DOT 428 Tim A.

Dynamic Science Report No. 212-DYS-80-013
Dynamic Science Report No. 219-DYS-80-013
Dynamic Science Report No. 301-DYS-80-013

NEW VEHICLE ASSESSMENT AND STANDARDS ENFORCEMENT INDICANT TESTING

FMVSS 212, 219, AND 301-75

VOLKSWAGEN WERK AG, WEST GERMANY
1980 VOLKSWAGEN RABBIT CONVERTIBLE
NHTSA NO. 800541

Prepared by:

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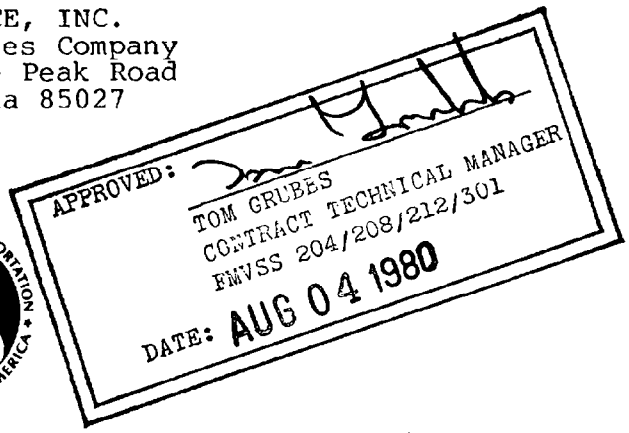

JUNE 1980

FINAL REPORT

Prepared for:

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
-----ENFORCEMENT-----
OFFICE OF VEHICLE SAFETY COMPLIANCE
400 SEVENTH STREET, S.W.
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Prepared by Mark Pozzi

Approved by E. Gyenes

Date July 31, 1980

Report Accepted by:

TOM GRUBBS

Contract Technical Manager
Office of Vehicle Safety Compliance

AUG 04 1980

Date

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. 212-DYS-80-013 219-DYS-80-013 301-DYS-80-013	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle FMVSS 212, 219, AND 301-75 NEW VEHICLE ASSESSMENT AND STANDARDS ENFORCEMENT INDICANT TESTING - 1980 VOLKSWAGEN RABBIT CONVERTIBLE - NHTSA 800541		5. Report Date July 1980 6. Performing Orgn Code
7. Author(s) Mark Pozzi, Project Engineer		8. Performing Orgn Rpt No. 3102-80-123 10. Work Unit No.
9. Performing Organization Name and Address Dynamic Science, Inc. A Talley Industries Company 1850 West Pinnacle Peak Road Phoenix, Arizona 85027		11. Contract or Grant No. DOT-HS-9-02274 13. Type of Report and Period Covered Final Report June 1980
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Vehicle Safety Compliance 400 Seventh St., SW, Washington, D.C. 20590		14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

The vehicle was tested using test parameter values which are in excess of the current upper limits of the subject FMVSS in order to obtain research and vehicle rating data. This test, therefore, can only be viewed as an "indicant" test by the Office of Vehicle Safety Compliance.

The front of the test vehicle impacted the fixed, load-measuring collision barrier at a speed of 34.93 mph.

The test was conducted at the Dynamic Science, Inc. Deer Valley facility on June 9, 1980, with the following results:

a) FMVSS 212 - No loss of windshield retention.

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

c) FMVSS 301 - Fuel leakage during the static rollover was within the allowable range.

17. Key Words	18. Distribution Statement
FMVSS 212 - Windshield Mounting FMVSS 219 - Windshield Zone Intrusion FMVSS 301-75 - Fuel System Integrity Vehicle Assessment Occupant Response	Copies of this report are available from Technical Reference Division, National Highway Traffic Safety Administration, Room 5108, Nassif Building, 400 7th Street, S.W., Washington, D.C. 20590

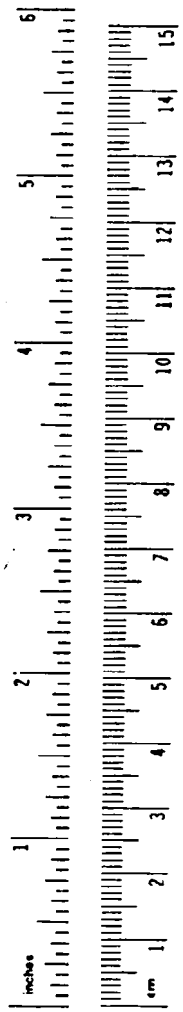
19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. Pages	22. Price
Unclassified	Unclassified		

Form DOT F 1700.7 (8-69)

METRIC CONVERSION FACTORS

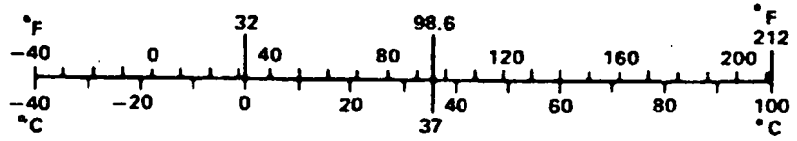
Approximate Conversions to Metric Measures

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 1980 Volkswagen Rabbit Convertible to the indicant test requirements of DOT Test Plan TP-212-02, April 1, 1980, Standard Enforcement Indicant Testing for FMVSS No. 212, "Windshield Mounting," FMVSS No. 219, "Windshield Zone Intrusion," and FMVSS 301-75, "Fuel System Integrity." The vehicle was tested using test parameters which are in excess of the current upper limits of the subject FMVSS in order to obtain research and vehicle rating data. This test, therefore, can only be viewed as an "indicant" test by the Office of Vehicle Safety Compliance (OVSC).

INTRODUCTION:

Section 2 contains General Test and Vehicle Parameter Data. Section 3 contains Compliance Related Data for FMVSS 212, 219, 301-75 Indicant Testing, together with photographs related to these tests. Appendix A contains pre-test and post-test vehicle and dummy photographs. Appendix B contains Calcomp plots. Appendix C contains dummy certification data.

SECTION 2
GENERAL TEST AND VEHICLE PARAMETER DATA

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

GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Vehicle Manufacturer: Volkswagenwerk AG, West Germany
Make/Model: Volkswagen Rabbit
Body Style: 2-door Convertible — Model Year: 1980
VIN: 15A0805394 — Build Date: 12/79
NHTSA No.: 800541 — Color: White
Engine Data: 4 cylinders; 97 $in.^3$ displacement
Transmission Data: 5 speed (X) Manual ( ) Automatic
Date Vehicle Received by Laboratory: March 1, 1980
Dealer Name & Address: VW West
1325 N. Lemon, Anaheim, Calif.

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

Vehicle Manufactured By: Volkswagenwerk AG, West Germany
Date of Manufacture: 12/79 ; VIN: 15A0805394
GVWR: 2866 lb; GAWR: Front = 1609 lb; Rear = 1323 lb

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

Vehicle Load:	FRONT	REAR	RECOMMENDED TIRE SIZE:	LOAD RANGE:
Up to Capacity	27 psi	31 psi		
Vehicle Capacity:			155-175/70SR13	B

Type of Seats - ___ Bench, X Bucket, ___ Split Bench
Number of Occupants (Designated Seating Capacity) = 2 Front, 2 Rear, 4 Total

CARGO LOAD = 262 lb
TOTAL = 862 lb

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

Right Front = 653 lb — Right Rear = 399 lb
Left Front = 663 lb — Left Rear = 457 lb
TOTAL FRONT WEIGHT = 1316 lb (61 % of Total Vehicle Weight)
TOTAL REAR WEIGHT = 856 lb (39 % of Total Vehicle Weight)
TOTAL DELV. WEIGHT = 2172 lb

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 262 lb CARGO:

Right Front = 749 lb — Right Rear = 636 lb
Left Front = 736 lb — Left Rear = 646 lb
TOTAL FRONT WEIGHT = 1485 lb (54 % of Total Vehicle Weight)
TOTAL REAR WEIGHT = 1282 lb (46 % of Total Vehicle Weight)
TOTAL TEST WEIGHT = 2767 lb

Weight of ballast secured in vehicle trunk area = 262 lb

TARGET WEIGHT = CARGO LOAD + UDW + 164 (NO. OF DUMMIES) = 2762 lb

GENERAL TEST AND VEHICLE PARAMETER DATA (CONTD)

TEST CONDITIONS:

Date of Test: June 9, 1980 Time of Test: 1130

Ambient Temperature: 100 °F at impact area.

Temperature in Occupant Compartment: 77 °F Windshield Molding Temperature: 88 °F

VEHICLE ATTITUDE: (all dimensions in inches)

Delivered Attitude:	RF 30.0	LF 30.0	RR 30.0	LR 30.0
Test Attitude:	RF 29.1	LF 29.2	RR 29.4	LR 29.4

VEHICLE TIRE DATA:

Recommended Cold Tire Pressure: Front = 27 psi
Rear = 31 psi

Recommended Tire Size: 155-175/70SR13
Load Range: B

Tires on Vehicle: 175/70SR13

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

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

TEST FLUID DATA:

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

Kinematic Viscosity: 0.99 centistokes

*Spill Point Volume: - Gallons

Test Volume: 9.74 Gallons

Fuel System Capacity (data from Owner's Manual): 10.5 gallons

Details of Fuel System: Rectangular metal fuel tank is attached to floorpan directly aft of "B" pillar by two metal straps. Vent, filler, and sender tubes exit right side of tank. Metal filler tube exits rear vertical side of tank and proceeds to body wall aft of right rear wheel where it is sealed by a locking twist cap.

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

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

VEHICLE REBOUND AND CRUSH:

Overall Length of Test Vehicle	Pre-test = R 153.5	L 153.5	inches
	Post-test = R 131.1	L 132.0	inches

CRUSH = R 22.4 L 21.5

FOR FRONTAL IMPACTS, distance from front of test vehicle to the barrier after impact = 7.3 inches

*Spill point was not determined. Test volume is 93% of "usable capacity" as defined in the vehicle manufacturer's Part 1 submission to the EPA plus "unusable capacity." Specified capacities are supplied by the OVSC CTM.

GENERAL TEST AND VEHICLE PARAMETER DATA (CONTD)

VISIBLE DUMMY CONTACT POINTS

	Driver	Passenger
Head	Steering wheel hub	None
Chest	Lower steering wheel rim	None*
Abdomen	None	None
Left Knee	Knee restraint	Knee restraint
Right Knee	Knee restraint	Knee restraint

	Front		Rear	
DOOR OPENING	Left	Right	Left	Right
Easy	X	X		
Difficult				
Tools Required				

SEAT BACK

Failure		

GLAZING DAMAGE

Windshield	Very slight cracking in lower right corner.
Backlight	
Others	

OTHER NOTABLE IMPACT EFFECTS: Right torso belt moved 2.0 inches through D-ring. Left torso belt moved 2.5 inches through D-ring. Both front tires pinned by crushed sheet metal. Left front roof latch failed. Left front seat moved 1.1 inches forward in seat track.

*No contact occurred between the dummy's chest and the dash. The high chest response was due to torso belt pressure only.

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.

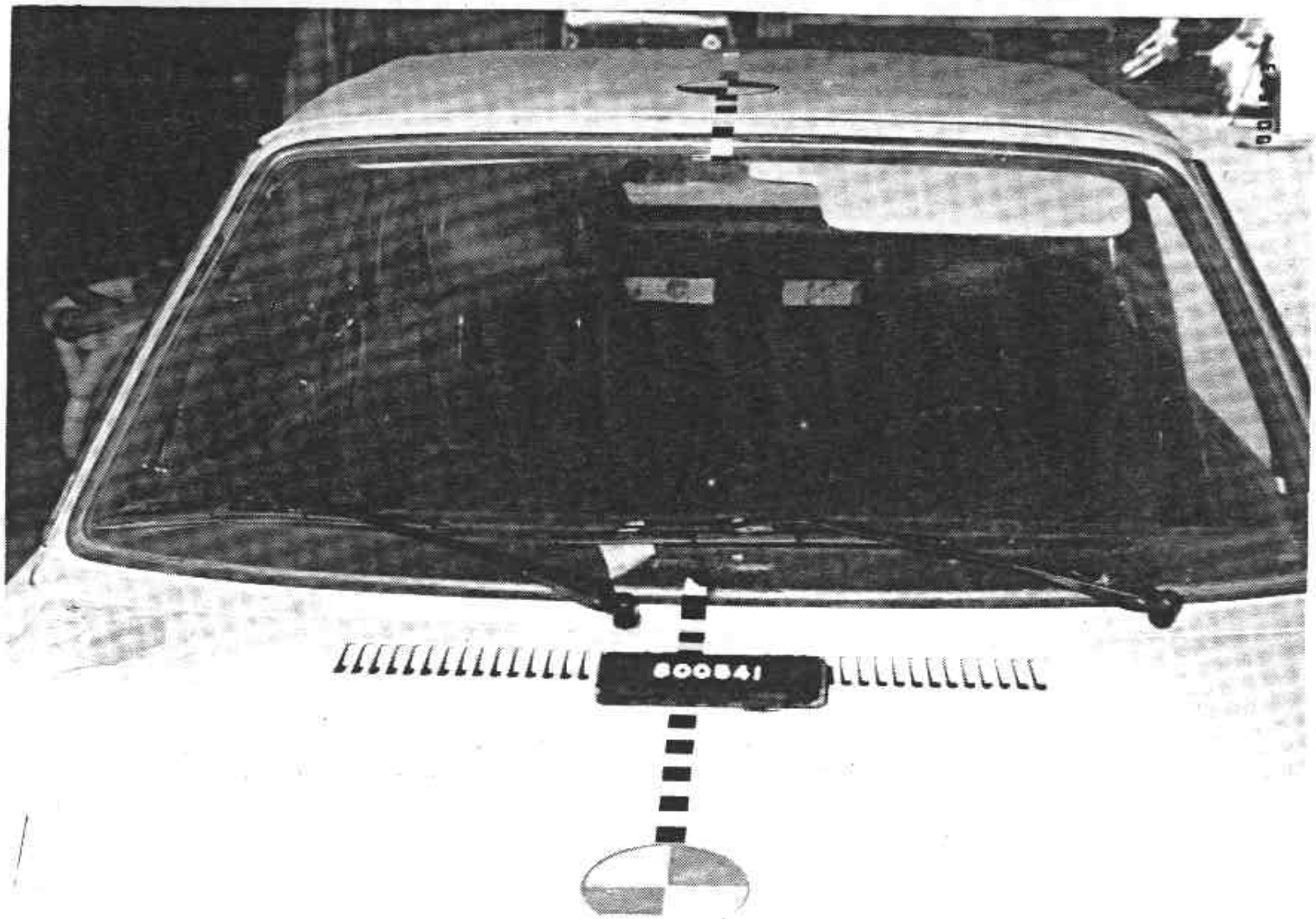


Figure 3-1. Pre-test Windshield - Overall View - 1980 VW Rabbit Convertible - NHTSA 800541.

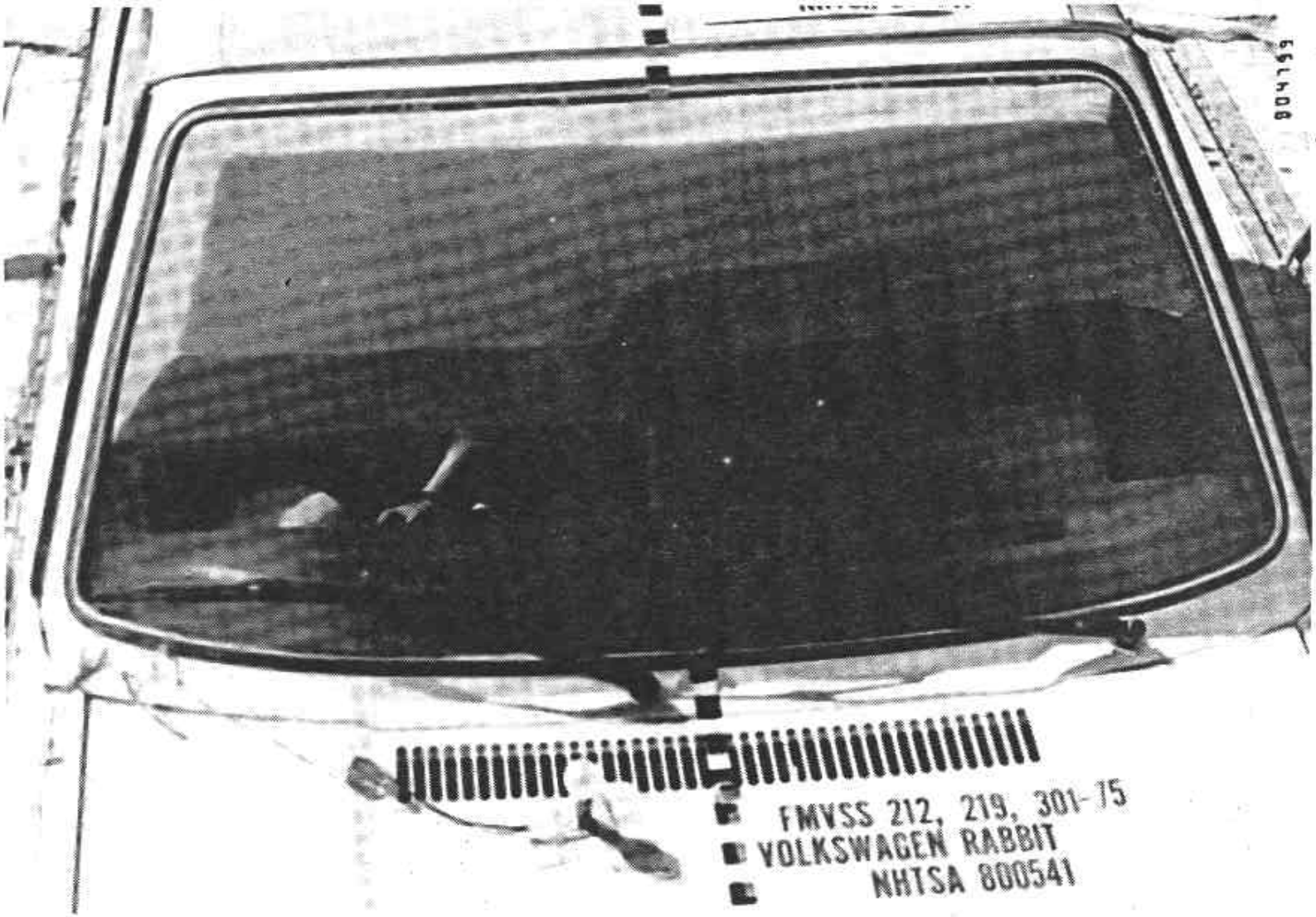


Figure 3-2. Pre-test Windshield - Overall View - 1980 VW Rabbit Convertible - NHTSA 800541.

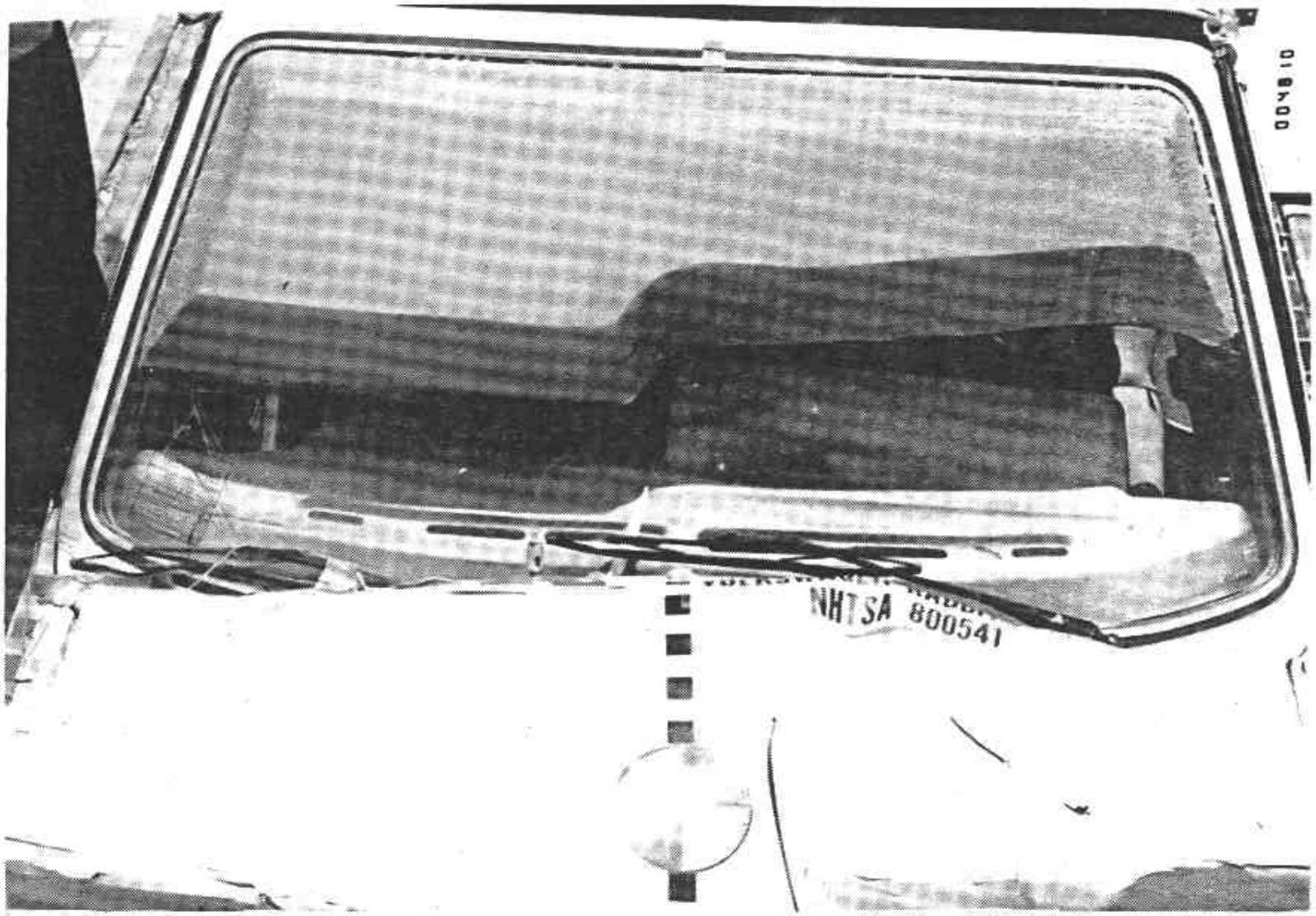


Figure 3-3. Post-test Windshield - Overall View - 1980 VW Rabbit Convertible - NHTSA 800541.

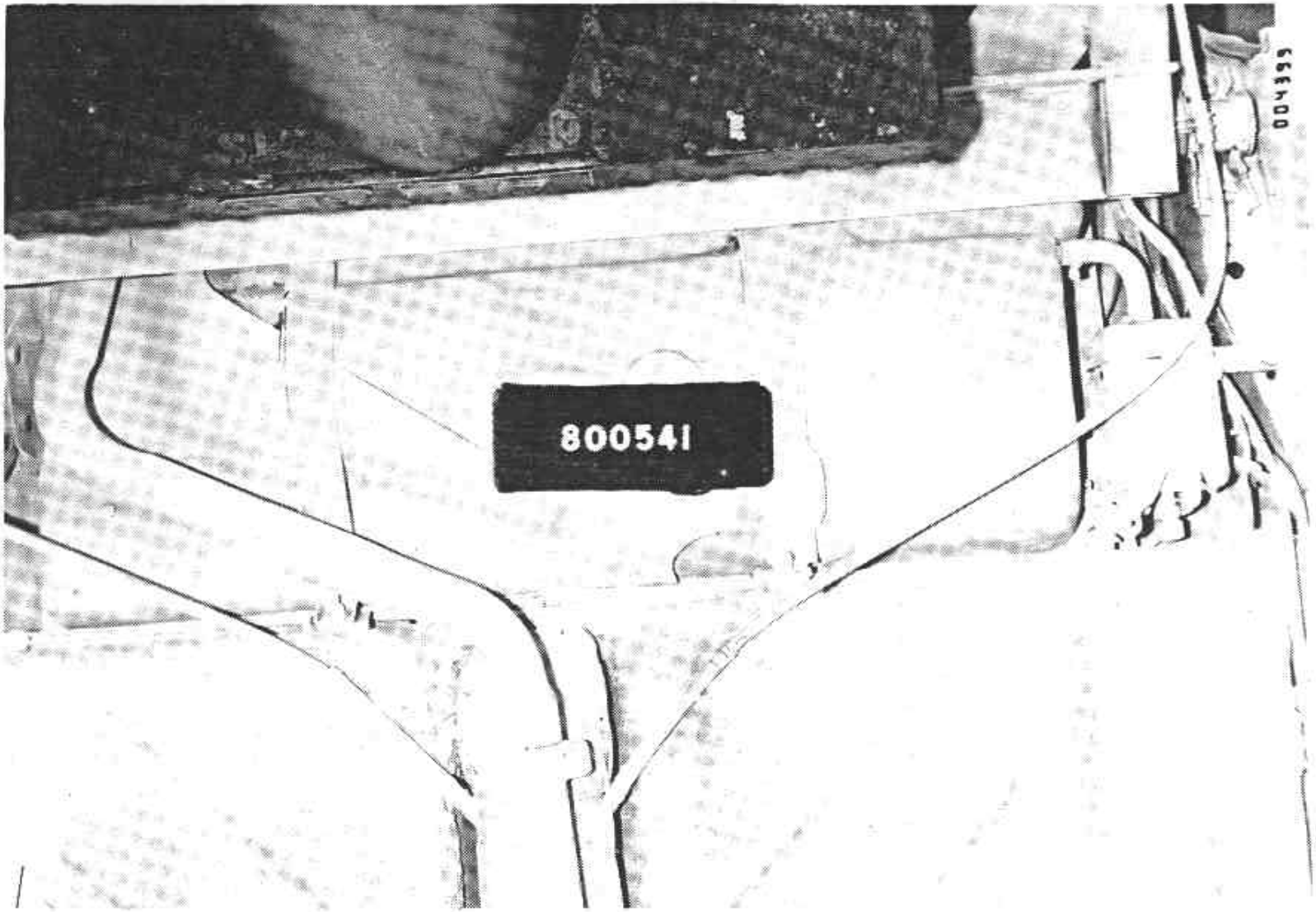


Figure 3-4. Pre-test View of Fuel Tank - 1980 VW Rabbit Convertible - NHTSA 800541.

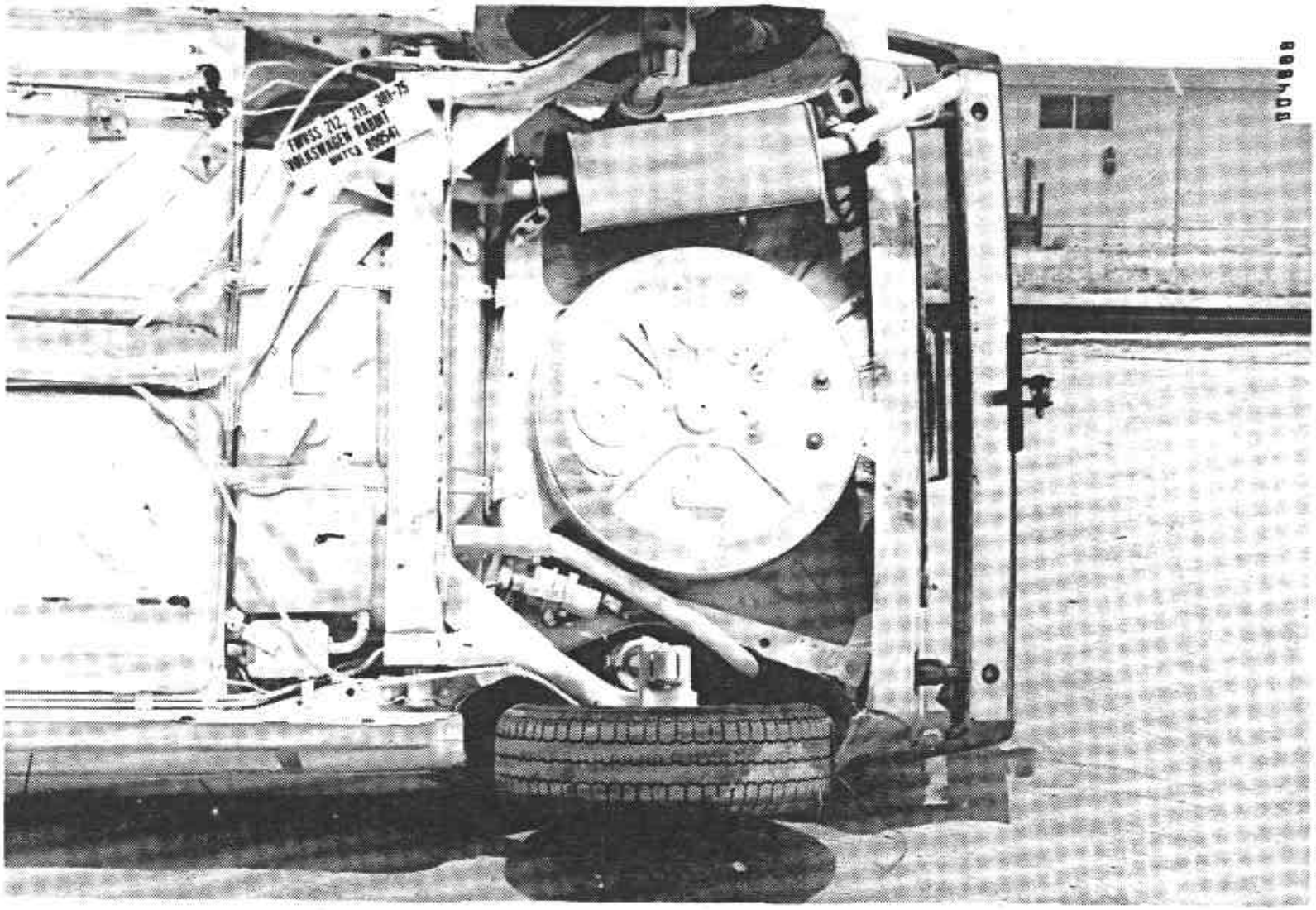


Figure 3-5. Post-test View of Fuel Tank - 1980 VW Rabbit Convertible - NHTSA 800541.

SUMMARY OF RESULTS
FMVSS 212 INDICANT DATA

VEHICLE DATA:

Manufacturer: Volkswagenwerk AG, West Germany Model Year: 1980

Make/Model: Volkswagen Rabbit

Body Style: 2-door Convertible Manufacture Date: 12/79

VIN: 15A0805394 NHTSA No.: 800541

Delivery Weight: 2172 lb; Test Weight: 2767 lb; GVWR: 2866 lb

Engine: No. of Cylinders 4 Displacement 97 $in.^3$

Vehicle Mileage: 383.3 miles

Remarks:

GENERAL TEST CONDITIONS:

Vehicle Impact Speed:

Primary 34.93 mph; Secondary 34.92 mph

Speed Range Specified by CTM: 34.5 to 35.5 mph

Ambient Temperature at Time of Test: 100 °F

Date of Test: June 9, 1980 Time: 1130

Windshield Molding Temperature: 88 °F

Static Crush: 22.7 in. (right) 22.2 in. (left)

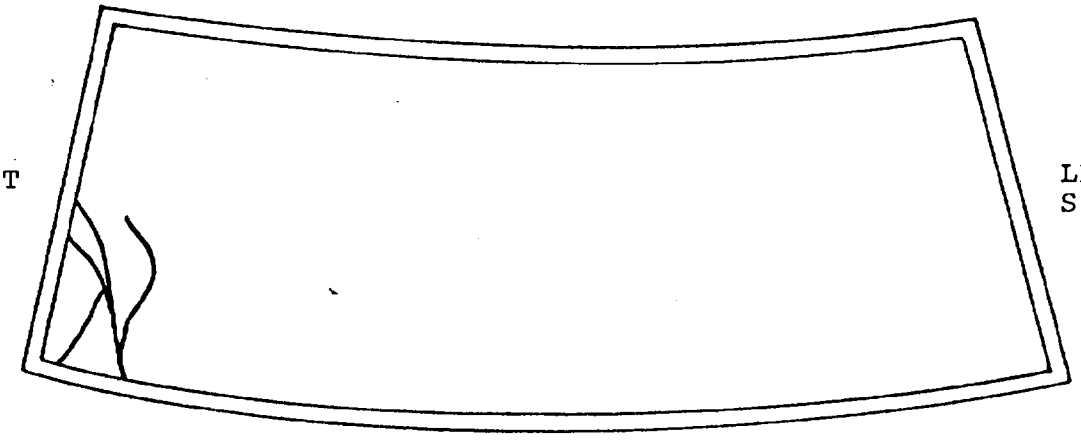
SUMMARY OF FMVSS 212 DATA

Details of windshield mounting (method of retention, type of trim, etc.): Windshield is held on all sides by a 1.0-inch wide "H"-shaped rubber grommet. A 0.25-inch wide metal locking strip is pressed into the outside center of the grommet.

	WINDSHIELD PERIPHERY	
	Pre-test	Post-test
RIGHT SIDE	70.4	70.4
LEFT SIDE	70.4	70.4
TOTAL	140.8	140.8

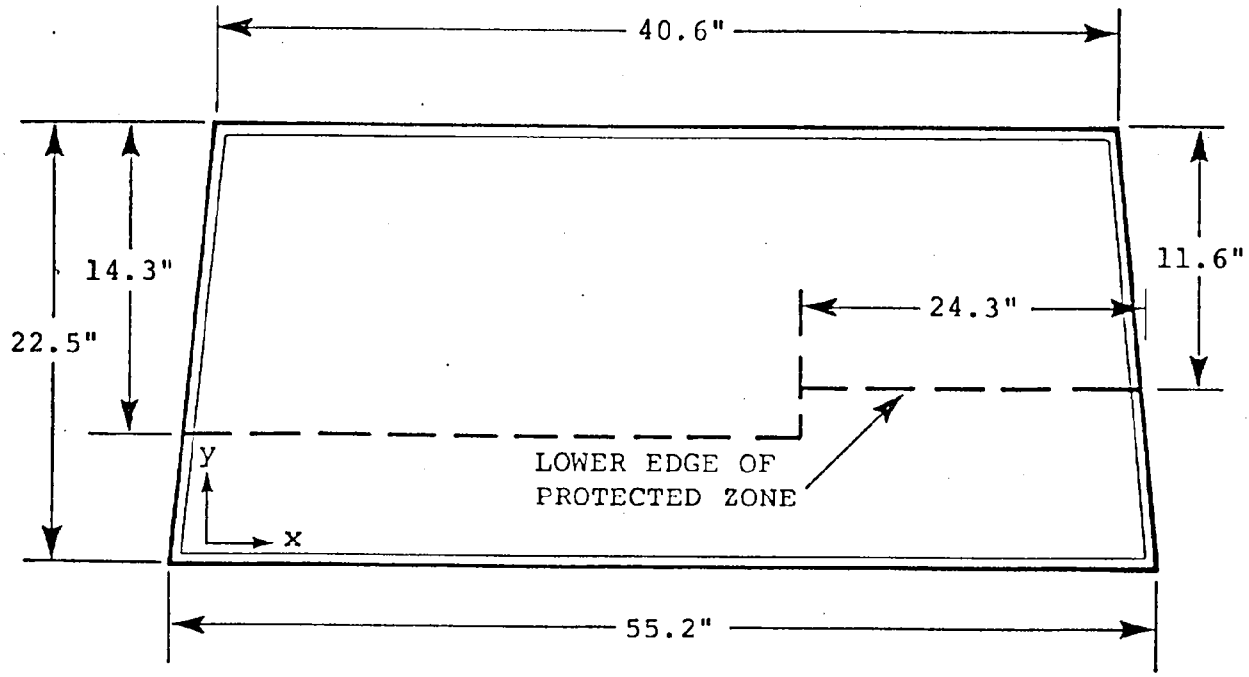
The standard requires that POST-TEST be a minimum of 75 percent of the PRE-TEST total periphery measurement for vehicles not equipped with occupant passive restraints and 50 percent for each side of the windshield for vehicles which are equipped with occupant passive restraints.

AREA OF RETENTION FAILURE (as noted): None



FRONT VIEW

WINDSHIELD ZONE INTRUSION, FMVSS 219



FRONT VIEW OF WINDSHIELD

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

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

Coordinates	
X	Y
N/A	N/A

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

Coordinates	
X	Y
N/A	N/A

C. Record any windshield retention clips or brackets used to ensure that the windshield would not disengage from the body.

* No retention clips are evident.

POST IMPACT DATA

TYPE OF TEST: X Frontal (90°) Impact

___ Oblique (___°) Impact on ___ Left (Driver's) Side

___ Right Side

___ Lateral or Side Impact on ___ Left (Driver's) Side

___ Right Side

___ Rear Impact

DATE OF TEST: June 9, 1980 ; TIME: 1130 ; TEMP: 100 ° F

NHTSA NO.: 800541 ; VIN: 15A0805394

REQUIRED VEHICLE VELOCITY RANGE: 34.5 to 35.5 mph

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

Primary = 34.93 mph; Secondary = 34.92 mph

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

exiting the vehicle velocity measurement device = 1.0 ft

VEHICLE STATIC CRUSH:

(For Frontal and Rear Impacts Only)

Driver's Side = 22.2 in.; Passenger's Side = 22.7 in.

Average = 22.45 in.

Crush Details: Symmetric crush to "A" pillar. Deformation of floorpan. Front wheels pinned.

(For Side Impacts Only)

Amount of Crush = _____ in. on _____ side

Crush Details: _____

VEHICLE REBOUND:

(From rigid barrier only)

Driver's Side = 7.5 in.; Passenger's Side = 7.3 in.

Average = 7.4 in.

REMARKS: The metal bumper is covered at each end with 2-inch wide rubber strips that are 8 inches long ending with a 5-inch-wide strip that covers the outer 7 inches of the bumper.

FUEL SYSTEM INTEGRITY POST-IMPACT

TEST DATA, FMVSS NO. 301-75

TEST VEHICLE NHTSA NO.: 800541 ; TEST DATE: June 9, 1980

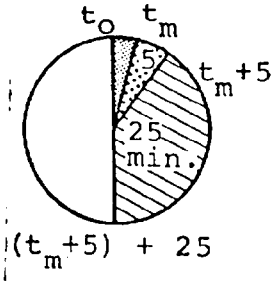
VEHICLE MANUFACTURER/
MAKE/MODEL: Volkswagenwerk AG, West Germany/Volkswagen Rabbit

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

A. TEST VEHICLE IMPACT TYPE:

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

FUEL SPILLAGE MEASUREMENT



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

B. SOLVENT SPILLAGE DETAILS: None

C. FUEL SYSTEM DATA:

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

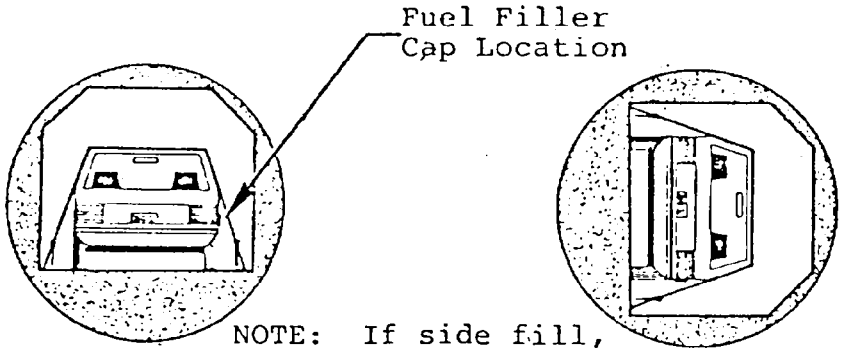
Kinematic Viscosity: 0.99 centistokes

Test Volume: 9.74 U.S. gal/lb Liquid Temp: ___°F

Details of Fuel Tank, Filler Pipes, and Connections: Rectangular metal fuel tank is attached to floorpan directly aft of "B" pillar by two metal straps. Vent, filler, and sender tubes exit right side of tank. Metal filler tube exits rear vertical side of tank and proceeds to body wall aft of right rear wheel where it is sealed by a locking twist cap.

FMVSS 301-75 INDICANT STATIC ROLLOVER DATA SHEET

TEST PHASE: 0° to 90° VEHICLE NHTSA NO. 800541



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

DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time.... = 1 min, 39 sec +
(Spec. Range = 1 to 3 min)

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

Total..... = 6 min, 39 sec

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

FMVSS 301 REQUIREMENTS AND ACTUAL TEST RESULTS:

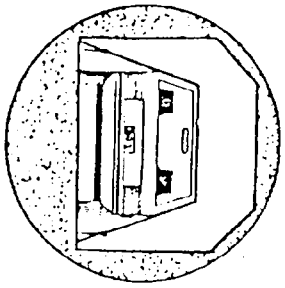
Time Period	First 5 min (from onset)	6th min	7th min	8th min (if req'd)
Maximum Spillage Allowed (oz)	5	1	1	1
Actual Spillage Recorded	0	0	0	-

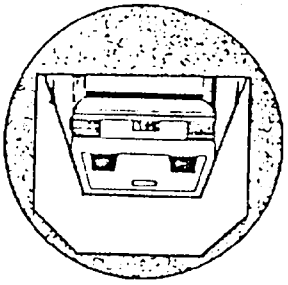
NOTE: Spillage is recorded in whole minute intervals only - as determined above.

SOLVENT SPILLAGE LOCATION(S): None

FMVSS 301-75 INDICANT STATIC ROLLOVER DATA SHEET

TEST PHASE: 90° to 180° VEHICLE NHTSA NO. 800541





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:

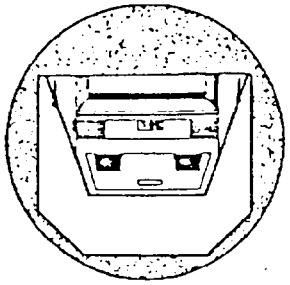
Time Period	First 5 min (from onset)	6th min	7th min	8th min (if req'd)
Maximum Spillage Allowed (oz)	5	1	1	1
Actual Spillage Recorded	Trace	Trace	Trace	-

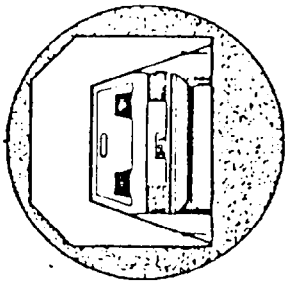
NOTE: Spillage is recorded in whole minute intervals only - as determined above.

SOLVENT SPILLAGE LOCATION(S): Filler cap

FMVSS 301-75 INDICANT STATIC ROLLOVER DATA SHEET

TEST PHASE: 180° to 270° VEHICLE NHTSA NO. 800541





DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

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

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

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

FMVSS 301 REQUIREMENTS AND ACTUAL TEST RESULTS:

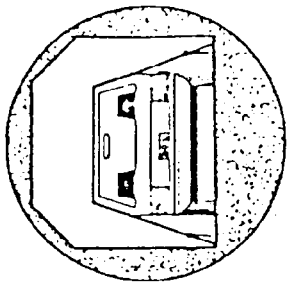
Time Period	First 5 min (from onset)	6th min	7th min	8th min (if req'd)
Maximum Spillage Allowed (oz)	5	1	1	1
Actual Spillage Recorded	Trace	0	0	-

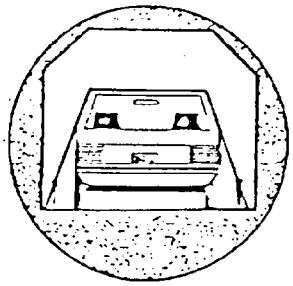
NOTE: Spillage is recorded in whole minute intervals only - as determined above.

SOLVENT SPILLAGE LOCATION(S): Filler cap

FMVSS 301-75 INDICANT STATIC ROLLOVER DATA SHEET

TEST PHASE: 270° to 360° VEHICLE NHTSA NO. 800541





DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time.... = 1 min, 39 sec +
(Spec. Range = 1 to 3 min)

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

Total..... = 6 min, 39 sec

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

FMVSS 301 REQUIREMENTS AND ACTUAL TEST RESULTS:

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

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

SOLVENT SPILLAGE LOCATION(S): None

SECTION 4
DATA REQUIRED BY R&D AND OAR

The following pages are included in this section:

1. Dummy positional data
2. Dummy injury summaries
3. Vehicle crush data
4. Accelerometer location and data summary
5. High-speed movie camera location and specification summary.

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

DUMMY POSITIONING

Pre-test Dummy Positions

Measurement	Driver (in.)	Passenger (in.)
Dummy Centerline to Vehicle Centerline	13.5	12.5
Nose to Upper Rim Steering Wheel	20.9	N/A
Nose to Windshield (Horizontal Distance)	24.6	20.3
Left Knee to Closest Point on Lower Panel	3.6	4.0
Right Knee to Closest Point on Lower Panel	3.8	4.0
Ankle Distance	10.0	10.0
Knee Distance	9.0	9.0
Head to Windshield Header	19.2	14.0
Chest to Dash	21.0	23.0
Chest to Steering Wheel	14.3	N/A

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

PART 572 DUMMY IN-VEHICLE POSITION RECORDING SHEET

NHTSA No.: 800541 Manufacturer: Volkswagenwerk AG, West Germany

Make/Model: Volkswagen Rabbit Model Year: 1980

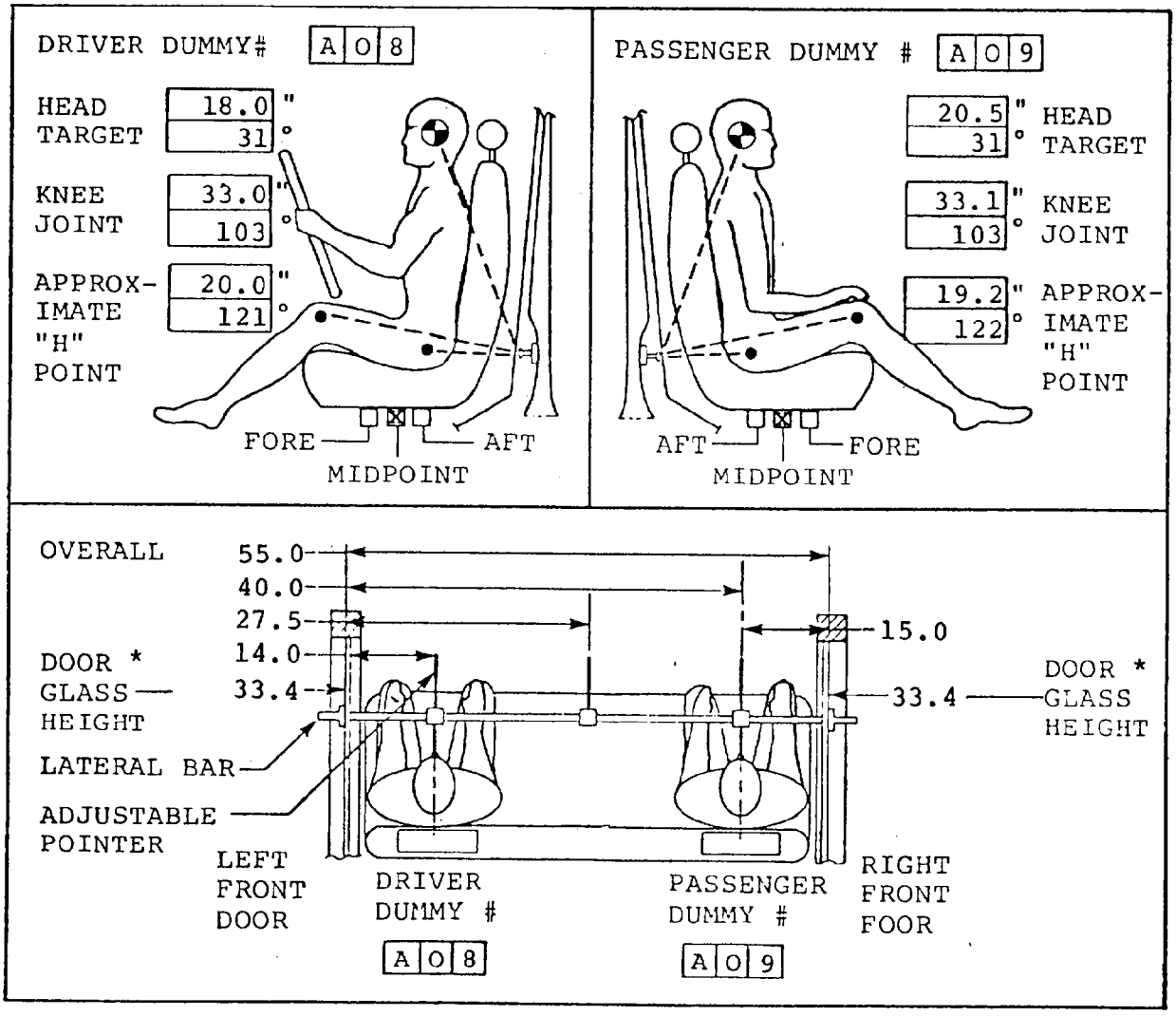
SEAT TYPE:	ADJUSTER TYPE:	BUCKET SEAT BACK TYPE:
___ Bench _X_ Bucket	_X_ Manual	_X_ Adjustable Reclining
___ Split Bench	___ Power	___ Fixed

AMBIENT TEMPERATURE: 100 °F; TIME: 1130

POSITIONING DATE: June 9, 1980

TECHNICIANS: 1. M. Pozzi
2. P. Lanser

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



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

PART 572 DUMMY DATA SUMMARY

	Driver Dummy				Passenger Dummy			
	Positive Direction*		Negative Direction**		Positive Direction*		Negative Direction**	
	Peak (G)	Time (msec)	Peak (G)	Time (msec)	Peak (G)	Time (msec)	Peak (G)	Time (msec)
Head Acceleration								
Longitudinal	21.8	181	-195.3	81	21.1	150	-38.1	143
Lateral	29.9	93	-14.0	81	13.1	113	-55.4	148
Vertical	93.4	83	-4.3	123	63.1	87	-9.7	143
Resultant	202.4	81			63.6	87		
HIC	1328 between 79 and 84 msec				829 between 55 and 156 msec			
Chest Acceleration								
Longitudinal	11.9	162	-54.4	91	5.6	142	-52.8	70
Lateral	11.4	83	-3.7	63	18.5	80	-31.3	140
Vertical	14.8	159	-15.3	85	20.7	153	-54.2	76
Resultant (Max)	55.0	91			62.9	74	-	-
Resultant (clip)	47.9	92			53.6	70	-	-
TIME > 60 G	0 msec				3 msec[1]			
SEVERITY INDEX	488.6 @ 200 msec				538.5 @ 200 msec			
	Peak (lb)	Time (msec)	Peak (lb)	Time (msec)	Peak (lb)	Time (msec)	Peak (lb)	Time (msec)
Femur Loads								
Left			-458.1	64			-1364.4	57
Right			-424.1	61			-721.8	61
Belt Loads								
Lap	1588.2	65			1589.9	64		
Torso	2059.5	76			2250.6	74		
Vehicle Impact Speed (mph): 34.93								

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

[1]Based on normal 1.0 millisecond sampling of analog data. A 0.125 millisecond sampling indicated that the chest resultant exceeded 60 G for 2.25 milliseconds, with a maximum of 66.07 G at 74.38 milliseconds.

DUMMY KINEMATIC SUMMARY

DRIVER - The steering column moved upward prior to dummy contact. The dummy struck the upper left side of the steering wheel hub with the center of its face. After rebounding into the seatback, the dummy came to rest upright with a slight lateral lean.

PASSENGER - The dummy's forward movement was arrested rapidly by the torso belt, resulting in considerable neck flexion. No dash contact occurred as the dummy's head dropped below the door window level. During the initial phase of the rebound the dummy's right occipital head area struck the door. The dummy continued to rebound into the seatback, and came to rest with a slight lateral lean.

OTHER COMMENTS - The high chest response exhibited by the passenger dummy is due only to the pressure exerted by the torso belt.

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

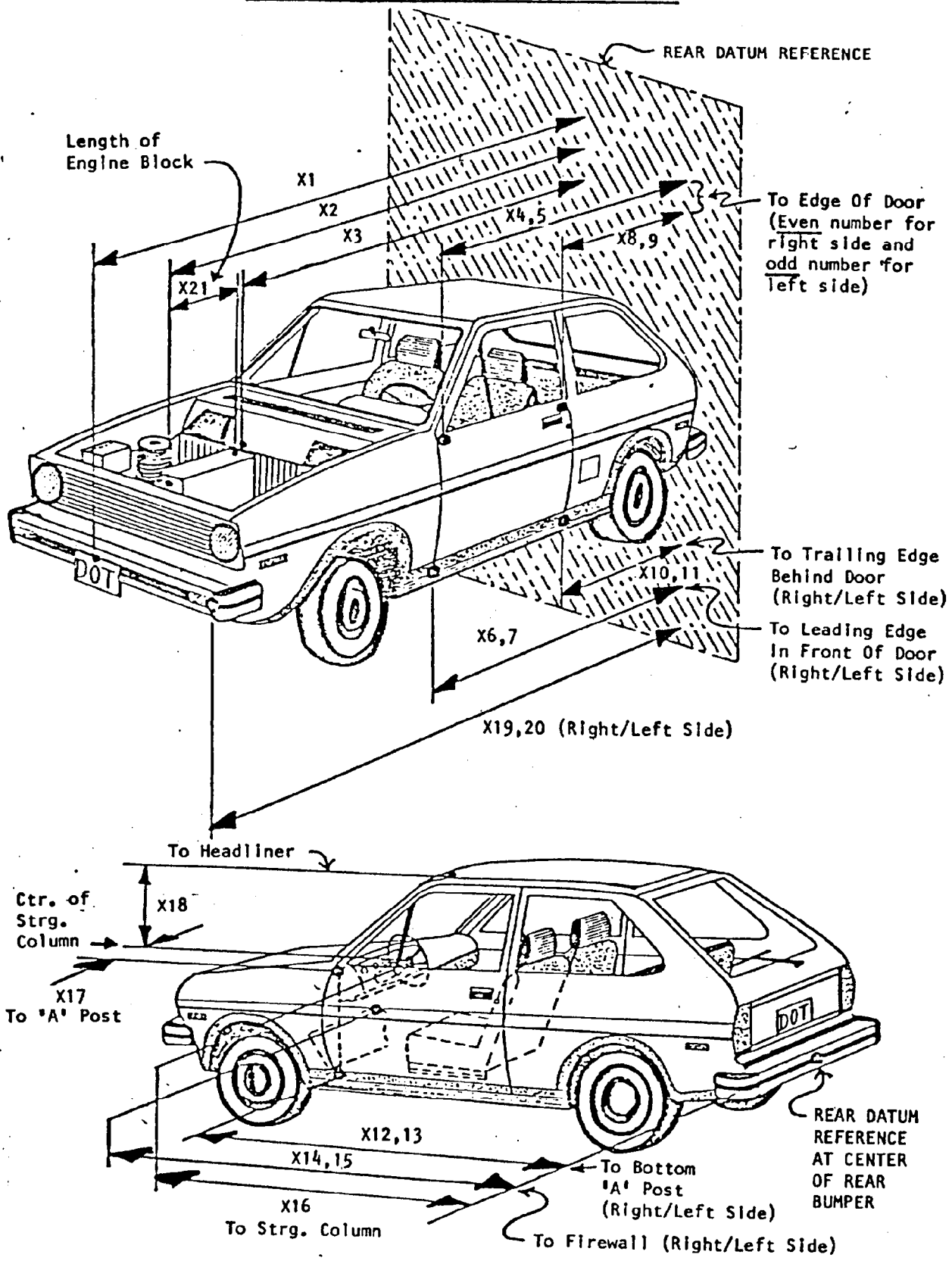
Vehicle: 1980 Volkswagen Rabbit Convertible NHTSA No.: 800541

Test Date: June 9, 1980 D.S. No.: 1046

Reference Dimension	Pre-test Measurement	Post-test Measurement	Change
X_1*	155.0	131.7	23.3
X_2	130.4	122.9	7.5
X_3	113.1	109.3	3.8
X_4	102.3	102.8	0.5
X_5	102.3	103.1	0.8
X_6	103.0	102.2	0.8
X_7	103.0	102.6	0.4
X_8*	58.8	59.1	0.3
X_9*	58.8	59.4	0.6
X_{10}	58.6	58.7	0.1
X_{11}	58.6	58.9	0.3
X_{12}	102.5	101.7	0.8
X_{13}	102.5	102.5	0.0
X_{14}	116.0	112.6	3.4
X_{15}	116.5	111.5	5.0
X_{16}	88.0	88.4	0.4
Y_{17}	15.5	13.5	2.0
Z_{18}	17.8	16.7	1.1
X_{19}*	153.5	131.1	22.4
X_{20}*	153.5	132.0	21.5
X_{21}	6.5	6.5	0.0

*Rear impact data requirements.

PRE-TEST AND POST-TEST MEASUREMENT POINTS



VEHICLE PROFILE DATA SHEET

Vehicle: 1980 Volkswagen Rabbit Convertible D.S. No.: 1046

Test Date: June 9, 1980

Measurement Date: Pre-test: June 9, 1980 Post-test June 10, 1980

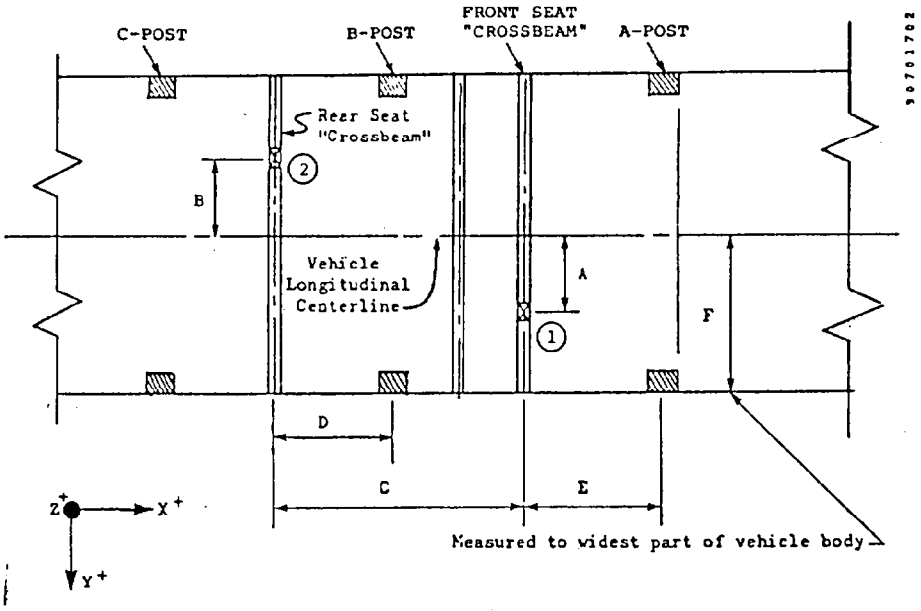
Exterior Measurements Referenced to Plane: 14 feet Forward of: Rear bumper

Location	Height	Vehicle Left (in.) 30	24	18	12	6	0	Vehicle Right (in.) 6	12	18	24	30
Pre-test Profile (in.)												
Top of Front Bumper	20.5	-	14.2	13.9	13.6	13.4	13.4	13.5	13.7	14.1	14.4	-
Front of Hood	29.1	-	19.8	19.2	18.9	18.6	18.5	18.7	18.9	19.3	19.8	-
Post-test Profile (in.)												
Top of Front Bumper	19.2	-	36.4	36.2	36.2	36.3	36.3	36.4	36.6	36.7	37.1	-
Front of Hood*	26.7	-	37.1	36.6	36.6	36.7	36.8	36.9	36.9	37.2	37.6	-
Post-test Static Crush (in.)												
Top of Front Bumper	1.3	-	22.2	22.3	22.6	22.9	22.9	22.9	22.9	22.6	22.7	-
Front of Hood	2.4	-	17.3	17.4	17.7	18.1	18.3	18.2	18.0	17.9	17.8	-

*Estimated value due to hood removal for rollover portion of test.

TEST VEHICLE ACCELEROMETER LOCATION DEFINITION AND DATA SUMMARY

Dim.	Length (in.)
A	11.0
B	24.5
C	26.3
D	2.8
E	17.5
F	32.0



No.	Location Description	Component Direction X	Y	Z	Data Summary Peak G @ msec X "+"	X "−"	Y "+"	Y "−"	Z "+"	Z "−"
1	Below front seat area	✓			4.0 @ 107	-47.7 @ 54	@	@	@	@
2	Below rear seat area	✓			19.9 @ 132	-36.6 @ 55	@	@	@	@

SUMMARY OF CAMERA LOCATIONS AND DESCRIPTIONS

Loc. No.	Location	Field of View	Lens Size	Frame Rate	Timing Speed (HZ)	Ser No.	Impact Dist-X	Center-line Dist-Y	Camera Height
1	Overhead (Barrier)	Windshield styrofoam up to barrier-vehicle contact if possible	13mm	400	102	11	-5	0	12
2	Ground Based (Left)	Windshield	16mm	400	105	9	-3	-7	6
3	Pit	Engine underside and fuel pump	8mm	1000	100	6	5	0	-8
4	Ground Based (Left)	Views entire left side of vehicle	16mm	400	98	3	3	-35	3.5
5	Ground Based (Real Time)	Documentary	Zoom	24	N/A	None	4	35	6
6	Ground Based (Left)	Driver dummy closeup	15mm	1000	102	8	4	-9	5
7	Ground Based (Right)	Passenger dummy closeup	25mm	1000	100	5	5	14	5
8	Pit	Fuel tank	8mm	1000	105	7	8	0	-8
9	Ground Based (Left)	Same view as Camera No. 6	15mm	1000	104	4	5	-9	4.5
10	Ground Based (Right)	Same view as Camera No. 7	25mm	1000	100	10	6	14	4.5

APPENDIX A

PHOTOGRAPHS

Figure A-1. Pre-test Front View - 1980 VW Rabbit Convertible - NHTSA 800541.

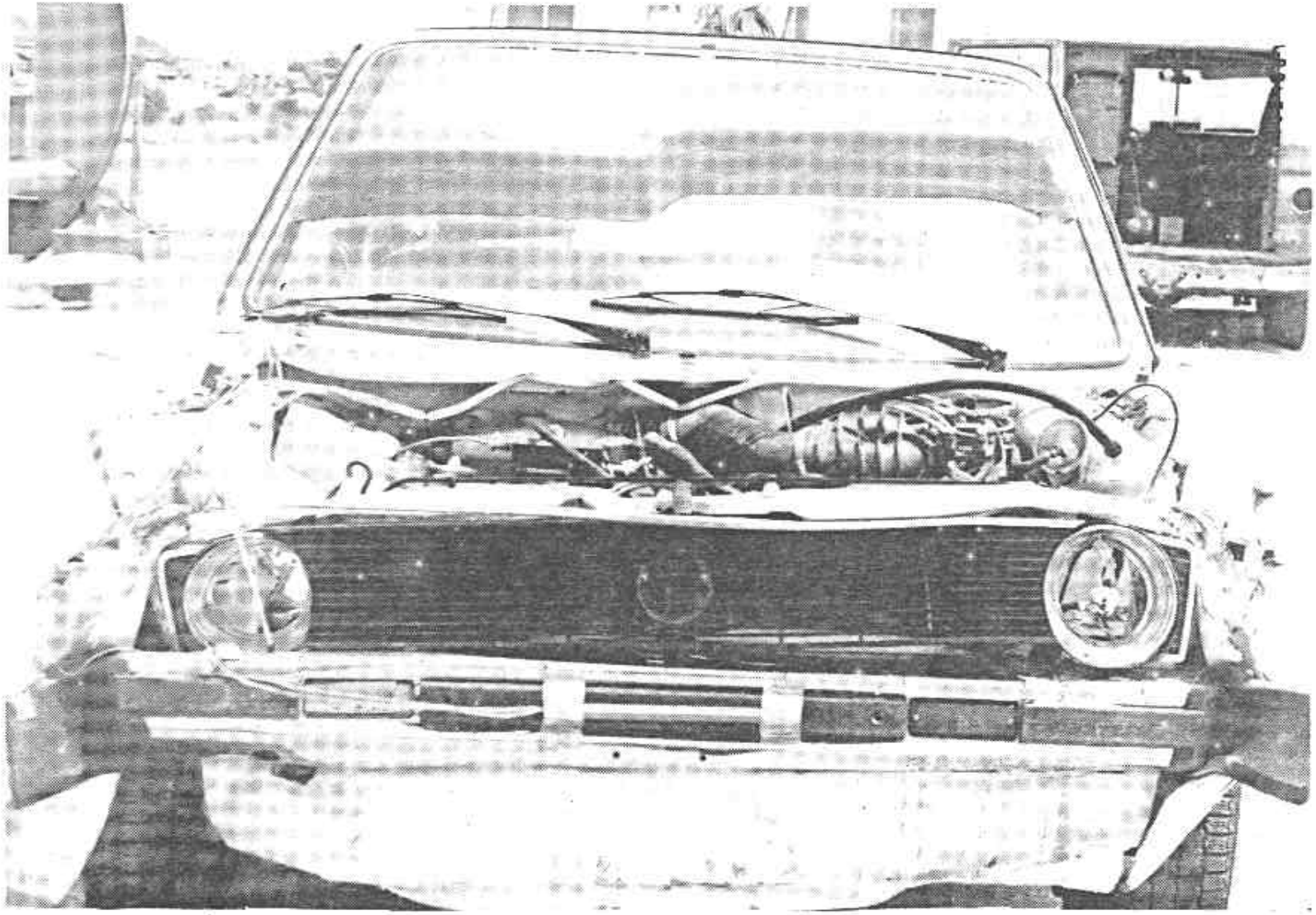


Figure A-2. Post-test Front View - 1980 VW Rabbit Convertible - NHTSA 800541.

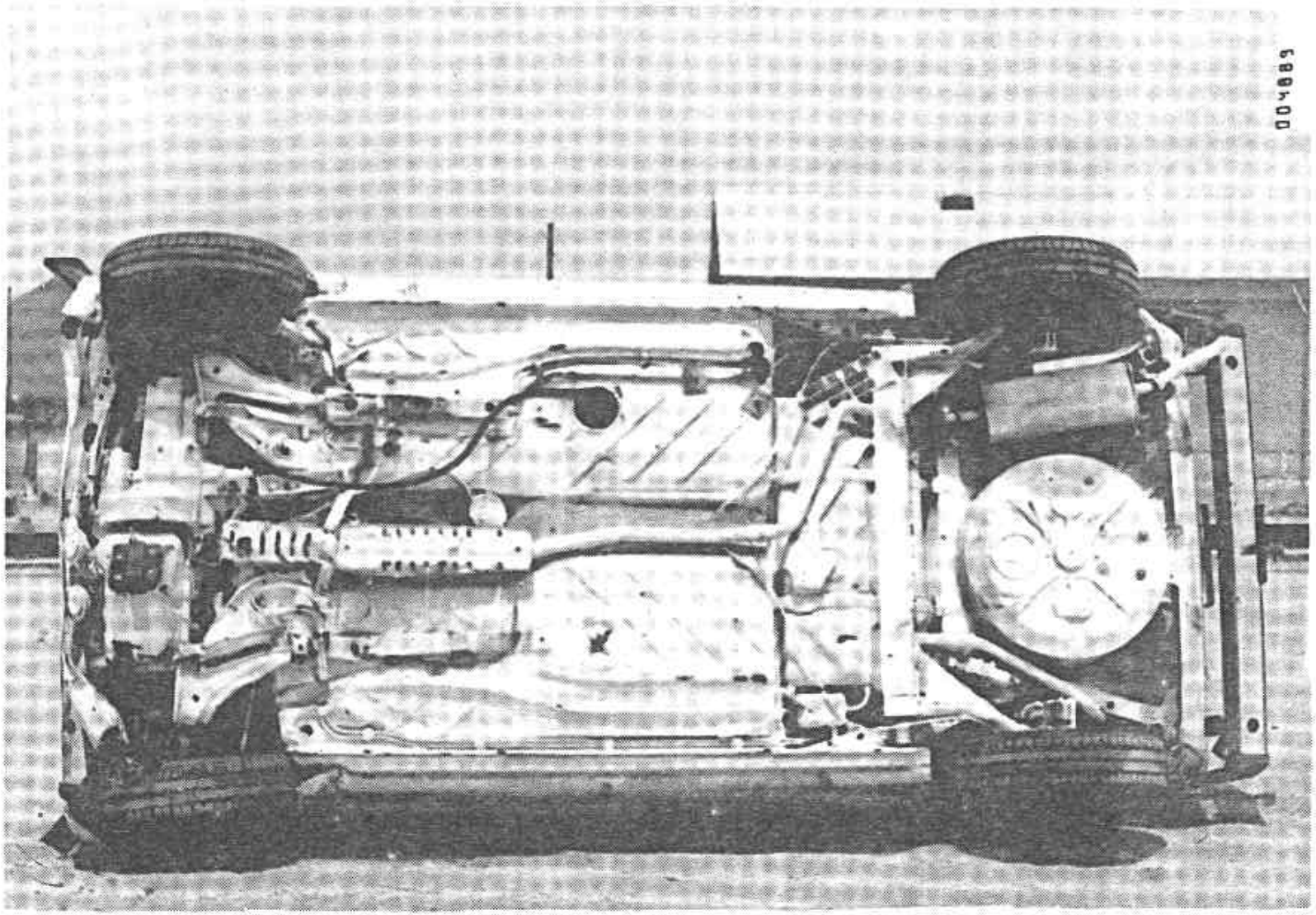


Figure A-3. Post-test Overall Underside View - 1980 VW Rabbit Convertible - NHTSA 800541.

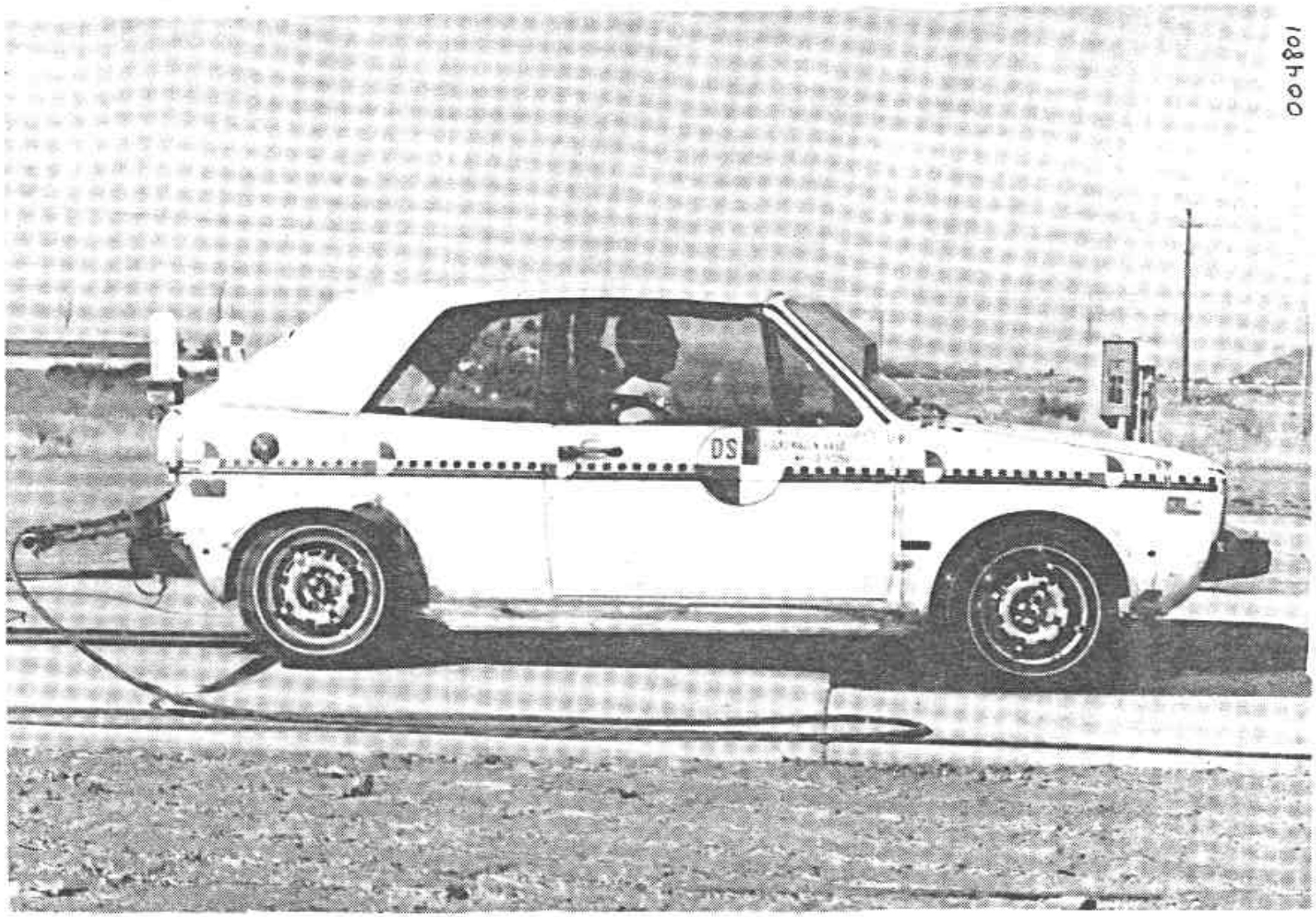


Figure A-4. Pre-test Side View - 1980 VW Rabbit Convertible - NHTSA 800541.

Figure A-5. Post-test Side View - 1980 VW Rabbit Convertible - NHTSA 800541.

Figure A-6. Pre-test Driver Dummy Position - 1980 VW Rabbit Convertible - NHTSA 800541.

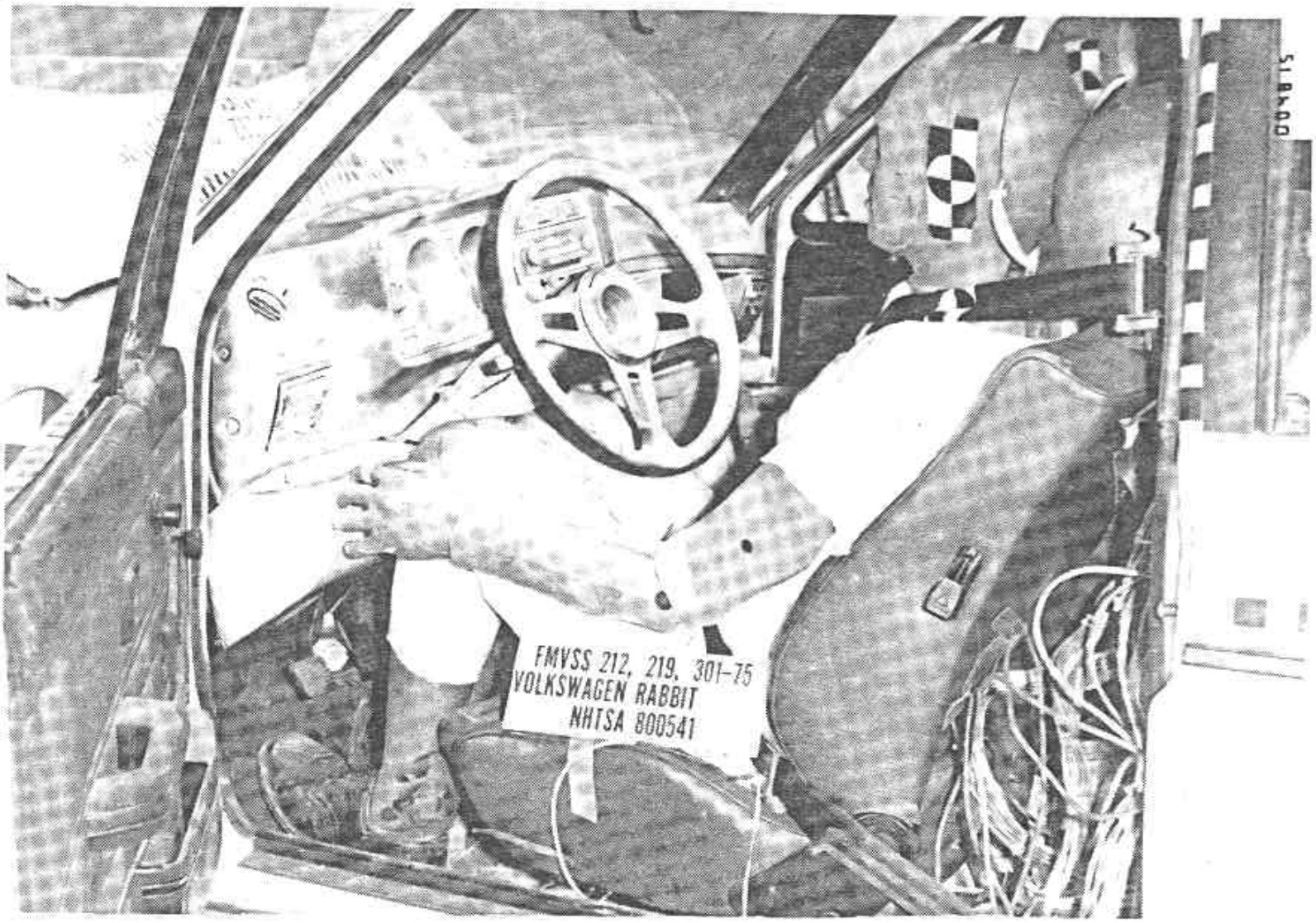


Figure A-7. Post-test Driver Dummy Position - 1980 VW Rabbit Convertible - NHTSA 800541.

Figure A-8. Pre-test Passenger Position - 1980 VW Rabbit Convertible - NHTSA 800541.

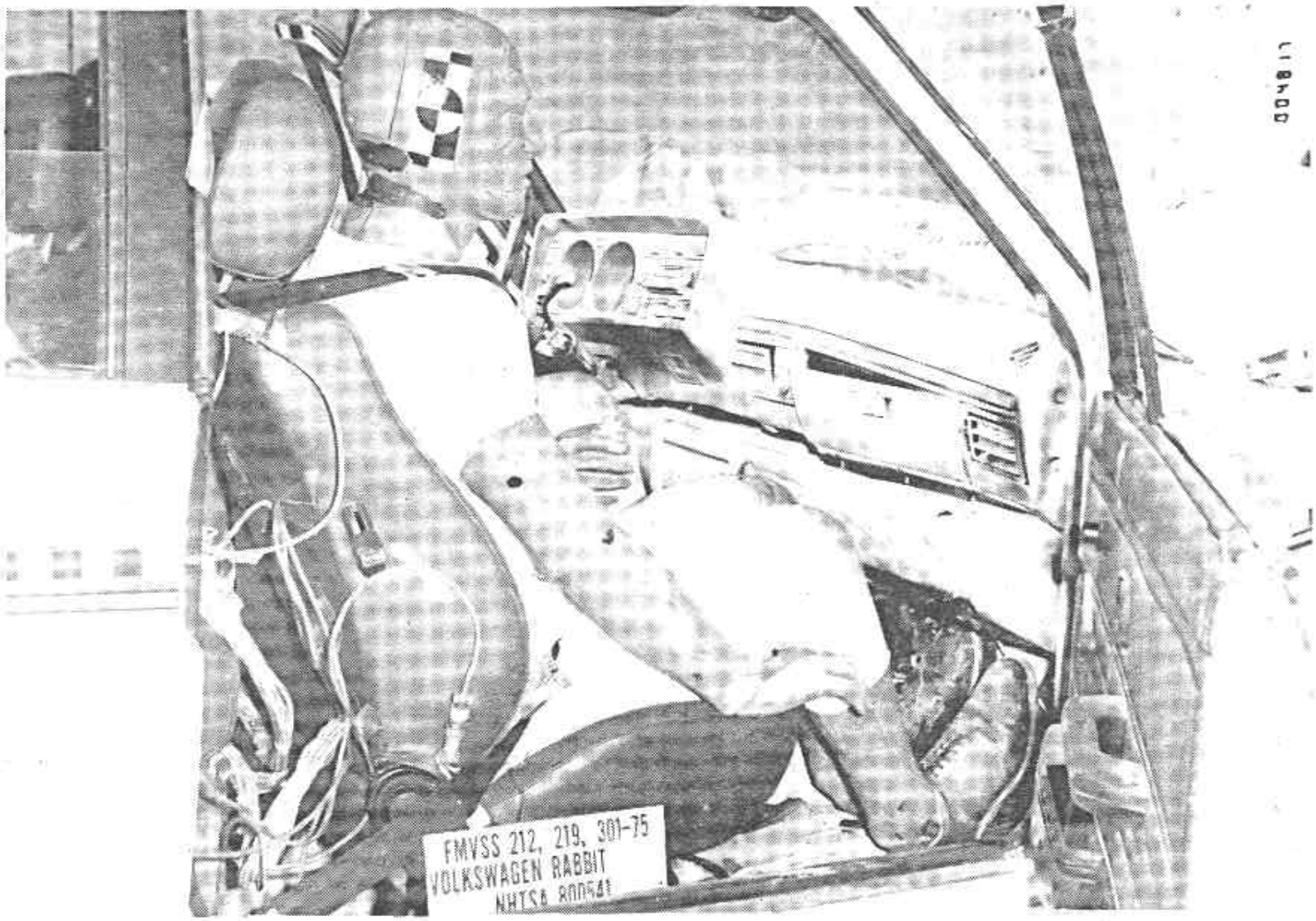
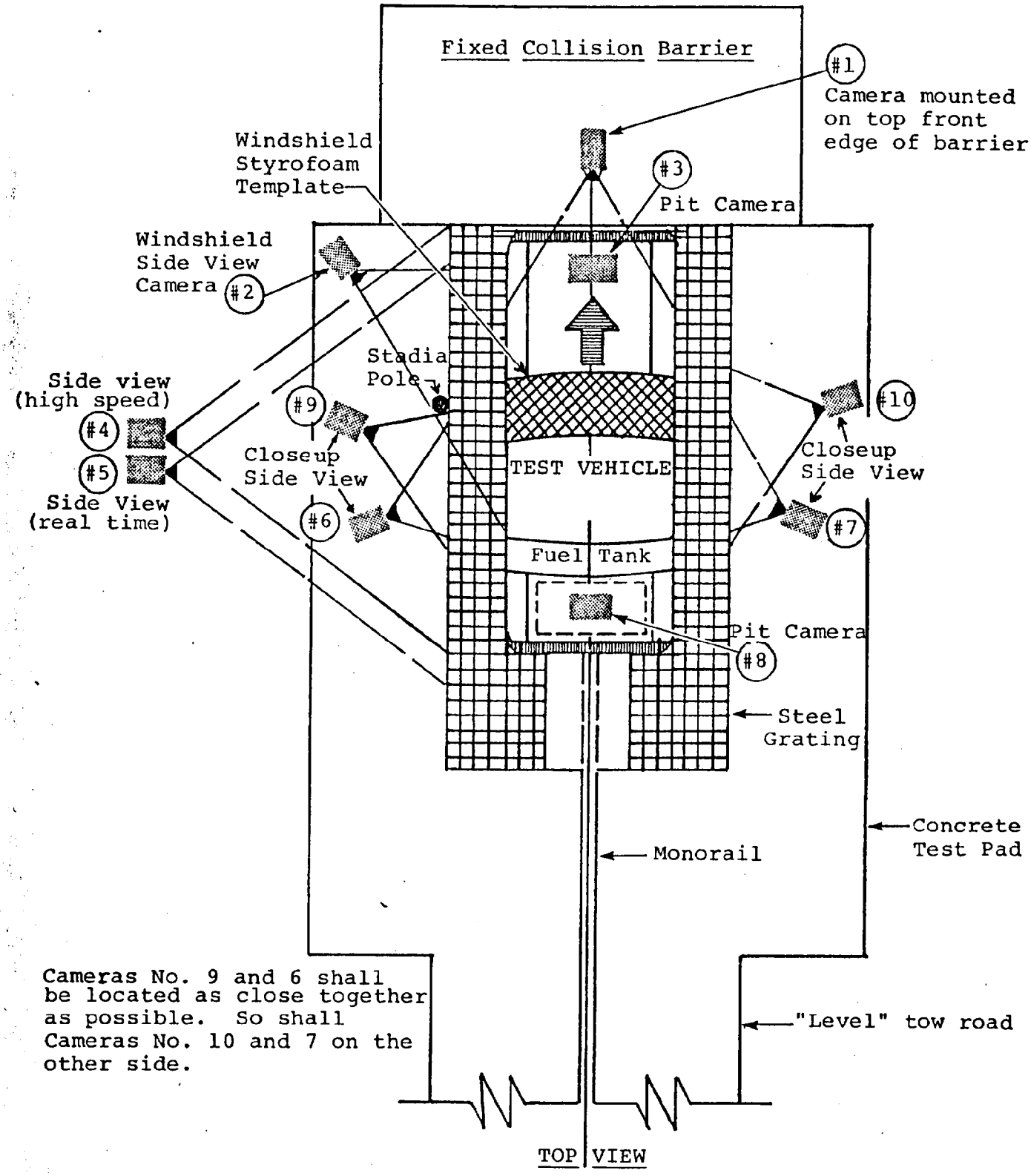


Figure A-9. Post-test Passenger Position - 1980 VW Rabbit Convertible - NHTSA 800541.


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

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*

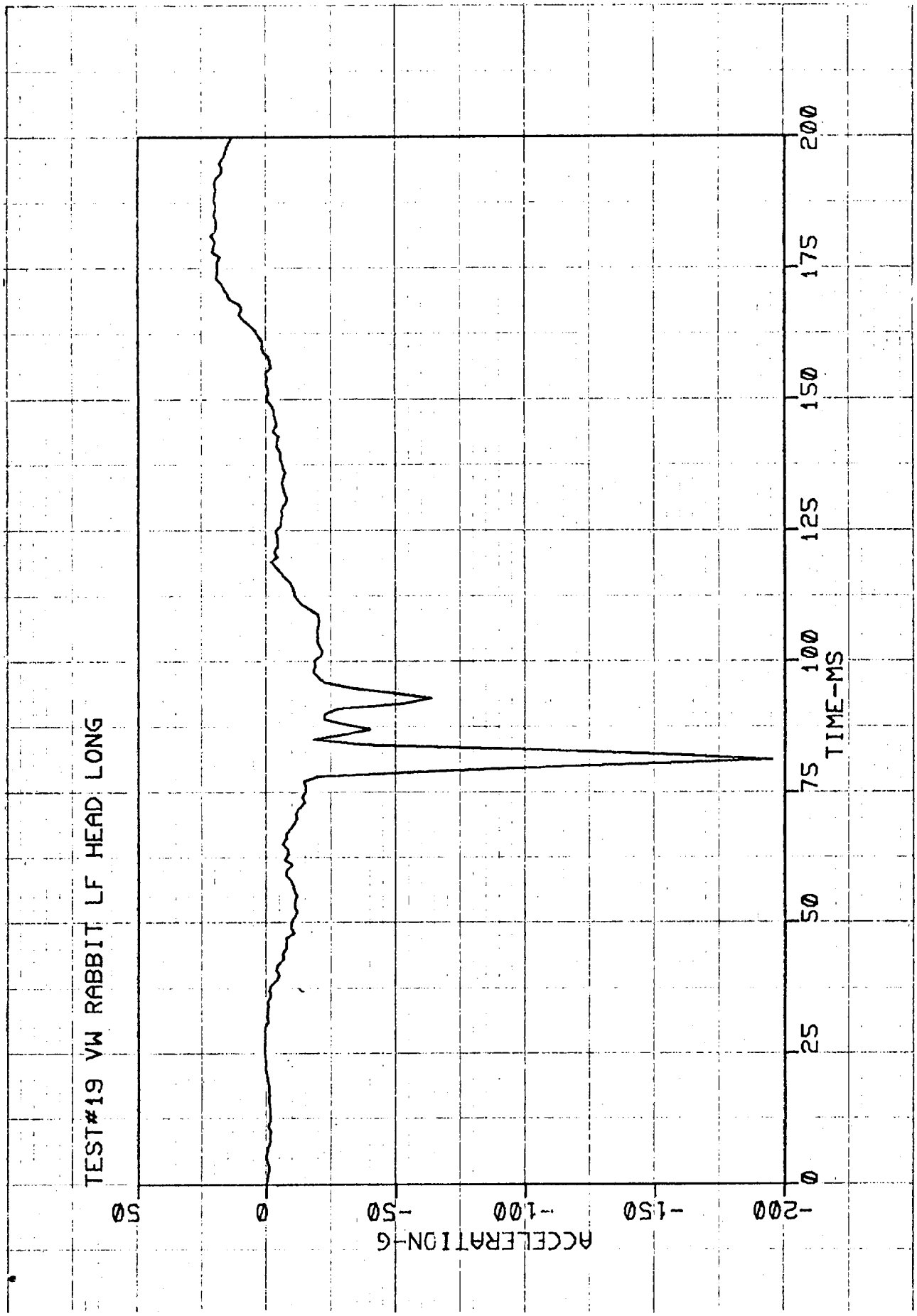
Driver	RF Outboard Passenger	Data Description
LF Head	RF Head	Head Acceleration (G)
LF Chest	RF Chest	Chest Acceleration (G)
LF Femurs	RF Femurs	Femur Loads (lb)
LF Belt Loads	RF Belt Loads	Lap and Torso Belt Loads (lb)

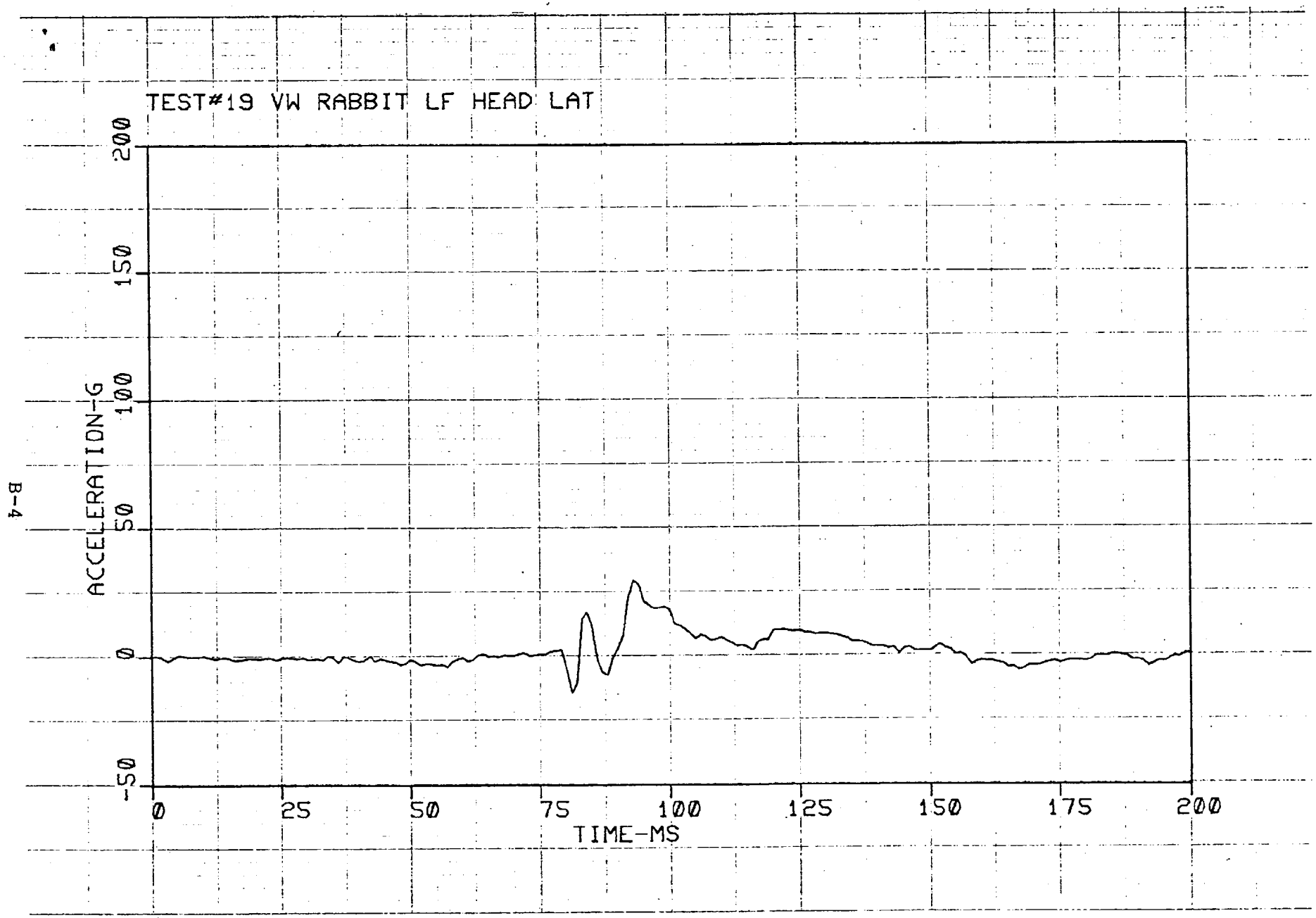
Vehicle Data**

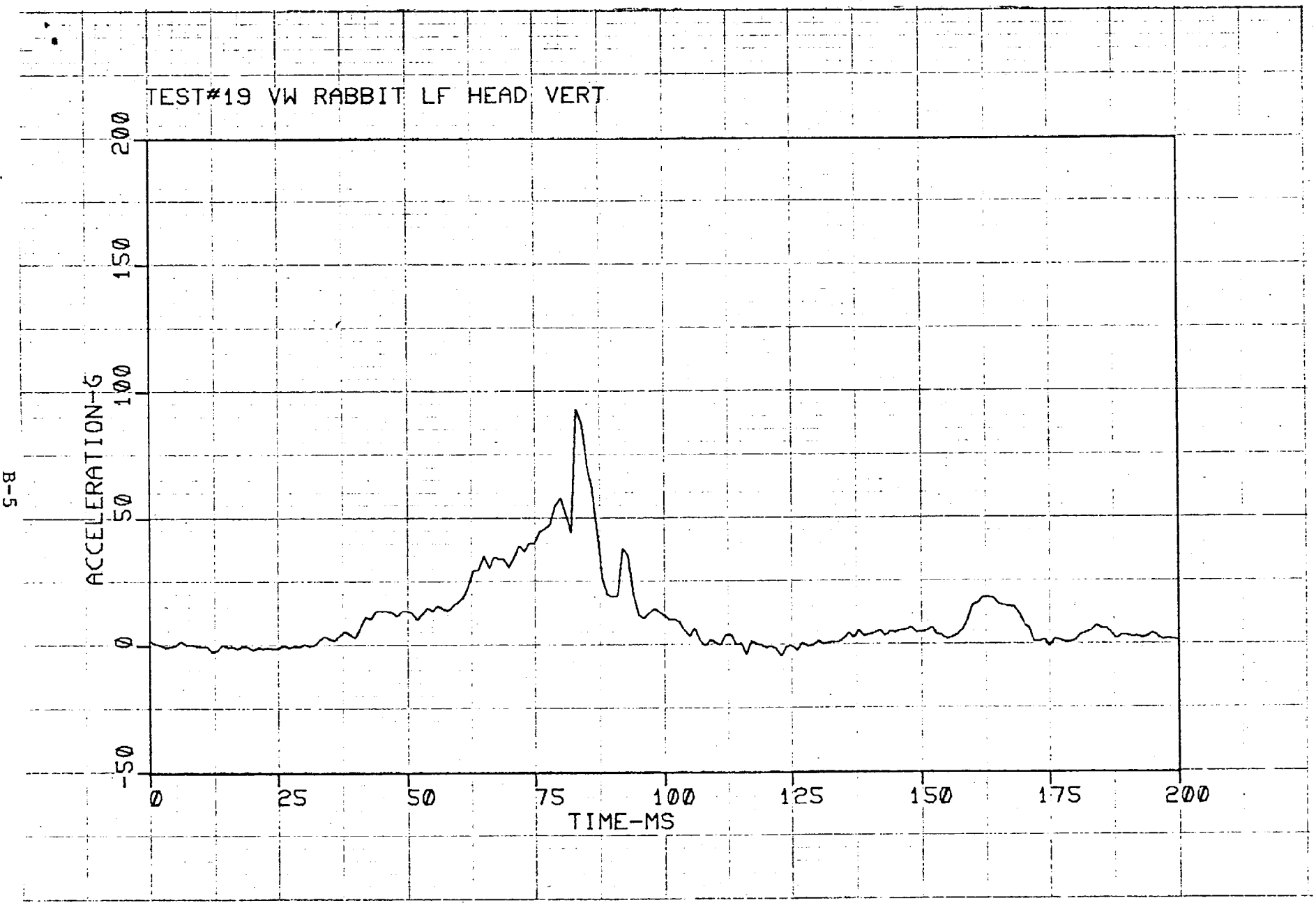
	Location
Loc 1	Front Seat Area Acceleration (G)
Loc 2	Rear Seat Area Acceleration (G)

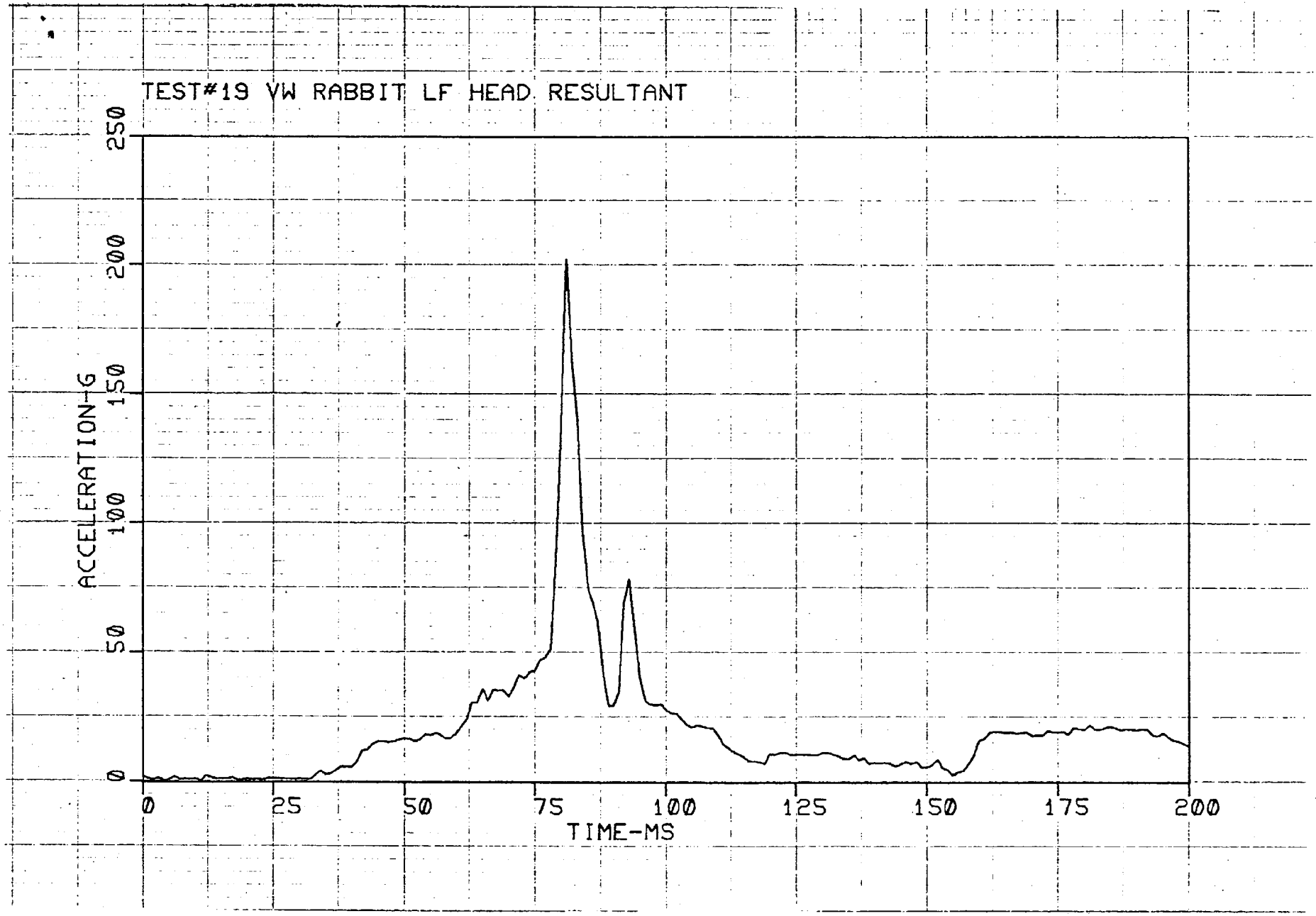
*Dummy Injury Summary presented on pages 4-4 and 4-5.
**Vehicle accelerometer location and data summarized on page 4-9.

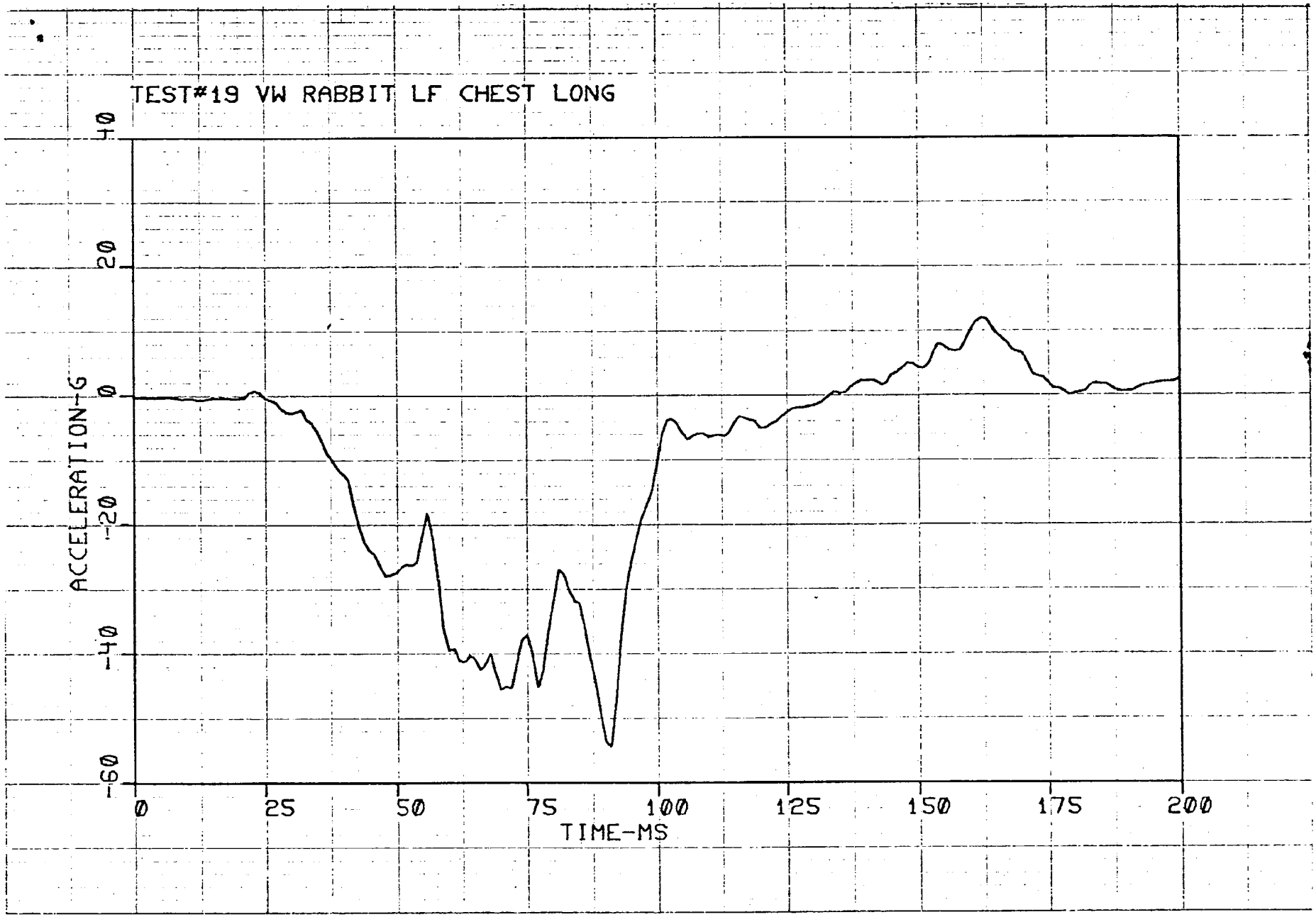
Test Anomalies: None

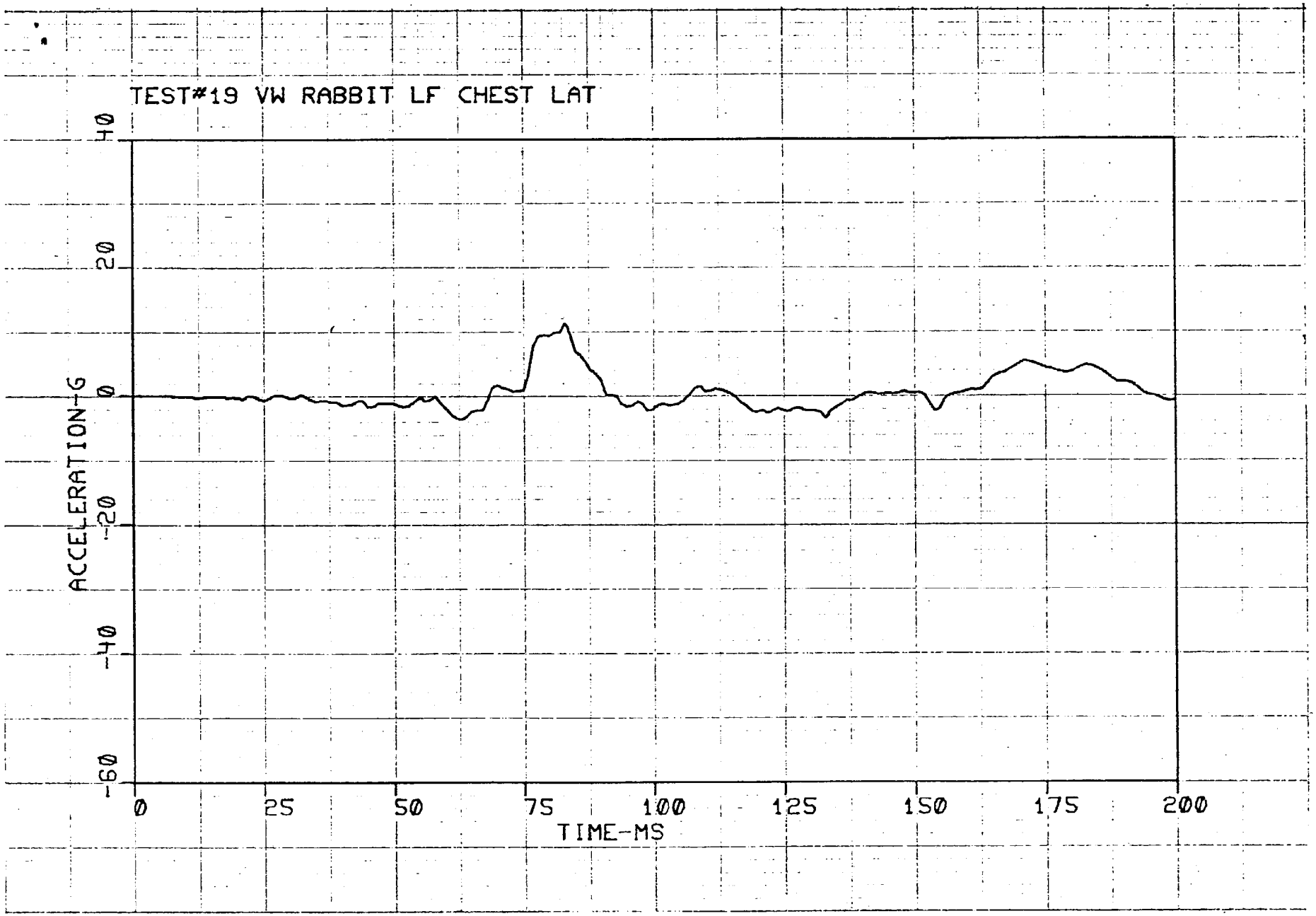

TEST#19 VW RABBIT LF HEAD LONG
ACCELERATION-G
50
0
-50
-100
-150
-200
0
25
50
75
100
125
150
175
200
TIME-MS

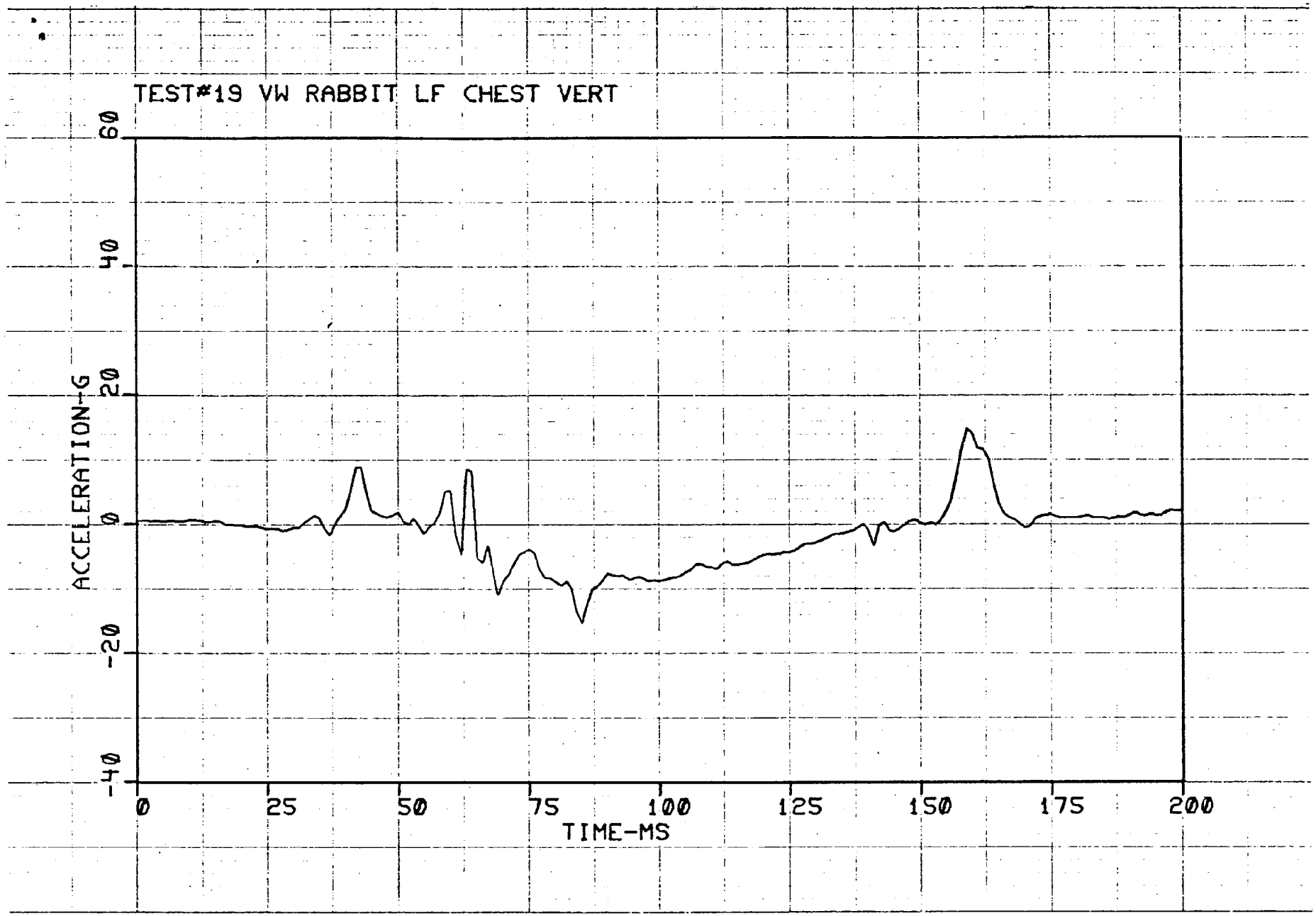

TEST#19 VW RABBIT LF HEAD LAT
ACCELERATION-G
200
150
100
50
0
-50
0
25
50
75
100
125
150
175
200
TIME-MS

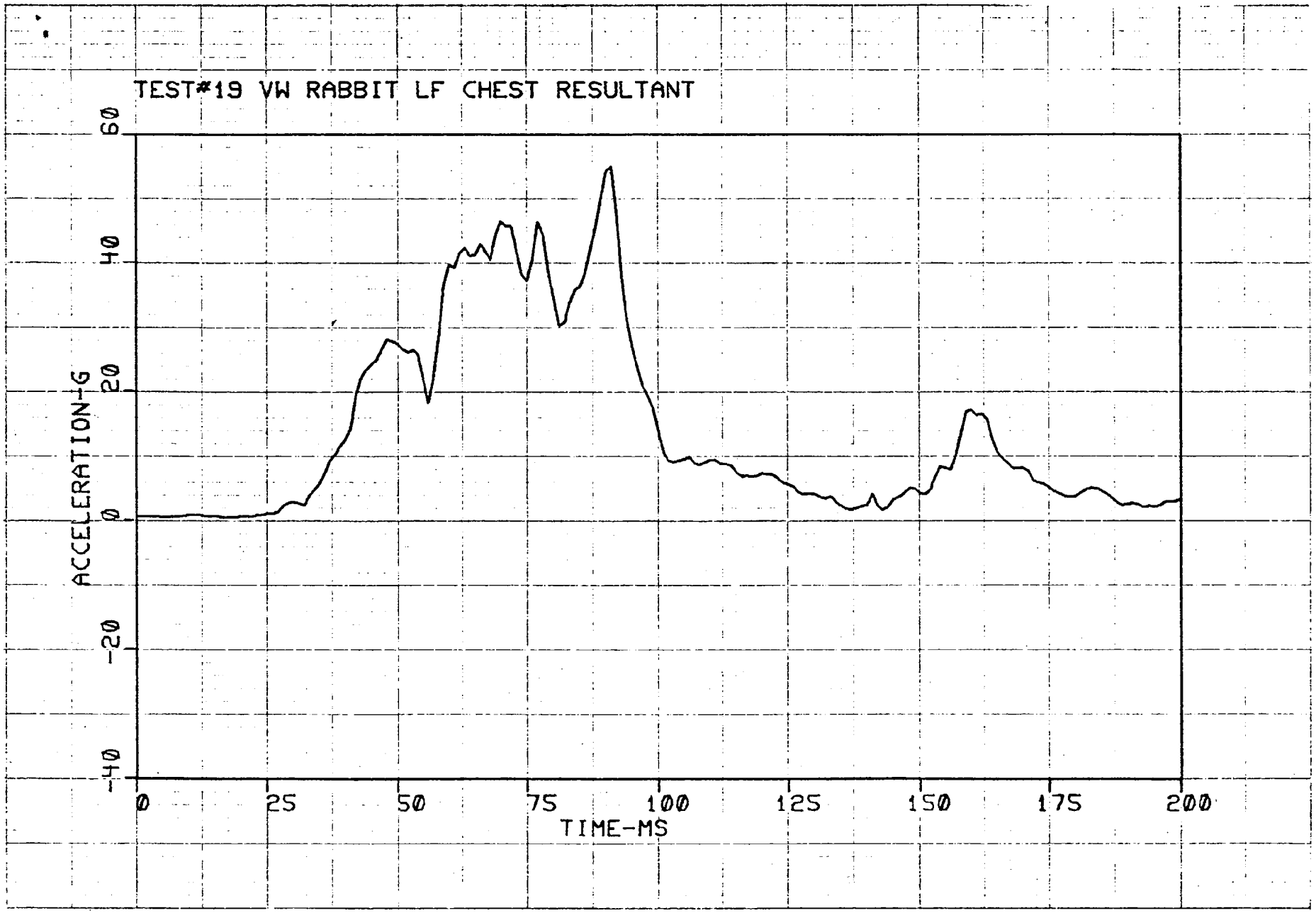

TEST#19 VW RABBIT LF HEAD VERT
ACCELERATION-G
200
150
100
50
0
-50
0
25
50
75
100
125
150
175
200
TIME-MS

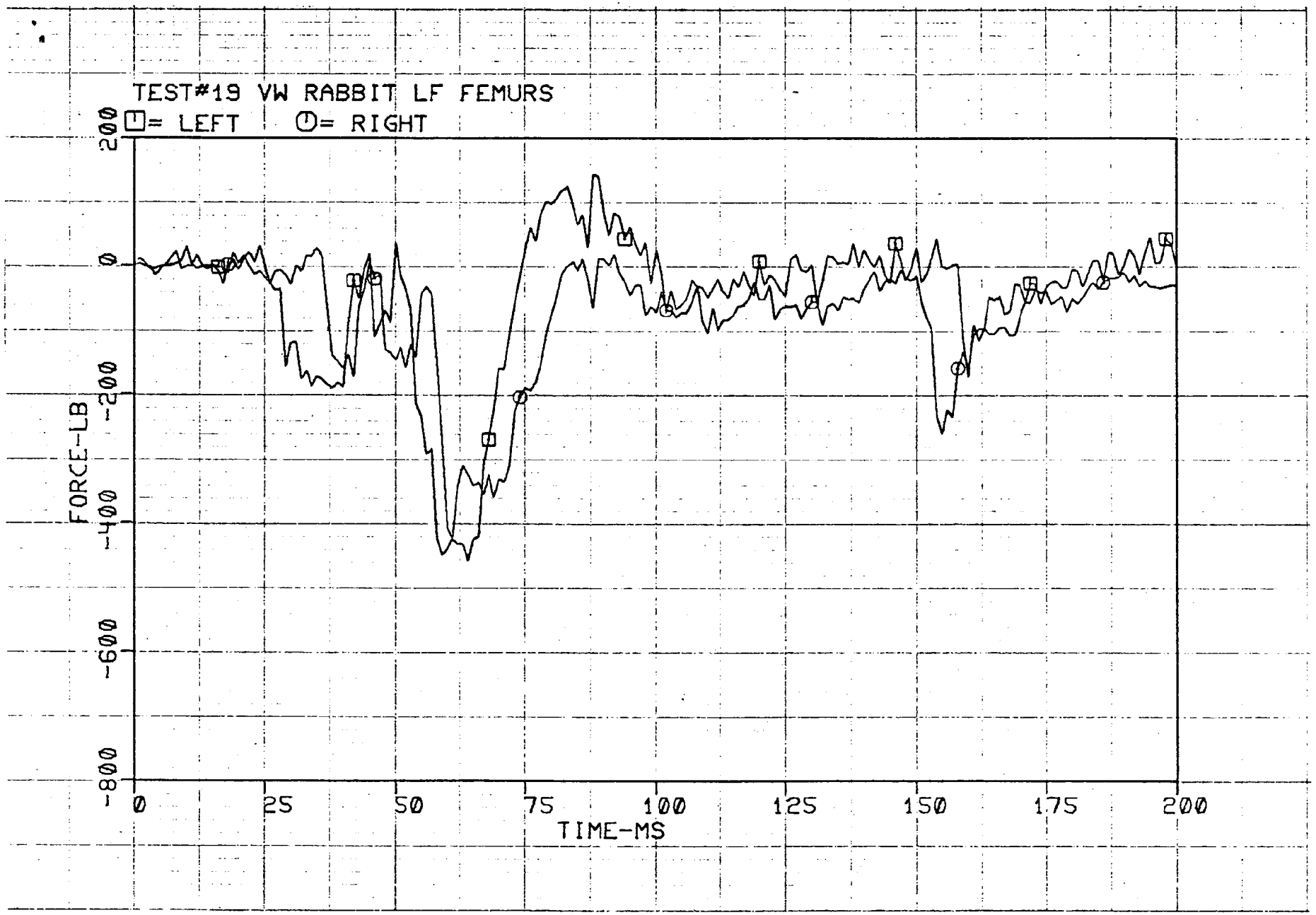

TEST#19 VW RABBIT LF HEAD RESULTANT
ACCELERATION-G
250
200
150
100
50
0
0
25
50
75
100
125
150
175
200
TIME-MS

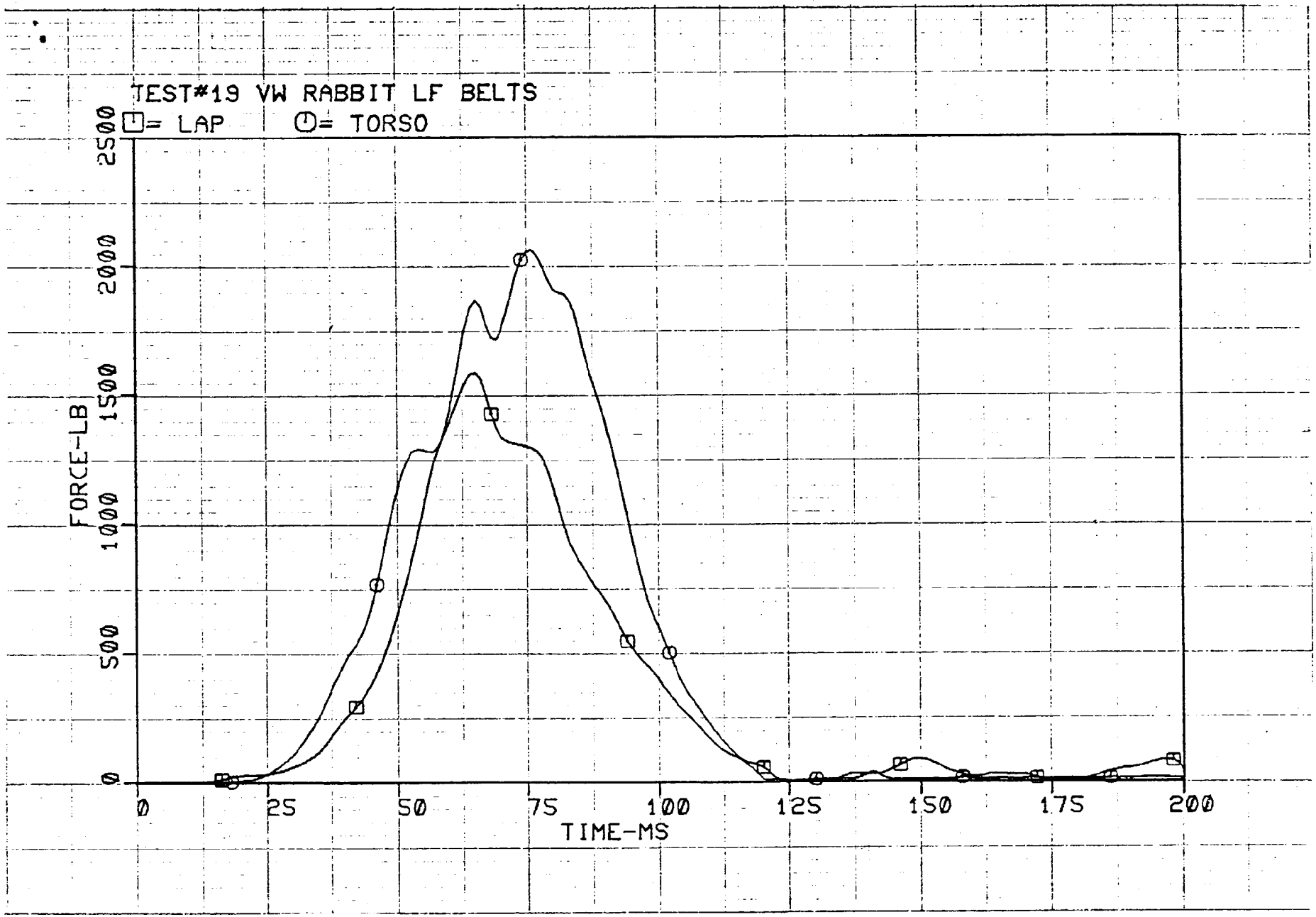

TEST#19 VW RABBIT LF CHEST LONG
ACCELERATION-G
40
20
0
-20
-40
-60
0
25
50
75
100
125
150
175
200
TIME-MS

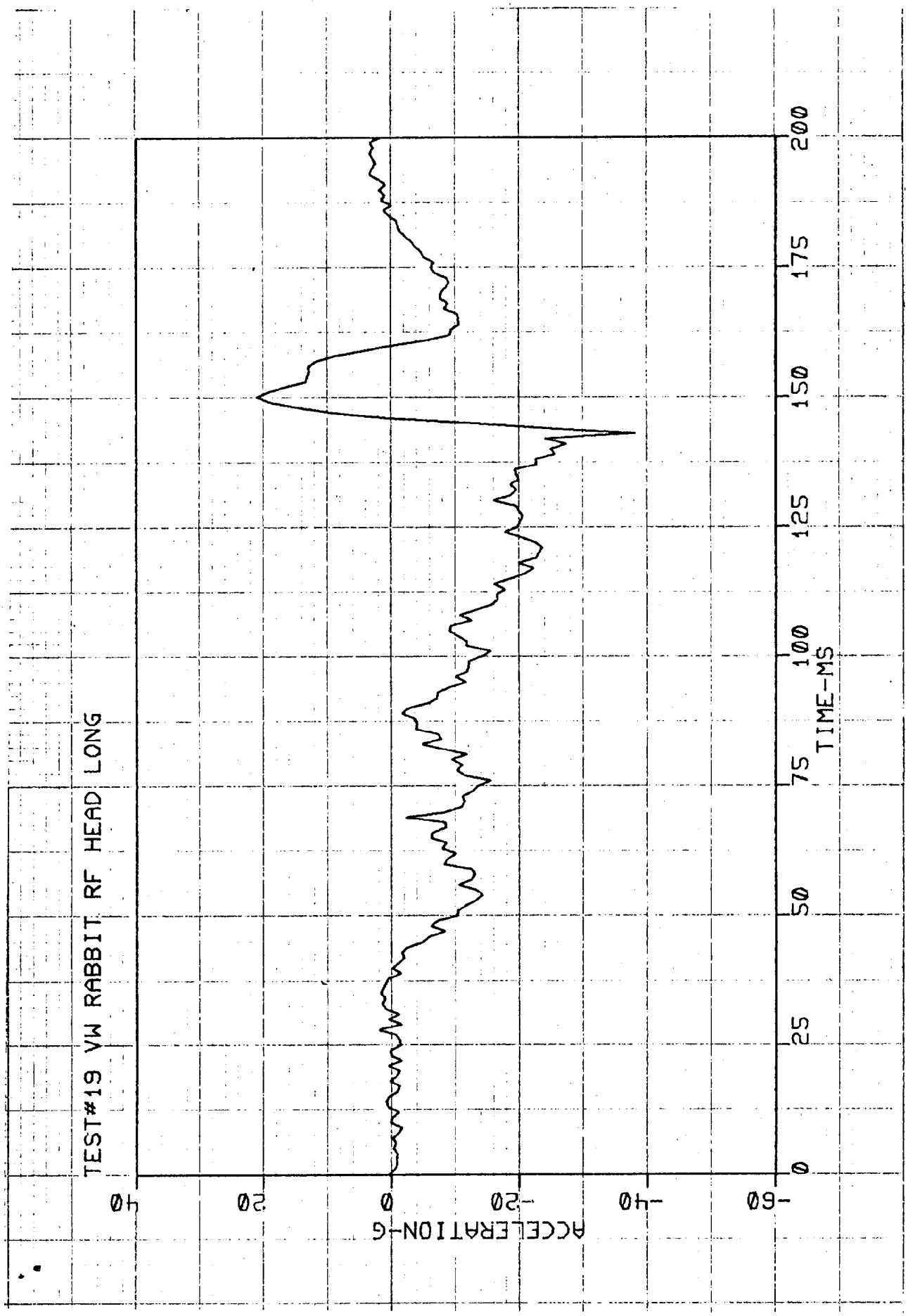

TEST#19 VW RABBIT LF CHEST LAT
40
20
0
-20
-40
-60
ACCELERATION-G
0
25
50
75
100
125
150
175
200
TIME-MS

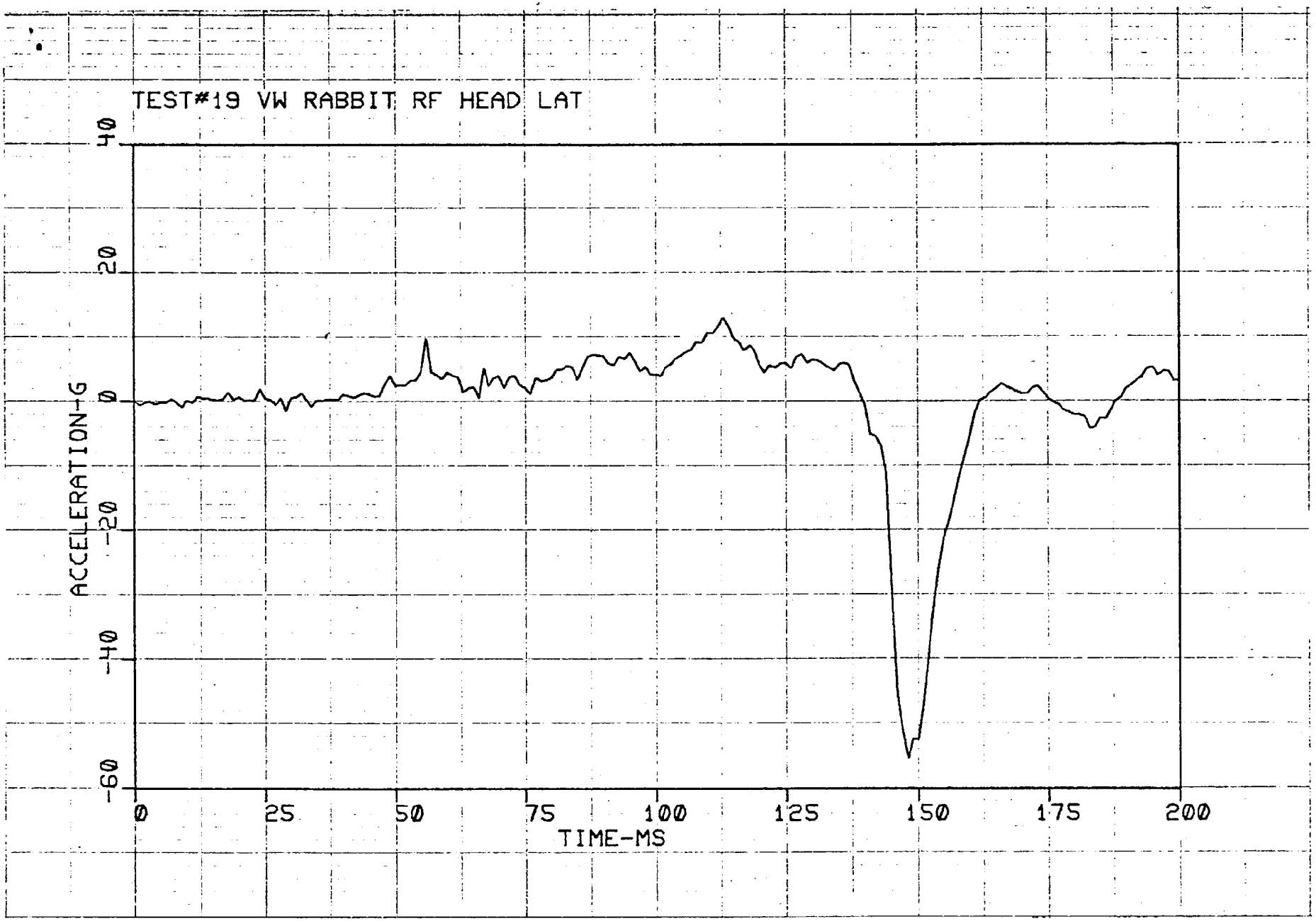

TEST#19 VW RABBIT LF CHEST VERT
ACCELERATION-G
60
40
20
0
-20
-40
0
25
50
75
100
125
150
175
200
TIME-MS

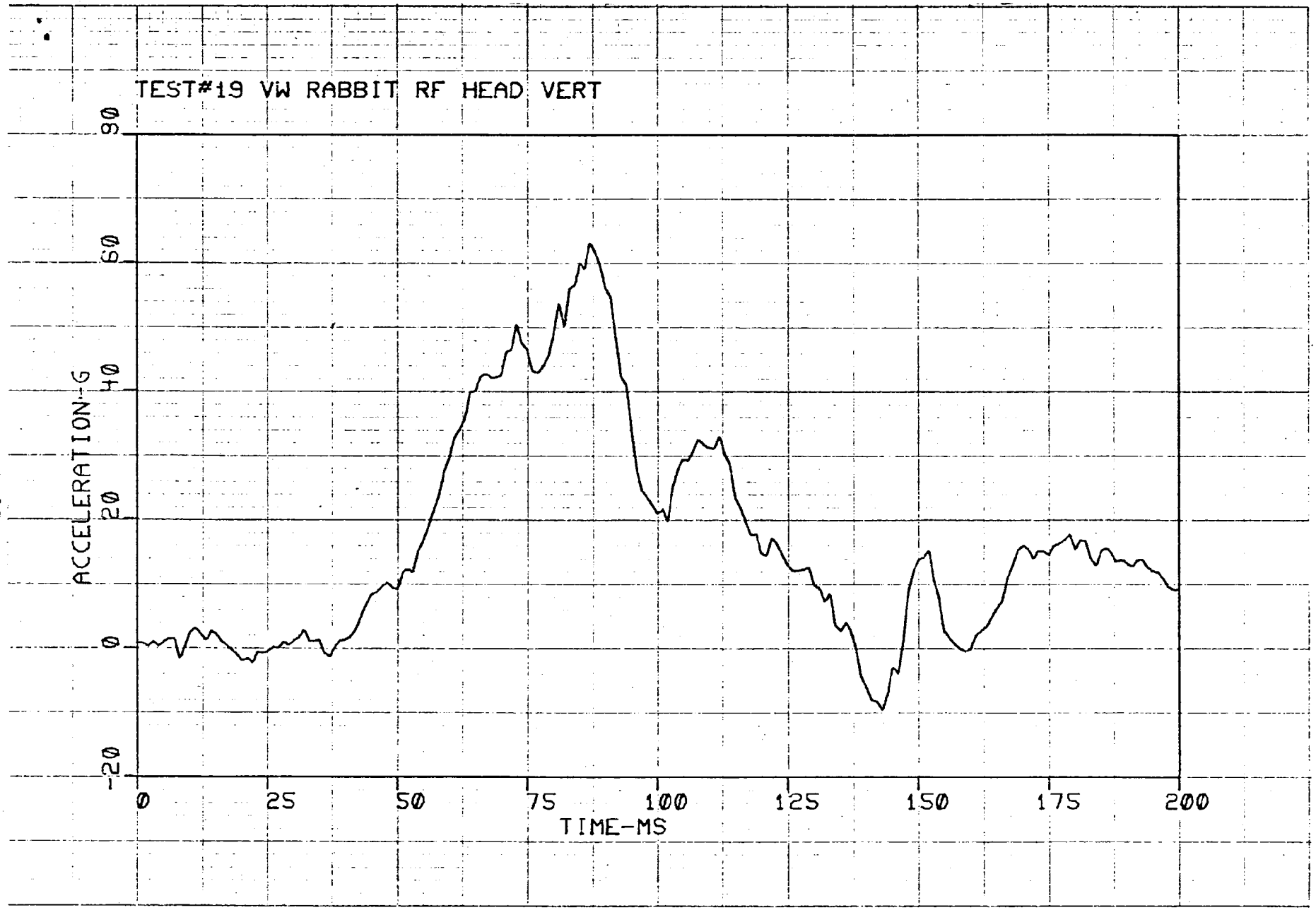

TEST#19 VW RABBIT LF CHEST RESULTANT
ACCELERATION-G
60
40
20
0
-20
-40
0
25
50
75
100
125
150
175
200
TIME-MS

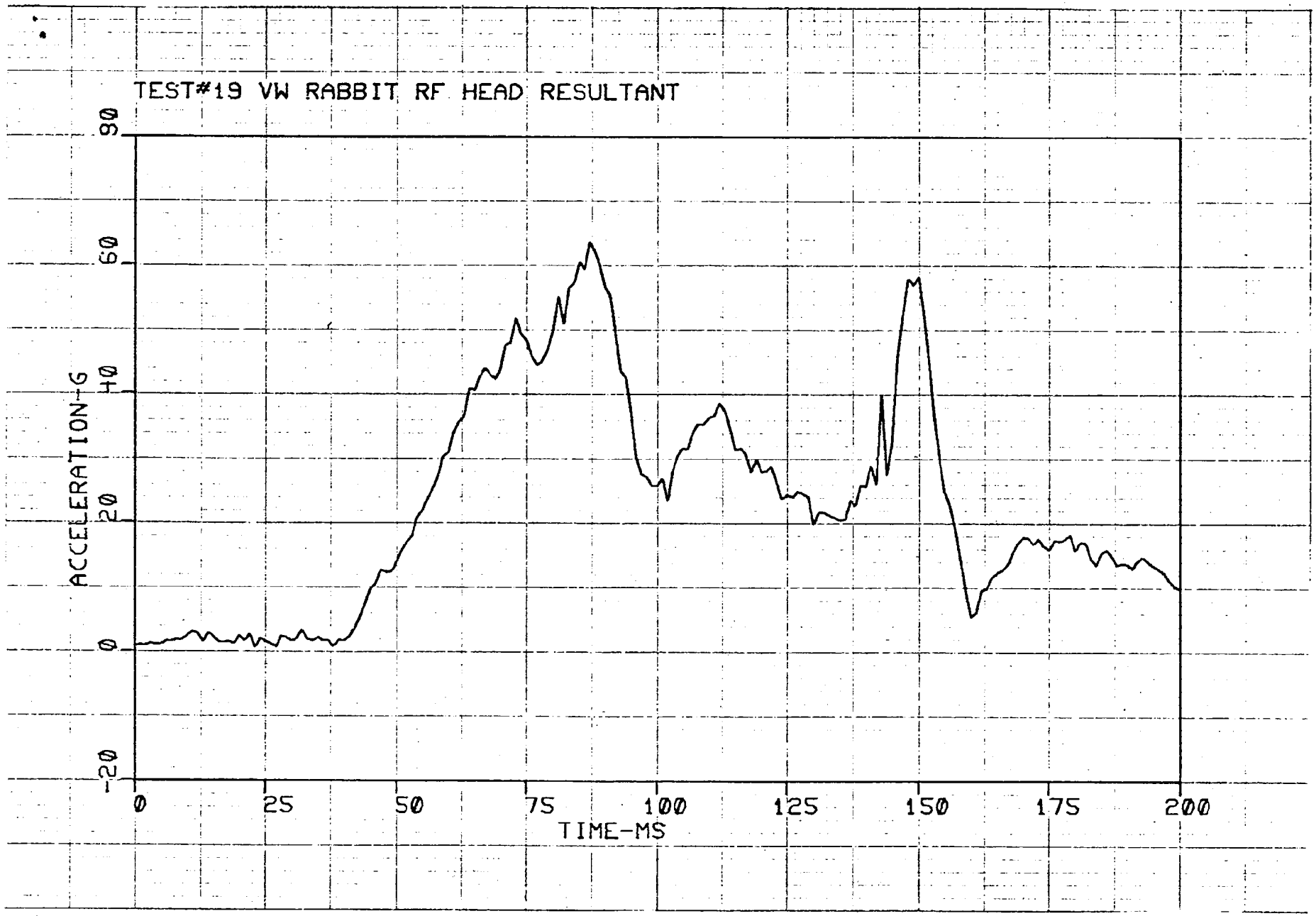

TEST#19 VW RABBIT LF FEMURS
□= LEFT ⓘ= RIGHT
200
0
-200
-400
-600
-800
FORCE-LB
0
25
50
75
100
125
150
175
200
TIME-MS


TEST#19 VW RABBIT LF BELTS
□= LAP
○= TORSO
FORCE-LB
2500
2000
1500
1000
500
0
0
25
50
75
100
125
150
175
200
TIME-MS


TEST#19 VW RABBIT RF HEAD LONG
ACCELERATION-G
40
20
0
-20
-40
-60
0
25
50
75
100
125
150
175
200
TIME-MS


TEST#19 VW RABBIT RF HEAD LAT
ACCELERATION-G
40
20
0
-20
-40
-60
0
25
50
75
100
125
150
175
200
TIME-MS


TEST#19 VW RABBIT RF HEAD VERT
ACCELERATION-G
90
60
40
20
0
-20
0
25
50
75
100
125
150
175
200
TIME-MS


TEST#19 VW RABBIT RF HEAD RESULTANT
ACCELERATION-G
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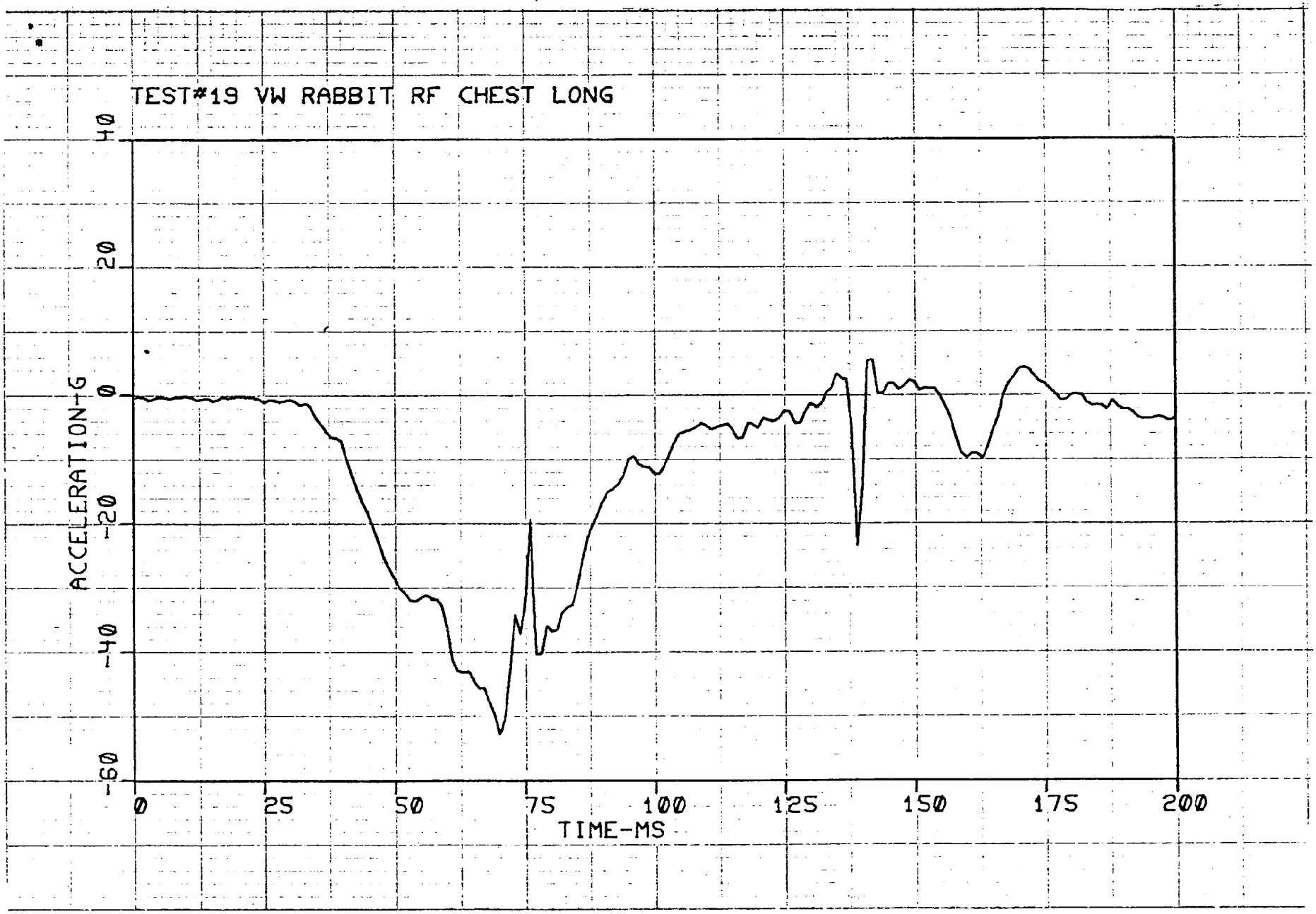
60
40
20
0
-20
0
25
50
75
100
125
150
175
200
TIME-MS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ACCELERATION-G
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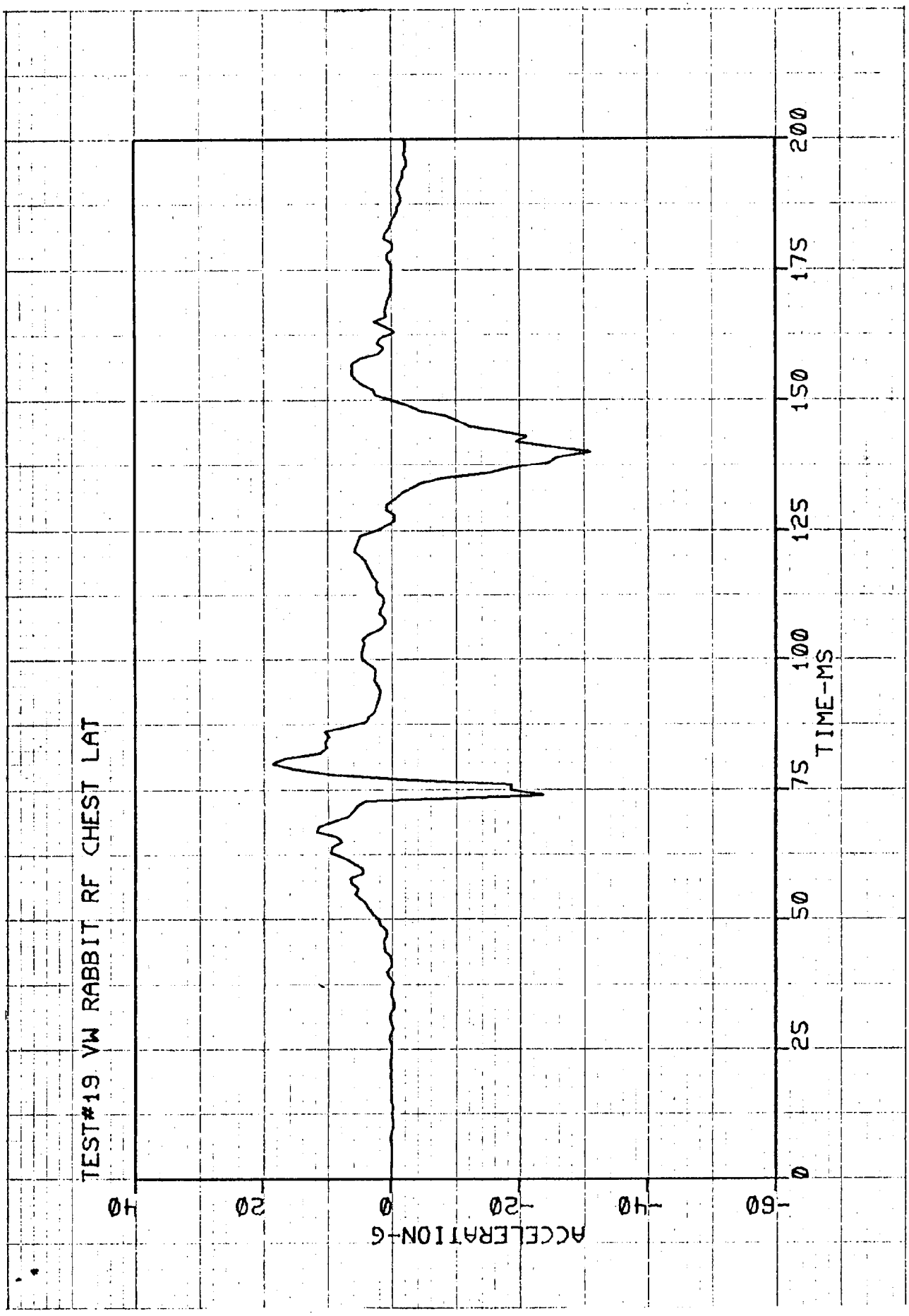
20
0
-20
-40
-60
0
25
50
75
100
125
150
175
200
TIME-MS


TEST#19 VW RABBIT RF CHEST LAT
ACCELERATION-G
TIME-MS
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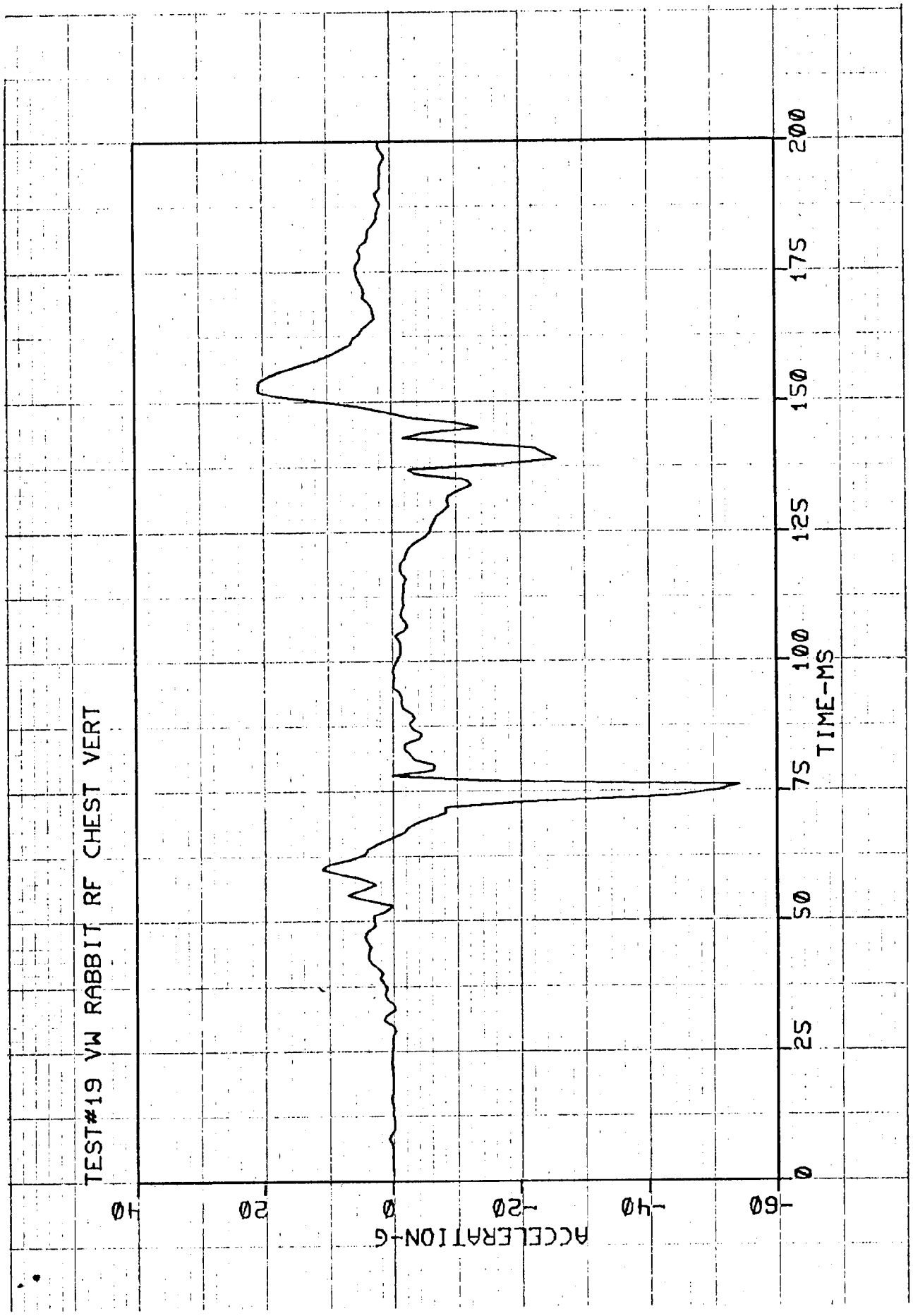
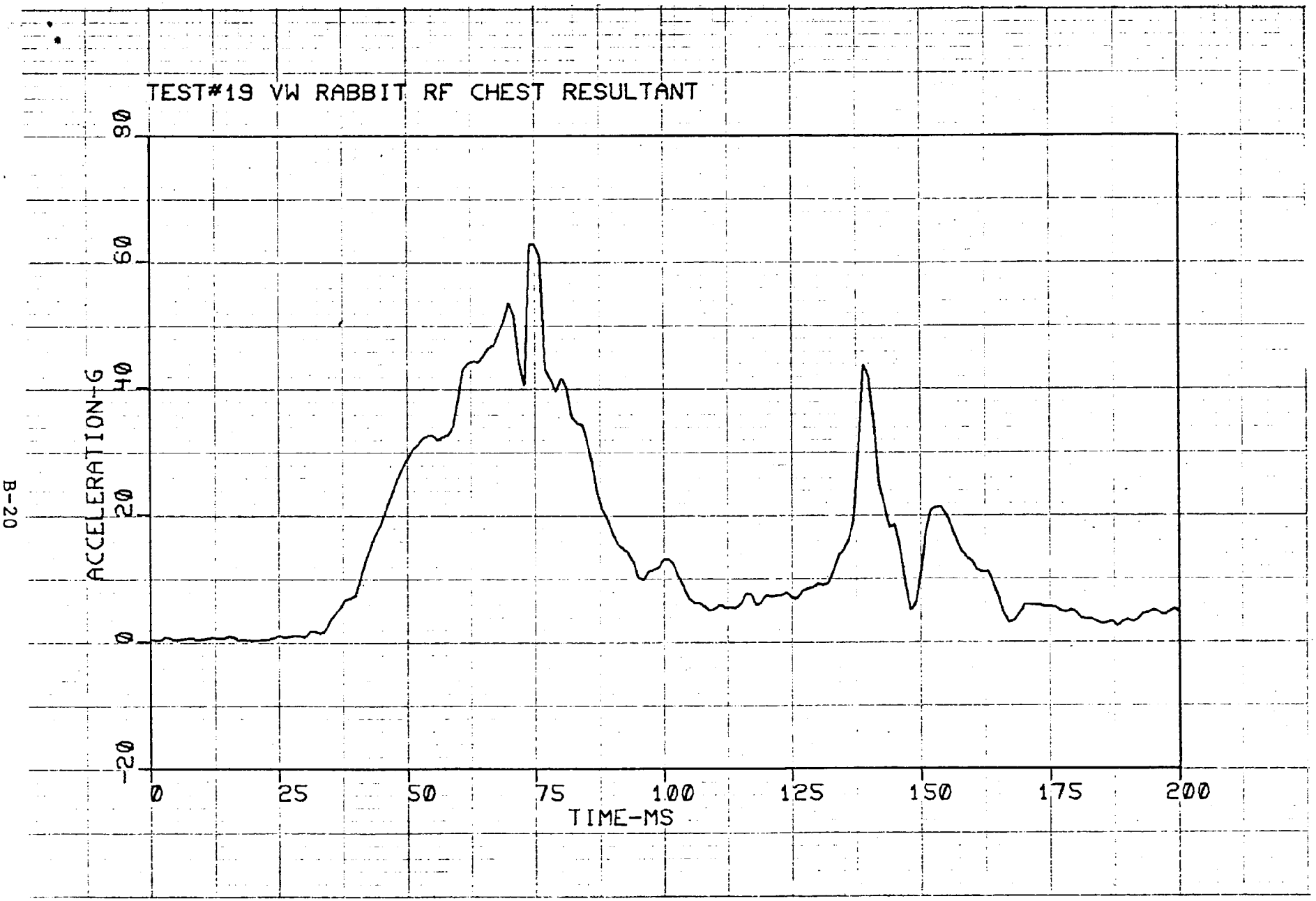
20
0
-20
-40
-60
0
25
50
75
100
125
150
175
200


TEST#19 VW RABBIT RF CHEST VERT
ACCELERATION-G
TIME-MS
0
25
50
75
100
125
150
175
200
-60
-40
-20
0
20
40


TEST#19 VW RABBIT RF CHEST RESULTANT
ACCELERATION-G
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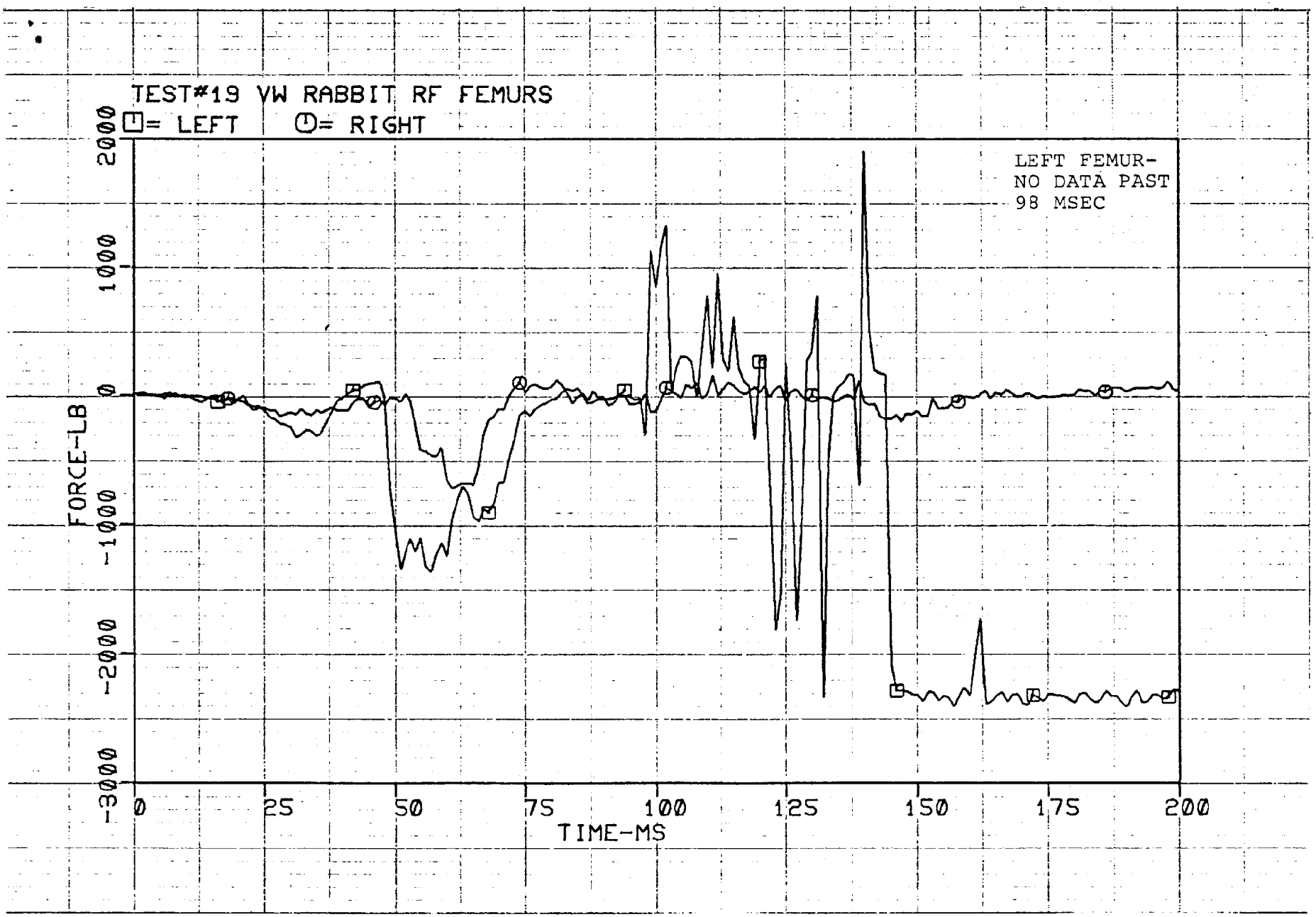
60
40
20
0
-20
0
25
50
75
100
125
150
175
200
TIME-MS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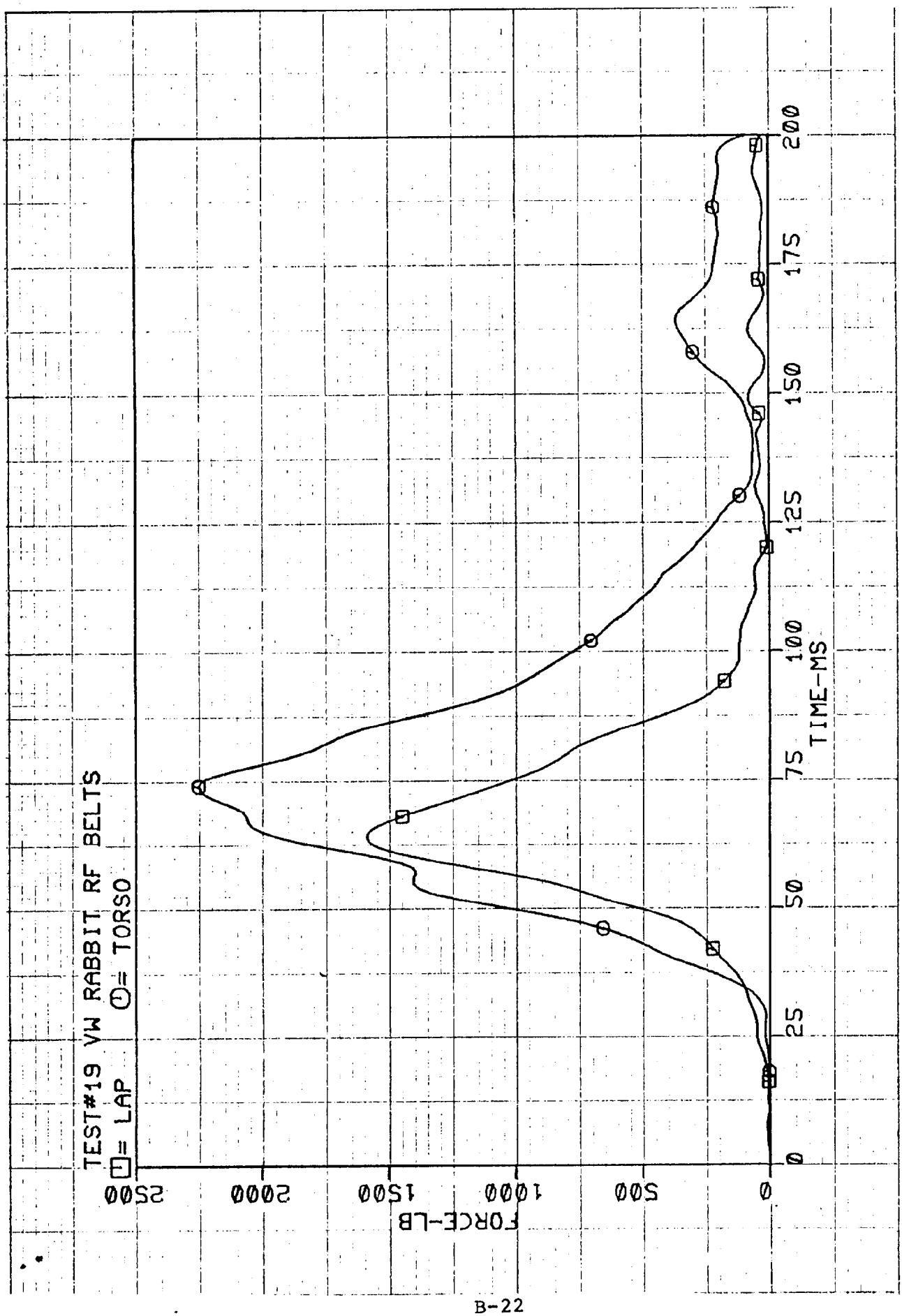
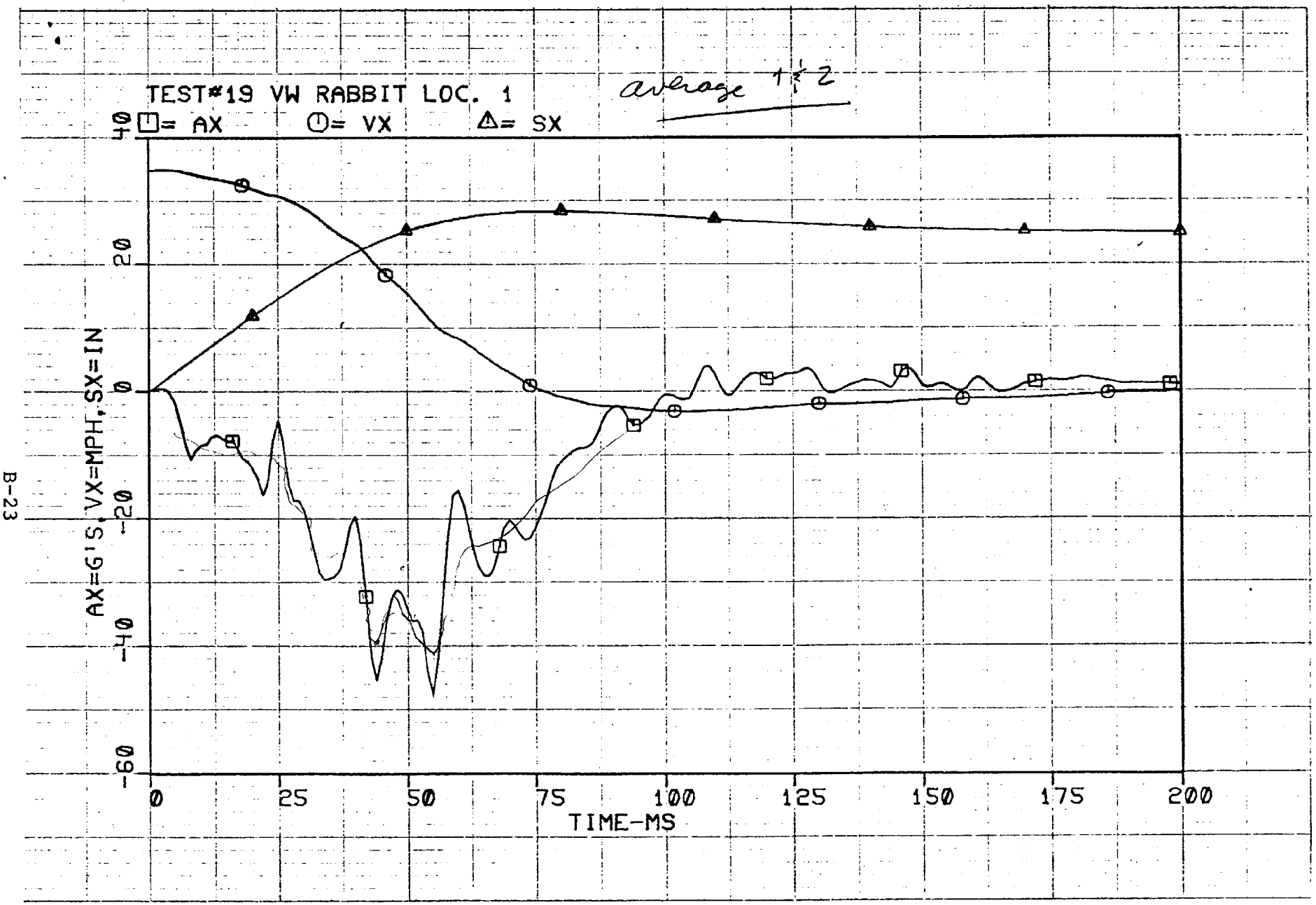
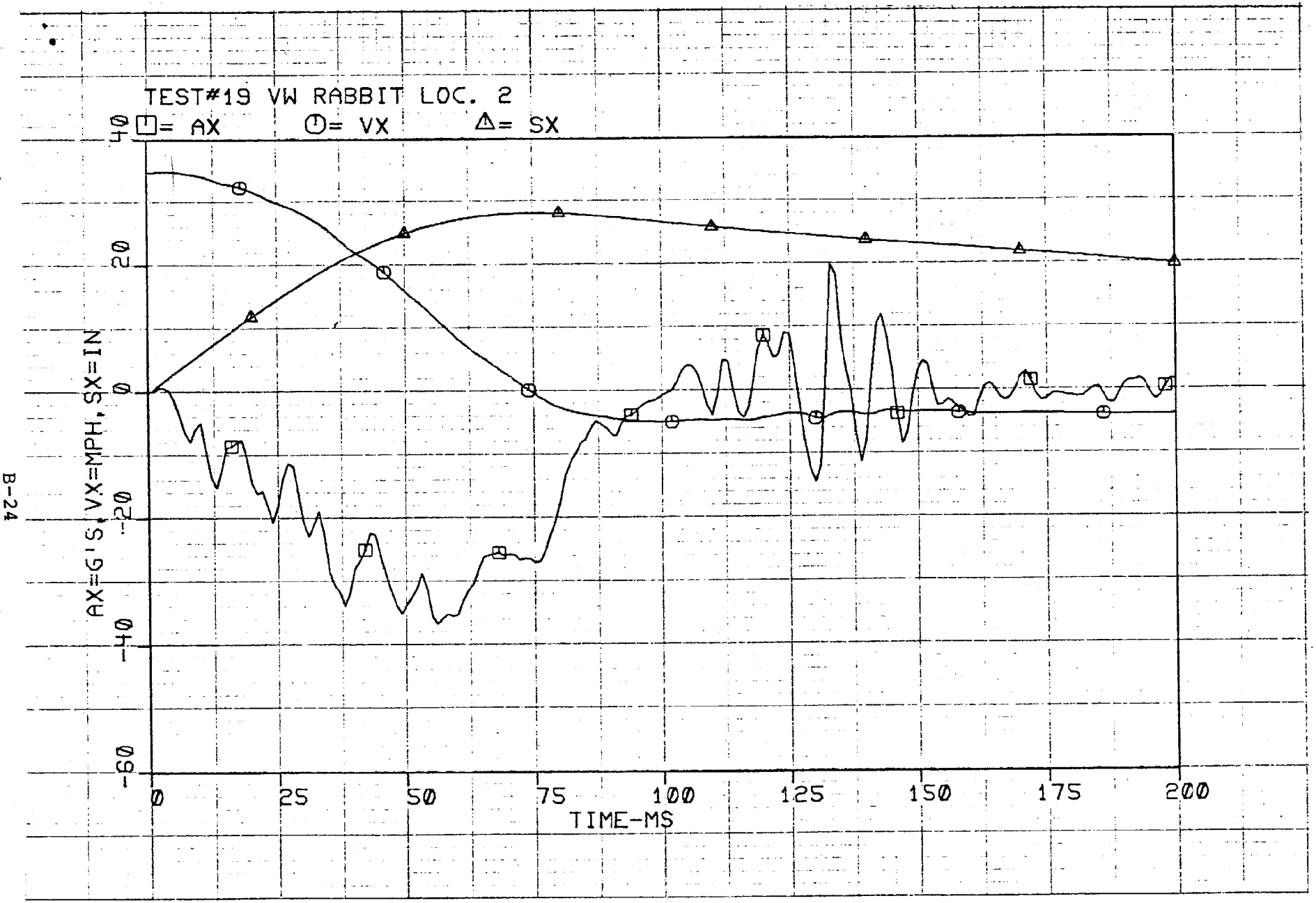
○= RIGHT
LEFT FEMUR-
NO DATA PAST
98 MSEC
FORCE-LB
2000
1000
0
-1000
-2000
-3000
0
25
50
75
100
125
150
175
200
TIME-MS


TEST#19 VW RABBIT RF BELTS
□= LAP ○= TORSO
FORCE-LB
0
500
1000
1500
2000
2500
TIME-MS
0
25
50
75
100
125
150
175
200


TEST#19 VW RABBIT LOC. 1
average 1 & 2
□= AX
○= VX
△= SX
AX=G'S, VX=MPH, SX=IN
40
20
0
-20
-40
-60
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
40
20
0
-20
-40
-60
0
25
50
75
100
125
150
175
200
TIME-MS

APPENDIX C

DUMMY CERTIFICATION DATA

PART 572 DUMMY CALIBRATION TEST DATA

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

Laboratory Technician: R. Bishop V. Agnihotri

		Pre-test Calibration	Post-test Calibration
Date of Dummy Calibration		5/20/80	6/10/80
Calibration Sequential Number for Dummy		24	30
Temperature in Lab. (Spec. = 66 to 78 °F)		74°	73°
Relative Humidity in Lab. (Spec. = 10 to 70%)			
Test Parameter	**Specification**		
1. Head Drop Test:			
a. Peak Resultant Accel	210 - 260G	221.1	214.63
b. Peak Lateral Accel	$\leq$ 10G	7.1	6.26
c. Time above 100G	0.9 - 1.5 ms	1.0	1.45
2. Neck Bending Test:			
a. Pendulum Speed	21.5 - 25.5 fps	21.9	22.1
b. Pendulum Avg Decel (over $t_3 - t_2$)	20 - 24G	22.2	23.34
c. Peak Resultant Head Acceleration	26G Maximum	21.7	23.62
d. Pendulum Decel ($t_2 - t_1$)	$\leq$ 3 ms	2.0	2.0
e. Pendulum Decel ($t_3 - t_2$)	25 - 30 ms	29.5	26.0
f. Pendulum Decel ($t_4 - t_3$)	$\leq$ 10 ms	3.0	3.0
g. Pendulum Direction Reversal Time	$\geq$ 123 ms		
h. Maximum Head Rotation	63 to 73°	72.6°	71.57°
i. Chordal Displacement:			
Head Rotation Angle			
0° Time	-2.0 - 2.0 ms	0.0	0.0
0° Displ	-0.5 - 0.5 in.	0.0	0.0
30° Time	25.6 - 34.4 ms	26.0	28.75
30° Displ	2.1 - 3.1 in.	2.3	2.38
60° Time	40.3 - 51.7 ms	41.0	46.5
60° Displ	4.3 - 5.3 in.	4.5	4.57
Maximum Time	53.2 - 66.8 ms	58.0	64.25
Maximum Displ	5.0 - 6.0 in.	5.3	5.35

PART 572 DUMMY CALIBRATION TEST DATA (CONTINUED)

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

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	76.0
	Displ	4.3 - 5.3 in.	4.4	4.57
30°	Time	85.4 - 104.6 ms	90.0	95.25
	Displ	2.1 - 3.1 in.	2.3	2.37
0°	Time	101.0 - 123.0 ms	105.0	110.25
	Displ	-0.5 - 0.5 in.	0.0	0.0
3. Abdominal Compression Test: (Preload = 10 pounds)				
a. Force at 0.5 in.		14 - 26 lb	18.5	21.99
b. Force at 0.75 in.		27 - 40 lb	28.9	32.99
c. Force at 1.0 in.		40 - 53 lb	44.0	50.36
d. Force at 1.3 in.		63 - 78 lb	63.7	76.98
4. Lumbar Flexion Test:				
a. Force at 20°		22 - 34 lb	27.2	25.5
b. Force at 30°		34 - 46 lb	41.7	39.4
c. Force at 40°		46 - 58 lb	48.6	47.5
d. Return Angle		12° Maximum	3.1°	4.0°
5. Chest Impact Tests:				
a. High Speed				
1) Probe Speed		21.78-22.22 fps	22.11	22.0
2) Peak Deflection		1.7 in. Maximum	1.592	1.592
3) Peak Resistive Force		2250 lb Maximum	1663.7	1672.98
4) Internal Hysteresis		50 - 70%	62.8%	62.7%
a. Low Speed				
1) Probe Speed		13.86-14.14 fps	13.99	13.95
2) Peak Deflection		1.1 in. Maximum	0.979	1.044
3) Peak Resistive Force		1450 lb Maximum	1007.6	1148.19
4) Internal Hysteresis		50 - 70%	66.4%	62.85%

PART 572 DUMMY CALIBRATION TEST DATA (CONTINUED)

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

Test Parameter	Specification	Pre-test Calibration	Post-test Calibration
6. Knee Impact Tests:			
a. Right Side			
1) Probe Speed	6.76 - 7.04 fps	6.8	6.86
2) Maximum Force	1850 - 2500 lb	2000.3	2170.35
3) Time >1000 lb	1.7 ms Minimum	1.75	2.0
a. Left Side			
1) Probe Speed	6.76 - 7.04 fps	6.8	6.85
2) Maximum Force	1850 - 2500 lb	2357.7	2263.39
3) Time >1000 lb	1.7 ms Minimum	2.0	1.85

PART 572 DUMMY CALIBRATION TEST DATA

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

Laboratory Technician: R. Bishop V. Agnihotri

		Pre-test Calibration	Post-test Calibration
Date of Dummy Calibration		5/20/80	6/10/80
Calibration Sequential Number for Dummy		22	28
Temperature in Lab. (Spec. = 66 to 78 °F)		74°	73°
Relative Humidity in Lab. (Spec. = 10 to 70%)			
Test Parameter	**Specification**		
1. Head Drop Test:			
a. Peak Resultant Accel	210 - 260G	243.6	252.20
b. Peak Lateral Accel	$\leq$ 10G	5.3	3.13
c. Time above 100G	0.9 - 1.5 ms	1.0	1.4
2. Neck Bending Test:			
a. Pendulum Speed	21.5 - 25.5 fps	21.9	22.0
b. Pendulum Avg Decel (over $t_3 - t_2$)	20 - 24G	22.0	22.54
c. Peak Resultant Head Acceleration	26G Maximum	19.7	19.68
d. Pendulum Decel ($t_2 - t_1$)	$\leq$ 3 ms	2.0	2.25
e. Pendulum Decel ($t_3 - t_2$)	25 - 30 ms	26.0	25.25
f. Pendulum Decel ($t_4 - t_3$)	$\leq$ 10 ms	5.0	7.0
g. Pendulum Direction Reversal Time	$\geq$ 123 ms		
h. Maximum Head Rotation	63 to 73°	71.02°	72.96°
i. Chordal Displacement:			
Head Rotation Angle			
0° Time	-2.0 - 2.0 ms	0.0	0.0
0° Displ	-0.5 - 0.5 in.	0.0	0.0
30° Time	25.6 - 34.4 ms	28.5	30.0
30° Displ	2.1 - 3.1 in.	2.4	2.30
60° Time	40.3 - 51.7 ms	46.5	47.25
60° Displ	4.3 - 5.3 in.	4.6	4.44
Maximum Time	53.2 - 66.8 ms	58.5	66.5
Maximum Displ	5.0 - 6.0 in.	5.4	5.28

PART 572 DUMMY CALIBRATION TEST DATA (CONTINUED)

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

Test Parameter		Specification	Pre-test Calibration	Post-test Calibration
2. Neck Bending Test: (Continued)				
Head Rotation Angle				
60°	Time	67.0 - 83.0 ms	74.0	80.5
	Displ	4.3 - 5.3 in.	4.6	4.43
30°	Time	85.4 - 104.6 ms	91.0	98.2
	Displ	2.1 - 3.1 in.	2.4	2.29
0°	Time	101.0 - 123.0 ms	108.0	114.25
	Displ	-0.5 - 0.5 in.	0.0	0.0
3. Abdominal Compression Test: (Preload = 10 pounds)				
a. Force at 0.5 in.		14 - 26 lb	19.7	19.45
b. Force at 0.75 in.		27 - 40 lb	28.9	31.87
c. Force at 1.0 in.		40 - 53 lb	42.3	47.0
d. Force at 1.3 in.		63 - 78 lb	66.6	74.0
4. Lumbar Flexion Test:				
a. Force at 20°		22 - 34 lb	31.8	27.78
b. Force at 30°		34 - 46 lb	41.7	40.52
c. Force at 40°		46 - 58 lb	50.9	47.46
d. Return Angle		12° Maximum	6.7°	8.0°
5. Chest Impact Tests:				
a. High Speed				
1) Probe Speed		21.78-22.22 fps	22.1	22.06
2) Peak Deflection		1.7 in. Maximum	1.545	1.561
3) Peak Resistive Force		2250 lb Maximum	1687.0	1661.52
4) Internal Hysteresis		50 - 70%	56.0%	61.1%
a. Low Speed				
1) Probe Speed		13.86-14.14 fps	14.0	13.95
2) Peak Deflection		1.1 in. Maximum	0.959	1.076
3) Peak Resistive Force		1450 lb Maximum	1031.0	1054.46
4) Internal Hysteresis		50 - 70%	64.0%	58.15%

PART 572 DUMMY CALIBRATION TEST DATA (CONTINUED)

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

Test Parameter	Specification	Pre-test Calibration	Post-test Calibration
6. Knee Impact Tests:			
a. Right Side			
1) Probe Speed	6.76 - 7.04 fps	6.8	6.85
2) Maximum Force	1850 - 2500 lb	1970.0	1936.62
3) Time >1000 lb	1.7 ms Minimum	2.0	2.0
a. Left Side			
1) Probe Speed	6.76 - 7.04 fps	6.8	6.86
2) Maximum Force	1850 - 2500 lb	2027.6	1949.03
3) Time >1000 lb	1.7 ms Minimum	1.75	1.9

Dynamic Science Report No.
3102-80-123A

(428 copy)

BARRIER IMPACT LOAD DATA
1980 VOLKSWAGEN RABBIT
NHTSA 800541

Prepared by:

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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

TABLE OF CONTENTS

1.0 INTRODUCTION

This report is an addendum to Report No. 301-DYS-80-013 and presents the barrier load measurement data acquired in testing a 1980 Volkswagen Rabbit Diesel (NHTSA No. 800541).

Barrier impact speed was 34.93 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.

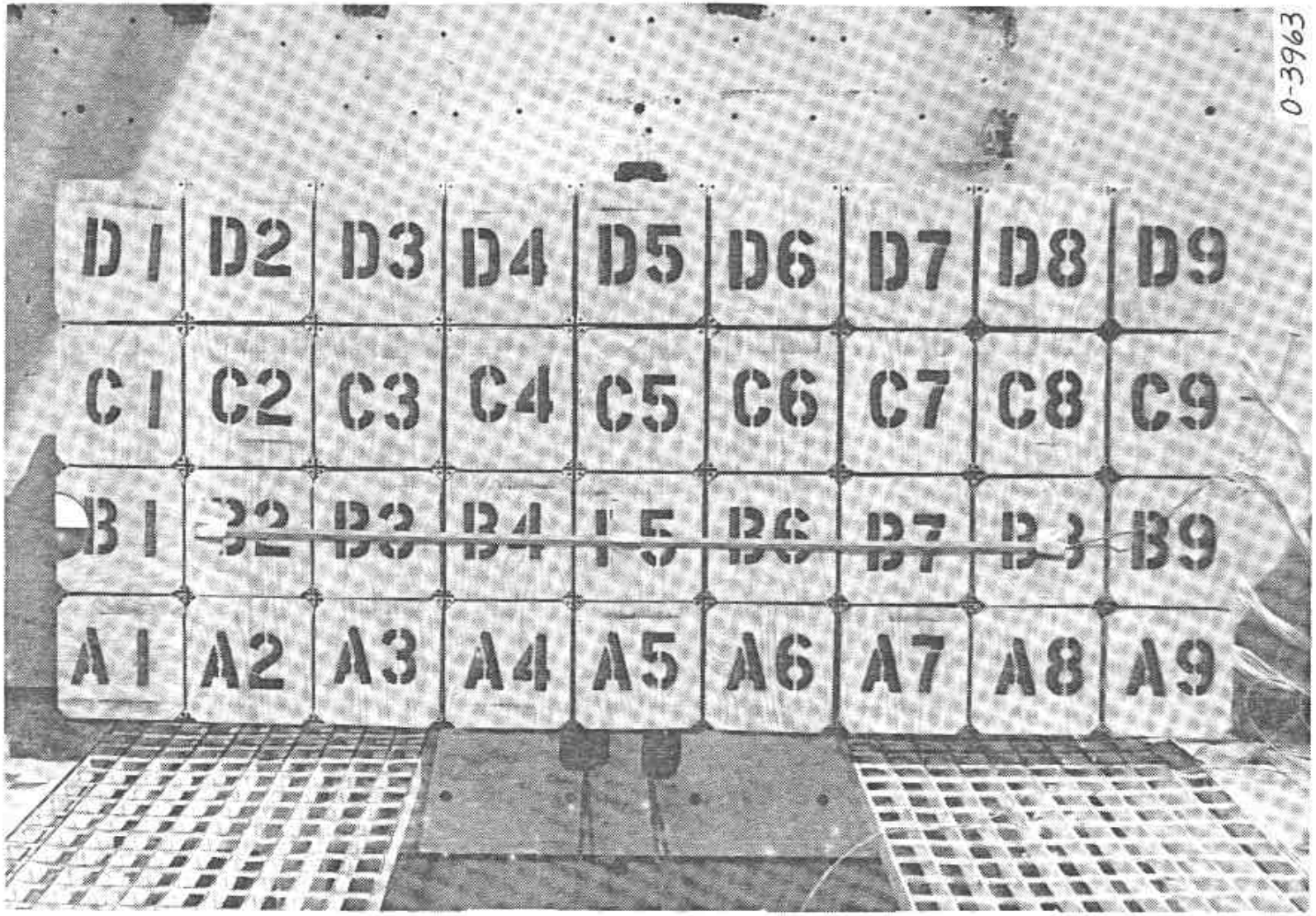
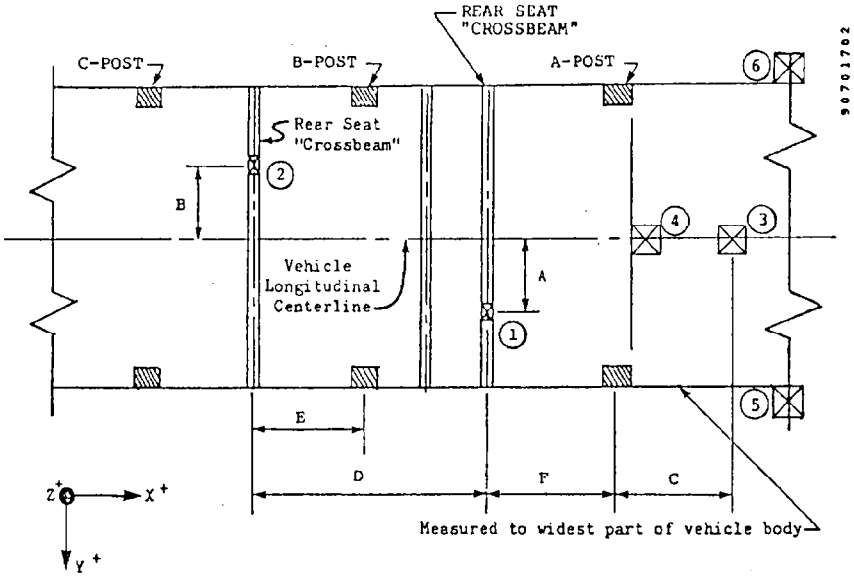


Figure 2-1. Load Cell Barrier Face.

TEST VEHICLE ACCELEROMETER LOCATION DEFINITION AND DATA SUMMARY

Dim.	Length (in.)
A	11.0
B	24.5
C	26.3
D	2.8
E	17.5
F	32.0



No.	Location Description	Component Direction X	Y	Z	Data Summary Peak G @ msec X "+"	X "−"	Y "+"	Y "−"	Z "+"	Z "−"
1	Below front seat area	✓			4.0 @107	-47.7 @54	@	@	@	@
2	Below rear seat area	✓			19.9 @132	-36.6 @55	@	@	@	@
3	Engine top	✓			40.3 @45	-159.2 @108	@	@	@	@
4	Engine bottom	✓			33.0 @44	-98.0 @36	@	@	@	@
5	RF brake caliper	✓			76.1 @63	-112.0 @49	@	@	@	@
6	LF brake caliper	✓			40.1 @56	-96.9 @41	@	@	@	@

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

TEST VEHICLE INFORMATION:

Vehicle Manufacturer: Volkswagenwerk AG, West Germany
Make/Model: Volkswagen Rabbit
Body Style: 2-door Convertible — Model Year: 1980
VIN: 15A0805394 — Build Date: 12/79
NHTSA No.: 800541 — Color: White
Engine Data: 4 cylinders; 97 in.^{3} displacement
Transmission Data: 5 speed (X) Manual ( ) Automatic
Date Vehicle Received by Laboratory: March 1, 1980
Dealer Name & Address: VW West
1325 N. Lemon, Anaheim, Calif.

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

Vehicle Manufactured By: Volkswagenwerk AG, West Germany
Date of Manufacture: 12/79 ; VIN: 15A0805394
GVWR: 2866 lb; GAWR: Front = 1609 lb; Rear = 1323 lb

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

Vehicle Load:	FRONT	REAR	RECOMMENDED TIRE SIZE:	LOAD RANGE:
Up to Capacity	27 psi	31 psi		
Vehicle Capacity:			155SR13-175/70SR13	B

Type of Seats - ___ Bench, X Bucket, ___ Split Bench
Number of Occupants (Designated Seating Capacity) = 2 Front, 2 Rear, 4 Total

CARGO LOAD = 262 lb
TOTAL = 862 lb

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

Right Front = 653 lb — Right Rear = 399 lb
Left Front = 663 lb — Left Rear = 457 lb
TOTAL FRONT WEIGHT = 1316 lb (61 % of Total Vehicle Weight)
TOTAL REAR WEIGHT = 856 lb (39 % of Total Vehicle Weight)
TOTAL DELV. WEIGHT = 2172 lb

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 262 lb CARGO:

Right Front = 749 lb — Right Rear = 636 lb
Left Front = 736 lb — Left Rear = 646 lb
TOTAL FRONT WEIGHT = 1485 lb (54 % of Total Vehicle Weight)
TOTAL REAR WEIGHT = 1282 lb (46 % of Total Vehicle Weight)
TOTAL TEST WEIGHT = 2767 lb

Weight of ballast secured in vehicle trunk area = 262 lb

TARGET WEIGHT = CARGO LOAD + UDW + 164 (NO. OF DUMMIES) = 2762 lb

POST IMPACT DATA

TYPE OF TEST: X Frontal (90°) Impact

___ Oblique (___°) Impact on ___ Left (Driver's) Side
___ Right Side

___ Lateral or Side Impact on ___ Left (Driver's) Side
___ Right Side

___ Rear Impact

DATE OF TEST: June 9, 1980 ; TIME: 1130 ; TEMP: 100 ° F

NHTSA NO.: 800541 ; VIN: 15A0805394

REQUIRED VEHICLE VELOCITY RANGE: 34.5 to 35.5 mph

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

Primary = 34.93 mph; Secondary = 34.92 mph

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

exiting the vehicle velocity measurement device = 1.0 ft

VEHICLE STATIC CRUSH:

(For Frontal and Rear Impacts Only)

Driver's Side = 22.2 in.; Passenger's Side = 22.7 in.

Average = 22.45 in.

Crush Details: Symmetric crush to "A" pillar. Deformation of floorpan. Front wheels pinned.

(For Side Impacts Only)

Amount of Crush = _____ in. on _____ side

Crush Details: _____

VEHICLE REBOUND:

(From rigid barrier only)

Driver's Side = 7.5 in.; Passenger's Side = 7.3 in.

Average = 7.4 in.

REMARKS: The metal bumper is covered at each end with 2-inch rubber strips that are 8 inches long ending with a 5-inch-wide strip that covers the outer 7 inches of the bumper.

VEHICLE PROFILE DATA SHEET

Vehicle: 1980 Volkswagen Rabbit Convertible D.S. No.: 1046

Test Date: June 9, 1980

Measurement Date: Pre-test: June 9, 1980 Post-test June 10, 1980

Exterior Measurements Referenced to Plane: 14 feet Forward of: Rear bumper

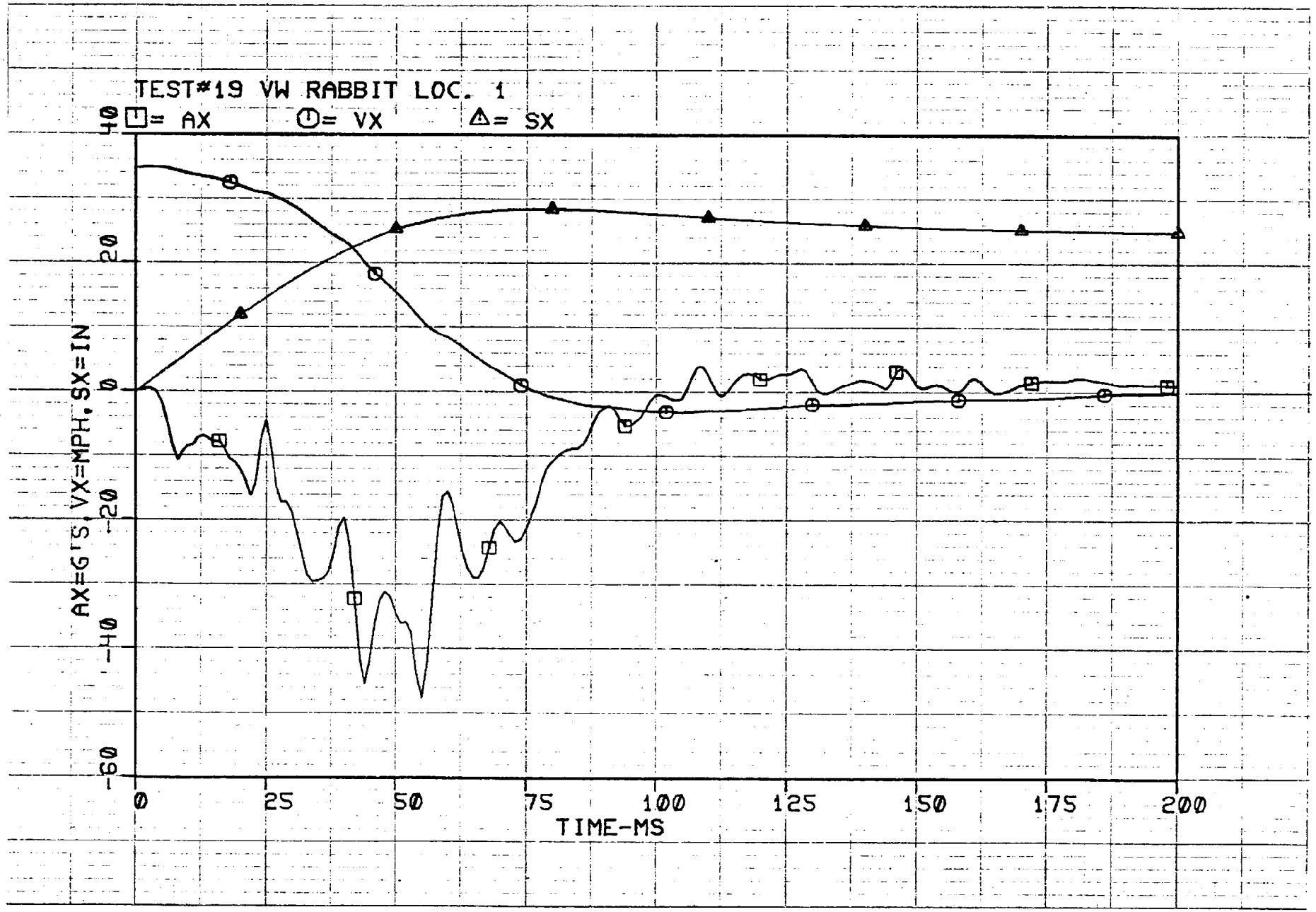
Location	Height	Vehicle Left (in.) 30	24	18	12	6	0	Vehicle Right (in.) 6	12	18	24	30
Pre-test Profile (in.)												
Top of Front Bumper	20.5	-	14.2	13.9	13.6	13.4	13.4	13.5	13.7	14.1	14.4	-
Front of Hood	29.1	-	19.8	19.2	18.9	18.6	18.5	18.7	18.9	19.3	19.8	-
Post-test Profile (in.)												
Top of Front Bumper	19.2	-	36.4	36.2	36.2	36.3	36.3	36.4	36.6	36.7	37.1	-
Front of Hood*	26.7	-	37.1	36.6	36.6	36.7	36.8	36.9	36.9	37.2	37.6	-
Post-test Static Crush (in.)												
Top of Front Bumper	1.3	-	22.2	22.3	22.6	22.9	22.9	22.9	22.9	22.6	22.7	-
Front of Hood	2.4	-	17.3	17.4	17.7	18.1	18.3	18.2	18.0	17.9	17.8	-

*Estimated value due to hood removal for rollover portion of test.

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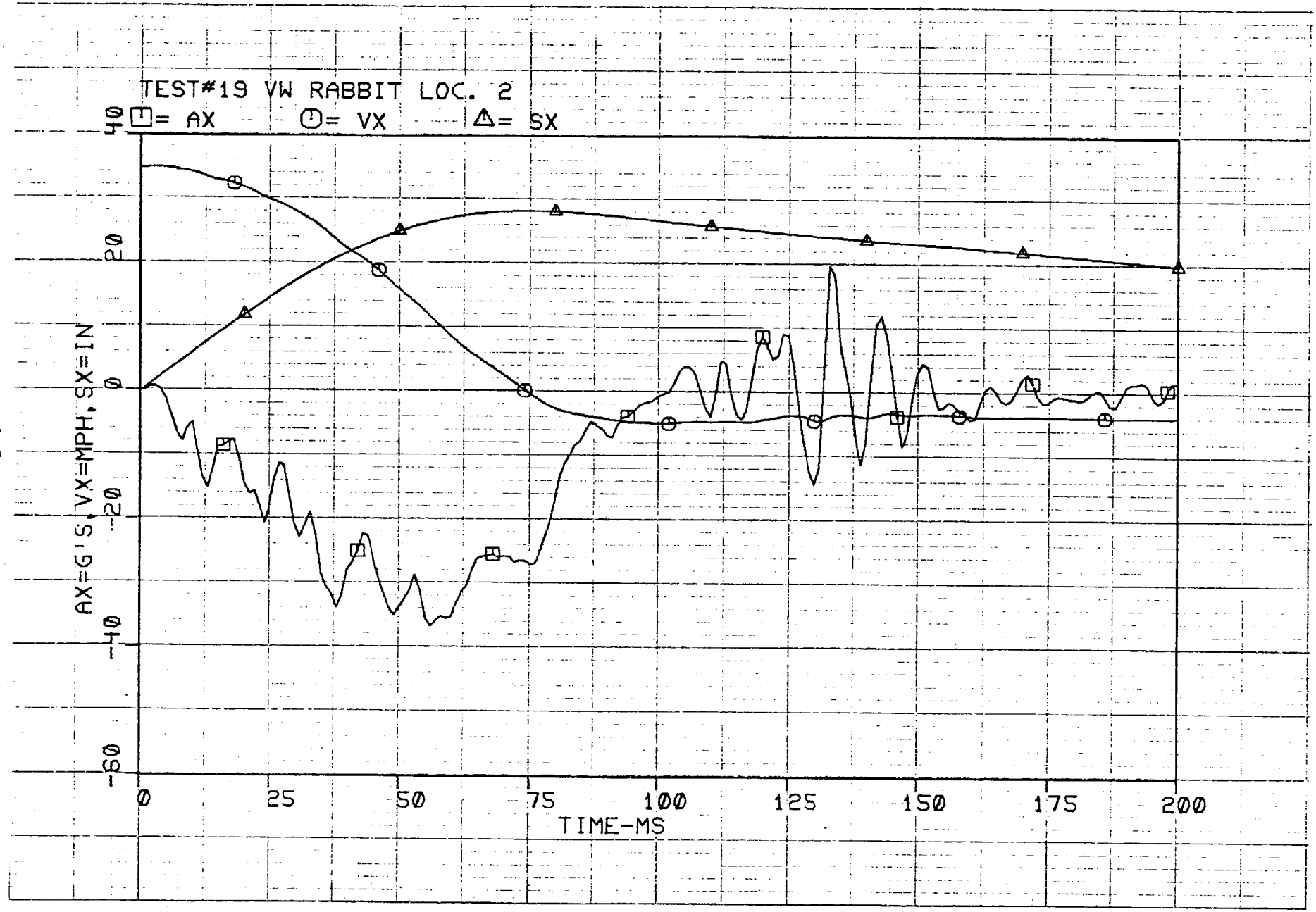
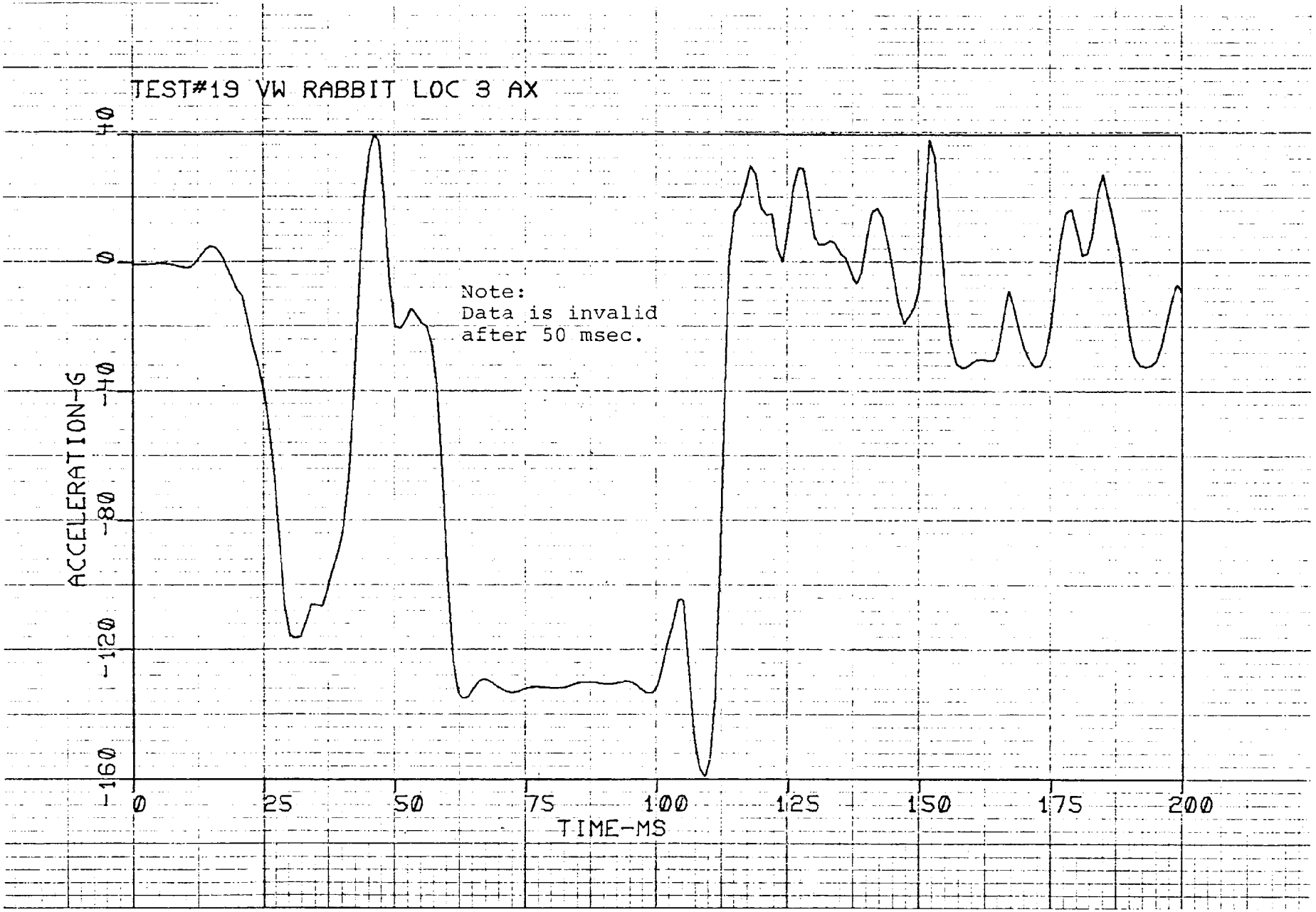
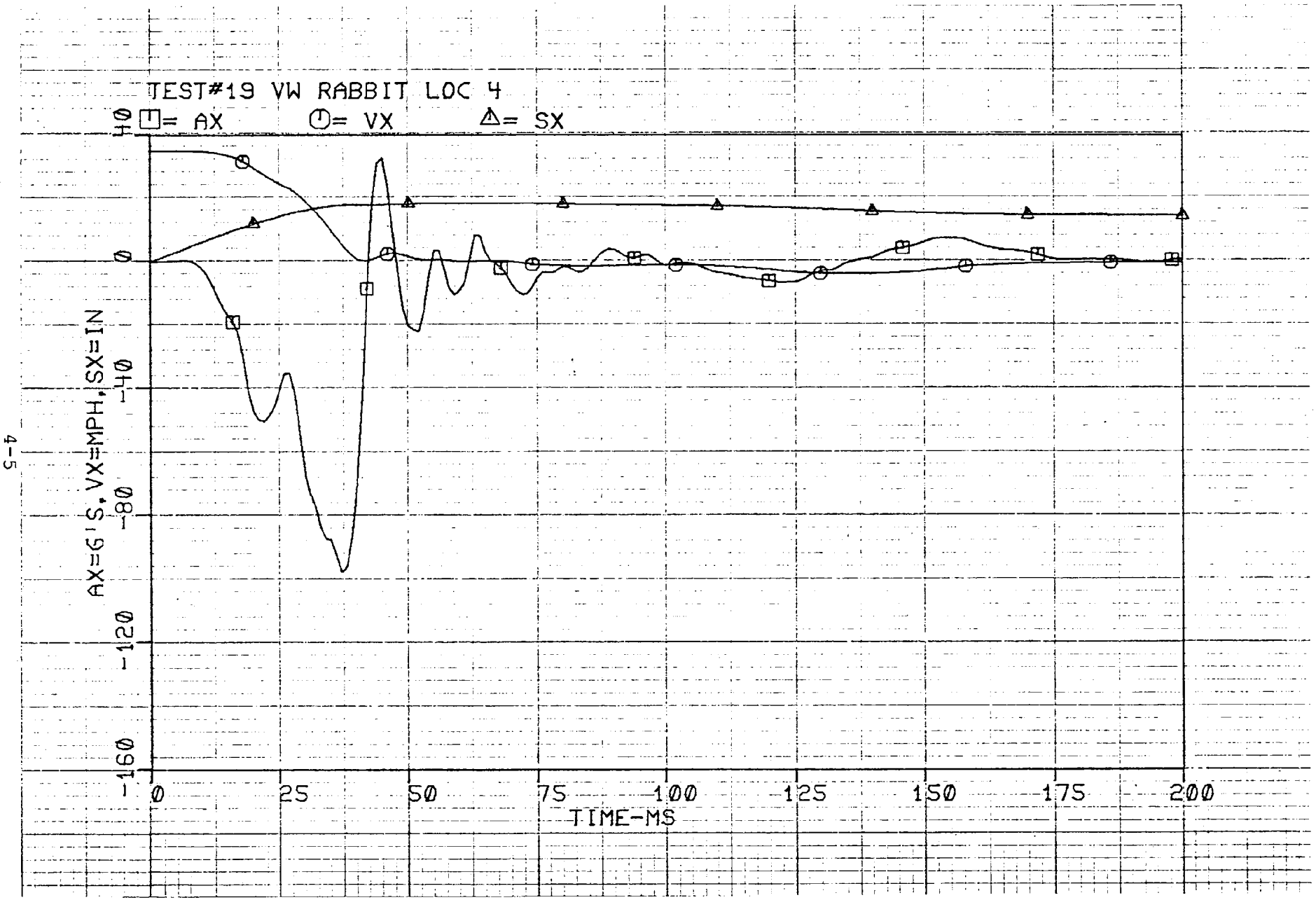
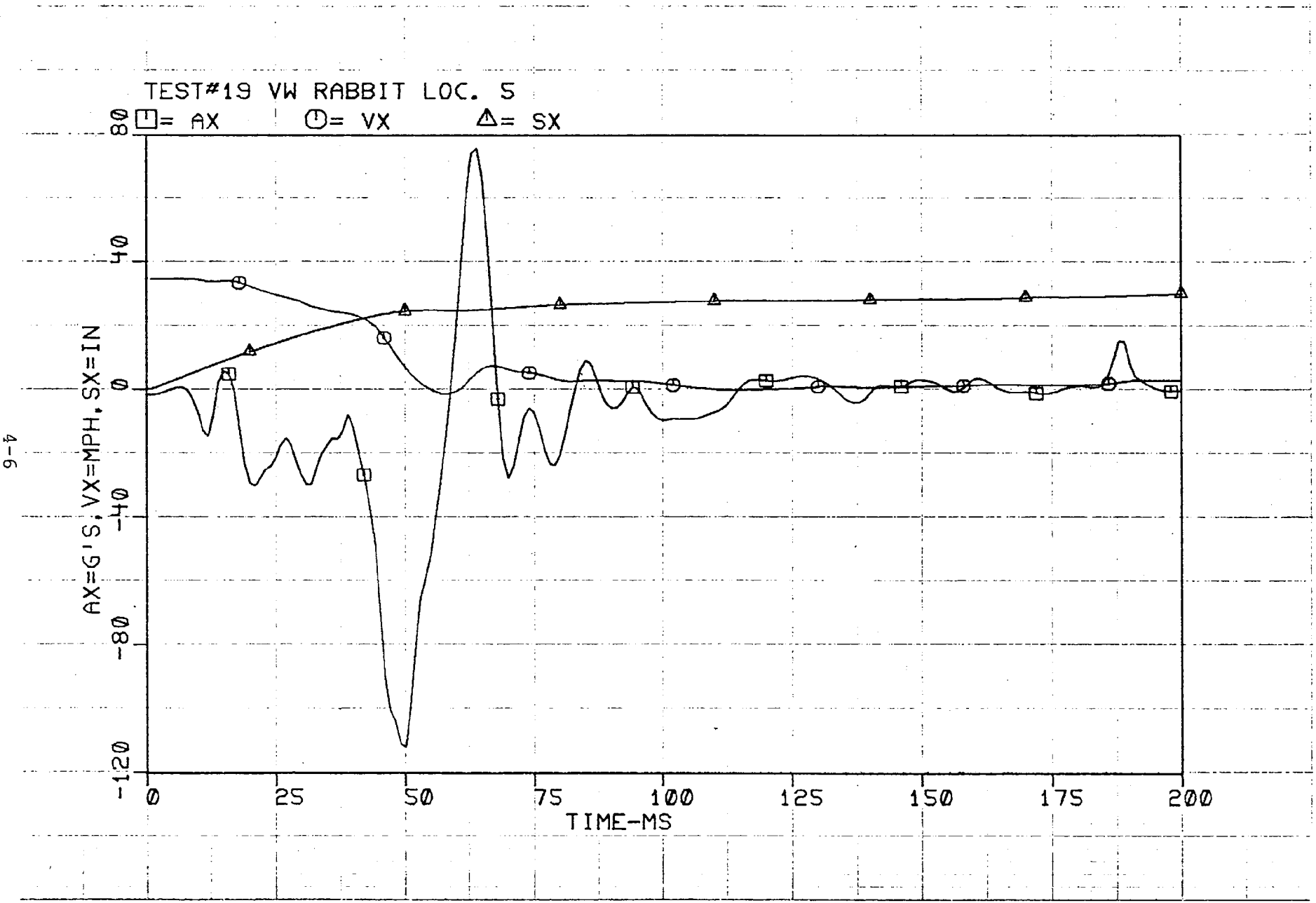
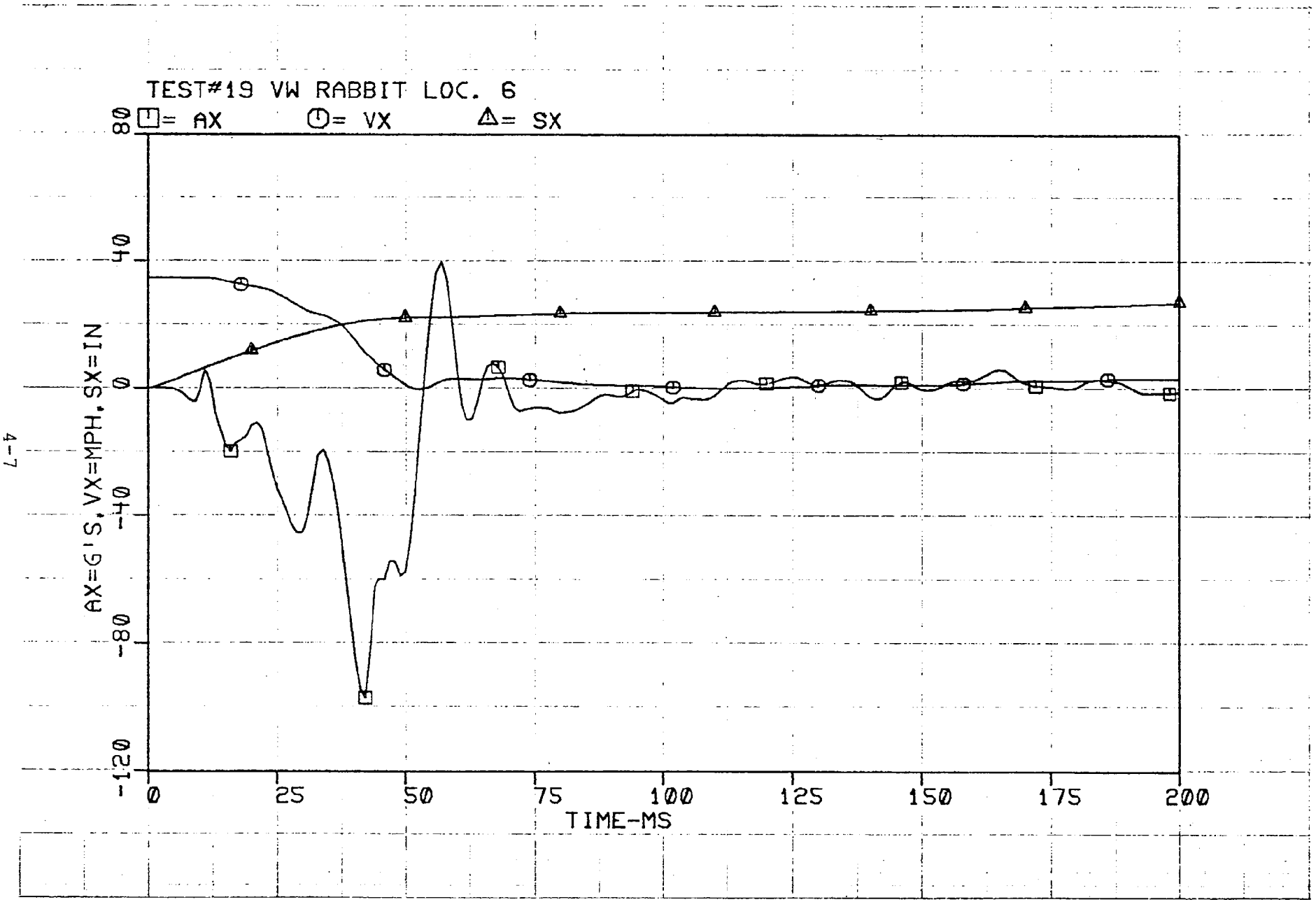
□= AX
○= VX
△= SX
AX=G'S, VX=MPH, SX=IN
40
20
0
-20
-40
-60
0
25
50
75
100
125
150
175
200
TIME-MS

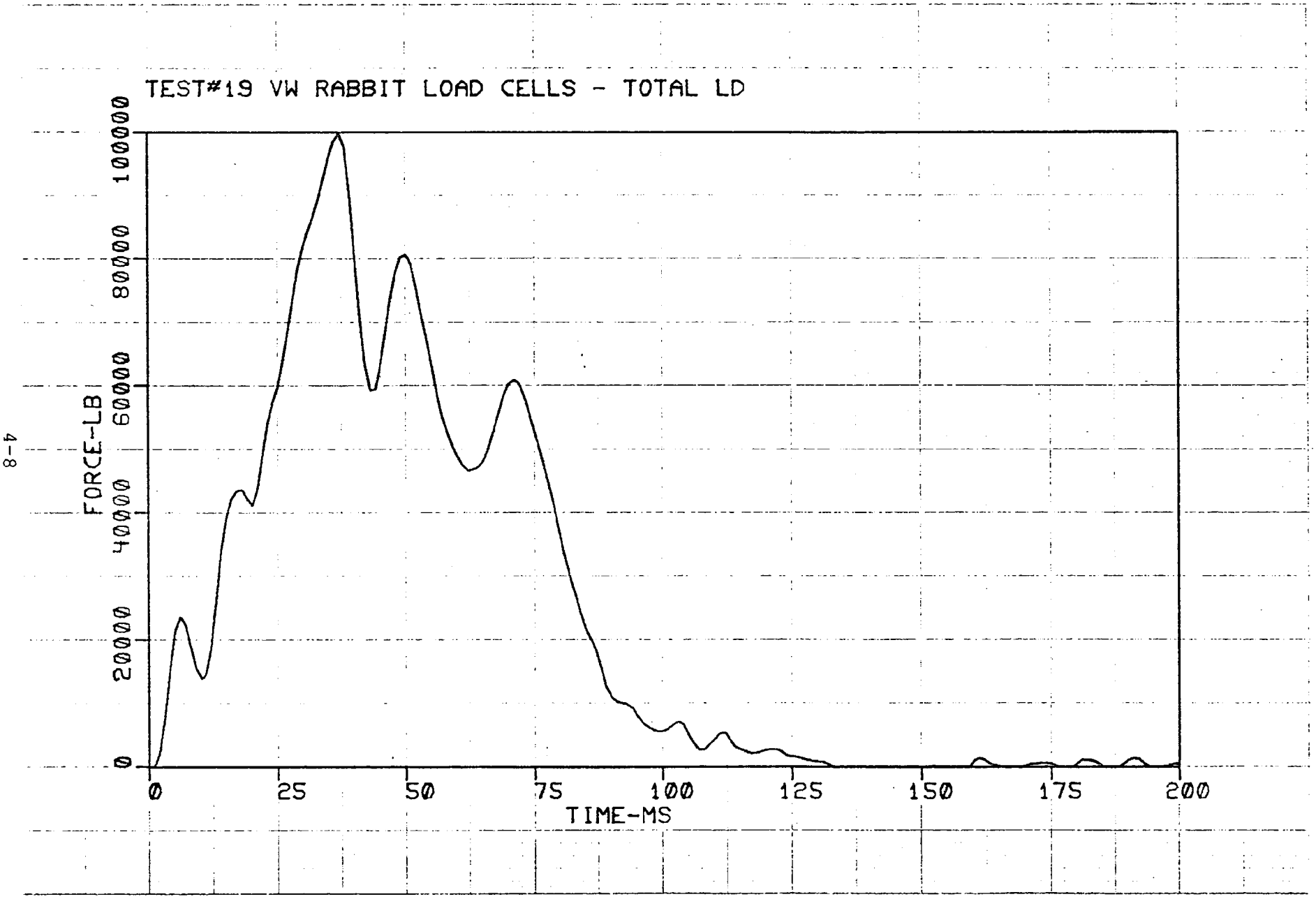

TEST#19 VW RABBIT LOC. 2
□= AX
○= VX
△= SX
AX=G'S, VX=MPH, SX=IN
40
20
0
-20
-40
-60
0
25
50
75
100
125
150
175
200
TIME-MS

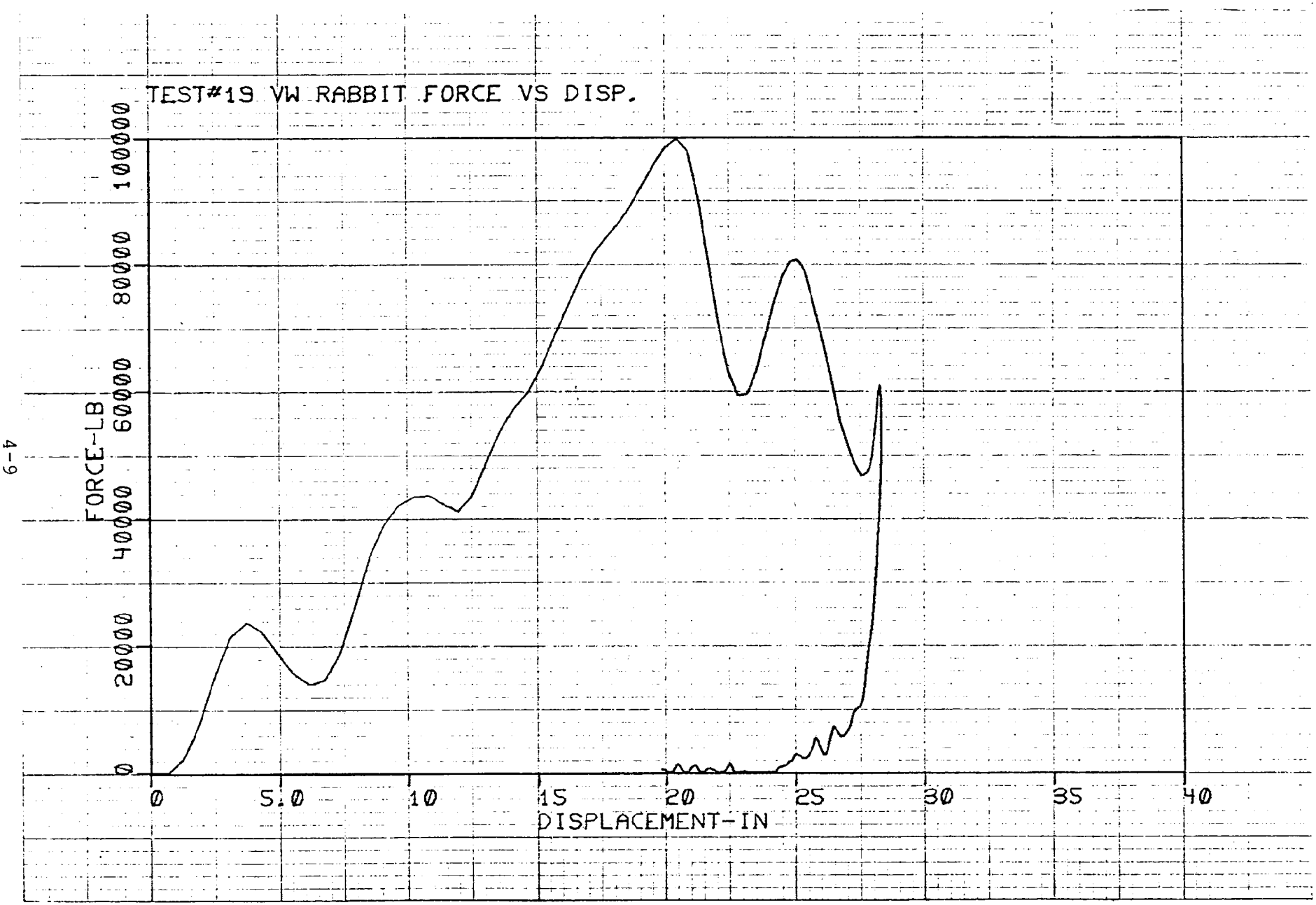

TEST#19 VW RABBIT LOC 3 AX
40
0
-40
-80
-120
-160
ACCELERATION-G
Note:
Data is invalid
after 50 msec.
0
25
50
75
100
125
150
175
200
TIME-MS

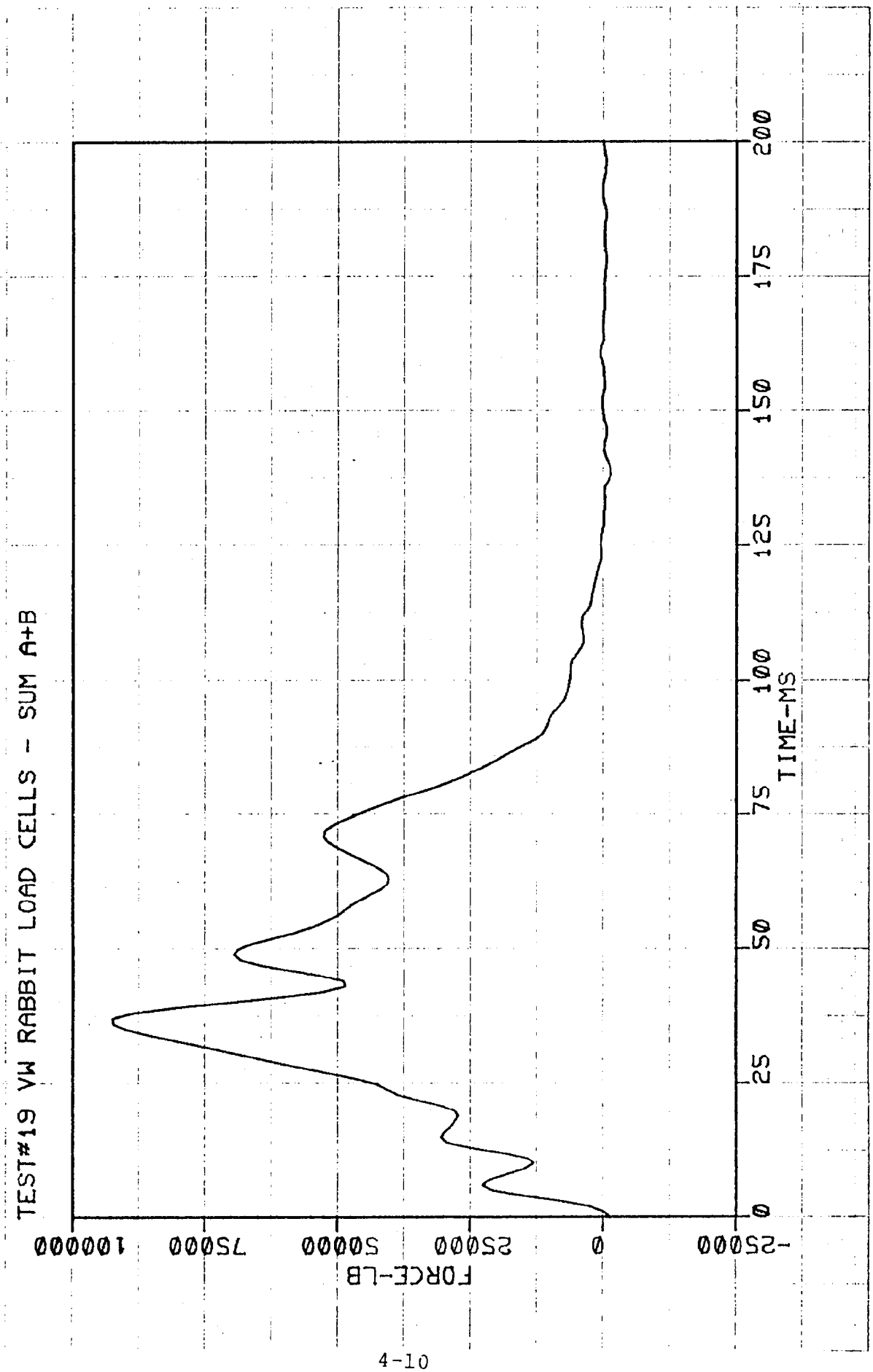

TEST#19 VW RABBIT LOC 4
□= AX
○= VX
△= SX
AX=G'S, VX=MPH, SX=IN
40
0
-40
-80
-120
-160
0
25
50
75
100
125
150
175
200
TIME-MS

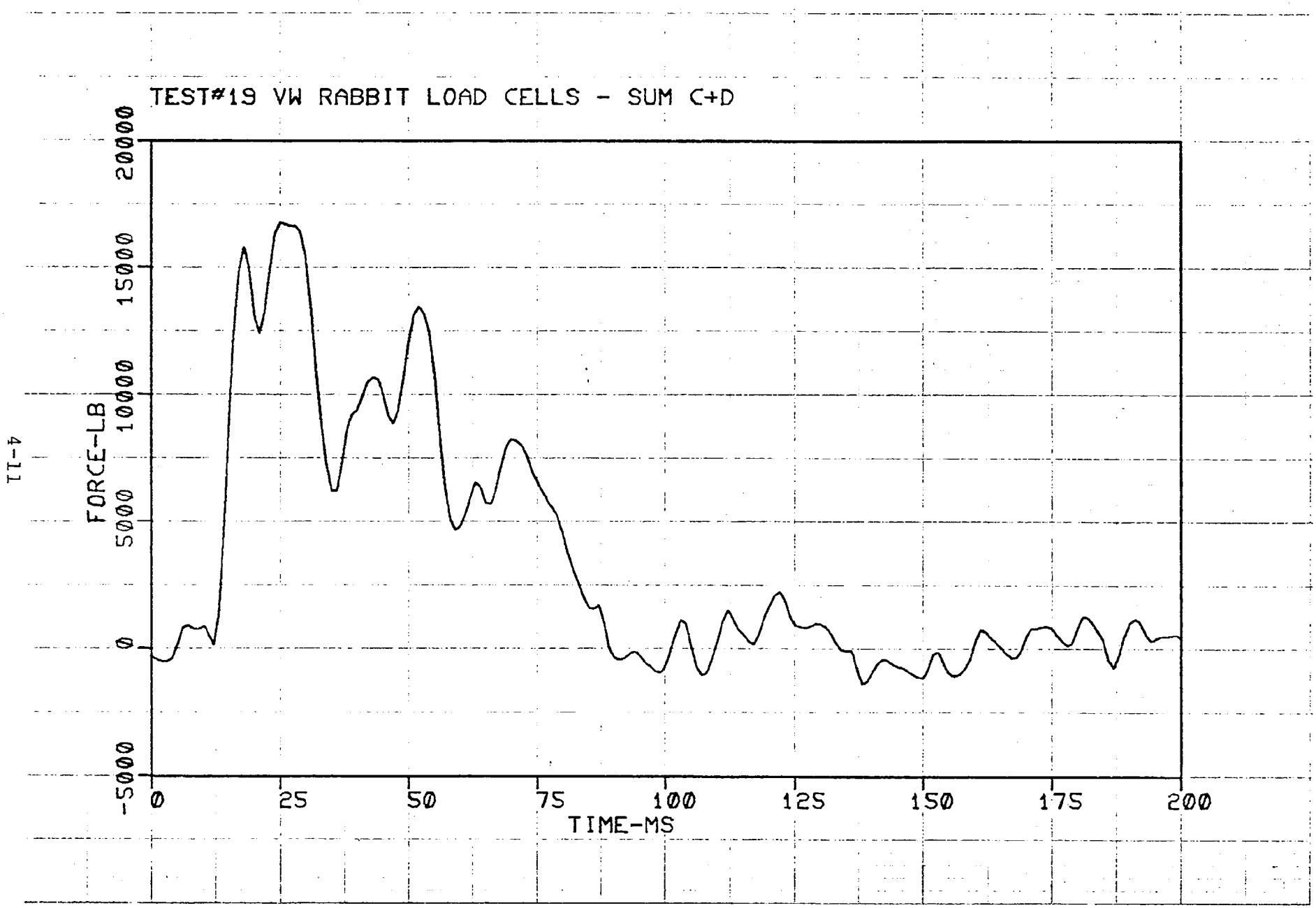

TEST#19 VW RABBIT LOC. 5
□= AX
⊙= VX
△= SX
AX=G'S, VX=MPH, SX=IN
80
40
0
-40
-80
-120
0
25
50
75
100
125
150
175
200
TIME-MS

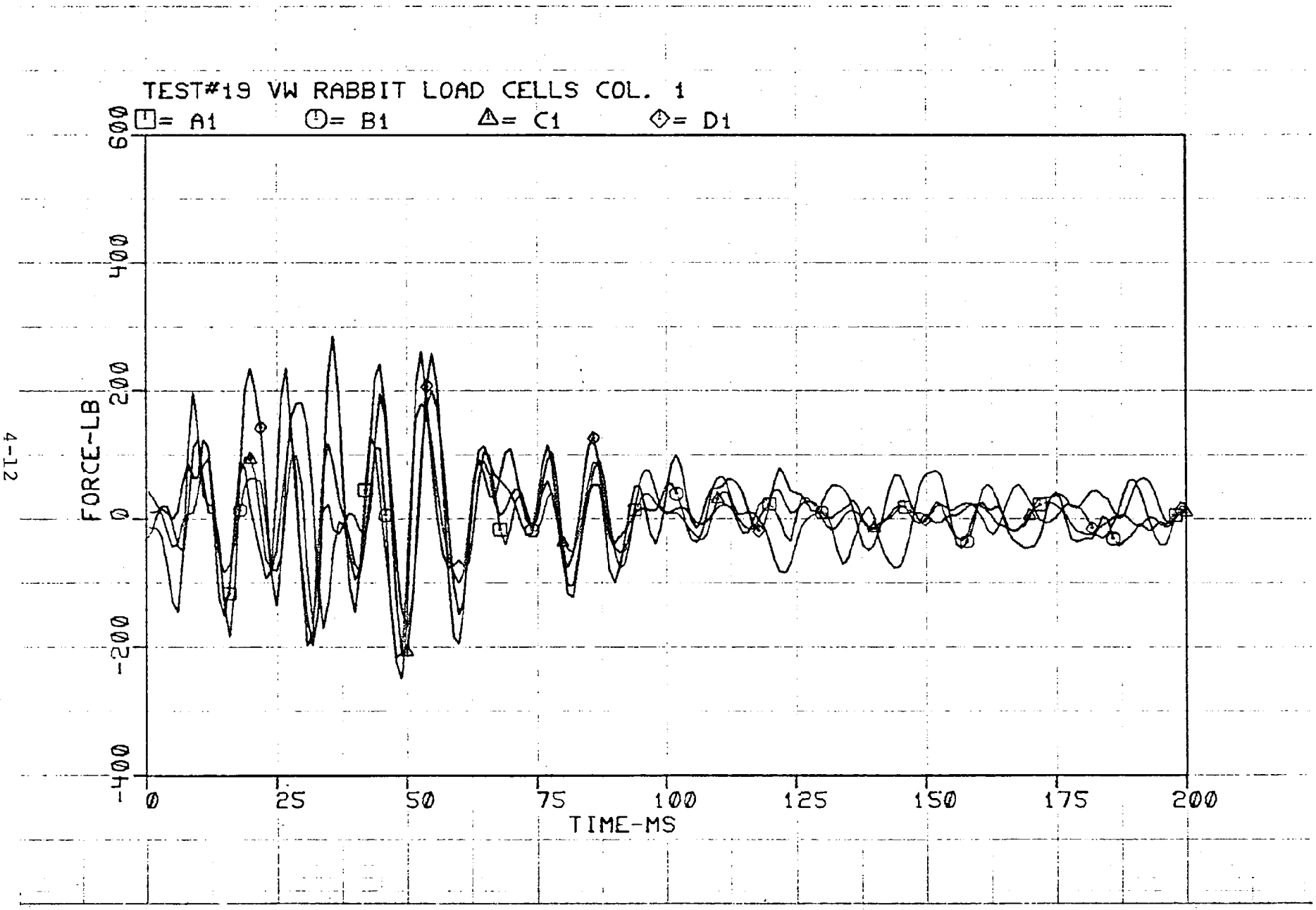

TEST#19 VW RABBIT LOC. 6
□= AX
○= VX
△= SX
80
40
0
-40
-80
-120
AX=G'S, VX=MPH, SX=IN
0
25
50
75
100
125
150
175
200
TIME-MS

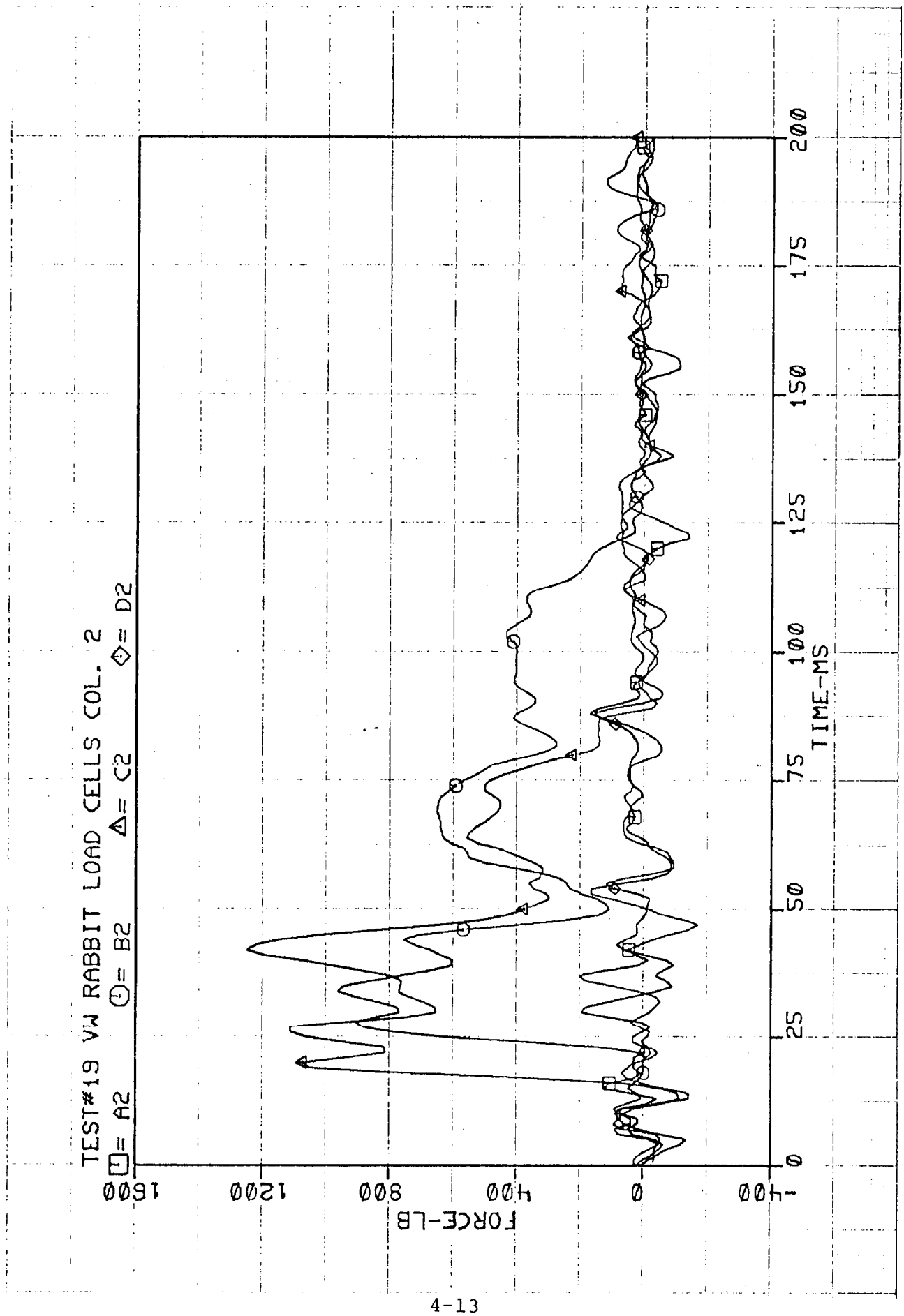

TEST#19 VW RABBIT LOAD CELLS - TOTAL LD
FORCE-LB
0
20000
40000
60000
80000
100000
0
25
50
75
100
125
150
175
200
TIME-MS

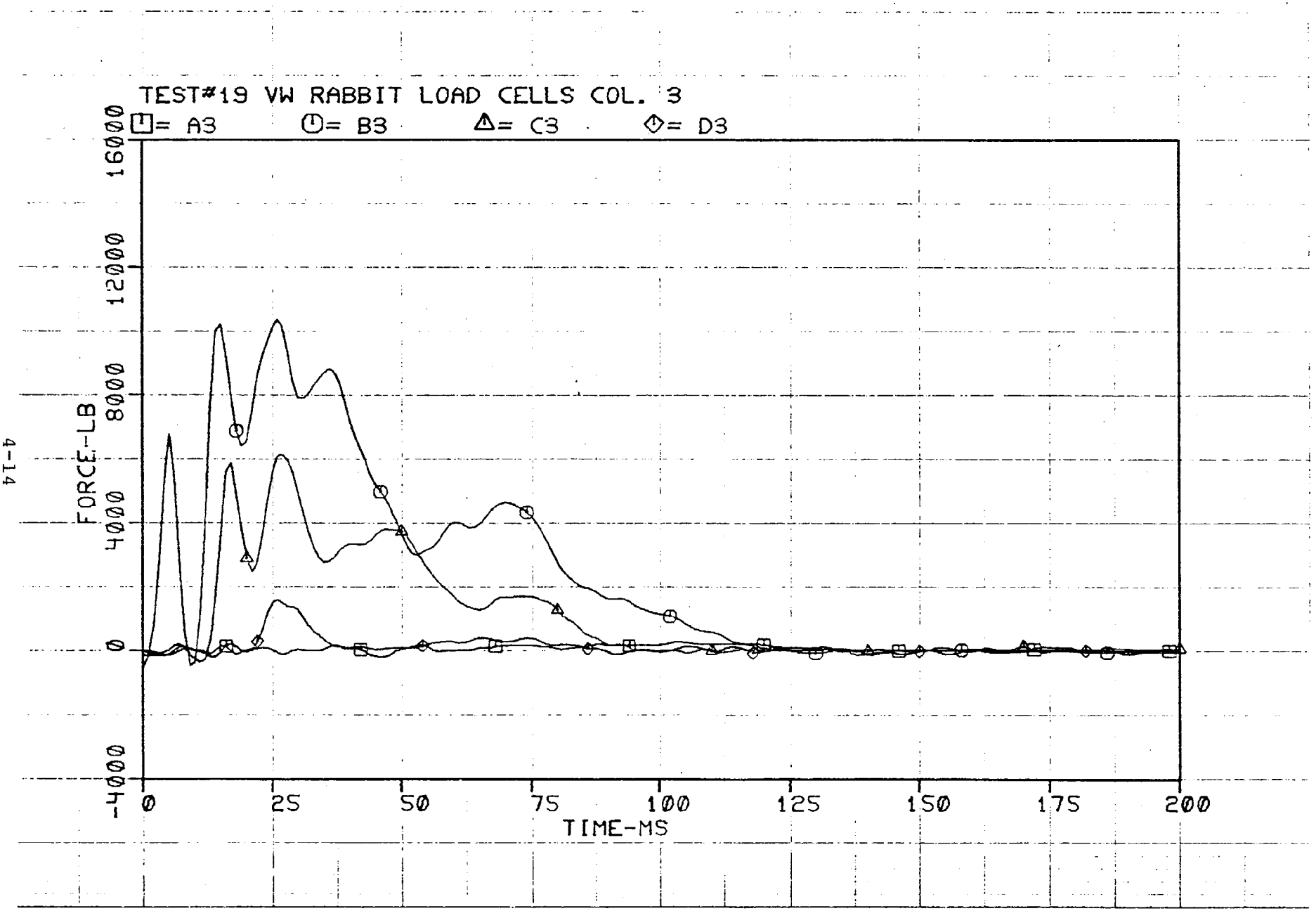

TEST#19 VW RABBIT FORCE VS DISP.
FORCE-LB
0
20000
40000
60000
80000
100000
0
5.0
10
15
20
25
30
35
40
DISPLACEMENT-IN

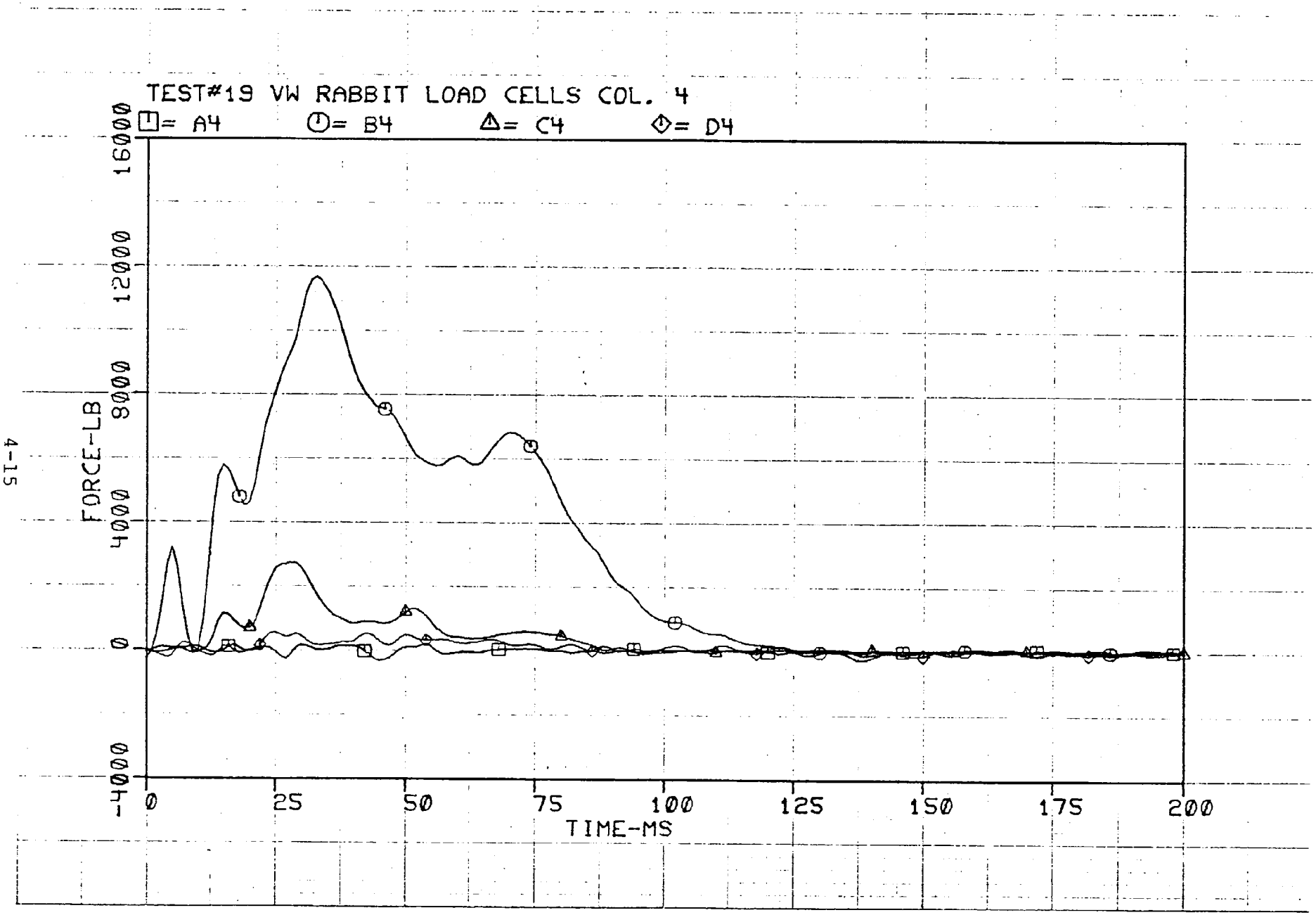

TEST#19 VW RABBIT LOAD CELLS - SUM A+B
FORCE-LB
100000
75000
50000
25000
0
-25000
0
25
50
75
100
125
150
175
200
TIME-MS

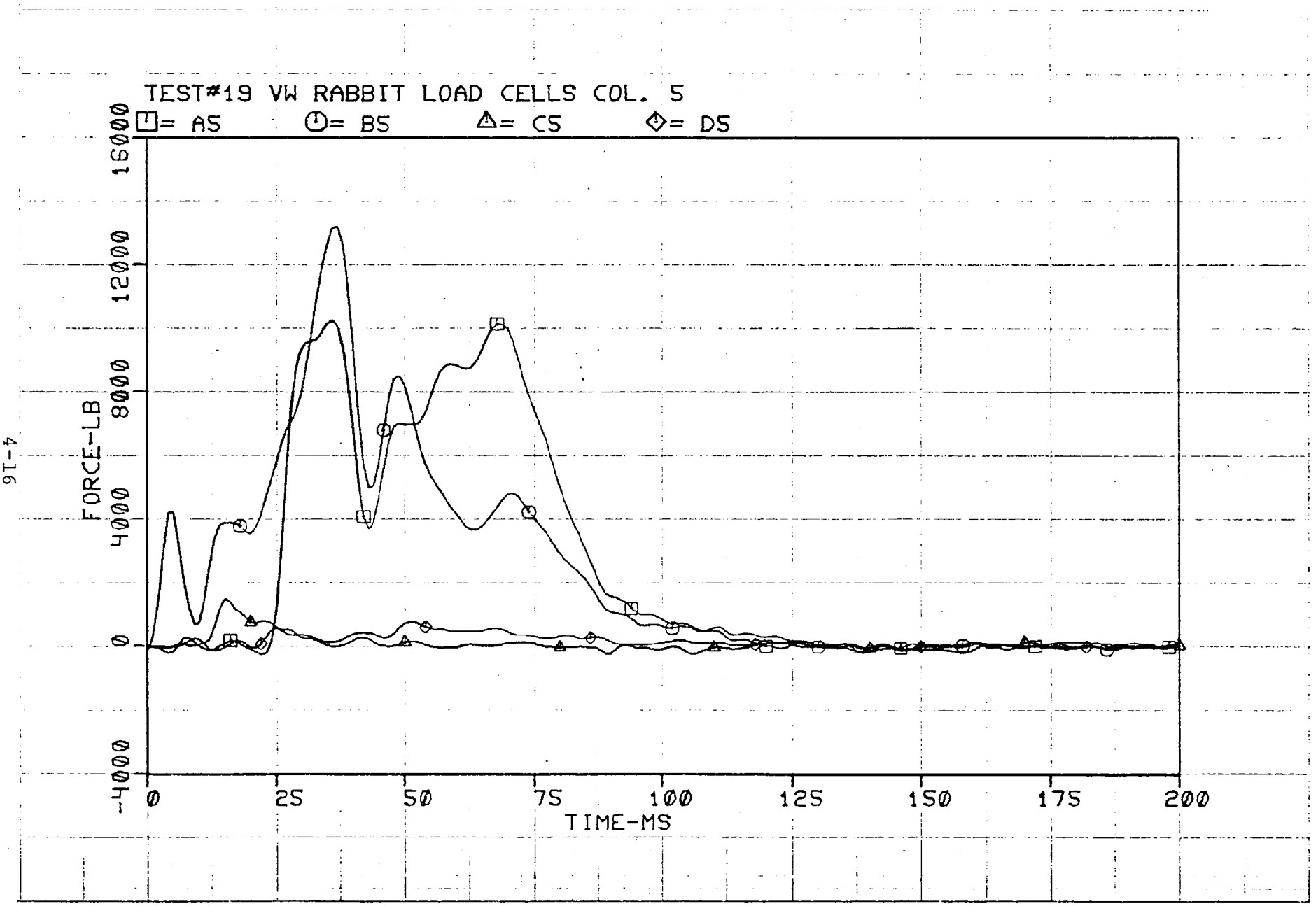

TEST#19 VW RABBIT LOAD CELLS - SUM C+D
FORCE-LB
20000
15000
10000
5000
0
-5000
0
25
50
75
100
125
150
175
200
TIME-MS

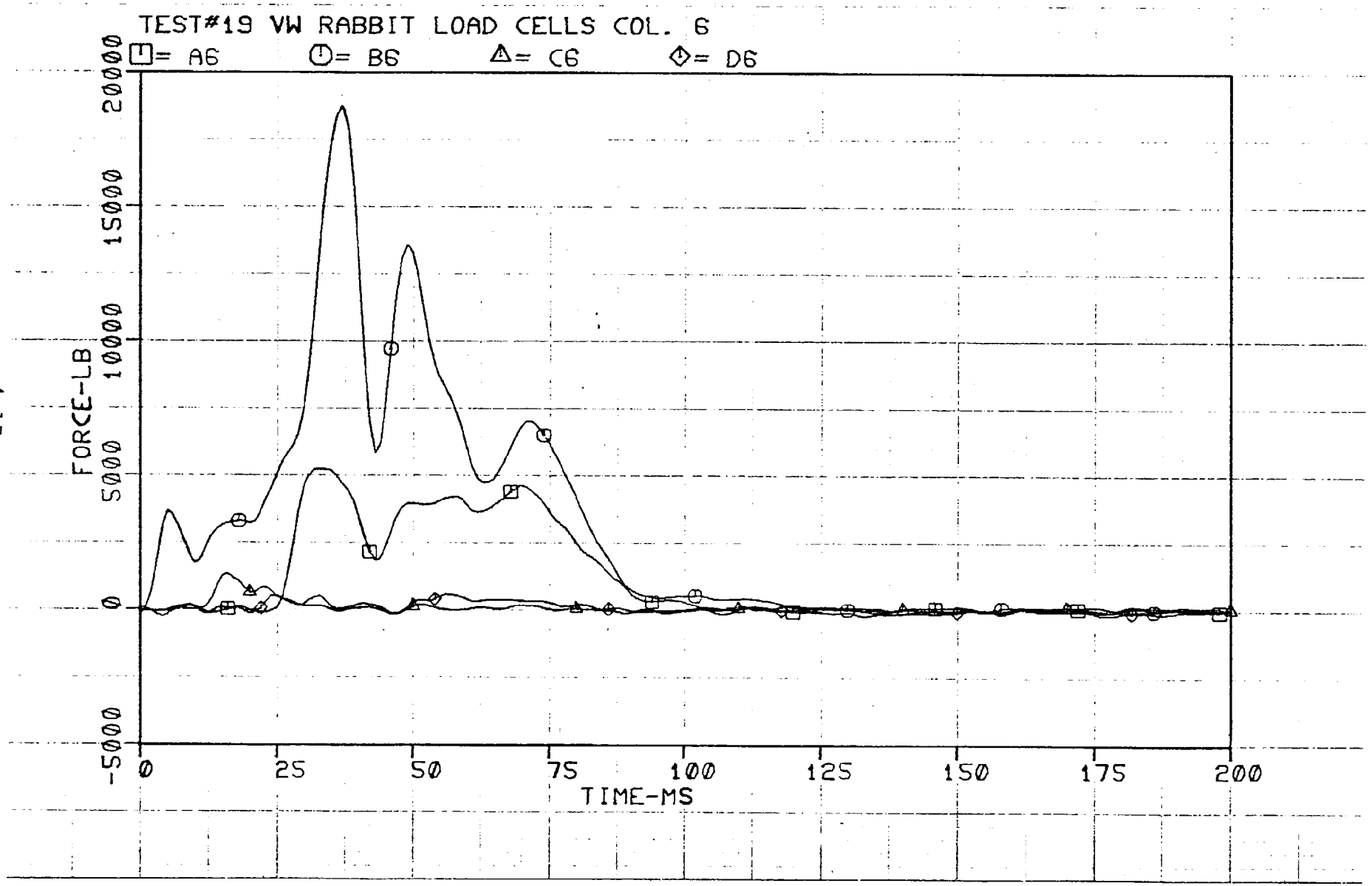

TEST#19 VW RABBIT LOAD CELLS COL. 1
= A1
= B1
= C1
= D1
600
400
200
0
-200
-400
FORCE-LB
0
25
50
75
100
125
150
175
200
TIME-MS

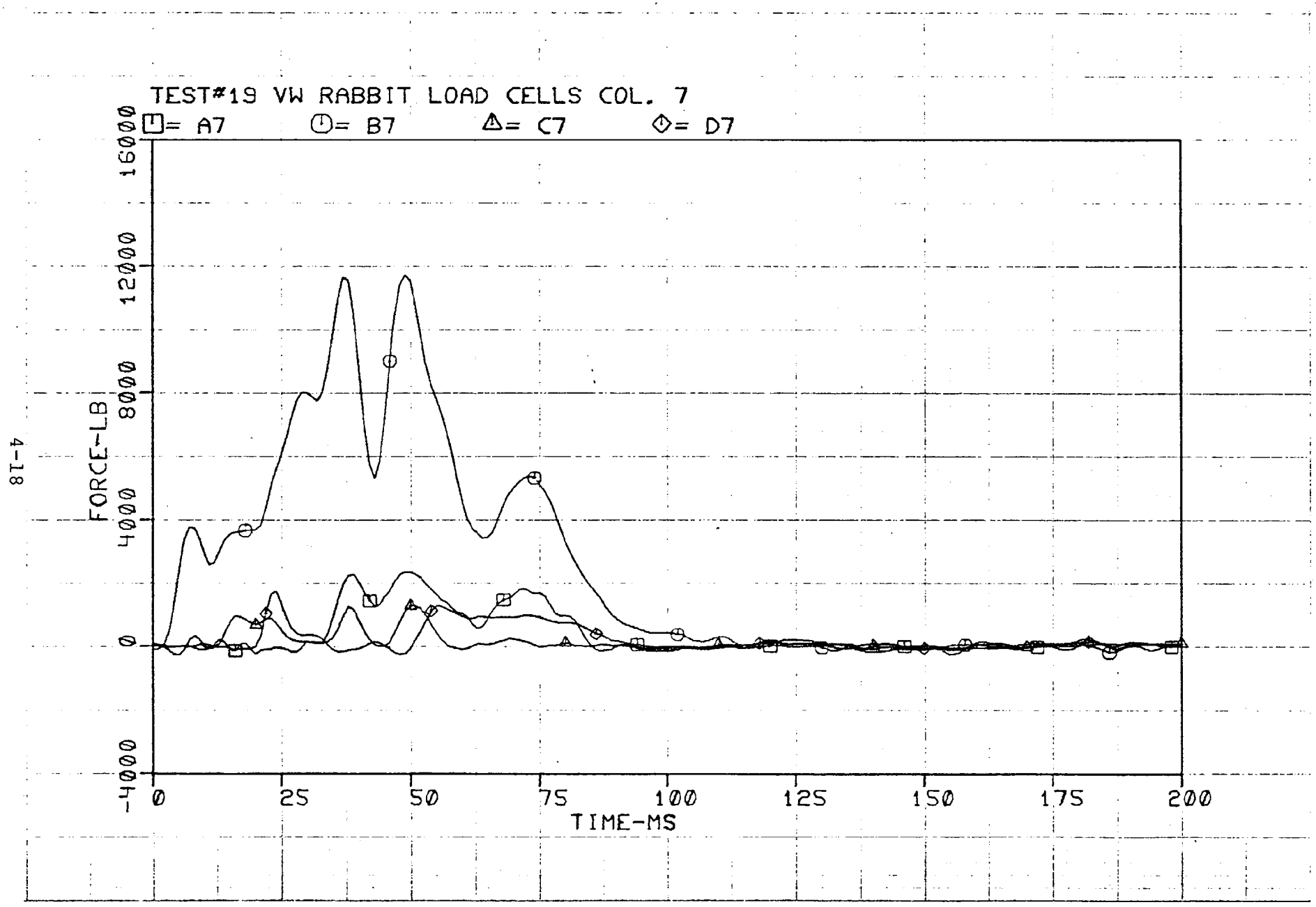

TEST#19 VW RABBIT LOAD CELLS COL. 2
□= A2
○= B2
△= C2
◇= D2
FORCE-LB
1600
1200
800
400
0
-400
TIME-MS
0
25
50
75
100
125
150
175
200

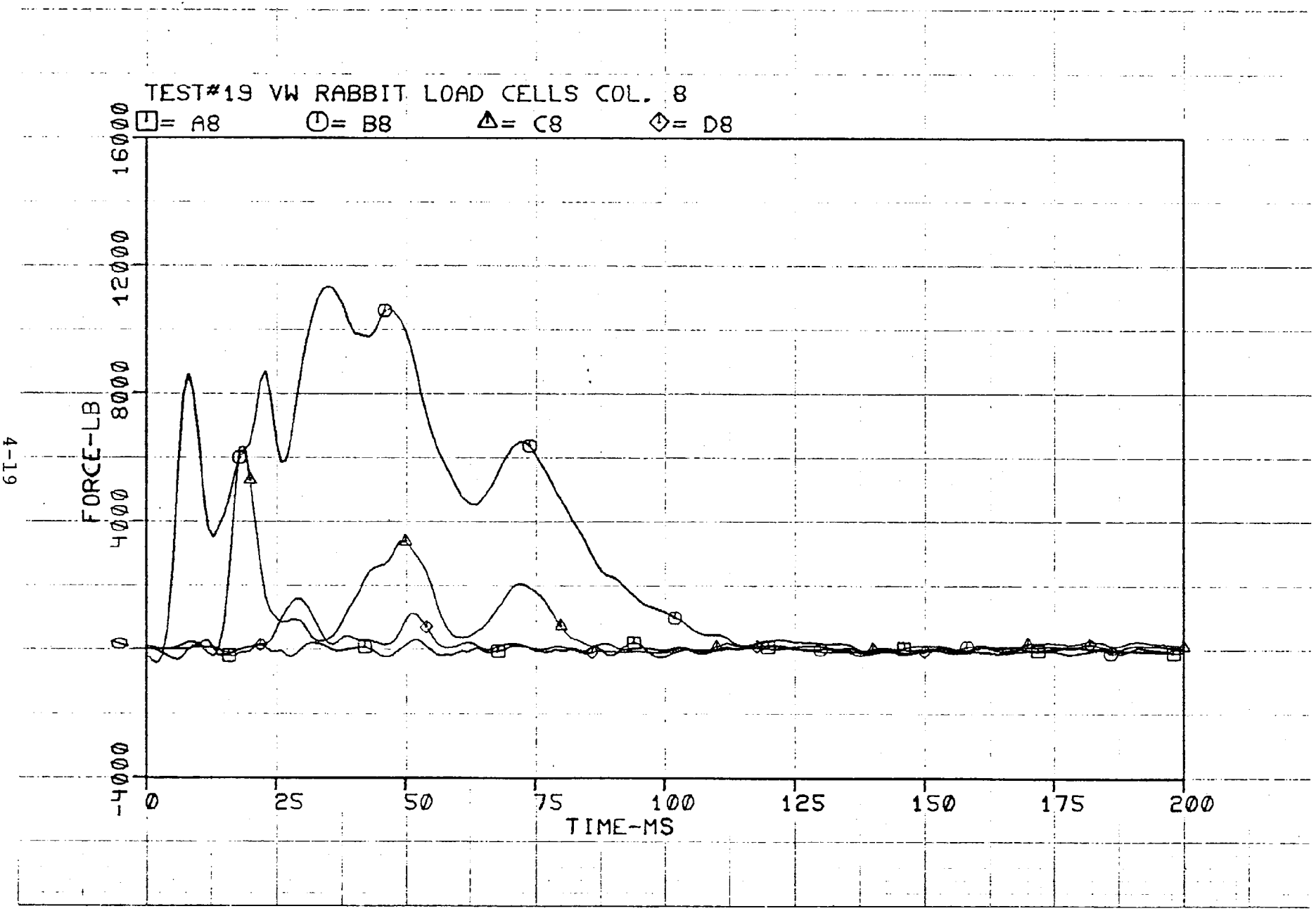

TEST#19 VW RABBIT LOAD CELLS COL. 3
= A3
= B3
= C3
= D3
FORCE-LB
16000
12000
8000
4000
0
-4000
0
25
50
75
100
125
150
175
200
TIME-MS

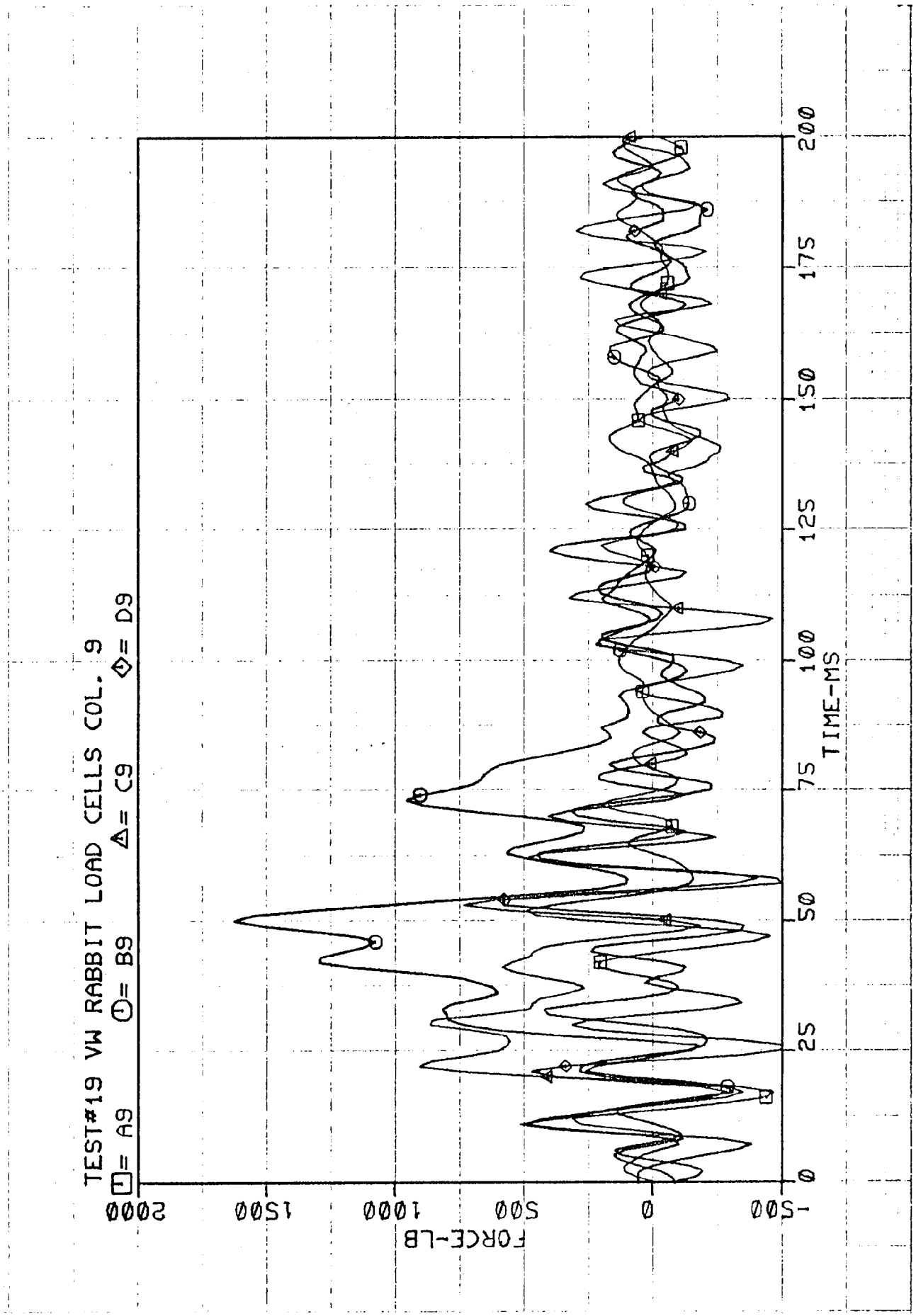

TEST#19 VW RABBIT LOAD CELLS COL. 4
□= A4
○= B4
△= C4
◇= D4
FORCE-LB
16000
12000
8000
4000
0
-4000
0
25
50
75
100
125
150
175
200
TIME-MS


TEST#19 VW RABBIT LOAD CELLS COL. 5
= A5
= B5
= C5
= D5
16000
12000
8000
4000
0
-4000
FORCE-LB
0
25
50
75
100
125
150
175
200
TIME-MS


TEST#19 VW RABBIT LOAD CELLS COL. 6
= A6
= B6
= C6
= D6
FORCE-LB
20000
15000
10000
5000
0
-5000
0
25
50
75
100
125
150
175
200
TIME-MS


TEST#19 VW RABBIT LOAD CELLS COL. 7
□= A7
○= B7
△= C7
◇= D7
FORCE-LB
16000
12000
8000
4000
0
-4000
0
25
50
75
100
125
150
175
200
TIME-MS


TEST#19 VW RABBIT LOAD CELLS COL. 8
A8
B8
C8
D8
FORCE-LB
16000
12000
8000
4000
0
-4000
0
25
50
75
100
125
150
175
200
TIME-MS


TEST#19 VW RABBIT LOAD CELLS COL. 9
□= A9
○= B9
△= C9
◇= D9
FORCE-LB
2000
1500
1000
500
0
-500
TIME-MS
0
25
50
75
100
125
150
175
200