

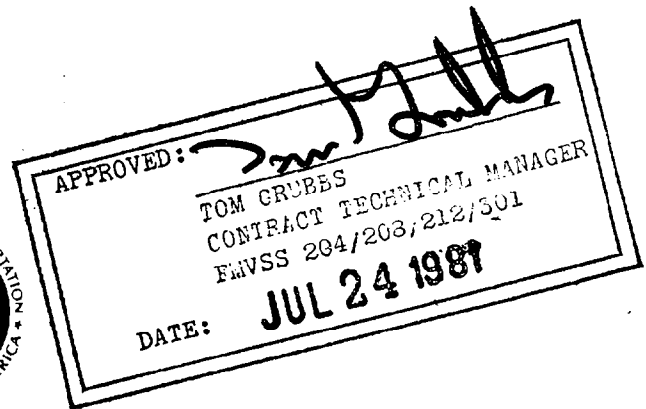
NEW VEHICLE ASSESSMENT AND
STANDARDS ENFORCEMENT INDICANT TESTING

FMVSS 301-75

FORD MOTOR COMPANY
1981 FORD ESCORT L 2-DOOR HATCHBACK
NHTSA 810210

Prepared by:

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July 1981

FINAL REPORT

Prepared for:

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
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July 13, 1981

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JUL 24 1981

Date of Report Acceptance

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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 30-degree angled barrier at a speed of 35.18 mph. The test was conducted at the Dynamic Science, Inc. Deer Valley facility on June 16, 1981 and the ambient temperature was 93°F. The subject test vehicle appears to comply with all the requirements of FMVSS 301-75.					
17. Key Words FMVSS 301 Standards Enforcement Testing, Fuel Tanks, Fuel Tank Filler Pipes, Fuel Tank Connections, Fuel System Integrity, Frontal 30° Angled Impact				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	
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				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	degrees Celsius	°C
		9	(after subtracting 32)	

Approximate Conversions from Metric Measures

Symbol When You Know Multiply by To Find Symbol

LENGTH

mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi

AREA

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

MASS (weight)

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

VOLUME

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

TEMPERATURE (exact)

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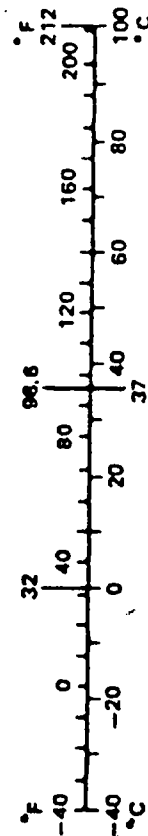


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SECTION 1
PURPOSE AND INTRODUCTION

PURPOSE

The purpose of the test was to subject a 1981 Ford Escort L 2-door Hatchback to the indicant test requirements of DOT Test Plan TP212-02, April 1, 1980, 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 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 301-75 Indicant Testing, together with photographs related to this test. Appendix A contains pre-test and post-test vehicle and dummy photographs. Appendix B contains Calcomp plots. Appendix C contains dummy calibrations.

SECTION 2
GENERAL TEST AND VEHICLE PARAMETER DATA

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

GENERAL TEST AND VEHICLE PARAMETER DATA

PRE-IMPACT DATA

Make/Model: Ford Escort L
 Body Style: 2-Door Hatchback Model Year: 1981
 NHTSA No.: 810210 DSI No. 1134 Color: Silver

DATA FROM CERTIFICATION LABEL

Vehicle Manufacturer: Ford Motor Company
 Date of Manufacture: 10/80 ; VIN: 1FABP0523BW124915
 GVWR: 3038 lb; GAWR: Front = 1687 lb; Rear = 1361 lb

DATA FROM "RECOMMENDED TIRE PRESSURE" LABEL

Vehicle Capacity: FRONT REAR RECOMMENDED LOAD RANGE:
 Tire Pressure: 35 psi 35 psi TIRE SIZE: B
PP15/80R13
 Designated Seating: 2 Front 2 Rear 4 Total
 Cargo load = 50 lb Is Spare Tire: Space Saver? no
 TOTAL = 650 lb Standard Equipment? yes
 Engine: 1.6 AP EGR/AIP/TWC 4-Cyl Transverse, 1.6 liter displacement
 Transmission: 4-Speed Manual Overdrive, front-wheel drive
 Date Vehicle Received by Laboratory: 11-12-80 ; Odometer: 75.0
 Dealer Name & Address: Pioneer Ford
2600 W. Grand Avenue, Phoenix, AZ 85009

WEIGHT (LB) OF TEST VEHICLE AS RECEIVED (WITH MAX. FLUIDS) = UDW

Right Front = 622 lb Right Rear = 361 lb
 Left Front = 632 lb Left Rear = 376 lb
 TOTAL FRONT WEIGHT = 1254 lb (63.0 % of Total Vehicle Weight)
 TOTAL REAR WEIGHT = 737 lb (37.0 % of Total Vehicle Weight)
 TOTAL DELV. WEIGHT = 1991 lb

TARGET WEIGHT = UDW + Cargo Load + 328 lbs Dummies = 2369 lb

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 50 lb CARGO:

Right Front = 695 lb Right Rear = 490 lb
 Left Front = 693 lb Left Rear = 490 lb
 TOTAL FRONT WEIGHT = 1388 lb (58.6 % of Total Vehicle Weight)
 TOTAL REAR WEIGHT = 980 lb (41.4 % of Total Vehicle Weight)
 TOTAL TEST WEIGHT = 2368 lb

Weight of ballast secured in vehicle trunk area = 0 lb

VEHICLE ATTITUDE: (inches)

Delivered Attitude: RF 29.0 LF 29.0 RR 29.0 LR 29.0
 Test Attitude: RF 28.8 LF 29.0 RR 27.8 LR 27.6

GENERAL TEST AND VEHICLE PARAMETER DATA (CONT)

POST-IMPACT DATA

Type of Test: Frontal Oblique (30°) Impact*

Date of Test: June 16, 1981 Time: 0944 Temperature 93 °F

Required Impact Velocity Range: 34.5 to 35.5 mph

Impact Velocity: Primary = 35.18 mph Secondary = 35.10 mph

Distance from the vehicle's front bumper to barrier face entering the vehicle velocity measurement device is 5.0 feet and distance exiting the vehicle velocity measurement device is 1.0 foot.

VEHICLE REBOUND AND CRUSH (in.)

Vehicle Length:	Pre-test = R	<u>160.2</u>	L	<u>160.3</u>
	Post-test = R	<u>159.2</u>	L	<u>131.7</u>
	Crush = R	<u>1.0</u>	L	<u>28.6</u>

Distance from front of test vehicle to point of impact:

R	<u>**</u>	L	<u>**</u>
---	-----------	---	-----------

VISIBLE DUMMY CONTACT POINTS

	<u>Driver</u>	<u>Passenger</u>
Head	<u>Right eye area struck top of steering wheel hub</u>	<u>Dash edge over glovebox</u>
Chest	<u>None</u>	<u>None</u>
Abdomen	<u>None</u>	<u>None</u>
Left Knee	<u>Underside dash</u>	<u>Glovebox</u>
Right Knee	<u>Dash left of ashtray</u>	<u>Glovebox</u>

DOOR OPENING

<u>Front</u>	
<u>Left</u>	<u>Right</u>
<u>Easy</u>	<u>Difficult</u>

SEAT MOVEMENT

Seatback Failure	<u>None</u>	<u>1 in. forward</u>
Seat Shift (in.)	<u>None</u>	<u>None</u>

GLAZING DAMAGE

Backlight/Windshield Cracked over entire surface

OTHER NOTABLE IMPACT EFFECTS: Right front door latch failed and door was ajar. Door buckled outward; inside and outside panels separated toward rear. Right sill has outward buckle at rear of forward front seat crossmember (approximately 28 inches forward of B Pillar) resulting in separation of sill from floorpan. Inward buckle in sill approximately 5 inches rearward of A Pillar. Window broken inside door.

*Impact on right (passenger) side.

**Vehicle skidded off barrier; measurement not possible.

OTHER NOTABLE IMPACT EFFECTS (Continued): Door remained unlocked. Right front fender was pushed rearward overlapping front of door, preventing door from swinging all the way open. Door was rotated upward at rear.

Left front door undamaged and opened easily. Remained unlocked. Door window undamaged but loose inside door. Downward buckle in roof over right B Pillar. Additional buckling across roof to left B Pillar. Both RF and LF tires in contact with vehicle structures. Severe firewall intrusion on right side. Seat-backs were not locked post test. Gear shift mechanism separated from center tunnel. Driver dummy's left forearm and hand outside of compartment through LF door window opening.

PRE-IMPACT DATA

Make/Model: Ford Escort L
 Body Style: 2-Door Hatchback Model Year: 1981
 NHTSA No.: 810210 DSI No. 1134 Color: Silver

DATA FROM CERTIFICATION LABEL

Vehicle Manufacturer: Ford Motor Company
 Date of Manufacture: 10/80 ; VIN: 1FABP0523BW124915
 GVWR: 3038 lb; GAWR: Front = 1687 lb; Rear = 1361 lb

POST-IMPACT DATA

Type of Test: Frontal Oblique (30°) Impact on Right (Passenger) Side
 Date of Test: 6/16/81 Time: 0944 Temperature 93 °F
 Required Impact Velocity Range: 34.5 to 35.5 mph
 Impact Velocity: Primary = 35.18 mph Secondary = 35.10 mph

Measurements Referenced to Plane 14 Feet Forward of Rear Bumper G

Location	Height	Vehicle Left (in.)			Vehicle Right (in.)			
		26.7	16.0	5.4	26.7	5.4	16.0	26.7
Pre-test Profile (in.)								
Top of Front Bumper	19.8	7.2	5.0	4.4	4.3	4.5	5.1	7.3
Front of Hood	28.0	13.5	11.1	11.6	-	11.6	11.1	13.6
Post-test Profile (in.)								
Top of Front Bumper	20.9	9.5	13.3	18.3	21.1	23.9	29.8	38.1
Front of Hood	27.6	14.3	15.6	21.7	-	27.1	33.3	36.2
Post-test Static Crush (in.)								
Top of Front Bumper	1.1	2.3	8.3	13.9	16.8	19.4	24.7	30.8
Front of Hood	0.4	0.8	4.5	10.1	1	15.5	22.2	22.6

SECTION 3
COMPLIANCE-RELATED DATA
FMVSS 301-75 INDICANT TESTING

The following data sheets and photographs document compliance data.

PRE-IMPACT DATA

Make/Model: Ford Escort L
 Body Style: 2-Door Hatchback Model Year: 1981
 NHTSA No.: 810210 DSI No. 1134 Color: Silver

DATA FROM CERTIFICATION LABEL

Vehicle Manufacturer: Ford Motor Company
 Date of Manufacture: 10/80 ; VIN: 1FABP0523BW124915
 GVWR: 3038 lb; GAWR: Front = 1687 lb; Rear = 1361 lb

POST-IMPACT DATA

Type of Test: Frontal Oblique (30°) Impact on Right (Passenger) Side
 Date of Test: 6/16/81 Time: 0944 Temperature 93 °F
 Required Impact Velocity Range: 34.5 to 35.5 mph
 Impact Velocity: Primary = 35.18 mph Secondary = 35.10 mph

FUEL SYSTEM DATA

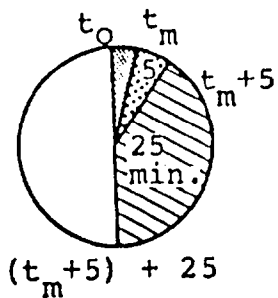
Test fluid: Red Stoddard Solvent Specific Gravity: 0.764

Kinematic Viscosity: 0.99 centistokes Test Volume: 9.3 U.S. gal

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) until start of static roll.

Details of fuel system: Carburetor mounted at rear of engine.
Fuel filter to left of carburetor. Two metal lines with rubber
sections cross between engine block and carburetor and exit to right
and down right side of firewall. These two metal lines run along
inside of right frame rail to center tunnel where they are joined by
a third metal line from the left side of the engine compartment. The
three lines run back through the center tunnel to the rectangular
metal fuel tank, held in place under the rear seat riser by two lon-
gitudinal metal straps. Two flexible rubber hoses, held to the tank
by hose clamps, exit the tank at the upper right corner and run
straight back to a one-piece, two-path, molded plastic filler tube.
The connection is secured by hose clamps. The plastic filler tube
crosses behind the rear tire and runs up to the access inside the
right rear quarter panel. The filler access is located on the right
rear quarter panel behind the right rear wheel. The cap is a plastic
screw-in type.

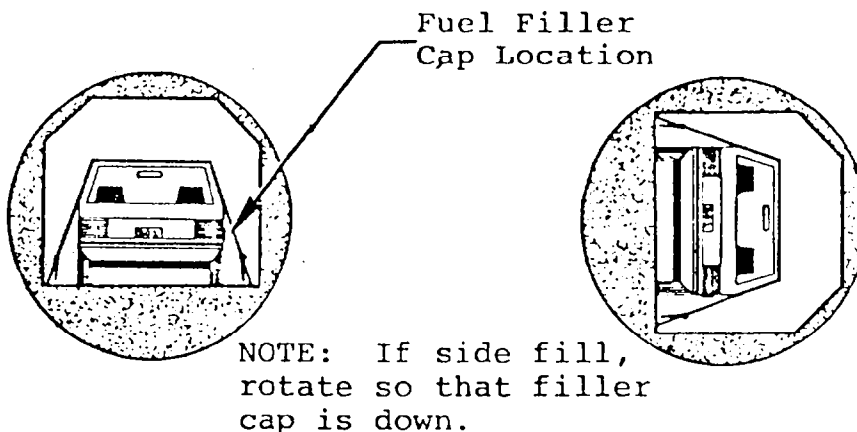
FUEL SPILLAGE MEASUREMENT



	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

SOLVENT SPILLAGE DETAILS: None

TEST PHASE: 0° to 90° VEHICLE NHTSA NO. 810210



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, 21 sec =

Total..... = 7 min, 0 sec

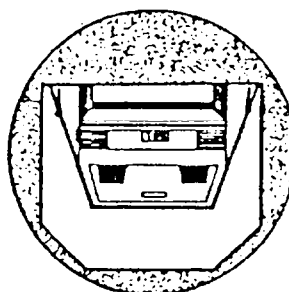
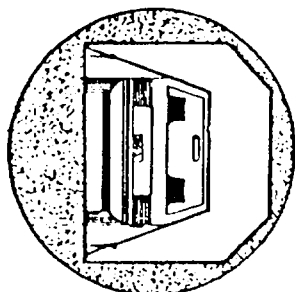
FMVSS 301 REQUIREMENTS AND ACTUAL TEST RESULTS:

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

TEST PHASE: 90° to 180° VEHICLE NHTSA NO. 810210



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, 22 sec =

Total..... = 7 min, 0 sec

FMVSS 301 REQUIREMENTS AND ACTUAL TEST RESULTS:

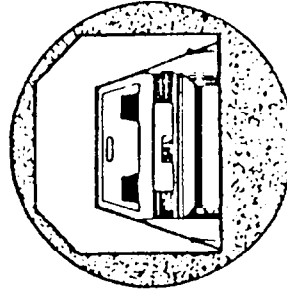
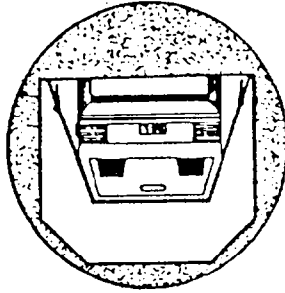
Time Period	First 5 min (from onset)	6th min	7th min	8th min (if req'd)
Maximum Spillage Allowed (oz)	5	1	1	1
Actual Spillage Recorded	Trace	0	0	---

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

SOLVENT SPILLAGE LOCATION(S): Carburetor

STATIC ROLLOVER DATA SHEET

TEST PHASE: 180° to 270° VEHICLE NHTSA NO. 810210



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, 24 sec =

Total..... = 7 min, 0 sec

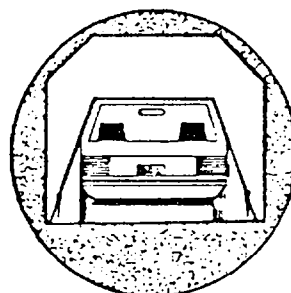
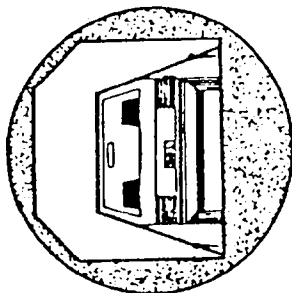
FMVSS 301 REQUIREMENTS AND ACTUAL TEST RESULTS:

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	15 ml	0	0	---

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

SOLVENT SPILLAGE LOCATION(S): Leaked from air cleaner housing during roll.

TEST PHASE: 270° to 360° VEHICLE NHTSA NO. 810210



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, 21 sec =
 Total..... = 7 min, 0 sec

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

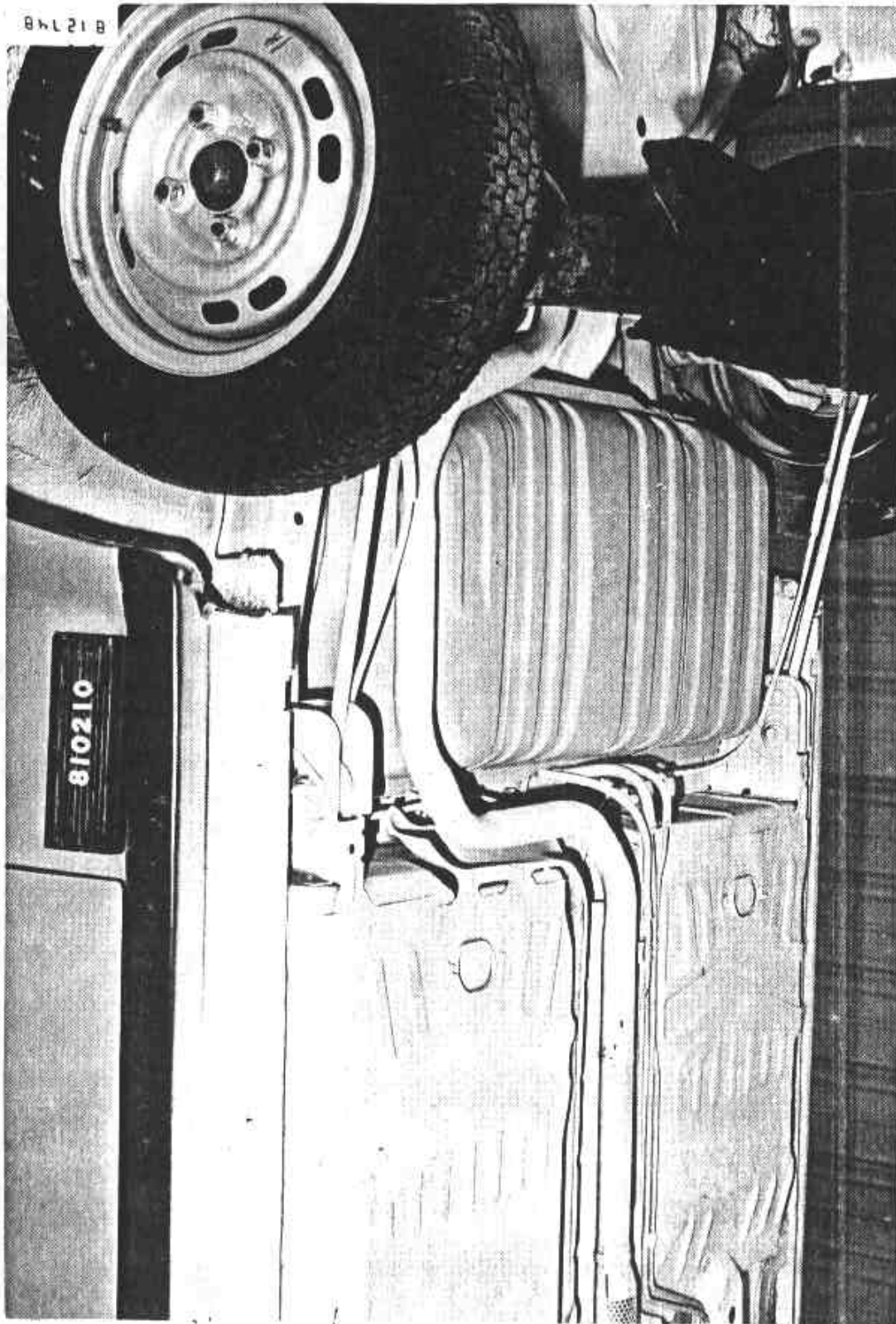


FIGURE 3-1. PRE-TEST FUEL TANK - 1981 FORD ESCORT L - NHTSA 810210.

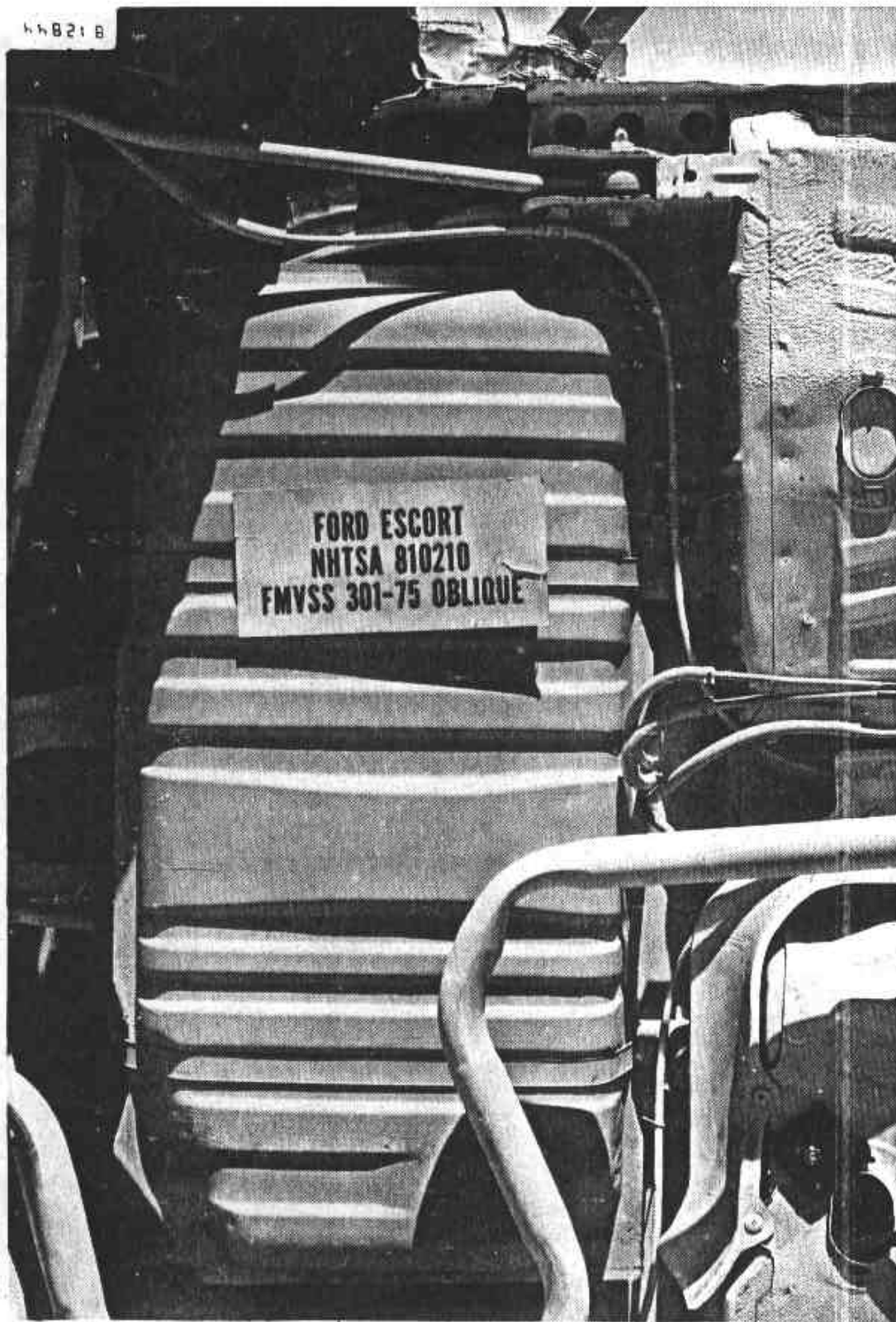


FIGURE 3-2. POST-TEST FUEL TANK - 1981 FORD ESCORT L - NHTSA 810210.

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 moving 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 calibrations are included as Appendix C.

PART 572 DUMMY IN-VEHICLE POSITION RECORDING SHEET

PRE-IMPACT DATA

Make/Model: Ford Escort L
 Body Style: 2-Door Hatchback Model Year: 1981
 NHTSA No. 810210 DSI No. 1134 Color: Silver

DATA FROM CERTIFICATION LABEL

Vehicle Manufacturer: Ford Motor Company
 Date of Manufacture: 10/80 ; VIN 1FABP0523BW124915
 GVWR: 3038 lb; GAWR: Front = 1687 lb; Rear 1361 lb

POST-IMPACT DATA

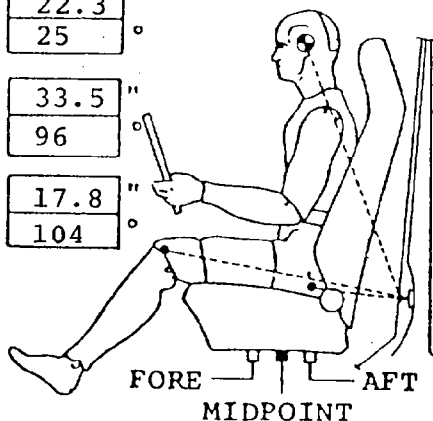
Type of Test: Frontal Oblique (30°) Impact on Right (Passenger) Side
 Date of Test: 6/16/81 Time: 0944 Temperature 93 °F
 Required Impact Velocity Range: 34.5 to 35.5 mph
 Impact Velocity: Primary = 35.18 mph Secondary = 35.10 mph
 Seat Type: Bucket Adjuster Type: Manual
 Bucket Seat Type Back: Fixed angle
 Technicians: Terry Bjork, Mike Rodack

DRIVER DUMMY# A 0 8

HEAD
TARGET 22.3 " 25 °

KNEE
JOINT 33.5 " 96 °

APPROX-
IMATE 17.8 " 104 °
"H"
POINT

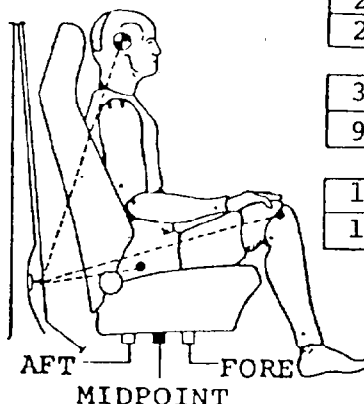


PASSENGER DUMMY # A 0 9

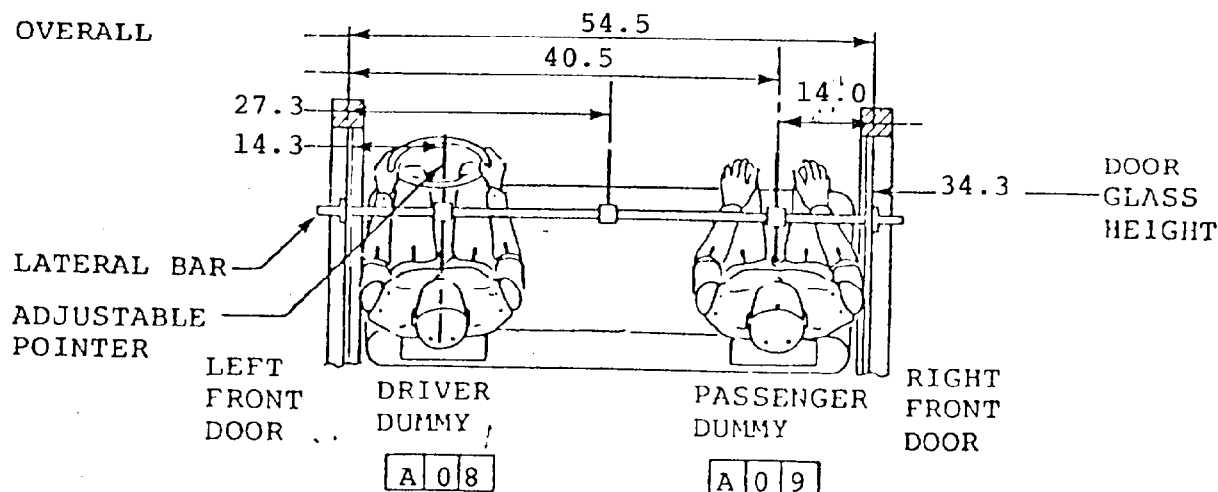
22.5 " HEAD
26 ° TARGET

32.5 " KNEE
95 ° JOINT

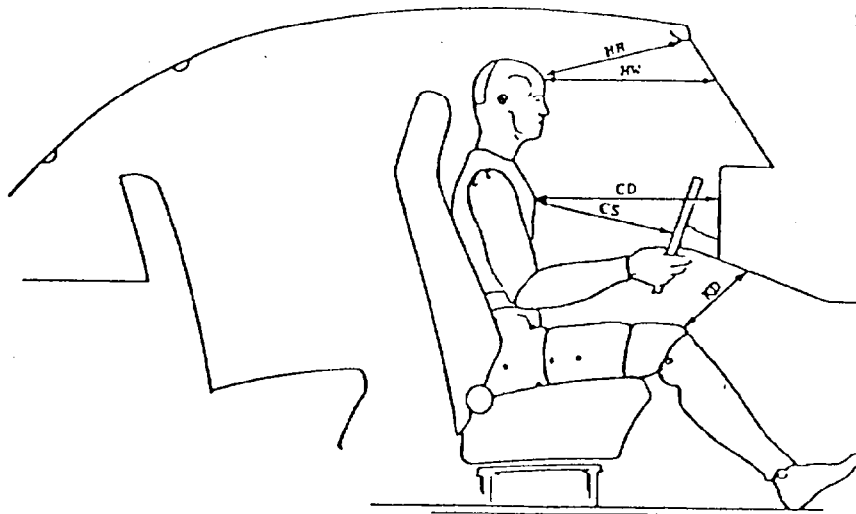
17.7 " APPROX-
107 ° IMATE
"H"
POINT



OVERALL



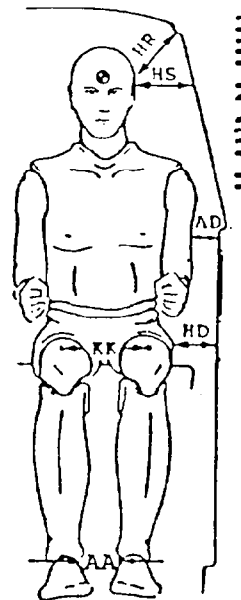
PART 572 DUMMY IN-VEHICLE POSITION RECORDING SHEET



	Driver	Passenger
HH	14.7	14.5
HW	18.8	21.0
CD	20.9	20.2
CS	13.0	N/A
KD	L=4.6/R=4.2 L=4.8/R=4.5	
Torso	Torso	
Angle	26°	Angle 25°
Seat Back	Seat Back	
Angle	19°	Angle 19°

HH = Head to Windshield Header
 HW = Head to Windshield
 CD = Chest to Dash
 CS = Chest to Steering Wheel
 KD = Knees to Dash
 HR = Head to Side Roof
 HS = Head to Side Window
 AD = Arm to Door
 HD = Hip to Door
 KK = Knee to knee
 Torso and seat back angles are relative to vertical.

REMARKS: Front seatbacks use emergency inertia latch system with emergency release handle. Angle fixed. Angle measurement taken on outside back just above emergency release handle. Dummies positioned according to OVSC recommended procedure for positioning Part 572 dummies in test vehicle.



	Driver	Passenger
HR	5.6	5.8
HS	7.7	7.8
AD	3.3	3.2
HD	5.7	5.3
KK	9.5	9.3
AA	10.0	9.7

FMVSS 208 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	12.3	58	65.9	94	11.9	198	29.9	125
Lateral	3.0	198	28.7	94	6.5	58	10.8	132
Vertical	30.1	89	1.9	9	54.7	103	2.3	10
Resultant	72.5	94			54.8	103		
HIC	242.7 between 66 and 127 msec				603.0	between 78 and 133 msec		
Chest Acceleration								
Longitudinal	3.6	135	27.3	87	4.9	154	39.1	76
Lateral	28.7	111	0.9	153	15.2	100	2.1	60
Vertical	5.6	64	8.4	112	5.2	118	8.3	94
Resultant (Max.)	35.6	87			39.2	76		
Resultant (clip)	32.0 between 86-88 & 110-112				37.9 between 74-76 & 87-89			
TIME > 60 G	0 msec				0 msec			
SEVERITY INDEX	208.1 @ 200 msec				244.6 @ 200 msec			
	Peak (lb)	Time (msec)	Peak (lb)	Time (msec)	Peak (lb)	Time (msec)	Peak (lb)	Time (msec)
Femur Loads								
Left			671.5	58			469.3	83
Right			933.9	58			762.6	68
Belt Loads								
Lap	1148.1	76			829.1	87		
Torso	1663.2	80			1868.6	82		
Vehicle Impact Speed (mph): 35.18								
*Longitudinal:	Forward				**Longitudinal:	Rearward		
Lateral:	Rightward				Lateral:	Leftward		
Vertical:	Downward				Vertical:	Upward		

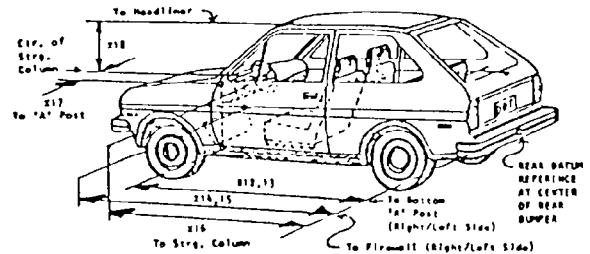
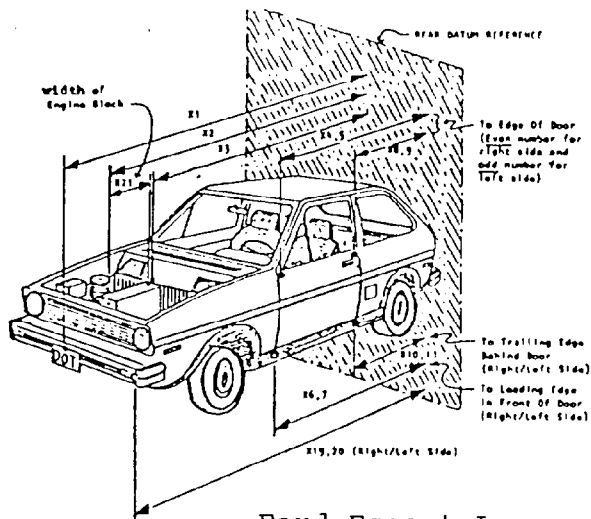
DUMMY KINEMATICS SUMMARY

DRIVER - After impact, dummy torso rotated forward and to right. Right eye area of head struck upper right rim of steering wheel just as shoulder belt reached maximum stretch. Torso rotated counterclockwise and dummy rebounded toward seat with rightward and rearward lean, recontacting seat back with left shoulder and arm. Dummy pitched to left as right side of car left the ground.

PASSENGER - Dummy rotated forward and leaned to right after impact, striking door interior with left shoulder. Head continued forward rotation, possibly grazing right side top edge of dash. Dummy then rebounded toward seat, leaning to the right, with head and upper torso outside plane of door, which was open. Dummy then pitched back toward center as right side of car left the ground.

OTHER - Passenger side door latch failed, and door was open throughout much of the crash event. Driver side emergency seat back latch did not appear to function.

PRE-/POST-TEST STATIC MEASUREMENT DATA



Vehicle: Ford Escort L

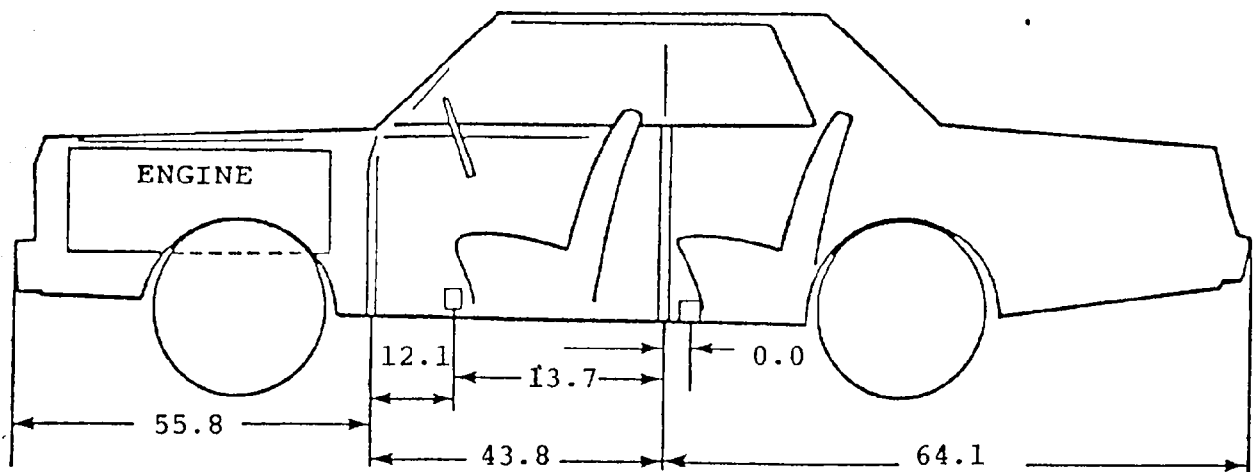
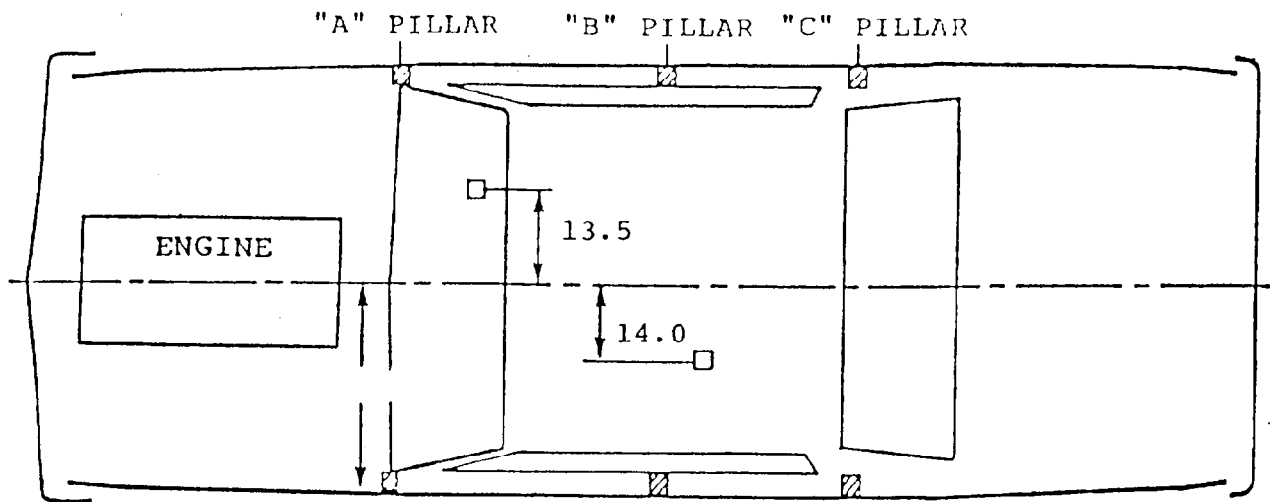
NHTSA No.: 810210

Test Date: 6/16/81

D.S. No.: 1134

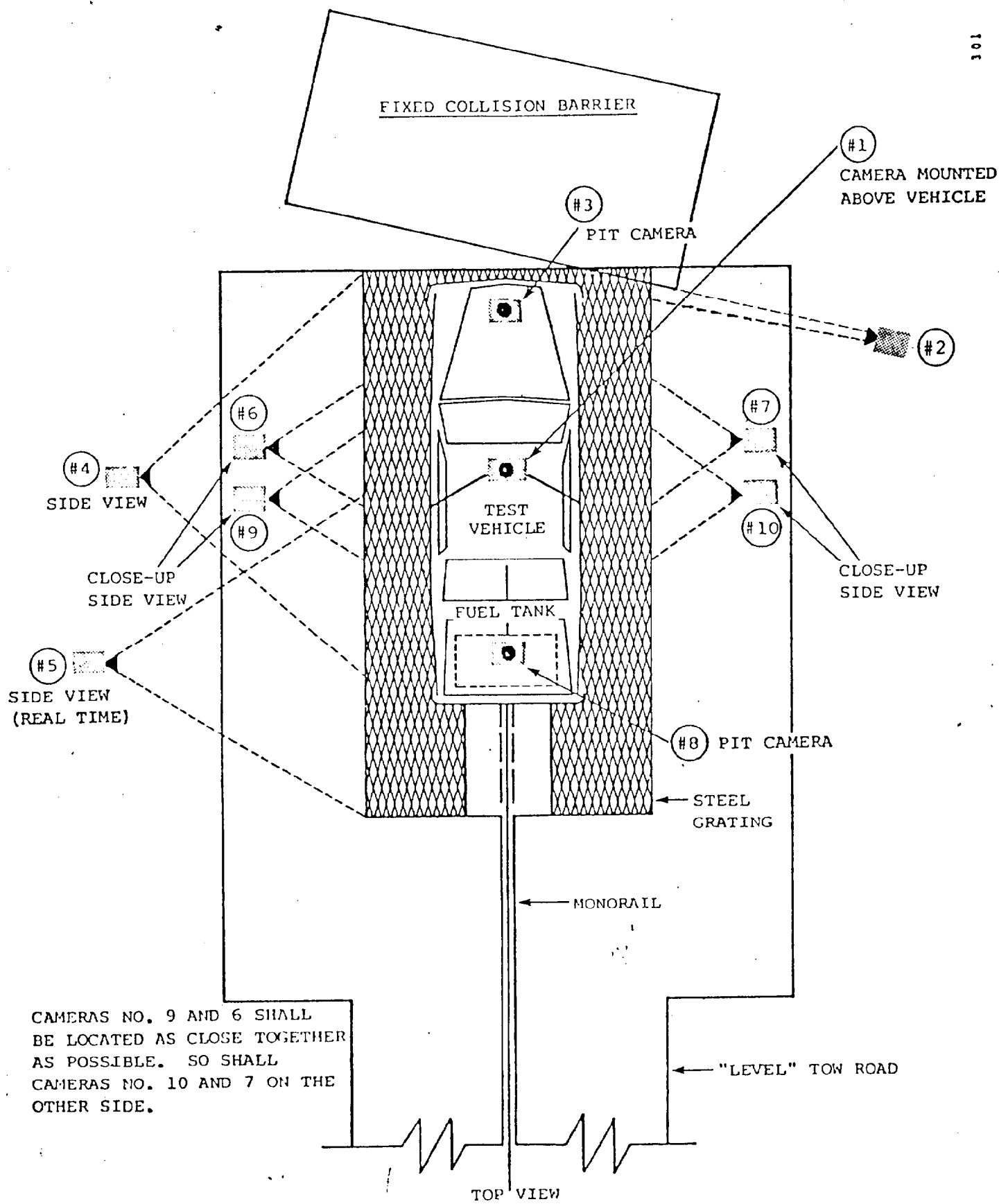
Reference Dimension	Pre-test Measurement	Post-test Measurement	Change
x ₁	163.7	146.9	16.8
x ₂	141.7	134.2	7.5
x ₃	124.6	112.4	12.2
x ₄	108.9	105.8	3.1
x ₅	108.9	108.9	0.0
x ₆	109.6	105.5	4.1
x ₇	109.4	109.5	0.1
x ₈	64.4	62.5	1.9
x ₉	64.4	64.6	0.2
x ₁₀	63.3	60.1	3.2
x ₁₁	63.1	63.3	0.2
x ₁₂	108.2	103.7	4.5
x ₁₃	108.2	108.3	0.1
x ₁₄	124.8	117.4	7.4
x ₁₅	126.2	124.2	2.0
x ₁₆	93.3	93.3	0.0
y ₁₇	15.2	15.3	0.1
z ₁₈	16.7	13.1	3.6
x ₁₉	160.2	159.2	1.0
x ₂₀	160.3	131.7	28.6
x ₂₁	6.3	6.3	0.0

VEHICLE ACCELEROMETER SUMMARY



No.	Location Description	Component Direction*	Data Summary Peak G @ msec							
			X		Y		Z			
			"+"	"-"	"+"	"-"	"+"	"-"	"+"	"-"
1	Right front floor pan	✓	20.0	70.3						
			84	65						
2	Left rear floor pan	✓	1.8	32.2						
			191	54						

*Positive: X = Forward Y = Rightward Z = Downward
 Negative: X = Rearward Y = Leftward Z = Upward



SUMMARY OF CAMERA LOCATIONS AND DESCRIPTIONS										
Loc. No.	Location	Field of View	Lens Size	Frm Rate	Timing Speed	Serial No.	Impact Dist-X	C.L. Dist-Y	Cam Height	
1	Overhead	Overall view of vehicle and barrier	16 mm	400	100 Hz	M8	5'2"	-4"	23'1"	
2	Ground Based (Right)	Tangent to barrier face	25 mm	400	99 Hz	M7	23'1"	36'2"	NA	
3	Pit	Engine underside	8 mm	1000	100 Hz	P10	3'8"	0	-8'	
4	Ground Based (Left)	Views entire left side of vehicle	25 mm	400	100 Hz	M3	3'8"	51'8"	NA	
5	Ground Based (Real Time)	Documentary	Zoom	24					NA	
6	Ground Based (Left)	Driver dummy closeup	15 mm	1000	101 Hz	P6	6'3"	11'2"	5'3"	
7	Ground Based (Right)	Passenger dummy closeup	13 mm	1000	101 Hz	P4	6'4"	12'2"	5'1"	
8	Pit	Fuel tank	8 mm	1000	100 Hz	P5	8'7"	0	-8'	
9	Ground Based (Left)	Same view as camera No. 6	15 mm	1000	101 Hz	P7	7'2"	11'2"	5'3"	
10	Ground Based (Right)	Same view as camera No. 7	13 mm	1000	101 Hz	P8	7'7"	12'2"	5'1"	
NA - Not available										

APPENDIX A
PHOTOGRAPHS

810210

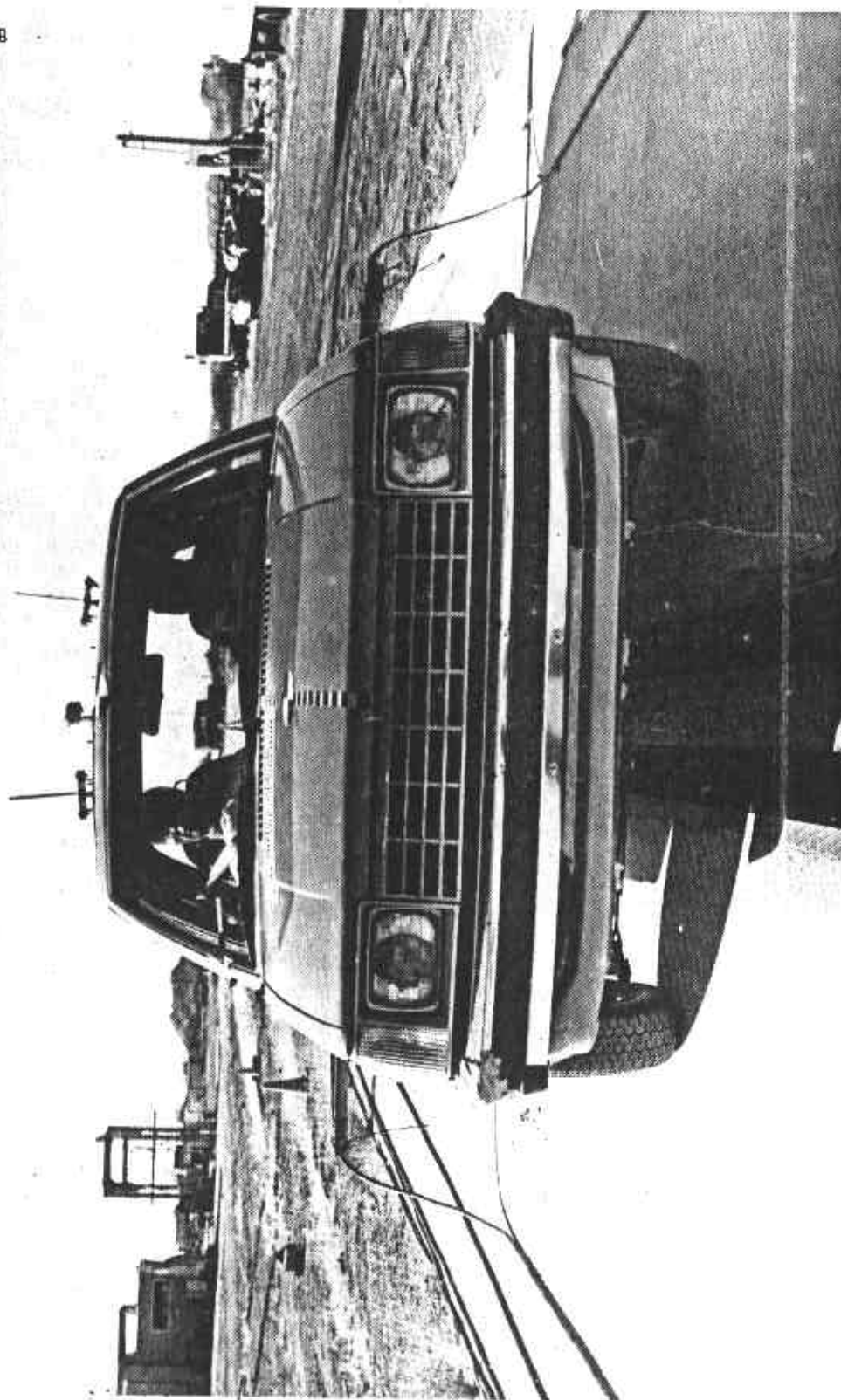


FIGURE A-1. PRE-TEST FRONT VIEW - 1981 FORD ESCORT L - NHTSA 810210.

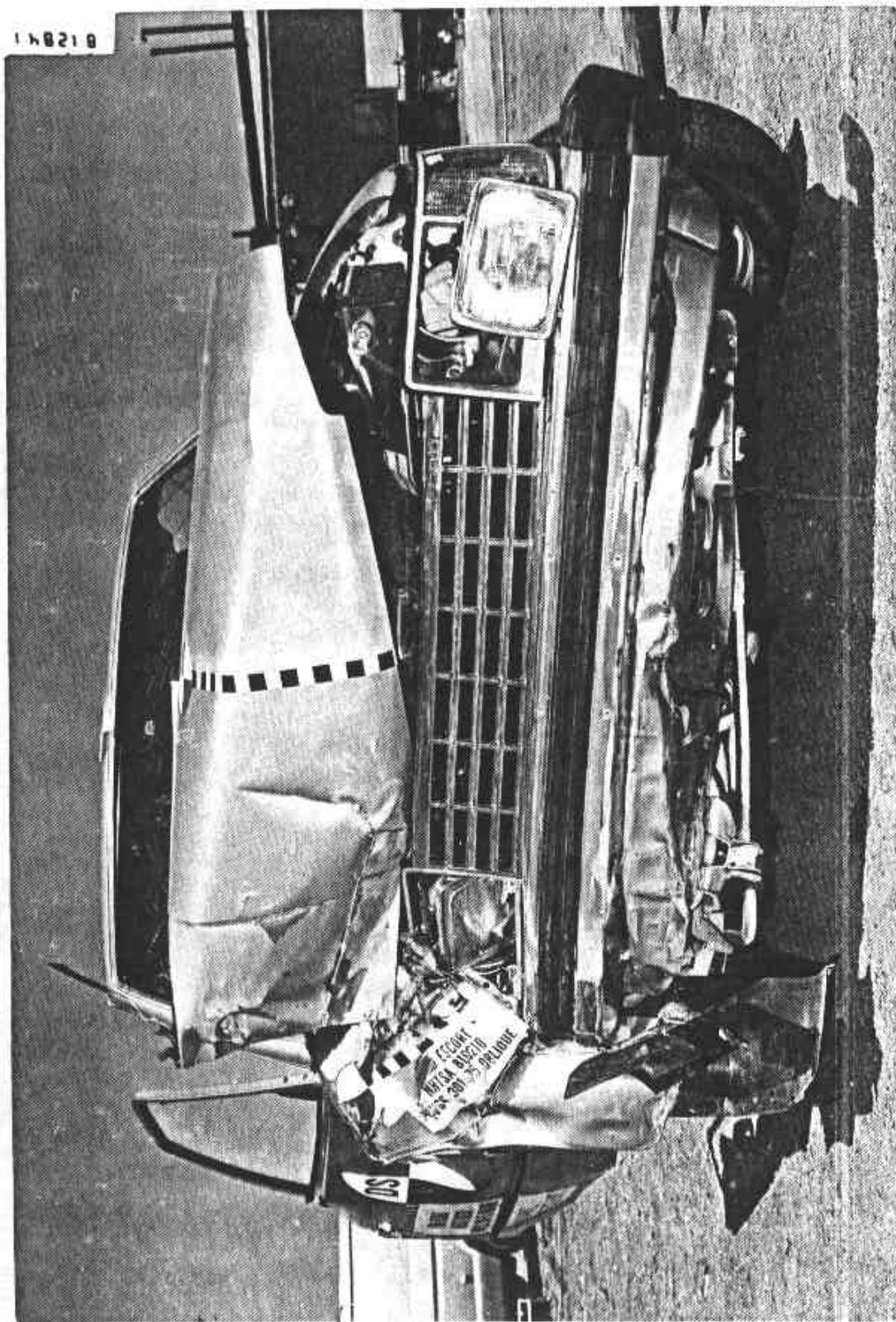


FIGURE A-2. POST-TEST FRONT VIEW - 1981 FORD ESCORT L - NHTSA 810210.

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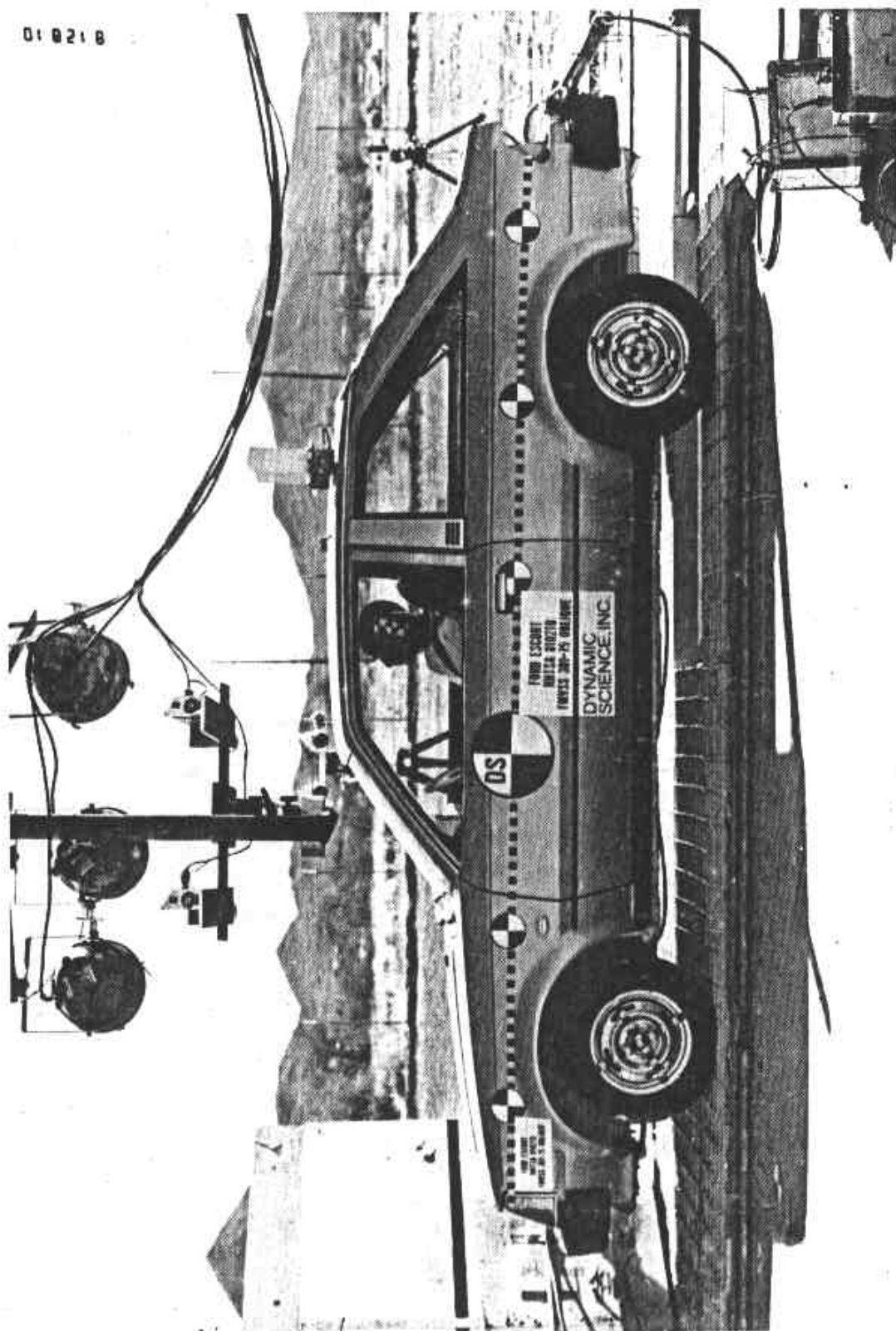


FIGURE A-3. PRE-TEST SIDE VIEW - 1981 FORD ESCORT L - NHTSA 810210.

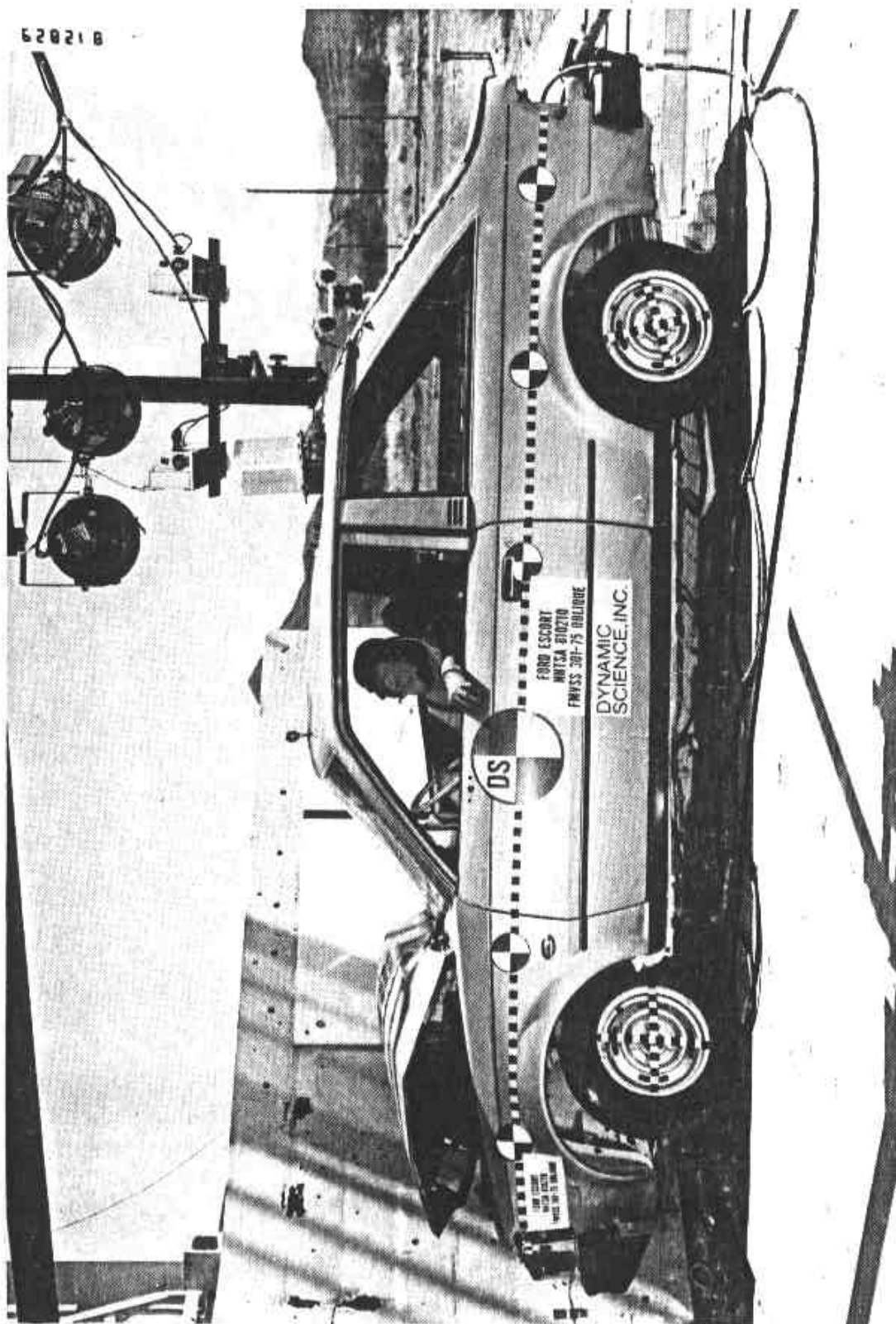


FIGURE A-4. POST-TEST DRIVER SIDE VIEW - 1981 FORD ESCORT L - NHTSA 810210.

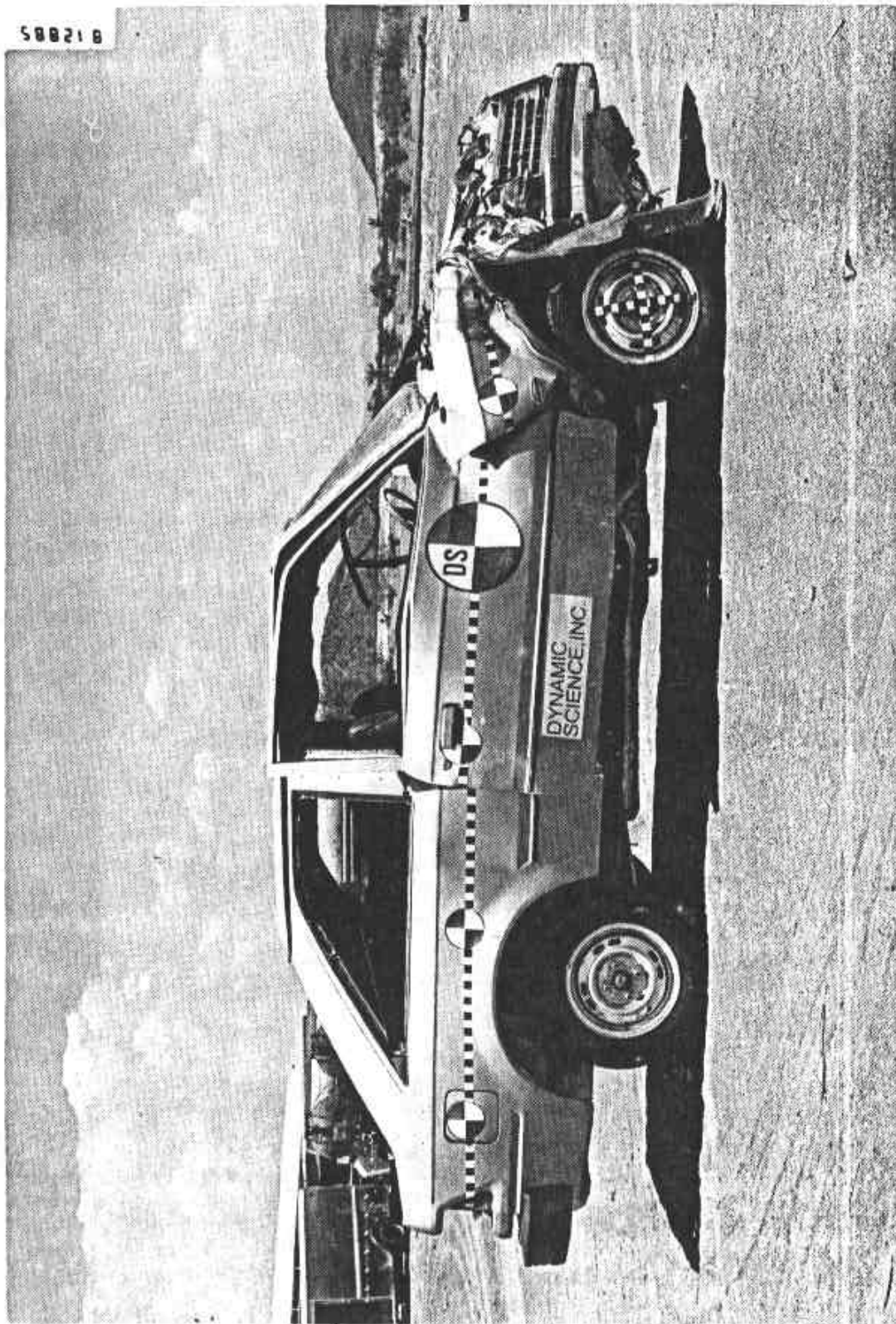


FIGURE A-5. POST-TEST PASSENGER SIDE VIEW - 1981 FORD ESCORT L - NHTSA 810210.

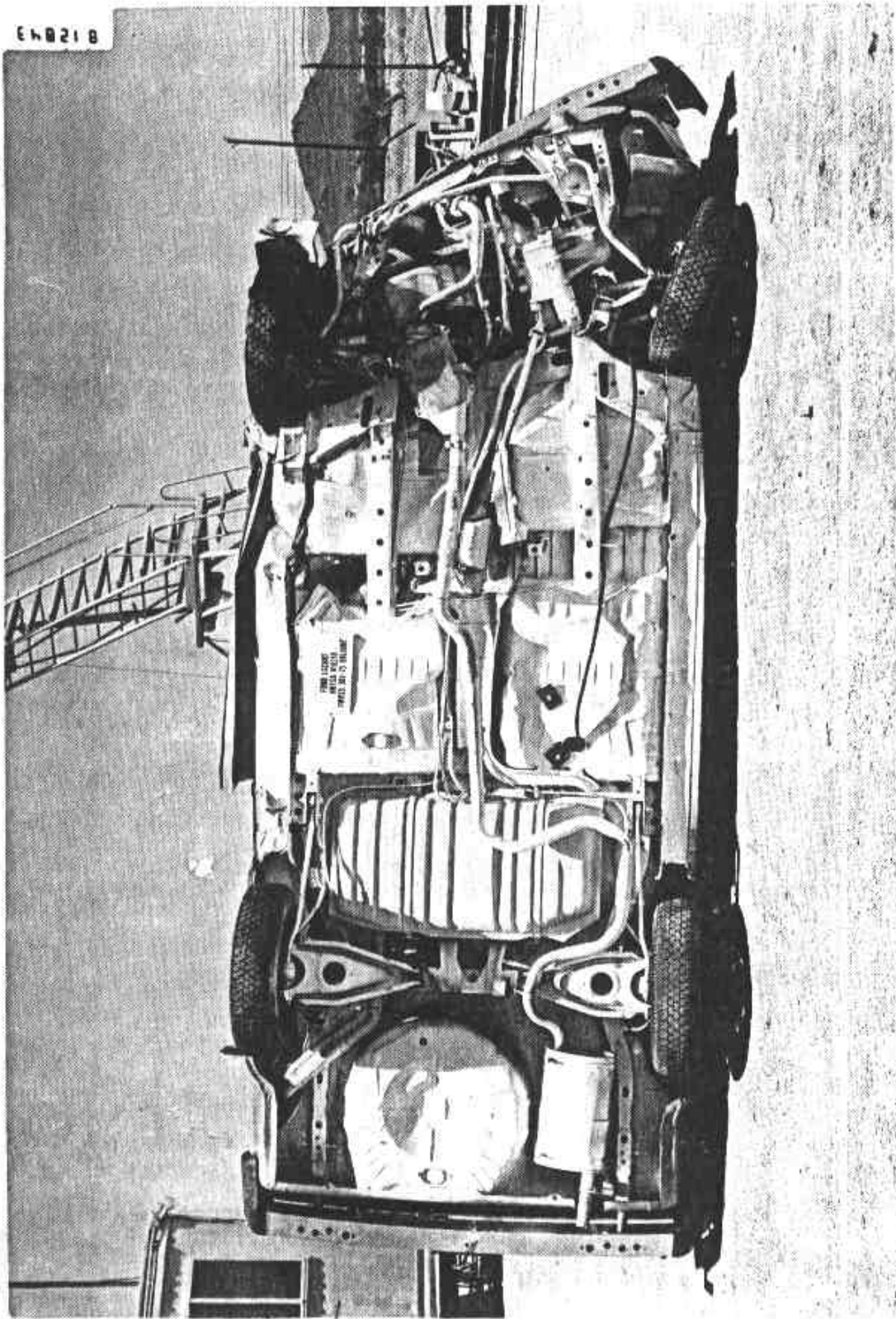


FIGURE A-6. POST-TEST OVERALL UNDERSIDE VIEW - 1981 FORD ESCORT L - NHTSA 810210.

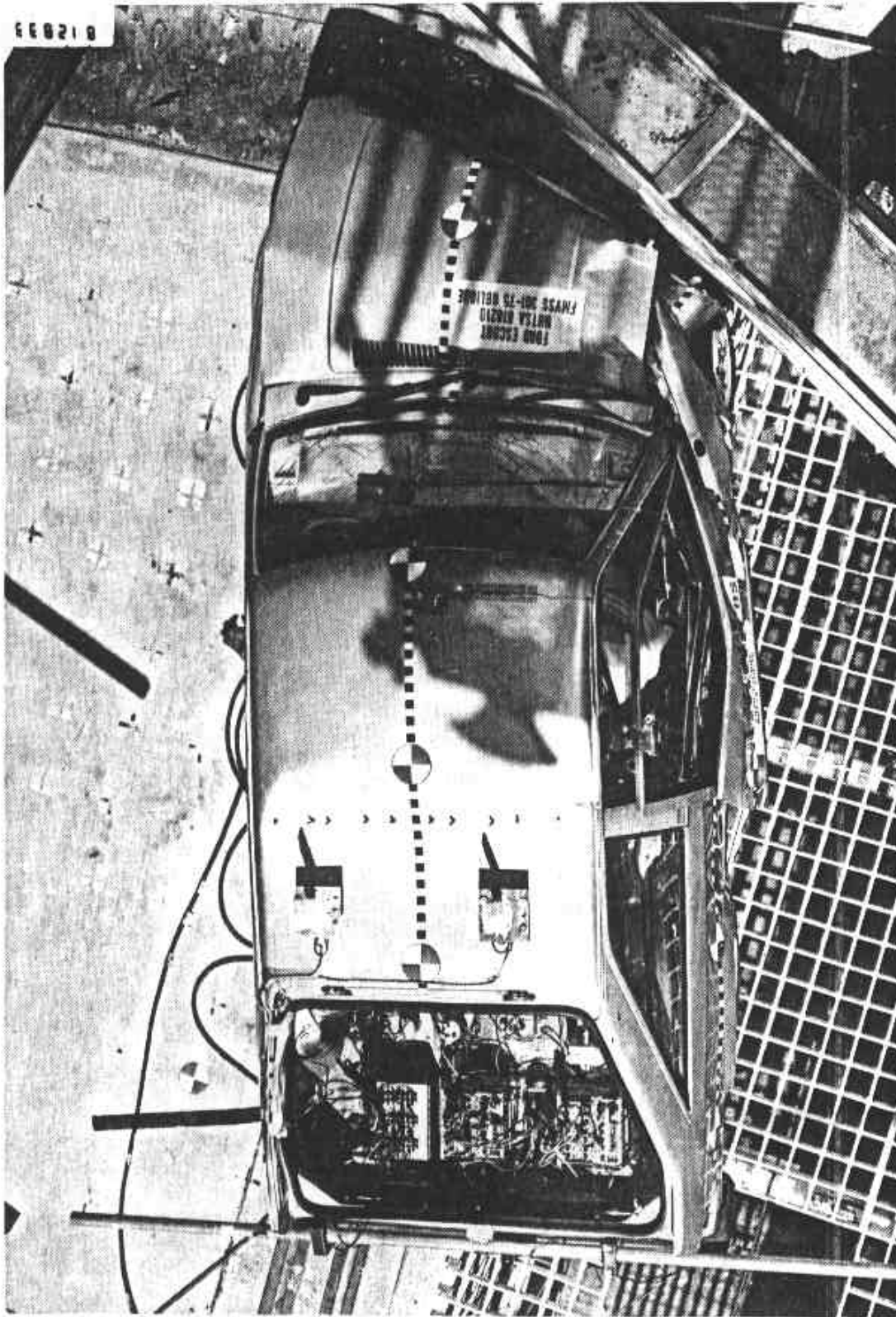


FIGURE A-7. POST-TEST OVERHEAD VIEW SHOWING POSITION OF VEHICLE RELATIVE TO BARRIER -
1981 FORD ESCORT L - NHTSA 810210.



FIGURE A-8. PRE-TEST VIEW OF DRIVER DUMMY - 1981 FORD ESCORT L - NHTSA 810210.

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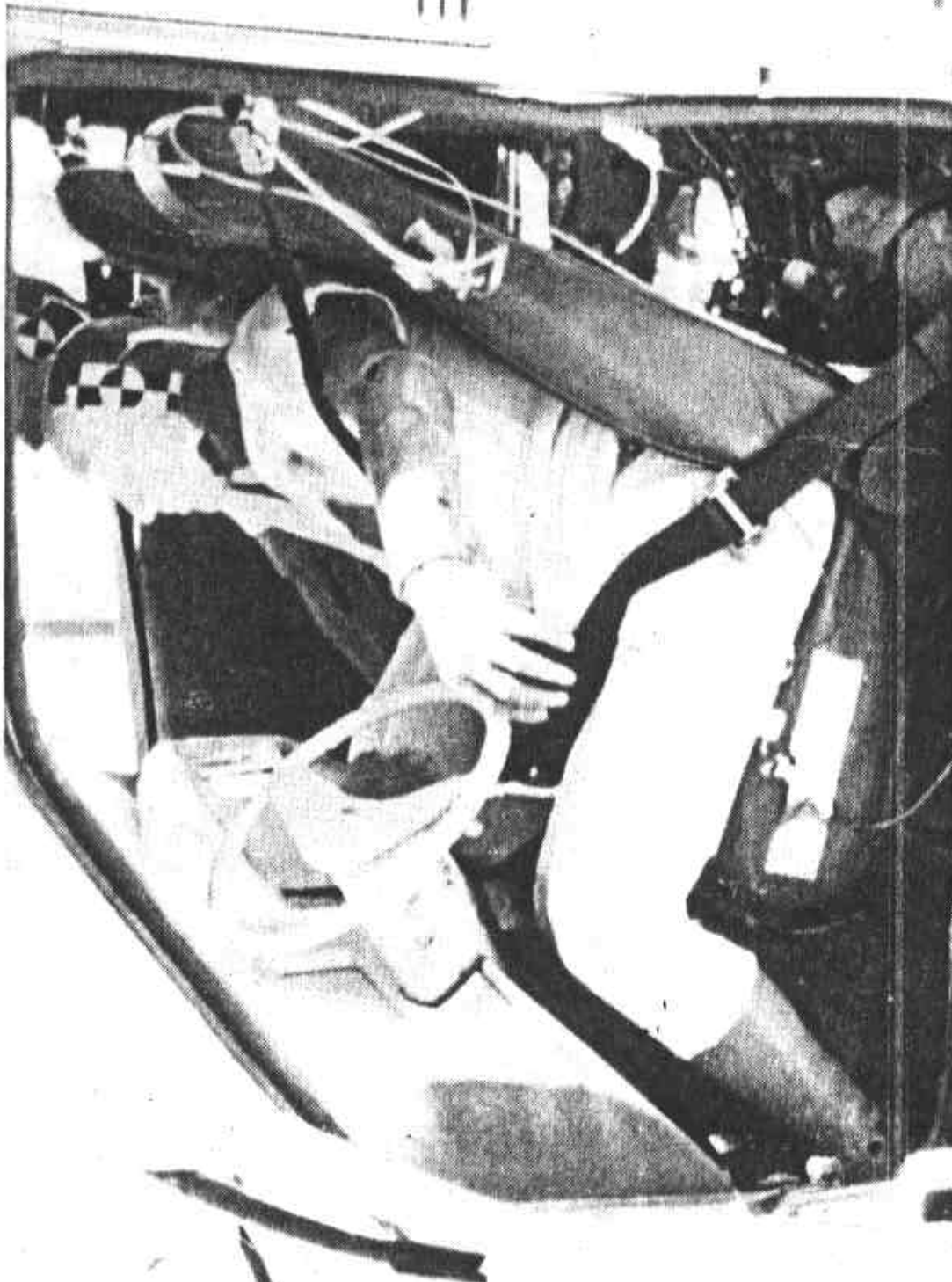


FIGURE A-9. POST-TEST VIEW OF DRIVER DUMMY - 1981 FORD ESCORT L - NHTSA 810210.

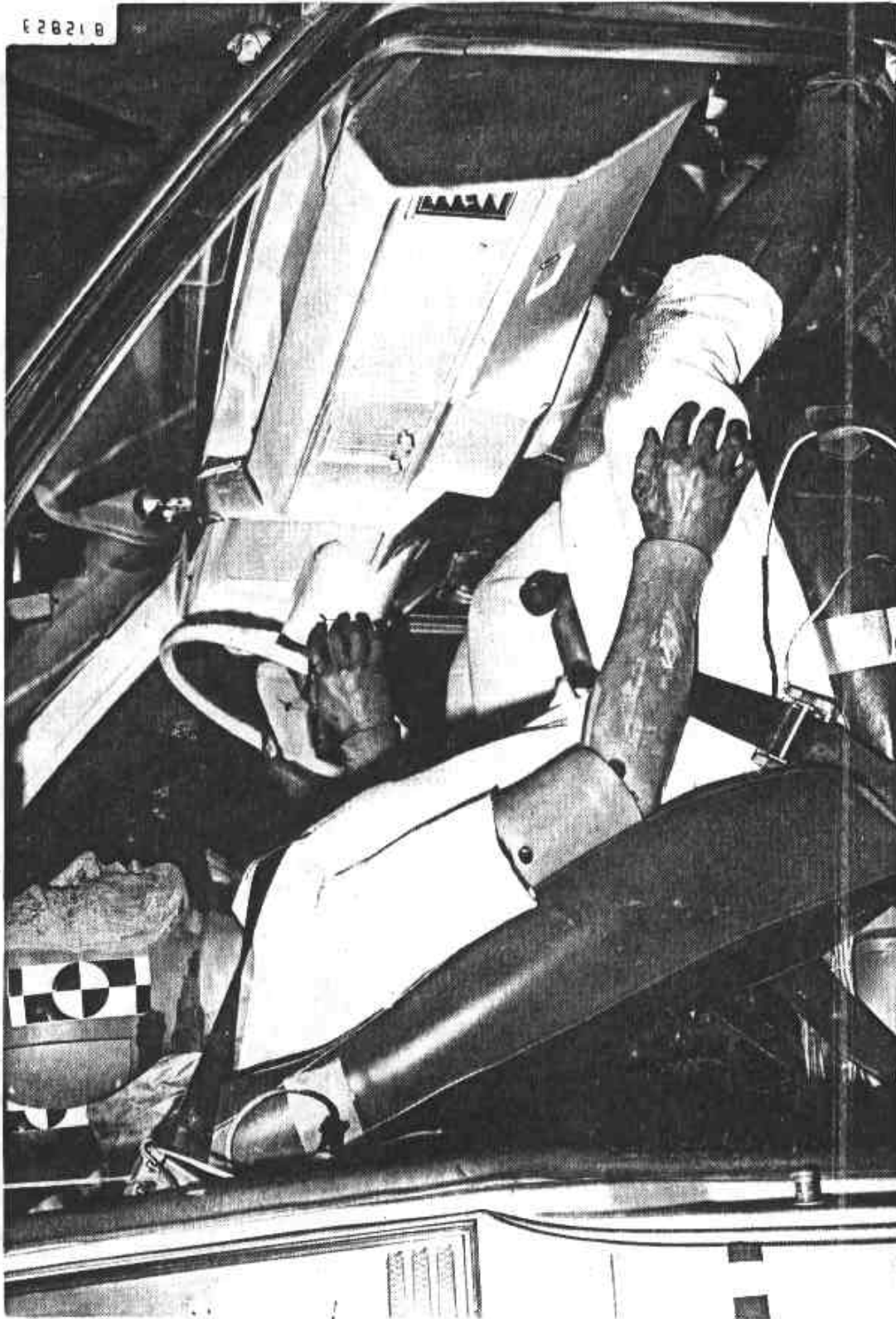


FIGURE A-10. PRE-TEST VIEW OF PASSENGER DUMMY - 1981 FORD ESCORT L - NHTSA 810210.



FIGURE A-11. POST-TEST VIEW OF PASSENGER DUMMY - 1981 FORD ESCORT L - NHTSA 810210.

APPENDIX B
CALCOMP PLOT PRESENTATION

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*

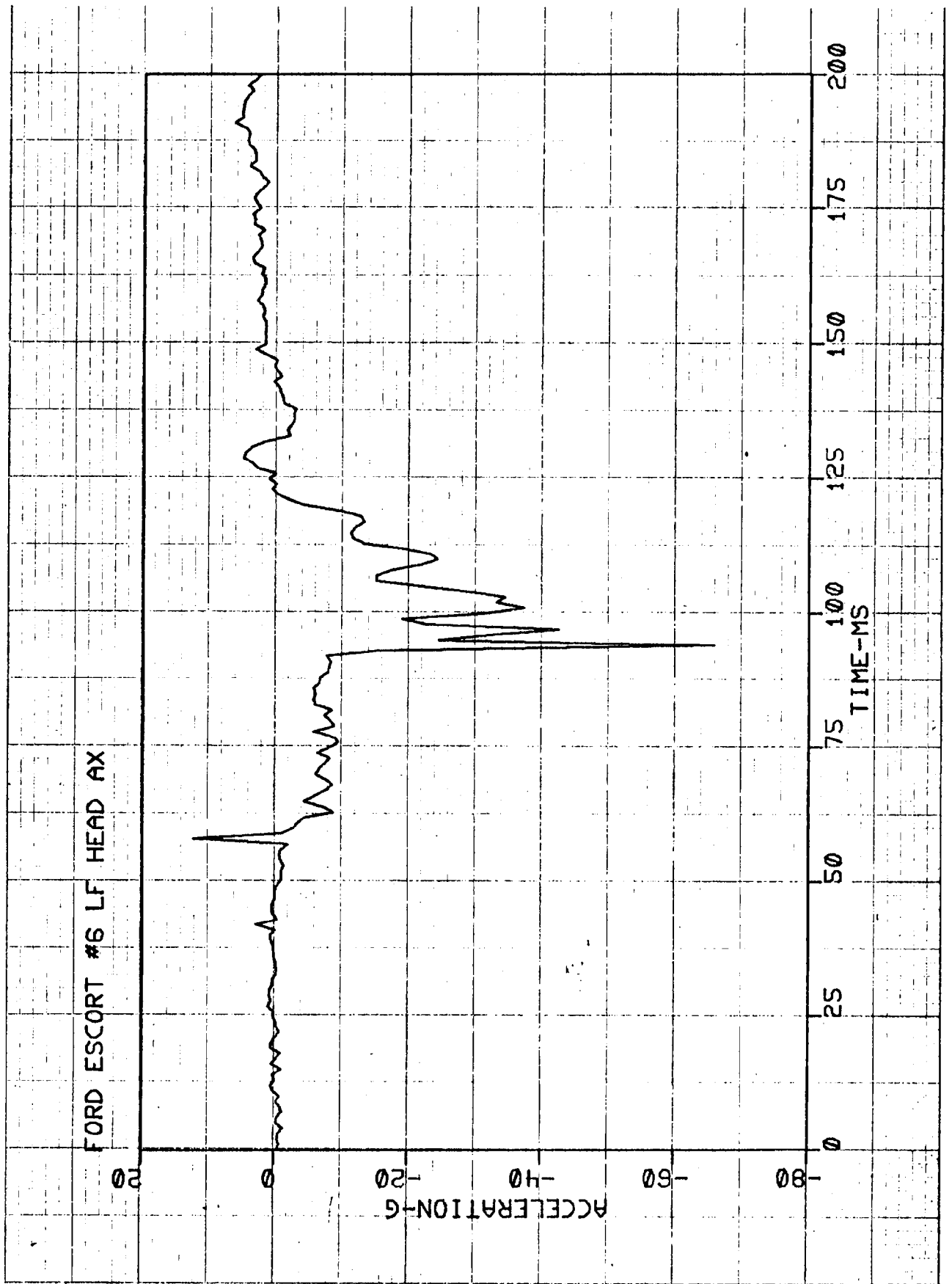
<u>Driver</u>	<u>RF Outboard Passenger</u>	<u>Data Description</u>
LF Head	RF Head	Head Acceleration (G)
LF Chest	RF Chest	Chest Acceleration (G)
LF Femurs	RF Femurs	Femur Loads (lb)
	RF Belt Load	Torso Belt Load (lb)

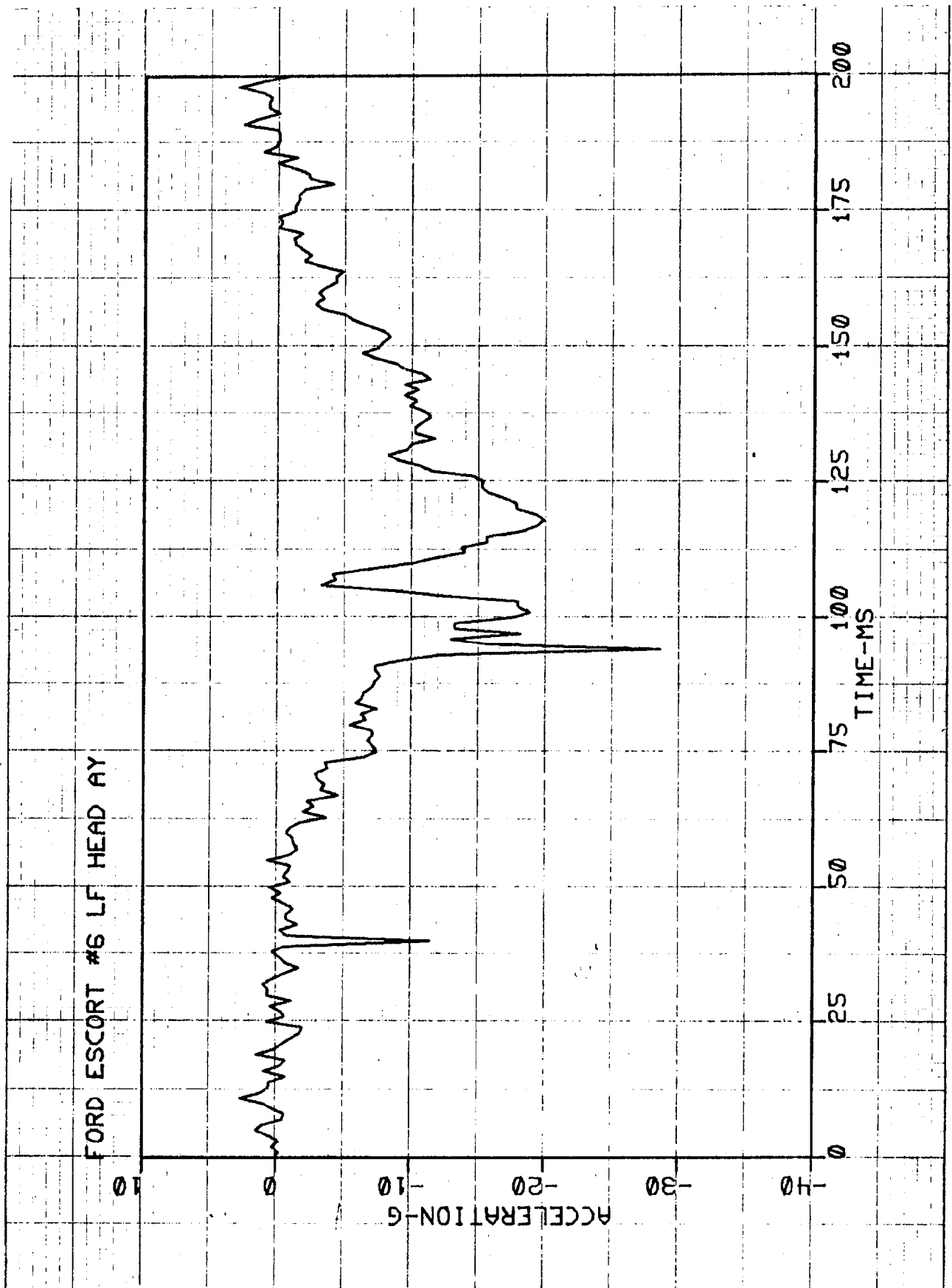
Vehicle Data**

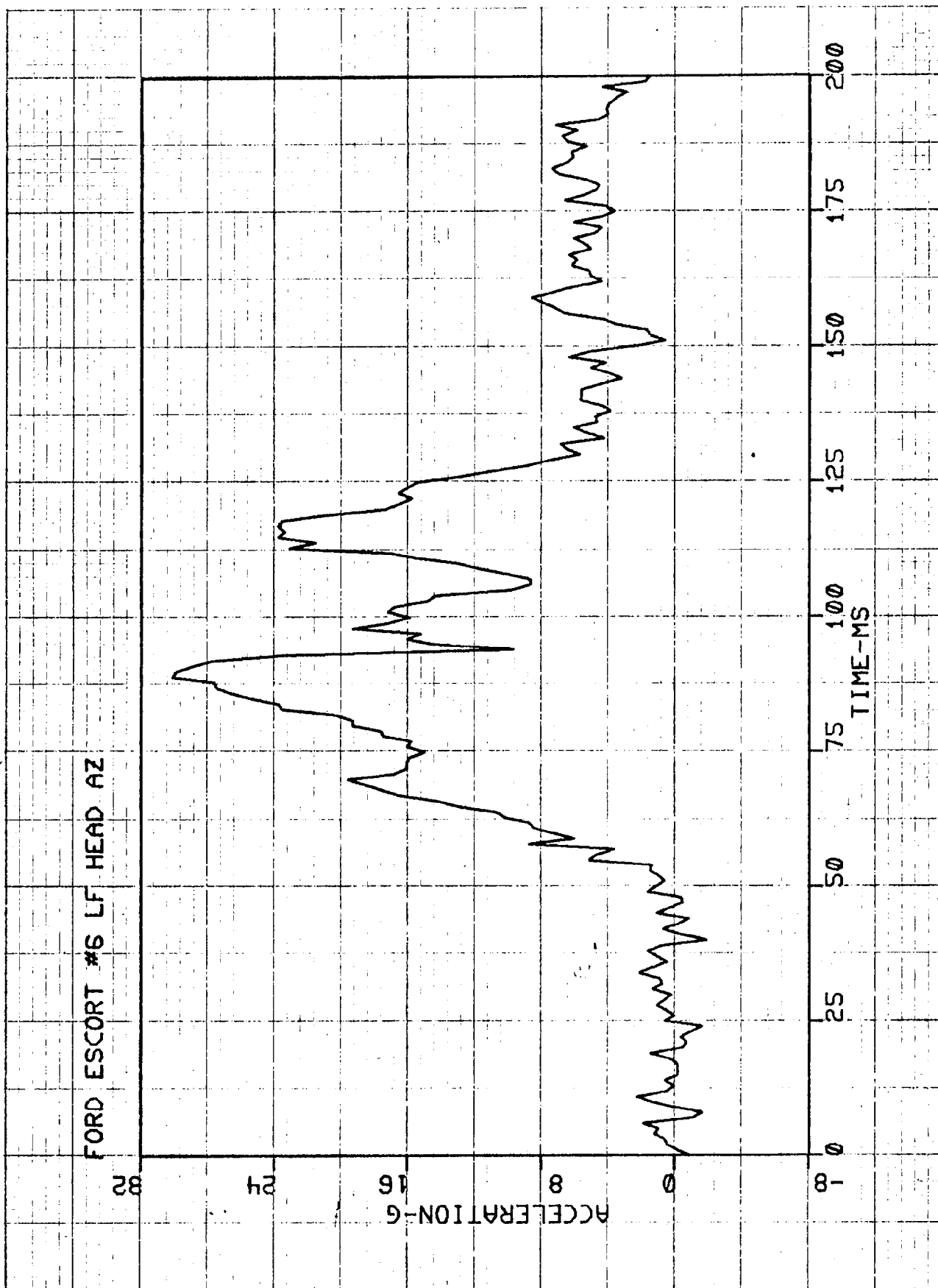
Loc 1	Front Seat Area Acceleration (G)
Loc 2	Rear Seat Area Acceleration (G)

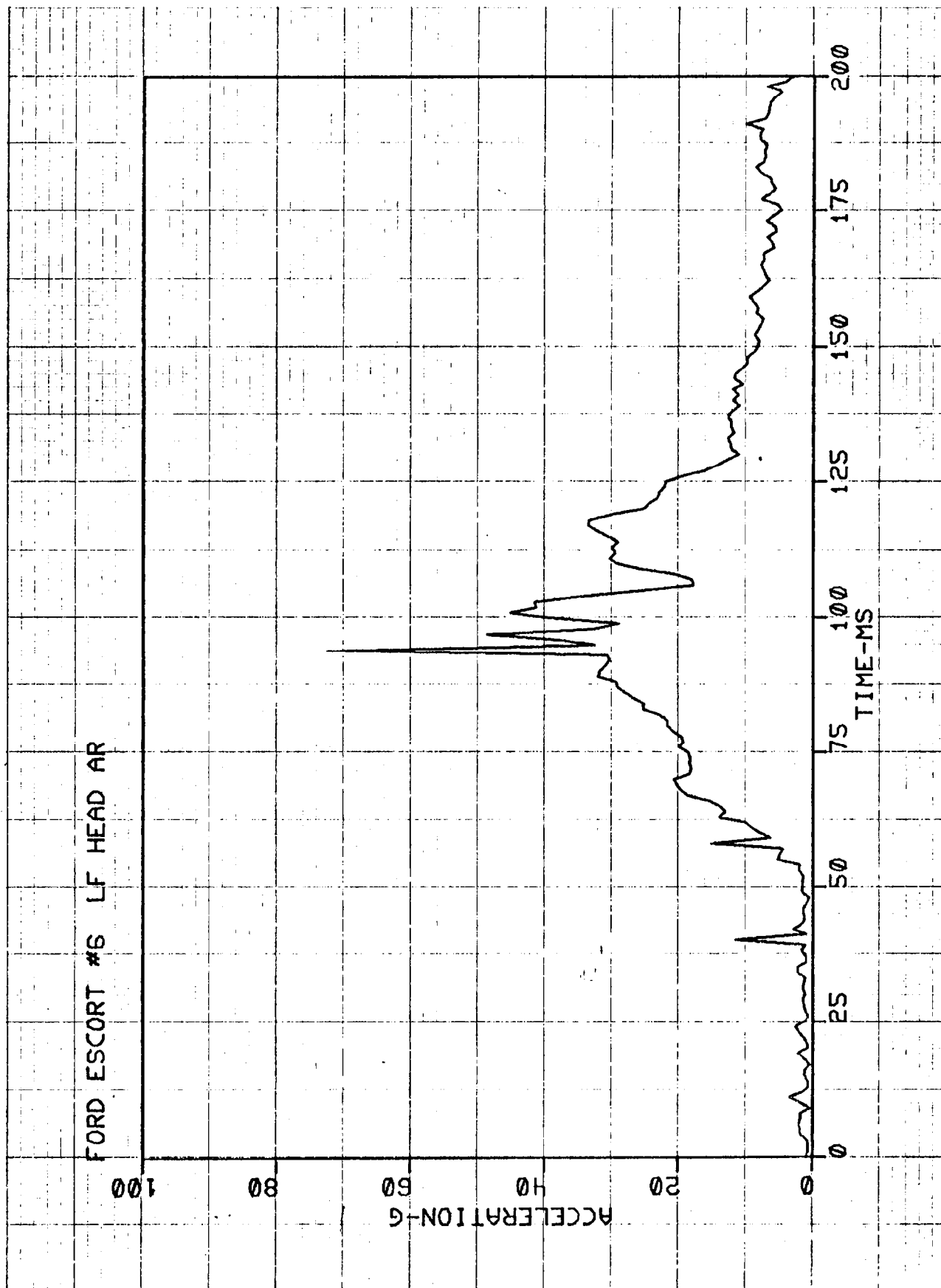
*Dummy Injury Summary presented on pages 4-4 and 4-5.

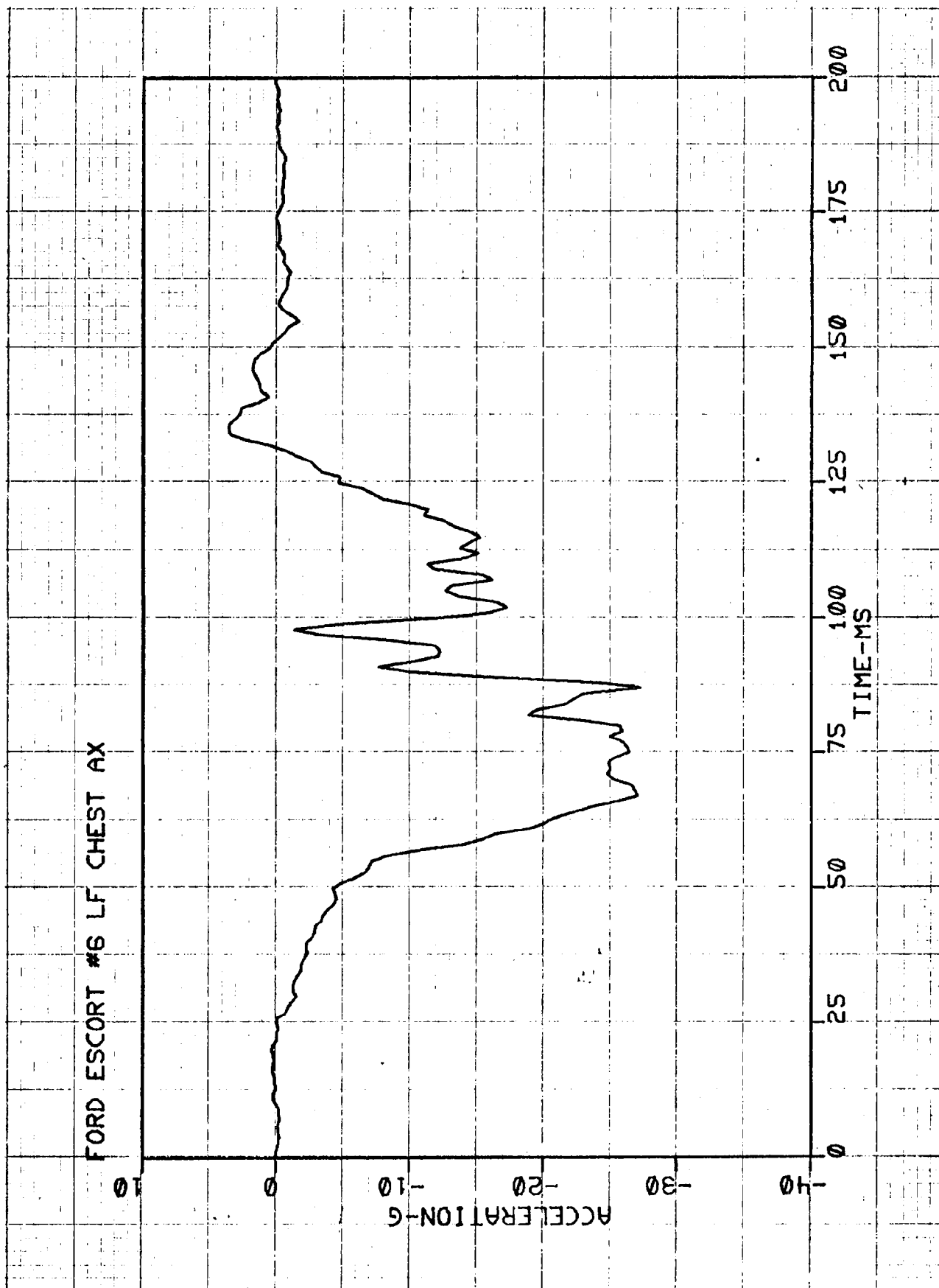
**Vehicle accelerometer location and data summarized on page 4-8.

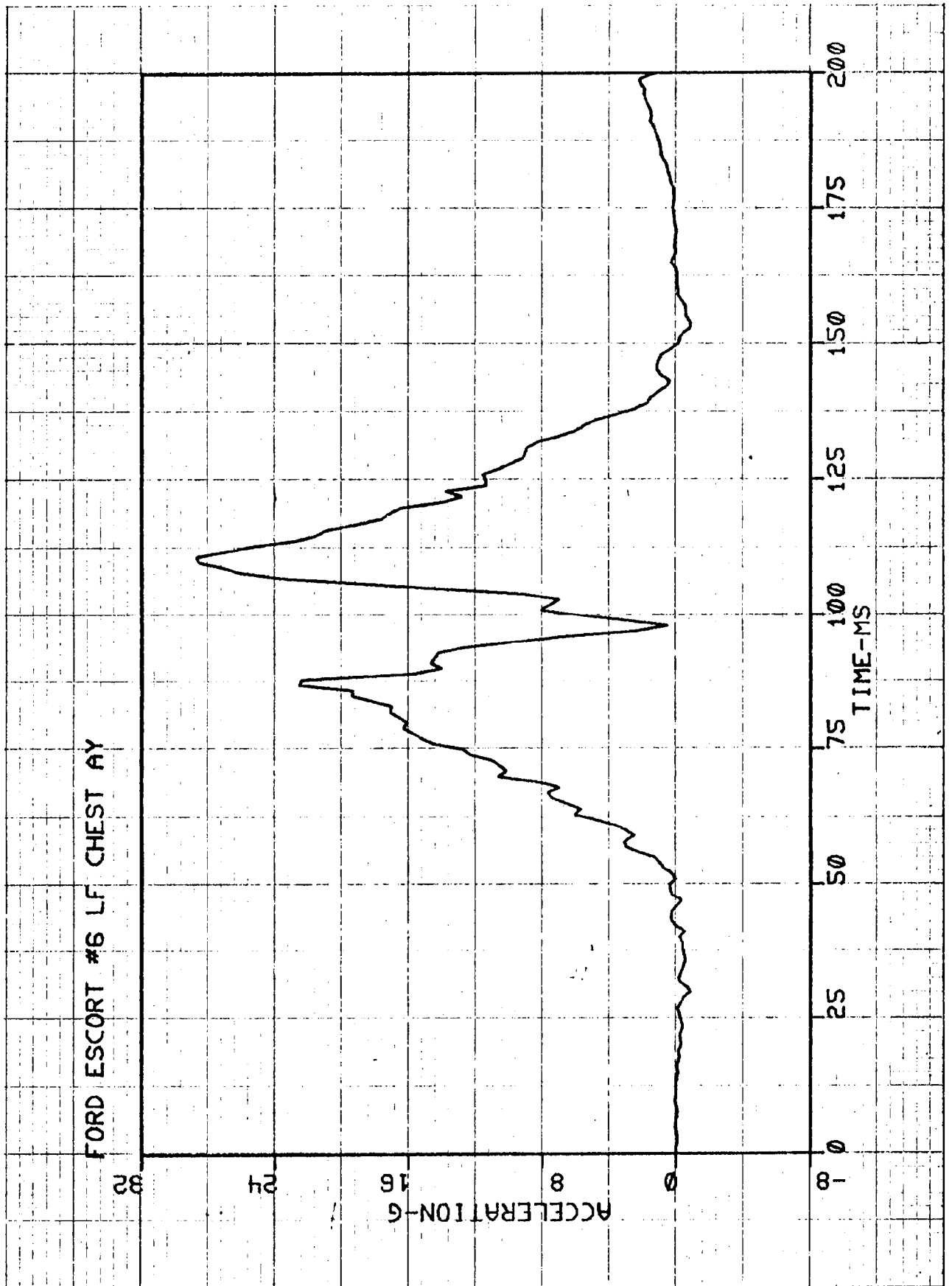


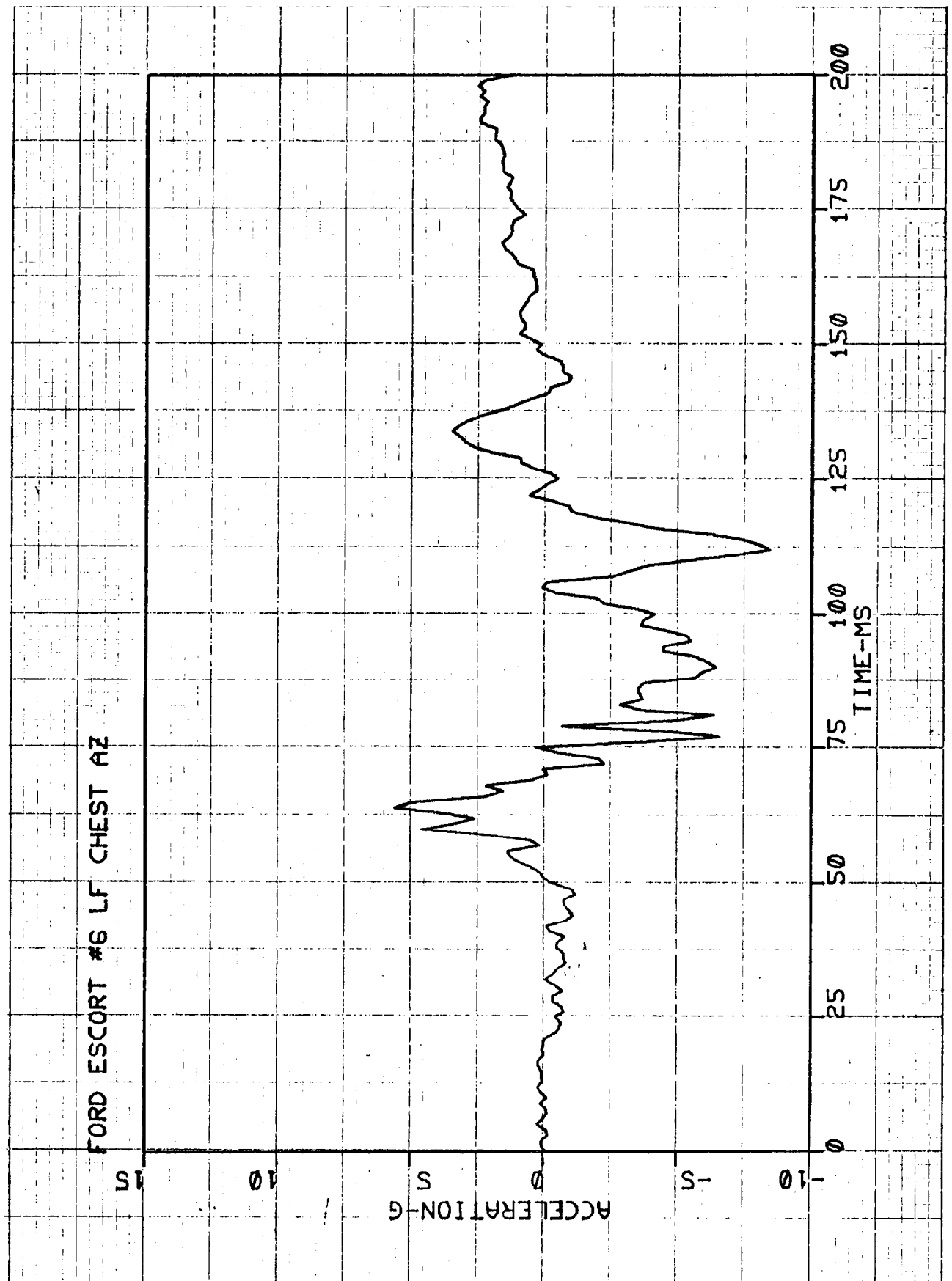


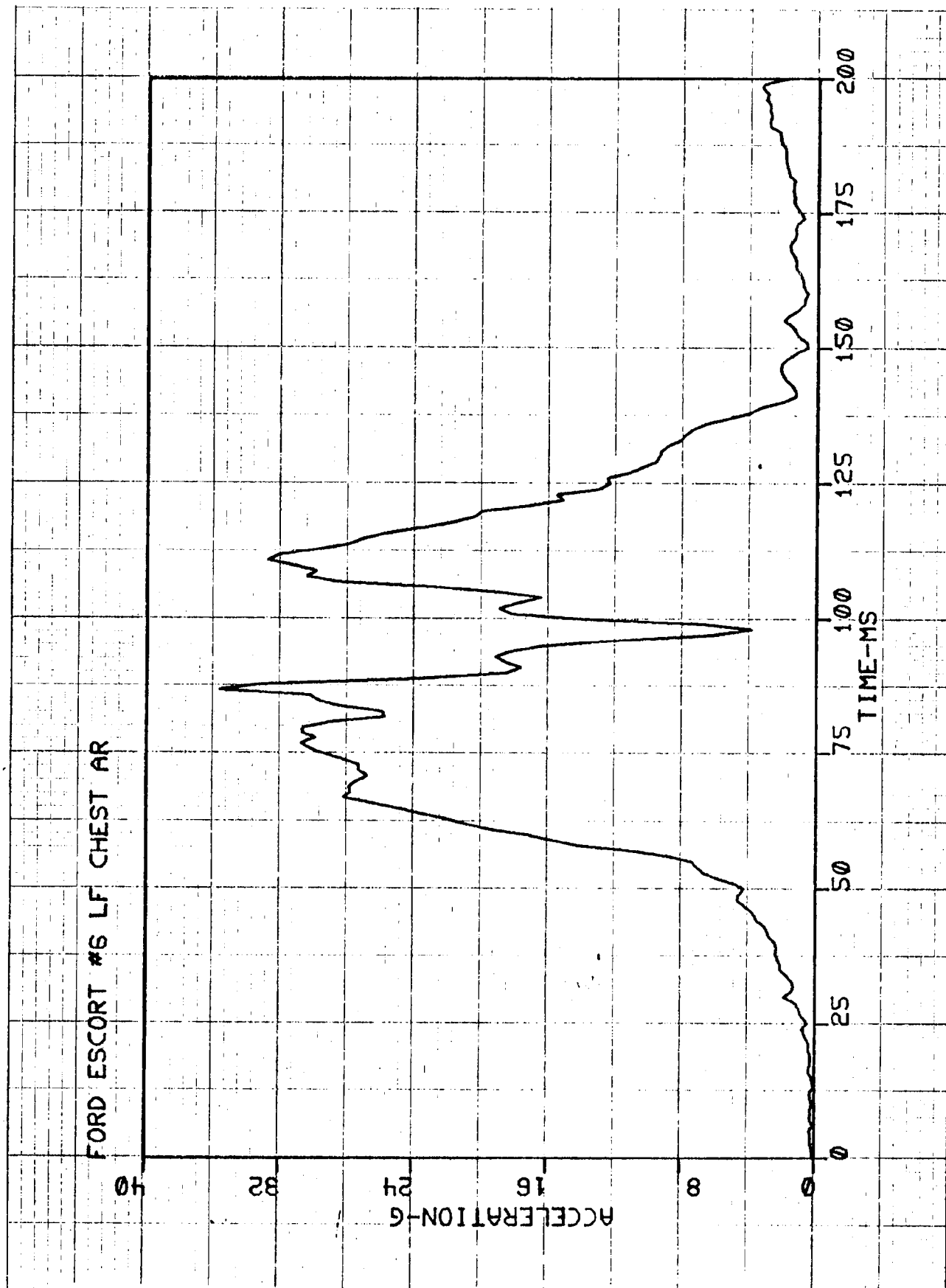


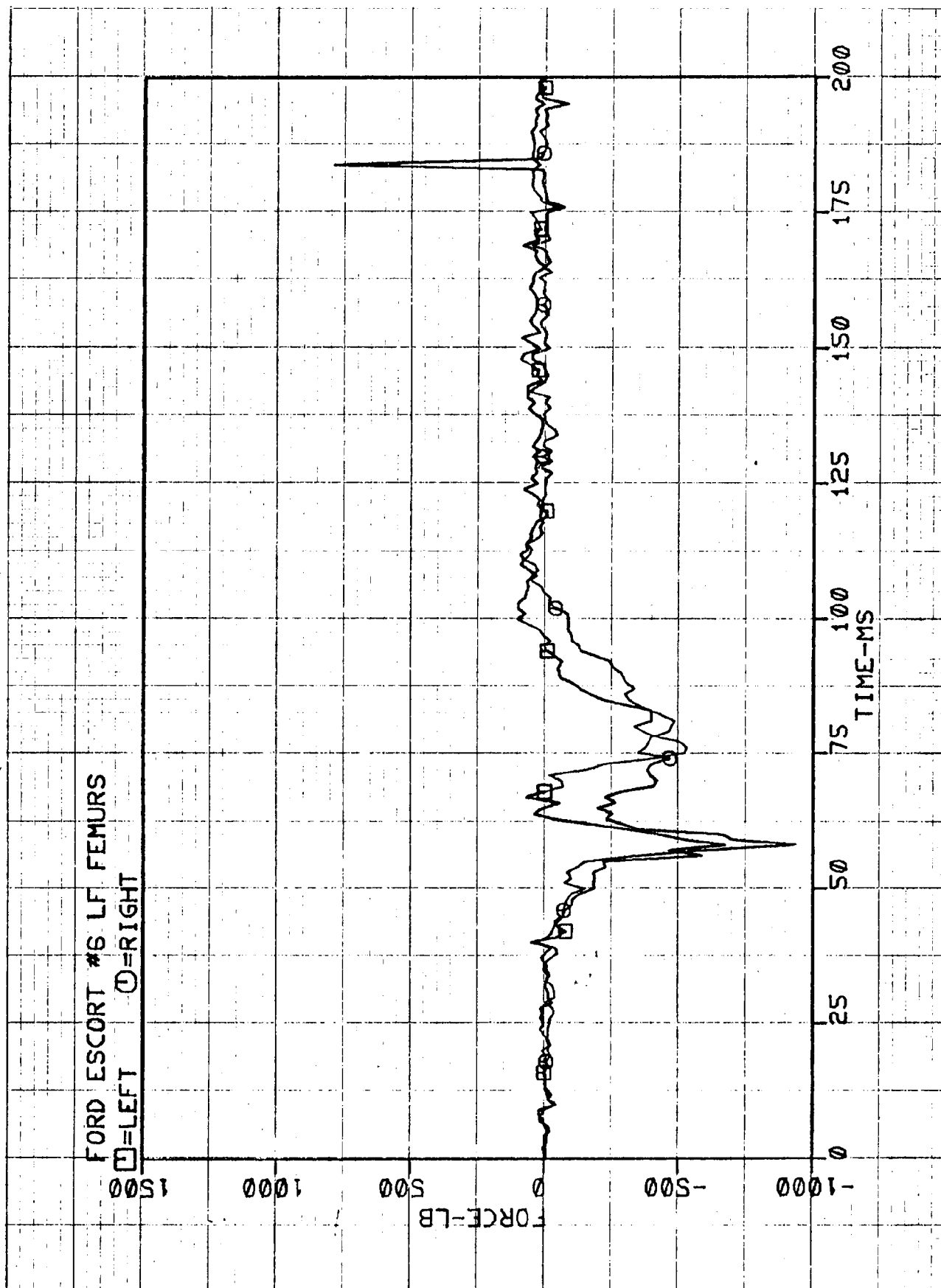


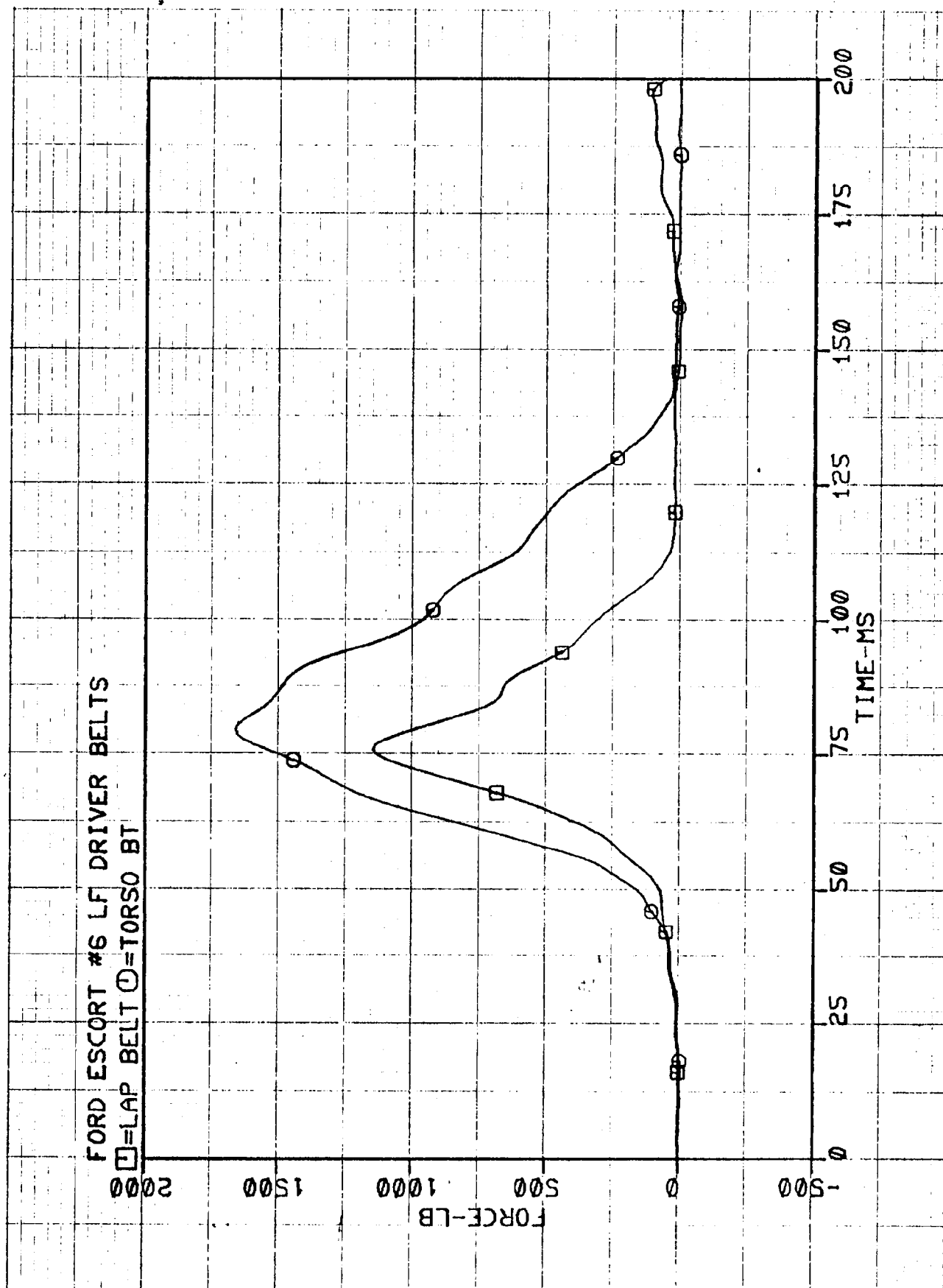


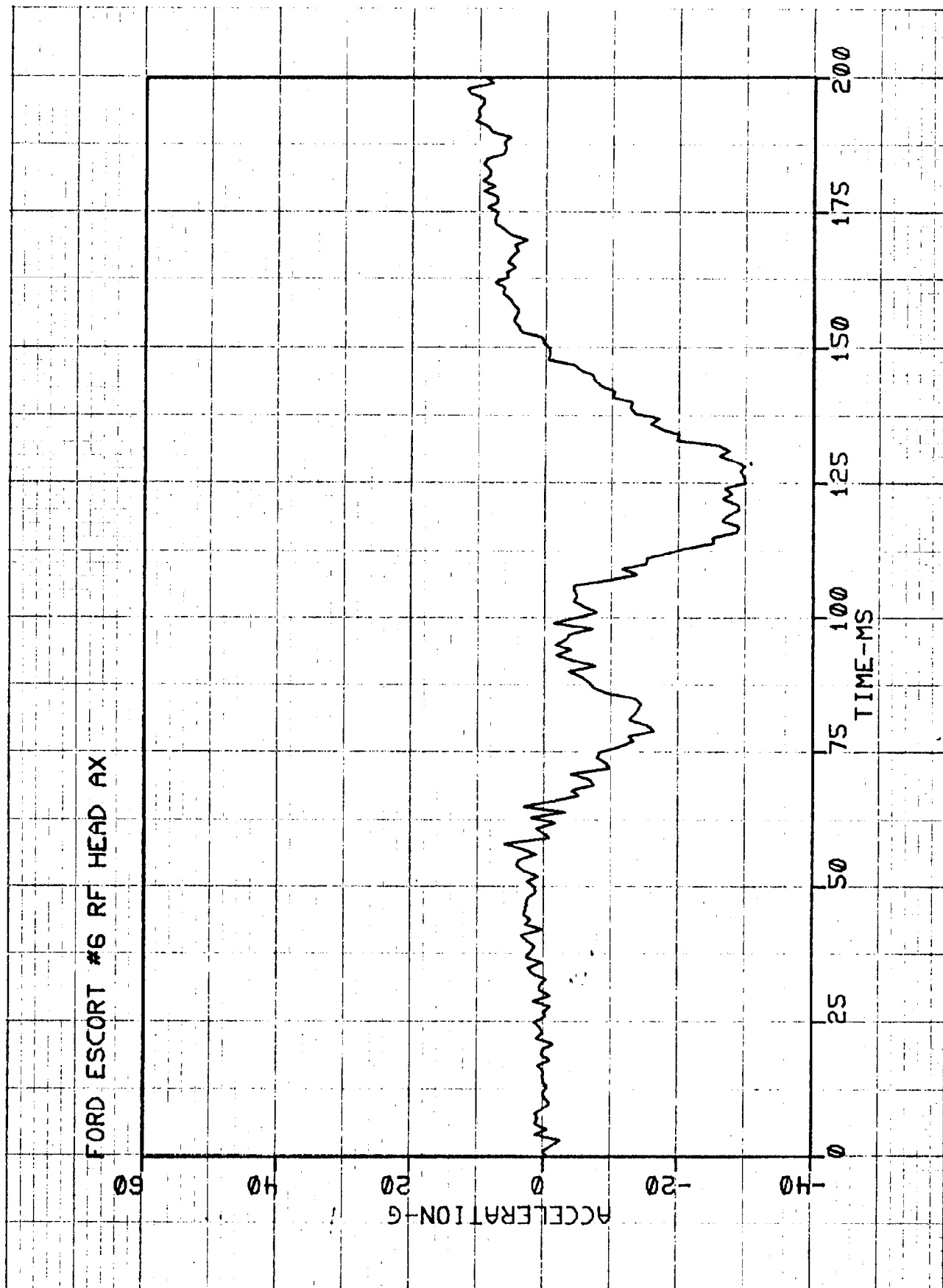


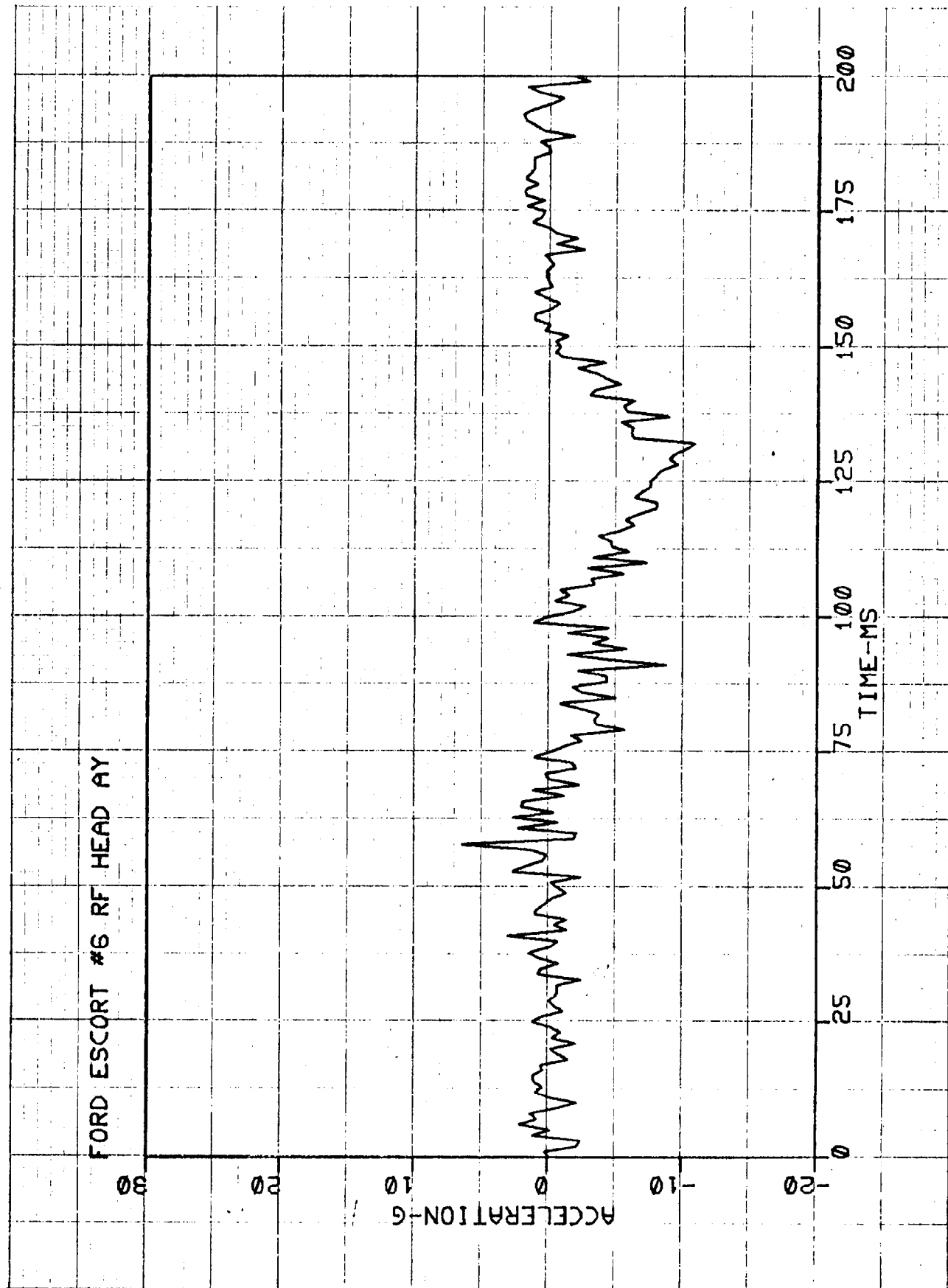


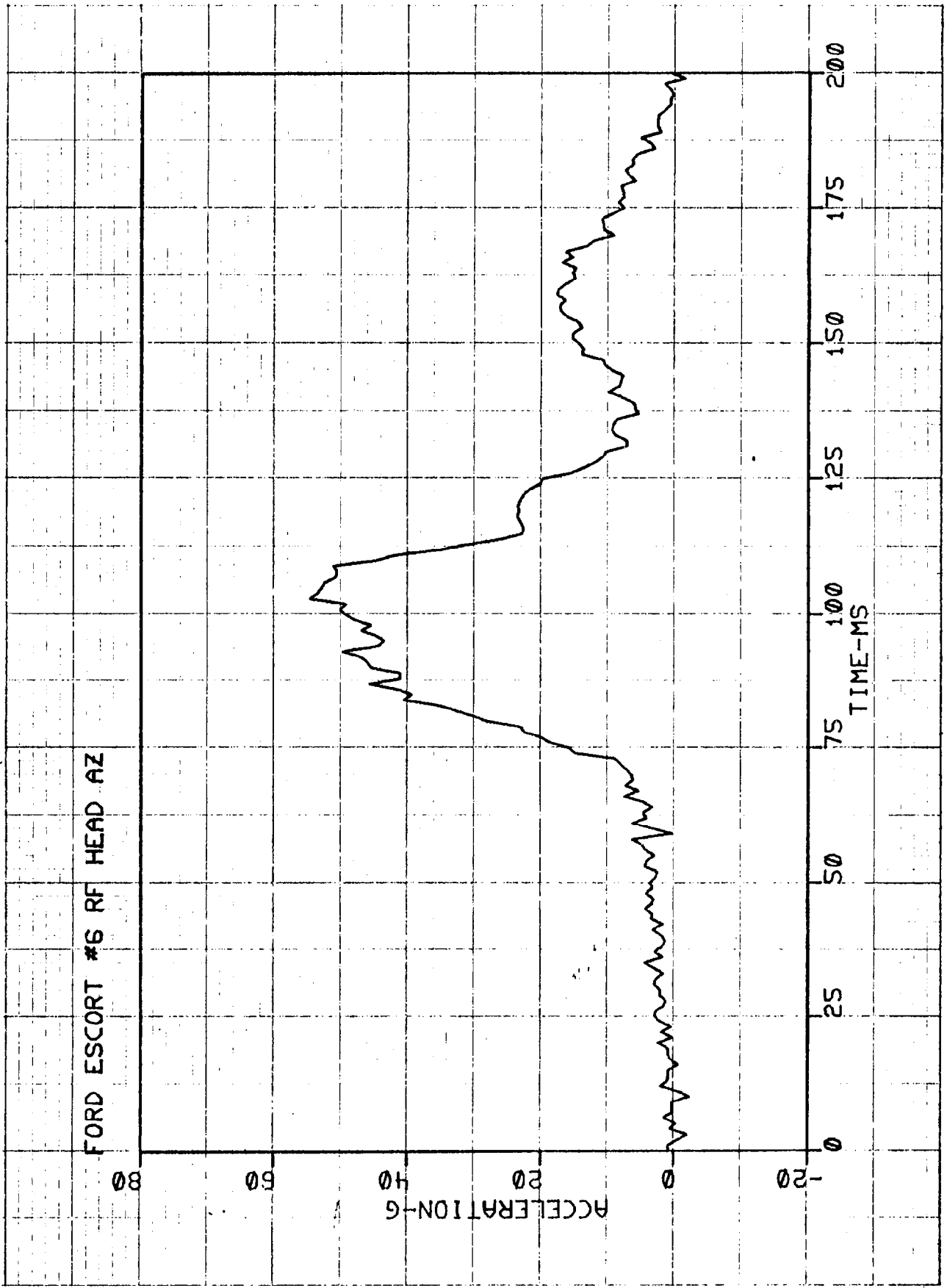


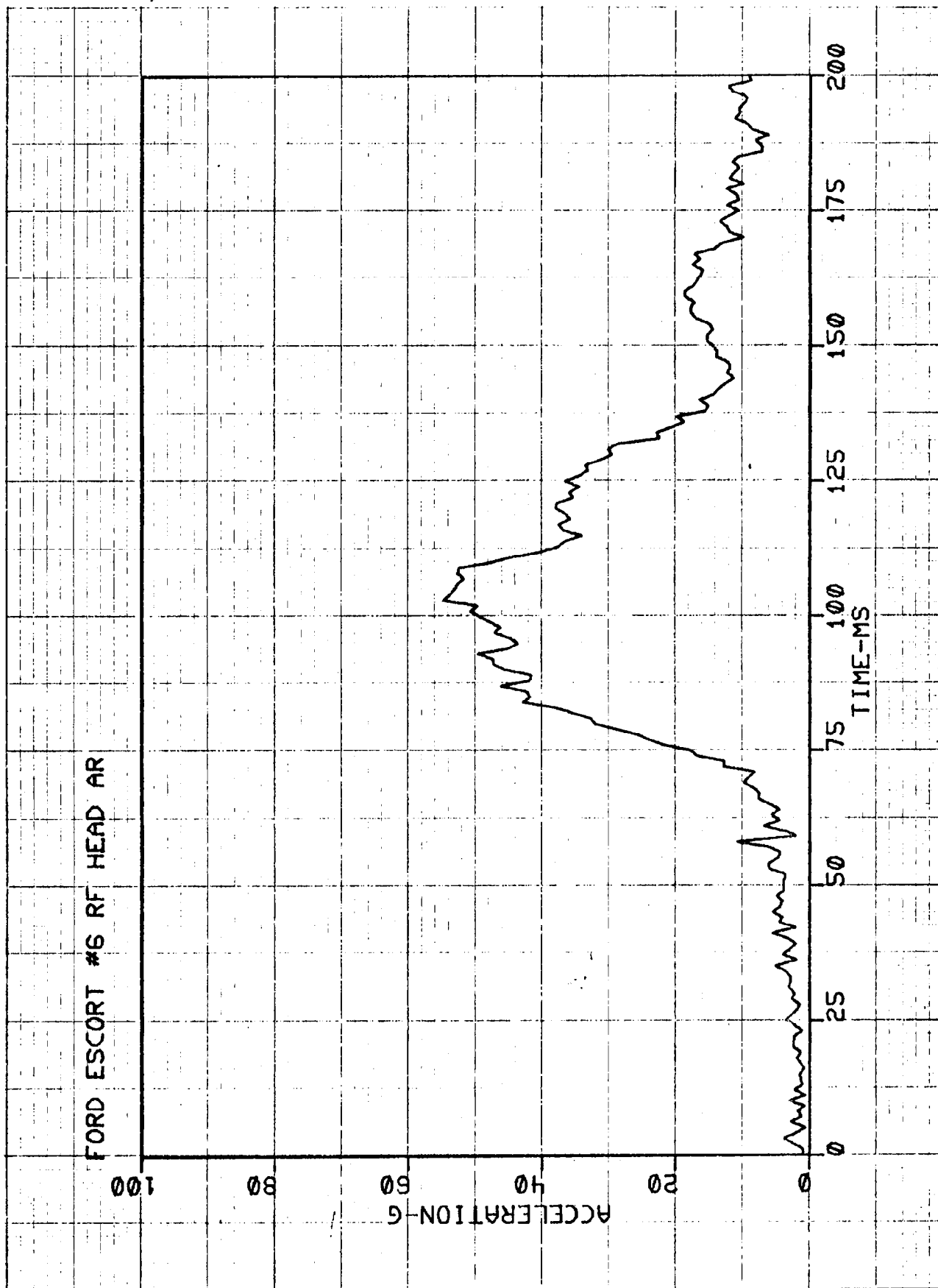


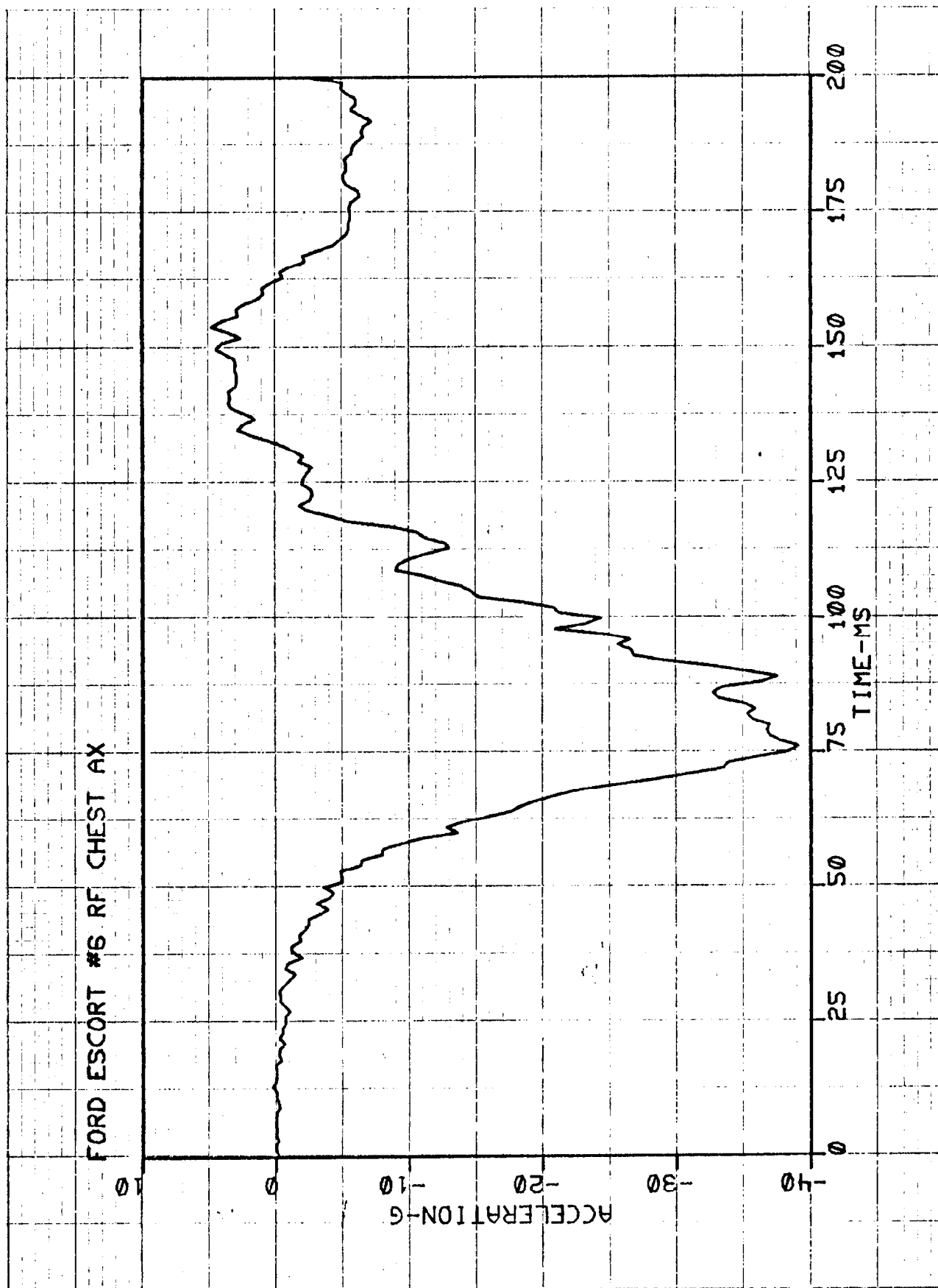


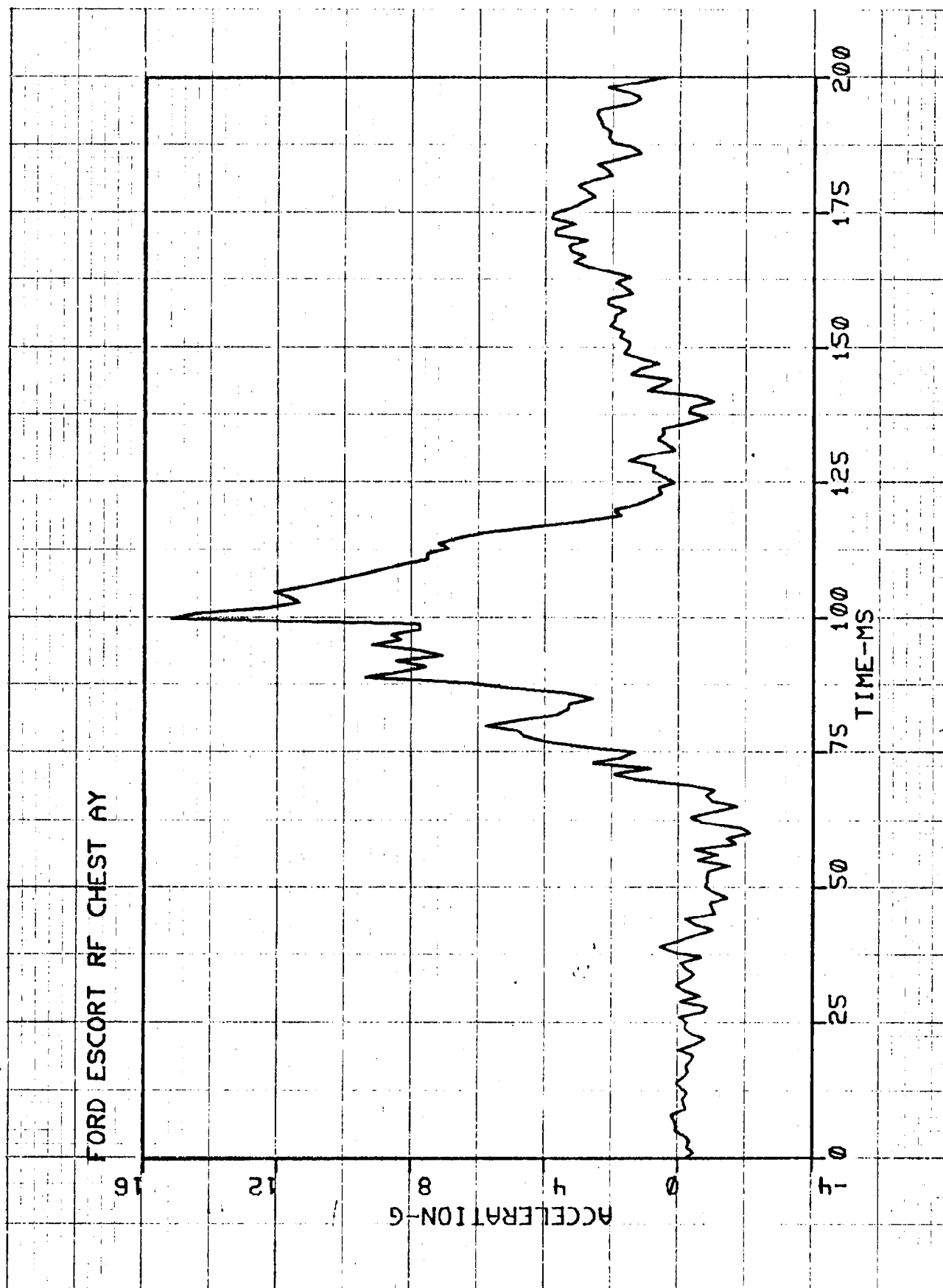


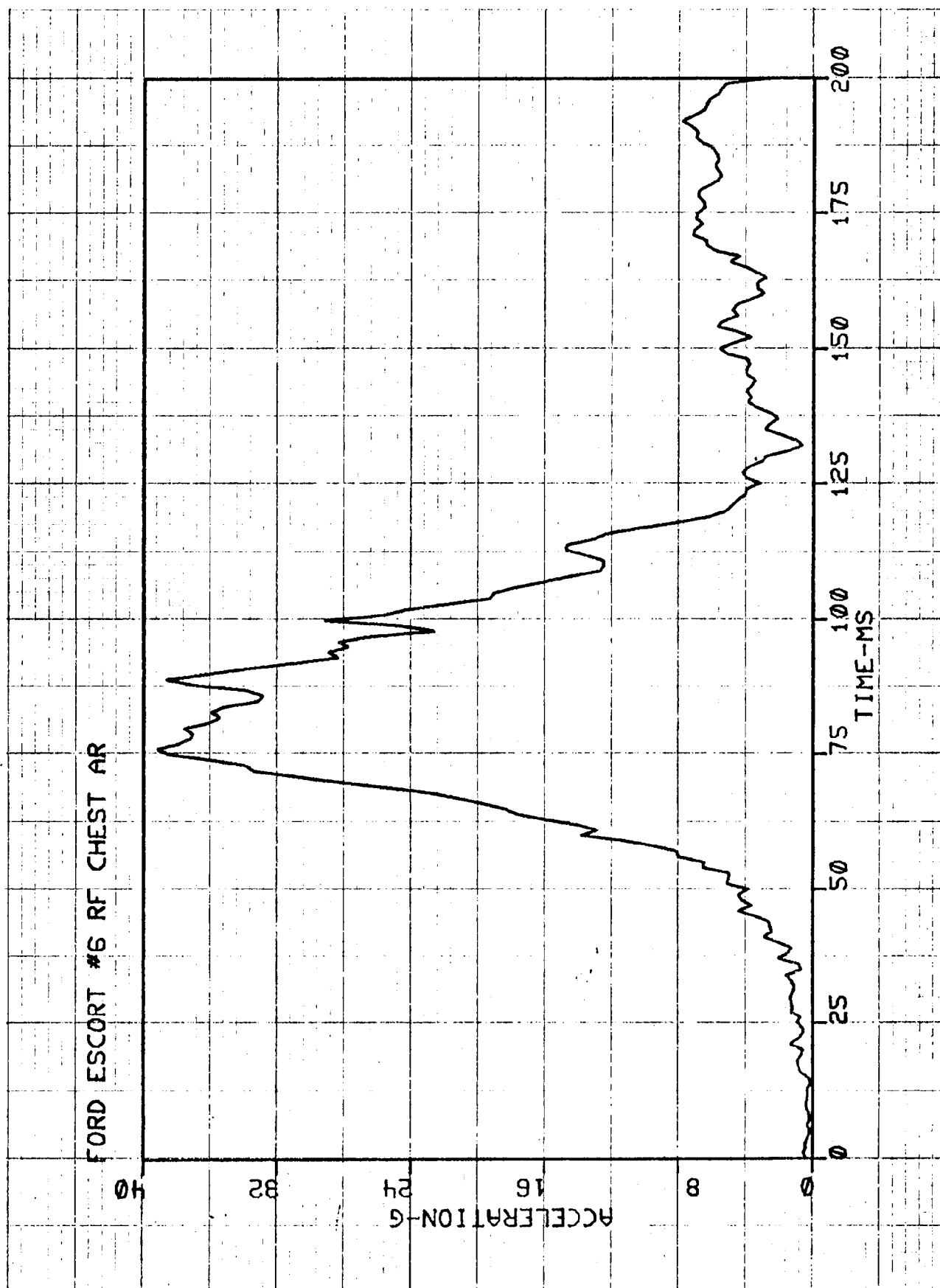


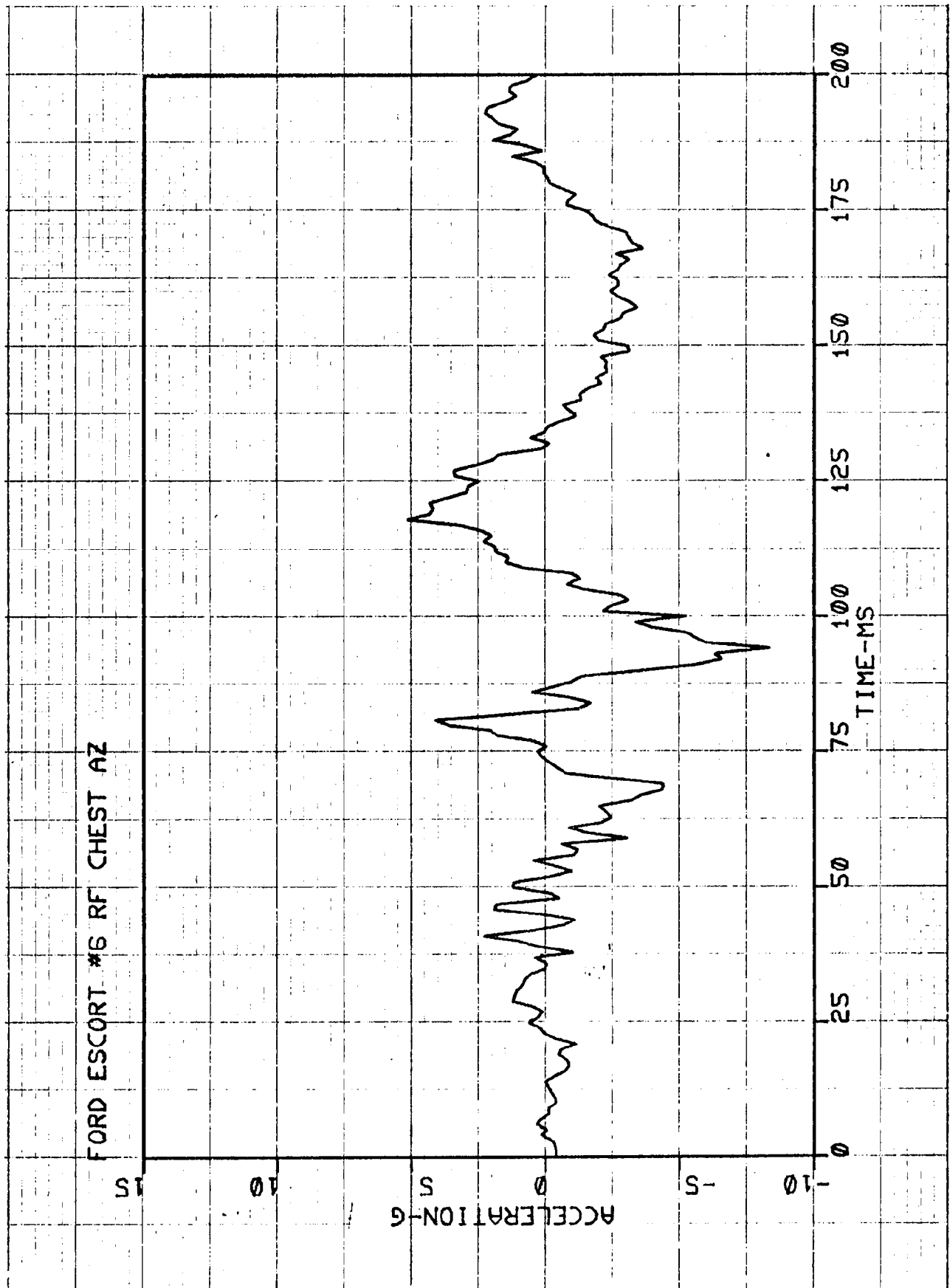


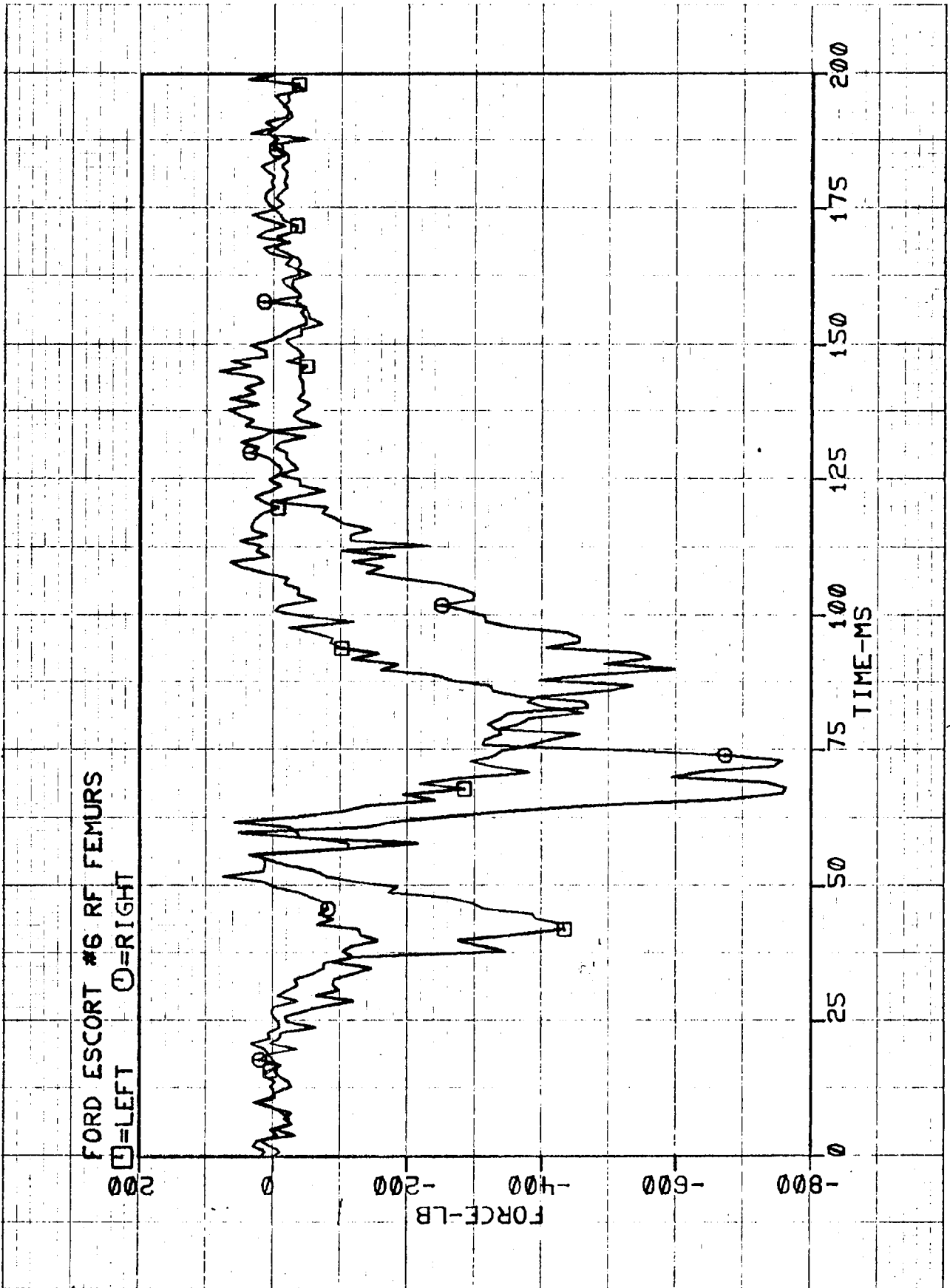


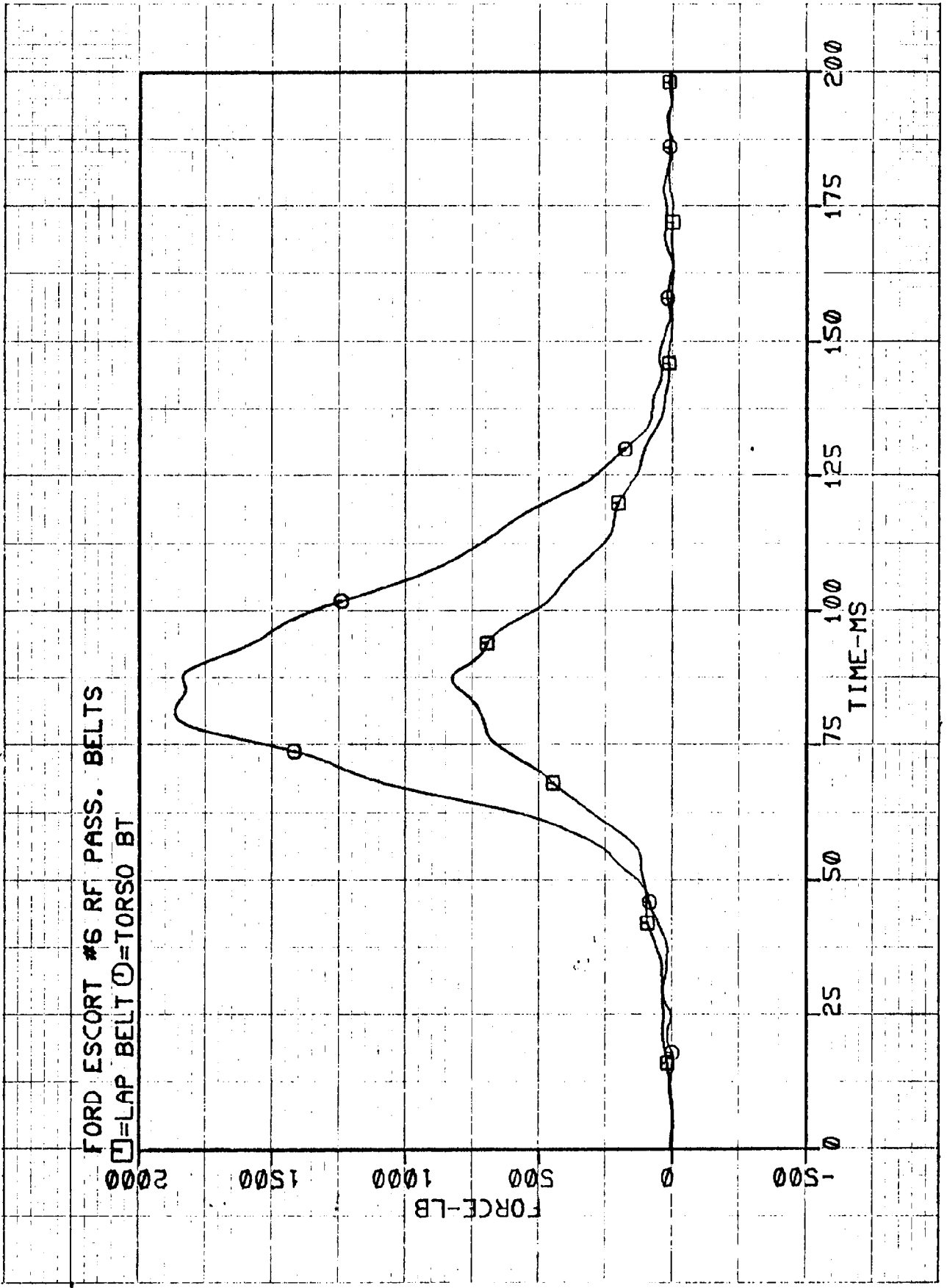


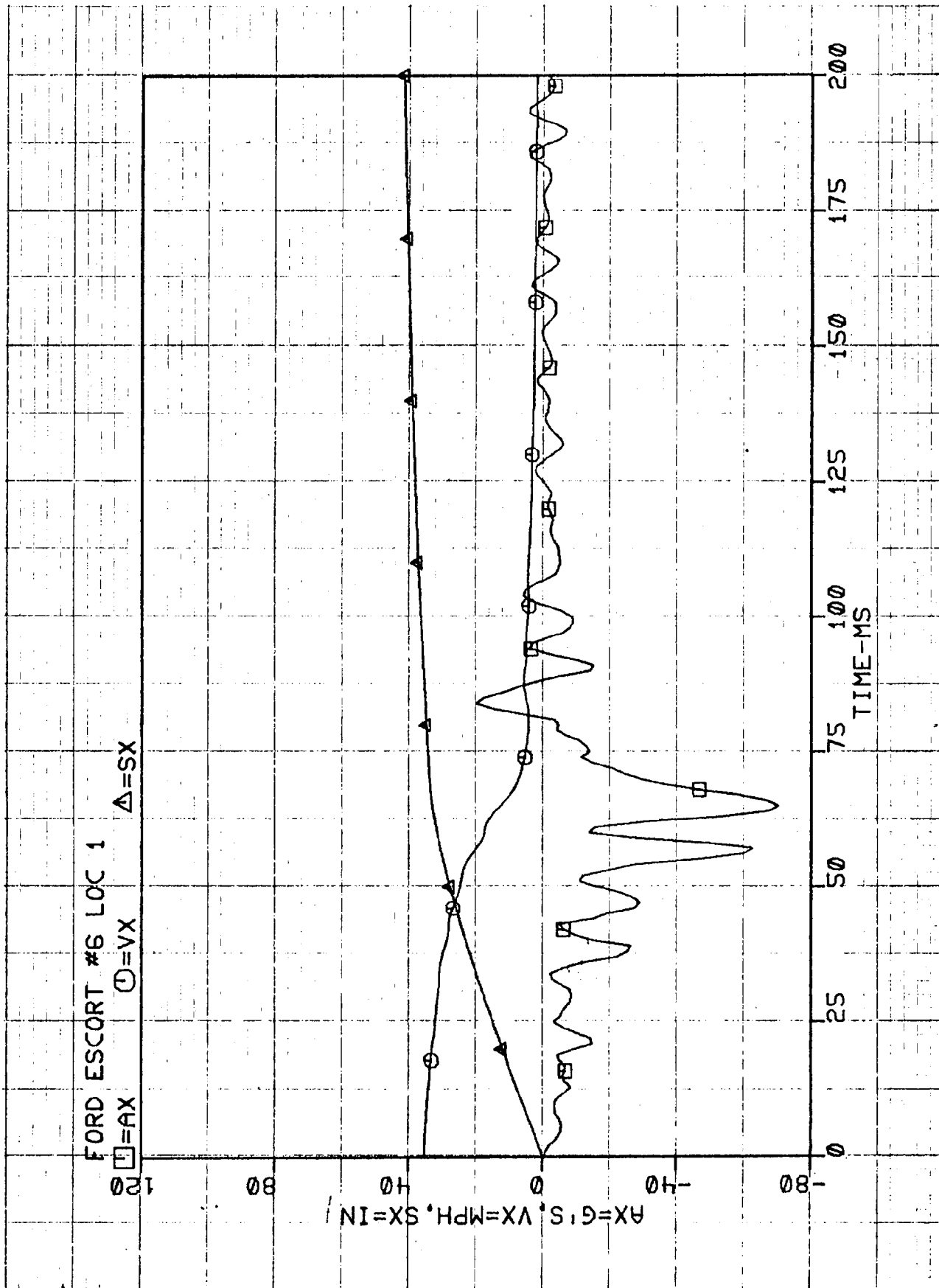


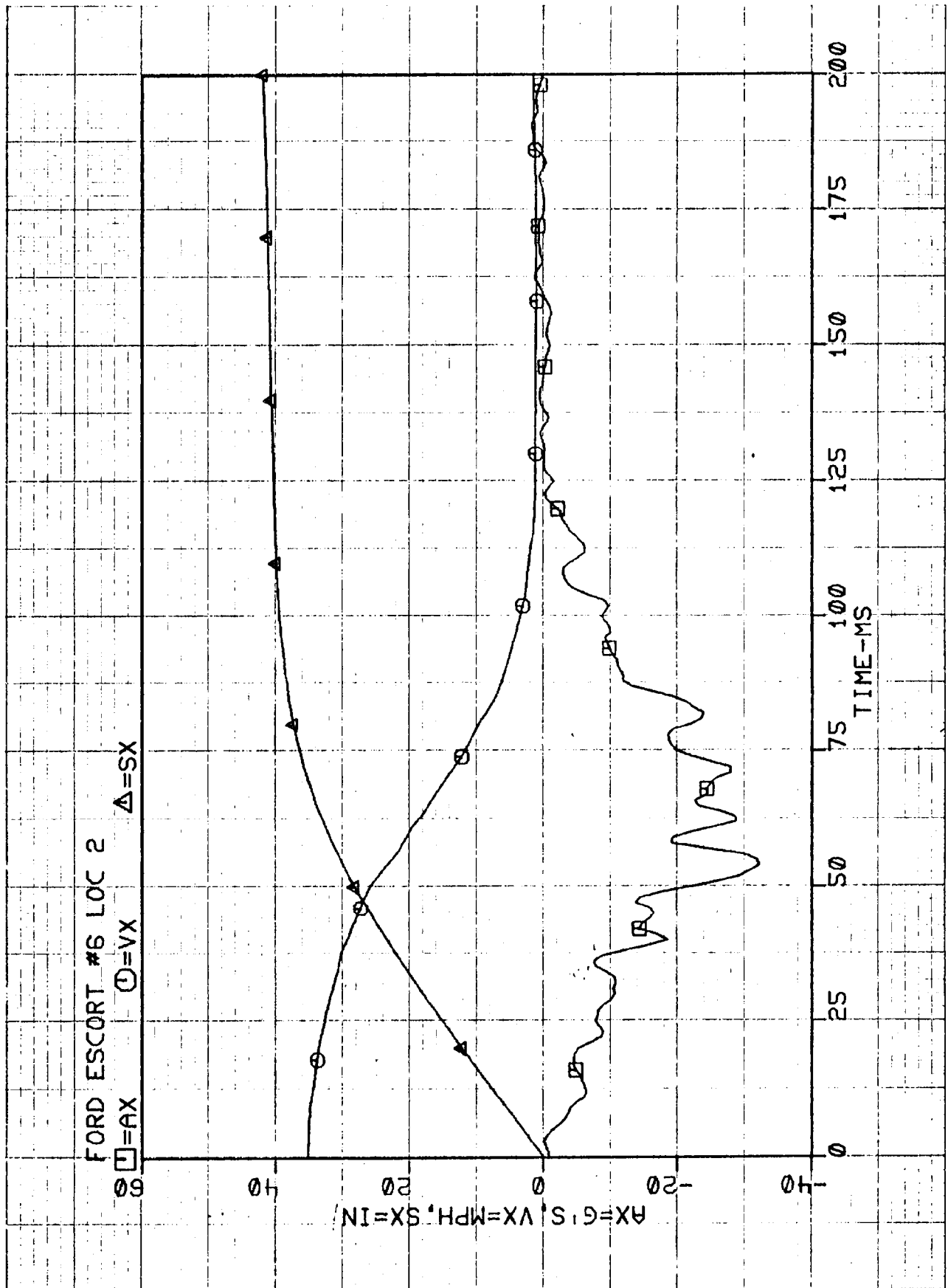












APPENDIX C
DUMMY CALIBRATION

PART 572 DUMMY CALIBRATION TEST DATA

NHTSA Dummy I.D. No.: A08

Laboratory Technician: Haymaker

	Pre-test Calibration	Post-test* Calibration
Date of Dummy Calibration	3/4/81	
Calibration Sequential Number for Dummy	40	
Temperature in Lab. (Spec. = 66 to 78 °F)	72	
Relative Humidity in Lab. (Spec. = 10 to 70%)	54	

Test Parameter	Specification		
1. Head Drop Test:			
a. Peak Resultant Accel	210 - 260G	221	
b. Peak Lateral Accel	< 10G	9	
c. Time above 100G	0.9 - 1.5 ms	1.3	
2. Neck Bending Test:			
a. Pendulum Speed	21.5 - 25.5 fps	22.1	
b. Pendulum Avg Decel (over t ₃ - t ₂)	20 - 24G	22	
c. Peak Resultant Head Acceleration	26G Maximum	17	
d. Pendulum Decel (t ₂ - t ₁)	≤ 3 ms	1	
e. Pendulum Decel (t ₃ -t ₂)	25 - 30 ms	25	
f. Pendulum Decel (t ₄ -t ₃)	≤ 10 ms	7	
g. Pendulum Direction Reversal Time	≥ 123 ms		
h. Maximum Head Rota- tion	63 to 73°	71	
i. Chordal Displacement:			
Head Rotation Angle			
0°	Time	-2 - 2 ms	0
	Displ	-0.5 - 0.5 in.	0
30°	Time	25.6 - 34.4 ms	26.0
	Displ	2.1 - 3.1 in.	2.3
60°	Time	40.3 - 51.7 ms	45.0
	Displ	4.3 - 5.3 in.	4.4
Maximum (73°)	Time	53.2 - 66.8 ms	56.0
	Displ	5.0 - 6.0 in.	5.0

*According to criteria established in NHTSA laboratory procedure TP-212-02, dated April 1, 1980, no post-test dummy calibration was required.

PART 572 DUMMY CALIBRATION TEST DATA (CONTINUED)

NHTSA Dummy I.D. No.: A08

Test Parameter	Specification	Pre-test Calibration	Post-test Calibration
----------------	---------------	----------------------	-----------------------

2. Neck Bending Test:
(Continued)

Head Rotation Angle

60°	Time	67.0 - 83.0 ms	68.0
	Displ	4.3 - 5.3 in.	4.4
30°	Time	85.4 - 104.6 ms	90.0
	Displ	2.1 - 3.1 in.	2.3
0°	Time	101.0 - 123.0 ms	105.0
	Displ	-0.5 - 0.5 in.	0.1

3. Abdominal Compression Test:
(Preload = 10 pounds)

a. Force at 0.5 in.	14 - 26 lb	21
b. Force at 0.75 in.	27 - 40 lb	33
c. Force at 1.0 in.	40 - 53 lb	49
d. Force at 1.3 in.	63 - 78 lb	74

4. Lumbar Flexion Test:

a. Force at 20°	22 - 34 lb	27
b. Force at 30°	34 - 46 lb	39
c. Force at 40°	46 - 58 lb	47
d. Return Angle	12° Maximum	8

5. Chest Impact Tests:

a. High Speed

1) Probe Speed	21.78-22.22 fps	22.02
2) Peak Deflection	1.7 in. Maximum	1.4
3) Peak Resistive Force	2250 lb Maximum	2117
4) Internal Hysteresis	50 - 70%	63

b. Low Speed

1) Probe Speed	13.86-14.14 fps	13.99
2) Peak Deflection	1.1 in. Maximum	0.9
3) Peak Resistive Force	1450 lb Maximum	1319
4) Internal Hysteresis	50 - 70%	65

PART 572 DUMMY CALIBRATION TEST DATA (CONTINUED)

NHTSA Dummy I.D. No.: A08

Test Parameter	Specification	Pre-test Calibration	Post-test Calibration
6. Knee Impact Tests:			
a. Right Side			
1) Probe Speed	6.76 - 7.04 fps	6.80	
2) Maximum Force	1850 - 2500 lb	2441	
3) Time >1000 lb	1.7 ms Minimum	2.0	
b. Left Side			
1) Probe Speed	6.76 - 7.04 fps	7.00	
2) Maximum Force	1850 - 2500 lb	2249	
3) Time >1000 lb	1.7 ms Minimum	2.0	

PART 572 DUMMY CALIBRATION TEST DATA

NHTSA Dummy I.D. No.: A09

Laboratory Technician: Haymaker

	Pre-test Calibration	Post-test* Calibration
Date of Dummy Calibration	3/4/81	
Calibration Sequential Number for Dummy	37	
Temperature in Lab. (Spec. = 66 to 78 °F)	72	
Relative Humidity in Lab. (Spec. = 10 to 70%)	54	

Test Parameter	Specification	
1. Head Drop Test:		
a. Peak Resultant Accel	210 - 260G	228
b. Peak Lateral Accel	< 10G	6
c. Time above 100G	0.9 - 1.5 ms	1.0
2. Neck Bending Test:		
a. Pendulum Speed	21.5 - 25.5 fps	22.1
b. Pendulum Avg Decel (over $t_3 - t_2$)	20 - 24G	22
c. Peak Resultant Head Acceleration	26G Maximum	16
d. Pendulum Decel ($t_2 - t_1$)	≤ 3 ms	1
e. Pendulum Decel ($t_3 - t_2$)	25 - 30 ms	27
f. Pendulum Decel ($t_4 - t_3$)	≤ 10 ms	8
g. Pendulum Direction Reversal Time	≥ 123 ms	
h. Maximum Head Rota- tion	63 to 73°	
i. Chordal Displacement:		
Head Rotation Angle		
0°	Time -2 - 2 ms	0
	Displ -0.5 - 0.5 in.	0
30°	Time 25.6 - 34.4 ms	27.0
	Displ 2.1 - 3.1 in.	2.3
60°	Time 40.3 - 51.7 ms	44.0
	Displ 4.3 - 5.3 in.	4.4
Maximum	Time 53.2 - 66.8 ms	57.0
(73°)	Displ 5.0 - 6.0 in.	5.0

*According to criteria established in NHTSA laboratory procedure TP-212-02, dated April 1, 1980, no post-test dummy calibration was required.

PART 572 DUMMY CALIBRATION TEST DATA (CONTINUED)

NHTSA Dummy I.D. No.: A09

Test Parameter	Specification	Pre-test Calibration	Post-test Calibration
2. Neck Bending Test: (Continued)			
Head Rotation Angle			
60°	Time	67.0 - 83.0 ms	73.0
	Displ	4.3 - 5.3 in.	4.4
30°	Time	85.4 - 104.6 ms	92.0
	Displ	2.1 - 3.1 in.	2.3
0°	Time	101.0 - 123.0 ms	107.0
	Displ	-0.5 - 0.5 in.	-0.09
3. Abdominal Compression Test: (Preload = 10 pounds)			
a. Force at 0.5 in.	14 - 26 lb	24	
b. Force at 0.75 in.	27 - 40 lb	32	
c. Force at 1.0 in.	40 - 53 lb	46	
d. Force at 1.3 in.	63 - 78 lb	66	
4. Lumbar Flexion Test:			
a. Force at 20°	22 - 34 lb	31	
b. Force at 30°	34 - 46 lb	40	
c. Force at 40°	46 - 58 lb	53	
d. Return Angle	12° Maximum	6	
5. Chest Impact Tests:			
a. High Speed			
1) Probe Speed	21.78-22.22 fps	22.00	
2) Peak Deflection	1.7 in. Maximum	1.4	
3) Peak Resistive Force	2250 lb Maximum	2013	
4) Internal Hysteresis	50 - 70%	57	
b. Low Speed			
1) Probe Speed	13.86-14.14 fps	13.98	
2) Peak Deflection	1.1 in. Maximum	0.9	
3) Peak Resistive Force	1450 lb Maximum	1284	
4) Internal Hysteresis	50 - 70%	58	

PART 572 DUMMY CALIBRATION TEST DATA (CONTINUED)

NHTSA Dummy I.D. No.: A09

Test Parameter	Specification	Pre-test Calibration	Post-test Calibration
6. Knee Impact Tests:			
a. Right Side			
1) Probe Speed	6.76 - 7.04 fps	6.80	
2) Maximum Force	1850 - 2500 lb	1876	
3) Time >1000 lb	1.7 ms Minimum	2.0	
b. Left Side			
1) Probe Speed	6.76 - 7.04 fps	6.80	
2) Maximum Force	1850 - 2500 lb	1977	
3) Time >1000 lb	1.7 ms Minimum	2.0	