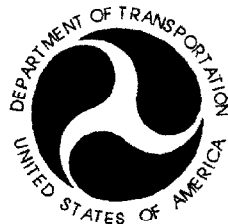


Report Numbers: TRC-98-V003

**Rear Impact Full-Scale Crash Testing
for Evaluation of Vehicle
and Occupant**

**Deformable Impactor into Rear of
1998 Honda Civic
at 81 kph with 70% Overlap
TRC Test Number: 981008**

**Prepared By:
Transportation Research Center Inc.
10820 State Route 347
East Liberty, OH 43319**



November 11, 1998

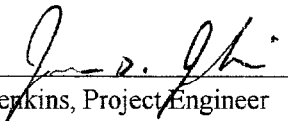
Final Report

**Prepared for:
John A. Volpe National Transportation Systems Center
Vehicle Crashworthiness Division, DTS-74
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Cambridge, MA 02142-1093**

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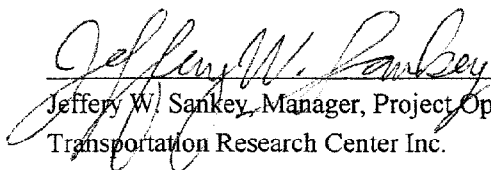
Report Prepared By:



Jason D. Jenkins, Project Engineer
Transportation Research Center Inc.

Date 11/09/98

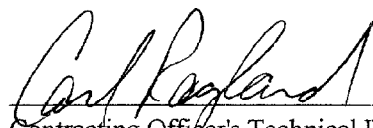
Report Approved By:



Jeffery W. Sankey, Manager, Project Operations
Transportation Research Center Inc.

Date 11/10/98

Final Report Accepted By:



Contracting Officer's Technical Representative (COTR),
NHTSA, ~~Office of Vehicle Safety Compliance~~

Date 12/7/98

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16. Abstract A deformable impactor into the rear of a 1998 Honda Civic 4-door sedan, NHTSA No. RW5329, was conducted at Transportation Research Center Inc. on October 8, 1998. This rear impact full-scale crash testing was conducted for evaluation of vehicle and occupant response. The deformable impactor's velocity was 81.1 kph. The vehicle's test weight was 1355.5 kg. The vehicle's maximum crush was 1001 millimeters. The ambient temperature was 19° C. The driver's Head Injury Criteria (HIC) was 758. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 32.0 g. The driver's chest maximum deflection was 3 mm. The driver's left and right femur maximum axial forces were 539 N and 589 N, respectively. The passenger's Head Injury Criteria (HIC) was 2740. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 33.0 g. The passenger's chest maximum deflection was 4 mm. The passenger's left and right femur maximum axial forces were 592 N and 642 N, respectively.			
17. Key Words Rear Impact Full-scale Crash Testing For Evaluation of Vehicle and Occupant Response		18. Distribution Statement Copies of this report are available from: NHTSA Technical Reference Division Nassif Building, Room 5108 400 Seventh Street, S.W. Washington, DC 20590	
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METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH								
in	inches	2.54	cm	mm	millimeters	0.04	inches	in
ft	feet	30	cm	cm	centimeters	0.4	inches	in
yd	yards	0.9	m	m	meters	3.3	feet	ft
mi	miles	1.6	km	km	kilometers	1.1	yards	yd
AREA								
in ²	square inches	6.5	cm ²	cm ²	square centimeters	0.16	square inches	in ²
ft ²	square feet	0.09	m ²	m ²	square meters	1.2	square yards	yd ²
yd ²	square yards	0.8	m ²	m ²	square kilometers	0.4	square miles	mi ²
mi ²	square miles	2.6	km ²	km ²	hectares	2.5	acres	
MASS (weight)								
oz	ounces	28	g	g	grams	0.035	ounces	oz
lb	pounds (2000 lb)	0.45	kg	kg	kilograms	2.2	pounds	lb
		0.9	t	t	tonnes (1000 kg)	1.1	short tons	
VOLUME								
tsp	teaspoons	5	ml	ml	milliliters	0.03	fluid ounces	fl oz
tblsp	tablespoons	15	ml	ml	liters	2.1	pints	pt
fl oz	fluid ounces	30	ml	ml	liters	1.06	quarts	qt
c	cups	0.24	l	l	liters	0.26	gallons	gal
pt	pints	0.47	l	l	cubic meters	35	cubic feet	ft ³
qt	quarts	0.95	l	l	cubic meters	1.3	cubic yards	yd ³
gal	gallons	3.8	l	l				
ft ³	cubic feet	0.03	m ³	m ³				
yd ³	cubic yards	0.76	m ³	m ³				
TEMPERATURE (exact)								
°F	Fahrenheit temperature	5/9 (after subtracting 32)	°C	°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F

* 1 m = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Mon., Publ. 286, Units of Weights and Measures, Price \$2.25, 50 Catalog No. C13.10.286.

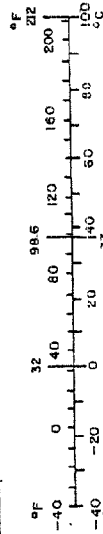


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Section 1.0

Purpose and Test Procedure

Purpose

This crash test was conducted to determine vehicle and occupant response in the 81 kph rear impact with 70% overlap test mode. The test was performed on a 1998 Honda Civic passenger car.

Test Procedure

This test was conducted per Contract No. DTRS57-95-C-00011, Technical Task Directive No. 5, "Rear Impact Full-Scale Crash Testing."

The test vehicle was instrumented with nine (9) accelerometers to measure longitudinal axis accelerations; nine (9) accelerometers to measure lateral axis accelerations; and nine (9) accelerometers to measure vertical accelerations.

The test vehicle contained two (2) Part 572 E 50th percentile adult male anthropomorphic test devices (dummies). The dummies were positioned in the front outboard designated seating positions according to the dummy placement procedure specified in Appendix C of the Laboratory Test Procedure TP-208-09.

The deformable impactor was instrumented with five (5) force load cells to measure longitudinal axis forces on the barrier face, one (1) accelerometer to measure longitudinal axis accelerations, one (1) accelerometer to measure lateral axis accelerations, and one (1) accelerometer to measure vertical accelerations.

Both dummies were instrumented with head center of gravity accelerometers to measure longitudinal, lateral, and vertical accelerations; upper neck 6-axis load cells to measure longitudinal, lateral, and vertical force and moments; chest and pelvis accelerometers to measure longitudinal, lateral, and vertical axis accelerations; and with left and right femur load cells to measure axial forces. Each Part 572 E dummy's instrumentation also included a chest potentiometer to measure longitudinal deflection.

The seventy-one (71) data channels were digitally sampled at 12,500 samples per second and processed per Sections 11.13 through 11.15 of the Laboratory Test Procedure.

The crash event was recorded by nine (9) high-speed motion picture cameras and a real-time panning camera.

The vehicle and occupant data are summarized in Section 2.0. The FMVSS 208 and 301 data are presented in Section 3.0. The vehicle, moving deformable barrier, occupant, and camera measurements are presented in Section 4.0. Appendix A contains the still photographic prints. Appendix B contains the dummy and vehicle data plots. Appendix C contains the dummy calibration information. Appendix D contains miscellaneous test information.

Section 2.0

Rear Deformable Barrier Impact Test Summary

Test Results Summary

This 81 kph rear crash test with 70% overlap was conducted at TRC on October 8, 1998.

The test vehicle, a 1998 Honda Civic passenger car, was equipped with airbags and three-point unibelts at the driver's and right front passenger's seating positions. The vehicle's test weight was 1355.5 kg. The vehicle's maximum static crush was 1001 mm.

The driver's HIC was 758. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 32.0 g. The driver's chest maximum deflection was 3 mm. The driver's left and right femur maximum compressive forces were 539 N and 589 N, respectively.

The right front passenger's HIC was 2740. The right front passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 33.0 g. The right front passenger's chest maximum deflection was 4 mm. The right front passenger's left and right femur maximum compressive forces were 592 N and 642 N, respectively.

Data Acquisition Explanations

The vehicle's left rocker panel Z-axis acceleration data channel, LFRZG1, exceeded its data channel's full scale input at approximately 40 milliseconds. This affected the resultant calculation for the vehicle's left rocker panel.

The vehicle's right rocker panel Y-axis acceleration data channel, RFRYG1, exceed its data channel's full scale input between 80 and 85 milliseconds, then lost data after 130 milliseconds. This affected the resultant calculation for the vehicle's right rocker panel.

The vehicle's right rocker panel Z-axis acceleration data channel, RFRZG1, exceeded its data channel's full scale input at approximately 58 and 72 milliseconds. This affected the resultant calculation for the vehicle's right rocker panel.

The vehicle's left front seatback mid Z-axis acceleration data channel, TCFZG1, exceeded its data channel's full scale input at approximately 60 and 61 milliseconds. This affected the resultant calculation for the vehicle's left front seatback mid.

The vehicle's right front seatback mid X-axis acceleration data channel, TRFXG1, exceeded its data channel's full scale input at approximately 60 milliseconds. This affected the resultant calculation for the vehicle's right front seatback mid.

The vehicle's right front seatback and Z-axis acceleration data channel, TRFZG1, exceeded its data channel's full scale input at approximately 60, 93, and 133 milliseconds. This affected the resultant calculation for the vehicle's right front seatback mid.

The vehicle's left rear wheel axle X-axis acceleration data channel, RAXXG1, lost data after 50 milliseconds. This affected the resultant calculation for the vehicle's left rear wheel axle.

Table 1 Crash Test Summary

Test type:	81 kph rear impact with 70% overlap
Test date:	10/08/98
Test time:	1523
Ambient temperature at impact area:	19° C
Vehicle year/make/ model/body style:	1998/Honda/Civic/passenger car
Vehicle test weight:	1355.5 kg
Moving barrier test weight:	1365 kg
Impact angle ¹ :	180°
Impact velocity ² :	
Primary:	N/A kph
Secondary:	N/A kph
Derived ³ :	81.1 kph
Maximum static crush:	1001 mm
Number of cameras:	
High-speed:	9
Door opening data:	
Left-front:	Easy
Left-rear:	Needed tools
Right-front:	Easy
Right-rear:	Needed tools
Impact location:	22 mm below target center 4 mm right target center

¹ With respect to the stationary vehicle's centerline.

² Speed trap measurement ($\pm .08$ kph accuracy)

Table 1 Crash Test Summary, Cont'd.

Dummies:	<u>Driver #001</u>	<u>Passenger #110</u>
Type:	Part 572 E	Part 572 E
Location:	Left front	Right front
Restraint:	Airbag/3-point unbelt	Airbag/3-point unbelt
Number of data channels:	18	18
Front seat data:		
Seat track failure:	None	None
Seat back failure:	Yes	Yes
Visible dummy contact points:		
Head:	None	None
Chest:	None	None
Abdomen:	None	None
Left knee:	Instrument panel	Instrument panel
Right knee:	Instrument panel	Instrument panel

Table 2 Test Vehicle Information

Vehicle year/make/
model/body style: 1998/Honda/Civic/passenger car

Color: Green

VIN: 1HGEJ6672WL050286

Engine data:

Placement: Transverse

Cylinders: 4

Displacement: 1.6 liters

Transmission data: 4 speed, manual, X automatic, overdrive

Final drive: x fwd, rwd, 4wd

Date vehicle received: N/A

Odometer reading: 53

Dealer's name
and address: Bill Marine
Springfield, OH

Accessories:

Power steering	Yes	Automatic transmission	Yes
Power brakes	Yes	Automatic speed control	Yes
Power seats	No	Tilting steering wheel	Yes
Power windows	Yes	Telescoping steering wheel	No
Tinted glass	Yes	Air conditioning	Yes
Radio	Yes	Anti-skid brake	No
Clock	Yes	Rear window defroster	Yes
Power door locks	Yes		

Certification data from vehicle's label:

Vehicle manufactured by: Honda of America Mfg. Inc.

Date of manufacture: 09/98

VIN: 1HGEJ6672WL050286

GVWR: 3330 lbs.

GAWR: Front: 1760 lbs.

Rear: 1610 lbs.

Table 2 Test Vehicle Information, Cont'd.

Size of tires on vehicle: P185/65R14
Spare tire: T105/80D13
Type of front seats: Bucket

Tire & capacity data from vehicle's label:

Recommended tire size: P185/65R14
Recommended cold tire pressure:
Front: 35 psi
Rear: 35 psi
Designated Seating Capacity:
Front 2
Rear 3
Total 5
Vehicle Capacity Weight: 850 lbs.

Test vehicle attitudes:

Delivered attitude:	LF: 647 mm	RF: 649 mm	LR: 652 mm	RR: 659 mm
Fully loaded attitude:	LF: 620 mm	RF: 625 mm	LR: 621 mm	RR: 620 mm
Pre-test attitude:	LF: 600 mm	RF: 605 mm	LR: 623 mm	RR: 616 mm
Post-test attitude:	LF: 600 mm	RF: 614 mm	LR: 697 mm	RR: 499 mm

Table 2 Test Vehicle Information, Cont'd.

Weight of test vehicle as received (with maximum fluids):

Right front	332.9 kg	Right rear	205.9 kg
Left front	333.8 kg	Left rear	211.4 kg
Total front weight	666.7 kg	(61.5% of total vehicle weight)	
Total rear weight	417.3 kg	(38.5% of total vehicle weight)	
Total delivered weight	1084.0 kg		

Calculation of test vehicle's target test weight:

RCLW = Rated Cargo and Luggage Weight

UDW = Unloaded Delivered Weight (1084.0 kg)

VCW = Vehicle Capacity Weight = 385.6 kg

DSC = Designated Seating Capacity (5)

RCLW = VCW - 68 (DSC) = 385.6 - 68 (5) = 45.6 kg

Target test weight = UDW + RCLW + (Number of Hybrid III dummies x 76 kg per dummy)

Target test weight¹ = 1084.0 + 45.6 + 152 = 1281.6 kg

Weight of test vehicle with required dummies and 119.5 kg of cargo weight:

Right front	417.0 kg	Right rear	264.0 kg
Left front	413.0 kg	Left rear	261.5 kg
Total front weight	830.0 kg	(61.2% of total vehicle weight)	
Total rear weight	525.5 kg	(38.8% of total vehicle weight)	
Total test weight	1355.5 kg		

Weight of ballast secured in vehicle cargo area: 0

Components removed to meet target test weight: Starter, air compressor, front bumper, headlights, windshield washer, distributor, radiator.

CG rearward of front wheel centerline: 1016 mm

Vehicle Wheelbase: 2622 mm

¹ Actual target test weight of 1354.0 kg was provided by the COTR.

Table 3 Post-Impact Data

Test number: 981008
Test date: 10/08/98
Test time: 1523
Test type: 81 kph rear impact with 70% overlap
Impact angle:¹ 180°
Ambient temperature
at impact area: 19° C
Temperature in
occupant compartment: N/A
Impact velocity:
Primary: N/A kph
Secondary: N/A kph
Derived²: 81.1 kph
Specified range: 79.5 to 82.5 kph
Distance from vehicle to barrier:
Entering velocity trap: 661 mm
Exiting velocity trap: 51 mm

Test vehicle static crush:

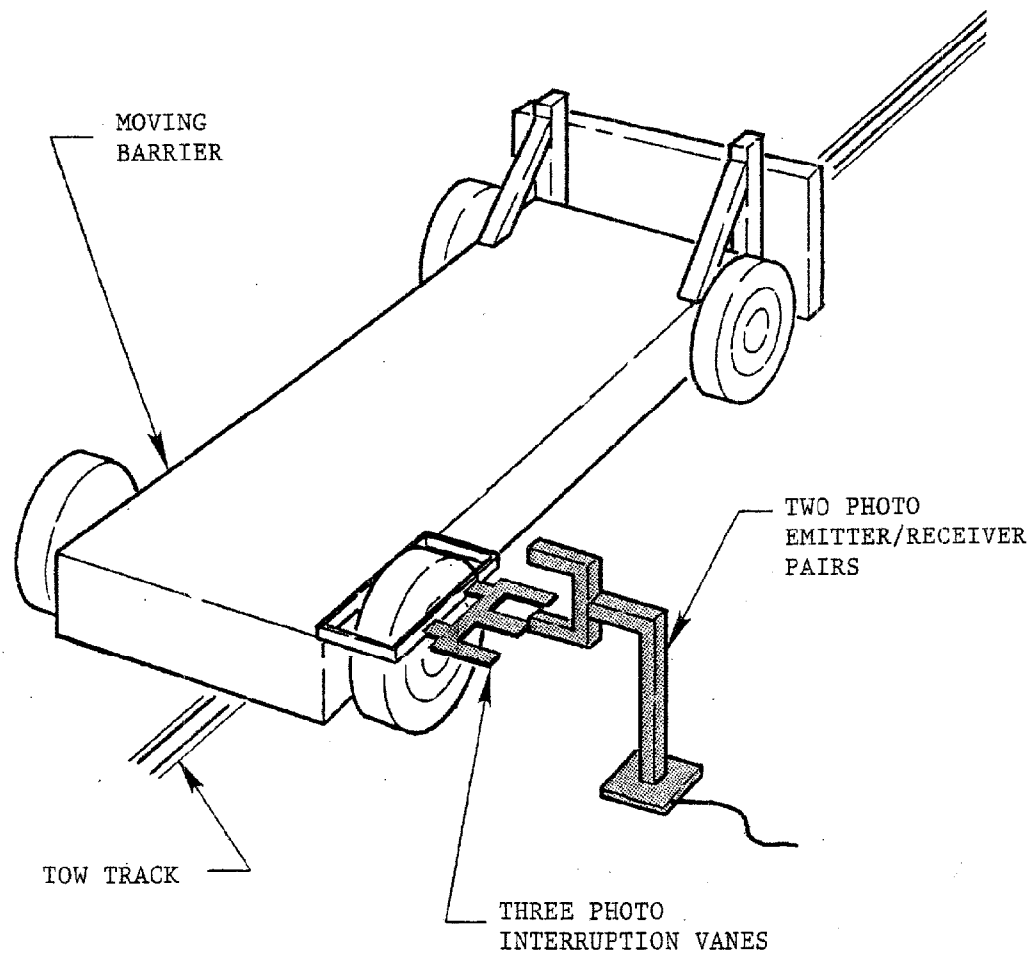
Overall length of test vehicle:

Pre-test:	L: 4575 mm	C: 4682 mm	R: 4575 mm
Post-test:	L: 3583 mm	C: 3681 mm	R: 4188 mm
Total crush:	L: 992 mm	C: 1001 mm	R: 387 mm
Average crush:	793 mm		

¹ With respect to the stationary vehicle's centerline.

² Impact velocity was derived from the tow cable system.

Figure 1 Impact Velocity Measurement System



The final vane clears the final emitter/receiver pair 51 millimeters before impact.

The vanes have 610-millimeter spacing.

Figure 2 Accident Investigation Division Data

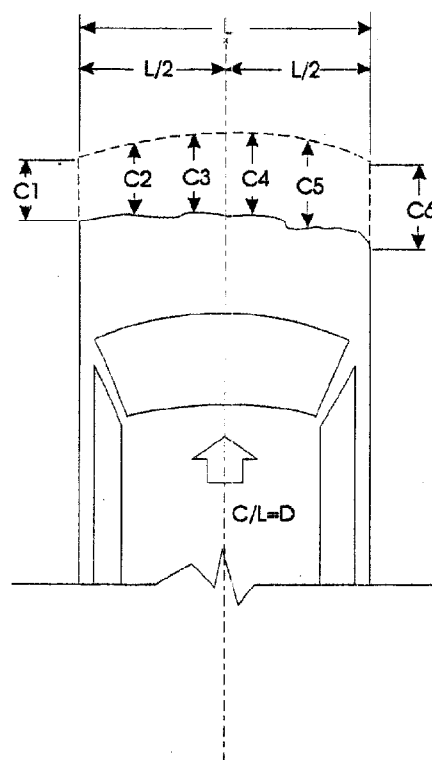
Test date: 10/08/98
Vehicle year/make/
model/body style: 1998/Honda/Civic/passenger car
Volpe No.: RW5329
VIN: 1HGEJ6672WL050286
Build date: 09/98
Test weight: 1355.5 kg
Vehicle wheelbase: 2622 mm
Maximum width: 1693 mm
Front overhang: N/A

Collision Deformation
Classification (CDC) Code: 06BZAW6

Crush depth
measurements: C1: 992 mm
C2: 981 mm
C3: 991 mm
C4: 934 mm
C5: 678 mm
C6: 387 mm

Midpoint of damage to
Vehicle Longitudinal
Centerline: D: 231 mm

Length of damaged
region: L: 1524 mm



Section 3.0

FMVSS 208 and 301 Data

Table 4 Dummy Injury Criteria

<u>Maximum Acceleration</u>								
Head				Chest				
	X	Y	Z	R	X	Y	Z	R
Driver	154.2 g	-29.6 g	-73.2 g	172.7 g	31.5 g	-7.2 g	14.8 g	34.2 g
Passenger	239.8 g	-85.8 g	-81.7 g	259.4 g	32.9 g	-15.9 g	16.5 g	34.8 g

<u>Maximum Femur Compressive Force</u>		
	Left Femur	Right Femur
Driver	539 N	589 N
Passenger	592 N	642 N

<u>Head Injury Criteria¹</u>			
	HIC	Time t_1	Time t_2
Driver	758	109.8 ms	122.4 ms
Passenger	2740	116.6 ms	120.6 ms

<u>Head Maximum Resultant Acceleration²</u>			
	Acceleration	Time t_1	Time t_2
Driver	85.9 g	111.8 ms	114.8 ms
Passenger	193.2 g	117.1 ms	120.1 ms

<u>Chest Maximum Resultant Acceleration²</u>			
	Acceleration	Time t_1	Time t_2
Driver	32.0 g	123.7 ms	126.7 ms
Passenger	33.0 g	128.4 ms	131.4 ms

<u>Maximum Chest Deflection</u>	
Driver	3 mm
Passenger	4 mm

¹ As defined in FMVSS No. 208

² Defined as equal to or exceeding 0.003 sec. duration

Table 5 Fuel System Data

Vehicle year/make/model/body style:	1998/Honda/Civic/passenger car
Volpe No.:	RW5329
Fuel system capacity:	45.0 liters (from owner's manual)
Usable capacity:	45.0 liters (furnished by COTR)
Test volume range:	41.4 liters to 42.3 liters (92-94% of usable)
Actual test volume:	41.8 liters (with entire fuel system filled)
Test fluid type:	Stoddard solvent
Specific gravity:	0.764
Kinematic viscosity:	0.99 centistoke
Test fluid color:	purple
Type of fuel pump:	electric
Does the electric fuel pump operate with ignition switch "on" and the engine not operating.	Yes
Details of fuel system:	The fuel tank is located forward of the rear axle. The fuel filler neck is on the left side of the vehicle.

Table 6 FMVSS 301 Post-Impact Test Data

Test date: 10/08/98

Volpe No.: RW5329

Vehicle year/make/model/body style: 1998/Honda/Civic/passenger car

Test requirements:

Test vehicle fuel tank filled to 92 to 94% of manufacturer's usable capacity and with electric fuel pump operating (if it will operate without engine operation). Part 572 test dummies located at each front designated seating position.

Test vehicle impact type:

☐ Frontal (113 kph)

☐ Oblique (48 kph) with ☐ barrier face first contacting (driver's/passenger's) side

☒ Rear moving barrier (81 kph)

☐ Lateral moving barrier (32 kph)

Fuel system fluid spillage measurements:

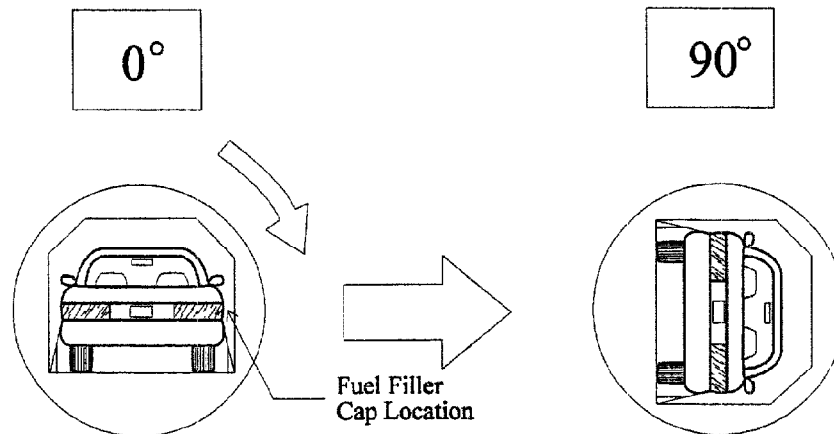
	<u>Test Results</u>	<u>Maximum Allowable</u>
1. From impact until vehicle motion ceases	0 g	28 g
2. 5-Minute period after vehicle motion ceases	0 g	140 g
3. Next 25 minutes after 5-minute period	0 g	28 g/1 min

Fuel system fluid spillage location(s): None

Figure 3 FMVSS 301 Static Rollover Test Data

Volpe No: RW5329

Test phase



Static rollover machine rotation time information: (specified range is 1-3 minutes)

Time required for machine to rotate 90° = 2 minutes, 0 seconds

FMVSS 301 position hold time = 5 minutes, 0 seconds

Total = 7 minutes, 0 seconds

Next whole minute interval = 7 minutes

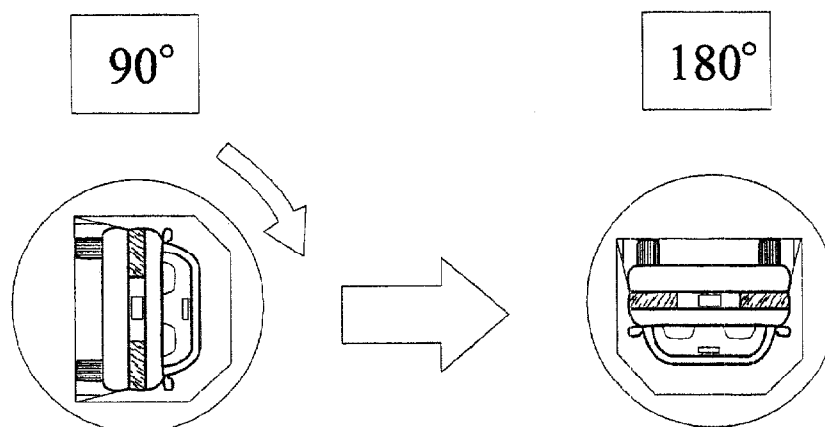
Fuel system fluid spillage measurements:

	Test Results	Maximum Allowable
<u>0° to 90° rotation (fuel filler cap down)</u>		
1. First five minutes from onset of rotation	0 g	142 g
2. Sixth minute from onset of rotation	0 g	28 g
3. Seventh minute from onset of rotation	0 g	28 g

Fuel system fluid spillage location(s): None

Figure 3 FMVSS 301 Static Rollover Test Data, Cont'd.

Test phase



Static rollover machine rotation time information: (specified range is 1-3 minutes)

Time required for machine to rotate 90° = 2 minutes, 0 seconds

FMVSS 301 position hold time = 5 minutes, 0 seconds

Total = 7 minutes, 0 seconds

Next whole minute interval = 14 minutes

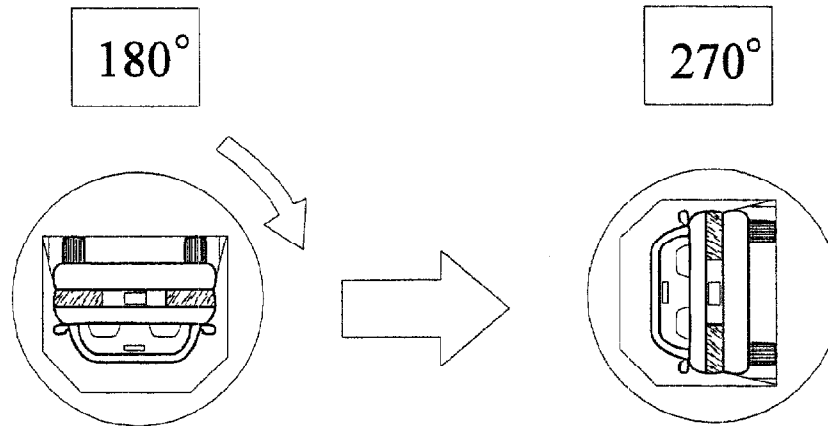
Fuel system fluid spillage measurements:

	Test Results	Maximum Allowable
<u>90° to 180° rotation</u>		
1. First five minutes from onset of rotation	0 g	142 g
2. Sixth minute from onset of rotation	0 g	28 g
3. Seventh minute from onset of rotation	0 g	28 g

Fuel system fluid spillage location(s): None

Figure 3 FMVSS 301 Static Rollover Test Data. Cont'd.

Test phase



Static rollover machine rotation time information: (specified range is 1-3 minutes)

Time required for machine to rotate 90° = 2 minutes, 0 seconds

FMVSS 301 position hold time = 5 minutes, 0 seconds

Total = 7 minutes, 0 seconds

Next whole minute interval = 21 minutes

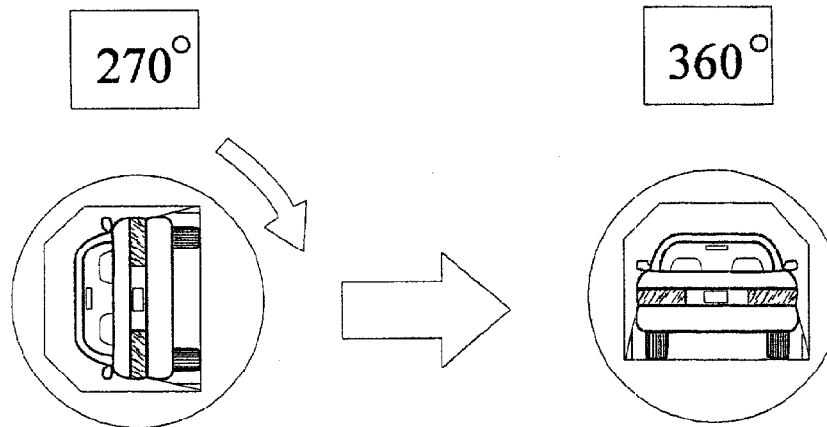
Fuel system fluid spillage measurements:

	Test Results	Maximum Allowable
<u>180 to 270° rotation</u>		
1. First five minutes from onset of rotation	0 g	142 g
2. Sixth minute from onset of rotation	0 g	28 g
3. Seventh minute from onset of rotation	0 g	28 g

Fuel system fluid spillage location(s): None

Figure 3 FMVSS 301 Static Rollover Test Data, Cont'd.

Test phase



Static rollover machine rotation time information: (specified range is 1-3 minutes)

Time required for machine to rotate 90° = 2 minutes, 0 seconds

FMVSS 301 position hold time = 5 minutes, 0 seconds

Total = 7 minutes, 0 seconds

Next whole minute interval = 28 minutes

Fuel system fluid spillage measurements:

<u>270° to 360° rotation</u>	<u>Test Results</u>	<u>Maximum Allowable</u>
1. First five minutes from onset of rotation	0 g	142 g
2. Sixth minute from onset of rotation	0 g	28 g
3. Seventh minute from onset of rotation	0 g	28 g

Fuel system fluid spillage location(s): None

Section 4.0

Vehicle, Moving Deformable Barrier, Occupant, and Camera Measurements

Figure 4 Pre-test and Post-test Measurement Points

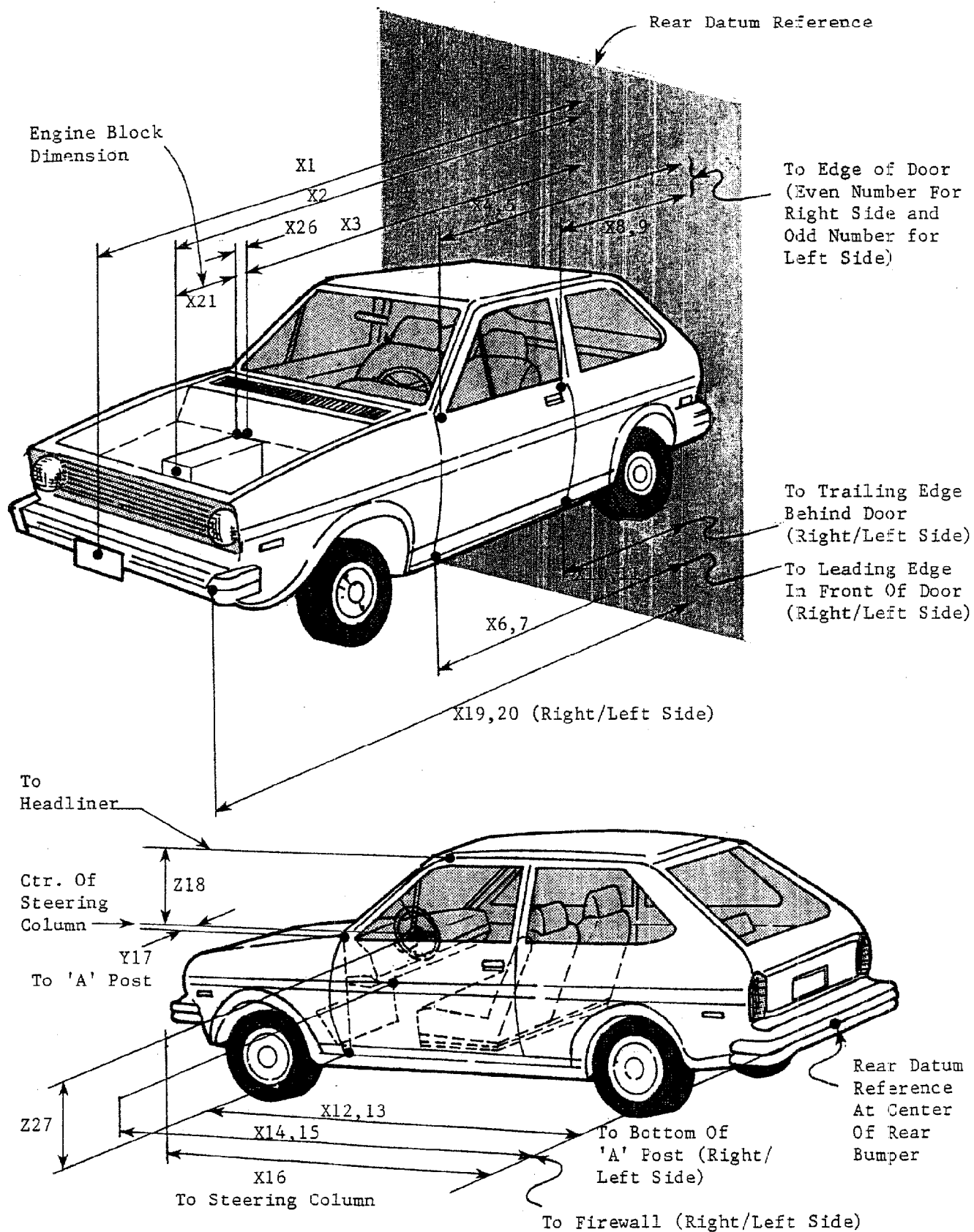


Figure 4 Pre-test and Post-test Measurement Points, Cont'd.

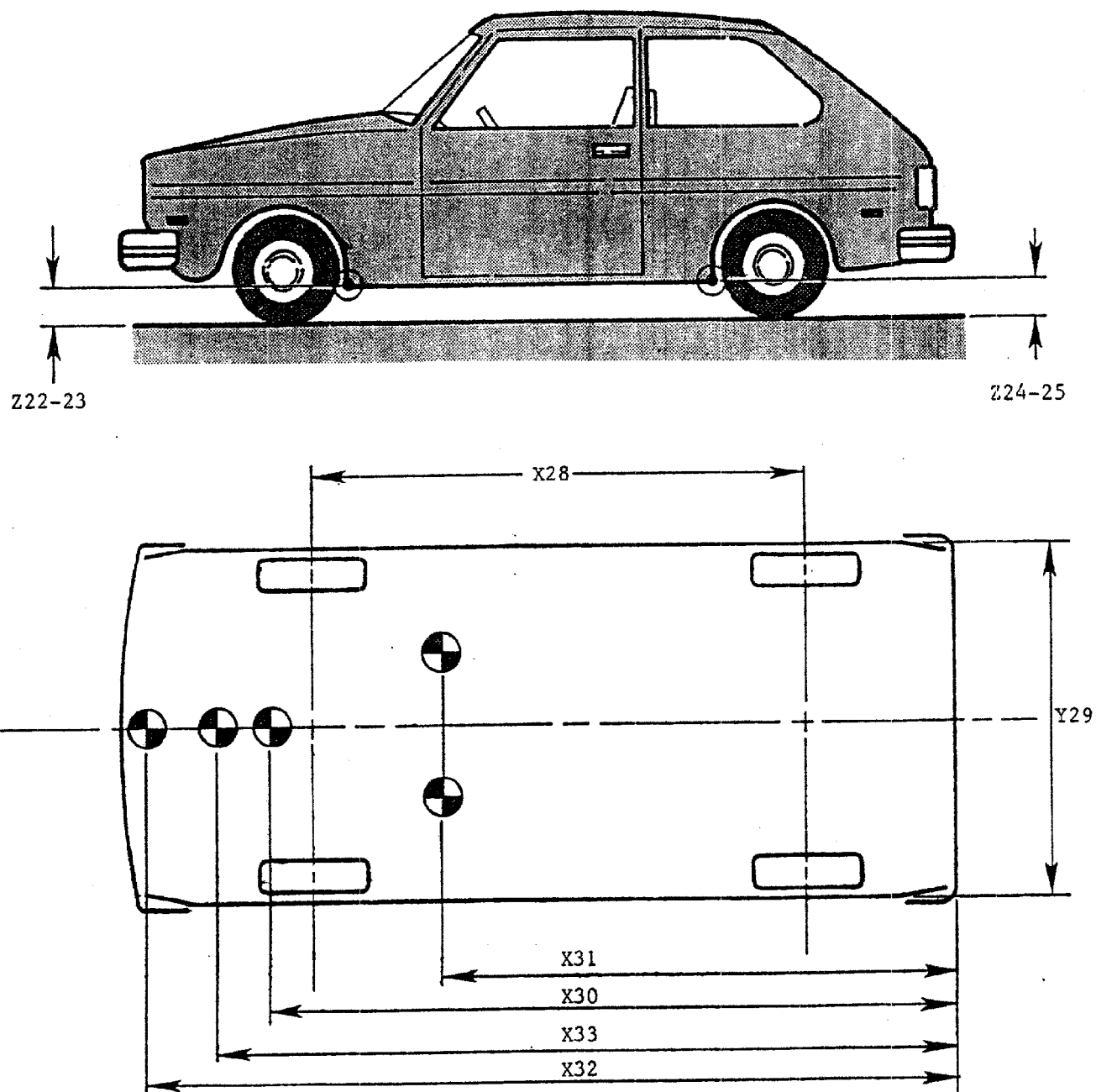


Table 7 Impacted Vehicle Measurements

Vehicle year/make/model/body style: 1998/Honda/Civic/passenger car Test Number: 981008

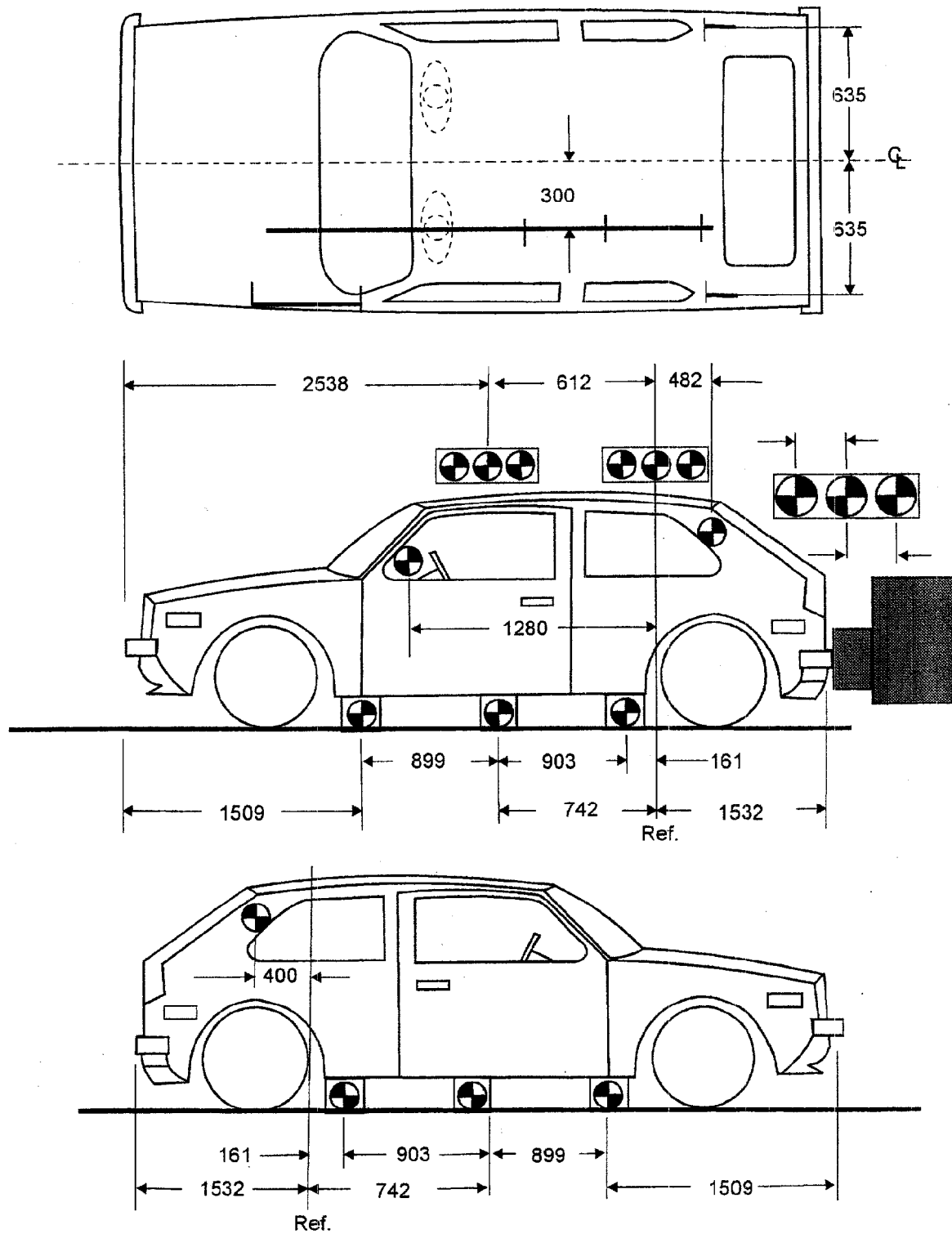
No.	Type of measurement	Pre-Test	Post-Test	Difference
X1	Total Length of Veh. at Centerline	4682	3681	1001
X2	Rear Surface of Veh. to Front of Engine Block	775	805	-30
X3	Rear Surface of Veh. to Firewall	1300	1340	-40
X4	Rear Surface of Veh. to Upper Leading Edge of Right Door	1678	1714	-36
X5	Rear Surface of Veh. to Upper Leading Edge of Left Door	1668	1705	-37
X6	Rear Surface of Veh. to Lower Leading Edge of Right Door	1564	1650	-86
X7	Rear Surface of Veh. to Lower Leading Edge of Left Door	1656	1650	6
X8	Rear Surface of Veh. to Upper Trailing Edge of Right Door	2651	2683	-32
X9	Rear Surface of Veh. to Upper Trailing Edge of Left Door	2638	2673	-35
X10	Rear Surface of Veh. to Lower Trailing Edge of Right Door	2625	2608	17
X11	Rear Surface of Veh. to Lower Trailing Edge of Left Door	2616	2600	16
X12	Rear Surface of Veh. to Bottom of " A " Post on Right Side	1665	1700	-35
X13	Rear Surface of Veh. to Bottom of " A " Post on Left Side	1635	1670	-35
X14	Rear Surface of Veh. to Firewall--Right Side	1390	1428	-38
X15	Rear Surface of Vehicle to Firewall --Left Side	1390	1425	-35
X16	Rear Surface of Veh. to Steering Wheel Center	2045	2100	-55
X17	Center of Steering Column to " A " Post	325	304	21
X18	Center of Steering Column to Headliner	415	430	-15
X19	Rear Surface of Veh. to Right Side of Front Bumper	4575	4188	387
X20	Rear Surface of Veh. to Left Side of Front Bumper	4575	3583	992
X21	Length of Engine Block	400	400	0

Table 7 Impacted Vehicle Measurements, Cont'd.

Vehicle year/make/model/body style: 1998/Honda/Civic/passenger car Test Number: 981008

No.	Type of measurement	Pre-Test	Post-Test	Difference
X1	Total Length of Veh. at Centerline	4682	3681	1001
X2	Front Surface of Vehicle to Bottom of "A" Post of Right Side	1665	1700	-35
X3	Front Surface of Vehicle to Bottom of "A" Post of Left Side	1635	1670	-35
X4	Front Surface of Vehicle to Right Side of Rear Bumper	4575	4188	387
X5	Front Surface of Vehicle to Left Side of Rear Bumper	4575	3583	992
Z6	Right front sill to ground plane	149	112	37
Z7	Left front sill to ground plane	144	114	30
Z8	Right rear sill to ground plane	156	60	96
Z9	Left rear sill to ground plane	159	140	19
X10	Left wheelbase of vehicle	2622	2360	262
X11	Width of vehicle at max. width point	1700	2260	-560
X12	Front surface of vehicle to engine target	775	805	-30
X13	Front surface of vehicle to compartment target	2538	2625	-87
X14	Front surface of vehicle to rear bumper target	4623	3640	983
X15	Right wheelbase of vehicle	2622	2520	102

Figure 5 Vehicle Target Locations



(Dimensions in Millimeters)

Table 8 Test Vehicle Rear Profile Data

X-axis measurements referenced to a plane 430 millimeters forward of the front bumper centerline. Y-axis measurements are left and right of the original vehicle centerline. Y-axis measurements (6 points) should divide the width of the car and be clearly indicated on the form. Z-axis (height) measurements are from the ground.

		Pre-Test Profile					
		Vehicle Left			Vehicle Right		
		pt. 1	pt. 2	pt. 3	pt. 4	pt. 5	pt. 6
Bottom of rear bumper	X	4537	4630	4650	4655	4638	4557
	Y	760	462	151	-155	-457	-462
	Z	385	385	385	385	385	385
Top of rear bumper	X	4575	4655	4680	4678	4657	4575
	Y	760	458	152	-155	-462	-765
	Z	562	556	556	560	561	558
Center of trunk	X	4490	4575	4545	4546	4584	4484
	Y	750	475	167	-140	-450	-745
	Z	788	819	808	815	824	798

Table 8 Test Vehicle Rear Profile Data, Cont'd.

		Post-Test Profile					
		Vehicle Left			Vehicle Right		
		pt. 1	pt. 2	pt. 3	pt. 4	pt. 5	pt. 6
Bottom of rear bumper	X	3614	3586	3602	3669	4050	4280
	Y	758	465	165	-133	-138	-325
	Z	594	603	575	533	749	620
Top of rear bumper	X	3583	3674	3689	3744	3979	4188
	Y	772	467	163	-73	-180	-480
	Z	750	751	726	763	791	666
Center of trunk	X	N/A	3640	3724	3808	N/A	N/A
	Y	N/A	452	135	-158	N/A	N/A
	Z	N/A	839	917	940	N/A	N/A

Table 8 Test Vehicle Rear Profile Data, Cont'd.

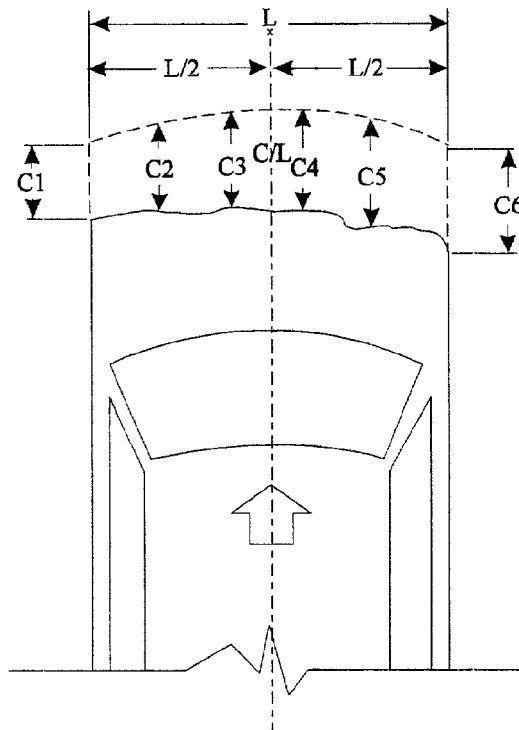
		Change					
		Vehicle Left			Vehicle Right		
		pt. 1	pt. 2	pt. 3	pt. 4	pt. 5	pt. 6
Bottom of rear bumper	X	923	1044	1048	986	588	277
	Y	2	-3	-14	-22	-319	-137
	Z	-209	-218	-191	-148	-364	-235
Top of rear bumper	X	992	991	991	1009	607	295
	Y	-12	-9	-11	-22	-324	-440
	Z	-188	-195	-171	27	-230	-62
Center of trunk	X	N/A	935	821	738	N/A	N/A
	Y	N/A	23	32	18	N/A	N/A
	Z	N/A	-20	-109	-125	N/A	N/A

+X: Rearward from a reference plane 430 mm forward of the vehicle front bumper

+Y: Left from vehicle longitudinal centerline

+Z: Up from ground

Figure 6 Vehicle Crush



Notes: L is pre-test length of contact surface.
C1 through C6 are spaced equally apart.
CL is vehicle centerline.

	Pre-test	Post-test	Crush
L	1524 mm		
C1	4575 mm	3583 mm	992 mm
C2	4655 mm	3674 mm	981 mm
C3	4680 mm	3689 mm	991 mm
C4	4678 mm	3744 mm	934 mm
C5	4657 mm	3979 mm	678 mm
C6	4575 mm	4188 mm	387 mm
CL	4682 mm	3681 mm	1001 mm

Figure 7 Vehicle Accelerometer Mounting Locations

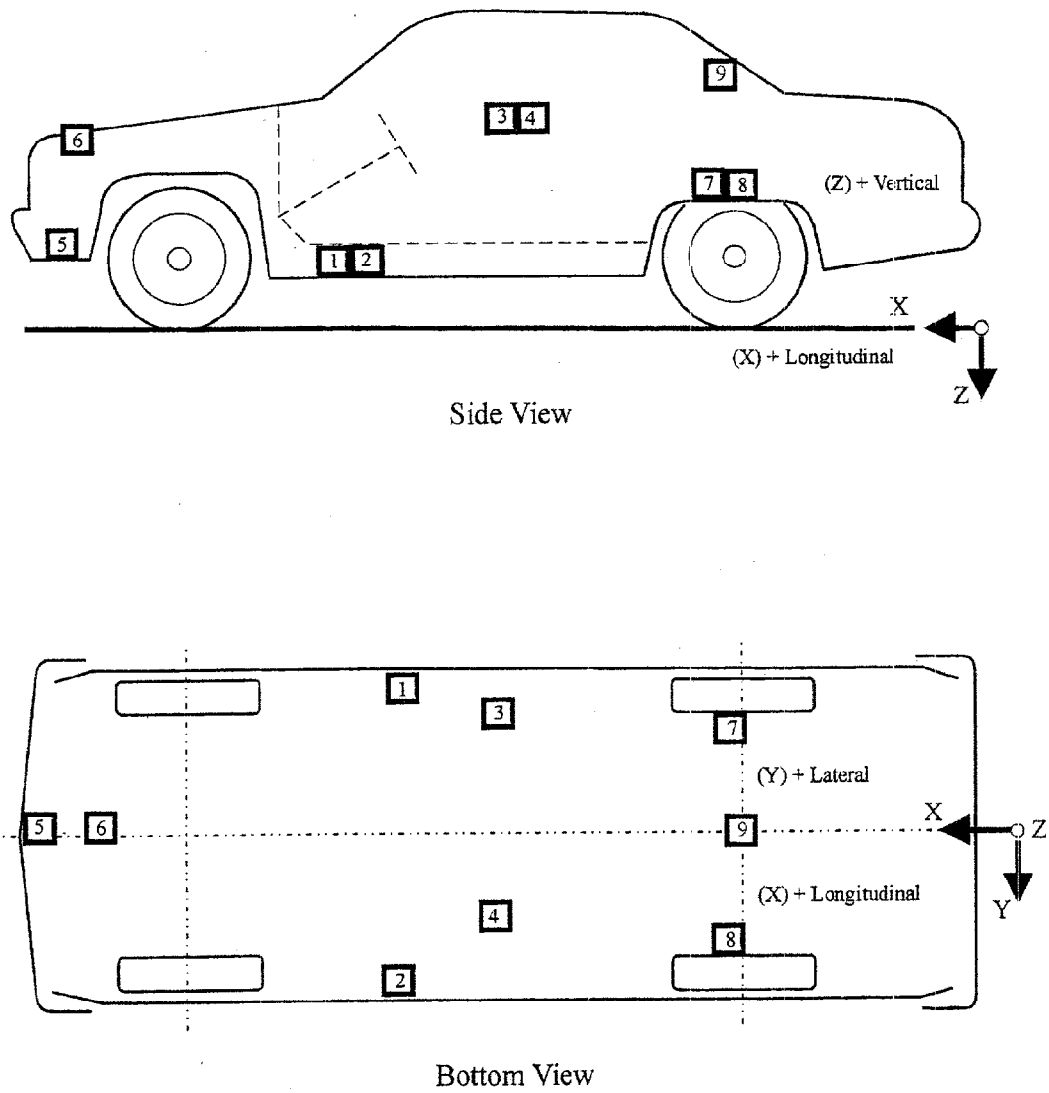


Table 9 Vehicle Accelerometer Locations and Data Summary

TEST NUMBER: 981008 No. LOCATION	X	Y	Z	POSITIVE DIRECTION	NEGATIVE DIRECTION
1 LEFT FRONT ROCKER	PRE 2200 mm	610 mm	253 mm		
PANEL	POST 2190 mm	610 mm	180 mm		
LONGITUDINAL			23.3 g	@ 43.6 ms	0.9 g @ 300.9 ms
LATERAL			5.1 g	@ 99.9 ms	8.4 g @ 63.0 ms
VERTICAL ¹			10.5 g	@ 122.3 ms	16.8 g @ 41.7 ms
RESULTANT ¹			26.3 g	@ 43.3 ms	
2 RIGHT FRONT ROCKER	PRE 2200 mm	-610 mm	253 mm		
PANEL	POST 2221 mm	-610 mm	166 mm		
LONGITUDINAL			61.1 g	@ 104.6 ms	8.0 g @ 237.8 ms
LATERAL ¹			---	---	---
VERTICAL ¹			9.9 g	@ 105.8 ms	19.9 g @ 153.4 ms
RESULTANT ¹			405.1 g	@ 134.9 ms	
3 LEFT FRONT SEATBACK	PRE 1725 mm	325 mm	813 mm		
MID	POST 2965 mm	333 mm	480 mm		
LONGITUDINAL			34.4 g	@ 127.8 ms	10.8 g @ 50.6 ms
LATERAL			8.4 g	@ 46.4 ms	13.9 g @ 56.5 ms
VERTICAL ¹			3.5 g	@ 116.7 ms	23.9 g @ 81.8 ms
RESULTANT ¹			34.9 g	@ 127.8 ms	
4 RIGHT FRONT SEATBACK	PRE 1725 mm	-325 mm	813 mm		
MID	POST 2995 mm	-290 mm	395 mm		
LONGITUDINAL ¹			105.0 g	@ 120.5 ms	103.1 g @ 127.6 ms
LATERAL			45.3 g	@ 127.8 ms	57.7 g @ 122.2 ms
VERTICAL ¹			81.6 g	@ 119.5 ms	30.8 g @ 127.7 ms
RESULTANT ¹			138.0 g	@ 120.2 ms	

Table 9 Vehicle Accelerometer Locations and Data Summary, Cont'd.

TEST NUMBER: 981008				POSITIVE DIRECTION		NEGATIVE DIRECTION	
No. LOCATION	X	Y	Z				
5 RADIATOR SUPPORT	PRE 500 mm	-5 mm	542 mm				
	POST 520 mm	0 mm	611 mm				
LONGITUDINAL				39.6 g	@ 49.2 ms	11.2 g	@ 29.8 ms
LATERAL				7.7 g	@ 73.0 ms	8.0 g	@ 32.5 ms
VERTICAL				23.2 g	@ 33.3 ms	23.0 g	@ 18.5 ms
RESULTANT				44.6 g	@ 49.4 ms		
6 LEFT ENGINE TOP	PRE 885 mm	35 mm	697 mm				
	POST 920 mm	45 mm	754 mm				
LONGITUDINAL				21.0 g	@ 29.9 ms	4.2 g	@ 189.4 ms
LATERAL				5.1 g	@ 88.3 ms	3.2 g	@ 67.9 ms
VERTICAL				7.9 g	@ 123.2 ms	4.5 g	@ 90.8 ms
RESULTANT				21.1 g	@ 30.0 ms		
7 LEFT REAR WHEEL AXLE	PRE 3795 mm	305 mm	232 mm				
	POST 3505 mm	338 mm	319 mm				
LONGITUDINAL ¹							
LATERAL				15.9 g	@ 45.7 ms	16.6 g	@ 35.8 ms
VERTICAL				49.6 g	@ 27.8 ms	61.1 g	@ 23.1 ms
RESULTANT ¹				1051.0 g	@ 54.5 ms		
8 RIGHT REAR WHEEL AXLE	PRE 3795 mm	-305 mm	229 mm				
	POST 3619 mm	-253 mm	308 mm				
LONGITUDINAL				124.2 g	@ 43.3 ms	22.8 g	@ 47.3 ms
LATERAL				17.7 g	@ 64.4 ms	14.2 g	@ 77.4 ms
VERTICAL				53.4 g	@ 47.3 ms	53.1 g	@ 43.3 ms
RESULTANT				135.3 g	@ 43.3 ms		

Table 9 Vehicle Accelerometer Locations and Data Summary, Cont'd.

TEST NUMBER: 981008 No. LOCATION	X		Y		Z		POSITIVE DIRECTION		NEGATIVE DIRECTION	
	PRE	3860 mm	0 mm	950 mm	POST	3615 mm	-15 mm	1024 mm		
9 REAR PKG SHELF										
LONGITUDINAL										
LATERAL										
VERTICAL										
RESULTANT										

REFERENCE: X: + FORWARD FROM REAR BUMPER
Y: + LEFTWARD FROM VEHICLE CENTERLINE
Z: + UPWARD FROM GROUND LEVEL

¹See DATA ACQUISITION EXPLANATIONS

Figure 8 Moving Deformable Barrier Instrumentation Placement

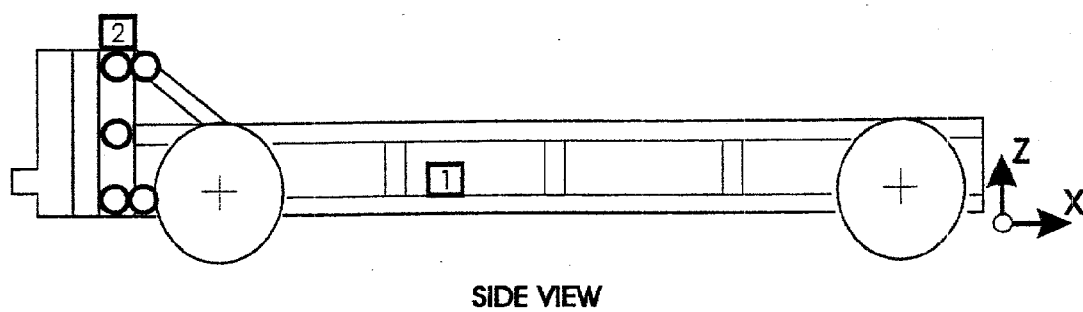
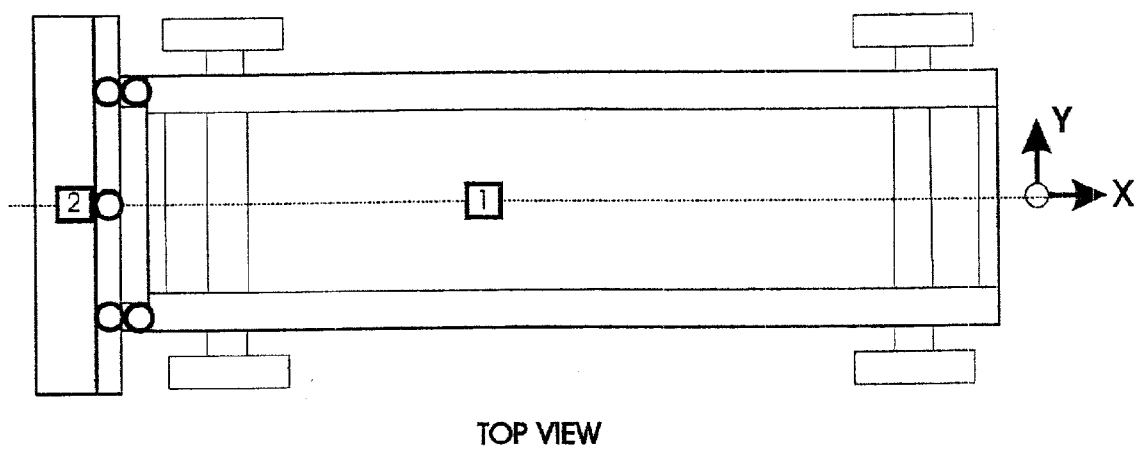
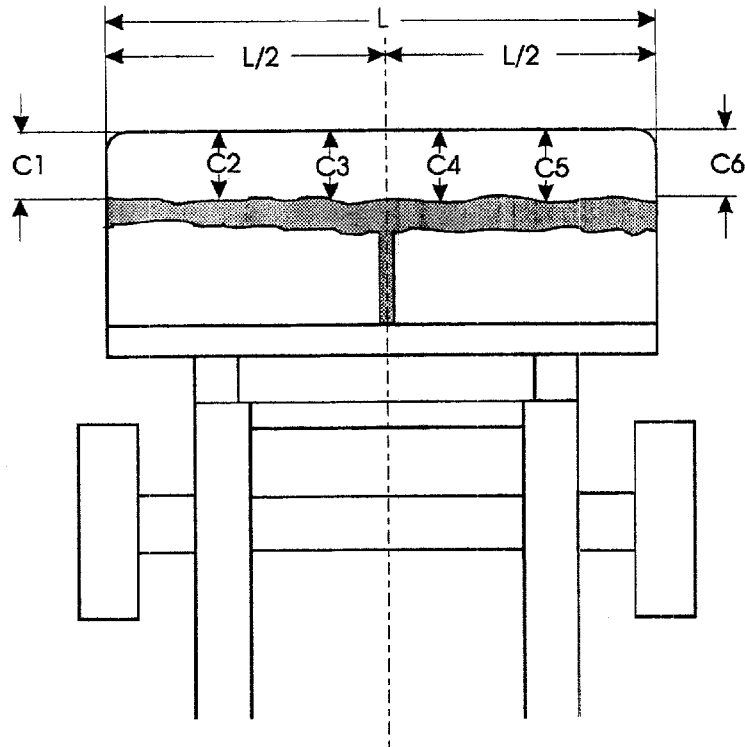


Table 10 Moving Deformable Barrier Instrumentation Placement and Data Summary

TEST NUMBER: 981008 No. LOCATION	X	Y	Z	POSITIVE DIRECTION	NEGATIVE DIRECTION
1 CENTER OF GRAVITY	NA	NA	NA		
LONGITUDINAL				1.5 g @ 235.9 ms	16.2 g @ 48.3 ms
LATERAL				4.2 g @ 43.9 ms	3.7 g @ 52.3 ms
VERTICAL				10.2 g @ 52.8 ms	8.5 g @ 93.4 ms
RESULTANT				19.4 g @ 52.7 ms	
2 BARRIER FRONT FORCE	NA	NA	NA		
TOP LEFT				15.8 kN @ 133.9 ms	31.4 kN @ 46.5 ms
BOTTOM LEFT				13.5 kN @ 37.5 ms	25.6 kN @ 6.6 ms
BOTTOM RIGHT				5.5 kN @ 117.0 ms	55.1 kN @ 39.5 ms
TOP RIGHT				1.3 kN @ 285.9 ms	62.9 kN @ 13.8 ms
FRONT CENTER				0.6 kN @ 294.9 ms	60.0 kN @ 53.0 ms

REFERENCE: X: + FORWARD FROM TRAILING EDGE OF BARRIER
Y: + LEFT FROM BARRIER CENTERLINE
Z: + UP FROM GROUND LEVEL

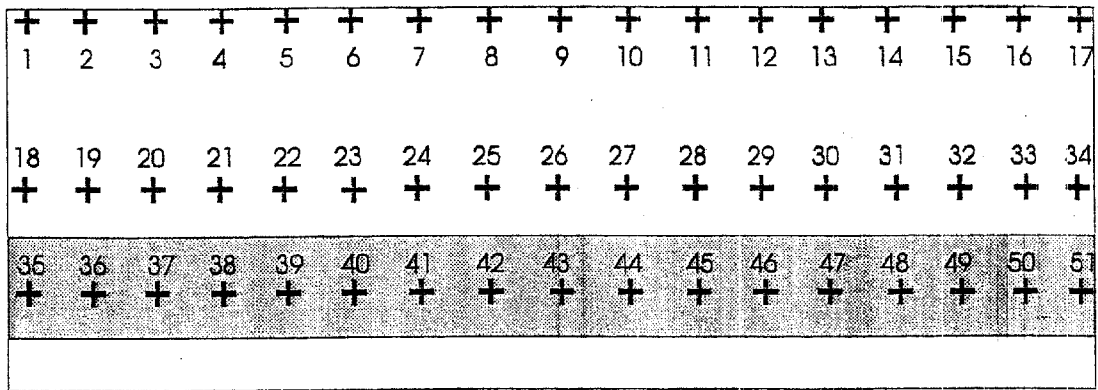
Figure 9 Moving Deformable Barrier Face Crush



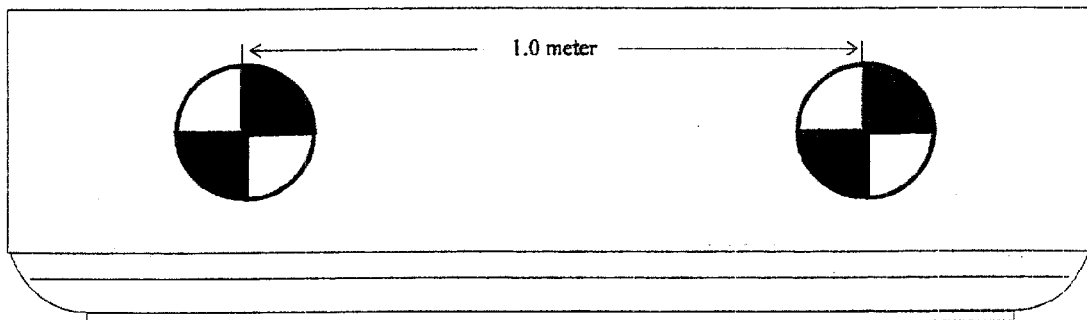
Notes: L is pre-test length of contact surface.
C1 through C6 are spaced equally apart.
CL is moving barrier centerline.

	Pre-test	Post-test	Crush
L	1676 mm		
C1	474 mm	533 mm	-59 mm
C2	484 mm	487 mm	-3 mm
C3	485 mm	437 mm	48 mm
C4	485 mm	445 mm	40 mm
C5	485 mm	440 mm	45 mm
C6	473 mm	409 mm	64 mm
CL	485 mm	435 mm	50 mm

Figure 10 Moving Deformable Barrier Face



Front View



Top View

Figure 11 Deformable Barrier Face Profile 1-17

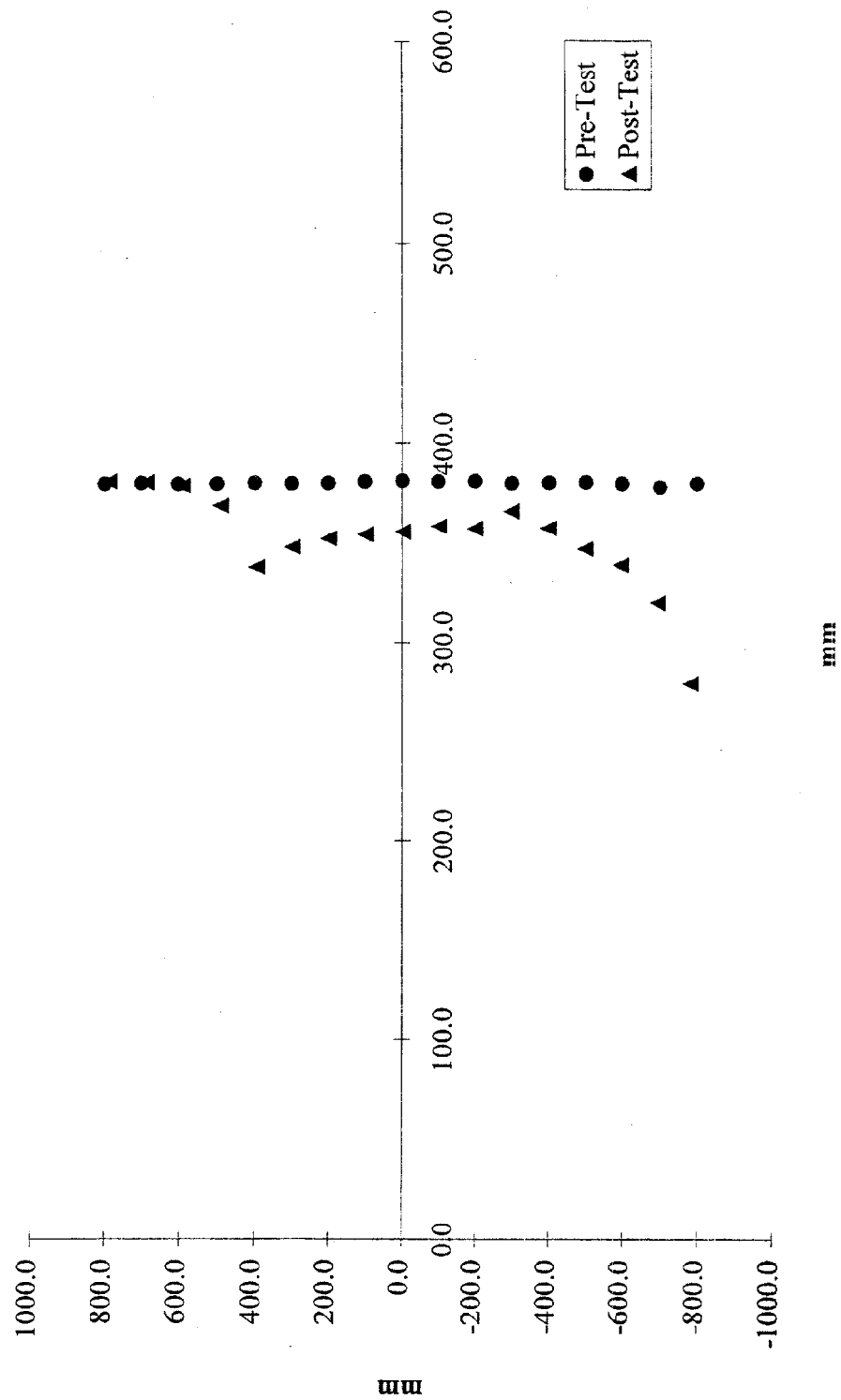


Figure 11 Deformable Barrier Face Profile 18-34

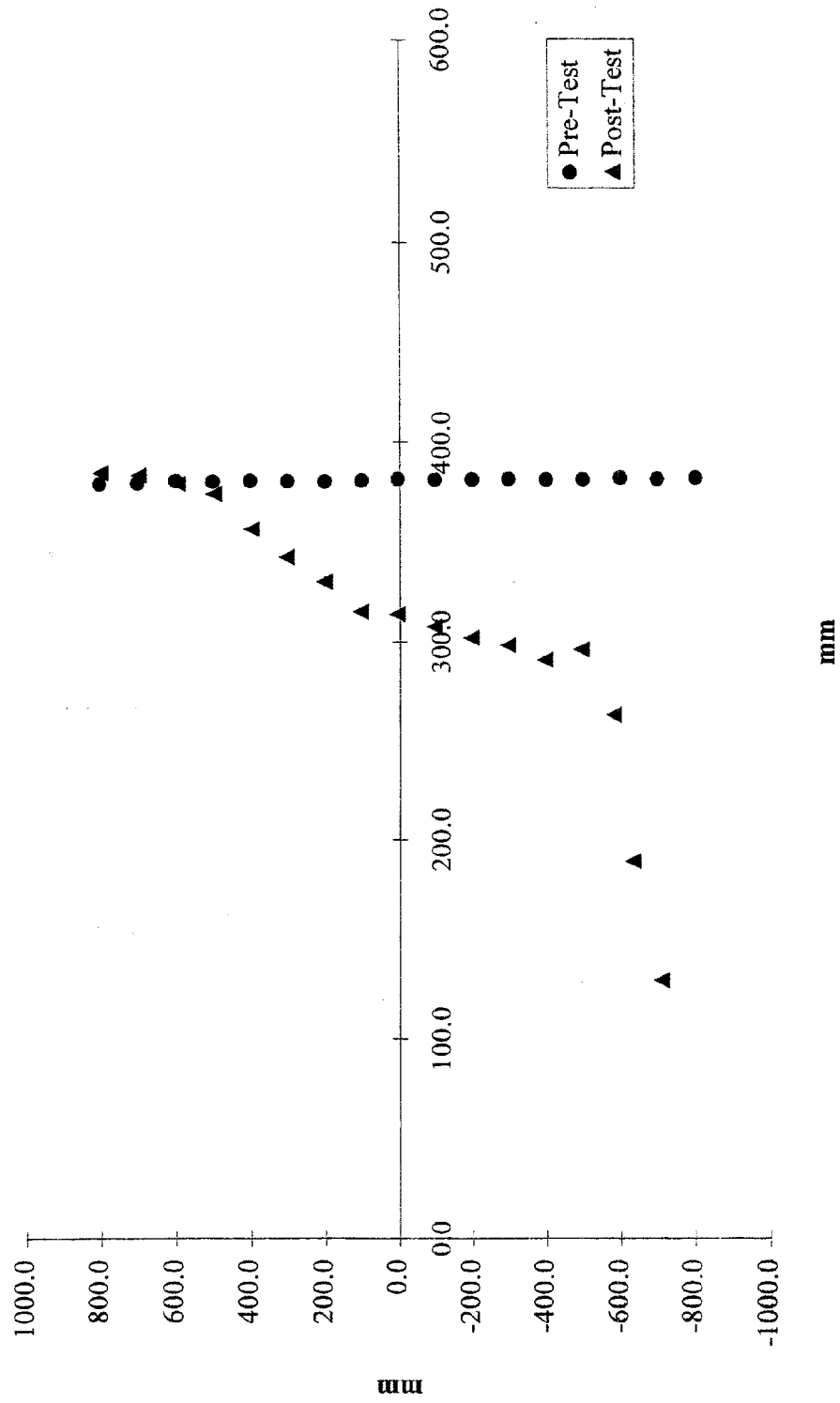


Figure 11 Deformable Barrier Face Profile 35-51

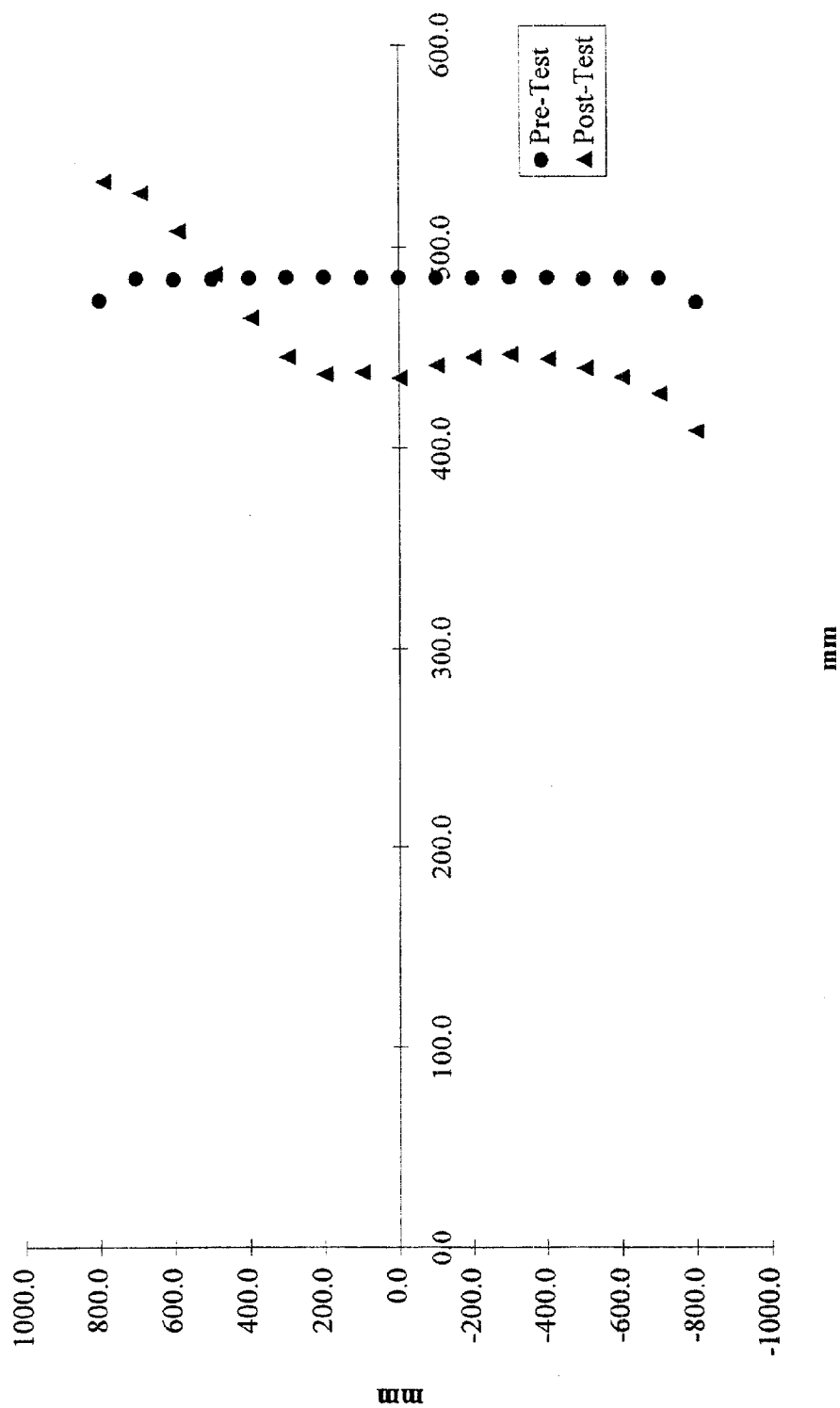


Table 1.1 Deformable Barrier Face Profile

Pre-Test				Post-Test				Difference			
Index	Xmm	Ymm	Zmm	Index	Xmm	Ymm	Zmm	Index	Xmm	Ymm	Zmm
1	380.6	-798.5	243.4	1	279.6	-784.1	208.0	1	101.0	-14.4	35.4
2	378.7	-700.5	243.6	2	320.4	-696.5	213.0	2	58.3	-4.0	30.6
3	380.6	-598.1	244.3	3	339.3	-597.0	215.6	3	41.3	-1.1	28.7
4	381.1	-501.3	245.2	4	347.4	-501.2	216.2	4	33.7	-0.1	29.0
5	380.8	-399.2	245.3	5	357.8	-399.8	218.1	5	23.0	0.6	27.2
6	380.6	-298.7	245.3	6	366.3	-299.5	218.6	6	14.3	0.8	26.7
7	381.5	-198.4	245.5	7	357.6	-200.9	212.1	7	23.9	2.5	33.4
8	381.2	-98.5	246.2	8	358.7	-101.7	217.1	8	22.5	3.2	29.1
9	381.5	-0.6	246.3	9	355.8	-3.4	218.2	9	25.7	2.8	28.1
10	381.1	101.1	247.7	10	354.4	97.6	222.9	10	26.7	3.5	24.8
11	380.3	200.3	247.6	11	352.3	196.5	228.8	11	28.0	3.8	18.8
12	380.0	299.4	249.2	12	347.9	295.0	222.4	12	32.1	4.4	26.8
13	380.3	399.0	249.5	13	337.7	391.9	232.3	13	42.6	7.1	17.2
14	379.9	499.6	248.3	14	368.8	487.2	240.8	14	11.1	12.4	7.5
15	379.8	603.0	249.5	15	378.8	588.9	247.1	15	1.0	14.1	2.4
16	380.3	701.7	250.3	16	380.4	686.6	251.6	16	-0.1	15.1	-1.3
17	380.0	800.1	250.2	17	381.0	785.3	255.1	17	-1.0	14.8	-4.9
18	382.7	-798.8	-8.9	18	129.4	-710.3	81.5	18	253.3	-88.5	-90.4
19	382.1	-696.0	-8.9	19	189.4	-634.2	48.0	19	192.7	-61.8	-56.9
20	382.7	-597.1	-7.3	20	263.3	-581.1	10.0	20	119.4	-16.0	-17.3
21	381.9	-496.2	-7.8	21	296.2	-494.0	-8.4	21	85.7	-2.2	0.6

Table 11 Deformable Barrier Face Profile Cont'd.

Pre-Test				Post-Test				Difference			
Index	Xmm	Ymm	Zmm	Index	Xmm	Ymm	Zmm	Index	Xmm	Ymm	Zmm
22	381.7	-396.7	-7.2	22	291.0	-395.9	-2.5	22	90.7	-0.8	-4.7
23	382.0	-295.3	-7.5	23	298.3	-295.5	0.0	23	83.7	0.2	-7.5
24	381.7	-195.7	-7.3	24	302.2	-195.7	2.5	24	79.5	0.0	-9.8
25	381.6	-94.2	-6.6	25	307.8	-95.0	5.1	25	73.8	0.8	-11.7
26	381.8	4.8	-6.2	26	313.9	4.2	5.2	26	67.9	0.6	-11.4
27	381.1	102.9	-6.6	27	315.2	102.7	6.4	27	65.9	0.2	-13.0
28	380.6	203.0	-4.7	28	330.0	201.5	0.7	28	50.6	1.5	-5.4
29	380.7	303.0	-4.5	29	342.1	302.8	-3.9	29	38.6	0.2	-0.6
30	381.0	402.7	-4.4	30	356.5	397.8	-6.6	30	24.5	4.9	2.2
31	380.5	502.3	-4.5	31	374.3	497.2	-7.9	31	6.2	5.1	3.4
32	381.0	601.6	-3.0	32	379.3	593.1	0.6	32	1.7	8.5	-3.6
33	379.8	703.2	-1.8	33	383.7	697.0	-0.9	33	-3.9	6.2	-0.9
34	379.5	805.5	-1.9	34	385.0	799.2	1.8	34	-5.5	6.3	-3.7
35	473.3	-797.0	-138.1	35	408.7	-799.1	-134.5	35	64.6	2.1	-3.6
36	485.1	-697.1	-137.2	36	427.5	-701.8	-129.0	36	57.6	4.7	-8.2
37	485.1	-596.1	-136.2	37	435.7	-600.7	-126.8	37	49.4	4.6	-9.4
38	484.9	-497.4	-135.5	38	440.2	-502.3	-126.7	38	44.7	4.9	-8.8
39	485.3	-398.5	-134.8	39	444.7	-403.5	-125.8	39	40.6	5.0	-9.0
40	485.5	-296.7	-135.3	40	446.9	-301.6	-127.9	40	38.6	4.9	-7.4
41	485.2	-196.4	-133.8	41	445.4	-201.2	-128.1	41	39.8	4.8	-5.7
42	485.1	-98.7	-134.6	42	441.5	-102.3	-131.2	42	43.6	3.6	-3.4

Table 11 Deformable Barrier Face Profile Cont'd.

Pre-Test				Post-Test				Difference			
Index	Xmm	Ymm	Zmm	Index	Xmm	Ymm	Zmm	Index	Xmm	Ymm	Zmm
43	485.1	2.0	-133.5	43	435.1	-2.5	-132.7	43	50.0	4.5	-0.8
44	485.2	100.5	-134.5	44	437.9	95.4	-133.7	44	47.3	5.1	-0.8
45	485.3	201.1	-133.7	45	436.9	196.0	-133.6	45	48.4	5.1	-0.1
46	485.1	301.8	-135.2	46	445.4	296.3	-134.8	46	39.7	5.5	-0.4
47	484.9	402.6	-133.5	47	464.6	394.6	-131.7	47	20.3	8.0	-1.8
48	484.4	501.8	-132.7	48	486.7	491.4	-129.5	48	-2.3	10.4	-3.2
49	484.3	602.3	-131.7	49	507.9	589.6	-127.0	49	-23.6	12.7	-4.7
50	484.9	702.7	-131.4	50	527.0	687.9	-125.8	50	-42.1	14.8	-5.6
51	474.1	801.8	-131.7	51	532.9	786.9	-126.1	51	-58.8	14.9	-5.6

Figure 12 Dummy Measurement Locations for Front Seat Occupants

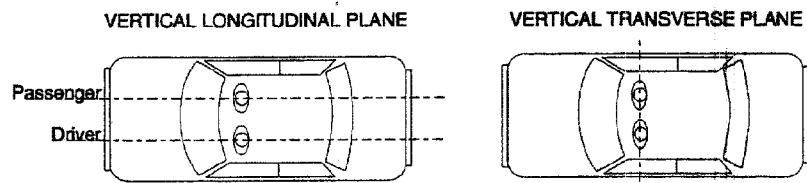
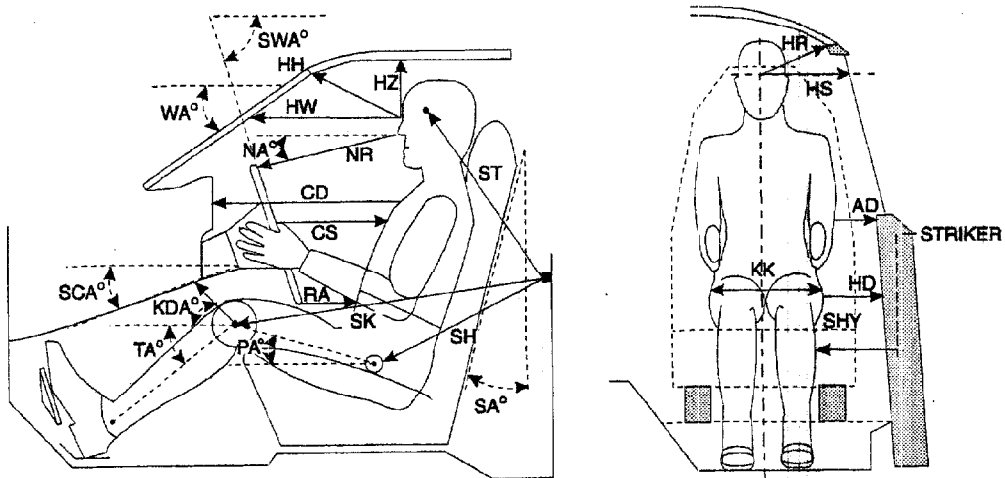
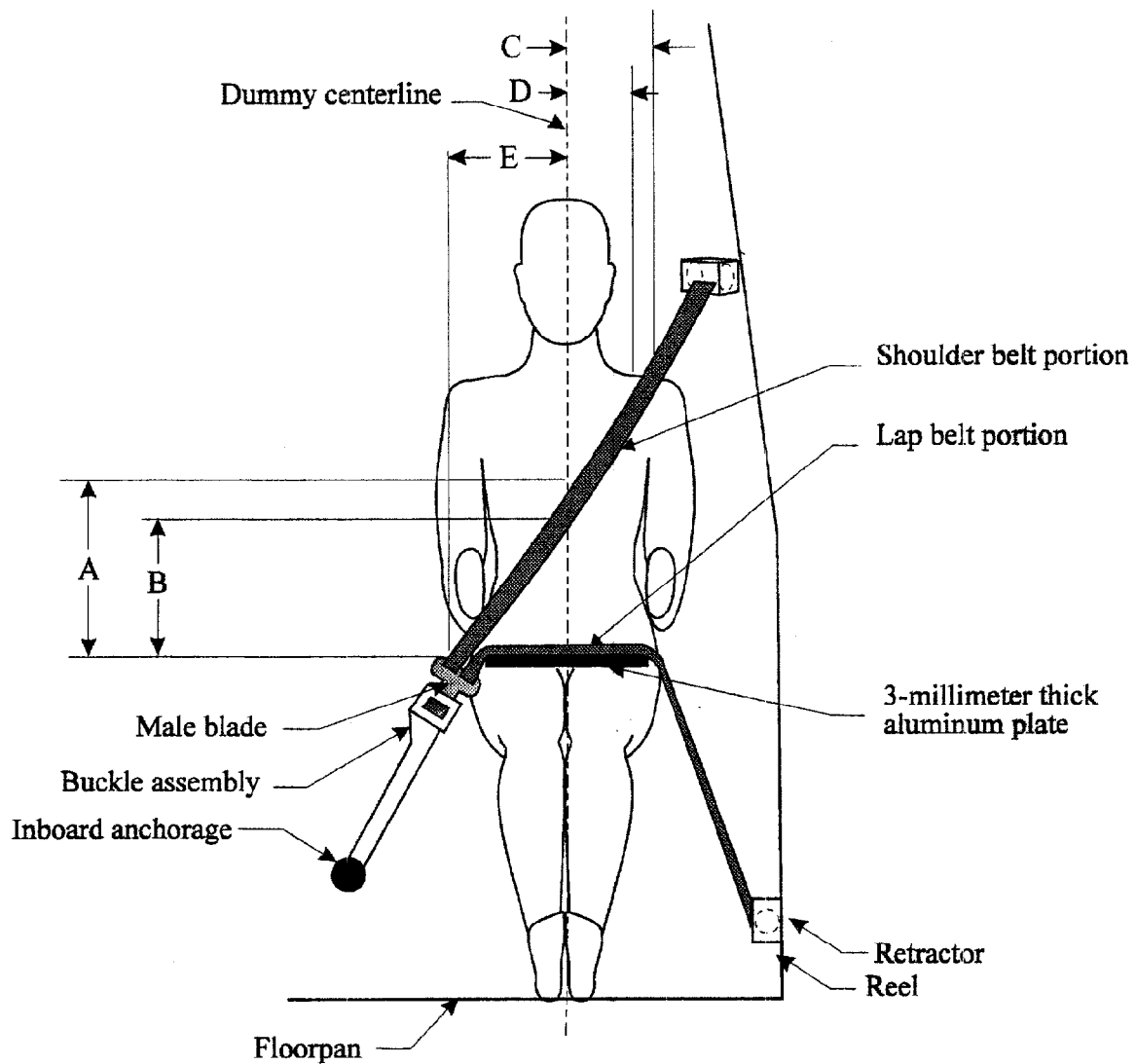


Table 12 Dummy Measurement Data For Front Seat Occupants

Designation	Type of Measurement	Driver (Serial #001)	Passenger (Serial #110)
WA	Windshield angle	31°	31°
SWA	Steering wheel angle	63°	NA
SCA	Steering column angle	27°	NA
SA	Seat back angle	22°	20°
HZ	Head to roof	176 mm	173 mm
HH	Head to header	302 mm	298 mm
HW	Head to windshield	525 mm	498 mm
HR	Head to side header	221 mm	221 mm
NR	Nose to rim	405 mm	NA
NA	Nose to rim angle	13°	NA
CD	Chest to dash	552 mm	539 mm
CS	Steering wheel to chest	326 mm	NA
RA	Rim to abdomen	190 mm	NA
KDL	Left knee to dash	172 mm	172 mm
KDR	Right knee to dash	164 mm	166 mm
KDA	Outboard knee to dash angle	30°	30°
PA	Pelvic angle	22°	21°
TA	Tibial angle	41°	35°
KK	Knee to knee	250 mm	270 mm
ST ¹	Striker to head	476 mm	487 mm
	Striker to head angle	-86°	-87°
SK	Striker to knee	554 mm	576 mm
	Striker to knee angle	3°	5°
SH	Striker to H-point	257 mm	250 mm
	Striker to H-point angle	41°	44°
SHY	Striker to H-point (Y dir.)	265 mm	259 mm
HS	Head to side window	310 mm	300 mm
HD	H-point to door	138 mm	124 mm
AD	Arm to door	92 mm	95 mm

The seat back angle (SA°) is measured relative to vertical, all other angles are measured relative to horizontal.

Figure 13 Seat Belt Positioning Data



		Driver	Passenger
A	Top surface of aluminum plate to belt upper edge	341 mm	330 mm
B	Top surface of aluminum plate to belt lower edge	265 mm	247 mm
C	Dummy centerline to outer edge of belt at chest flesh top	127 mm	148 mm
D	Dummy centerline to inner edge of belt at chest flesh top	66 mm	91 mm
E	Dummy centerline to intersection of upper torso belt and lap belt	290 mm	290 mm

Figure 14 Camera Positions

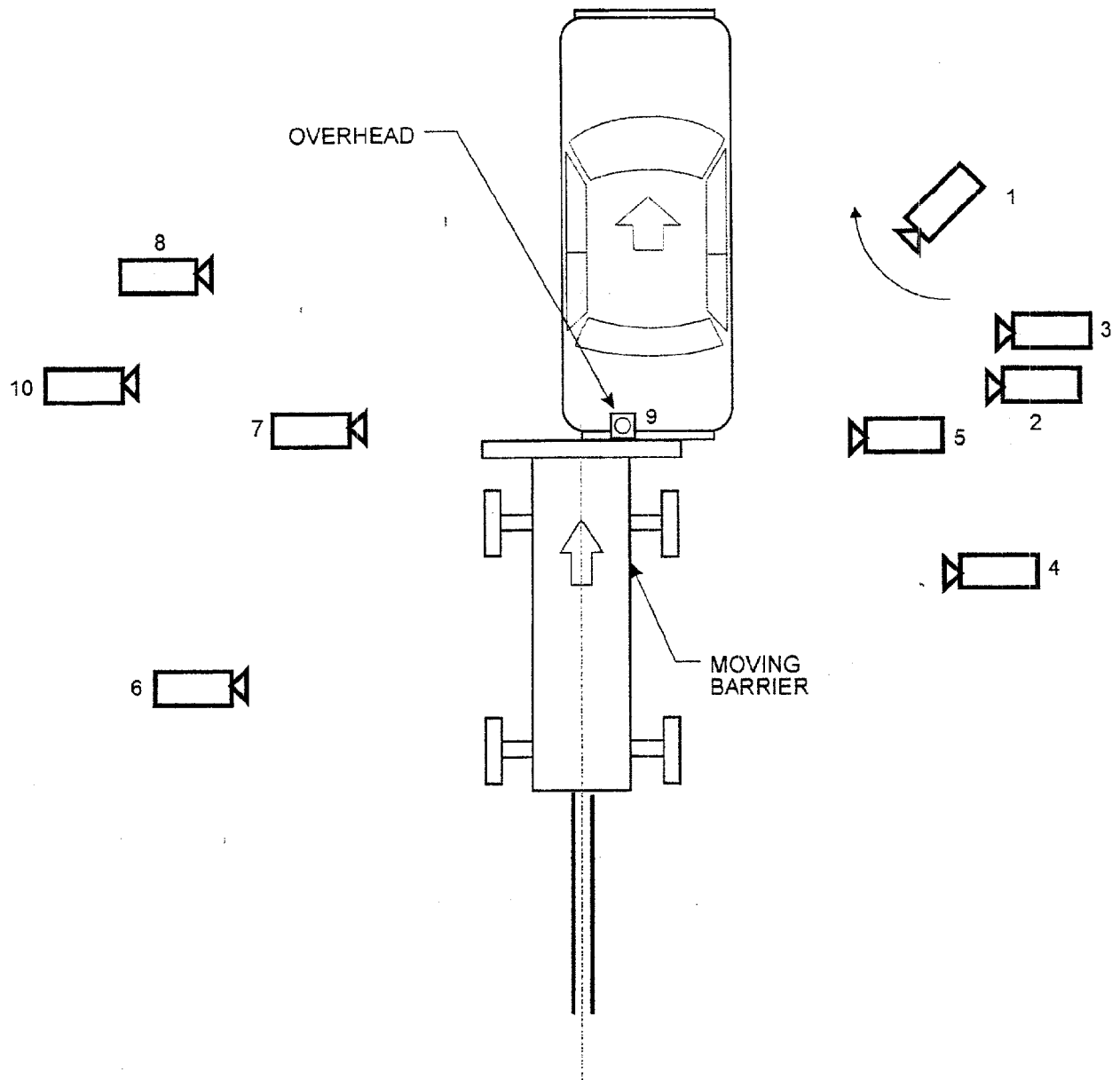


Table 13 Motion Picture Camera Locations

Vehicle year/make/model/body style: 1998/Honda/Civic/passenger car

Test number: 981008

Camera Number	View	Camera Positions ¹			Angle of Inclination ²	Angle of Rotation ³	Camera Lens	Film Speed
		X	Y	Z				
1	DOC/panning	NA	NA	NA	NA	NA		24 frames/s
2	Right side medium tight	NA	NA	NA	NA	NA	25 mm	953 frames/s
3	Right side wide	NA	NA	NA	NA	NA	25 mm	995 frames/s
4	Moving barrier - right side	NA	NA	NA	NA	NA	13 mm	990 frames/s
5	Right impact	NA	NA	NA	NA	NA	35 mm	1000 frames/s
6	Moving barrier - left side	NA	NA	NA	NA	NA	13 mm	978 frames/s
7	Left impact	NA	NA	NA	NA	NA	35 mm	1000 frames/s
8	Left side medium tight	NA	NA	NA	NA	NA	25 mm	1000 frames/s
9	Over tight - impact	NA	NA	NA	NA	NA	8 mm	1005 frames/s
10	Left side wide	NA	NA	NA	NA	NA	17 mm	1002 frames/s

¹ +X: Leftward from longitudinal centerline of vehicle

+Y: Forward from front bumper

+Z: Upward from ground level

² +Angle of Inclination: Camera lens (upward from horizontal)³ +Angle of Rotation: Camera lens toward barrier from line perpendicular to monorail centerline

Appendix A

Photographs

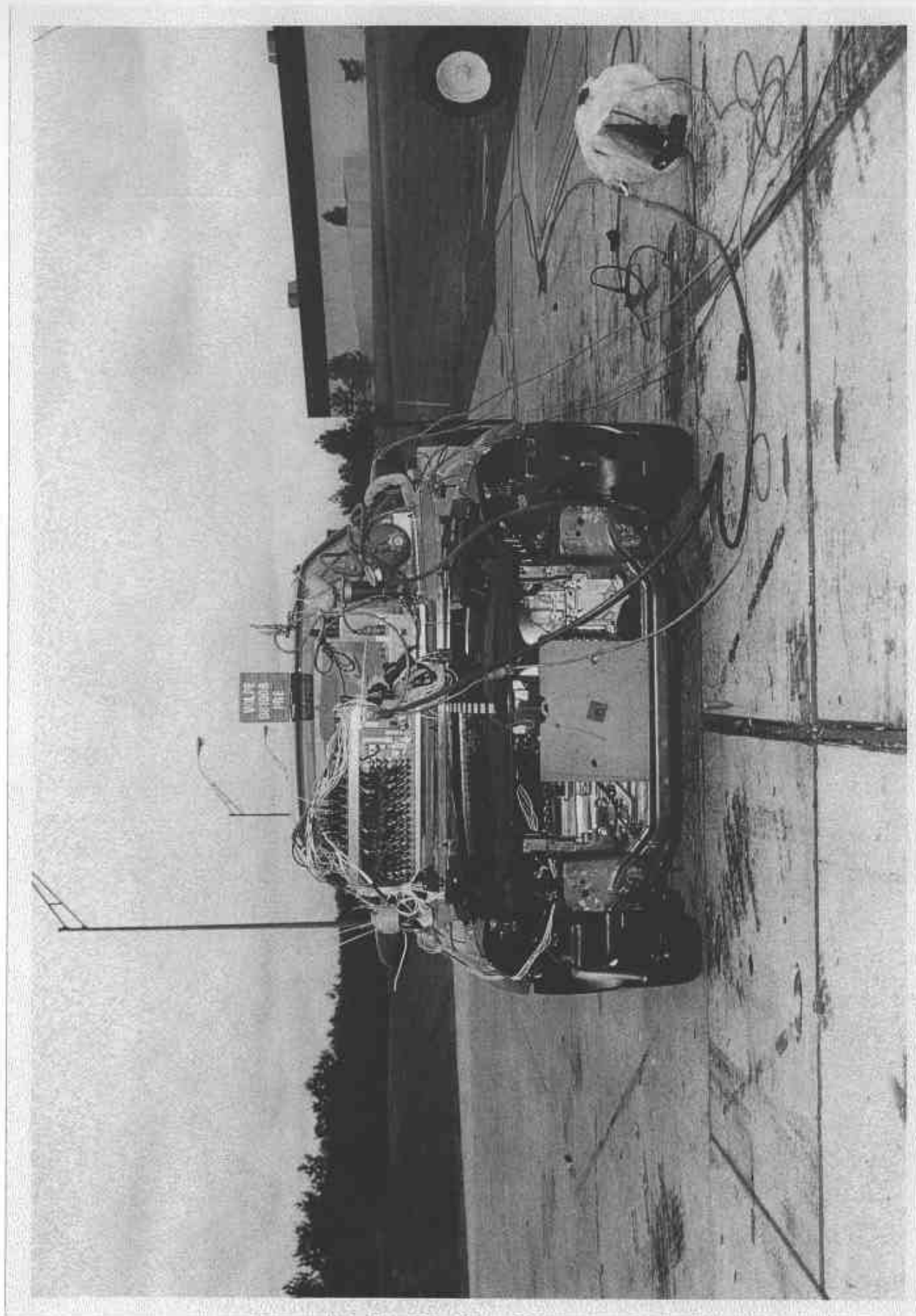


Figure A-1 Pre-Test Front View
A-2

981008

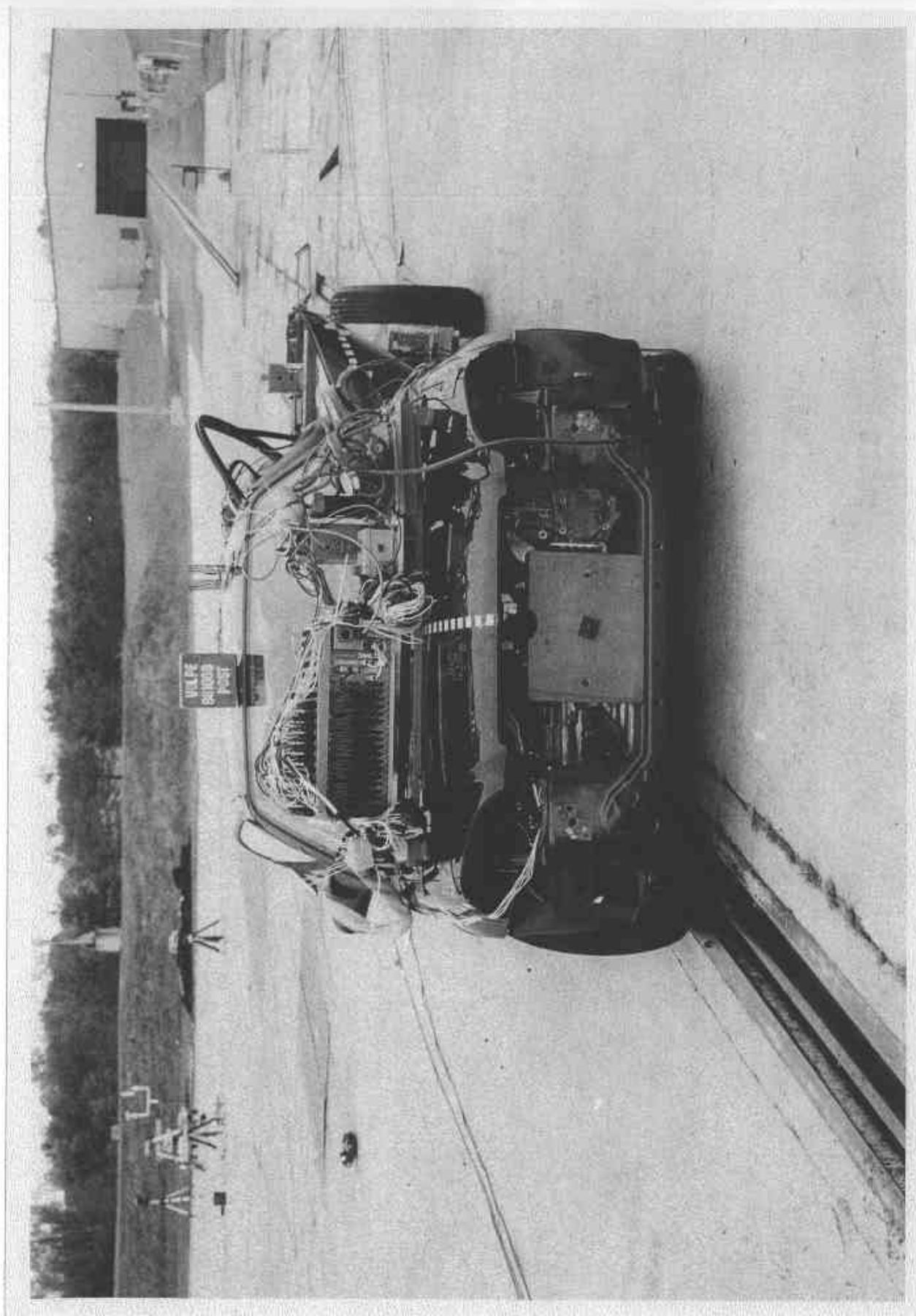


Figure A-2 Post-Test Front View
A-3

981008

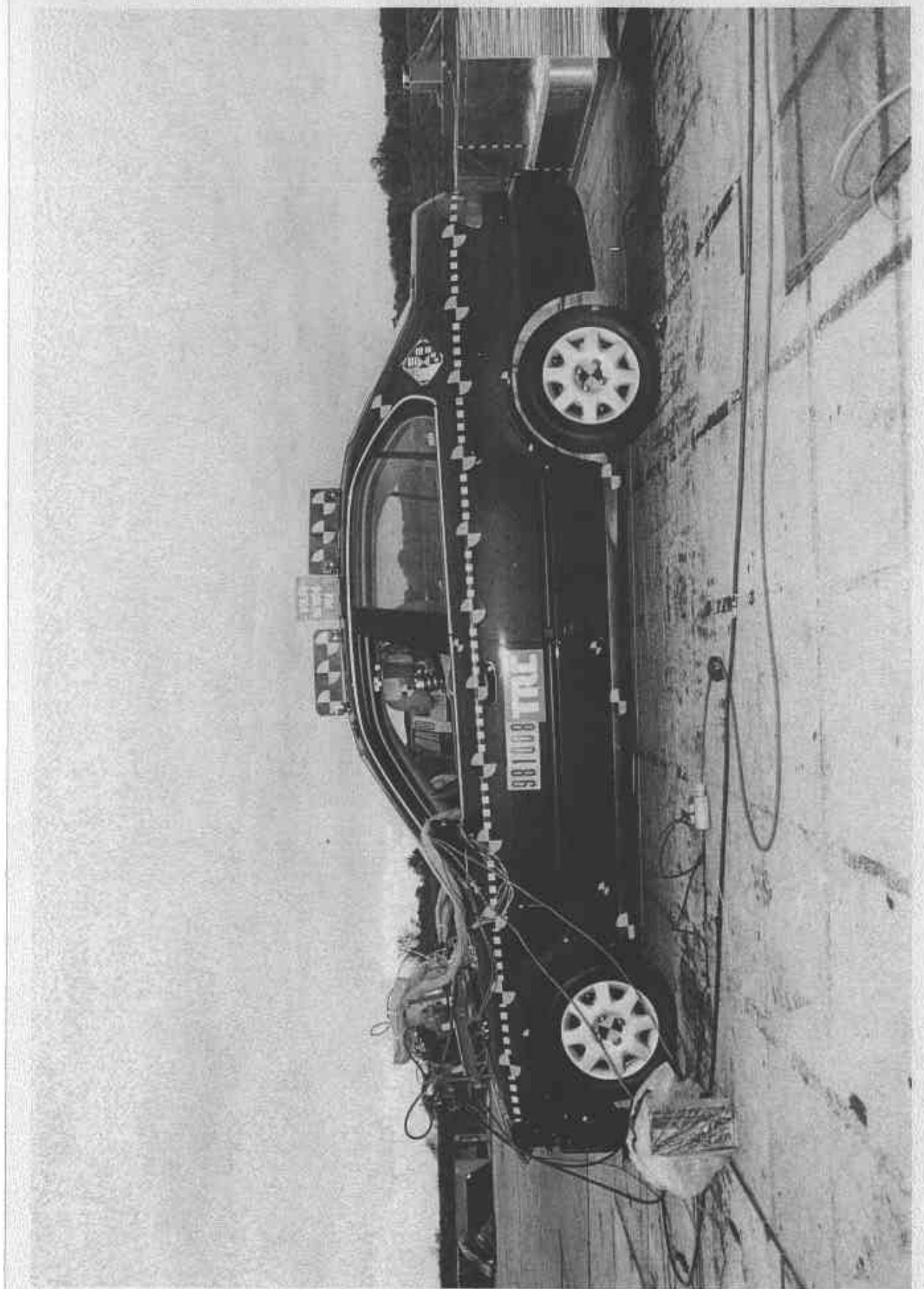


Figure A-3 Pre-Test Left Side View

A-4

981008

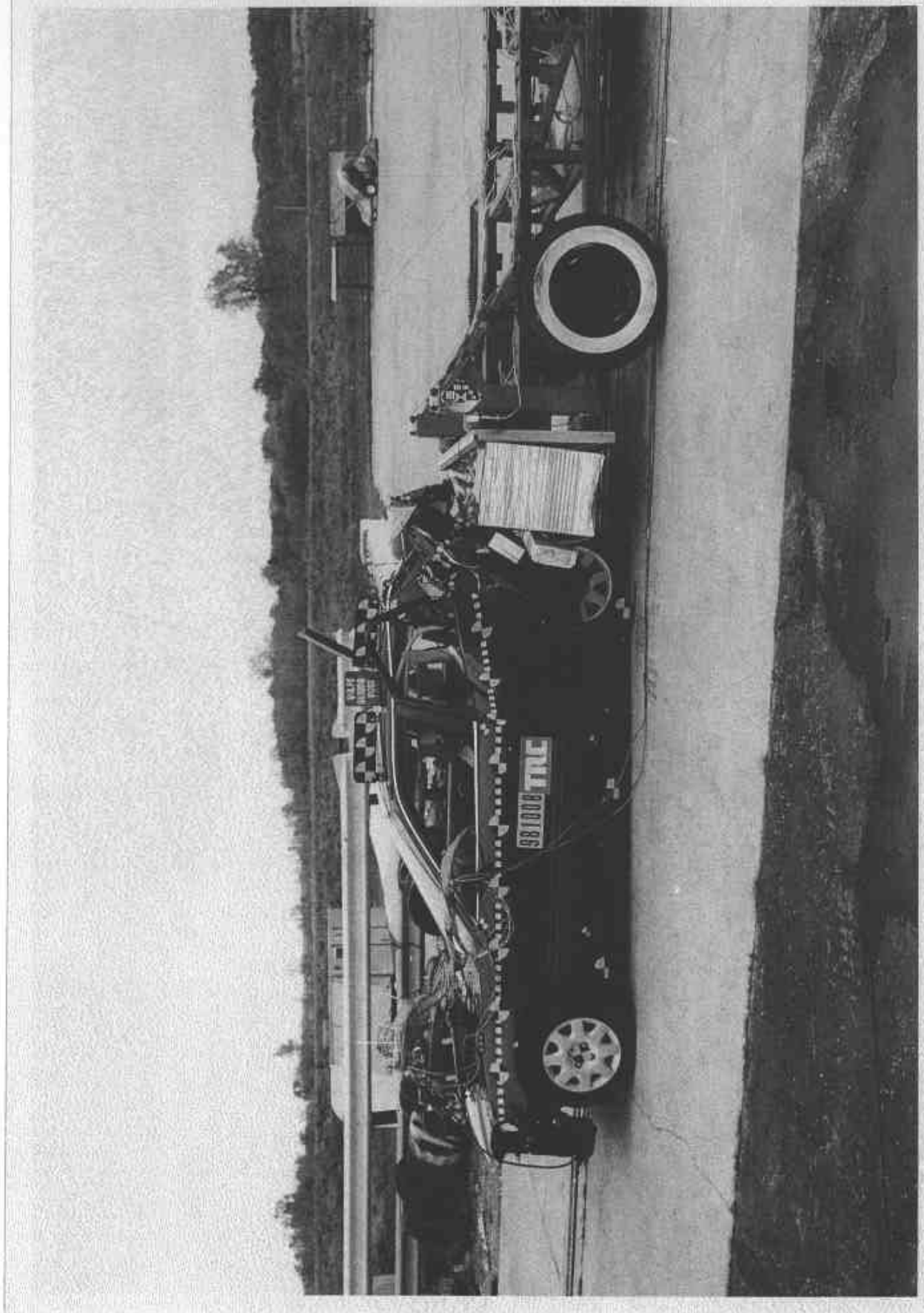


Figure A-4 Post-Test Left Side View
A-5

981008

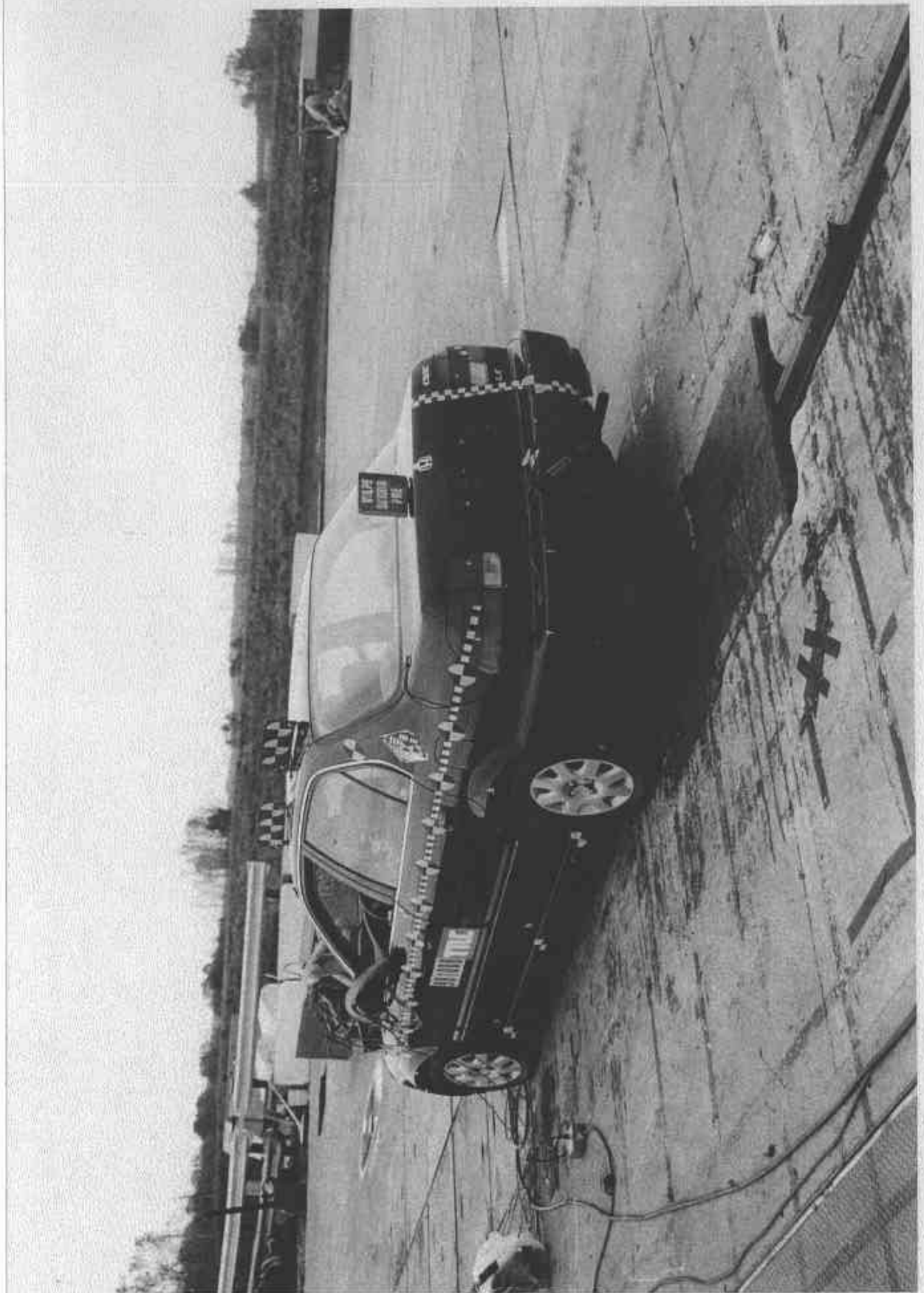


Figure A-5 Pre-Test Left Rear Three-Quarter View
A-6

981008

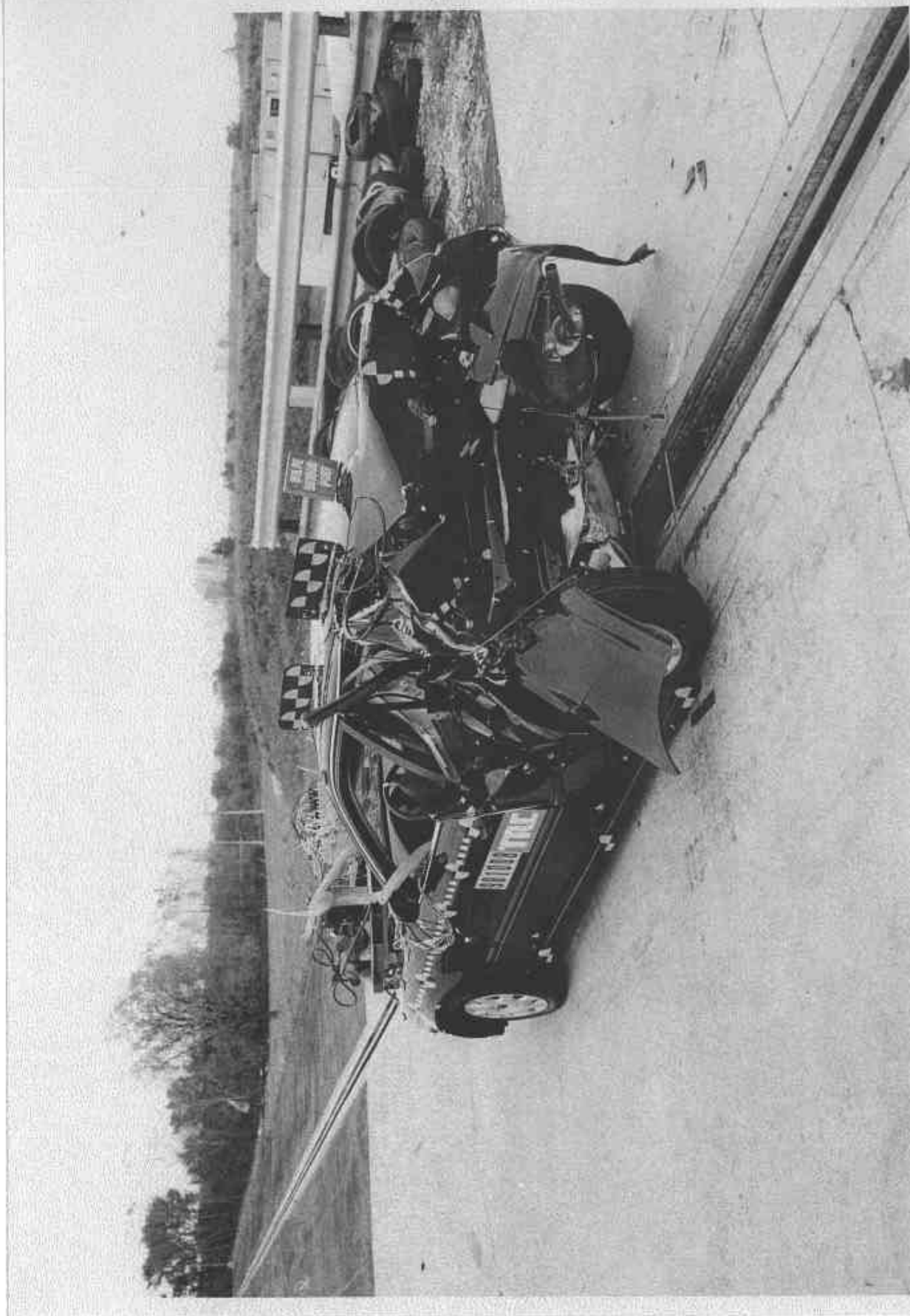


Figure A-6 Post-Test Left Rear Three-Quarter View
A-7

981008

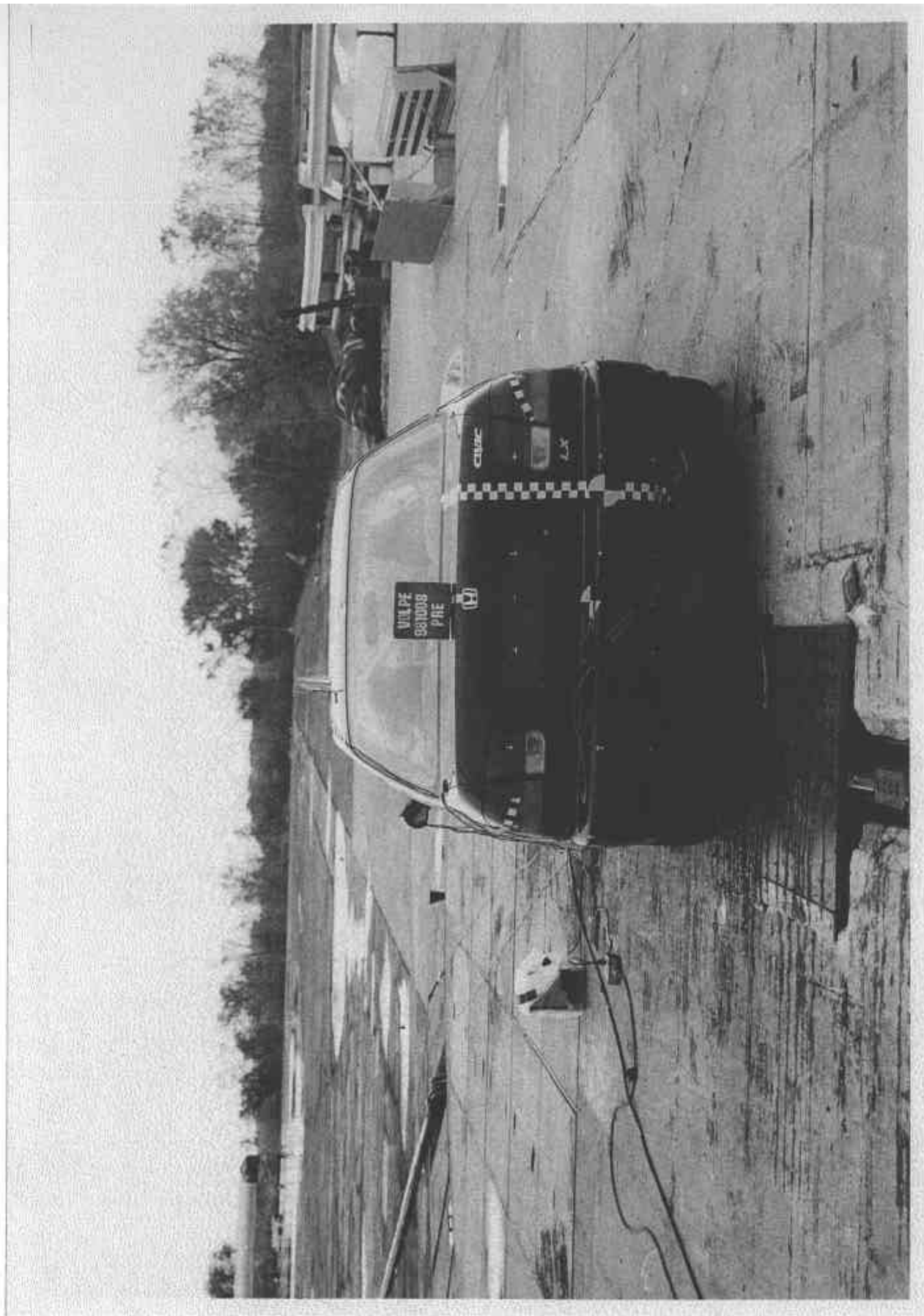


Figure A-7 Pre-Test Rear View
A-8

981008

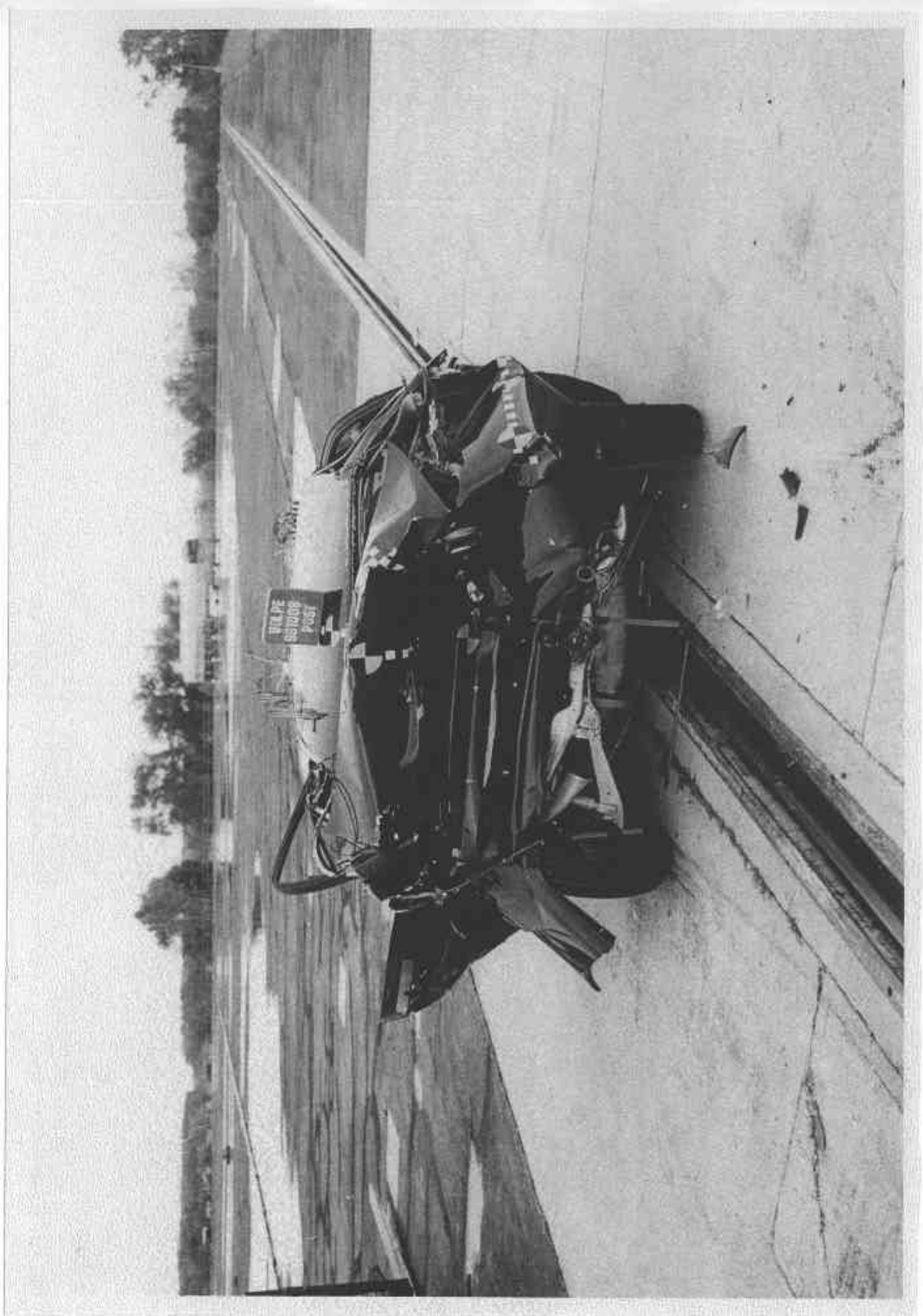


Figure A-8 Post-Test Rear View
A-9

981008



Figure A-9 Pre-Test Right Rear Three-Quarter View

A-10

981008



Figure A-10 Post-Test Right Rear Three-Quarter View
A-11

981008



Figure A-11 Pre-Test Right Side View
A-12

981008

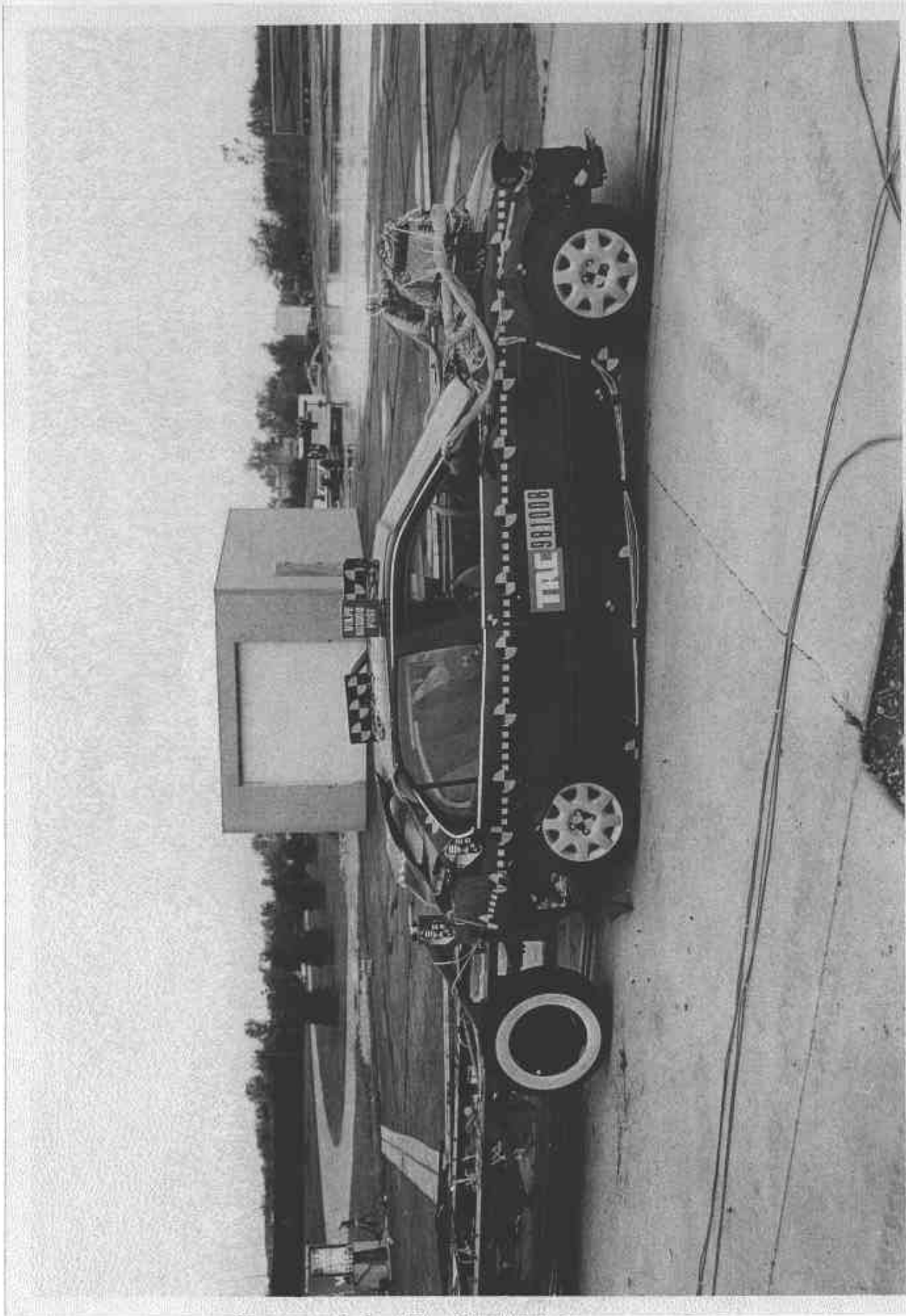


Figure A-12 Post-Test Right Side View
A-13

981008

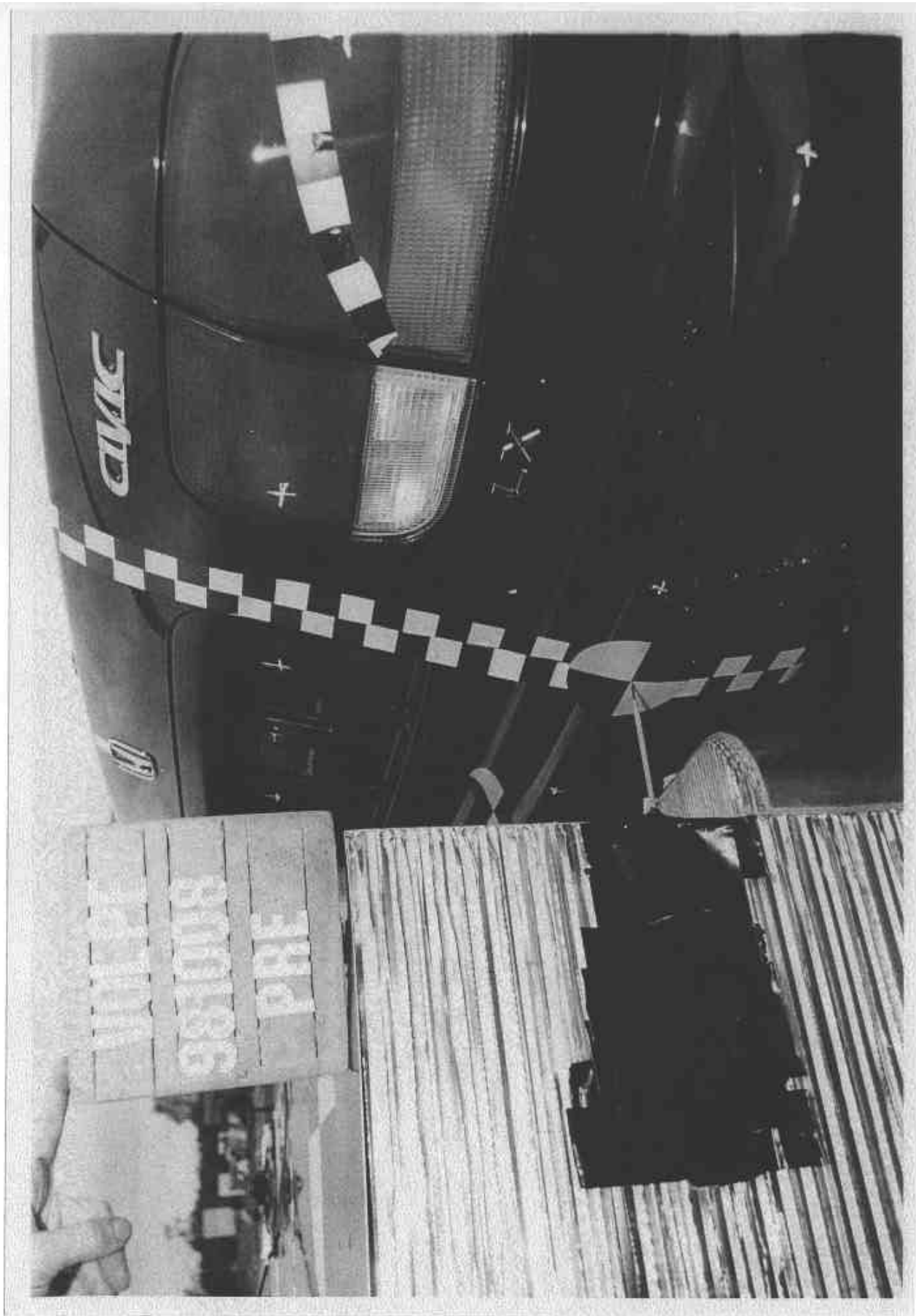


Figure A-13 Pre-Test Barrier Alignment View
A-14

981008

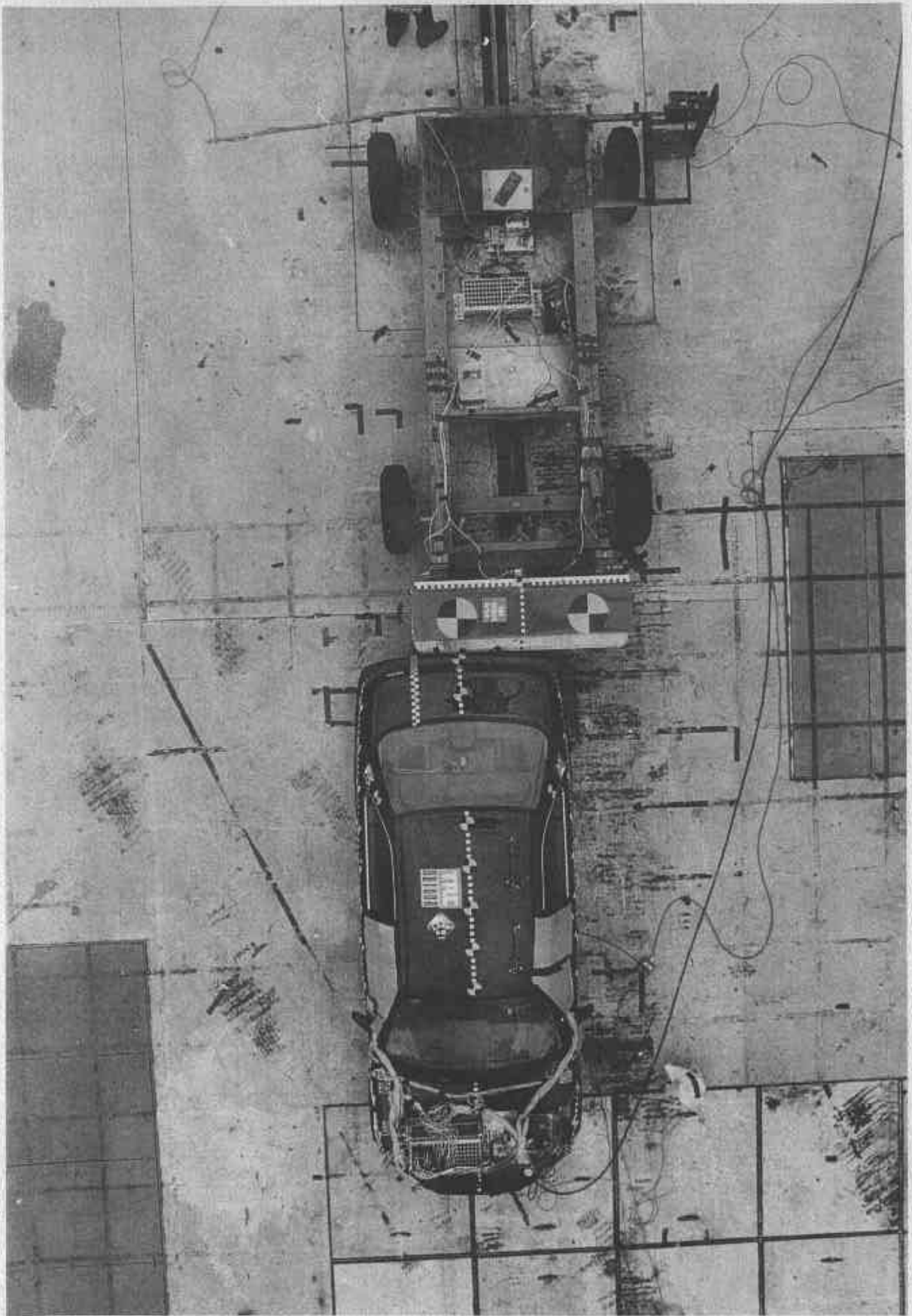


Figure A-14 Pre-Test Overhead - View 1
A-15

981008

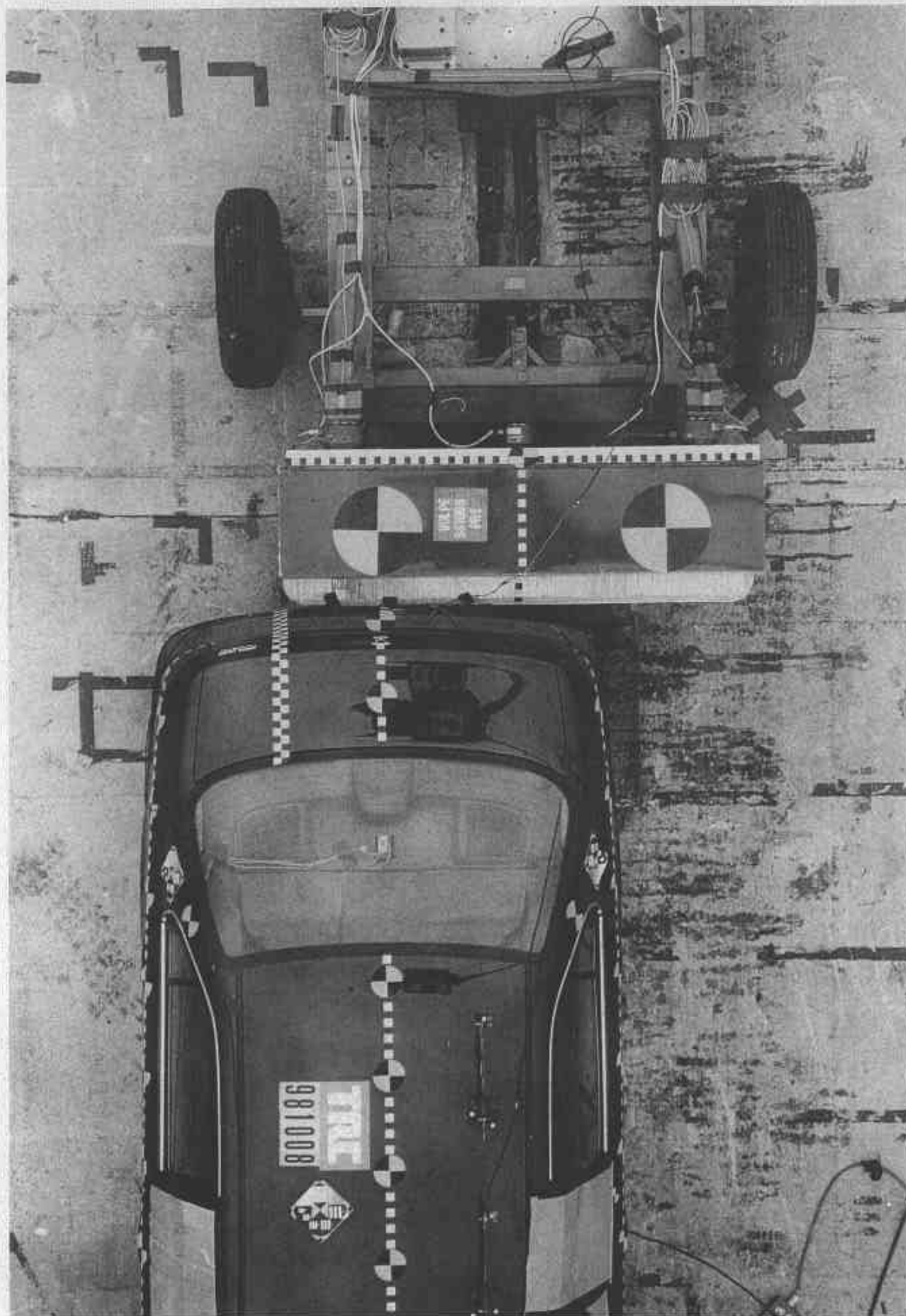


Figure A-15 Pre-Test Overhead - View 2
A-16

981008

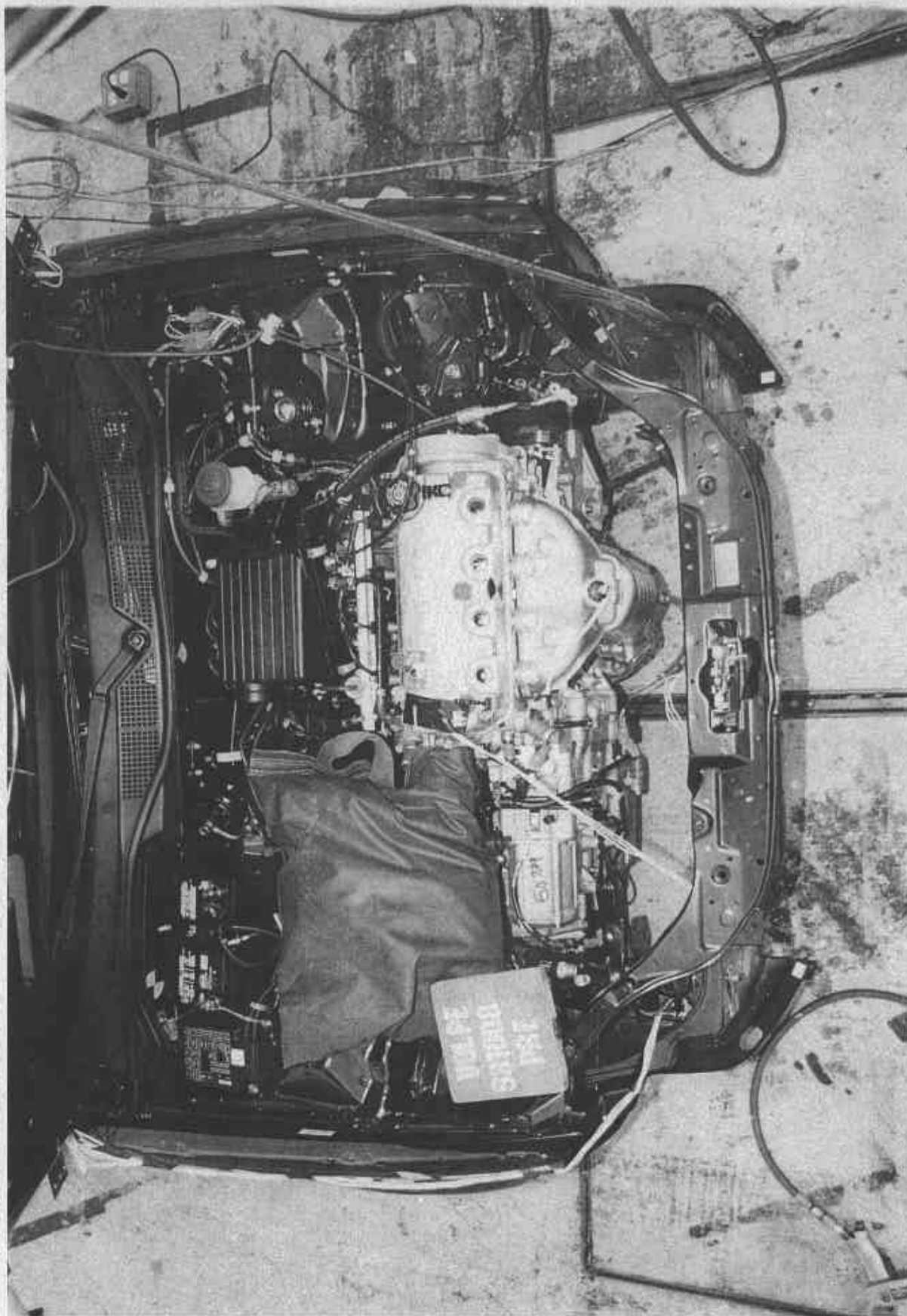


Figure A-16 Pre-Test Engine Compartment View

A-17

981008

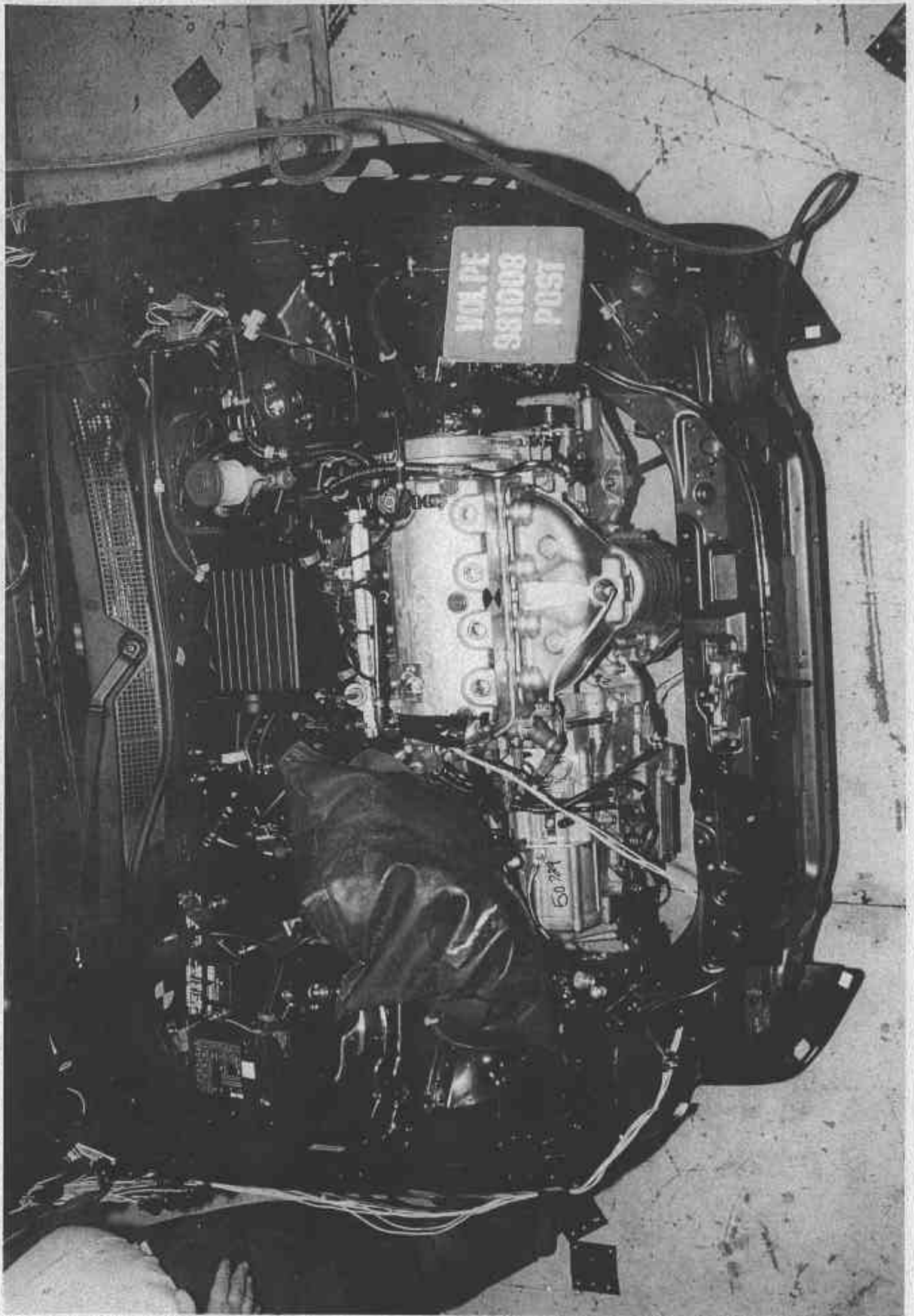


Figure A-17 Post-Test Engine Compartment View

A-18

981008

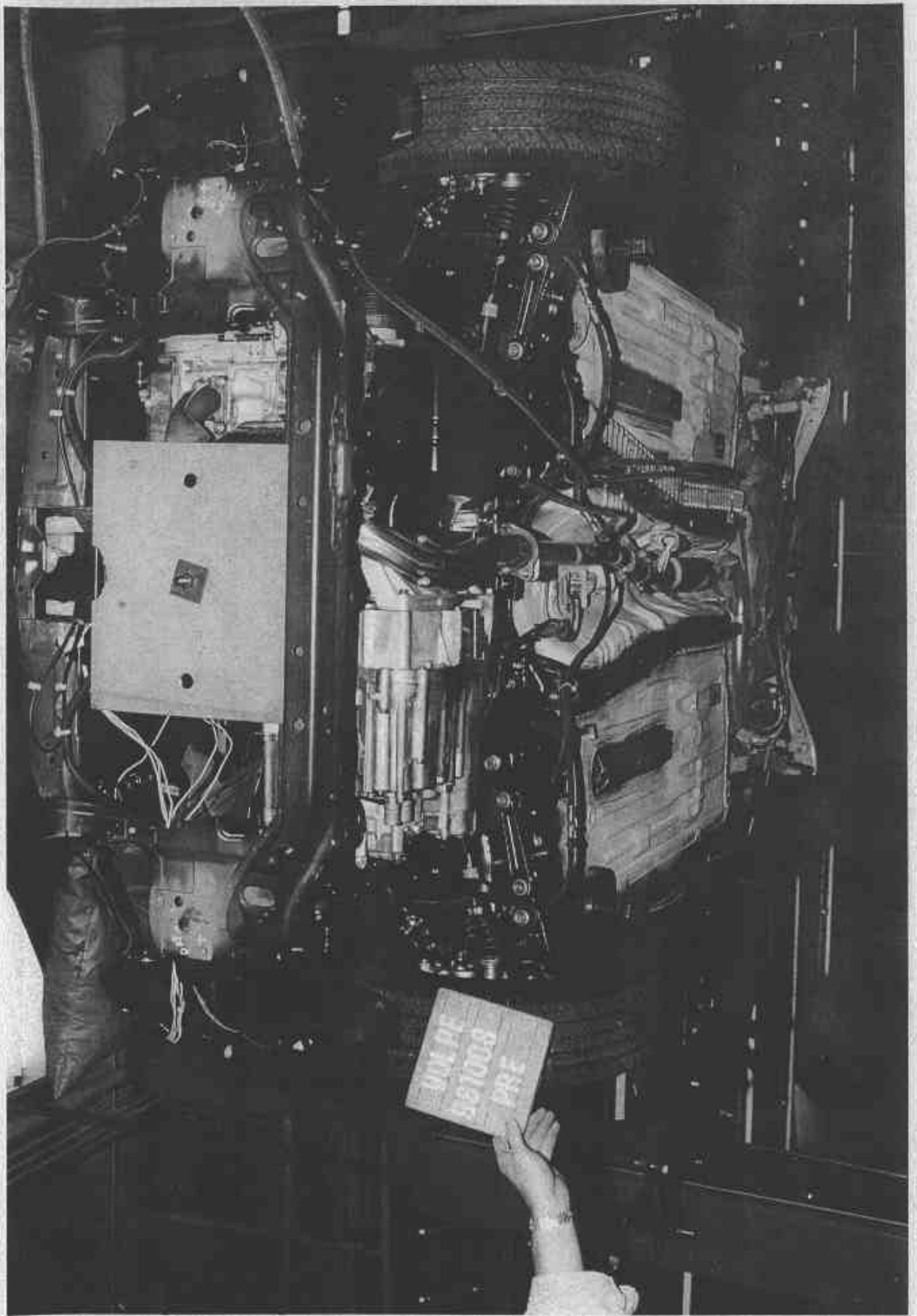


Figure A-18 Pre-Test Front Underbody View
A-19

981008

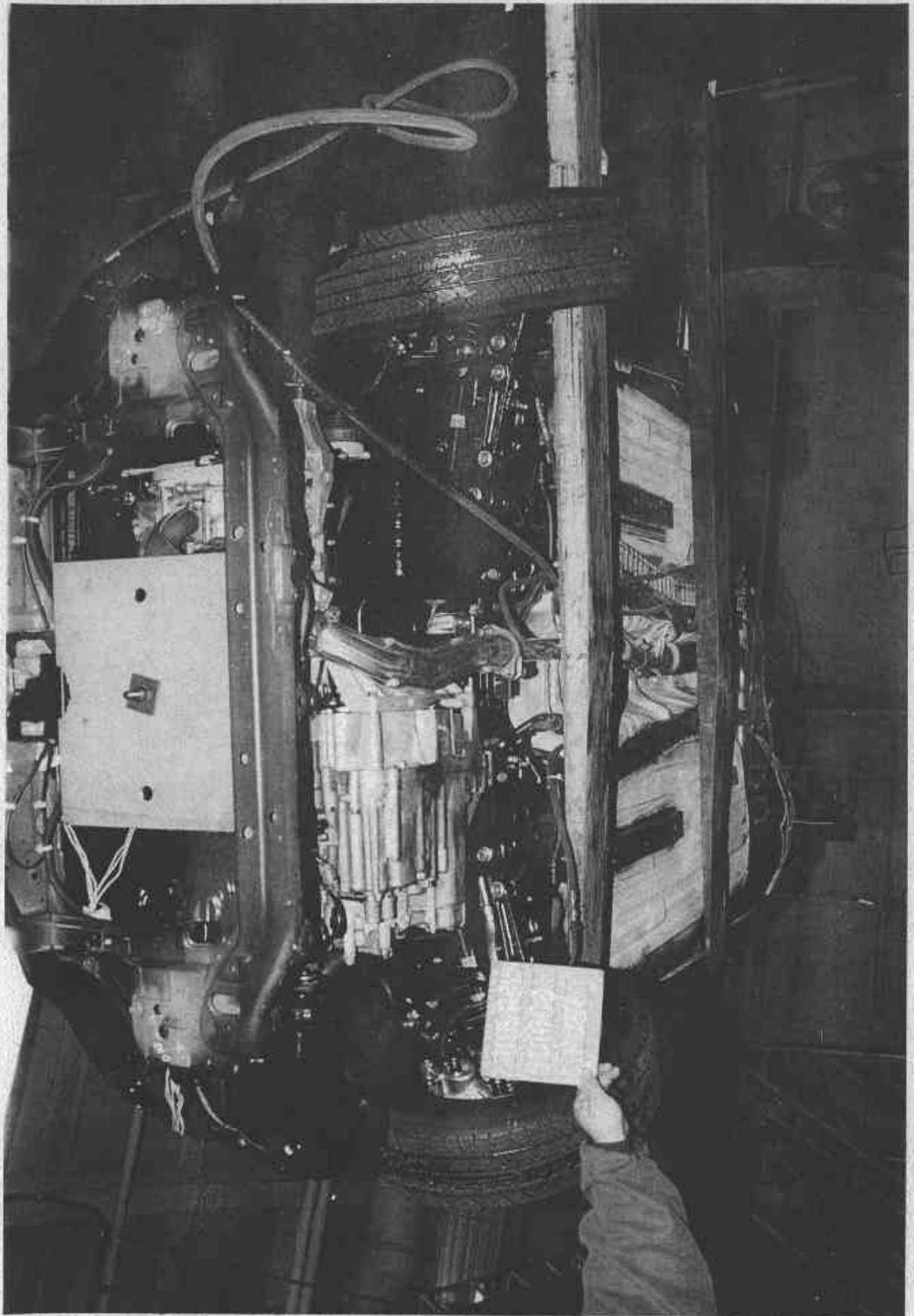


Figure A-19 Post-Test Front Underbody View
A-20

981008



Figure A-20 Pre-Test Rear Underbody View
A-21

981008

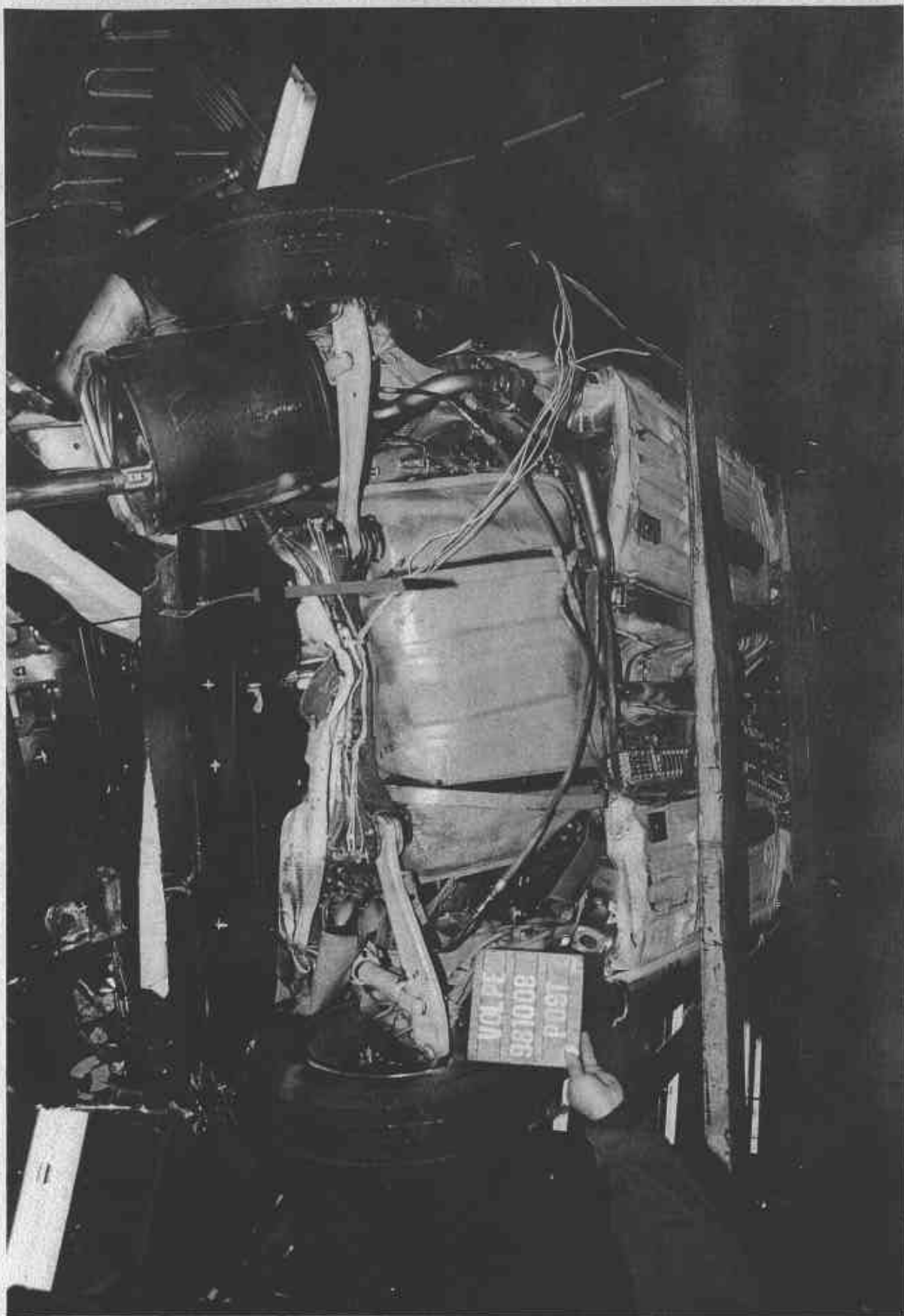


Figure A-21 Post-Test Rear Underbody View
A-22

981008

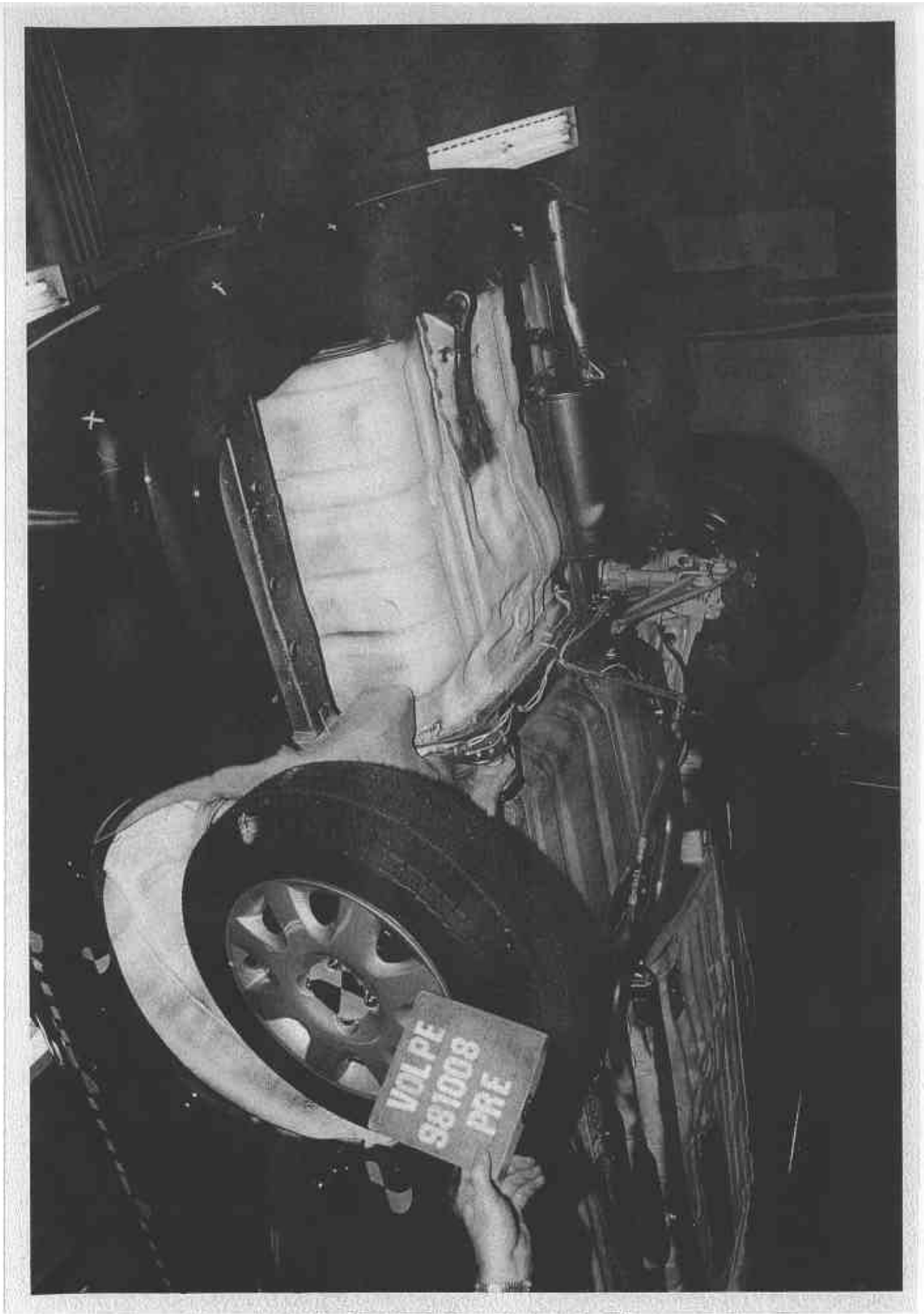


Figure A-22 Pre-Test Left Rear Underbody View

A-23

981008



Figure A-23 Post-Test Left Rear Underbody View

A-24

981008



Figure A-24 Pre-Test Right Rear Underbody View
A-25

981008



Figure A-25 Post-Test Right Rear Underbody View
A-26

981008

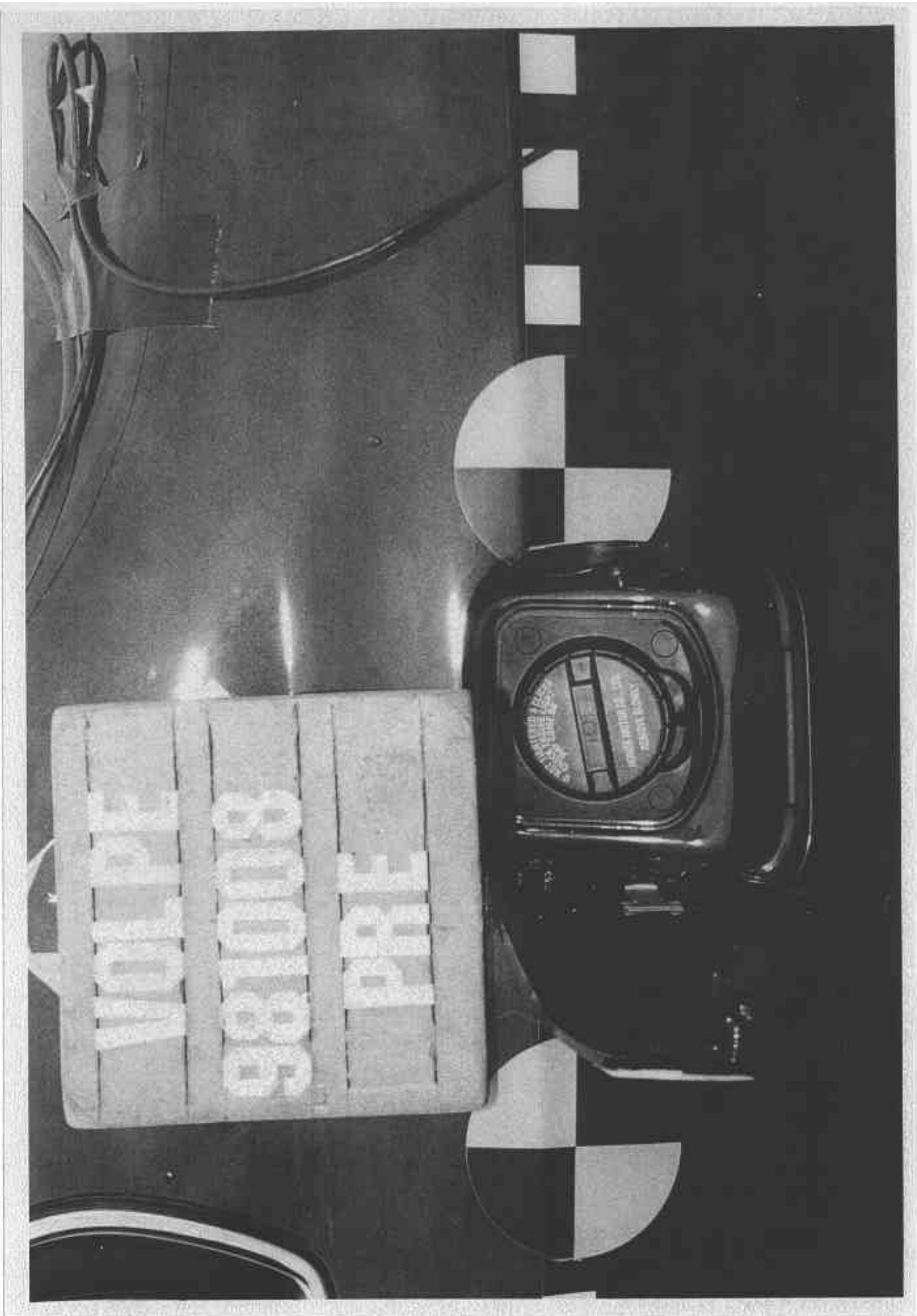


Figure A-26 Pre-Test Fuel Filler Cap View
A-27

981008

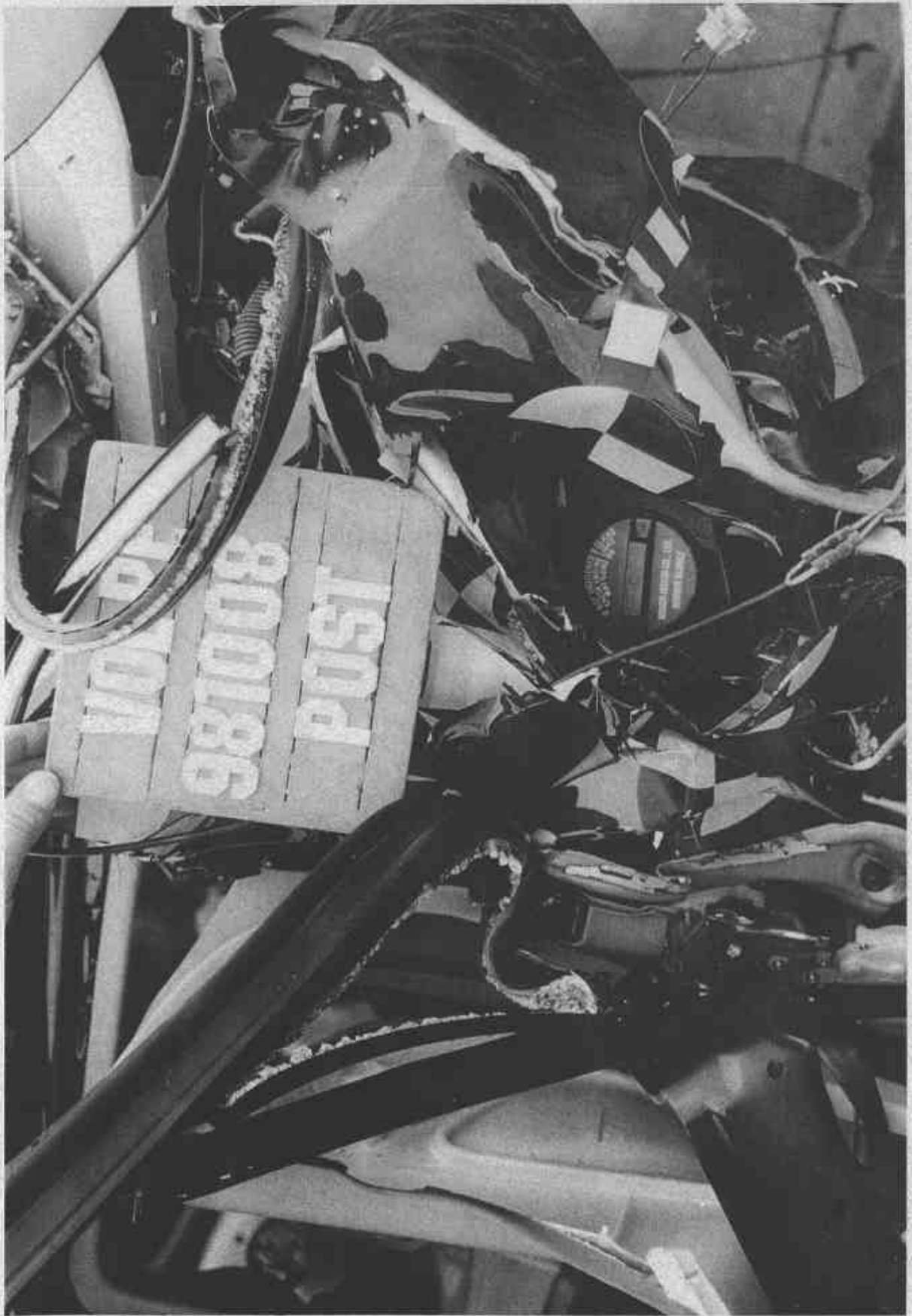


Figure A-27 Post-Test Fuel Filler Cap View
A-28

981008

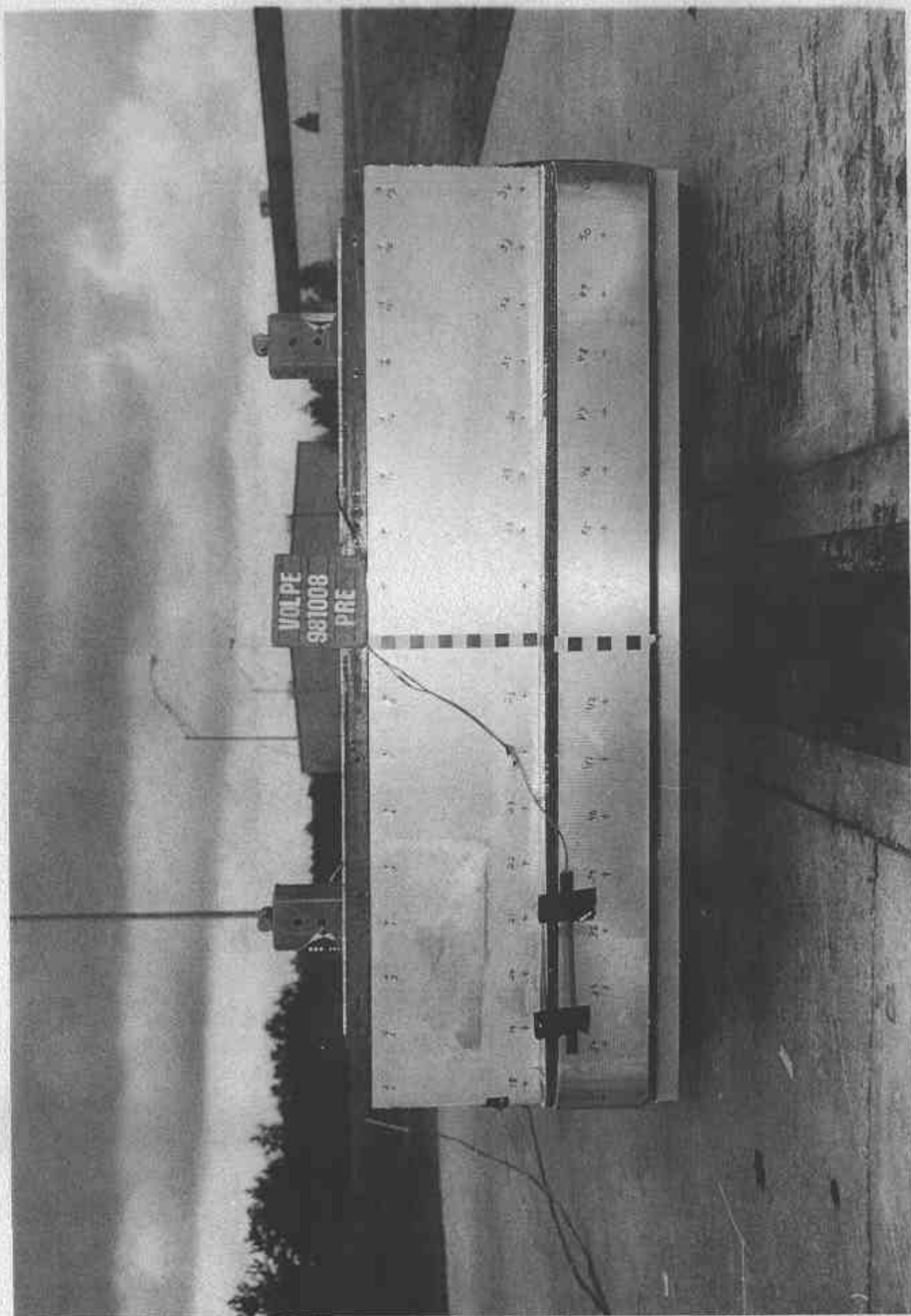


Figure A-28 Pre-Test Deformable Barrier Face Front View
A-29

981008

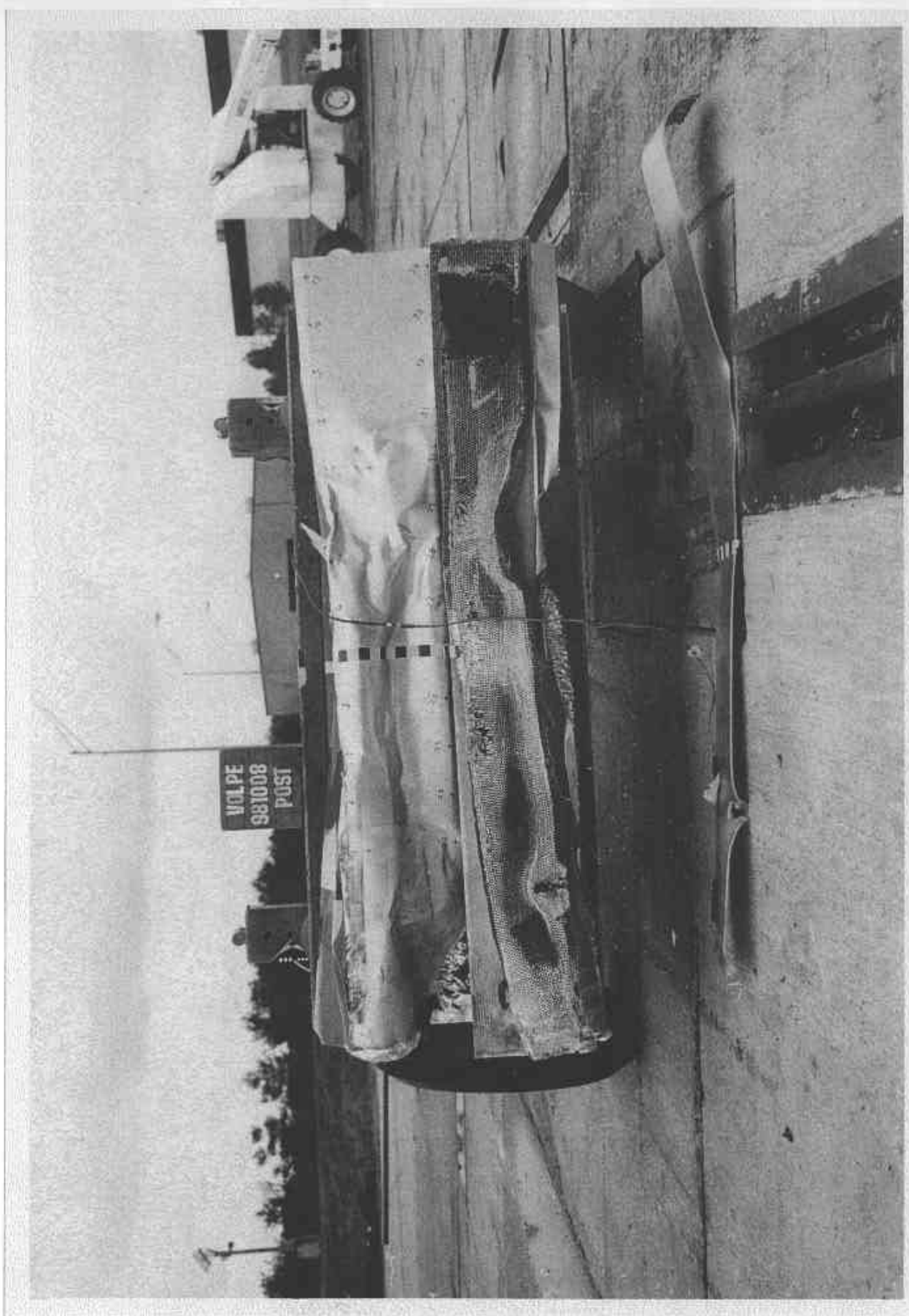


Figure A-29 Post-Test Deformable Barrier Face Front View

A-30

981008

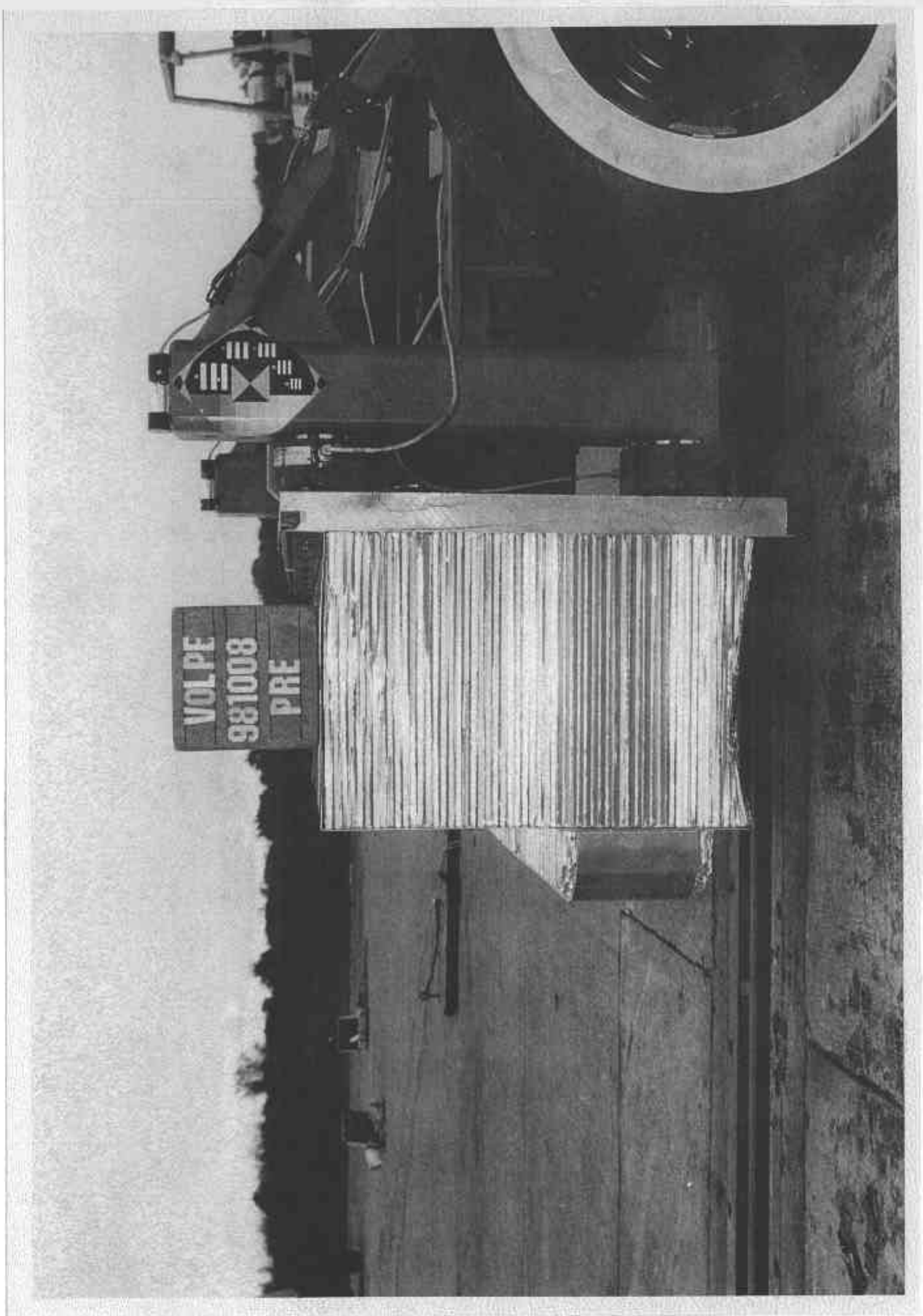


Figure A-30 Pre-Test Deformable Barrier Face Left Side View

A-31

981008

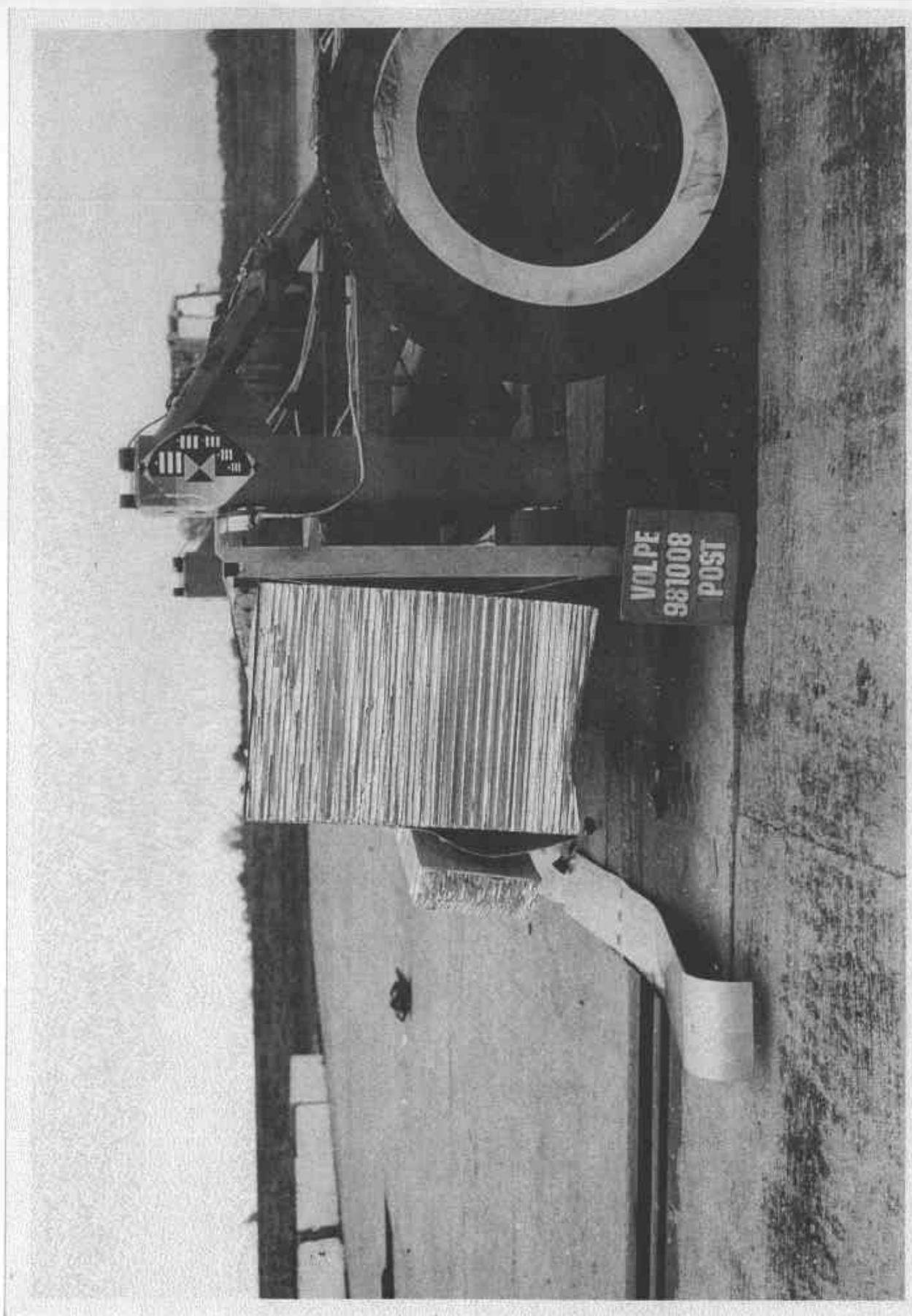


Figure A-31 Post-Test Deformable Barrier Face Left Side View
A-32

981008

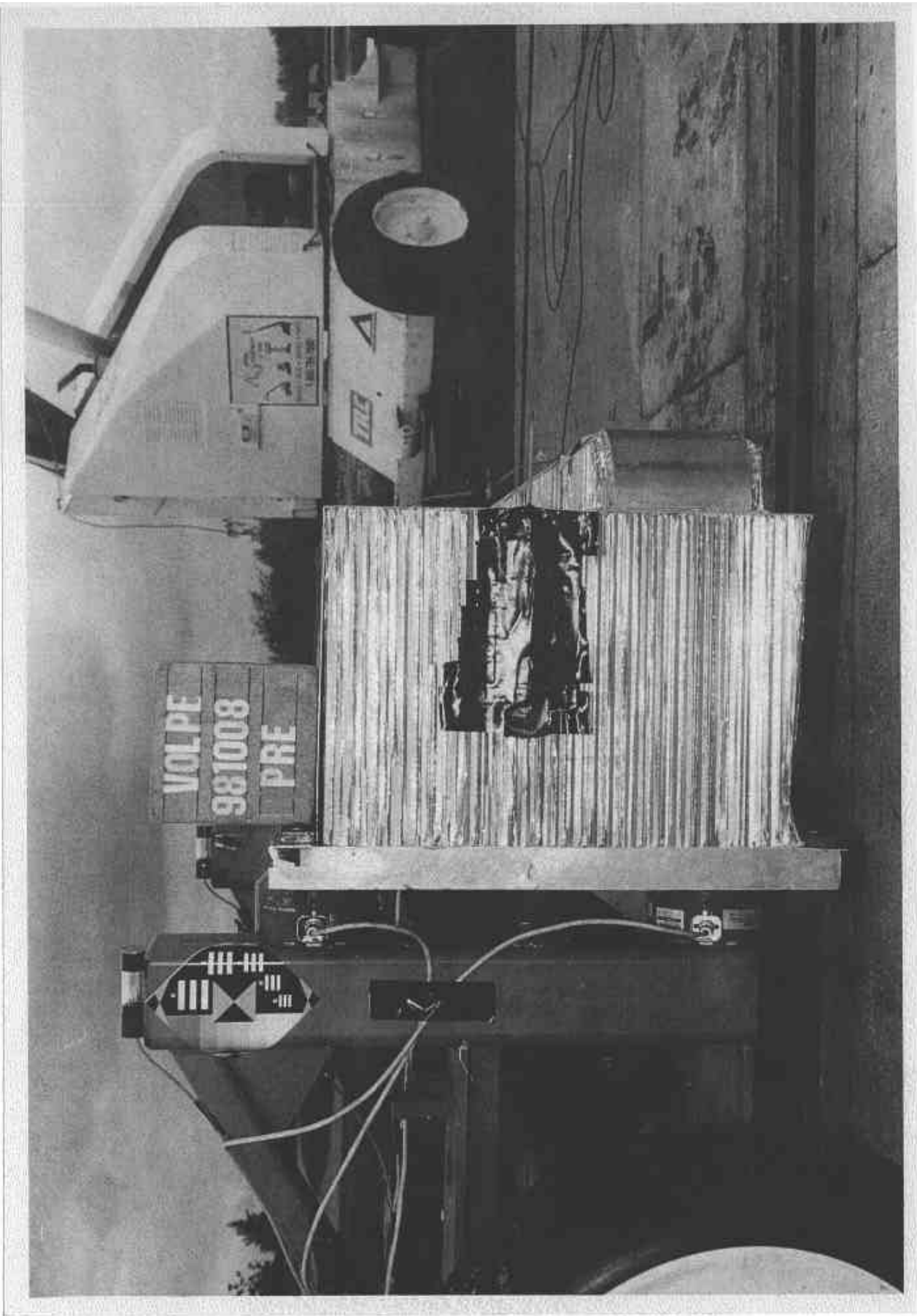


Figure A-32 Pre-Test Deformable Barrier Face Right Side View

A-33

981008

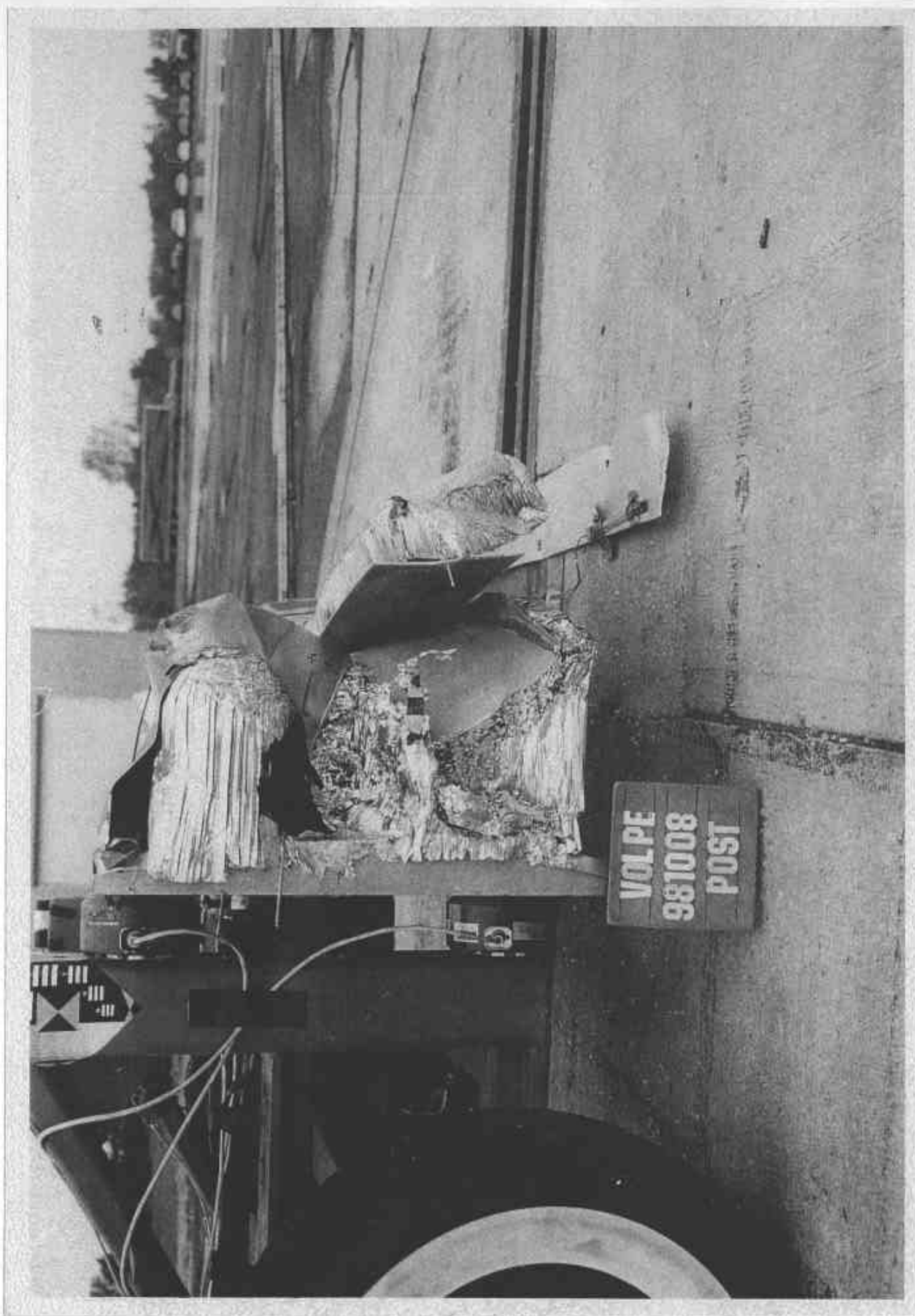


Figure A-33 Post-Test Deformable Barrier Face Right Side View

A-34

981008

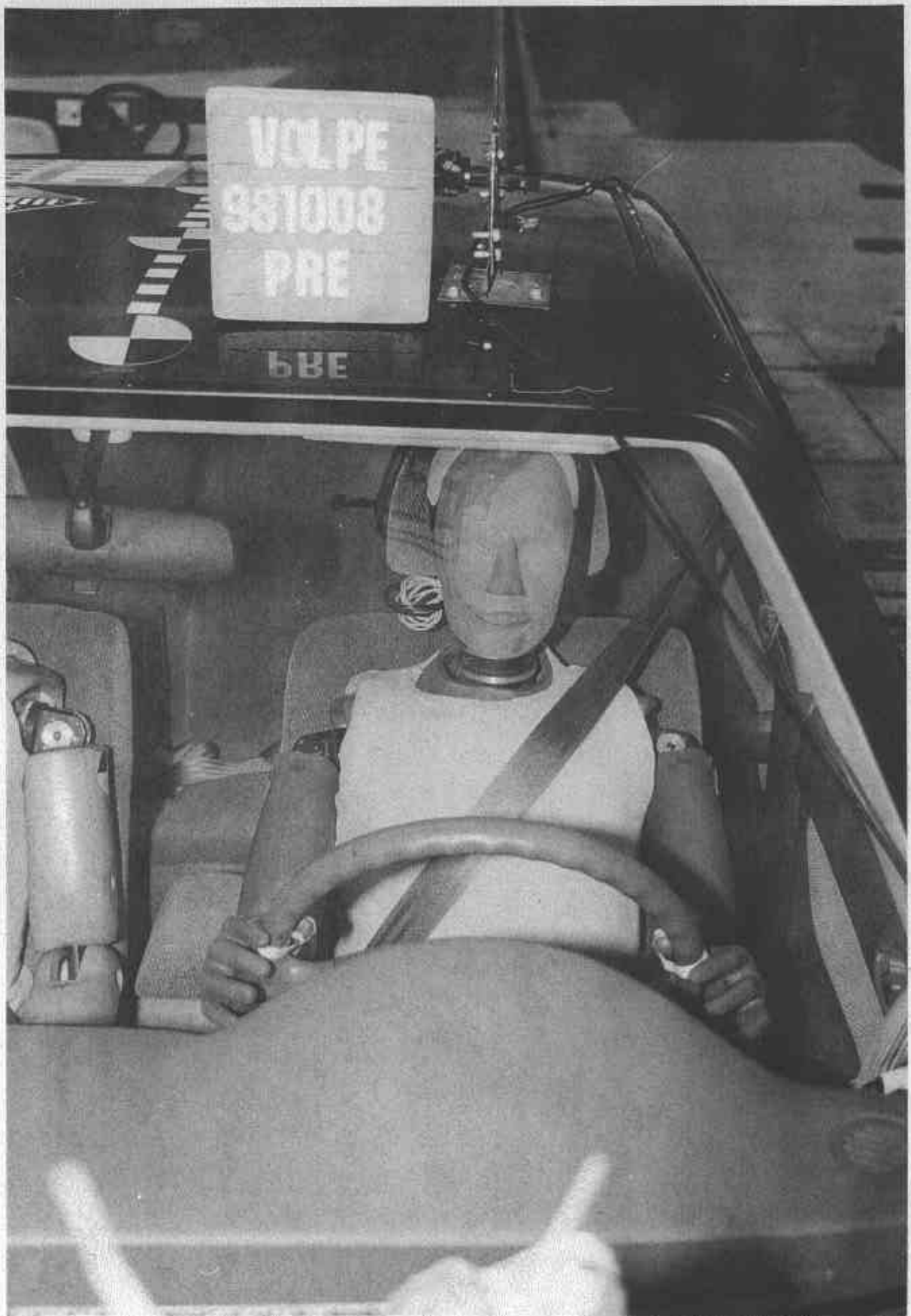


Figure A-34 Pre-Test Driver Dummy Position - View 1
A-35

981008

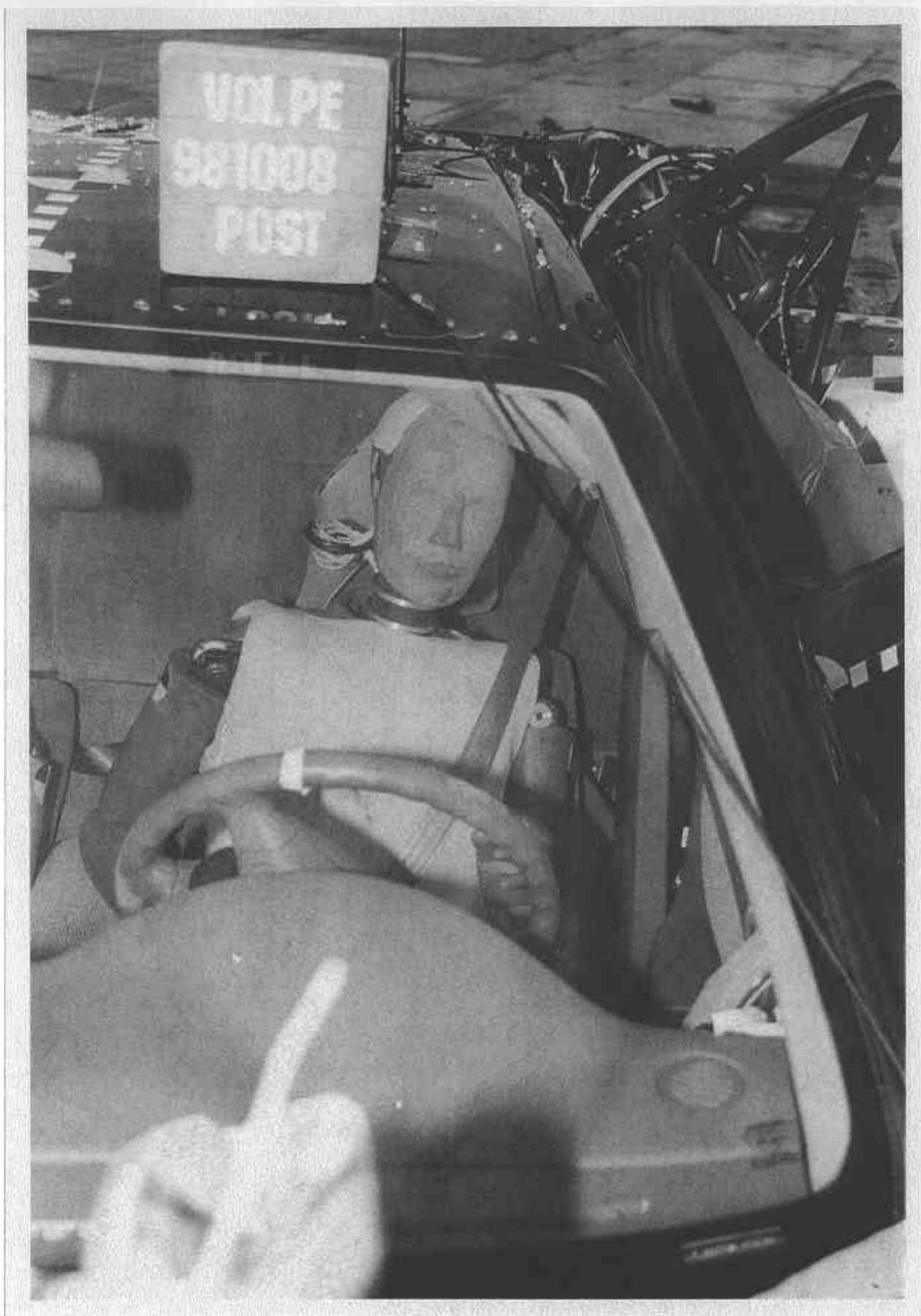


Figure A-35 Post-Test Driver Dummy Position - View 1
A-36

981008

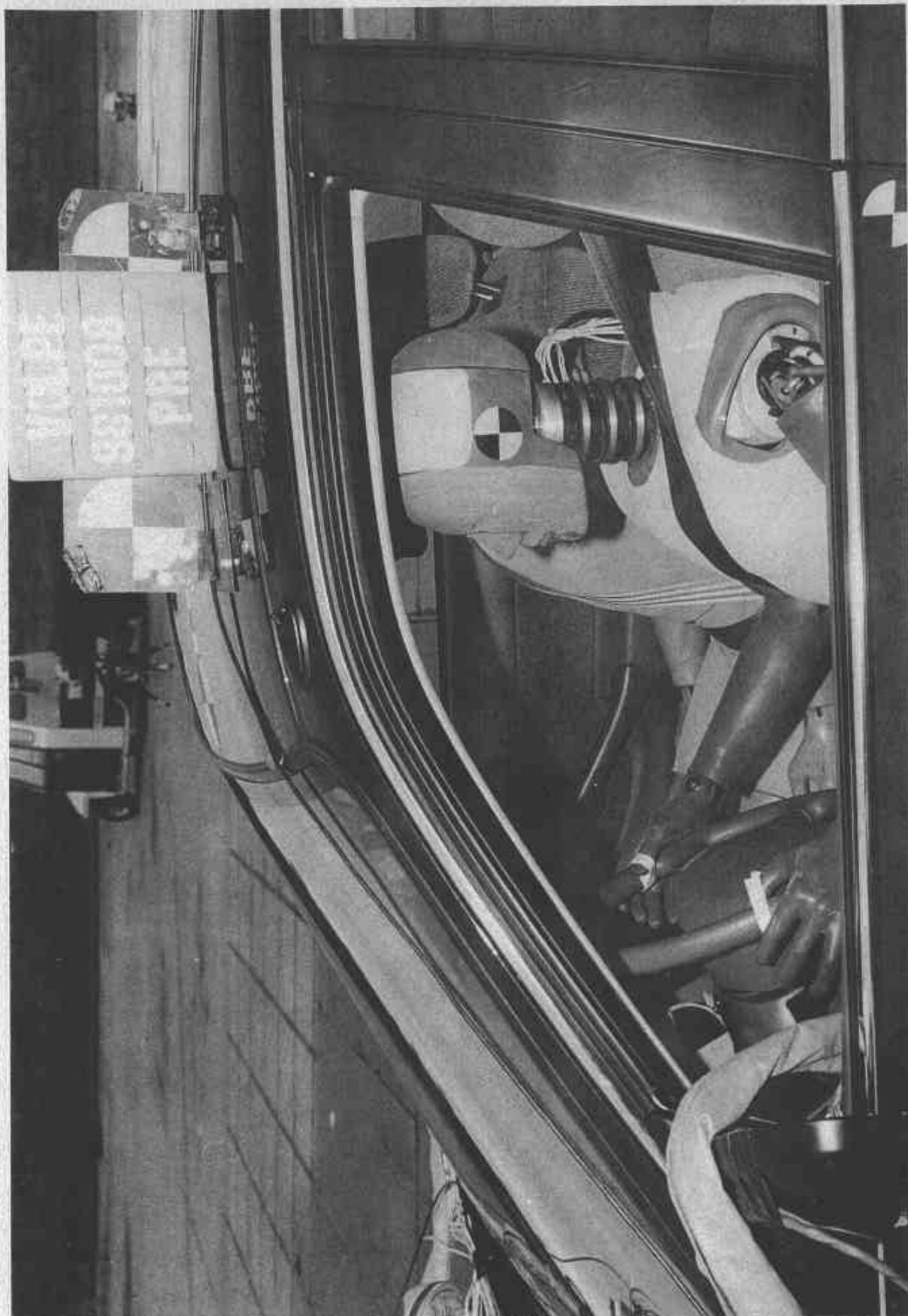


Figure A-36 Pre-Test Driver Dummy Position - View 2
A-37

981008

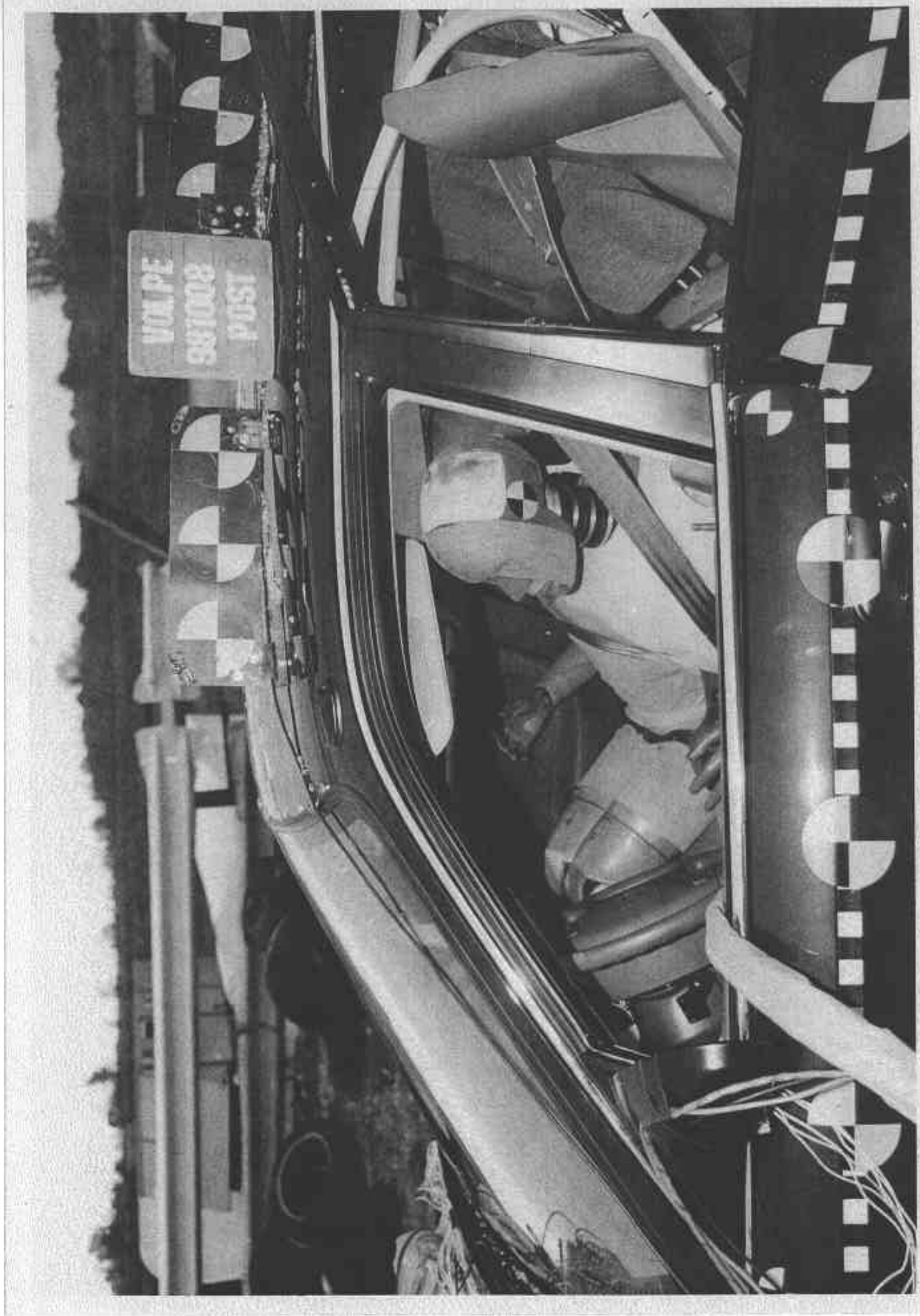


Figure A-37 Post-Test Driver Dummy Position - View 2
A-38

981008

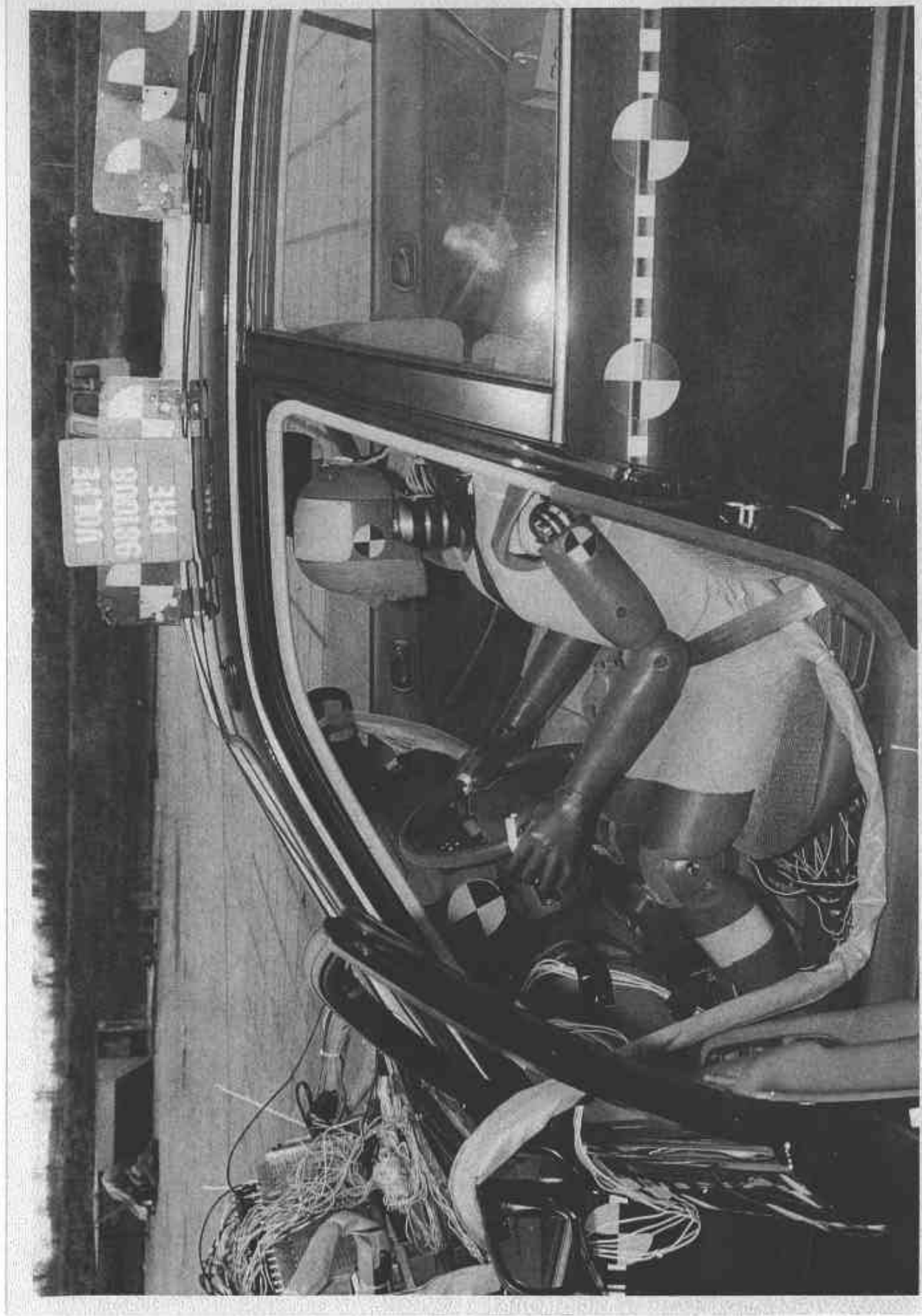


Figure A-38 Pre-Test Driver Dummy Position - View 3

A-39

981008

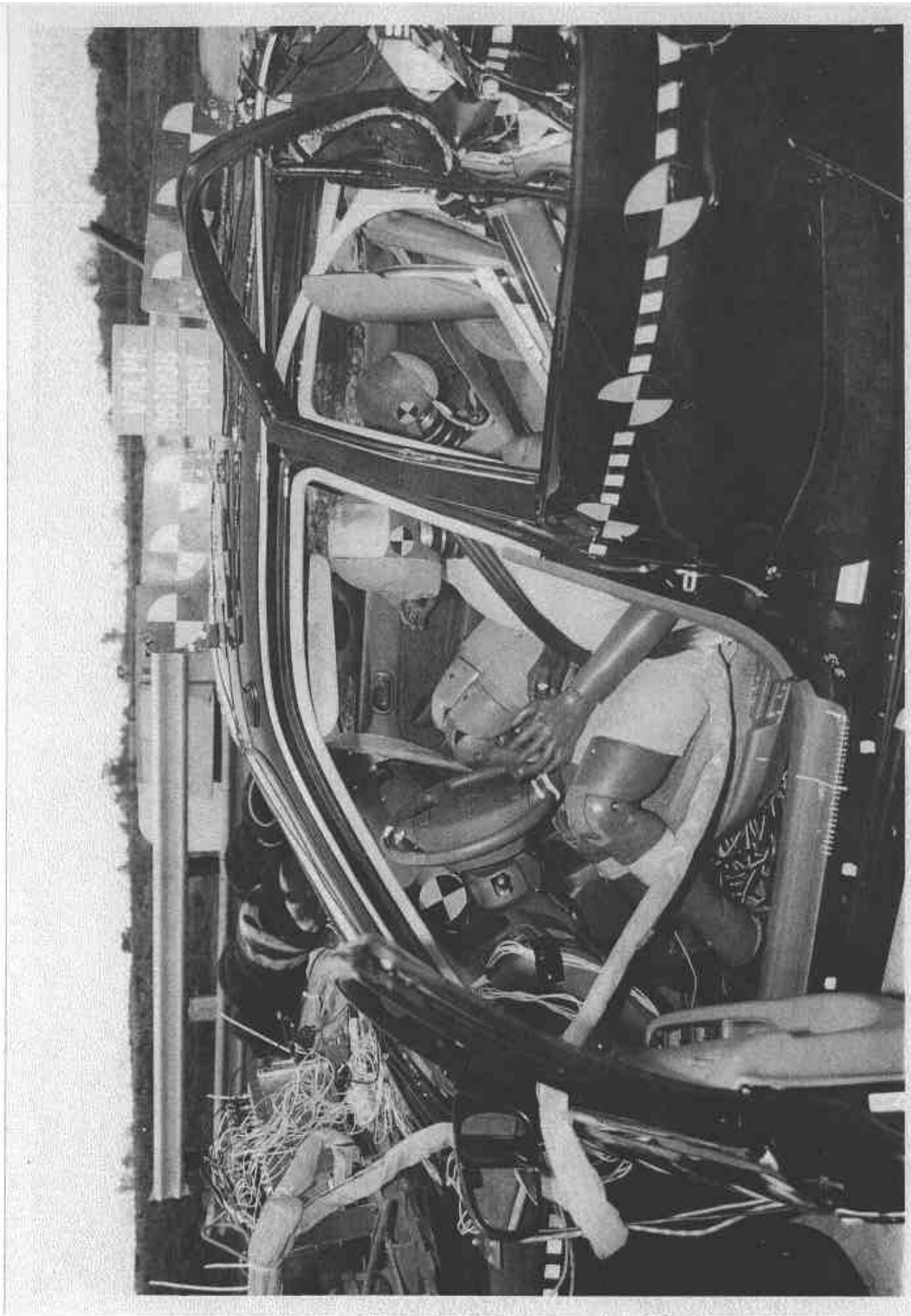


Figure A-39 Post-Test Driver Dummy Position - View 3

A-40

981008



Figure A-40 Pre-Test Driver Dummy Position - View 4
A-41

981008



Figure A-41 Post-Test Driver Dummy Position - View 4
A-42

981008

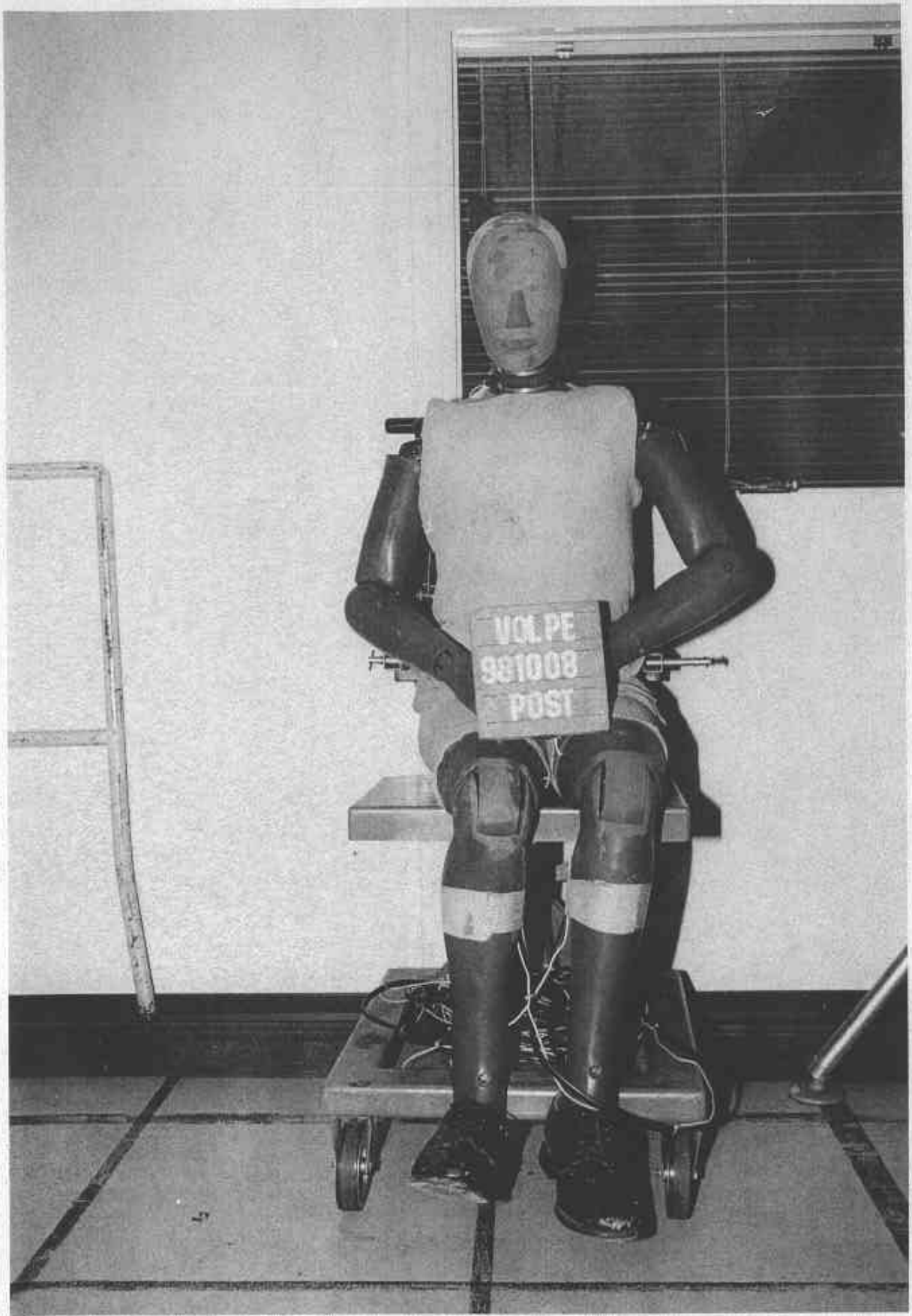


Figure A-42 Post-Test Driver Dummy Contact View
A-43

981008

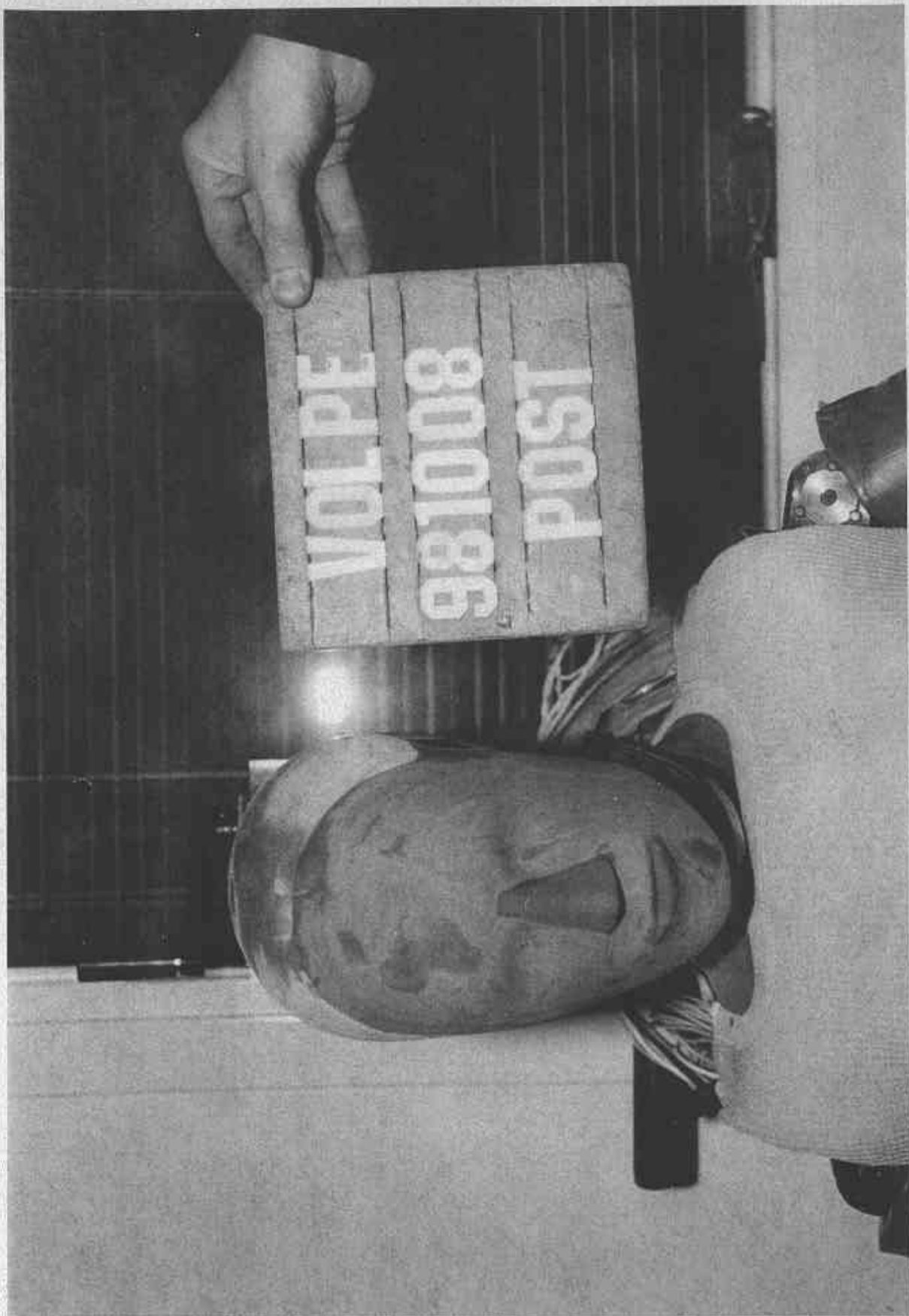


Figure A-43 Post-Test Driver Dummy Head Contact View

A-44

981008

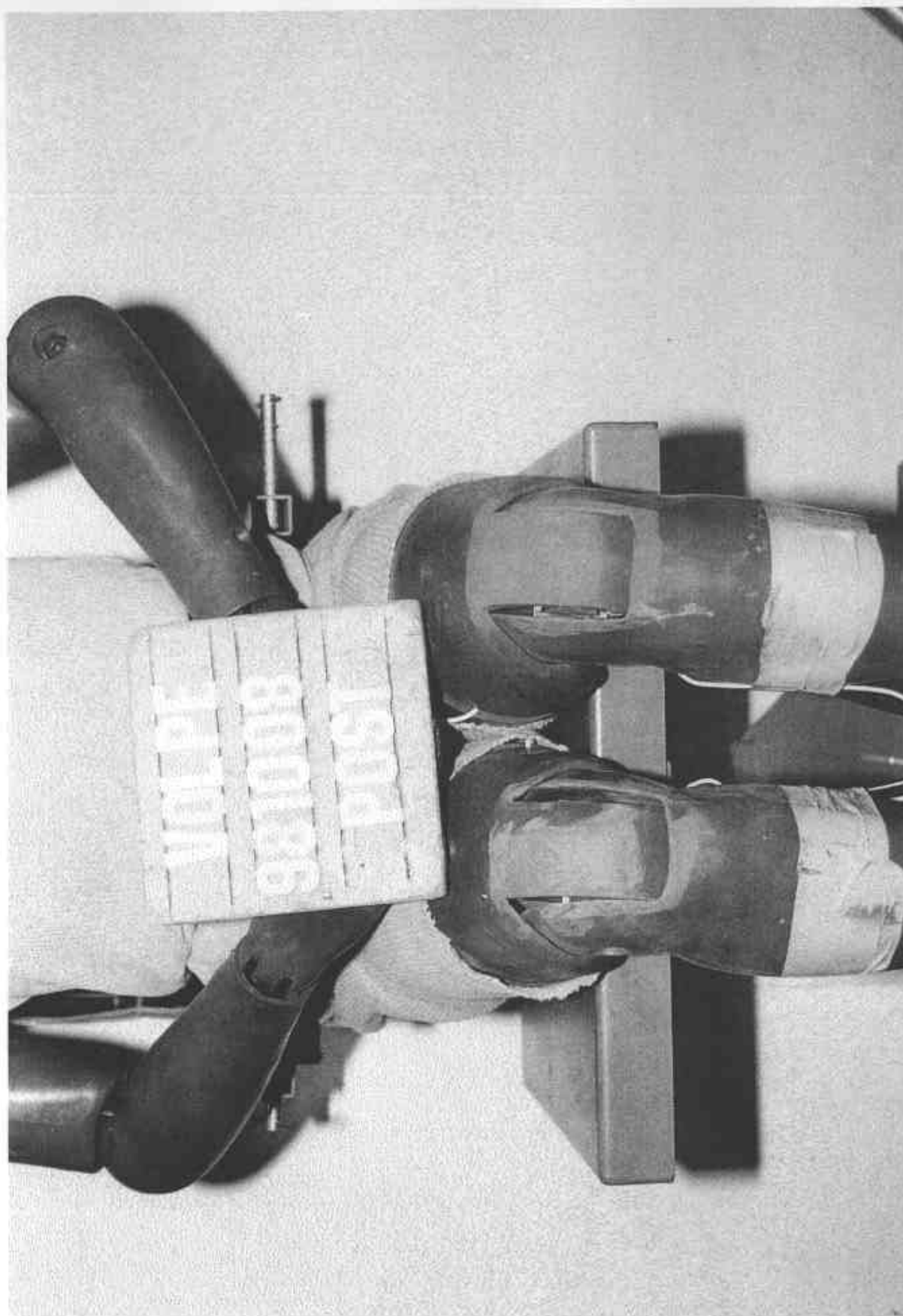


Figure A-44 Post-Test Driver Dummy Knee Contact View
A-45

981008

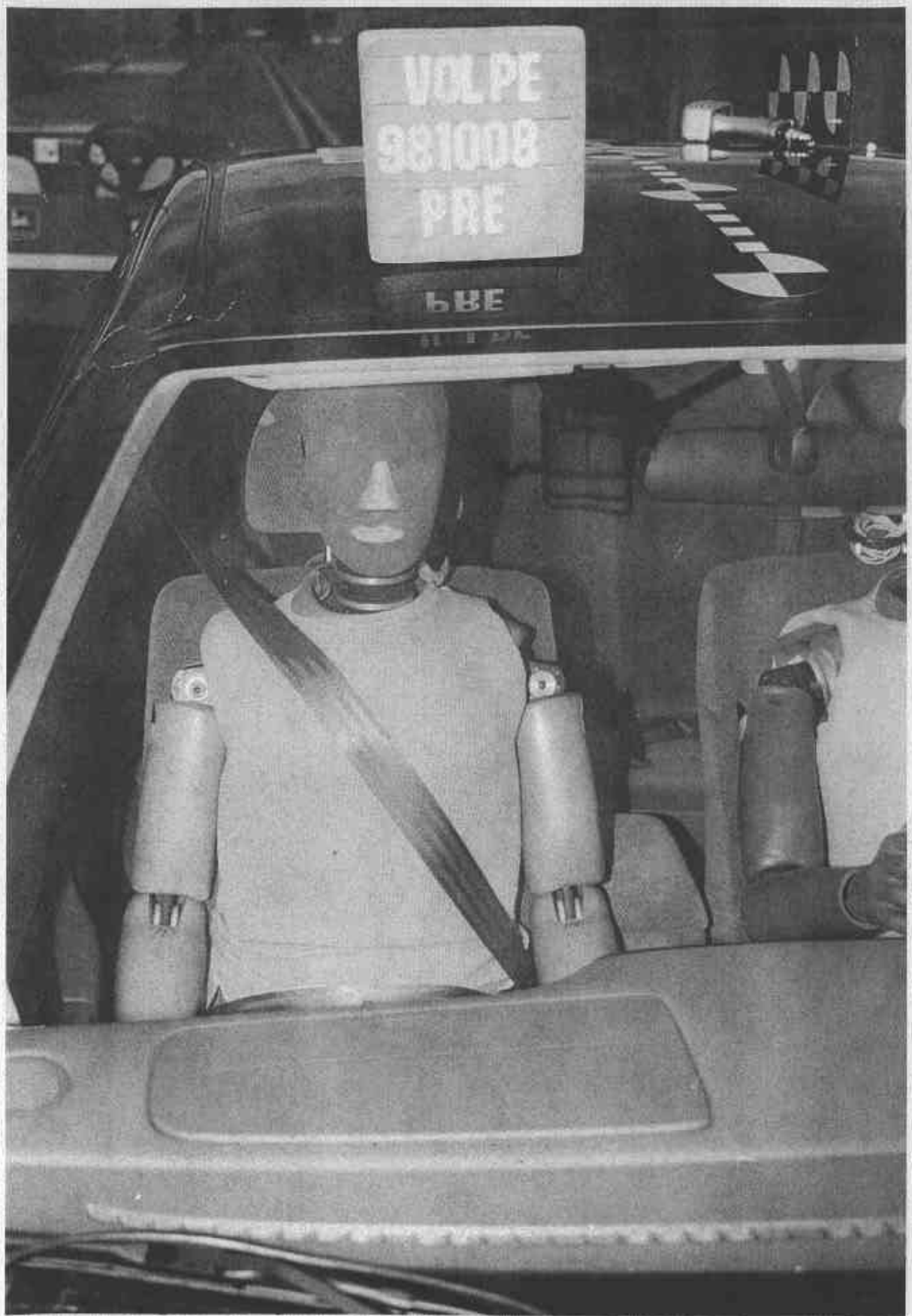


Figure A-45 Pre-Test Passenger Dummy Position - View 1
A-46

981008

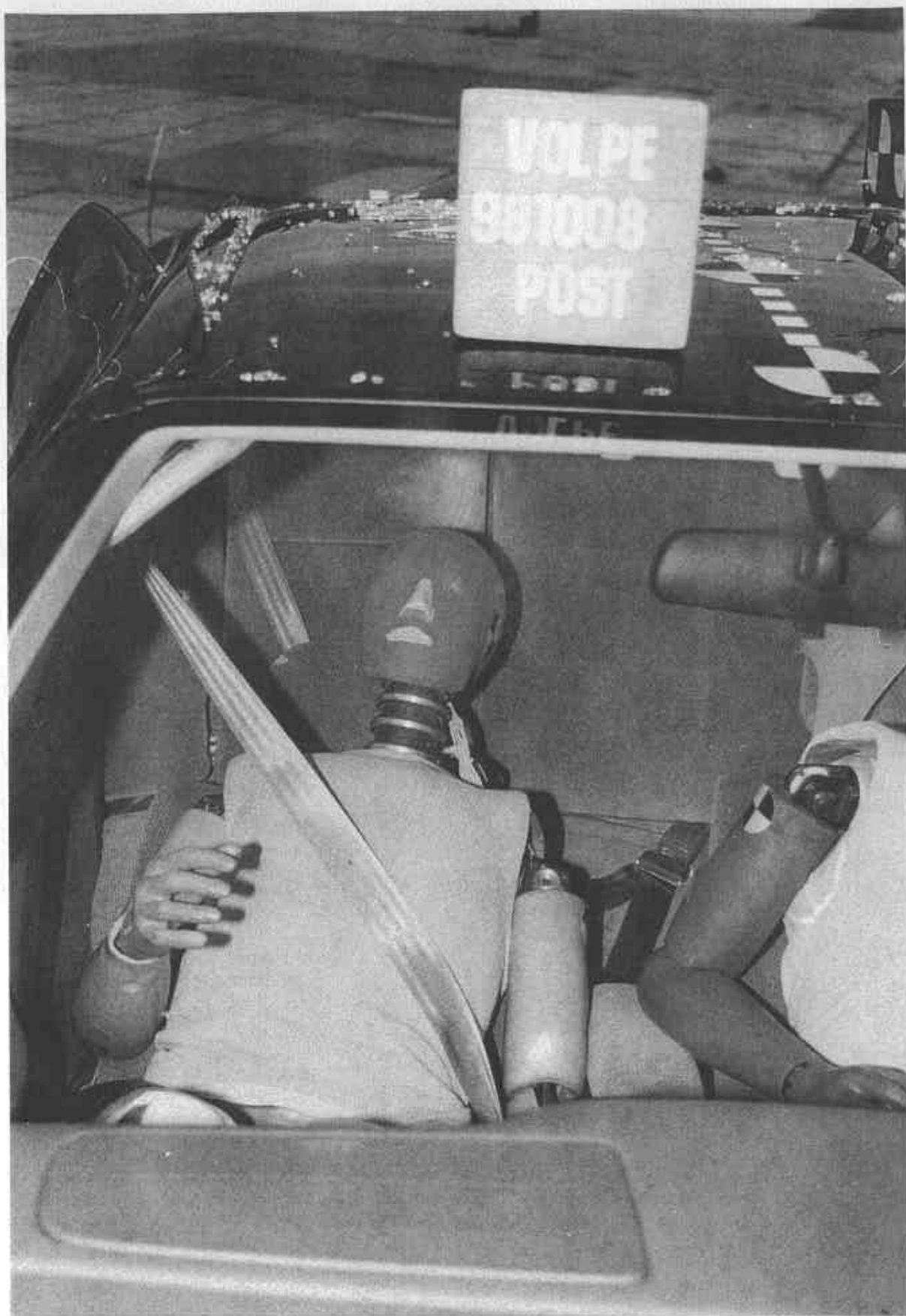


Figure A-46 Post-Test Passenger Dummy Position - View 1

A-47

981008

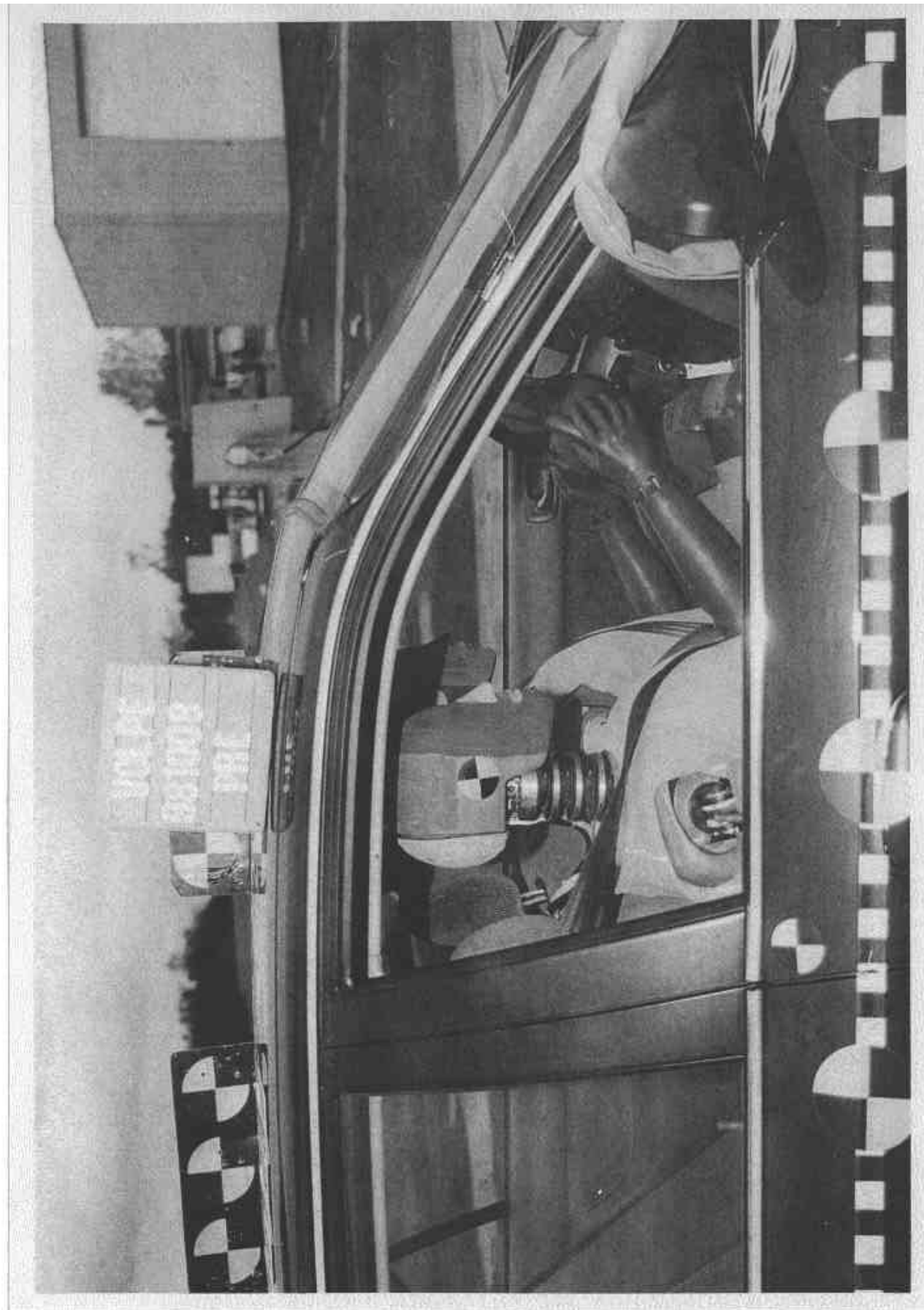


Figure A-47 Pre-Test Passenger Dummy Position - View 2
A-48

981008

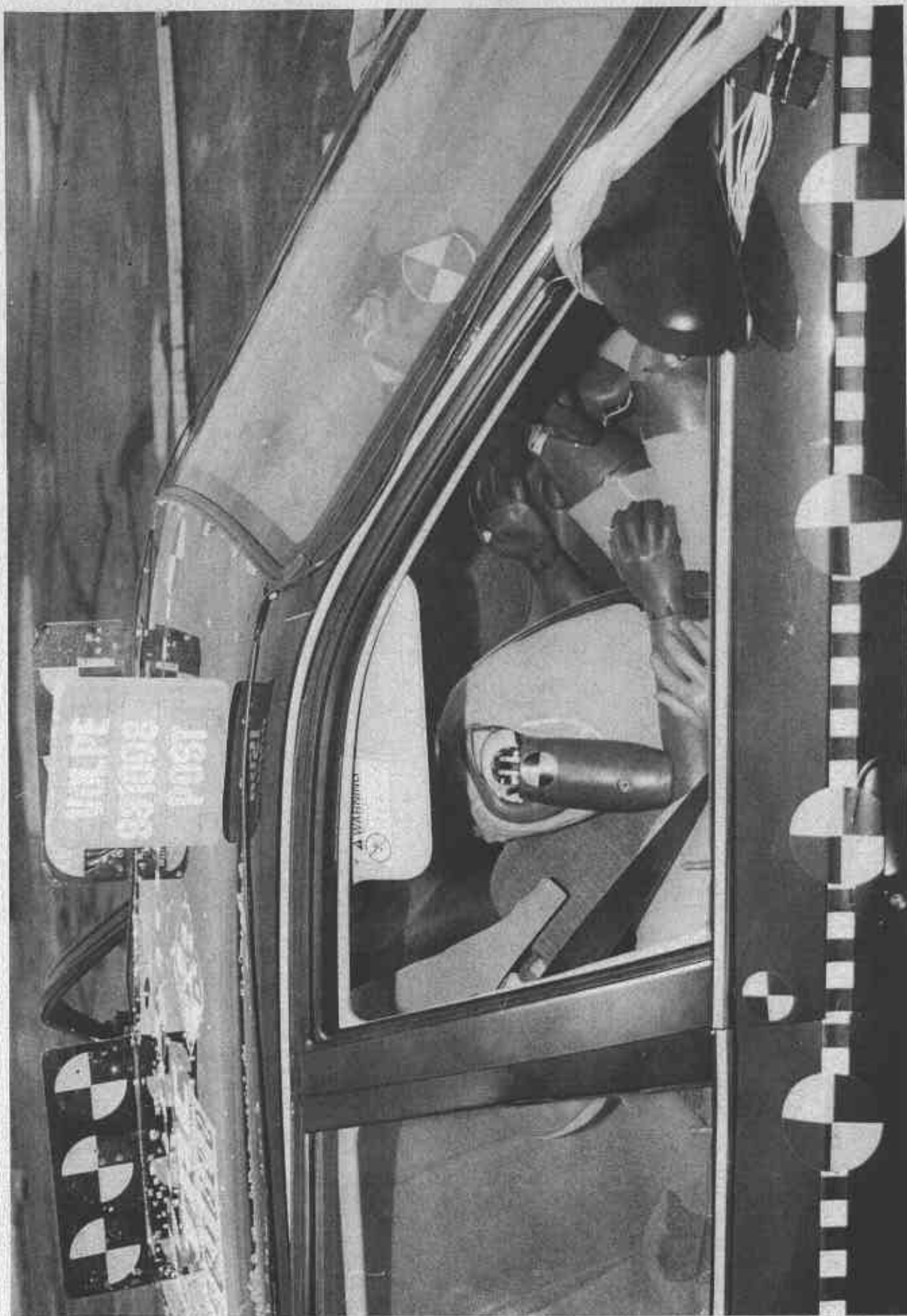


Figure A-48 Post-Test Passenger Dummy Position - View 2

A-49

981008



Figure A-49 Pre-Test Passenger Dummy Position - View 3
A-50

981008



Figure A-50 Post-Test Passenger Dummy Position - View 3

A-51

981008



Figure A-51 Pre-Test Passenger Dummy Position - View 4
A-52

981008



Figure A-52 Post-Test Passenger Dummy Position - View 4

A-53

981008



Figure A-53 Post-Test Passenger Dummy Contact View
A-54

981008

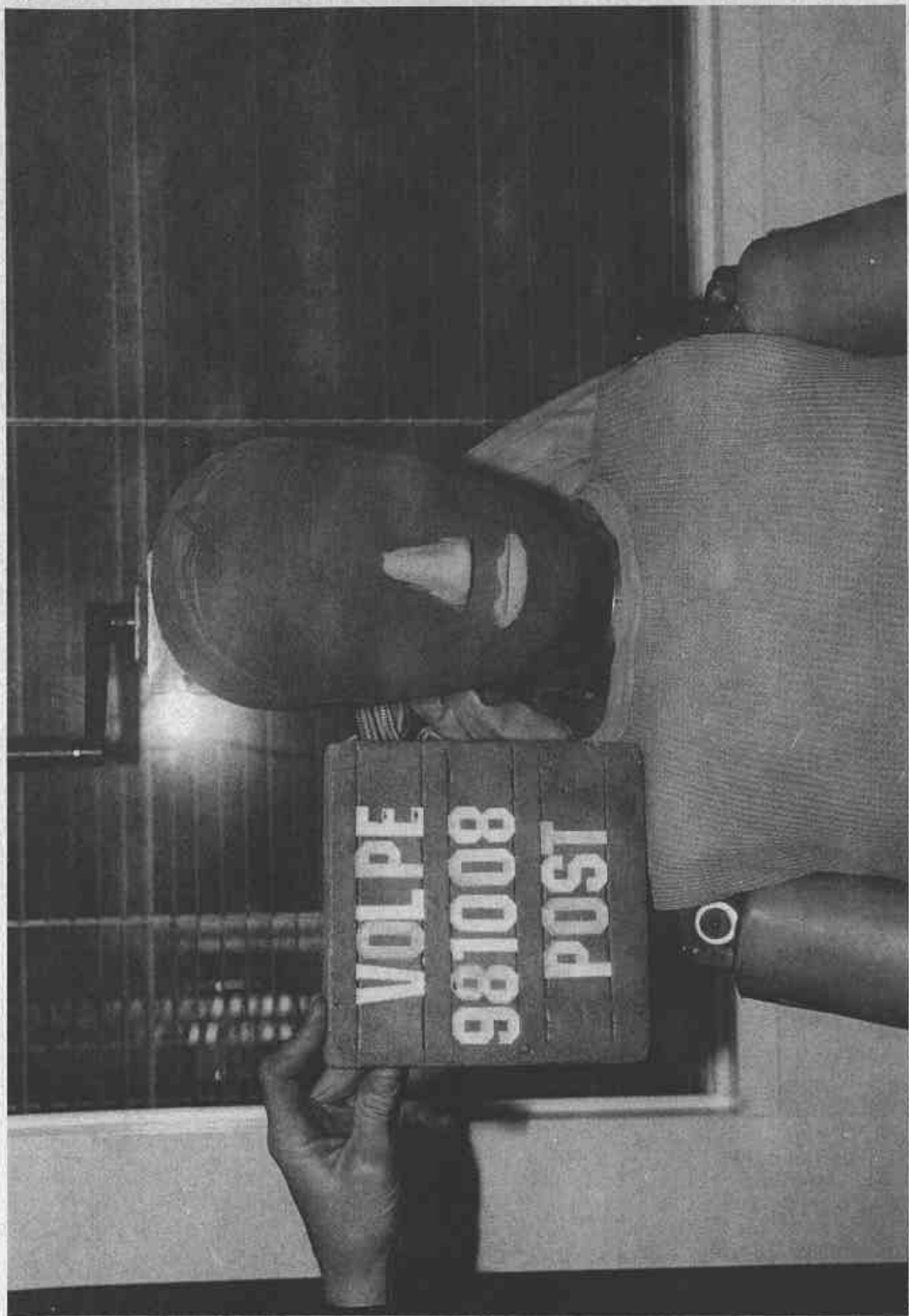


Figure A-54 Post-Test Passenger Dummy Head Contact View

A-55

981008

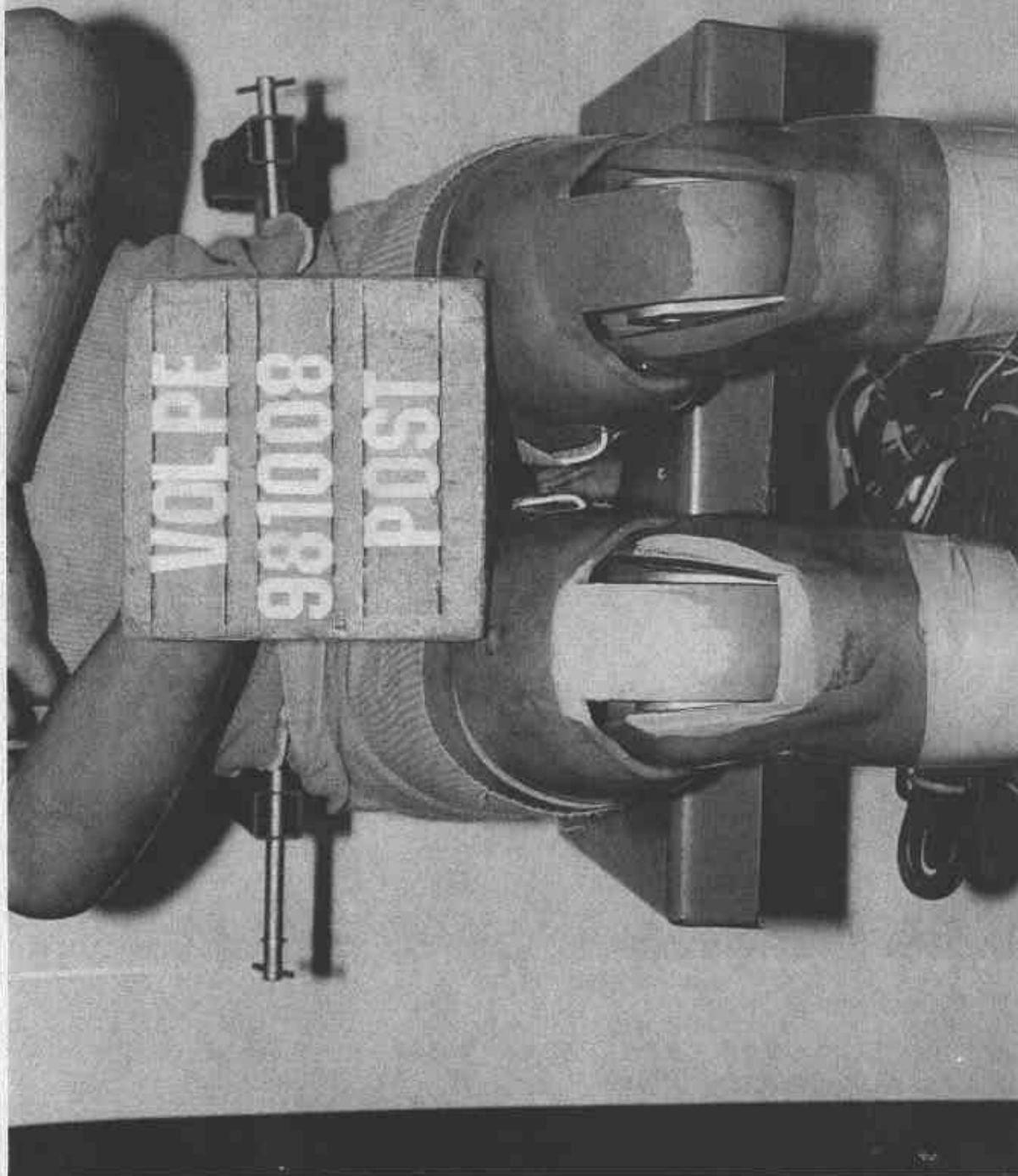


Figure A-55 Post-Test Passenger Dummy Knee Contact View

A-56

981008

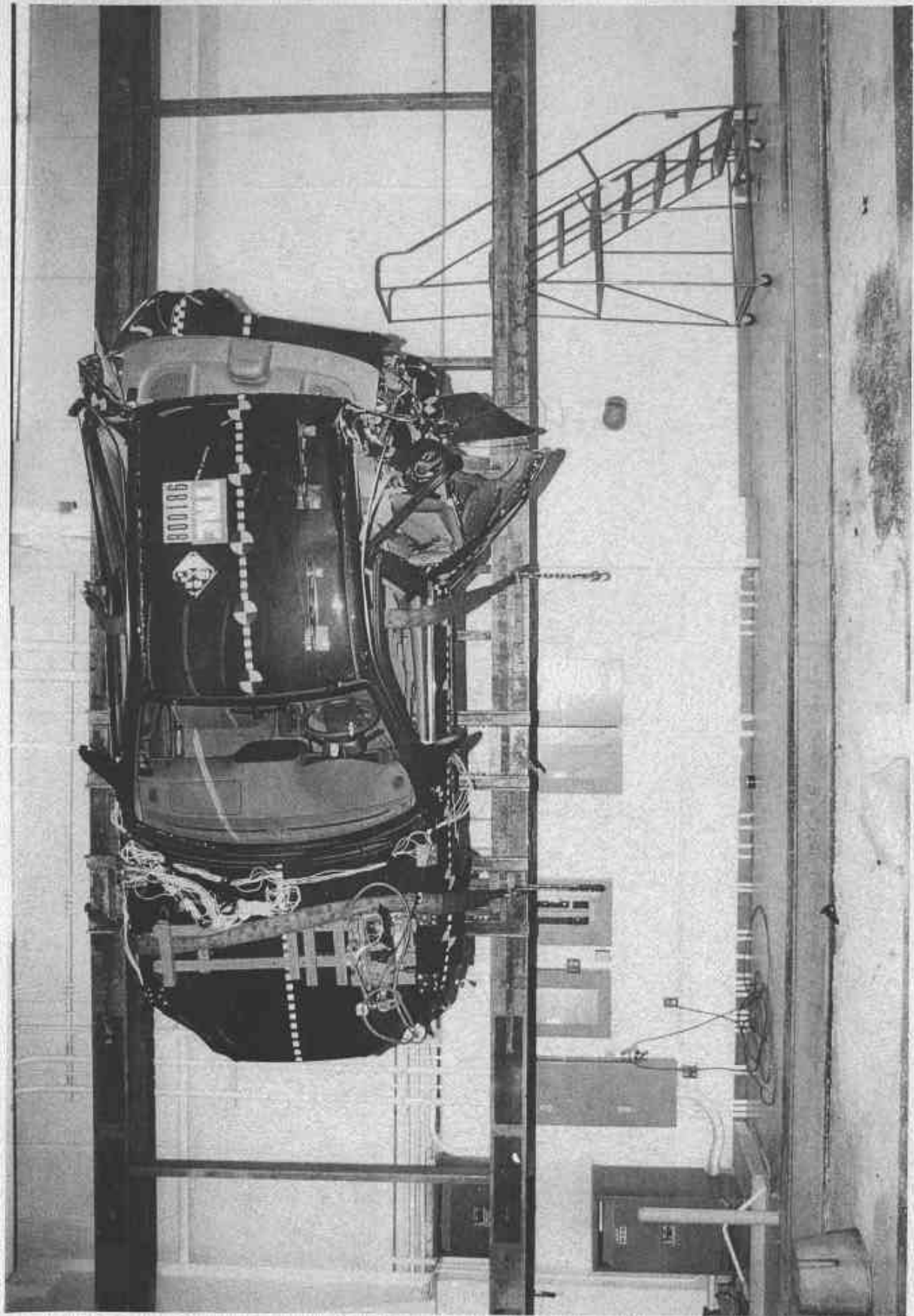


Figure A-56 Vehicle on Static Rollover Machine at 90° View
A-57

981008



Figure A-57 Vehicle on Static Rollover Machine at 180° View

A-58

981008

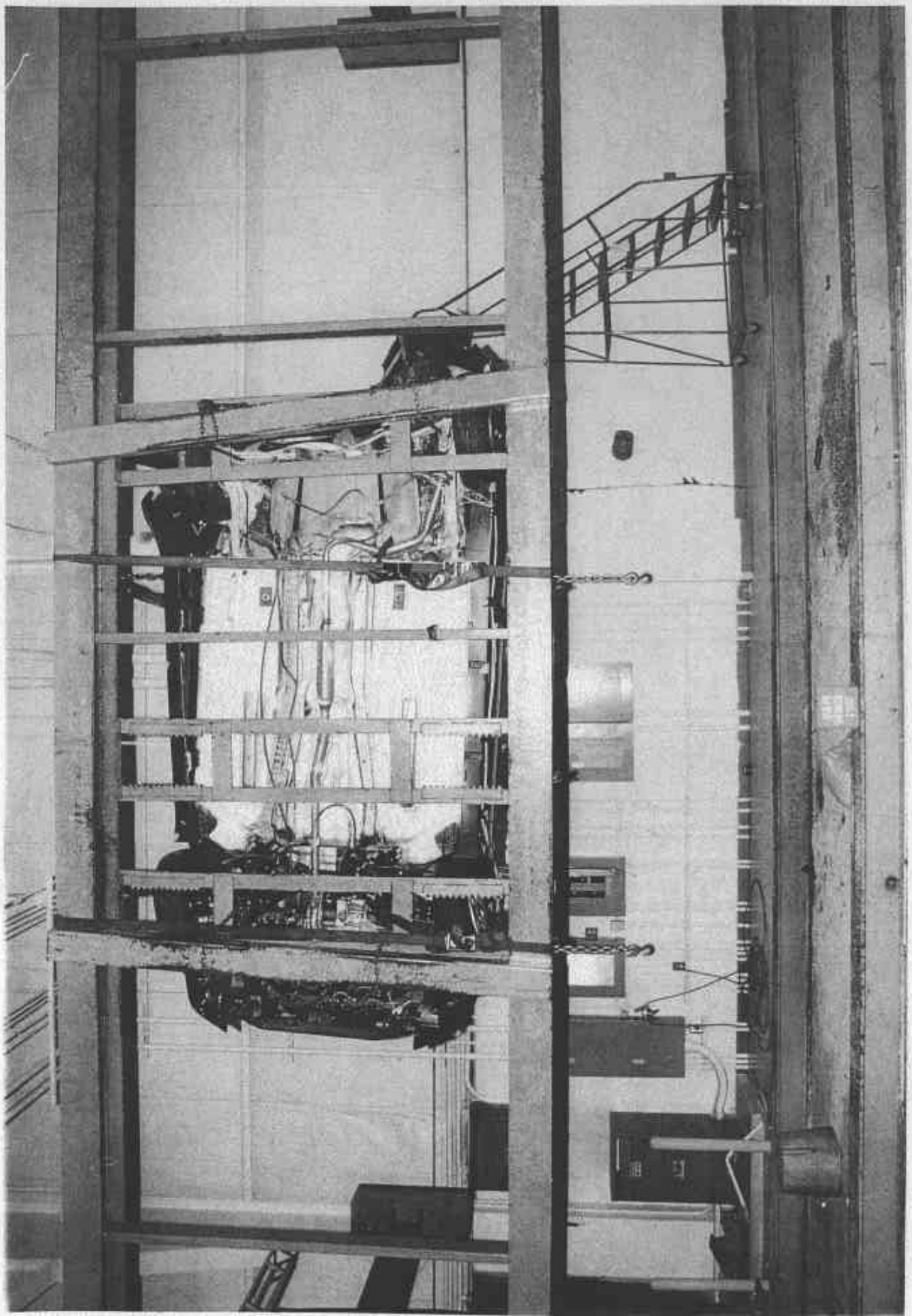


Figure A-58 Vehicle on Static Rollover Machine at 270° View

A-59

981008

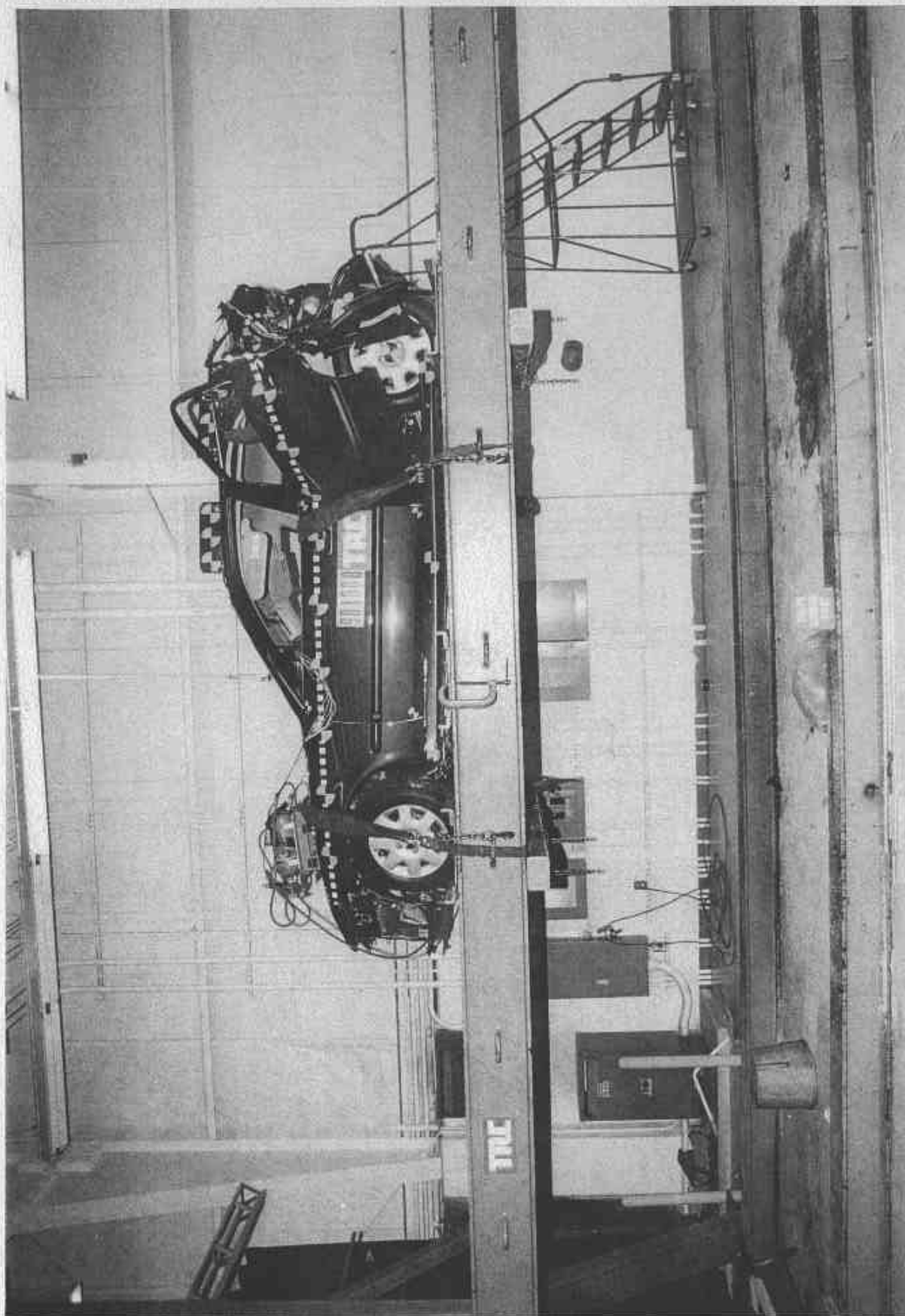


Figure A-59 Vehicle on Static Rollover Machine at 360° View

A-60

981008

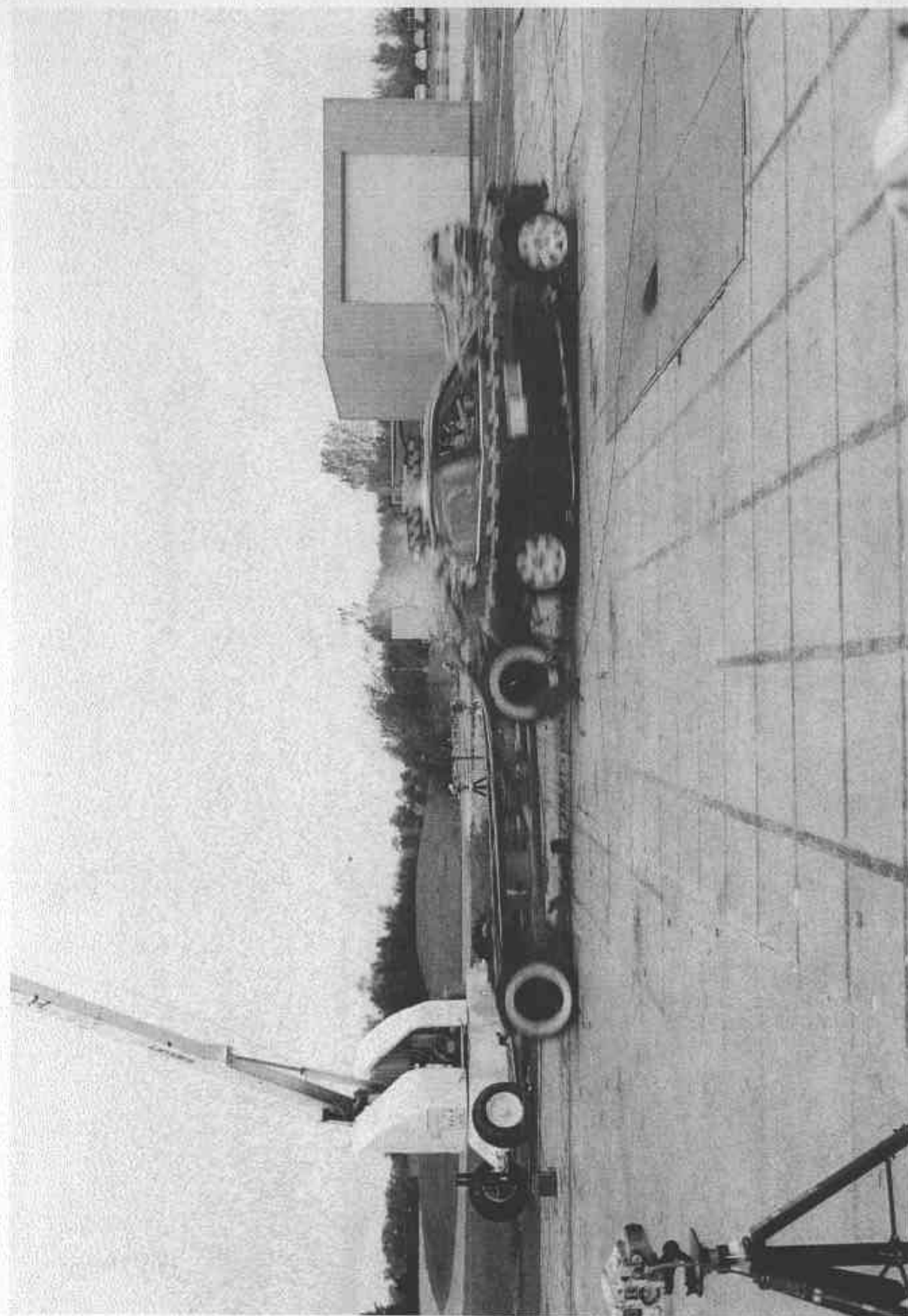


Figure A-60 Impact Event
A-61

981008

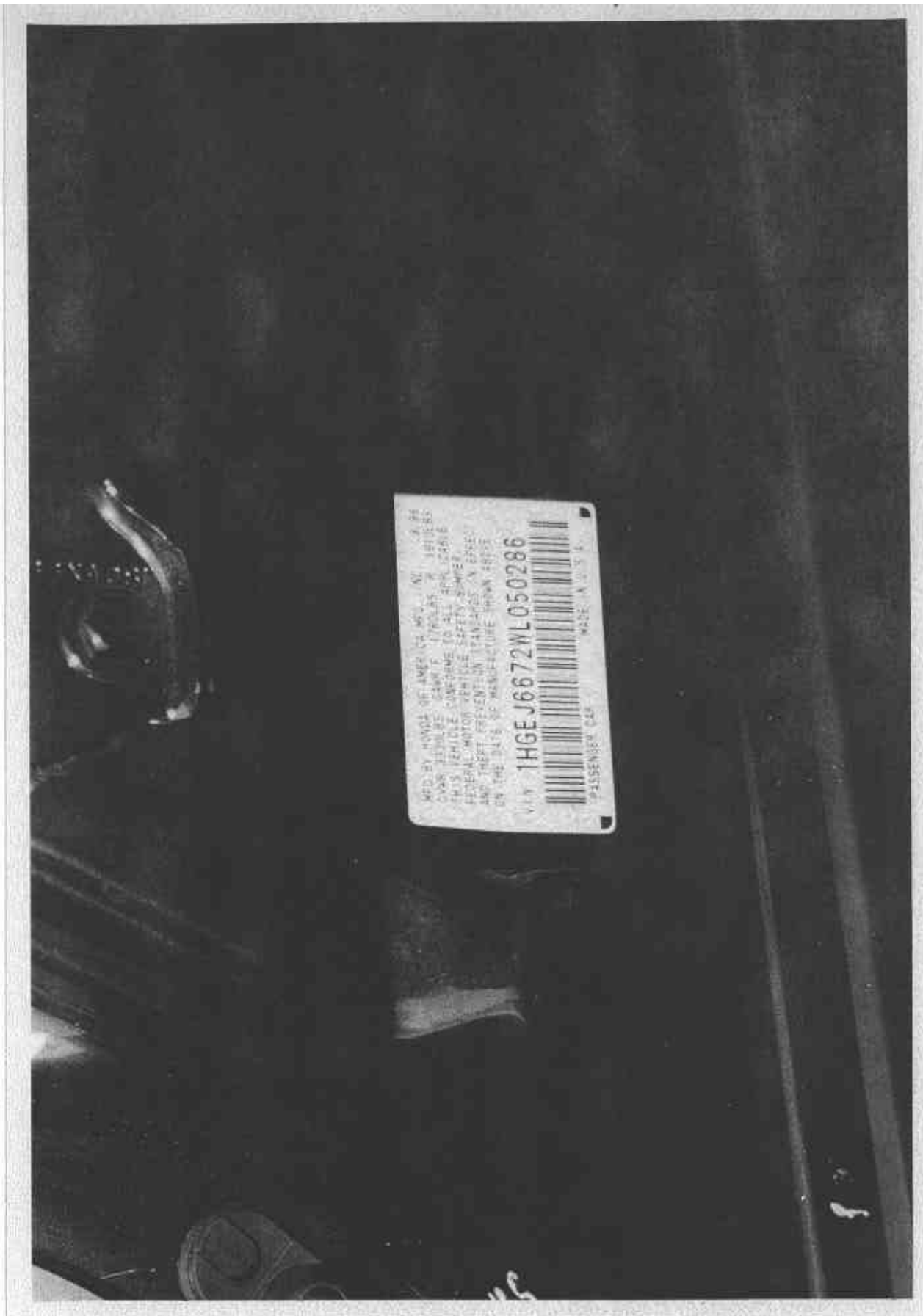


Figure A-61 Pre-Test Vehicle Certification Label

A-62

981008

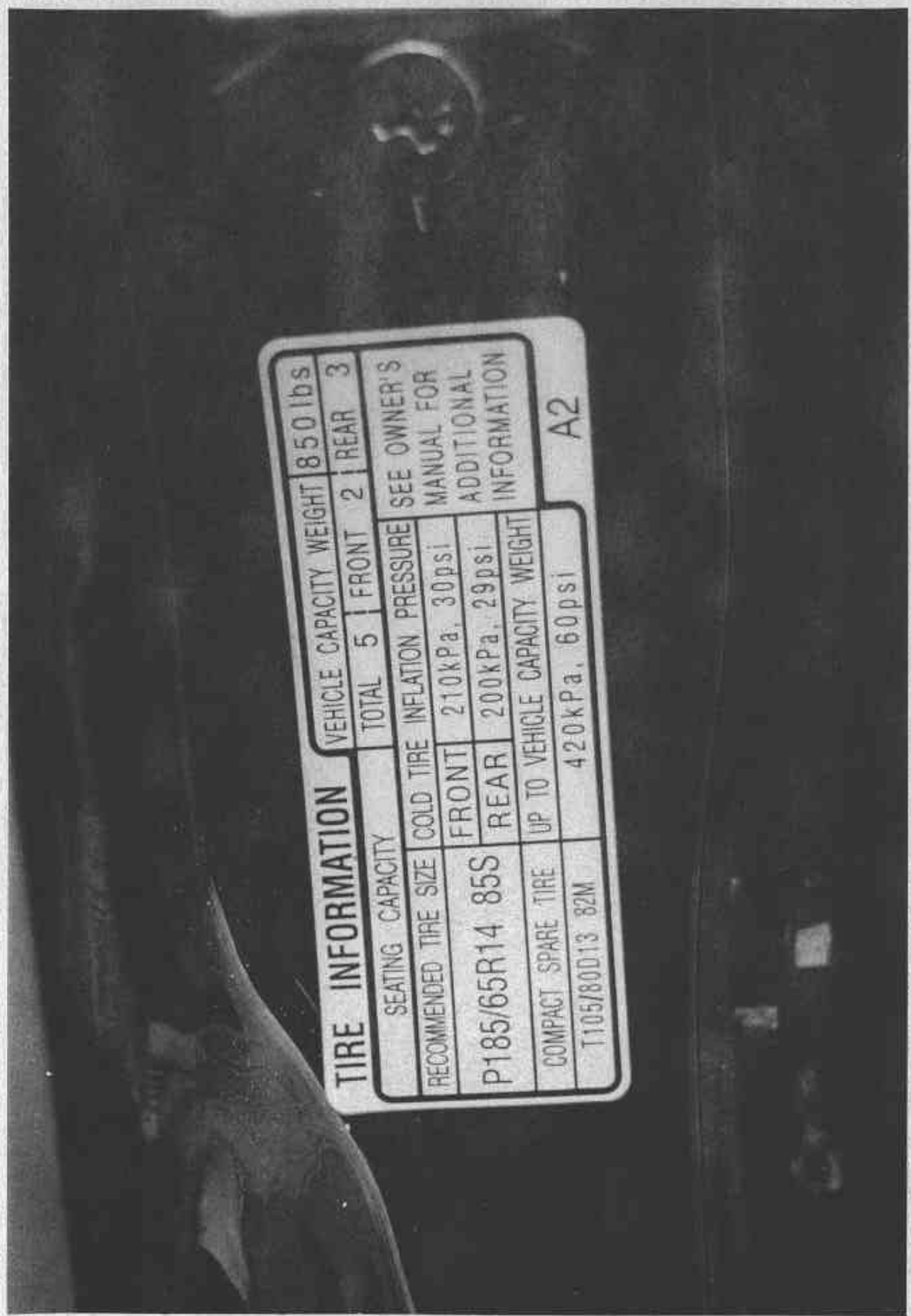
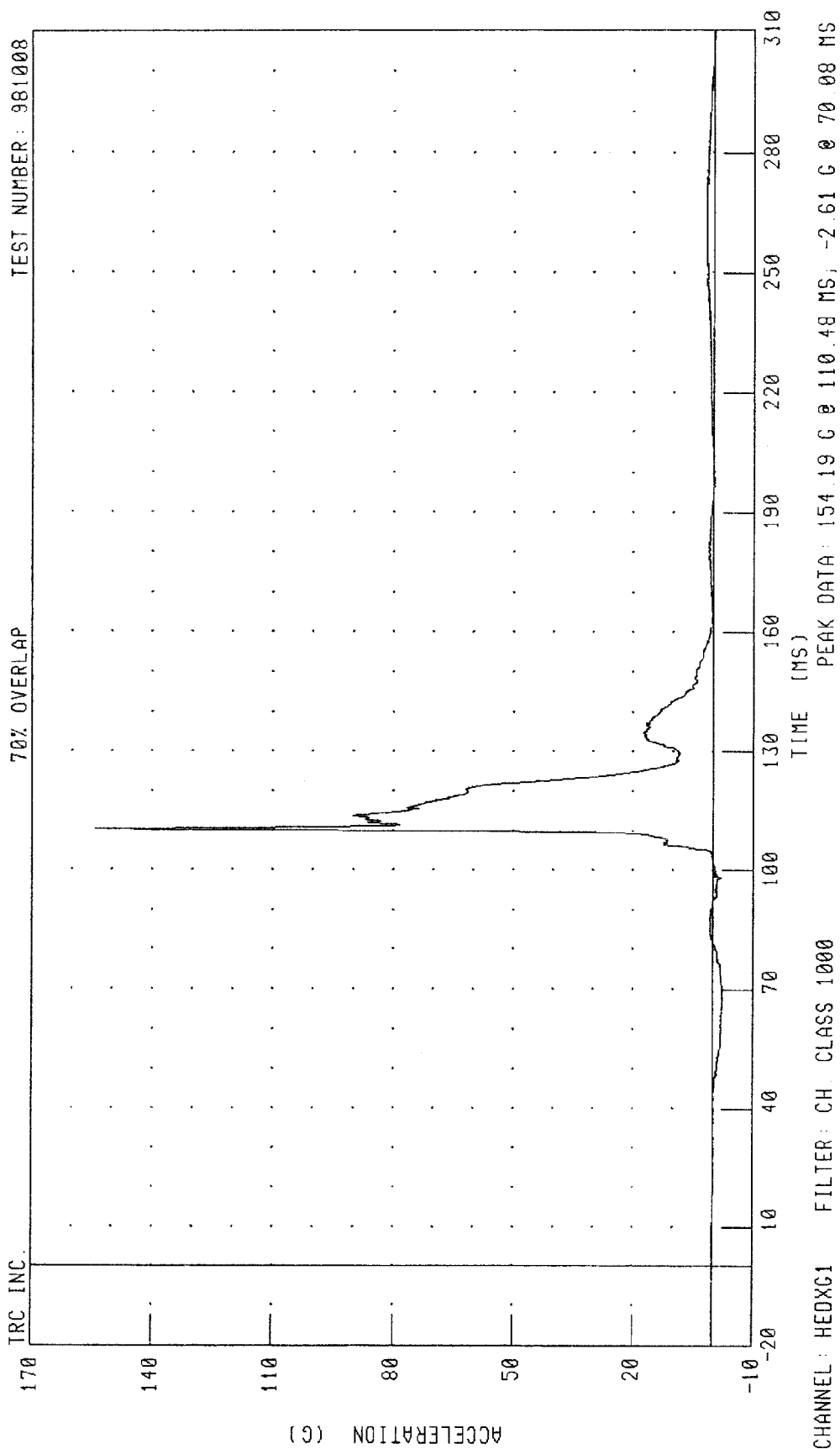


Figure A-62 Pre-Test Vehicle Tire Load Label

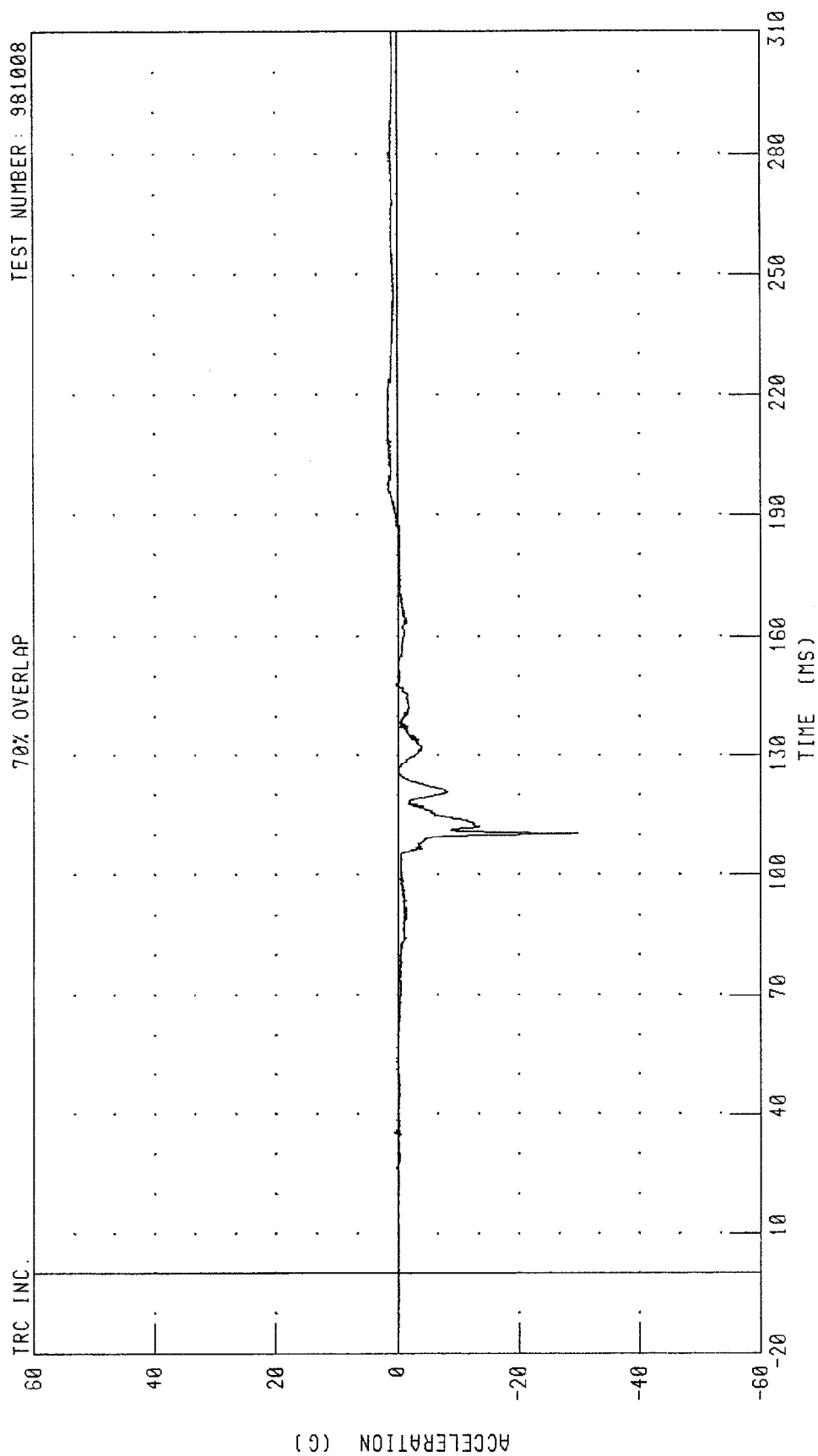
Appendix B

Data Plots

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
DRIVER HEAD X-AXIS ACCELERATION



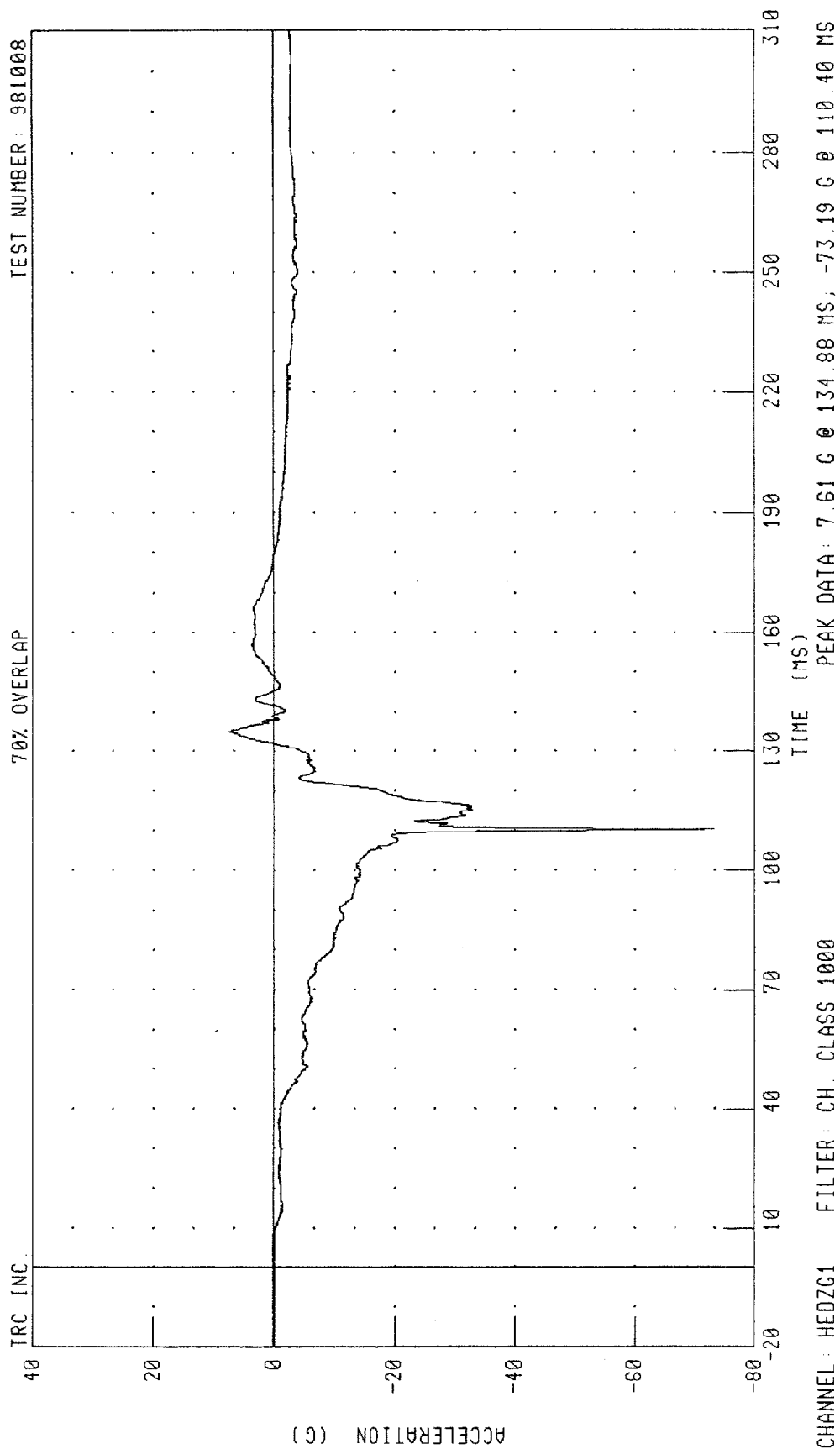
81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
 DRIVER HEAD Y-AXIS ACCELERATION



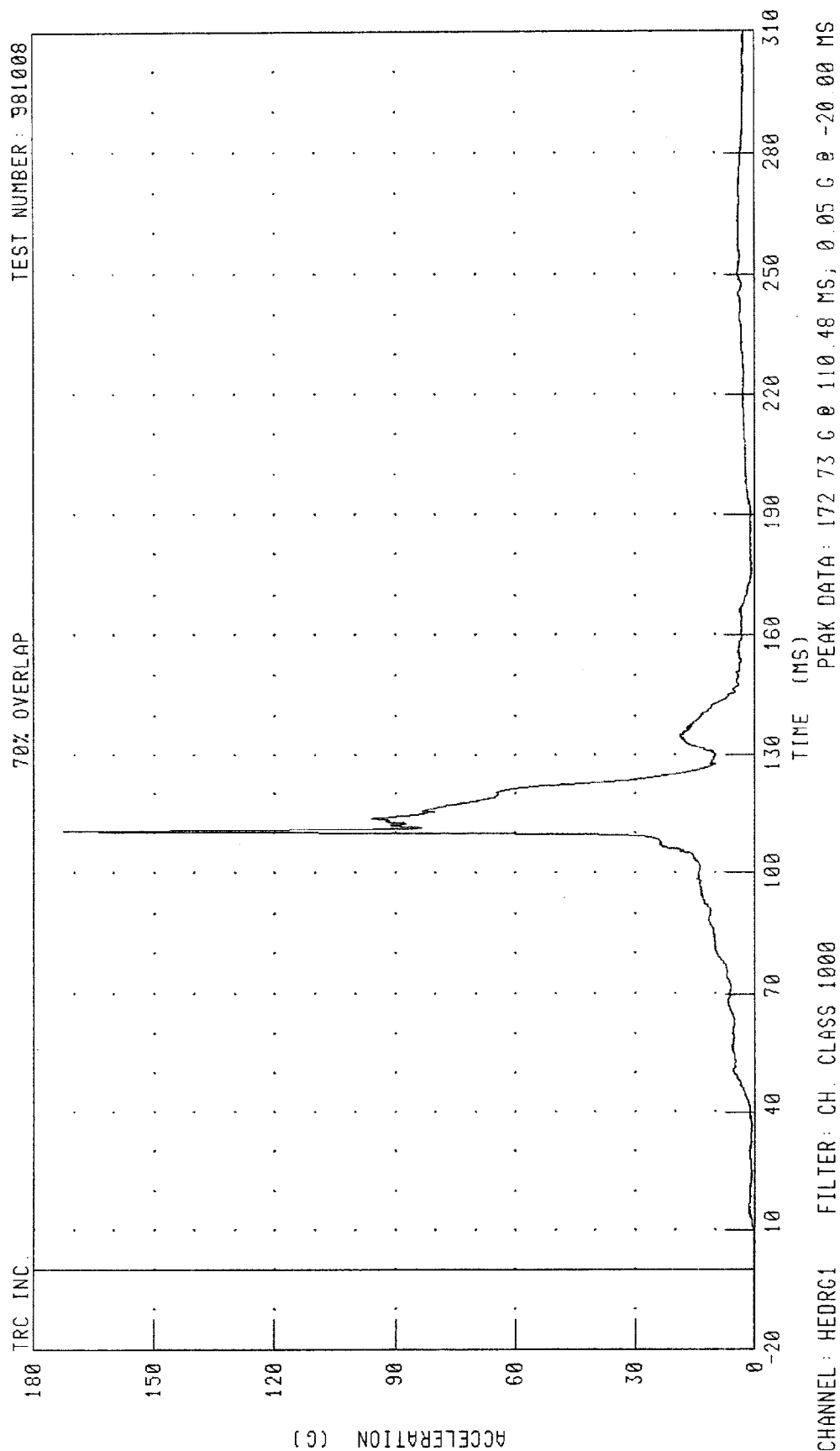
PEAK DATA: 1.77 G @ 208.56 MS; -29.62 G @ 110.40 MS

CHANNEL: HEDYC1 FILTER: CH. CLASS 1000

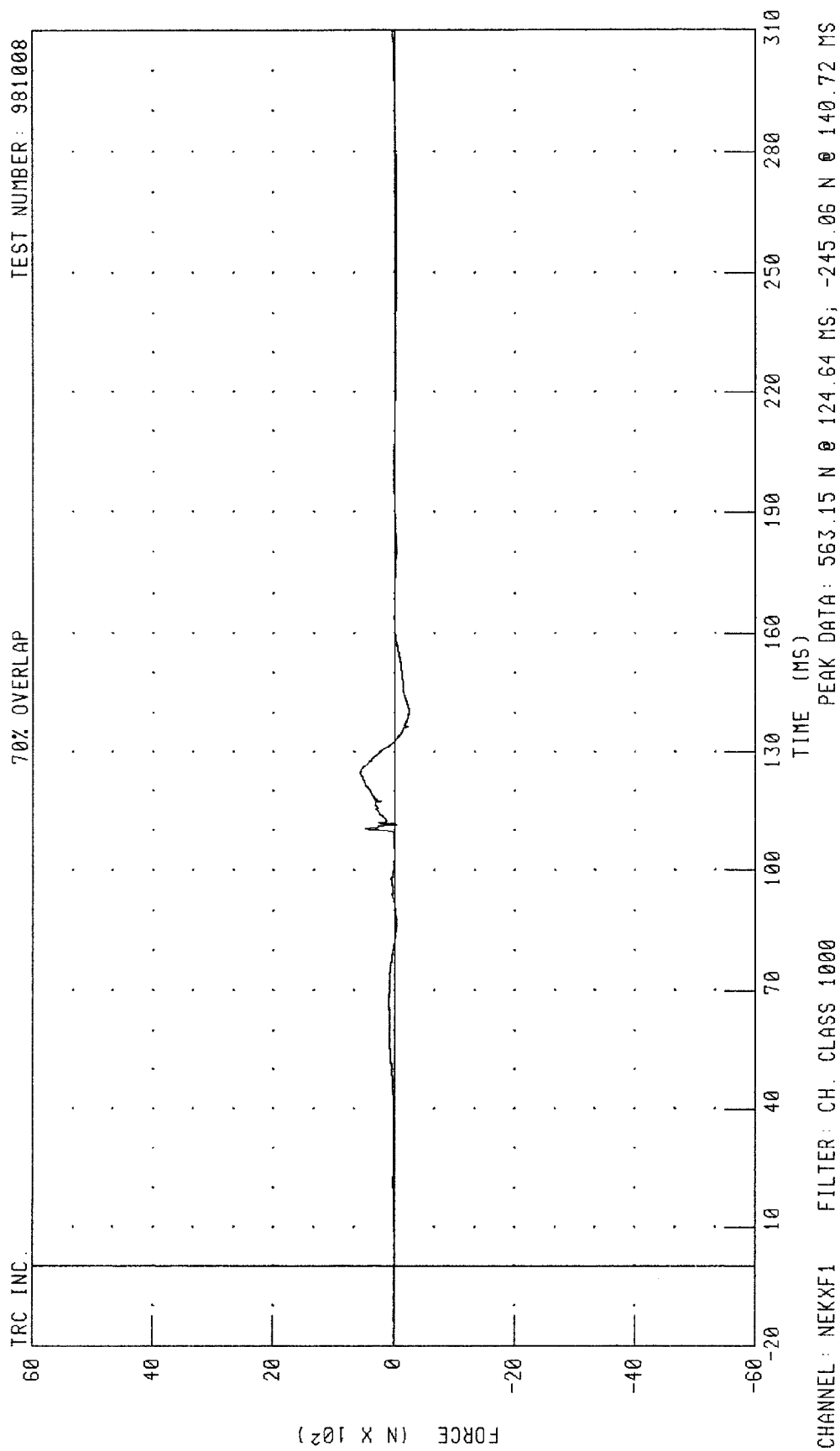
81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
 DRIVER HEAD Z-AXIS ACCELERATION



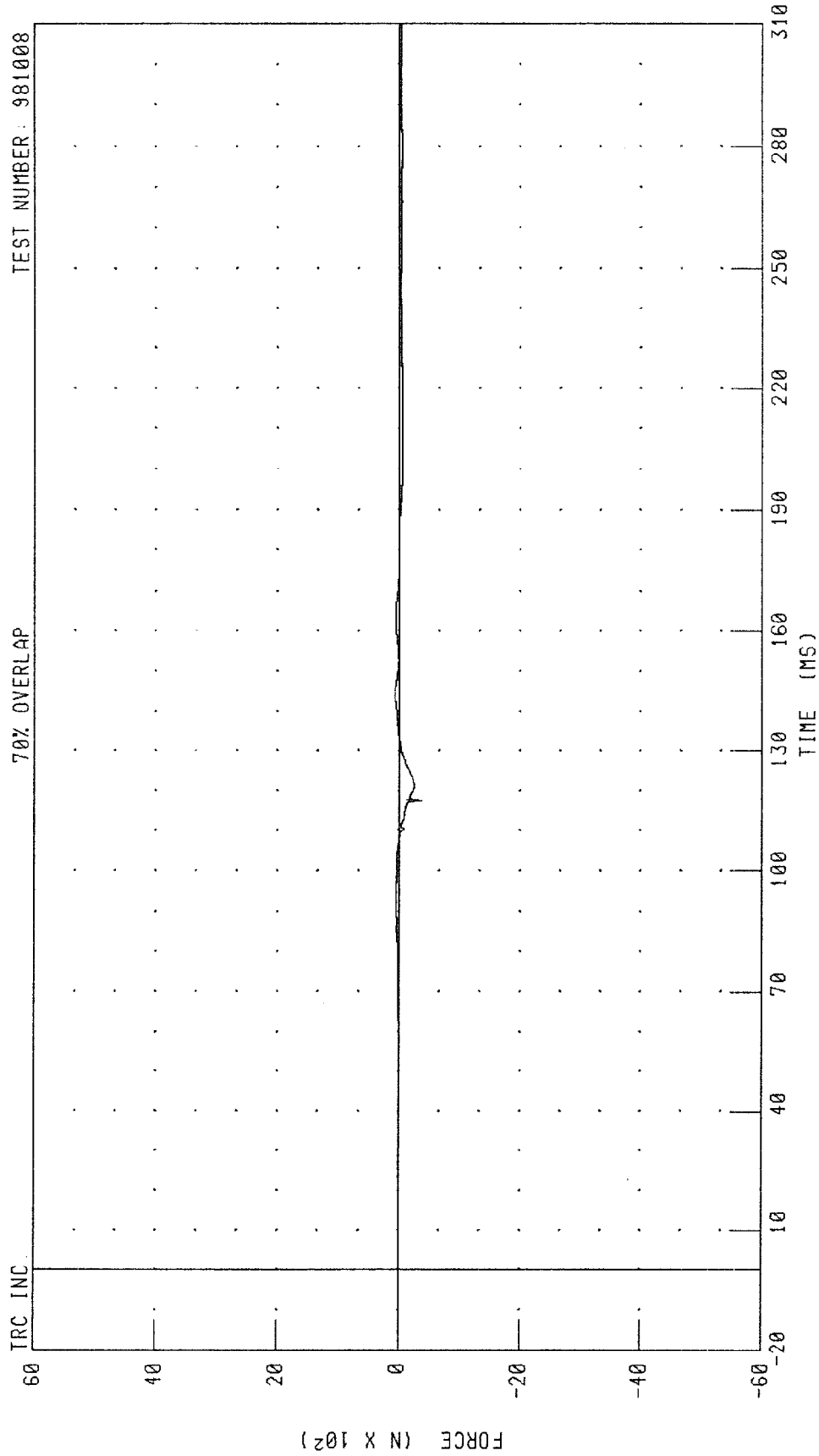
81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
 DRIVER HEAD RESULTANT ACCELERATION



81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
DRIVER UPPER NECK X-AXIS SHEAR FORCE



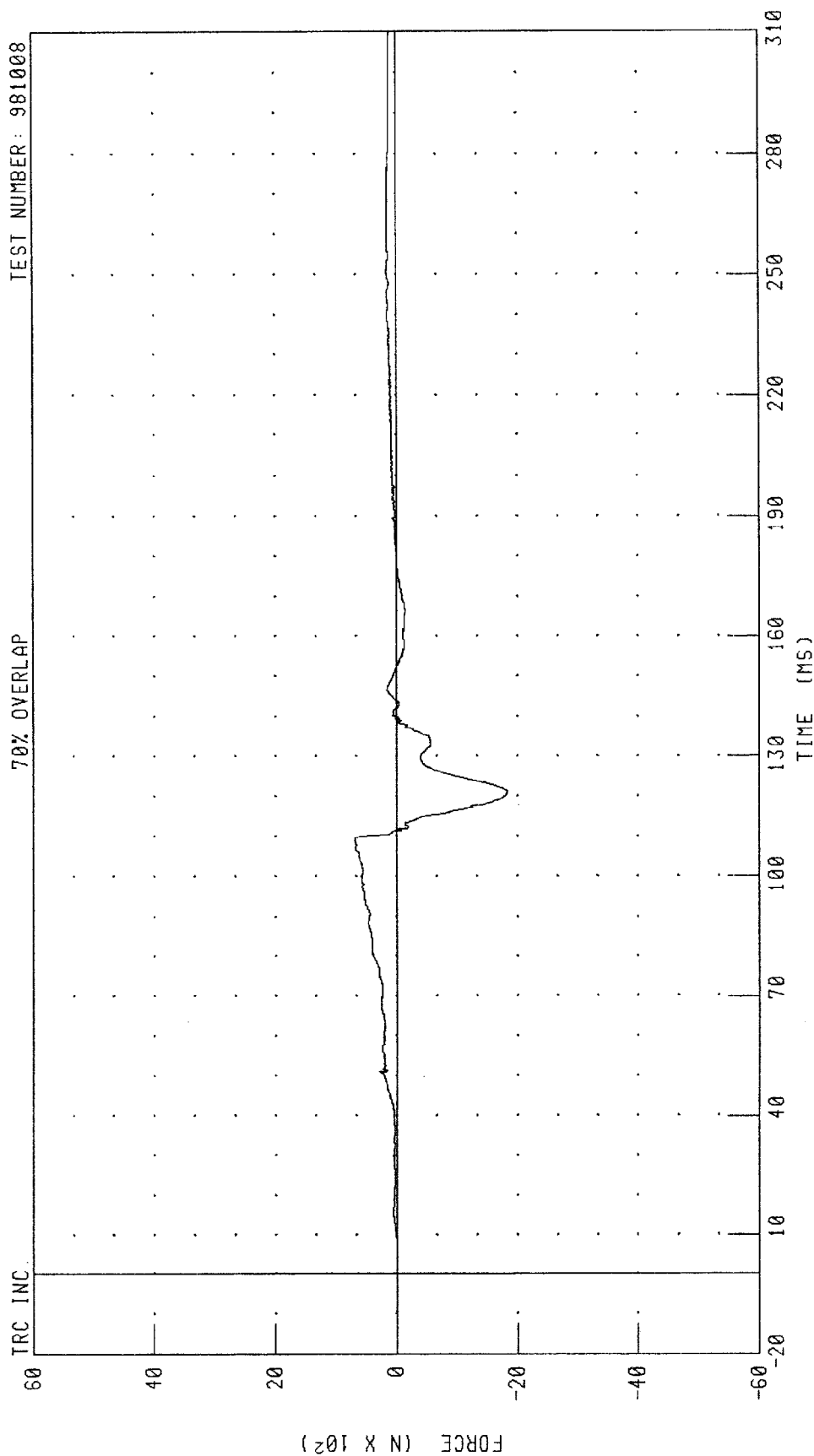
81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
 DRIVER UPPER NECK Y-AXIS SHEAR FORCE



PEAK DATA: 57.45 N @ 144.80 MS; -385.84 N @ 117.60 MS

CHANNEL: NEKYF1 FILTER: CH. CLASS 1000

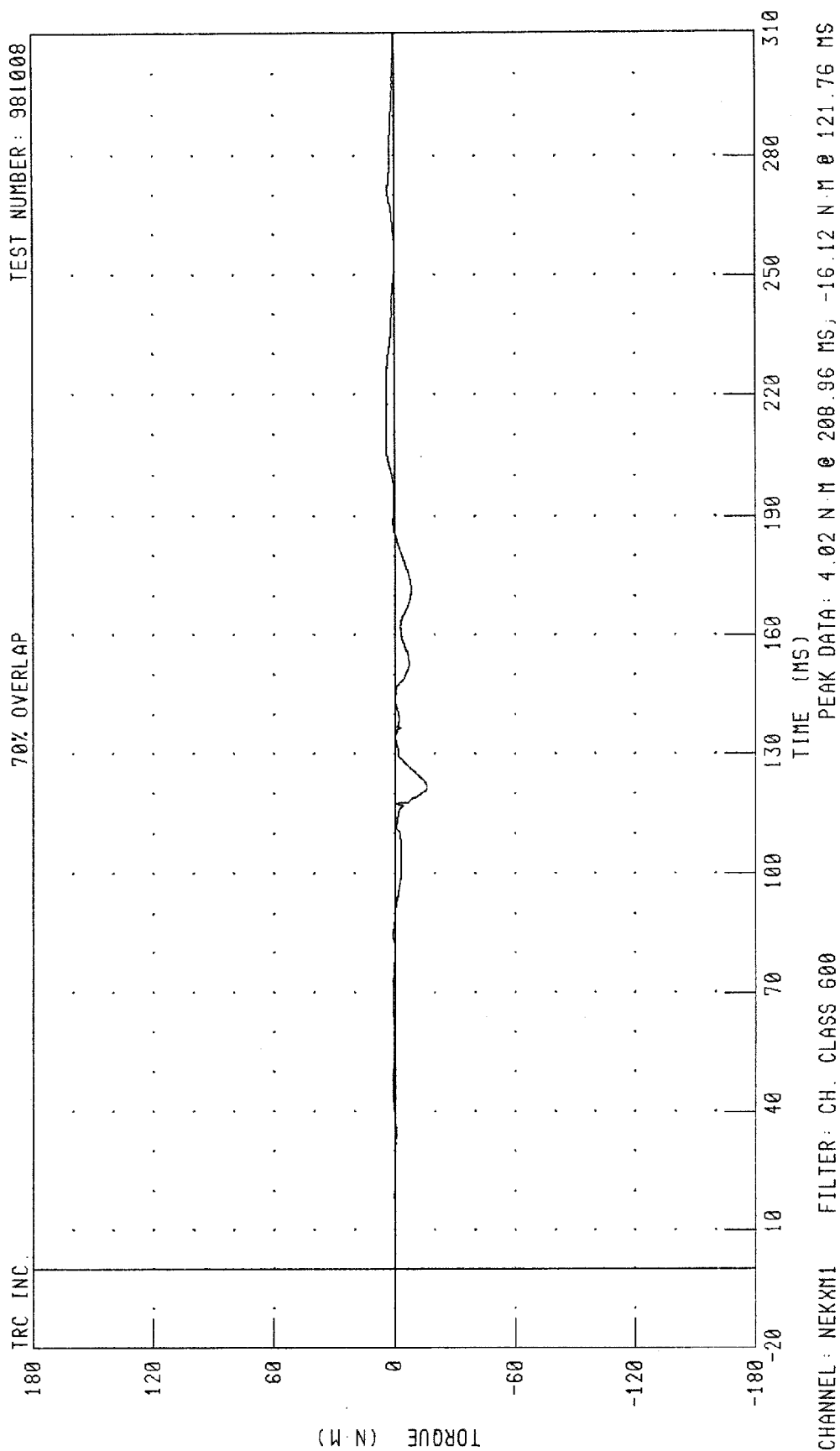
81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
 DRIVER UPPER NECK Z-AXIS AXIAL FORCE



PEAK DATA: 691.24 N @ 108.88 MS; -1838.96 N @ 120.88 MS

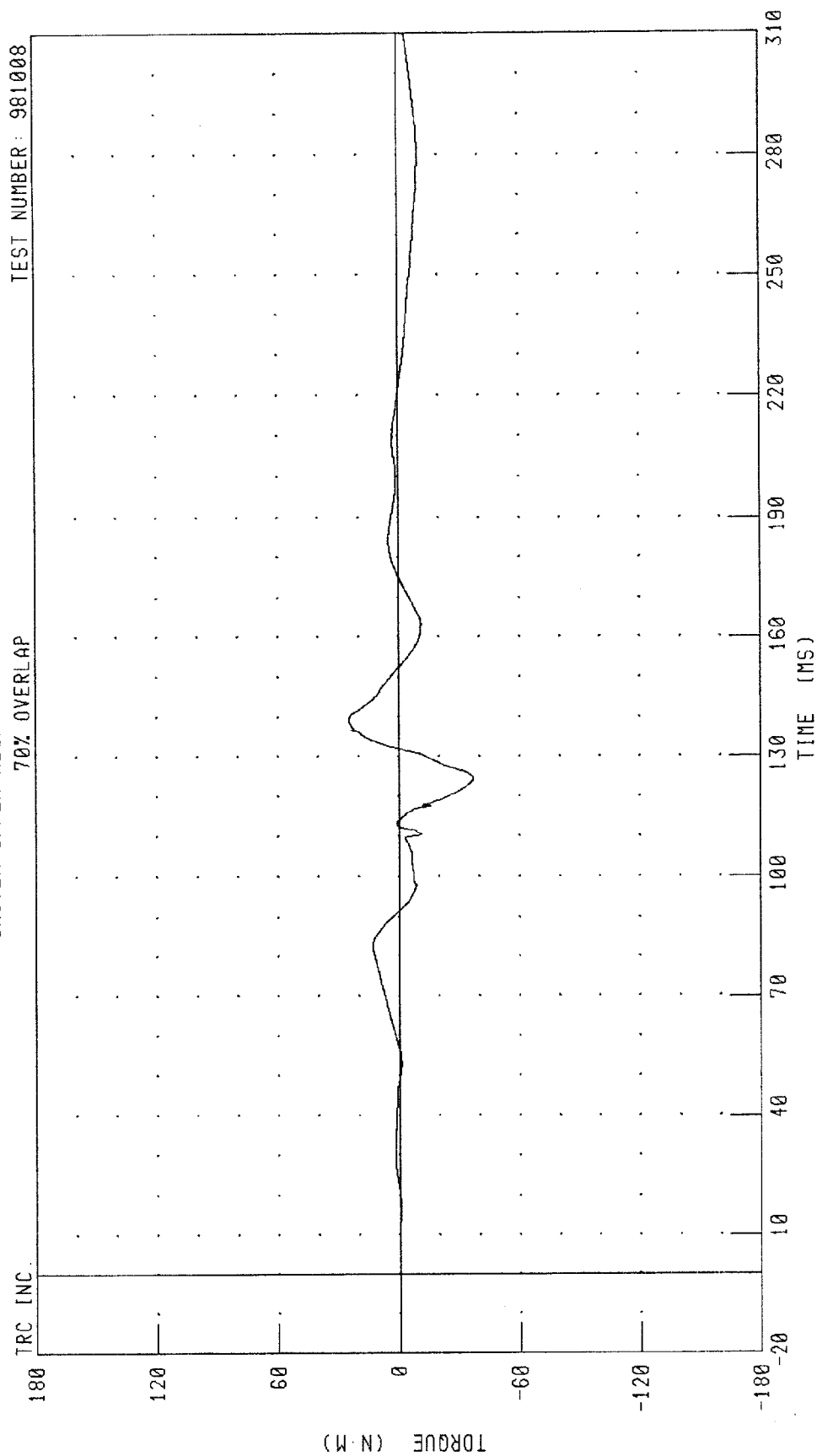
CHANNEL: NEKZF1 FILTER: CH. CLASS 1000

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
DRIVER UPPER NECK MOMENT ABOUT X-AXIS



CHANNEL: NEKX01 FILTER: CH. CLASS 600

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
DRIVER UPPER NECK MOMENT ABOUT Y-AXIS



CHANNEL: NEKYM1 FILTER: CH. CLASS 600

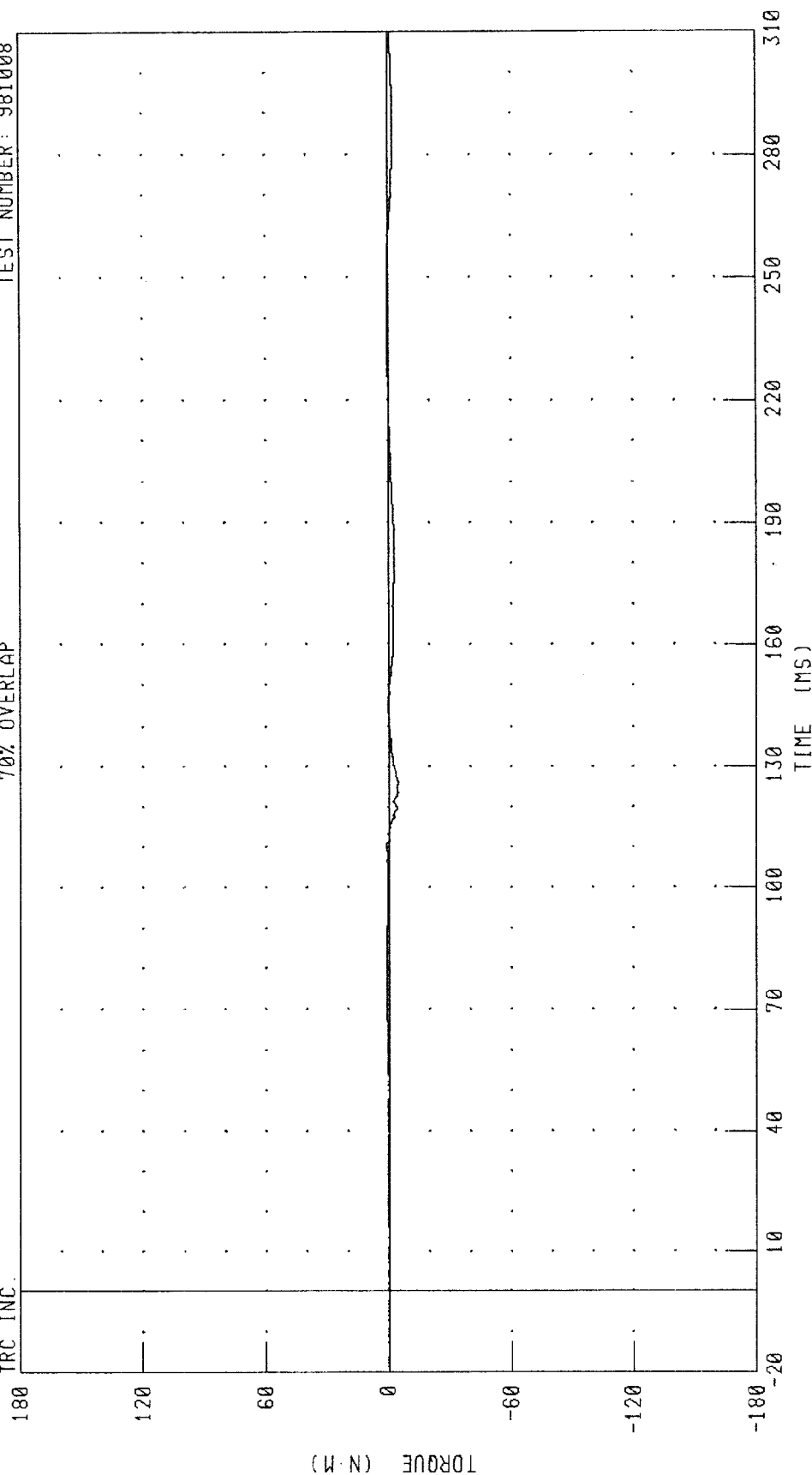
81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC

DRIVER UPPER NECK MOMENT ABOUT Z-AXIS

TEST NUMBER: 981008

70% OVERLAP

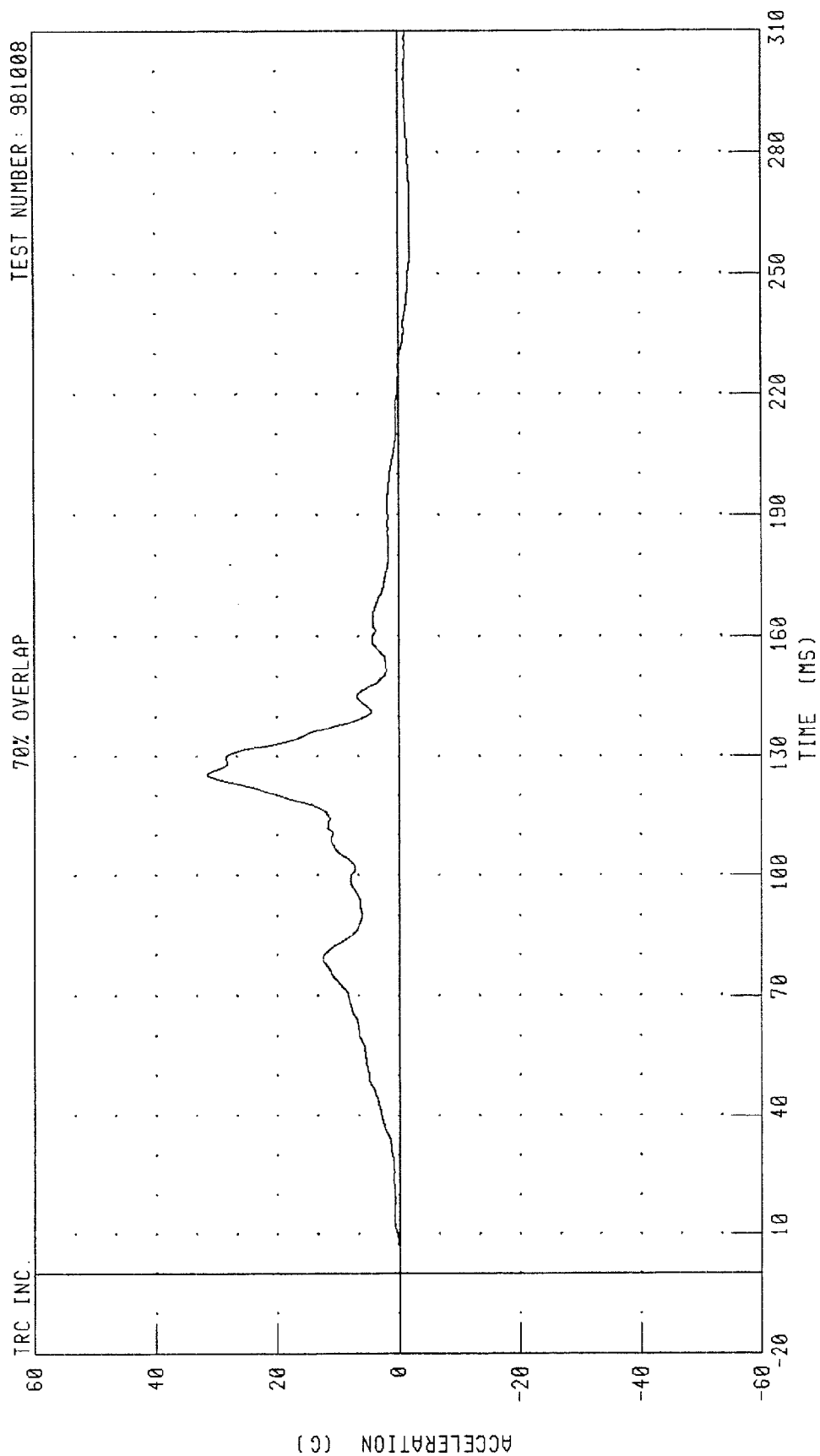
TRC INC.



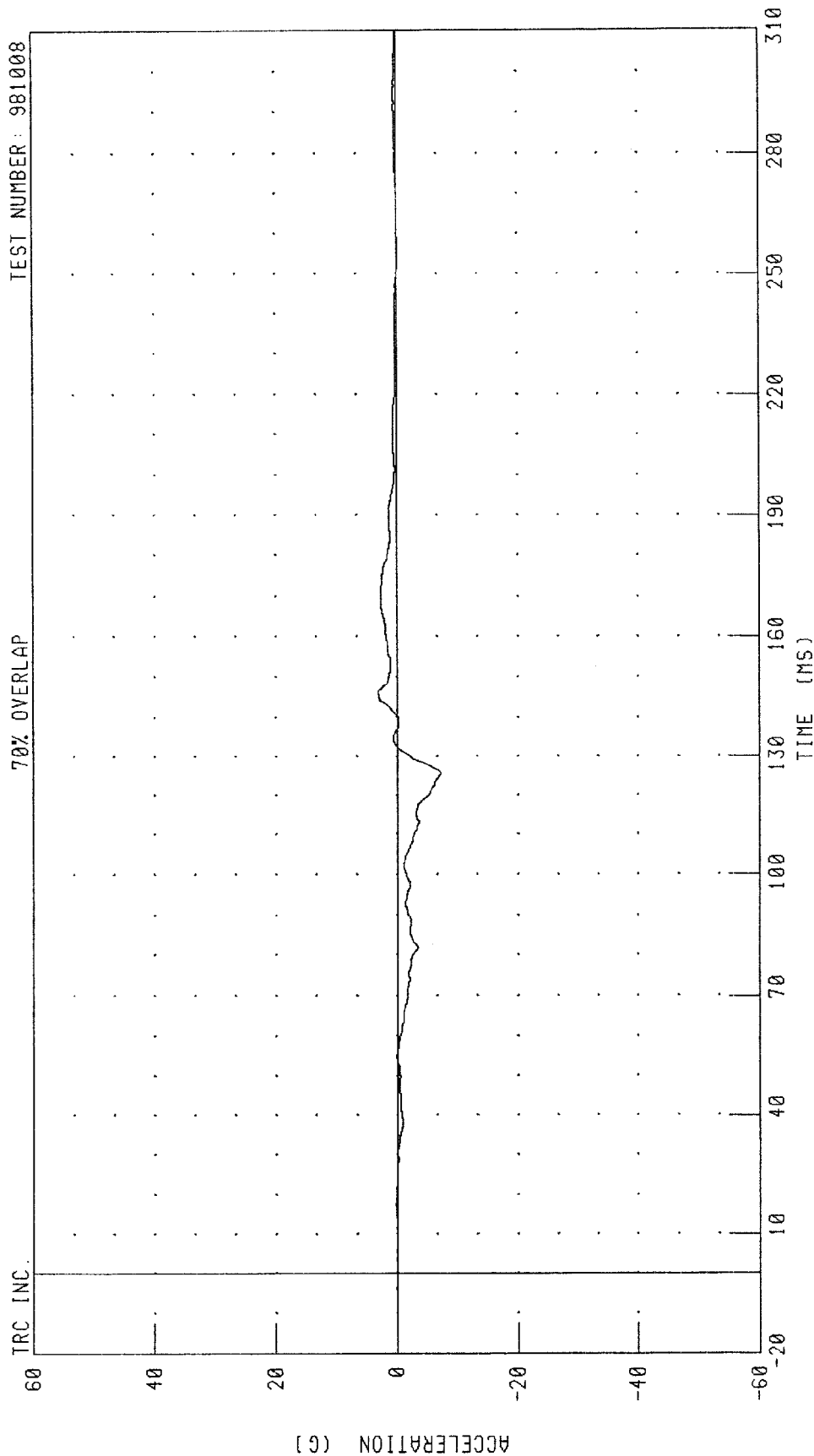
CHANNEL: NEKZM1 FILTER: CH. CLASS 600

PEAK DATA: 1.31 N-M @ 110.40 MS; -4.73 N-M @ 126.00 MS

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
 DRIVER CHEST X-AXIS ACCELERATION



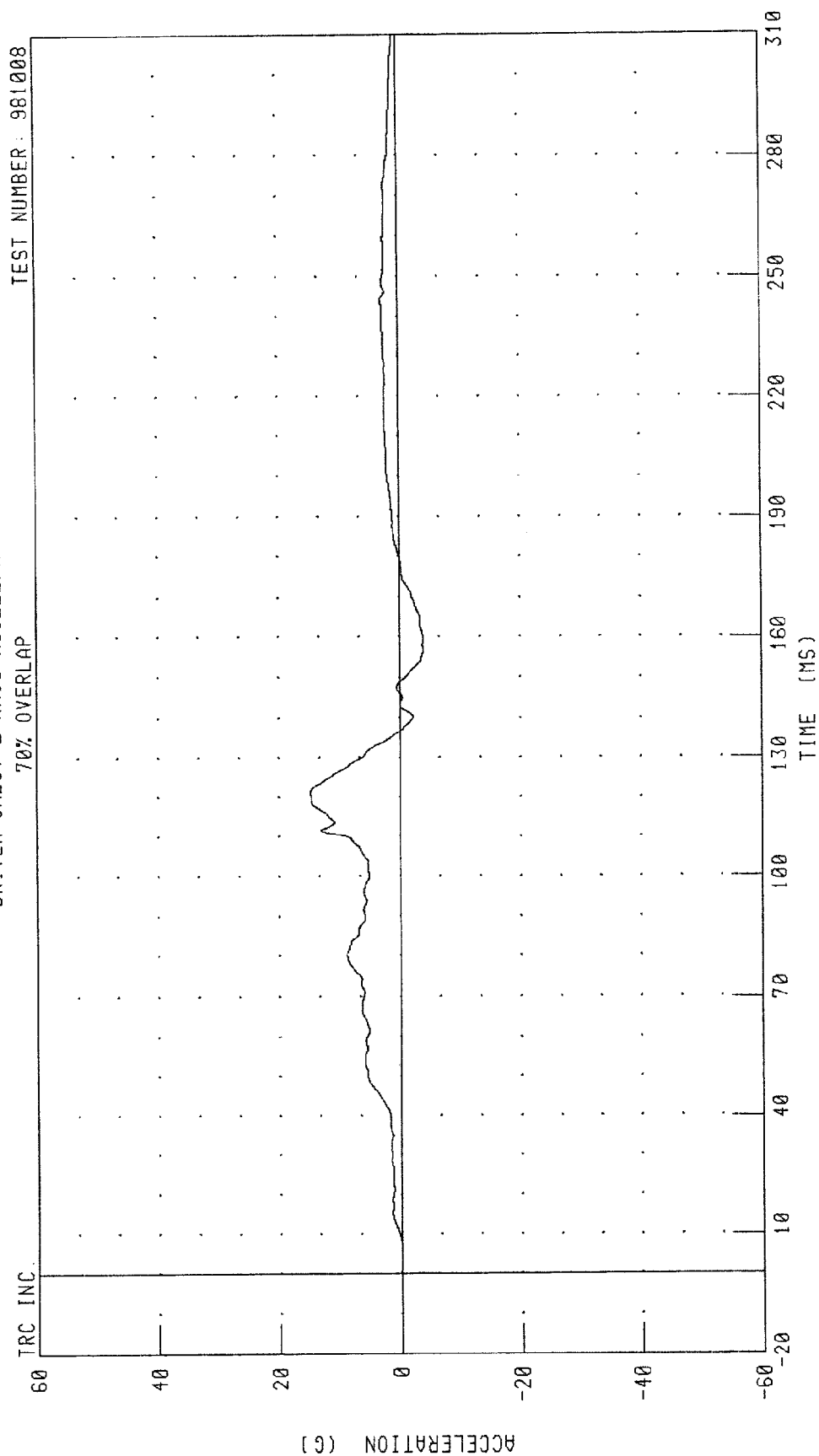
81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
 DRIVER CHEST Y-AXIS ACCELERATION



PEAK DATA: 3.17 G @ 146.32 MS, -7.22 G @ 125.76 MS

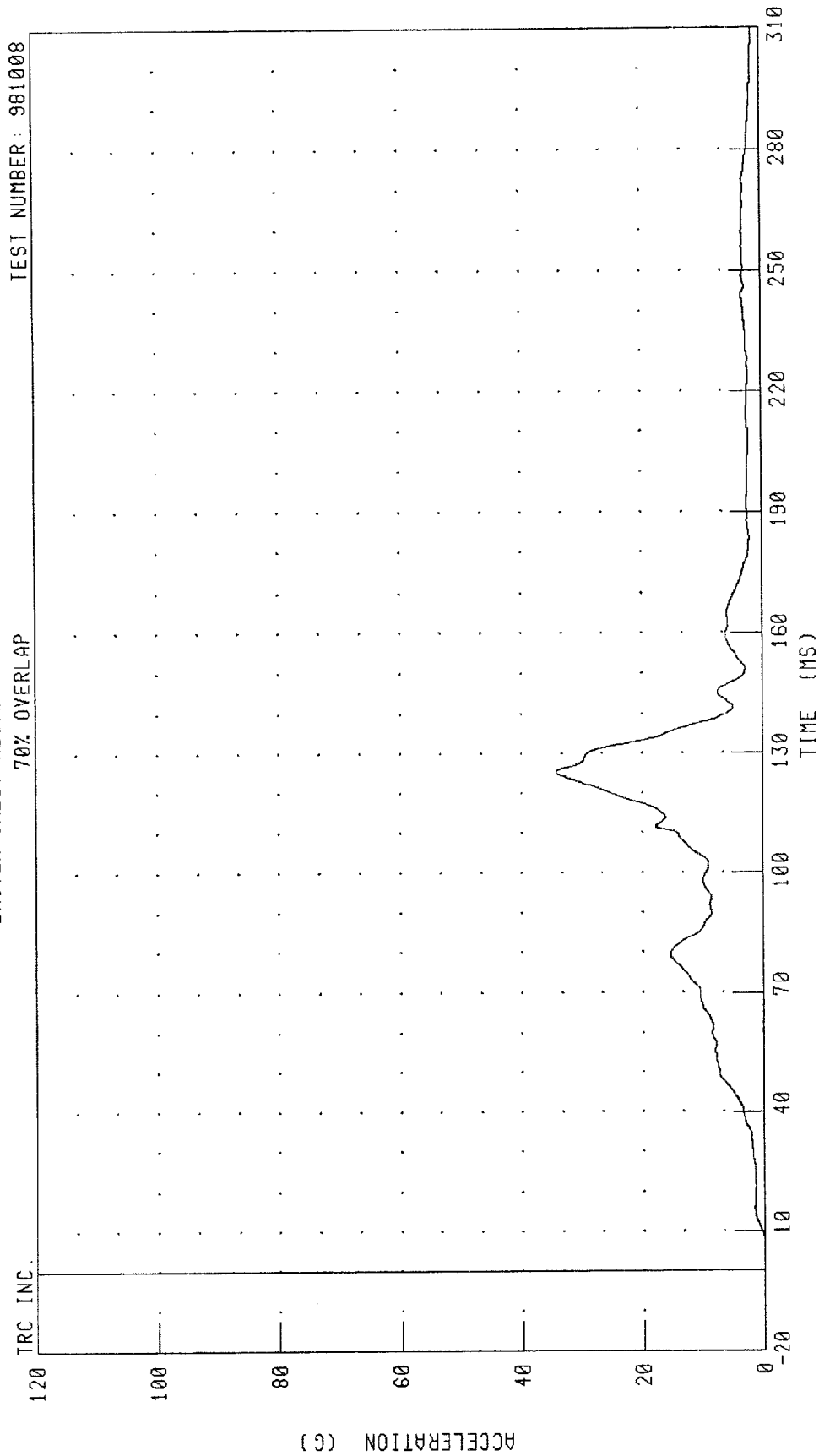
CHANNEL: CSTYG1 FILTER: CH. CLASS 180

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
DRIVER CHEST Z-AXIS ACCELERATION



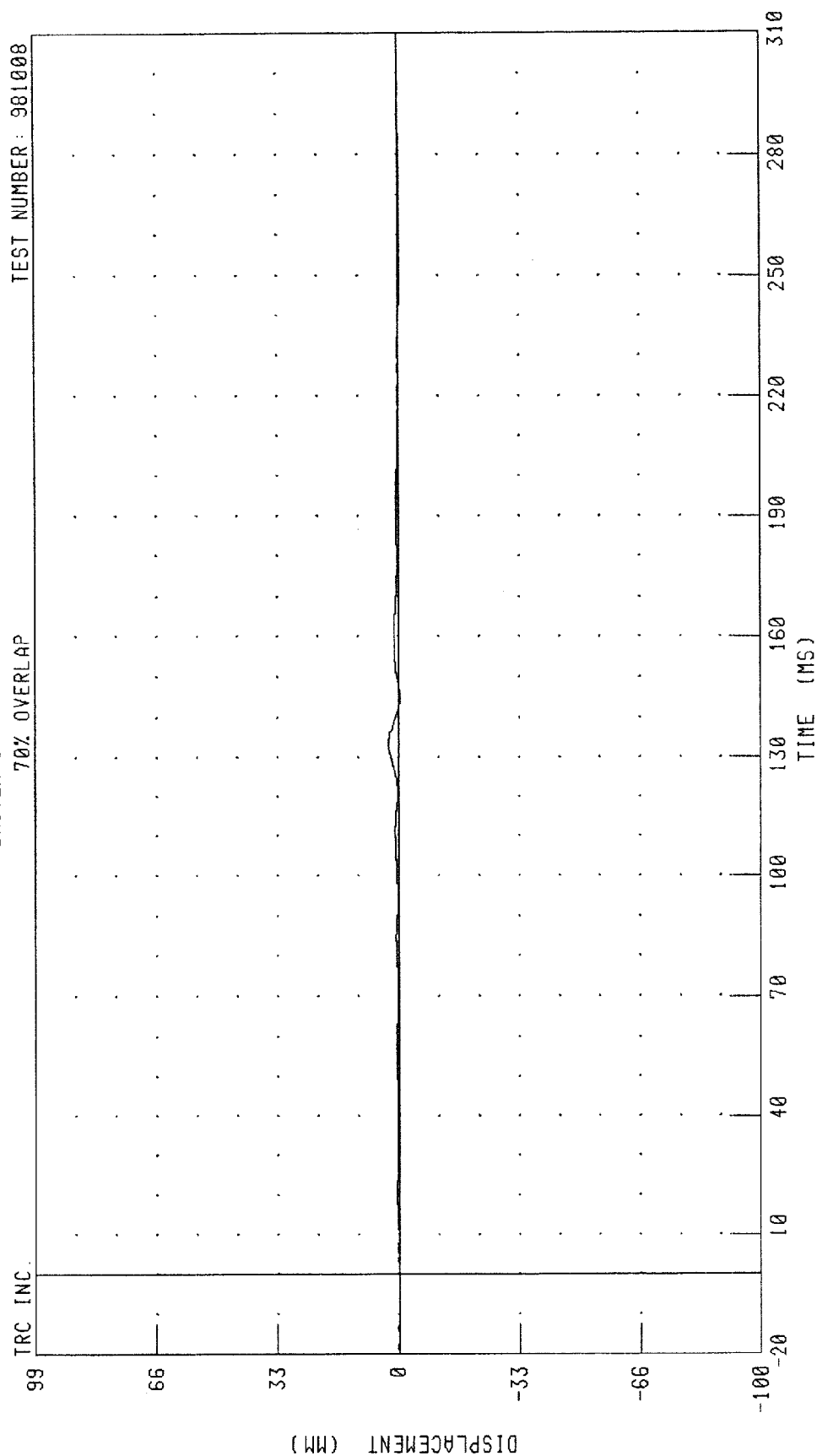
CHANNEL: CSTZG1 FILTER: CH. CLASS 180

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
 DRIVER CHEST RESULTANT ACCELERATION



CHANNEL: CSTRG1 FILTER: CH. CLASS 180

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
DRIVER CHEST DEFLECTION

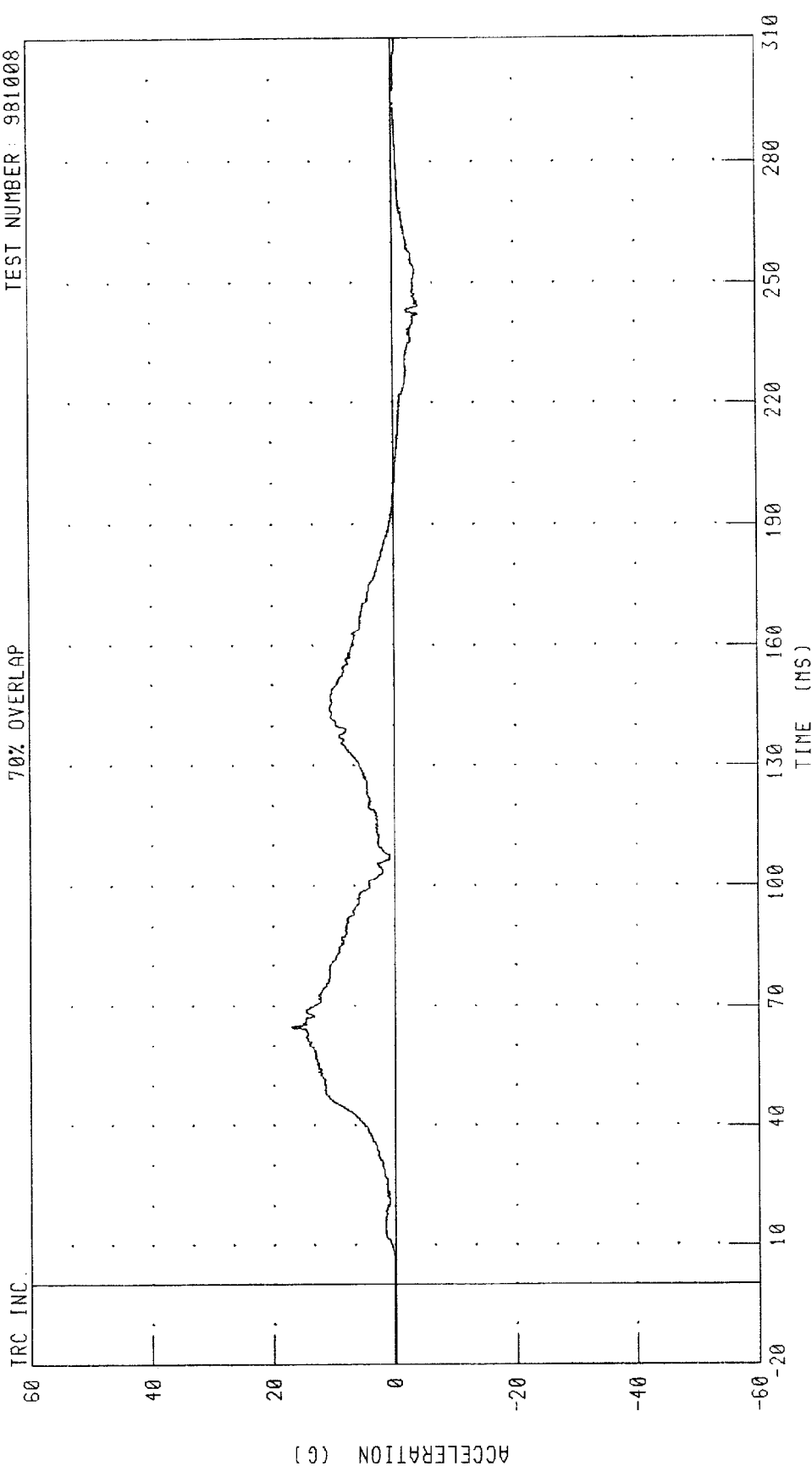


CHANNEL: CSTXD1 FILTER: CH. CLASS 180

PEAK DATA: 2 80 MM @ 133.12 MS, -0.48 MM @ 254.96 MS

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
 DRIVER PELVIS X-AXIS ACCELERATION
 70% OVERLAP

TEST NUMBER: 981008

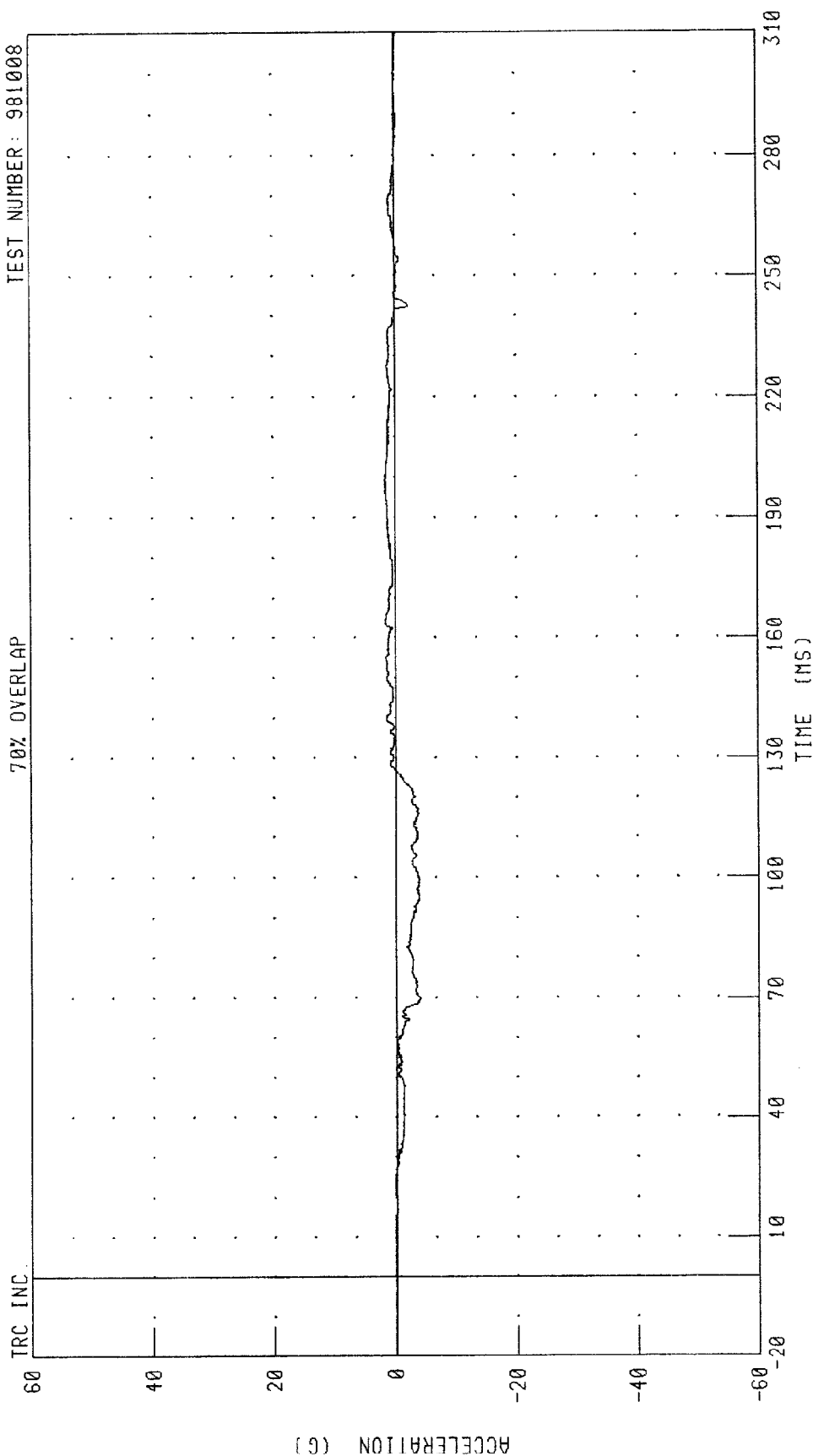


CHANNEL: PEVXC1 FILTER: CH. CLASS 1000

981008

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
 DRIVER PELVIS Y-AXIS ACCELERATION
 70% OVERLAP

TEST NUMBER: 981008



PEAK DATA: 1.67 G @ 154.88 MS; -4.00 G @ 69.60 MS

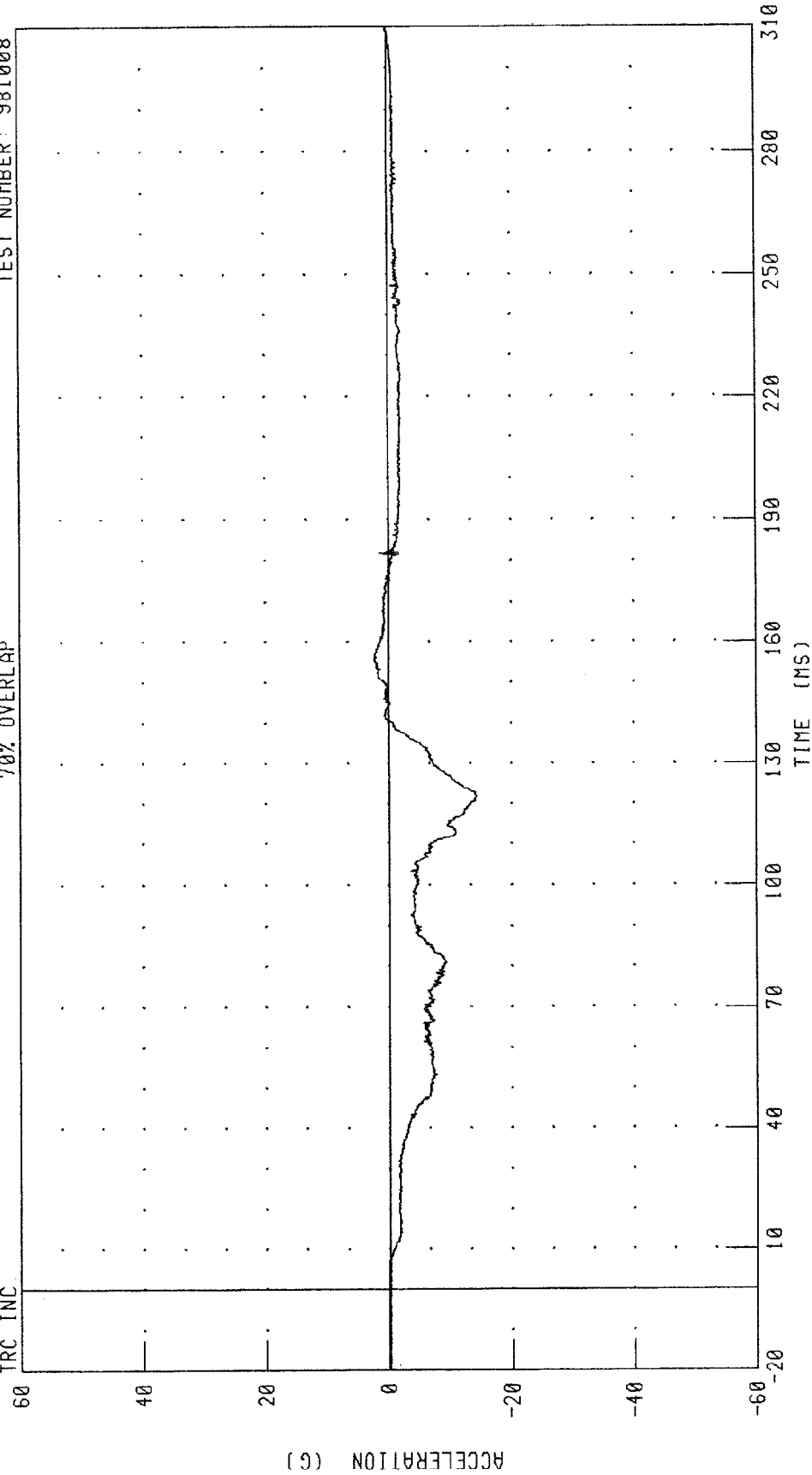
CHANNEL: PEVYG1 FILTER: CH. CLASS 1000

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
DRIVER PELVIS Z-AXIS ACCELERATION

TEST NUMBER: 981008

70% OVERLAP

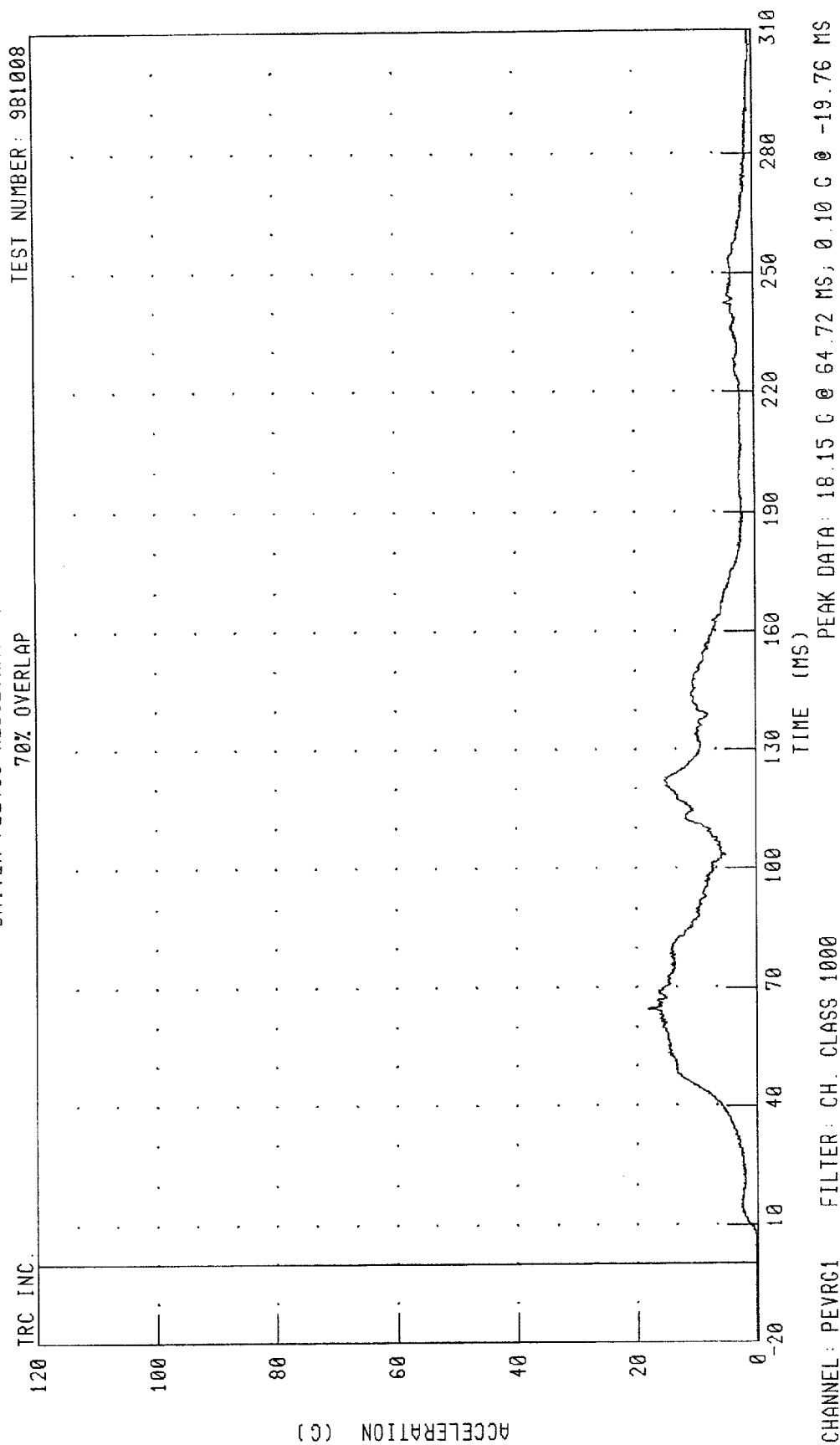
TRC INC.



CHANNEL: PEVZG1 FILTER: CH. CLASS 1000

PEAK DATA: 2.38 G @ 155.44 MS; -14.30 G @ 121.84 MS

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
DRIVER PELVIS RESULTANT ACCELERATION

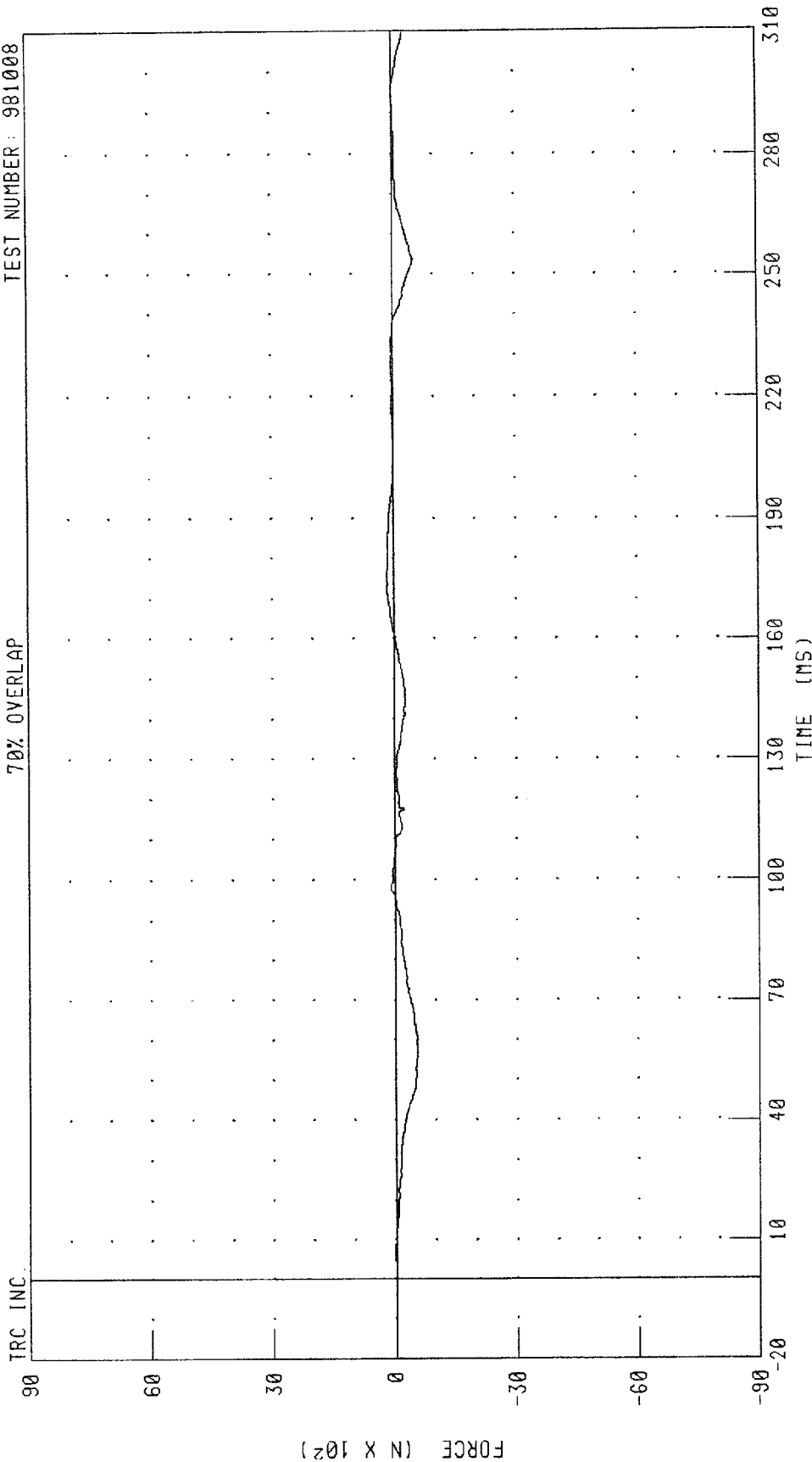


81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC

DRIVER LEFT FEMUR FORCE

70% OVERLAP

TEST NUMBER: 981008

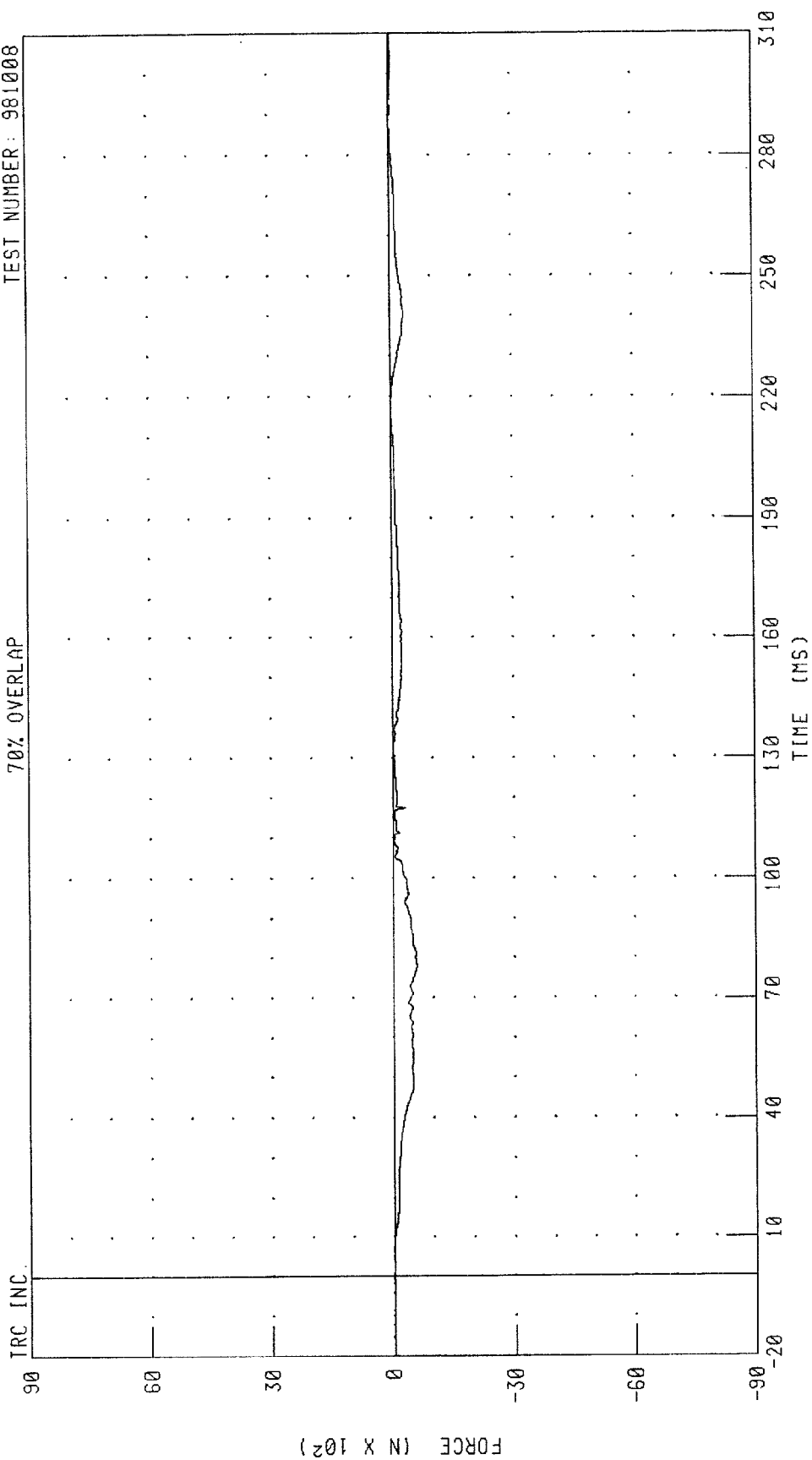


PEAK DATA: 159.15 N @ 175.36 MS; -539.42 N @ 57.20 MS

CHANNEL: LFMF1 FILTER: CH. CLASS 600

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
DRIVER RIGHT FEMUR FORCE
70% OVERLAP

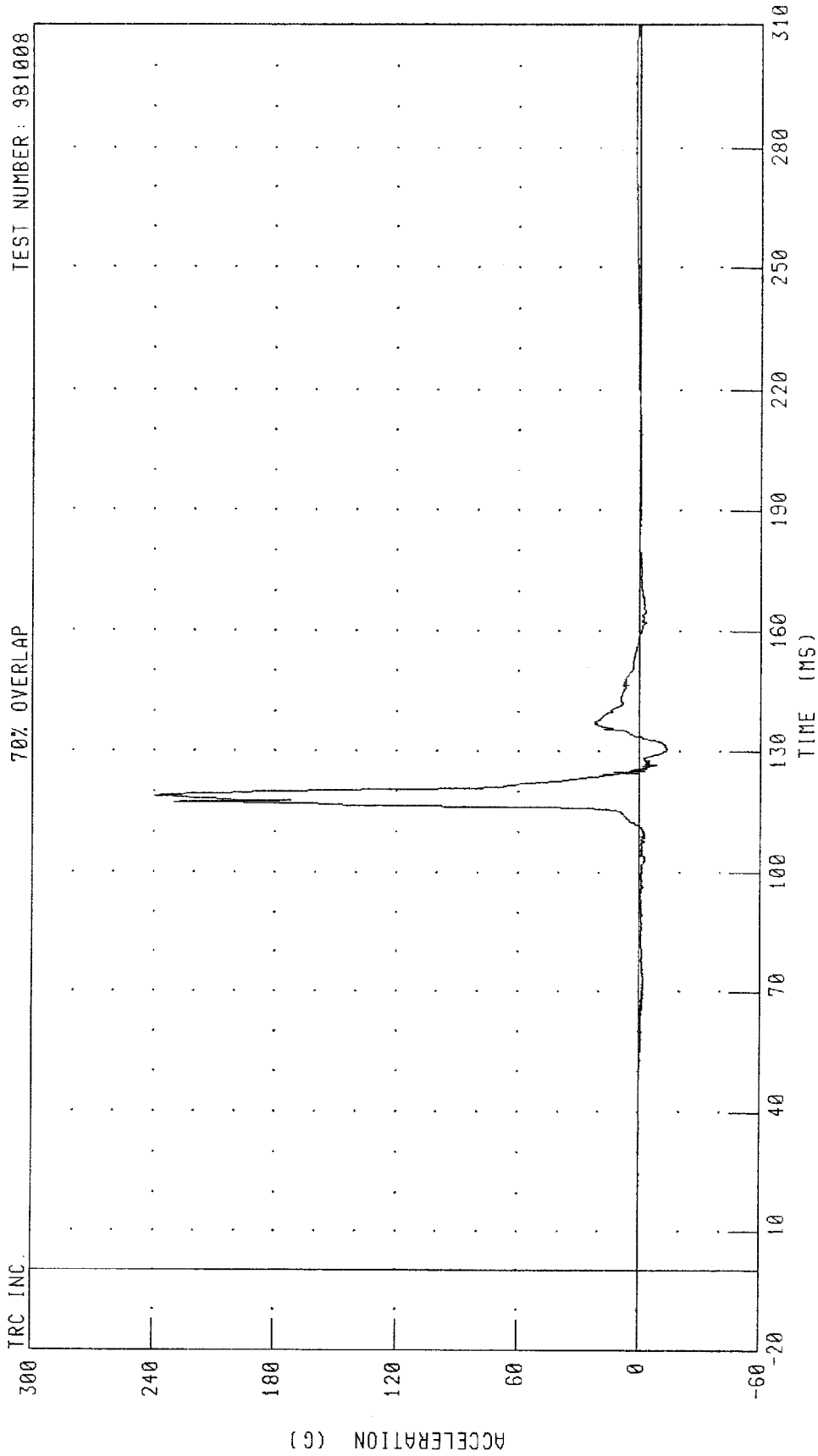
TEST NUMBER: 981008



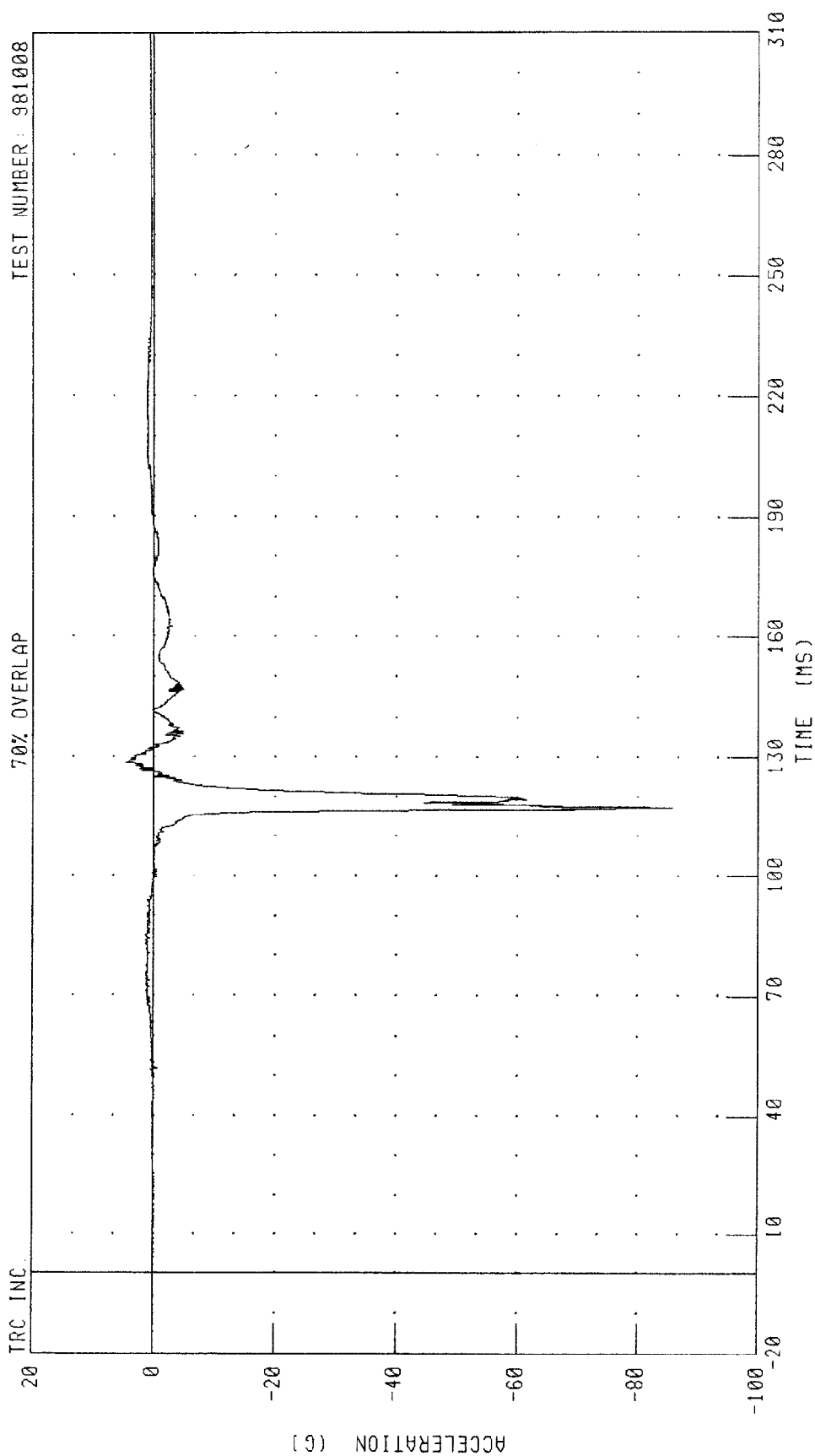
PEAK DATA: 3.30 N @ 6.64 MS, -589.44 N @ 78.00 MS

CHANNEL: RFMF1 FILTER: CH. CLASS 600

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
RIGHT FRONT PASSENGER HEAD X-AXIS ACCELERATION



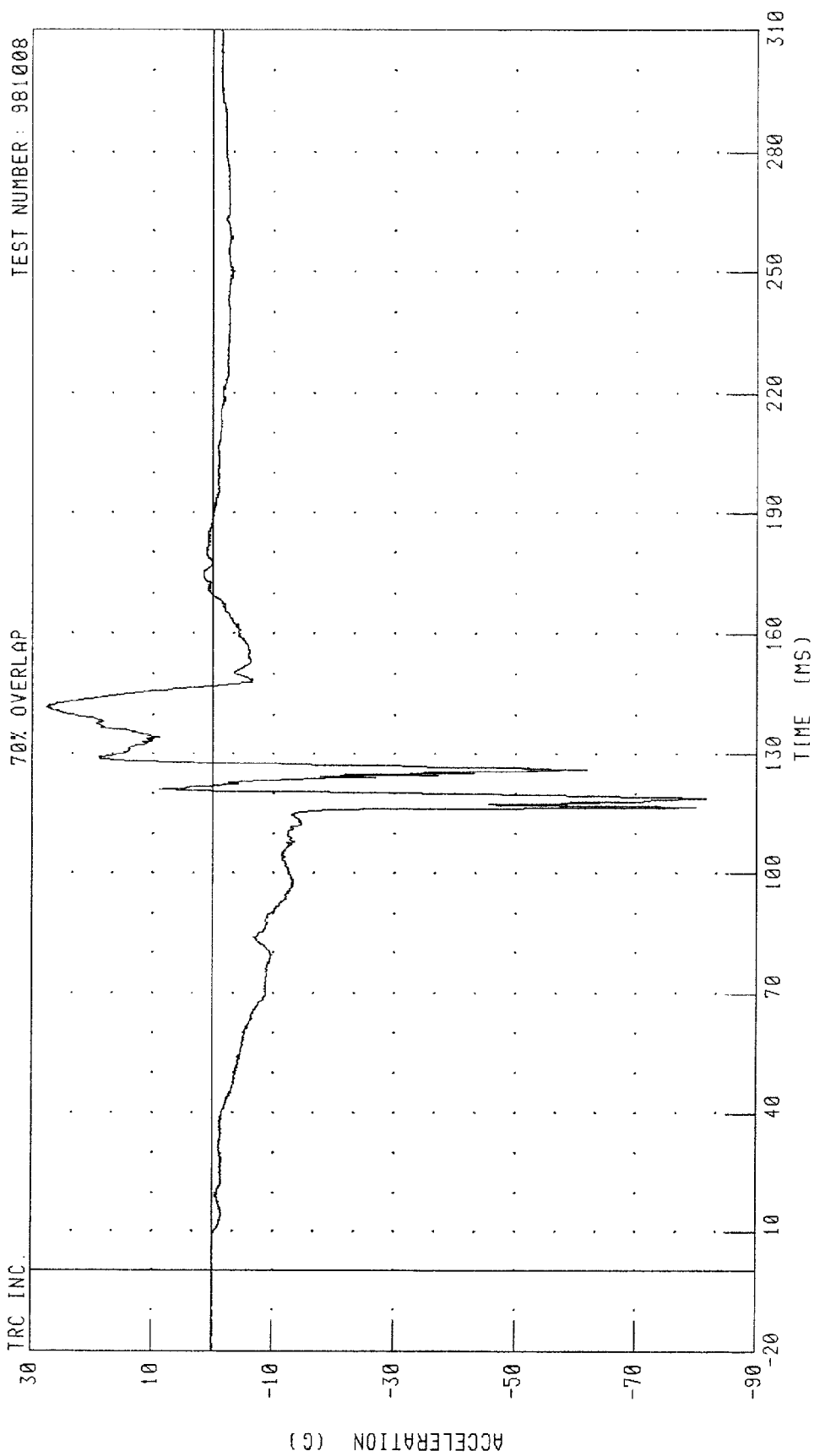
81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
 RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION



PEAK DATA: 4.71 G @ 128.64 MS, -85.82 G @ 117.36 MS

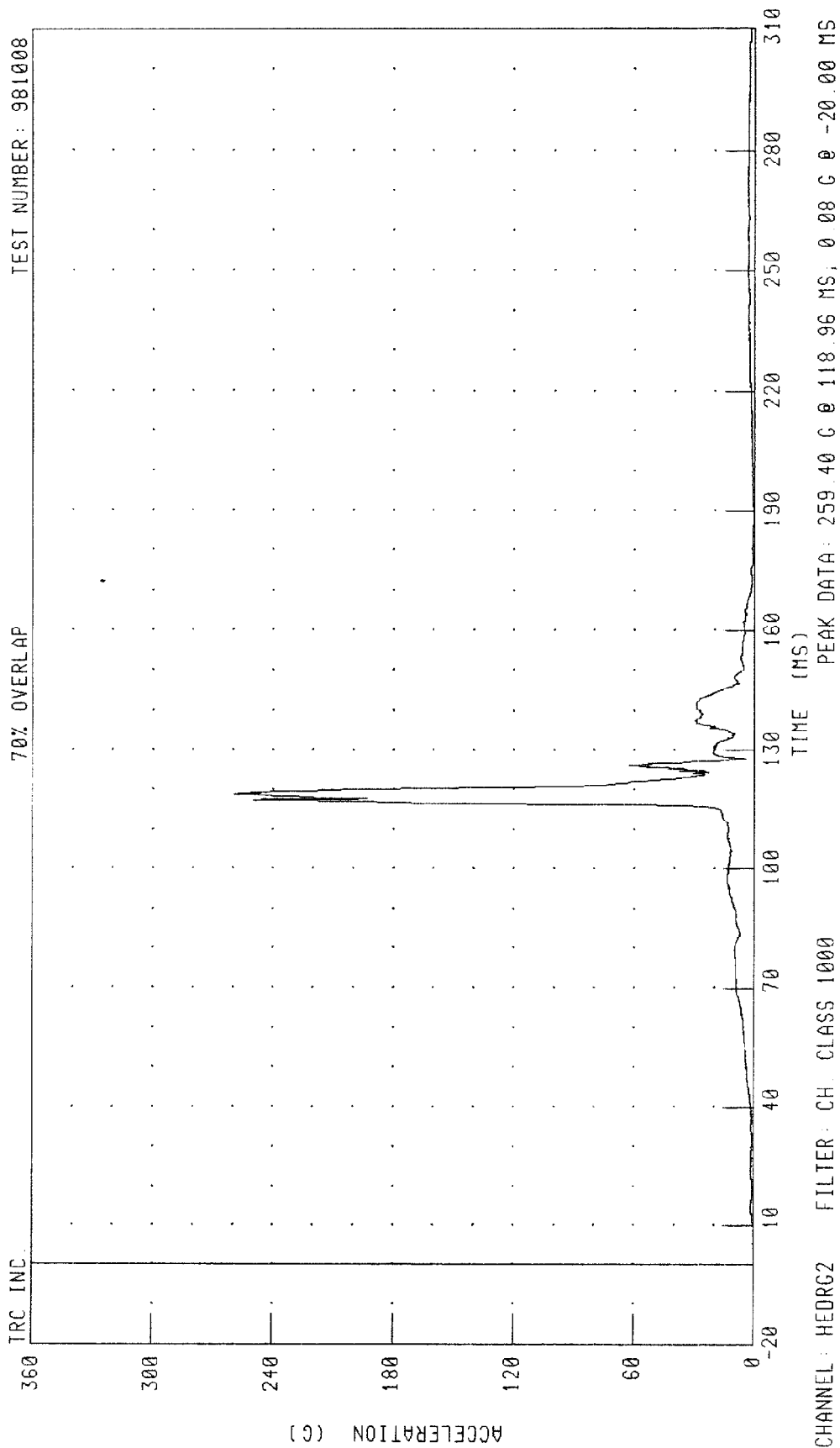
CHANNEL: HEDYC2 FILTER: CH. CLASS 1000

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
RIGHT FRONT PASSENGER HEAD Z-AXIS ACCELERATION

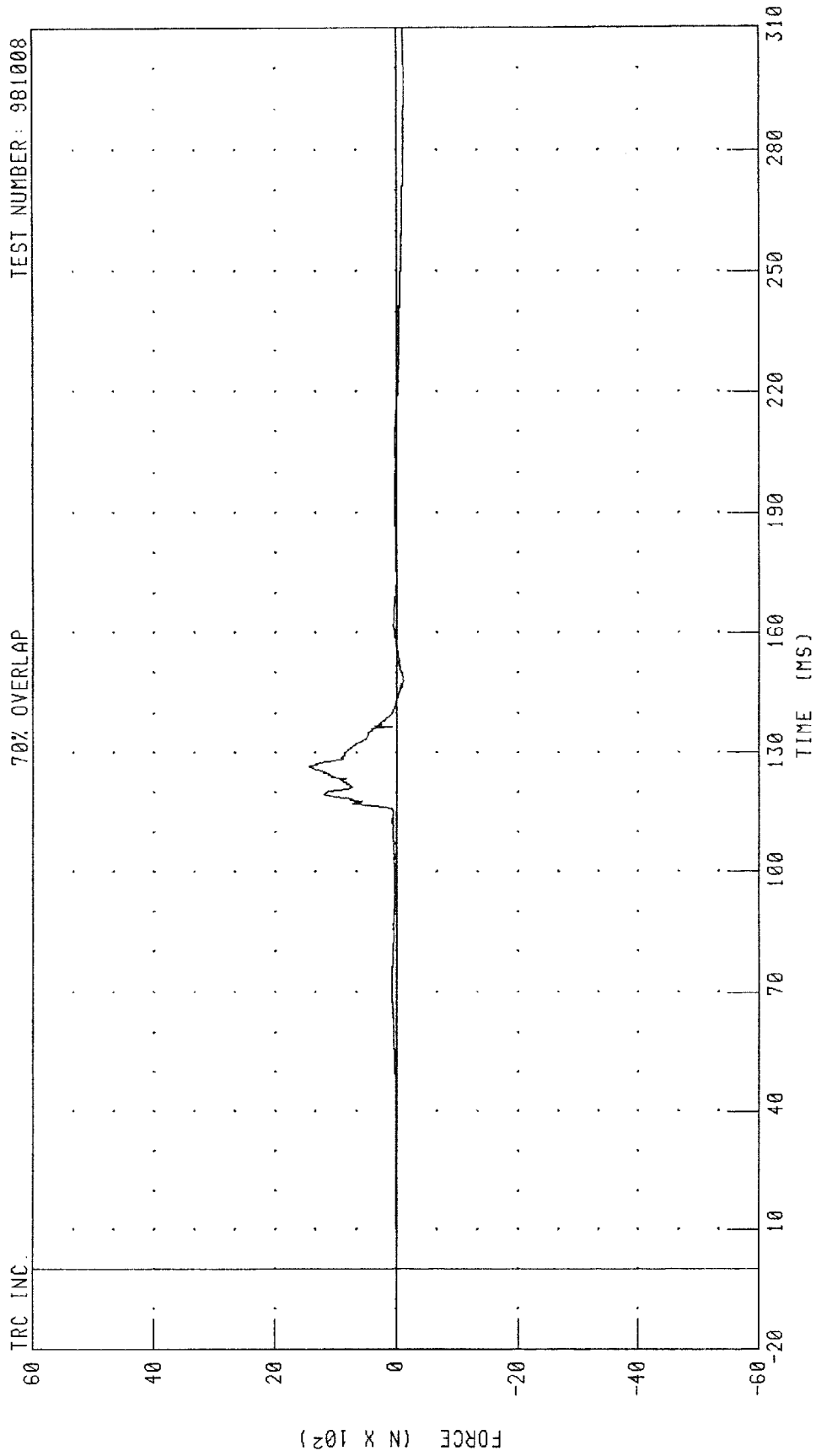


CHANNEL: HEDZC2 FILTER: CH. CLASS 1000

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
RIGHT FRONT PASSENGER HEAD RESULTANT ACCELERATION



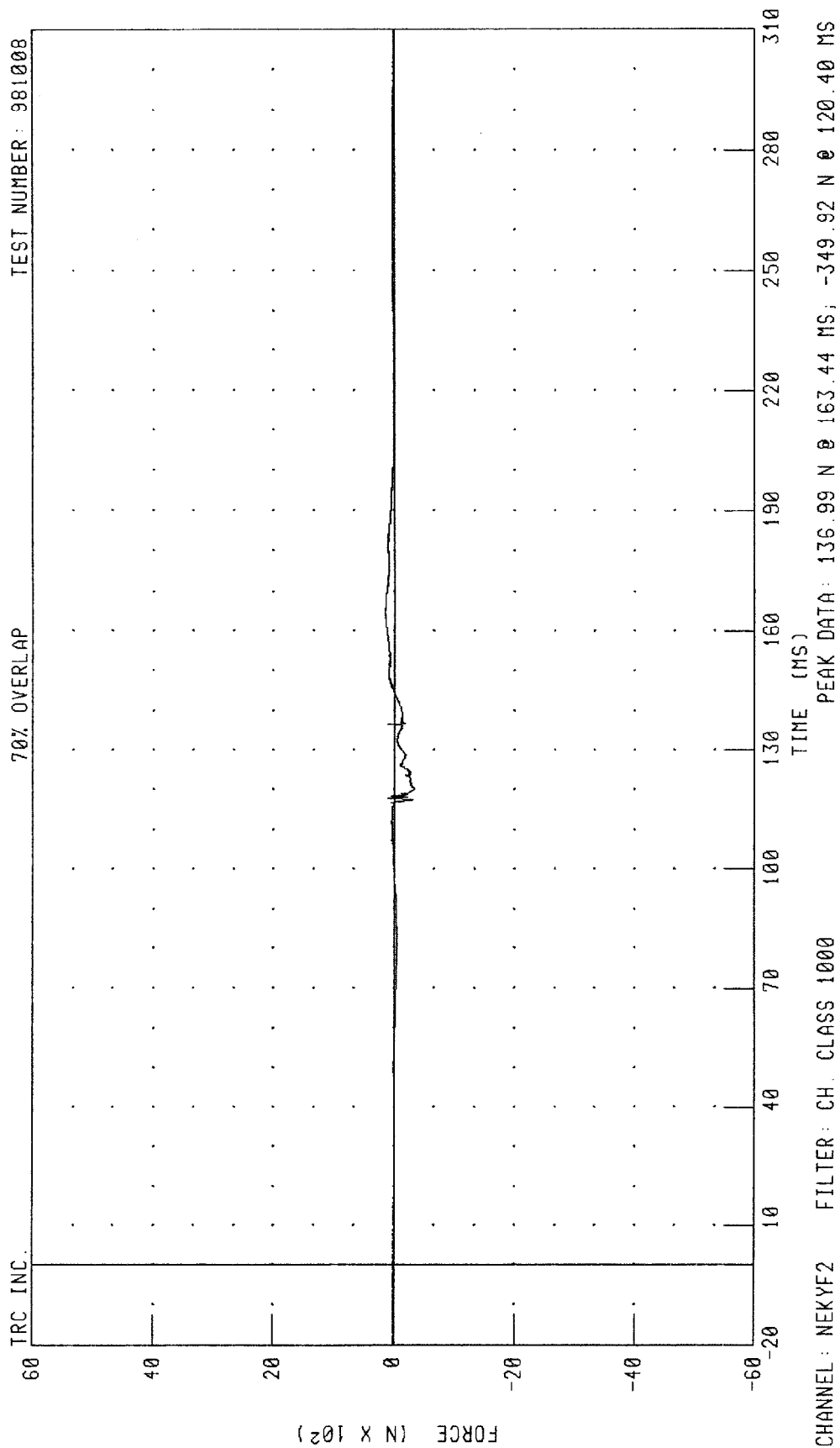
81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
 RIGHT FRONT PASSENGER UPPER NECK X-AXIS SHEAR FORCE



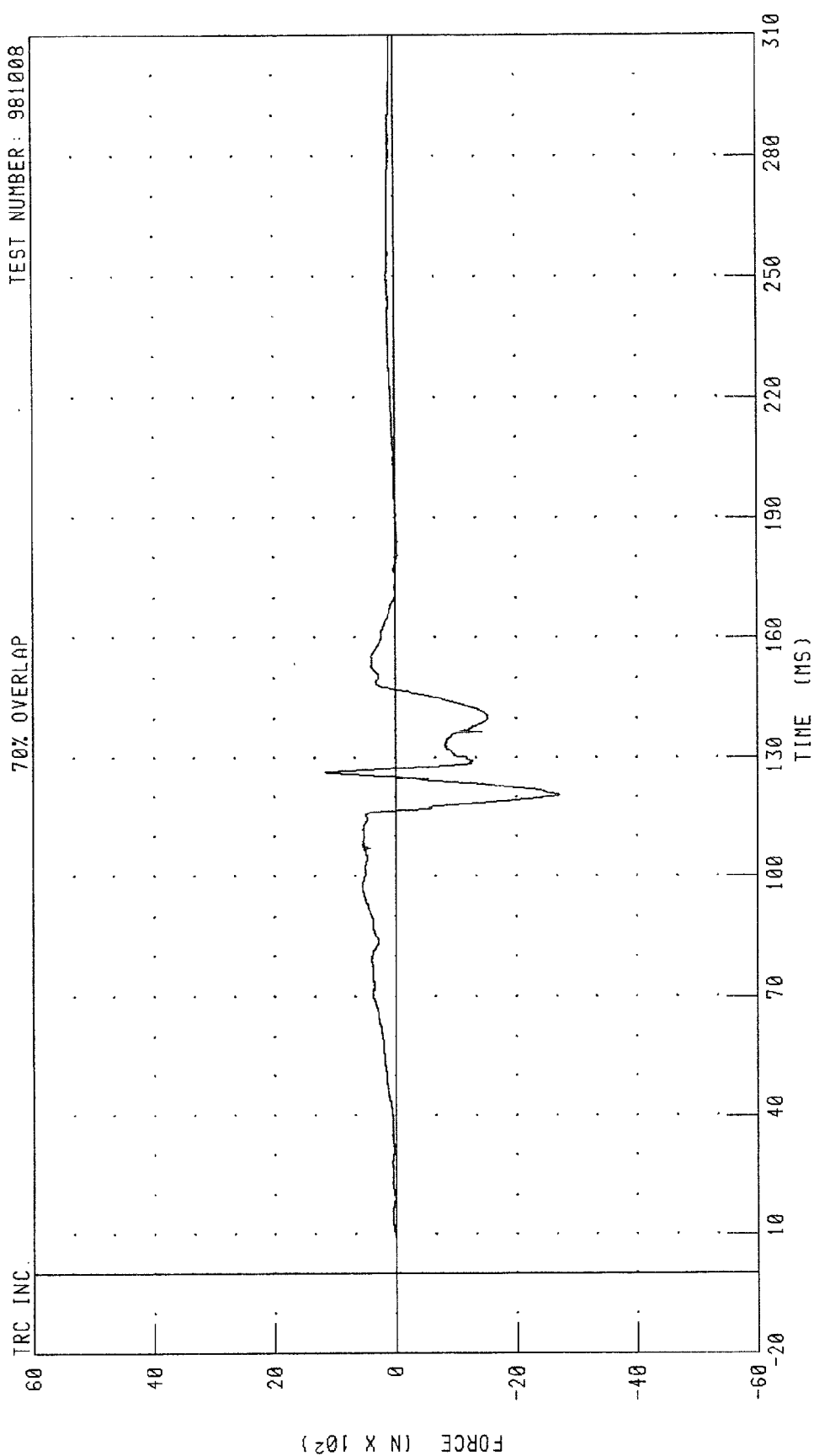
PEAK DATA: 1426.81 N @ 126.48 MS, -117.47 N @ 148.16 MS

CHANNEL: NEKXF2 FILTER: CH. CLASS 1000

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
 RIGHT FRONT PASSENGER UPPER NECK Y-AXIS SHEAR FORCE

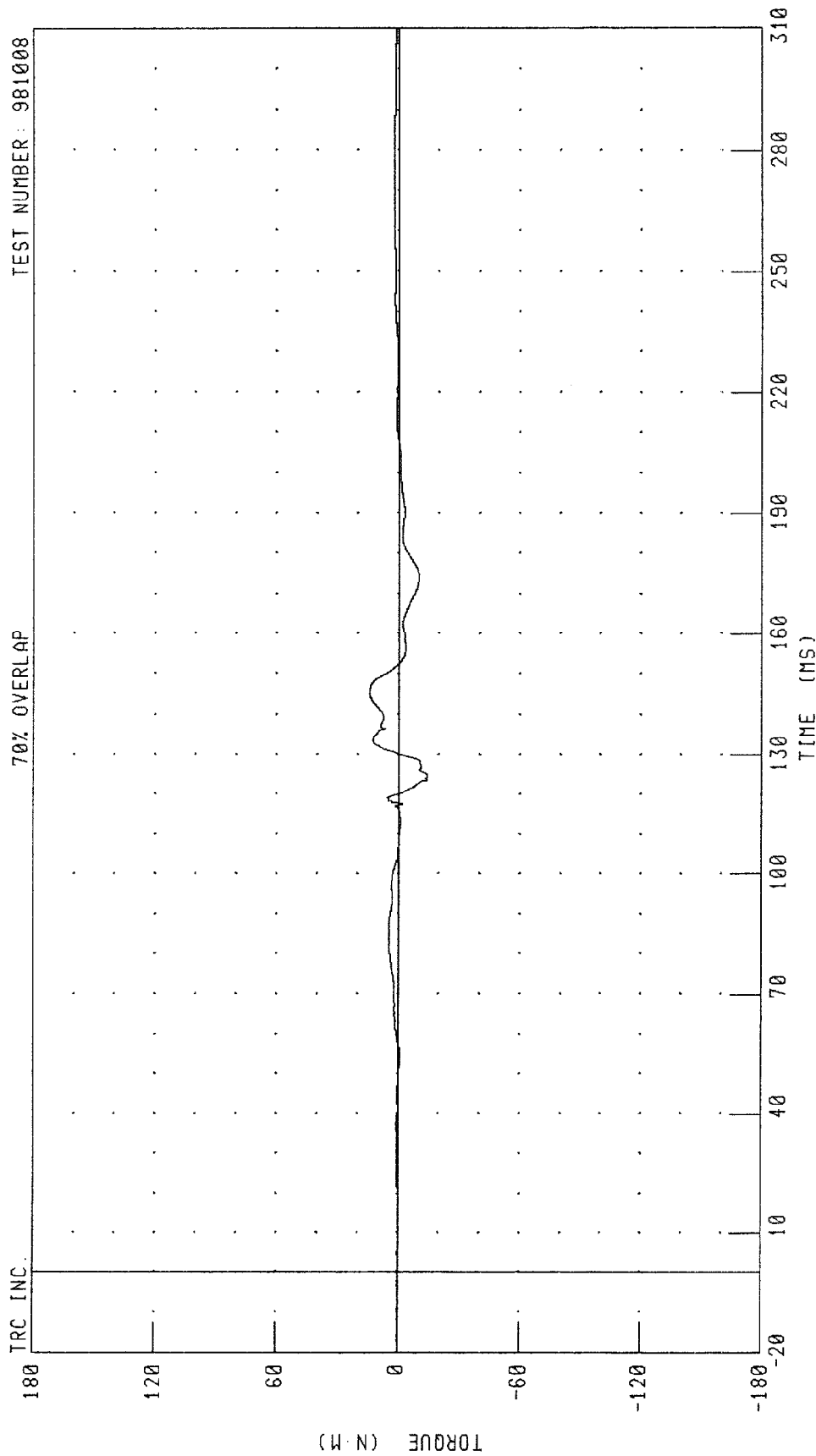


81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
RIGHT FRONT PASSENGER UPPER NECK Z-AXIS AXIAL FORCE



CHANNEL: NEKZF2 FILTER: CH. CLASS 1000

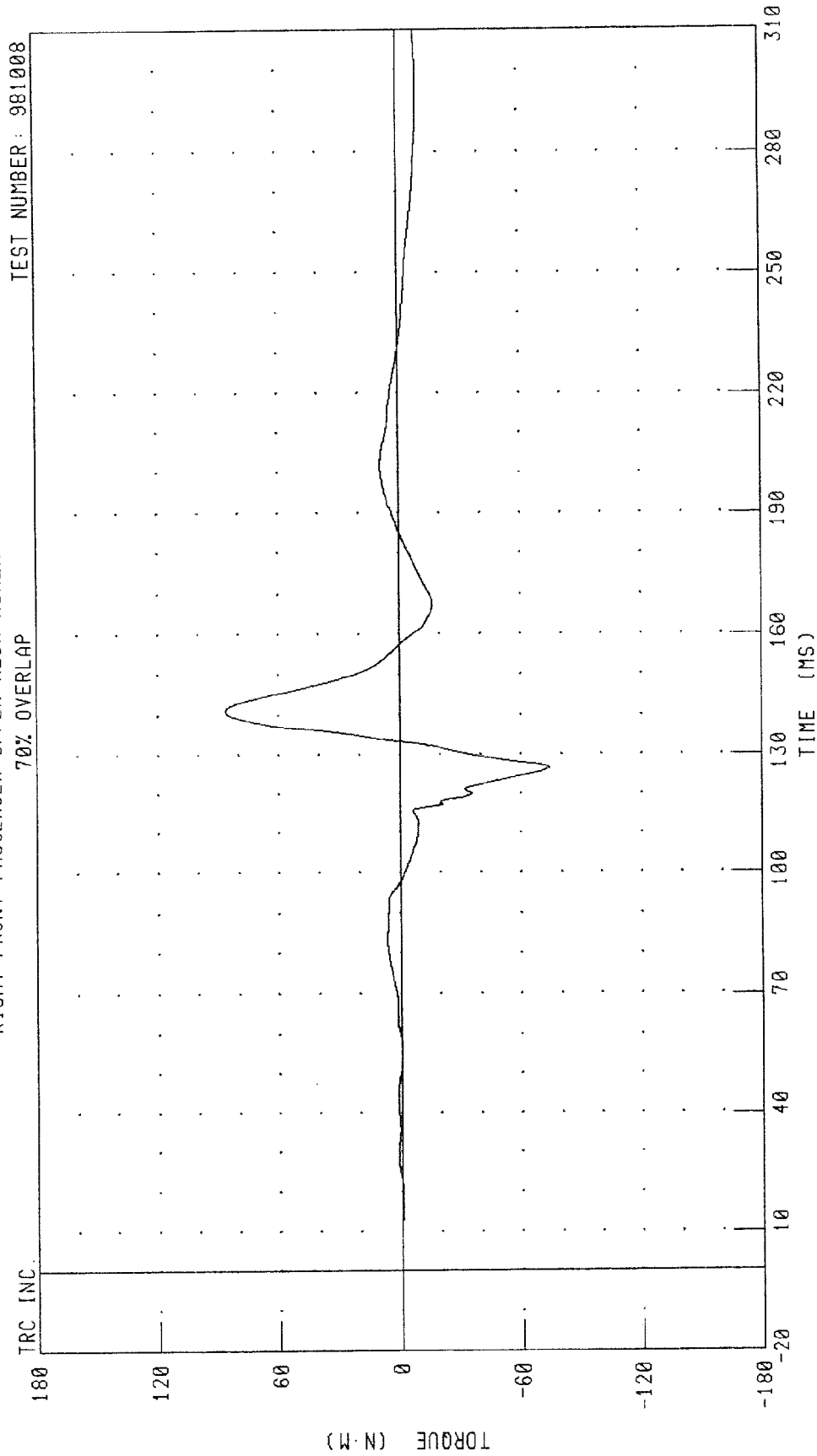
81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
 RIGHT FRONT PASSENGER UPPER NECK MOMENT ABOUT X-AXIS



PEAK DATA: 14.25 N·M @ 146.00 MS; -14.33 N·M @ 124.56 MS

CHANNEL: NEKXN2 FILTER: CH. CLASS 600

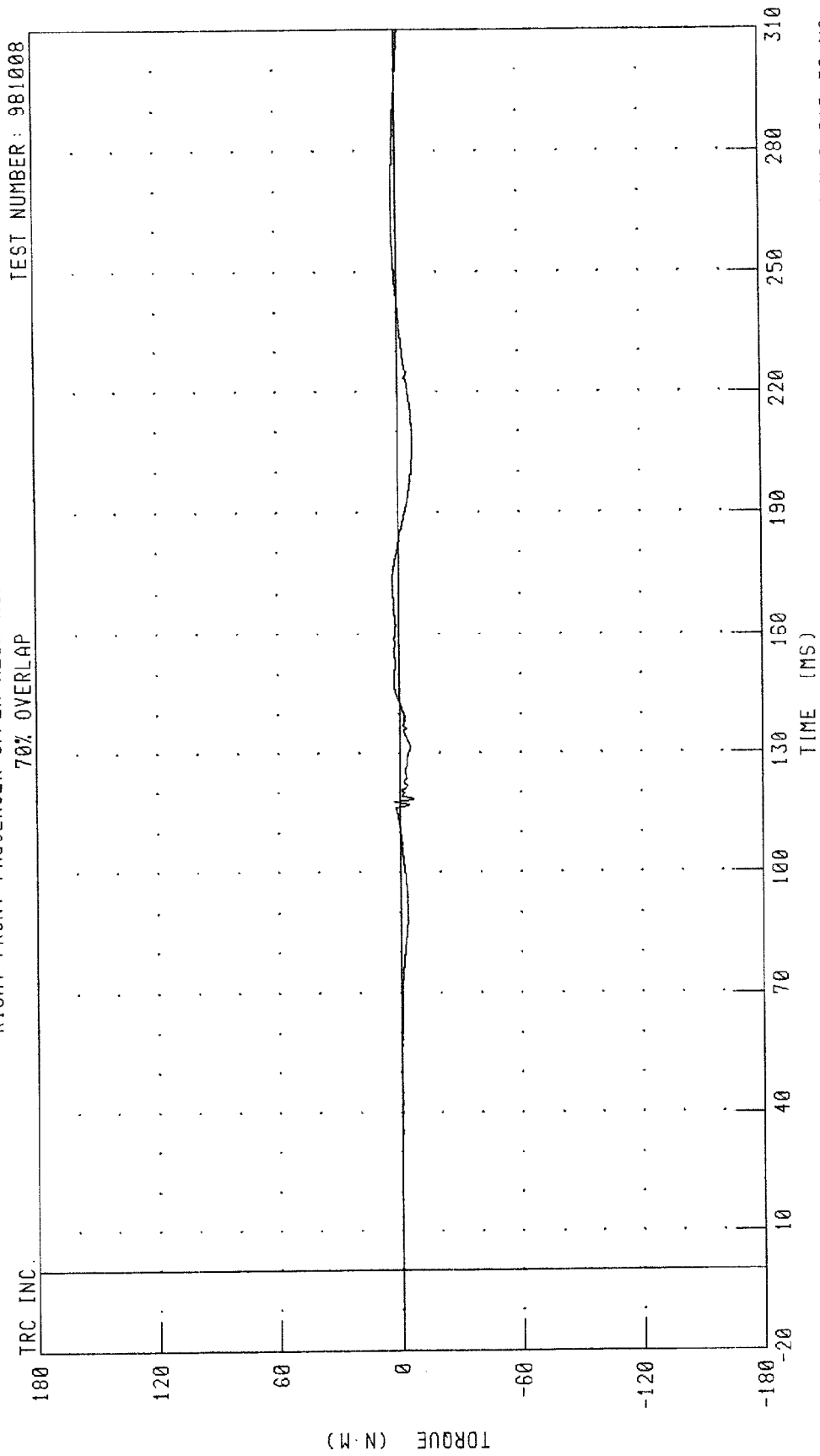
81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
RIGHT FRONT PASSENGER UPPER NECK MOMENT ABOUT Y-AXIS



PEAK DATA: 86.03 N·M @ 141.20 MS; -74.35 N·M @ 126.72 MS

CHANNEL: NEKYM2 FILTER: CH. CLASS 600

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
RIGHT FRONT PASSENGER UPPER NECK MOMENT ABOUT Z-AXIS



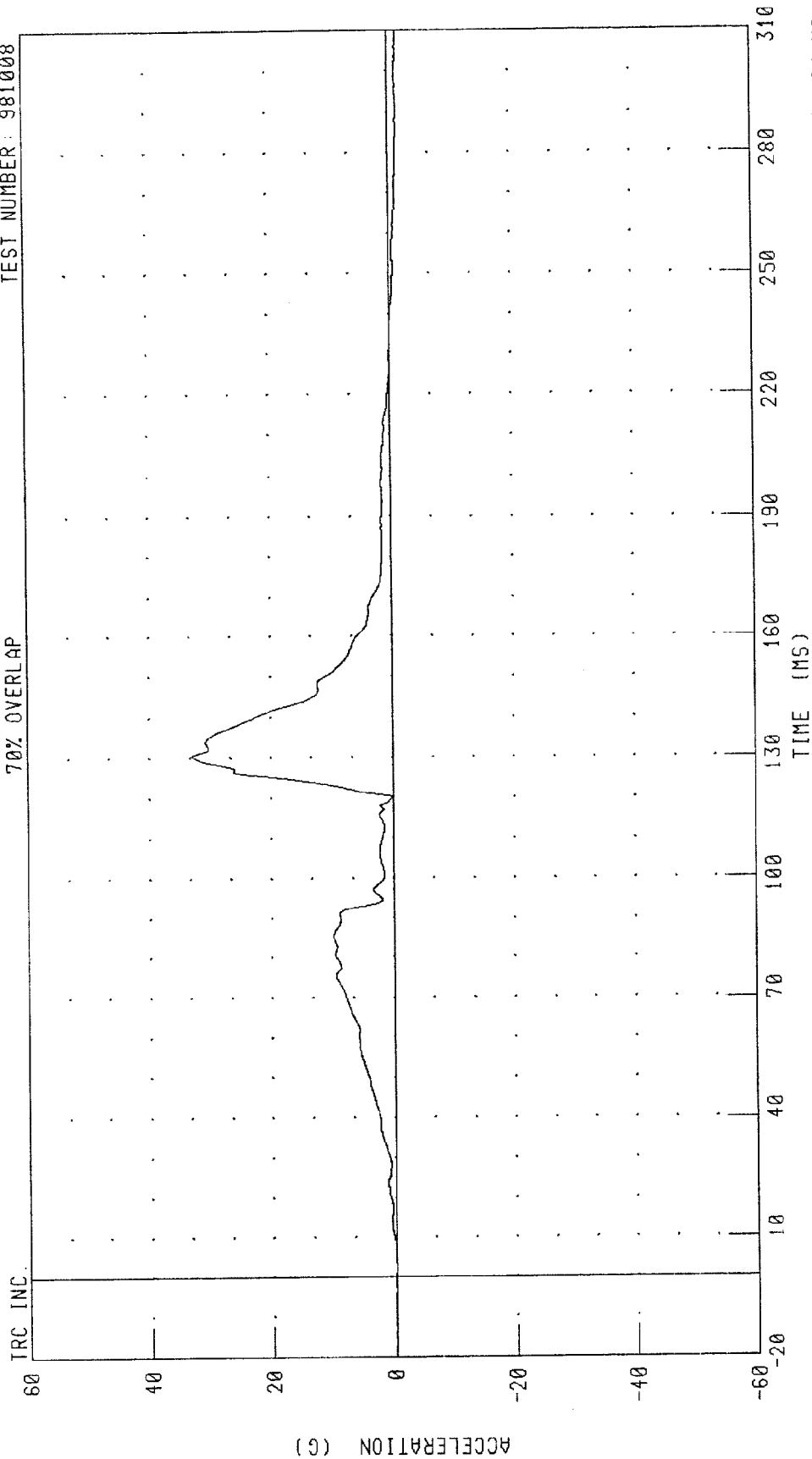
PEAK DATA: 2.75 N-M @ 170.96 MS; -7.44 N-M @ 210.32 MS

CHANNEL: NEKZM2 FILTER: CH. CLASS 600

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION

TEST NUMBER: 981008

70% OVERLAP



CHANNEL: CSTXC2 FILTER: CH. CLASS 180

PEAK DATA: 32.93 G @ 130.56 MS; -1.46 G @ 291.04 MS

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
 RIGHT FRONT PASSENGER CHEST Y-AXIS ACCELERATION

TEST NUMBER: 981008

70% OVERLAP

TRC INC.

60

40

20

0

-20

-40

-60

ACCELERATION (G)

TIME (MS)

310

280

250

220

190

160

130

100

70

40

10

PEAK DATA: 3.62 G @ 171.68 MS, -15.92 G @ 27.04 MS

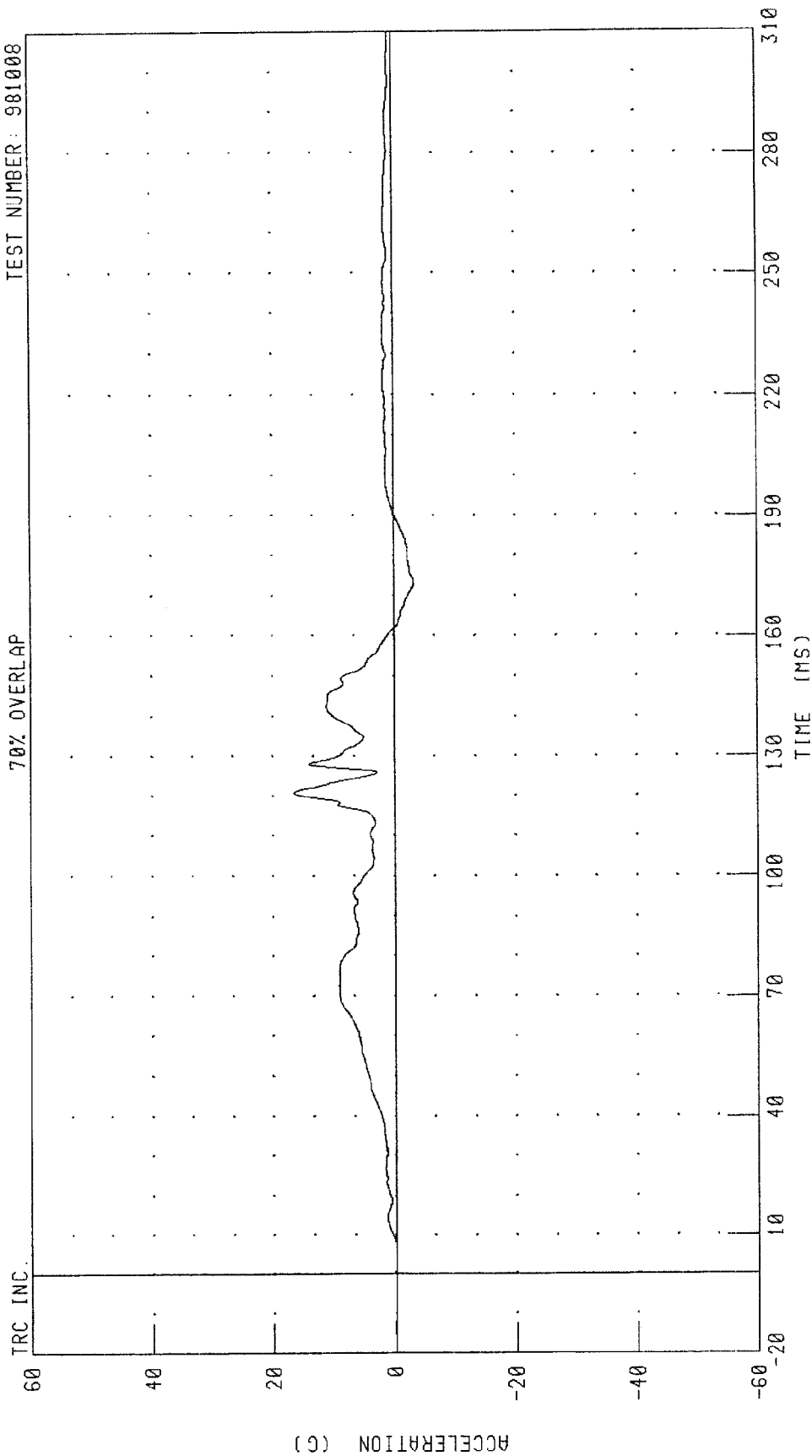
FILTER: CH. CLASS 180

CHANNEL: CSTYG2

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
 RIGHT FRONT PASSENGER CHEST Z-AXIS ACCELERATION

TEST NUMBER: 981008

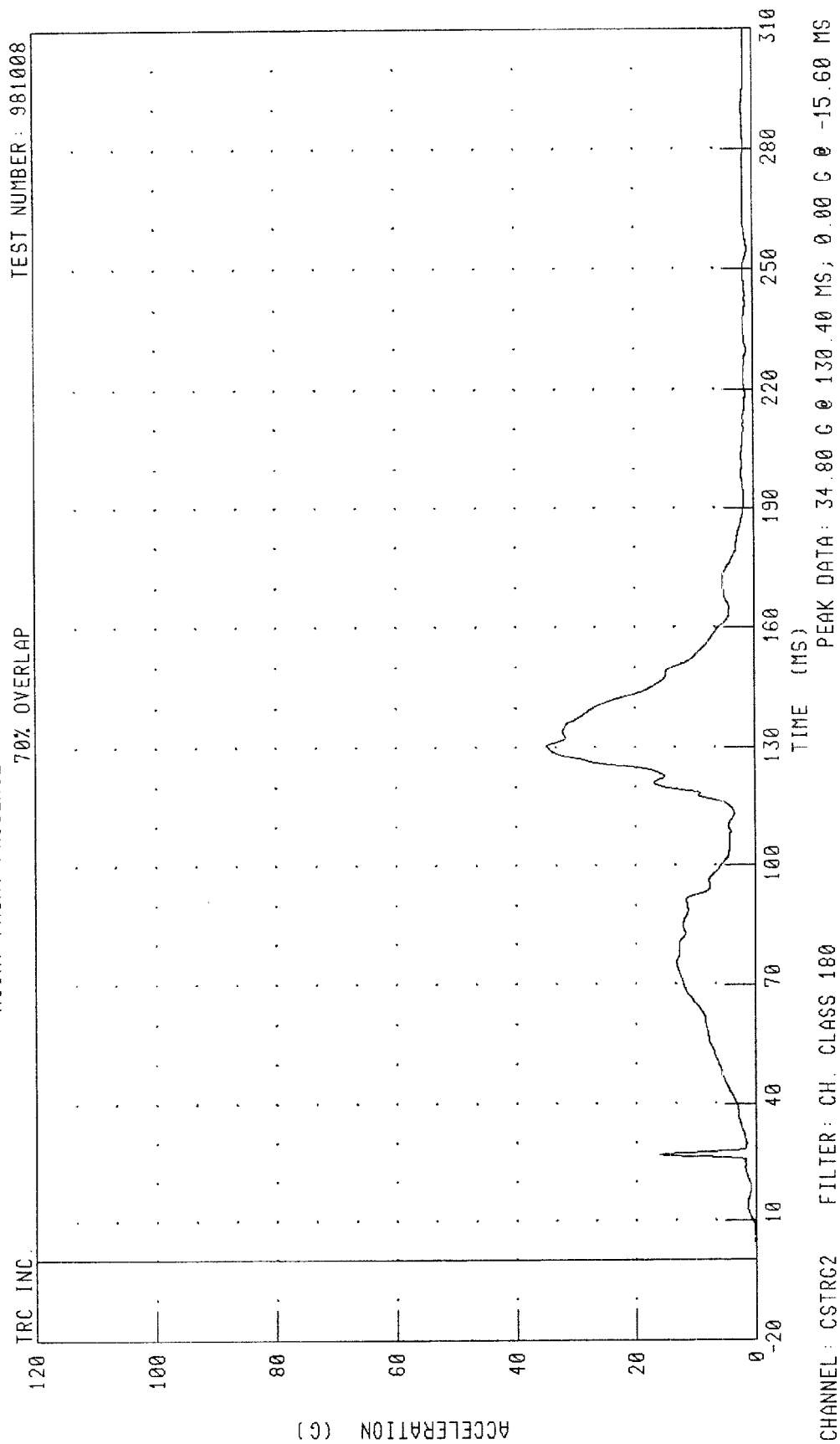
70% OVERLAP



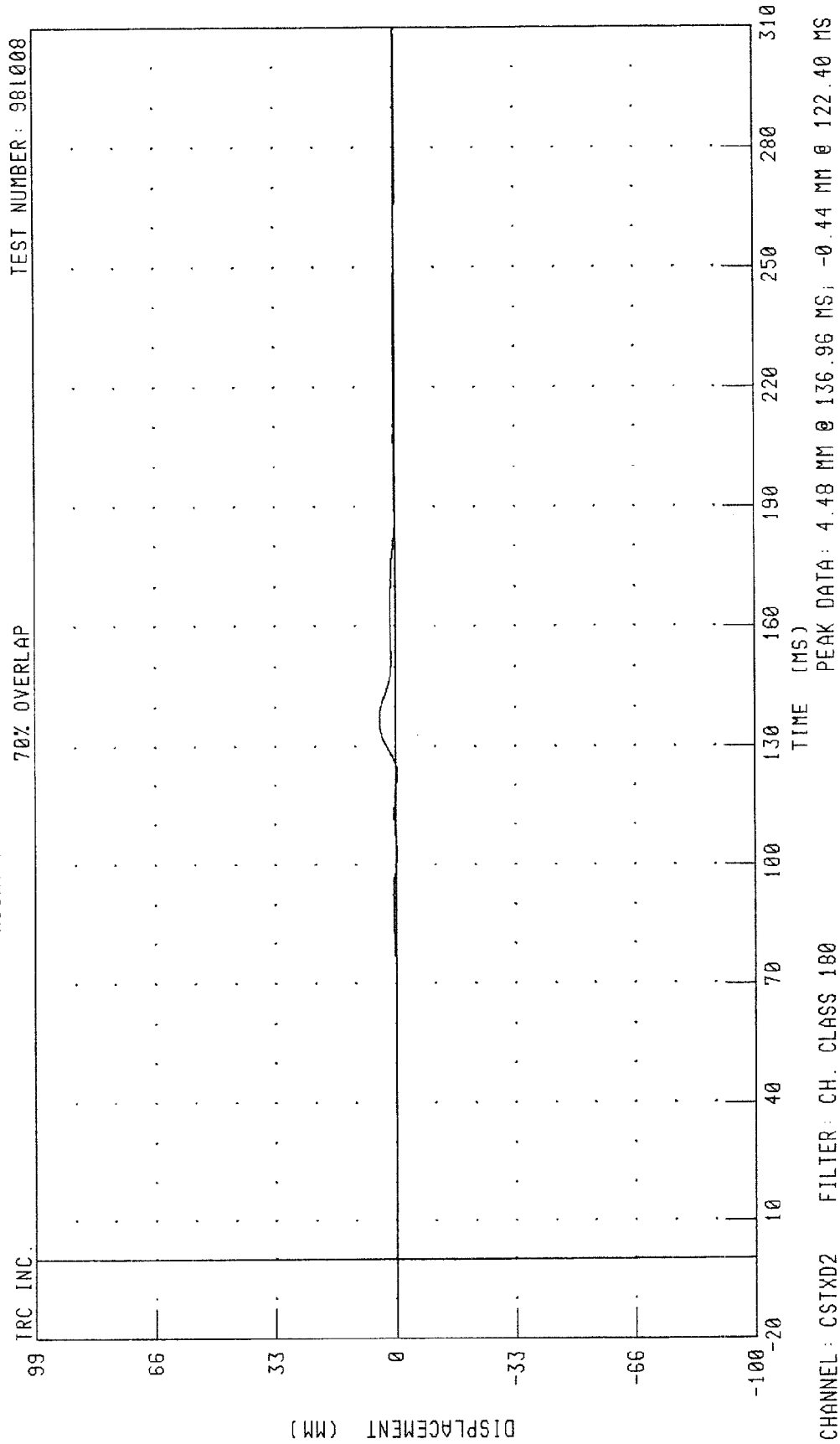
CHANNEL: CSTZG2 FILTER: CH. CLASS 180

PEAK DATA: 16.54 G @ 120.88 MS, -3.36 G @ 173.36 MS

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION



81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
 RIGHT FRONT PASSENGER CHEST DEFLECTION

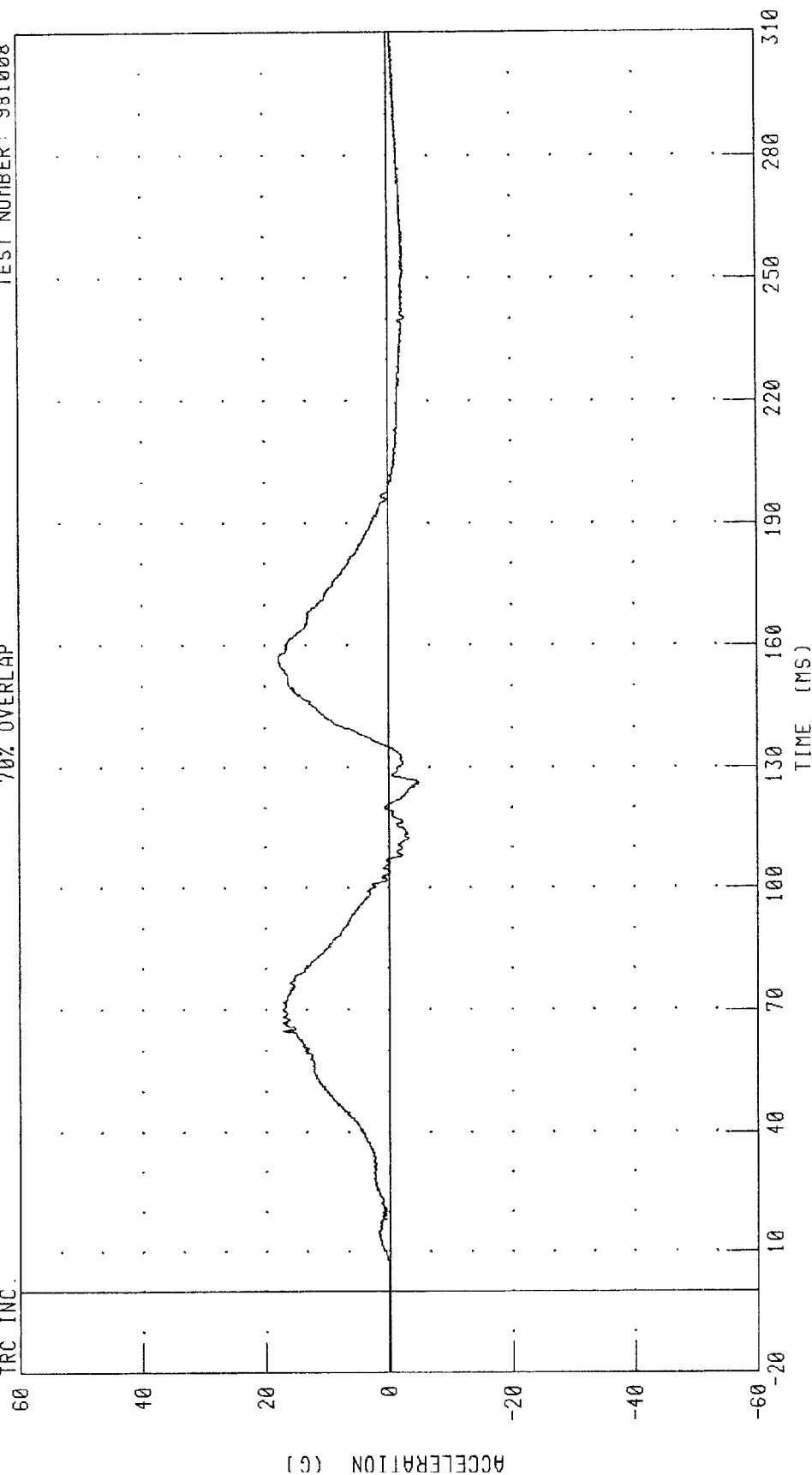


81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
RIGHT FRONT PASSENGER PELVIS X-AXIS ACCELERATION

TEST NUMBER: 981008

70% OVERLAP

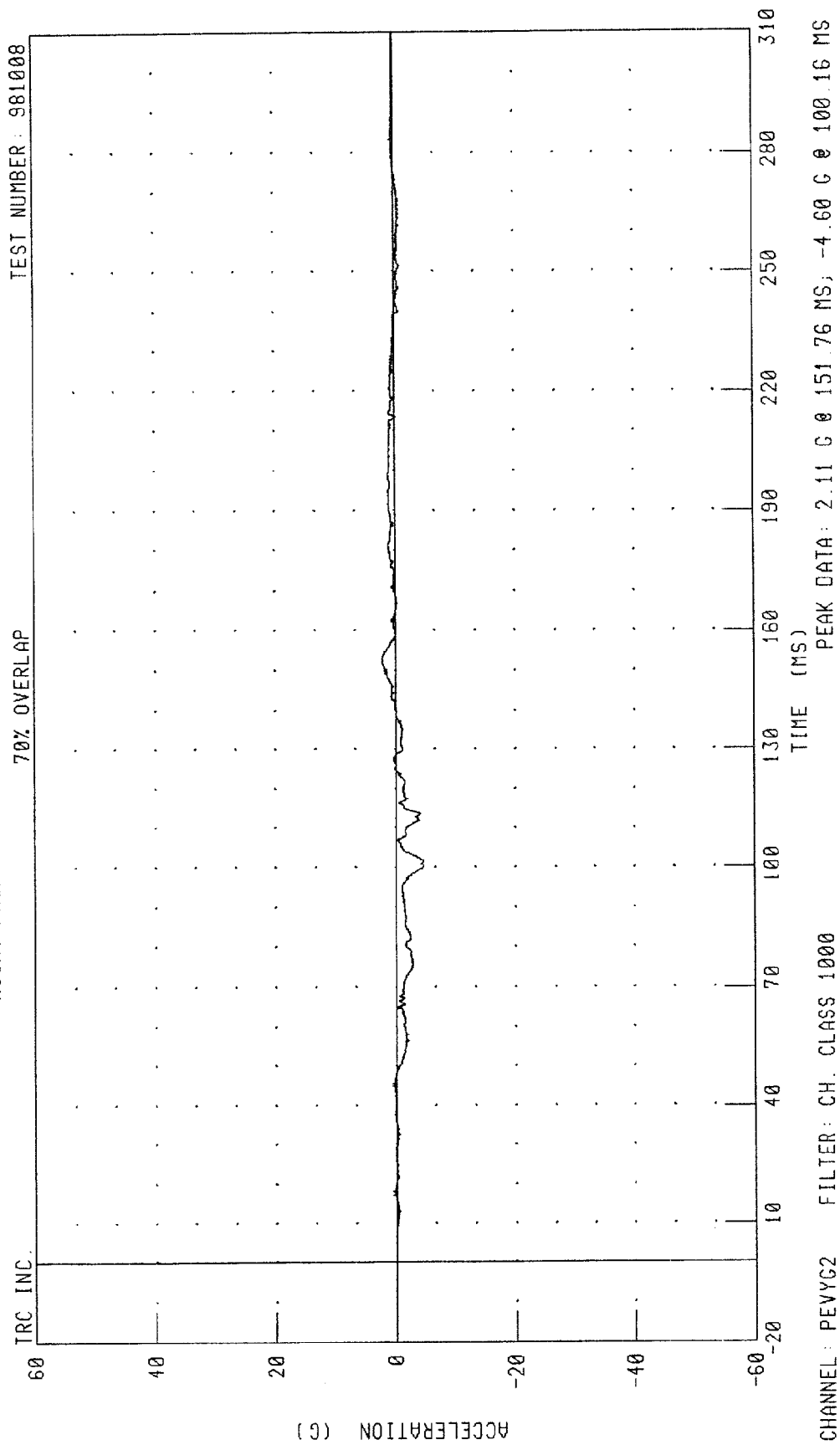
TRC INC.



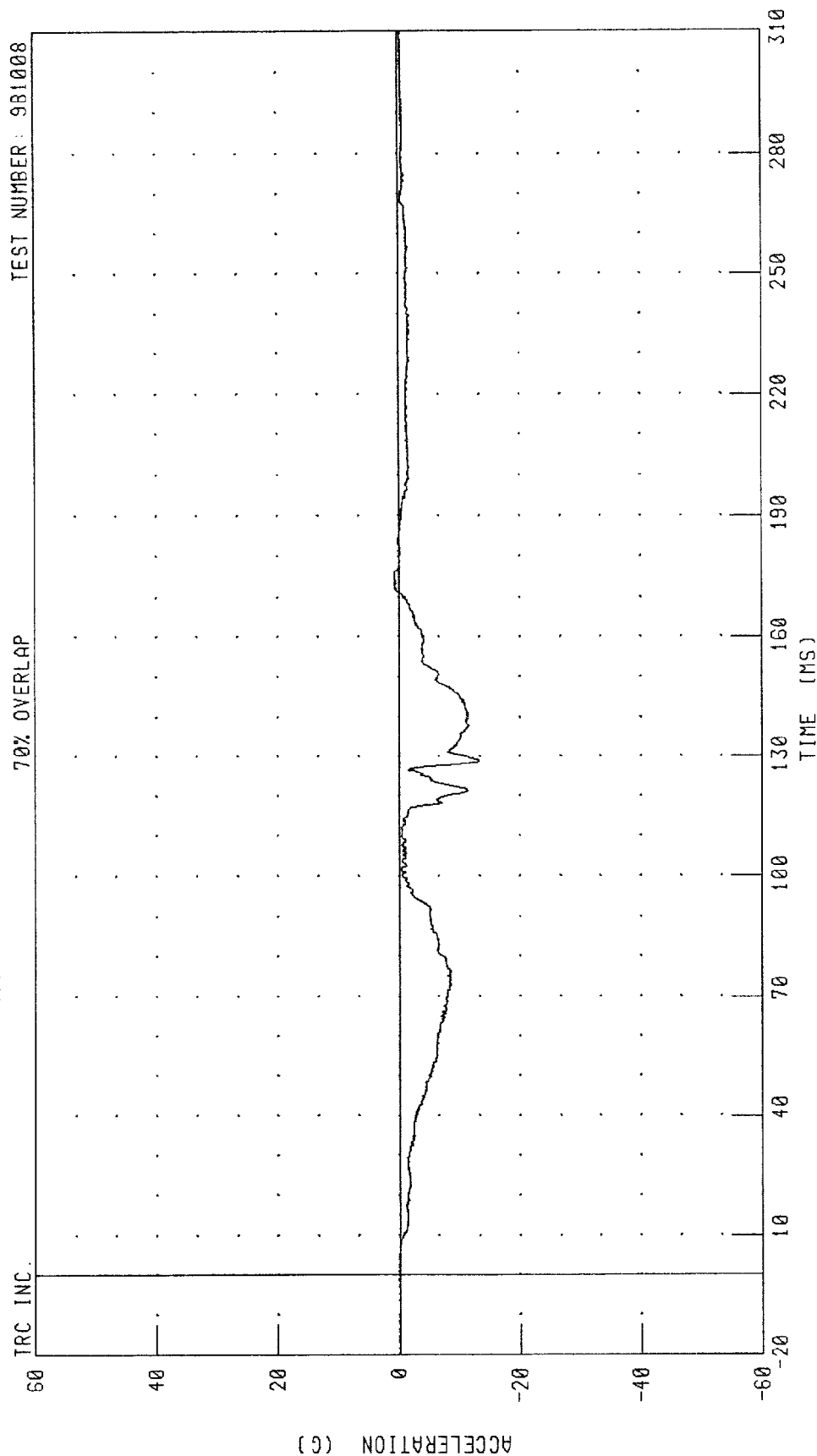
CHANNEL: PEVXC2 FILTER: CH. CLASS 1000

PEAK DATA: 17.92 G @ 156.00 MS; -5.01 G @ 126.56 MS

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
RIGHT FRONT PASSENGER PELVIS Y-AXIS ACCELERATION



81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
RIGHT FRONT PASSENGER PELVIS Z-AXIS ACCELERATION

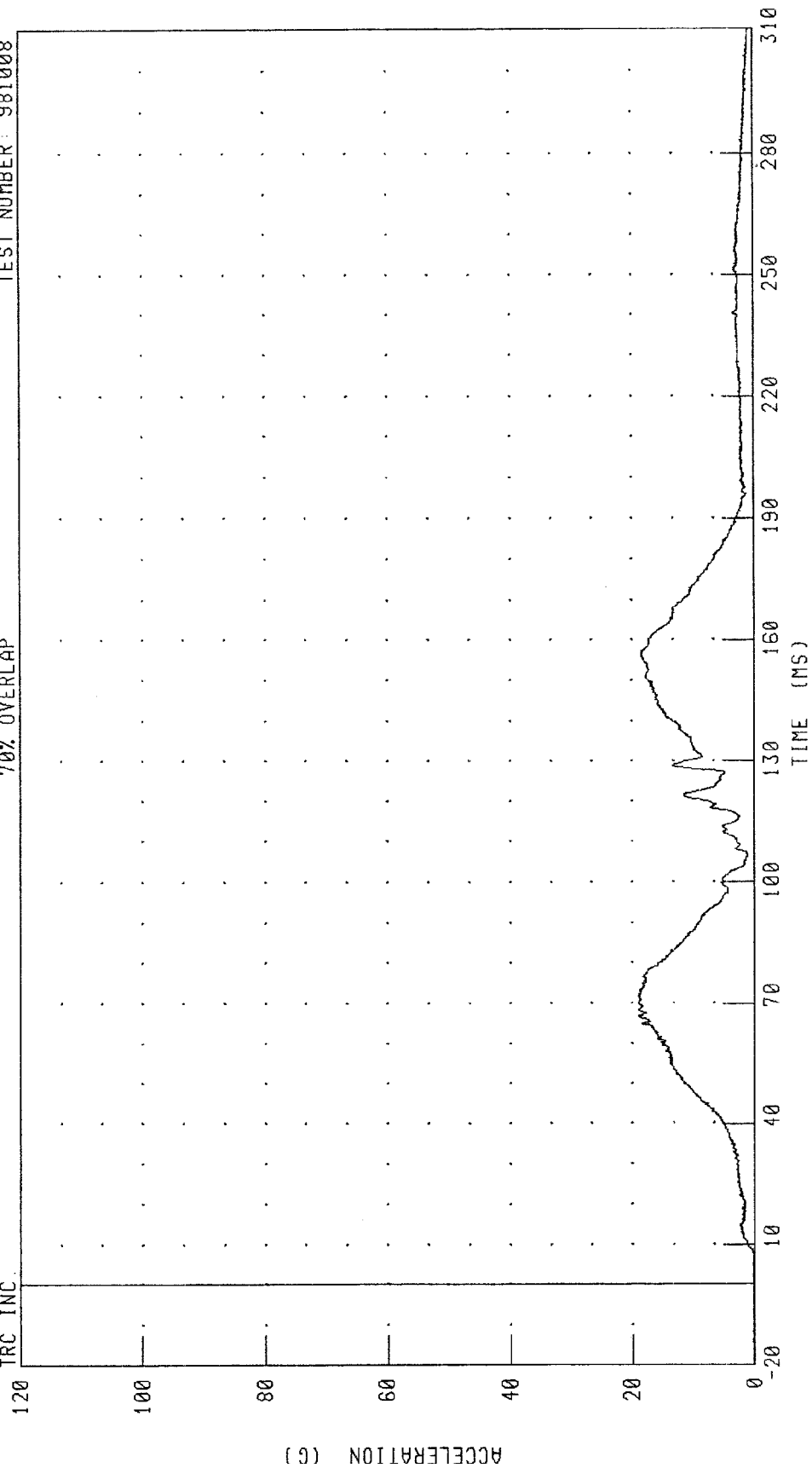


81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
RIGHT FRONT PASSENGER PELVIS RESULTANT ACCELERATION

TEST NUMBER: 981008

70% OVERLAP

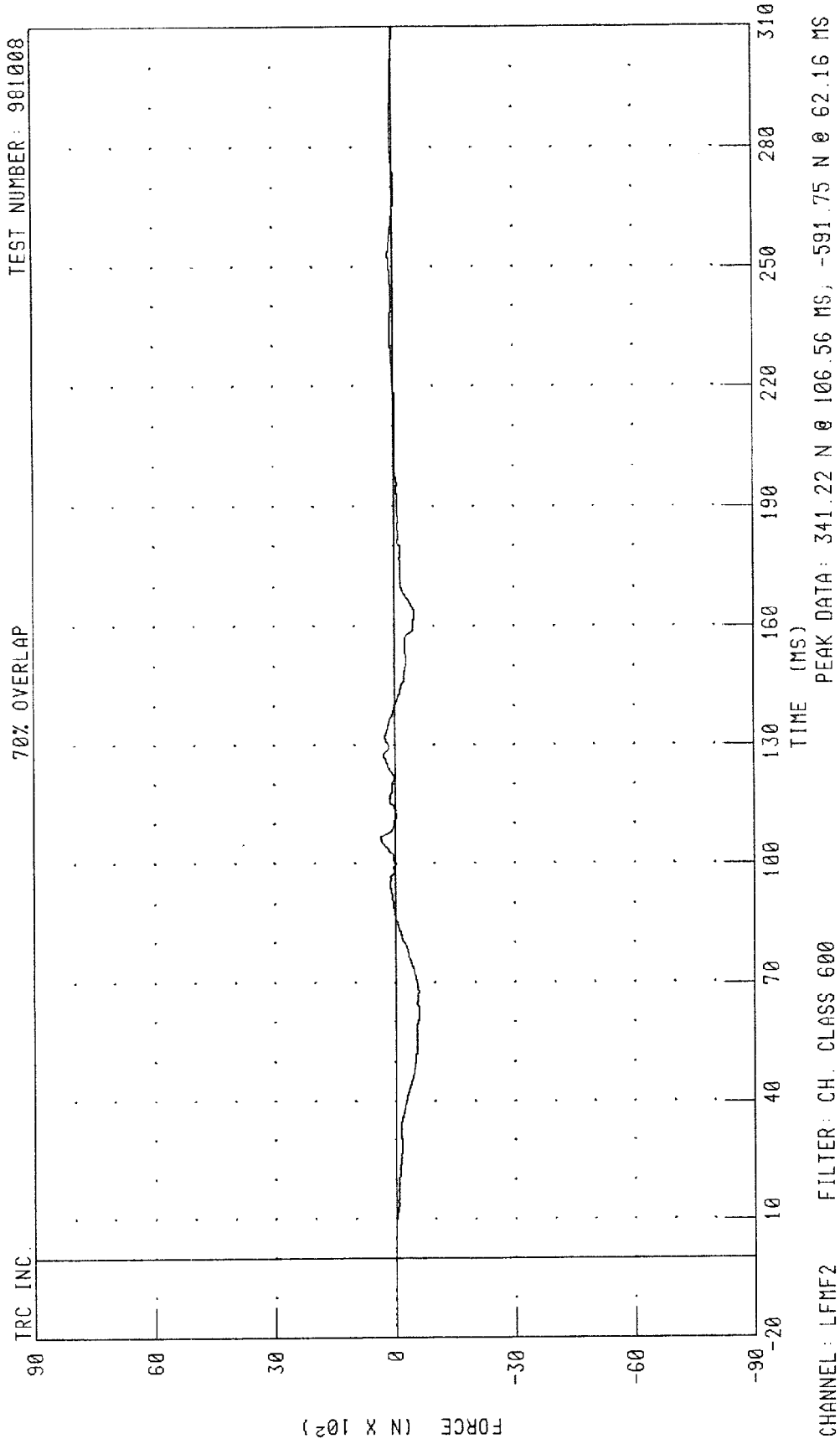
TRC INC.



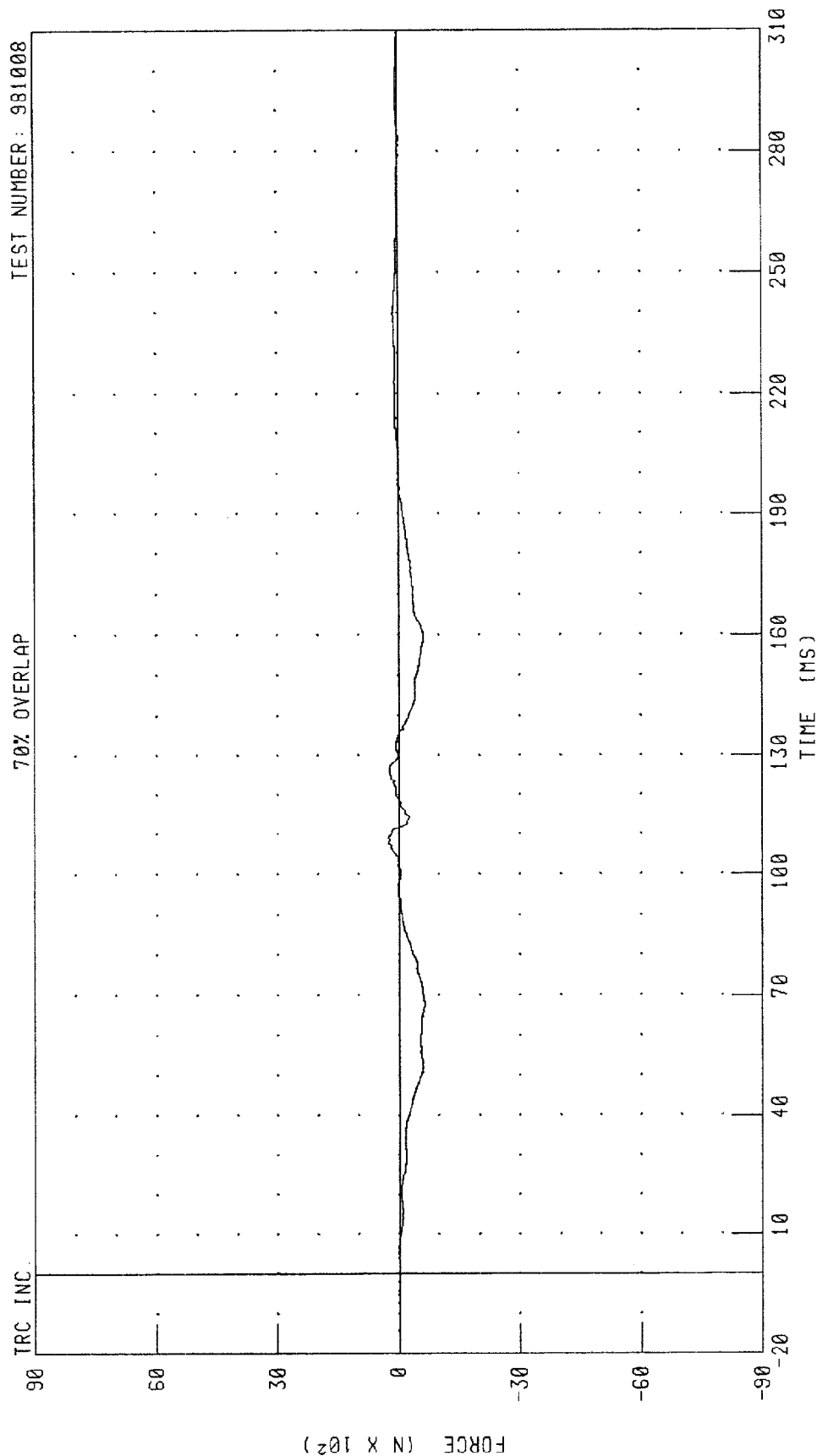
CHANNEL: PEVRC2 FILTER: CH. CLASS 1000

PEAK DATA: 19.11 G @ 71.84 MS; 0.11 G @ -19.68 MS

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
RIGHT FRONT PASSENGER LEFT FEMUR FORCE



81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
 RIGHT FRONT PASSENGER RIGHT FEMUR FORCE



PEAK DATA: 237.65 N @ 109.12 MS, -642.40 N @ 67.84 MS

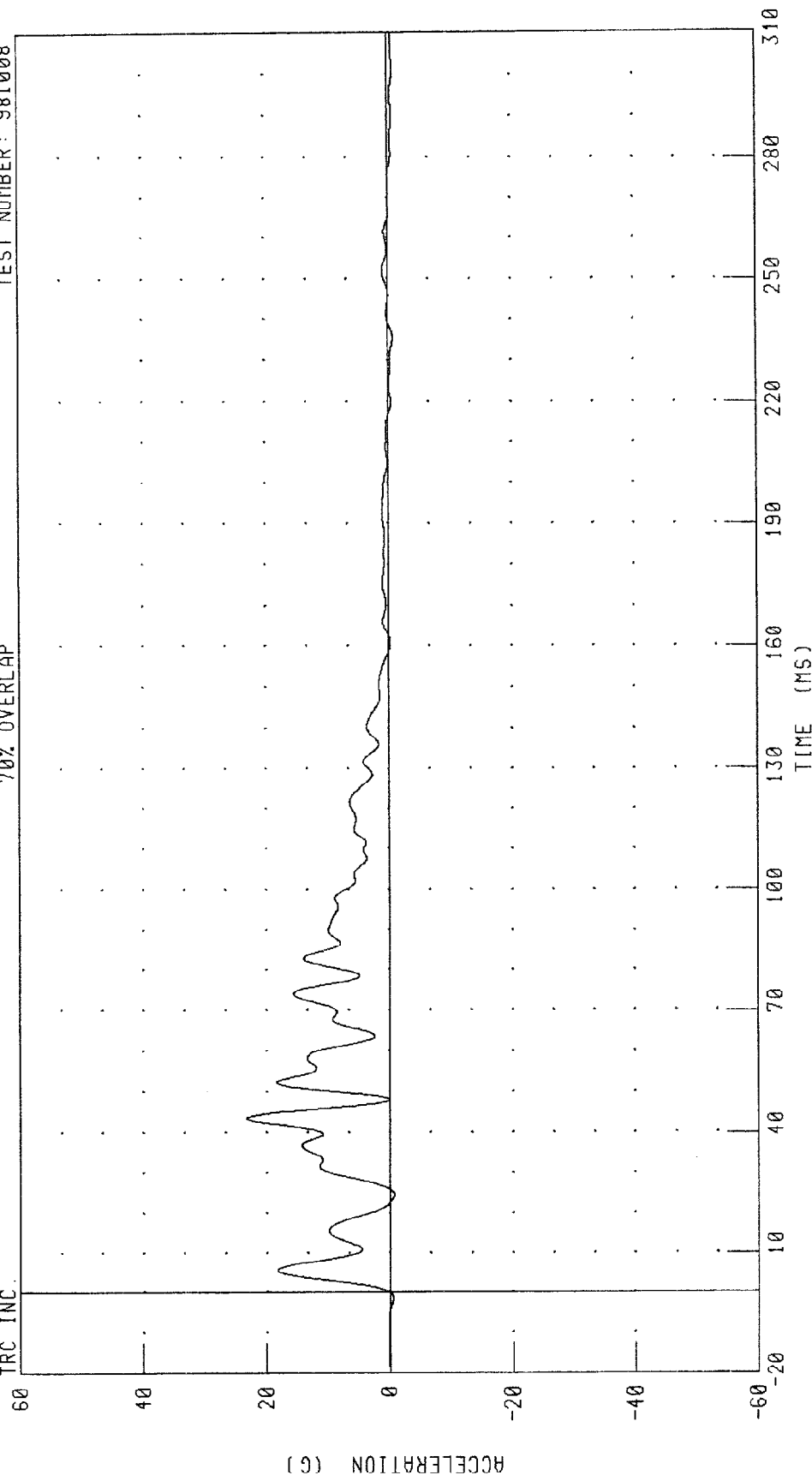
CHANNEL: RFMF2 FILTER: CH. CLASS 600

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
LEFT ROCKER PANEL X-AXIS ACCELERATION

TEST NUMBER: 981008

70% OVERLAP

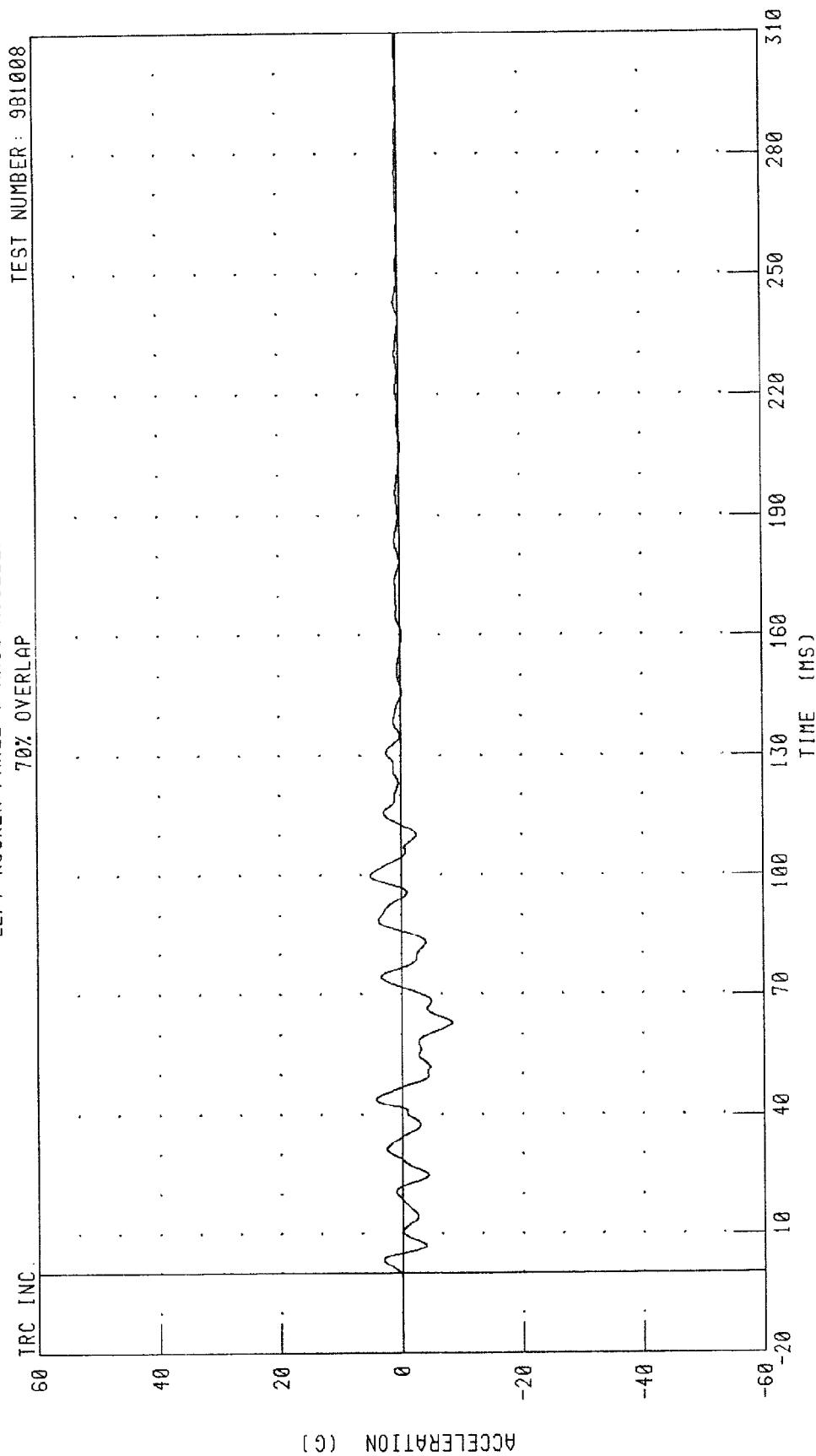
TRC INC.



CHANNEL: LFRXG1 FILTER: CH. CLASS 60

PEAK DATA: 23.32 G @ 43.60 MS; -0.94 G @ 300.88 MS

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
LEFT ROCKER PANEL Y-AXIS ACCELERATION



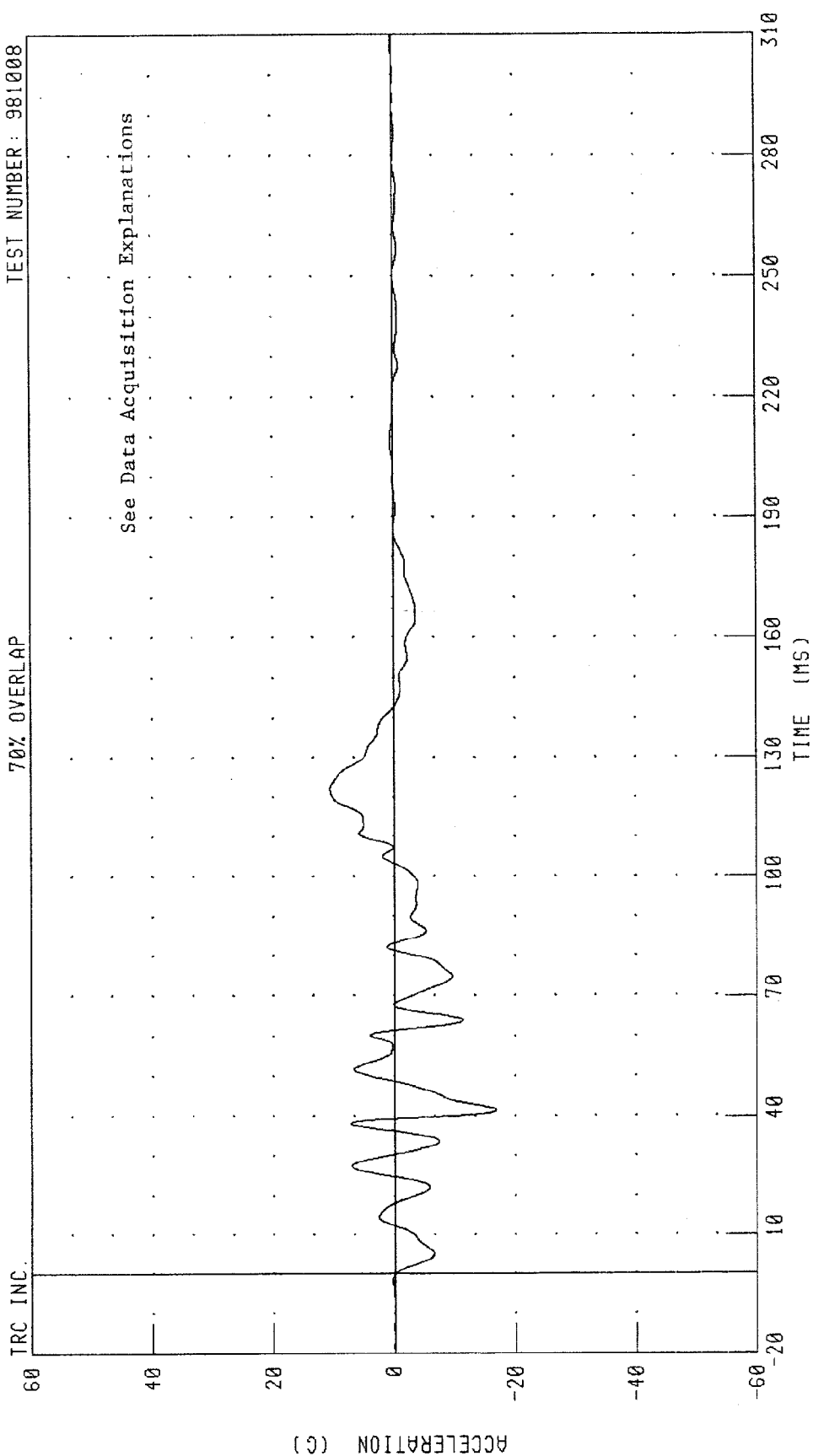
CHANNEL: LFRYG1 FILTER: CH. CLASS 60

PEAK DATA: 5.08 G @ 99.92 MS; -8.37 G @ 63.04 MS

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
LEFT ROCKER PANEL Z-AXIS ACCELERATION

TEST NUMBER: 981008

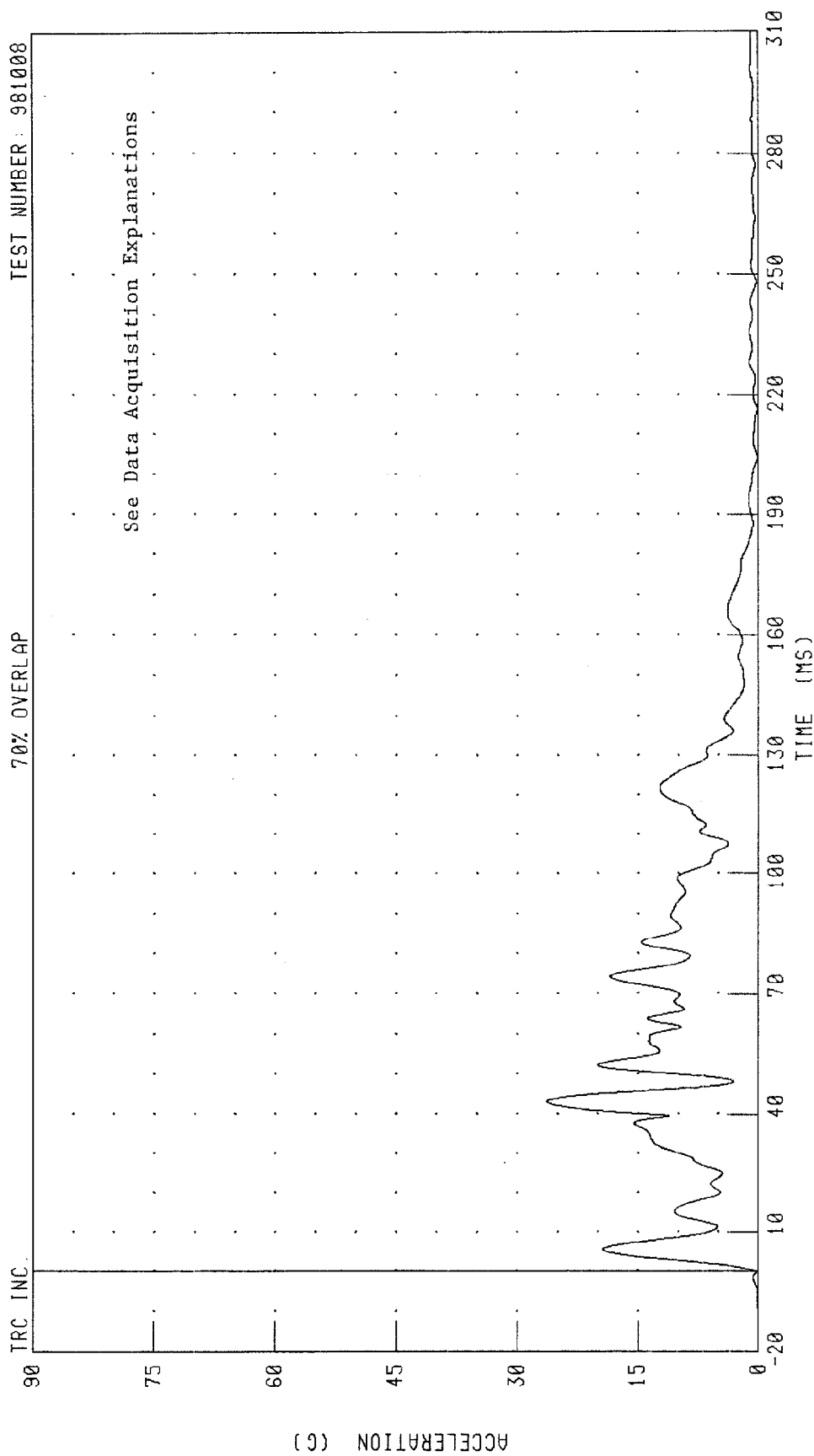
70% OVERLAP



CHANNEL: LFRZG1 FILTER: CH. CLASS 60

PEAK DATA: 10.54 G @ 122.32 MS, -16.85 G @ 41.68 MS

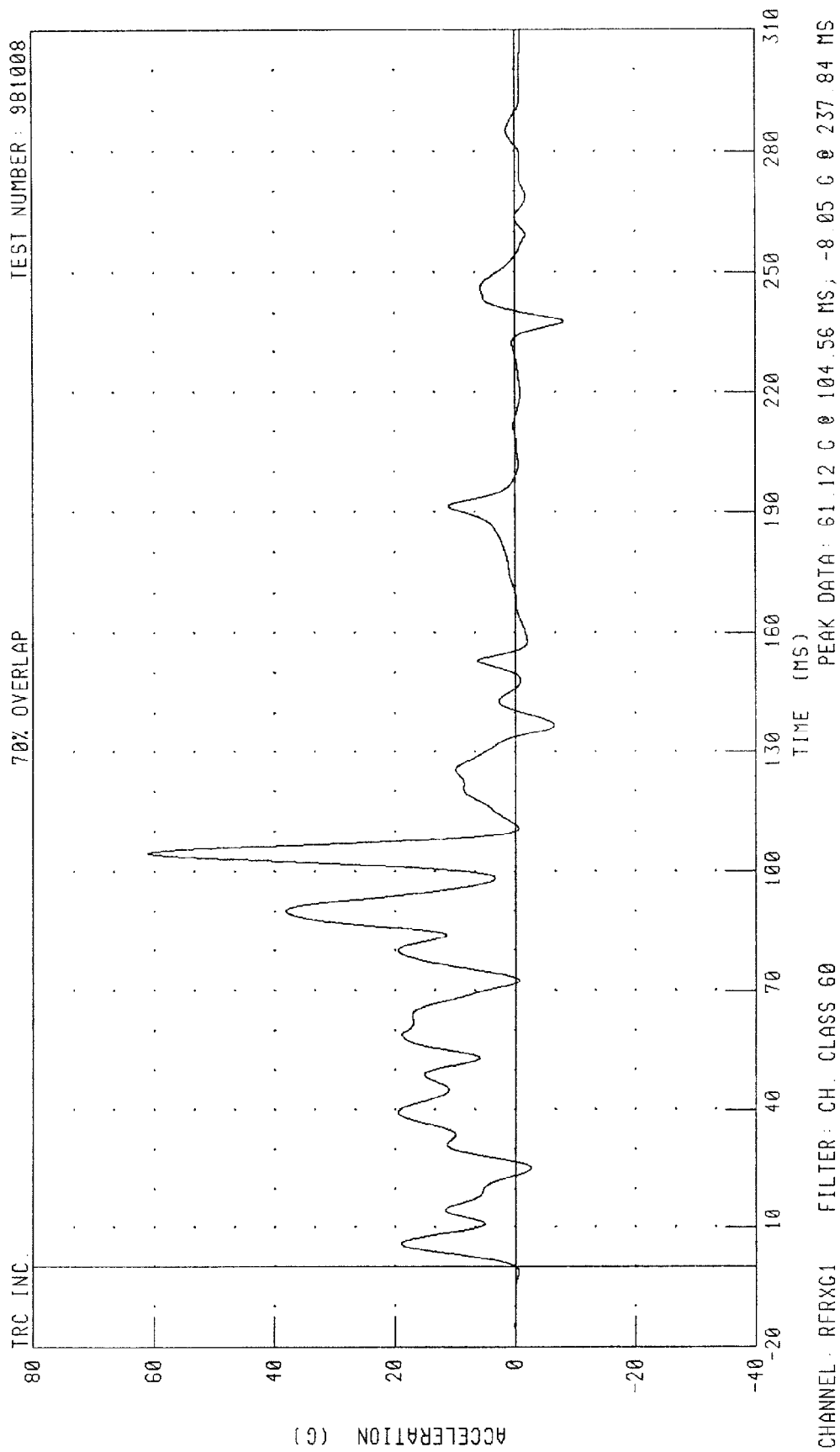
81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
LEFT ROCKER PANEL RESULTANT



PEAK DATA: 26.34 G @ 43.28 MS, 0.01 G @ -19.60 MS

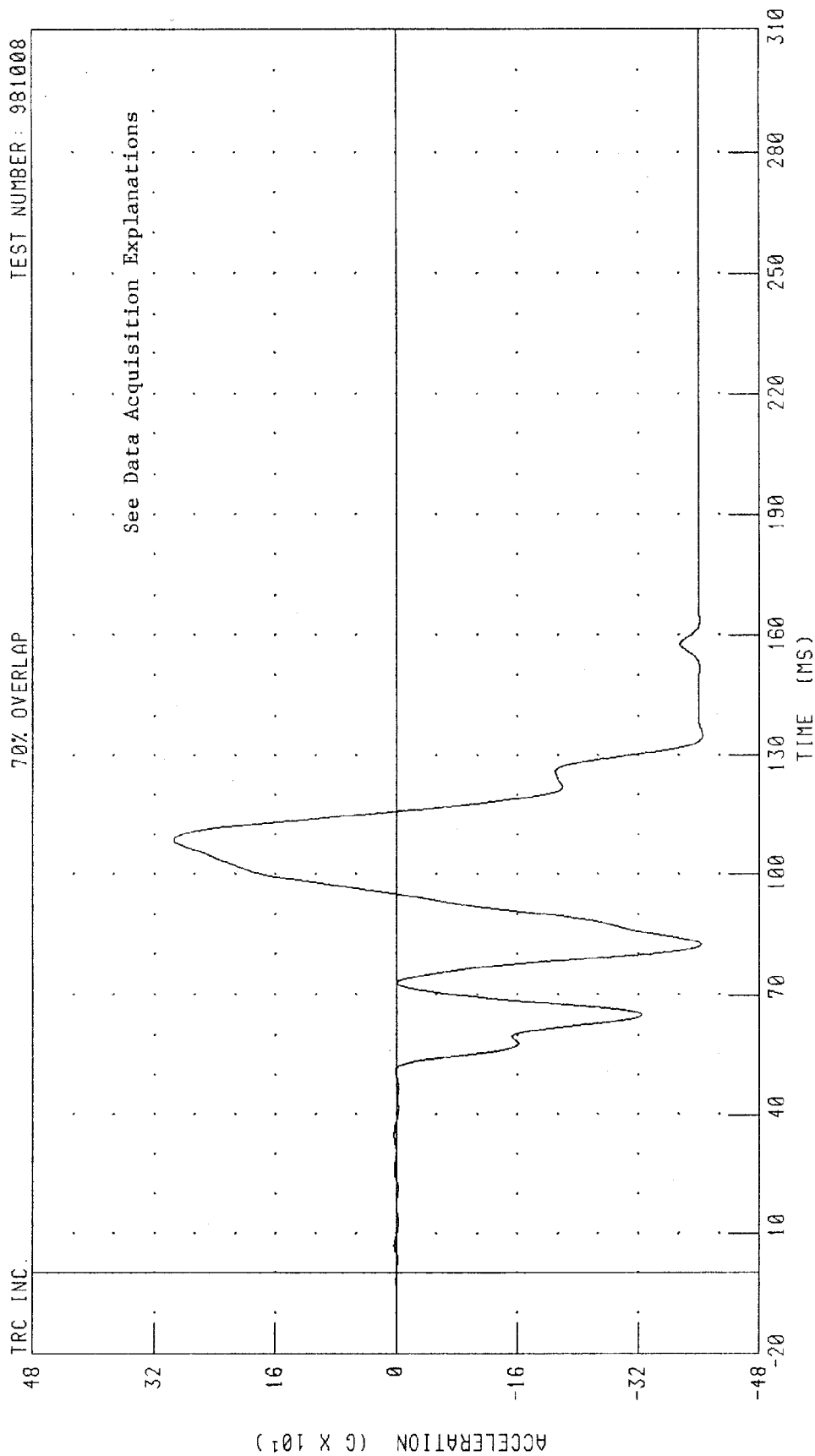
CHANNEL: LFRRG1 FILTER: CH. CLASS 60

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
RIGHT ROCKER PANEL X-AXIS ACCELERATION



81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
 RIGHT ROCKER PANEL Y-AXIS ACCELERATION
 70% OVERLAP

TEST NUMBER: 981008



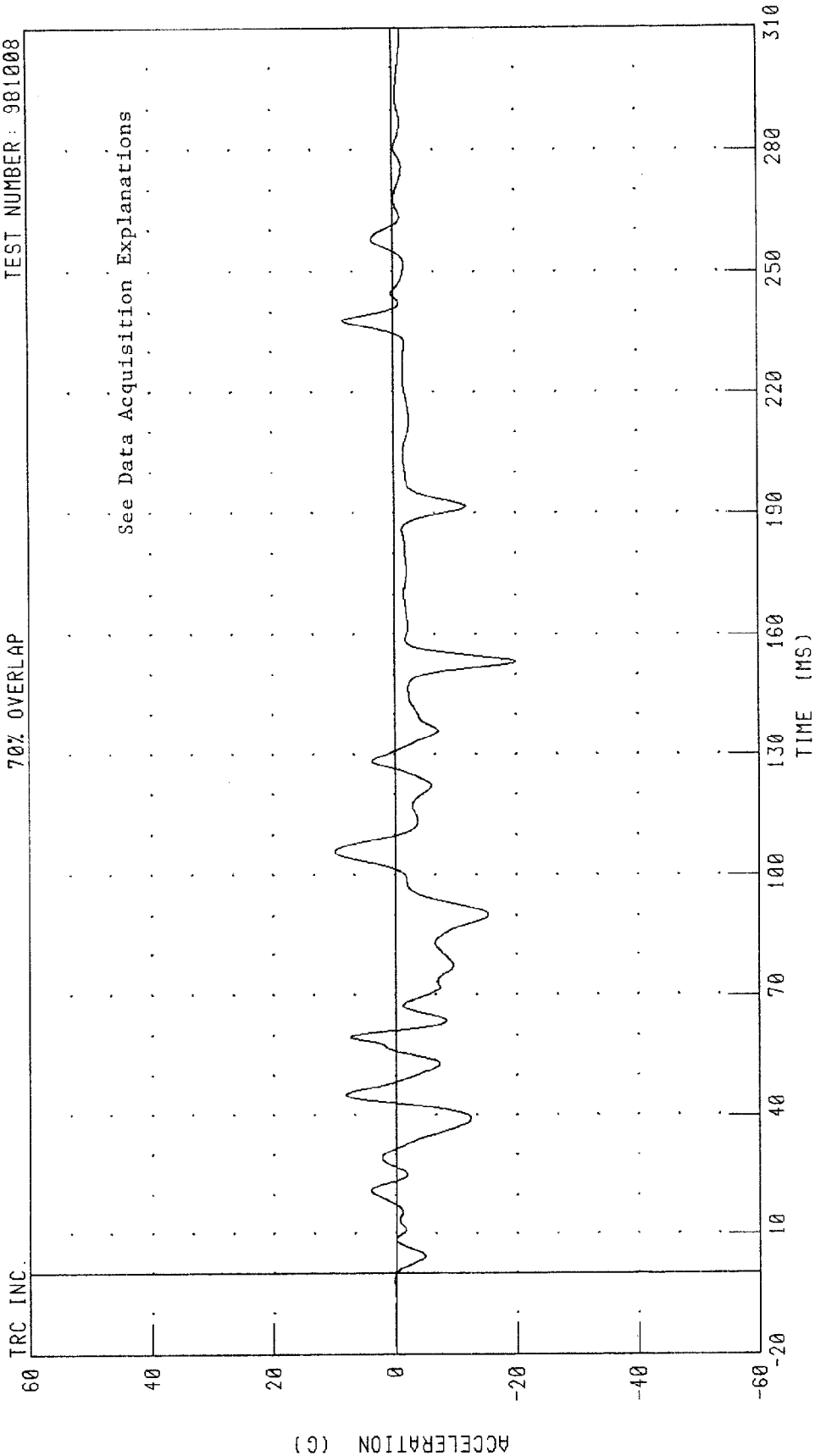
PEAK DATA: 294.00 G @ 108.56 MS; -405.03 G @ 134.88 MS

CHANNEL: RFRY01 FILTER: CH. CLASS 60

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
RIGHT ROCKER PANEL Z-AXIS ACCELERATION

TEST NUMBER: 981008

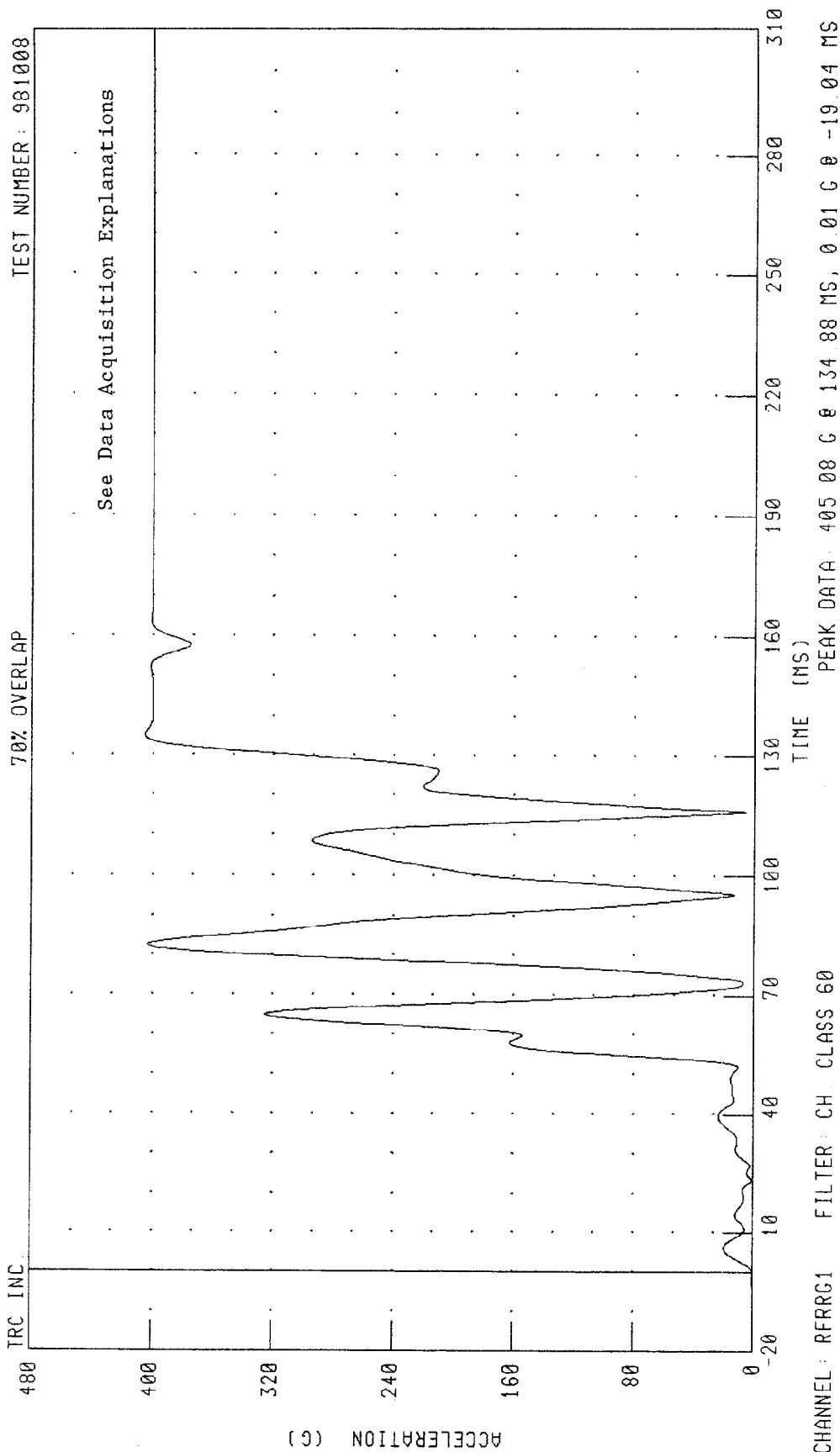
70% OVERLAP



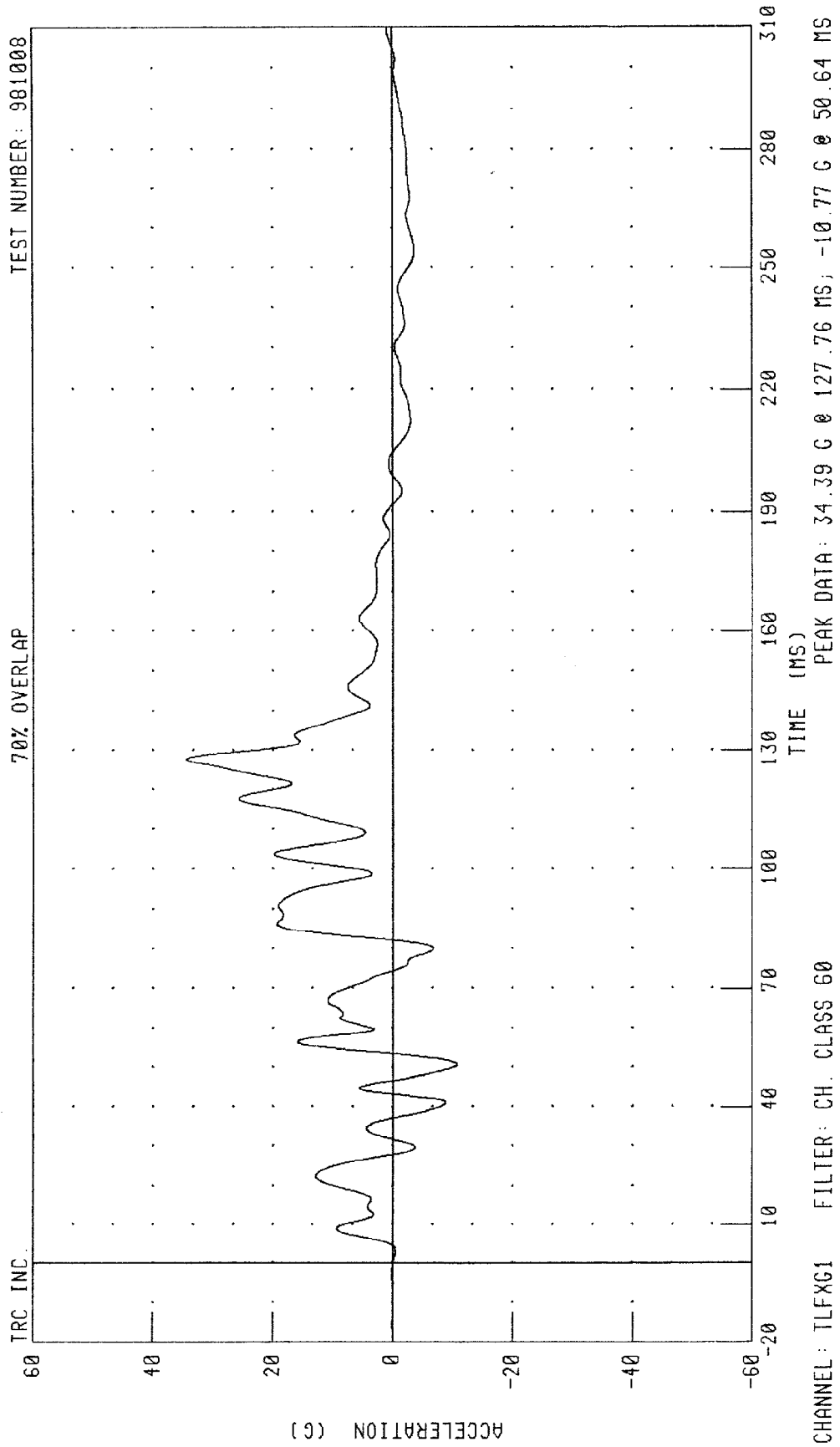
CHANNEL: RFRZC1 FILTER: CH. CLASS 60

PEAK DATA: 9.87 G @ 105.84 MS, -19.90 G @ 153.36 MS

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
 RIGHT ROCKER PANEL RESULTANT
 70% OVERLAP



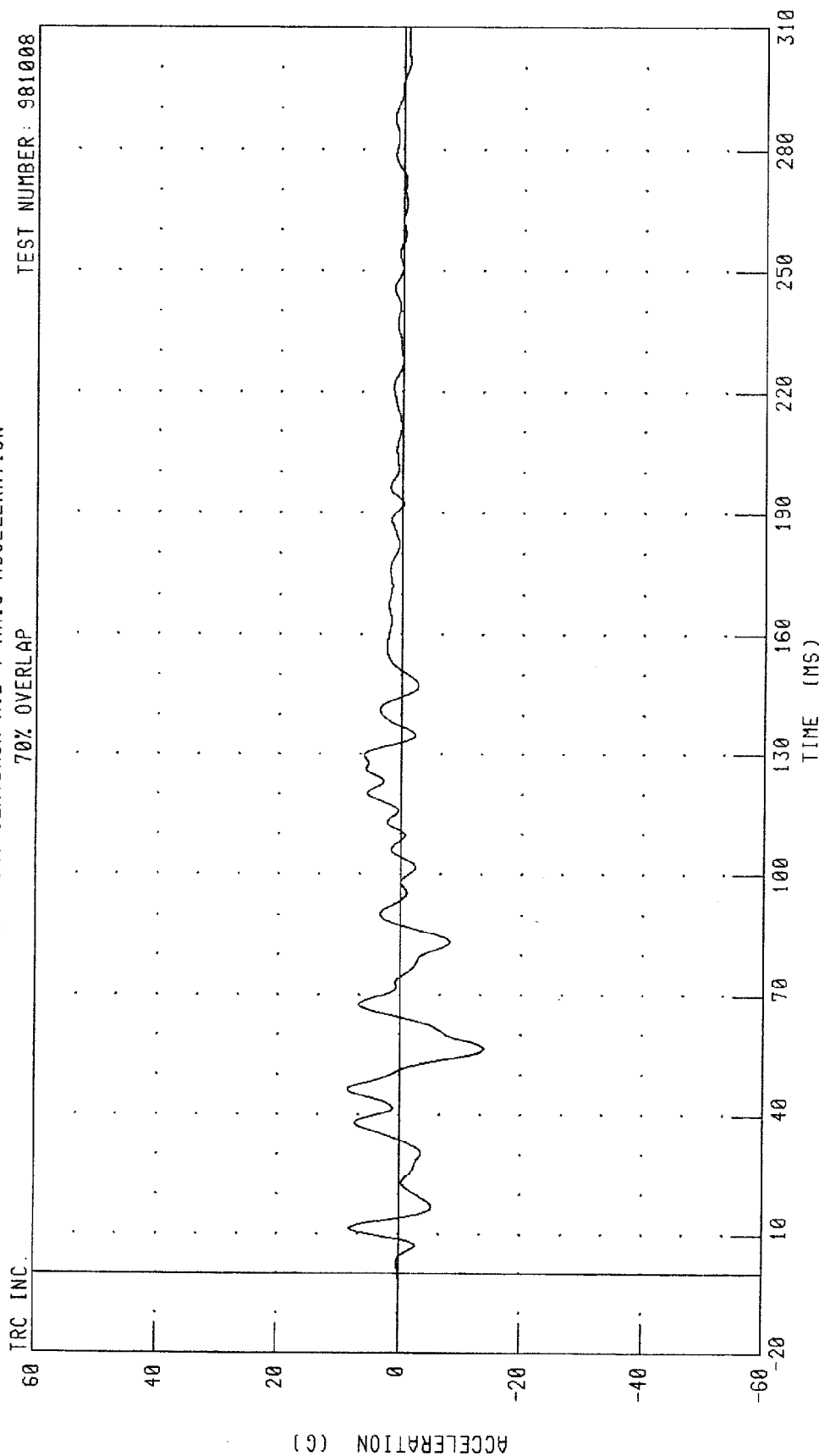
81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
LEFT FRONT SEATBACK MID X-AXIS ACCELERATION



81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
LEFT FRONT SEATBACK MID Y-AXIS ACCELERATION

TEST NUMBER: 981008

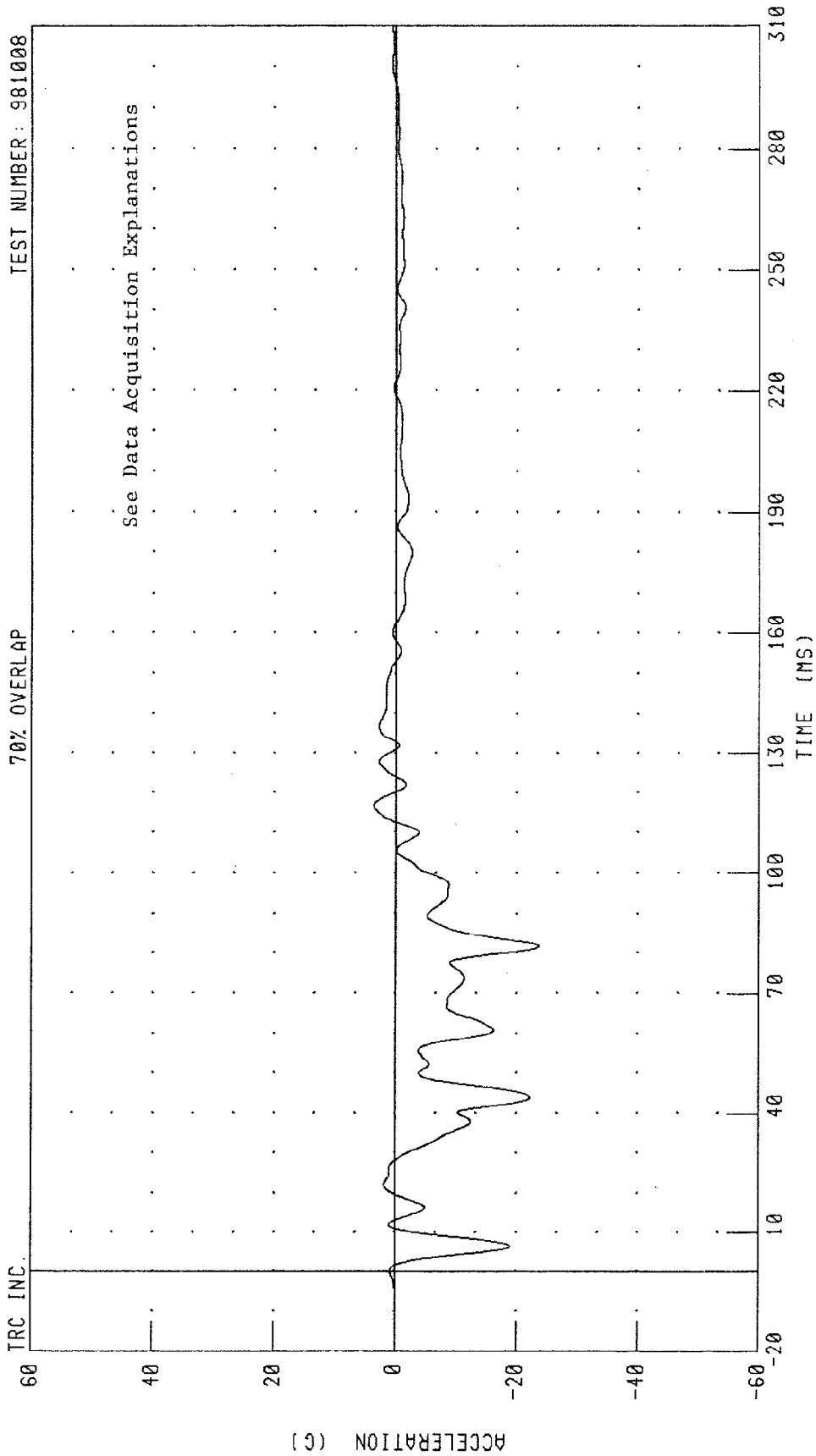
70% OVERLAP



CHANNEL: TLFY01 FILTER: CH. CLASS 60

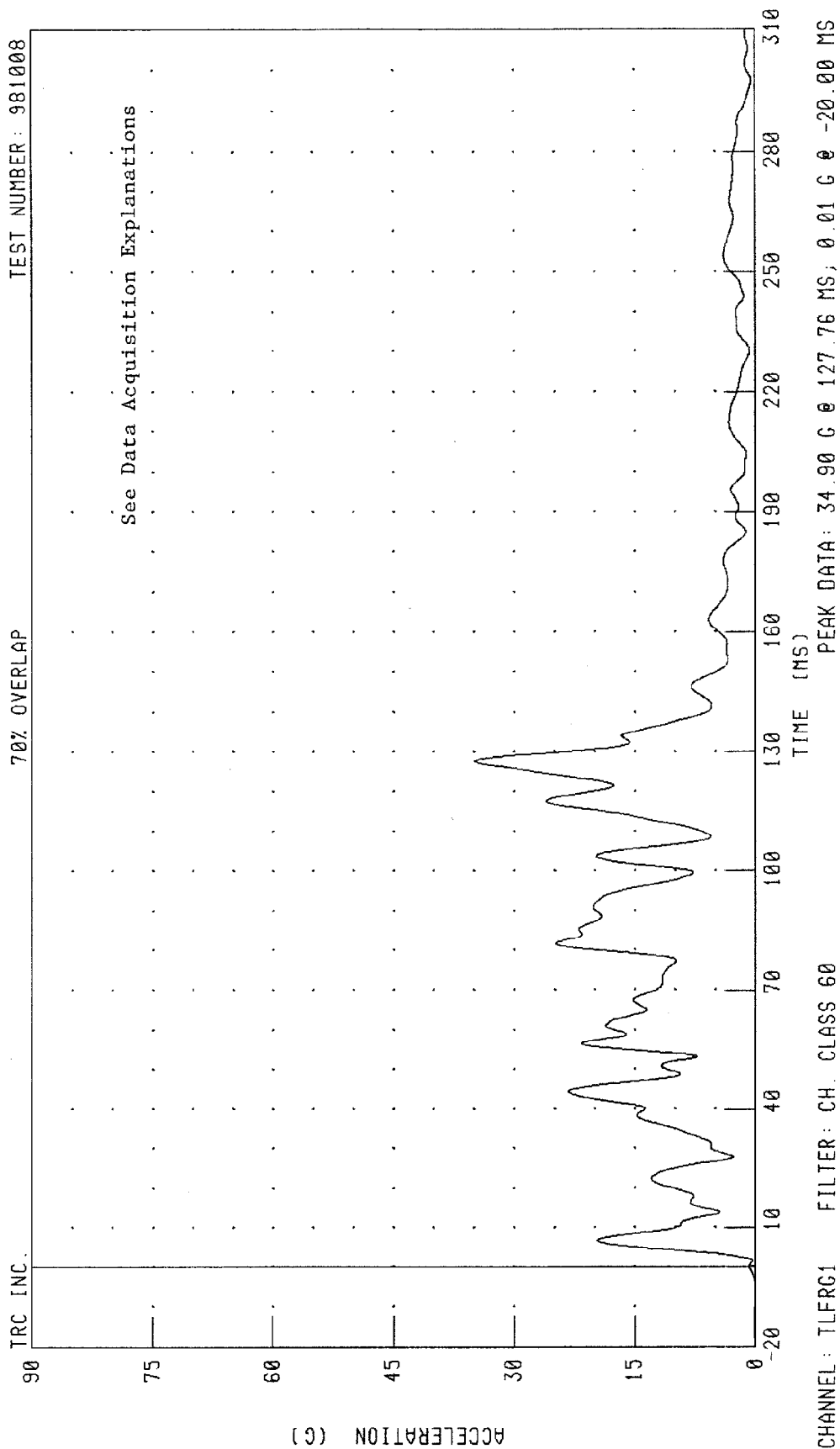
PEAK DATA: 8.43 G @ 46.40 MS, -13.93 G @ 56.48 MS

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
LEFT FRONT SEATBACK MID Z-AXIS ACCELERATION

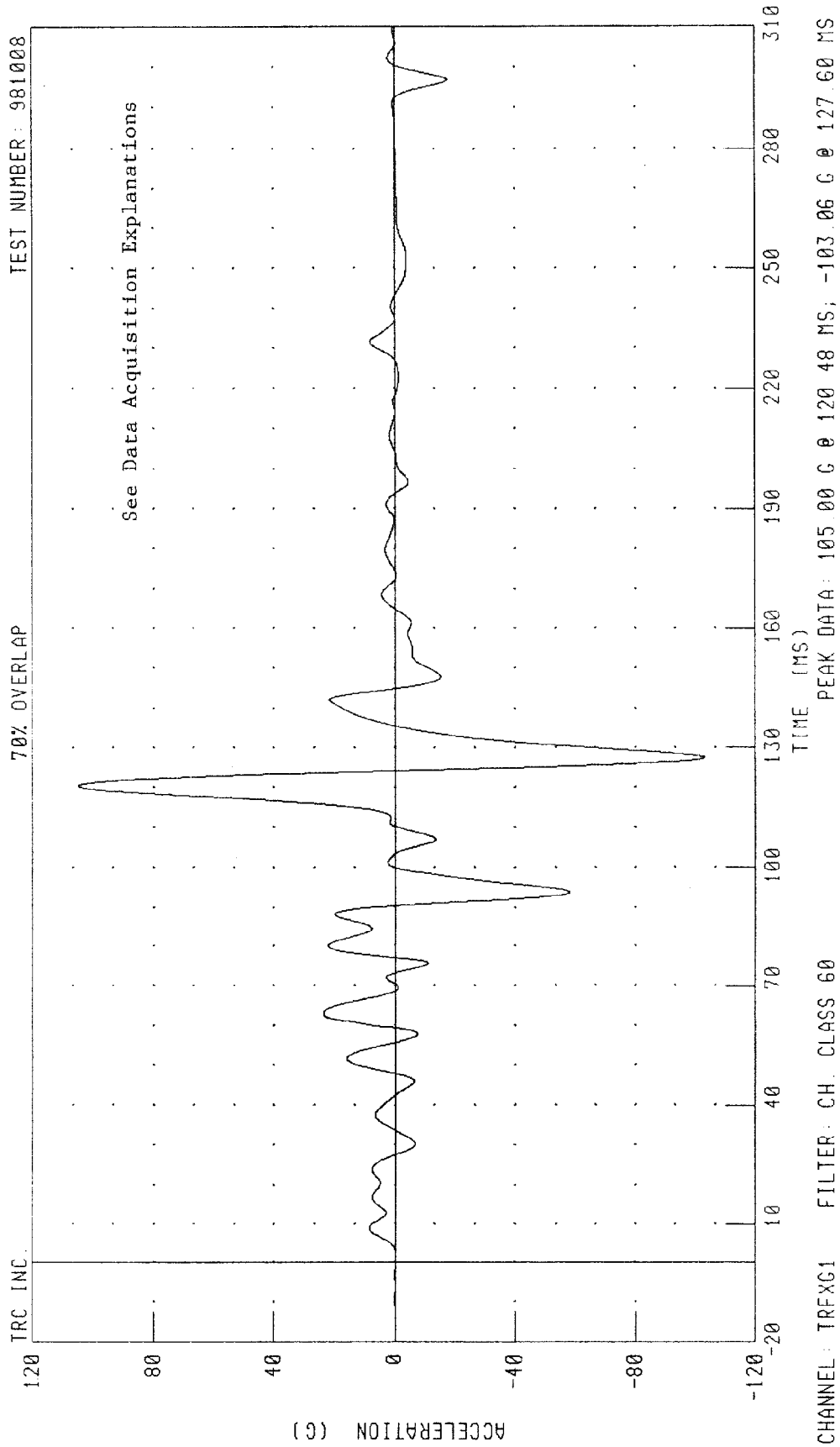


CHANNEL: TLFZG1 FILTER: CH. CLASS 60

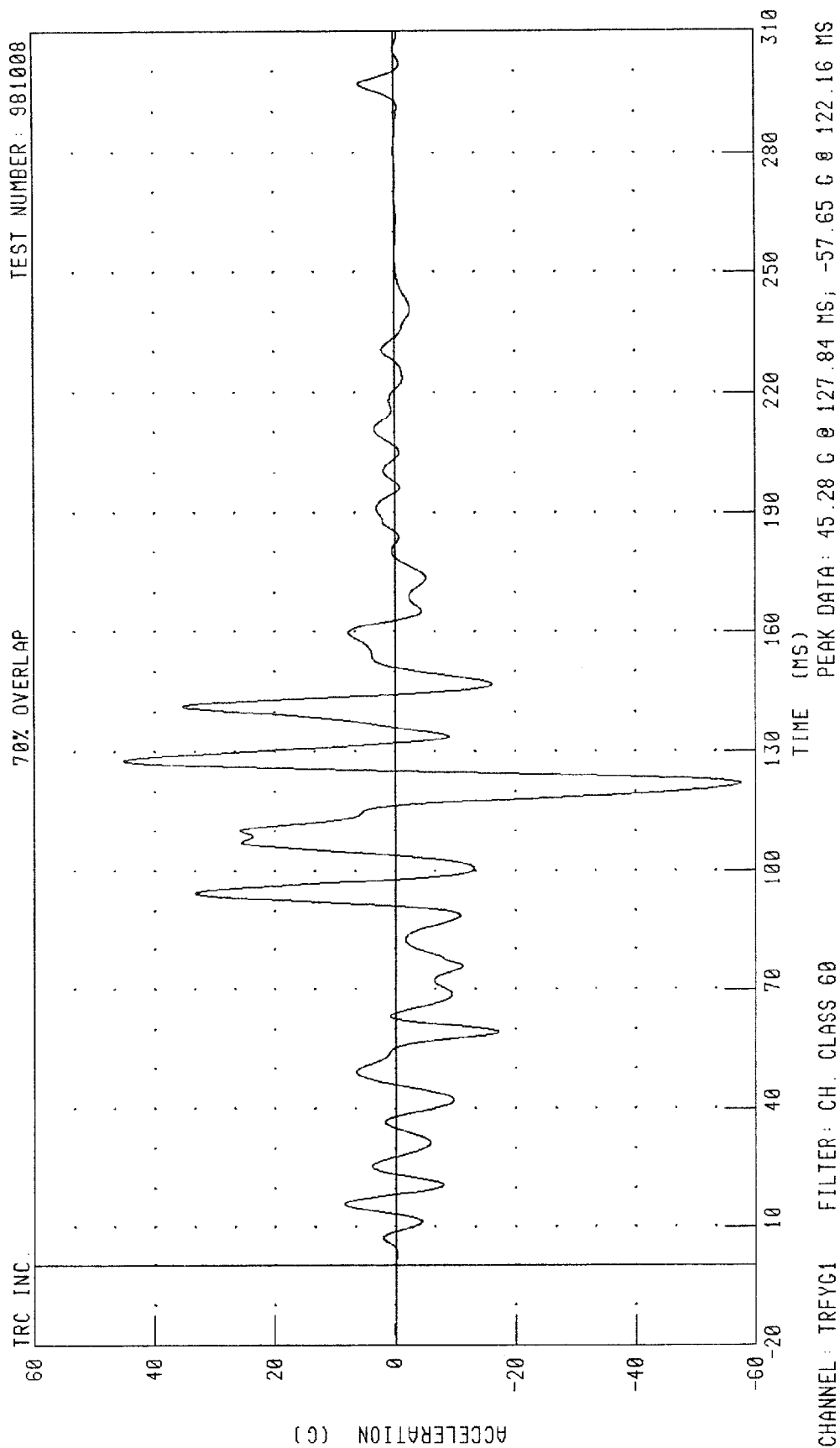
81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
LEFT FRONT SEATBACK MID RESULTANT



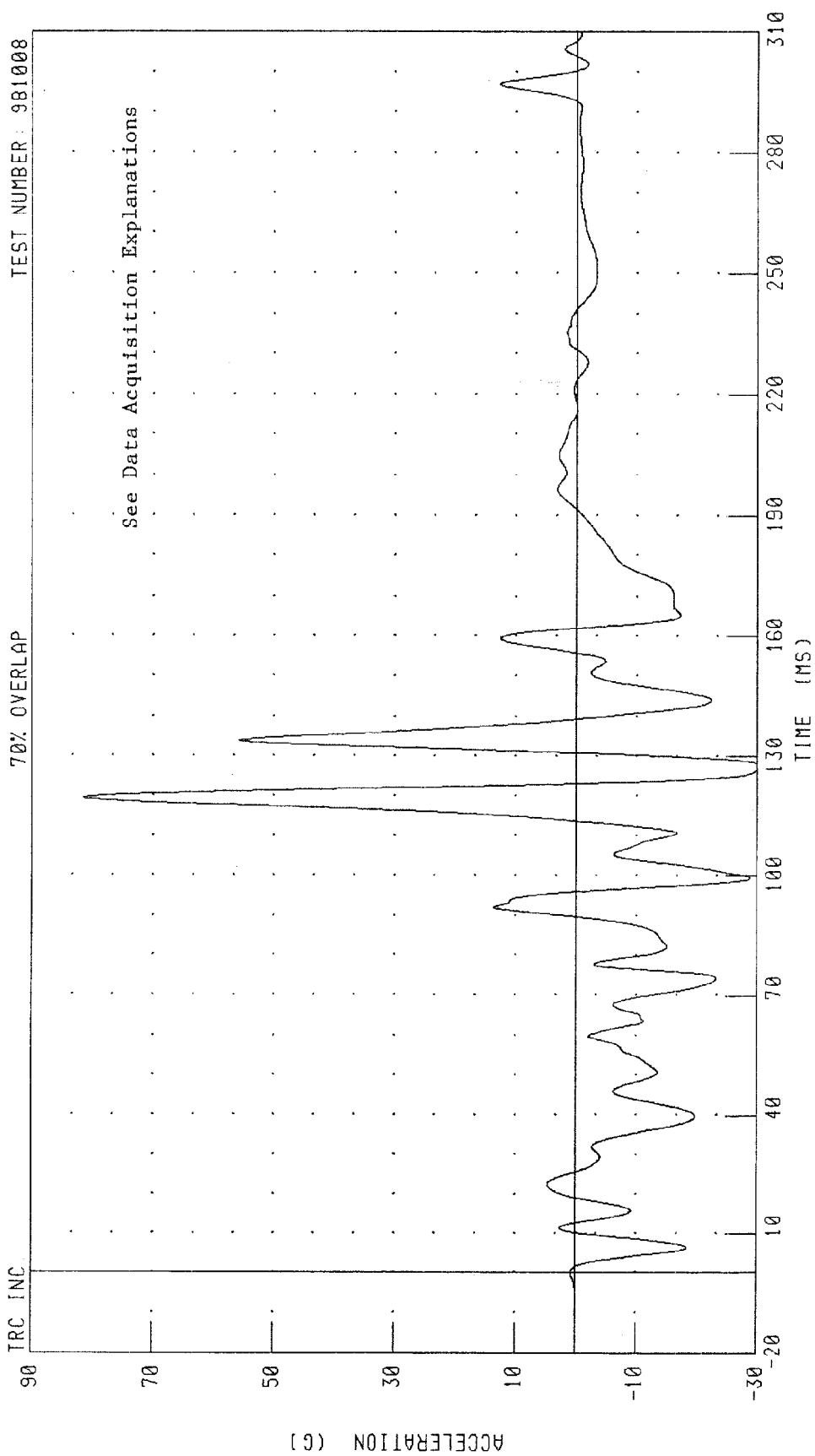
81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
RIGHT FRONT SEATBACK MID X-AXIS ACCELERATION



81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
RIGHT FRONT SEATBACK MID Y-AXIS ACCELERATION



81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
RIGHT FRONT SEATBACK MID Z-AXIS ACCELERATION



CHANNEL: TRFZG1 FILTER: CH. CLASS 60

PEAK DATA: 81.63 G @ 119.52 MS, -30.76 G @ 127.68 MS

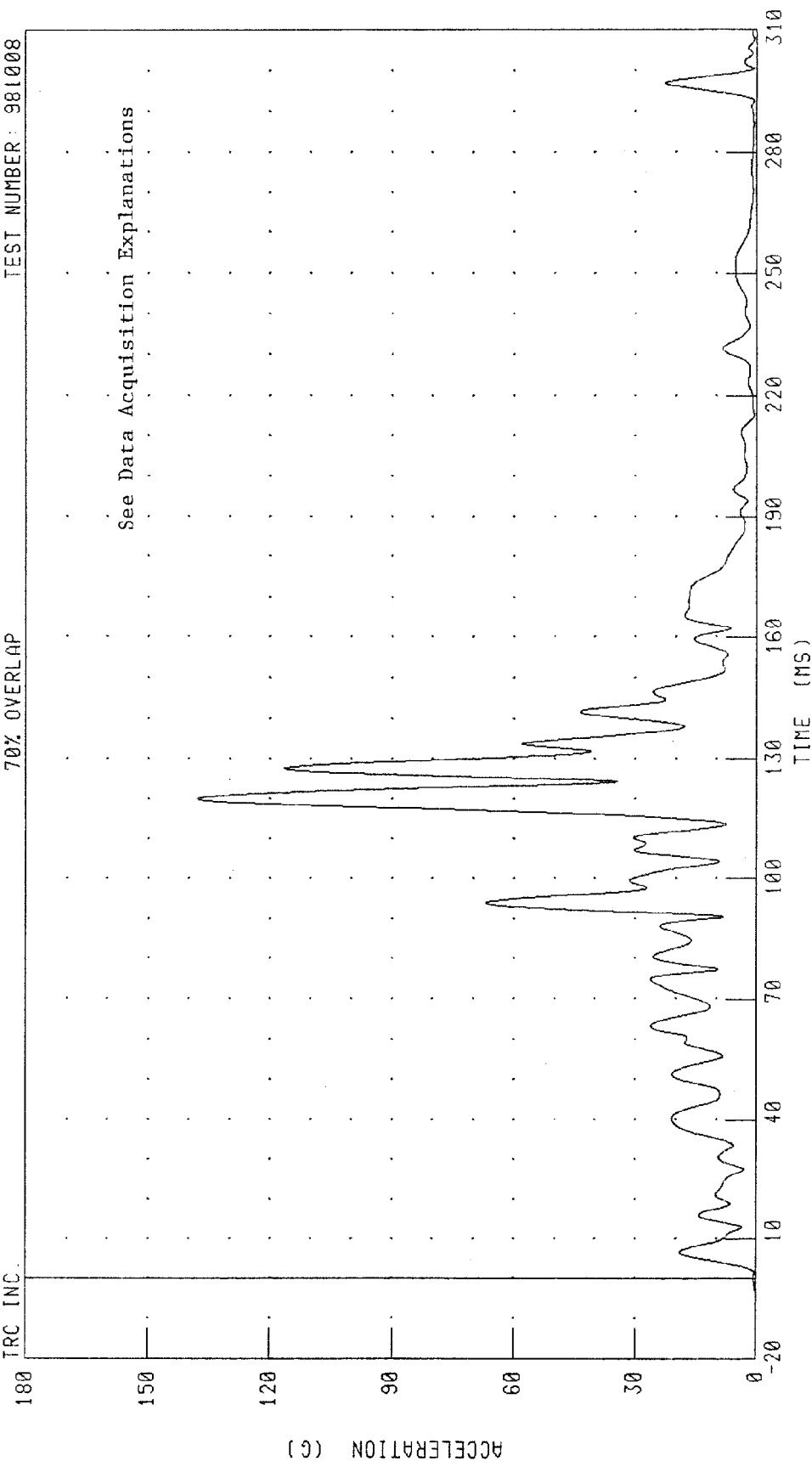
81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
RIGHT FRONT SEATBACK MID RESULTANT

TEST NUMBER: 981008

70% OVERLAP

TRC INC.

See Data Acquisition Explanations

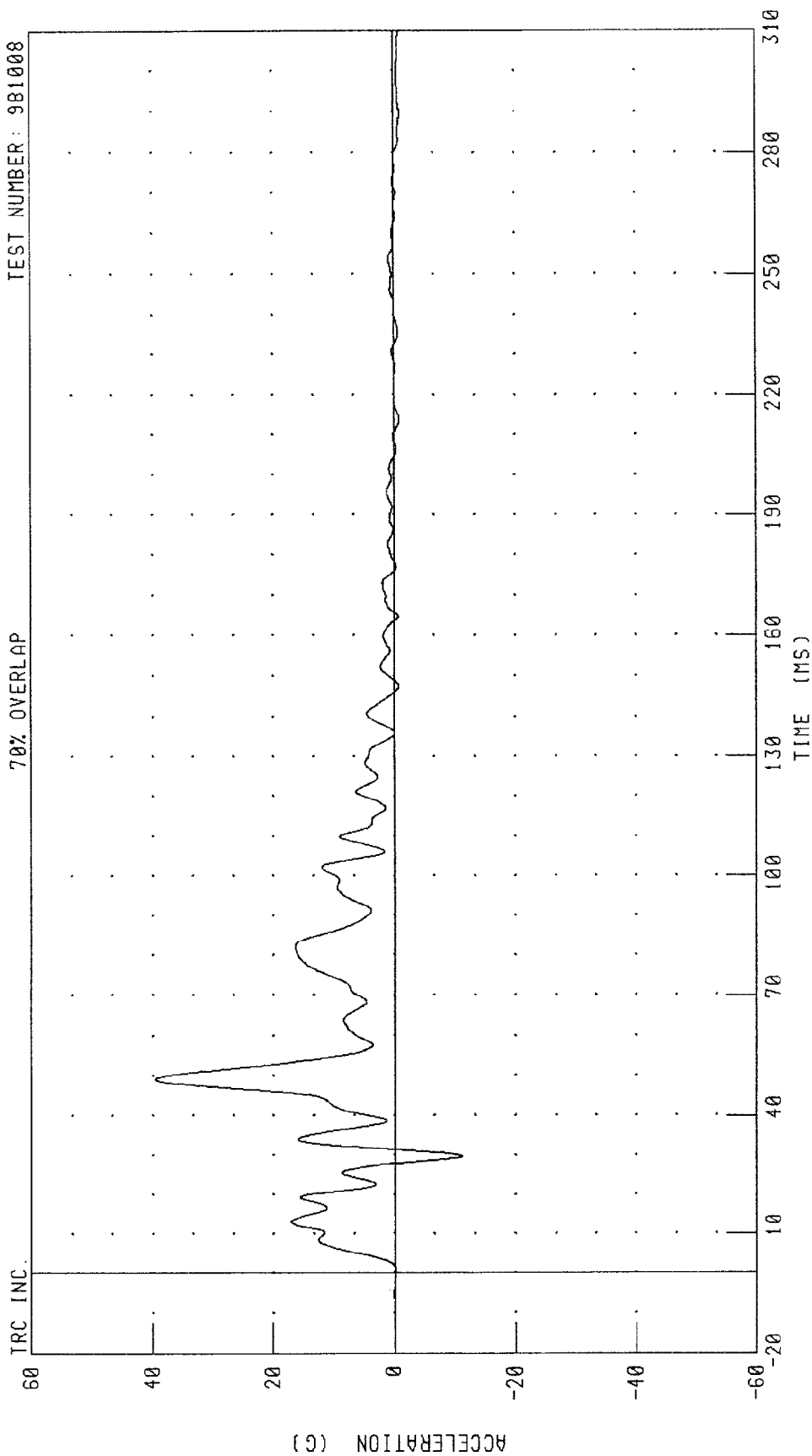


PEAK DATA: 137.99 C 0 120.16 MS, 0.01 C 0 -13.28 MS

CHANNEL: TRFRG1 FILTER: CH. CLASS 60

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
RADIATOR SUPPORT X-AXIS ACCELERATION
70% OVERLAP

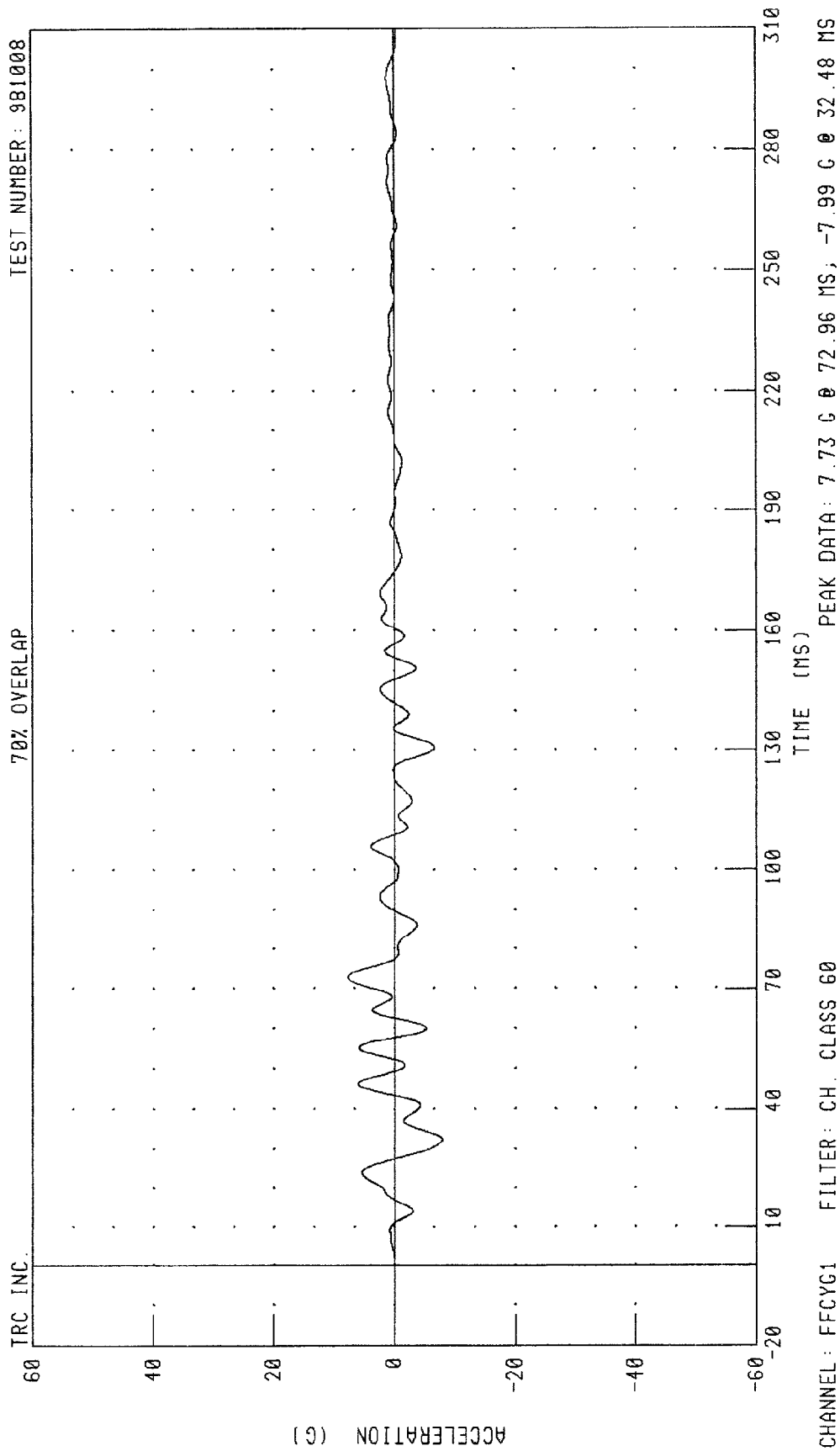
TEST NUMBER: 981008



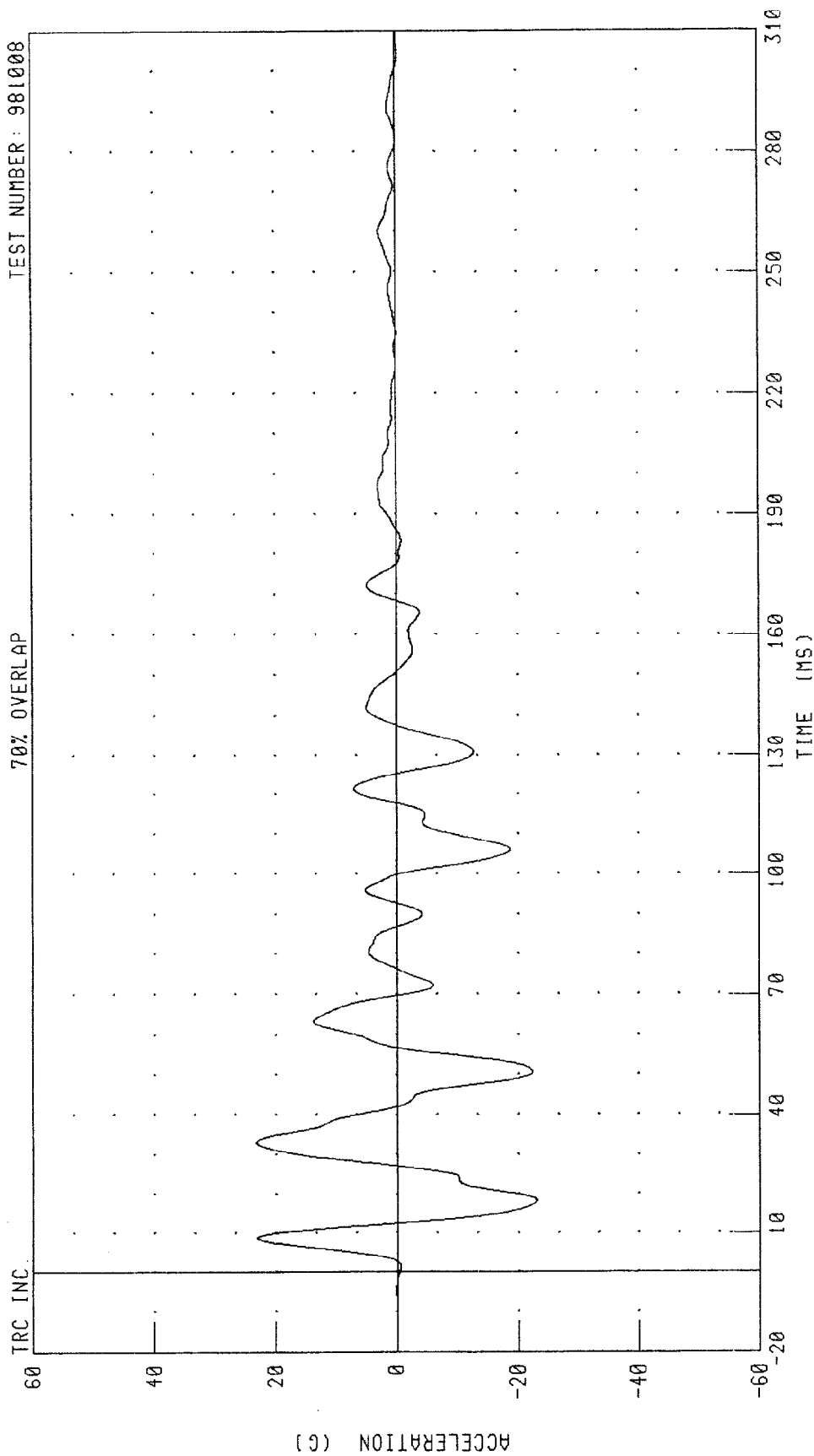
CHANNEL: FFCXC1 FILTER: CH. CLASS 60

PEAK DATA: 39.55 G @ 49.20 MS, -11.18 G @ 29.76 MS

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
RADIATOR SUPPORT Y-AXIS ACCELERATION

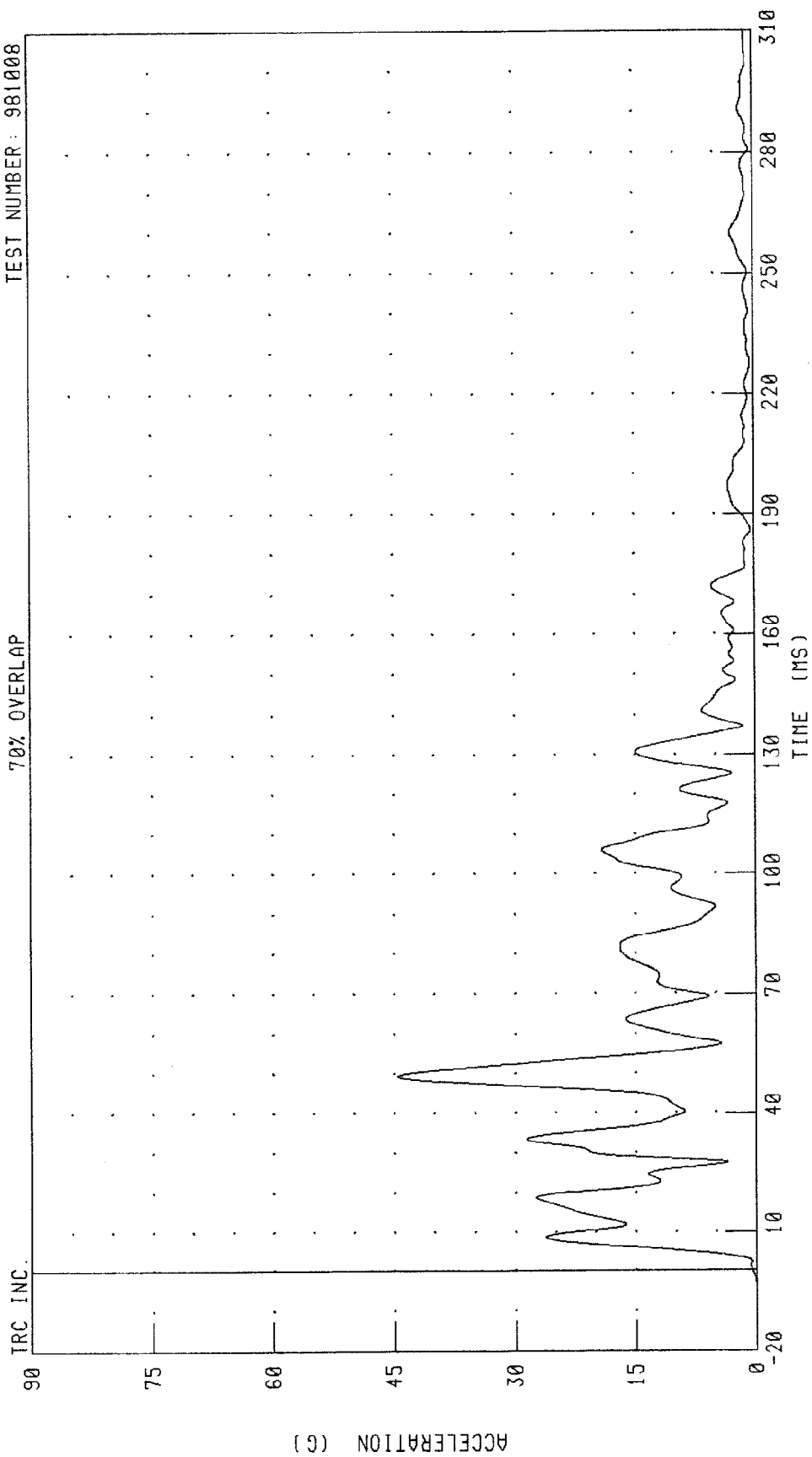


81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
RADIATOR SUPPORT Z-AXIS ACCELERATION



81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
RADIATOR SUPPORT RESULTANT
70% OVERLAP

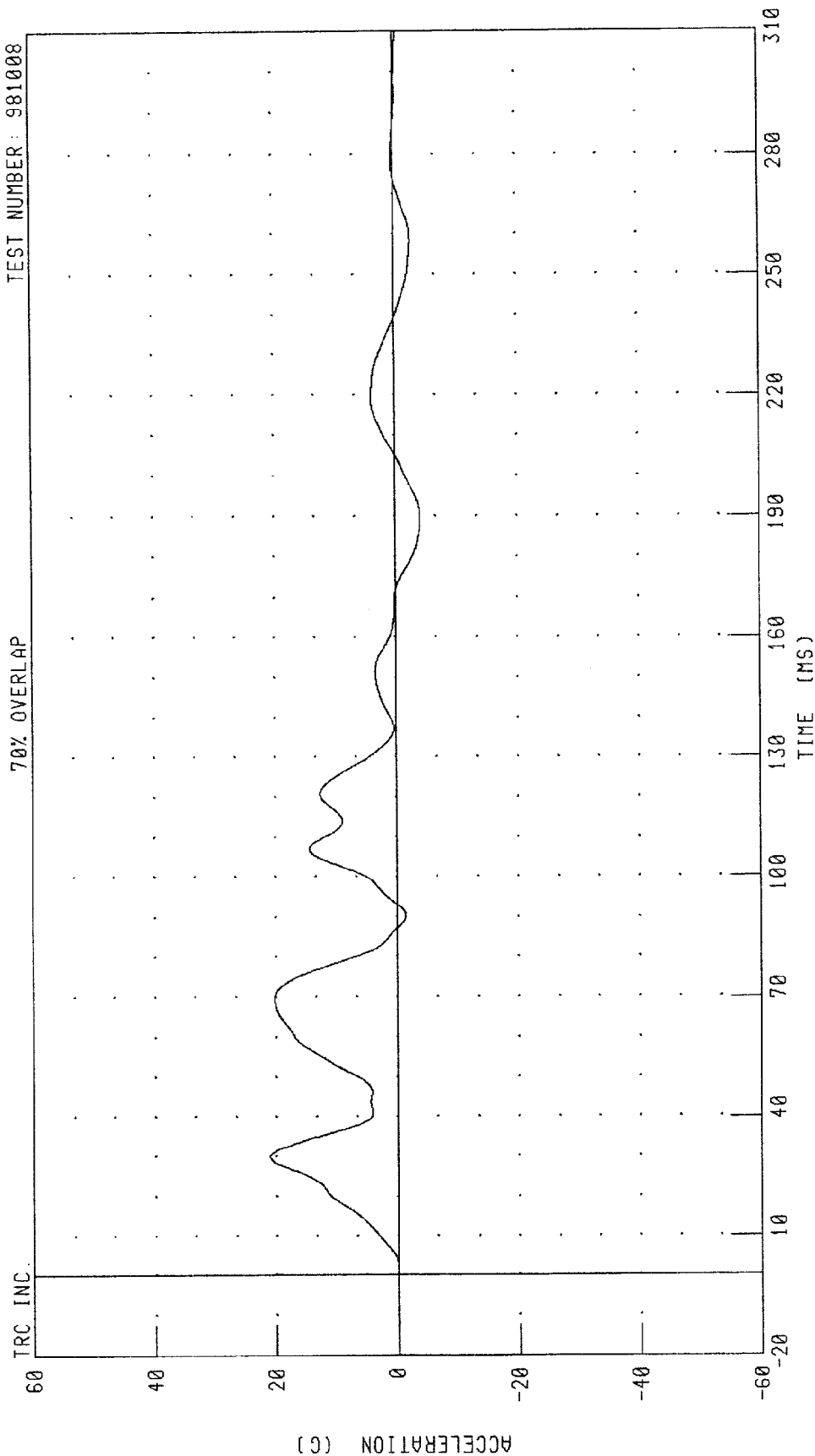
TEST NUMBER: 981008



81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
ENGINE TOP X-AXIS ACCELERATION

TEST NUMBER: 981008

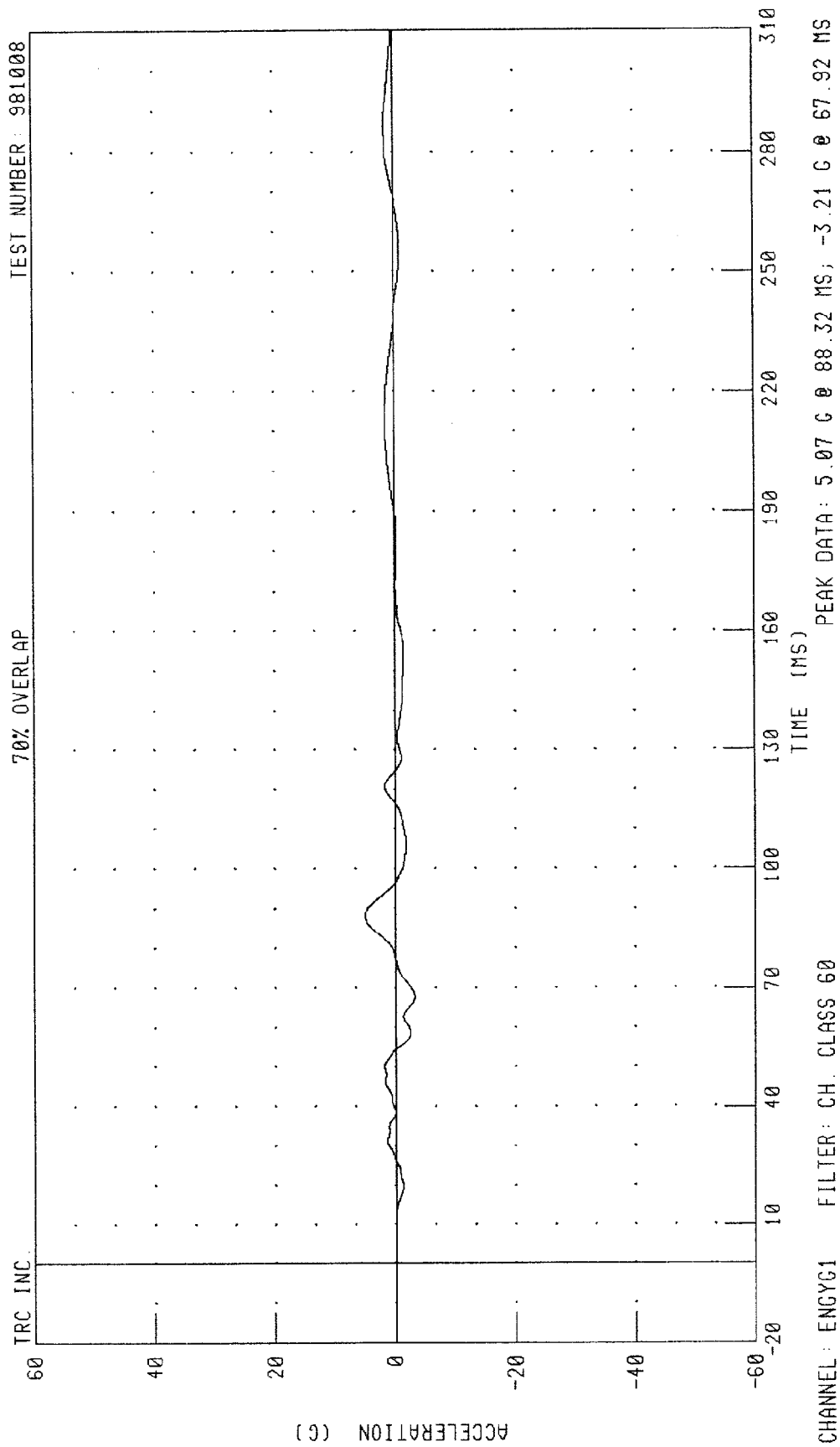
70% OVERLAP



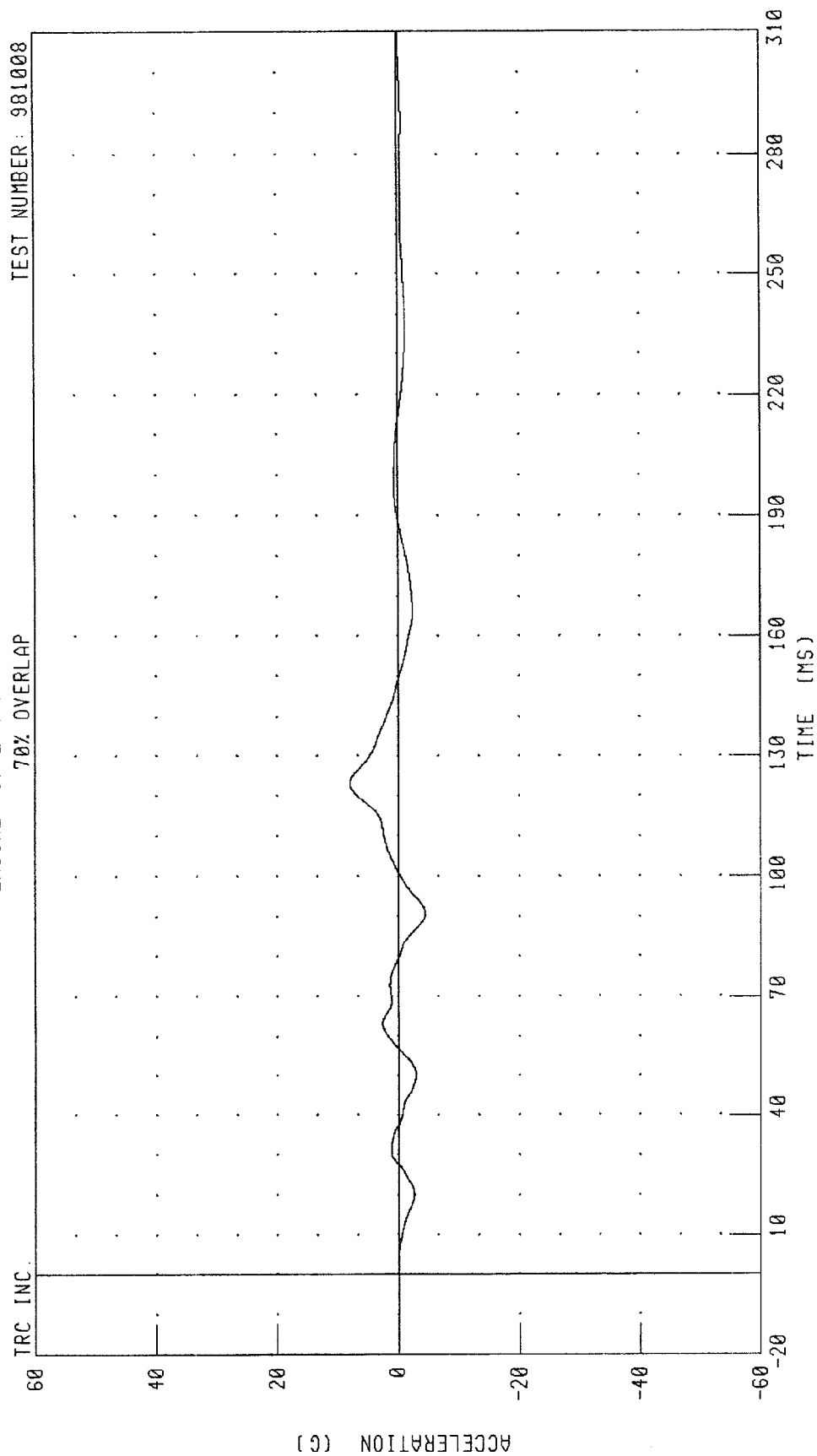
CHANNEL: ENCXC1 FILTER: CH. CLASS 60

PEAK DATA: 21.03 G @ 29.92 MS; -4.22 G @ 189.36 MS

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
ENGINE TOP Y-AXIS ACCELERATION



81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
ENGINE TOP Z-AXIS ACCELERATION



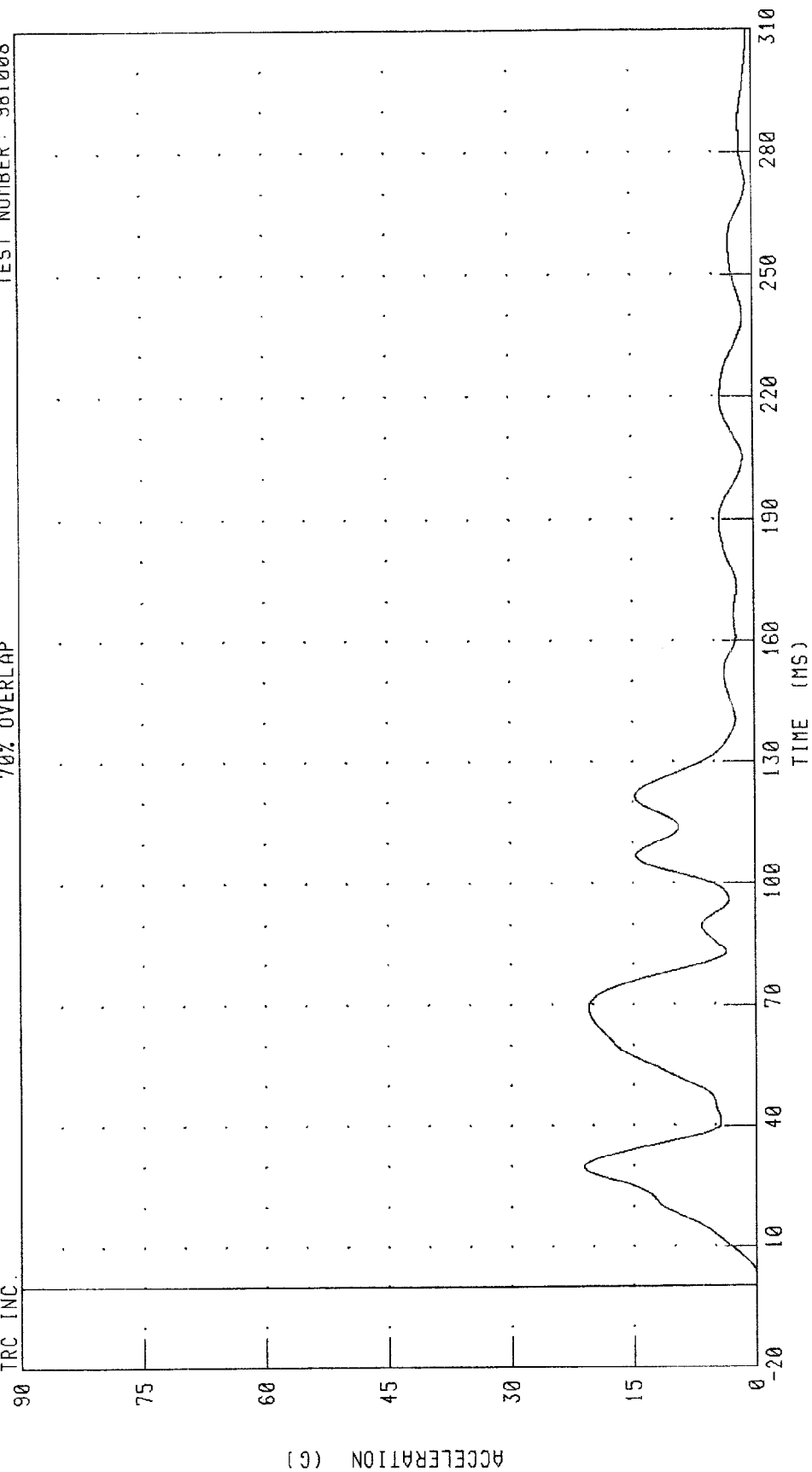
81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC

ENGINE TOP RESULTANT

70% OVERLAP

TEST NUMBER: 981008

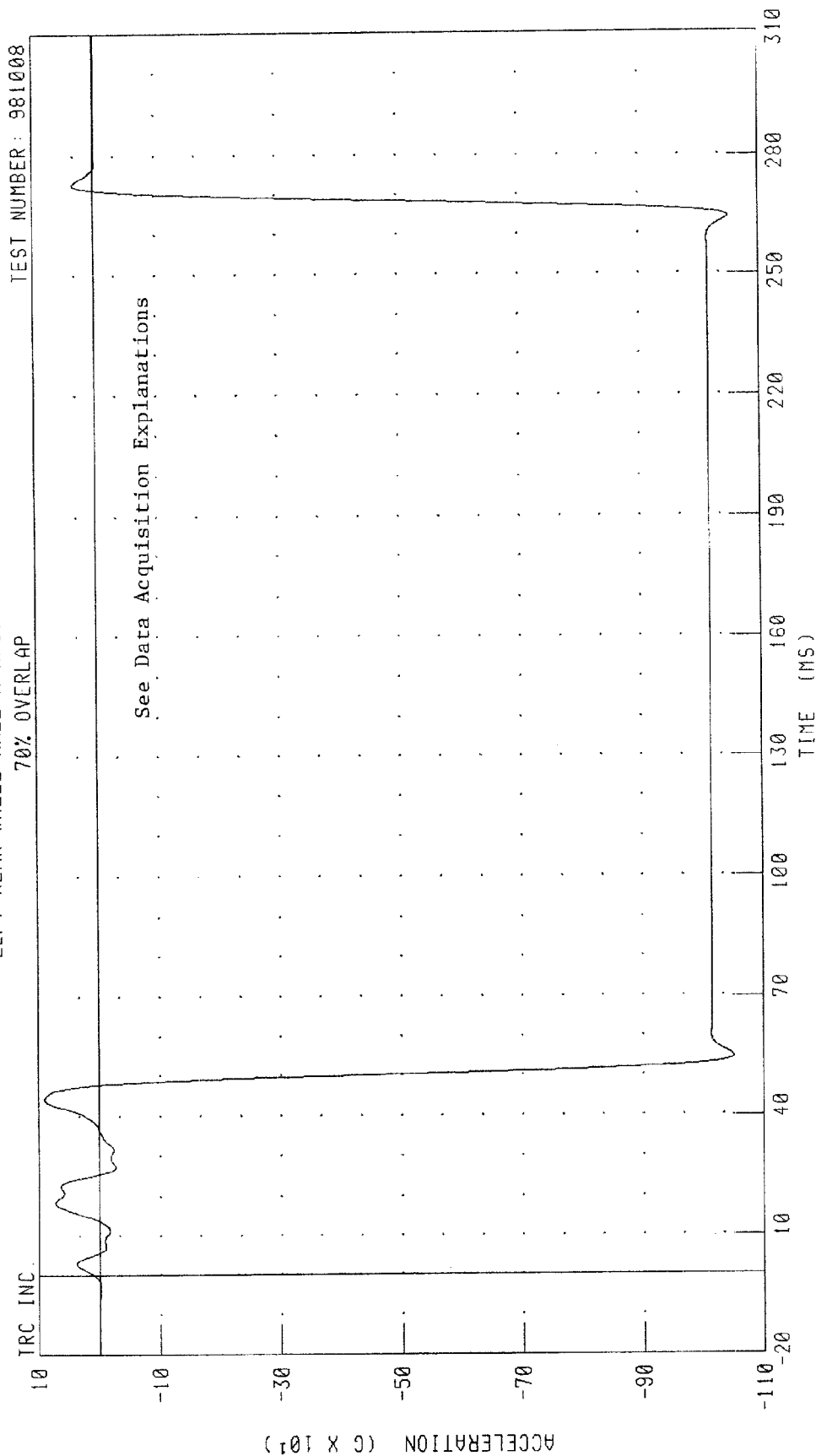
TRC INC.



CHANNEL: ENCRG1 FILTER: CH. CLASS 60

PEAK DATA: 21.08 G @ 30.00 MS; 0.00 G @ -18.56 MS

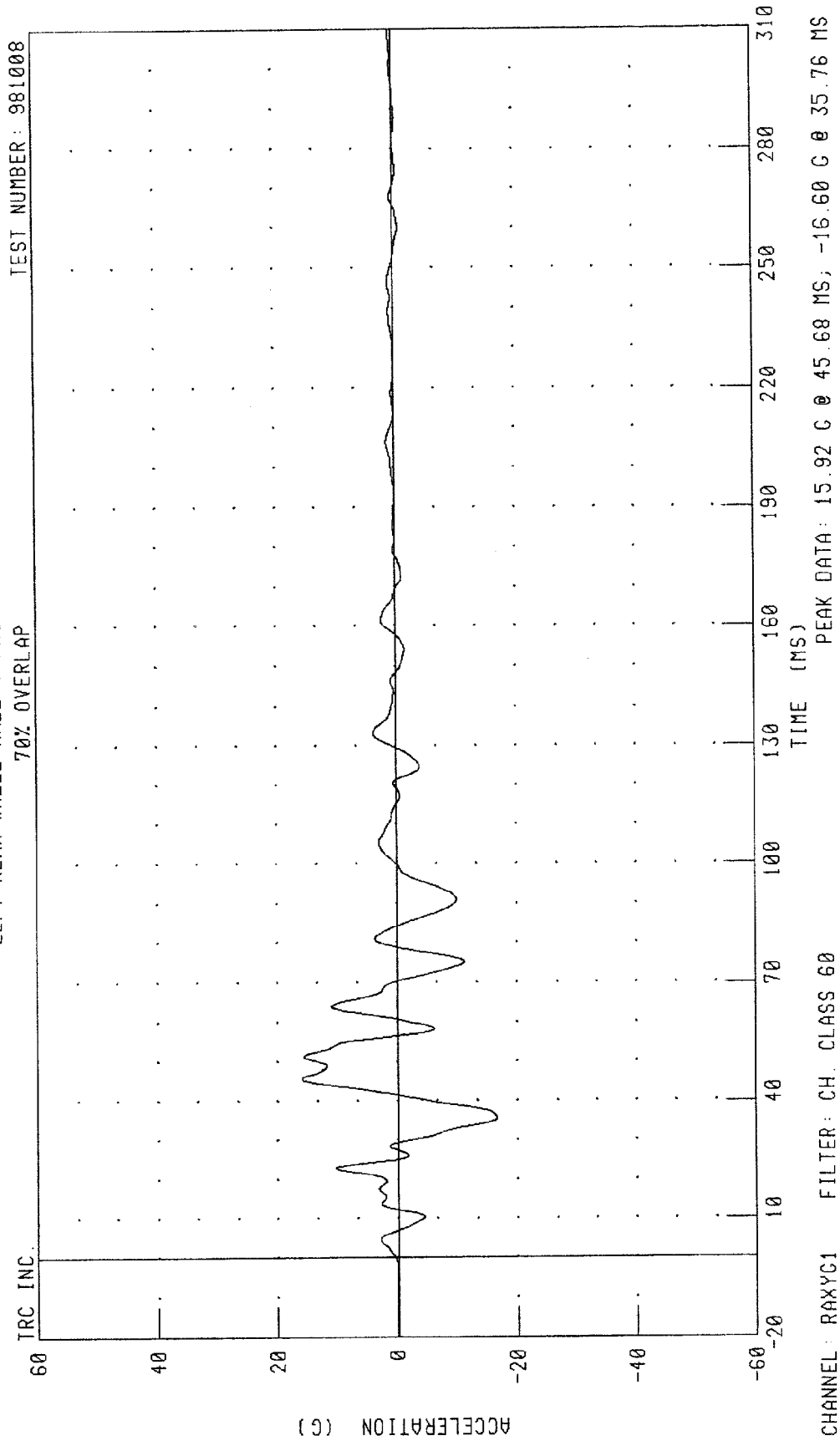
81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
LEFT REAR WHEEL AXLE X-AXIS ACCELERATION



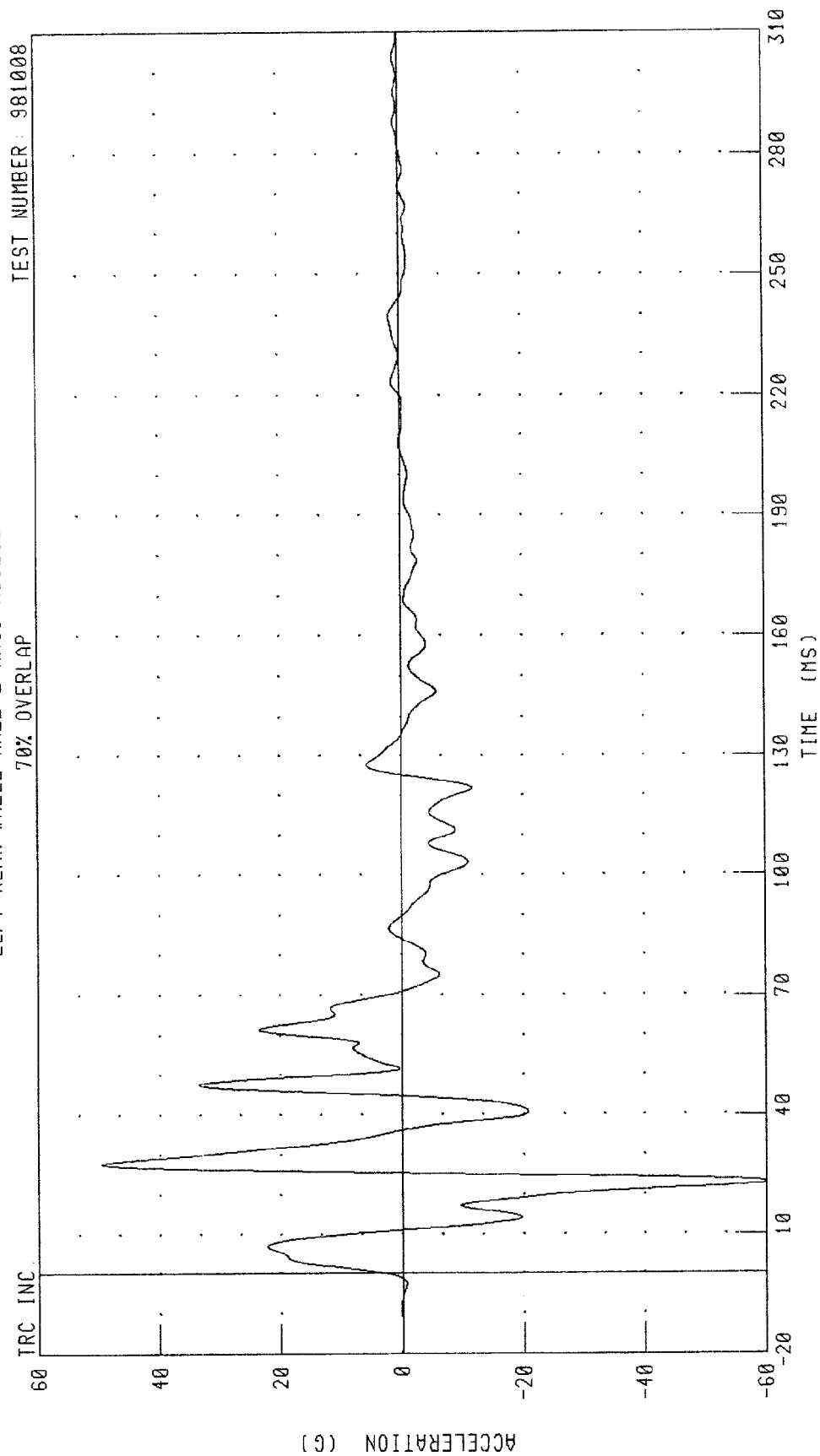
PEAK DATA: 90 29 G @ 44.32 MS; -1050 96 G @ 54.48 MS

CHANNEL: RAXXG1 FILTER: CH. CLASS 60

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
LEFT REAR WHEEL AXLE Y-AXIS ACCELERATION



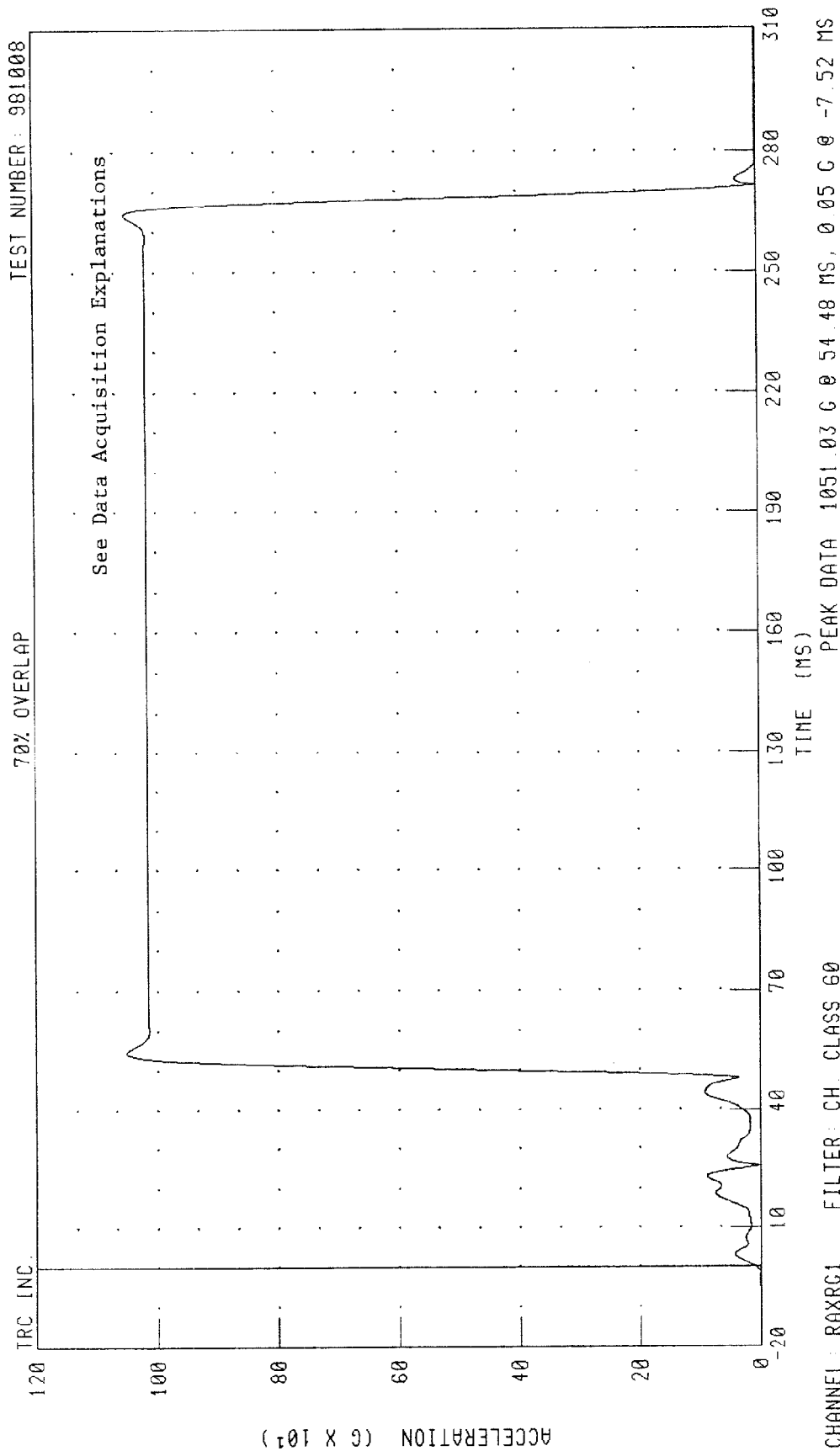
81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
LEFT REAR WHEEL AXLE Z-AXIS ACCELERATION



PEAK DATA: 49.64 G @ 27.84 MS; -61.15 G @ 23.12 MS

CHANNEL: RAXZG1 FILTER: CH. CLASS 60

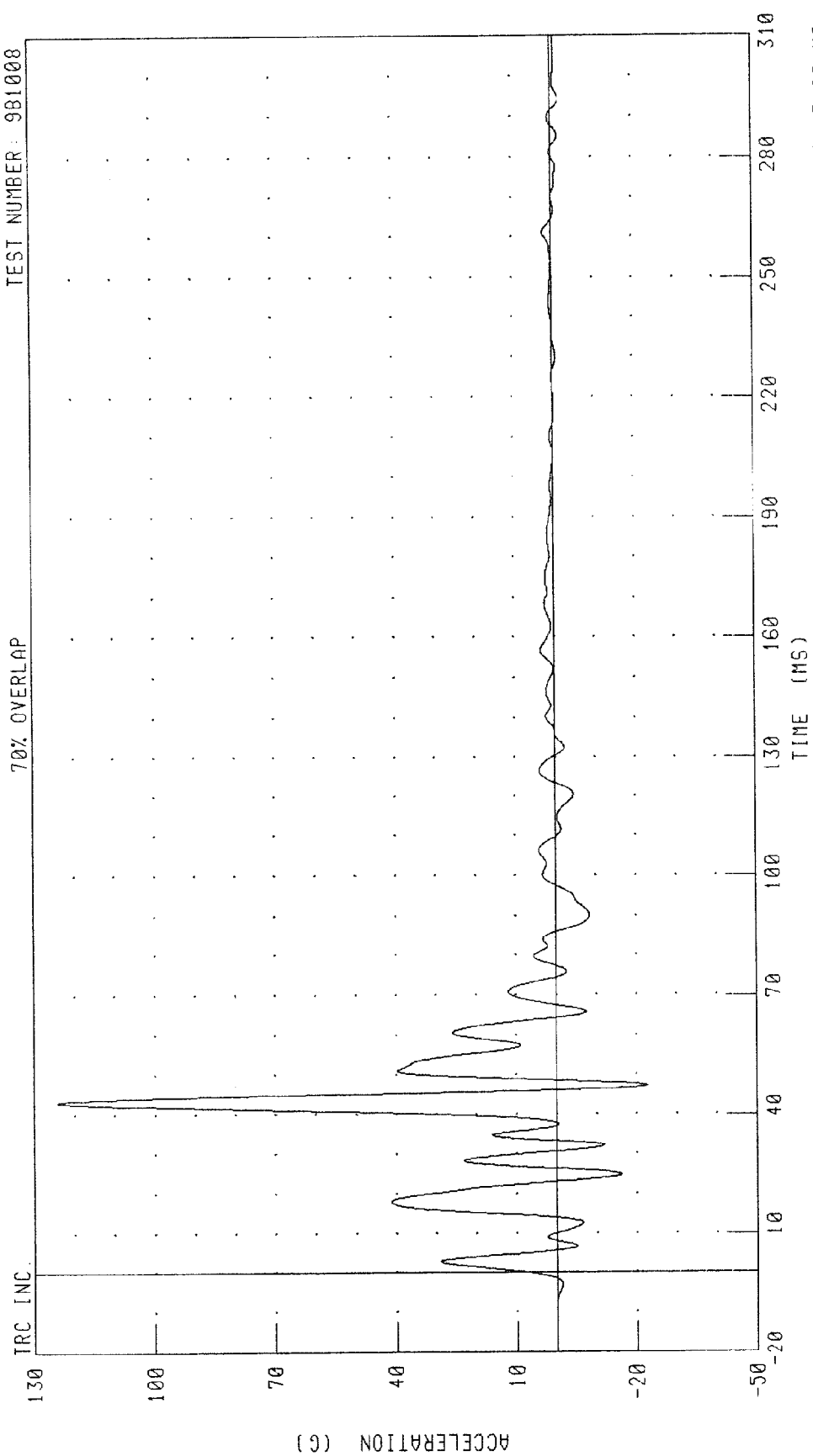
81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
LEFT REAR WHEEL AXLE RESULTANT



81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
RIGHT REAR WHEEL AXLE X-AXIS ACCELERATION

TEST NUMBER: 981008

70% OVERLAP



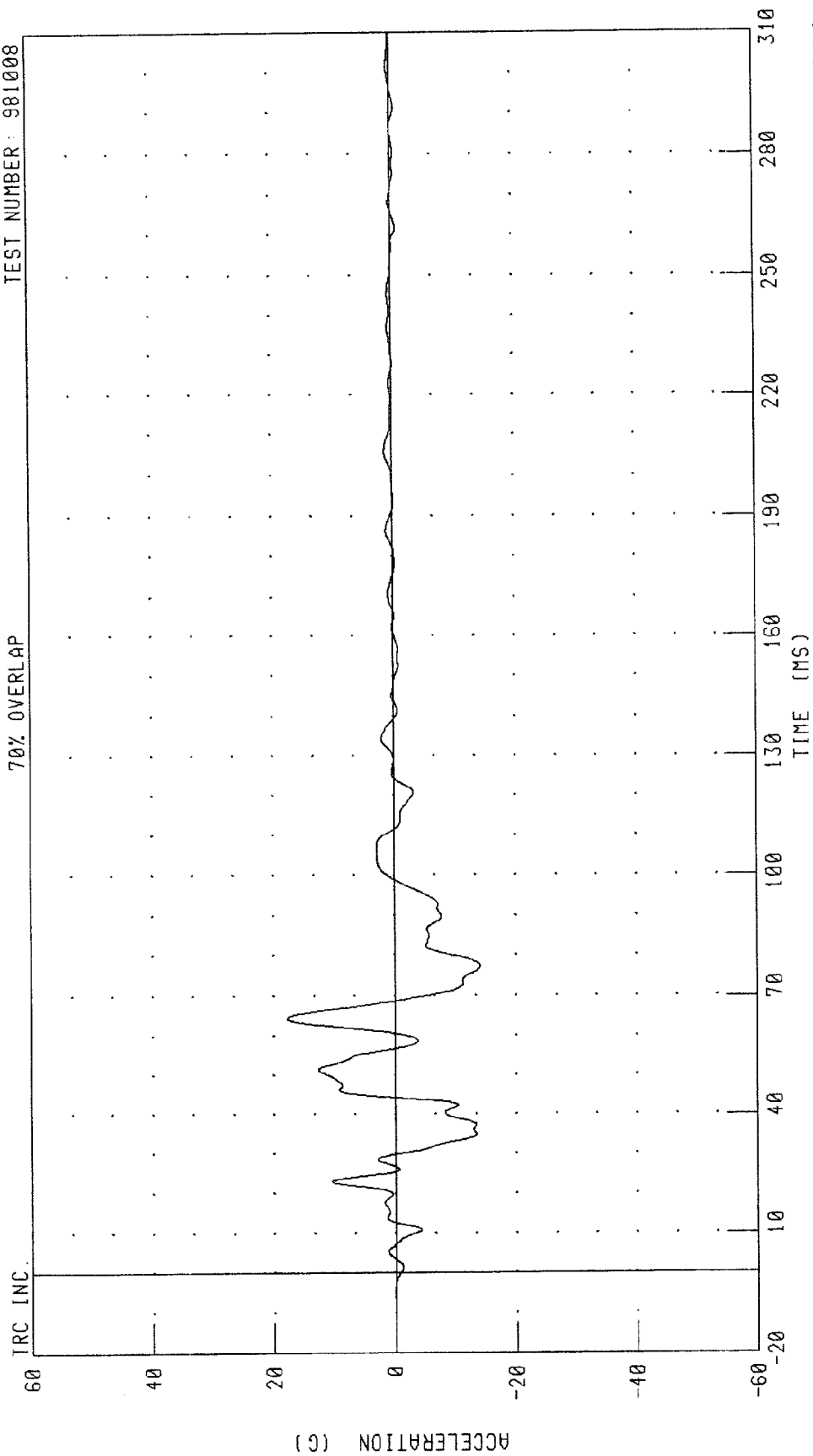
PEAK DATA: 124.18 G @ 43.28 MS, -22.83 G @ 47.28 MS

CHANNEL: RAXXC2 FILTER: CH CLASS 60

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
RIGHT REAR WHEEL AXLE Y-AXIS ACCELERATION

TEST NUMBER: 981008

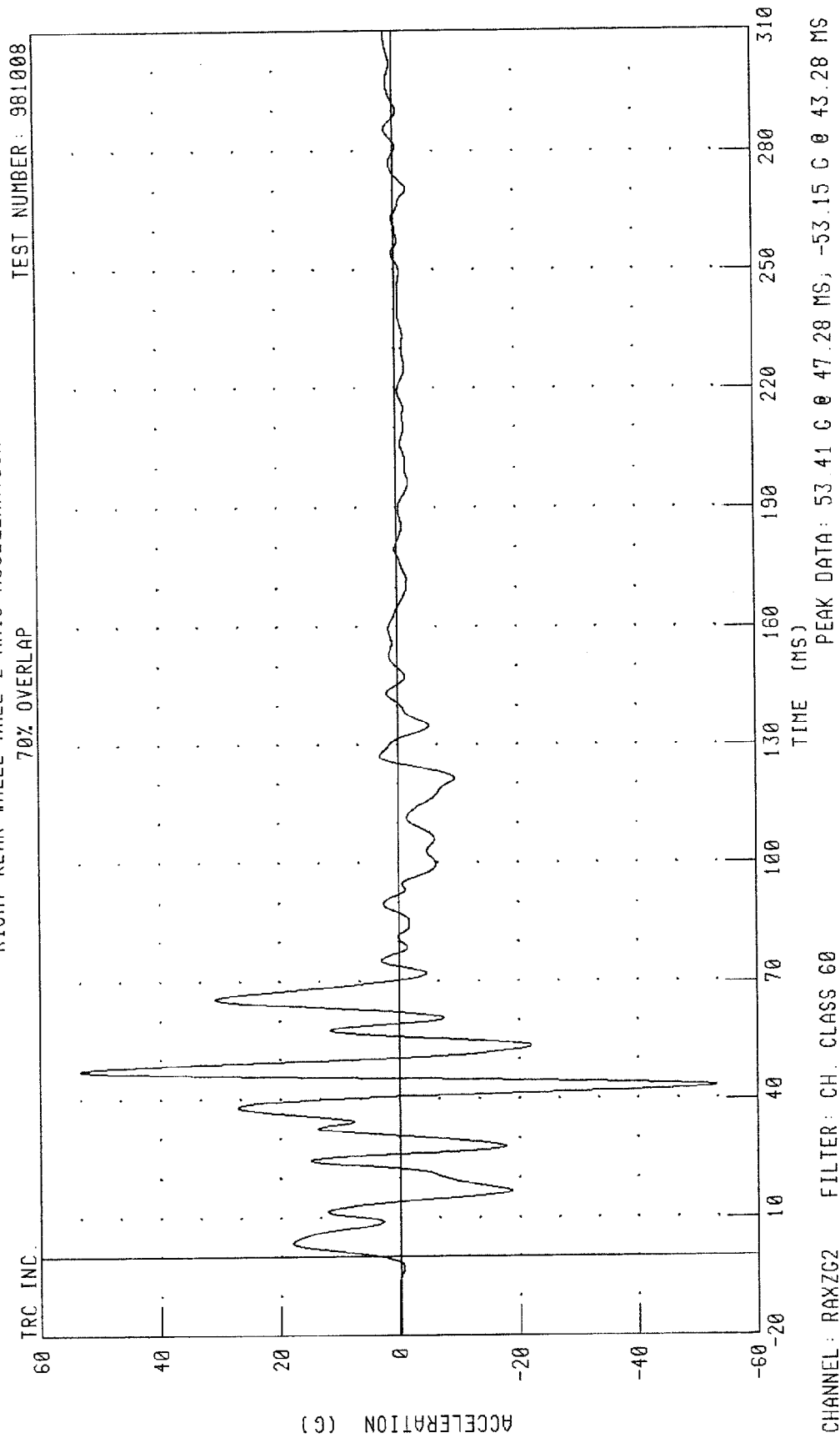
70% OVERLAP



CHANNEL: RAXYC2 FILTER: CH. CLASS 60

PEAK DATA: 17.74 G @ 64.40 MS, -14.20 G @ 77.36 MS

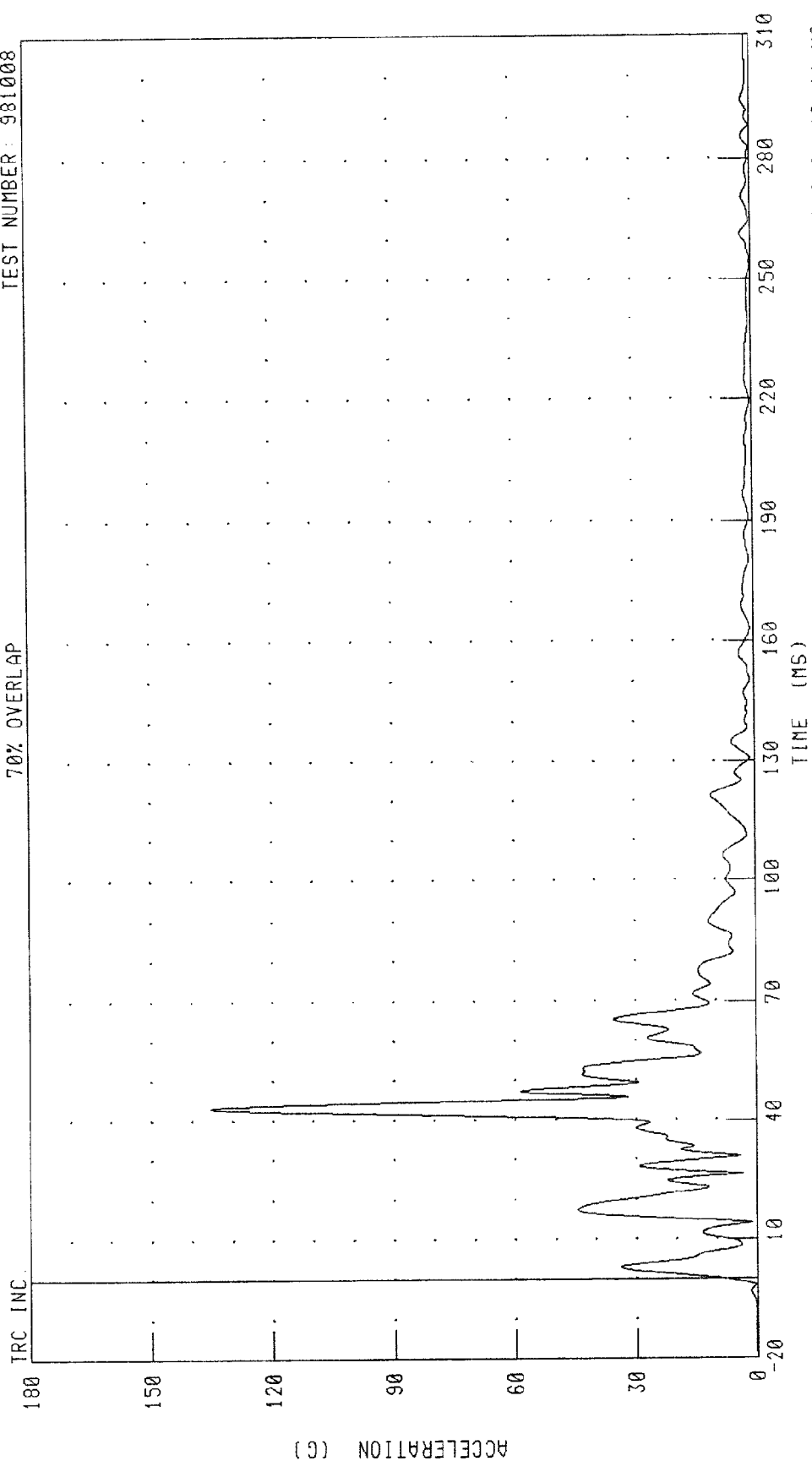
81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
RIGHT REAR WHEEL AXLE Z-AXIS ACCELERATION
70% OVERLAP



81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
RIGHT REAR WHEEL AXLE RESULTANT

TEST NUMBER: 981008

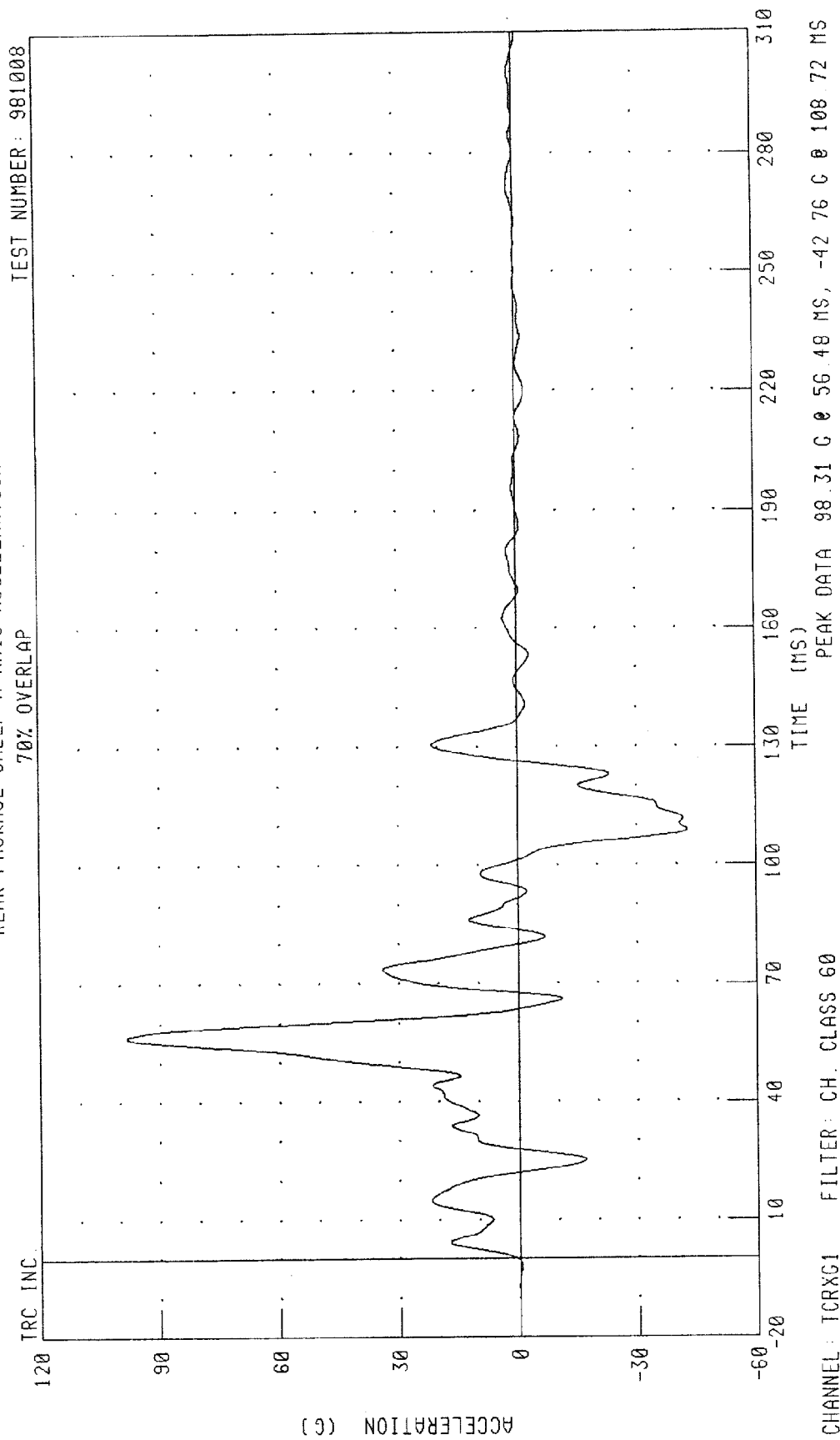
70% OVERLAP



CHANNEL: RAXRG2 FILTER: CH. CLASS 60

PEAK DATA: 135.33 G @ 43.28 MS; 0.06 G @ -19.44 MS

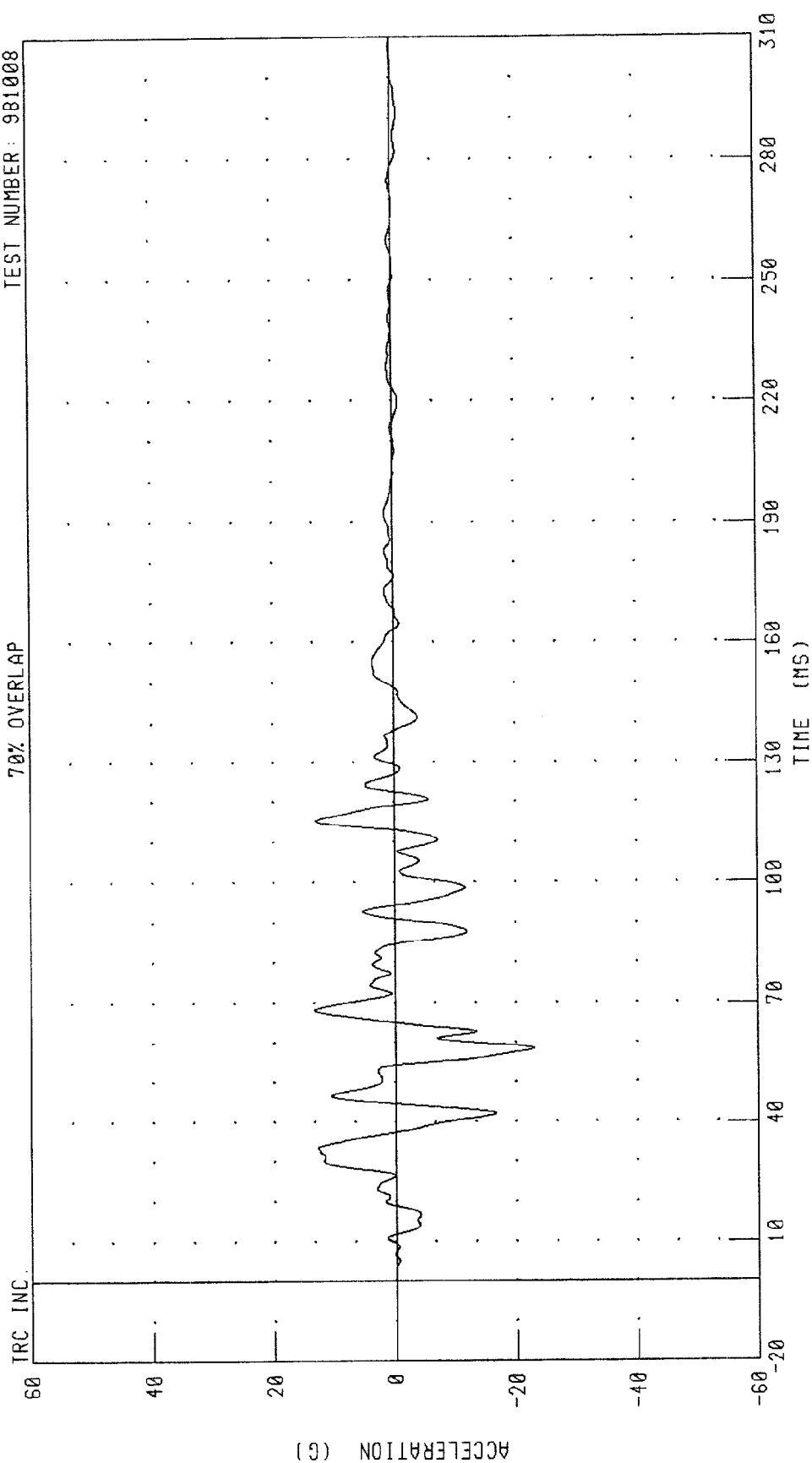
81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
REAR PACKAGE SHELF X-AXIS ACCELERATION



81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
REAR PACKAGE SHELF Y-AXIS ACCELERATION

TEST NUMBER: 981008

70% OVERLAP



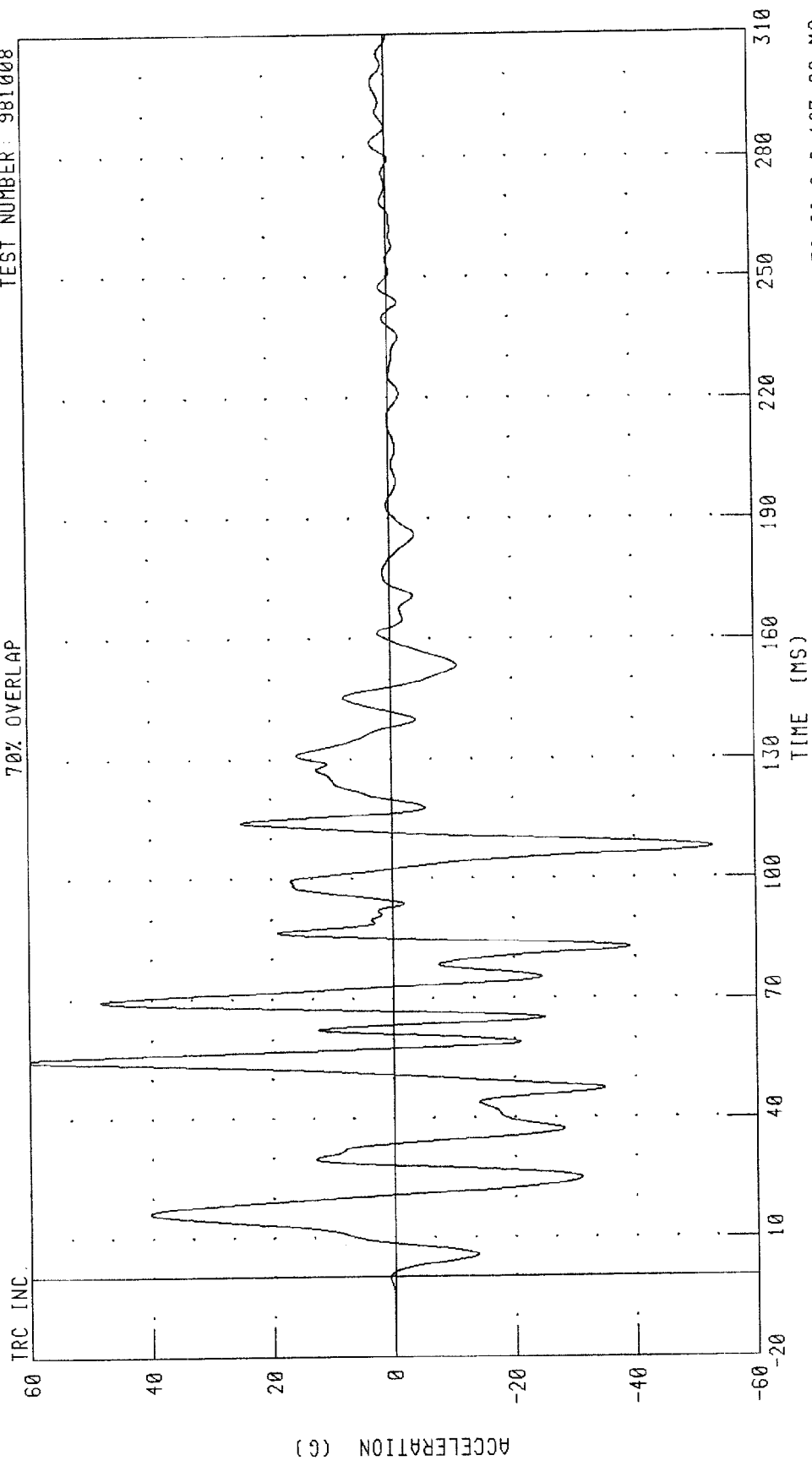
CHANNEL: TCRYG1 FILTER: CH. CLASS 60

PEAK DATA: 13.33 G @ 68.40 MS; -23.08 G @ 58.56 MS

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
 REAR PACKAGE SHELF Z-AXIS ACCELERATION

TEST NUMBER: 981008

70% OVERLAP



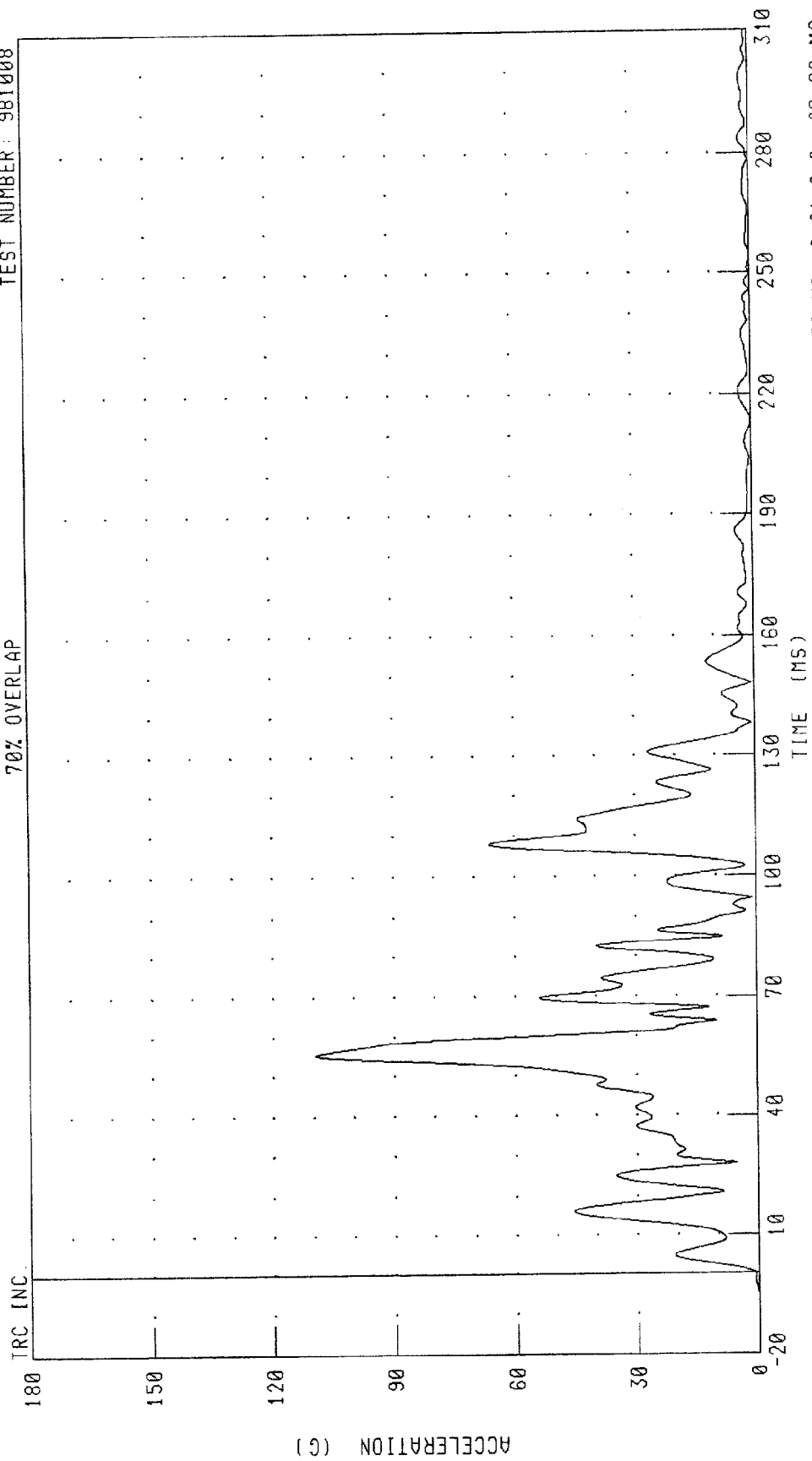
PEAK DATA: 61.26 G @ 54.80 MS; -52.89 G @ 107.60 MS

CHANNEL: TCRZG1 FILTER: CH. CLASS 60

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
 REAR PACKAGE SHELF RESULTANT

TEST NUMBER: 981008

70% OVERLAP



PEAK DATA: 109.71 G @ 55.36 MS; 0.01 G @ -20.00 MS

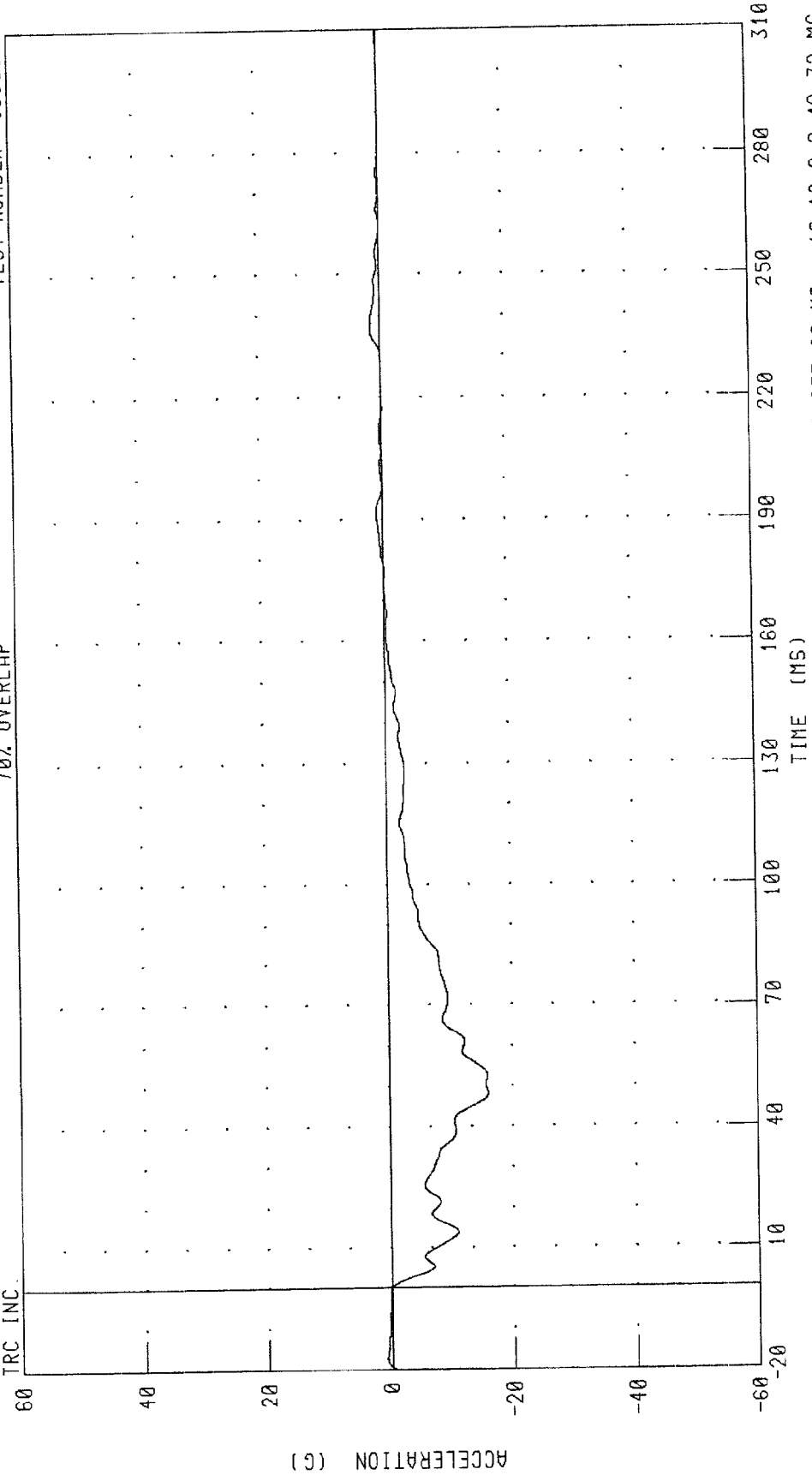
CHANNEL: TCRRG1 FILTER: CH. CLASS 60

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
MOVING BARRIER CENTER OF GRAVITY X-AXIS ACCELERATION

TEST NUMBER: 981008

70% OVERLAP

TRC INC.



CHANNEL: BCCXG1 FILTER: CH. CLASS 60

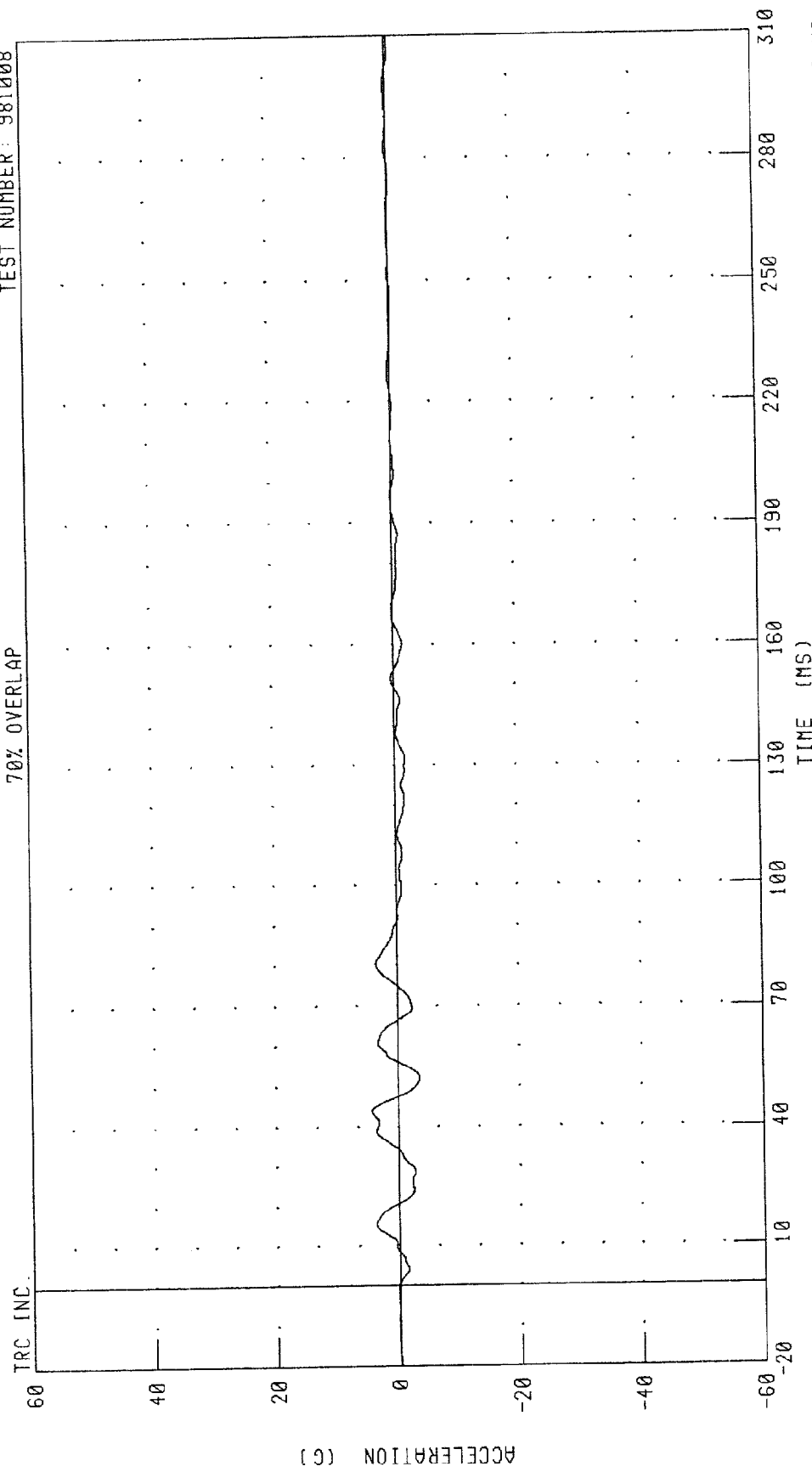
TIME (MS)

PEAK DATA: 1.47 G @ 235.92 MS, -16.19 G @ 48.32 MS

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
MOVING BARRIER CENTER OF GRAVITY Y-AXIS ACCELERATION

TEST NUMBER: 981008

70% OVERLAP



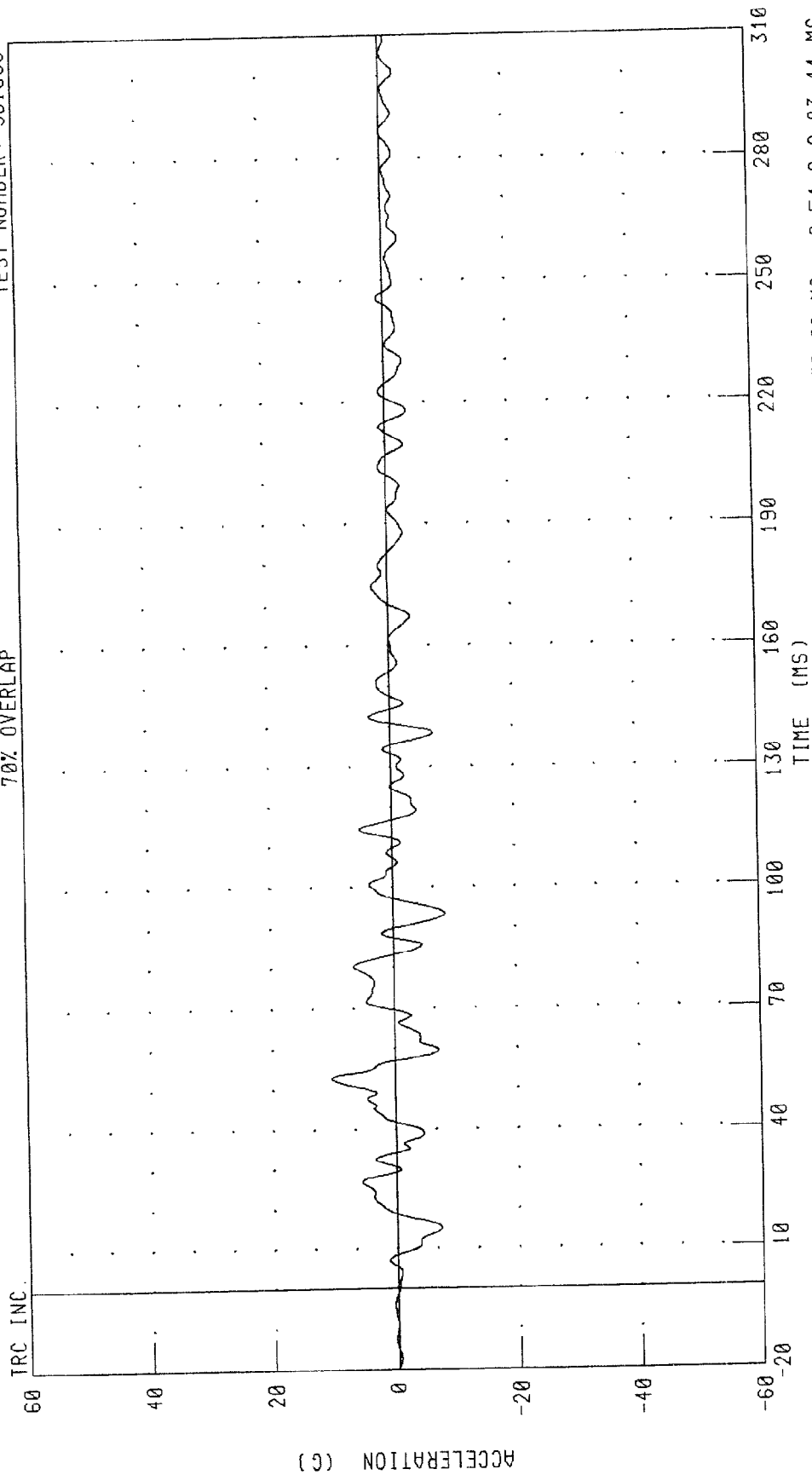
PEAK DATA: 4.22 G @ 43.92 MS; -3.68 G @ 52.32 MS

CHANNEL: BCCYG1 FILTER: CH. CLASS 60

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
MOVING BARRIER CENTER OF GRAVITY Z-AXIS ACCELERATION

TEST NUMBER: 981008

70% OVERLAP



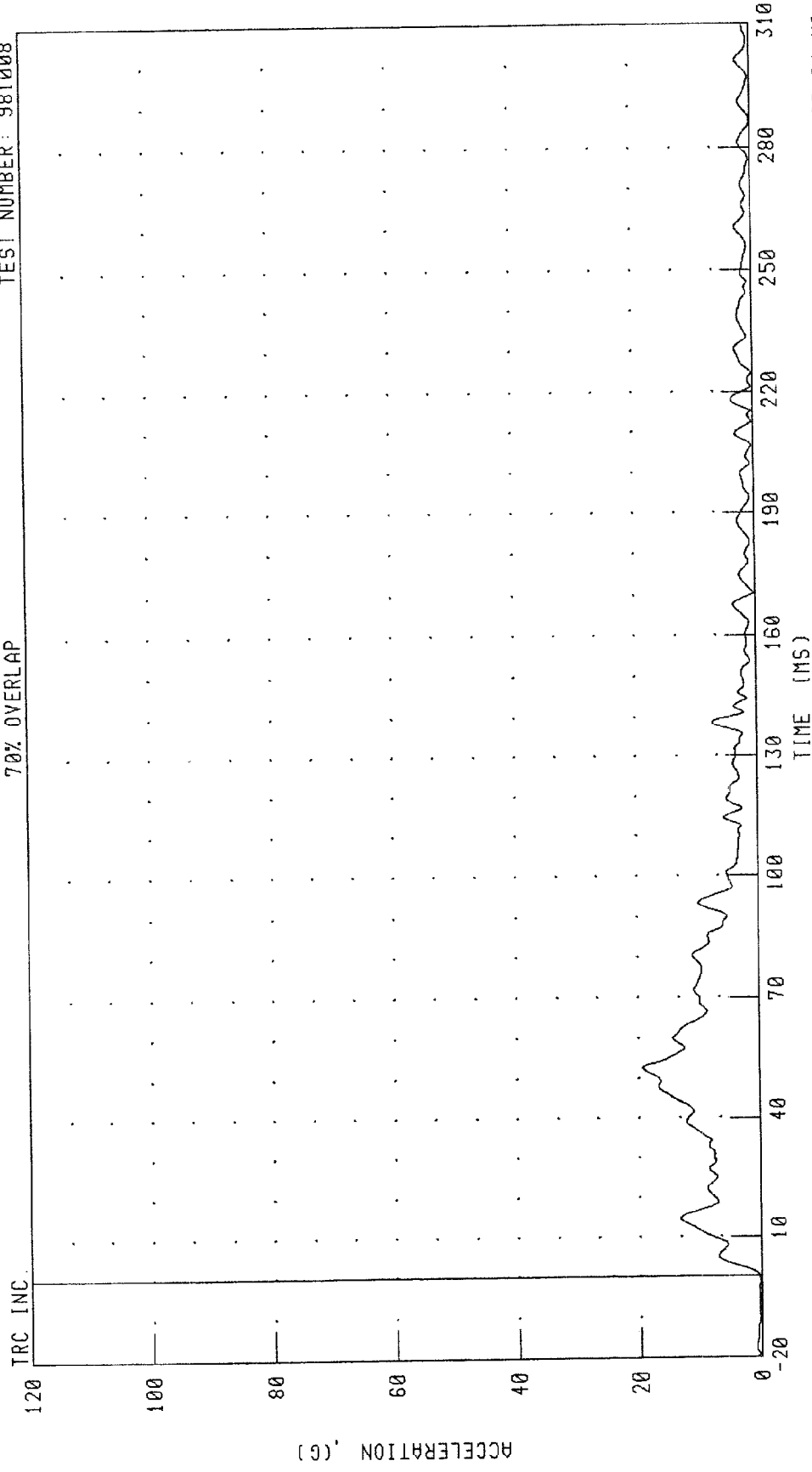
PEAK DATA: 10.25 G @ 52.80 MS, -8.54 G @ 93.44 MS

CHANNEL: BCGZG1 FILTER: CH. CLASS 60

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
MOVING BARRIER CENTER OF GRAVITY RESULTANT

TEST NUMBER: 981008

70% OVERLAP

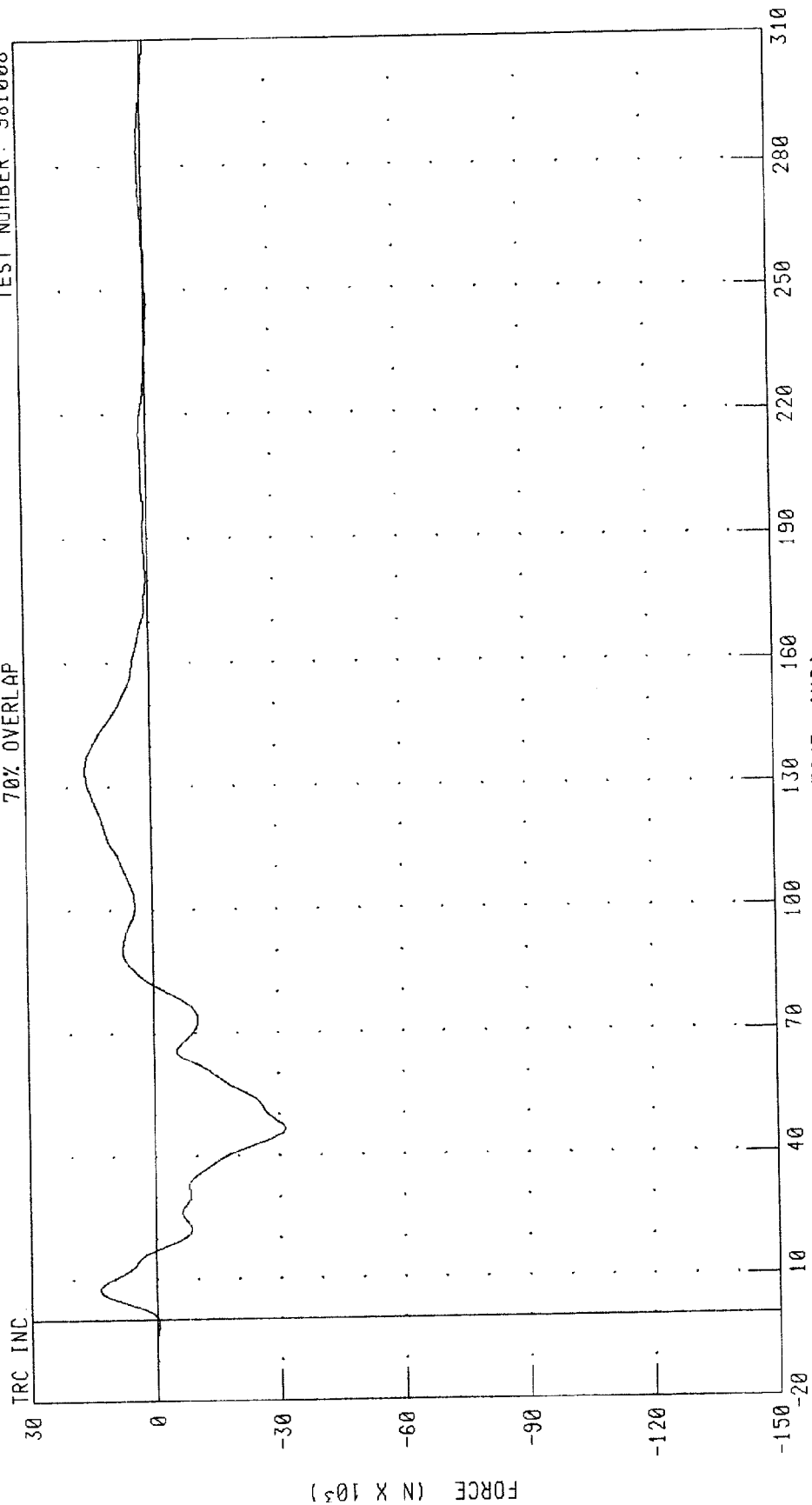


PEAK DATA: 19.38 G @ 52.72 MS; 0.11 G @ 287.04 MS

CHANNEL: BCGRG1 FILTER: CH. CLASS 60

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
 BARRIER FRONT TOP LEFT FORCE
 70% OVERLAP

TEST NUMBER: 981008

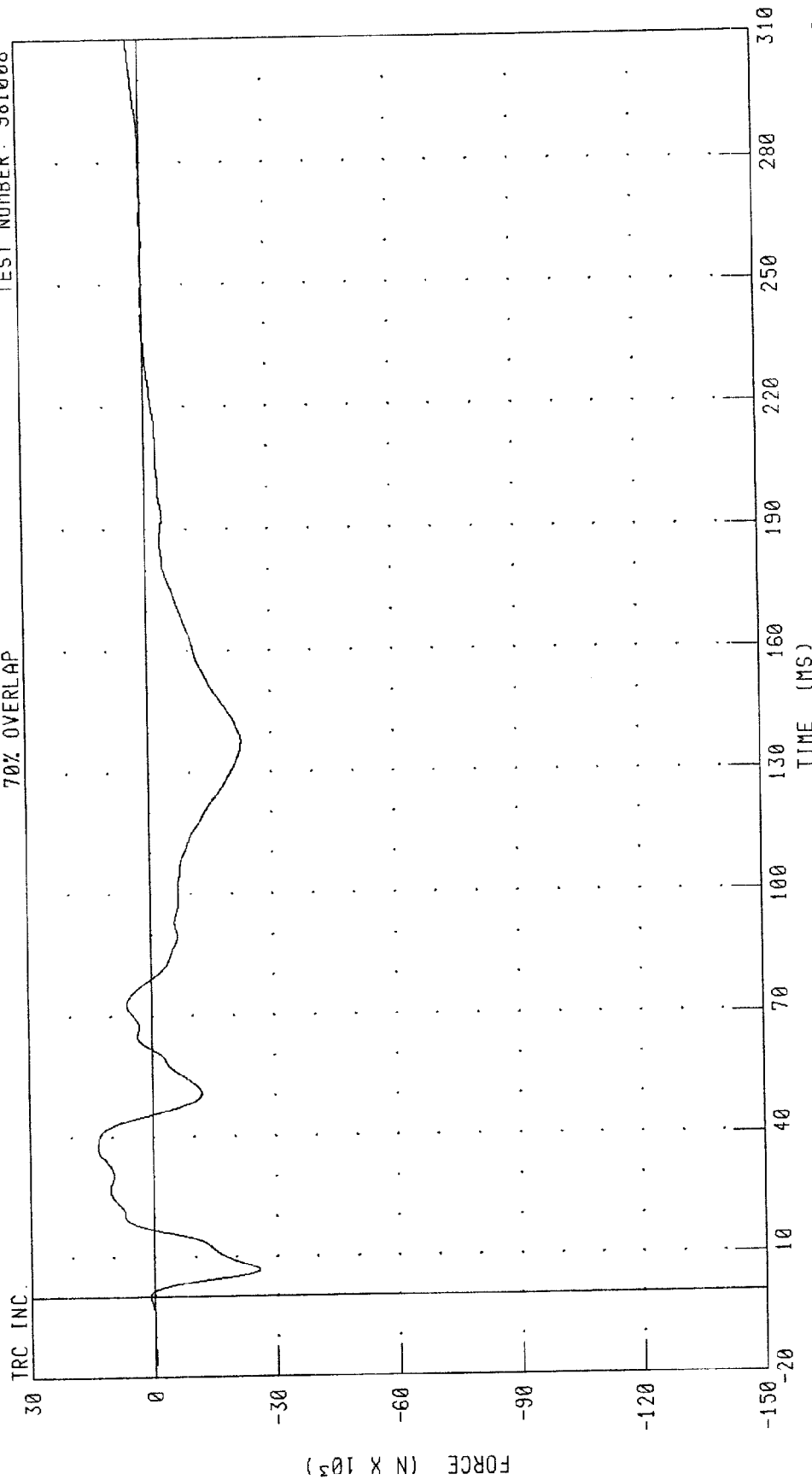


PEAK DATA: 15805.36 N @ 133.92 MS; -31390.83 N @ 46.48 MS

CHANNEL: BFFXF1 FILTER: CH. CLASS 60

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
 BARRIER FRONT BOTTOM LEFT FORCE
 70% OVERLAP

TEST NUMBER: 981008

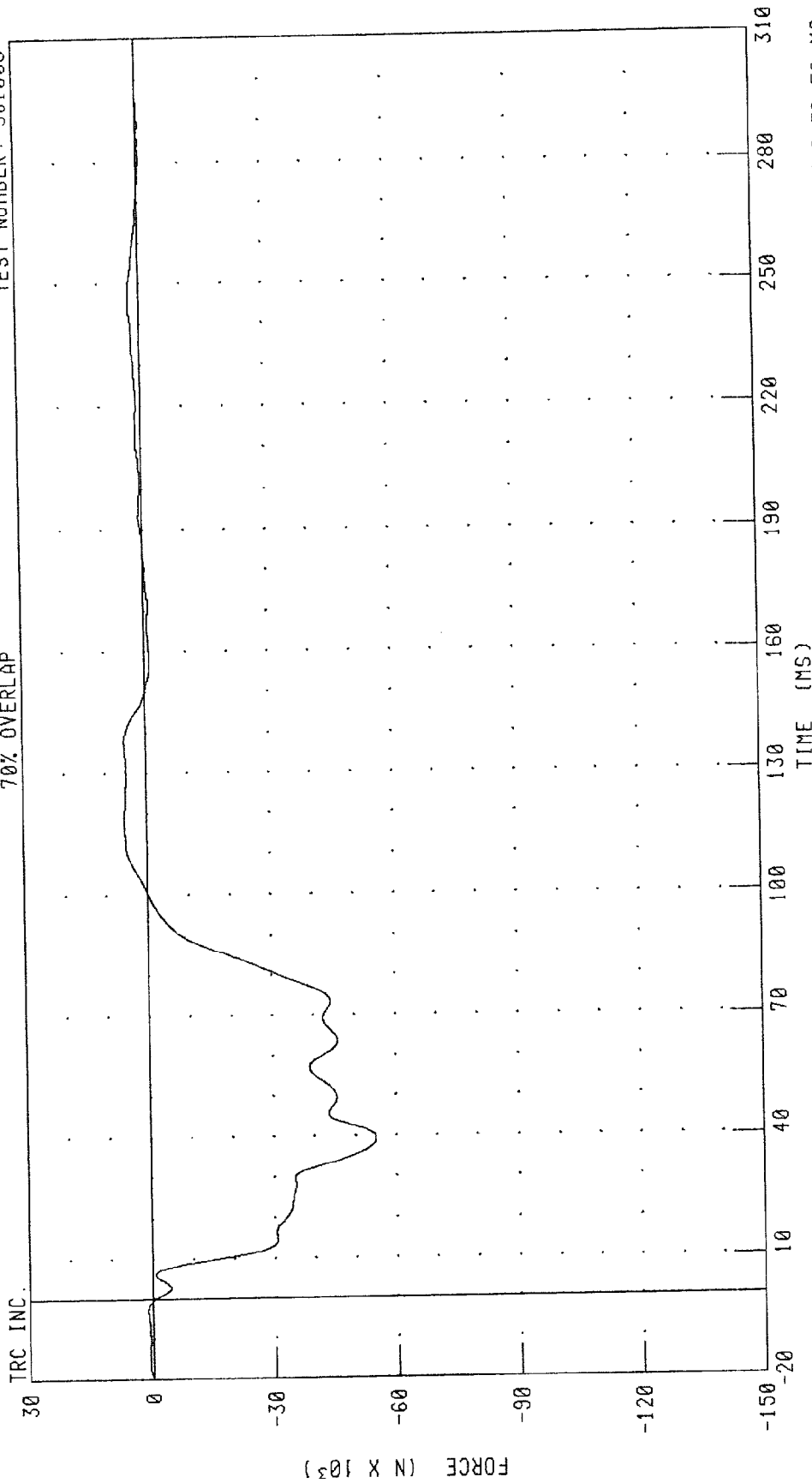


PEAK DATA: 13456.20 N @ 37.52 MS; -25637.57 N @ 6.56 MS

CHANNEL: BFFXF2 FILTER: CH. CLASS 60

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
 BARRIER FRONT BOTTOM RIGHT FORCE
 70% OVERLAP

TEST NUMBER: 981008

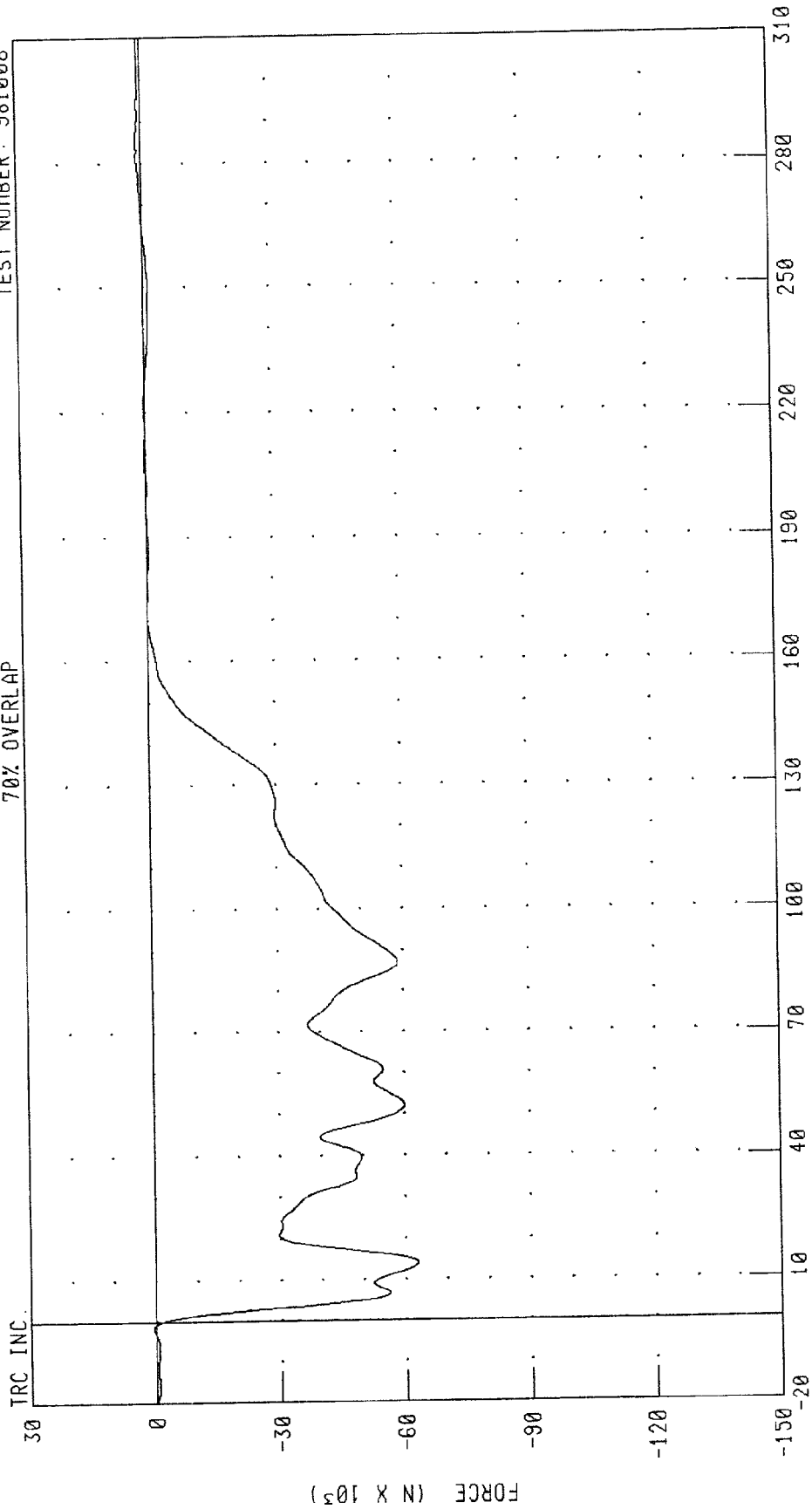


PEAK DATA: 5526.92 N @ 117.04 MS; -55147.48 N @ 39.52 MS

CHANNEL: BFFXF3 FILTER: CH. CLASS 60

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
 BARRIER FRONT TOP RIGHT FORCE
 70% OVERLAP

TEST NUMBER: 981008

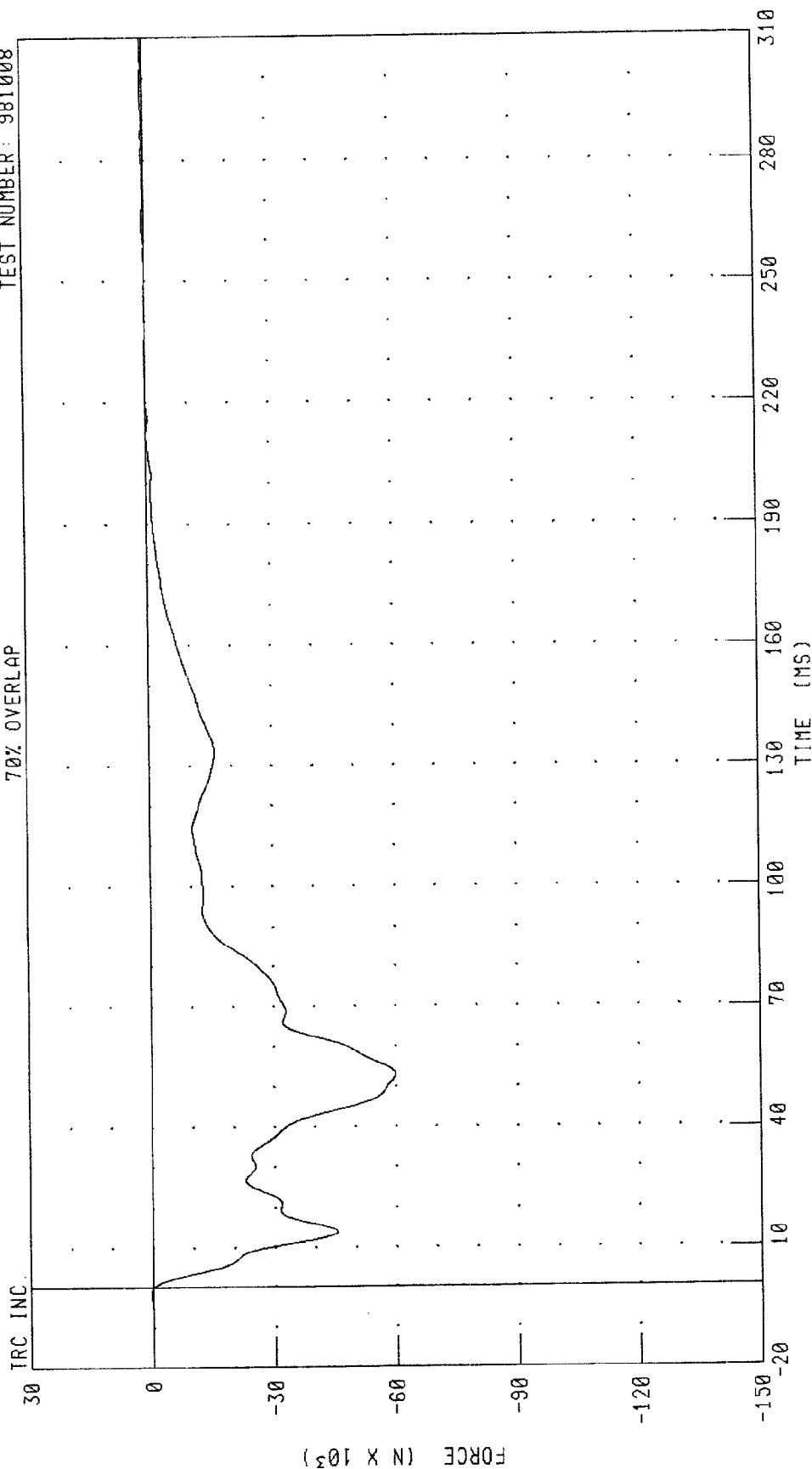


PEAK DATA: 1313.92 N @ 285.92 MS; -62932.44 N @ 13.84 MS

CHANNEL: BFFXF4 FILTER: CH. CLASS 60

81 KPH MOVING DEFORMABLE BARRIER INTO REAR OF 1998 HONDA CIVIC
BARRIER FRONT CENTER FORCE
70% OVERLAP

TEST NUMBER: 981008



CHANNEL: BFFXFS FILTER: CH. CLASS 60

TIME (MS)

PEAK DATA: 636.70 N @ 294.88 MS; -59980.43 N @ 53.04 MS

Appendix C

Dummy Calibration Information

Pre-Test Calibration

Serial Number 001

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III 50th

03-SEP-98

TRC INC.

TEST NO: 001C5HD1

572E SNO01 HEAD DROP CAL 5

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	55.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	239.41 G
PEAK LATERAL ACCELERATION	15 G MAX	-6.66 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN

By Cult

RUN NUMBER: 090398.1302;1

PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION X AXIS

572E SN001 HEAD DROP CAL 5

TRC TEST NUMBER: 001C5HD1

75

0

-75

-150

-225

-300

-375

ACCELERATION (G)

TIME (NS X 10⁻¹)

0 10 20 30 40 50 60 70 80 90 100

PEAK DATA: 0.67 G @ 4.32 MS; -199.55 G @ 2.00 MS

CHANNEL: HEDXC FILTER: CH. CLASS 1000

RUN NUMBER: 090398.1302,1

981008

C-4

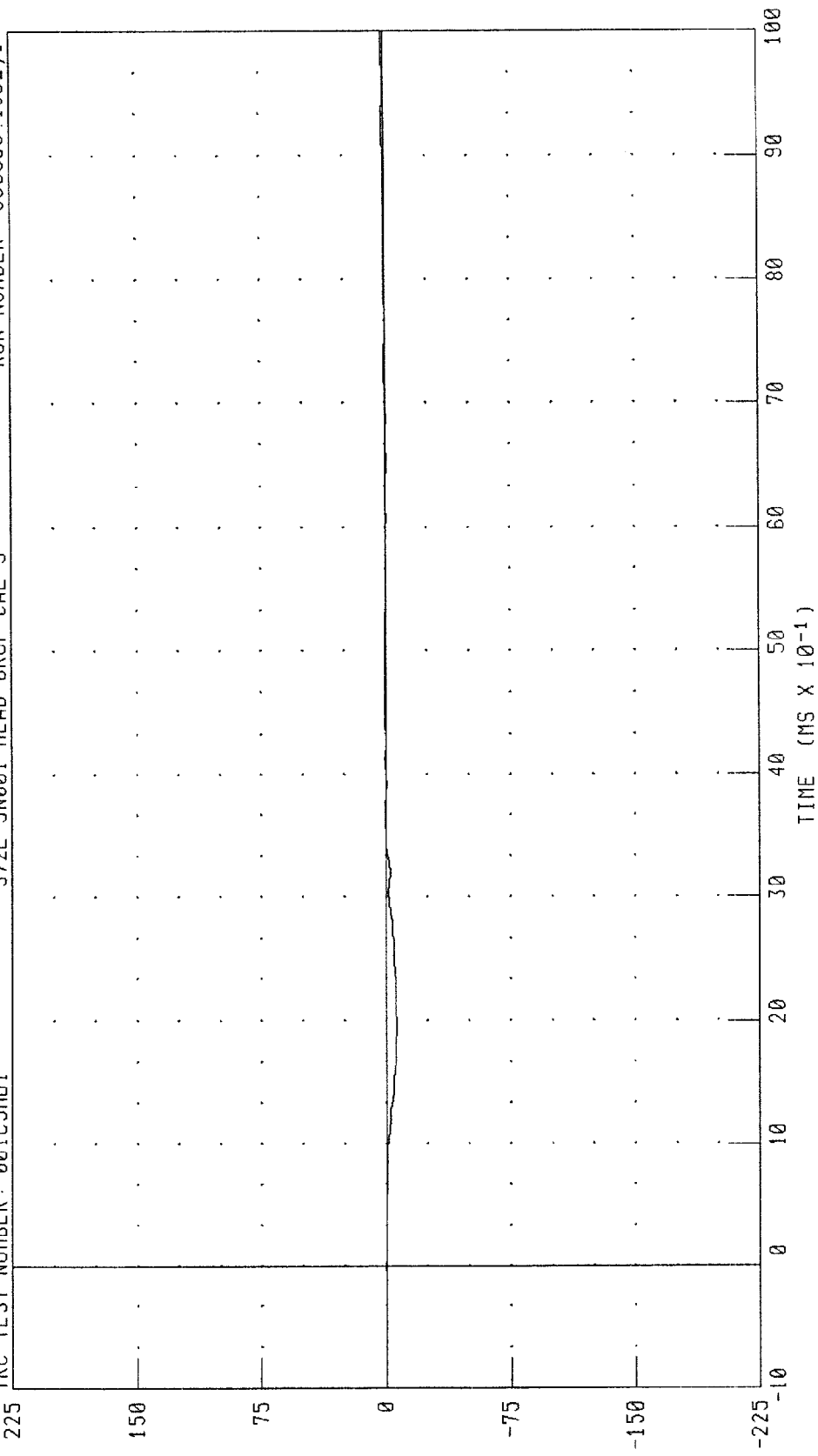
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

TRC TEST NUMBER: 001C5HD1

572E SN001 HEAD DROP CAL 5

RUN NUMBER: 090398.1302;1



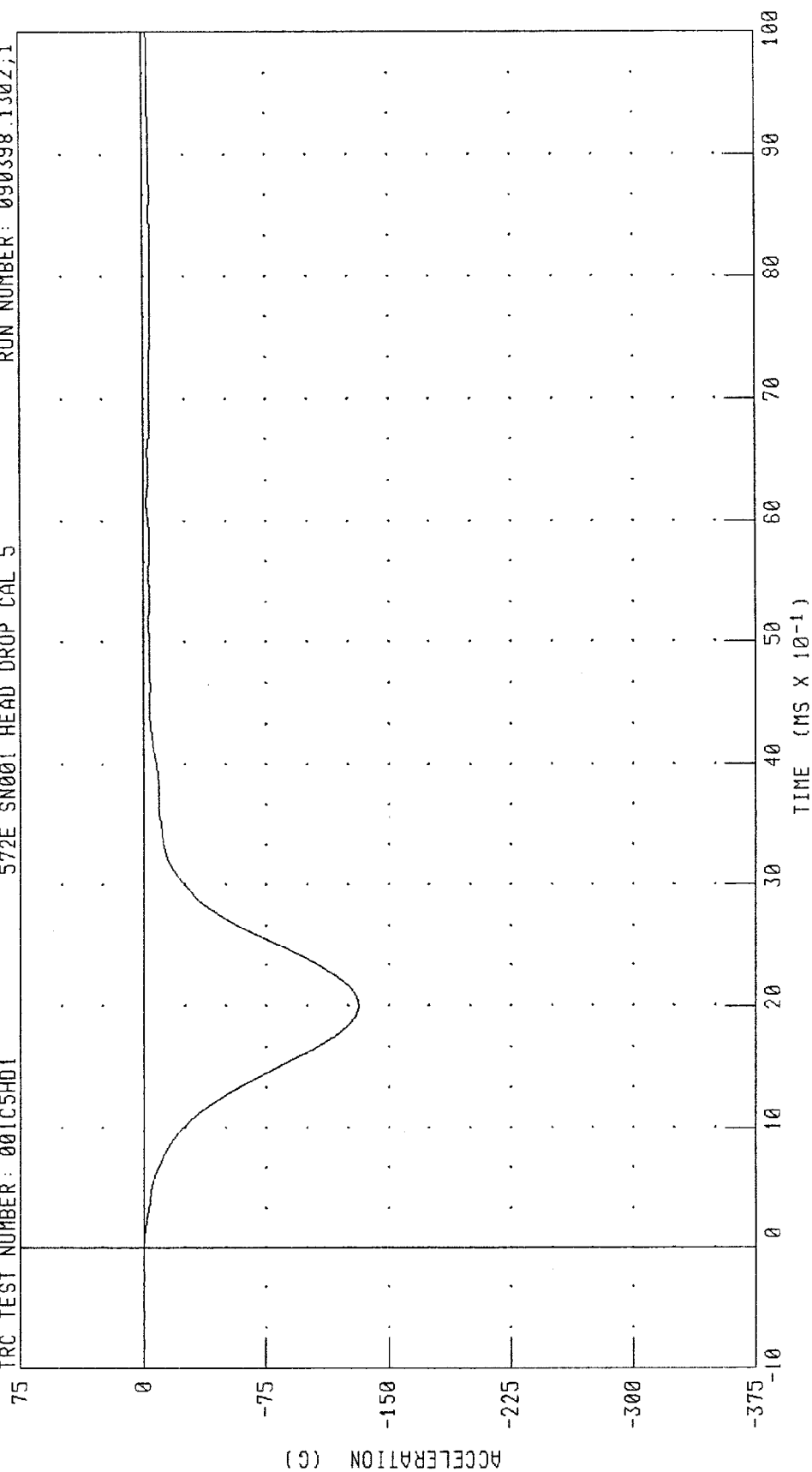
CHANNEL: HEDYC FILTER: CH. CLASS 1000

PEAK DATA: 0.98 G @ 10.00 MS; -6.66 G @ 1.92 MS

PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Z AXIS
572E SN001 HEAD DROP CAL 5

RUN NUMBER: 090398.1302;1

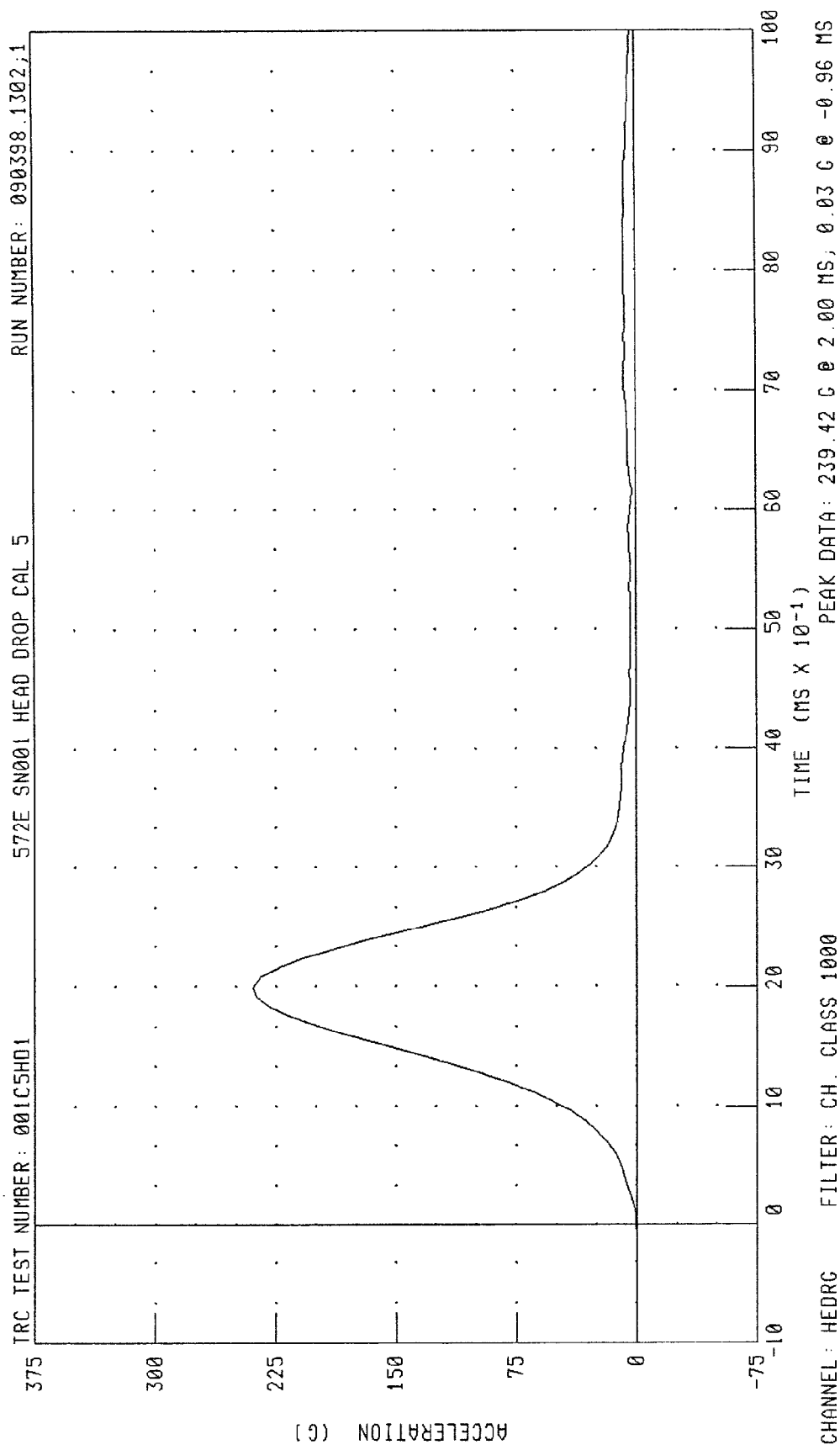
TRC TEST NUMBER: 001C5HD1



CHANNEL: HEDZG FILTER: CH. CLASS 1000

PEAK DATA: 0.03 C @ -0.96 MS; -132.12 C @ 2.00 MS

PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION



TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

03-SEP-98

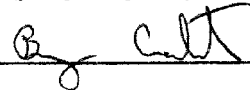
NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 001C5NF2 572E SN001 NECK FLEXION CAL 5

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	55.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	7.06 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	25.82 G
	20 MS	17.60 - 22.60 G	21.68 G
	30 MS	12.50 - 18.50 G	17.71 G
MAX PENDULUM G		29 G MAX	26.47 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	17.66 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	36.32 MS
D PLANE	MAX	64 - 78 DEG.	71.14 DEG.
ROTATION	TIME	57 - 64 MS	59.60 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	94.29 NM
	TIME	47 - 58 MS	50.72 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	115.04 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	99.76 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 090398.1359;1

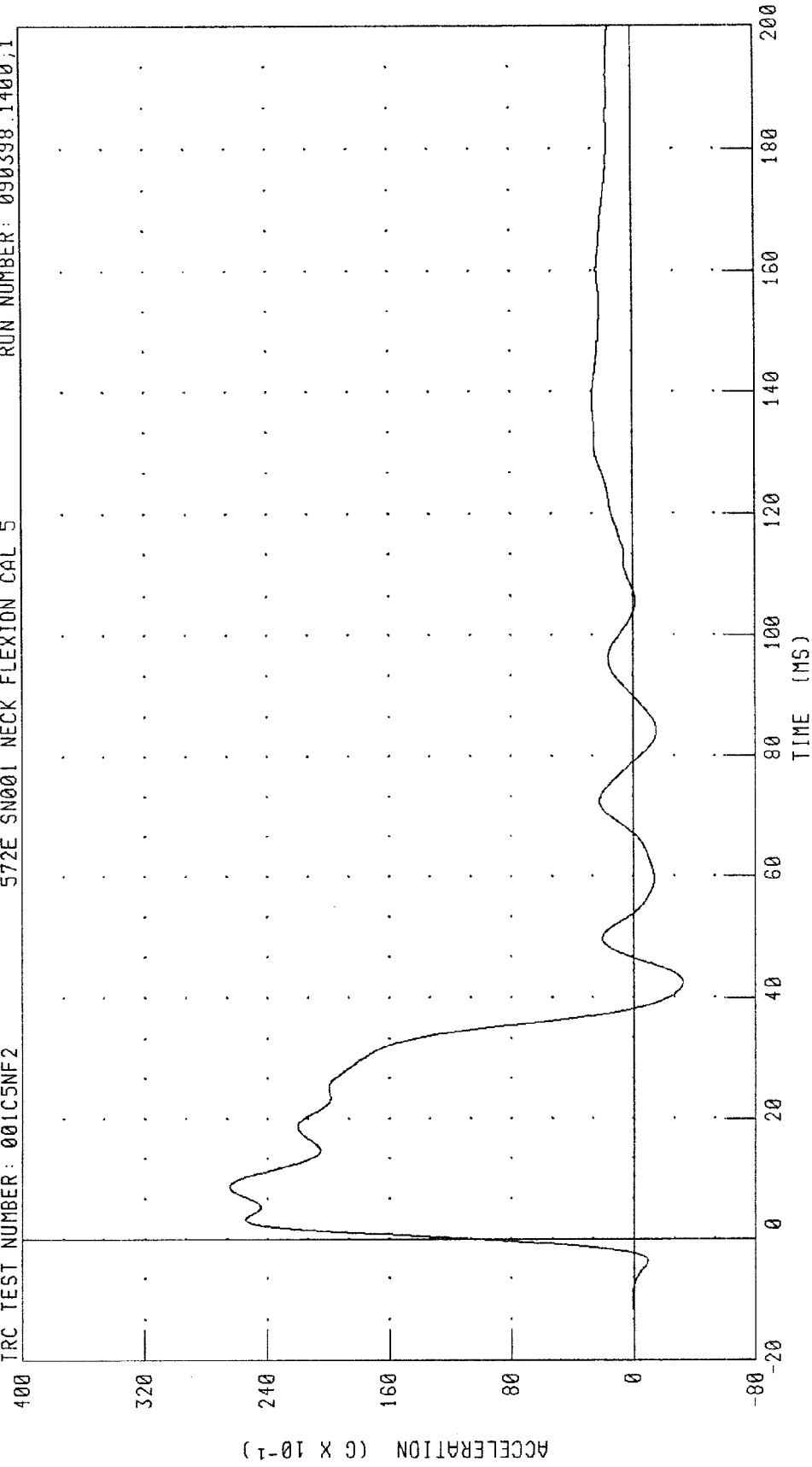
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 001C5NF2

572E SN001 NECK FLEXION CAL 5

RUN NUMBER: 090398.1400,1



PEAK DATA: 26.47 G @ 8.80 MS, -3.25 G @ 42.48 MS

CHANNEL: PENXG FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN001 NECK FLEXION CAL 5

TRC TEST NUMBER: 001C5NF2

120

90

60

30

0

-30

-60

ANGLE (°)

0

20

40

60

80

100

120

140

160

180

200

TIME (MS)

PEAK DATA: 34.90 ° @ 59.20 MS; -23.41 ° @ 172.16 MS

CHANNEL: BETA

FILTER: CH. CLASS 60

981008

C-10

RUN NUMBER: 090398.1400,1

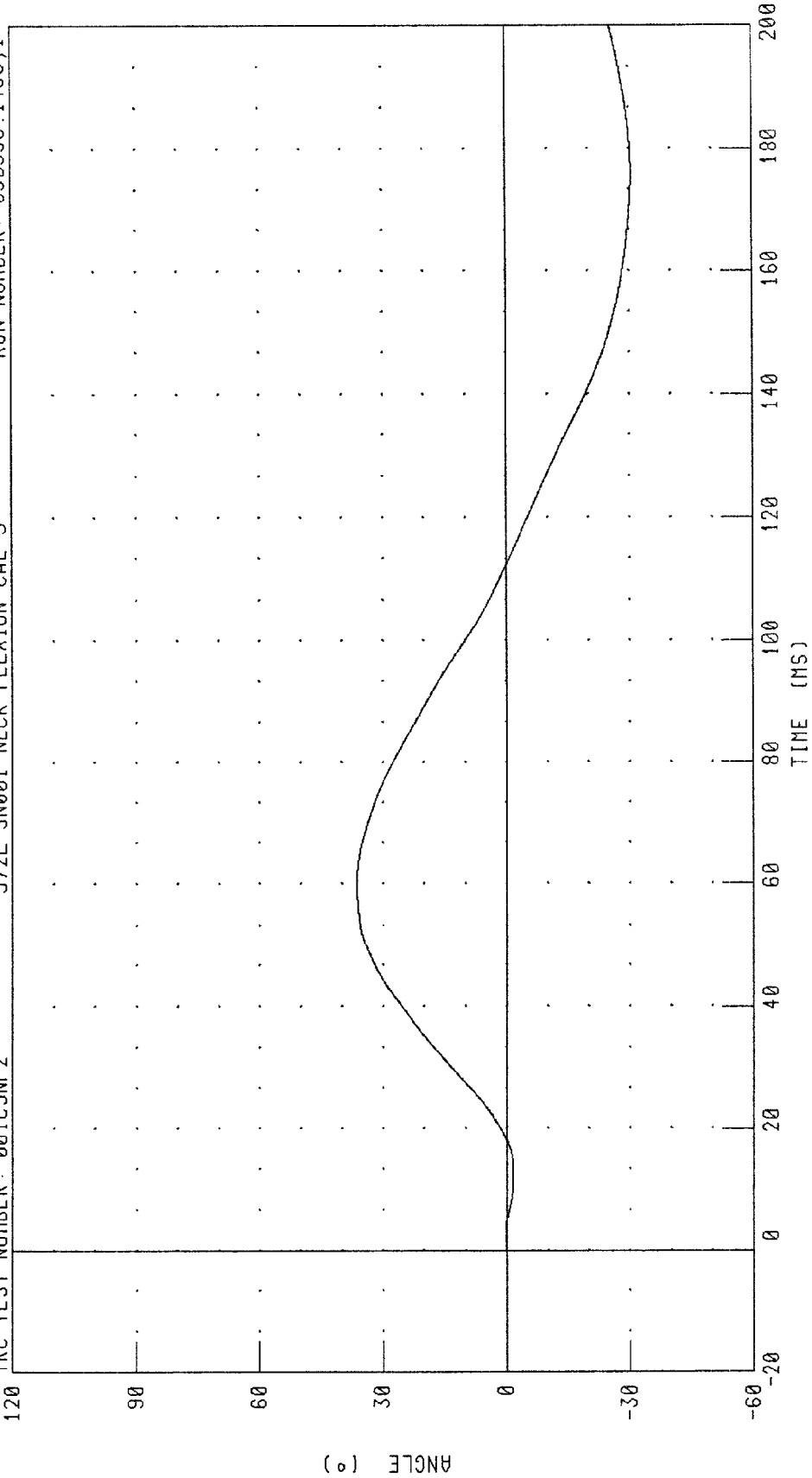
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 001C5NF2

572E SN001 NECK FLEXION CAL 5

RUN NUMBER: 090398.1400;1



PEAK DATA: 36.25 ° @ 60.00 MS; -30.49 ° @ 175.92 MS

CHANNEL: THETA FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 001C5NF2

572E SN001 NECK FLEXION CAL 5

RUN NUMBER: 090398.1400,1

120

90

60

30

0

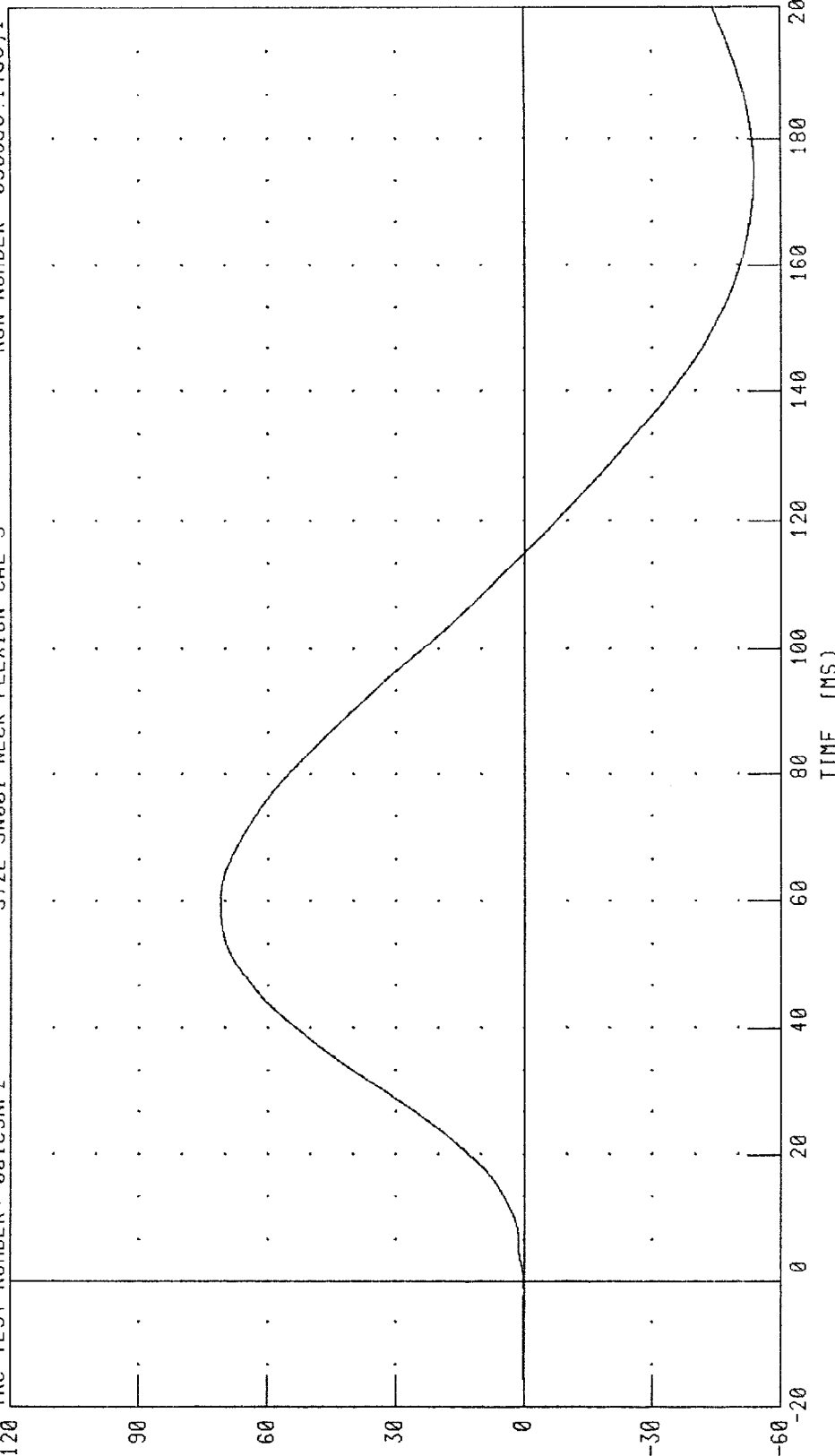
-30

-60

ANGLE (°)

C-12

981008



PEAK DATA: 71.14 ° @ 59.60 MS, -53.84 ° @ 174.88 MS

FILTER: CH. CLASS 60

CHANNEL: TOTAN

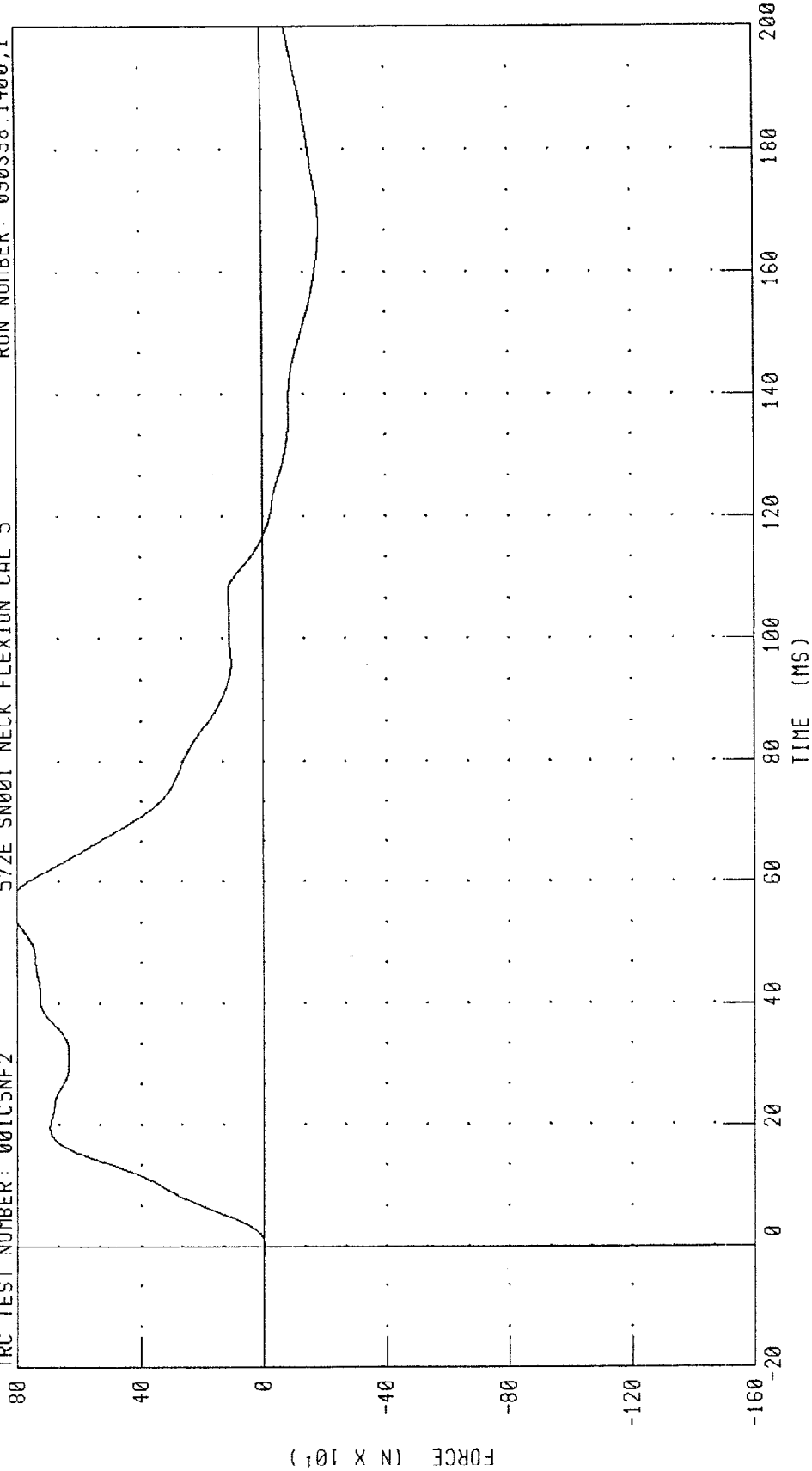
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 001C5NF2

572E SN001 NECK FLEXION CAL 5

RUN NUMBER: 090398.1400.1



CHANNEL: NEKXF FILTER: CH. CLASS 60

PEAK DATA: 827.57 N @ 56.40 MS; -183.89 N @ 167.44 MS

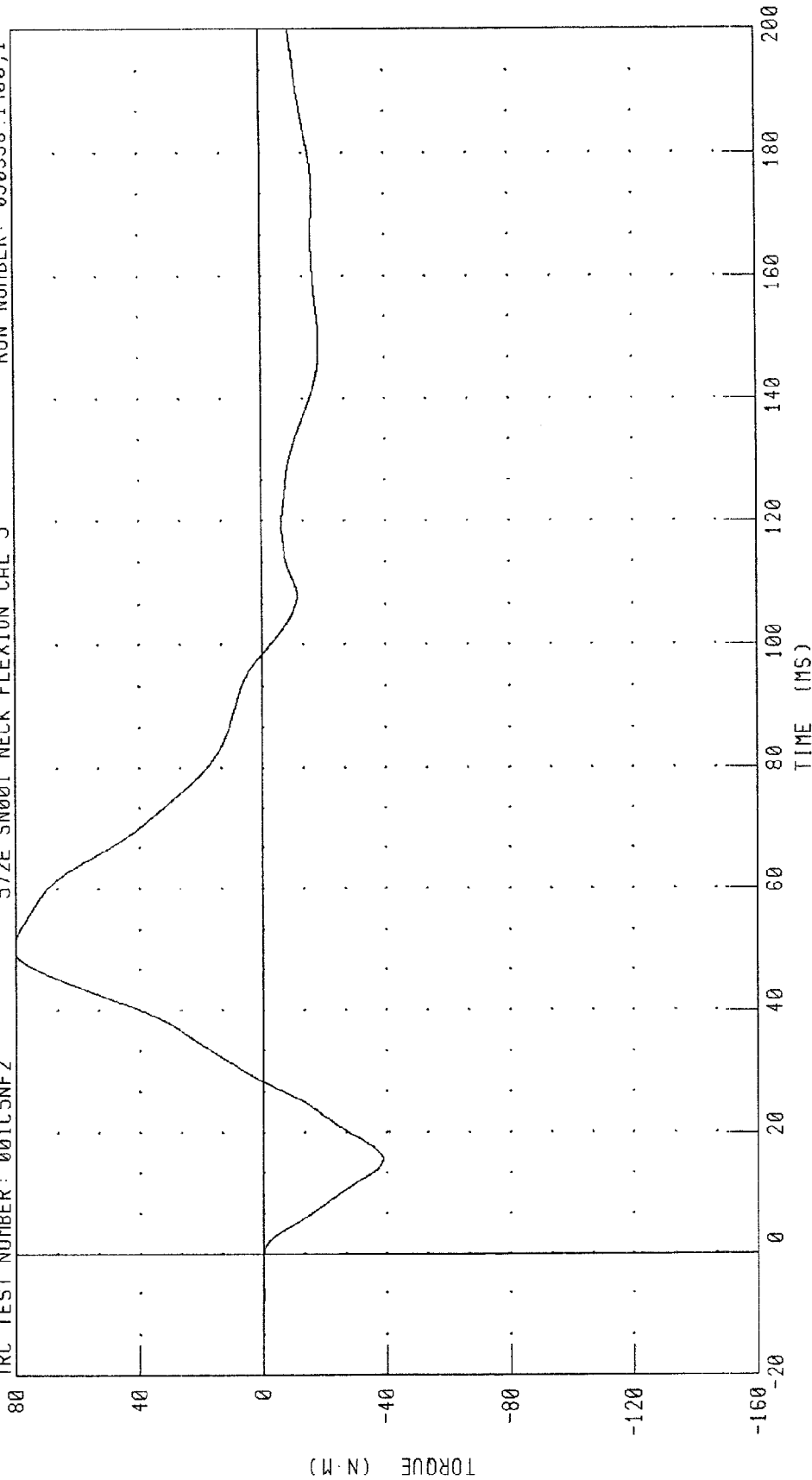
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 001C5NF2

572E SN001 NECK FLEXION CAL 5

RUN NUMBER: 090398.1400;1



PEAK DATA: 80.73 N·M @ 50.40 MS; -38.70 N·M @ 15.60 MS

CHANNEL: NEKYM FILTER: CH CLASS 60

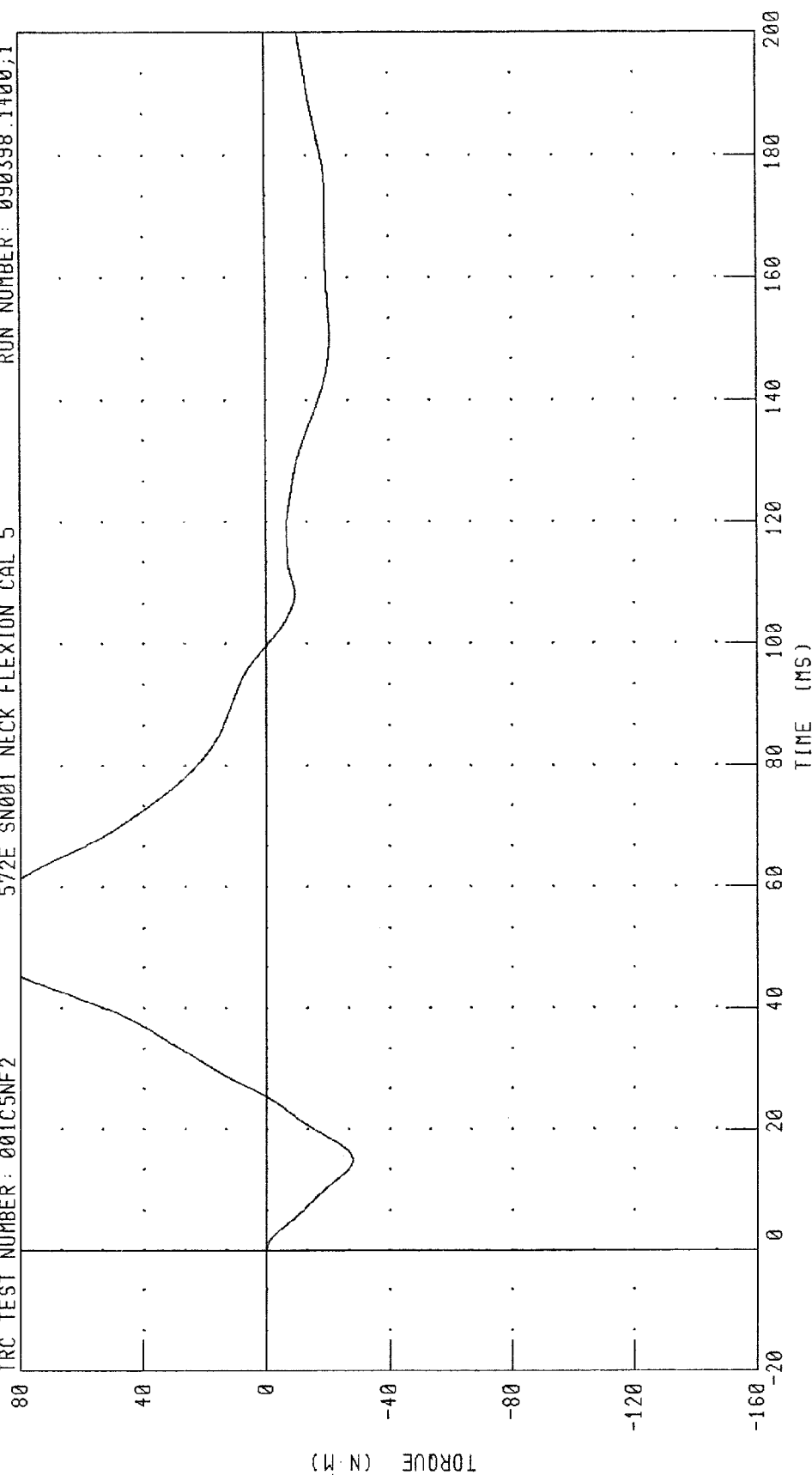
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 001C5NF2

572E SN001 NECK FLEXION CAL 5

RUN NUMBER: 090398.1400,1



PEAK DATA: 94.29 N-M @ 50.72 ms, -28.00 N-M @ 15.04 ms

CHANNEL: NEKOM FILTER: CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

03-SEP-98

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 001C5NE1 572E SN001 NECK EXT CAL 5

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	55.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.05 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	18.74 G
	20 MS	14.00 - 19.00 G	17.43 G
	30 MS	11.00 - 16.00 G	15.17 G
MAX PENDULUM G		22 G MAX	19.22 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	15.13 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	40.72 MS
D PLANE	MAX	81 - 106 DEG.	97.73 DEG.
ROTATION	TIME	72 - 82 MS	77.20 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-61.75 NM
	TIME	65 - 79 MS	72.24 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	156.56 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	140.96 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN g. alt

RUN NUMBER: 090398.1442;1

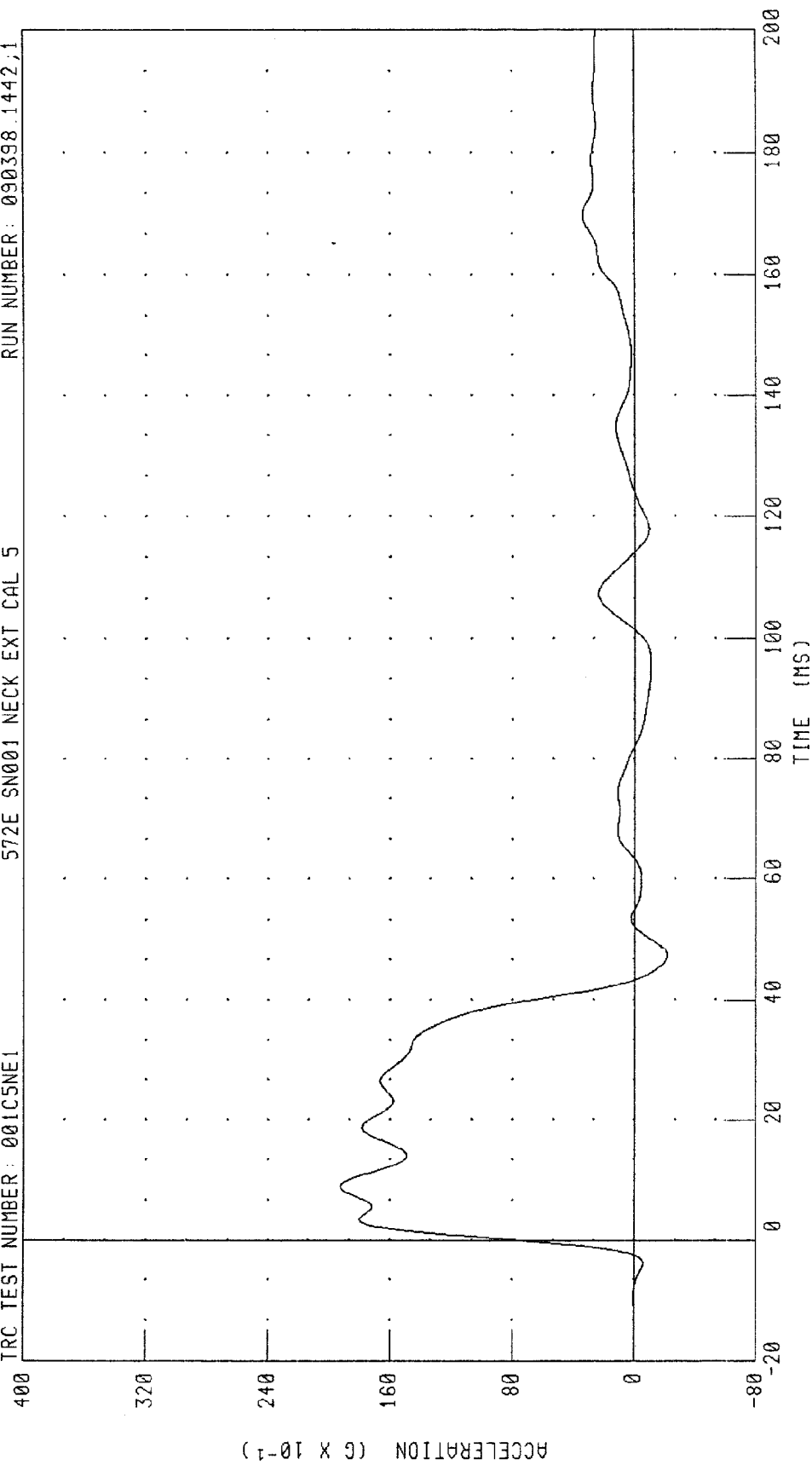
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 001C5NE1

572E SN001 NECK EXT CAL 5

RUN NUMBER: 090398 1442,1



CHANNEL: PENXG FILTER: CH. CLASS 60

PEAK DATA: 19.22 G @ 8.96 MS, -2.18 G @ 47.36 MS

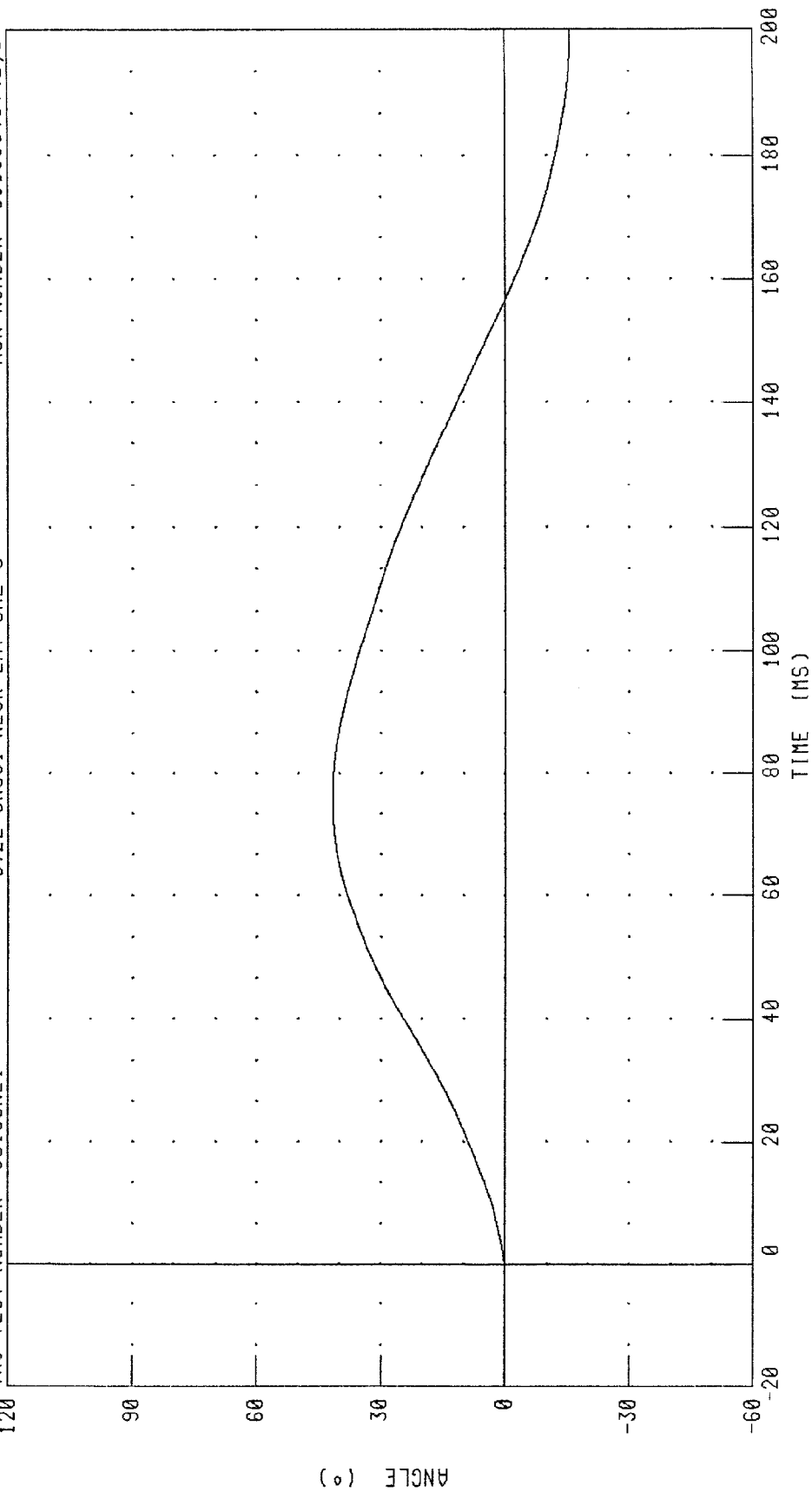
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 001C5NE1

572E SN001 NECK EXT CAL 5

RUN NUMBER: 090398.1442;1



CHANNEL: BETA FILTER: CH. CLASS 60

PEAK DATA: 41.67 ° @ 75.92 MS, -15.80 ° @ 198.40 MS

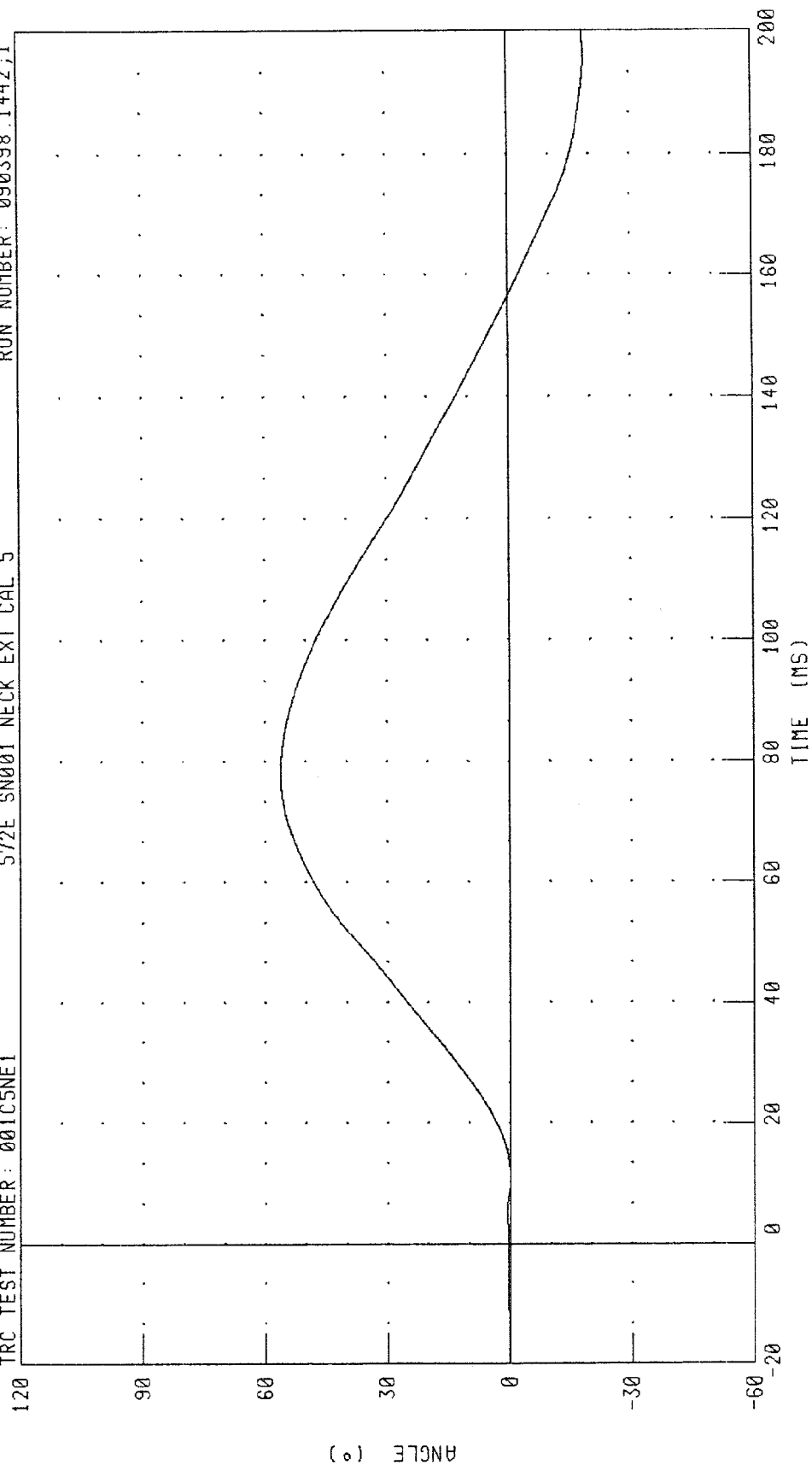
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 001C5NE1

572E SN001 NECK EXT CAL 5

RUN NUMBER: 090398.1442,1



PEAK DATA: 56.09 ° @ 78.00 MS, -18.81 ° @ 195.92 MS

CHANNEL: THETA FILTER: CH. CLASS 60

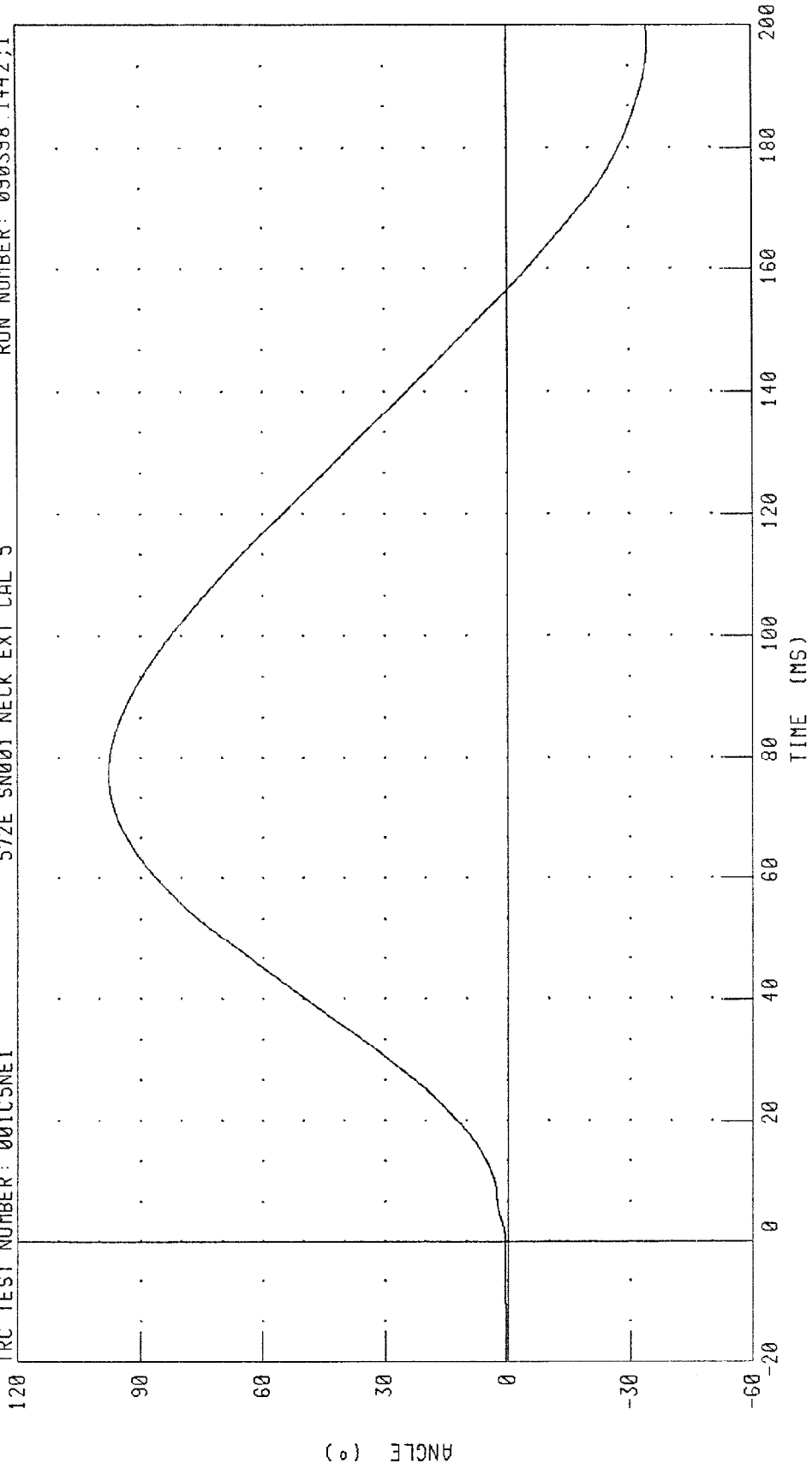
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 001C5NE1

572E SN001 NECK EXT CAL 5

RUN NUMBER: 090398.1442;1

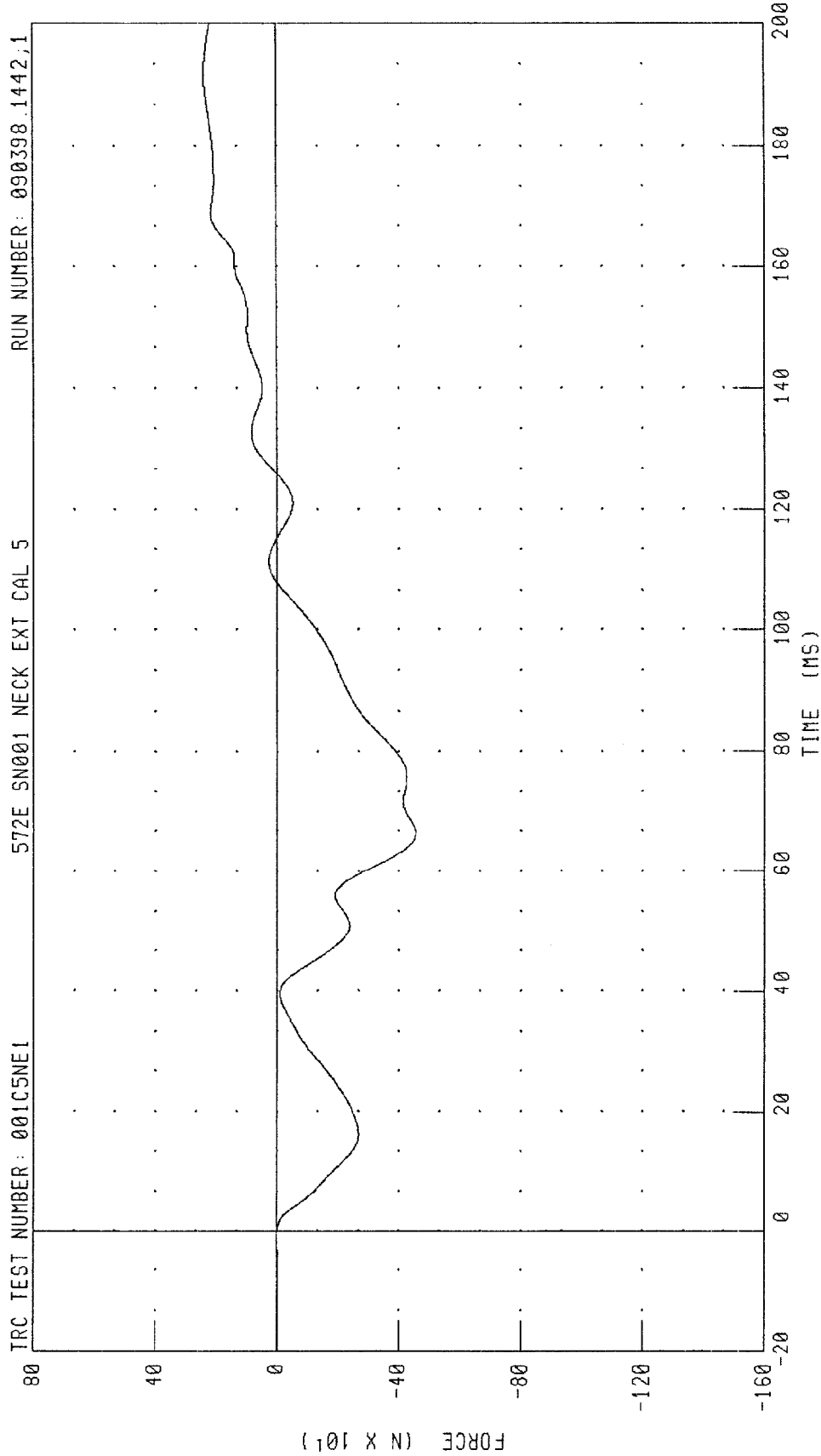


PEAK DATA: 97.73 ° @ 77.20 MS, -34.57 ° @ 196.96 MS

CHANNEL: TOTAN FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS



CHANNEL: NEKXF FILTER: CH. CLASS 60 PEAK DATA: 238.34 N @ 191.92 MS, -454.93 N @ 66.32 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

572E SN001 NECK EXT CAL 5 RUN NUMBER: 090398.1442;1

TRC TEST NUMBER: 001C5NE1

80

40

0

-40

-80

-120

-160

TORQUE (N·M)

TIME (MS)

PEAK DATA: 29.28 N·M @ 184.24 MS, -54.38 N·M @ 72.16 MS

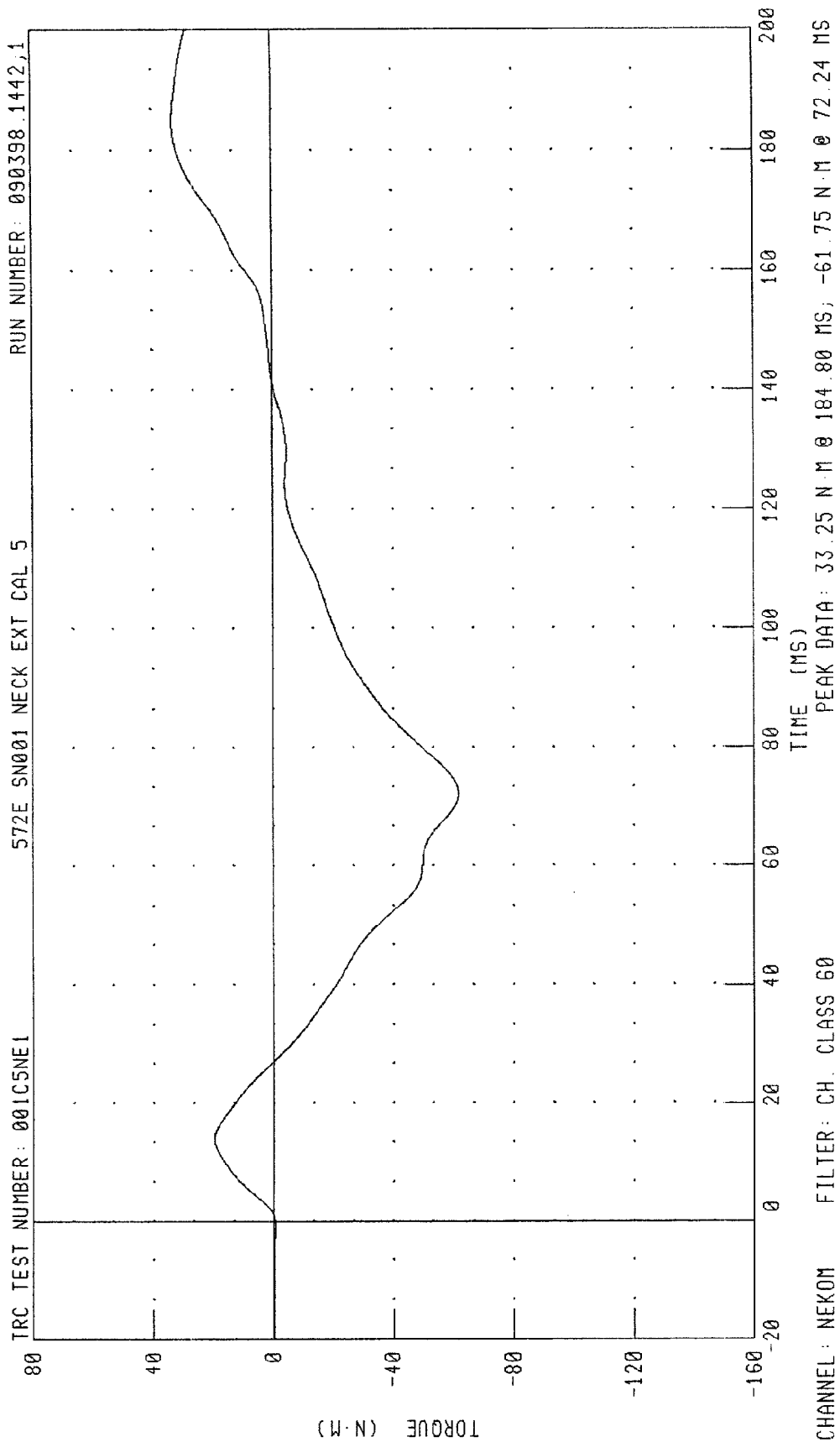
FILTER: CH CLASS 60

CHANNEL: NEKYM

981008

C-22

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE



TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III 50th

02-SEP-98

TRC INC.

TEST NO: 001C5TH2

572E SN001 H.S.THORAX CAL 5

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	55.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.62 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	67.1 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5833. N
INTERNAL HYSTERESIS	69% - 85%	72.0%

TEST MEETS SPECIFICATIONS

TECHNICIAN

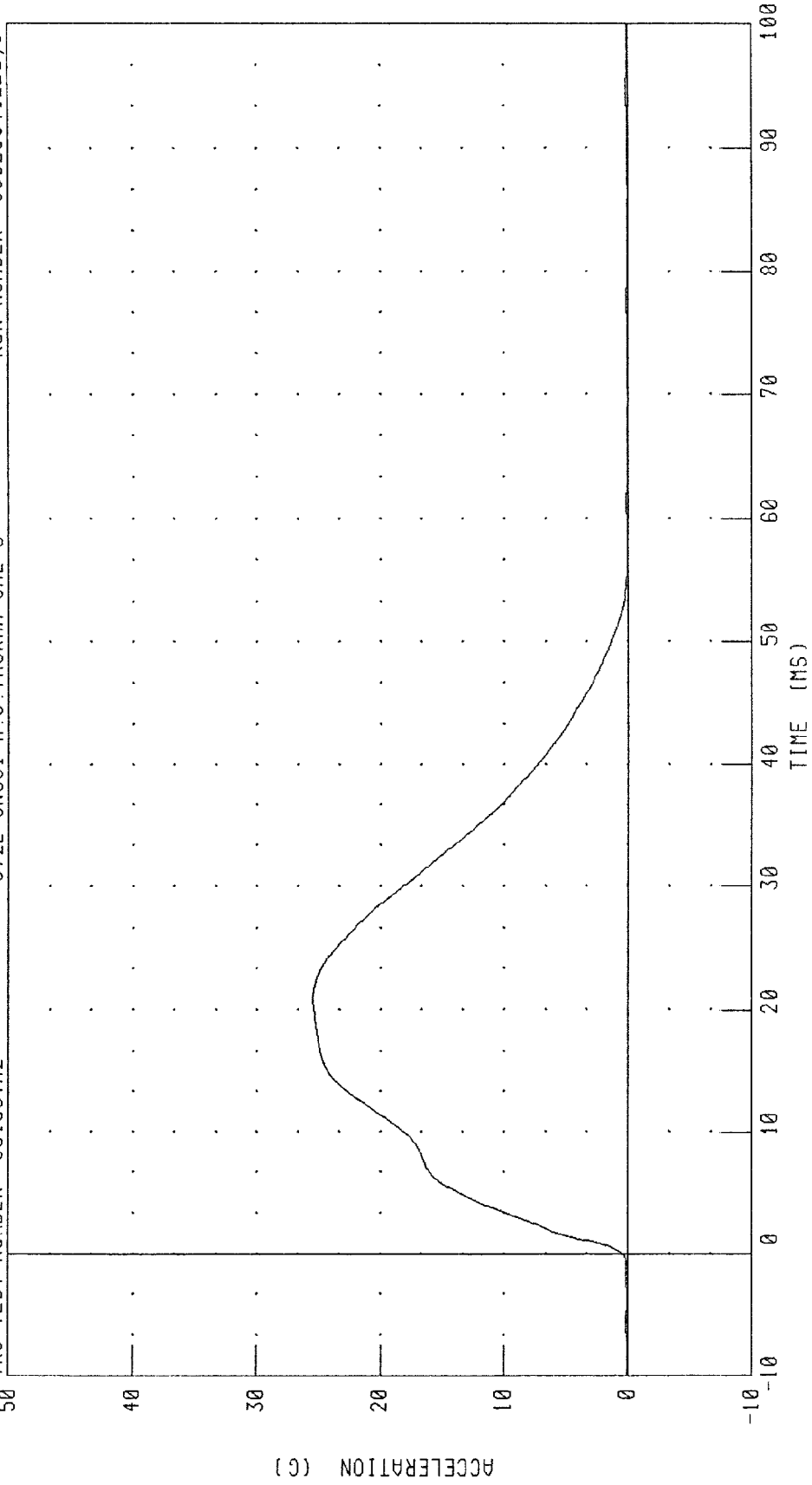
B. J. Calt

RUN NUMBER: 090298.1221;1

PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 001C5TH2 572E SN001 H.S. THORAX CAL 5 RUN NUMBER: 090298.1222,1



CHANNEL: PENXG FILTER: CH CLASS 180 PEAK DATA: 25.46 G @ 20.96 MS; -0.01 G @ 69.76 MS

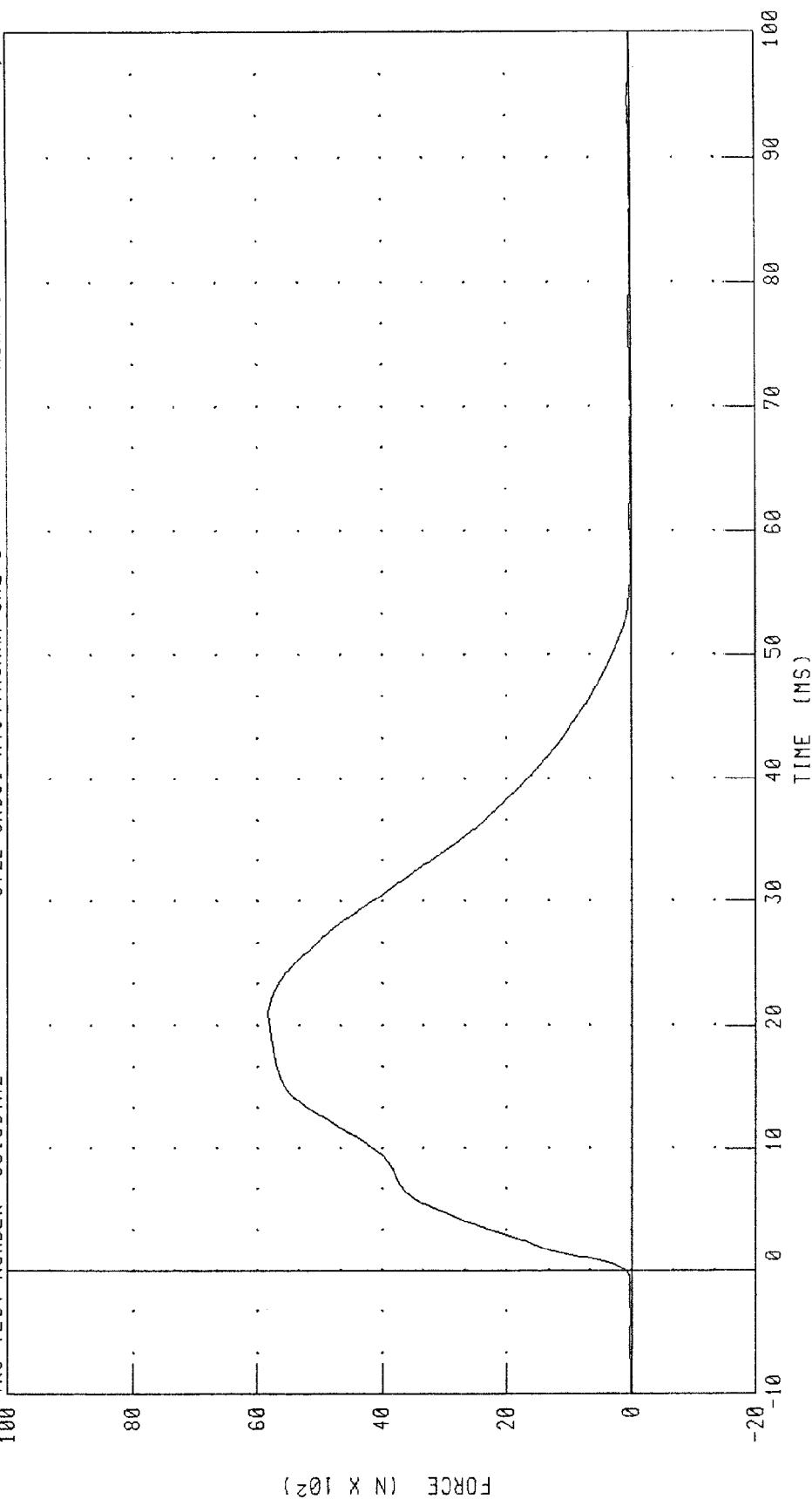
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM FORCE

TRC TEST NUMBER: 001C5TH2

572E SN001 H.S. THORAX CAL 5

RUN NUMBER: 090298.1222,1



CHANNEL: PENXF FILTER: CH. CLASS 180

PEAK DATA: 5833.17 N @ 20.96 MS, -2.97 N @ 69.76 MS

PART 572-E HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

572E SN001 H.S.THORAX CAL 5

IRC TEST NUMBER: 001C5TH2

150

120

90

60

30

0

-30

-10

0

10

20

30

40

50

60

70

80

90

100

110

120

130

140

150

160

170

180

190

200

210

220

230

240

250

260

270

280

290

300

310

320

330

340

350

360

370

380

390

400

410

420

430

440

450

460

470

480

490

500

510

520

530

540

550

560

570

580

590

600

610

620

630

640

650

660

670

680

690

700

710

720

730

740

750

760

770

780

790

800

810

820

830

840

850

860

870

880

890

900

910

920

930

940

950

960

970

980

990

1000

1010

1020

1030

1040

1050

1060

1070

1080

1090

1100

1110

1120

1130

1140

1150

1160

1170

1180

1190

1200

1210

1220

1230

1240

1250

1260

1270

1280

1290

1300

1310

1320

1330

1340

1350

1360

1370

1380

1390

1400

1410

1420

1430

1440

1450

1460

1470

1480

1490

1500

1510

1520

1530

1540

1550

1560

1570

1580

1590

1600

1610

1620

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1670

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1700

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1800

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1890

1900

1910

1920

1930

1940

1950

1960

1970

1980

1990

2000

2010

2020

2030

2040

2050

2060

2070

2080

2090

2100

2110

2120

2130

2140

2150

2160

2170

2180

2190

2200

2210

2220

2230

2240

2250

2260

2270

2280

2290

2300

2310

2320

2330

2340

2350

2360

2370

2380

2390

2400

2410

2420

2430

2440

2450

2460

2470

2480

2490

2500

2510

2520

2530

2540

2550

2560

2570

2580

2590

2600

2610

2620

2630

2640

2650

2660

2670

2680

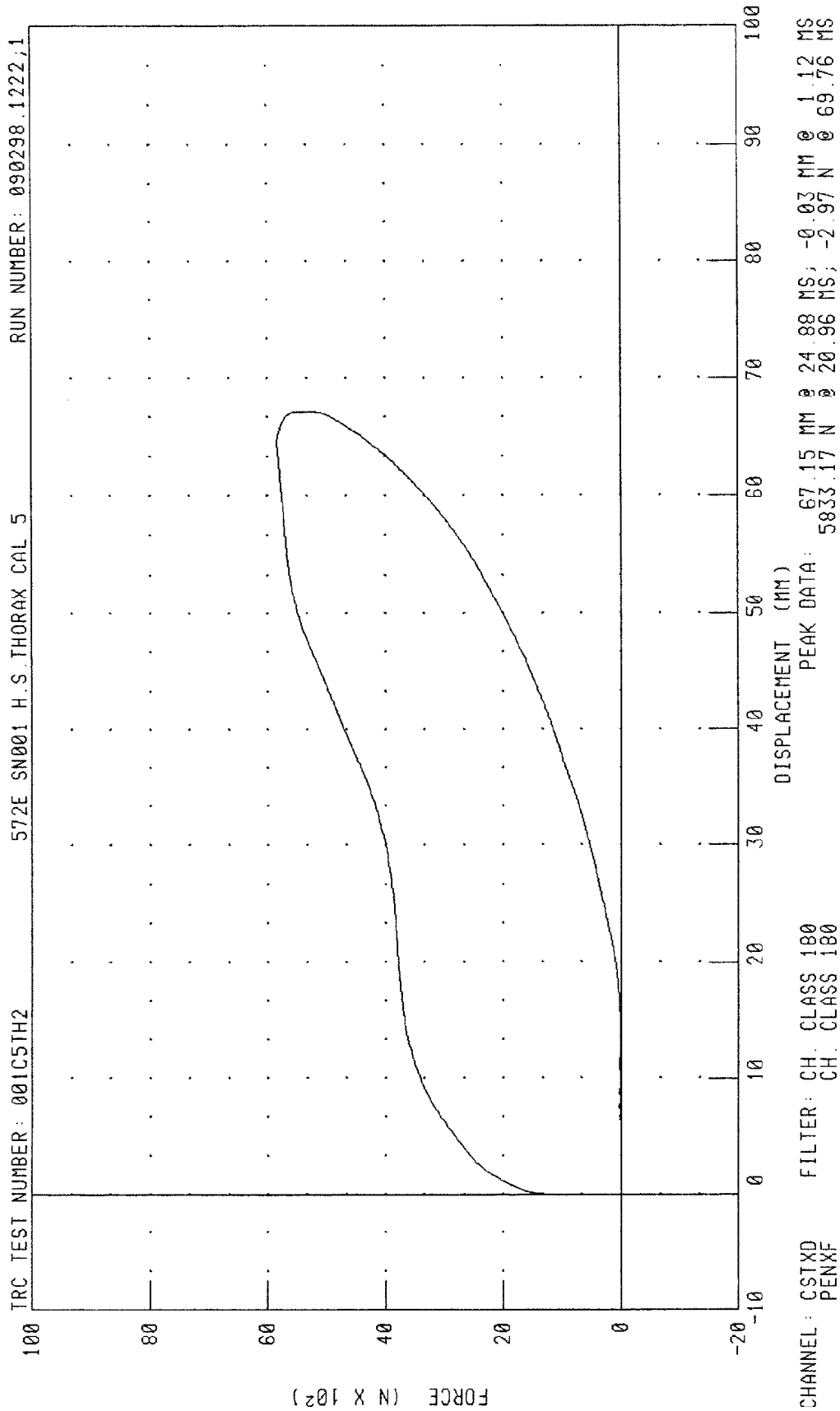
2690

2700

2710

2720

PART 572-E HYBRID III THORAX CALIBRATION
CHEST DISPLACEMENT VS PENDULUM FORCE



TRANSPORTATION RESEARCH CENTER INC.

RIGHT HIP JOINT FEMUR FLEXION TEST

HYBRID III PART 572E

03-SEP-98

TRC INC.

TEST NO: 001C5HR1

572E SN 001 HIPFLEX CAL 5

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	55.0 %
ROTATION RATE	5 - 10 deg/sec	YES
TORQUE @ 30 deg ROTATION	<= 94.9 Nm	78.4 Nm
ROTATION @ 203.4 Nm TORQUE	40 - 50 deg.	41.1 deg.

TEST MEETS SPECIFICATIONS

TECHNICIAN By *elt*

RUN NUMBER: 090398.1352;1

HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

RIGHT HIP FLEXION ROTATION

572E SN 001 HIPFLEX CAL 5

TRC TEST NUMBER: 001C5HR1

75

60

45

30

15

0

-15

-80

0

80

160

240

320

400

480

560

640

720

800

TIME (S X 10⁻²)

PEAK DATA: 41.84 ° @ 5.30 S, -10.06 ° @ -1.00 S

CHANNEL: RHPXD FILTER: CH. CLASS 60

RUN NUMBER: 090398.1352;1

ANGLE (°)

C-30

981008

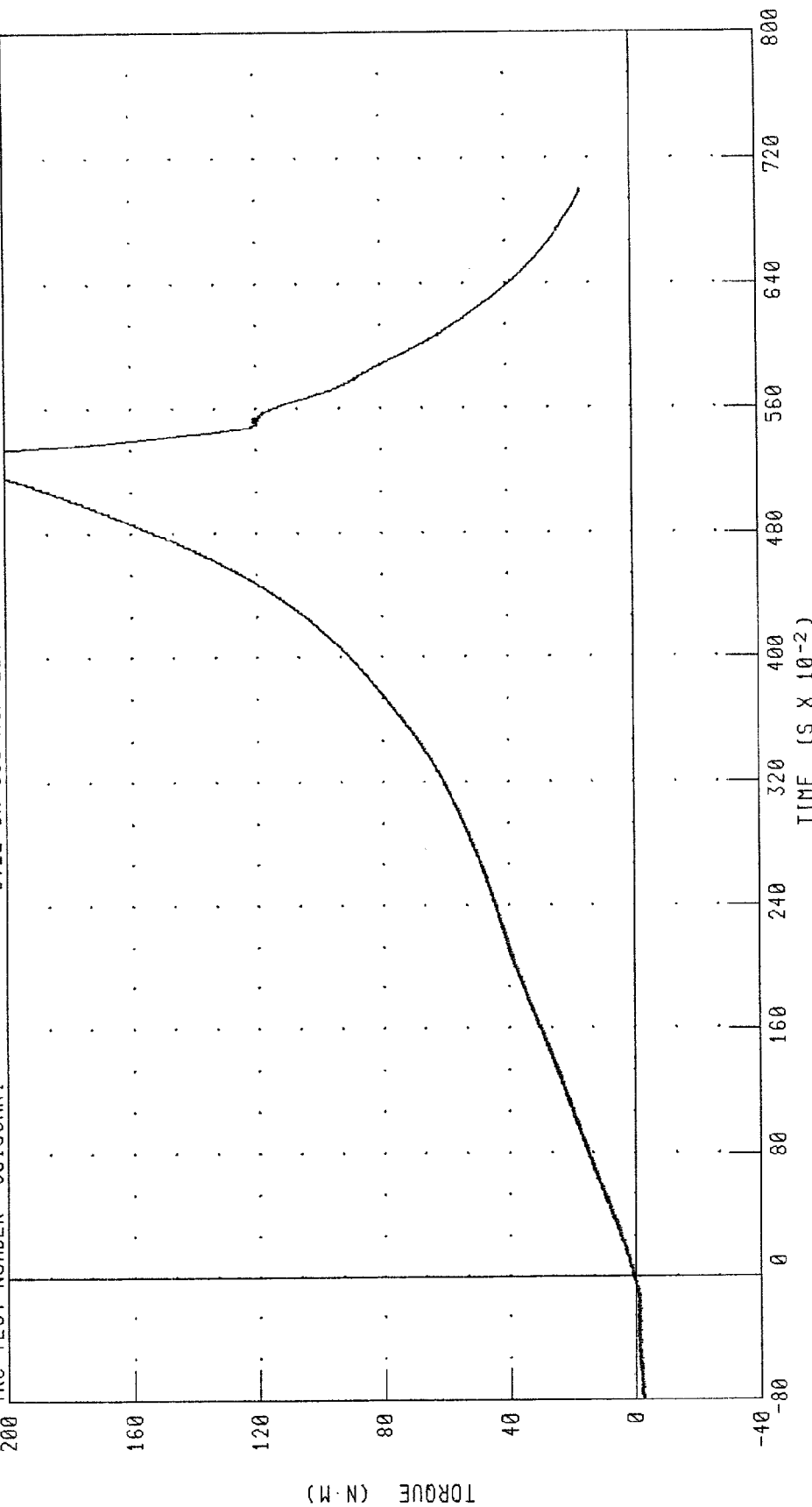
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

RIGHT HIP FLEXION MOMENT

572E SN 001 HIPFLEX CAL 5

TRC TEST NUMBER: 001C5HR1

RUN NUMBER: 090398.1352;1



CHANNEL: RHPYM FILTER: CH. CLASS 60

TIME (S X 10⁻²)

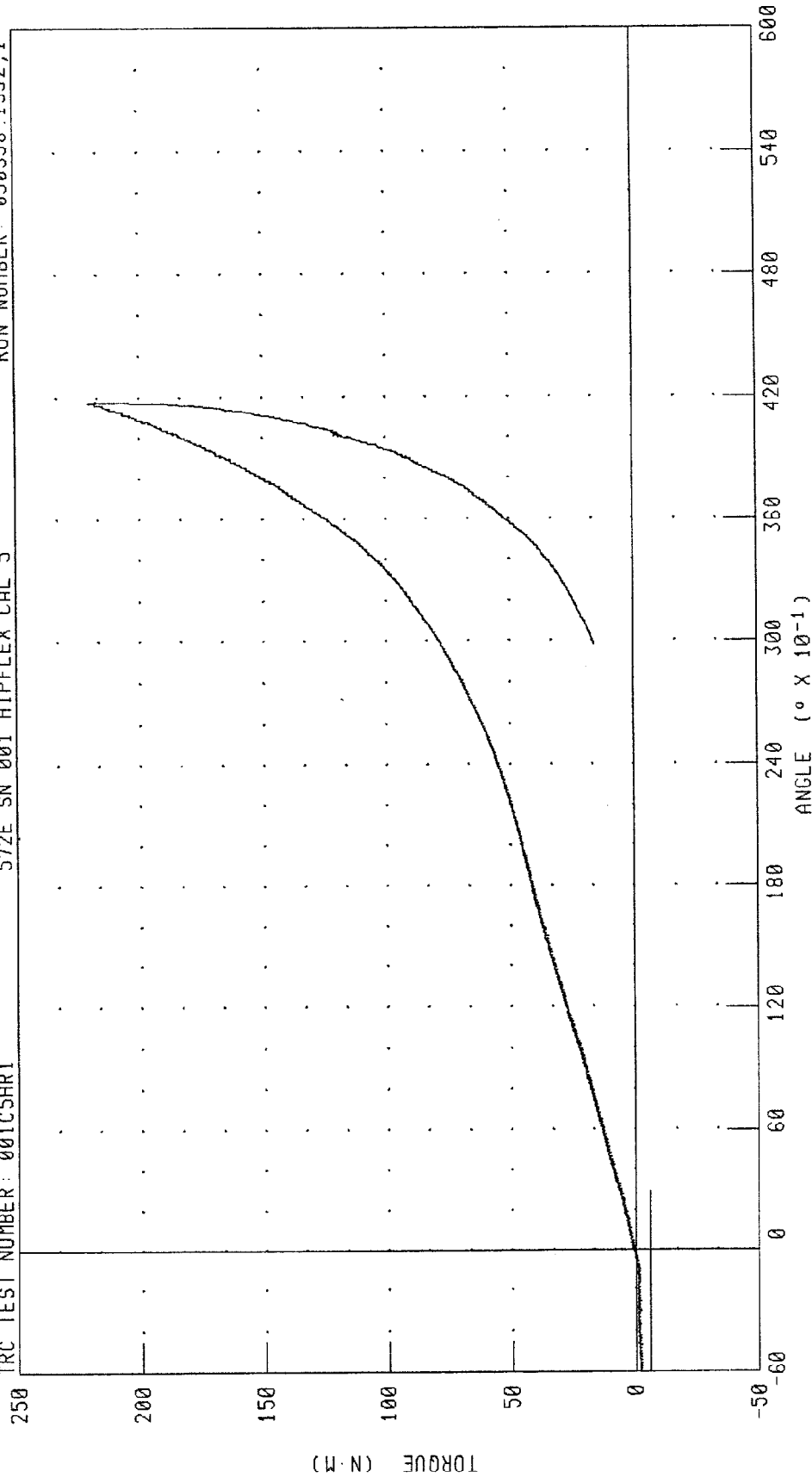
PEAK DATA: 220.39 N·M @ 5.28 S; -6.76 N·M @ -0.99 S

HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES
 RIGHT HIP FLEXION MOMENT VS ROTATION ANGLE

TRC TEST NUMBER: 001C5HR1

572E SN 001 HIPFLEX CAL 5

RUN NUMBER: 090398.1352.1



PEAK DATA: 41.84 $^{\circ}$ 5.30 S; -10.06 $^{\circ}$ -1.00 S
 220.39 N·M 5.28 S; -6.76 N·M -0.99 S

FILTER: CH. CLASS 60
 CH. CLASS 60

CHANNEL: RHPXD
 RHPYM

TRANSPORTATION RESEARCH CENTER INC.

LEFT HIP JOINT FEMUR FLEXION TEST

HYBRID III PART 572E

03-SEP-98

TRC INC.

TEST NO: 001C5HL1

572E SN 001 HIPFLEX CAL 5

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	55.0 %
ROTATION RATE	5 - 10 deg/sec	YES
TORQUE @ 30 deg ROTATION	<= 94.9 Nm	74.4 Nm
ROTATION @ 203.4 Nm TORQUE	40 - 50 deg.	42.0 deg.

TEST MEETS SPECIFICATIONS

TECHNICIAN

B. J. Calt

RUN NUMBER: 090398.1357;1

HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

LEFT HIP FLEXION ROTATION

572E SN 001 HIPFLEX CAL 5

TRC TEST NUMBER: 001C5HL1

75

60

45

30

15

0

-15

-80

0

80

160

240

320

400

480

560

640

720

800

TIME (S X 10⁻²)

PEAK DATA: 42.83 ° @ 5.42 S; -10.08 ° @ -1.00 S

CHANNEL: LHPXD FILTER: CH. CLASS 60

RUN NUMBER: 090398.1357;1

ANGLE (°)

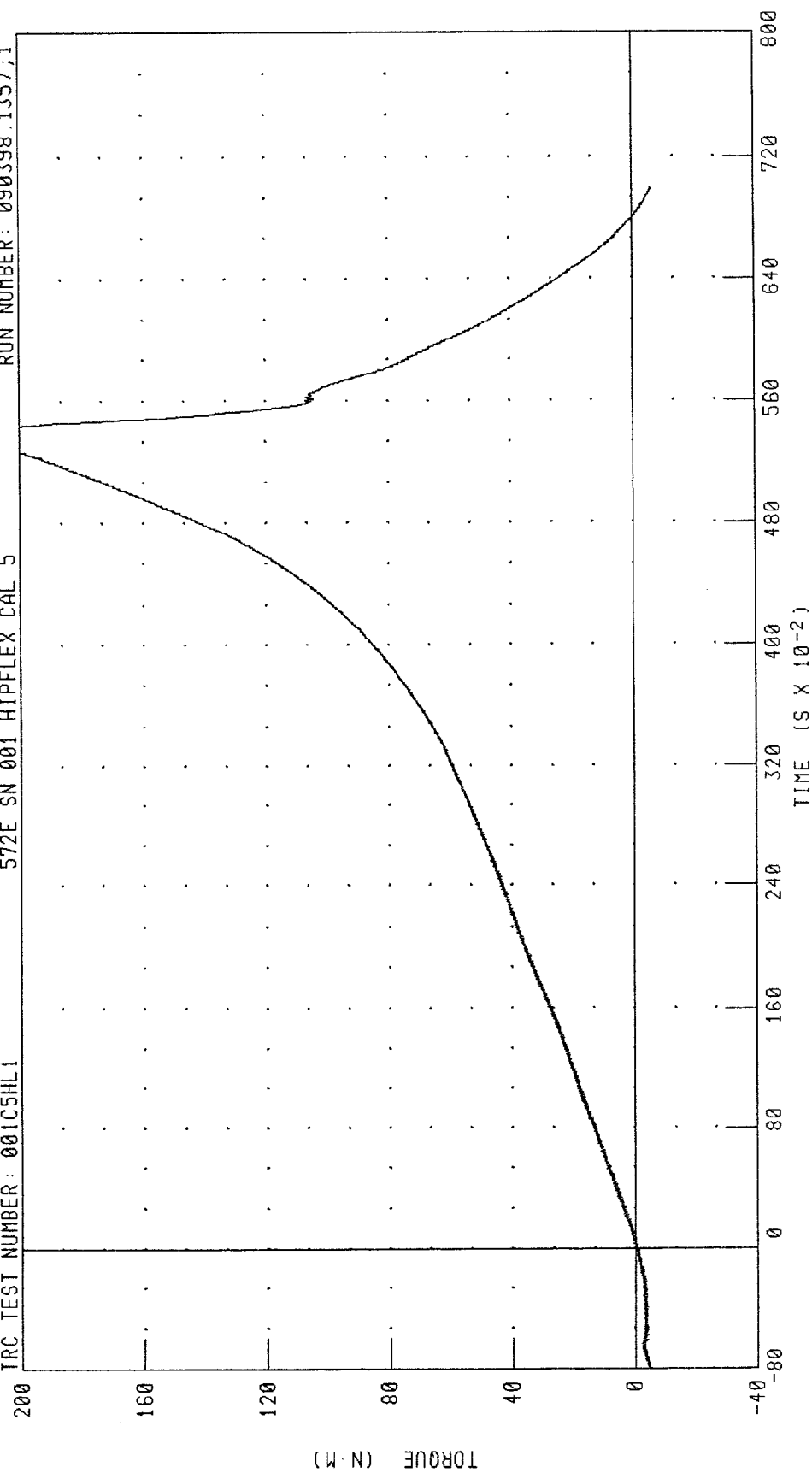
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

LEFT HIP FLEXION MOMENT

572E SN 001 HIPFLEX CAL 5

TRC TEST NUMBER: 001C5HL1

RUN NUMBER: 090398.1357;1



TIME (S X 10⁻²)

PEAK DATA: 219.78 N·m @ 5.39 S; -16.53 N·m @ -1.00 S

FILTER: CH. CLASS 60

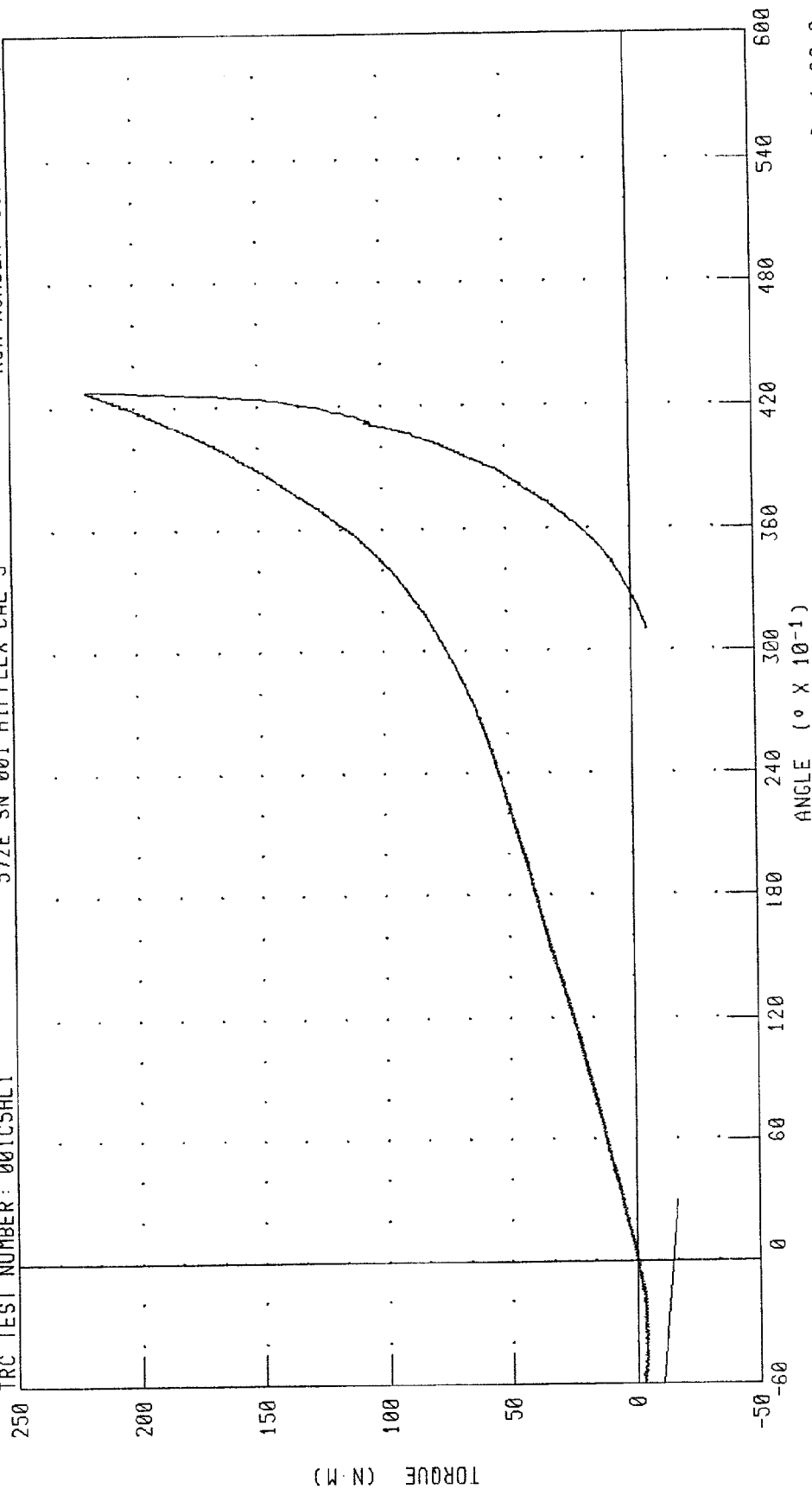
CHANNEL: LHPYM

HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES LEFT HIP FLEXION MOMENT VS ROTATION ANGLE

TRC TEST NUMBER: 001C5HL1

572E SN 001 HIPELEX CAL 5

RUN NUMBER: 090398.1357,1



PEAK DATA: 42.83 ° 0 5.42 S; -10.08 ° 0 -1.00 S
219.78 N-M 0 5.39 S; -16.53 N-M 0 -1.00 S

CHANNEL: LHPXD
LHPYH
FILTER: CH. CLASS 60
CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III 50th

03-SEP-98

TRC INC.

TEST NO: 001C5RK1

572E SN001 RIGHT KNEE CAL 05

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	55.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.08 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5438.4 N

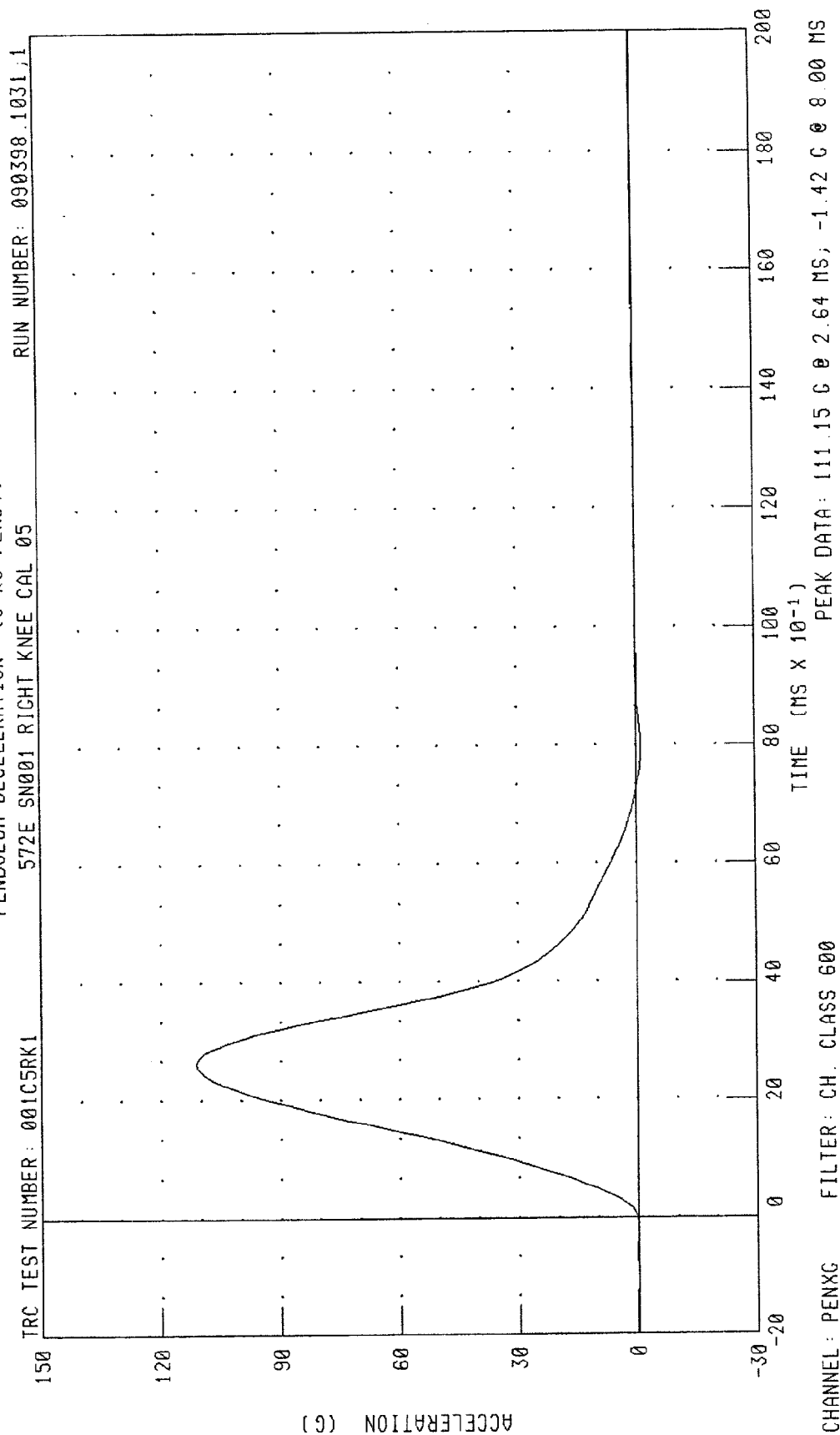
TEST MEETS SPECIFICATIONS

TECHNICIAN

By Cult

RUN NUMBER: 090398.1031;1

PART 572-E HYBRID III RIGHT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)



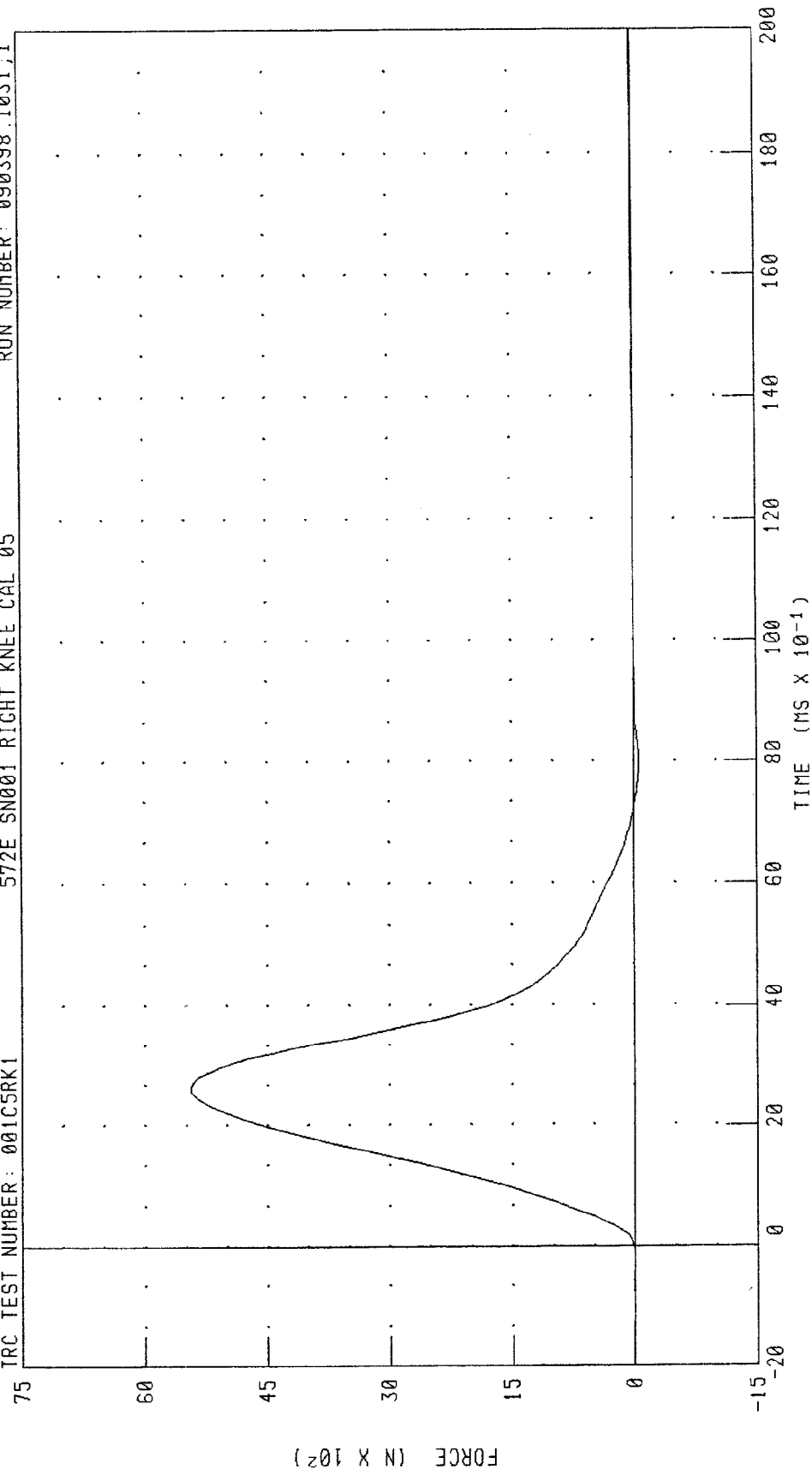
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

572E SN001 RIGHT KNEE CAL 05

RUN NUMBER: 090398.1031.1

TRC TEST NUMBER: 001C5RK1



CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 5438.50 N @ 2.64 MS; -69.58 N @ 8.00 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III 50th

03-SEP-98

TRC INC.

TEST NO: 001C5LK1

572E SN001 LEFT KNEE CAL 5

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	55.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.08 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5658.9 N

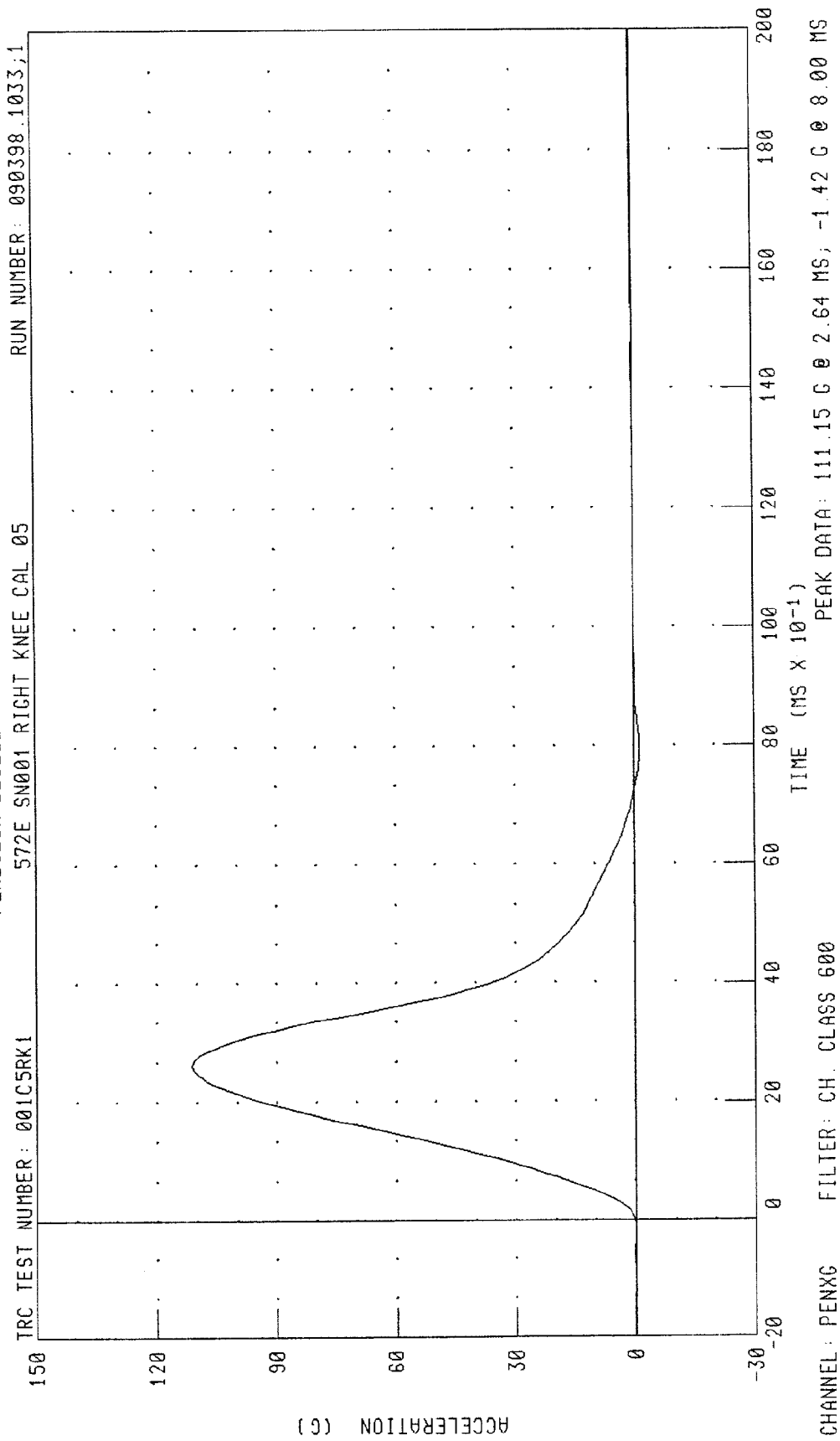
TEST MEETS SPECIFICATIONS

TECHNICIAN

Bj Calt

RUN NUMBER: 090398.1032;1

PART 572-E HYBRID III RIGHT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)



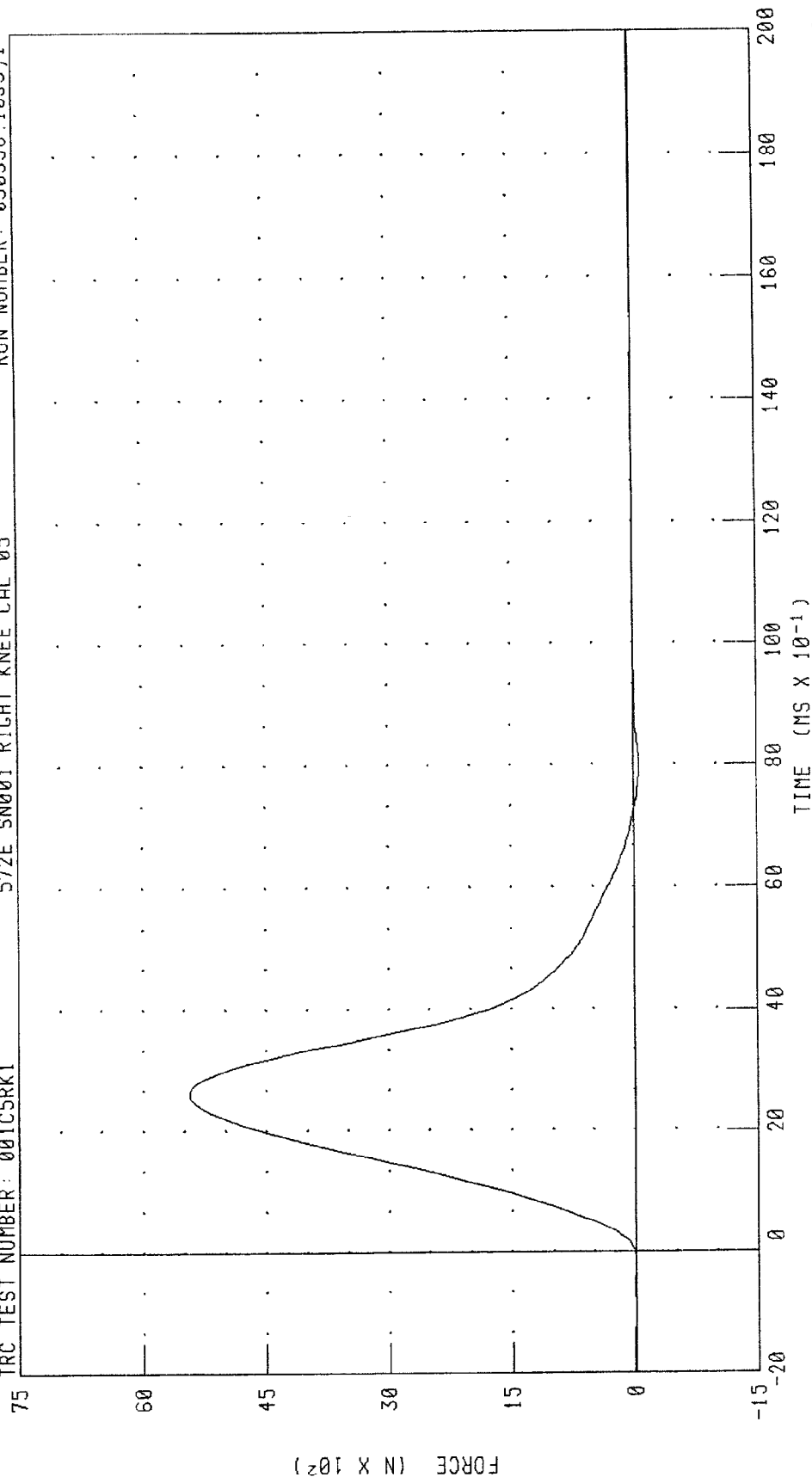
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

RUN NUMBER: 090398.1033;1

TRC TEST NUMBER: 001C5RK1

572E SN001 RIGHT KNEE CAL 05



PEAK DATA: 5438.50 N @ 2.64 MS; -69.58 N @ 8.00 MS

CHANNEL: PENXF FILTER: CH. CLASS 600

Pre-Test Calibration

Serial Number 110

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III 50th

03-SEP-98

TRC INC.

TEST NO: 110C7HD1

572E SN110 HEAD DROP CAL 07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	55.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	272.87 G
PEAK LATERAL ACCELERATION	15 G MAX	-7.64 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

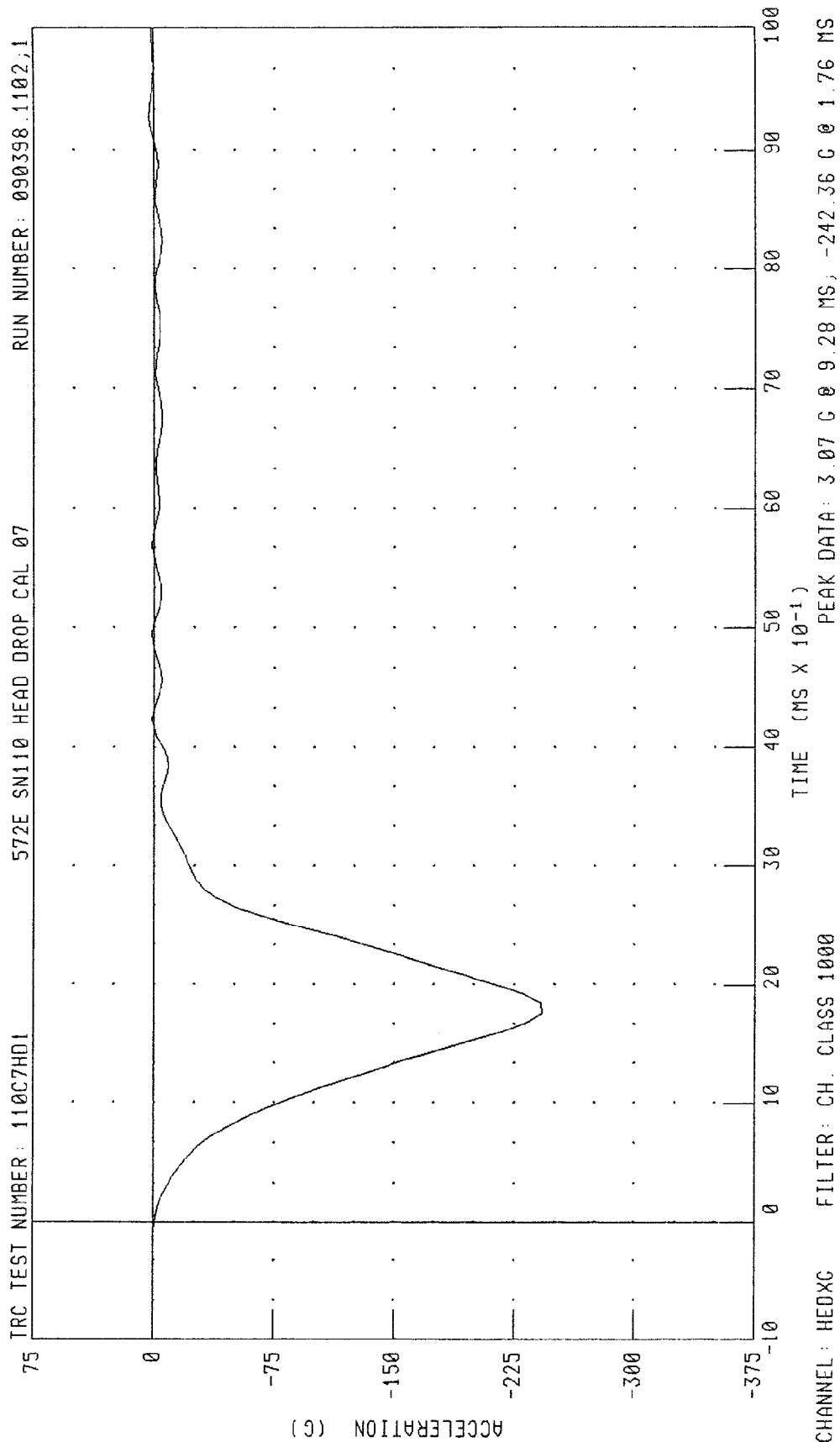
TEST MEETS SPECIFICATIONS

TECHNICIAN

Ray C. Holt

RUN NUMBER: 090398.1102;1

PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION X AXIS



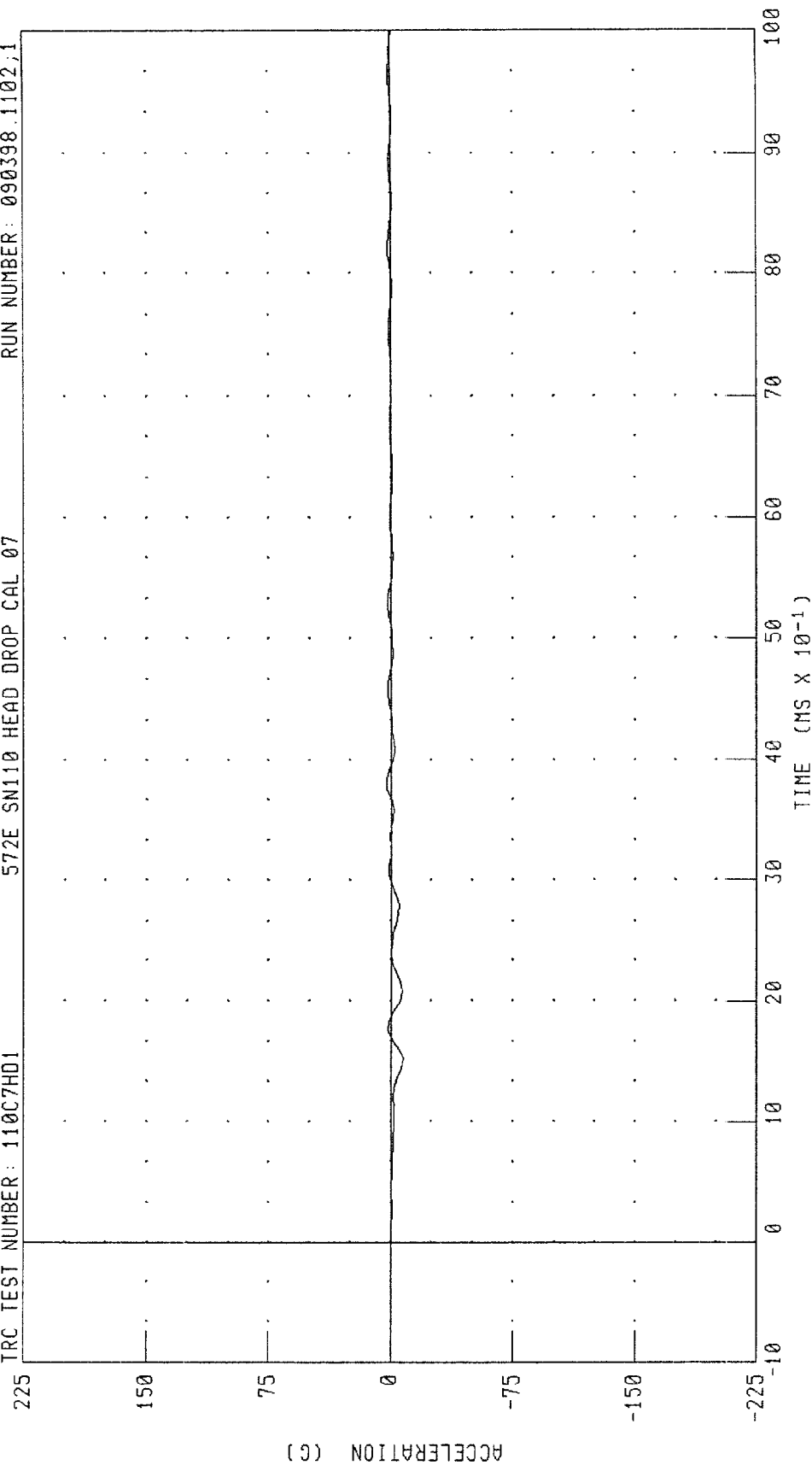
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

TRC TEST NUMBER: 110C7HD1

572E SN110 HEAD DROP CAL 07

RUN NUMBER: 090398.1102;1



PEAK DATA: 2.54 G @ 3.84 MS; -7.65 G @ 1.52 MS

CHANNEL: HEDYG FILTER: CH. CLASS 1000

PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Z AXIS

572E SN110 HEAD DROP CAL 07

TRC TEST NUMBER: 110C7HD1

75

0

-75

-150

-225

-300

-375

TIME (MS X 10⁻¹)

0 10 20 30 40 50 60 70 80 90 100

PEAK DATA: 1.62 G @ 10.00 MS; -125.39 G @ 1.76 MS

CHANNEL: HEDZG FILTER: CH. CLASS 1000

RUN NUMBER: 090398.1102;1

ACCELERATION (G)

0

-75

-150

-225

-300

-375

0

10

20

30

40

50

60

70

80

90

100

ACCELERATION (G)

0

-75

-150

-225

-300

-375

0

10

20

30

40

50

60

70

80

90

100

ACCELERATION (G)

0

-75

-150

-225

-300

-375

0

10

20

30

40

50

60

70

80

90

100

ACCELERATION (G)

0

-75

-150

-225

-300

-375

0

10

20

30

40

50

60

70

80

90

100

ACCELERATION (G)

0

-75

-150

-225

-300

-375

0

10

20

30

40

50

60

70

80

90

100

ACCELERATION (G)

0

-75

-150

-225

-300

-375

0

10

20

30

40

50

60

70

80

90

100

ACCELERATION (G)

0

-75

-150

-225

-300

-375

0

10

20

30

40

50

60

70

80

90

100

ACCELERATION (G)

0

-75

-150

-225

-300

-375

0

10

20

30

40

50

60

70

80

90

100

ACCELERATION (G)

0

-75

-150

-225

-300

-375

0

10

20

30

40

50

60

70

80

90

100

ACCELERATION (G)

0

-75

-150

-225

-300

-375

0

10

20

30

40

50

60

70

80

90

100

ACCELERATION (G)

0

-75

-150

-225

-300

-375

0

10

20

30

40

50

60

70

80

90

100

ACCELERATION (G)

0

-75

-150

-225

-300

-375

0

10

20

30

40

50

60

70

80

90

100

ACCELERATION (G)

0

-75

-150

-225

-300

-375

0

10

20

30

40

50

60

70

80

90

100

ACCELERATION (G)

0

-75

-150

-225

-300

-375

0

10

20

30

40

50

60

70

80

90

100

ACCELERATION (G)

0

-75

-150

-225

-300

-375

0

10

20

30

40

50

60

70

80

90

100

ACCELERATION (G)

0

-75

-150

-225

-300

-375

0

10

20

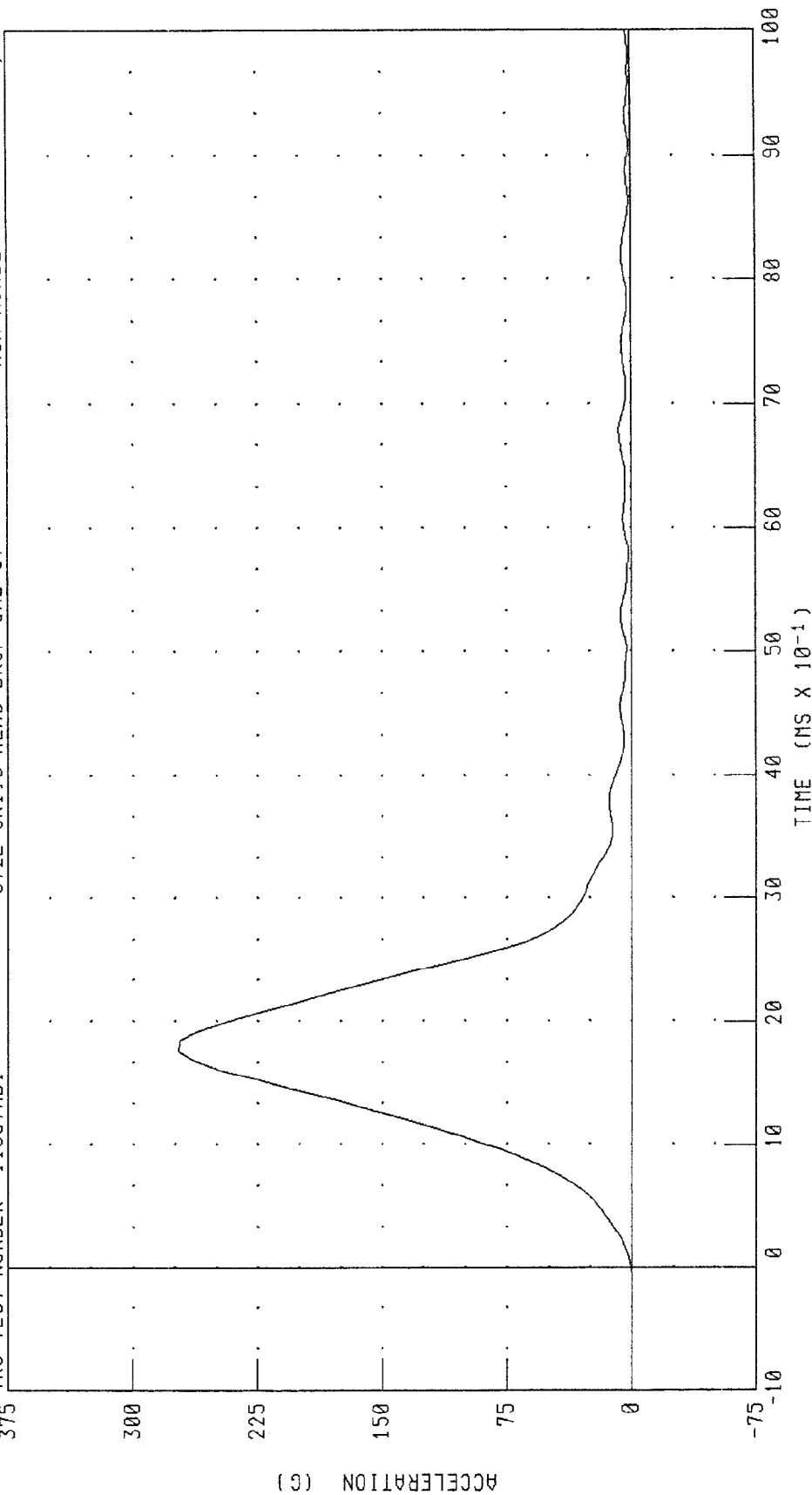
PART 572-E HYBRID III HEAD CALIBRATION

HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: 110C7HD1

572E SN110 HEAD DROP CAL 07

RUN NUMBER: 090398.1102;1



PEAK DATA: 272.88 G @ 1.76 MS; 0.08 G @ -0.96 MS

FILTER: CH. CLASS 1000

CHANNEL: HEDRC

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

03-SEP-98

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 110C7NF1 572E SN110 NECK FLEXION CAL07

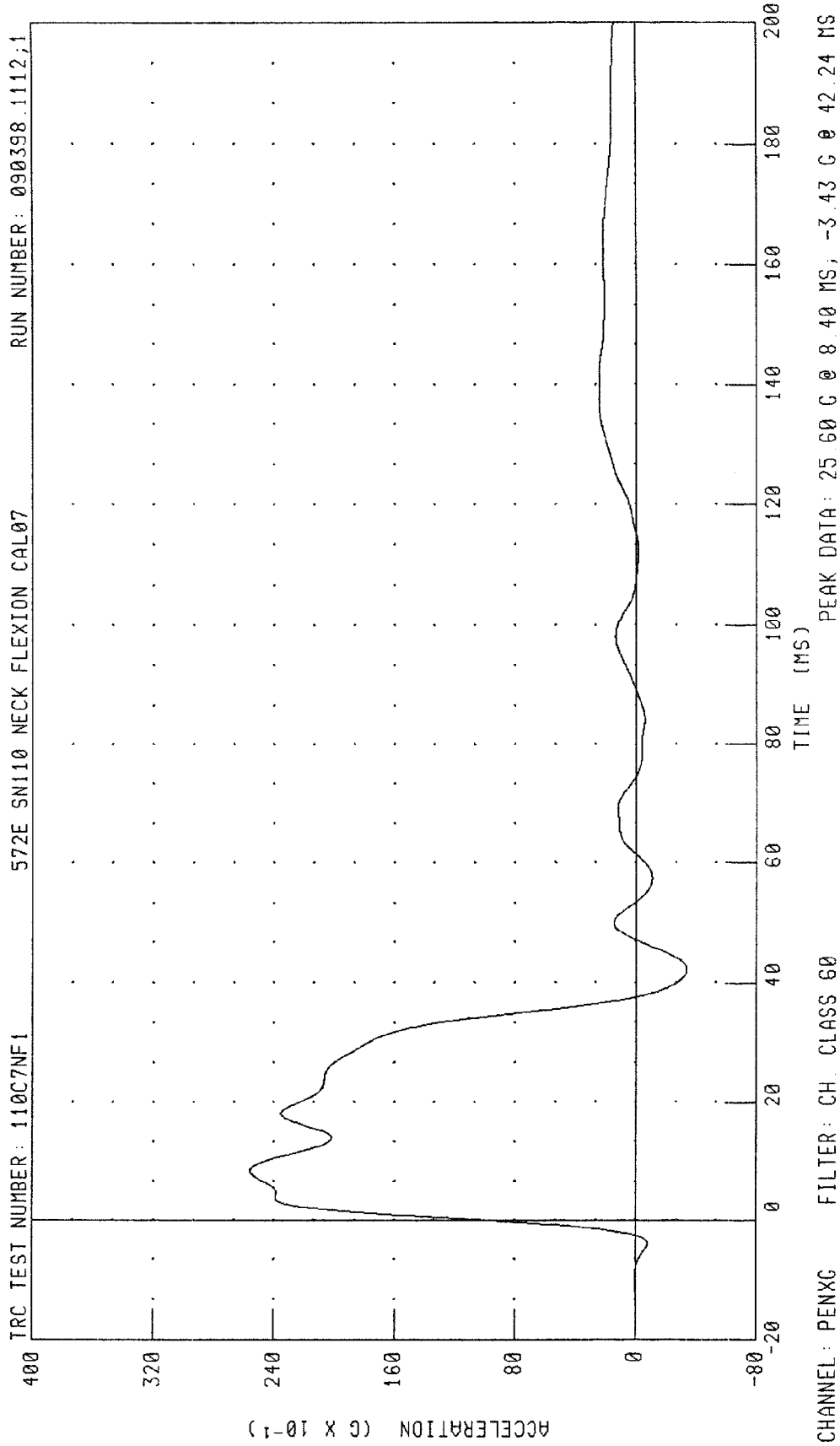
TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	55.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	6.93 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	24.72 G
	20 MS	17.60 - 22.60 G	22.40 G
	30 MS	12.50 - 18.50 G	17.73 G
MAX PENDULUM G		29 G MAX	25.59 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	17.67 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	35.76 MS
D PLANE	MAX	64 - 78 DEG.	71.99 DEG.
ROTATION	TIME	57 - 64 MS	60.80 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	92.52 NM
	TIME	47 - 58 MS	49.36 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	119.52 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	103.04 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN By Cult

RUN NUMBER: 090398.1111;1

PART 572-E HYBRID III NECK FLEXION CALIBRATION
 PENDULUM DECELERATION



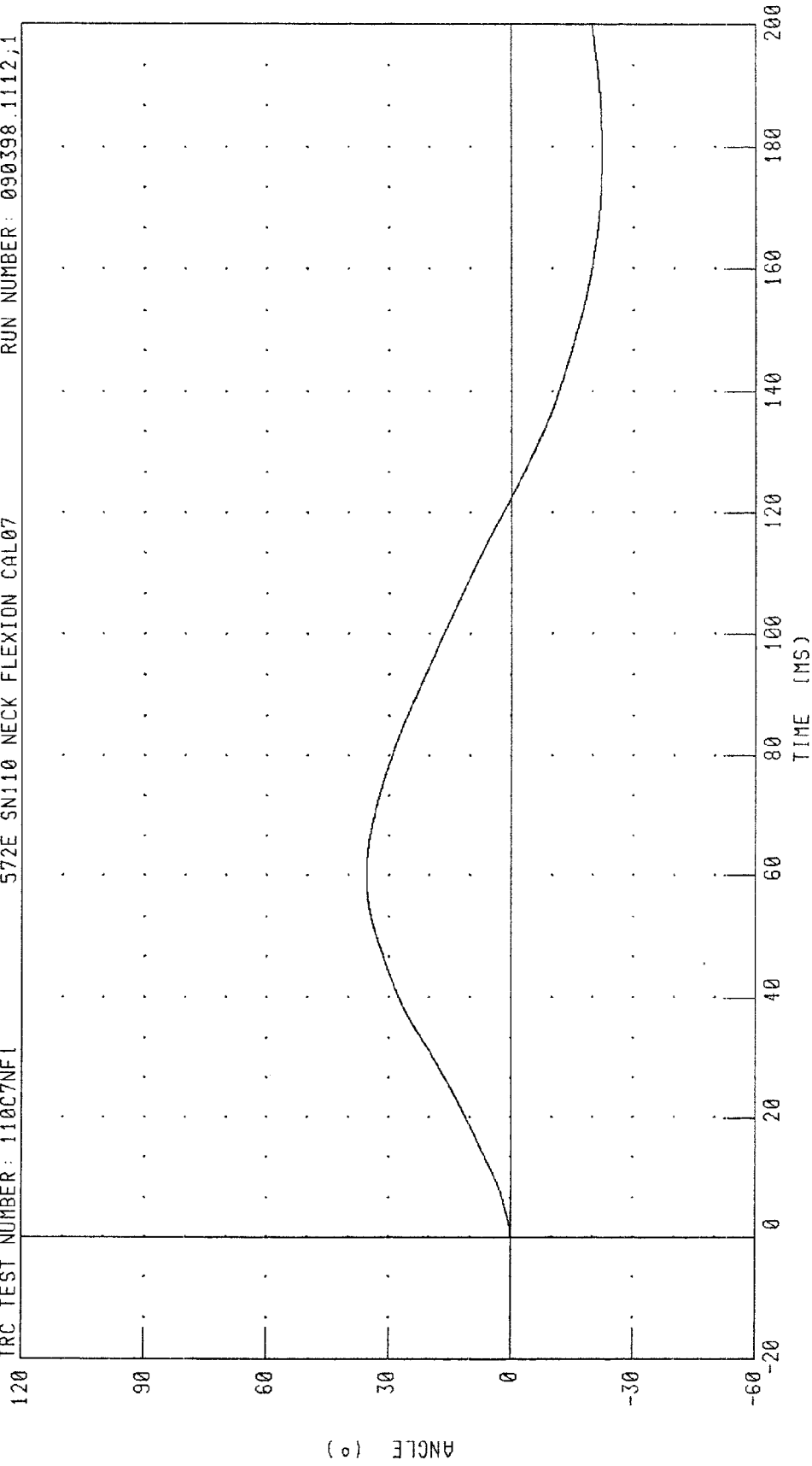
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN110 NECK FLEXION CAL07

TRC TEST NUMBER: 110C7NF1

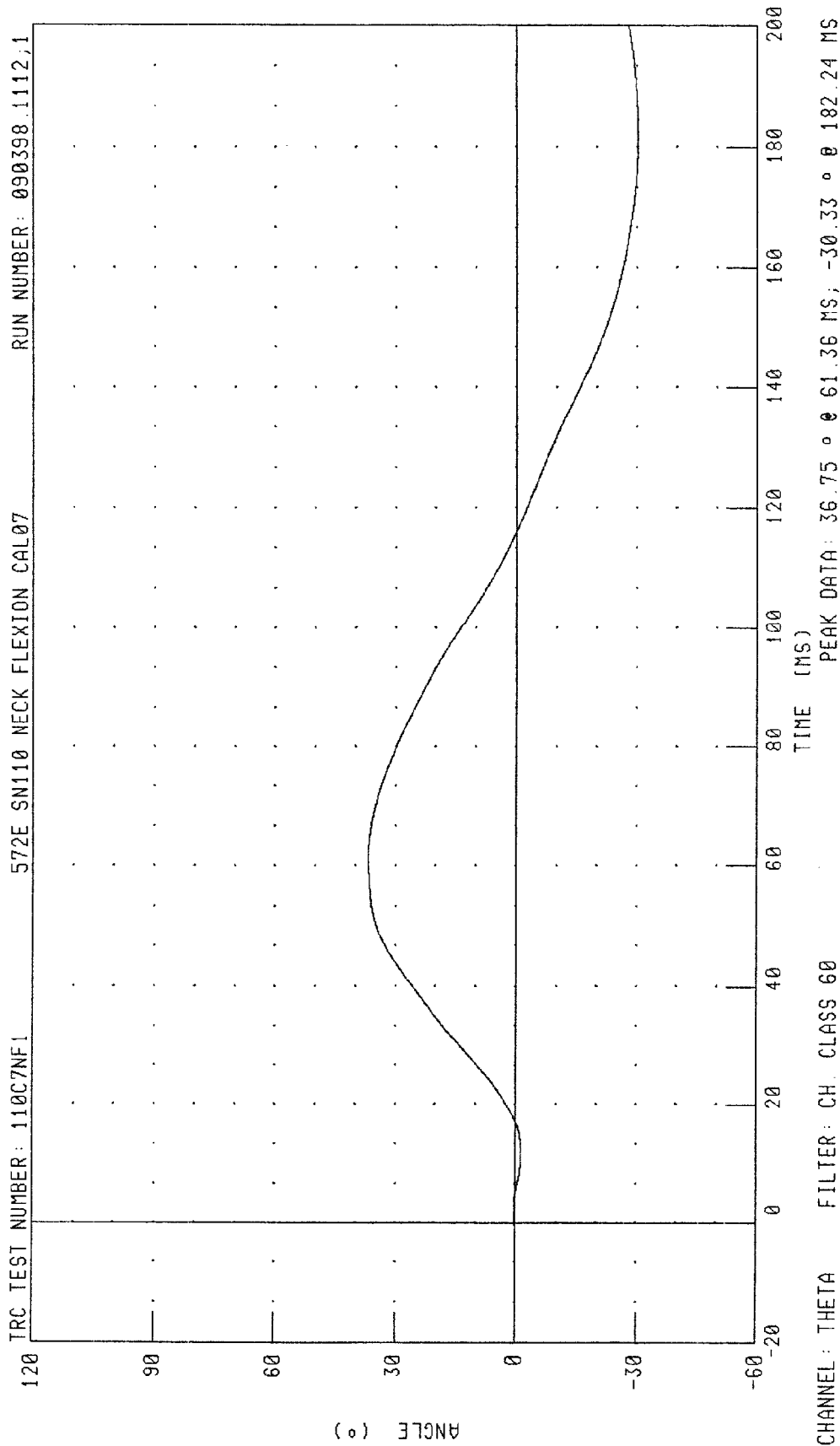
RUN NUMBER: 090398.1112;1



CHANNEL: BETA FILTER: CH. CLASS 60

PEAK DATA: 35.26 ° @ 60.24 MS, -22.41 ° @ 178.96 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION
 ROTATION ABOUT OCCIPITAL CONDYLE



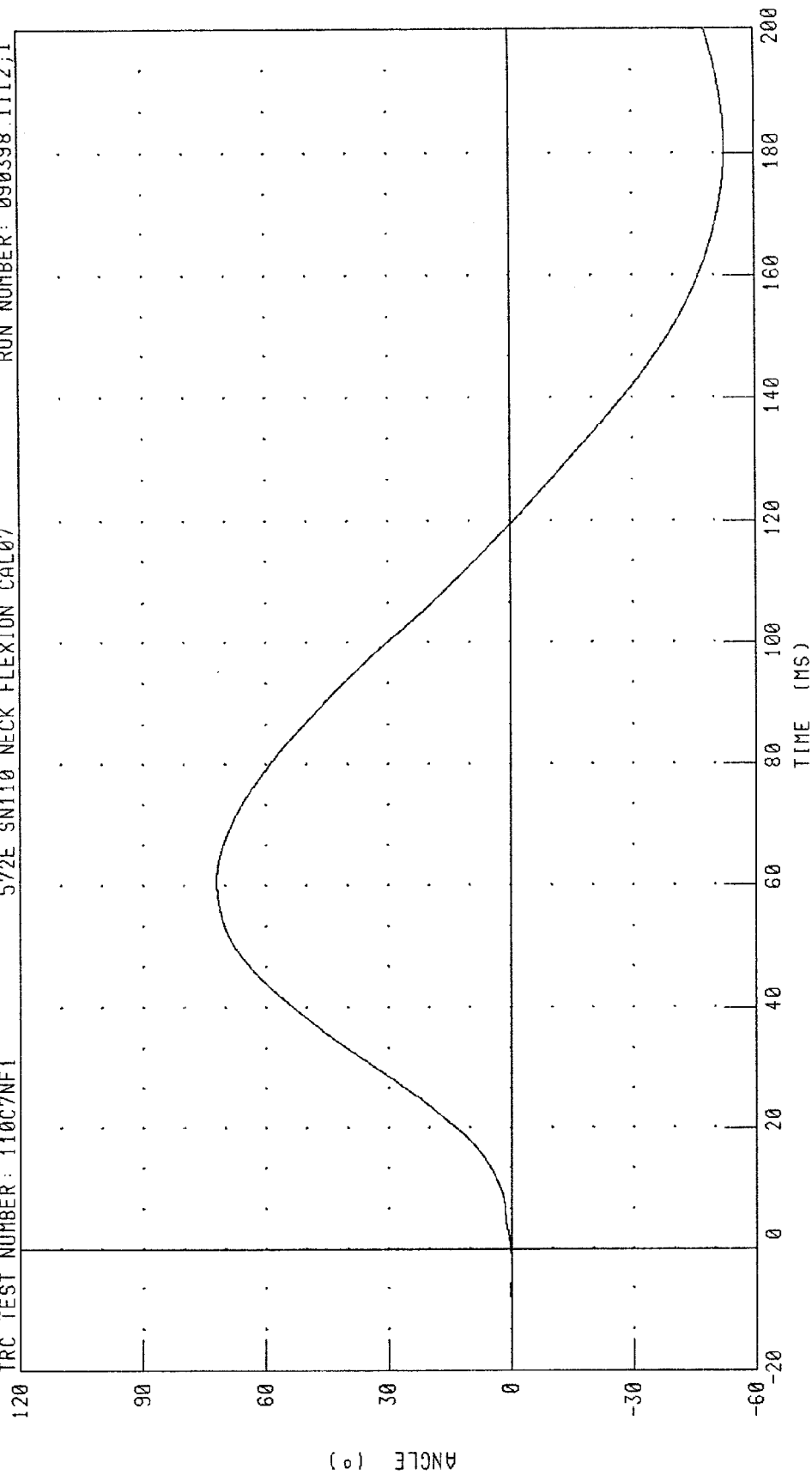
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 110C7NF1

572E SN110 NECK FLEXION CAL07

RUN NUMBER: 090398.1112,1



CHANNEL: TOTAN FILTER: CH. CLASS 60

PEAK DATA: 72.00 ° @ 60.80 MS; -52.70 ° @ 180.56 MS

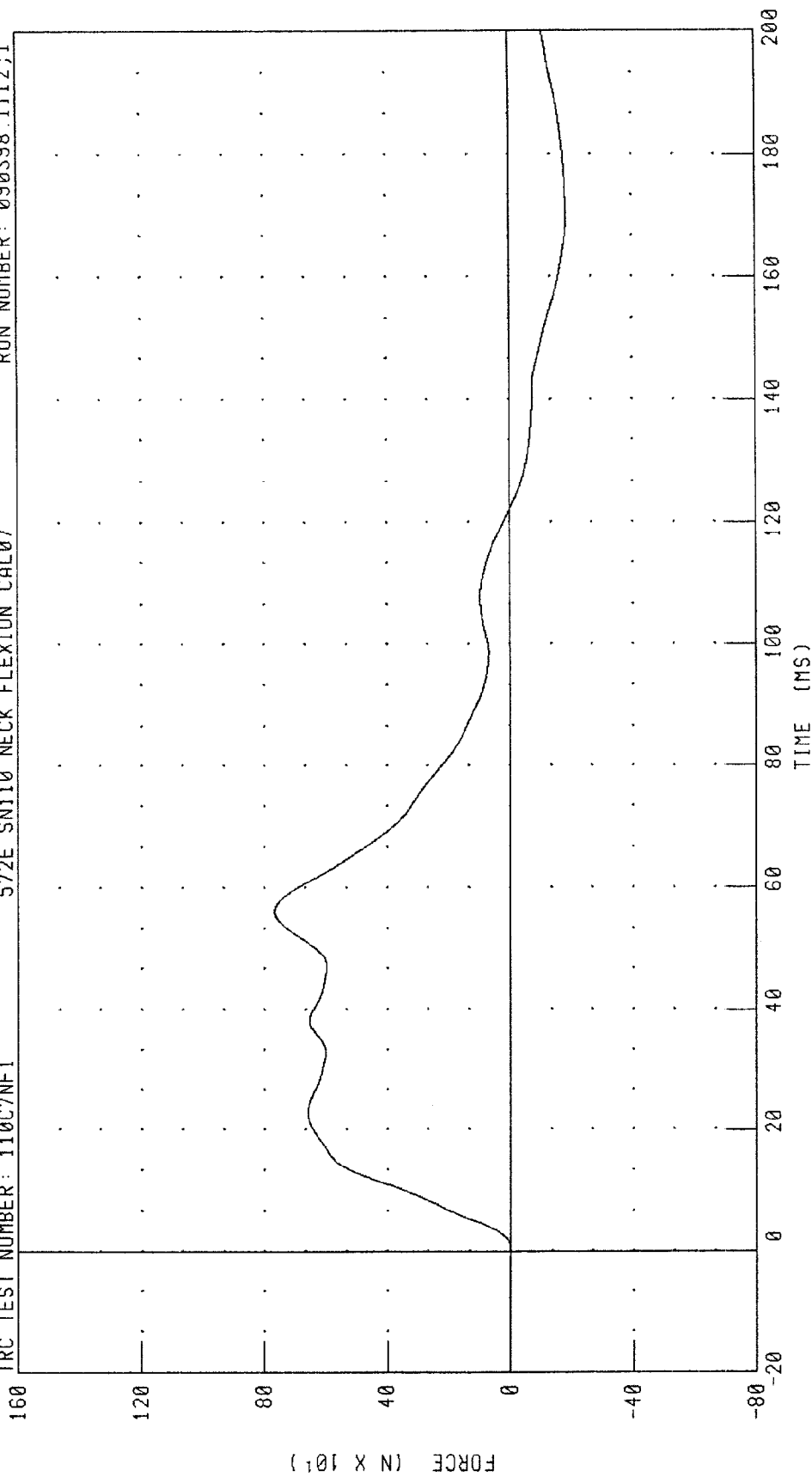
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 110C7NF1

572E SN110 NECK FLEXION CAL07

RUN NUMBER: 090398.1112;1



CHANNEL: NEKXF FILTER: CH. CLASS 60

PEAK DATA: 766.54 N @ 56.16 MS, -187.45 N @ 170.32 MS

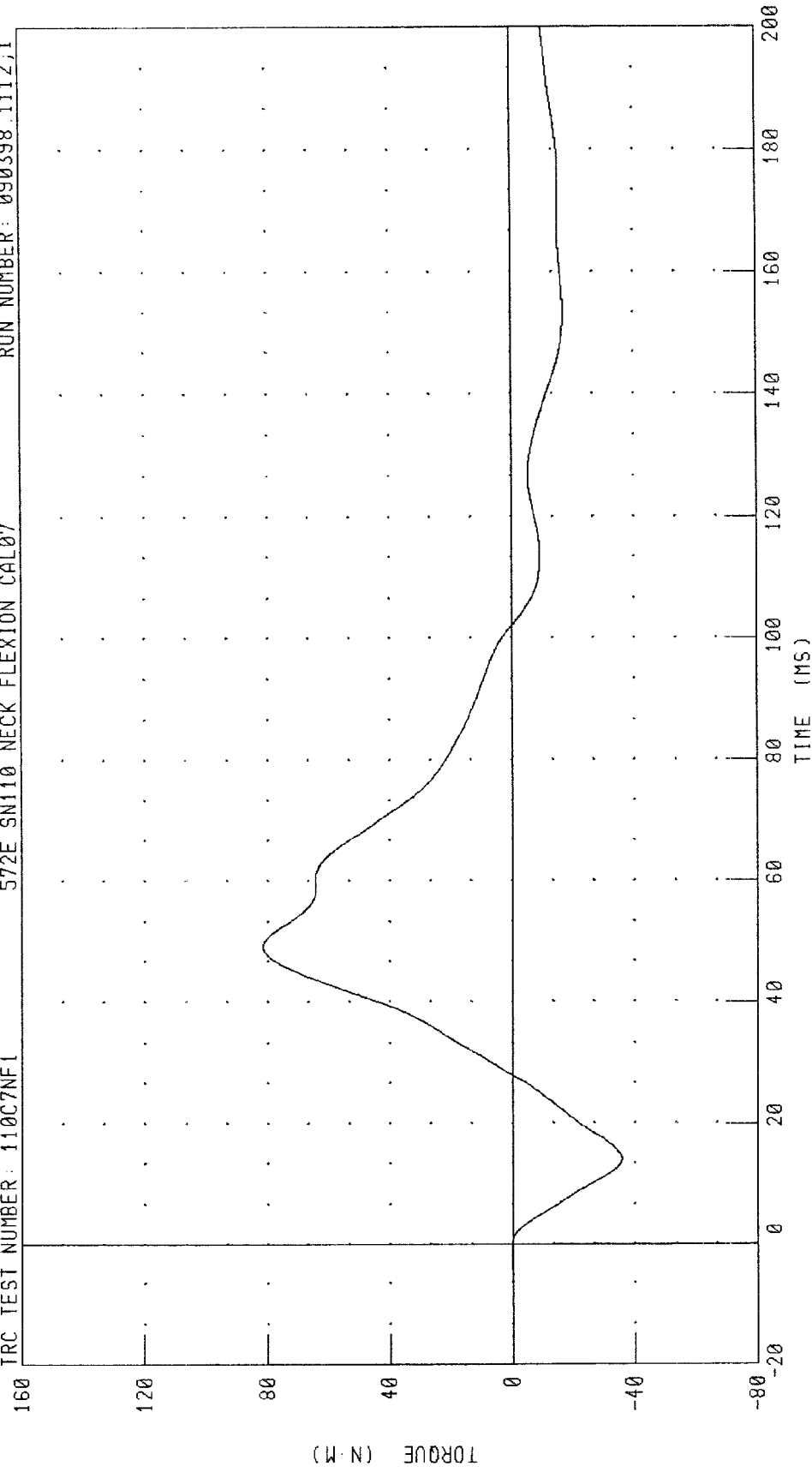
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 110C7NF1

572E SN110 NECK FLEXION CAL07

RUN NUMBER: 090398.1112,1



PEAK DATA: 81.56 N·M @ 49.12 MS, -35.88 N·M @ 14.16 MS

CHANNEL: NEKYM FILTER: CH. CLASS 60

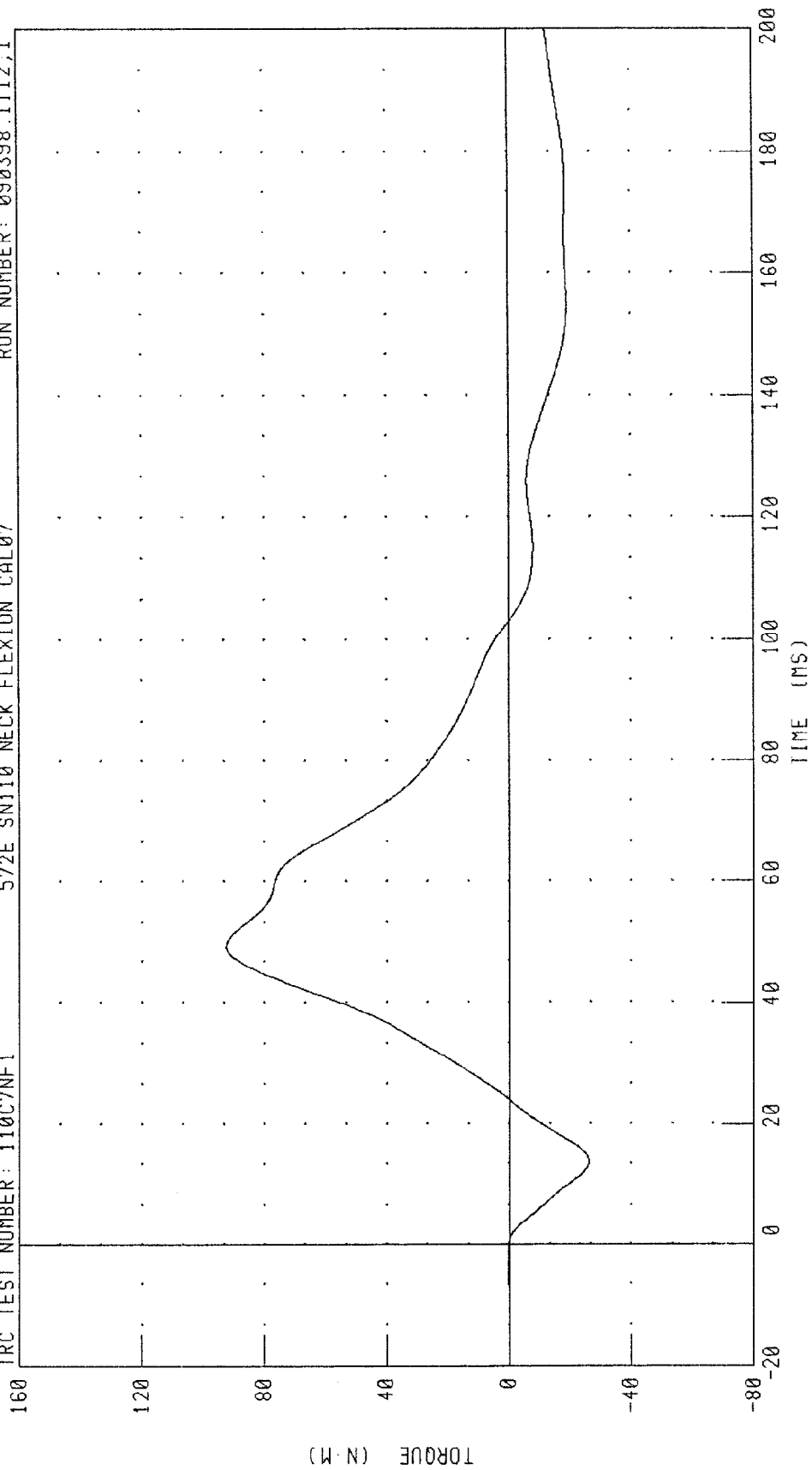
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 110C7NF1

572E SN110 NECK FLEXION CAL07

RUN NUMBER: 090398.1112.1



CHANNEL: NEKOM FILTER: CH. CLASS 60

PEAK DATA: 92.52 N·M @ 49.36 MS, -26.20 N·M @ 13.76 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

03-SEP-98

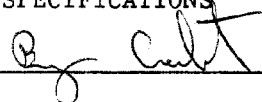
NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 110C7NE1 572E SN110 NECK EXT CAL07

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	55.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.00 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	18.93 G
	20 MS	14.00 - 19.00 G	17.91 G
	30 MS	11.00 - 16.00 G	14.42 G
MAX PENDULUM G		22 G MAX	19.50 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	14.53 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	39.92 MS
D PLANE	MAX	81 - 106 DEG.	97.43 DEG.
ROTATION	TIME	72 - 82 MS	77.12 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-68.90 NM
	TIME	65 - 79 MS	71.12 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	158.80 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	141.28 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 090398.1222;1

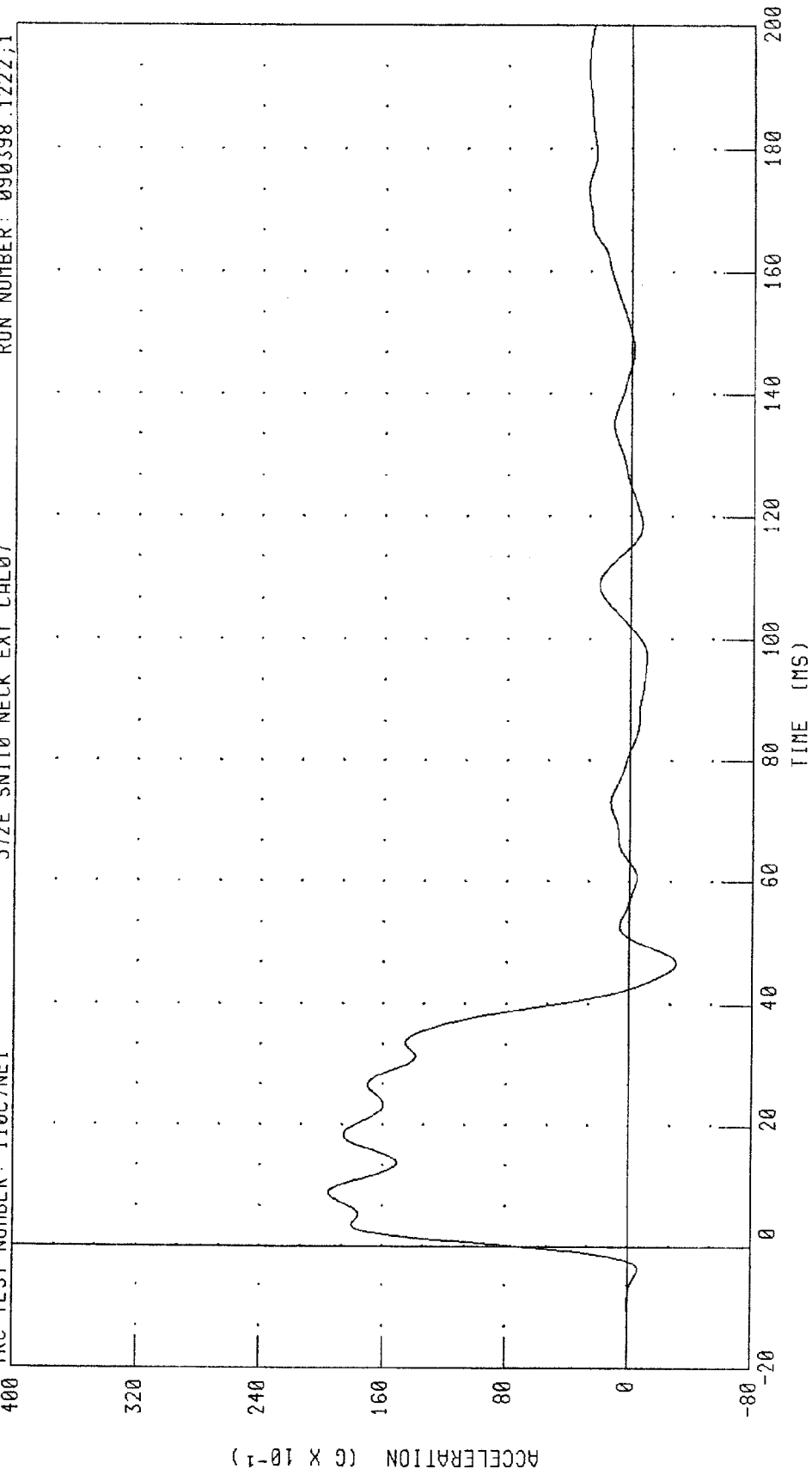
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 110C7NE1

572E SN110 NECK EXT CAL07

RUN NUMBER: 090398.1222;1



CHANNEL: PENXC FILTER: CH. CLASS 60

PEAK DATA: 19.51 G @ 8.88 MS, -3.05 G @ 46.64 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN110 NECK EXT CAL07

IRC TEST NUMBER: 110C7NE1

120

90

60

30

0

-30

-60

ANGLE (°)

0

20

40

60

80

100

120

140

160

180

200

TIME (MS)

0

75.84

41.69

PEAK DATA:

-15.17

°

200.00

MS

FILTER: CH. CLASS 60

CHANNEL: BETA

800188

C-59

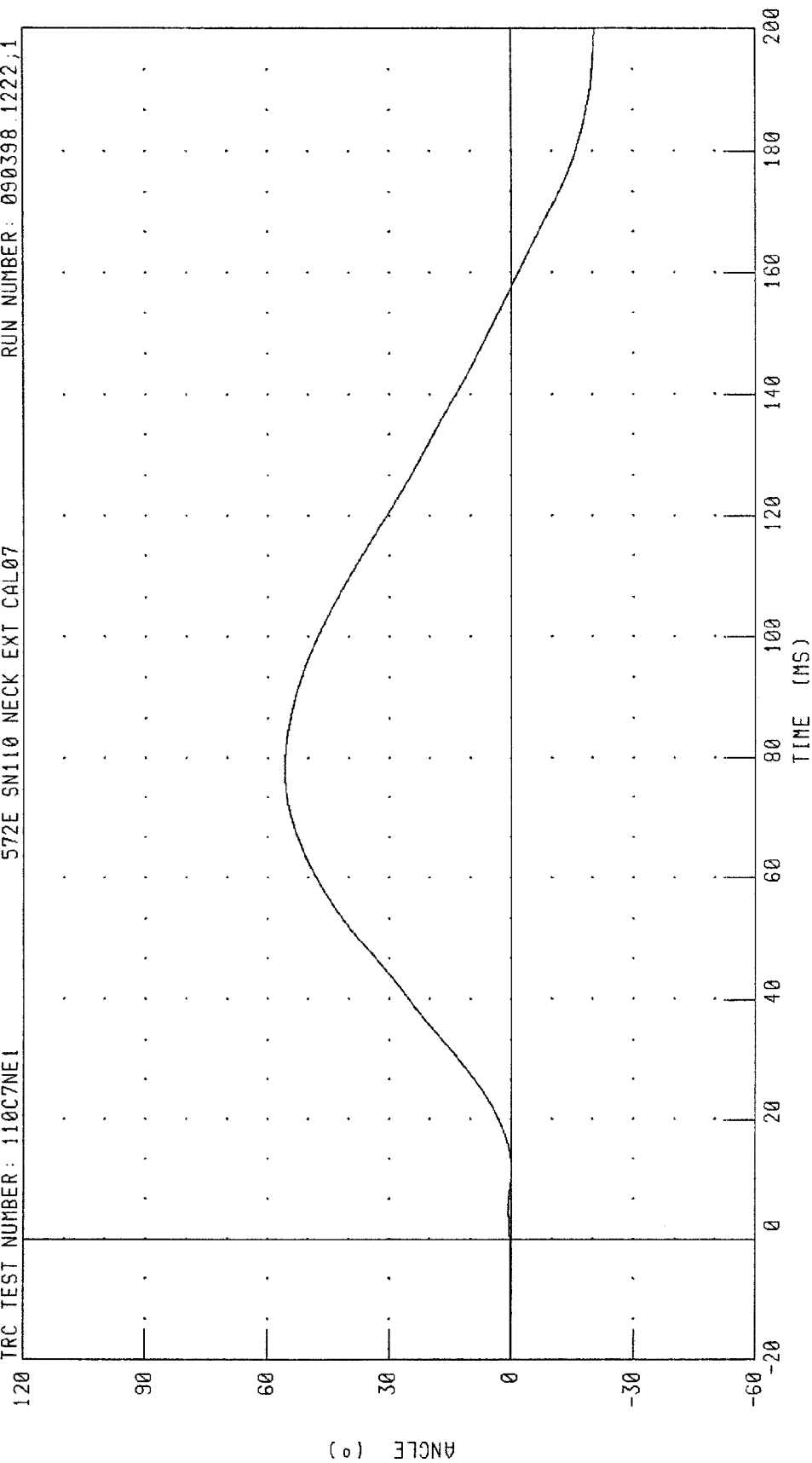
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 110C7NE1

572E SN110 NECK EXT CAL07

RUN NUMBER: 090398.1222,1



CHANNEL: THETA FILTER: CH. CLASS 60

PEAK DATA: 55.79 ° @ 78.16 MS, -20.62 ° @ 200.00 MS

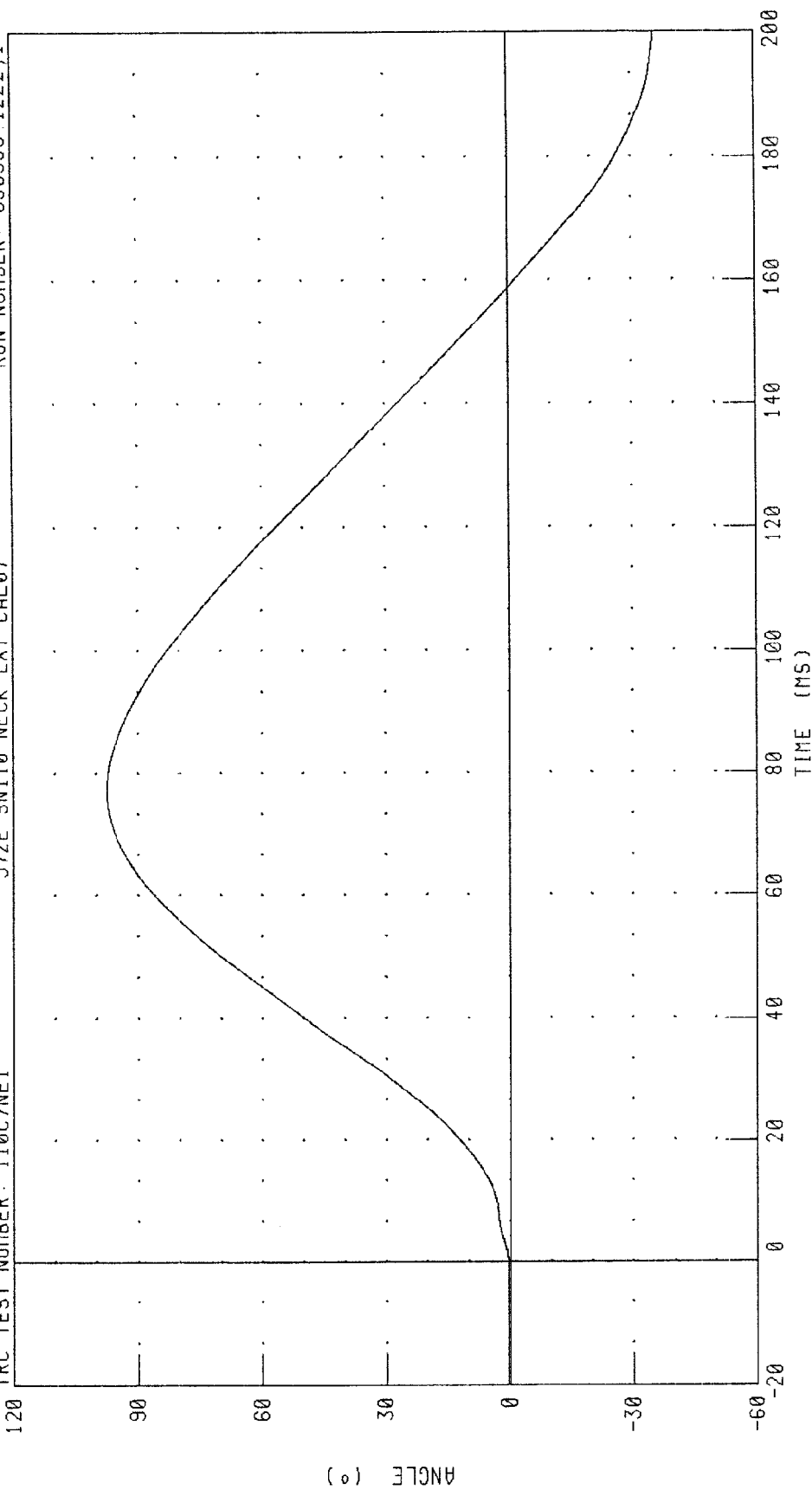
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 110C7NE1

572E SN110 NECK EXT CAL07

RUN NUMBER: 090398.1222,1



CHANNEL: TOTAN FILTER: CH. CLASS 60

PEAK DATA: 97.43 ° @ 77.12 MS, -35.78 ° @ 200.00 MS

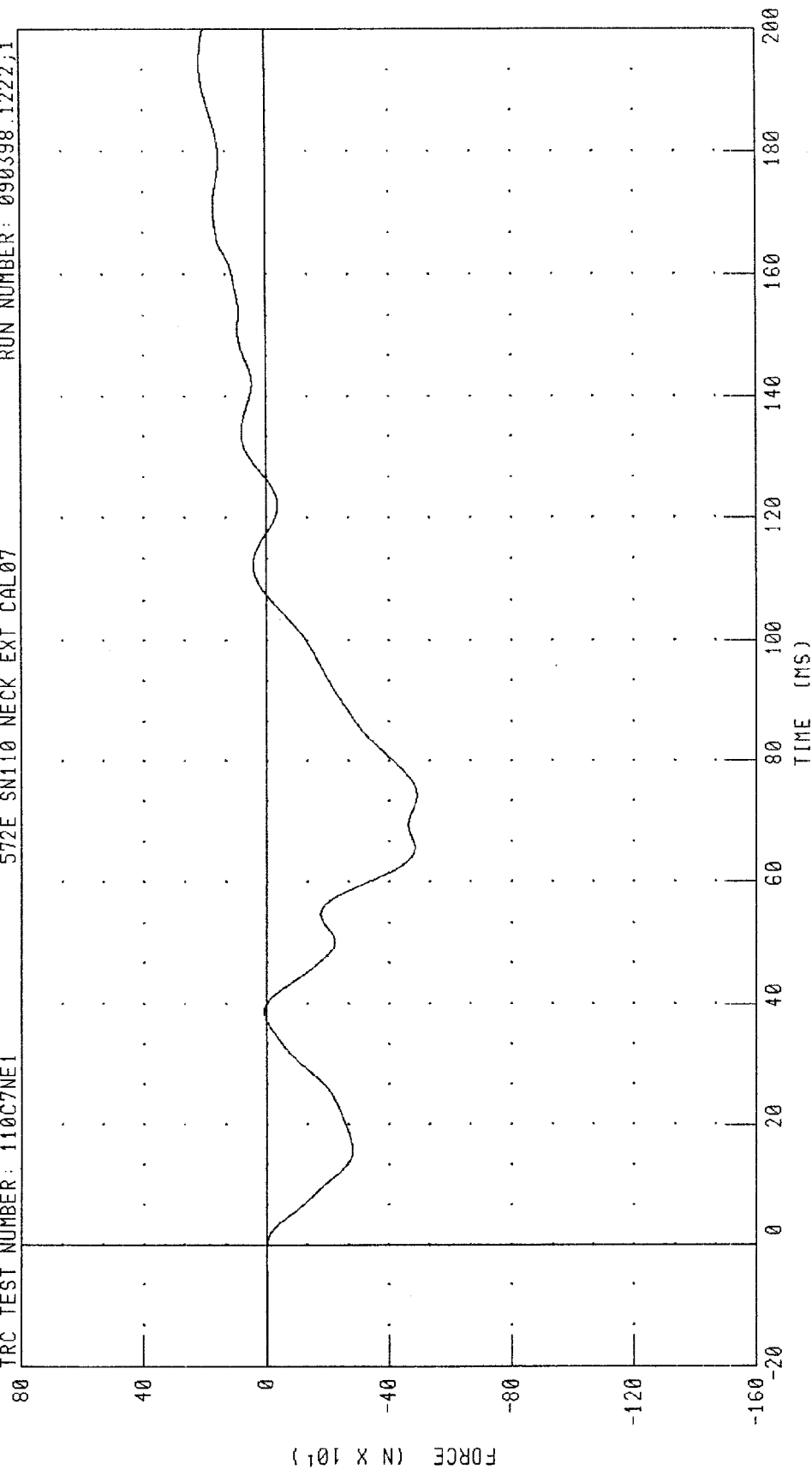
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 110C7NE1

572E SN110 NECK EXT CAL07

RUN NUMBER: 090398.1222;1



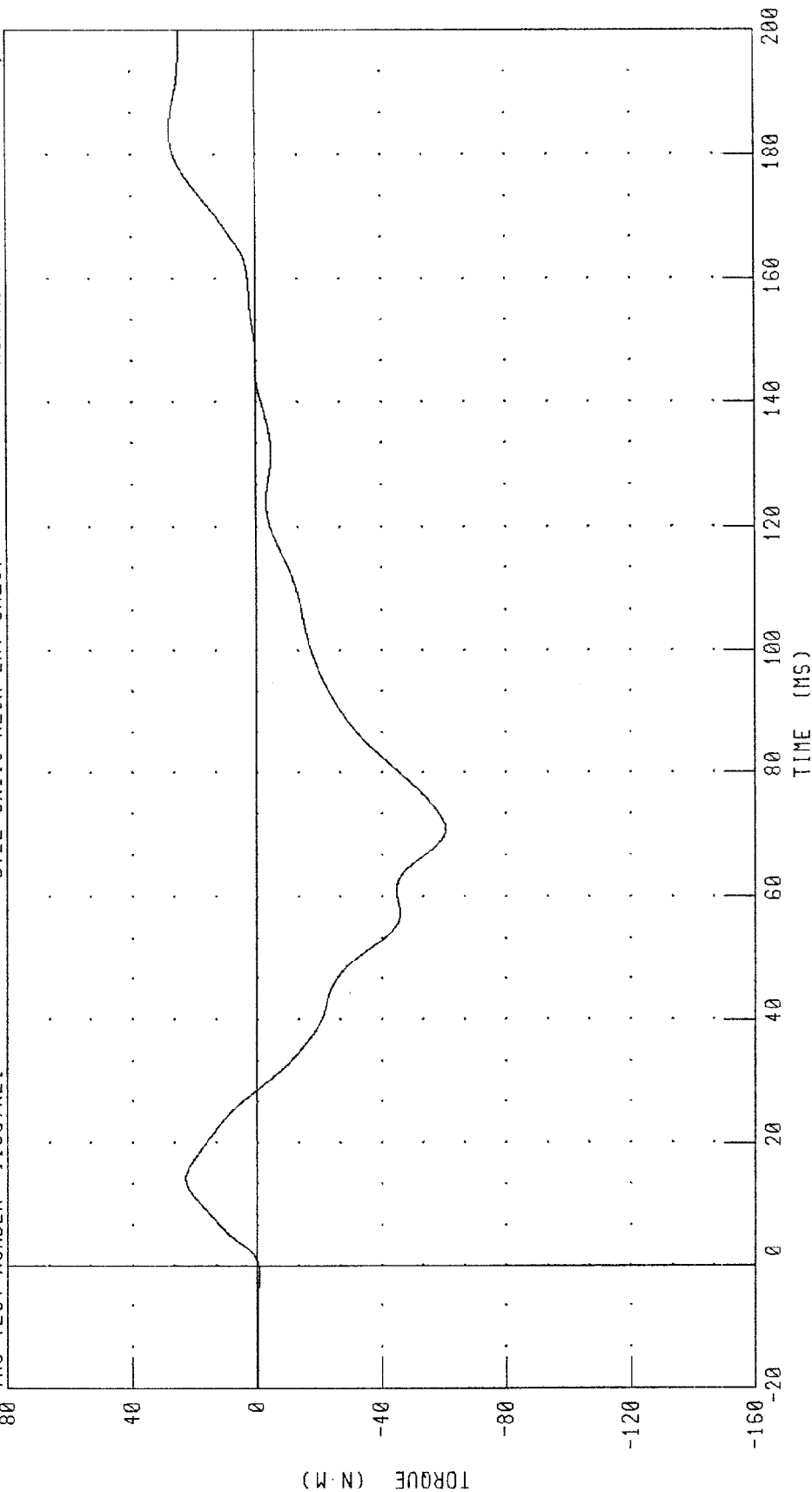
CHANNEL: NEKXF FILTER: CH. CLASS 60

PEAK DATA: 214.48 N @ 194.40 MS, -492.02 N @ 74.40 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 110C7NE1 572E SN110 NECK EXT CAL07 RUN NUMBER: 090398.1222;1



PEAK DATA: 27.67 N-M @ 183.84 MS, -60.55 N-M @ 70.96 MS

CHANNEL: NEKYM FILTER: CH. CLASS 60

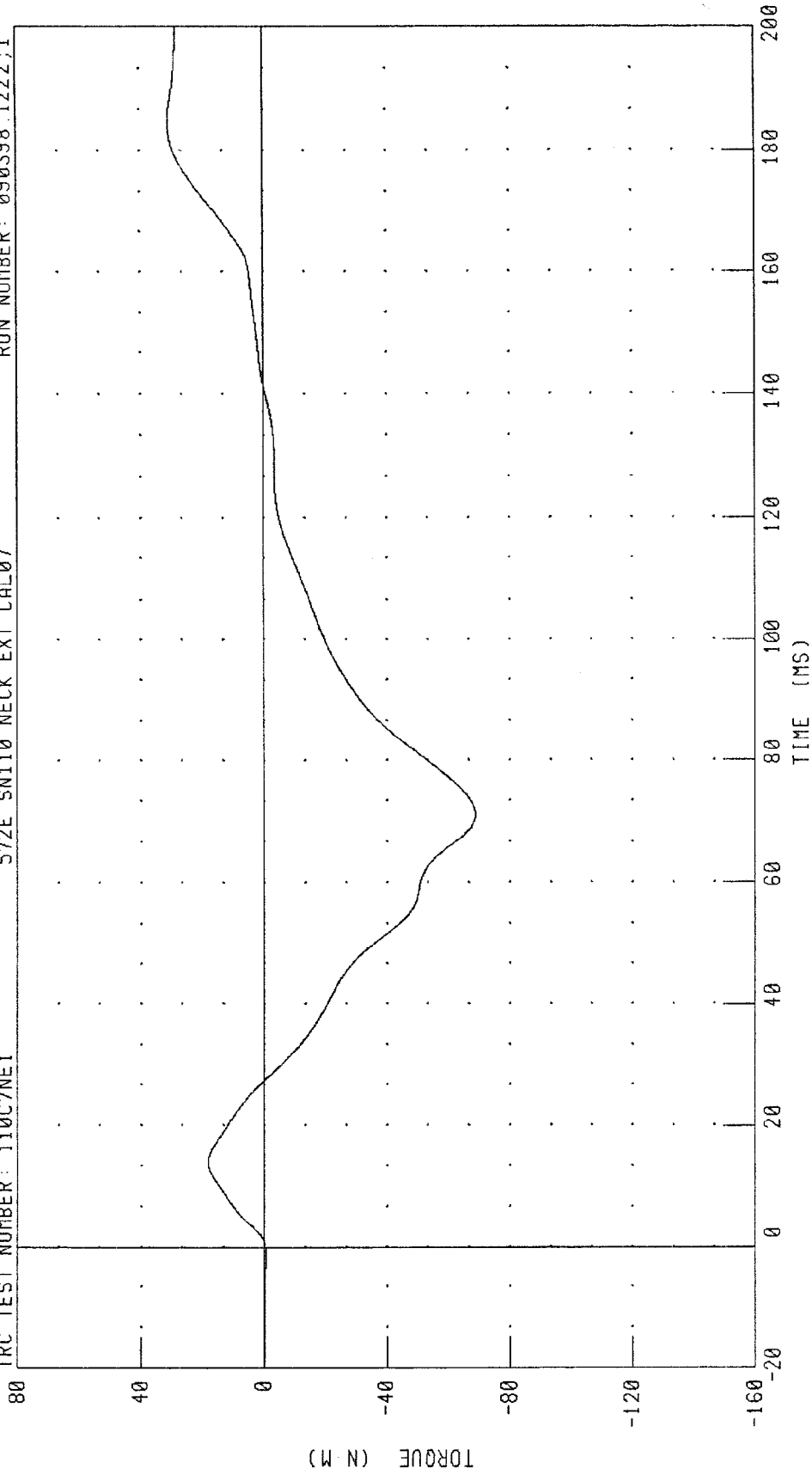
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 110C7NE1

572E SN110 NECK EXT CAL07

RUN NUMBER: 090398.1222;1



CHANNEL: NEKOM FILTER: CH. CLASS 60

PEAK DATA: 30.72 N.M @ 184.64 MS; -68.90 N.M @ 71.12 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III 50th

02-SEP-98

TRC INC.

TEST NO: 110C7TH1

572E SN110 H.S.THORAX CAL07

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	55.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.62 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	72.4 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5734. N
INTERNAL HYSTERESIS	69% - 85%	70.8%

TEST MEETS SPECIFICATIONS

TECHNICIAN By Cuth

RUN NUMBER: 090298.1333;3

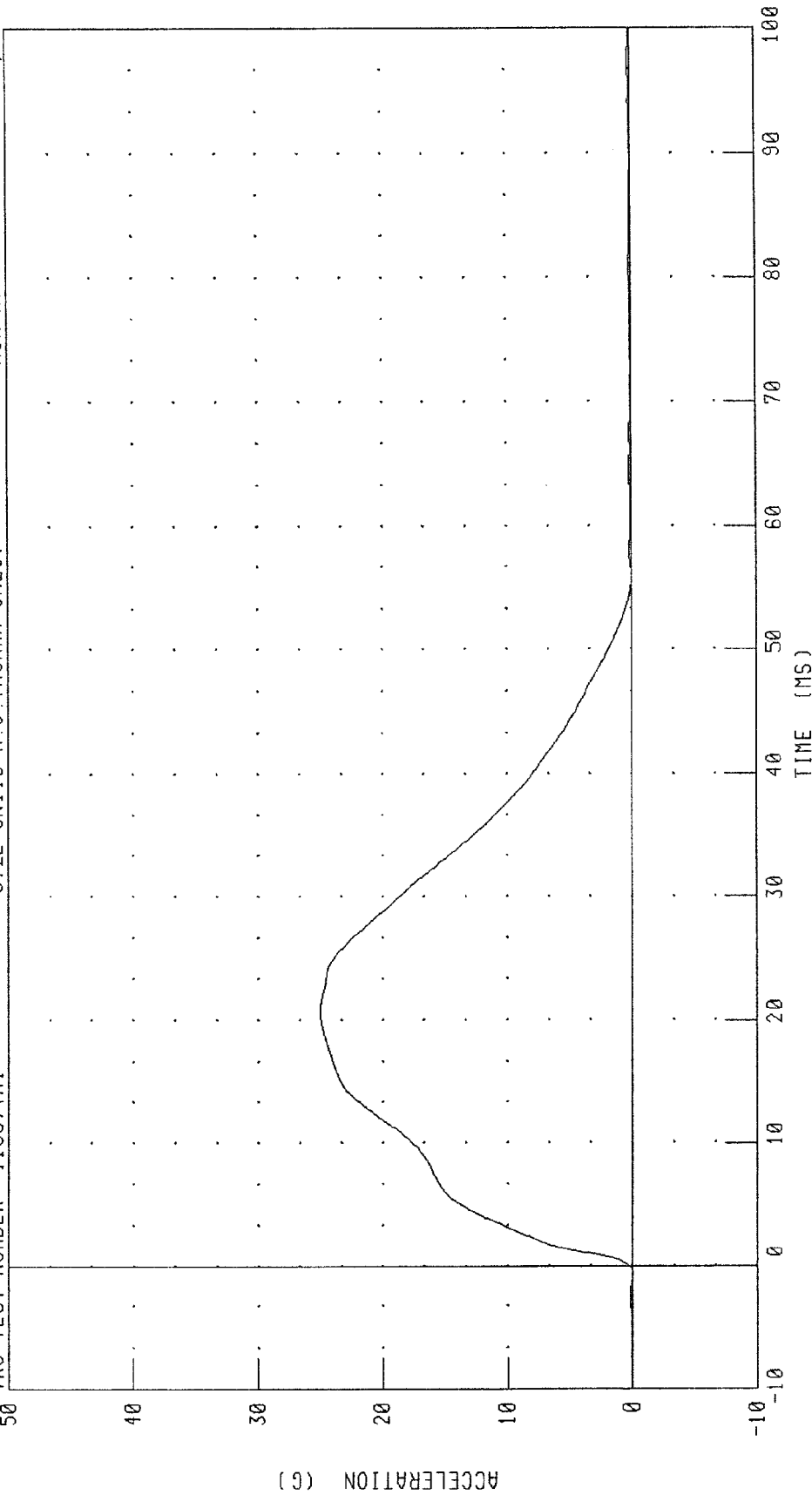
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 110C7TH1

572E SN110 H.S. THORAX CAL07

RUN NUMBER: 090298.1334,3

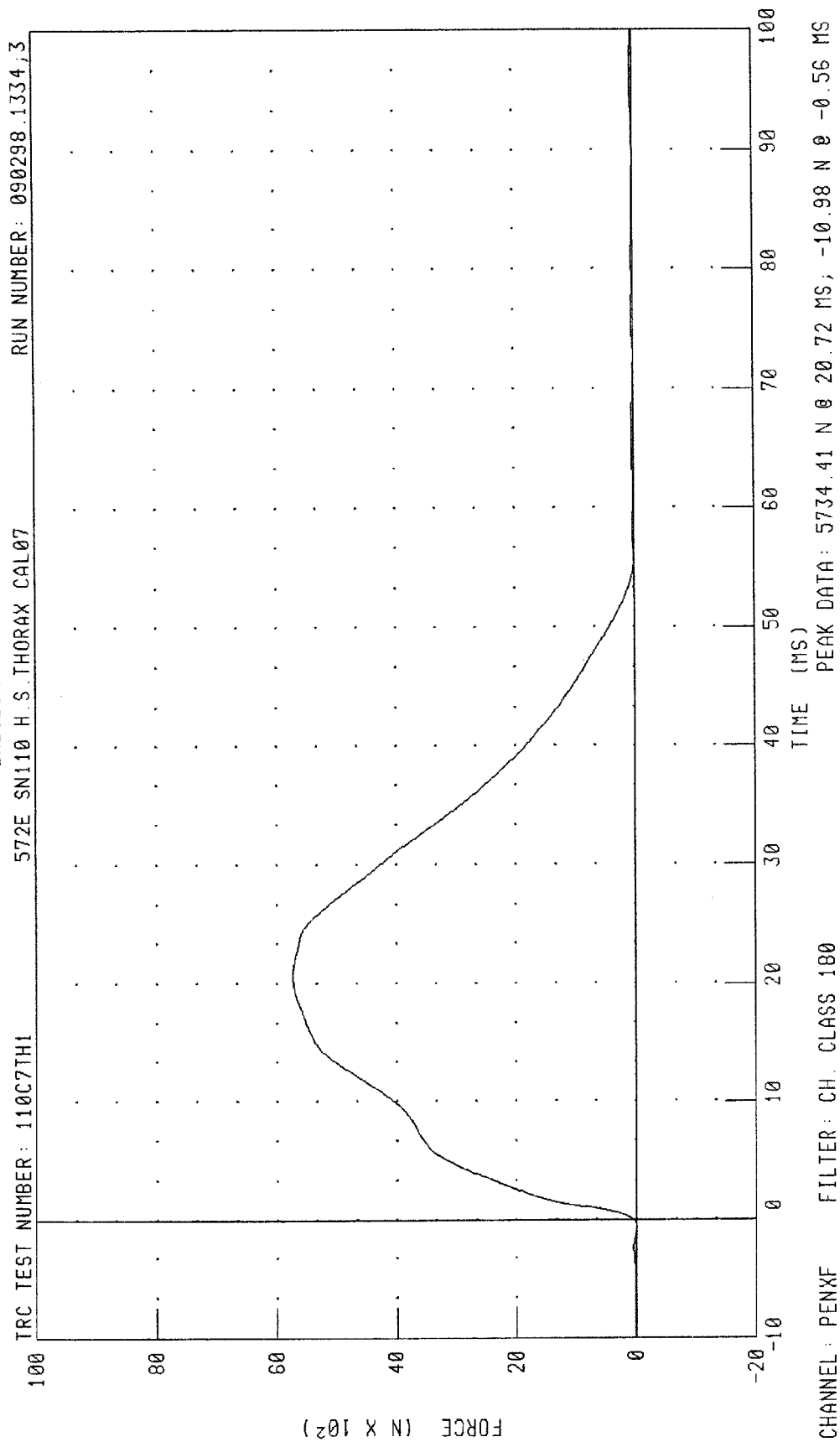


PEAK DATA: 25.03 G @ 20.72 MS; -0.05 G @ -0.56 MS

FILTER: CH. CLASS 180

CHANNEL: PENXC

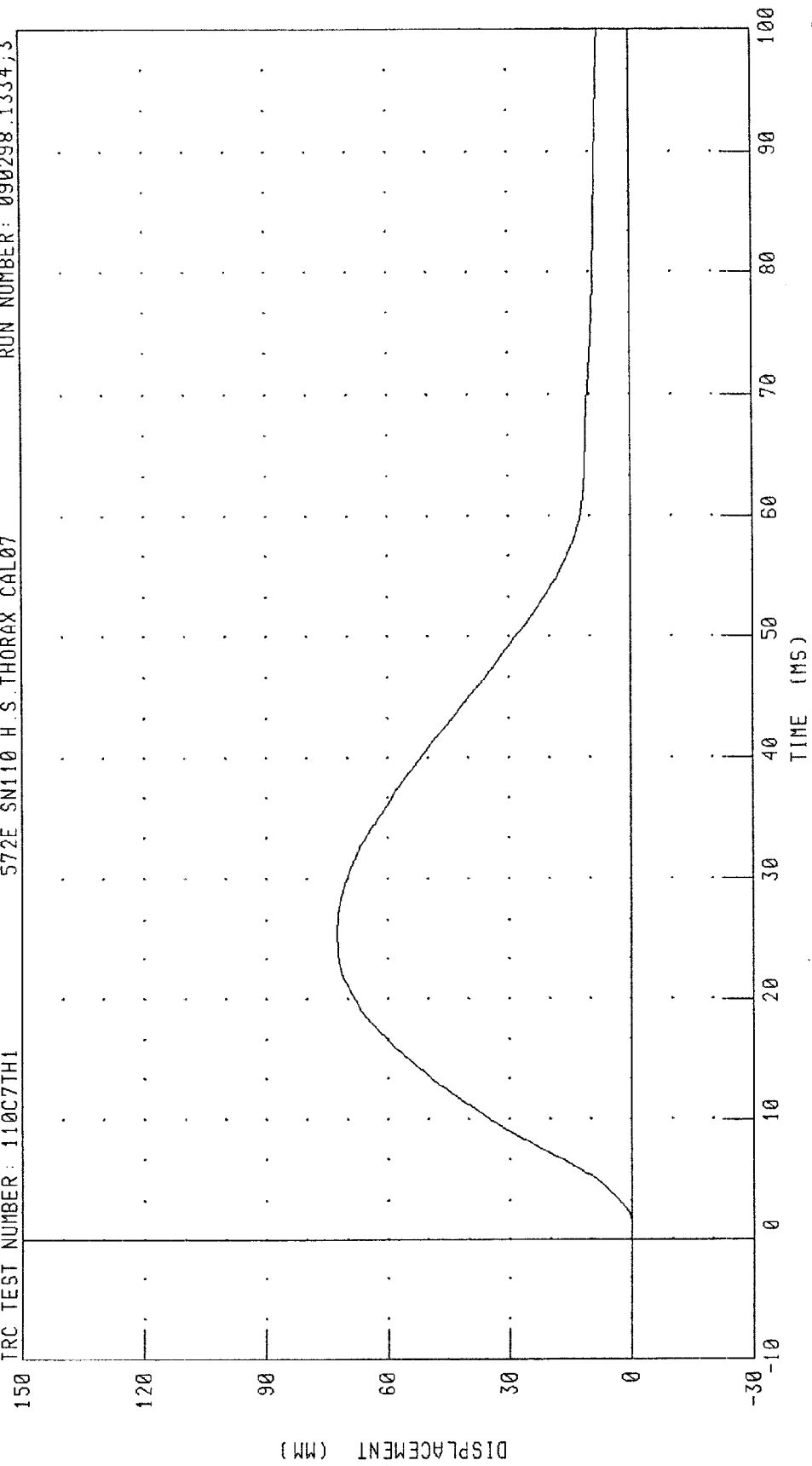
PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM FORCE



PART 572-E HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

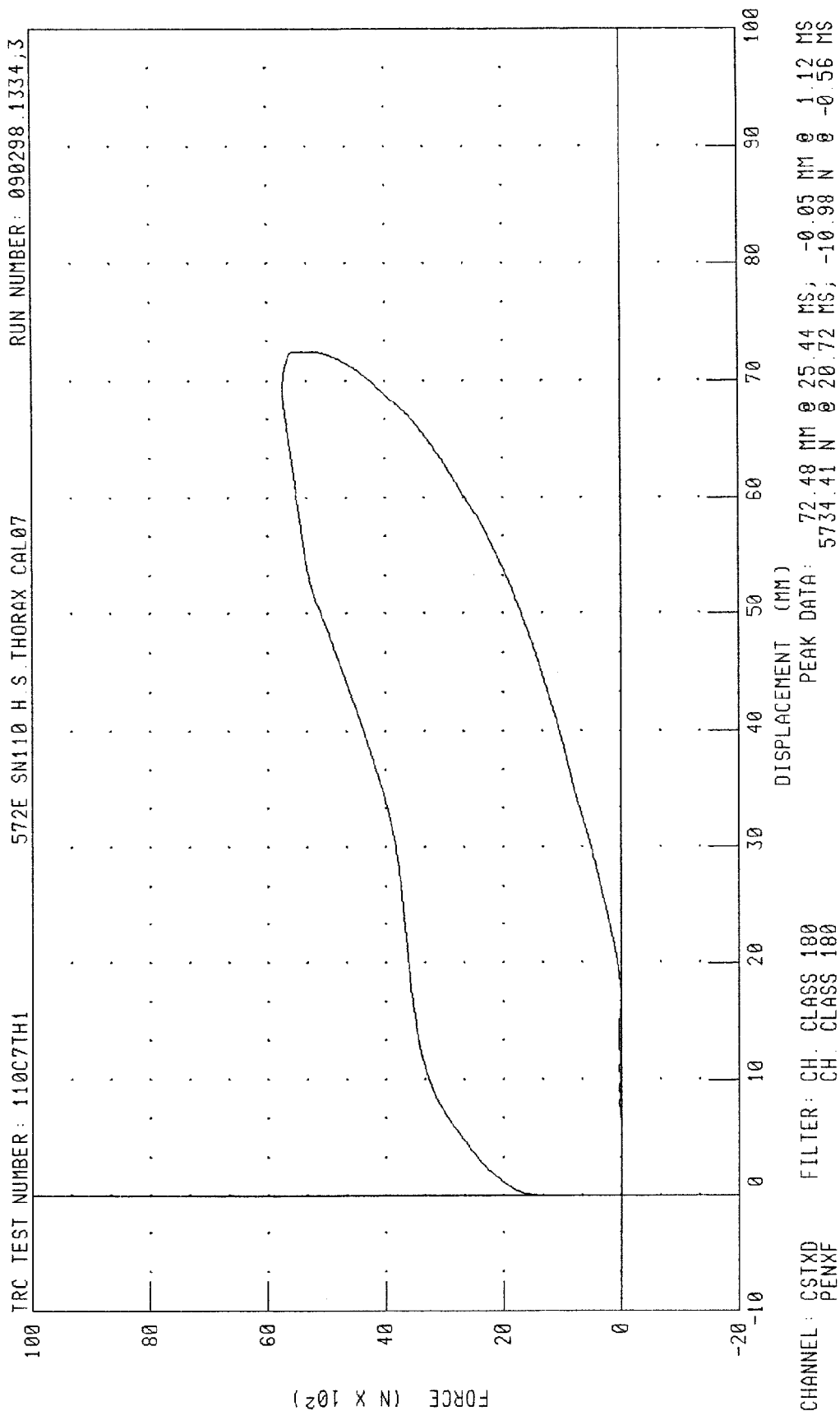
TRC TEST NUMBER: 110C7TH1 572E SN110 H.S. THORAX CAL07 RUN NUMBER: 090298.1334,3



CHANNEL: CSTXD FILTER: CH. CLASS 180

PEAK DATA: 72.48 MM @ 25.44 MS; -0.05 MM @ 1.12 MS

PART 572-E HYBRID III THORAX CALIBRATION
CHEST DISPLACEMENT VS PENDULUM FORCE



TRANSPORTATION RESEARCH CENTER INC.

RIGHT HIP JOINT FEMUR FLEXION TEST

HYBRID III PART 572E

03-SEP-98

TRC INC.

TEST NO: 110C7HR1

572E SN 110 HIPFLEX CAL 07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	55.0 %
ROTATION RATE	5 - 10 deg/sec	YES
TORQUE @ 30 deg ROTATION	<= 94.9 Nm	80.8 Nm
ROTATION @ 203.4 Nm TORQUE	40 - 50 deg.	45.6 deg.

TEST MEETS SPECIFICATIONS

TECHNICIAN

By Carl

RUN NUMBER: 090398.1212;1

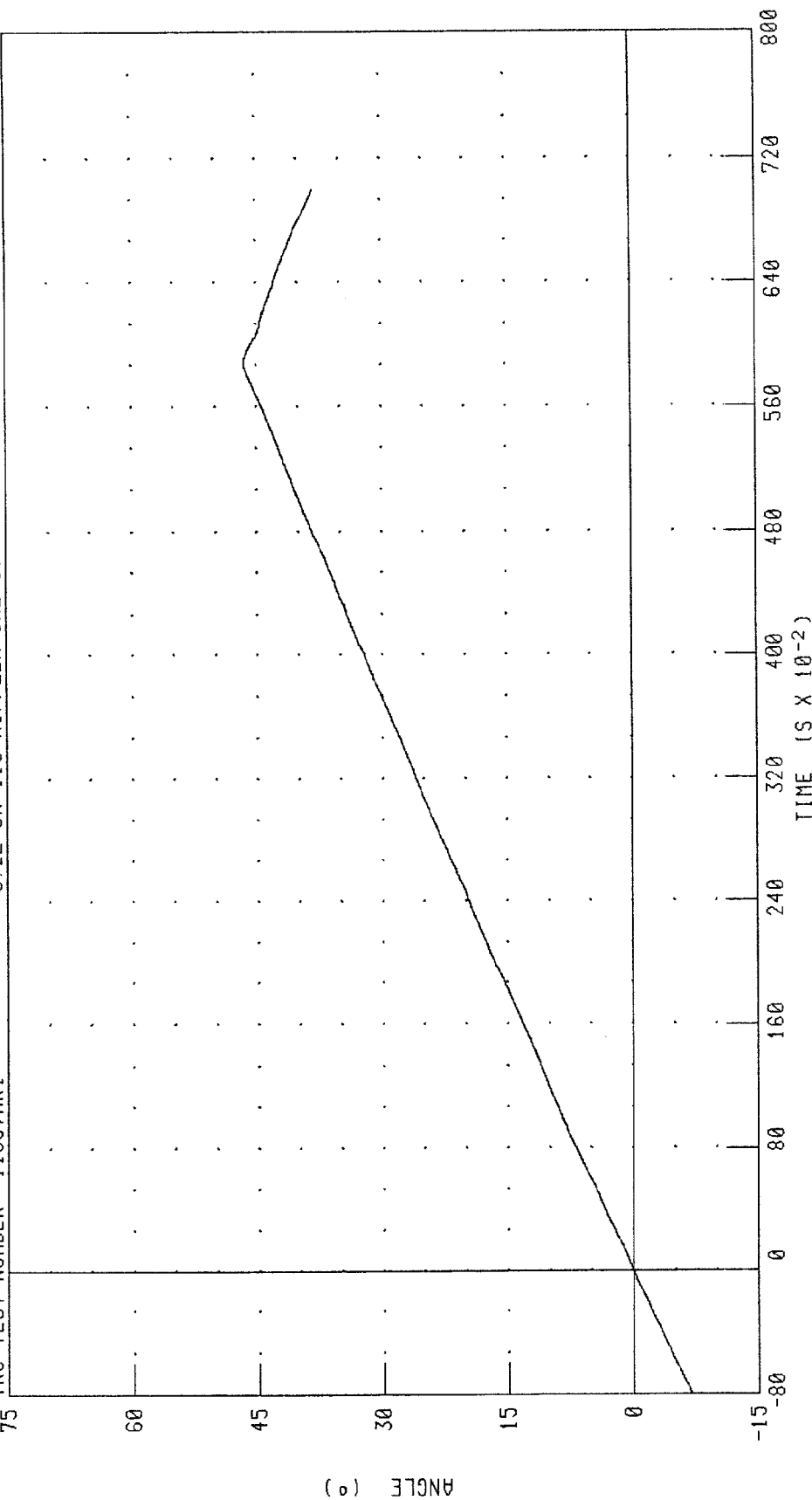
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

RIGHT HIP FLEXION ROTATION

TRC TEST NUMBER: 110C7HR1

572E SN 110 HIPFLEX CAL 07

RUN NUMBER: 090398.1213.1



CHANNEL: RHPXD FILTER: CH. CLASS 60

PEAK DATA: 46.48 ° @ 5.86 S, -9.95 ° @ -1.00 S

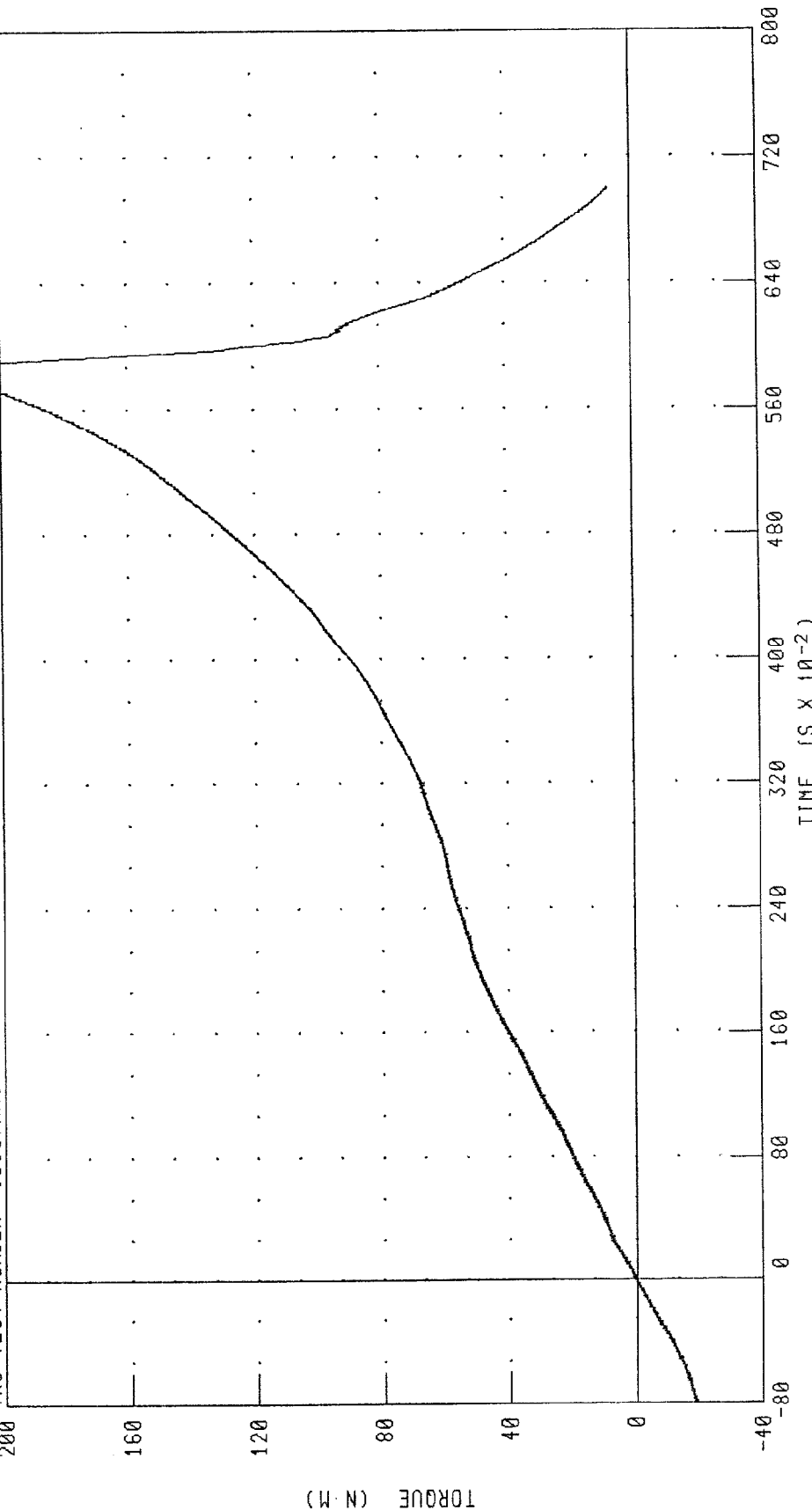
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

RIGHT HIP FLEXION MOMENT

TRC TEST NUMBER: 110C7HR1

572E SN 110 HIPFLEX CAL 07

RUN NUMBER: 090398.1213;1

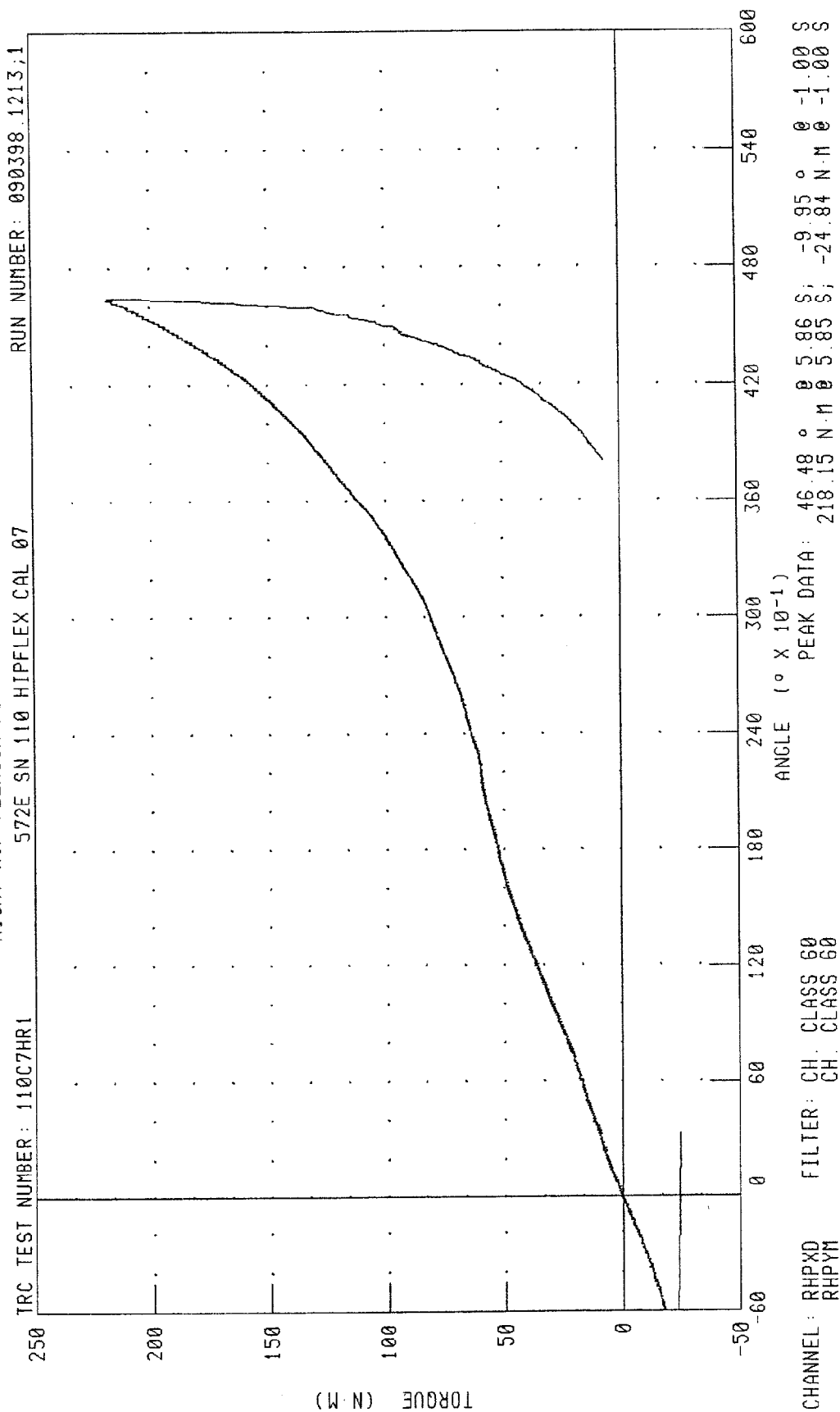


TIME (S X 10⁻²)

PEAK DATA: 218.15 N·M @ 5.85 S; -24.84 N·M @ -1.00 S

CHANNEL: RHPYM FILTER: CH. CLASS 60

HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES RIGHT HIP FLEXION MOMENT VS ROTATION ANGLE



TRANSPORTATION RESEARCH CENTER INC.

LEFT HIP JOINT FEMUR FLEXION TEST

HYBRID III PART 572E

03-SEP-98

TRC INC.

TEST NO: 110C7HL1

572E SN 110 HIPFLEX CAL 07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	55.0 %
ROTATION RATE	5 - 10 deg/sec	YES
TORQUE @ 30 deg ROTATION	<= 94.9 Nm	64.9 Nm
ROTATION @ 203.4 Nm TORQUE	40 - 50 deg.	46.6 deg.

TEST MEETS SPECIFICATIONS

TECHNICIAN

Ray Cull

RUN NUMBER: 090398.1126;1

HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

LEFT HIP FLEXION ROTATION

572E SN 110 HIPFLEX CAL 07

TRC TEST NUMBER: 110C7HL1

75

60

45

30

15

0

-15

ANGLE (°)

0

80

160

240

320

400

480

560

640

720

800

TIME (S X 10⁻²)

PEAK DATA: 47.30 ° @ 6.32 S; -9.37 ° @ -1.00 S

CHANNEL: LHPXD

FILTER: CH. CLASS 60

RUN NUMBER: 090398.1127.1

75

60

45

30

15

0

-15

ANGLE (°)

0

80

160

240

320

400

480

560

640

720

800

TIME (S X 10⁻²)

PEAK DATA: 47.30 ° @ 6.32 S; -9.37 ° @ -1.00 S

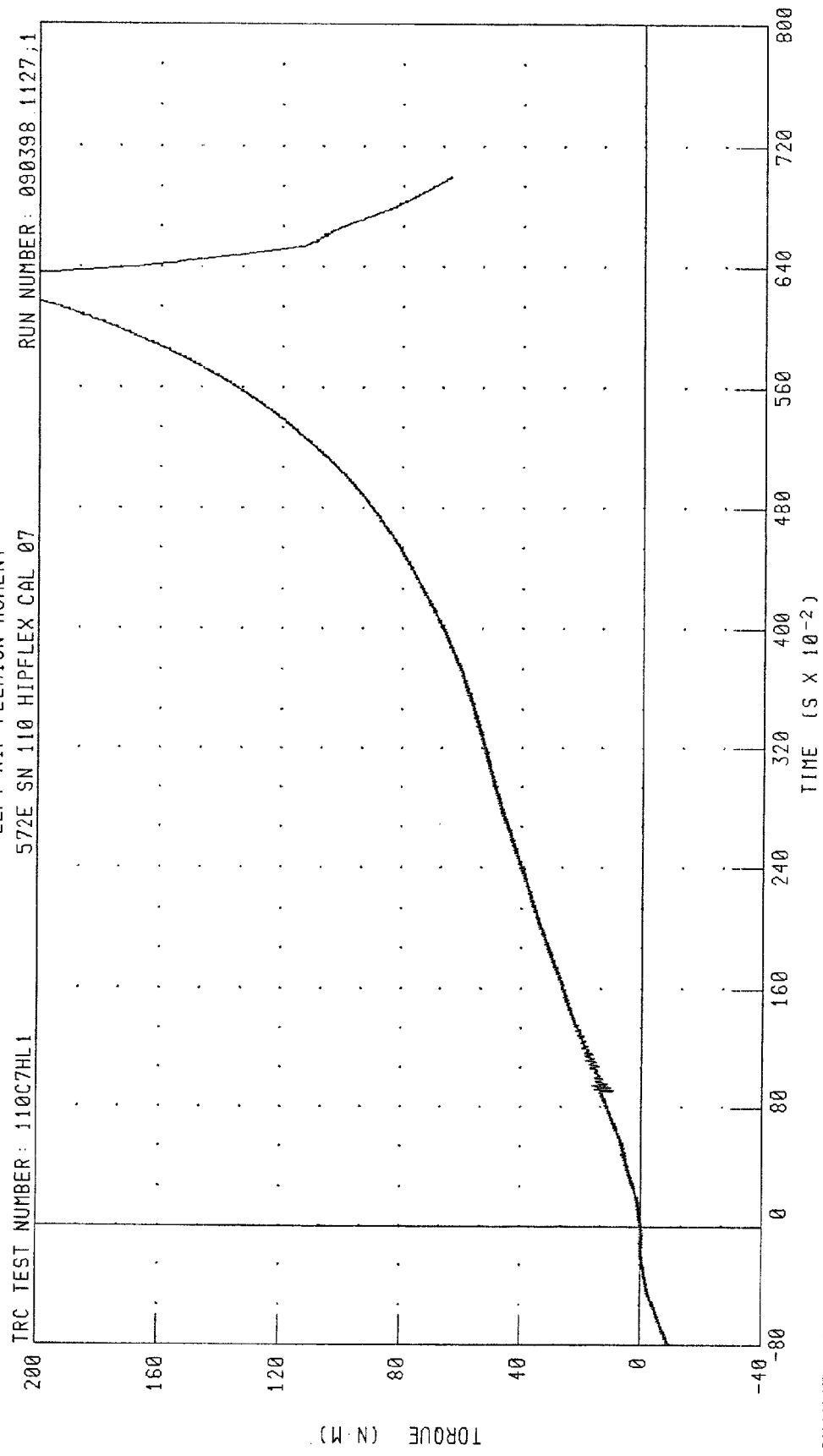
CHANNEL: LHPXD

FILTER: CH. CLASS 60

RUN NUMBER: 090398.1127.1

HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

LEFT HIP FLEXION MOMENT



TRC TEST NUMBER: 110C7HL1

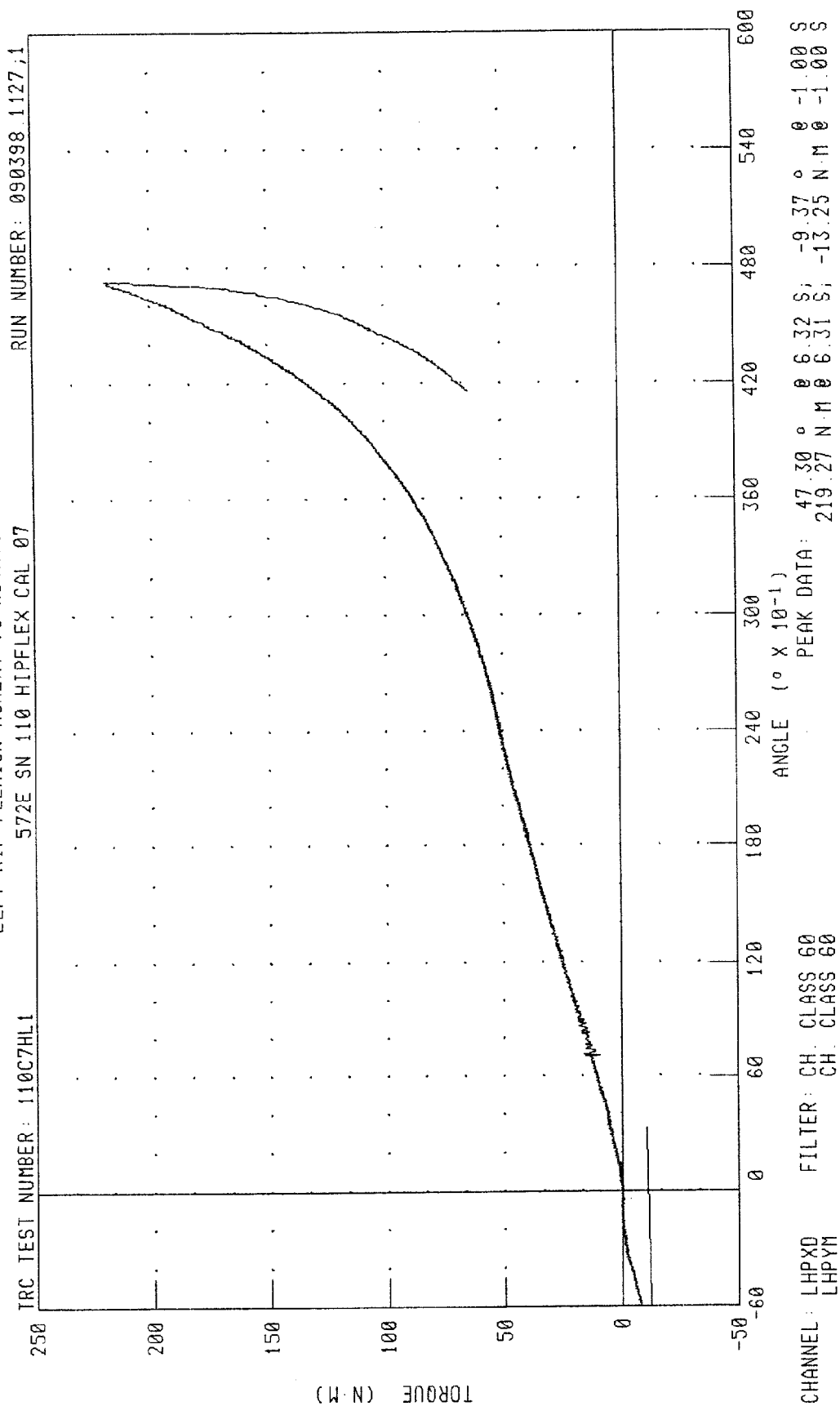
572E SN 110 HIPFLEX CAL 07

RUN NUMBER: 090398.1127.1

PEAK DATA: 219.27 N-M @ 6.31 S, -13.25 N-M @ -1.00 S

CHANNEL: LHPYM FILTER: CH. CLASS 60

HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES LEFT HIP FLEXION MOMENT VS ROTATION ANGLE



TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III 50th

03-SEP-98

TRC INC.

TEST NO: 110C7RK1

572E SN110 RIGHT KNEE CAL 07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	55.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.08 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5606.4 N

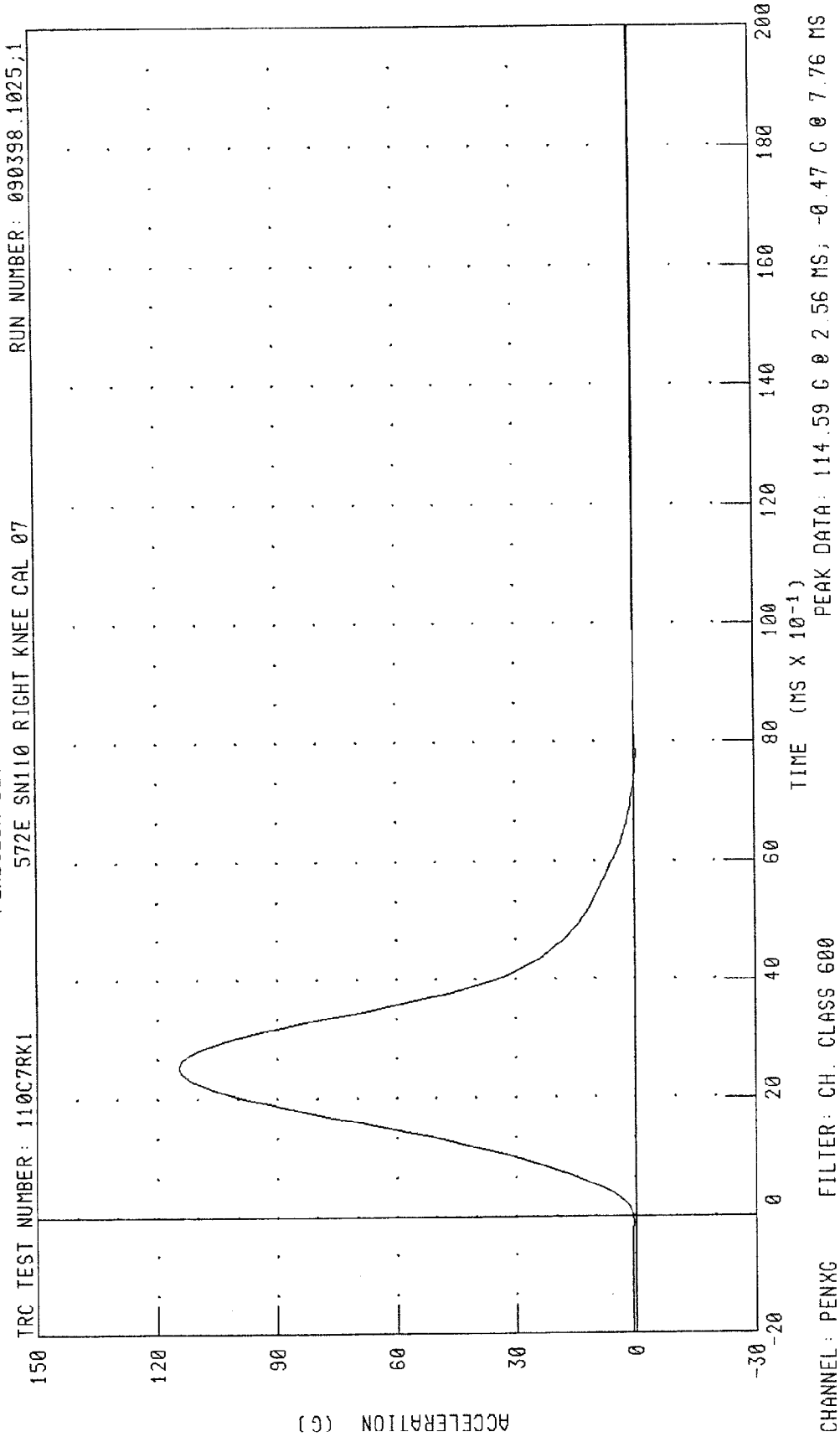
TEST MEETS SPECIFICATIONS

TECHNICIAN

By [Signature]

RUN NUMBER: 090398.1025;1

PART 572-E HYBRID III RIGHT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)



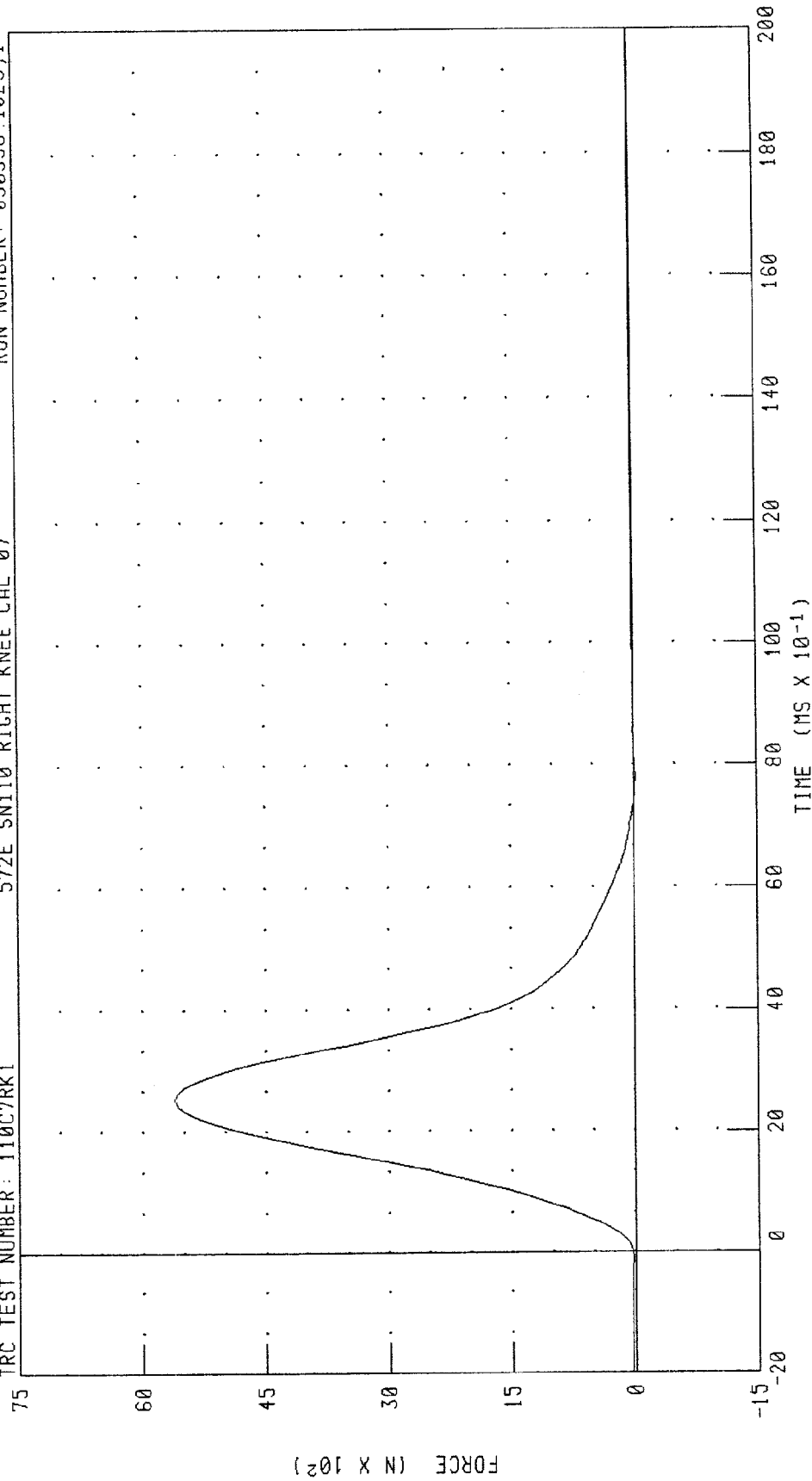
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

572E SN110 RIGHT KNEE CAL 07

RUN NUMBER: 090398 1025,1

TRC TEST NUMBER: 110C7RK1



CHANNEL: PENXF

FILTER: CH. CLASS 600

TIME (MS X 10⁻¹)

PEAK DATA: 5606.50 N @ 2.56 MS, -22.76 N @ 7.76 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III 50th

03-SEP-98

TRC INC.

TEST NO: 110C7LK1

572E SN110 LEFT KNEE CAL 07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	55.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.08 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5533.6 N

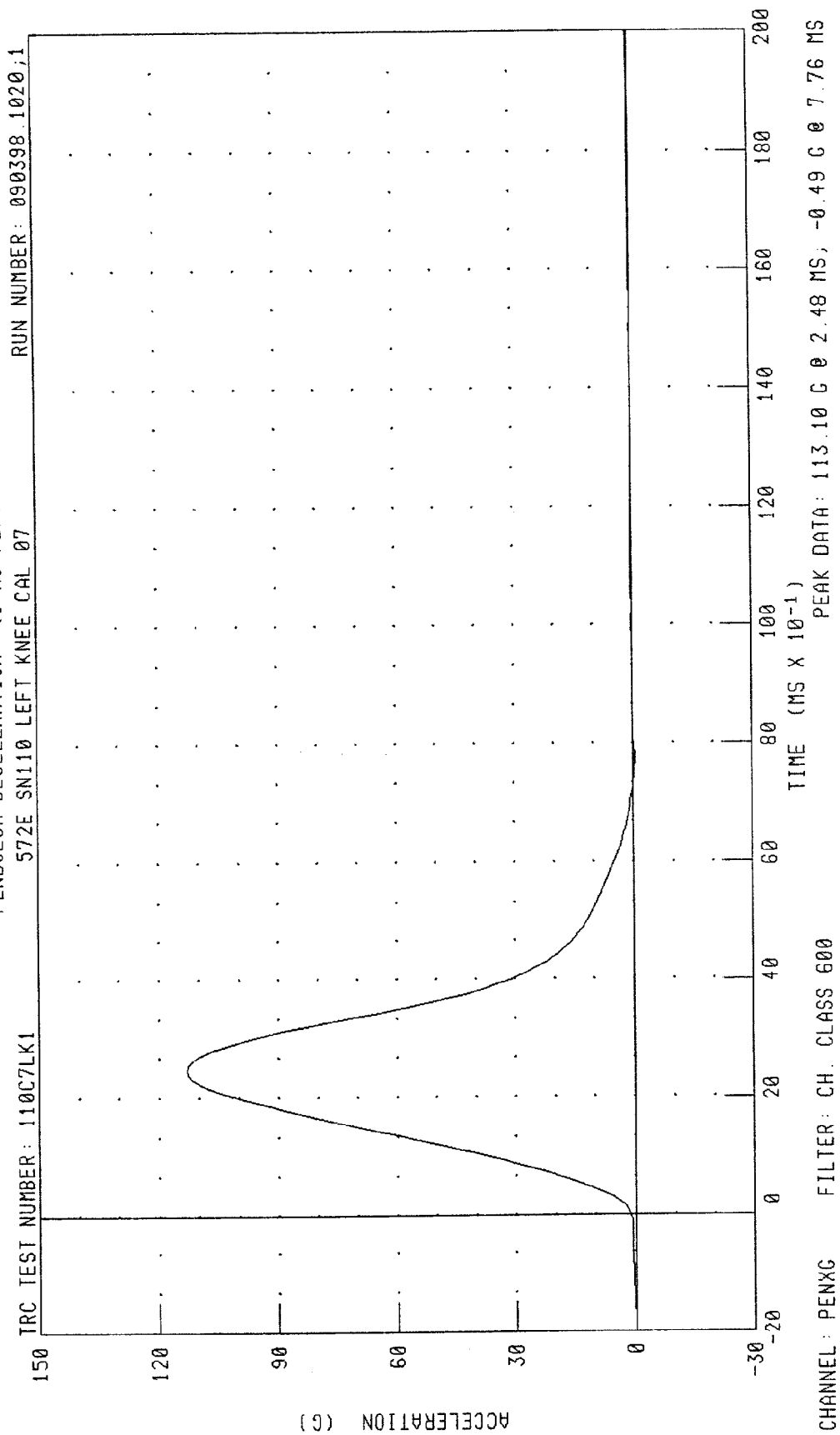
TEST MEETS SPECIFICATIONS

TECHNICIAN

B. J. Cult

RUN NUMBER: 090398.1019;1

PART 572-E HYBRID III LEFT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)



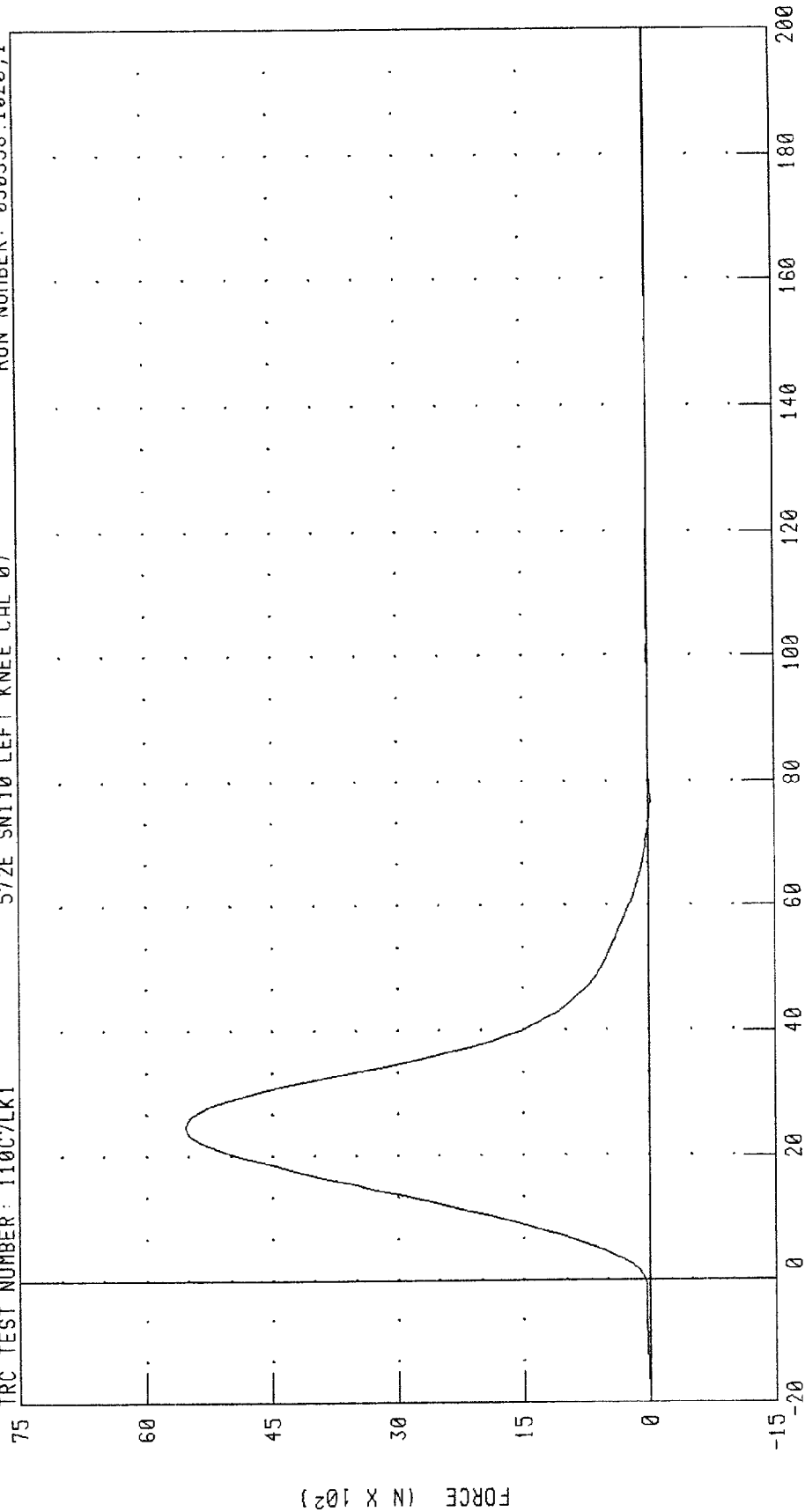
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 11007LK1

572E SN110 LEFT KNEE CAL 07

RUN NUMBER: 090398.1020;1



PEAK DATA: 5533.64 N @ 2.48 MS; -23.99 N @ 7.76 MS

CHANNEL: PENXF FILTER: CH. CLASS 600

Appendix D

Miscellaneous Test Information

Sign Convention
NHTSA Data Tape Reference Guide

<u>Accelerometers:</u>	+X: Forward	
	+Y: Leftward	
	+Z: Upward	
<u>Potentiometers:</u>	+Chest longitudinal deflection:	Outward
	+Chest lateral deflection:	Leftward
	+Seat belt displacement:	Outward
	+Seat belt extension:	Elongation
	+Knee slider displacement:	Distance between femur and tibia increased (in relation to a seated dummy)
<u>Load cells:</u>	+Femur force:	Tension
	+Seat belt force:	Tension
	+Barrier force:	Tension
<u>Neck load cells:</u>	+X force:	Head pushed forward
	+y force:	Head pushed leftward
	+Z force:	Head pulled upward (tension on neck)
	+X moment:	Right ear rotating toward right shoulder
	+Y moment:	Chin rotating toward chest
	+Z moment:	Chin rotating toward left shoulder
<u>Tibia load cells:</u>	+X force:	Tension
	+Y force:	Tension
	+Z force:	Tension
	+X moment:	Bottom of tibia moving leftward
	+Y moment:	Bottom of tibia moving rearward

Frequency Response Classes
SAE J211 OCT88

<u>Typical Test Measurements</u>	<u>Channel Class</u>
Vehicle Structural Accelerations for use in:	
Total vehicle comparison	60
Collision simulation input	60
Component analysis	600
Integration for velocity or displacement	180
Barrier Face Forces	60
Belt Restraint System Loads	60
Anthropomorphic Test Device	
Head accelerations (linear and angular)	1000
Neck	
Forces	1000
Moments	600
Thorax	
Spine accelerations	180
Rib accelerations	1000
Sternum accelerations	1000
Deflections	180
Lumbar	
Forces	1000
Moments	1000
Pelvis	
Accelerations	1000
Forces	1000
Moments	1000
Femur/Knee/Tibia/Ankle	
Forces	600
Moments	600
Displacements	180
Sled Accelerations	60
Steering Column Loads	600
Head form Accelerations	1000