

REPORT NOS. 208-CAL-89-08
212-CAL-89-08
301-CAL-89-08

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

FORD MOTOR COMPANY
LINCOLN CONTINENTAL
4-DOOR SEDAN

NHTSA NO. CK0202
CALSPAN TEST NO. 7715-8
JUNE 12, 1989

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FINAL REPORT

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16. Abstract A 30 mph vehicle safety compliance test was conducted on a 1989 Lincoln Continental 4-Door Sedan. This test was performed at the Calspan Advanced Technology Center in Buffalo, New York on June 12, 1989. The purpose of this test was to determine compliance with the performance requirements of the following Federal Motor Vehicle Safety Standards (FMVSS 213): 1. FMVSS No. 208, "Occupant Crash Protection" 2. FMVSS No. 212, "Windshield Mounting" 3. FMVSS No. 219 (partial), "Windshield Zone Intrusion" 4. FMVSS No. 301, "Fuel System Integrity" The test mode was perpendicular (0°) and the impact velocity was 29.5 mph. The ambient temperature at the impact face was 76°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 air bag restraint system. The vehicle was also equipped with a 3-point manual seat belt restraint 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 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 1
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 1989 Lincoln Continental 4-Door Sedan, 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 CK0202

A frontal barrier was impacted by a 1989 Lincoln Continental 4-Door Sedan at a velocity of 29.5 mph. The test was performed at the Calspan Corporation Advanced Technology Center on June 12, 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 421. The maximum chest deceleration over 3 milliseconds was 46.5 g's. The maximum force on the driver's left femur was 1572 lbs and 1391 lbs on the right femur.

The right-front passenger's HIC was 305. The maximum chest deceleration over 3 milliseconds was 42.6 g's and loads were 1100 and 1468 pounds on the left and right femurs respectively.

TABLE 1

CRASH TEST SUMMARYVEHICLE NHTSA NO.: CK0202 TEST MODE: 30 mph Frontal BarrierTEST DATE: June 12, 1989 TIME: 14:45 76° FVEHICLE MAKE/MODEL/BODY STYLE: 1989 Lincoln Continental 4-Door SedanVEHICLE TEST WEIGHT: 4230 lbsVEHICLE/BARRIER IMPACT ANGLE: 0°IMPACT VELOCITY: 29.5 mphMAXIMUM STATIC CRUSH: 20.3"VEHICLE REBOUND: 11.7"

<u>DUMMIES:</u>	<u>DRIVER</u>	<u>PASSENGER</u>
TYPE	<u>Part 572</u>	<u>Part 572</u>
RESTRAINT SYSTEM	<u>air bag</u>	<u>air bag</u>

NUMBER OF DATA CHANNELS: 27

NUMBER OF CAMERAS: <u>1</u>	Real Time
<u>14</u>	High Speed

DOOR OPENING DATA:	<u>Closed operable</u>	- Left Front
	<u>Closed operable</u>	- 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>

VISIBLE DUMMY CONTACT POINTS:	<u>DRIVER</u>	<u>PASSENGER</u>
Head	<u>air bag</u>	<u>air bag, sun visor</u>
Chest	<u>air bag</u>	<u>air bag</u>
Knees	<u>dash panel</u>	<u>dash panel</u>

TABLE 2

GENERAL TEST AND VEHICLE PARAMETER DATATEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 1989 Lincoln Continental 4 Door Sedan
 NHTSA No. CK0202 ; VIN ILNLM974XKY700154 ; Color: Blue
 Engine Data: 6 cylinders; - CID; 3.8 Litres; - cc
 Placement - Longitudinal or In-Line; X Transverse or lateral
 Transmission Data: 4 speeds; - Manual; X Automatic; X Overdrive
 Final Drive: - Rear Wheel Drive; X Front Wheel Drive; - Four Wheel Drive
 Major Options: X A/C; X Pwr Strg. X Pwr. Brakes X Pwr Windows
X Power Door Locks
 Date Received: N/A ; Odometer Reading - 54.6 miles
 Selling Dealer: Towne Lincoln-Mercury
 & address Buffalo, New York

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: Ford Motor Company
 Date of Manufacture: 1-89
 GVWR: 4911 lbs; GAWR: 2731 lbs FRONT
2241 lbs REAR

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load 30 psi Front
30 psi Rear

Recommended Tire Size P205/70R15 Load Range Standard
 Recommended Cold Tire Pressure 30 psi Front 30 psi Rear
 Size of Tires on Test Vehicle P205/70R15 Manufacturer: Firestone

Vehicle Capacity Data:

Type of Front Seats - Bench - Bucket X Split Bench
 Number of Occupants 3 Front 3 Rear 6 Total
 Vehicle Capacity Weight (VCW) = 1100 lbs.
 No. of Occupants x 150 lbs = 900 lbs.
 Rated Cargo/Luggage Weight (RCLW) = 200 lbs. (Difference)

WEIGHT OF TEST VEHICLE AS RECEIVED AT LABORATORY (with maximum fluids):

Right Front = 1180 lbs Right Rear = 650 lbs
 Left Front = 1150 lbs Left Rear = 720 lbs
 TOTAL FRONT = 2330 lbs TOTAL REAR = 1370 lbs
 % of Total Weight = 63.0 % % of Total Weight = 37.0 %
 TOTAL DELIVERED WEIGHT = 3700 lbs.

TABLE 2 (continued)
GENERAL TEST & VEHICLE PARAMETER DATA

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight	=	<u>3700</u>	lbs.
Rated Cargo/Luggage Weight (RCLW)	=	<u>200</u>	lbs.
Weight of 2 P.572 Dummies @ 164 ea.	=	<u>328</u>	lbs.
TARGET TEST WEIGHT	=	<u>4228</u>	lbs. (sum)

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 257 LBS OF CARGO WEIGHT:

Right Front =	<u>1170</u>	lbs.	Right Rear =	<u>1010</u>	lbs.
Left Front =	<u>1110</u>	lbs.	Left Rear =	<u>940</u>	lbs.
TOTAL FRONT =	<u>2280</u>	lbs.	TOTAL REAR =	<u>1950</u>	lbs.
% of Total Weight =	<u>53.9</u>	%	% of Total Weight =	<u>46.1</u>	%
TOTAL TEST WEIGHT =	<u>4230</u>	lbs.			
Weight of Ballast secured in vehicle's cargo area =	<u>257</u>	lbs.			
Vehicle Components Removed for Weight Reduction	<u>None</u>				

TEST VEHICLE ATTITUDE*: (all dimensions in inches)

AS DELIVERED	RF	<u>27.7</u>	;	LF	<u>27.9</u>	;	RR	<u>26.9</u>		<u>26.9</u>	
FULLY LOADED	RF	<u>27.4</u>	;	LF	<u>27.5</u>	;	RR	<u>26.3</u>	;	LR	<u>26.2</u>
AS TESTED	RF	<u>27.6</u>	;	LF	<u>27.8</u>	;	RR	<u>26.7</u>	;	LR	<u>26.8</u>
Vehicle's Wheelbase =	<u>109.0</u>	inches									
Location of Vehicle's C.G. =	<u>50.2 inches from front wheel center</u>										

*Vehicle equipped with self-leveling suspension system.

FUEL SYSTEM DATA:

Fuel System Capacity From Owner's Manual =	<u>18.6</u>	gallons
Usable Capacity Figure Furnished by COTR =	<u>18.6</u>	gallons
Test Volume Range (92 to 94% of Usable Capacity) =	<u>17.1</u>	to <u>17.5</u> gallons
ACTUAL TEST VOLUME =	<u>17.3</u>	gallons (with entire fuel system filled)

TABLE 3

POST-IMPACT DATA

TYPE OF TEST: Frontal Impact IMPACT ANGLE: 0°

TEST DATE: June 12, 1989 TIME: 14:45 TEMP: 76 °F

VEHICLE NHTSA NO.: CK0202

REQUIRED IMPACT VELOCITY RANGE: 28.9 to 29.9 mph

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

Trap No. 1 = 29.5 mph; Trap No. 2 = 29.5 mph

Distance from vehicle to barrier (1) entering trap = 52 inches

(2) exiting trap = 12 inches

VEHICLE STATIC CRUSH: (for Frontal and Rear Impacts Only)

Vehicle Length: Pre-Test Right = 201.0 "; C/L= 205.3 "; Left = 200.8 "

Post-Test Right = 185.7 "; C/L = 185.0 "; Left = 188.7 "

CRUSH Right = 15.3 "; C/L = 20.3 "; Left = 12.1 "

AVERAGE = 15.9 inches

VEHICLE REBOUND: (from rigid barrier only)

Distance from front of test vehicle to impact point:

Right = 12.0 "; C/L = 12.4 "; Left = 10.7 "

AVERAGE = 11.7 inches

<u>DOOR OPENING:</u>	Left	Right
Front	<u>operable</u>	<u>operable</u>

Front operable operable

Rear operable operable

SEAT MOVEMENT:	Seat Back Failure	Seat Shift
-----------------------	--------------------------	-------------------

Front	None	None
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Rear _____

TABLE 3 (continued)

POST-IMPACT DATA

GLAZING DAMAGE: windshield cracked

Section 3
OCCUPANT AND VEHICLE DATA

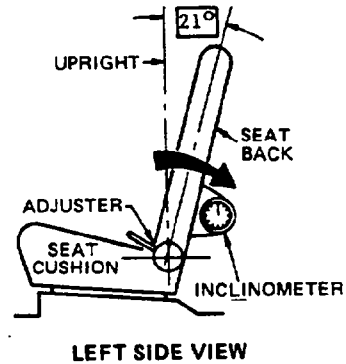
Figure 1

TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model year: 1989 Vehicle Model: Lincoln Continental Body Style: 4-Door Sedan

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 21°

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

Seat back angle for passenger's seat 21°

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): located in 7th detent (midpoint) of 13 total detents

3. Fuel Tank Capacity Data

A. "Usable Capacity" of the standard equipment fuel tank is 18.6 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.: CK0202

VEHICLE: 1989 Lincoln Continental

SEAT TYPE:

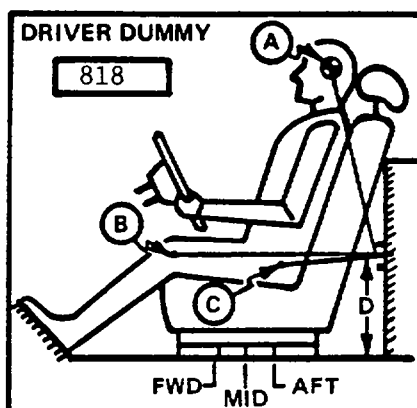
- Bench
- Bucket
X Split Bench

ADJUSTER TYPE:

- Manual
X Power

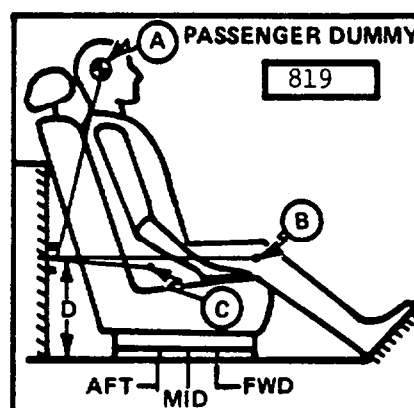
4-Door Sedan
BUCKET SEAT BACK TYPE:

- Fixed
X Adjustable Reclining



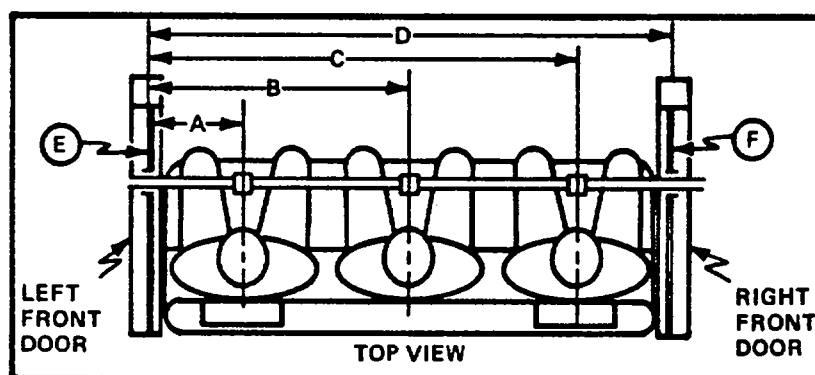
MEASUREMENT
LOCATION

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



A = 20.2 in. 7 Degrees
B = 22.7 in. 98 Degrees
C = 8.4 in. 136 Degrees
D = 12.7 in.

A = 20.5 in. 5 Degrees
B = 23.4 in. 99 Degrees
C = 9.6 in. 131 Degrees
D = 12.7 in.



DUMMY ID

S/N 818

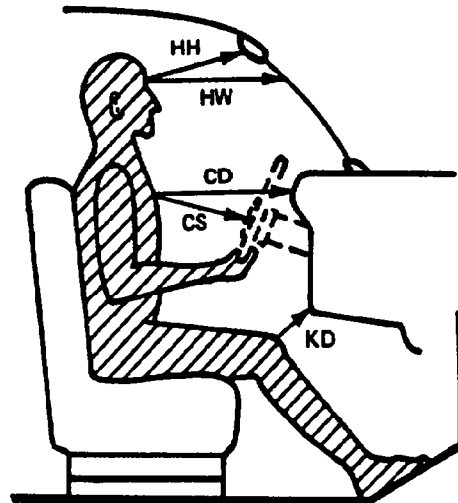
819

A	=	Left Door to Driver Centerline	13.6 in.
B	=	Left Door to Center Passenger Centerline	- in.
C	=	Left Door to Right Passenger Centerline	41.7 in.
D	=	Left Door to Right Door	55.3 in.
E, F	=	Window Glass Height (Right and Left Must Be Equal)	11.0 in.

Figure 3

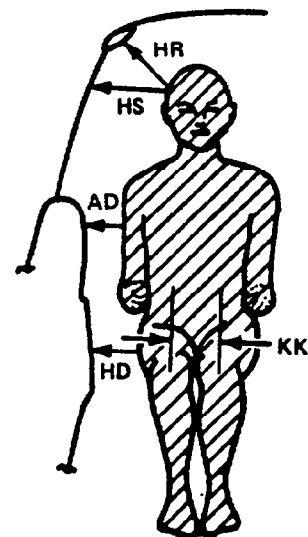
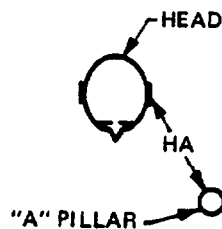
OCCUPANT CLEARANCE DIMENSIONS

	DRIVER	PASSENGER
HH	13.6	13.9
HW	21.0	21.1
CD	21.3	19.9
CS	11.8	-
KDL	5.4	5.2
KDR	5.9	4.6
SA	21°	21°
TA	19°	19°



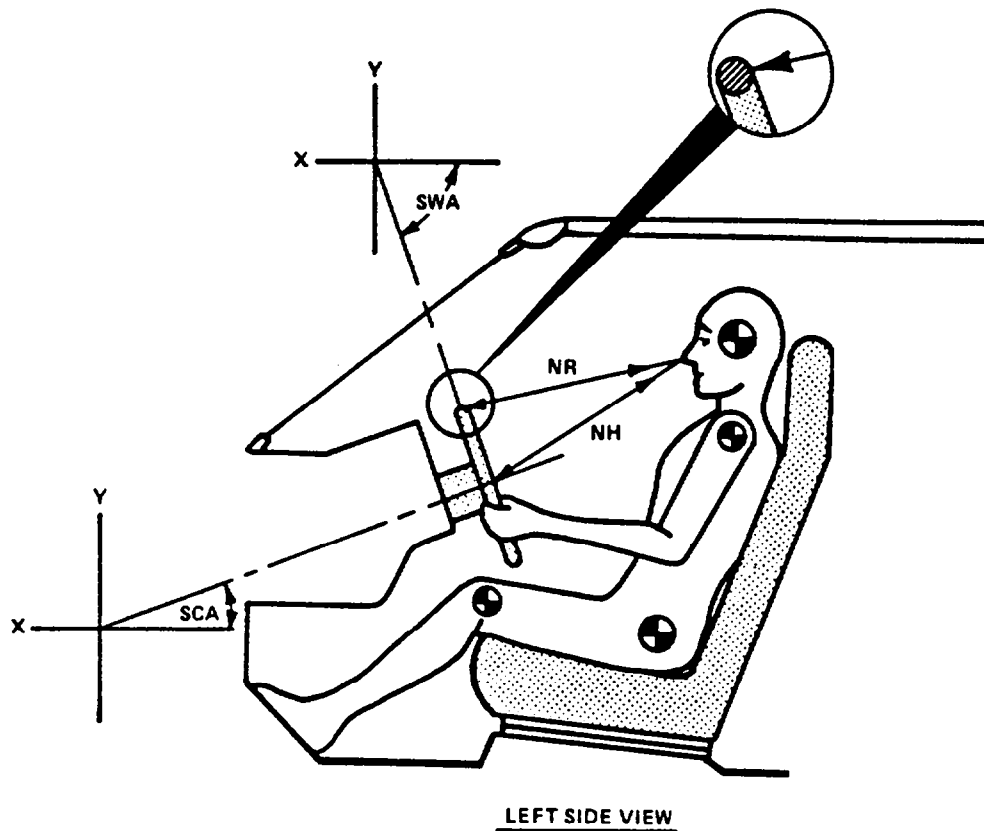
HH = Head to Windshield Header
 HW = Head to Windshield
 CD = Chest to Dash
 CS = Chest to Steering Wheel
 KD(L/R) = Knee to Dash (Left/Right)
 SA = Seat Back Angle
 TA = Torso Angle

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



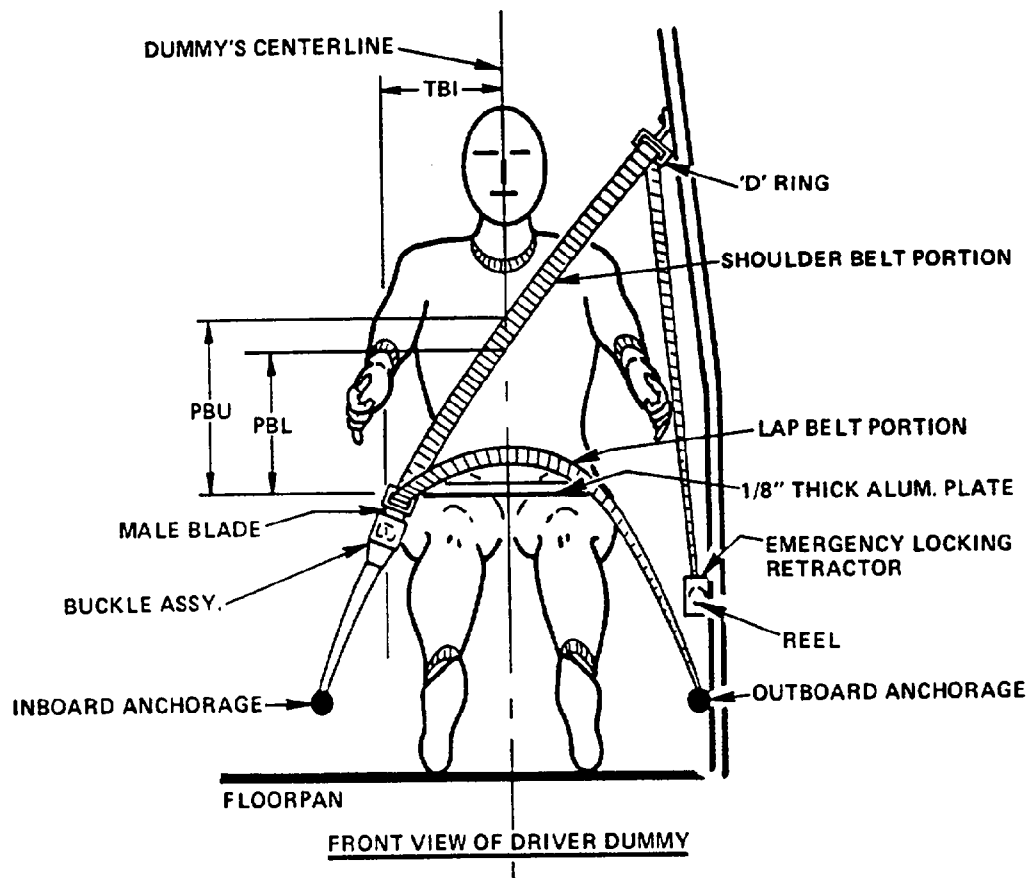
	DRIVER	PASSENGER
HR	6.6	6.7
HS	10.1	10.5
AD	4.7	4.8
HD	6.4	6.3
KK	9.7	7.8
HA	20.4	20.2

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	15.7 Inches
<u>NH</u> -- Distance from tip of dummy's nose to center of steering column hub	15.9 Inches
<u>SCA</u> -- Angle of steering column relative to the horizontal X axis	24 Degrees
<u>SWA</u> -- Angle of steering wheel relative to the horizontal X axis	-66 Degrees

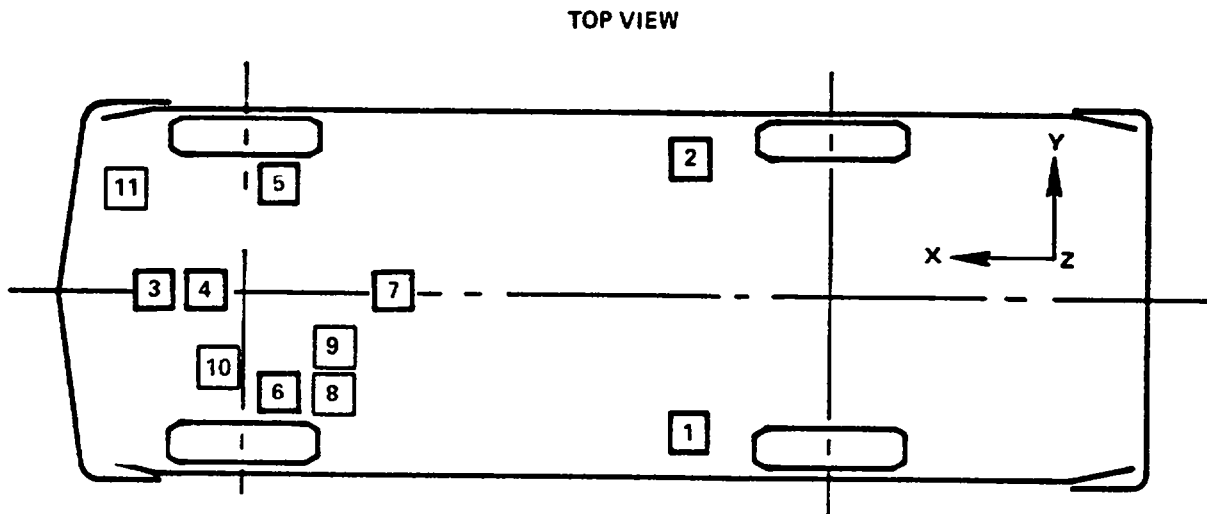
Figure 5
SEAT BELT POSITIONING DATA



	DRIVER DUMMY (inches)	PASSENGER DUMMY (inches)
<u>PBU</u> -- Top surface of alum. plate to upper edge	N/A*	N/A*
<u>PBL</u> -- Top surface of alum. plate to belt lower edge	N/A*	N/A*
<u>TBI</u> -- distance from Torso centerline to buckle	N/A*	N/A*

*Seat belt not used for test, air bag only.

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	82.4	21.4	17.6				
	AT LEFT SIDE PRE:							
	POST:	82.7	20.7	17.3				
	LONGITUDINAL ACCELERATION				3	130	-26	56
2	REAR SEAT X-MEMBER	82.0	-21.4	17.6				
	AT RIGHT SIDE PRE:							
	POST:	81.6	-21.1	17.3				
	LONGITUDINAL ACCELERATION				2	149	-27	54
3	TOP OF ENGINE BLOCK	169.3	-4.0	35.4				
	PRE:							
	POST:	162.7	-3.0	33.3				
	LONGITUDINAL ACCELERATION				20	58	-79	39
4	BOTTOM OF ENGINE BLOCK	171.2	7.0	7.6				
	PRE:							
	POST:	167.4	6.4	9.5				
	LONGITUDINAL ACCELERATION				19	62	-80	47
5	BRAKE CALIPER AT RIGHT SIDE	158.7	-24.6	18.6				
	PRE:							
	POST:	155.6	-24.2	18.9				
	LONGITUDINAL ACCELERATION				17	64	-62	52
6	BRAKE CALIPER AT LEFT SIDE	158.7	24.7	18.3				
	PRE:							
	POST:	158.4	23.3	19.3				
	LONGITUDINAL ACCELERATION				10	72	-64	54
7	DASH PANEL	130.8	2.3	38.2				
	PRE:							
	POST:	131.3	2.8	39.0				
	LONGITUDINAL ACCELERATION				27	104	-56	87

**

POSITIVENEGATIVE

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

LONGITUDINAL: FORWARD
 LATERAL: LEFTWARD
 VERTICAL: UPWARD

REARWARD
 RIGHTWARD
 DOWNWARD

DISTANCE MEASUREMENTS IN INCHES

TABLE 4 (continued)

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION**		NEGATIVE DIRECTION**	
					MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
8	FRONT SHOCK TOWER	158.9	16.0	32.0				
	PRE: LONGITUDINAL ACCELERATION	154.0	17.7	32.8				
	POST:				12	44	-60	55
9	FIREWALL	151.8	18.3	34.5				
	PRE: LONGITUDINAL ACCELERATION	148.7	20.5	32.8				
	POST:				12	30	-78	59
10	CRADLE FRAME	170.1	16.0	7.4				
	PRE: LONGITUDINAL ACCELERATION	166.7	16.1	5.2				
	POST:				30	52	-72	40
11	RADIATOR SUPPORT	181.1	-23.2	29.1				
	PRE: LONGITUDINAL ACCELERATION	176.0	-24.5	27.8				
	POST:				27	56	-126	27

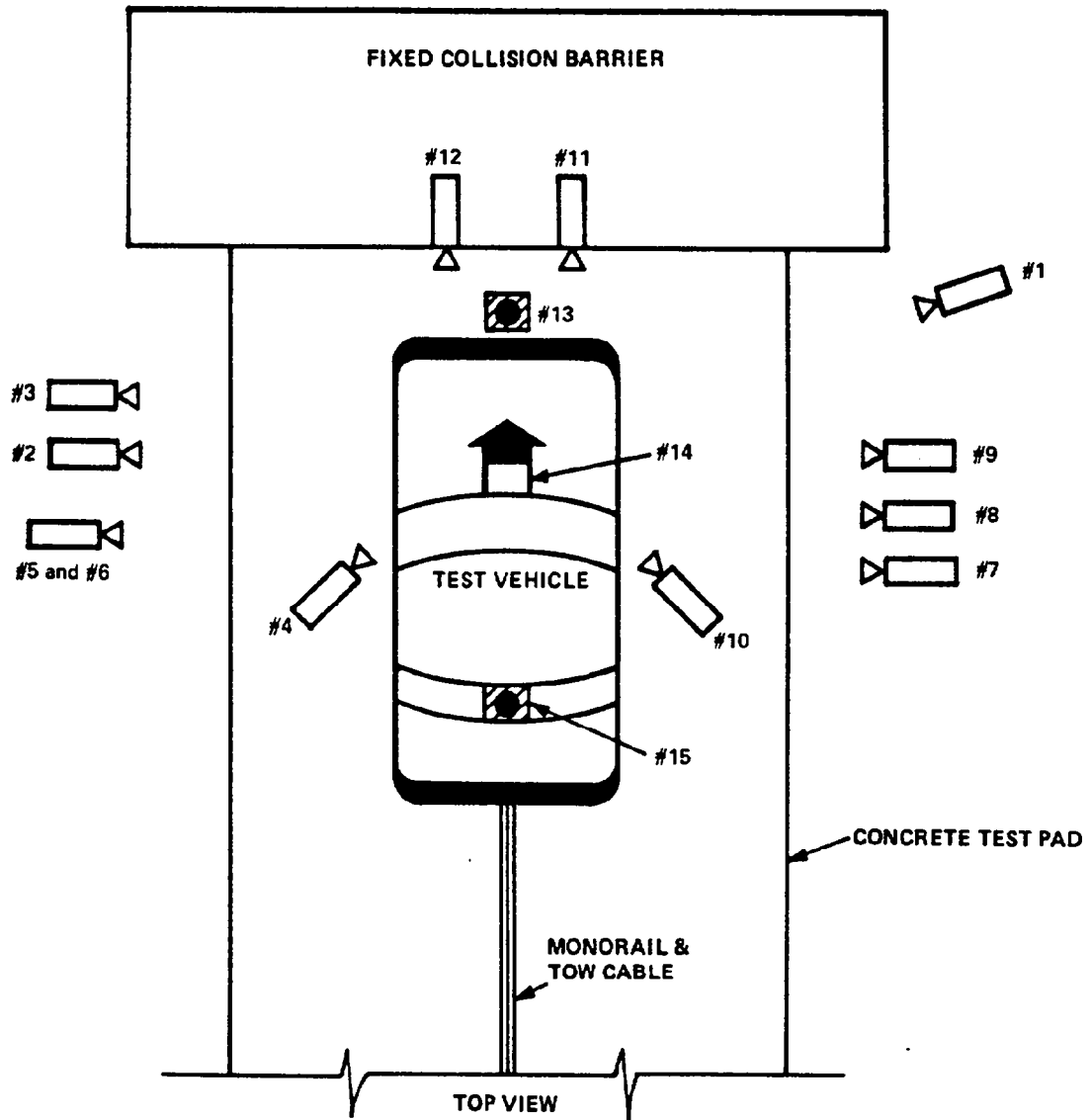
*X + Forward from rear bumper LONGITUDINAL: FORWARD REARWARD
 Y + Left from vehicle centerline LATERAL: LEFTWARD RIGHTWARD
 Z + Up from ground VERTICAL: UPWARD DOWNWARD

DISTANCE MEASUREMENTS IN INCHES

Figure 7

CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information Shown on Table 5



Test No. CK0202

TABLE 5
HIGH-SPEED CAMERA LOCATIONS

1989 Lincoln Continental 4-Door Sedan
Vehicle

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	260.0	57.0	41.0	-4	242.9	13	530
3	Left Side View	330.0	32.0	40.0	-3	312.9	25	530
4	Driver and Interior View	110.0	108.0	67.5	-15	-	13	890
5	Steering Column (bottom)	325.0	72.0	46.5	-4	307.9	25	540
6	Steering Column (top)	325.0	72.0	70.5	-8	307.9	25	550
7	Overall Right Side	362.0	86.0	42.0	-3	244.9	13	***
8	Right Side View	321.0	67.0	41.0	-4	303.9	25	750
9	Right Passenger View	331.0	82.5	57.0	-4	313.9	35	750
10	Passenger and Interior View	100.0	113.0	68.0	-16	-	13	600
11	Passenger Front View	24	8.0	73.0	-34	-	13	590
12	Driver Front View	24	8.0	73.0	-33	-	13	560
13	Windshield View	0	0	126.0	-45	-	13	570
14	Pit View of Engine	0	32.0	-120.0	90	-	13	850
15	Pit View of Fuel Tank	0	140.0	-120.0	90	-	13	750

* X = Film plane to monorail centerline

Y = Film plane to impact location

Z = Film plane to ground

** = Referenced to horizontal plane

*** = Timing marks not available.

Figure 8
VEHICLE TARGET LOCATIONS

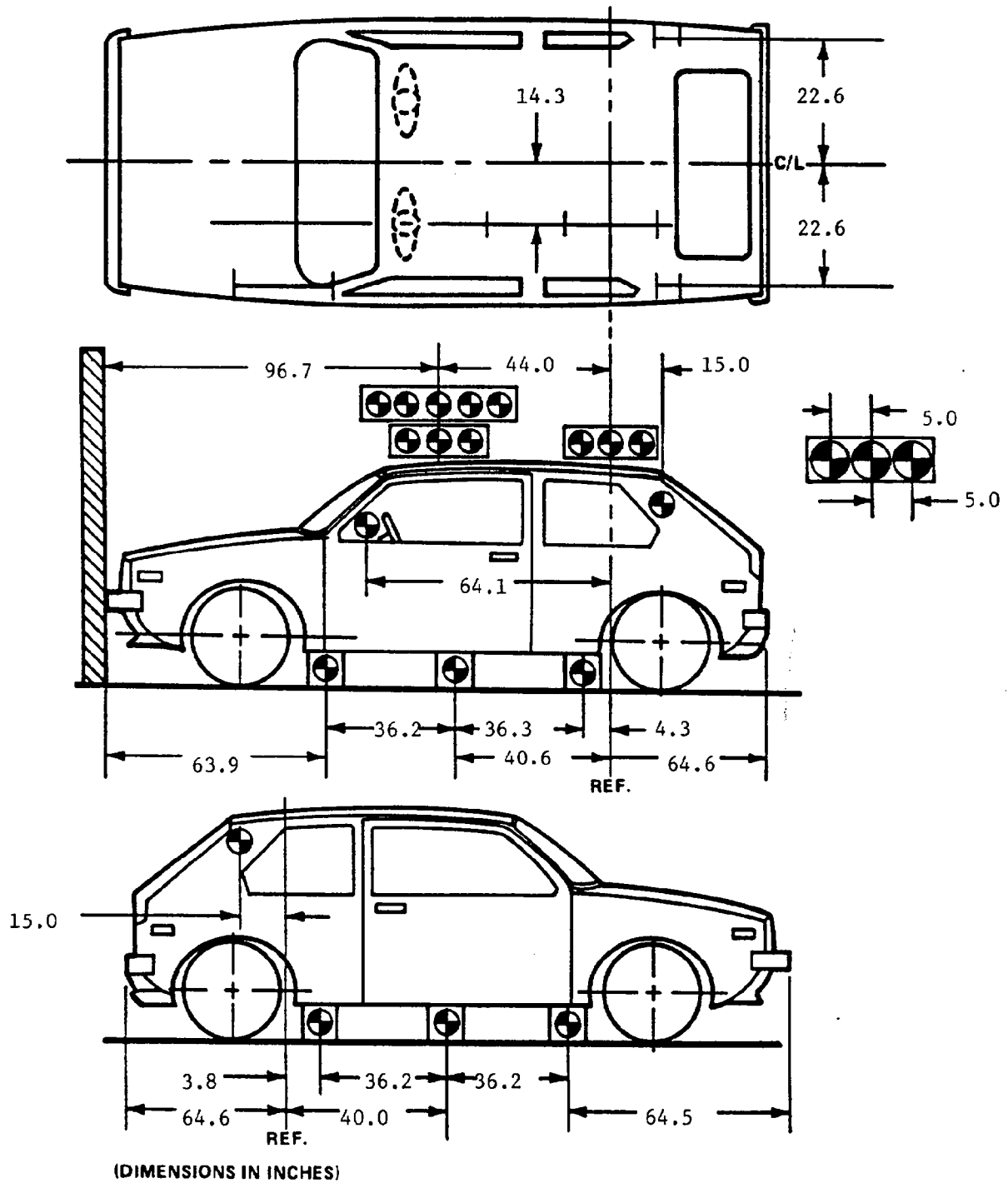


Figure 9

TEST VEHICLE MEASUREMENTS

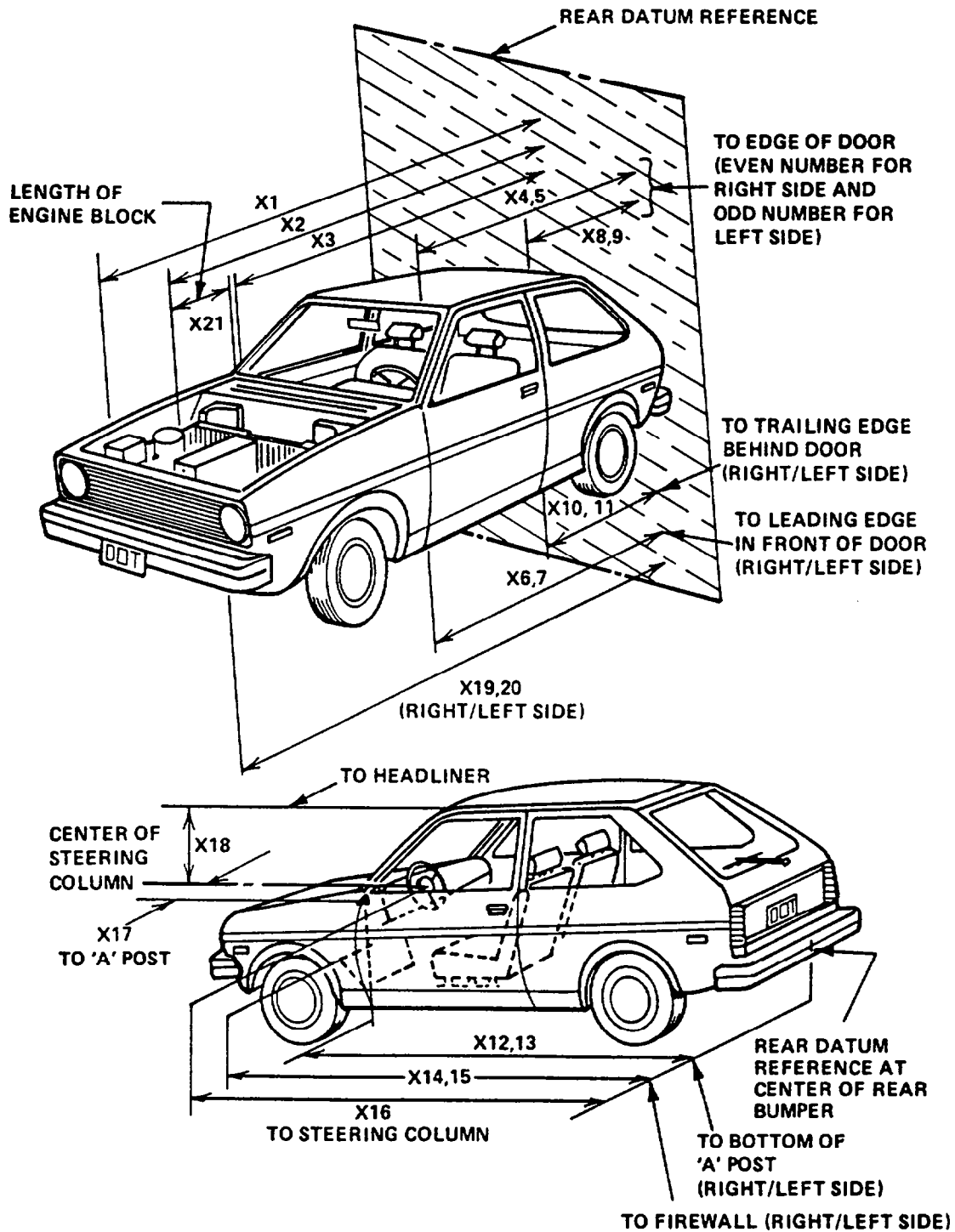


TABLE 6
VEHICLE MEASUREMENTS

No.		All Dimensions in Inches		
		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	205.3	185.0	20.3
X2	Rear Surface of Vehicle to Front of Engine	178.9	173.0	5.9
X3	Rear Surface of Vehicle to Firewall	153.0	152.0	1.0
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	140.4	140.2	0.2
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	140.1	141.2	-1.1
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	138.6	137.8	0.8
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	138.3	137.9	0.4
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	98.4	97.5	0.9
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	98.4	98.5	-0.1
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	97.9	97.2	0.7
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	97.5	97.1	0.4
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	138.3	137.5	0.8
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	137.9	137.5	0.4
X14	Rear Surface of Vehicle to Firewall, Right Side	151.7	149.4	2.3
X15	Rear Surface of Vehicle to Firewall, Left Side	151.0	149.2	1.8
X16	Rear Surface of Vehicle to Steering Column	121.3	122.0	-0.7
X17	Center of Steering Column to "A" Post	16.4	16.5	-0.1
X18	Center of Steering Column to Headliner	17.5	16.8	0.7
X19	Rear Surface of Vehicle to Right Side of Front Bumper	201.0	185.7	15.3
X20	Rear Surface of Vehicle to Left Side of Front Bumper	200.8	188.7	12.1
X21	Length of Engine Block	22.0	22.0	0.0

Section 4

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

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

TABLE 7
DUMMY INJURY CRITERIA VALUES

	MAXIMUM ACCELERATION ("G")							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R*
DUMMY (1)	-54	-9	-6	57	-47	-8	-7	46.5
DUMMY (2)	-57	13	35	67	-42	15	-35	42.6

	MAXIMUM FORCE - FEMUR LOAD (LBS)	
	Left Femur	Right Femur
DUMMY (1)	1572	1391
DUMMY (2)	1100	1468

	HEAD INJURY CRITERIA **			
	HIC	36 millisecond Maximum		AVE. ACC. (g) t ₁ TO t ₂
		t ₁ (SEC)	t ₂ (SEC)	
DUMMY (1)	421	0.07485	0.10845	43.6
DUMMY (2)	305	0.07305	0.09352	46.7

*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 = 5.5 sec.

Log time duration of reminder light operation = 5.5 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 = 5.5 sec.

Note wording of visual warning:

Fasten seat belt -

Fasten Belt -

Symbol 101-80 X

TABLE 9

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

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

Describe location: located in front glove box

The manufacturers recommended schedule is to replace or repair this system if:

1. The "air bag" lamp does not go on as described.
2. The "air bag" lamp flashes intermittently or stays on continuously.
3. A tone sounds intermittently with no "air bag" lamp.
4. The supplemental air bags have deployed.

Were appropriate instructions concerning maintenance and/or replacement of this system provided?

YES X NO

Was a description of the functional operation of the system provided?

YES X NO

Is there a reference to the instructions and description of the system on the label?

YES X NO

Was an owner's manual provided?

YES X NO

Did the owner's manual contain appropriate information concerning maintenance and/or replacement and a description of the functional operation of the system?

YES X NO

TABLE 10

FMVSS NO 208 - READINESS INDICATOR

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

Is the system totally mechanical?

YES _____ NO X

Describe the location of the readiness indicator:

Center of instrument (dash) panel

Is the readiness indicator clearly visible to the driver?

YES X NO _____

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

YES X NO _____

TABLE 11

FMVSS NO. 208 - COMFORT AND CONVENIENCE TEST SUMMARY

Test Vehicle NHTSA No.:	<u>CK0202</u>
Make/Model:	<u>1989 Lincoln Continental</u>
Date of Comfort/Convenience Check:	<u>6-9-89</u>
Technician Performing Check:	<u>DJT</u>
GVWR:	<u>4911 lbs.</u>

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

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

1. Automatic seat belts YES _____ NO X

If yes, go to requirements D1, D2 and D3

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

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

YES X 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.

** - Seat belts not used for test.

TABLE 11 (continued)

FMVSS NO. 208 - COMFORT AND CONVENIENCE TEST SUMMARY

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

(If NO, provide explanation)

D3
BELT CONTACT FORCE

1. Do not measure the belt contact force if the manual or automatic seat belt assemblies in this vehicle incorporate a webbing tension relieving device.

YES _____ NO X

2. Seats are adjusted according to instructions in Appendix B.

YES X NO _____

3. The test dummies are positioned according to dummy position placement instructions in Appendix B and Appendix C.

YES X NO _____

4. Close the vehicle's adjacent door, pull either 12 inches of belt webbing or the maximum available amount of belt webbing, whichever is less, from the retractor and then release it, allowing the belt webbing to return to the dummy's chest. Then fasten the latch. Locate the point where the centerline of the upper torso belt webbing crosses the midsagittal line on the dummy's chest. At that point, pull the belt webbing out 3 inches from the dummy's chest and release until it is within one inch from the dummy's chest. Measure the contact force exerted by the belt webbing on the dummy's chest. The contact force is * pounds. Contact the COTR if the contact force exceeds 0.7 pounds.

*Air bag used for both driver and passenger locations.

Figure 10

FMVSS NO. 212 - "WINDSHIELD MOUNTING" DATA SHEET

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

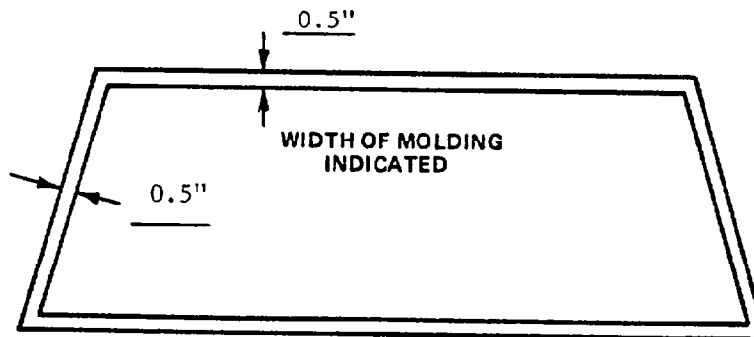
Windshield bonded in place covered by 0.5" wide rubber trim along top and sides. Bottom of windshield covered by a plastic shroud.

FMVSS 212 REQUIREMENTS: The Post-Test periphery retention amount must be at least 75% of the Pre-Test periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of windshield for vehicles equipped with automatic restraint systems for front occupants.

FMVSS 212 TEST DATA:

	WINDSHIELD PERIPHERY		
	PRE-TEST (in.)	POST-TEST (in.)	PERCENT RETENTION
RIGHT SIDE	83.6	83.6	100%
LEFT SIDE	83.6	83.6	100%
TOTAL	167.2	167.2	100%

AREA OF RETENTION FAILURE:



FRONT VIEW

FAILURE DETAILS:

None.

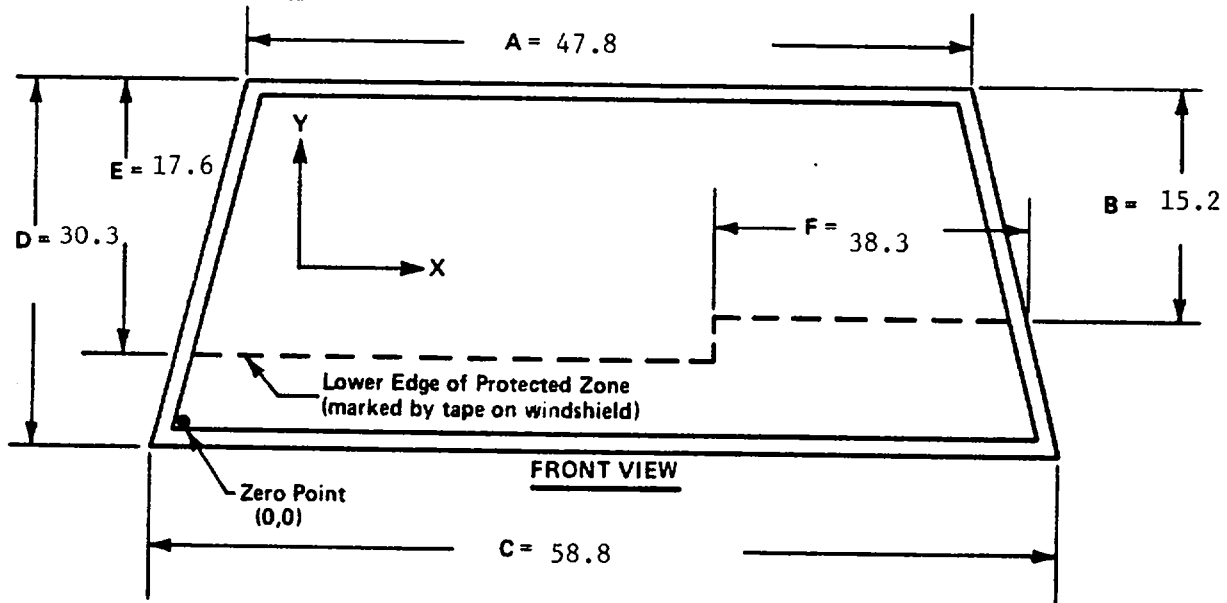
Figure 11

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.		

TABLE 12

FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

FMVSS NO. 301

TEST VEHICLE NHTSA NO.:

C	K	0	2	0	2
---	---	---	---	---	---

TEST DATE: June 12, 1989

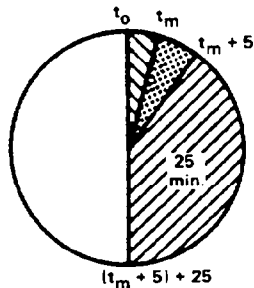
Vehicle Mfr/Make/Model: 1989 Lincoln Continental 4-Door Sedan

Test vehicle fuel tank filled to 92% to 94% of manufacturer's "useable" 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.

TEST VEHICLE IMPACT TYPE

- X Frontal (30 mph)
- Oblique (30 mph) with ^o barrier face
first contacting
(driver/passenger) side
- Rear Moving Barrier (30 mph)
- Lateral Moving Barrier (20 mph)

FUEL SPILLAGE MEASUREMENT



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

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

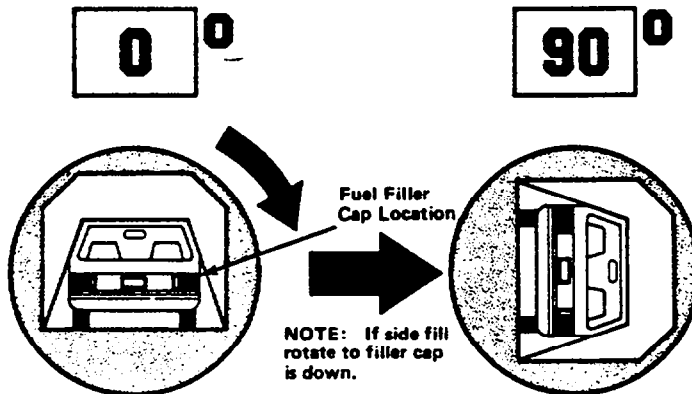
SOLVENT SPILLAGE DETAILS

None.

TABLE 13
FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

Veh. NHTSA ID No.:
 CK0202

TEST PHASE:



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 3 minutes 0 seconds
 (Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 05 minutes 00 seconds

TOTAL 8 minutes 0 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

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

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

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

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

IV. SOLVENT SPILLAGE LOCATION(S):

None.

Veh. NHTSA ID No.:
CK0202

The diagram illustrates the rotation of the front panel. On the left, a circular inset shows the front panel at a 90-degree angle, with the label '90°' above it. A curved arrow points from this position to the right. On the right, another circular inset shows the front panel at a 180-degree angle, with the label '180°' above it. A straight arrow points from the 90-degree position to the 180-degree position.

Rollover Fixture 90° Rotation Time 2 minutes 55 seconds
(Spec. Range = 1 to 3 minutes)

TOTAL	7	minutes	55	seconds
-------	---	---------	----	---------

(1) Time Period

(2) Maximum Allowable Solvent Spillage

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

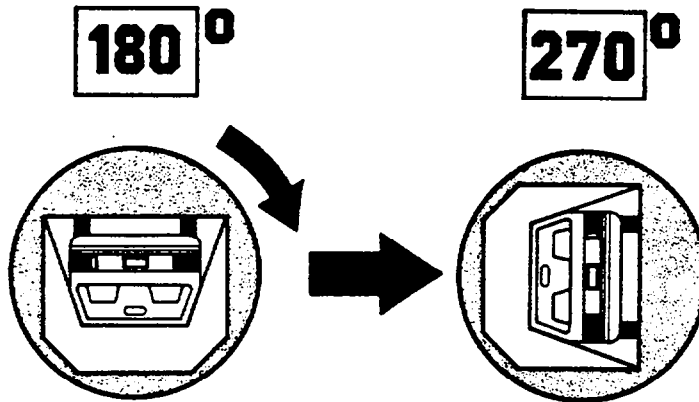
Note: Record spillage for whole minute intervals only as determined above.

None.

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

Veh. NHTSA ID No.:
CK0202

TEST PHASE:



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 3 minutes 0 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 05 minutes 00 seconds

TOTAL

8 minutes 0 seconds

Next whole minute interval

8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

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

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

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

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

IV. SOLVENT SPILLAGE LOCATION(S):

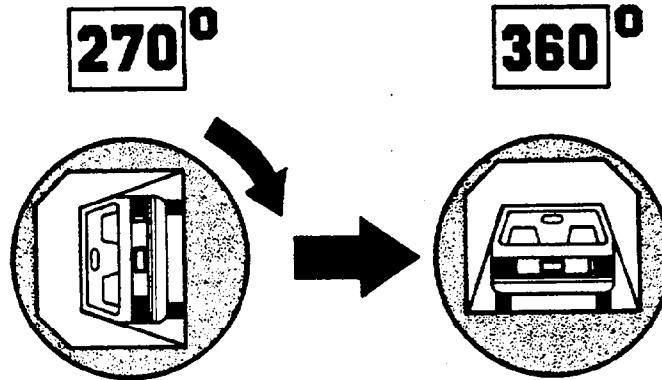
None.

TABLE 13 (continued)
FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

Veh. NHTSA ID No.:

CK0202

TEST PHASE:



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 3 minutes 0 seconds
 (Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 05 minutes 00 seconds

TOTAL 8 minutes 0 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

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

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

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

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

IV. SOLVENT SPILLAGE LOCATION(S):

None.

TABLE 14

TEST VEHICLE NONCOMPLIANCE NOTICE

NHTSA CONTRACT LAB: Calspan Advanced Technology Center

LAB. PROJECT MANAGER & TELEPHONE NO.: Walter E. Levan (716) 632-7500

DATE OF TEST: June 12, 1989 VEH. NHTSA No. CK0202

VEHICLE MANUFACTURER: Ford Motor Company

Model Year 1989 VIN: ILNLM974XKY700154

Body Style: 4-door Sedan Build Date: January 1989

DUMMY STABILIZED TEMPERATURE AT TIME OF TEST: 70 °F (pec. = 66-78°F)

IMPACT VELOCITY: 29.5 mph TIME OF TEST: 14:45

TYPE OF AUTOMATIC RESTRAINT SYSTEM: driver and passenger airbag restraint.

FAILURE DETAILS: Vehicle appears to comply with the requirements of

FMVSS Nos 208, 212, 219 (partial) and 301.

Appendix A

PHOTOGRAPHS

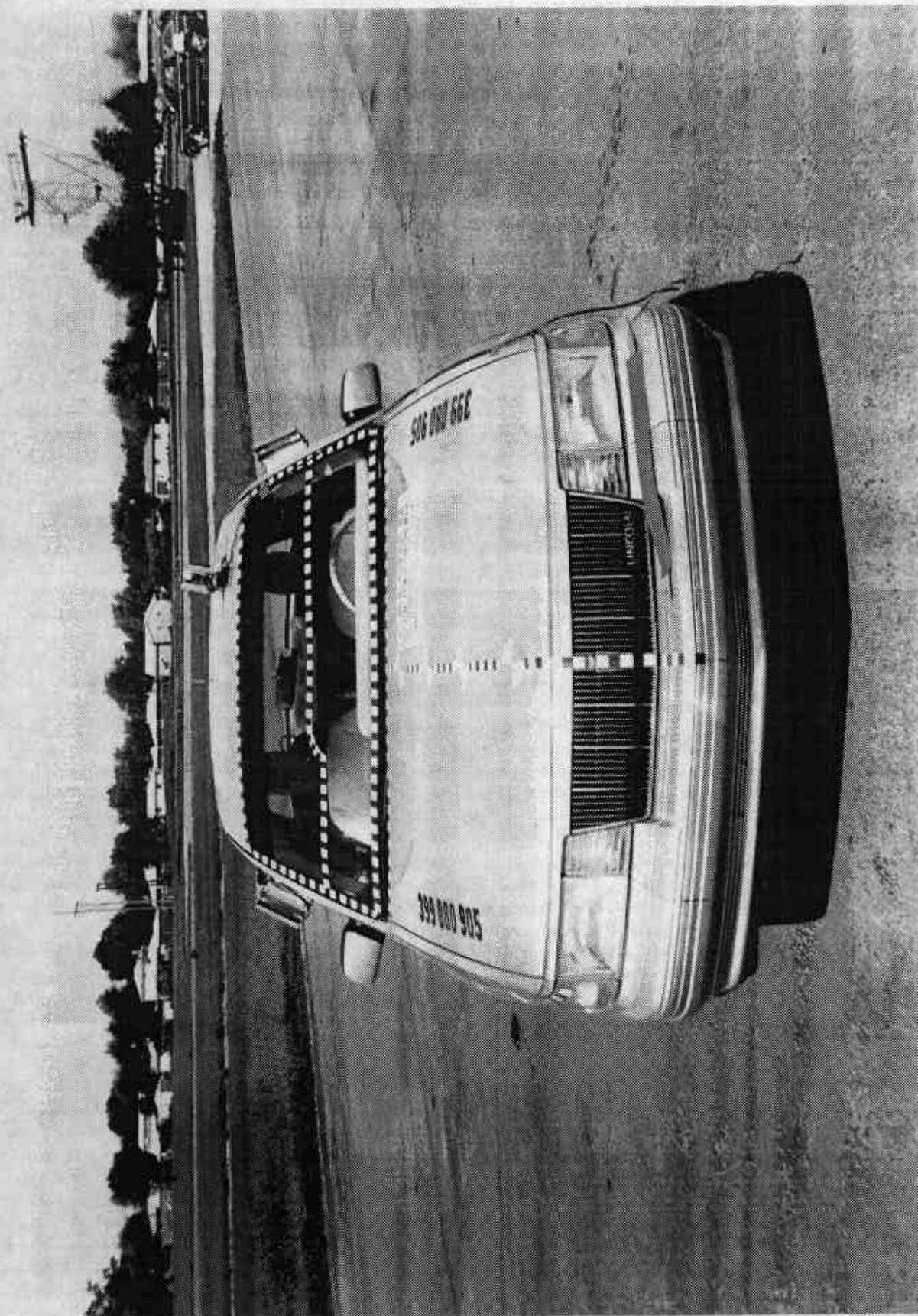


Figure A-1 PRE-TEST FRONT VIEW

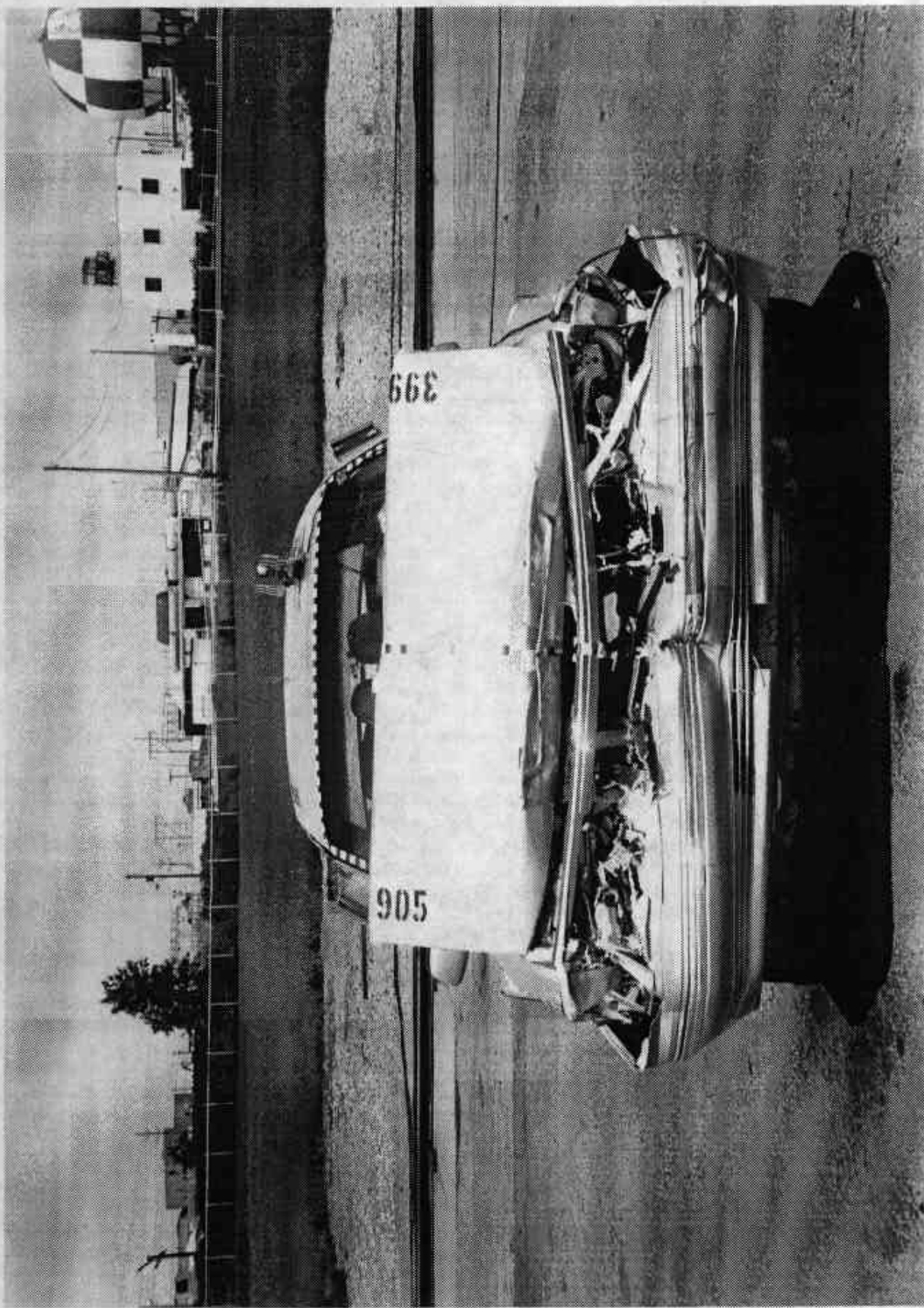


Figure A-2 POST-TEST FRONT VIEW

A-3

7715-8

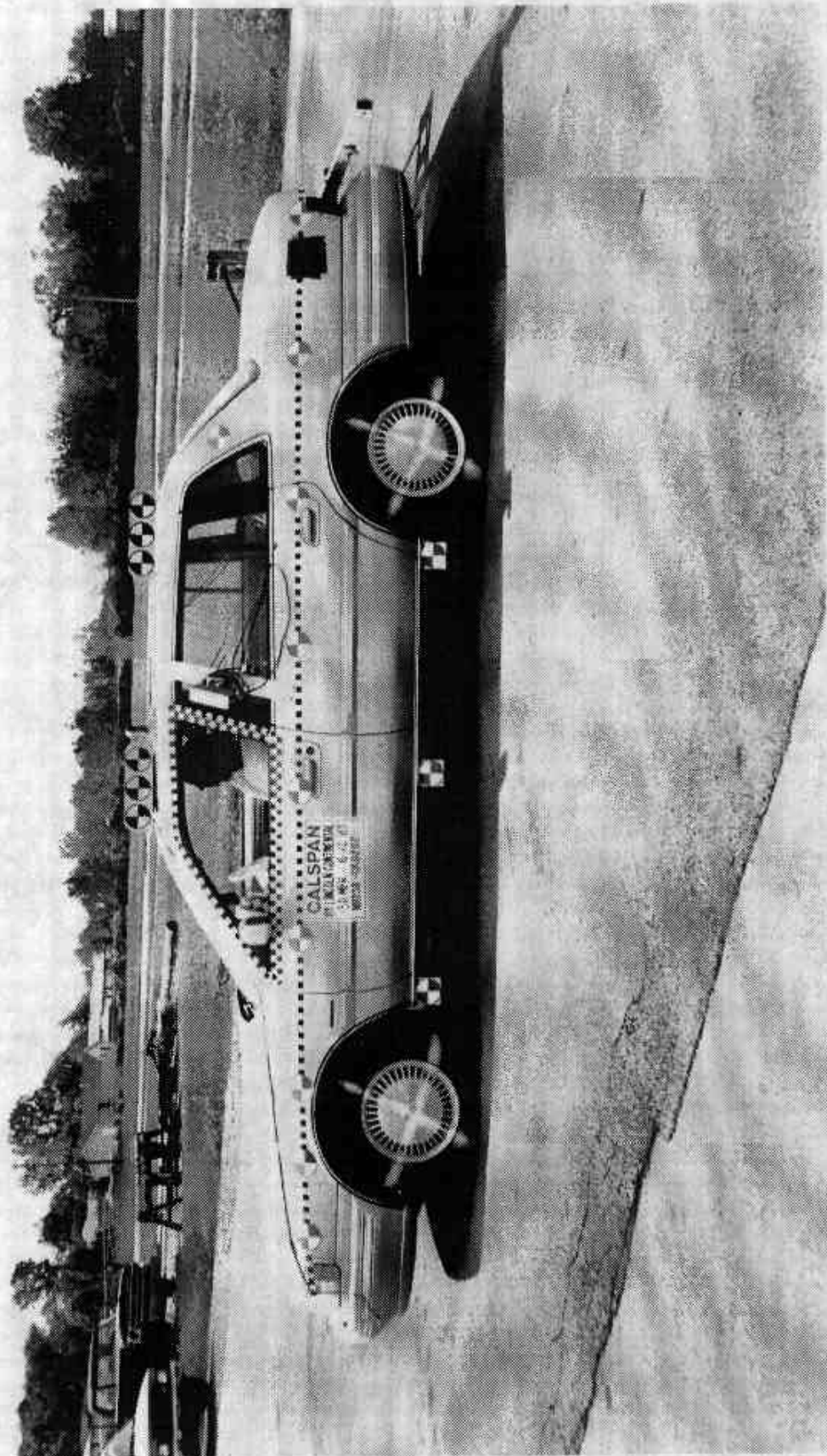


Figure A-3 PRE-TEST LEFT SIDE VIEW

A-4

7715-8

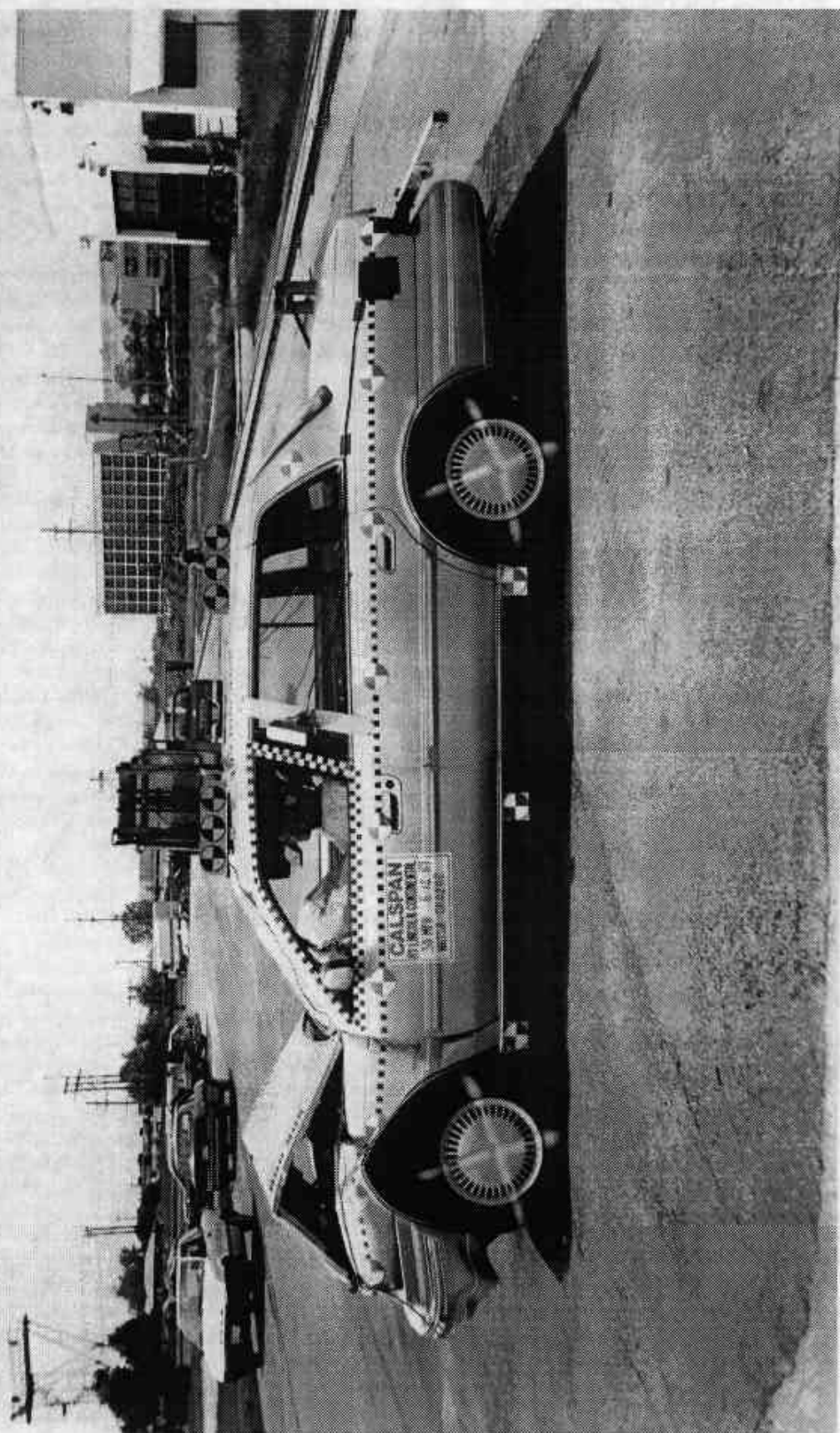


Figure A-4 POST-TEST LEFT SIDE VIEW

A-5

7715-8

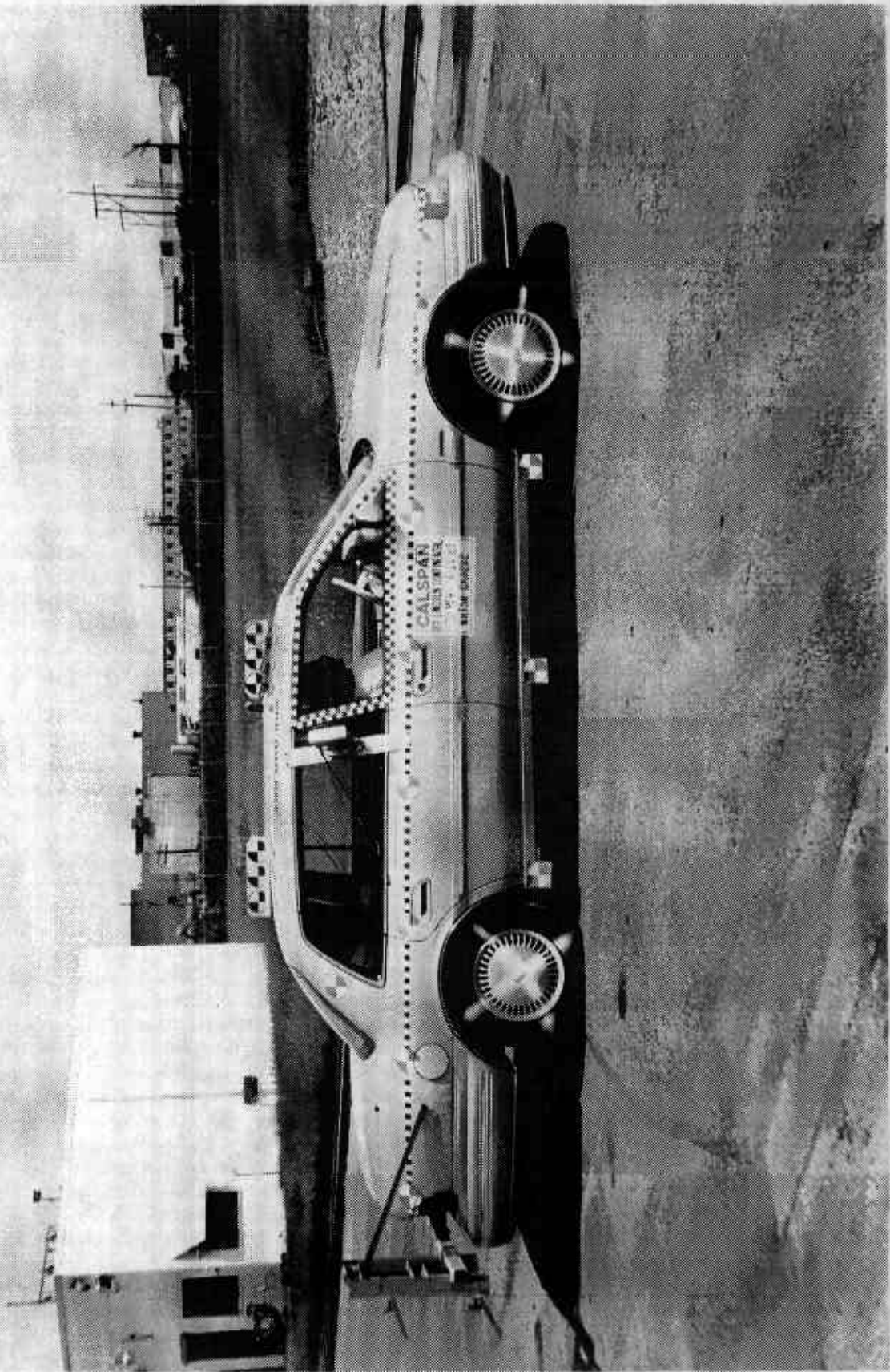


Figure A-5 PRE-TEST RIGHT SIDE VIEW

A-6

7715-8

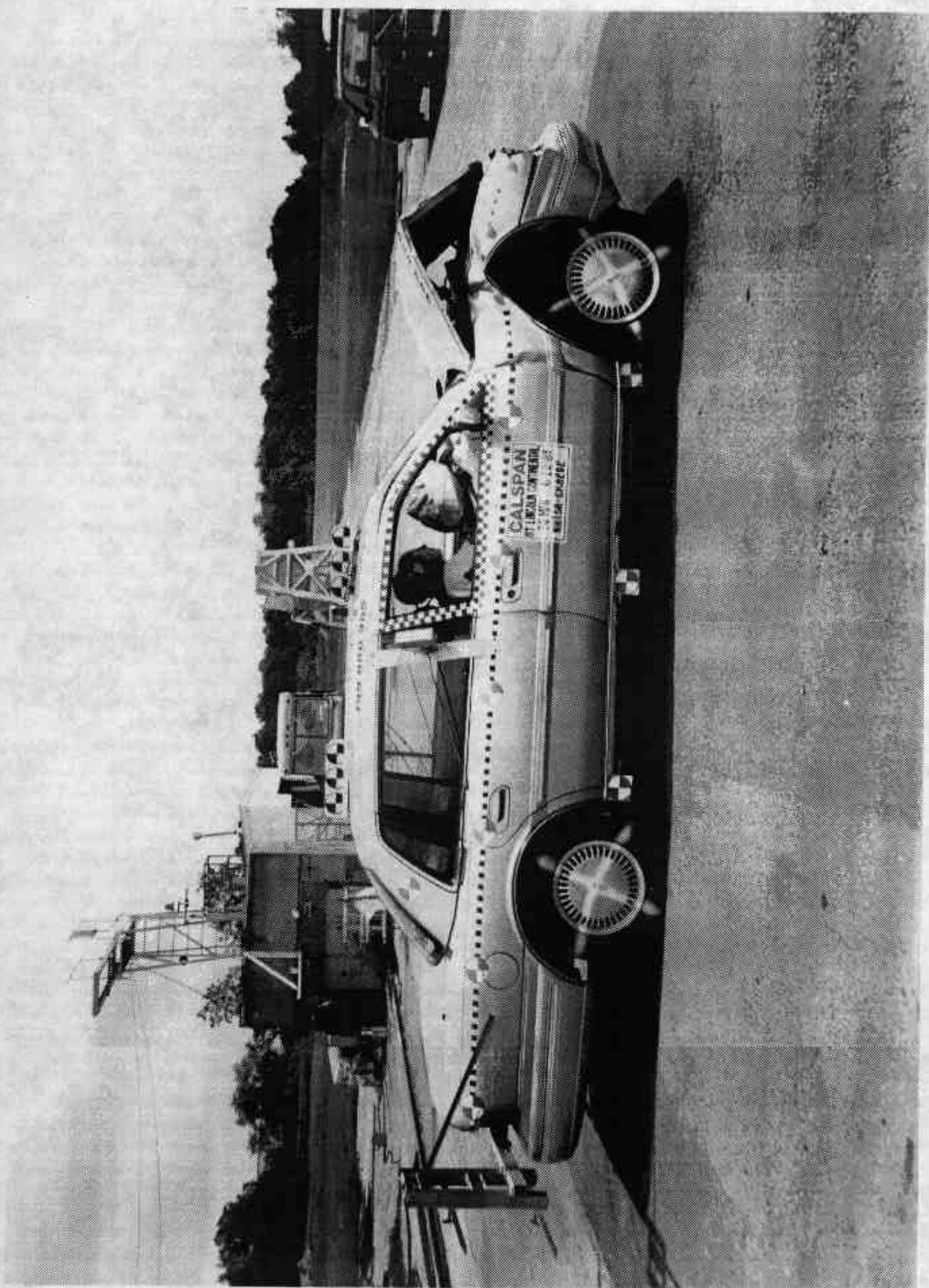


Figure A-6 POST-TEST RIGHT SIDE VIEW

A-7

7715-8

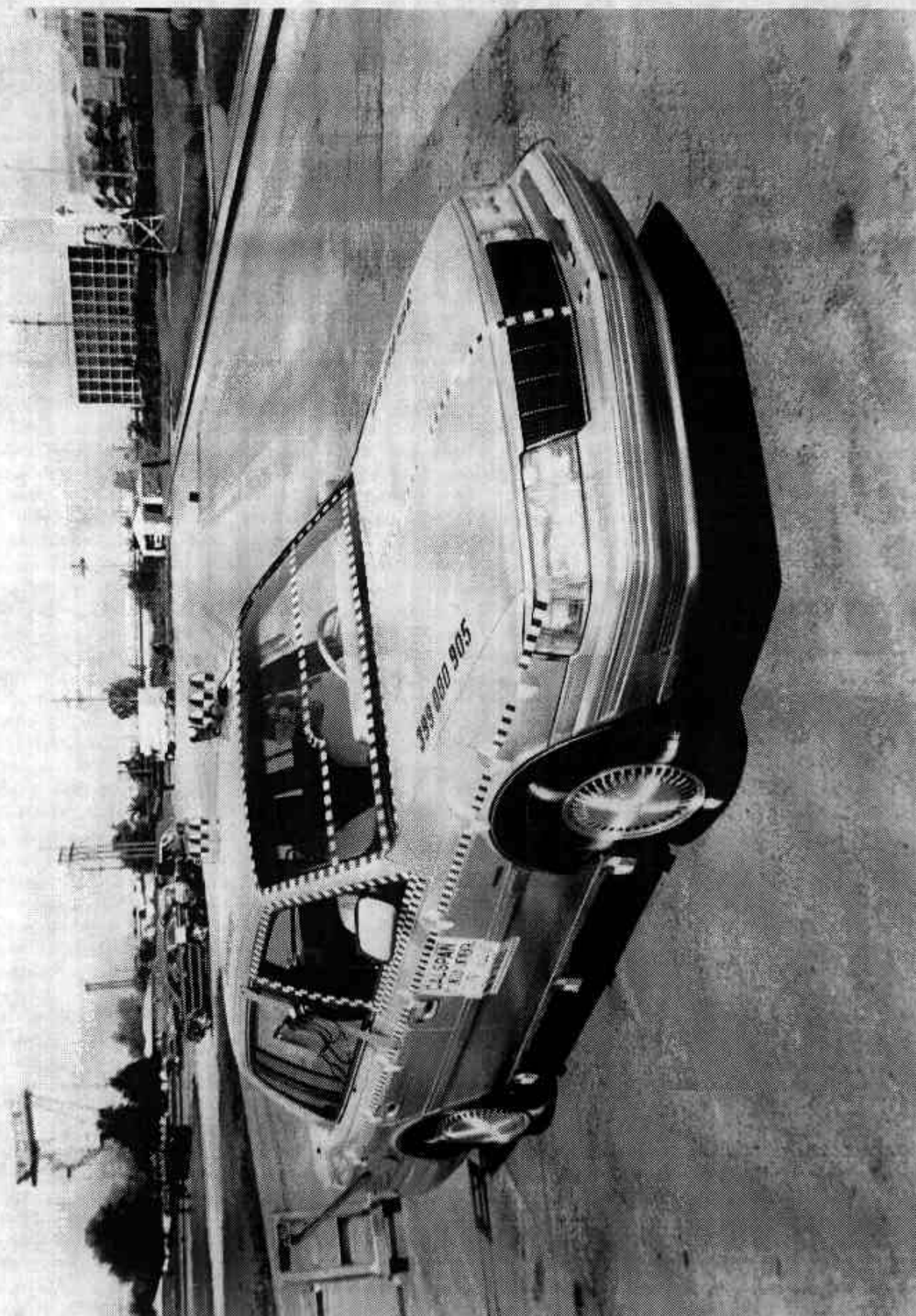


Figure A-7 PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

A-8

7715-8

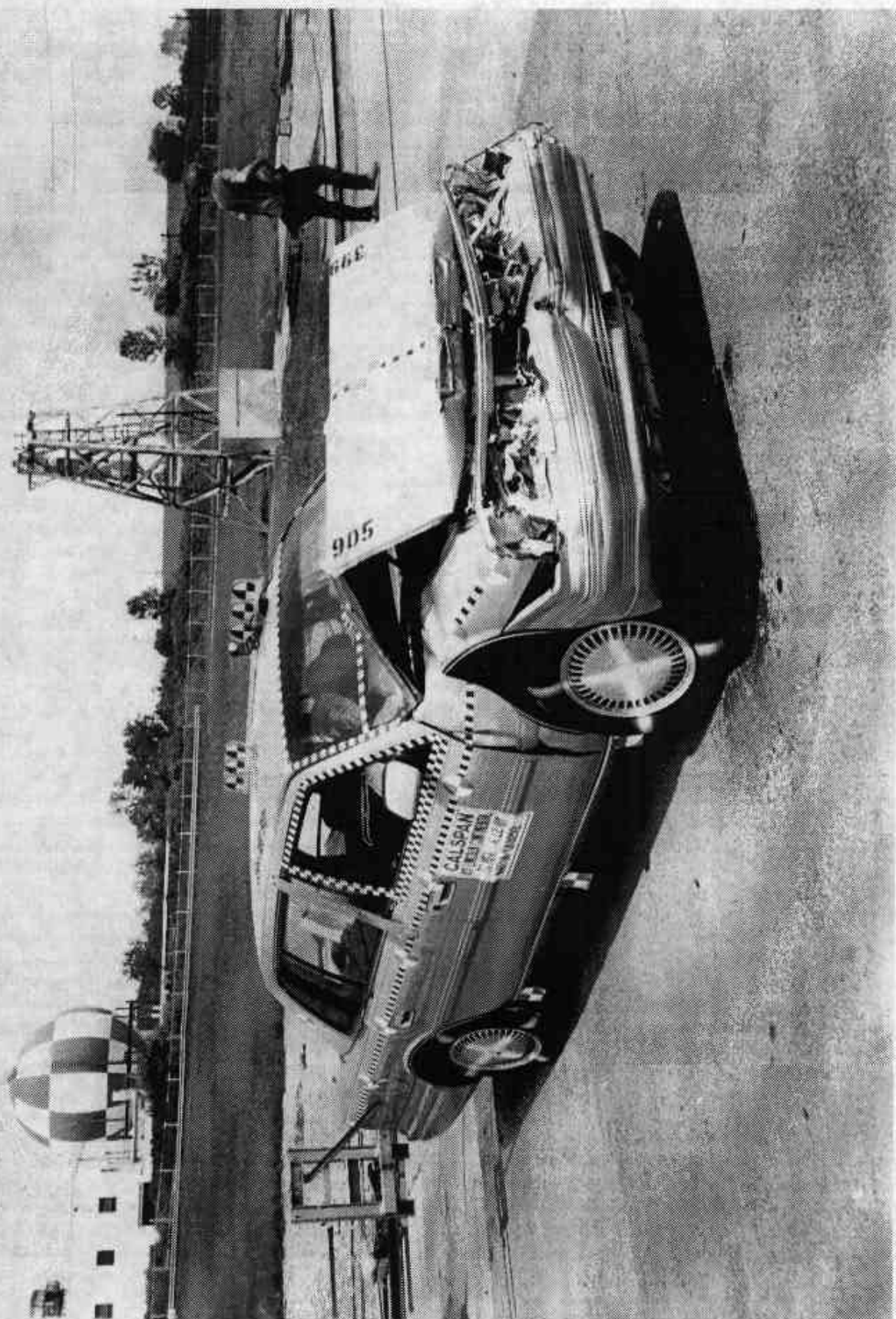


Figure A-8 POST-TEST RIGHT FRONT THREE-QUARTER VIEW

A-9

7715-8

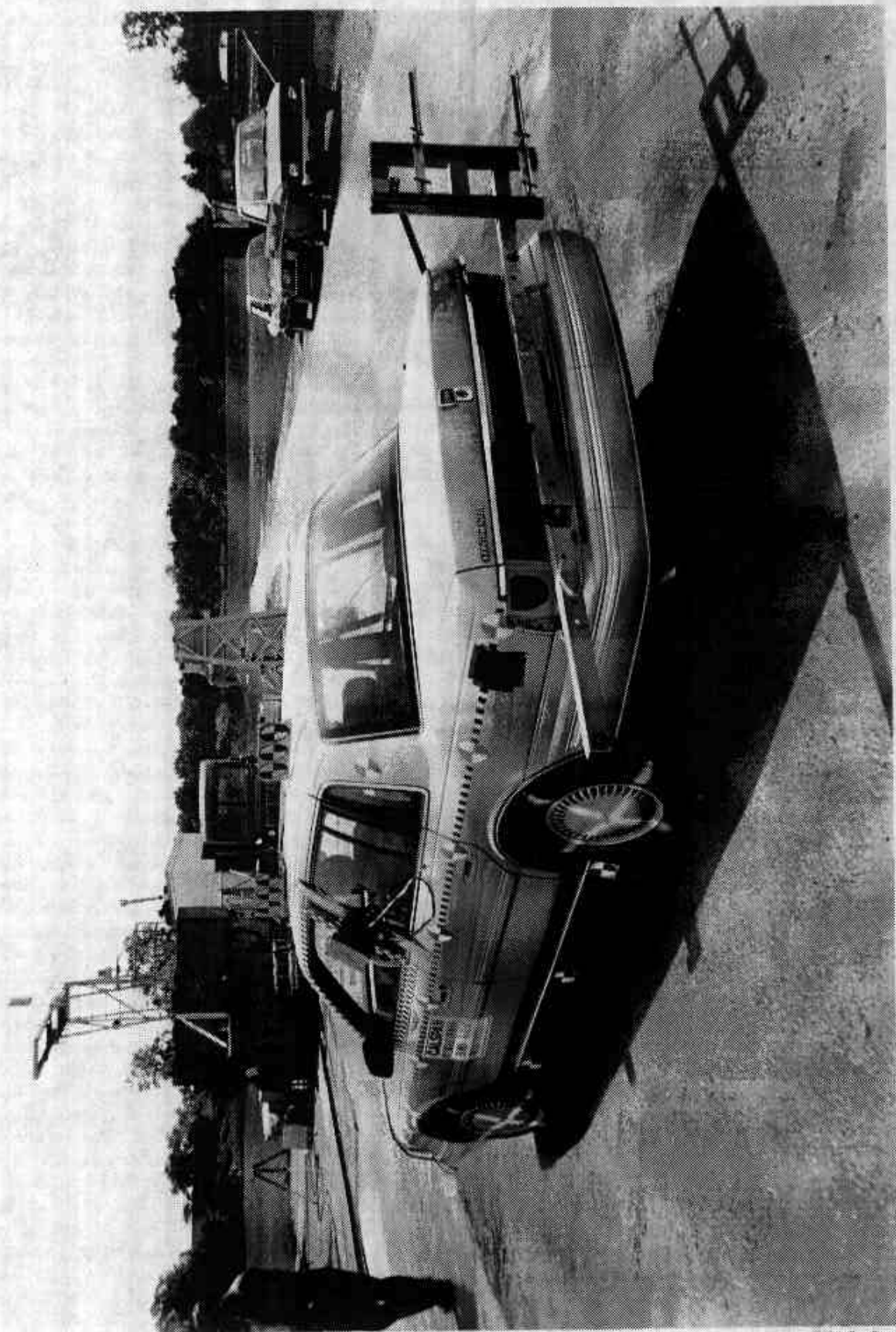


Figure A-9 PRE-TEST LEFT REAR THREE-QUARTER VIEW

A-10

7715-8



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

A-11

7715-8

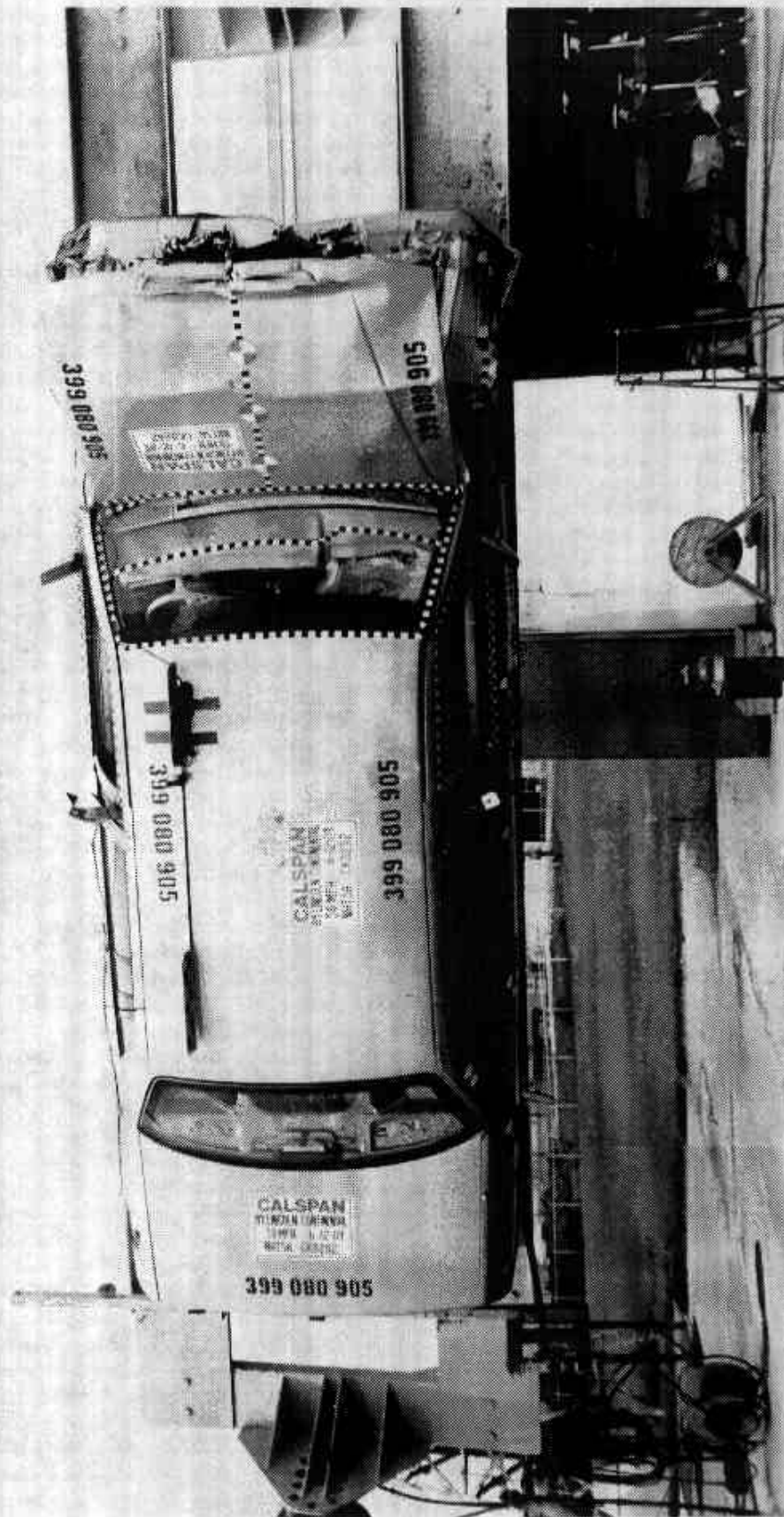


Figure A-11 POST-TEST TOP VIEW

A-12

7715-8

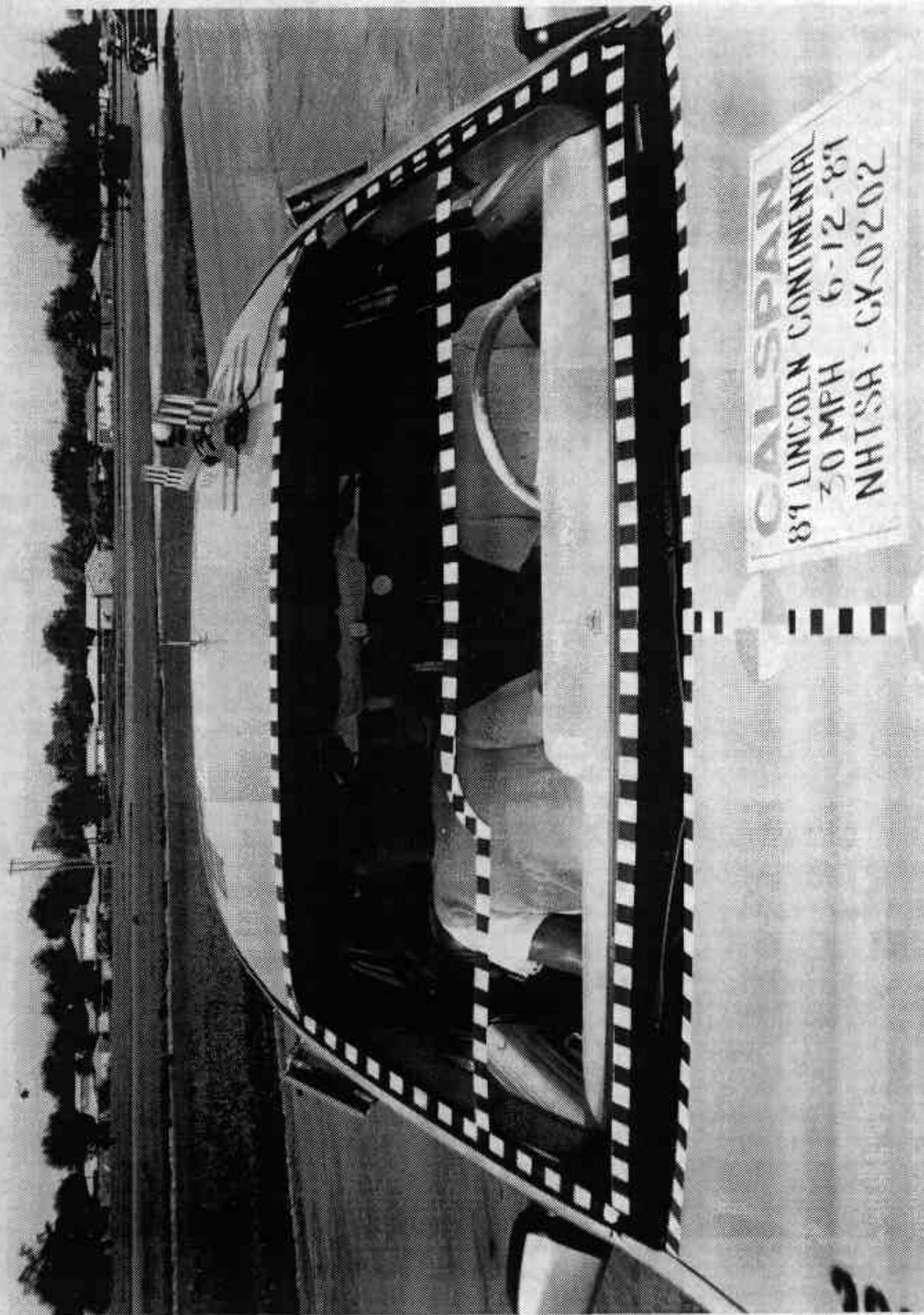


Figure A-12 PRE-TEST WINDSHIELD VIEW

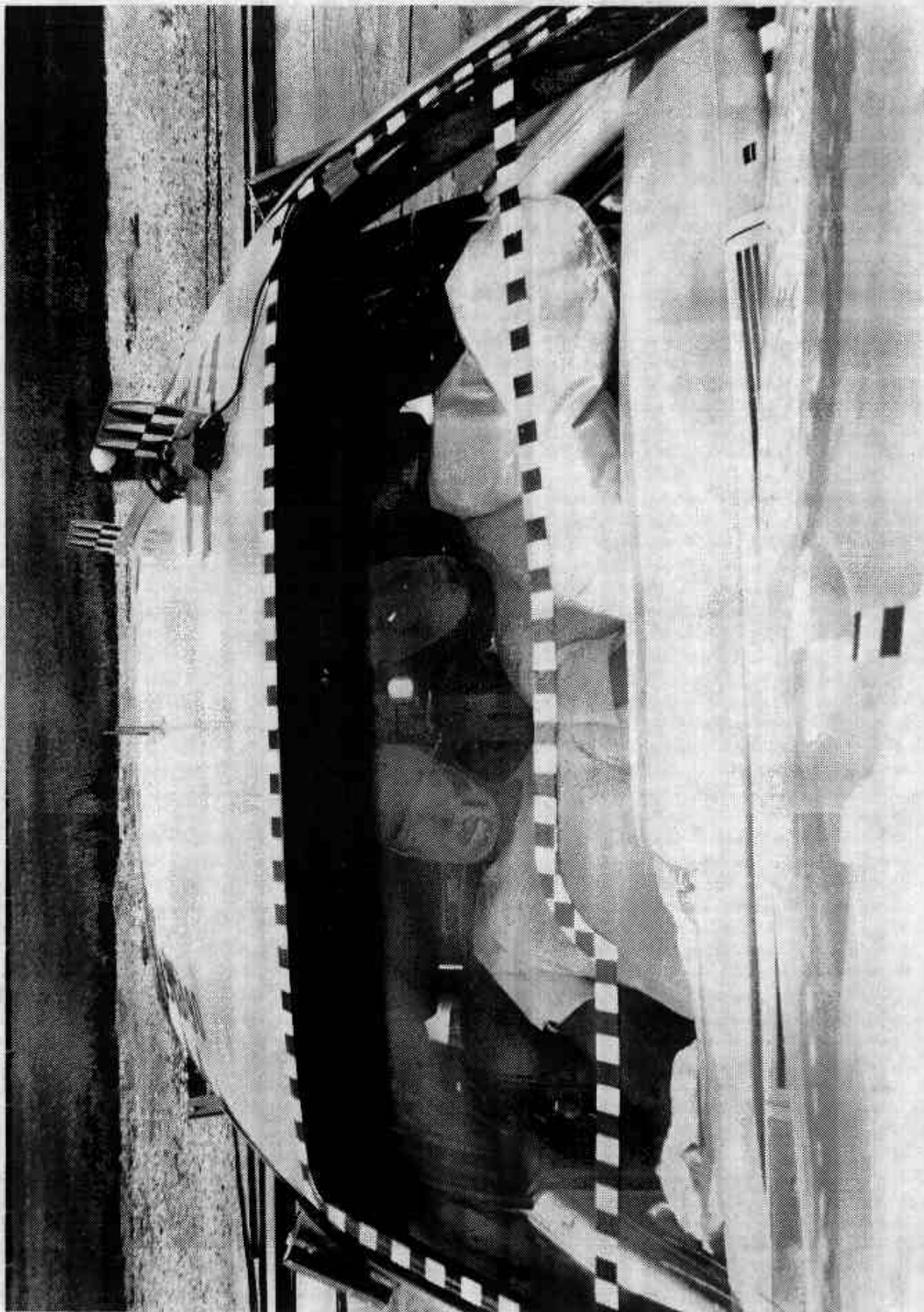


Figure A-13 POST-TEST WINDSHIELD VIEW

A-14

7715-8

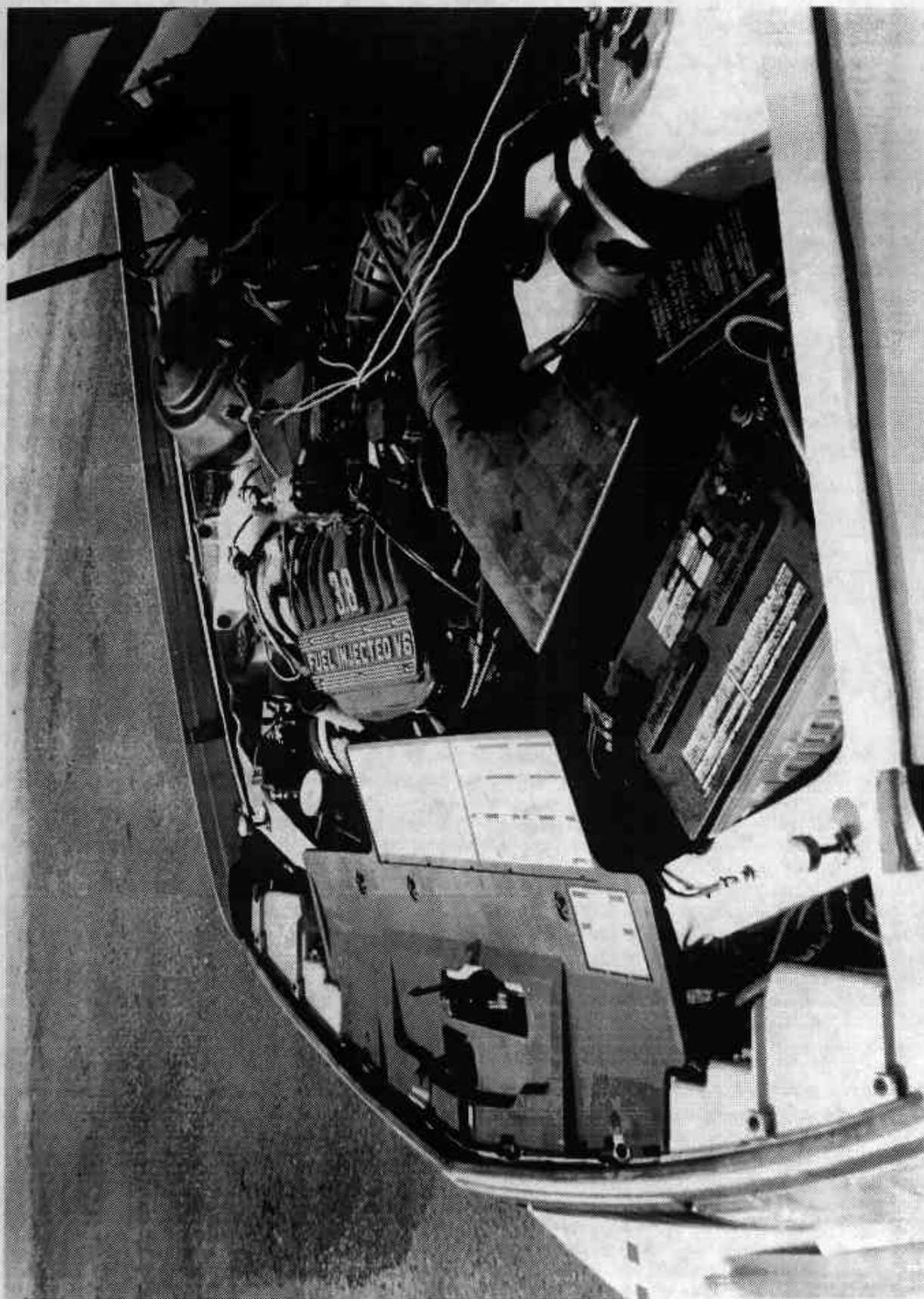


Figure A-14 PRE-TEST ENGINE COMPARTMENT VIEW

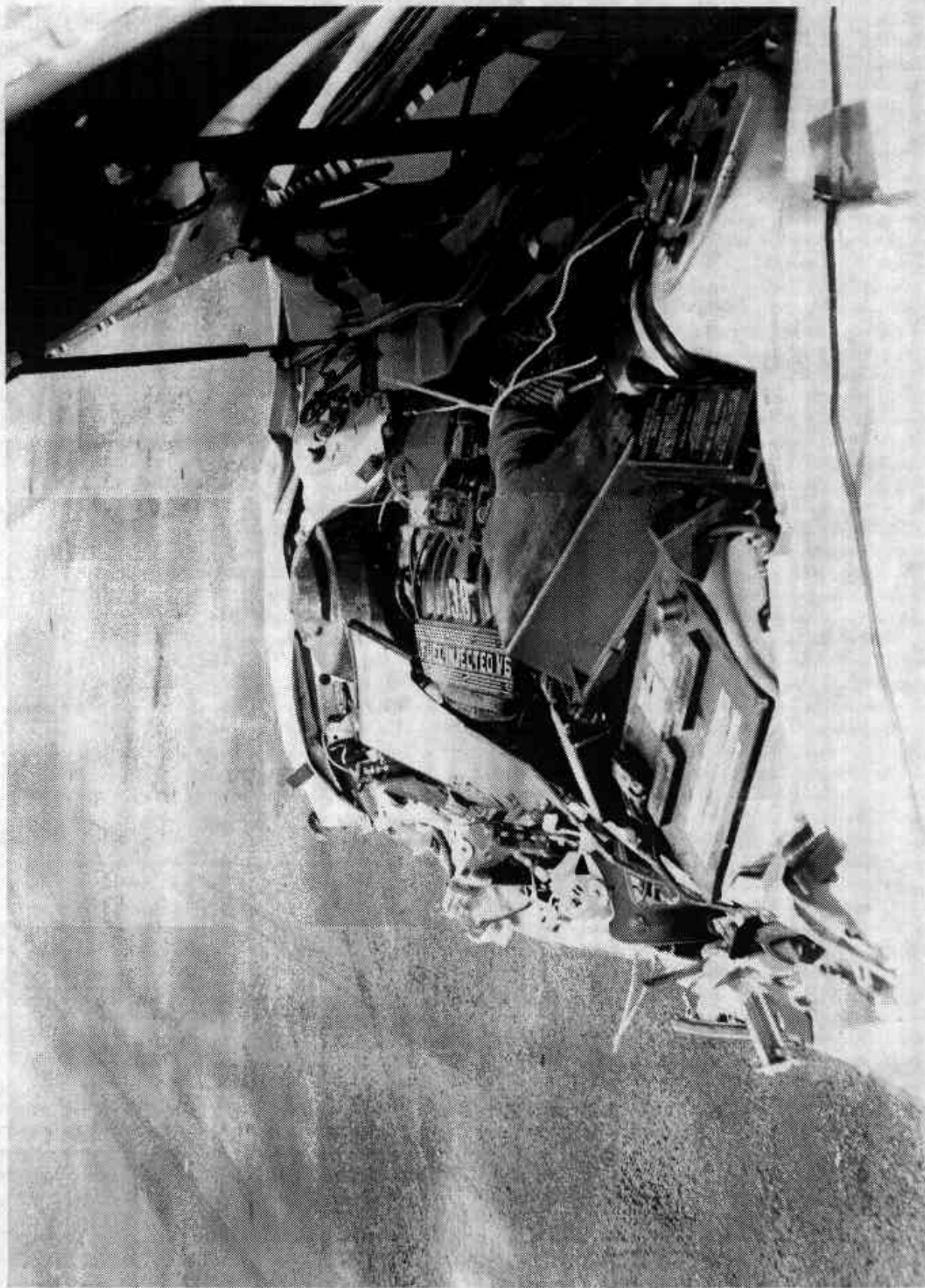


Figure A-15 POST-TEST ENGINE COMPARTMENT VIEW

A-16

7715-8

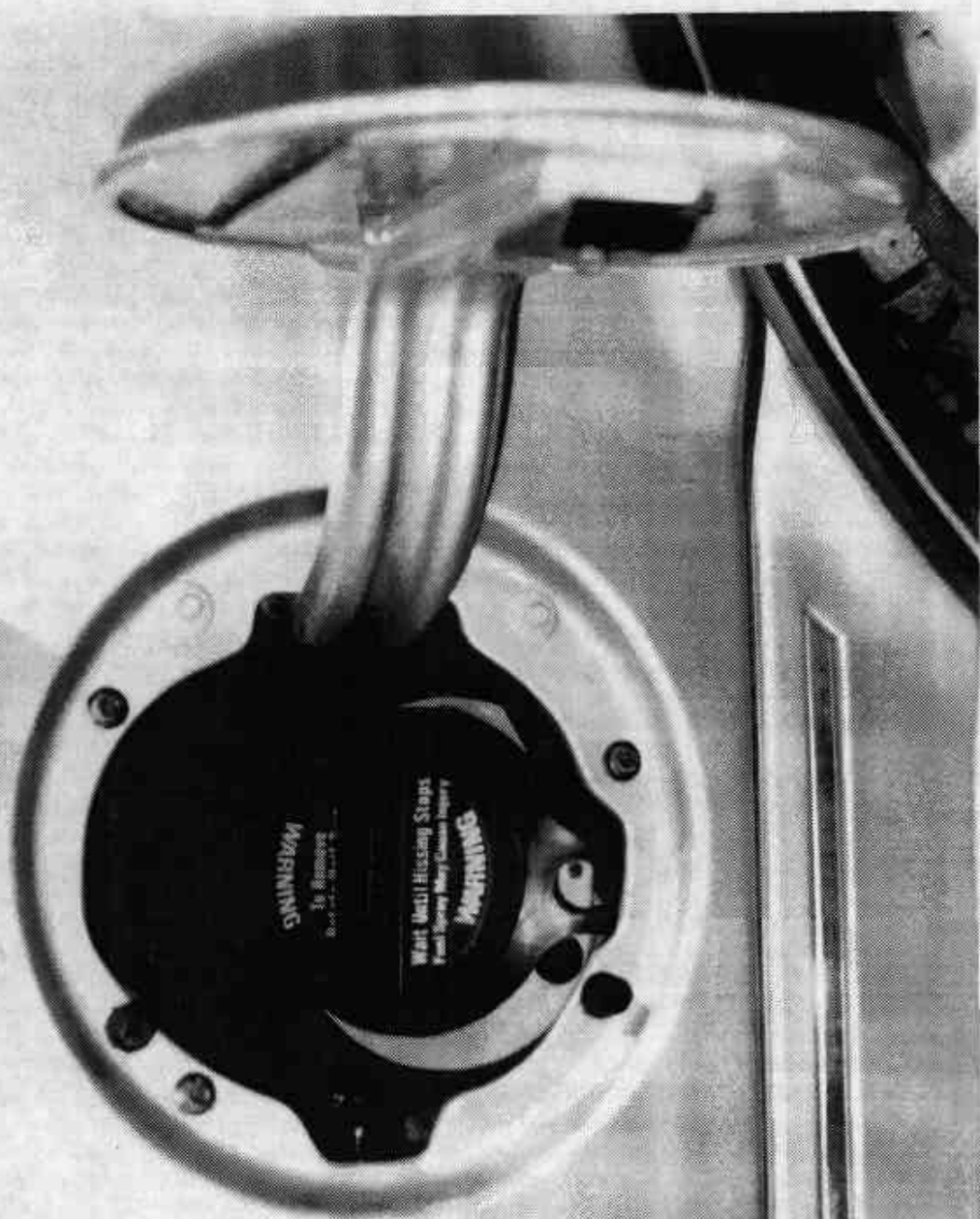


Figure A-16 PRE-TEST FUEL FILLER CAP VIEW

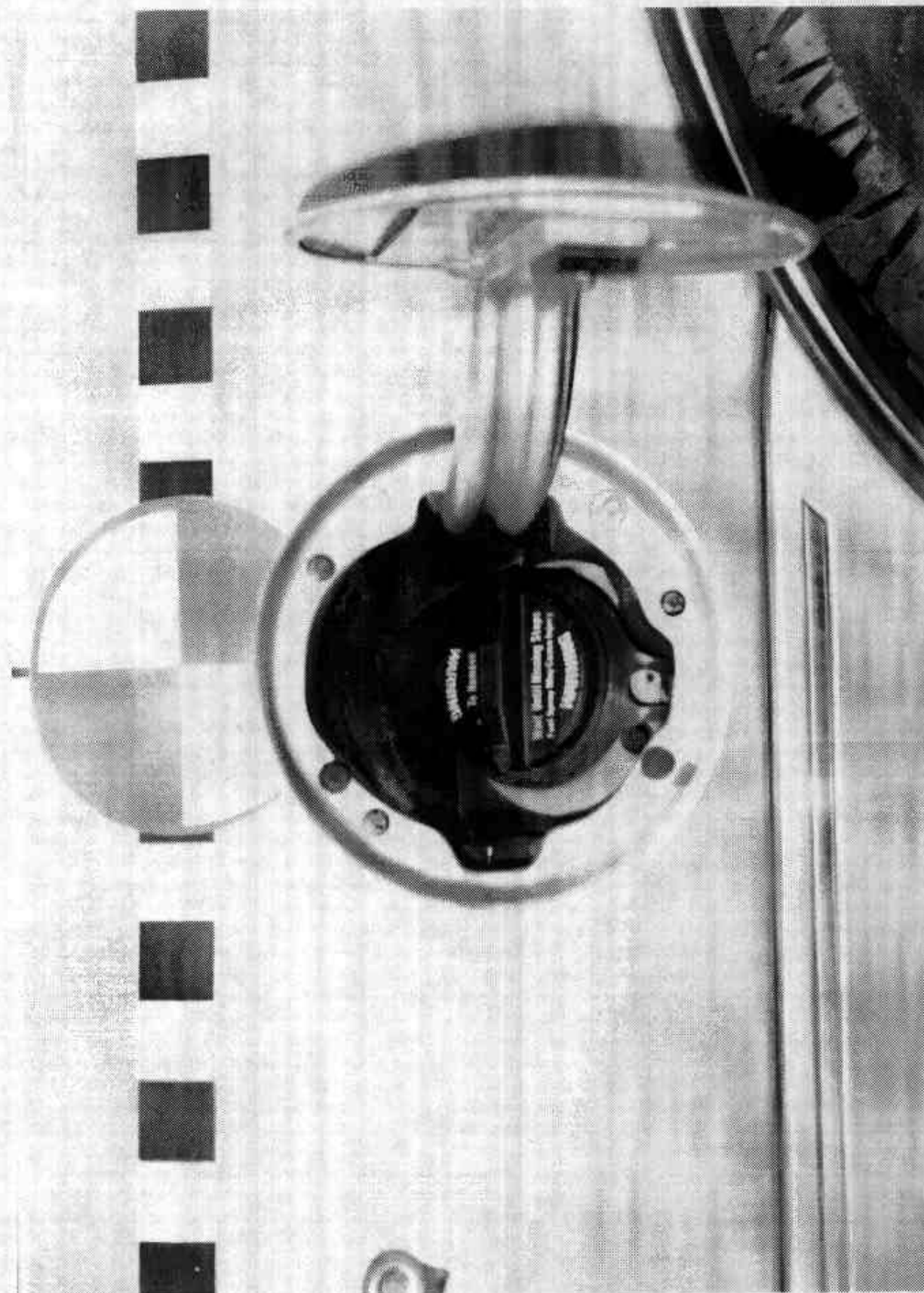


Figure A-17 POST-TEST FUEL FILLER CAP VIEW

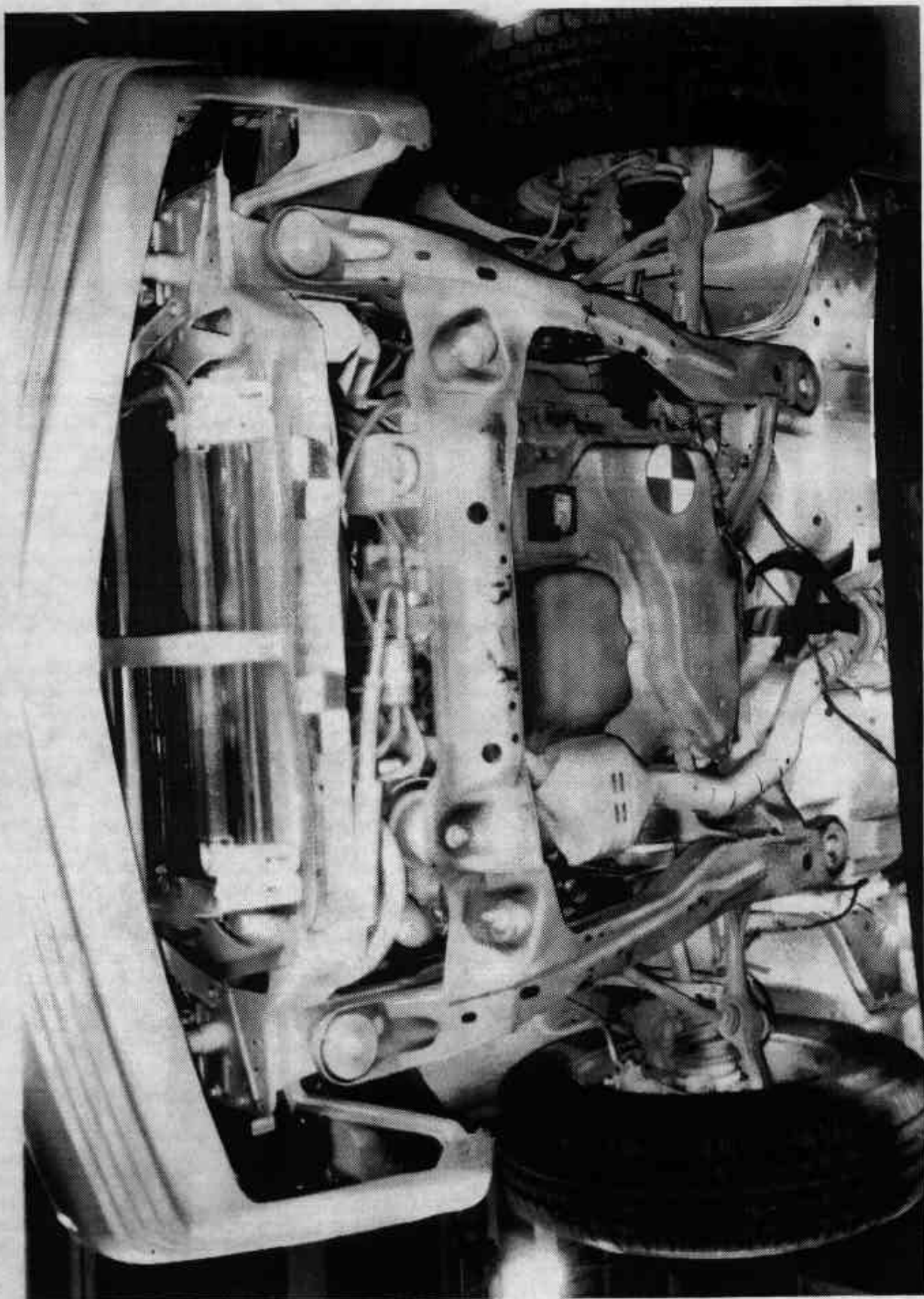


Figure A-18 PRE-TEST FRONT UNDERBODY VIEW

A-19

7715-8

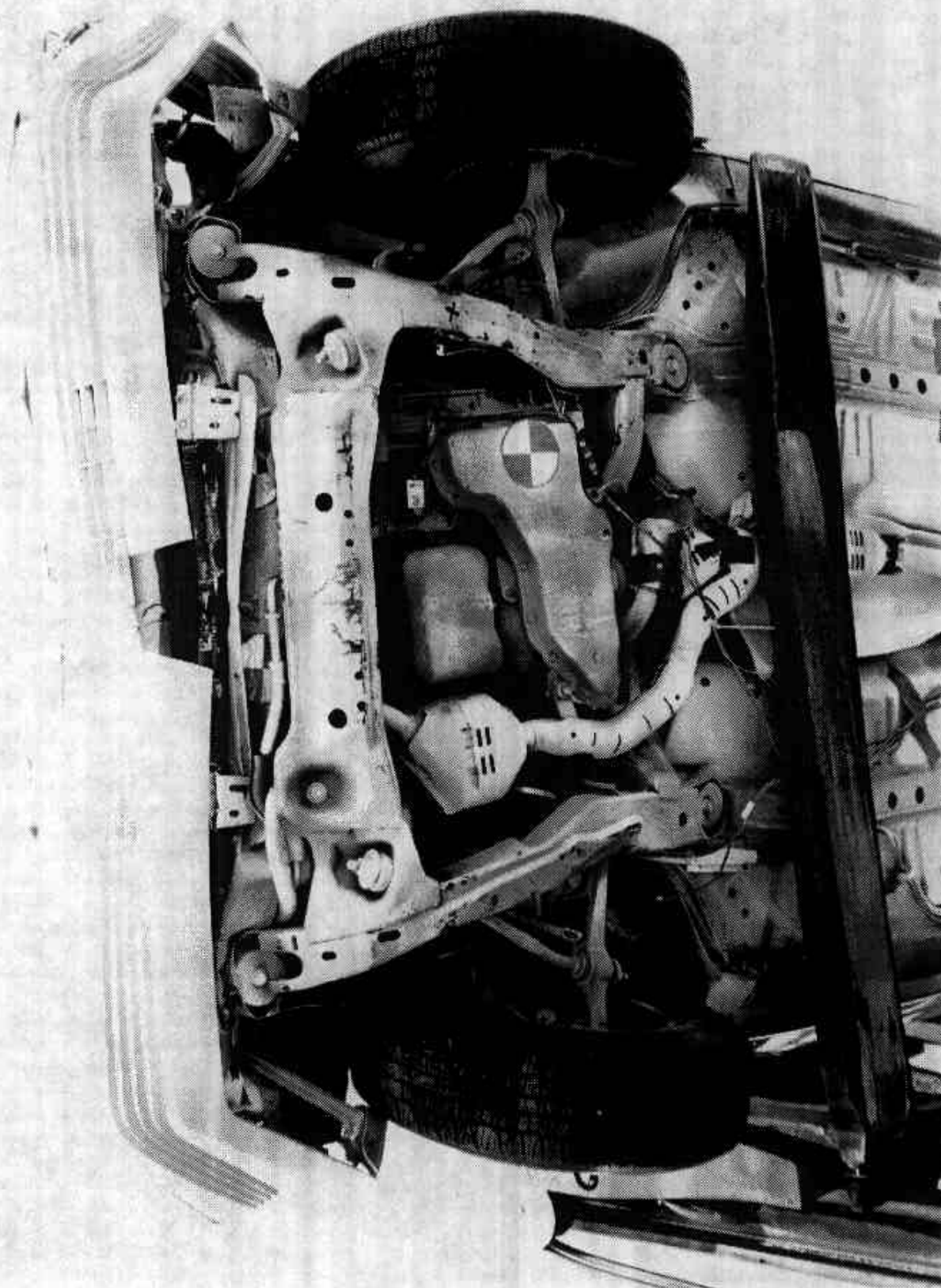


Figure A-19 POST-TEST FRONT UNDERBODY VIEW

A-20

7715-8

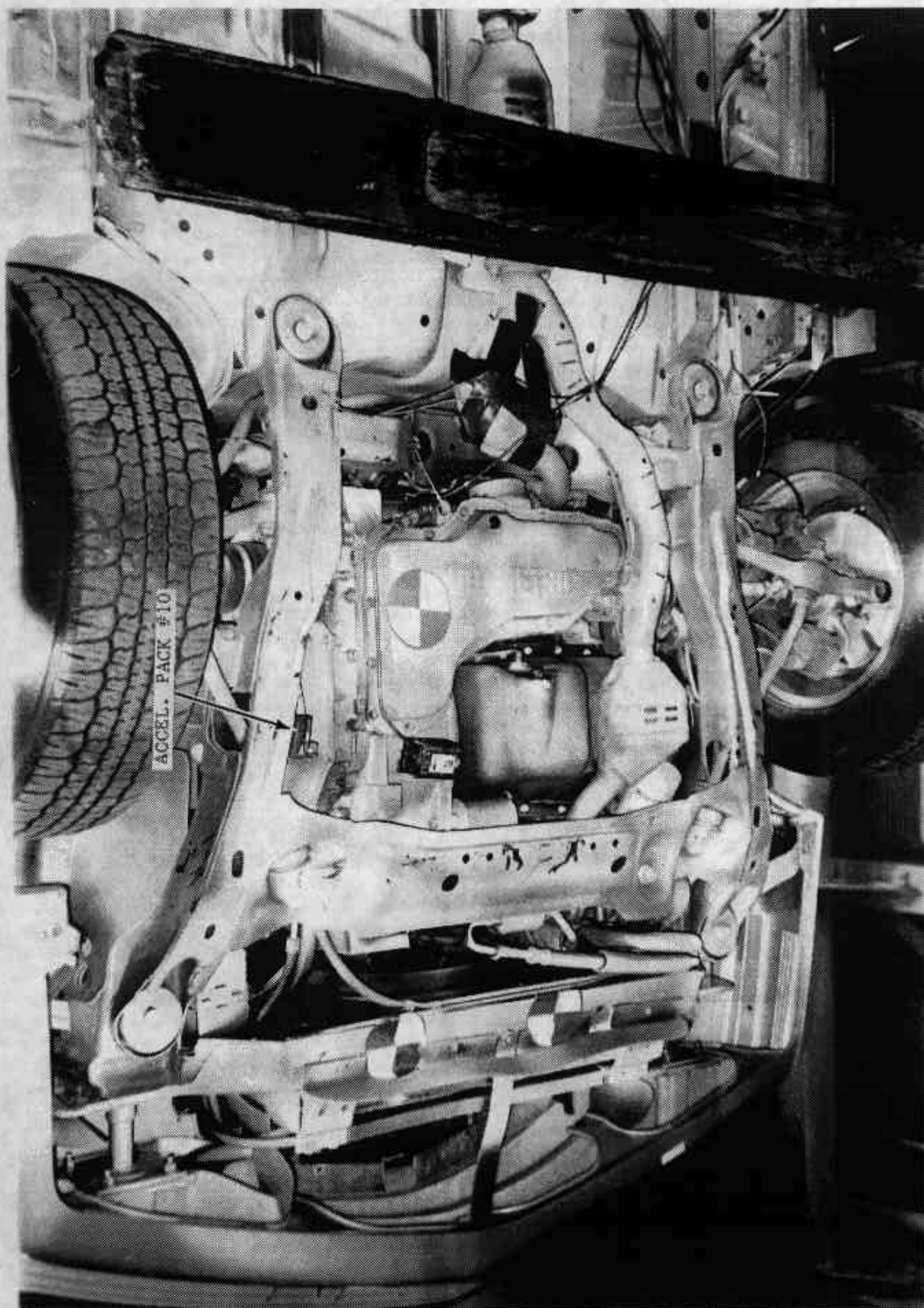


Figure A-20 PRE-TEST FRONT SIDE UNDERBODY VIEW



Figure A-21 POST-TEST FRONT SIDE UNDERBODY VIEW

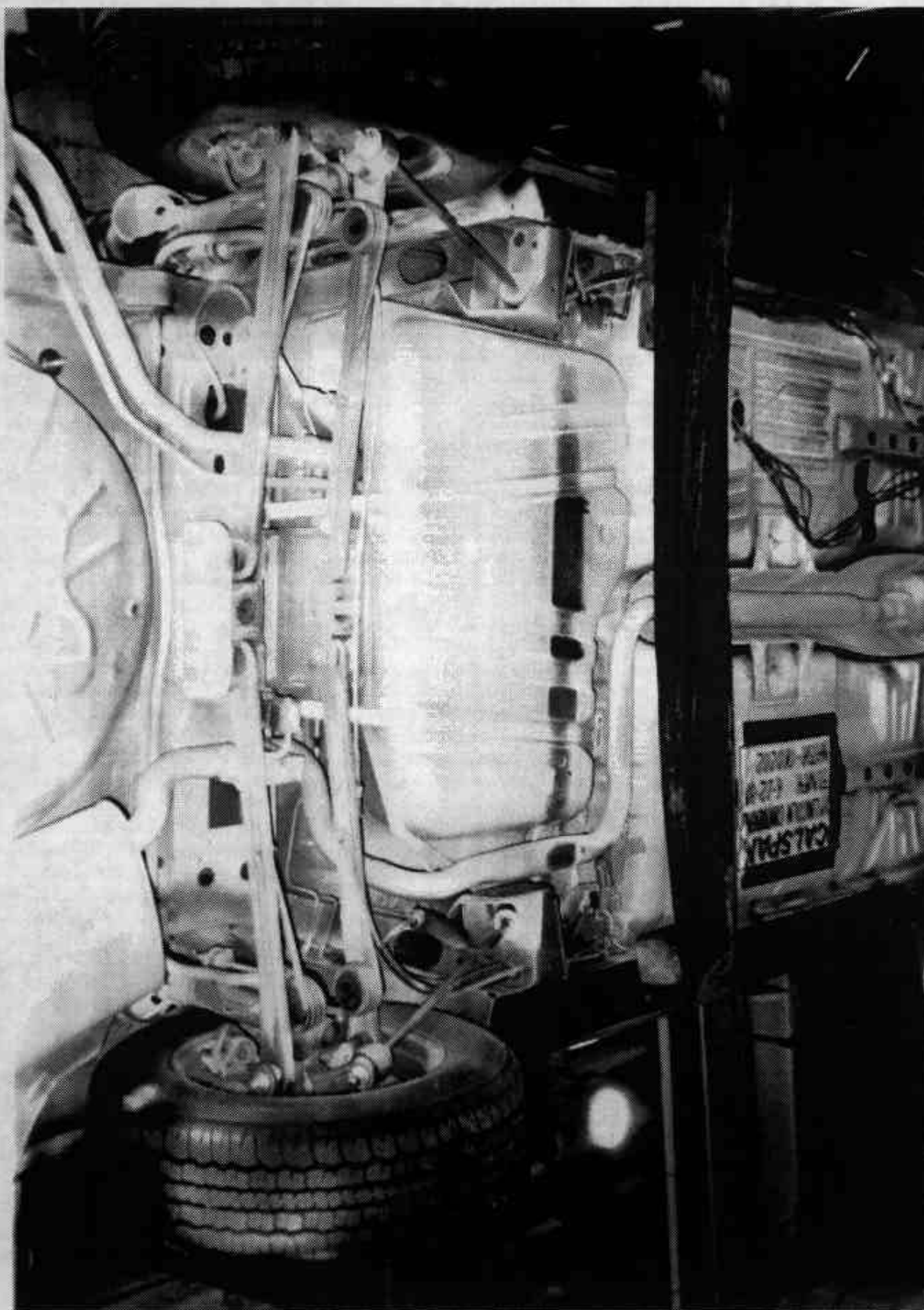


Figure A-22 PRE-TEST REAR UNDERBODY VIEW

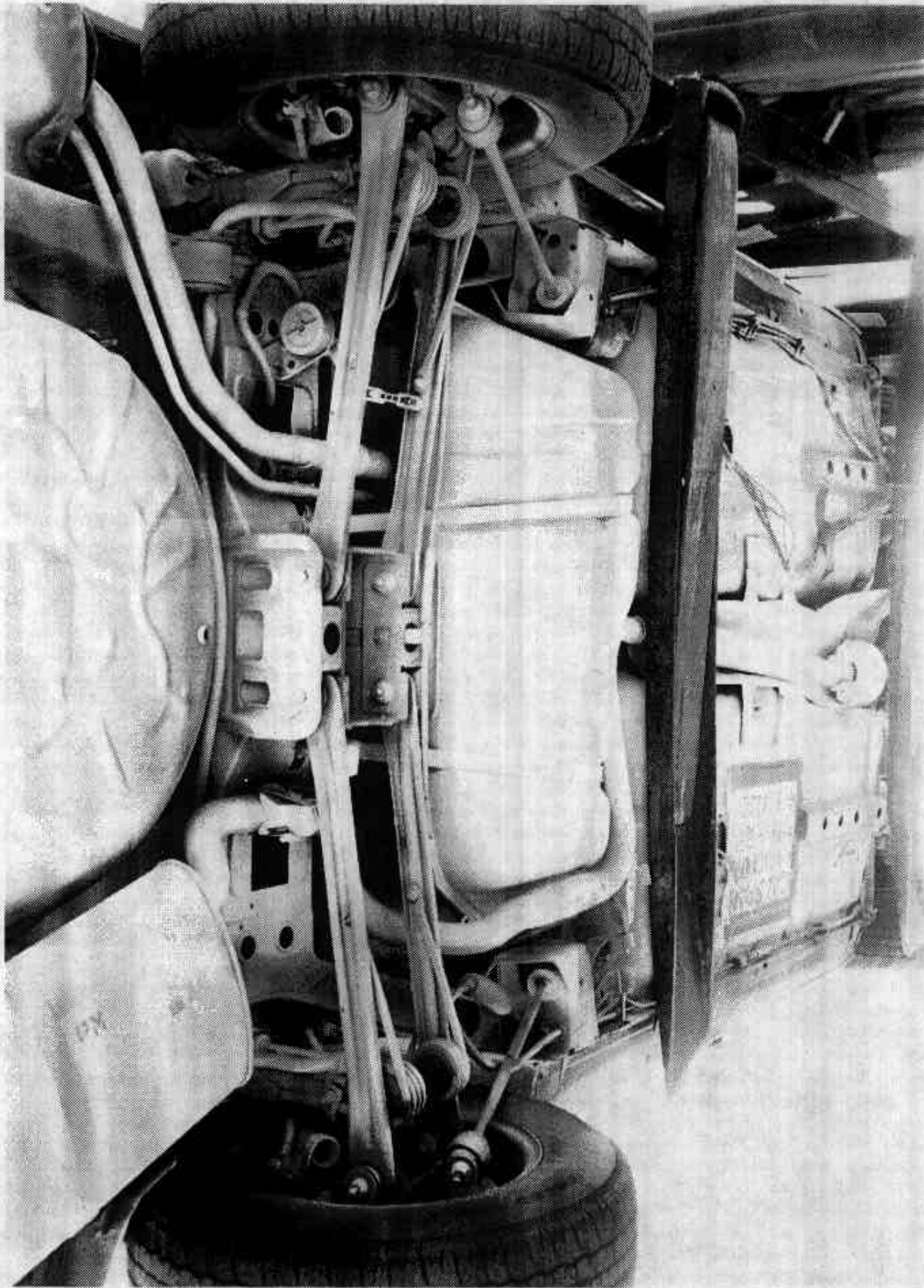


Figure A-23 POST-TEST REAR UNDERBODY VIEW

A-24

7715-8

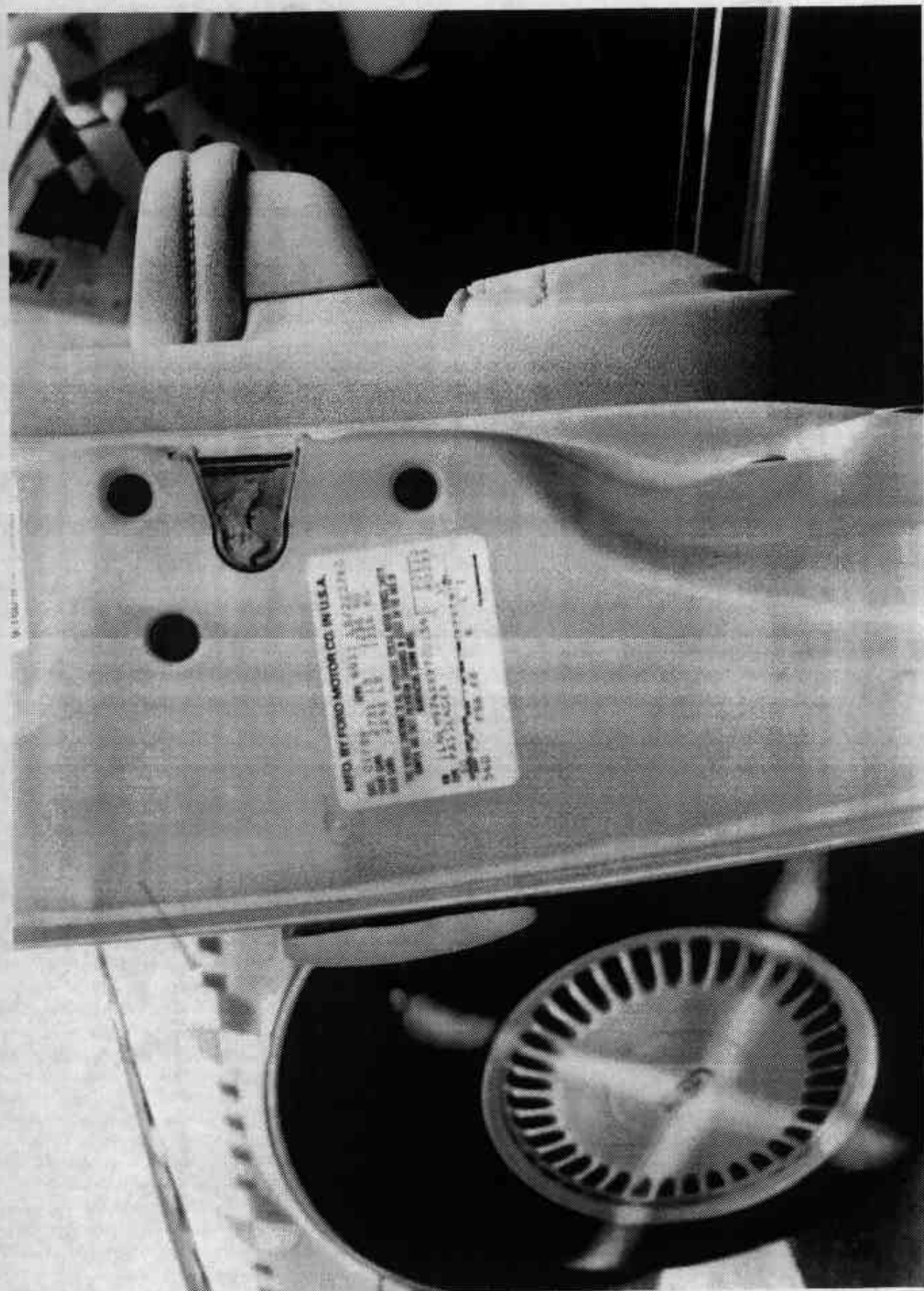


Figure A-24 CERTIFICATION LABEL



Figure A-26 PRE-TEST DRIVER DUMMY POSITION



Figure A-27 POST-TEST DRIVER DUMMY POSITION

A-28

7715-8



Figure A-28 PRE-TEST PASSENGER DUMMY POSITION

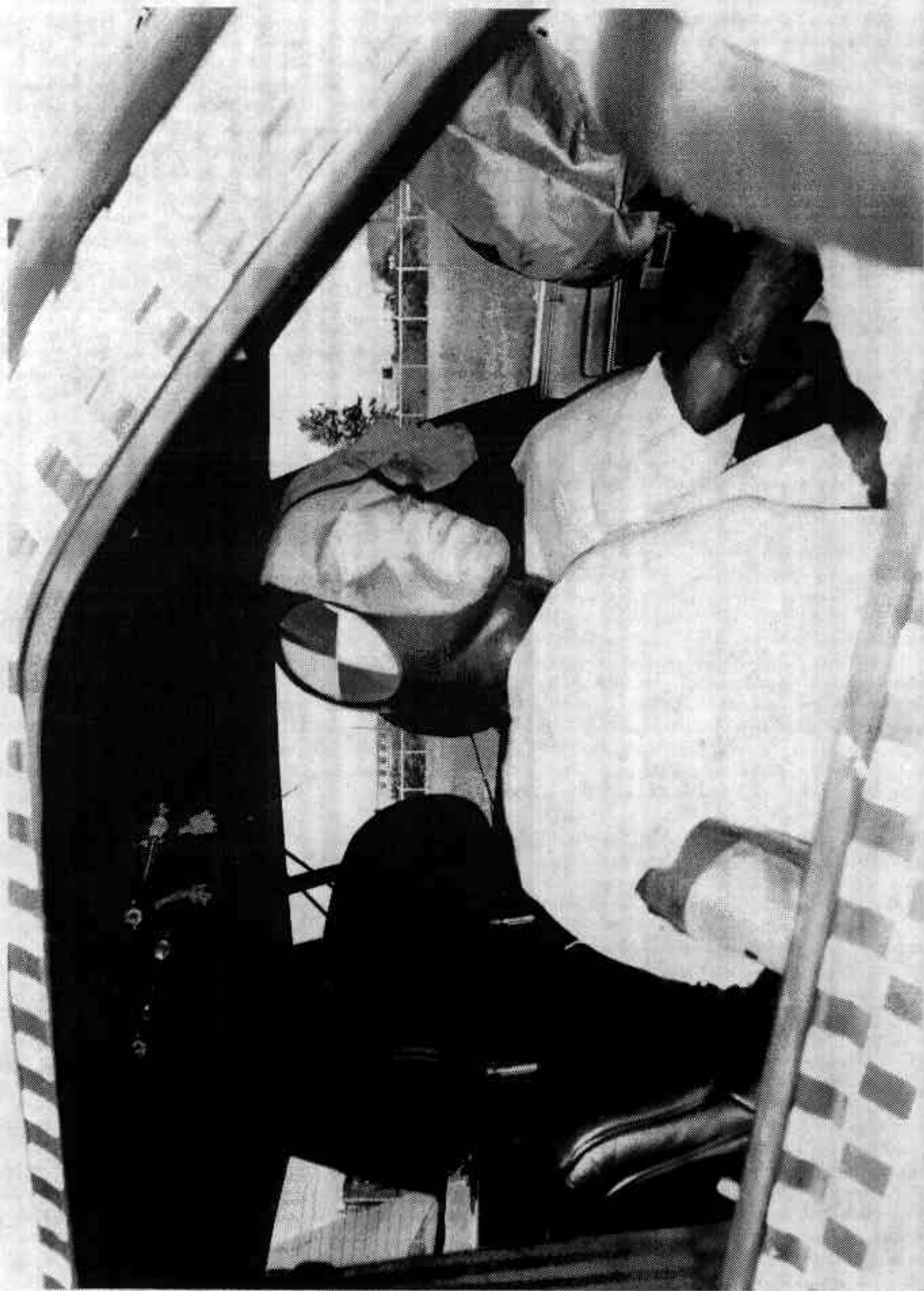


Figure A-29 POST-TEST PASSENGER DUMMY POSITION



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

A-31

7715-8



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



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



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

A-34

7715-8



Figure A-34 POST-TEST DRIVER AIRBAG VIEW



Figure A-35 POST-TEST PASSENGER AIR BAG VIEW

A-36

7715-8

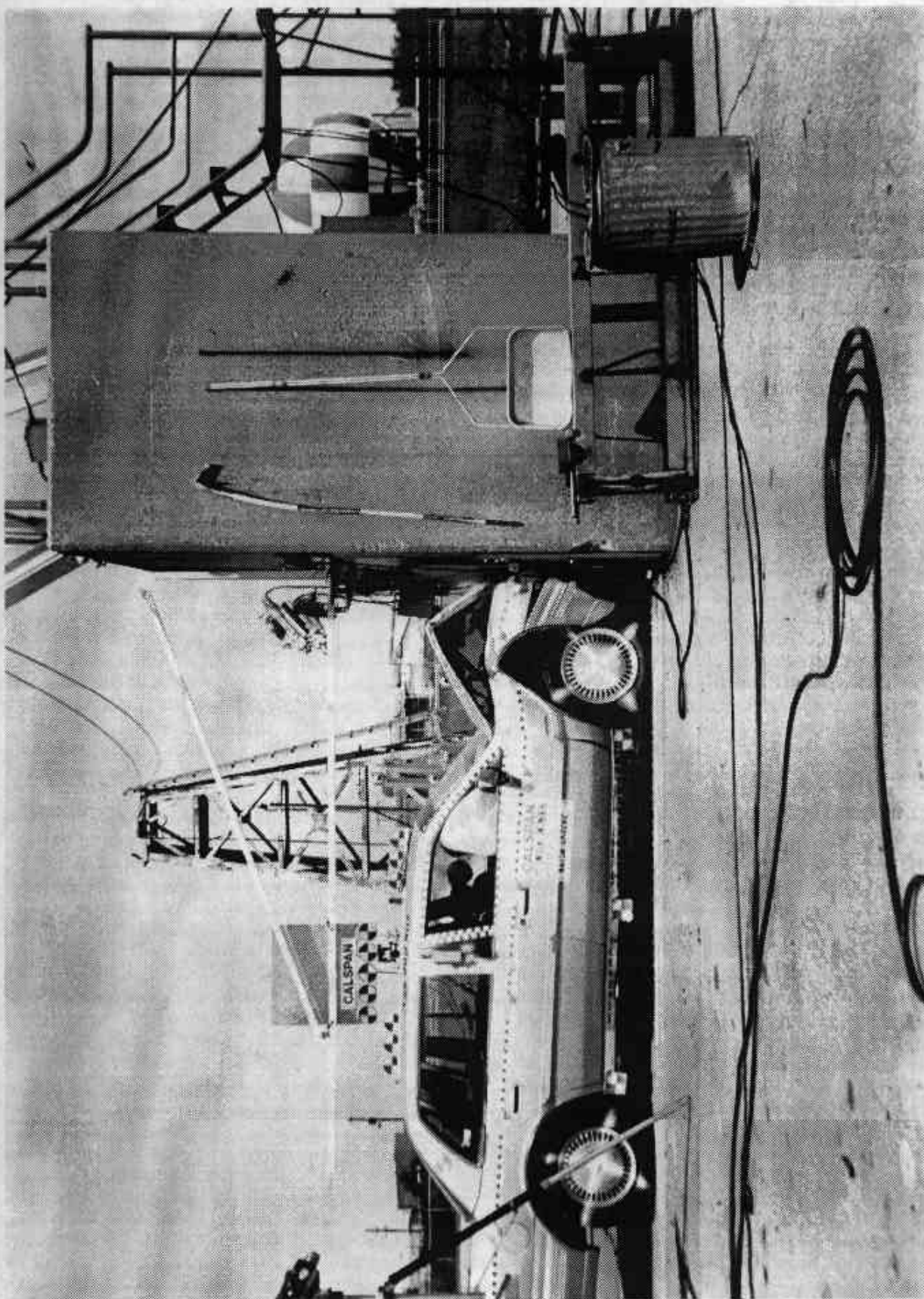


Figure A-36 VEHICLE IMPACT

A-37

7715-8

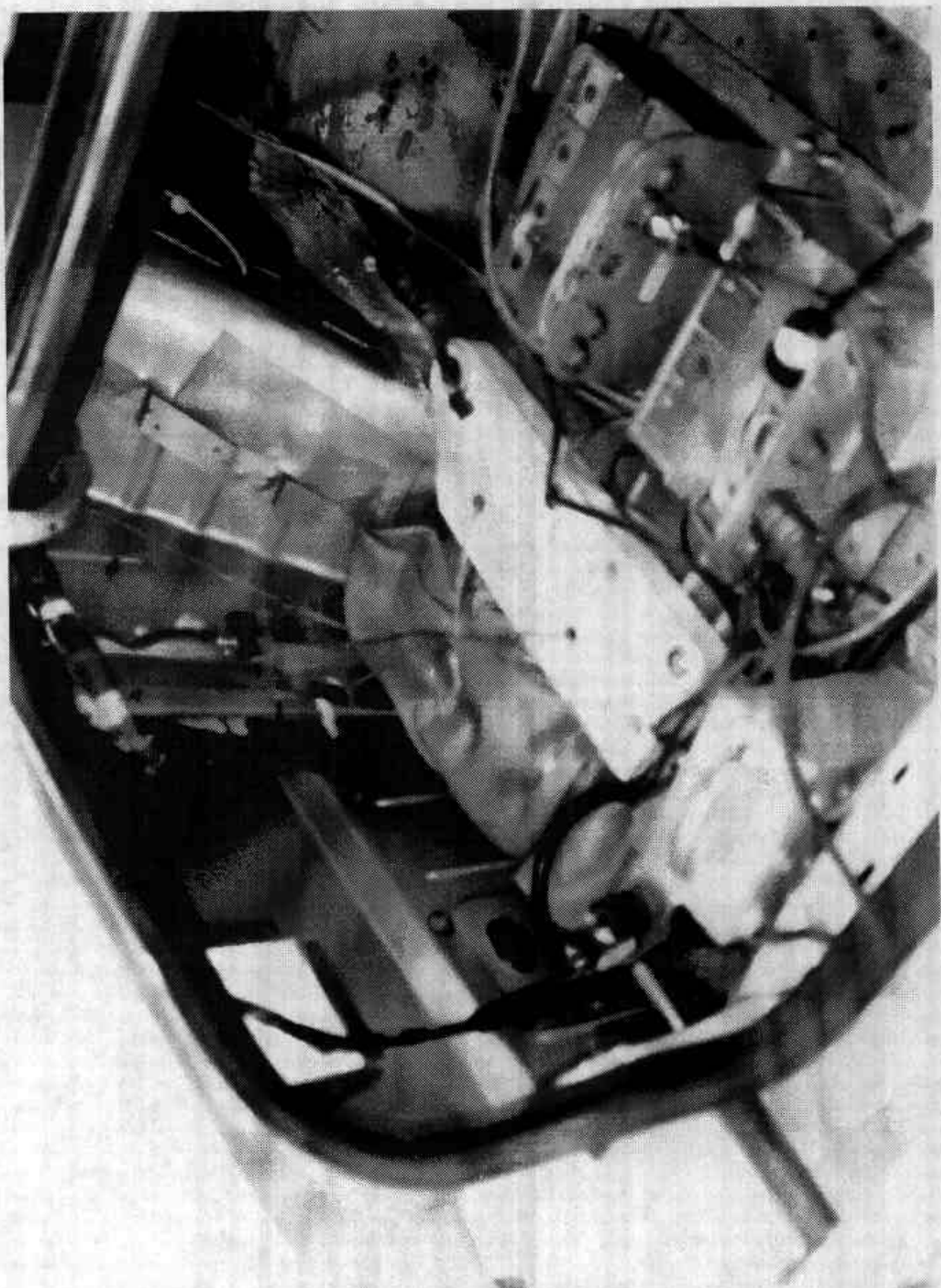


Figure A-37 BALLAST LOCATED IN LEFT REAR TRUNK COMPARTMENT

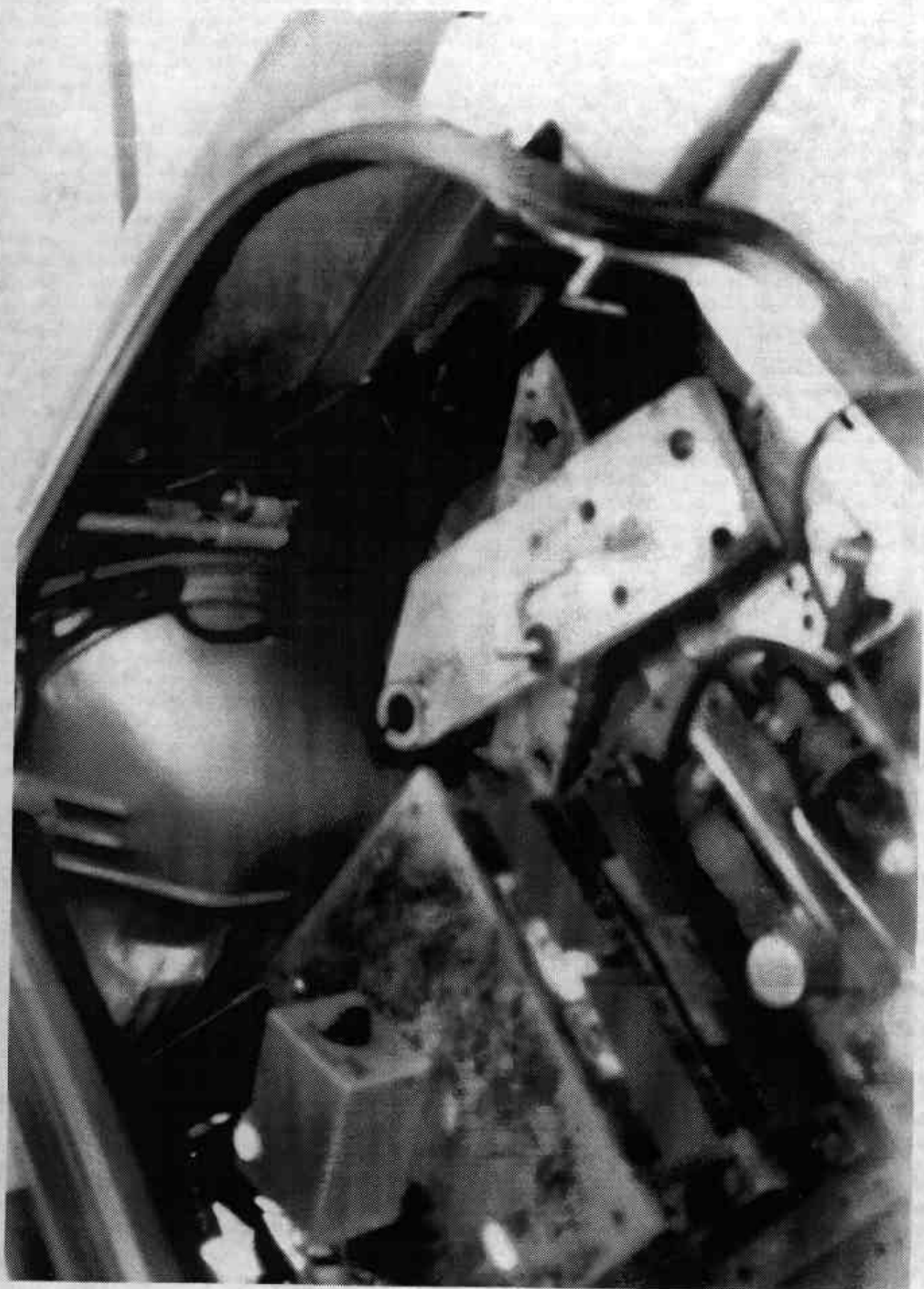


Figure A-38 BALLAST LOCATED IN RIGHT REAR TRUNK COMPARTMENT

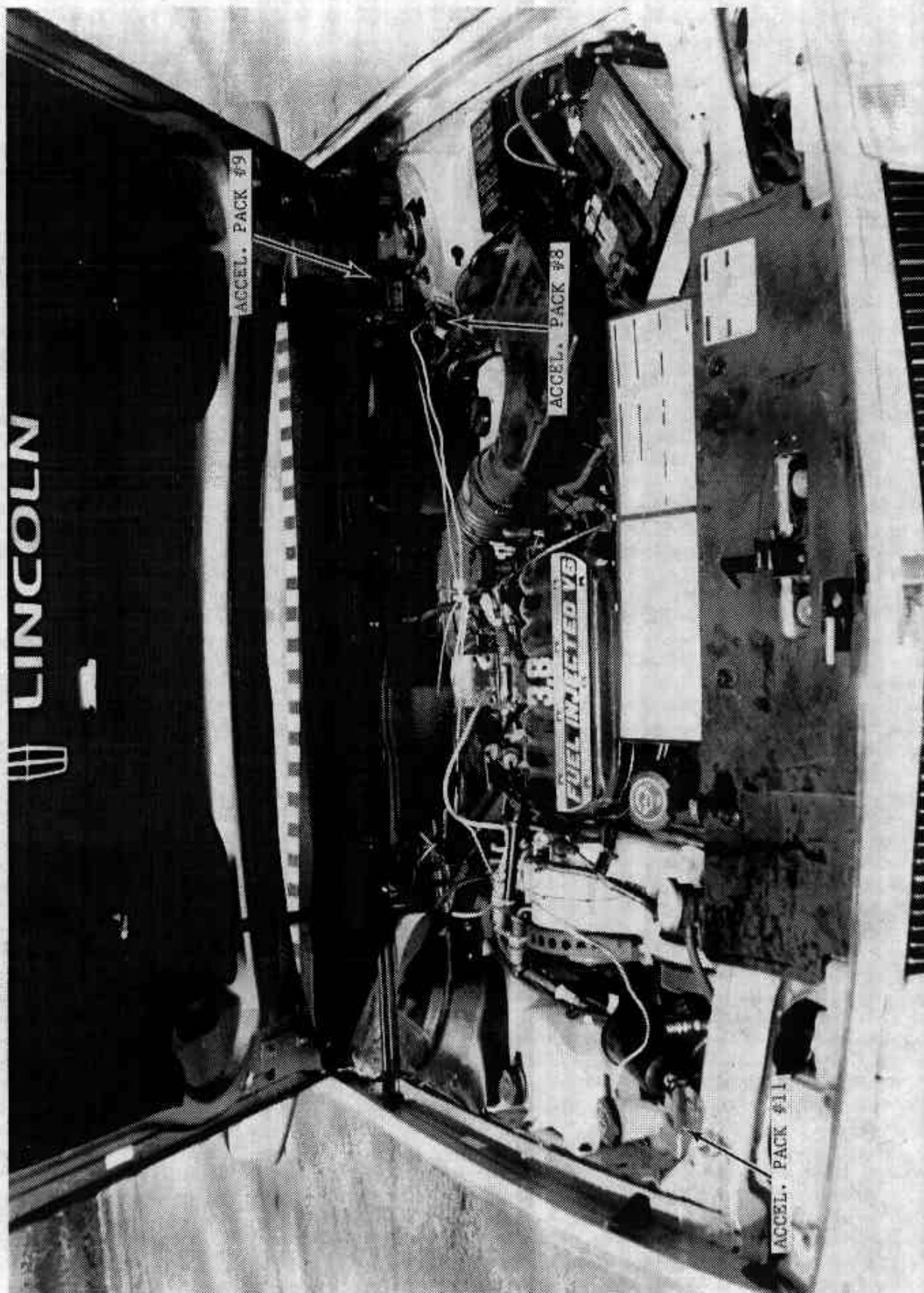


Figure A-39 ADDITIONAL ACCELEROMETERS LOCATED IN ENGINE COMPARTMENT

Appendix B
VEHICLE AND DUMMY RESPONSE DATA

TEST NO. CK0202

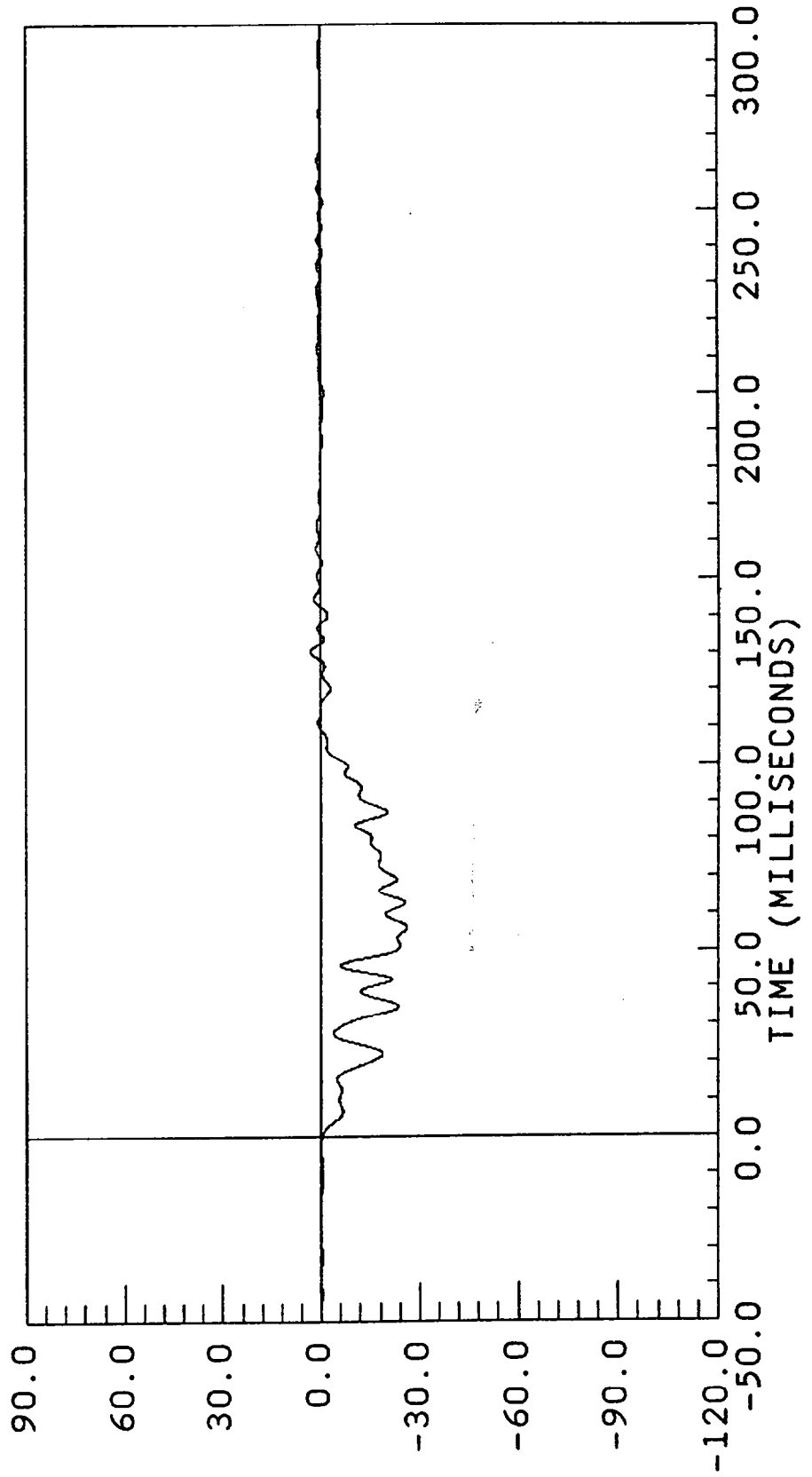
VEHICLE DATA

FILTER CHANNEL CLASS

60

29.50 mph

ACC PACK #1(X) XL AXIS
 FILTERED YMIN = -26.12619 at 56.25000
 FILTER CUTOFF: 100Hz YMAX = 3.020801 at 130.4250

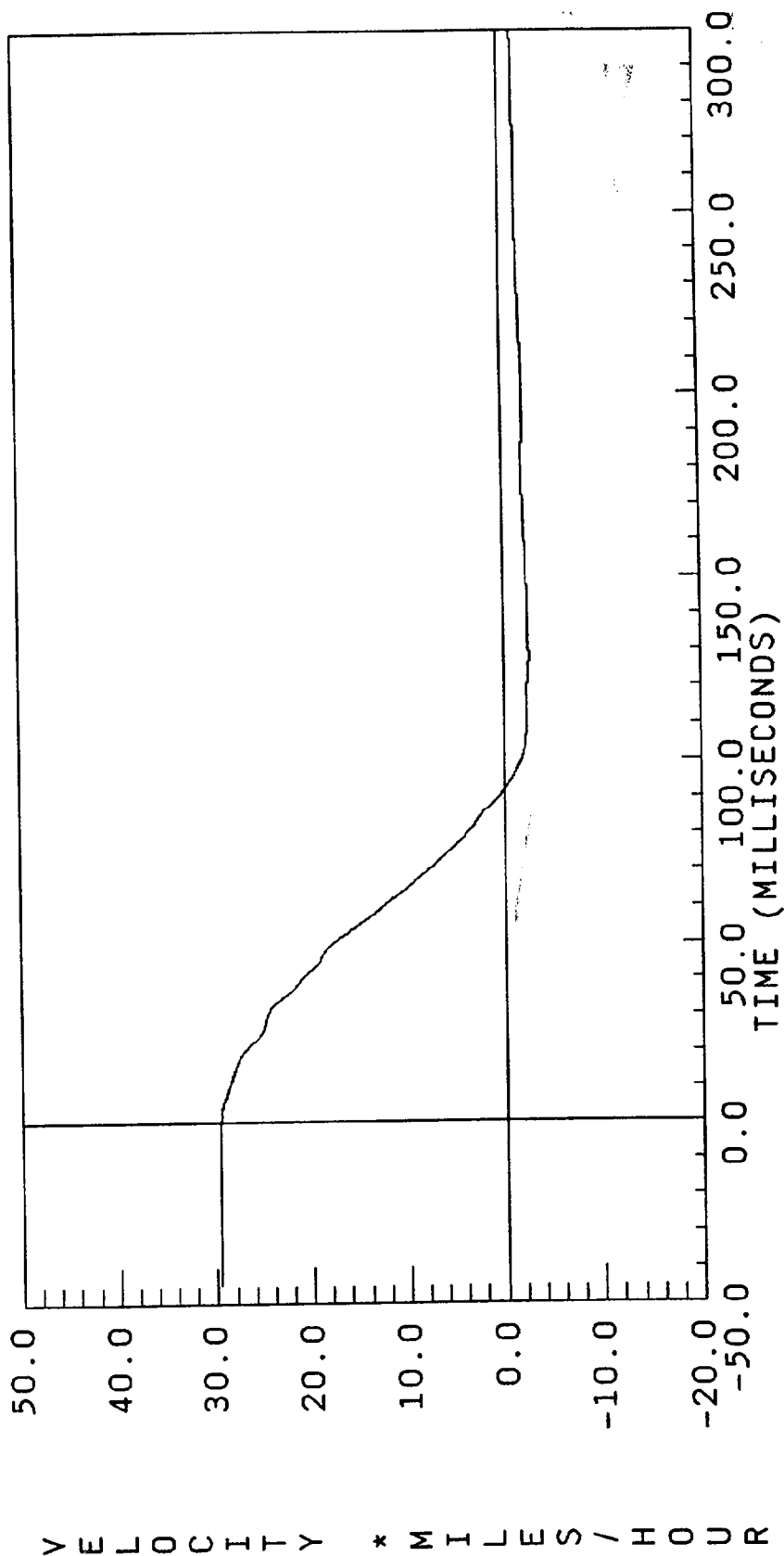


V905-17.DAT

29.50 mph

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

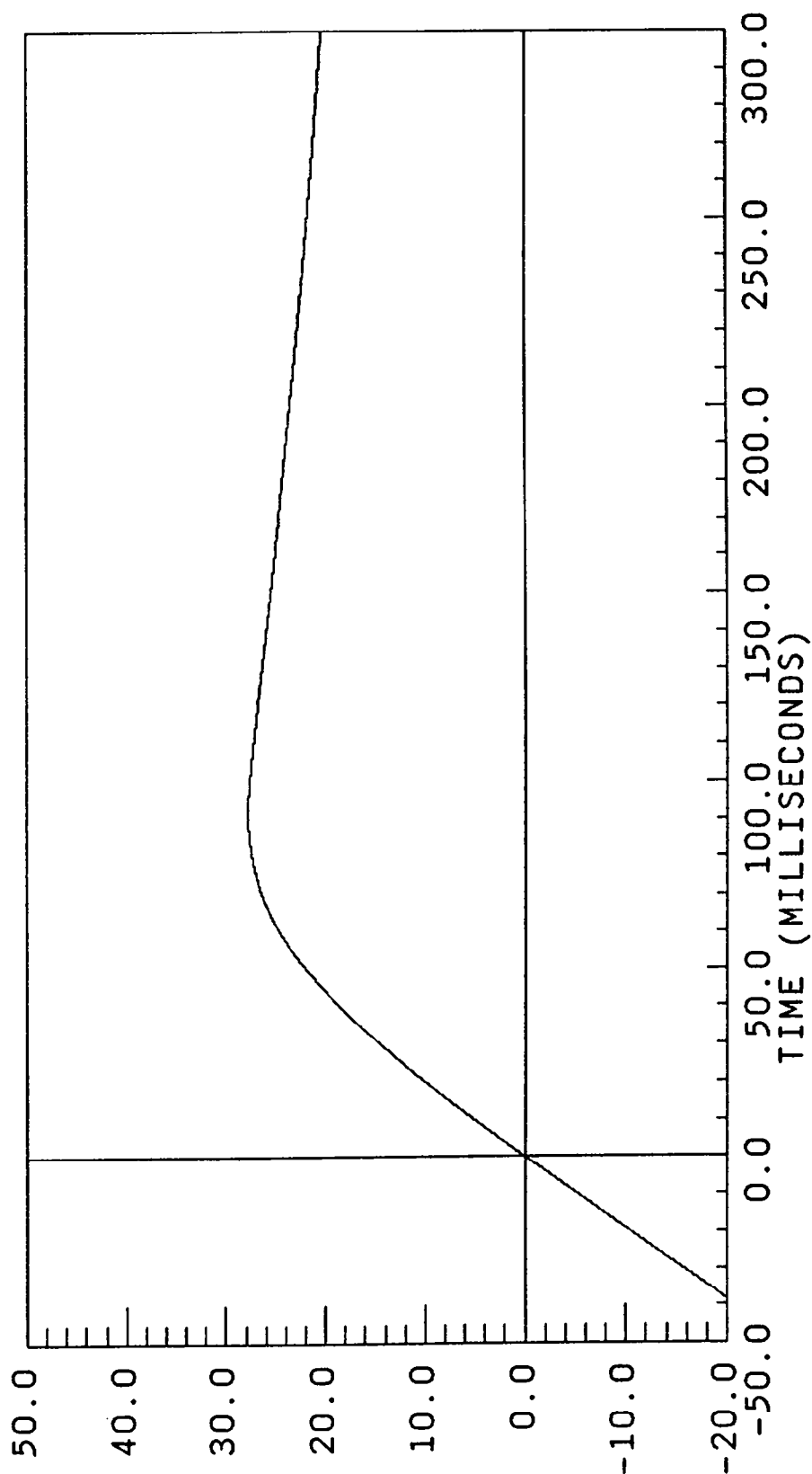
XL AXIS
YMIN = -2.656383 at 128.0250
YMAX = 29.65818 at -44.62500



29.50 mph

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

XL AXIS
YMIN = -23.38716 at 128.0250
YMAX = 27.73579 at 91.72501

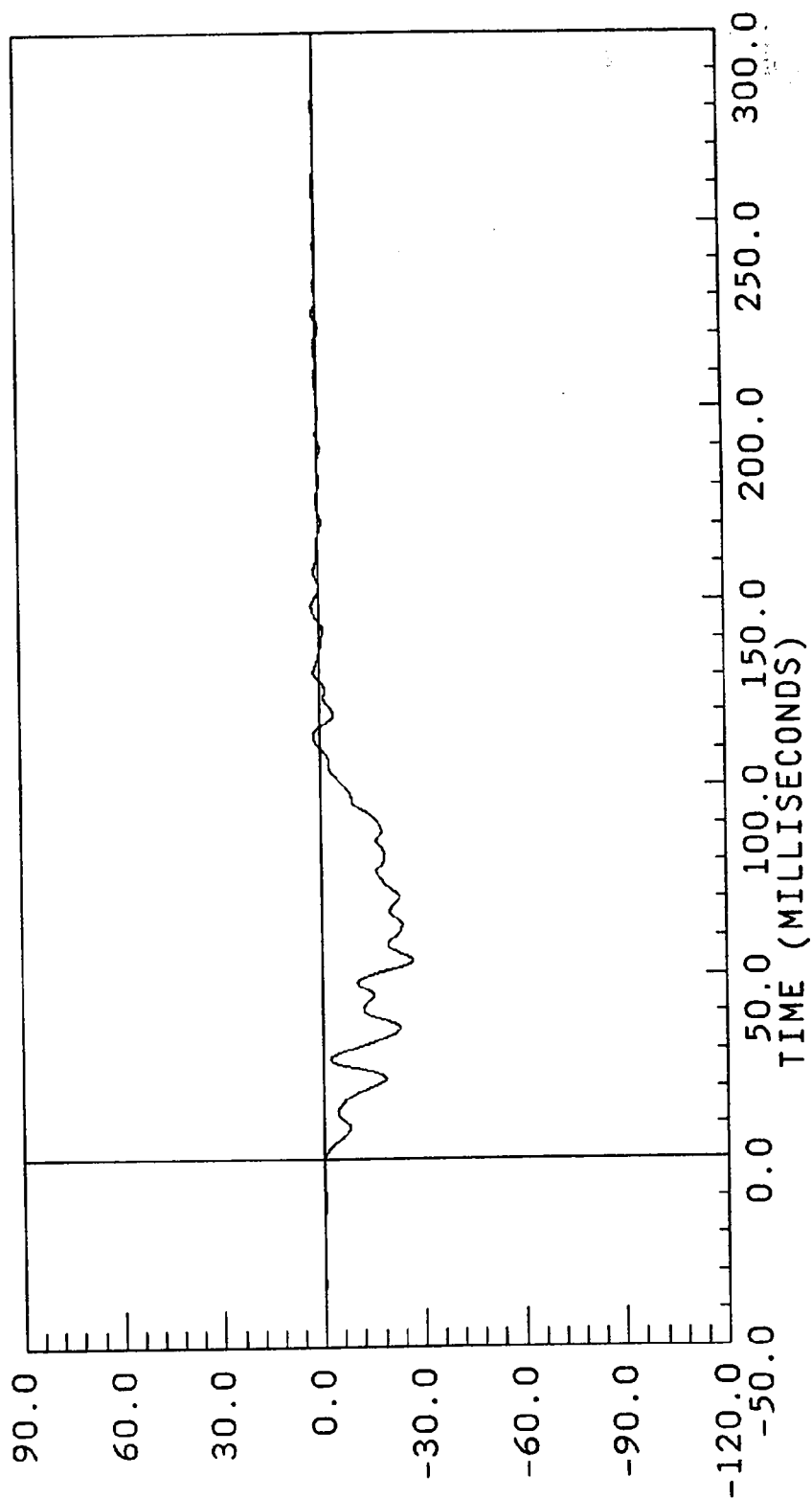


DISPLACEMENT * INCHES

BW905-18.DAT

29.50 mph

ACC PACK #2(X)
FILTERED
FILTER CUTOFF: 100HZ
XL AXIS
YMIN = -27.02221 at 53.77500
YMAX = 2.354427 at 148.6500

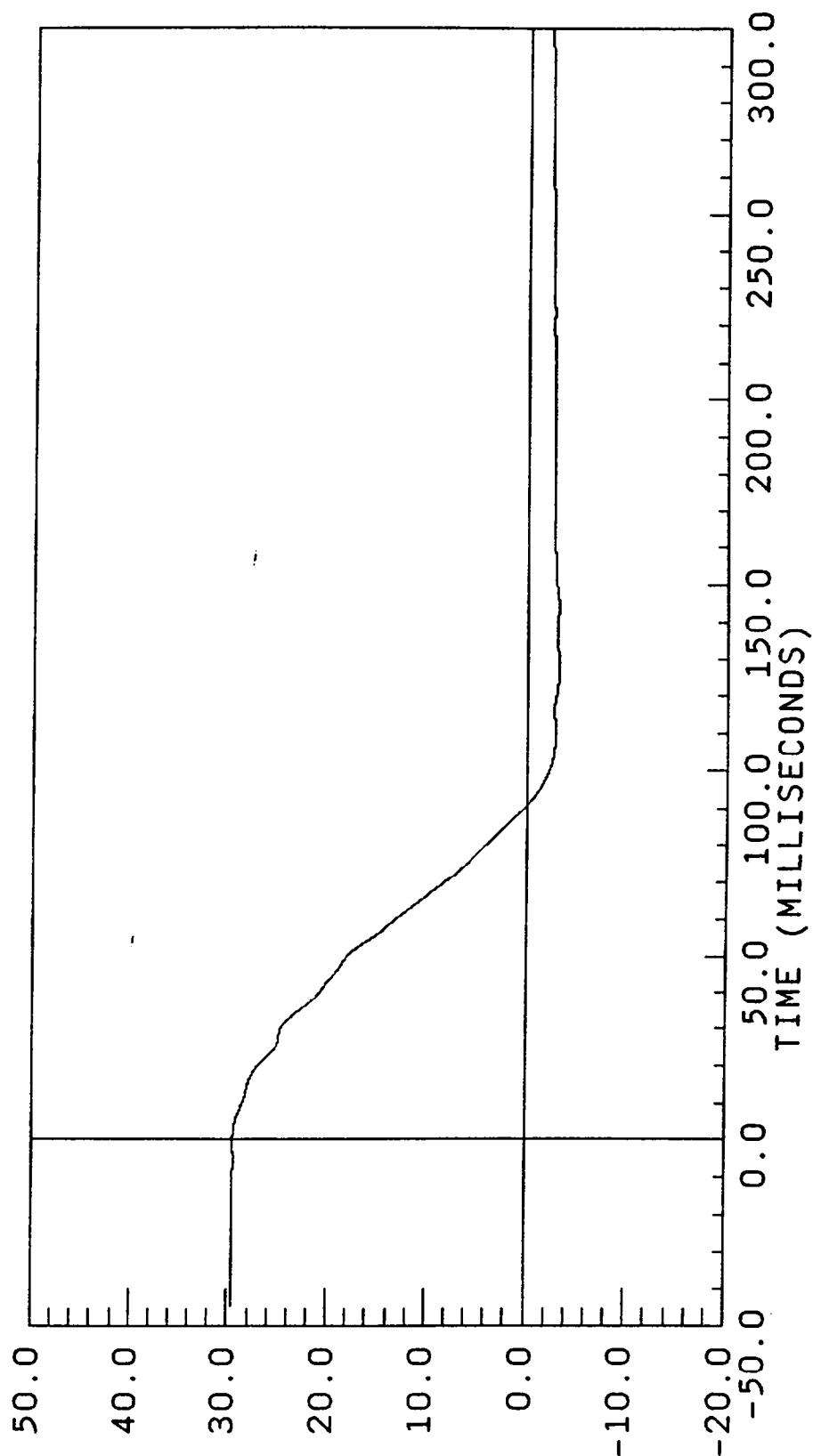


29.50 mph

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

XL AXIS

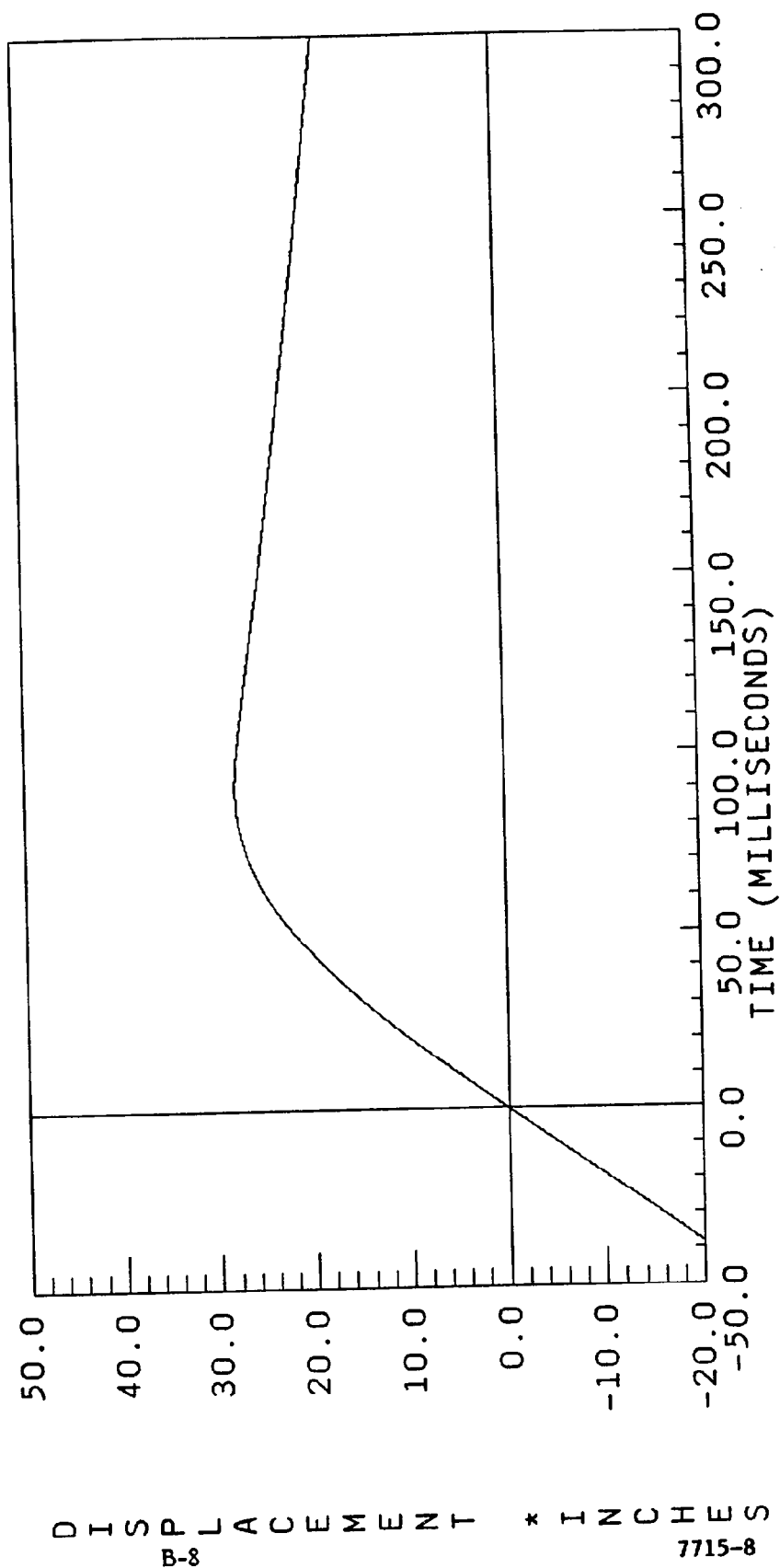
YMIN = -3.239054 at 128.1750
YMAX = 29.54448 at -36.82500



D905-18.DAT

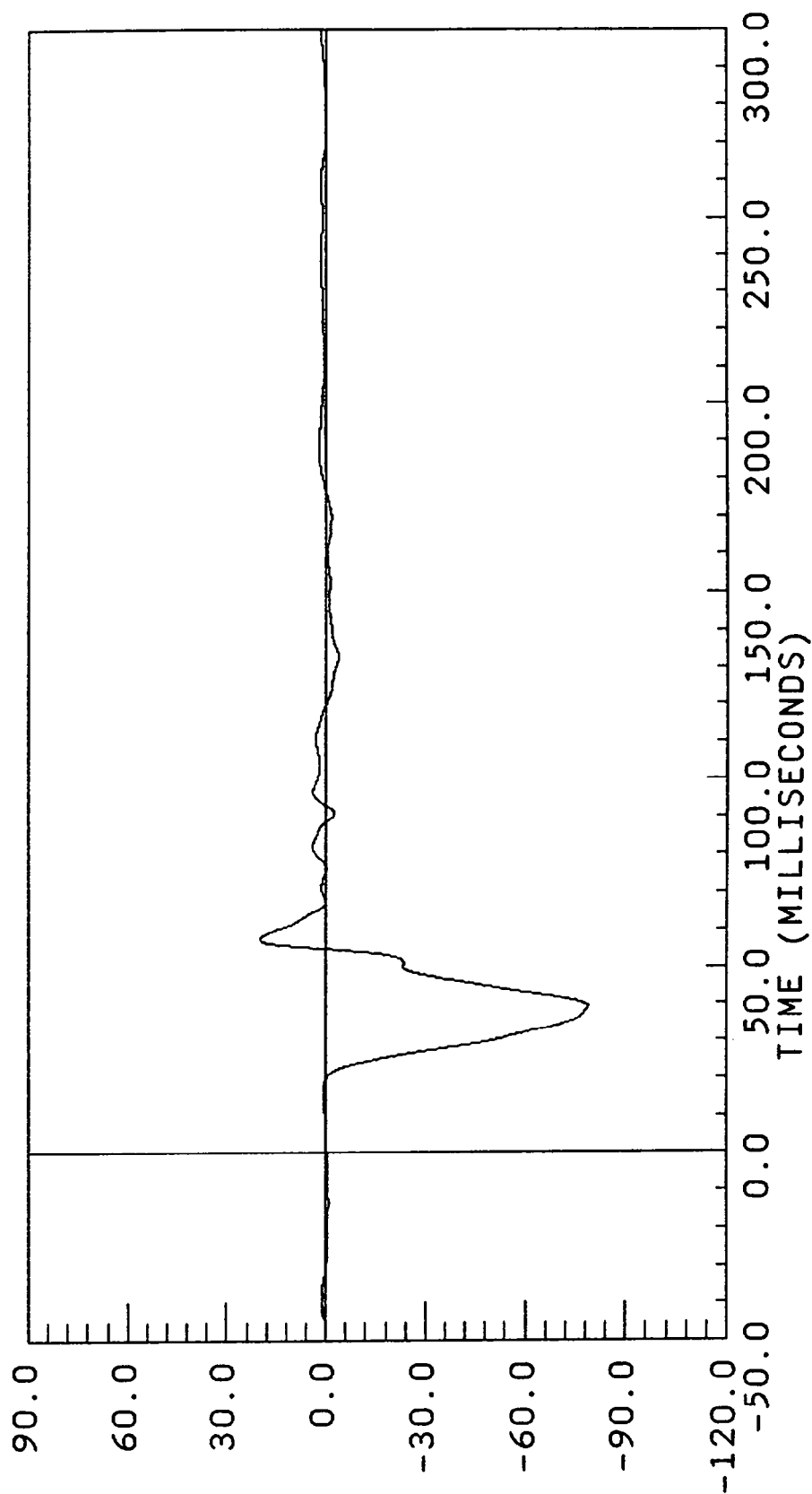
29.50 mph

ACC PACK #2(X) XL AXIS
COMPUTED YMIN = -23.34704 at 128.1750
FILTER CUTOFF: 100HZ YMAX = 28.02769 at 90.52500



29.50 mph

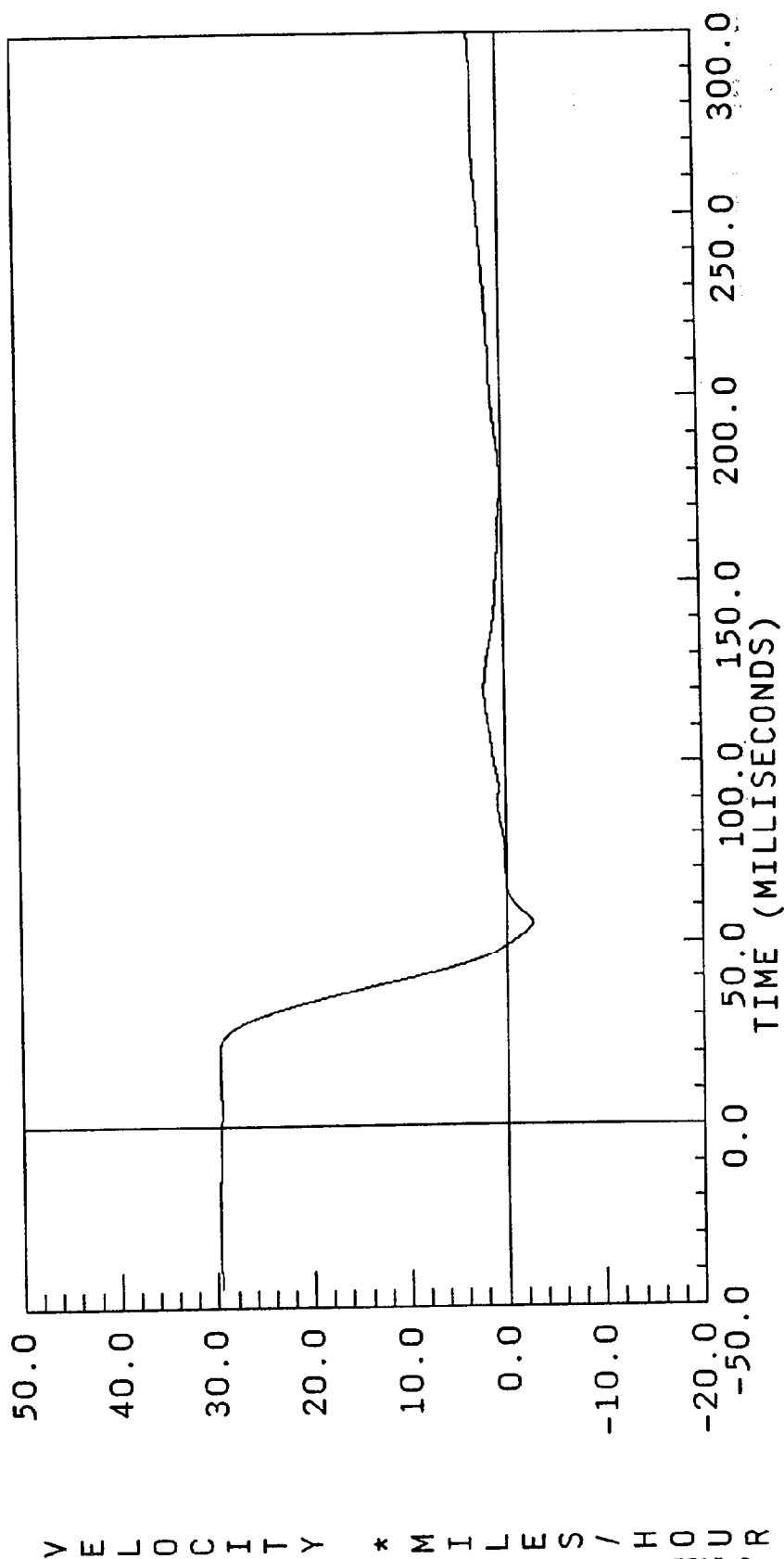
ACC PACK #3(X) XL AXIS
 FILTERED YMIN = -78.82000 at 39.30000
 FILTER CUTOFF: 100Hz YMAX = 20.07272 at 57.52500



V905-19.DAT

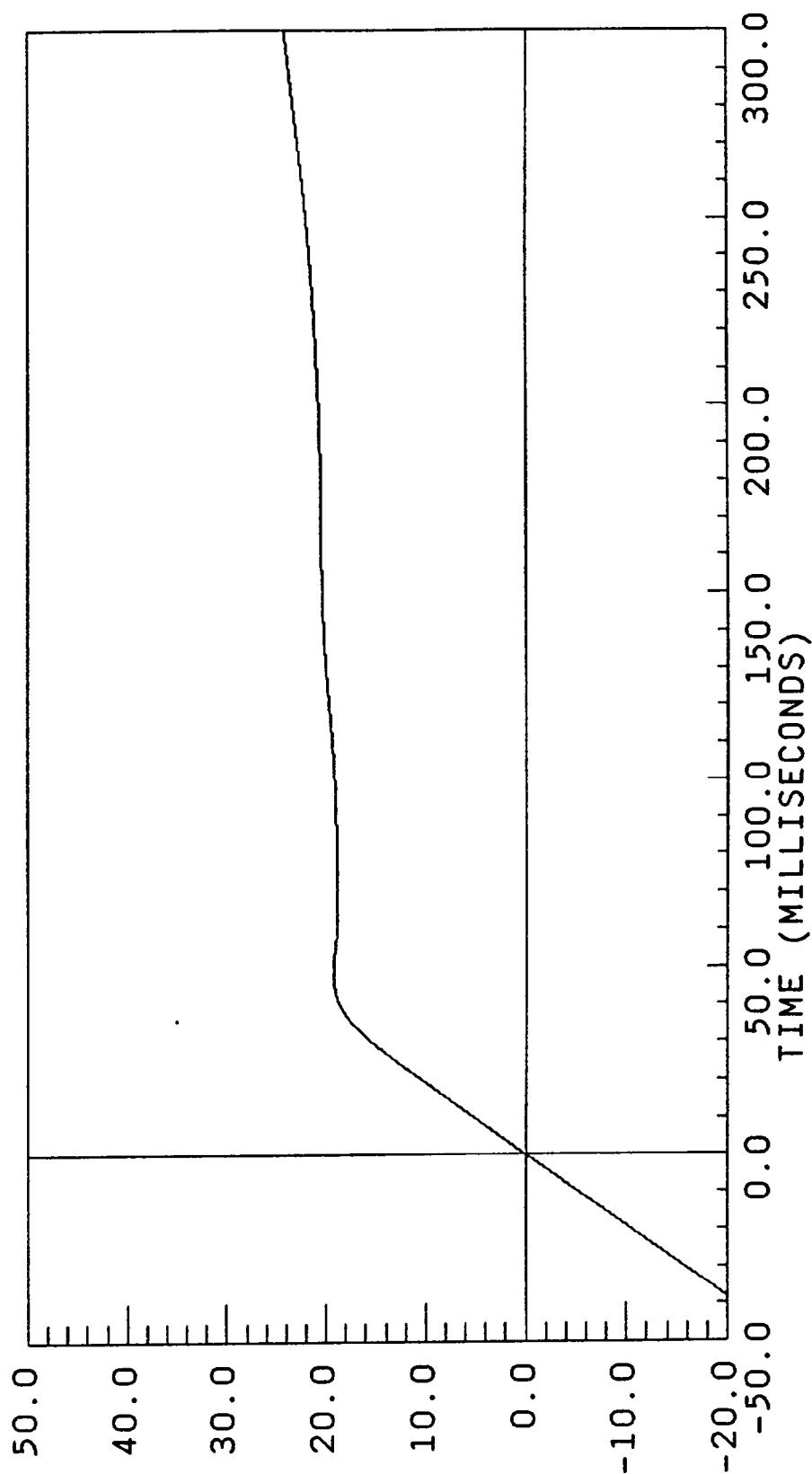
29.50 mph

ACC PACK #3(X)
COMPUTED
FILTER CUTOFF: 100Hz
XL AXIS
YMIN = -2.739704 at 54.97500
YMAX = 29.55081 at -30.30000



29.50 mph

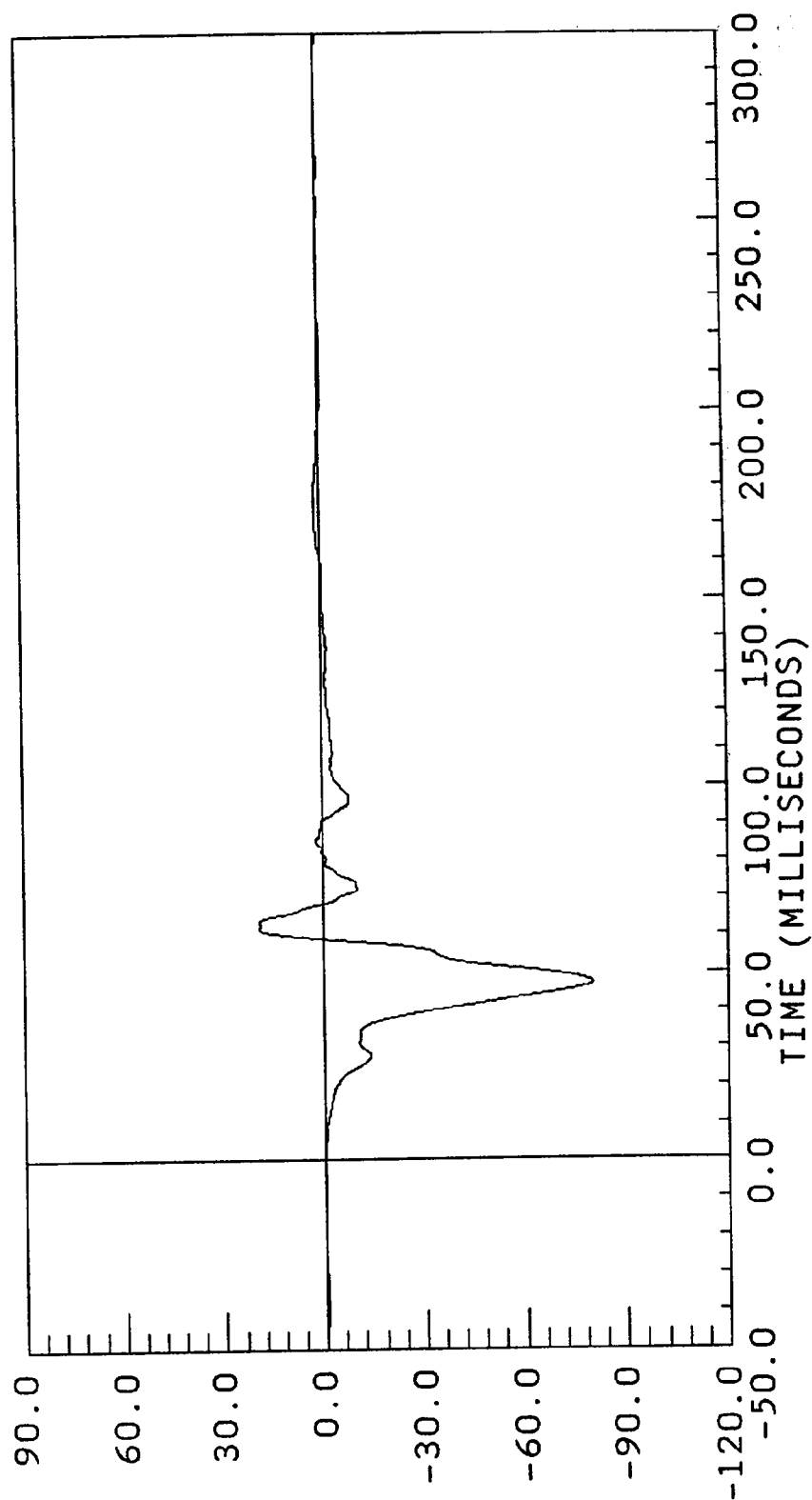
ACC PACK #3(X) XL AXIS
 COMPUTED YMIN = -23.45766 at 54.97500
 FILTER CUTOFF: 100Hz YMAX = 24.20658 at 300.0000



BW905-20.DAT

29.50 mph

ACC PACK #4(X)
FILTERED
FILTER CUTOFF: 100HZ
XL AXIS
YMIN = -80.24892 at 47.25000
YMAX = 19.30830 at 61.57500

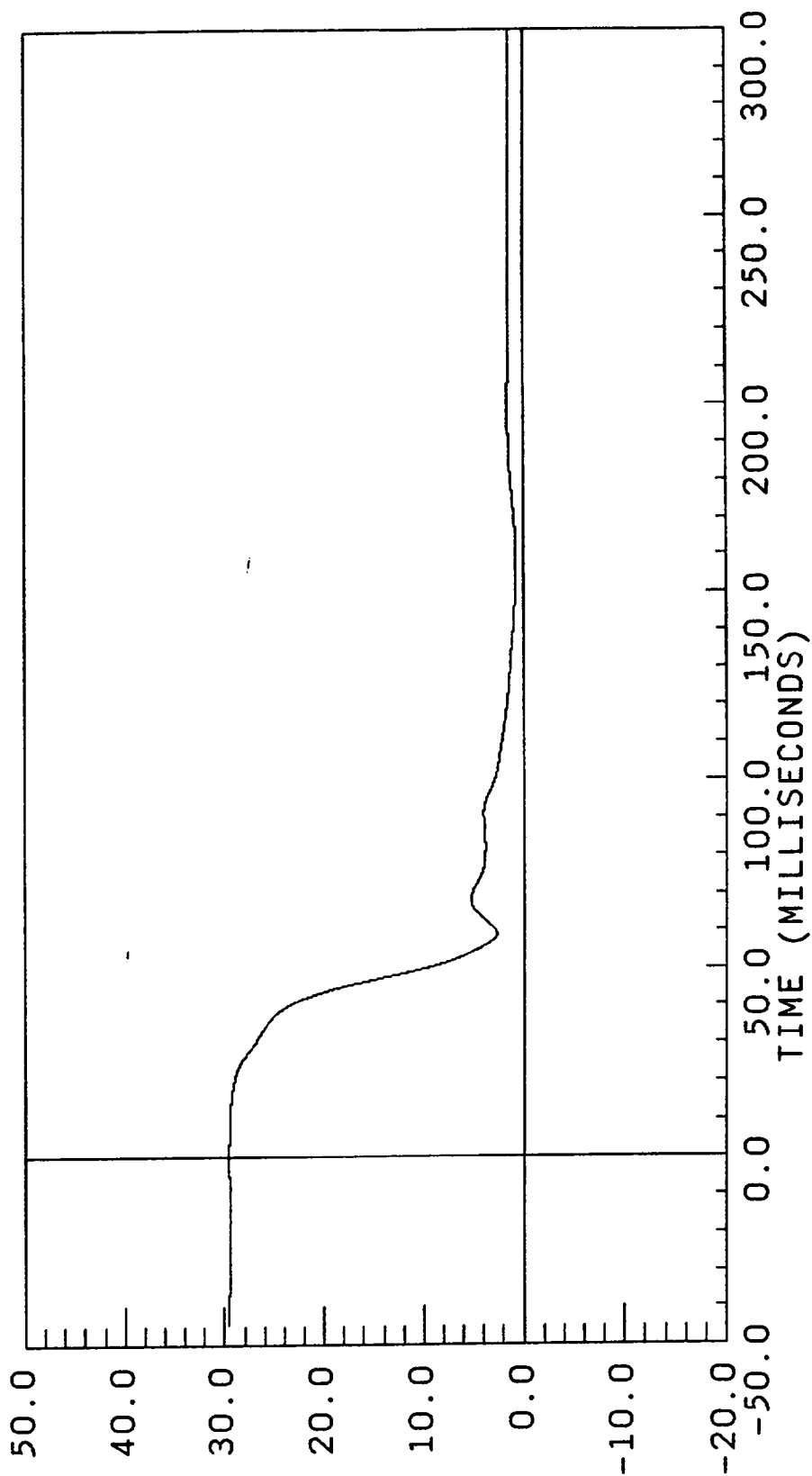


ACCELERATION * G, S *
B-12 7715-8

29.50 mph

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

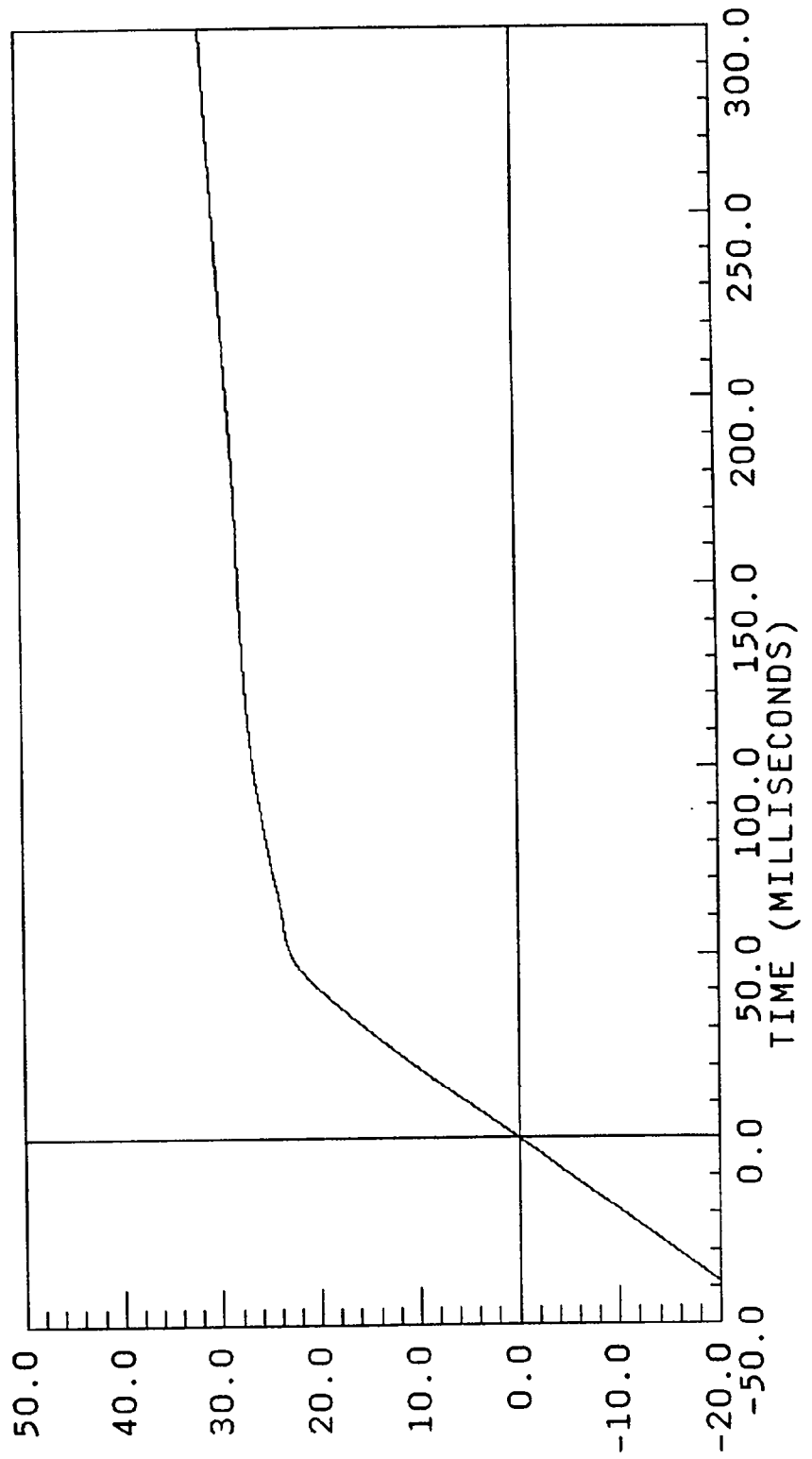
XL AXIS
YMIN = 0.724230 at 160.3500
YMAX = 29.56143 at -44.70000



D905-20.DAT

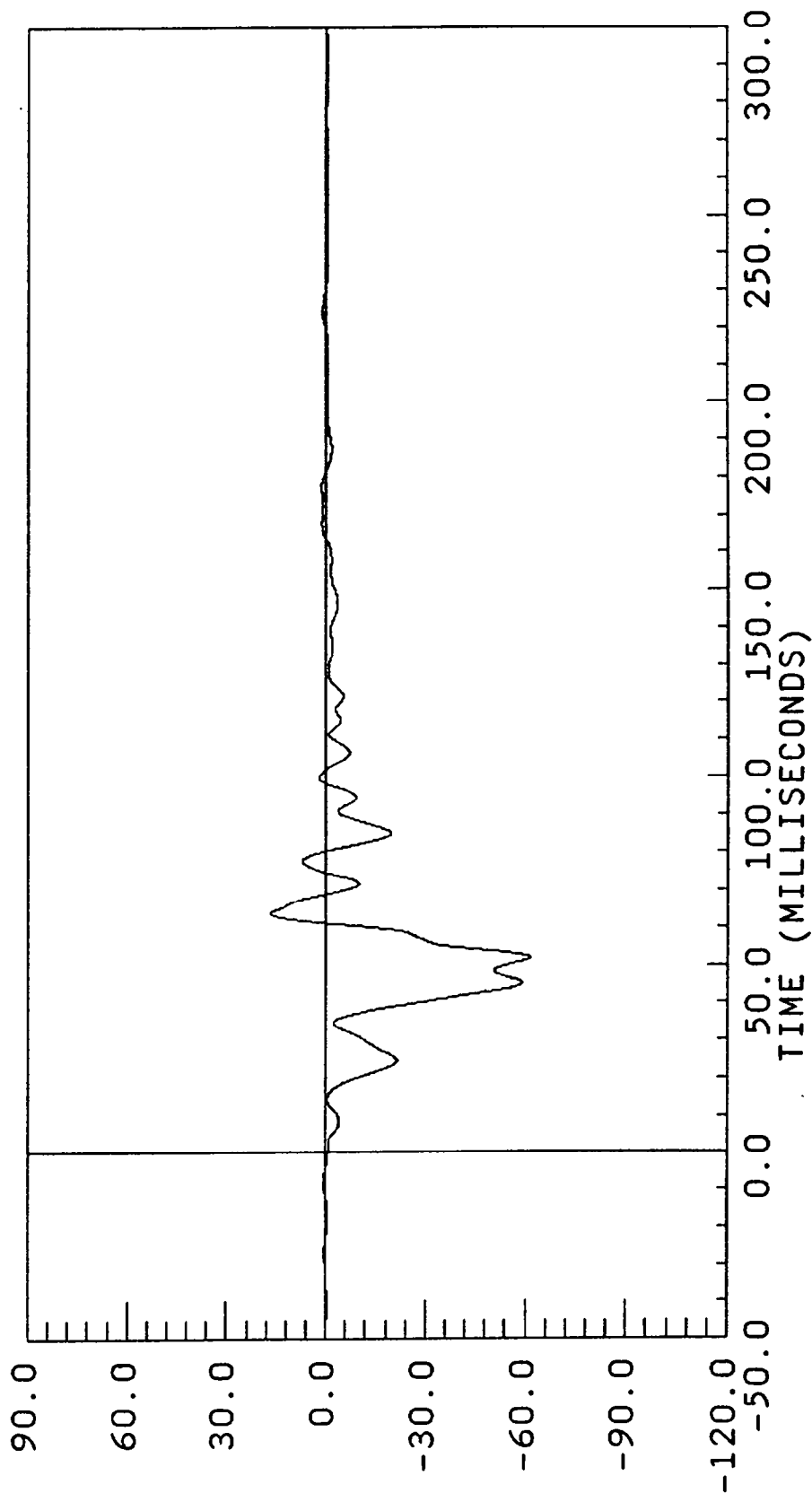
29.50 mph

ACC PACK #4(X)
COMPUTED
FILTER CUTOFF: 100Hz
XL AXIS
YMIN = -23.31055 at 160.3500
YMAX = 31.39003 at 300.0000



29.50 mph

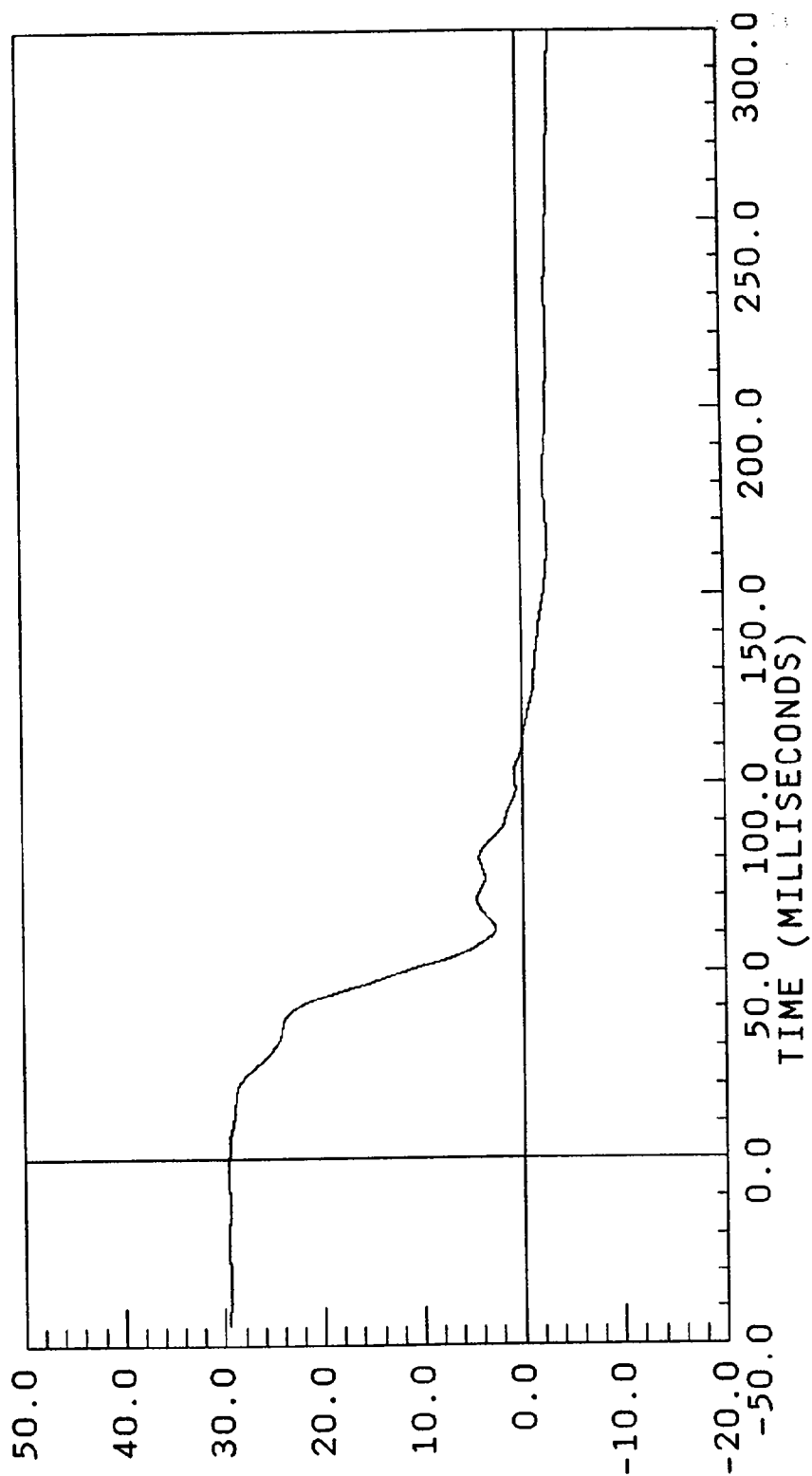
ACC PACK #5(X) XL AXIS
 FILTERED YMIN = -61.64524 at 51.82500
 FILTER CUTOFF: 100Hz YMAX = 16.90654 at 63.75000



V905-21.DAT

29.50 mph

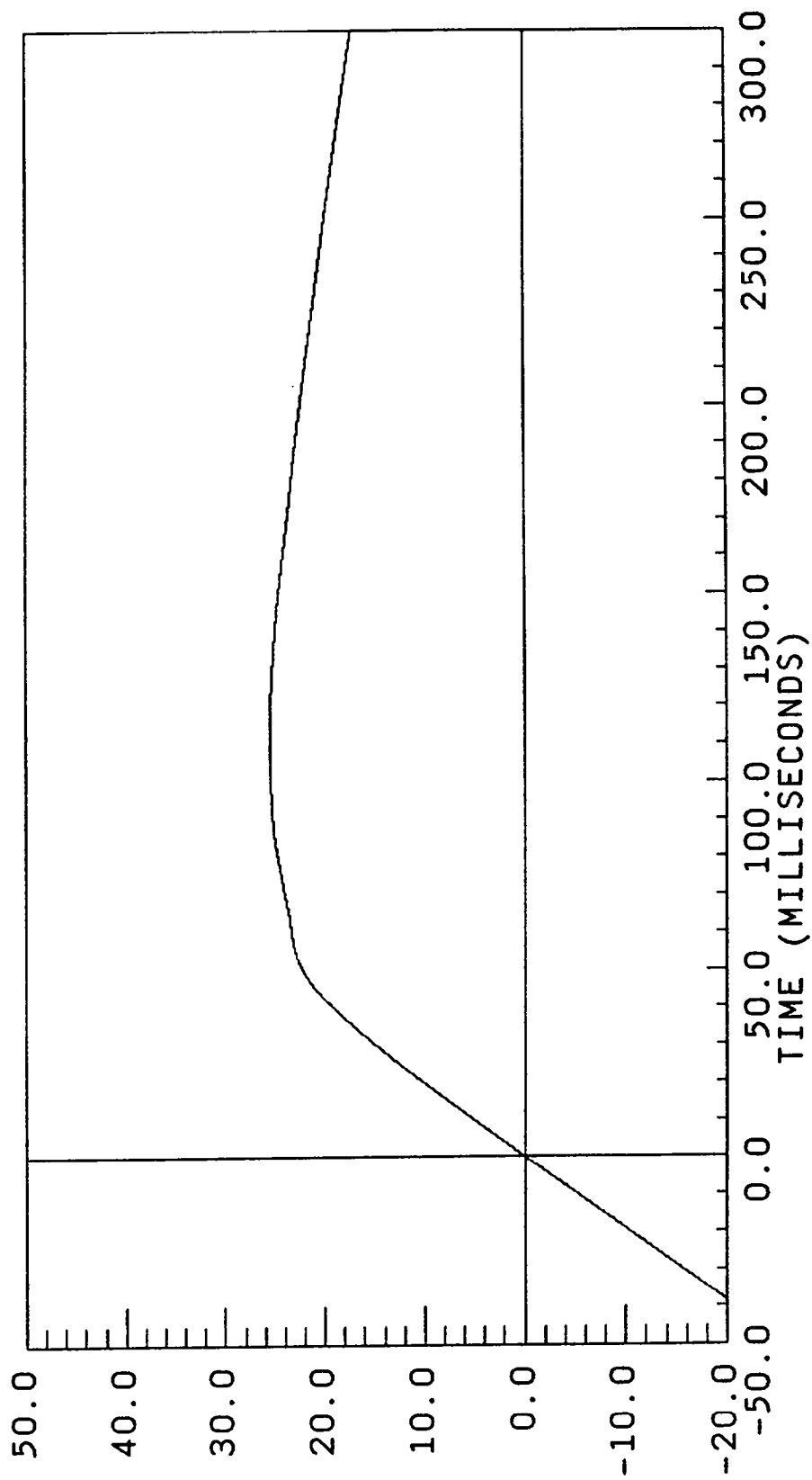
ACC PACK #5(X)
COMPUTED
FILTER CUTOFF: 100Hz
XL AXIS
YMIN = -3.311592 at 300.0000
YMAX = 29.53202 at -4.275000



29.50 mph

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

XL AXIS
YMIN = -23.32250 at 300.0000
YMAX = 25.49586 at 109.2750

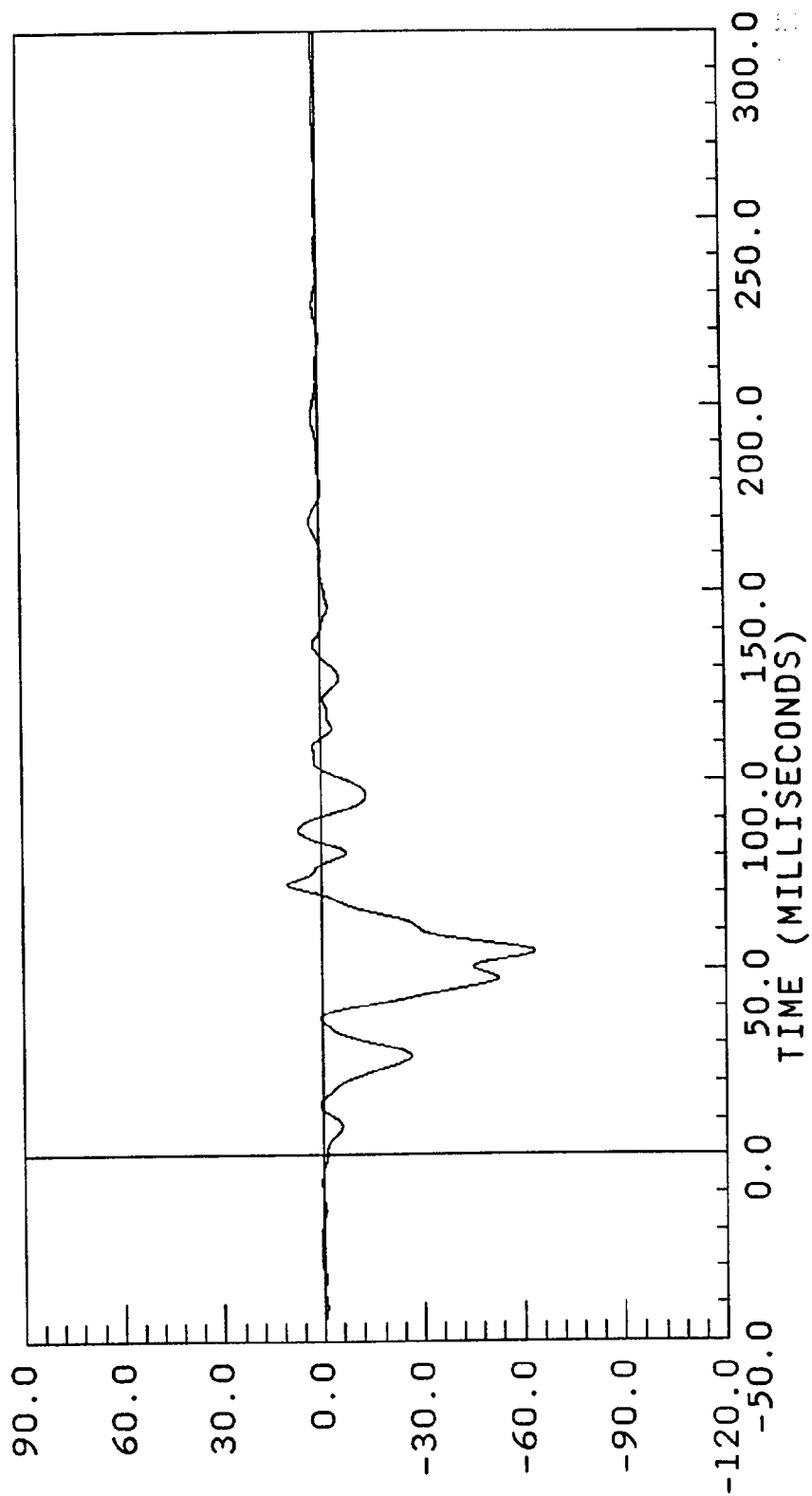


DISPLACEMENT * INCHES

BW905-22.DAT

29.50 mph

ACC PACK #6(X)
FILTERED
FILTER CUTOFF: 100HZ
XL AXIS
YMIN = -63.82577 at 54.37500
YMAX = 10.30290 at 72.45000

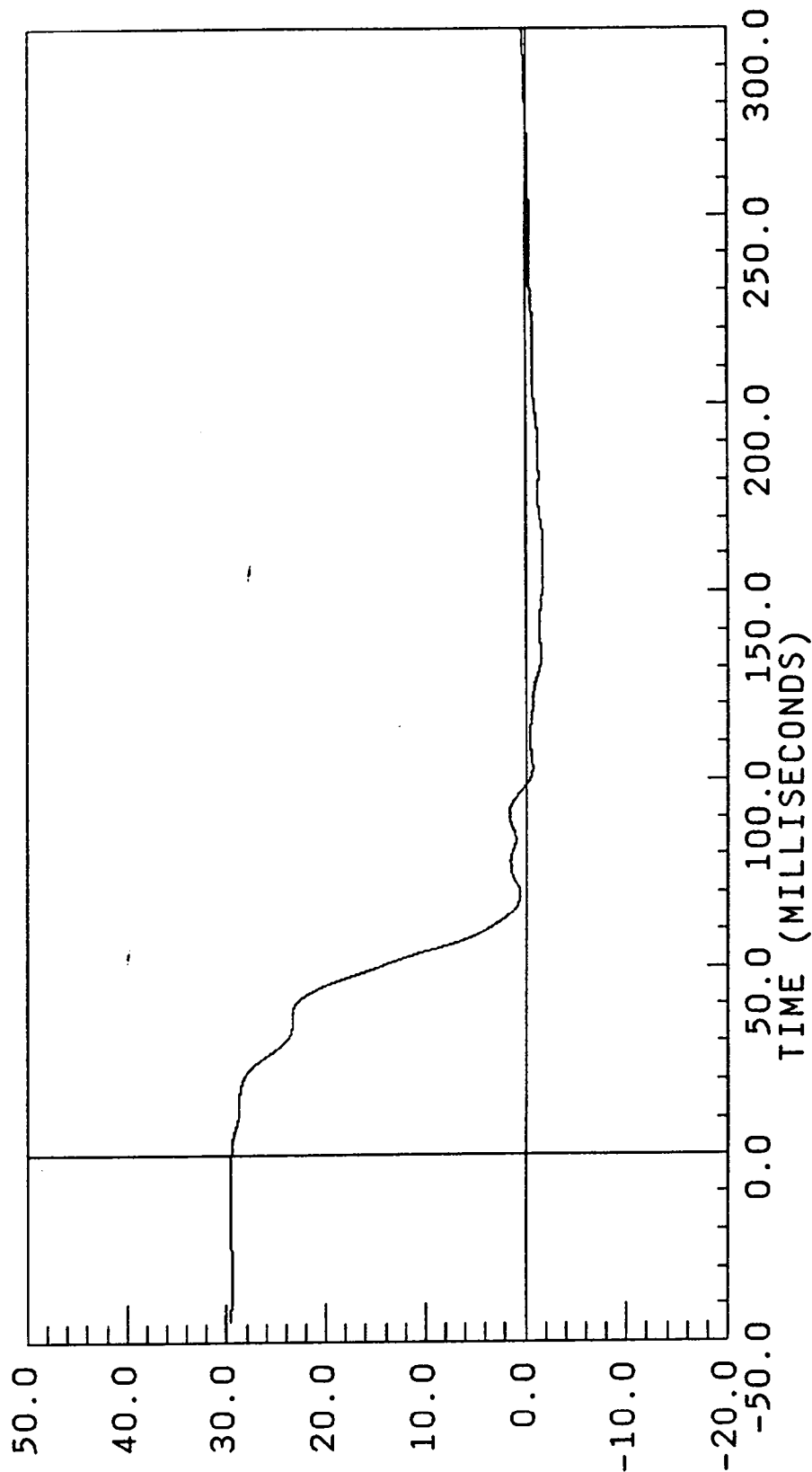


ACCELERATION * G * S *
B-18 7715-8

29.50 mph

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

XL AXIS
YMIN = -1.755879 at 162.1500
YMAX = 29.52508 at -17.40000



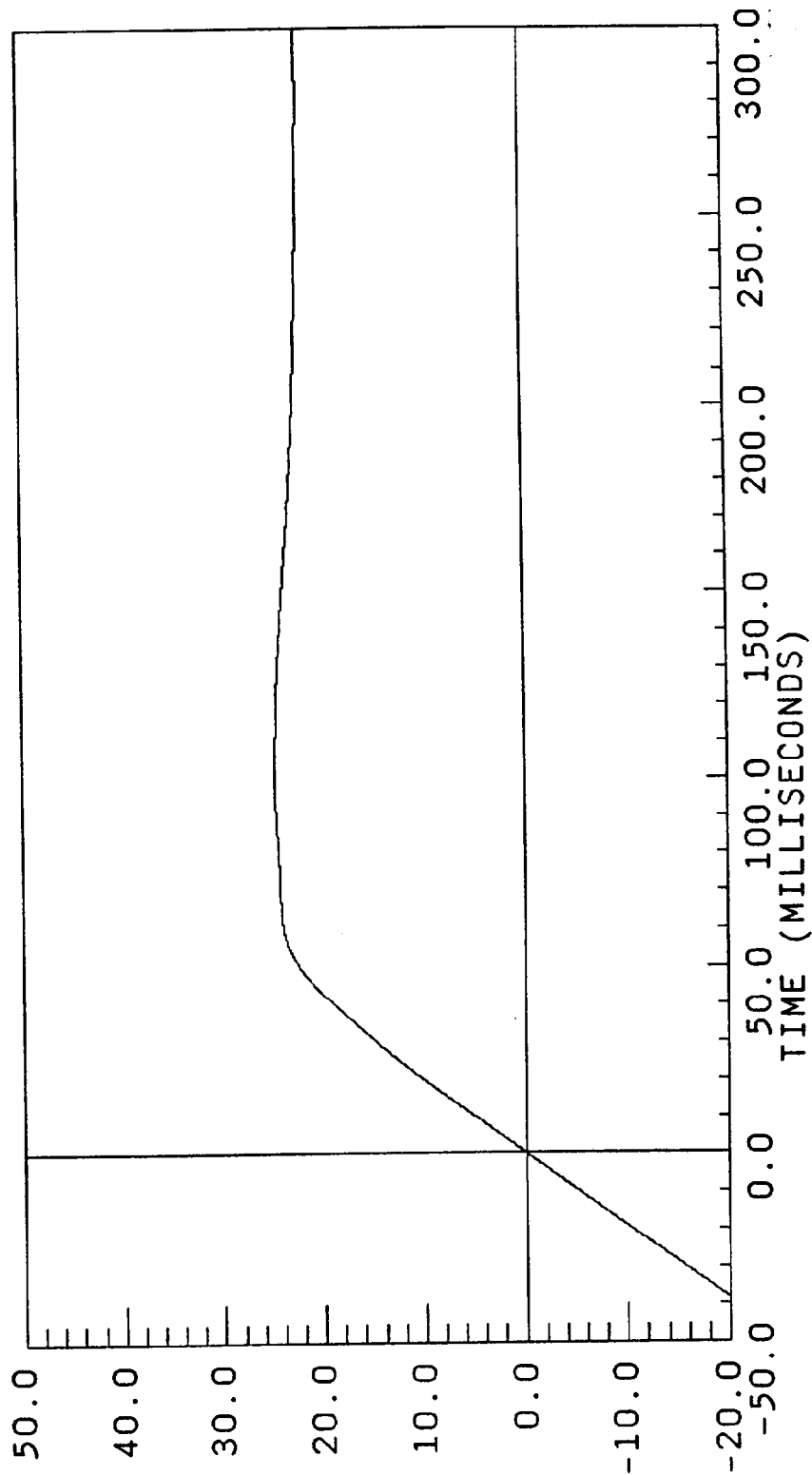
VELOCITY * MILES / HOUR

D905-22.DAT

29.50 mph

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

XL AXIS
YMIN = -23.33290 at 162.1500
YMAX = 24.82945 at 98.17500

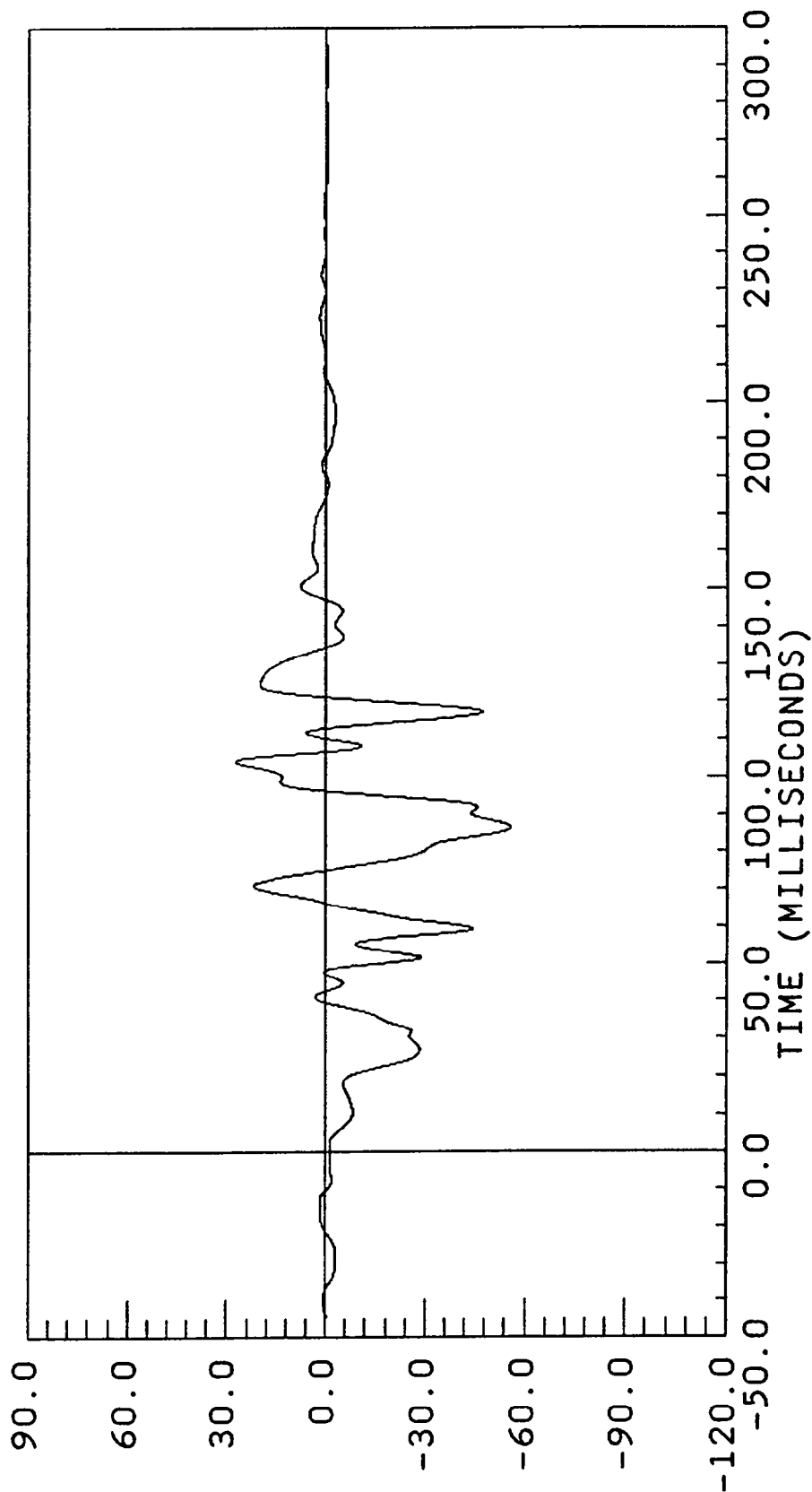


DISPLACEMENT * INCHES
B-20 7715-8

29.50 mph

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

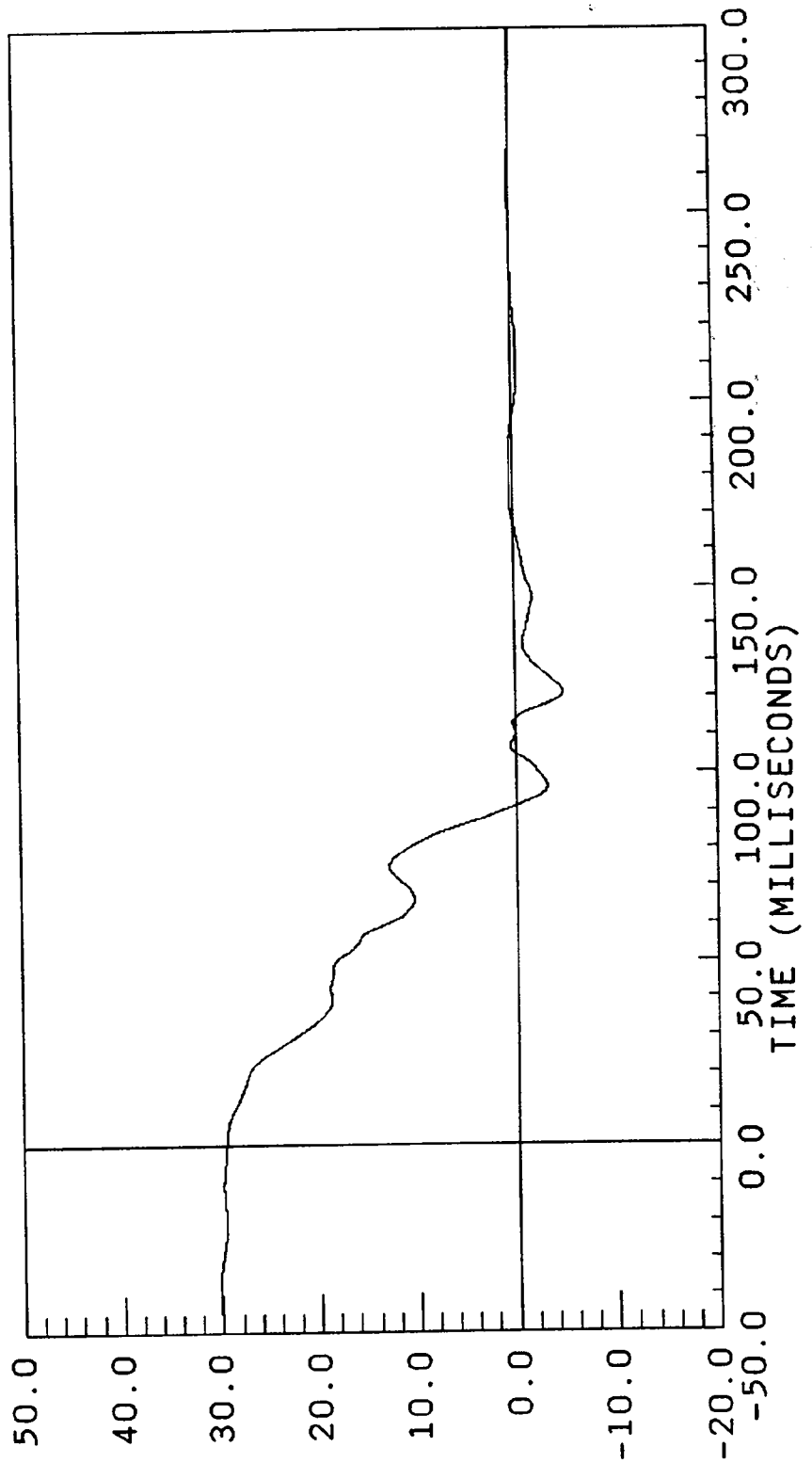
XL AXIS
 YMIN = -55.89246 at 86.55000
 YMAX = 27.24825 at 104.3250



V905-23.DAT

29.50 mph

ACC PACK #7(X)
COMPUTED
FILTER CUTOFF: 100HZ
XL AXIS
YMIN = -4.800143 at 121.3500
YMAX = 30.20362 at -37.20000

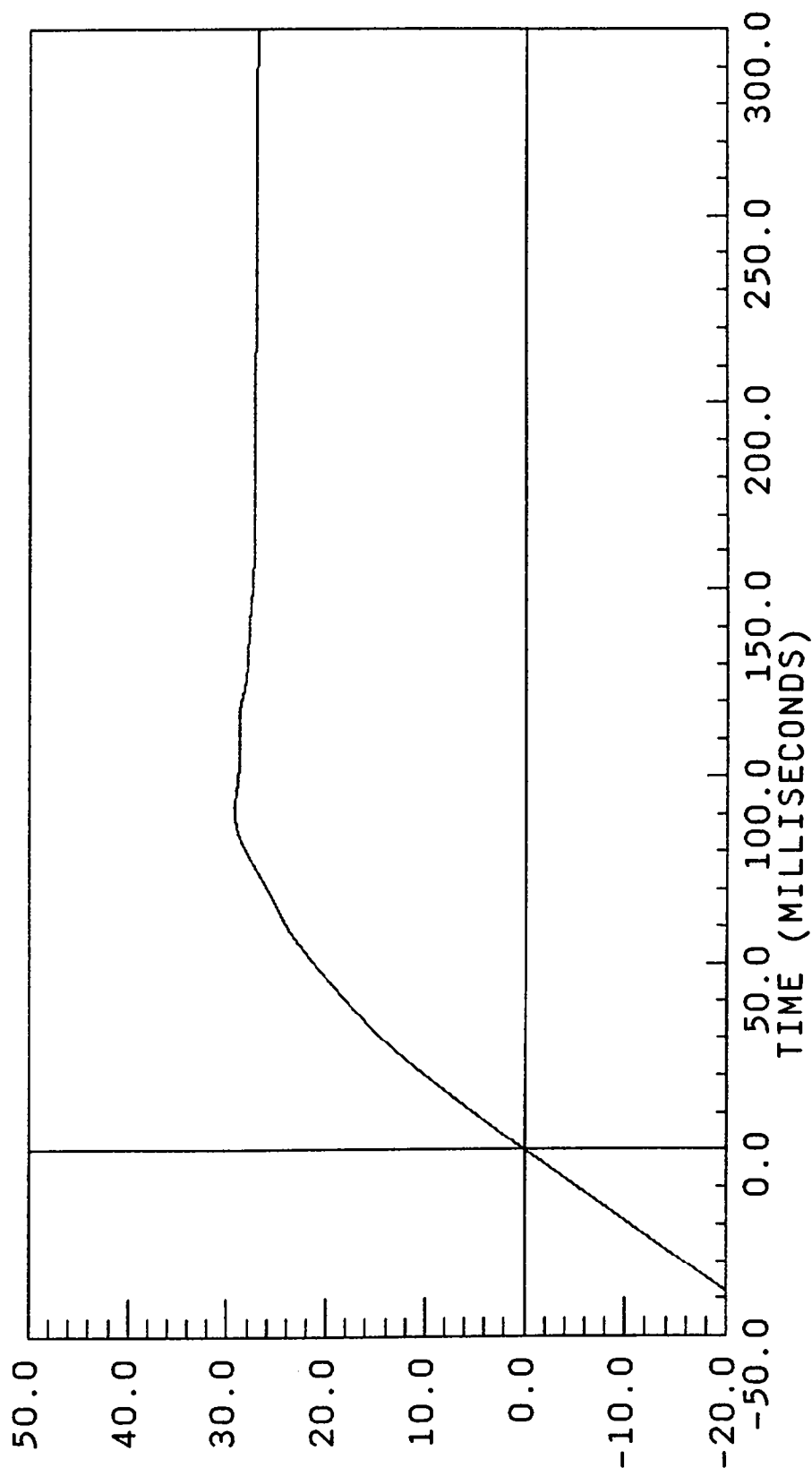


VELOCITY * MILES / HOUR
B-22
7715-8

29.50 mph

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

XL AXIS
YMIN = -23.60123 at 121.3500
YMAX = 29.24831 at 91.27500

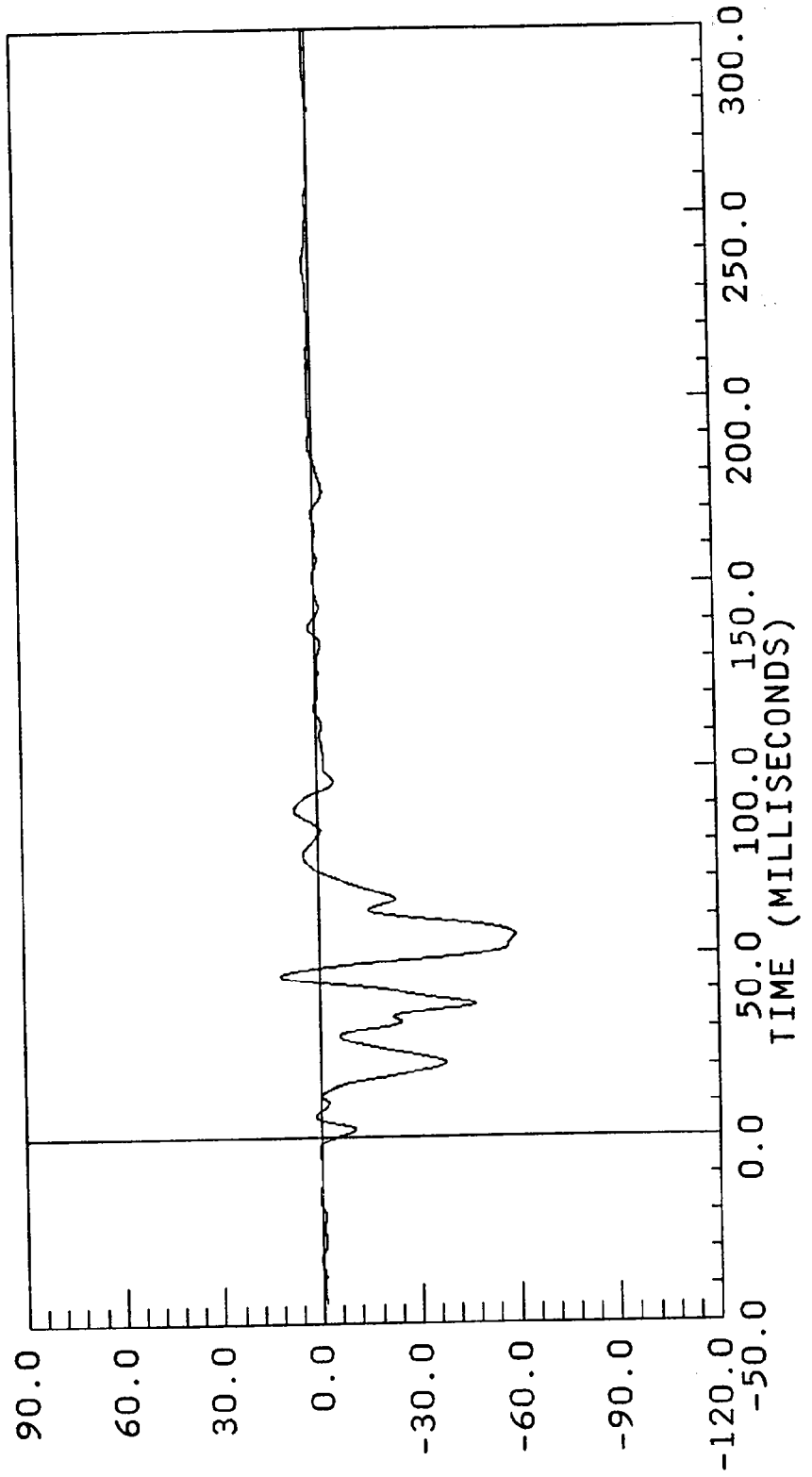


DISPLACEMENT * INCHES

BW905-24.DAT

29.50 mph

ACC PACK #8(X)
FILTERED
FILTER CUTOFF: 100Hz
XL AXIS
YMIN = -59.67981 at 54.90000
YMAX = 11.81570 at 44.32500



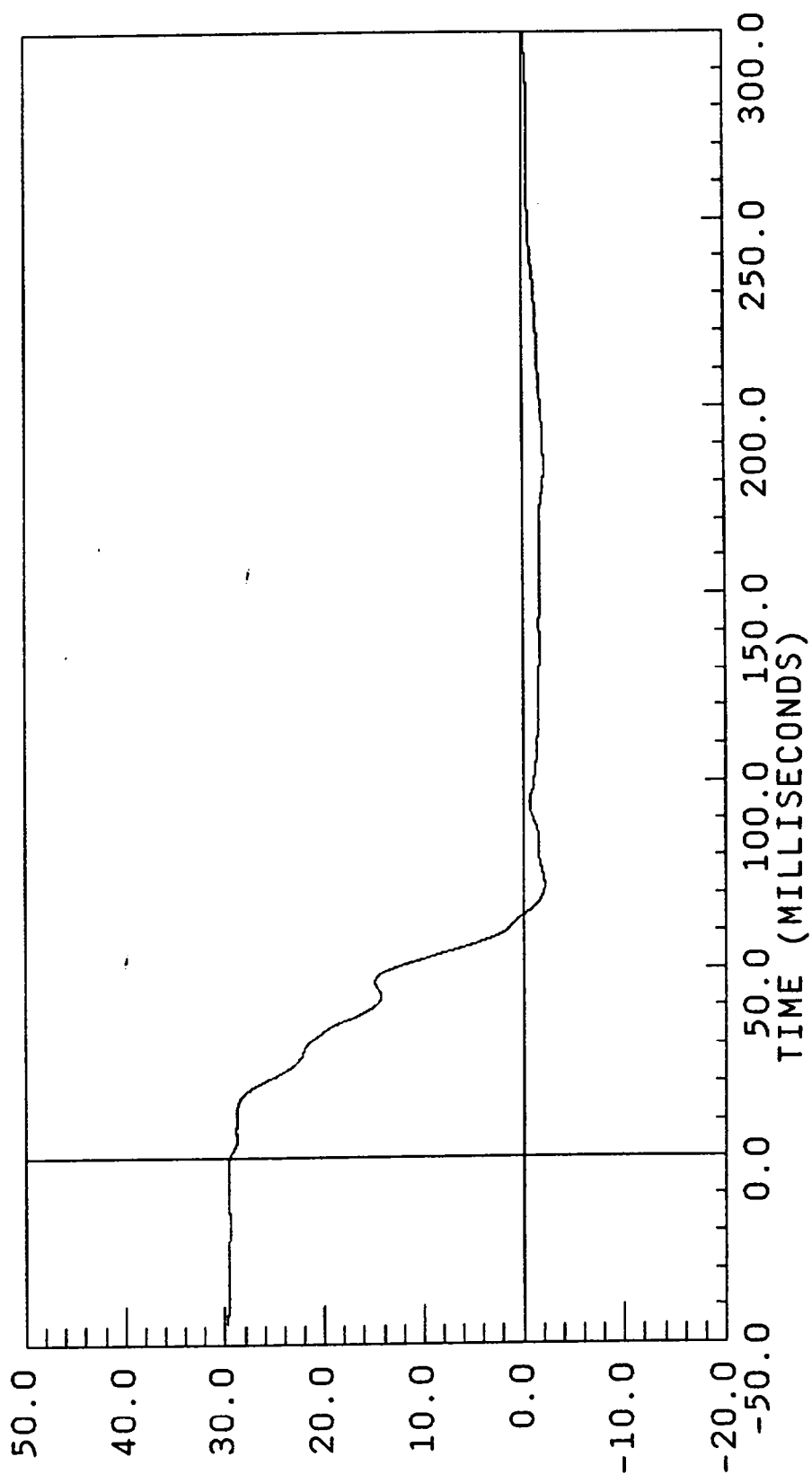
ACCELERATION * G * S
B-24 7715-8

V905-24.DAT

29.50 mph

ACC PACK #8(X)
COMPUTED
FILTER CUTOFF: 100Hz

XL AXIS
YMIN = -2.160721 at 184.2750
YMAX = 29.70020 at 44.32500



VELOCITY * MILES / HOUR

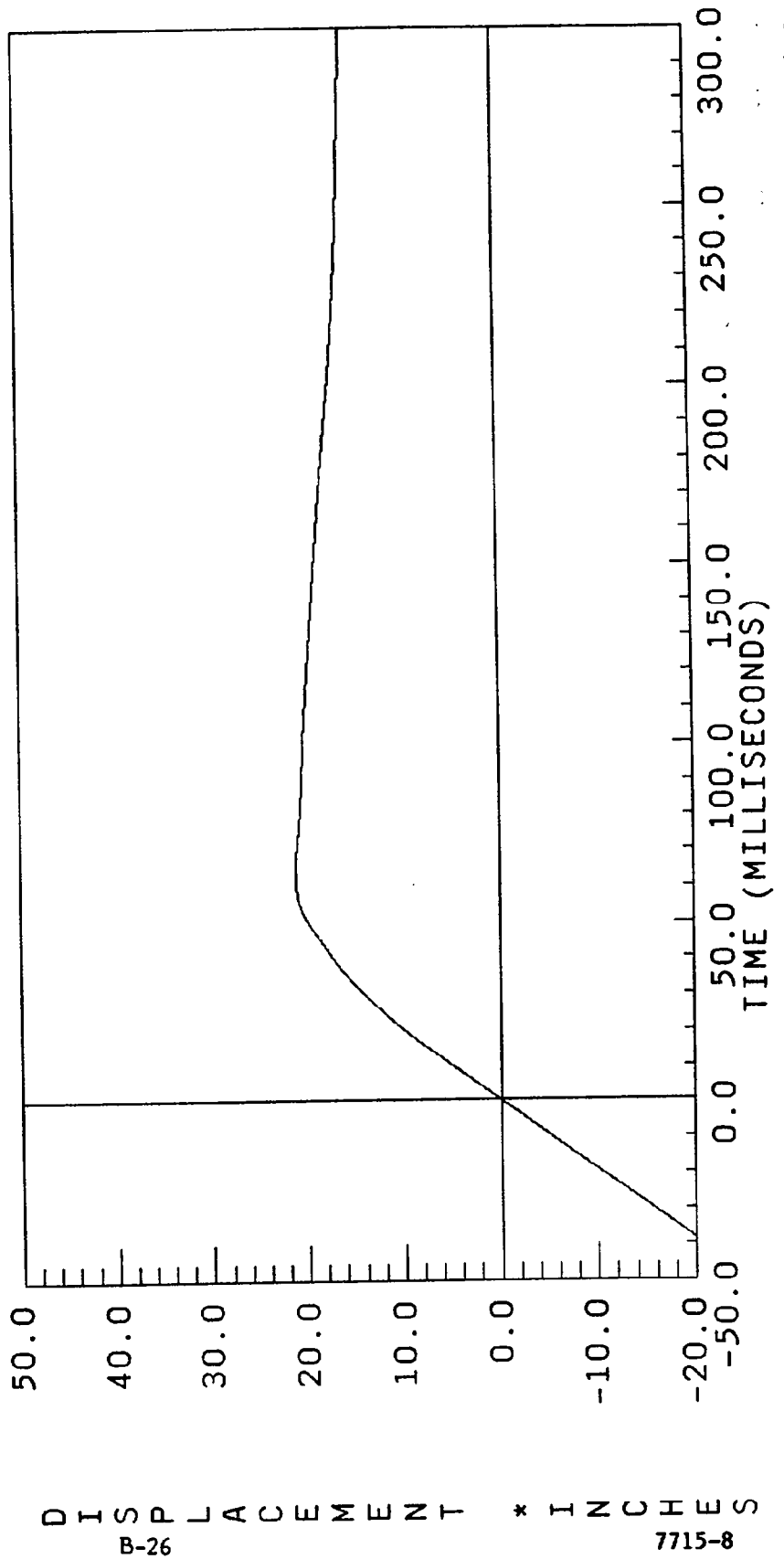
B-25

7715-8

D905-24.DAT

29.50 mph

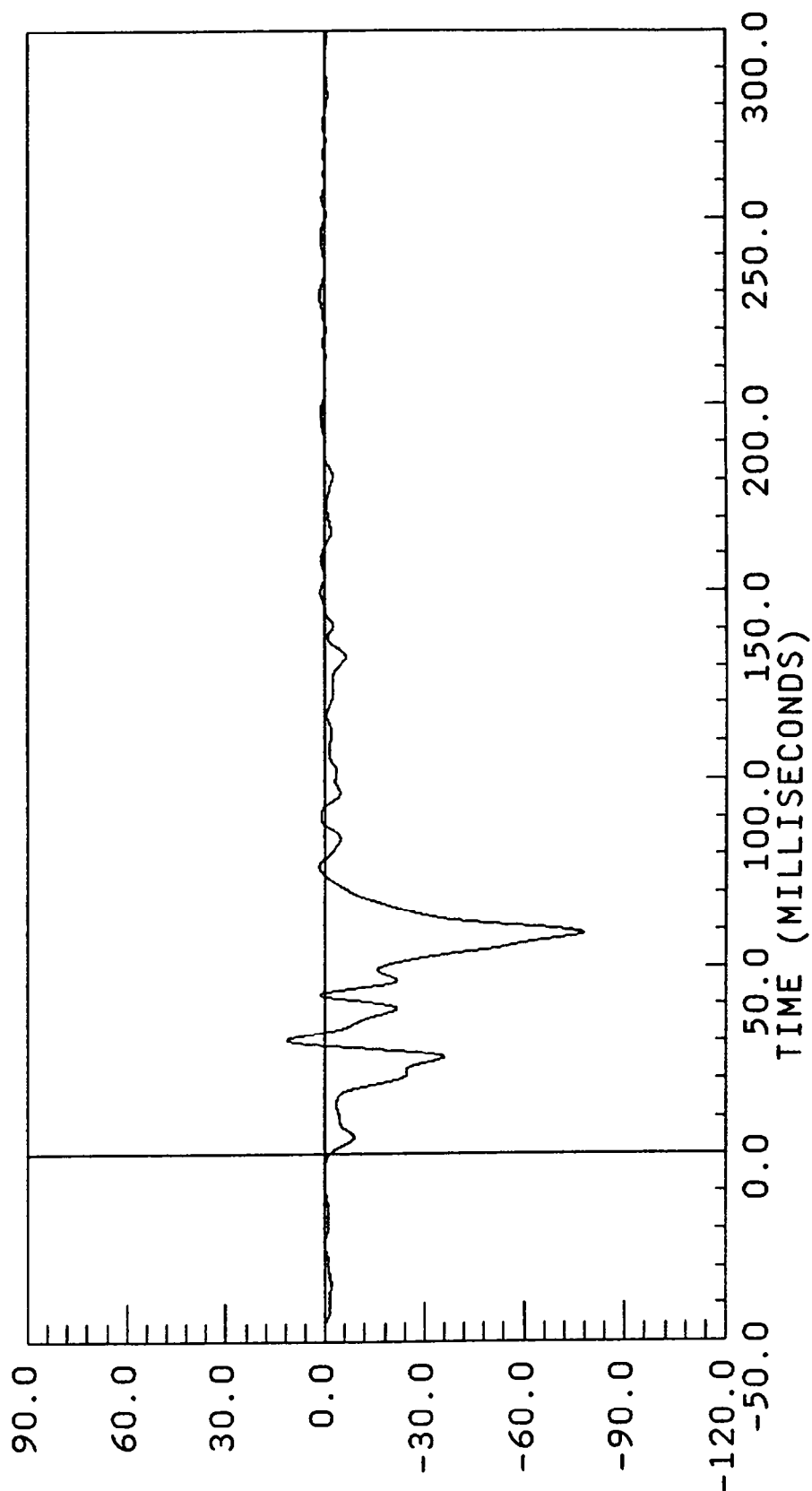
ACC PACK #8(X) XL AXIS
COMPUTED YMIN = -23.37205 at 184.2750
FILTER CUTOFF: 100HZ YMAX = 21.20750 at 64.05000



29.50 mph

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

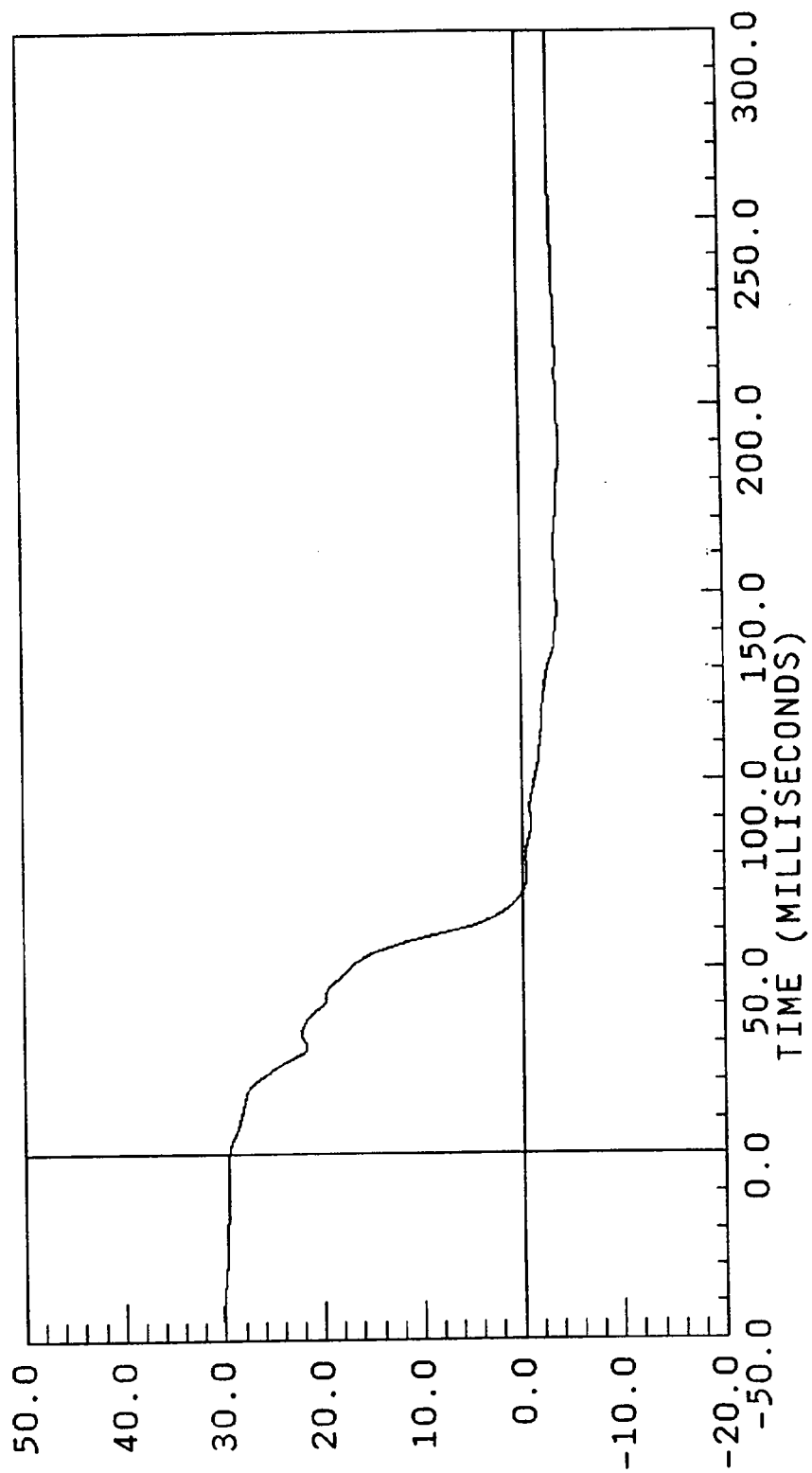
XL AXIS
 YMIN = -77.84235 at 59.02500
 YMAX = 11.66700 at 30.30000



V905-25.DAT

29.50 mph

ACC PACK #9(X)
COMPUTED
FILTER CUTOFF: 100Hz
XL AXIS
YMIN = -4.009682 at 185.6250
YMAX = 30.24971 at -44.77500

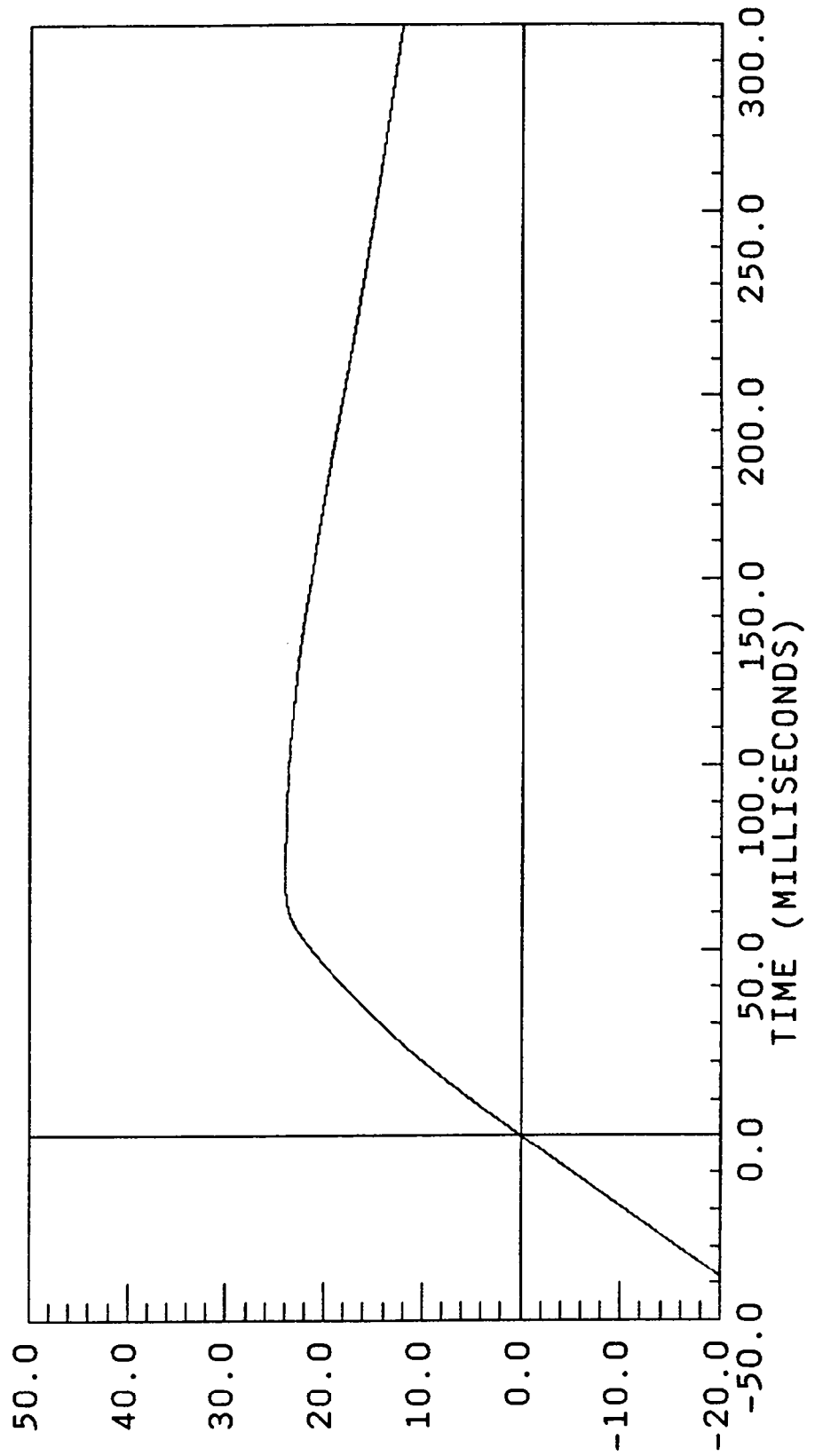


VELOCITY * MILES / HOUR
B-28 7715-8

29.50 mph

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

XL AXIS
YMIN = -23.52721 at 185.6250
YMAX = 23.94924 at 69.67500



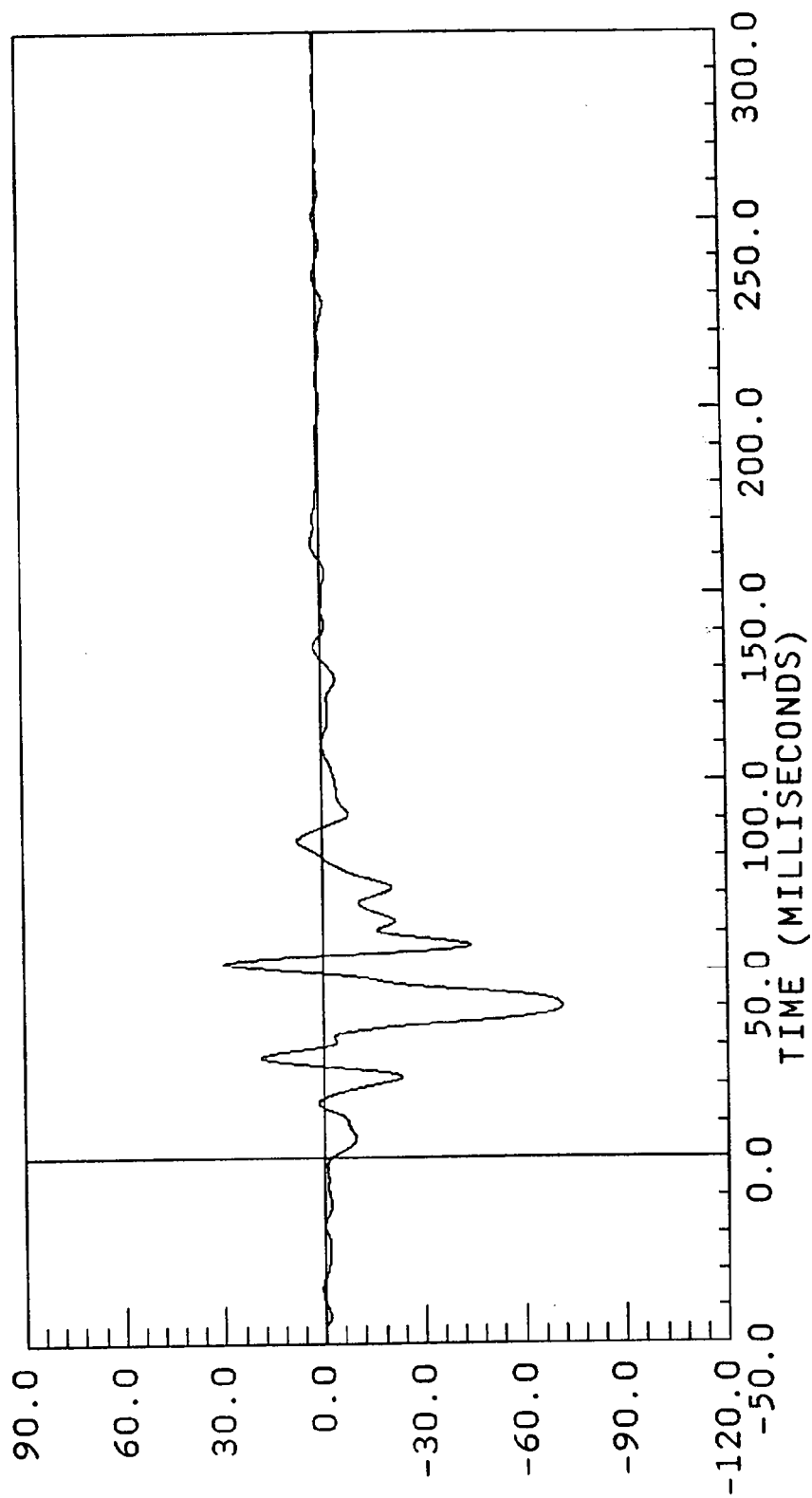
DISPLACEMENT * INCHES

BW905-26.DAT

29.50 mph

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

XL AXIS
YMIN = -71.55397 at 40.12500
YMAX = 29.97767 at 51.97500

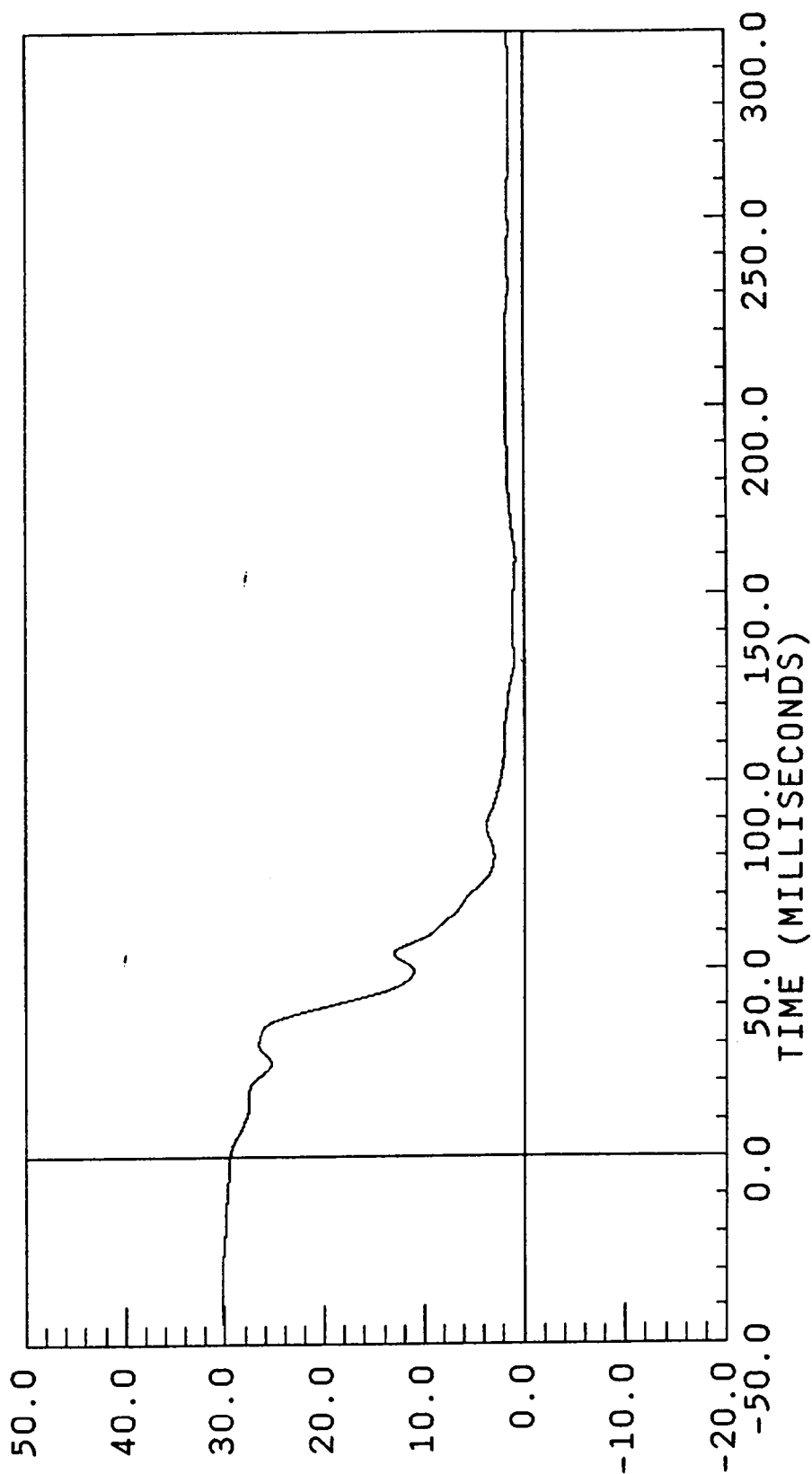


ACCELERATION * G * S
B-30 7715-8

29.50 mph

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

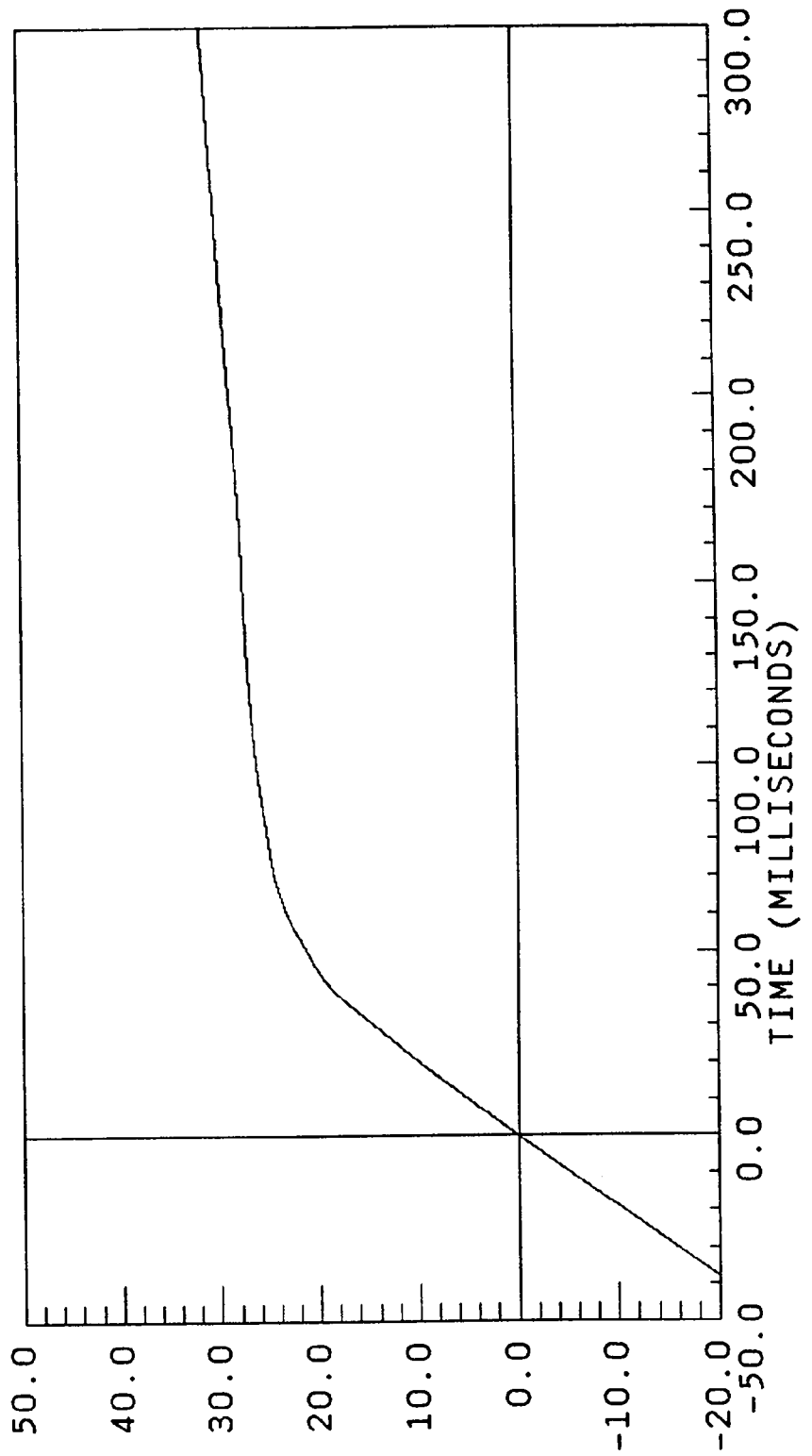
XL AXIS
YMIN = 0.830787 at 159.1500
YMAX = 30.31615 at 51.97500



D905-26.DAT

29.50 mph

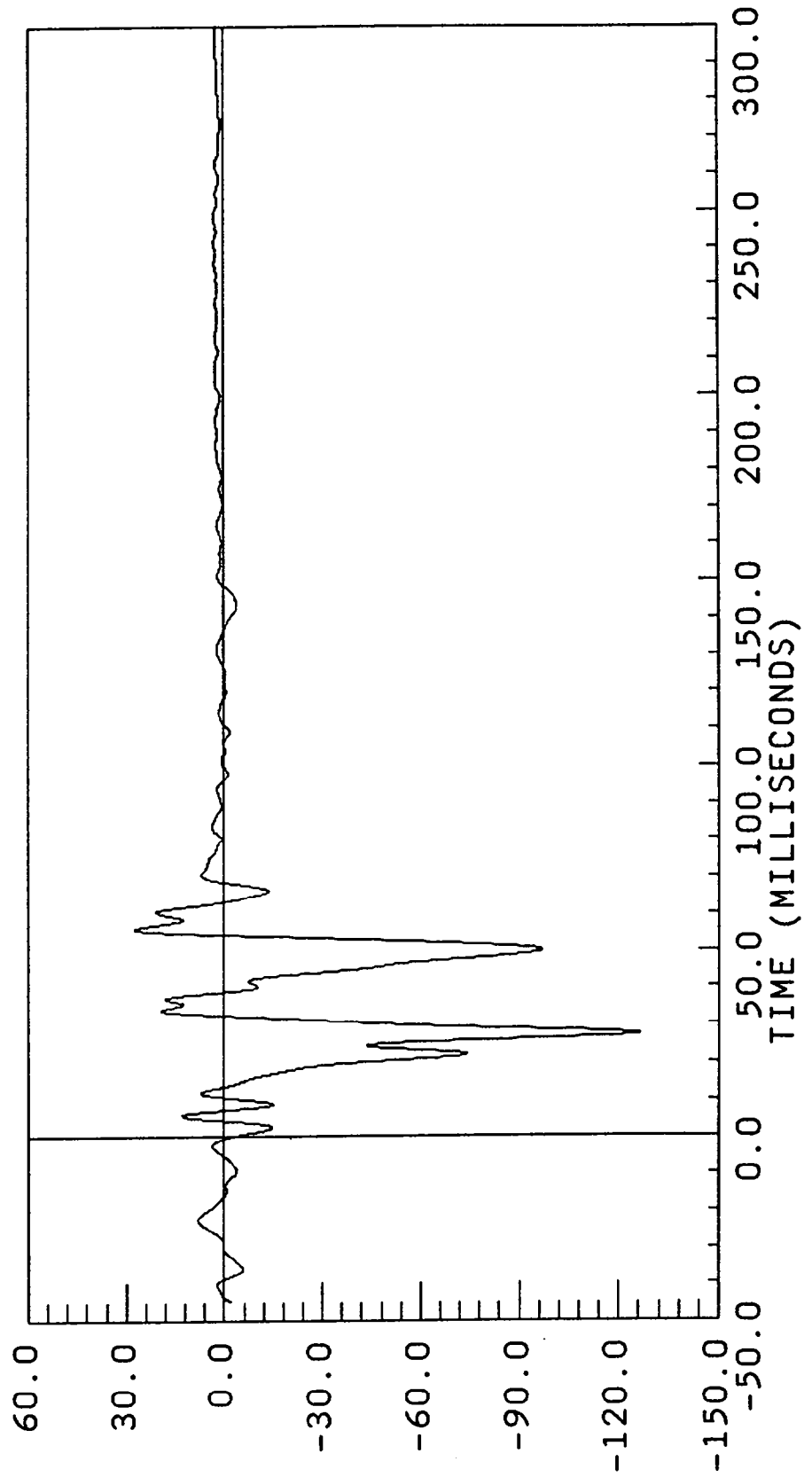
ACC PACK #10(X)
COMPUTED
FILTER CUTOFF: 100HZ
XL AXIS
YMIN = -23.71969 at 159.1500
YMAX = 31.46775 at 300.0000



DISPLACEMENT * INCHES

29.50 mph

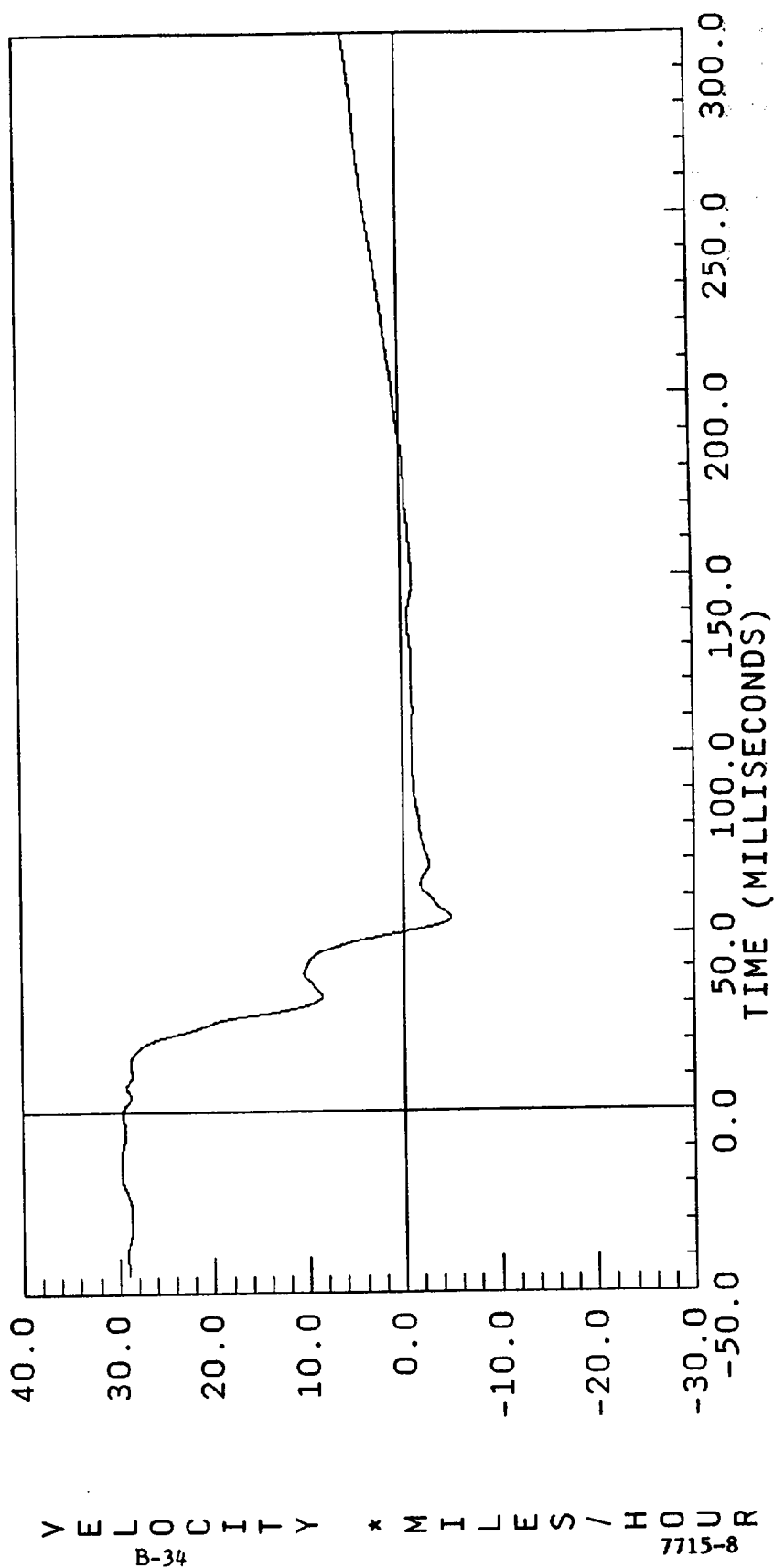
ACC PACK #11(X) XL AXIS
 FILTERED YMIN = -126.2362 at 27.15000
 FILTER CUTOFF: 100HZ YMAX = 27.45685 at 55.80000



V905-27.DAT

29.50 mph

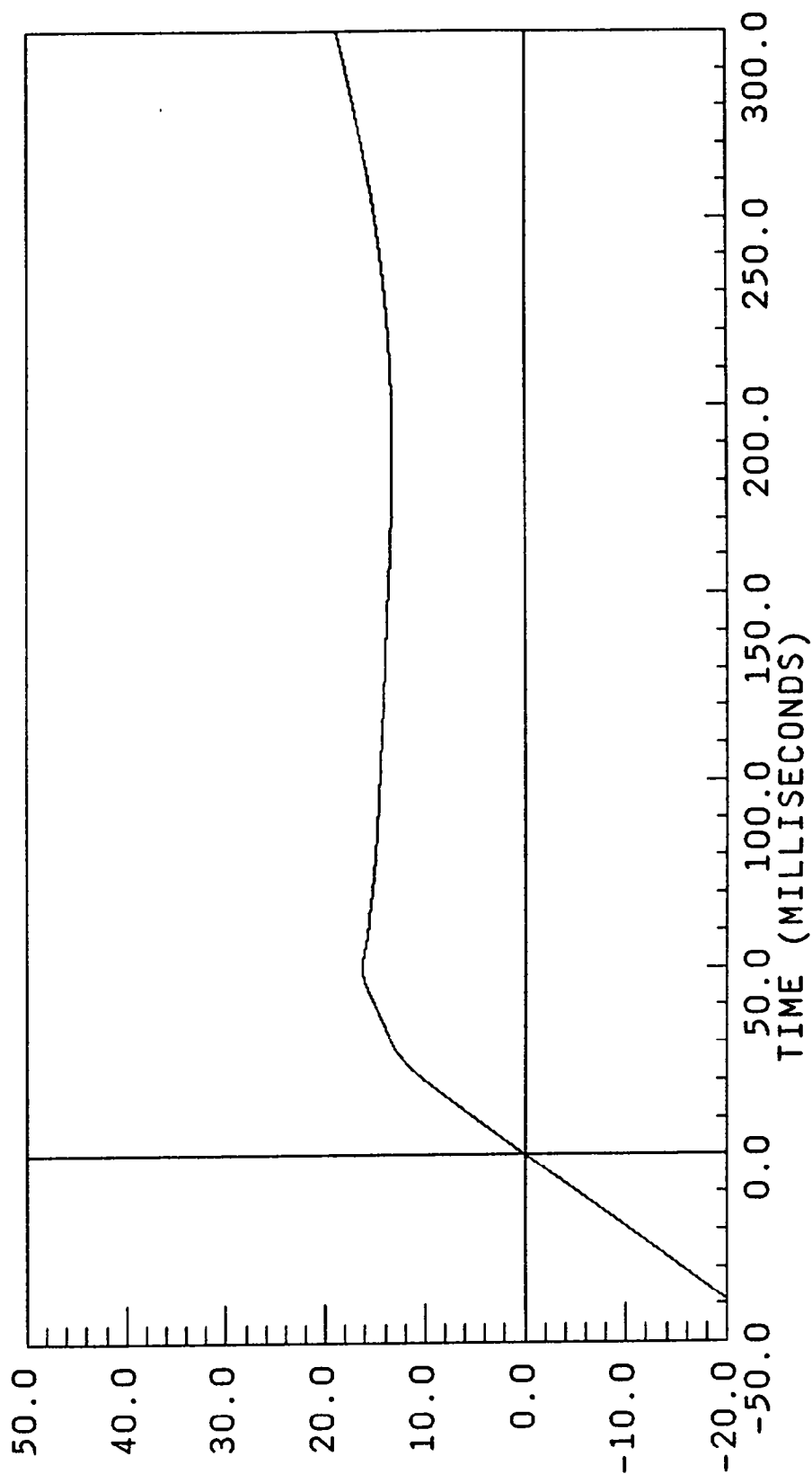
ACC PACK #11(X)
COMPUTED
FILTER CUTOFF: 100HZ
XL AXIS
YMIN = -5.016727 at 54.15000
YMAX = 29.02503 at -16.12500



29.50 mph

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

XL AXIS
YMIN = -23.05679 at 54.15000
YMAX = 18.85312 at 300.0000



DISPLACEMENT * INCHES

TEST NO. CK0202

DUMMY DATA

FILTER CHANNEL CLASS

HEAD ACCELERATIONS

1000

CHEST ACCELERATIONS

180

FEMUR FORCES

600

HEAD INJURY CRITERION
HEAD SEVERITY INDEX
36MS. MAXIMUM DURATION

NHTSA CRASH TEST - PROC. 208

RUN= 905

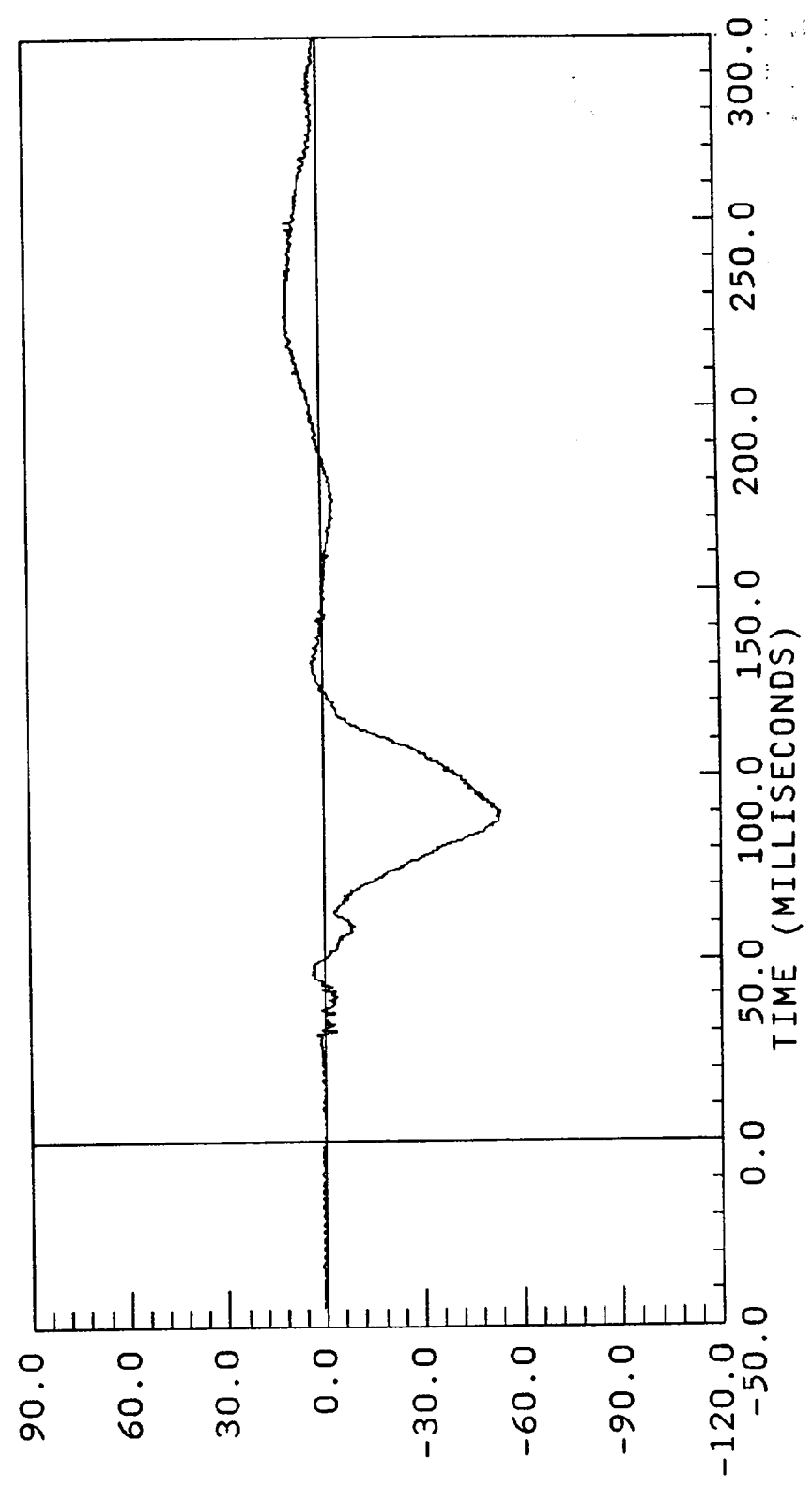
POS#1 HEAD R

HIC= 420.7 FROM T1= .07485 TO T2= .10845
AVERAGE ACCELERATION BETWEEN T1 AND T2= 43 G'S
EVENT TIME= 300.0 MSEC
SEVERITY INDEX= 501.6

UDS\$905-1.DAT

0.00 mph

POS#1 HEAD X
XL AXIS
YMIN = -53.88800 at 89.62500
YMAX = 10.86000 at 224.2500
FILTER CUTOFF: 0Hz



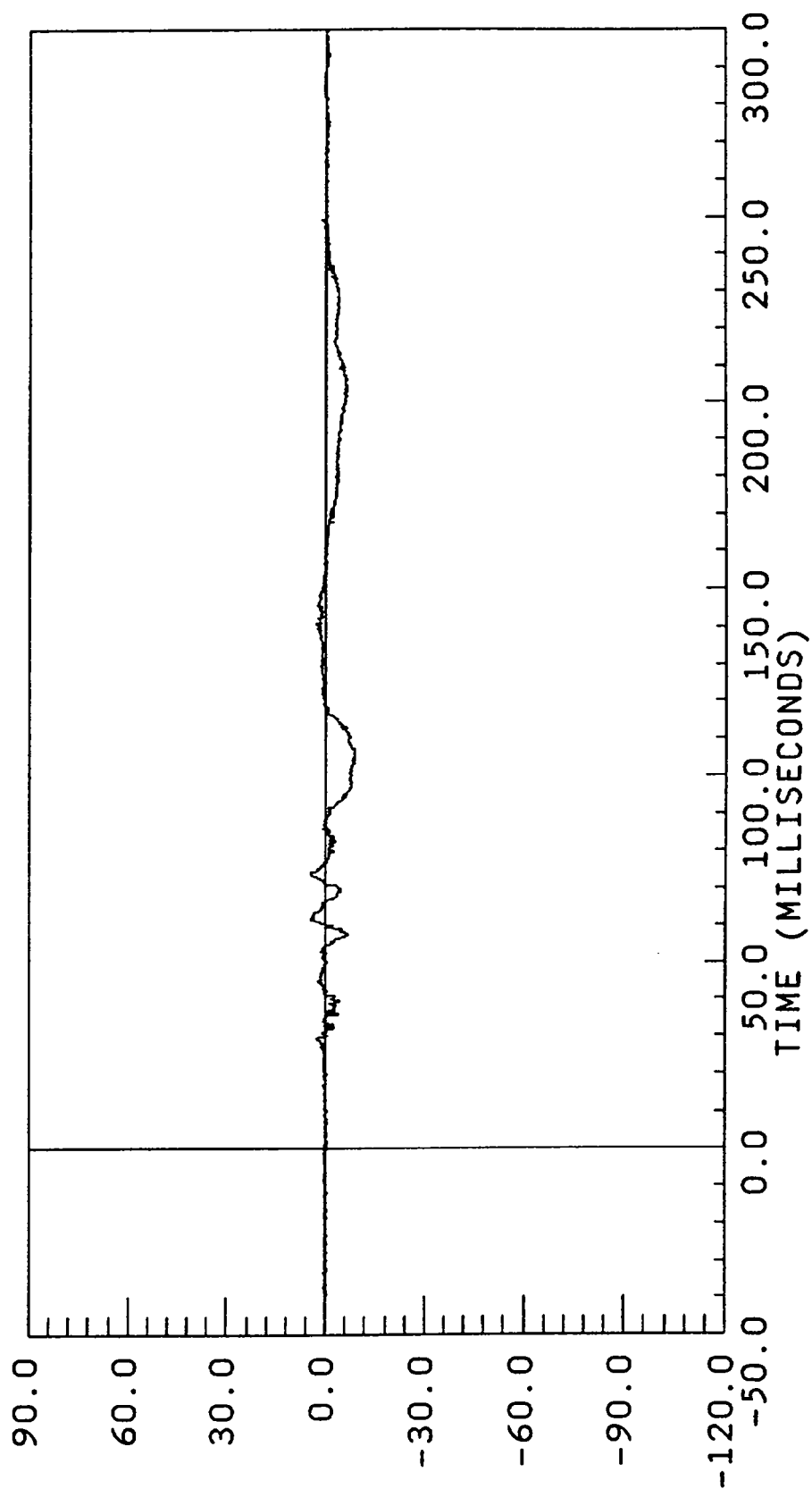
0.00 mph

POS#1 HEAD Y

YL AXIS

YMIN = -8.972000 at 103.5000
YMAX = 4.758300 at 61.42500

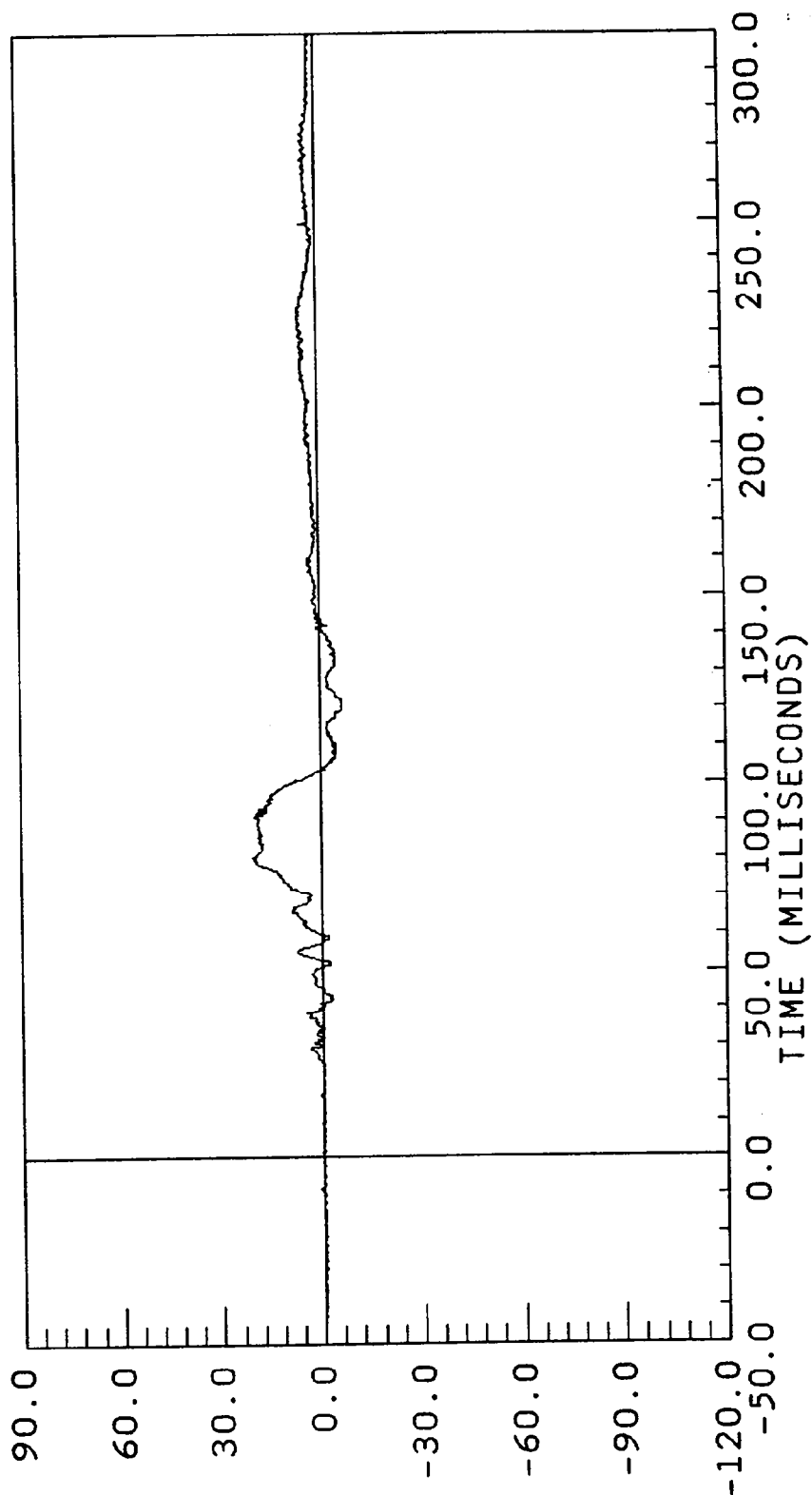
FILTER CUTOFF: 0Hz

ACCELERATION * G, S *
B-39 7715-8

UDS\$905-3.DAT

0.00 mph

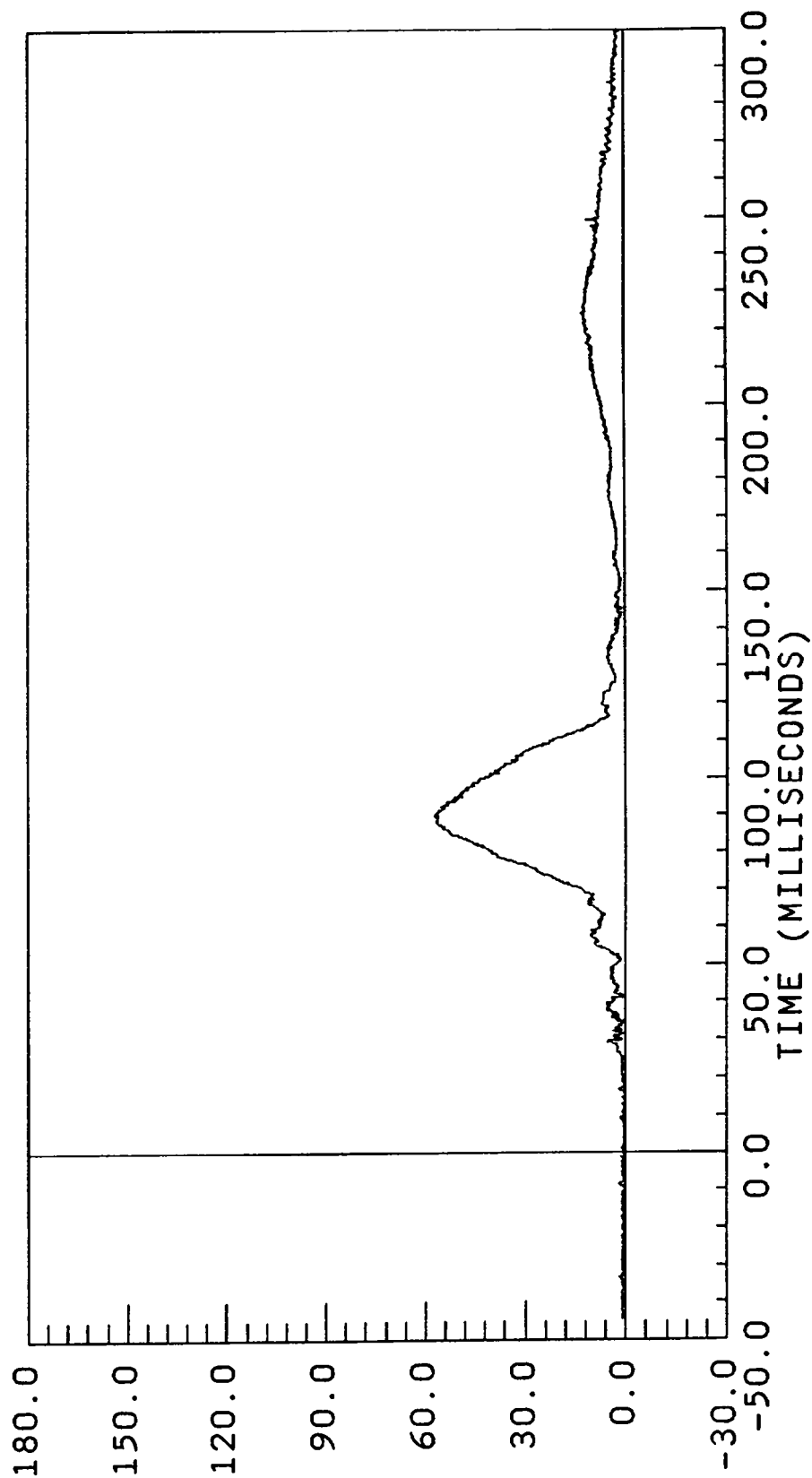
POS#1 HEAD Z ZL AXIS
YMIN = -6.483600 at 119.5500
YMAX = 20.83100 at 80.40000
FILTER CUTOFF: OHZ



ACCELERATION * G * S
B-40 7715-8

0.00 mph

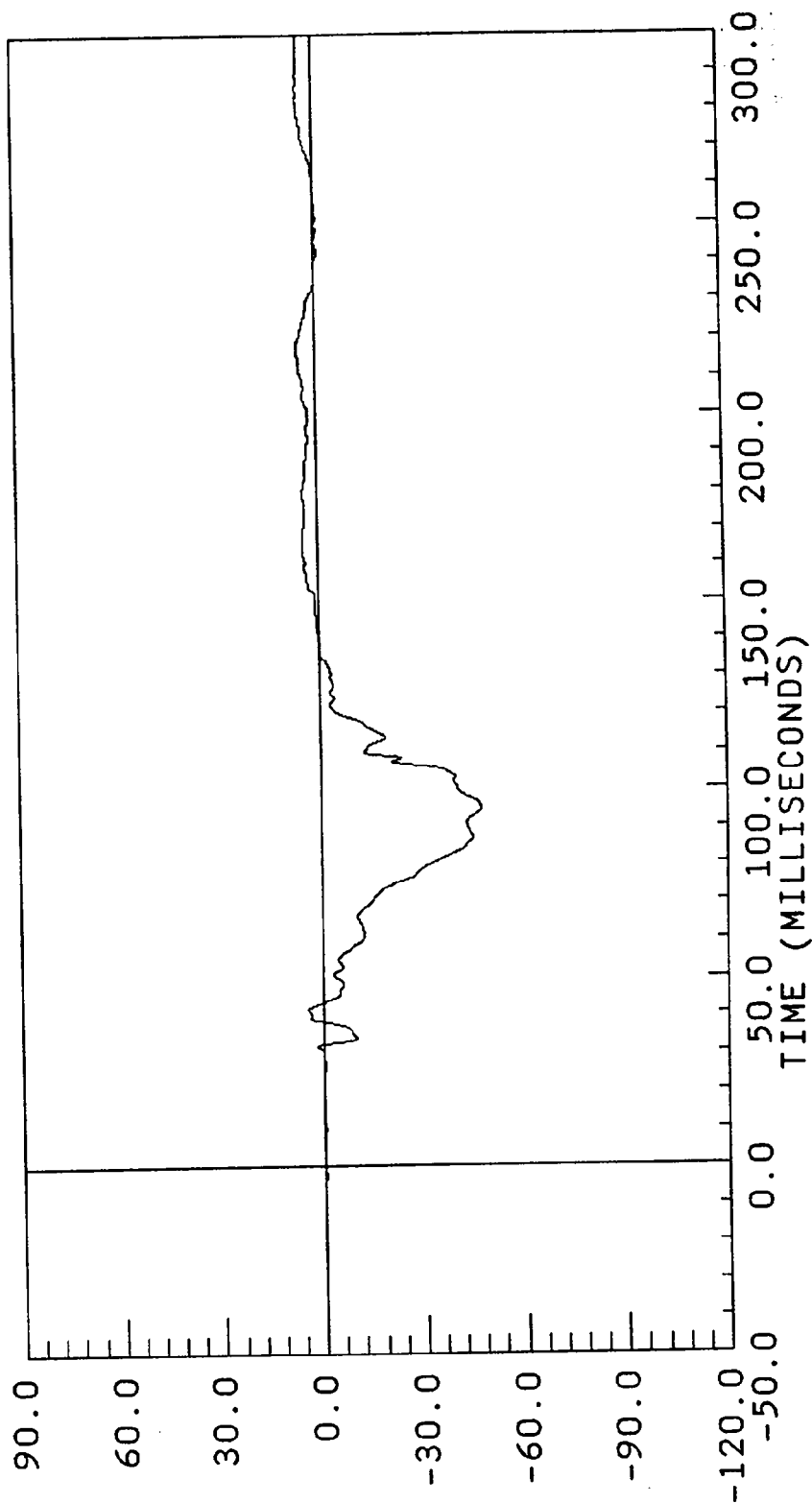
POS#1 HEAD RS AXIS
 NONSTANDARD YMIN = 1.217174 at -9.825001
 FILTER CUTOFF: 0Hz YMAX = 57.27911 at 89.62500



BW905-4.DAT

0.00 mph

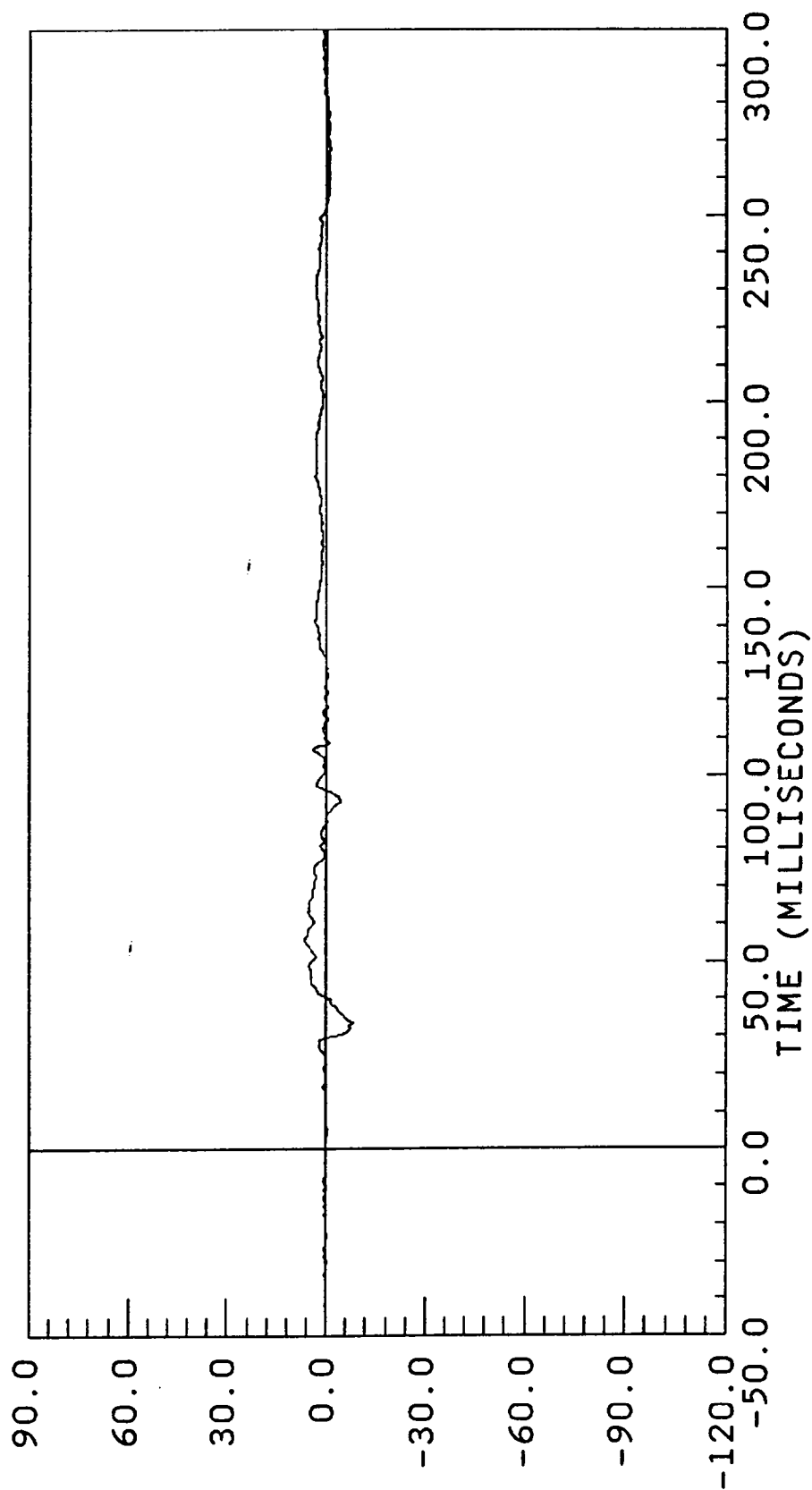
POS#1 CHEST X
FILTERED
FILTER CUTOFF: 300Hz
XL AXIS
YMIN = -47.42661 at 94.65000
YMAX = 5.506116 at 216.6000



ACCELERATION * G * S *
B-42 7715-8

0.00 mph

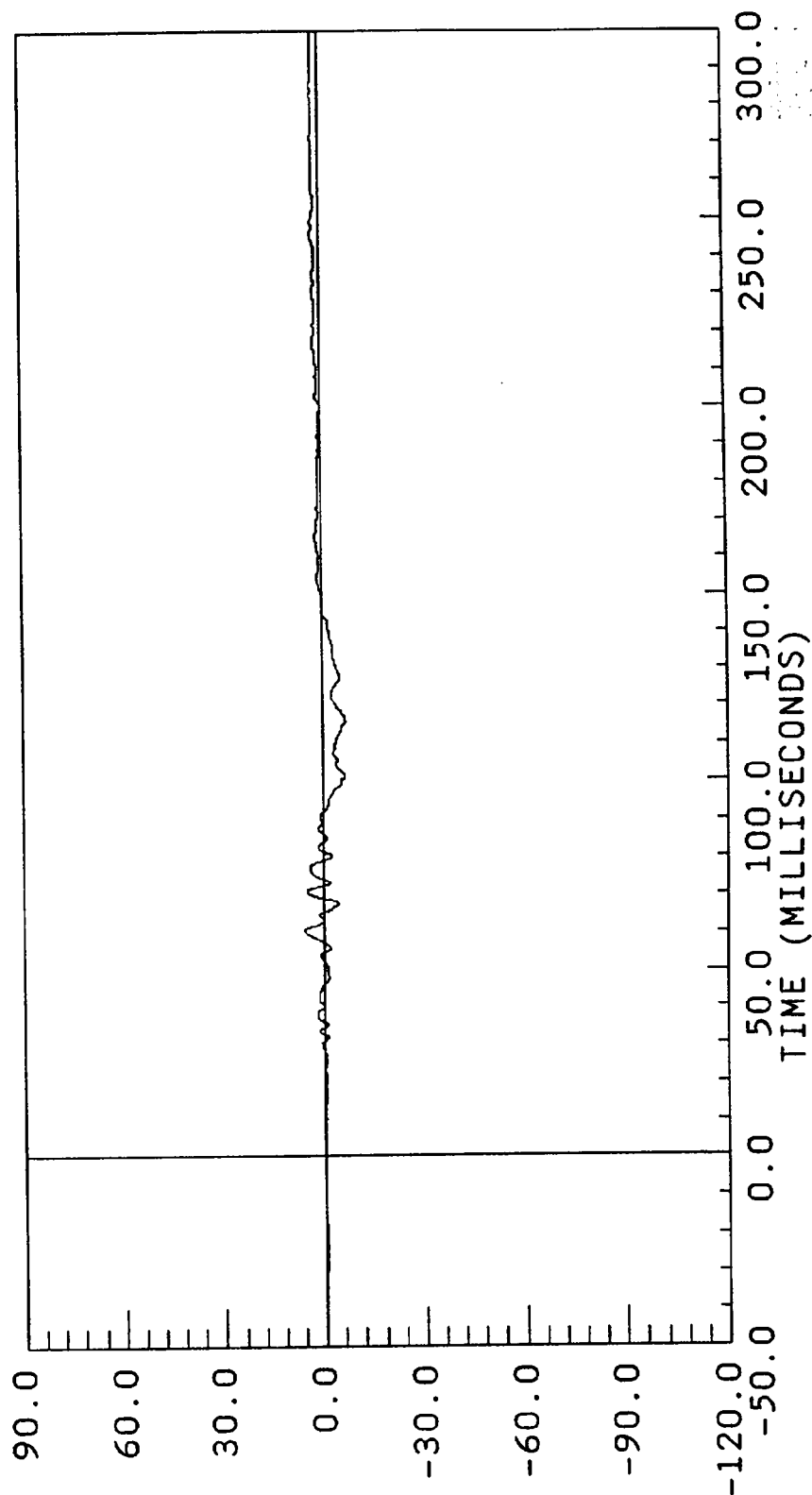
POS#1 CHEST Y
 FILTERED
 FILTER CUTOFF: 300Hz
 YL AXIS
 YMIN = -8.218446 at 33.82500
 YMAX = 6.525038 at 56.02500



BW905-6.DAT

0.00 mph

POS#1 CHEST Z
FILTERED
FILTER CUTOFF: 300Hz
ZL AXIS
YMIN = -6.747516 at 115.5000
YMAX = 5.847358 at 60.37500

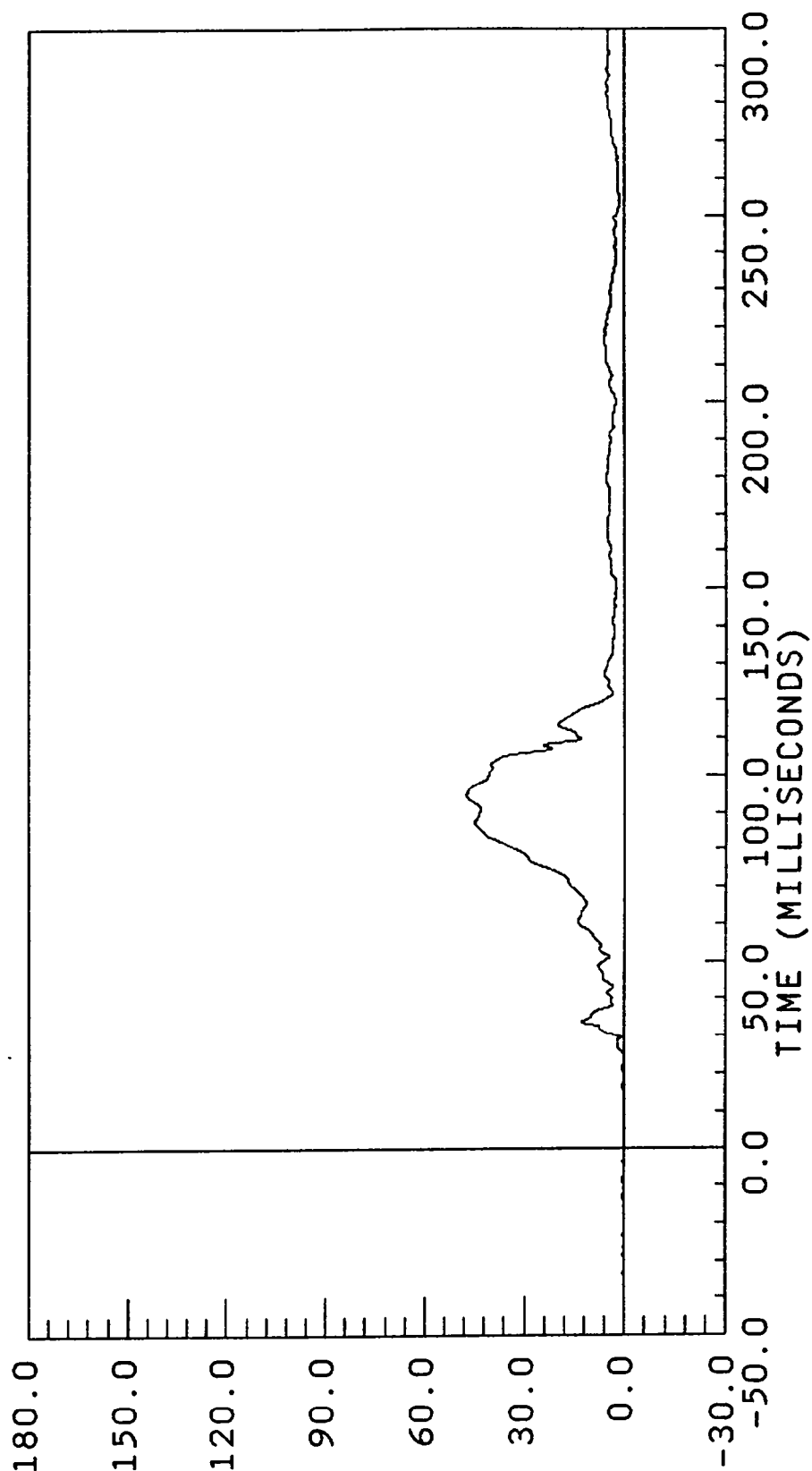


CHST905-1.DAT

0.00 mph

POS#1 CHEST
COMPUTED
FILTER CUTOFF: 300Hz

RS AXIS
YMIN = 0.0121251 at 2.325000
YMAX = 47.53018 at 94.57500



ACCELERATION * G, S *

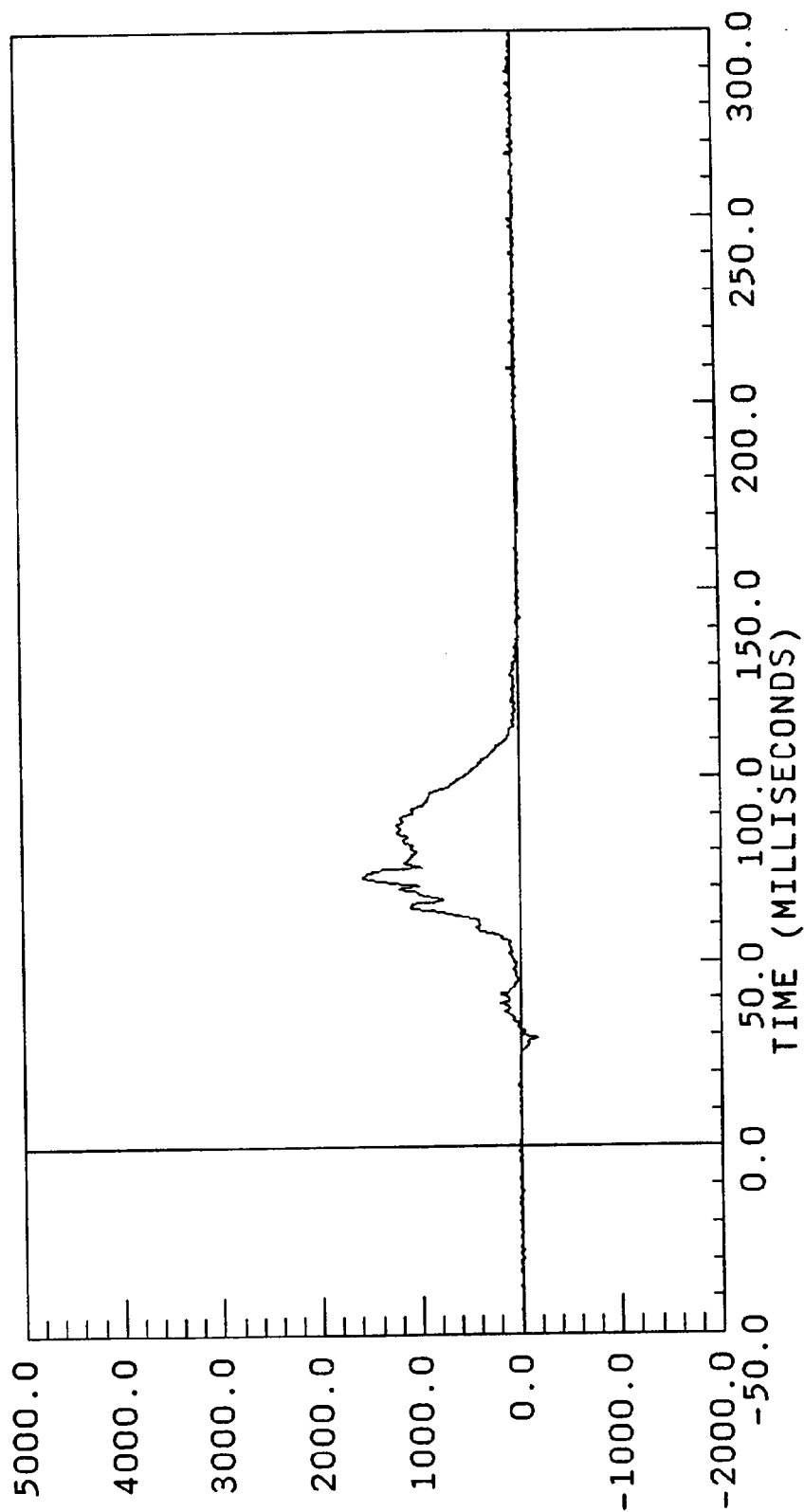
B-45

7715-8

BW905-7.DAT

0.00 mph

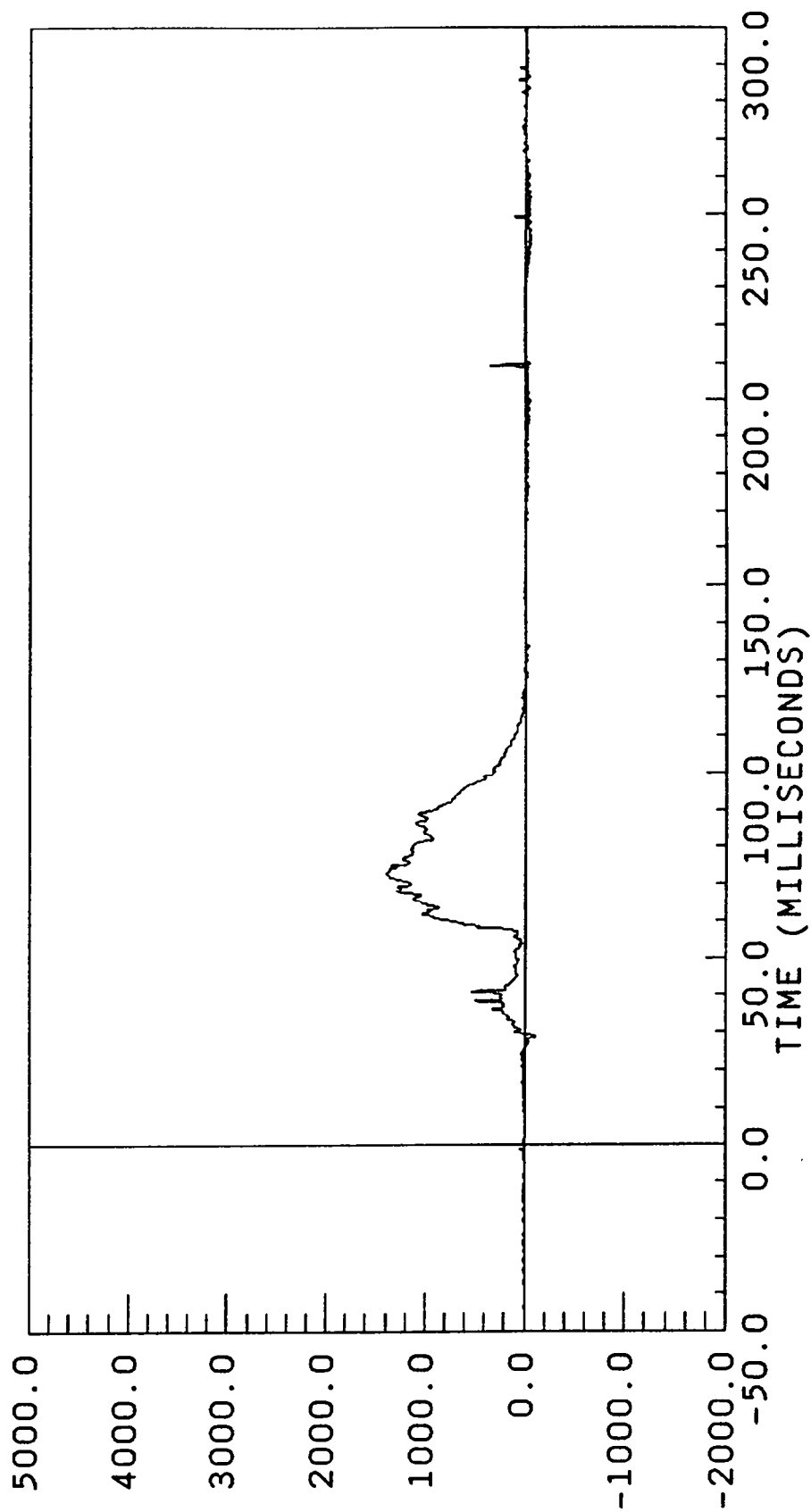
POS#1 LEFT FEMUR
FILTERED
FILTER CUTOFF: 1000HZ
NA AXIS
YMIN = -164.3569 at 29.25000
YMAX = 1572.180 at 72.82500



FORCE * LBS *

0.00 mph

POS#1 RIGHT FEMUR
 FILTERED
 FILTER CUTOFF: 1000Hz
 NA AXIS
 YMIN = -106.0761 at 28.95000
 YMAX = 1391.003 at 72.90000



HEAD INJURY CRITERION
HEAD SEVERITY INDEX
35MS. MAXIMUM DURATION

NHTSA CRASH TEST - PROC. 208

PUN= 905

POS#2 HEAD R

HIC= 305.1 FROM T1= .07305 TO T2= .09352
AVERAGE ACCELERATION BETWEEN T1 AND T2= 46.7G'S
EVENT TIME= 300.0 MSEC
SEVERITY INDEX= 479.5

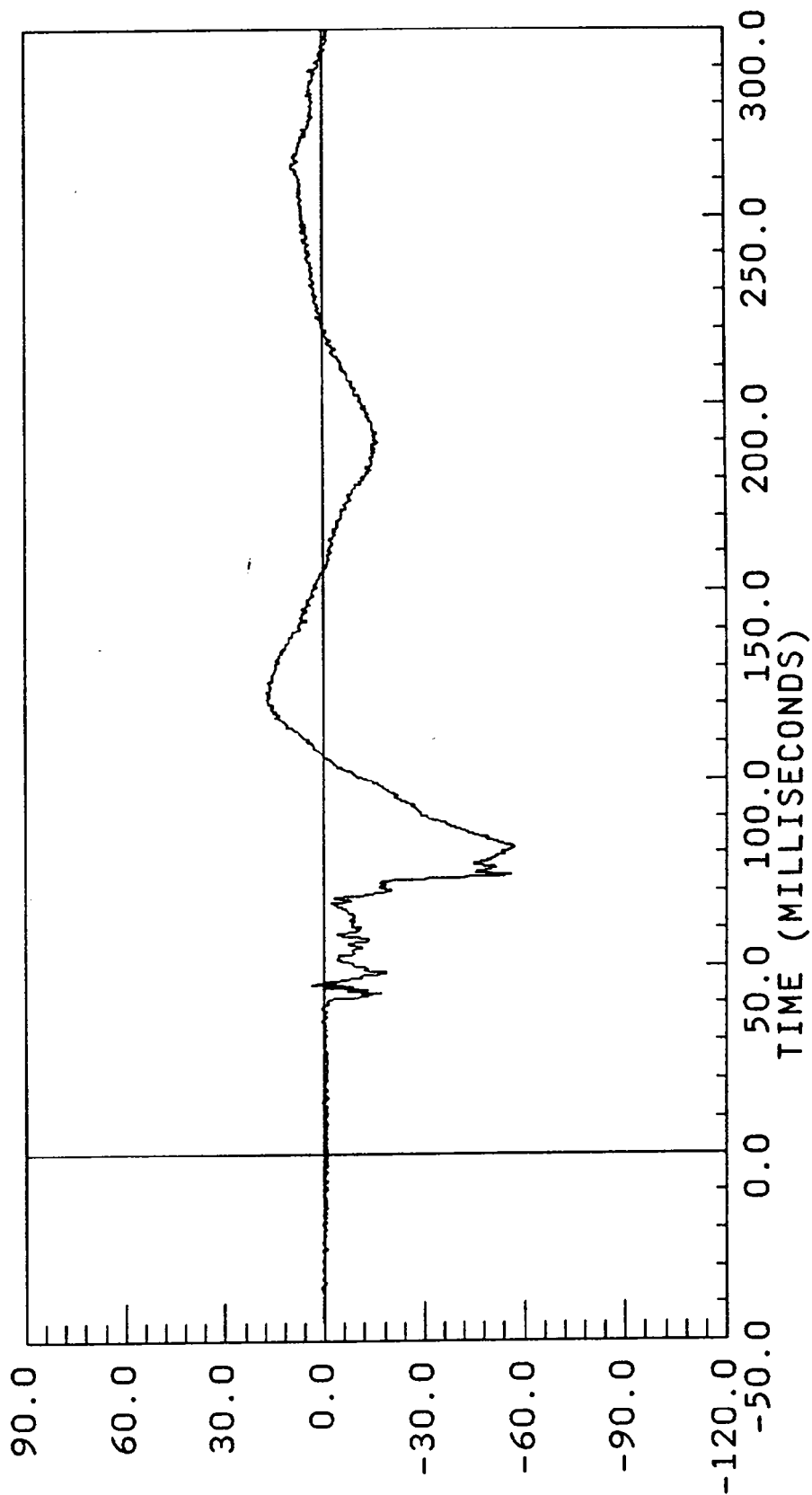
0.00 mph

POS#2 HEAD X

XL AXIS

YMIN = -57.18900 at 81.52500
YMAX = 17.34400 at 121.3500

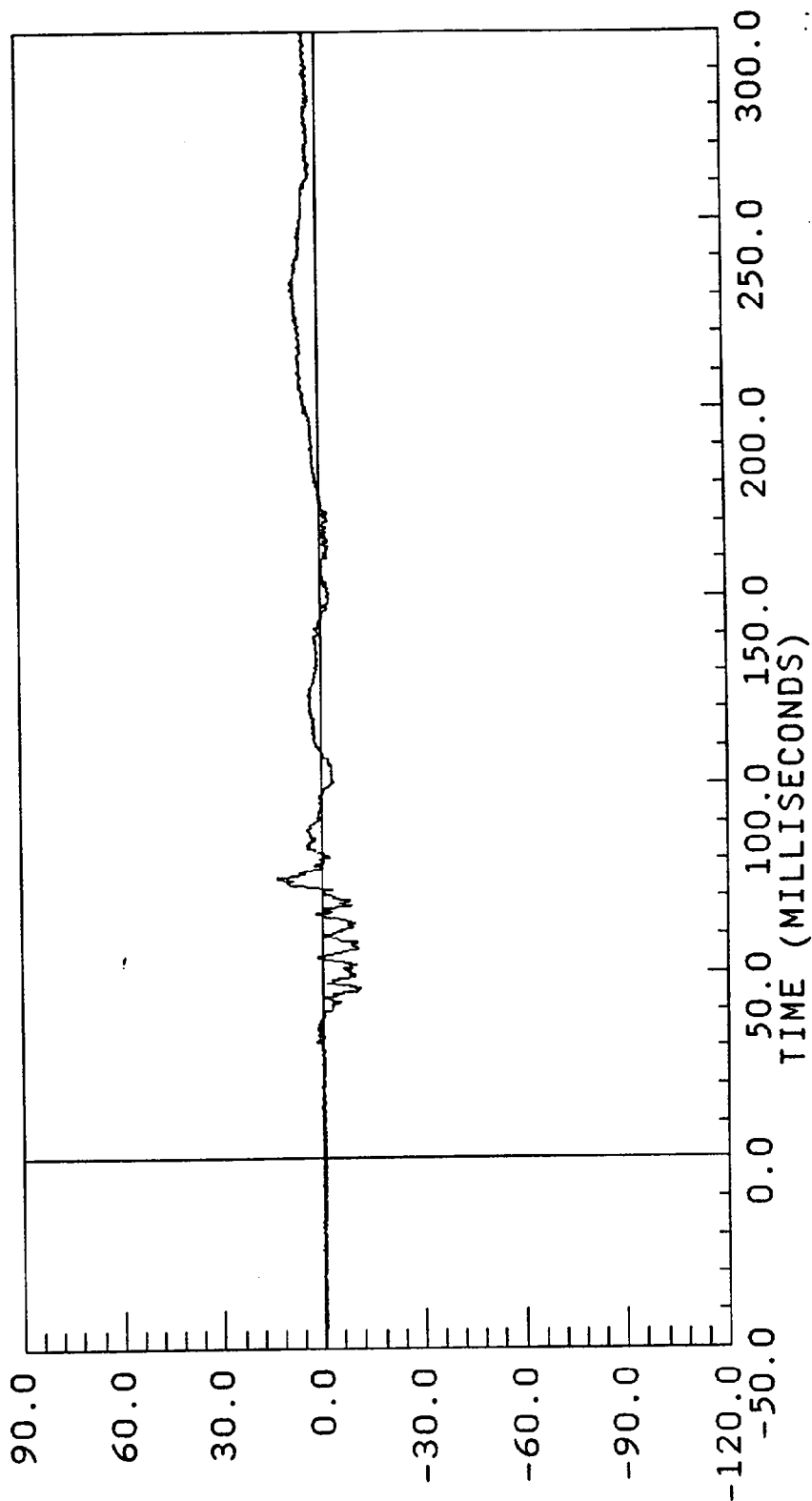
FILTER CUTOFF: 0HZ



UDS\$905-12.DA

0.00 mph

POS#2 HEAD Y
YL AXIS
YMIN = -11.30500 at 45.67500
YMAX = 13.36900 at 75.07500
FILTER CUTOFF: 0HZ



ACCELERATION * G, S *
B-50 7715-8

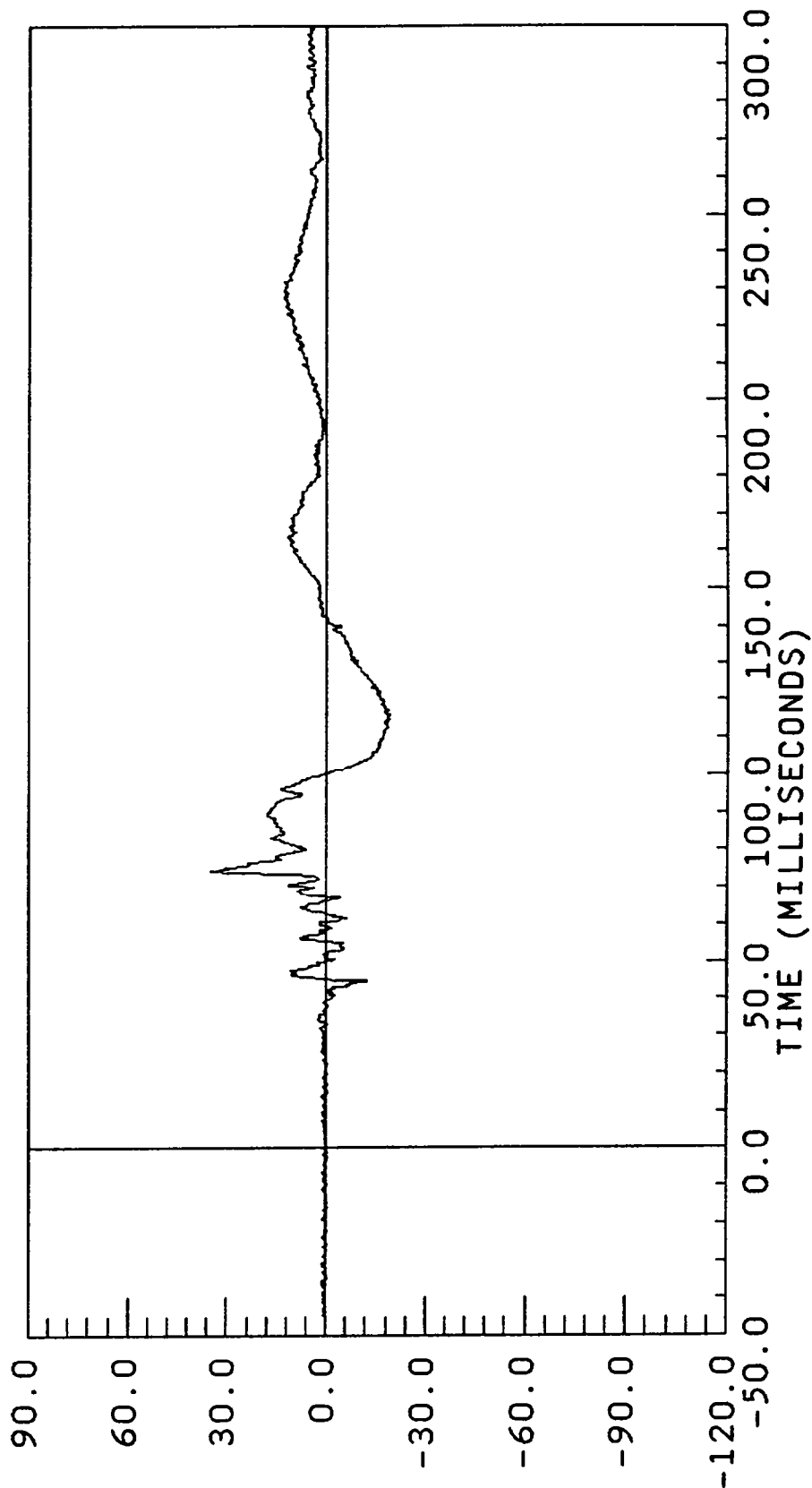
0.00 mph

POS#2 HEAD Z

ZL AXIS

YMIN = -19.16400 at 114.8250
YMAX = 35.39100 at 74.47501

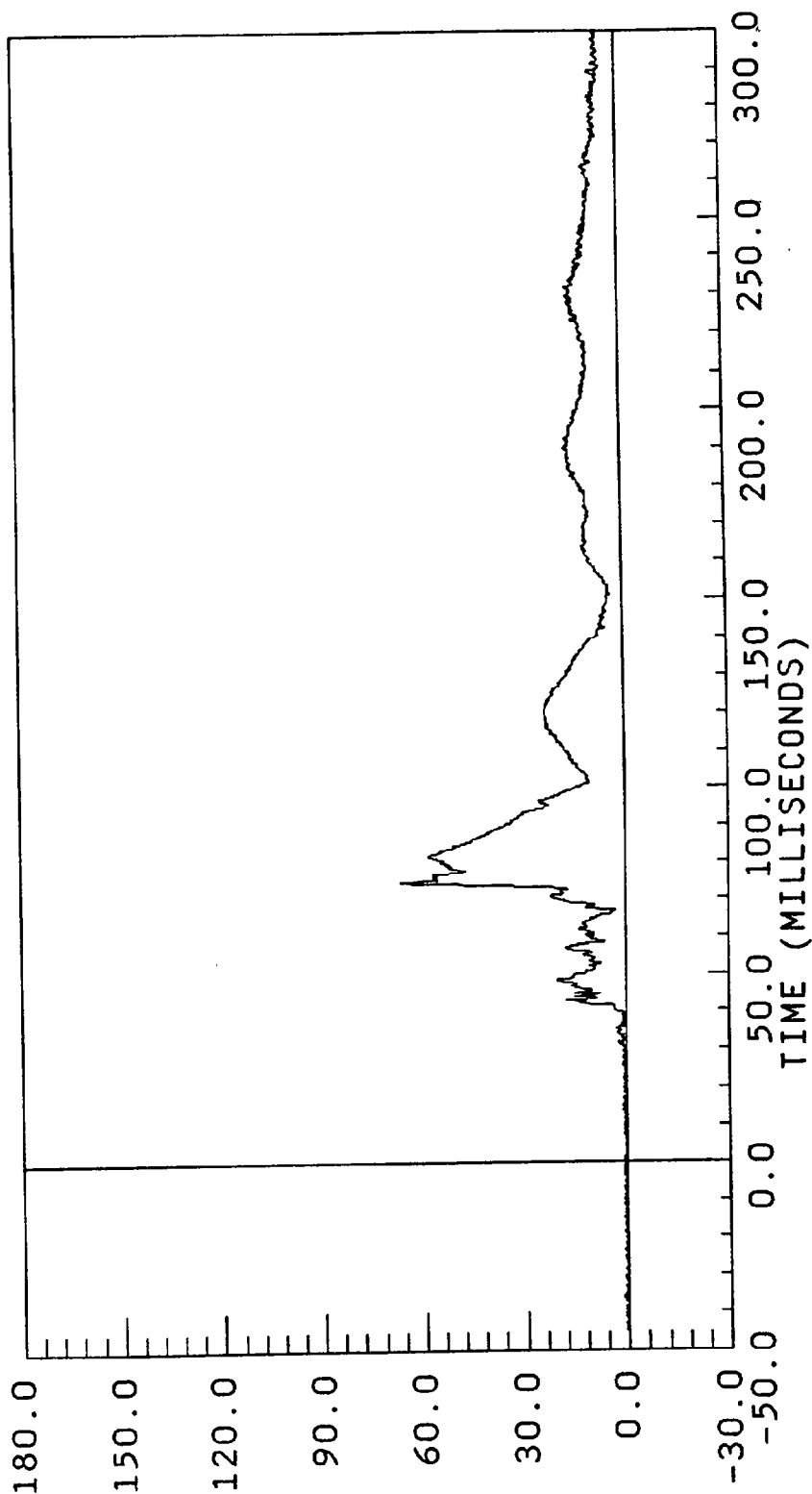
FILTER CUTOFF: 0Hz



HRES905-2.DAT

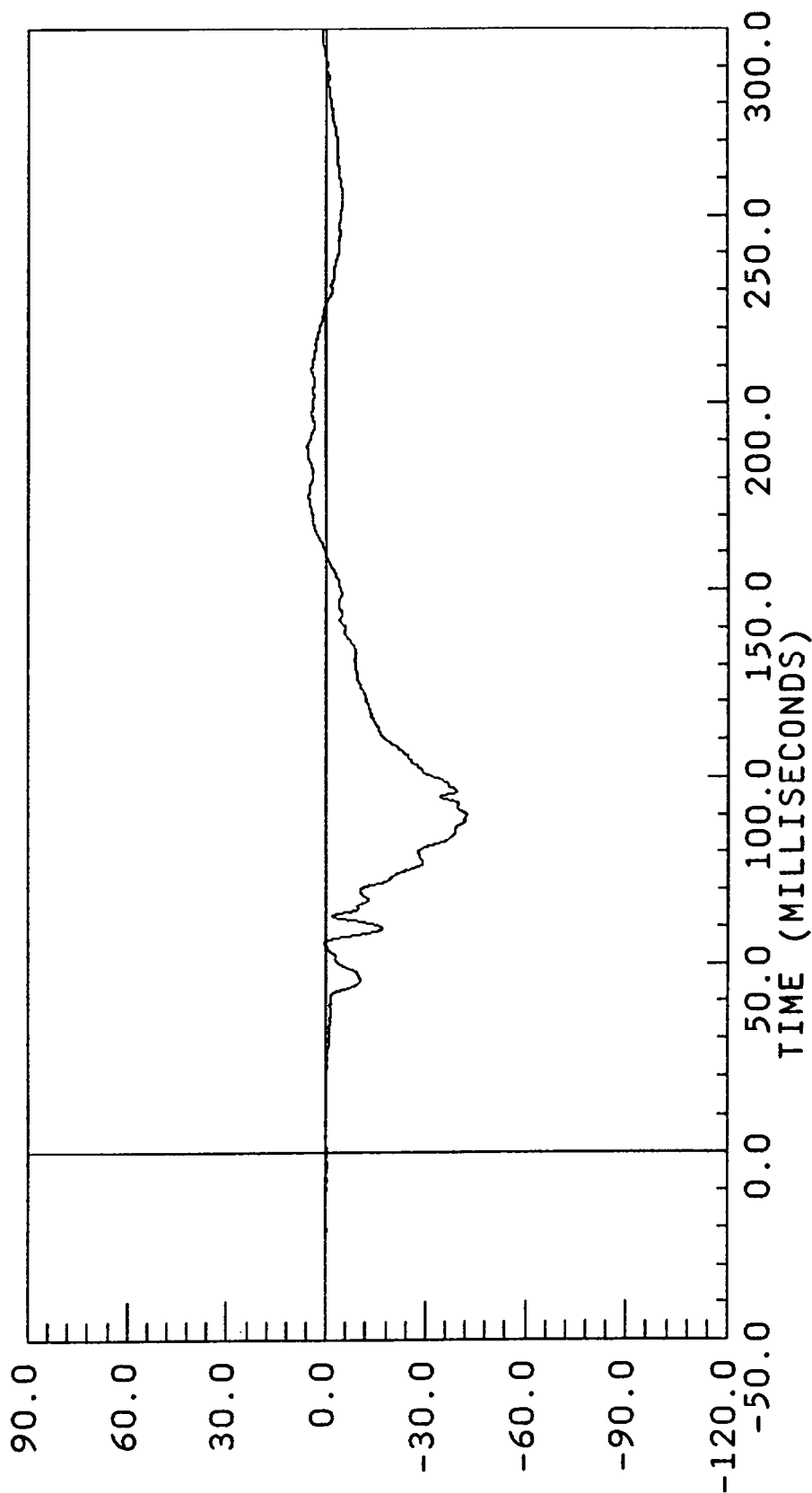
0.00 mph

POS#2 HEAD RS AXIS
NONSTANDARD YMIN = 1.141359 at -44.70000
FILTER CUTOFF: OHZ YMAX = 67.04198 at 74.47501



0.00 mph

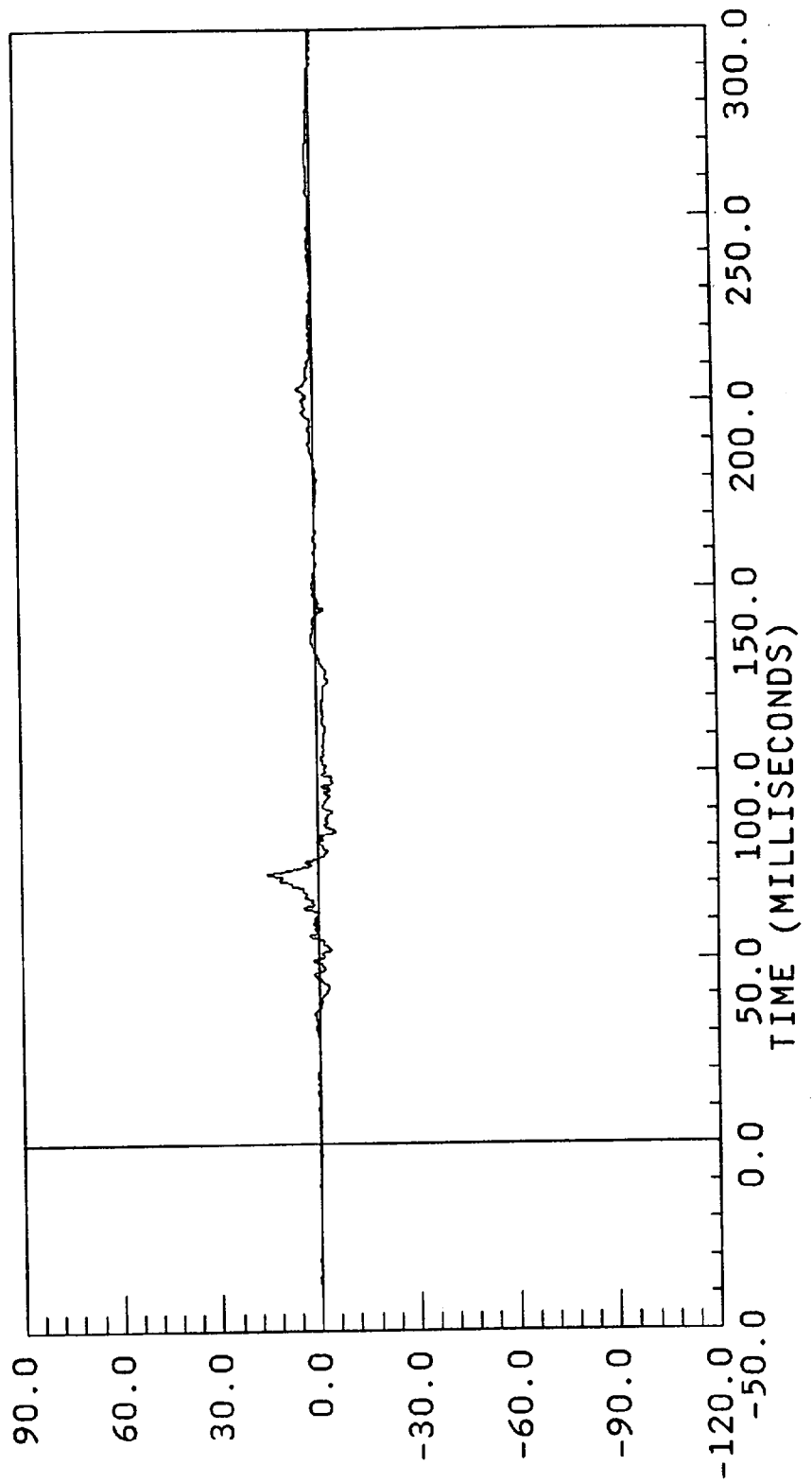
POS#2 CHEST X
 FILTERED
 FILTER CUTOFF: 300Hz
 XL AXIS
 YMIN = -42.33593 at 89.92500
 YMAX = 5.766411 at 188.4750



BW905-15.DAT

0.00 mph

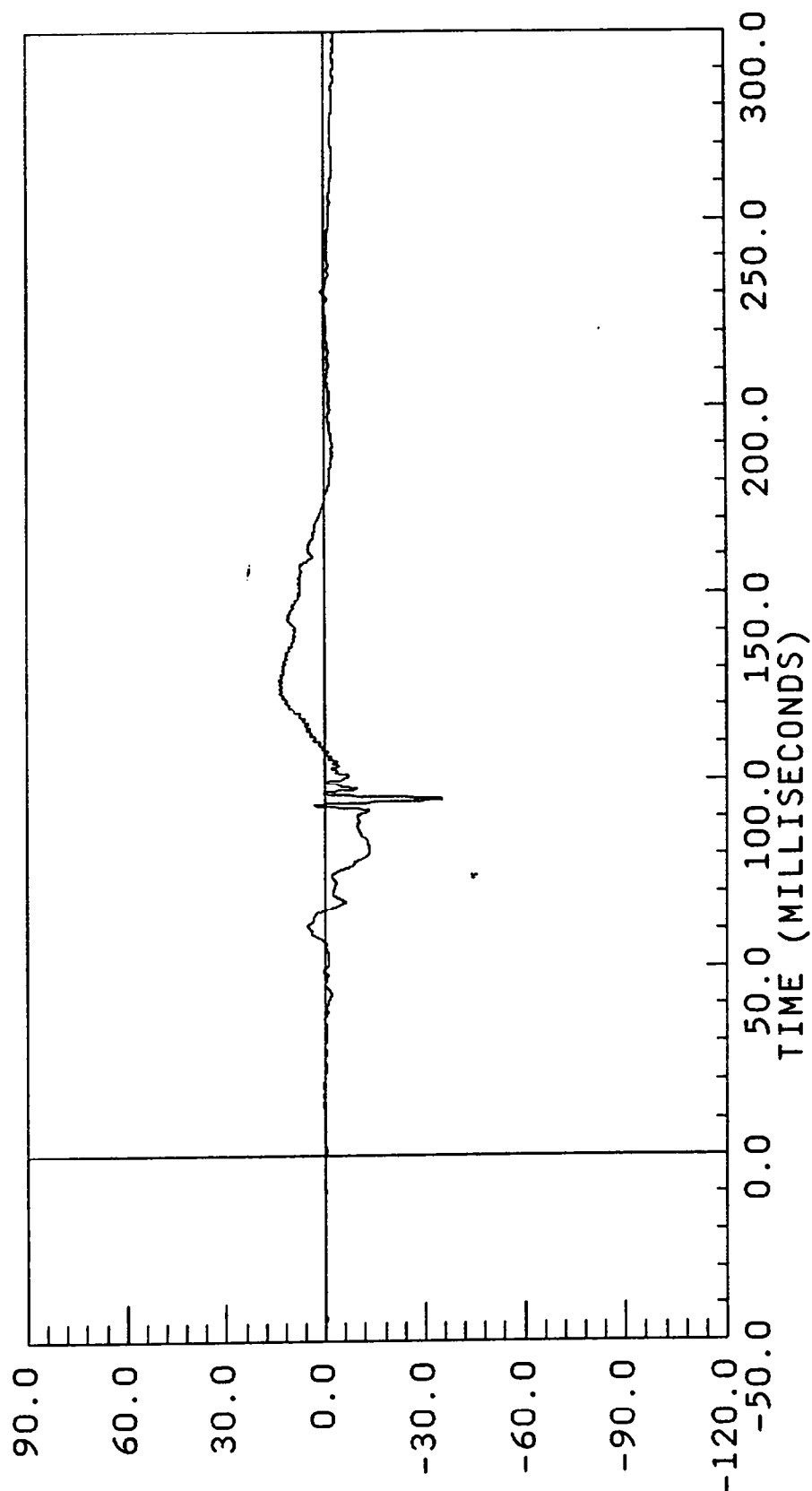
POS#2 CHEST Y
FILTERED
FILTER CUTOFF: 300HZ
YL AXIS
YMIN = -5.448463 at 84.45000
YMAX = 15.22762 at 72.52500



ACCELERATION * G, S
B-54 7715-8

0.00 mph

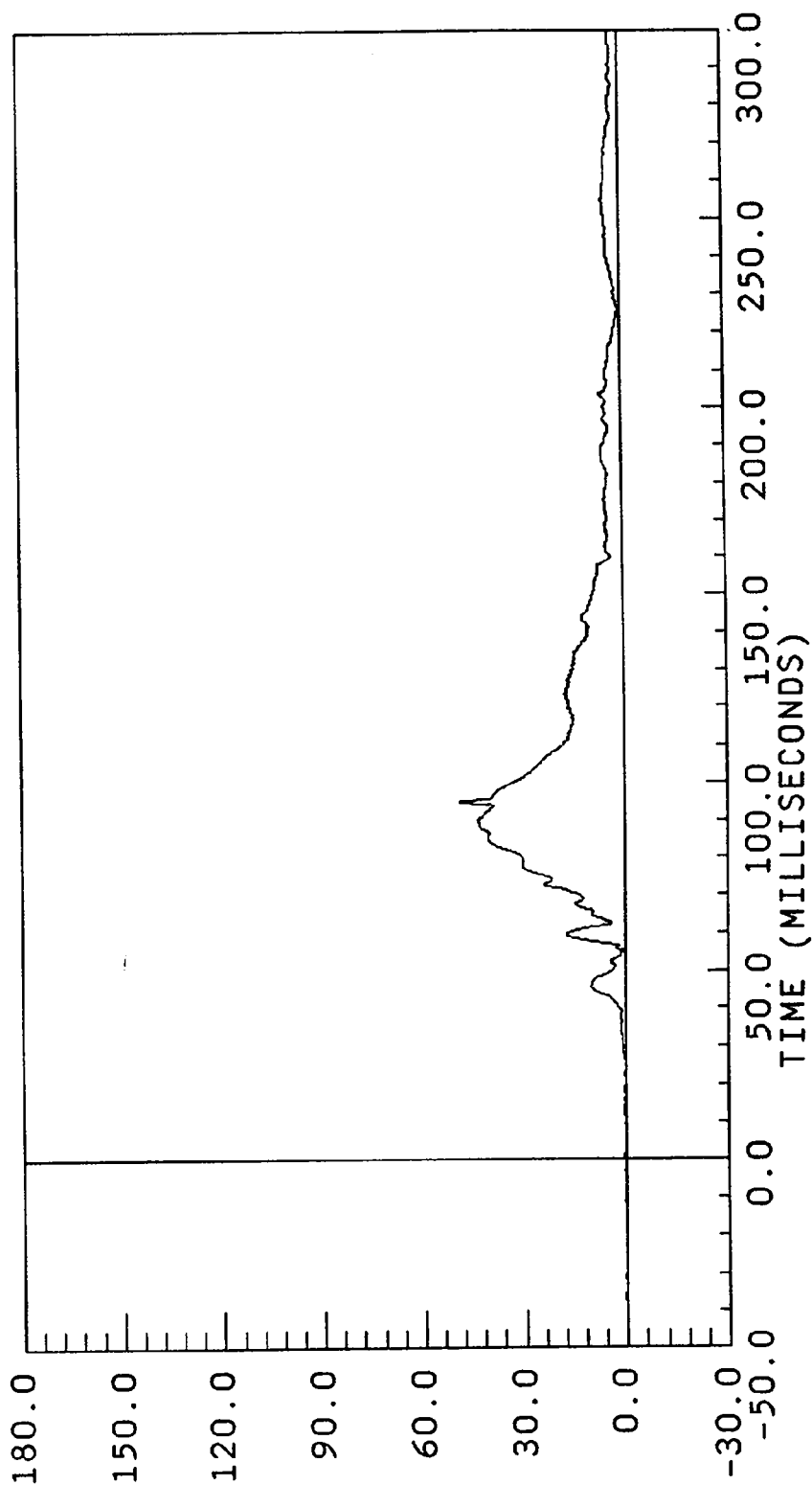
POS#2 CHEST Z
 FILTERED
 FILTER CUTOFF: 300Hz
 ZL AXIS
 YMIN = -35.42478 at 94.80000
 YMAX = 13.82983 at 124.5000



CHST905-2.DAT

0.00 mph

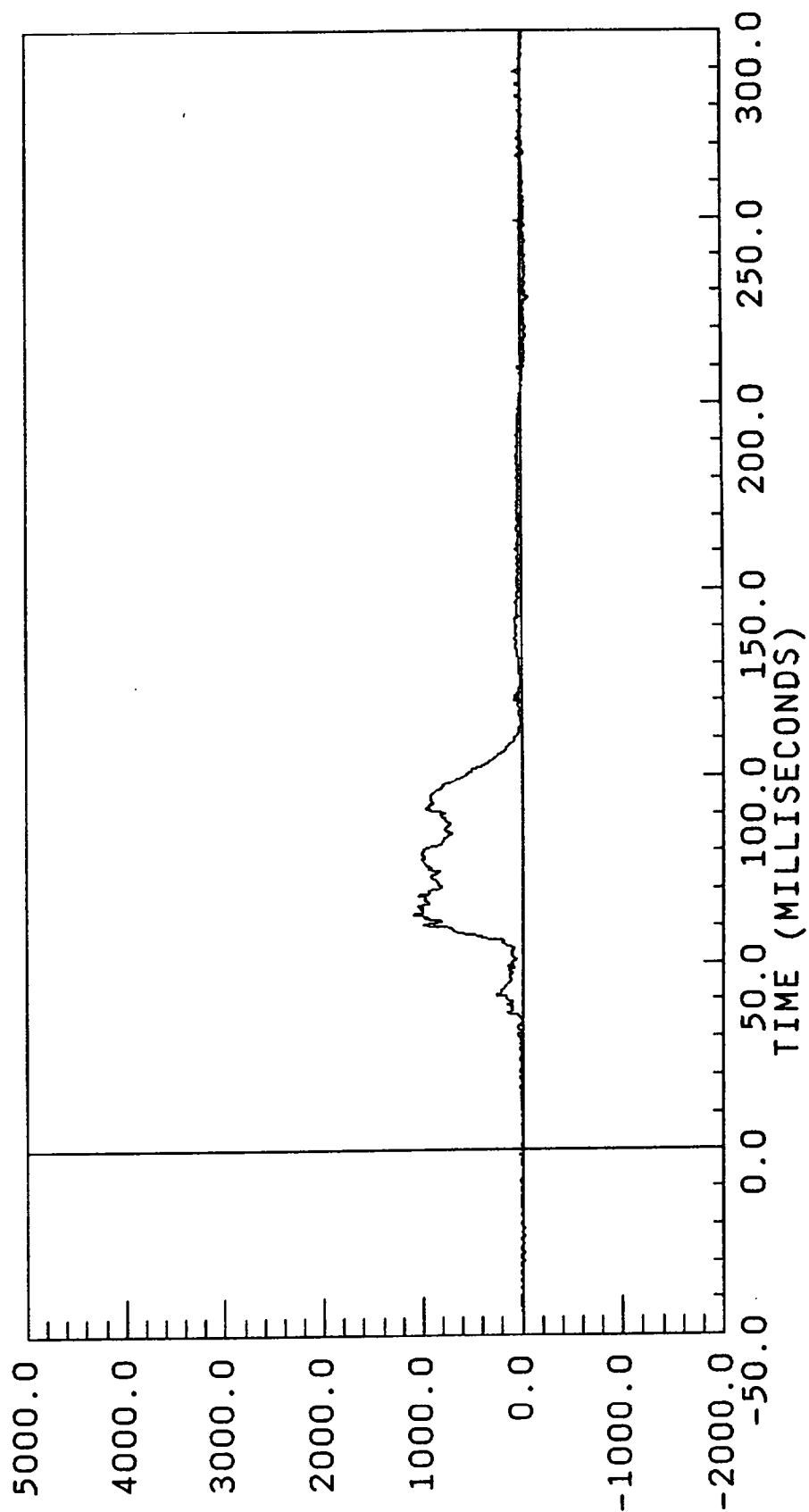
POS#2 CHEST
COMPUTED
FILTER CUTOFF: 300HZ
RS AXIS
YMIN = 0.0371703 at 94.80000
YMAX = 49.26877 at 94.80000



ACCELERATION * G, S *
B-56 7715-8

0.00 mph

POS#2 LEFT FEMUR
 FILTERED
 FILTER CUTOFF: 1000Hz
 NA AXIS
 YMIN = -89.92239 at 228.4500
 YMAX = 1100.061 at 63.07500

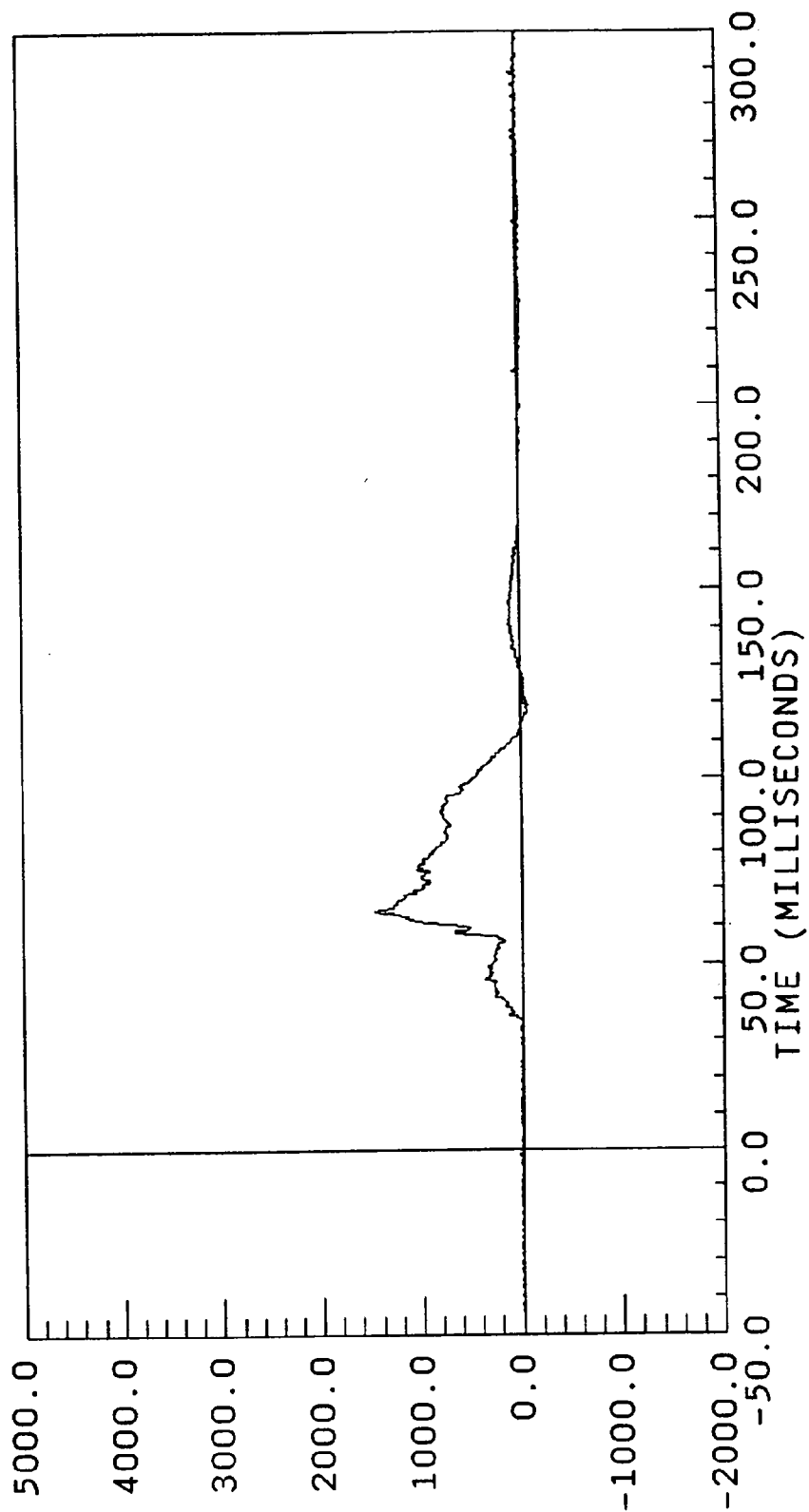


* L B S *

BW905-10.DAT

0.00 mph

POS#2 RIGHT FEMUR
FILTERED
FILTER CUTOFF: 1000Hz
NA AXIS
YMIN = -81.25607 at 119.7000
YMAX = 1468.205 at 63.82500



F O R C E * L B S *

Appendix C

VEHICLE OWNERS MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

BEFORE DRIVING YOUR VEHICLE

Safety Belt Maintenance

Safety belt assemblies should be periodically inspected to assure that they have not become damaged and that they remain in proper operating condition, particularly if they have been subjected to severe stress.

WARNING — All safety belt assemblies including retractors and attaching hardware should be inspected after any collision. Ford recommends that all safety belt assemblies in use during a collision be replaced unless the collision was minor and a qualified technician finds that the belts show no 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.

SUPPLEMENTAL AIR BAG RESTRAINT SYSTEM (SRS)

What is the Supplemental Air Bag System?

Your vehicle is equipped with two air bags, one for the driver and the other for the right front seat passenger. These air bags are a supplemental restraint system because they are designed to be used with safety belts to give you greater protection against head and chest injuries than safety belts alone.

WARNING — Safety belts must be worn by all vehicle occupants to reduce the risk of injury in an accident.

Why Must Safety Belts Be Worn?

There are four very important reasons to use safety belts with your air bags. First, safety belts help to keep occupants in proper position when the air bags inflate. Second, safety belts reduce the risk of harm in rollover, side or rear impact accidents where air bags are not designed to inflate. Third, air bags only deploy in moderate to

BEFORE DRIVING YOUR VEHICLE

severe frontal collisions. Safety belts reduce the risk of harm in less severe frontal crashes as well. Fourth, safety belts reduce the risk of ejection, and thereby reduce the risk of harm.

WARNING — The supplemental air bags are not designed to protect occupants in the center front seating position.

Importance of Proper Seated Position

In an accident, air bags must inflate very rapidly to reduce the risk of injury to occupants. They therefore inflate with considerable force. If front occupants are not seated in a normal riding position with their backs against the seat backs, the effectiveness of the air bag is likely to be substantially reduced and the force of the inflating air bag could cause serious injury.

WARNING — Front passengers, especially children and small adults, should never sit on the edge of the seat, stand near the glove compartment of the instrument panel, or lean over with their faces near the glove compartment when the vehicle is moving. All occupants should sit with their back against the seat back and use the safety belts. Children below 40 lbs. should use child or infant seats. Forward facing child seats must have the passenger seat moved as far back from the instrument panel as possible. **REAR FACING INFANT SEATS SHOULD NEVER BE USED IN THE FRONT SEAT, BECAUSE THE FORCE OF THE RAPIDLY INFLATING PASSENGER AIR BAG WOULD PUSH THE TOP OF THE REAR FACING SEAT AGAINST THE VEHICLE SEAT BACK OR CENTER ARM RESTS. WE RECOMMEND THAT REAR FACING INFANT SEATS BE PLACED IN THE REAR SEAT.**

BEFORE DRIVING YOUR VEHICLE

WARNING — Do not put objects in front of the air bags' storage areas that might restrict their inflation or that might increase personal injury.

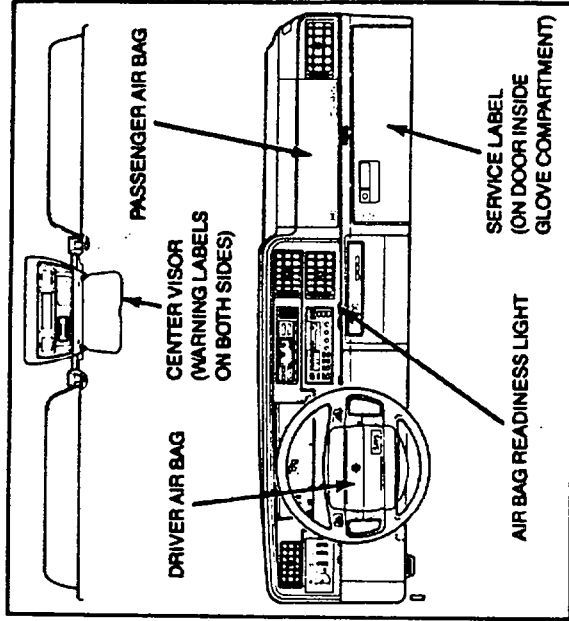
How Does the Supplemental Air Bag System Operate?

The supplemental air bag system consists primarily of two basic sub-systems: the supplemental air bag system, with supplemental driver and passenger side air bags and inflators; and the electrical system, including impact sensors and diagnostic module. The supplemental driver air bag is mounted in the center of the steering wheel. The right front seat supplemental passenger air bag is mounted in the instrument panel above the glove compartment. The diagnostic module monitors the supplemental air bag electrical system readiness, including the five crash sensors and wiring connecting them to the module, readiness light, air bag power, and supplemental air bags.

The supplemental air bag system uses a readiness light and a tone generator to indicate system readiness. The readiness light is located on the center of the instrument panel ledge. When the ignition key is turned to the ON position, this light will illuminate for 6-8 seconds, then turn off, indicating normal system operation. A system malfunction is indicated by the flashing or continuous illumination of the readiness light, failure of the light to illuminate, or by a series of beeping sounds. If any of these conditions exists, the supplemental air bag system is in need of service. See your Ford or Lincoln-Mercury dealer immediately.

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BEFORE DRIVING YOUR VEHICLE



Tone Generator

The supplemental air bag readiness lamp is the prime means of indicating air bag system condition. However, a series of five sets of five beeps will be heard only if the readiness lamp circuit is out and a fault occurs in the air bag system. This also means that the Supplemental Air Bag Restraint System (SRS) is in need of service. The tone pattern will repeat (five sets of five beeps) periodically until the fault and lamp outage are serviced. Unless serviced, the Supplemental Air Bag Restraint System may not function properly in the event of an accident.

WARNING — Do not attempt any servicing, repair, or modification of the Supplemental Air Bag Restraint System; tampering could cause activation of the system and the risk of personal injury. For servicing of the Supplemental Air Bag Restraint System, see your Ford or Lincoln-Mercury dealer.

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BEFORE DRIVING YOUR VEHICLE

Inflation

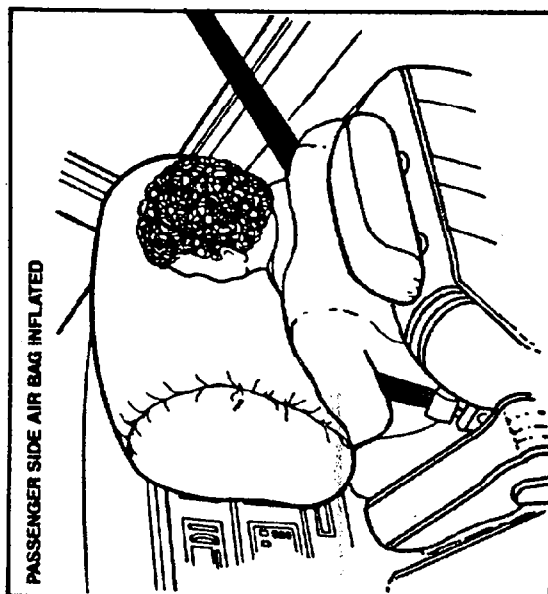
The supplemental air bag system is designed to stay out of sight until activated in accidents more severe than hitting a parked car of similar size and weight head-on at about 25 mph. In such a collision, the driver and right front seat passenger are thrown forward against the safety belts. After receiving a signal from the crash sensors, the supplemental air bags inflate in about 50 milliseconds. Upon inflation in frontal and front-angled collisions at certain speeds, the nylon air bags help to reduce the impact forces to the head and chest, then deflate within seconds after contact by the occupants. The forward motion of the occupants is thereby slowed by both the safety belts and the supplemental air bags.

NOTE — Several air bag system components get hot after inflation. Do not try to touch them after inflation.



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BEFORE DRIVING YOUR VEHICLE



Report Air Bag Inflation

If you are involved in an accident that results in an inflation of the supplemental air bags, Ford Motor Company would appreciate your cooperation in reporting the inflation to the Accident Investigation Team. To report, please call Ford Motor Company by calling "collect" (313) 337-8040.

WARNING — The air bag modules will inflate only once. The system is designed to function on a one-time-only basis. If the air bags are inflated, **THE AIR BAG MODULES WILL NOT FUNCTION AGAIN AND MUST BE REPLACED IMMEDIATELY**. If the air bag is not replaced, the storage area will increase the risk of injury in a collision.

Disposal Of Air Bag Equipped Vehicles

For disposal of air bags or air bag equipped vehicles, refer to the procedures in the 1989 Ford Shop Manual.

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BEFORE DRIVING YOUR VEHICLE

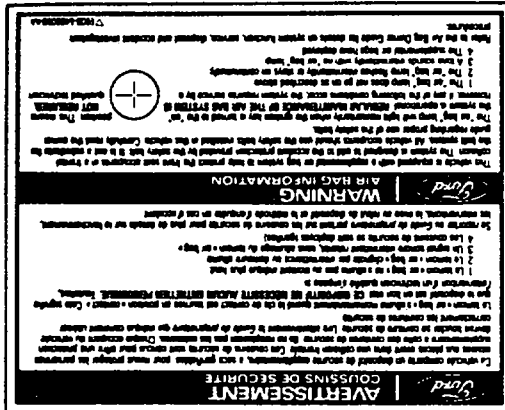
Service and information labels are attached inside the glove compartment, on both sides of the center sun visor, and on the radiator support in the engine compartment.

Avant de conduire, lisez l'étiquette au revers du pare-soleil.

VOIR LE GUIDE DU PROPRIÉTAIRE

BEFORE DRIVING YOUR VEHICLE

SEE OWNERS GUIDE



BEFORE DRIVING YOUR VEHICLE

LABEL LOCATED ON RIGHT SHIELD ATTACHED
TO RADIATOR SUPPORT (IN ENGINE COMPARTMENT)

WARNING

THIS VEHICLE IS EQUIPPED WITH A SUPPLEMENTAL AIR BAG SYSTEM. TAMPERING WITH OR DISCONNECTING THE AIR BAG SYSTEM WIRING COULD DEPLOY THE BAG OR RENDER THE SYSTEM INOPERATIVE, WHICH MAY RESULT IN HUMAN INJURY.

AVERTISSEMENT

CE VÉHICULE EST ÉQUIPÉ D'UN DISPOSITIF DE SÉCURITÉ SUPPLÉMENTAIRE À SAC GONFLABLE APPELÉ COUSSIN DE SÉCURITÉ. UNE ALTÉRATION OU LE DÉBRANCHEMENT D'UNE PARTIE QUELCONQUE DU CÂBLAGE ÉLECTRIQUE PEUT ENTRAÎNER LE GONFLEMENT SUDAIN DU COUSSIN DE SÉCURITÉ OU LE METTRE HORS SERVICE, AVEC RISQUE DE BLESSURES.

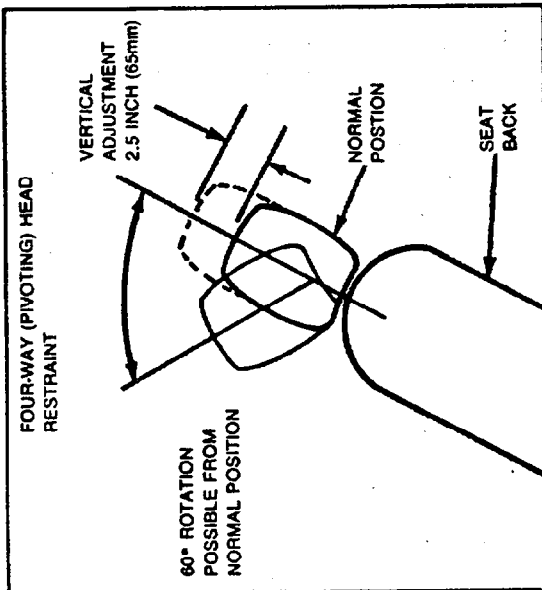
E 908 5400011-A-A

Head Restraints

WARNING — Adjust the head restraint so that it is just behind your head and never behind your neck to reduce the chance of injury in the event of a collision.

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BEFORE DRIVING YOUR VEHICLE



Infant and Child Restraints

WARNING — For maximum protection in the event of a collision or sudden stop, always protect the infant and child occupants of your vehicle with an infant or child safety seat designed especially for them and which conforms to applicable motor vehicle safety standards. Do not permit children to sit where they cannot be properly restrained.

WARNING — Since a safety belt or child restraint can become very hot if it is left in a closed vehicle, be sure and check the seat cover and buckles before placing a child in them.

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