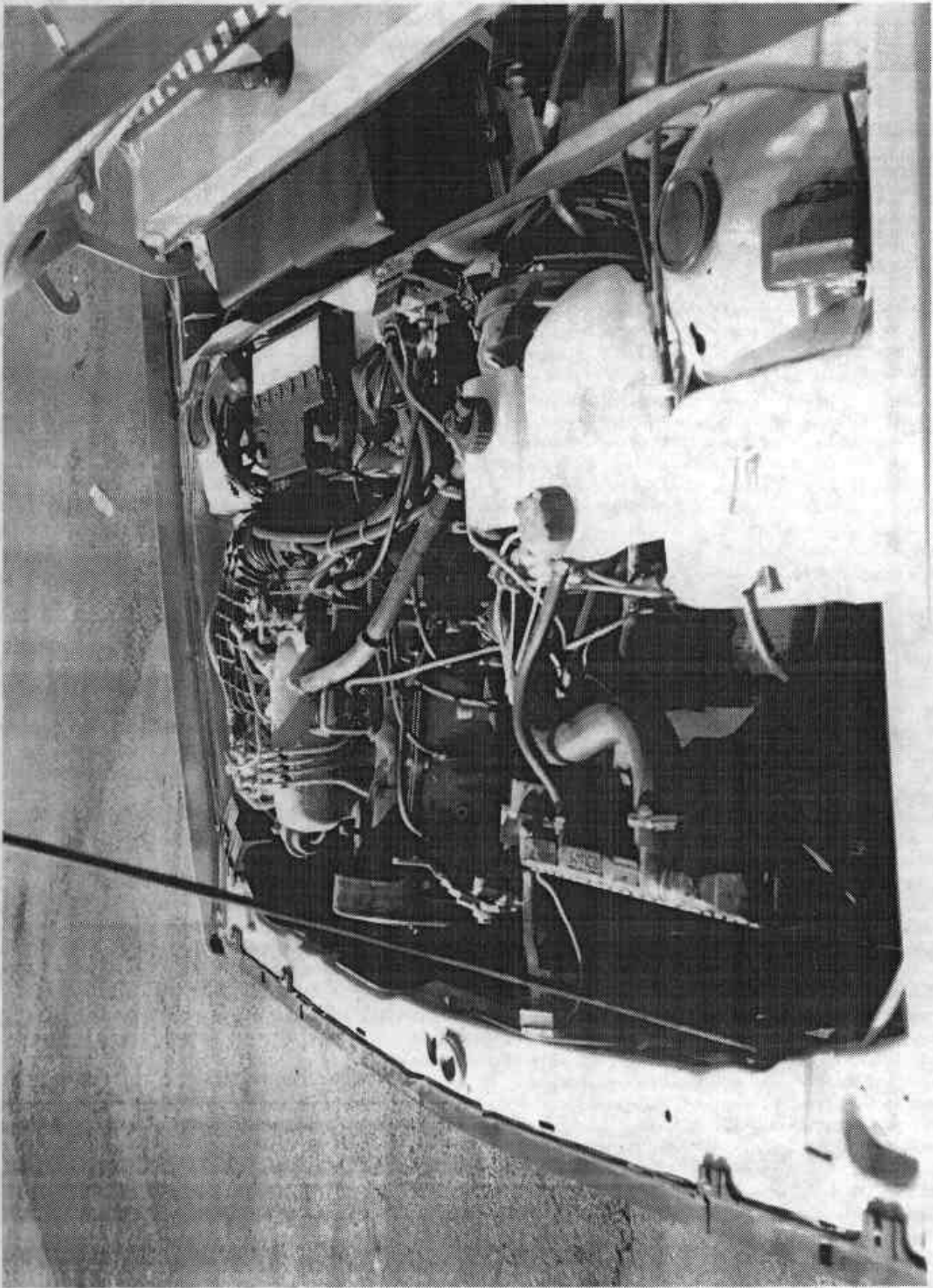


FIGURE A-14 PRE-TEST ENGINE COMPARTMENT SIDE VIEW

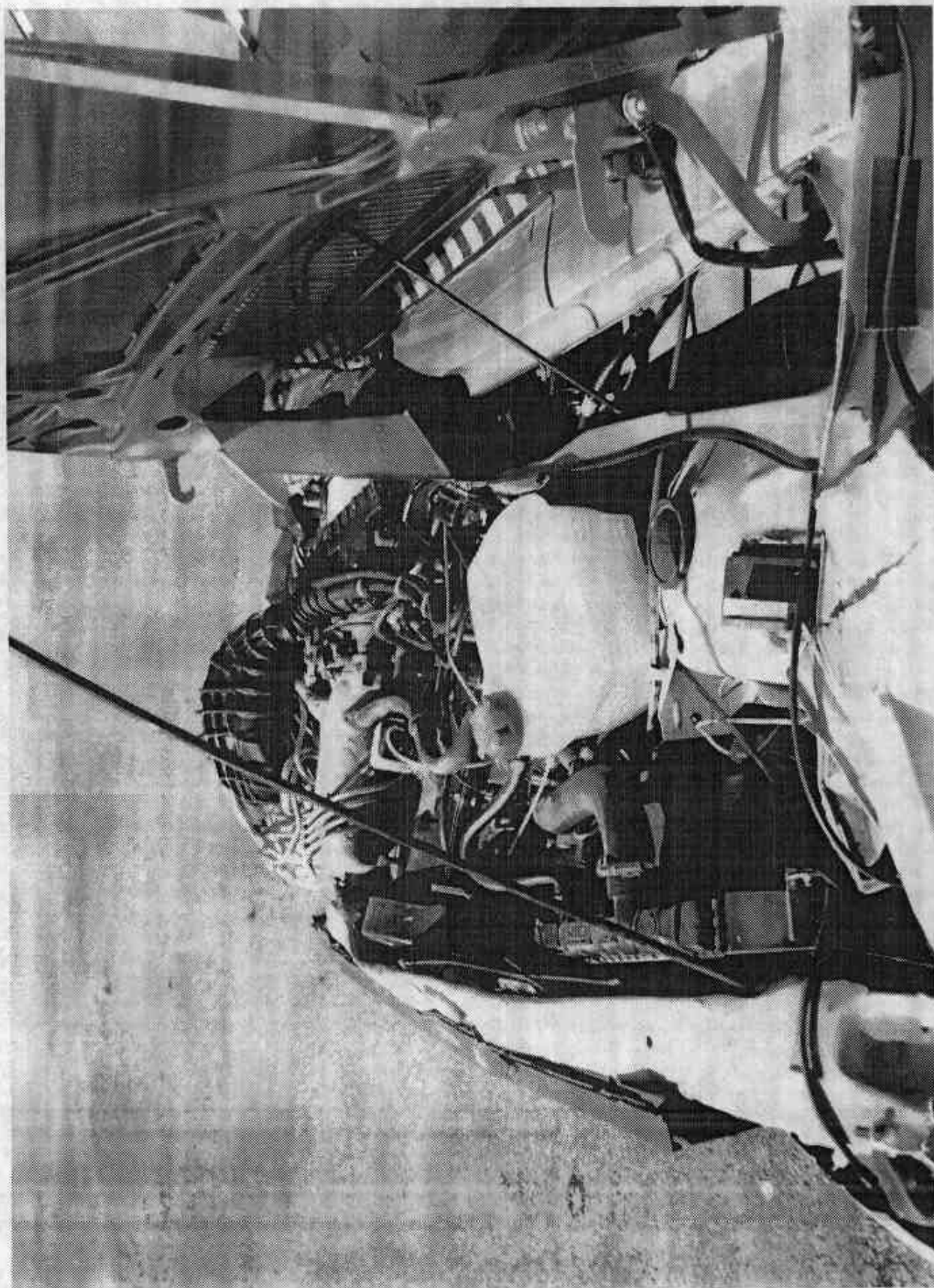


Figure A-15 POST-TEST ENGINE COMPARTMENT SIDE VIEW

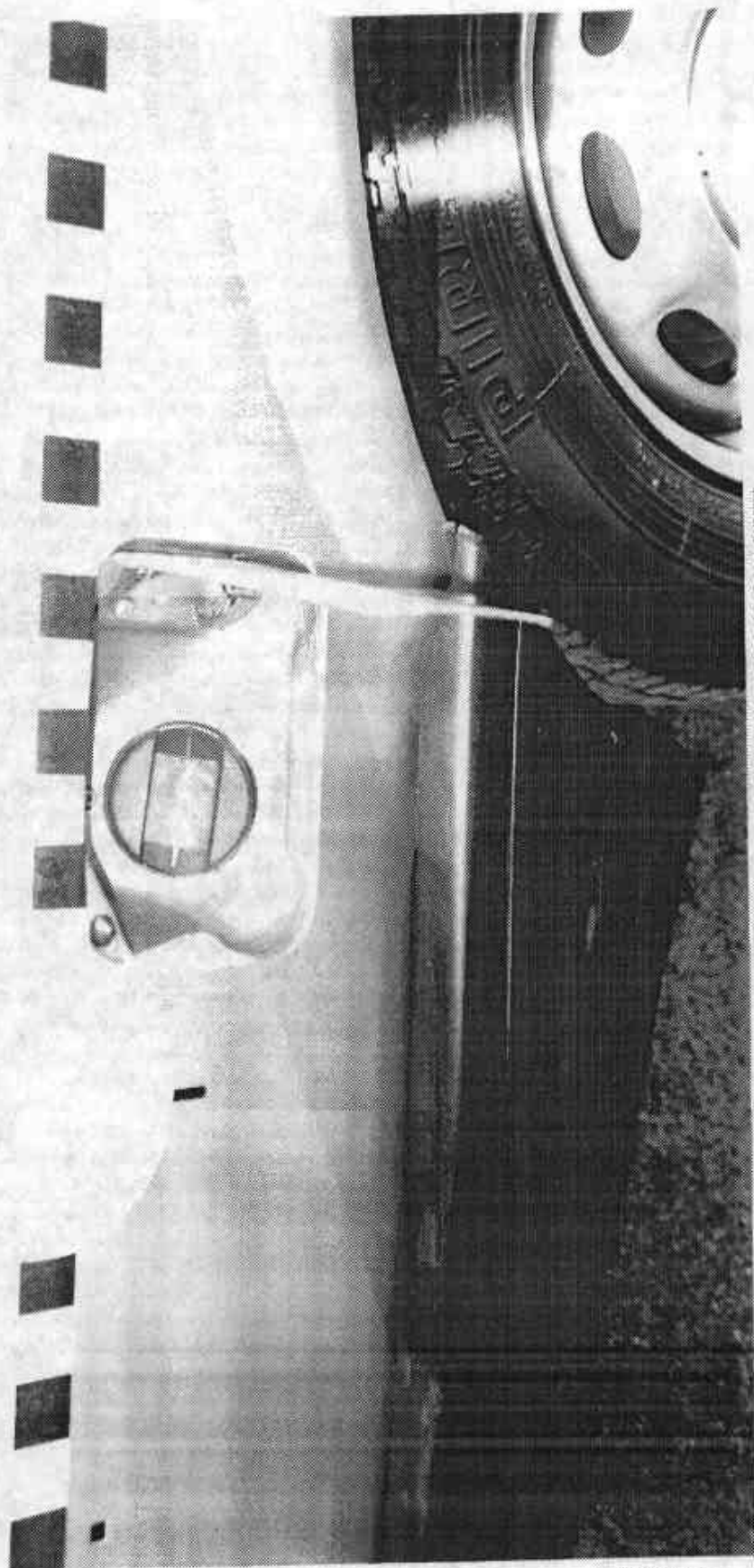


Figure A-18 PRE-TEST FUEL FILLER CAP VIEW

A-18

7804-10

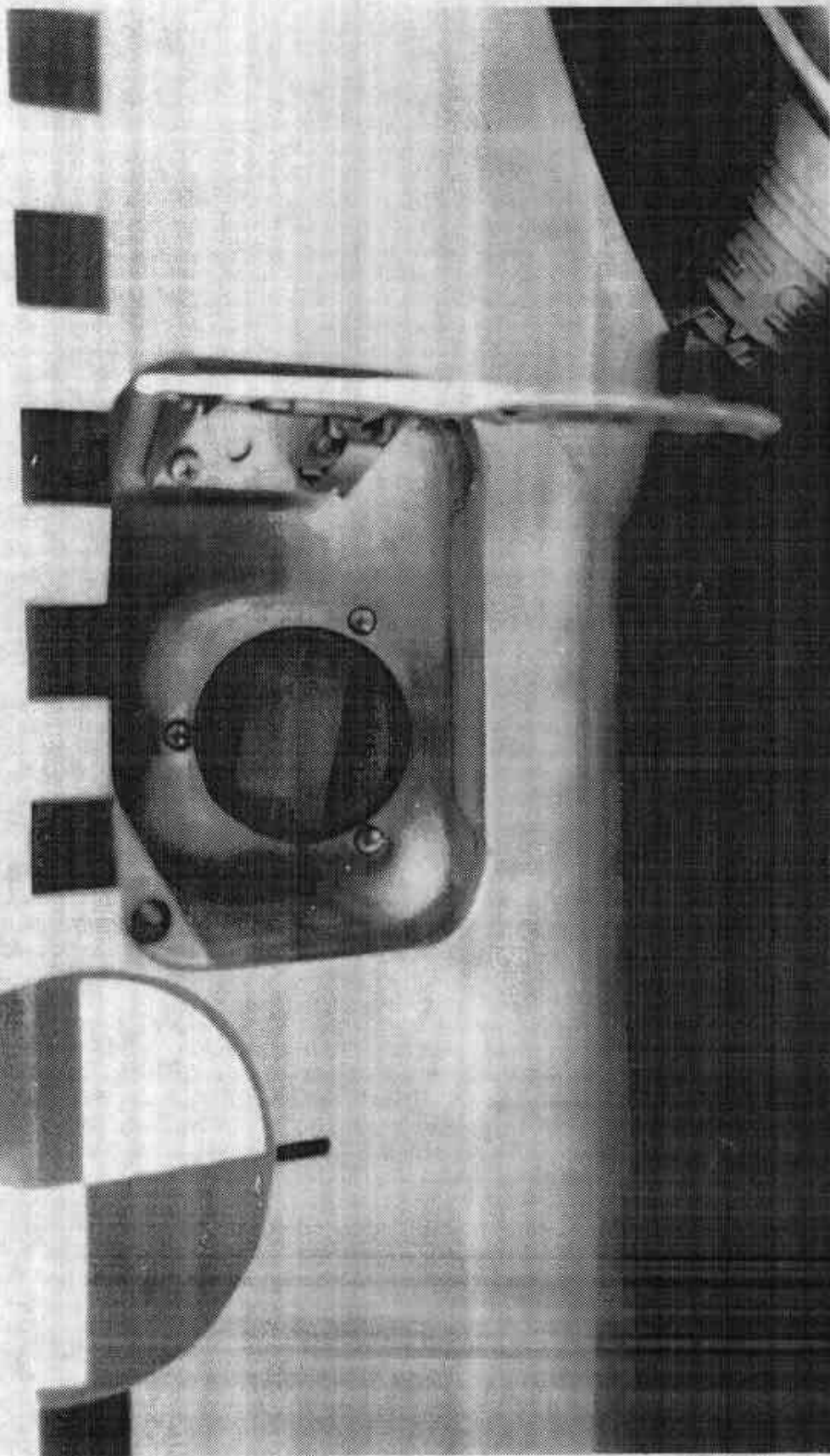
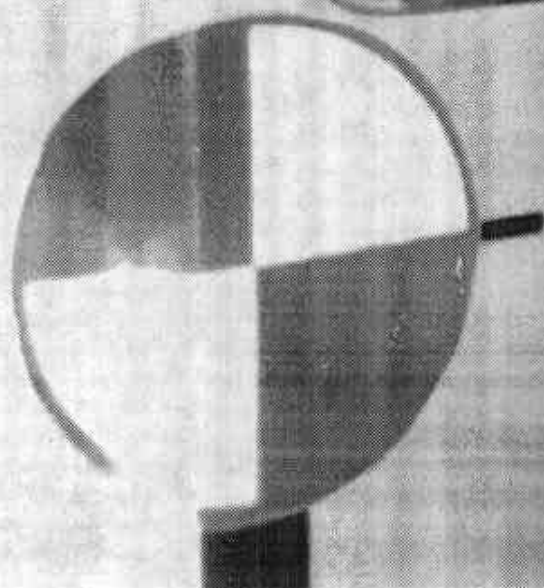


Figure A-17 POST-TEST FUEL FILLER CAP VIEW

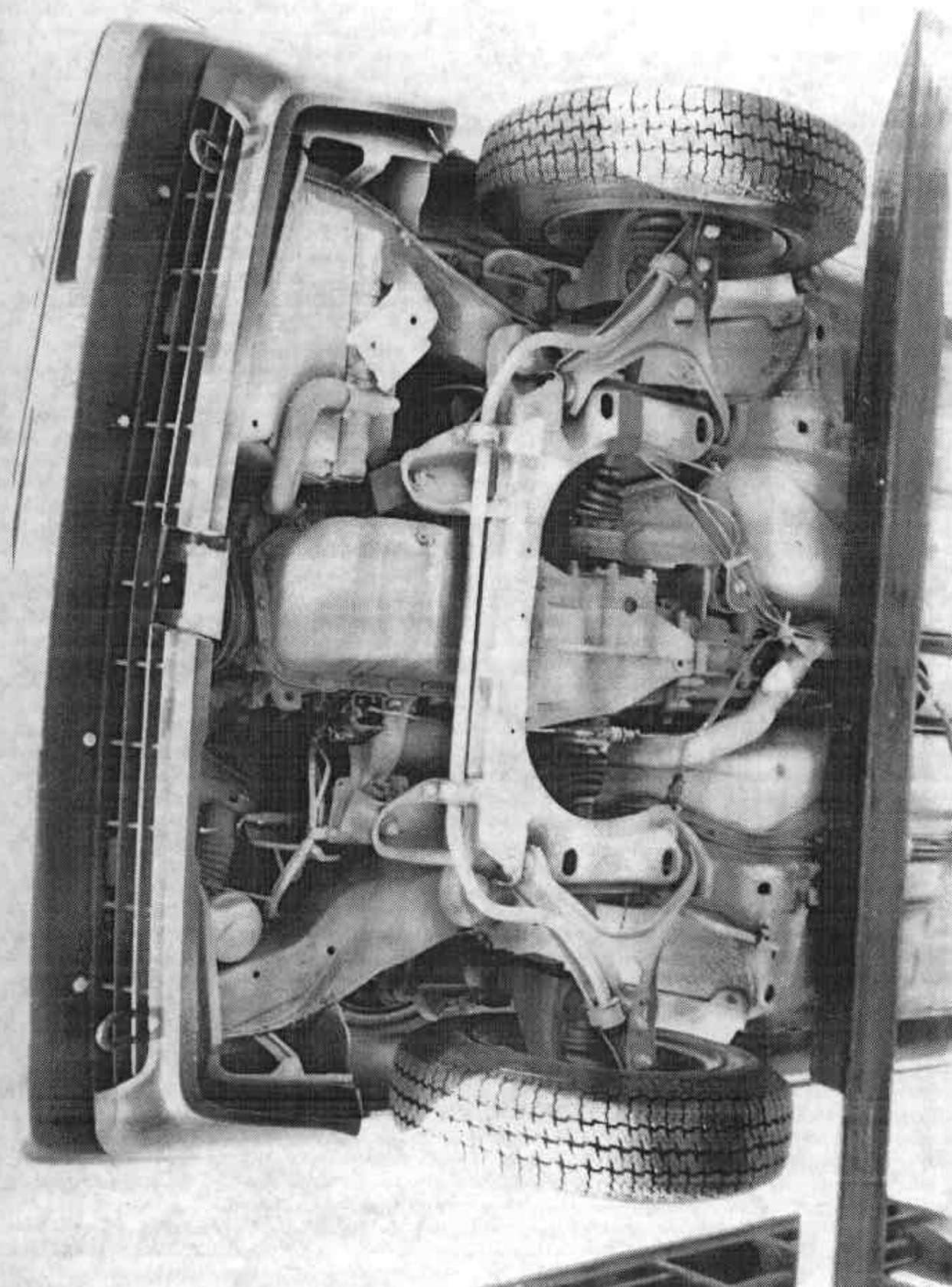


FIGURE A-18 PRE-TEST FRONT UNDERBODY VIEW

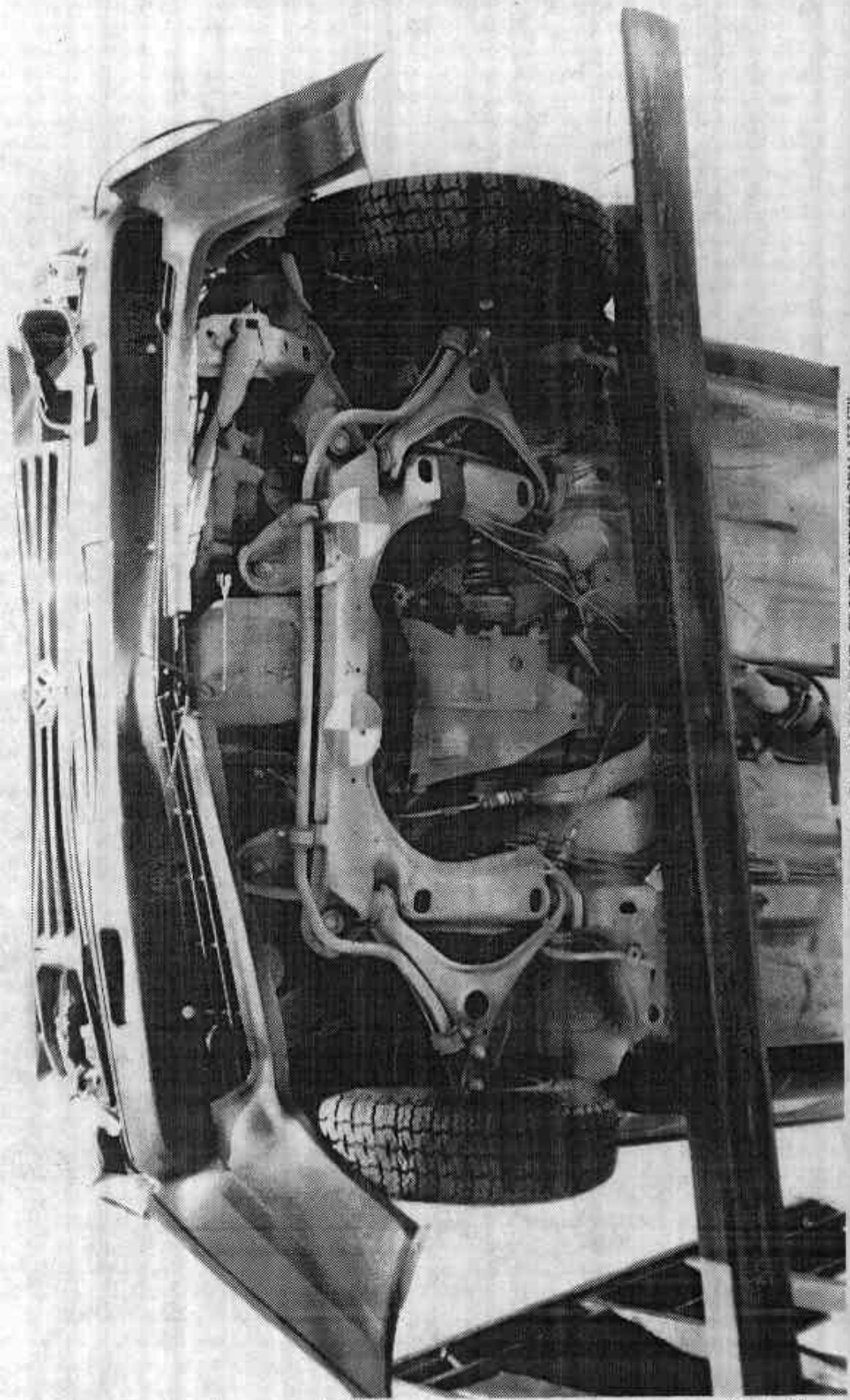


Figure A-19 POST-TEST FRONT UNDERBODY VIEW

A-21

7804-10

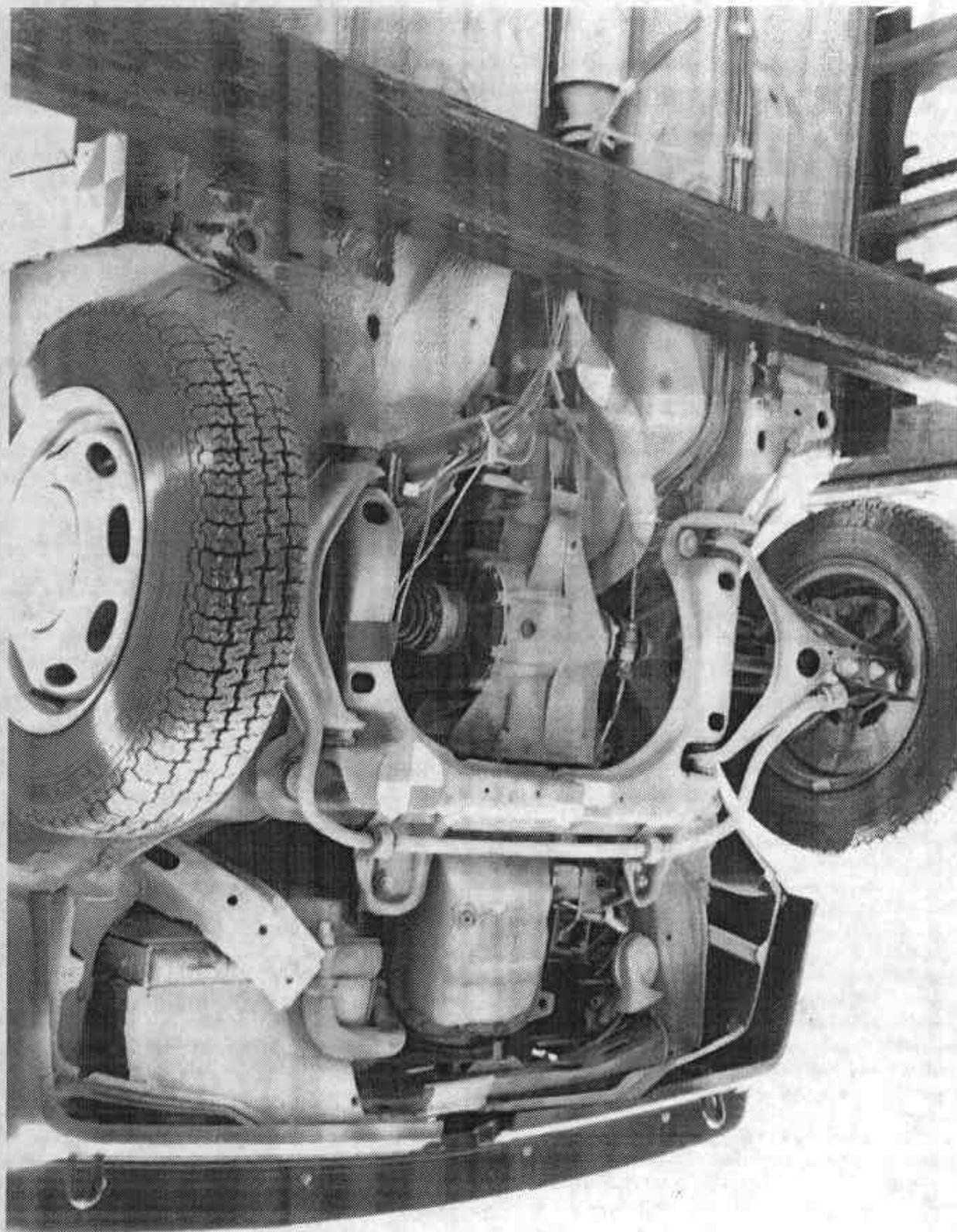


Figure A-20 PRE-TEST FRONT SIDE UNDERBODY VIEW

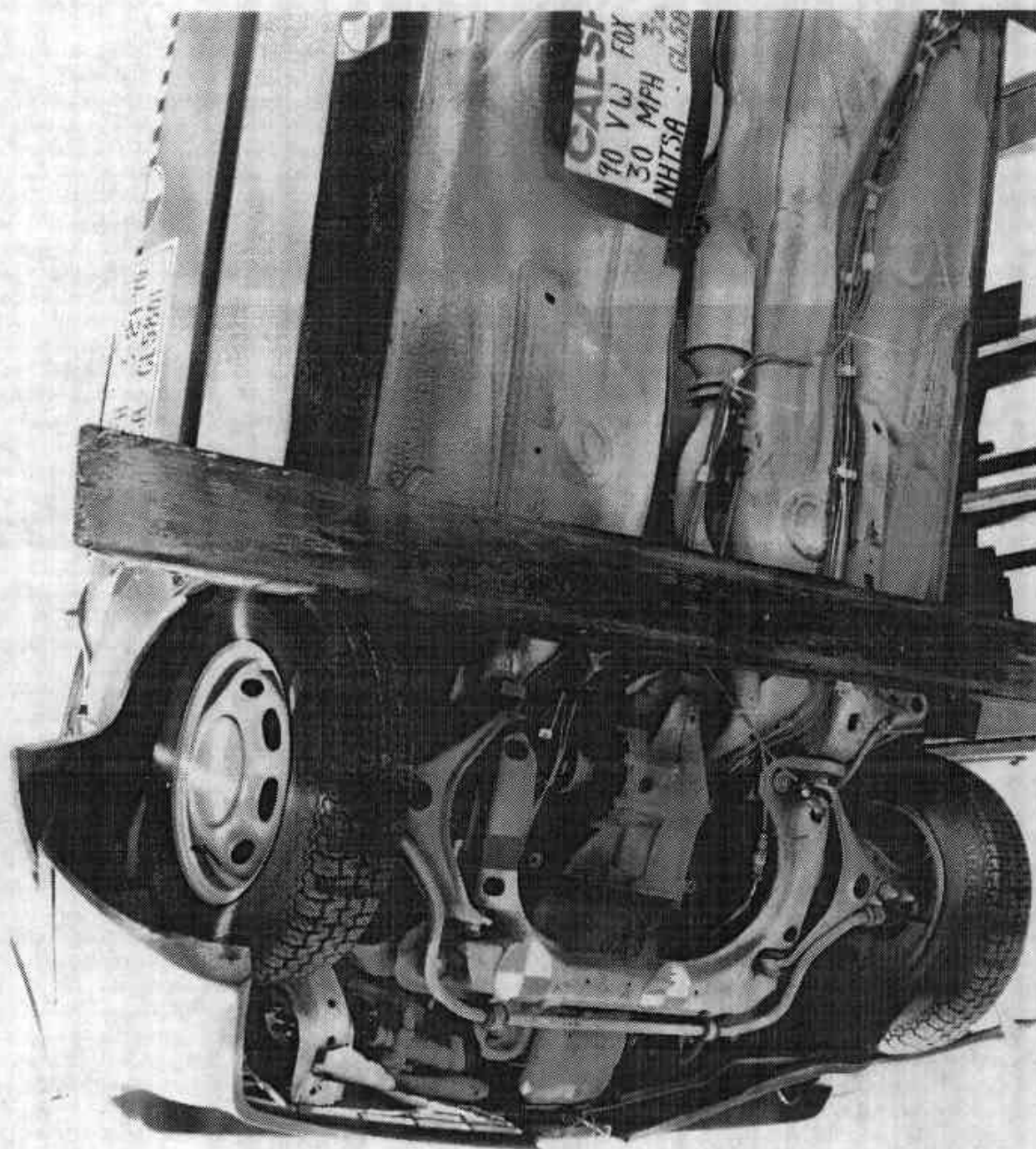


FIGURE A-21 POST-TEST FRONT SIDE UNDERBODY VIEW



Figure A-22 PRE-TEST REAR UNDERBODY VIEW

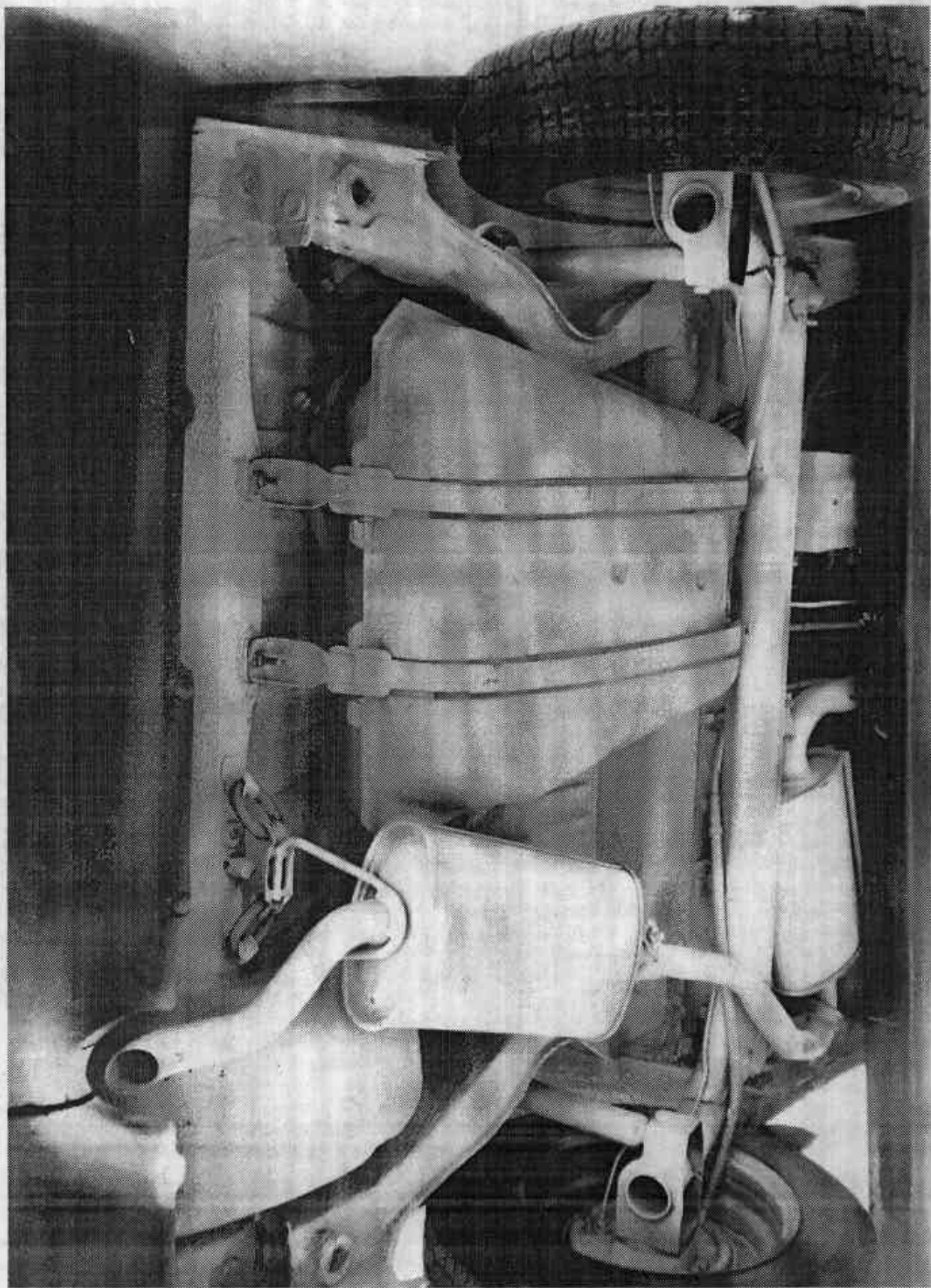


Figure A-23 POST-TEST REAR UNDERBODY VIEW

A-25

7804-10

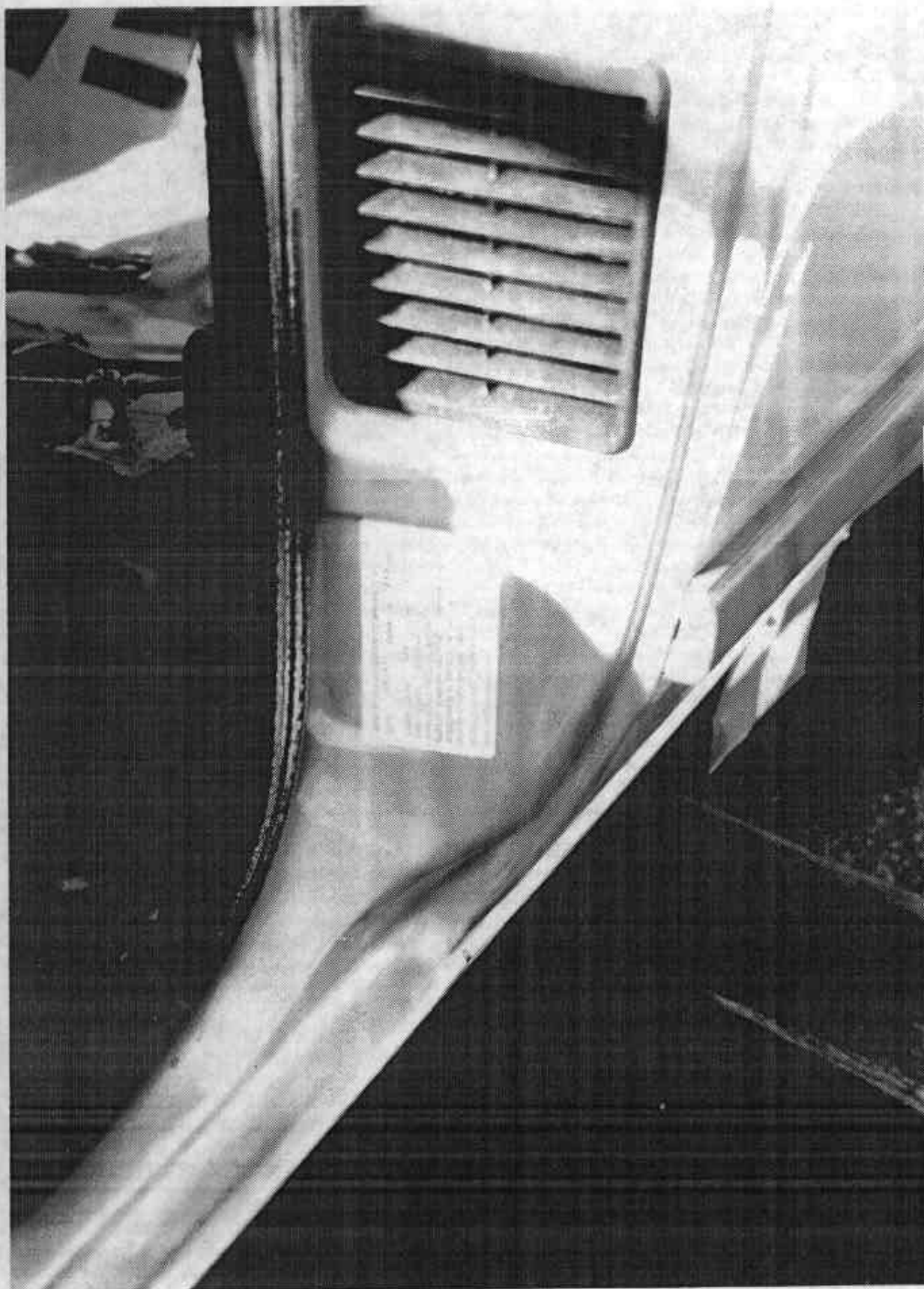


Figure A-24 CERTIFICATION LABEL

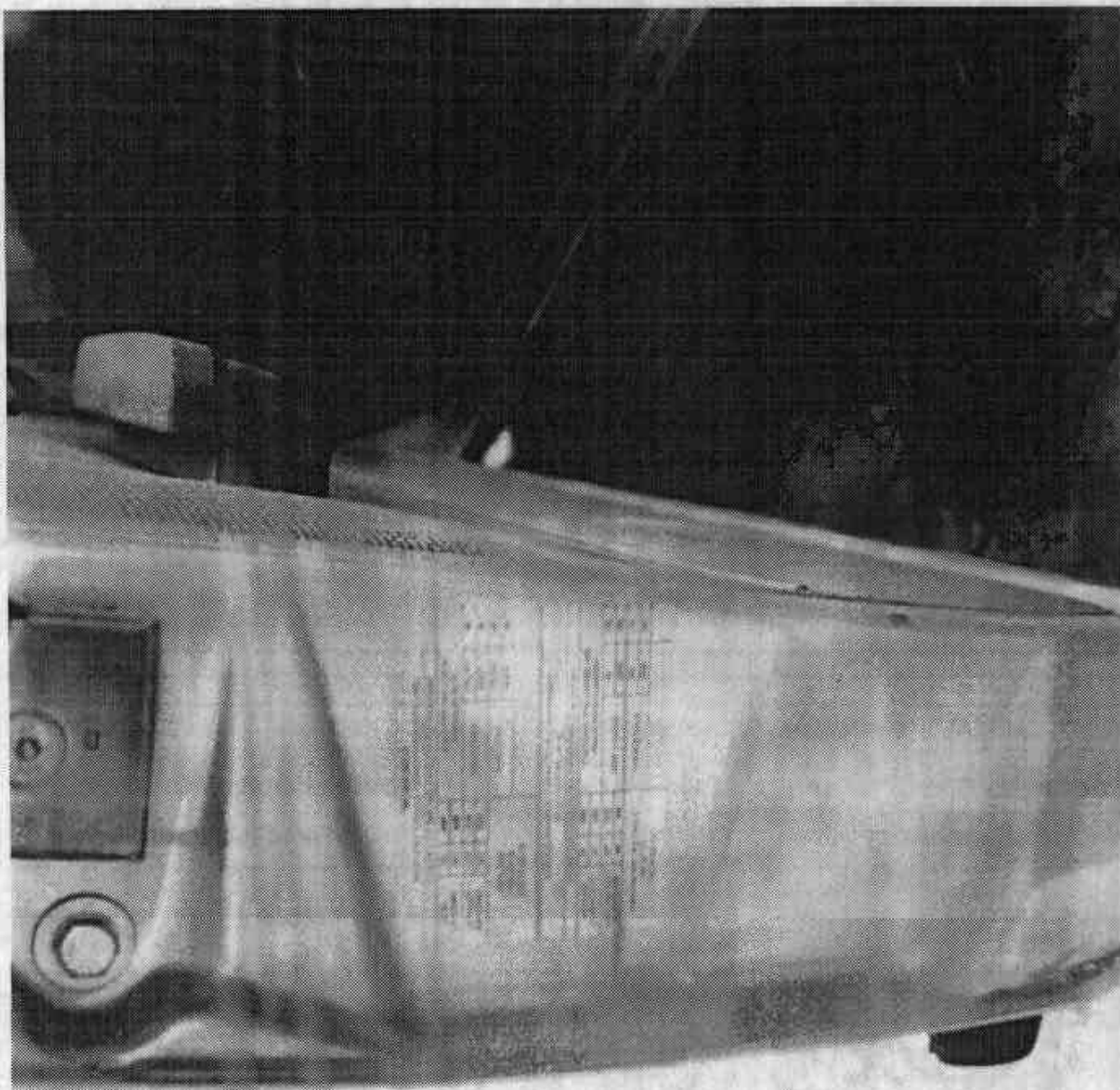


FIGURE A-25 TIRE PLACARD

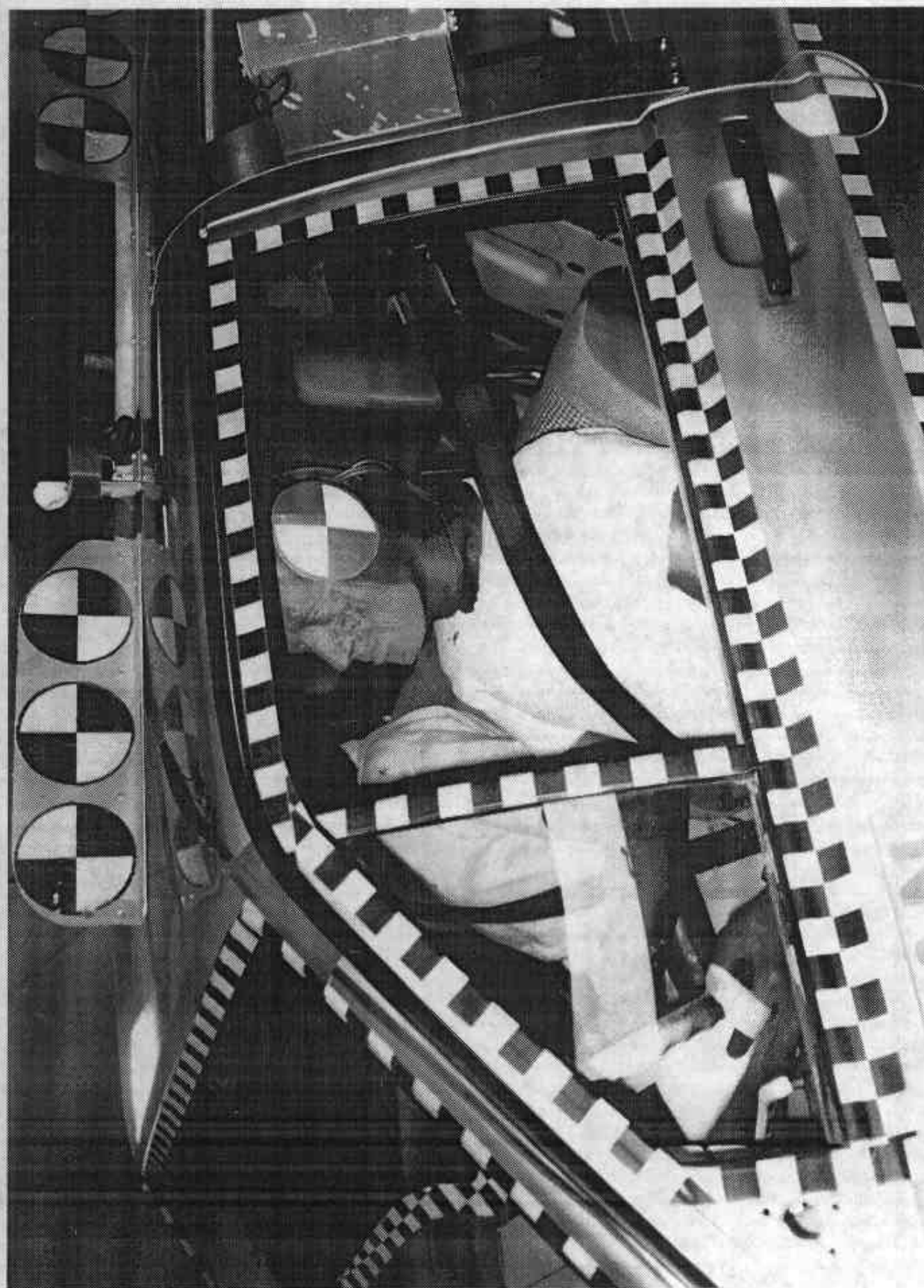


Figure A-26 PRE-TEST DRIVER DUMMY POSITION

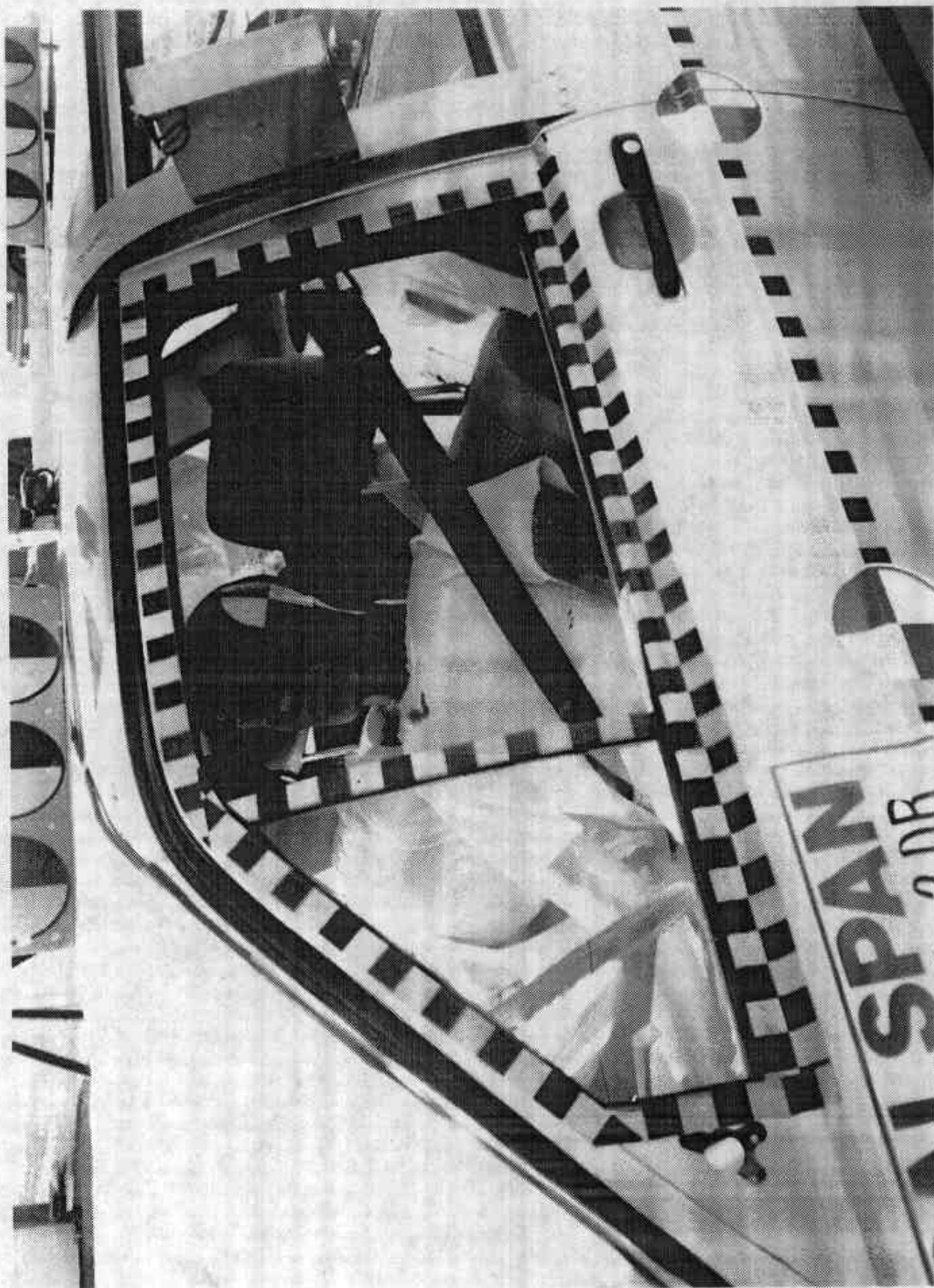


Figure A-27 POST-TEST DRIVER DUMMY POSITION



FIGURE A-28 PRE-TEST PASSENGER DUMMY POSITION



Figure A-29 POST-TEST PASSENGER DUMMY POSITION

A-31

7804-10

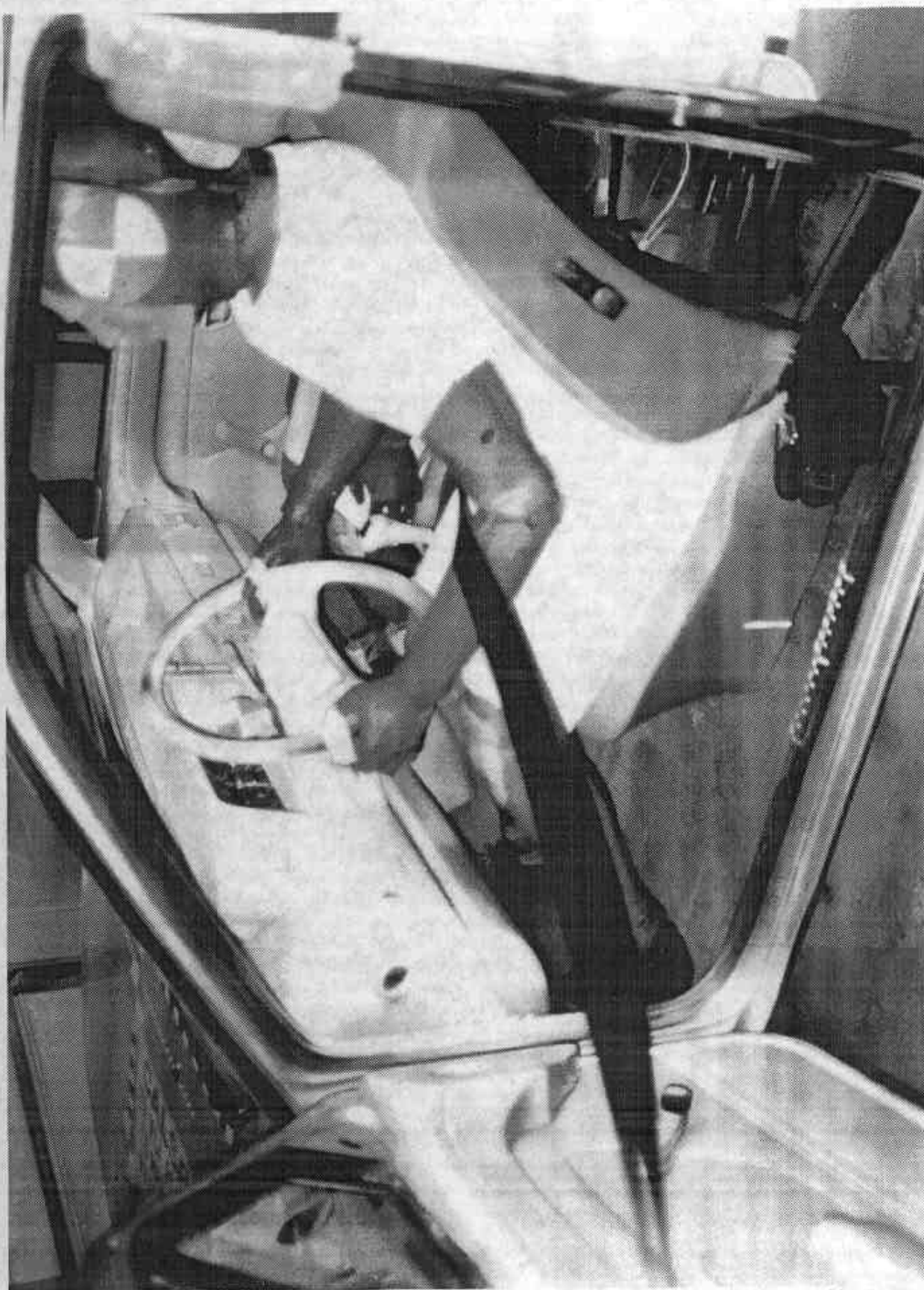


FIGURE A-30 PRE-TEST DRIVER DUMMY AND INTERIOR VIEW

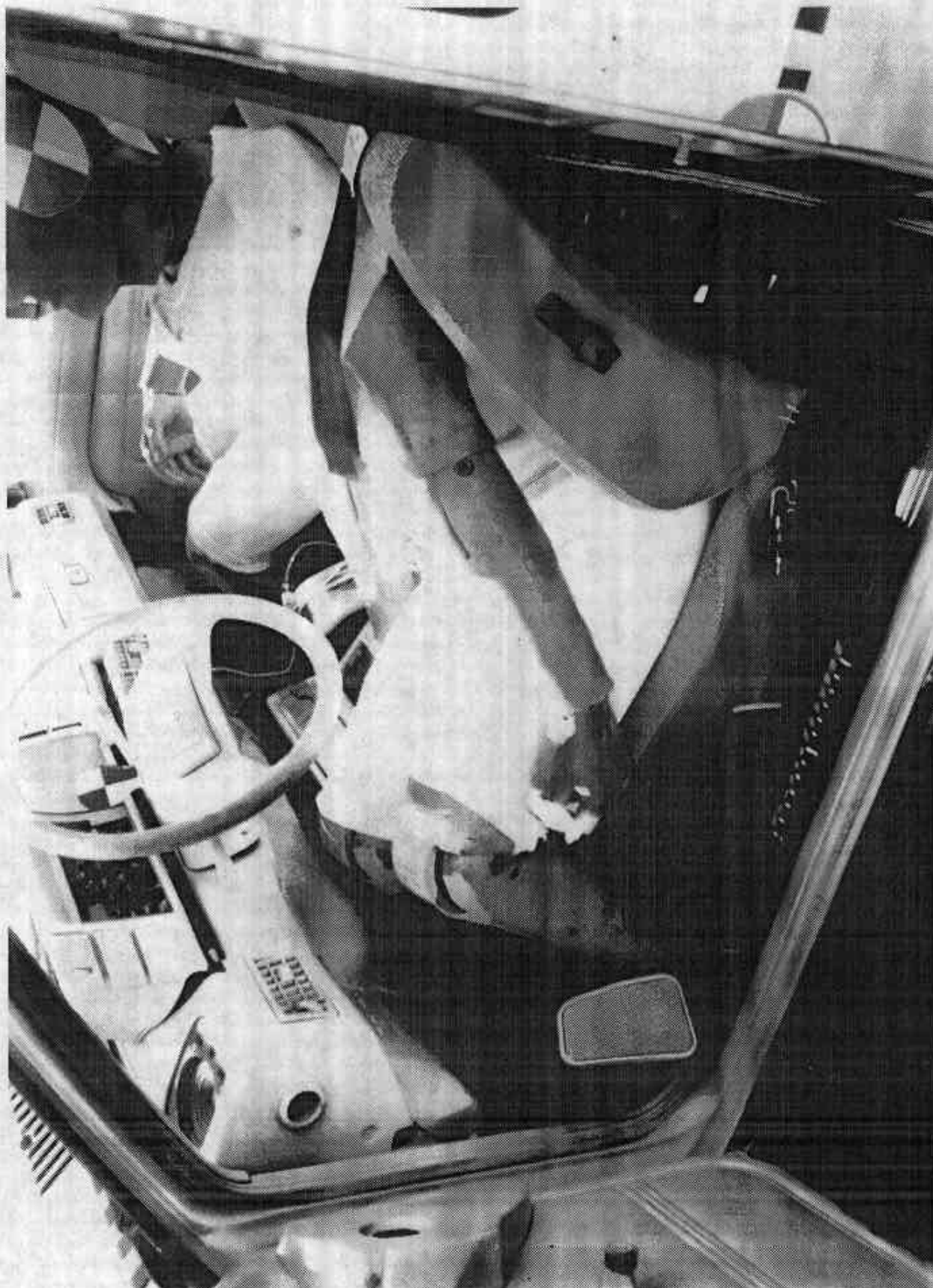


FIGURE A-31 POST-TEST DRIVER DUMMY AND INTERIOR VIEW

A-33

7804-10



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

A-34

7804-10

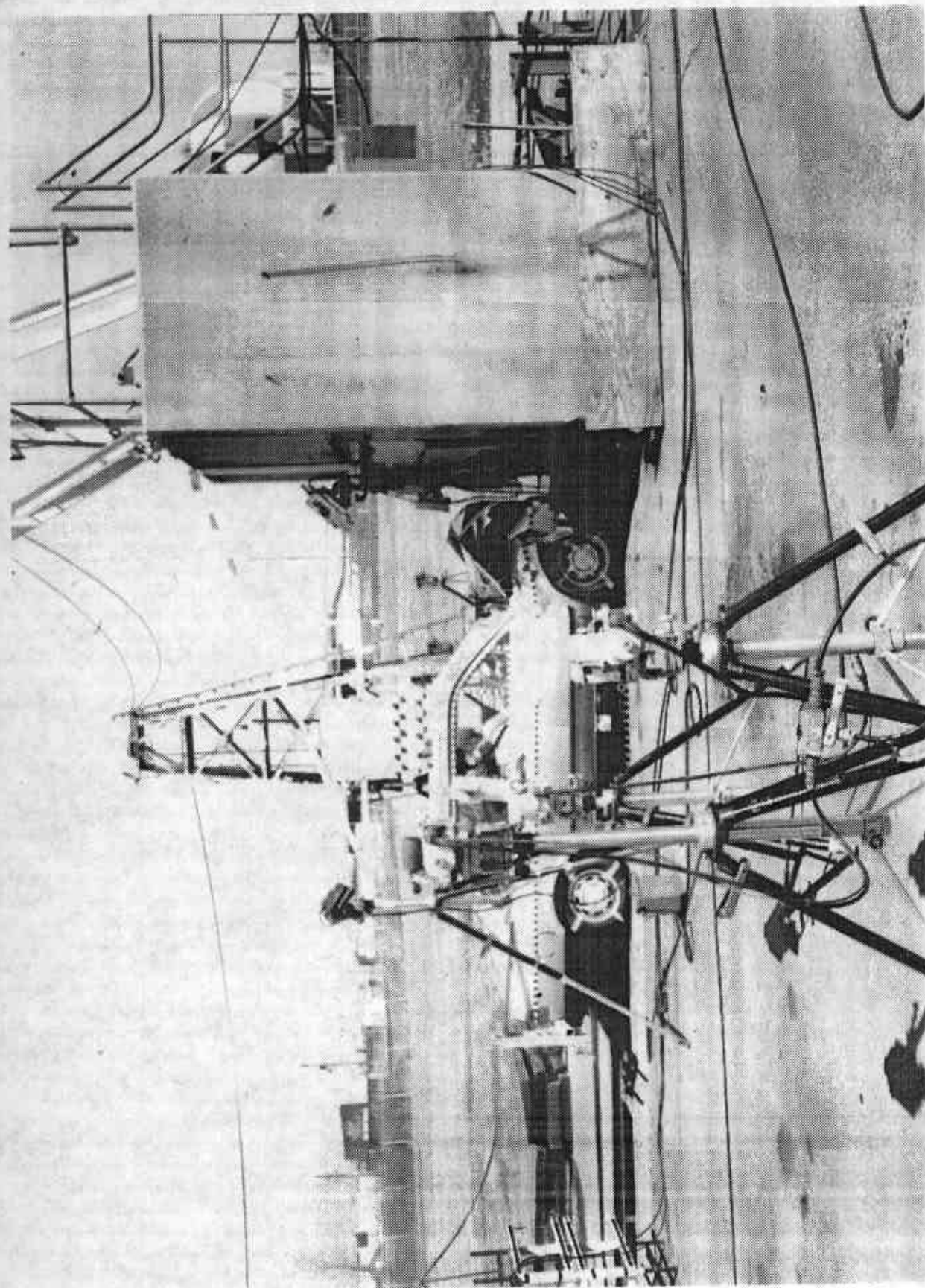


Figure A-34 VEHICLE IMPACT

A-36

7804-10

Appendix B

VEHICLE AND DUMMY RESPONSE DATA

TEST NO. CL5801

VEHICLE DATA

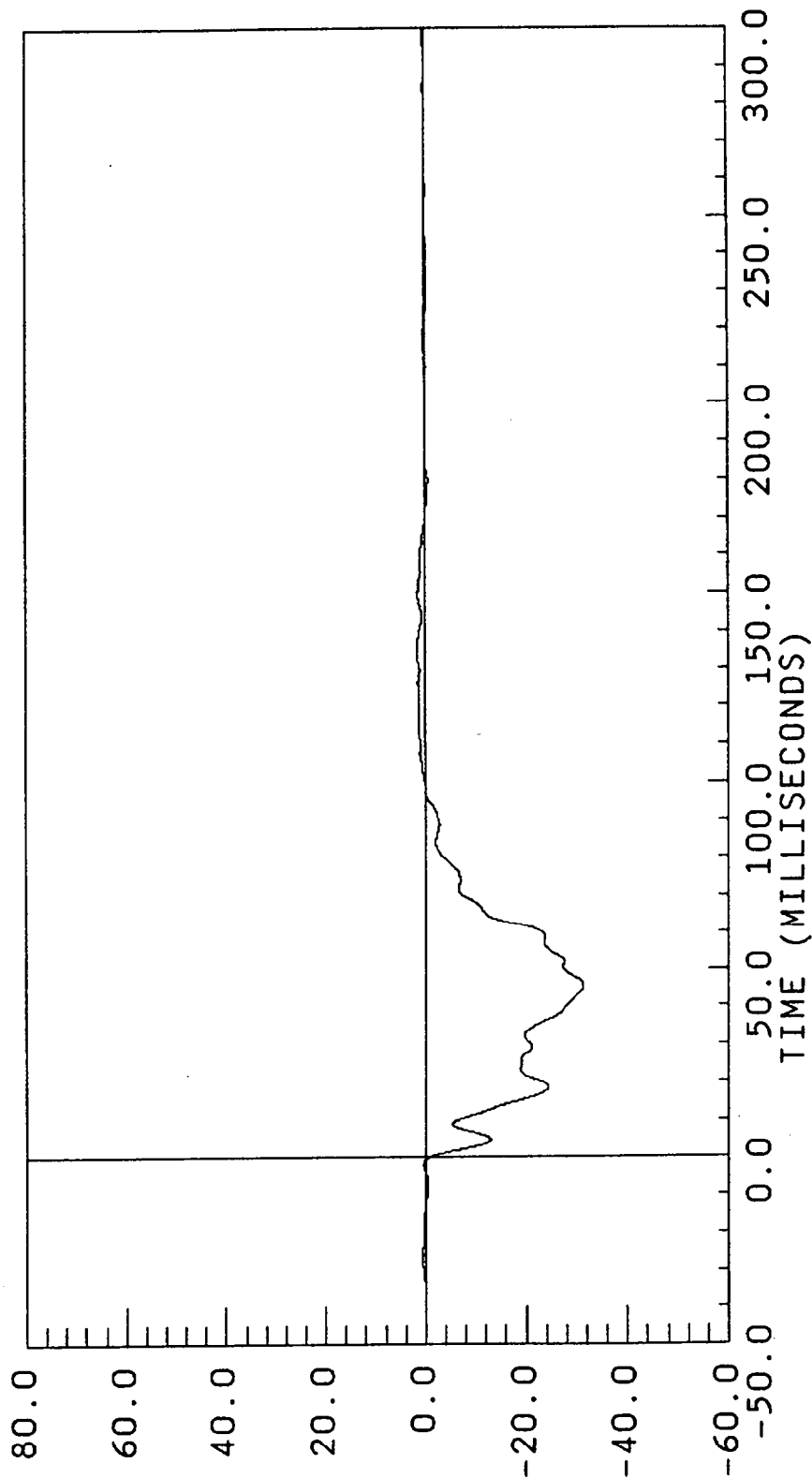
FILTER CHANNEL CLASS

60

29.60 mph

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

XL AXIS
YMIN = -31.48337 at 45.37500
YMAX = 1.704484 at 135.6000

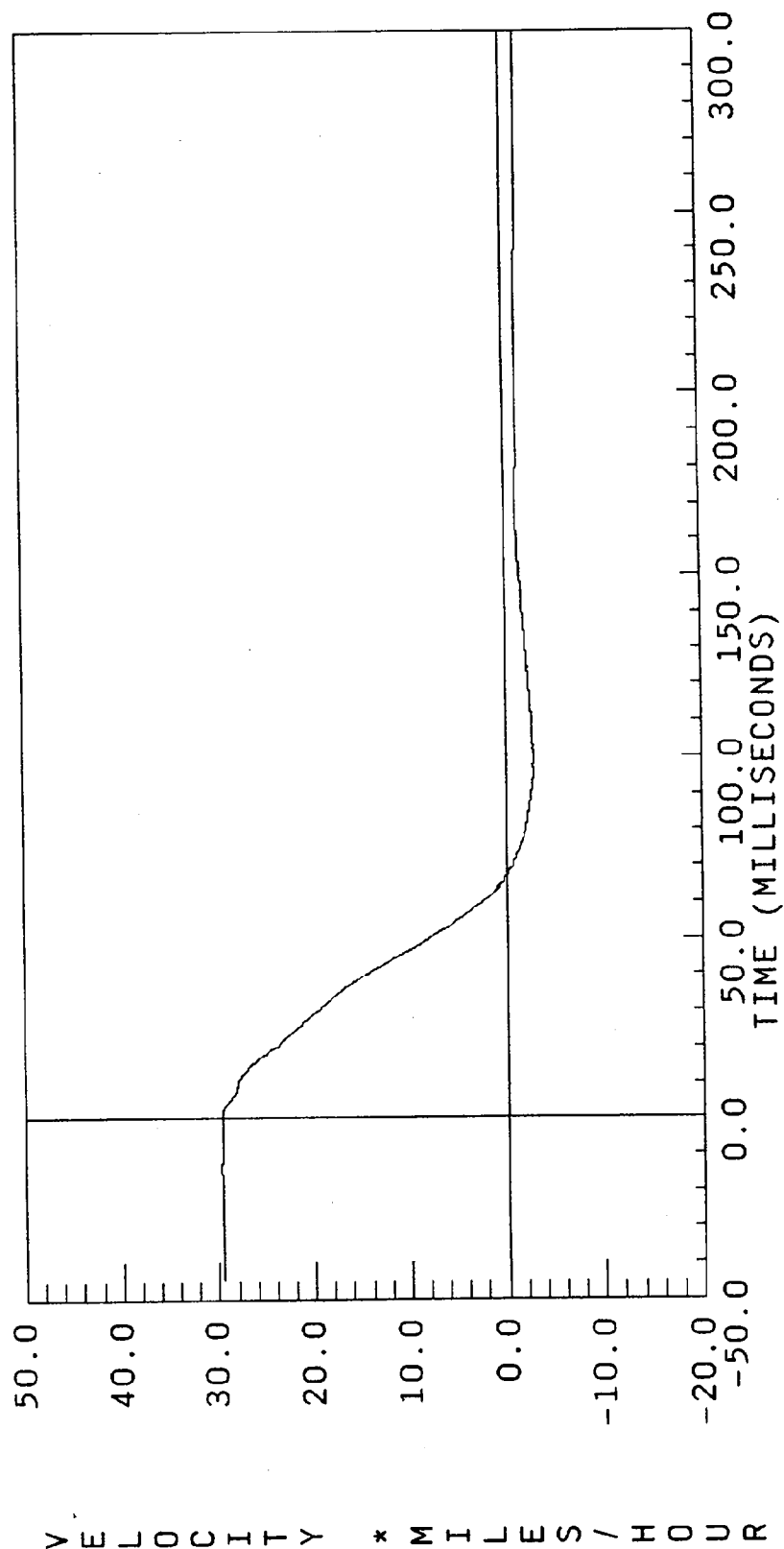


ACCELERATION * G, S *

V973-17.DAT

29.60 mph

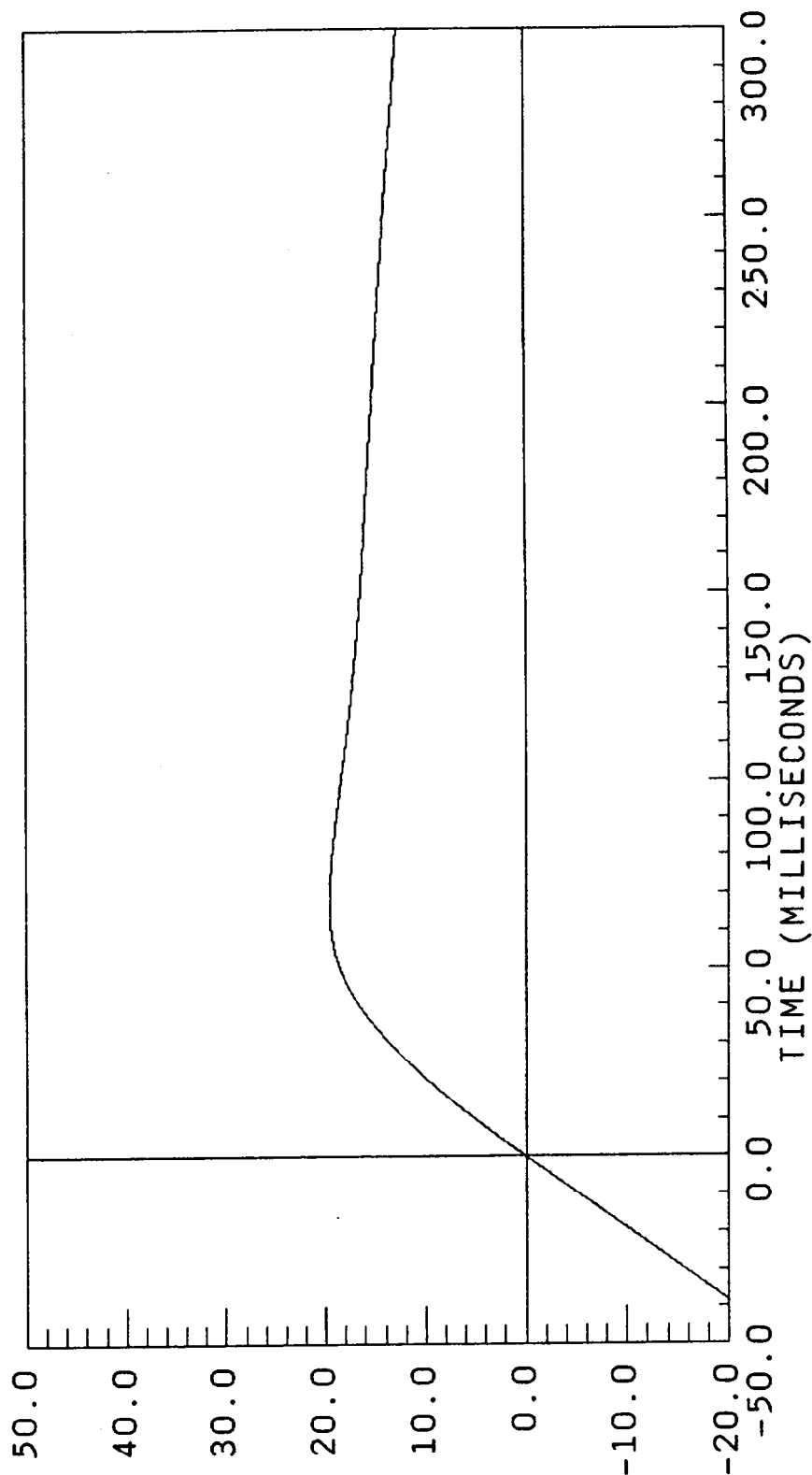
ACC PACK #1(X)
COMPUTED
FILTER CUTOFF: 0Hz
XL AXIS
YMIN = -2.828029 at 100.1250
YMAX = 29.51037 at -14.62500



29.60 mph

ACC PACK #1(X)
COMPUTED
FILTER CUTOFF: OHZ

XL AXIS
YMIN = -23.38714 at 100.1250
YMAX = 19.56298 at 67.05000

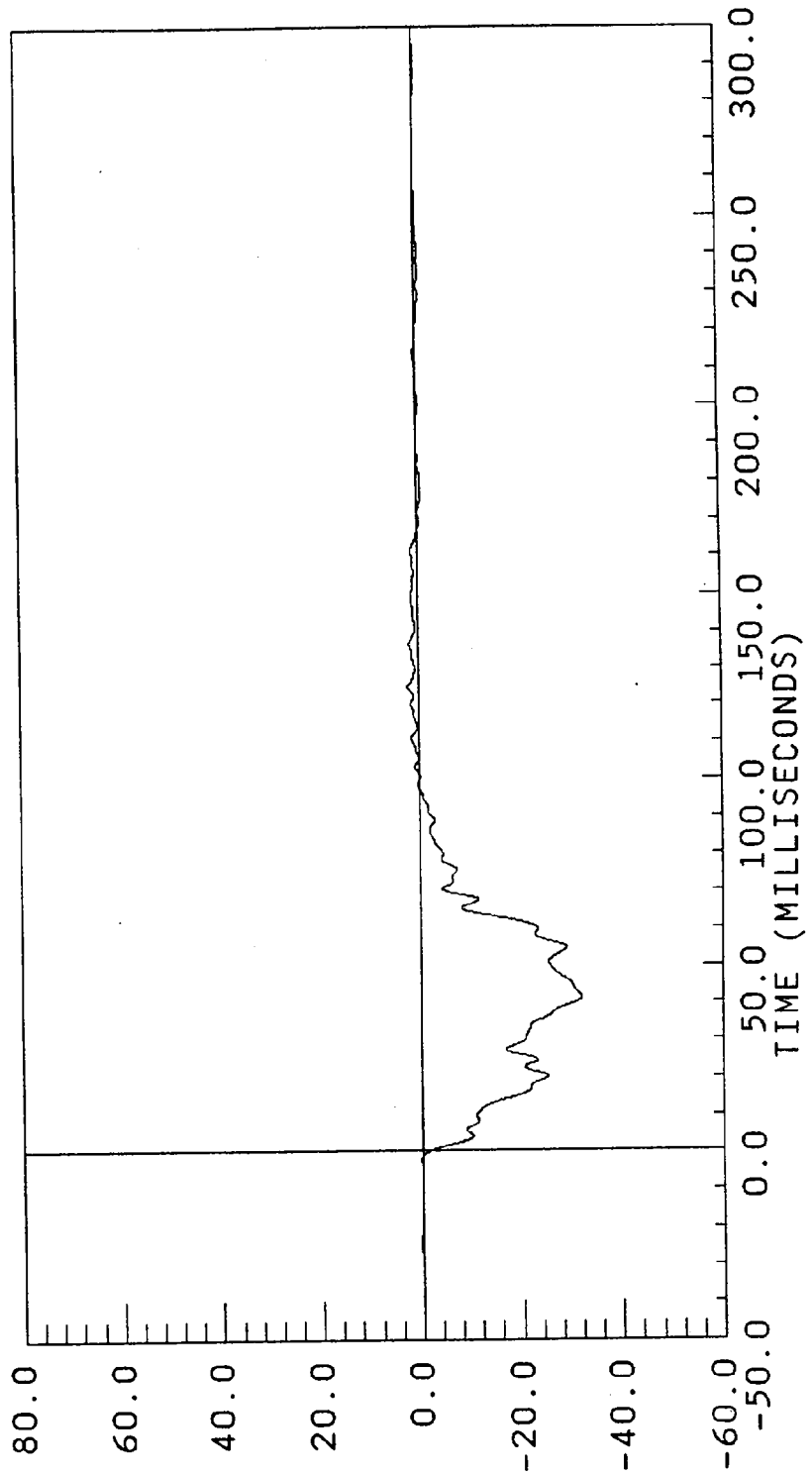


DISPLACEMENT * INCHES

BW973-18.DAT

29.60 mph

ACC PACK #2(X)
FILTERED
FILTER CUTOFF: 100Hz
XL AXIS
YMIN = -32.09622 at 41.32500
YMAX = 2.145918 at 124.5000



ACCELERATION * G, S *

29.60 mph

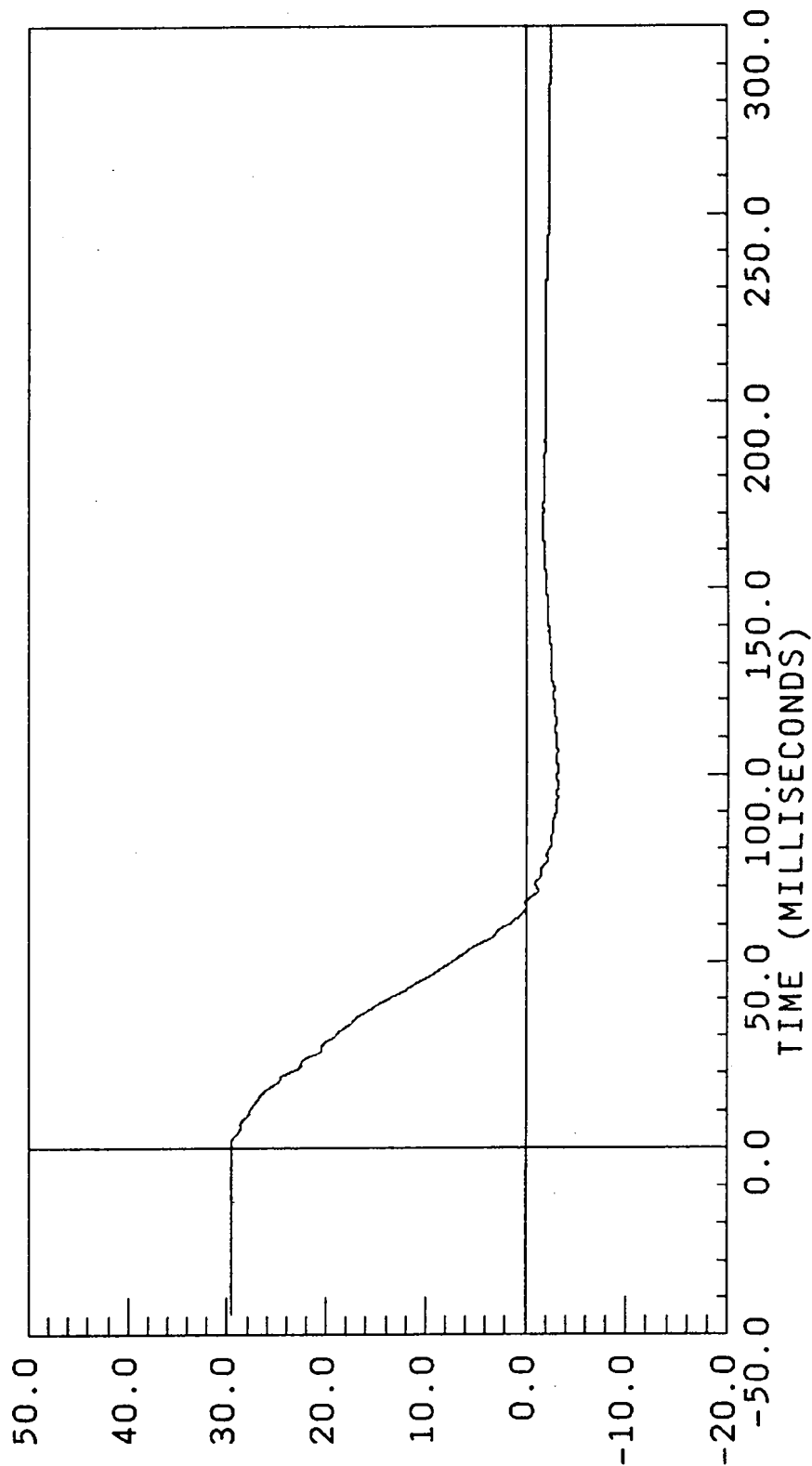
ACC PACK #2(X)
COMPUTED
FILTER CUTOFF:

OHZ

XL AXIS

YMIN = -3.185205 at 101.7750

YMAX = 29.64840 at -43.65000



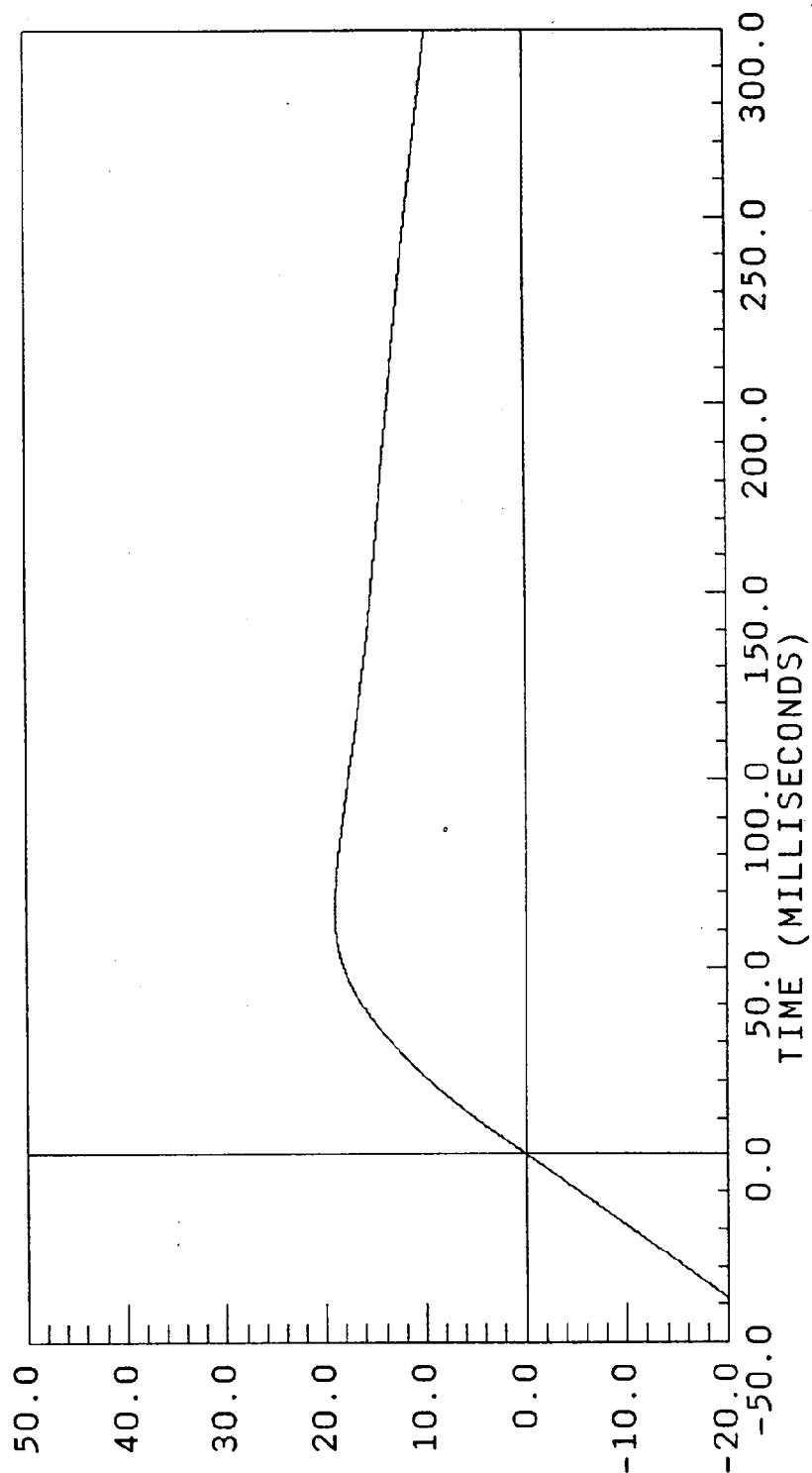
VELOCITY * MILES / HOUR

D973-18.DAT

29.60 mph

ACC PACK #2(X)
COMPUTED
FILTER CUTOFF: OHZ

XL AXIS
YMIN = -23.42930 at 101.7750
YMAX = 19.02056 at 63.82500



DISPLACEMENT * INCHES

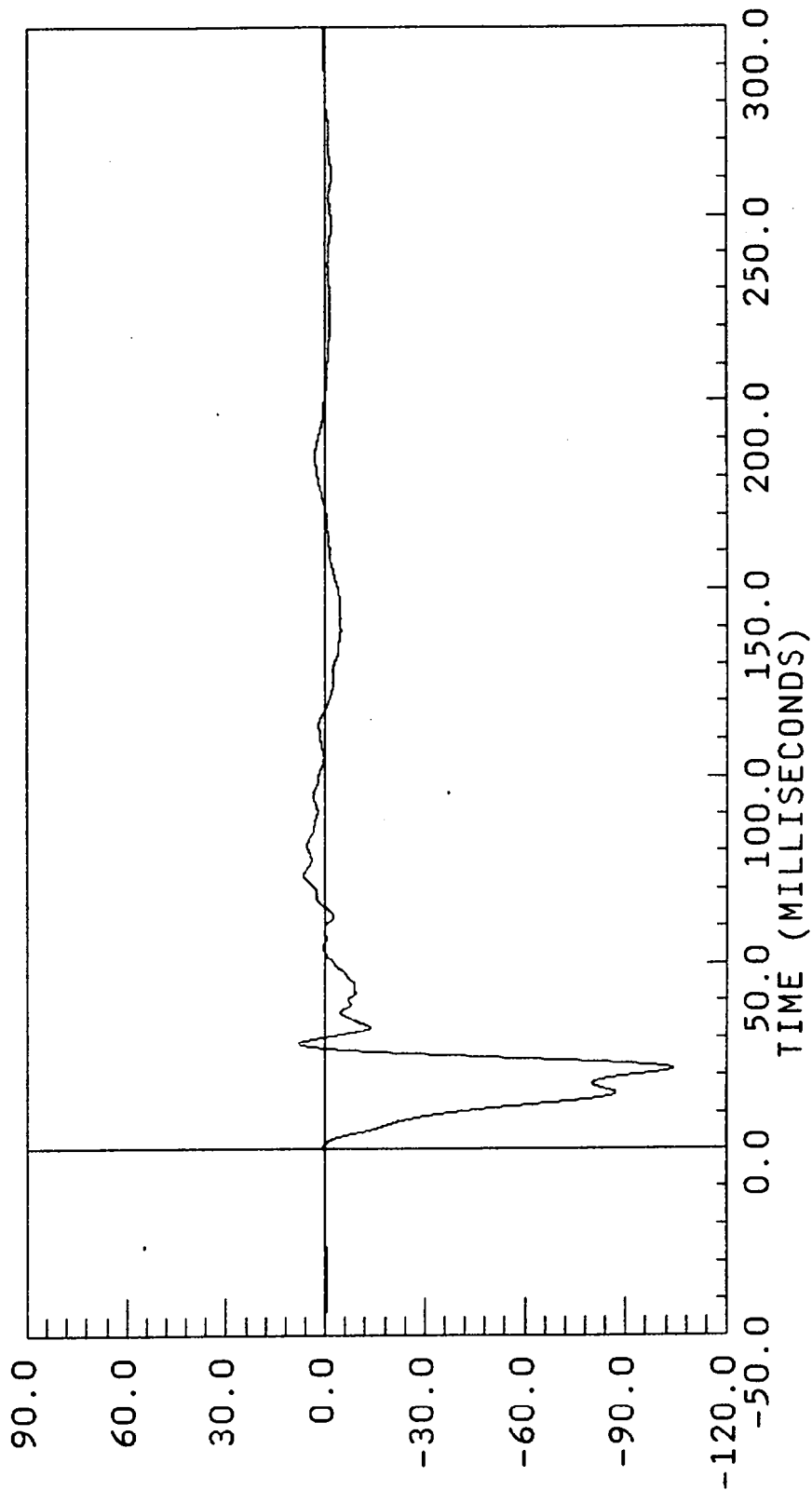
B-8

7804-10

29.60 mph

ACC PACK #3(X)
FILTERED
FILTER CUTOFF: 100HZ

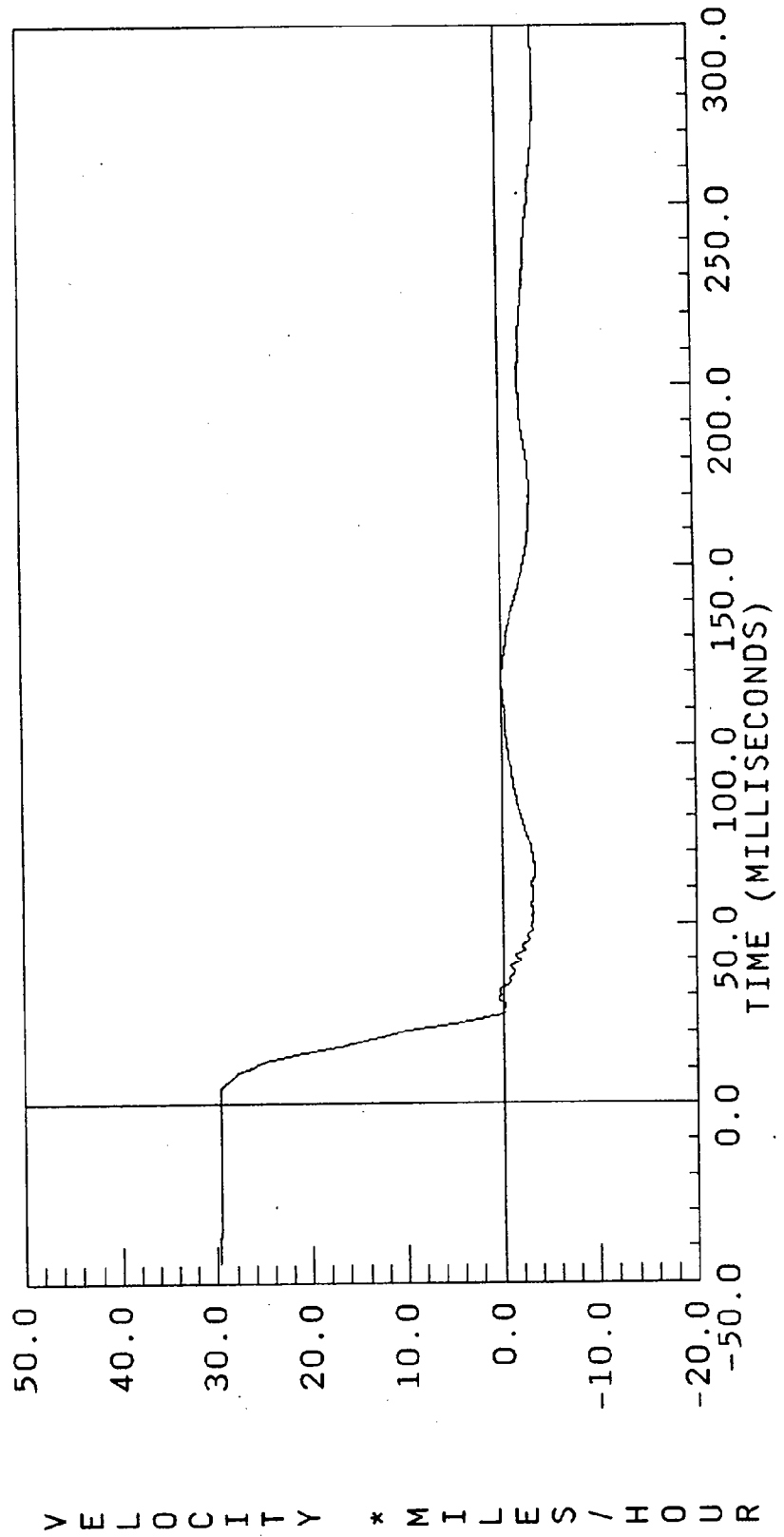
XL AXIS
YMIN = -104.0844 at 21.45000
YMAX = 8.157065 at 28.35000



V973-19.DAT

29.60 mph

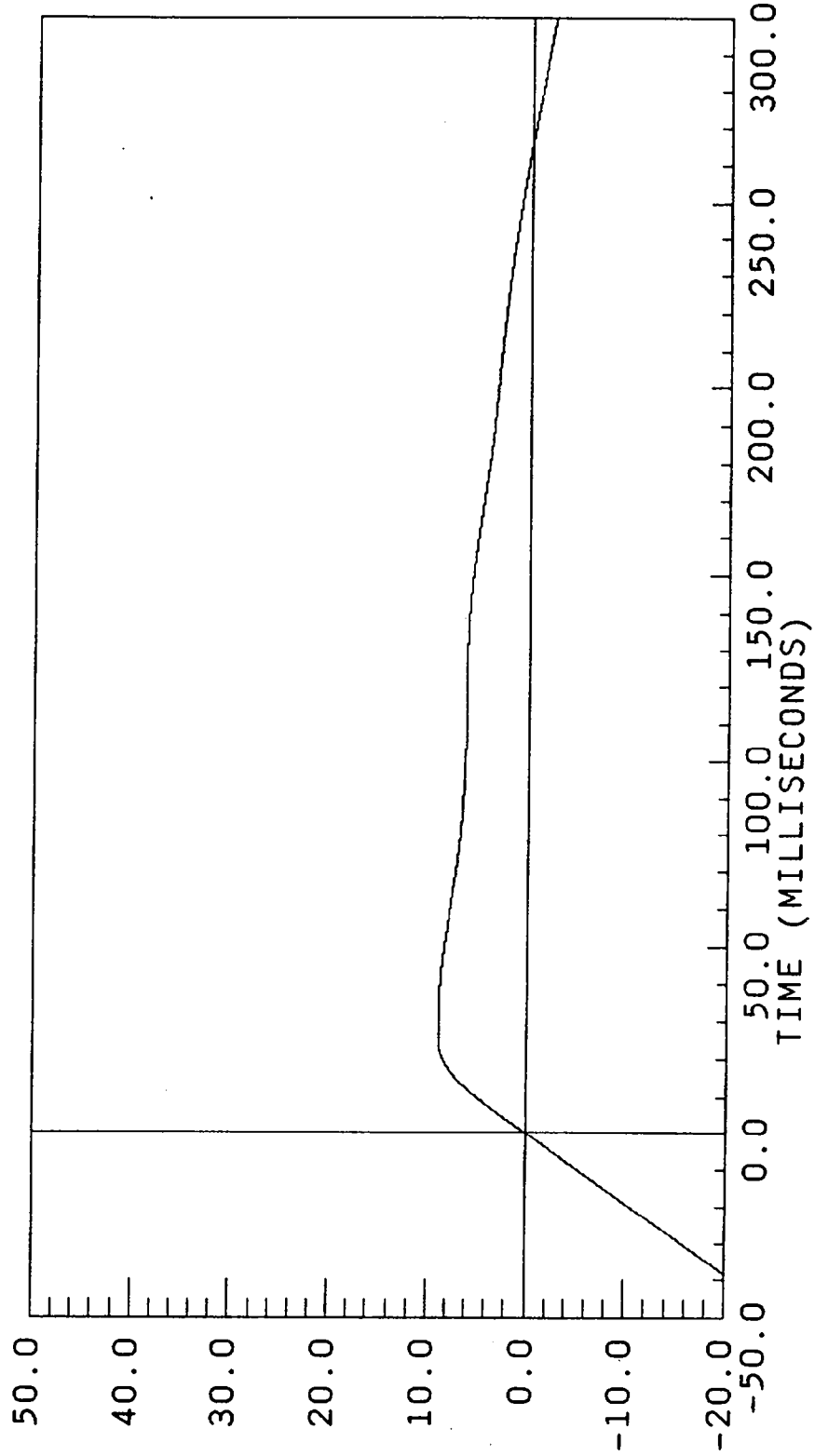
ACC PACK #3(X)
COMPUTED
FILTER CUTOFF: 0HZ
XL AXIS
YMIN = -4.023447 at 282.2250
YMAX = 29.74310 at -43.72500



29.60 mph

ACC PACK #3(X)
COMPUTED
FILTER CUTOFF: OHZ

XL AXIS
YMIN = -23.42249 at 282.2250
YMAX = 8.869253 at 32.17500

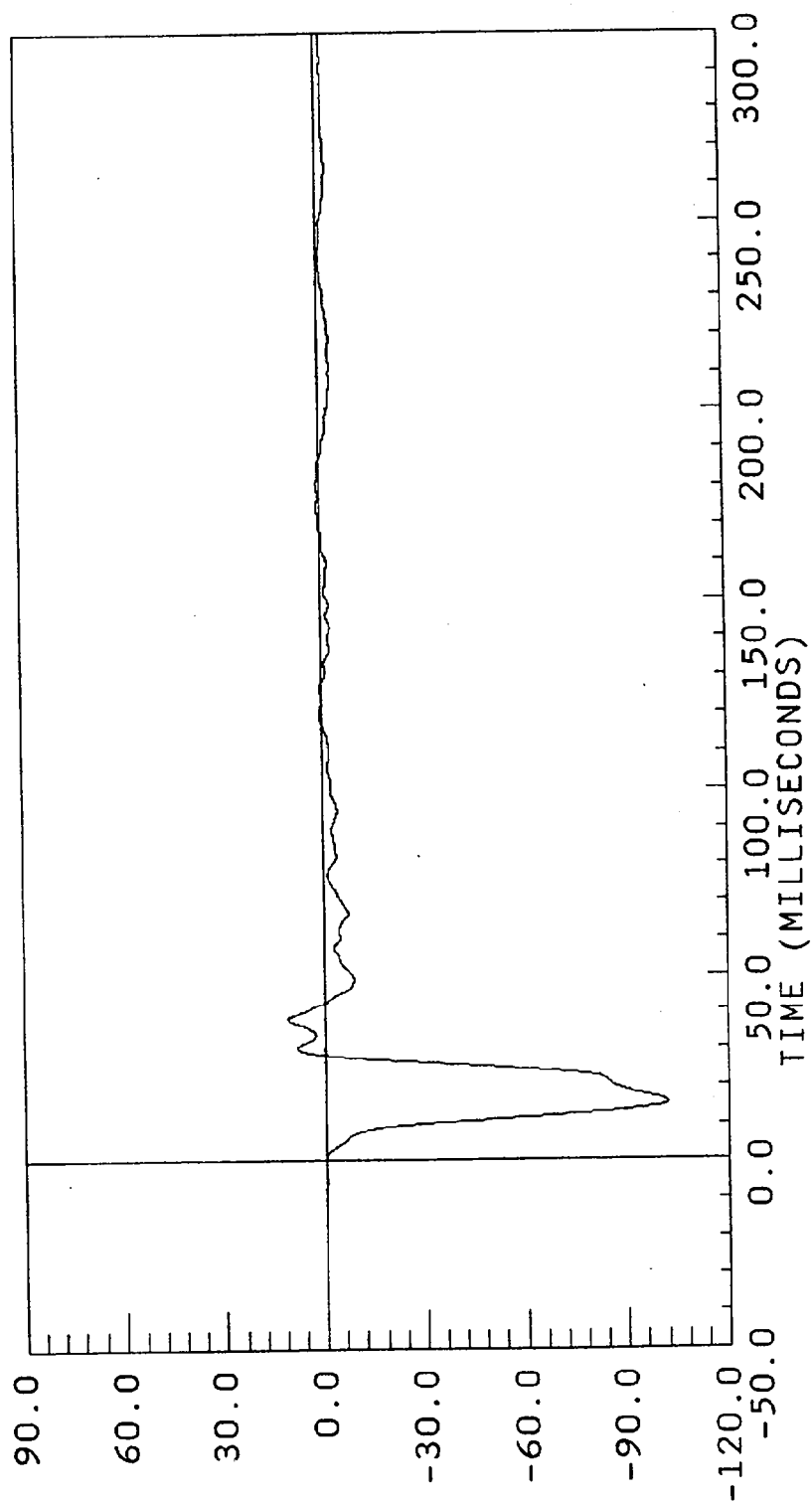


D I S P L A C E M E N T * I N C H E S

BW973-20.DAT

29.60 mph

ACC PACK #4(X)
FILTERED
FILTER CUTOFF: 100Hz
XL AXIS
YMIN = -102.1801 at 15.30000
YMAX = 11.20080 at 37.80000

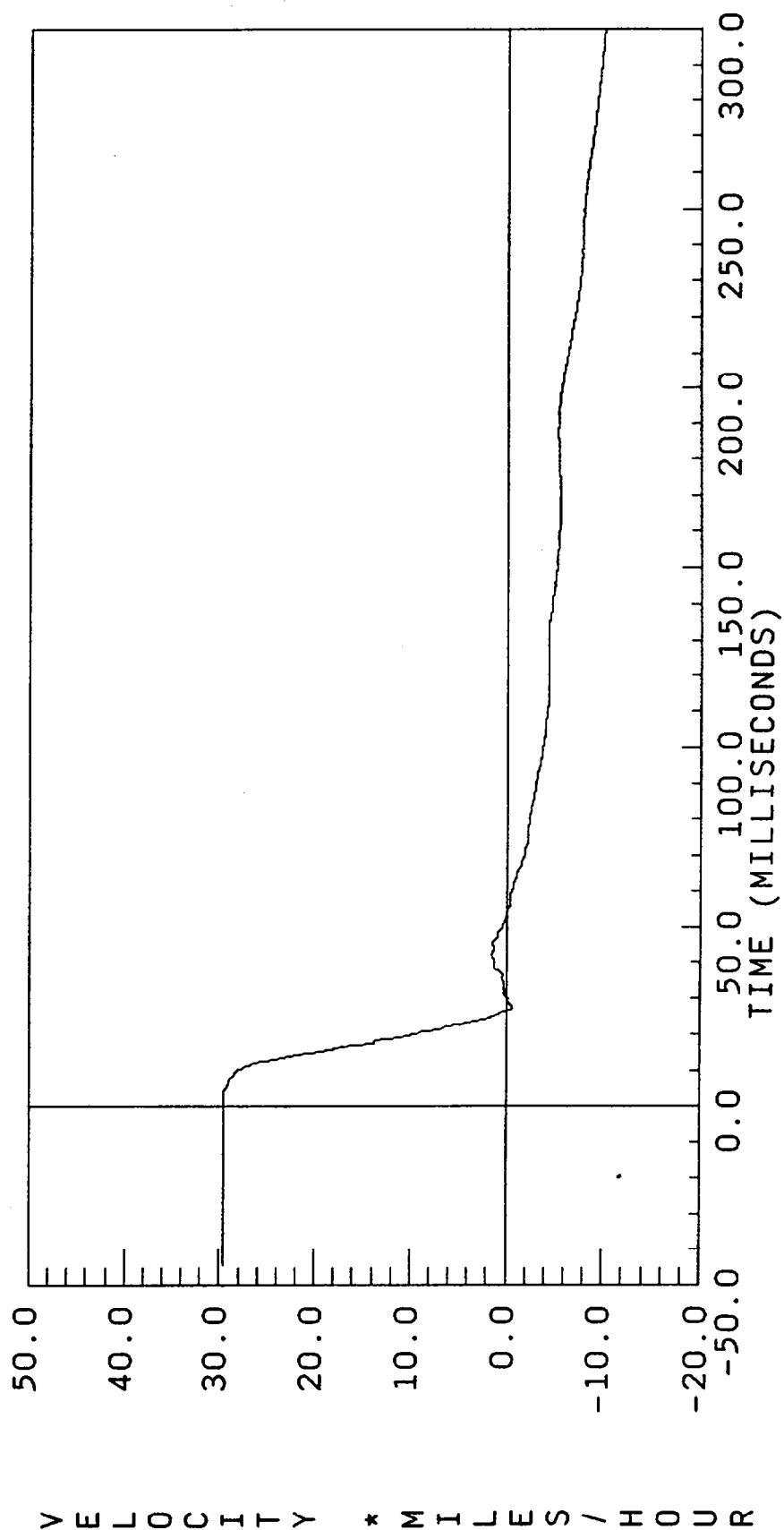


ACCELERATION * G * S *
B-12 7804-10

29.60 mph

ACC PACK #4(X)
COMPUTED
FILTER CUTOFF: 0Hz

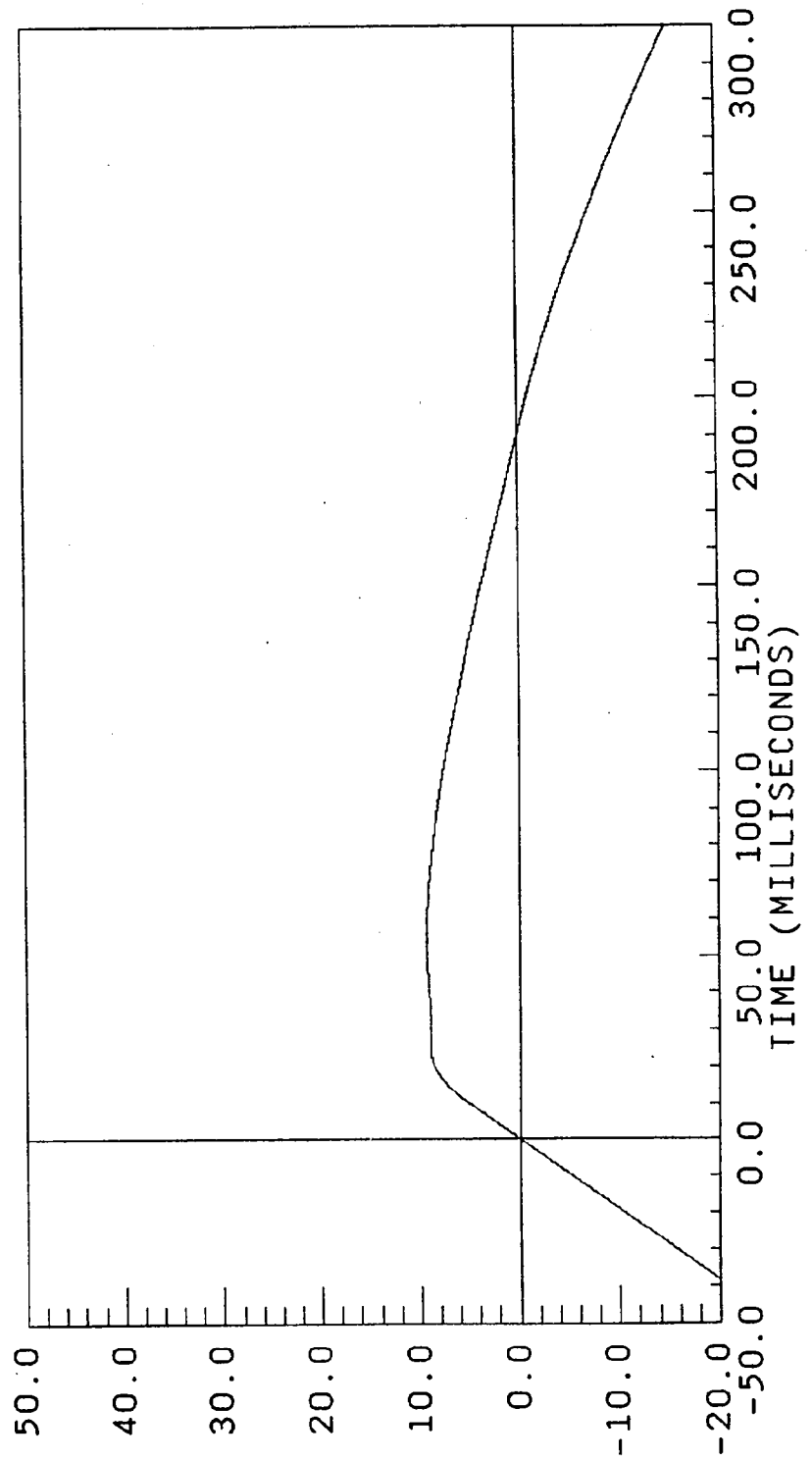
XL AXIS
YMIN = -10.07809 at 300.0000
YMAX = 29.62565 at -44.02500



D973-20.DAT

29.60 mph

ACC PACK #4(X)
COMPUTED
FILTER CUTOFF: 0Hz
XL AXIS
YMIN = -23.40483 at 300.0000
YMAX = 9.313780 at 52.95000



DISPLACEMENT * INCHES

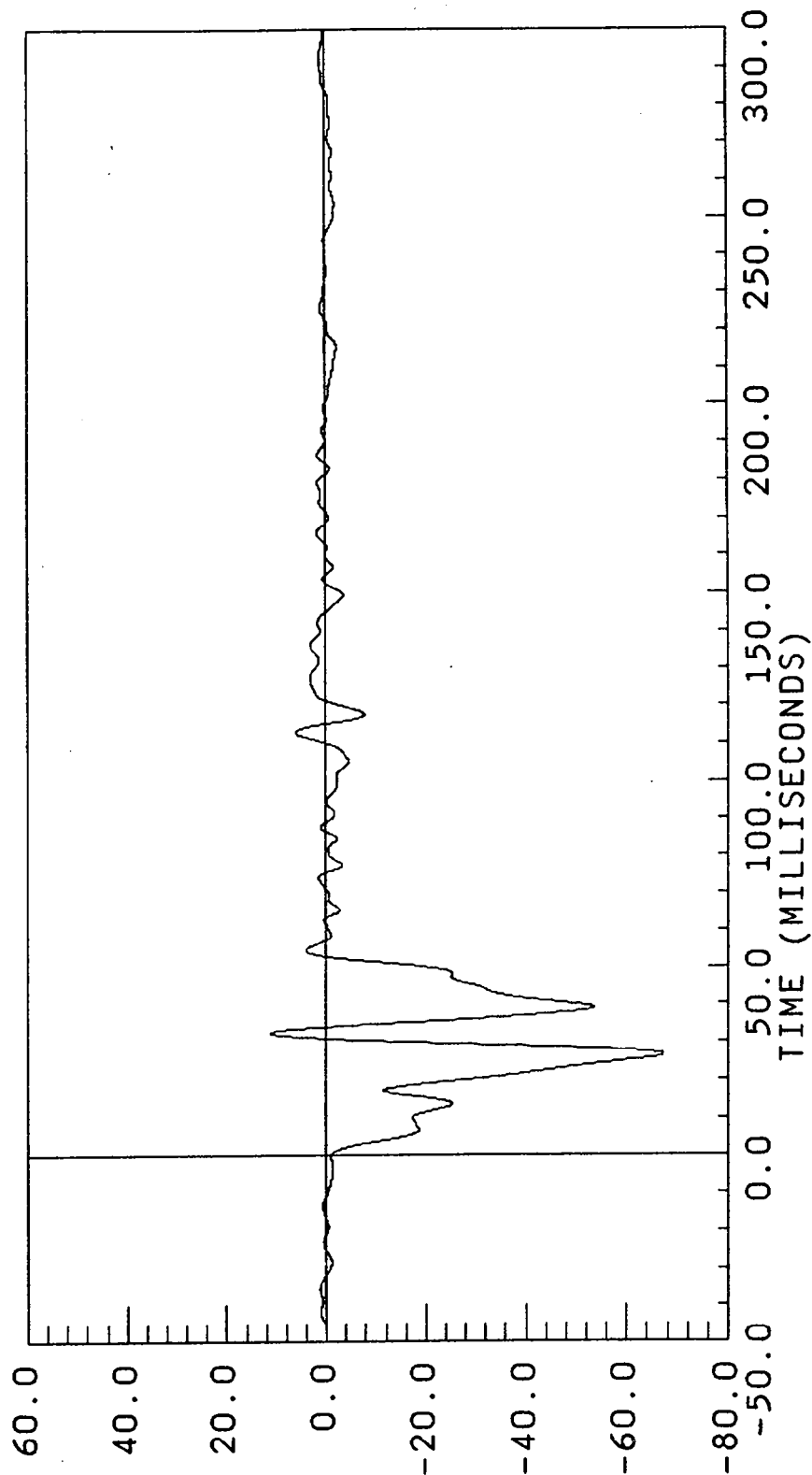
B-14

7804-10

29.60 mph

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

XL AXIS
 YMIN = -67.31631 at 26.47500
 YMAX = 11.20374 at 32.47500

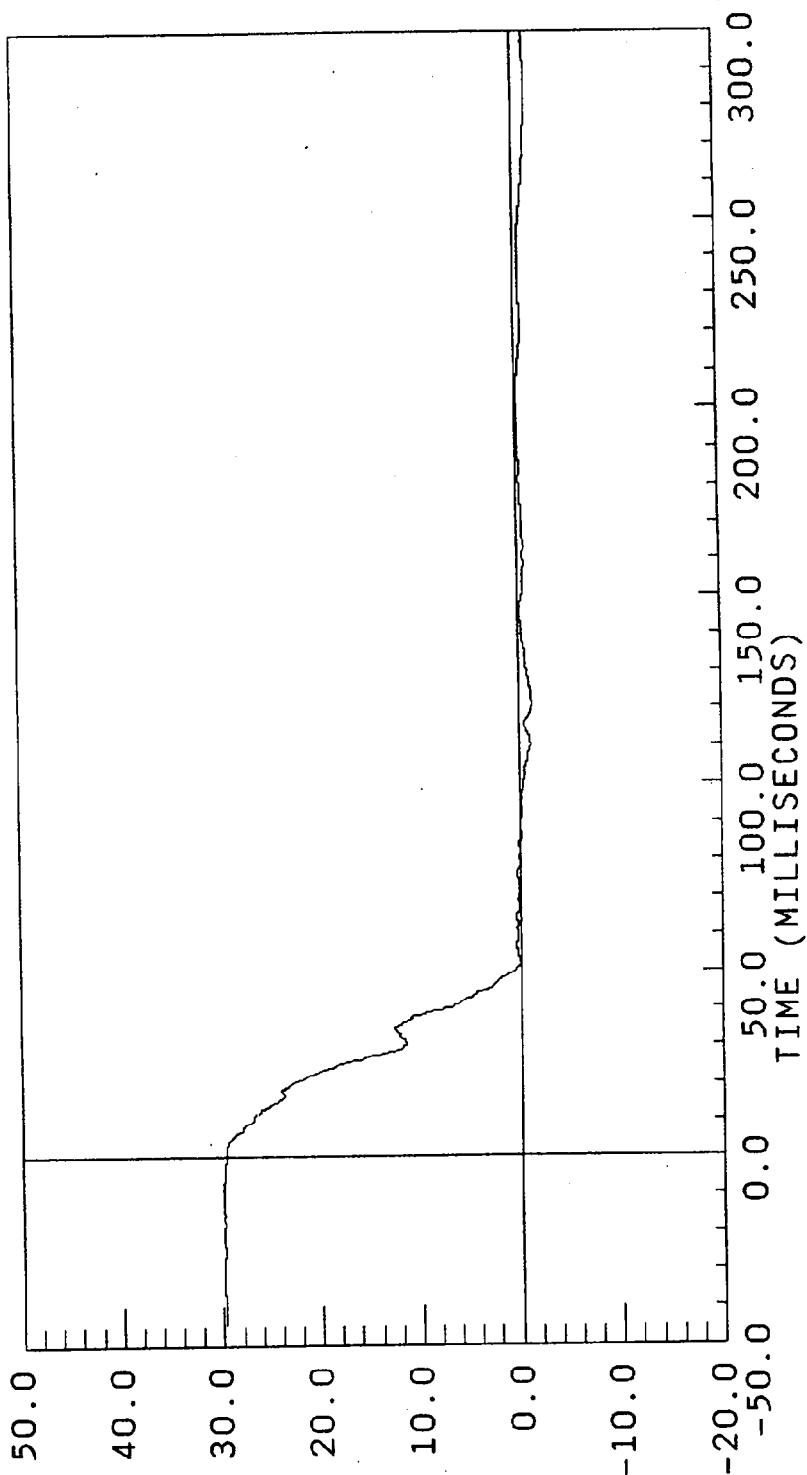


ACCELERATION * G * S *

V973-21.DAT

29.60 mph

ACC PACK #5(X)
COMPUTED
FILTER CUTOFF: 0HZ
XL AXIS
YMIN = -1.455000 at 284.5500
YMAX = 29.67409 at -31.20000



VELOCITY * MILES / HOUR

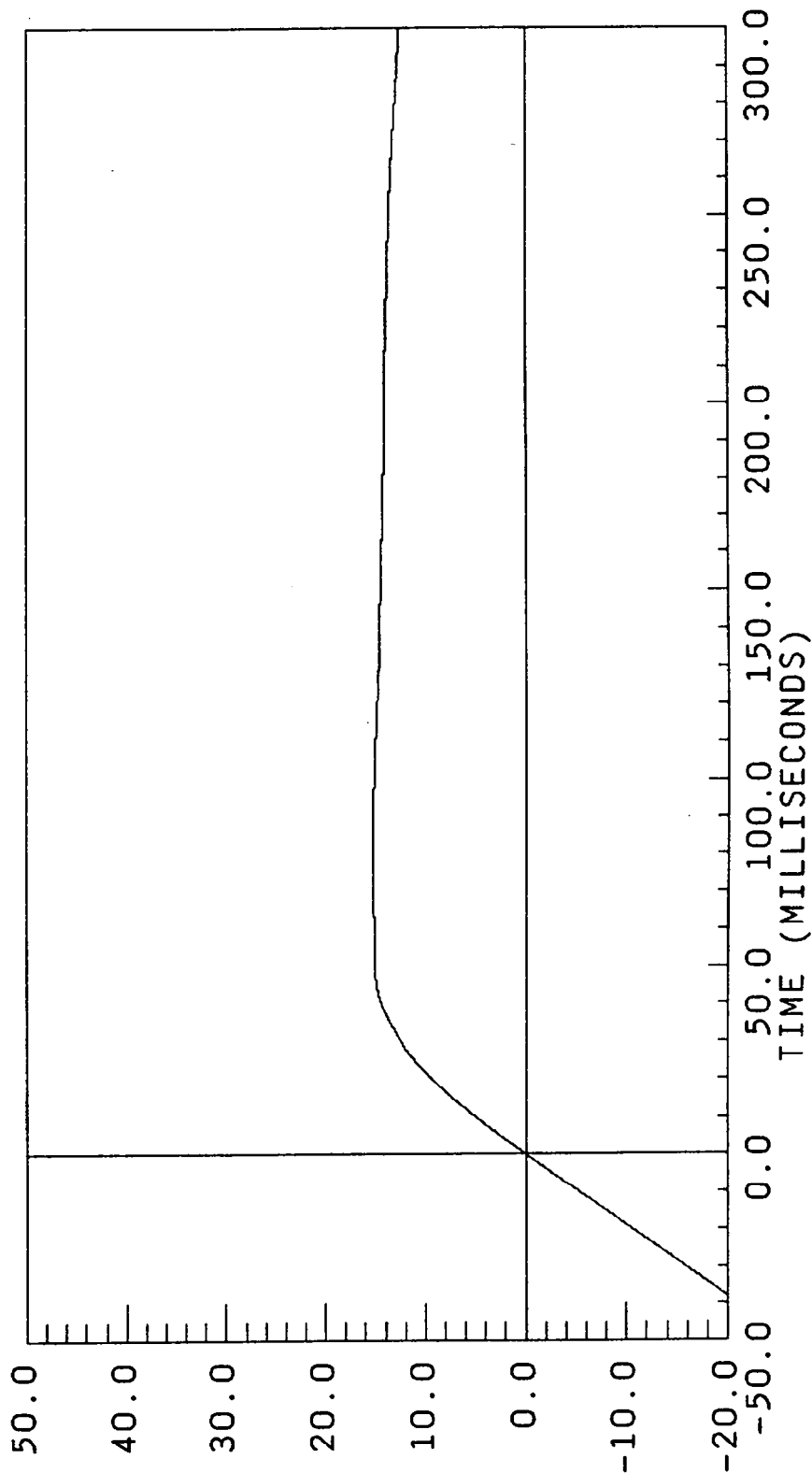
B-16

7804-10

29.60 mph

ACC PACK #5(X)
COMPUTED
FILTER CUTOFF: 0Hz

XL AXIS
YMIN = -23.57824 at 284.5500
YMAX = 15.21039 at 77.85001

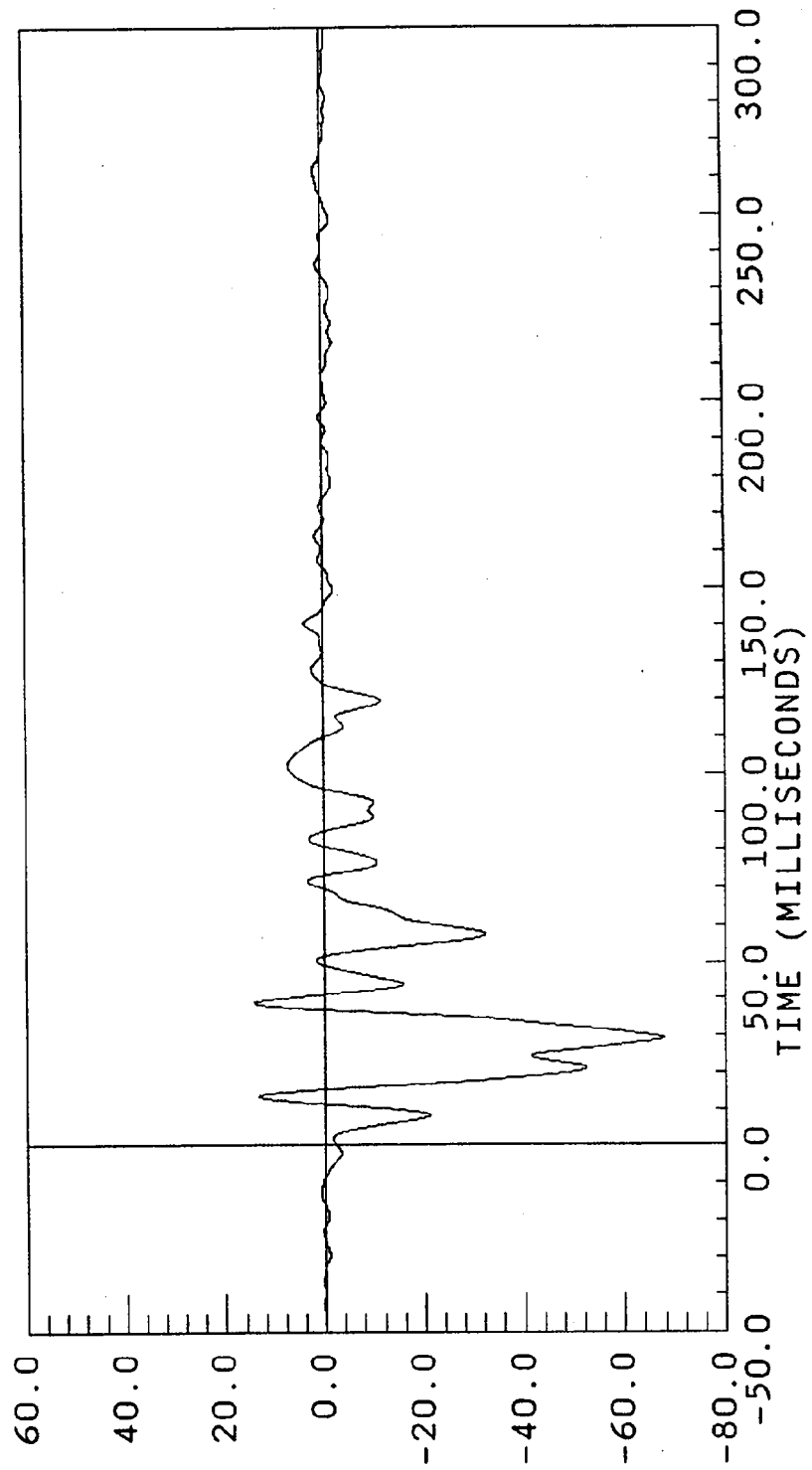


DISPLACEMENT * INCHES

BW973-22.DAT

29.60 mph

ACC PACK #6(X)
FILTERED
FILTER CUTOFF: 100HZ
XL AXIS
YMIN = -67.91385 at 29.25000
YMAX = 14.22303 at 38.85000



29.60 mph

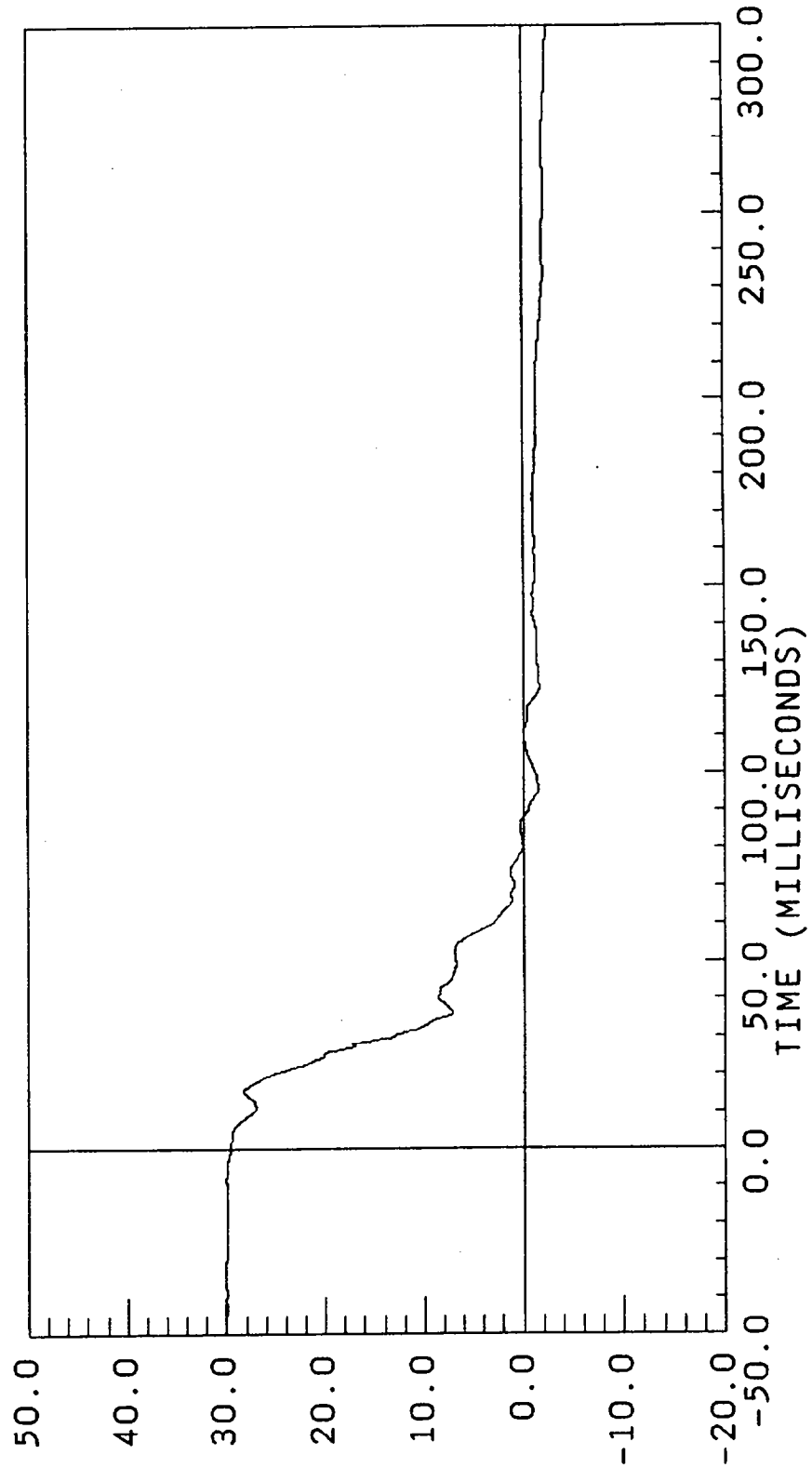
ACC PACK #6(X)
COMPUTED
FILTER CUTOFF:

OHZ

XL AXIS

YMIN = -2.531549 at 299.3250

YMAX = 29.93129 at -32.17500

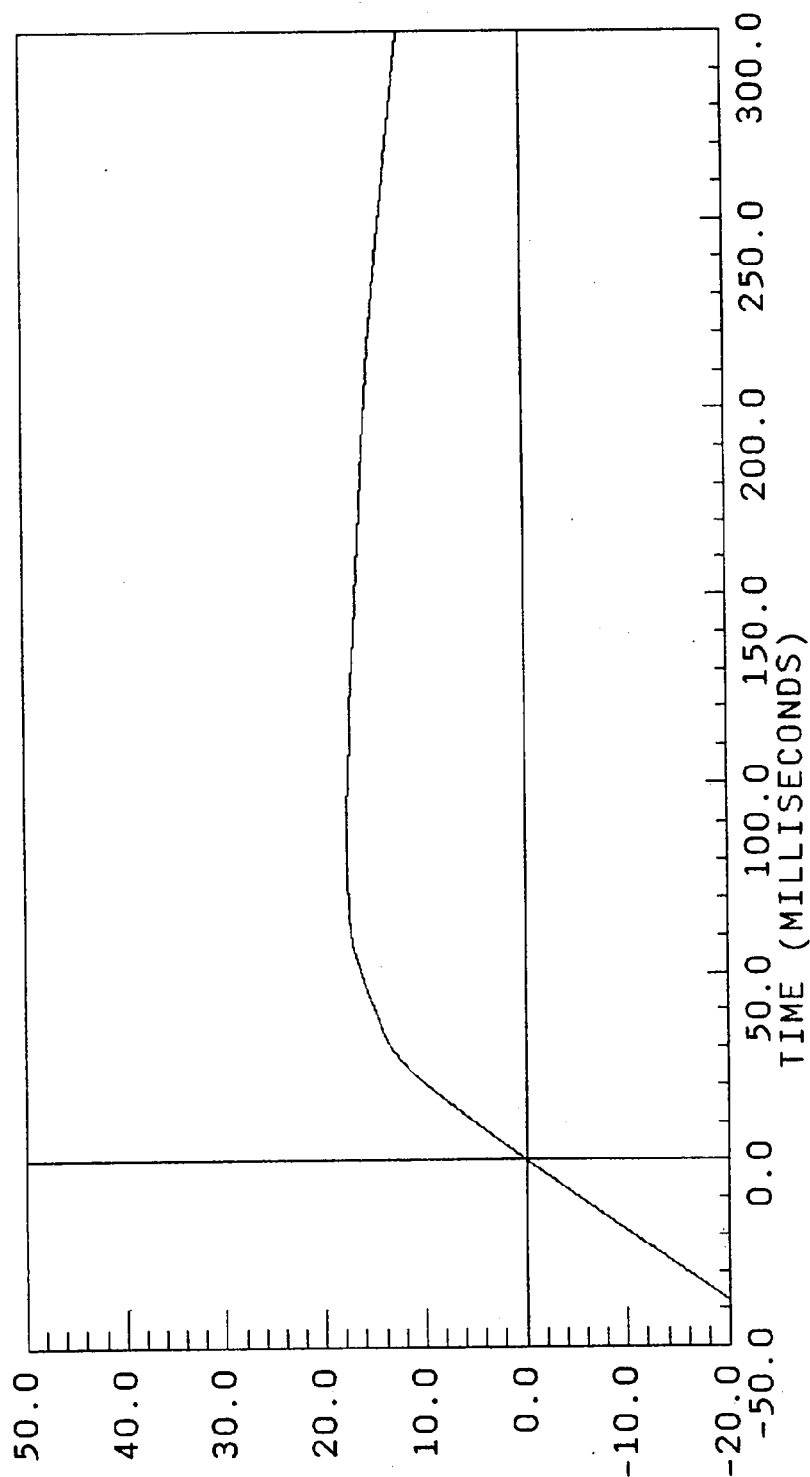


VELOCITY * MILES / HOUR

D973-22.DAT

29.60 mph

ACC PACK #6(X) XL AXIS
COMPUTED YMIN = -23.67374 at 299.3250
FILTER CUTOFF: 0Hz YMAX = 17.78132 at 87.82500



DISPLACEMENT * INCHES

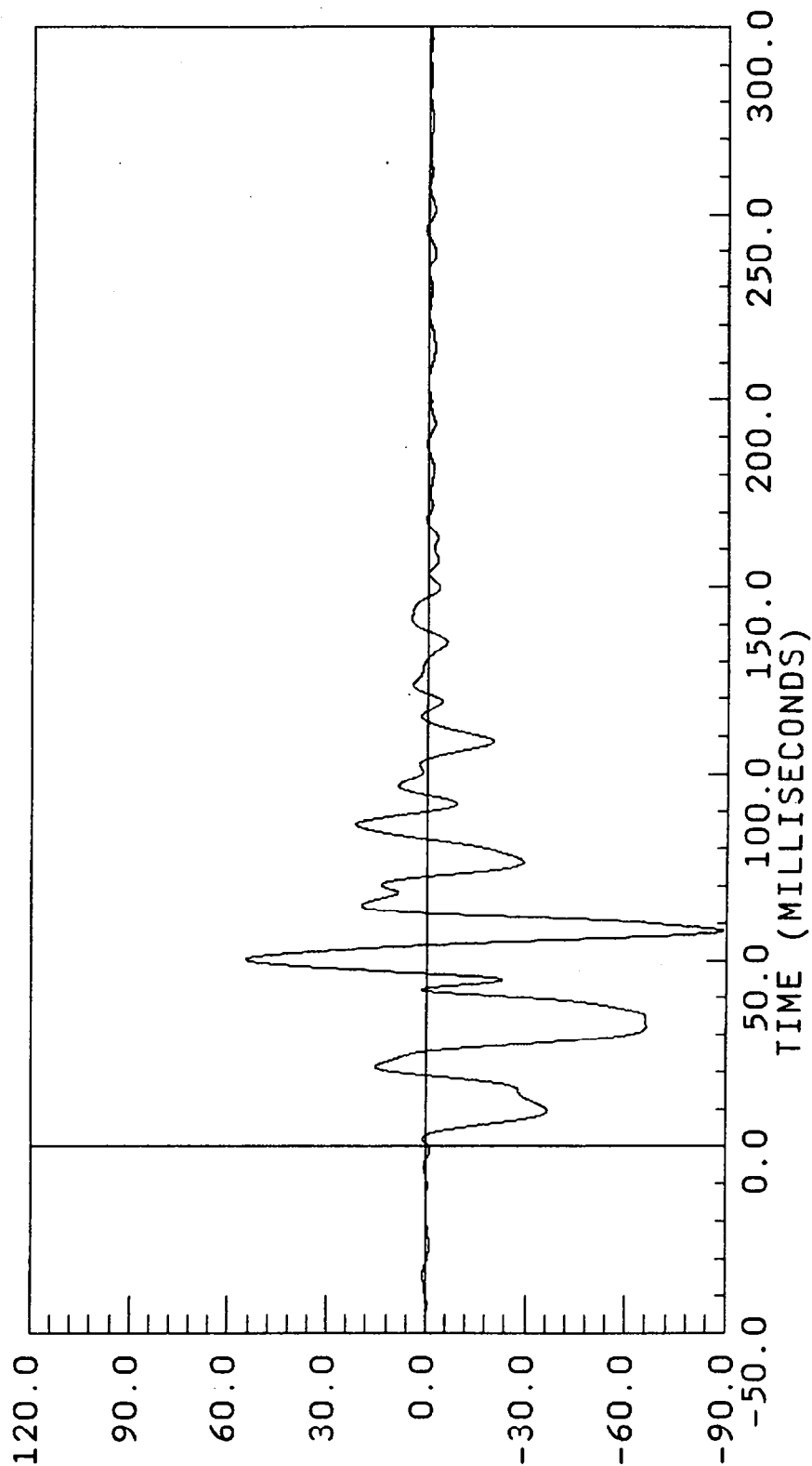
B-20

7804-10

29.60 mph

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

XL AXIS
 YMIN = -88.89054 at 57.90000
 YMAX = 54.77580 at 50.32500



V973-23.DAT

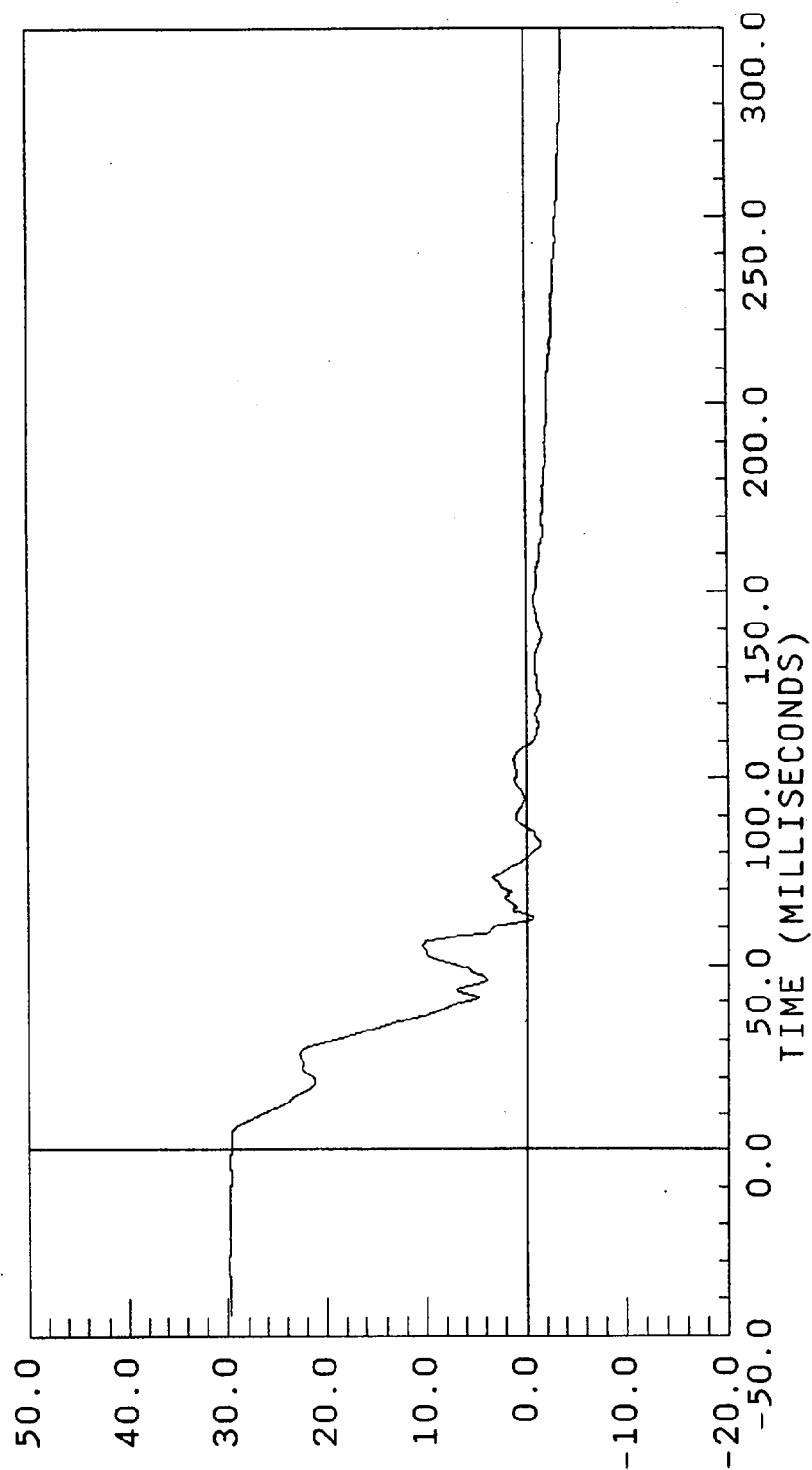
29.60 mph

ACC PACK #7(X)
COMPUTED
FILTER CUTOFF:

0Hz

XL AXIS

YMIN = -3.903022 at 300.0000
YMAX = 29.79936 at -32.10000



VELOCITY * MILES / HOUR

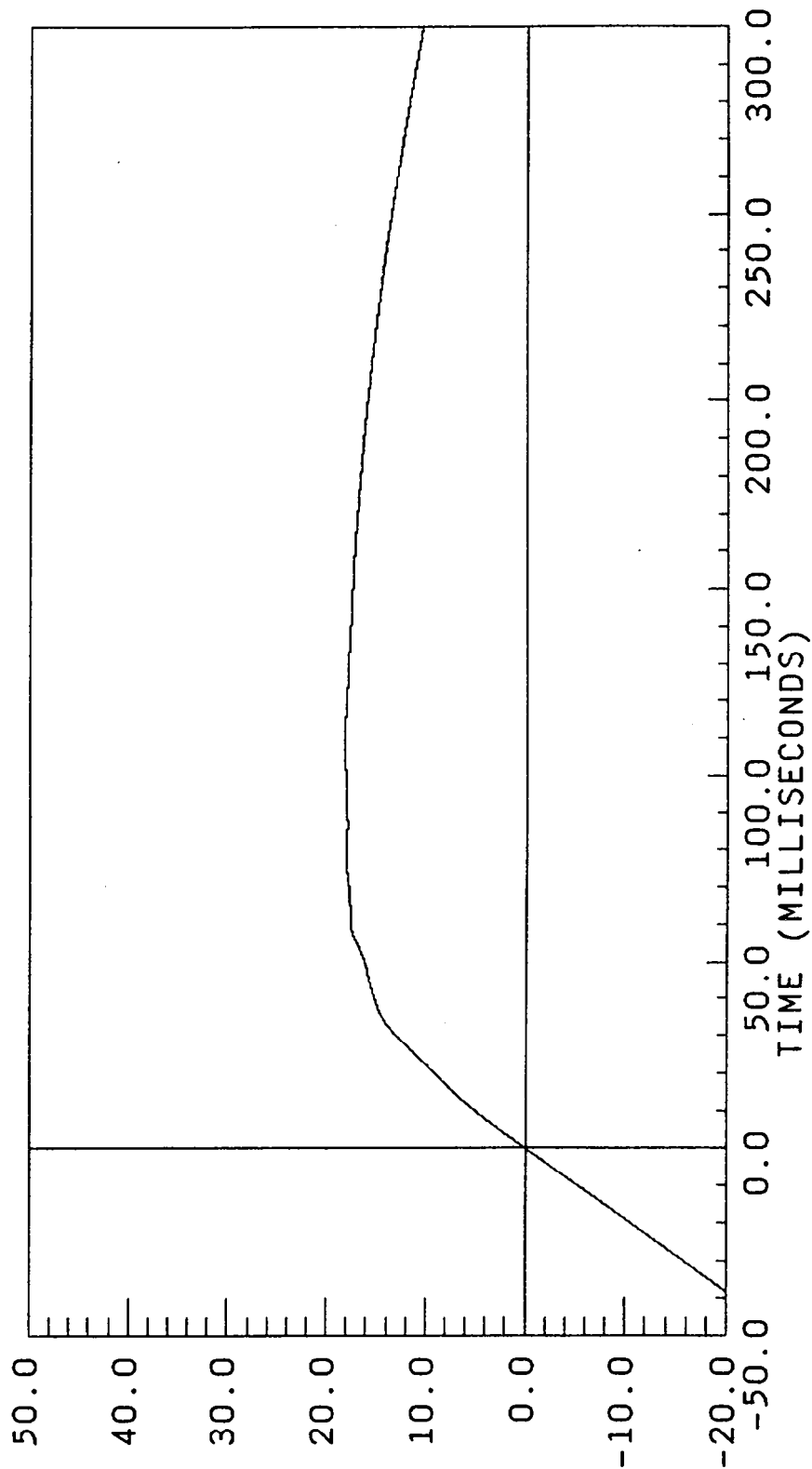
B-22

7804-10

29.60 mph

ACC PACK #7(X)
COMPUTED
FILTER CUTOFF: OHZ

XL AXIS
YMIN = -23.51014 at 300.0000
YMAX = 18.24651 at 108.7500

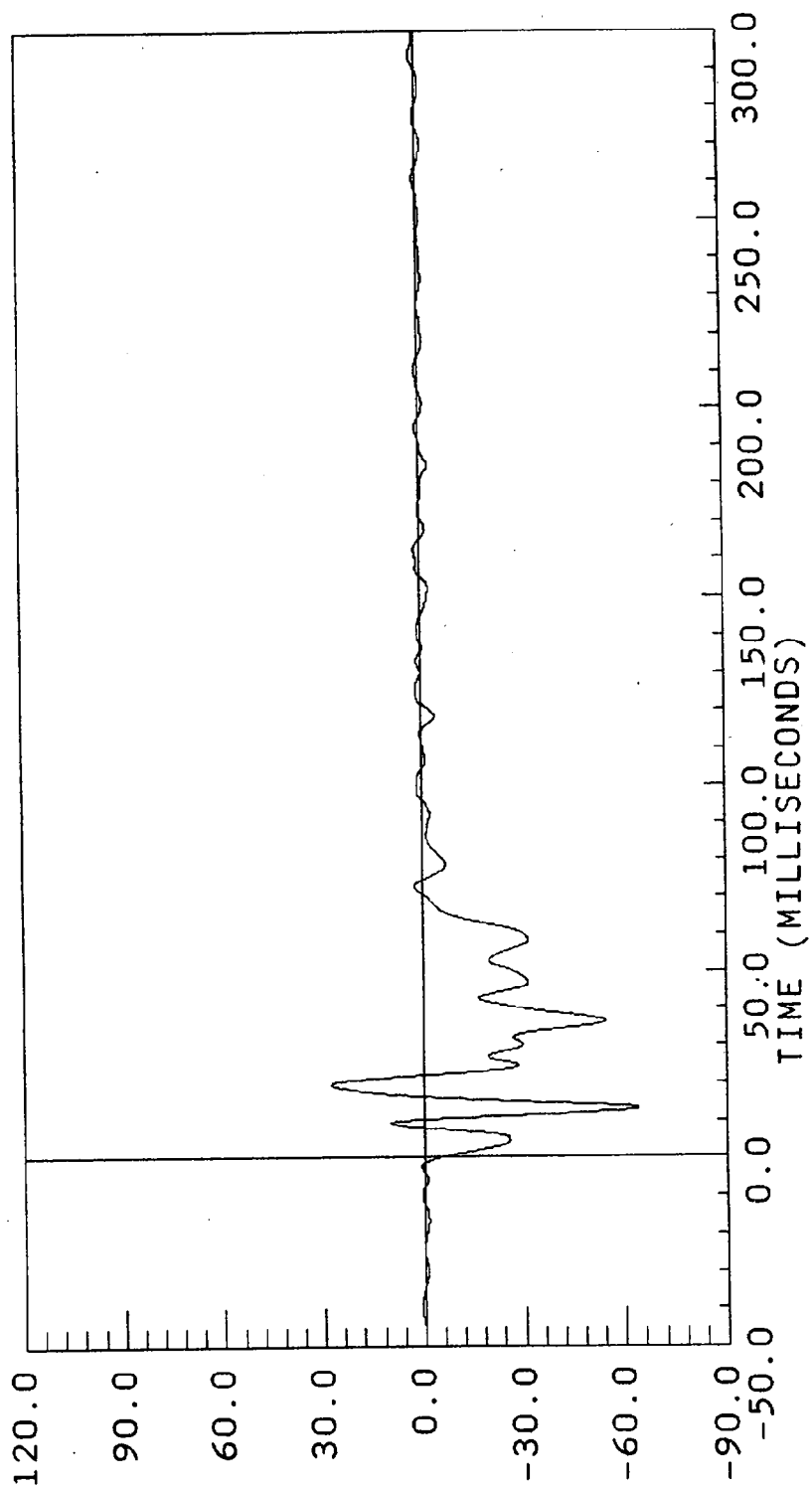


D I S P L A C E M E N T * I N C H E S

BW973-24.DAT

29.60 mph

ACC PACK #8(X)
FILTERED
FILTER CUTOFF: 100Hz
XL AXIS
YMIN = -63.91936 at 13.12500
YMAX = 27.86093 at 19.57500



ACCELERATION * G, S *

B-24

7804-10

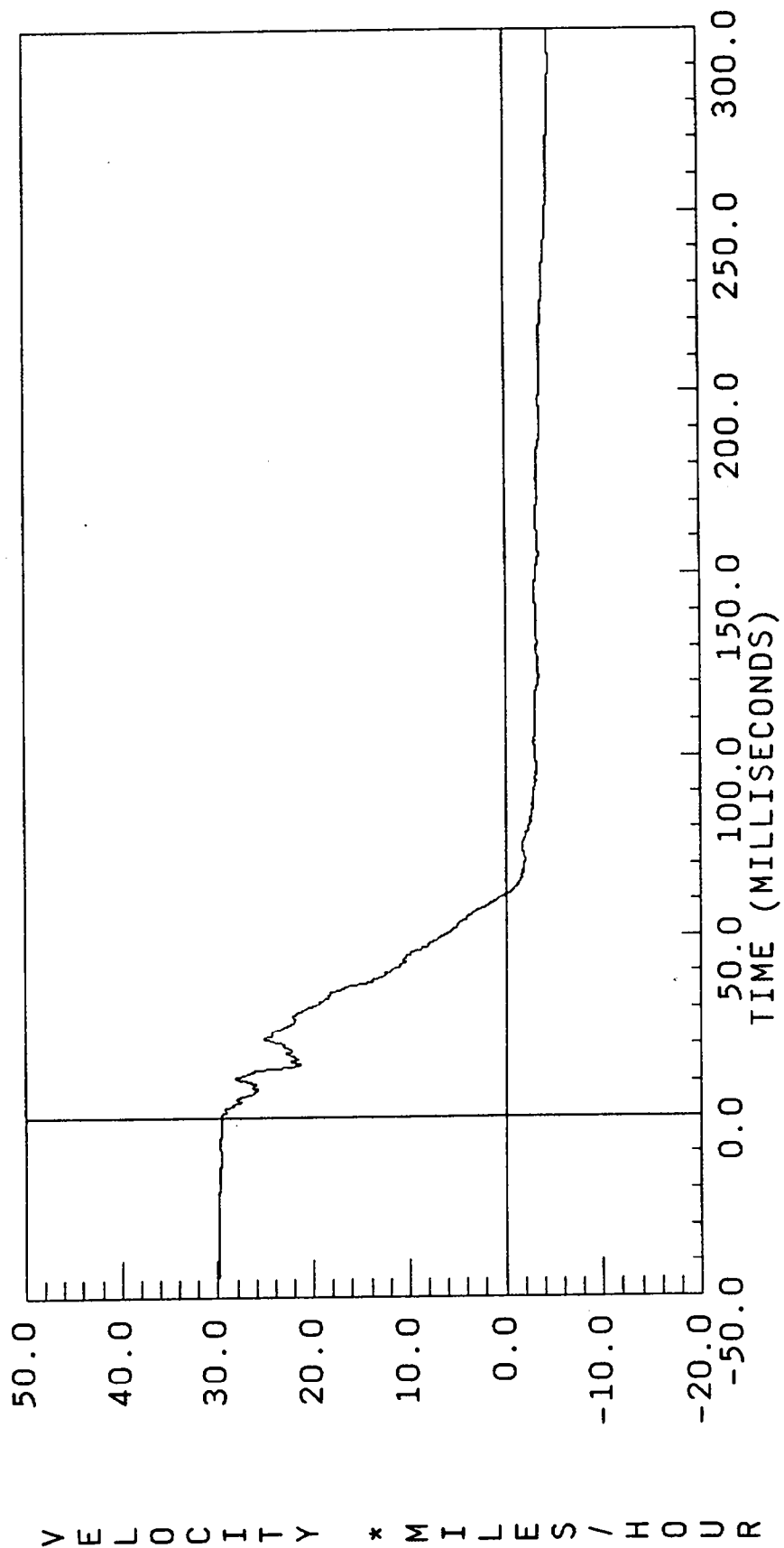
29.60 mph

ACC PACK #8(X)
COMPUTED
FILTER CUTOFF:

OHZ

XL AXIS

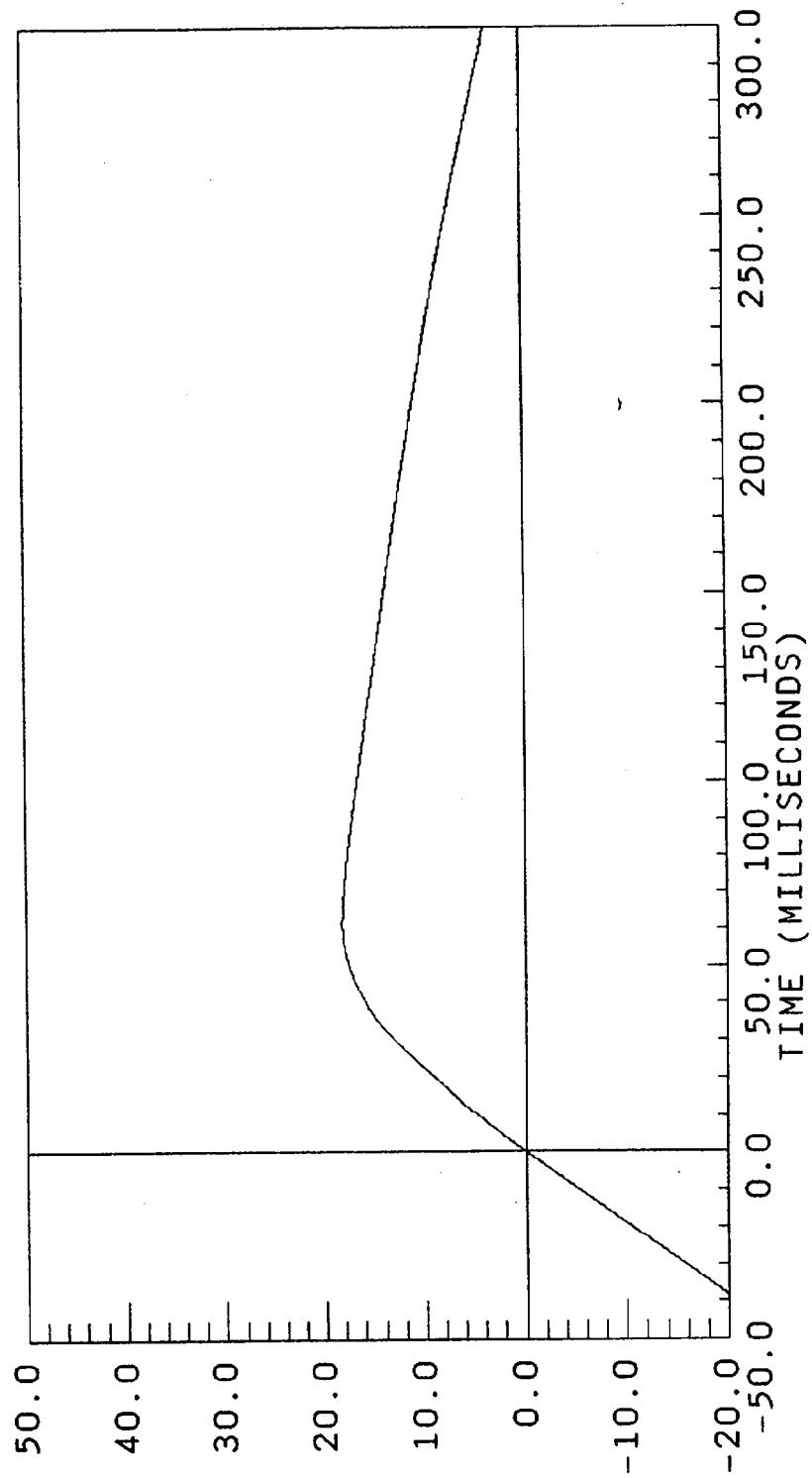
YMIN = -4.828850 at 289.7250
YMAX = 29.82680 at -35.55000



D973-24.DAT

29.60 mph

ACC PACK #8(X) XL AXIS
COMPUTED YMIN = -23.55119 at 289.7250
FILTER CUTOFF: 0HZ YMAX = 18.30245 at 61.20000

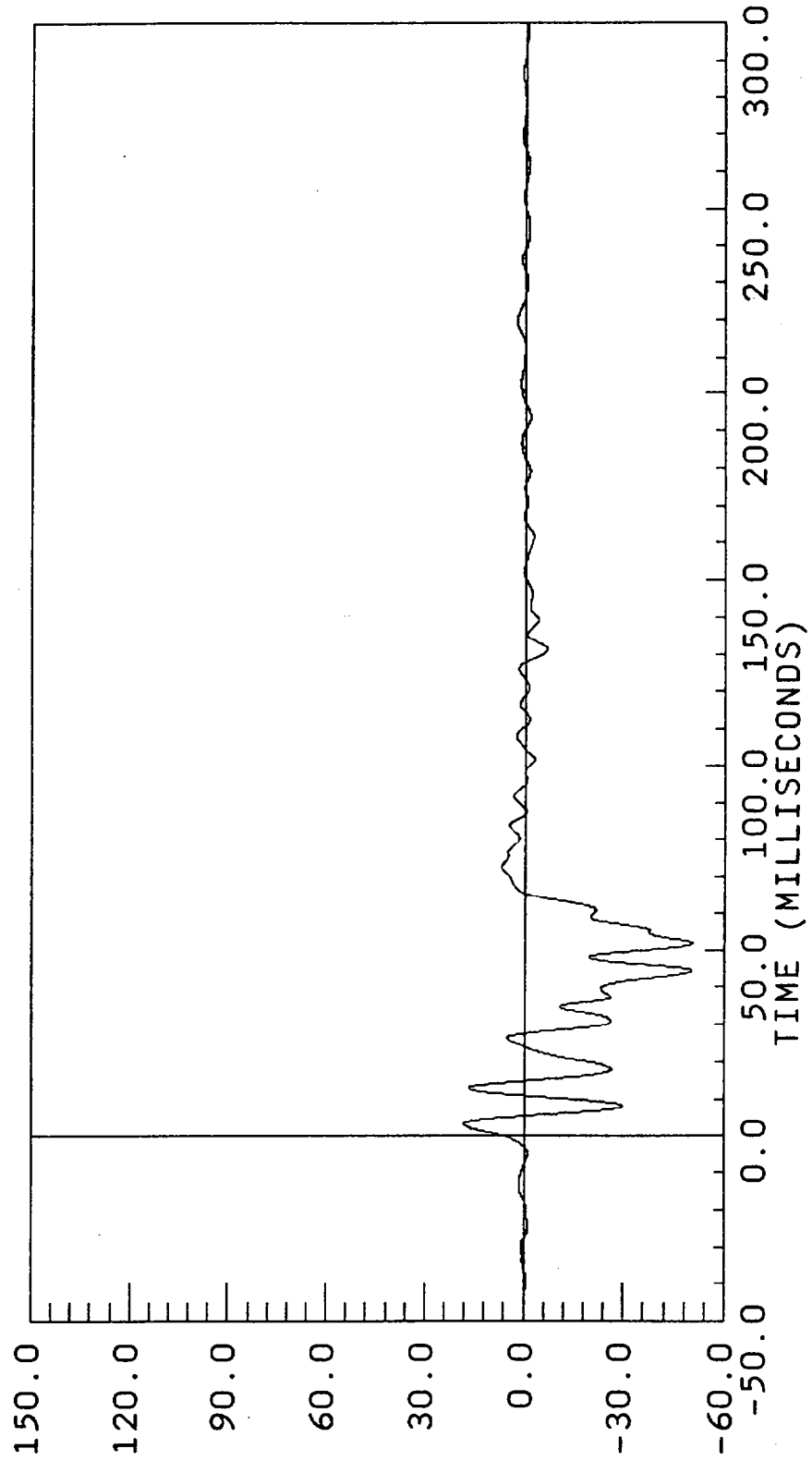


DISPLACEMENT * INCHES

29.60 mph

ACC PACK #10(X)
 FILTERED
 FILTER CUTOFF: 100HZ

XL AXIS
 YMIN = -50.61433 at 51.75000
 YMAX = 18.19534 at 3.150000

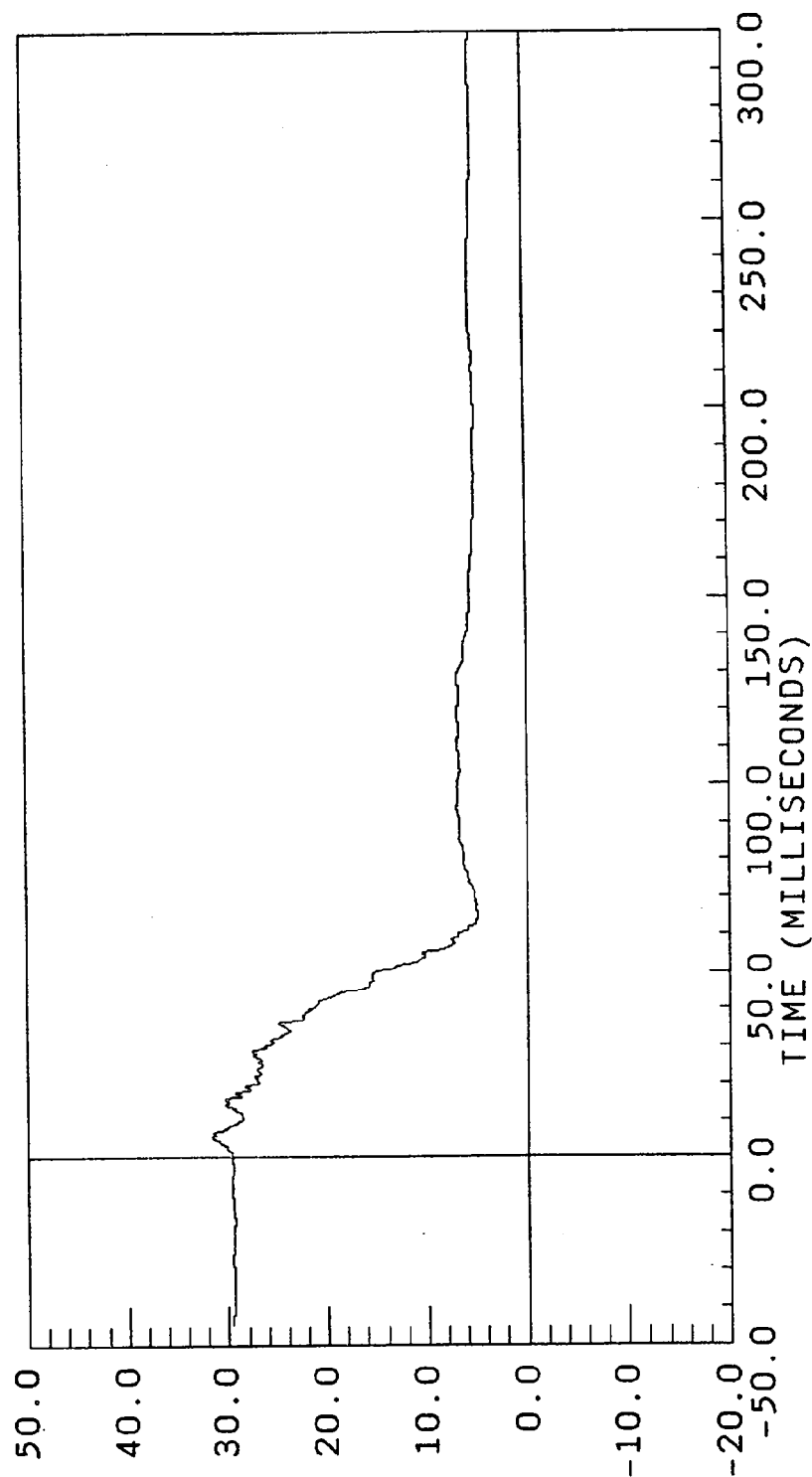


ACCELERATION * G * S *

V973-25.DAT

29.60 mph

ACC PACK #10(X) XL AXIS
COMPUTED YMIN = 4.792047 at 64.42500
FILTER CUTOFF: OHZ YMAX = 31.63497 at 5.325000

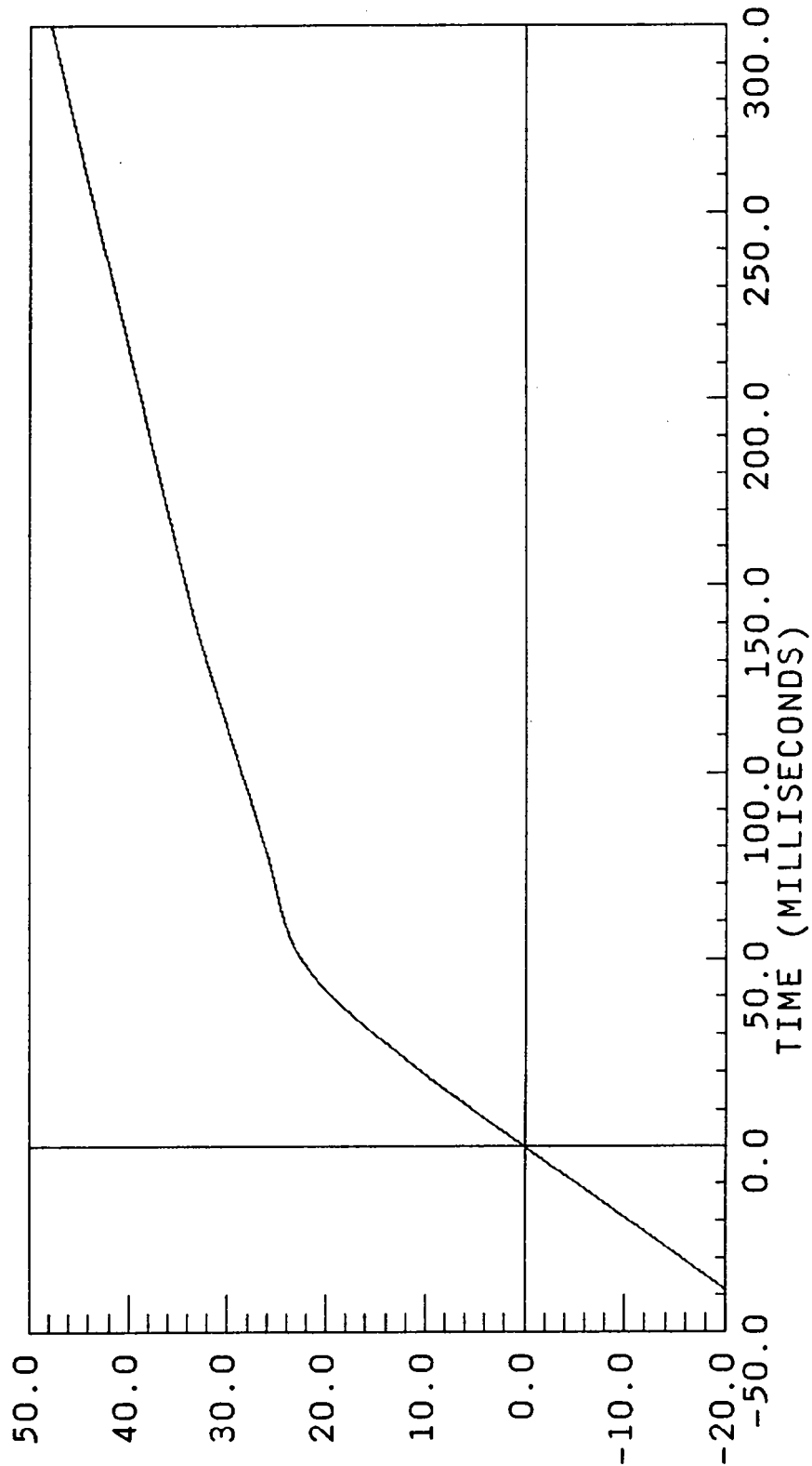


VELOCITY * MILES / HOUR
B-28 7804-10

29.60 mph

ACC PACK #10(X)
COMPUTED
FILTER CUTOFF: 0HZ

XL AXIS
YMIN = -23.28790 at 64.42500
YMAX = 47.86026 at 300.0000



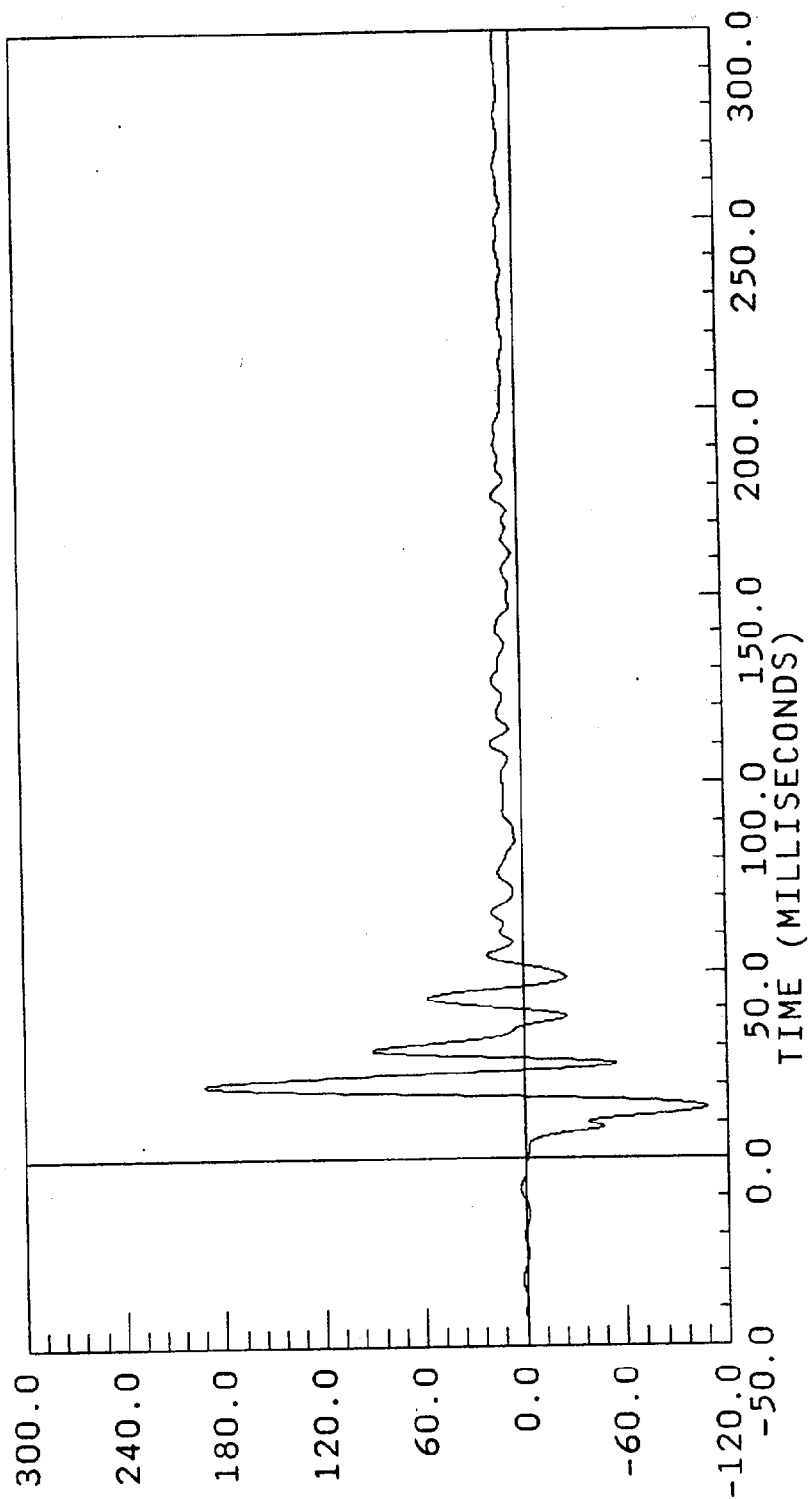
D I S P L A C E M E N T * I N C H E S

BW973-26.DAT

29.60 mph

ACC PACK #11(X)
FILTERED
FILTER CUTOFF: 100Hz
DATA QUESTIONABLE AFTER 20 MSEC.

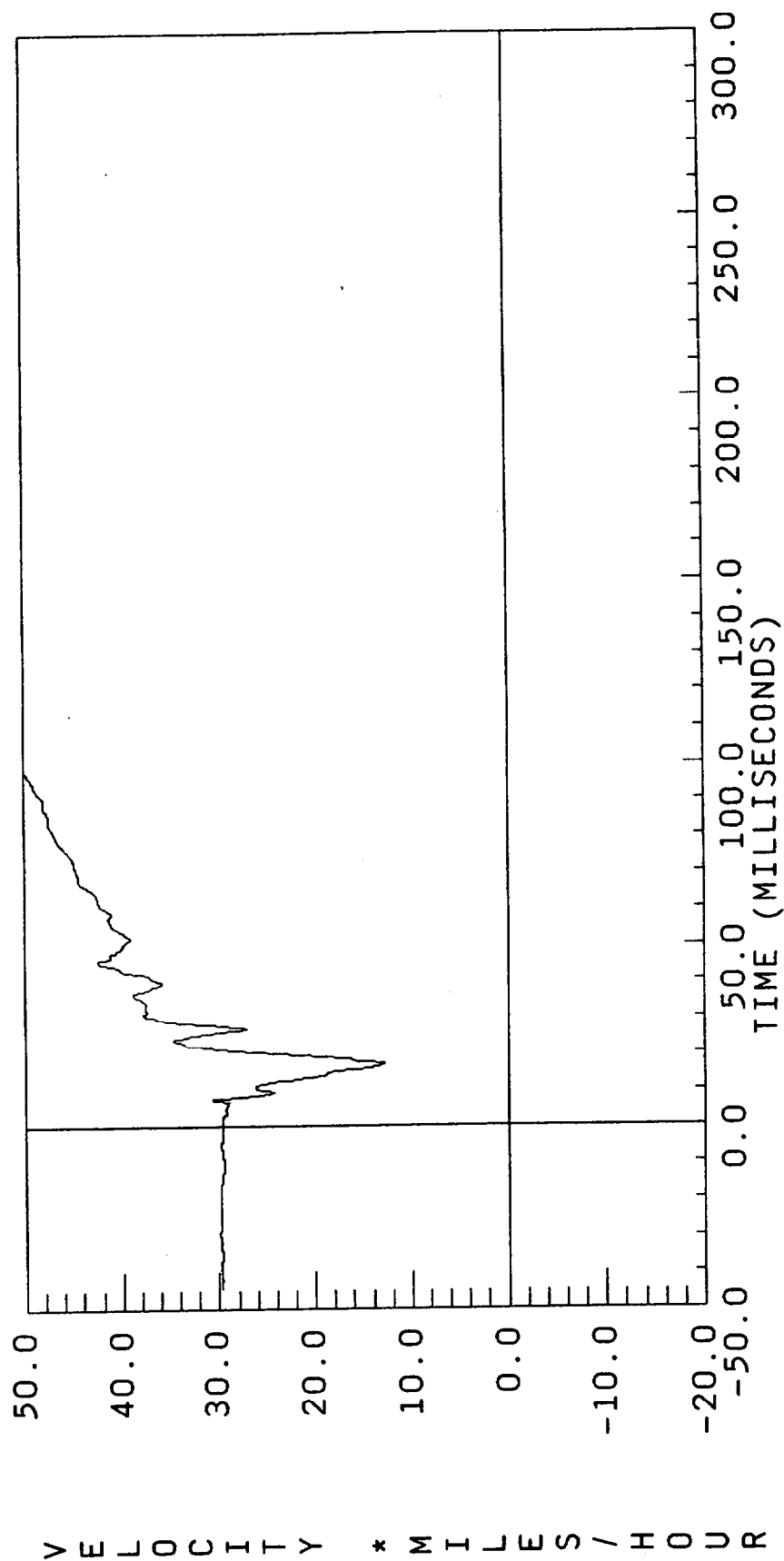
XL AXIS
YMIN = -107.8295 at 13.65000
YMAX = 191.9812 at 19.95000



ACCELERATION * G, S *
B-30 7804-10

29.60 mph

ACC PACK #11(X)
COMPUTED
FILTER CUTOFF: 0HZ
XL AXIS
YMIN = 12.71063 at 17.02500
YMAX = 90.71400 at 300.0000
DATA QUESTIONABLE AFTER 20 MSEC.



D973-26.DAT

29.60 mph

ACC PACK #11(X)

COMPUTED

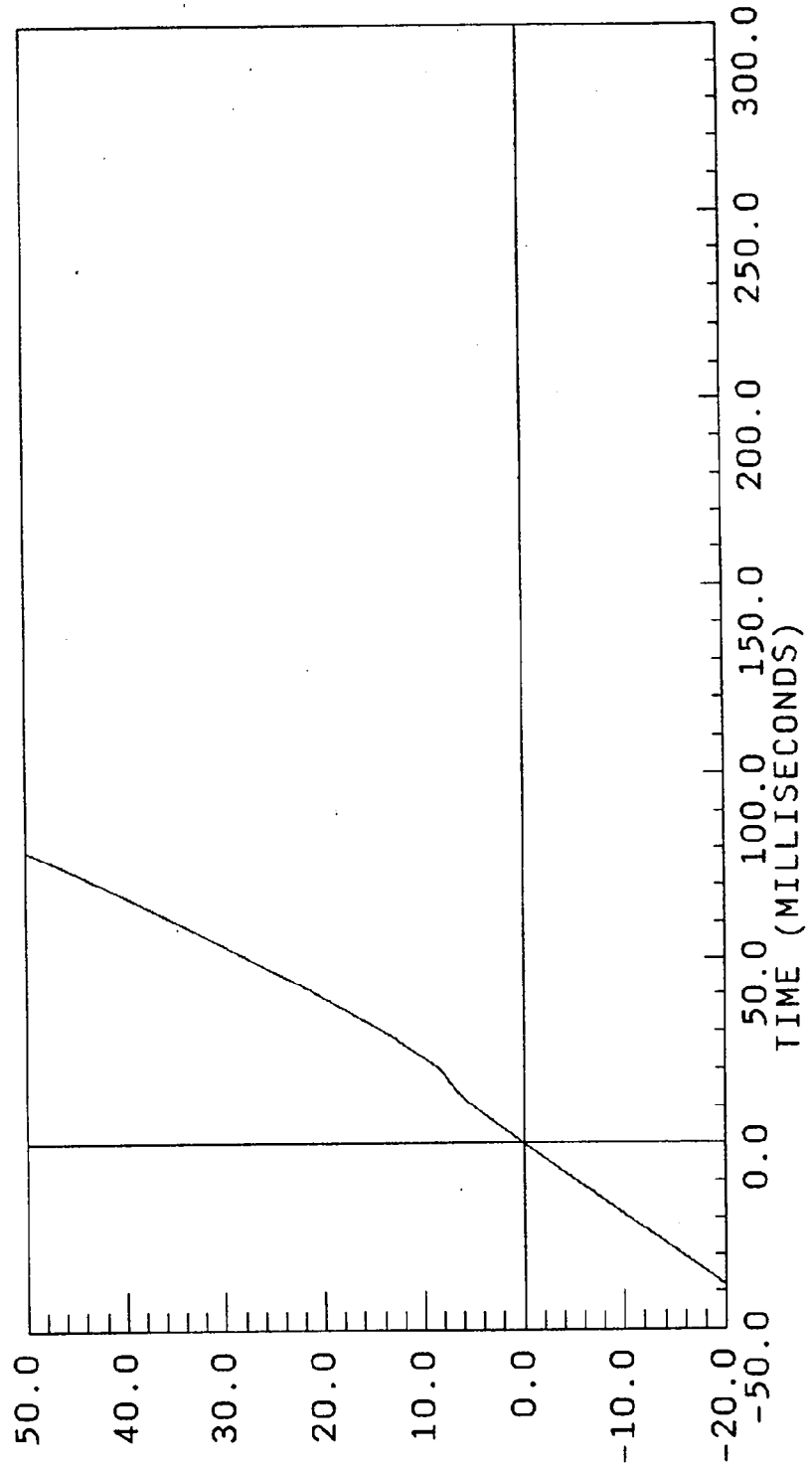
FILTER CUTOFF: 0Hz

DATA QUESTIONABLE AFTER 20 MSEC.

XL AXIS

YMIN = -23.45630 at 17.02500

YMAX = 319.8252 at 300.0000



TEST NO. CL5801

DUMMY DATA

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

HEAD INJURY CRITERION
HEAD SEVERITY INDEX
35MS. MAXIMUM DURATION

NHTSA CRASH TEST - PROC. 208

PUN= 973

POS #1 HEAD RESULTANT

HIC= 571.9 FROM T1= .06180 TO T2= .09780

AVERAGE ACCELERATION BETWEEN T1 AND T2= 47.9G'S

EVENT TIME= 300.0 MSEC

SEVERITY INDEX=1140.3

29.60 mph

POS#1 HEAD X

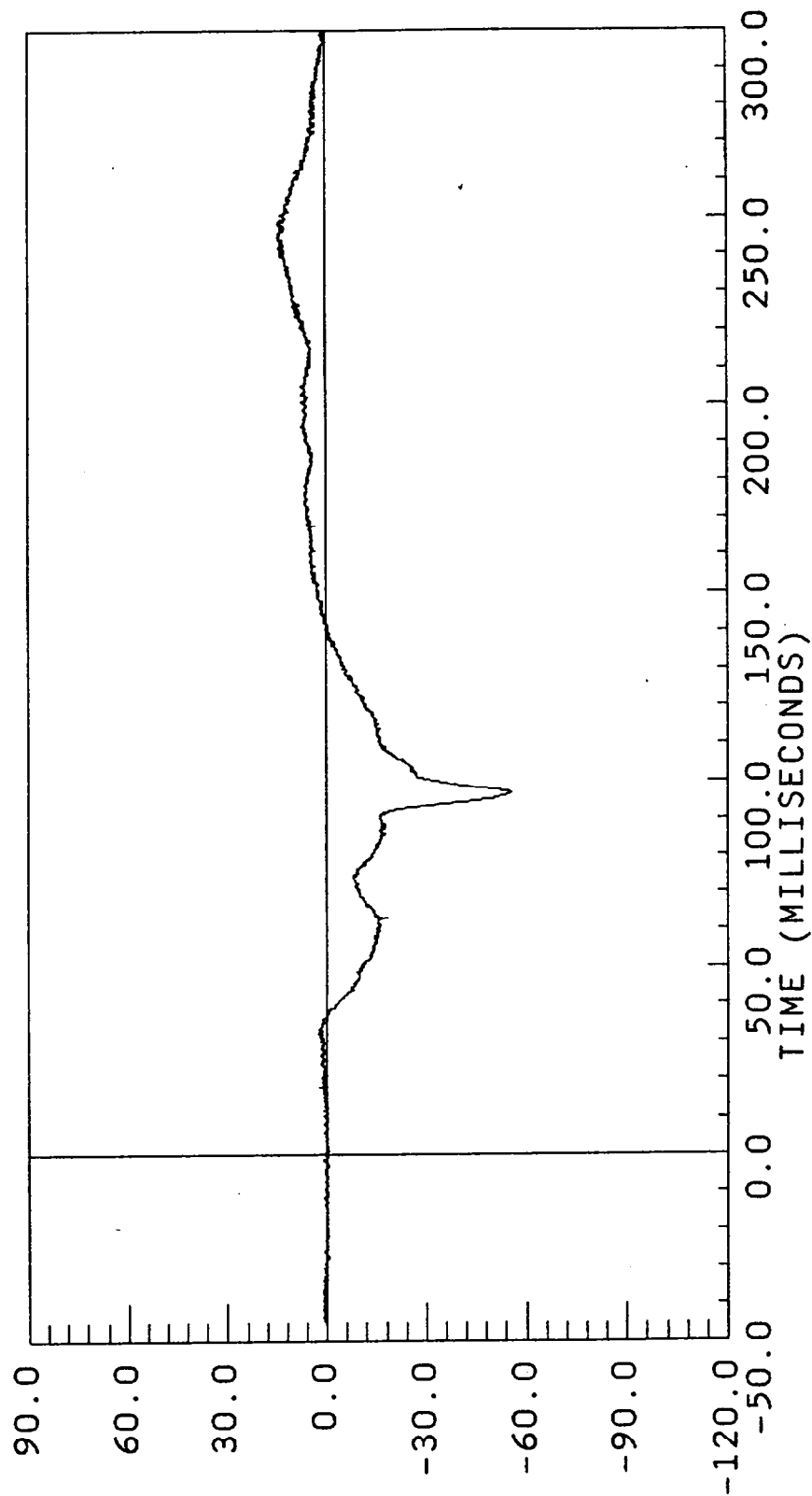
XL AXIS

YMIN = -55.78000 at 96.67500

YMAX = 14.21900 at 242.0250

0 Hz

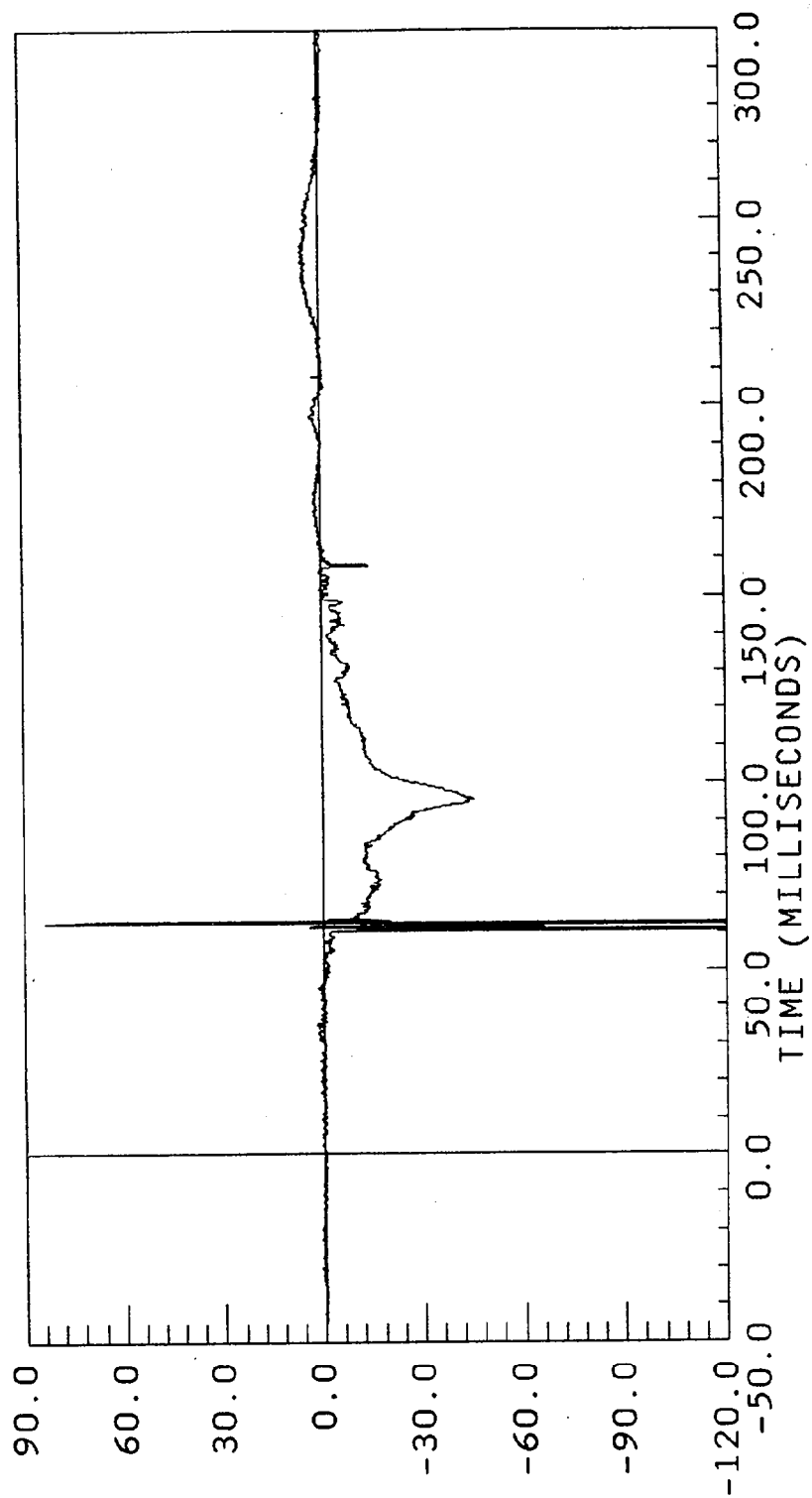
FILTER CUTOFF:



UDS\$973-2.DAT

0.00 mph

POS#1 HEAD Y . YL AXIS
YMIN = -248.8100 at 62.32500
YMAX = 84.07800 at 62.77500
FILTER CUTOFF: 0Hz



ACCELERATION * G * S *

B-36

7804-10

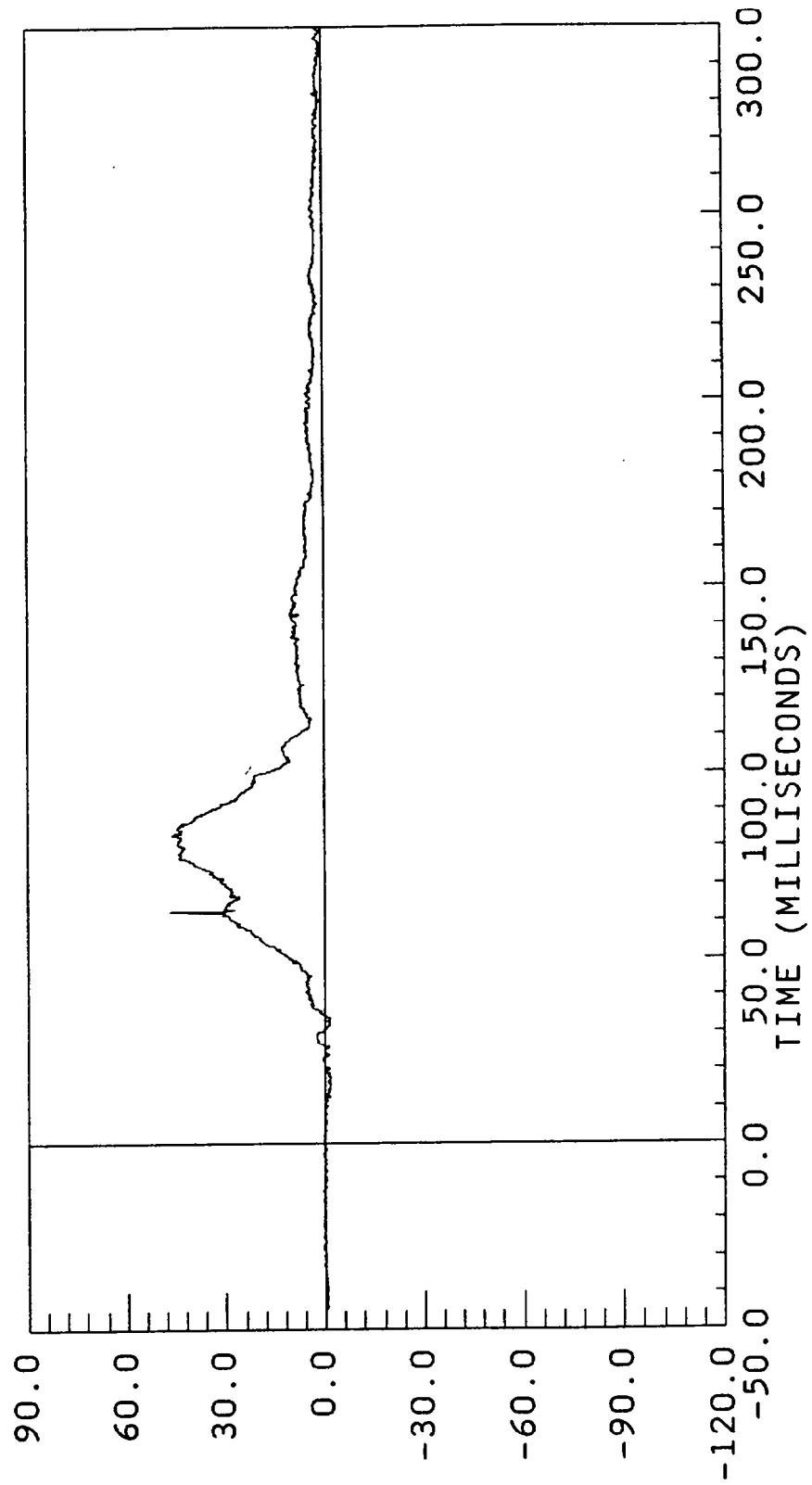
0.00 mph

POS#1 HEAD Z

ZL AXIS

YMIN = -1.874500 at 15.97500
YMAX = 46.87400 at 62.92500

FILTER CUTOFF: 0Hz



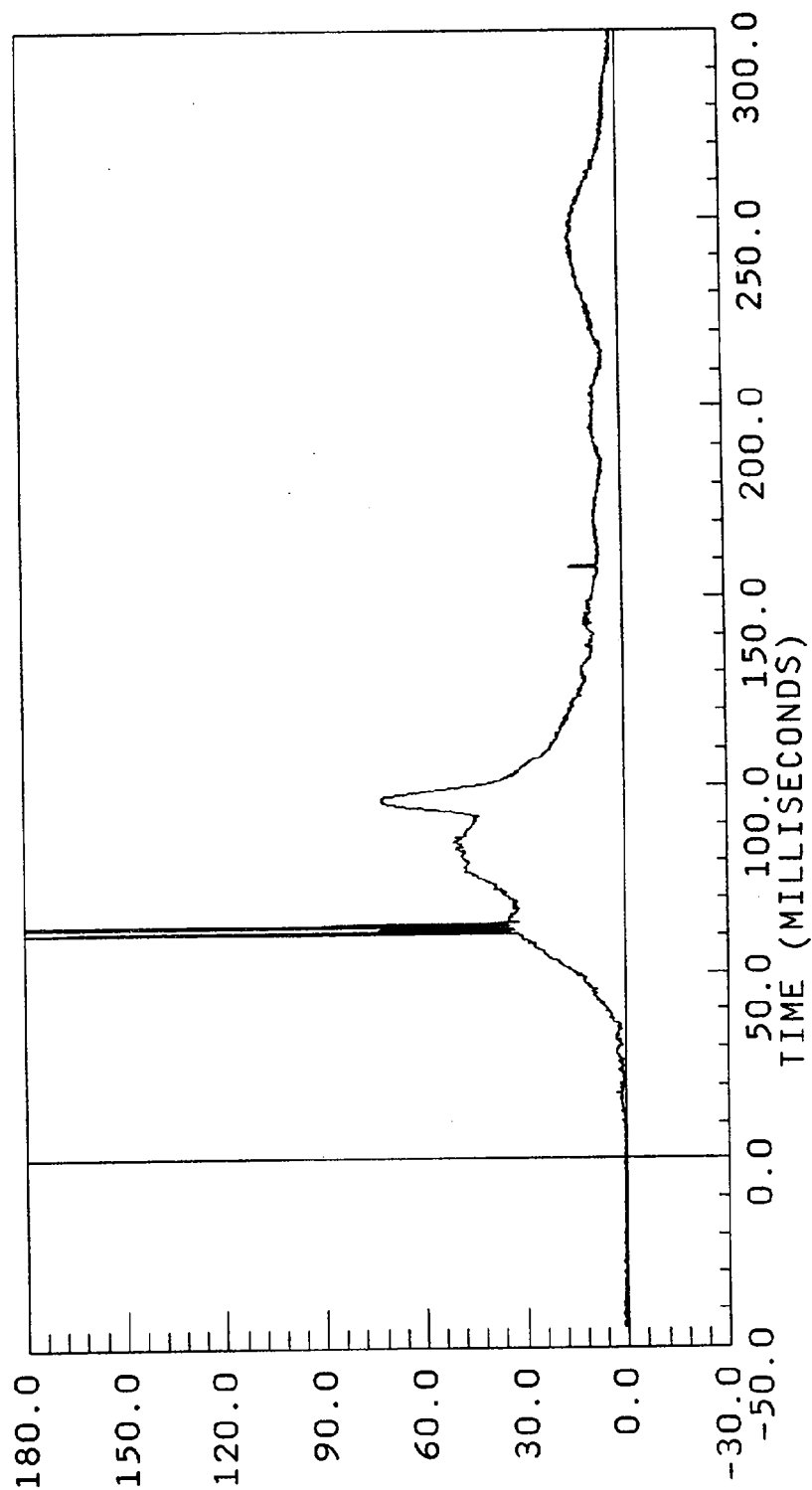
ACCELERATION

* G * S *

HRES973-1.DAT

0.00 mph

POS#1 HEAD
NONSTANDARD
FILTER CUTOFF: 0Hz
RS AXIS
YMIN = 0.468280 at -43.27500
YMAX = 251.0794 at 62.32500

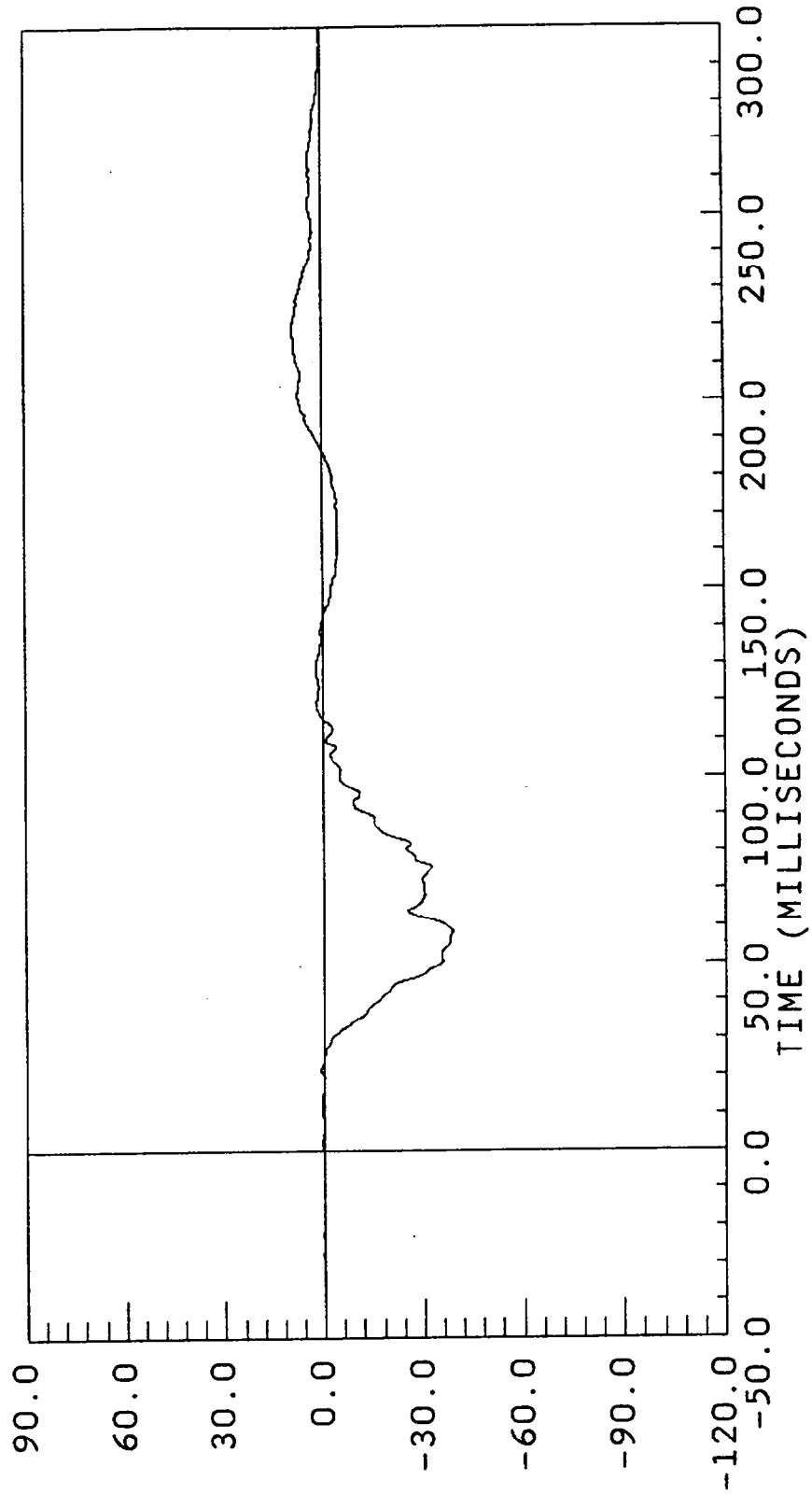


ACCELERATION * G, S *
B-38 7804-10

29.60 mph

POS#1 CHEST X
 FILTERED
 FILTER CUTOFF: 300HZ

XL AXIS
 YMIN = -38.77984 at 58.27500
 YMAX = 8.938022 at 220.0500

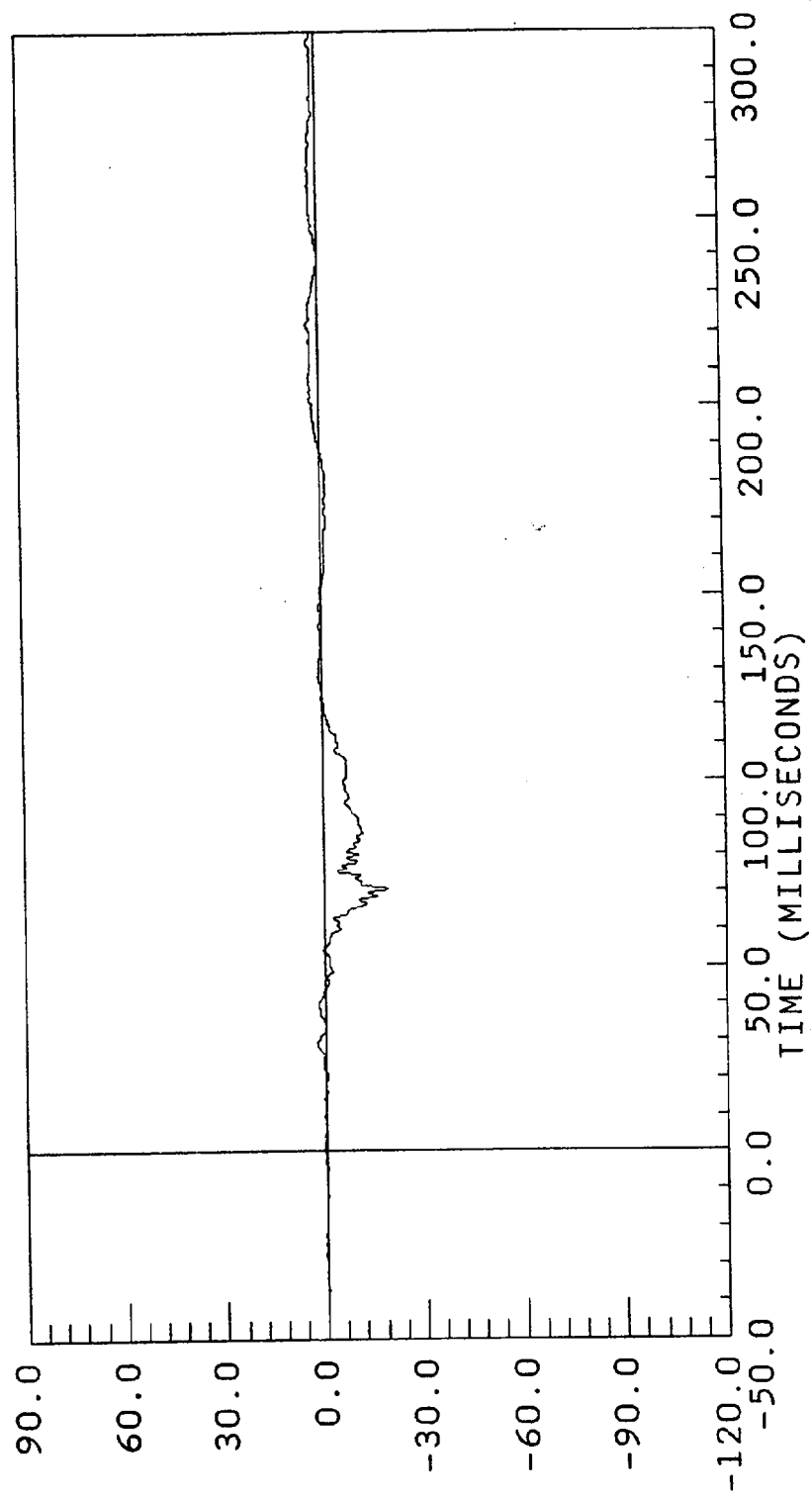


ACCELERATION * G, S *

BW973-5.DAT

0.00 mph

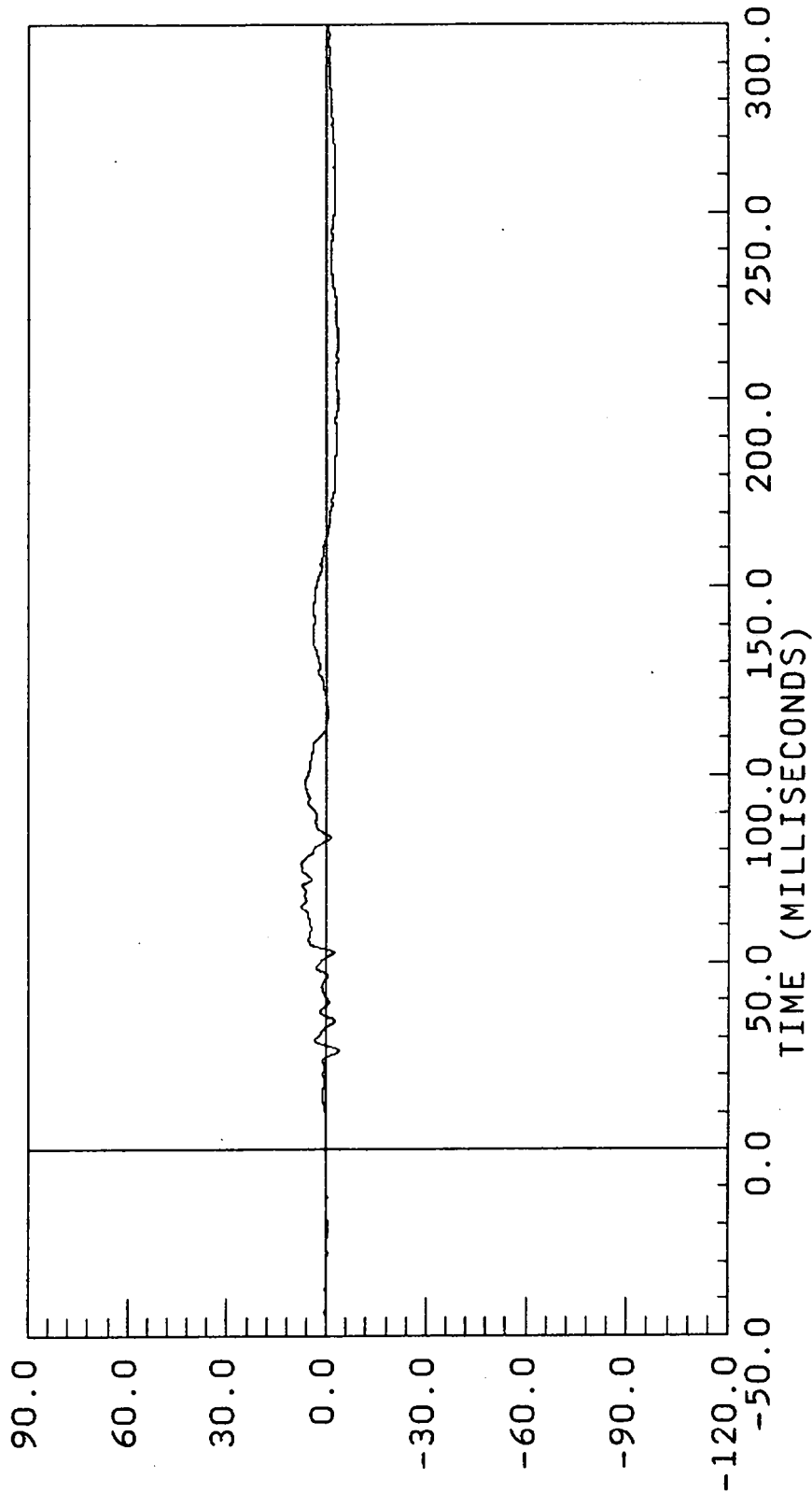
POS#1 CHEST Y
FILTERED
FILTER CUTOFF: 300HZ
YL AXIS
YMIN = -19.17538 at 70.95000
YMAX = 3.791732 at 222.0000



ACCELERATION * G, S *
B-40 7804-10

0.00 mph

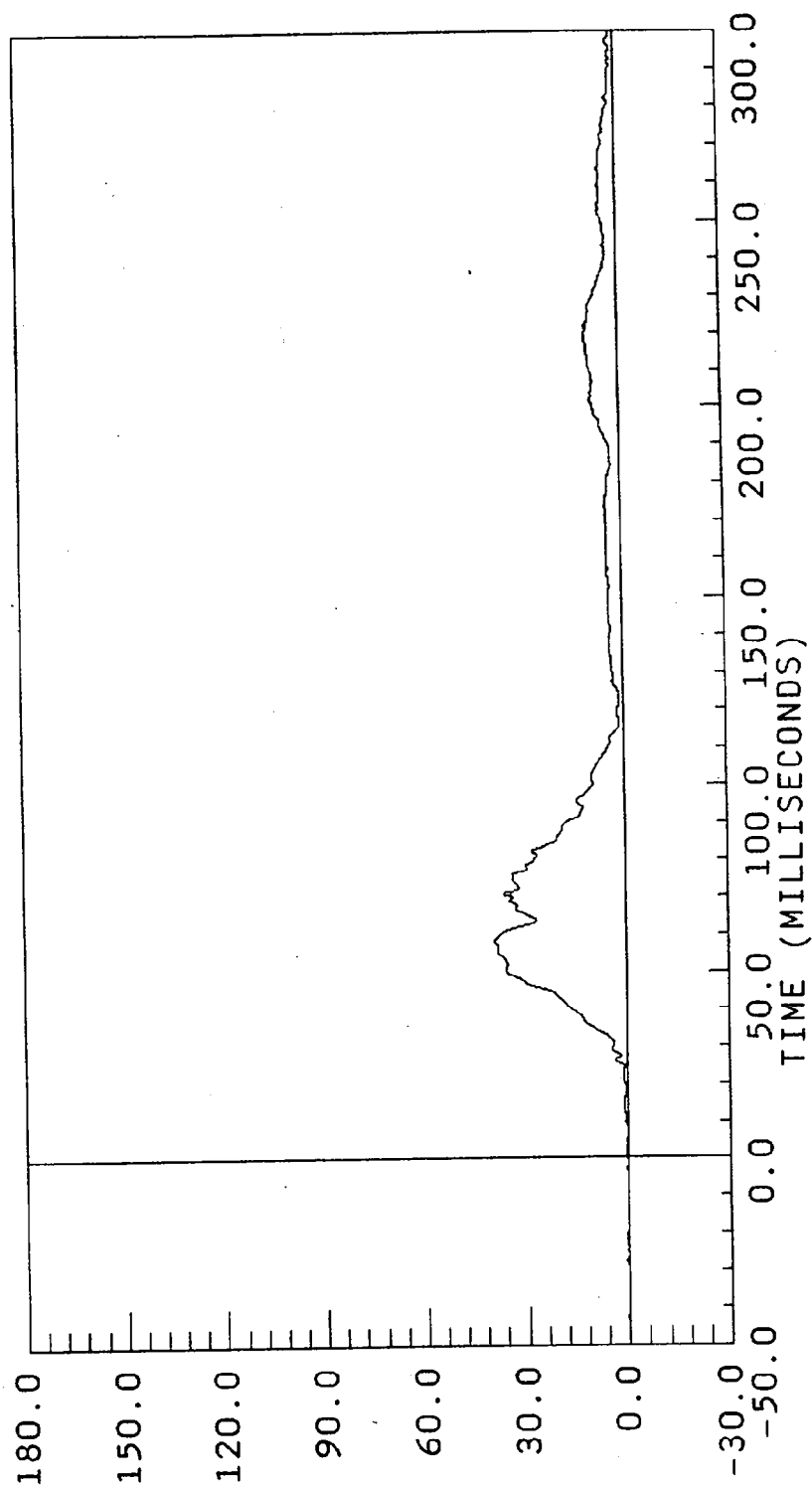
POS#1 CHEST Z
FILTERED
FILTER CUTOFF: 300HZ
ZL AXIS
YMIN = -3.773253 at 26.25000
YMAX = 7.754270 at 65.25000



CHST973-1.DAT

0.00 mph

POS#1 CHEST
COMPUTED
FILTER CUTOFF: 300Hz
RS AXIS
YMIN = 0.0558434 at -9.975000
YMAX = 39.11459 at 58.27500



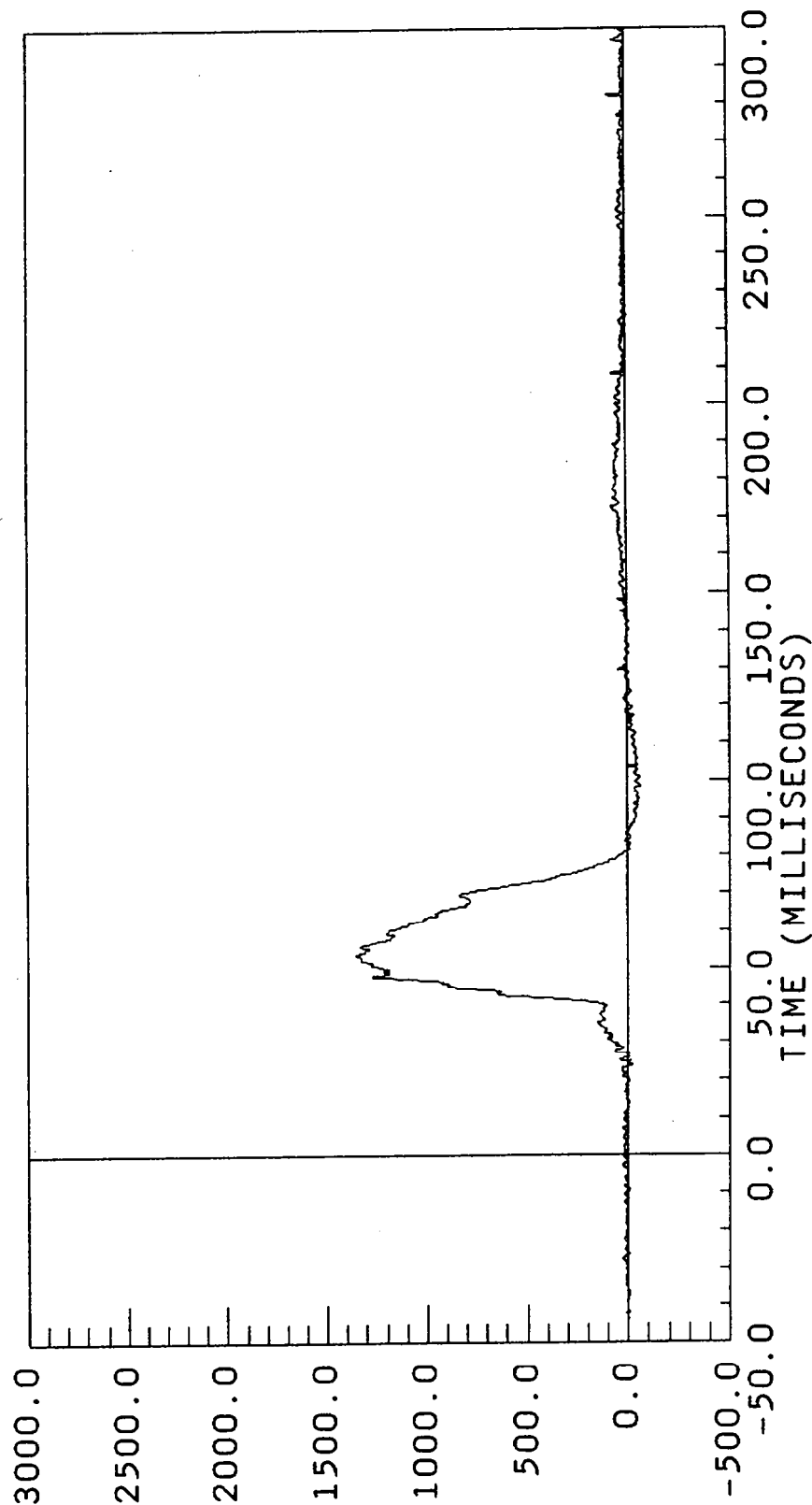
ACCELERATION * G * S *

B-42

7804-10

0.00 mph

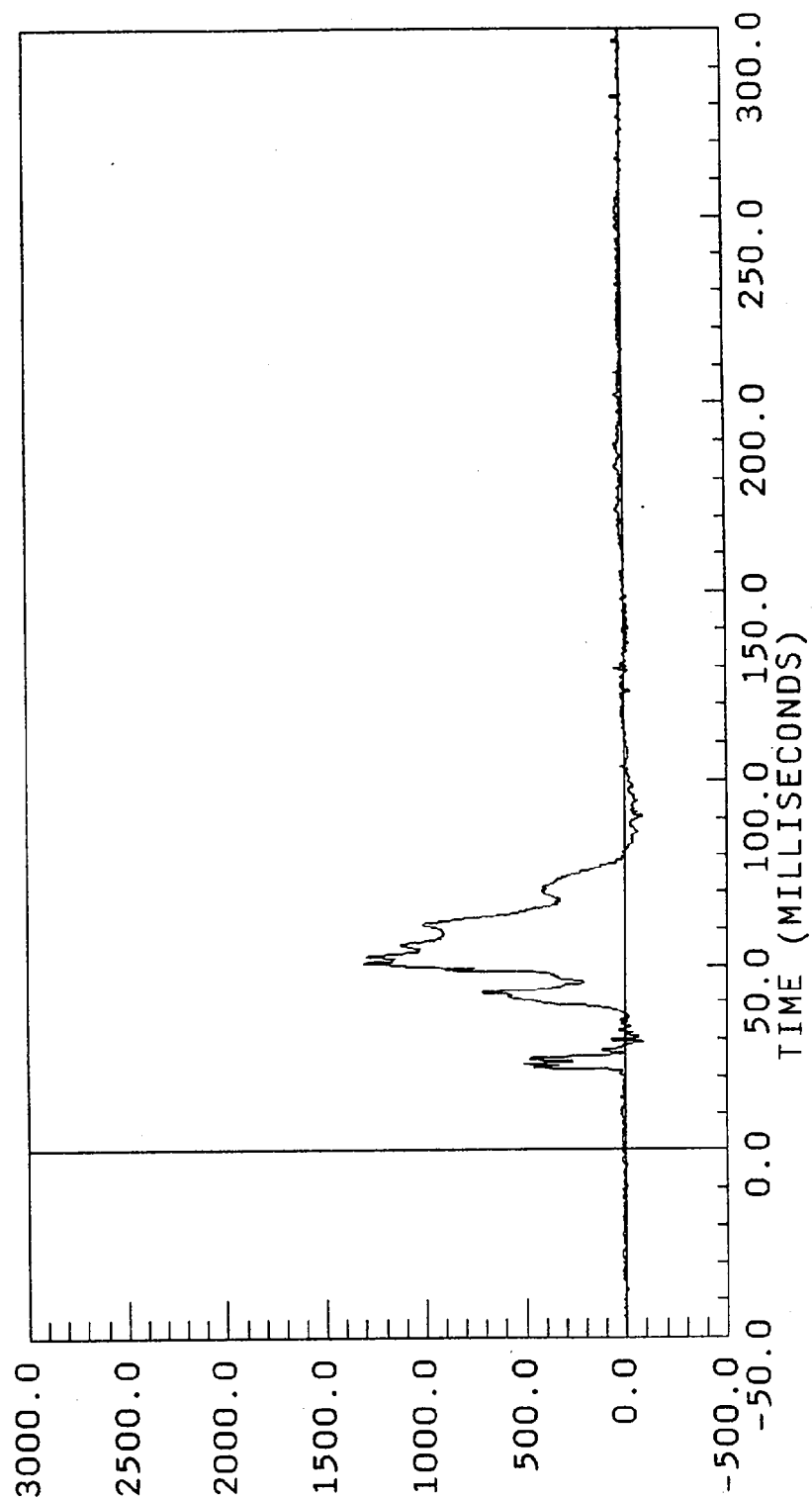
POS#1 LEFT FEMUR
FILTERED
FILTER CUTOFF: 1000HZ
NA AXIS
YMIN = -64.55642 at 98.40000
YMAX = 1350.274 at 53.55000



BW973-8.DAT

0.00 mph

POS#1 RIGHT FEMUR
FILTERED
FILTER CUTOFF: 1000HZ
NA AXIS
YMIN = -92.31296 at 29.25000
YMAX = 1310.003 at 50.77500



HEAD INJURY CRITERION
HEAD SEVERITY INDEX
3CMS: MAXIMUM DURATION

NHTSA CRASH TEST - PROC 208

PUN= 973

PDS #2 HEAD RESULTANT

HIC= 305.2 FROM T1= .06135 TO T2= .09735

AVERAGE ACCELERATION BETWEEN T1 AND T2= 37.3G'S

EVENT TIME= 300.0 MSEC

SEVERITY INDEX= 521.5

UDS\$973-11.DA

29.60 mph

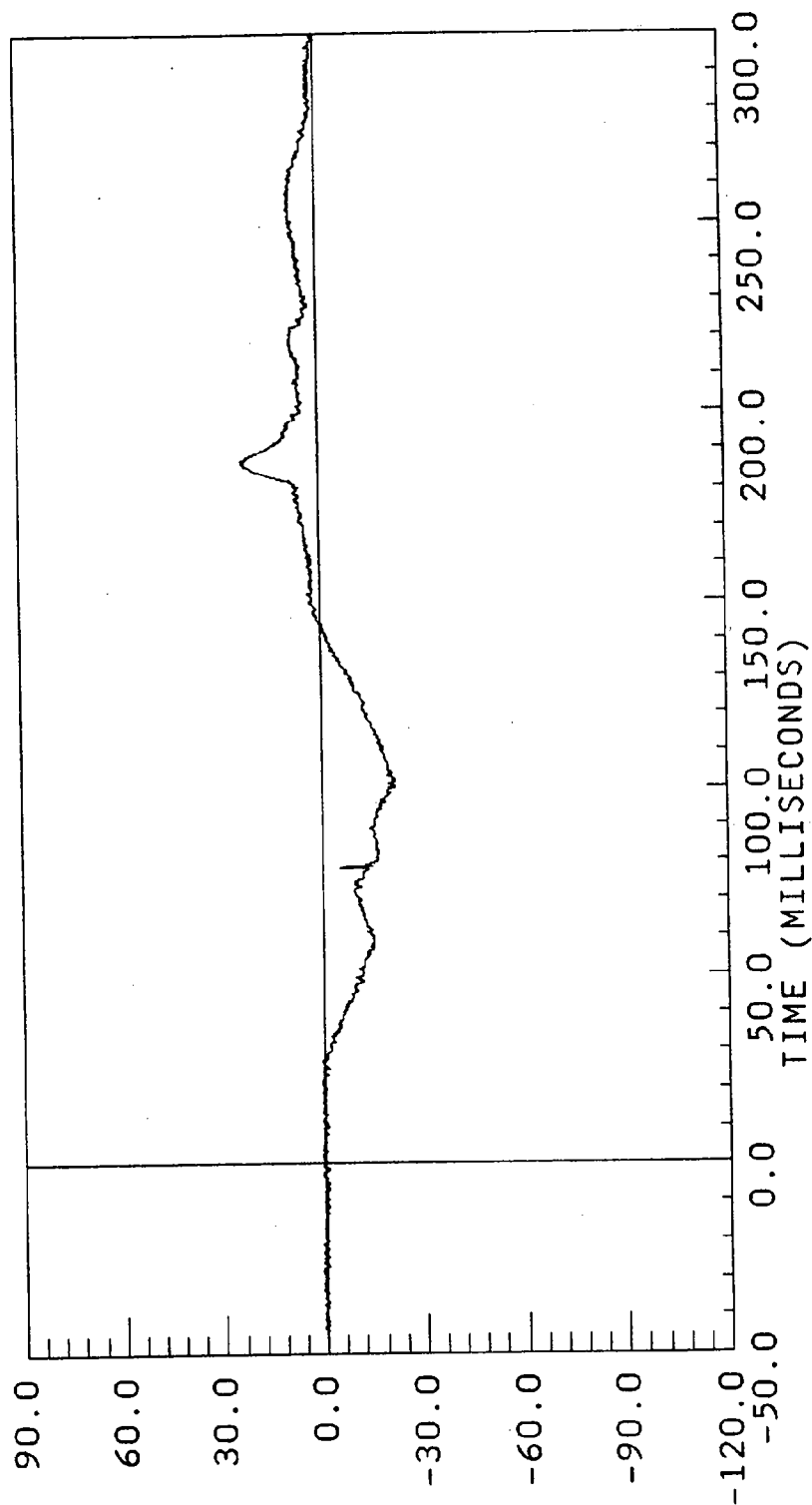
POS#2 HEAD X

XL AXIS

YMIN = -21.47500 at 100.5000

YMAX = 23.19300 at 186.4500

FILTER CUTOFF: 0Hz



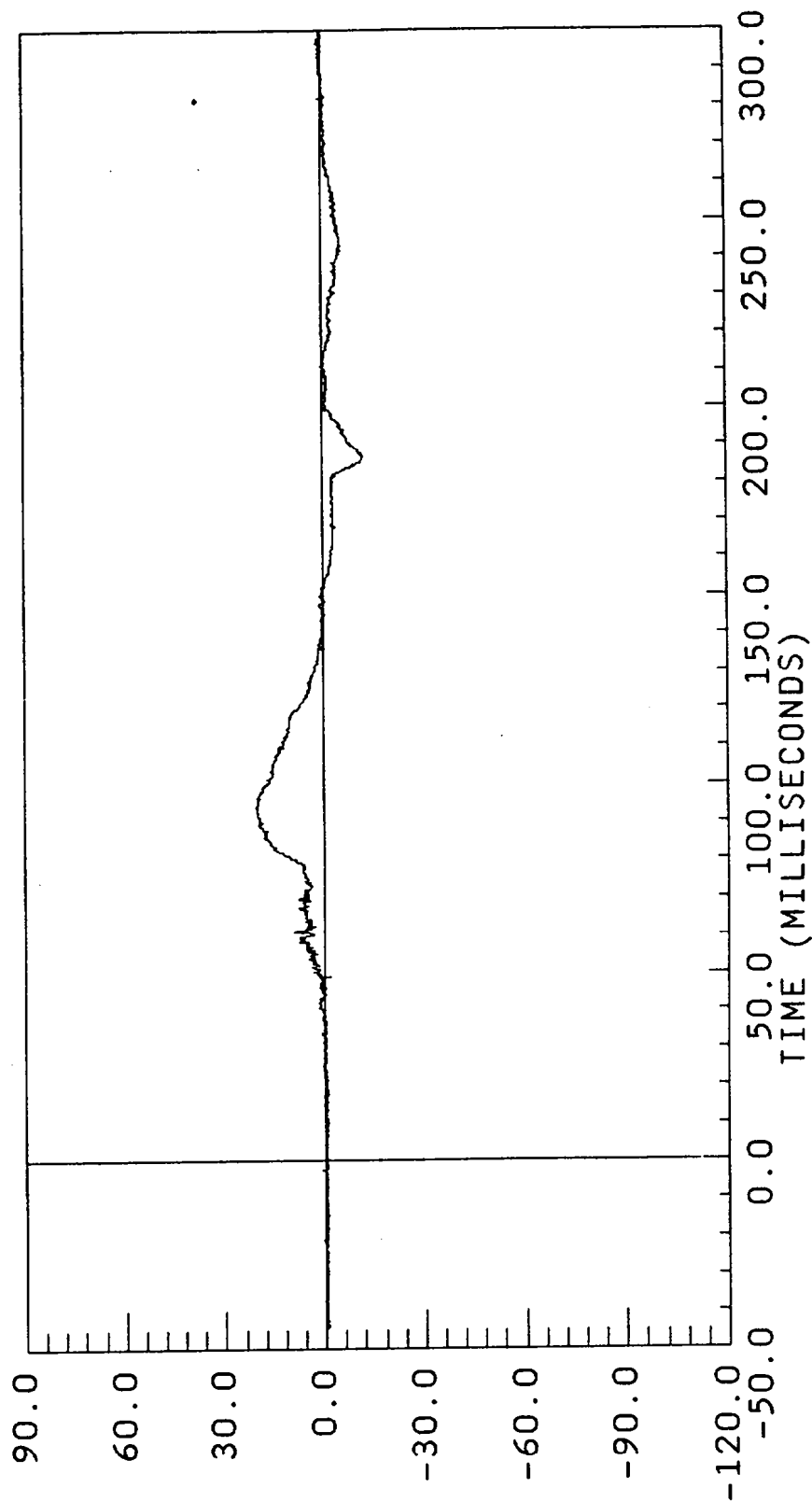
ACCELERATION * G * S *

B-46

7804-10

0.00 mph

POS#2 HEAD Y YL AXIS
YMIN = -12.47500 at 186.8250
YMAX = 20.94000 at 93.67500
FILTER CUTOFF: 0Hz



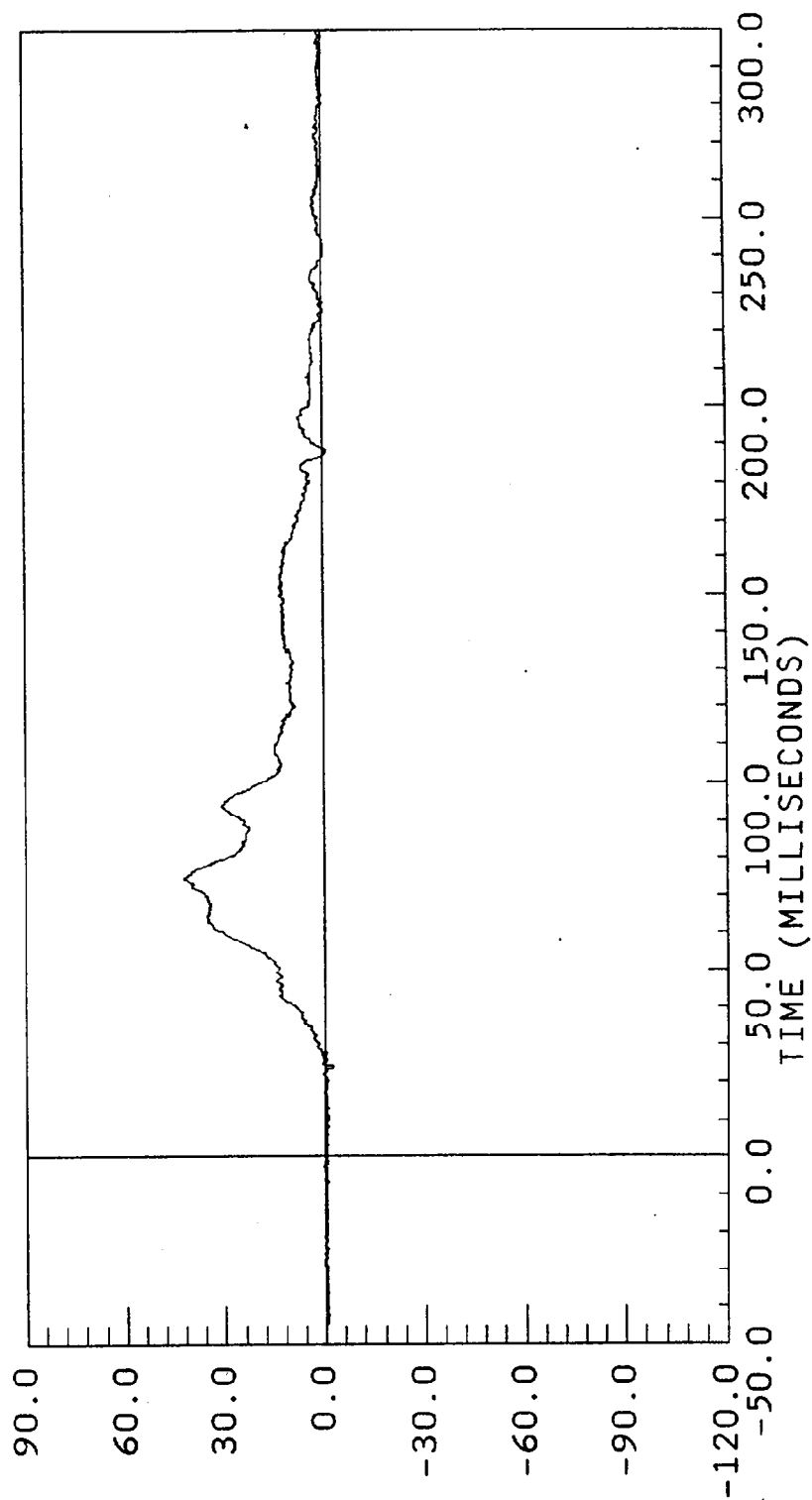
ACCELERATION

* G, S *

UDS\$973-13.DA

0.00 mph

POS#2 HEAD Z
ZL AXIS
YMIN = -2.544800 at 23.62500
YMAX = 42.76100 at 74.47501
FILTER CUTOFF: 0Hz



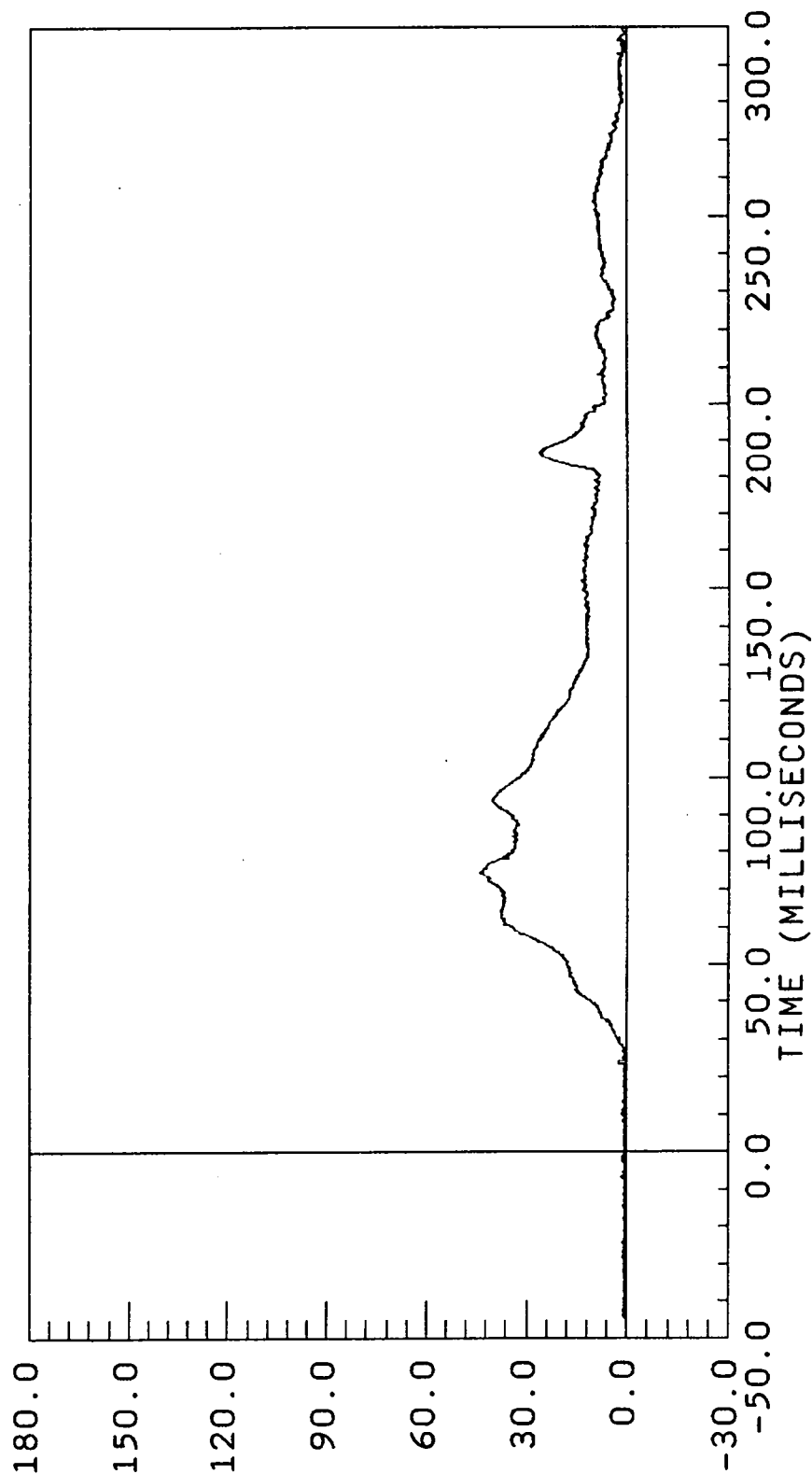
ACCELERATION * G, S *

B-48

7804-10

0.00 mph

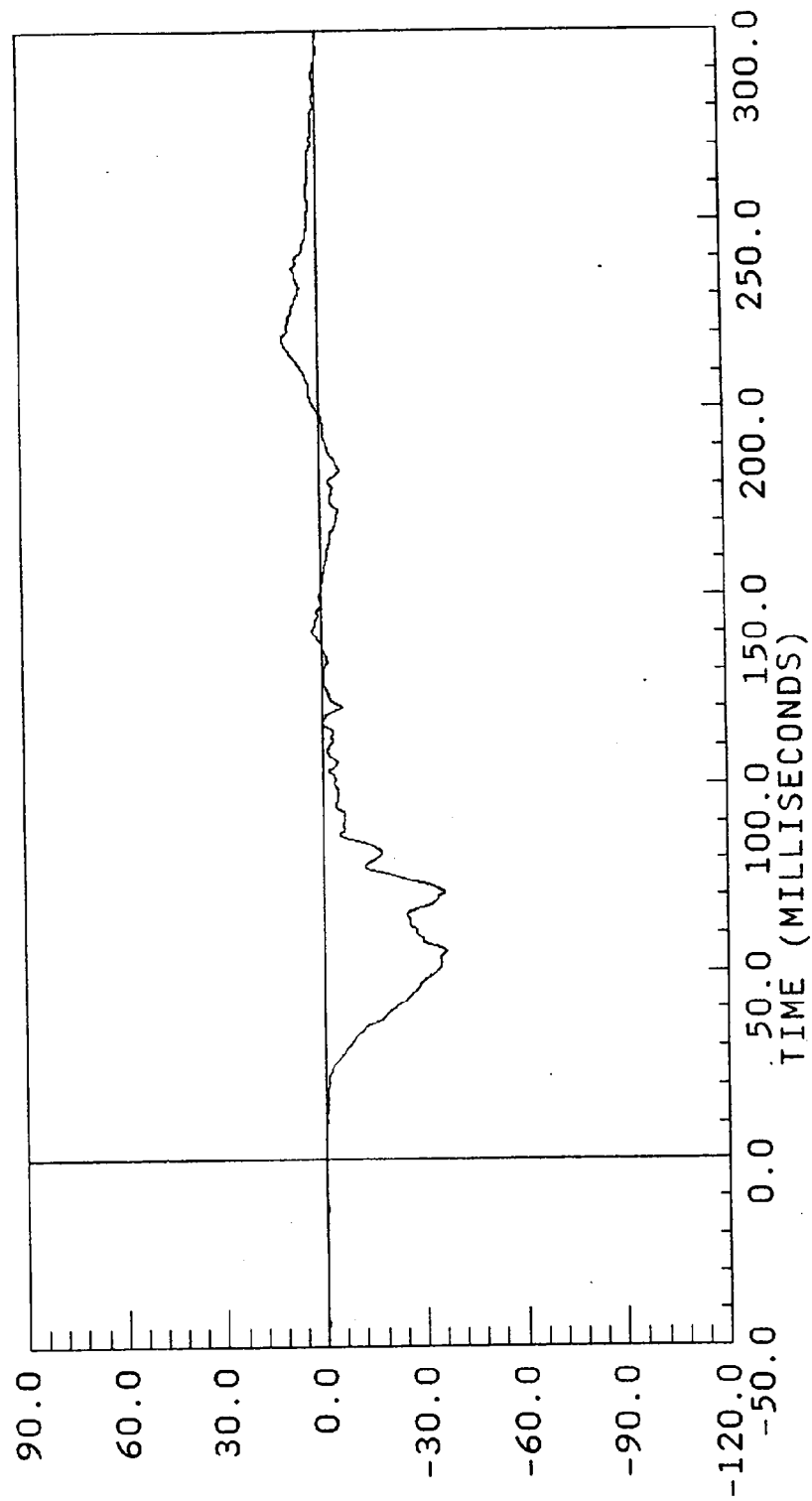
POS#2 HEAD
NONSTANDARD
FILTER CUTOFF: OHZ
RS AXIS
YMIN = 0.676113 at -23.92500
YMAX = 44.16006 at 74.47501



BW973-14.DAT

29.60 mph

POS#2 CHEST X
FILTERED
FILTER CUTOFF: 300Hz
XL AXIS
YMIN = -36.35637 at 55.20000
YMAX = 10.98959 at 218.9250



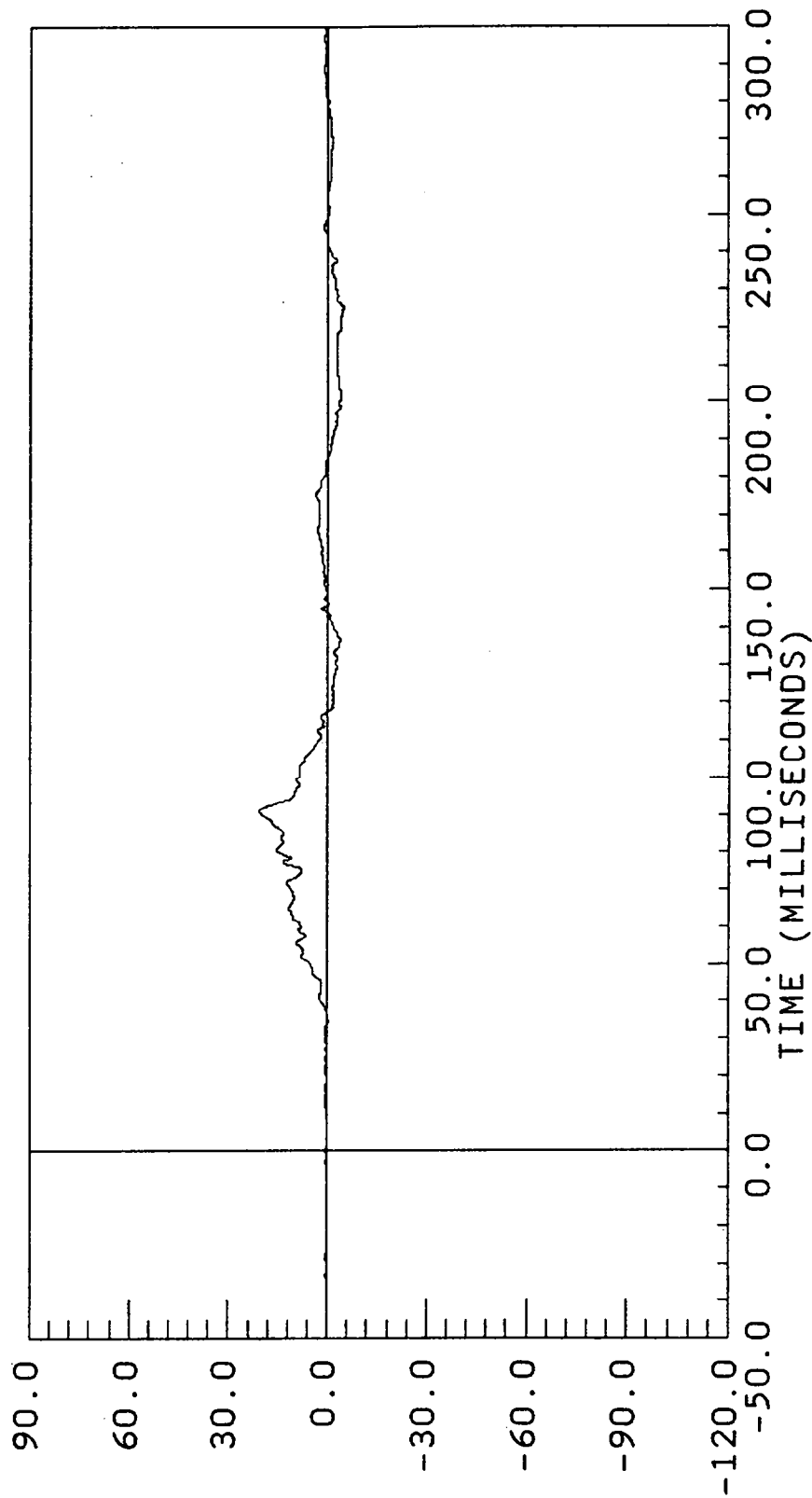
ACCELERATION * G * S *

B-50

7804-10

0.00 mph

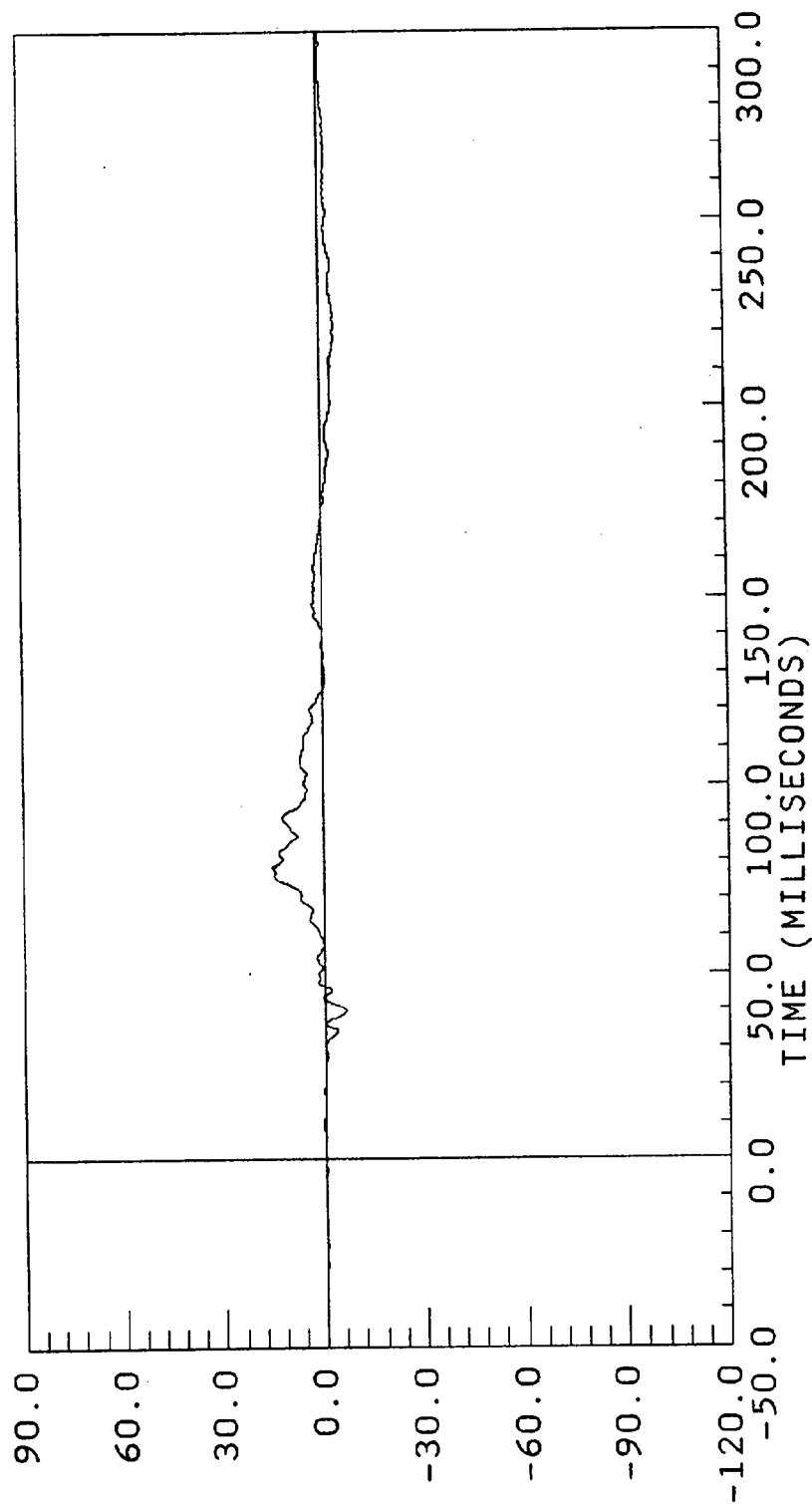
POS#2 CHEST Y
FILTERED
FILTER CUTOFF: 300HZ
YL AXIS
YMIN = -4.749049 at 225.3750
YMAX = 20.80005 at 90.97501



BW973-16.DAT

0.00 mph

POS#2 CHEST Z
FILTERED
FILTER CUTOFF: 300Hz
ZL AXIS
YMIN = -6.372631 at 39.97500
YMAX = 15.66838 at 78.37500

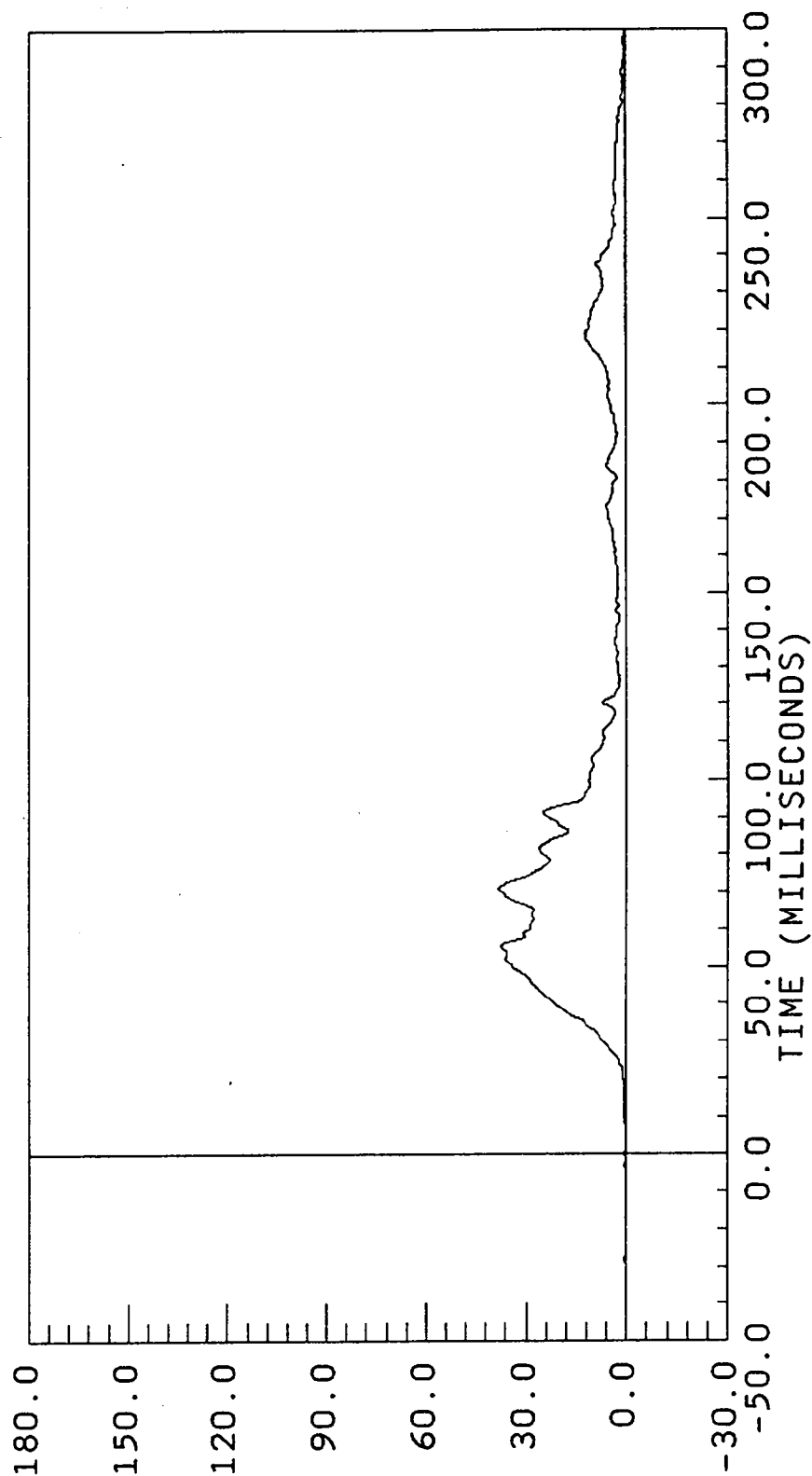


ACCELERATION * G, S *
B-52 7804-10

0.00 mph

POS#2 CHEST
COMPUTED
FILTER CUTOFF: 300Hz

RS AXIS
YMIN = 0.0547257 at -9.975000
YMAX = 38.47413 at 70.95000

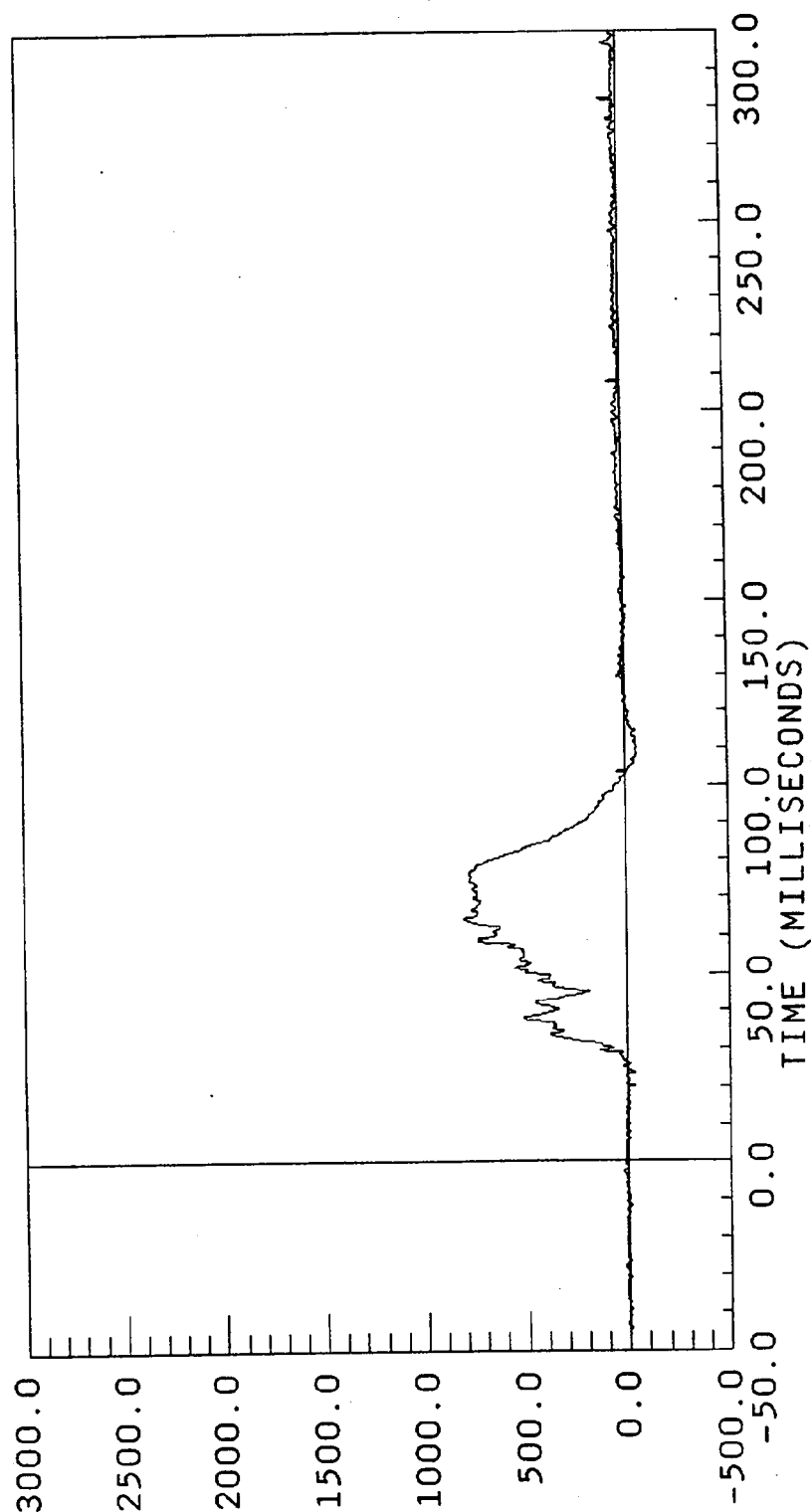


ACCELERATION * G * S *
B-53 7804-10

BW973-9.DAT

0.00 mph

POS#2 LEFT FEMUR
FILTERED
FILTER CUTOFF: 1000HZ
NA AXIS
YMIN = -58.03081 at 110.2500
YMAX = 810.0314 at 64.35001

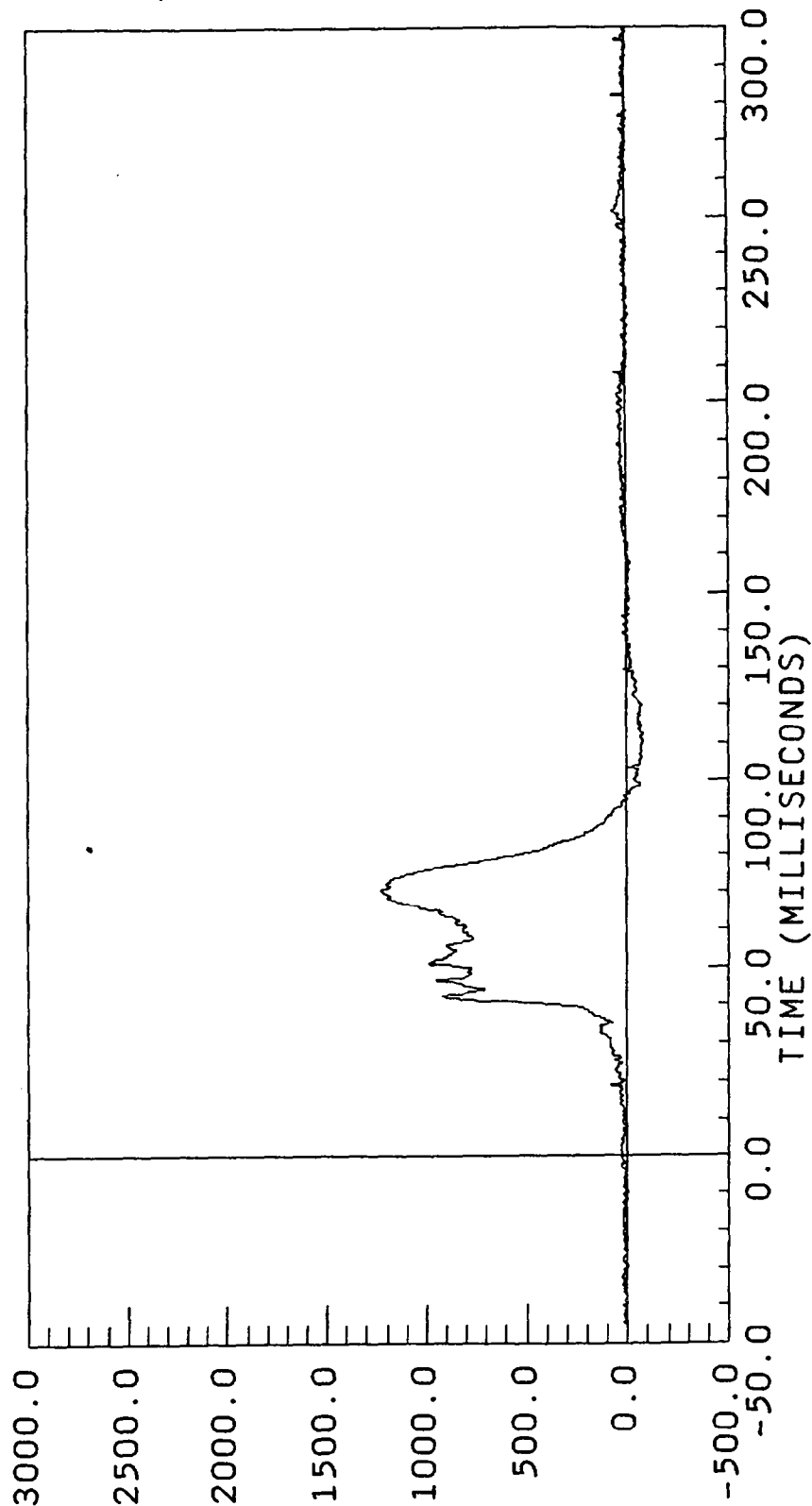


B-54
F O R C E * L B S *

7804-10

0.00 mph

POS#2 RIGHT FEMUR NA AXIS
 FILTERED YMIN = -78.60149 at 110.3250
 FILTER CUTOFF: 1000HZ YMAX = 1225.823 at 70.57500



* L B S *

Appendix C

VEHICLE OWNERS MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

CONTROLS AND EQUIPMENT

SAFETY BELTS

WARNING

Safety belts have been shown to be the single most effective means available for reducing the potential for serious injury and death in automobile accidents. Therefore for your own protection as well as that of your passengers always properly wear safety belts when the vehicle is in motion. Also pregnant women, injured or physically impaired persons should properly use safety belts.

In order to provide the maximum level of protection safety belts must be properly positioned on the body. Improperly positioned safety belts can cause serious personal injury in case of an accident. Therefore read and always observe all of the following instructions and warnings pertaining to the use of the safety belts installed in your vehicle.

- The shoulder belt should be positioned midway over the shoulder — never across the neck. See illustration on page 14.
- The combination lap-shoulder belt* on the front seats can be adjusted to fit properly — see page 14.

- Always make certain that the safety belt tongue is inserted into the safety belt buckle associated with the corresponding seat. Attaching the safety belt to the buckle for another seat could reduce safety belt effectiveness and cause injury.

- Do not wear shoulder part of belt under your arm or otherwise out of position. This would increase the risk of serious injury in case of an accident.

- Do not use comfort clips or devices which create slack in the shoulder belt portion and can increase the risk of injury in an accident. However such clips may be required in the proper use of some child restraint systems.

- Never strap in more than one person, including small children, with each belt. It is especially dangerous to place a safety belt over a child sitting on your lap.

- The lap belt must be worn low and tight across the pelvis. Make sure any slack is wound on the retractor.

- Belts should not be worn twisted.

- Do not wear belts over rigid or breakable objects in or on your clothing, such as eyeglasses, pens, keys, etc. as these may cause injury.

- Several layers of heavy clothing may interfere with proper positioning of belts and reduce the overall effectiveness of the system.

- Keep belt buckle free of any obstruction that may prevent secure locking.

- Make sure the belts of the unoccupied seats are in their stowed positions.

- Belts that have been subjected to excessive stretch force in an accident must be replaced.

- Belts must not rub against sharp objects.

- Do not allow safety belts to become damaged by becoming caught in door or seat hardware.

- Inspect your belts periodically. If belts show damage to webbing, bindings, buckles or retractors, they must be replaced.

CONTROLS AND EQUIPMENT

WARNING continued

- If belts do not work properly, see your Volkswagen dealer.
- Do not modify or disassemble the safety belts in your vehicle.
- The belts must be kept clean as otherwise the retractors may not work properly (also see "Vehicle care", page 60).
- Never bleach or dye safety belts.
- Do not allow safety belts to retract until they are completely dry.

If your vehicle is equipped with a Restraint Automatic Seatbelt System, see also page 16.

Child safety

WARNING

All vehicle occupants and especially children should be restrained whenever riding in cars. Holding a child in your arms is not a substitute for a child restraint system. In an accident, a child held in a person's arms can be struck or crushed by an unrestrained rider. An unrestrained child could

also be injured by striking the interior, or by being ejected from the vehicle during a sudden maneuver or impact. Do not allow children to stand or kneel on the seat. A child restraint system can help protect a child in a car.

Accident statistics have shown that children are generally safer in the rear seat area than in the front seating positions.

A suitable child restraint properly installed and used in one of the rear seating positions provides the highest degree of protection for infants and small children in most accident situations.

Commercially available child seats are required to comply with U.S. Federal Motor Vehicle Safety Standard (FMVSS) 213 (or in Canada, CMVSS 213). These standards include installation requirements which utilize a lap belt or the lap portion of a combination lap-shoulder belt such as that installed in your vehicle.

Should these safety belts be too short, a special lap belt adapter is available from your Volkswagen dealer.

When purchasing a child restraint, select one which properly fits your child and car.

Only use child restraint systems which fully contact the flat portion of the seat cushion. The child seat must not tip or lean to either side. We do not recommend the use of child seats which rest on legs or tube-like frames because they do not provide adequate contact with the seat.

Improperly or inadequately installed child restraint systems can increase the risk of injury to children in accidents, therefore, always carefully read and follow all instructions on installation and use that come with the system.

Children must be positioned so that the shoulder belt does not contact or remain in front of the face, chin, neck or throat. Failure to follow this precaution can increase the risk or severity of injury in the event of a collision.

In summary:

Children who are less than 12 years old should always sit in the rear.

CONTROLS AND EQUIPMENT

WARNING continued

For reasons of safety a child should only occupy the front seat if all of the rear seating positions are already occupied by other children.

The children should wear, depending on age and body size, either a child restraint system or the existing safety belts:

- Babies and children up to about 6 or 7 years should be secured with a child restraint system designed for their size.
- Children of average size of about 6 or 7 years of age may use available safety belts. Always make sure that upper torso belt or shoulder portion

of a three point belt is positioned midway over the shoulder — it must never rest against or across the neck. See Illustration page 14. The lap belt or the lap belt portion of the three point belt must always pass as low as possible across the pelvis, never over the abdomen.

If the safety belt will not properly fit the child, we recommend the use of a suitable booster seat in a rear seating position in order to raise the child's seating height so that the safety belt will properly fit the child.

For important information pertaining to child safety on the front seat of a Fox equipped with restraint automatic seatbelt system, see page 18.

Belt warning system

An audio-visual warning system is interconnected with the driver's safety belt.

Every time the ignition is turned on, the safety belt warning light will come on for about six seconds as a reminder to buckle up. If the driver does not fasten the safety belt, the chime will also come on for six seconds. With the driver's door closed, the chime will go off as soon as the driver has buckled up.

CONTROLS AND EQUIPMENT

Lap-shoulder belt

The combination lap-shoulder belt is equipped with a locking retractor. The system adjusts automatically to your size and movements as long as the pull on the belt is slow.

Hard braking or a collision locks the belt. The belt will also lock when you drive up or down a steep hill or in a sharp curve.

- Before fastening the seat belt, first adjust seat. See page 20.

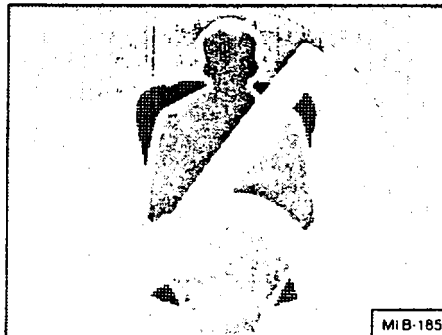
- To fasten, grasp belt tongue and pull belt in continuously slow motion across your chest and lap.

- Insert belt tongue into buckle on in-board side of seat. Push down until it is securely locked with an audible click. Pull belt to check.

- Pull upward on shoulder section to make sure belt fits snugly across the pelvis.

- The shoulder belt must be positioned midway over the shoulder — **It must never rest against the neck.** See illustration.

- Belts should fit snugly across the pelvis and chest. **Make sure any slack is wound up on the retractor.**



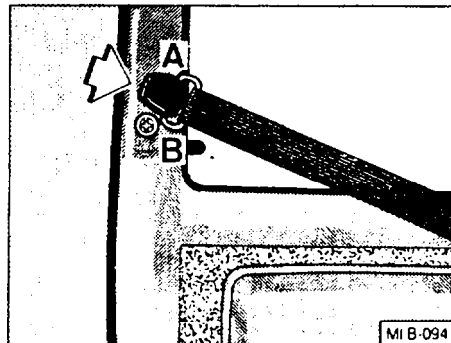
- Adjust height of belt anchorage, if necessary. Do not wear shoulder part of belt under your arm or otherwise out of position. This would increase the possibility of serious injury in case of an accident.

- To unfasten belt, push in release button on buckle. Belt will spring out of buckle.

- To release a locked belt, lean back to take the body pressure off the belt.

- To store lap-shoulder belt, allow belt to wind up on retractor as you guide belt tongue to its stowed position.

Always heed WARNINGS on page 11.



Adjusting the shoulder seatbelt

There are two fastening points on the center pillar for the front safety belts to accommodate the height of the driver and the front passenger. On your vehicle, the belts are attached at the upper point (A).

- To lower the belt, remove cap at belt anchor (arrow) and remove hexagon bolt.

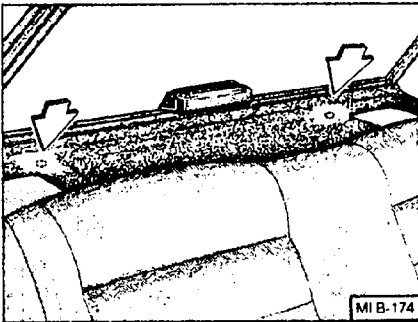
- Remove plug and washer at point (B).

- Place belt at lower point and fasten with hexagon bolt.

- Tighten bolt and replace cap.

- Install plug and washer at point (A).

CONTROLS AND EQUIPMENT



Child restraint anchorages

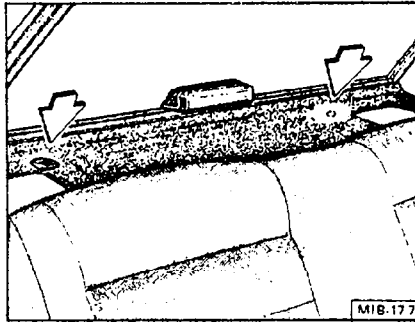
Depending upon the child restraint system to be used, additional anchorage points may be required.

Always heed WARNINGS on page 11.

USA models

Your vehicle can be fitted with anchorage points for use with certain types of child restraints requiring a tether strap.

Ask your authorized Volkswagen dealer for proper installation and positioning of one or more anchorage points and the required hardware for the attachment of the tether.



Canada models

Anchorage points are provided behind the rear seatback to connect a tether strap, if the child restraint system of your choice is so equipped. One of the anchorage points comes with the necessary hardware to attach the child restraint tether strap.

See your authorized Volkswagen dealer for proper installation and positioning of additional hardware for the other anchorage points, if desired.

If more than one child restraint system is to be used at the same time, the necessary hardware must first be mounted on the respective anchorage point.

WARNING

- Child restraint anchorages are designed to withstand only those loads imposed by correctly fitted child restraints. Under no circumstances are they to be used for adult seat belts or harnesses.
- Do not mount more than one child restraint on one anchorage point.

During pregnancy

Pregnant women should always wear safety belts. The lap belt must be worn snugly and as low as possible across the pelvis. **To avoid pressure on the abdomen, the belt must never pass over the waist.**

Injured persons and the physically impaired

We recommend that injured persons and the physically impaired wear safety belts whenever possible. Although the instructions provided above still apply, your doctor can give you special recommendations when necessary.

CONTROLS AND EQUIPMENT

RESTRAINT AUTOMATIC SEATBELT SYSTEM FOR FRONT SEATS*

The Volkswagen Automatic Seatbelt System is a passive restraint system. Driver and front seat passenger are buckled up automatically as they sit down and close the door.

The automatic seatbelt on the driver's side is connected to the ignition.

To be able to start engine, the driver's belt should be properly connected to buckle at upper rear edge of door.

How the automatic seatbelt system works

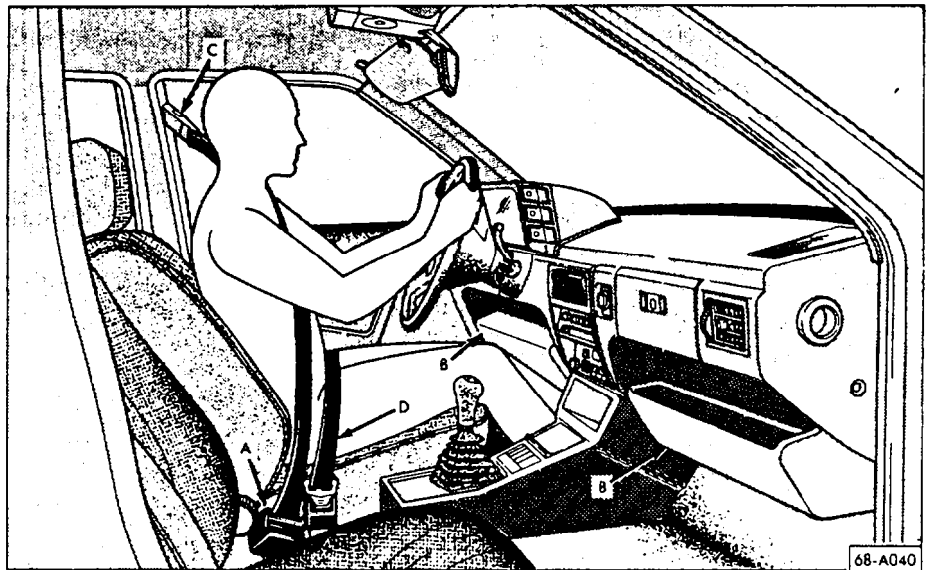
The front seats of your Fox are equipped with an automatic passive restraint system consisting of an upper torso belt and an integrated knee bar. The Fox is also equipped with an additional lap belt. The upper torso restraint automatically buckles up after you have entered the car and closed the door.

Always heed WARNING on page 11.

WARNING

Never attach the driver's torso belt to belt buckle on the passenger's side. Conversely never attach the passenger's torso belt to the buckle on the driver's side.

*where applicable



■ Make sure that the belt is positioned midway over the shoulder — it must never rest against the neck.

■ Front seat passengers should not ride in a moving vehicle with the seatback reclined. Safety belts only offer optimum protection when the

seatback is in an upright position as illustrated.

■ The automatic seatbelt must not be used to hold child's seat as the diagonal belt will not provide the needed protection.

CONTROLS AND EQUIPMENT

WARNING continued

■ **The torso belt must not remain in front of the child's head, face or neck. This can increase the risk of injury or severity of injury in the event of an accident.**

If necessary, release the torso belt buckle and feed the belt into the retractor.

Always reconnect the belt after removing the child's seat.

■ **If a child seat has to be installed on the front passenger seat, a separate lap belt must be mounted to hold the child's seat. For details, see page 18.**

Always heed WARNINGS on page 11.

Driver's safety belt warning light and chime

When driver's belt is not connected ...

the engine cannot be started. The chime will sound for about six seconds, and the warning light will glow until the belts are reconnected. Only after the belts are reconnected, can the engine be started.

If driver's belt is disconnected while you are driving ...

the engine will not stop but the warning light will glow until the belts are reconnected.

A stalled engine cannot be restarted if the driver's belt is disconnected.

Inertia reel retractor (A)

The belt automatically takes up any belt slack and adjusts to your normal wearing position and movements so that you can conveniently reach all operating controls.

In a sudden stop or impact, the belt's inertia reel retractor automatically locks the belt. Sudden acceleration or hard braking, fast cornering or driving up or down steep hills also locks the belt. To release a locked belt, lean back to take the body pressure off the belt.

Knee bar (B)

The knee bar integrated into the dashboard is designed to restrain the forward movement of the lower torso during an impact and to prevent the occupant from sliding down in the seat and moving underneath the belt. The use of a knee bar

also serves to protect the sensitive abdominal region from impact loadings and reduces the potential for serious injury in a wide range of accidents.

Note

The knee bar must not be removed.

Emergency release (C)

If required, press the emergency release on the belt buckle marked PRESS EMERGENCY, and pull out the belt tongue. Always reconnect the belt to the buckle.

Since the automatic restraint system of the driver's seat is interconnected with the ignition, the engine can only be started if the driver's belt is properly connected.

Additional lap belt (D)

The additional lap belt offers those front seat occupant's who are more accustomed to a combination lap-shoulder belt the ability to use a system which more closely resembles the seatbelts on previous vehicles which they have become used to.

The lap belt may also offer additional comfort under more extreme road and driving conditions when it may be difficult to main-

CONTROLS AND EQUIPMENT

tain firm contact with the seat. Furthermore, in some types of accidents the lap belt may provide additional occupant restraint and mitigate certain types of occupant's injury.

WARNING

The additional lap belt must be routed in front of the automatic belt — see illustration on page 16.

Note

On the passenger's side, the lap belt must not be used to secure a child restraint — please see following information.

To fasten a child's seat on the front passenger seat

We recommend that child seats and booster cushions only be installed at one of the rear seating positions. See page 15.

WARNING

■ If a child seat must be installed on the front passenger seat, a special lap belt must be used to properly hold the child seat in place. See your dealer.

■ The upper torso belt must never be used to hold a child's seat as the diagonal belt will not provide the secure attachment needed.

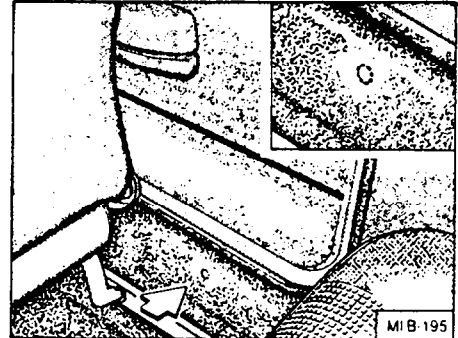
■ The torso belt must never remain in front of the child's head, face or neck. In this position the torso belt can substantially increase the risk of injury or the severity of injury in the event of an accident.

■ When installing a child seat on the right front passenger seat, we recommend that you release the torso belt buckle and feed the belt into the retractor.

■ Always be sure to reconnect the belt after removing the child's seat.

■ If a booster seat must be used for average sized 6 to 7 year old children on the front passenger's seat always make sure that:

- the seat is adjusted so that the child's knees are close to the knee bar or
- that the additional lap belt is properly used and properly routed to prevent the child from passing beneath the upper torso belt.



Installation of the special lap belt

Child seats must be fastened with a special lap belt which complies with all applicable Federal Safety Standards. See your Volkswagen dealer. This belt must be mounted with a special seat belt anchor bolt to the anchorage point at the base of the right side member.

To mount the special belt tongue, first remove the threaded plastic plug.

The seat belt anchor bolts must be tightened to a torque of 30 ft. lbs.

If you are uncertain about how to properly install the lap belt, your Volkswagen dealer will be happy to install it for you.