DOT-HS-805 335

Dynamic Science Report No. 212-DYS-81-005
Dynamic Science Report No. 219-DYS-81-005
Dynamic Science Report No. 301-DYS-81-005

NEW VEHICLE ASSESSMENT AND STANDARDS ENFORCEMENT INDICANT TESTING

FMVSS 212, 219, AND 301-75

CHRYSLER CORPORATION
1981 CHRYSLER IMPERIAL
NHTSA 810307

Prepared by:

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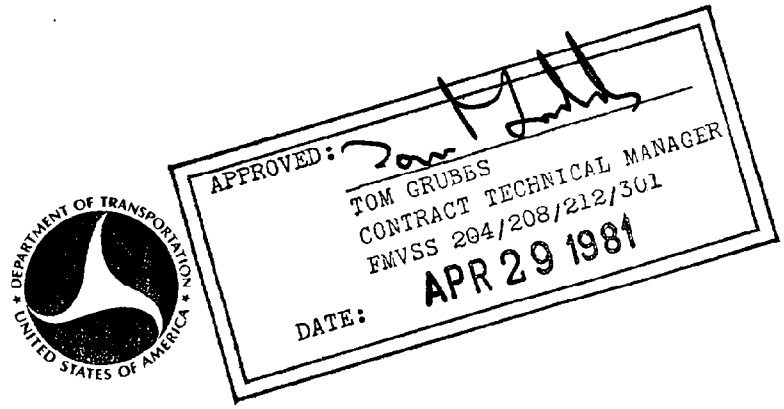

March 1981

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.
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Prepared by Joan E. Keltner

Approved by Robert Gemmell

Date April 6, 1981

TOM GRUBBS

NHTSA Contract Technical Manager

APR 29 1981

Date of Report Acceptance

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report	2. Government Accession No.	3. Recipient's Catalog No.

4. Title and Subtitle 212, 219, and 301-75 NEW VEHICLE ASSESSMENT AND STANDARDS ENFORCEMENT INDICANT TESTING - 1981 Chrysler Imperial - NHTSA 810307	5. Report Date March 1981 6. Performing Orgn Code
7. Author(s) Mark Pozzi, Project Engineer	8. Performing Orgn Rpt No. 3103-81-017
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
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Vehicle Safety Compliance 400 Seventh st. SW, Washington, D.C. 20590	13. Type of Report and Period Covered FINAL REPORT February 1981 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 NHTSA fixed load-measuring barrier at a speed of 34.96 mph.

The test was conducted at the Dynamic Science, Inc., Deer Valley facility on February 23, 1981 with the following results:

a) FMVSS 212 - Loss of windshield periphery was within requirements of

b) FMVSS 219 - No intrusion into windshield protected zone.

c) FMVSS 301-75 - Fuel leakage was within the requirements of FMVSS 301-75.

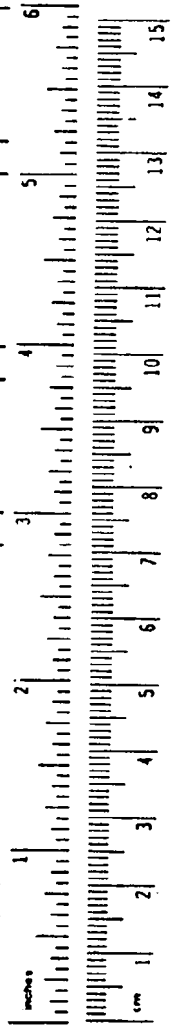
17. Key Words FMVSS 212 - Windshield Mounting, FMVSS 219 - Windshield Zone Intrusion, FMVSS 301-75 - Fuel System Integrity, Vehicle Assessment, Frontal Impact, Load-Measuring Barrier, Occupant Response	18. Distribution Statement Copies of this report are available from Technical Reference Division, National Highway Traffic Safety Administration, Room 5108, Nassif Building, 400 7th St. SW, Washington, D.C. 20590		
19. Security Classif. (of this report) Classified	20. Security Classif. (of this page) Classified	21. No. Pages	22. Price

Form DOT F 1700.7 (8-69)

METRIC CONVERSION FACTORS

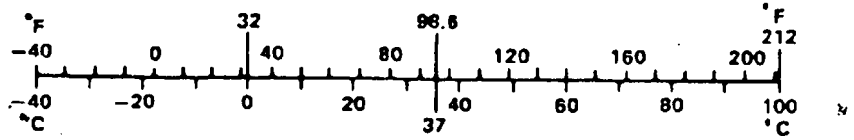
Approximate Conversions to Metric Measures

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 (2000 lb)	0.9	metric ton	t
	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 (10 000 m^2)	2.5	acres	
	MASS (weight)			
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	metric ton (1000 kg)	1.1	short tons	
	VOLUME			
mL	milliliters	0.03	fluid ounces	fl oz
mL	milliliters	0.06	cubic inches	in^3
L	liters	2.1	pints	pt
L	liters	1.06	quarts	qt
L	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
	TEMPERATURE (exact)			
°C	degrees Celsius	9/5 (then add 32)	degrees Fahrenheit	°F



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SECTION 1
PURPOSE AND INTRODUCTION

PURPOSE

The purpose of the test was to subject a 1981 Chrysler Imperial to the indicant test requirements of DOT Test Plan TP-212-02, April 01, 1980, Standard Enforcement Indicant Testing for FMVSS No. 212, "Windshield Mounting," FMVSS No. 219, "Windshield Zone Intrusion," and FMVSS 301-75, "Fuel System Integrity." Calibrated Part 572 50th percentile male dummies were utilized to acquire data relative to FMVSS 208, "Occupant Crash Protection." 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. Section 4 contains Occupant and Vehicle Response Data. 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 describe the General Test and Vehicle Parameter Data.

GENERAL TEST AND VEHICLE PARAMETER DATA

PRE-IMPACT DATA

Make/Model: Chrysler Imperial
Body Style: 2-door Hardtop Model Year: 1981
NHTSA No.: 810307 DSI No. 1135 Color: Green

DATA FROM CERTIFICATION LABEL

Vehicle Manufacturer: Chrysler Canada LTD
Date of Manufacture: 9/80 ; VIN: 2A3BY62J4BR110342
GVWR: 5240 lb; GAWR: Front = 2695 lb; Rear = 2595 lb

DATA FROM "RECOMMENDED TIRE PRESSURE" LABEL

Vehicle Capacity: FRONT REAR RECOMMENDED LOAD RANGE:
Tire Pressure: 29 psi 29 psi Tire Size: B
P205/75R15

Designated Seating: 2 Front 3 Rear 5 Total
Cargo load = 200 lb Is Spare Tire: Space Saver? Yes
TOTAL = 1100 lb Standard Equipment? Yes
Engine: 8 Cylinder, 5.2 Litre displacement
Transmission: 3-speed automatic, rear wheel drive
Date Vehicle Received by Laboratory: 11/14/80
Dealer Name & Address: Lanker Chrysler/Plymouth
4600 W. Glendale Ave., Glendale, AZ
Remarks: Production vehicle with standard 3-point restraint belt system.

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

Right Front = 1144 lb Right Rear = 891 lb
Left Front = 1182 lb Left Rear = 820 lb
TOTAL FRONT WEIGHT = 2326 lb (57.6 % of Total Vehicle Weight)
TOTAL REAR WEIGHT = 1711 lb (42.4 % of Total Vehicle Weight)
TOTAL DELV. WEIGHT = 4037 lb
TARGET WEIGHT = UDW + Cargo Load + 328 lbs Dummies = 4565 lb *

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

Right Front = 1131 lb Right Rear = 1131 lb
Left Front = 1219 lb Left Rear = 1081 lb
TOTAL FRONT WEIGHT = 2350 lb (51.5 % of Total Vehicle Weight)
TOTAL REAR WEIGHT = 2212 lb (45.5 % of Total Vehicle Weight)
TOTAL TEST WEIGHT = 4562 lb
Weight of ballast secured in vehicle trunk area = 200 lb

VEHICLE ATTITUDE: (inches)

Delivered Attitude:	RF	31.0	LF	31.0	RR	31.0	LR	31.0
Test Attitude:	RF	31.5	LF	31.0	RR	29.0	LR	28.8

GENERAL TEST AND VEHICLE PARAMETER DATA (CONTD)

POST-TEST DATA

Type of Test: Frontal (0°) Impact.
Date of Test: 2/23/81 Time: 1428 Temperature 81 °F
Required Impact Velocity Range: 34.5 to 35.5 mph
Impact Velocity: Primary = 34.96 mph Secondary = 34.96 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.)

		R	L
Vehicle Length:	Pre-test =	209.4	209.4
	Post-test =	179.1	179.7
	Crash =	30.3	29.7
Distance from front of test vehicle to point of impact (in.):		14.1	15.3

VISIBLE DUMMY CONTACT POINTS

	Driver	Passenger
Head	Steering wheel upper rim	None
Chest	None	None
Abdomen	Steering wheel lower rim	None
Left Knee	Dash panel	Glovebox
Right Knee	Dash panel	Glovebox

DOOR OPENING

Front		Rear	
Left	Right	Left	Right
Tools Required	Tools Required	N/A	N/A

SEAT MOVEMENT

Seatback Failure	None	None
Seat Shift (in.)	0	0

GLAZING DAMAGE

Windshield/Backlight: 100% shattered; deformed by dash.

OTHER NOTABLE IMPACT EFFECTS: Both front tires totally deflated and pinned by crushed sheet metal. Floorpan sheet metal separated from rocker panel immediately aft of both A pillars. Steering column sheared completely free of dash and had substantial lateral and vertical play. Driveshaft bent severely. Rear axle bent rearward. Right side of differential split. Front edge of hood split but latch did not fail.

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 FMVSS 212 DATA

PRE-IMPACT DATA

Make/Model: Chrysler Imperial

Body Style: 2-door Hardtop Model Year: 1981

NHTSA No. 810307 DSI No. 1135 Color: Green

DATA FROM CERTIFICATION LABEL

Vehicle Manufacturer: Chrysler Canada LTD

Date of Manufacture: 9/80 ; VIN 2A3BY62J4BR110342

GVWR: 5240 lb; GAWR: Front = 2695 lb; Rear 2595 lb

POST-IMPACT DATA

Type of Test: Frontal (0°) Impact

Date of Test: 2/23/81 Time: 1428 Temperature 81 °F

Required Impact Velocity Range: 34.5 to 35.5 mph

Impact Velocity: Primary = 34.96 mph Secondary = 34.96 mph

Test weight: 4562 lb Static crush: 33.6 in.

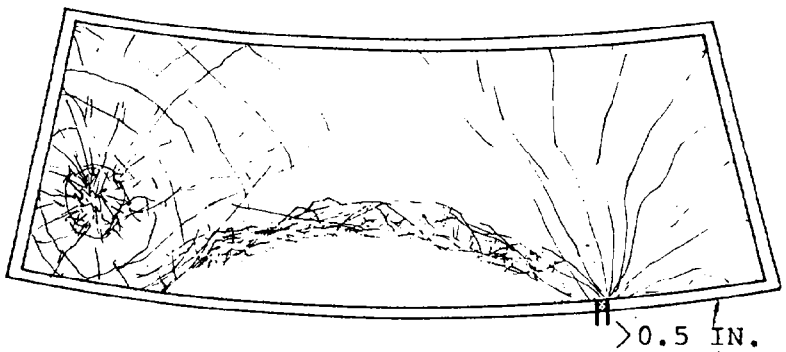
Rebound distance: 14.1 in.

DETAILS OF WINDSHIELD MOUNTING: The entire windshield periphery is pressed into a soft mastic. The bottom of the windshield is overlapped by a 3-inch metal strip which is screwed into the upper part of the firewall. The sides and top are secured by a 3/4-inch chrome strip which is mounted with clips. There is an unattached Y-shaped plastic strip inside the chrome strips.

	WINDSHIELD PERIPHERY	
	Pre-test	Post-test
RIGHT SIDE	83.7	83.7
LEFT SIDE	83.7	83.2
TOTAL	167.4	166.9

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: Small area at bottom of crack on left side; less than 0.5 inch.



FRONT VIEW

SUMMARY OF FMVSS 212 DATA

PRE-IMPACT DATA

Make/Model: Chrysler Imperial

Body Style: 2-door Hardtop Model Year: 1981

NHTSA No. 810307 DSI No. 1135 Color: Green

DATA FROM CERTIFICATION LABEL

Vehicle Manufacturer: Chrysler Canada LTD

Date of Manufacture: 9/80 ; VIN 2A3BY62J4BR110342

GVWR: 5240 lb; GAWR: Front = 2695 lb; Rear 2595 lb

POST-IMPACT DATA

Type of Test: Frontal (0°) Impact

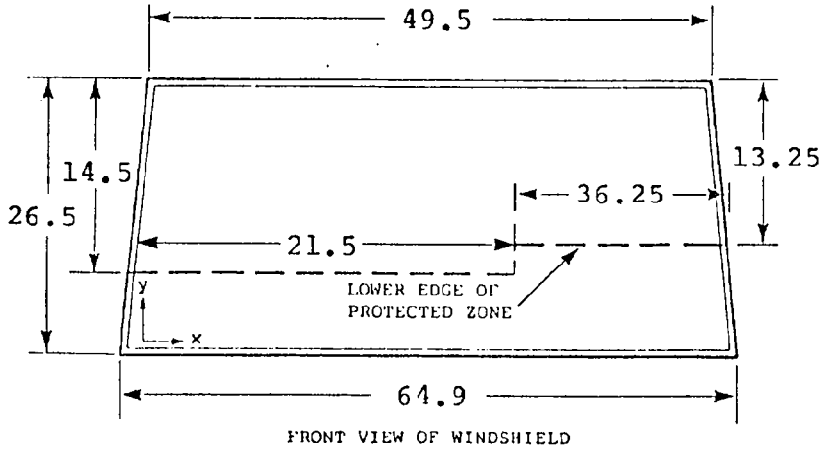
Date of Test: 2/23/81 Time: 1428 Temperature 81 °F

Required Impact Velocity Range: 34.5 to 35.5 mph

Impact Velocity: Primary = 34.96 mph Secondary = 34.96 mph

Test weight: 4562 lb Static crush: 33.6 in.

Rebound distance: 14.1 in.



FRONT VIEW OF WINDSHIELD

A. The area that the "Protected Zone" that the inner 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

SUMMARY OF FMVSS 219 DATA (CONTD)

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

PRE-IMPACT DATA

Make/Model: Chrysler Imperial
Body Style: 2-door Hardtop Model Year: 1981
NHTSA No. 810307 DSI No. 1135 Color: Green

DATA FROM CERTIFICATION LABEL

Vehicle Manufacturer: Chrysler Canada LTD
Date of Manufacture: 9/80; VIN: 2A3BY62J4BR110342
GVWR: 5240 lb; GAWR: Front = 2695 lb; Rear 2595 lb

POST-IMPACT DATA

Type of Test: Frontal (0°) Impact
Date of Test: 2/23/81 Time: 1428 Temperature 81 °F
Required Impact Velocity Range: 34.5 to 35.5 mph
Impact Velocity: Primary = 34.96 mph Secondary = 34.96 mph
Test Weight: 4562 lb Static Crush: 33.6 in.
Rebound: 14.1 in.

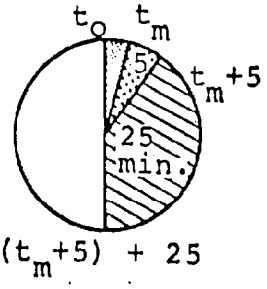
FUEL SYSTEM DATA

Test Fluid: Stoddard Solvent Specific Gravity: 0.764
Kinematic Viscosity: 0.99 centistokes
Test Volume: 18.4 U.S. gallons

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: Rectangular metal tank is mounted under trunk with filler neck on left rear quarter panel. Metal fuel lines exit tank on left, cross in front of tank, to outside of right frame rail inside right rear wheelwell. They follow right side frame up to fuel filters, then up firewall and enter electronic fuel injection system. Electric fuel pump is located inside fuel tank.

FUEL SPILLAGE MEASUREMENT

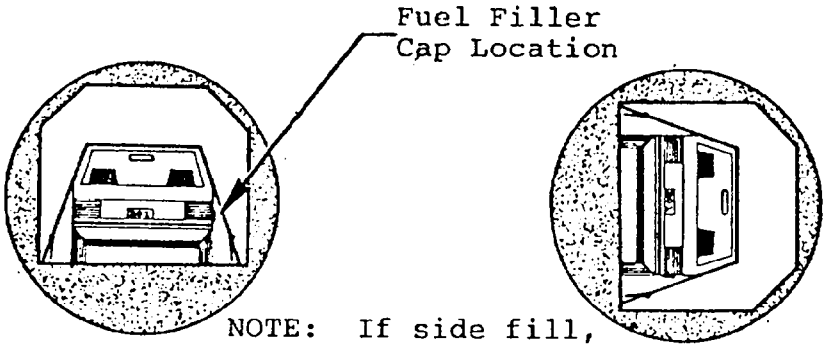


		ACTUAL	MAXIMUM ALLOWABLE
1.	From impact until vehicle motion ceases	0	1 oz
2.	For 5-minute period after vehicle motion ceases	0	5 oz
3.	For next 25 minutes	0	1 oz/1 min

SOLVENT SPILLAGE DETAILS: None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 0° to 90° VEHICLE NHTSA NO. 810307



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

DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

FMVSS 301 Position Hold Time..... = 5 min, 0 sec =

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

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

FMVSS 301 REQUIREMENTS AND ACTUAL TEST RESULTS:

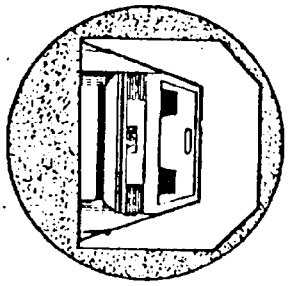
Time Period	First 5 min (from onset)	6th min	7th min	8th min (if req'd)
Maximum Spillage Allowed (oz)	5	1	1	1
Actual Spillage Recorded	Trace	Trace	Trace	---

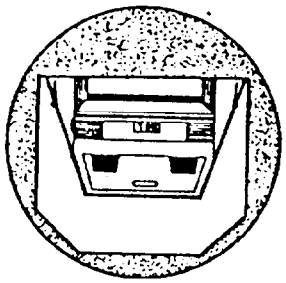
NOTE: Spillage is recorded in whole minute intervals only - as determined above.

SOLVENT SPILLAGE LOCATION(S): Fuel line entering fuel filters below right A pillar.

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 90° to 180° VEHICLE NHTSA NO. 810307





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:

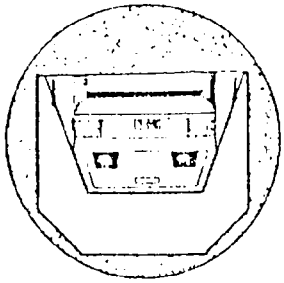
Time Period	First 5 min (from onset)	6th min	7th min	8th min (if req'd)
Maximum Spillage Allowed (oz)	5	1	1	1
Actual Spillage Recorded	Trace	Trace	Trace	---

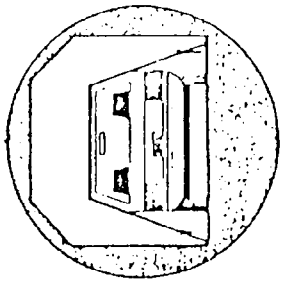
NOTE: Spillage is recorded in whole minute intervals only - as determined above.

SOLVENT SPILLAGE LOCATION(S): Fuel line entering fuel filters below right A pillar.

FMVSS 301-75 INDICANT STATIC ROLLOVER DATA SHEET

TEST PHASE: 180° to 270° VEHICLE NHTSA NO. 810307





DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time.... = 1 min, 35 sec +
(Spec. Range = 1 to 3 min)

FMVSS 301 Position Hold Time..... = 5 min, 0 sec =

Total..... = 6 min, 35 sec

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

FMVSS 301 REQUIREMENTS AND ACTUAL TEST RESULTS:

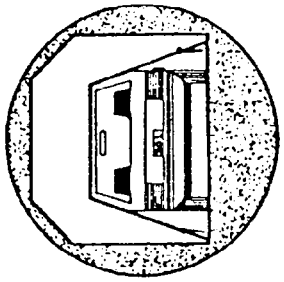
Time Period	First 5 min (from onset)	6th min	7th min	8th min (if req'd)
Maximum Spillage Allowed (oz)	5	1	1	1
Actual Spillage Recorded	Trace	Trace	Trace	---

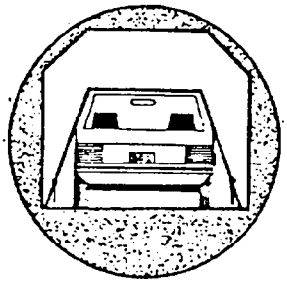
NOTE: Spillage is recorded in whole minute intervals only - as determined above.

SOLVENT SPILLAGE LOCATION(S): Carburetor and fuel line entering fuel filters below right A pillar.

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 270° to 360° VEHICLE NHTSA NO. 810307





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	Trace	Trace	Trace	---

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

SOLVENT SPILLAGE LOCATION(S): Fuel line entering fuel filters below right A pillar.

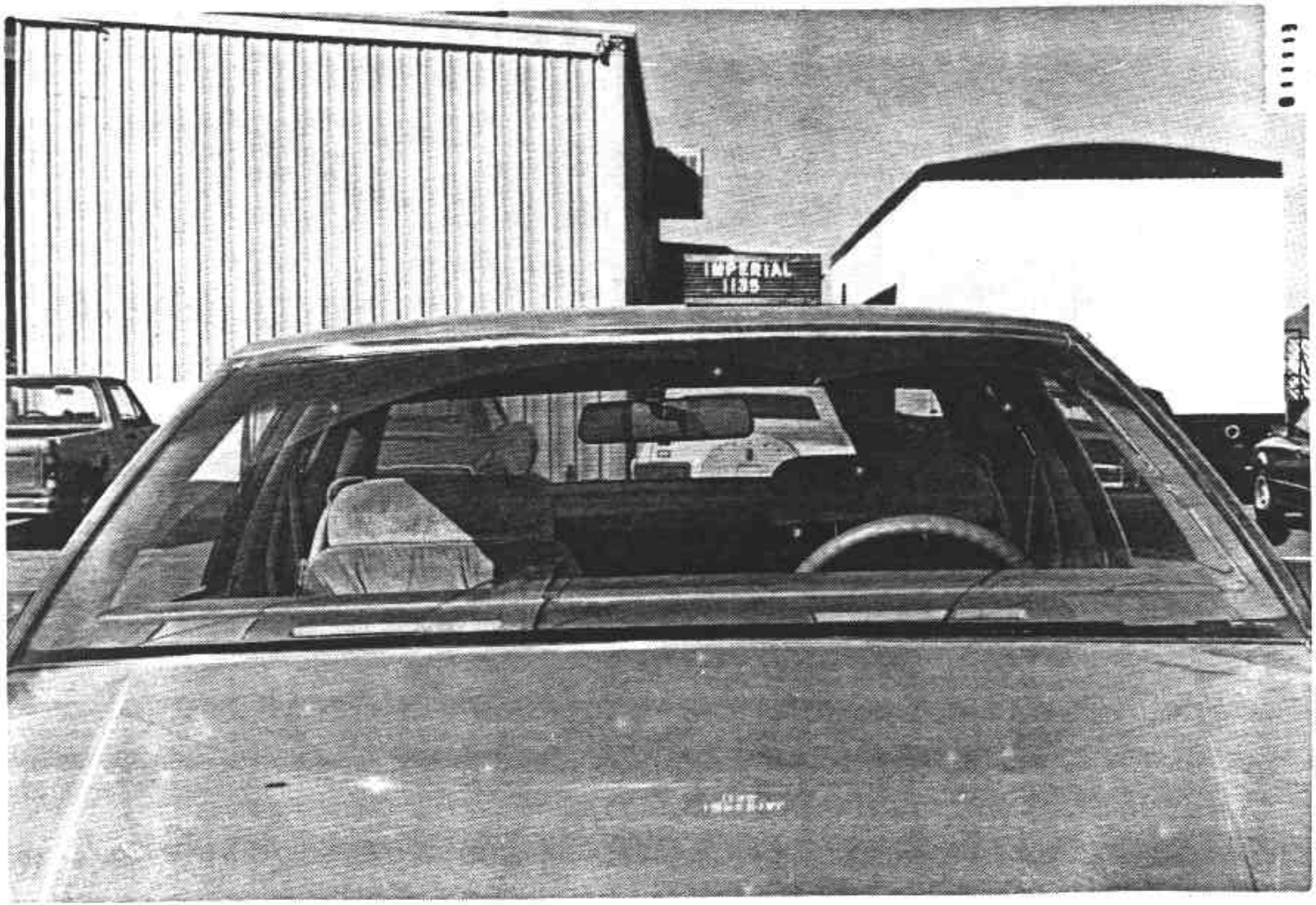


FIGURE 3-1. PRE-TEST WINDSHIELD - OVERALL VIEW - 1931 CHRYSLER IMPERIAL - NHTSA 810307.

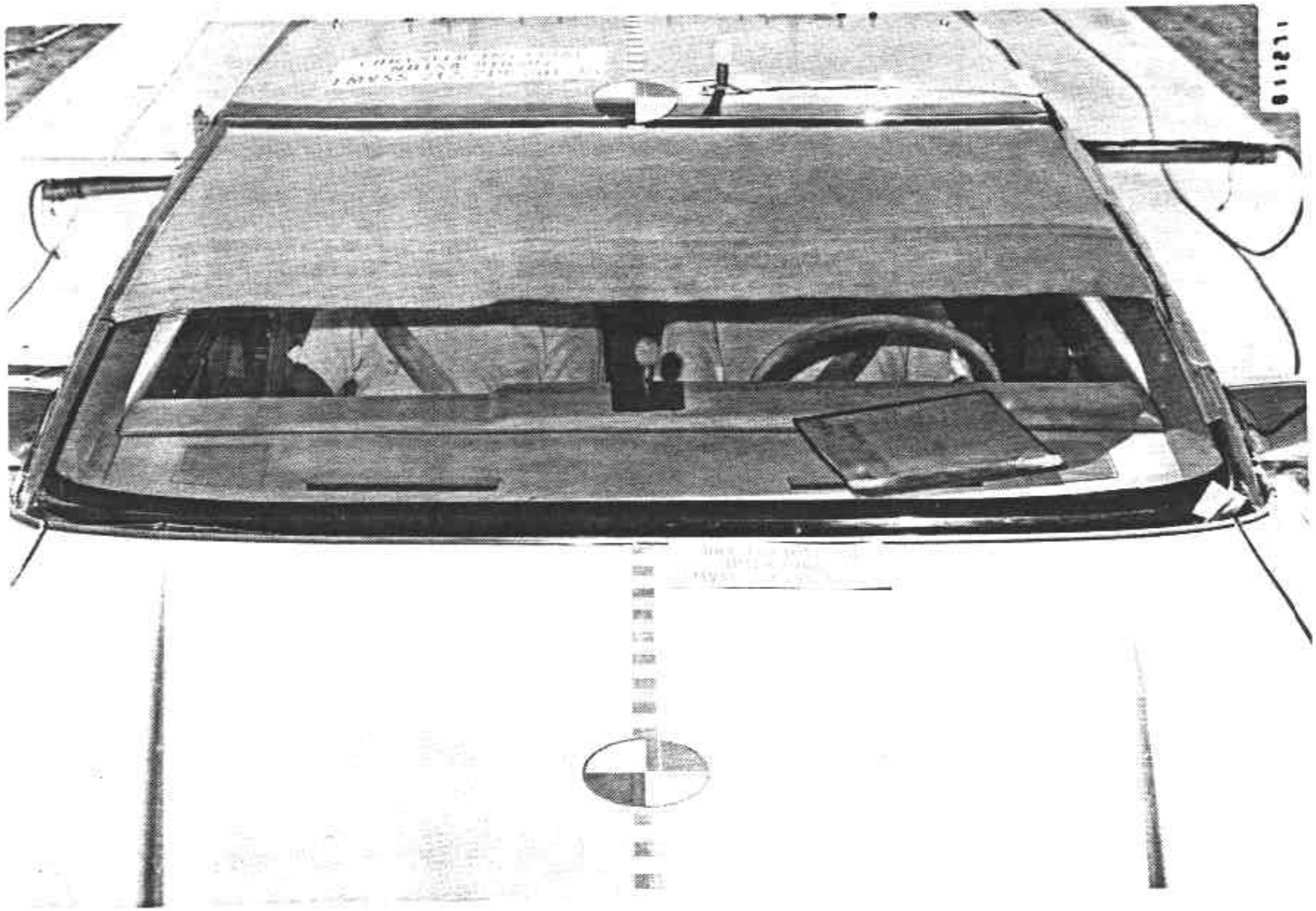


FIGURE 3-2. PRE-TEST WINDSHIELD - OVERALL VIEW - 1981 CHRYSLER IMPERIAL - NHTSA 810307.

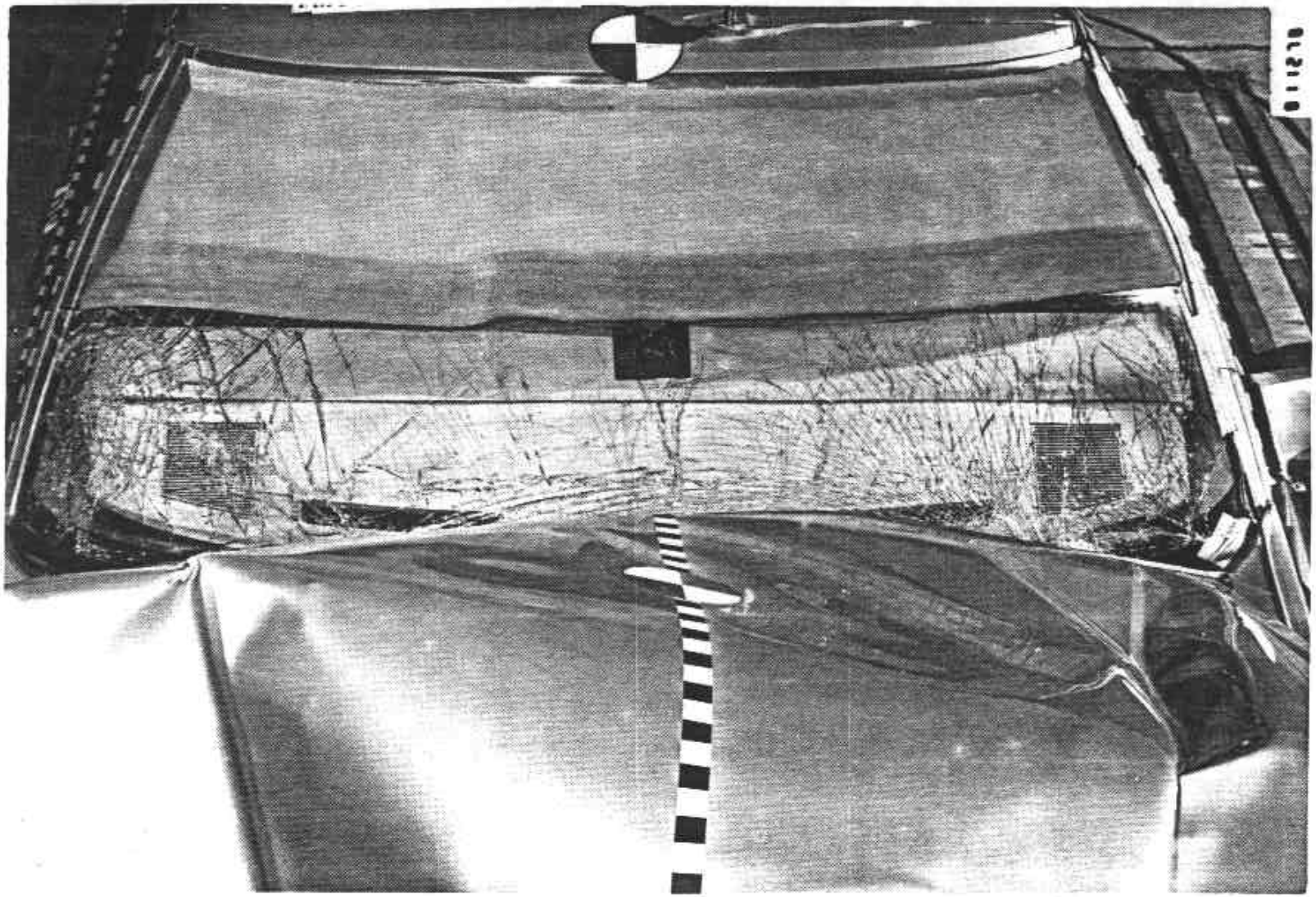


FIGURE 3-3. POST-TEST WINDSHIELD - OVERALL VIEW - 1981 CHRYSLER IMPERIAL - NHTSA 810307.

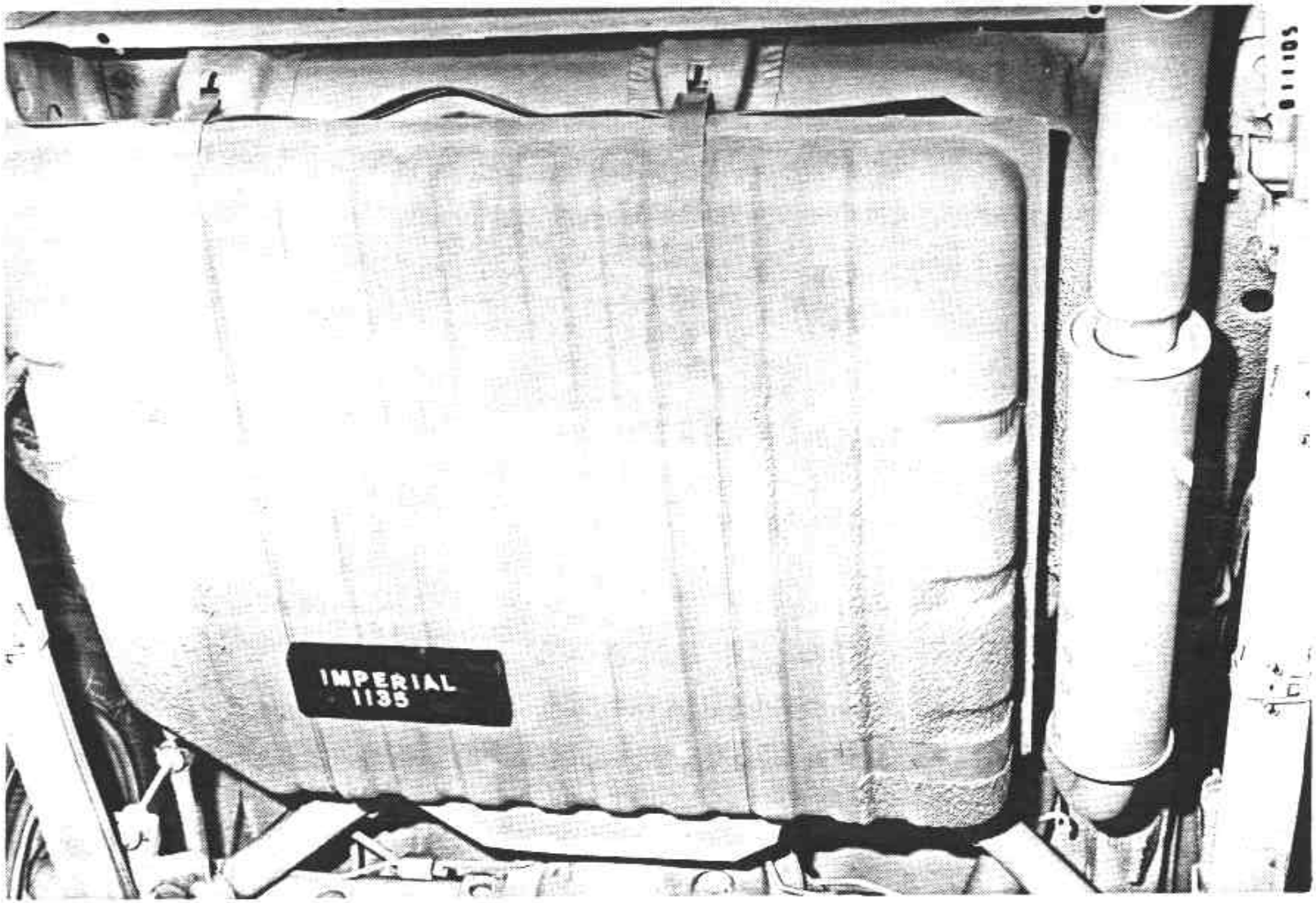


FIGURE 3-4. PRE-TEST VIEW OF FUEL TANK - 1981 CHRYSLER IMPERIAL - NHTSA 810307.

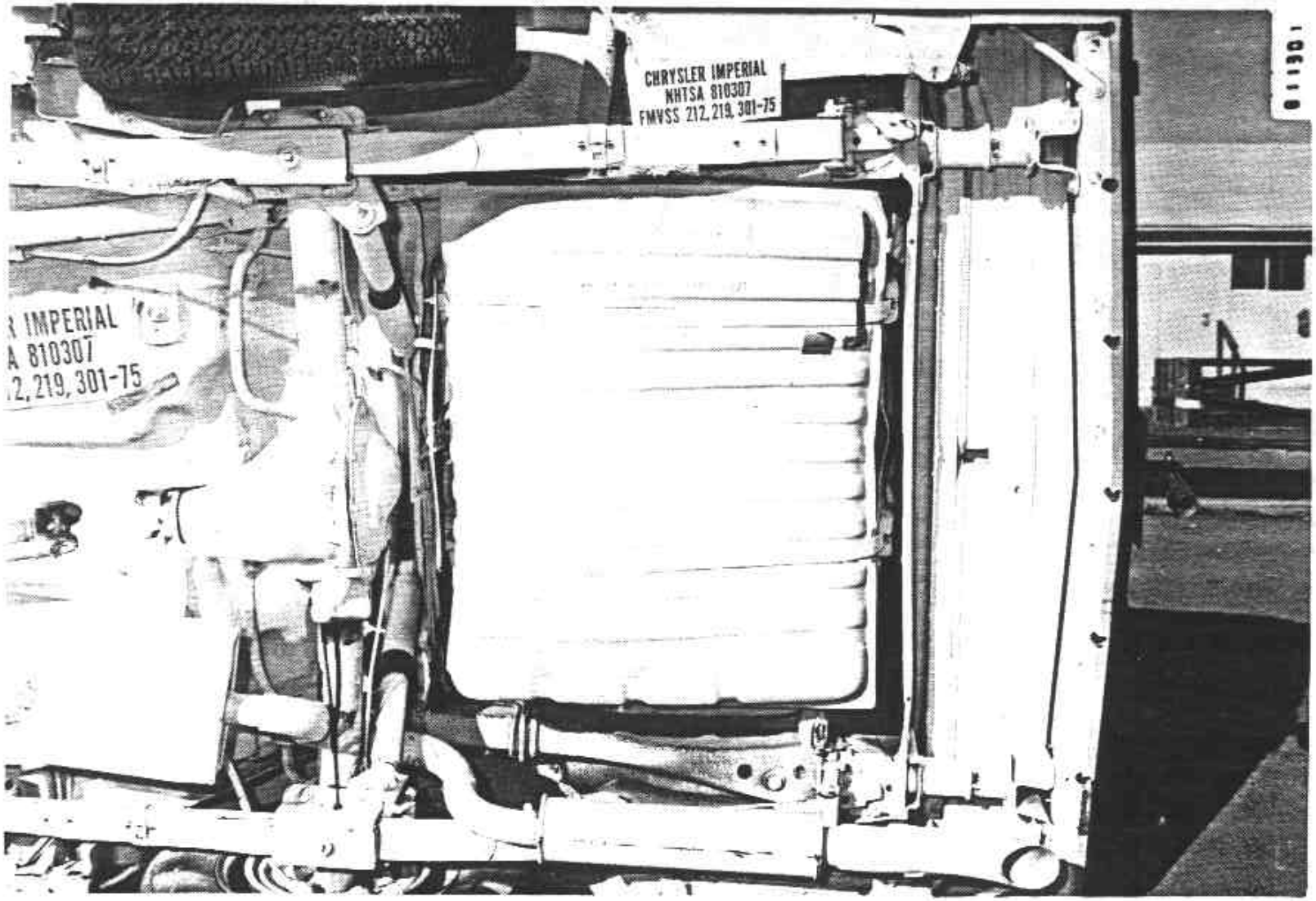


FIGURE 3-5. POST-TEST VIEW OF FUEL TANK - 1981 CHRYSLER IMPERIAL - NHTSA 810307.

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.

PART 572 DUMMY IN-VEHICLE POSITION RECORDING SHEET

PRE-IMPACT DATA

Make/Model: Chrysler Imperial

Body Style: 2-door Hardtop Model Year: 1981

NHTSA No. 810307 DSI No. 1135 Color: Green

DATA FROM CERTIFICATION LABEL

Vehicle Manufacturer: Chrysler Canada LTD

Date of Manufacture: 9/80 ; VIN 2A3BY62J4BR110342

GVWR: 5240 lb; GAWR: Front = 2695 lb; Rear 2595 lb

POST-IMPACT DATA

Type of Test: Frontal (0°) Impact

Date of Test: 2/23/81 Time: 1428 Temperature 81 °F

Required Impact Velocity Range: 34.5 to 35.5 mph

Impact Velocity: Primary = 34.96 mph Secondary = 34.96 mph

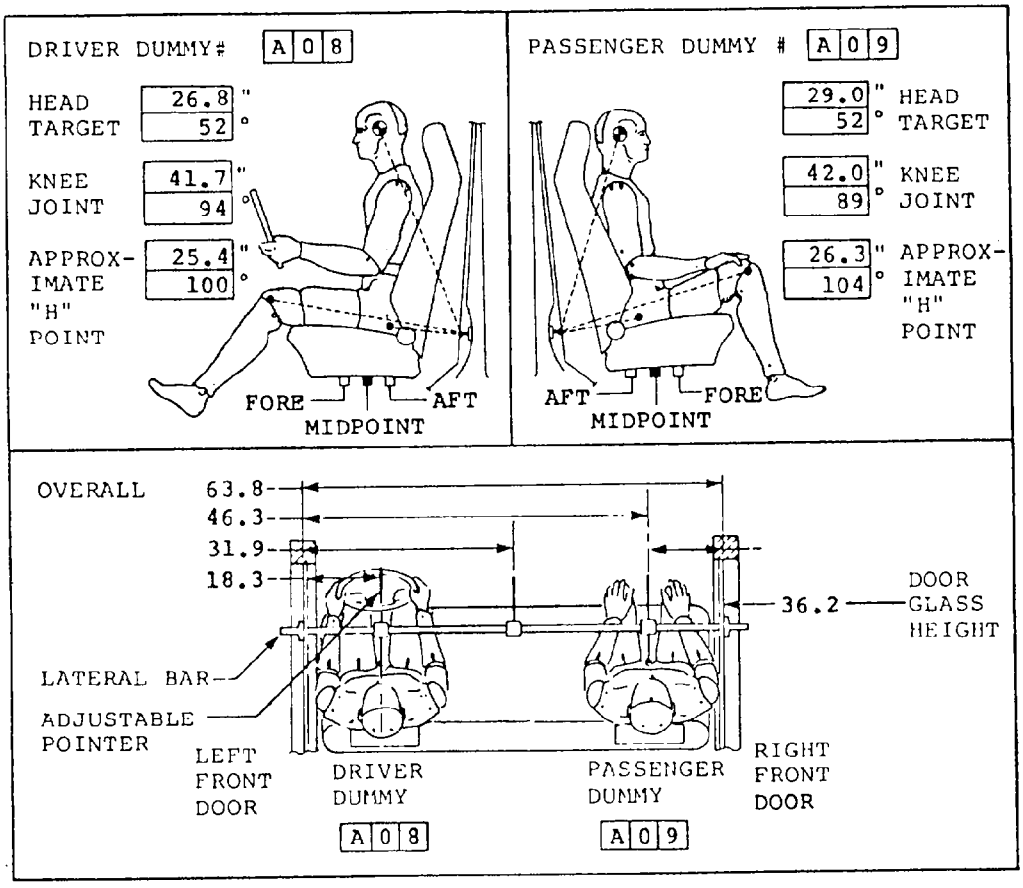
Test weight: 4562 lb Static crush: 33.6 in.

Rebound distance: 14.1 in.

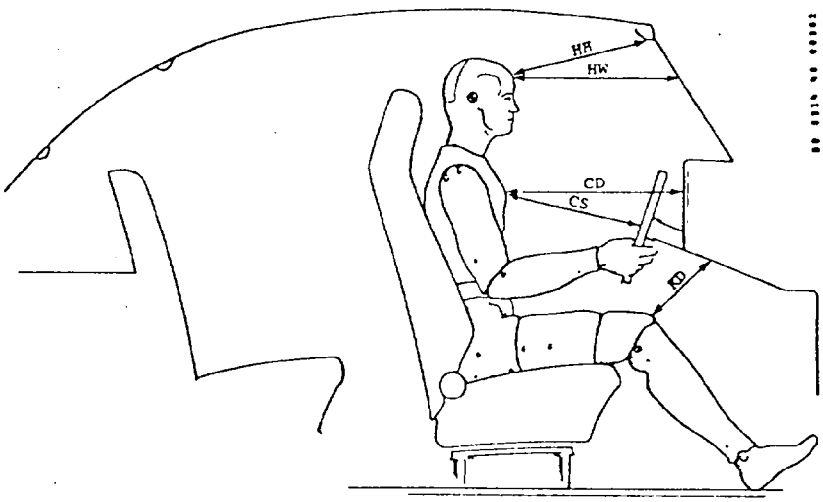
Seat Type: Split bench Adjuster Type: Power

Seat Back Type: Power Reclining

Technicians: Mark Pozzi, Terry Bjork, Jim Shirrit

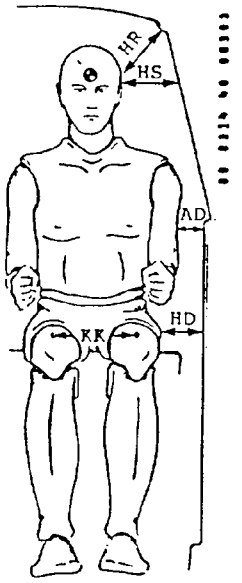


PART 572 DUMMY IN-VEHICLE POSITION RECORDING SHEET



	Driver	Passenger
HH	14.0	13.5
HW	20.0	19.5
CD	19.5	19.9
CS	12.8	N/A
KD	7.3	5.8
Torso Angle 25°		Torso Angle 25°
Seat Back Angle 27°		Seat Back Angle 27°
HSW 19.8		Head Dash 25.3

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



REMARKS: Dummies positioned according to OVSC recommended procedure.

	Driver	Passenger
HR	7.0	6.3
HS	9.0	9.0
AD	5.2	5.0
HD	6.8	6.3
KK	9.0	9.0
AA	10.0	10.0

DUMMY KINEMATIC SUMMARY

DRIVER - Driver began to rotate forward ≈30 ms into crash. The steering wheel began to displace rearward and upward at ≈57 ms, and the driver's chest contacted the lower rim at ≈76 ms. The driver's head had begun a forward rotation relative to the torso at ≈62 ms, and the lower forehead of the dummy struck the upper steering wheel rim at ≈83 ms with the head rotated slightly counterclockwise. The head then slid down the rim and maximum forward motion occurred at ≈107 ms. The dummy then rebounded into the seat with the head hitting the headrest at ≈165 ms, and came to rest with no discernible lateral lean.

PASSENGER - After impact, the passenger dummy's torso began to rotate forward. The lower legs were forced rearward and the knees upward, and the knees loaded into the underside of the dash. The torso continued forward until restrained by the shoulder belt, and the head continued to rotate forward, reaching a point 112° forward of initial position with no observable head strike. Dummy then rebounded into seat coming to rest with no lateral lean.

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	18.3	180	89.6	89	7.1	205	33.2	120
Lateral	12.0	180	17.3	115	5.5	143	10.2	54
Vertical	62.0	89	2.6	208	54.5	102	3.7	12
Resultant	110.1	89			55.5	102		
HIC	976.4 between 85 and 120 msec				590.3 between 78 and 138 msec			
Chest Acceleration								
Longitudinal	4.8	232	49.5	84	5.5	249	34.4	86
Lateral	2.2	239	14.9	91	4.6	90	8.8	115
Vertical	10.2	61	10.5	114	5.2	120	7.6	102
Resultant (Max)	52.1	84			34.6	86		
Resultant (clip)	46.7	86			32.3	90		
TIME > 60 G	0 msec				0 msec			
SEVERITY INDEX	239.8 @ 200 msec				251.6 @ 200 msec			
	Peak (lb)	Time (msec)	Peak (lb)	Time (msec)	Peak (lb)	Time (msec)	Peak (lb)	Time (msec)
Femur Loads								
Left			742.3	59			750.4	55
Right			371.3	82			563.6	58
Belt Loads								
Lap	934.4	84			1061.0	79		
Torso	2751.6	90			1836.1	106		

Vehicle Impact Speed (mph): 34.96

*Longitudinal:	Forward	**Longitudinal:	Rearward
Lateral:	Rightward	Lateral:	Leftward
Vertical:	Downward	Vertical:	Upward

Comments:

VEHICLE PROFILE DATA SHEET

PRE-IMPACT DATA

Make/Model: Chrysler Imperial

Body Style: 2-door Hardtop Model Year: 1981

NHTSA No.: 810307 DSI No. 1135 Color: Green

DATA FROM CERTIFICATION LABEL

Vehicle Manufacturer: Chrysler Canada LTD

Date of Manufacture: 9/80 ; VIN: 2A3BY62J4BR110342

GVWR: 5240 lb; GAWR: Front = 2695 lb; Rear = 2595 lb

POST-IMPACT DATA

Type of Test: Frontal (0°) Impact

Date of Test: 2/23/81 Time: 1428 Temperature 81 °F

Required Impact Velocity Range: 34.5 to 35.5 mph

Impact Velocity: Primary = 34.96 mph Secondary = 34.96 mph

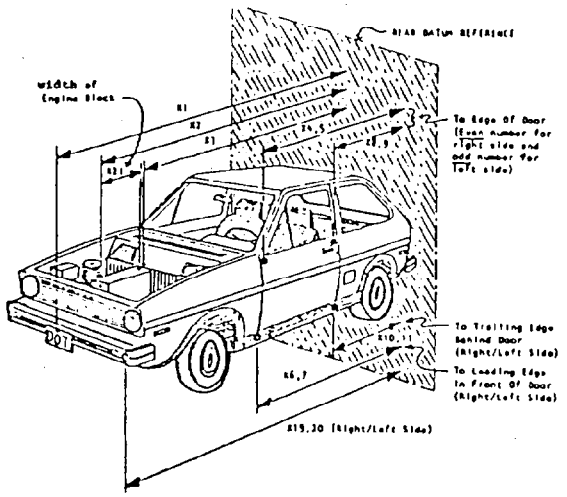
Test Weight: 4562 lb Static Crush: 33.6 in. Rebound: 14.1 in.

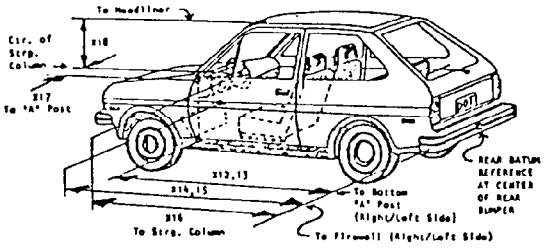
Vehicle Profile Data

Measurements Referenced to Plane 19 Feet Forward of Rear Bumper ℄

Location	Height	Vehicle Left (in.) 31.2	18.7	6.2	℄	Vehicle Right (in.) 6.2	18.7	31.2
Pre-test Profile (in.)								
Top of Front Bumper	19.1	18.6	17.8	16.3	14.8	16.3	17.8	18.6
Front of Hood	31.6	24.3	28.0	21.6	20.1	21.6	28.0	24.5
Post-test Profile (in.)								
Top of Front Bumper	19.3	48.9	49.3	49.1	48.4	48.9	48.8	48.3
Front of Hood	28.3	48.2	50.6	46.1	45.6	45.0	49.6	48.0
Post-test Static Crush (in.)								
Top of Front Bumper	-0.2	30.3	31.5	32.8	33.6	32.6	31.0	29.7
Front of Hood	3.3	23.9	22.6	24.5	25.5	23.4	21.6	23.5

PRE-/POST-TEST STATIC MEASUREMENT DATA





Vehicle: Chrysler Imperial

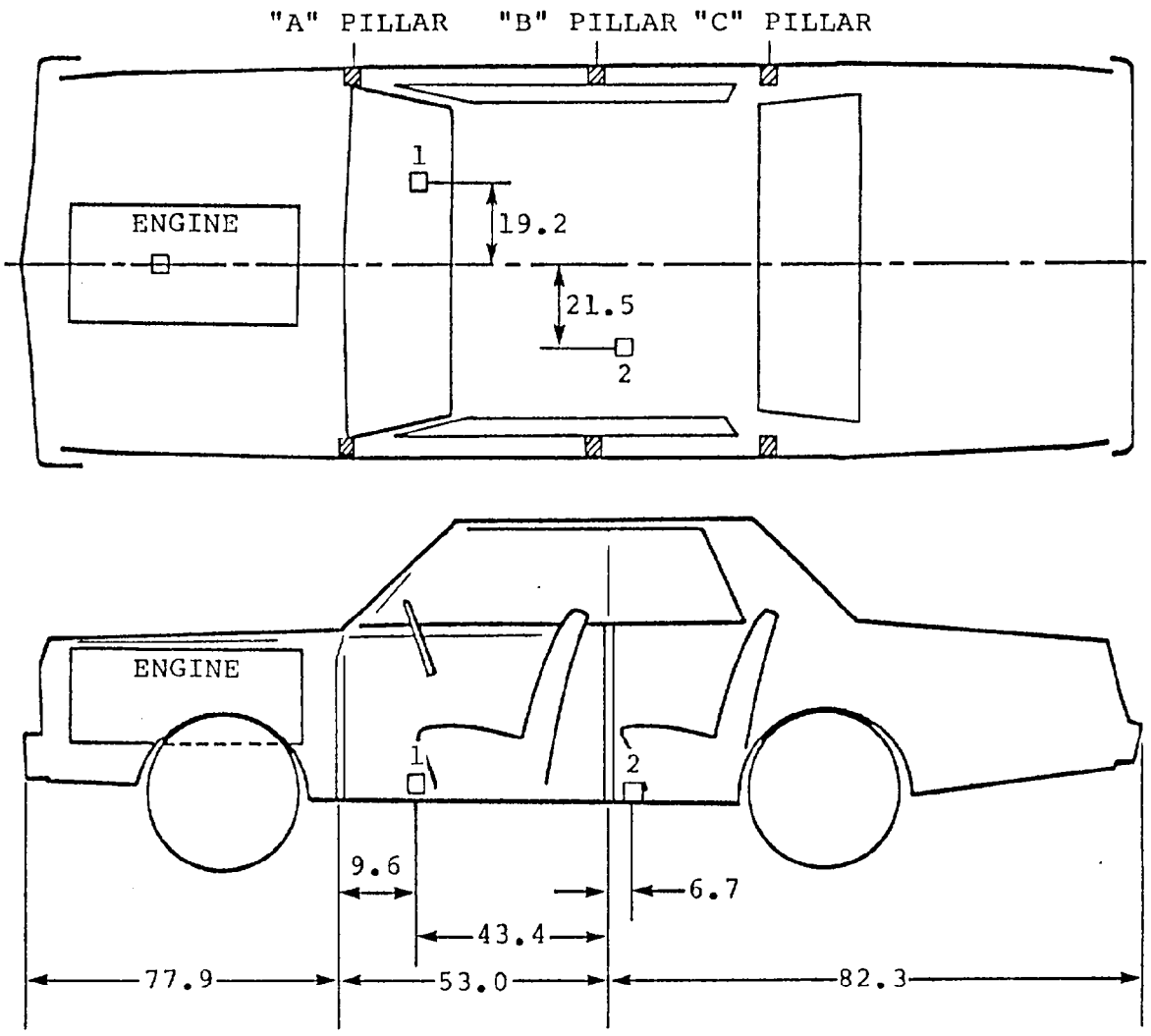
NHTSA No.: 810309

Test Date: 2/23/81

D.S. No.: 1135

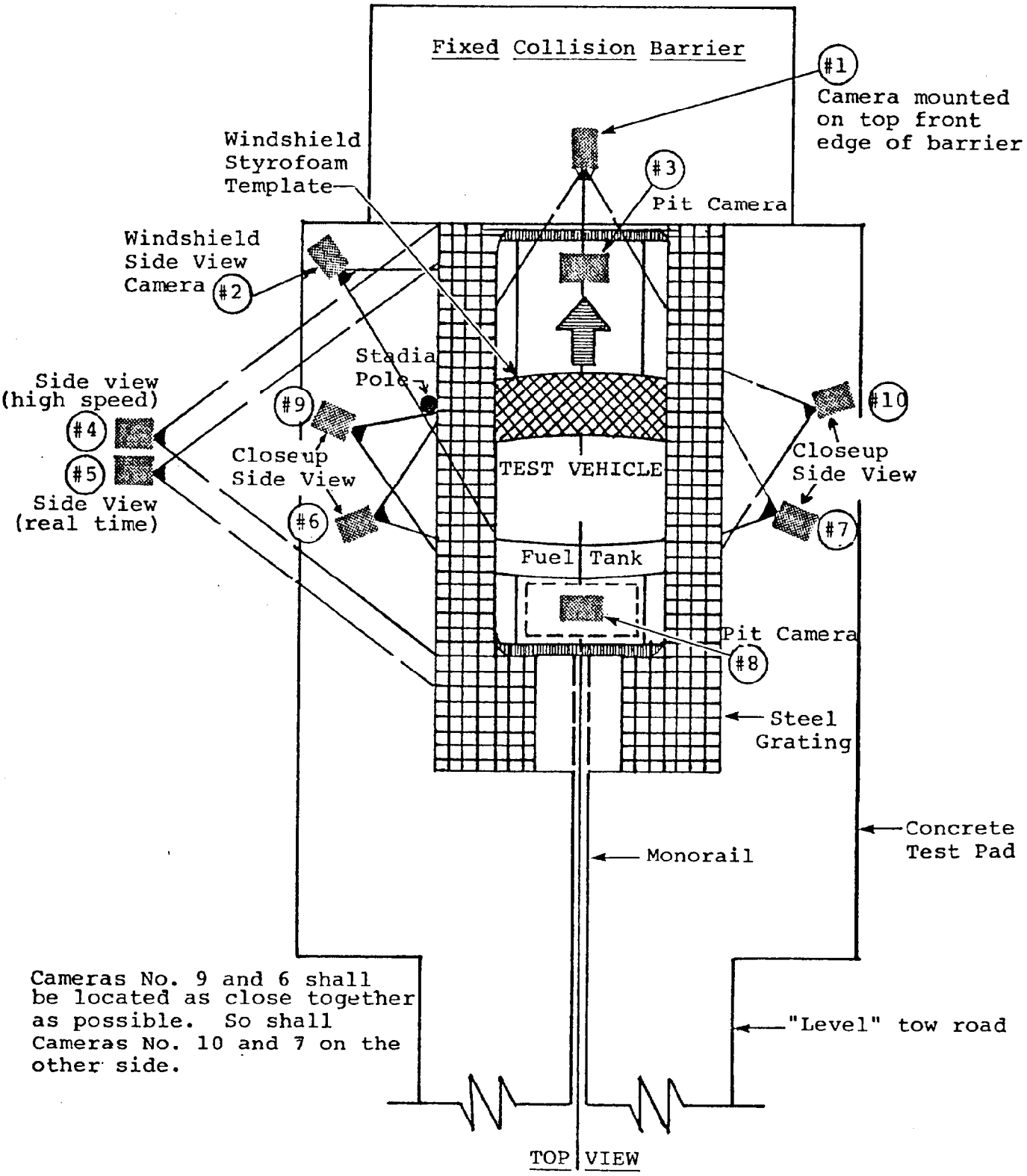
Reference Dimension	Pre-test Measurement	Post-test Measurement	Change
X_1	213.2	179.6	33.6
X_2	174.1	163.0	11.1
X_3	151.5	148.8	2.7
X_4	136.3	136.0	0.3
X_5	136.3	136.1	0.2
X_6	137.6	135.2	2.4
X_7	137.6	136.0	1.6
X_8	81.8	81.7	0.1
X_9	81.8	81.8	0.0
X_{10}	81.7	80.5	1.2
X_{11}	81.7	80.9	0.8
X_{12}	135.3	134.2	1.1
X_{13}	135.3	133.7	1.6
X_{14}	151.9	145.9	6.0
X_{15}	152.9	145.4	7.5
X_{16}	119.7	116.4	3.3
Y_{17}	19.2	16.4	2.8
Z_{18}	17.4	20.6	-3.2
X_{19}	209.4	179.1	30.3
X_{20}	209.4	179.7	29.7
X_{21}	18.1	18.1	0.0

VEHICLE ACCELEROMETER SUMMARY



No.	Location Description	Component Direction* X	Y	Z	Data Summary Peak G @ msec X "+"	X "-"	Y "+"	Y "-"	Z "+"	Z "-"
1	Left front floor pan	✓			20.8 37	42.3 54				
2	Left rear floor pan	✓			18.4 11	32.2 52				

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


Fixed Collision Barrier
#1
Camera mounted on top front edge of barrier
Windshield Styrofoam Template
#3
Pit Camera
Windshield Side View Camera
#2
Stadia Pole
Side view (high speed)
#4
#5
Side View (real time)
#9
Closeup Side View
#6
TEST VEHICLE
#10
Closeup Side View
#7
Fuel Tank
Pit Camera
#8
Steel Grating
Concrete Test Pad
Monorail
"Level" tow road
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	Ser No.	Impact Dist-X	Center-line Dist-Y	Camera Height
1	Overhead (Barrier)	Windshield stryrofoam up to barrier-vehicle contact if possible	16mm	400	101 HZ	M8	-66"	0.0	133"
2	Ground Based (Left)	Windshield	16mm	400	101 HZ	M7	-28"	115"	64"
3	Pit	Engine underside and fuel pump	8mm	1000	101 HZ	11	3.5	0.0	-8.0'
4	Ground Based (Left)	Views entire left of vehicle	16mm	400	100 HZ	M9	74"	40'2"	44"
5	Ground Based (Real Time)	Documentary	Zoom	24	N/A HZ	--			
6	Ground Based (Left)	Driver dummy closeup	15mm	1000	101 HZ	5	63"	122"	60"
7	Ground Based (Right)	Passenger dummy closeup	13mm	1000	104 HZ	10	73"	132"	61"
8	Pit	Fuel tank	8mm	1000	100 HZ	7	11.0	0.0	-8.0'
9	Ground Based (Left)	Same view as Camera No. 6	15mm	1000	101 HZ	6	75"	122"	60"
10	Ground Based (Right)	Same view as Camera No. 7	13mm	1000	100 HZ	4	89"	132"	61"

APPENDIX A

PHOTOGRAPHS

FIGURE A-1. PRE-TEST FRONT VIEW - 1981 CHRYSLER IMPERIAL - NHTSA 810307.

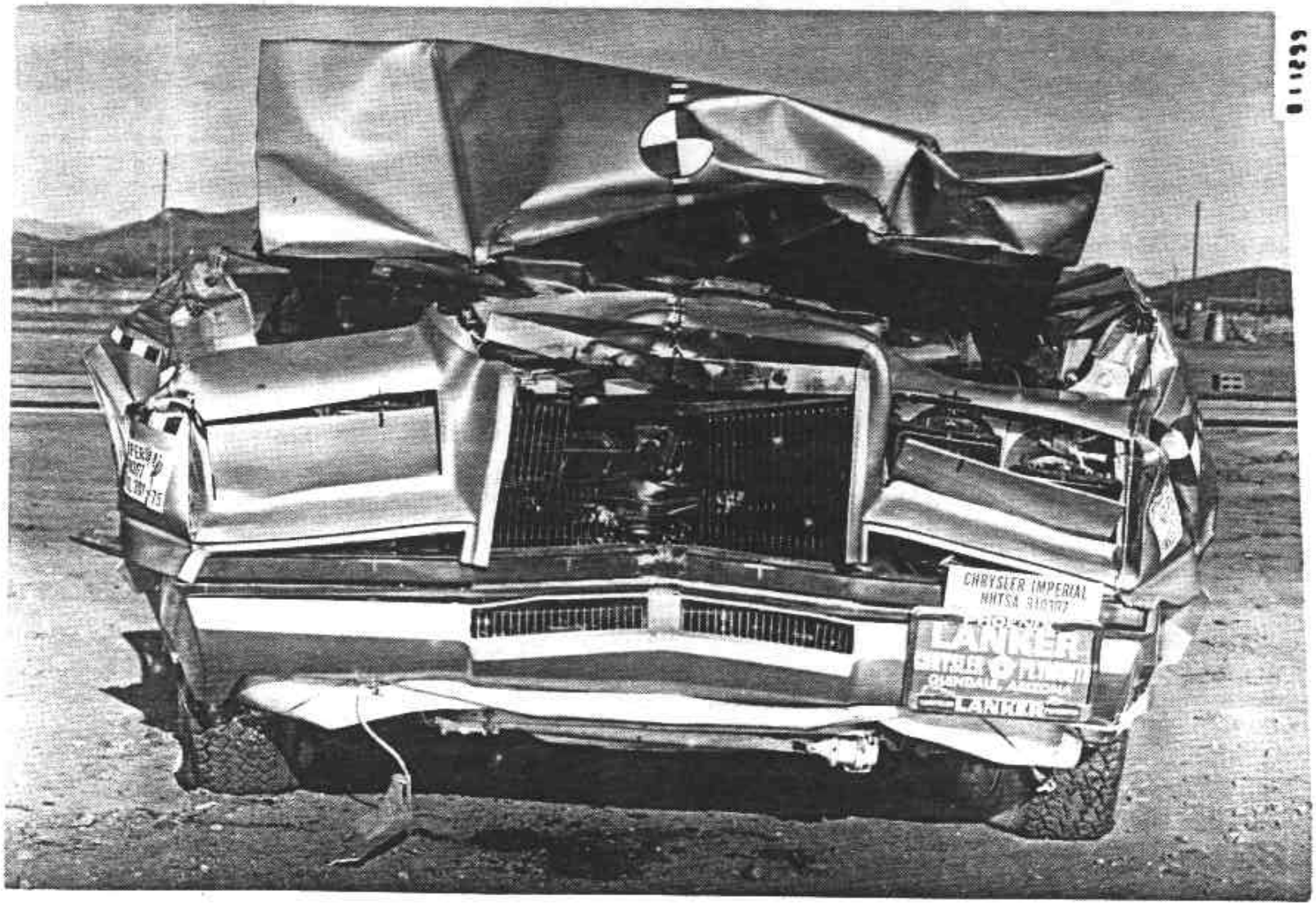


FIGURE A-2. POST-TEST FRONT VIEW - 1981 CHRYSLER IMPERIAL - NHTSA 810307.

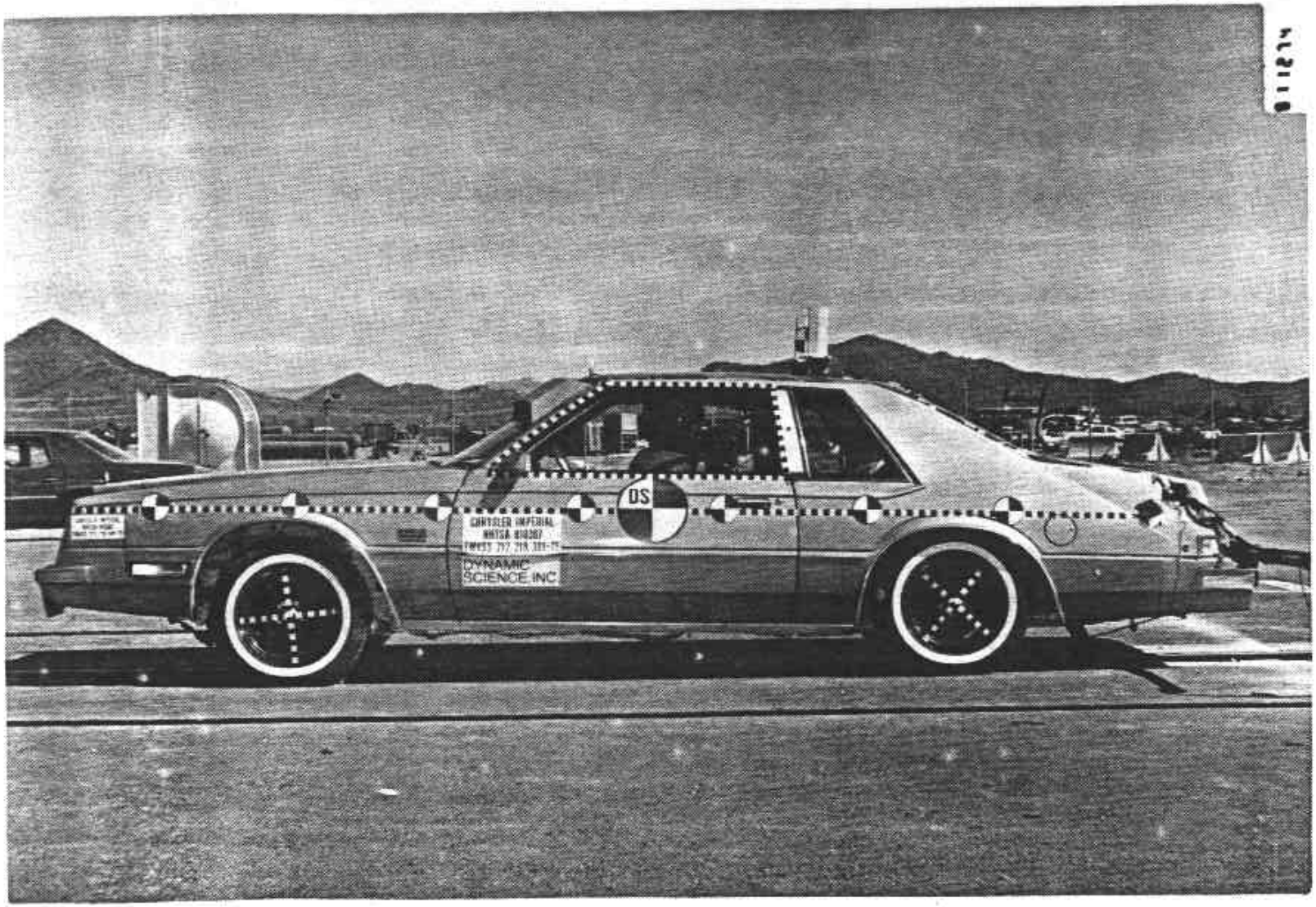


FIGURE A-3. PRE-TEST SIDE VIEW - 1981 CHRYSLER IMPERIAL - NHTSA 810307.

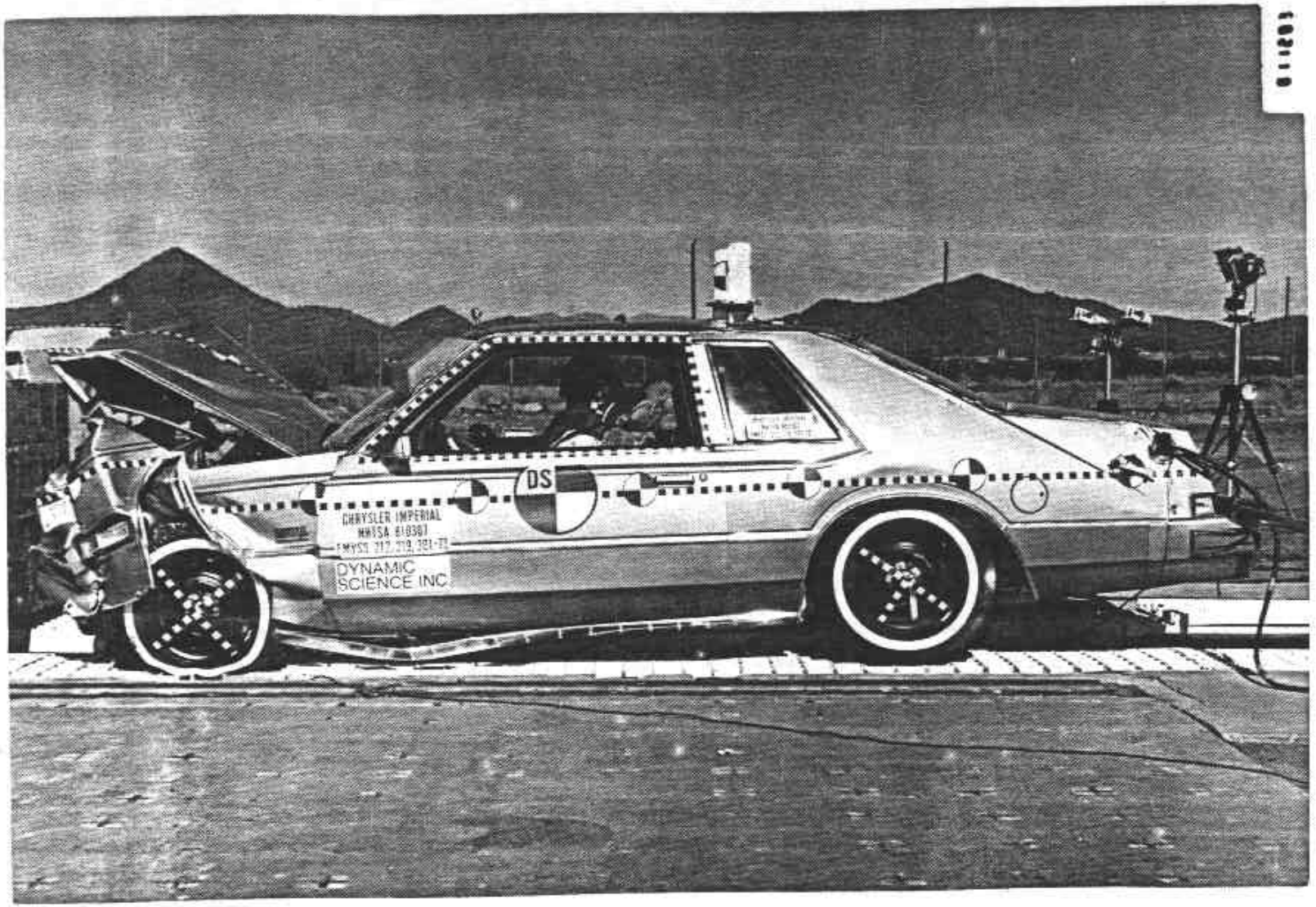


FIGURE A-4. POST-TEST SIDE VIEW - 1981 CHRYSLER IMPERIAL - NHTSA 810307.

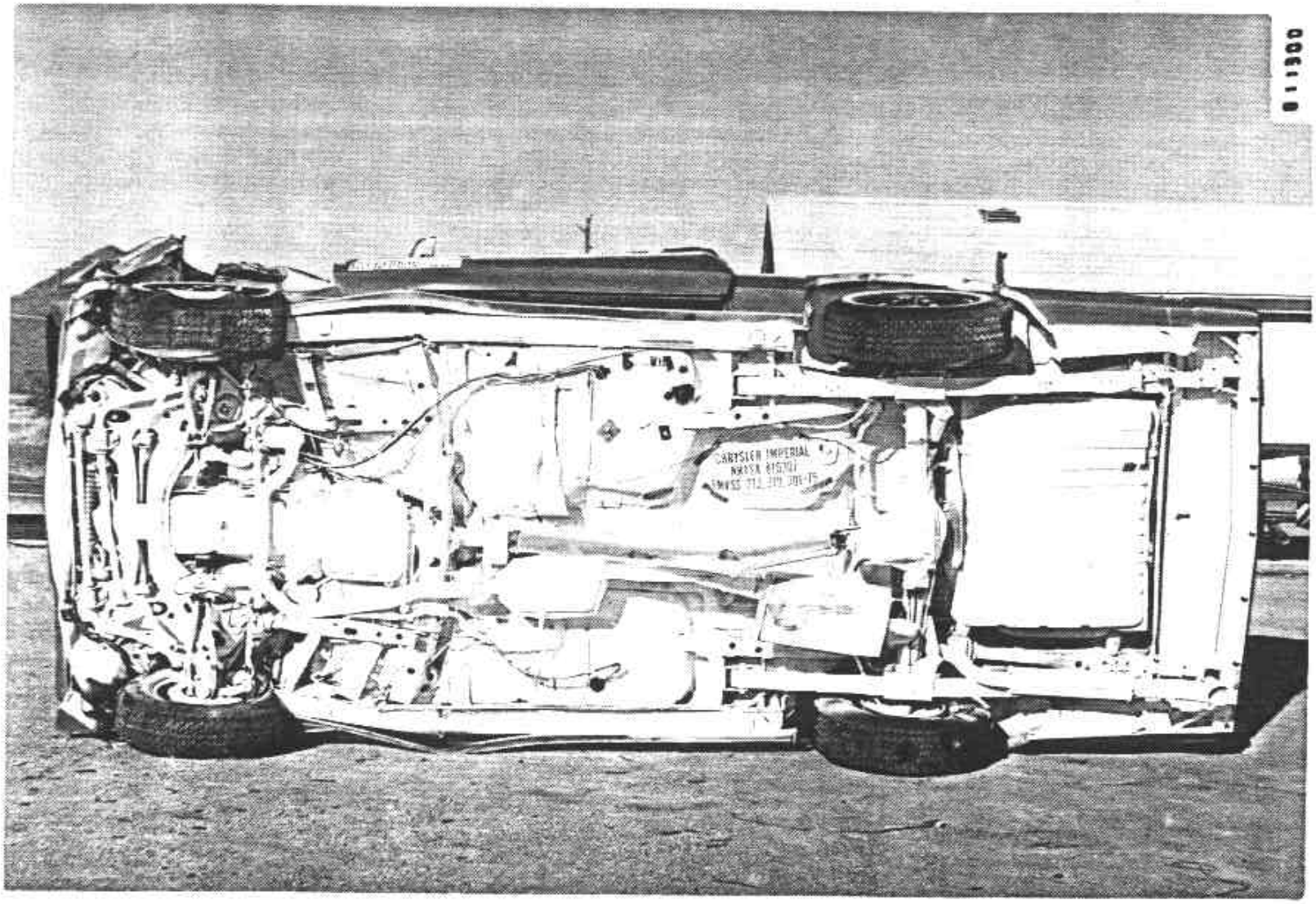


FIGURE A-5. POST-TEST OVERALL UNDERSIDE VIEW - 1981 CHRYSLER IMPERIAL - NHTSA 810307.

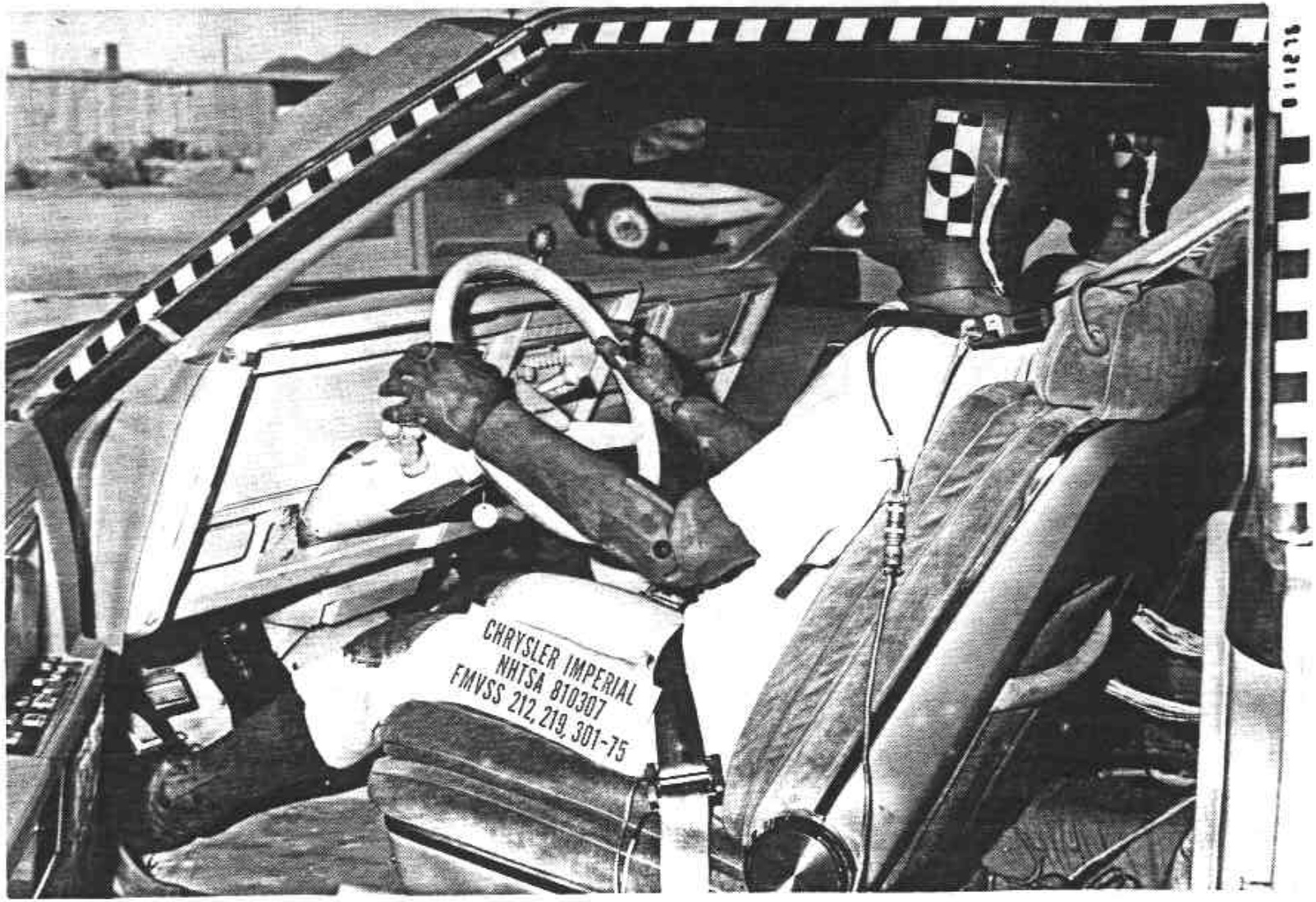


FIGURE A-6. PRE-TEST DRIVER DUMMY POSITION - 1981 CHRYSLER IMPERIAL - NHTSA 810307.

FIGURE A-7. POST-TEST DRIVER DUMMY POSITION - 1981 CHRYSLER IMPERIAL - NHTSA 810307.

FIGURE A-8. POST-TEST PASSENGER POSITION - 1981 CHRYSLER IMPERIAL - NHTSA 810307.

APPENDIX B

CALCOMP PLOT PRESENTATION

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

PLOT LEGEND

Dummy Data*

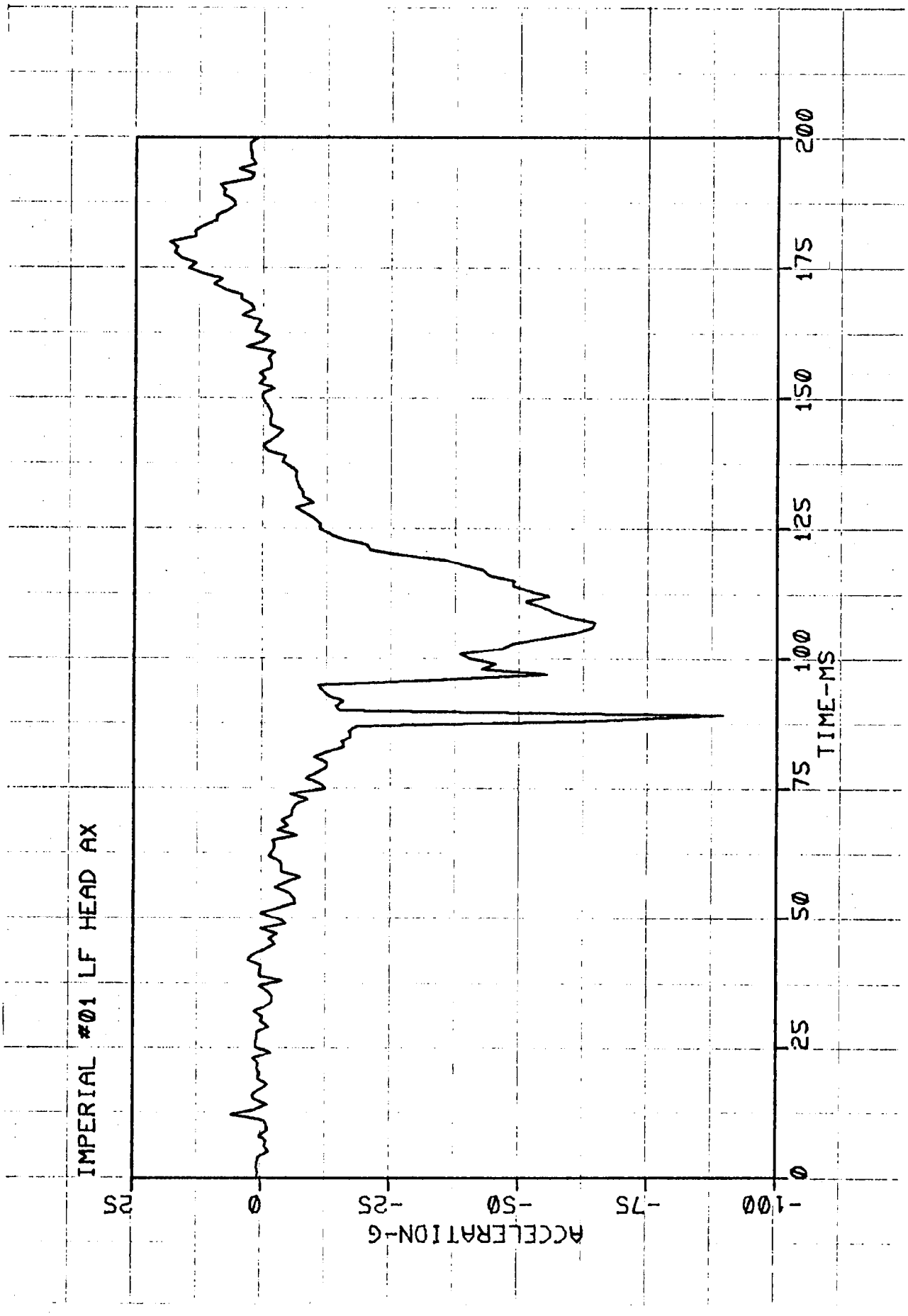
Driver	RF Outboard Passenger	Data Description
LF Head	RF Head	Head Acceleration (G)
LF Chest	RF Chest	Chest Acceleration (G)
LF Femurs	RF Femurs	Femur Loads (lb)
LF Belt Loads	RF Belt Loads	Lap and Torso Belt Loads (lb)

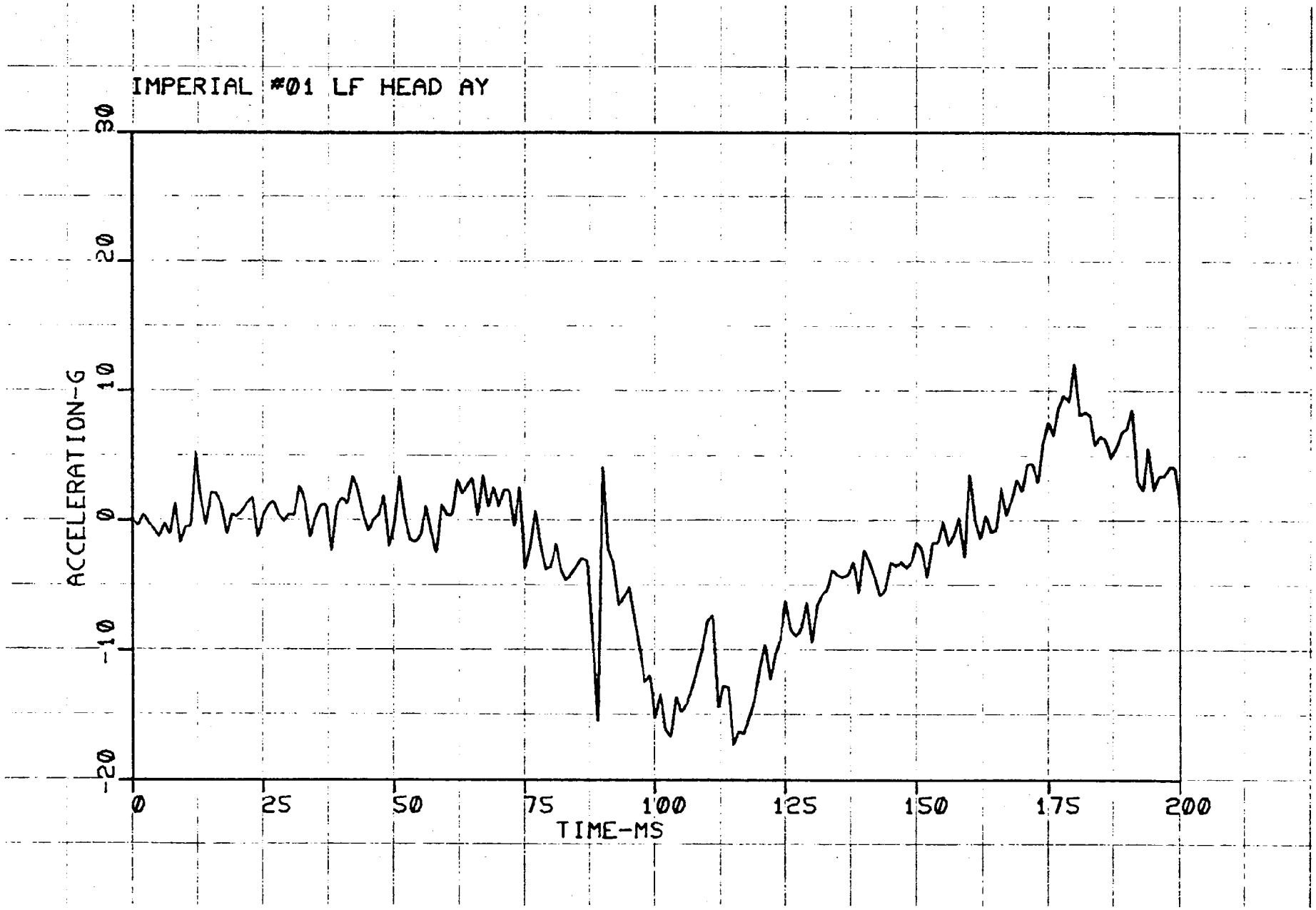
Vehicle Data**

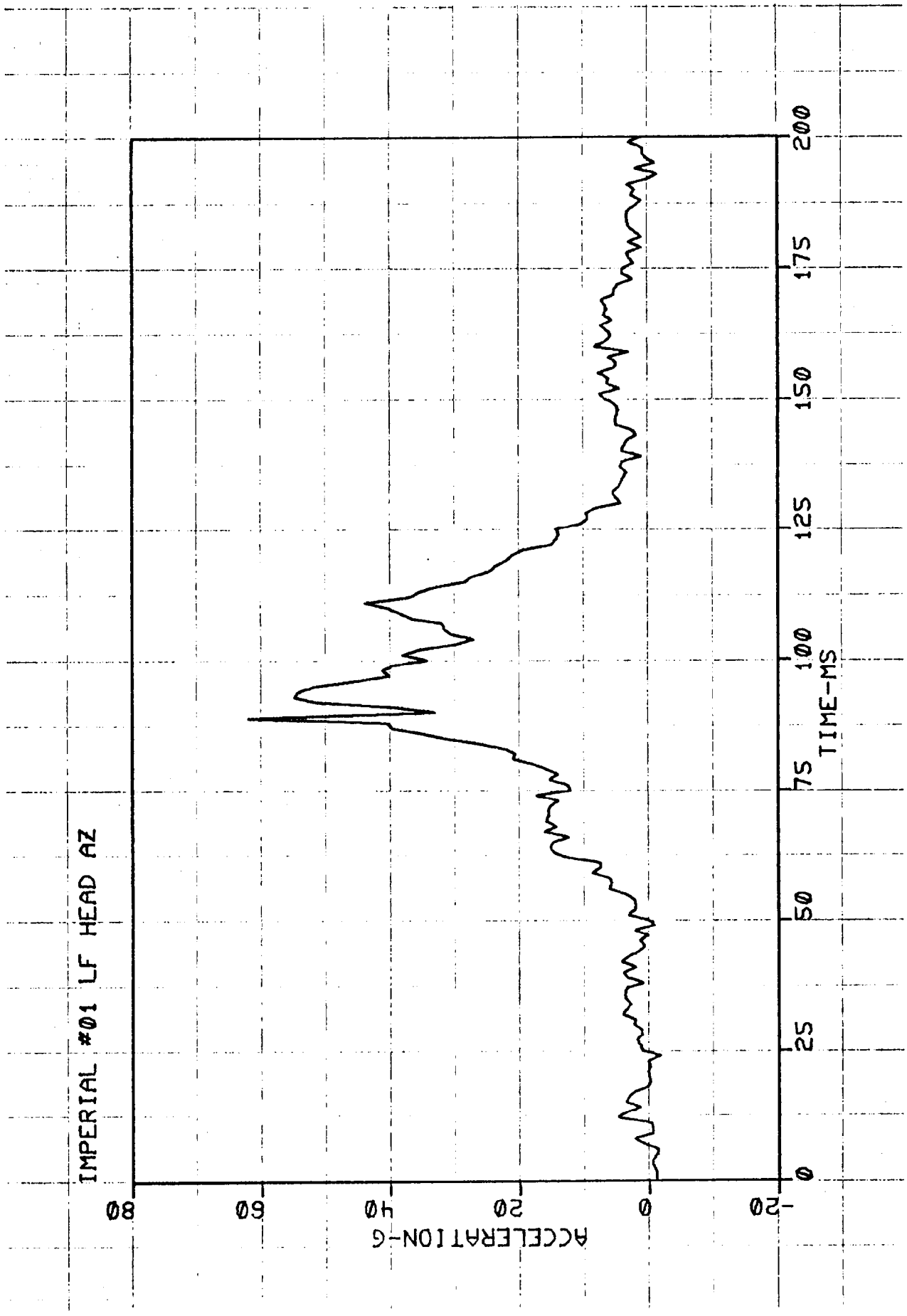
Loc 1	Front Seat Area Acceleration (G)
Loc 2	Rear Seat Area Acceleration (G)

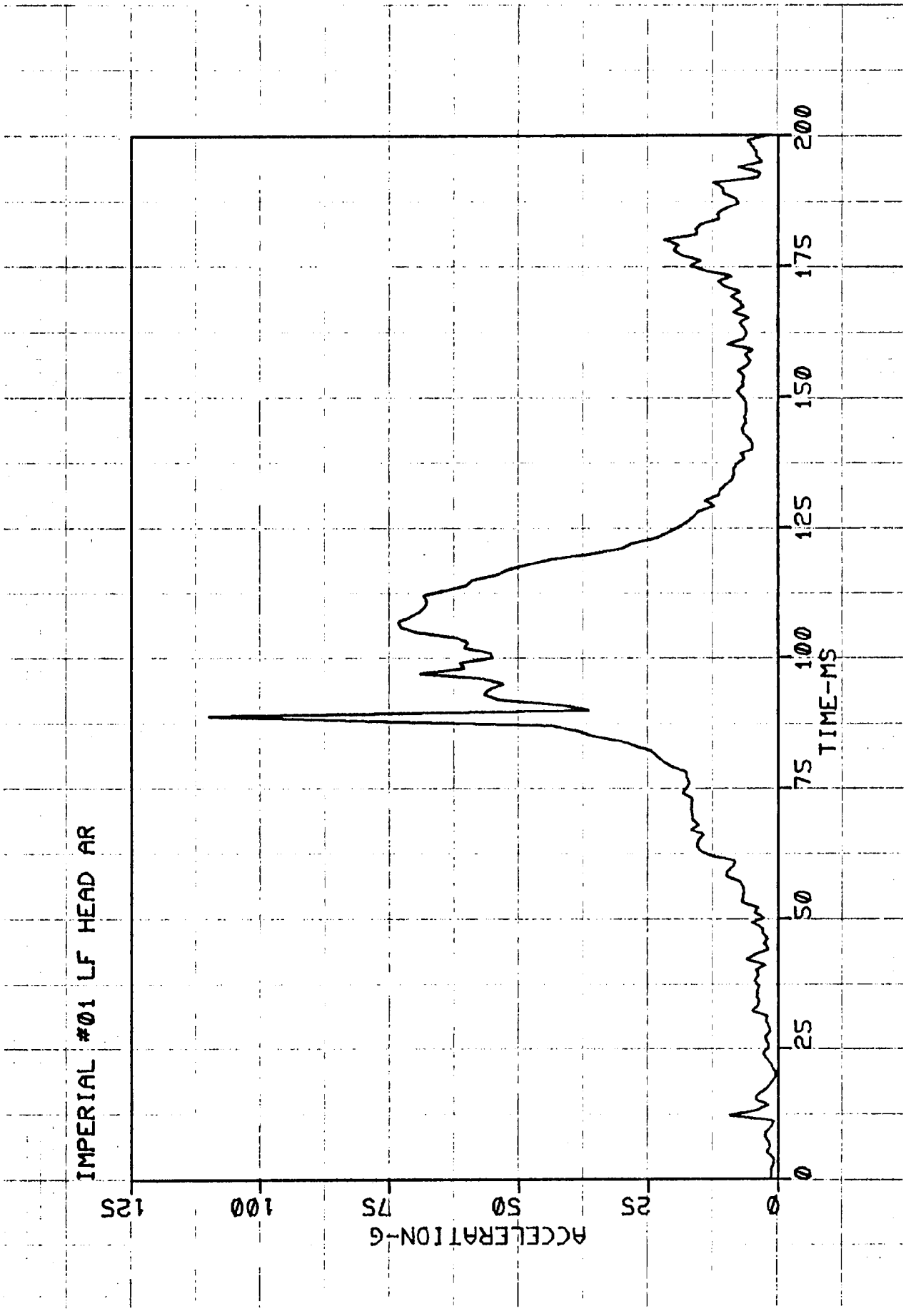
*Dummy Injury Summary preseted on pages 4-4 and 4-5.

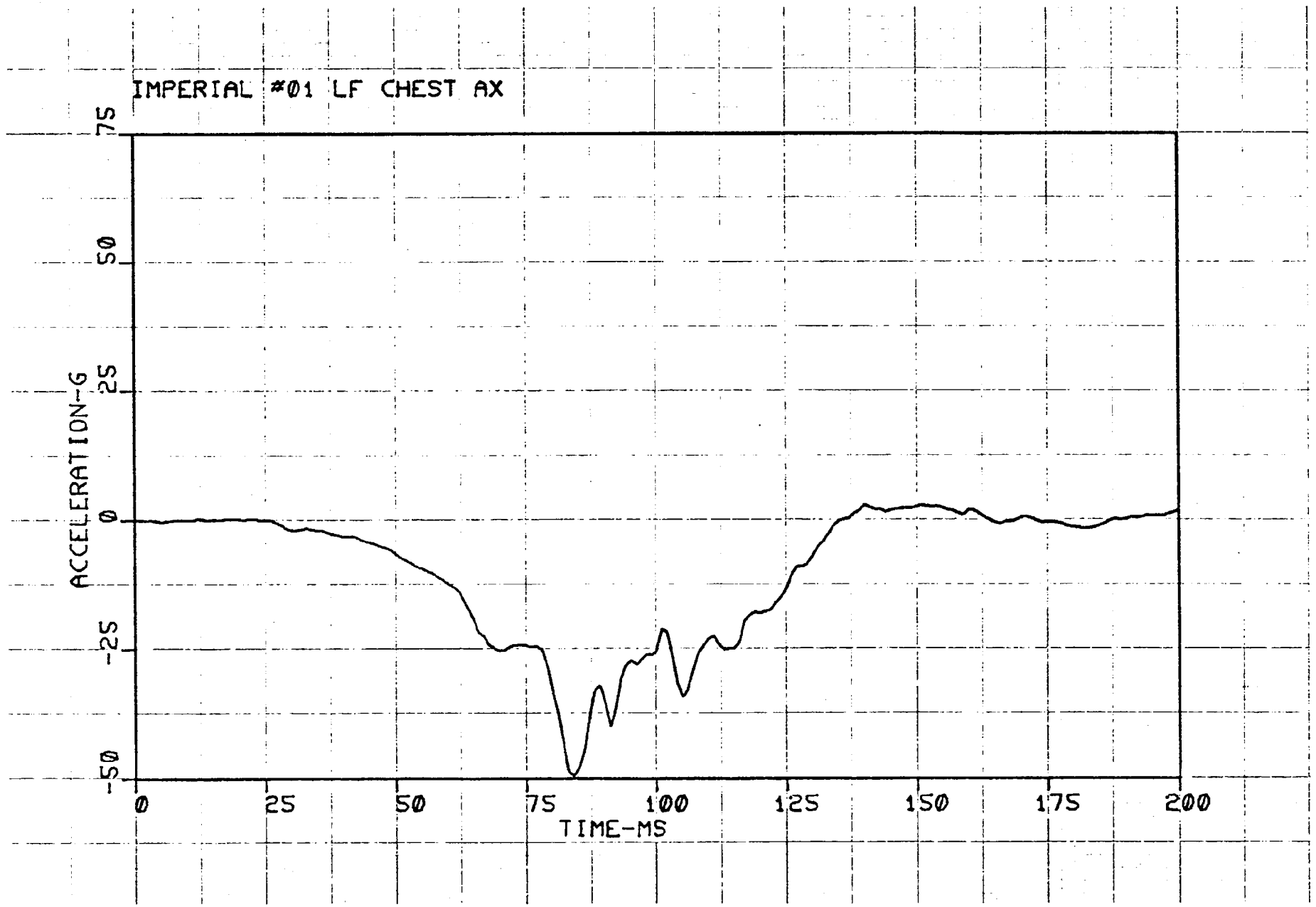
**Vehicle accelerometer location and data summarized on page 4-8.

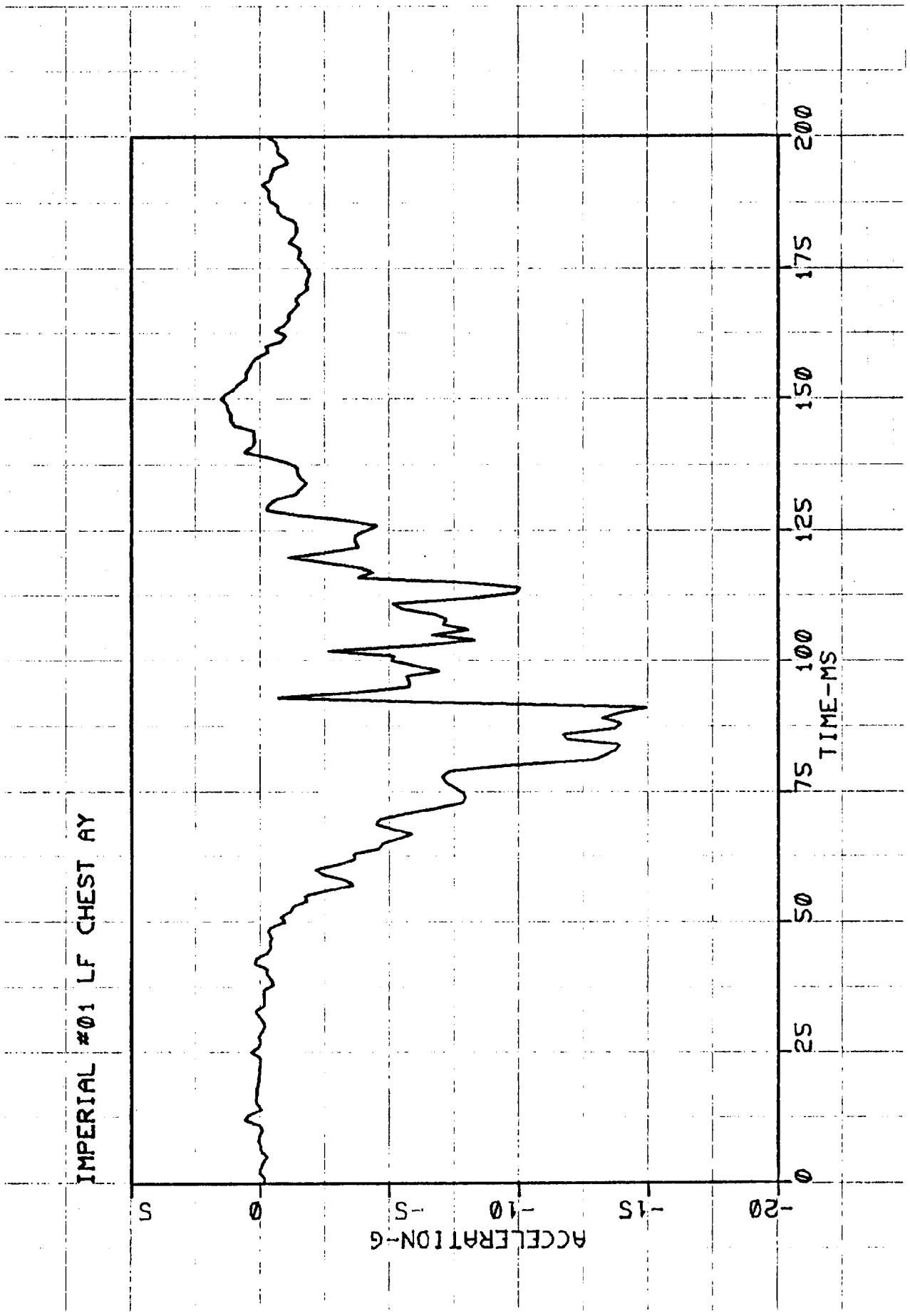

IMPERIAL #01 LF HEAD AX
ACCELERATION-G
25
0
-25
-50
-75
-100
TIME-MS
0
25
50
75
100
125
150
175
200

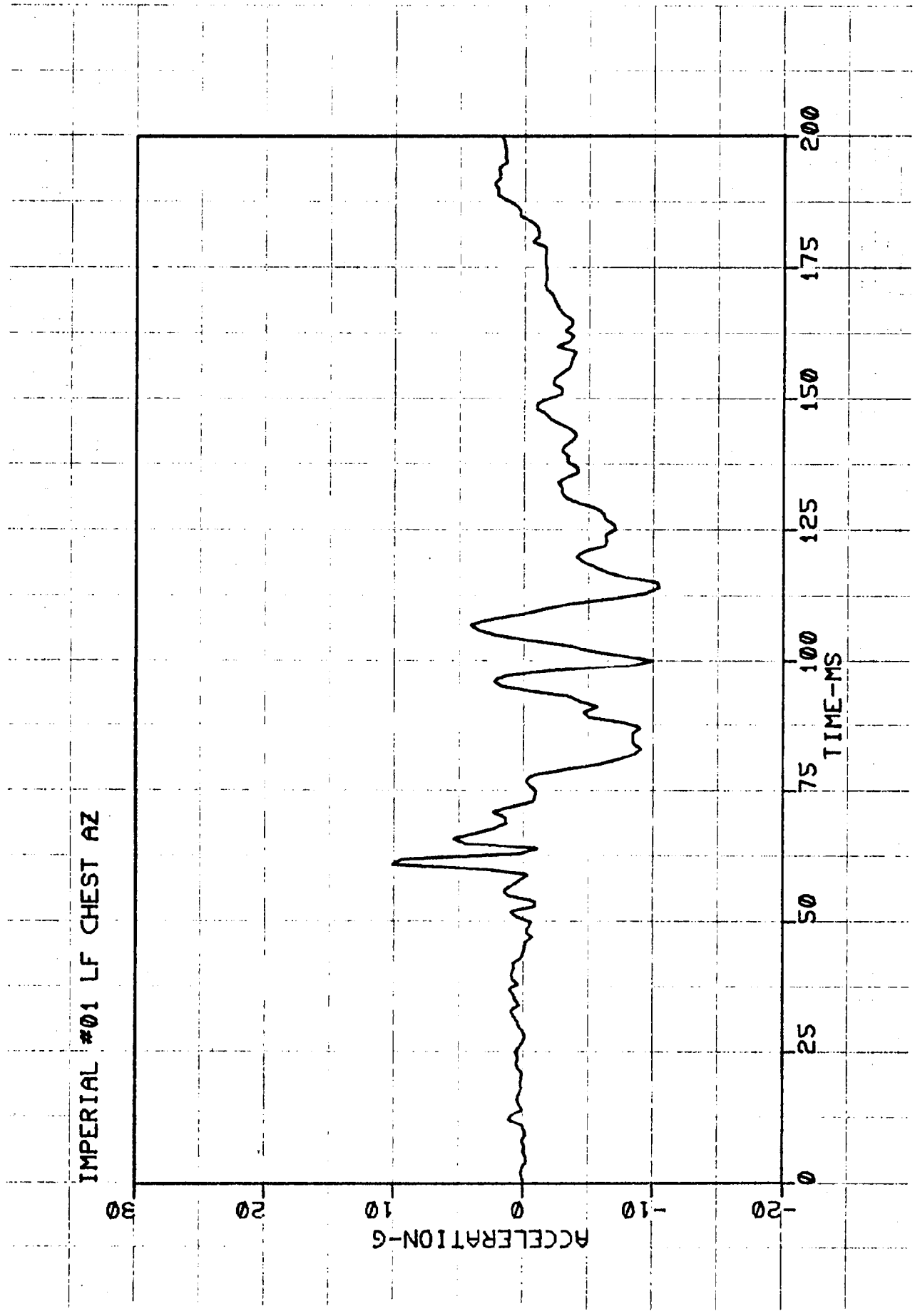

IMPERIAL #01 LF HEAD AY
ACCELERATION-G
30
20
10
0
-10
-20
0
25
50
75
100
125
150
175
200
TIME-MS

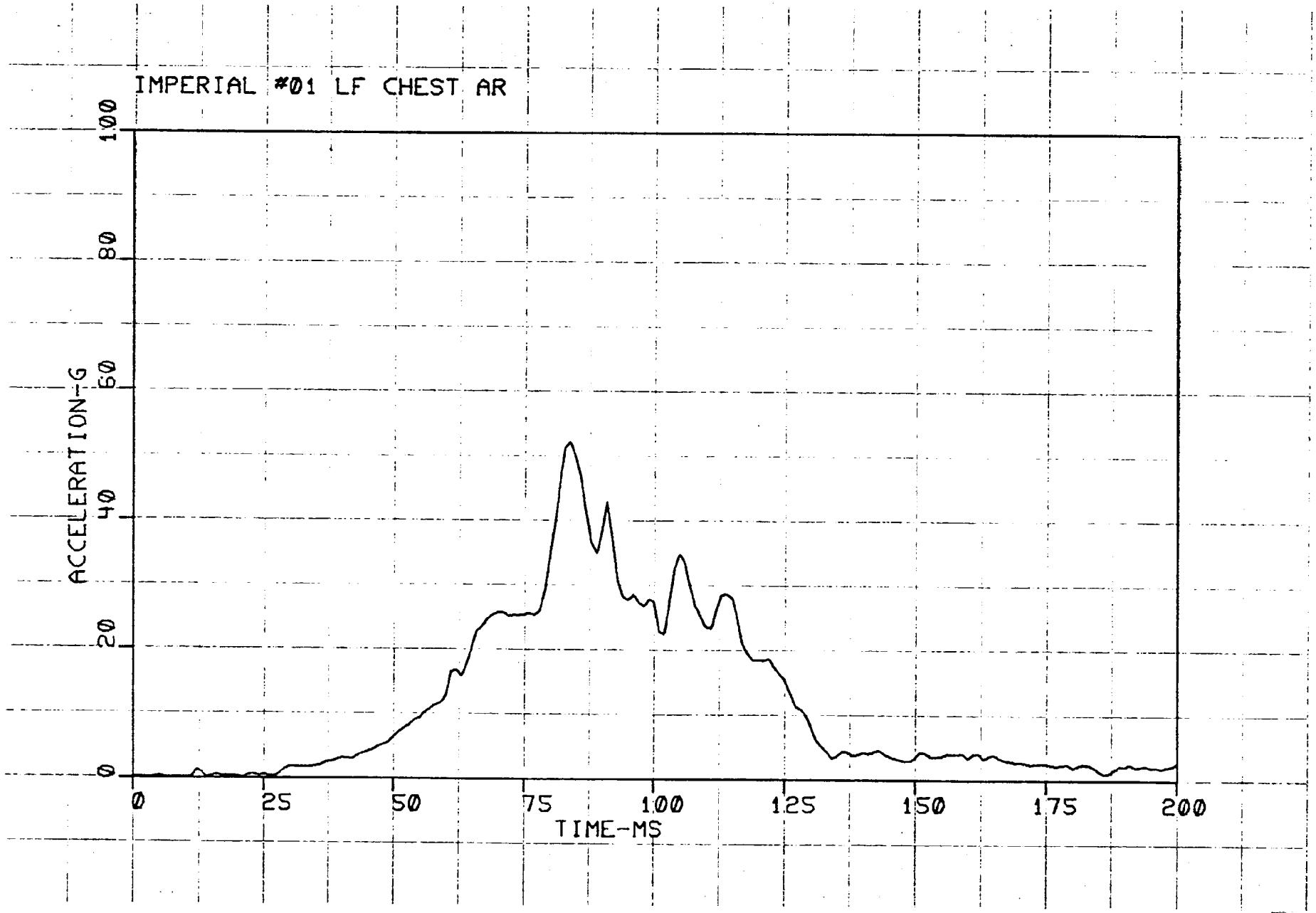

IMPERIAL #01 LF HEAD AZ
ACCELERATION-G
80
60
40
20
0
-20
TIME-MS
0
25
50
75
100
125
150
175
200

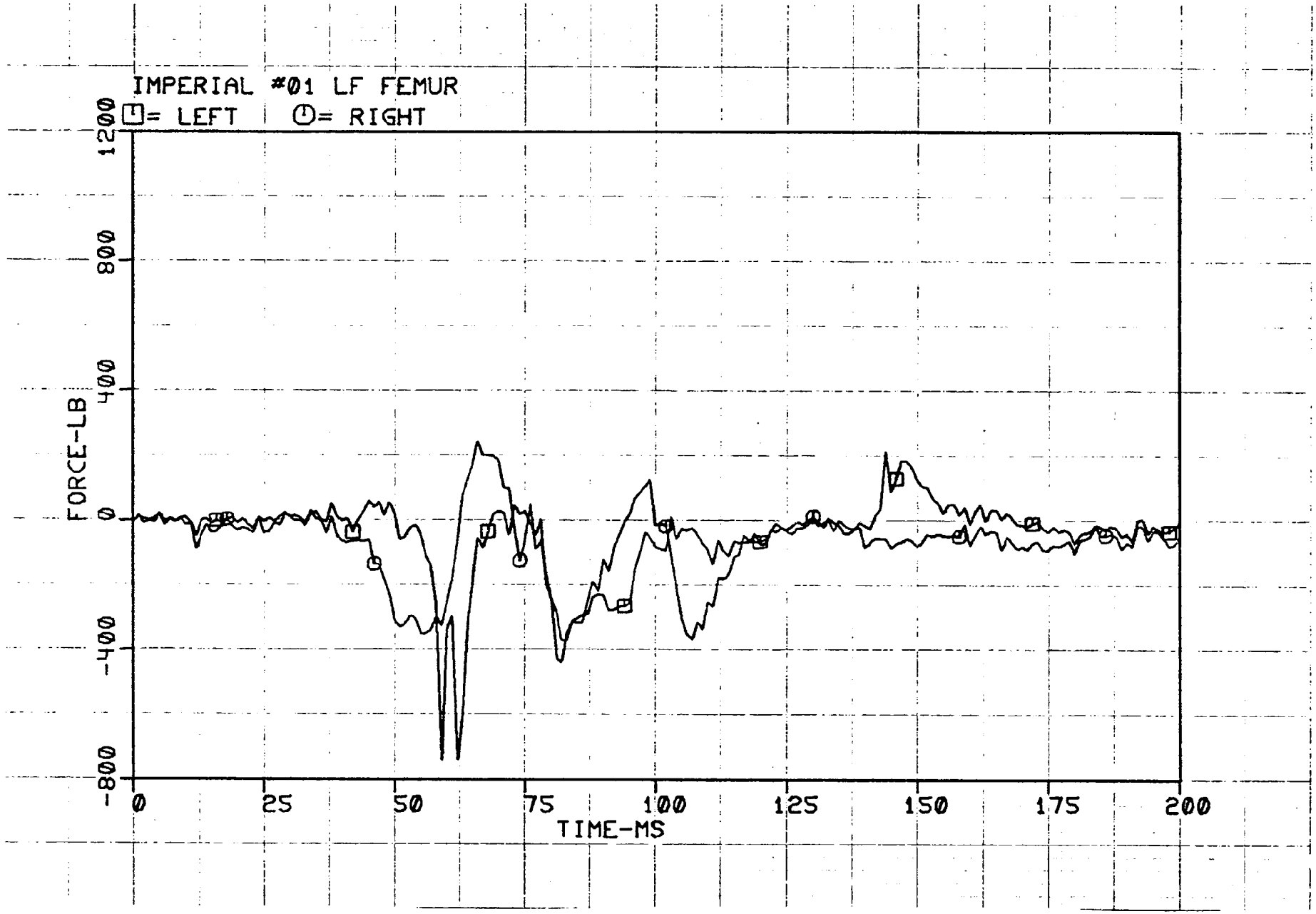

IMPERIAL #01 LF HEAD AR
ACCELERATION-G
0
25
50
75
100
125
150
175
200
TIME-MS

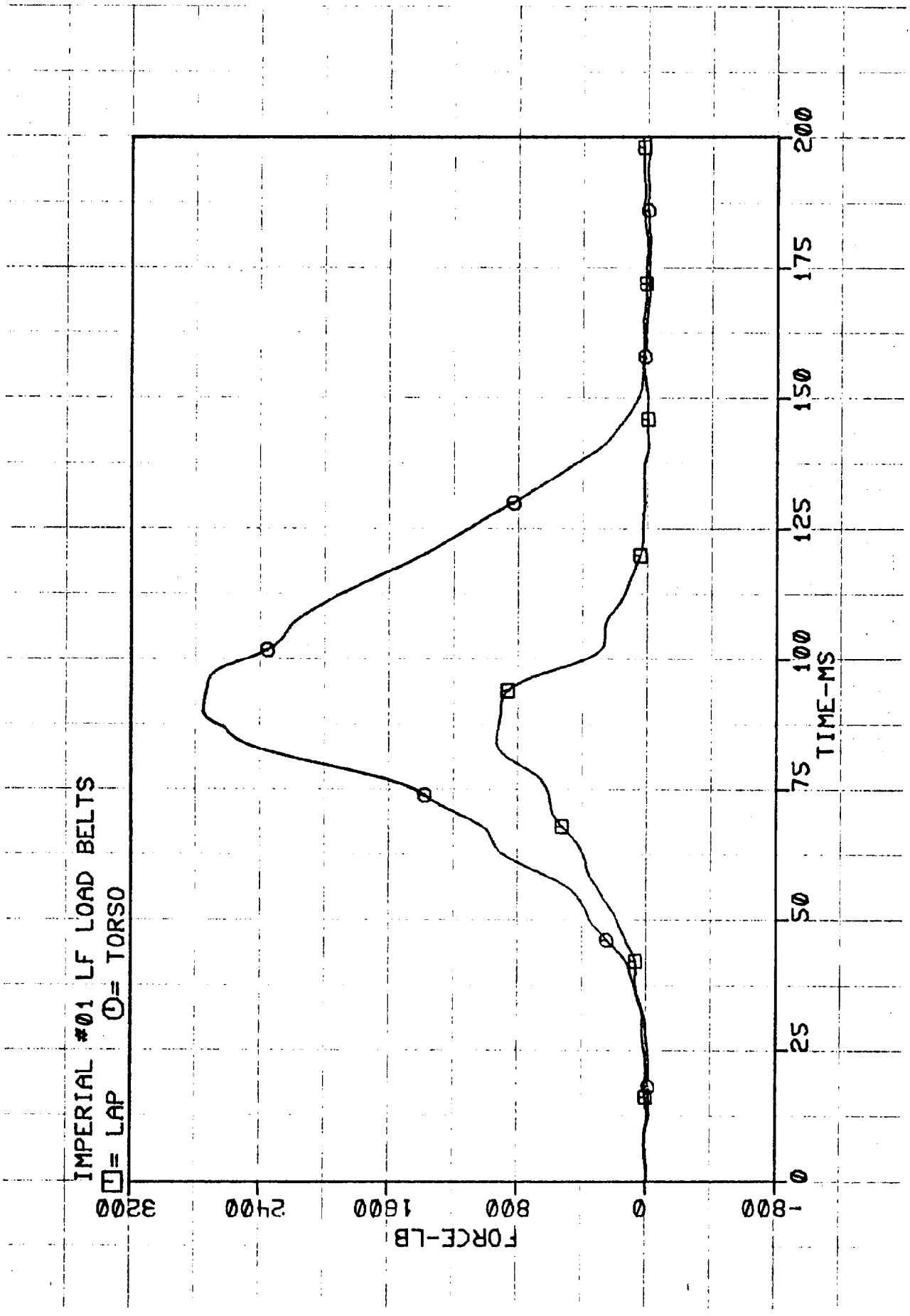

IMPERIAL #01 LF CHEST AX
ACCELERATION-G
75
50
25
0
-25
-50
0
25
50
75
100
125
150
175
200
TIME-MS

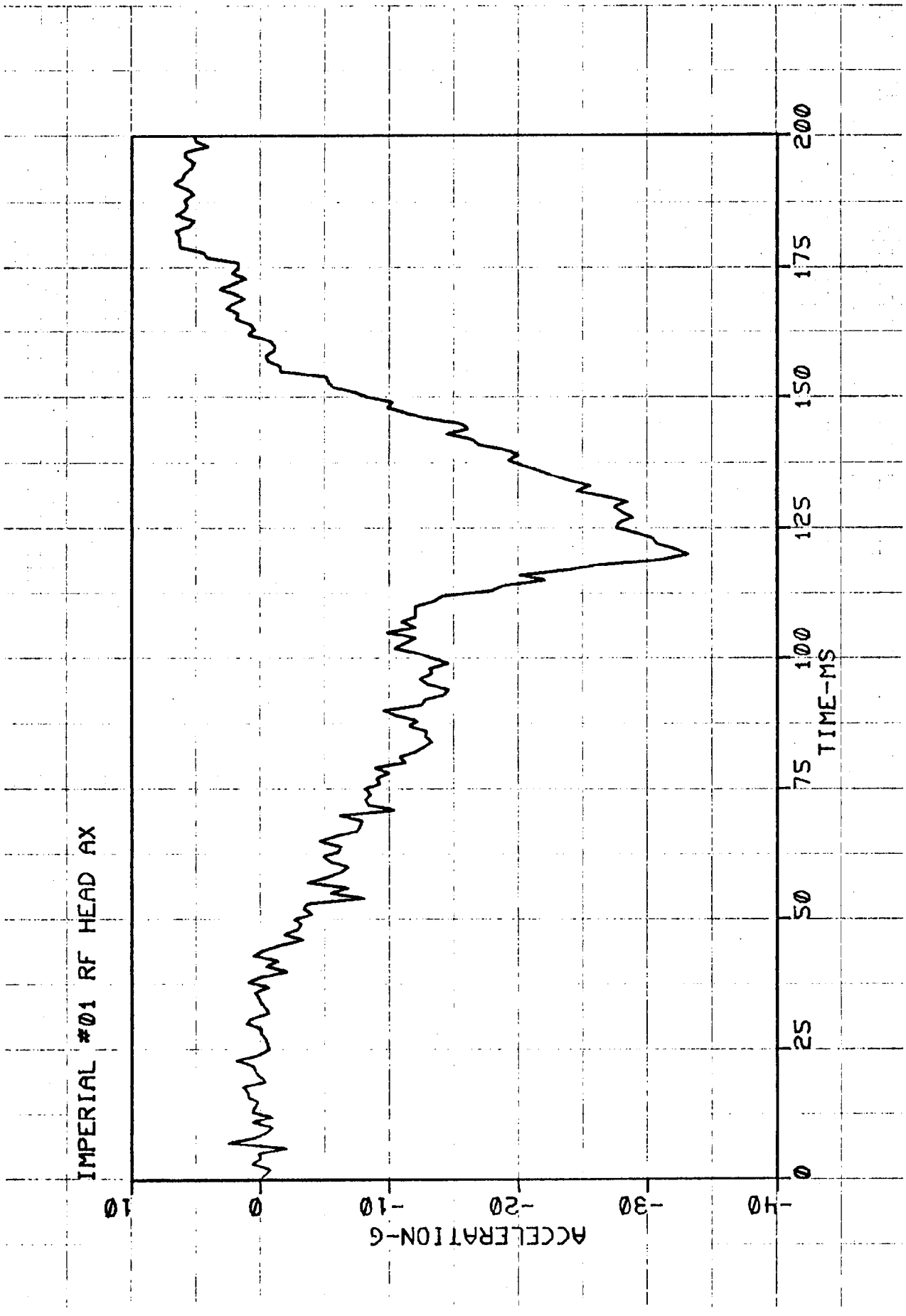

IMPERIAL #01 LF CHEST AY
ACCELERATION-G
5
0
-5
-10
-15
-20
0
25
50
75
100
125
150
175
200
TIME-MS

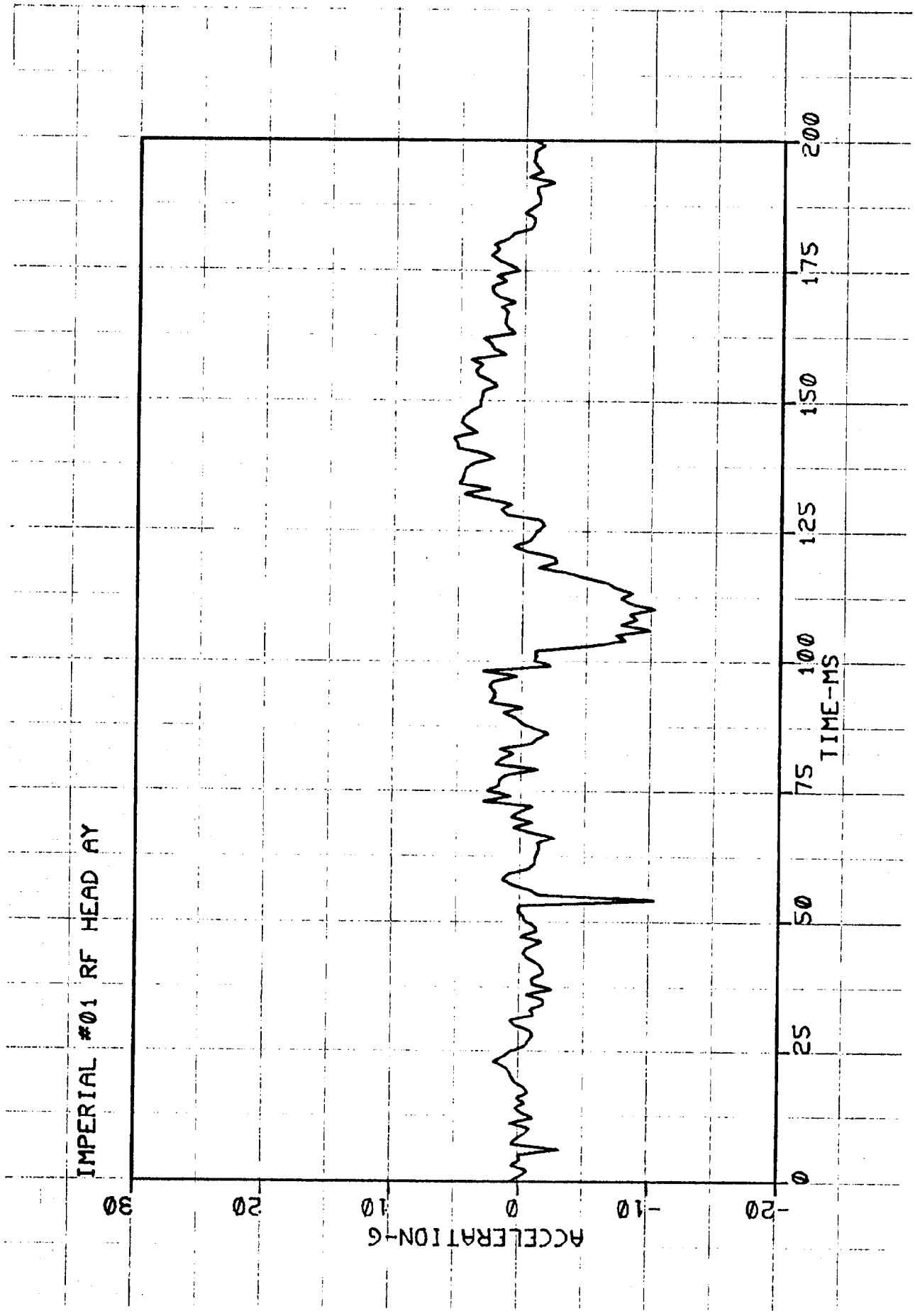

IMPERIAL #01 LF CHEST AZ
ACCELERATION-G
30
20
10
0
-10
-20
TIME-MS
0
25
50
75
100
125
150
175
200

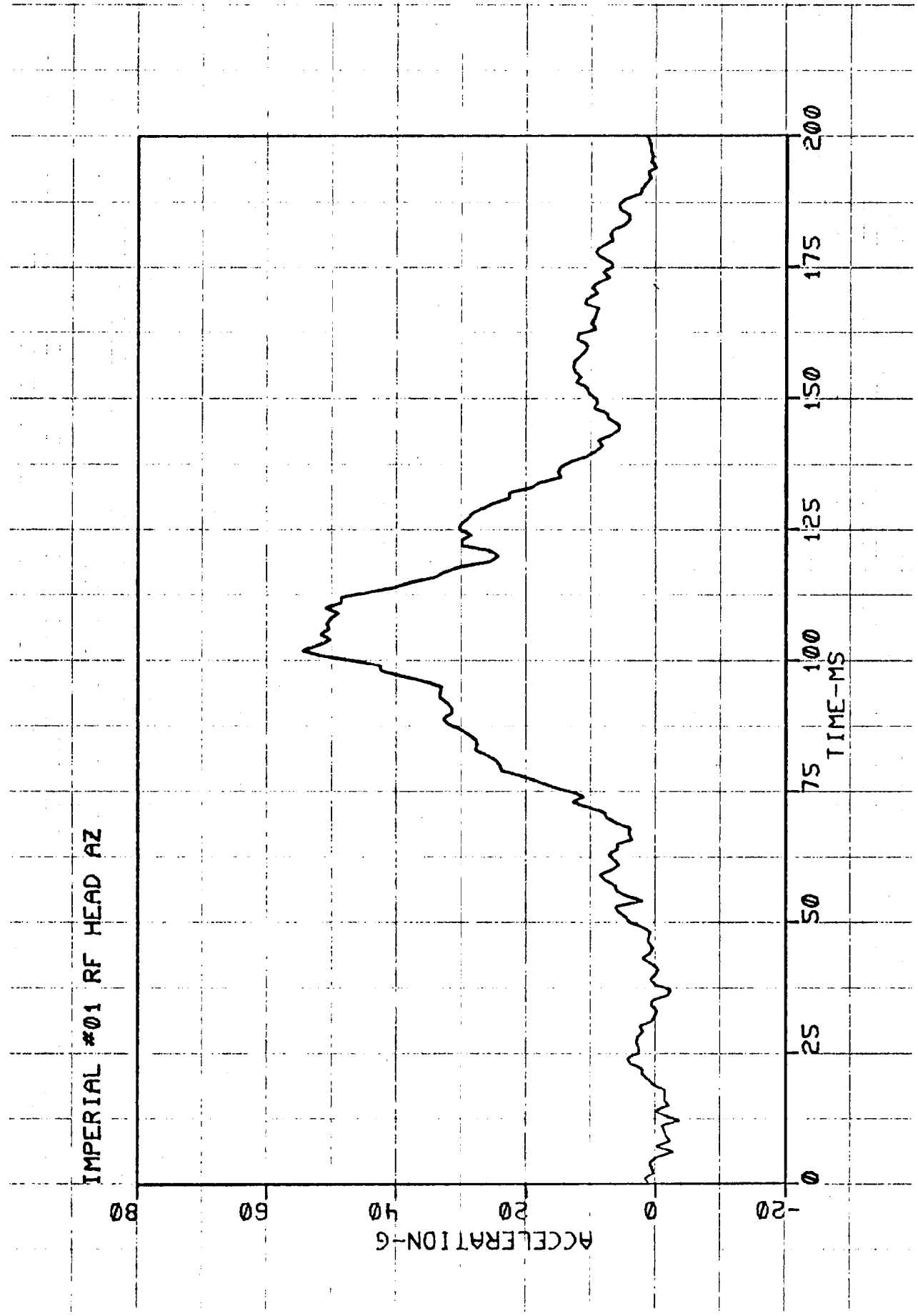

IMPERIAL #01 LF CHEST AR
ACCELERATION-G
100
80
60
40
20
0
0
25
50
75
100
125
150
175
200
TIME-MS


IMPERIAL #01 LF FEMUR
□= LEFT
○= RIGHT
1200
800
400
0
-400
-800
FORCE-LB
0
25
50
75
100
125
150
175
200
TIME-MS


IMPERIAL #01 LF LOAD BELTS
□= LAP ⊙= TORSO
FORCE-LB
3200
2400
1600
800
0
-800
TIME-MS
0
25
50
75
100
125
150
175
200


IMPERIAL #01 RF HEAD AX
ACCELERATION-G
10
0
-10
-20
-30
-40
TIME-MS
0
25
50
75
100
125
150
175
200


IMPERIAL #01 RF HEAD AY
ACCELERATION-G
30
20
10
0
-10
-20
TIME-MS
0
25
50
75
100
125
150
175
200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60
40
20
0
-20
TIME-MS
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25
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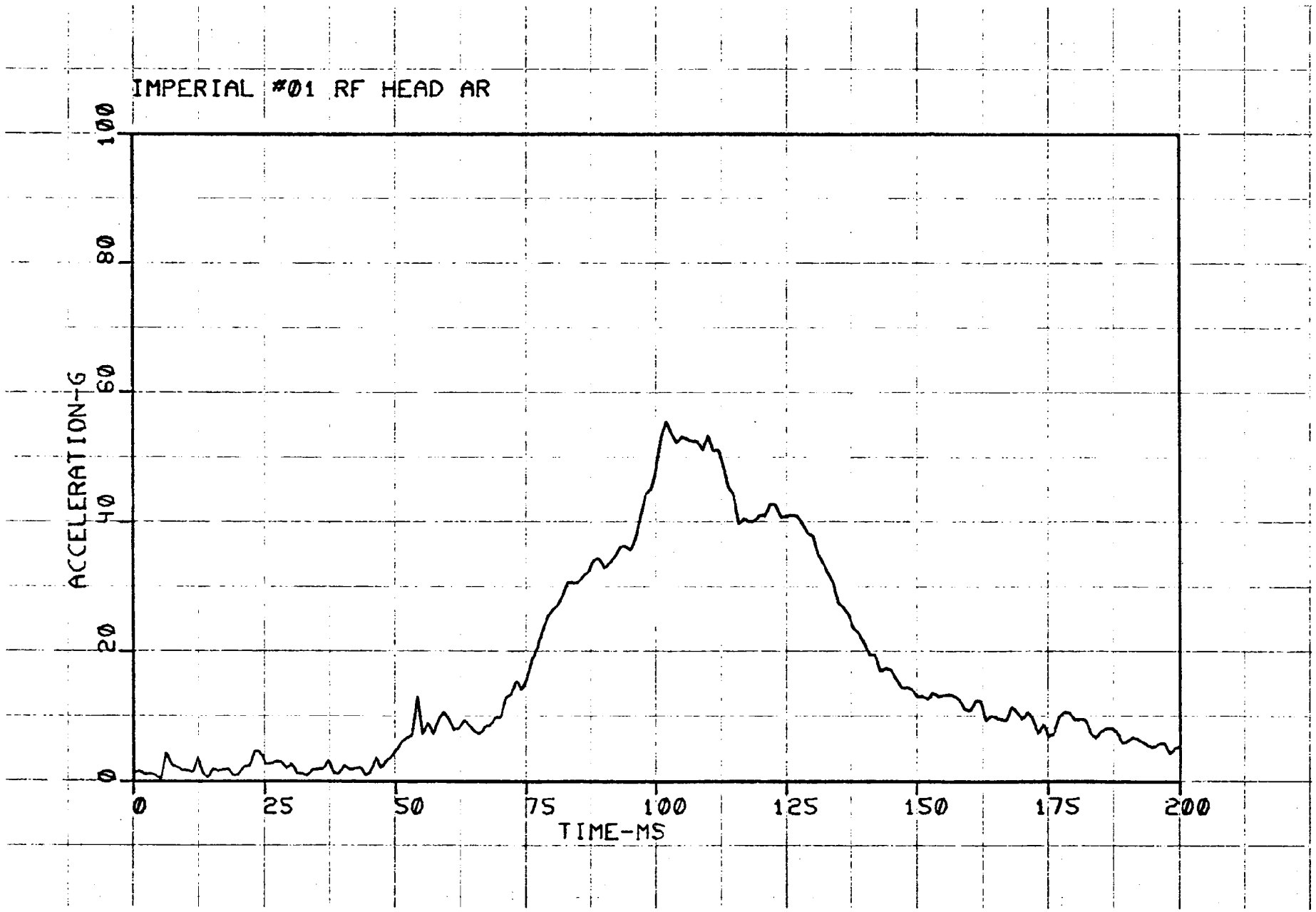
75
100
125
150
175
200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ACCELERATION-G
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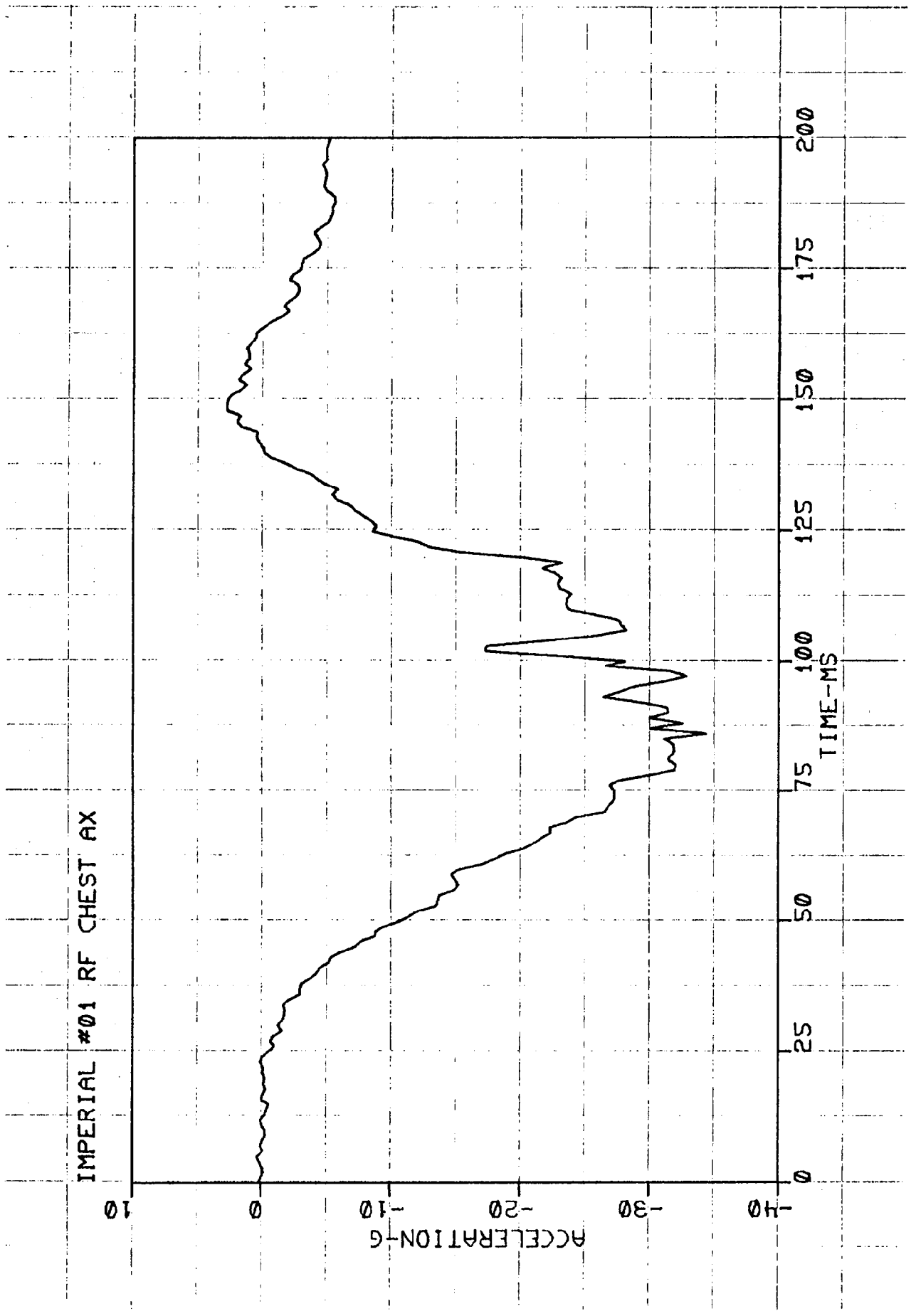
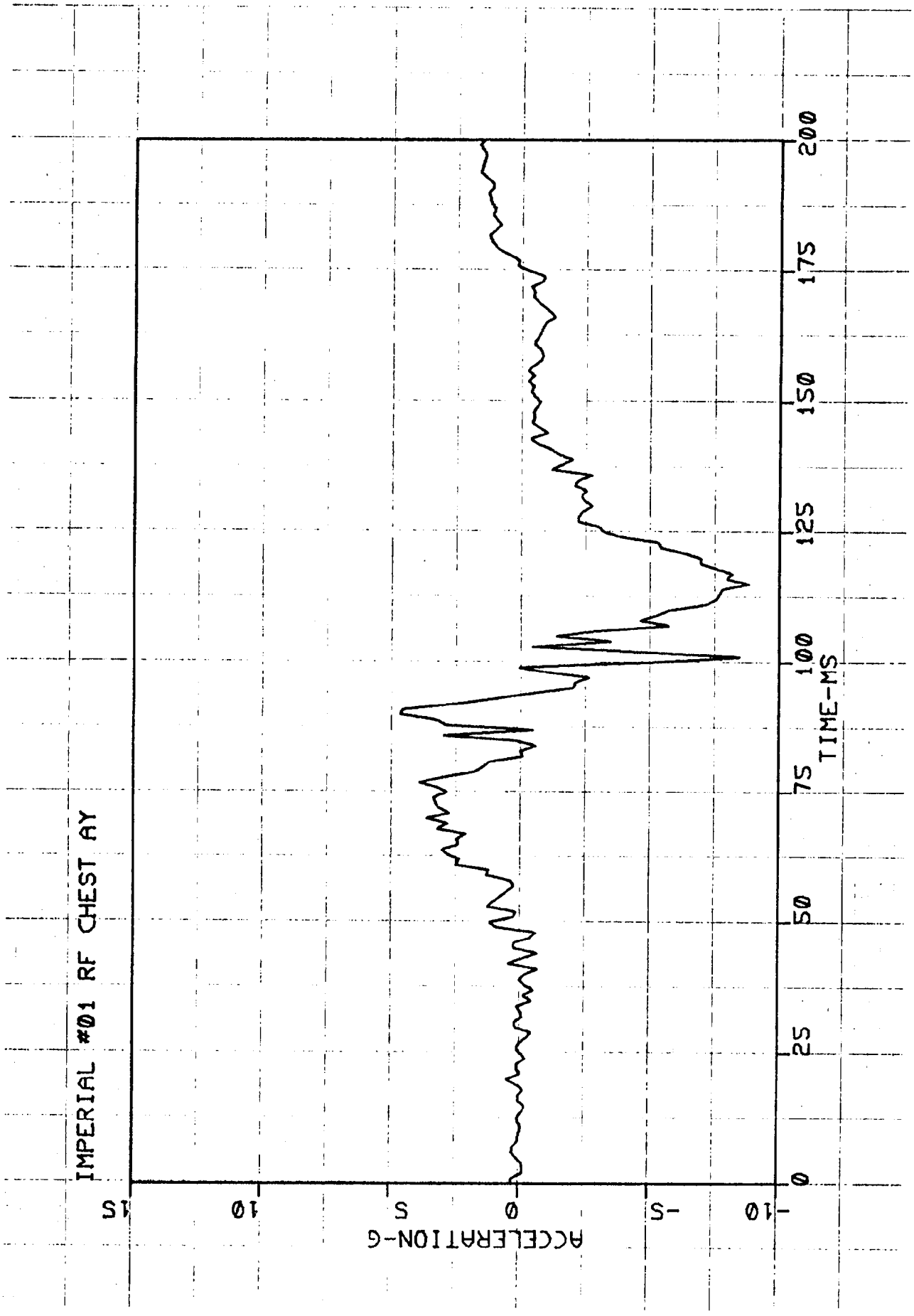
20
40
60
80
100
0
25
50
75
100
125
150
175
200
TIME-MS


IMPERIAL #01 RF CHEST AX
ACCELERATION-G
10
0
-10
-20
-30
-40
TIME-MS
0
25
50
75
100
125
150
175
200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ACCELERATION-G
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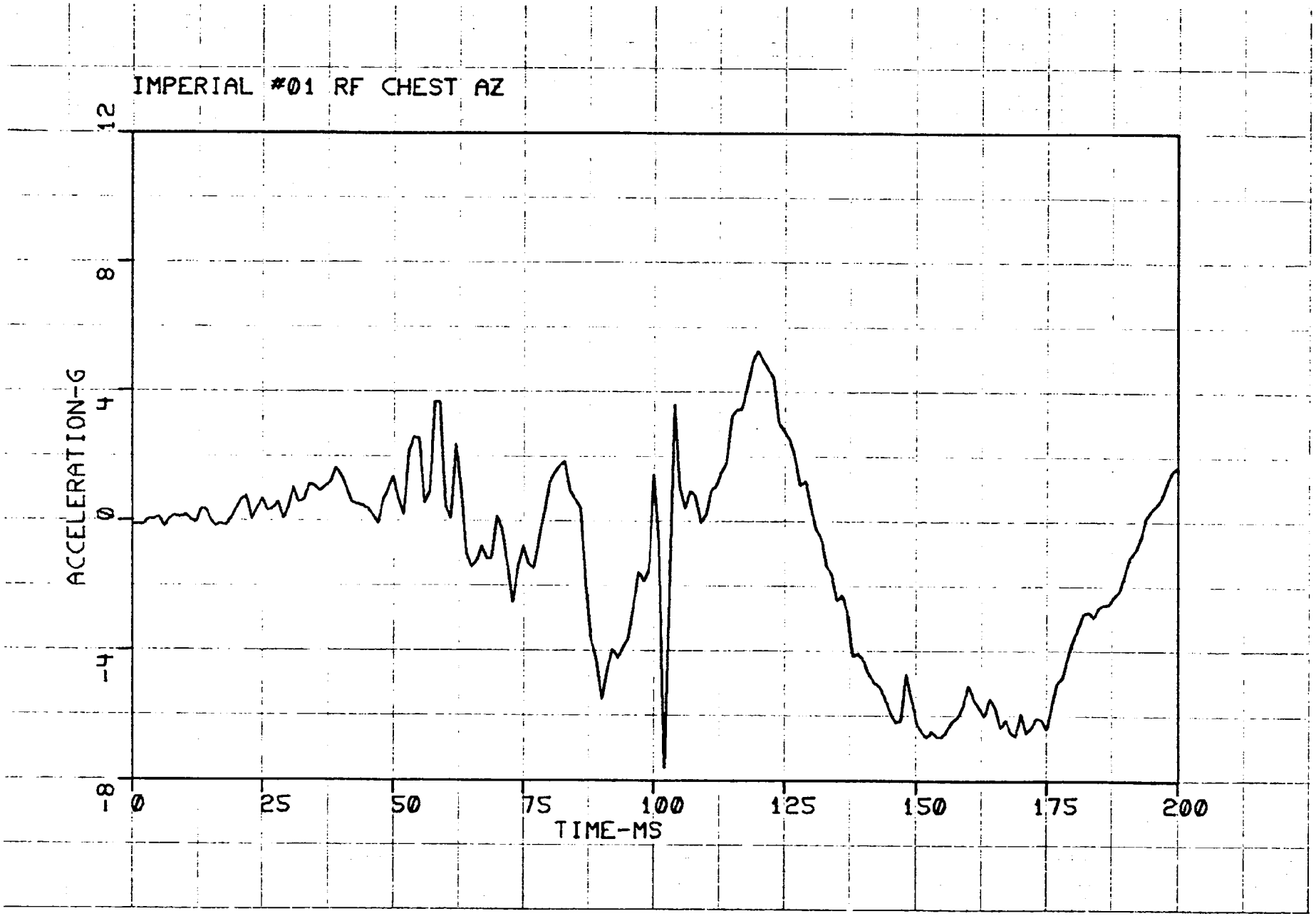
10
5
0
-5
-10
0
25
50
75
100
125
150
175
200
TIME-MS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ACCELERATION-G
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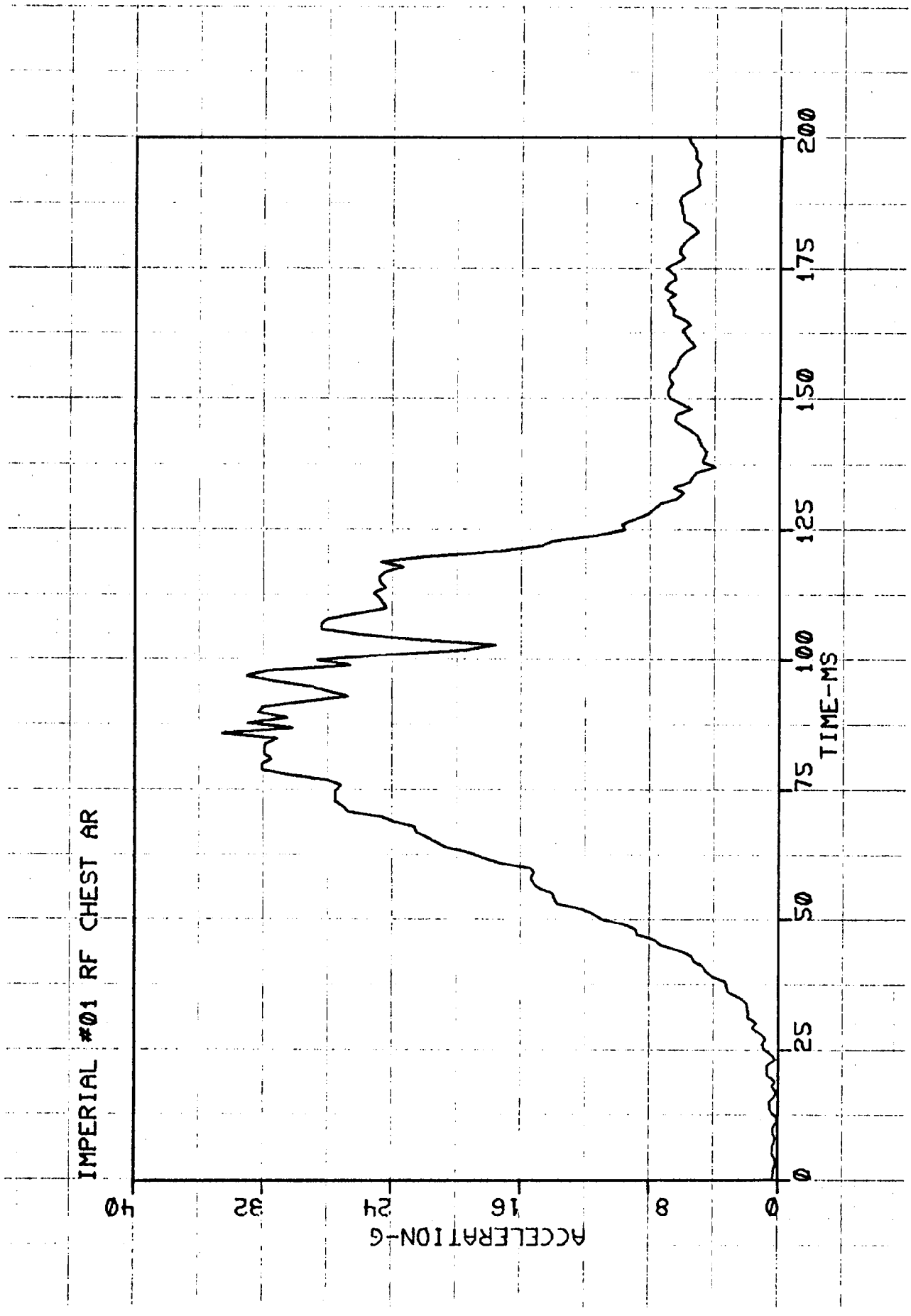
8
4
0
-4
-8
0
25
50
75
100
125
150
175
200
TIME-MS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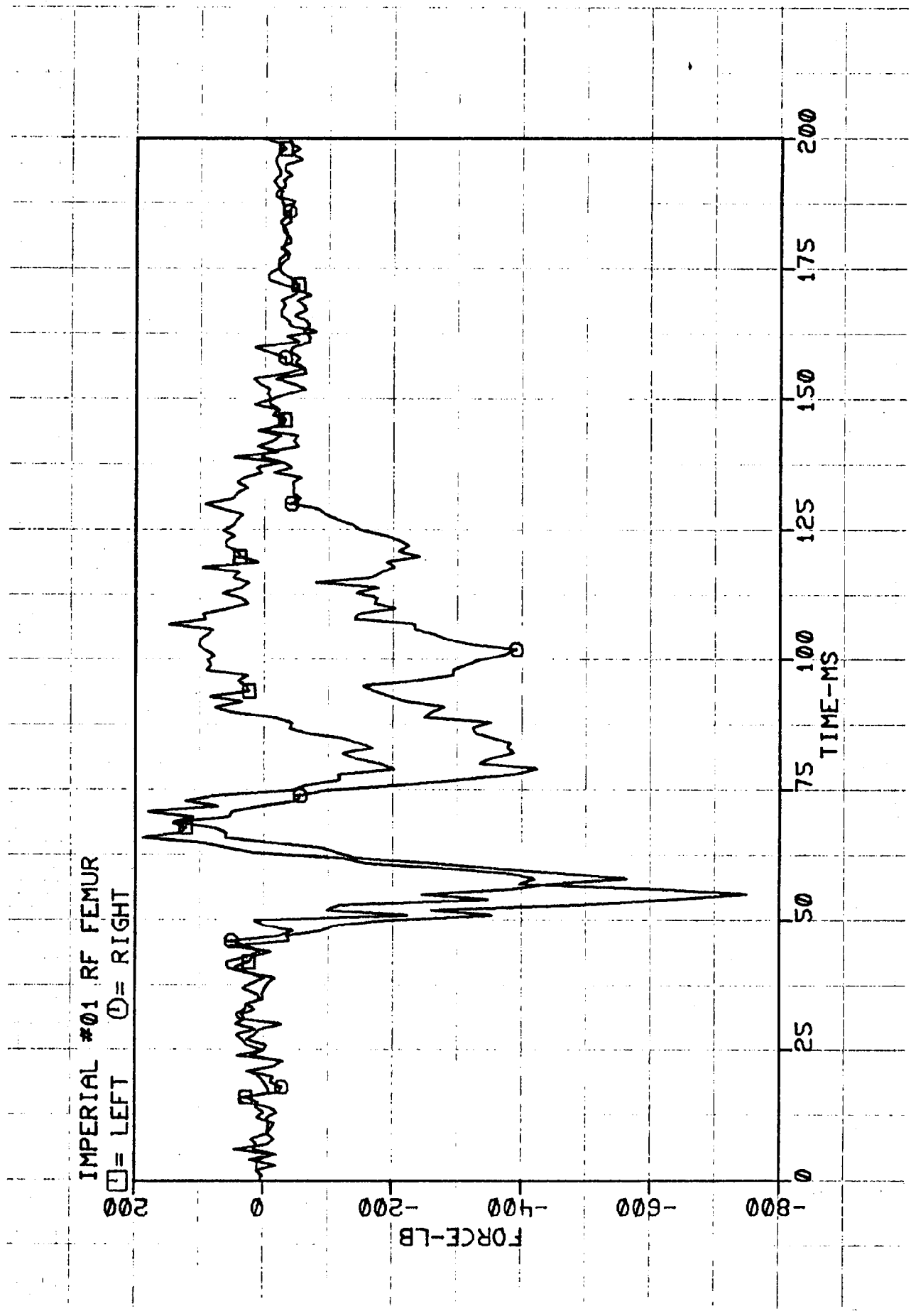
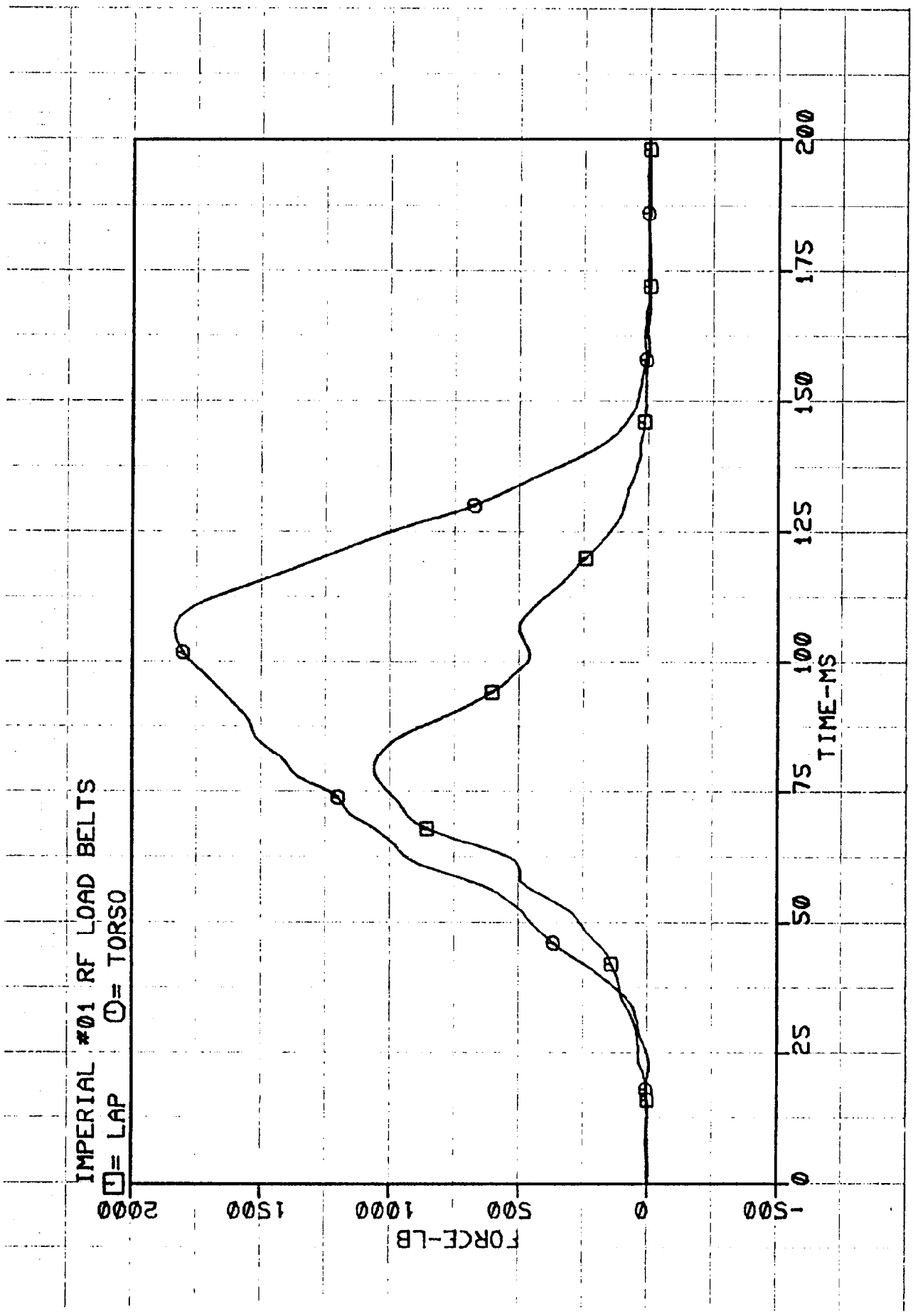
ACCELERATION-G
0
8
16
24
32
40
TIME-MS
0
25
50
75
100
125
150
175
200


IMPERIAL #01 RF FEMUR
□= LEFT ①= RIGHT
FORCE-LB
200
0
-200
-400
-600
-800
TIME-MS
0
25
50
75
100
125
150
175
200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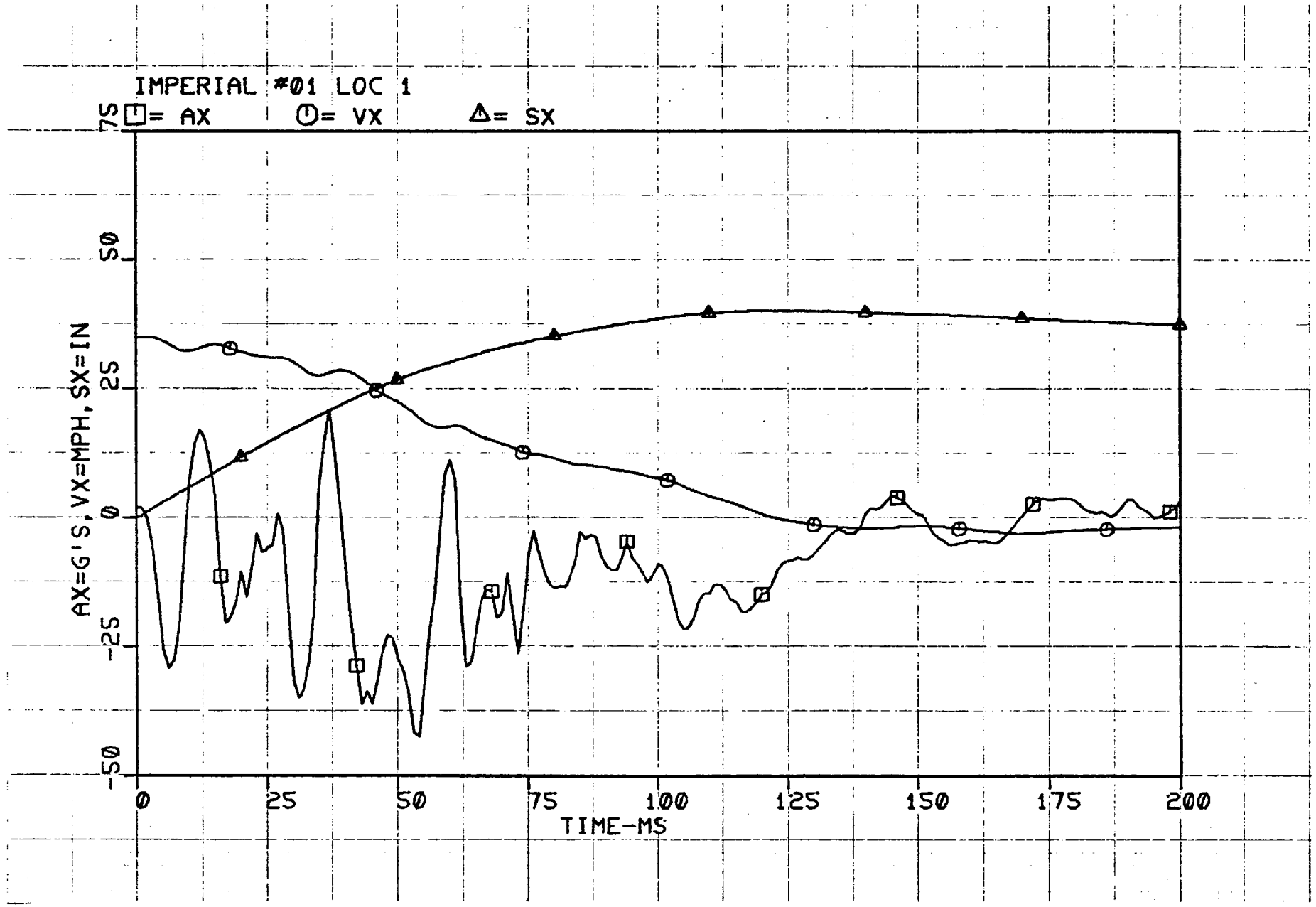
□= LAP ○= TORSO
FORCE-LB
2000
1500
1000
500
0
-500
TIME-MS
0
25
50
75
100
125
150
175
200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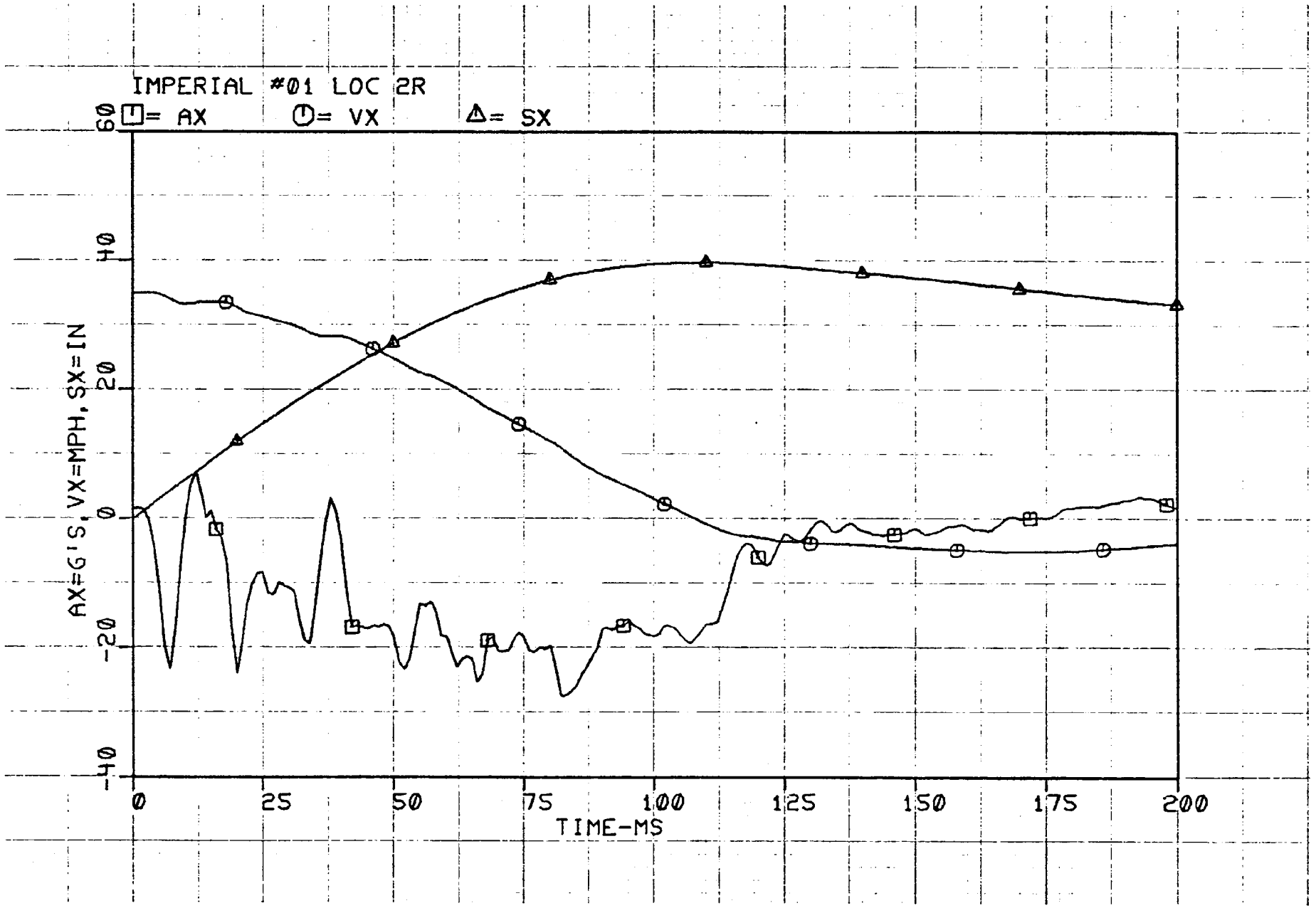
□= AX
⏲= VX
Δ= SX
AX=G'S, VX=MPH, SX=IN
75
50
25
0
-25
-50
0
25
50
75
100
125
150
175
200
TIME-MS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□= AX
○= VX
△= SX
AX=G'S, VX=MPH, SX=IN
60
40
20
0
-20
-40
0
25
50
75
100
125
150
175
200
TIME-MS

APPENDIX C

DUMMY CALIBRATION

PART 572 DUMMY CALIBRATION TEST DATA

NHTSA Dummy I.D. No.: A08

Laboratory Technicians: B. Campbell, V. Agnihotri

		Pre-test Calibration	Post-test Calibration
Date of Dummy Calibration		1/29/81	
Calibration Sequential Number for Dummy		39	
Temperature in Lab. (Spec. = 66 to 78 °F)		70	
Relative Humidity in Lab. (Spec. = 10 to 70%)		40	
Test Parameter		**Specification**	
1. Head Drop Test:			
a. Peak Resultant Accel		210 - 260G	243
b. Peak Lateral Accel		$\leq$ 10G	8
c. Time above 100G		0.9 - 1.5 ms	1.3
2. Neck Bending Test:			
a. Pendulum Speed		21.5 - 25.5 fps	22.0
b. Pendulum Avg Decel (over $t_3 - t_2$)		20 - 24G	23
c. Peak Resultant Head Acceleration		26G Maximum	18
d. Pendulum Decel ($t_2 - t_1$)		$\leq$ 3 ms	2
e. Pendulum Decel ($t_3 - t_2$)		25 - 30 ms	27
f. Pendulum Decel ($t_4 - t_3$)		$\leq$ 10 ms	
g. Pendulum Direction Reversal Time		$\geq$ 123 ms	
h. Maximum Head Rotation		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	25.6
	Displ	2.1 - 3.1 in.	2.2
60°	Time	40.3 - 51.7 ms	40.0
	Displ	4.3 - 5.3 in.	4.3
Maximum (73°)	Time	53.2 - 66.8 ms	57.5
	Displ	5.0 - 6.0 in.	5.3

* 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	75.0	
	Displ	4.3 - 5.3 in.	4.3	
30°	Time	85.4 - 104.6 ms	90.0	
	Displ	2.1 - 3.1 in.	2.2	
0°	Time	101.0 - 123.0 ms	103.0	
	Displ	-0.5 - 0.5 in.	-0.1	
3. Abdominal Compression Test: (Preload = 10 pounds)				
a. Force at 0.5 in.		14 - 26 lb	15	
b. Force at 0.75 in.		27 - 40 lb	29	
c. Force at 1.0 in.		40 - 53 lb	44	
d. Force at 1.3 in.		63 - 78 lb	62	
4. Lumbar Flexion Test:				
a. Force at 20°		22 - 34 lb	26	
b. Force at 30°		34 - 46 lb	44	
c. Force at 40°		46 - 58 lb	47	
d. Return Angle		12° Maximum	2	
5. Chest Impact Tests:				
a. High Speed				
1) Probe Speed		21.78-22.22 fps	22.00	
2) Peak Deflection		1.7 in. Maximum	1.7	
3) Peak Resistive Force		2250 lb Maximum	1384	
4) Internal Hysteresis		50 - 70%	66	
b. Low Speed				
1) Probe Speed		13.86-14.14 fps	13.97	
2) Peak Deflection		1.1 in. Maximum	1.1	
3) Peak Resistive Force		1450 lb Maximum	903	
4) Internal Hysteresis		50 - 70%	60	

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	6.9	
2) Maximum Force	1850 - 2500 lb	2150	
3) Time >1000 lb	1.7 ms Minimum	2.0	
b. Left Side			
1) Probe Speed	6.76 - 7.04 fps	6.87	
2) Maximum Force	1850 - 2500 lb	2050	
3) Time >1000 lb	1.7 ms Minimum	2.0	

PART 572 DUMMY CALIBRATION TEST DATA

NHTSA Dummy I.D. No.: A09

Laboratory Technicians: B. Campbell, V. Agnihotri

		Pre-test Calibration	Post-test Calibration
Date of Dummy Calibration		1/29/81	
Calibration Sequential Number for Dummy		36	
Temperature in Lab. (Spec. = 66 to 78 °F)		70	
Relative Humidity in Lab. (Spec. = 10 to 70%)		40	
Test Parameter	**Specification**		
1. Head Drop Test:			
a. Peak Resultant Accel	210 - 260G	260	
b. Peak Lateral Accel	$\leq$ 10G	5	
c. Time above 100G	0.9 - 1.5 ms	1.3	
2. Neck Bending Test:			
a. Pendulum Speed	21.5 - 25.5 fps	22.0	
b. Pendulum Avg Decel (over $t_3 - t_2$)	20 - 24G	23	
c. Peak Resultant Head Acceleration	26G Maximum	19	
d. Pendulum Decel ($t_2 - t_1$)	$\leq$ 3 ms	2	
e. Pendulum Decel ($t_3 - t_2$)	25 - 30 ms	25	
f. Pendulum Decel ($t_4 - t_3$)	$\leq$ 10 ms	7	
g. Pendulum Direction Reversal Time	$\geq$ 123 ms		
h. Maximum Head Rotation	63 to 73°		
i. Chordal Displacement:			
Head Rotation Angle			
0° Time	-2 - 2 ms	0	
0° Displ	-0.5 - 0.5 in.	0	
30° Time	25.6 - 34.4 ms	26.0	
30° Displ	2.1 - 3.1 in.	2.3	
60° Time	40.3 - 51.7 ms	43.0	
60° Displ	4.3 - 5.3 in.	4.5	
Maximum (73°) Time	53.2 - 66.8 ms	55.5	
Maximum (73°) Displ	5.0 - 6.0 in.	5.1	

* 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	71.0	
	Displ	4.3 - 5.3 in.	4.5	
30°	Time	85.4 - 104.6 ms	88.0	
	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	25	
b. Force at 0.75 in.		27 - 40 lb	38	
c. Force at 1.0 in.		40 - 53 lb	49	
d. Force at 1.3 in.		63 - 78 lb	68	
4. Lumbar Flexion Test:				
a. Force at 20°		22 - 34 lb	28	
b. Force at 30°		34 - 46 lb	41	
c. Force at 40°		46 - 58 lb	50	
d. Return Angle		12° Maximum	8	
5. Chest Impact Tests:				
a. High Speed				
1) Probe Speed		21.78-22.22 fps	21.99	
2) Peak Deflection		1.7 in. Maximum	1.5	
3) Peak Resistive Force		2250 lb Maximum	1423	
4) Internal Hysteresis		50 - 70%	61	
b. Low Speed				
1) Probe Speed		13.86-14.14 fps	14	
2) Peak Deflection		1.1 in. Maximum	1.0	
3) Peak Resistive Force		1450 lb Maximum	902	
4) Internal Hysteresis		50 - 70%	61	

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	6.9	
2) Maximum Force	1850 - 2500 lb	1985	
3) Time >1000 lb	1.7 ms Minimum	2.0	
b. Left Side			
1) Probe Speed	6.76 - 7.04 fps	6.87	
2) Maximum Force	1850 - 2500 lb	2001	
3) Time >1000 lb	1.7 ms Minimum	2.0	

Dynamic Science Report No. 3103-81-017A

BARRIER IMPACT LOAD DATA
1981 CHRYSLER IMPERIAL
NHTSA 810307

335 copy

Prepared by:

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Phoenix, Arizona 85023

March 1981

Prepared for:

U.S. Department of Transportation
National Highway Traffic Safety Administration
Office of Passenger Vehicle Research
400 Seventh Street, S.W.
Washington, D.C. 20590

DYNAMIC SCIENCE, INC. | Talley Industries
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(602) 869-9331

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Prepared by Jean A. Kelley

Approved by E Ernsworth

Date March 24, 1981

Report Accepted by:

_____
Contract Technical Manager
Office of Vehicle Safety Compliance

_____
Date

TABLE OF CONTENTS

1.0 INTRODUCTION

This report is an addendum to Report No. 3101-81-017 and presents the barrier load measurement data acquired in testing a 1981 Chrysler Imperial (NHTSA No. 810307).

Barrier impact speed was 34.96 mph.

Section 2.0 presents information on the load cell barrier and vehicle accelerometers.

Section 3.0 provides general test and vehicle parametric data.

Section 4.0 presents plots of load cell and accelerometer data versus time.

2.0 INSTRUMENTATION DESCRIPTION

2.1 LOAD CELL BARRIER

The load cell barrier face is pictured in Figure 2-1. The barrier consists of a 9 x 4 array of 50 klb load cells each faced with a section of 1-3/4-inch thick plywood. Plywood sections for Rows C and D (upper two rows) each measure 10 inches high and 9 inches wide. Plywood sections for Rows A and B (lower two rows) each measure 9 inches high and 9 inches wide. Overall width of the barrier is 83 inches and overall height is 38-3/4 inches. The lower edge of the barrier is 2-5/8 inches above the surface of the ground.

2.2 PLACEMENT OF VEHICLE ACCELEROMETERS

Six longitudinal accelerometers were located on the vehicle as schematically illustrated in Figure 2-2. Two instruments (Loc. 1 and 2) represent occupant compartment accelerations. Two (Loc. 3 and 4) represent engine accelerations and two (Loc. 5 and 6) represent front wheel accelerations.

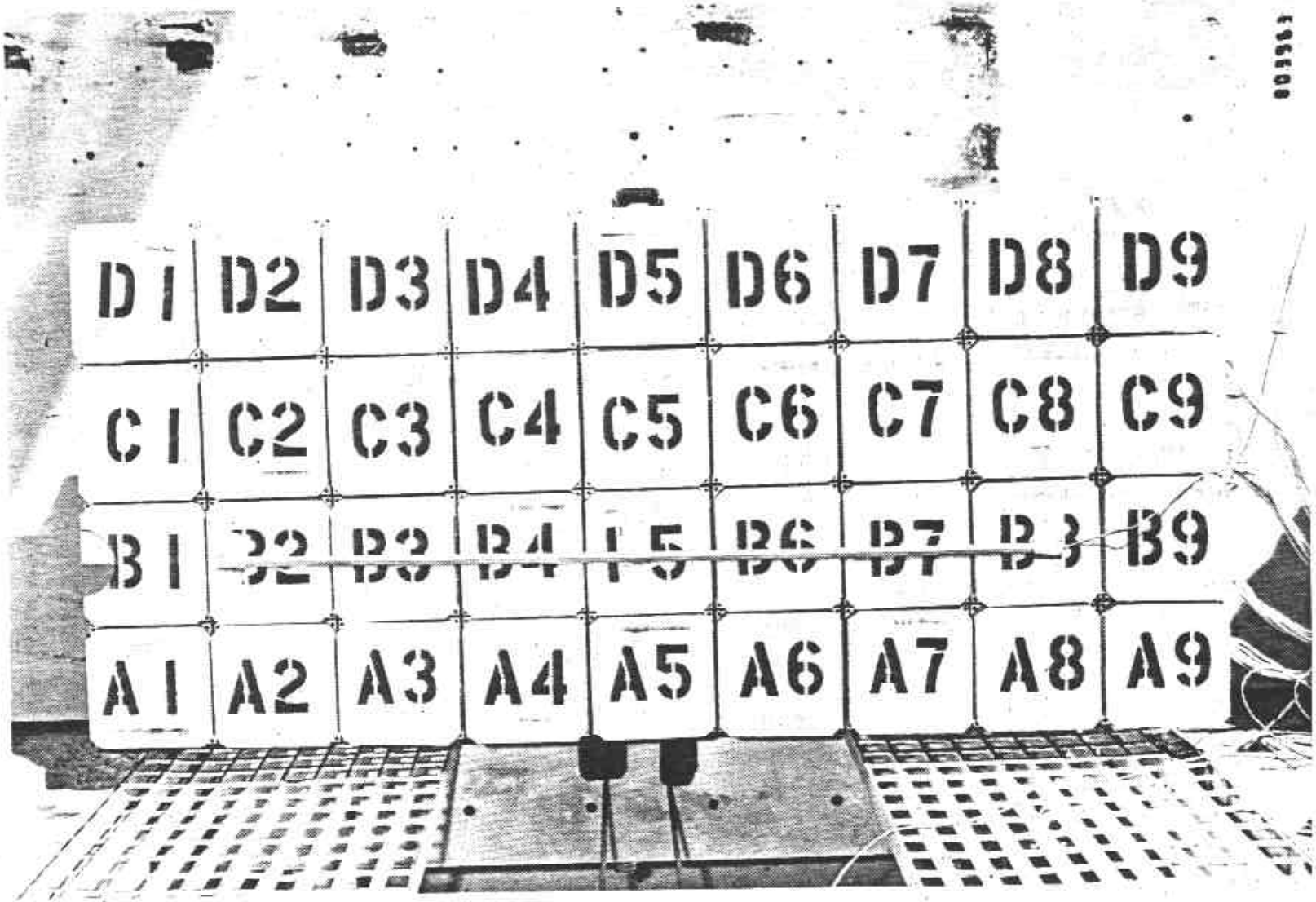
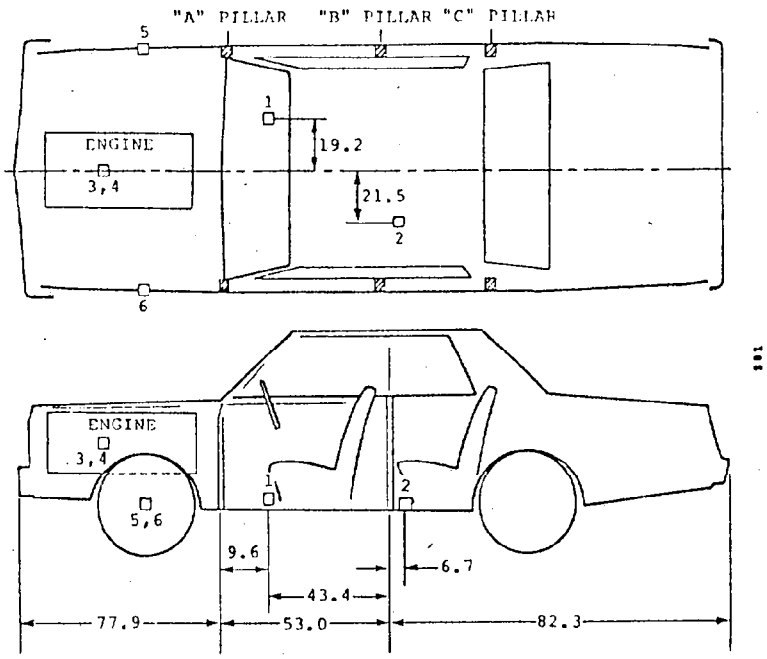


FIGURE 2-1. LOAD CELL BARRIER FACE.



No.	Location Description	Component Direction* X	Y	Z	Data Summary Peak G @ msec X "+"	X "-"	Y "+"	Y "-"	Z "+"	Z "-"
1	Right front floor pan	✓			20.8 37	42.3 54				
2	Left rear floor pan	✓			18.4 11	32.2 52				
3	Top of Engine	✓			14.7 69	78.6 50				
4	Bottom of Engine	✓			52.6 38	12.3 72				
5	Right front brake caliper	✓			30.9 68	173.6 88				
6	Left front brake caliper	✓			18.0 84	71.7 44				

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

FIGURE 2-2. VEHICLE ACCELEROMETER DATA SUMMARY.

3.0 GENERAL TEST AND VEHICLE PARAMETER DATA

This section consists of three tables which document vehicle information, test conditions, and the post-impact crush configuration.

GENERAL TEST AND VEHICLE PARAMETER DATA

PRE-IMPACT DATA

Make/Model: Chrysler Imperial
Body Style: 2-door hardtop Model Year: 1981
NHTSA No.: 810307 DSI No. 1135 Color: Green

DATA FROM CERTIFICATION LABEL

Vehicle Manufacturer: Chrysler Canada, Ltd
Date of Manufacture: 9-80 ; VIN: 2A3BY62J4BR110342
GVWR: 5240 lb; GAWR: Front = 2695 lb; Rear = 2595 lb

DATA FROM "RECOMMENDED TIRE PRESSURE" LABEL

Vehicle Capacity:	FRONT	REAR	RECOMMENDED	LOAD RANGE:
Tire Pressure:	29 psi	29 psi	TIRE SIZE: P205/75R15	B

Designated Seating: 2 Front 3 Rear 5 Total
Cargo load = 200 lb Is Spare Tire: Space Saver? Yes
TOTAL = 1100 lb Standard Equipment? Yes
Engine: 8 cylinder, 5.2 liter Displacement
Transmission: 3-speed, automatic, Rear-Wheel Drive
Date Vehicle Received by Laboratory: 11/14/80
Dealer Name & Address: Lanker Chrysler/Plymouth
4600 W. Glendale Ave, Glendale Az.
Remarks: Production vehicle with standard 3-point restraint belt system.

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

Right Front = 1144 lb Right Rear = 891 lb
Left Front = 1182 lb Left Rear = 820 lb
TOTAL FRONT WEIGHT = 2326 lb (57.6 % of Total Vehicle Weight)
TOTAL REAR WEIGHT = 1711 lb (42.4 % of Total Vehicle Weight)
TOTAL DELV. WEIGHT = 4037 lb
TARGET WEIGHT = UDW + Cargo Load + 328 lbs Dummies = 4565 lb

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

Right Front = 1131 lb Right Rear = 1131 lb
Left Front = 1219 lb Left Rear = 1081 lb
TOTAL FRONT WEIGHT = 2350 lb (51.5 % of Total Vehicle Weight)
TOTAL REAR WEIGHT = 2212 lb (48.5 % of Total Vehicle Weight)
TOTAL TEST WEIGHT = 4562 lb
Weight of ballast secured in vehicle trunk area = 200 lb

VEHICLE ATTITUDE: (inches)

Delivered Attitude:	RF	31.0	LF	31.0	RR	31.0	LR	31.0
Test Attitude:	RF	31.5	LF	31.0	RR	29.0	LR	28.8

GENERAL TEST AND VEHICLE PARAMETER DATA (CONTD)

POST-TEST DATA

Type of Test: Frontal (0°) Impact.
Date of Test: 2/23/81 Time: 1428 Temperature 81 °F
Required Impact Velocity Range: 34.5 to 35.5 mph
Impact Velocity: Primary = 34.96 mph Secondary = 34.96 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.)

		R	L
Vehicle Length:	Pre-test =	209.4	209.4
	Post-test =	179.1	179.7
	Crush =	30.3	29.7

Distance from front of test vehicle to point of impact (in.):

R	L
14.1	15.3

VISIBLE DUMMY CONTACT POINTS

	Driver	Passenger
Head	Steering wheel upper rim	None
Chest	None	None
Abdomen	Steering wheel lower rim	None
Left Knee	Dash	Glovebox
Right Knee	Dash	Glovebox

DOOR OPENING	Front		Rear	
	Left	Right	Left	Right
	Tools Required	Tools Required	N/A	N/A

SEAT MOVEMENT				
Seatback Failure	None	None		
Seat Shift (in.)	0	0		

GLAZING DAMAGE

Backlight/Windshield 100% shattered; deformed by dash.

OTHER NOTABLE IMPACT EFFECTS: Both front tires totally deflated and pinned by crushed sheet metal. Floorpan sheet metal separated from rocker panel immediately aft of both A pillars. Steering column sheared completely free of dash and had substantial lateral and vertical play. Drive shaft bent severely. Rear axle bent rearward. Right side of differential split. Front edge of hood split but latch did not fail.

VEHICLE PROFILE DATA SHEET

PRE-IMPACT DATA

Make/Model: Chrysler Imperial

Body Style: 2-door hardtop Model Year: 1981

NHTSA No.: 810307 DSI No.: 1135 Color: Green

DATA FROM CERTIFICATION LABEL

Vehicle Manufacturer: Chrysler Canada, Ltd.

Date of Manufacturer: 9-80 ; VIN: 2A3BY62J4BR110342

GVWR: 5240 lb; GAWR: Front = 2695 lb; Rear = 2595 lb

POST-IMPACT DATA

Type of Test: Frontal (0°) Impact

Date of Test: 2-23-81 Time: 1428 Temperature: 81 °F

Required Impact Velocity Range: 34.5 to 35.5

Impact Velocity: Primary = 34.96 mph Secondary = 34.96 mph

Test Weight: 4562 lb Static Crush: 33.6 in. Rebound: 14.1 in.

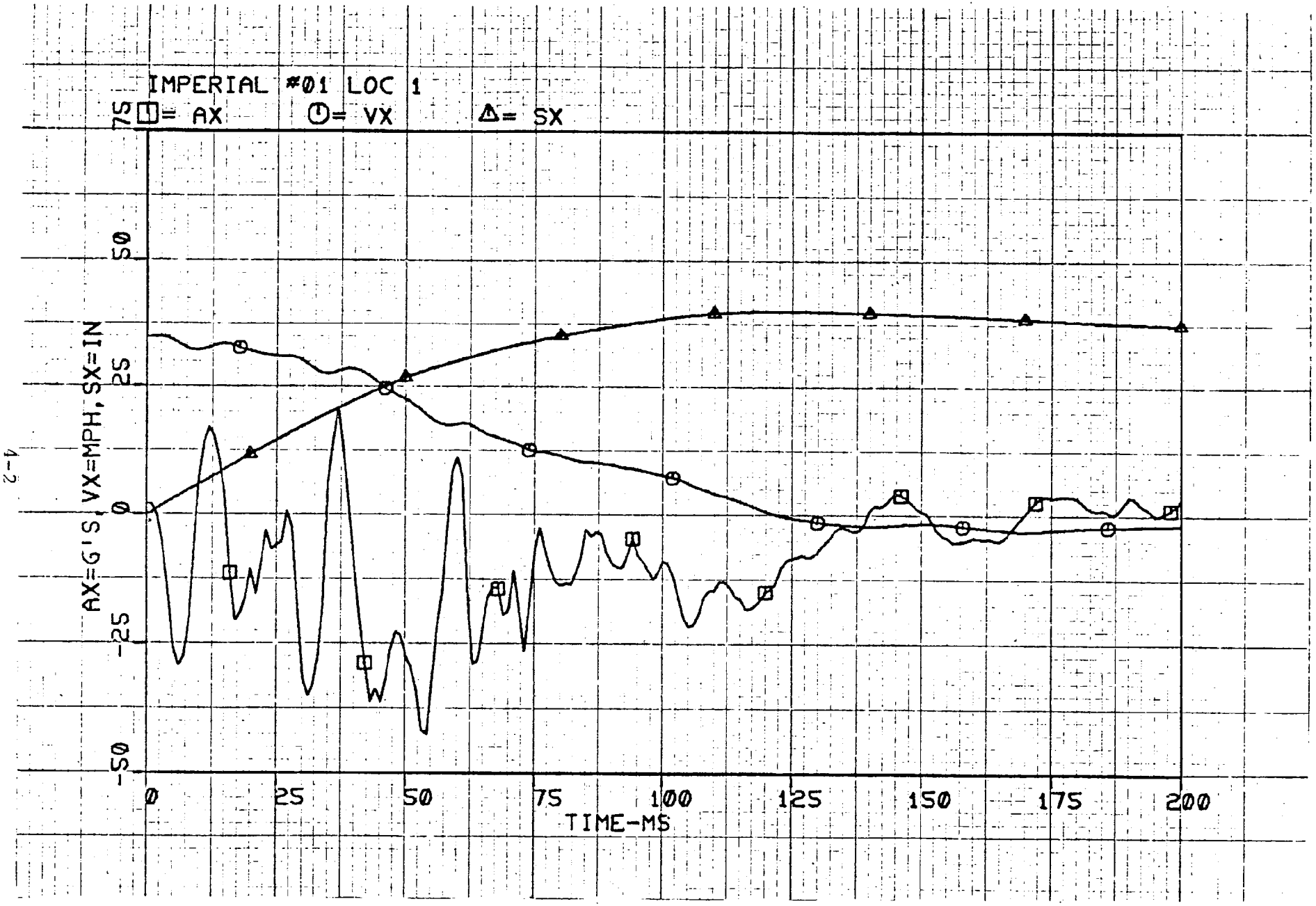
Measurements Referenced to Plane 19 Feet Forward of Rear Bumper ℄

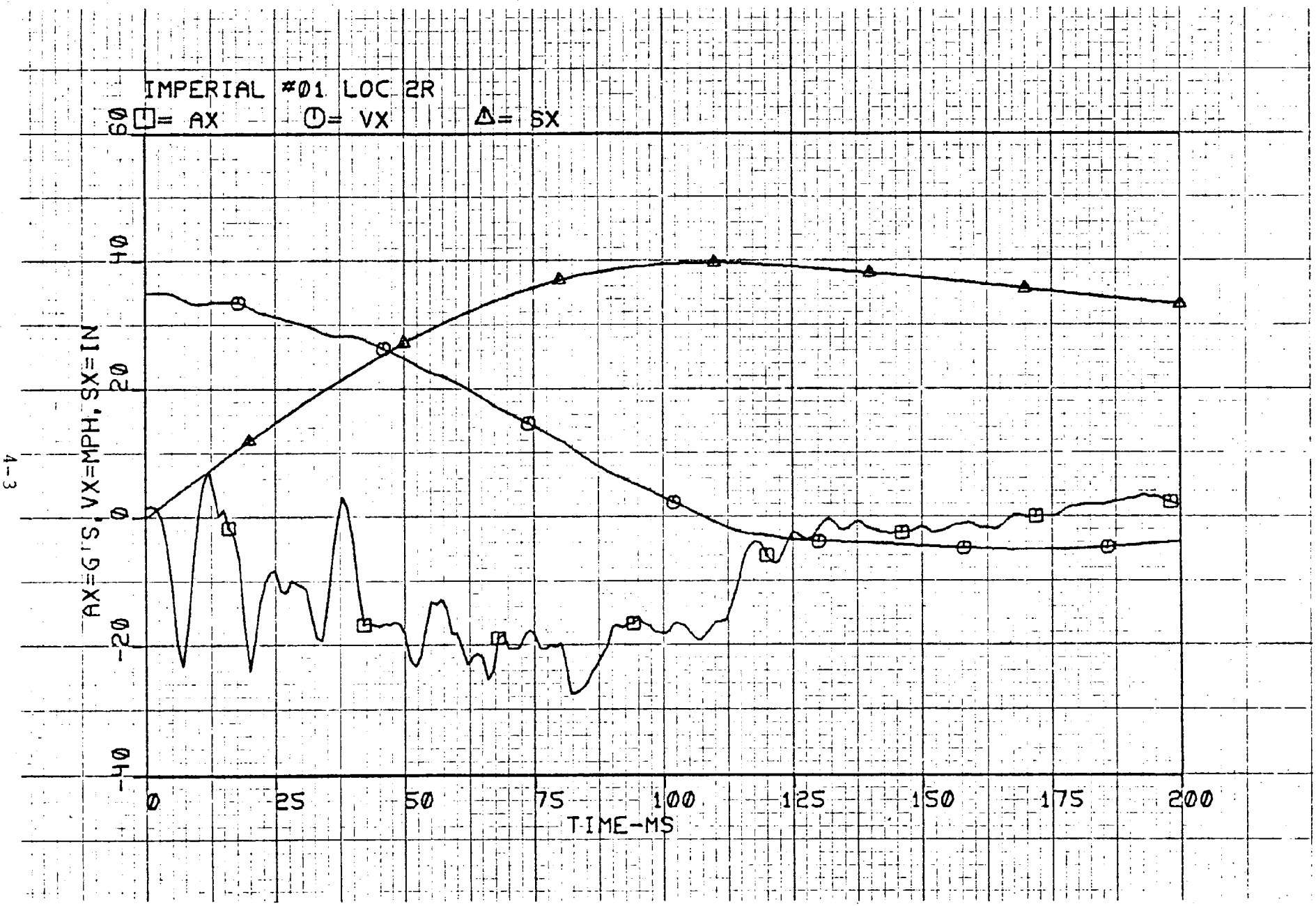
Location	Height	Vehicle Left (in.) 31.2	18.7	6.2	℄	Vehicle Right (in.) 6.2	18.7	31.2
		Pre-test Profile (in.)						
Top of Front Bumper	19.1	18.6	17.8	16.3	14.8	16.3	17.8	18.6
Front of Hood	31.6	24.3	28.0	21.6	20.1	21.6	28.0	24.5
		Post-test Profile (in.)						
Top of Front Bumper	19.3	48.9	49.3	49.1	48.4	48.9	48.8	48.3
Front of Hood	28.3	48.2	50.6	46.1	45.6	45.0	49.6	48.0
		Post-test Static Crush (in.)						
Top of Front Bumper	-0.2	30.3	31.5	32.8	33.6	32.6	31.0	29.7
Front of Hood	3.3	23.9	22.6	24.5	25.5	23.4	21.6	23.5

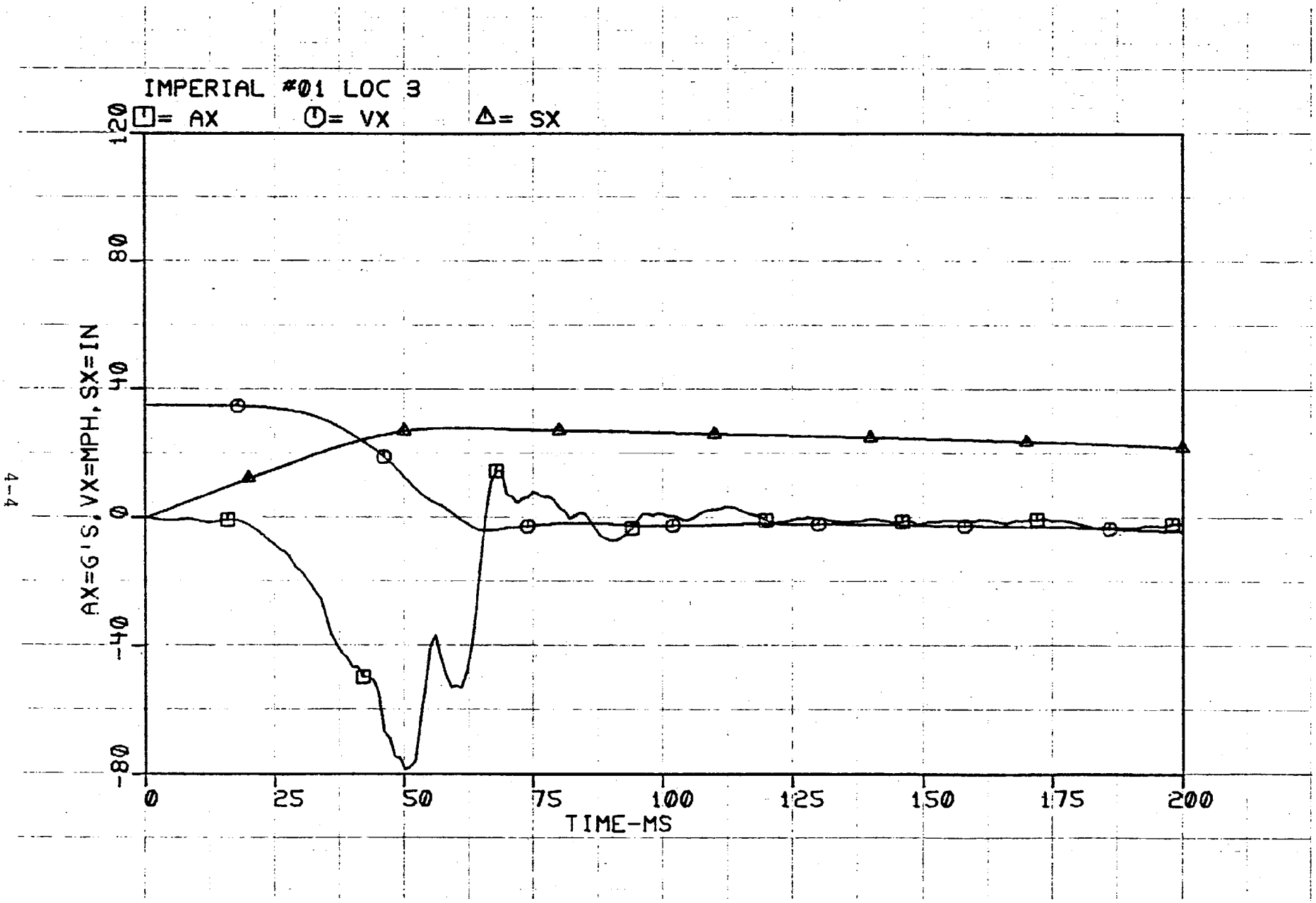
4.0 DATA PRESENTATION

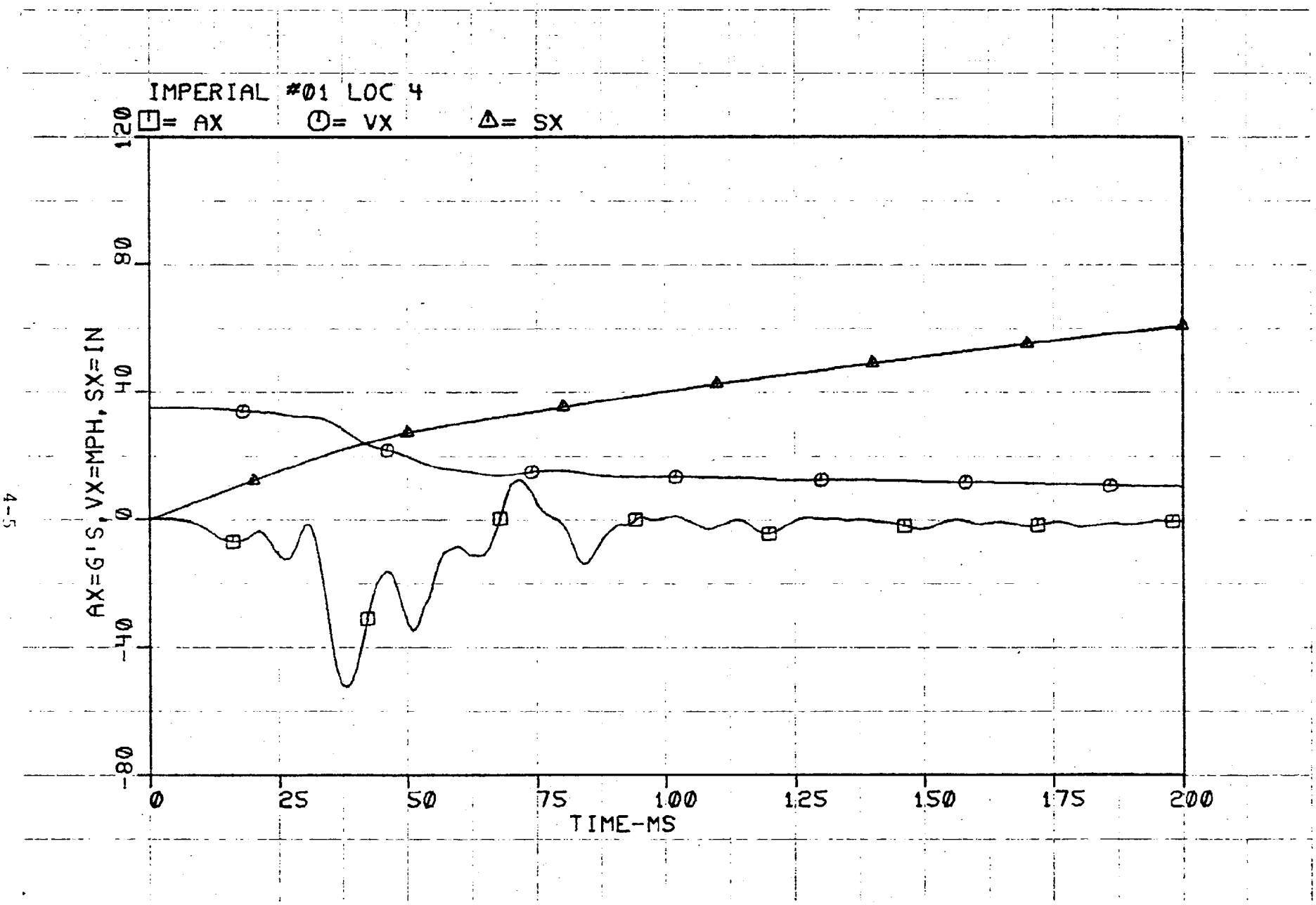
Data plots are presented for each accelerometer and consist of the accelerometer data plus the first integral versus time (velocity) and the second integral versus time (displacement) of the acceleration data.

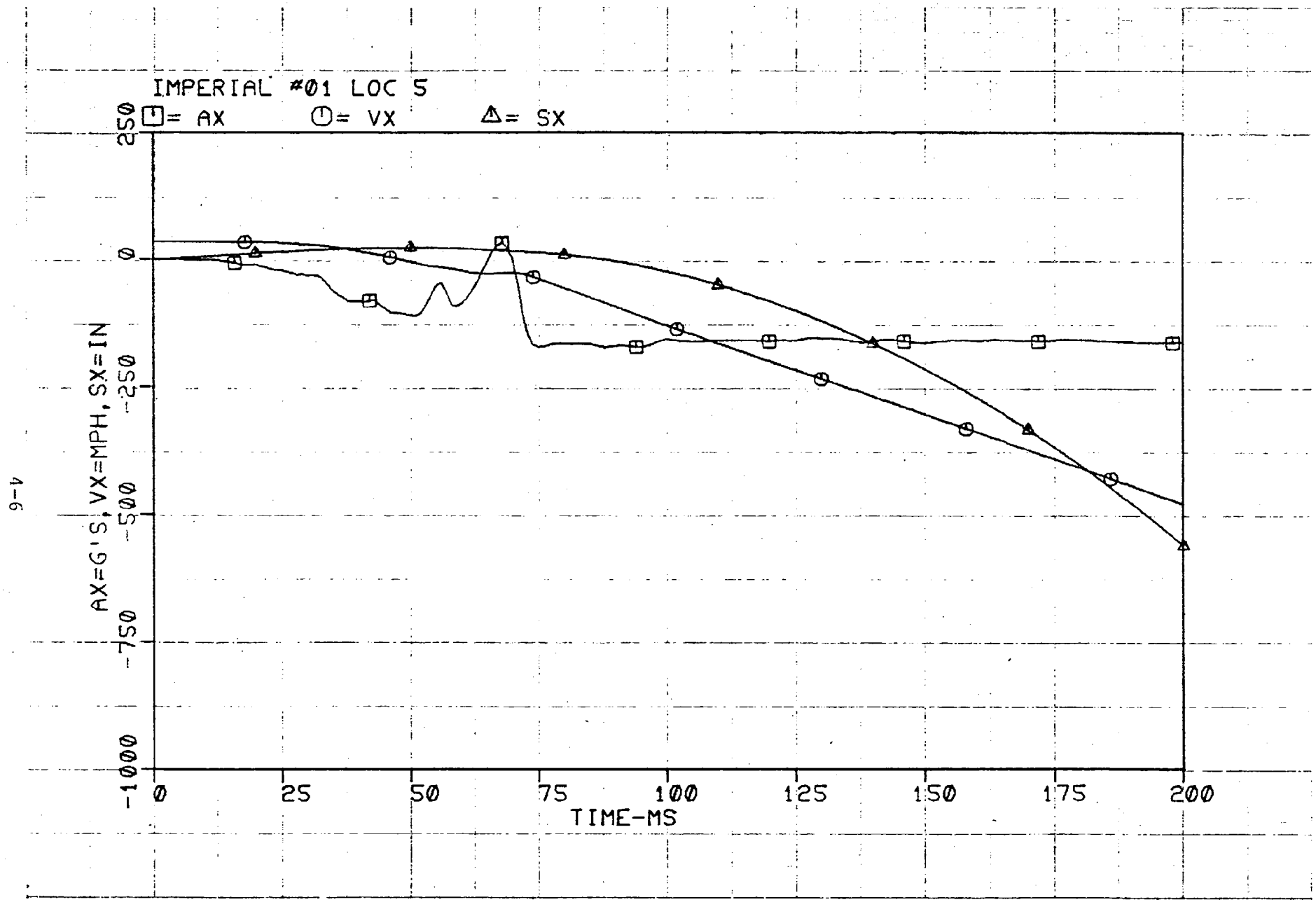
For the load cells, all data are summed and presented as total load versus time, upper two rows (C and D) summed versus time and lower two rows (A and B) summed versus time. Additional plots are presented for each cell multi-plotted by column. Individual loads may be difficult to discern on some of these plots. Tabular data can be provided if necessary.

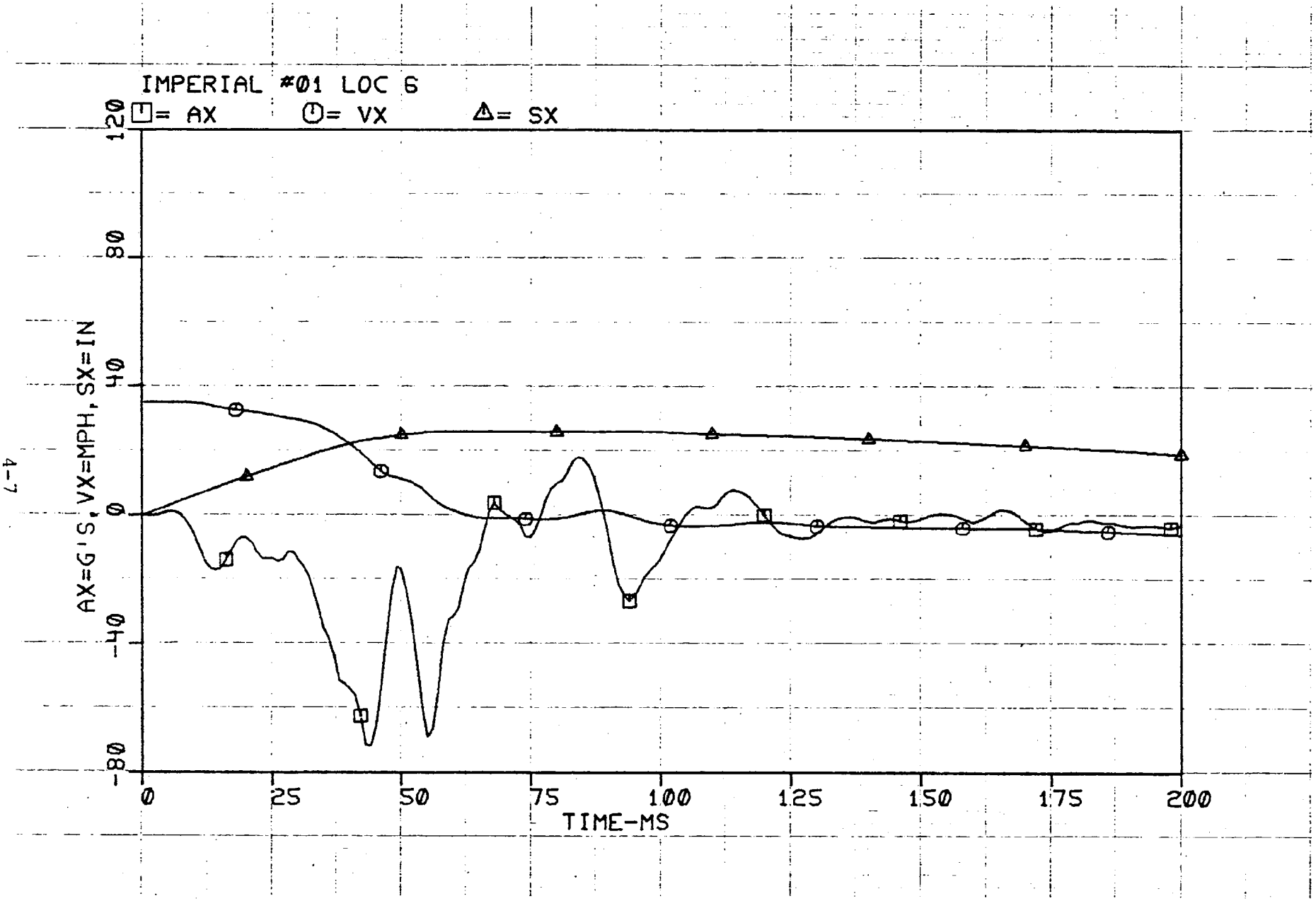

IMPERIAL #01 LOC 1
□= AX
○= VX
△= SX
AX=G'S, VX=MPH, SX=IN
75
50
25
0
-25
-50
0
25
50
75
100
125
150
175
200
TIME-MS

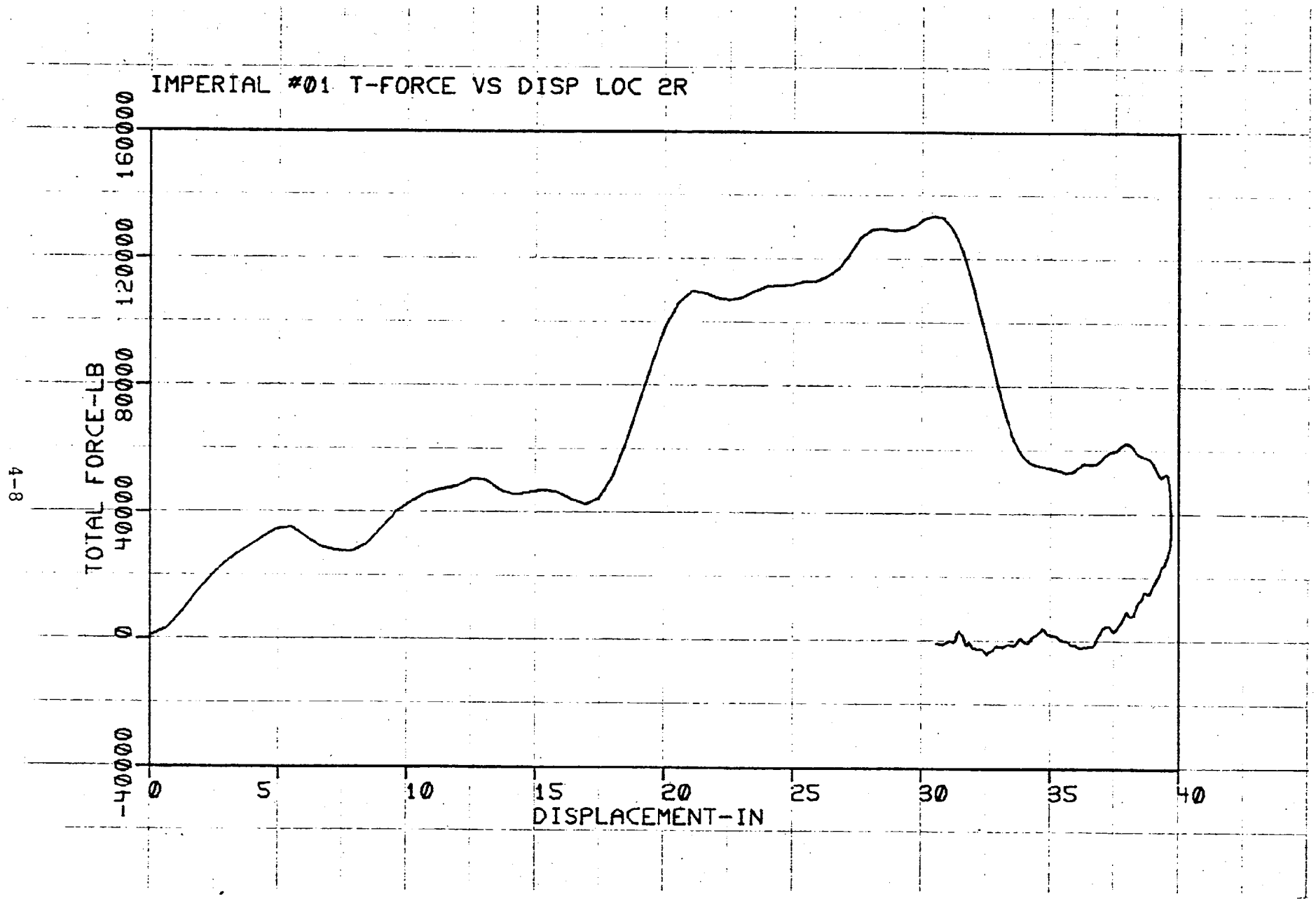

IMPERIAL #01 LOC 2R
□= AX ○= VX △= SX
AX=G'S, VX=MPH, SX=IN
60
40
20
0
-20
-40
0
25
50
75
100
125
150
175
200
TIME-MS

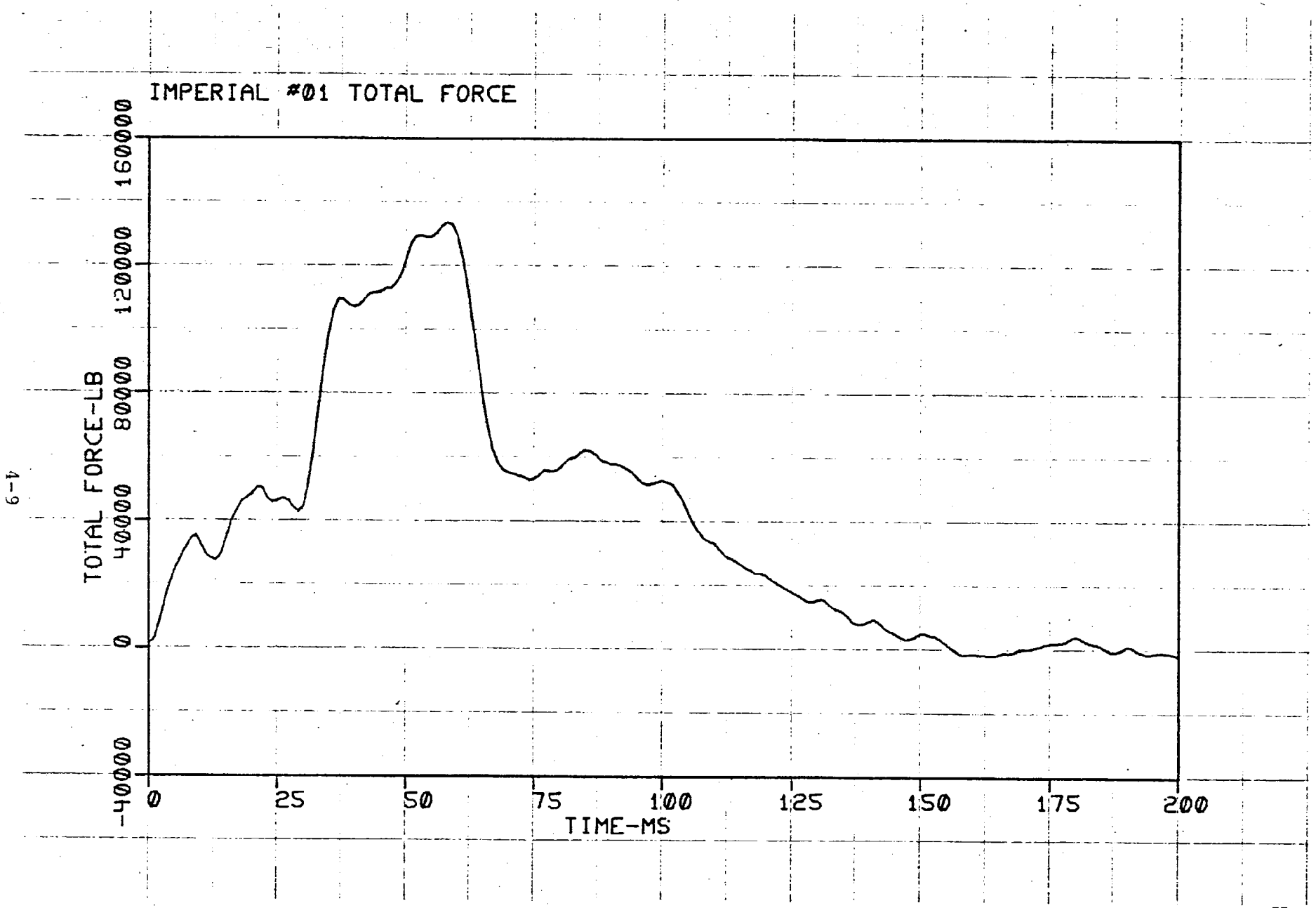

IMPERIAL #01 LOC 3
□= AX
○= VX
△= SX
AX=G'S, VX=MPH, SX=IN
120
80
40
0
-40
-80
0
25
50
75
100
125
150
175
200
TIME-MS

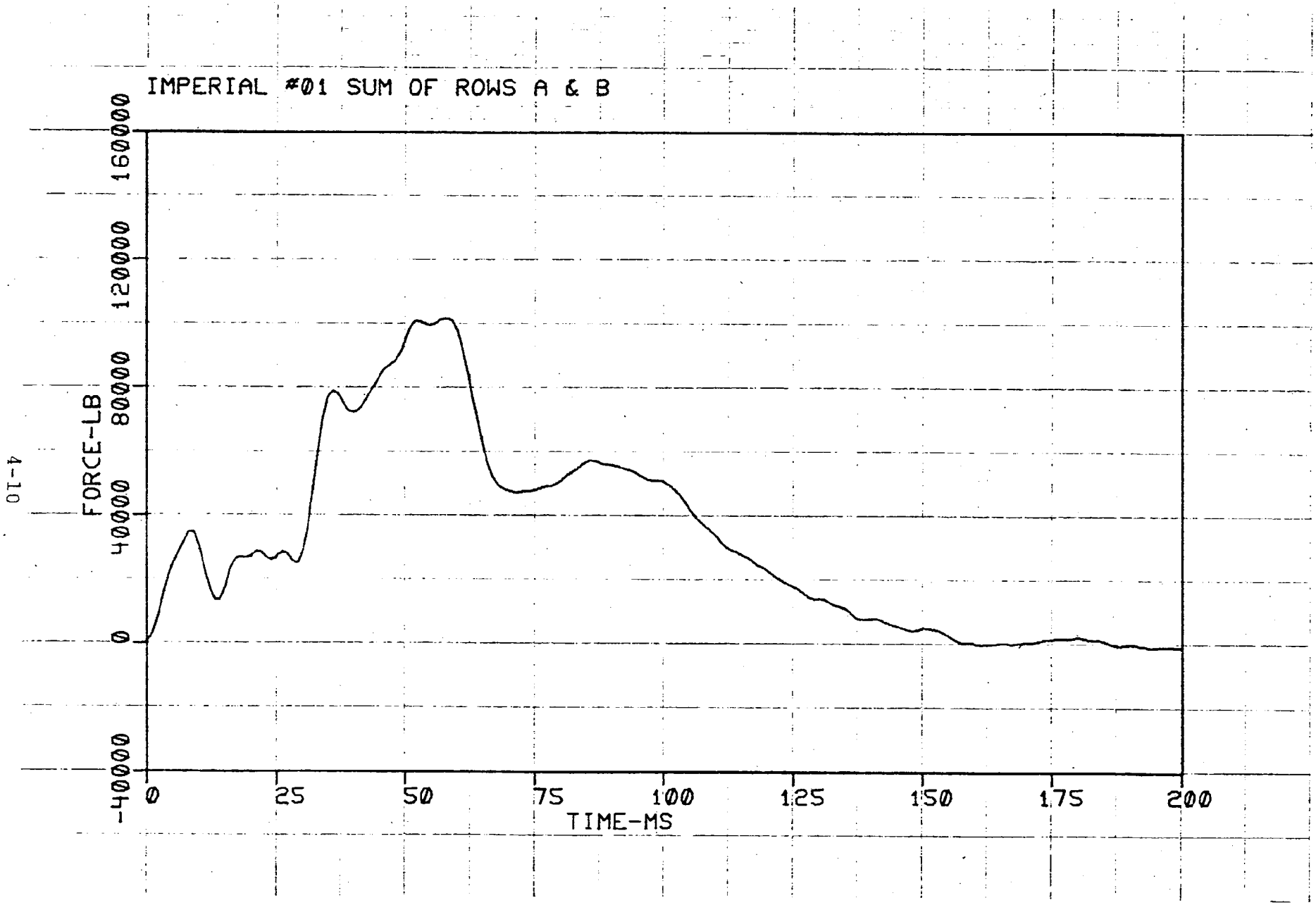

IMPERIAL #01 LOC 4
□= AX
○= VX
△= SX
AX=G'S, VX=MPH, SX=IN
120
80
40
0
-40
-80
0
25
50
75
100
125
150
175
200
TIME-MS

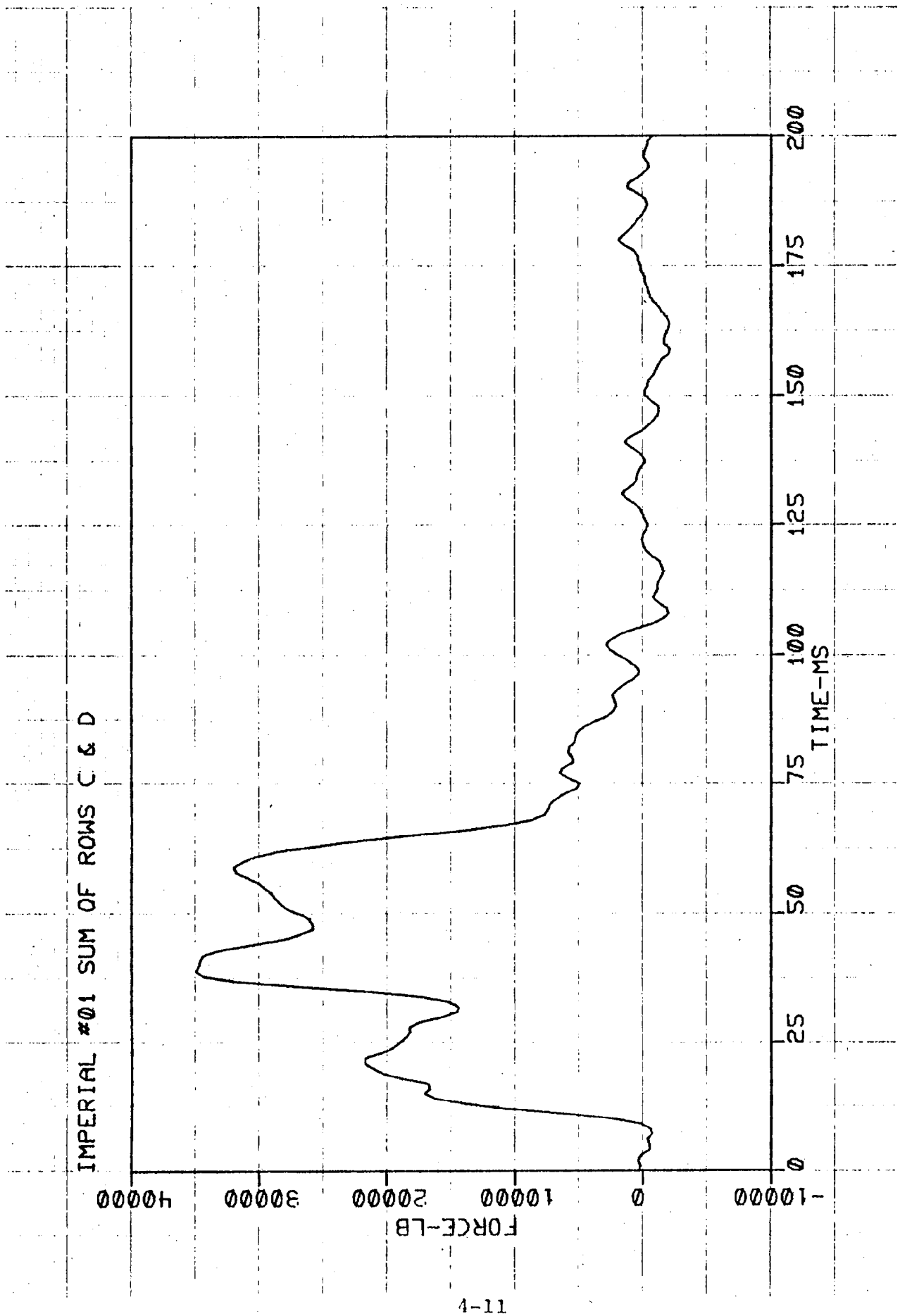

IMPERIAL #01 LOC 5
□= AX
○= VX
△= SX
AX=G'S, VX=MPH, SX=IN
250
0
-250
-500
-750
-1000
0
25
50
75
100
125
150
175
200
TIME-MS

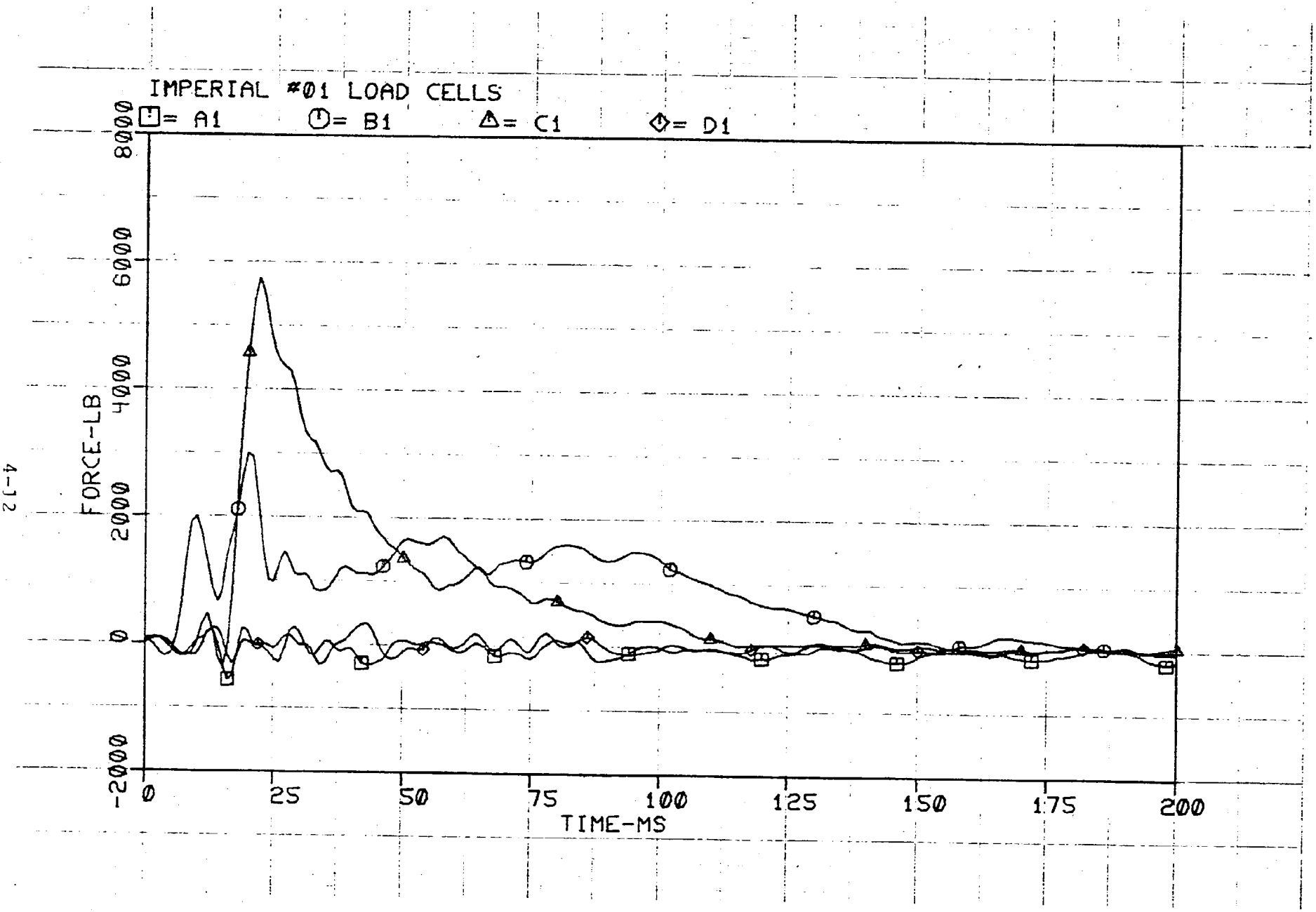

IMPERIAL #01 LOC 6
□= AX
⏲= VX
△= SX
120
80
40
0
-40
-80
AX=G'S, VX=MPH, SX=IN
0
25
50
75
100
125
150
175
200
TIME-MS

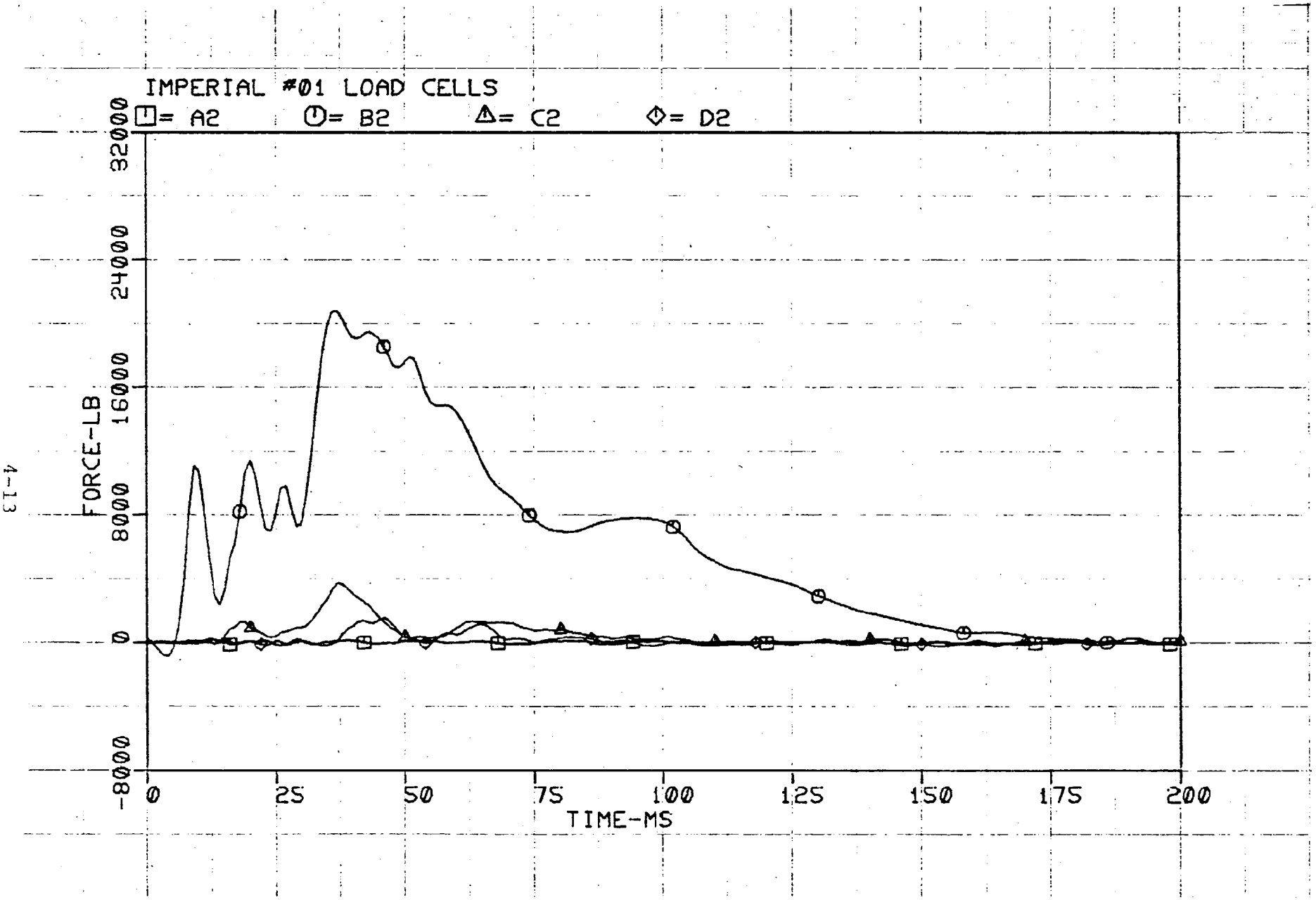

IMPERIAL #01 T-FORCE VS DISP LOC 2R
TOTAL FORCE-LB
160000
120000
80000
40000
0
-40000
0
5
10
15
20
25
30
35
40
DISPLACEMENT-IN

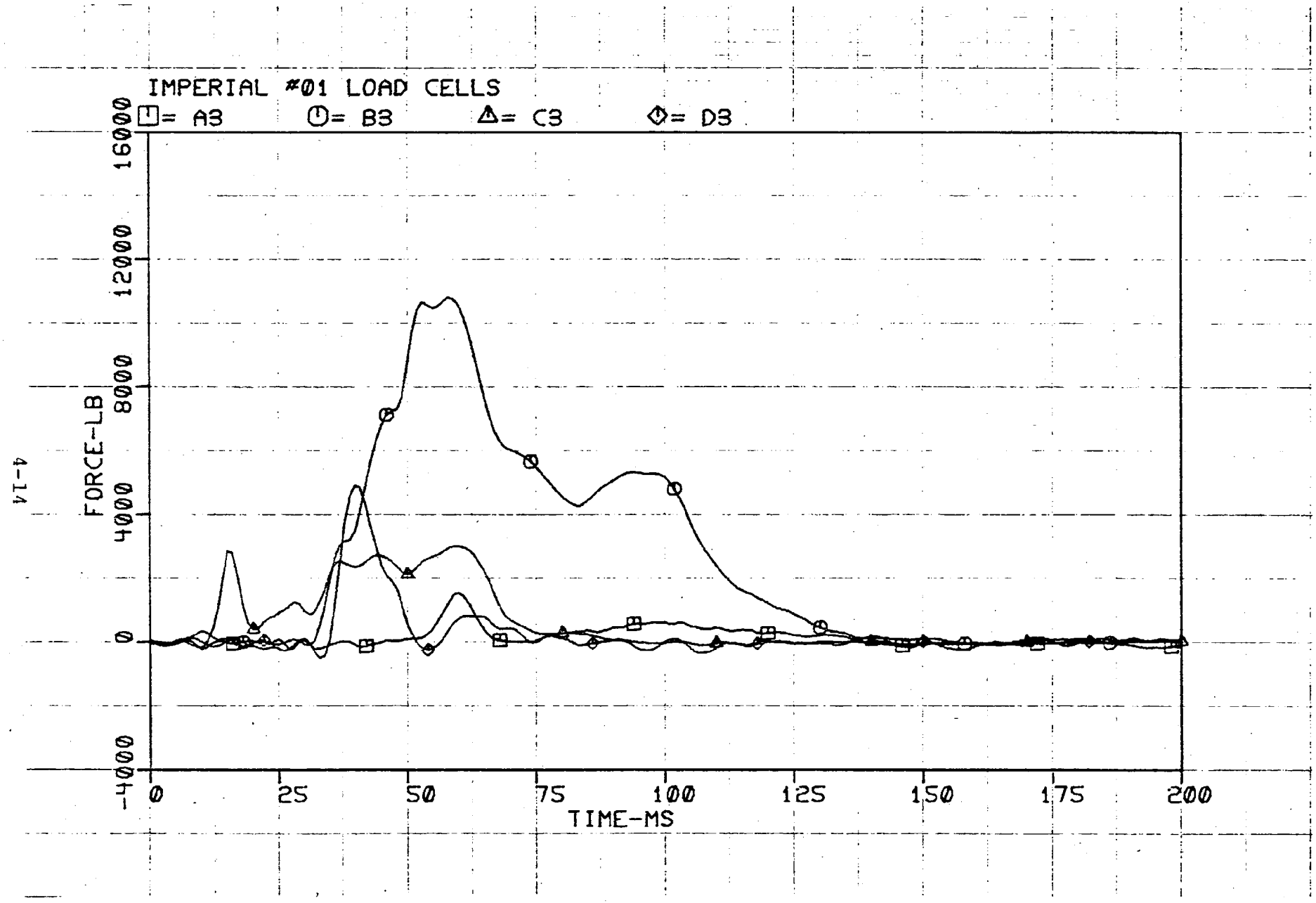

IMPERIAL #01 TOTAL FORCE
TOTAL FORCE-LB
160000
120000
80000
40000
0
-40000
0
25
50
75
100
125
150
175
200
TIME-MS

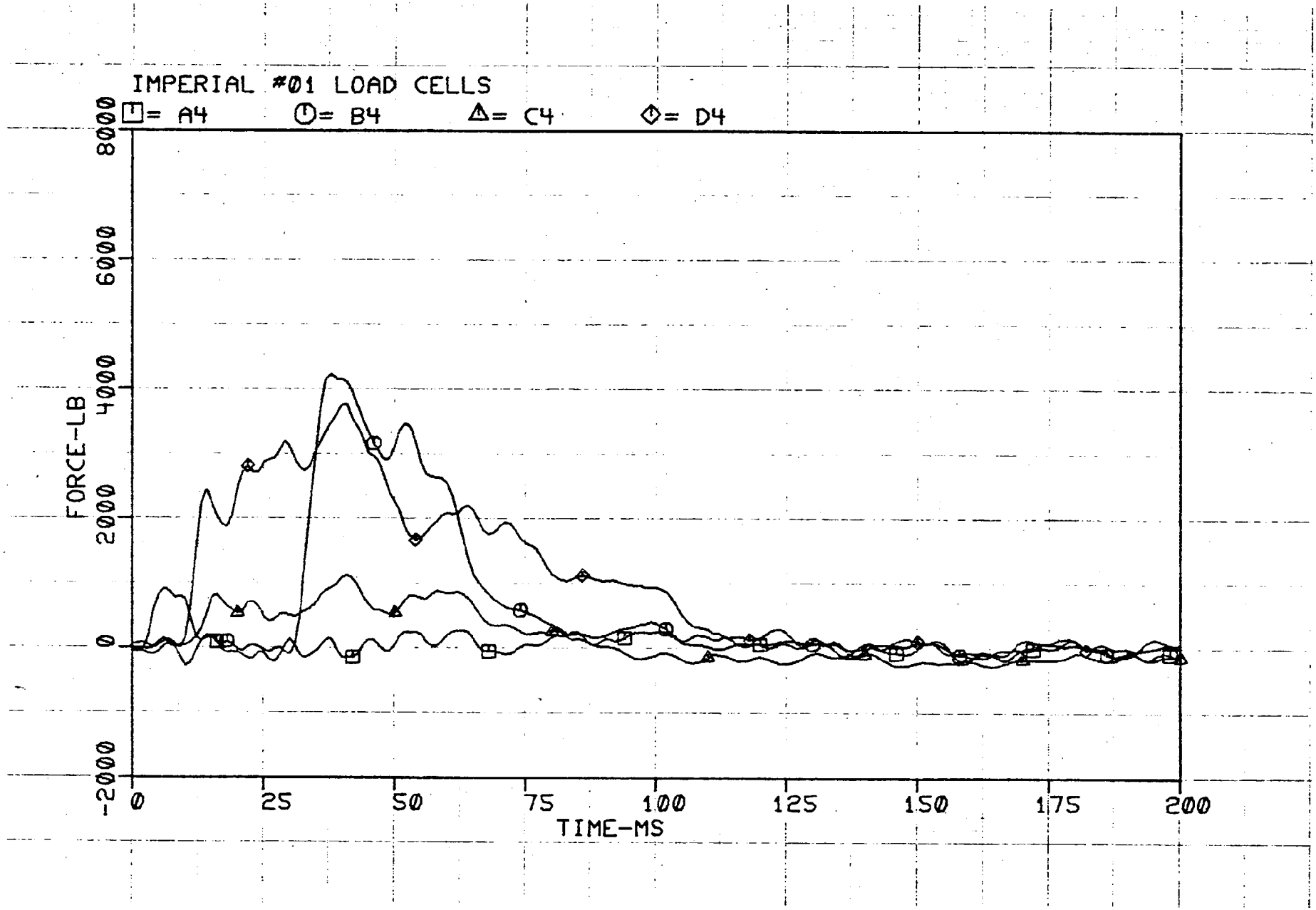

IMPERIAL #01 SUM OF ROWS A & B
FORCE-LB
160000
120000
80000
40000
0
-40000
0
25
50
75
100
125
150
175
200
TIME-MS

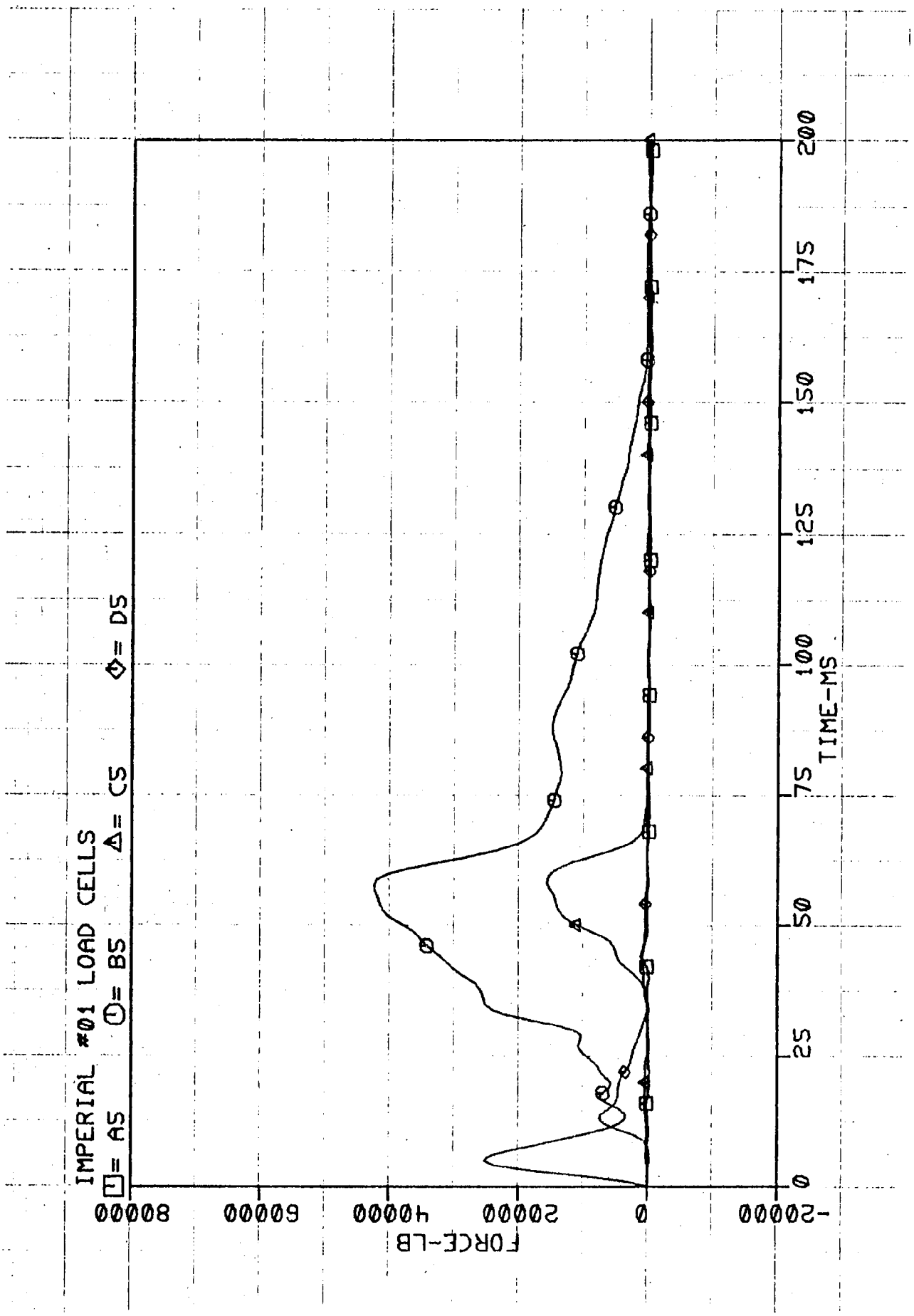

IMPERIAL #01 SUM OF ROWS C & D
FORCE-LB
40000
30000
20000
10000
0
-10000
TIME-MS
0
25
50
75
100
125
150
175
200

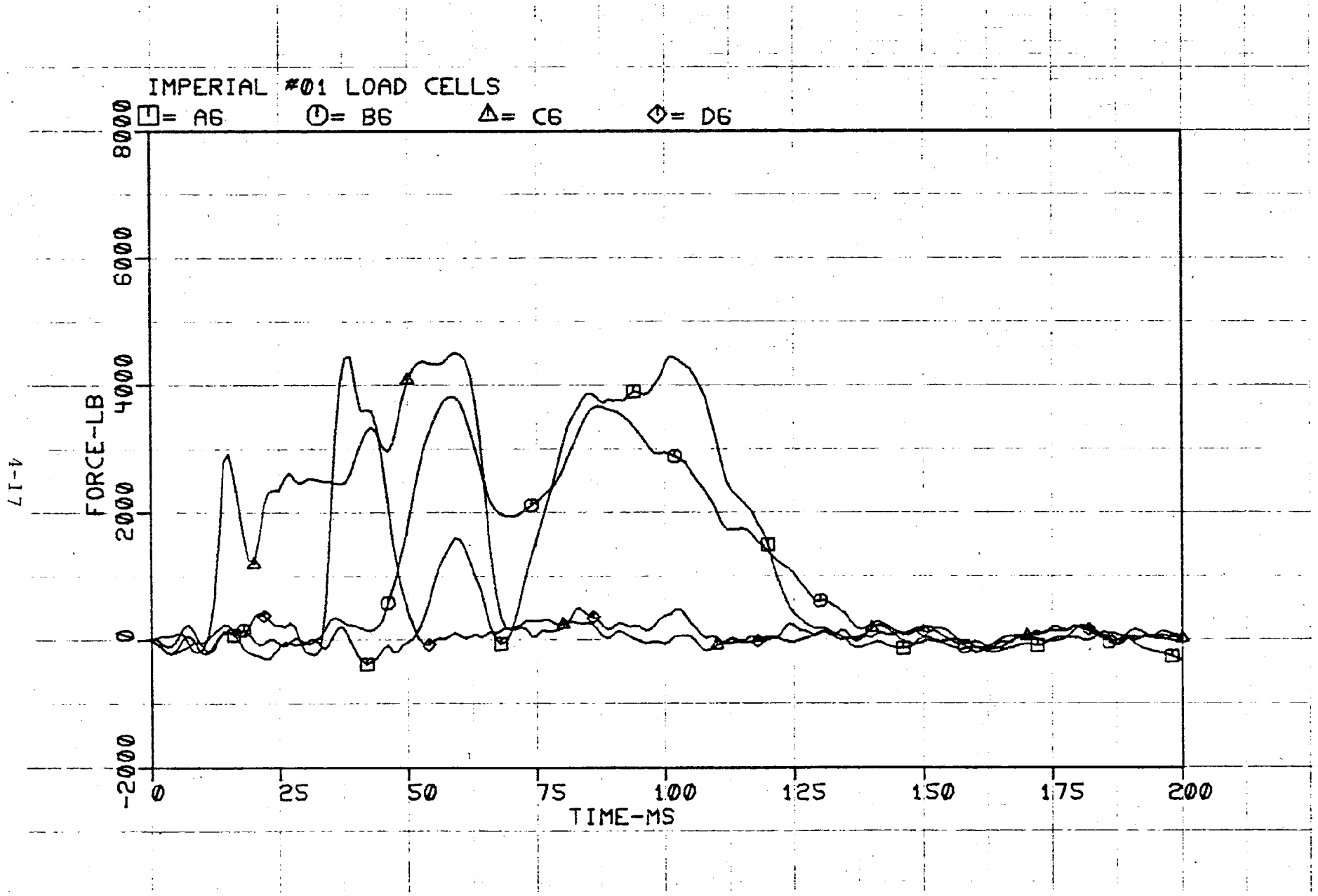

IMPERIAL #01 LOAD CELLS
= A1
= B1
= C1
= D1
8000
6000
4000
2000
0
-2000
FORCE-LB
0
25
50
75
100
125
150
175
200
TIME-MS

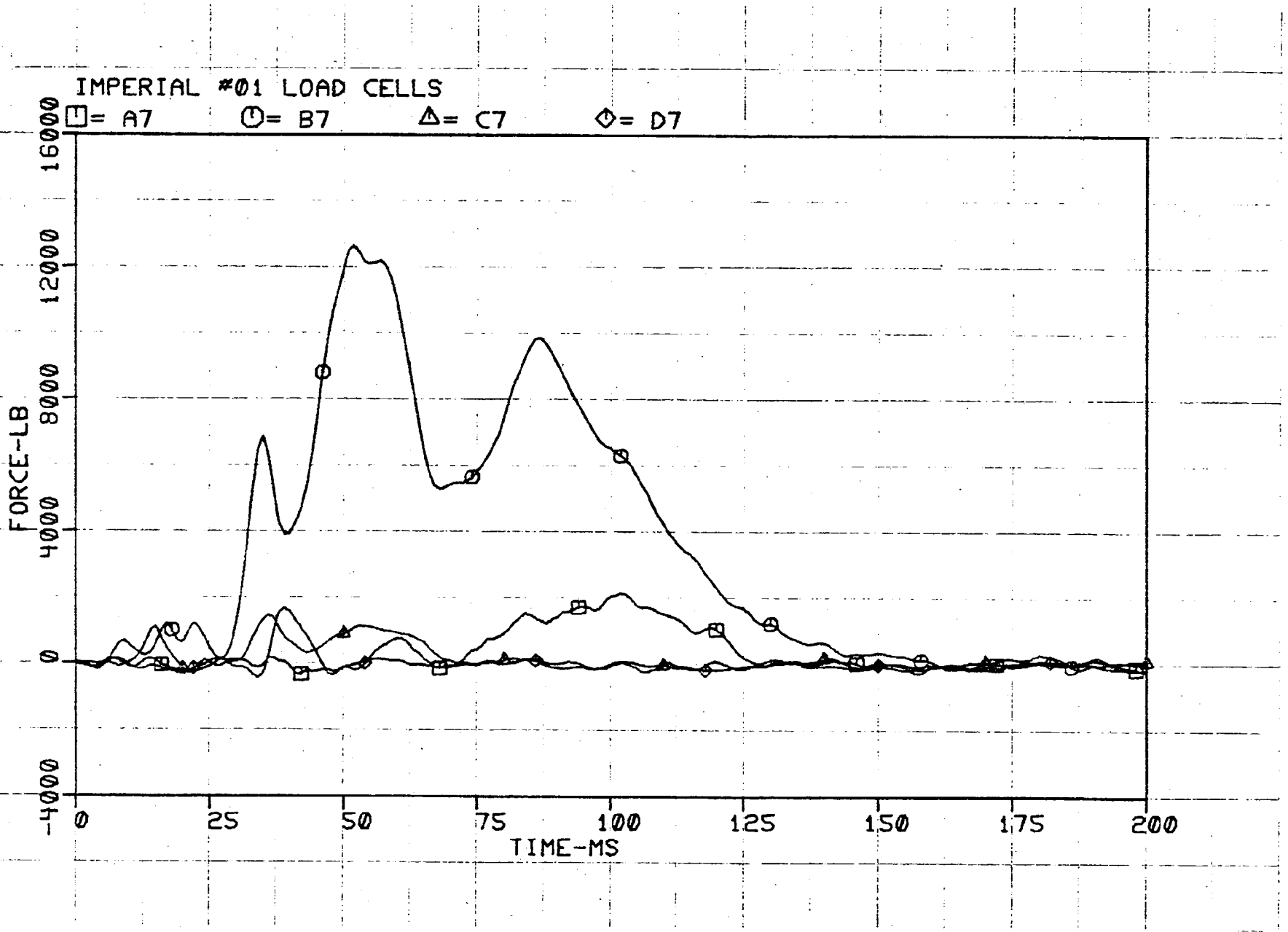

IMPERIAL #01 LOAD CELLS
□= A2
○= B2
△= C2
◇= D2
FORCE-LB
32000
24000
16000
8000
0
-8000
0
25
50
75
100
125
150
175
200
TIME-MS

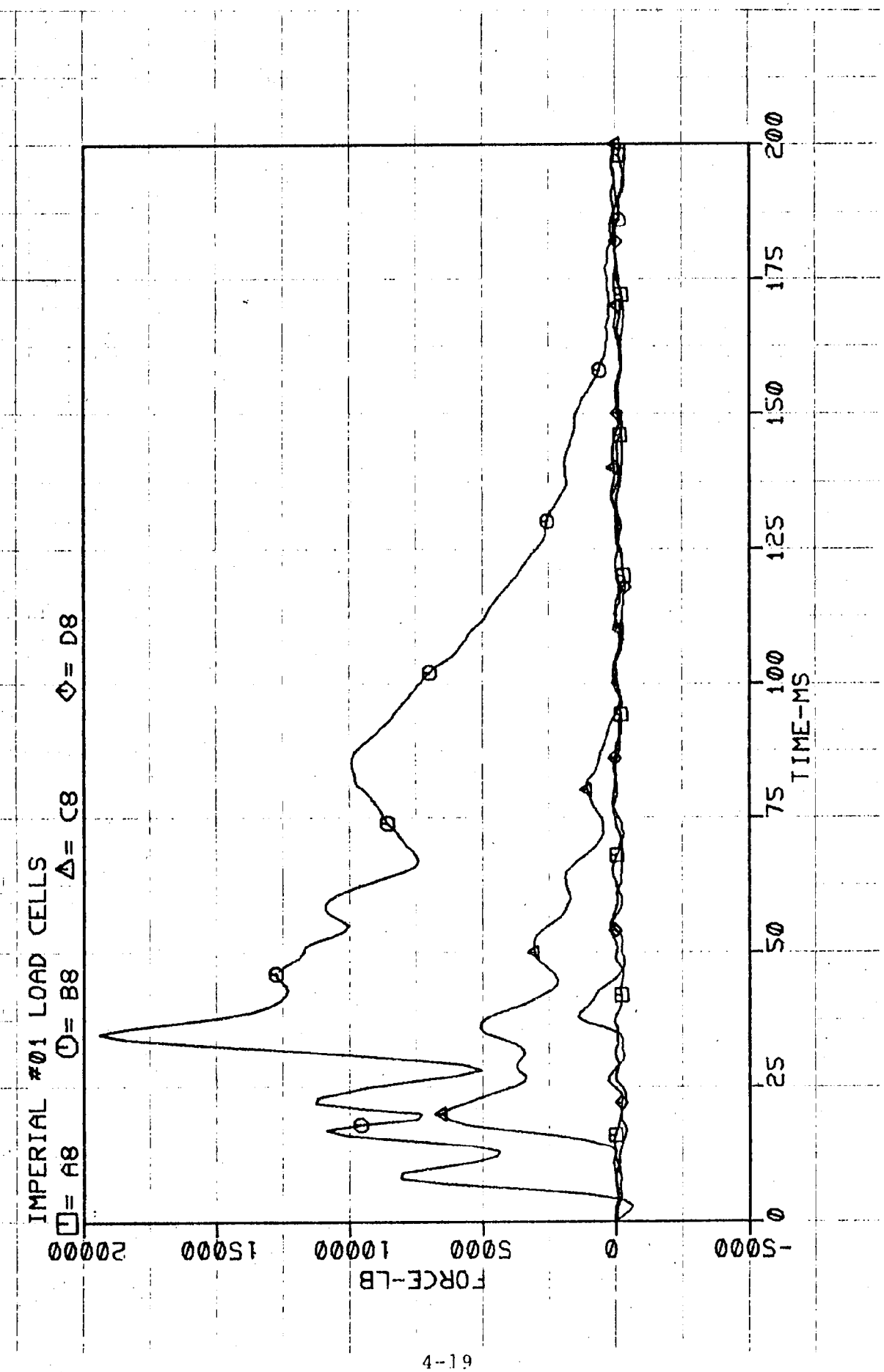

IMPERIAL #01 LOAD CELLS
□= A3
○= B3
△= C3
◇= D3
FORCE-LB
16000
12000
8000
4000
0
-4000
0
25
50
75
100
125
150
175
200
TIME-MS

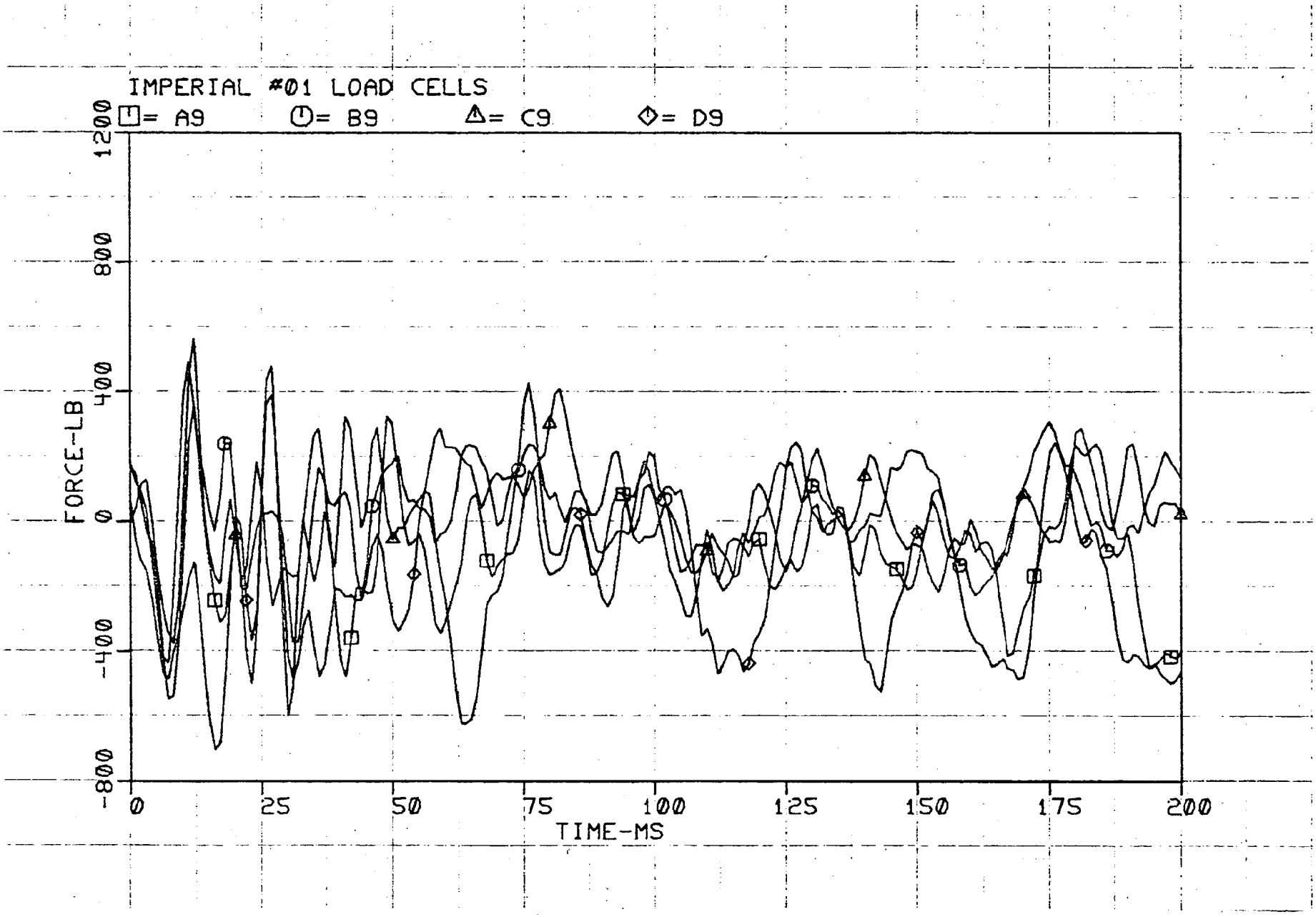

IMPERIAL #01 LOAD CELLS
□= A4
Ⓣ= B4
△= C4
◇= D4
8000
6000
4000
2000
0
-2000
FORCE-LB
0
25
50
75
100
125
150
175
200
TIME-MS


IMPERIAL #01 LOAD CELLS
□= AS
○= BS
△= CS
◇= DS
FORCE-LB
80000
60000
40000
20000
0
-20000
0
25
50
75
100
125
150
175
200
TIME-MS


IMPERIAL #01 LOAD CELLS
= A6
= B6
= C6
= D6
8000
6000
4000
2000
0
-2000
FORCE-LB
0
25
50
75
100
125
150
175
200
TIME-MS


IMPERIAL #01 LOAD CELLS
□= A7
○= B7
△= C7
◇= D7
FORCE-LB
16000
12000
8000
4000
0
-4000
0
25
50
75
100
125
150
175
200
TIME-MS


IMPERIAL #01 LOAD CELLS
□= A8
○= B8
△= C8
◇= D8
FORCE-LB
-5000
0
5000
10000
15000
20000
TIME-MS
0
25
50
75
100
125
150
175
200


IMPERIAL #01 LOAD CELLS
□= A9
○= B9
△= C9
◇= D9
1200
800
400
0
-400
-800
FORCE-LB
0
25
50
75
100
125
150
175
200
TIME-MS