

TIM ARNEY

Dynamic Science Report No. 301-DYS-79-018

DOT 424

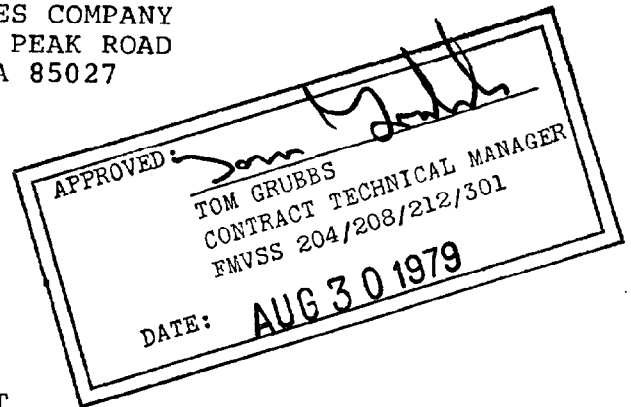
NEW VEHICLE ASSESSMENT AND
STANDARDS ENFORCEMENT INDICANT
TESTING

FMVSS 301-75

CHRYSLER CORPORATION
1979 CHRYSLER CORDOBA 2-DOOR SEDAN
NHTSA NO. 790314

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
400 SEVENTH STREET, S.W.
WASHINGTON, D.C. 20590

dsi Dynamic Science Inc.

a TALLEY INDUSTRIES Company

1850 WEST PINNACLE PEAK ROAD · PHOENIX, ARIZONA 85027 · (602) 942-3300

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DOT-HS-6-01478. This document is disseminated under the sponsorship of the U.S. Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its contents or use thereof.

FINAL REPORT ACCEPTED BY:

TOM GRUBBS

NHTSA Contract Technical Manager
FMVSS 301-75

AUG 30 1979

Date of Report Acceptance

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle NEW VEHICLE ASSESSMENT AND STANDARDS ENFORCEMENT INDICANT TESTING - FMVSS 301-75 - 1979 CHRYSLER CORDOBA 2-DOOR SEDAN - NHTSA 790314				5. Report Date August 1979	
				6. Performing Orgn Code	
7. Author(s) <i>Mark Pozzi</i> Mark Pozzi				8. Performing Orgn Rpt No. 3066-79-137/1491	
9. Performing Organization Name and Address Dynamic Science, Inc. A Talley Industries Company 1850 West Pinnacle Peak Road Phoenix, Arizona 85027				10. Work Unit No.	
				11. Contract or Grant No. DOT-HS-6-01478	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration 400 Seventh Street, S.W. Washington, D.C. 20590				13. Type of Report and Period Covered FINAL REPORT June 1979	
				14. Sponsoring Agency Code	
15. Supplementary Notes Approved: <i>E. Evers</i> , Director, Test Operations					
16. Abstract Federal Motor Vehicle Safety Standard 301-75 Indicant Testing of a 1979 Chrysler Cordoba 2-Door Sedan, NHTSA 790314, VIN SS22G9R117091, was conducted at the Dynamic Science, Inc. Phoenix test facility. The test date was June 5, 1979, and the ambient temperature was 81°F. The test impact speed was 35.48 mph. There was no measurable fuel leakage from the vehicle fuel system, and the vehicle, therefore, appears to comply with the requirements of FMVSS 301.					
17. Key Words FMVSS 301 Indicant Testing, Fuel Tanks, Fuel Tank Filler Pipes, Fuel Tank Connectors, Fuel System Integrity			18. Distribution Statement Available from Technical Reference Division, NHTSA, Room 5108, Nassif Building, 400 Seventh Street, S.W., Washington, D.C. 20590		
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. Pages 81	
				22. Price	

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	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
----	-----------------	-------------------	--------------------	----

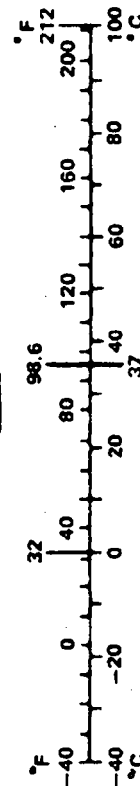


TABLE OF CONTENTS

<u>Section</u>		<u>Page</u>
1	PURPOSE AND INTRODUCTION	1-1
2	GENERAL TEST AND VEHICLE PARAMETER DATA	2-1
3	COMPLIANCE-RELATED DATA FMVSS 301-75 INDICANT TESTING	3-1
4	DATA REQUIRED BY R&D AND OAR	4-1
APPENDIX A - TEST FACILITIES AND PROCEDURE		A-1
APPENDIX B - CALCOMP PLOT PRESENTATION		B-1

LIST OF ILLUSTRATIONS

<u>Figure</u>		<u>Page</u>
2-1	Pre-test Rear View	2-5
2-2	Post-test Rear View	2-6
2-3	Pre-test Right Side View	2-7
2-4	Post-test Left Side View	2-8
2-5	Post-test Right Side View	2-9
2-6	Post-test Left Rear Quarter	2-10
2-7	Post-test Right Rear Quarter	2-11
2-8	Post-test Overall Underside View	2-12
3-1	Pre-test Fuel Tank	3-7
3-2	Post-test Fuel Tank	3-8

LIST OF ILLUSTRATIONS (CONTD)

<u>Figure</u>		<u>Page</u>
4-1	Pre-test Driver Dummy Position	4-9
4-2	Post-test Driver Dummy Position	4-10
4-3	Post-test Driver Dummy Position	4-11
4-4	Post-test Driver Location With Dummy Removed	4-12
4-5	Pre-test Passenger Location	4-13
4-6	Post-test Passenger Position	4-14
4-7	Post-test Passenger Position	4-15
4-8	Post-test Passenger Position With Dummy Removed	4-16

SECTION 1
PURPOSE AND INTRODUCTION

PURPOSE:

The purpose of the test was to subject a 1979 Chrysler Cordoba 2-door Sedan to the indicant test requirements of DOT Test Plan TP-212-01, March 20, 1979, Standard Enforcement Indicant Testing for FMVSS 301-75, "Fuel System Integrity." The vehicle was tested using test parameters which are in excess of the current upper limits of FMVSS 301-75, 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 301-75 are contained in Appendix A. Section 2 contains General Test and Vehicle Parameter Data. Section 3 contains Compliance Related Data for FMVSS 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: Chrysler Corporation
 Make/Model: Chrysler Cordoba
 Body Style: 2-door Coupe Model Year: 1979
 VIN: SS22G9R117091 Build Date: 7/78
 NHTSA No.: 790314 Color: Green
 Engine Data: 8 cylinders; 318 in.³ displacement
 Transmission Data: 3 speed () Manual (X) Automatic
 Date Vehicle Received by Laboratory: March 7, 1979
 Dealer Name & Address: Bill Luke Chrysler Plymouth, Inc.
2425 W. Camelback, Phoenix, AZ 85015

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

Vehicle Manufactured By: Chrysler Corporation
 Date of Manufacture: 7/78 ; VIN: SS22G9R117091
 GVWR: 5295 lb; GAWR: Front = 2620 lb; Rear = 2725 lb

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

Vehicle Load:	FRONT	REAR	RECOMMENDED	LOAD RANGE:
Up to Capacity	<u>30</u> psi	<u>30</u> psi	TIRE SIZE:	
Vehicle Capacity:			<u>FR 78 x 15</u>	<u>B</u>
			<u>Minimum</u>	
Type of Seats -	<u>X</u> Bench	Number of Occupants =	<u>3</u> Front	
	<u> </u> Bucket	(Designated Seating	<u>3</u> Rear	
	<u> </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>1107</u> lb	Right Rear =	<u>907</u> lb
Left Front =	<u>1095</u> lb	Left Rear =	<u>834</u> lb
TOTAL FRONT WEIGHT =	<u>2202</u> lb (<u>56.0%</u> of Total Vehicle Weight)		
TOTAL REAR WEIGHT =	<u>1741</u> lb (<u>44.0%</u> of Total Vehicle Weight)		
TOTAL DELV. WEIGHT =	<u>3943</u> lb		

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

Right Front =	<u>1236</u> lb	Right Rear =	<u>995</u> lb
Left Front =	<u>1163</u> lb	Left Rear =	<u>1069</u> lb
TOTAL FRONT WEIGHT =	<u>2399</u> lb (<u>54.0%</u> of Total Vehicle Weight)		
TOTAL REAR WEIGHT =	<u>2064</u> lb (<u>46.0%</u> of Total Vehicle Weight)		
TOTAL TEST WEIGHT =	<u>4463</u> lb		

Weight of ballast secured in vehicle trunk area = 117 lb

TARGET WEIGHT = CARGO LOAD + UDW + 164 (NO. OF DUMMIES) = 4471 lb

SECTION 2
GENERAL TEST AND VEHICLE PARAMETER DATA (CONTD)

TEST CONDITIONS:

Date of Test: June 5, 1979 Time of Test: 0850
Ambient Temperature: 81 °F at impact area.
Temperature in Windshield Molding
Occupant Compartment: 81 °F Temperature: 81 °F

VEHICLE ATTITUDE: (all dimensions in inches)

Delivered Attitude: RF 30.0 LF 30.0 RR 30.0 LR 30.0
Test Attitude: RF 29.1 LF 29.4 RR 28.6 LR 28.6

VEHICLE TIRE DATA:

Recommended Cold Tire Pressure: Front = 30 psi
Rear = 30 psi

Recommended Tire Size: FR 78 x 15

Load Range: B

Tires on Vehicle: FR 78 x 15 Goodyear Polyglas 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: 23.7 Gallons (SPV)

Test Volume: 21.6 Gallons (90 to 91% of SPV)

Fuel System Capacity (data from Owner's Manual): 21 gallons

Details of Fuel System: The fuel tank is mounted below the
trunk floor and aft of the rear axle. Two tank straps secure
the tank to the floor. A filler tube extends through a rubber
grommet in the top center rear and terminates at the rear of the
vehicle behind the rear license plate fixture.

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 212 L 212 inches
Test Vehicle Post-test = R 195.2 L 195.2 inches

CRUSH = R 16.8 L 16.8

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

SECTION 2

GENERAL TEST AND VEHICLE PARAMETER DATA (CONTD)

VISIBLE DUMMY CONTACT POINTS

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

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

SEAT BACK

Failure	Yes	Yes
---------	-----	-----

GLAZING DAMAGE

Windshield	None			
Backlight			None	
Others	None	None	None	None

OTHER NOTABLE IMPACT EFFECTS: Front seat moved aft 2.5 inches in seat track. Driver headrest came out of seatback. Glovebox door opened. Jack stand/spare tire securing bolt sheared off. Slight door sill buckling noted two-thirds back from front edge of door.

99596

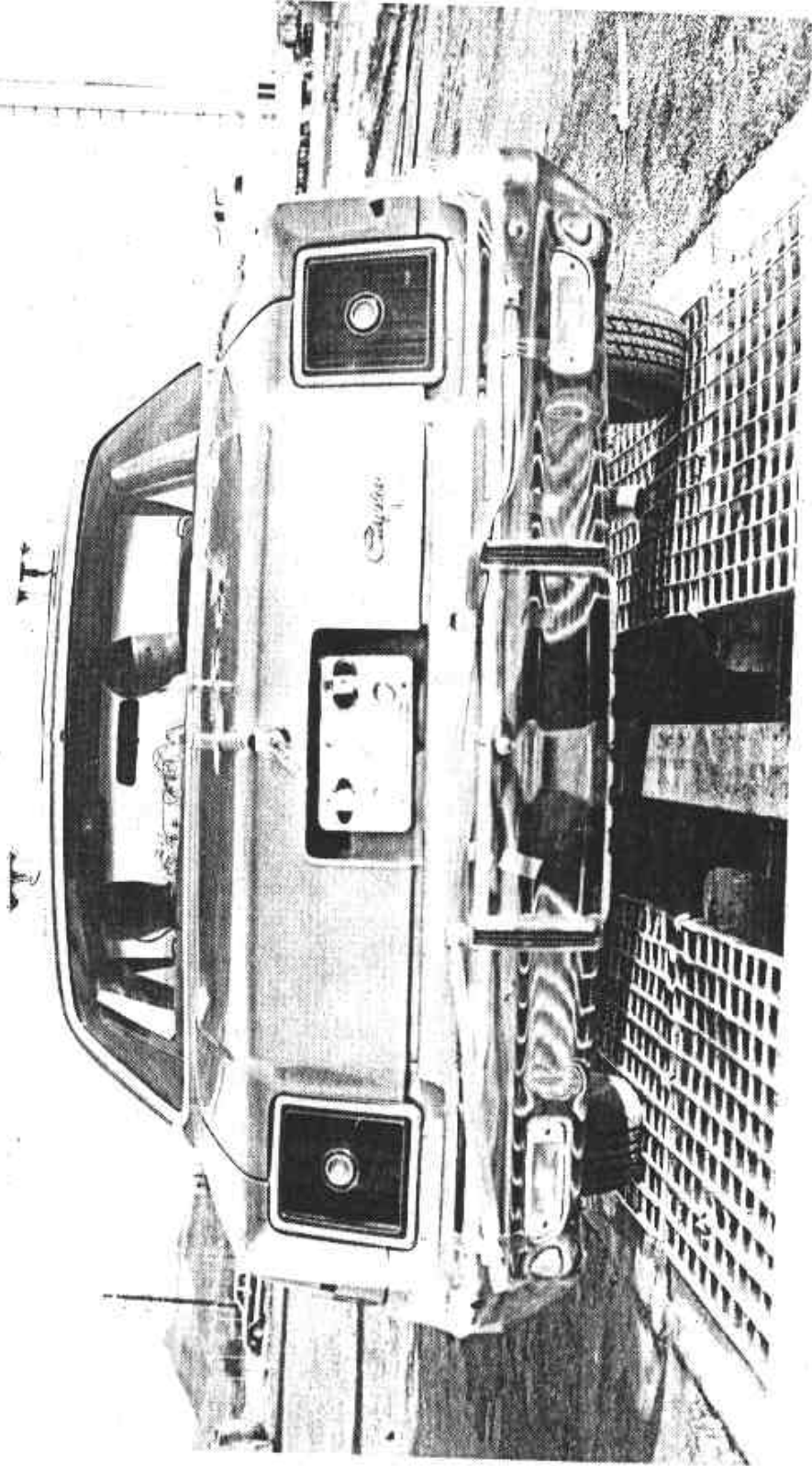


Figure 2-1. Pre-test Rear View.

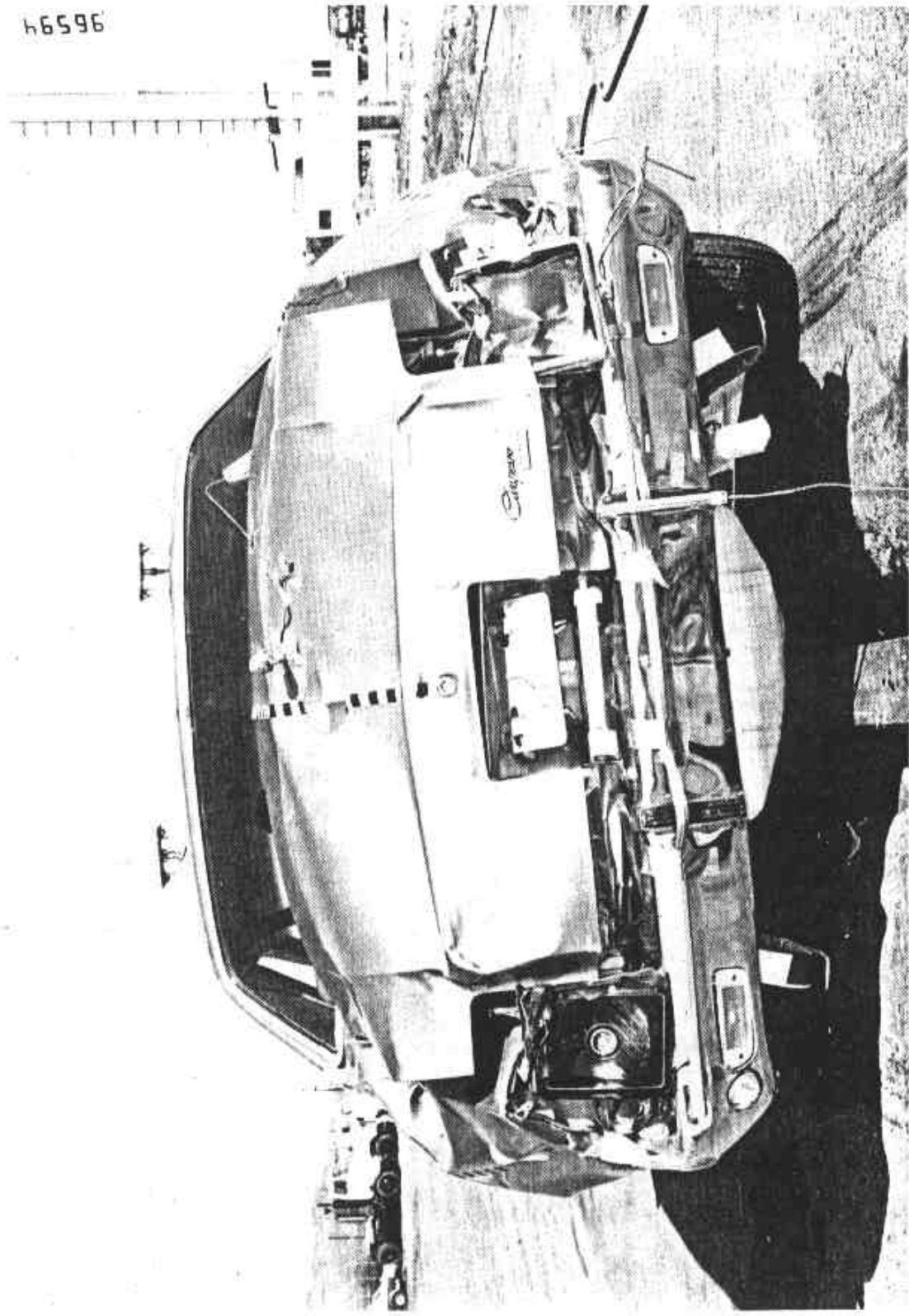


Figure 2-2. Post-test Rear View.

89596



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

66596

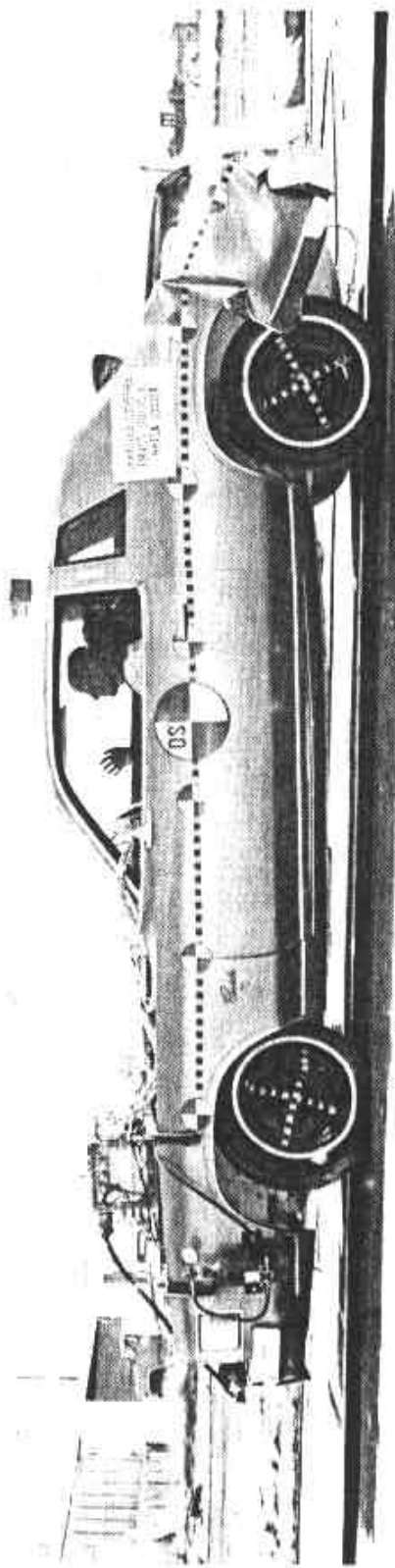


Figure 2-4. Post-test Left Side View.

96596

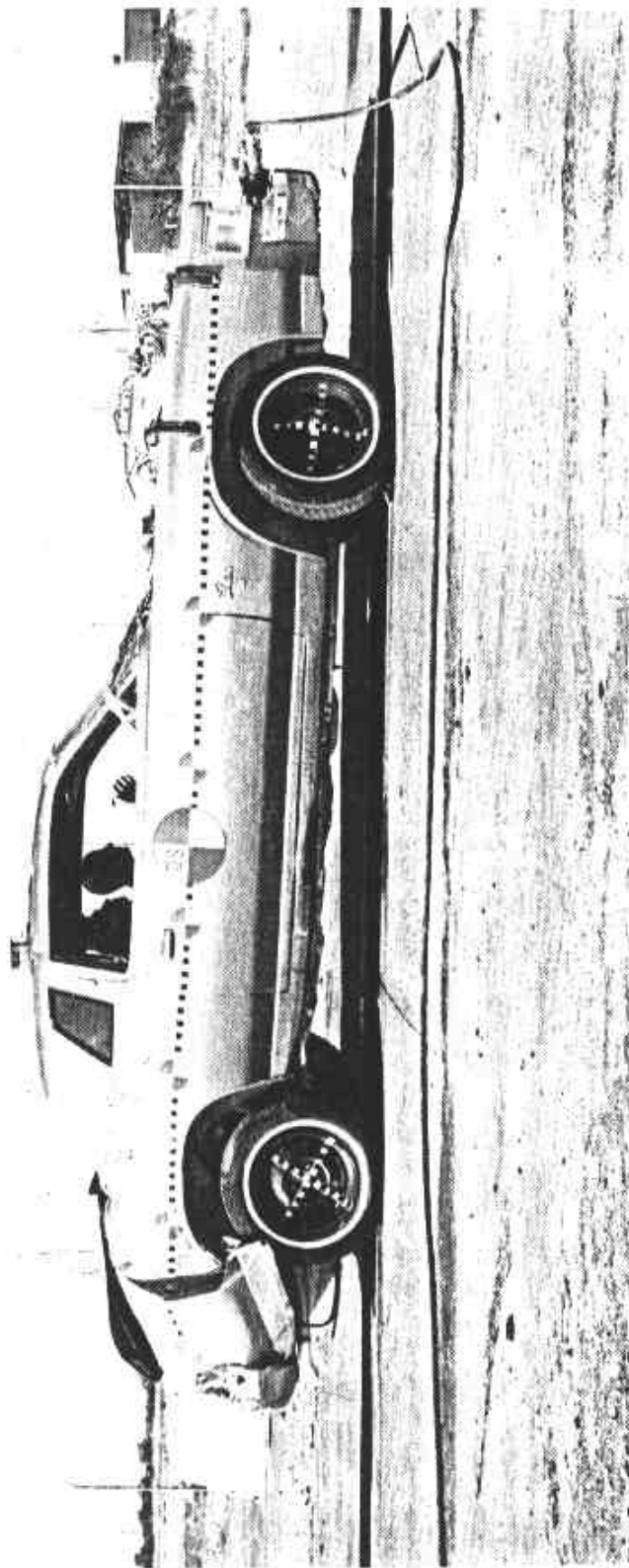


Figure 2-5. Post-test Right Side View.

26596

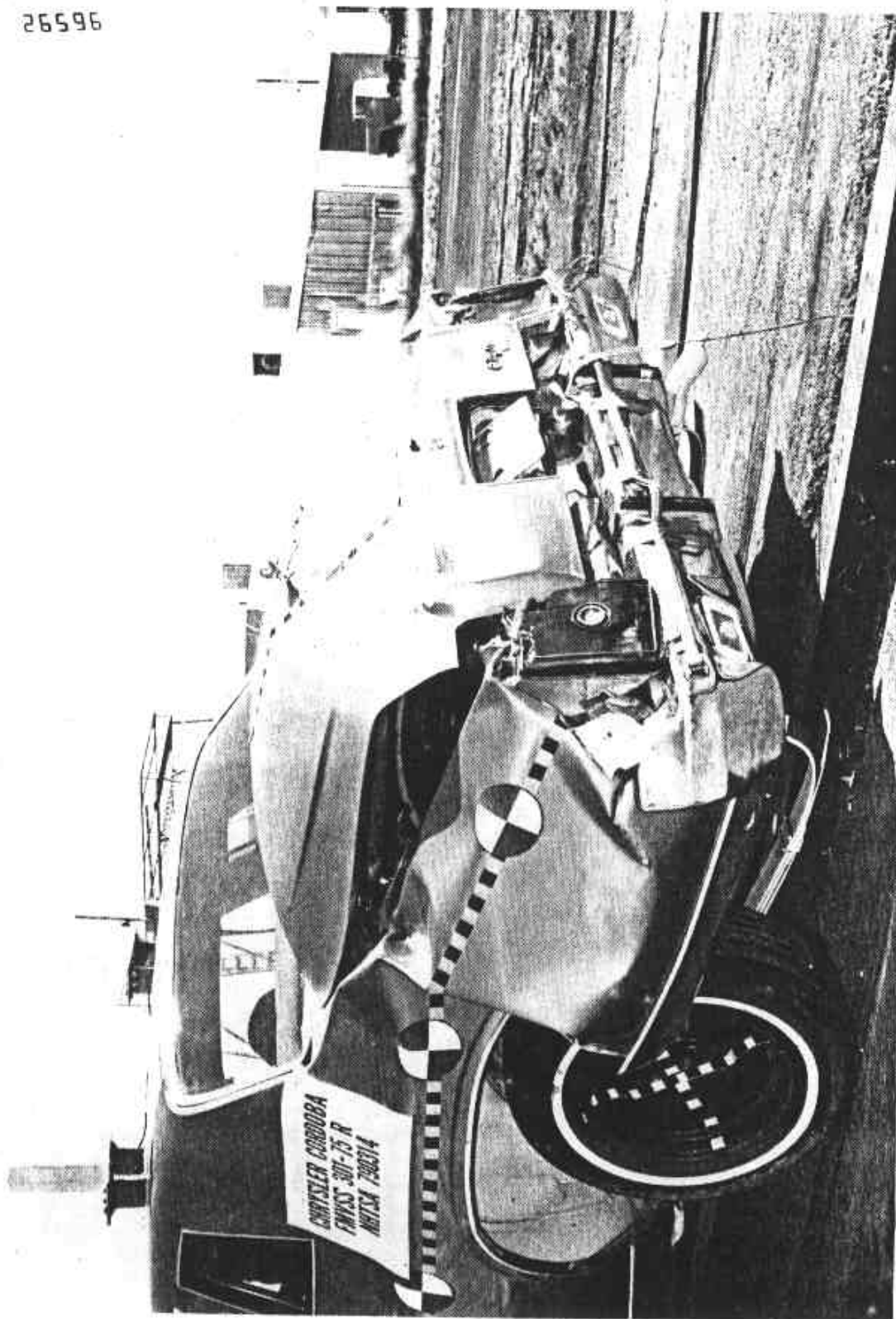


Figure 2-6. Post-test Left Rear Quarter.

56596

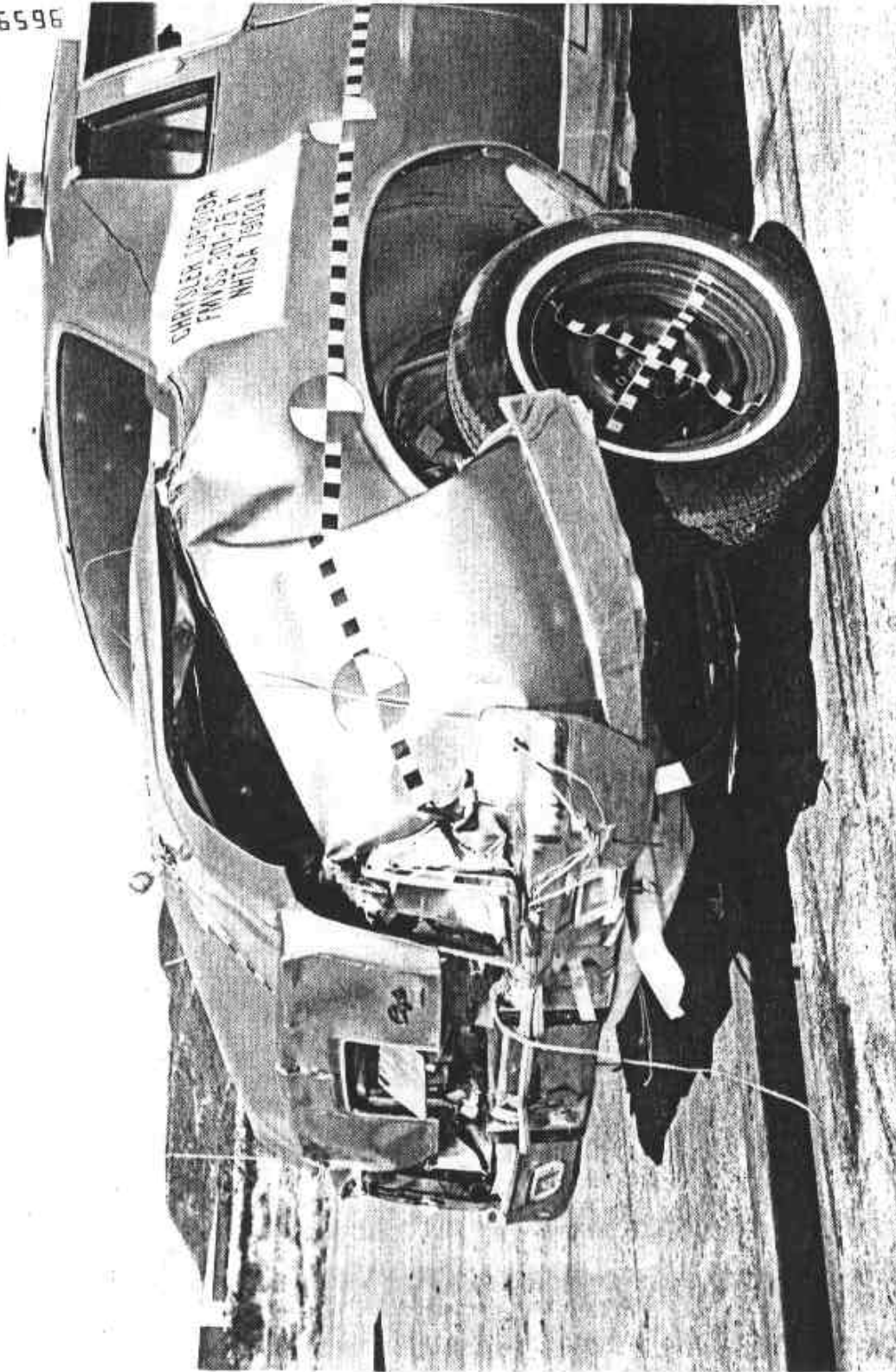


Figure 2-7. Post-test Right Rear Quarter.

SHEL6

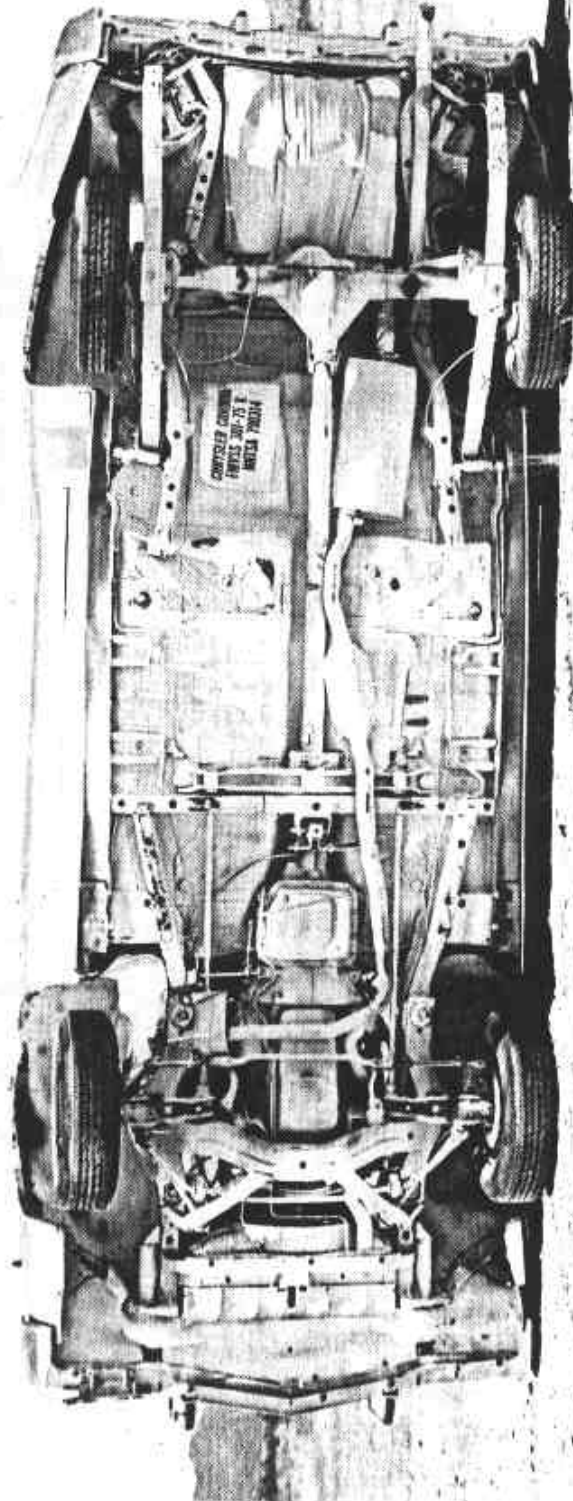


Figure 2-8. Post-test Overall Underside View.

SECTION 3

COMPLIANCE-RELATED DATA
FMVSS 301-75 INDICANT TESTING

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

SECTION 3
FMVSS 301-75 INDICANT DATA

GENERAL TEST CONDITIONS:

Vehicle Impact Speed:

Primary 35.48 mph Secondary 35.46 mph Speed
Range Specified by CTM: 34.5 to 35.5 mph
Ambient Temperature at Time of Test: 81 °F
Date of Test: June 5, 1979 Time: 0850

FUEL SYSTEM DATA:

Test Fluid: Stoddard Solvent No. 2 Specific Gravity: 0.764
Kinematic Viscosity: 0.99 centistokes
Spill Point Volume: 23.7 U.S. gal Liquid Temp: 73 °F
Test Volume: 21.6 U.S. gal Liquid Temp: 73 °F

Details of Fuel Tank, Filler Pipes, and Connections:

The fuel tank is mounted below the trunk floor and aft of the rear axle. Two tank straps secure the tank to the floor. A filler tube extends through a rubber grommet in the top center rear and terminates at the rear of the vehicle behind the rear license plate fixture.

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

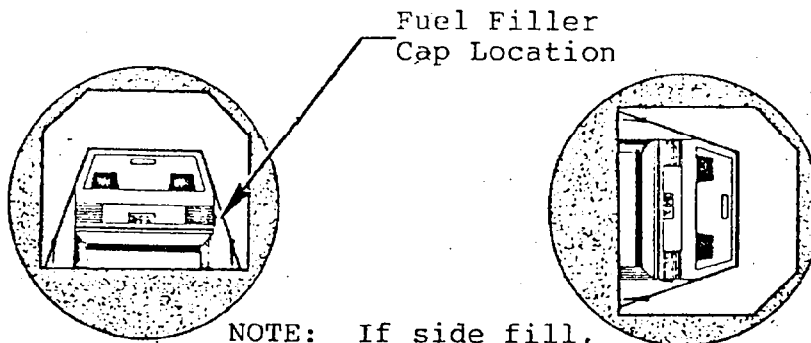
3. Static Rollover: See following four pages

LABORATORY INFORMATION:

Project Engineer: R. Pirtle Date: June 1979
Project Manager: E. Enserink Date: June 1979

SECTION 3
FMVSS 301-75 INDICANT STATIC ROLLOVER DATA SHEET

TEST PHASE: 0° to 90° VEHICLE NHTSA NO. 790314



NOTE: If side fill,
rotate so that filler
cap is down.

DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time.... = 1 min, 44 sec +
(Spec. Range = 1 to 3 min)
FMVSS 301 Position Hold Time..... = 5 min, 0 sec =
Total..... = 6 min, 44 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	Trace	0	0	-

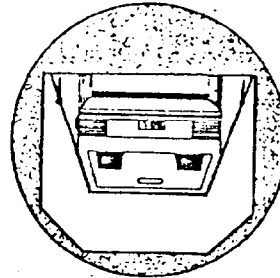
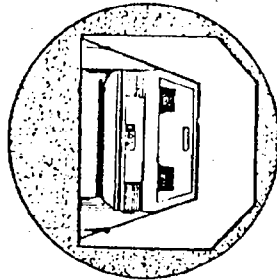
NOTE: Spillage is recorded in whole minute intervals only - as determined above.

SOLVENT SPILLAGE LOCATION(S):

Filler Tube/Tank Junction

SECTION 3
FMVSS 301-75 INDICANT STATIC ROLLOVER DATA SHEET

TEST PHASE: 90° to 180° VEHICLE NHTSA NO. 790314



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, 0 sec =
Total..... = 6 min, 37 sec
Next Whole Minute Interval..... = 7 min

FMVSS 301 REQUIREMENTS AND ACTUAL TEST RESULTS:

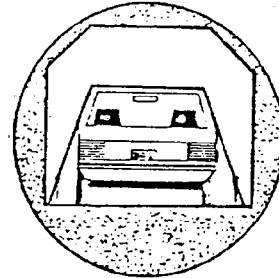
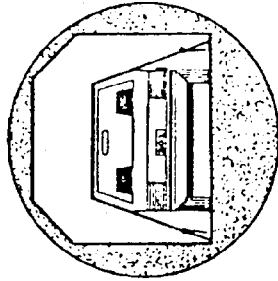
Time Period	First 5 min (from onset)	6th min	7th min	8th min (if req'd)
Maximum Spillage Allowed (oz)	5	1	1	1
Actual Spillage Recorded	0	0	0	-

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

SOLVENT SPILLAGE LOCATION(S):

SECTION 3
FMVSS 301-75 INDICANT STATIC ROLLOVER DATA SHEET

TEST PHASE: 270° to 360° VEHICLE NHTSA NO. 790314



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time.... = 1 min, 39 sec +
(Spec. Range = 1 to 3 min)
FMVSS 301 Position Hold Time..... = 5 min, 0 sec =
Total..... = 6 min, 39 sec
Next Whole Minute Interval..... = 7 min

FMVSS 301 REQUIREMENTS AND ACTUAL TEST RESULTS:

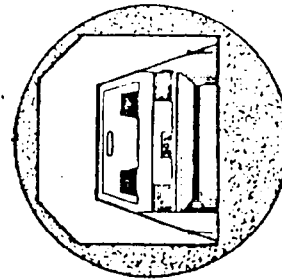
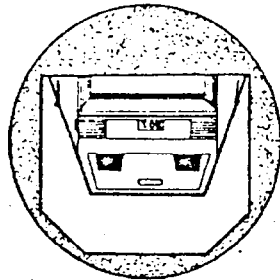
Time Period	First 5 min (from onset)	6th min	7th min	8th min (if req'd)
Maximum Spillage Allowed (oz)	5	1	1	1
Actual Spillage Recorded	0	0	0	-

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

SOLVENT SPILLAGE LOCATION(S):

SECTION 3
FMVSS 301-75 INDICANT STATIC ROLLOVER DATA SHEET

TEST PHASE: 180° to 270° VEHICLE NHTSA NO. 790314



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, 0 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):

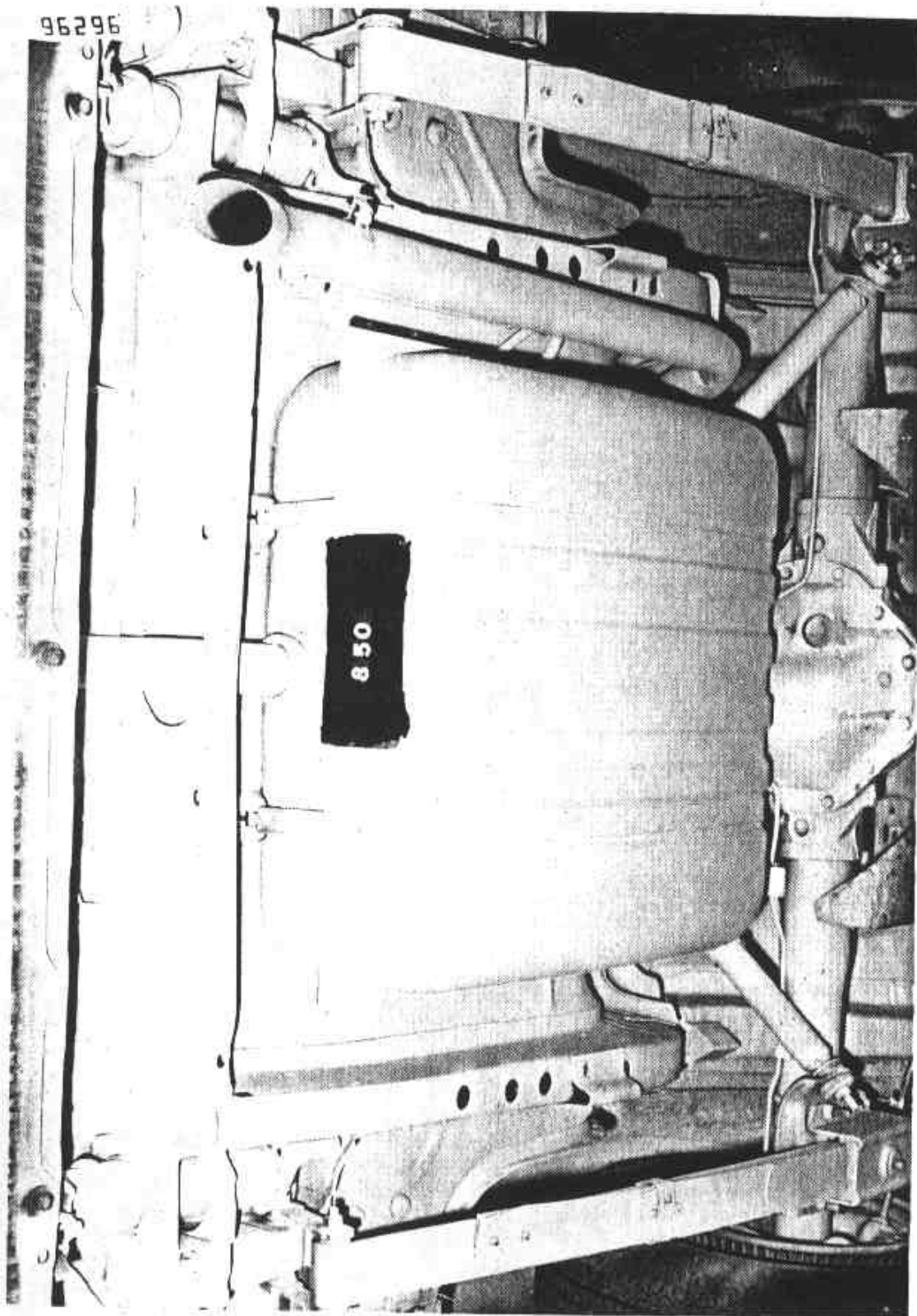


Figure 3-1. Pre-test Fuel Tank.

26996



Figure 3-2. Post-test 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
PART 572 DUMMY IN-VEHICLE POSITION
RECORDING SHEET

NHTSA No.: 790314

Manufacturer: Chrysler Corporation

Make/Model: Chrysler Cordoba

Model Year: 1979

SEAT TYPE:

☒ Bench ☐ Bucket
☐ Split Bench

ADJUSTER TYPE:

☒ Manual
☐ Power

BUCKET SEAT BACK TYPE:

☐ Adjustable
Reclining
☒ Fixed

AMBIENT TEMPERATURE: 81 °F; TIME: 0700

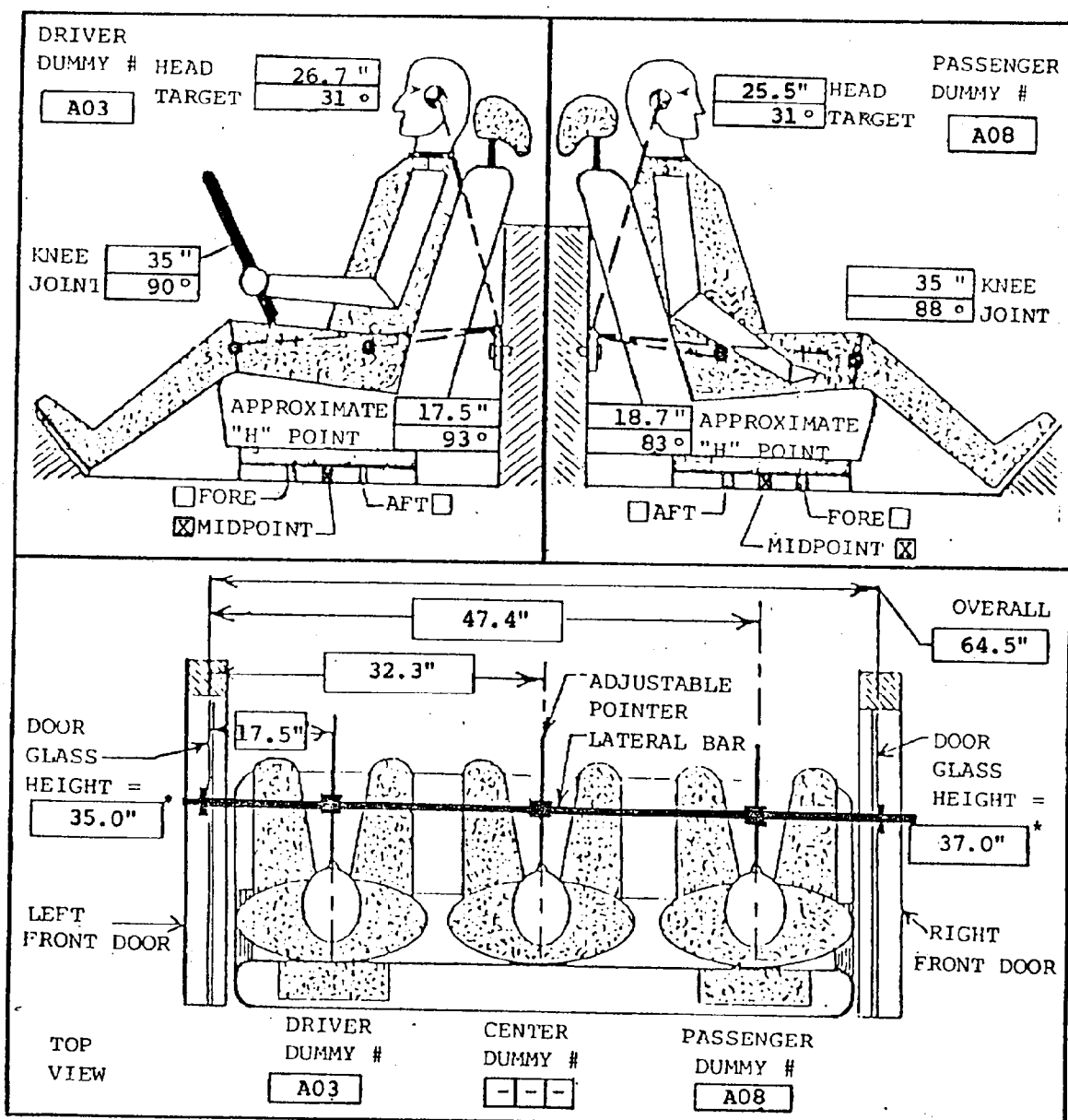
POSITIONING

DATE: June 5, 1979

TECHNICIANS: 1. R. Pirtle

2. M. Pozzi

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
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>14.75</u>	<u>15.2</u>	<u>-</u>
Chest to Hub Steering Wheel	<u>14.3</u>	<u>-</u>	<u>-</u>
Chest to Dash	<u>20.4</u>	<u>20.7</u>	<u>-</u>
Nose to Windshield (Horizontal Distance)	<u>20.6</u>	<u>21.7</u>	<u>-</u>
Left Knee to Closest Point on Lower Panel	<u>9.5</u>	<u>7.0</u>	<u>-</u>
Right Knee to Closest Point on Lower Panel	<u>9.0</u>	<u>7.7</u>	<u>-</u>
Ankle Distance	<u>13.8</u>	<u>9.7</u>	<u>-</u>
Knee Distance	<u>10.0</u>	<u>8.6</u>	<u>-</u>
Nose to Seatback	<u>-</u>	<u>-</u>	<u>20.3</u>

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

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	26.4	155	-8.1	98	110.4	117	-4.6	98
Lateral	7.3	118	-6.5	173	16.4	120	-61.8	117
Vertical	27.2	140	-4.6	84	157.3	117	-20.9	119
Resultant	33.3	13.5	0.9	0	201.8	117	0.6	37
HIC	177.8 @ 115-181 msec				357.5 @ 116-118 msec			
Chest Acceleration								
Longitudinal	16.9	111	-0.6	58	39.1	87	-3.0	92
Lateral	7.1	109	-2.5	195	5.7	101	-0.4	3
Vertical	10.8	172	-0.9	200	11.8	120	-0.6	87
Resultant (Max)	19.5	110			39.4	87		
Resultant (clip)	19.0	112	0.1	0	30.5	85	0.1	8
TIME > 60 G	0 msec				0 msec			
SEVERITY INDEX	41.5 @ 200 msec				63.6 @ 200 msec			
	Peak (lb)	Time (msec)	Peak (lb)	Time (msec)	Peak (lb)	Time (msec)	Peak (lb)	Time (msec)
Femur Loads								
Left				None				
Right				None				
Belt Loads								
Lap				None				
Torso				None				
Vehicle Impact Speed (mph): 35.48								
*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: Chrysler Cordoba

NHTSA No.: 790314

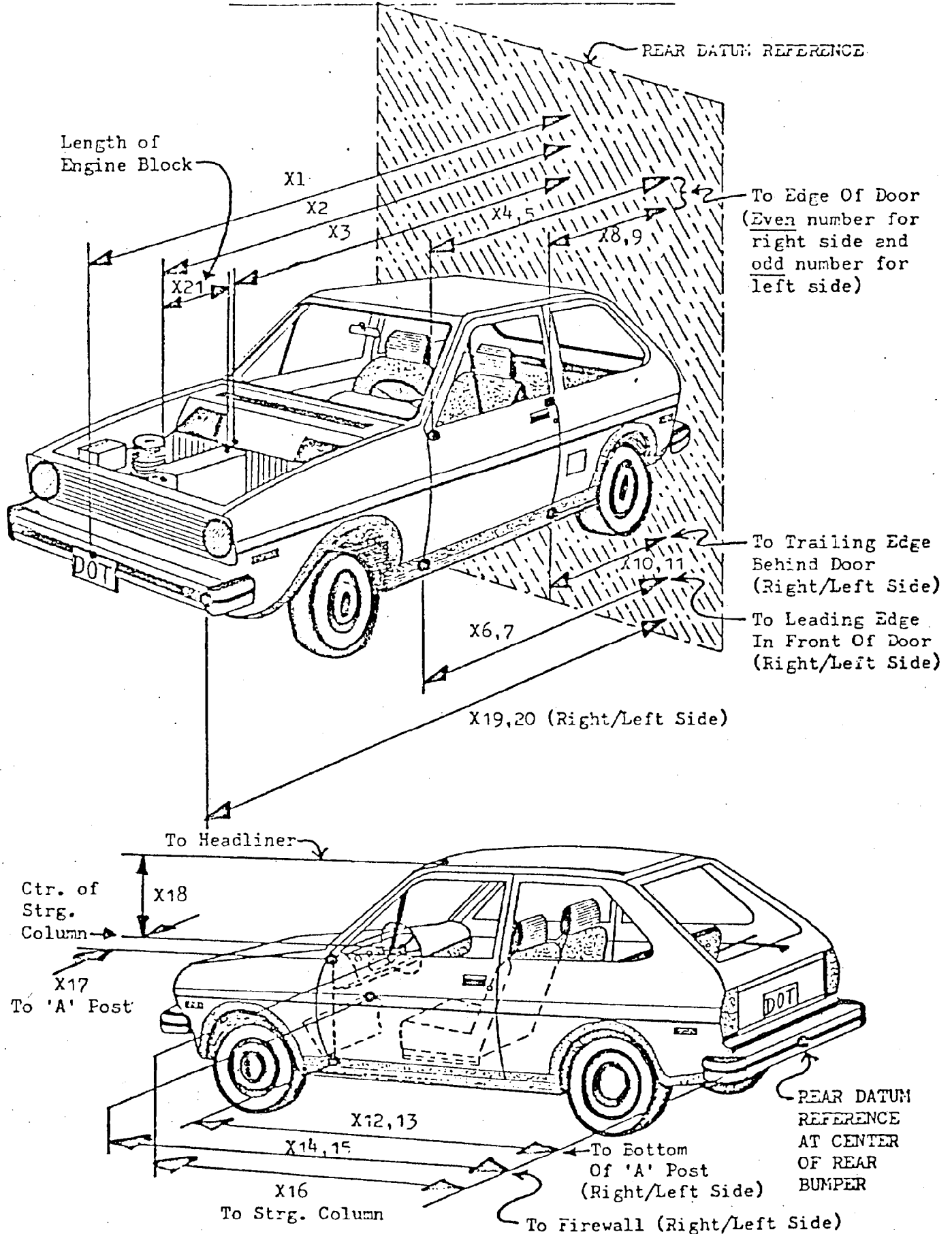
Test Date: 6-5-79

D.S. No.: 850

<u>Reference Dimension</u>	<u>Pre-test Measurement</u>	<u>Post-test Measurement</u>	<u>Change</u>
X ₁ *	215.8	195.2	20.6
X ₂			
X ₃			
X ₄			
X ₅			
X ₆			
X ₇			
X ₈ *	129.0	128.9	0.1
X ₉ *	129.0	129.2	0.2
X ₁₀			
X ₁₁			
X ₁₂			
X ₁₃			
X ₁₄			
X ₁₅			
X ₁₆			
Y ₁₇			
Z ₁₈			
X ₁₉ *	212.0	195.2	16.8
X ₂₀ *	212.0	195.2	16.8
X ₂₁			

*Rear impact data requirements.

PRE-TEST AND POST-TEST MEASUREMENT POINTS



SECTION 4
DUMMY KINEMATIC SUMMARY

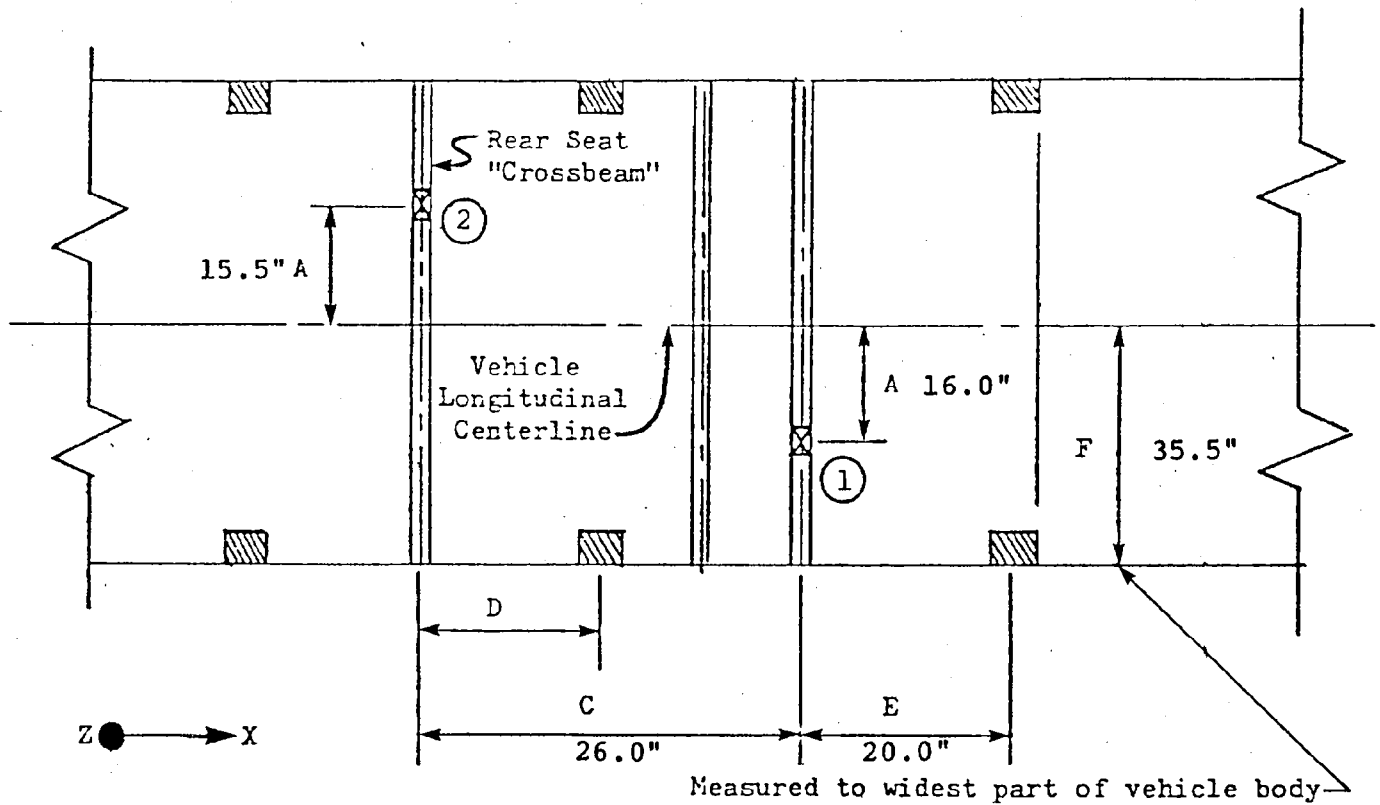
DRIVER - At impact, moved smoothly backward and struck rear seatback with top of front seatback, then torso flexed forward past pre-test seating position. Torso came to rest in pre-test position; only lumbar portion of back was in contact with seatback.

PASSENGER - Smooth transition rearward with no violent motion. Came to rest reclining in seat with slight medial (leftward) rotation of torso.

CHILD - No discernible motion other than head pressing into rear seatback at impact. Came to rest in pre-test position.

OTHER COMMENTS:

SECTION 4 TEST VEHICLE ACCELEROMETER LOCATION DEFINITION AND DATA SUMMARY



No.	Location Description	Component Direction			Data Summary					
					Peak G @ MSEC					
		X	Y	Z	X "+"	X "-"	Y "+"	Y "-"	Z "+"	Z "-"
1	Front seat "crossbeam"	✓	✓	✓	27.1 @ 9	2.4 @ 194	32.3 @ 14	26.9 @ 66	15.8 @ 17	9.5 @ 12
2	Rear seat "crossbeam"	✓		✓	52.2 @ 9	46.2 @ 21	@	@	39.0 @ 16	38.6 @ 12

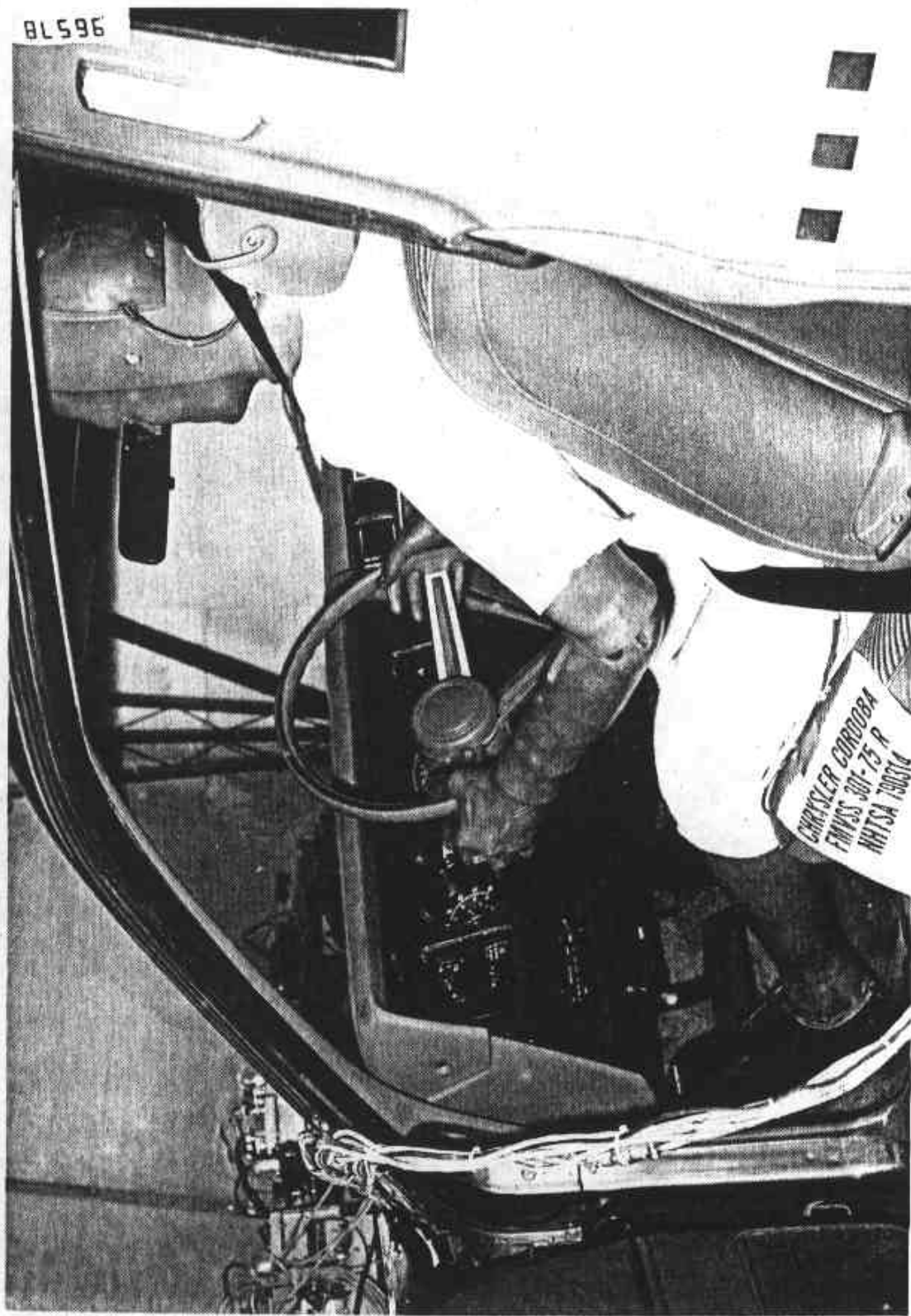


Figure 4-1. Pre-test Driver Dummy Position.

18596

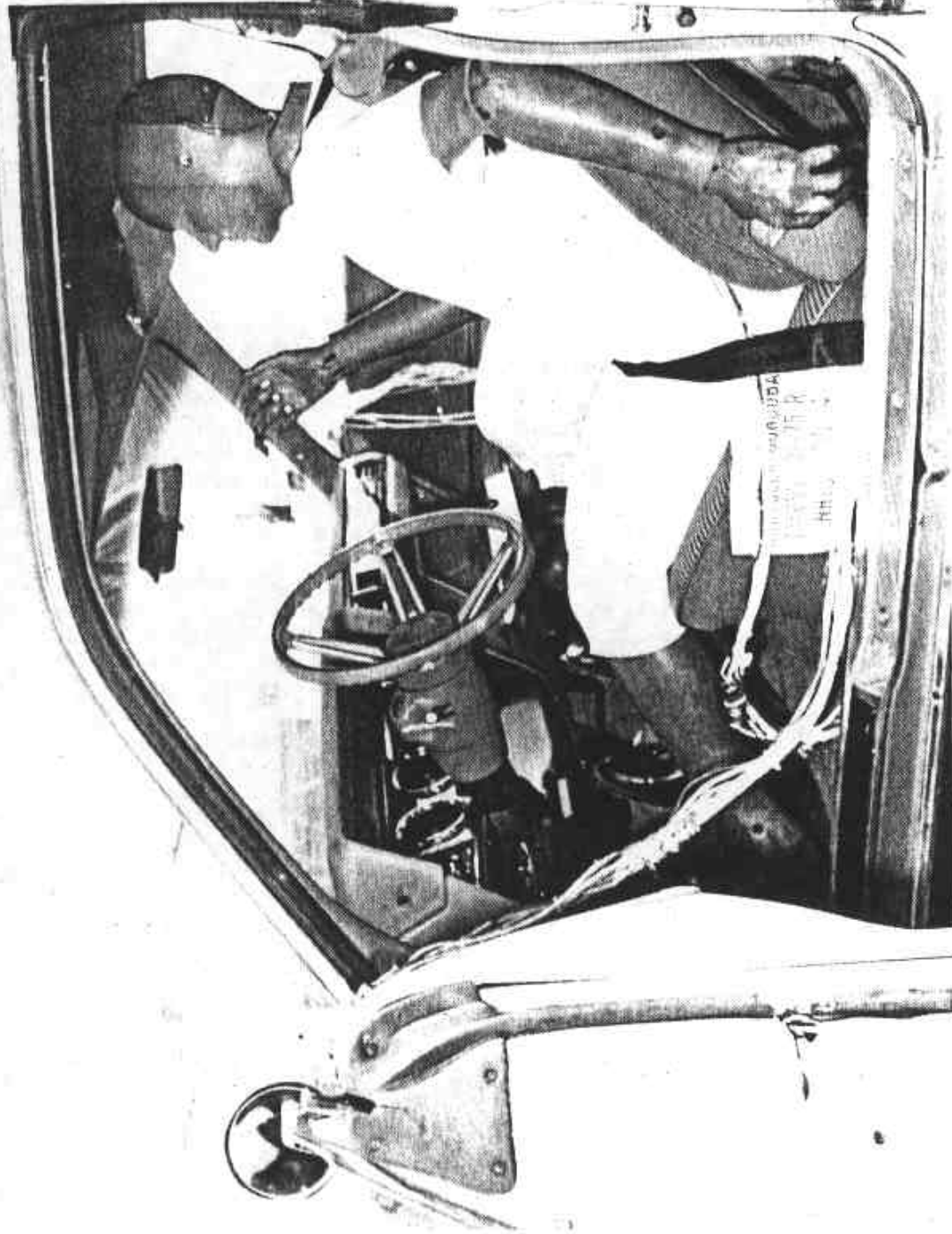


Figure 4-2. Post-test Driver Dummy Position.



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

98596



Figure 4-4. Post-test Driver Location With Dummy Removed.



Figure 4-5. Pre-test Passenger Location.

E8596

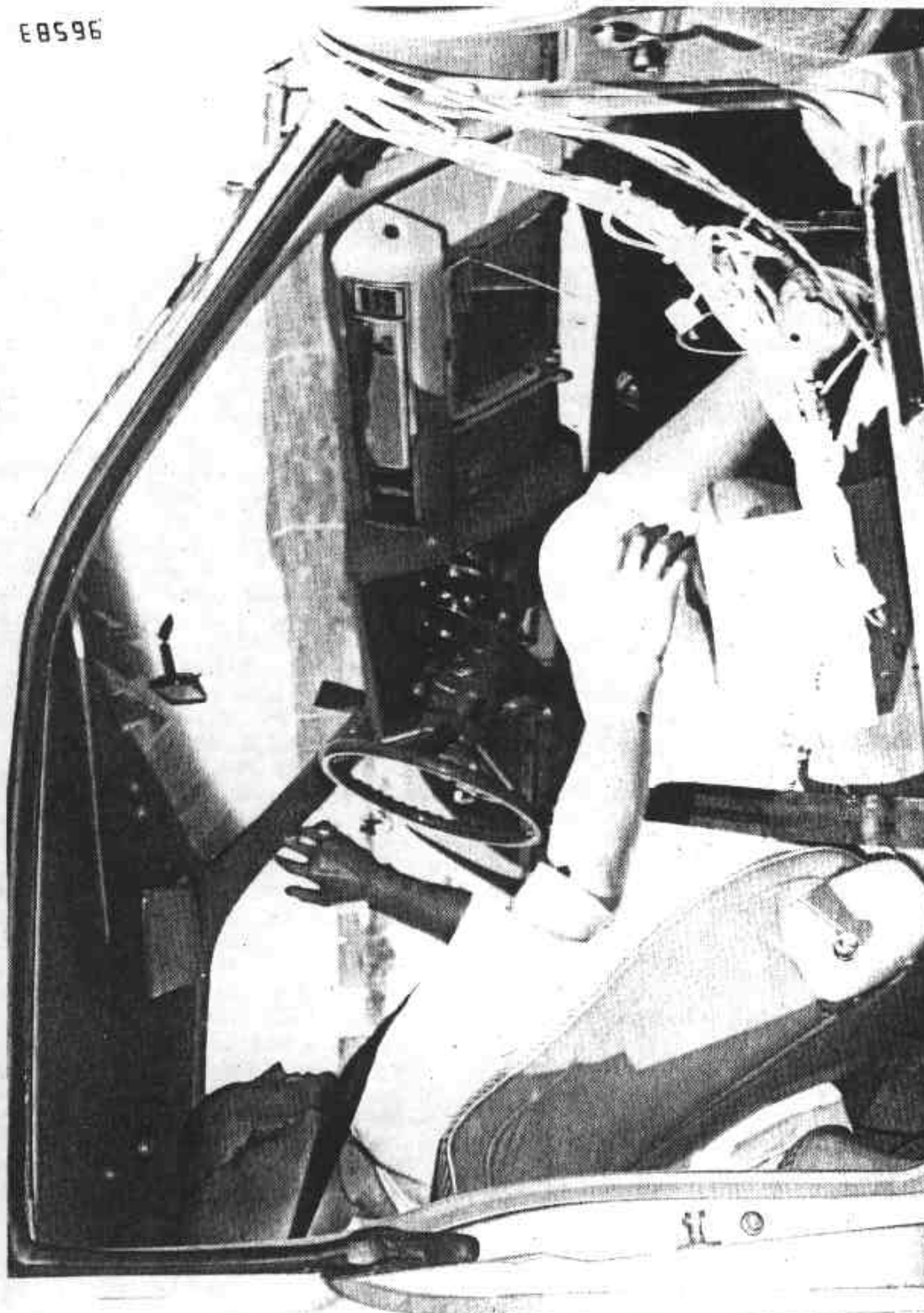


Figure 4-6. Post-test Passenger Position.

h8596



Figure 4-7. Post-test Passenger Position.

18596



Figure 4-8. Post-test Passenger Position With Dummy Removed.

APPENDIX A
TEST FACILITIES AND PROCEDURE

A.0 TEST FACILITY AND EQUIPMENT FOR FMVSS 301-75 REAR IMPACT TESTS

General Test Facility Description

FMVSS 301-75 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 PARKING BRAKE TEST RAMP
22. PULL-OFF AREA (TYPICAL OF THIRTEEN)
23. BALLISTIC TEST RANGE

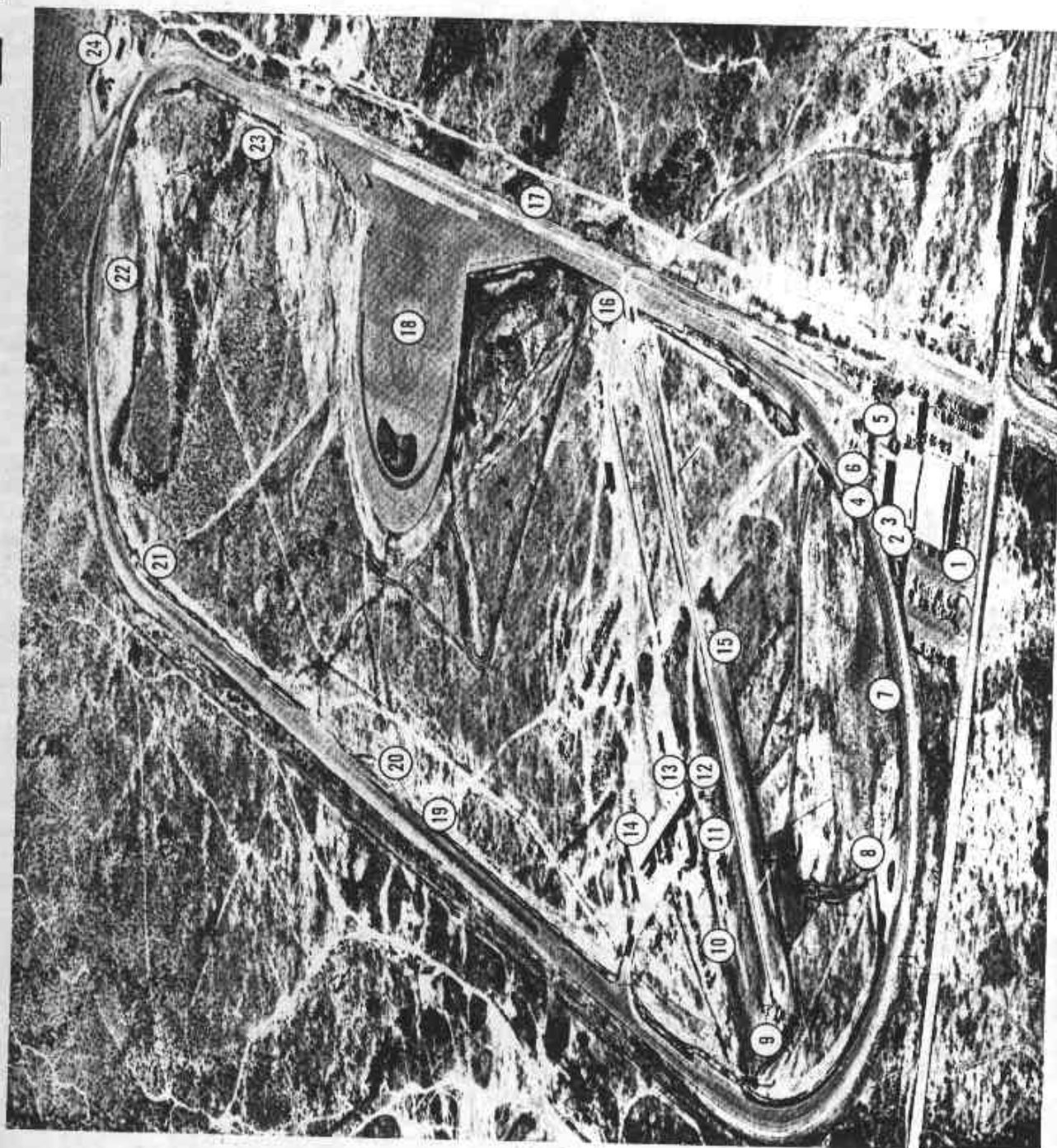


Figure A-1. The Dynamic Science, Inc. Deer Valley Facility.

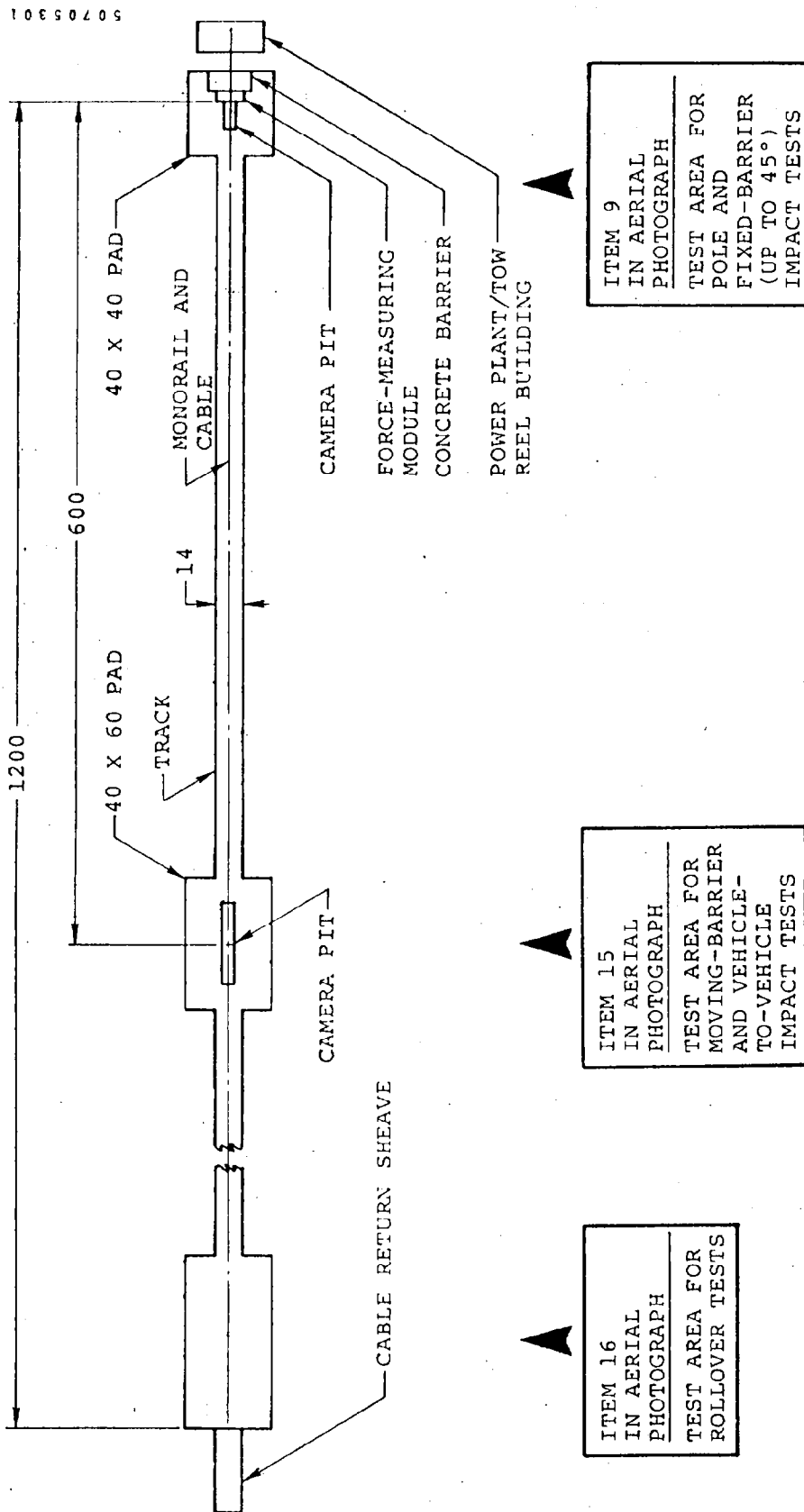


Figure A-2. Monorail Impact Facility.

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.

Moving Barrier

The moving barrier used by Dynamic Science conforms to all the requirements of paragraph S8.2 of FMVSS 208, "Occupant Crash Protection." It is rigid and has a solid suspension so it undergoes no significant amount of dynamic or static deformation and absorbs no significant portion of the energy dissipated in the impact.

The impact surface is a vertical, rigid, flat rectangle, 78 inches wide and 60 inches high, perpendicular to the barrier's direction of travel. The lower edge of the barrier face is horizontal and 5 inches above the ground surface.

The nominal weight of the moving barrier is 4,000 pounds. The actual measured weight of the barrier is 3,996 pounds distributed as follows:

LF	1536 lb	RF	1415 lb
LR	427 lb	RR	618 lb

The tires are size J60-15, inflated to 24 psi in the front and 10 psi in the rear.

A guide at the back of the moving barrier which rides along the monorail ensures that the barrier travels in a straight line with no significant lateral, vertical, or rotational movement.

Fuel Simulation

As prescribed in the FMVSS 301 Laboratory Procedure, the vehicle fuel system is filled to 90 to 95 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. Stoddard 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.

High-Speed Motion Photography

Seven high-speed (1,000 frames per second) motion cameras with 100 Hz timing marks are used for photographic test documentation. The general location of the cameras is diagrammed in Figure A-3. Precise positioning is accomplished through bore sighting with the vehicle at the impact point prior to the test.

Test No: _____ Test Date: _____

Test Type: FMVSS 301 Rear Inducant Tests

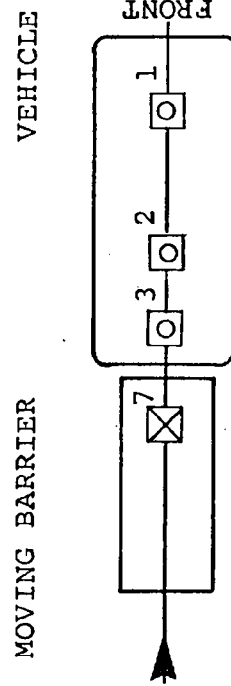
Vehicle A (Away): _____

Vehicle B (Barrier): Certified Moving Barrier

Comments: _____

- CAMERA SYMBOLS
- ☐ PIT
- ☒ GROUND
- ☐ BARRIER
- ☒ OVERHEAD
- ☐ ON-BOARD
- FRAME RATE
1. 1000 fr/sec
2. 200 fr/sec
3. Other 24 fr/sec
4. 400 fr/sec
5. 500 fr/sec
- TIMING LIGHT SPEED
1. 100 Hz (10 msec/light)
2. 200 Hz (5 msec/light)
3. Other _____

CAMERA	YES
STILLS	X
SLIDES	
MOVIE	X
POLAROID	
VIDEO	



Loc. No.	Location	Field of View	Lens Size	Frm Rate	Tmng Spd	Ser No	Impact Dist-X	C.L. Dist-Y	Cap. Hght
1	Pit	Underside forward engine compartment		>500					
2	Pit	Underside mid-car		>500					
3	Pit	Underside fuel tank		>500					
4	Hand-held	Real time documentary							
5	Ground	Complete left side of vehicle		>500					
6	Ground/right side	Contact area between barrier and car		>500					
7	On moving barrier	Contact area between barrier and car		>500					

Figure A-3. Camera Locations.

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.

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	Photosonics 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.

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*

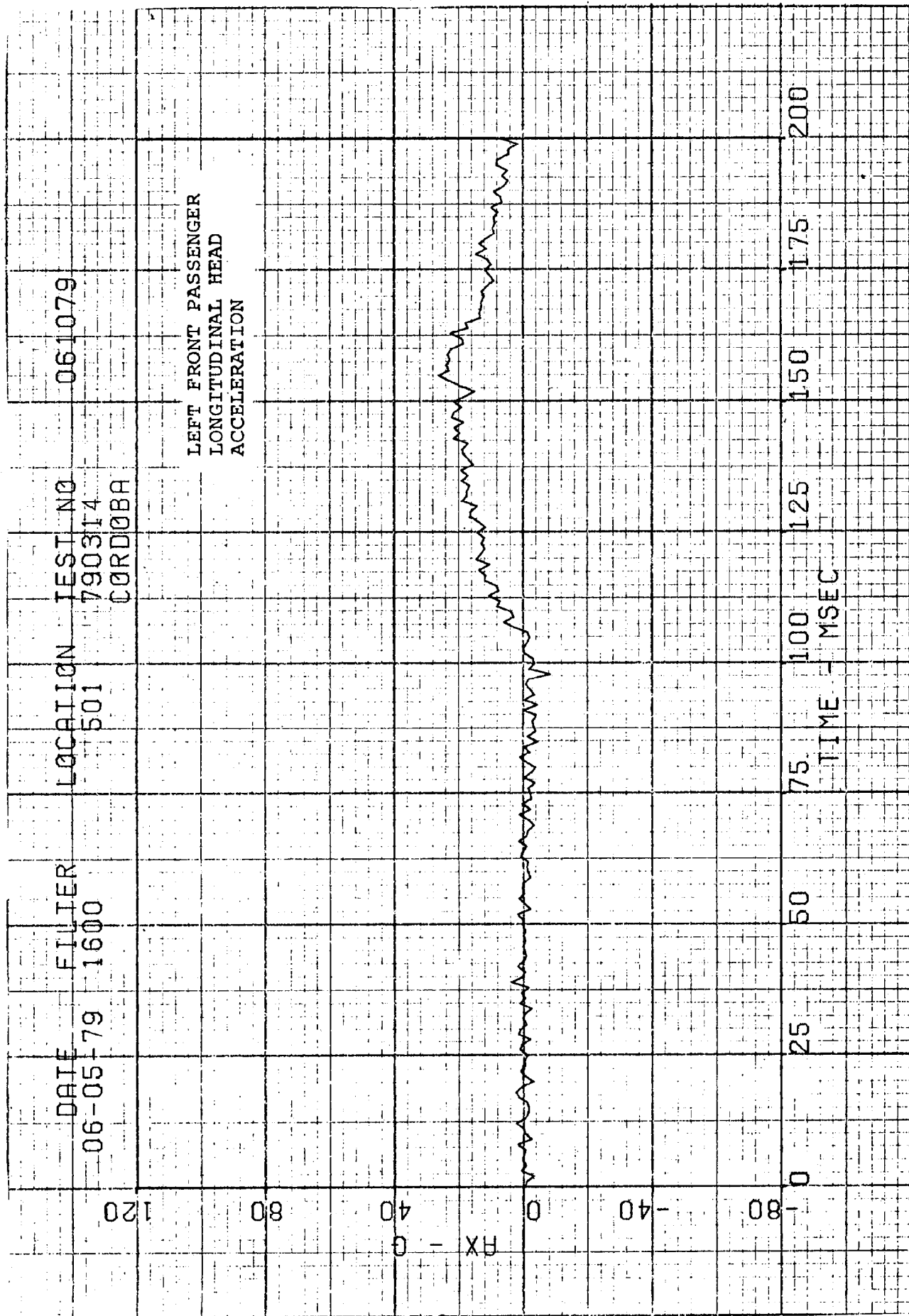
<u>Driver</u>	<u>RF Outboard Passenger</u>	<u>Data Description</u>
501	503	Head Acceleration
1101	1103	Chest Acceleration
2111	2131	Left Femur Load
2112	2132	Right Femur Load
4101	4103	Torso Belt Load

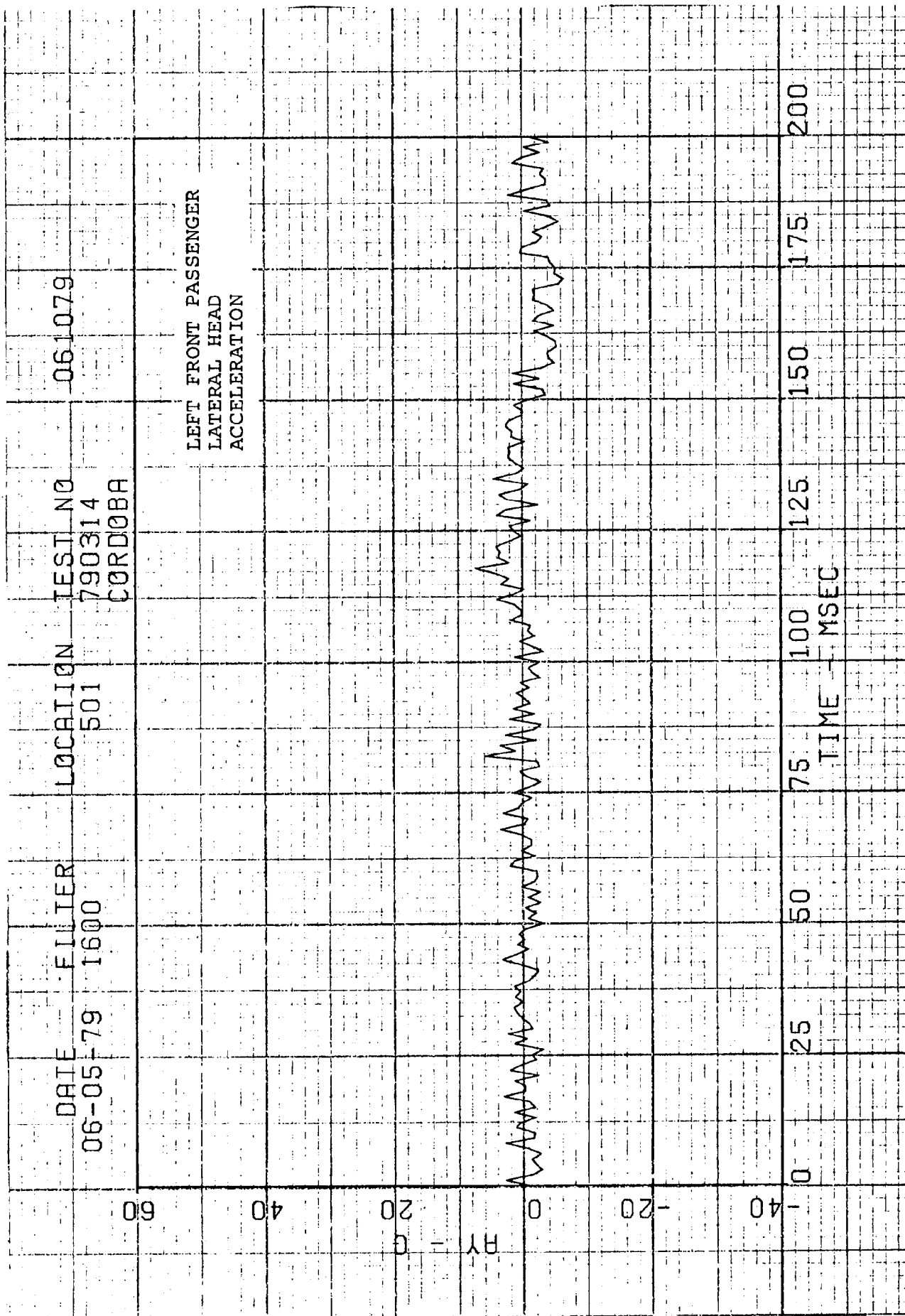
Vehicle Data**

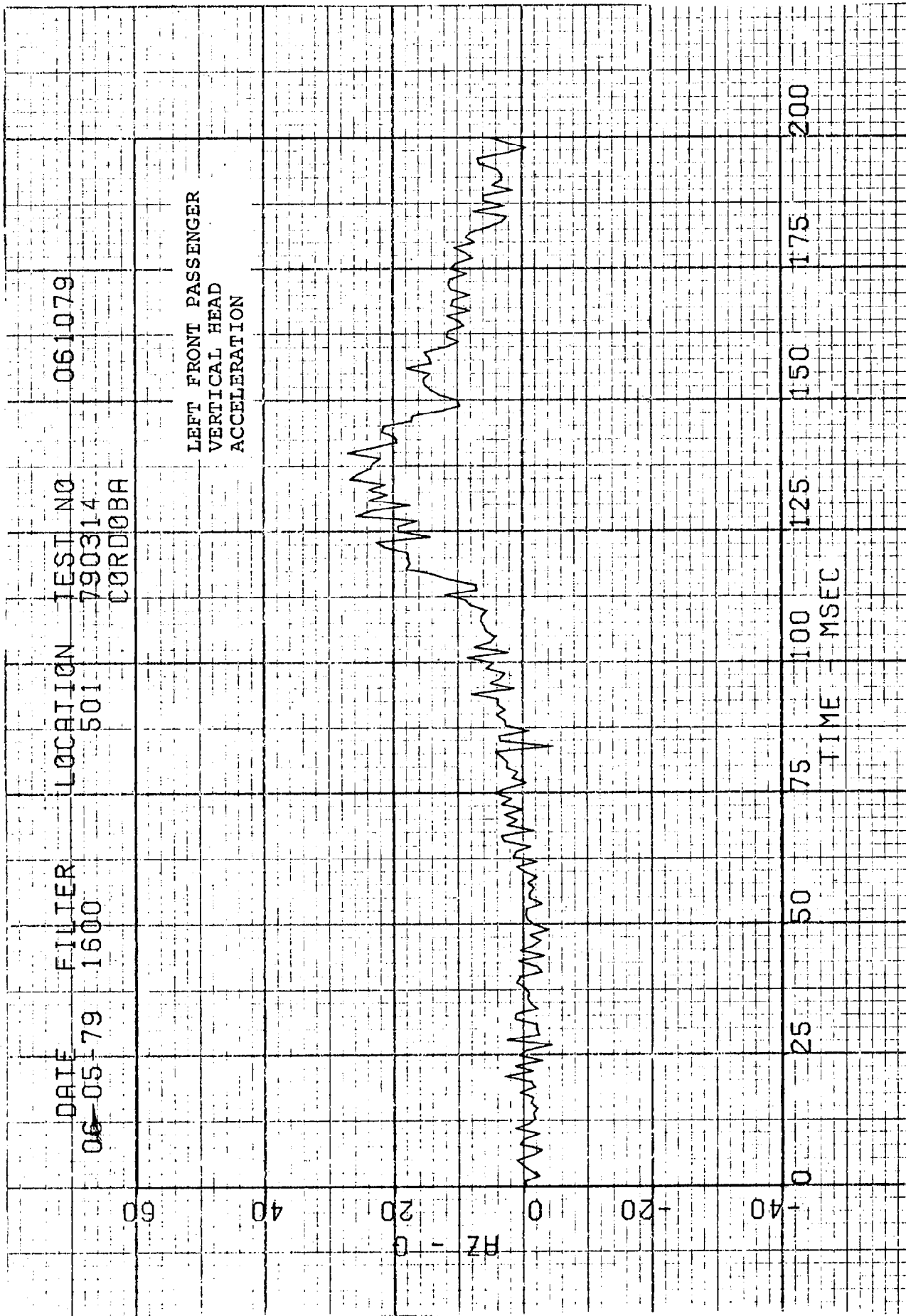
	<u>Location</u>
101	Front Seat Area
102	Rear Seat Area

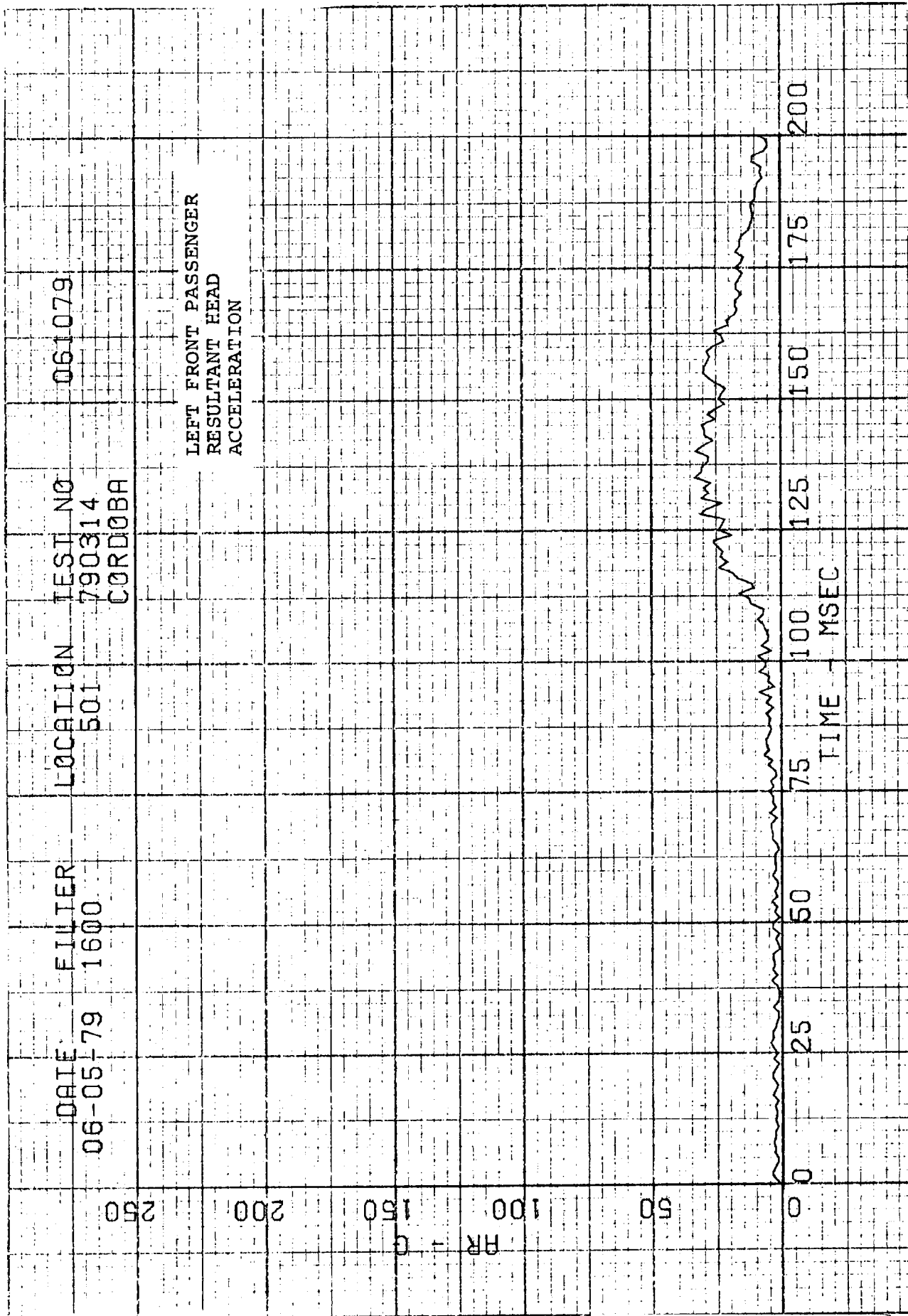
*Dummy Injury Summary presented on page 4-4.

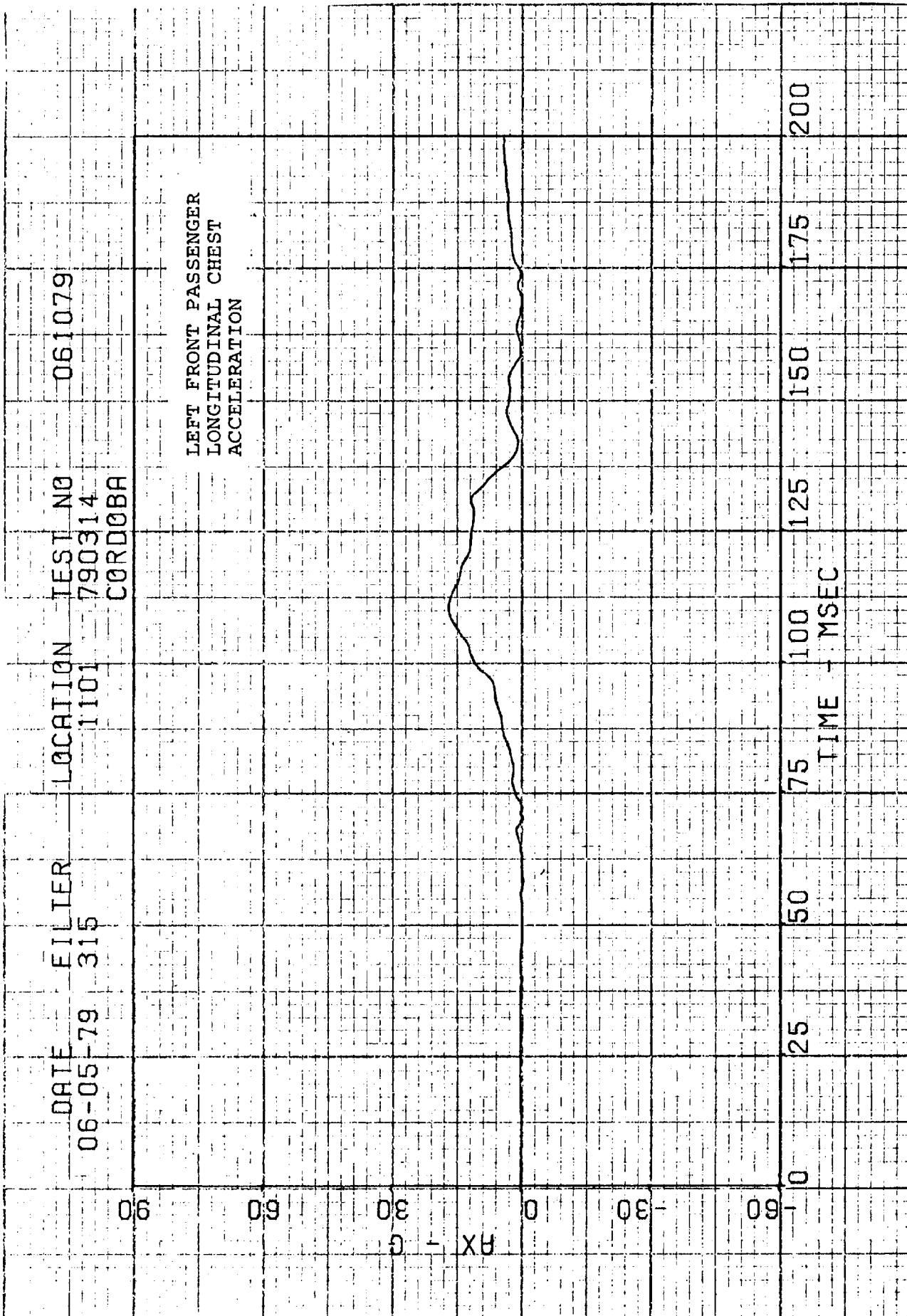
**Vehicle accelerometer location and data summarized on page 4-8.

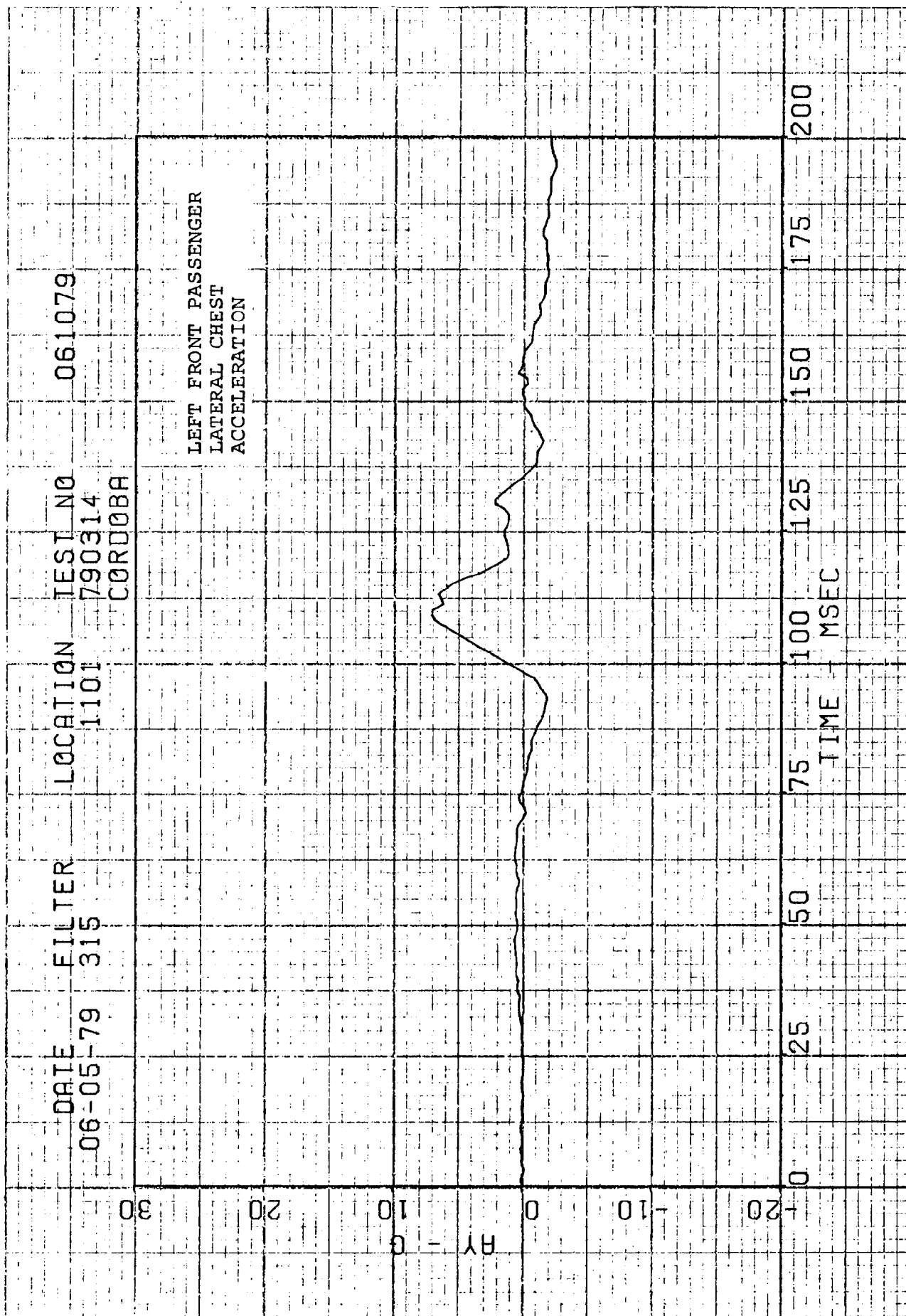


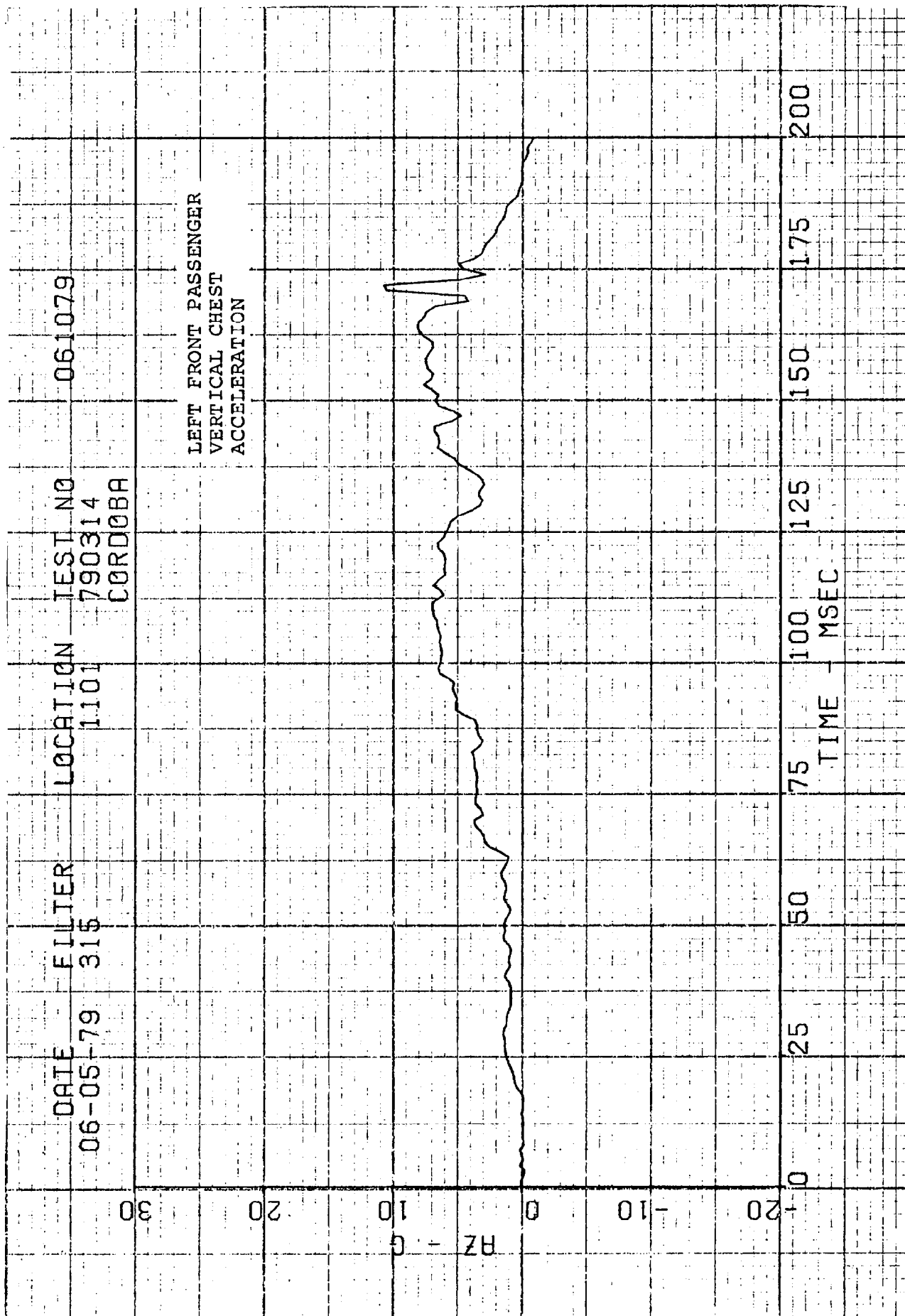


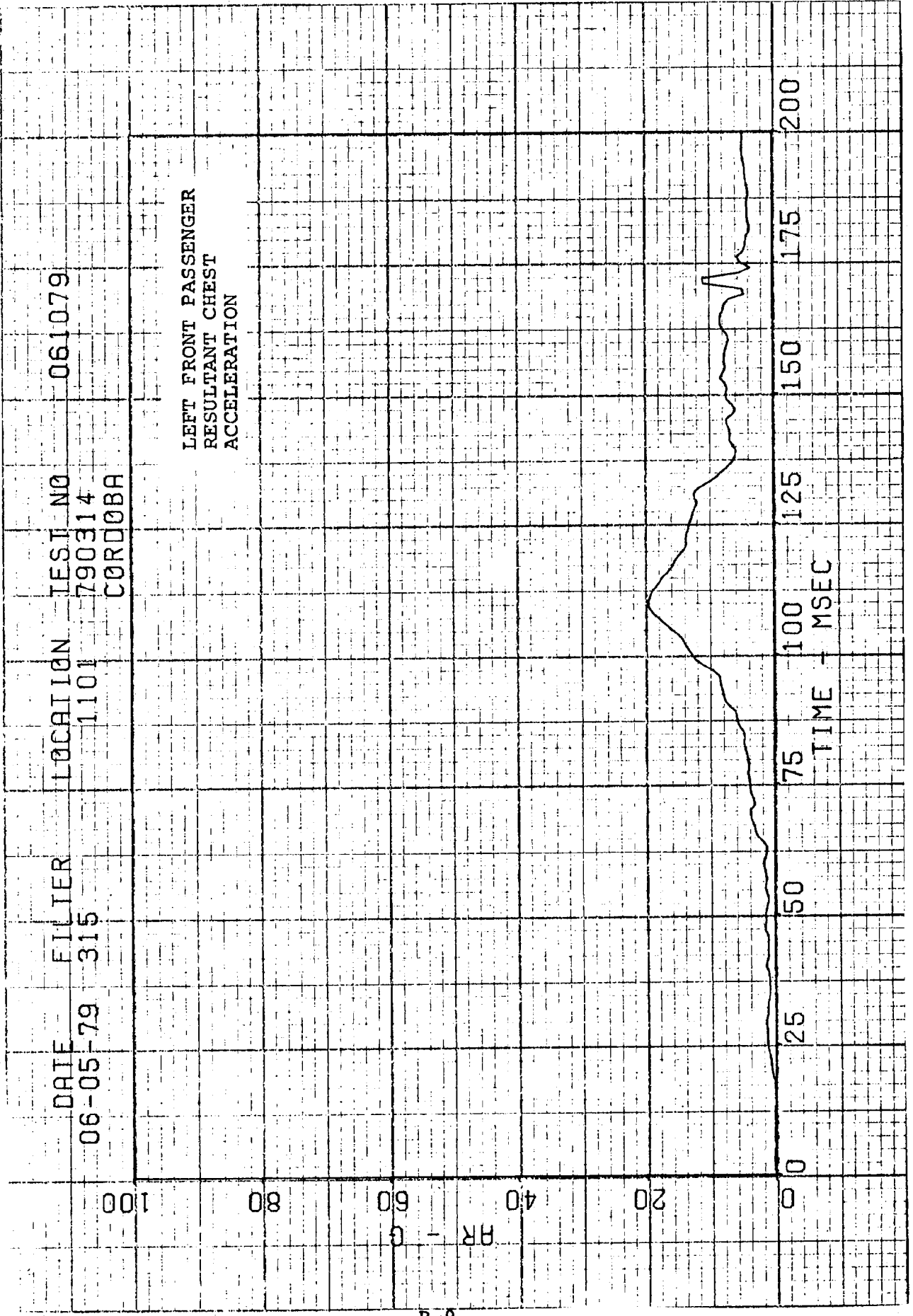


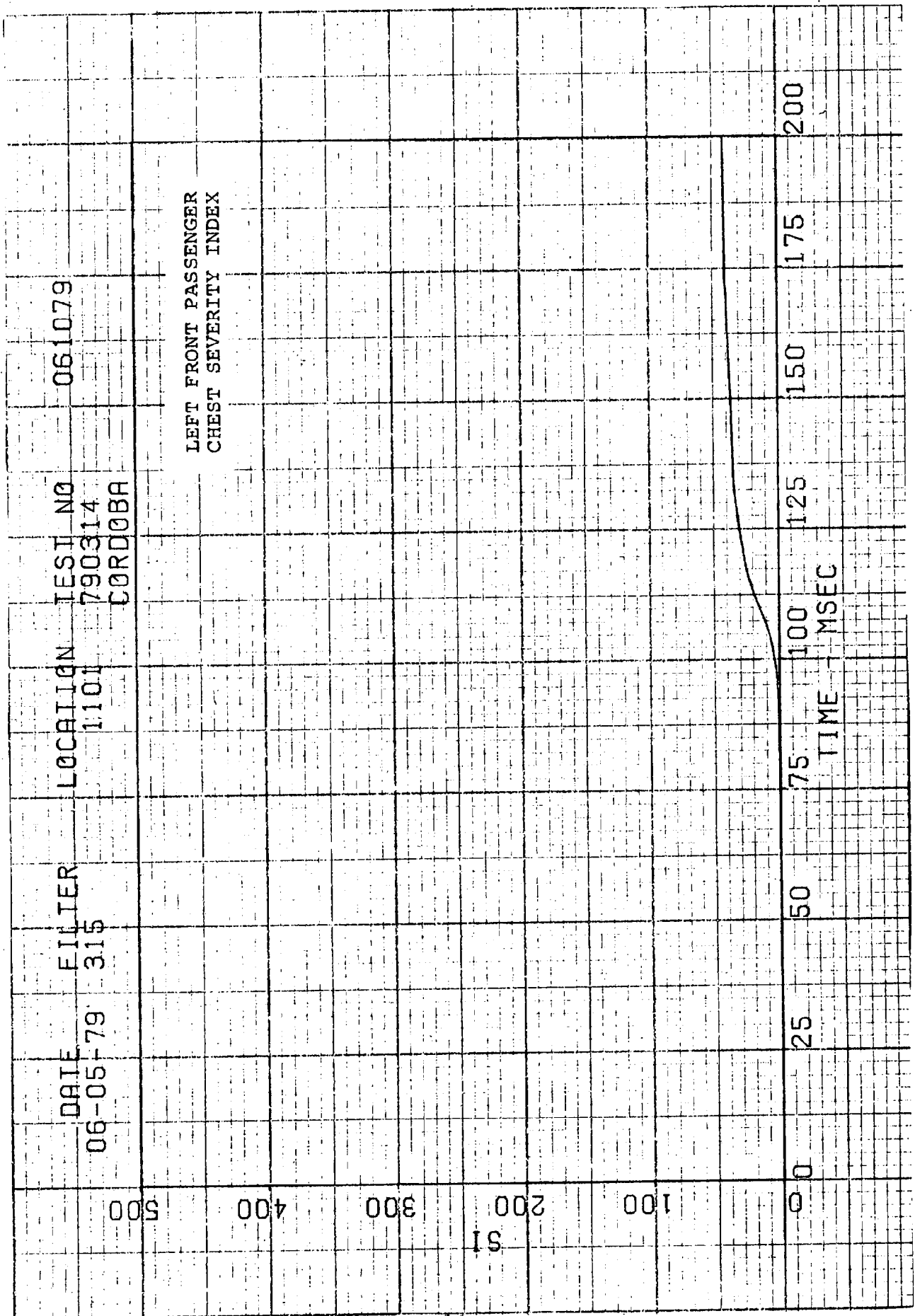


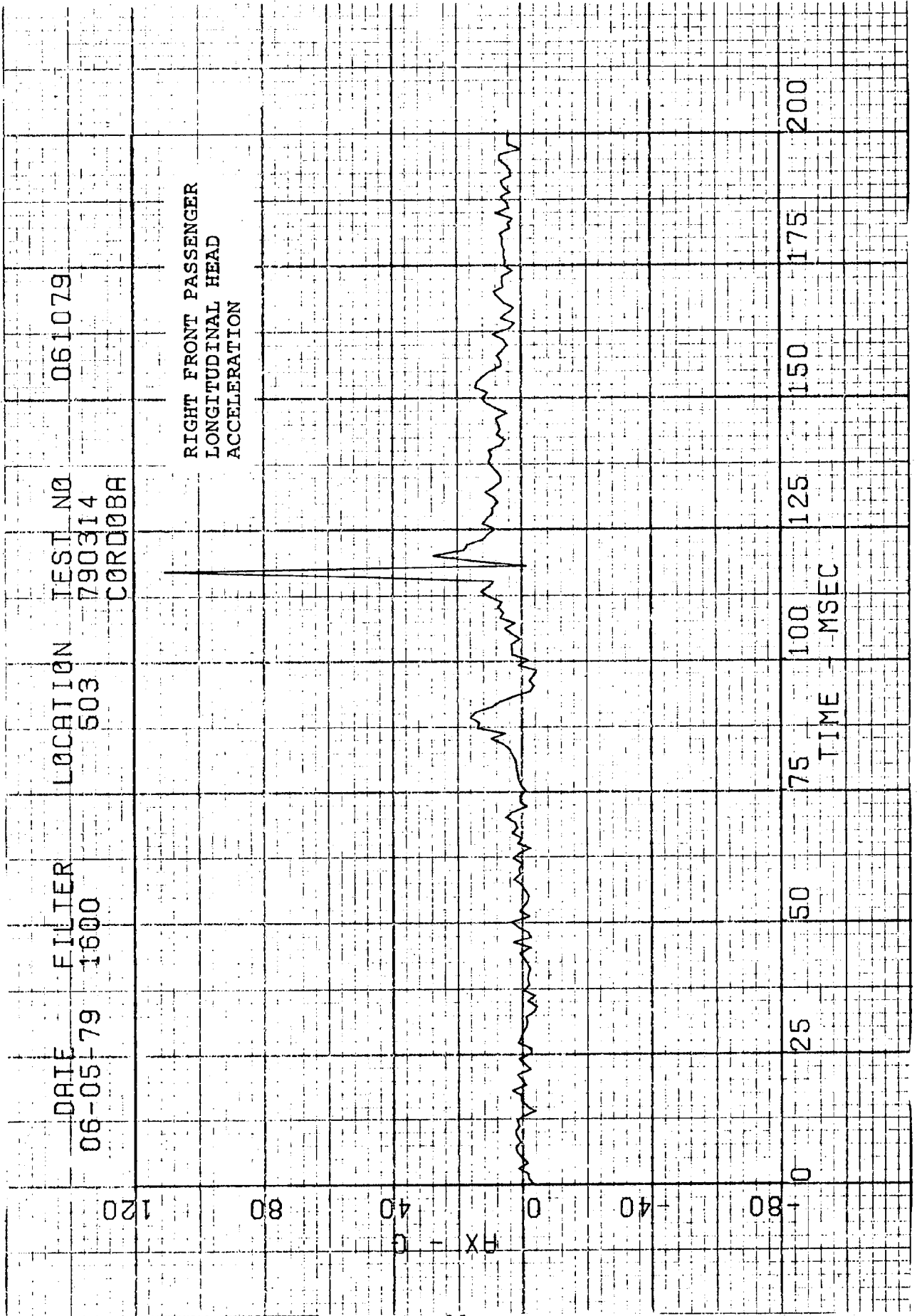


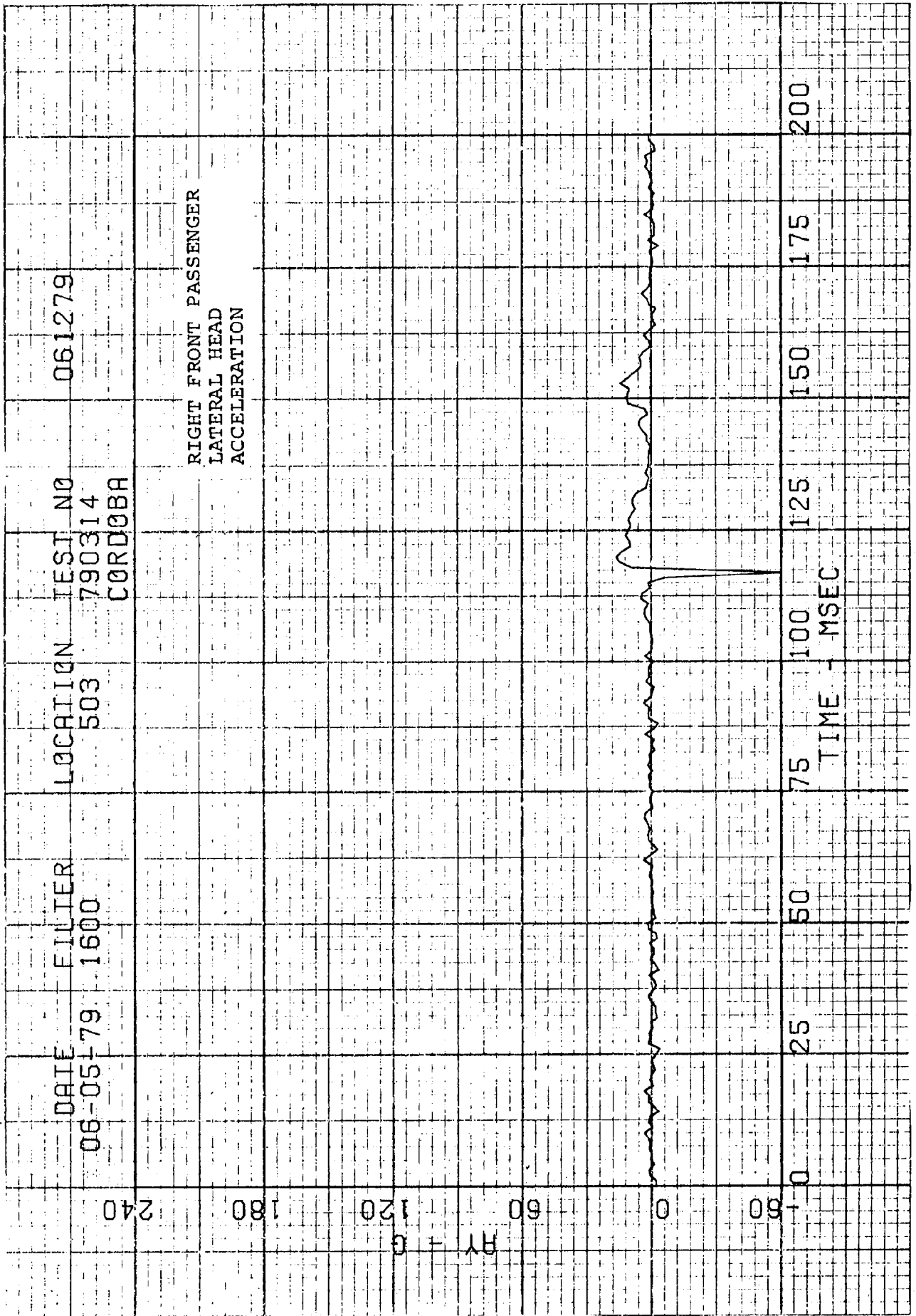


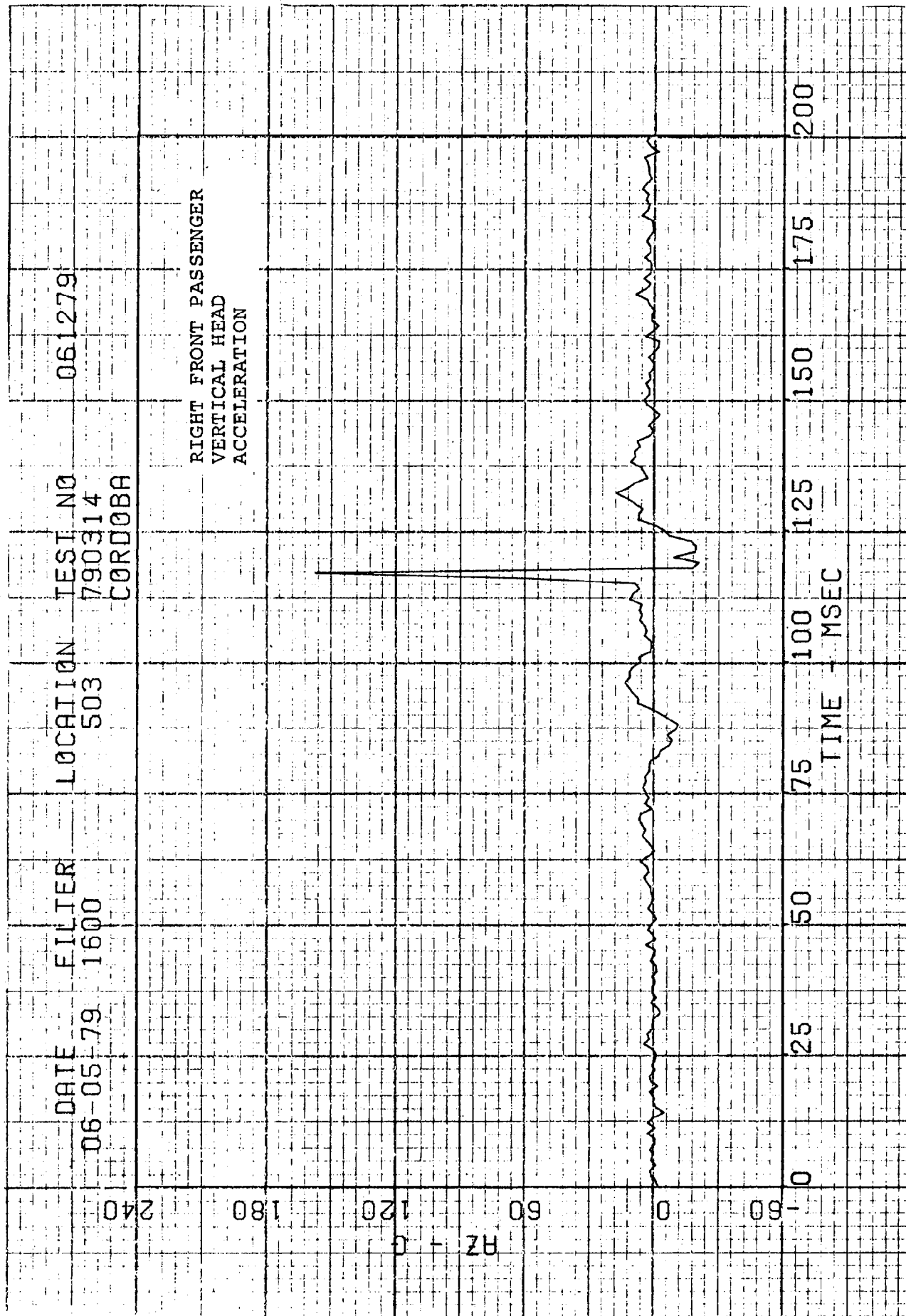


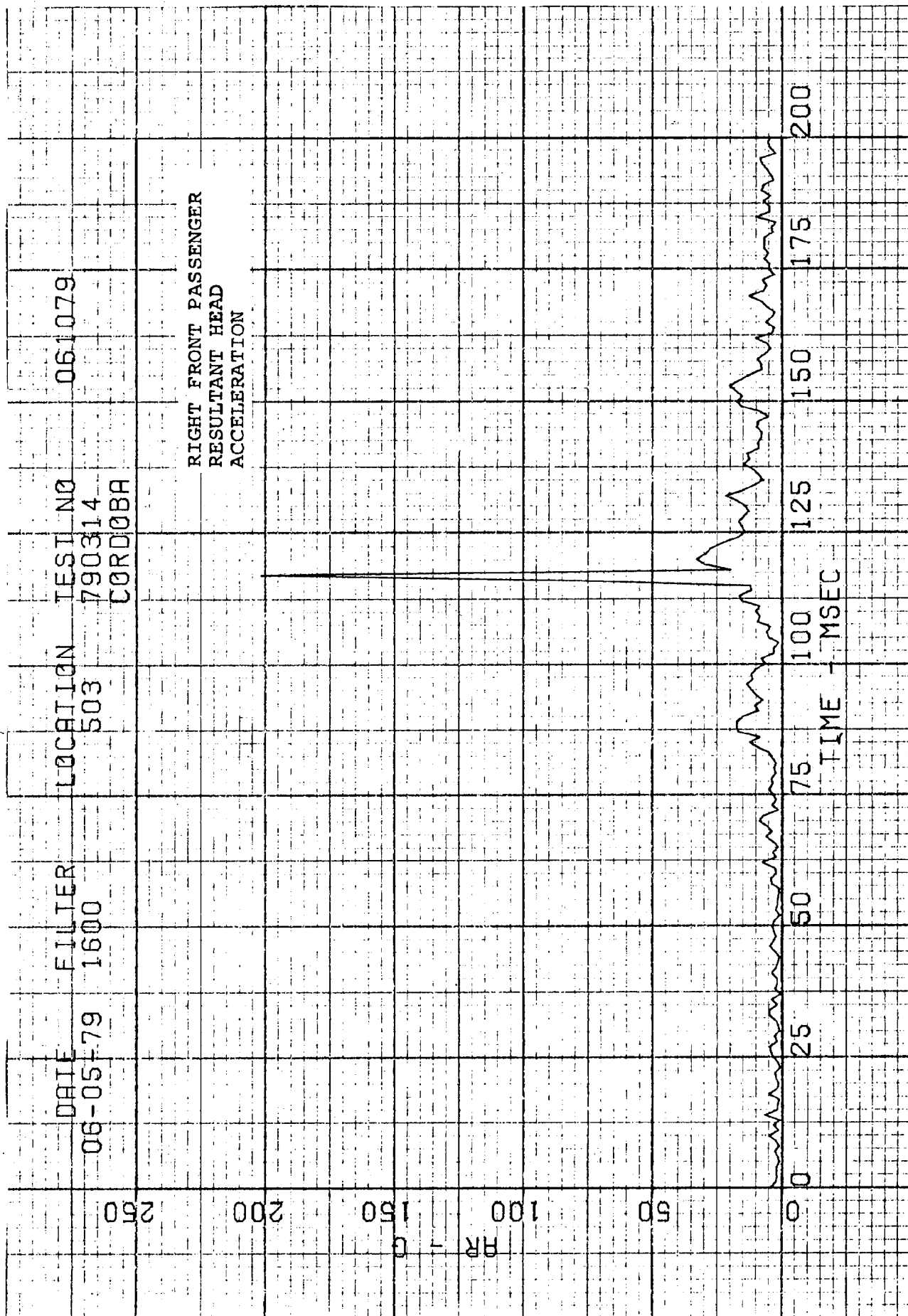


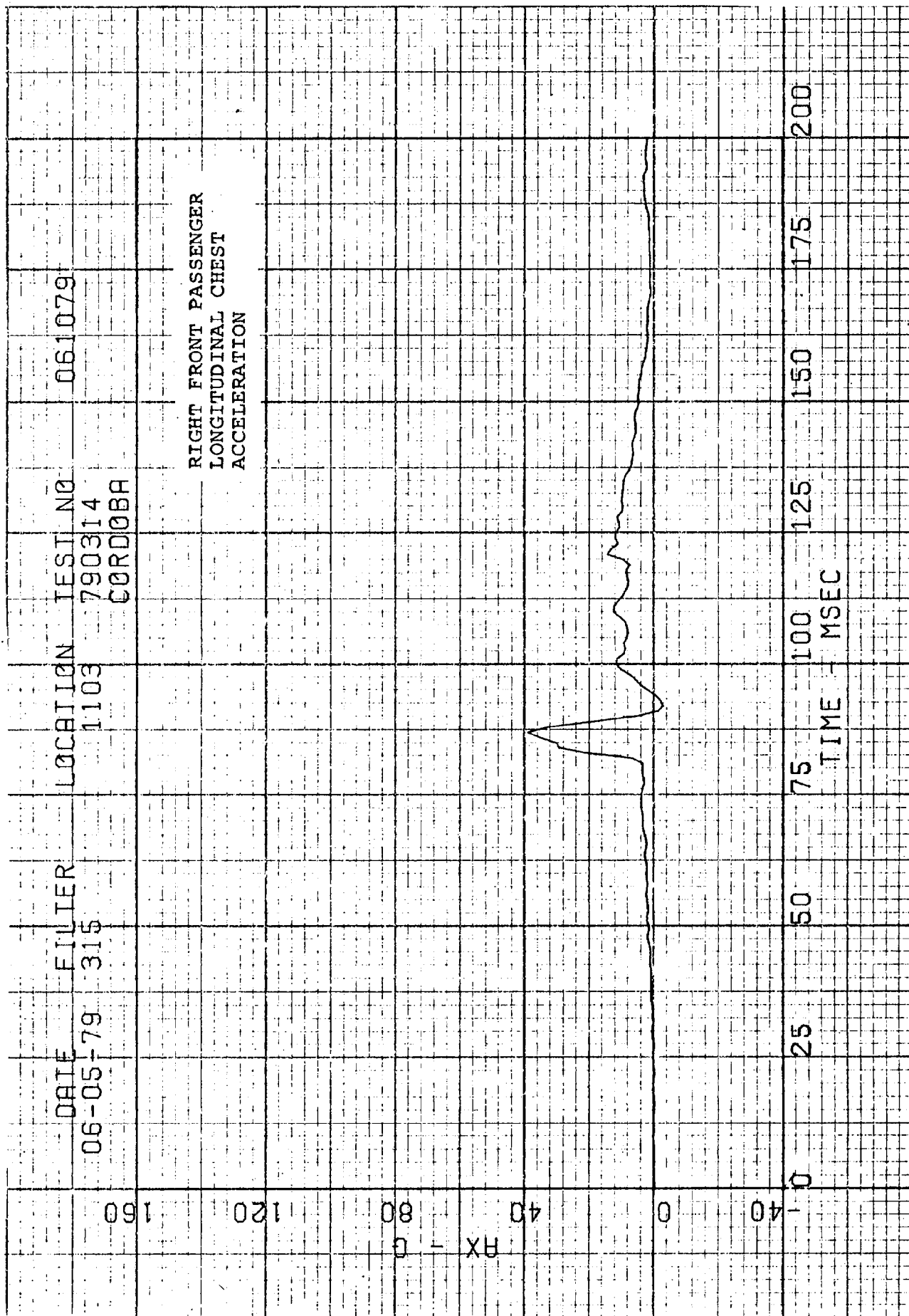


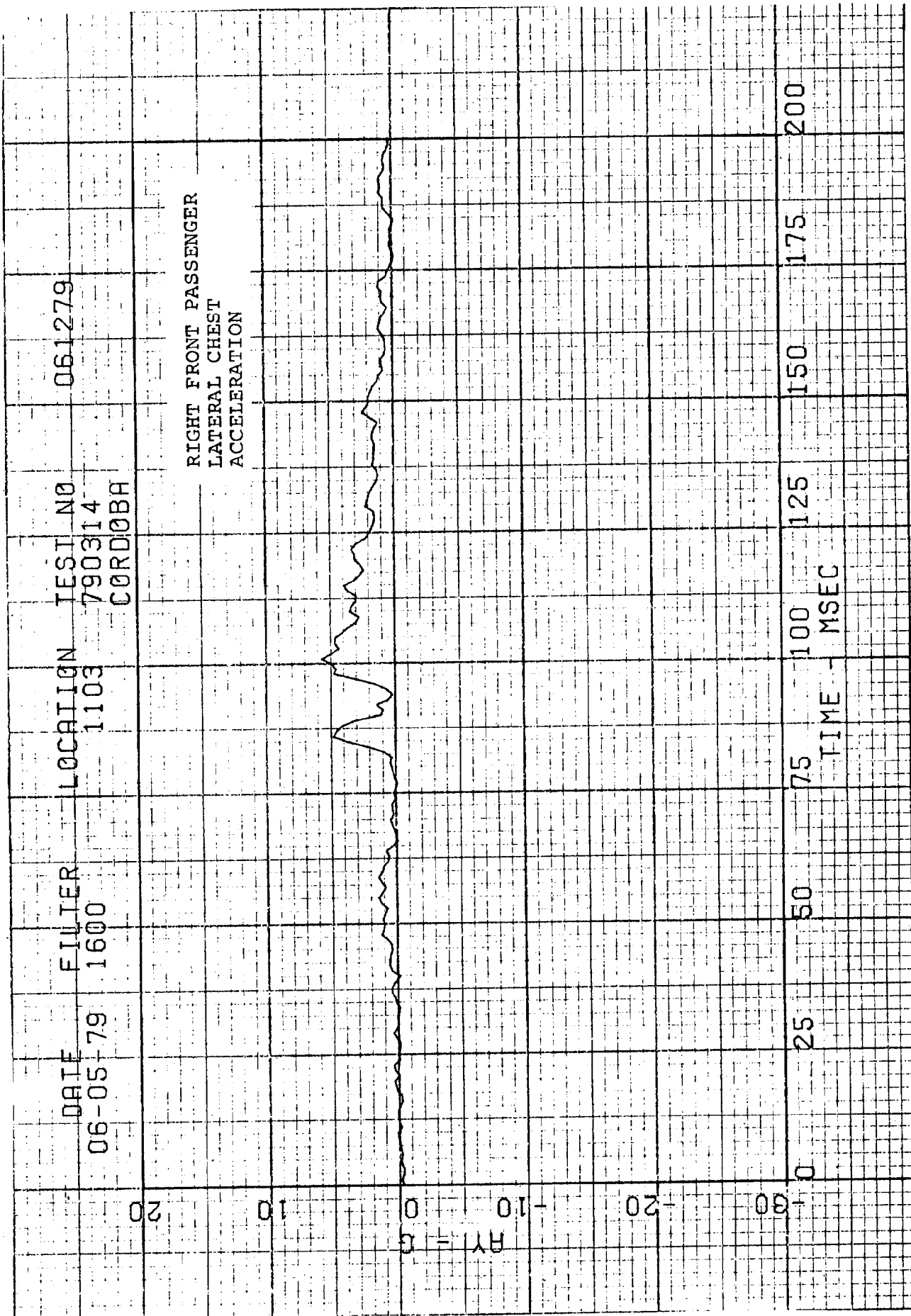


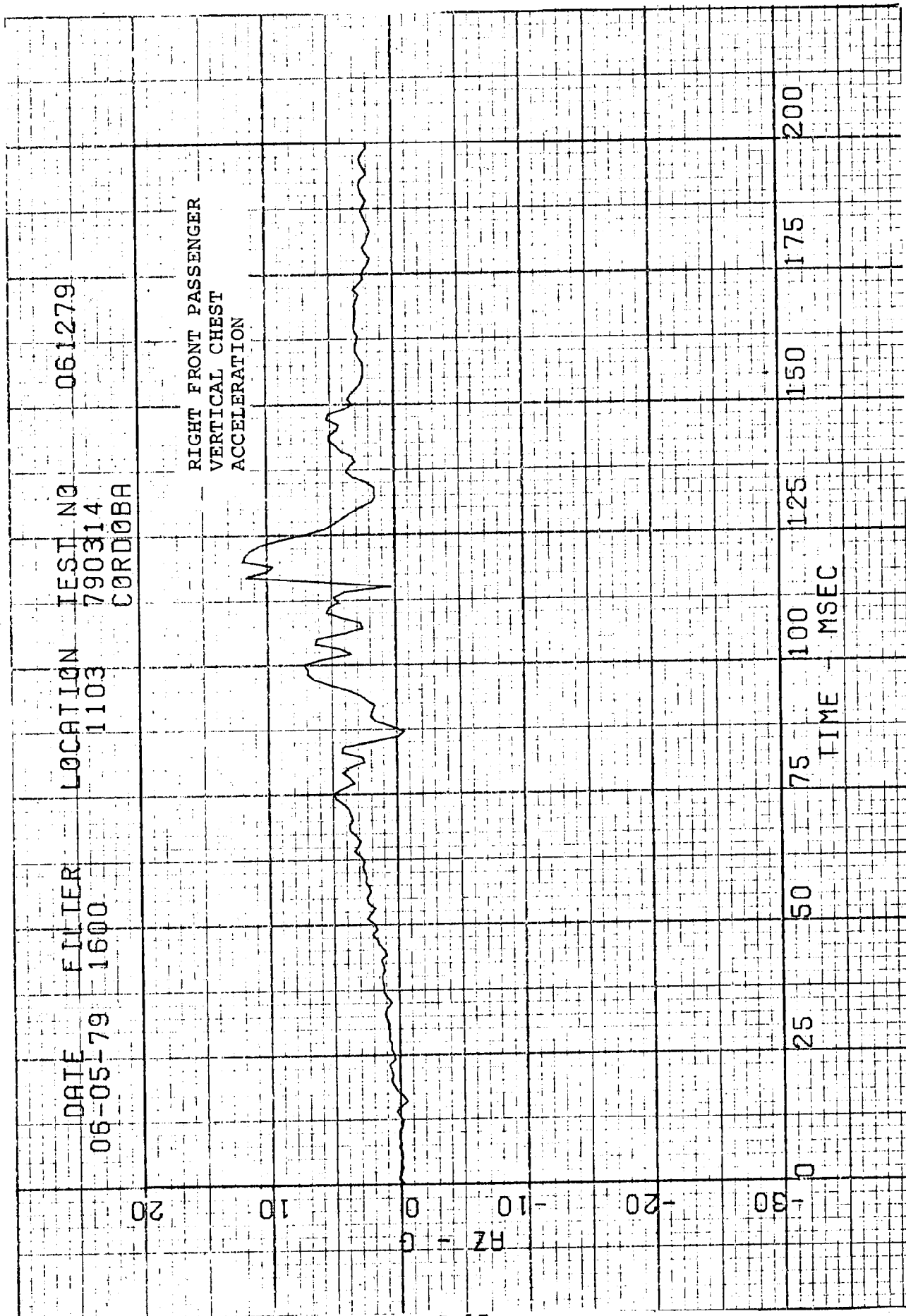


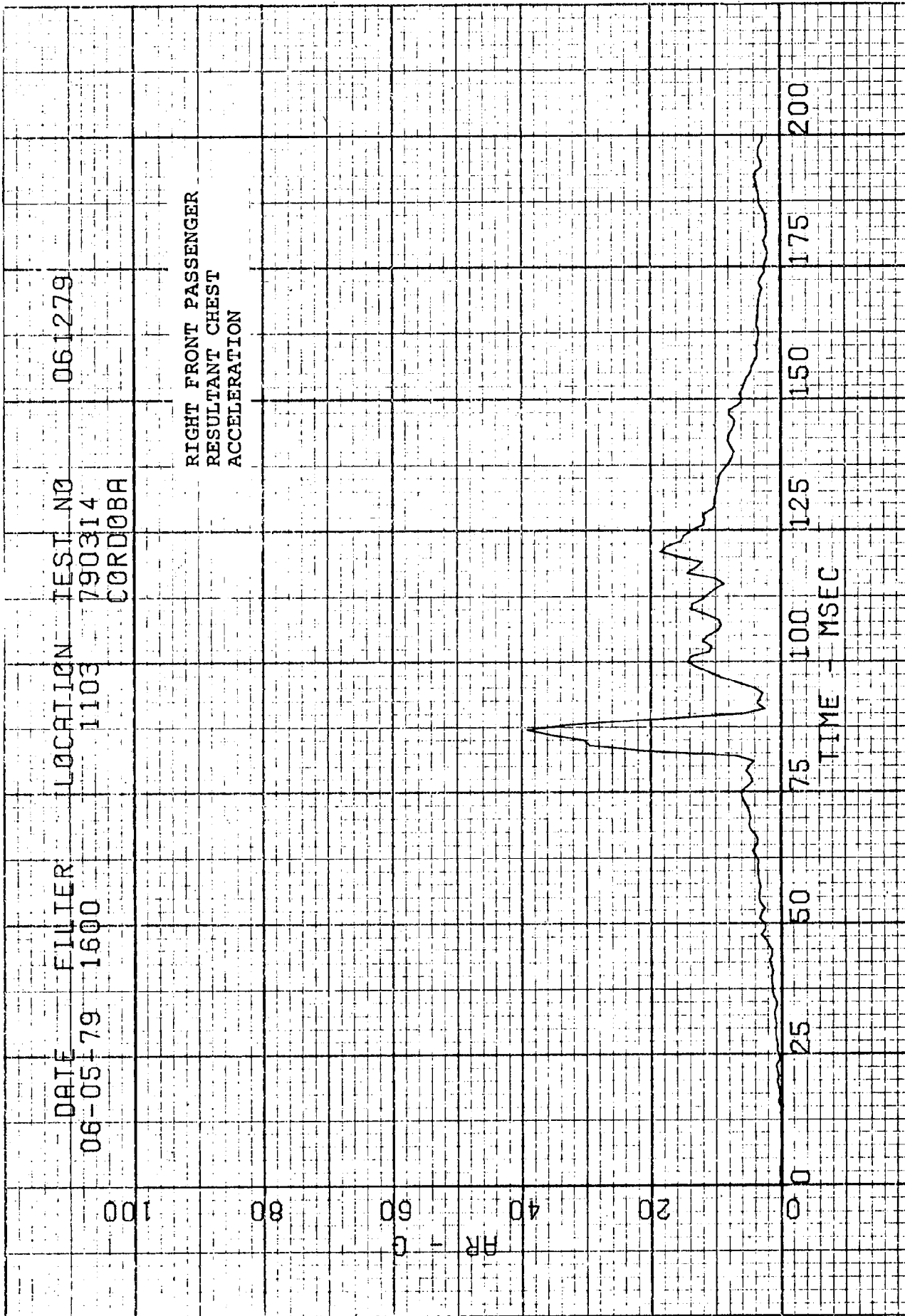


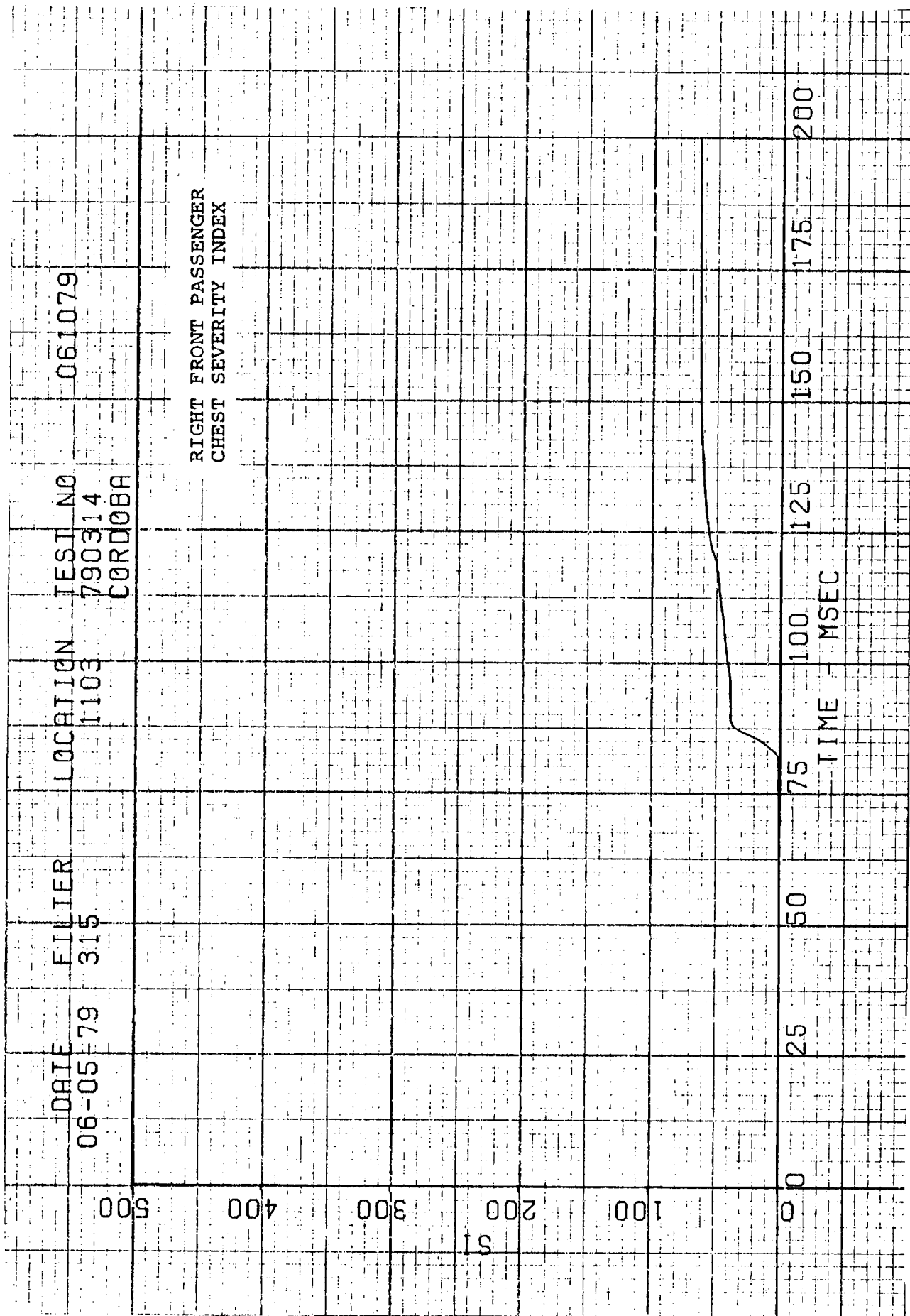


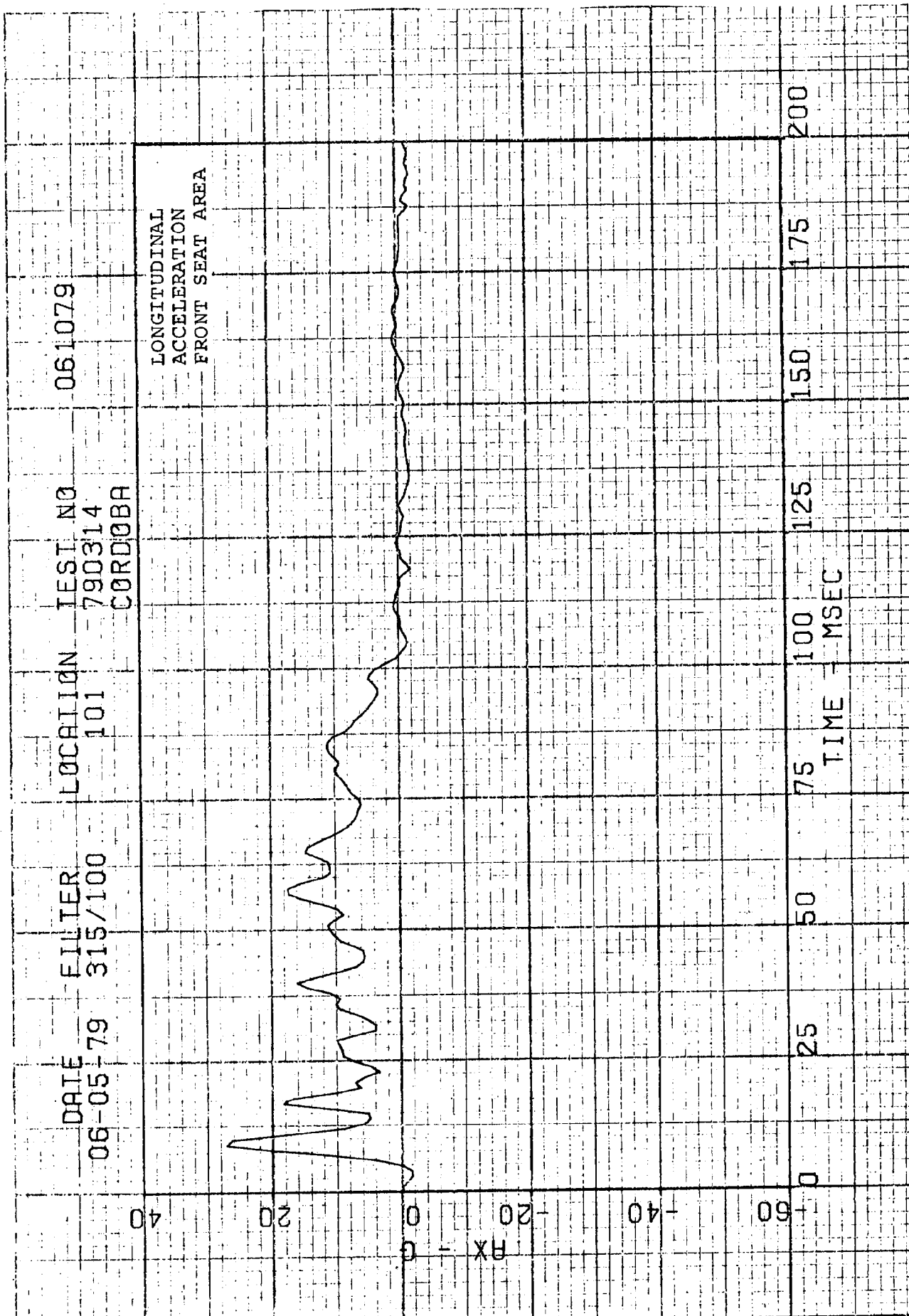


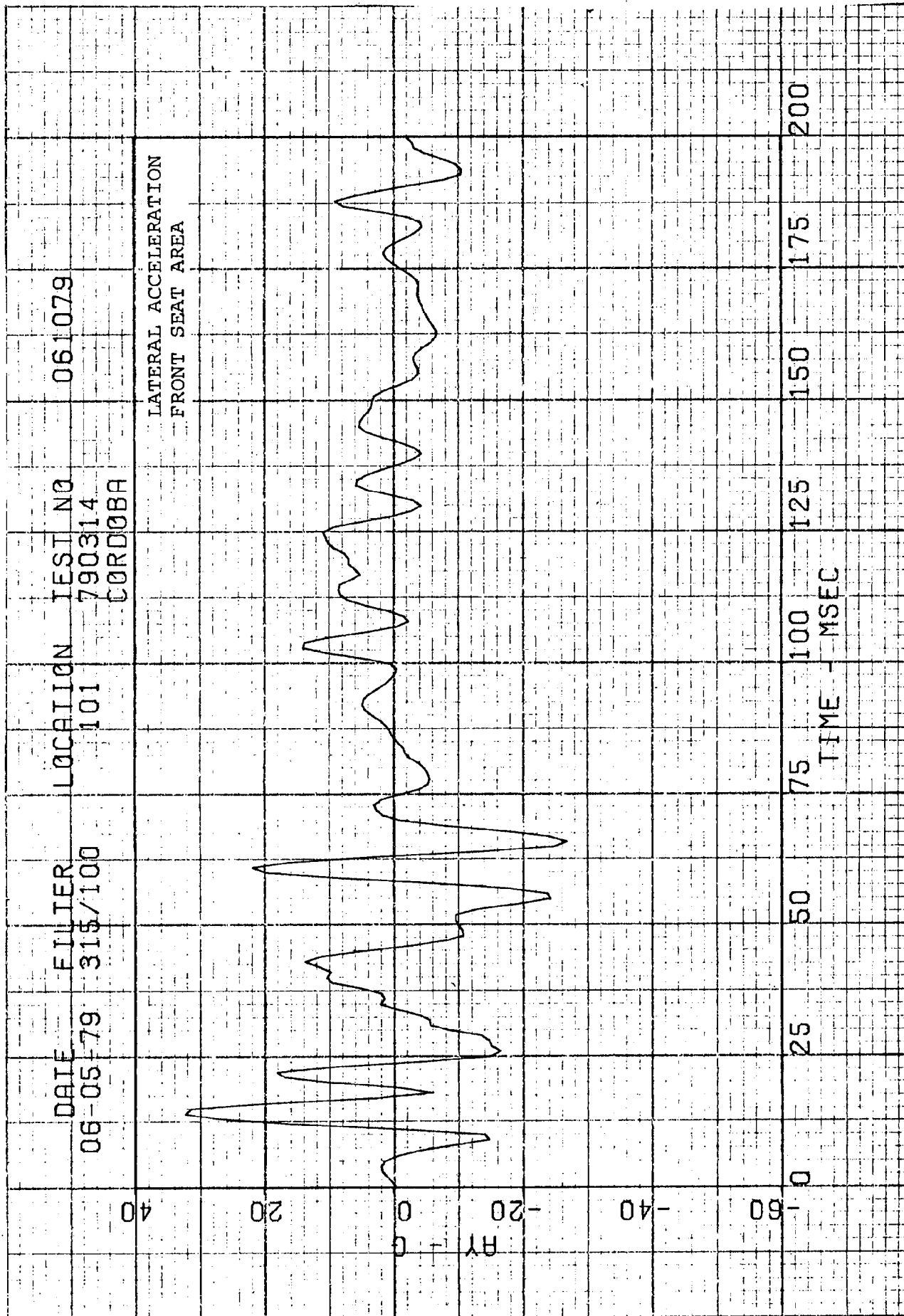


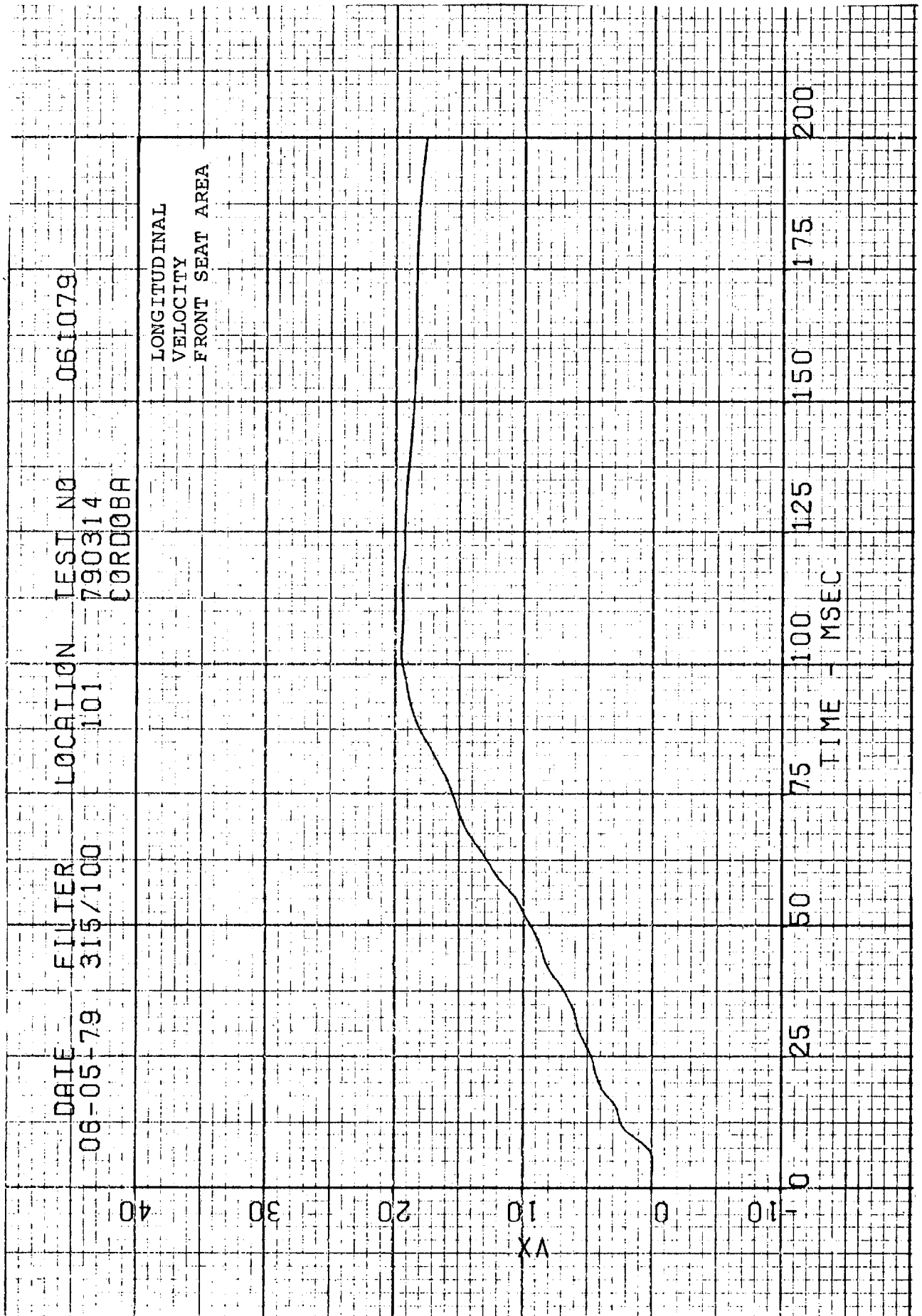


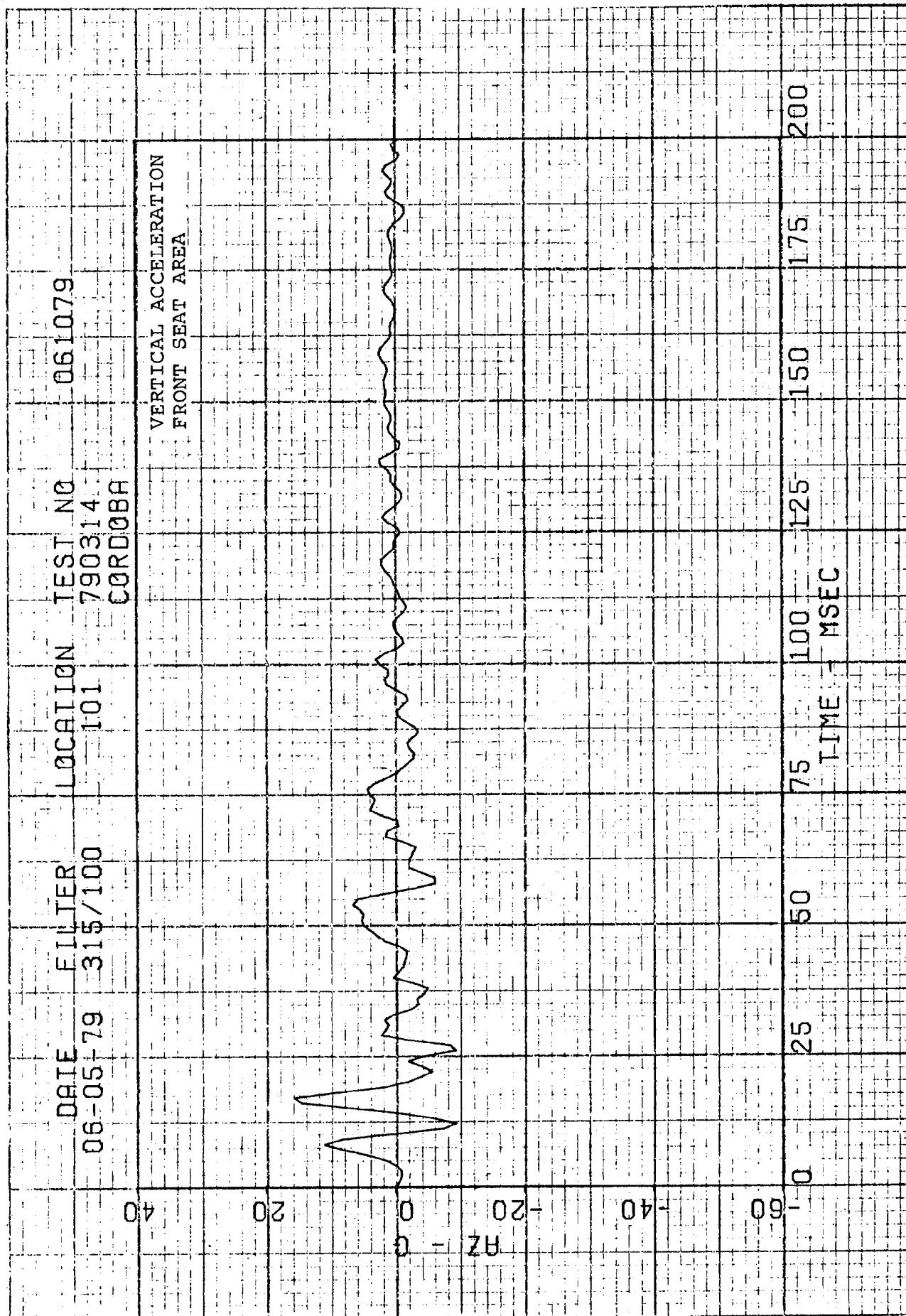


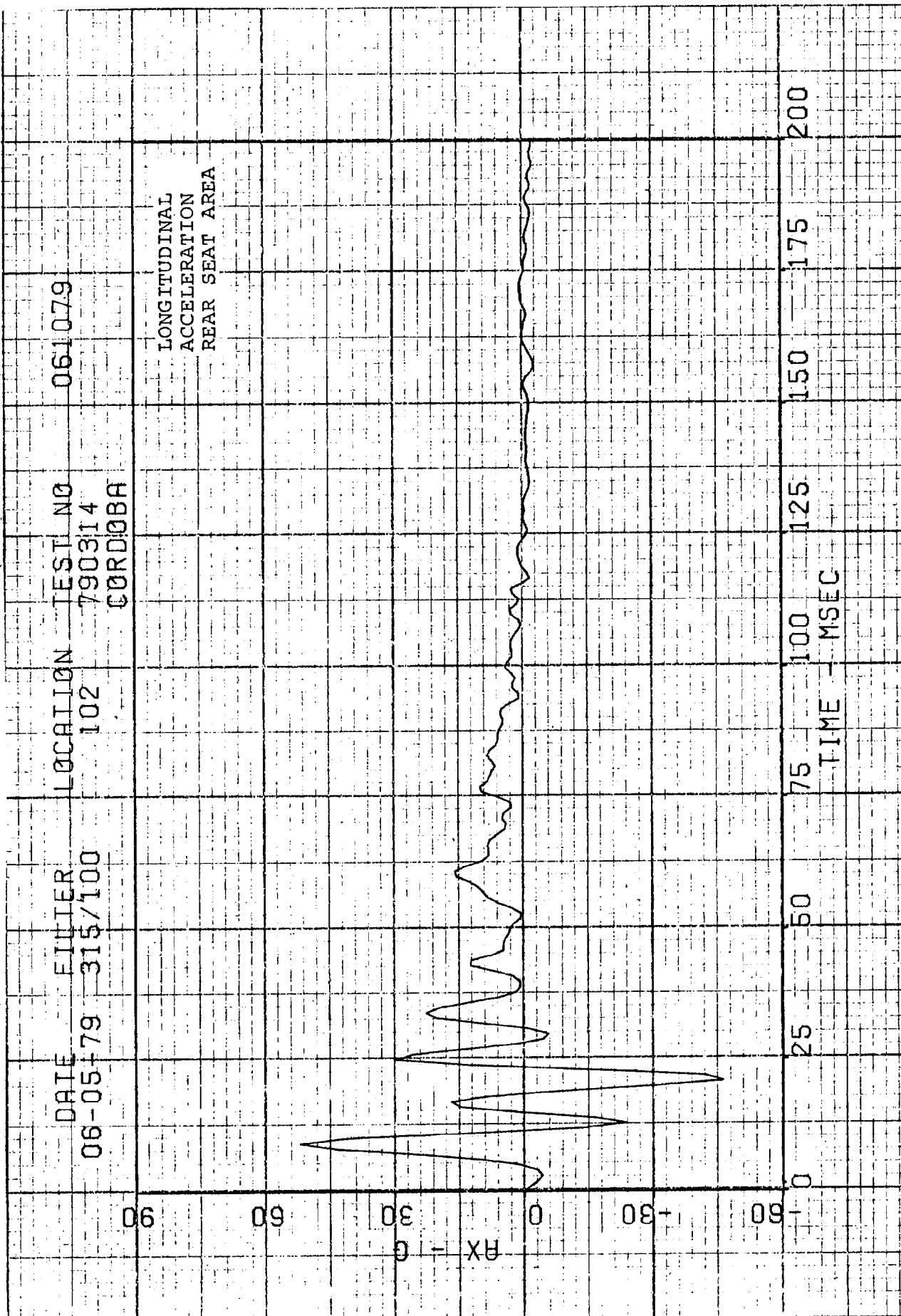


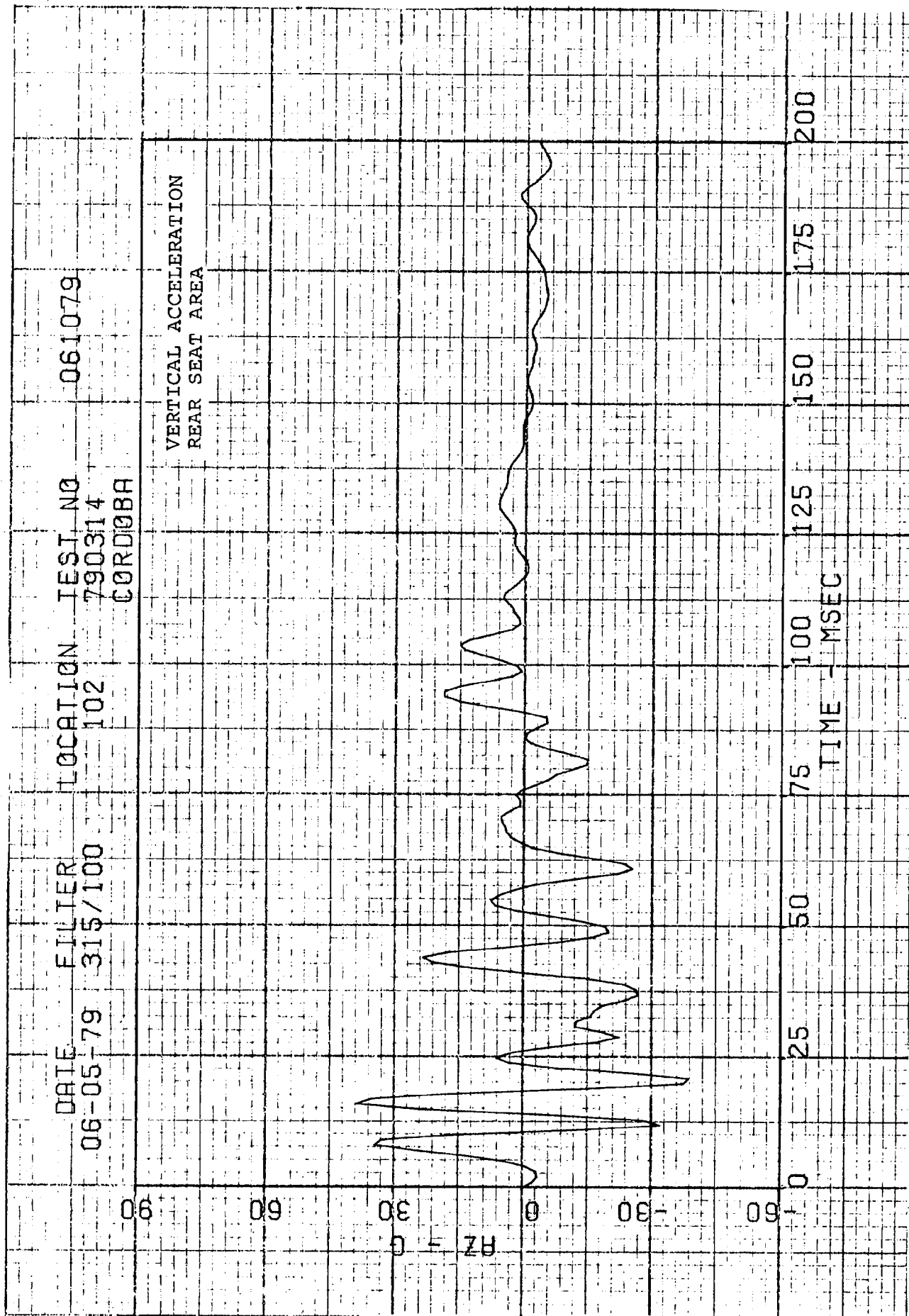












APPENDIX B (CONTD)

Test Anomalies: None.