

Dynamic Science Report No. 212-DYS-79-012
Dynamic Science Report No. 219-DYS-79-011
Dynamic Science Report No. 301-DYS-79-024

NEW VEHICLE ASSESSMENT AND
STANDARDS ENFORCEMENT INDICANT
TESTING

FMVSS 212, 219, AND 301-75

GENERAL MOTORS CORPORATION
1979 OLDSMOBILE 98 REGENCY 4-DOOR SEDAN
NHTSA NO. 790115

Prepared by:

DYNAMIC SCIENCE, INC.
A TALLEY INDUSTRIES COMPANY
1850 WEST PINNACLE PEAK ROAD
PHOENIX, ARIZONA 85027



FINAL REPORT

AUGUST 1979

Prepared for:

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
-----ENFORCEMENT-----
OFFICE OF VEHICLE SAFETY COMPLIANCE
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DOT 183

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FINAL REPORT ACCEPTED BY:

NHTSA Contract Technical Manager
FMVSS 212/219/301-75

Date of Report Acceptance

TECHNICAL REPORT STANDARD TITLE PAGE

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16. Abstract FMVSS 212, 219, and 301-75 Standards Enforcement Indicant Testing of a 1979 Oldsmobile 98 Regency 4-door Sedan, NHTSA No. 790115, VIN 3X69K9M203044, was conducted at the Dynamic Science, Inc., Phoenix facility in Arizona. The vehicle was tested using test parameter values which are in excess of the current upper limits of the subject FMVSS in order to obtain research and vehicle rating data. This test, therefore, can only be viewed as an "indicant" test by the Office of Vehicle Safety Compliance. The front of the test vehicle impacted the fixed collision barrier at a speed of 34.99 mph. The test was conducted July 18, 1979, with the following results: (a) FMVSS 212 - No loss of windshield retention. (b) FMVSS 219 - No intrusion noted to windshield protected zone. (c) FMVSS 301 - No fuel leakage or observable damage to fuel system.			
17. Key Words Frontal Impact Windshield Testing Fuel System Integrity		18. Distribution Statement Available from Technical Reference Division, National Highway Traffic Safety Administration, Room 5108, Nassif Building, 400 7th Street, S.W., Washington, D.C. 20590	
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METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
in ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
acres	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons	0.9	metric ton	t
	(2000 lb)			
VOLUME				
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
in ³	cubic inches	16	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	L
pt	pints	0.47	liters	L
qt	quarts	0.95	liters	L
gal	gallons	3.8	liters	L
ft ³	cubic feet	0.03	cubic meters	m ³
yd ³	cubic yards	0.76	cubic meters	m ³
TEMPERATURE (exact)				
°F	degrees Fahrenheit	5/9 (after subtracting 32)	degrees Celsius	°C

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares	2.5	acres	
	(10 000 m ²)			
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	metric ton	1.1	short tons	
	(1000 kg)			
VOLUME				
ml	milliliters	0.03	fluid ounces	fl oz
ml	milliliters	0.06	cubic inches	in ³
L	liters	2.1	pints	pt
L	liters	1.06	quarts	qt
L	liters	0.26	gallons	gal
m ³	cubic meters	35	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³
TEMPERATURE (exact)				
°C	degrees Celsius	9/5 (then add 32)	degrees Fahrenheit	°F

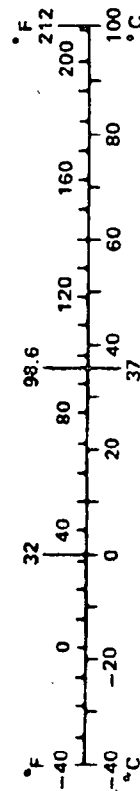


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SECTION 1
PURPOSE AND INTRODUCTION

PURPOSE:

The purpose of the test was to subject a 1979 Oldsmobile 98 Regency 4-door Sedan to the indicant test requirements of DOT Test Plan TP-212-01, March 20, 1979, Standard Enforcement Indicant Testing for FMVSS No. 212, "Windshield Mounting," FMVSS No. 219, "Windshield Zone Intrusion," and FMVSS 301-75, "Fuel System Integrity." The vehicle was tested using test parameters which are in excess of the current upper limits of the subject FMVSS, in order to obtain research and vehicle rating data. This test, therefore, can only be viewed as an "indicant" test by the Office of Vehicle Safety Compliance (OVSC).

INTRODUCTION:

The test procedure describing the facilities used and the test checklists completed for each vehicle indicant tested for FMVSS 212, 219, 301-75 are contained in Appendix A. Section 2 contains General Test and Vehicle Parameter Data. Section 3 contains Compliance Related Data for FMVSS 212, 219, 301-75 Indicant Testing, together with photographs related to these tests. Appendix B contains Calcomp plots.

SECTION 2

GENERAL TEST AND VEHICLE PARAMETER DATA

The following data sheets and photographs describe the General Test and Vehicle Parameter Data.

SECTION 2

GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Vehicle Manufacturer: General Motors Corporation
 Make/Model: Oldsmobile 98 Regency
 Body Style: 4-door Sedan Model Year: 1979
 VIN: 3X69K9M203044 Build Date: 1/79
 NHTSA No.: 790115 Color: White
 Engine Data: 8 cylinders; 403 in.³ displacement
 Transmission Data: 3 speed () Manual (X) Automatic
 Date Vehicle Received by Laboratory: March 12, 1979
 Dealer Name & Address: Holiday Oldsmobile Co.
3530 N. Scottsdale Road, Scottsdale, AZ

DATA FROM CERTIFICATION LABEL ON LEFT DOOR REAR FACE OR B-POST:

Vehicle Manufactured By: General Motors Corporation
 Date of Manufacture: 1/79; VIN: 3X69K9M203044
 GVWR: 5420 lb; GAWR: Front = 2650 lb; Rear = 2770 lb

DATA FROM "RECOMMENDED TIRE PRESSURE" LABEL ON DOOR, POST, GLOVE BOX, ETC.:

Vehicle Load:	FRONT	REAR	RECOMMENDED	LOAD RANGE:
Up to Capacity	<u>24</u> psi	<u>28</u> psi	TIRE SIZE:	
Vehicle Capacity:			<u>GR 78 X 15</u>	<u>B</u>
Type of Seats -	<u>Bench</u>	Number of Occupants =	<u>3</u>	Front
	<u>Bucket</u>	(Designated Seating	<u>3</u>	Rear
	<u>X</u> Split Bench	Capacity)	<u>6</u>	Total
CARGO LOAD =	<u>200</u> lb			
TOTAL =	<u>1100</u> lb			

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (with max. fluids) (UDW)

Right Front =	<u>1142</u> lb	Right Rear =	<u>921</u> lb
Left Front =	<u>1186</u> lb	Left Rear =	<u>938</u> lb
TOTAL FRONT WEIGHT =	<u>2328</u> lb	(<u>56.0%</u> of Total Vehicle Weight)	
TOTAL REAR WEIGHT =	<u>1859</u> lb	(<u>44.0%</u> of Total Vehicle Weight)	
TOTAL DELV. WEIGHT =	<u>4187</u> lb		

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 200 lb CARGO:

Right Front =	<u>1188</u> lb	Right Rear =	<u>1157</u> lb
Left Front =	<u>1221</u> lb	Left Rear =	<u>1143</u> lb
TOTAL FRONT WEIGHT =	<u>2409</u> lb	(<u>51.0%</u> of Total Vehicle Weight)	
TOTAL REAR WEIGHT =	<u>2300</u> lb	(<u>49.0%</u> of Total Vehicle Weight)	
TOTAL TEST WEIGHT =	<u>4709</u> lb		

Weight of ballast secured in vehicle trunk area = 40 lb

TARGET WEIGHT = CARGO LOAD + UDW + 164 (NO. OF DUMMIES) = 4715 lb

SECTION 2

GENERAL TEST AND VEHICLE PARAMETER DATA (CONTD)

TEST CONDITIONS:

Date of Test: July 18, 1979 Time of Test: 0901
 Ambient Temperature: 92 °F at impact area.
 Temperature in Windshield Molding
 Occupant Compartment: 75 °F Temperature: 75 °F

VEHICLE ATTITUDE: (all dimensions in inches)

Delivered Attitude:	RF <u>32.0</u>	LF <u>32.0</u>	RR <u>32.0</u>	LR <u>32.0</u>
Test Attitude:	RF <u>31.5</u>	LF <u>31.5</u>	RR <u>29.6</u>	LR <u>29.8</u>

VEHICLE TIRE DATA:

Recommended Cold Tire Pressure: Front = 24 psi
 Rear = 28 psi

Recommended Tire Size: GR 78 X 15

Load Range: B

Tires on Vehicle: GR 78 X 15 Goodrich Steel Belted Radial

Is Spare Tire a "Space Saver": No (yes/no)

Is Spare Tire standard equipment: Yes (yes/no)

TEST FLUID DATA:

Test Fluid Type: Red Stoddard Solvent; Spec. Grav.: 0.764

Kinematic Viscosity: 0.99 centistokes

Spill Point Volume: 25.5 Gallons (SPV)

Test Volume: 23.2 Gallons (90 to 91% of SPV)

Fuel System Capacity (data from Owner's Manual): 25 gallons

Details of Fuel System: The rectangular fuel tank is attached aft of the rear axle under the trunk area by two tank straps.

Metal filler tube attaches to tank at center rear vertical side of tank and terminates at rear center above the bumper behind license plate bracket. Sealed by a ratcheting screw-type cap.

Electric Fuel Pump: No (yes/no); Fuel Injection: No (yes/no)

Does electric fuel pump operate with ignition switch "on" and the engine not operating: NA (yes/no)

VEHICLE REBOUND AND CRUSH:

Overall Length of	Pre-test = R <u>215.0</u>	L <u>214.5</u> inches
Test Vehicle	Post-test = R <u>189.4</u>	L <u>187.7</u> inches

CRUSH = R 25.6 L 26.8

FOR FRONTAL IMPACTS, distance from front of test vehicle to the barrier after impact = 18.2 inches

SECTION 2

GENERAL TEST AND VEHICLE PARAMETER DATA (CONTD)

VISIBLE DUMMY CONTACT POINTS

	Driver	Passenger	Child
Head	Steering Wheel	None	Front Seatback
Chest	Steering Wheel	None	None
Abdomen	None	None	None
Left Knee	Dash	Dash	None
Right Knee	Dash	Dash	None

	Front		Rear	
	Left	Right	Left	Right
<u>DOOR OPENING</u>				
Easy				X
Difficult	X	X	X	
Tools Required				

SEAT BACK

Failure	None	None
---------	------	------

GLAZING DAMAGE

Windshield	Cracked			
Backlight			None	
Others	None	None	None	None

OTHER NOTABLE IMPACT EFFECTS: Steering wheel column broke at tilt adjust hinge. Right front tire deflated on impact. Right rear seatback and bottom separated 3 inches. Left front door would not open until left rear door was opened.

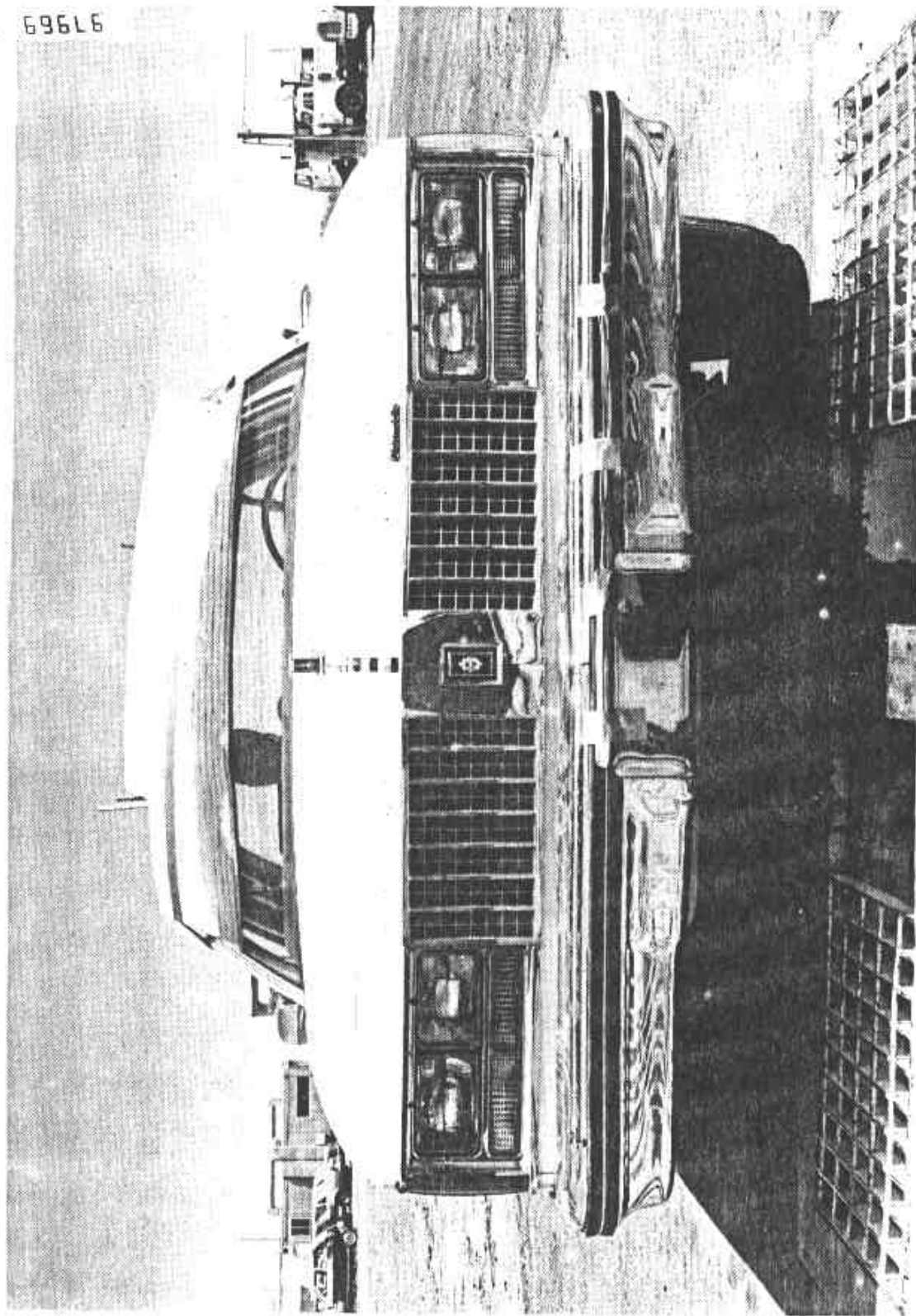


Figure 2-1. Pre-test Front View.

20086

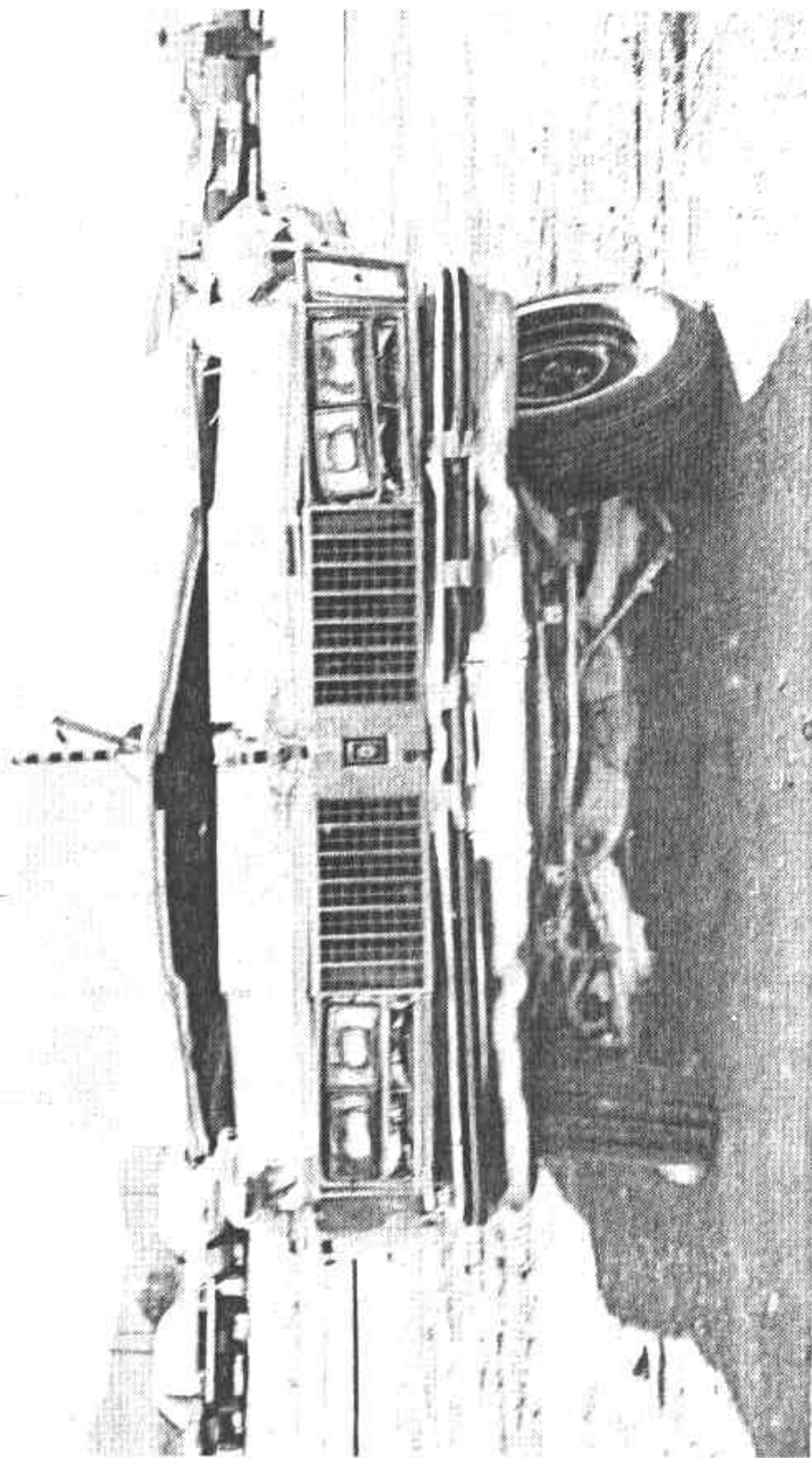


Figure 2-2. Post-test Front View.

58666

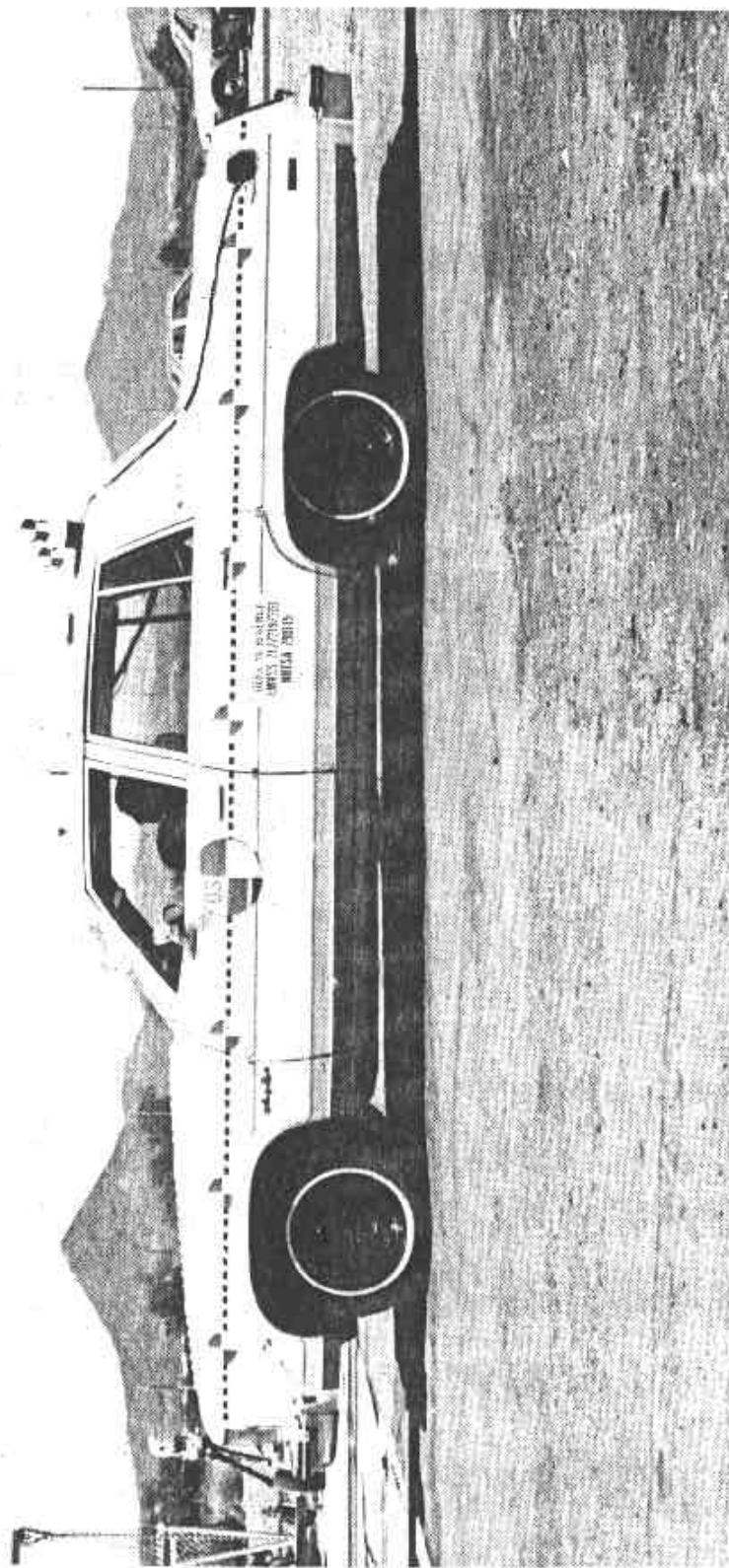


Figure 2-3. Pre-test Overall Side View.

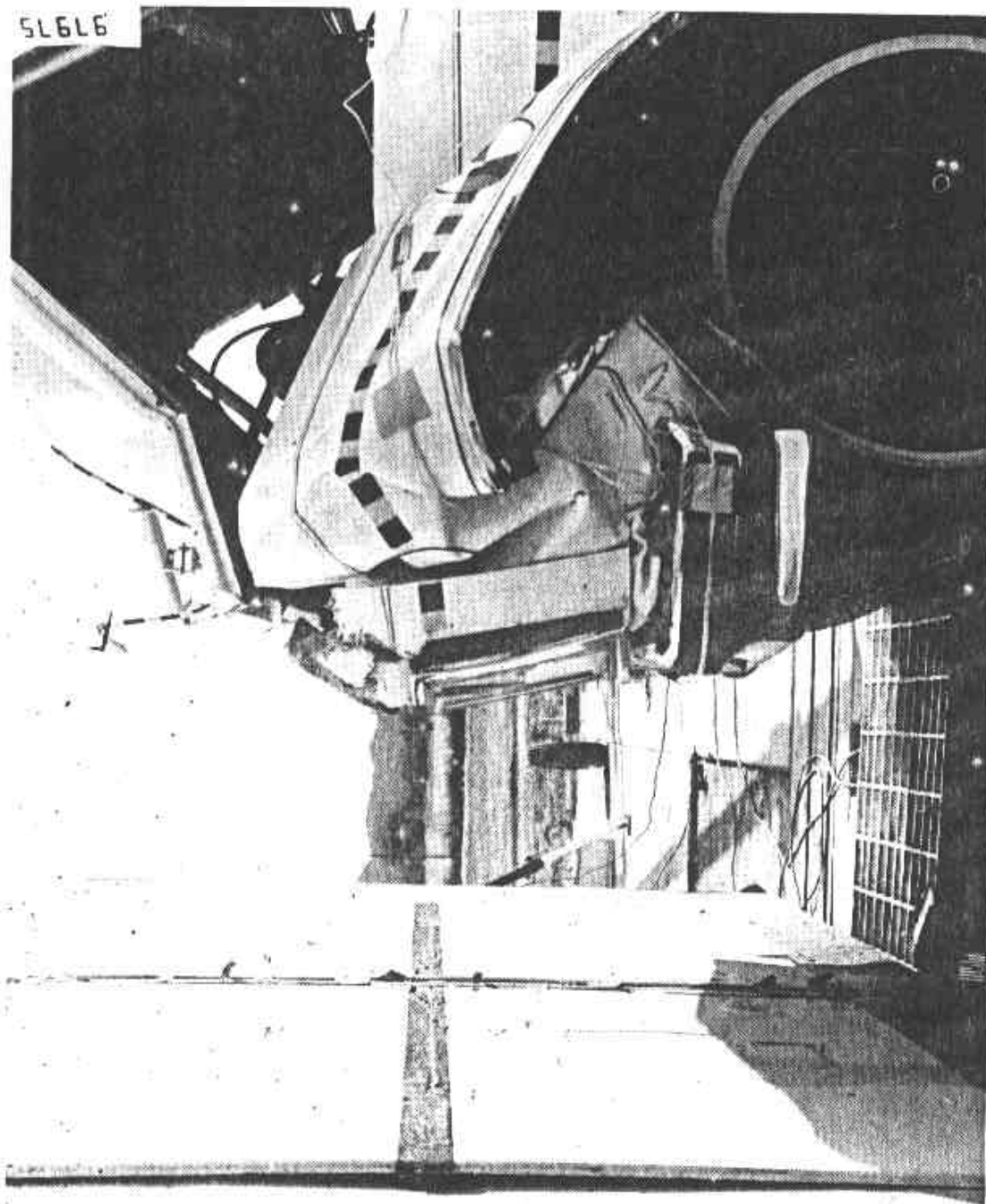


Figure 2-4. Post-test Left Side View of Impact Area.

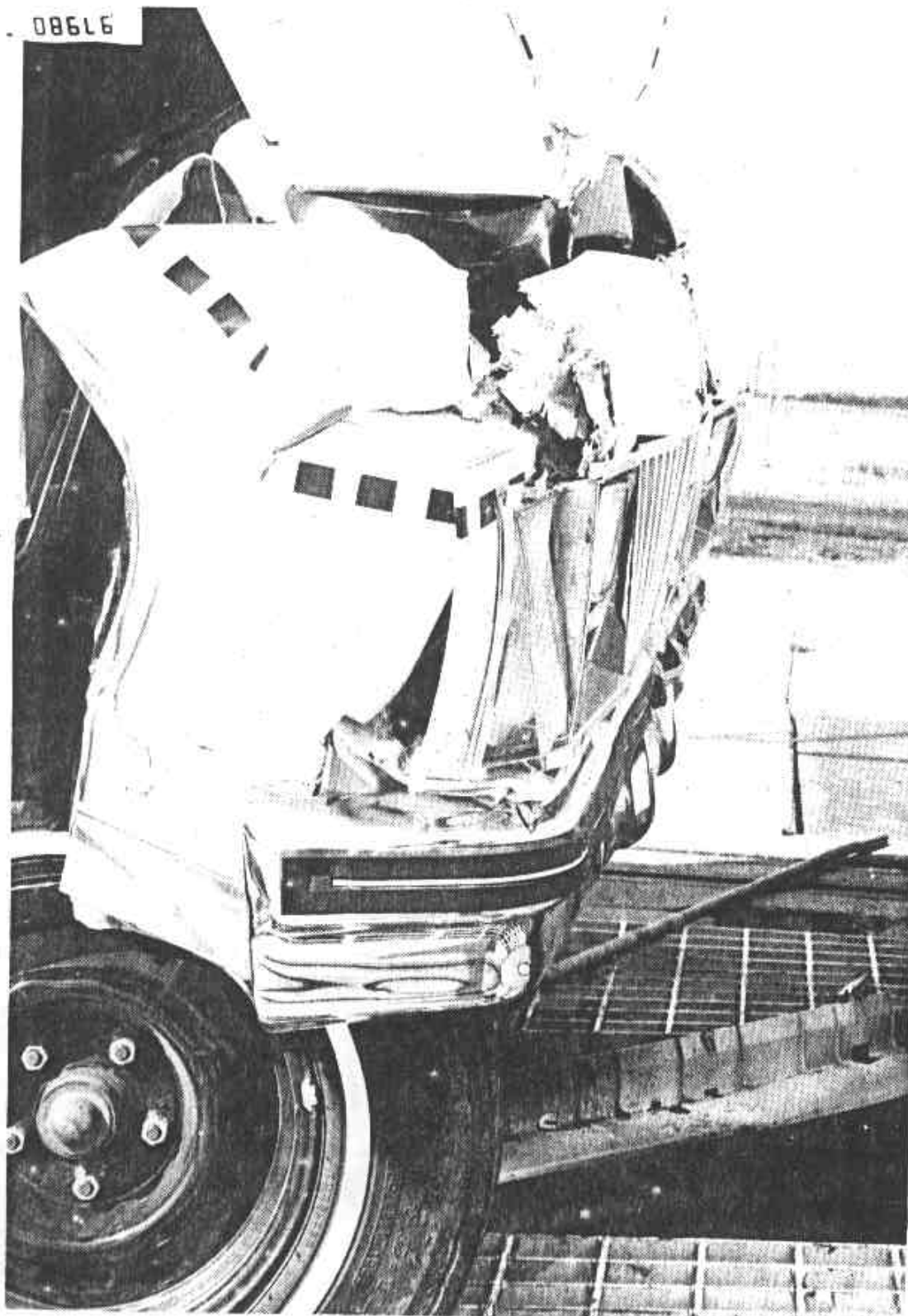


Figure 2-5. Post-test Right Side View of Impact Area.

980086

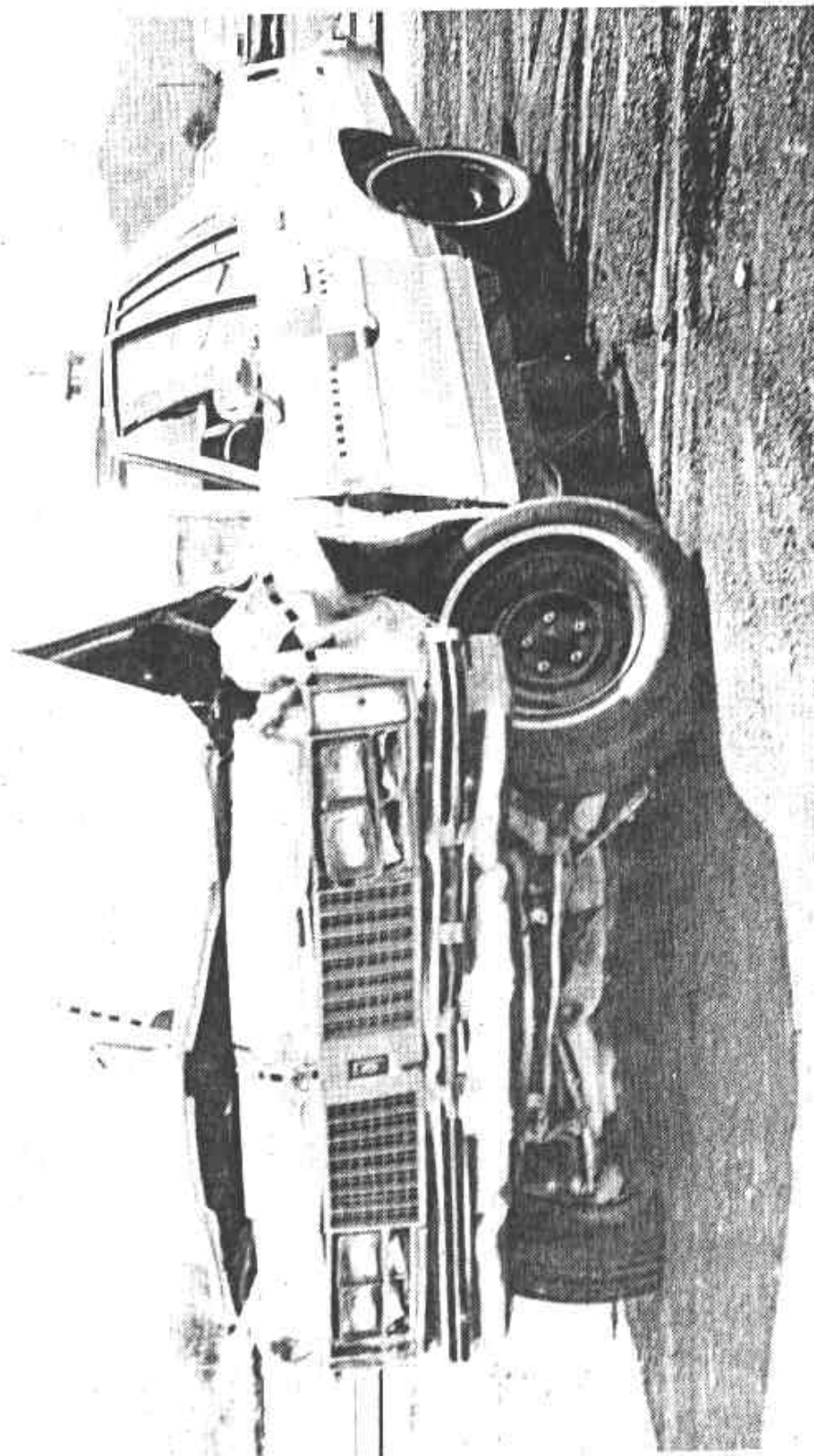


Figure 2-6. Post-test Left Front Quarter View.

- 1 0086



Figure 2-7. Post-test Right Front Quarter View.

89286

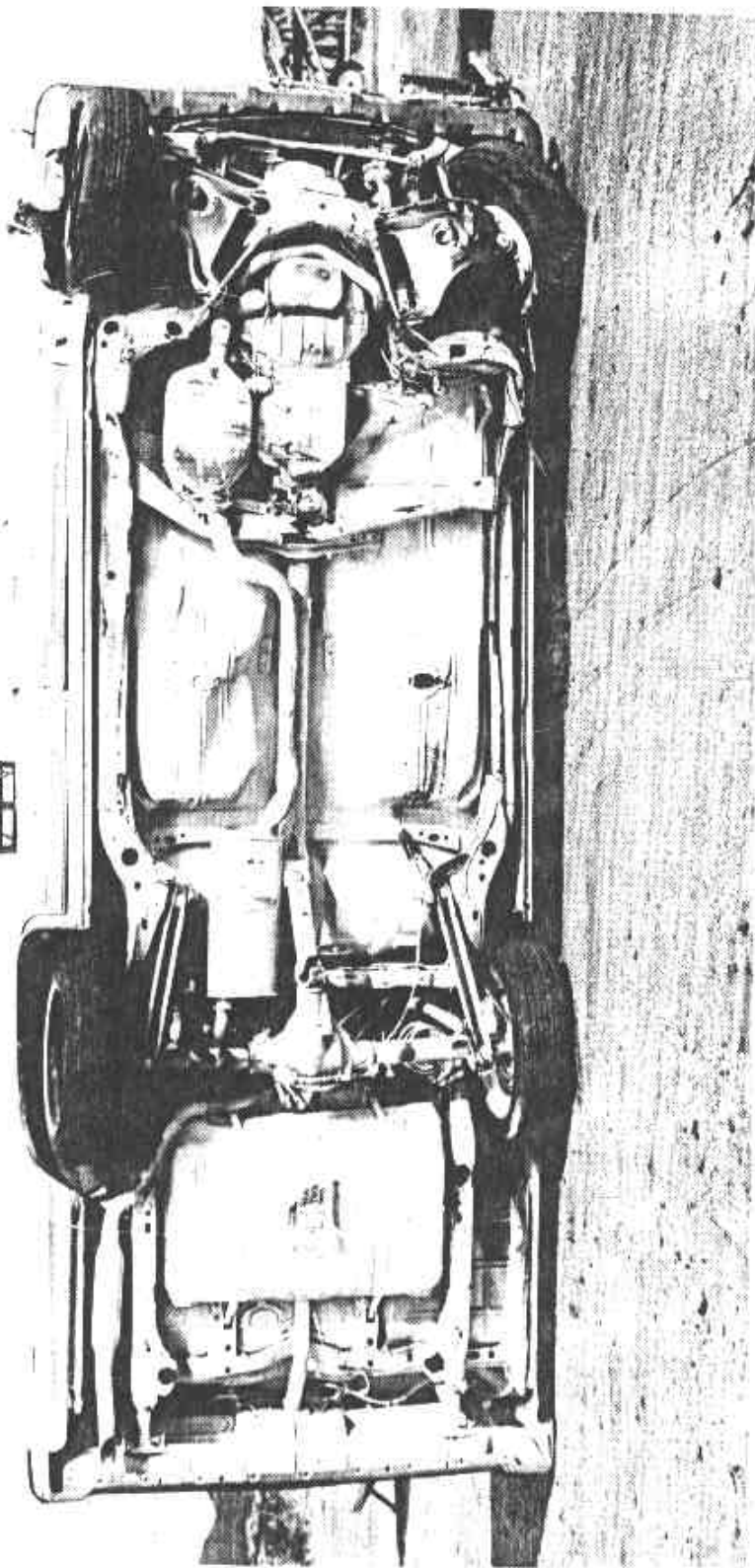


Figure 2-8. Post-test Overall Underside View.

SECTION 3

COMPLIANCE-RELATED DATA
FMVSS 212, 219, 301-75 INDICANT TESTING

The following data sheets and photographs document compliance data related to FMVSS 212, 219, and 301-75.

SECTION 3
SUMMARY OF RESULTS
FMVSS 212 INDICANT DATA

VEHICLE DATA:

Manufacturer: General Motors Corporation Model Year: 1979
Make/Model: Oldsmobile 98 Regency
Body Style: 4-door Sedan Manufacture Date: 1/79
VIN: 3X69K9M203044 NHTSA No.: 790115
Delivery Weight: 4187 lb; Test Weight: 4709 lb; GVWR: 5420 lb
Engine: No. of Cylinders 8 Displacement 403 in.³
Vehicle Mileage: 68.8 miles
Remarks: Tilt steering wheel, automatic transmission, power
brakes, power seats, power windows, tinted glass, power steering,
automatic speed control, air conditioning

GENERAL TEST CONDITIONS:

Vehicle Impact Speed:

Primary 34.99 mph; Secondary 34.96 mph
Speed Range Specified by CTM: 34.5 to 35.5 mph
Ambient Temperature at Time of Test: 92 °F
Date of Test: July 18, 1979 Time: 0901
Windshield Molding Temperature: 75 °F

SUMMARY FOR FMVSS NO. 212:

		<u>Actual Data</u>	<u>Standard Requirement</u>	<u>Pass/Fail</u>
1. Pre-test Windshield	Right	<u>82.0</u>		
Periphery (in.)	Left	<u>82.0</u>		
	Total	<u>164.0</u>		
2. Post-test Windshield	Right	<u>82.0</u>		
Periphery (in.)	Left	<u>82.0</u>		
	Total	<u>164.0</u>	75% Minimum	<u>Pass</u>

LABORATORY INFORMATION:

Project Engineer: M. Pozzi Date: July 1979
Project Manager: E. Enserink Date: July 1979

SECTION 3
TEST DATA SHEET FOR
FMVSS 212 INDICANT DATA

VEHICLE DATA:

NHTSA No.: 790115 Tire Size and Type: GR 78 X 15 Steel Belted

Cold Tire Inflation Pressure (psi): RF 24.0 LF 24.0
RR 28.0 LR 28.0 Spare -

Delivered Vehicle Attitude (in.):

RF 32.0 LF 32.0 RR 32.0 LR 32.0

Vehicle Test Attitude (in.):

RF 31.5 LF 31.5 RR 29.6 LR 29.8

Static Crush: 25.6 in. (Right Side) 26.8 in. (Left Side)

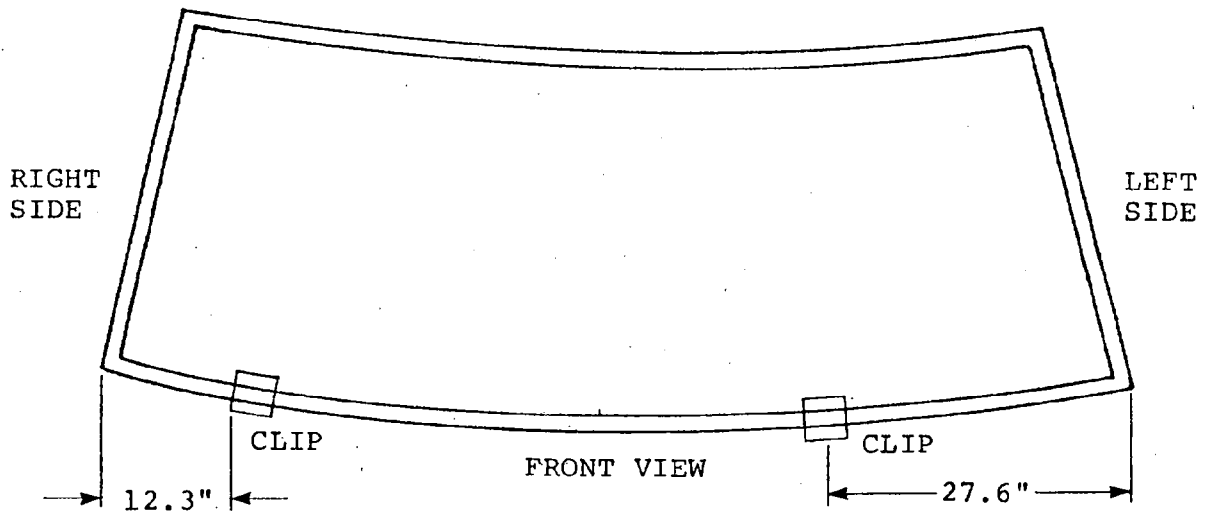
Rebound Distance: Right 19.1 in. Left 17.2 in.

SPECIFIC TEST DATA FOR FMVSS 212:

Details of Windshield Mounting:

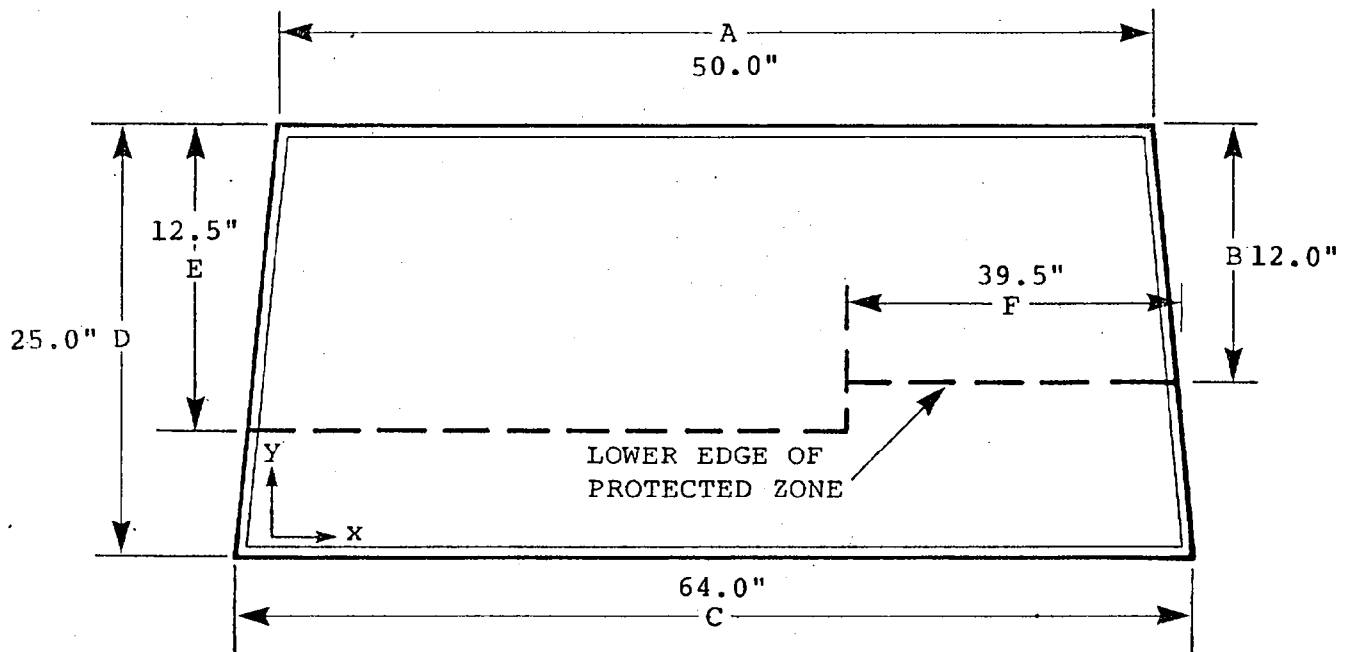
The windshield is held in place at the top and sides by black mastic and rubber gasket in combination, with a 1-inch metal strip overlaying the gasket. Bottom of windshield is held by a 4.2-inch wide mastic. Bottom edge lies below the horizontal plane of the hood by 4 inches. Two rubber clips (1" x 1/2") at the bottom appear to serve as stops or rests for wipers. These appear to be capable of retaining or adding to retention of lower windshield edge.

Area of Retention Failure (as noted): None.



SECTION 3
FMVSS 219 INDICANT DATA

1. PROTECTED ZONE DEFINITION:



FRONT VIEW OF WINDSHIELD

Method of adhering styrofoam to the windshield:

One-half inch cut cell foam panels glued on with 3M cement and at least 24 hours of compression. Template then undergoes final 45° contouring and is recovered to protect template.

2. TEST RESULTS:

Zone Intrusion Description/Cause: None

	Coordinates		Depth (in.)
	X	Y	
1.	NA	NA	NA
2.	NA	NA	NA
3.	NA	NA	NA

SECTION 3
FMVSS 301-75 INDICANT DATA

GENERAL TEST CONDITIONS:

Vehicle Impact Speed:

Primary 34.99 mph Secondary 34.96 mph
Speed Range Specified by CTM: 34.5 to 35.5 mph
Ambient Temperature at Time of Test: 92 °F
Date of Test: July 18, 1979 Time: 0901

FUEL SYSTEM DATA:

Test Fluid: Stoddard Solvent No. 2 Specific Gravity: 0.764
Kinematic Viscosity: 0.99 centistokes
Spill Point Volume: 25.5 U.S. gal Liquid Temp: 75 °F
Test Volume: 23.2 U.S. gal Liquid Temp: 75 °F
Details of Fuel Tank, Filler Pipes, and Connections:

The rectangular fuel tank is attached aft of the rear axle under the trunk area by two tank straps. Metal filler tube attaches to tank at center rear vertical side of tank and terminates at rear center above the bumper behind license plate bracket. Sealed by a ratcheting screw-type cap.

PERFORMANCE SUMMARY FOR FMVSS NO. 301-75:

	<u>Actual Data</u>	<u>Standard Requirement</u>	<u>Pass/Fail</u>
1. Transimpact Fluid Loss (oz)	<u>0.0</u>	1 oz maximum	<u>Pass</u>
2. Post-impact Fluid Loss (oz) (30-minute period post- impact)	<u>0.0</u>	1 oz/ minute maximum	<u>Pass</u>

Details of Leakage: None

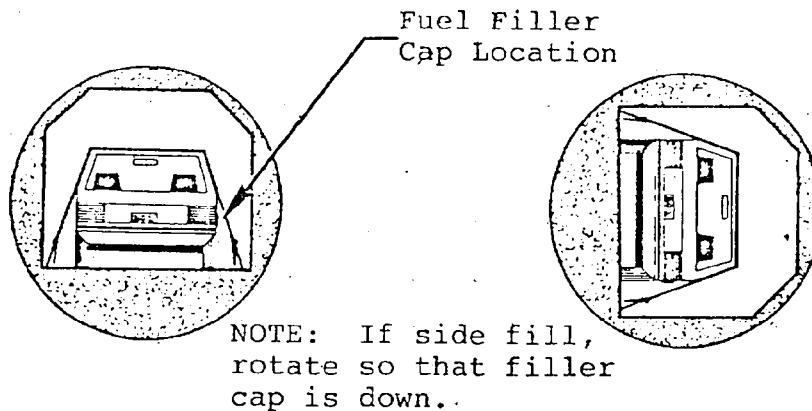
3. Static Rollover: See following four pages

LABORATORY INFORMATION:

Project Engineer: M. Pozzi Date: July 1979
Project Manager: E. Enserink Date: July 1979

SECTION 3
FMVSS 301-75 INDICANT STATIC ROLLOVER DATA SHEET

TEST PHASE: 0° to 90° VEHICLE NHTSA NO. 790115



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time.... = 1 min, 40 sec +
(Spec. Range = 1 to 3 min)

FMVSS 301 Position Hold Time..... = 5 min, 00 sec =

Total..... = 6 min, 40 sec

Next Whole Minute Interval..... = 7 min

FMVSS 301 REQUIREMENTS AND ACTUAL TEST RESULTS:

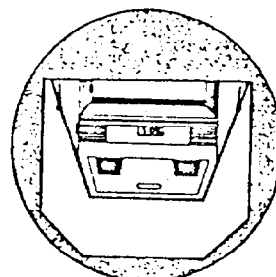
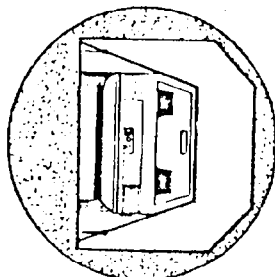
Time Period	First 5 min (from onset)	6th min	7th min	8th min (if req'd)
Maximum Spillage Allowed (oz)	5	1	1	1
Actual Spillage Recorded	0	0	0	

NOTE: Spillage is recorded in whole minute intervals only - as determined above.

SOLVENT SPILLAGE LOCATION(S): None

SECTION 3
FMVSS 301-75 INDICANT STATIC ROLLOVER DATA SHEET

TEST PHASE: 90° to 180° VEHICLE NHTSA NO. 790115



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time.... = 1 min, 37 sec +
(Spec. Range = 1 to 3 min)

FMVSS 301 Position Hold Time..... = 5 min, 00 sec =

Total..... = 6 min, 37 sec

Next Whole Minute Interval..... = 7 min

FMVSS 301 REQUIREMENTS AND ACTUAL TEST RESULTS:

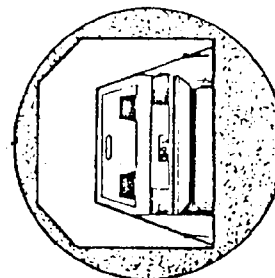
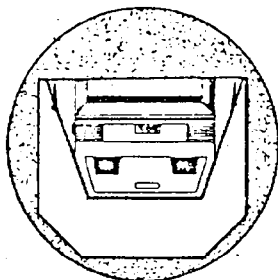
Time Period	First 5 min (from onset)	6th min	7th min	8th min (if req'd)
Maximum Spillage Allowed (oz)	5	1	1	1
Actual Spillage Recorded	0	0	0	

NOTE: Spillage is recorded in whole minute intervals only - as determined above.

SOLVENT SPILLAGE LOCATION(S): None

SECTION 3
FMVSS 301-75 INDICANT STATIC ROLLOVER DATA SHEET

TEST PHASE: 180° to 270° VEHICLE NHTSA NO. 790115



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time.... = 1 min, 37 sec +
(Spec. Range = 1 to 3 min)
FMVSS 301 Position Hold Time..... = 5 min, 00 sec =
Total..... = 6 min, 37 sec
Next Whole Minute Interval..... = 7 min

FMVSS 301 REQUIREMENTS AND ACTUAL TEST RESULTS:

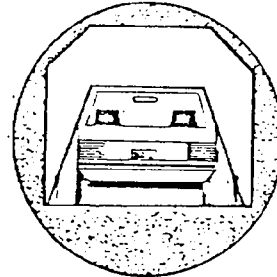
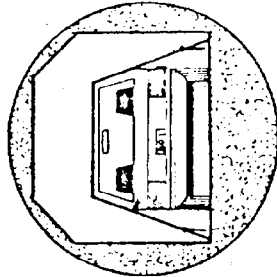
Time Period	First 5 min (from onset)	6th min	7th min	8th min (if req'd)
Maximum Spillage Allowed (oz)	5	1	1	1
Actual Spillage Recorded	0	0	0	

NOTE: Spillage is recorded in whole minute intervals only - as determined above.

SOLVENT SPILLAGE LOCATION(S): None

SECTION 3
FMVSS 301-75 INDICANT STATIC ROLLOVER DATA SHEET

TEST PHASE: 270° to 360° VEHICLE NHTSA NO. 790115



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time.... = 1 min, 36 sec +
(Spec. Range = 1 to 3 min)

FMVSS 301 Position Hold Time..... = 5 min, 00 sec =

Total..... = 6 min, 36 sec

Next Whole Minute Interval..... = 7 min

FMVSS 301 REQUIREMENTS AND ACTUAL TEST RESULTS:

Time Period	First 5 min (from onset)	6th min	7th min	8th min (if req'd)
Maximum Spillage Allowed (oz)	5	1	1	1
Actual Spillage Recorded	0	0	0	

NOTE: Spillage is recorded in whole minute intervals only - as determined above.

SOLVENT SPILLAGE LOCATION(S): None

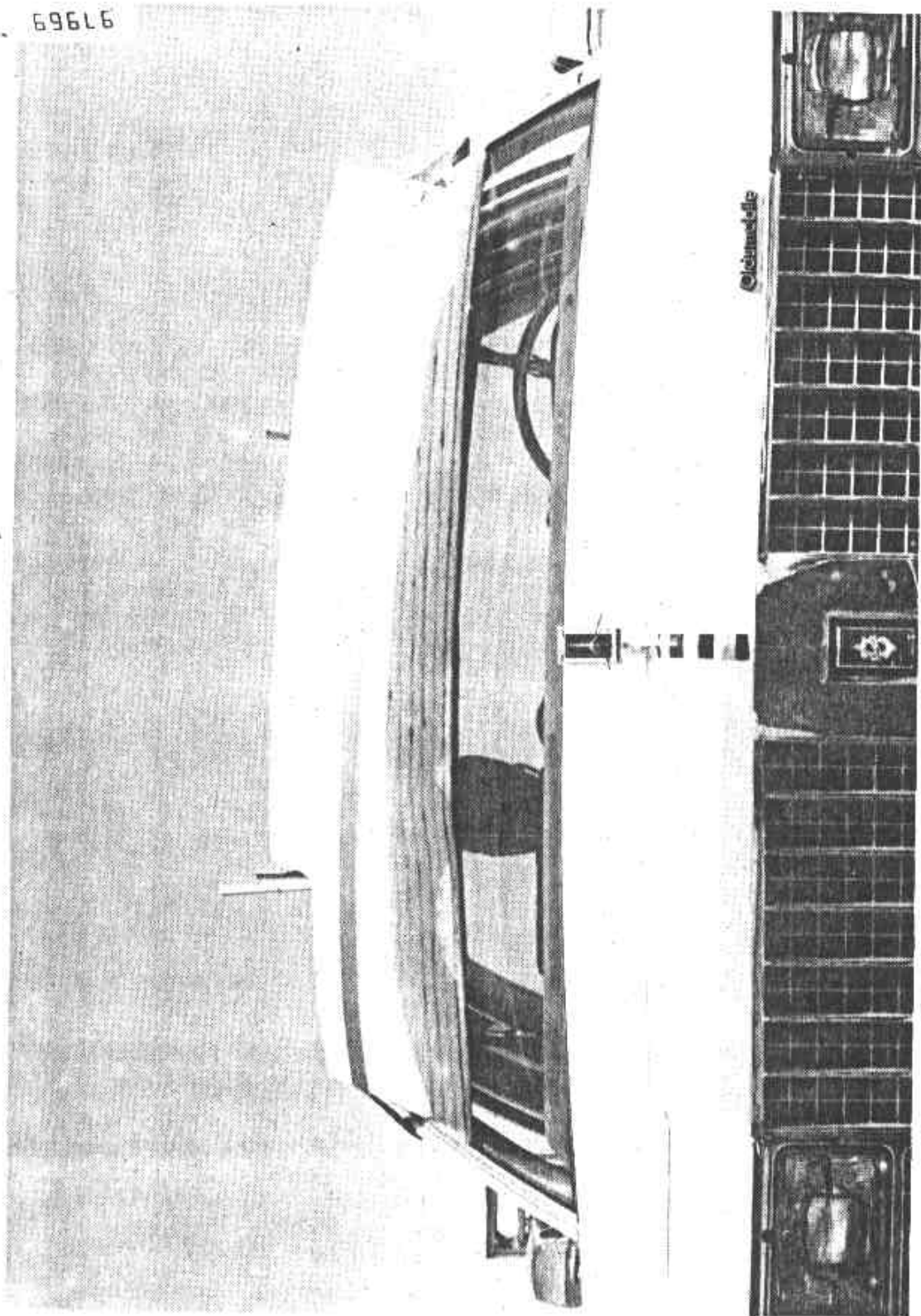


Figure 3-1. Pre-test Windshield - Overall View.

92086



Figure 3-2. Post-test Windshield - Right Front Three-Quarter.

65916

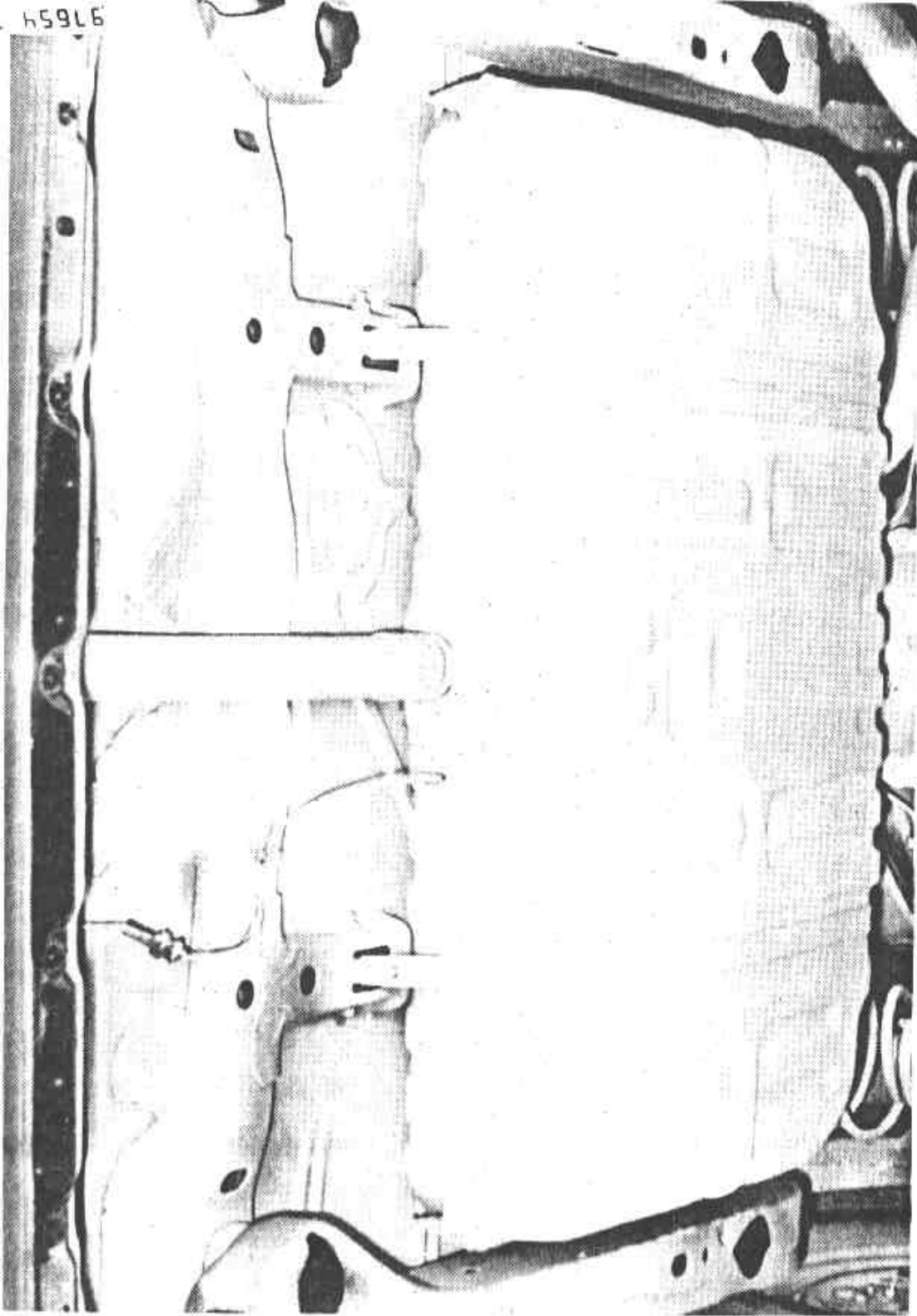


Figure 3-3. Pre-test View of Fuel Tank.

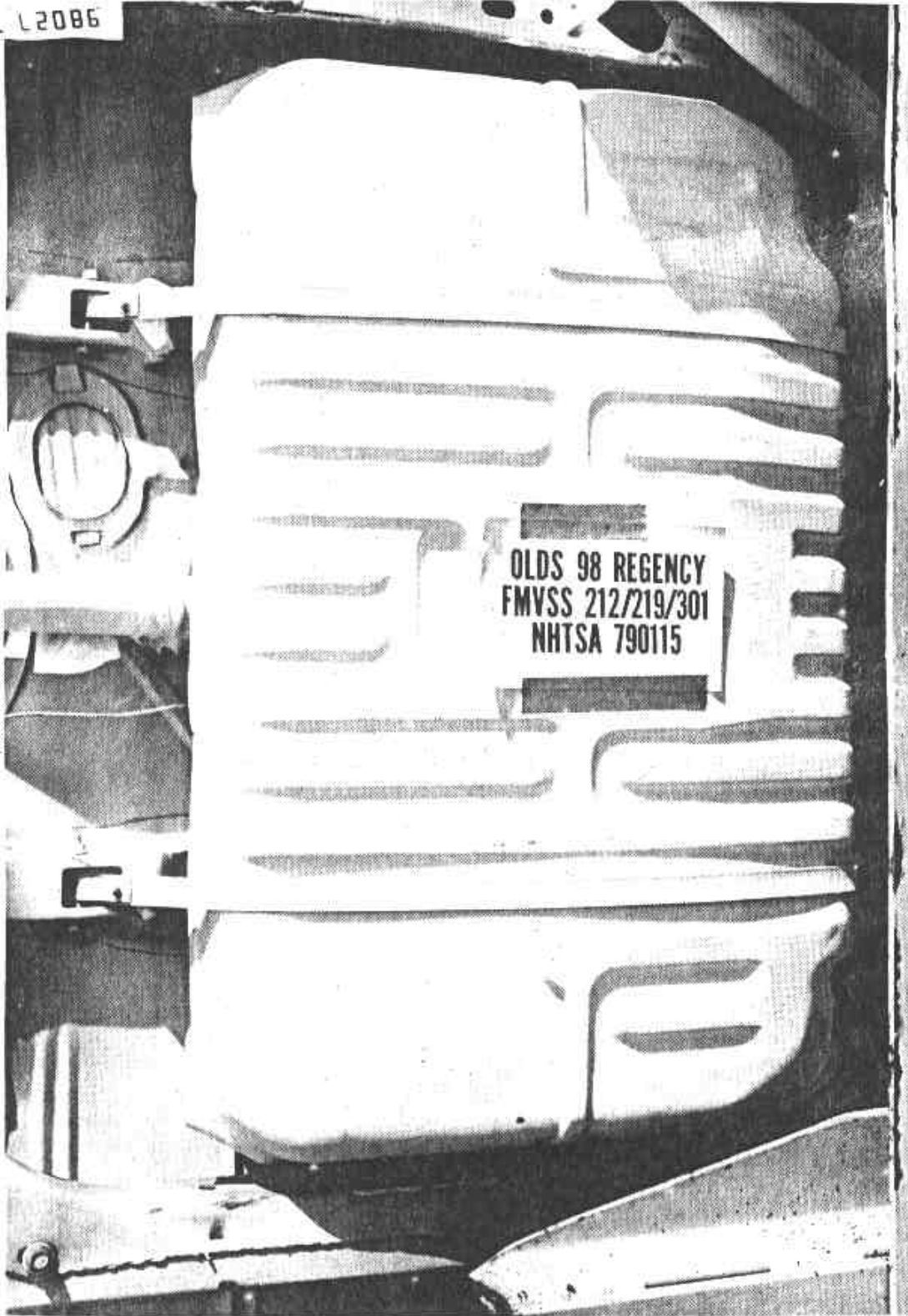


Figure 3-4. Post-test View of Fuel Tank.

SECTION 4
DATA REQUIRED BY R&D AND OAR

The following pages are included in this section:

1. Dummy positional data
2. Dummy injury summaries
3. Vehicle crush data
4. Accelerometer location and data summary
5. Photographs pertinent to R&D and OAR

Calcomp plots of dummy and vehicle accelerometer data are presented in Appendix B.

SECTION 4
DUMMY POSITIONING

Pre-test Dummy Positions

<u>Measurement</u>	<u>Driver (in.)</u>	<u>Passenger (in.)</u>	<u>Child (in.)</u>
Dummy Centerline to Vehicle Centerline	<u>14.0</u>	<u>15.0</u>	<u>-</u>
Chest to Upper Rim Steering Wheel	<u>18.2</u>	<u>NA</u>	<u>-</u>
Forehead to Windshield (Horizontal Distance)	<u>19.6</u>	<u>19.5</u>	<u>-</u>
Chest to Steering Wheel Hub	<u>-</u>	<u>-</u>	<u>-</u>
Chest to Instrument Panel	<u>-</u>	<u>-</u>	<u>-</u>
Left Knee to Closest Point on Lower Panel	<u>6.1</u>	<u>6.5</u>	<u>-</u>
Right Knee to Closest Point on Lower Panel	<u>5.6</u>	<u>7.6</u>	<u>-</u>
Ankle Distance	<u>10.0</u>	<u>10.0</u>	<u>-</u>
Knee Distance	<u>9.0</u>	<u>9.0</u>	<u>-</u>
Nose to Seatback	<u>-</u>	<u>-</u>	<u>26.6</u>

Additional dummy positioning information is presented in the
PART 572 DUMMY IN-VEHICLE POSITION RECORDING SHEET which follows.

SECTION 4
PART 572 DUMMY IN-VEHICLE POSITION
RECORDING SHEET

NHTSA No.: 790115

Manufacturer: General Motors Corporation

Make/Model: Oldsmobile 98 Regency

Model Year: 1979

SEAT TYPE:

ADJUSTER TYPE:

BUCKET SEAT BACK TYPE:

☐ Bench ☐ Bucket

☐ Manual

☐ Adjustable
☐ Reclining

☒ Split Bench

☒ Power

☒ Fixed

AMBIENT TEMPERATURE: 76 °F; TIME: 0700

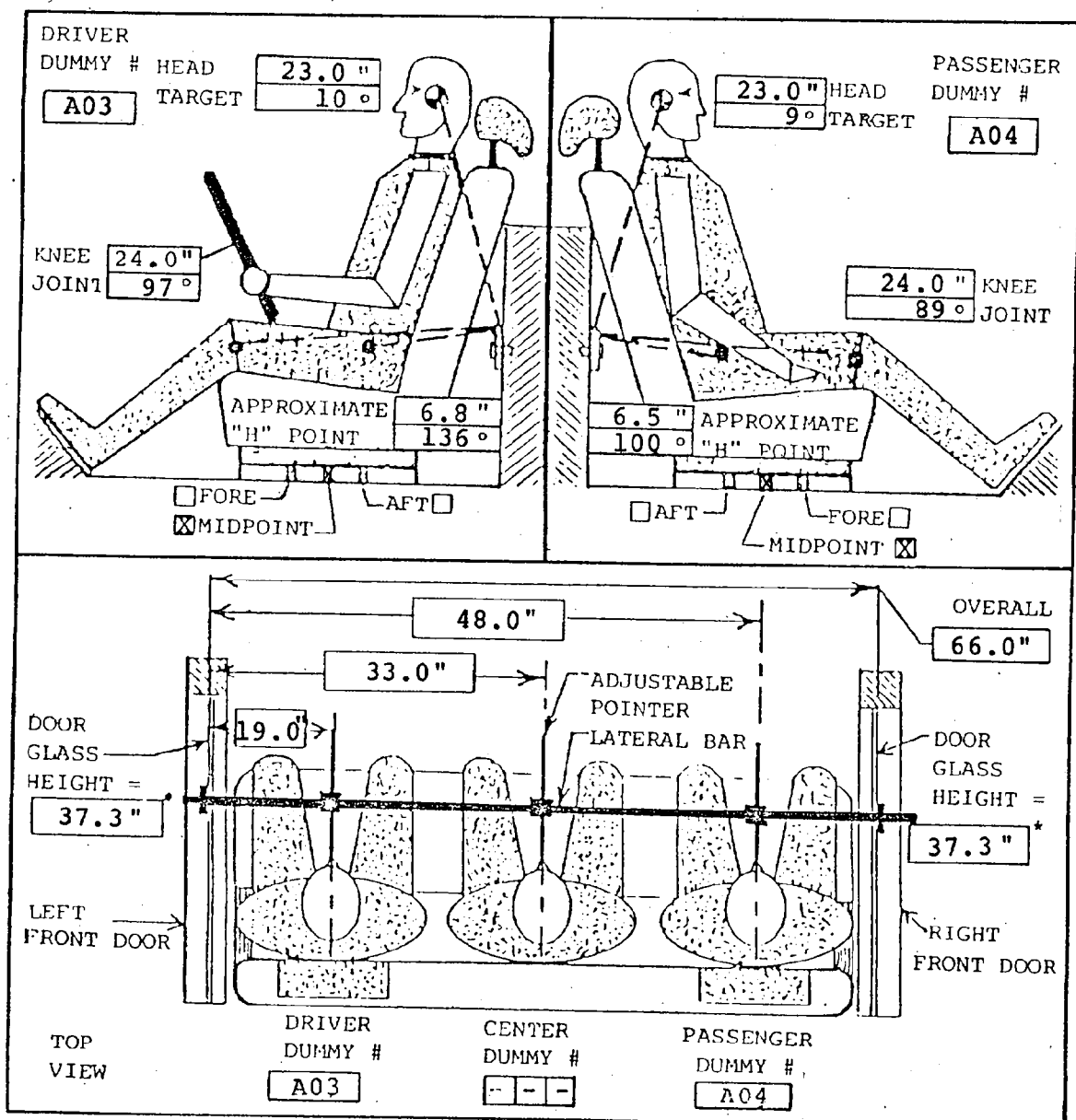
POSITIONING

TECHNICIANS: 1. M. Pozzi

DATE: 9/18/79

2.

All front seat dummies shall be positioned according to the procedure "OSE RECOMMENDED PROCEDURE FOR POSITIONING PART 572 DUMMIES IN TEST VEHICLE."



*Door glass height is equal on the right and left side of vehicle

SECTION 4
PART 572 DUMMY DATA SUMMARY

	Driver Dummy				Passenger Dummy			
	Positive Direction*		Negative Direction**		Positive Direction*		Negative Direction**	
	Peak (G)	Time (msec)	Peak (G)	Time (msec)	Peak (G)	Time (msec)	Peak (G)	Time (msec)
Head Acceleration								
Longitudinal	6.1	188	101.3	96	7.7	38	105.0	102
Lateral	11.2	153	50.8	96	85.6	104	4.7	33
Vertical	44.3	90	3	26	106	101	17.9	108
Resultant	113.3	96			165.1	102		
HIC	909.8 @ 83-110 msec				1734.2 @ 99-111 msec			
Chest Acceleration								
Longitudinal	2.5	158	56.0	96	5.3	167	32.4	115
Lateral	13.8	90	20.8	108	50.1	113	4.85	166
Vertical	12.5	80	12.9	102	26.0	74	15.2	120
Resultant (Max)	58.9	96			57.9	113		
Resultant (clip)	59.4	98			53.5	115		
TIME > 60 G	0 msec				0 msec			
SEVERITY INDEX	464.0 @ 200 msec				584.0 @ 200 msec			
	Peak (lb)	Time (msec)	Peak (lb)	Time (msec)	Peak (lb)	Time (msec)	Peak (lb)	Time (msec)
Femur Loads								
Left			774.4	57			370.2	79
Right			534.5	62			439.1	51
Belt Loads								
Torso	1425.7	101			1577.4	92		
Vehicle Impact Speed (mph):					34.99			
*Longitudinal:	Forward							
Lateral:	Rightward							
Vertical:	Downward							
**Longitudinal:	Rearward							
Lateral:	Leftward							
Vertical:	Upward							

SECTION 4
CHILD DUMMY DATA SUMMARY

	Child Dummy			
	Positive Direction*		Negative Direction**	
	Peak G	Time (msec)	Peak G	Time (msec)
Head Acceleration				
Longitudinal	16.5	116	144.3	145
Lateral	26.4	145	13.8	151
Vertical	82.6	128	2.37	3
Resultant	146.8	145		
HIC				
1970.4 @ 92-159 msec				
Chest Acceleration				
Longitudinal	16.3	126	57.5	158
Lateral	14.4	138	15.0	127
Vertical	59.7	129	12.3	148
Resultant (Maximum)	61.2	158		
Resultant (clip)	56.7	127		
TIME > 60 G				
2 msec				
SEVERITY INDEX				
810.4 @ 200 msec				
Femur Loads				
NO DATA				
Vehicle Impact Speed (mph): 34.99				
*Longitudinal:	Forward			
Lateral:	Rightward			
Vertical:	Downward			
**Longitudinal:	Rearward			
Lateral:	Leftward			
Vertical:	Upward			

SECTION 4

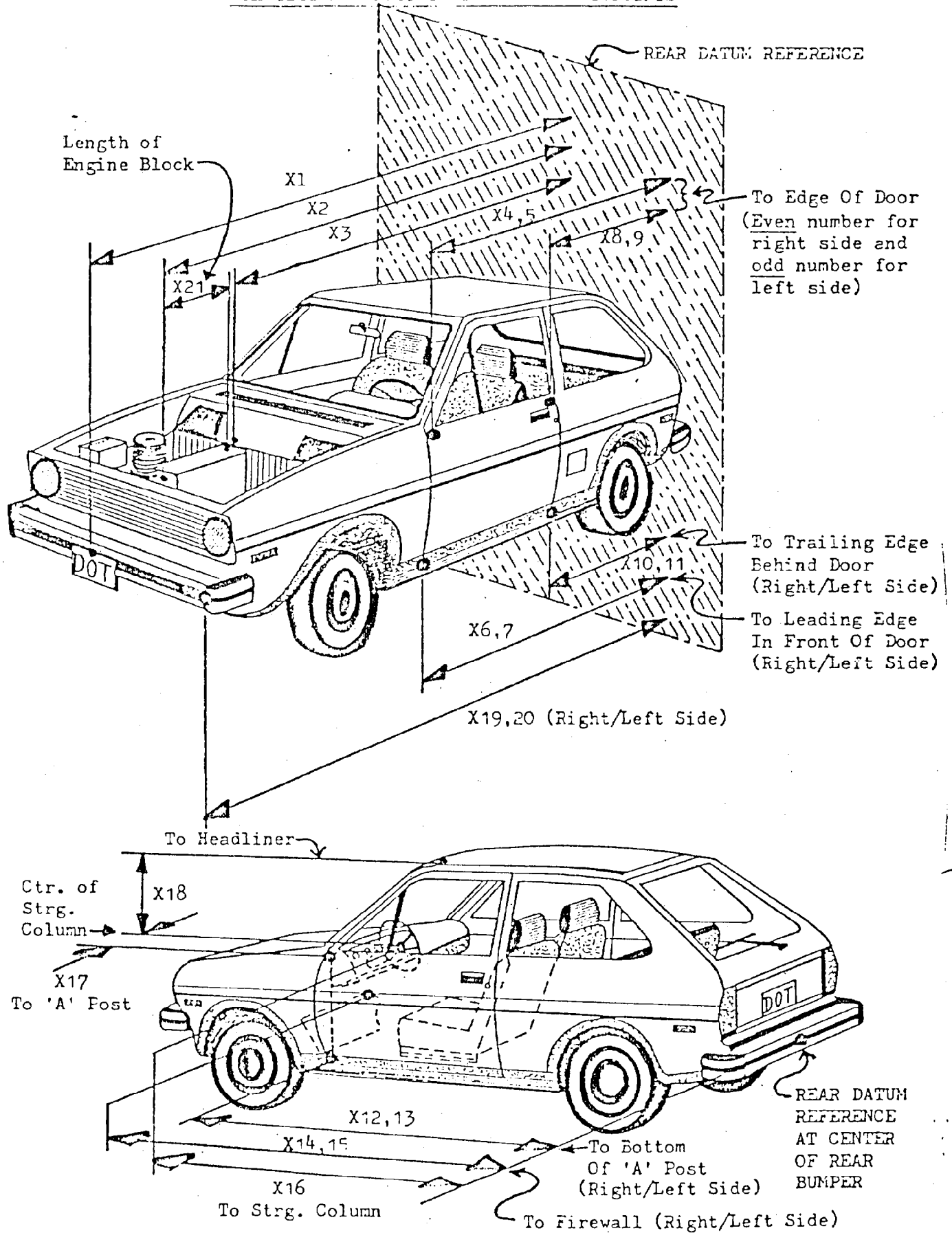
PRE-/POST-TEST STATIC MEASUREMENT DATA
(See Following Page for Dimension Definition)

Vehicle: 1979 Oldsmobile 98 Regency 4-door SedanNHTSA No.: 790115Test Date: July 18, 1979D.S. No.: 869

<u>Reference Dimension</u>	<u>Pre-test Measurement</u>	<u>Post-test Measurement</u>	<u>Change</u>
X ₁ *	225.0	198.0	27.0
X ₂	176.0	Obscured	NA
X ₃	155.0	Obscured	NA
X ₄	146.2	146.2	0.0
X ₅	146.0	145.7	0.3
X ₆	151.5	151.7	0.2
X ₇	152.0	150.0	2.0
X ₈ *	107.5	107.2	0.3
X ₉ *	107.5	106.8	0.8
X ₁₀	107.5	107.5	0.0
X ₁₁	107.5	107.5	0.0
X ₁₂	147.5	146.8	0.7
X ₁₃	147.0	144.8	2.2
X ₁₄	157.0	152.8	4.2
X ₁₅	160.2	154.8	5.4
X ₁₆	130.0	130.0	0.0
Y ₁₇	16.5	13.6	2.9
Z ₁₈	18.5	23.2	4.7
X ₁₉ *	215.0	184.4	30.6
X ₂₀ *	214.5	187.7	26.8
X ₂₁	21.0	21.0	0.0

*Rear impact data requirements.

PRE-TEST AND POST-TEST MEASUREMENT POINTS



SECTION 4
VEHICLE PROFILE DATA SHEET

Vehicle: 1979 Oldsmobile 98 Regency 4-door Sedan D.S. No.: 869

Test Date: July 18, 1979

Measurement Date: Pre-test: 7/9/59 Post-test

Exterior Measurements
Referenced to Plane: 168 inches Forward of: Rear Axle

Location	Height	Vehicle Left (in.)					Vehicle Right (in.)				
		30	24	18	12	6	0	6	12	18	24
Pre-test Profile (in.)											

Top of Front Bumper	21.0	10.8	7.5	10.7
---------------------	------	------	-----	------

Front of Hood

Post-test Profile (in.)

Top of Front Bumper	37.6	34.5	41.3
---------------------	------	------	------

Front of Hood

Post-test Static Crush (in.)

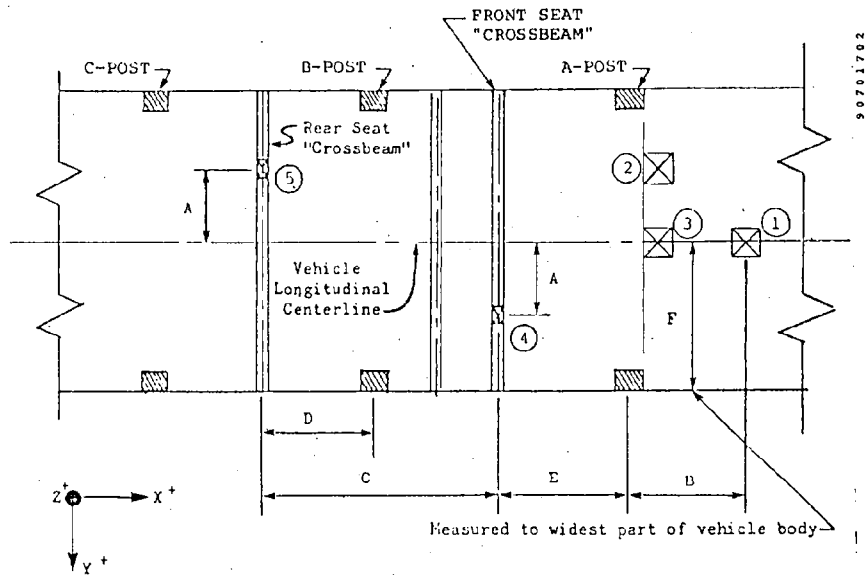
Top of Front Bumper	26.8	27.0	30.6
---------------------	------	------	------

Front of Hood

SECTION 4

TEST VEHICLE ACCELEROMETER LOCATION DEFINITION AND DATA SUMMARY

Dim.	Length (in.)
A ₄	14.5
A ₅	15.5
B	26.1
C	34.5
D	14.5
E	21.3
F	37.7



No.	Location Description	Component Direction			Data Summary Peak G @ MSEC					
		X Y Z			X		Y		Z	
		X	Y	Z	"+"	"-"	"+"	"-"	"+"	"-"
1	Engine	✓		✓	21.1 @ 65	79.8 @ 45			13.5 @ 53	24.4 @ 72
2	Firewall above steering column	✓		✓	42.4 @ 51	63.4 @ 57			37.7 @ 63	21.6 @ 88
3	Firewall @ ve- hicle center- line	✓		✓	9.8 @ 45	51.4 @ 85			33.9 @ 63	29.6 @ 83
4	Below front seat area	✓	✓	✓	20.2 @ 17	45.0 @ 58	33.0 @ 72	29.1 @ 60	62.3 @ 62	45.4 @ 38
5	Below rear seat area	✓		✓	19.1 @ 16	39.5 @ 23			40.6 @ 23	0.7 @ 4

SECTION 4
DUMMY KINEMATIC SUMMARY

DRIVER -

Head impacts steering wheel but does not appear to contact instrument panel. Body rolls slightly inboard during return to upright position. Large thin chrome plastic molding panel popped loose from dash panel on rebound and approached driver head, possibly striking dummy. View was obscured by B-pillar.

PASSENGER -

Body is bent over at waist with moderate force. Forehead appears to lightly contact instrument panel with dummy returning to near upright position leaning slightly forward.

CHILD -

Body is thrown forward with head lightly contacting passenger side front seatback. Later in event, body is thrown rearward with sufficient force to extend both arms. Came to rest leaning laterally with head on window sill near C-pillar.

OTHER COMMENTS:

Passenger and child kinematics difficult to analyze due to lack of adequate coverage by right side cameras.

166L6

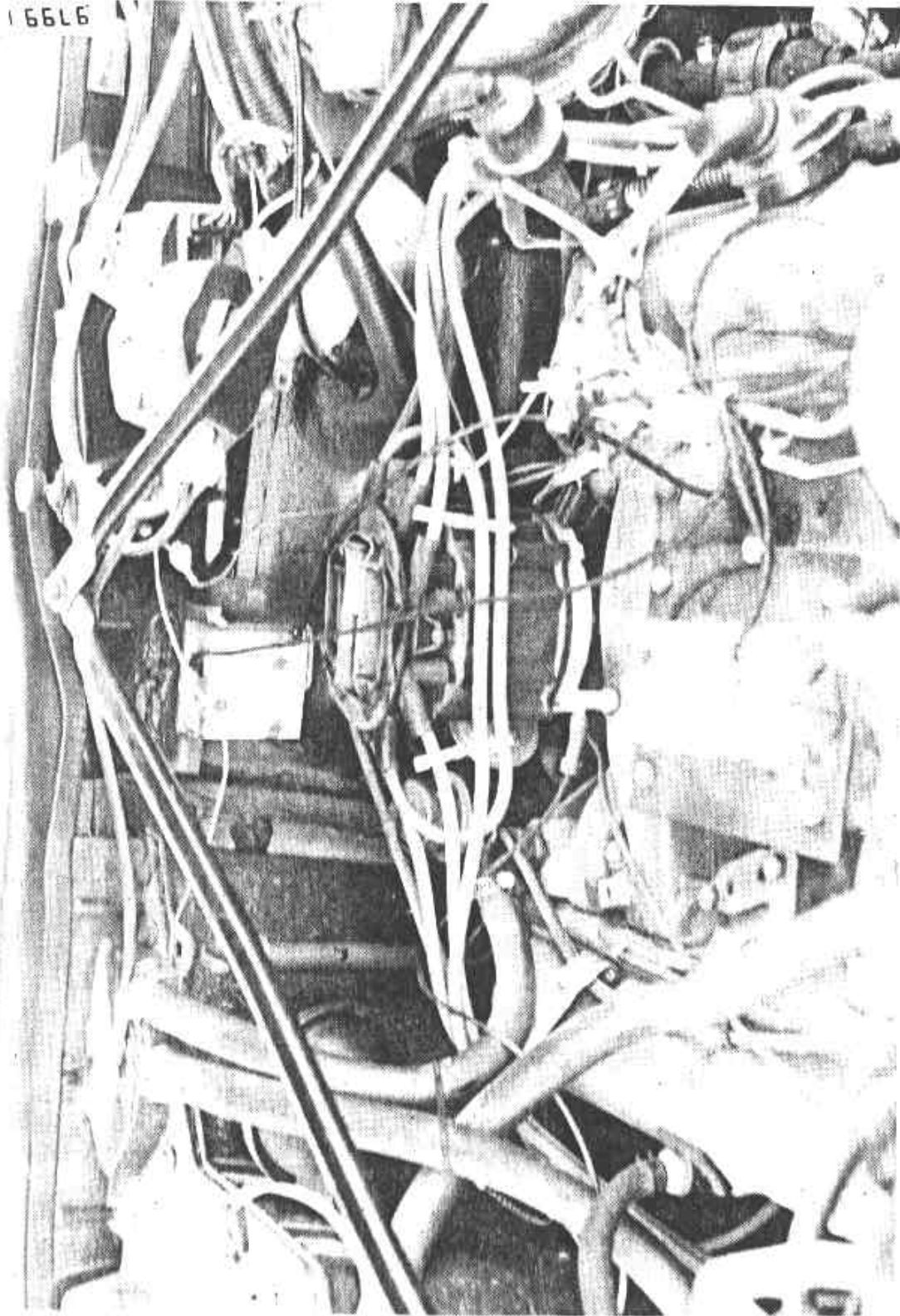


Figure 4-1. Engine Compartment Accelerometer Location.

- hL6L6

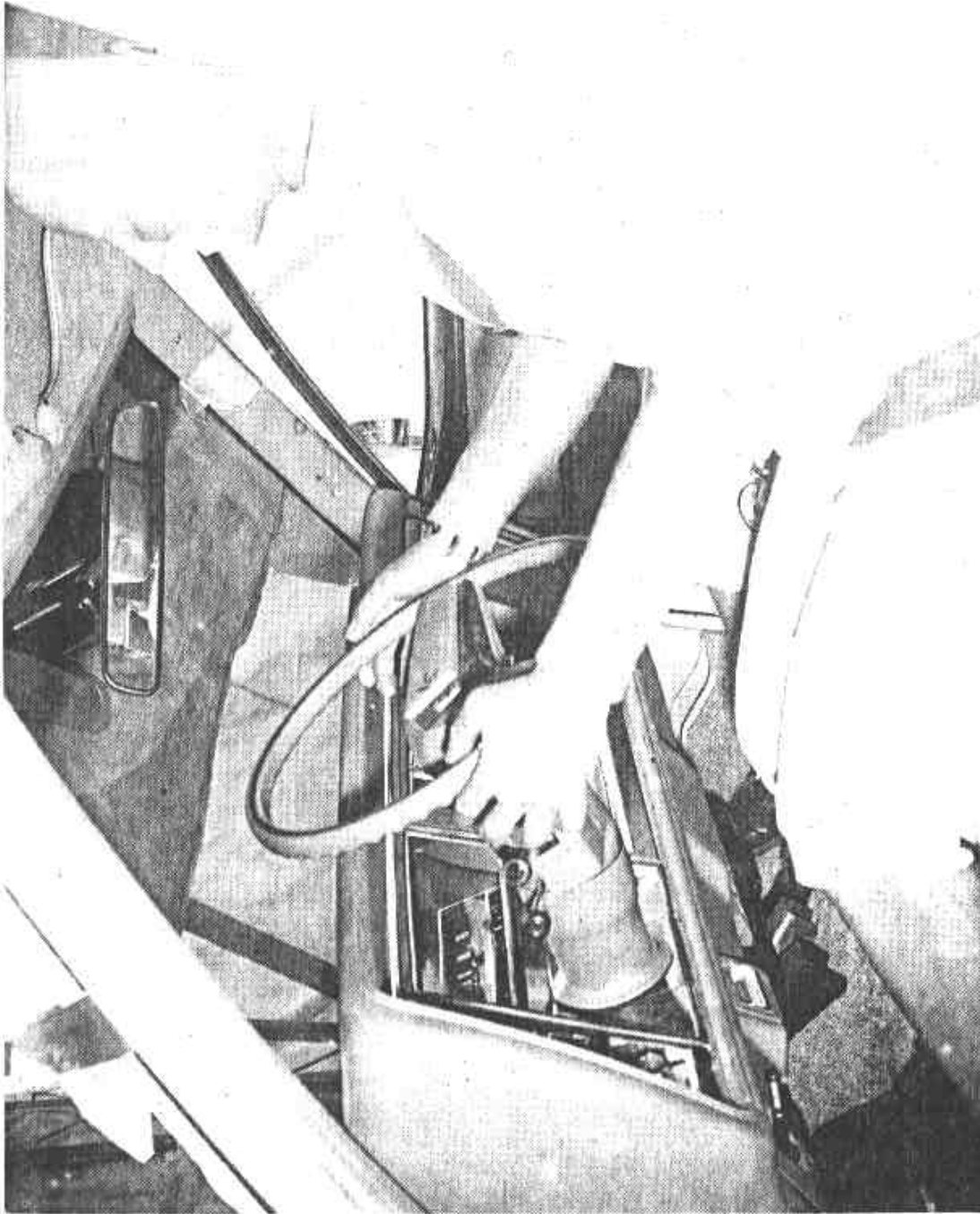


Figure 4-2. Pre-test Driver Dummy Position.

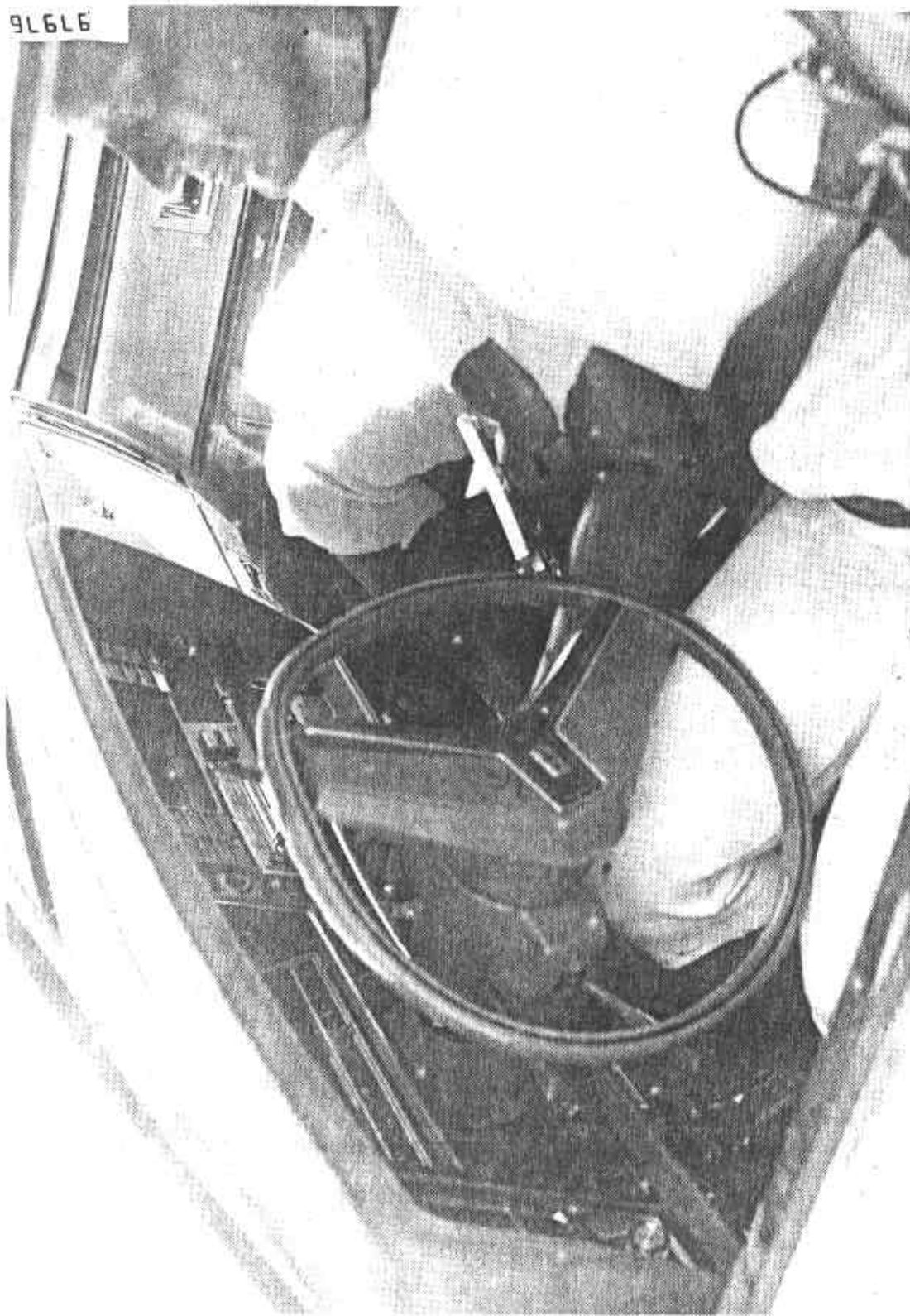


Figure 4-3. Post-test Driver Dummy Position.

966L6



Figure 4-4. Post-test Driver Dummy Position.

666L6

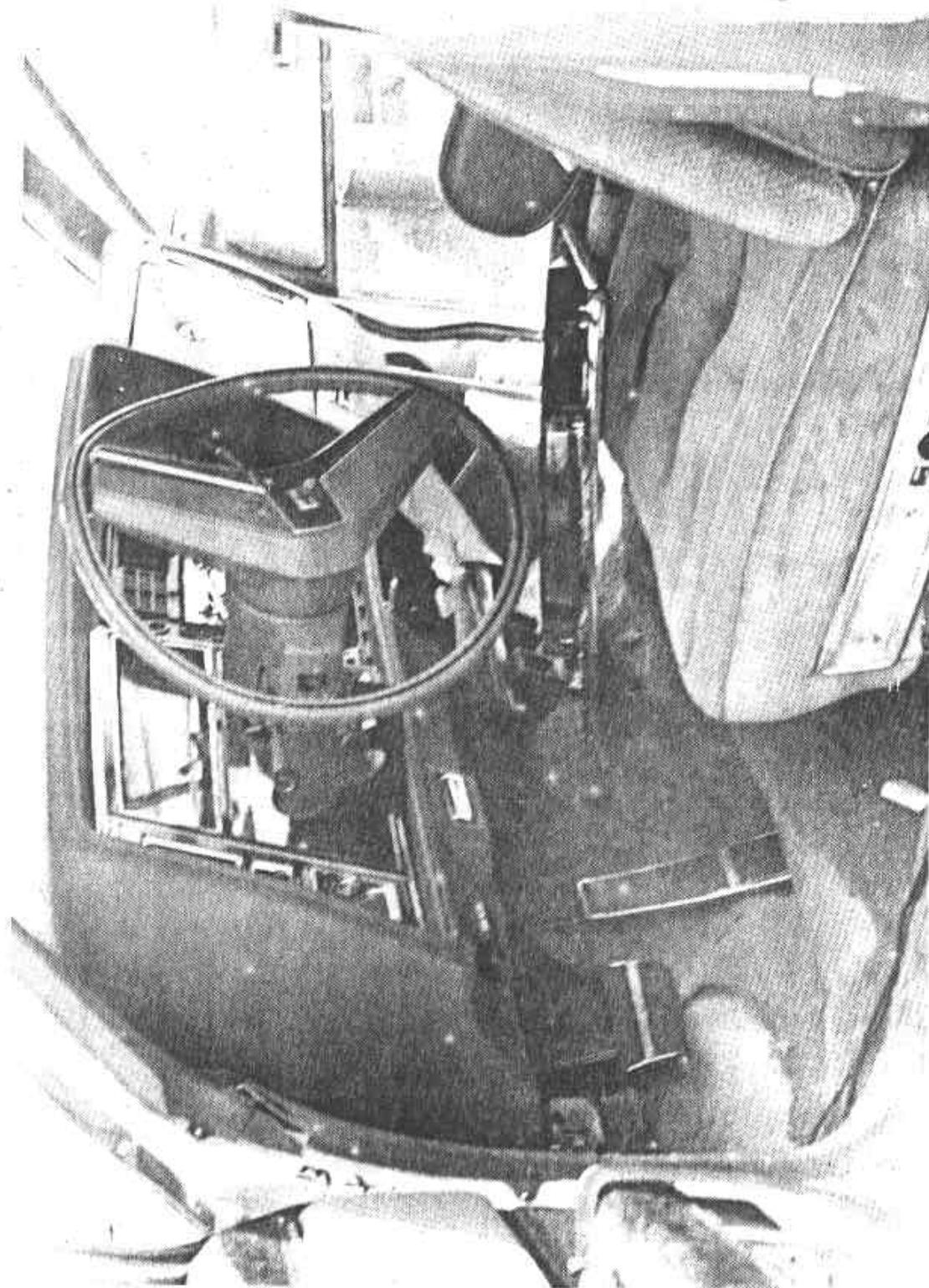


Figure 4-5. Post-test Driver Compartment.

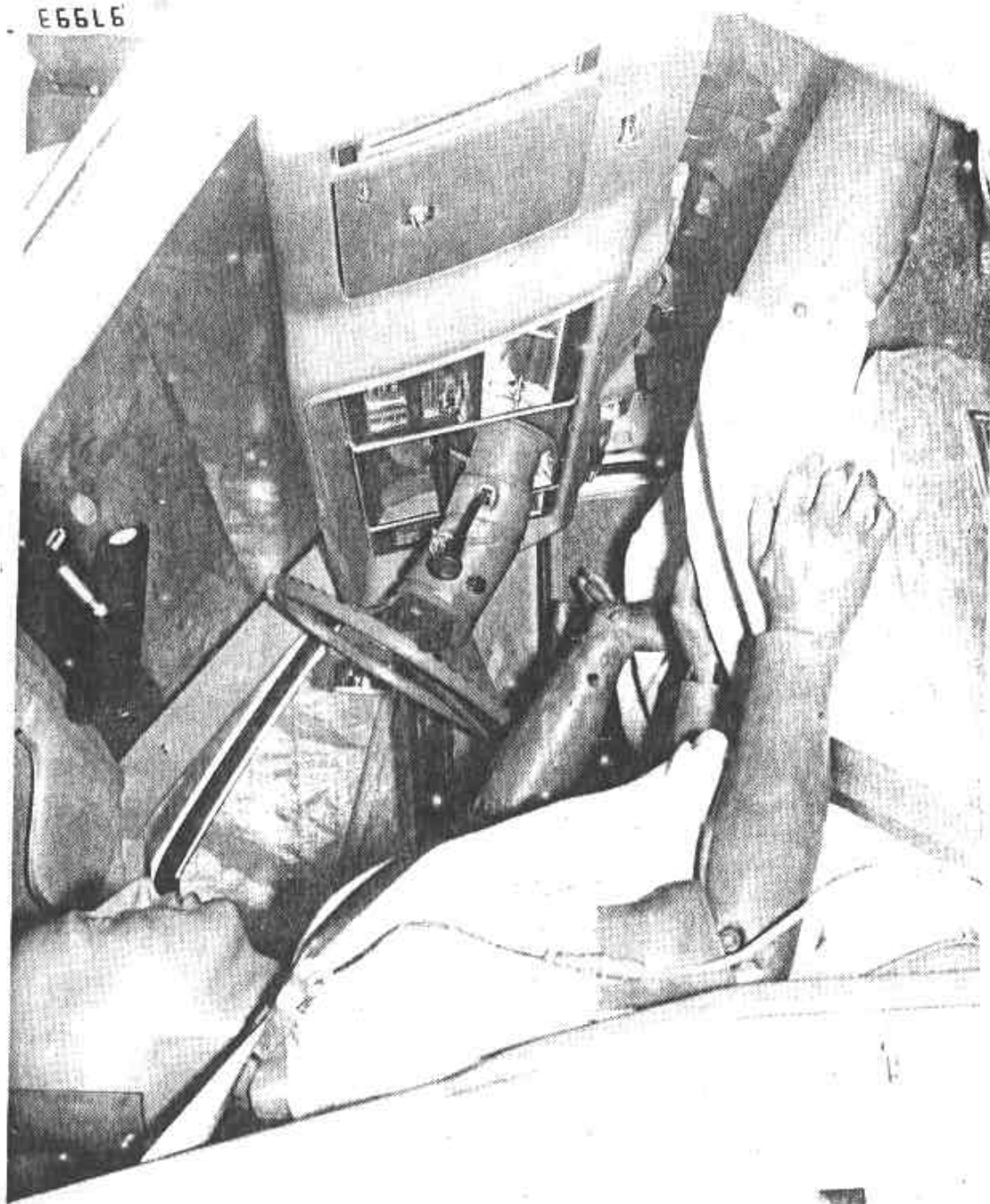


Figure 4-6. Pre-test Passenger Position.

566L6

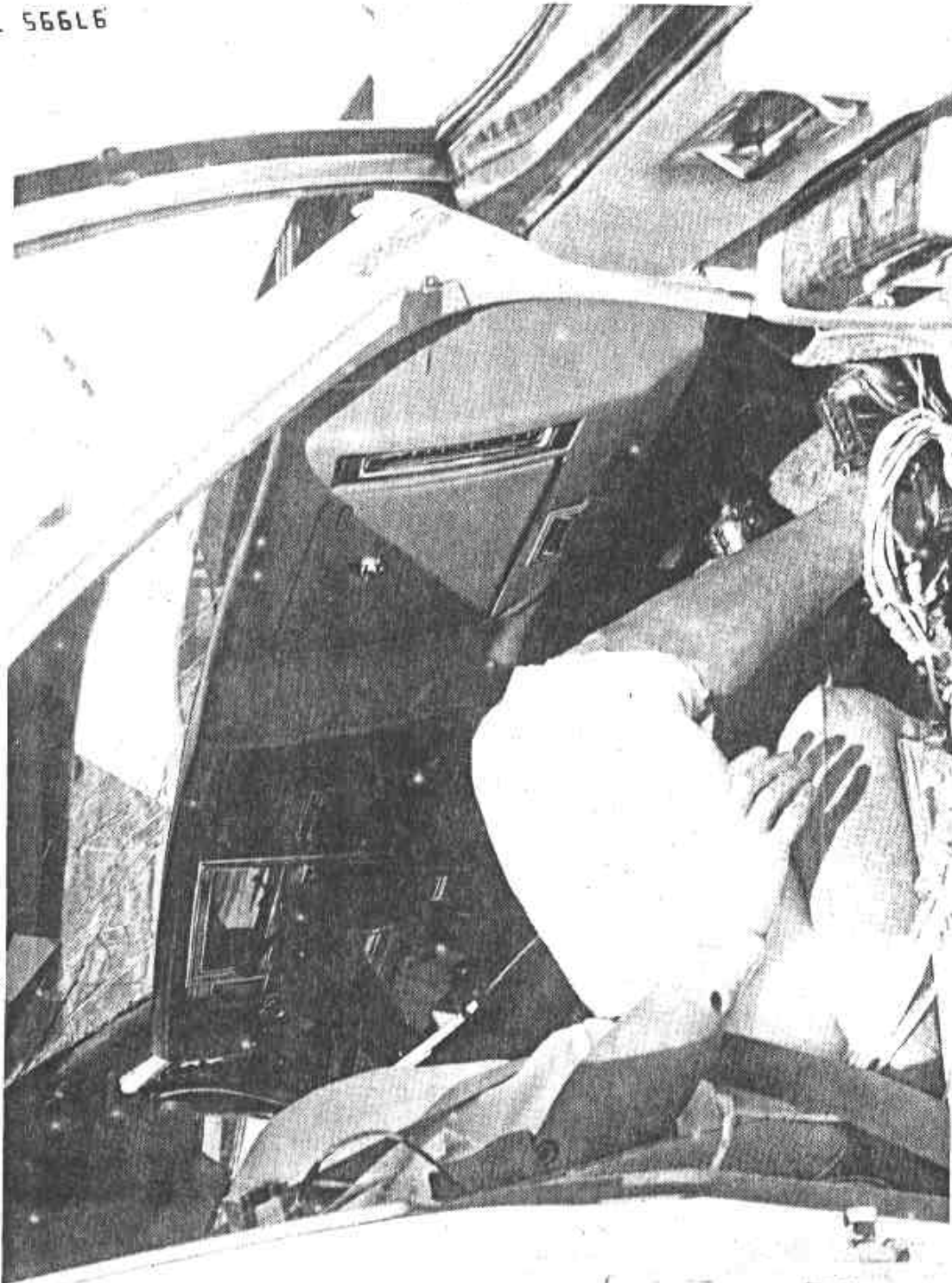


Figure 4-7. Post-test Passenger Position.

- 8L6L6

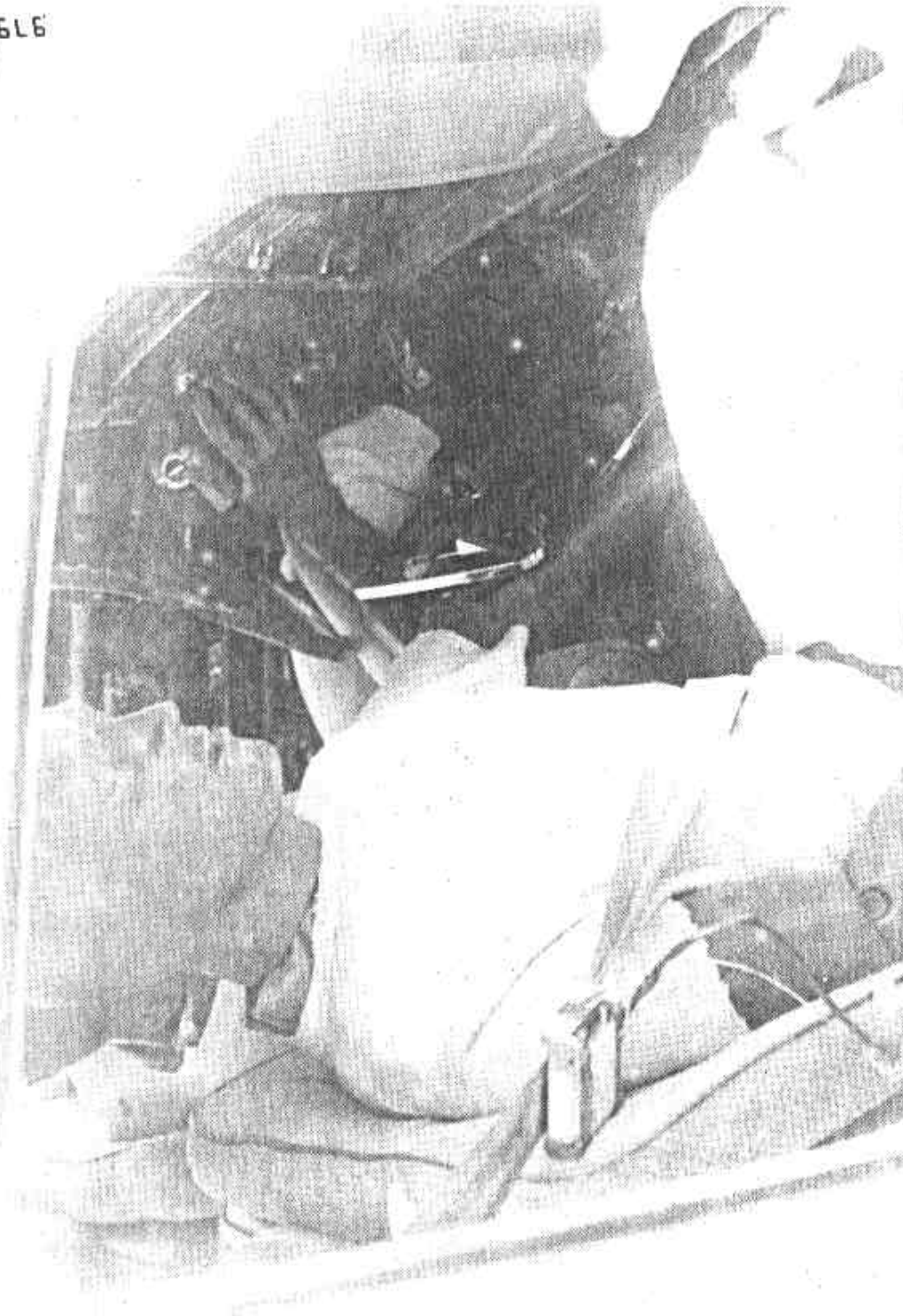


Figure 4-8. Post-test Passenger Position.

86616

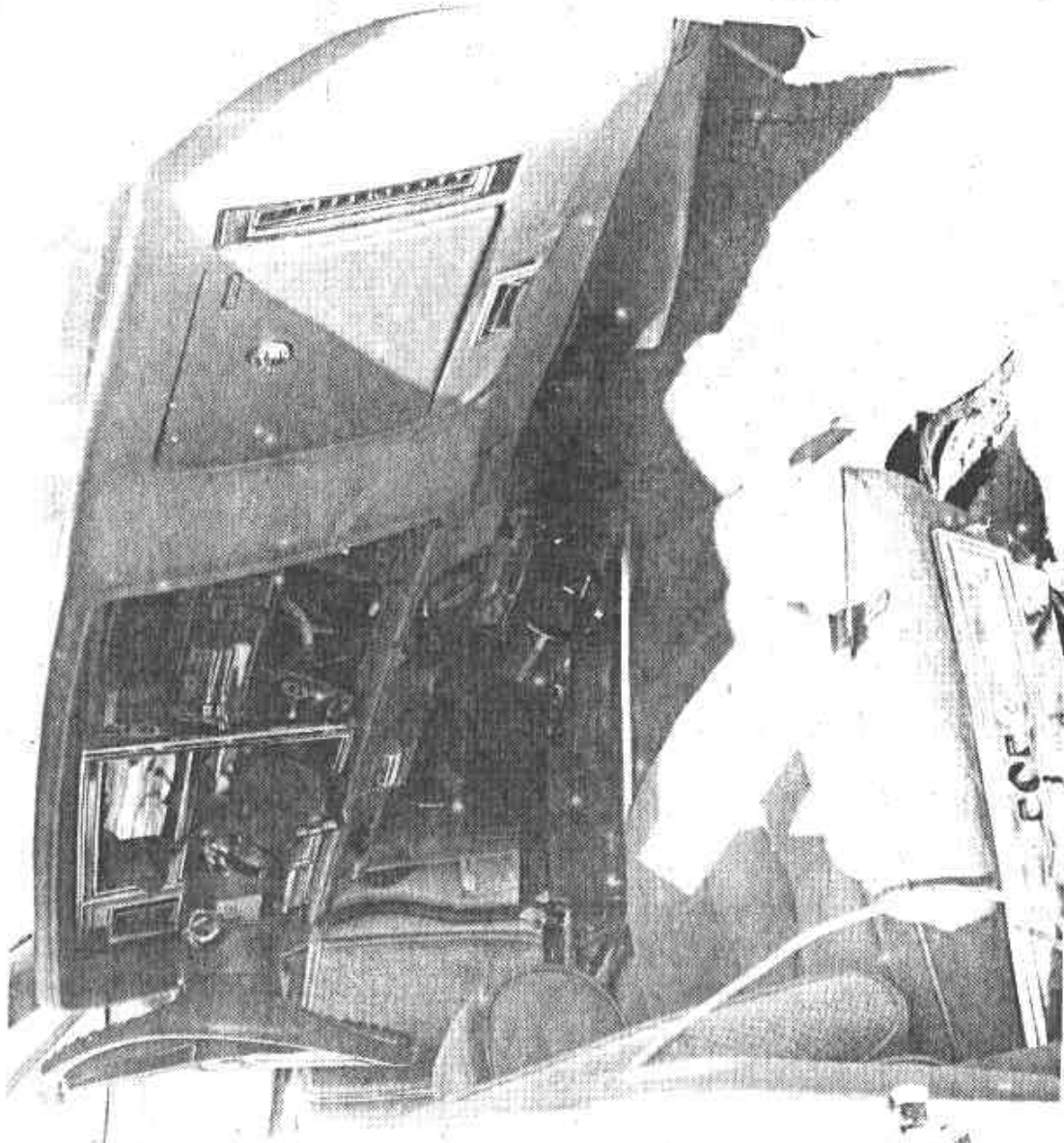


Figure 4-9. Post-test Passenger Compartment (Note: Broken Steering Column Tilt Hinge).

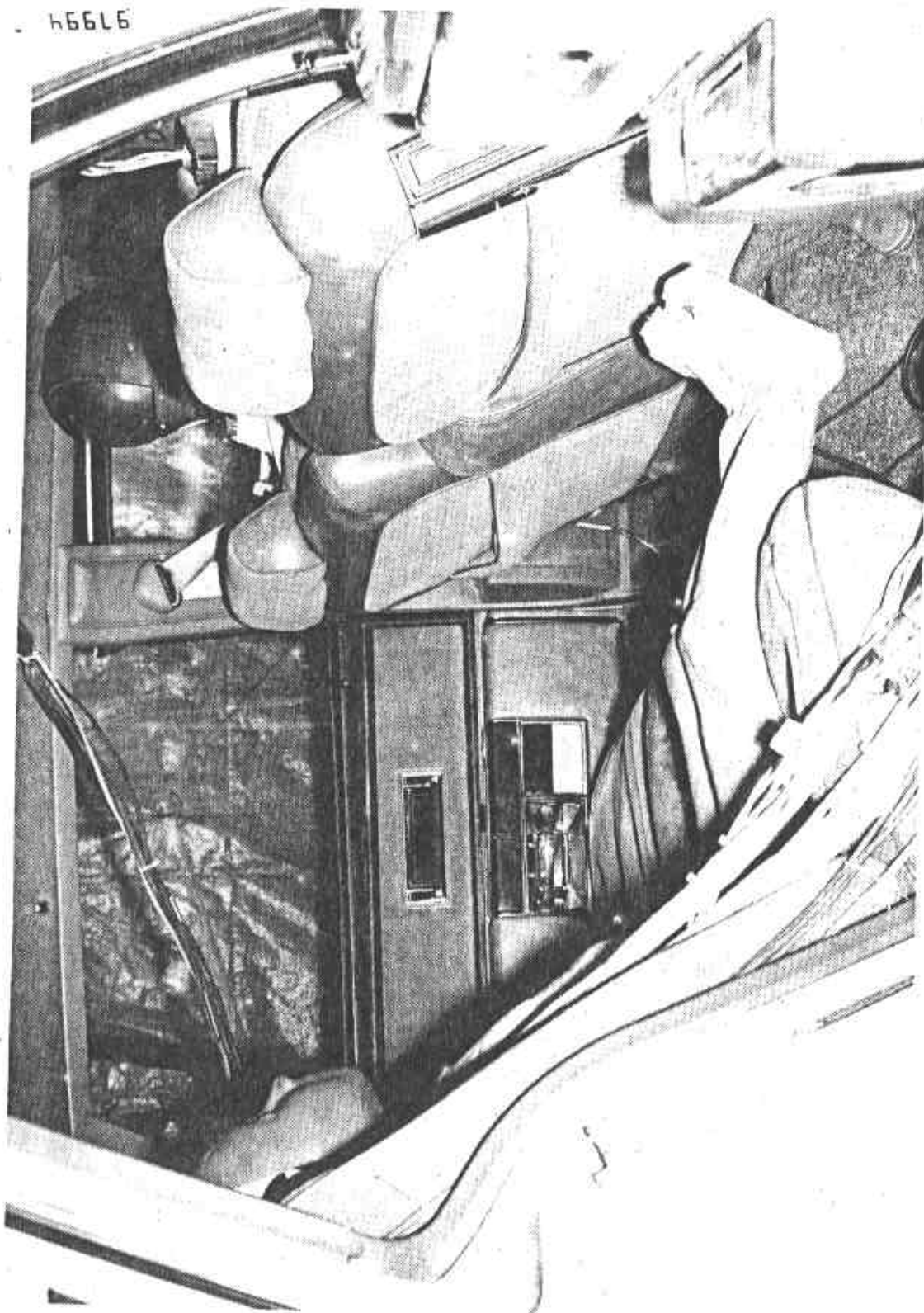


Figure 4-10. Pre-test Child Dummy Position.

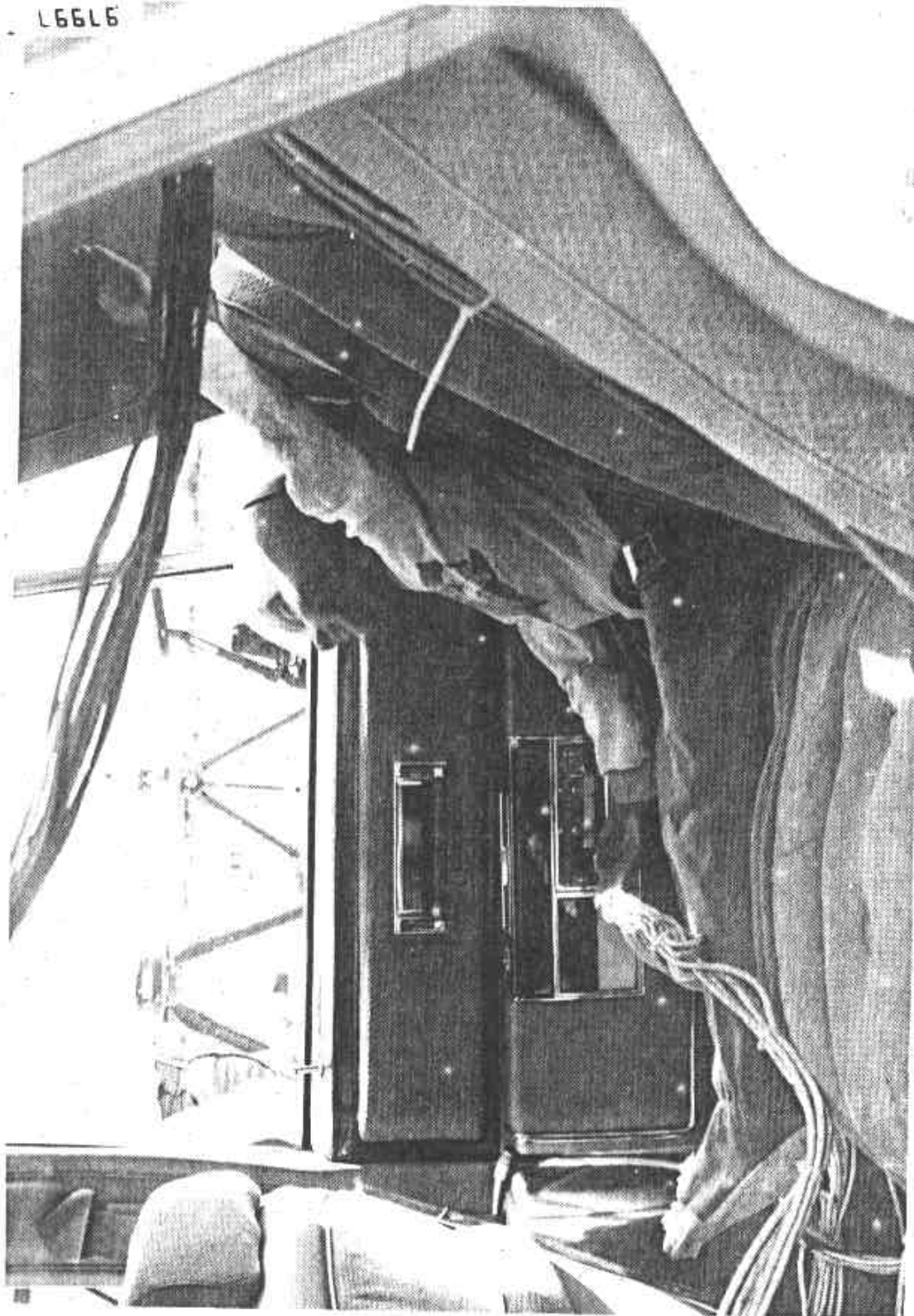


Figure 4-11. Post-test Child Dummy Position.

APPENDIX A
TEST FACILITIES AND PROCEDURE

TEST FACILITY AND EQUIPMENT FOR FMVSS 301-75 and 219 IMPACT TESTS

General Test Facility Description

FMVSS 301-75 and 219 impact tests are conducted at the Dynamic Science, Inc. Phoenix Facility in Phoenix, Arizona. Figure A-1 is an overall aerial view of that facility.

More specifically, the Monorail Impact Facility shown schematically in Figure A-2 is used. As indicated in Figure A-2, the Monorail Impact Facility accommodates a variety of test modes and configurations.

Test Track and Guidance System

The test track consists of 1,200 feet of asphalt pavement (SN = 75 $\pm$ 5), 14 feet in width. The length allows sufficient acceleration distance to accommodate impact speeds in excess of 60 mph with sufficient distance remaining to abort the test if necessary. Guidance for the test vehicle is provided by a sliding shoe attached to the vehicle. The sliding shoe rides on the monorail embedded in the test track. Prior to impact, the shoe is mechanically released from the test vehicle.

Tow System and Velocity Control

The tow system consists of a drum-driven endless cable powered by a pair of 390-cubic-inch engines driven in tandem driving a modified three-speed C-6 automatic truck transmission. The tow system can propel a 6,000-pound vehicle into the fixed barrier at 75 mph. Velocity control is achieved through a manually controlled throttle system. A visual readout of speed versus distance is provided and compared with the "ideal curve." Velocity control under ± 0.5 mph is realizable down to 20 mph and ± 2.0 percent down to zero mph.



1. ENGINEERING/ADMINISTRATION CENTER
2. MECHANICAL/INSTRUMENTATION SHOPS
3. DUMMY CALIBRATION LABORATORY
4. GARAGE/MAINTENANCE SHOP
5. ENVIRONMENTAL CHAMBER
6. STATIC CRUSH FACILITY
7. TWO-MILE OVAL
8. TURNAROUND (TYPICAL OF TWO)
9. BARRIER IMPACT FACILITY
10. DROP TOWER/SLED TEST FACILITY
11. CENTRAL DATA ACQUISITION AND CONTROL STATION
12. PENDULUM FACILITY
13. NONMETALLICS LABORATORY
14. TEST SERVICE FACILITY
15. VEHICLE-TO-VEHICLE TEST FACILITY
16. ROLLOVER TEST FACILITY
17. RIDE QUALITY COURSE
18. SKID PAD
19. HIGH AND LOW SKID NUMBER BRAKING LANES
20. SALT WATER TROUGH
21. BELGIAN BLOCK
22. PARKING BRAKE TEST RAMP
23. PULL-OFF AREA (TYPICAL OF THIRTEEN)
24. BALLISTIC TEST RANGE

Figure A-1. The Dynamic Science, Inc. Phoenix Facility.

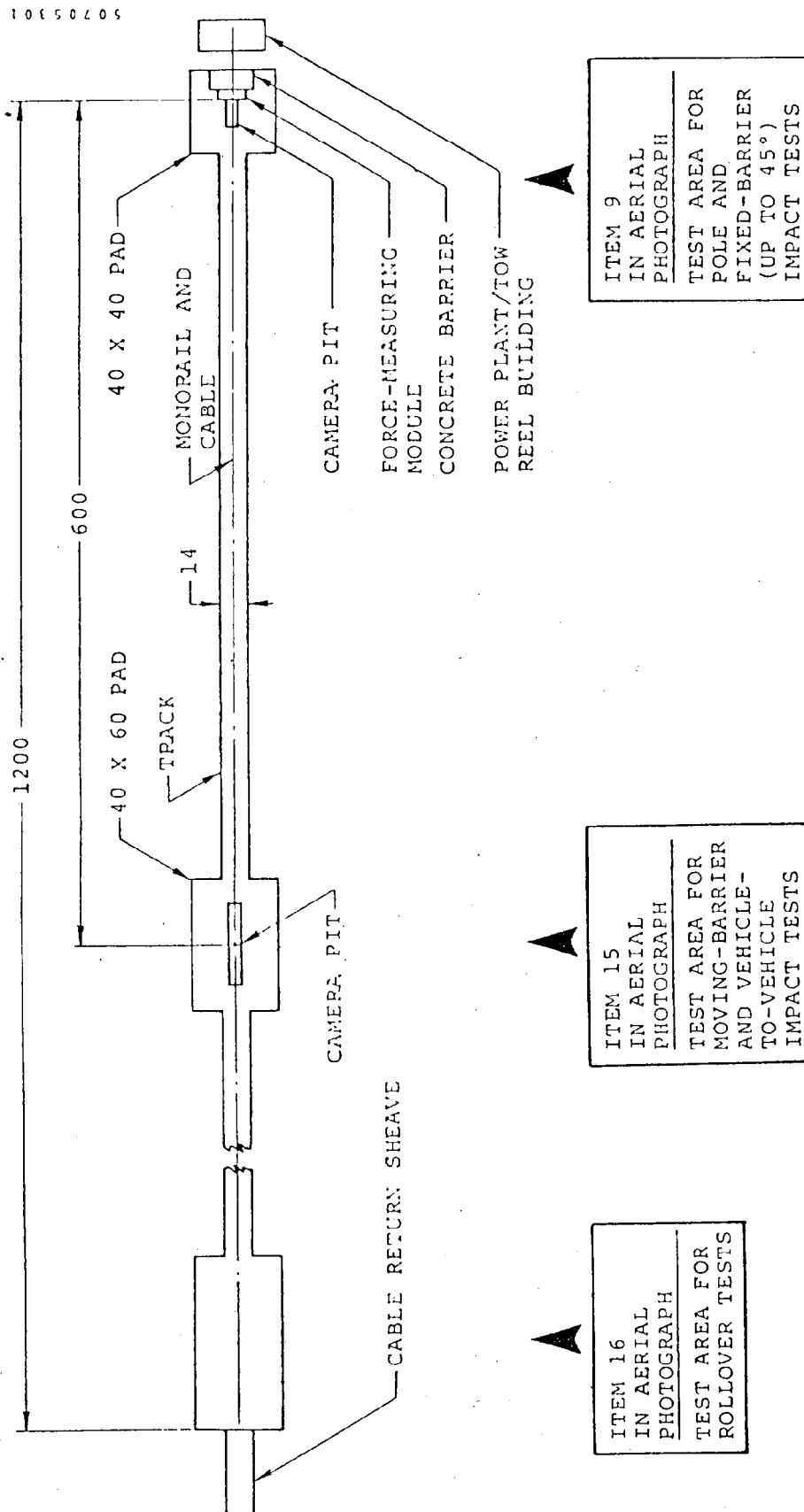


Figure A-2. Monorail Impact Facility.

Automatic abort capability is provided through the vehicle service brakes which are actuated by releasing high-pressure air into the hydraulic system. Abort criteria consist of vehicle speed, data acquisition and instrumentation system readiness, and stability of the vehicle on the test track. The first two criteria are automatically monitored by the test control system, while the third criterion is visually monitored by the test conductor. Manual abort provisions are available to the test conductor. Upon verifying vehicle speed, the test control system automatically deactivates the abort system to preclude inadvertent test abort immediately prior to impact.

Control System

The master control system used for impact tests controls and monitors all primary system functions that must operate throughout a predetermined interval during a test. This includes the starting and stopping of the tape recorder, high-speed cameras, and oscillograph, and control of the power winch which propels the test vehicle. The operation of the various devices is confirmed, including vehicle velocity and tape recorder speed synchronization, before it passes through a "commit" window. When the vehicle is committed, the abort system is disarmed, preventing an accidental abort after the point of no return is reached.

Any system malfunction, including improper vehicle velocity up to the commit window, generates an abort. The control system uses the pulse output from the IRIG time base generator as a clock with a manual push button defining time zero. The logic circuits compare pulse counts from time zero to preset values dialed in at the control panel. As each control circuit gets an equal comparison, that circuit is turned on. If the self-test circuit does not verify, the abort system is automatically activated. After successful vehicle test, the last control circuit shuts the entire system down. The manual backup control system provides the test conductor the option for manually aborting the test if the need arises.

Fixed Collision Barrier

The basic fixed collision barrier conforms to the definition in Part 571-1, Paragraph 571.3 - Definitions, 36 F.R. 11242, dated July 14, 1970 and effective September 1, 1970. The fixed impact barrier is a reinforced concrete structure, 6-feet high, 6-feet thick, 12-feet wide, and weighing approximately 100,000 pounds. The barrier face is adjustable for conducting 30-degree oblique impact tests.

Fuel Simulation

As prescribed in the FMVSS 301-75 Laboratory Procedure, the vehicle fuel system is filled to 90-91 percent of capacity with Stoddard Solvent.

The fuel is pumped out of the fuel tank, and the residual fuel in the fuel lines and the carburetor is burned by operating the vehicle engine. The fuel system is filled with Stoddard Solvent No. 2. The solvent is then pumped into the fuel lines, up to the carburetor. The weight of the Stoddard Solvent added and removed is determined with two Western Beam Scales (Model No. WP 2000).

The solvent used, Stoddard Solvent No. 2, has a specific gravity of 0.764 at 75°F and a viscosity of 0.99 centistokes.

Windshield Zone Intrusion Template

A windshield zone intrusion template is laid out and fabricated for each vehicle to spatially define the windshield protected zone.

Windshield Protected Zone Boundaries

The lower boundary of the protected zone is determined as follows:

1. A 6.5-inch diameter rigid sphere, weighing 15 pounds, is positioned so it simultaneously contacts the inner surface of the windshield glazing and the surface of the instrument panel, and the locus of points contacted by the sphere is marked. The line is then extended horizontally to the edge of the glazing material.
2. A line is drawn on the inner surface of the windshield below and one-half inch distant from the locus of points determined in Step 1.

The top and side boundaries of the zone are the top and sides of the windshield opening. The protected zone extends three inches outward from the outer surface of the windshield measured perpendicular to any point along the outer boundary of the zone. The protected zone is shown in Figure A-3.

Fabrication of Windshield Zone Intrusion Template

In order to determine whether or not there is any penetration into the protected zone, FMVSS No. 219 specifies that a template be formed of Styrofoam, type DB, cut cell, conforming to the shape of the zone and attached to the windshield. The Styrofoam exhibits essentially only plastic deformation characteristics, making it excellent for recording possible intrusion but difficult to shape to the windshield contour. The ultimate thickness of 3 inches is achieved by laminating six 1/2-inch-thick layers which can be individually bent to the windshield curvature, an operation not possible with 3-inch-thick Styrofoam because of its brittleness. The laminations are glued together in place on the windshield and the 45° bevel is applied to the perimeter of the template after it is bonded to the windshield.

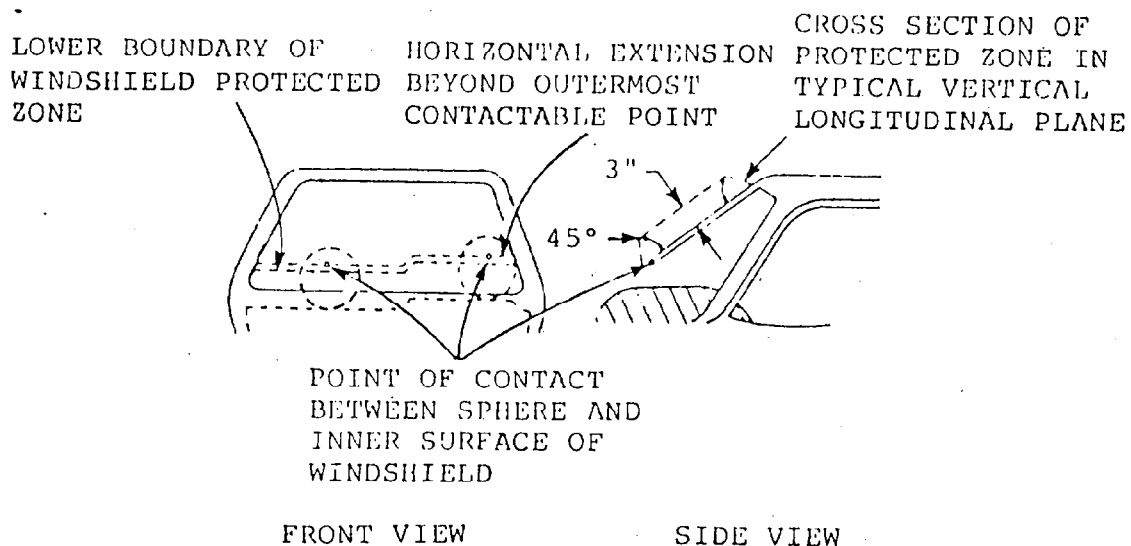


Figure A-3. Windshield Protected Zone.

Camera Coverage

Eight high-speed cameras are positioned on and around the impact barrier and test vehicle to provide total coverage of the barrier impact (Figure A-4). Specific locations are:

1. Left side overall
2. Offboard vehicle right side to view windshield.
3. At the front end of the pit to view possible fuel spillage in the engine compartment.
4. In the pit under the fuel tank to view possible fuel spillage from the tank.
5. Right side closeup of dummy motion and the windshield zone template.
6. Left side closeup of dummy motion and the windshield zone template.
7. On the barrier to provide a front view of the windshield template.

CAMERA LEGEND*

- ① LEFT SIDE OVERALL
- ② OFFBOARD RIGHT WIND-SHIELD
- ③ PIT (FRONT)
- ④ PIT (REAR)
- ⑤ RIGHT SIDE CLOSEUP PASSENGER
- ⑥ LEFT SIDE CLOSEUP DRIVER
- ⑦ BARRIER
- ⑧ OFFBOARD RIGHT CHILD
- ⑨ OFFBOARD RIGHT CLOSEUP

FIXED COLLISION
BARRIER PER PART
571-1, PARA. 571-3 -
DEFINITIONS, 36 F.R.
11242, 7-14-70

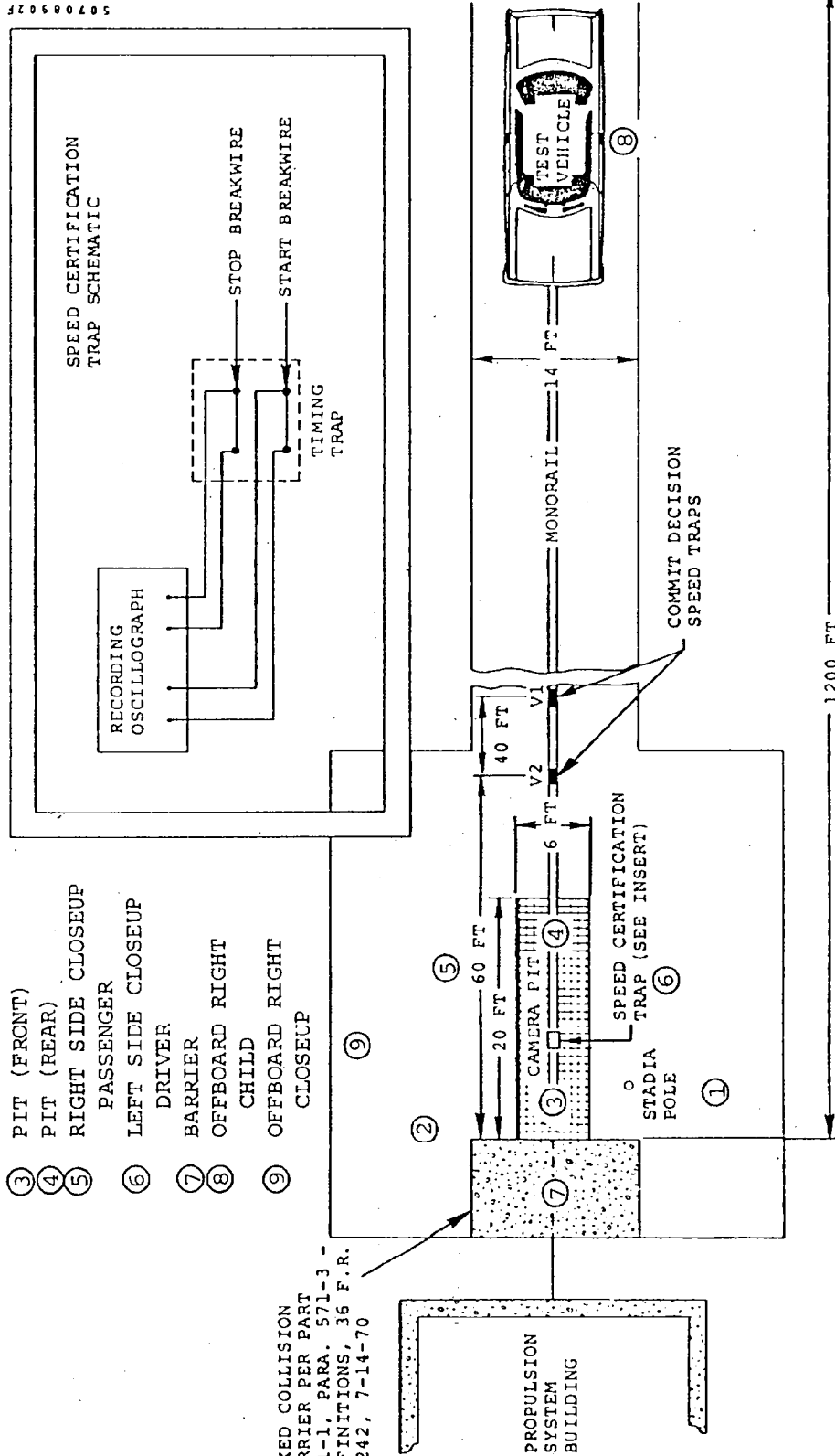


Figure A-4. FMVSS 301-75 and 219 (Frontal Impact Test) Barrier Test Site Layout.

Test Equipment List and Function

<u>Item</u>	<u>Manufacturer</u>	<u>Model</u>	<u>Purpose</u>
Timing Trap	Dynamic Science	None	Determine impact speed by furnishing a start and stop signal to recording oscillograph.
Oscillograph	Bell and Howell	5-134	Records timing start and stop signals from timing traps, cable drum drive rpm, and impact switch.
Speed Control	Dynamic Science	None	Precision control of cable drive drum rpm.
Beam Scales	Western	WP 2000	Used to determine vehicle test weights.
High-speed Motion Picture Cameras	Photsonics Milliken Red Lake Labs	16-1B 5A 164-5AC	Used for front, side, overhead, and underside film coverage.
Motion Picture Camera	Canon Scoopic		Panning and documentation.
Still Camera	Mamiya	RB 67	Documentary photo coverage.
100 and 1000 Hz Time Code Generators	Dynamic Science	None	Furnish timing signal for high-speed cameras and a 1 second timing for velocity determination.
Stop Watch	Brietling	None	Time for collection of fuel leak samples.
Containers	-	-	Collection for fuel leak samples.
Graduated Cylinder	Pyrex	3022	Fuel volume measurement.
Graduated Cylinder	Kimax	-	Fuel volume measurement.
Calibrated Steel Rule	Starret	48 in.	Precision measurement of velocity trap spacing.
Anthropomorphic Dummies	Alderson Research Labs	Hybrid II	To ballast the vehicle and to gather occupant response data.

8. Offboard right to view child in rear seat.
9. Offboard right to view two-thirds of vehicle.

Ballast Weight

The ballast used in this program is weighed on a Howe platform scale prior to installation in the test vehicle.

The platform scale is calibrated by placing precision weights thereon and recording the scale reading. The accuracy of the ballast weights is:

- $\pm 1/2$ pound for 0 to 300-pound weights
- ± 1 pound for 300 to 1000-pound weights.

Vehicle Weight

The weights of the test vehicle are determined by placing each wheel on a Western Model WP 2000 beam scale, certified with test weights scaled to National Bureau of Standards Class B tolerances.

Dummy Positioning

The following table summarizes the steps taken to position the instrumented, calibrated dummies in the test vehicle. The dummies were kept in a temperature-controlled enclosure at the head of the track until t-30 seconds. The temperatures both in the enclosure, and the outside ambient temperature were recorded immediately prior to rollout.

DUMMY PLACEMENT AND POSITIONING

Part 572 Dummy	Driver DSP	Passenger DSP
HEAD	Surface of transverse instrument mounting platform is horizontal & midsagittal plane falls in longitudinal plane.	Surface of transverse instrument mounting platform is horizontal & midsagittal plane falls in longitudinal plane.
UPPER TORSO	Placed against seat back. Midsagittal plane is vertical & longitudinal & passes through center point of steering wheel rim.	Placed against seat back. Midsagittal plane is vertical, longitudinal, & the same distance from vehicle longitudinal centerline as driver dummy midsagittal plane.
UPPER ARMS	Initially placed against seat back & tangent to side of Upper Torso. Push arms rearward into seat back with bending at elbows.	Initially placed against seat back & tangent to side of Upper Torso. Push arms rearward into seat back with bending at elbows. Remains tangent.
LOWER ARMS	Initially placed against the outside of the thighs. Centerline as close as possible in a vertical plane.	Initially placed against the outside of the thighs. Centerline as close as possible in a vertical plane.
HAND PALMS	Palms contact outer part of steering wheel rim at horizontal centerline.	Palms contact the outsides of the thighs.
HAND THUMBS	Placed over steering wheel rim.	
HAND LITTLE FINGERS		Barely in contact with the seat cushion.

DUMMY PLACEMENT AND POSITIONING (CONTD)

Part 572

Dummy	Driver DSP	Passenger DSP
LOWER TORSO	Centered on bucket seat cushion. Midsagittal plane is vertical & longitudinal. For bench seat, midsagittal plane is vertical & longitudinal & passes through center point of plane described by steering wheel rim.	Centered on bucket seat cushion. Midsagittal plane is vertical & longitudinal. For bench seat, midsagittal plane is vertical, longitudinal, and same distance from vehicle longitudinal centerline as driver dummy midsagittal plane.
UPPER LEGS (thighs or femurs)	Placed against seat cushion. Plane defined by femur and tibia centerlines is as close as possible to vertical.	Placed against seat cushion. Plane defined by femur and tibia centerlines is as close as possible to vertical.
RIGHT KNEE	Knees initially set 14.5" apart between pivot bolt head outer surfaces.	Located so that plane defined by femur and tibia centerlines is as close as possible to vertical.
LEFT KNEE	Outer surface of pivot bolt head is 5.9" from midsagittal plane of dummy.	Located as above.
LOWER LEGS (tibias)	Plane defined by femur and tibia centerlines is as close as possible to vertical longitudinal plane.	Plane defined by femur and tibia centerlines is as close as possible to vertical longitudinal plane.
RIGHT FOOT	Placed on undepressed accelerator pedal--rearmost point of heel on floorpan in plane of pedal.	Centerline falls in vertical longitudinal plane. Placed on toeboard--rearmost point of heel on floorpan as close as possible to intersection of toeboard and floorpan.
LEFT FOOT	Placed on toeboard--rearmost point of heel on floorpan as close as possible to intersection of toeboard and floorpan. Centerline falls in vertical longitudinal plane.	Centerline falls in vertical longitudinal plane. Placed on toeboard--rearmost point of heel on floorpan as close as possible to intersection of toeboard and floorpan.

APPENDIX B
CALCOMP PLOT PRESENTATION

Calcomp plots generated from the crash test data are presented on the following pages. All data will be recorded on magnetic tape for inclusion in the NHTSA crash test data base system. All data was filtered according to SAE J211. Plot legends and test anomalies are listed below:

PLOT LEGEND

Dummy Data*

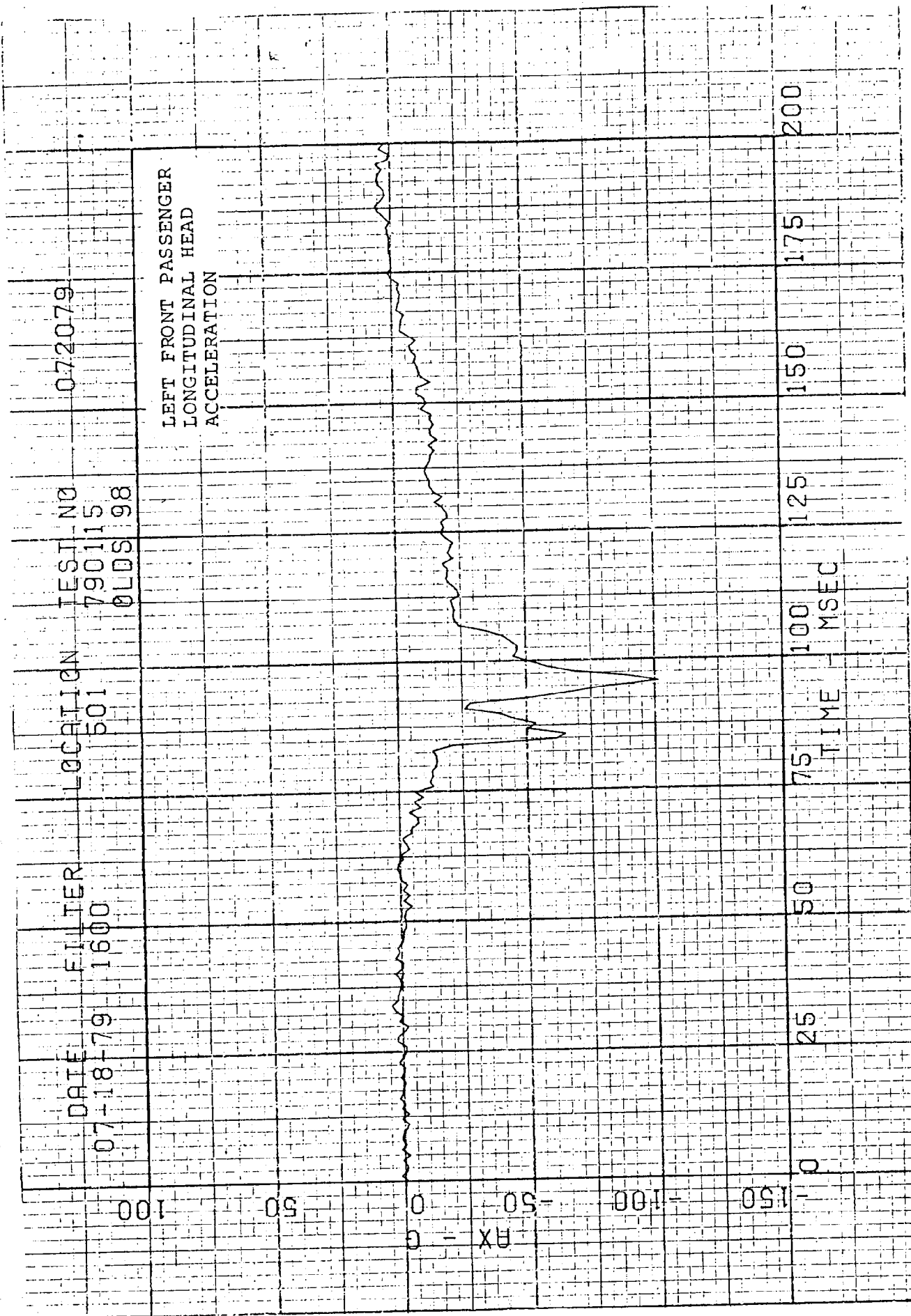
Driver	RF Outboard Passenger	RR 6-year- Child	Data Description
501	503	506	Head Acceleration
1101	1103	1106	Chest Acceleration
2111	2131	2161	Left Femur Load
2112	2132	2162	Right Femur Load
4101	4103	-	Torso Belt Load

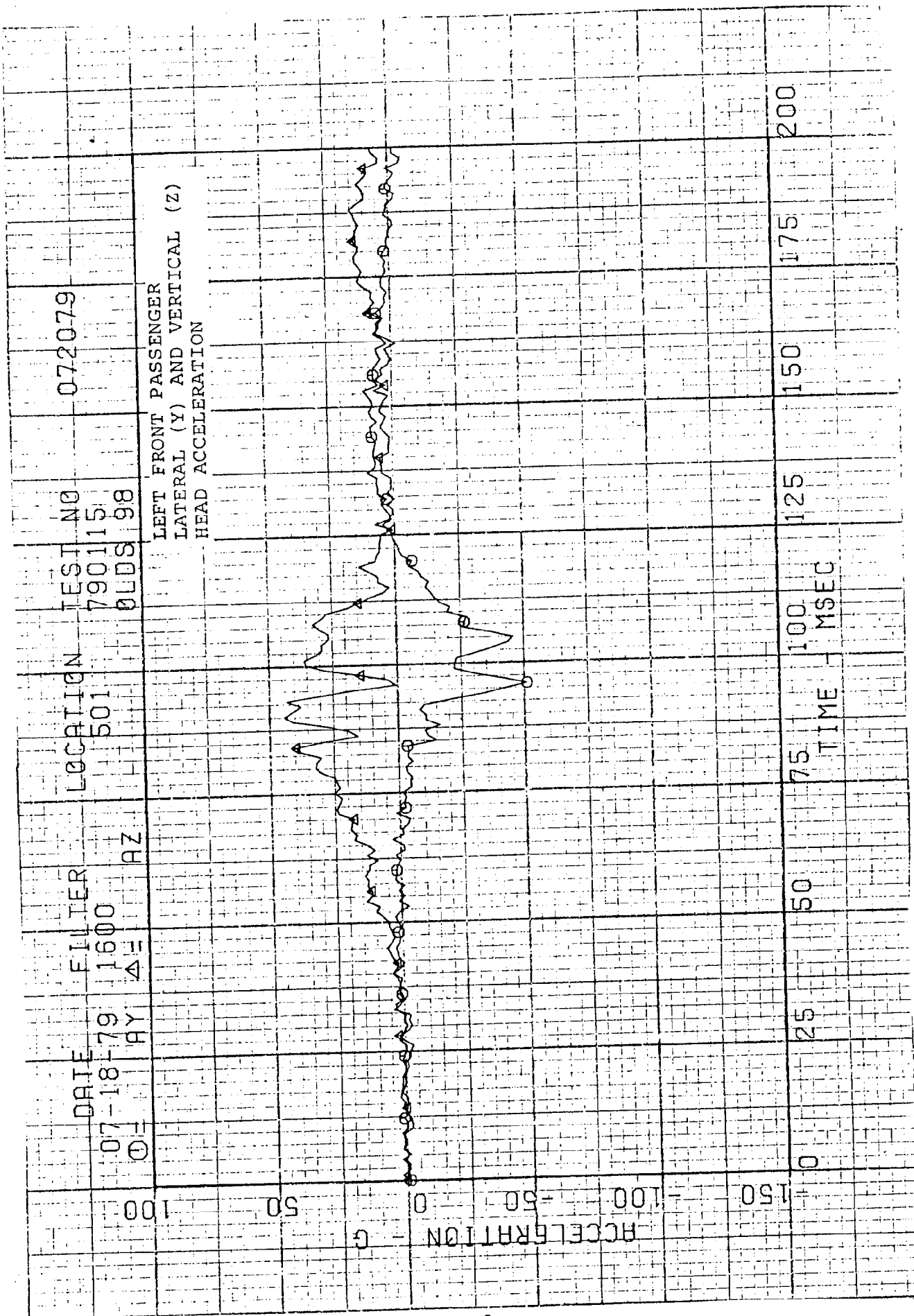
Vehicle Data**

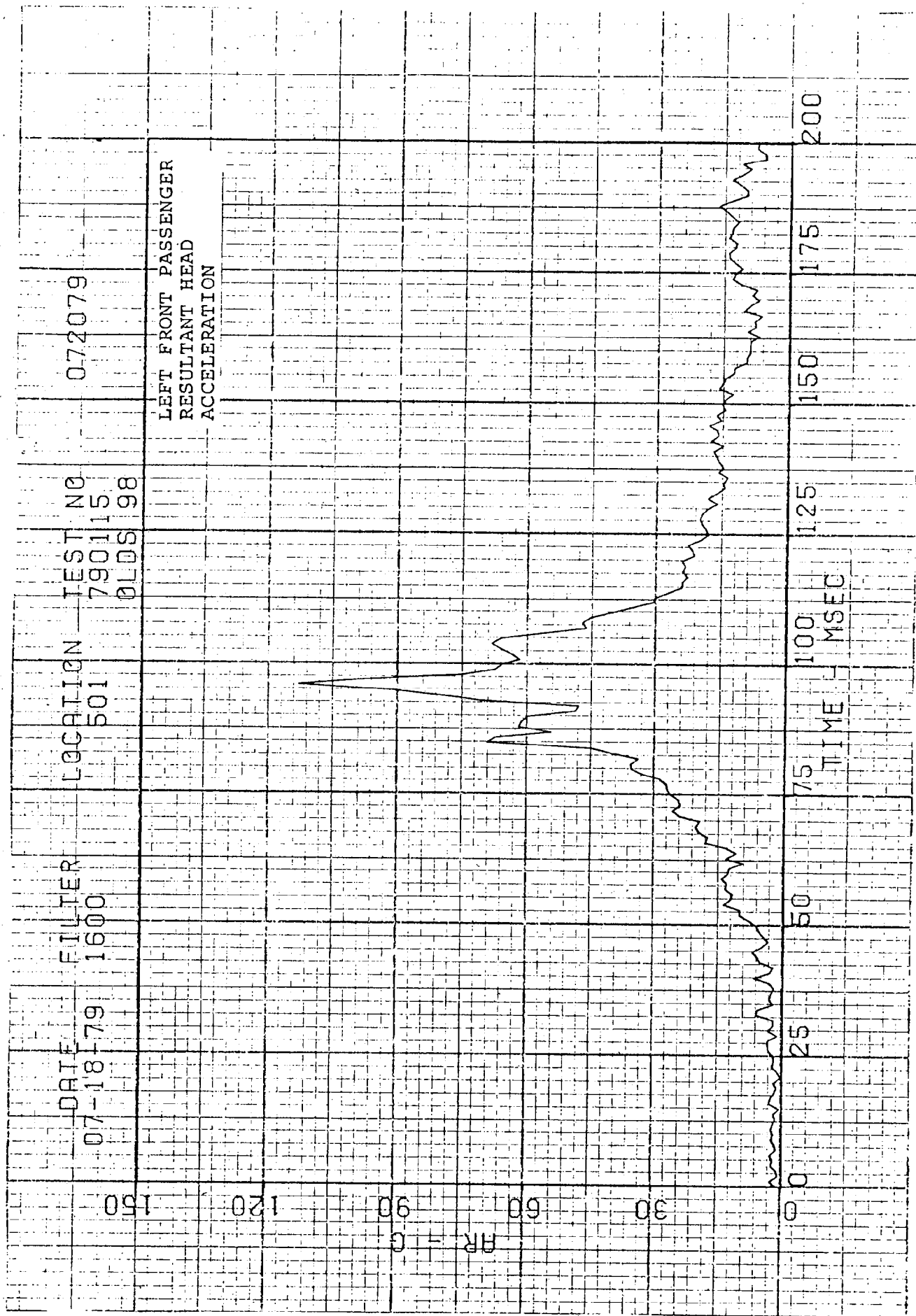
	Location
101	Engine
102	Firewall
103	Firewall at Vehicle Centerline
104	Front Seat Area
105	Rear Seat Area

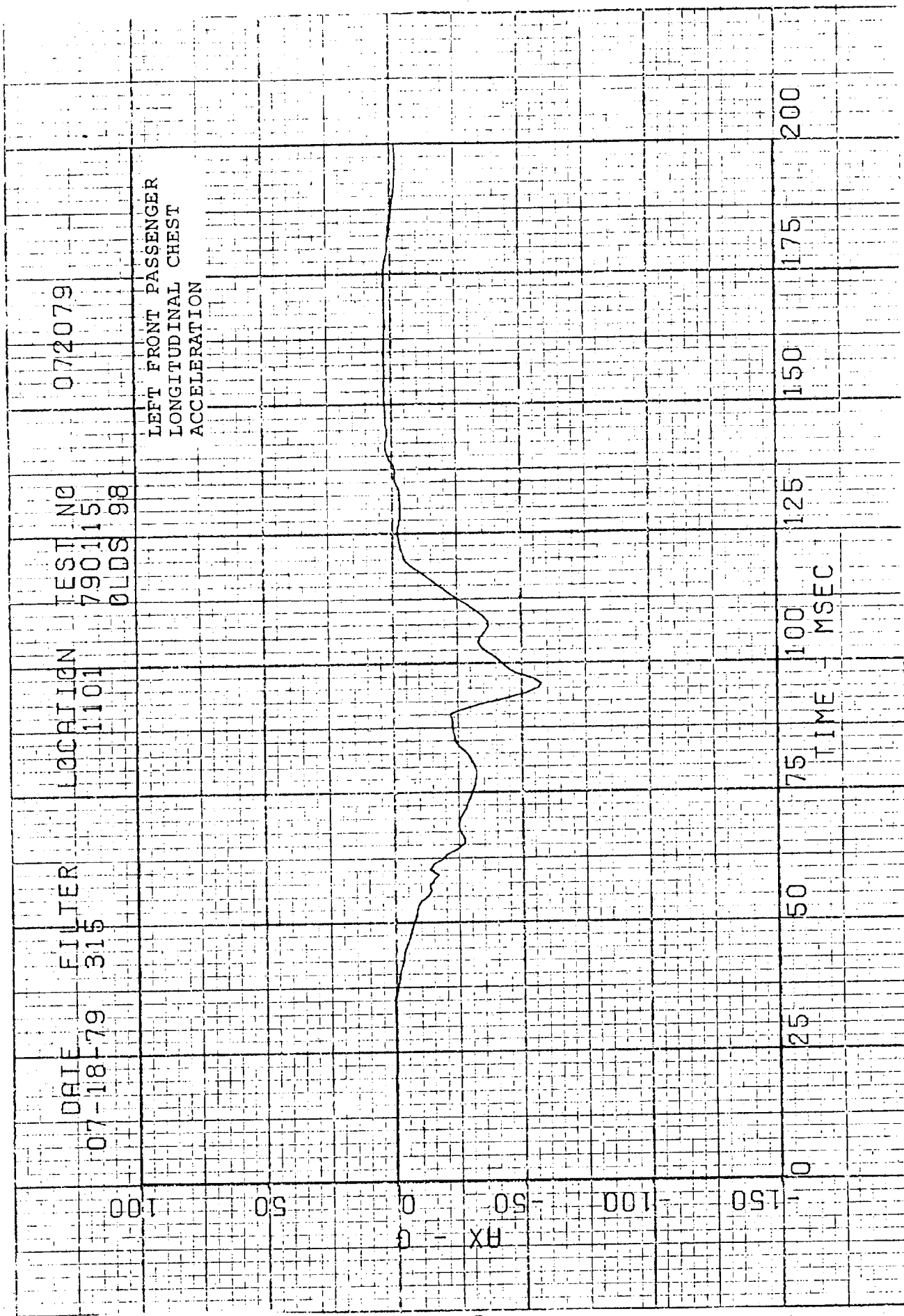
*Dummy Injury Summary presented on pages 4-4 and 4-5.

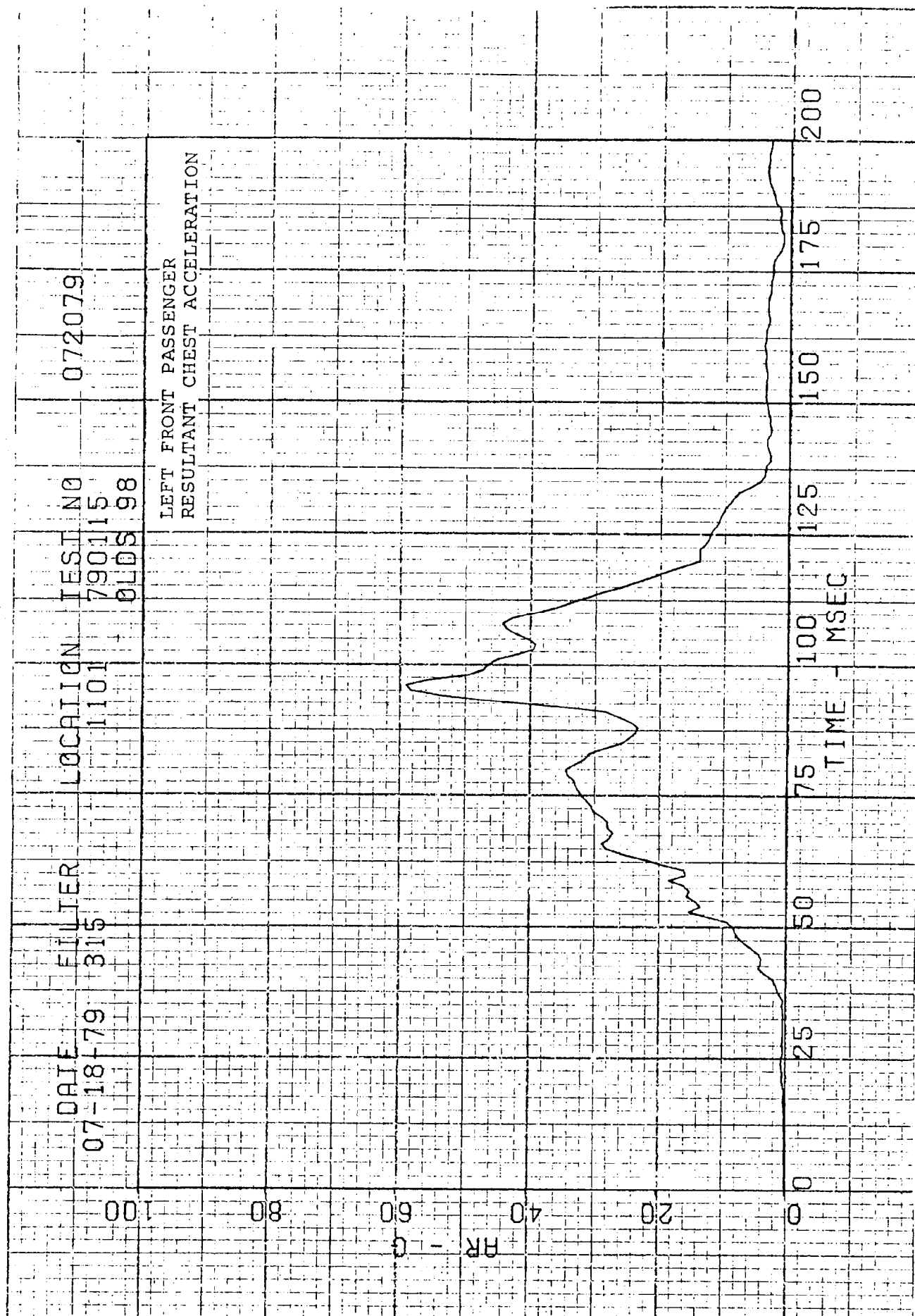
**Vehicle accelerometer location and data summarized on page 4-9.

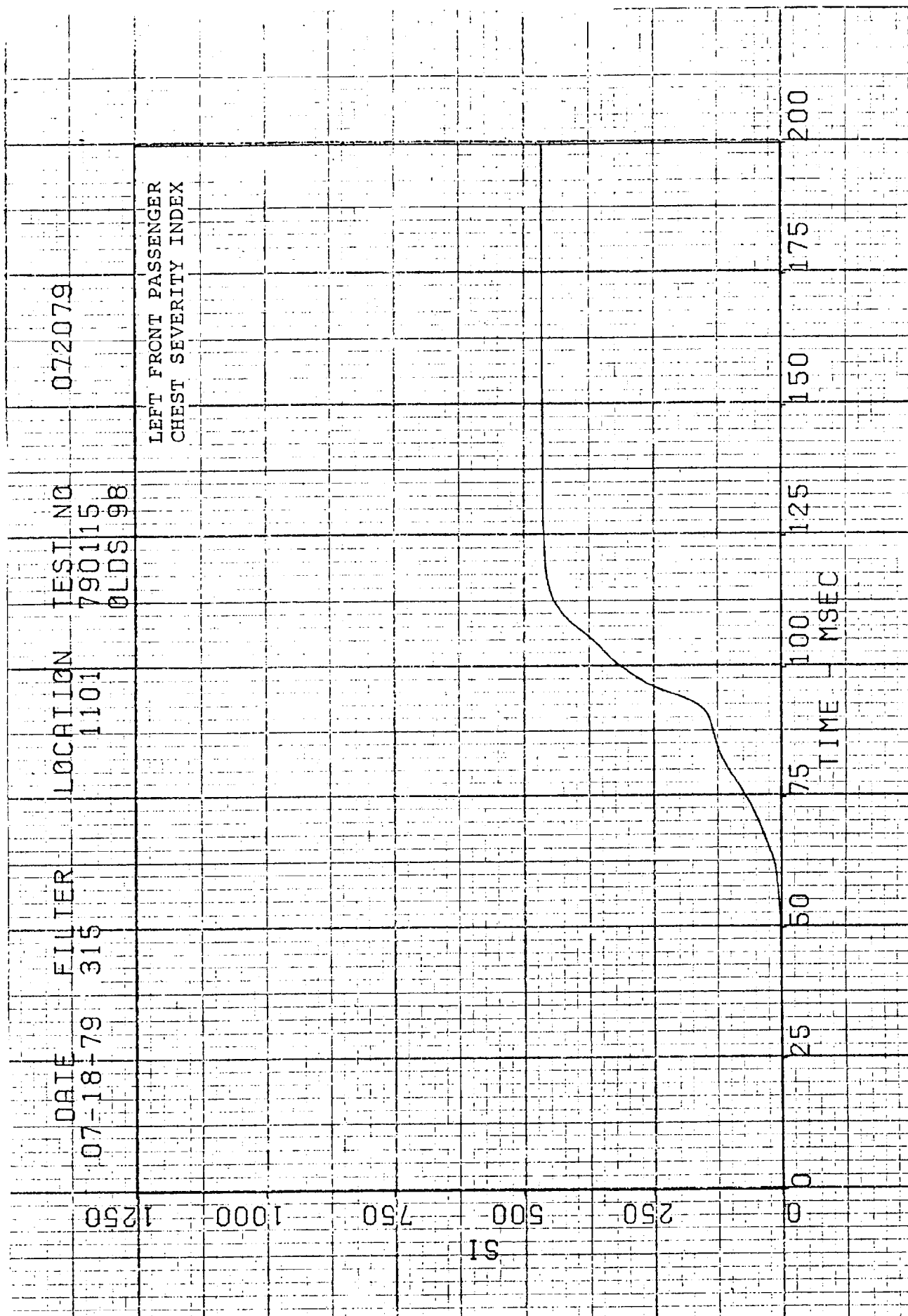


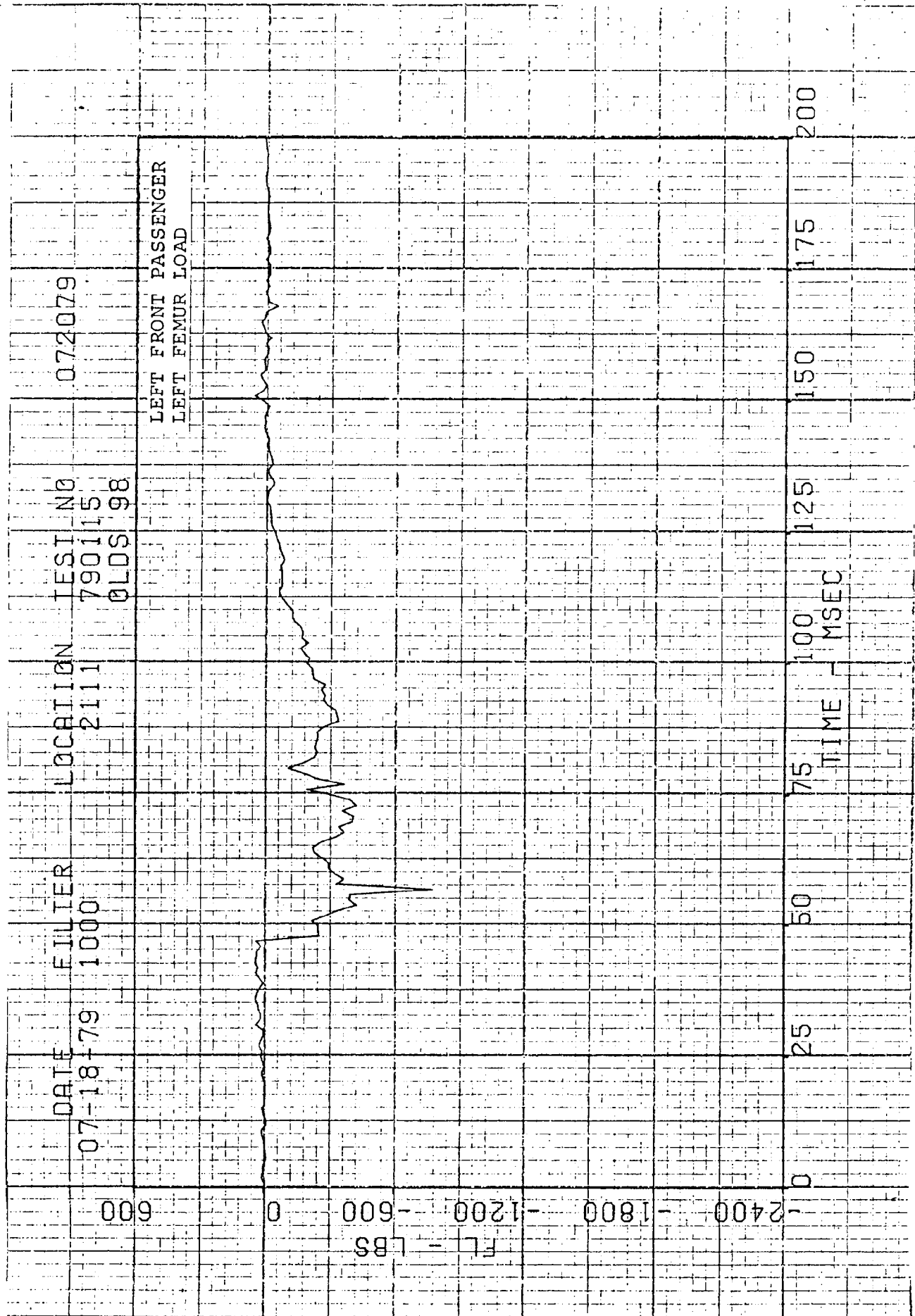


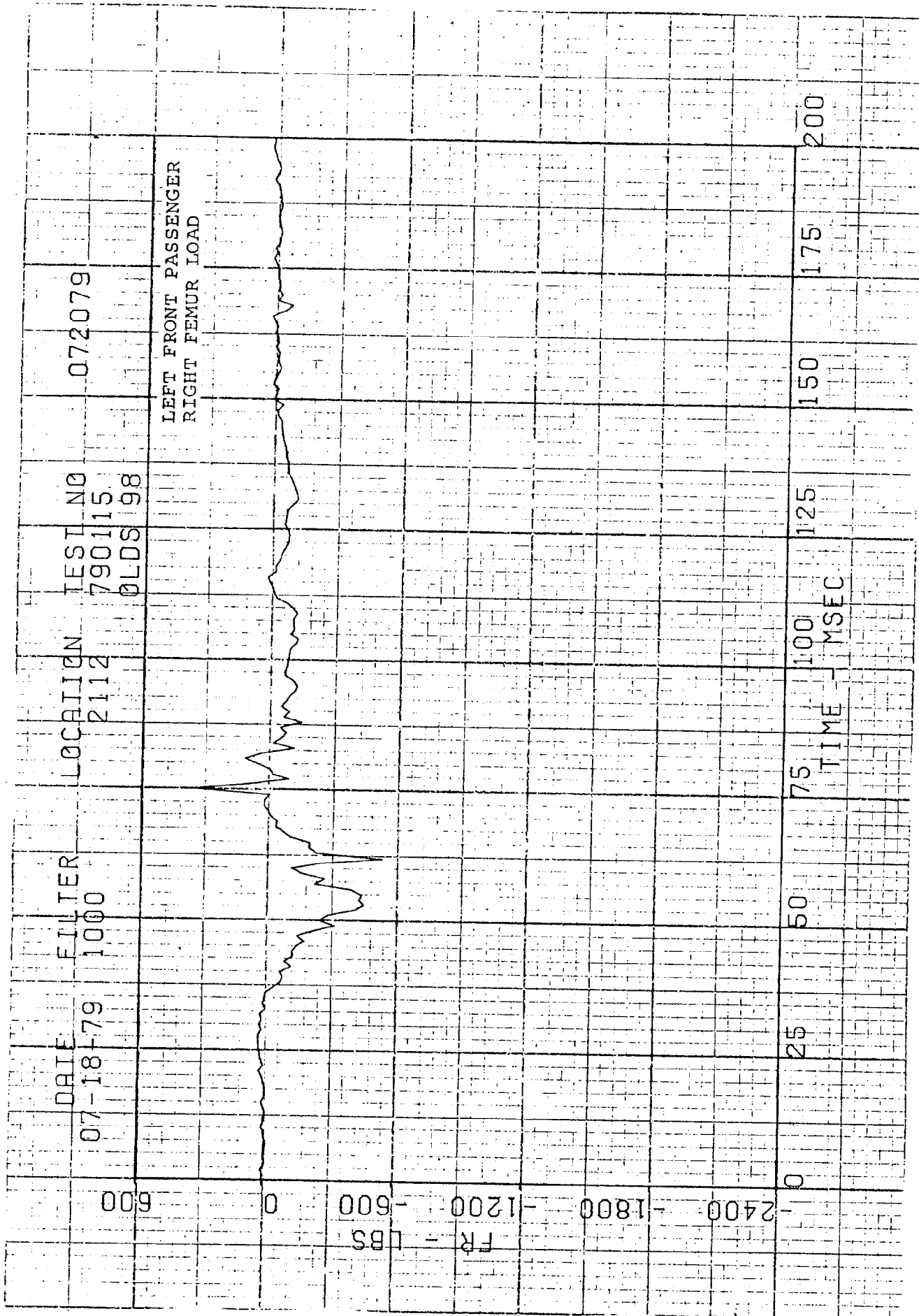


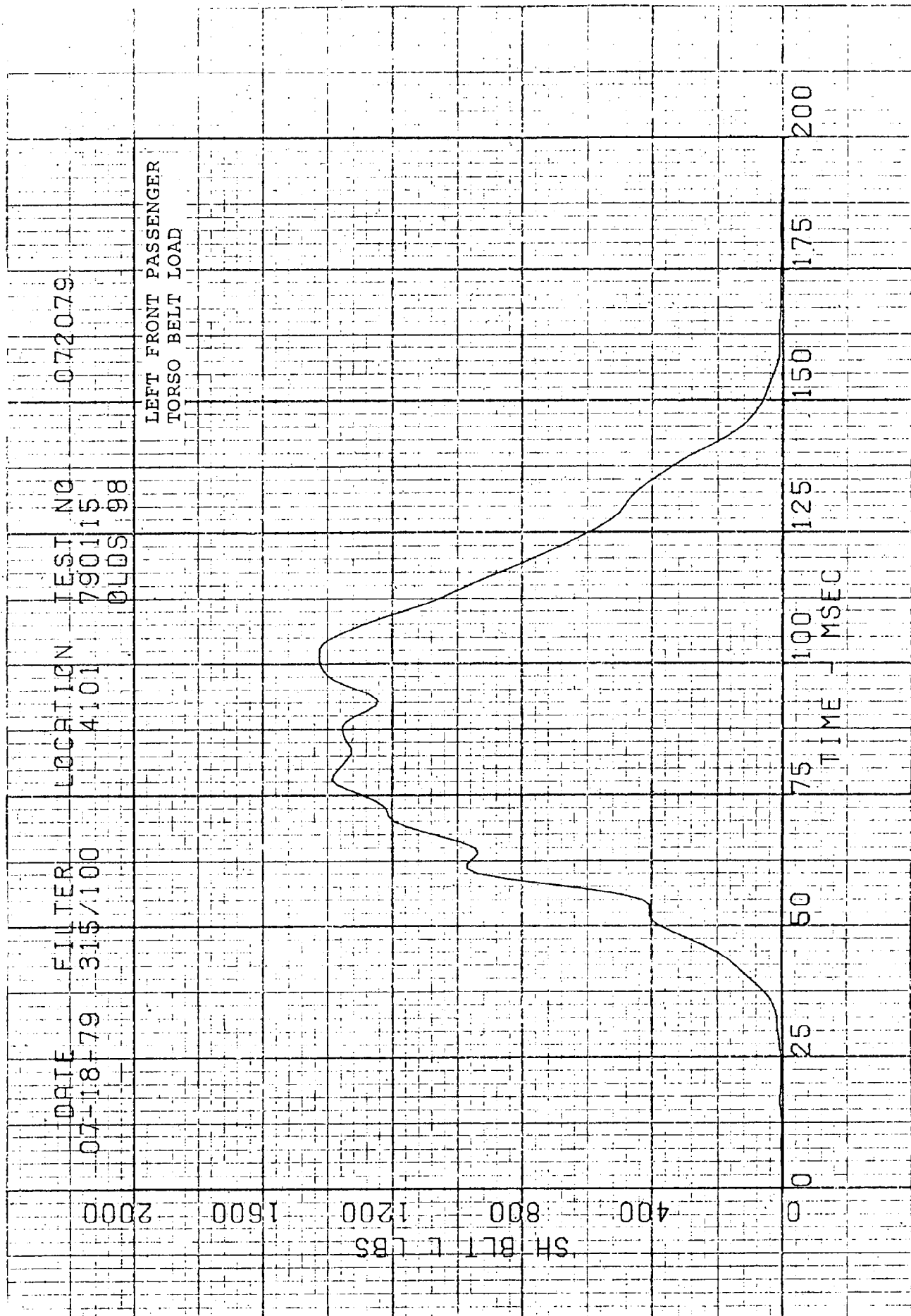


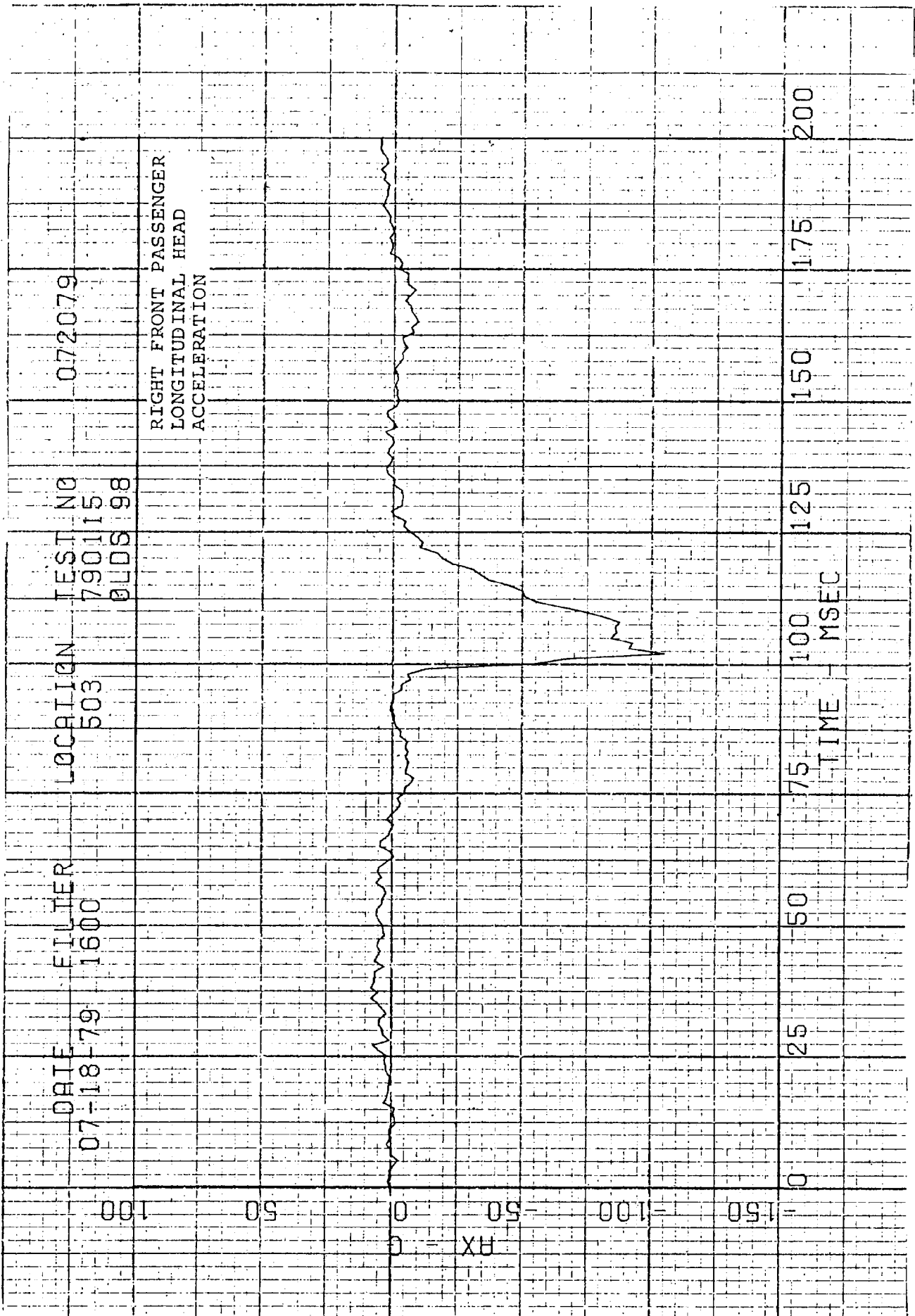


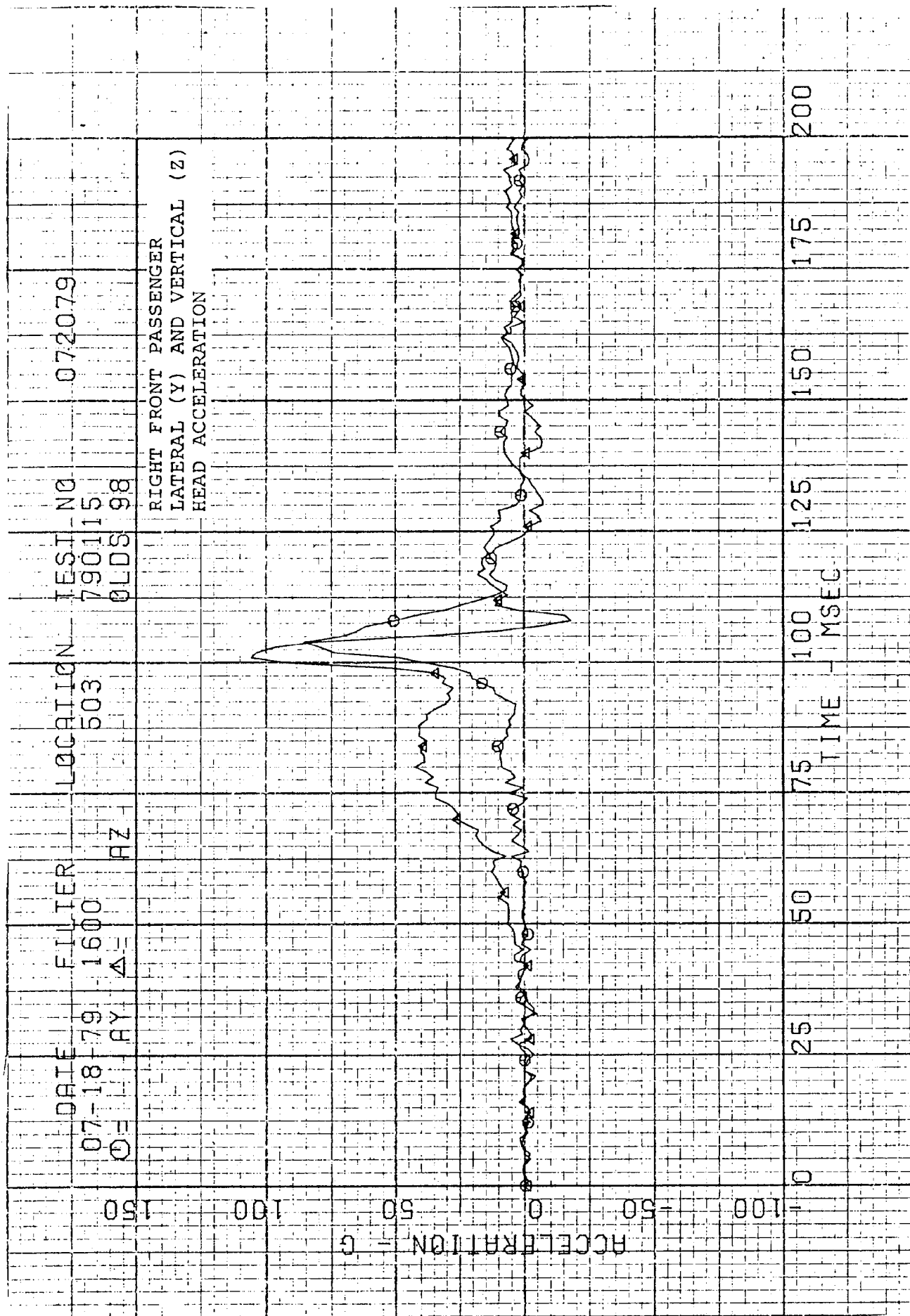


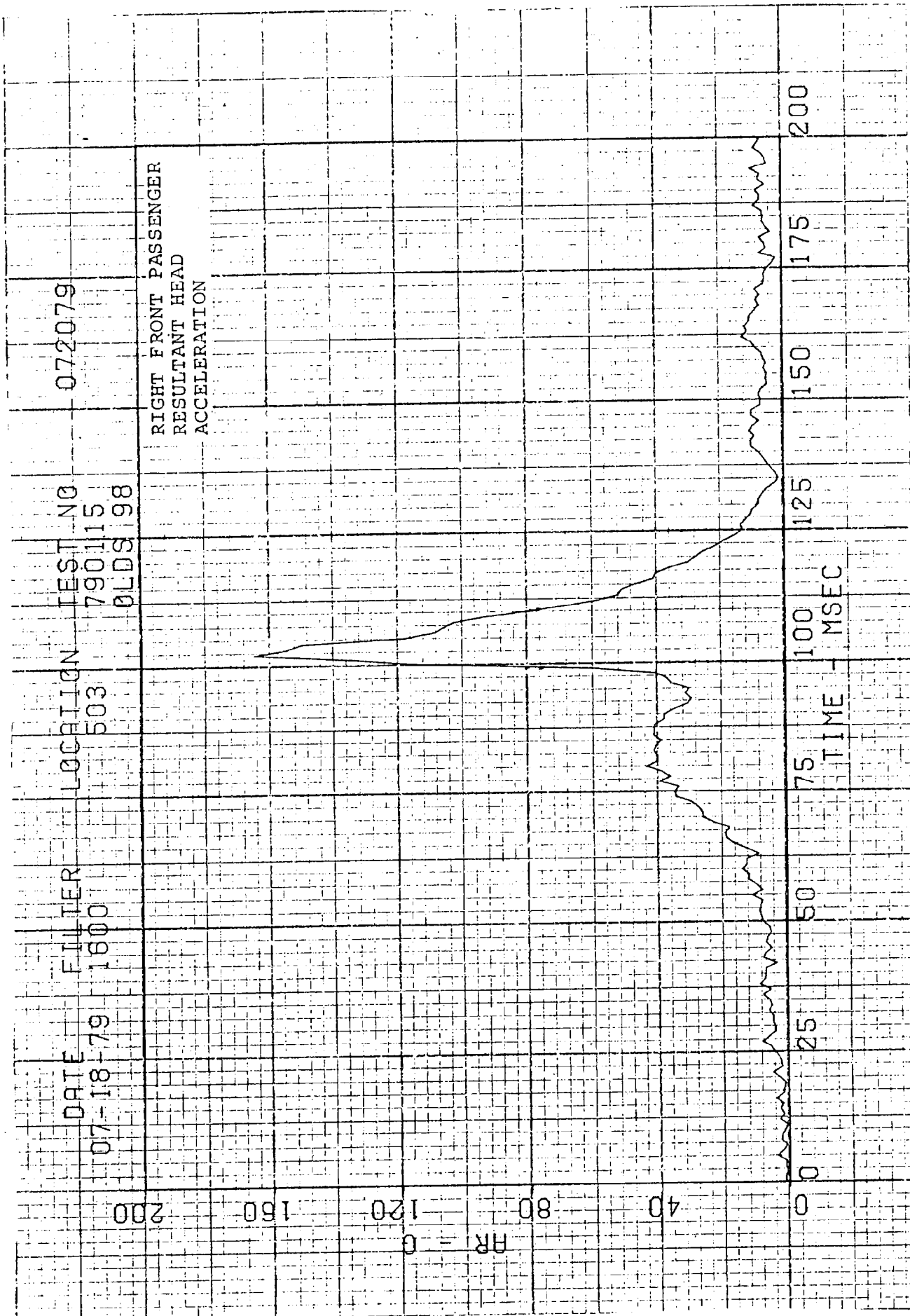


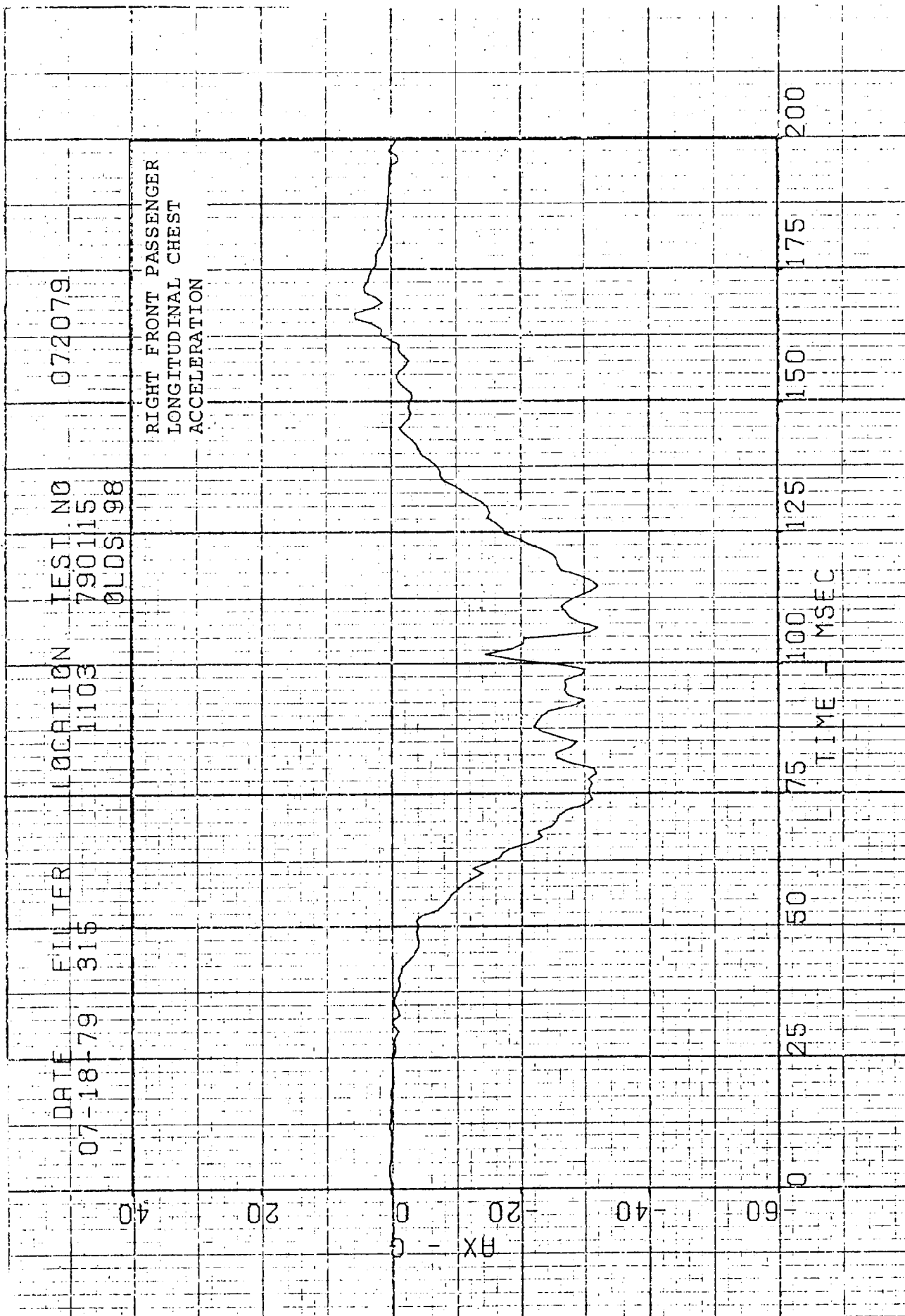


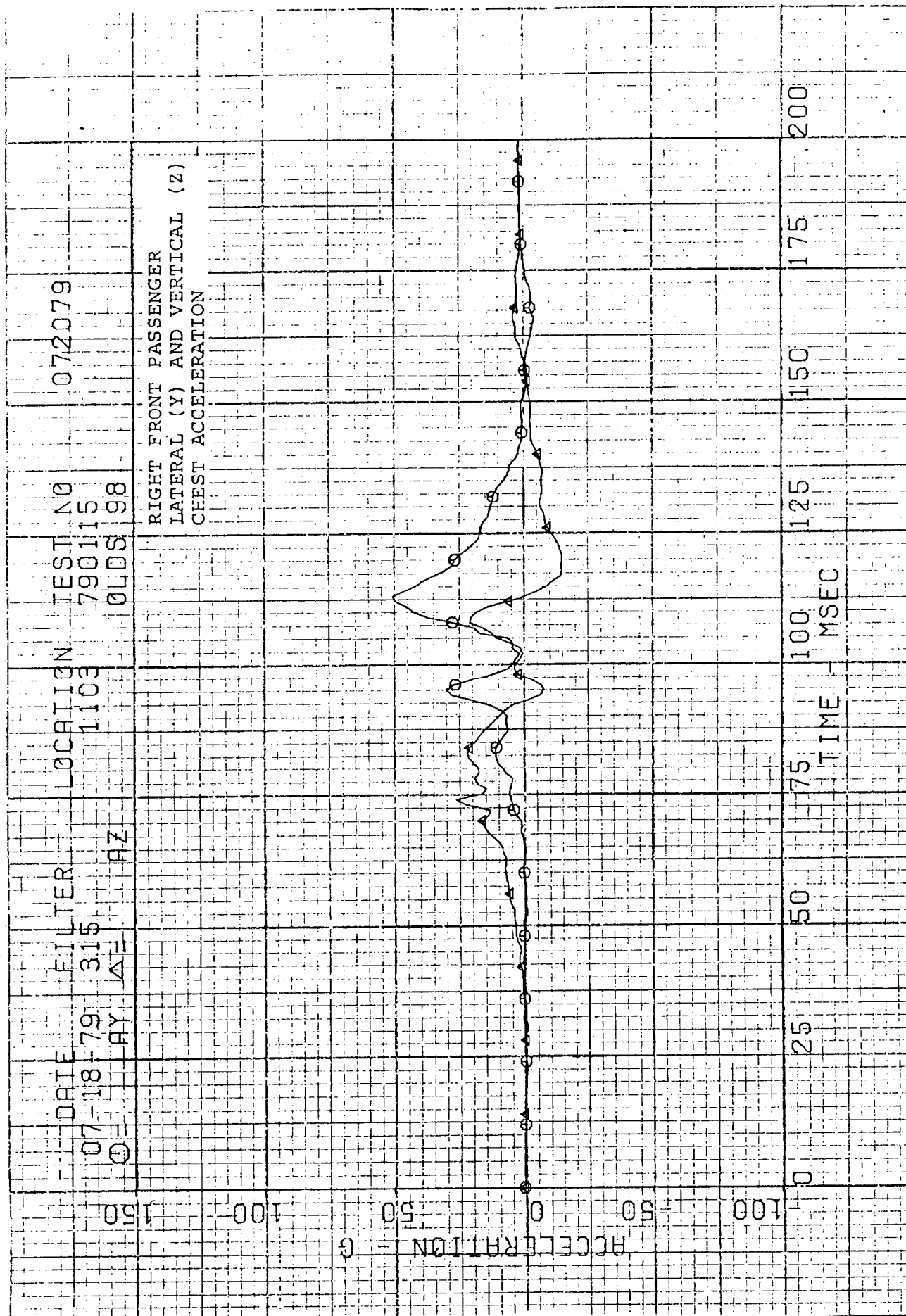


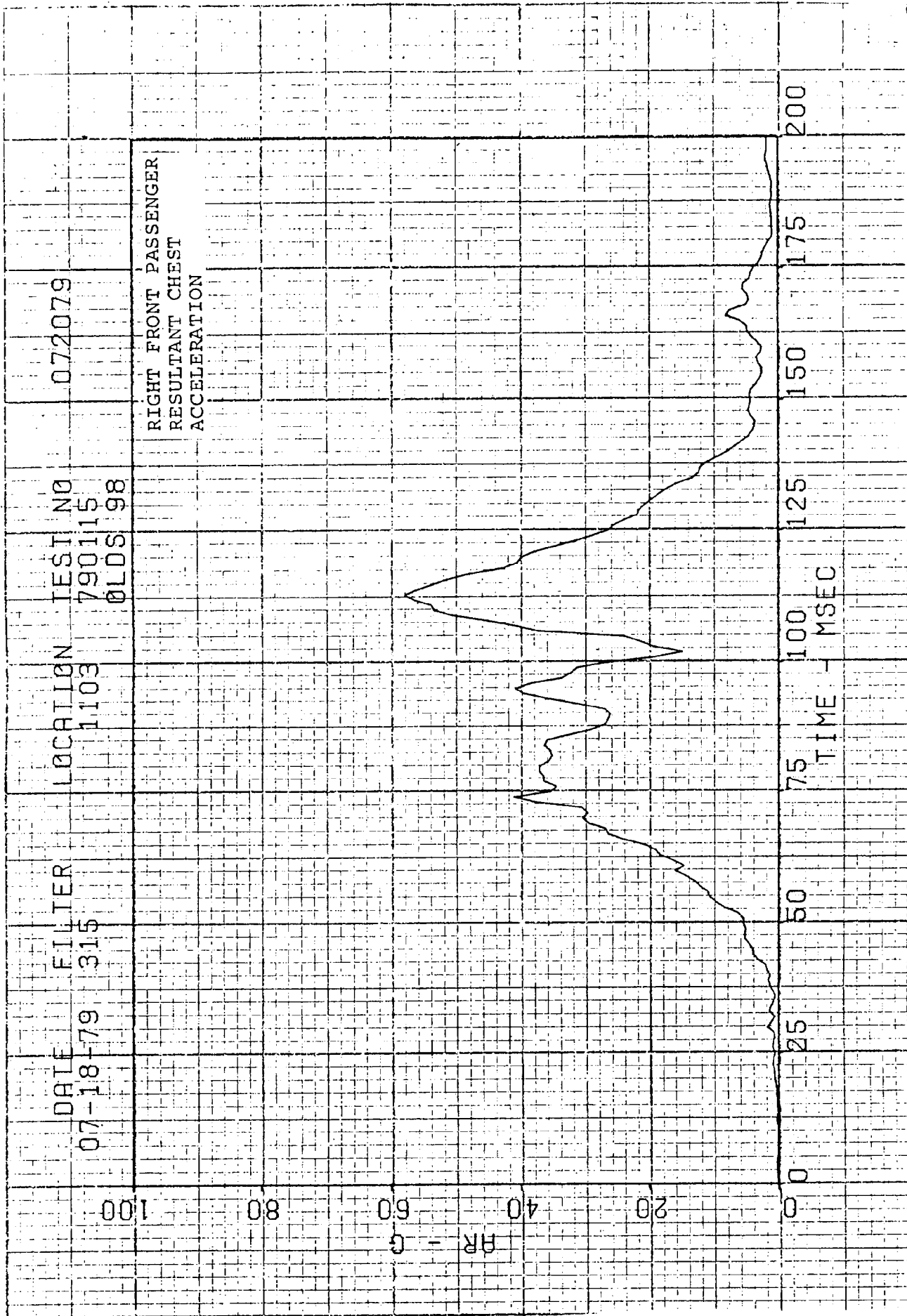


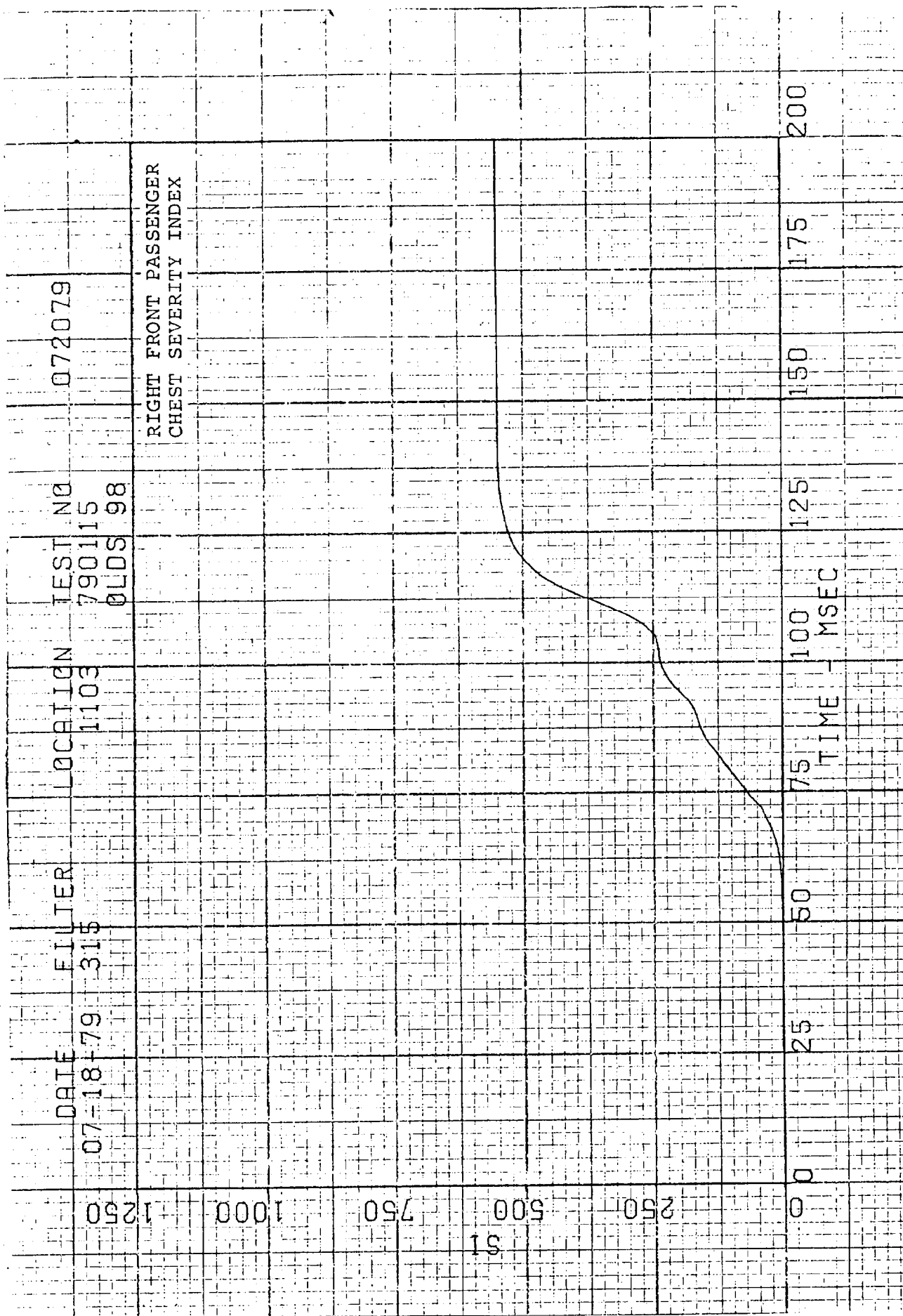


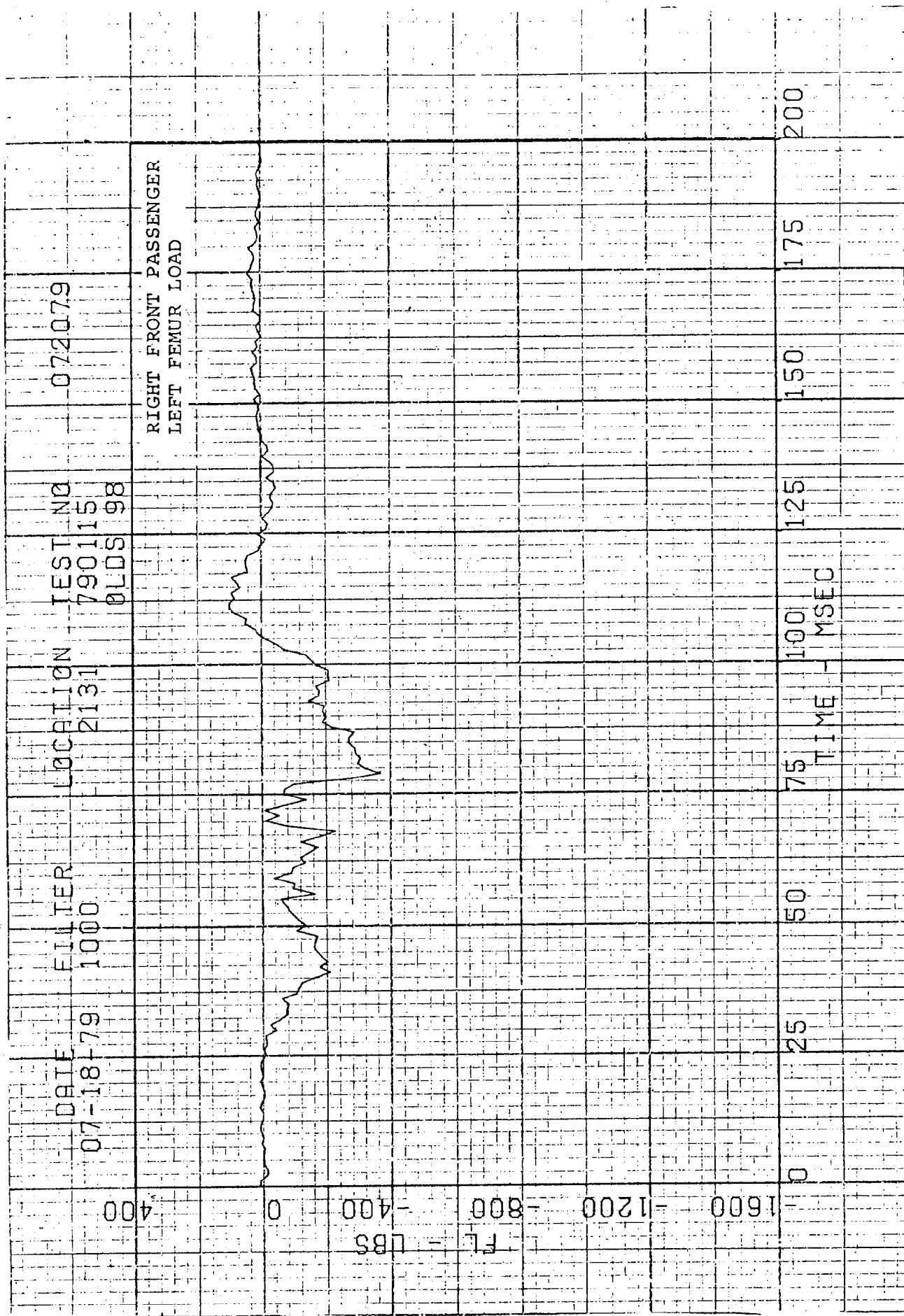


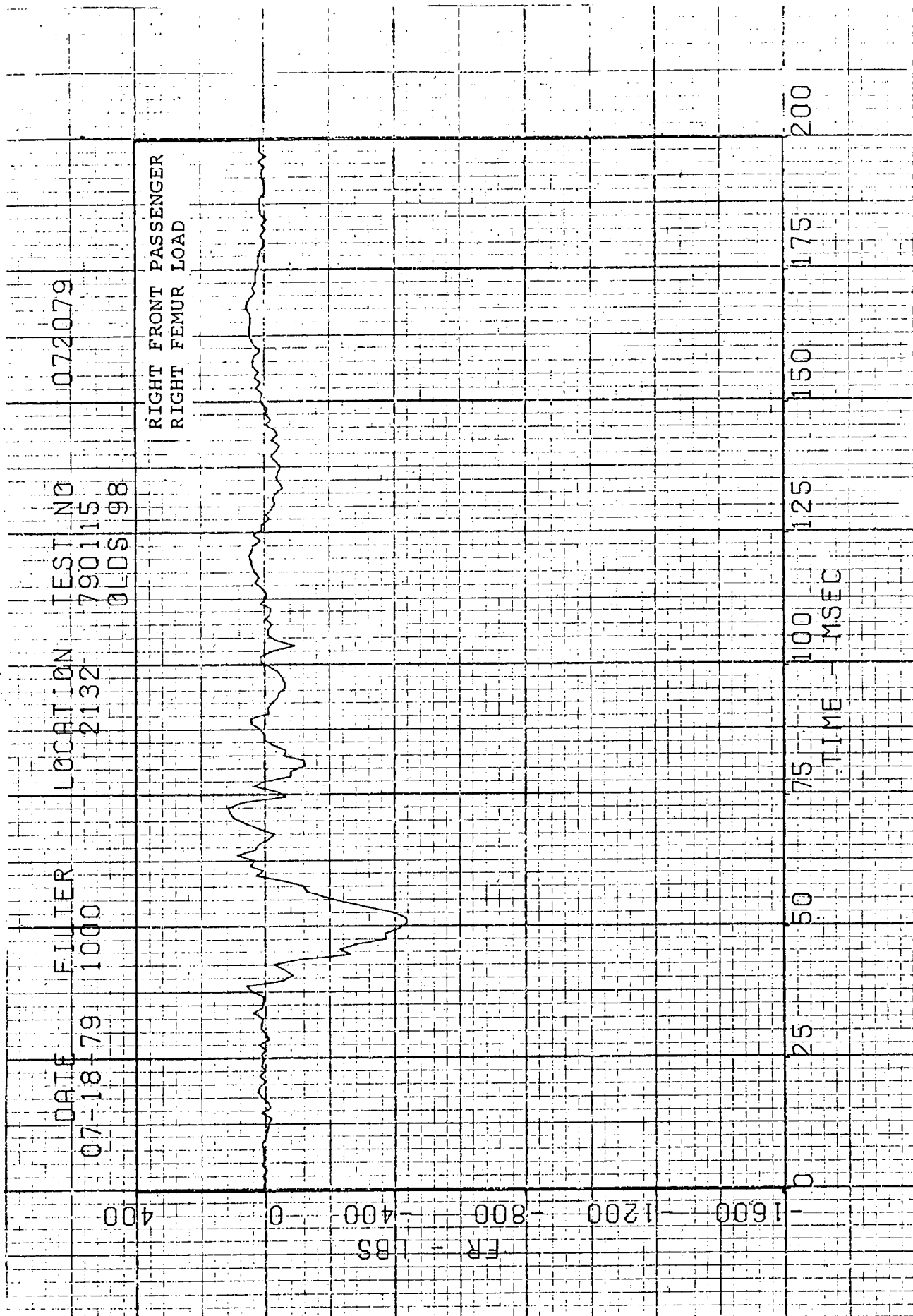












DATE

07-18-79

FILIER

315/100

LOCATION

4103

TEST NO

790115

10LDS 98

072079

RIGHT FRONT PASSENGER
TORSO BELT LOAD

SH. BLT R LBS

2000

1500

1200

800

400

0

TIME - MSEC

25

50

75

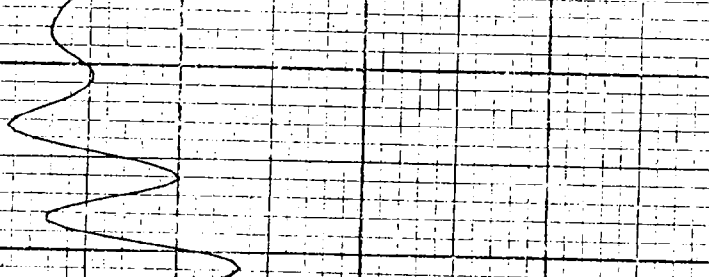
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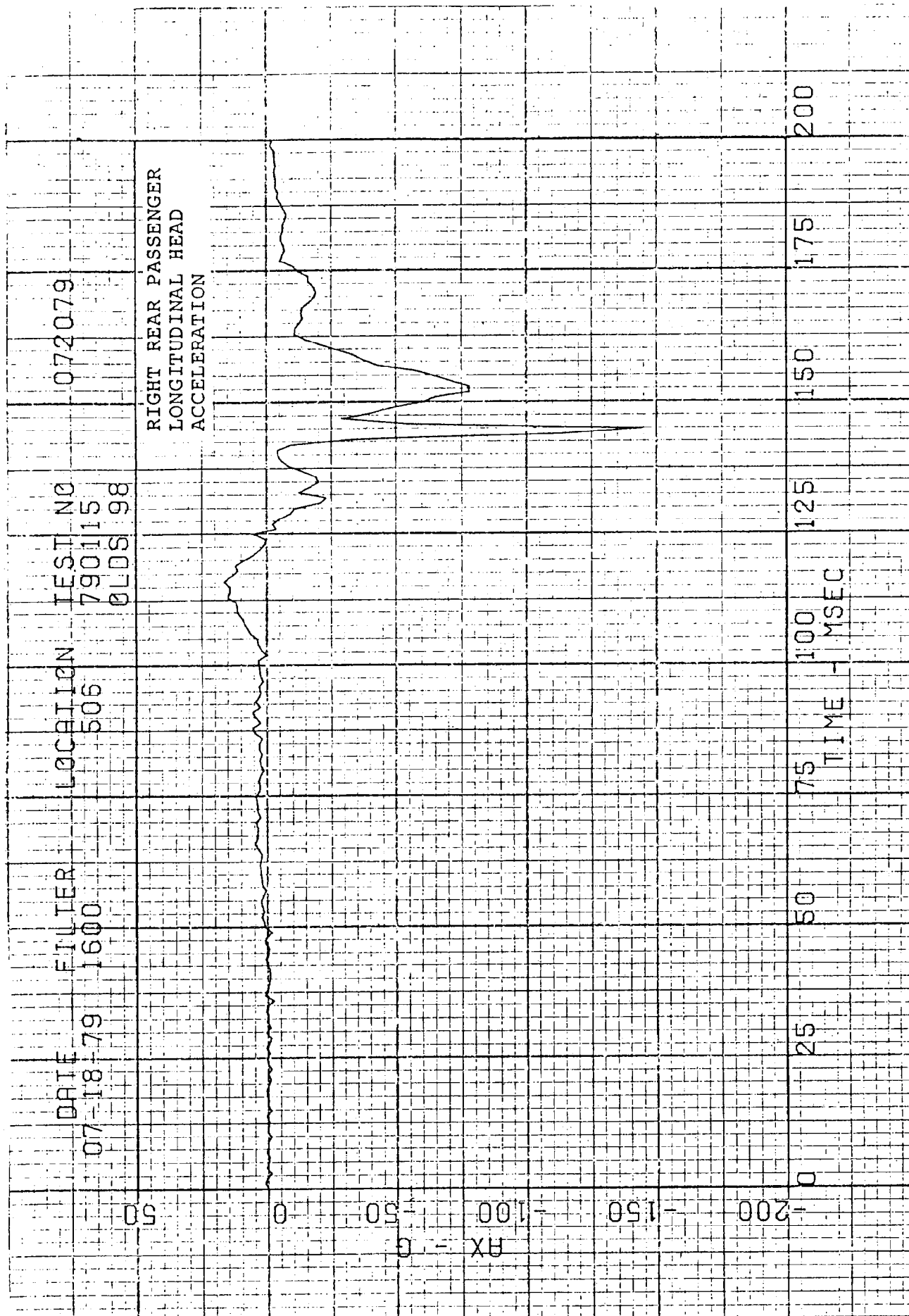
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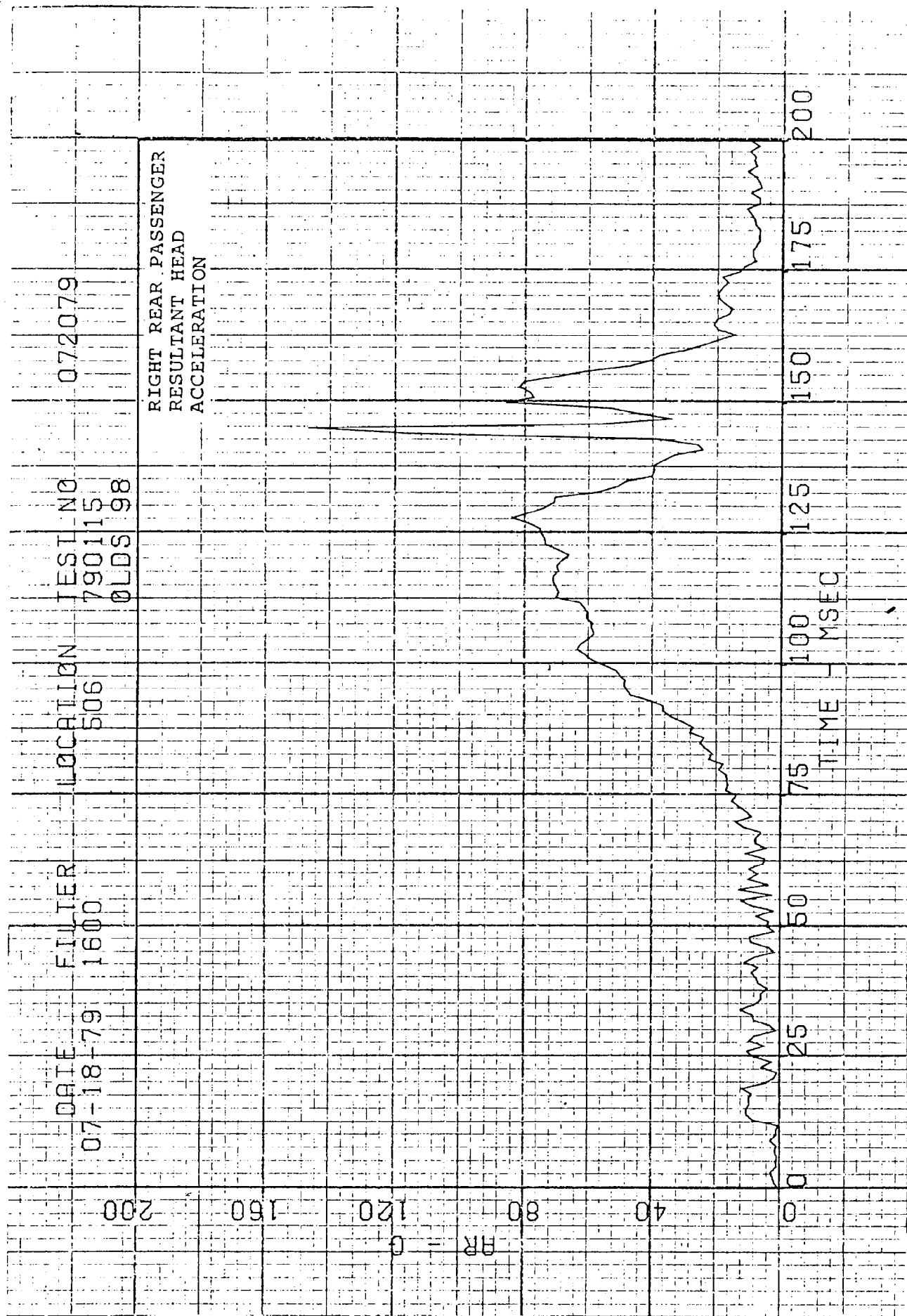
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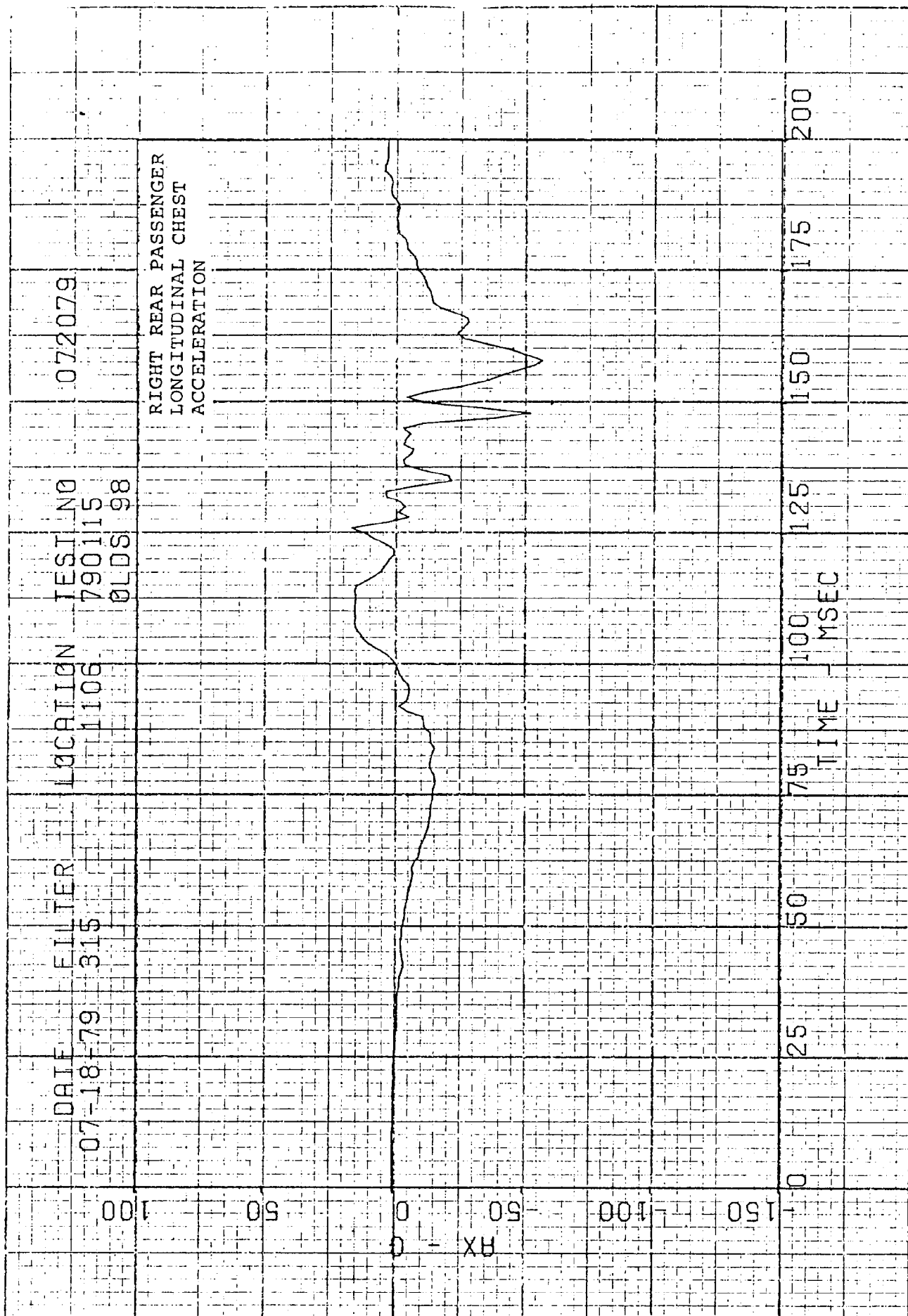
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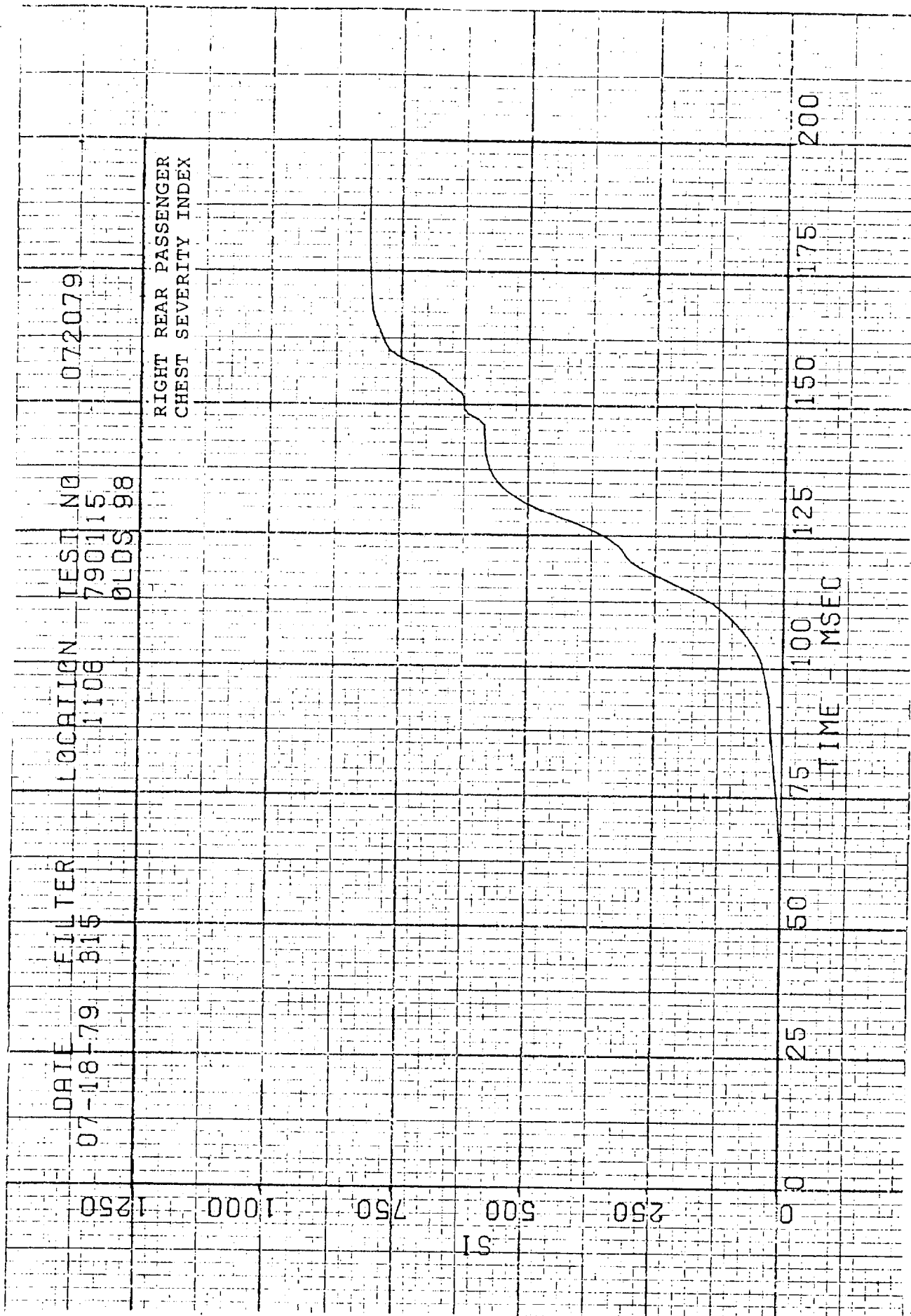
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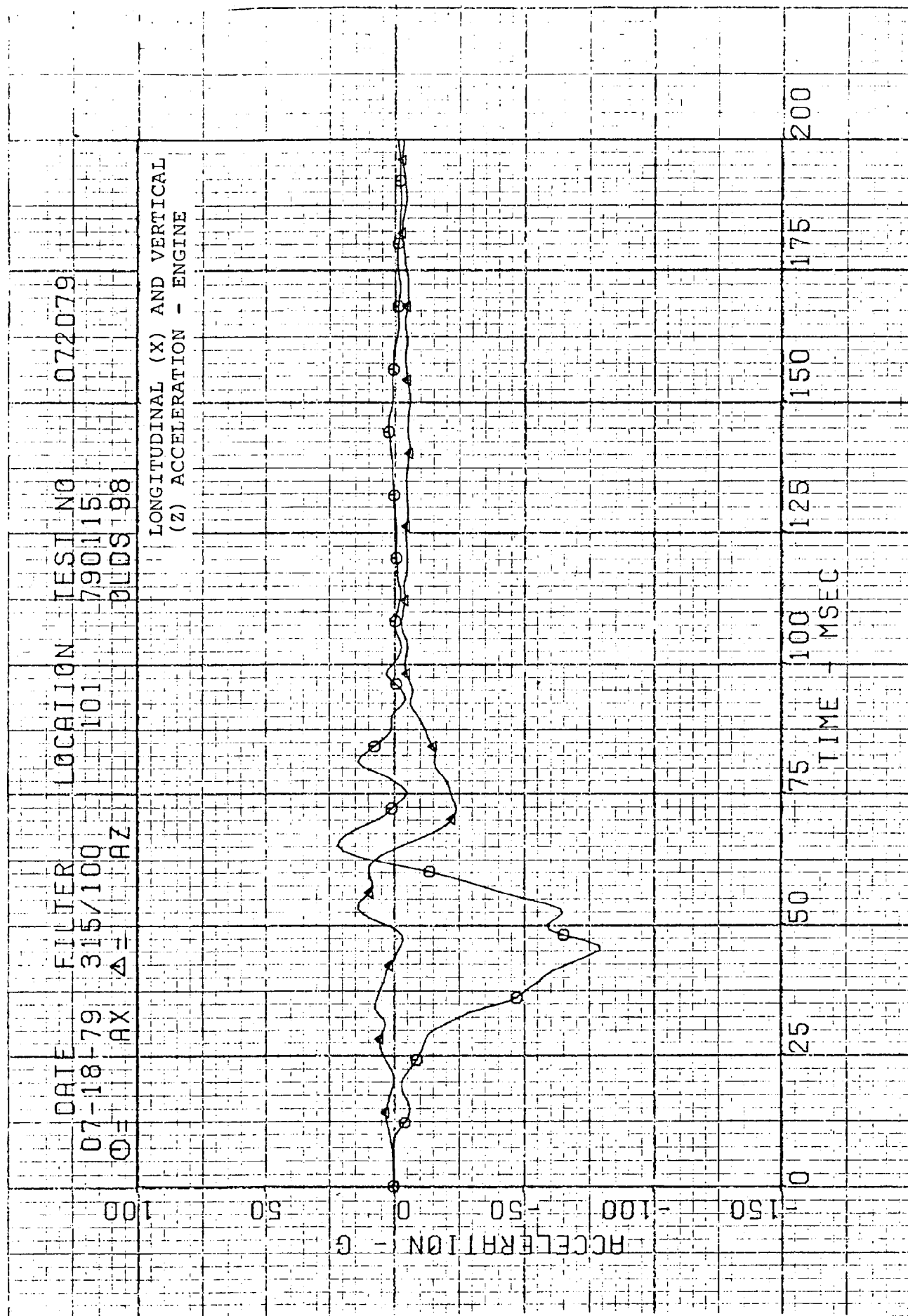


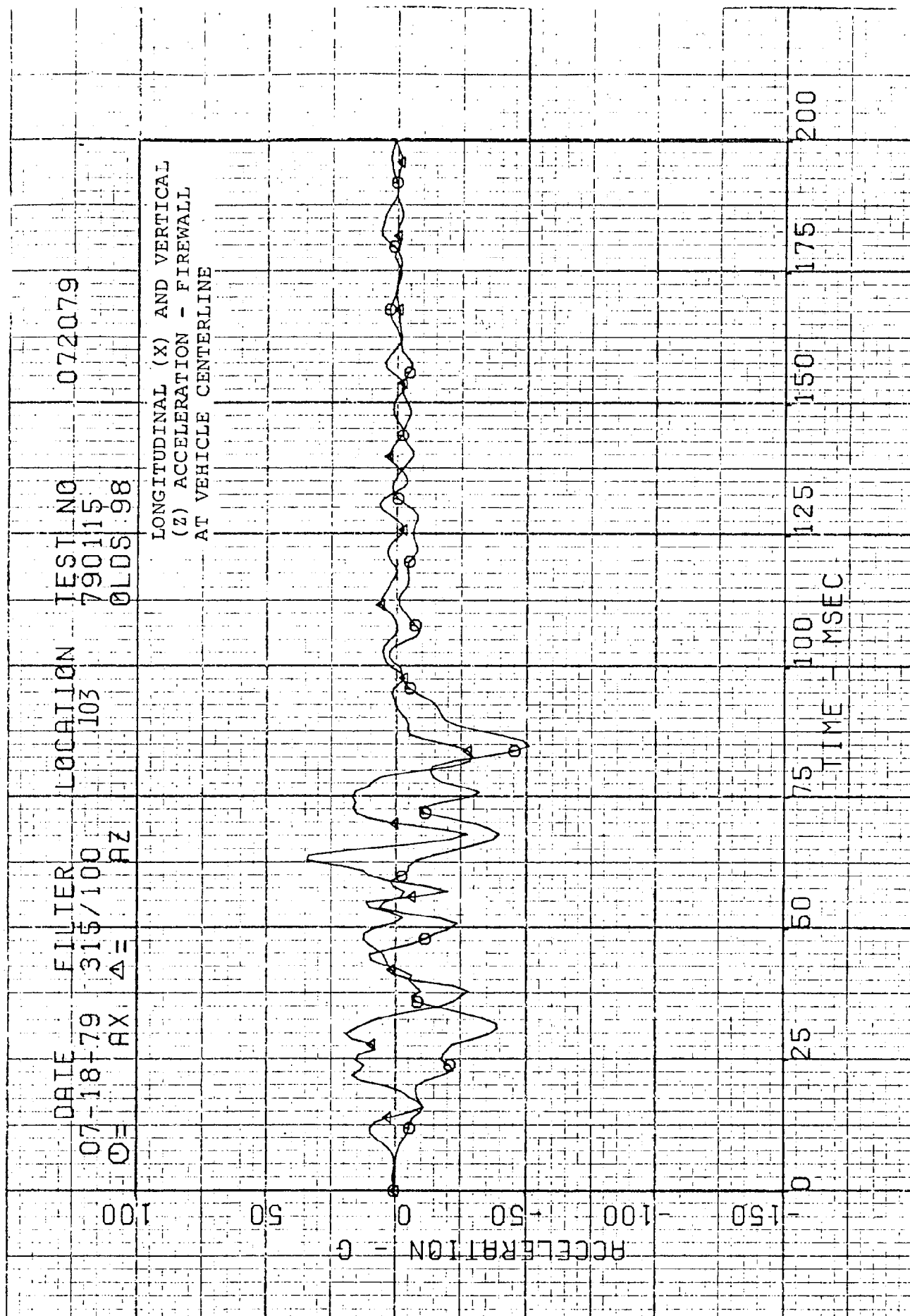


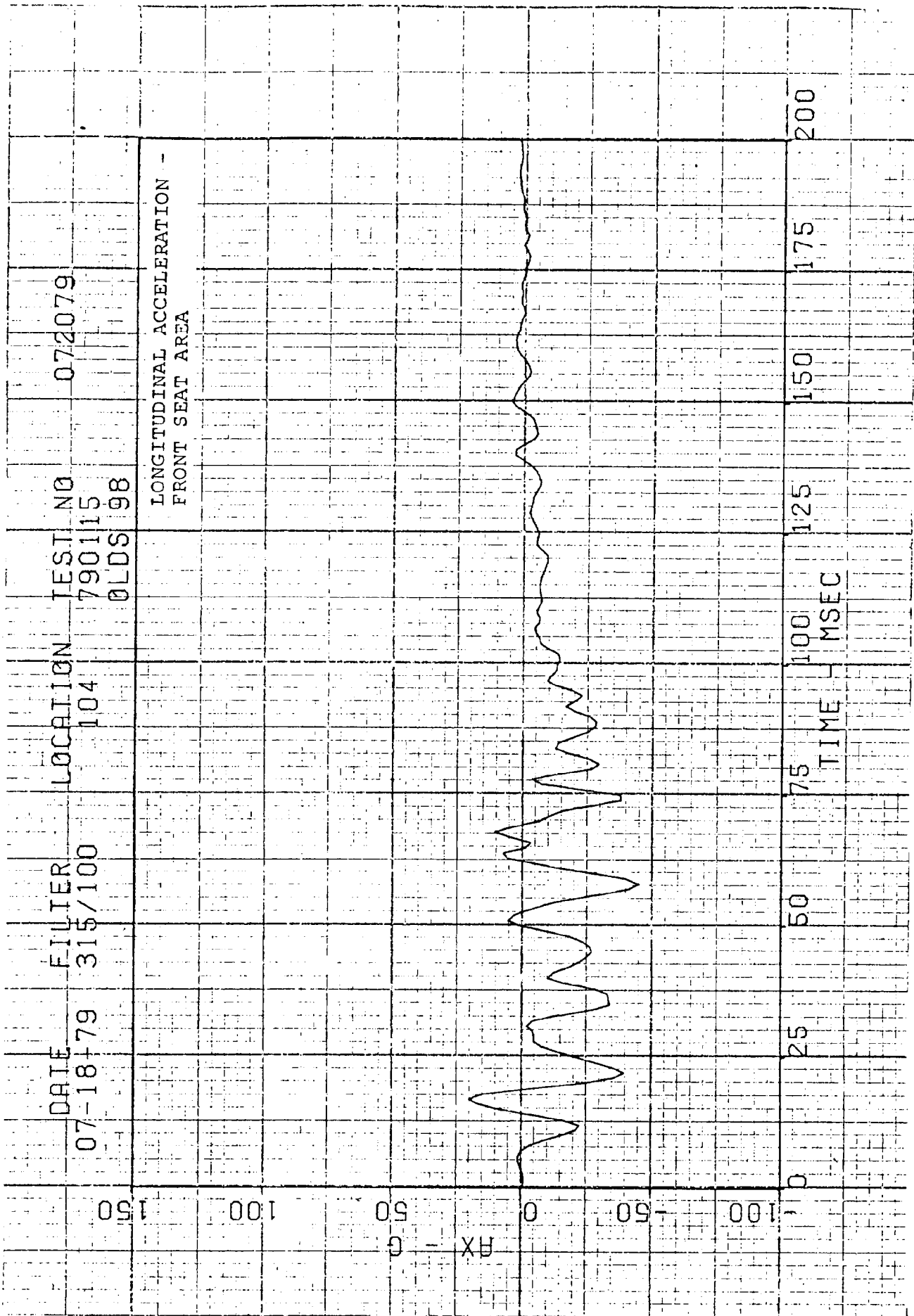


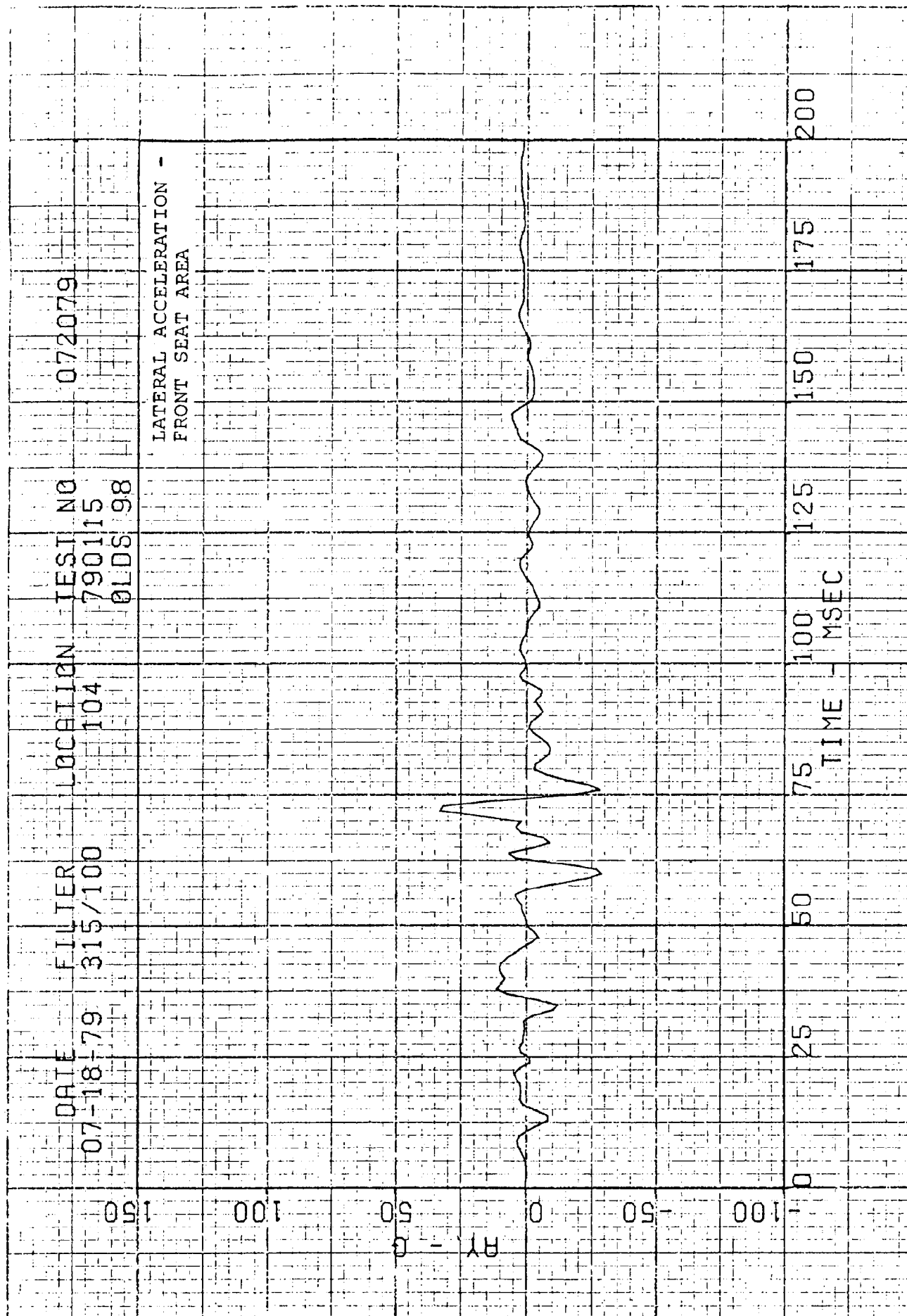


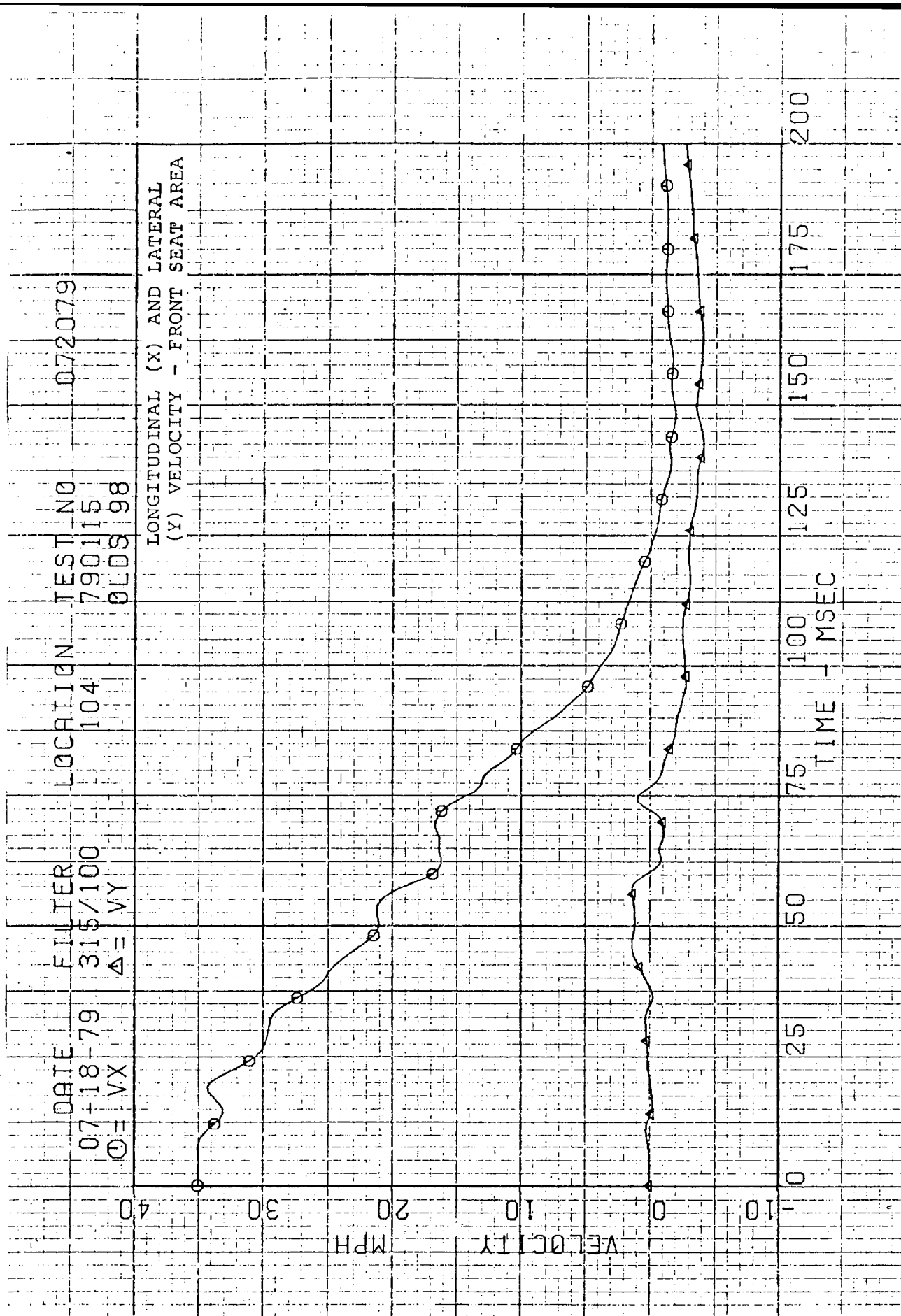


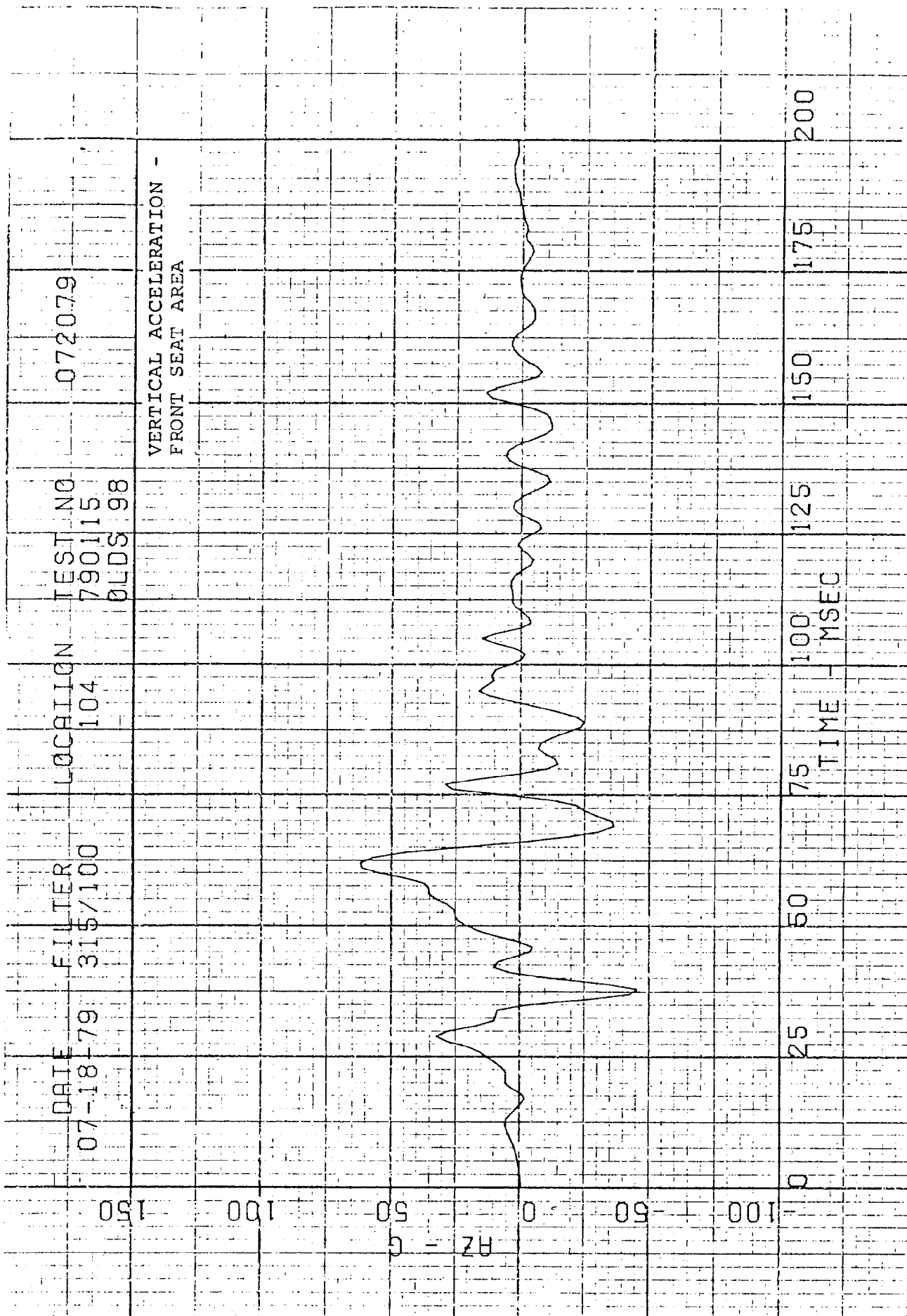


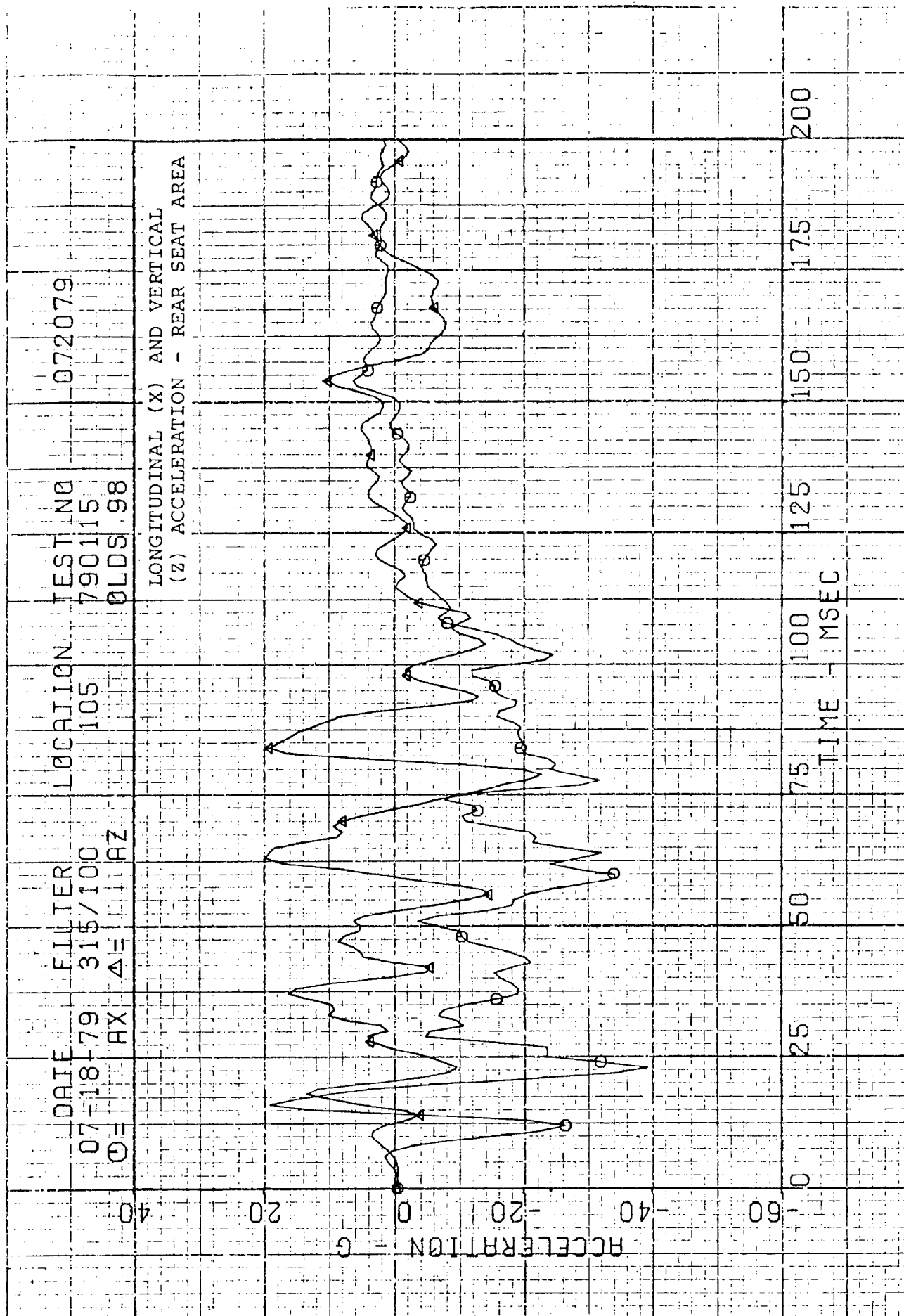












APPENDIX B (CONTD)

Test Anomalies: Cameras 2, 3, 4, 5, and 8 did not function, due to internal electronic problem in power switching system. No problems were evident prior to test; all systems passed pre-test checkout. See Figure A-4 for camera location diagram.