

Tim A.

Dynamic Science Report No. 212-DYS-80-002  
Dynamic Science Report No. 219-DYS-80-002  
Dynamic Science Report No. 301-DYS-80-002

DOT 136

NEW VEHICLE ASSESSMENT AND  
STANDARDS ENFORCEMENT INDICANT  
TESTING

FMVSS 212, 219, AND 301-75

GENERAL MOTORS CORPORATION  
1980 OLDSMOBILE CUTLASS

NHTSA NO. 800132

Prepared by:

DYNAMIC SCIENCE, INC.  
A Talley Industries Company  
1850 West Pinnacle Peak Road  
Phoenix, Arizona 85027

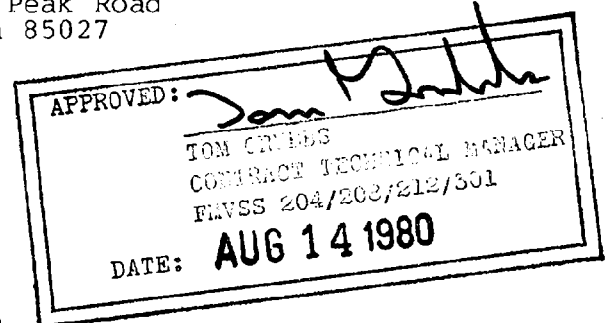


August 1980

FINAL REPORT

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



DYNAMIC  
SCIENCE, INC. | **Talley**<sup>™</sup>  
Industries

1850 West Pinnacle Peak Road · Phoenix, Arizona 85027  
(602) 869-9331

Prepared for the Department of Transportation, National Highway Traffic Safety Administration under Contract No. DOT-HS-9-02274. 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.

Prepared by Mark Pizzi

Approved by E. Everswood

Date Aug. 12, 1980

Report Accepted by:

**TOM GRUBBS**

Contract Technical Manager  
Office of Vehicle Safety Compliance

**AUG 14 1980**

Date

## TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. 212-DYS-80-002 219-DYS-80-002 301-DYS-80-002	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle FMVSS 212, 219, AND 301-75 NEW VEHICLE ASSESSMENT AND STANDARDS ENFORCEMENT INDICANT TESTING - 1980 OLDSMOBILE CUTLASS 4-DOOR SEDAN - NHTSA 800132		5. Report Date August 1980	
		6. Performing Orgn Code	
7. Author(s) Mark Pozzi, Project Engineer		8. Performing Orgn Rpt No. 3102-80-145	
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-9-02274	
		13. Type of Report and Period Covered Final Report January 1980	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Vehicle Safety Compliance 400 Seventh St. S.W., Washington, D.C. 20590		14. Sponsoring Agency Code	
15. Supplementary Notes			
16. Abstract  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 35.35 mph.  The test was conducted at the Dynamic Science, Inc. Deer Valley facility on January 17, 1980, with the following results:  a) FMVSS 212 - No loss of windshield retention.  b) FMVSS 219 - No intrusion into windshield protection zone.  c) FMVSS 301 - No fuel leakage.			
17. Key Words FMVSS 212 - Windshield Mounting FMVSS 219 - Windshield Zone Intrusion FMVSS 301-75 - Fuel System Integrity Vehicle Assessment Occupant Response		18. Distribution Statement Copies of this report are available from Technical Reference Division, National Highway Traffic Safety Administration, Room 5108, Nassif Building, 400 7th Street, S.W., Washington, D.C. 20590	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. Pages  79	22. Price

# METRIC CONVERSION FACTORS

Approximate Conversions  
From Metric Measures

Approximate Conversions to 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

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				
cm <sup>2</sup>	square centimeters	0.16	square inches	in <sup>2</sup>
m <sup>2</sup>	square meters	1.2	square yards	yd <sup>2</sup>
km <sup>2</sup>	square kilometers	0.4	square miles	mi <sup>2</sup>
ha	hectares	2.5	acres	
	(10 000 m <sup>2</sup> )			

AREA				
in <sup>2</sup>	square inches	6.5	square centimeters	cm <sup>2</sup>
ft <sup>2</sup>	square feet	0.09	square meters	m <sup>2</sup>
yd <sup>2</sup>	square yards	0.8	square meters	m <sup>2</sup>
mi <sup>2</sup>	square miles	2.6	square kilometers	km <sup>2</sup>
acres	acres	0.4	hectares	ha

MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	metric ton	1.1	short tons	
	(1000 kg)			

MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons	0.9	metric ton	t
	(2000 lb)			

VOLUME				
mL	milliliters	0.03	fluid ounces	fl oz
mL	milliliters	0.06	cubic inches	in <sup>3</sup>
L	liters	2.1	pints	pt
L	liters	1.06	quarts	qt
L	liters	0.26	gallons	gal
m <sup>3</sup>	cubic meters	35	cubic feet	ft <sup>3</sup>
m <sup>3</sup>	cubic meters	1.3	cubic yards	yd <sup>3</sup>

VOLUME				
tsp	teaspoons	5	milliliters	mL
Tbsp	tablespoons	15	milliliters	mL
in <sup>3</sup>	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 <sup>3</sup>	cubic feet	0.03	cubic meters	m <sup>3</sup>
yd <sup>3</sup>	cubic yards	0.76	cubic meters	m <sup>3</sup>

TEMPERATURE (exact)		
°C	degrees Celsius	9/5 (then degrees add 32) Fahrenheit

TEMPERATURE (exact)		
°F	degrees Fahrenheit	5/9 (after subtracting 32) degrees Celsius

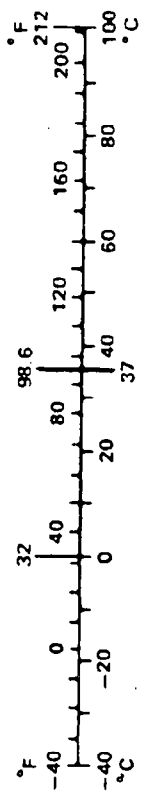
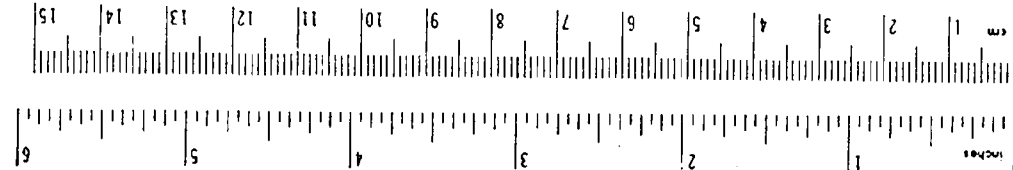


TABLE OF CONTENTS

	<u>Page</u>
1.0 PURPOSE AND INTRODUCTION	1-1
2.0 GENERAL TEST AND VEHICLE PARAMETER DATA	2-1
3.0 COMPLIANCE-RELATED DATA, FMVSS 212, 219, 301-75 INDICANT TESTING	3-1
4.0 DATA REQUIRED BY R&D AND OAR	4-1
APPENDIX A - OVERALL VEHICLE PHOTOS AND DUMMY PHOTOS	A-1
APPENDIX B - CALCOMP PLOT PRESENTATION	B-1
APPENDIX C - DUMMY CERTIFICATION DATA	C-1

LIST OF ILLUSTRATIONS

<u>Figure</u>		<u>Page</u>
3-1	Pre-test Windshield - Overall View - 1980 Oldsmobile Cutlass - NHTSA 800132	3-11
3-2	Post-test Windshield - Overall View - 1980 Oldsmobile Cutlass - NHTSA 800132	3-12
3-3	Pre-test View of Fuel Tank - 1980 Oldsmobile Cutlass - NHTSA 800132	3-13
3-4	Post-test View of Fuel Tank - 1980 Oldsmobile Cutlass - NHTSA 800132	3-14
A-1	Pre-test Front View - 1980 Oldsmobile Cutlass - NHTSA 800132	A-2
A-2	Post-test Front View - 1980 Oldsmobile Cutlass - NHTSA 800132	A-3
A-3	Post-test Overall Underside View - 1980 Oldsmobile Cutlass - NHTSA 800132	A-4
A-4	Pre-test Side View - 1980 Oldsmobile Cutlass - NHTSA 800132	A-5
A-5	Post-test Side View - 1980 Oldsmobile Cutlass - NHTSA 800132	A-6
A-6	Pre-test Driver Dummy Position - 1980 Oldsmobile Cutlass - NHTSA 800132	A-7
A-7	Post-test Driver Dummy Position - 1980 Oldsmobile Cutlass - NHTSA 800132	A-8

LIST OF ILLUSTRATIONS

<u>Figure</u>		<u>Page</u>
A-8	Post-test Driver Compartment - 1980 Oldsmobile Cutlass - NHTSA 800132	A-9
A-9	Pre-test Passenger Position - 1980 Oldsmobile Cutlass - NHTSA 800132	A-10
A-10	Post-test Passenger Position - 1980 Oldsmobile Cutlass - NHTSA 800132	A-11
A-11	Post-test Passenger Compartment - 1980 Oldsmobile Cutlass - NHTSA 800132	A-12

SECTION 1  
PURPOSE AND INTRODUCTION

PURPOSE:

The purpose of the test was to subject a 1980 Oldsmobile Cutlass 4-door Sedan to the indicant test requirements of DOT Test Plan TP-212-02, April 1, 1980, 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:

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 A contains pre-test and post-test vehicle and dummy photographs. Appendix B contains Calcomp plots. Appendix C contains dummy certification data.

SECTION 2  
GENERAL TEST AND VEHICLE PARAMETER DATA

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

GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Vehicle Manufacturer: General Motors Corporation  
 Make/Model: Oldsmobile Cutlass  
 Body Style: 4-door Sedan Model Year: 1980  
 VIN: 3G69AAR436361 Build Date: 11-79  
 NHTSA No.: 800132 Color: White  
 Engine Data: 6 cylinders; 231 CID  
 Transmission Data: \_\_\_\_\_ speed ( ) Manual ( x ) Automatic  
 Date Vehicle Received by Laboratory: December 7, 1979  
 Dealer Name & Address: Holiday Oldsmobile  
3530 N. Scottsdale Rd, Scottsdale, Az,  
85251

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

Vehicle Manufactured By: General Motors Corporation  
 Date of Manufacture: 11-79 ; VIN: 3G69AAR436361  
 GVWR: 4480 lb; GAWR: Front = 2140 lb; Rear = 2340 lb

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

Vehicle Load:	FRONT	REAR	RECOMMENDED	LOAD RANGE:
Up to Capacity	<u>35</u> psi	<u>35</u> psi	TIRE SIZE:	
Vehicle Capacity:	<u>6</u>		<u>P185/75R14</u>	<u>B</u>
Type of Seats -	<u>x</u> Bench		Number of Occupants =	<u>3</u> Front
	_____ Bucket		(Designated Seating	<u>3</u> Rear
	_____ Split Bench		Capacity)	<u>6</u> Total
CARGO LOAD =	<u>160</u> lb			
TOTAL =	<u>1060</u> lb			

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

Right Front =	<u>940</u> lb	Right Rear =	<u>737</u> lb
Left Front =	<u>930</u> lb	Left Rear =	<u>722</u> lb
TOTAL FRONT WEIGHT =	<u>1870</u> lb	( <u>56</u> % of Total Vehicle Weight)	
TOTAL REAR WEIGHT =	<u>1459</u> lb	( <u>44</u> % of Total Vehicle Weight)	
TOTAL DELV. WEIGHT =	<u>3329</u> lb		

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 160 lb CARGO:

Right Front =	<u>937</u> lb	Right Rear =	<u>941</u> lb
Left Front =	<u>1005</u> lb	Left Rear =	<u>932</u> lb
TOTAL FRONT WEIGHT =	<u>1942</u> lb	( <u>51</u> % of Total Vehicle Weight)	
TOTAL REAR WEIGHT =	<u>1873</u> lb	( <u>49</u> % of Total Vehicle Weight)	
TOTAL TEST WEIGHT =	<u>3815</u> lb		

Weight of ballast secured in vehicle trunk area = 0 lb

TARGET WEIGHT = CARGO LOAD + UDW + 164 (NO. OF DUMMIES) = 3817 lb

GENERAL TEST AND VEHICLE PARAMETER DATA (CONTD)

TEST CONDITIONS:

Date of Test: January 17, 1980 Time of Test: 1126

Ambient Temperature: 62 °F at impact area.

Temperature in Occupant Compartment: 68 °F Windshield Molding Temperature: 62 °F

VEHICLE ATTITUDE: (all dimensions in inches)

Delivered Attitude: RF 31.0 LF 31.0 RR 31.0 LR 31.0

Test Attitude: RF 28.9 LF 30.5 RR 29.5 LR 31.3

VEHICLE TIRE DATA:

Recommended Cold Tire Pressure: Front = 29 psi  
Rear = 29 psi

Recommended Tire Size: P185/75R14

Load Range: B

Tires on Vehicle: P195/75R14

Is Spare Tire a "Space Saver": Yes (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 Centistrokes

Spill Point Volume: 18.2 Gallons

Test Volume: 16.6 Gallons

Fuel System Capacity (data from Owner's Manual): 18.2 gallons

Details of Fuel System: The rectangular metal fuel tank is attached to trunk floor by two metal straps. The sender tubes exit front center of tank and proceed forward along floorpan to engine. The fuel filler tube and cap are located behind the fold-down license plate. The cap has an extended threaded area on one end which is designed to release any remaining fuel tank pressure while the cap is being removed.

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: N/A (yes/no)

VEHICLE REBOUND AND CRUSH:

Overall Length of Pre-test = R 197.0 L 197.0 inches

Test Vehicle Post-test = R 168.4 L 167.8 inches

CRUSH = R 28.6 L 29.2

FOR FRONTAL IMPACTS, distance from front of test vehicle to the barrier after impact = 19.3 inches

GENERAL TEST AND VEHICLE PARAMETER DATA (CONTD)

VISIBLE DUMMY CONTACT POINTS

	<u>Driver</u>		<u>Passenger</u>	
Head	<u>Steering Wheel Rim</u>		<u>Left Knee</u>	
	<u>and Hub</u>			
Chest	<u>Lower Steering Wheel</u>		<u>None</u>	
	<u>Rim</u>			
Abdomen	<u>Lower Steering Wheel</u>		<u>None</u>	
	<u>Rim</u>			
Left Knee	<u>Dash</u>		<u>Dash</u>	
Right Knee	<u>Dash</u>		<u>Dash</u>	
	<u>Front</u>		<u>Rear</u>	
<u>DOOR OPENING</u>	<u>Left</u>	<u>Right</u>	<u>Left</u>	<u>Right</u>
Easy				
Difficult		X	X	X
Tools Required	X			
<u>SEAT BACK</u>				
Failure	<u>No</u>	<u>No</u>		
<u>GLAZING DAMAGE</u>				
Windshield	<u>Cracked</u>			
Backlight	<u>None</u>			
Others	<u>None</u>	<u>None</u>	<u>None</u>	<u>None</u>
<u>OTHER NOTABLE IMPACT EFFECTS: Both front wheels pinned by crushed sheet metal. No windshield intrusion or loss of retention.</u>				

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.

SUMMARY OF RESULTS  
FMVSS 212 INDICANT DATA

VEHICLE DATA:

Manufacturer: General Motors Corporation Model Year: 1980  
Make/Model: Oldsmobile Cutlass  
Body Style: 4-door Sedan Manufacture Date: 11-79  
VIN: 3G69AAR436361 NHTSA No.: 800132  
Delivery Weight: 3329 lb; Test Weight: 3815 lb; GVWR: 4480 lb  
Engine: No. of Cylinders 6 Displacement 231 in.<sup>3</sup>  
Vehicle Mileage: 34.5 miles  
Remarks: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

GENERAL TEST CONDITIONS:

Vehicle Impact Speed:  
Primary 35.35 mph; Secondary 35.32 mph  
Speed Range Specified by CTM: 34.5 to 35.5 mph  
Ambient Temperature at Time of Test: 62 °F  
Date of Test: January 17, 1980 Time: 1126  
Windshield Molding Temperature: 62 °F  
Static Crush: 27.0 in. (right) 26.2 in. (left)

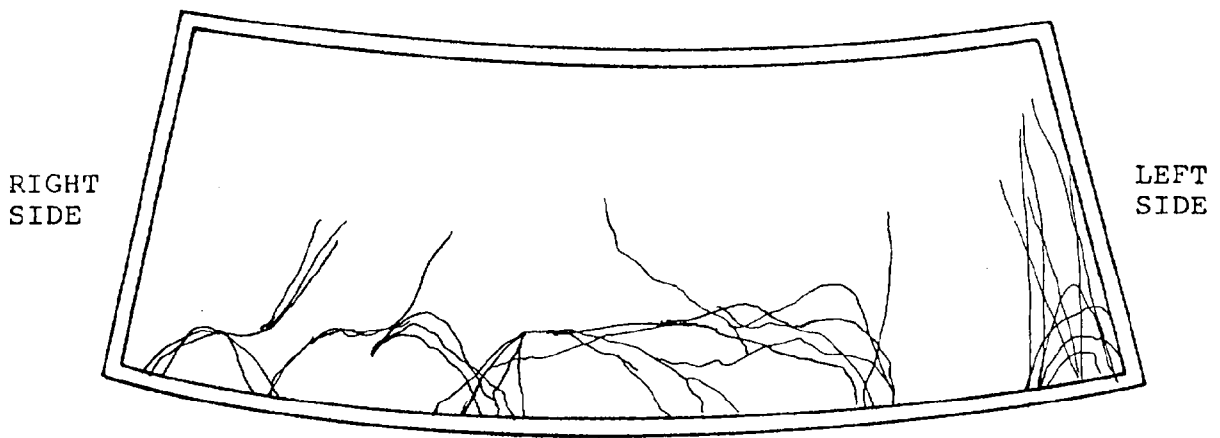
SUMMARY OF FMVSS 212 DATA

Details of windshield mounting (method of retention, type of trim, etc.): The windshield is held in place on the top, left, and right sides by a one-inch wide black mastic, and is overlaid on these sides by a one-inch wide rubber-lined metal molding. The bottom edge is held by a black mastic at least one inch wide and is overlaid with a 3.5-inch wide metal molding which is secured to the vehicle by three bolts and two windshield wiper rests. This strip interlocks with the side moldings.

	<u>WINDSHIELD PERIPHERY</u>	
	<u>Pre-test</u>	<u>Post-test</u>
<u>RIGHT SIDE</u>	76.0	76.0
<u>LEFT SIDE</u>	76.0	76.0
<u>***TOTAL***</u>	152.0	152.0

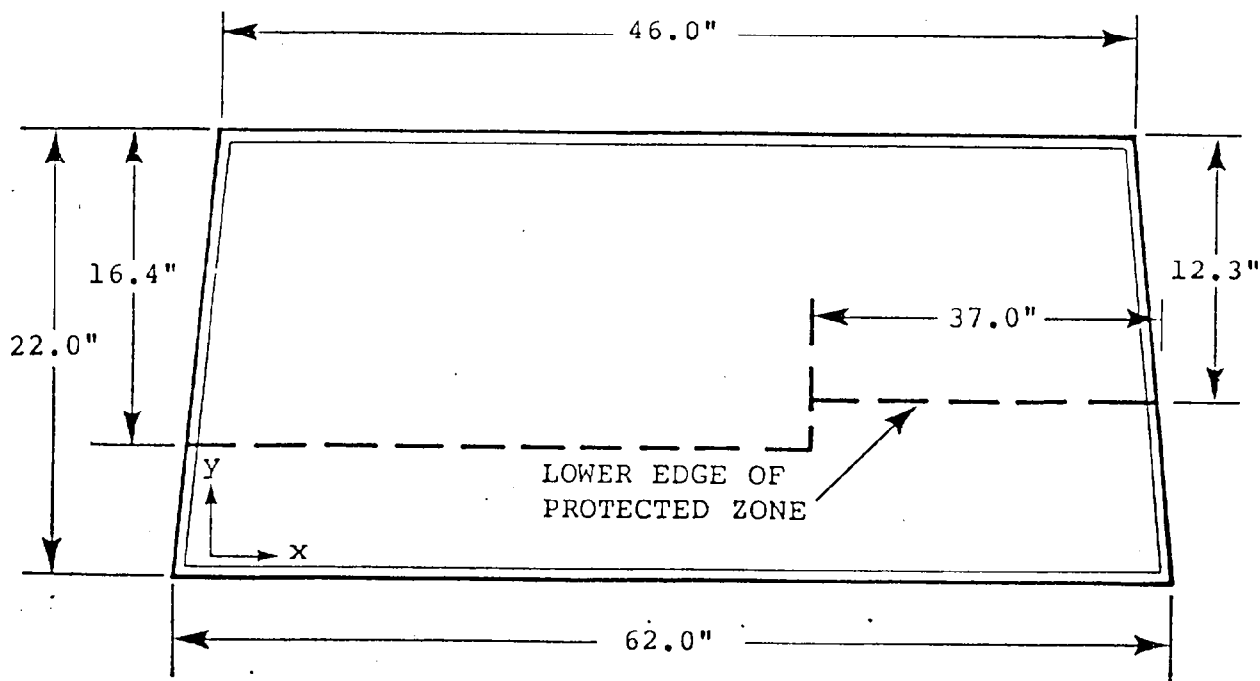
The standard requires that POST-TEST be a minimum of 75 percent of the PRE-TEST total periphery measurement for vehicles not equipped with occupant passive restraints and 50 percent for each side of the windshield for vehicles which are equipped with occupant passive restraints.

AREA OF RETENTION FAILURE (as noted): None.



FRONT VIEW

WINDSHIELD ZONE INTRUSION, FMVSS 219



FRONT VIEW OF WINDSHIELD

With the zero coordinate for the X-Y grid located at the lower right corner (passenger side) of the windshield, record the following positions:

- A. The area that the "Protected Zone" template was penetrated more than 0.25 inch by a vehicle component other than one which is normally in contact with the windshield.

Coordinates	
X	Y
N/A	N/A
_____	_____
_____	_____

- B. The area beneath the "Protected Zone" that the inner surface of the windshield was penetrated by a vehicle component.

Coordinates	
X	Y
N/A	N/A
_____	_____
_____	_____

- C. Record any windshield retention clips or brackets used to ensure that the windshield would not disengage from the body.  
 A 3.5-inch wide metal molding is secured across the bottom windshield edge by three bolts and two windshield wiper rests.

POST IMPACT DATA

TYPE OF TEST:  X  Frontal (90°) Impact  
  Oblique ( °) Impact on   Left (Driver's) Side  
  Right Side  
  Lateral or Side Impact on   Left (Driver's) Side  
  Right Side  
  Rear Impact

DATE OF TEST:  January 17, 1980  ; TIME:  1126  ; TEMP:  62  ° F

NHTSA NO.:  800132  ; VIN:  3G69AAR436361

REQUIRED VEHICLE VELOCITY RANGE:  34.5  to  35.5  mph

IMPACT VELOCITY: (traps within 5 feet of impact event)

Primary =  35.35  mph; Secondary =  35.32  mph

Distance from the vehicle's front bumper to the barrier face entering the vehicle velocity measurement device =  5.0  ft

exiting the vehicle velocity measurement device =  1.0  ft

VEHICLE STATIC CRUSH:

(For Frontal and Rear Impacts Only)

Driver's Side =  26.2  in.; Passenger's Side =  27.0  in.

Average =  26.6  in.

Crush Details:  Both front wheels were pinned by crushed sheet metal.

(For Side Impacts Only)

Amount of Crush =   in. on   side

Crush Details:

VEHICLE REBOUND:

(From rigid barrier only)

Driver's Side =  19.3  in.; Passenger's Side =  20.8  in.

Average =  20.05  in.

REMARKS:  Narrow rubber strip is affixed at the top edge of the front face of the metal bumper and runs the entire width of the bumper. There are two strips that are placed vertically on either side of the front license plate.

FUEL SYSTEM INTEGRITY POST-IMPACT

TEST DATA, FMVSS NO. 301-75

TEST VEHICLE NHTSA NO.: 800132 ; TEST DATE: January 17, 1980

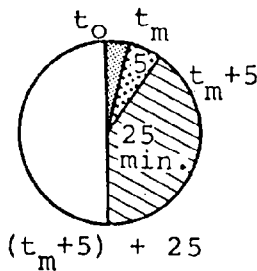
VEHICLE MANUFACTURER/  
MAKE/MODEL: General Motors Corporation, Oldsmobile Cutlass

Test vehicle fuel tank filled to 93% of "usable" plus "unusable" capacity with Stoddard Solvent and with electric fuel pump operating (if it will operate without engine operation). Part 572 test dummies located at each front designated seating position.

A. TEST VEHICLE IMPACT TYPE:

- Frontal (35 mph)
- Oblique (35 mph) with     ° barrier face first contacting      driver /      passenger side.
- Rear Moving Barrier (30 mph)
- Lateral Moving Barrier (20 mph)

FUEL SPILLAGE MEASUREMENT



	ACTUAL	MAXIMUM ALLOWABLE
1. From impact until vehicle motion ceases. . . .	0	1 oz
2. For 5-minute period after vehicle motion ceases . . . . .	0	5 oz
3. For next 25 minutes. . . . .	0	1 oz/1 min

B. SOLVENT SPILLAGE DETAILS: None.

C. FUEL SYSTEM DATA:

Test Fluid: Stoddard Solvent No. 2 Specific Gravity: 0.764

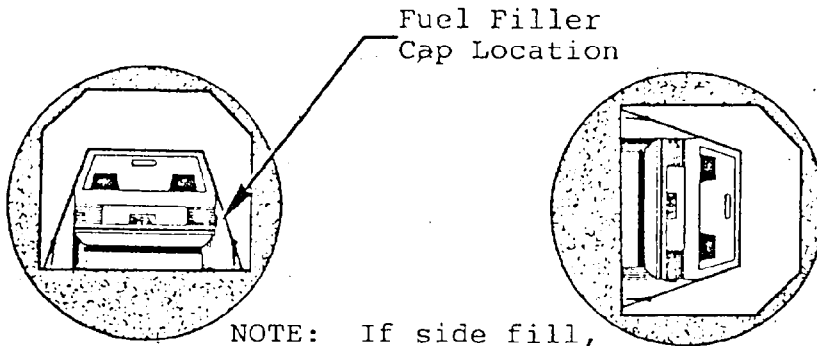
Kinematic Viscosity: 0.99 centistokes

Test Volume: 16.6 U.S. gal/lb Liquid Temp: 60 °F

Details of Fuel Tank, Filler Pipes, and Connections: The rectangular metal fuel tank is attached to trunk floor by two metal straps. The sender tubes exit front center of tank and proceed forward along floorpan to engine. The fuel filler tube and cap are located behind the fold-down license plate. The cap has an extended threaded area on one end which is designed to release any remaining fuel tank pressure while the cap is being removed.

FMVSS 301-75 INDICANT STATIC ROLLOVER DATA SHEET

TEST PHASE: 0° to 90° VEHICLE NHTSA NO. 800132



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

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:

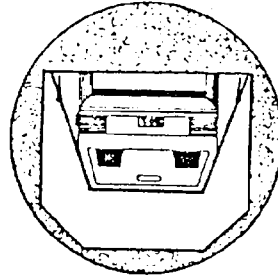
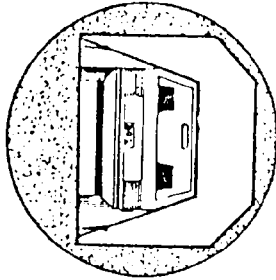
Time Period	First 5 min (from onset)	6th min	7th min	8th min (if req'd)
Maximum Spillage Allowed (oz)	5	1	1	1
Actual Spillage Recorded	0	0	0	-

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

SOLVENT SPILLAGE LOCATION(S): None.

FMVSS 301-75 INDICANT STATIC ROLLOVER DATA SHEET

TEST PHASE: 90° to 180° VEHICLE NHTSA NO. 800132



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time.... = 1 min, 38 sec +  
 (Spec. Range = 1 to 3 min)  
 FMVSS 301 Position Hold Time..... = 5 min, 0 sec =  
 Total..... = 6 min, 38 sec  
 Next Whole Minute Interval..... = 7 min

FMVSS 301 REQUIREMENTS AND ACTUAL TEST RESULTS:

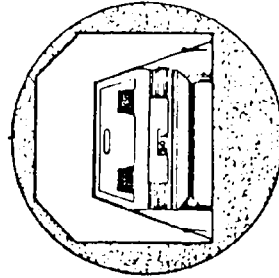
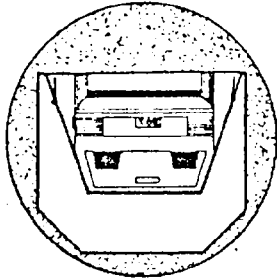
Time Period	First 5 min (from onset)	6th min	7th min	8th min (if req'd)
Maximum Spillage Allowed (oz)	5	1	1	1
Actual Spillage Recorded	0	0	0	-

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

SOLVENT SPILLAGE LOCATION(S): None.

FMVSS 301-75 INDICANT STATIC ROLLOVER DATA SHEET

TEST PHASE: 180° to 270° VEHICLE NHTSA NO. 800132



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:

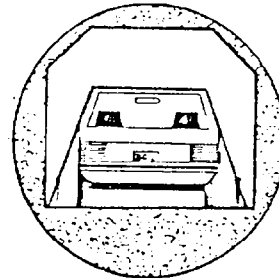
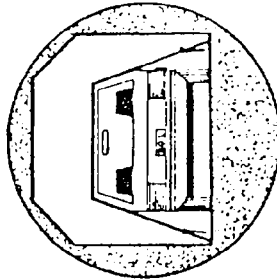
Time Period	First 5 min (from onset)	6th min	7th min	8th min (if req'd)
Maximum Spillage Allowed (oz)	5	1	1	1
Actual Spillage Recorded	0	0	0	-

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

SOLVENT SPILLAGE LOCATION(S): None.

FMVSS 301-75 INDICANT STATIC ROLLOVER DATA SHEET

TEST PHASE: 270° to 360° VEHICLE NHTSA NO. 800132



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time.... = 1 min, 38 sec +  
 (Spec. Range = 1 to 3 min)  
 FMVSS 301 Position Hold Time..... = 5 min, 0 sec =  
 Total..... = 6 min, 38 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.

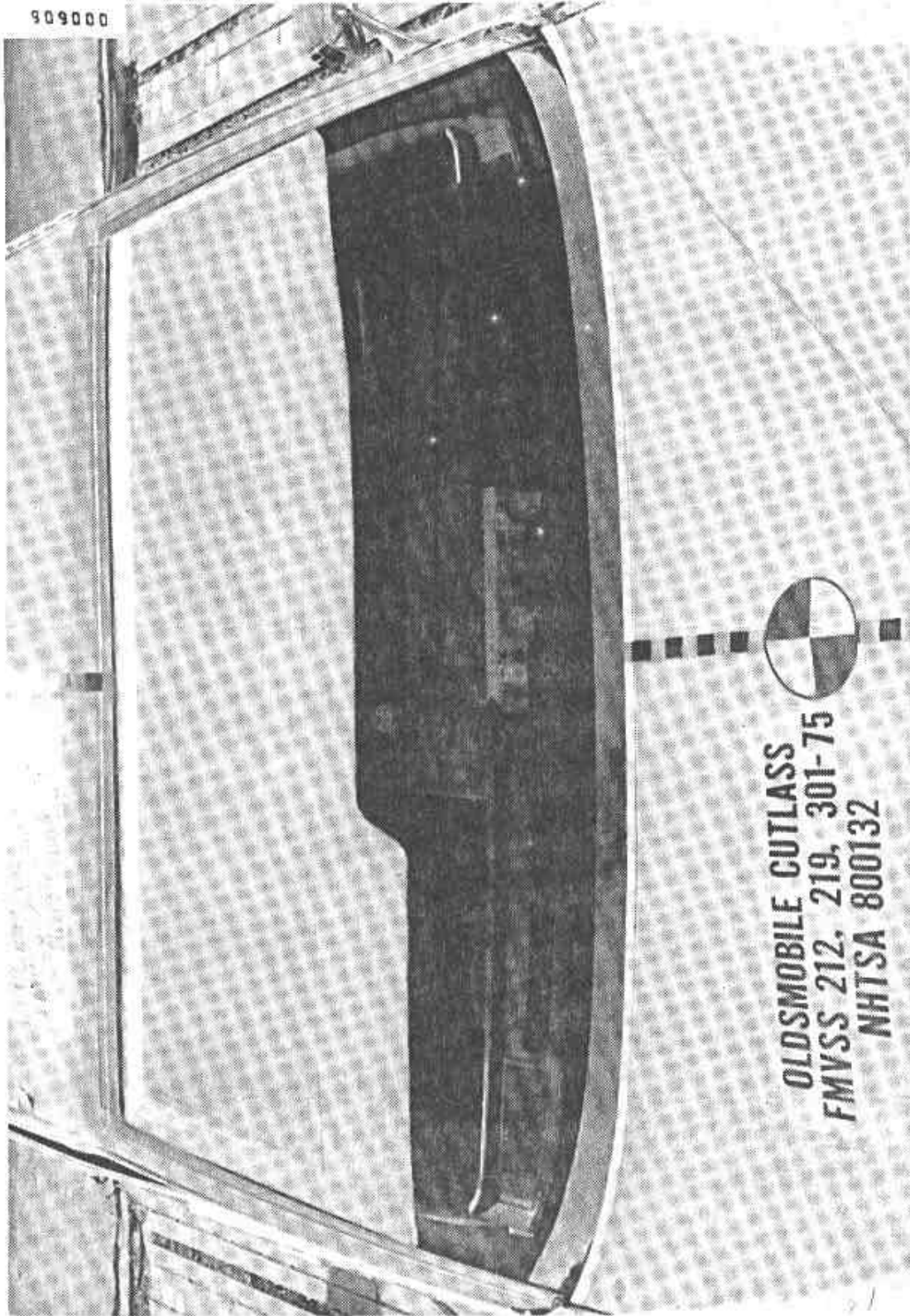


FIGURE 3-1. PRE-TEST WINDSHIELD - OVERALL VIEW - 1980 OLDSMOBILE CUTLASS - NHTSA 800132.

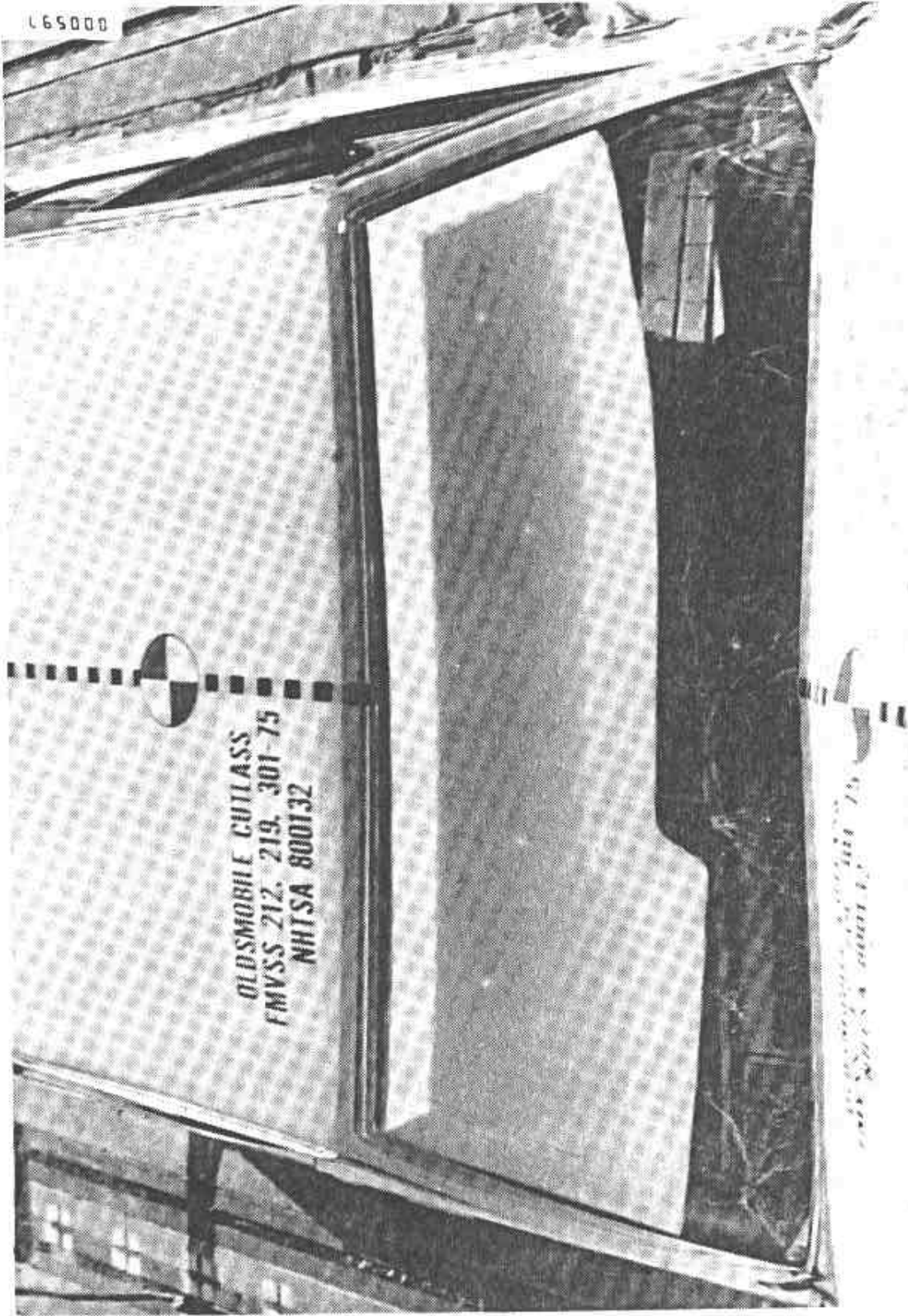


FIGURE 3-2. POST-TEST WINDSHIELD - OVERALL VIEW - 1980 OLDSMOBILE CUTLASS - NHTSA 800132.

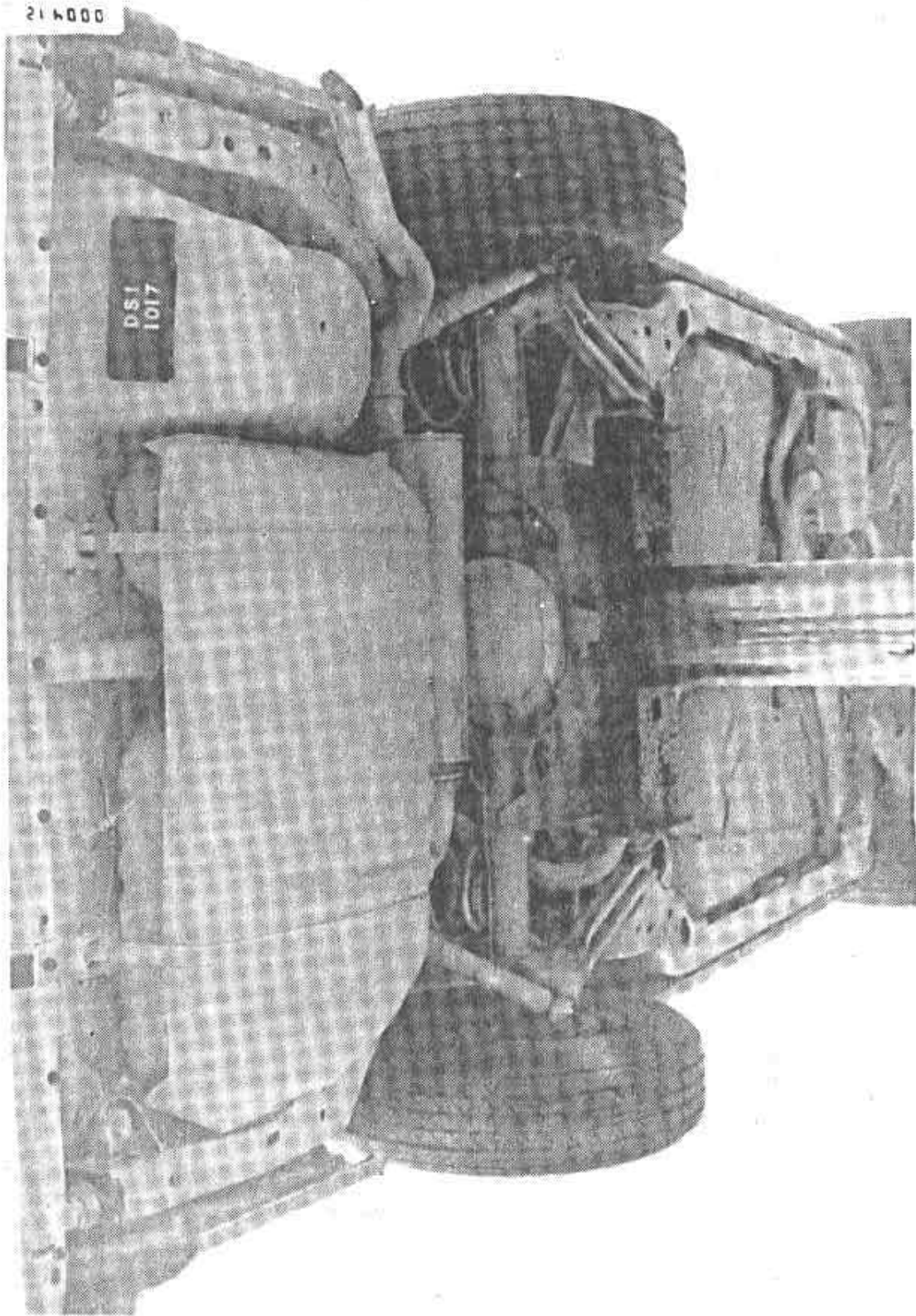


FIGURE 3-3. PRE-TEST VIEW OF FUEL TANK - 1980 OLDSMOBILE CUTLASS - NHTSA 800132.

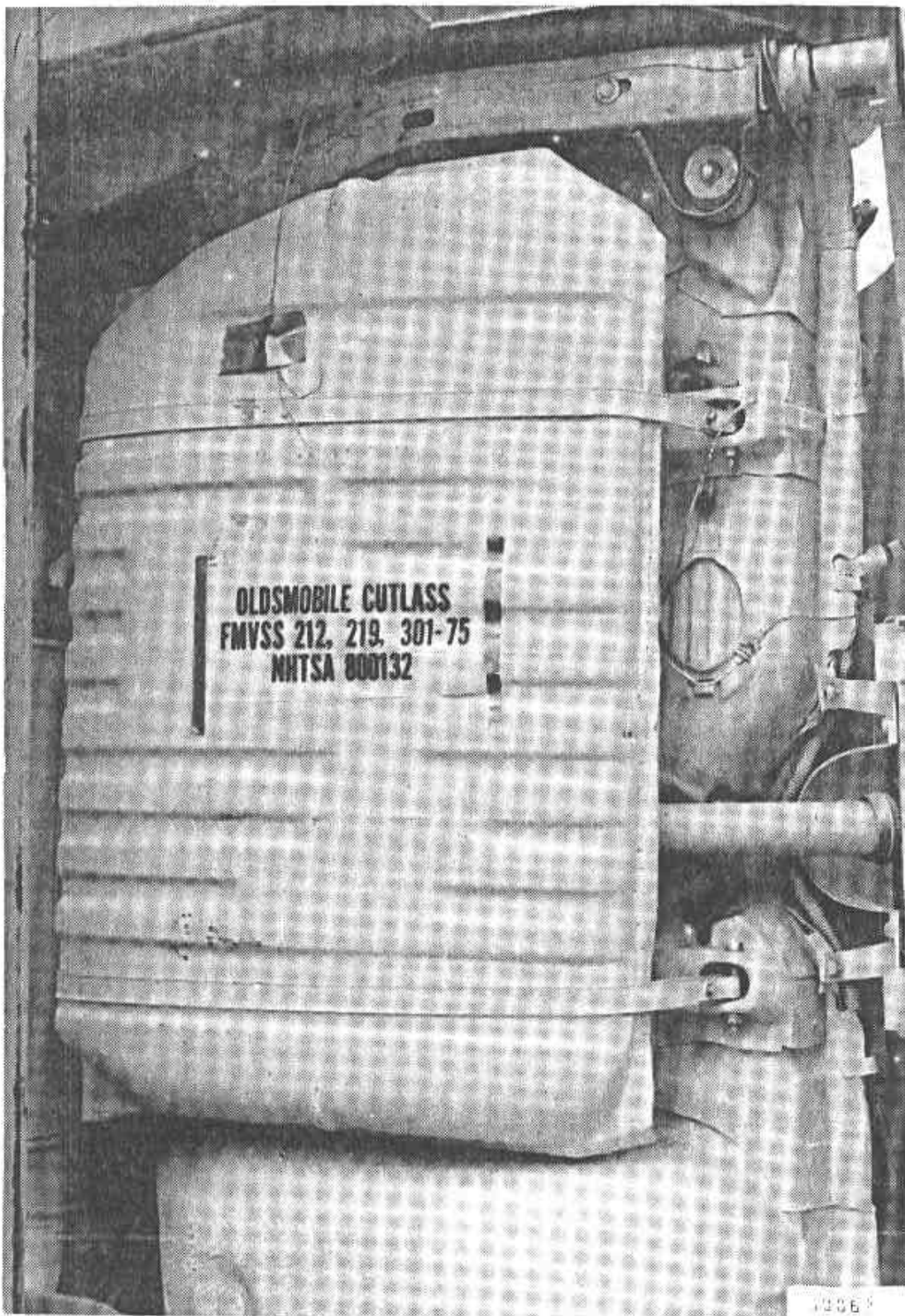


FIGURE 3-4. POST-TEST VIEW OF FUEL TANK - 1980 OLDSMOBILE CUTLASS - NHTSA 800132.  
3-14

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. High-speed movie camera location and specification summary.

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

DUMMY POSITIONING

Pre-test Dummy Positions

<u>Measurement</u>	<u>Driver (in.)</u>	<u>Passenger (in.)</u>
Dummy Centerline to Vehicle Centerline	<u>14.0</u>	<u>14.0</u>
Nose to Upper Rim Steering Wheel	<u>20.2</u>	<u>N/A</u>
Nose to Windshield (Horizontal Distance)	<u>22.6</u>	<u>24.2</u>
Chest to Steering Wheel Hub	<u>12.5</u>	<u>N/A</u>
Chest to Instrument Panel	<u>22.0</u>	<u>26.0</u>
Left Knee to Closest Point on Lower Panel	<u>7.2</u>	<u>7.5</u>
Right Knee to Closest Point on Lower Panel	<u>7.7</u>	<u>7.3</u>
Ankle Distance (Outer-Outer)	<u>14.0</u>	<u>12.0</u>
Knee Distance (Outer-Outer)	<u>14.0</u>	<u>12.0</u>
Nose to Seatback	<u>11.0</u>	<u>10.8</u>

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

PART 572 DUMMY IN-VEHICLE POSITION RECORDING SHEET

NHTSA No.: 800132 Manufacturer: General Motors Corporation

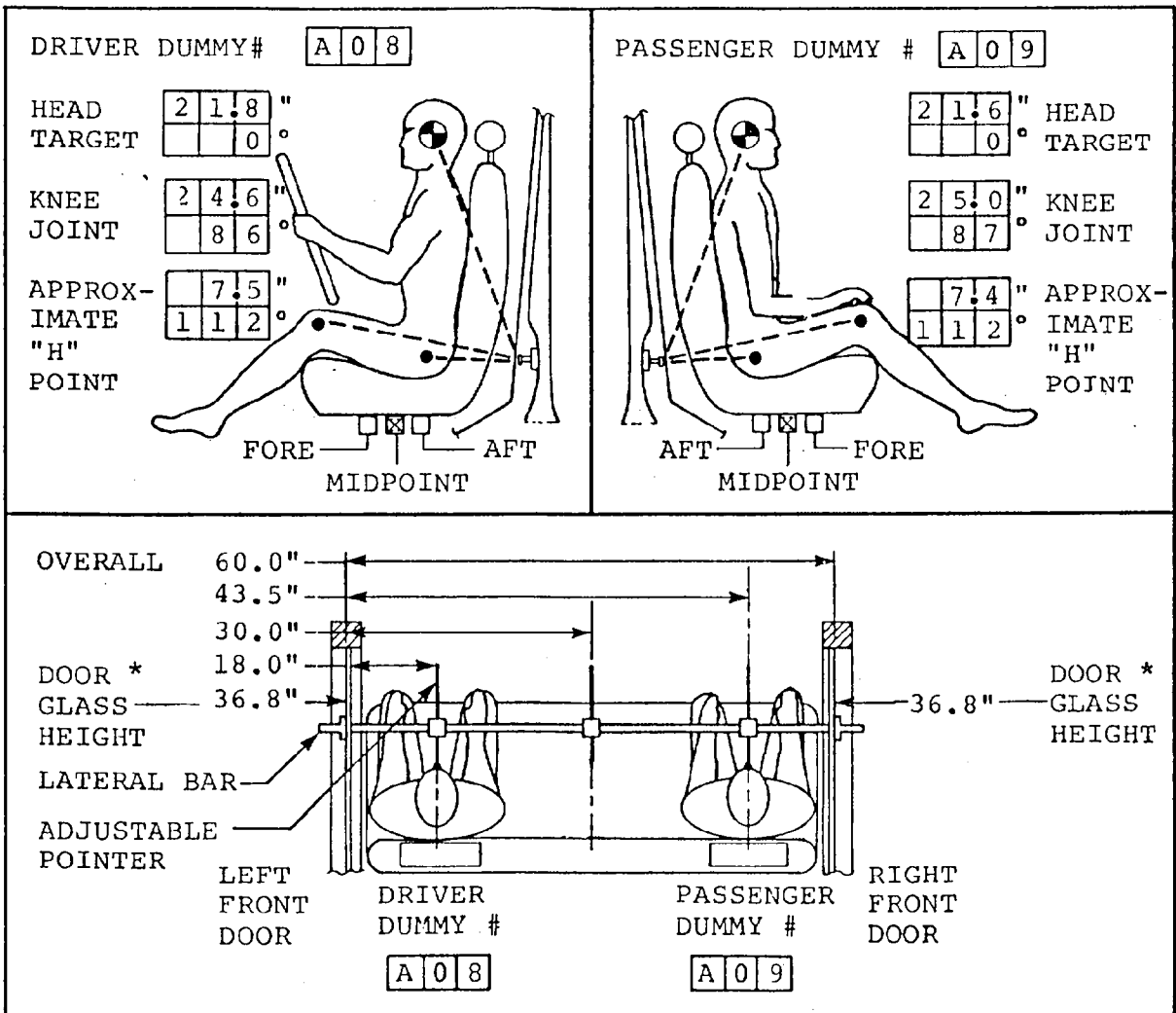
Make/Model: Oldsmobile Cutlass Model Year: 1980

SEAT TYPE: X Bench      Bucket      Split Bench  
 ADJUSTER TYPE: X Manual      Power  
 BUCKET SEAT BACK TYPE:      Adjustable Reclining X Fixed

AMBIENT TEMPERATURE: 64 °F; TIME: 0830

POSITIONING TECHNICIANS: 1. Mark Pozzi  
 DATE: 1-17-80 2. Peter Lanser

All front seat dummies are 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.

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	3.2	195	183.5	94	8.8	193	59.0	117
Lateral	5.2	100	33.4	94	203.7	116	3.5	50
Vertical	74.3	99	16.2	114	182.3	116	6.9	17
Resultant	192.1	94			275.0	116		
HIC	1333.9 between 91 and 97 msec				1125.0 between 115 and 117 msec			
Chest Acceleration								
Longitudinal	4.5	152	67.4	96	4.1	171	49.9	102
Lateral	3.6	100	14.7	107	42.2	120	4.7	167
Vertical	18.1	62	21.7	120	9.0	67	13.3	116
Resultant (Max)	69.5	96			51.2	102		
Resultant (clip)	61.7	94			46.9	121		
TIME > 60 G	6 msec				0 msec			
SEVERITY INDEX	707.4 @ 200 msec				402.1 @ 200 msec			
	Peak (lb)	Time (msec)	Peak (lb)	Time (msec)	Peak (lb)	Time (msec)	Peak (lb)	Time (msec)
Femur Loads								
Left			-801.3	83			-476.2	83
Right			-1957.9	78			-458.7	84
Belt Loads								
Lap	1297.2	74			737.5	71		
Torso	1286.3	97			2177.4	115		
Vehicle Impact Speed (mph):					35.35			
*Longitudinal:	Forward							
Lateral:	Rightward							
Vertical:	Downward							
**Longitudinal:	Rearward							
Lateral:	Leftward							
Vertical:	Upward							

## DUMMY KINEMATIC SUMMARY

DRIVER - Initial contact occurred between the lower steering wheel rim and the upper abdomen and chest. The dummy then struck the upper steering wheel rim and the steering wheel hub with its head. The dummy rebounded into the seatback and came to rest upright, with a slight counter-clockwise rotation.

PASSENGER - As the dummy's torso moved forward, the head began to rotate clockwise prior to impact with its left knee, which was moving upward due to floorpan crush. The dummy's head struck its left knee immediately above and forward of the left ear resulting in an unusually rapid acceleration onset in the lateral and vertical planes. No head, chest, or abdomen contact was made with the vehicle. The dummy rebounded into the seatback and came to rest reclining slightly due to forward displacement of its buttocks.

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

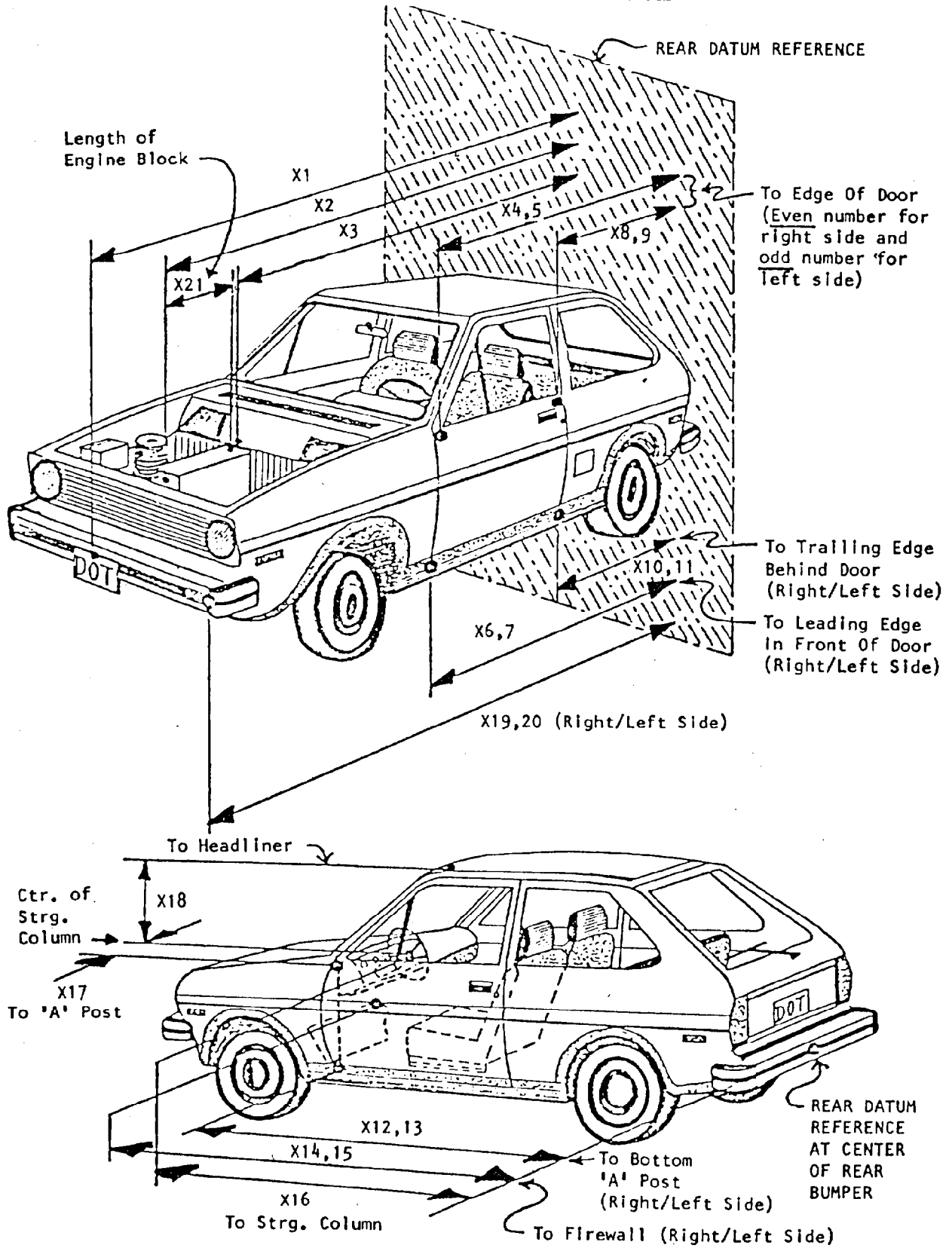
Vehicle: 1980 Oldsmobile Cutlass      NHTSA No.: 800132

Test Date: January 17, 1980      D.S. No.: 1017

Reference Dimension	Pre-test Measurement	Post-test Measurement	Change
X <sub>1</sub> *	197.6	168.1	29.5
X <sub>2</sub>	164.0	155.5	8.5
X <sub>3</sub>	139.0	137.0	2.0
X <sub>4</sub>	131.5	131.6	0.1
X <sub>5</sub>	131.5	130.9	0.6
X <sub>6</sub>	135.0	134.0	1.0
X <sub>7</sub>	135.0	133.5	1.5
X <sub>8</sub> *	92.0	92.1	0.1
X <sub>9</sub> *	92.0	91.6	0.4
X <sub>10</sub>	93.0	92.3	0.7
X <sub>11</sub>	93.0	91.8	1.2
X <sub>12</sub>	134.0	132.4	1.6
X <sub>13</sub>	134.0	131.8	3.0
X <sub>14</sub>	146.0	133.5	12.5
X <sub>15</sub>	146.0	138.8	7.2
X <sub>16</sub>	117.1	115.1	2.0
Y <sub>17</sub>	15.4	13.5	1.9
Z <sub>18</sub>	15.5	14.4	1.1
X <sub>19</sub> *	197.0	168.4	28.6
X <sub>20</sub> *	197.0	167.8	29.2
X <sub>21</sub>	25.0	18.5	6.5

\*Rear impact data requirements.

PRE-TEST AND POST-TEST MEASUREMENT POINTS



VEHICLE PROFILE DATA SHEET

Vehicle: 1980 Oldsmobile Cutlass D.S. No.:1017 Test Date: January 17, 1980

Measurement Date: Pre-test: January 16, 1980 Post-test January 21, 1980

Exterior Measurements Referenced to Plane: 17' Forward of: Rear Bumper

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

Top of Front Bumper 18.0 9.7 8.9 8.4 7.8 7.3 6.8 7.3 7.8 8.4 8.9 9.7

Front of Hood 30.0 13.7 13.3 11.9 11.4 10.8 10.5 10.8 11.3 11.9 13.2 13.8

Post-test Profile (in.)

Top of Front Bumper 24.0 35.9 35.7 35.7 35.9 36.0 35.9 36.1 36.2 36.2 36.4 36.7

Front of Hood 35.0 33.9 34.3 33.8 33.9 33.9 33.9 33.7 33.3 33.1 33.9 34.7

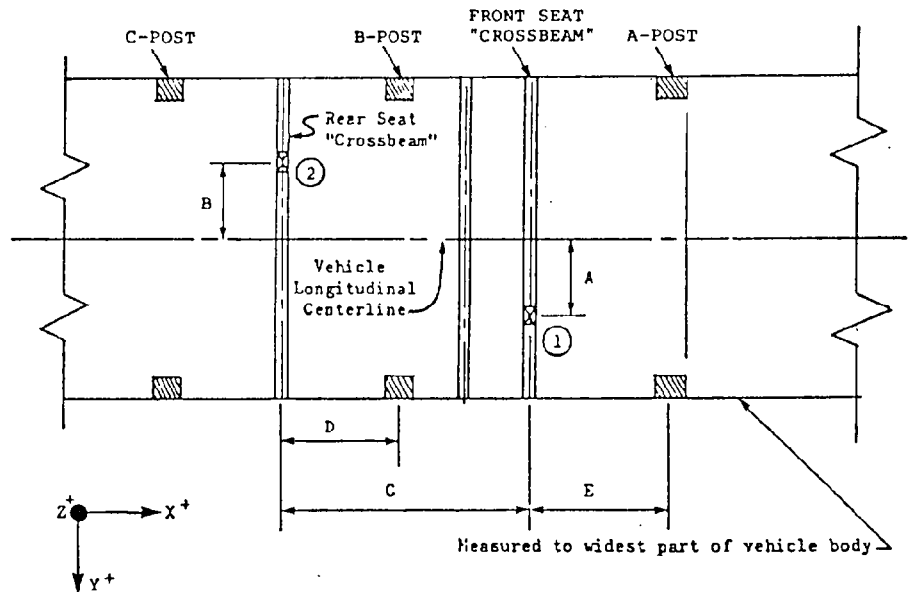
Post-test Static Crush (in.)

Top of Front Bumper 6.0 26.2 26.8 27.3 28.1 28.7 29.1 28.8 28.4 27.8 27.5 27.0

Front of Hood 5.0 20.2 21.0 21.9 22.5 23.1 23.4 22.9 22.0 20.2 20.7 20.9

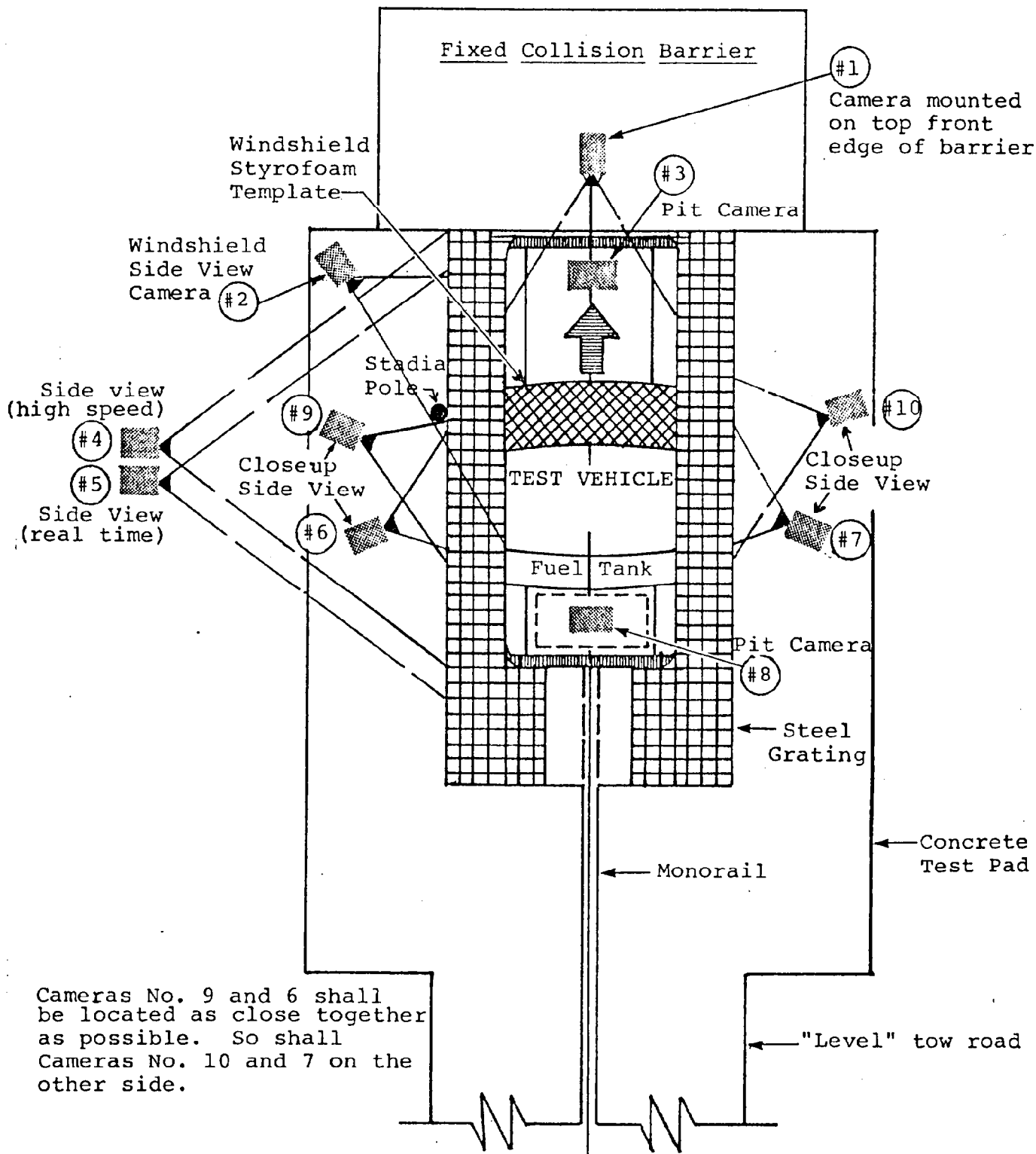
TEST VEHICLE ACCELEROMETER LOCATION DEFINITION AND DATA SUMMARY

Dim.	Length (in.)
A	14.0
B	14.0
C	35.5
D	9.0
E	19.0



98761782

No.	Location Description	Component Direction			Data Summary					
					Peak G @ msec					
		X	Y	Z	X		Y		Z	
			"+"	"-"	"+"	"-"	"+"	"-"	"+"	"-"
1	Front Seat "Crossbeam"	✓	✓	✓	4.1 @ 156	39.0 @ 76	25.3 @ 66	21.0 @ 61	29.9 @ 64	25.0 @ 36
2	Rear Seat "Crossbeam"	✓		✓	7.7 @ 156	59.9 @ 78	@	@	21.6 @ 71	24.4 @ 39



Cameras No. 9 and 6 shall be located as close together as possible. So shall Cameras No. 10 and 7 on the other side.

TOP VIEW

SUMMARY OF CAMERA LOCATIONS AND DESCRIPTIONS

Loc. No.	Location	Field of View	Lens Size	Frame Rate	Timing Speed (HZ)	Ser No.	Impact Dist-X	Center-line Dist-Y	Camera Height
1	Overhead (Barrier)	Windshield styrofoam up to barrier-vehicle contact if possible	31mm	400	102	11	-3.5	0.0	12.0
2	Ground Based (Left)	Windshield	16mm	400	105	M8	-3.0	13.3	6.0
3	Pit	Engine underside and fuel pump	8mm	1000	100	6	-1.5	0.0	-8.0
4	Ground Based (Left)	Views entire left side of vehicle	16mm	400	98	9	5.0	-26.0	4.0
5	Ground Based (Real Time)	Documentary	Zoom	24	N/A	-	10.0	-26.0	6.0
6	Ground Based (Left)	Driver dummy closeup	15mm	1000	102	8	3.5	-11.0	5.0
7	Ground Based (Right)	Passenger dummy closeup	25mm	1000	100	5	5.0	16.0	4.5
8	Pit	Fuel tank	8mm	1000	105	7	7.5	0.0	-8.0
9	Ground Based (Left)	Same view as Camera No. 6	15mm	1000	104	10	4.0	-11.0	5.0
10	Ground Based (Right)	Same view as Camera No. 7	25mm	1000	100	4	6.0	16.0	4.5
11	On Board	Driver Seatbelt Retractor	8mm	1000	100	12	9.0	-1.5	1.5
12	On Board	Passenger Seatbelt Retractor	8mm	1000	102	11	9.0	1.5	1.5

Note: All distances are in feet.

APPENDIX A  
PHOTOGRAPHS

019000

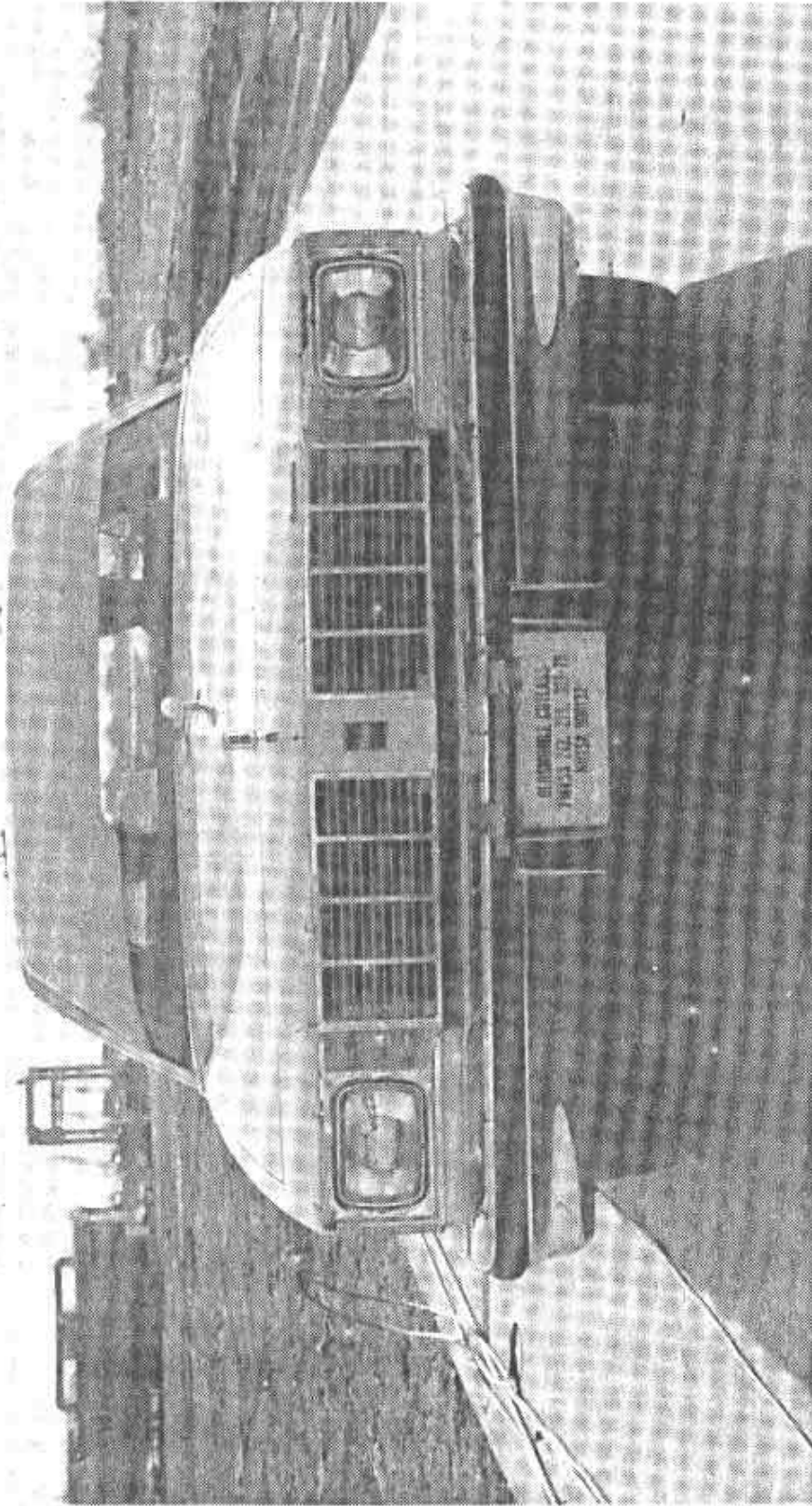


FIGURE A-1. PRE-TEST FRONT VIEW - 1980 OLDSMOBILE CUTLIASS - NHTSA 800132.

W22900

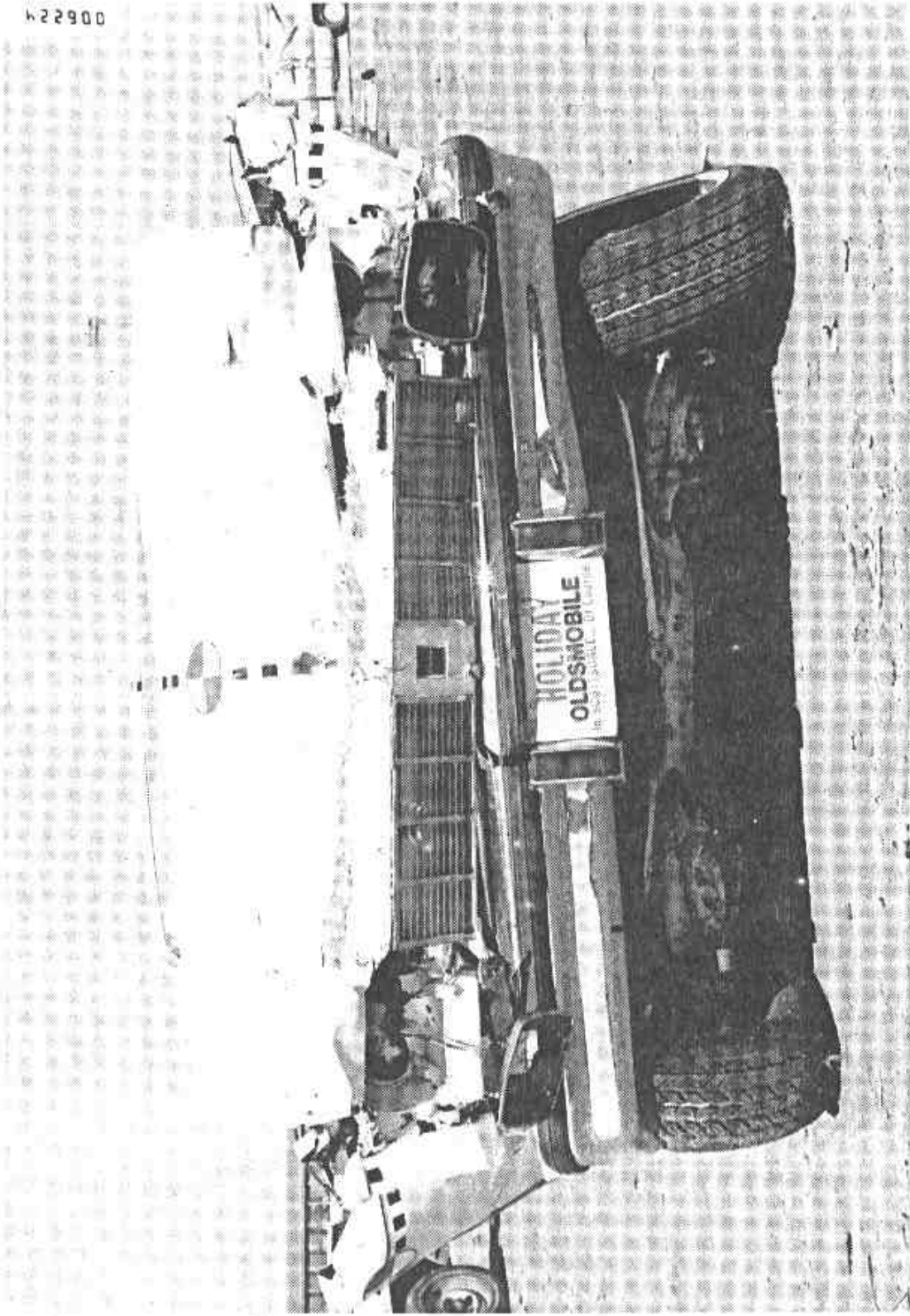


FIGURE A-2. POST-TEST FRONT VIEW - 1980 OLDSMOBILE CUTLASS - NHTSA 800132.

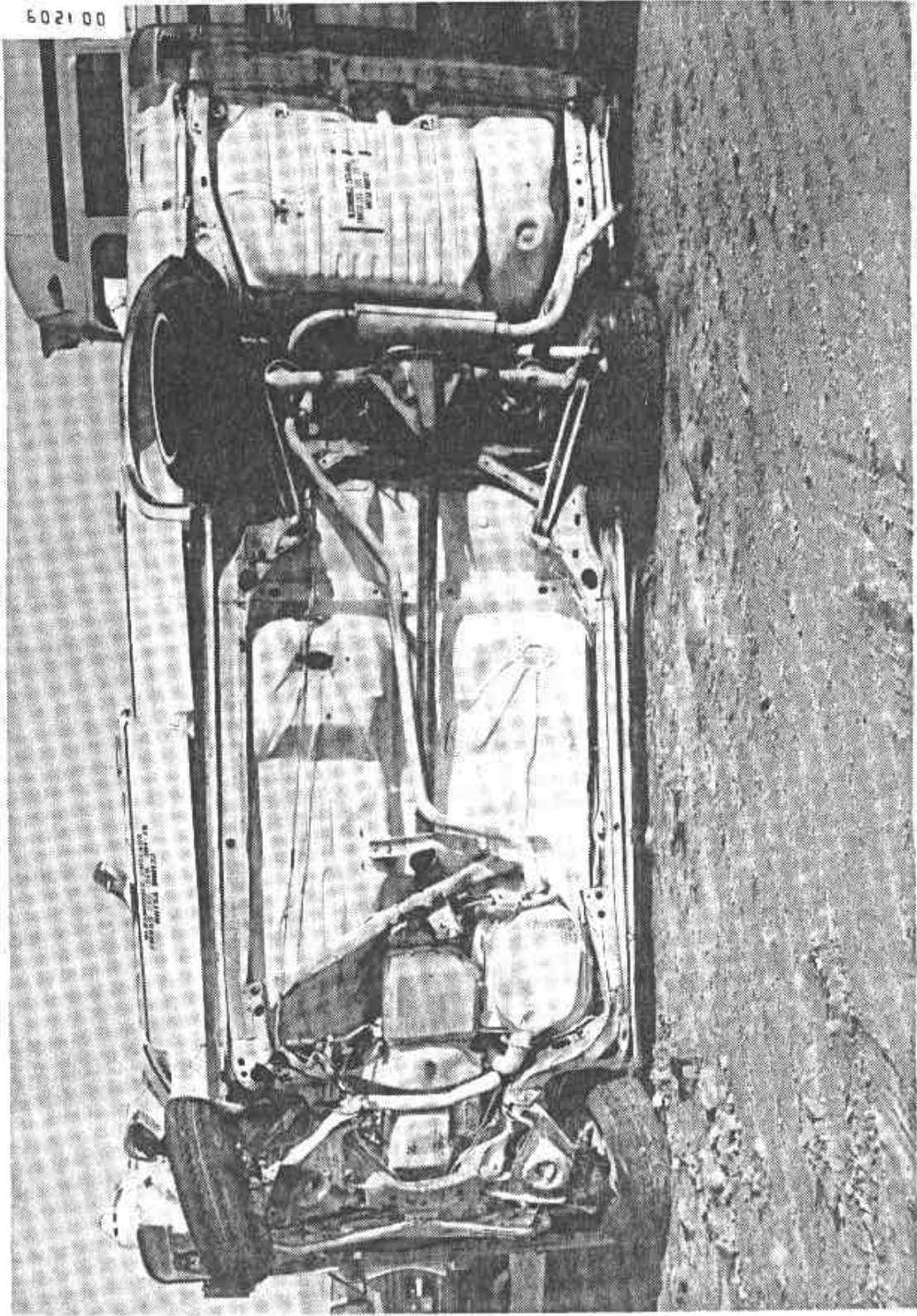


FIGURE A-3. POST-TEST OVERALL UNDERSIDE VIEW - 1980 OLDSMOBILE CUTLASS - NHTSA 800132.

000601

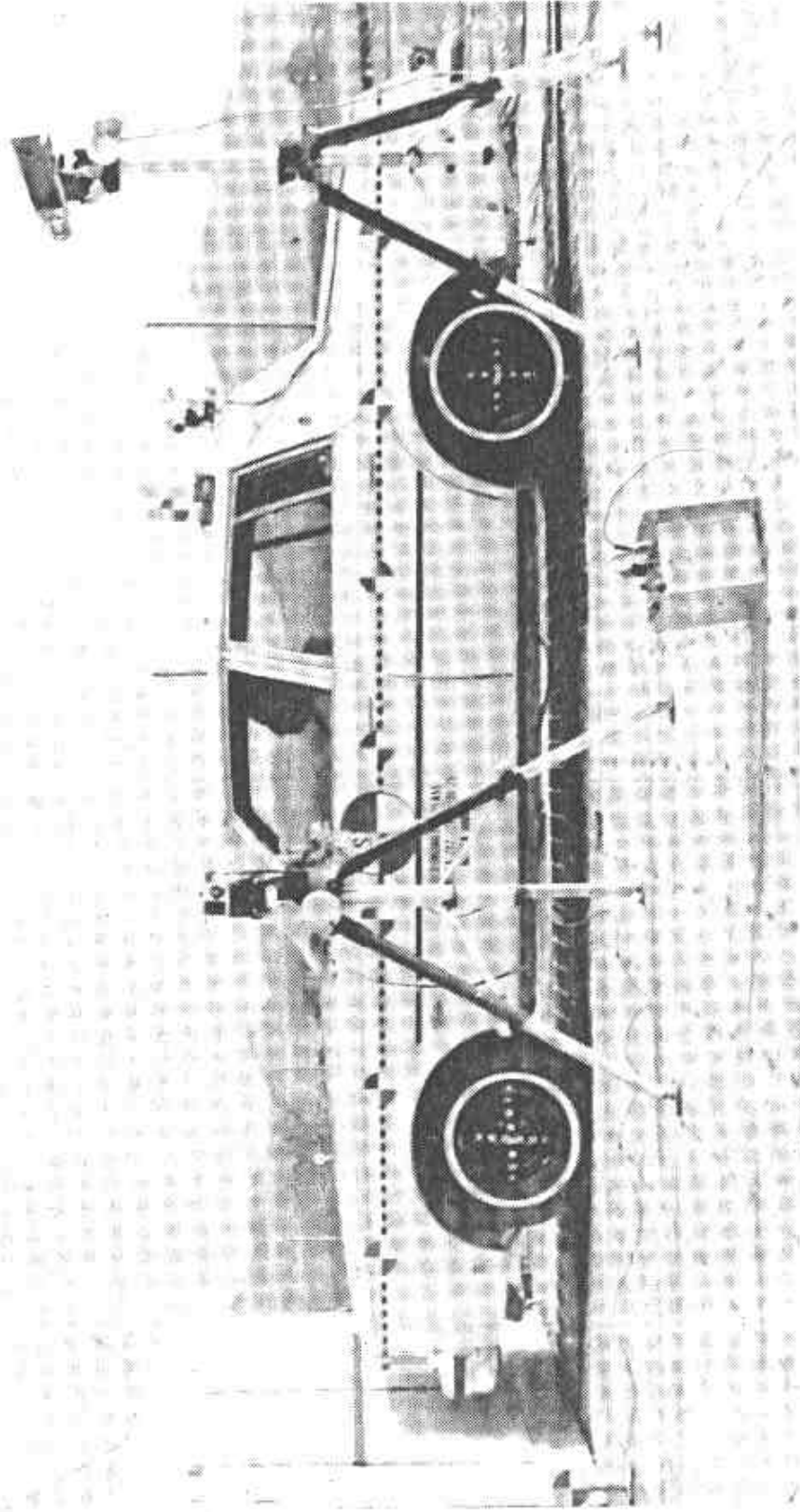


FIGURE A-4. PRE-TEST SIDE VIEW - 1980 OLDSMOBILE CUTLASS - NHTSA 800132.

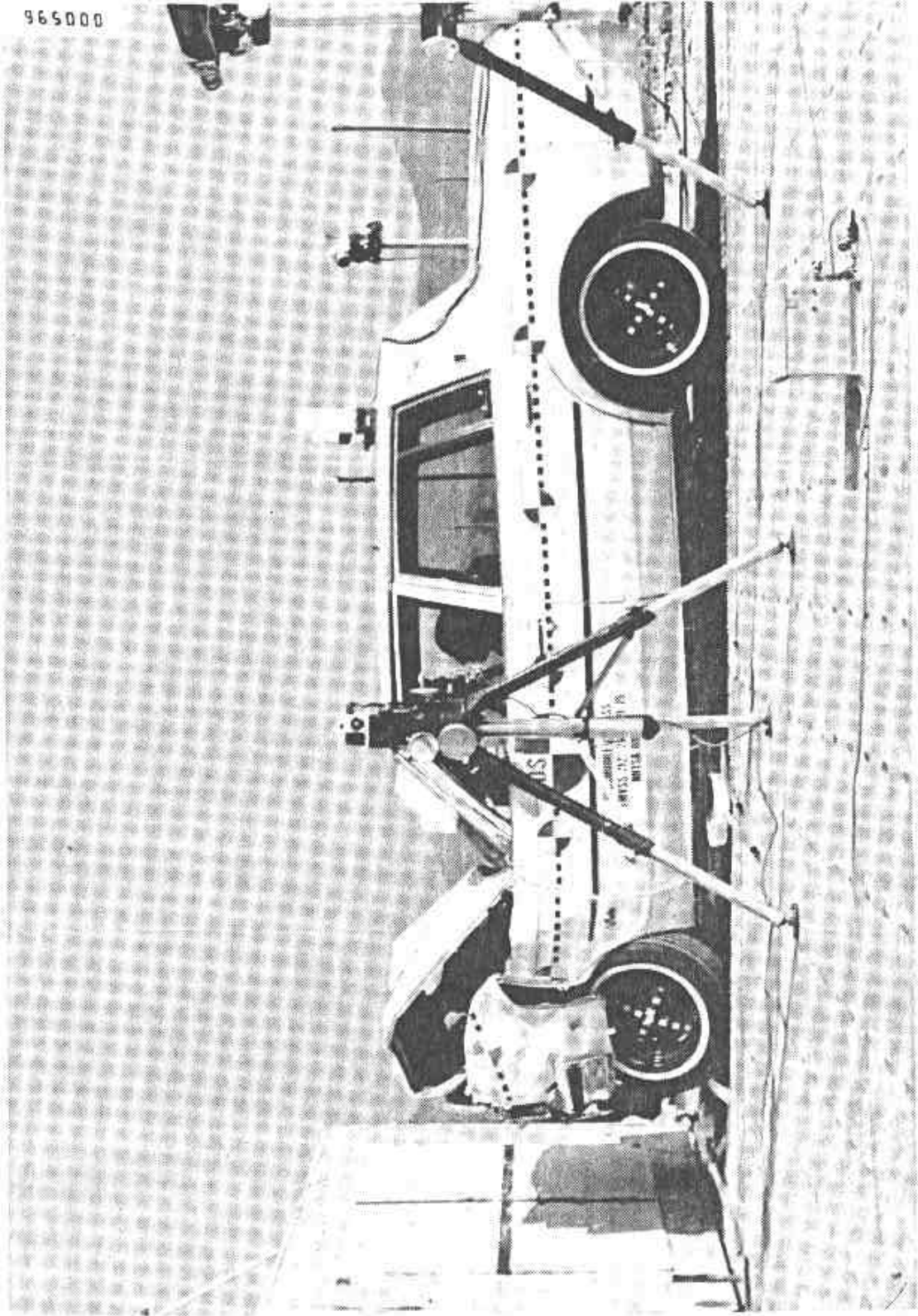


FIGURE A-5. POST-TEST SIDE VIEW - 1980 OLDSMOBILE CUTLASS - NHTSA 800132.



FIGURE A-6. PRE-TEST DRIVER DUMMY POSITION - 1980 OLDSMOBILE CUTLASS - NHTSA 800132.



FIGURE A-7. POST-TEST DRIVER DUMMY POSITION - 1980 OLDSMOBILE CUTLASS - NHTSA 800132.



FIGURE A-8. POST-TEST DRIVER COMPARTMENT - 1980 OLDSMOBILE CUTLASS - NHTSA 800132.

109000



FIGURE A-9. PRE-TEST PASSENGER POSITION - 1980 OLDSMOBILE CUTLASS - NHTSA 800132.

665000

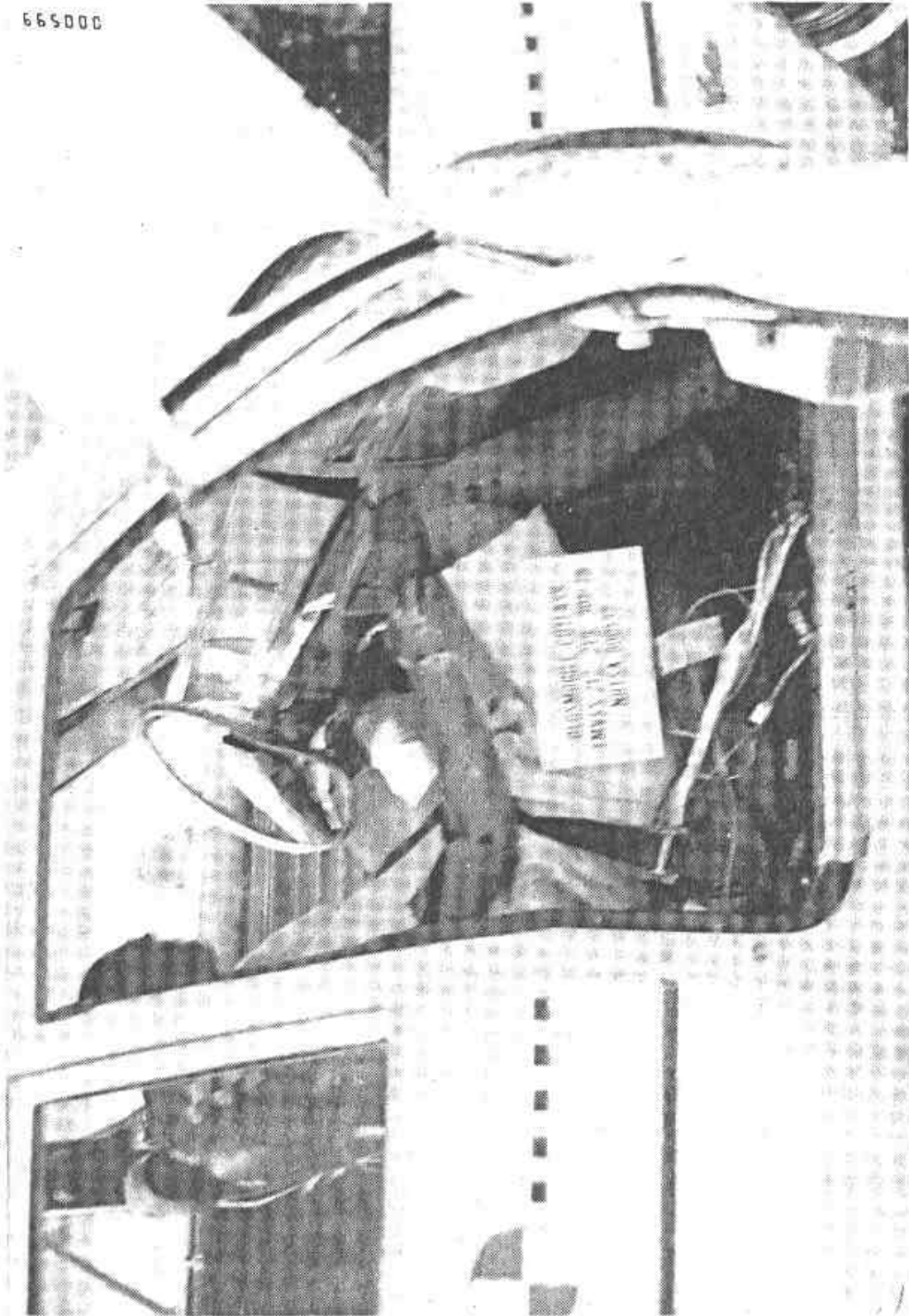


FIGURE A-10. POST-TEST PASSENGER POSITION - 1980 OLDSMOBILE CUTLASS - NHTSA 800132.



FIGURE A-11. POST-TEST PASSENGER COMPARTMENT - 1980 OLDSMOBILE CUTLASS - NHTSA 800132.

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>
LF Head	RF Head	Head Acceleration (G)
LF Chest	RF Chest	Chest Acceleration (G)
LF Femurs	RF Femurs	Femur Loads (lb)
LF Belt Loads	RF Belt Loads	Lap and Torso Belt Loads (lb)

Vehicle Data\*\*

	<u>Location</u>
Loc 1	Front Seat Area Acceleration (G)
Loc 2	Rear Seat Area Acceleration (G)

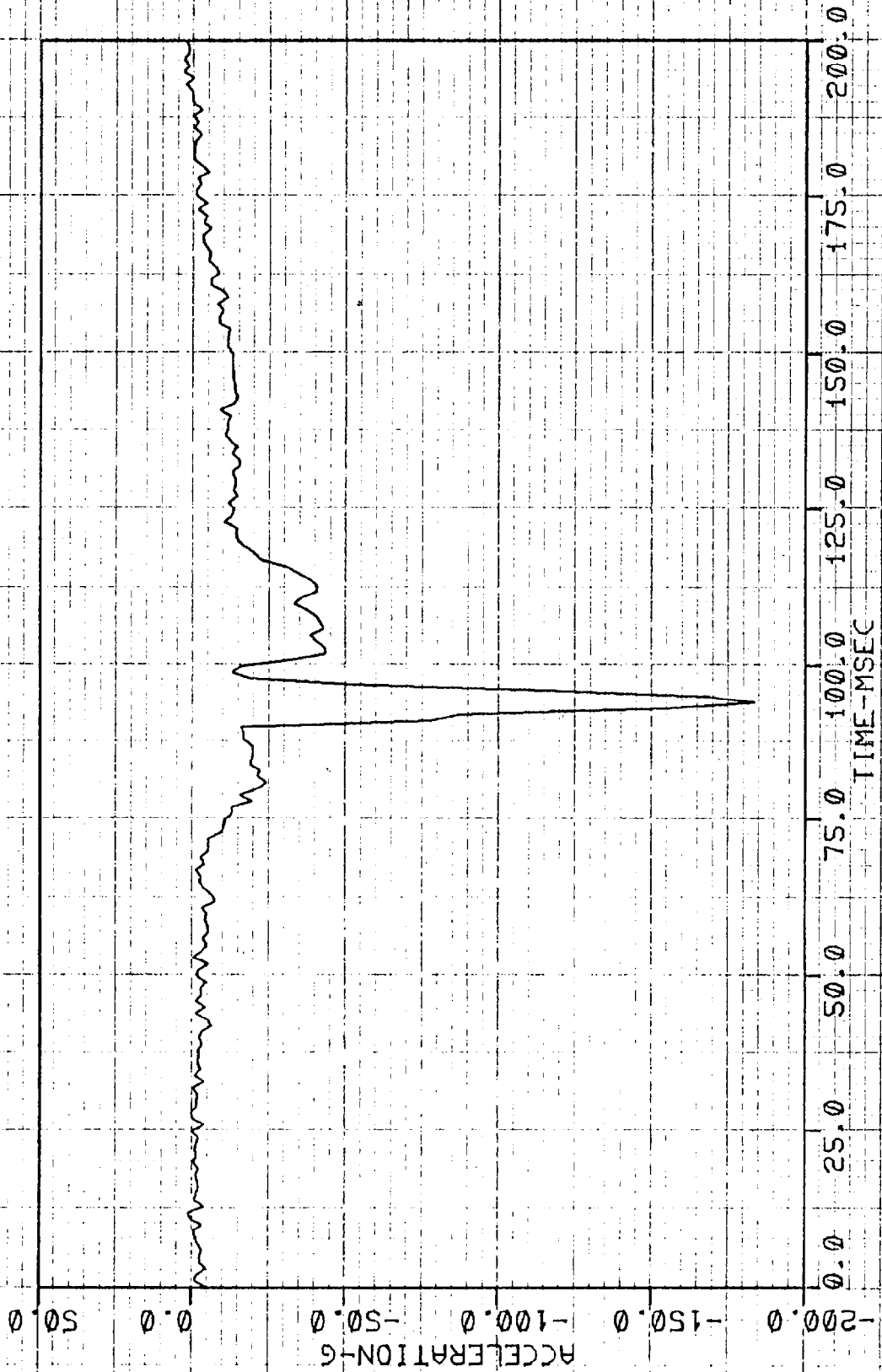
\*Dummy Injury Summary presented on pages 4-4 and 4-5.

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

APPENDIX B (CONTD)

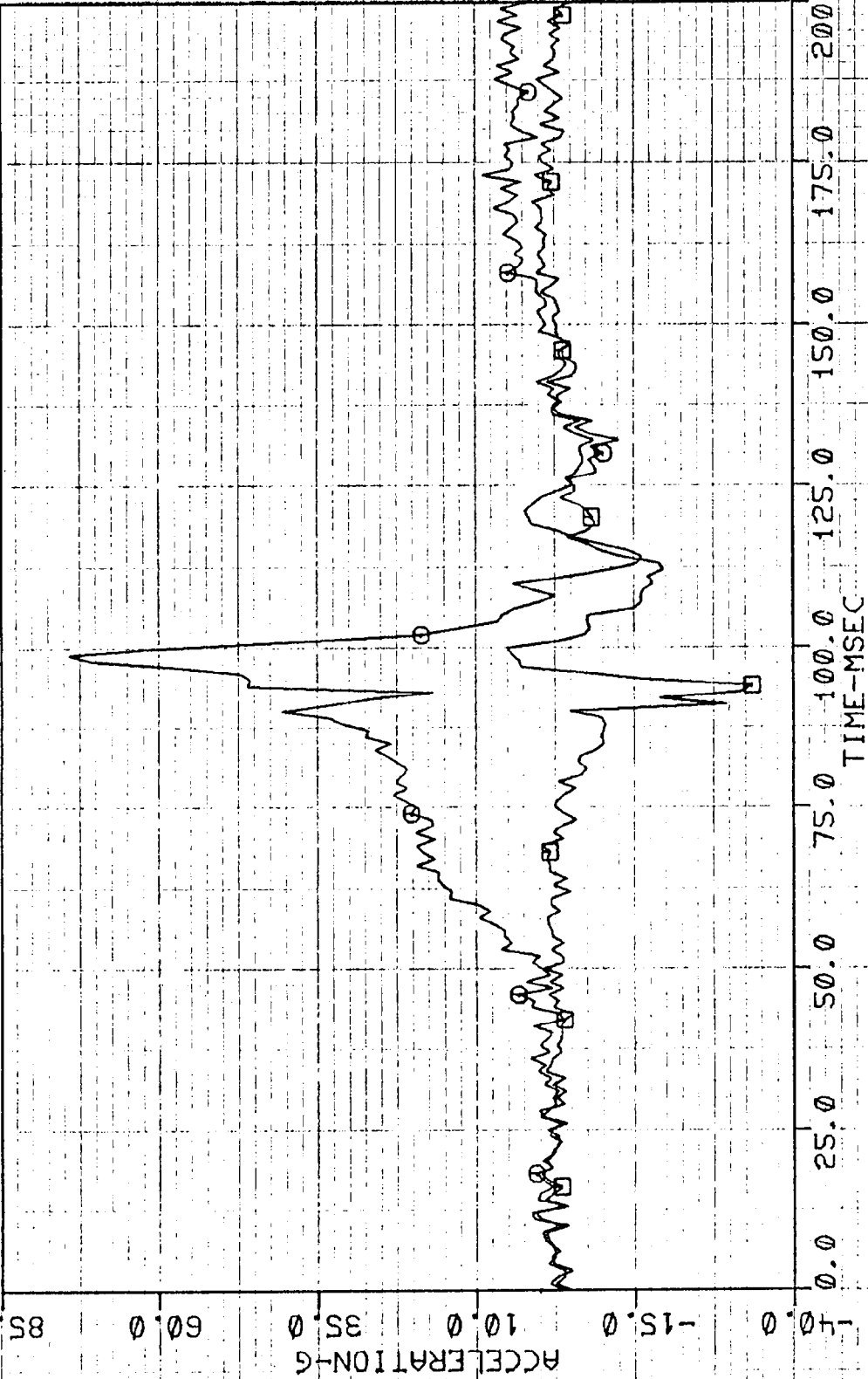
Test Anomalies: None

TEST#800132 OLDSCUTLASS LF HEAD LONG

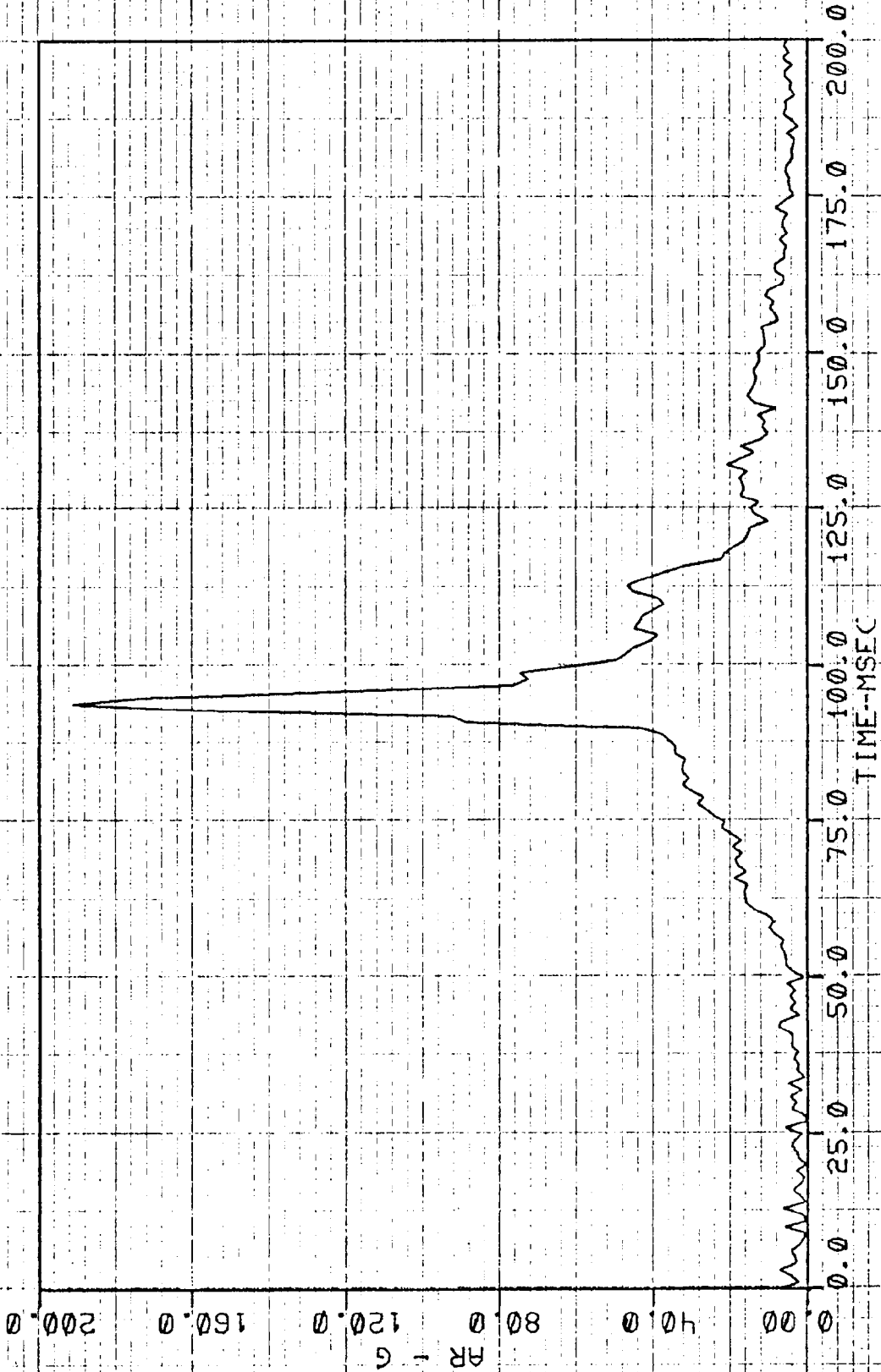


TEST#800132 OLDSCUTLASS LF HEAD

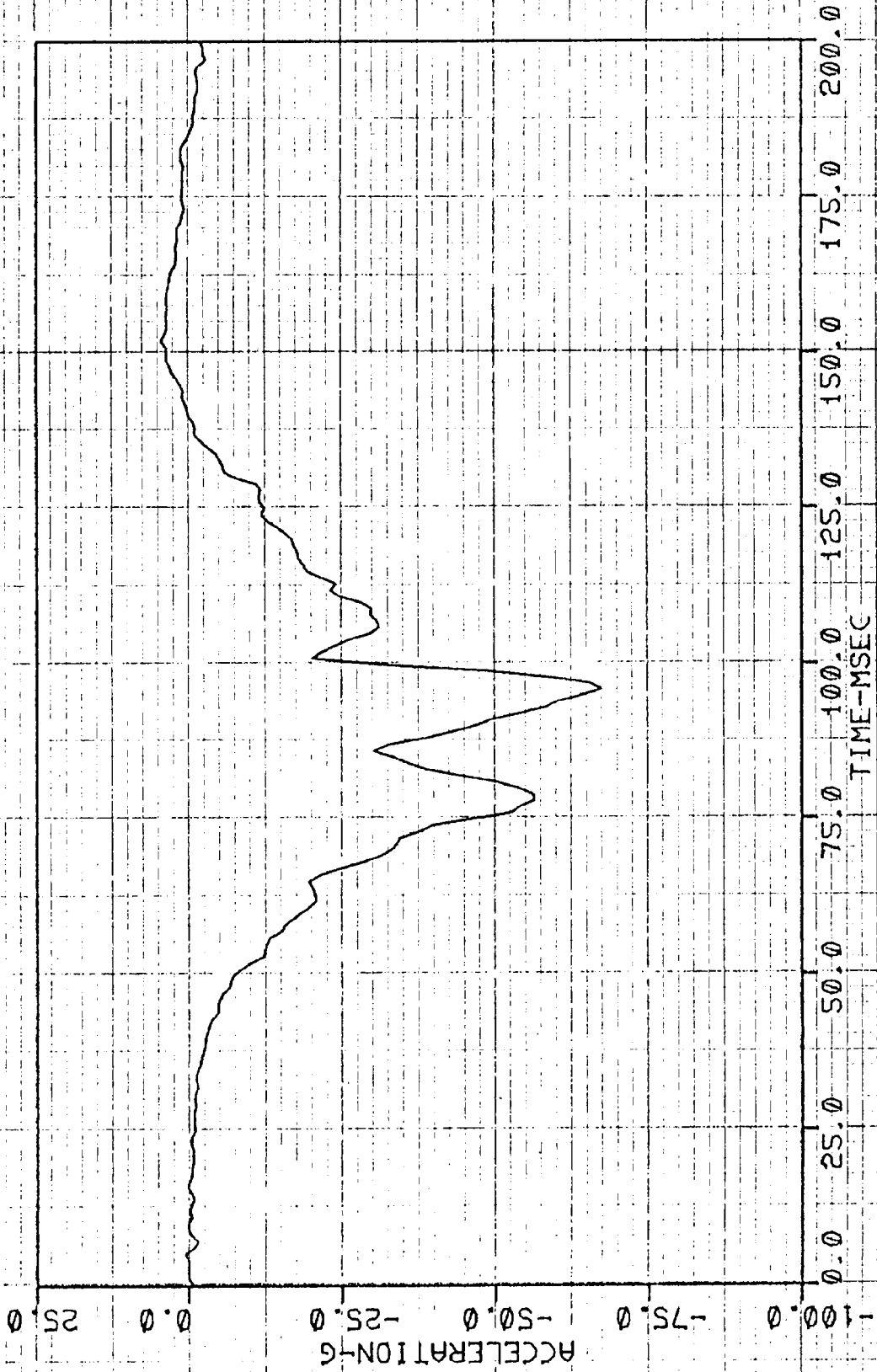
□ = AY    ○ = AZ



TEST#800132 OLDSCUTLASS LF HEAD

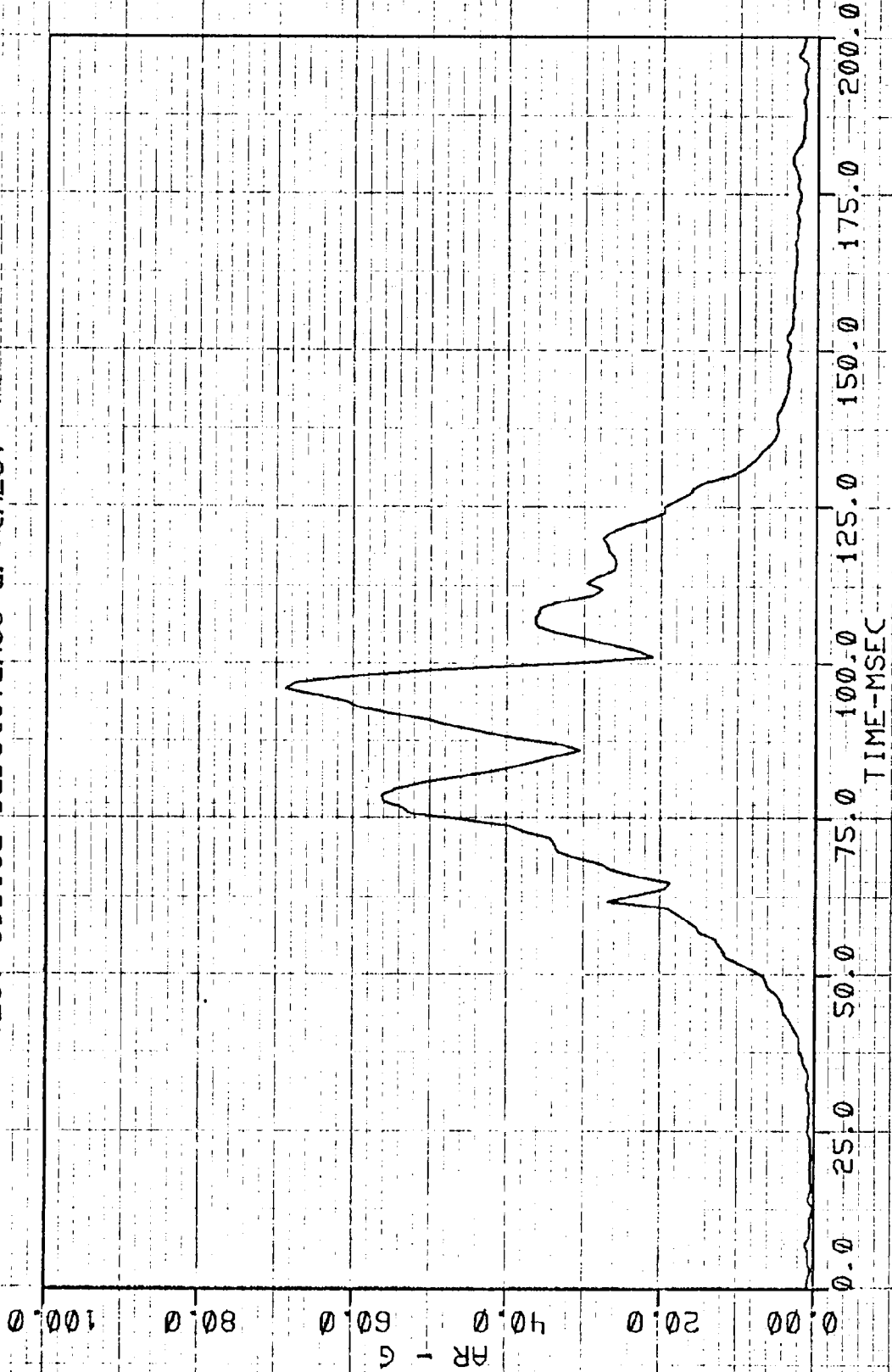


TEST#800132 OLDSCUTLASS LF CHEST LONG

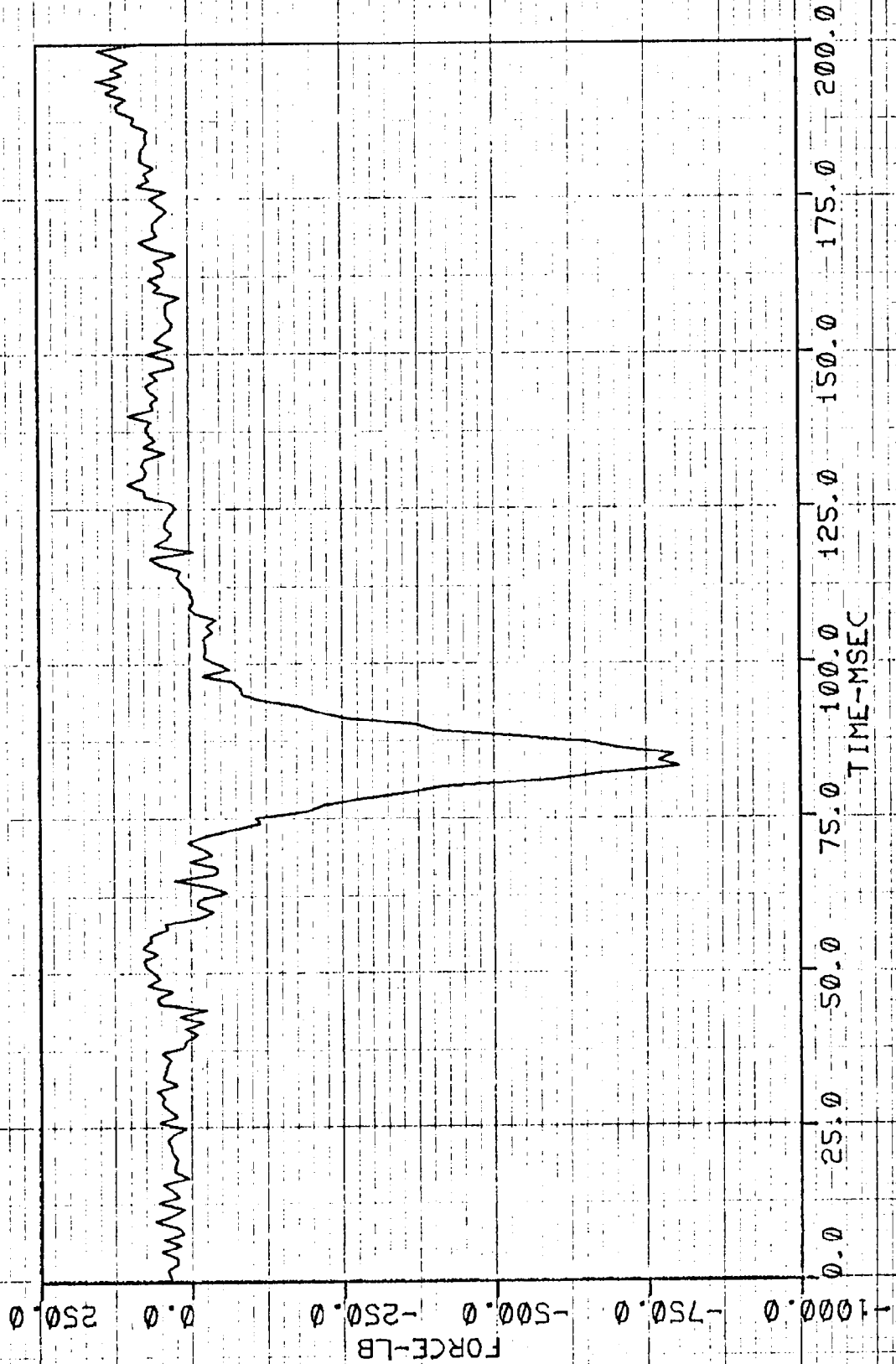




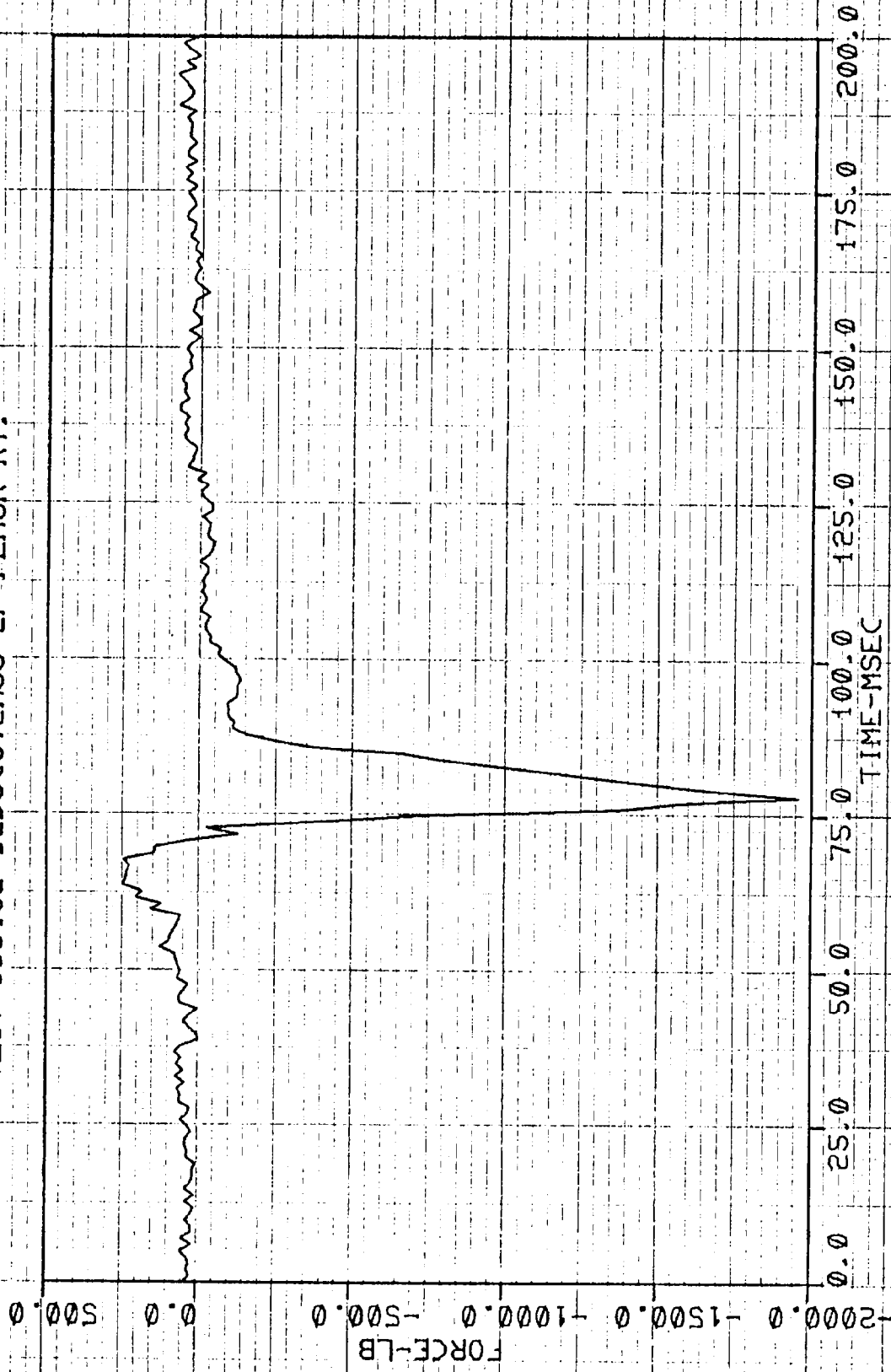
TEST#800132 OLDSCUTLASS LF CHEST



TEST#800132 OLDSCUTLASS LF FEMUR LT.

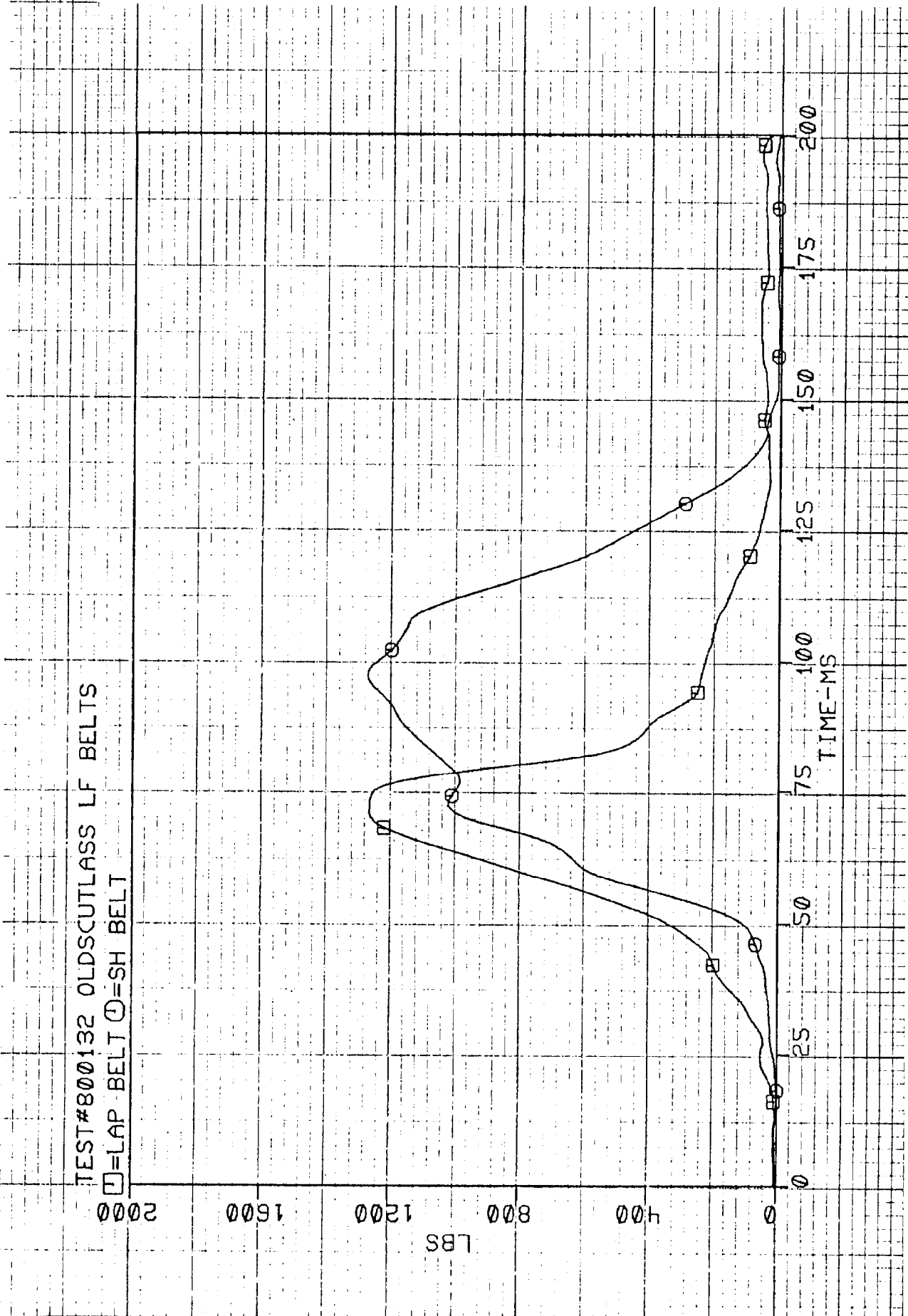


TEST#800132 OLDSCUTLASS LF FEMUR RT.

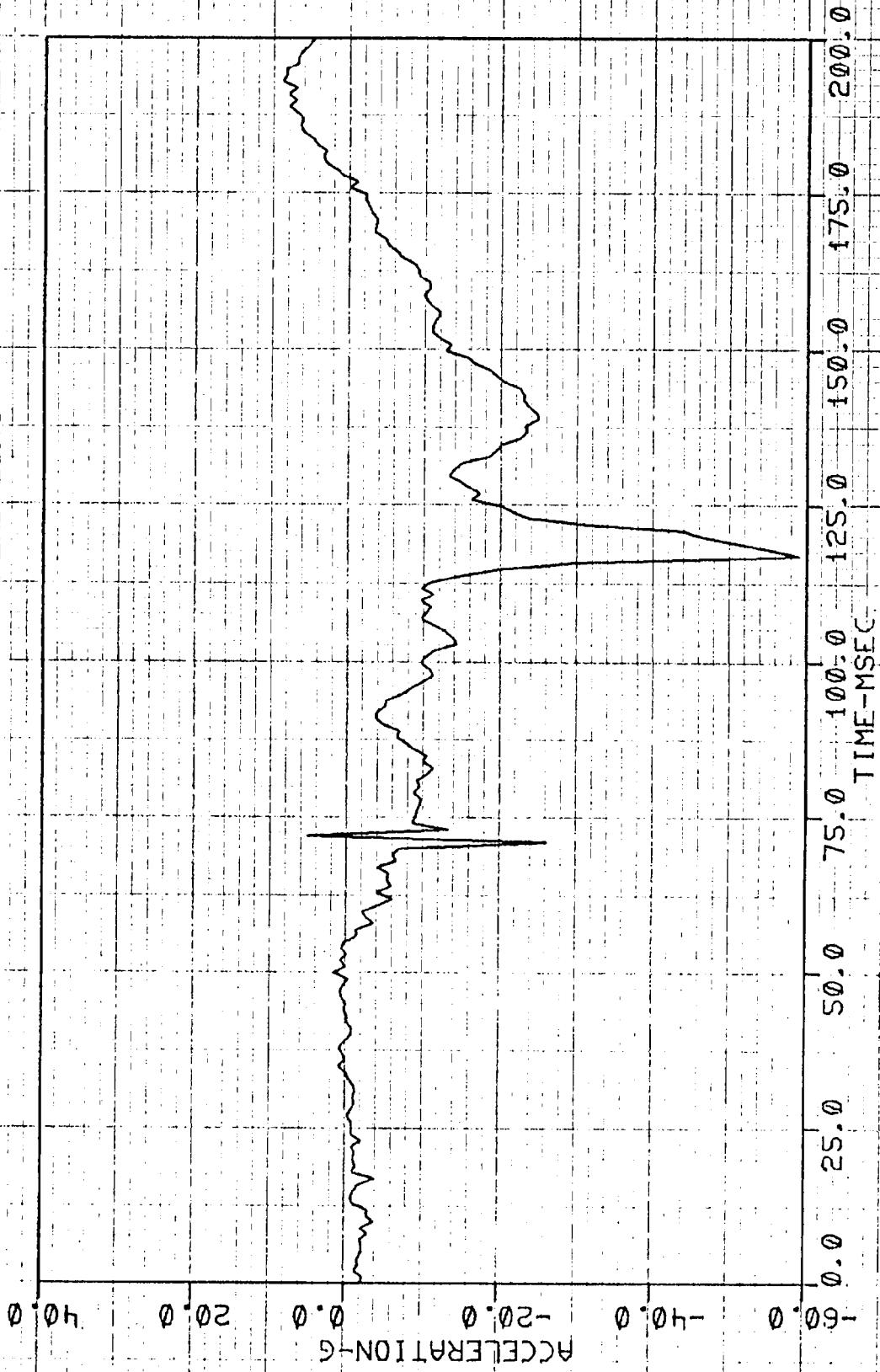


TEST#800132 OLDS CUTLASS LF BELTS

□ = LAP BELT ○ = SH BELT



TEST#800132 OLDSCUTLASS RF HEAD LONG



TEST#800132 OLDSCUTLASS RF HEAD

□ = AY    ⊙ = AZ

250

200

150

100

50

0

ACCELERATION-G

25

50

75

100

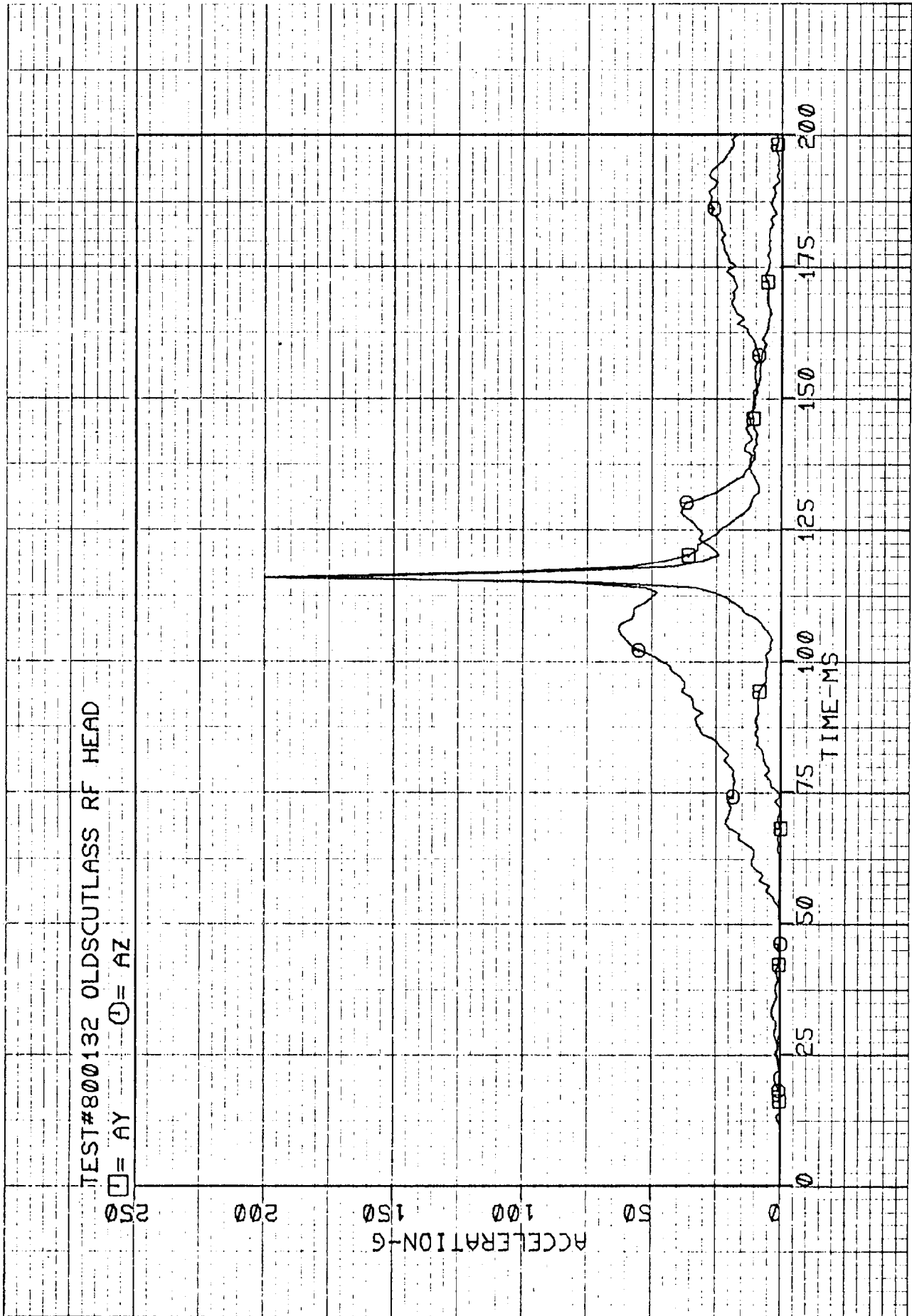
125

150

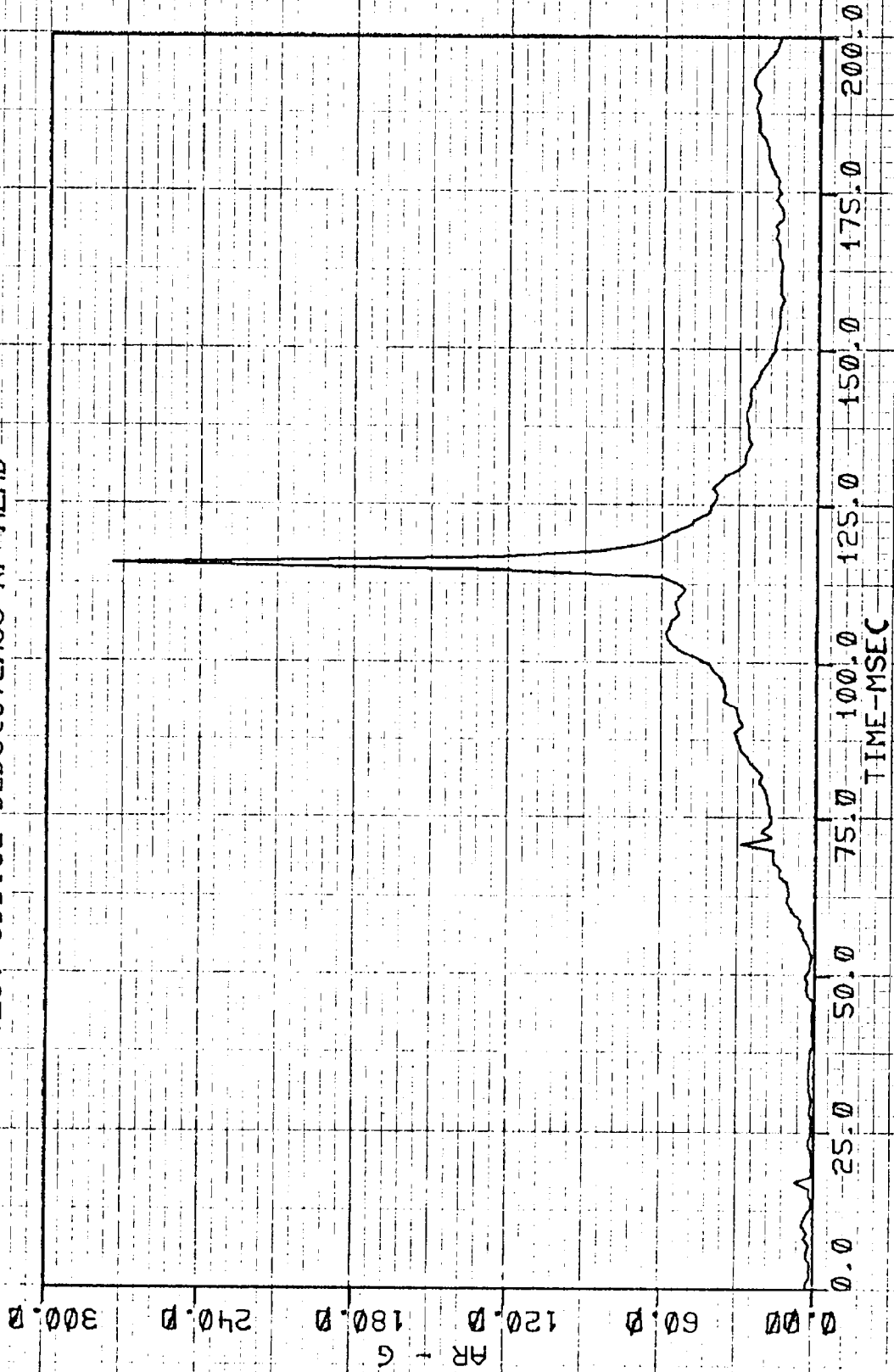
175

200

TIME-MS



TEST#800132 OLDSCUTLASS RF HEAD



TEST#800132 OLDSCUTLASS RF CHEST LONG

20

0

-20

-40

-60

-80

ACCELERATION-G

0

25

50

75

100

125

150

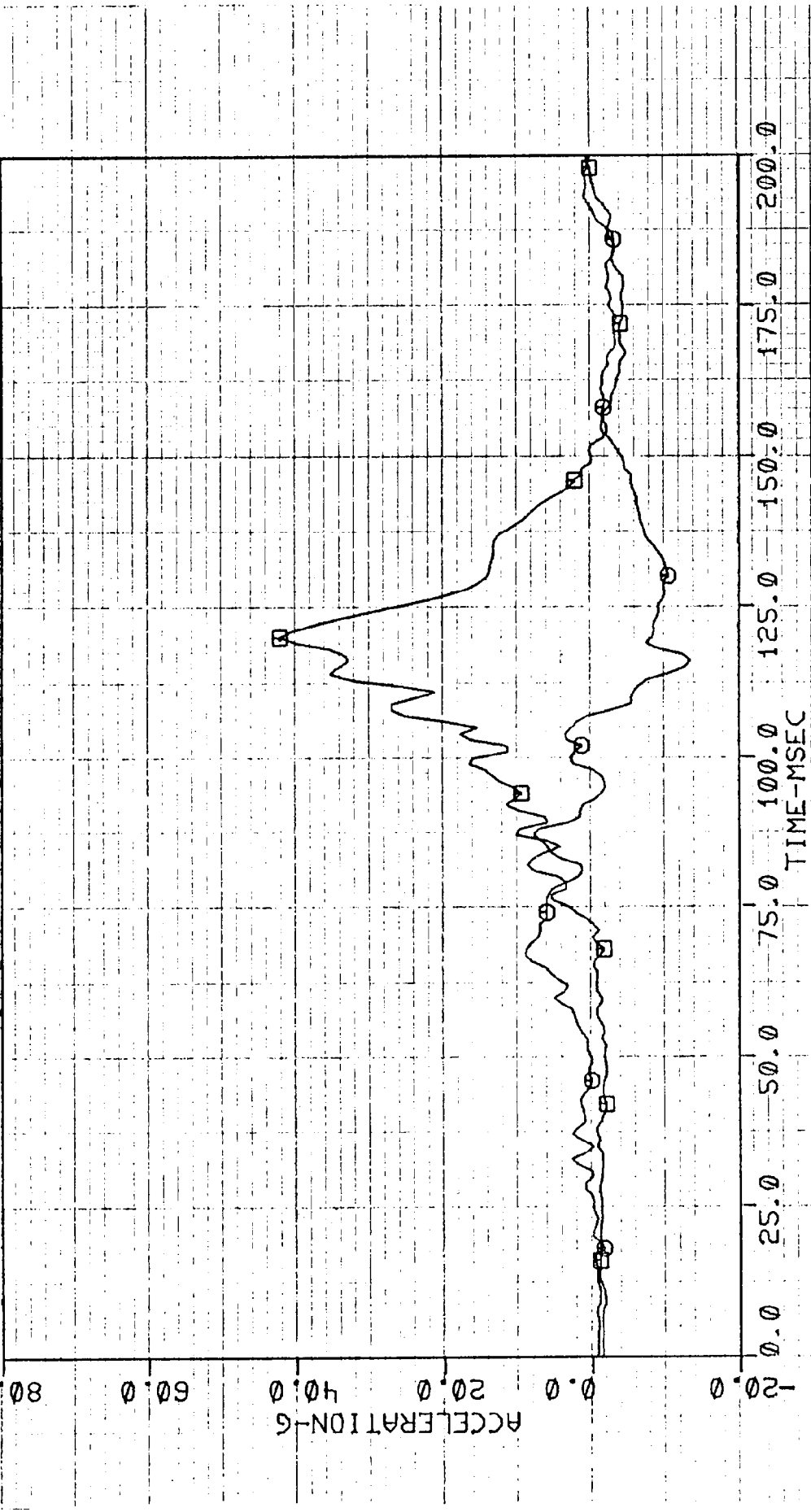
175

200

TIME-MS

TEST#800132 OLDSCUTLASS RF CHEST

□ = AY    ○ = AZ



TEST#800132 OLDSCUTLASS RF CHEST

100

80

60

AR - G

20

0

25

50

75

100

125

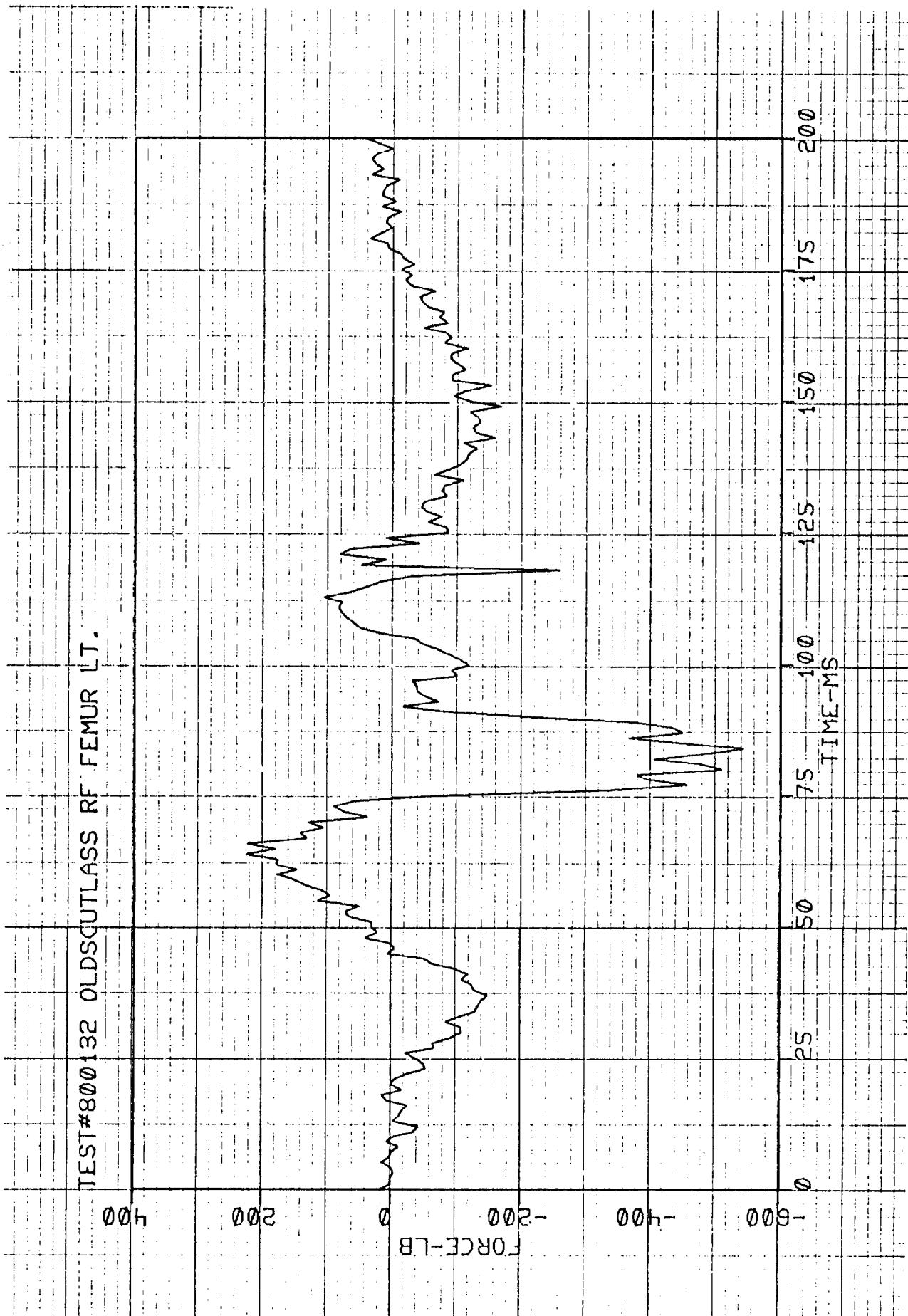
150

175

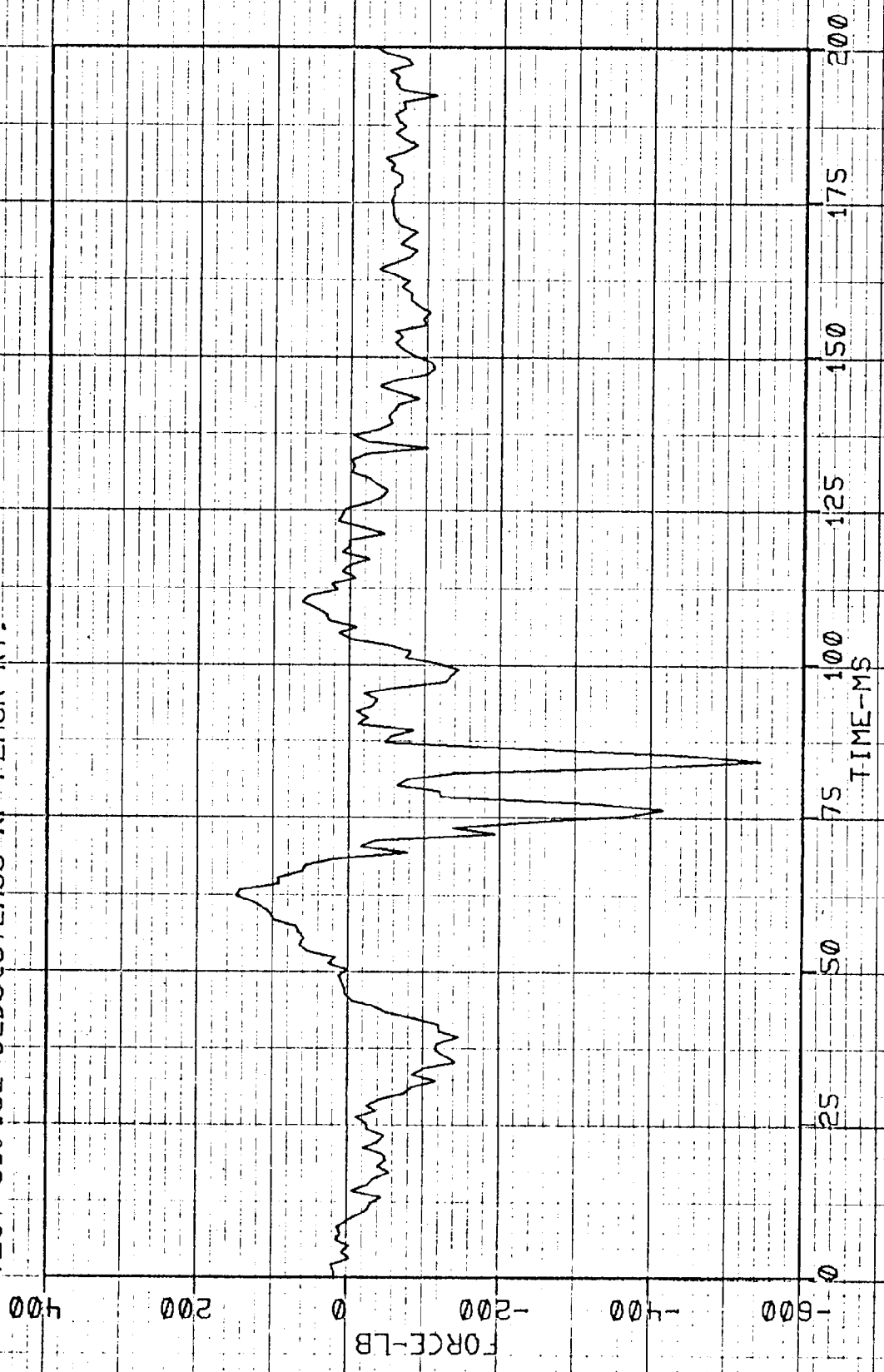
200

TIME-MS

TEST#800132 OLDSUTLASS RF FEMUR LT.



TEST#800132 OLDSCUTLASS RF FEMUR RT.



TEST #800132 OLDSCUTLASS RF BELTS

□ = LAP BELT ○ = SH BELT

2500

2000

1500

1000

500

0

LBS

200

175

150

125

100

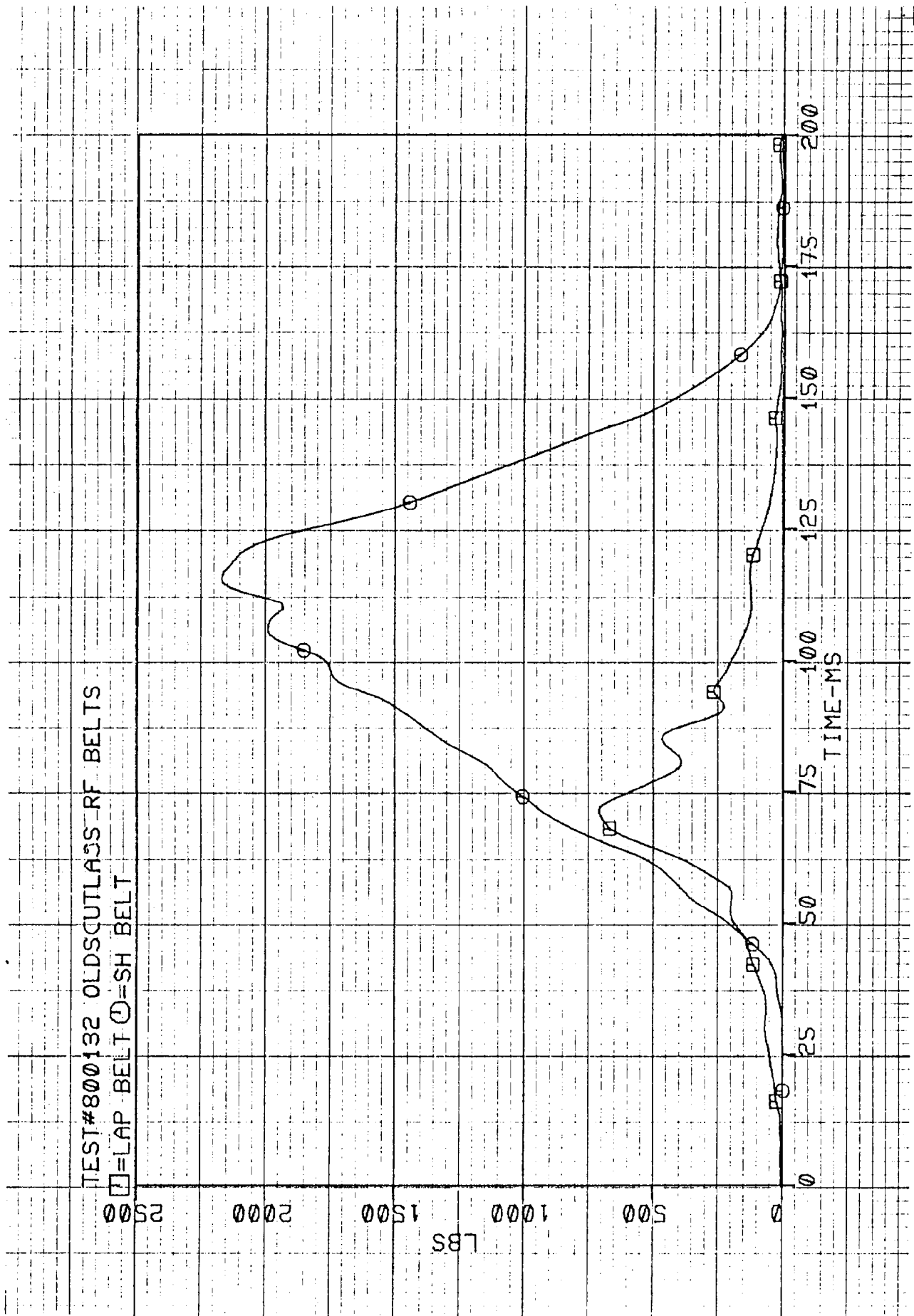
75

50

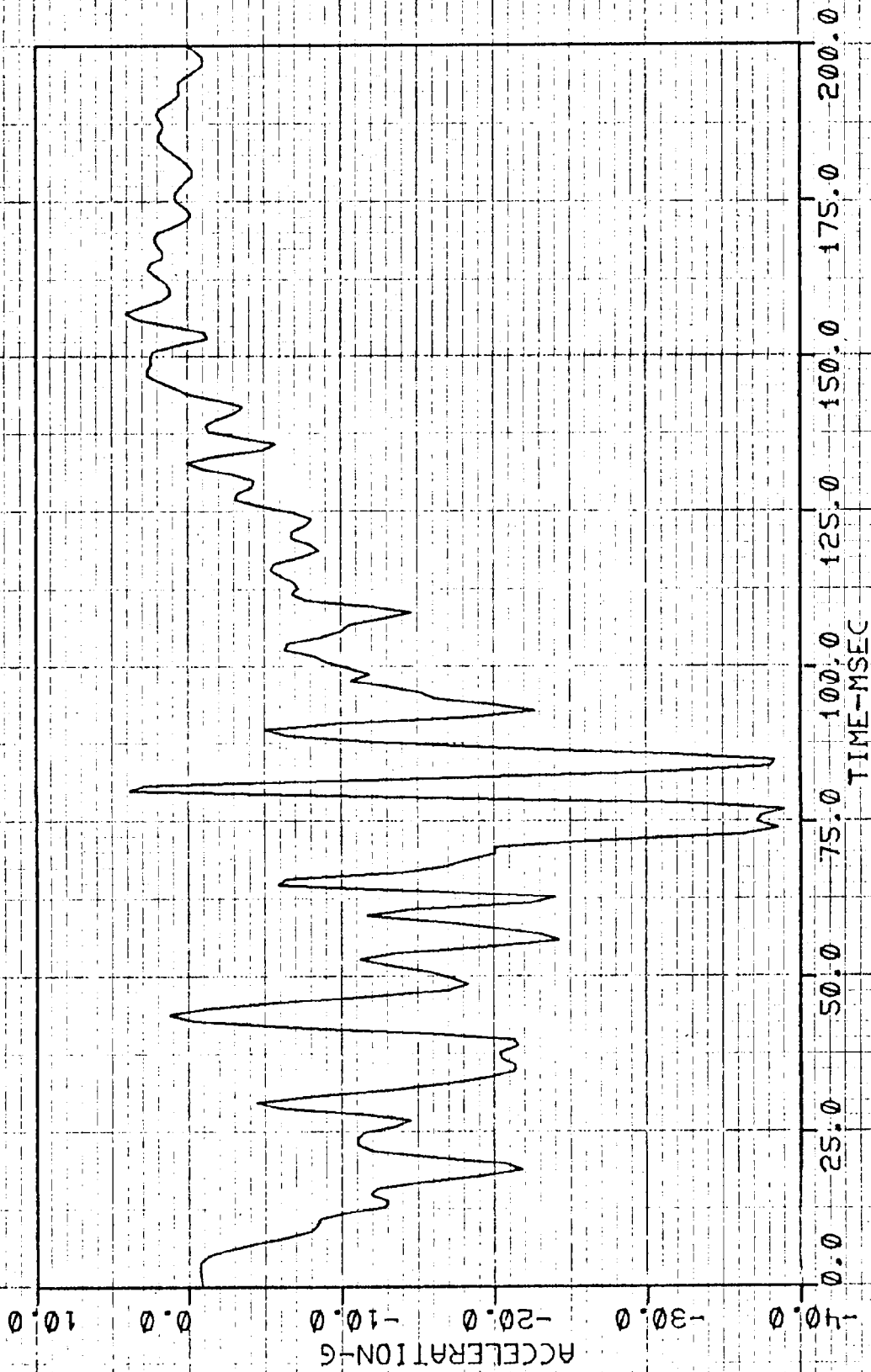
25

0

TIME-MS



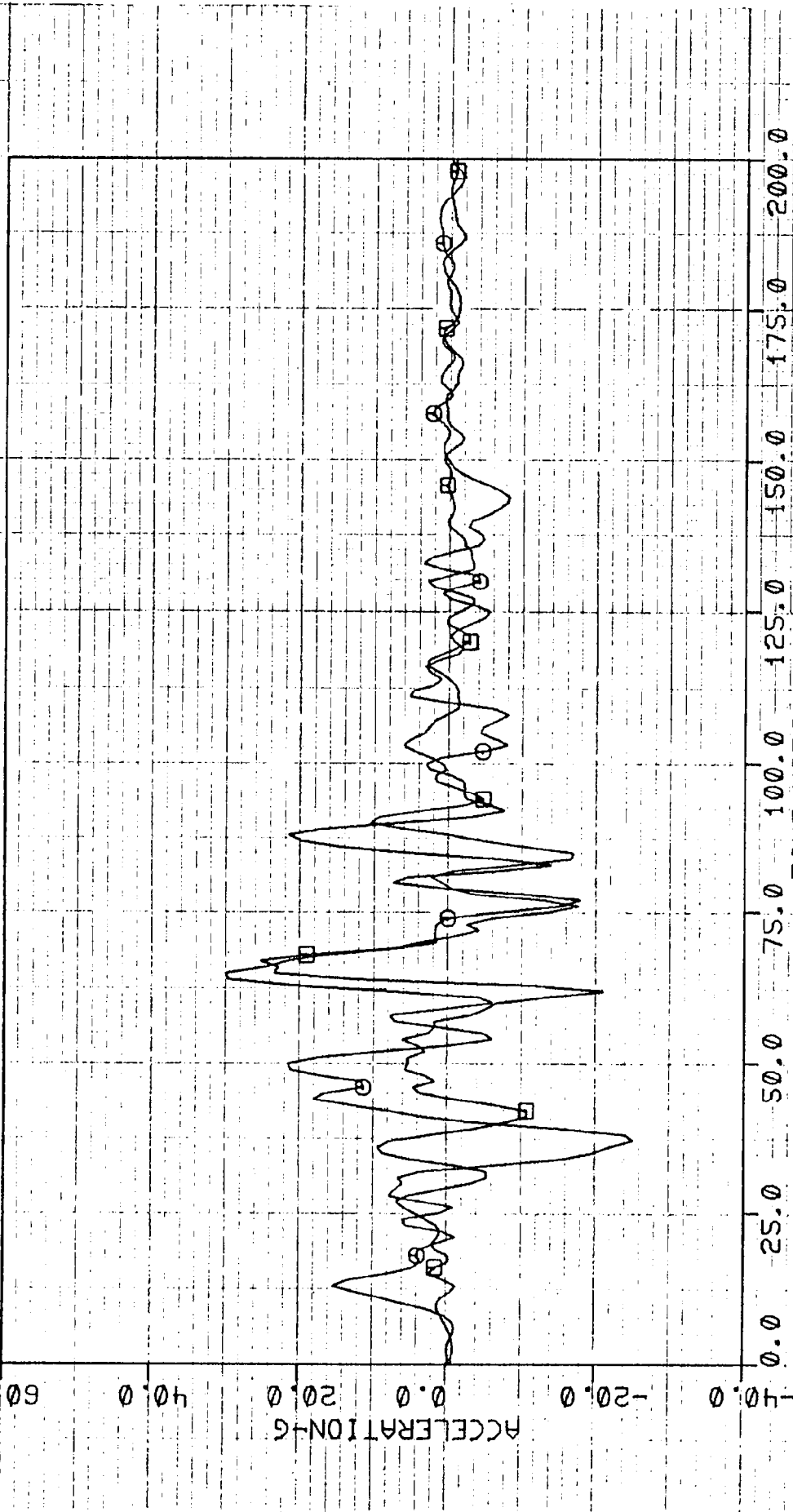
TEST#800132 OLDSCUTLASS LOC 1 LONG



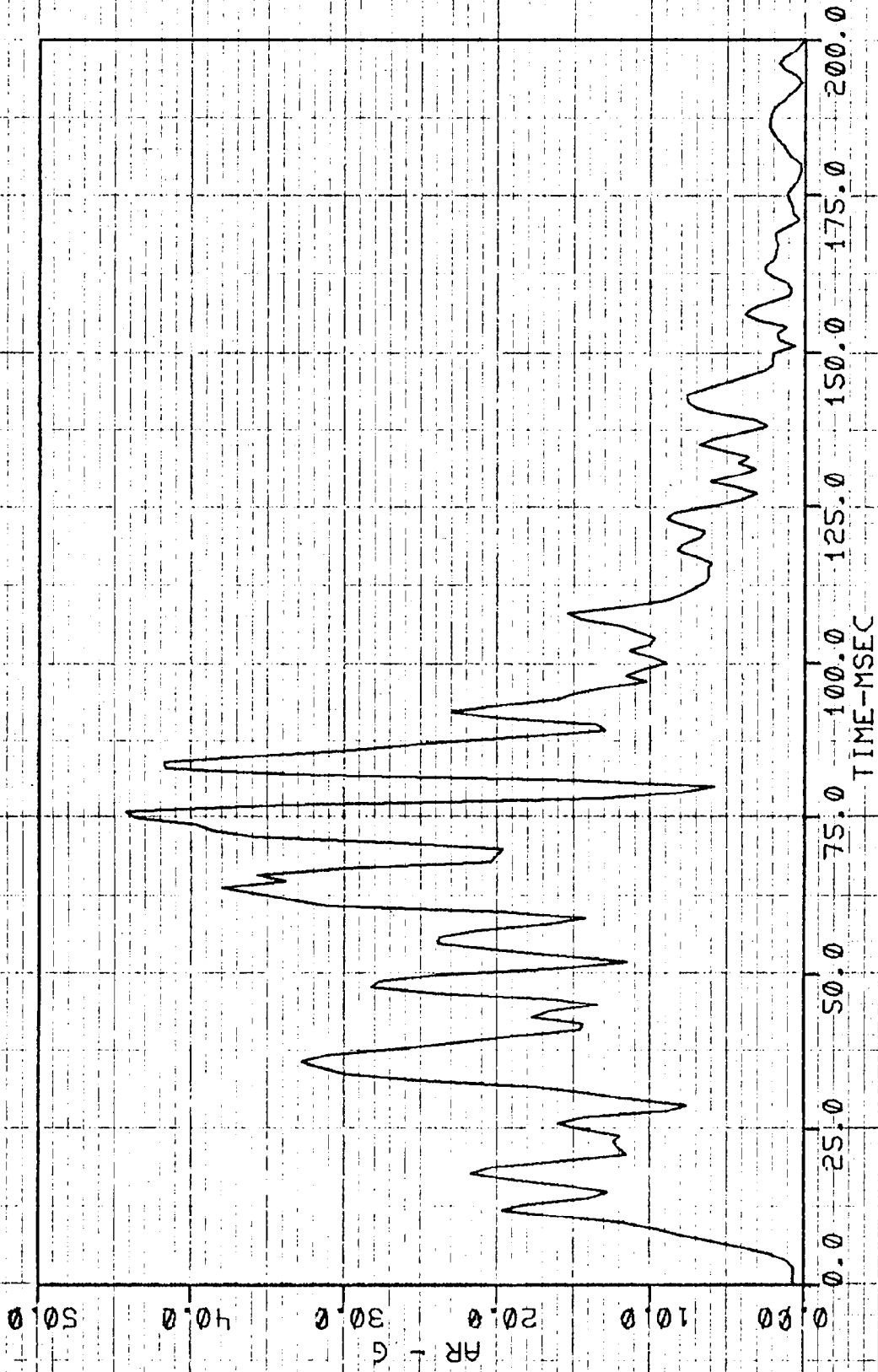
TEST#800132 OLDSCUTLASS LOC 1

□ = AY

○ = AZ

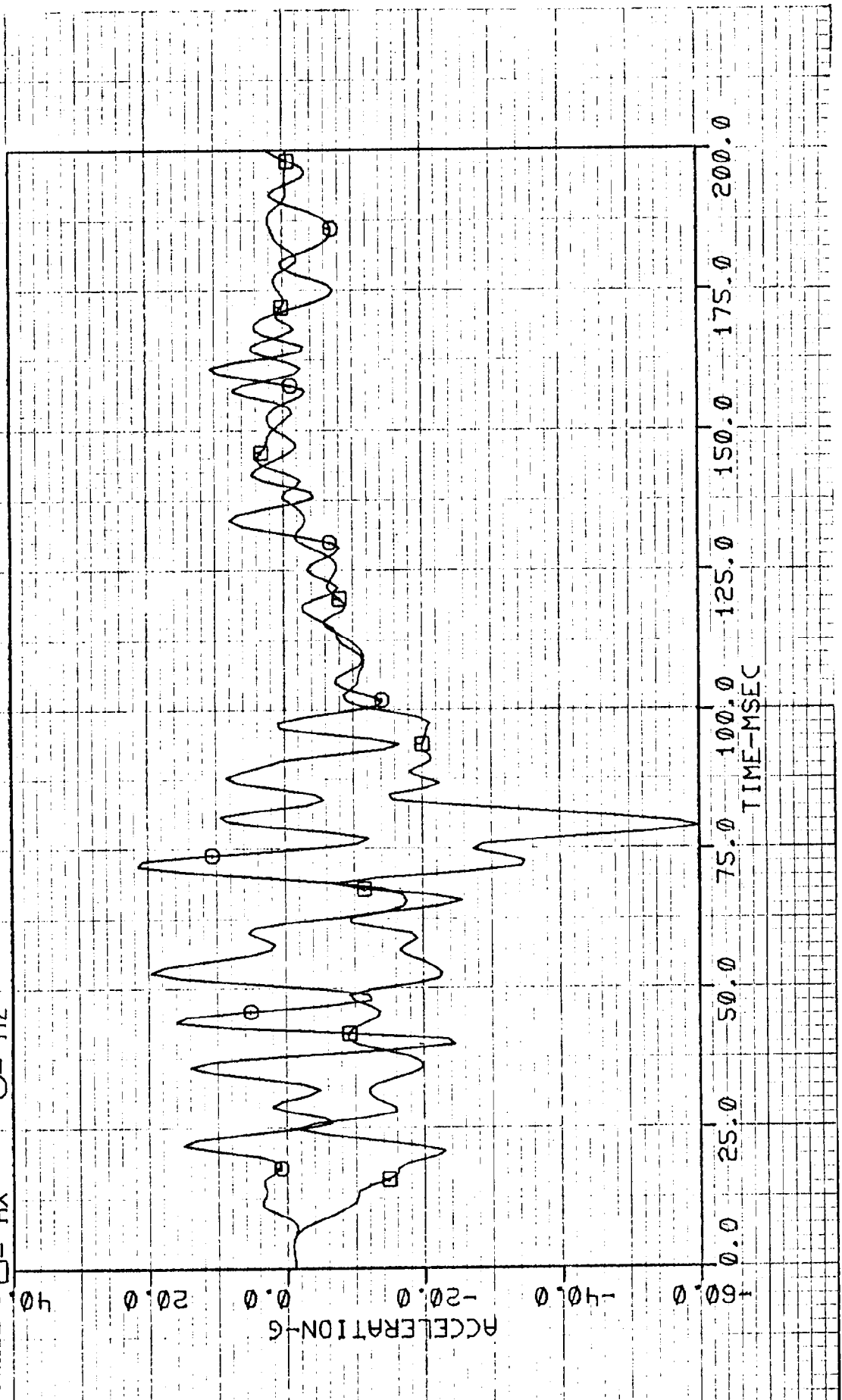


TEST#800132 OLDSCUTLASS LOC 1



TEST#800132 OLDSCUTLASS LOC 2

□ = AX      ○ = AZ



APPENDIX C  
DUMMY CERTIFICATION DATA

PART 572 DUMMY CALIBRATION TEST DATA

NHTSA Dummy I.D. No.: A 0 8

Laboratory Technician: M. Finnegan/V. Agnihotri

	Pre-test Calibration	Post-test Calibration
Date of Dummy Calibration	1-2-80	1-25-80
Calibration Sequential Number for Dummy	16	18
Temperature in Lab. (Spec. = 66 to 78 °F)	74	76
Relative Humidity in Lab. (Spec. = 10 to 70%)		

Test Parameter	Specification			
1. Head Drop Test:				
a. Peak Resultant Accel	210 - 260G	255.8	247.85	
b. Peak Lateral Accel	≤ 10G	4.5	5.8	
c. Time above 100G	0.9 - 1.5 ms	1.0	1.2	
2. Neck Bending Test:				
a. Pendulum Speed	21.5 - 25.5 fps	21.796	21.86	
b. Pendulum Avg Decel (over t <sub>3</sub> - t <sub>2</sub> )	20 - 24G	23.7	22.49	
c. Peak Resultant Head Acceleration	26G Maximum	24.88	18.9	
d. Pendulum Decel (t <sub>2</sub> - t <sub>1</sub> )	≤ 3 ms	2.0	2.5	
e. Pendulum Decel (t <sub>3</sub> -t <sub>2</sub> )	25 - 30 ms	29.0	27.5	
f. Pendulum Decel (t <sub>4</sub> -t <sub>3</sub> )	≤ 10 ms	2.0	6.5	
g. Pendulum Direction Reversal Time	≥ 123 ms			
h. Maximum Head Rota- tion	63 to 73°	69.3	68.6	
i. Chordal Displacement:				
Head Rotation Angle				
0°	Time	-2 - 2 ms	0.0	0.0
	Displ	-0.5 - 0.5 in.	0.0	0.0
30°	Time	25.6 - 34.4 ms	27.0	26.0
	Displ	2.1 - 3.1 in.	2.312	2.286
60°	Time	40.3 - 51.7 ms	44.0	43.0
	Displ	4.3 - 5.3 in.	4.469	4.434
Maximum (73°)	Time	53.2 - 66.8 ms	57.0	56.0
	Displ	5.0 - 6.0 in.	5.099	5.037

## PART 572 DUMMY CALIBRATION TEST DATA (CONTINUED)

NHTSA Dummy I.D. No.: A 0 8

Test Parameter	Specification	Pre-test	Post-test
		Calibration	Calibration
2. Neck Bending Test: (Continued)			
Head Rotation Angle			
60°	Time	67.0 - 83.0 ms	71.0
	Displ	4.3 - 5.3 in.	4.46
30°	Time	85.4 - 104.6 ms	89.0
	Displ	2.1 - 3.1 in.	2.30
0°	Time	101.0 - 123.0 ms	103.0
	Displ	-0.5 - 0.5 in.	0.0
3. Abdominal Compression Test: (Preload = 10 pounds)			
a. Force at 0.5 in.	14 - 26 lb	19.87	18.7
b. Force at 0.75 in.	27 - 40 lb	30.98	32.25
c. Force at 1.0 in.	40 - 53 lb	43.84	47.93
d. Force at 1.3 in.	63 - 78 lb	65.46	75.4
4. Lumbar Flexion Test:			
a. Force at 20°	22 - 34 lb	25.13	25.72
b. Force at 30°	34 - 46 lb	42.08	39.16
c. Force at 40°	46 - 58 lb	46.76	49.68
d. Return Angle	12° Maximum	9.74	4.4
5. Chest Impact Tests:			
a. High Speed			
1) Probe Speed	21.78-22.22 fps	21.9	22.2
2) Peak Deflection	1.7 in. Maximum	1.471	1.669
3) Peak Resistive Force	2250 lb Maximum	2141.4	2083.5
4) Internal Hysteresis	50 - 70%	68.7	64.6
a. Low Speed			
1) Probe Speed	13.86-14.14 fps	13.88	13.93
2) Peak Deflection	1.1 in. Maximum	1.007	0.987
3) Peak Resistive Force	1450 lb Maximum	1331.14	1273.0
4) Internal Hysteresis	50 - 70%	65.0	66.0

PART 572 DUMMY CALIBRATION TEST DATA (CONTINUED)

NHTSA Dummy I.D. No.: A 0 8

Test Parameter	Specification	Pre-test Calibration	Post-test Calibration
6. Knee Impact Tests:			
a. Right Side			
1) Probe Speed	6.76 - 7.04 fps	6.88	6.85
2) Maximum Force	1850 - 2500 lb	2493	2159
3) Time >1000 lb	1.7 ms Minimum	1.75	2.0
a. Left Side			
1) Probe Speed	6.76 - 7.04 fps	6.88	6.86
2) Maximum Force	1850 - 2500 lb	2423	2325
3) Time >1000 lb	1.7 ms Minimum	1.75	1.75

PART 572 DUMMY CALIBRATION TEST DATA

NHTSA Dummy I.D. No.: A 0 9

Laboratory Technician: M. Finnegan/V. Agnihotri

	Pre-test Calibration	Post-test Calibration
Date of Dummy Calibration	12-5-79	1-25-80
Calibration Sequential Number for Dummy	14	16
Temperature in Lab. (Spec. = 66 to 78 °F)	75	76
Relative Humidity in Lab. (Spec. = 10 to 70%)		

Test Parameter	Specification			
1. Head Drop Test:				
a. Peak Resultant Accel	210 - 260G	246.03	250.73	
b. Peak Lateral Accel	< 10G	9.11	6.62	
c. Time above 100G	0.9 - 1.5 ms	1.5	1.25	
2. Neck Bending Test:				
a. Pendulum Speed	21.5 - 25.5 fps	21.76	21.8	
b. Pendulum Avg Decel (over $t_3 - t_2$ )	20 - 24G	22.86	22.8	
c. Peak Resultant Head Acceleration	26G Maximum	21.46	16.6	
d. Pendulum Decel ( $t_2 - t_1$ )	< 3 ms	2.0	1.5	
e. Pendulum Decel ( $t_3 - t_2$ )	25 - 30 ms	26.5	27.0	
f. Pendulum Decel ( $t_4 - t_3$ )	< 10 ms	5.0	4.5	
g. Pendulum Direction Reversal Time	> 123 ms			
h. Maximum Head Rota- tion	63 to 73°	68.32	68.1	
i. Chordal Displacement:				
Head Rotation Angle				
0°	Time	-2 - 2 ms	0.0	0.0
	Displ	-0.5 - 0.5 in.	0.0	0.0
30°	Time	25.6 - 34.4 ms	25.5	26.0
	Displ	2.1 - 3.1 in.	2.53	2.392
60°	Time	40.3 - 51.7 ms	46.0	46.0
	Displ	4.3 - 5.3 in.	4.86	4.627
Maximum (73°)	Time	53.2 - 66.8 ms	56.0	55.0
	Displ	5.0 - 6.0 in.	5.47	5.204

## PART 572 DUMMY CALIBRATION TEST DATA (CONTINUED)

NHTSA Dummy I.D. No.: A 0 9

Test Parameter	Specification	Pre-test Calibration	Post-test Calibration
2. Neck Bending Test: (Continued)			
Head Rotation Angle			
60°	Time	67.0 - 83.0 ms	65.0
	Displ	4.3 - 5.3 in.	4.85
30°	Time	85.4 - 104.6 ms	85.0
	Displ	2.1 - 3.1 in.	2.52
0°	Time	101.0 - 123.0 ms	101.0
	Displ	-0.5 - 0.5 in.	0.0
3. Abdominal Compression Test: (Preload = 10 pounds)			
a. Force at 0.5 in.	14 - 26 lb	21.0	22.1
b. Force at 0.75 in.	27 - 40 lb	33.9	32.73
c. Force at 1.0 in.	40 - 53 lb	47.3	49.09
d. Force at 1.3 in.	63 - 78 lb	71.3	74.23
4. Lumbar Flexion Test:			
a. Force at 20°	22 - 34 lb	26.3	26.3
b. Force at 30°	34 - 46 lb	38.0	40.3
c. Force at 40°	46 - 58 lb	41.0	46.2
d. Return Angle	12° Maximum	5.21	8.84
5. Chest Impact Tests:			
a. High Speed			
1) Probe Speed	21.78-22.22 fps	21.96	21.95
2) Peak Deflection	1.7 in. Maximum	1.62	1.585
3) Peak Resistive Force	2250 lb Maximum	2080.2	2025.6
4) Internal Hysteresis	50 - 70%	61.56	63.0
a. Low Speed			
1) Probe Speed	13.86-14.14 fps	13.88	13.88
2) Peak Deflection	1.1 in. Maximum	0.94	1.003
3) Peak Resistive Force	1450 lb Maximum	1300.0	1331.0
4) Internal Hysteresis	50 - 70%	66.8	61.3

## PART 572 DUMMY CALIBRATION TEST DATA (CONTINUED)

NHTSA Dummy I.D. No.: A 0 9

<u>Test Parameter</u>	<u>Specification</u>	<u>Pre-test Calibration</u>	<u>Post-test Calibration</u>
6. Knee Impact Tests:			
a. Right Side			
1) Probe Speed	6.76 - 7.04 fps	6.79	6.80
2) Maximum Force	1850 - 2500 lb	2237.9	1927.0
3) Time >1000 lb	1.7 ms Minimum	1.75	1.75
a. Left Side			
1) Probe Speed	6.76 - 7.04 fps	6.87	6.86
2) Maximum Force	1850 - 2500 lb	2365.0	2358.0
3) Time >1000 lb	1.7 ms Minimum	2.0	1.75