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Report Number TRC-95-N12

New Car Assessment Program (NCAP)

Frontal Barrier Impact Test

General Motors Corporation

1995 Chevrolet Lumina

4-door sedan

NHTSA Number: MS0110

TRC Test Number: 950209

Prepared By:

Transportation Research Center Inc.

10820 State Route 347

East Liberty, Ohio 43319



March 6, 1995

Final Report

Prepared For:

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Office Of Market Incentives

Room No. 5313 (NRM-22)

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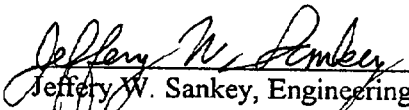
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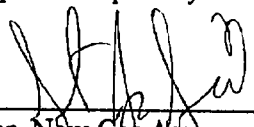
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16. Abstract A 56 kph (35 mph) frontal load cell barrier impact test was conducted on a 1995 Chevrolet Lumina 4-door sedan, NHTSA No. MS0110, at Transportation Research Center Inc. on February 9, 1995. This test was conducted to obtain new car assessment and research data indicant of FMVSS 208, 212, 219 (partial), and 301 performance. The barrier impact velocity was 56.2 kph. The vehicle's maximum static crush was 552 millimeters. The ambient temperature was 23° C. The driver's Head Injury Criteria (HIC) was 394. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 42.1 g. The driver's chest maximum deflection was 32 millimeters. The driver's left and right femur maximum axial forces were 4689 N and 3086 N, respectively. The passenger's HIC was 560. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 45.7 g. The passenger's chest maximum deflection was 31 millimeters. The passenger's left and right femur maximum axial forces were 3601 N and 2235 N, respectively.			
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METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

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

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

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
km	kilometers	1.1	miles	mi
		0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares (10,000 m ²)	2.5	acres	
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
VOLUME				
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m ³	cubic meters	35	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³
TEMPERATURE (exact)				
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F

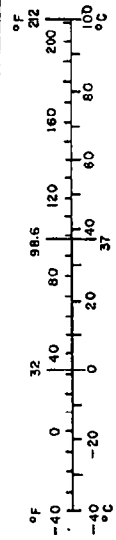


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Section 1.0

Purpose and Test Procedure

Purpose

This 56 kph (35 mph) frontal barrier impact test is part of the New Car Assessment Program (NCAP) conducted for the National Highway Traffic Safety Administration's (NHTSA) Office of Market Incentives by Transportation Research Center Inc. (TRC) under Contract Number DTNH22-90-D-22121.

The purpose of this test was to obtain new car assessment and research data for vehicle crashworthiness and occupant restraint system performance for the subject vehicle, a 1995 Chevrolet Lumina 4-door sedan, NHTSA Number MS0110, at an impact speed in excess of the current 48 kph (30 mph) FMVSS 208 requirements.

Test Procedure

This test was conducted in accordance with NHTSA's Laboratory Indicant Test Procedure, New Car Assessment Program, dated January 1, 1990. Data was obtained indicant of FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Retention"; FMVSS 219, "Windshield Zone Intrusion"; and FMVSS 301, "Fuel System Integrity," performance.

The test vehicle was instrumented with nine (9) accelerometers to measure longitudinal axis accelerations. The driver's and passenger's restraint systems were instrumented with load cells to measure lap and shoulder belt forces and potentiometers to measure shoulder belt stretch and spoolout. The vehicle impacted a frontal load cell barrier instrumented with thirty-six (36) barrier face load cells. The vehicle's specified impact velocity range was 55.5 to 57.1 kph.

The test vehicle contained two (2) Part 572E 50th percentile adult male anthropomorphic test devices (dummies). The dummies were positioned in the front outboard designated seating positions according to the dummy placement procedures specified in Appendices VII and VIII of the Laboratory Indicant Test Procedure. This test was the third use of the driver dummy and the third use of the passenger dummy.

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

The eighty-nine (89) data channels were multiplexed and recorded on two (2) 14-track tape drives. The data was digitally sampled at 12,500 samples per second and processed per section IP11 of the Laboratory Indicant Test Procedure.

The crash event was recorded by one (1) real-time panning motion picture camera and sixteen (16) high-speed motion picture cameras. The pre- and post-test conditions were recorded by one (1) real-time motion picture camera.

The vehicle, occupant, and load cell barrier data are presented in Section 2.0. The occupant, camera, and vehicle measurements are presented in Section 3.0. Appendix A contains the still photographic prints. Appendix B contains the dummy, vehicle, and load cell barrier data plots. Appendix C contains the dummy certification data. Appendix D contains miscellaneous test information. Appendix E contains the restraint system instructions from the owner's manual.

Section 2.0

Frontal Barrier Impact Test Summary

Test Results Summary

This frontal load cell barrier test was conducted at TRC on February 9, 1995.

The test vehicle, a 1995 Chevrolet Lumina 4-door sedan, NHTSA Number MS0110, was equipped with a 3.1-liter transverse engine, automatic transmission, power steering, and power brakes. The vehicle's test weight was 1737 kg. The vehicle's impact speed was 56.2 kph. The vehicle sustained 552 mm of static crush during the impact.

The driver's Head Injury Criteria (HIC) was 394. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 42.1 g. The driver's chest maximum deflection was 32 mm. The driver's left and right femur maximum axial forces were 4689 N and 3086 N, respectively.

The passenger's HIC was 560. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 45.7 g. The passenger's chest maximum deflection was 31 mm. The passenger's left and right femur maximum axial forces were 3601 N and 2235 N, respectively.

There was no loss of windshield periphery retention. There was no penetration through the windshield. Following the impact, no fluid spilled from the vehicle's fuel system prior to the static rollover test or during any portion of the static rollover test.

Data Acquisition Explanations

The driver's pelvis Z-axis accelerometer, PEVZG1, recorded questionable data spikes from 20 to 140 ms. The questionable data affected the driver's pelvis resultant acceleration calculation, PEVRG1.

Table 1 Crash Test Summary

NHTSA number:	MS0110	
Test type:	Frontal Load Cell Barrier	
Test date:	02/09/95	
Test time:	1619	
Ambient temperature:	23° C	
Vehicle year/make/ model/body style:	1995/Chevrolet/Lumina/4-door sedan	
Vehicle test weight:	1737 kg	
Impact angle ¹ :	0°	
Impact velocity ² :	Primary = 56.2 kph Secondary = 56.2 kph	
Maximum static crush:	552 mm	
Average rebound:	1065 mm	
Dummies:	Driver #142	Passenger #192
Type:	Part 572 E	Part 572 E
Location:	Left front	Right front
Restraint:	Airbag and 3-point unbelt	Airbag and 3-point unbelt
Number of data channels:	89	
Number of cameras:	High-speed 16 Real-time 2	

¹ With respect to tow track centerline.

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

Table 2 Test Vehicle Information

Vehicle year/make/
model/body style: 1995/Chevrolet/Lumina/4-door sedan

Color: Maroon

VIN: 2G1WL52M8S1145494

NHTSA number: MS0110

Engine data:

 Placement: Transverse

 Cylinders: 6

 Displacement 3.1 liters

Transmission data: 4 speed, __manual, X automatic, __overdrive
 X FWD, __RWD, __4WD

Date vehicle received: 01/26/95

Odometer reading: 52

Dealer's name Bobby Layman Chevrolet, Inc.
and address: 3900 West Broad St.
 Columbus, OH 43228

Accessories:

Power steering	Yes	Automatic transmission	Yes
Power brakes	Yes	Automatic speed control	No
Power seats	No	Tilting steering wheel	Yes
Power windows	No	Telescoping steering wheel	No
Tinted glass	Yes	Air conditioning	Yes
Radio	Yes	Anti-skid brake	No
Clock	Yes	Rear window defroster	Yes
Other	None		

Certification data from vehicle's label:

Vehicle manufactured by: General Motors Corporation of Canada

Date of manufacture: 1/95

VIN: 2G1WL52M8S1145494

GVWR: 2015 kg

GAWR: Front: 1112 kg

 Rear: 903 kg

Table 2 Test Vehicle Information, Cont'd.

Size of tires: P205/70R15

Tire pressure with maximum
capacity vehicle load:

Front: 300 kPa

Rear: 300 kPa

Spare tire: Goodyear T125/70D15

Type of front seats: Split bench

Tire & capacity data from vehicle's label:

Recommended tire size: P205/70R15

Recommended cold tire pressure:

Front: 240 kPa

Rear: 240 kPa

Designated seating capacity:

Front 3

Rear 3

Total 6

Vehicle capacity weight: 480 kg

Test vehicle attitude:

Delivered attitude: LF 732 mm; RF 741 mm; LR 753 mm; RR 755 mm

Pre-test attitude: LF 712 mm; RF 717 mm; LR 723 mm; RR 725 mm

Post-test attitude: LF 795 mm; RF 798 mm; LR 691 mm; RR 688 mm

Table 2 Test Vehicle Information Cont'd

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

Right front	471 kg	Right rear	283 kg
Left front	492 kg	Left rear	271 kg
Total front weight	963 kg	(63.5% of total vehicle weight)	
Total rear weight	554 kg	(36.5% of total vehicle weight)	
Total delivered weight	1517 kg		

Calculation of test vehicle's target test weight:

RCLW = Rated cargo and luggage weight

UDW = Unloaded delivered weight (1517 kg)

VCW¹ = Vehicle capacity weight (480 kg)

DSC = Designated seating capacity (6)

RCLW = VCW - 68 (DSC) = 480 - 68(6) = 72 kg

Target test weight = UDW + RCLW¹ + (Number of Hybrid III dummies x 76 kg/dummy)

Target test weight = 1517 + 72 + 152

Target test weight = 1741 kg

Weight of test vehicle with required dummies and 68 kg of cargo weight:

Right front	510 kg	Right rear	354 kg
Left front	532 kg	Left rear	341 kg
Total front weight	1042 kg	(60.0% of total vehicle weight)	
Total rear weight	695 kg	(40.0% of total vehicle weight)	
Total test weight	1737 kg	(0.2 % under target test weight)	

Weight of ballast secured in vehicle: 0 kg

Components removed to meet target test weight: Trunk lid, rear bumper, rear door glass, muffler

CG rearward of front wheel centerline: 1092 mm

Vehicle wheelbase: 2730 mm

¹ From the vehicle's recommended tire pressure label.

Table 3 Post-Impact Data

Test number: 950209
NHTSA number: MS0110
Test date: 02/09/95
Test time: 1619
Test type: Frontal load cell barrier
Impact angle: 0°
Ambient temperature
at impact area: 23° C
Temperature in
occupant compartment: 21° C
Impact velocity:
Primary 56.2 kph
Secondary 56.2 kph
Specified range 55.5 to 57.1 kph

Distance from vehicle to barrier:

Entering velocity trap 356 mm
Exiting velocity trap 51 mm

Test vehicle static crush:

Overall length of test vehicle:

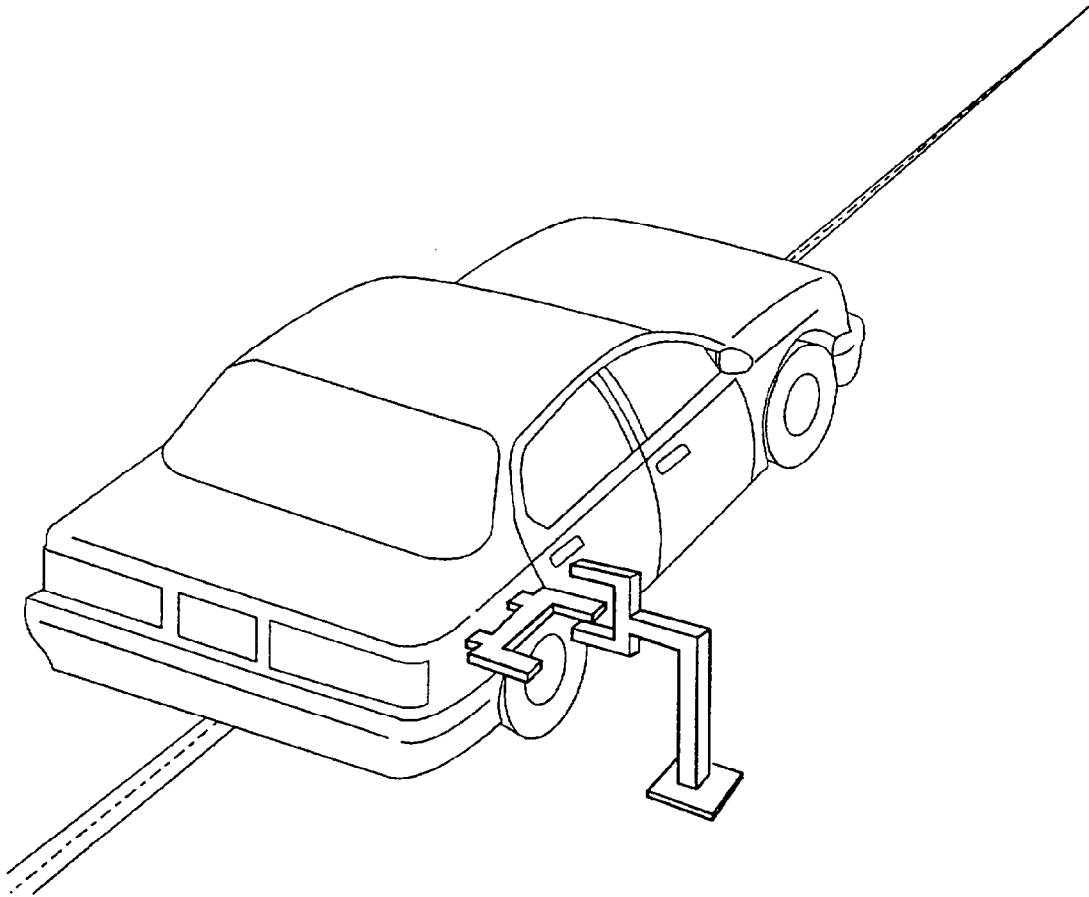
Pre-test:	L	4680 mm;	C	4924 mm;	R	4680 mm
Post-test:	L	4380 mm;	C	4400 mm;	R	4266 mm
Total crush:	L	300 mm;	C	524 mm;	R	414 mm
Average crush:		413 mm				

Test vehicle rebound from flat barrier:

Distance from test vehicle to barrier:

Post-test:	L	1114 mm;	C	1054 mm;	R	1028 mm
Average rebound		1065 mm				

Figure 1 Impact Velocity Measurement System



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

The vanes have 305-millimeter spacing.

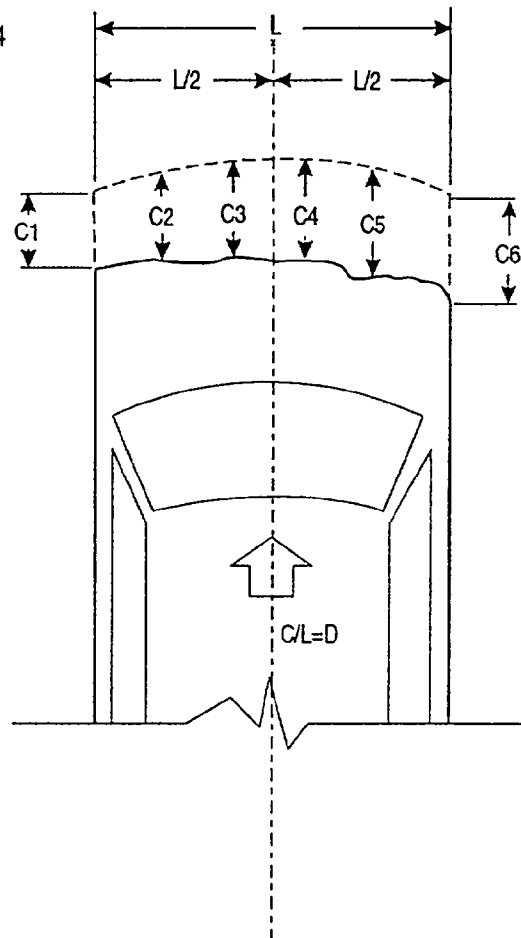
Figure 2 Accident Investigation Division Data
for 56 kph (35 mph) Frontal Barrier Impact

NHTSA number: MS0110
 Test date: 02/09/95
 Vehicle year/make/
 model/body style: 1995/Chevrolet/Lumina/4-door sedan
 Vehicle size category: Mid-size
 VIN: 2G1WL52M8S1145494
 Build date: 1/95
 Test weight: 1737 kg
 Vehicle wheelbase: 2730 mm
 Maximum width: 1837 mm
 Front overhang: 1992 mm

Collision Deformation
 Classification (CDC) code: 12FDEW2

Crush depth
 measurements:

C1	=	300 mm
C2	=	473 mm
C3	=	552 mm
C4	=	505 mm
C5	=	465 mm
C6	=	414 mm



Midpoint of damage: D: Vehicle Longitudinal Centerline

Length of damaged region: L: 1524 mm

Figure 3 Vehicle Accelerometer Placement

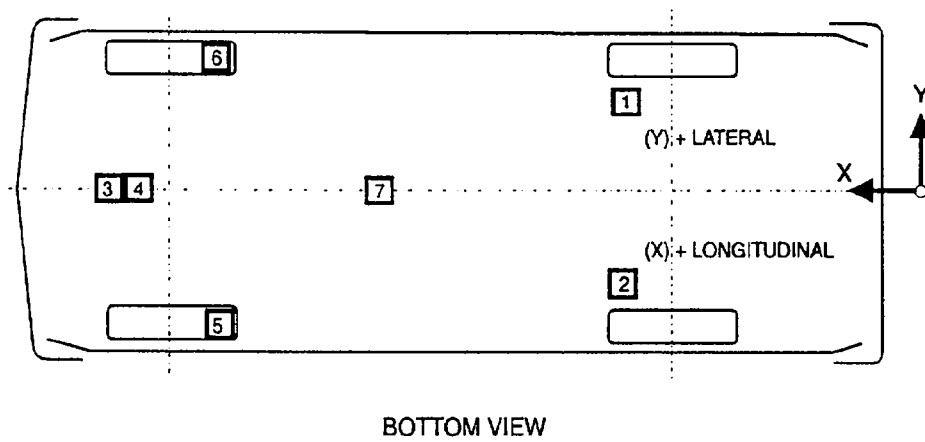
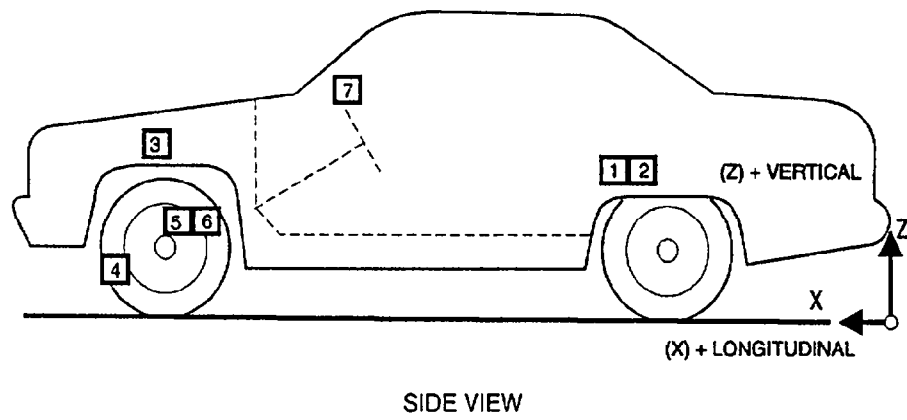


Table 4 Vehicle Accelerometer Locations and Data Summary

TEST NUMBER: 950209 No. LOCATION	X	Y	Z	POSITIVE DIRECTION	NEGATIVE DIRECTION
1 LEFT REAR SEAT CROSSMEMBER LONGITUDINAL REDUNDANT	3144 mm	675 mm	325 mm	3.0 g @ 154.4 ms 3.0 g @ 154.6 ms	34.8 g @ 60.6 ms 34.4 g @ 60.6 ms
2 RIGHT REAR SEAT CROSSMEMBER LONGITUDINAL REDUNDANT	3159 mm	-677 mm	338 mm	2.7 g @ 155.3 ms 2.7 g @ 155.3 ms	31.0 g @ 72.8 ms 30.6 g @ 61.1 ms
3 ENGINE TOP LONGITUDINAL	775 mm	5 mm	750 mm	29.7 g @ 58.5 ms	96.2 g @ 44.1 ms
4 ENGINE BOTTOM LONGITUDINAL	770 mm	-30 mm	173 mm	30.8 g @ 63.9 ms	72.5 g @ 44.2 ms
5 RIGHT BRAKE CALIPER LONGITUDINAL	880 mm	-663 mm	304 mm	29.1 g @ 89.9 ms	50.2 g @ 62.2 ms
6 LEFT BRAKE CALIPER LONGITUDINAL	877 mm	663 mm	305 mm	37.3 g @ 89.8 ms	91.7 g @ 63.3 ms
7 INSTRUMENT PANEL CENTER LONGITUDINAL	1745 mm	0 mm	953 mm	13.7 g @ 46.2 ms	50.8 g @ 33.5 ms

* X-AXIS LOCATIONS ARE MEASURED REARWARD FROM THE FRONT BUMPER.

REFERENCE: X: + FORWARD ACCELERATION
Y: + LEFT FROM VEHICLE CENTERLINE
Z: + UP FROM GROUND LEVEL

Table 5 Post-Impact Dummy/Vehicle Data

Visible Dummy Contact Points:

	<u>Driver #142</u>	<u>Passenger #192</u>
Head	Airbag	Airbag
Chest	Airbag	Airbag
Abdomen	None	None
Left knee	Instrument panel	Instrument panel
Right knee	Instrument panel	Instrument panel

Door Opening:

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

Seat Movement:

	<u>Seat Back Failure</u>	<u>Seat Shift</u>
Front	None	None
Rear	NA	NA

Glazing Damage: The entire windshield cracked on impact.

Other Notable Impact Effects: None

Table 6 FMVSS 208 Data Summary

Vehicle year/make/
model/body style: 1995/Chevrolet/Lumina/4-door sedan
Vehicle NHTSA number: MS0110
Test date: 02/09/95

	Driver Dummy #142		Passenger Dummy #192	
<u>Maximum Accelerations:</u>				
Head X-axis	-48.7	g	-66.1	g
Head Y-axis	18.4	g	-14.0	g
Head Z-axis	-15.6	g	-16.5	g
Head resultant	52.1	g	66.9	g
Chest X-axis	-43.6	g	-45.2	g
Chest Y-axis	3.9	g	-4.3	g
Chest Z-axis	4.9	g	-10.9	g
Chest resultant ¹	42.1	g	45.7	g
Chest resultant time interval ¹	.003	sec	.003	sec
<u>Head Injury Criteria (HIC) Values:</u>				
HIC ²	394		560	
HIC starting time	.063	sec	.062	sec
HIC ending time	.099	sec	.093	sec
Avg. head resultant accel. during HIC time interval	41.3	g	50.0	g
<u>Maximum Chest Deflections:</u>				
Chest X-axis	32	mm	31	mm
Maximum chest deflection time	.086	sec	.083	sec
<u>Maximum Compressive Femur Forces:</u>				
Left femur	4689	N	3601	N
Right femur	3086	N	2235	N
<u>Maximum Seat Belt Forces:</u>				
Lap belt	5195	N	2529	N
Shoulder belt	1618	N	6446	N

Note: All values listed must be occurring during primary impact event.
(Head accelerations listed must be during hic time interval.)

¹ 0.003 Sec. Minimum duration.

² The maximum hic time interval is 36 milliseconds.

Table 7 Hybrid III Neck and Pelvis Data Summary

Vehicle year/make/
model/body style: 1995/Chevrolet/Lumina/4-door sedan
Vehicle NHTSA number: MS0110
Test date: 02/09/95

	Driver Dummy #142	Passenger Dummy #192
<u>Maximum Values:</u>		
Neck X-axis force	-190 N	-434 N
Neck Y-axis force	278 N	-210 N
Neck Z-axis force	1984 N	2213 N
Neck moment about X-axis	24 N-m	-23 N
Neck moment about Y-axis	27 N-m	-35 N
Neck moment about Z-axis	13 N-m	-5 N
<u>Maximum Accelerations:</u>		
Pelvis X-axis	-41.3 g	-38.0 g
Pelvis Y-axis	10.0 g	7.3 g
Pelvis Z-axis ¹	NA	15.9 g
Pelvis resultant ¹	NA	41.3 g

Note: All values listed must be occurring during primary impact event.

¹ See data acquisition explanations.

Dummy Kinematic Summary

Driver Dummy

Upon impact, the driver dummy translated forward on the seat impacting both knees into the instrument panel. The dummy's head and chest were restrained by the driver's airbag as the dummy's torso was restrained by the three-point unbelt. The dummy rebounded rearward into the seat back with the dummy's head rotating rearward contacting the head restraint. The driver dummy came to rest in the driver's seat, restrained by the three-point unbelt.

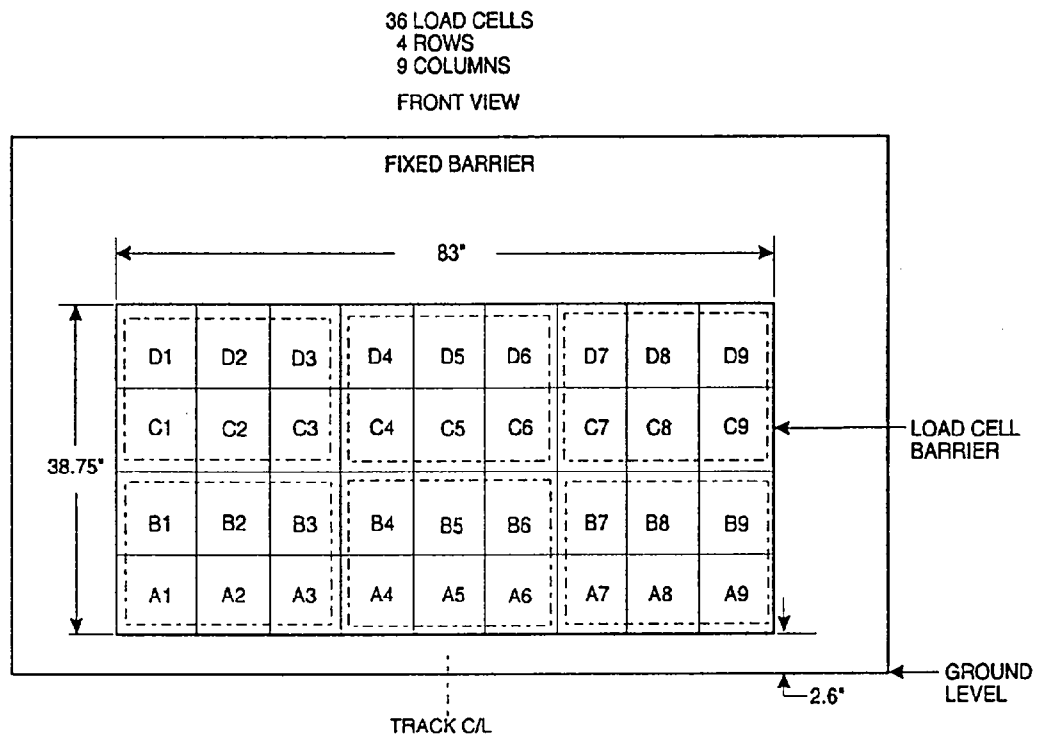
Right Front Passenger Dummy

Upon impact, the right front passenger dummy translated forward on the seat impacting both knees into the instrument panel. The dummy's head and chest were restrained by the passenger's airbag as the dummy's torso was restrained by the three-point unbelt. The dummy rebounded into the seat back as the dummy's head rotated rearward. The right front passenger dummy came to rest in the right front passenger's seat restrained by the three-point unbelt.

Table 8 Seat Belt Performance Assessment Test Data

	Driver	Passenger
<u>Belt length data:</u>		
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems.	2870 mm	2718 mm
Shoulder belt length as measured on Part 572 dummy.	835 mm	855 mm
Lap belt length as measured on Part 572 dummy.	700 mm	695 mm
<u>Shoulder belt spool-off length:</u>		
As determined by film analysis	94 mm	81 mm
As determined mechanically	93 mm	88 mm
As determined electronically	67 mm	114 mm
<u>Belt stretch length:</u>		
As measured mechanically	0 mm/m	0 mm/m
As measured electronically	50 mm/m	33 mm/m
<u>Retractor lock-up time:</u>		
As determined by shoulder belt spool-off	68 ms	80 ms

Figure 4 Load Cell Barrier Configuration



- Group 1: A1 through B3
- Group 2: A4 through B6
- Group 3: A7 through B9
- Group 4: C1 through D3
- Group 5: C4 through D6
- Group 6: C7 through D9

Table 9 Load Cell Barrier Data Summary

Location	Positive direction				Negative direction			
Total group 1	1.9	kN	@	5.1 ms	73.8	kN	@	32.7 ms
Total group 2	1.1	kN	@	256.5 ms	144.3	kN	@	73.0 ms
Total group 3	1.4	kN	@	4.5 ms	92.5	kN	@	30.6 ms
Total group 4	1.1	kN	@	5.4 ms	81.1	kN	@	62.2 ms
Total group 5	0.8	kN	@	272.3 ms	85.2	kN	@	46.8 ms
Total group 6	1.1	kN	@	223.4 ms	64.7	kN	@	36.8 ms
Total load cell force	4.6	kN	@	256.2 ms	417.4	kN	@	38.7 ms

Tension is positive
Compression is negative

Section 3.0

FMVSS 212, 219 (partial), and 301 Data

Figure 5 FMVSS 212 Test Data

Details of windshield mounting such as retention method, trim type, etc.:

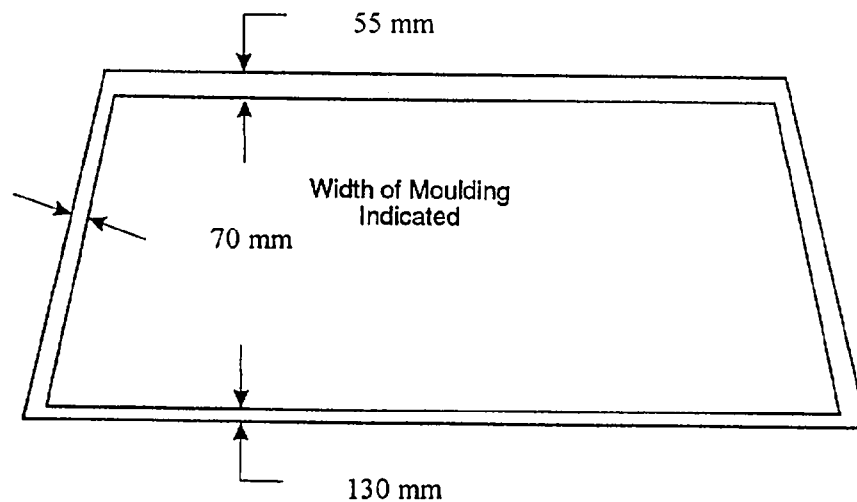
Plastic trim around outer perimeter, adhesive around inner perimeter.

FMVSS 212 requirements: The post-test periphery retention amount must be at least 75% of the pre-test periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of windshield for vehicles equipped with automatic restraint systems for front occupants.

Windshield periphery measurements:

	<u>Pre-test</u>	<u>Post-test</u>	<u>Percent retention</u>
Right side	2205 mm	2205 mm	100
Left side	2205 mm	2205 mm	100
Total	4410 mm	4410 mm	100

Pre-test windshield mounting material temperature: 21° C



Front view of windshield¹

Loss of windshield retention lengths: None

¹ Indicate areas of loss of retention, if any, on windshield diagram.

Figure 6 FMVSS 219 Test Data

Protected zone lower edge requirement:

The lower edge of the protected zone is determined by placing a 165-millimeter diameter rigid sphere weighing 6.8 kg in a position such that it simultaneously contacts the inner surface of the windshield and the top surface of the instrument panel including padding. Draw the locus of points on the inner surface of the windshield contactable by the sphere across the width of the instrument panel. From the outermost contactable points, extend the locus line horizontally to the edges of the windshield, and then draw a line on the inner surface of the windshield below and 13 millimeters from the locus line. The lower edge of the protected zone is the longitudinal projection onto the outer surface of the windshield of this line.

Windshield measurements:

A = 1230 mm

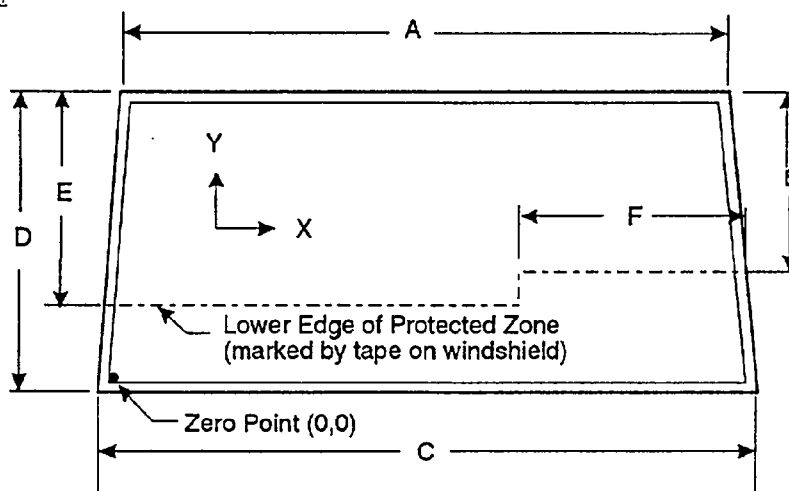
B = 427 mm

C = 1740 mm

D = 776 mm

E = 515 mm

F = 820 mm



FRONT VIEW

Method of adhering protected zone template to windshield: NA

Areas of windshield template penetration greater than 6 mm: NA

Coordinates	
X	Y
1.	
2.	
3.	

Areas of windshield penetration, below the protected zone, through the inner surface of the windshield: None

- 1.
- 2.
- 3.

Table 10 Fuel System Data

Vehicle year/make/ model/body style:	1995/Chevrolet/Lumina/4-door sedan
NHTSA number:	MS0110
Fuel system capacity:	64.7 liters (from owner's manual)
Usable capacity:	64.7 liters (furnished by COTR)
Test volume range:	59.4 liters to 60.9 liters (92-94% of usable)
Actual test volume:	60.2 liters (with entire fuel system filled)
Test fluid type:	Stoddard solvent
Specific gravity:	0.764
Kinematic viscosity:	0.99 centistoke
Test fluid color:	Purple

The electric fuel pump did not operate with ignition switch "on" and the engine not operating.

Details of fuel system:	The fuel tank was located in front of the rear axle. The fuel filler neck was located on the left side. The fuel lines ran along the left side to the front.
-------------------------	--

Table 11 FMVSS 301 Post-Impact Test Data

NHTSA number: MS0110
 Test date: 02/09/95
 Vehicle year/make/
 model/body style: 1995/Chevrolet/Lumina/4-door sedan

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 (56 kph)
☐ Oblique (48 kph) with ___° barrier face first contacting ___ (driver/pass.) side
☐ Rear moving barrier (48 kph)
☐ Lateral moving barrier (32 kph)

Fuel system fluid spillage measurements:

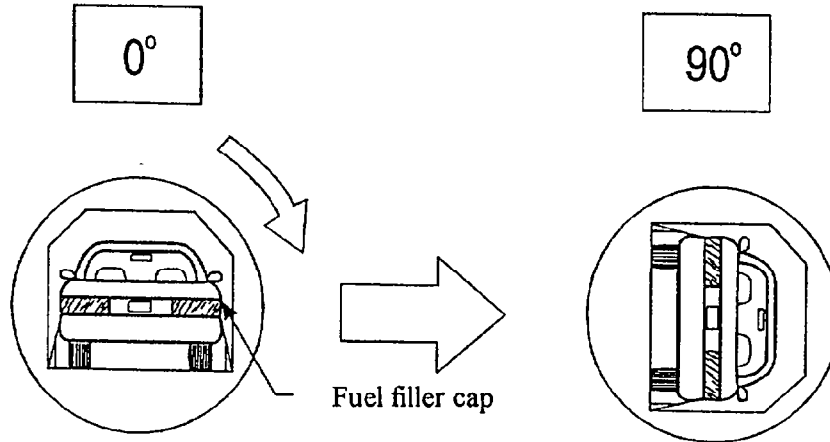
	<u>Test Results</u>	<u>Maximum Allowable</u>
1. From impact until vehicle motion ceases	0 g	28 g
2. 5-minute period after vehicle motion ceases	0 g	142 g
3. Next 25 minutes after 5-minute period	0 g	28 g/min

Fuel system fluid spillage location(s): None

Figure 7 FMVSS 301 Static Rollover Test Data

NHTSA number: MS0110

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

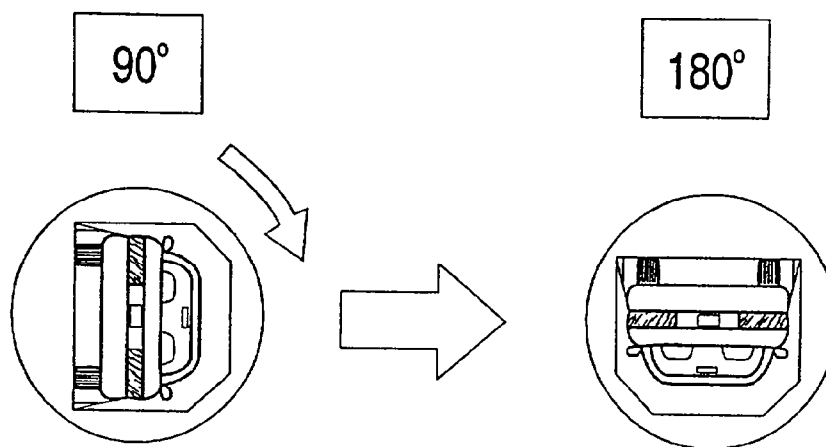
Fuel system fluid spillage measurements:

	Test Results	Maximum Allowable
<u>0° to 90° rotation (fuel filler cap down)</u>		
1. First 5 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 7 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	

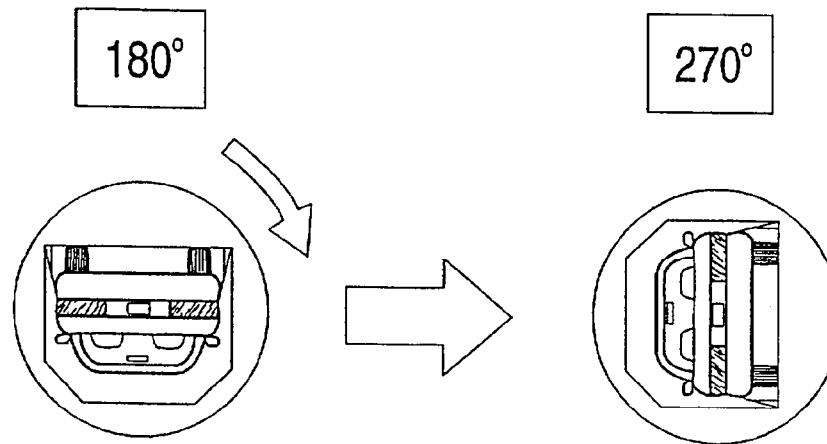
Fuel system fluid spillage measurements:

90° to 180° rotation	Test Results	Maximum Allowable
1. First 5 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 7 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

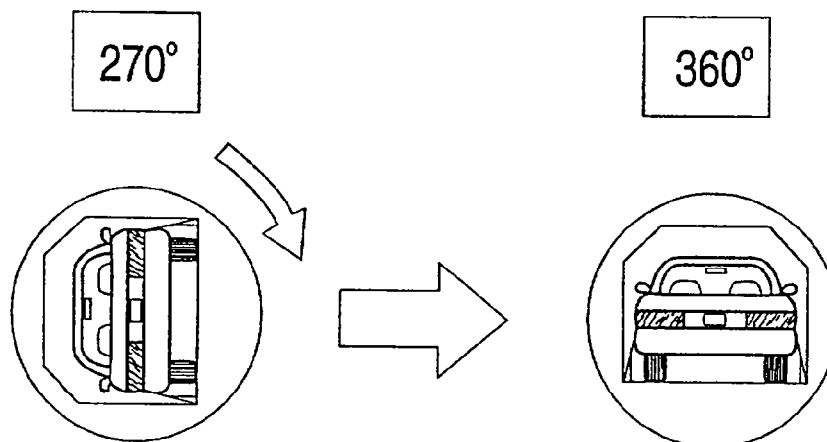
Fuel system fluid spillage measurements:

	Test Results	Maximum Allowable
<u>180° to 270° rotation</u>		
1. First 5 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 7 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:

270° to 360° rotation		Test Results	Maximum Allowable
1.	First 5 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

Occupant, Camera, and Vehicle Information

Figure 8 Dummy Measurement Locations for Front Seat Occupants

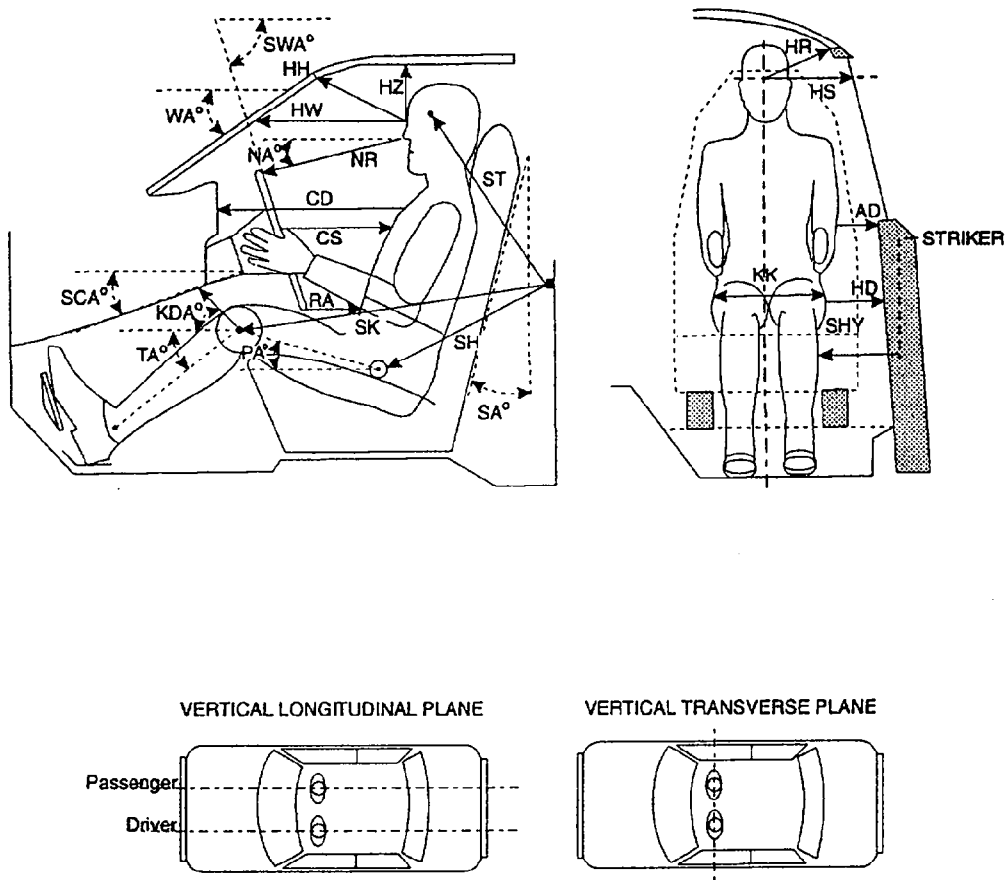


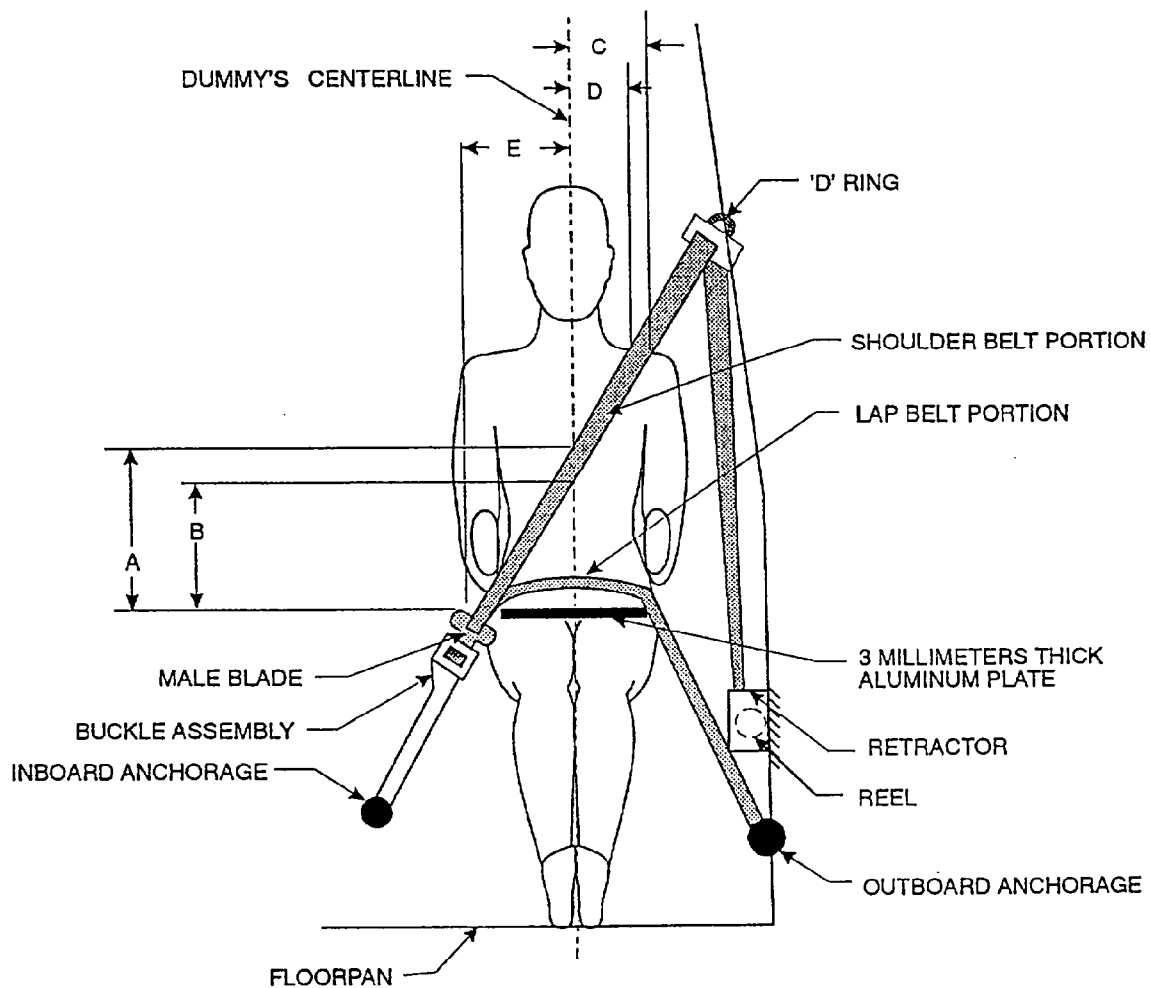
Table 12 Dummy Measurement Data For Front Seat Occupants

Designation	Type of Measurement	Driver (Serial #142)	Passenger (Serial #192)
WA	Windshield angle	27°	27°
SWA	Steering wheel angle	78°	NA
SCA	Steering column angle	18°	NA
SA	Seat back angle	26°	26°
HZ	Head to roof	148 mm	142 mm
HH	Head to header	297 mm	302 mm
HW	Head to windshield	510 mm	524 mm
HR	Head to side header	213 mm	210 mm
NR	Nose to rim	312 mm	NA
NA	Nose to rim angle	15°	NA
CD	Chest to dash	468 mm	468 mm
CS	Steering wheel to chest	242 mm	NA
RA	Rim to abdomen	140 mm	NA
KDL	Left knee to dash	150 mm	139 mm
KDR	Right knee to dash	173 mm	112 mm
KDA	Outboard knee to dash angle	26°	37°
PA	Pelvic angle	21°	23°
TA	Tibial angle	42°	44°
KK	Knee to knee	350 mm	270 mm
ST ¹	Striker to head	506 mm	503 mm
	Striker to head angle	-82°	-80°
SK ¹	Striker to knee	582 mm	576 mm
	Striker to knee angle	-2°	-2°
SH ¹	Striker to H-point	252 mm	248 mm
	Striker to H-point angle	32°	36°
SHY	Striker to H-point (Y dir.)	272 mm	284 mm
HS	Head to side window	340 mm	358 mm
HD	H-point to door	166 mm	163 mm
AD	Arm to door	151 mm	160 mm

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

¹ A negative angle indicates the measurement point was located above the striker.

Figure 9 Seat Belt Positioning Data



	Driver		Passenger	
A - Top surface of aluminum plate to belt upper edge	340	mm	327	mm
B - Top surface of aluminum plate to belt lower edge	255	mm	240	mm
C - Dummy centerline to outer edge of belt at chest flesh top	109	mm	129	mm
D - Dummy centerline to inner edge of belt at chest flesh top	51	mm	69	mm
Lap belt tension	16	N	16	N
Shoulder belt tension	16	N	16	N
Adjustable seat belt anchorage position	One position down from top		One position down from top	

Figure 10 Camera Positions

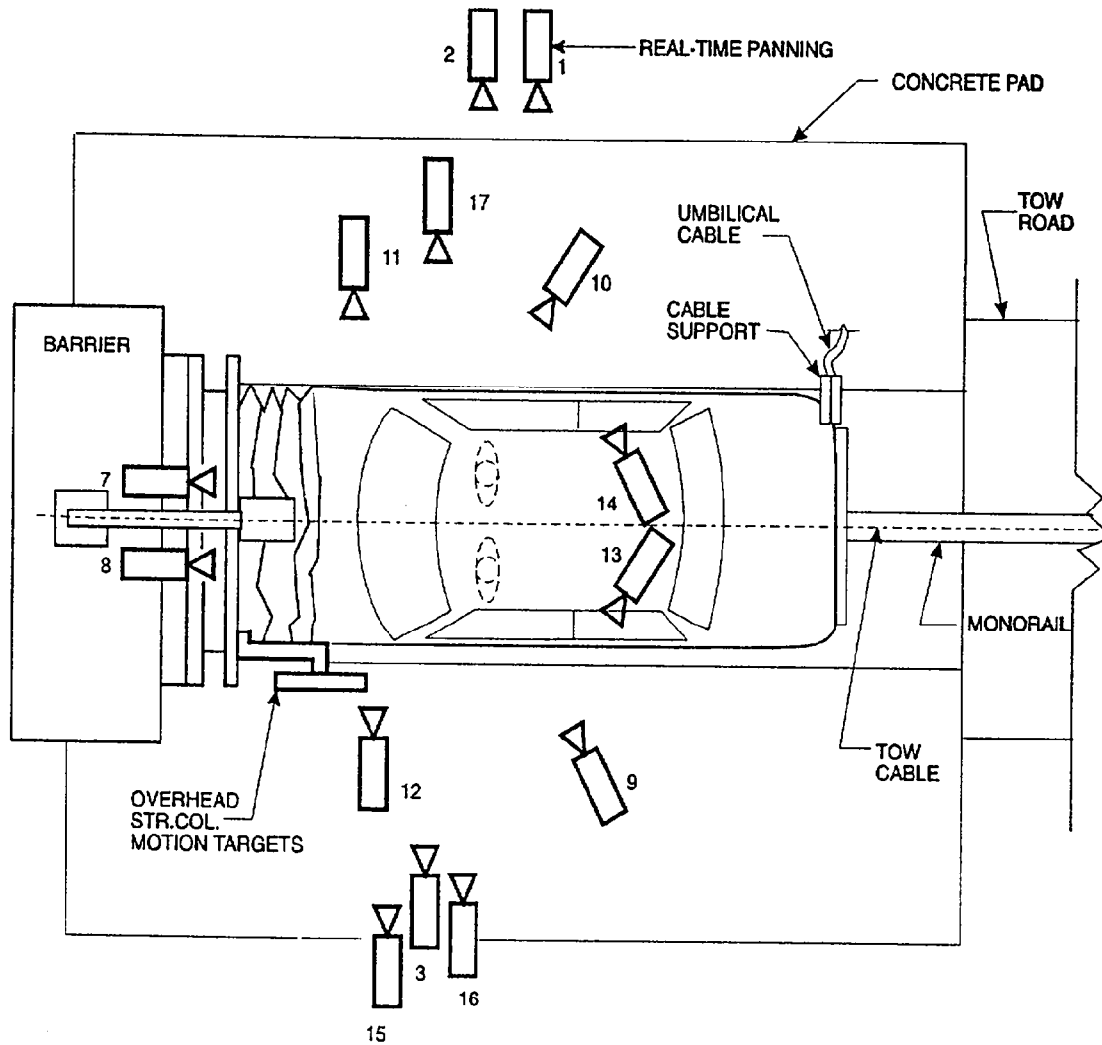


Figure 10 Camera Positions, Cont'd.

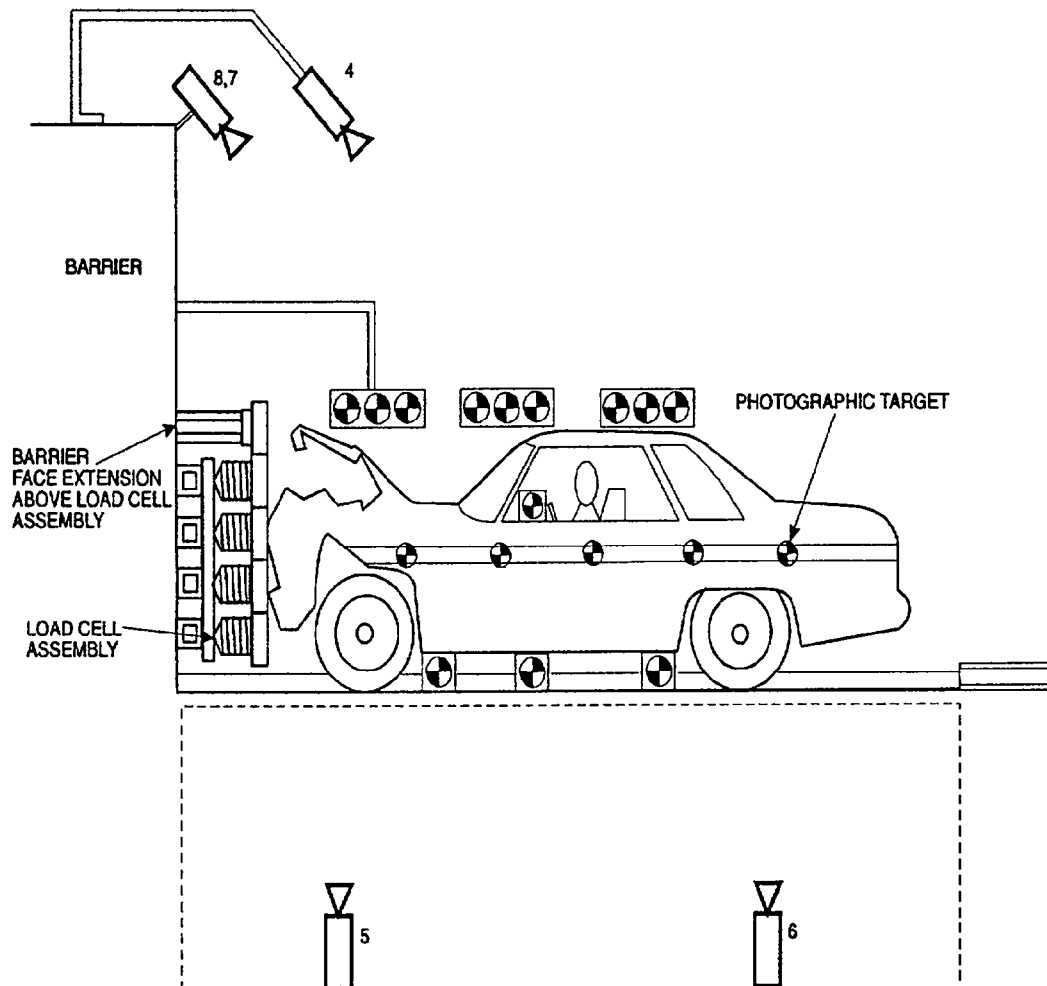


Table 13 Motion Picture Camera Locations

Test Number: 950209

Vehicle year/make/model/body style: 1995/Chevrolet/Lumina/4-door sedan

Camera Number	View	Camera Positions ¹			Angle ²	Film Plane to Head Target	Lens	Film Speed
		X	Y	Z				
1	Real-time panning	-3607 mm	-2802 mm	1549 mm	NA	NA mm	16 mm	24 frames/s
2	Vehicle crush	-2065 mm	-6767 mm	942 mm	-2°	NA mm	13 mm	505 frames/s
3	Dummy kinematics	-1054 mm	7493 mm	1118 mm	-12°	5563 mm	25 mm	1002 frames/s
4	Windshield damage	-925 mm	0 mm	2489 mm	-40°	NA mm	13 mm	498 frames/s
5	Crush & fluid spillage	-1283 mm	0 mm	-2347 mm	90°	NA mm	13 mm	1002 frames/s
6	Fluid spillage	-2522 mm	0 mm	-2515 mm	90°	NA mm	13 mm	1000 frames/s
7	Passenger kinematics	-114 mm	-351 mm	2159 mm	-40°	NA mm	17 mm	502 frames/s
8	Driver kinematics	-173 mm	368 mm	2159 mm	-41°	NA mm	17 mm	502 frames/s
9	Driver kinematics	-4572 mm	1854 mm	2591 mm	-27°	2616 mm	25 mm	500 frames/s
10	Passenger kinematics	-4674 mm	-1880 mm	2540 mm	-26°	2159 mm	25 mm	985 frames/s
11	Windshield intrusion	-968 mm	-7775 mm	1118 mm	0°	NA mm	50 mm	500 frames/s
12	Windshield intrusion	-1346 mm	7859 mm	1074 mm	0°	NA mm	50 mm	502 frames/s
13	Driver seat belt movement	NA	NA	NA	NA	NA mm	NA mm	498 frames/s
14	Passenger seat belt movement	NA	NA	NA	NA	NA mm	NA mm	502 frames/s
15	Column movement	-2438 mm	7264 mm	2616 mm	-14°	NA mm	25 mm	502 frames/s
16	Column movement	-2438 mm	7264 mm	1908 mm	-9°	NA mm	25 mm	500 frames/s
17	Passenger kinematics	-986 mm	-5354 mm	1151 mm	7°	5791 mm	25 mm	985 frames/s

¹ +X = Film plane forward of barrier face

+Y = Film plane to left of monorail centerline

+Z = Film plane above ground level

² +Angle = Film plane angled upward from horizontal plane

Figure 11 Vehicle Target Locations

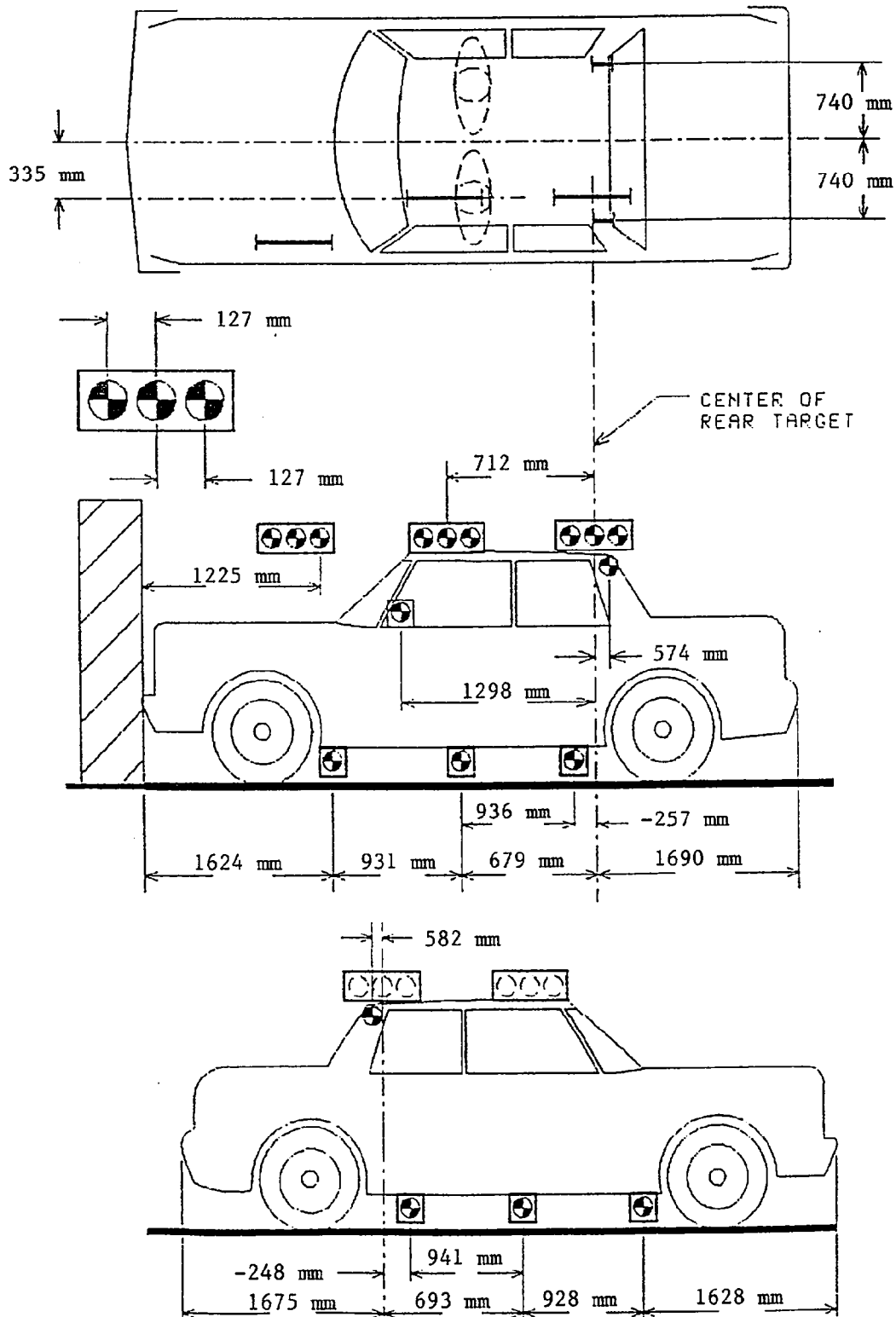


Figure 12 Pre-Test And Post-Test Measurement Points

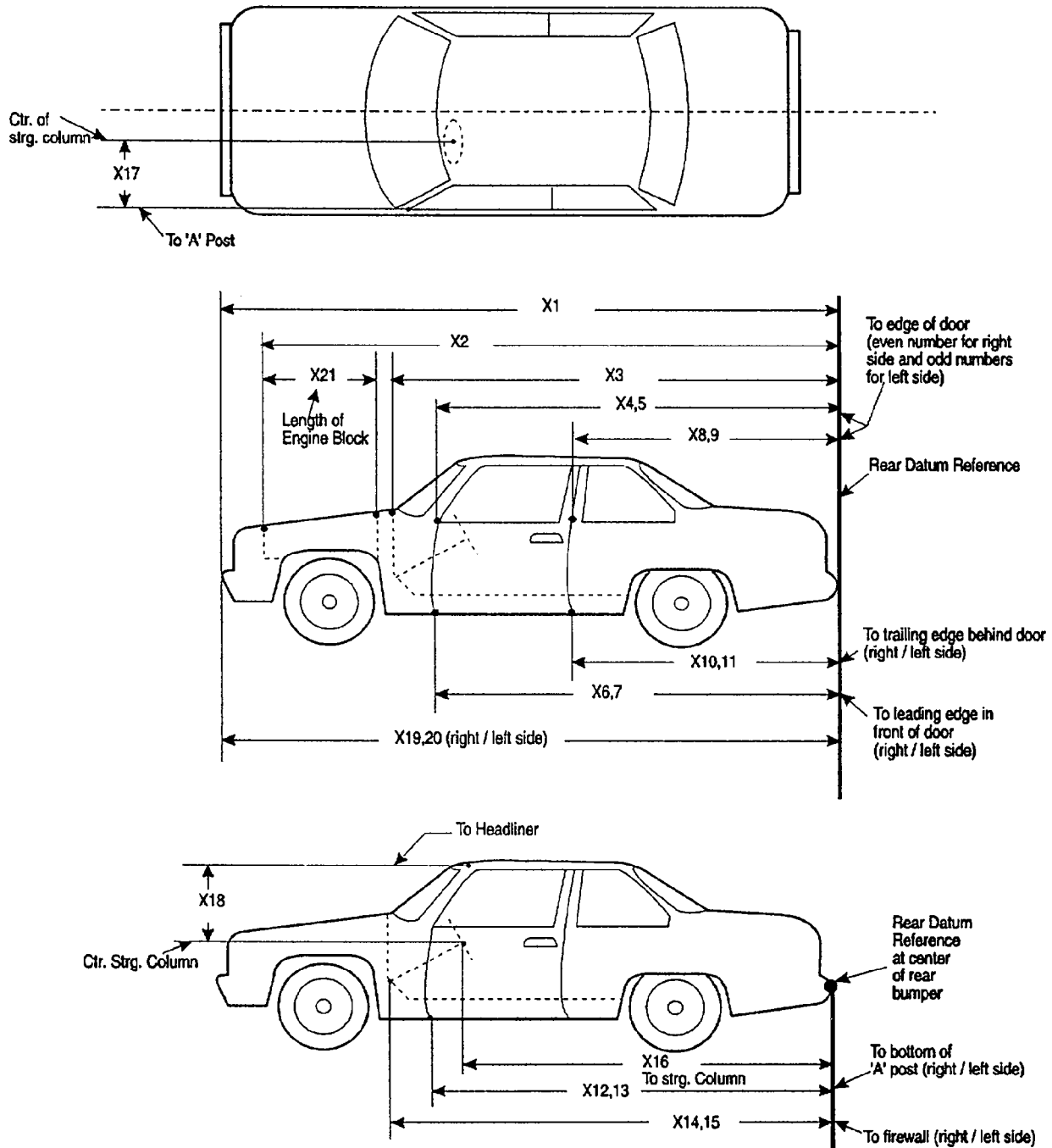


Table 14 Impacted Vehicle Measurements

Vehicle Make/Model: Chevrolet Lumina

Test Number: 950209

No.	Type of measurement	Pre-test	Post-test	Diff.
X1	Total length of vehicle at centerline	4924 mm	4400 mm	524 mm
X2	Rear surface of vehicle to front of engine block	4204 mm	3960 mm	244 mm
X3	Rear surface of vehicle to firewall	3609 mm	3570 mm	39 mm
X4	Rear surface of vehicle to upper leading edge of right door	3264 mm	3266 mm	-2 mm
X5	Rear surface of vehicle to upper leading edge of left door	3260 mm	3273 mm	-13 mm
X6	Rear surface of vehicle to lower leading edge of right door	3241 mm	3206 mm	35 mm
X7	Rear surface of vehicle to lower leading edge of left door	3225 mm	3311 mm	-86 mm
X8	Rear surface of vehicle to upper trailing edge of right door	2222 mm	2222 mm	0 mm
X9	Rear surface of vehicle to upper trailing edge of left door	2216 mm	2225 mm	-9 mm
X10	Rear surface of vehicle to lower trailing edge of right door	2226 mm	2194 mm	32 mm
X11	Rear surface of vehicle to lower trailing edge of left door	2218 mm	2205 mm	13 mm
X12	Rear surface of vehicle to bottom of "A" post on right side	3180 mm	3155 mm	25 mm
X13	Rear surface of vehicle to bottom of "A" post on left side	3170 mm	3160 mm	10 mm
X14	Rear surface of vehicle to firewall - right side	3580 mm	3595 mm	-15 mm
X15	Rear surface of vehicle to firewall - left side	3588 mm	3567 mm	21 mm
X16	Rear surface of vehicle to steering wheel center	2754 mm	2786 mm	-32 mm
X17	Center of steering column to "A" post	310 mm	230 mm	80 mm
X18	Center of steering column to headliner	400 mm	411 mm	-11 mm
X19	Rear surface of vehicle to right side of front bumper	4680 mm	4266 mm	414 mm
X20	Rear surface of vehicle to left side of front bumper	4680 mm	4380 mm	300 mm
X21	Length of engine block	460 mm	460 mm	0 mm

Appendix A

Photographs

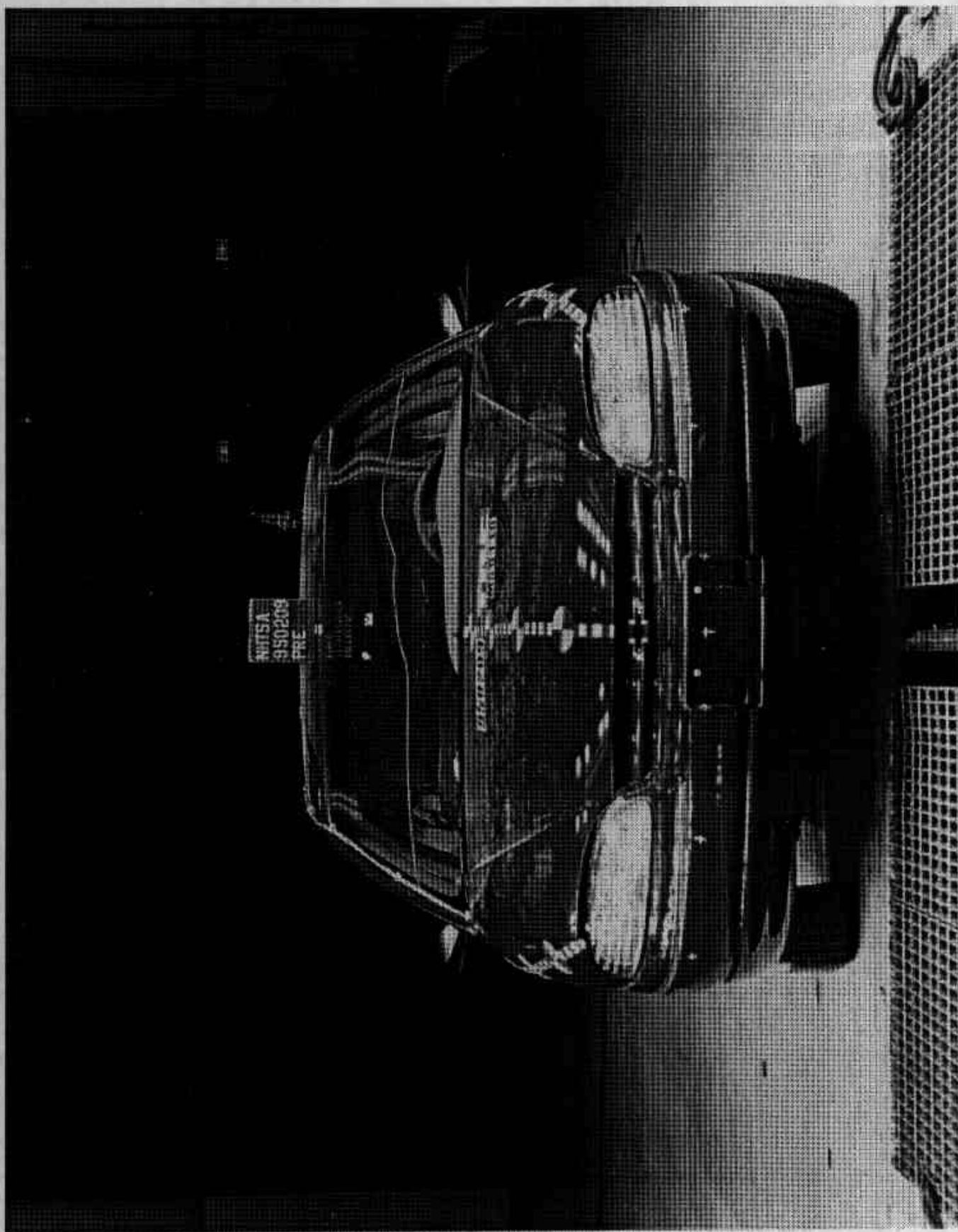


Figure A-1. Pre-Test Front View
A-2

950209

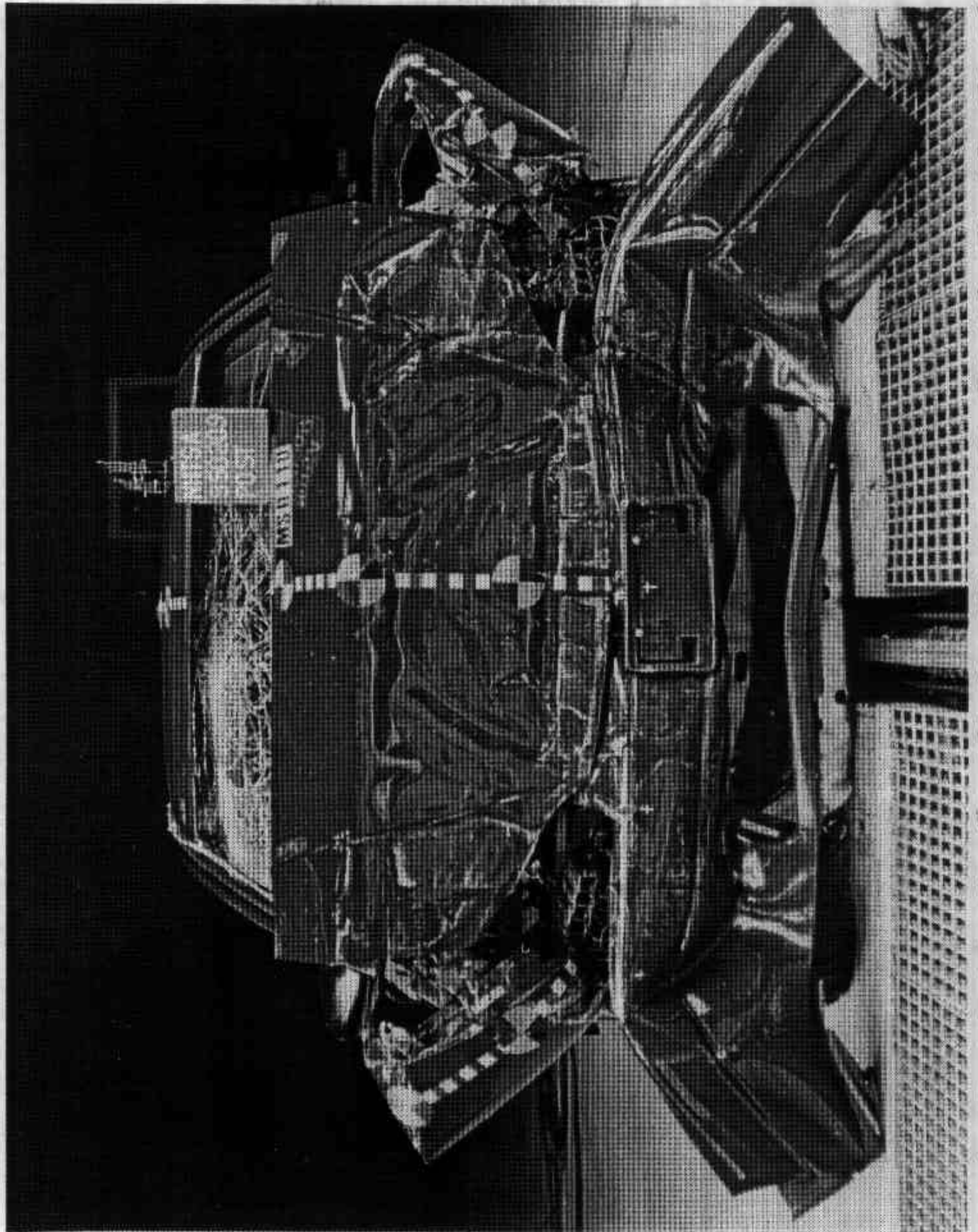


Figure A-2. Post-Test Front View
A-3

950209

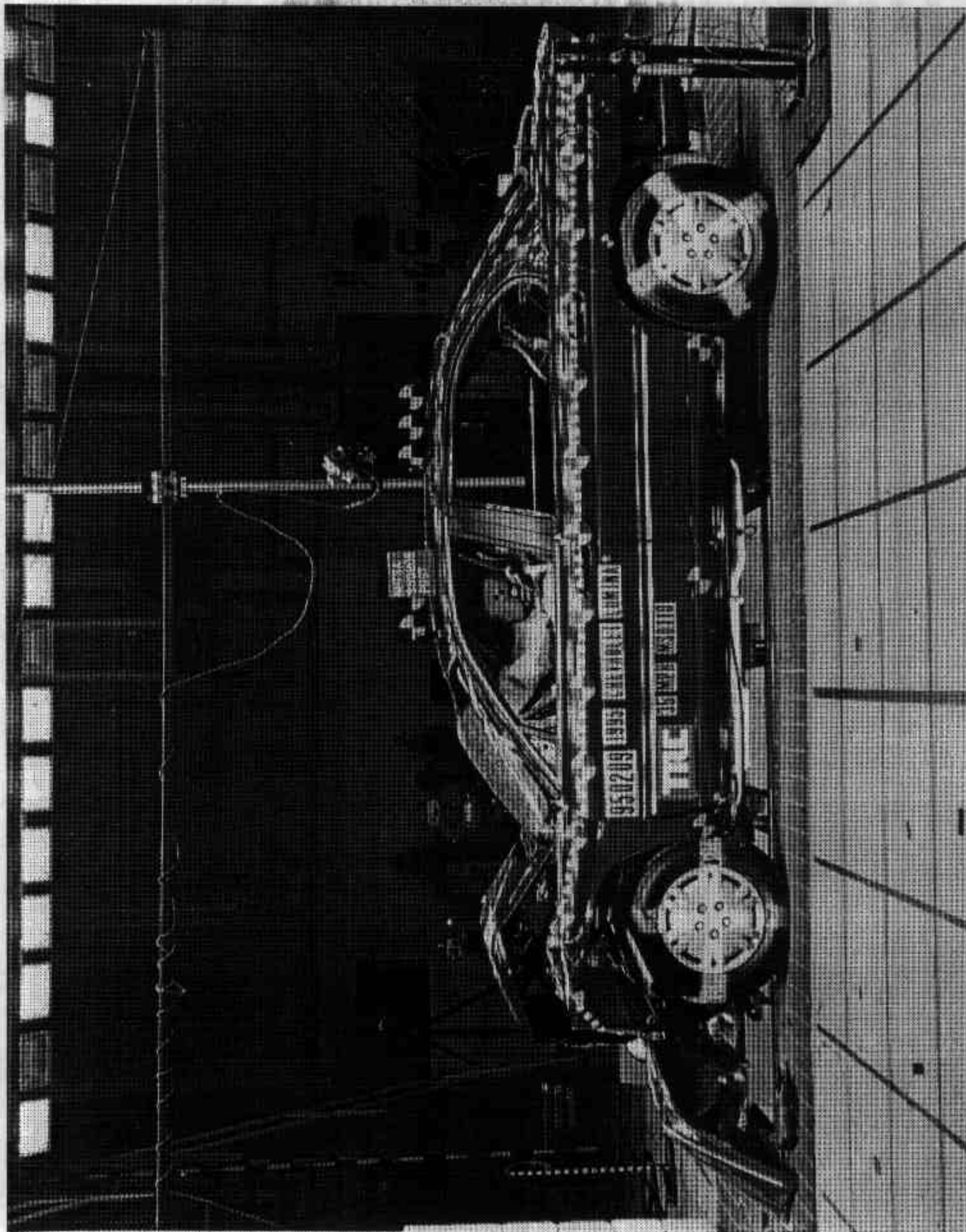


Figure A-4. Post-Test Left Side View
A-5

950209

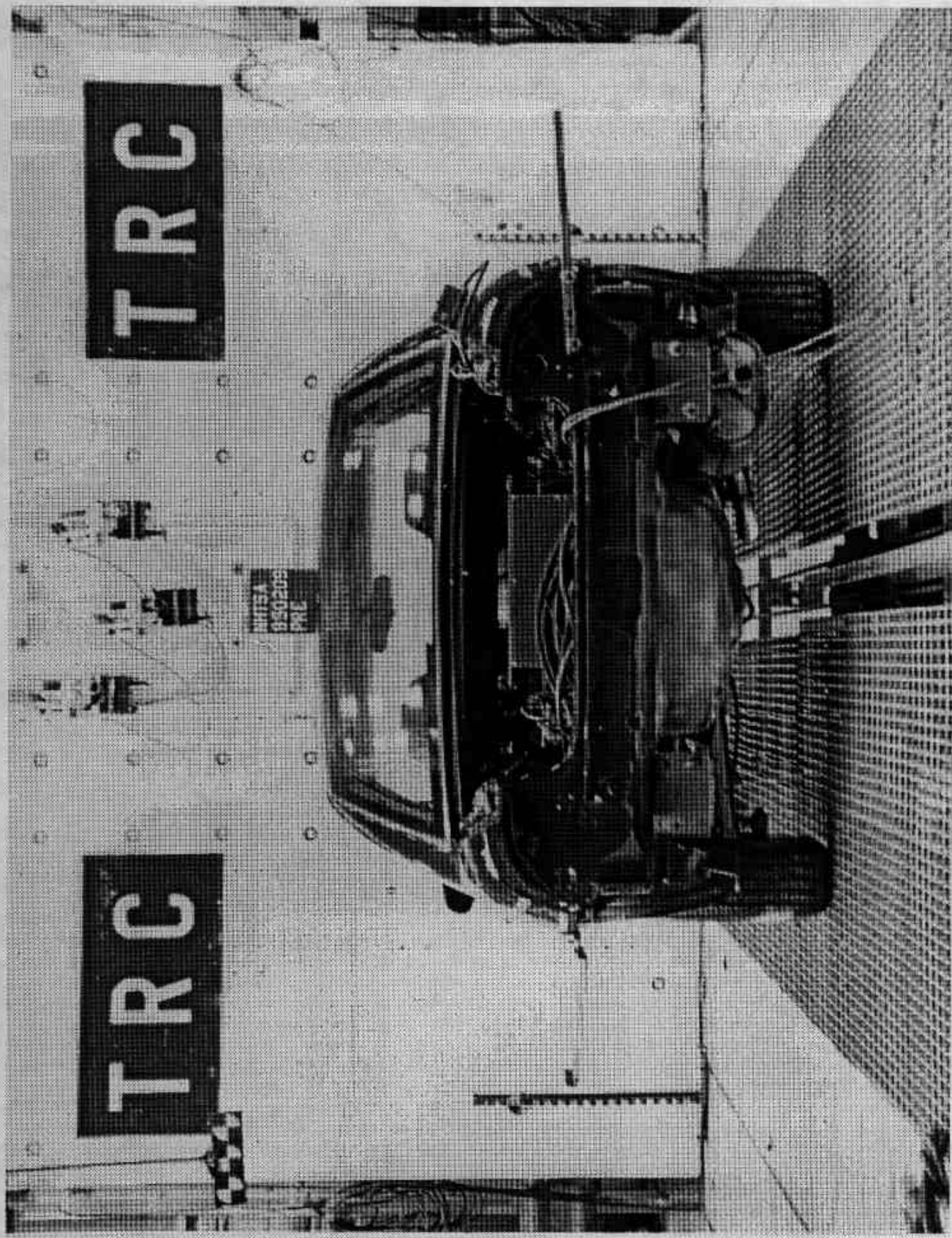


Figure A-5. Pre-Test Rear View
A-6

950209

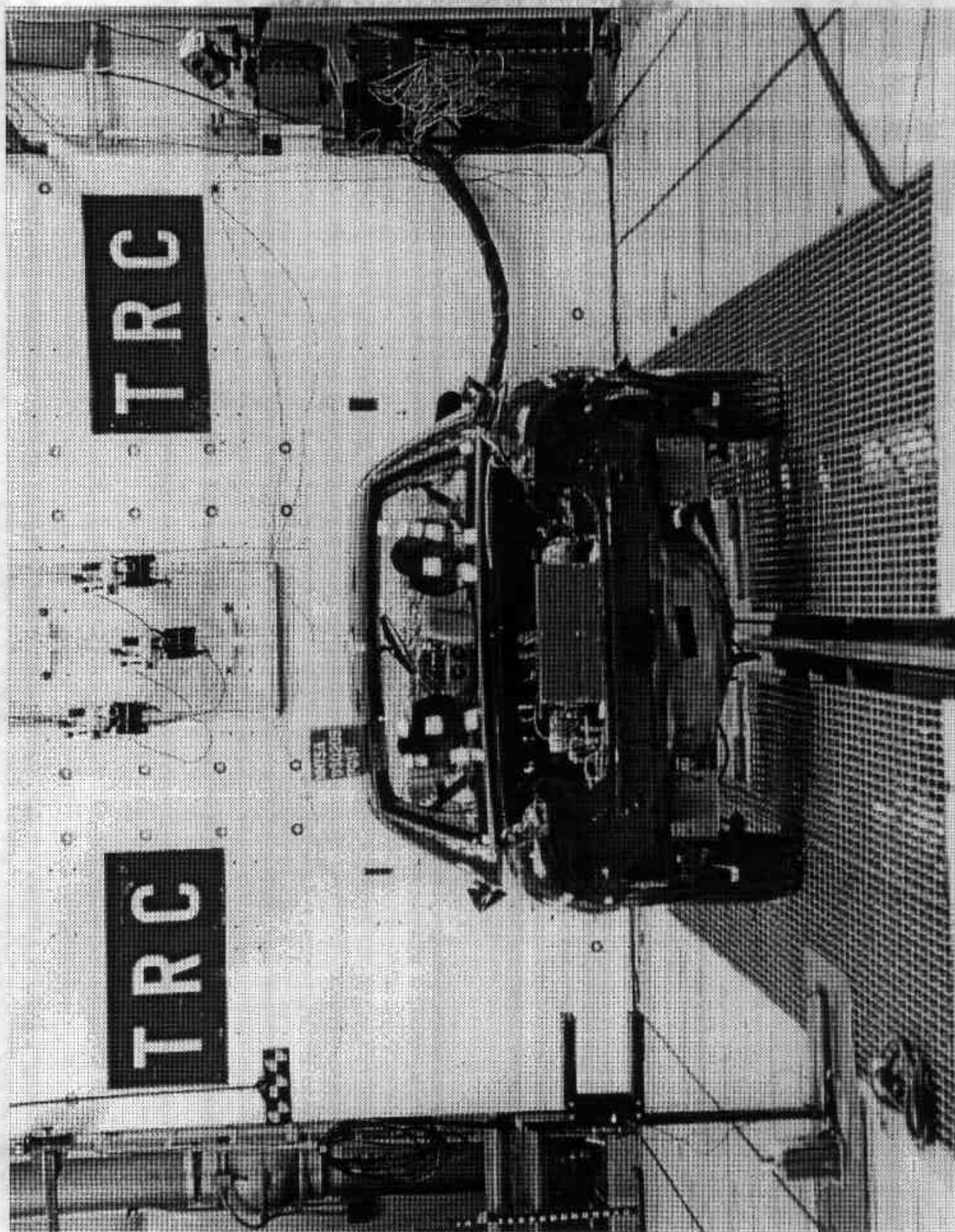


Figure A-6. Post-Test Rear View
A-7

950209

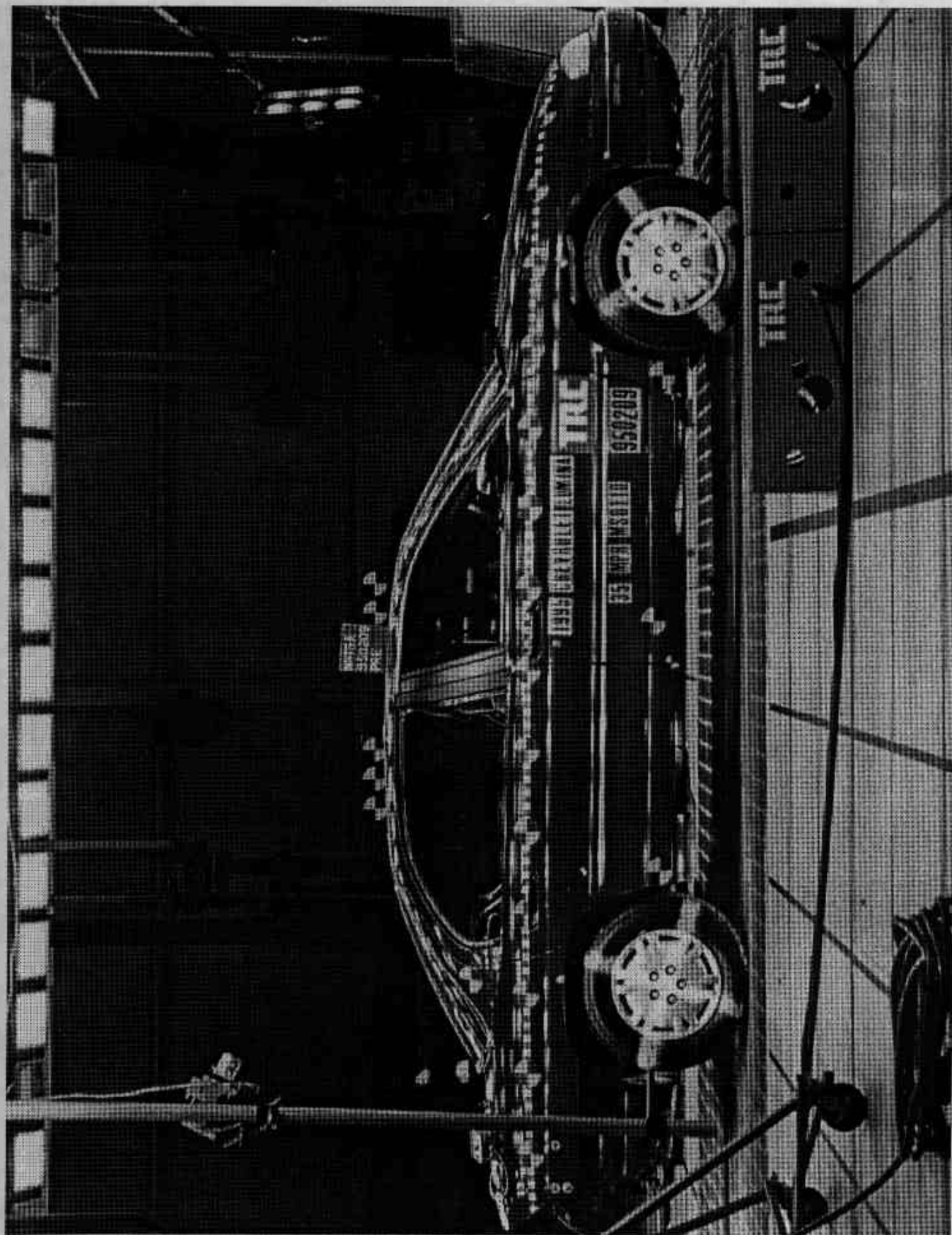


Figure A-7. Pre-Test Right Side View
A-8

950209

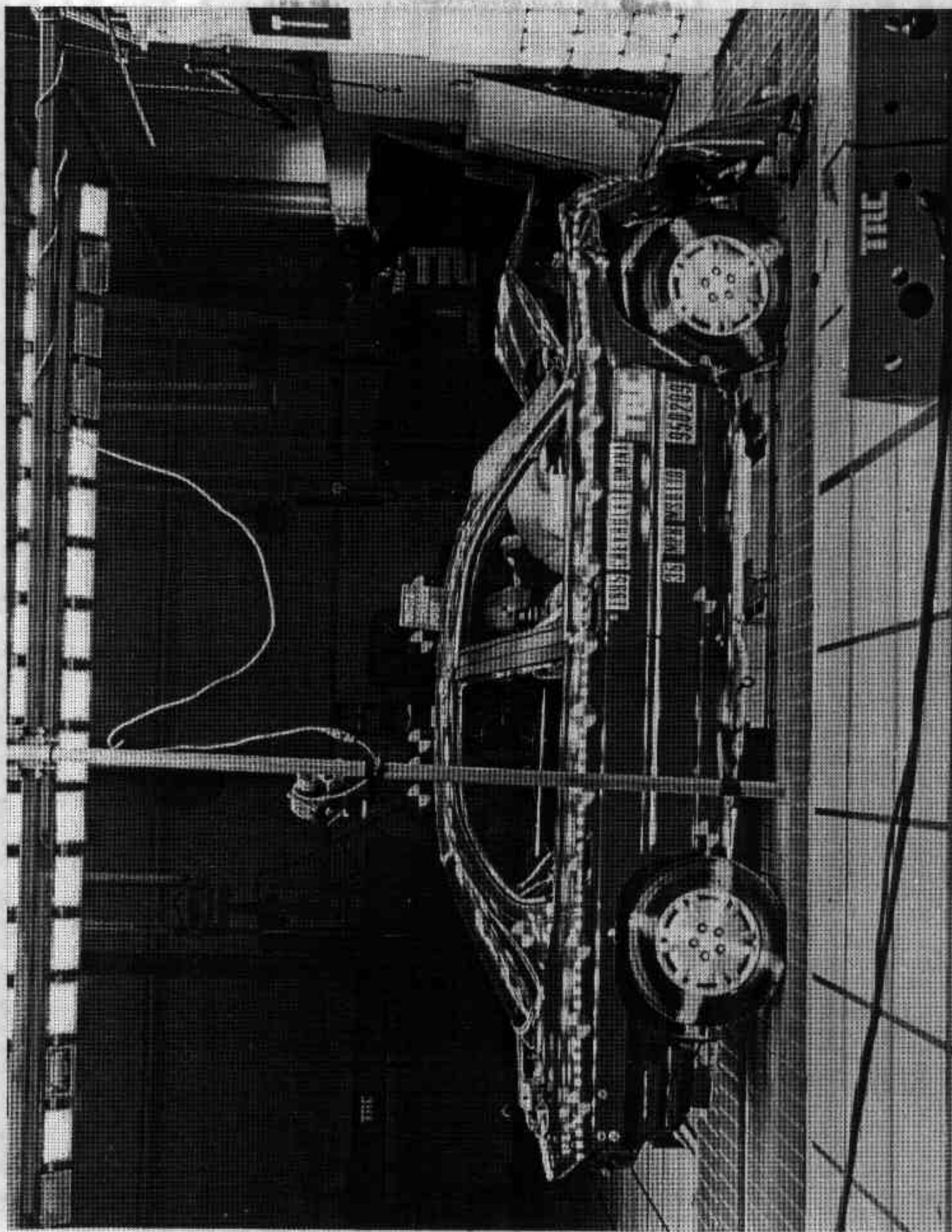


Figure A-8. Post-Test Right Side View
A-9

950209

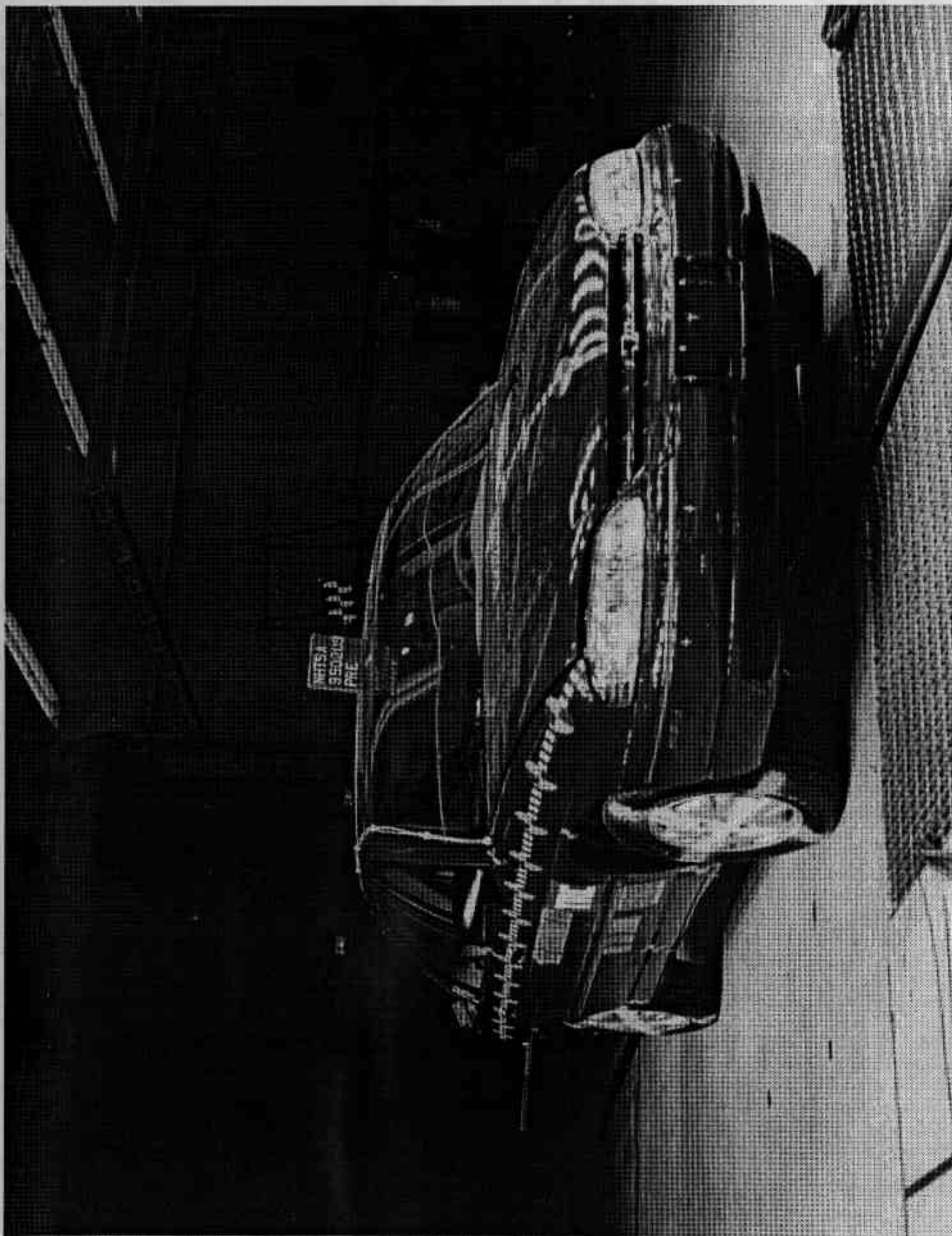


Figure A-9. Pre-Test Right Front Three-Quarter View
A-10

950209

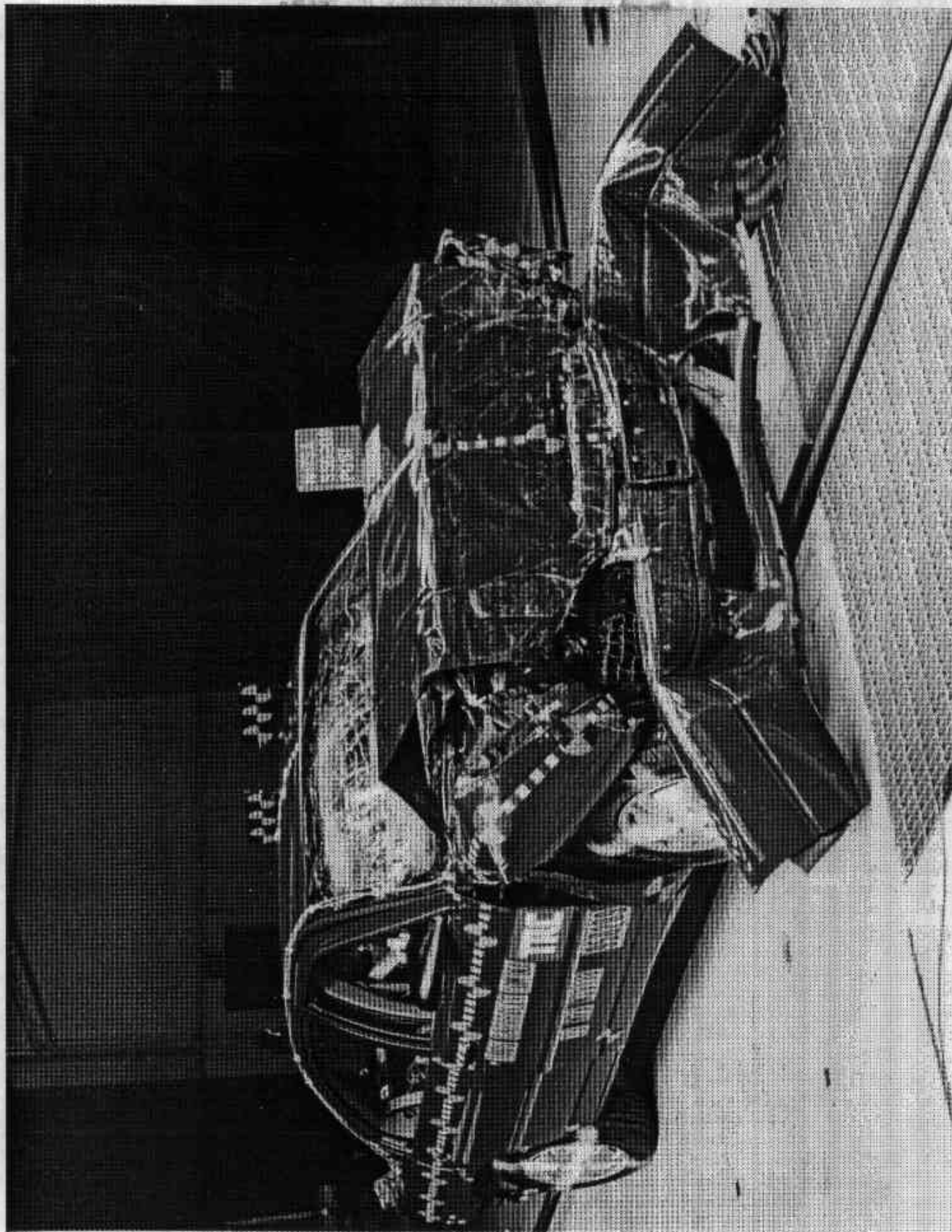


Figure A-10. Post-Test Right Front Three-Quarter View
A-11

950209

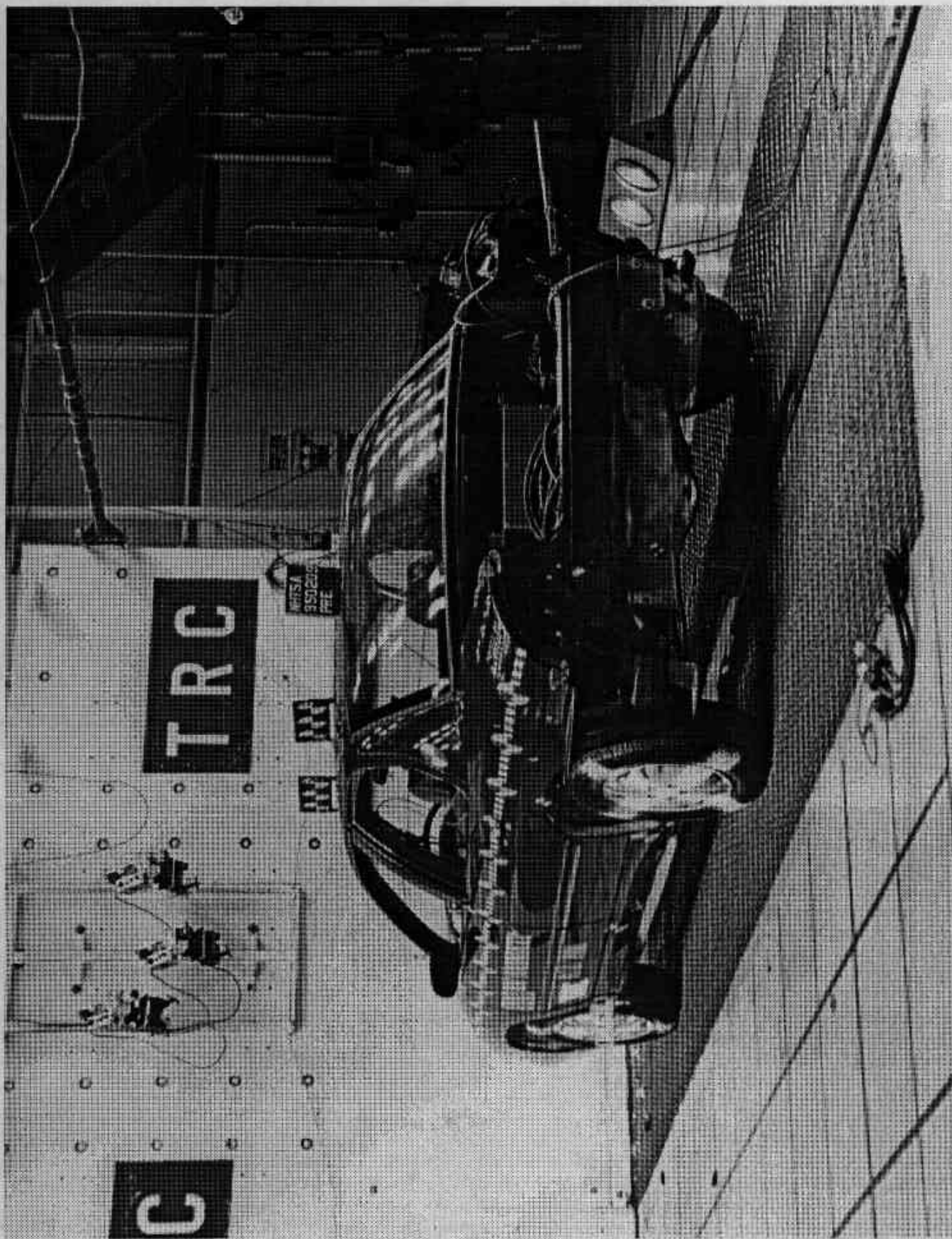


Figure A-11. Pre-Test Left Rear Three-Quarter View
A-12

950209

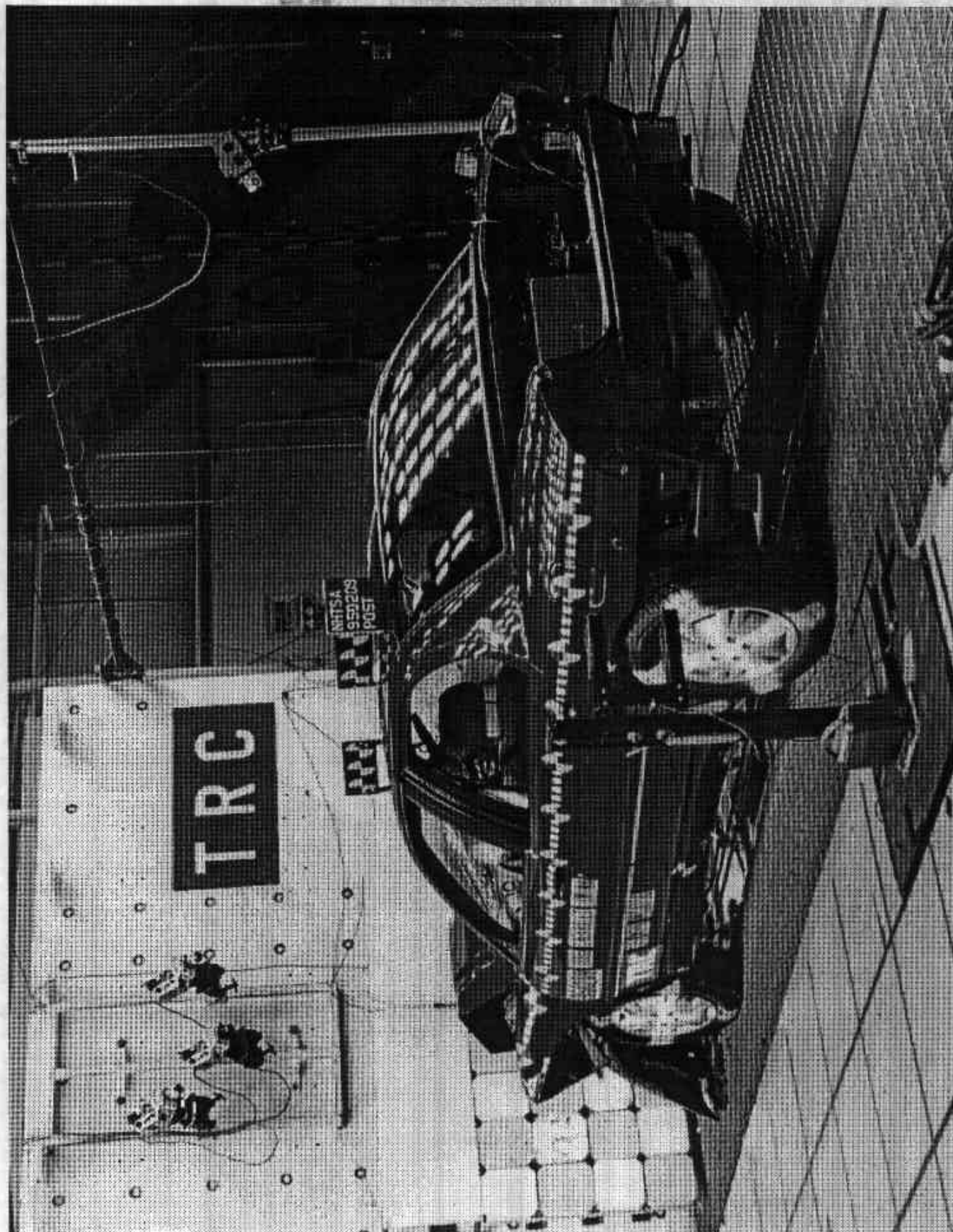


Figure A-12. Post-Test Left Rear Three-Quarter View

A-13

950209

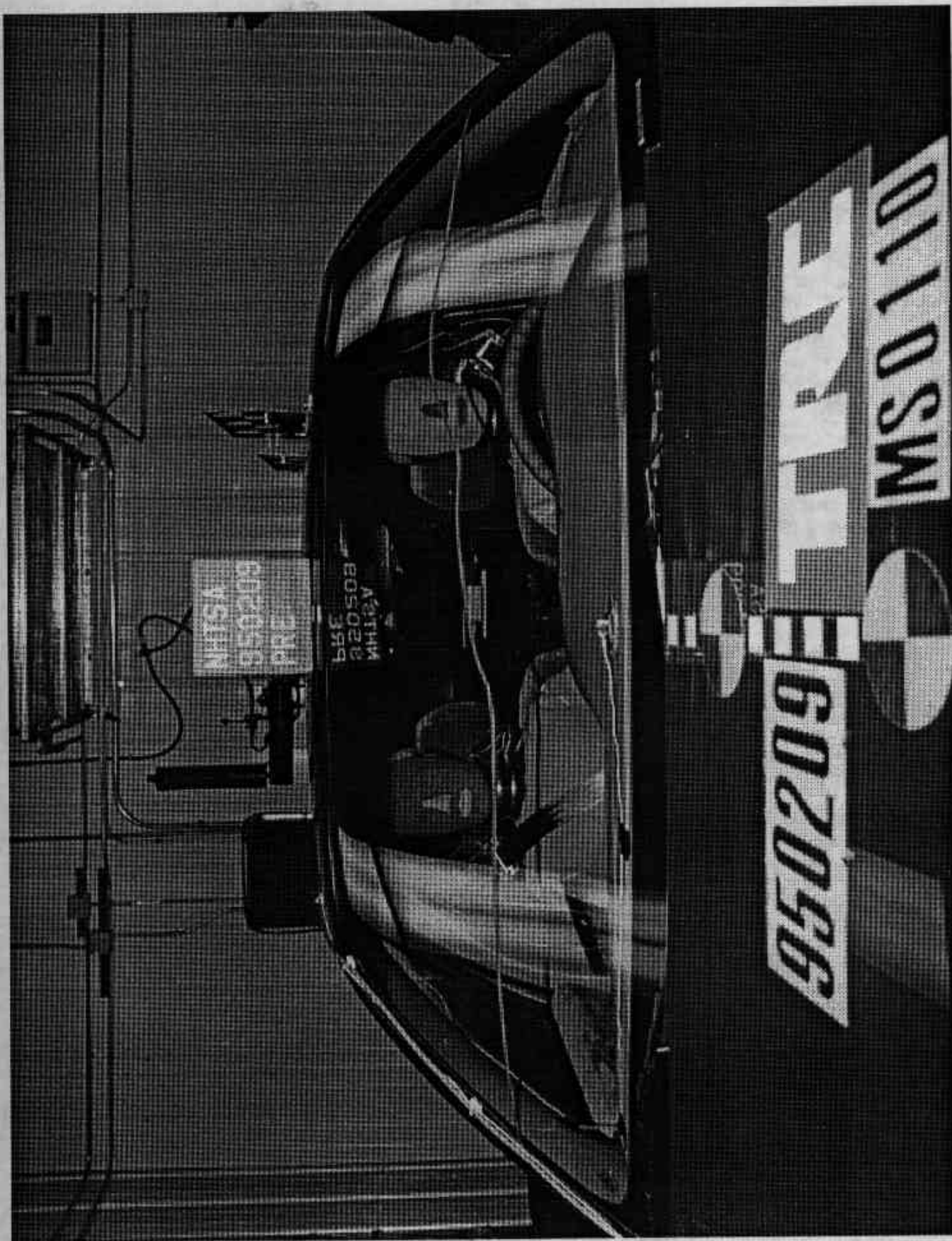


Figure A-13. Pre-Test Windshield View
A-14

950209

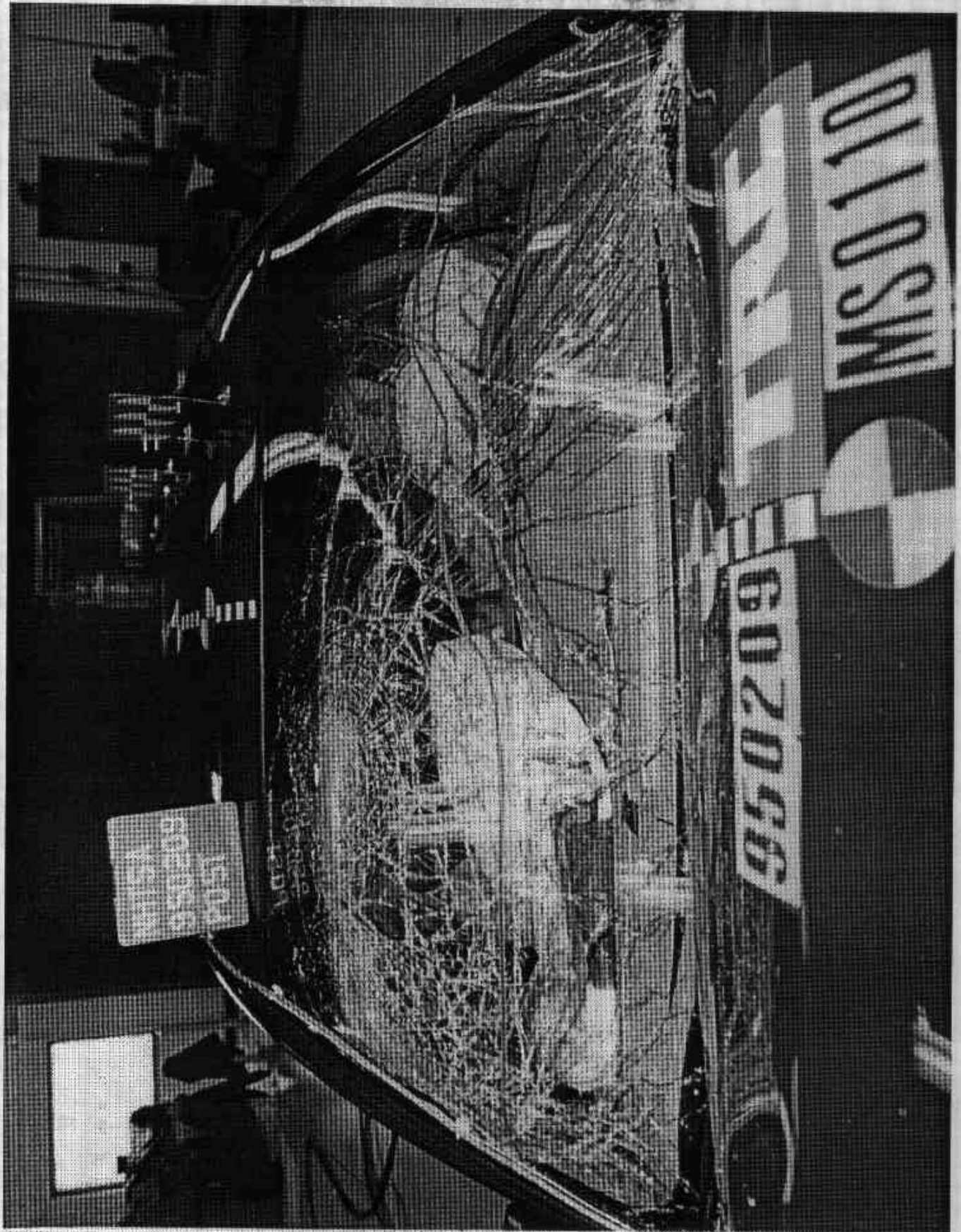


Figure A-14. Post-Test Windshield View
A-15

950209

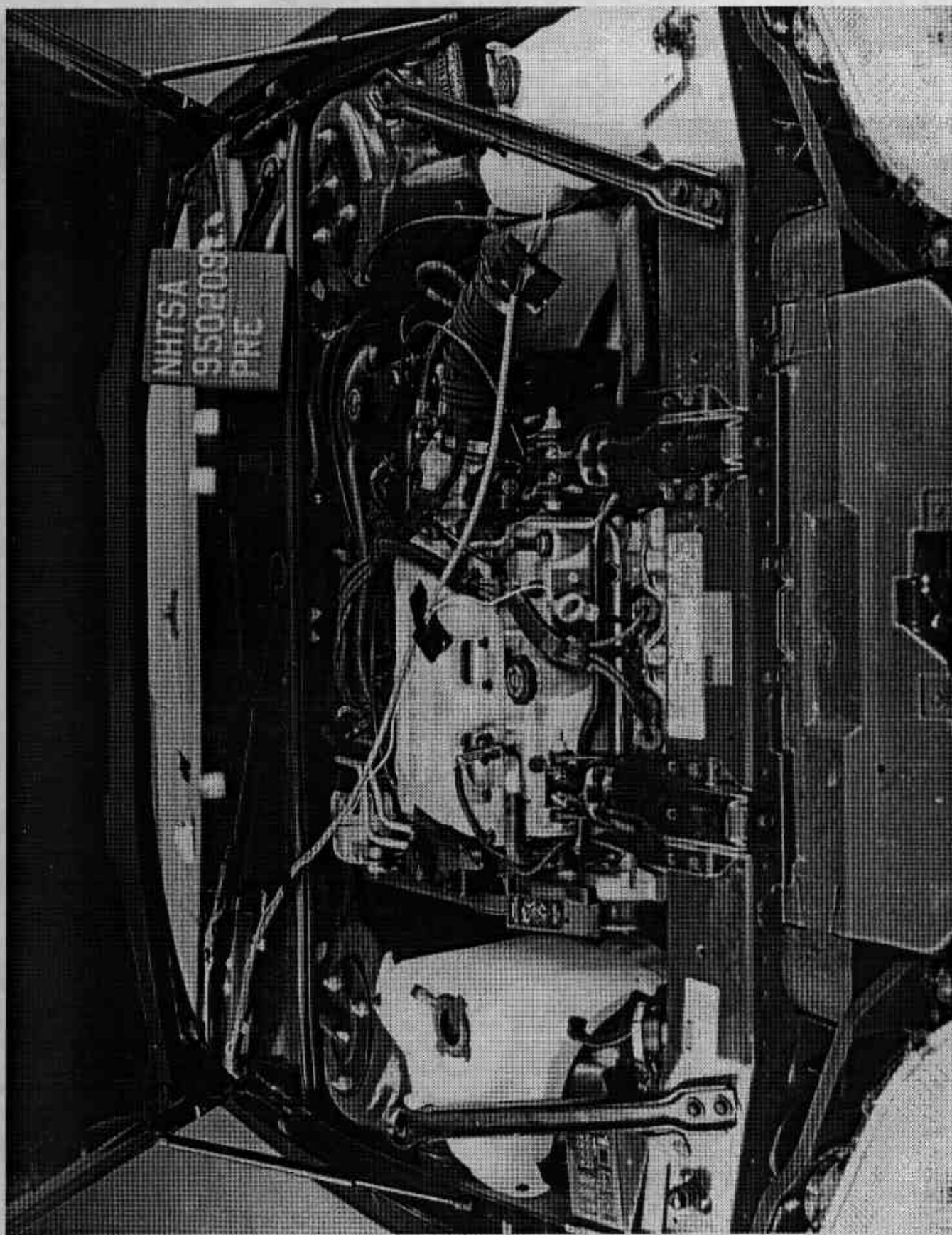


Figure A-15. Pre-Test Engine Compartment View
A-16

950209

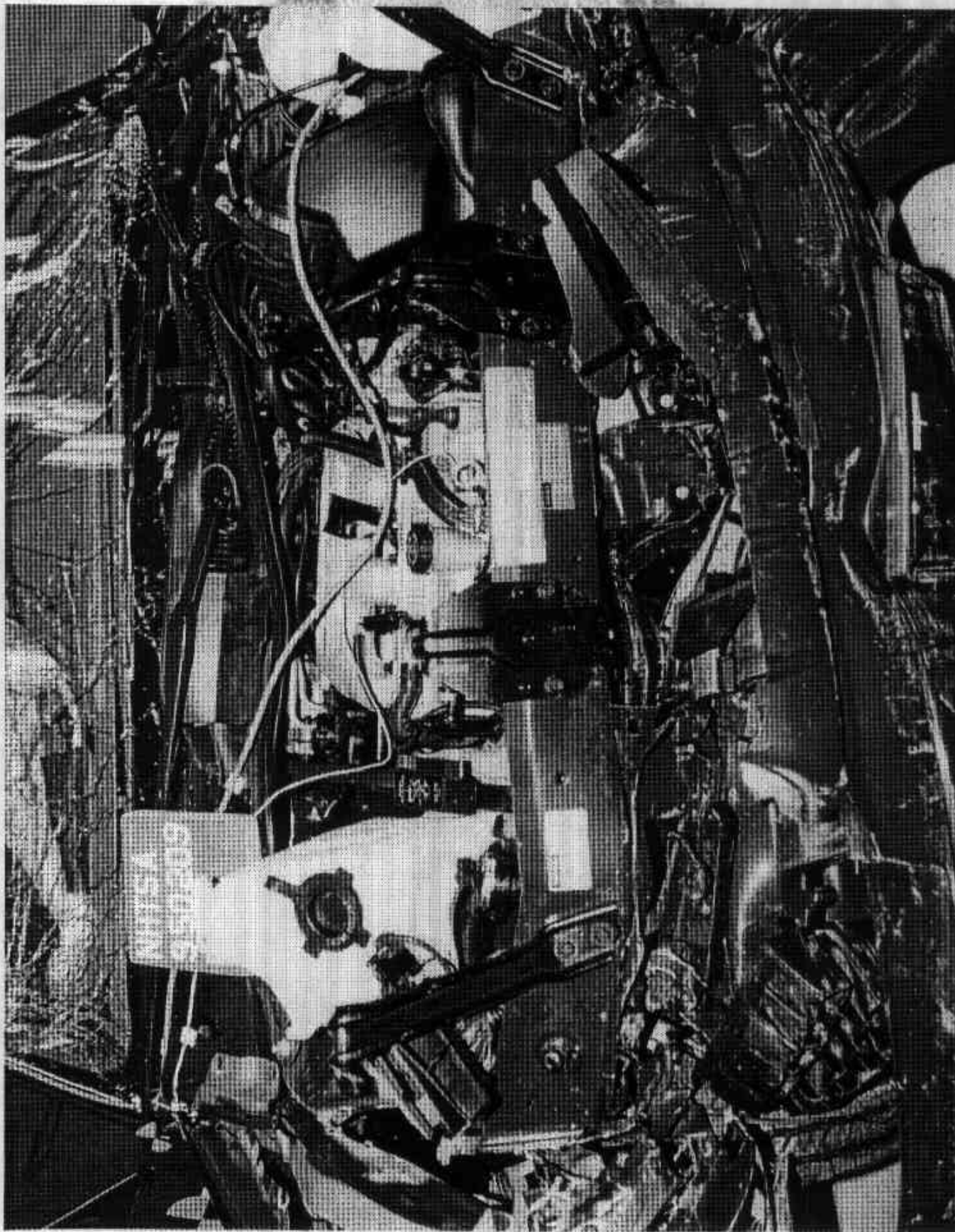


Figure A-16. Post-Test Engine Compartment View
A-17

950209

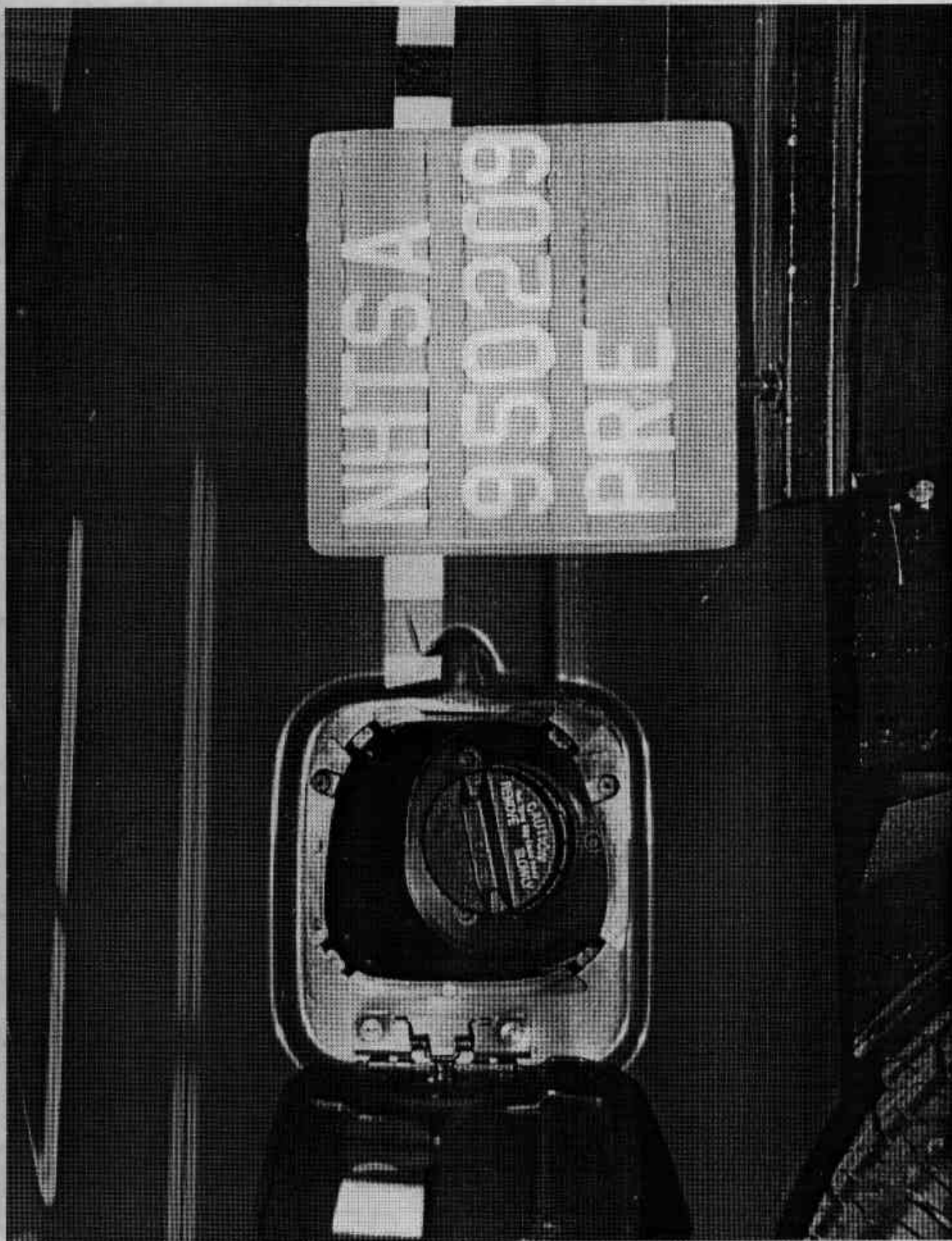


Figure A-17. Pre-Test Fuel Filler Cap View
A-18

950209



Figure A-18. Post-Test Fuel Filler Cap View

A-19

950209

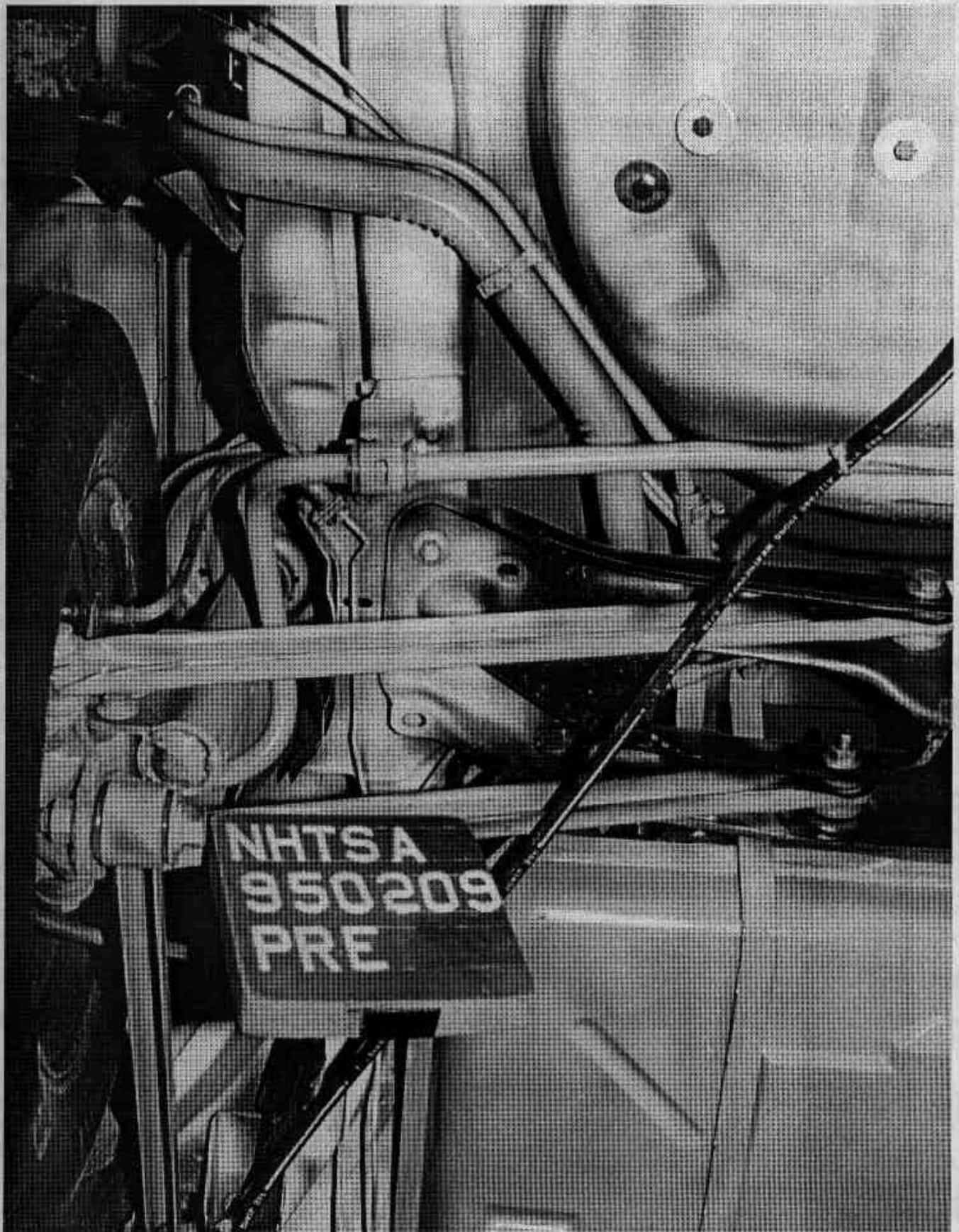


Figure A-19. Pre-Test Fuel Filler Neck View
A-20

950209

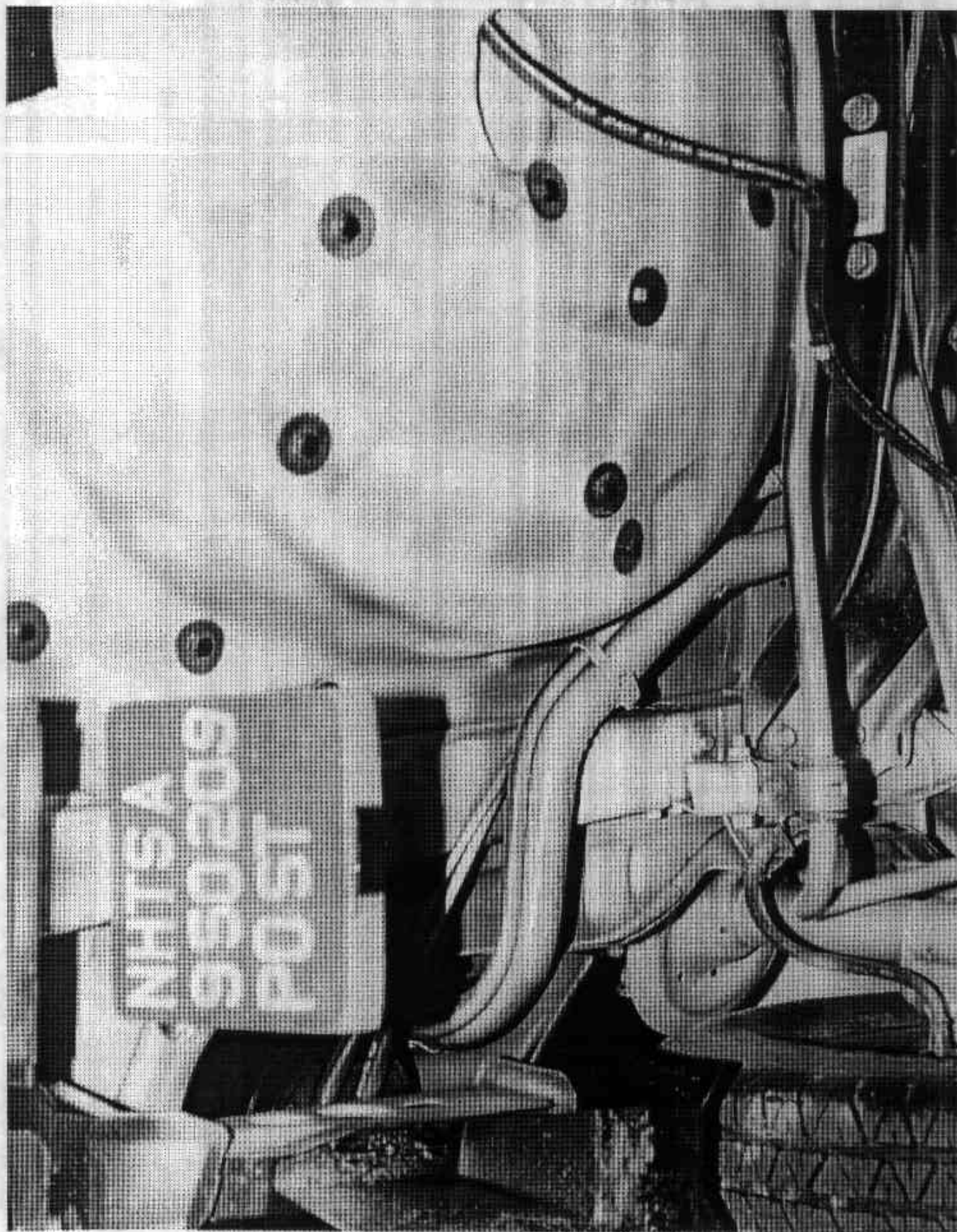


Figure A-20. Post-Test Fuel Filler Neck View
A-21

950209

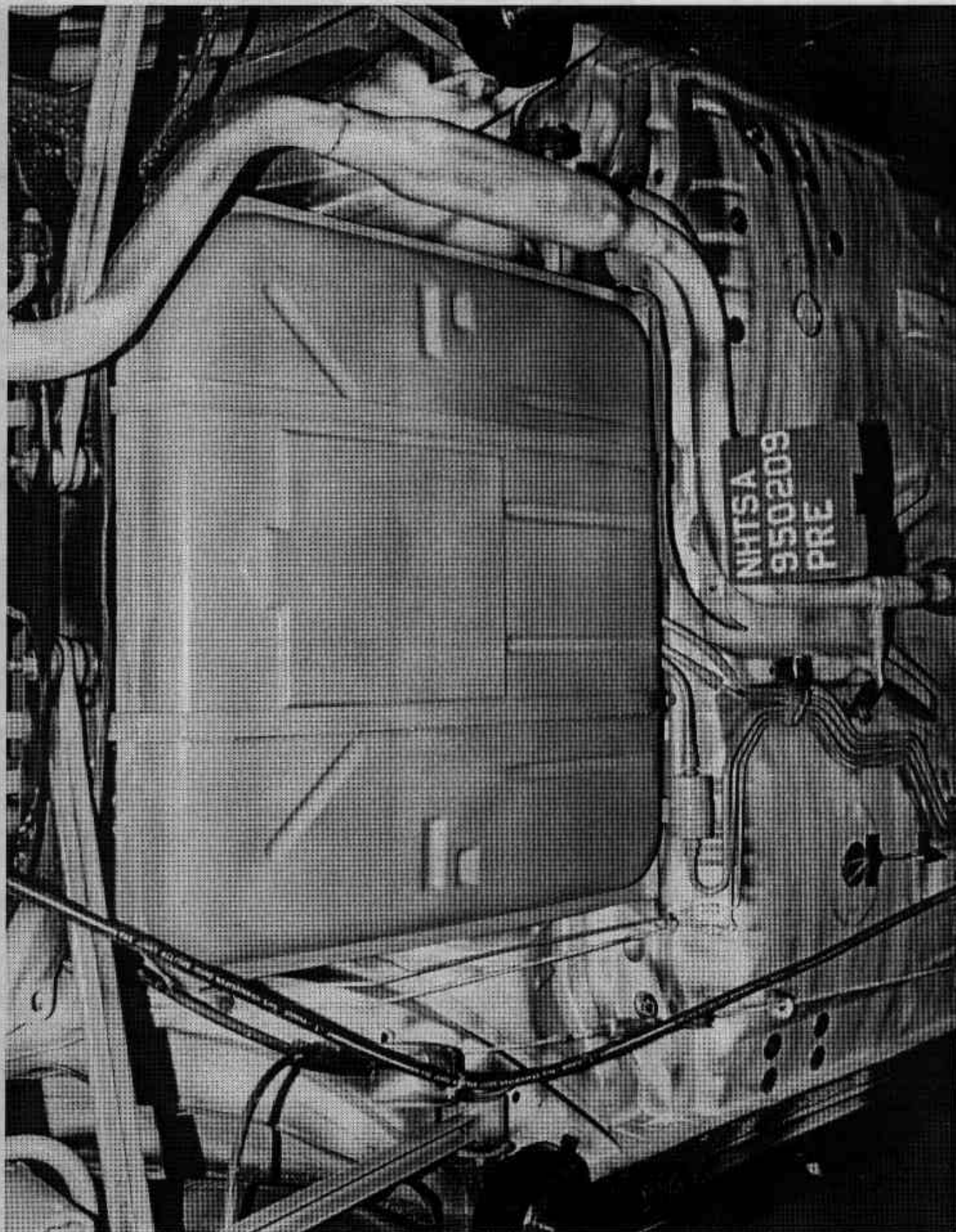


Figure A-21. Pre-Test Fuel Tank View
A-22

950209

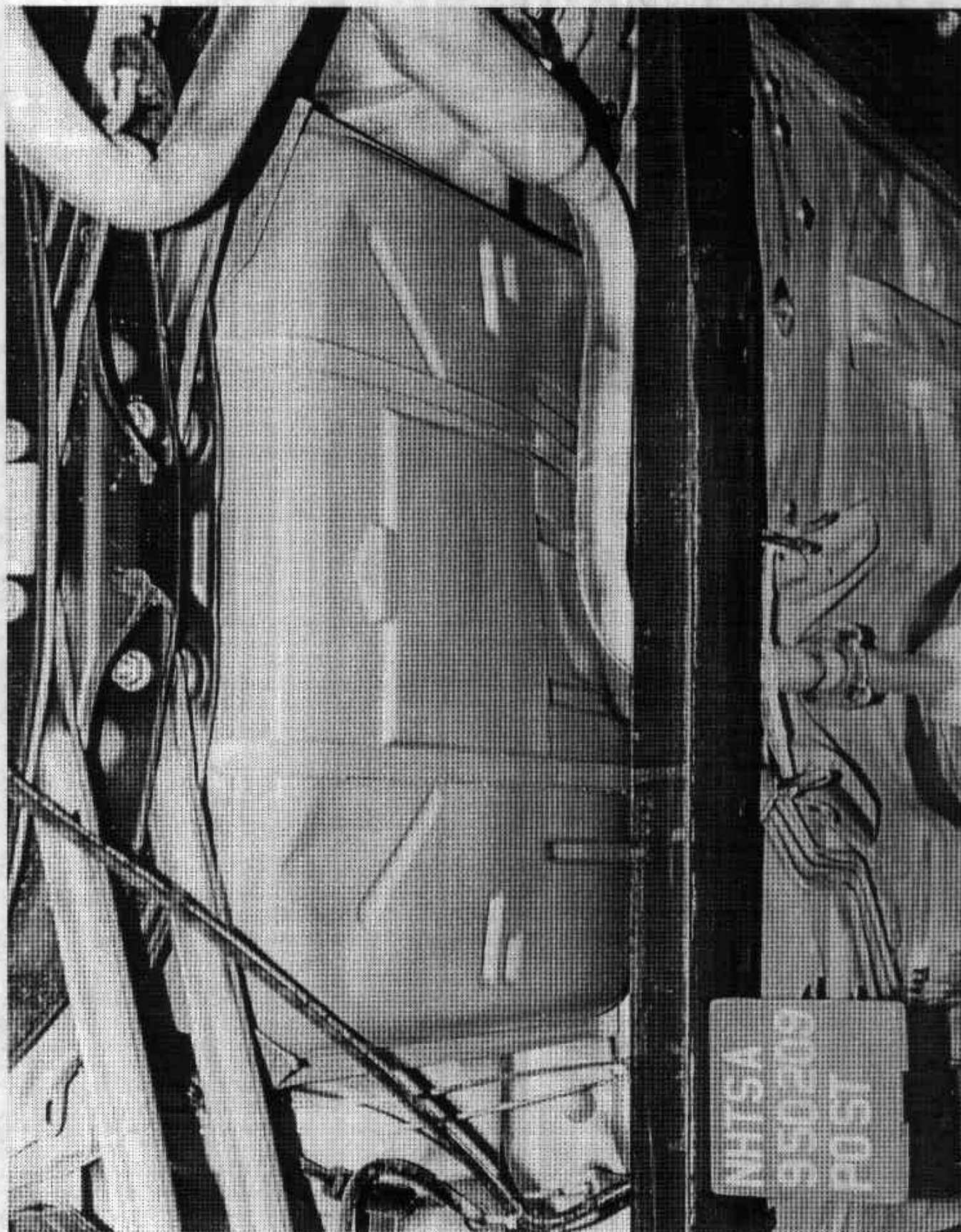


Figure A-22. Post-Test Fuel Tank View
A-23

950209

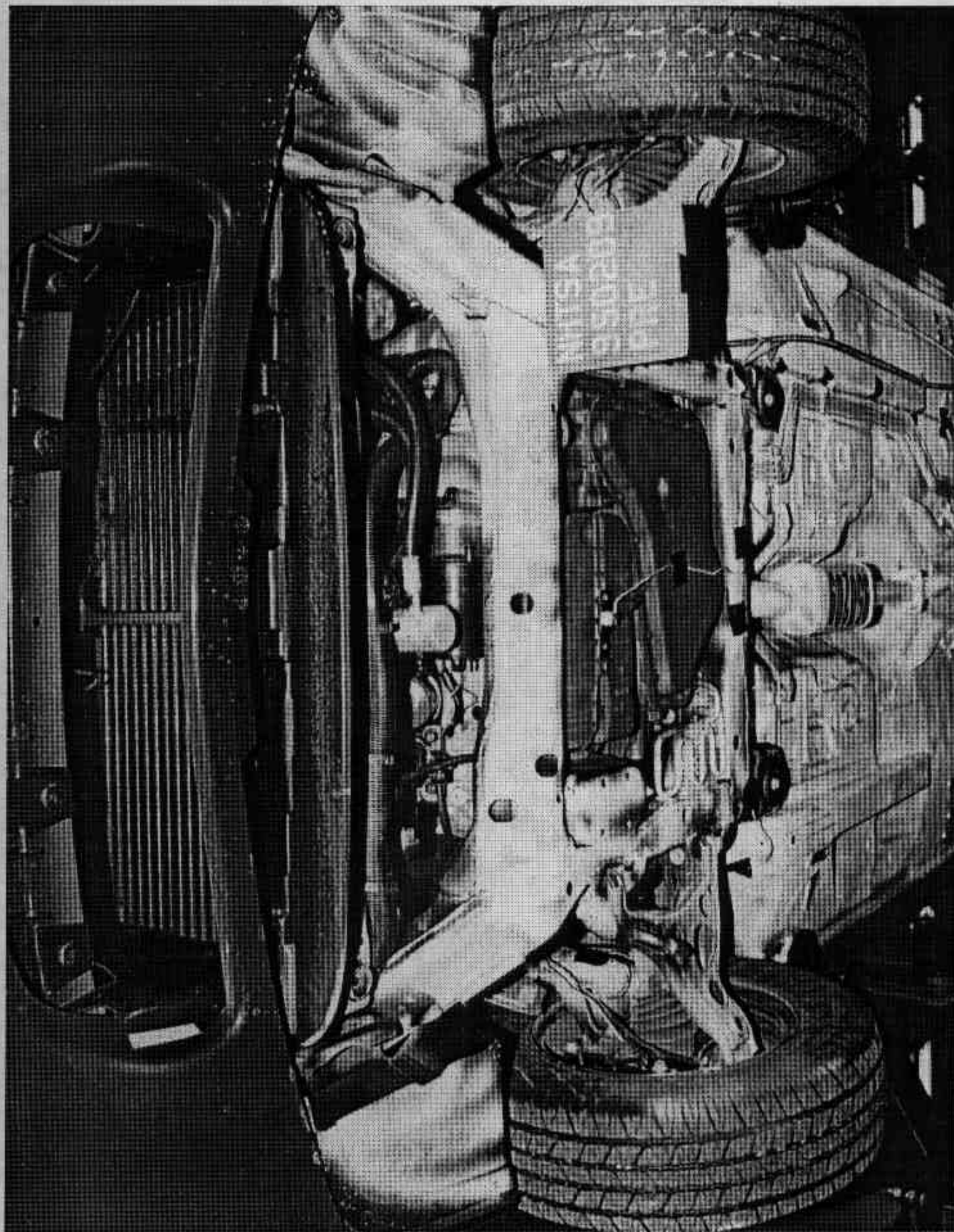


Figure A-23. Pre-Test Front Underbody View
A-24

950209

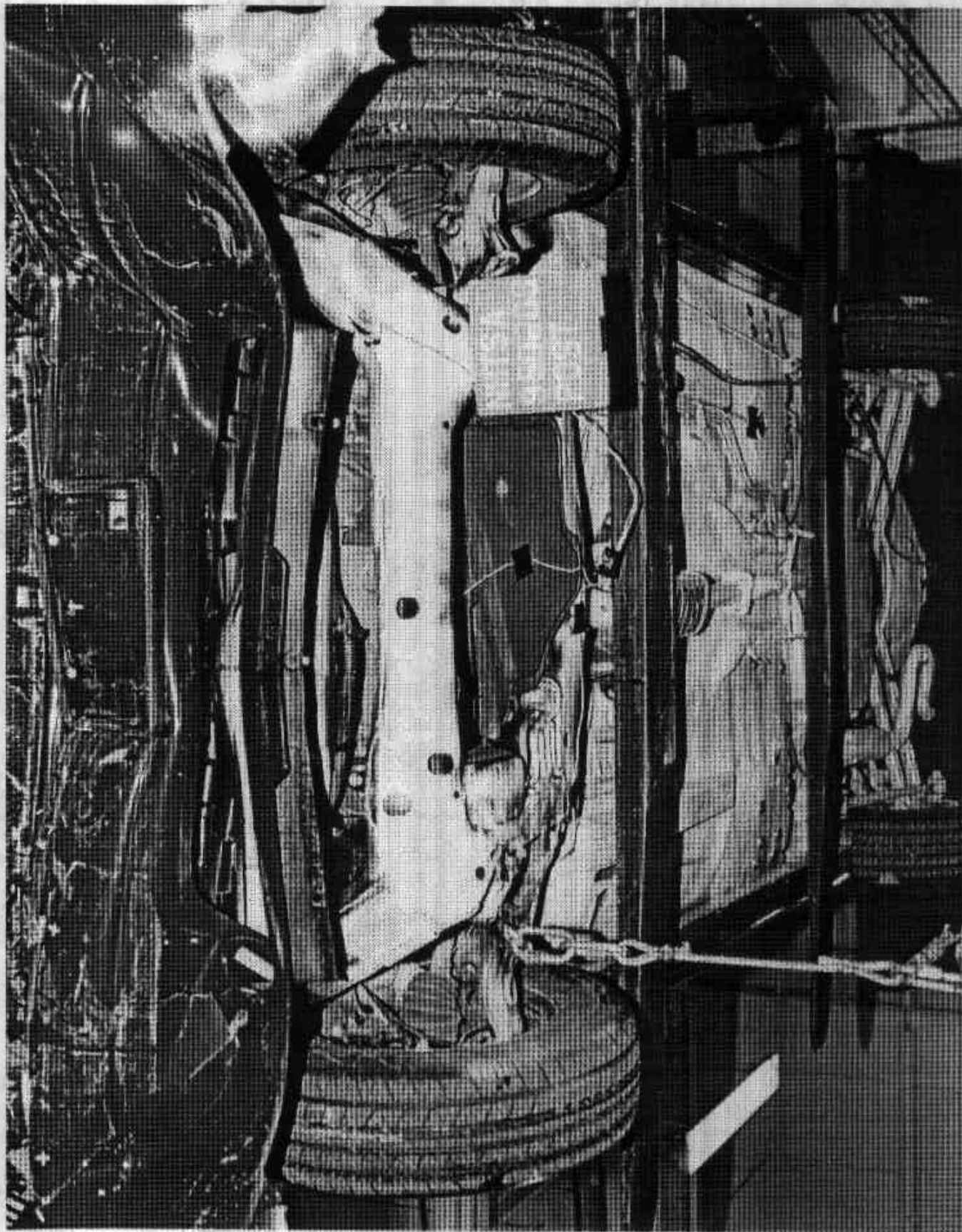


Figure A-24. Post-Test Front Underbody View
A-25

950209

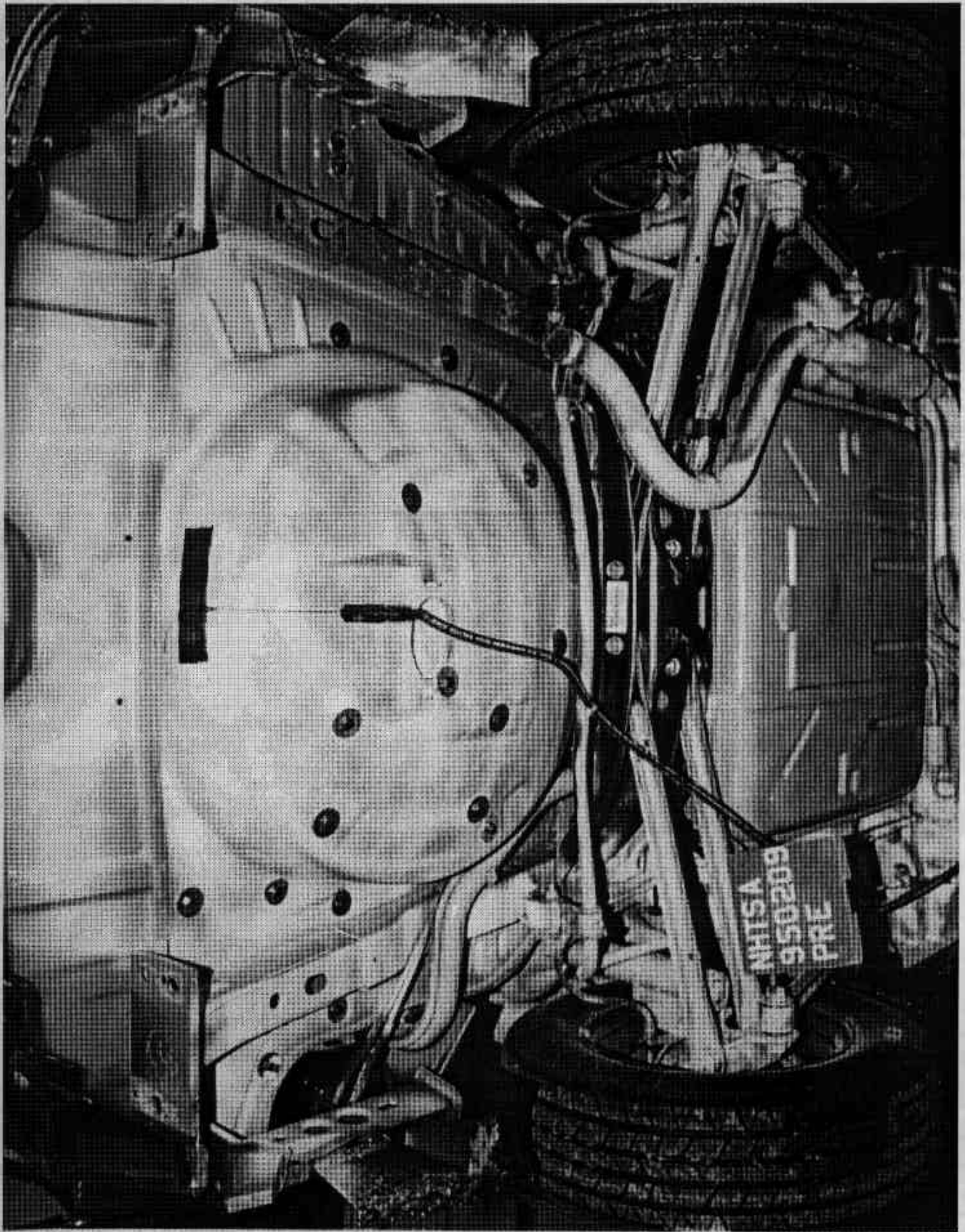


Figure A-25. Pre-Test Rear Underbody View
A-26

950209

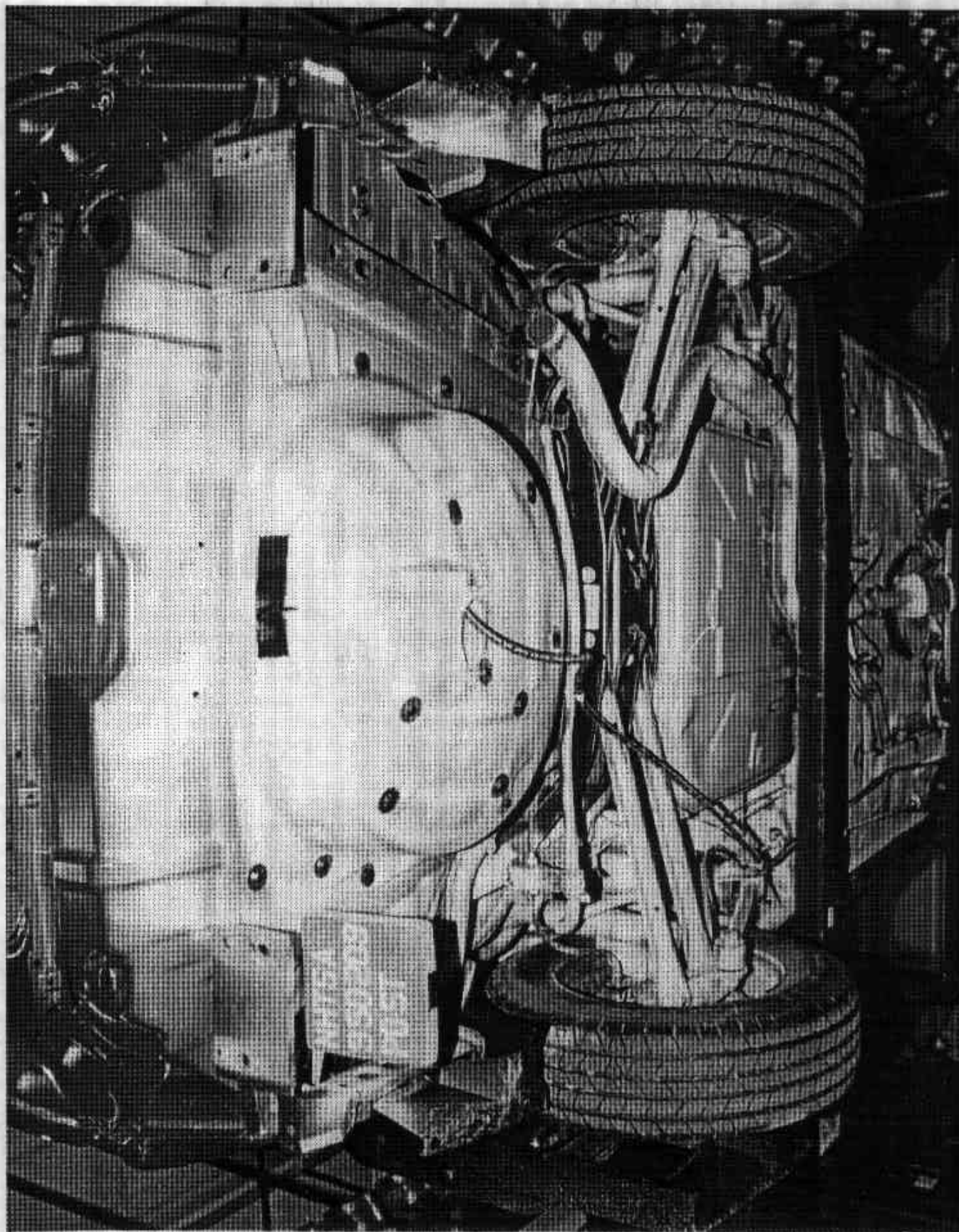


Figure A-26. Post-Test Rear Underbody View
A-27

950209



Figure A-27. Pre-Test Driver Dummy Position View
A-28

950209

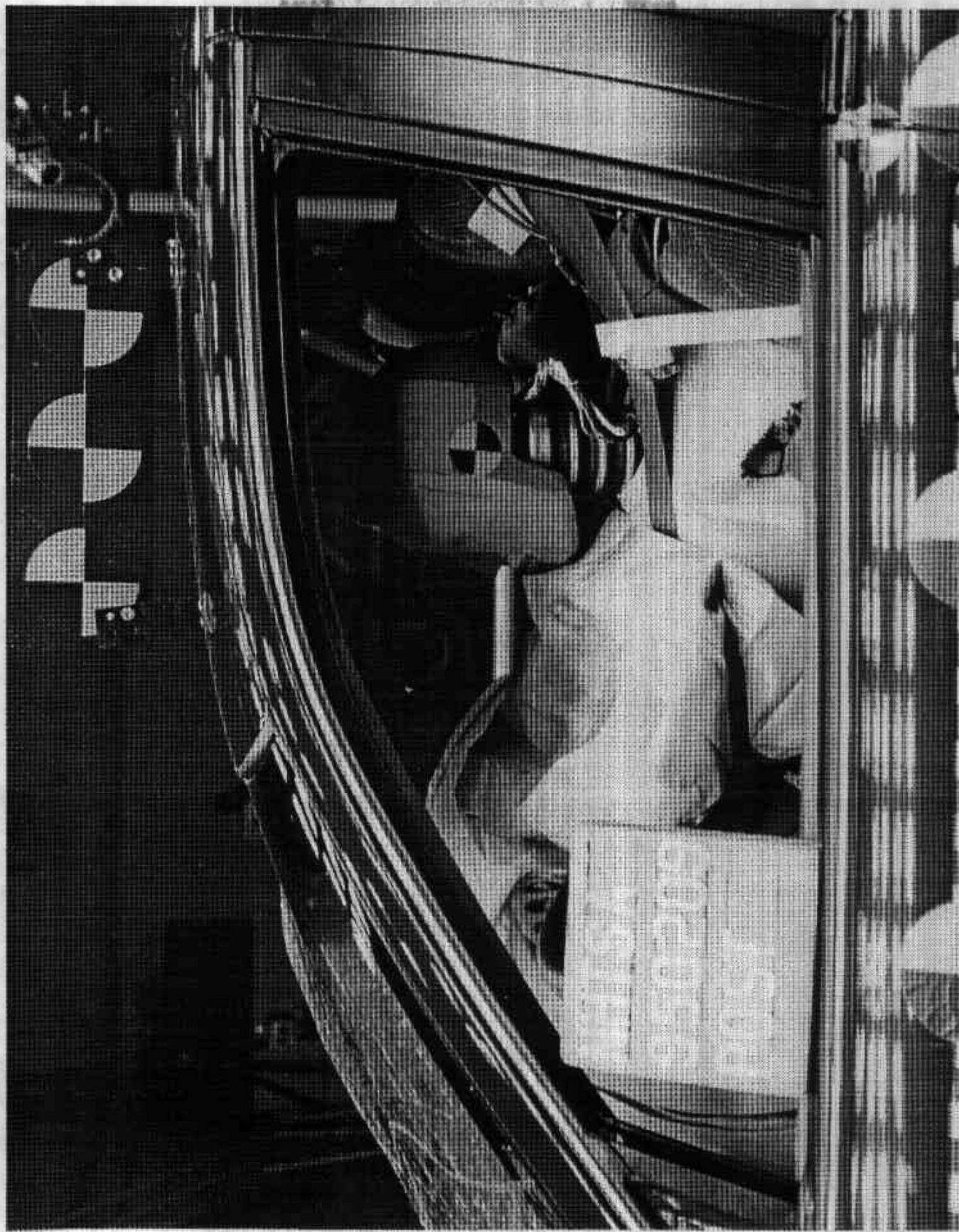


Figure A-28. Post-Test Driver Dummy Position View
A-29

950209

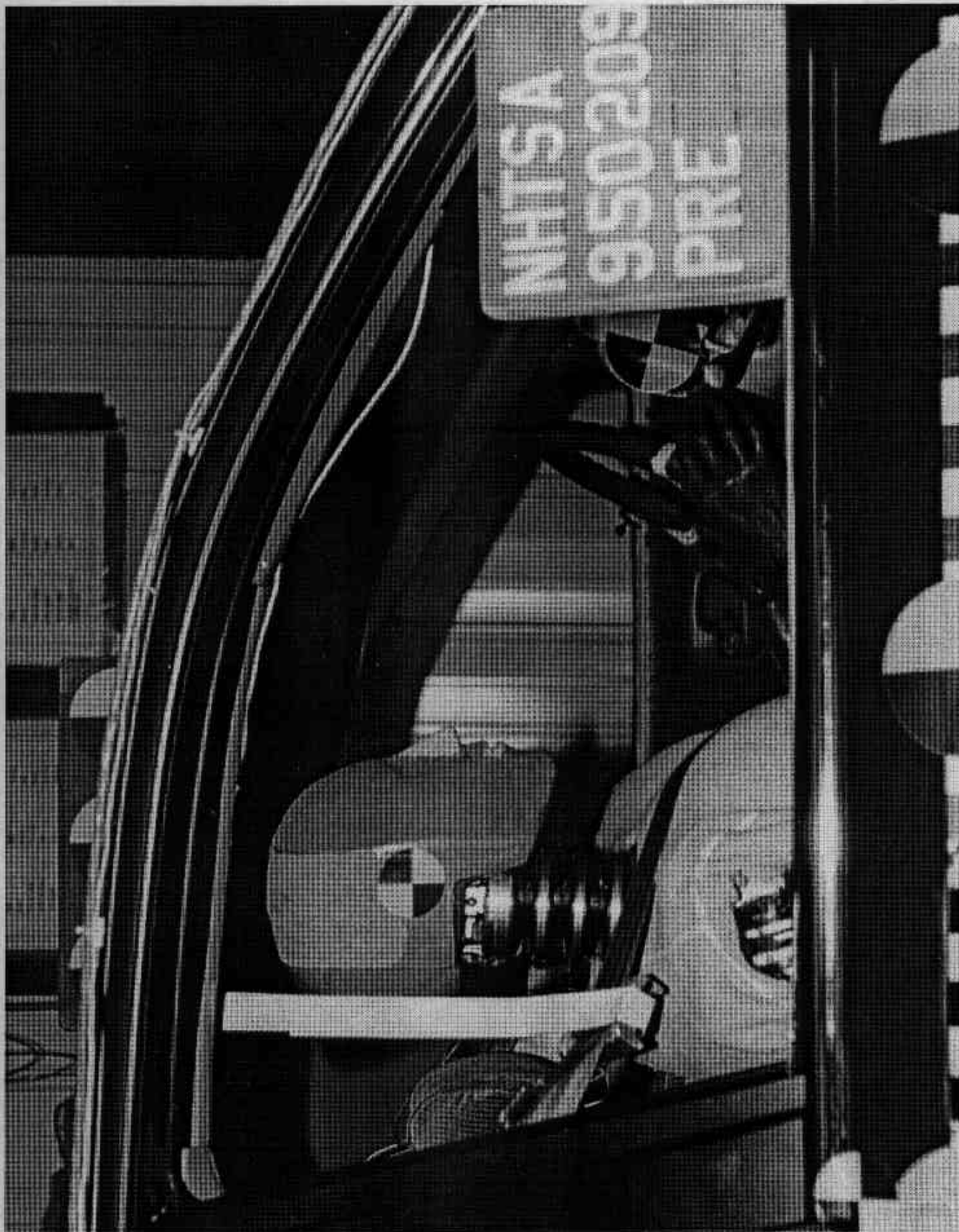


Figure A-29. Pre-Test Passenger Dummy Position View
A-30

950209

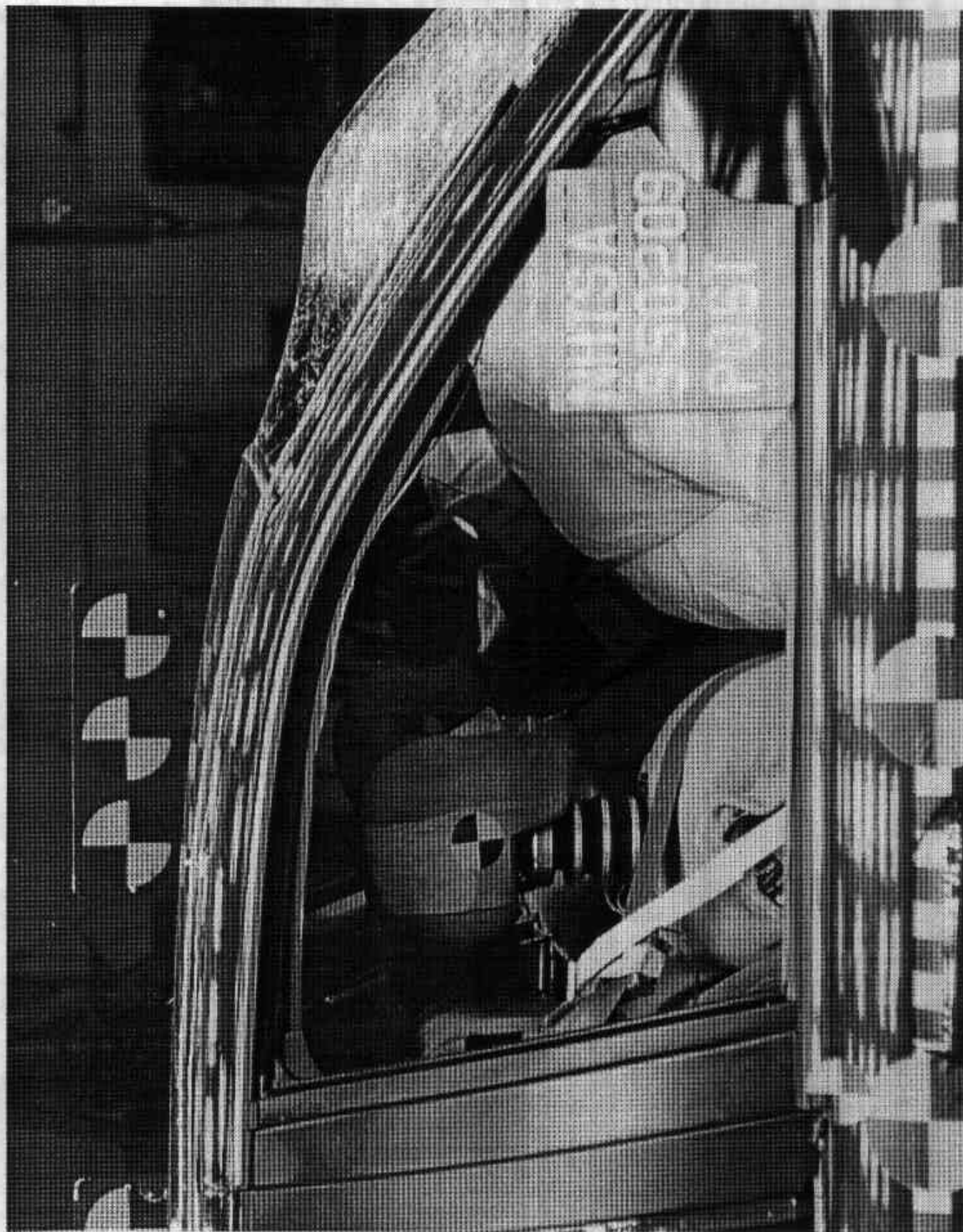


Figure A-30. Post-Test Passenger Dummy Position View
A-31

950209

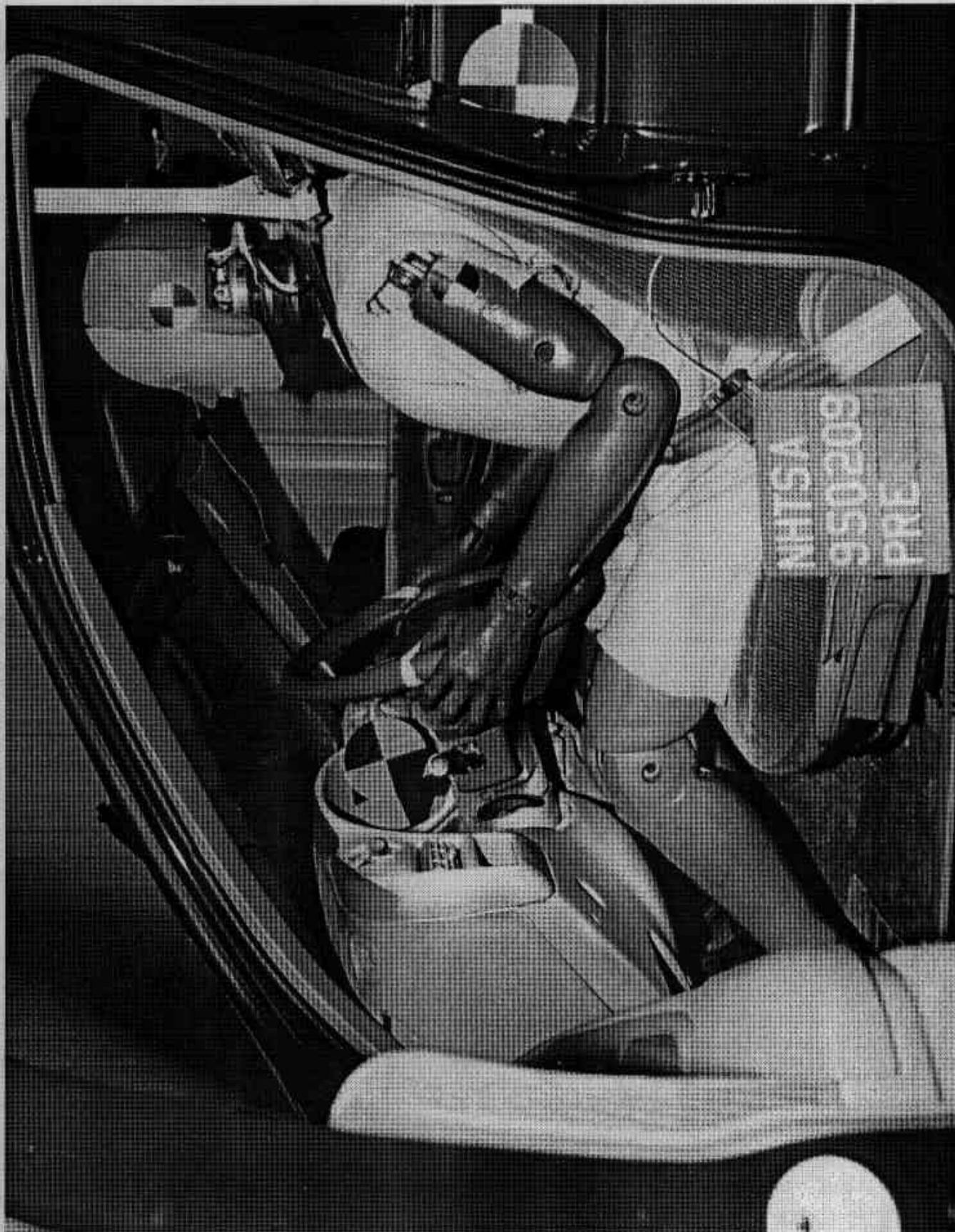


Figure A-31. Pre-Test Driver Dummy & Vehicle Interior - View I
A-32

950209

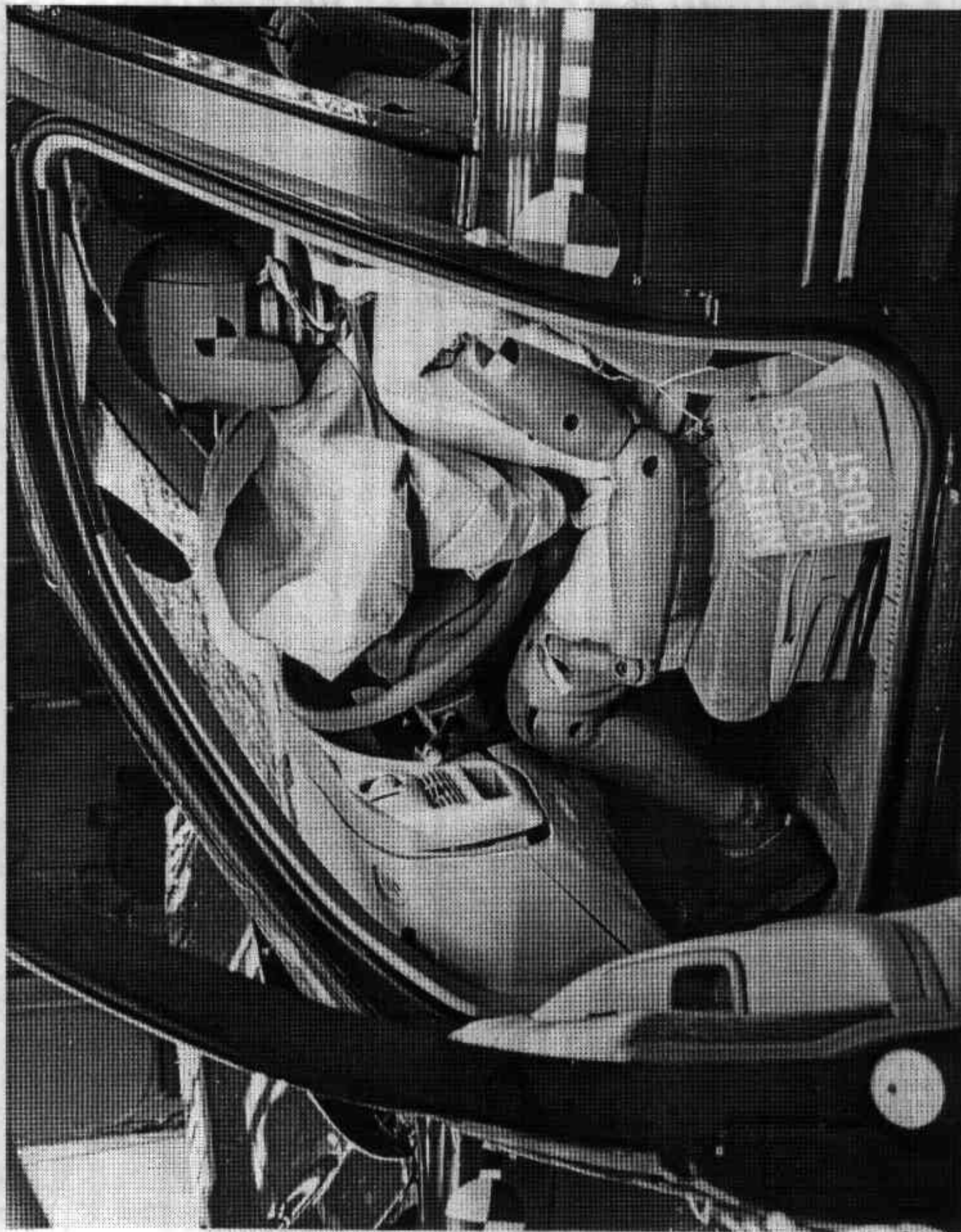


Figure A-32. Post-Test Driver Dummy & Vehicle Interior - View 1

A-33

950209



Figure A-33. Pre-Test Driver Dummy & Vehicle Interior - View 2

A-34

950209

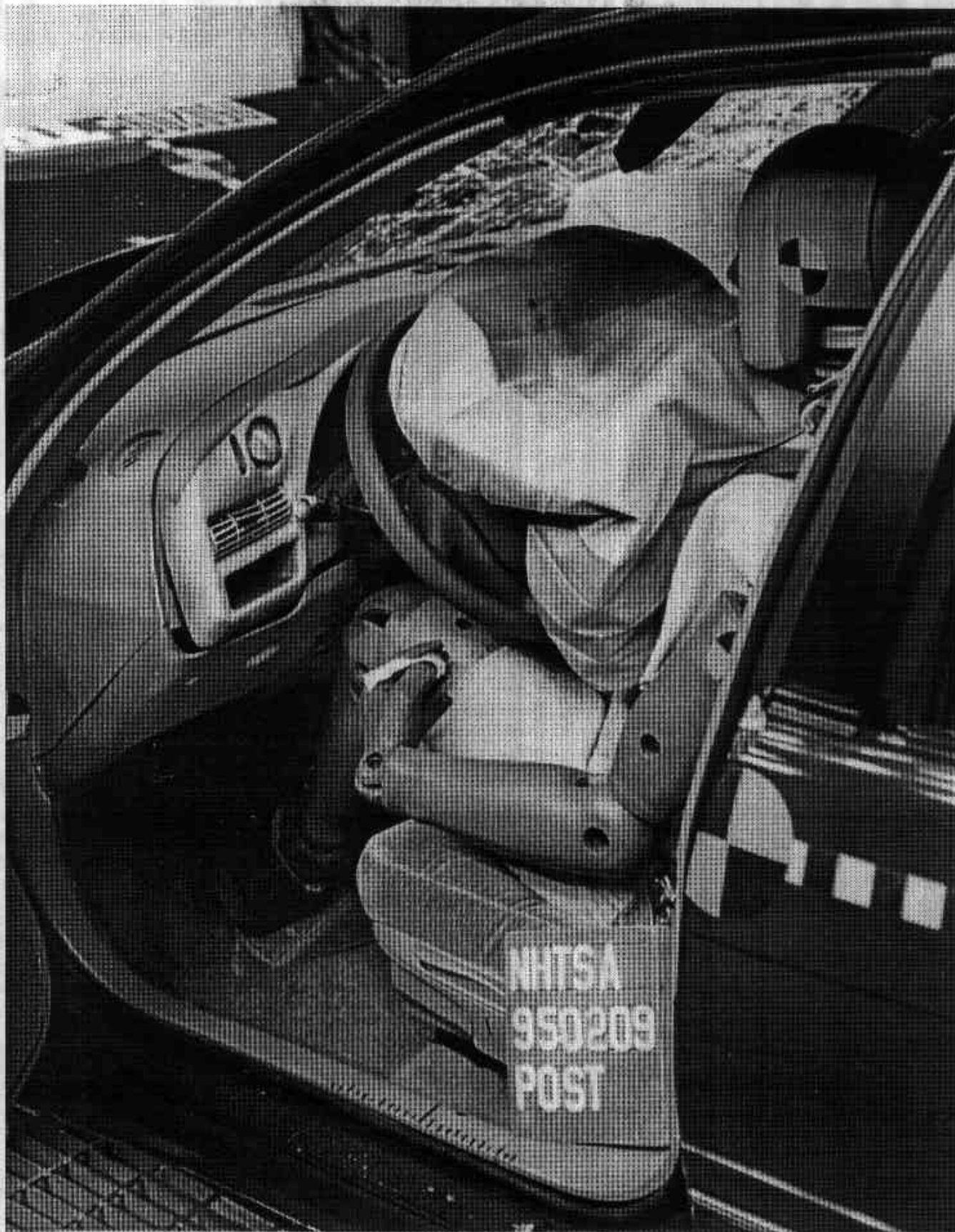


Figure A-34. Post-Test Driver Dummy & Vehicle Interior - View 2

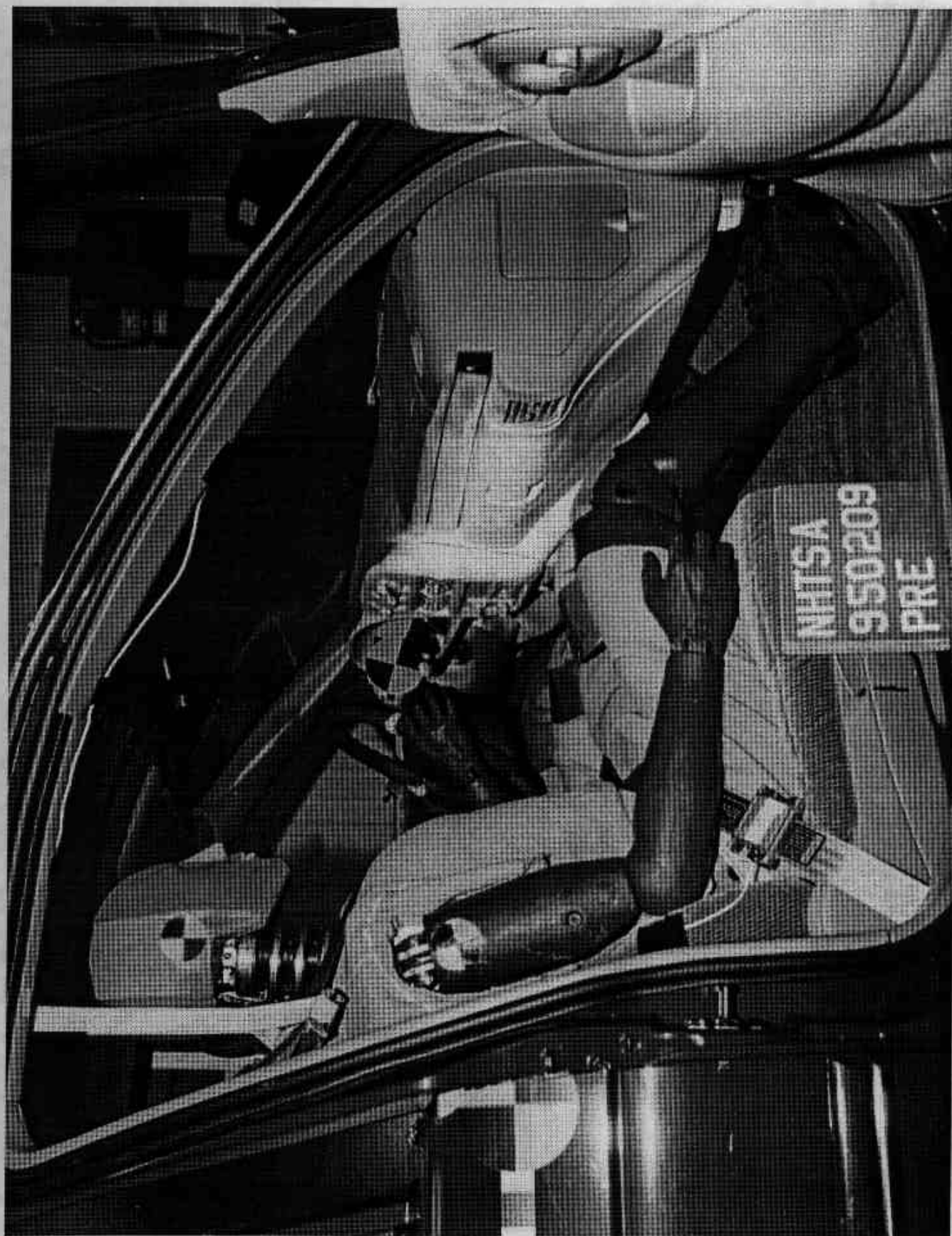


Figure A-35. Pre-Test Passenger Dummy & Vehicle Interior - View I

A-36

950209



Figure A-36. Post-Test Passenger Dummy & Vehicle Interior - View 1

A-37

950209

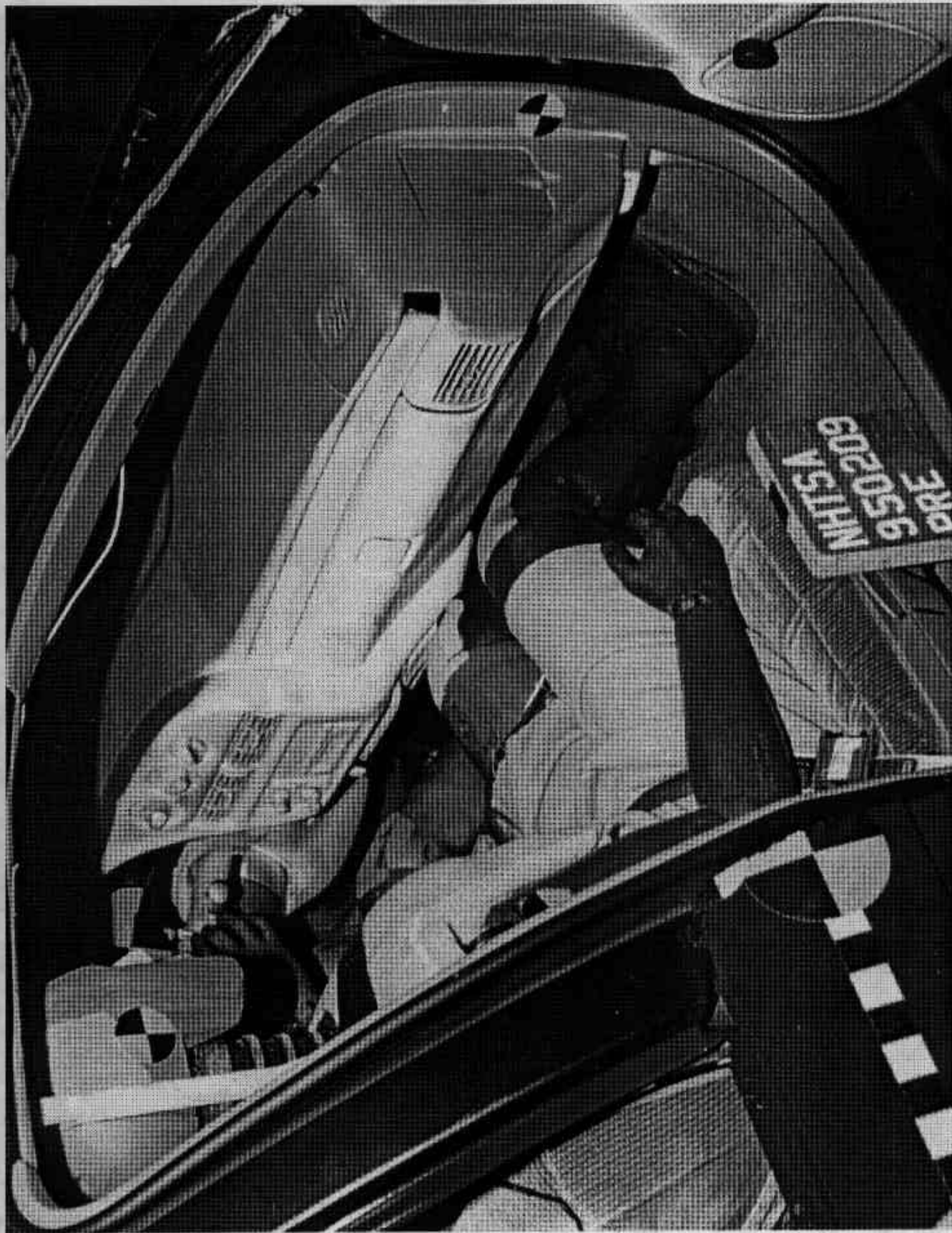


Figure A-37. Pre-Test Passenger Dummy & Vehicle Interior - View 2
A-38

950209



Figure A-38. Post-Test Passenger Dummy & Vehicle Interior - View 2

A-39

950209

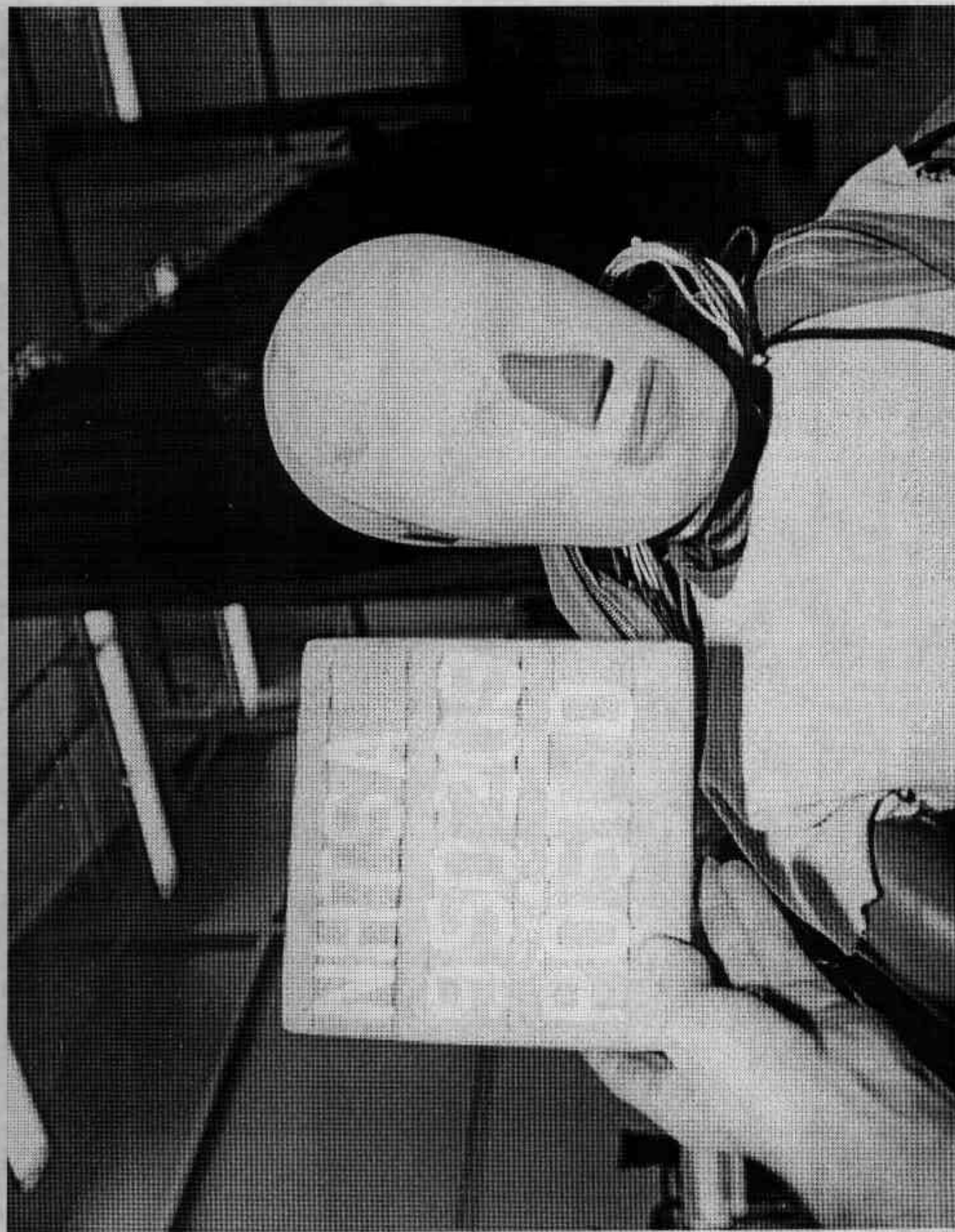


Figure A-39. Post-Test Driver Dummy Head Contact - View 1
A-40

950209



Figure A-40. Post-Test Driver Dummy Head Contact - View 2

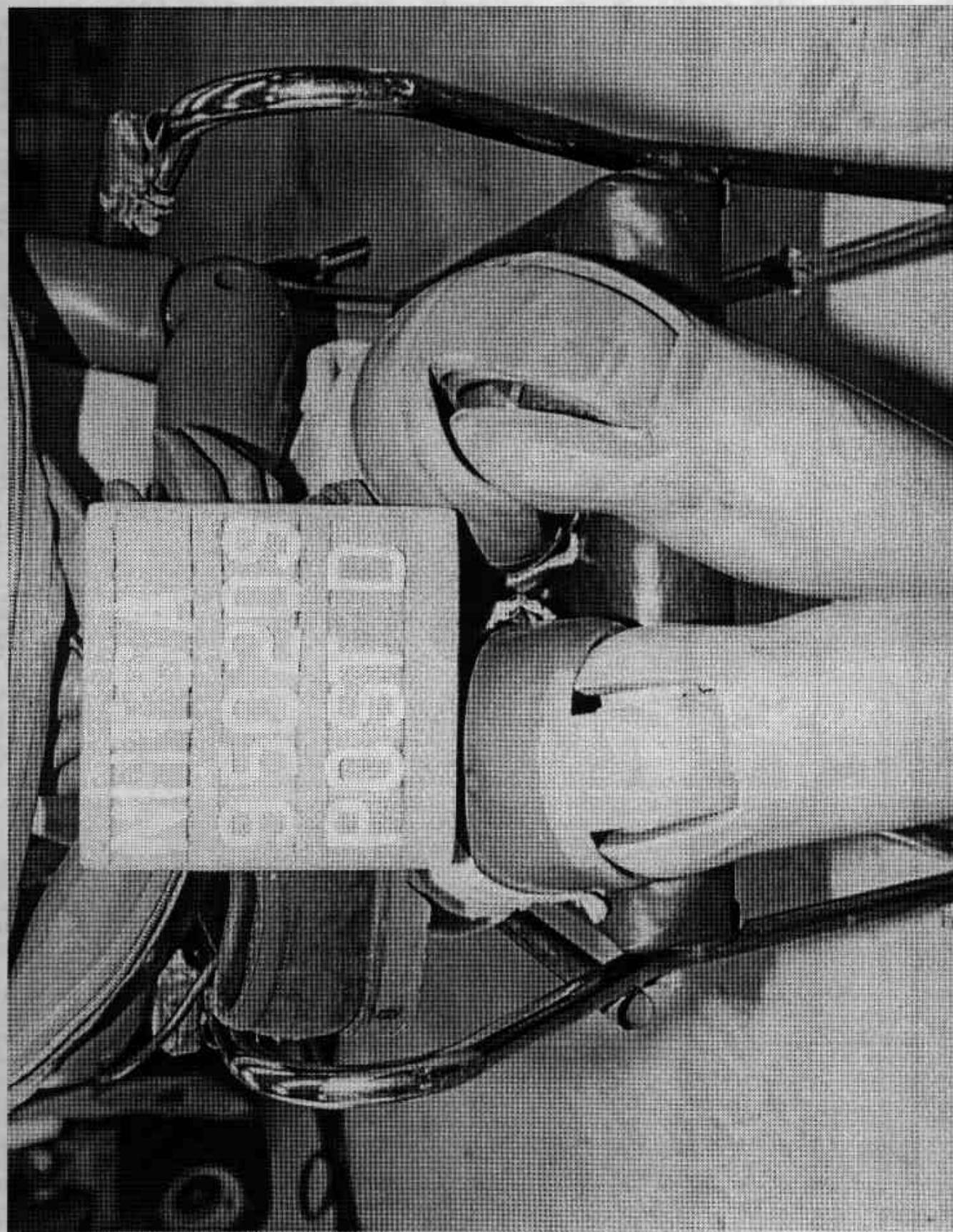


Figure A-41. Post-Test Driver Dummy Knee Contact - View 1

A-42

950209



Figure A-42. Post-Test Driver Dummy Knee Contact - View 2

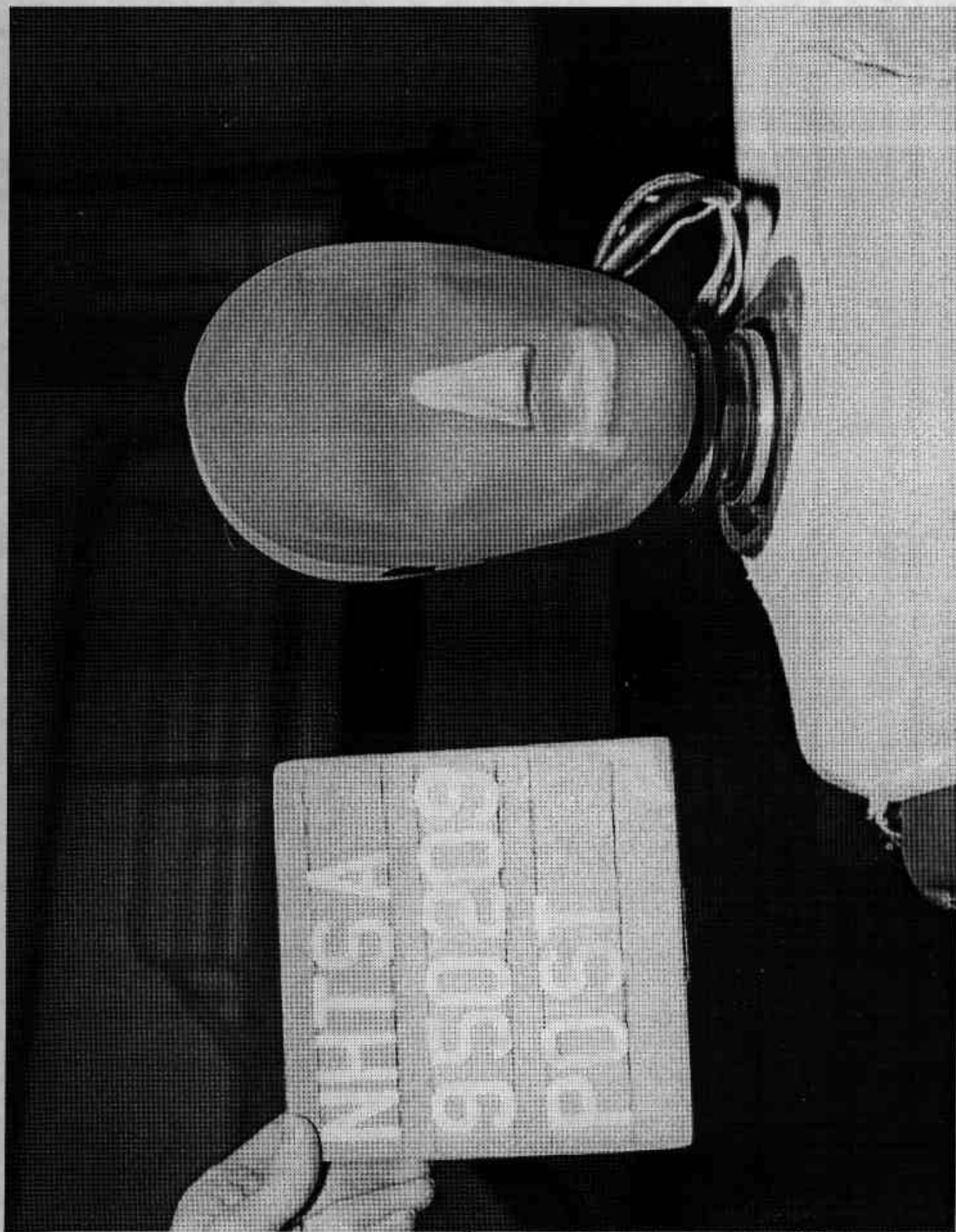


Figure A-43. Post-Test Passenger Dummy Head Contact - View 1

A-44

950209

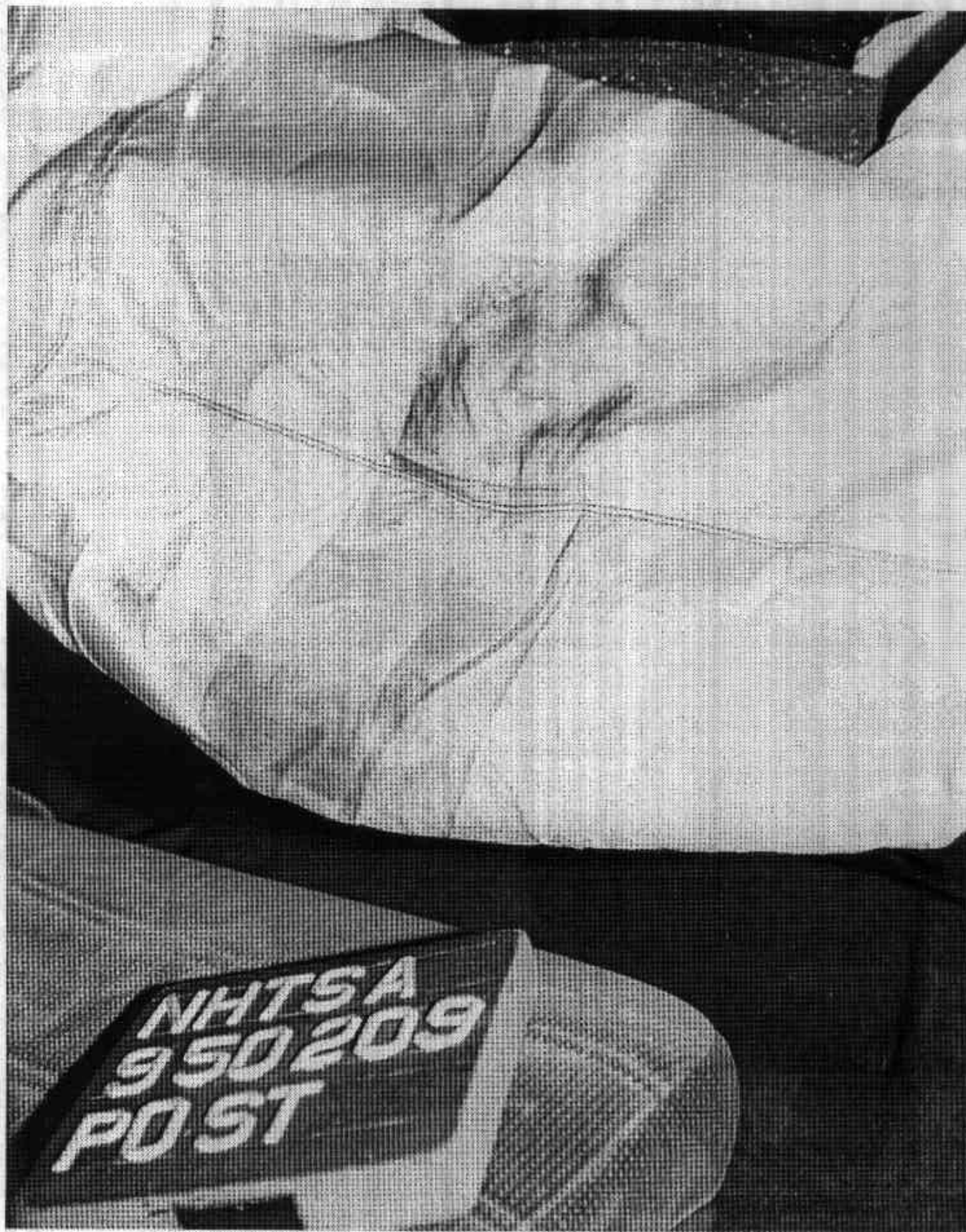


Figure A-44. Post-Test Passenger Dummy Head Contact - View 2

A-45

950209

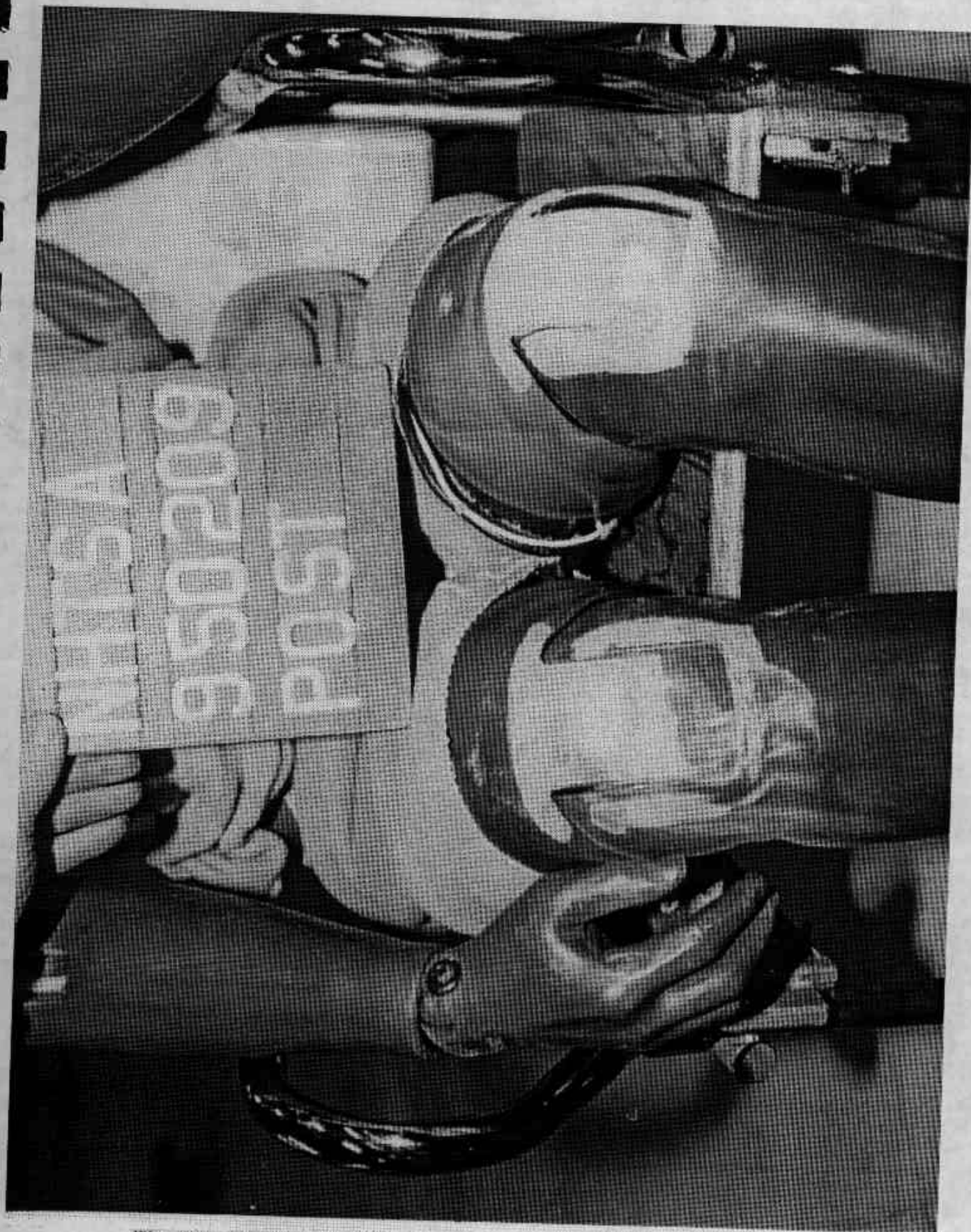


Figure A-45. Post-Test Passenger Dummy Knee Contact - View 1

A-46

950209

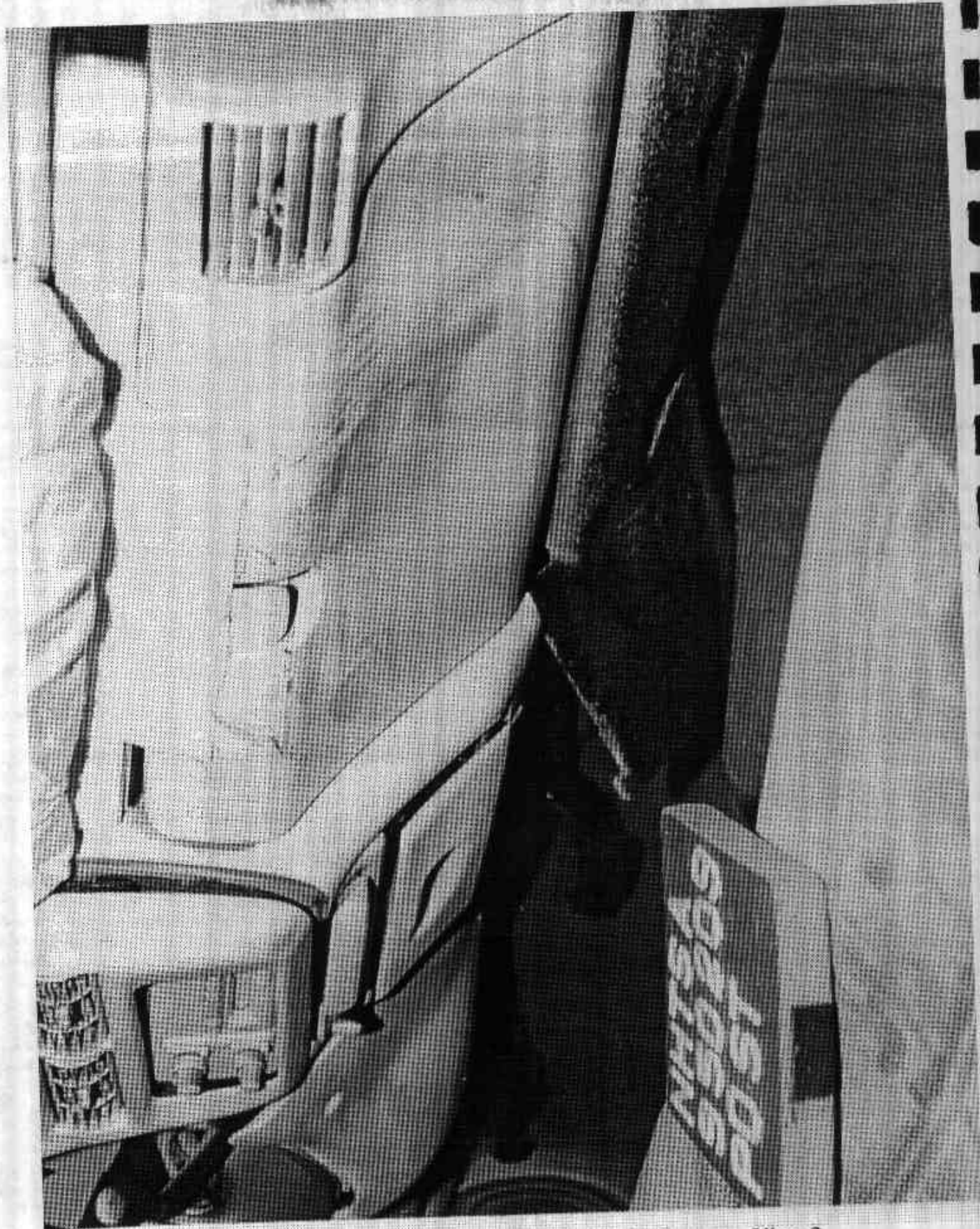


Figure A-46. Post-Test Passenger Dummy Knee Contact - View 2

A-47

950209

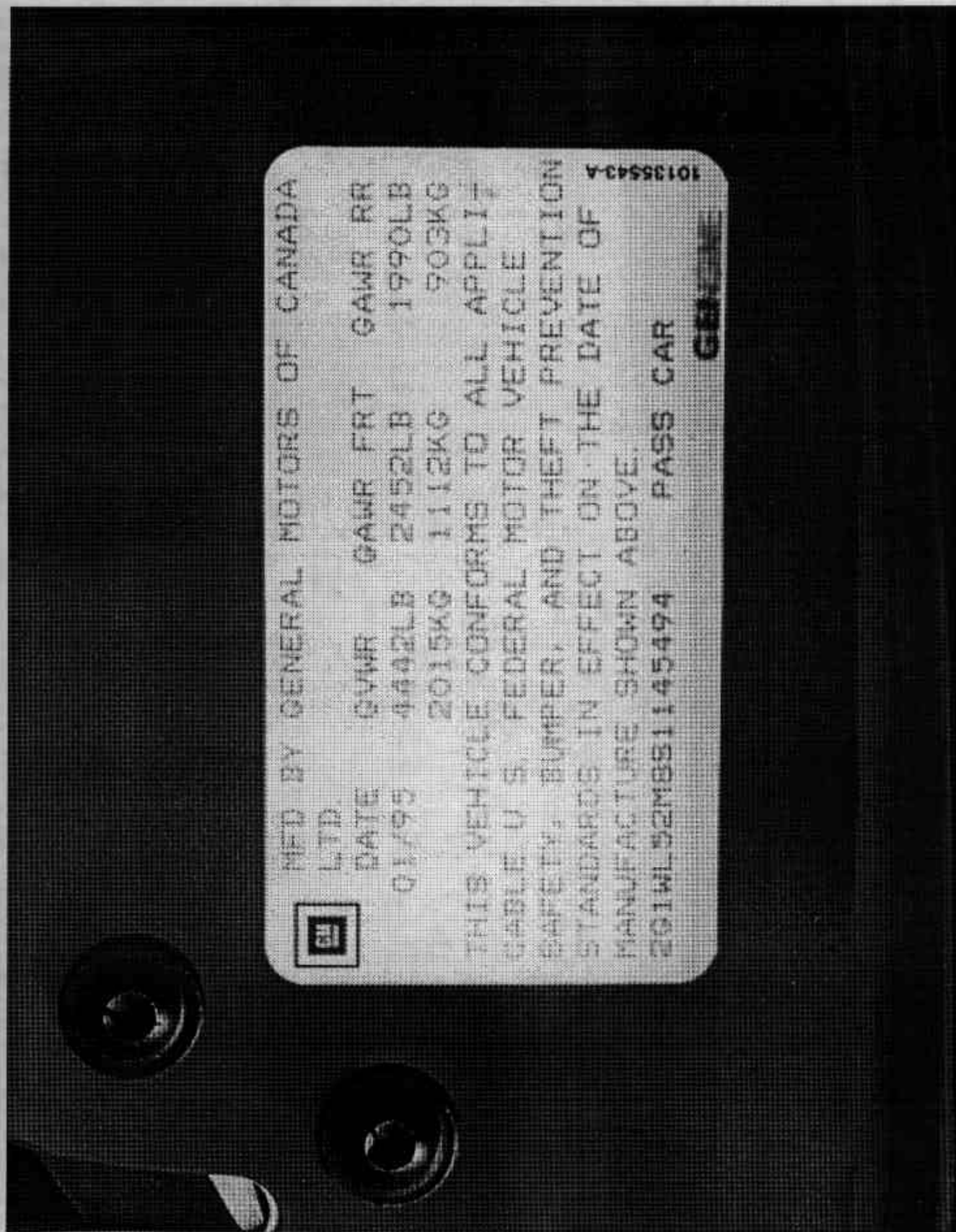


Figure A-47. Pre-Test Vehicle Certification Label View

10135543-B

TIRE-LOADING INFORMATION

OCCUPANTS		VEHICLE CAP.		WT.
FRT	RR	TOTAL	LEBS	KG
0	3	6	1055	480

MAX. LOADING & GVWR SAME AS VEHICLE

CAPACITY WEIGHT, WAC COLD TIRE

MODEL NH69 SPEED PRESSURE

TIRE SIZE	RTG	PSI/KPA
FRT P205/70R15	B	30/210
RR P205/70R15	B	30/210
SPA T125/70D15	M	50/420

IF TIRES ARE HOT, ADD 4PSI/28KPA

SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION

10135543-B
SER NO. FMKS

Figure A-48. Pre-Test Vehicle Recommended Tire Pressure Label View

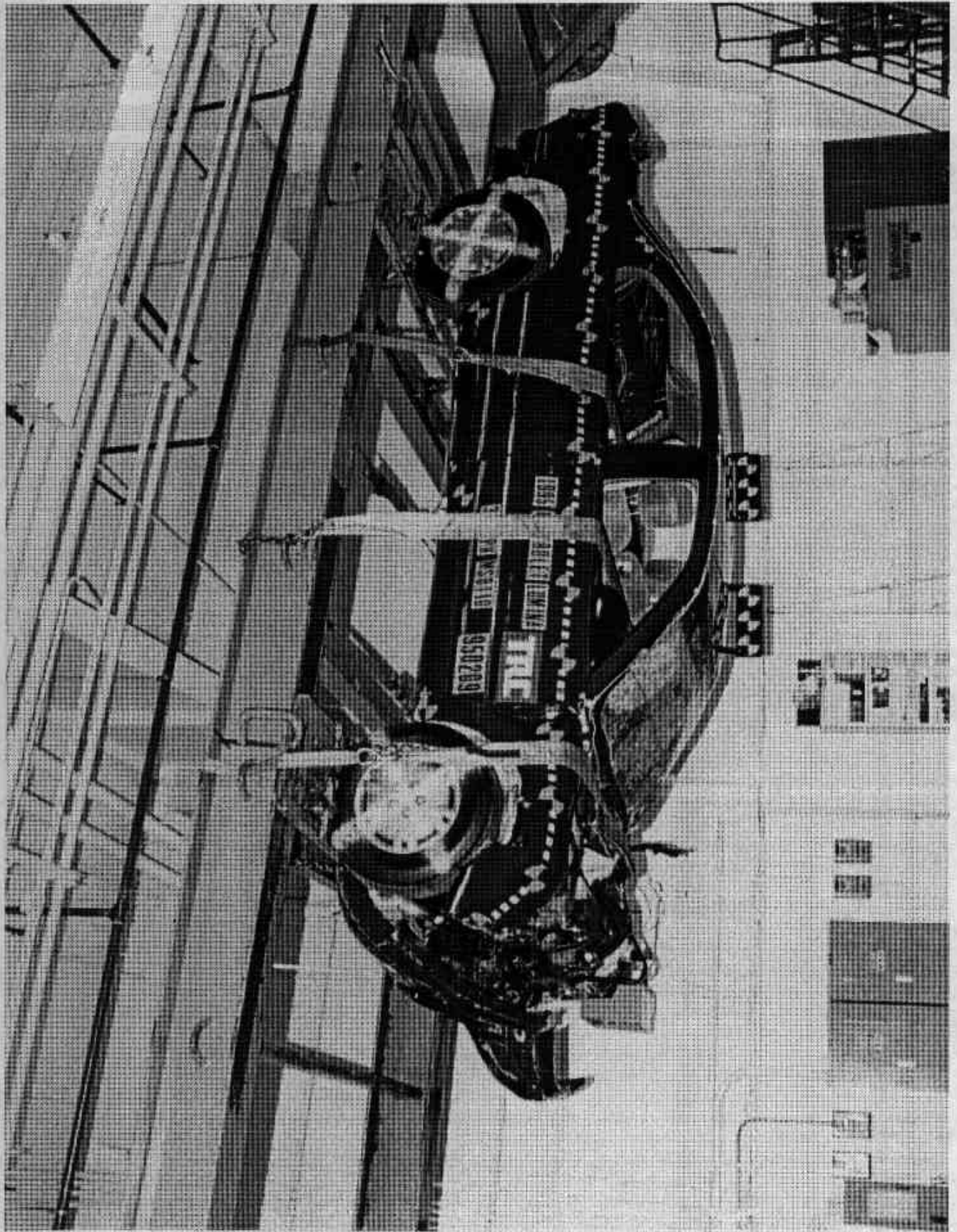


Figure A-49. Post-Test Vehicle on Static Rollover Machine View

A-50

950209

Appendix B

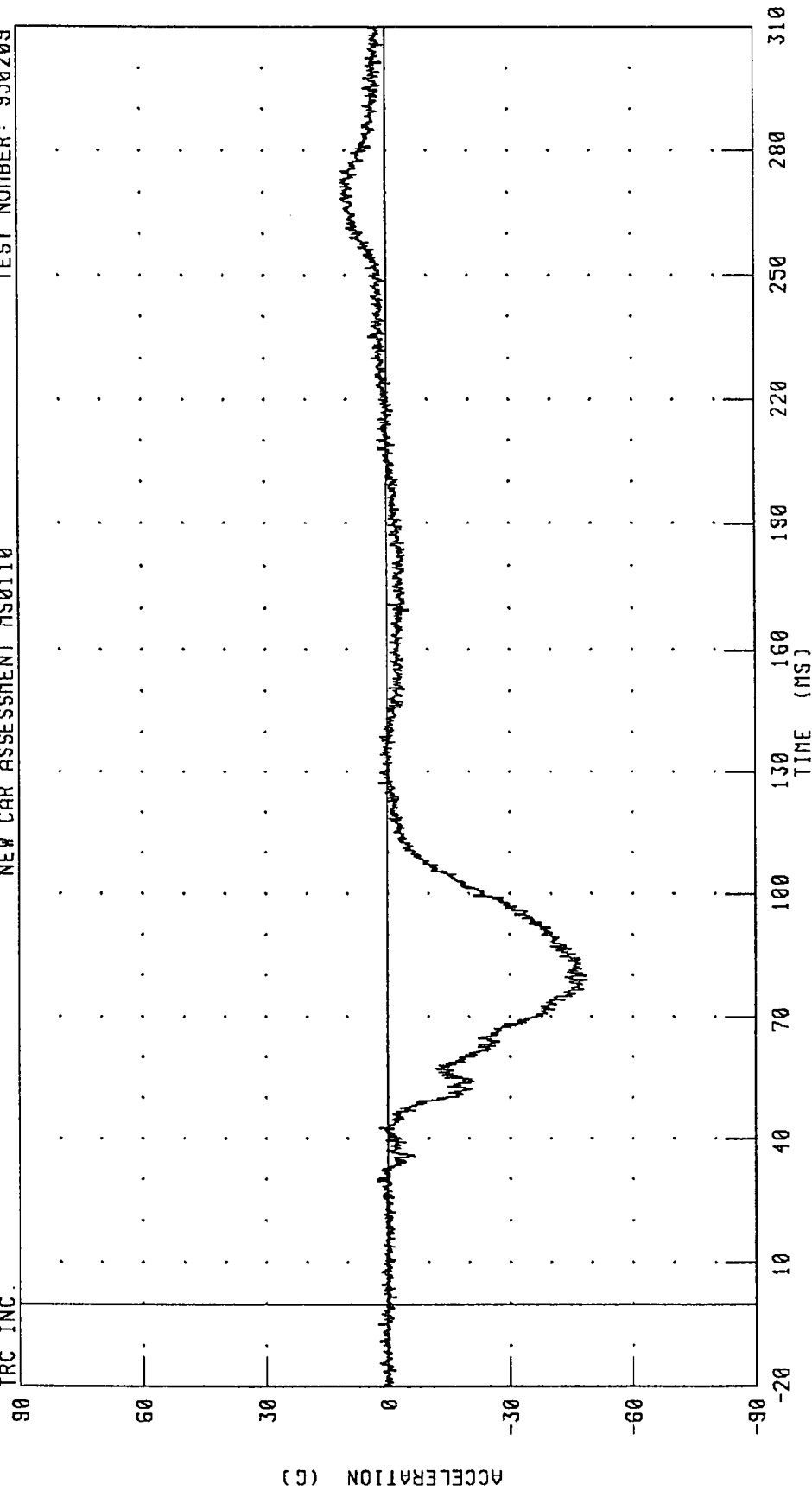
Data Plots

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
DRIVER HEAD X-AXIS ACCELERATION

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.

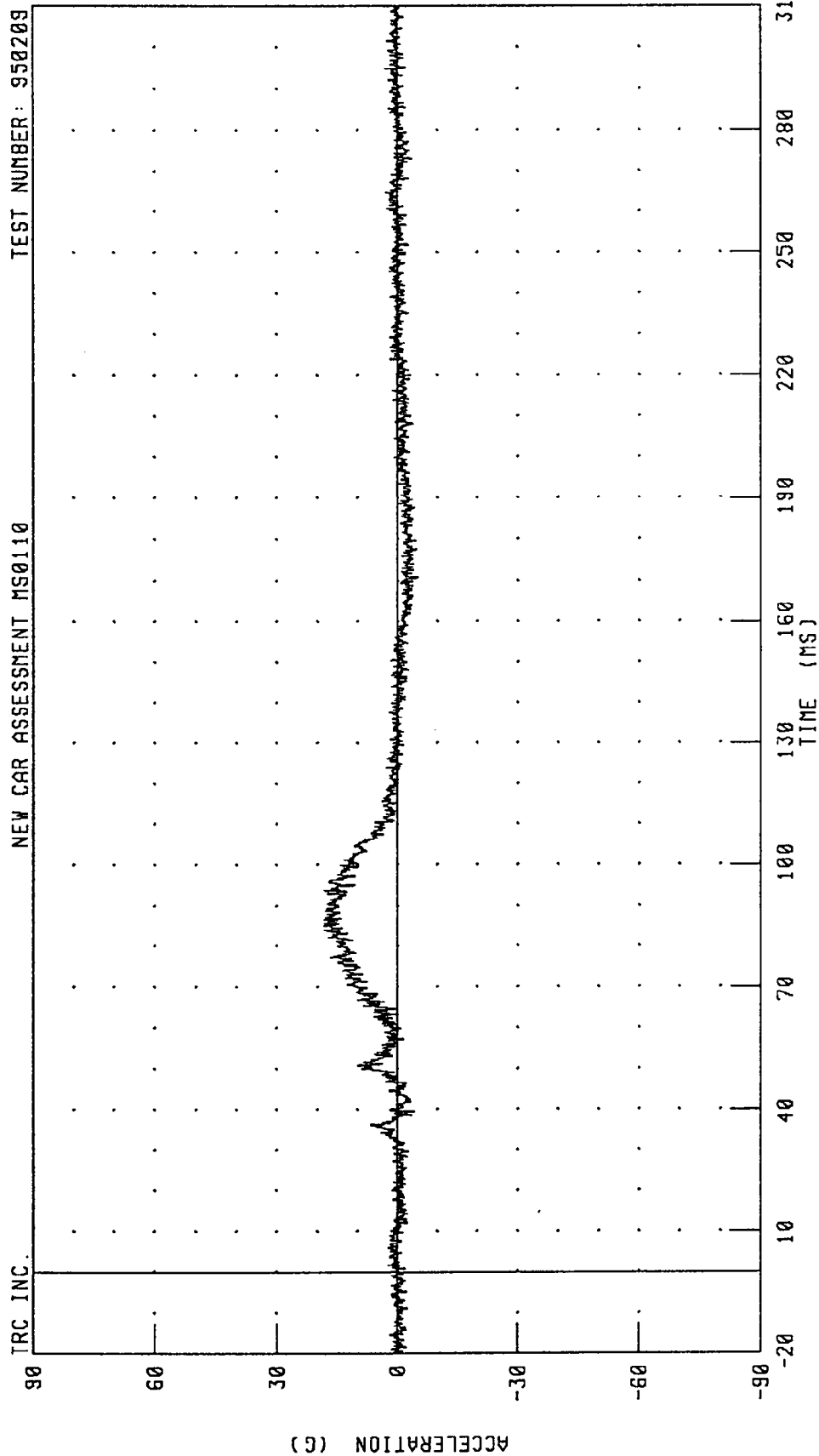


PEAK DATA: 11.26 G @ 272.40 MS; -48.66 G @ 78.96 MS

CHANNEL: HDXG1 FILTER: CH. CLASS 1000

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 DRIVER HEAD Y-AXIS ACCELERATION
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

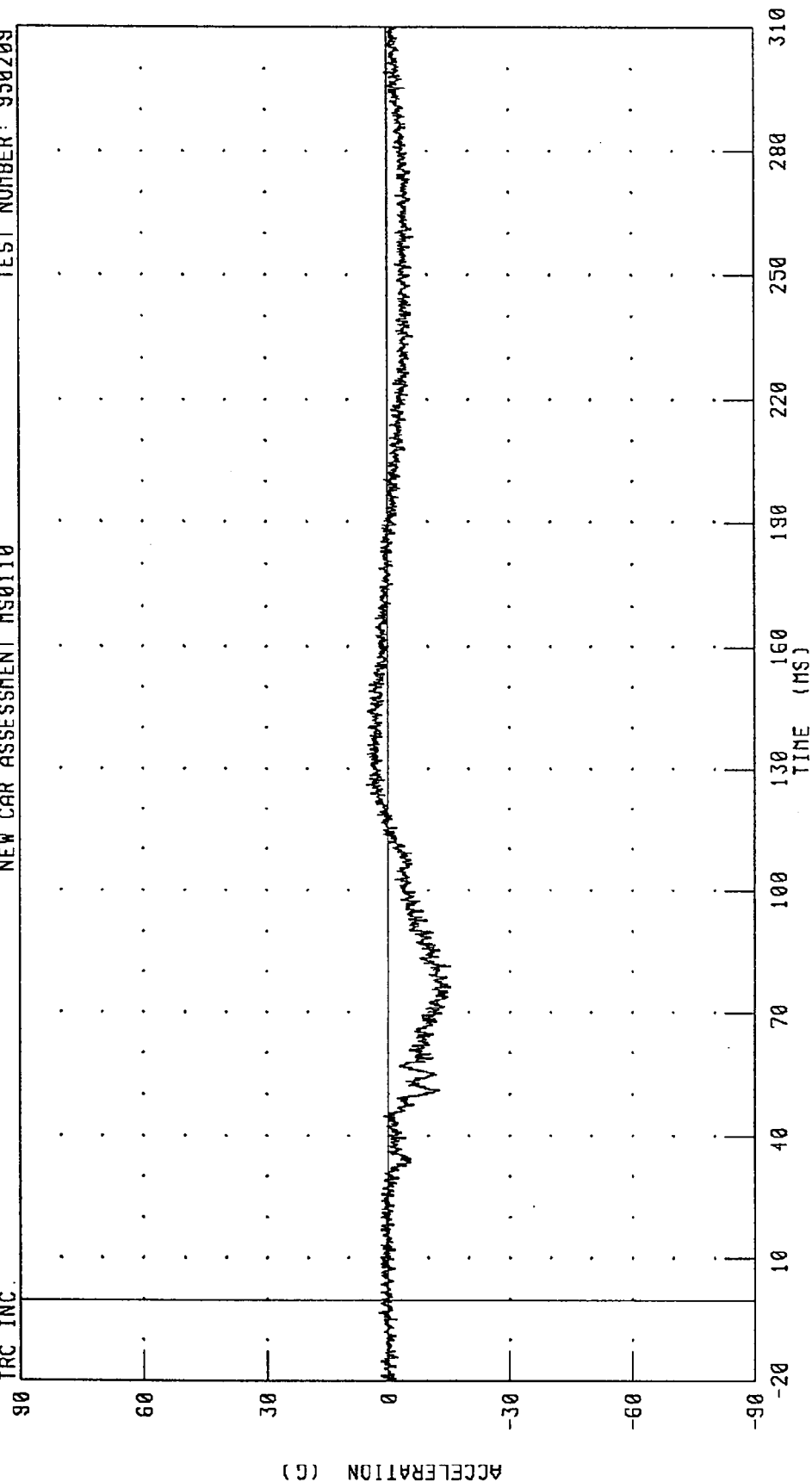


1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
DRIVER HEAD Z-AXIS ACCELERATION

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.



CHANNEL: HEDZG1 FILTER: CH. CLASS 1000

PEAK DATA: 5.24 G @ 126.16 MS; -15.57 G @ 76.48 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
DRIVER HEAD RESULTANT ACCELERATION

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.

120

100

80

60

40

20

0

ACCELERATION (G)

TIME (MS)

310

280

250

220

190

160

130

100

70

40

10

-20

CHANNEL: HEDRG1 FILTER: CH. CLASS 1000

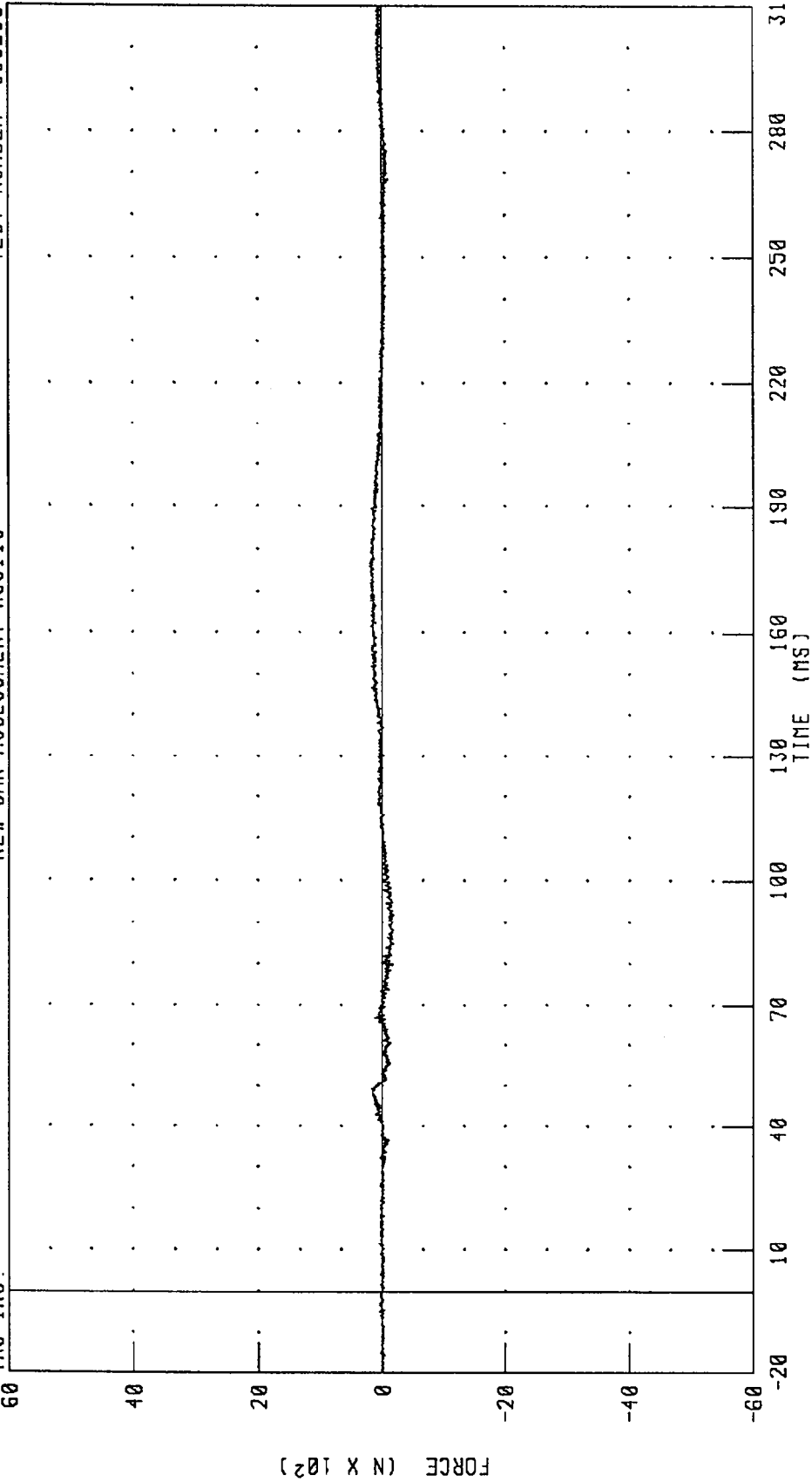
PEAK DATA: 52.14 G @ 78.80 MS; 0.16 G @ 18.88 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 DRIVER NECK X-AXIS SHEAR FORCE
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

TRC INC.

60



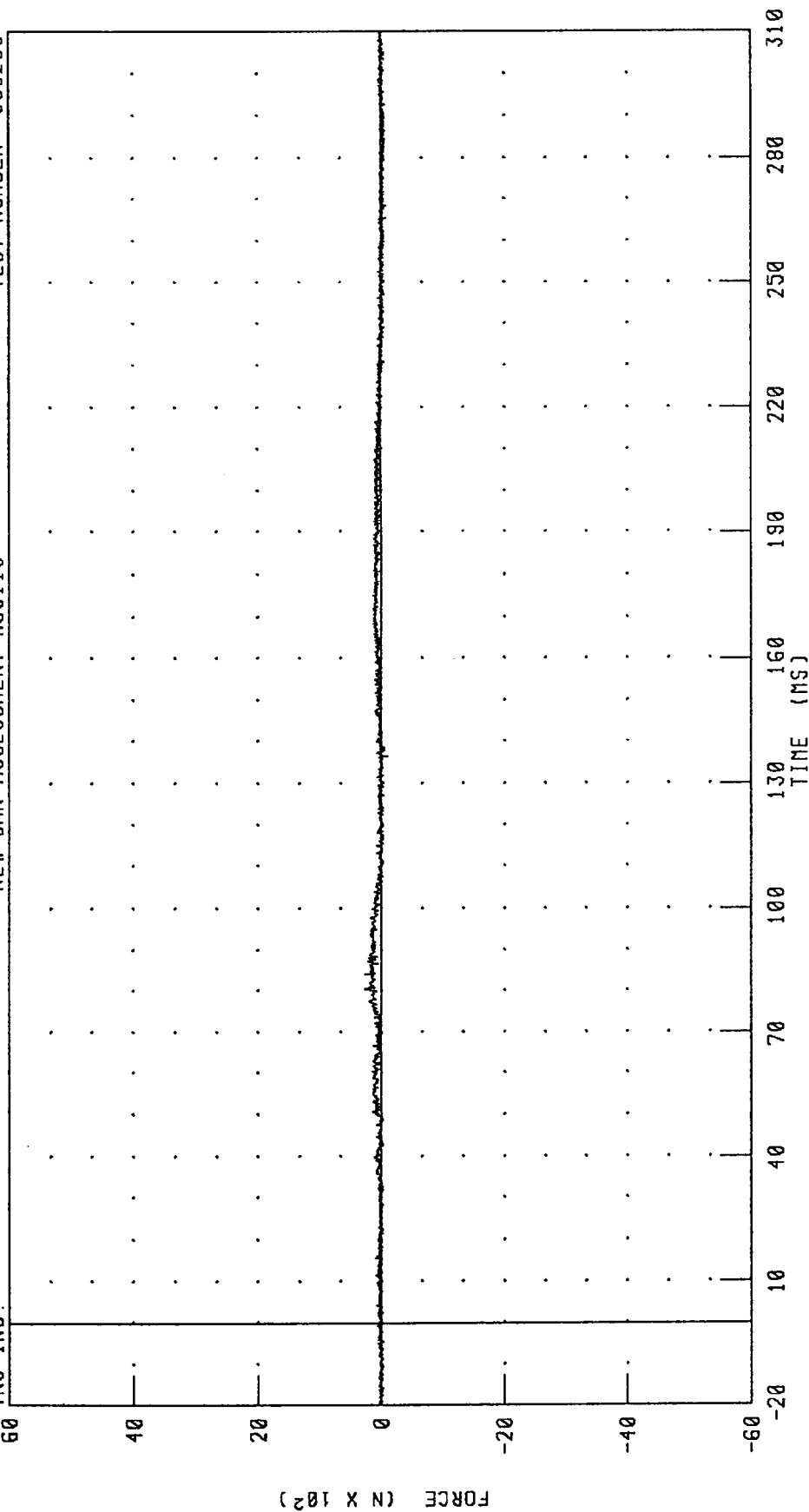
CHANNEL: NEKXF1 FILTER: CH. CLASS 1000
 PEAK DATA: 199.50 N @ 176.08 MS, -189.51 N @ 92.00 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 DRIVER NECK Y-AXIS SHEAR FORCE

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.



PEAK DATA: 277.70 N @ 80.40 MS; -117.91 N @ 136.48 MS

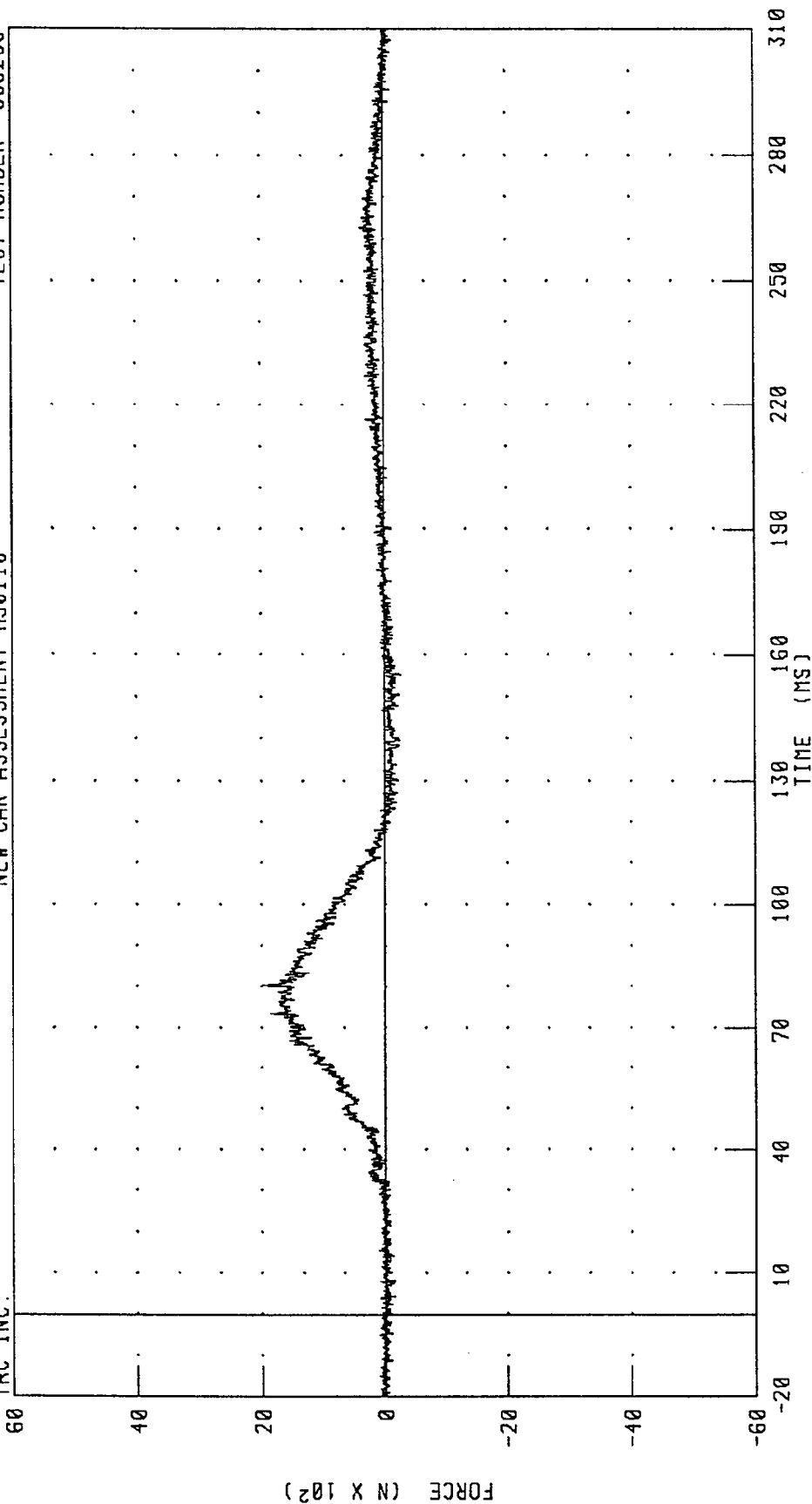
CHANNEL: NEKYF1 FILTER: CH. CLASS 1000

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
DRIVER NECK Z-AXIS AXIAL FORCE

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.

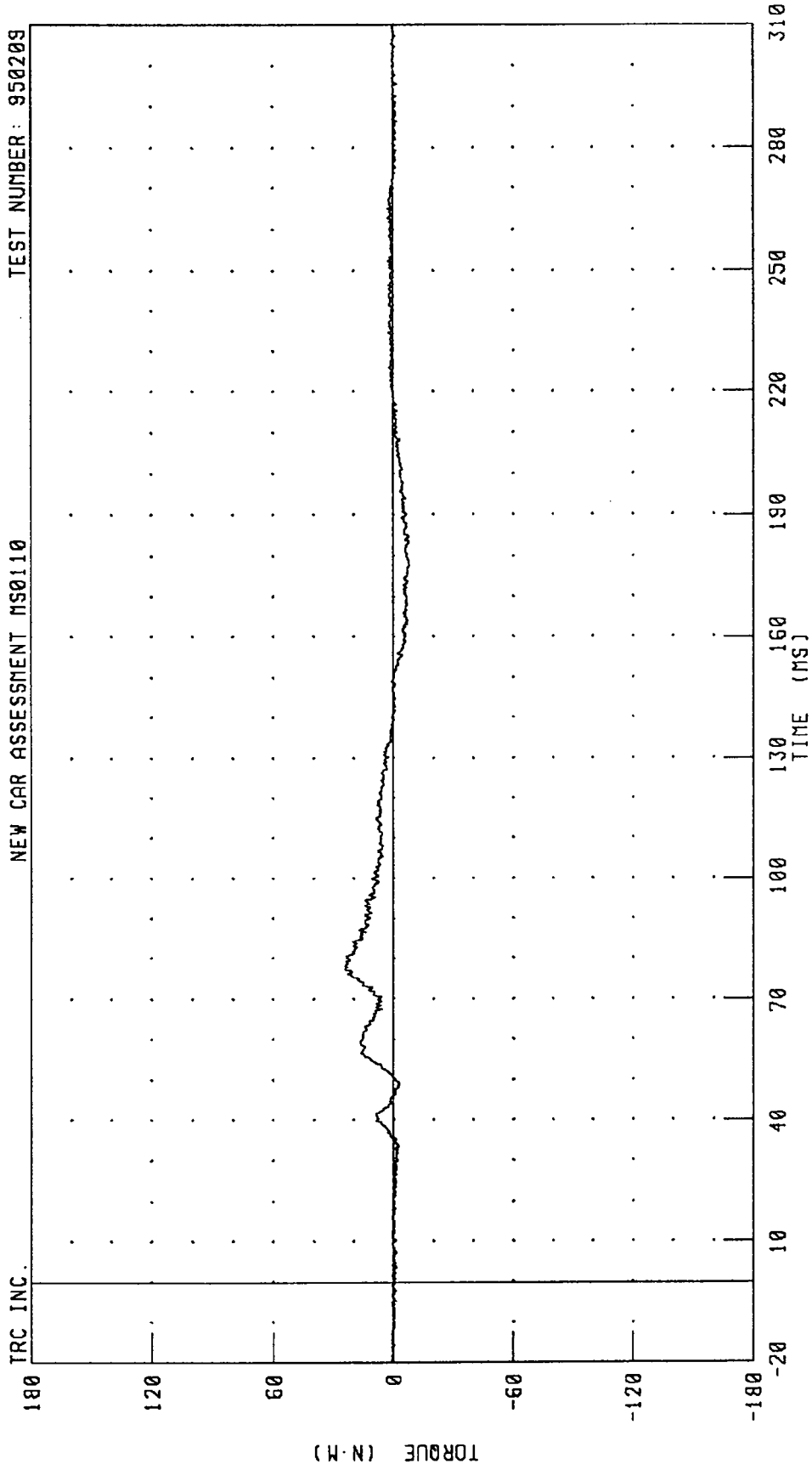


PEAK DATA: 1984.23 N @ 80.32 MS; -264.48 N @ 155.36 MS

CHANNEL: NEKZF1 FILTER: CH. CLASS 1000

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 DRIVER NECK MOMENT ABOUT X AXIS
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209



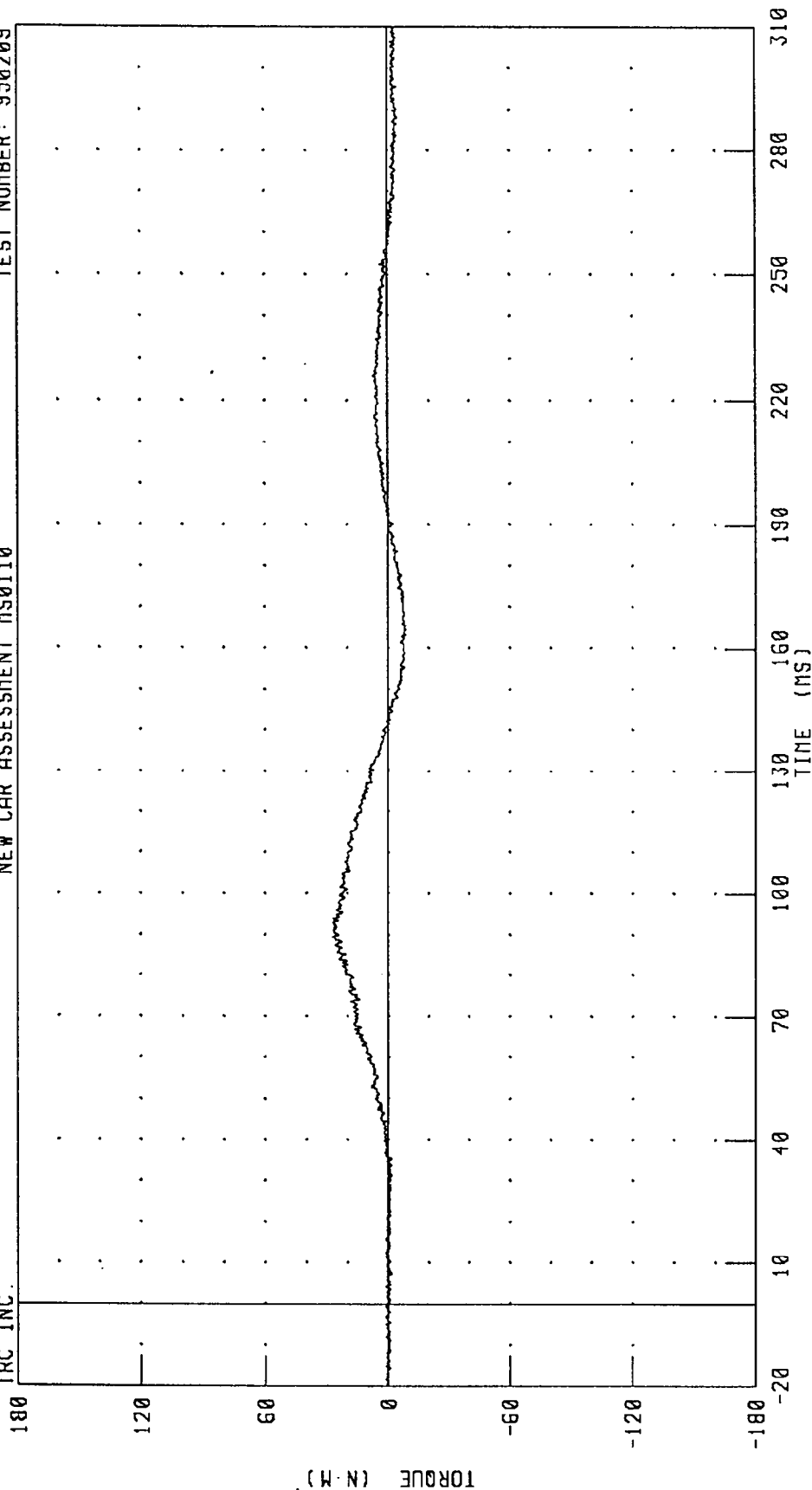
CHANNEL: NEXXM1 FILTER: CH. CLASS 600

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
DRIVER NECK MOMENT ABOUT Y AXIS

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.

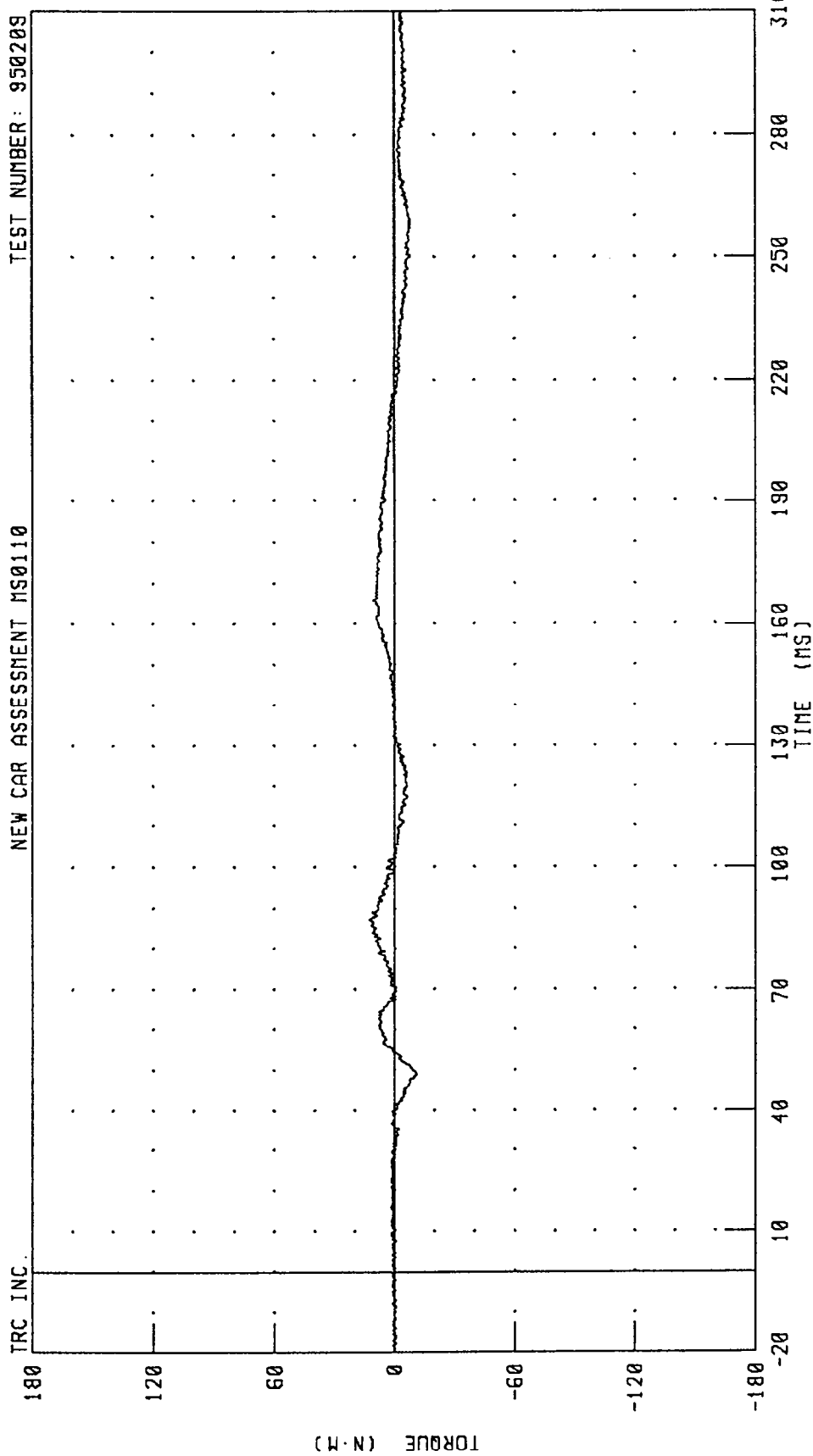


PEAK DATA: 27.27 N-M @ 89.44 MS; -8.54 N-M @ 163.36 MS

CHANNEL: NEKYM1 FILTER: CH. CLASS 600

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 DRIVER NECK MOMENT ABOUT Z AXIS
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209



PEAK DATA: 12.67 N·M @ 87.20 MS, -11.15 N·M @ 48.96 MS

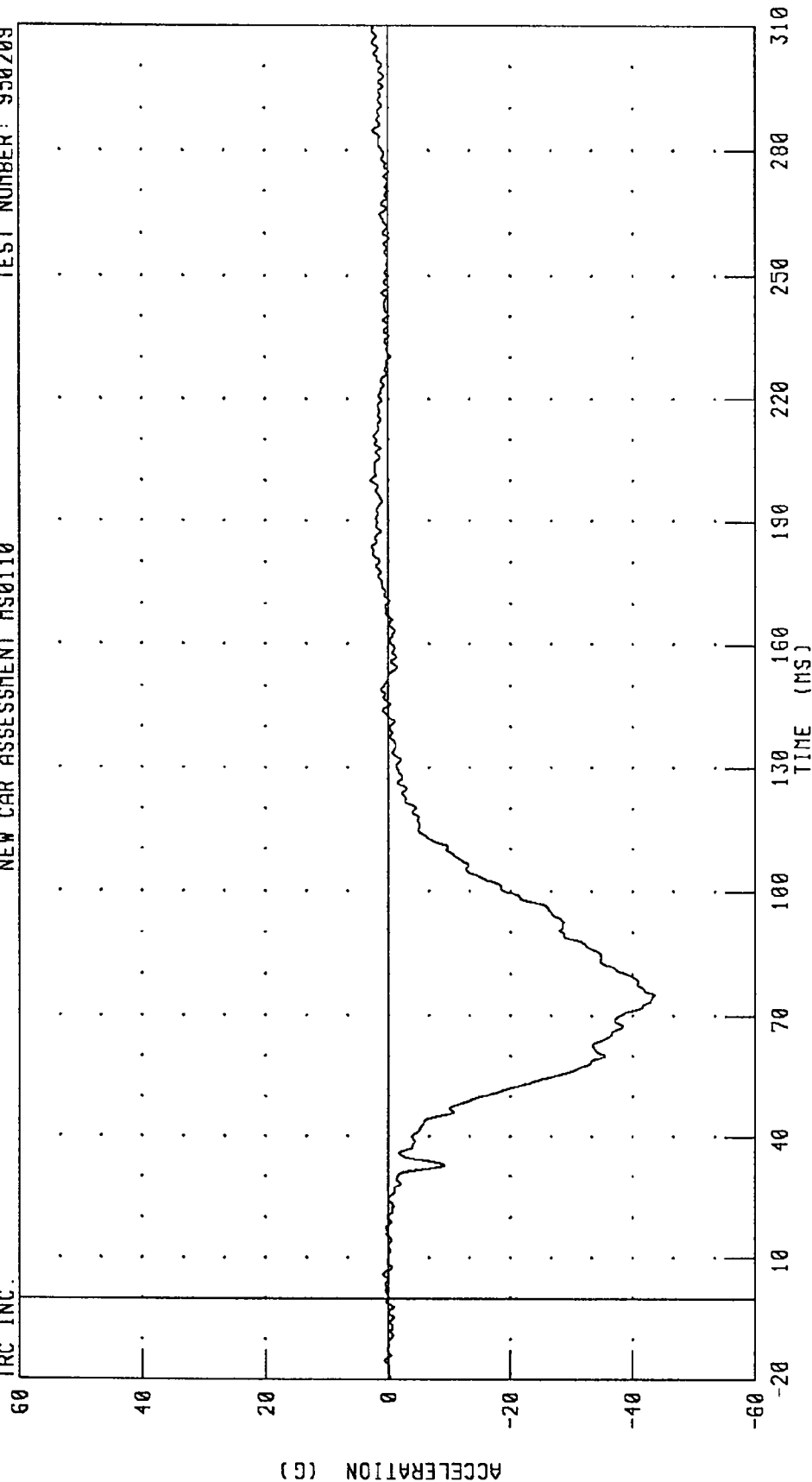
CHANNEL: NEKZM1 FILTER: CH. CLASS 600

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 DRIVER CHEST X-AXIS ACCELERATION

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.



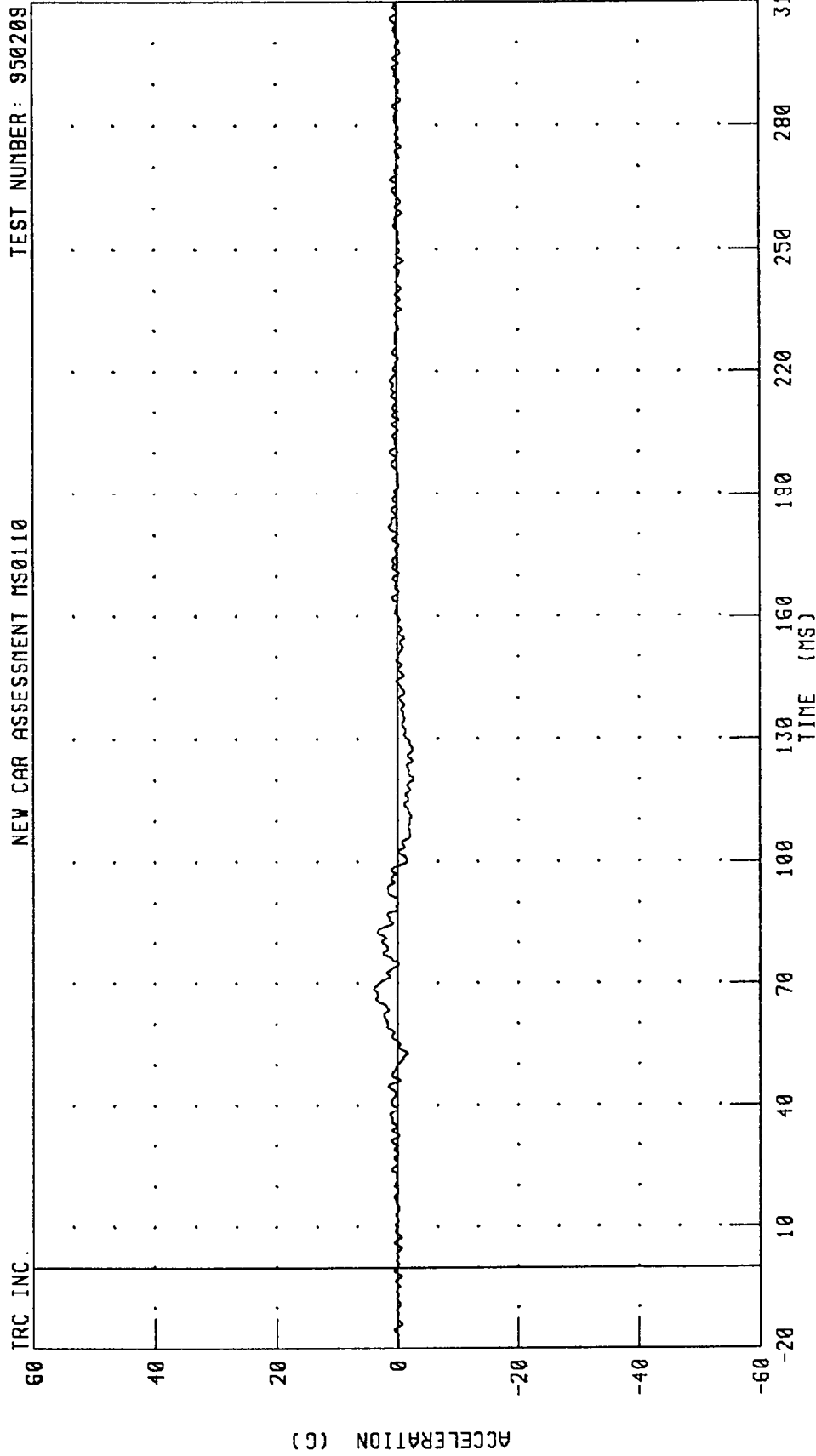
CHANNEL: CSTXG1 FILTER: CH. CLASS 180

PEAK DATA: 2.85 G @ 200.16 MS; -43.65 G @ 75.04 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST Y-AXIS ACCELERATION

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110



CHANNEL: CSTYG1 FILTER: CH. CLASS 180

PEAK DATA: 3.90 G @ 68.72 MS, -2.72 G @ 120.48 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST Z-AXIS ACCELERATION

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.

60

40

20

ACCELERATION (G)

B-14

-20

-40

-60

TIME (MS)

PEAK DATA: 4.87 G @ 144.24 MS, -2.66 G @ 51.28 MS

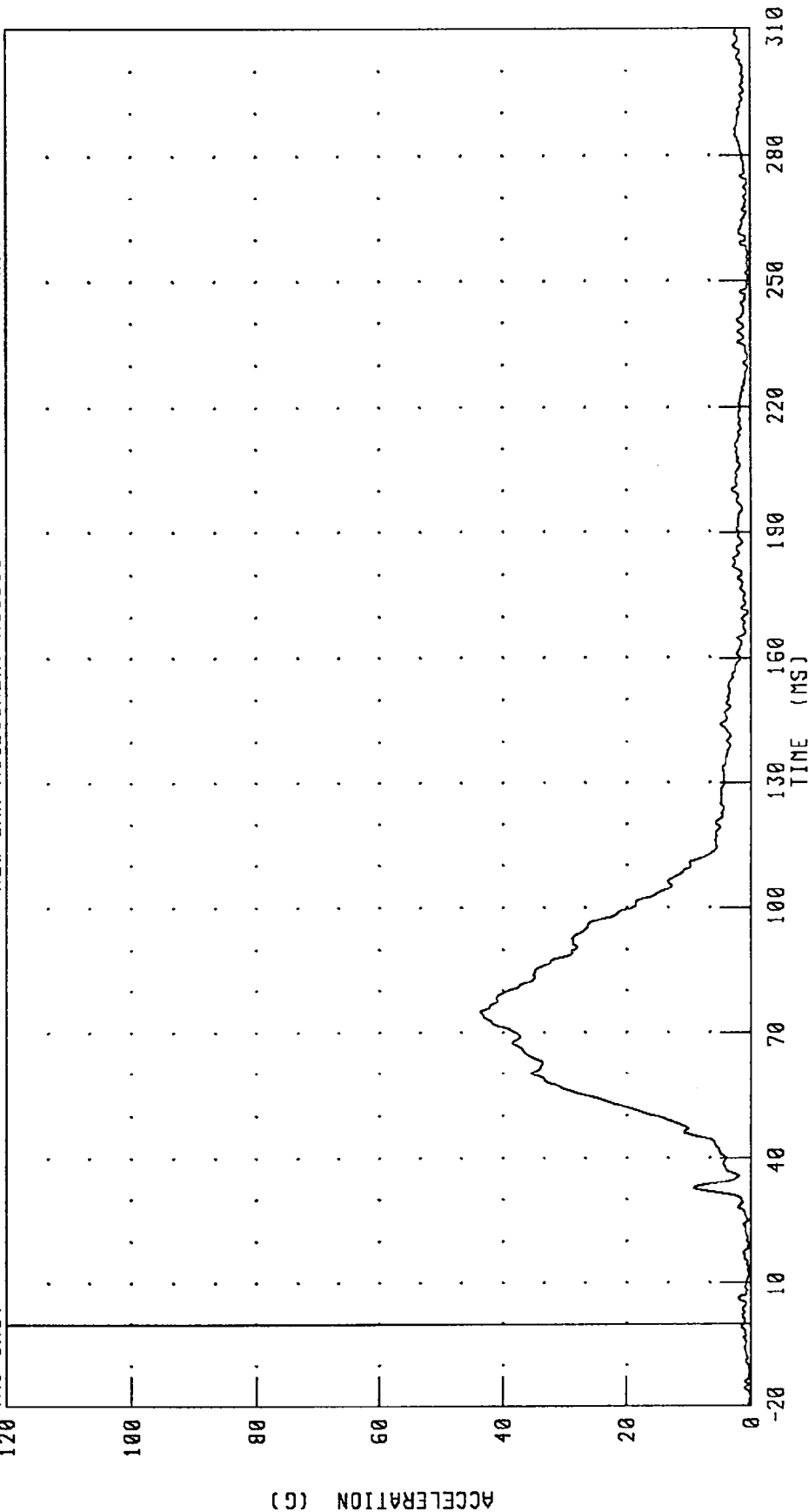
CHANNEL: CSTZG1 FILTER: CH. CLASS 180

950209

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 DRIVER CHEST RESULTANT ACCELERATION
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

TRC INC.



PEAK DATA: 43.66 G @ 75.04 MS; 0.06 G @ -20.00 MS

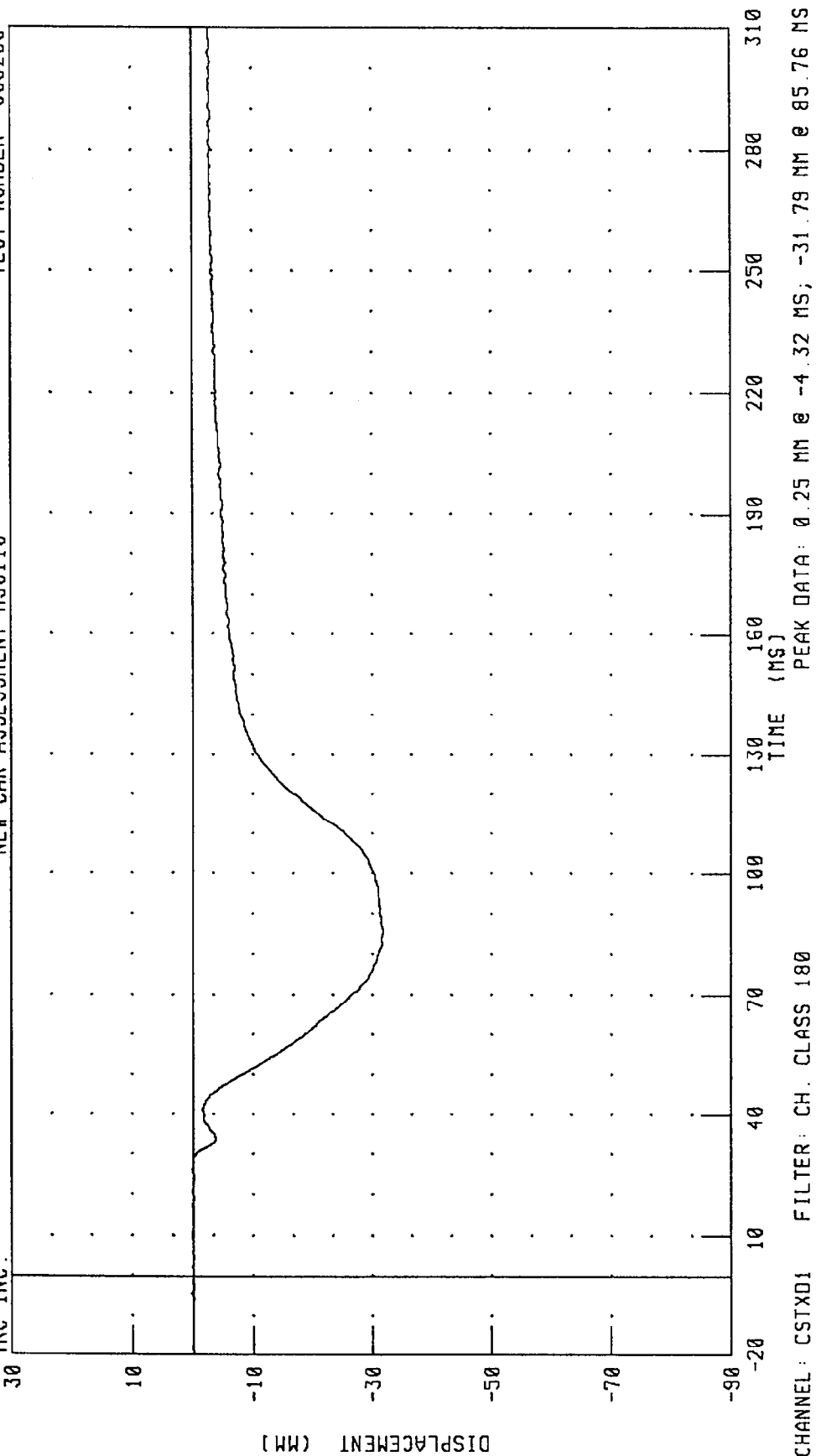
CHANNEL: CSTRG1 FILTER: CH. CLASS 180

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST DEFLECTION

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.

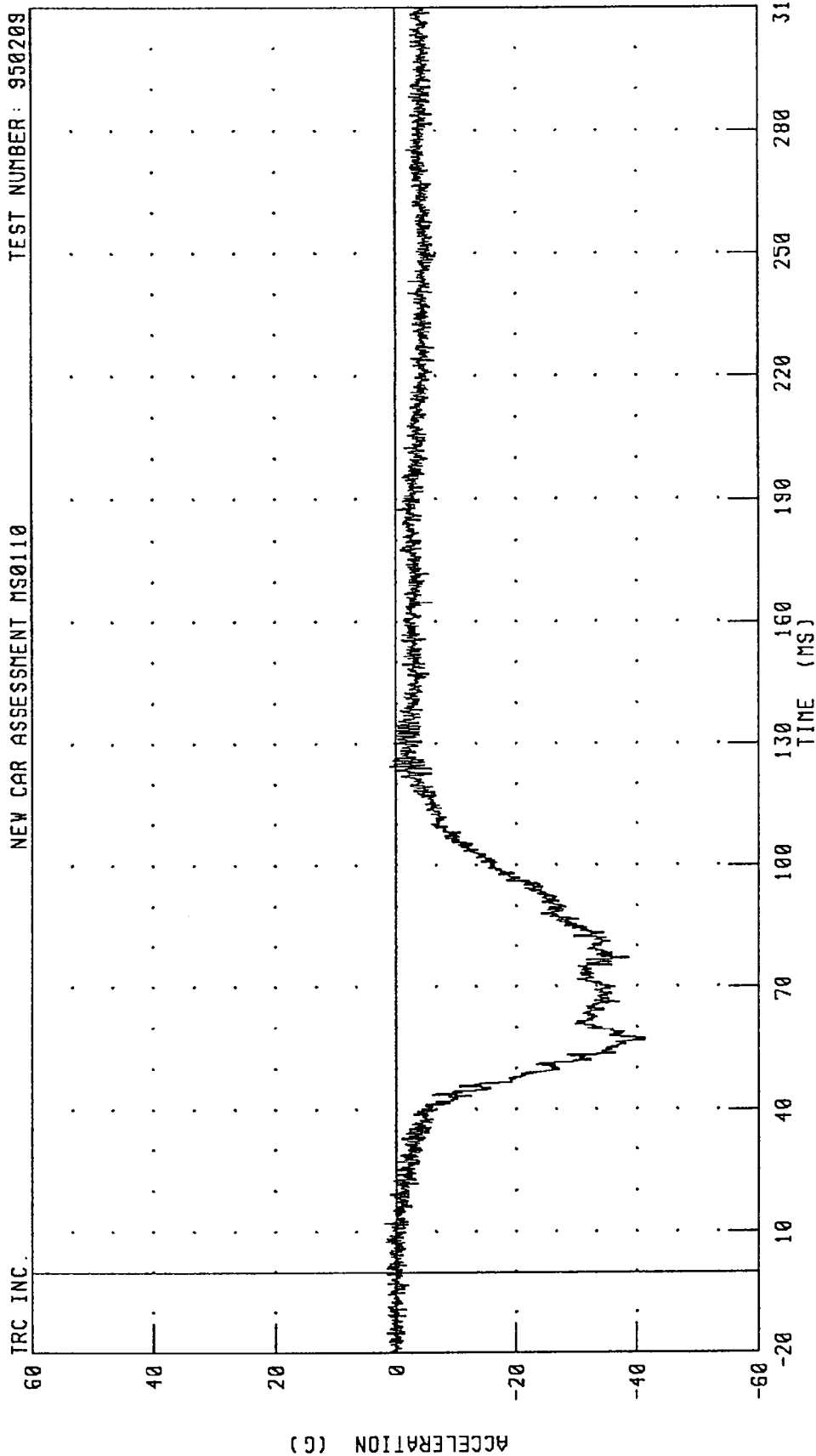


CHANNEL: CSTXD1 FILTER: CH. CLASS 180

PEAK DATA: 0.25 MM @ -4.32 MS; -31.79 MM @ 85.76 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 DRIVER PELVIS X-AXIS ACCELERATION
 NEW CAR ASSESSMENT MS0110

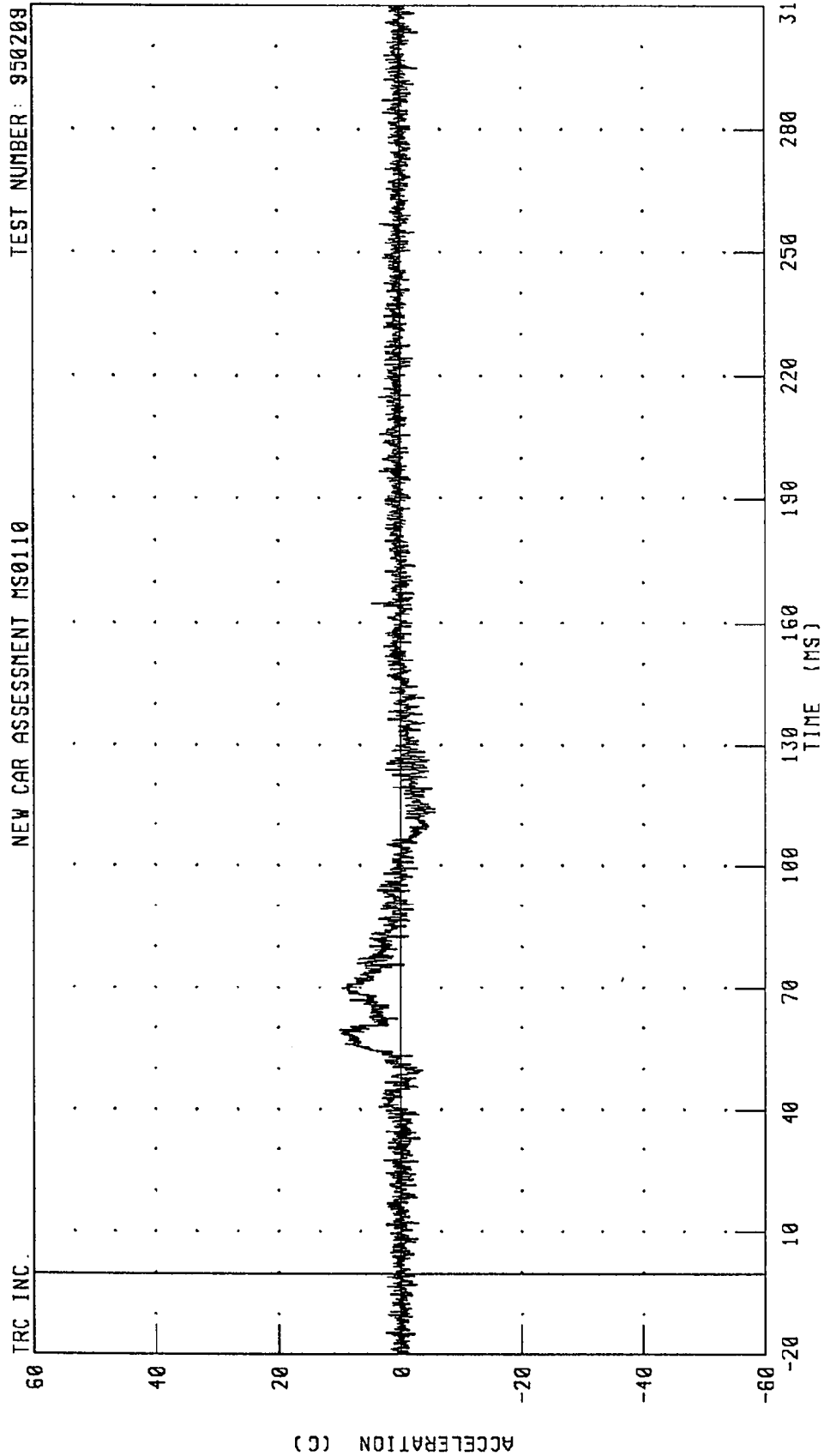
TEST NUMBER: 950209



CHANNEL: PEVXG1 FILTER: CH. CLASS 1000

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 DRIVER PELVIS Y-AXIS ACCELERATION
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209



CHANNEL: PEVYG1 FILTER: CH. CLASS 1000

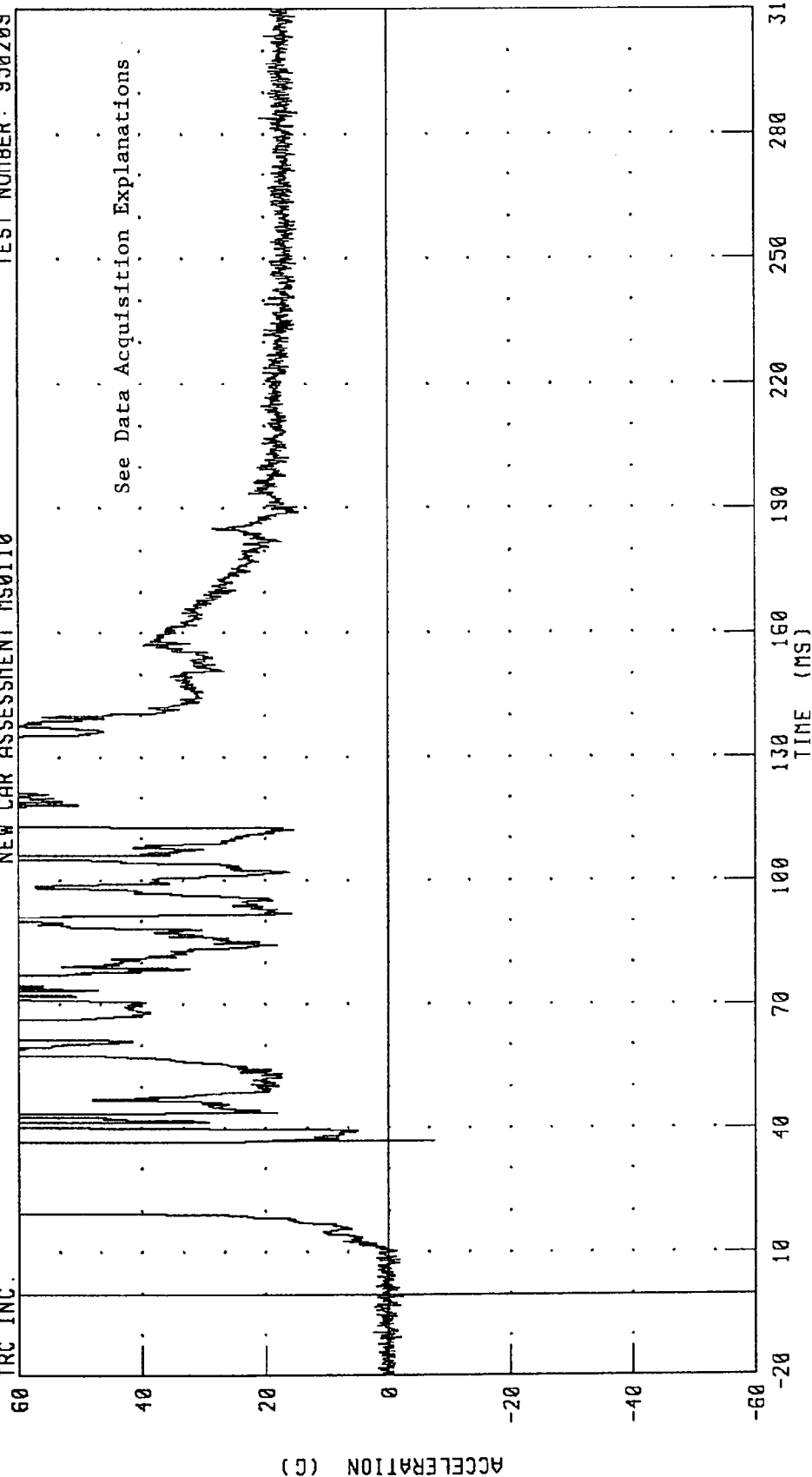
PEAK DATA: 9.99 G @ 59.52 MS; -5.58 G @ 113.20 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
DRIVER PELVIS Z-AXIS ACCELERATION

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.



CHANNEL: PEVZG1 FILTER: CH. CLASS 1000

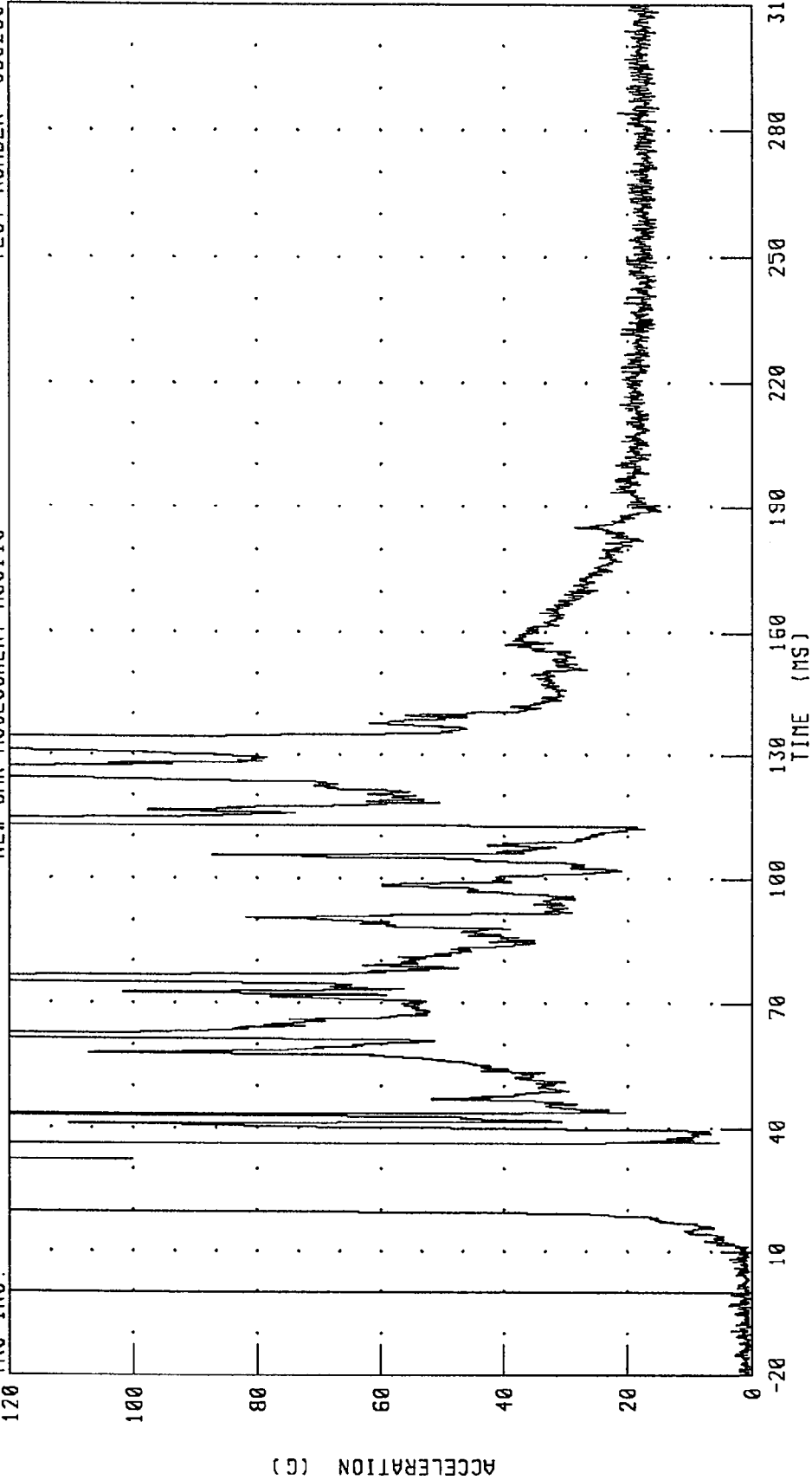
PEAK DATA: 401.81 G @ 20.08 MS, -7.42 G @ 36.64 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
DRIVER PELVIS RESULTANT ACCELERATION

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.

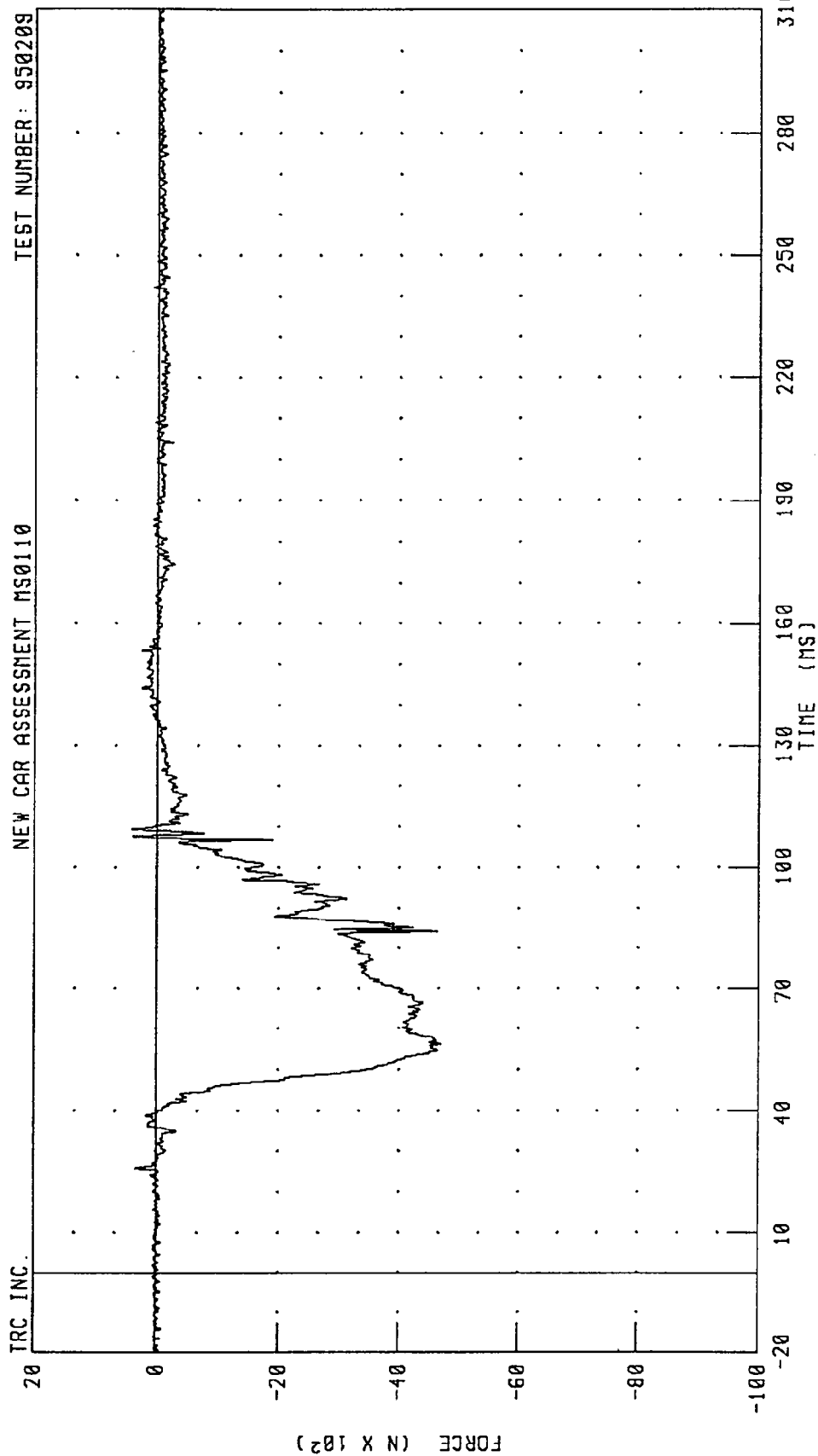


CHANNEL: PEVRG1 FILTER: CH. CLASS 1000

PEAK DATA: 401.82 G @ 21.20 MS; 0.13 G @ -19.84 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 DRIVER LEFT FEMUR FORCE
 NEW CAR ASSESSMENT MS0110

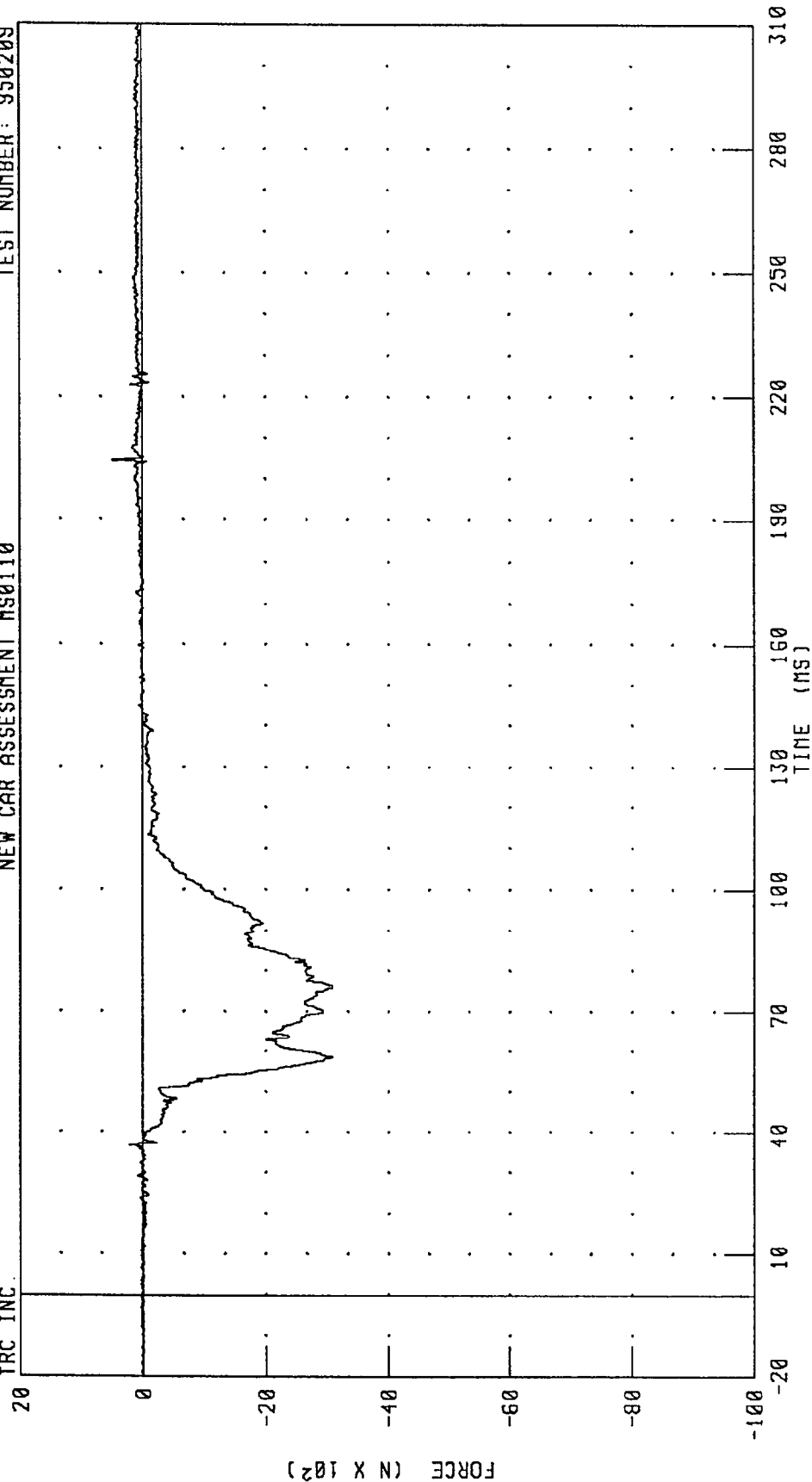
TEST NUMBER: 950209



1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
DRIVER RIGHT FEMUR FORCE
NEW CAR ASSESSMENT MS0110

TEST NUMBER: 350208

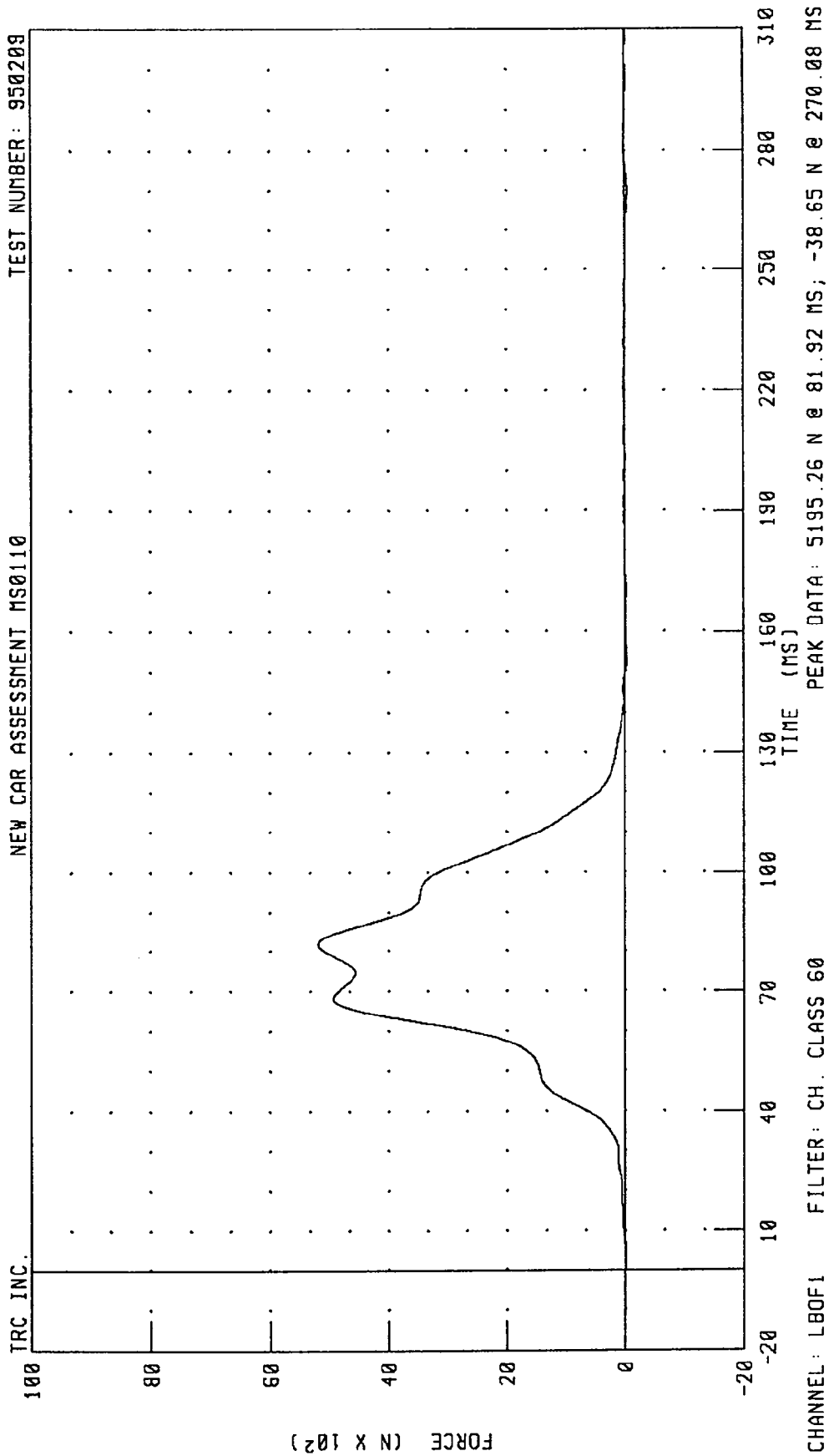
TRC INC.



CHANNEL: RFMFI FILTER: CH. CLASS 600

PEAK DATA: 489.23 N @ 204.48 MS; -3085.75 N @ 76.40 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
DRIVER LAP BELT OUTBOARD FORCE



1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
DRIVER SHOULDER BELT FORCE

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.

100

80

60

40

20

0

-20

FORCE (N X 10²)

TIME (MS)

100

70

40

10

-20

130

160

190

220

250

280

310

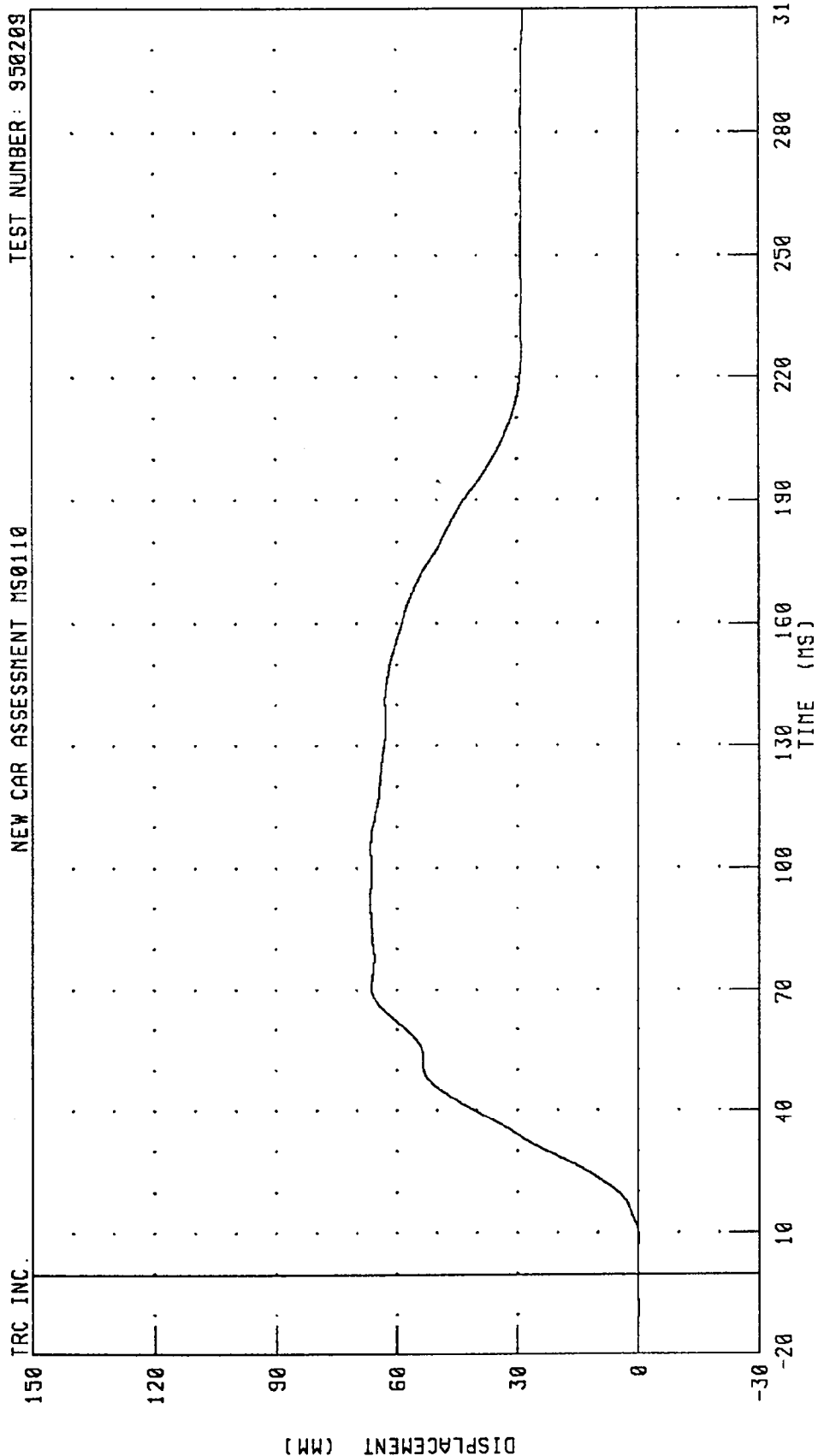
CHANNEL: SHBFI

FILTER: CH. CLASS 60

PEAK DATA: 1617.70 N @ 65.92 MS, -28.32 N @ 309.44 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 DRIVER SHOULDER BELT DISPLACEMENT
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209



PEAK DATA: 66.74 MM @ 90.88 MS, -0.12 MM @ -8.72 MS

CHANNEL: SHB01 FILTER: CH. CLASS 60

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 DRIVER SEAT BELT EXTENSION
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

TRC INC.

90

60

30

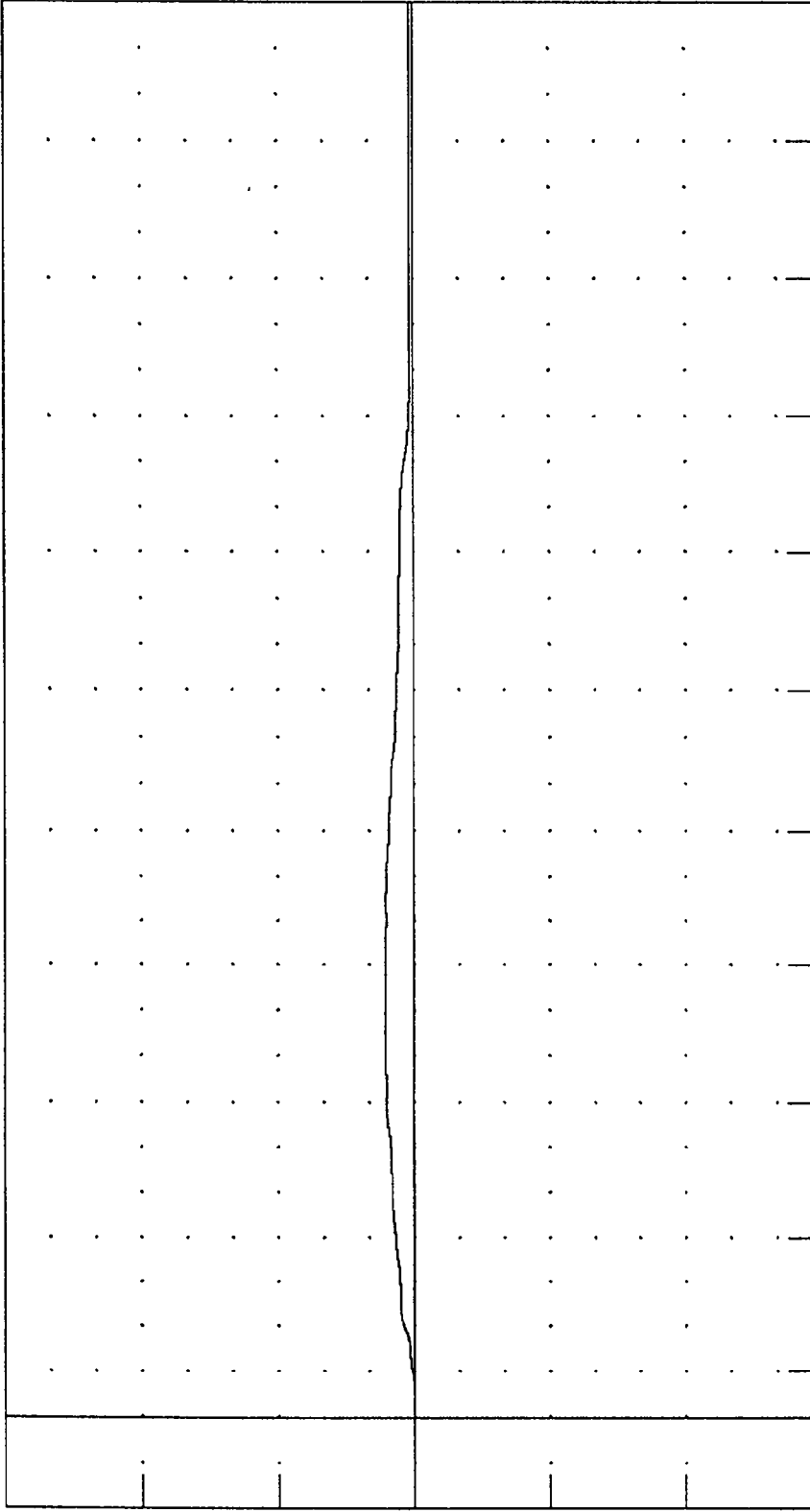
0

-30

-60

-90

DISPLACEMENT (MM X 10⁻¹)



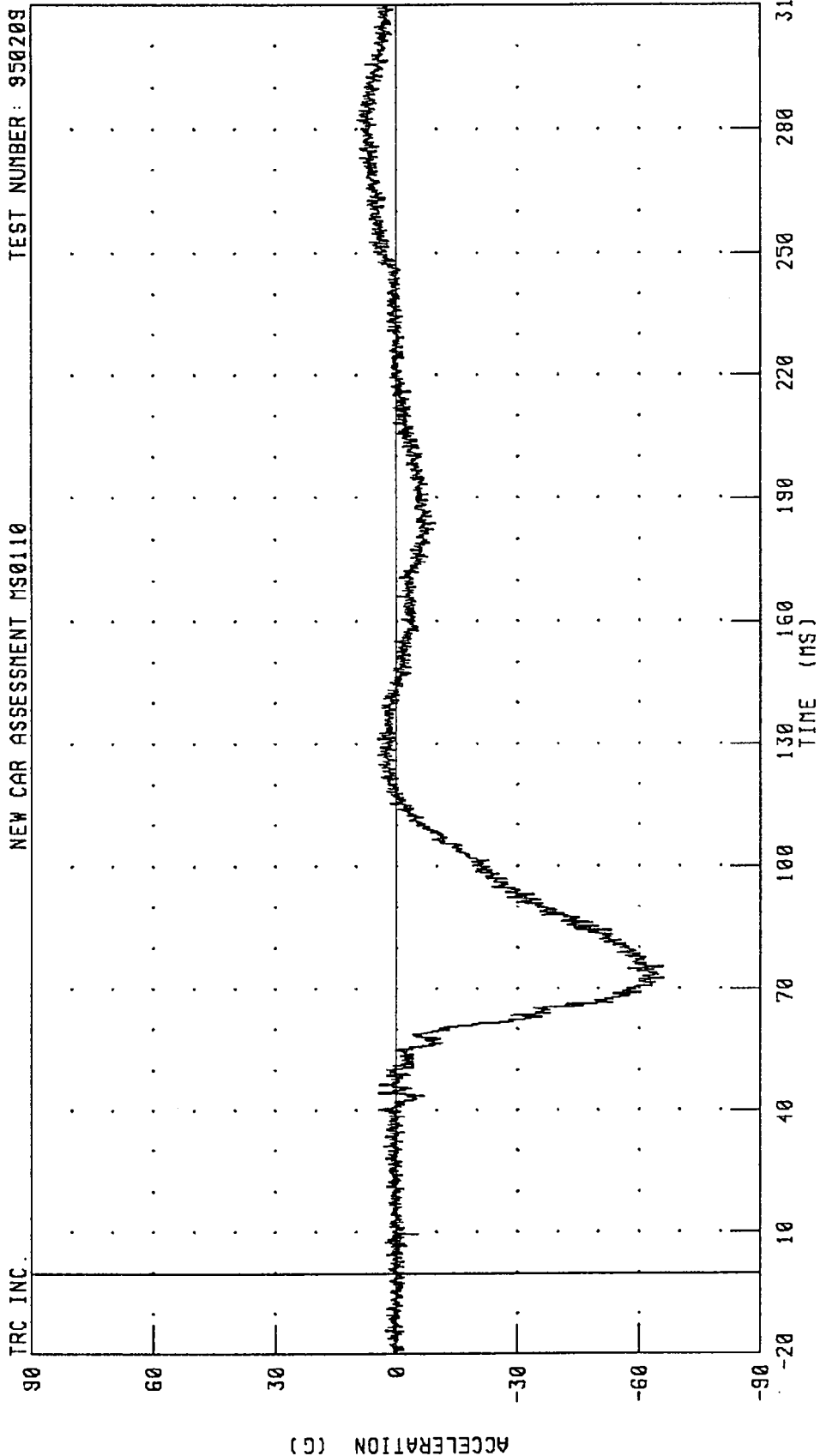
PEAK DATA: 0.64 MM @ 86.40 MS; 0.00 MM @ -8.80 MS

CHANNEL: SBED1 FILTER: CH. CLASS 60

950209

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD X-AXIS ACCELERATION
NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209



CHANNEL: HEDXG2 FILTER: CH CLASS 1000

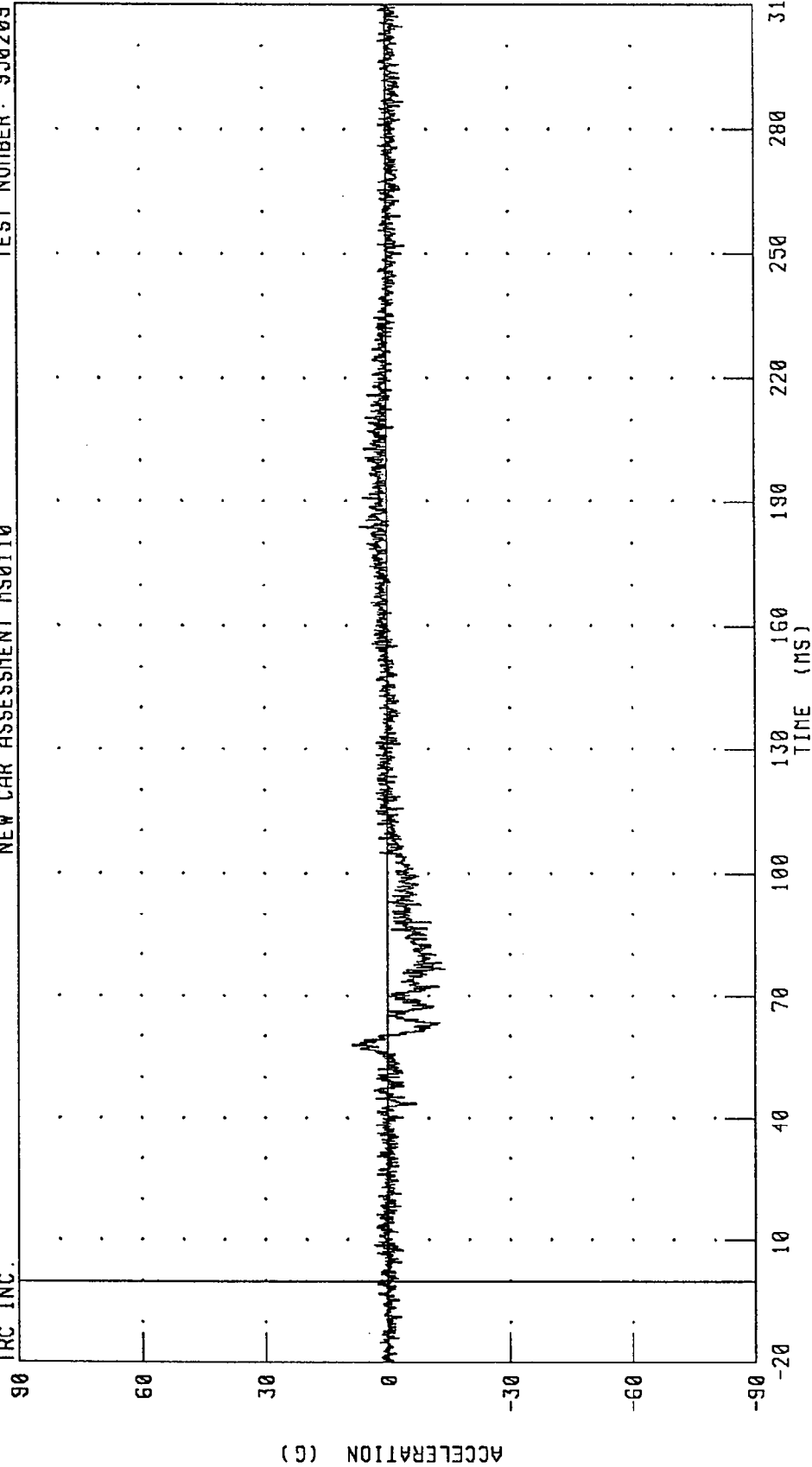
PEAK DATA: 9.70 G @ 282.24 MS, -66.12 G @ 75.52 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD Y-AXIS ACCELERATION

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.

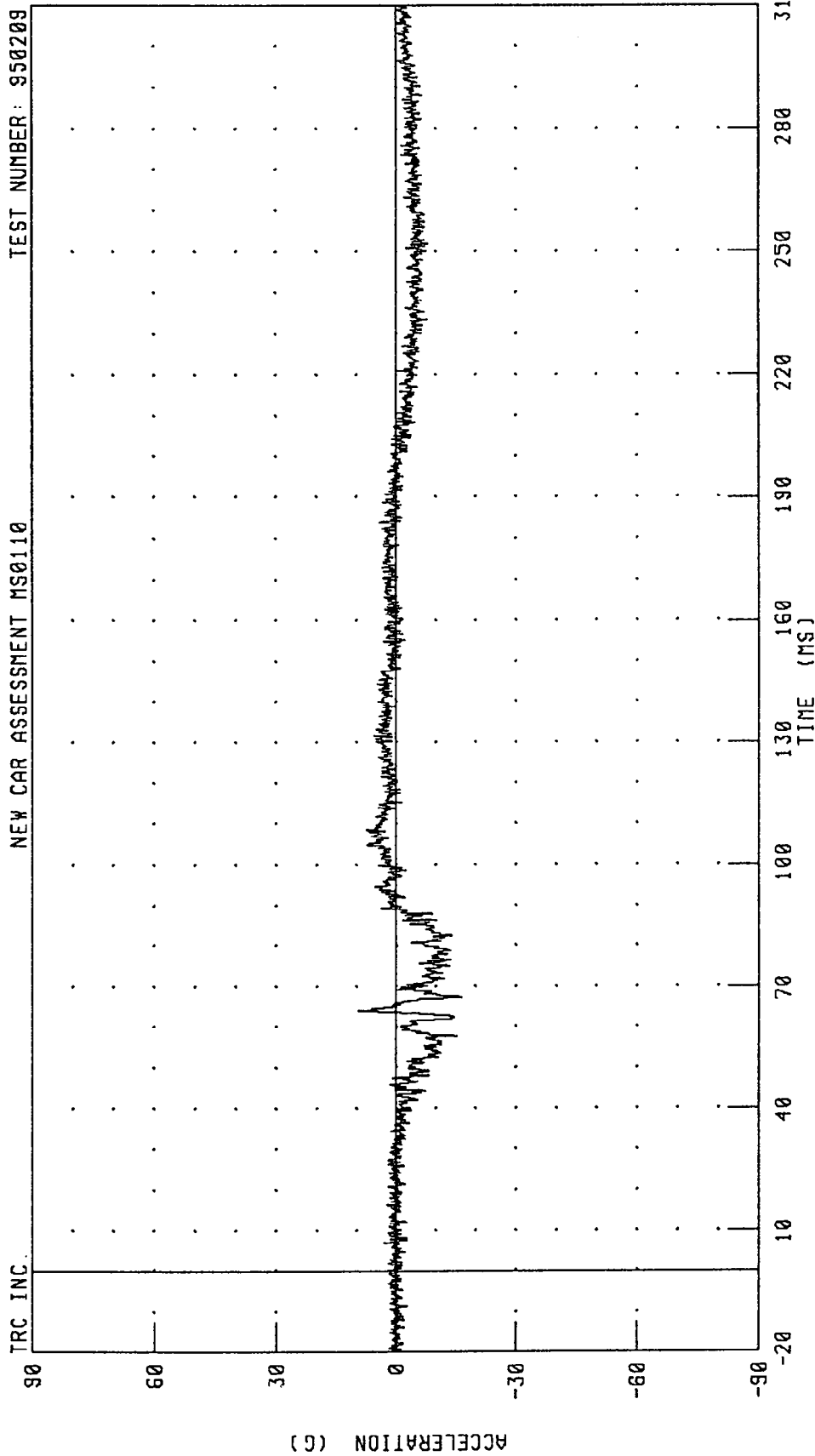


CHANNEL: HEDYG2 FILTER: CH. CLASS 1000

PEAK DATA: 8.67 G @ 57.92 MS, -14.01 G @ 76.64 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD Z-AXIS ACCELERATION
NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209



CHANNEL: HEDZG2 FILTER: CH. CLASS 1000

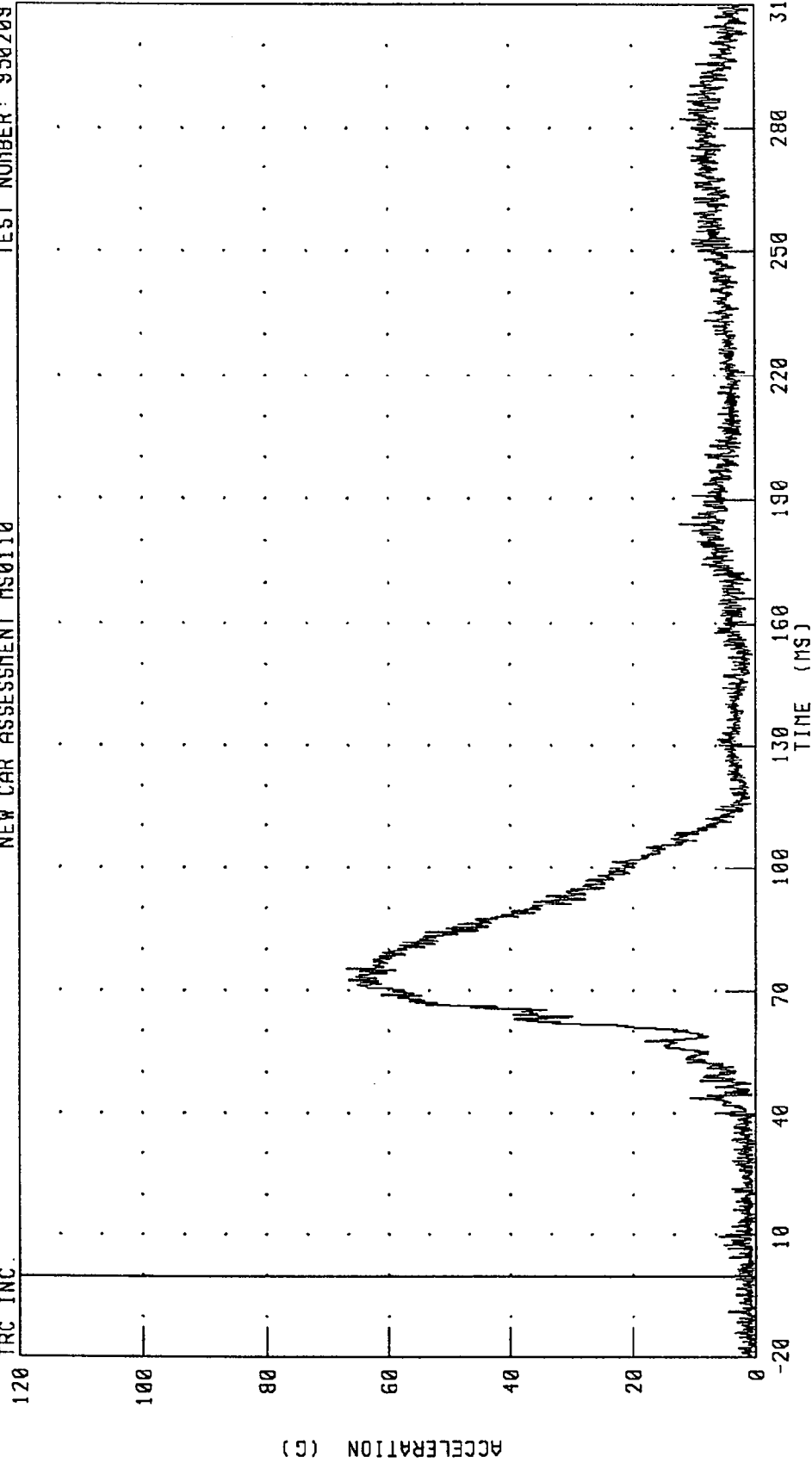
PEAK DATA: 9.63 G @ 64.00 MS, -16.47 G @ 67.28 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD RESULTANT ACCELERATION

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.

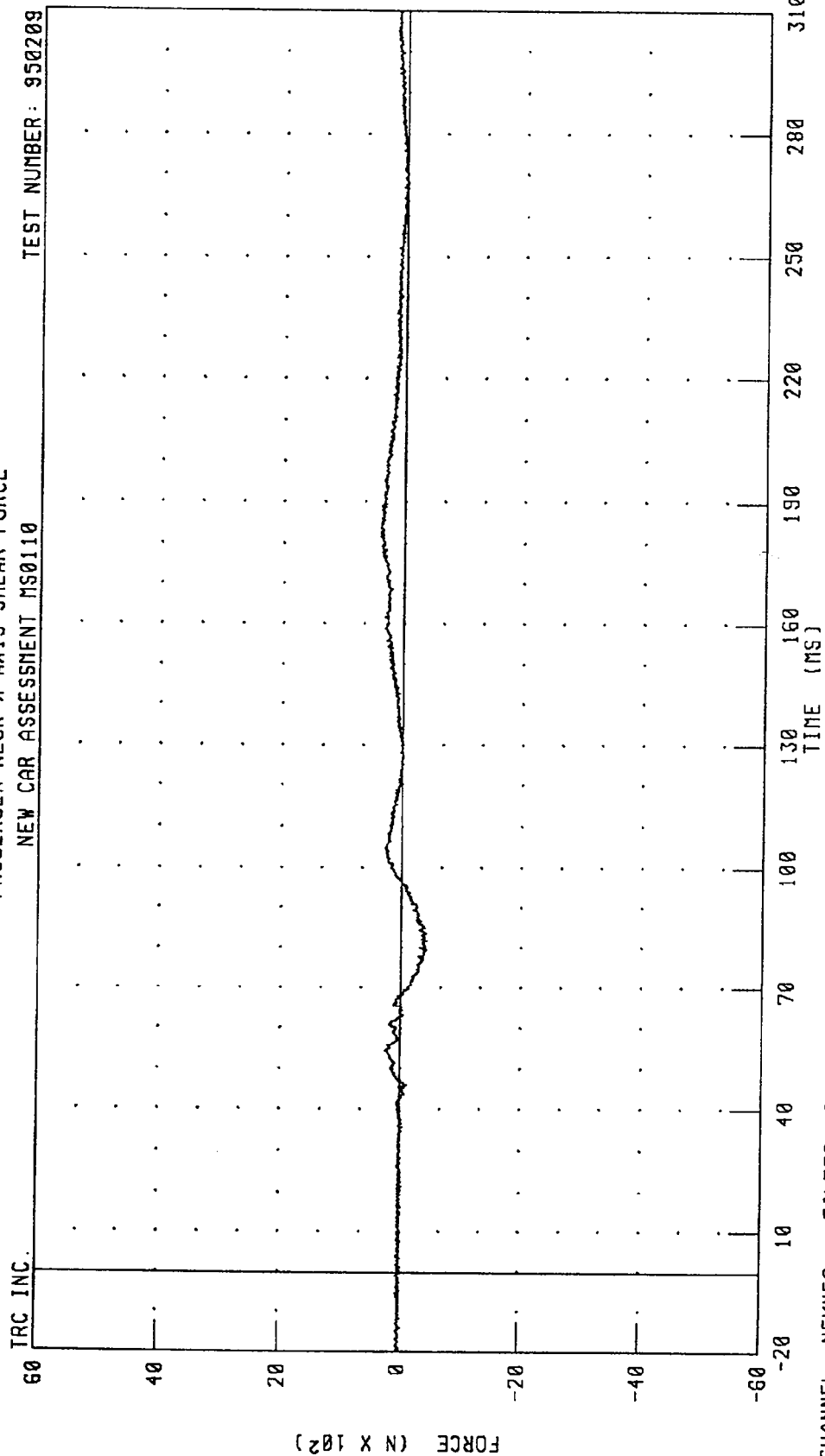


PEAK DATA: 66.94 G @ 75.44 MS; 0.15 G @ -18.64 MS

CHANNEL: HEDRG2 FILTER: CH. CLASS 1000

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK X-AXIS SHEAR FORCE
NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

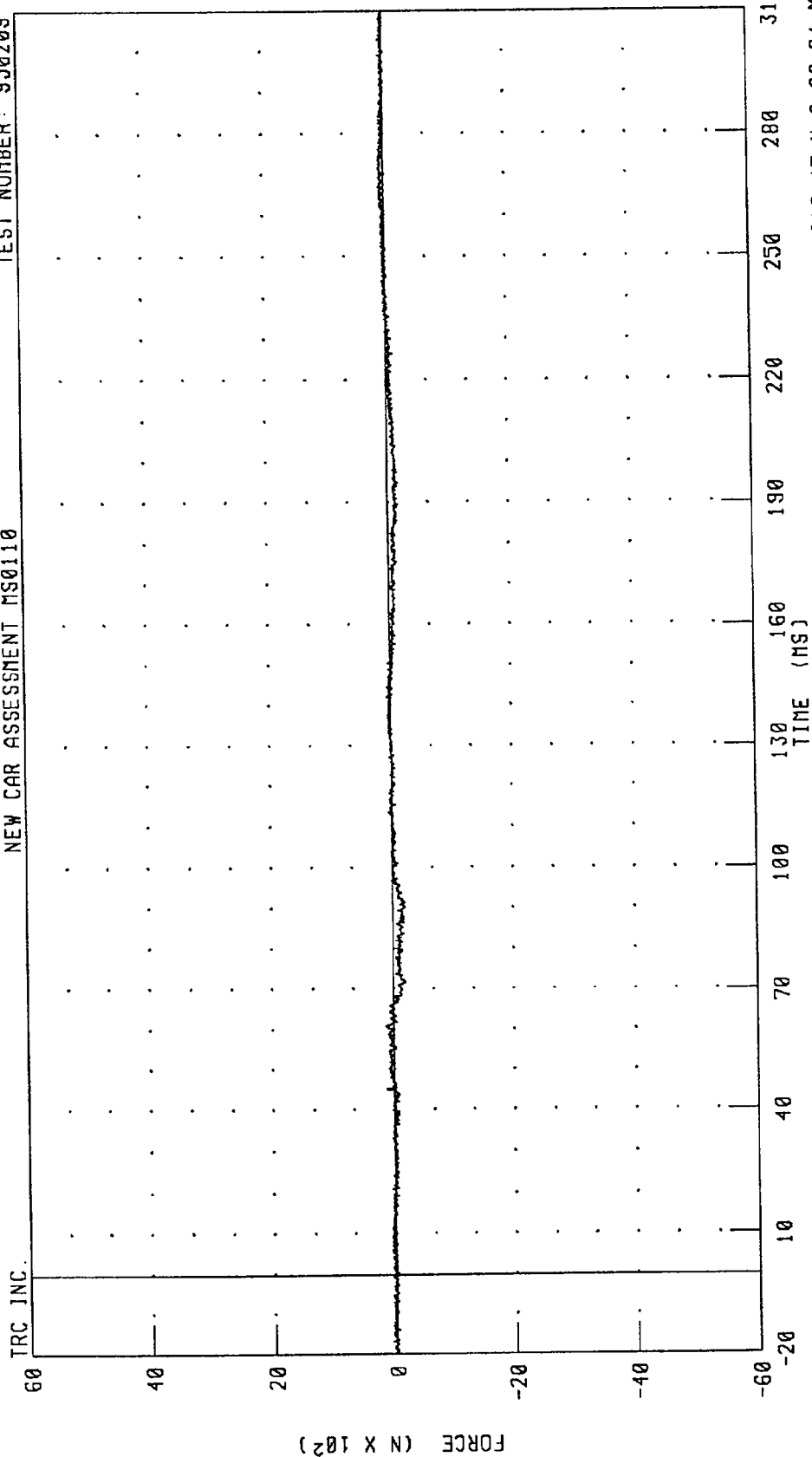


CHANNEL: NEKXF2 FILTER: CH. CLASS 1000

PEAK DATA: 411.66 N @ 182.40 MS; -433.95 N @ 81.84 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK Y-AXIS SHEAR FORCE
NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209



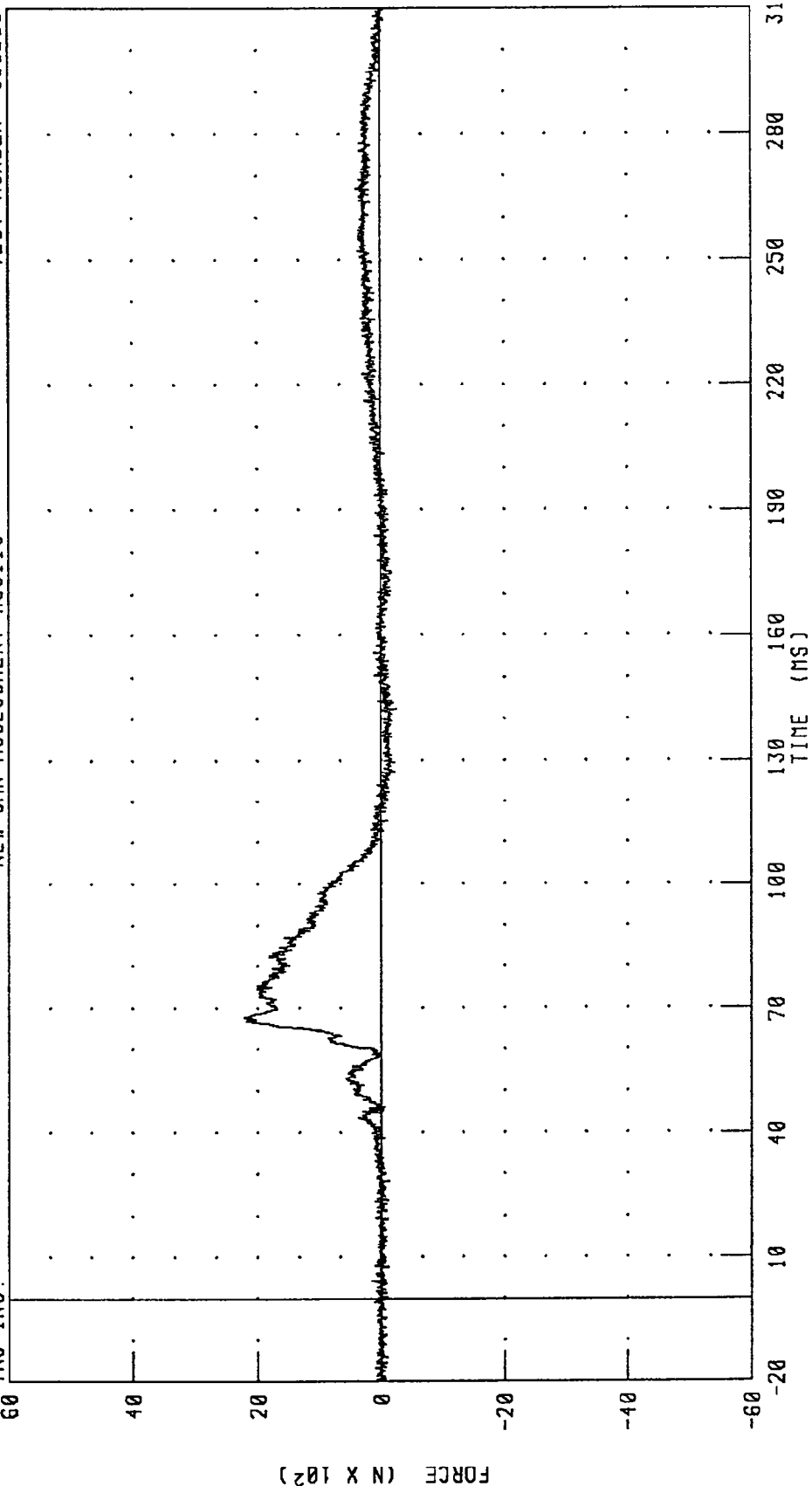
PEAK DATA: 132.47 N @ 60.88 MS; -210.47 N @ 90.24 MS

CHANNEL: NEKYF2 FILTER: CH. CLASS 1000

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK Z-AXIS AXIAL FORCE
NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

TRC INC.



PEAK DATA: 2213.16 N @ 67.92 MS; -254.86 N @ 142.56 MS

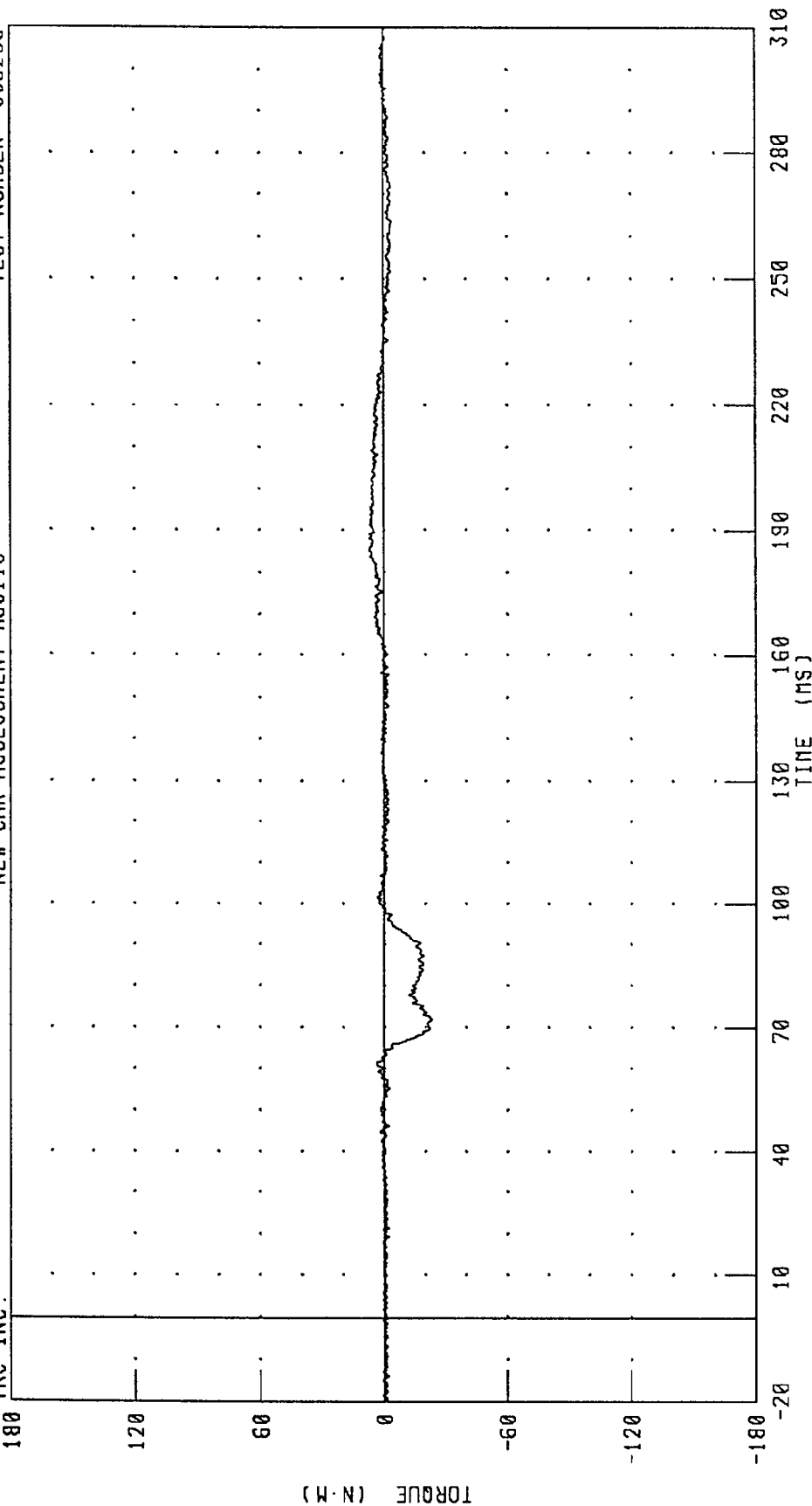
CHANNEL: NEKZF2 FILTER: CH. CLASS 1000

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK MOMENT ABOUT X AXIS

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.



PEAK DATA: 7.31 N·M @ 185.60 MS; -23.15 N·M @ 72.00 MS

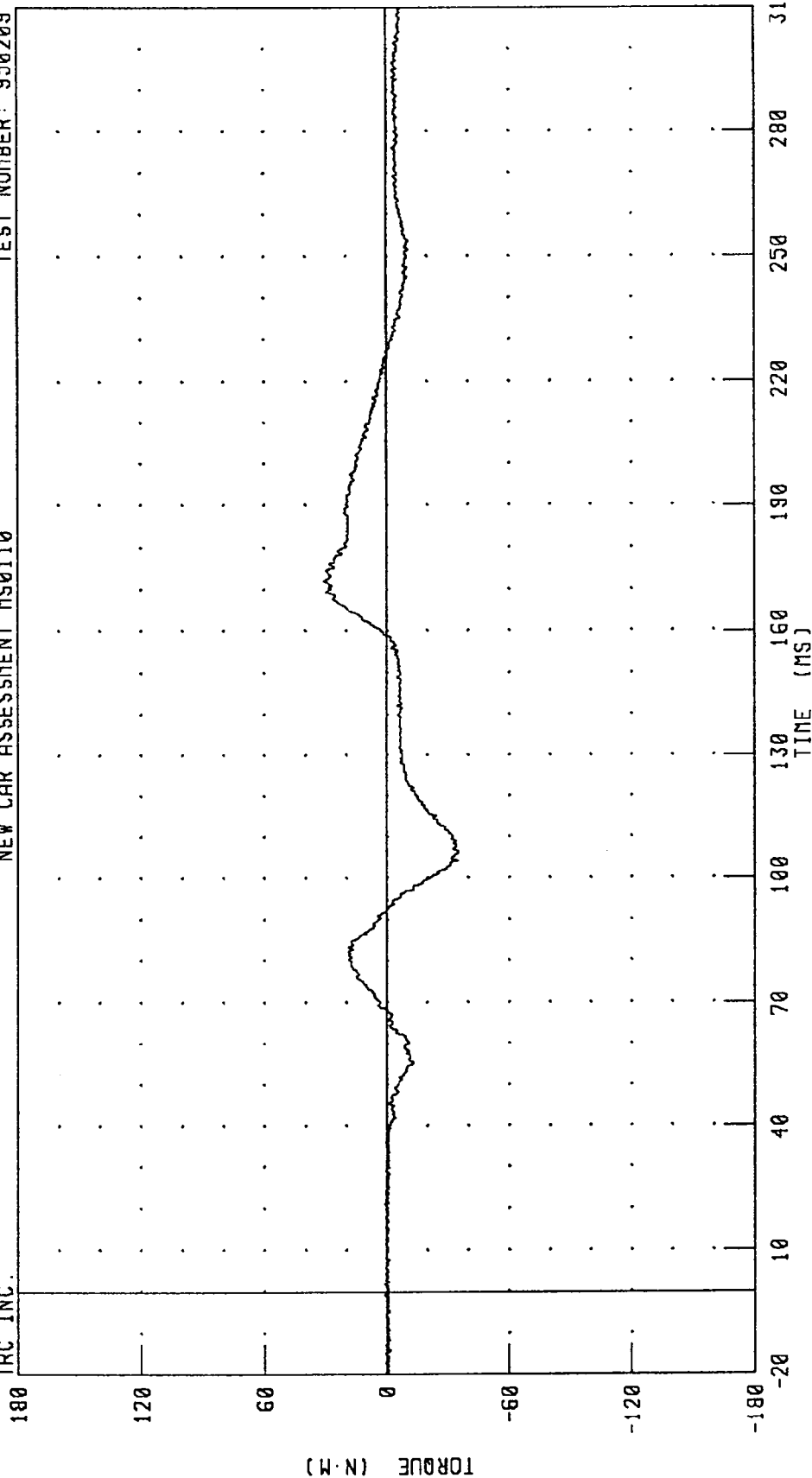
CHANNEL: NEKXM2 FILTER: CH. CLASS 600

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK MOMENT ABOUT Y AXIS

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.



PEAK DATA: 30.82 N·M @ 172.16 MS; -35.21 N·M @ 106.32 MS

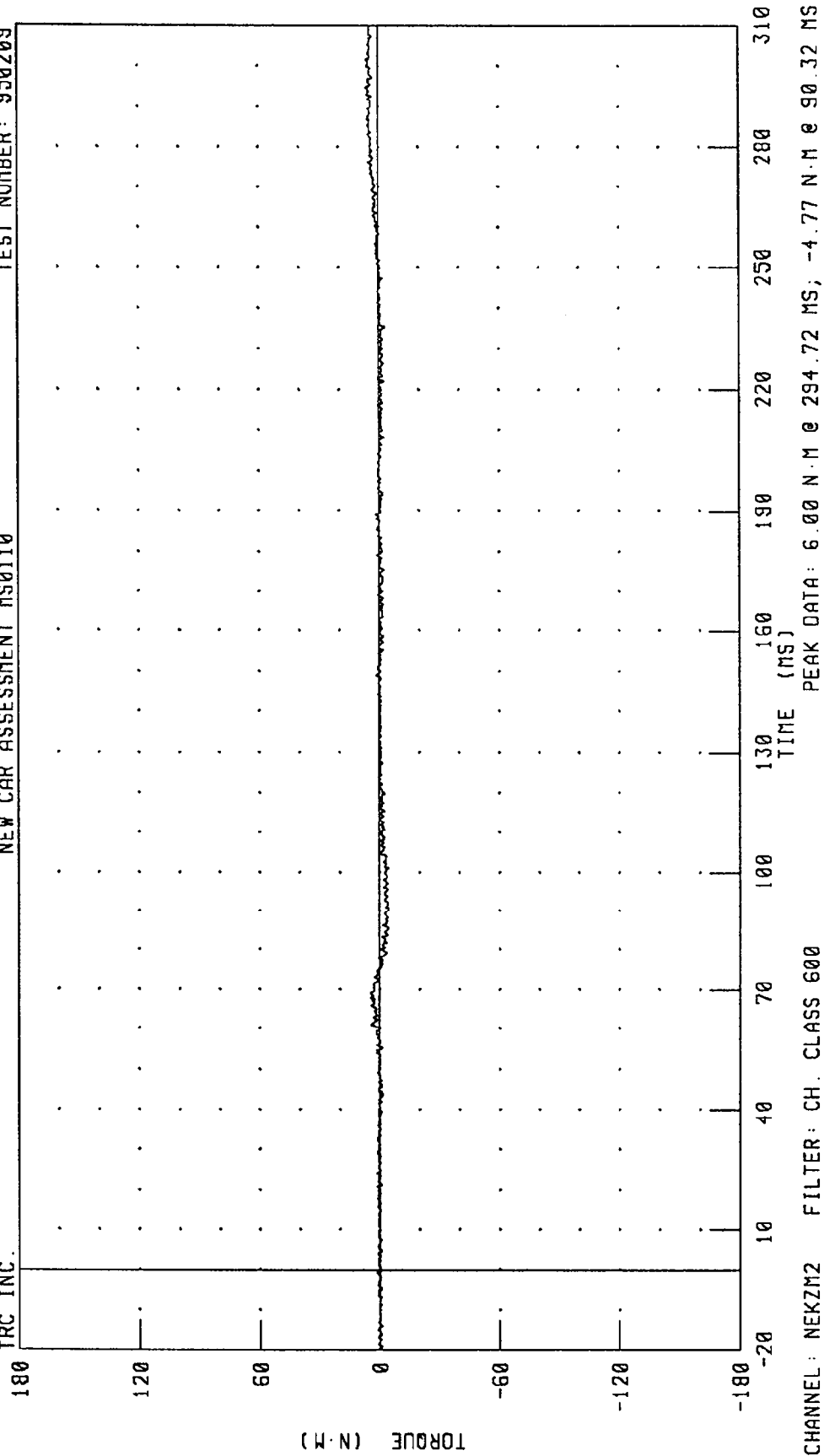
CHANNEL: NEKYM2 FILTER: CH. CLASS 600

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK MOMENT ABOUT Z AXIS

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.



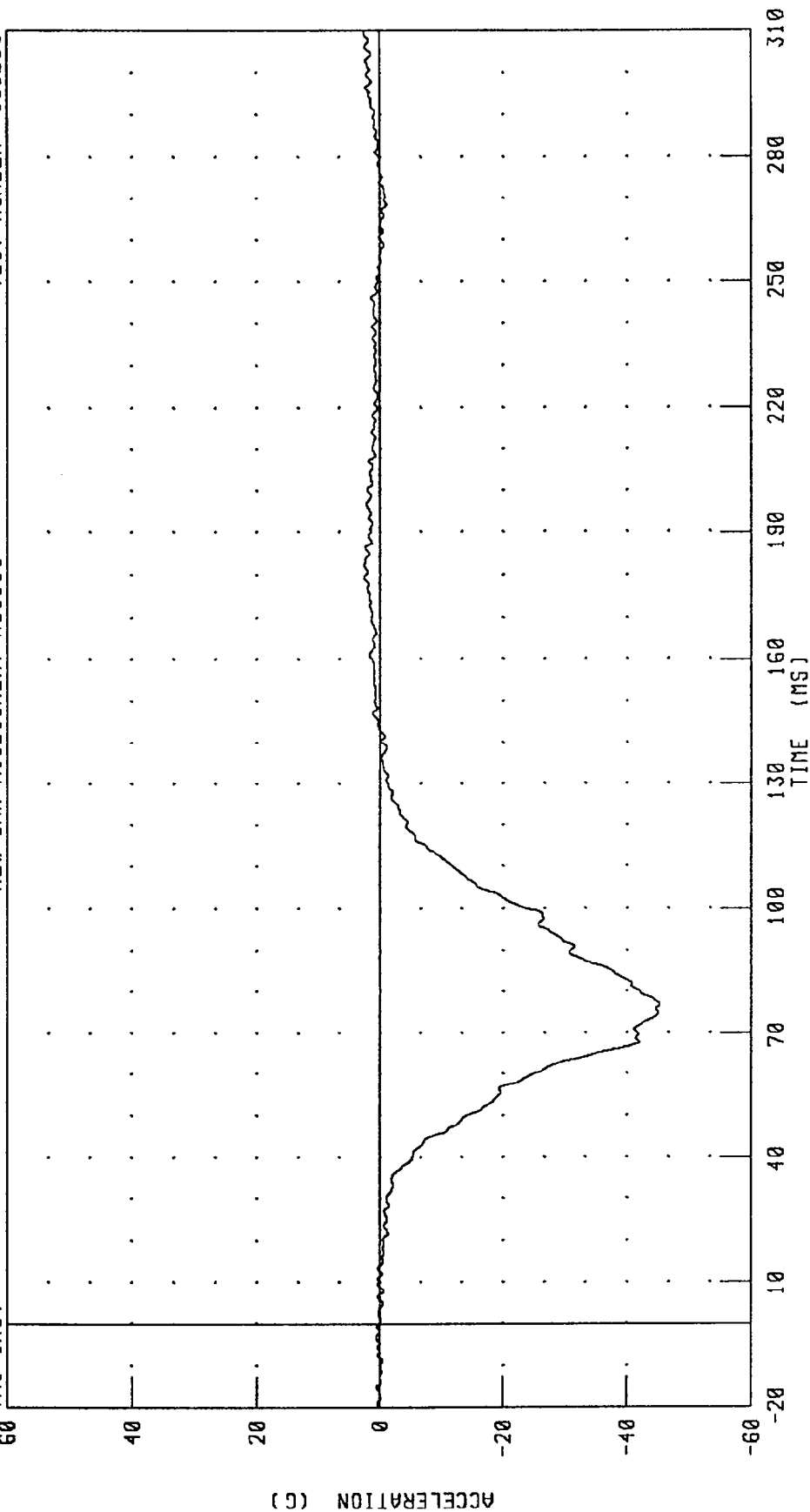
CHANNEL: NEKZM2 FILTER: CH. CLASS 600

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST X-AXIS ACCELERATION

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.



PEAK DATA: 2.60 G @ 309.20 MS, -45.23 G @ 76.88 MS

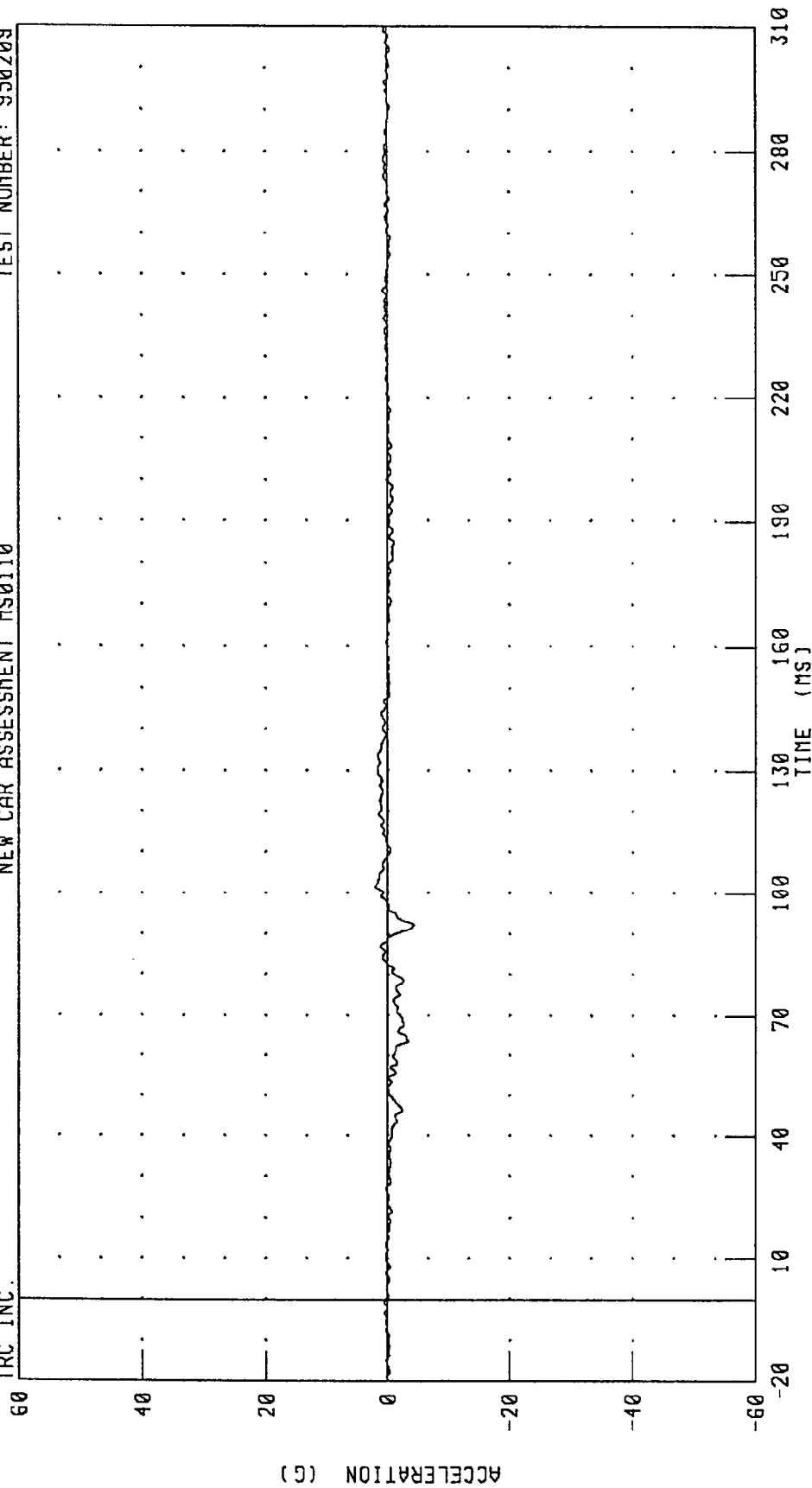
CHANNEL: CSTXG2 FILTER: CH. CLASS 180

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST Y-AXIS ACCELERATION

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.



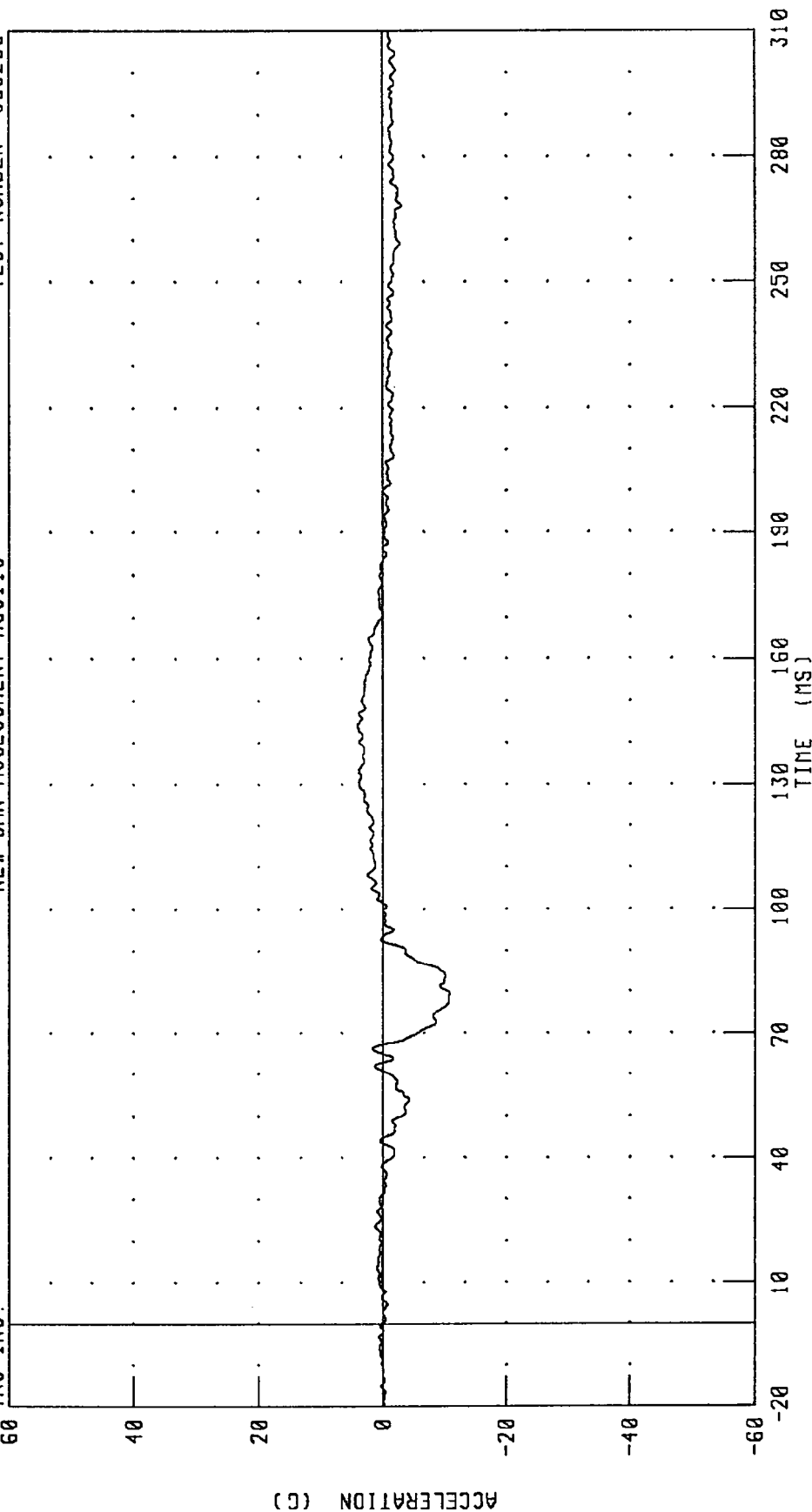
PEAK DATA: 1.98 G @ 101.76 MS; -4.33 G @ 92.32 MS

CHANNEL: CSTYG2 FILTER: CH. CLASS 180

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 PASSENGER CHEST Z-AXIS ACCELERATION
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

TRC INC.



CHANNEL: CST2G2 FILTER: CH. CLASS 180

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST RESULTANT ACCELERATION

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.

120

100

80

60

40

20

0

ACCELERATION (G)

TIME (MS)

310

280

250

220

190

160

130

100

70

40

10

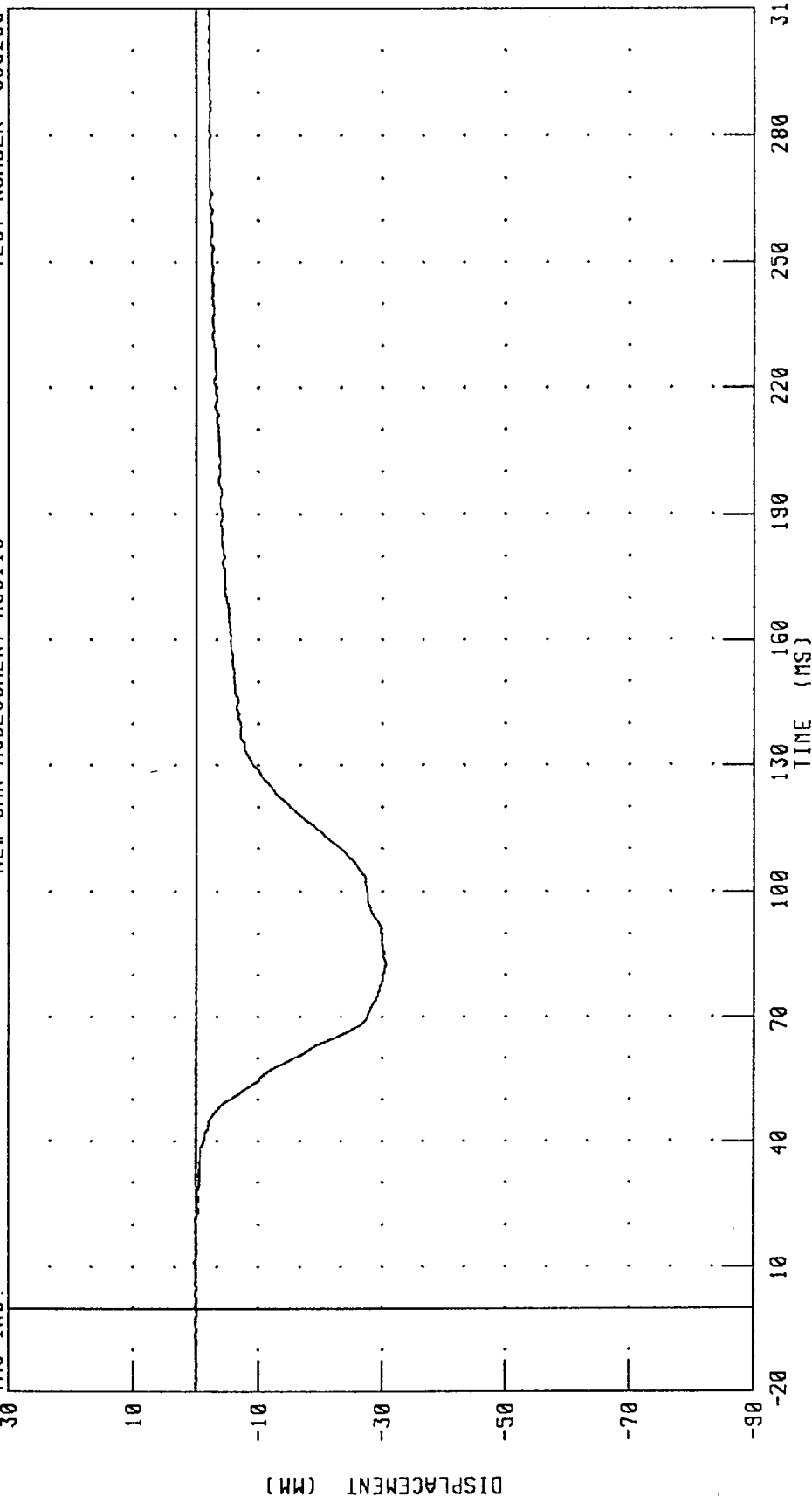
PEAK DATA: 46.45 G @ 76.96 MS; 0.07 G @ 5.84 MS

CHANNEL: CSTRG2 FILTER: CH. CLASS 180

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST DEFLECTION
NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

TRC INC.



CHANNEL: CSTX02 FILTER: CH. CLASS 180

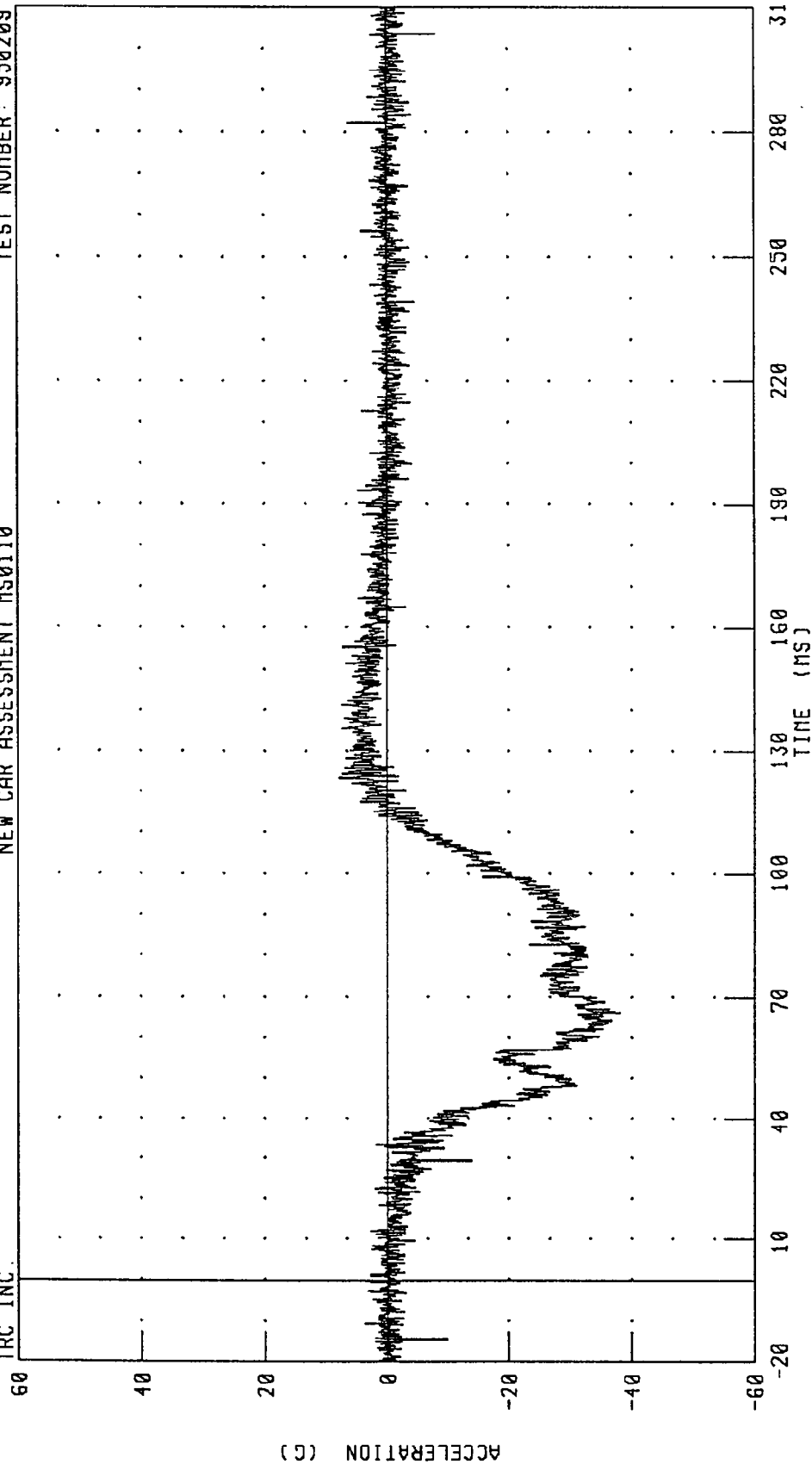
PEAK DATA: 0.24 MM @ 11.04 MS; -30.62 MM @ 82.64 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
PASSENGER PELVIS X-AXIS ACCELERATION

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.

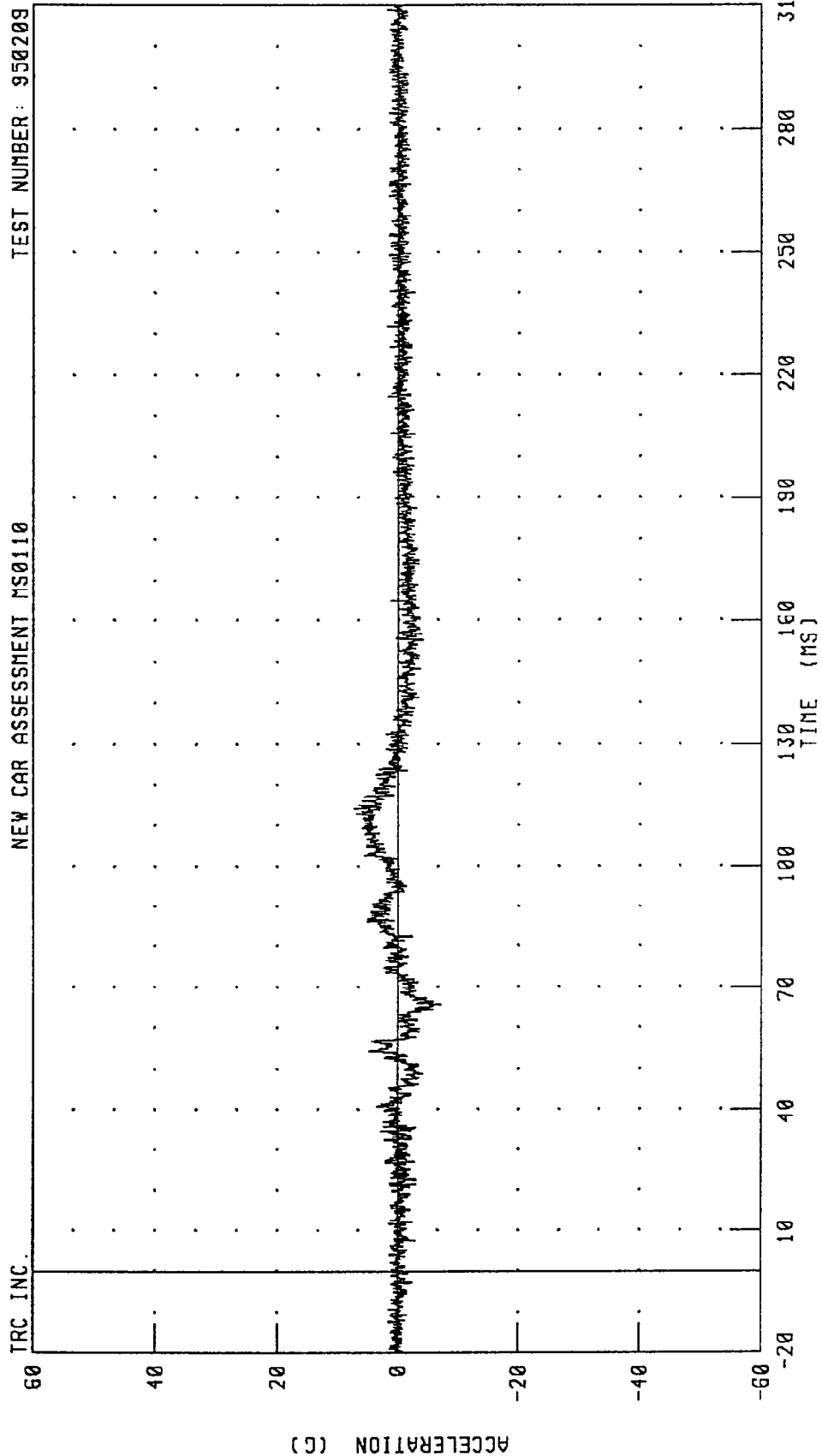


CHANNEL: PEVXG2 FILTER: CH. CLASS 1000

PEAK DATA: 7.97 G @ 123.44 MS; -38.03 G @ 66.24 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
PASSENGER PELVIS Y-AXIS ACCELERATION
NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209



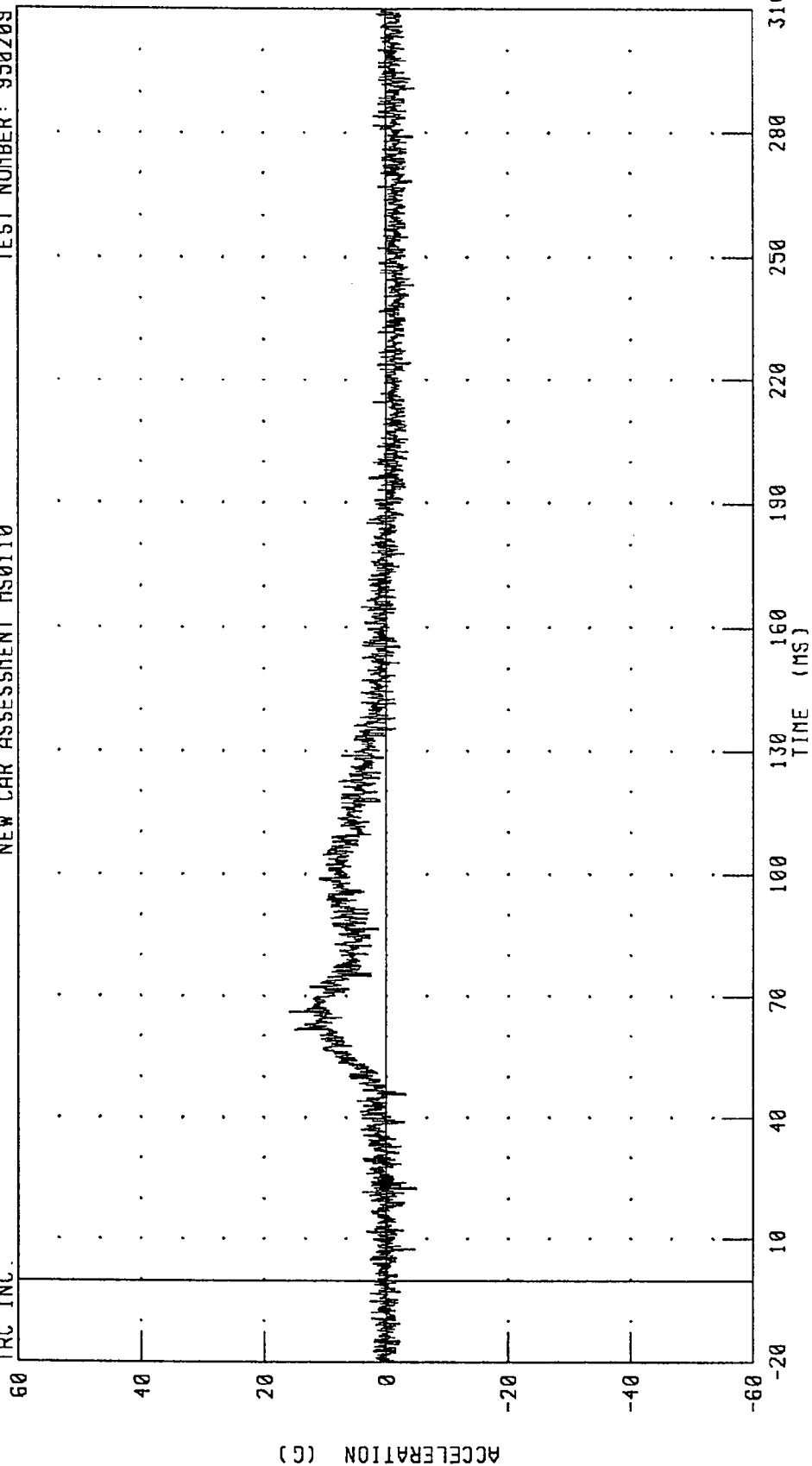
CHANNEL: PEVYG2 FILTER: CH. CLASS 1000

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
PASSENGER PELVIS Z-AXIS ACCELERATION

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

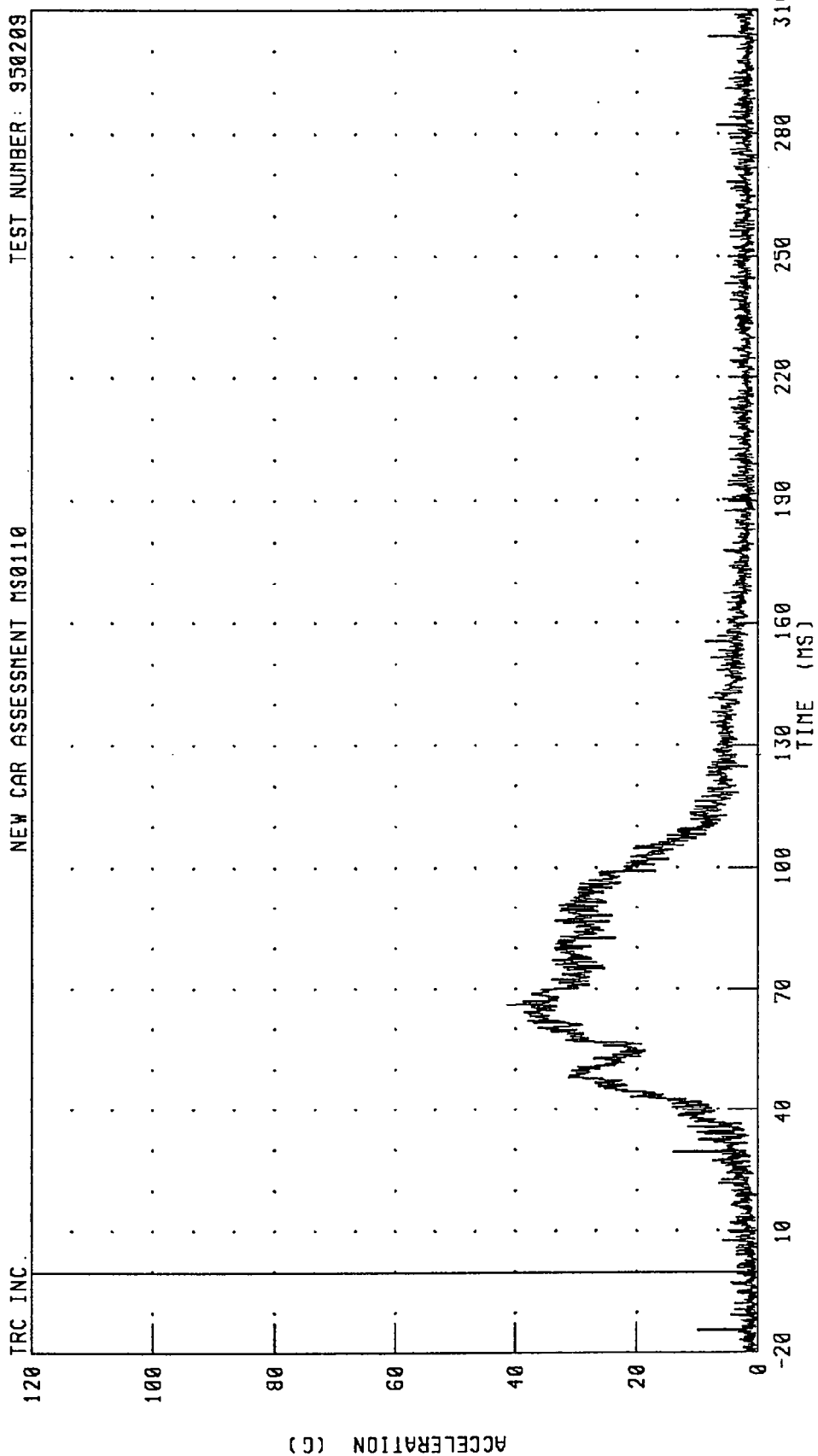
TRC INC.



CHANNEL: PEVZG2 FILTER: CH. CLASS 1000

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
PASSENGER PELVIS RESULTANT ACCELERATION
NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209



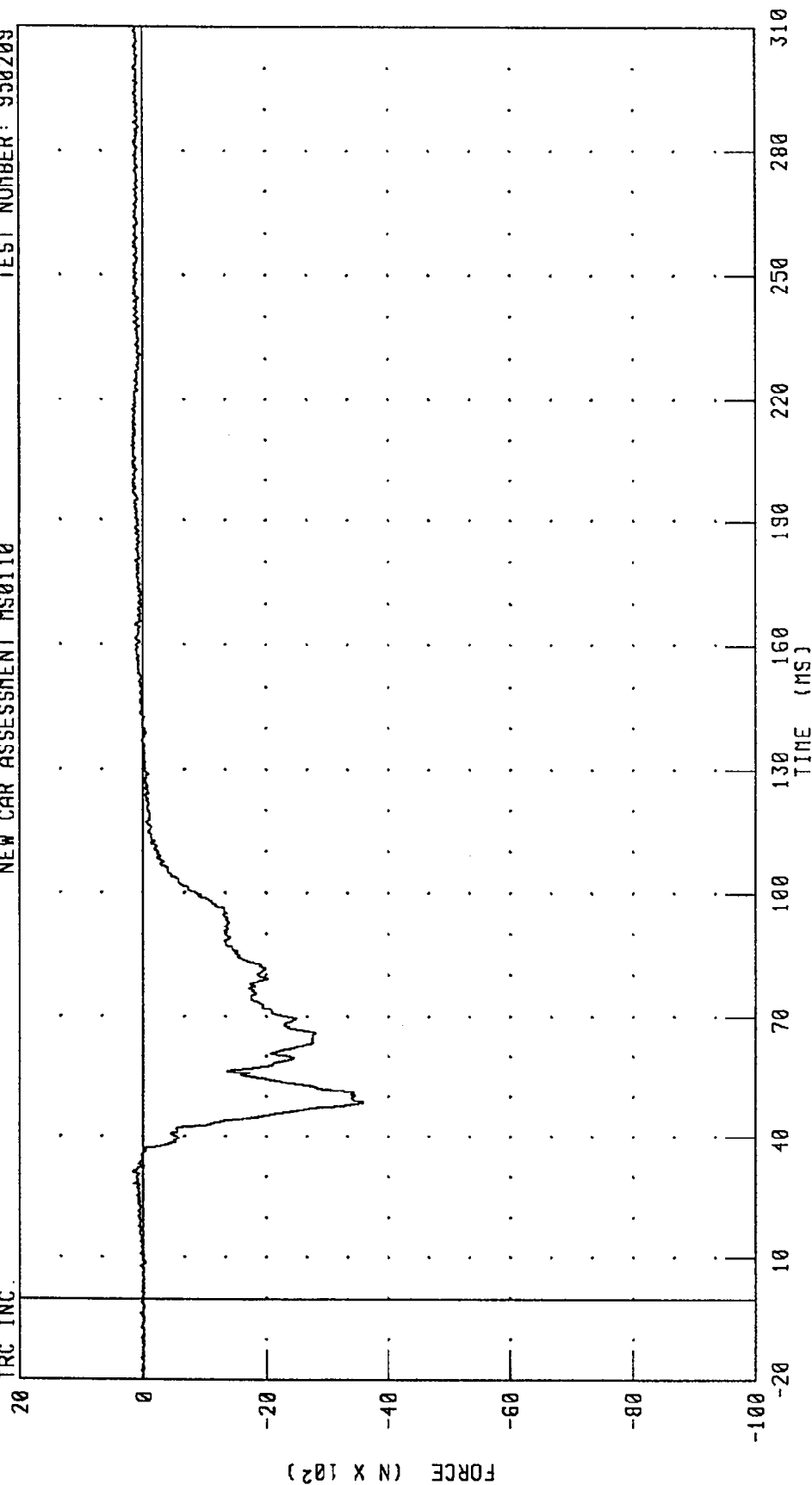
PEAK DATA: 41.34 G @ 66.24 MS; 0.09 G @ 5.84 MS

CHANNEL: PEVRC2 FILTER: CH. CLASS 1000

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
PASSENGER LEFT FEMUR FORCE
NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

TRC INC.

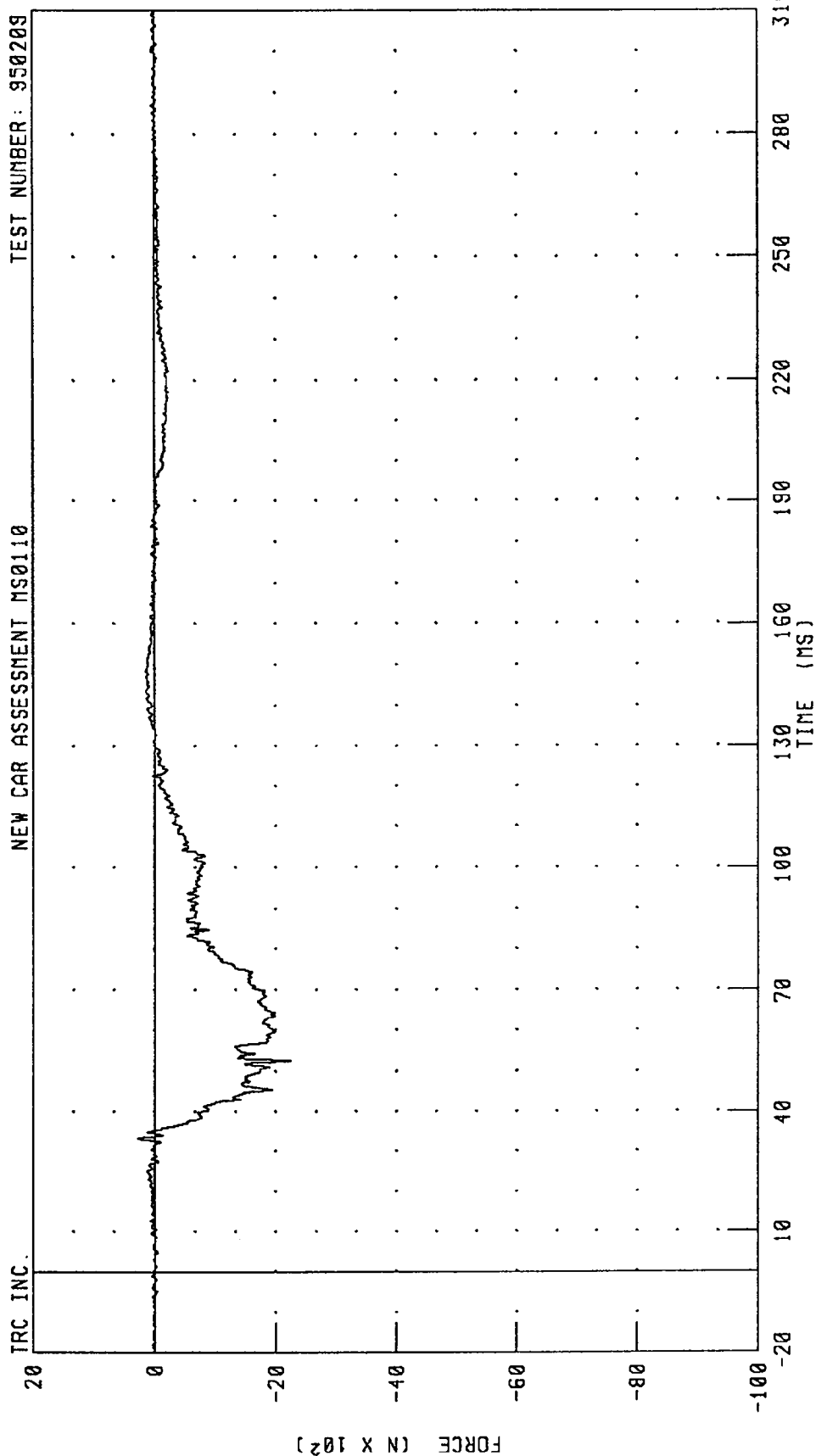


PEAK DATA: 179.96 N @ 208.64 MS; -3600.55 N @ 48.56 MS

CHANNEL: LFMF2 FILTER: CH. CLASS 600

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
PASSENGER RIGHT FEMUR FORCE
NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209



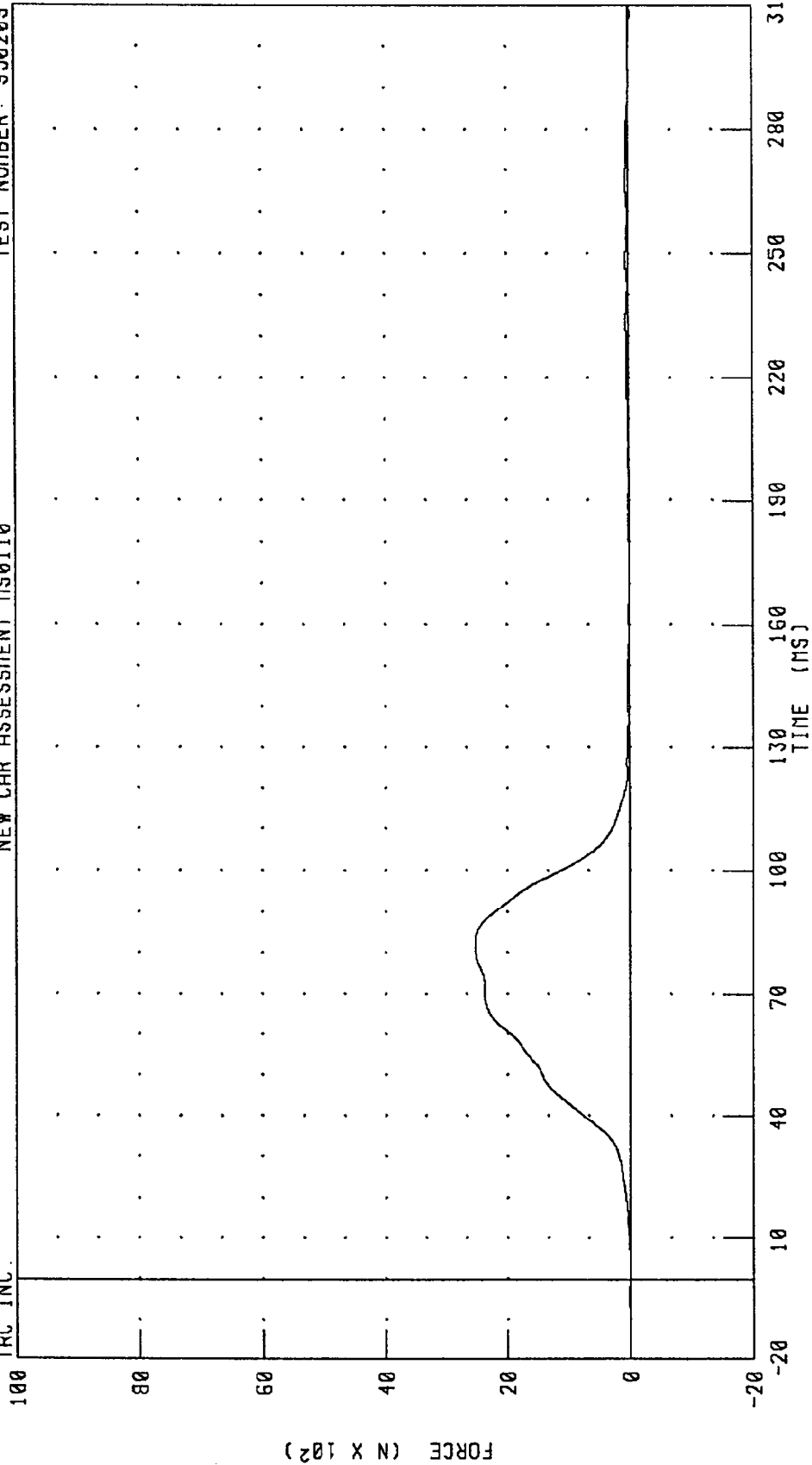
PEAK DATA: 275.30 N @ 33.28 MS; -2235.42 N @ 33.28 MS

CHANNEL: RFMF2 FILTER: CH. CLASS 600

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
PASSENGER LAP BELT OUTBOARD FORCE
NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

TRC INC.



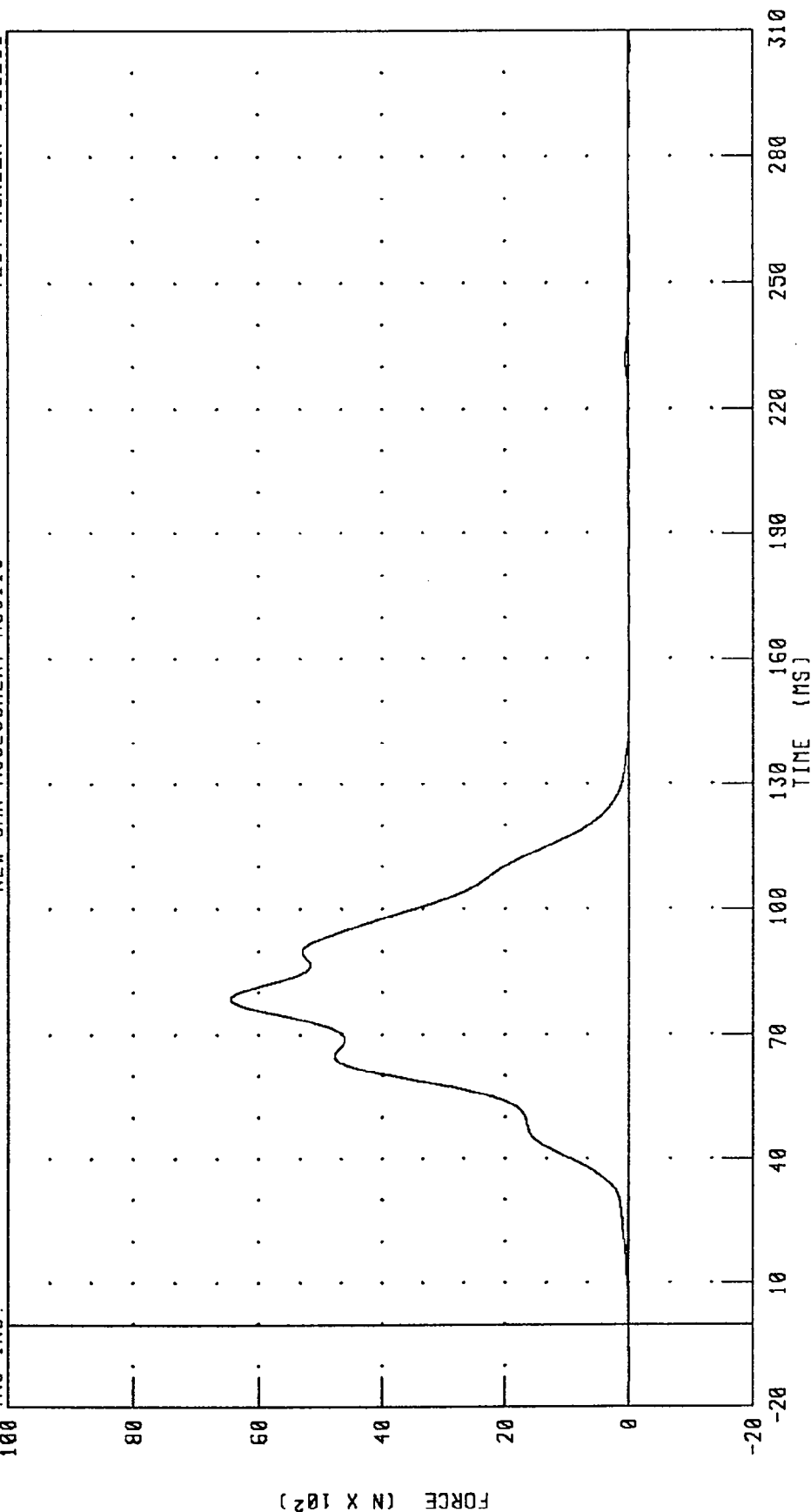
PEAK DATA: 2529.10 N @ 82.64 MS, -21.46 N @ 307.84 MS

CHANNEL: L80F2 FILTER: CH. CLASS 60

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
PASSENGER SHOULDER BELT FORCE
NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

TRC INC.



PEAK DATA: 6446.47 N @ 78.64 MS; -21.62 N @ 305.68 MS

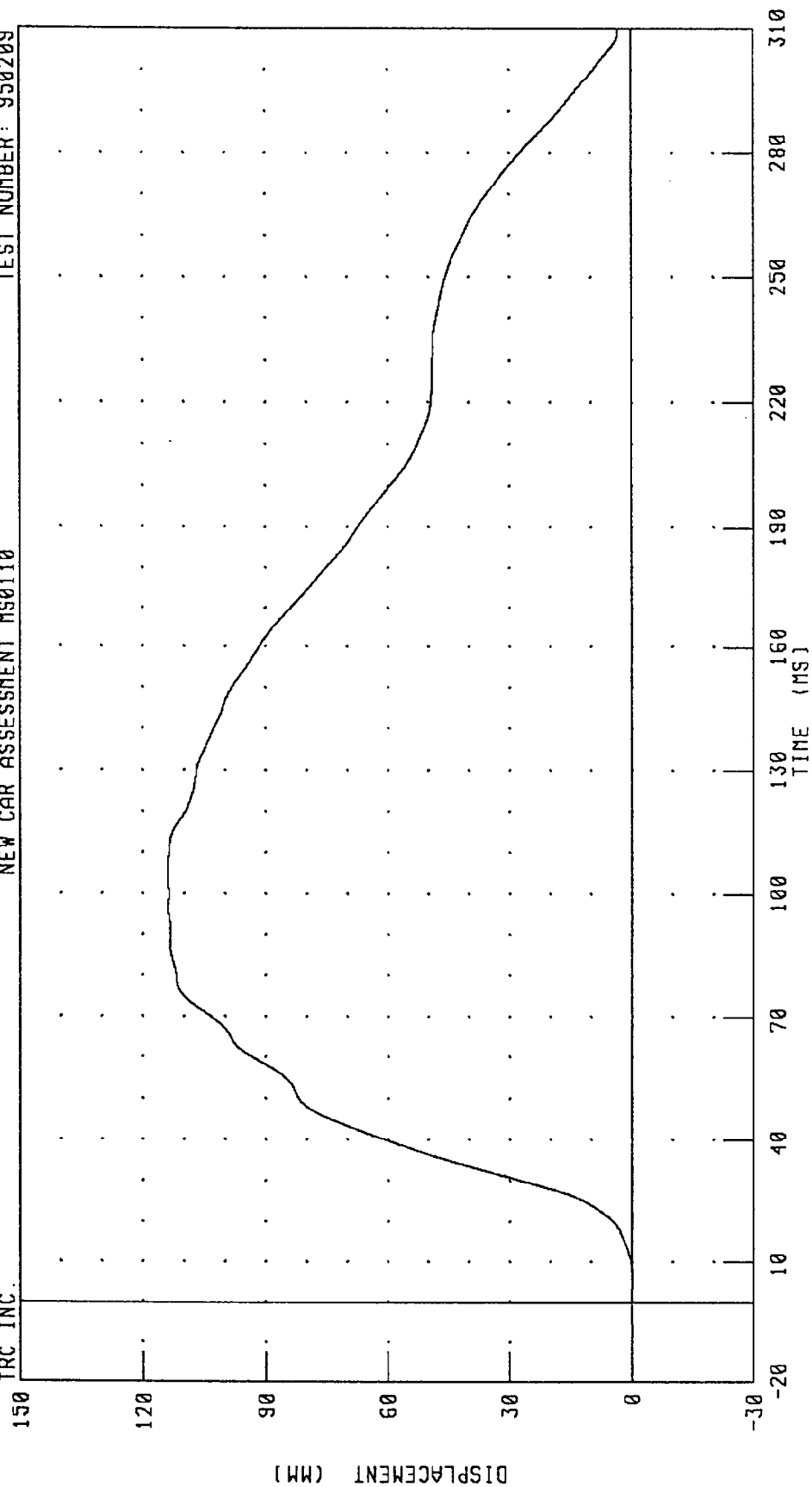
CHANNEL: SHBF2 FILTER: CH. CLASS 60

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
PASSENGER SHOULDER BELT DISPLACEMENT

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.

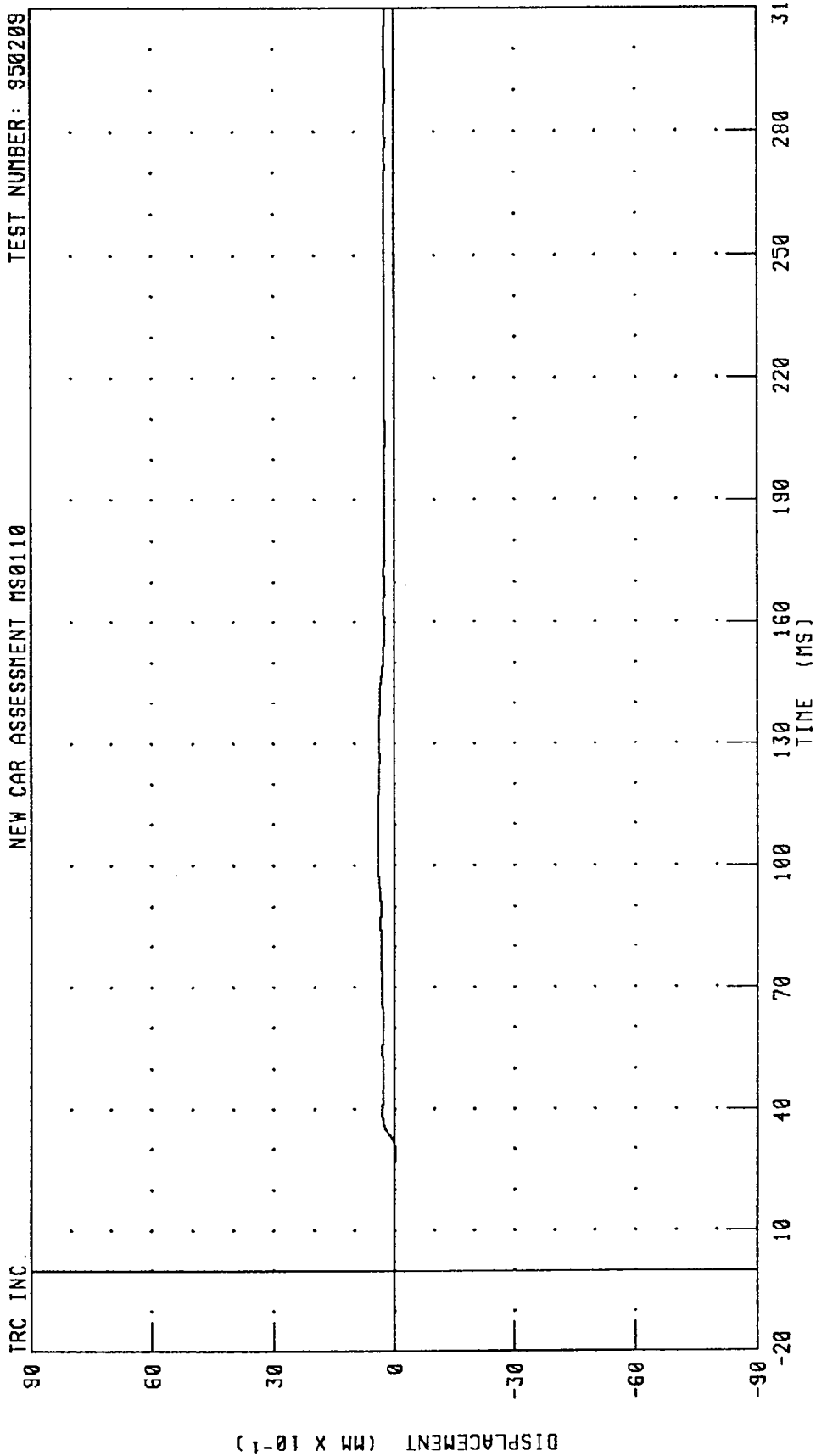


PEAK DATA: 113.88 MS; -0.13 MM @ 5.52 MS

CHANNEL: SHB02 FILTER: CH. CLASS 60

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
PASSENGER SEAT BELT EXTENSION
NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209



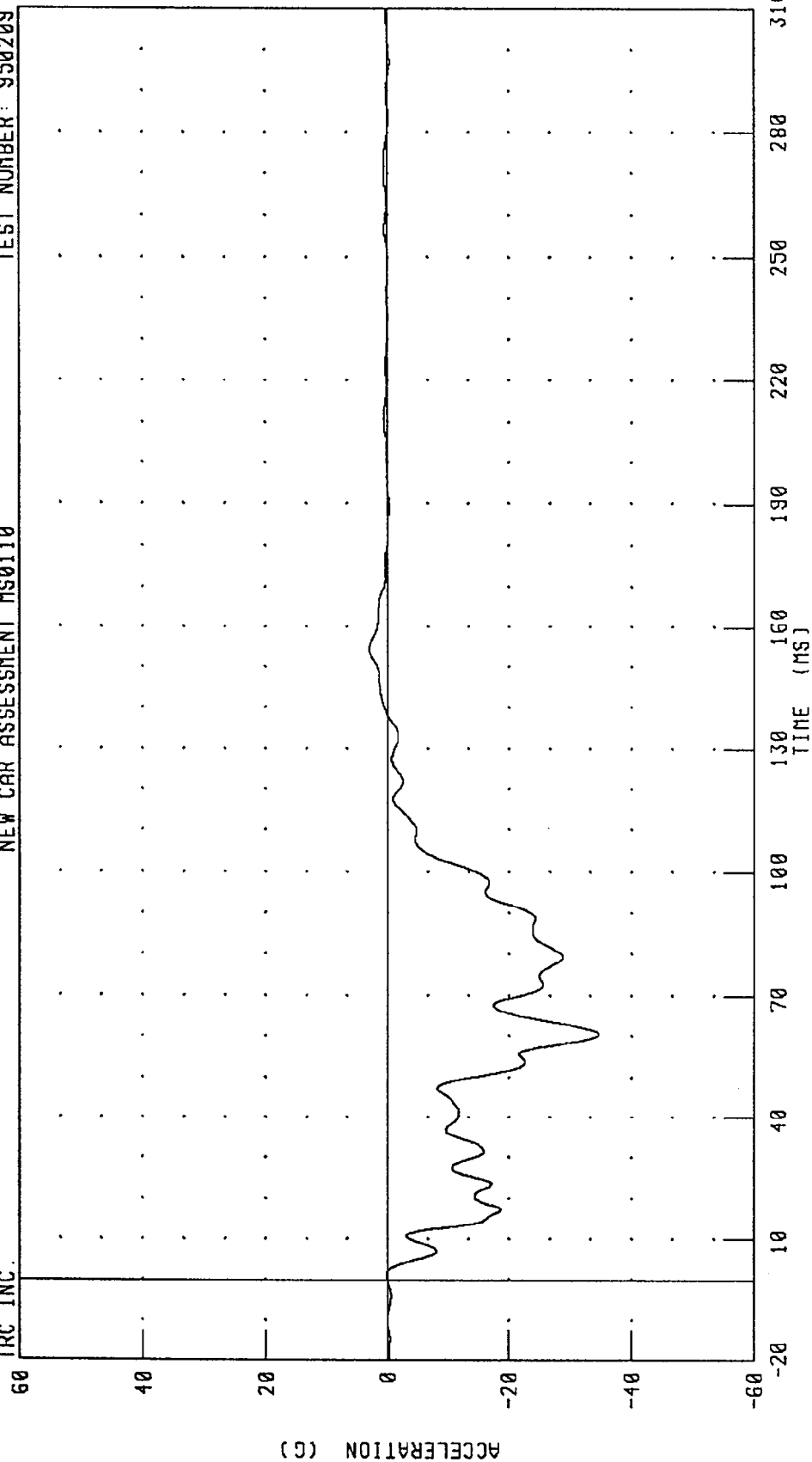
CHANNEL: SBED2 FILTER: CH. CLASS 60

PEAK DATA: 0.41 MM @ 105.76 MS; -0.02 MM @ 29.52 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 LEFT REAR SEAT X-AXIS ACCELERATION
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

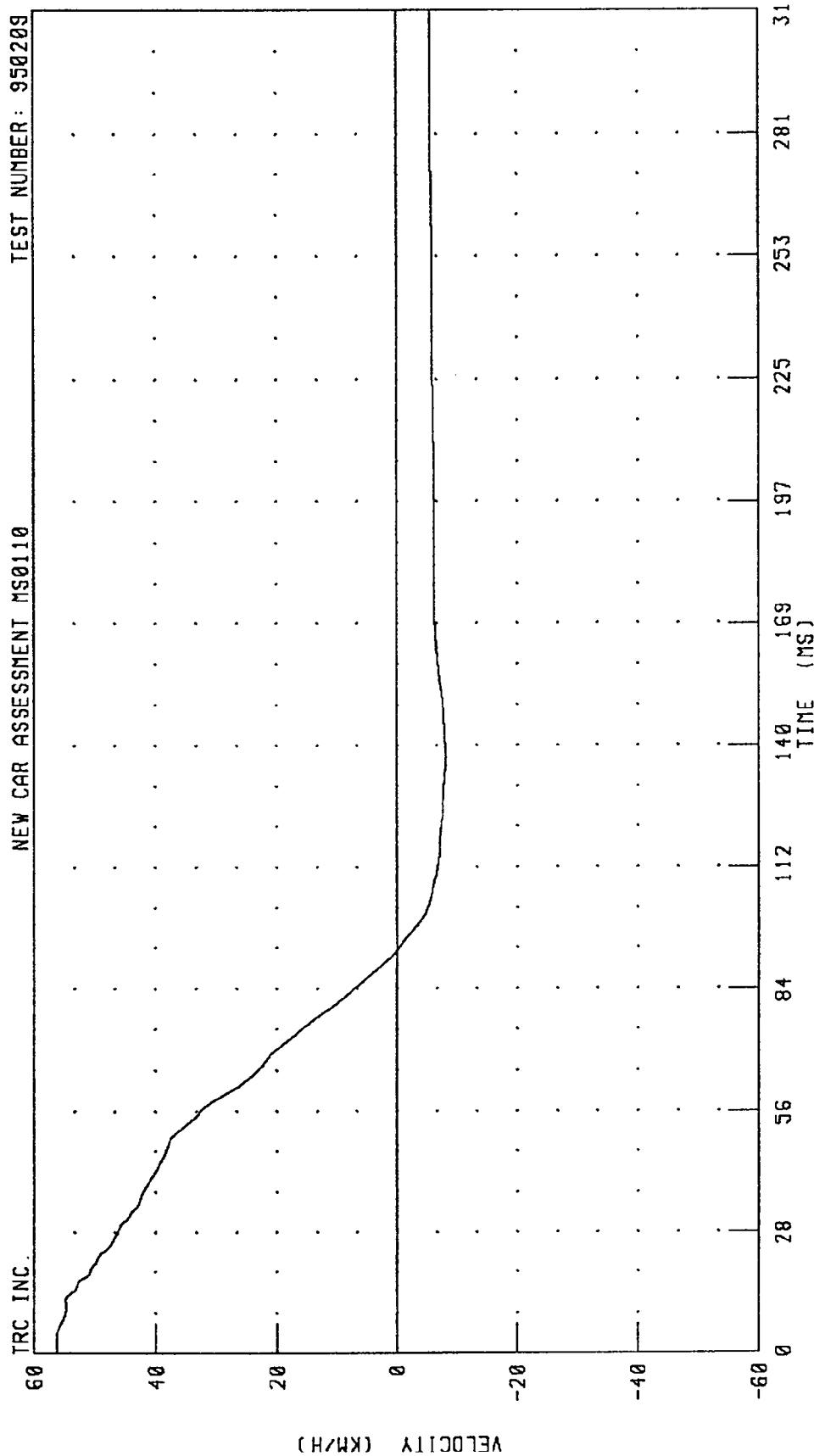
TRC INC.



CHANNEL: TLRXG1 FILTER: CH. CLASS 60

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
LEFT REAR SEAT X-AXIS VELOCITY
NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209



CHANNEL: TLRXV1 FILTER: CH. CLASS 180

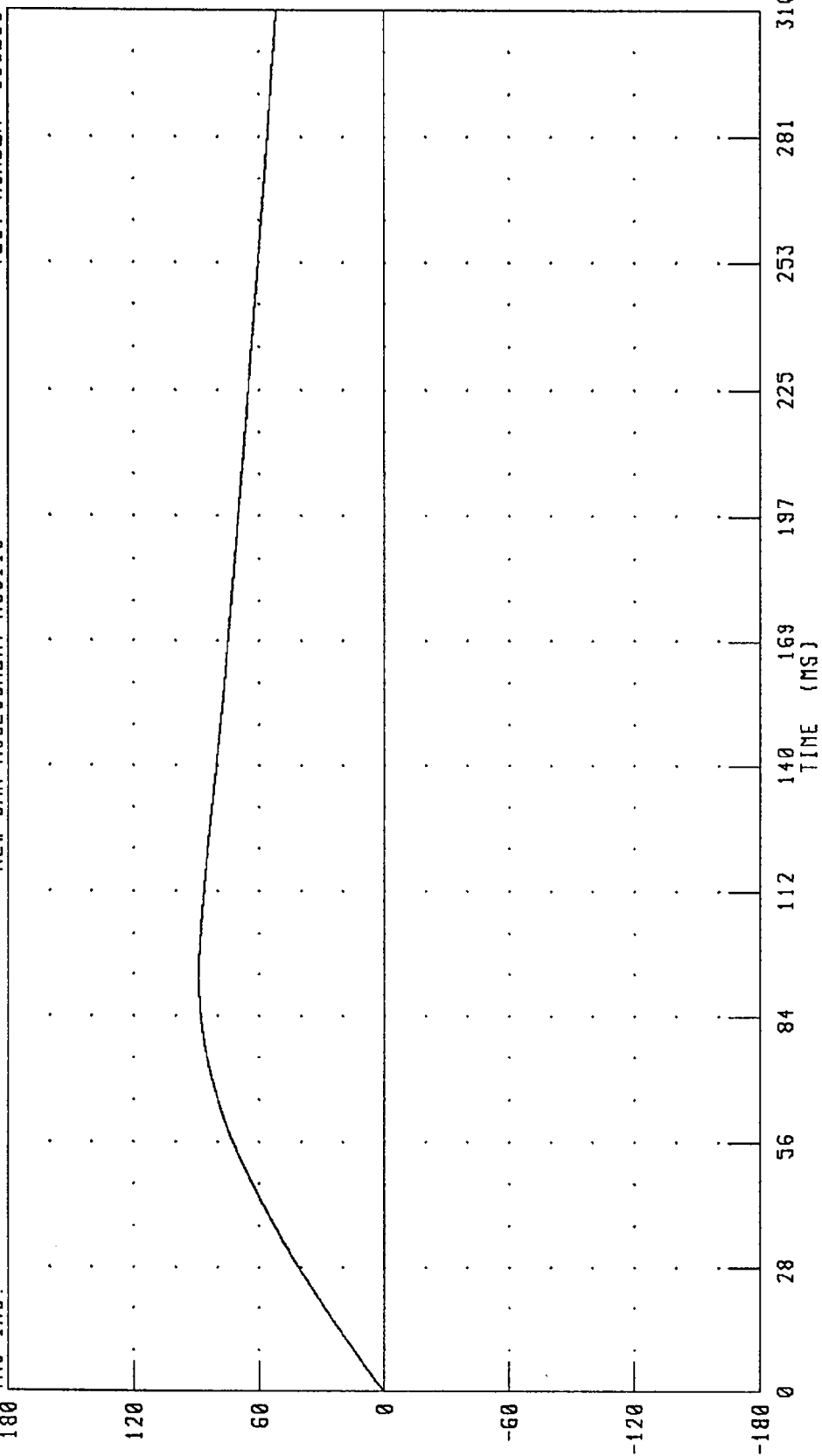
PEAK DATA: 56.20 KM/H @ 3.84 MS; -8.10 KM/H @ 138.48 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
LEFT REAR SEAT X-AXIS DISPLACEMENT
NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

TRC INC.

DISPLACEMENT (MM X 10¹)



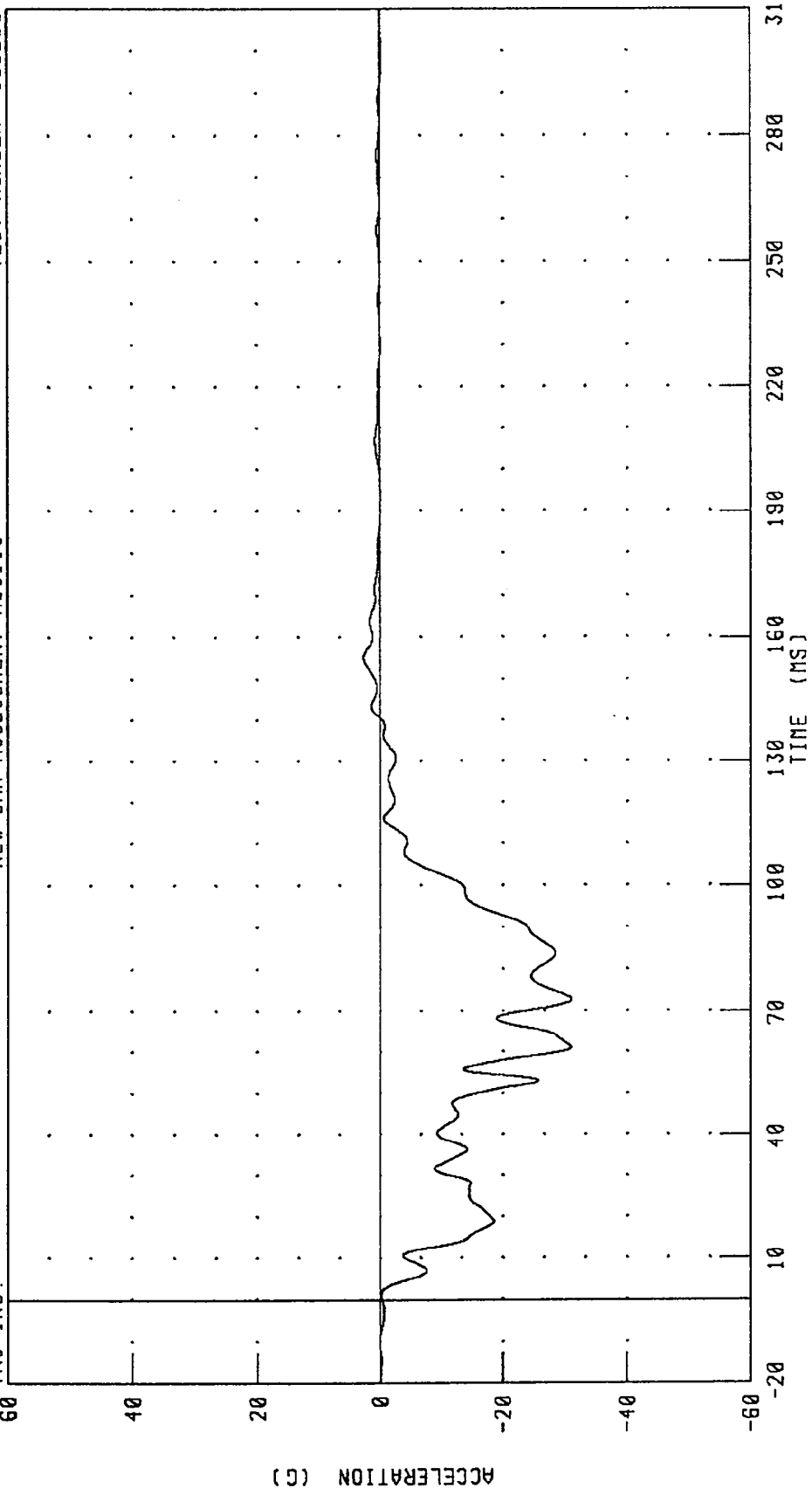
PEAK DATA: 888.96 MM @ 93.44 MS; 0.00 MM @ 0.00 MS

CHANNEL: TLRXD1 FILTER: CH. CLASS 180

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
RIGHT REAR SEAT X-AXIS ACCELERATION
NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

TRC INC.



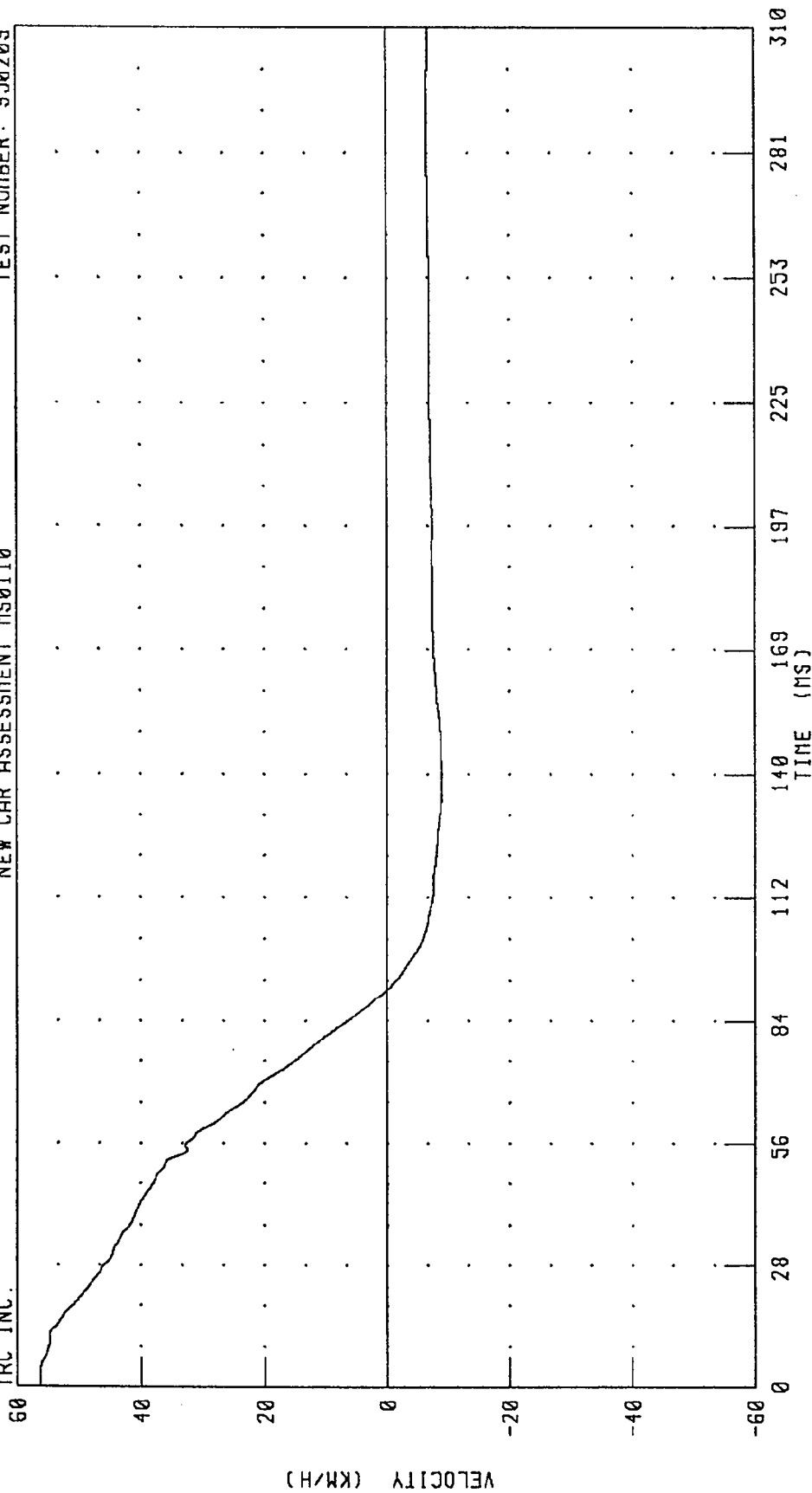
CHANNEL: TRRXG1 FILTER: CH. CLASS 60

PEAK DATA: 2.68 G @ 155.28 MS, -31.04 G @ 72.80 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 RIGHT REAR SEAT X-AXIS VELOCITY
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

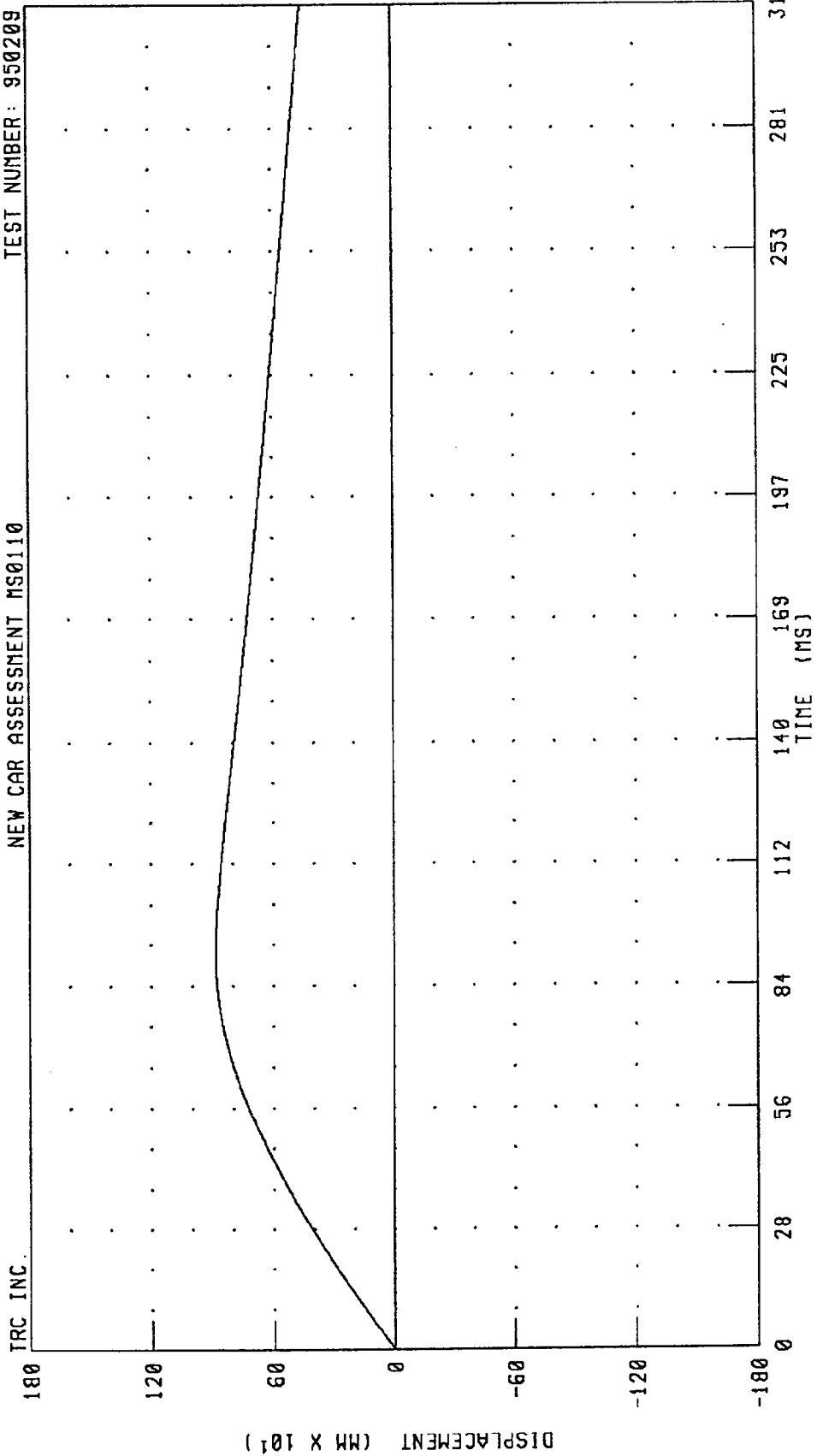
TRC INC.



CHANNEL: TRRXV1 FILTER: CH. CLASS 180 PEAK DATA: 56.20 KM/H @ 0.00 MS, -9.05 KM/H @ 140.80 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 RIGHT REAR SEAT X-AXIS DISPLACEMENT
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209



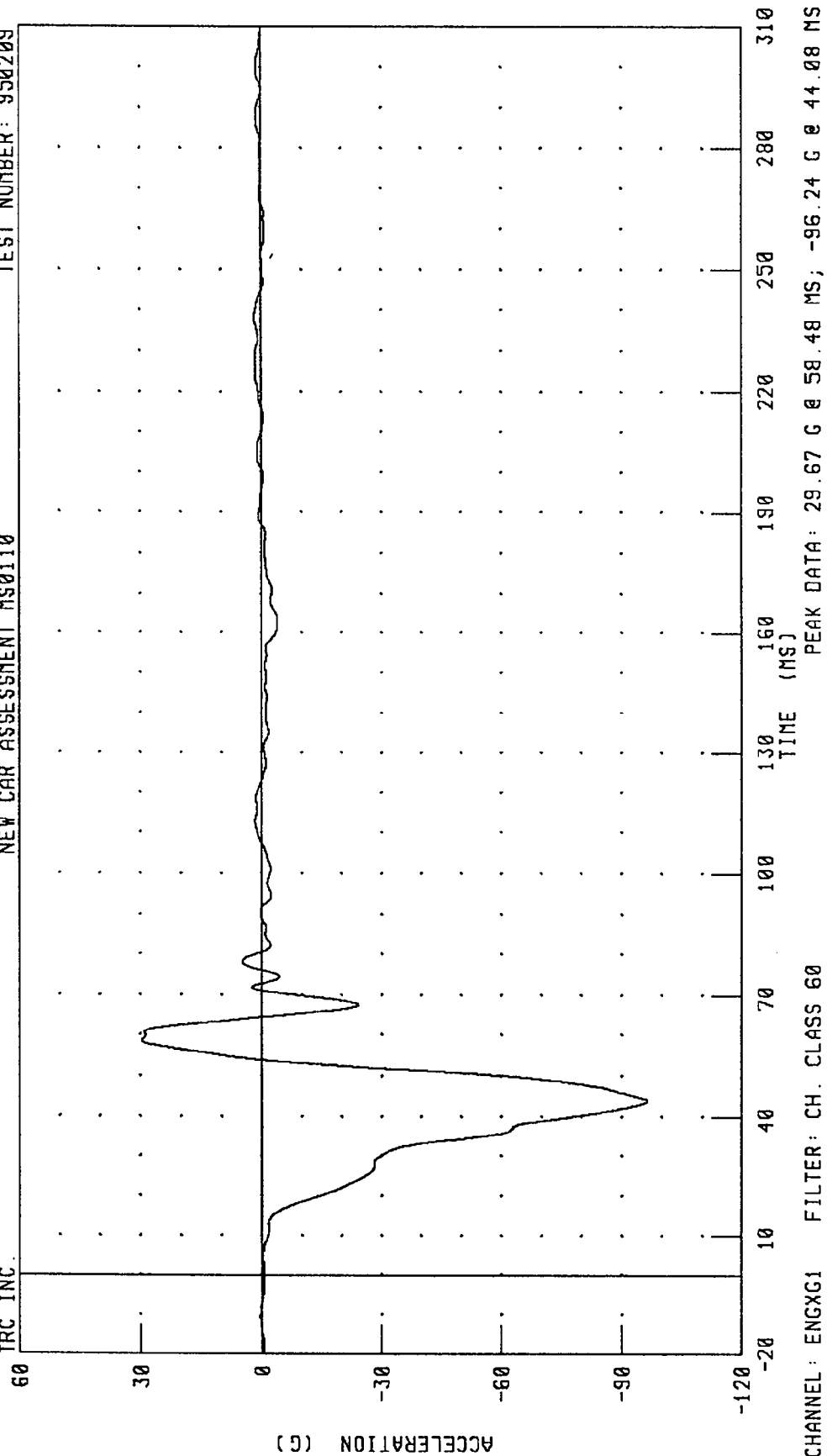
PEAK DATA: 884.97 MM @ 91.92 MS; 0.00 MM @ 0.00 MS

CHANNEL: TRRXD1 FILTER: CH. CLASS 180

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
ENGINE TOP X-AXIS ACCELERATION
NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

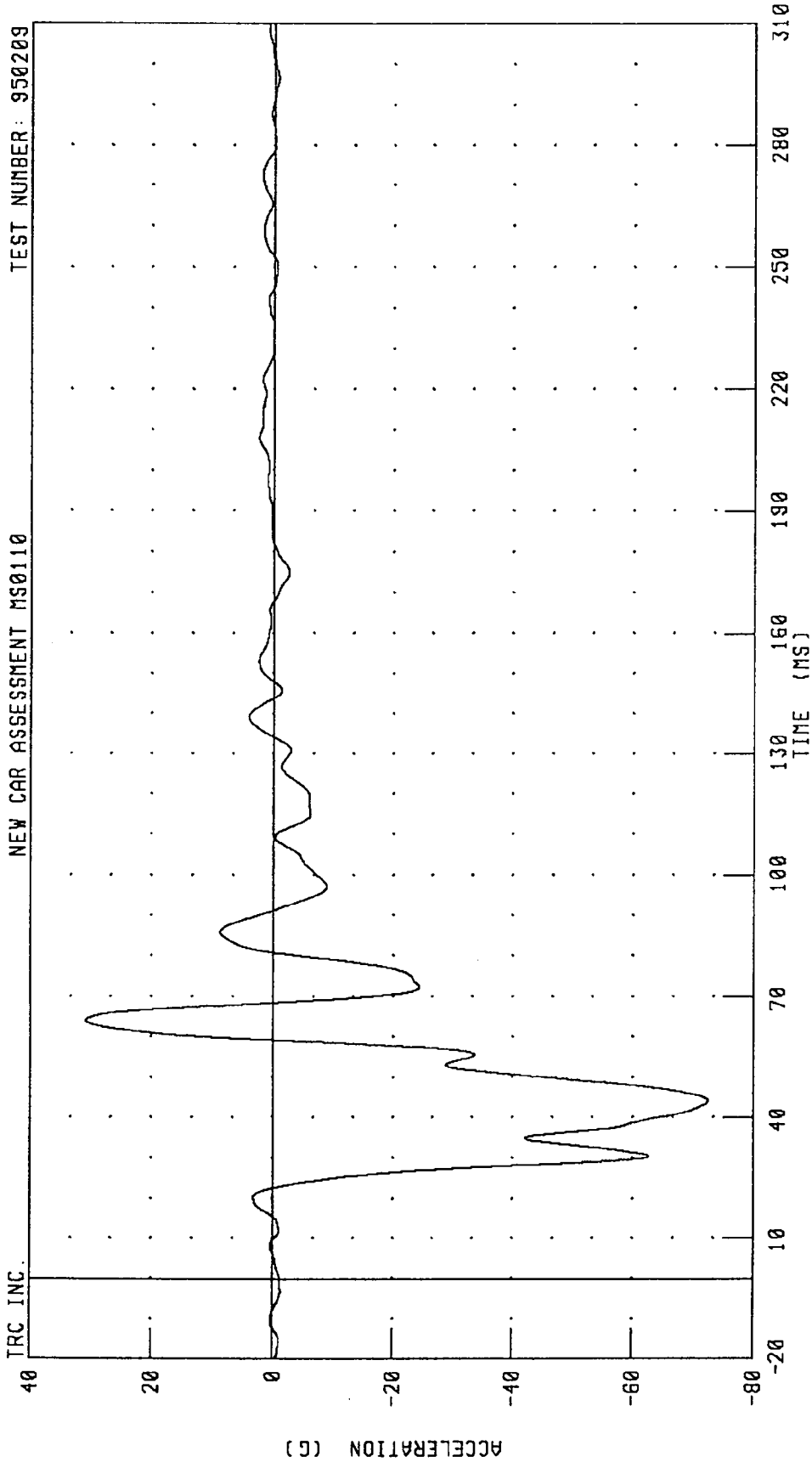
TRC INC.



CHANNEL: ENGXG1 FILTER: CH. CLASS 60

950209

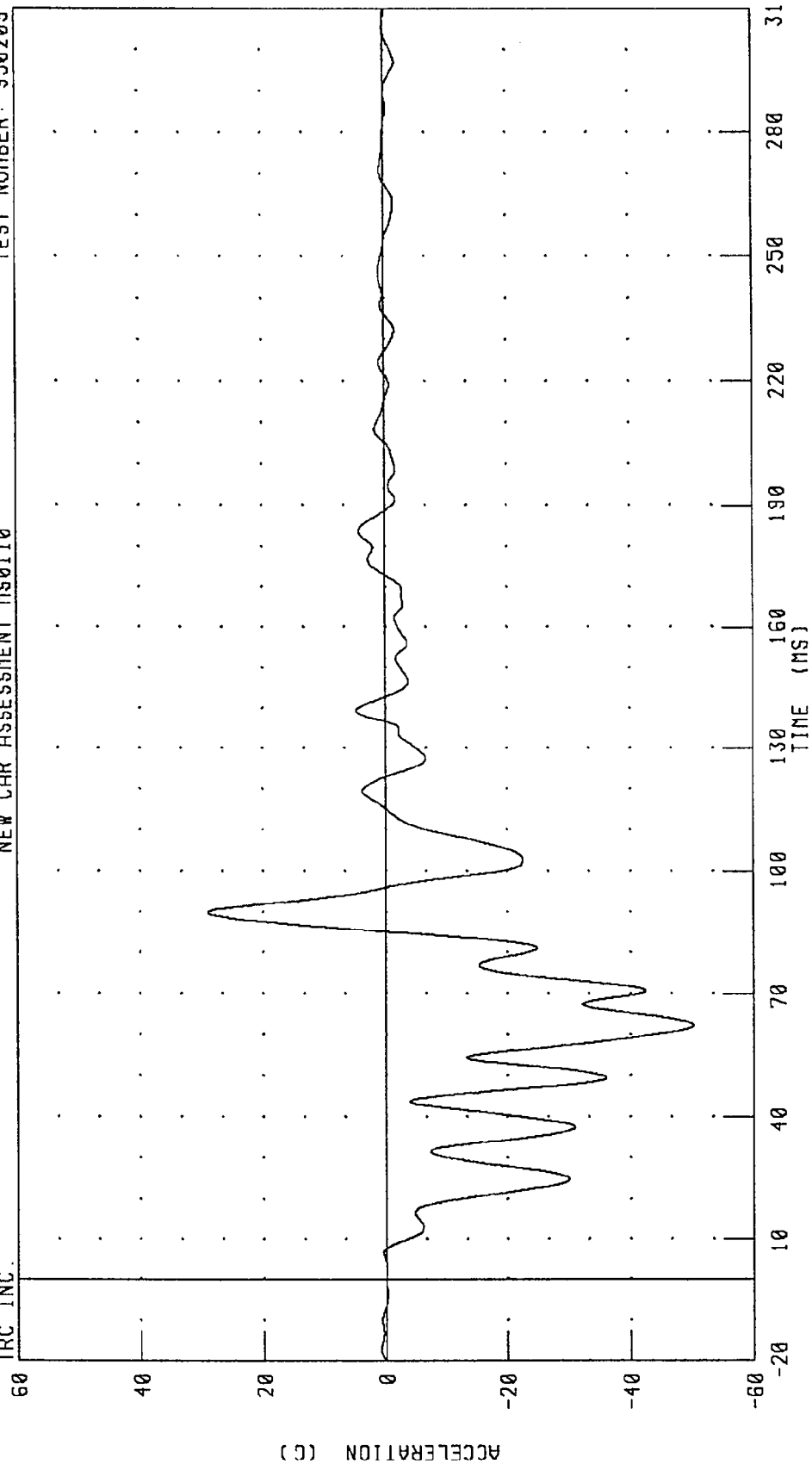
1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 ENGINE BOTTOM X-AXIS ACCELERATION
 NEW CAR ASSESSMENT MS0110



1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 RIGHT BRAKE CALIPER X-AXIS ACCELERATION
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

TRC INC.

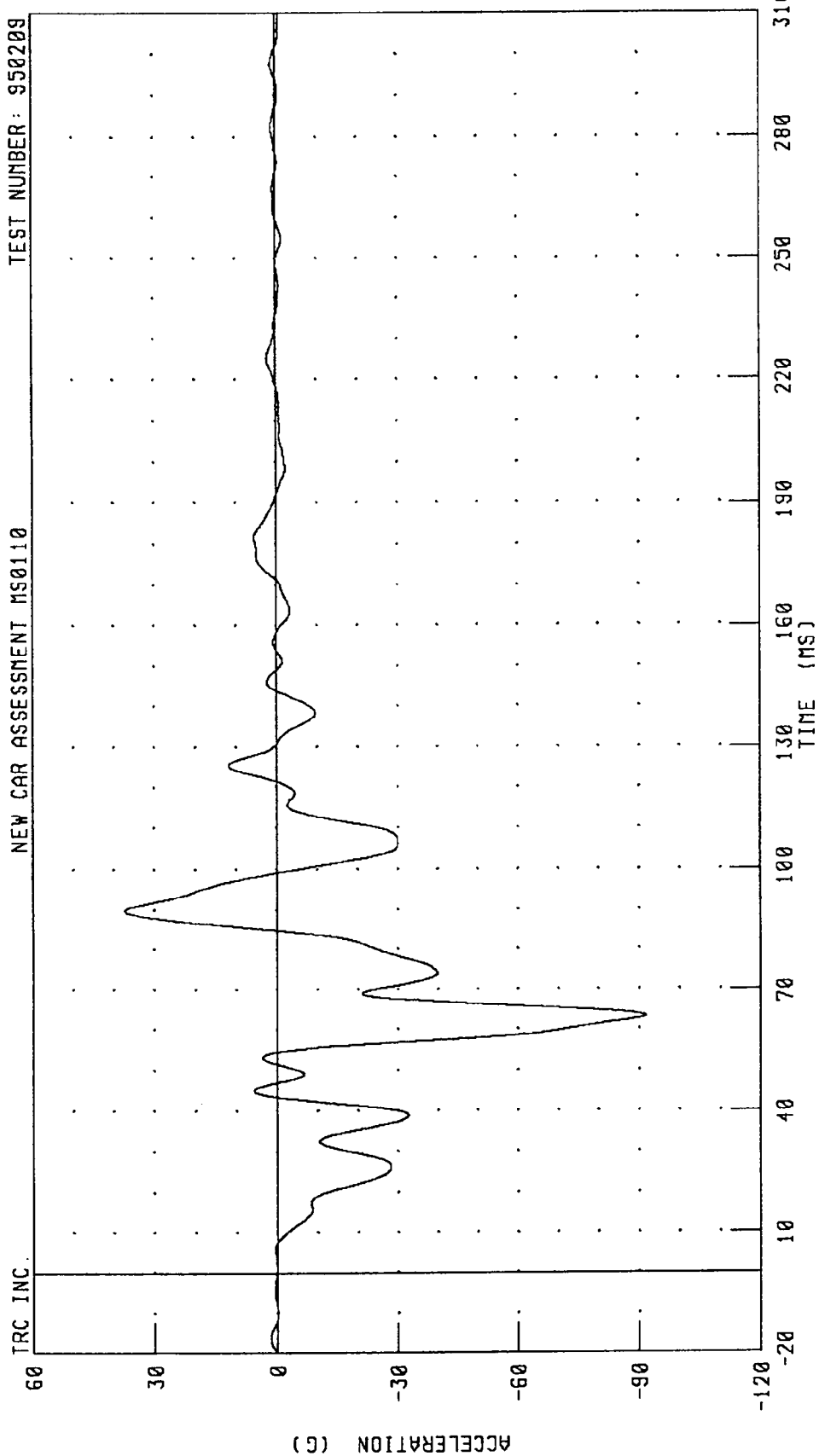


CHANNEL: BCRXG1 FILTER: CH. CLASS 60

PEAK DATA: 29.05 G @ 89.92 MS; -50.22 G @ 62.24 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
LEFT BRAKE CALIPER X-AXIS ACCELERATION
NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209



CHANNEL: BCLXG1 FILTER: CH. CLASS 60

PEAK DATA: 37.25 G @ 89.84 MS; -91.72 G @ 63.28 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
INSTRUMENT PANEL CENTER X-AXIS ACCELERATION
NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

TRC INC.

60

40

20

ACCELERATION (G)

0

-20

-40

-60

-20

10

40

70

100

130

160

190

220

250

280

310

TIME (MS)

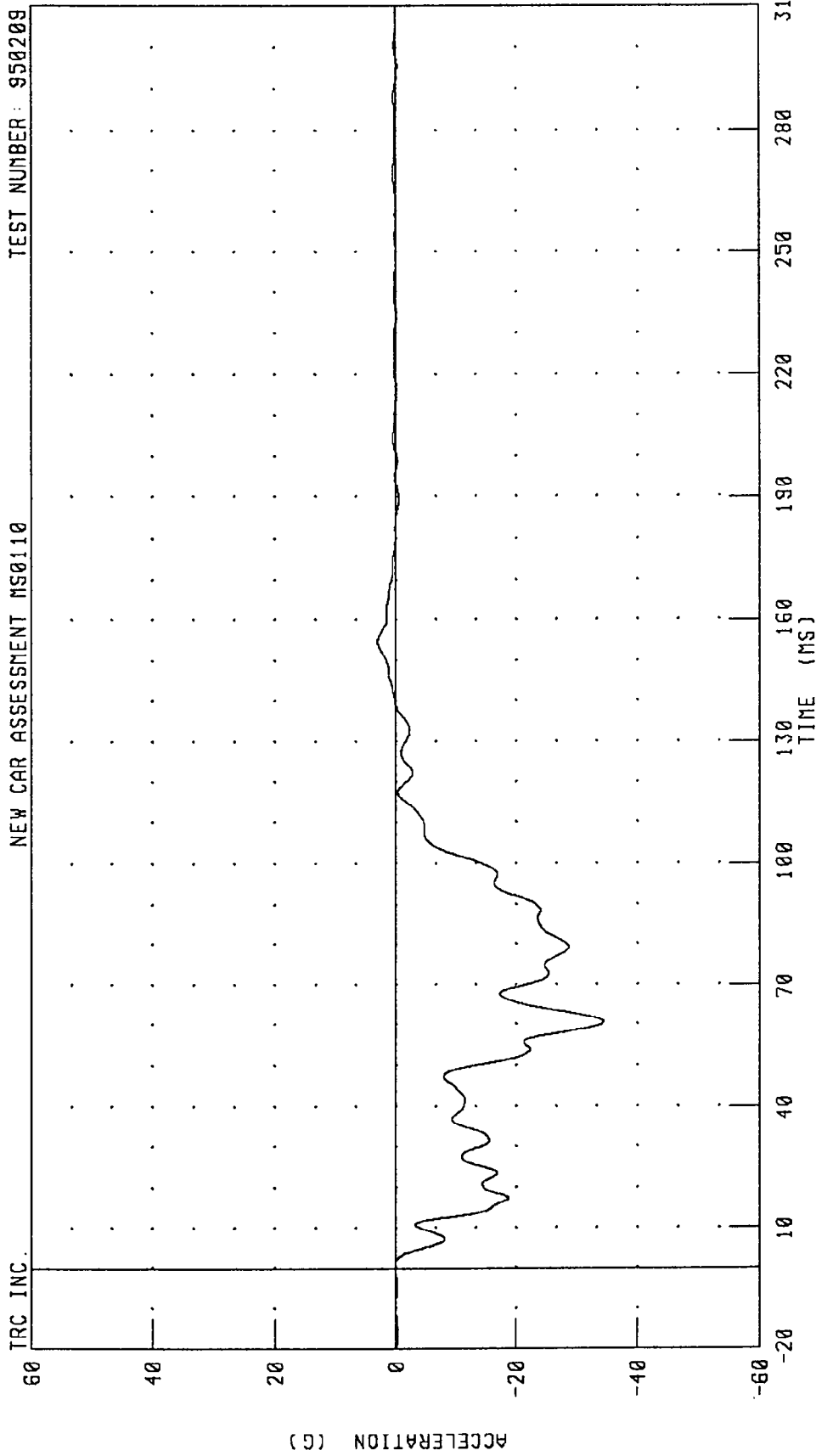
CHANNEL: DPCXG1 FILTER: CH. CLASS 60

PEAK DATA: 13.75 G @ 46.16 MS; -50.84 G @ 33.52 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 LEFT REAR SEAT REDUNDANT X-AXIS ACCELERATION

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110



PEAK DATA: 3.04 G @ 154.64 MS; -34.45 G @ 60.56 MS

CHANNEL: TLRXGA FILTER: CH. CLASS 60

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
RIGHT REAR SEAT REDUNDANT X-AXIS ACCELERATION

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.

60

40

20

0

-20

-40

-60

ACCELERATION (G)

TIME (MS)

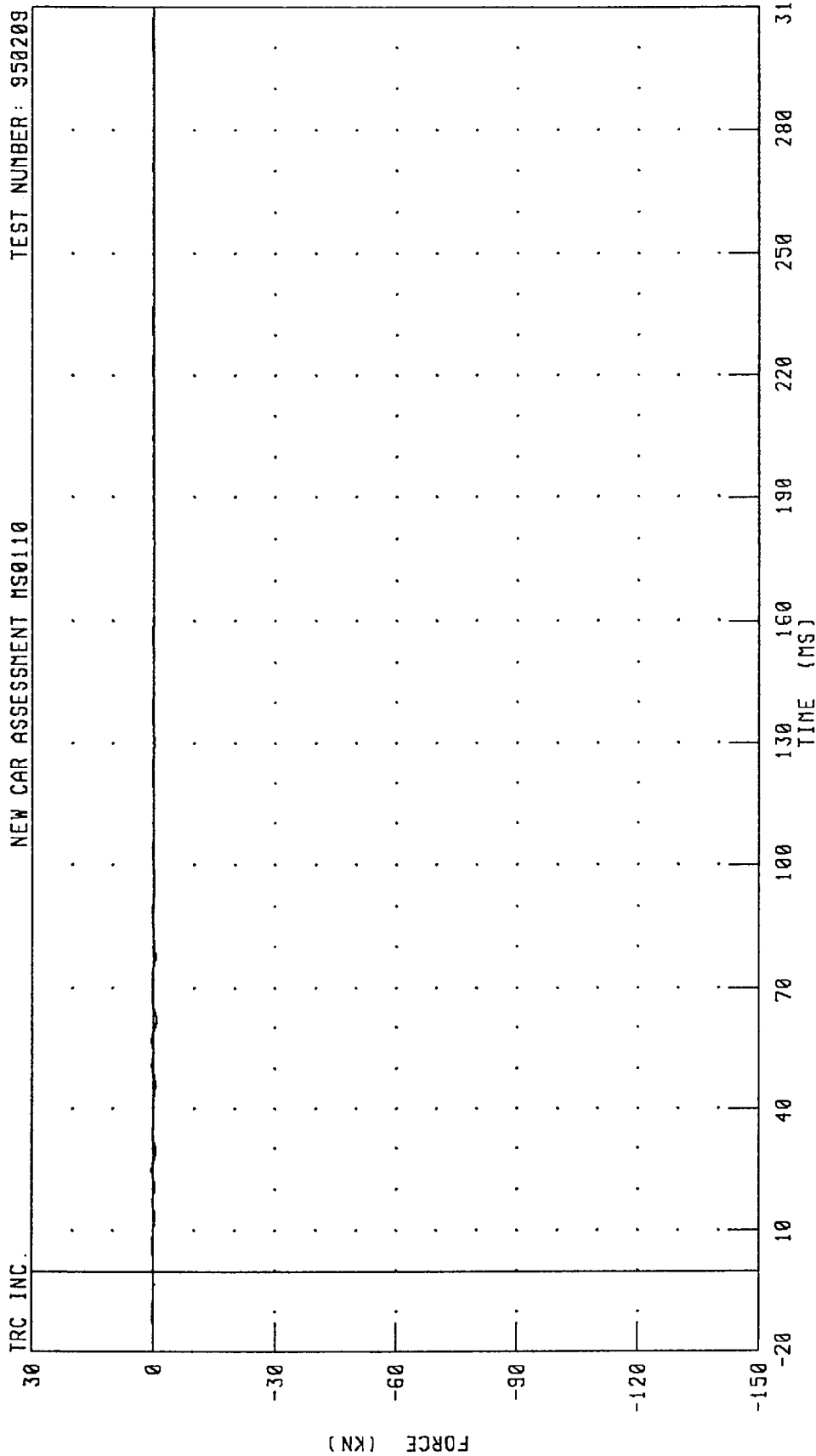
-20 10 40 70 100 130 160 190 220 250 280 310

CHANNEL: TRRXGA FILTER: CH. CLASS 60

PEAK DATA: 2.66 G @ 155.28 MS, -30.56 G @ 61.12 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A1 FORCE
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209



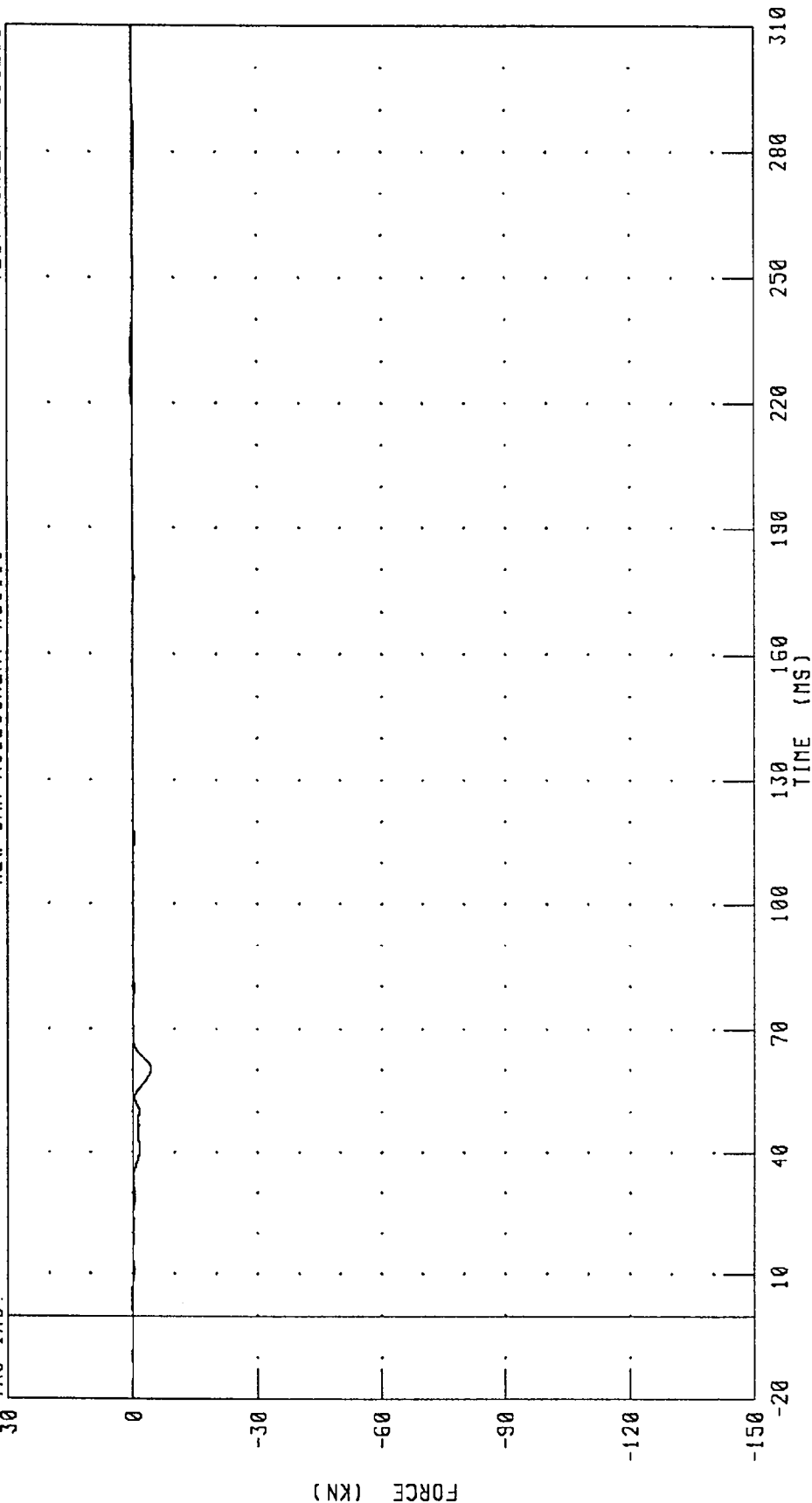
PEAK DATA: 0.37 KN @ 56.88 MS; -0.79 KN @ 62.16 MS

CHANNEL: BA1F FILTER: CH. CLASS 60

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A2 FORCE
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950208

TRC INC.

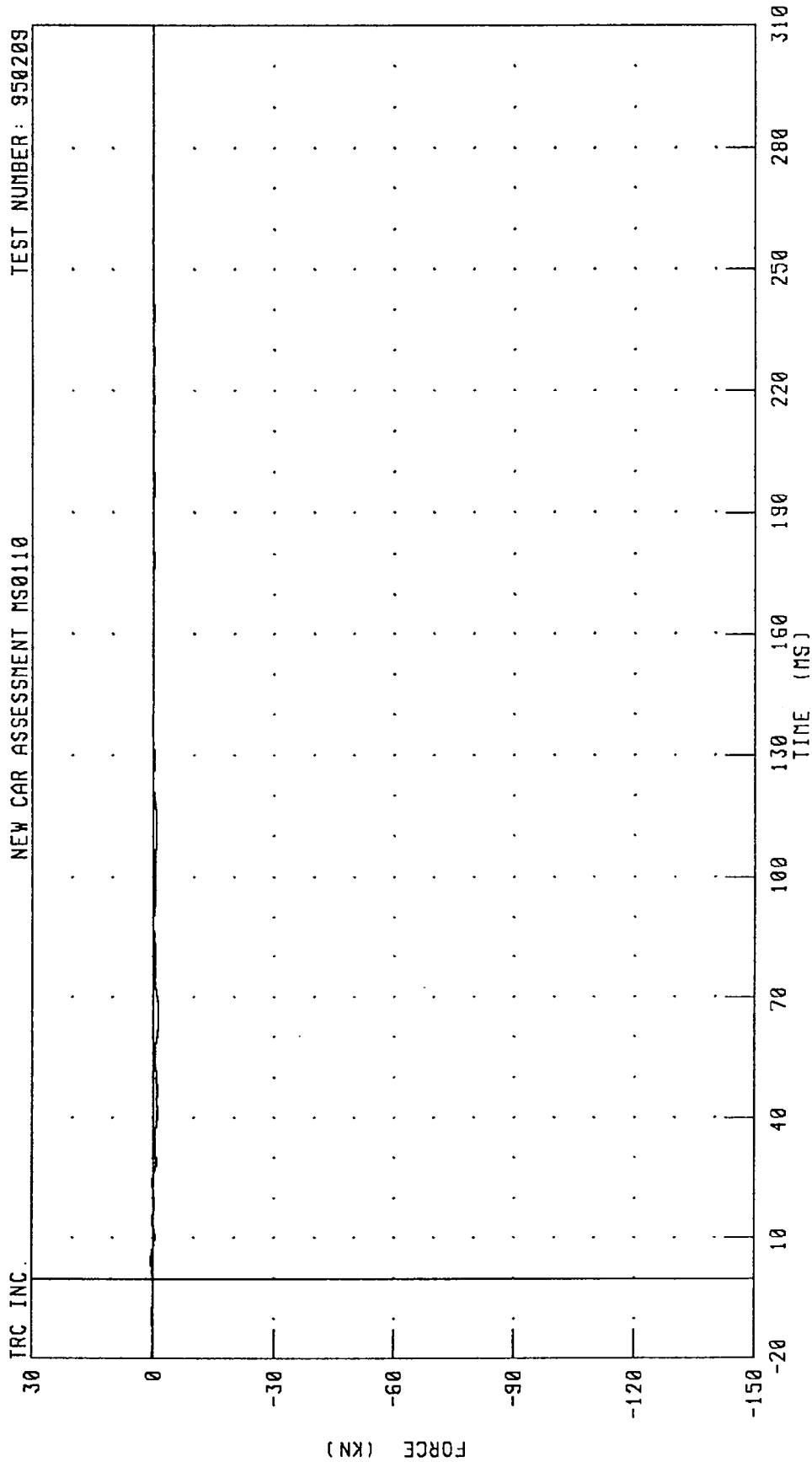


CHANNEL: BA2F FILTER: CH. CLASS 60

PEAK DATA: 0.48 KN @ 232.72 MS, -4.37 KN @ 60.32 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A3 FORCE
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209



PEAK DATA: 0.41 KN @ 4.56 MS; -1.41 KN @ 66.72 MS

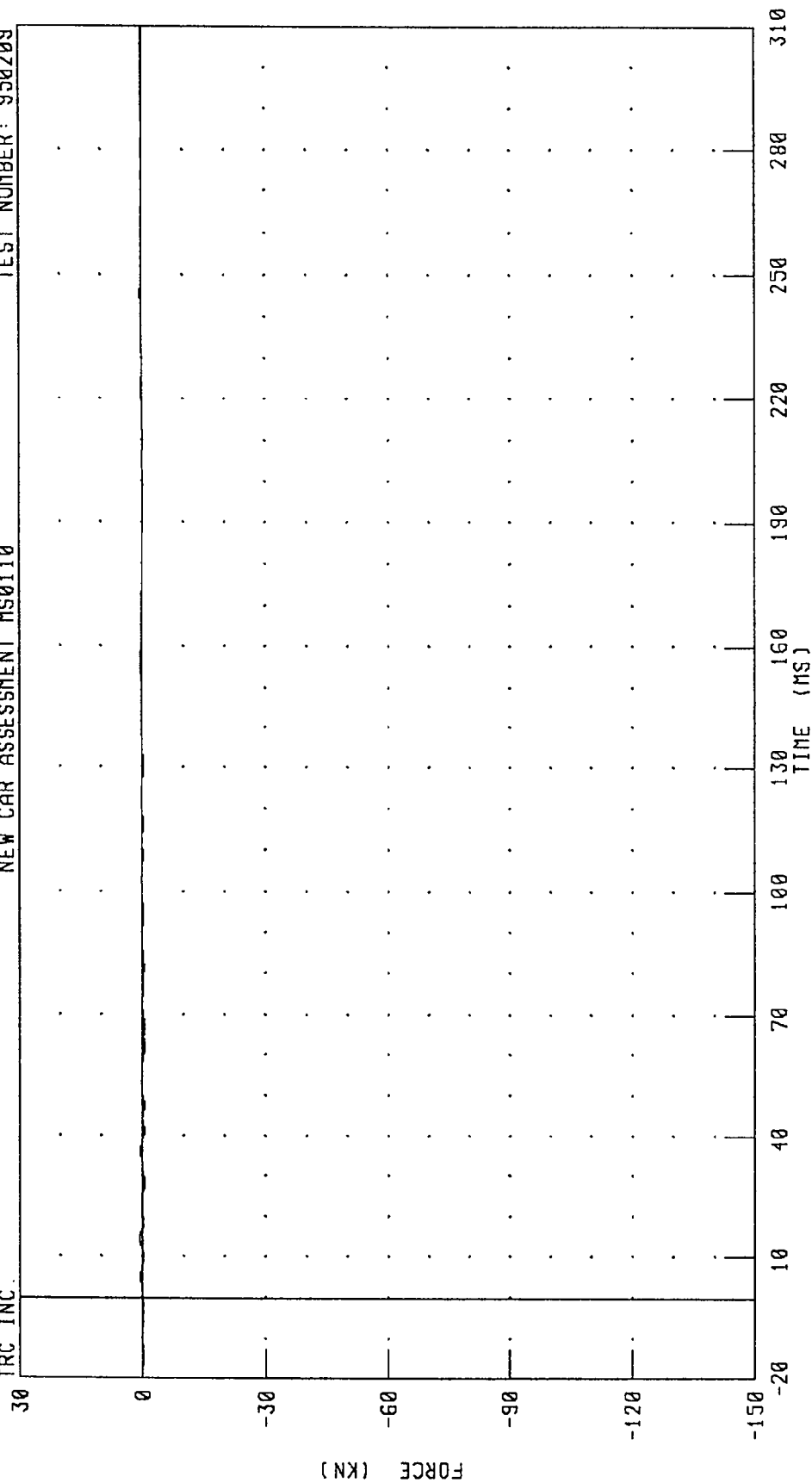
CHANNEL: BA3F FILTER: CH. CLASS 60

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A4 FORCE

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.



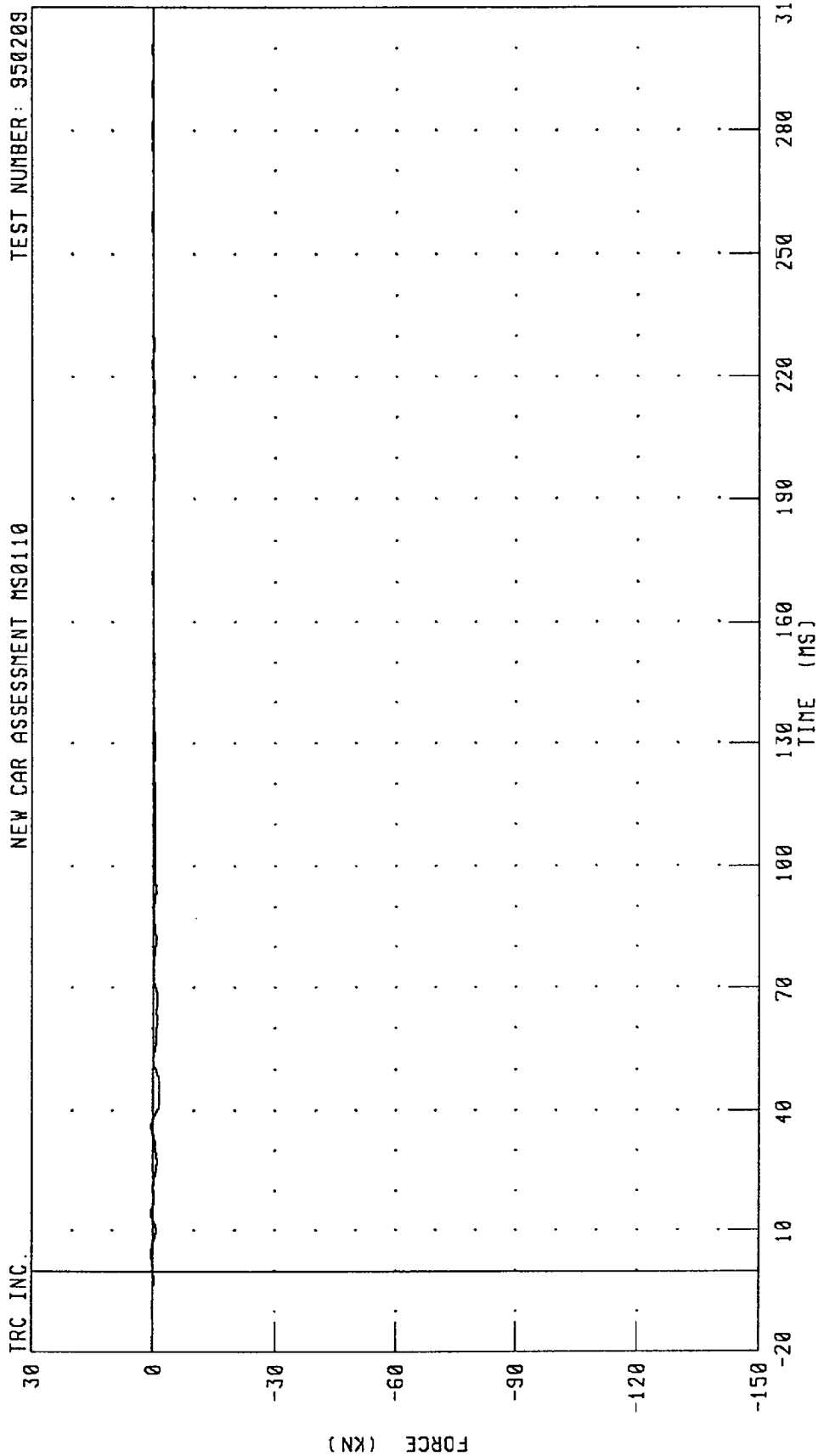
PEAK DATA: 0.72 KN @ 14.40 MS; -0.67 KN @ 28.24 MS

FILTER: CH. CLASS 60

CHANNEL: BA4F

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A5 FORCE
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209



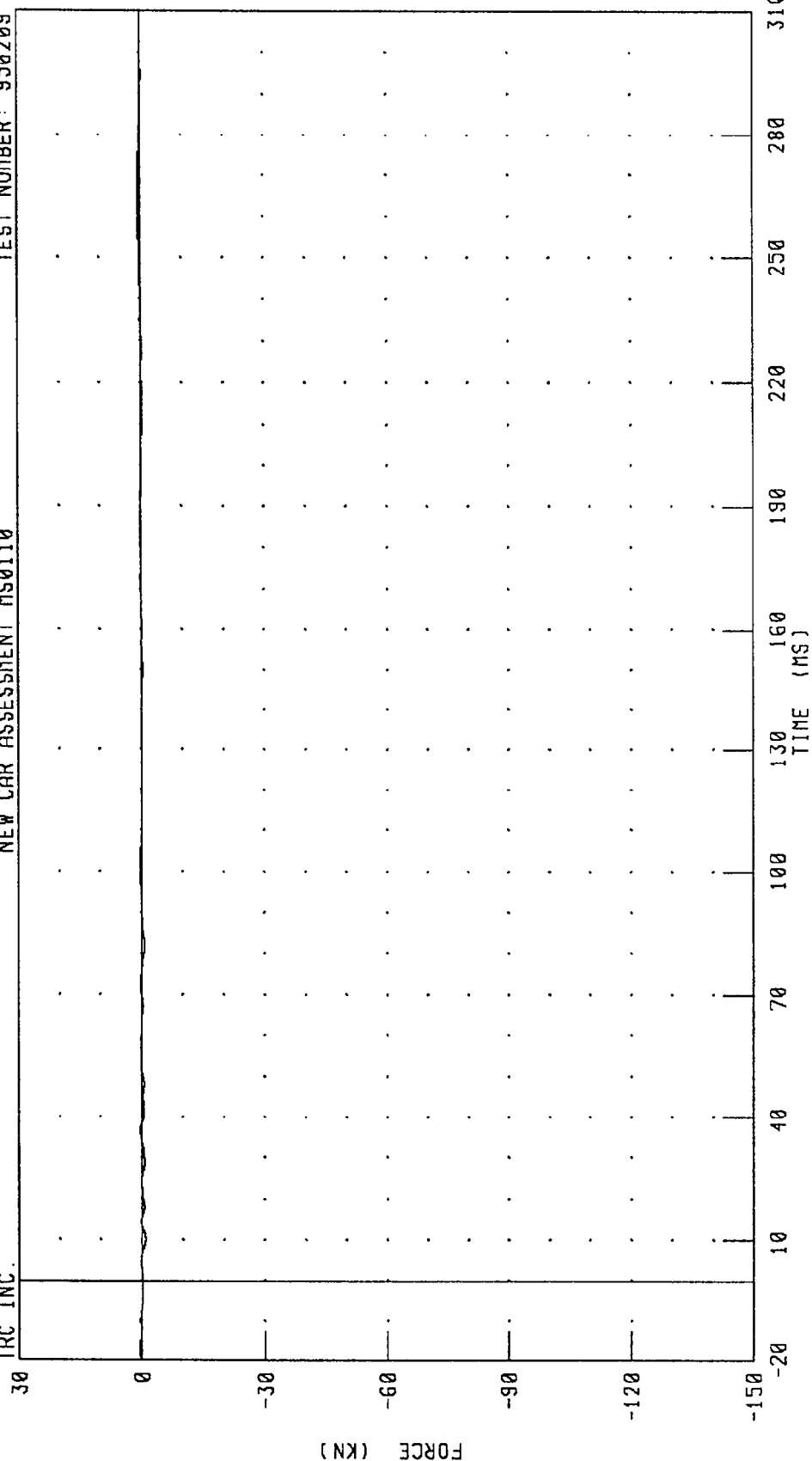
PEAK DATA: 0.48 KN @ 14.56 MS; -1.66 KN @ 45.84 MS

CHANNEL: BASF FILTER: CH. CLASS 60

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A6 FORCE
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

TRC INC.



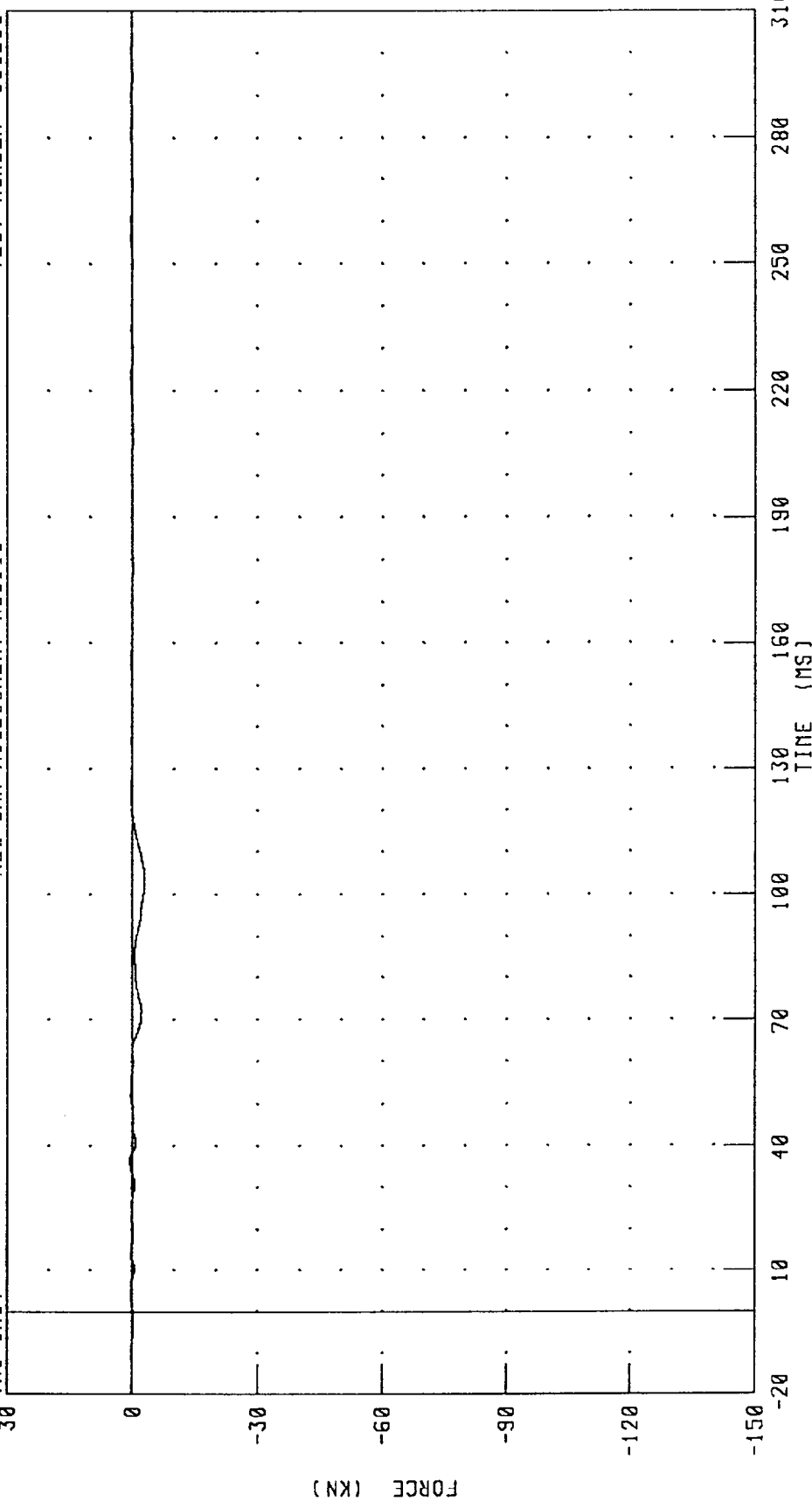
PEAK DATA: 0.53 KN @ -17.68 MS; -0.95 KN @ 10.24 MS

CHANNEL: BA6F FILTER: CH. CLASS 60

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A7 FORCE
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

IRC INC.



CHANNEL: BA7F FILTER: CH. CLASS 60

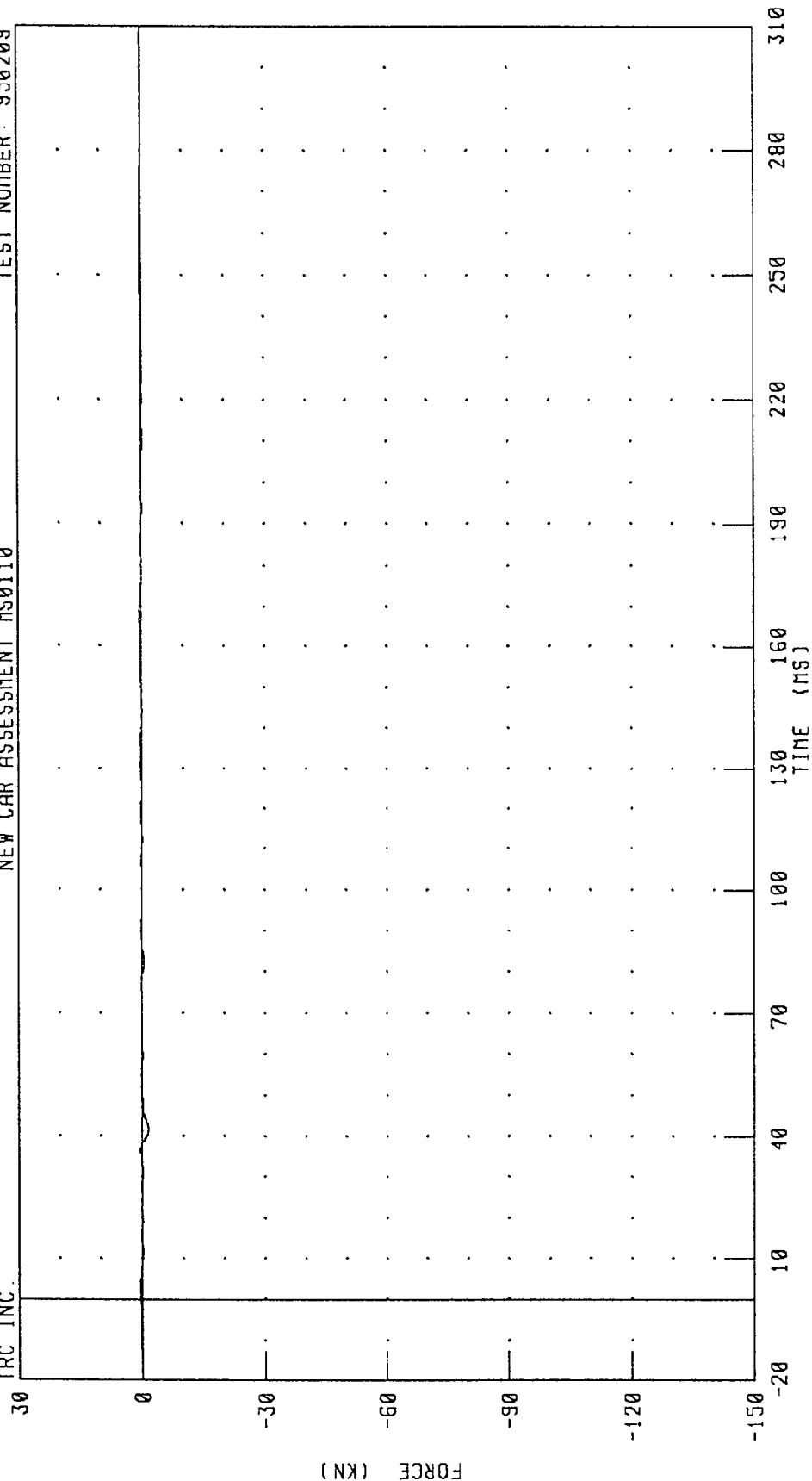
PEAK DATA: 0.47 KN @ 36.72 MS; -2.89 KN @ 103.04 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A8 FORCE

TEST NUMBER: 950208

NEW CAR ASSESSMENT MS0110

TRC INC.



PEAK DATA: 0.41 KN @ 3.04 MS, -1.49 KN @ 41.68 MS

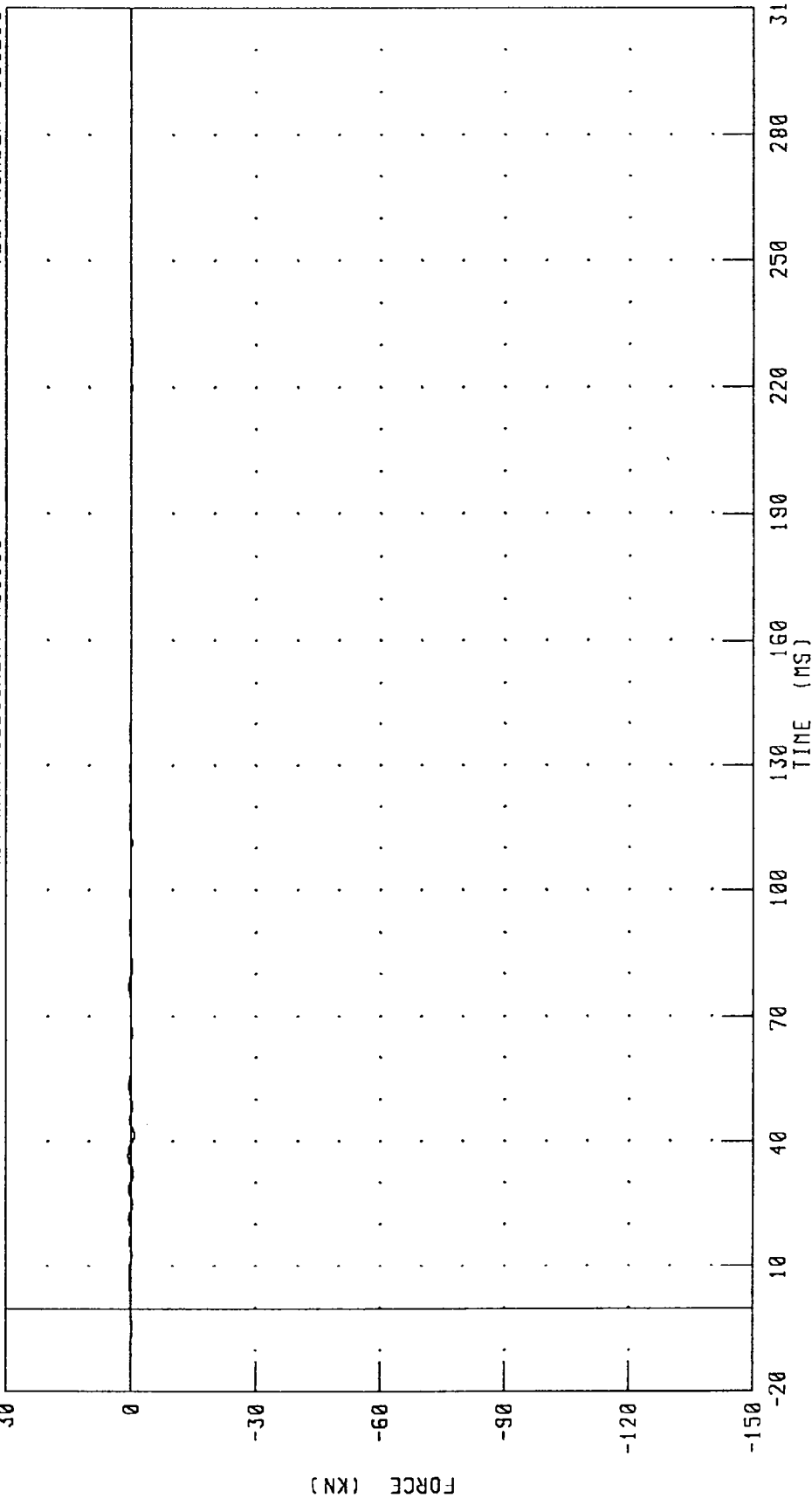
FILTER: CH. CLASS 60

CHANNEL: BABF

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A9 FORCE
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

TRC INC.



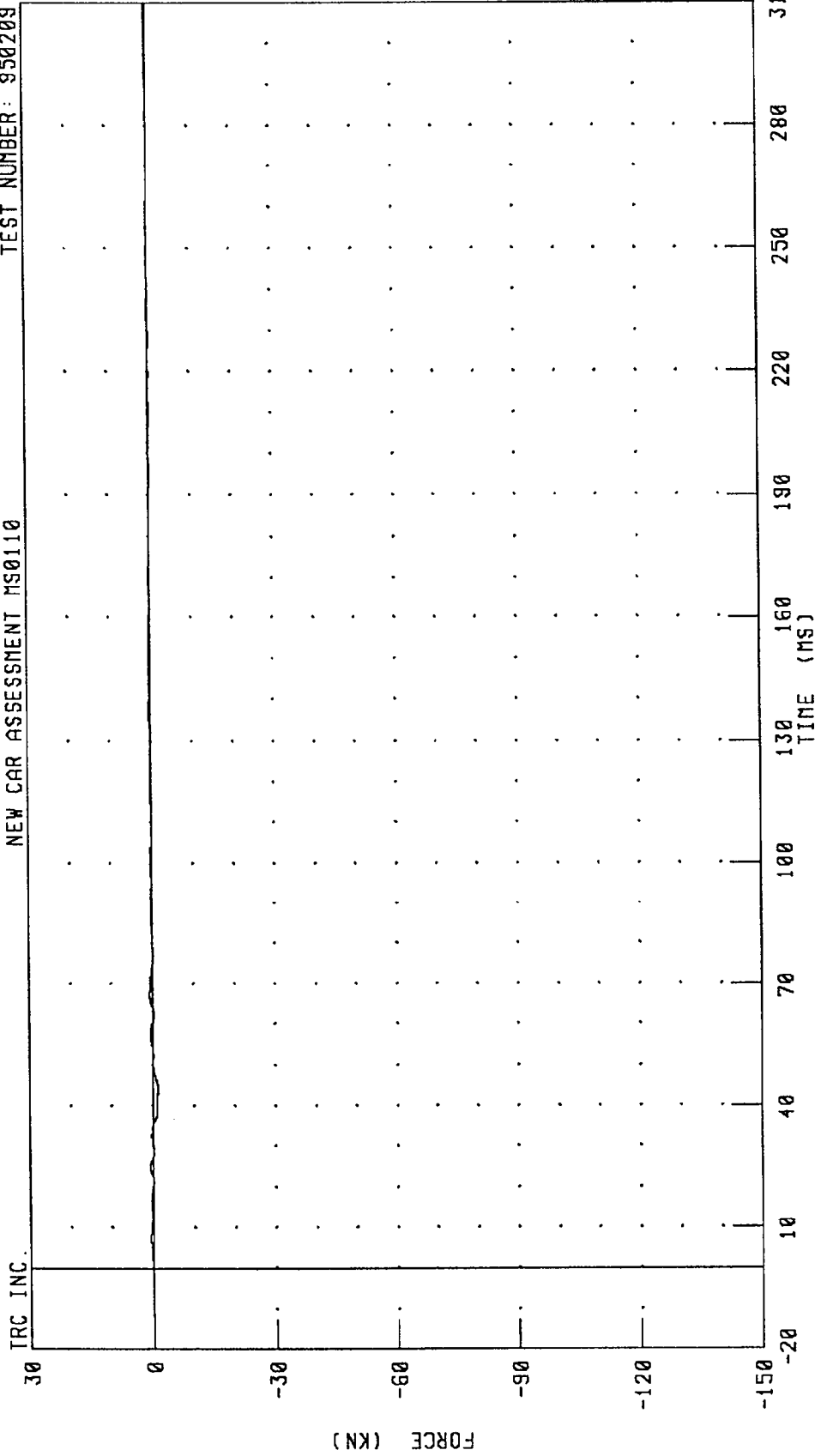
CHANNEL: BA9F FILTER: CH. CLASS 60

PEAK DATA: 0.61 KN @ 36.48 MS, -0.83 KN @ 41.60 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B1 FORCE

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110



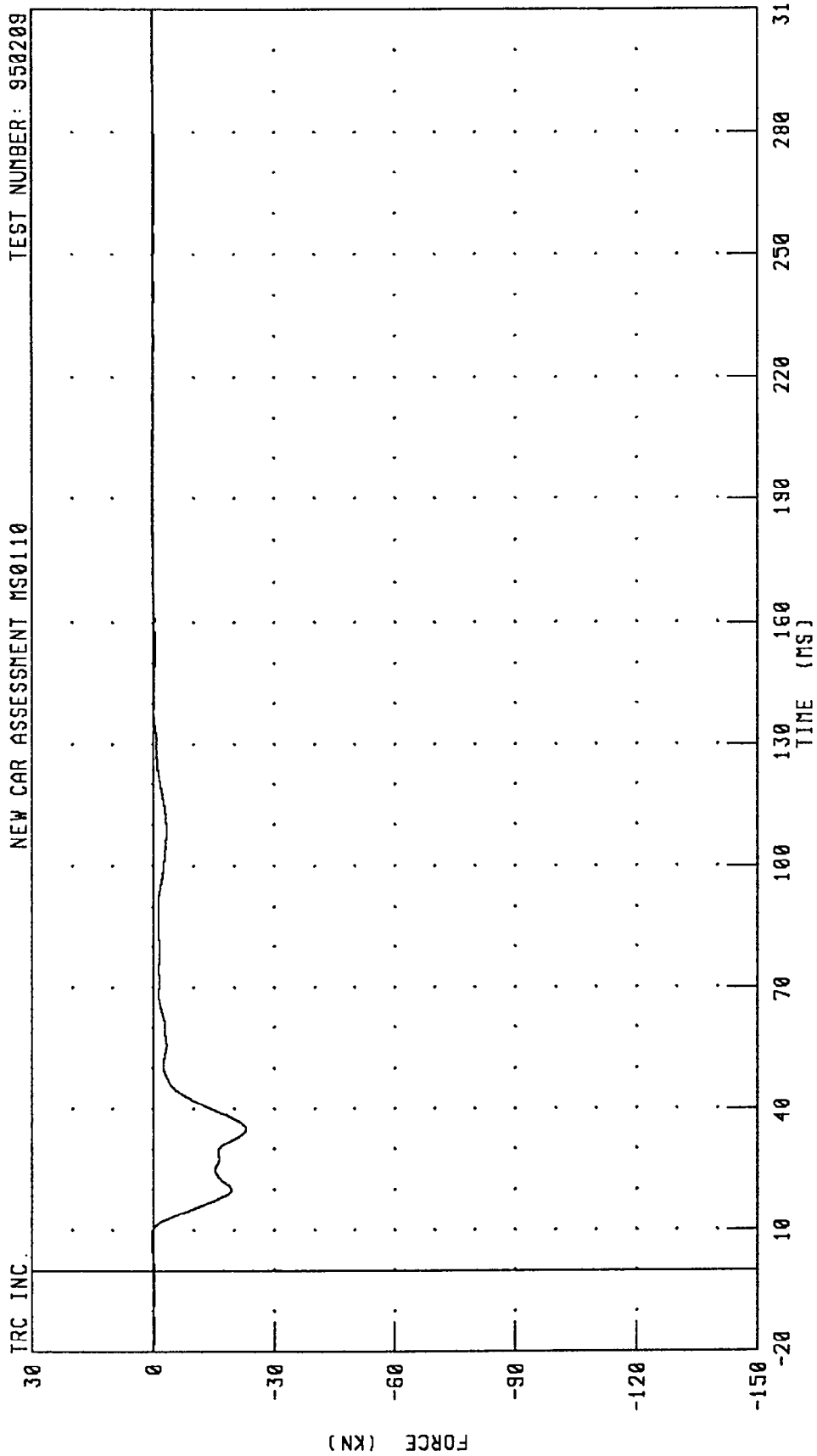
PEAK DATA: 0.74 KN @ 24.88 MS, -1.30 KN @ 44.08 MS

FILTER: CH. CLASS 60

CHANNEL: BB1F

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION B2 FORCE
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209



PEAK DATA: 0.32 KN @ 199.84 MS; -22.89 KN @ 35.12 MS

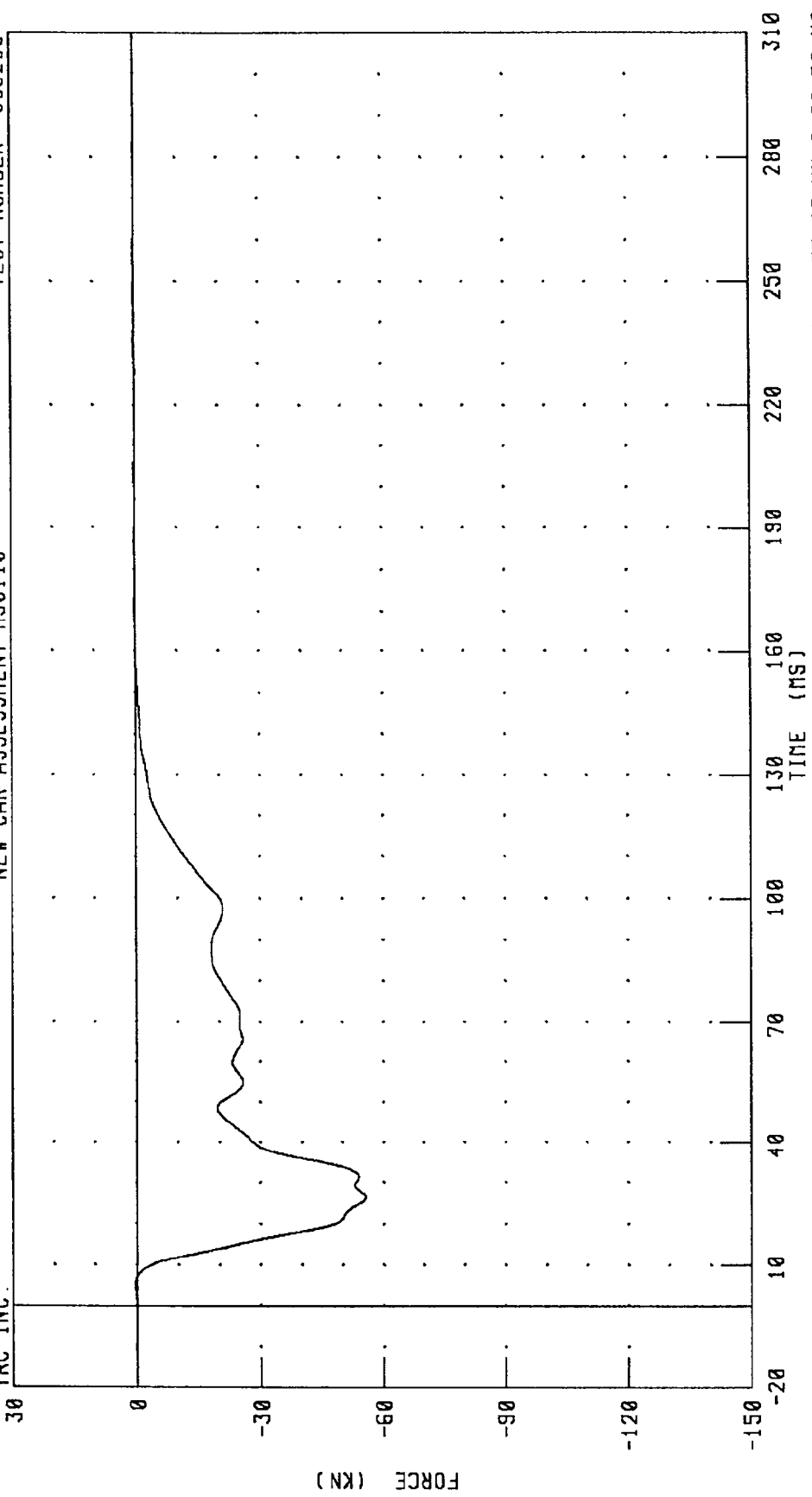
CHANNEL: BB2F FILTER: CH. CLASS 60

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B3 FORCE

TEST NUMBER: 950209

NEW CAR ASSESSMENT NS0110

TRC INC.



PEAK DATA: 0.41 KN @ 4.88 MS; -55.63 KN @ 26.56 MS

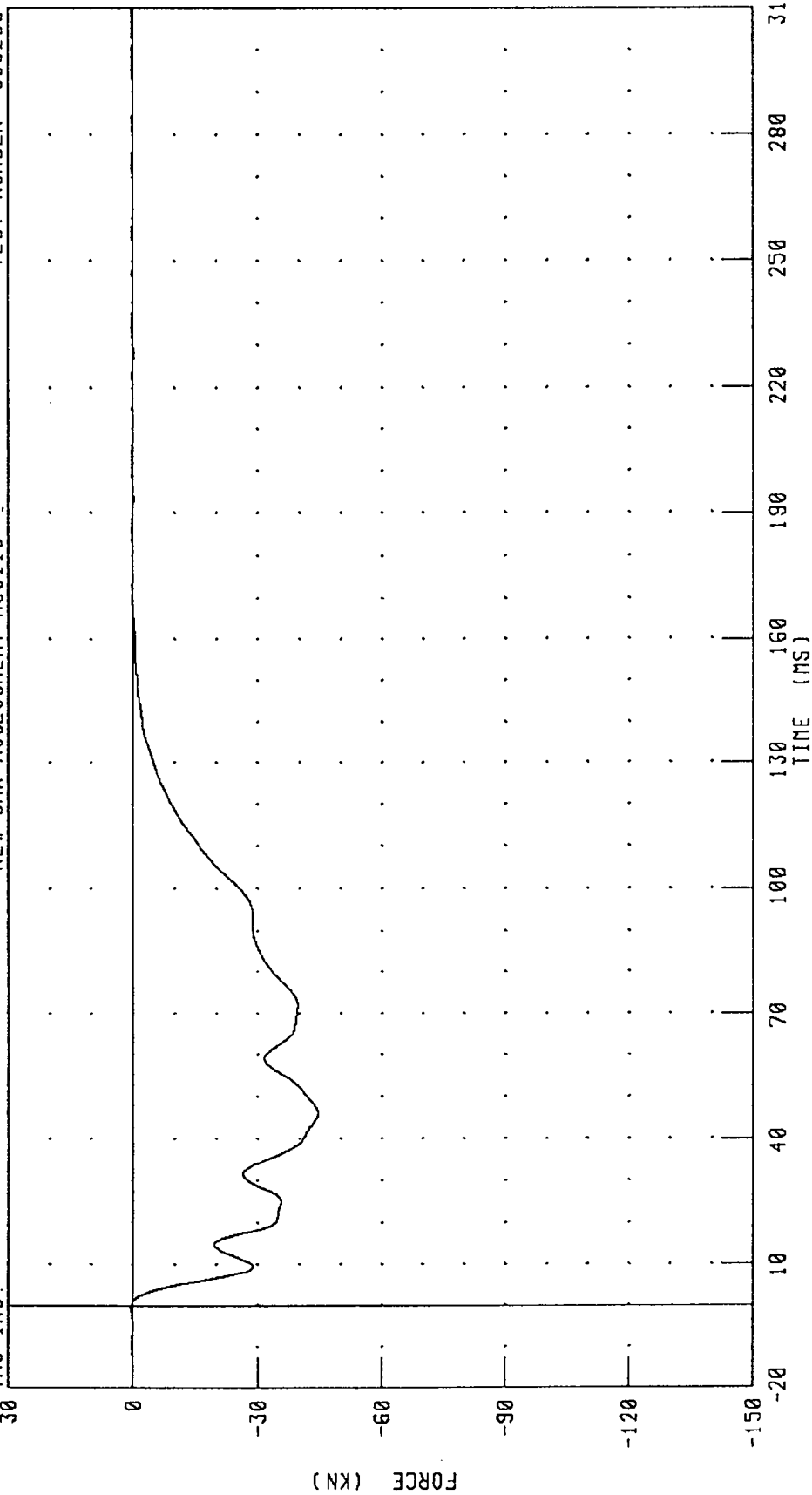
FILTER: CH. CLASS 60

CHANNEL: BB3F

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION B4 FORCE
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

TRC INC.

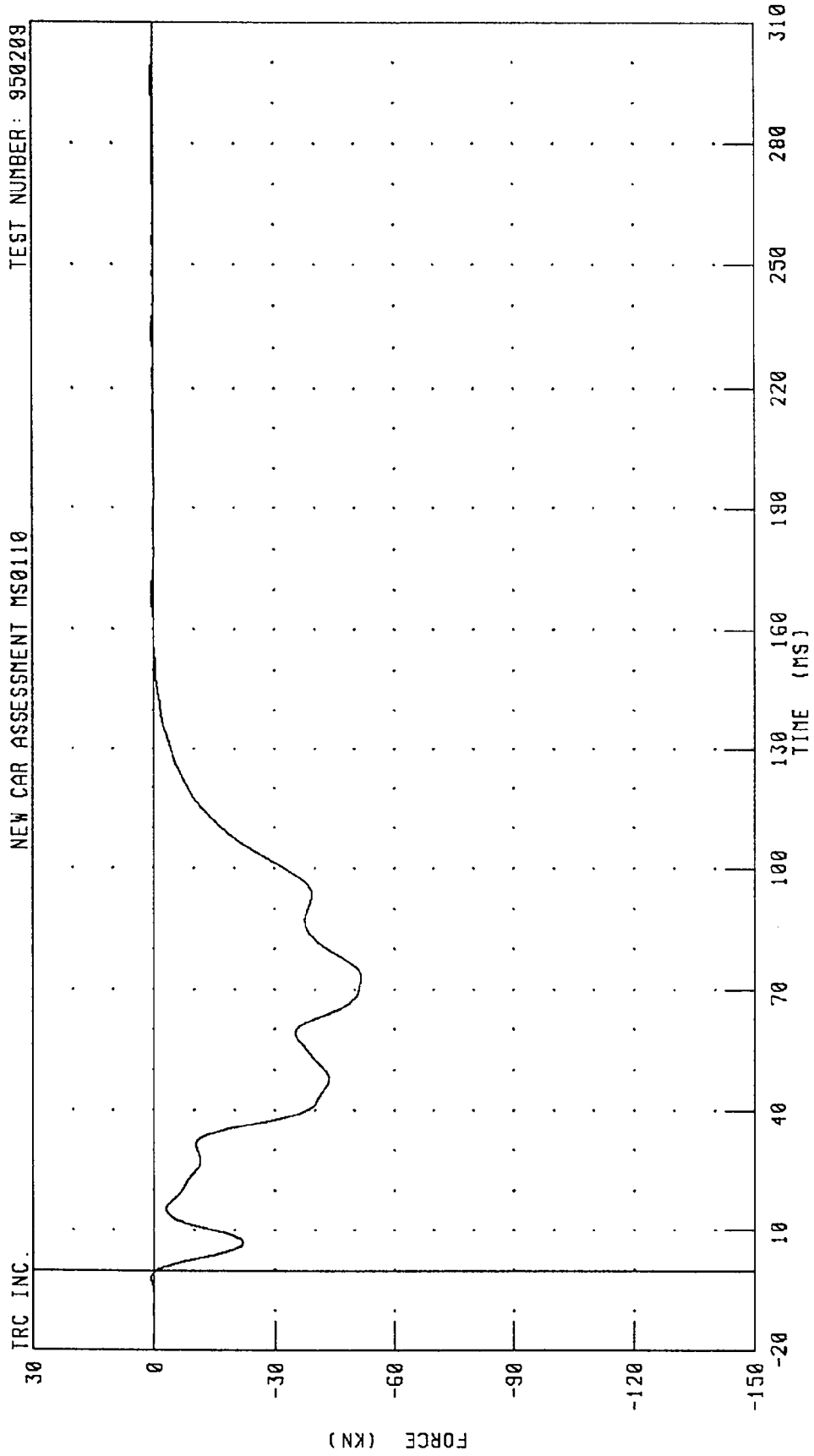


PEAK DATA: 0.39 KN @ -0.64 MS, -44.49 KN @ 46.16 MS

CHANNEL: BB4F FILTER: CH. CLASS 60

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION B5 FORCE
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209



PEAK DATA: 0.67 KN @ -2.00 MS; -51.69 KN @ 73.12 MS

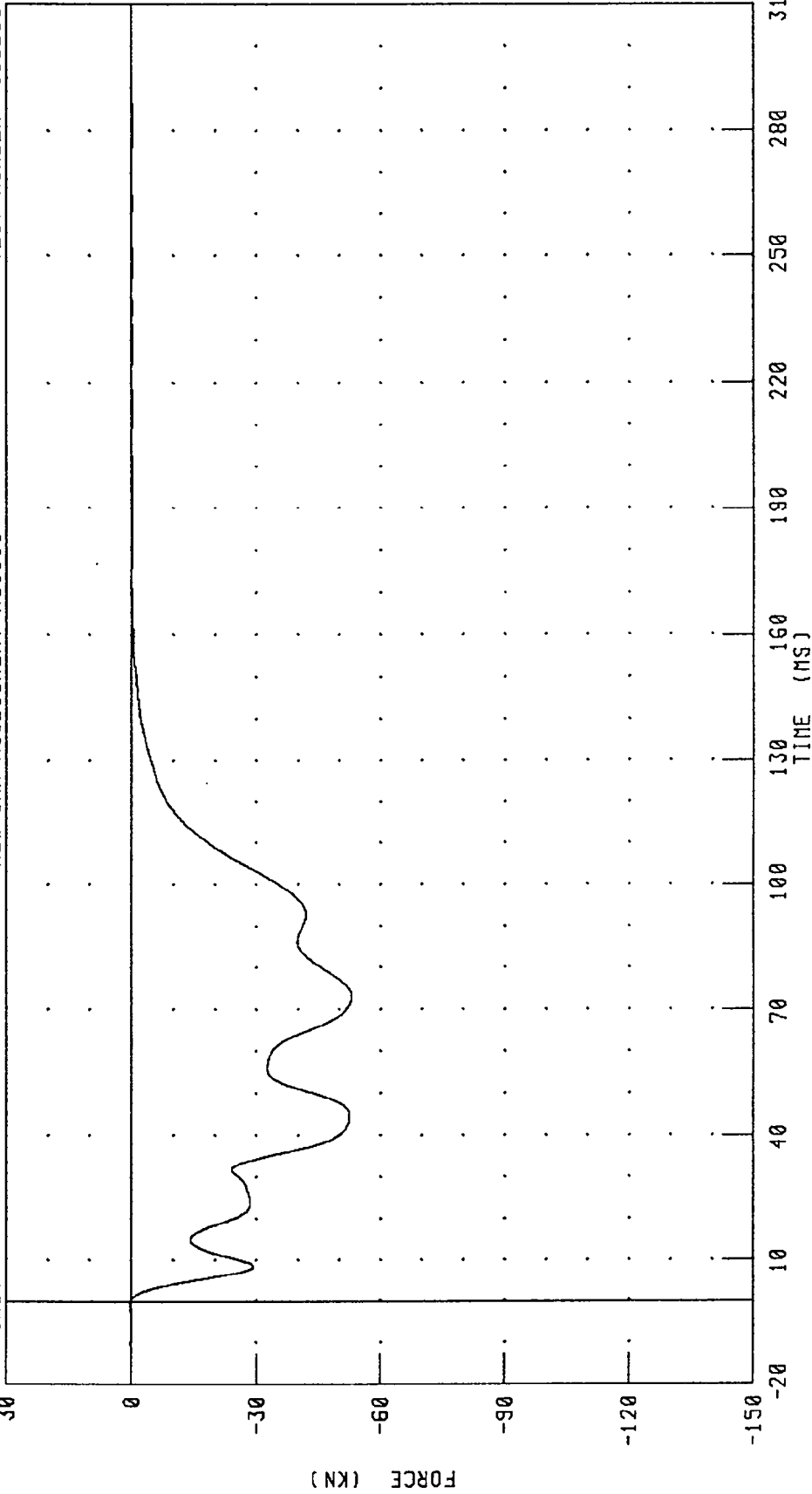
FILTER: CH. CLASS 60

CHANNEL: 885F

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION B6 FORCE
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

TRC INC.



PEAK DATA: 0.32 KN @ -0.88 MS; -52.95 KN @ 73.12 MS

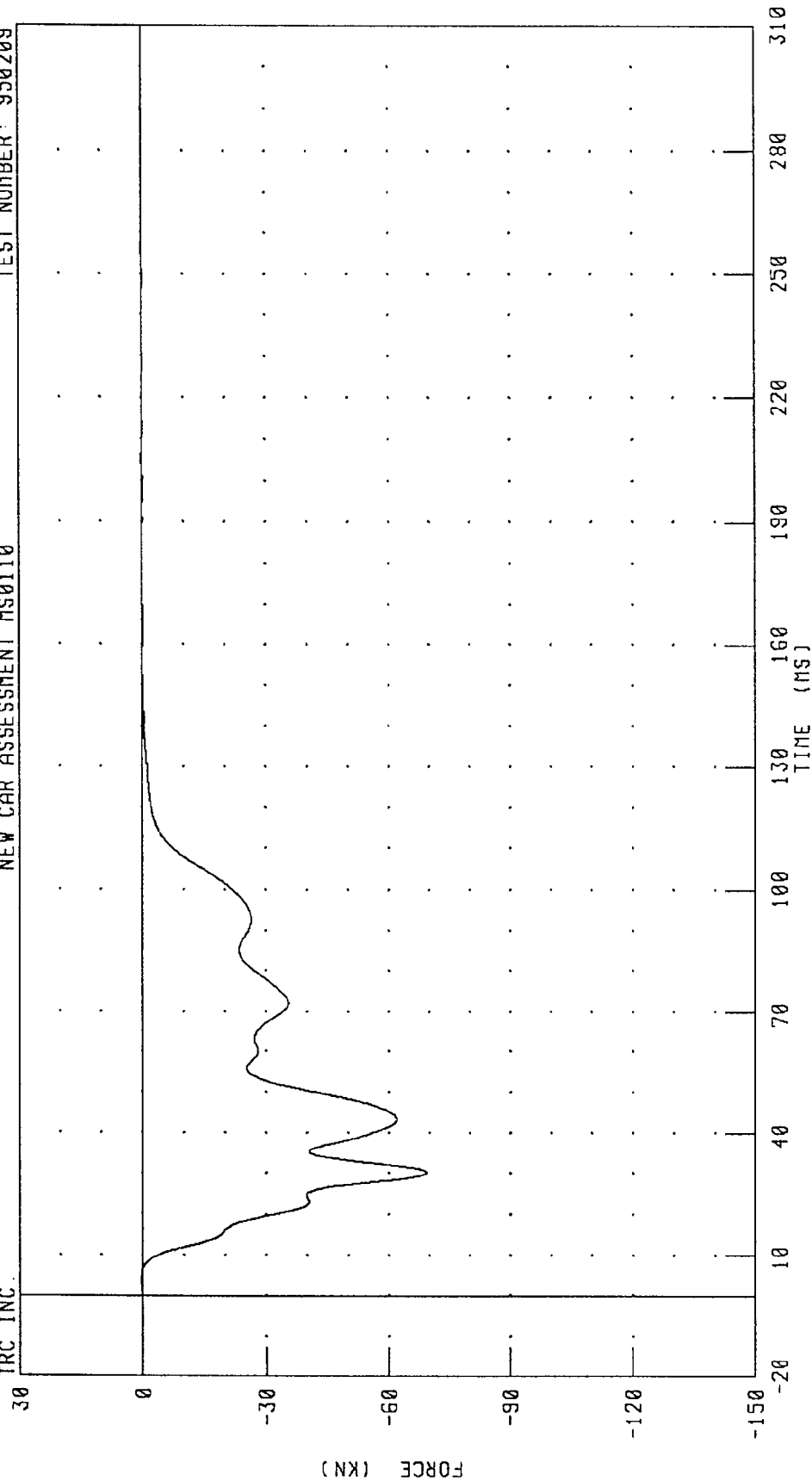
CHANNEL: BB6F FILTER: CH. CLASS 60

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B7 FORCE

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.



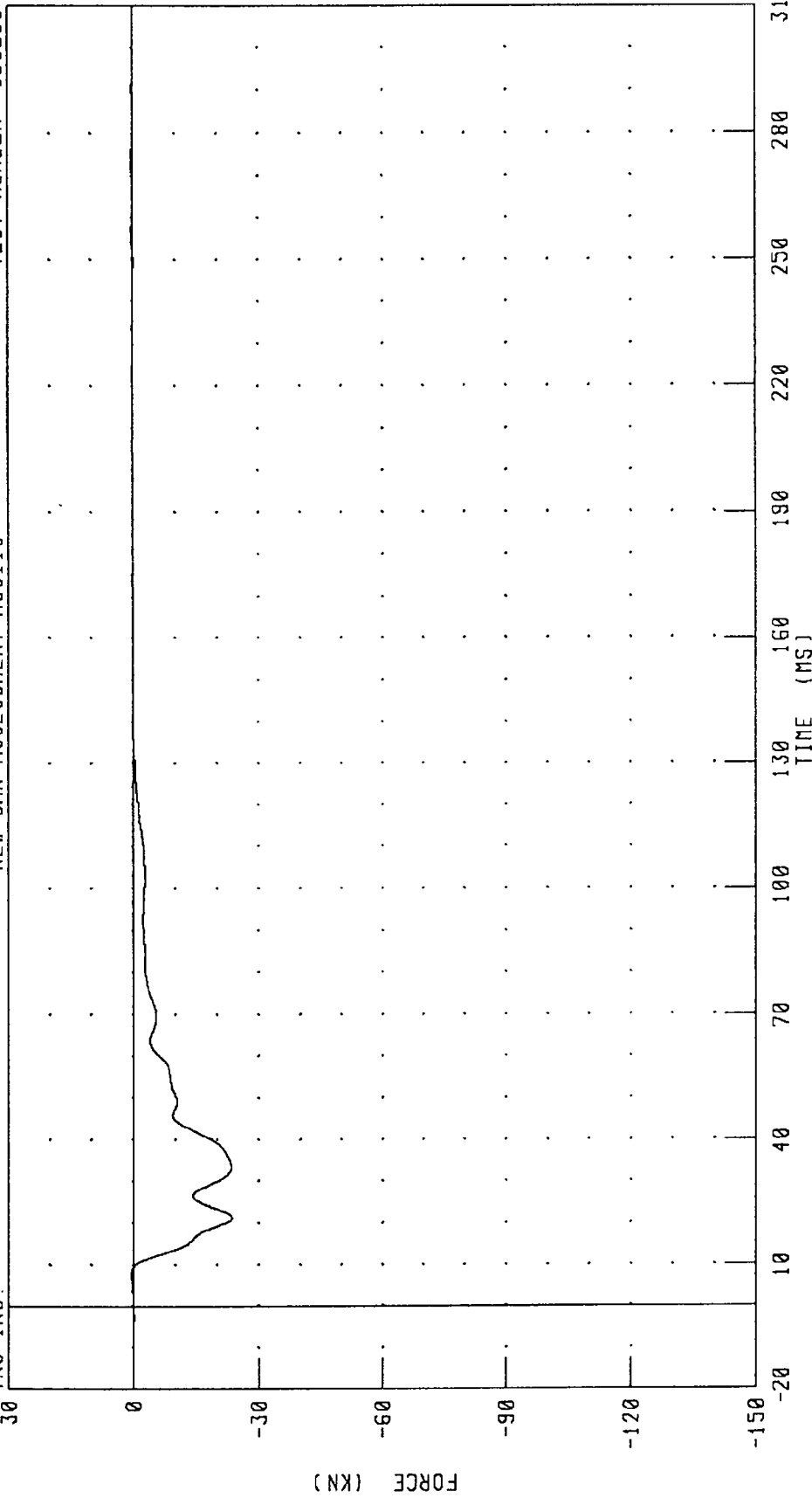
CHANNEL: 887F FILTER: CH. CLASS 60

PEAK DATA: 0.38 KN @ 3.84 MS; -69.36 KN @ 30.24 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B8 FORCE
NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

TRC INC.



CHANNEL: BB8F

FILTER: CH. CLASS 60

TIME (MS)

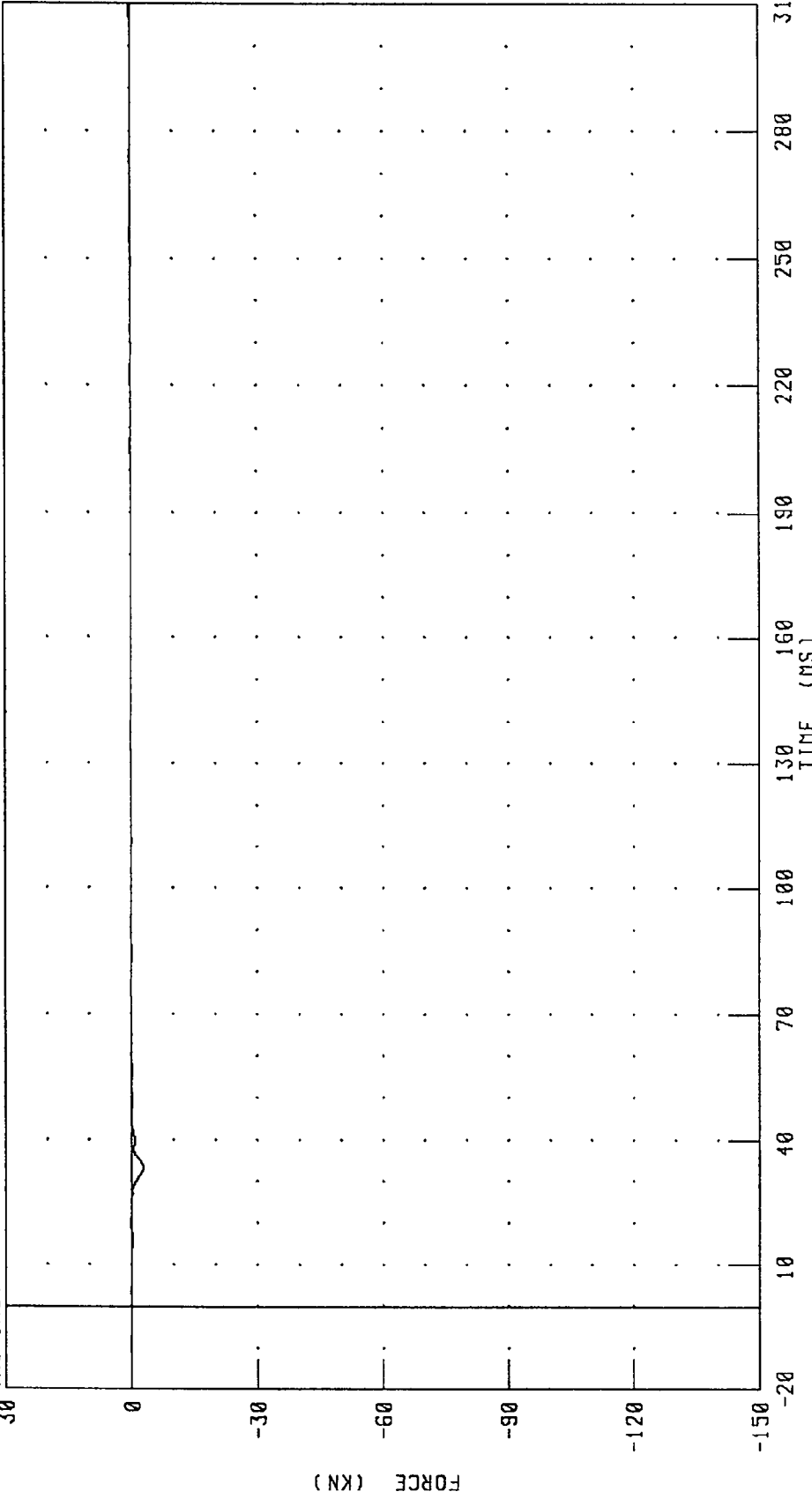
PEAK DATA: 0.39 KN @ 7.68 MS, -23.64 KN @ 21.28 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B9 FORCE

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.



PEAK DATA: 0.23 KN @ 76.24 MS; -2.85 KN @ 33.36 MS

FILTER: CH. CLASS 60

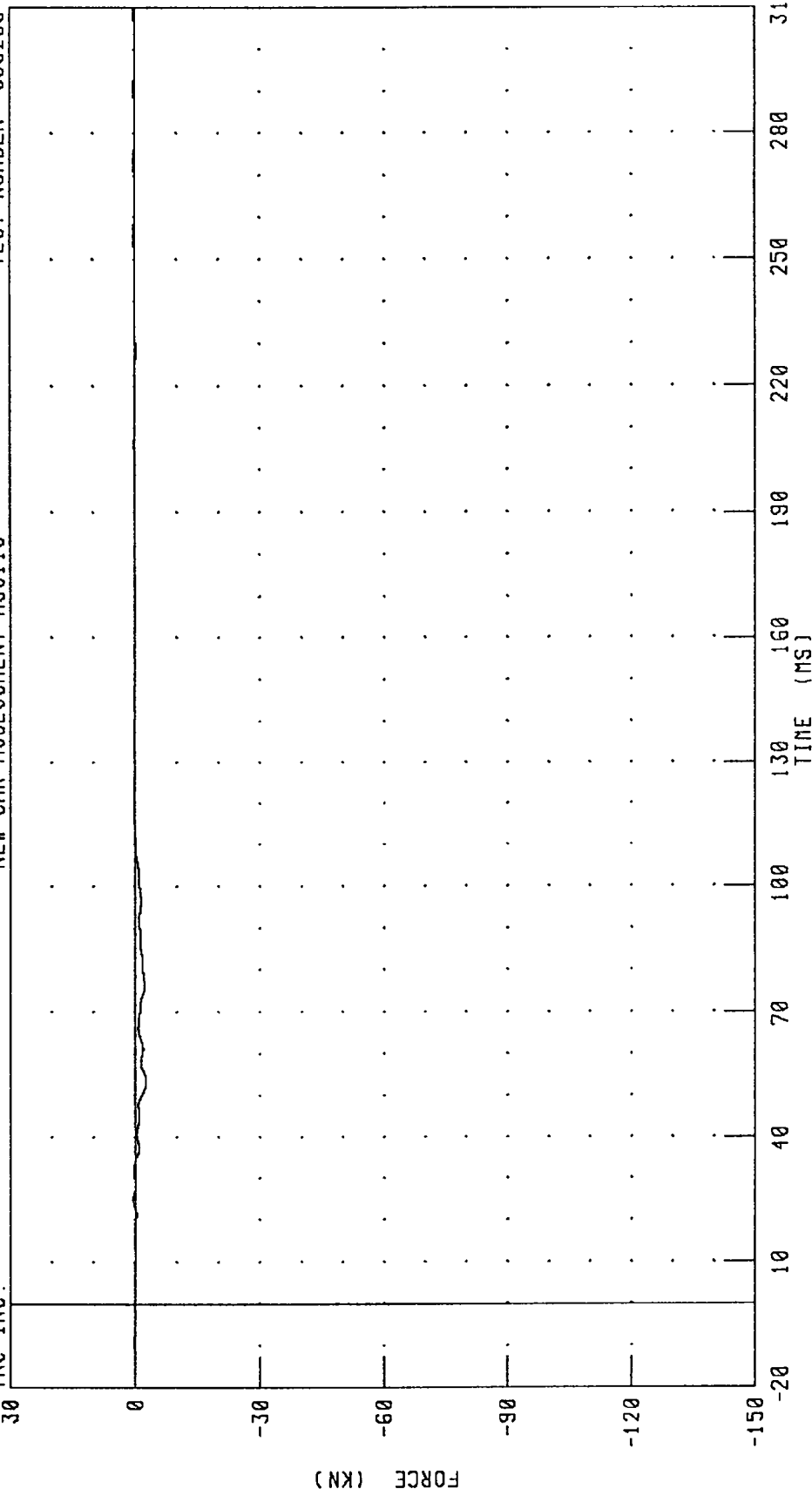
CHANNEL: 889F

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C1 FORCE

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.



PEAK DATA: 0.43 KN @ 24.96 MS; -2.70 KN @ 53.44 MS

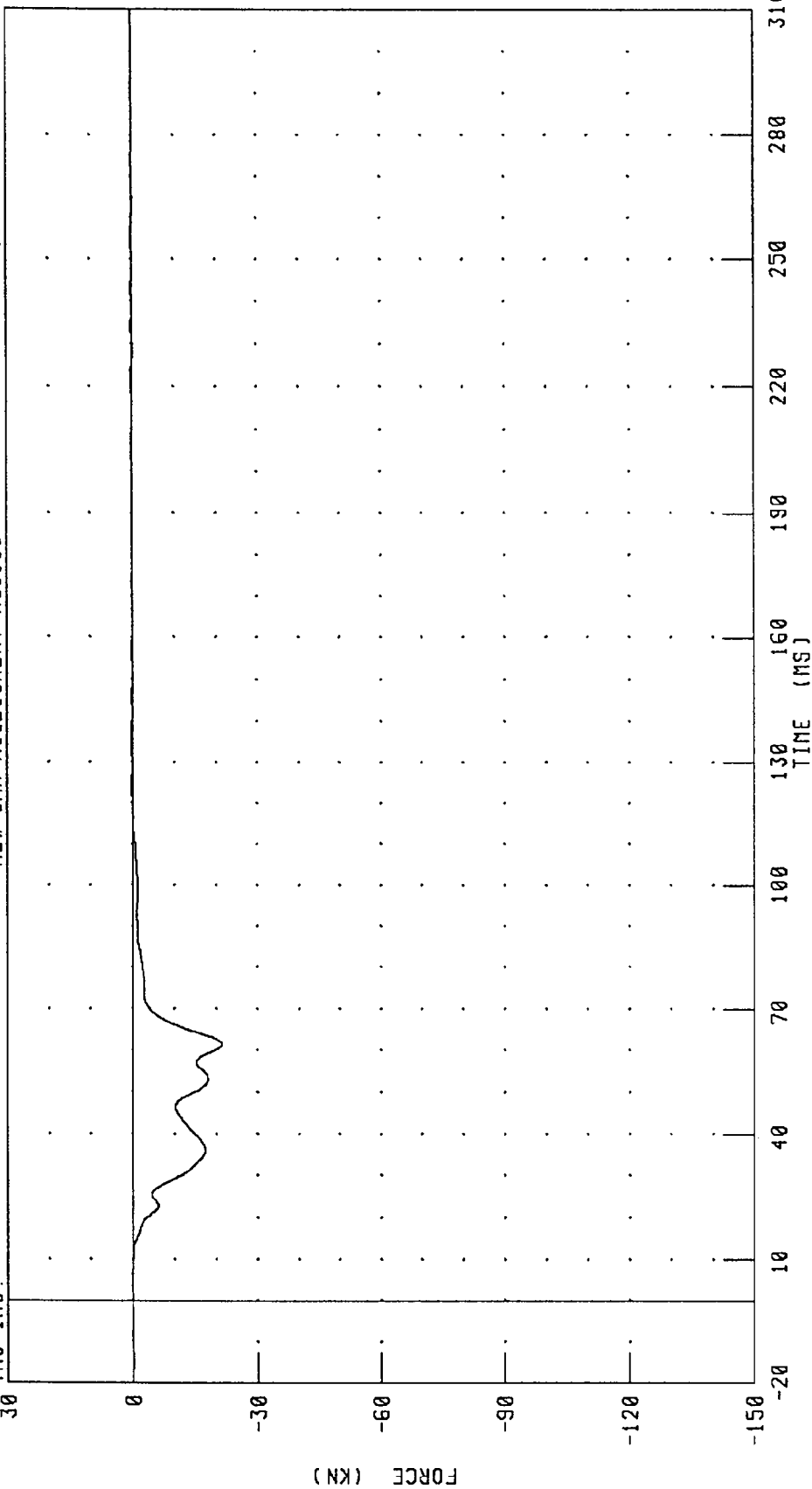
FILTER: CH. CLASS 60

CHANNEL: BC1F

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C2 FORCE
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

TRC INC.



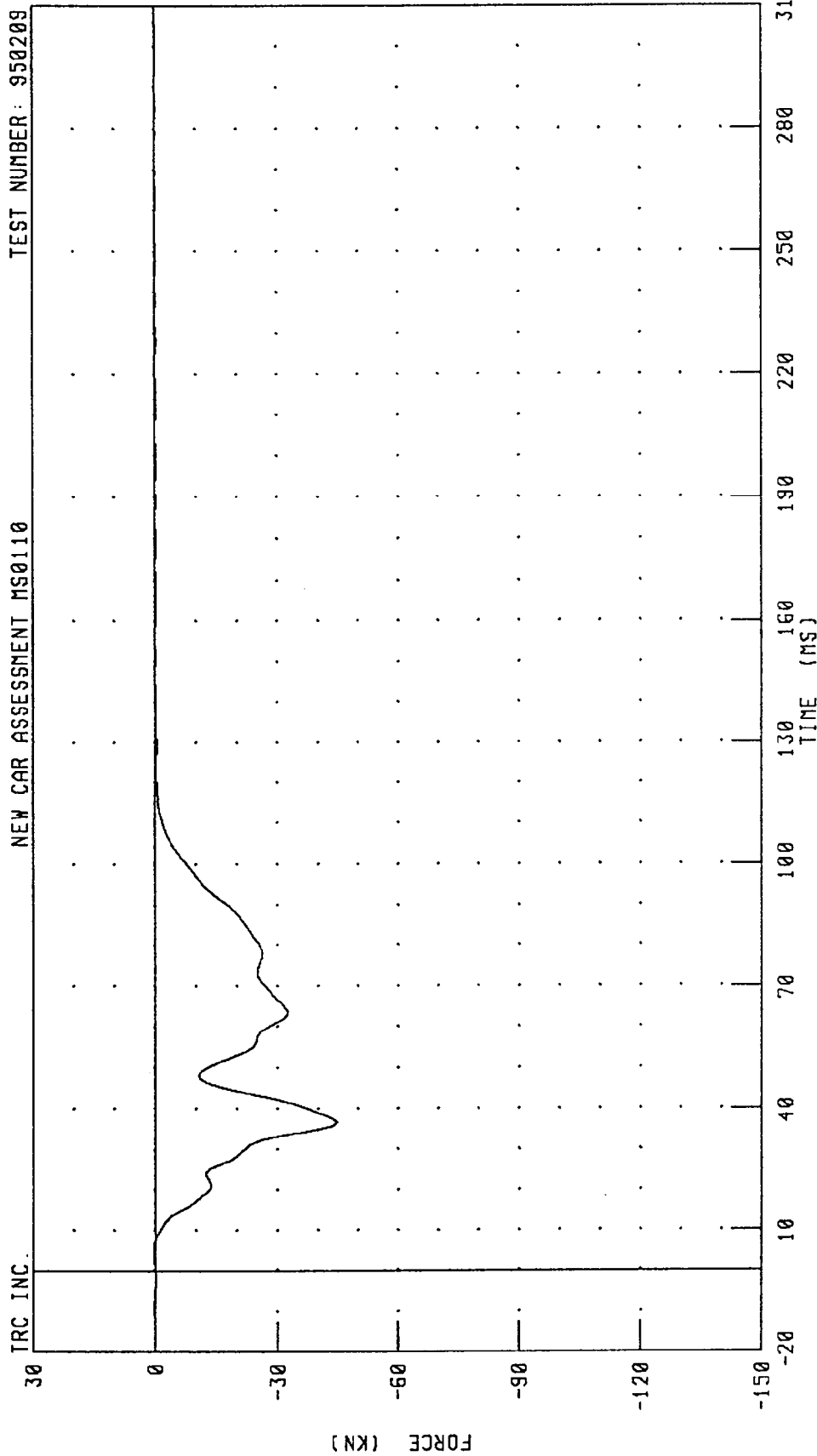
PEAK DATA: 0.29 KN @ 206.08 MS; -21.44 KN @ 61.52 MS

FILTER: CH. CLASS 60

CHANNEL: BC2F

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C3 FORCE
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209



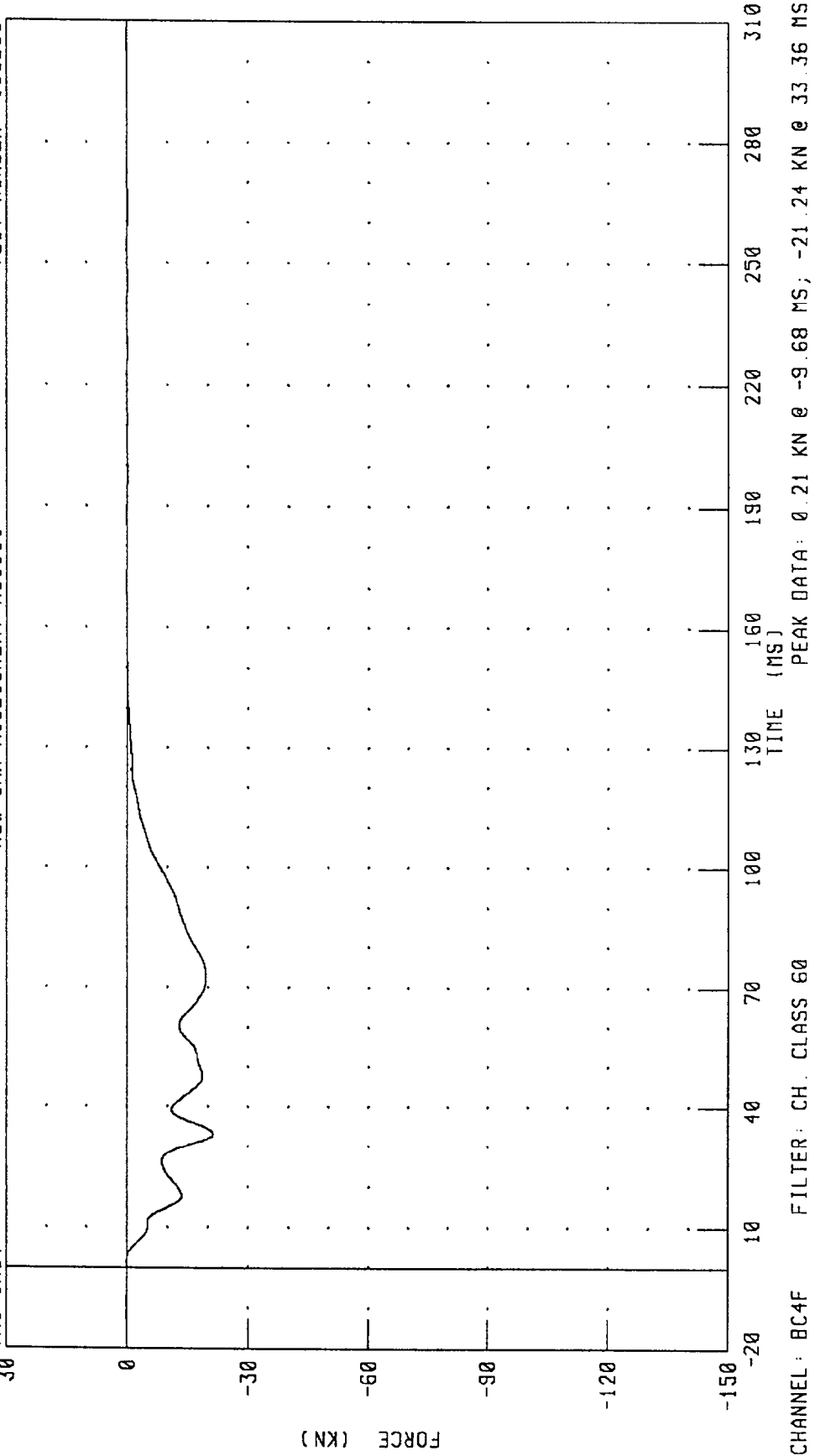
CHANNEL: BC3F FILTER: CH. CLASS 60

PEAK DATA: 0.33 KN @ 4.16 MS; -44.63 KN @ 36.72 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C4 FORCE
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

TRC INC.



CHANNEL: BC4F

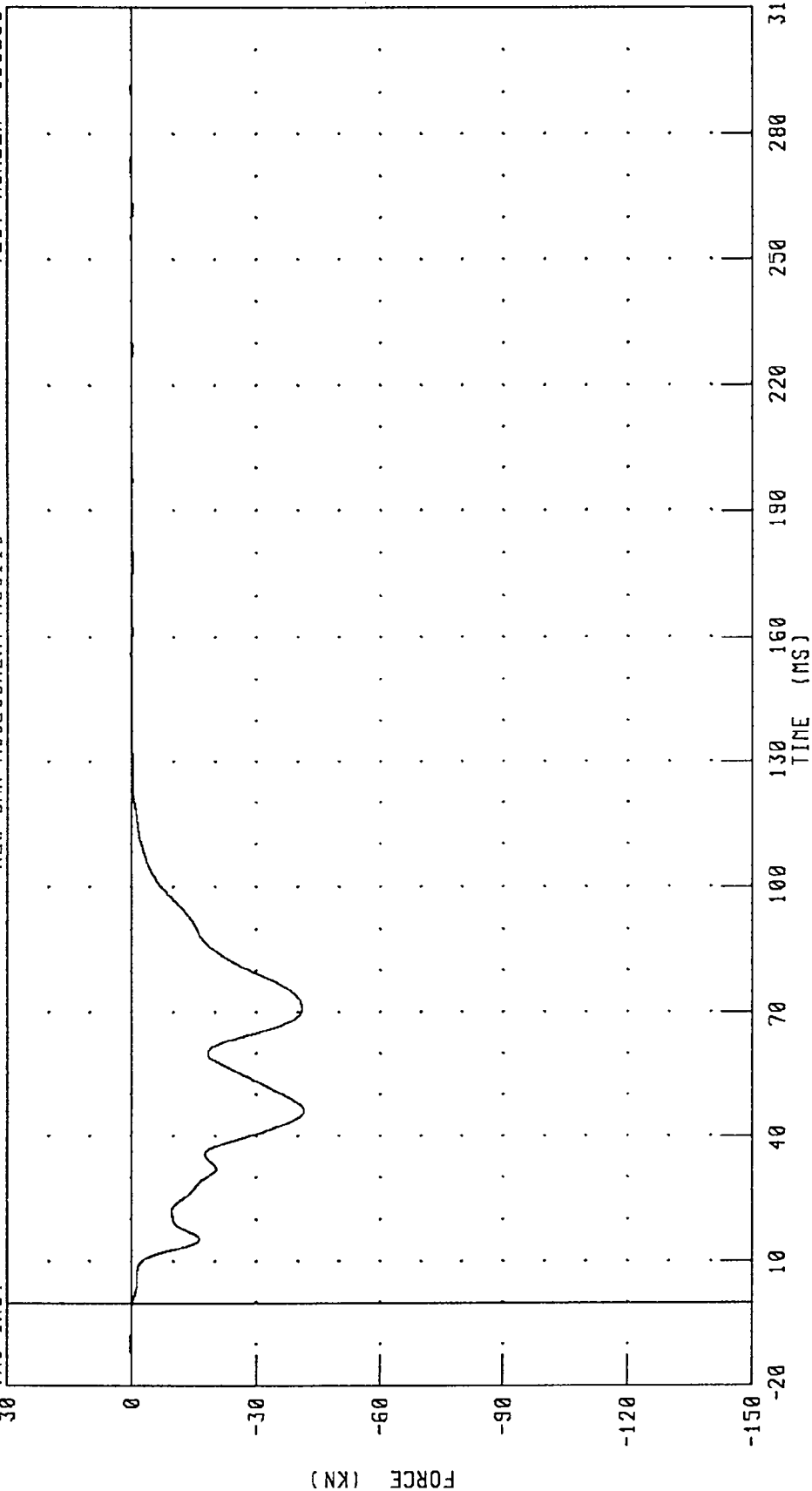
FILTER: CH. CLASS 60

PEAK DATA: 0.21 KN @ -9.68 MS; -21.24 KN @ 33.36 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C5 FORCE
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

TRC INC.



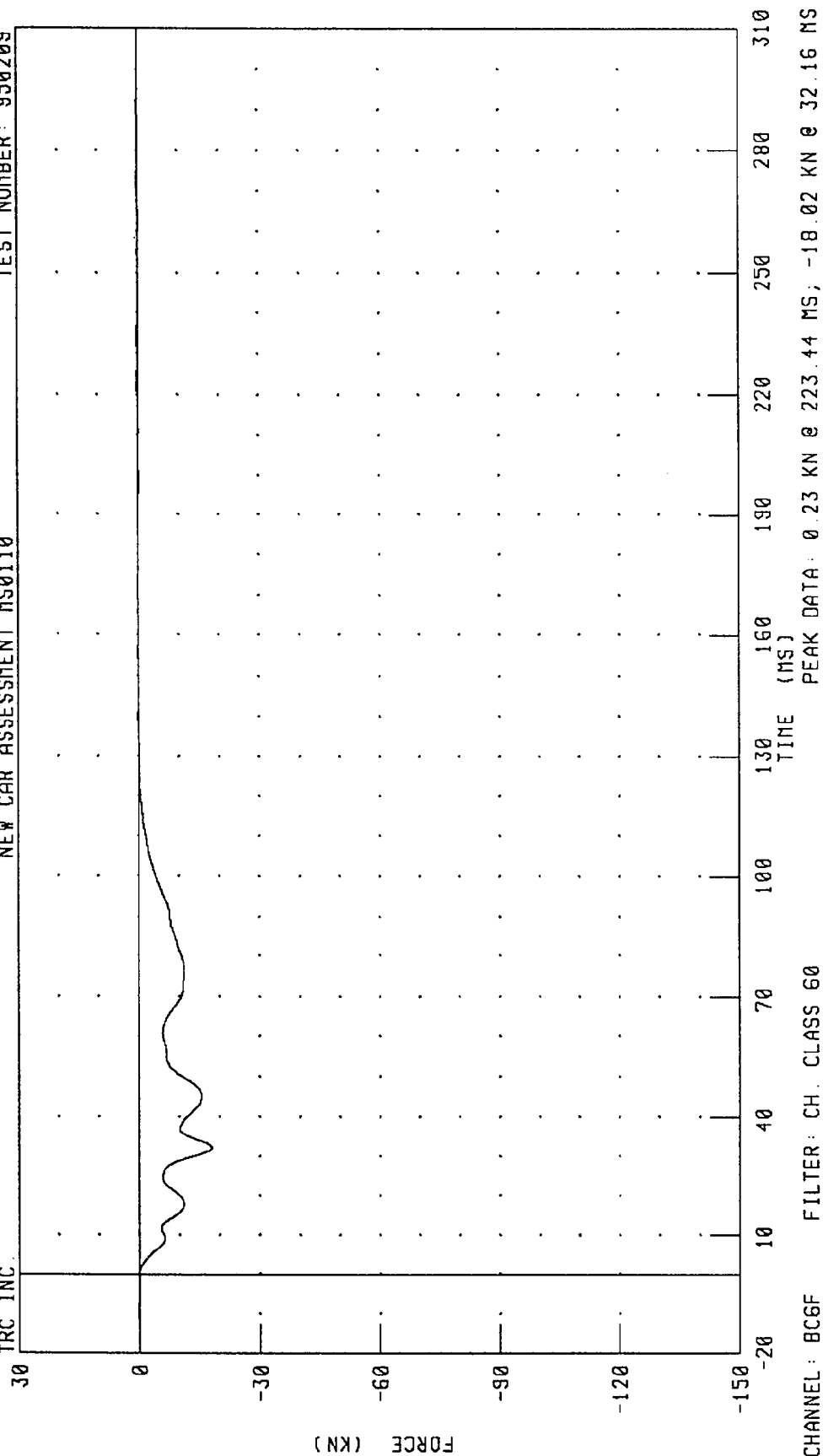
PEAK DATA: 0.19 KN @ -9.76 MS; -41.52 KN @ 46.16 MS

CHANNEL: BC5F FILTER: CH. CLASS 60

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C6 FORCE
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

TRC INC.



CHANNEL: BC6F FILTER: CH. CLASS 60

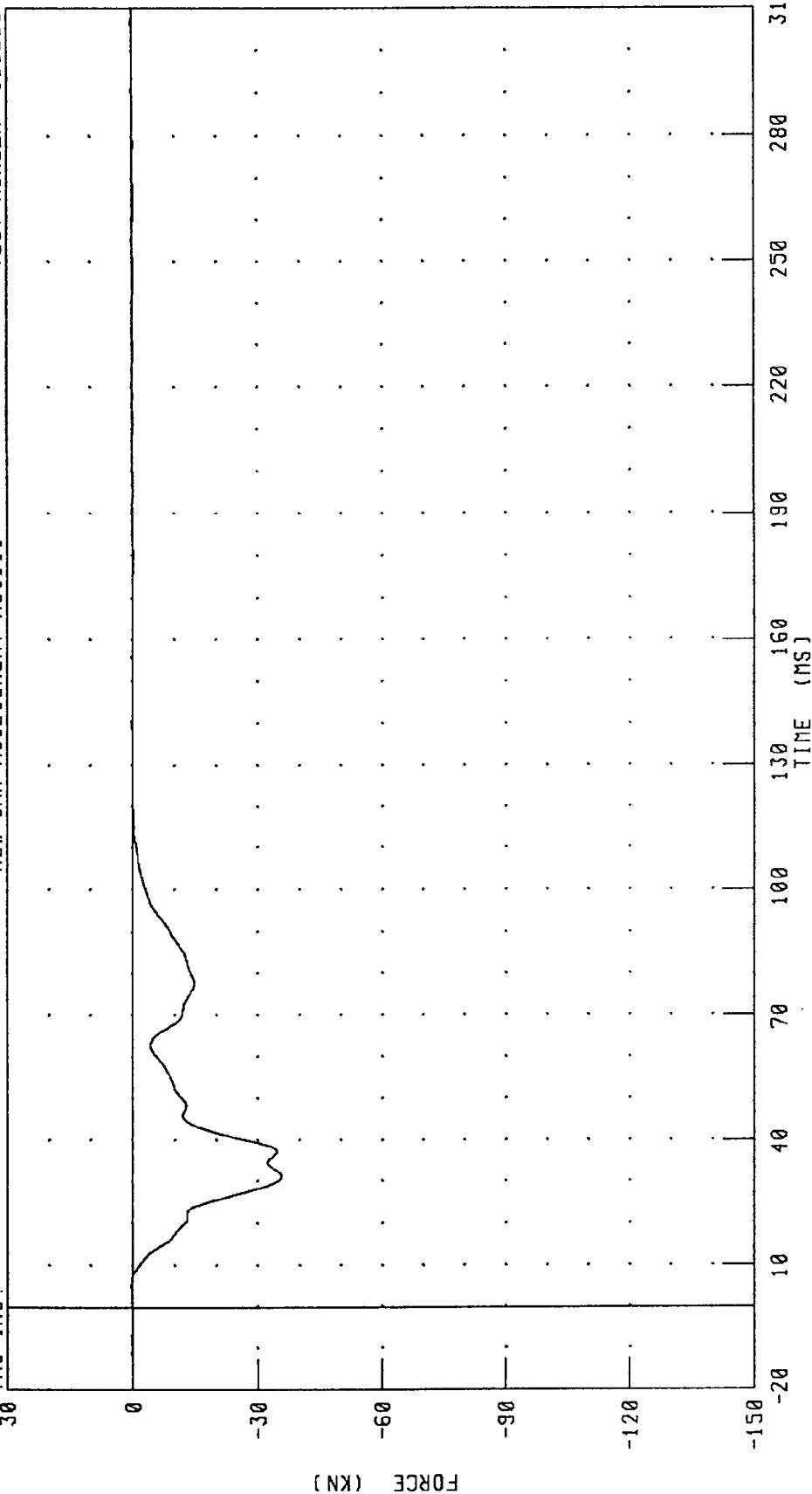
PEAK DATA: 0.23 KN @ 223.44 MS, -18.02 KN @ 32.16 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C7 FORCE
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

TRC INC.

30



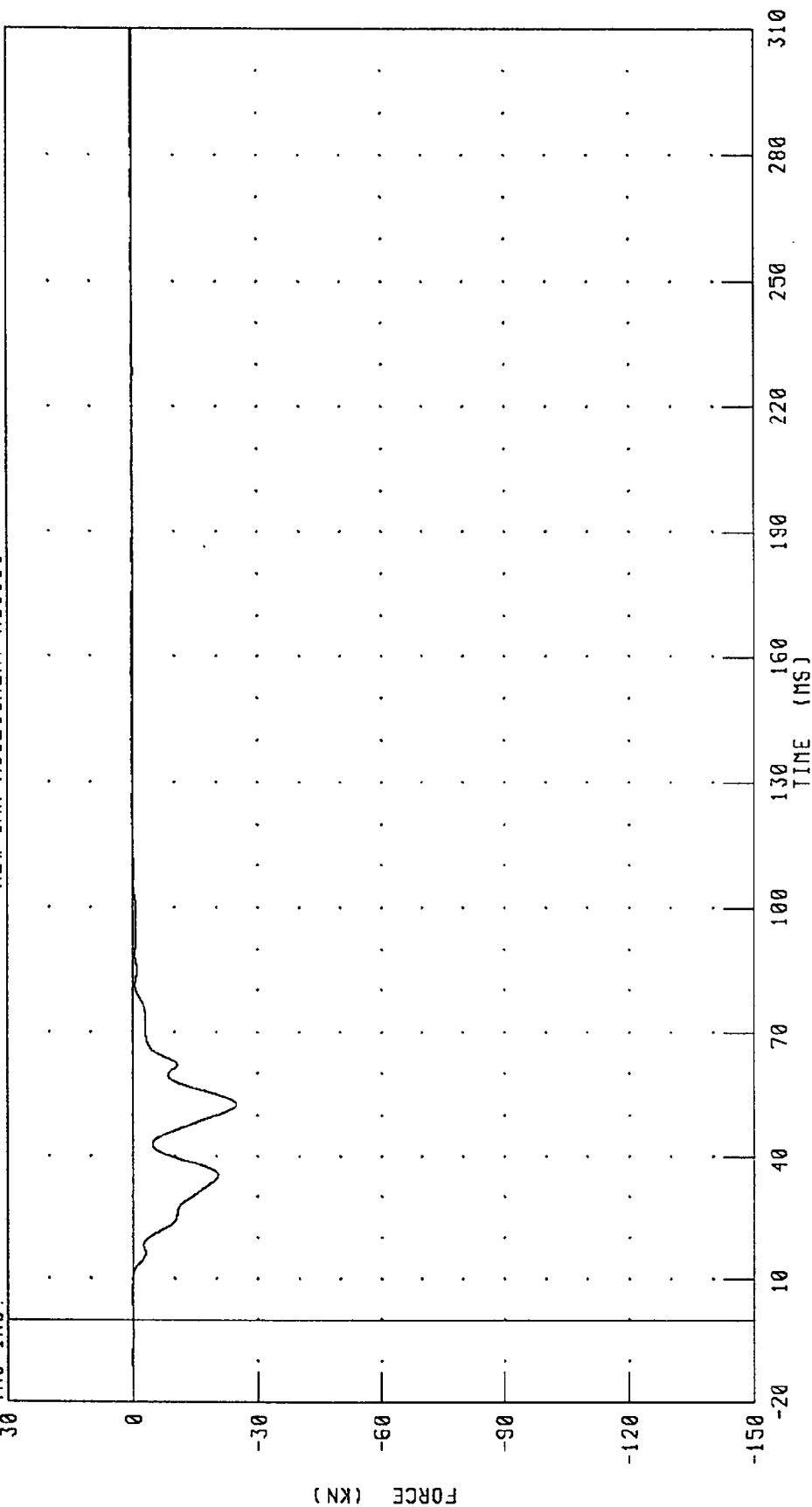
PEAK DATA: 0.34 KN @ 4.80 MS; -35.67 KN @ 31.20 MS

CHANNEL: BC7F FILTER: CH. CLASS 60

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C8 FORCE
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950208

TRC INC.



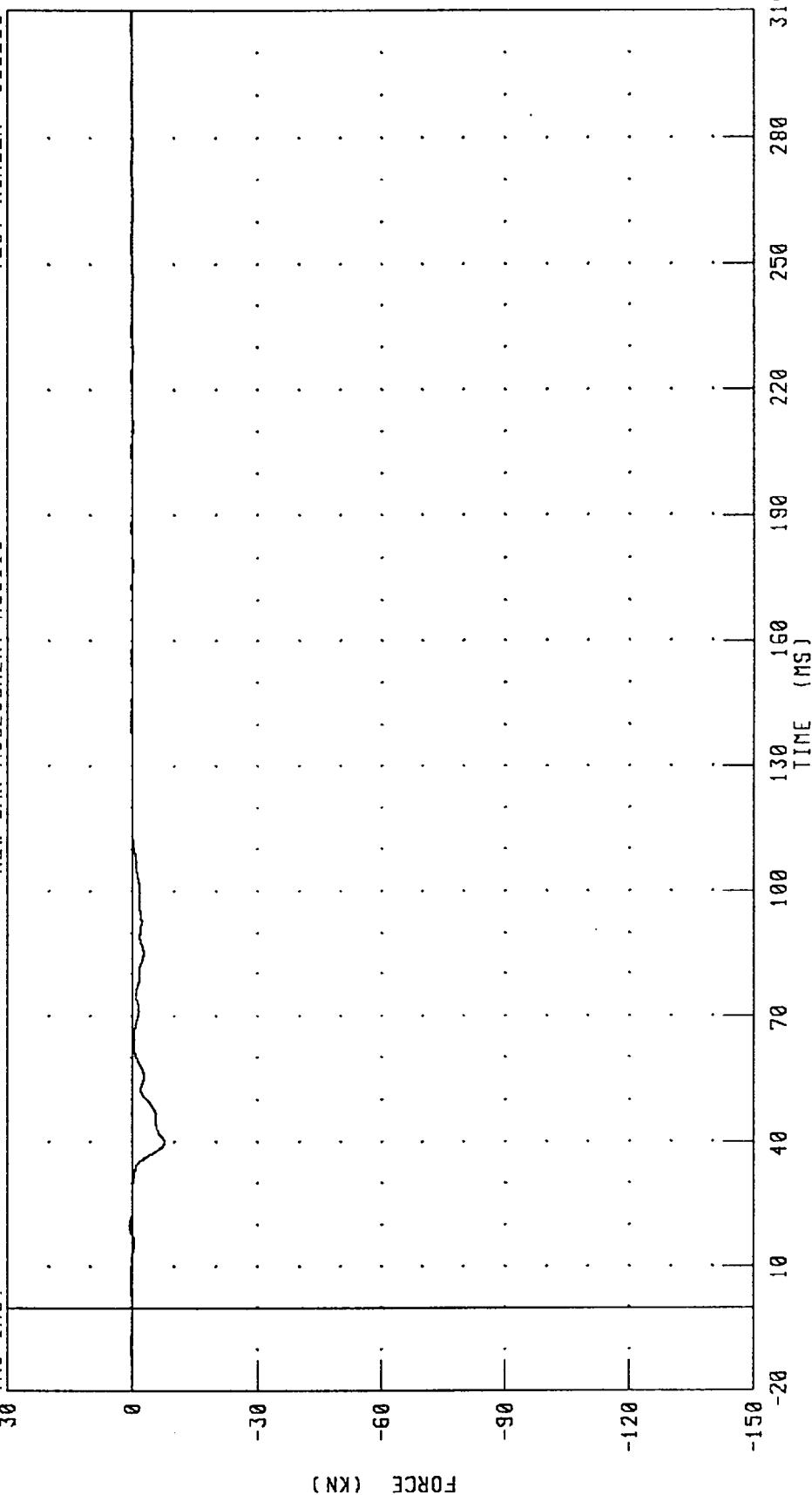
CHANNEL: BC8F FILTER: CH. CLASS 60

PEAK DATA: 0.35 KN @ 156.16 MS, -24.75 KN @ 52.64 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C9 FORCE
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

TRC INC.



PEAK DATA: 0.56 KN @ 19.68 MS; -7.68 KN @ 40.08 MS

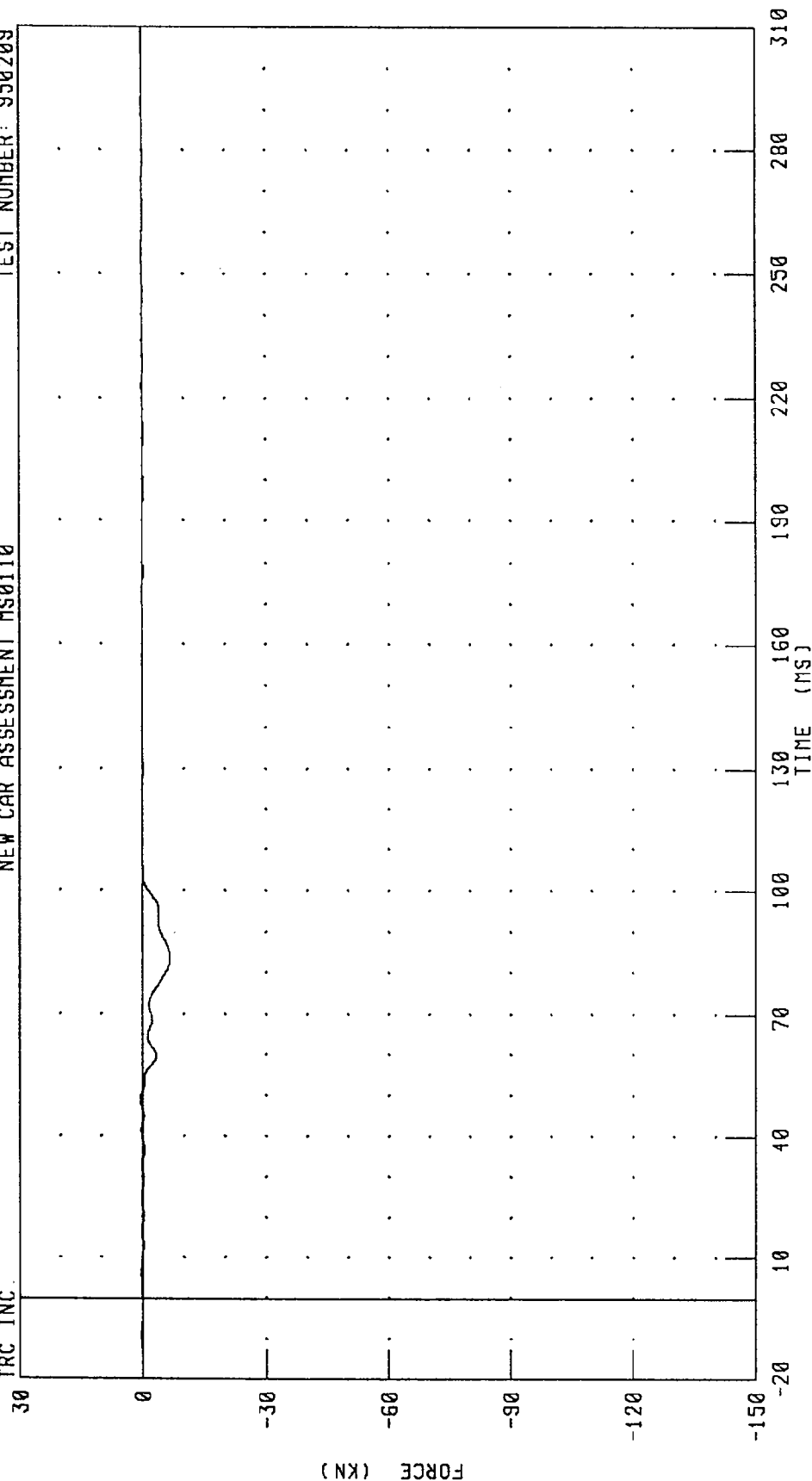
CHANNEL: BC9F FILTER: CH. CLASS 60

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D1 FORCE

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.



PEAK DATA: 0.55 KN @ 48.96 MS; -6.74 KN @ 83.36 MS

FILTER: CH. CLASS 60

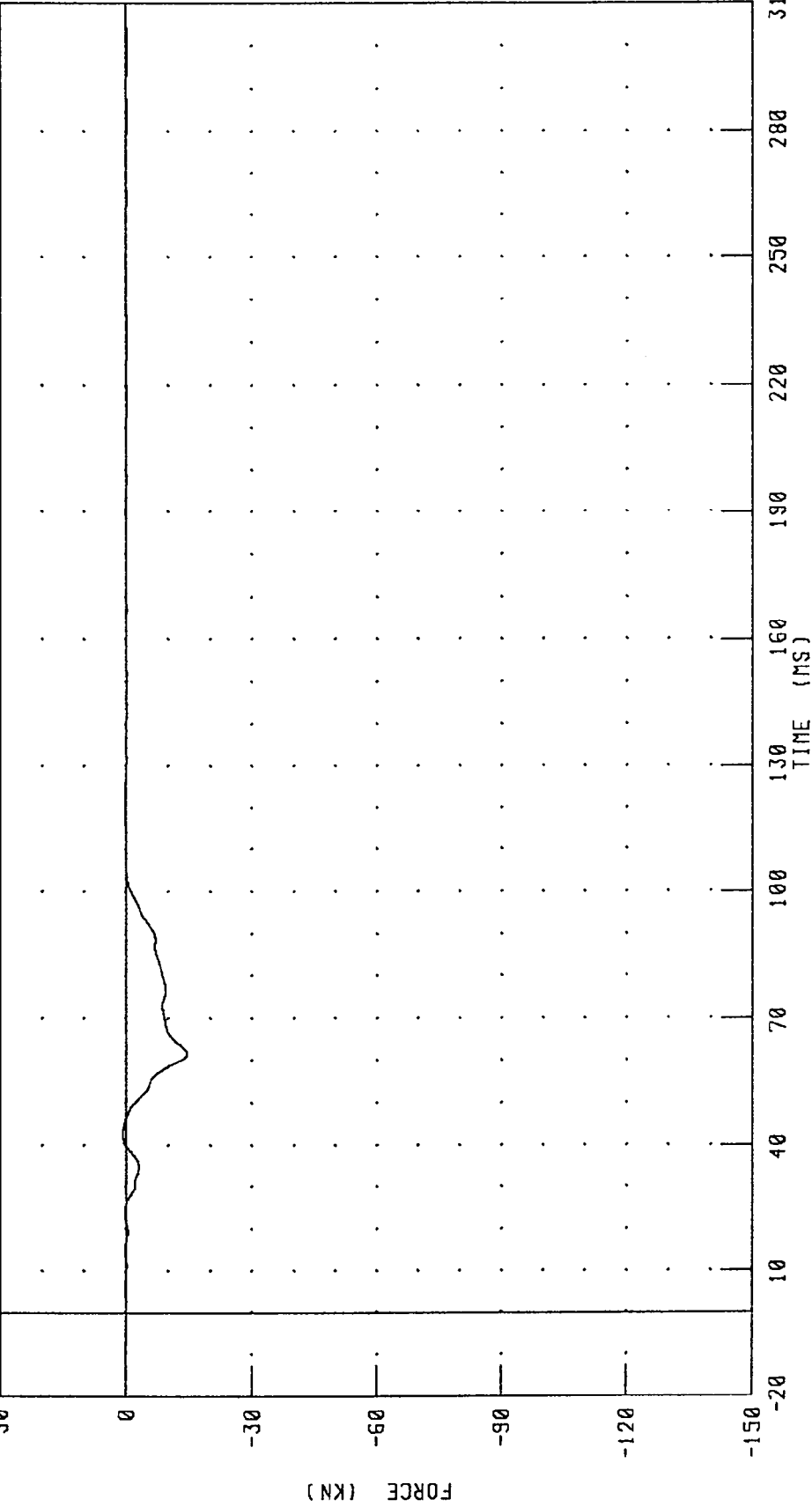
CHANNEL: BD1F

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D2 FORCE

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.



PEAK DATA: 0.68 KN @ 42.48 MS; -14.59 KN @ 61.68 MS

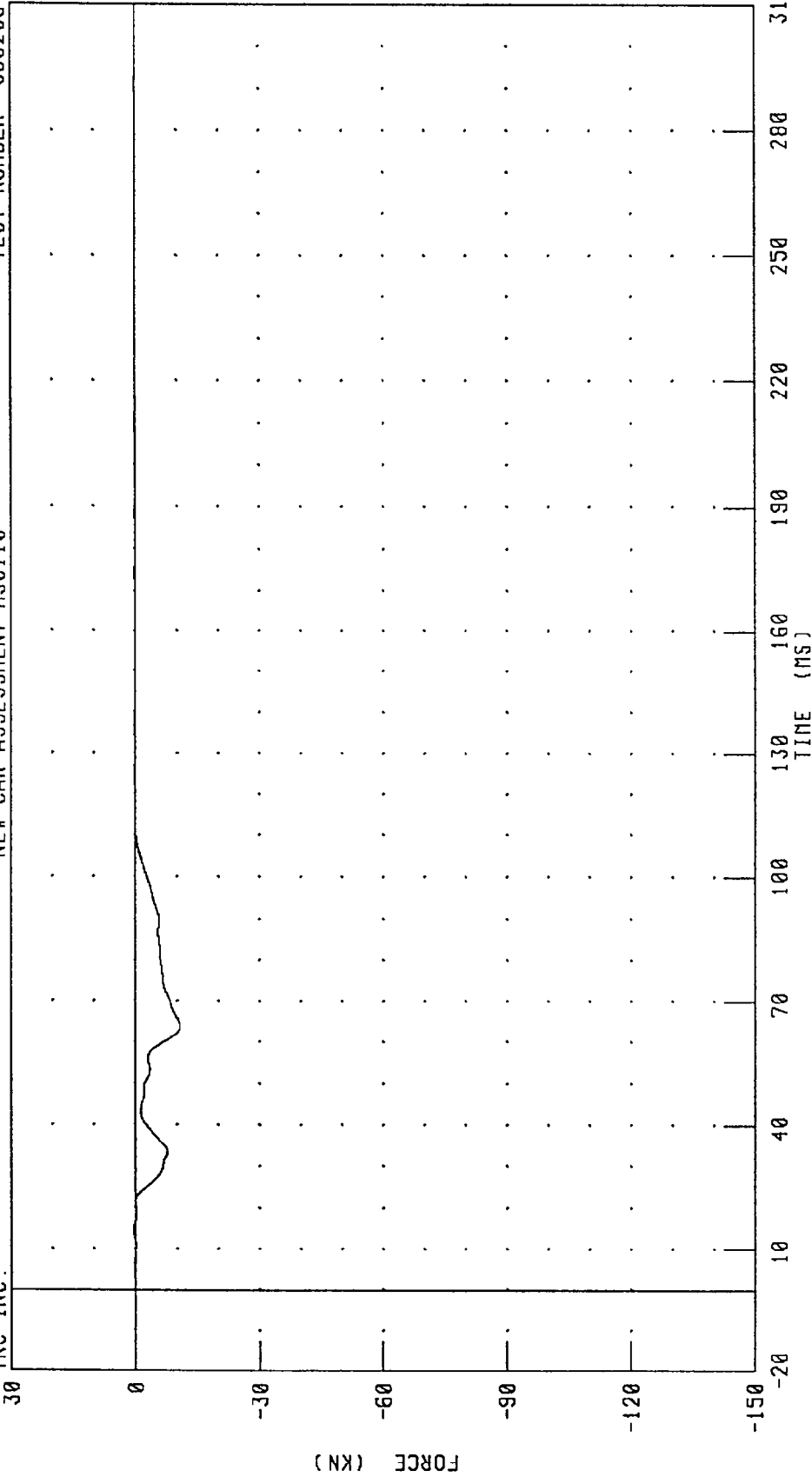
CHANNEL: BD2F FILTER: CH. CLASS 60

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D3 FORCE

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.



PEAK DATA: 0.48 KN @ 14.64 MS; -10.79 KN @ 63.84 MS

FILTER: CH. CLASS 60

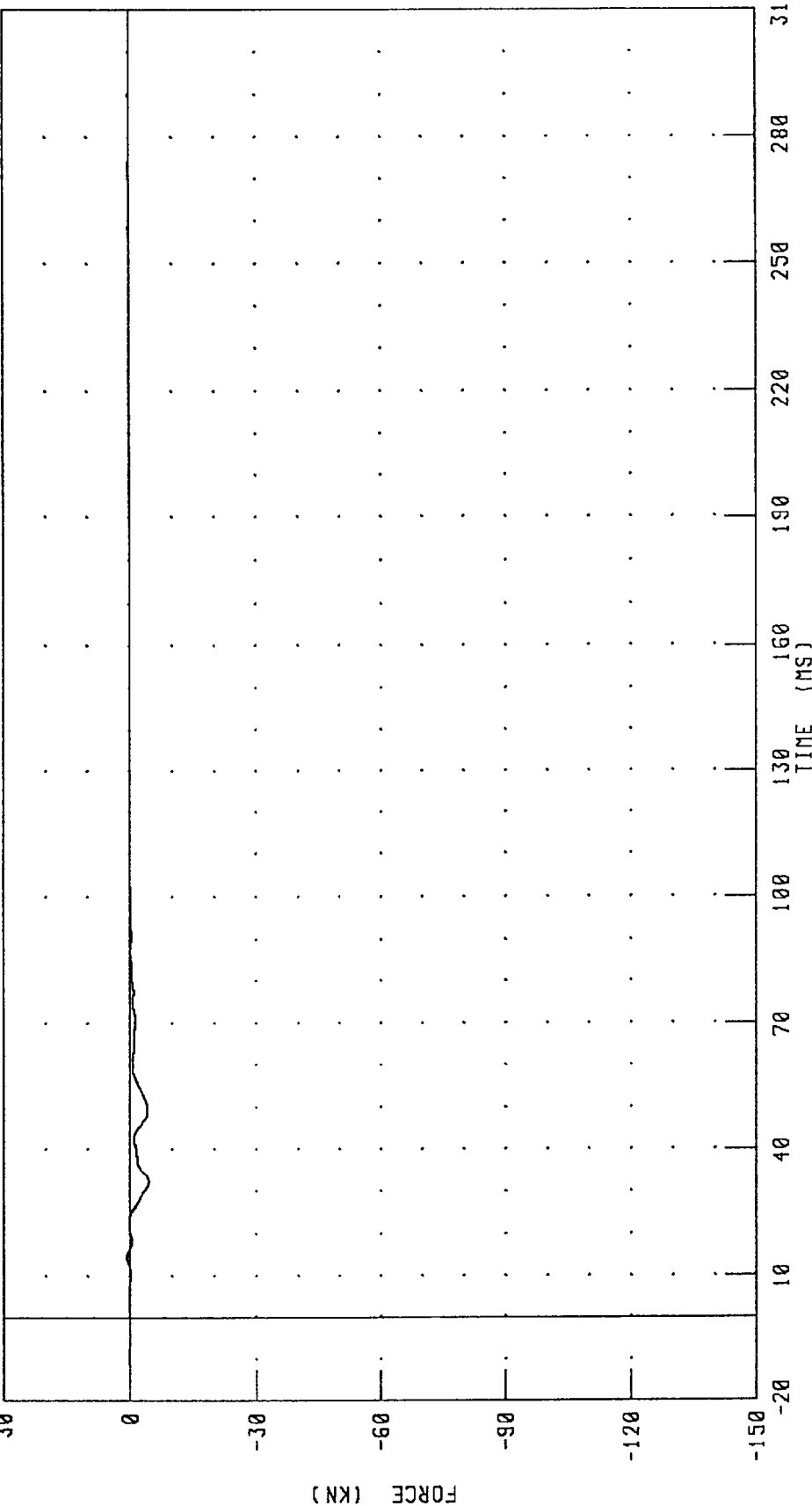
CHANNEL: B03F

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D4 FORCE

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.



PEAK DATA: 0.69 KN @ 14.56 MS; -4.50 KN @ 32.48 MS

FILTER: CH. CLASS 60

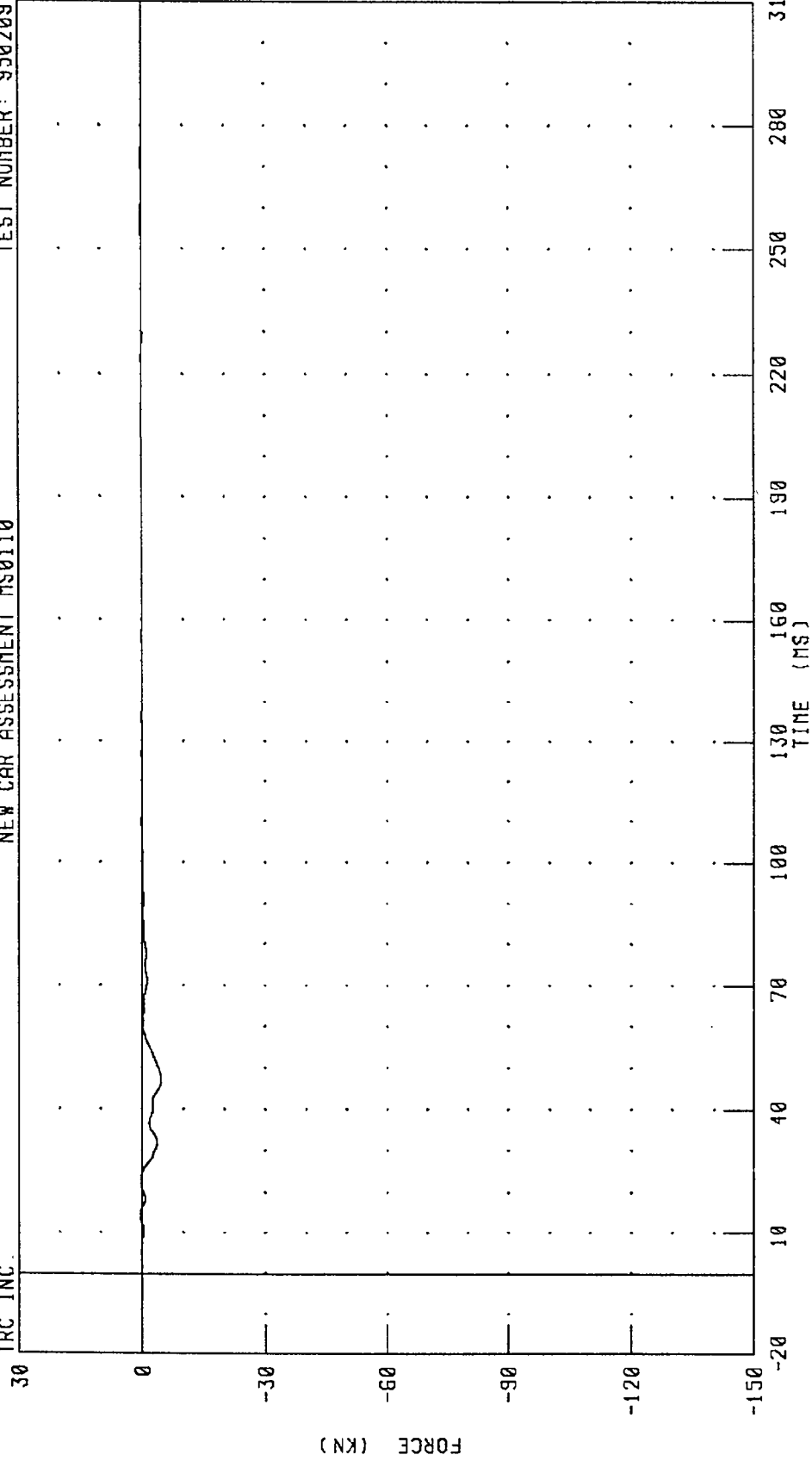
CHANNEL: BD4F

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D5 FORCE

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.



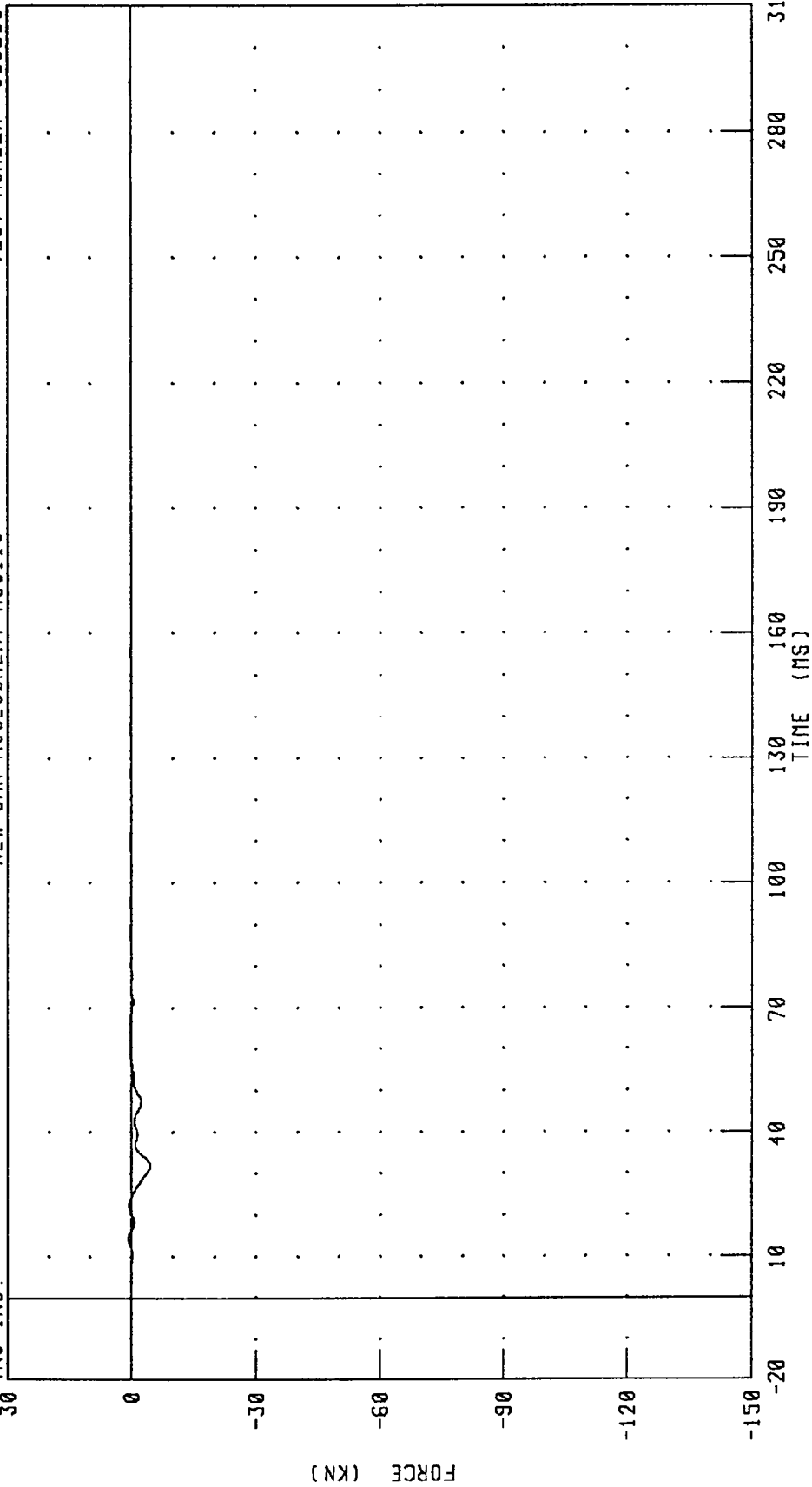
CHANNEL: 805F FILTER: CH. CLASS 60

PEAK DATA: 0.58 KN @ 14.48 MS; -4.67 KN @ 47.12 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION D6 FORCE
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

TRC INC.



PEAK DATA: 0.62 KN @ 14.40 MS; -4.61 KN @ 31.92 MS

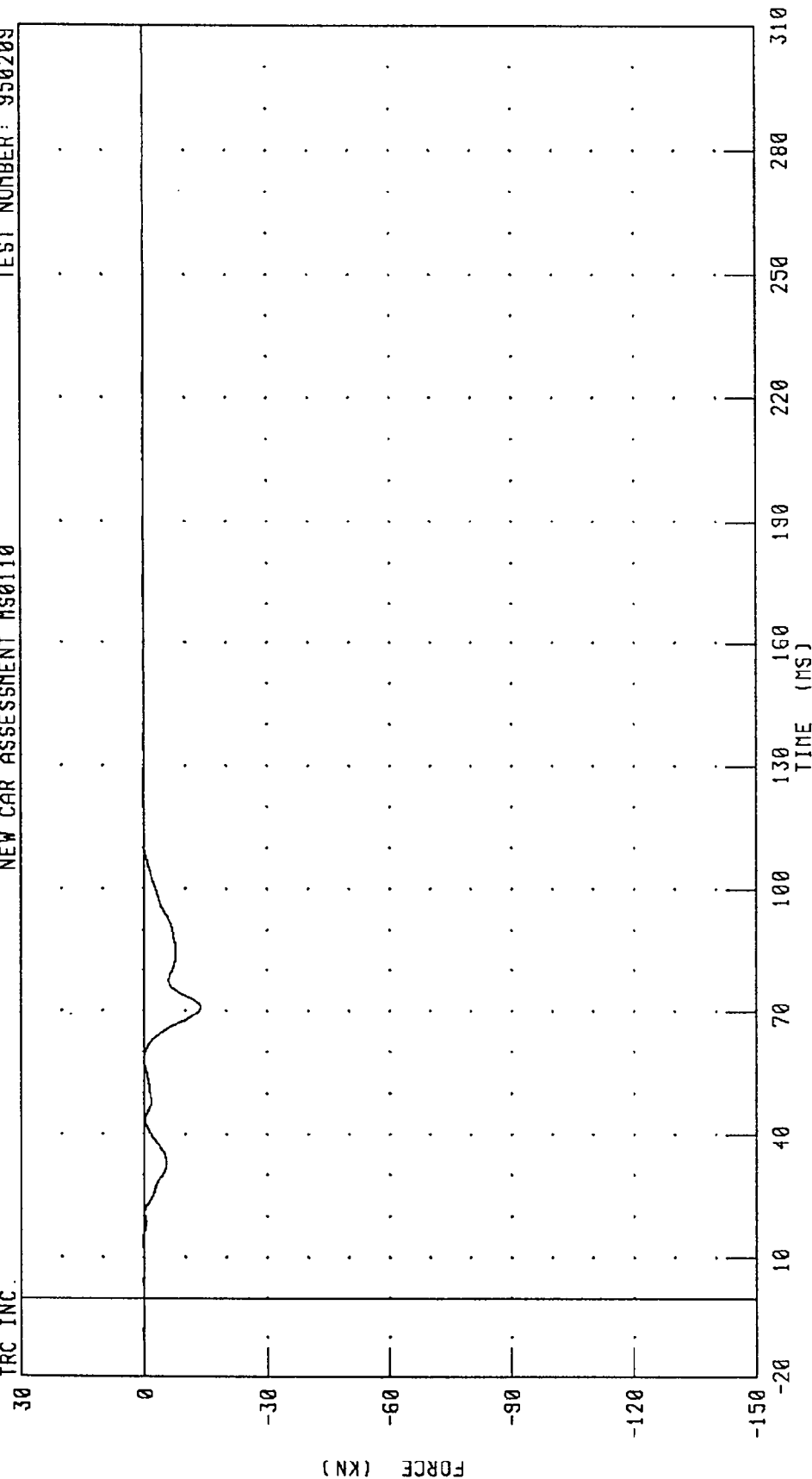
CHANNEL: B06F FILTER: CH. CLASS 60

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D7 FORCE

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.



PEAK DATA: 0.32 KN @ 14.24 MS; -13.79 KN @ 70.96 MS

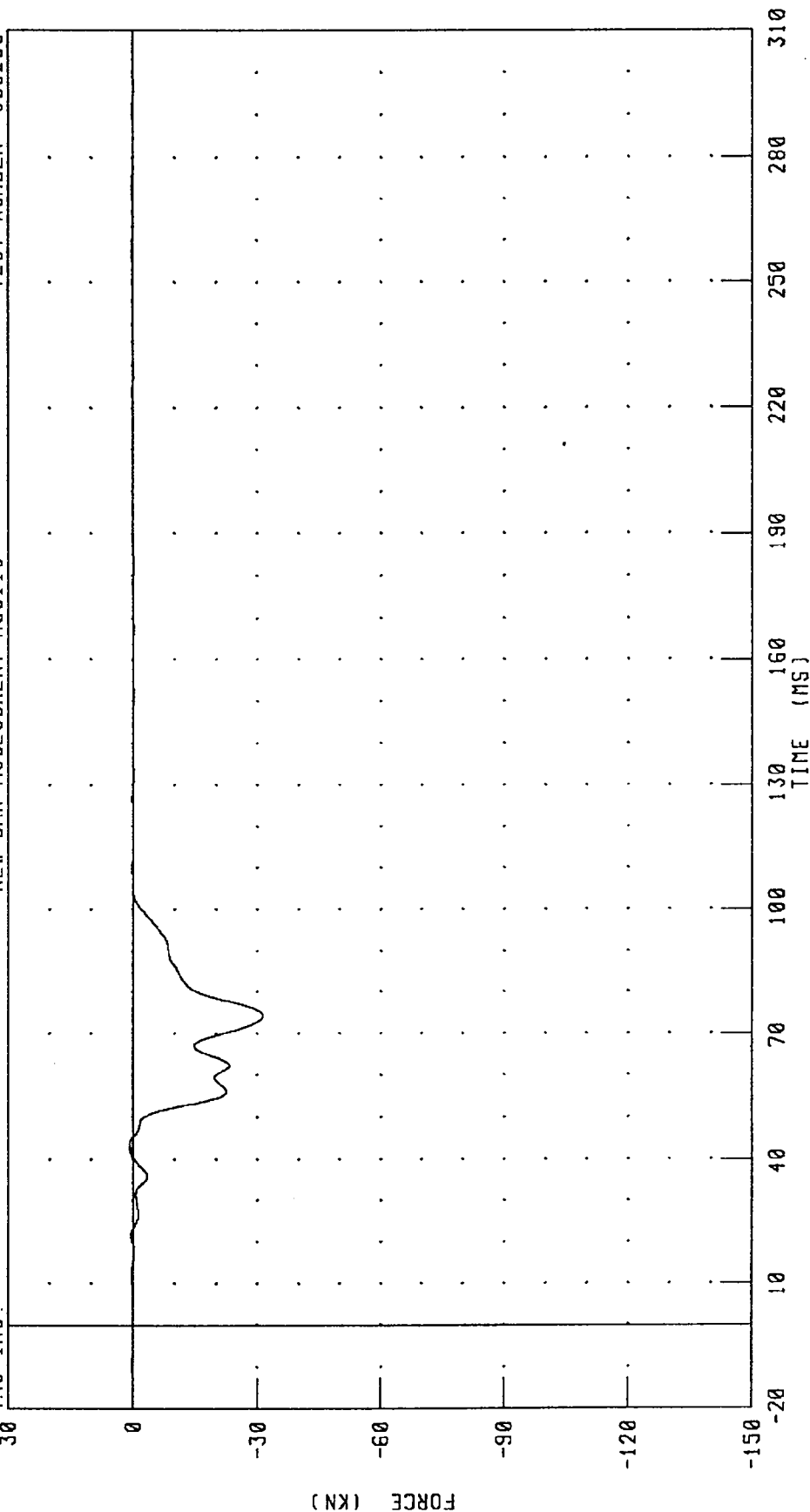
FILTER: CH. CLASS 60

CHANNEL: B07F

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION D8 FORCE
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

TRC INC.



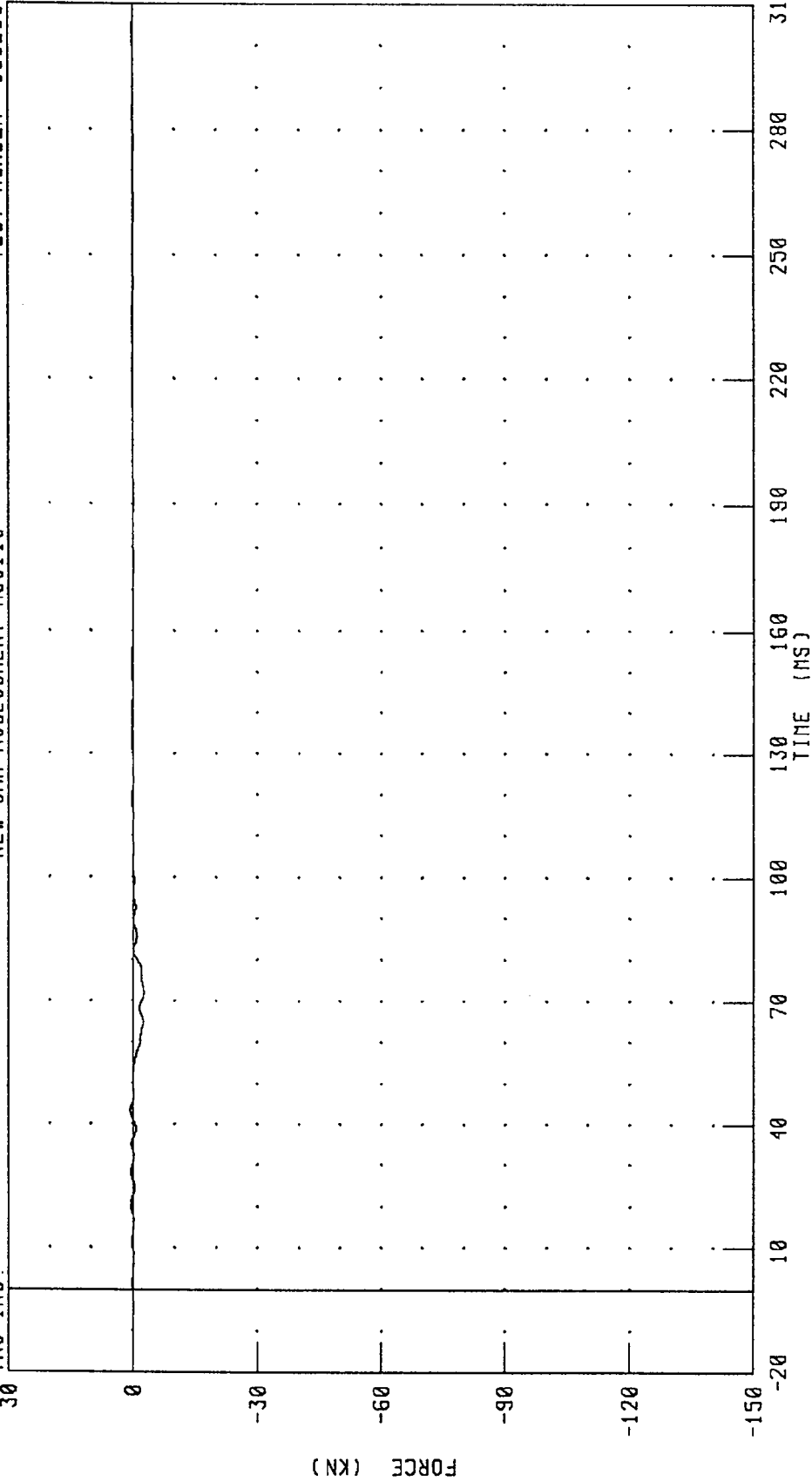
PEAK DATA: 0 83 KN @ 43.36 MS, -31.28 KN @ 74.40 MS

CHANNEL: B08F FILTER: CH. CLASS 60

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION D9 FORCE
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

TRC INC.



PEAK DATA: 0.61 KN @ 43.44 MS; -2.74 KN @ 72.08 MS

FILTER: CH. CLASS 60

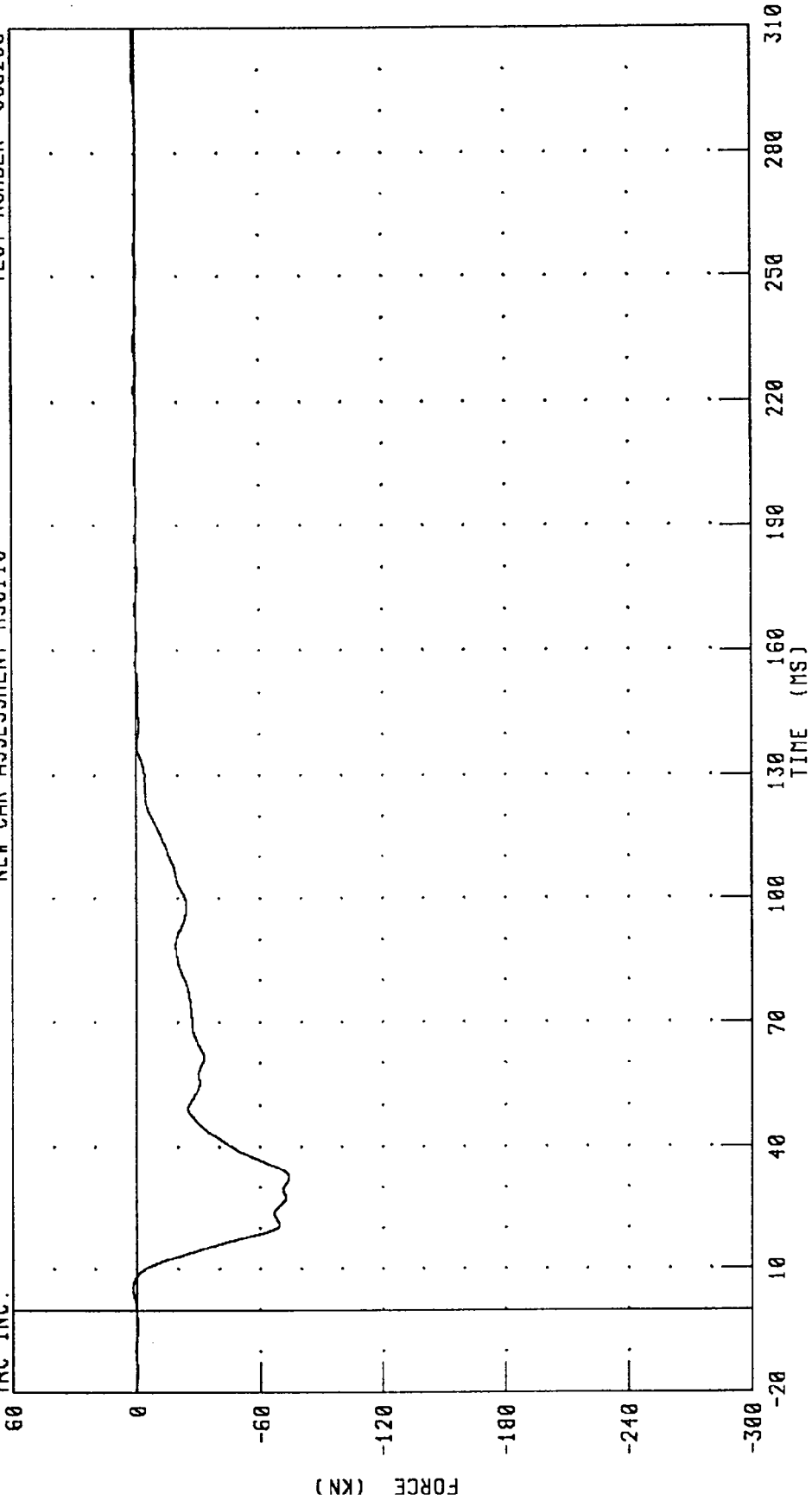
CHANNEL: B09F

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 1 FORCE TOTAL

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.



PEAK DATA: 1.88 KN @ 5.12 MS; -73.83 KN @ 32.72 MS

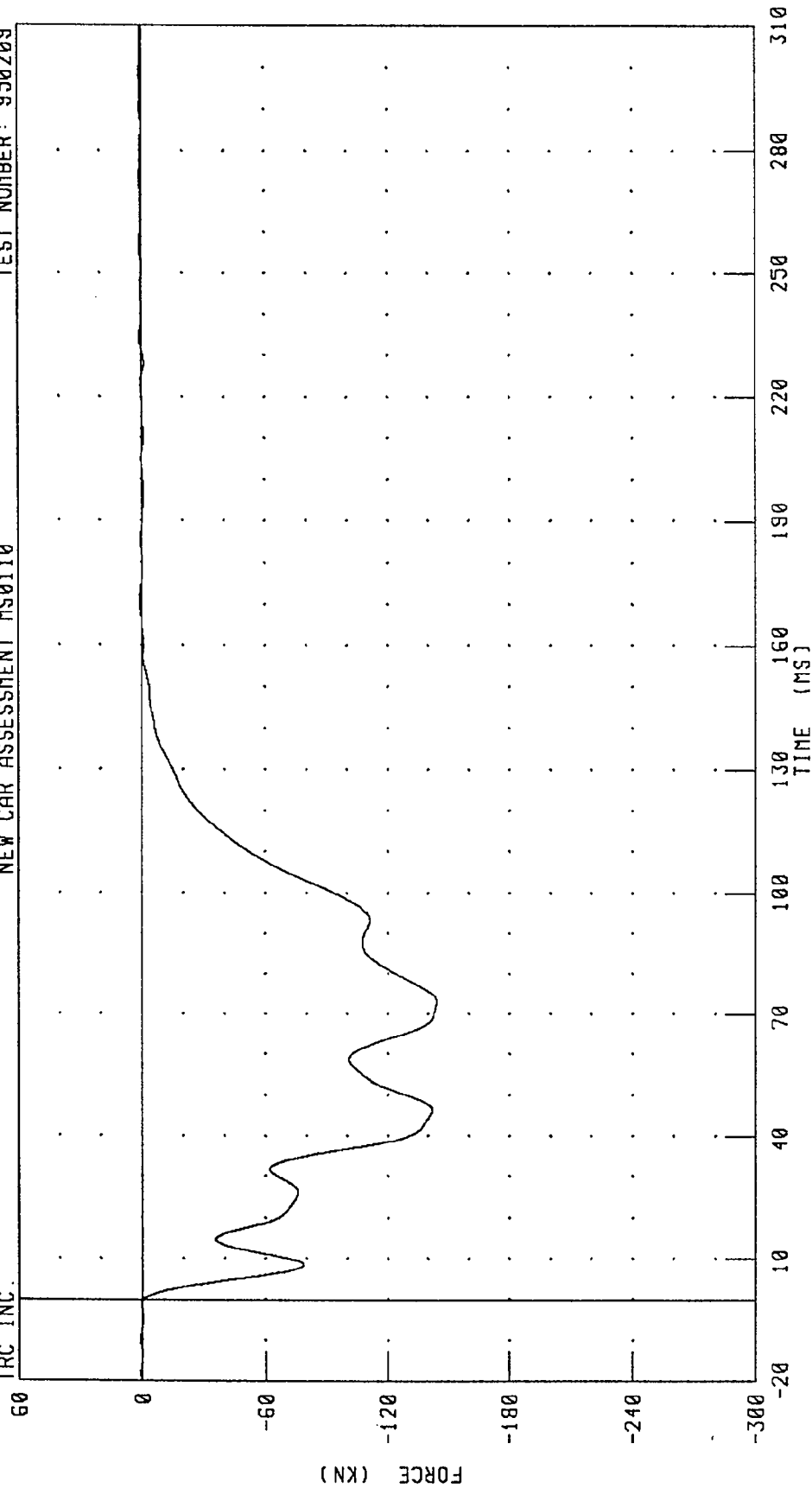
CHANNEL: LCBGIF FILTER: CH. CLASS 60

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 2 FORCE TOTAL

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.

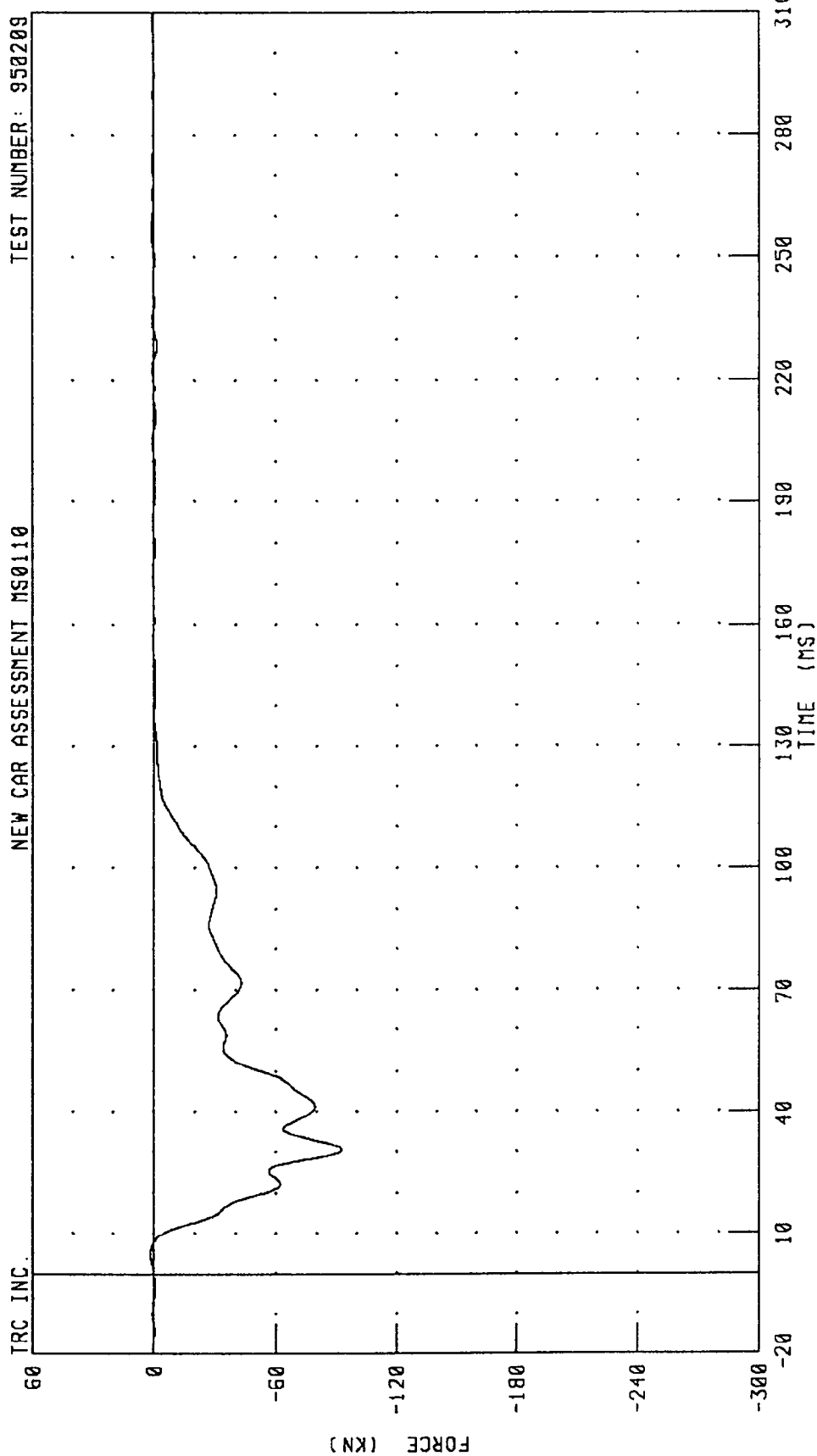


CHANNEL: LCBG2F FILTER: CH. CLASS 60

PEAK DATA: 1.14 KN @ 256.48 MS; -144.25 KN @ 72.96 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER GROUP # 3 FORCE TOTAL
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209



PEAK DATA: 1.37 KN @ 4.48 MS; -92.49 KN @ 30.64 MS

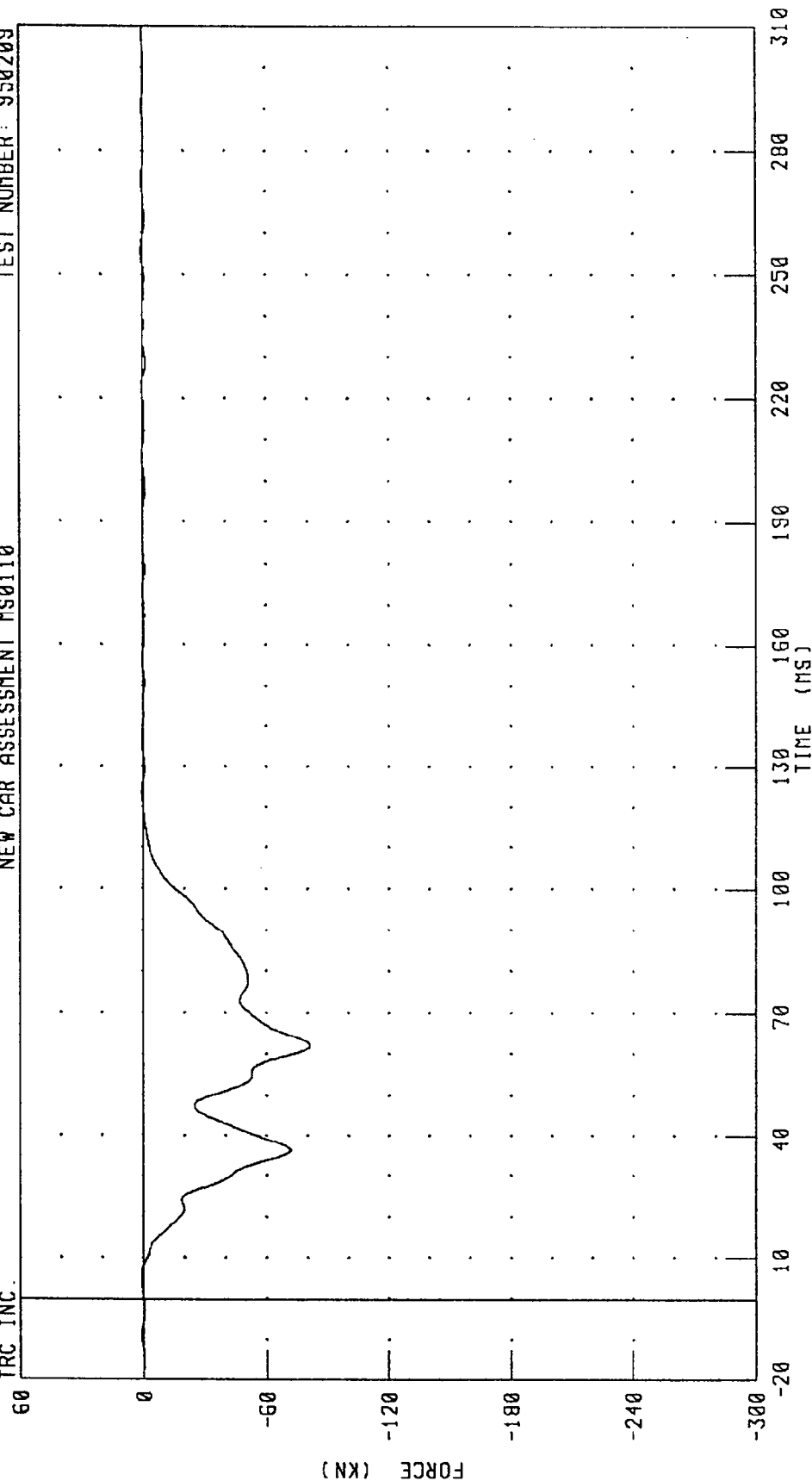
CHANNEL: LCBG3F FILTER: CH. CLASS 60

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 4 FORCE TOTAL

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.

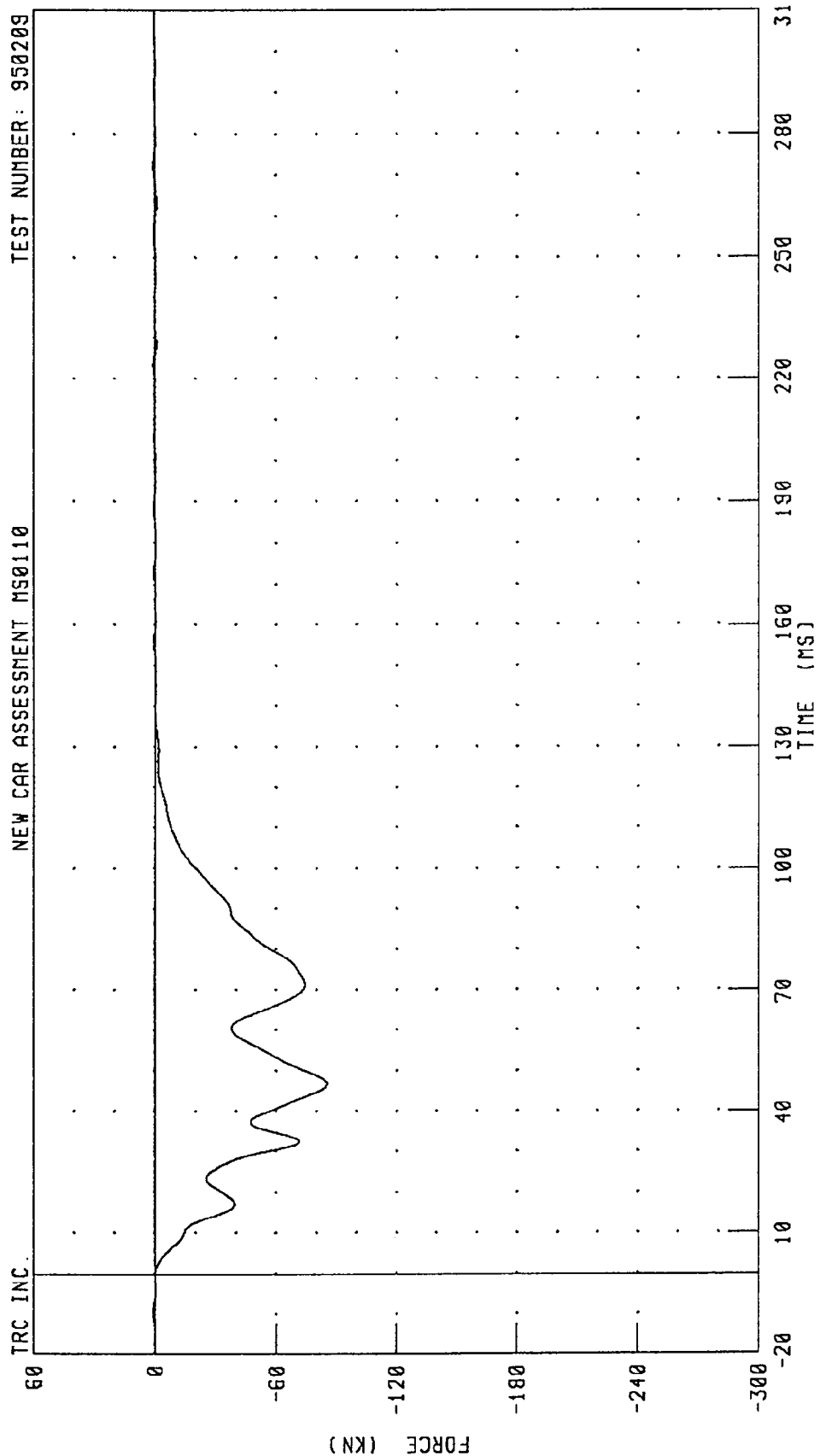


PEAK DATA: 1.08 KN @ 5.36 MS; -81.09 KN @ 62.16 MS

CHANNEL: LCBG4F FILTER: CH. CLASS 60

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER GROUP # 5 FORCE TOTAL
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209

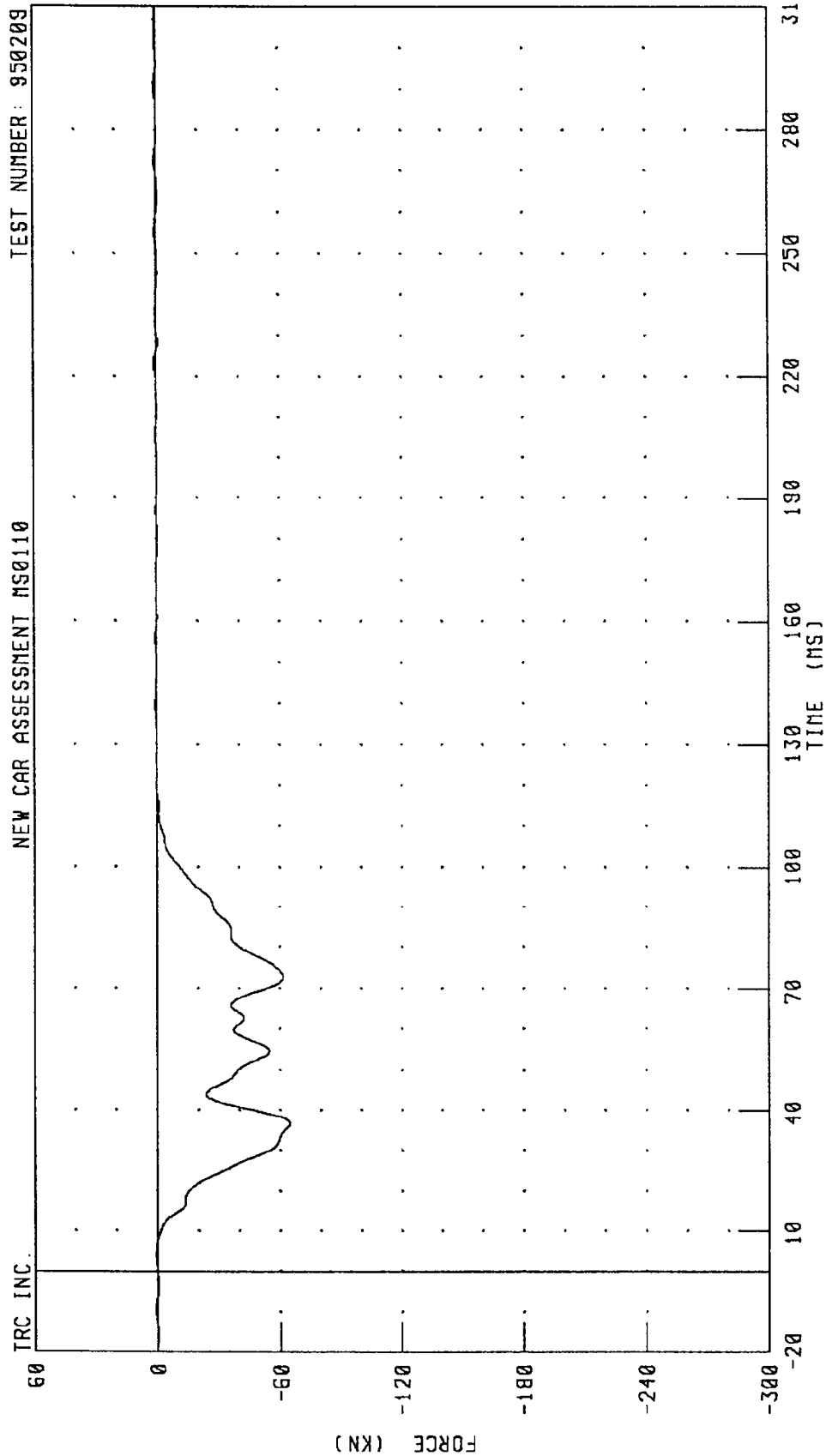


CHANNEL: LCBG5F FILTER: CH. CLASS 60

PEAK DATA: 0.88 KN @ -9.68 MS; -85.21 KN @ 46.80 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER GROUP # 6 FORCE TOTAL
 NEW CAR ASSESSMENT MS0110

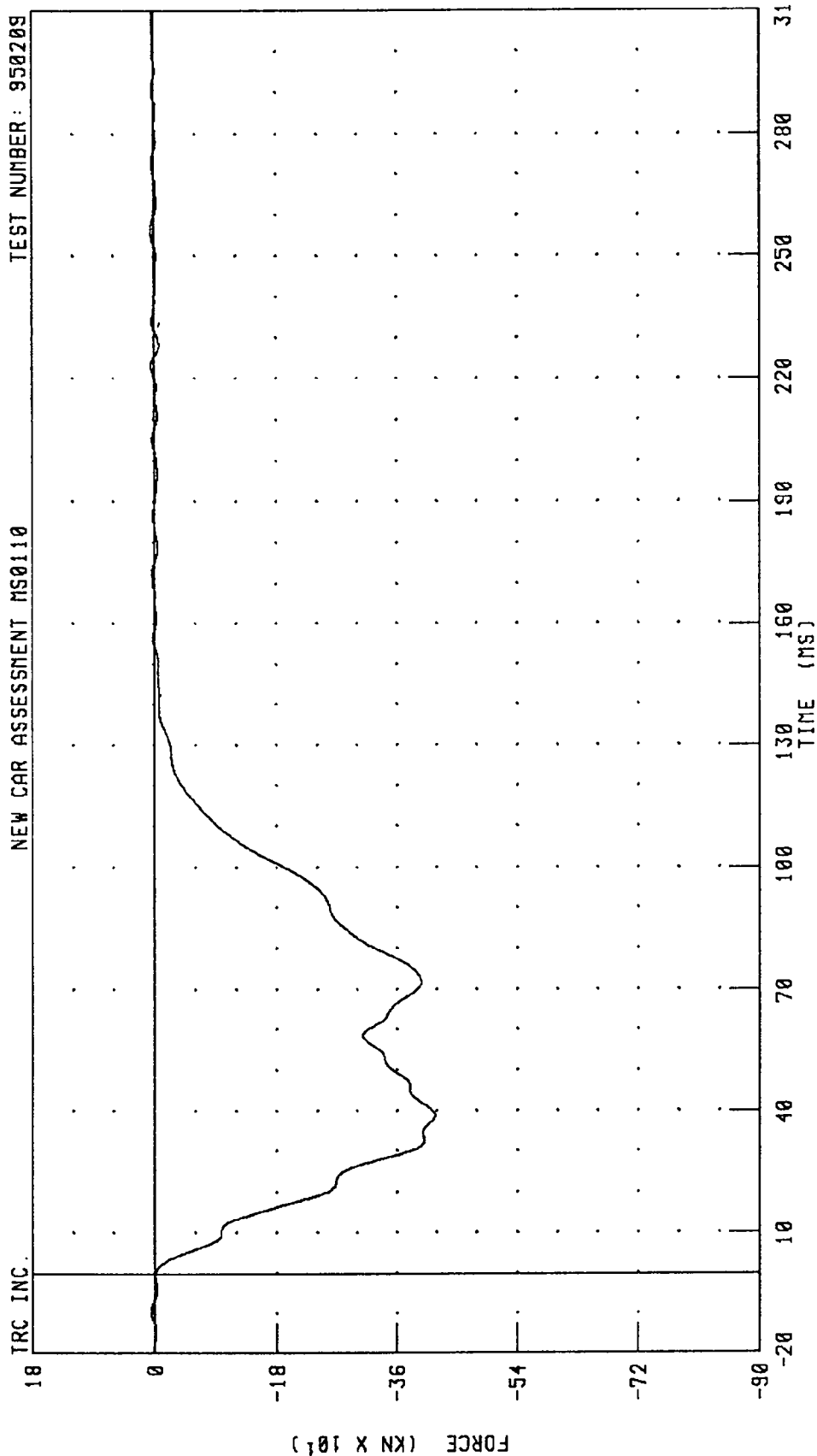
TEST NUMBER: 950209



CHANNEL: LCBG6F FILTER: CH. CLASS 60
 PEAK DATA: 1.12 KN @ 223.36 MS; -64.70 KN @ 36.80 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
 TOTAL LOAD CELL BARRIER FORCE
 NEW CAR ASSESSMENT MS0110

TEST NUMBER: 950209



CHANNEL: LCBGT FILTER: CH. CLASS 60

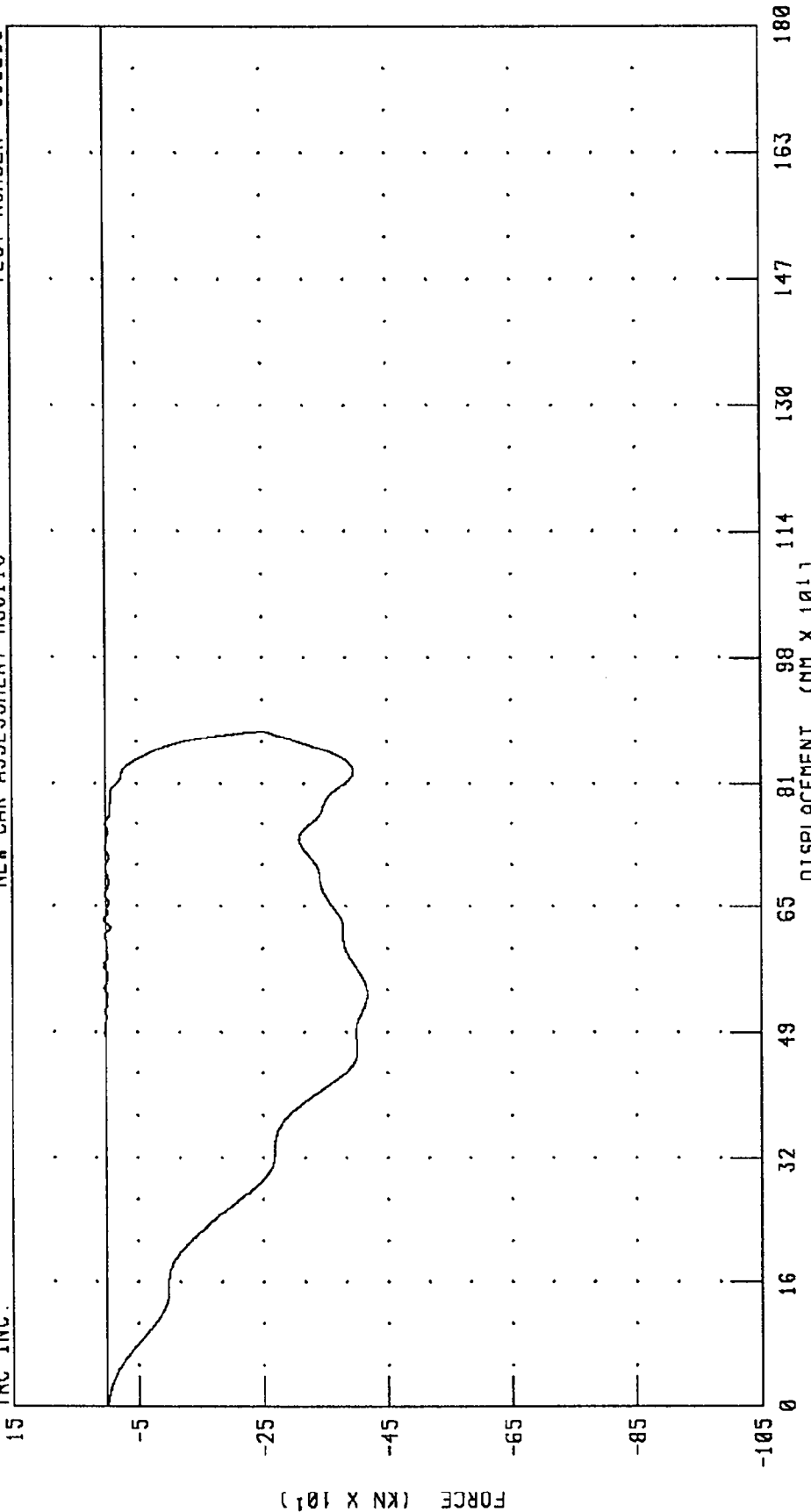
PEAK DATA: 4.95 KN @ -9.76 MS; -417.43 KN @ 38.72 MS

1995 CHEVROLET LUMINA INTO FRONTAL LOAD CELL BARRIER
TOTAL LOAD CELL BARRIER FORCE VS AVERAGE VEHICLE X-AXIS DISPLACEMENT

TEST NUMBER: 950209

NEW CAR ASSESSMENT MS0110

TRC INC.



PEAK DATA: 886.91 NM @ 92.56 MS;
-417.43 KN @ 38.72 MS

FILTER: CH. CLASS 180
CH. CLASS 60

CHANNEL: 0THXD
LCBGT

Appendix C

Dummy Certification Data

Pre-test Certification Data

Driver Dummy S/N: 142

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III EXTERNAL DIMENSIONS
142 HUMANOID

25-JAN-95

TRC INC. TEST NO: 142C26ED1 572E SN142 EXT.DIMENSION CAL26

TEST PARAMETER	(DIMEN.)	SPECIFICATION	TEST RESULTS
LOCATION FOR CHEST CIRCUMFERENCE (AA)		429 - 434 MM	432. MM
LOCATION FOR WAIST CIRCUMFERENCE (BB)		226 - 231 MM	229. MM
CHEST CIRCUMFERENCE (Y)		970 -1001 MM	986. MM
WAIST CIRCUMFERENCE (Z)		836 - 866 MM	848. MM
CHEST DEPTH (O)		213 - 229 MM	221. MM
H-POINT HEIGHT (C)		84 - 89 MM	84. MM
H-POINT FROM SEATBACK (D)		135 - 140 MM	137. MM
SKULL CAP TO BACKLINE (H)		41 - 46 MM	43. MM
TOTAL SITTING HEIGHT (A)		879 - 889 MM	879. MM
THIGH CLEARANCE (F)		140 - 155 MM	145. MM
BUTTOCK KNEE LENGTH (K)		579 - 605 MM	602. MM
BUTTOCK POPLITEAL LENGTH (N)		452 - 478 MM	470. MM
POPLITEAL HEIGHT (L)		429 - 455 MM	445. MM
KNEE PIVOT HEIGHT (M)		485 - 500 MM	488. MM
FOOT LENGTH (P)		252 - 267 MM	257. MM
FOOT BREADTH (W)		91 - 107 MM	97. MM
SHOULDER PIVOT FROM BACKLINE (E)		84 - 94 MM	91. MM
SHOULDER BREADTH (V)		422 - 437 MM	429. MM
SHOULDER PIVOT HEIGHT (B)		506 - 521 MM	508. MM
ELBOW REST HEIGHT (J)		191 - 211 MM	203. MM
SHOULDER-ELBOW LENGTH (I)		330 - 345 MM	345. MM
BACK OF ELBOW TO WRIST PIVOT (G)		290 - 305 MM	292. MM

DUMMY MEETS SPECIFICATIONS
TECHNICIAN Chris. Middleton

RUN NUMBER: 012595.1342

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III

13-JAN-95

TRC INC.

TEST NO: 142C26HD7

572E SN142 HEAD DROP CAL 26

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	58.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	230.81 G
PEAK LATERAL ACCELERATION	15 G MAX	-1.41 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

HEAD WAS INSTRUMENTED WITH THREE 7264 ACCELEROMETERS

TEST MEETS SPECIFICATIONS

TECHNICIAN

Chas Middleton

RUN NUMBER: 011395.1457;1

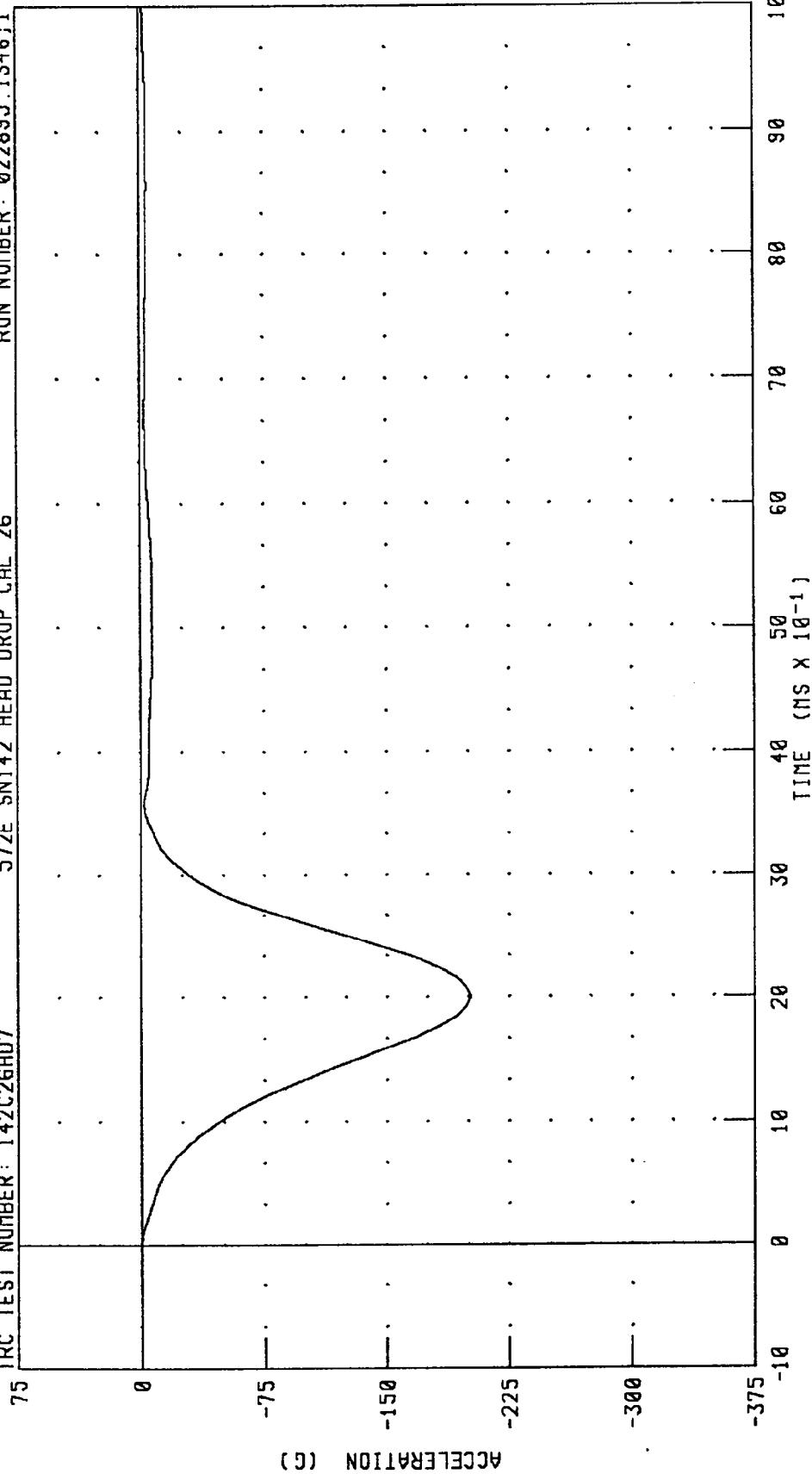
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION X AXIS

TRC TEST NUMBER: 142C26HD7

572E SN142 HEAD DROP CAL 26

RUN NUMBER: 022895.1346,1



PEAK DATA: 0.04 G @ -0.08 MS; -201.23 G @ 2.00 MS

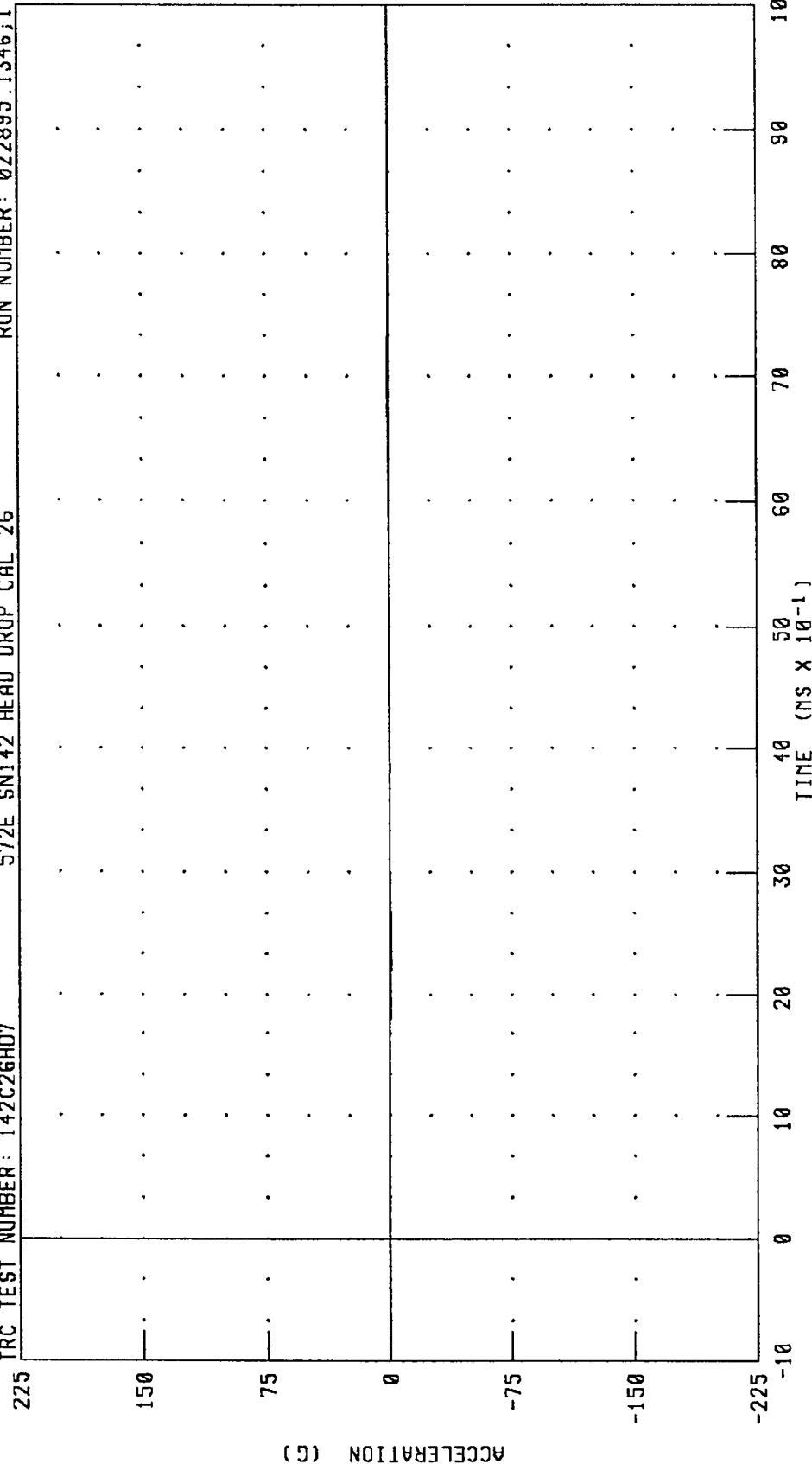
CHANNEL: HEDXG FILTER: CH. CLASS 1000

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

TRC TEST NUMBER: 142C26HD7

572E SN142 HEAD DROP CAL 26

RUN NUMBER: 022895.1346;1



PEAK DATA: 0.65 G @ 6.96 MS; -1.42 G @ 2.48 MS

CHANNEL: HEDYG FILTER: CH. CLASS 1000

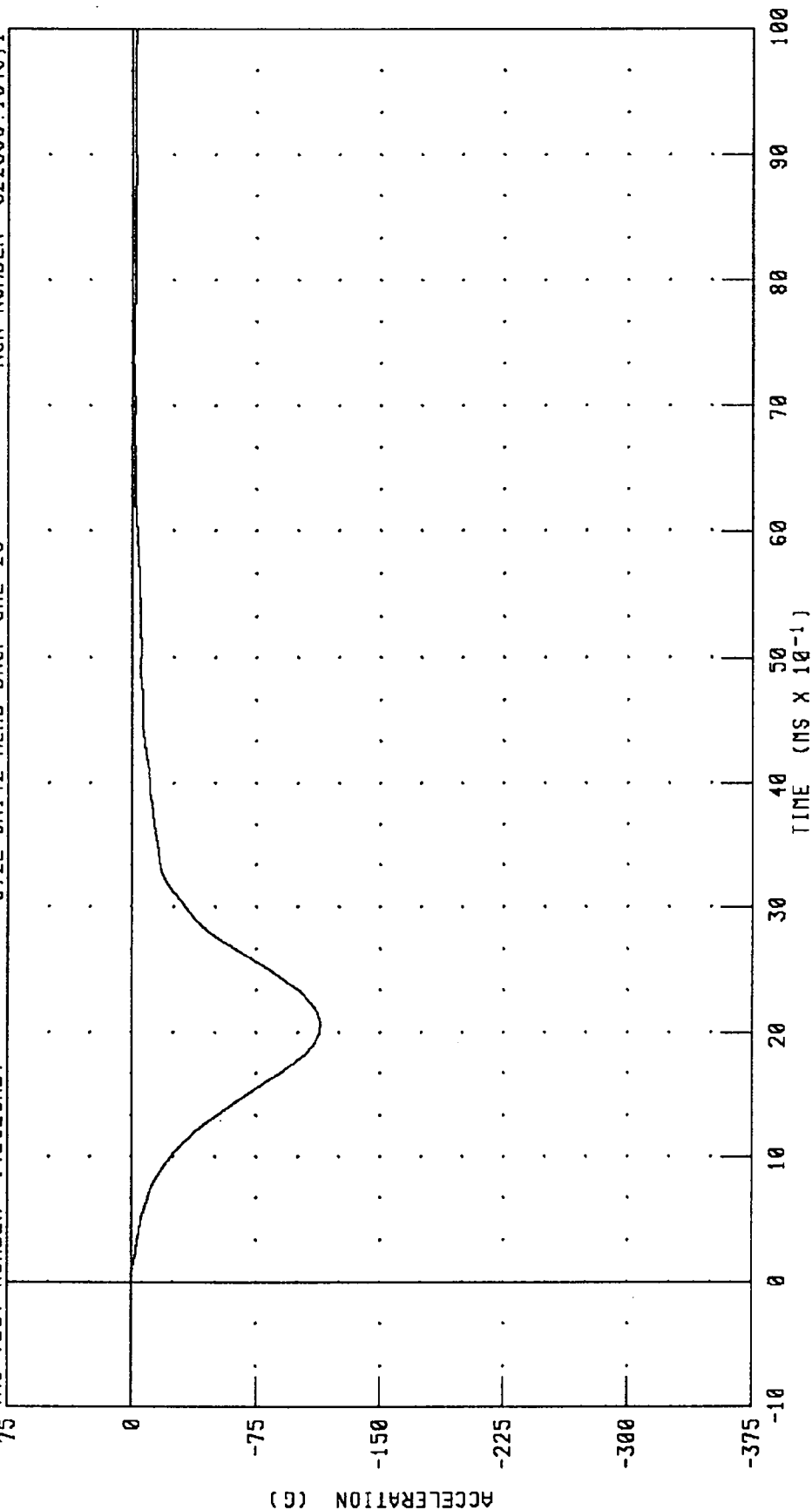
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Z AXIS

TRC TEST NUMBER: 142C26HD7

572E SN142 HEAD DROP CAL 26

RUN NUMBER: 022895.1346,1



CHANNEL: HEDZG FILTER: CH. CLASS 1000

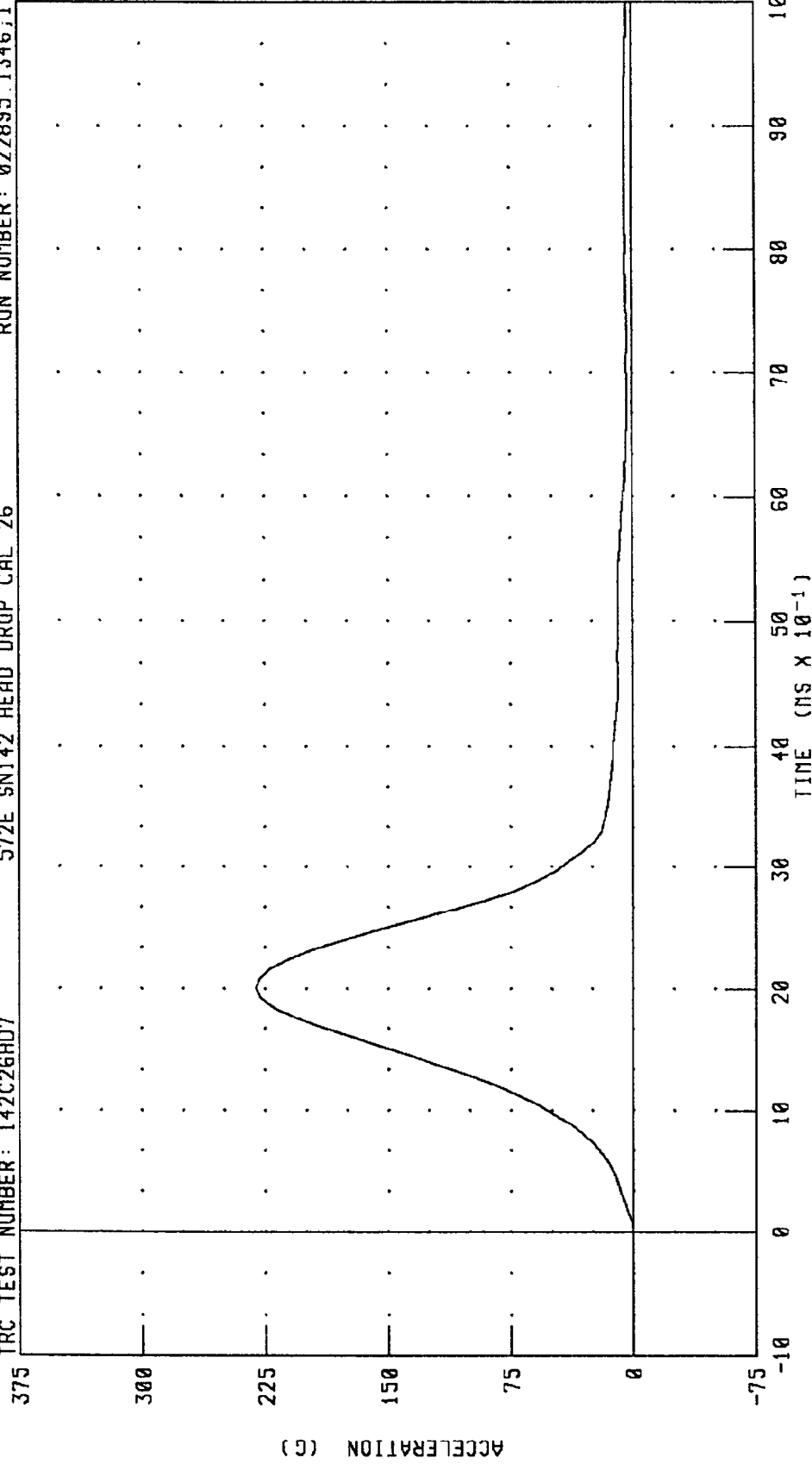
PEAK DATA: 0.03 G @ -0.32 MS; -113.57 G @ 2.08 MS

PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: 142C26HD7

572E SN142 HEAD DROP CAL 26

RUN NUMBER: 022895.1346;1



PEAK DATA: 230.81 G @ 2.00 MS; 0.03 G @ -0.40 MS

CHANNEL: HEDRG FILTER: CH. CLASS 1000

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

HYBRID III

13-JAN-95

TRC INC. TEST NO: 142C26NF7 572E SN142 NECK FLEXION CAL26

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	58.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	7.06 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	23.08 G
	20 MS	17.60 - 22.60 G	20.10 G
	30 MS	12.50 - 18.50 G	16.77 G
MAX PENDULUM G		29 G MAX	23.86 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	16.72 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	39.28 MS
D PLANE	MAX	64 - 78 DEG.	73.75 DEG.
ROTATION	TIME	57 - 64 MS	60.48 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	95.22 NM
	TIME	47 - 58 MS	52.88 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	115.76 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	104.40 MS

TEST WITH ORIGINAL THREE 7264 ACCELEROMETERS

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middlets

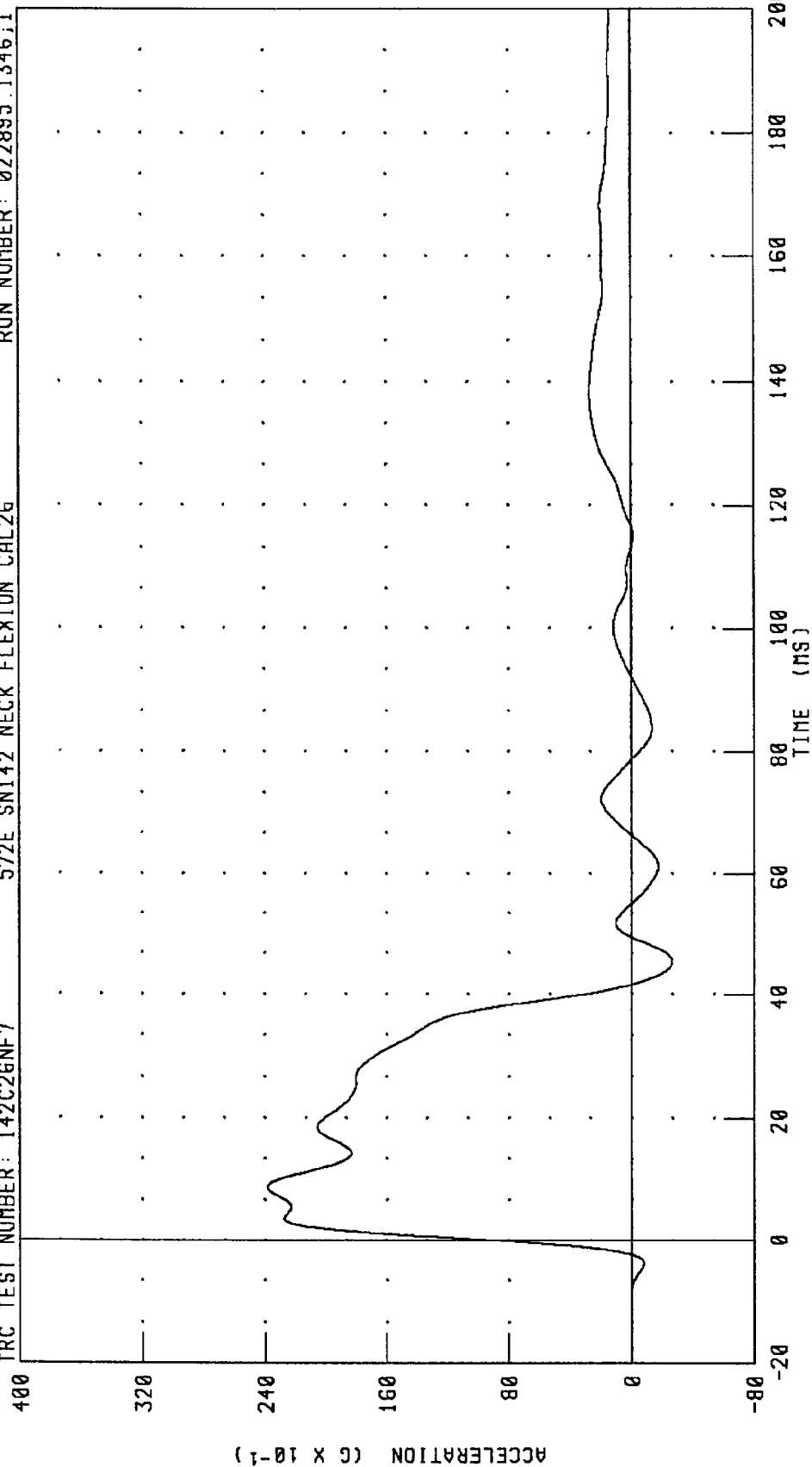
RUN NUMBER: 011395.1436;1

PART 572-E HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION

TRC TEST NUMBER: 142C26NF7

572E SN142 NECK FLEXION CAL26

RUN NUMBER: 022895.1346.1



PEAK DATA: 23.86 G @ 8.72 MS, -2.64 G @ 45.36 MS

CHANNEL: PENXG FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 142C26NF7

572E SN142 NECK FLEXION CAL26

RUN NUMBER: 022895.1346;1

120

90

60

30

0

-30

-60

ANGLE (°)

TIME (MS)

PEAK DATA: 33.61 ° @ 60.72 MS; -22.04 ° @ 174.72 MS

FILTER: CH. CLASS 60

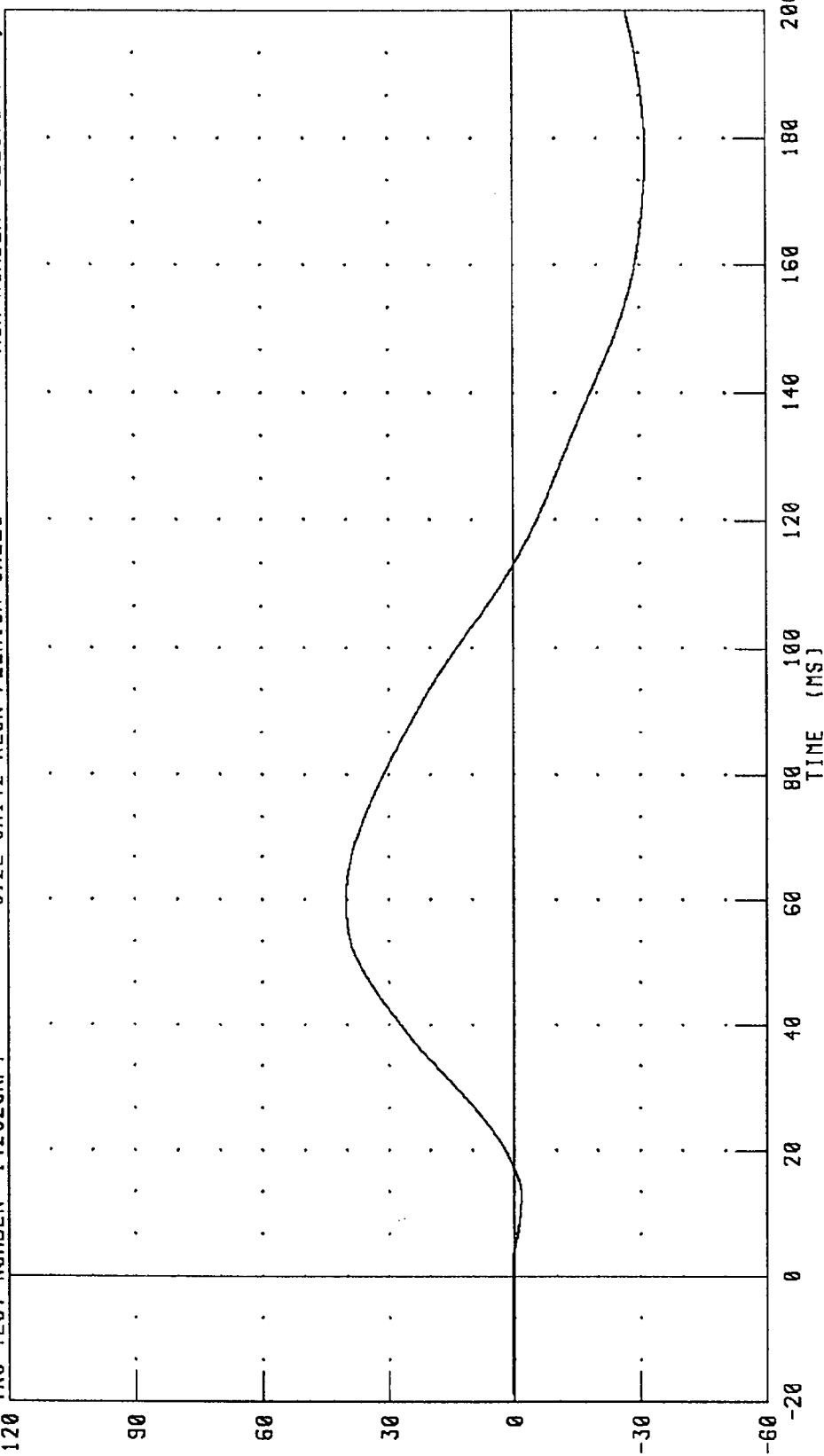
CHANNEL: BETA

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

TRC TEST NUMBER: 142C26NF7

572E SN142 NECK FLEXION CAL26

RUN NUMBER: 022895.1346;1



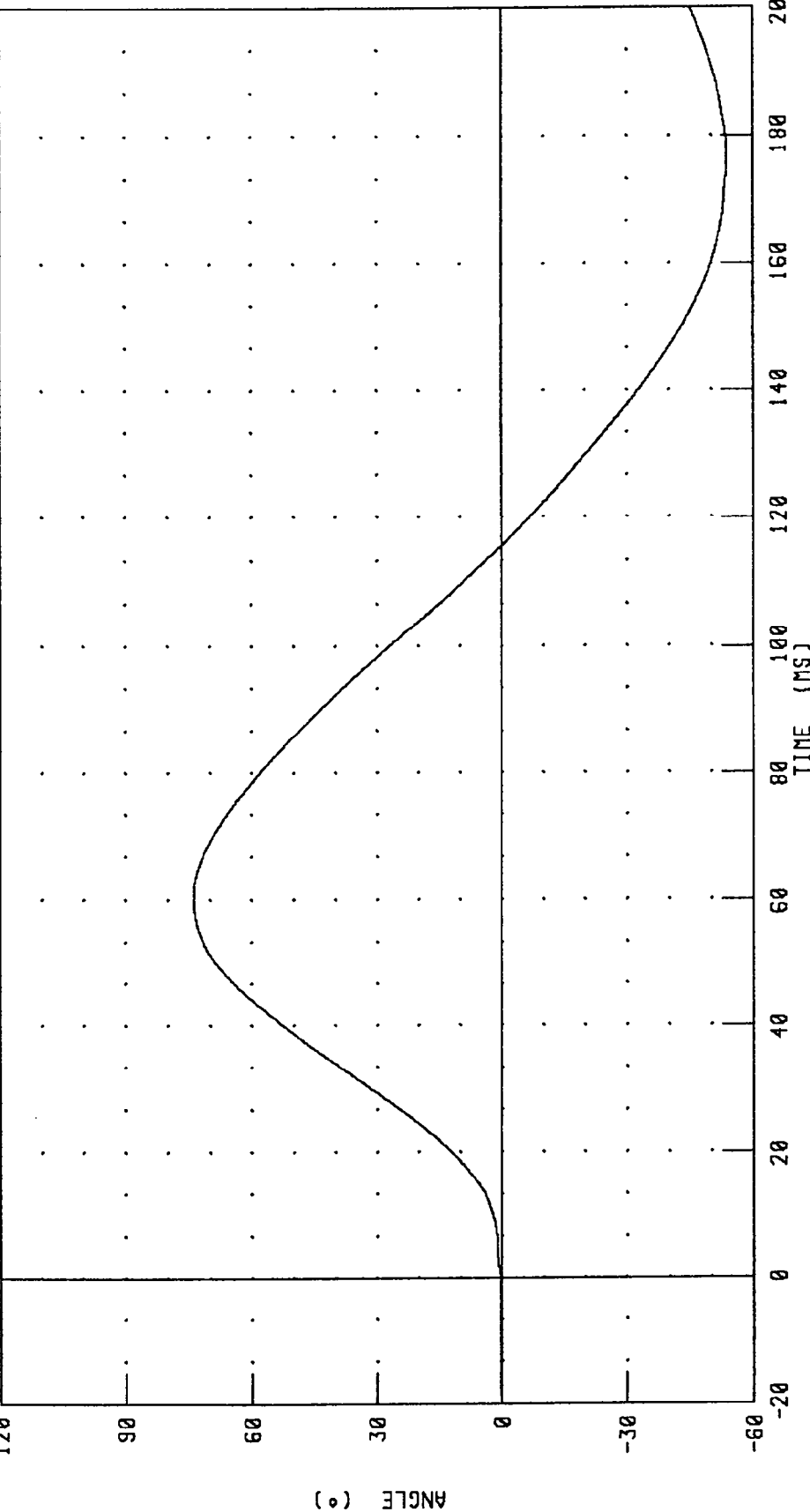
PEAK DATA: 40.15 ° @ 59.92 MS; -31.56 ° @ 177.52 MS

CHANNEL: THETA FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 142C26NF7 572E SN142 NECK FLEXION CAL26 RUN NUMBER: 022895.1346.1



PEAK DATA: 73.76 ° @ 60.48 MS; -53.60 ° @ 177.20 MS

CHANNEL: TOTAN FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 142C26NF7

572E SN142 NECK FLEXION CAL26

RUN NUMBER: 022895.1346;1

160

120

80

40

0

-40

-80

FORCE (N X 10¹)

TIME (MS)

200

180

160

140

120

100

80

60

40

20

0

-20

CHANNEL: NEKXF FILTER: CH. CLASS 60

PEAK DATA: 883.20 N @ 58.40 MS; -198.76 N @ 170.56 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 142C26NF7

572E SN142 NECK FLEXION CAL26

RUN NUMBER: 022895.1346;1

160

120

80

40

0

-40

-80

TORQUE (N·M)

TIME (MS)

PEAK DATA: 80.76 N·M @ 52.72 MS; -31.92 N·M @ 14.00 MS

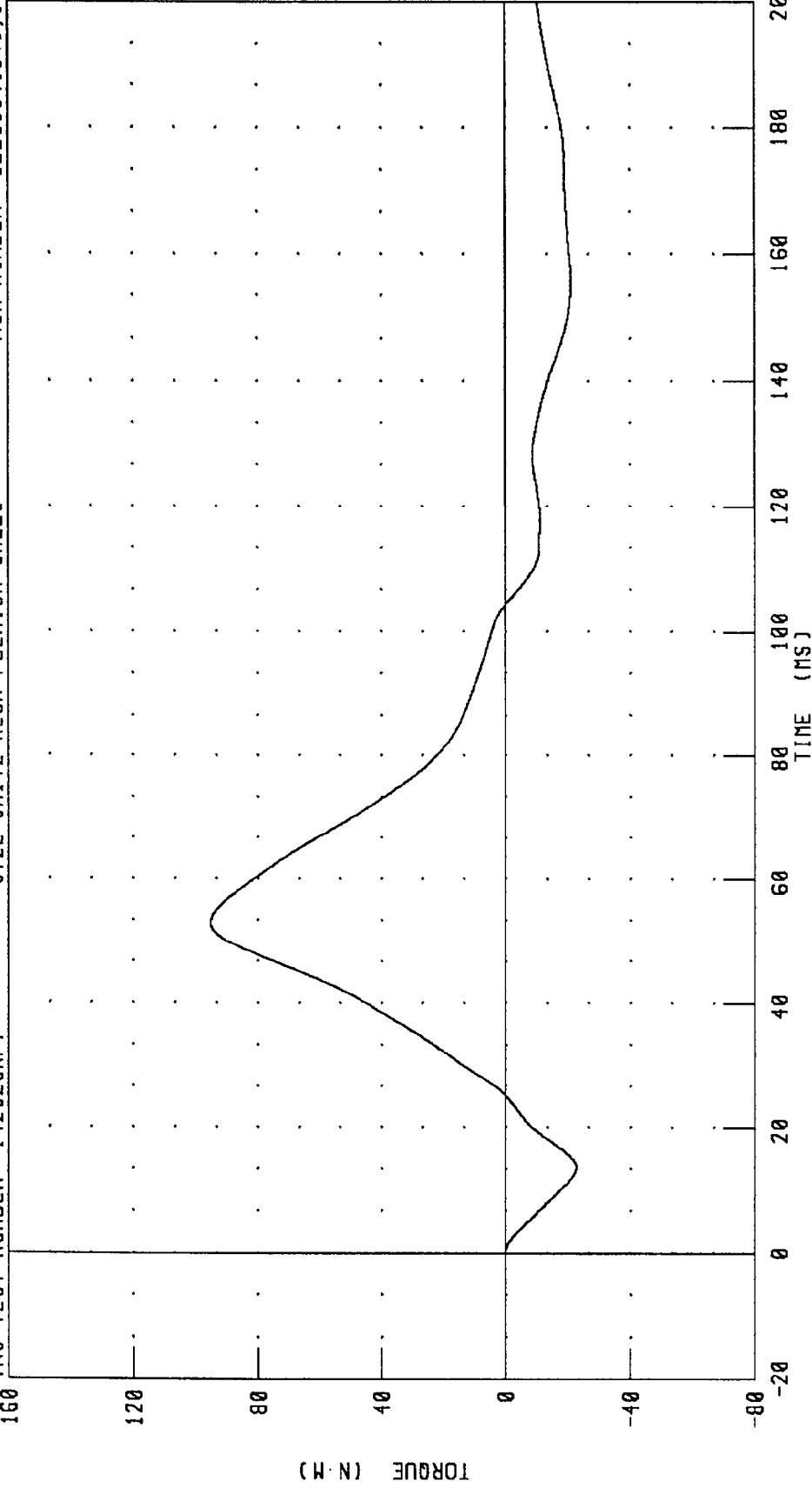
CHANNEL: NEKYM FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 142C26NF7

572E SN142 NECK FLEXION CAL26

RUN NUMBER: 022895.1346;1



PEAK DATA: 95.22 N·M @ 52.88 MS; -22.57 N·M @ 13.60 MS

CHANNEL: NEKOM FILTER: CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

HYBRID III

09-JAN-95

TRC INC. TEST NO: 142C26NE1 572E SN142 NECK EXT. CAL26

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	26.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.05 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	17.95 G
	20 MS	14.00 - 19.00 G	15.21 G
	30 MS	11.00 - 16.00 G	13.47 G
MAX PENDULUM G		22 G MAX	19.05 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	13.49 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	42.40 MS
D PLANE	MAX	81 - 106 DEG.	95.90 DEG.
ROTATION	TIME	72 - 82 MS	74.72 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-69.77 NM
	TIME	65 - 79 MS	70.48 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	152.80 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	140.48 MS

TEST MEETS SPECIFICATIONS

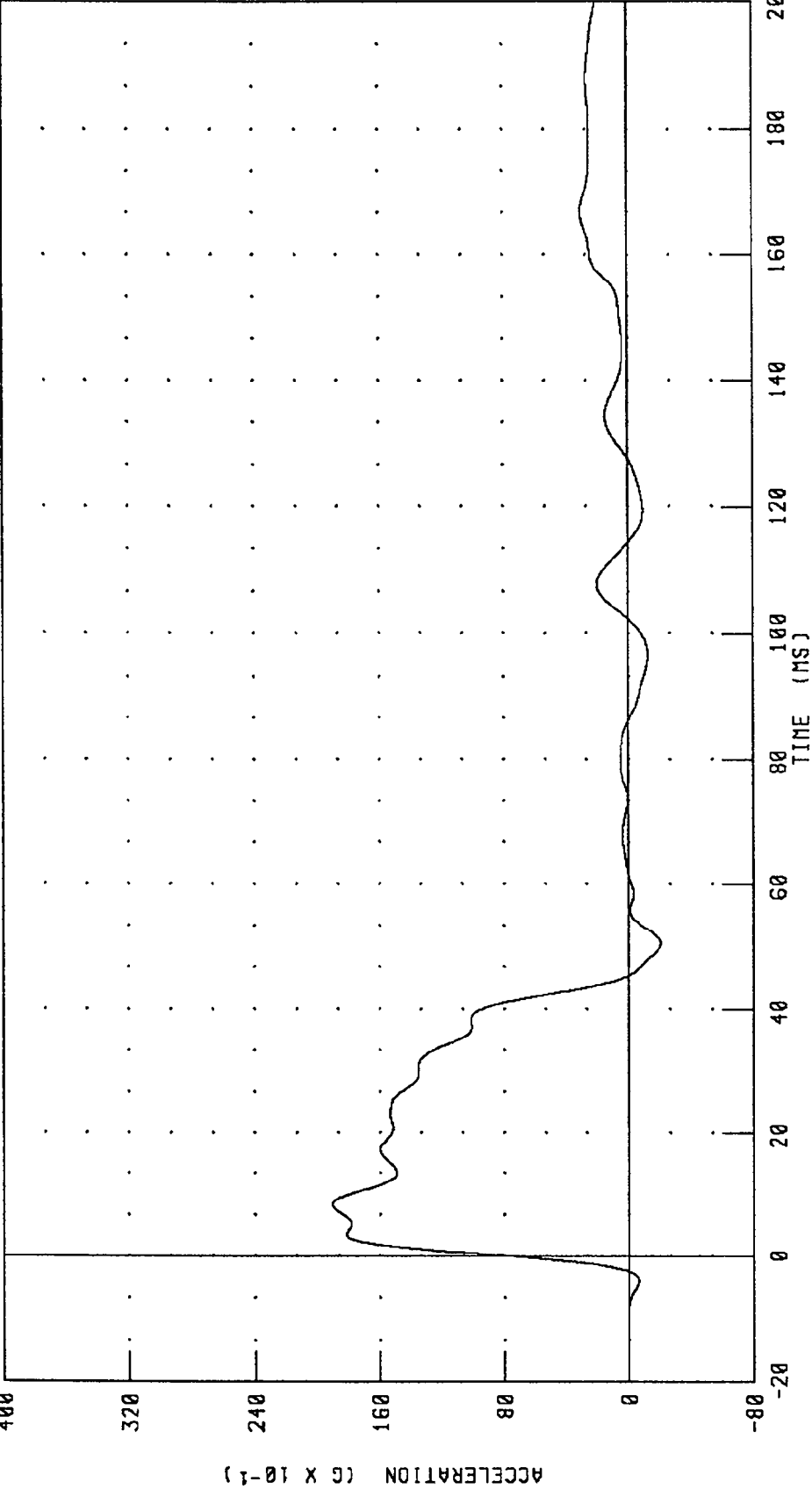
TECHNICIAN Chas. Middleton

RUN NUMBER: 010995.0930;1

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

IRC TEST NUMBER: 142C26NE1 572E SN142 NECK EXT. CAL26 RUN NUMBER: 022895.1346.1



PEAK DATA: 19.06 G @ 8.32 MS, -2.06 G @ 50.48 MS

CHANNEL: PENXG FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 142C26NE1

572E SN142 NECK EXT. CAL26

RUN NUMBER: 022895.1346;1

120

90

60

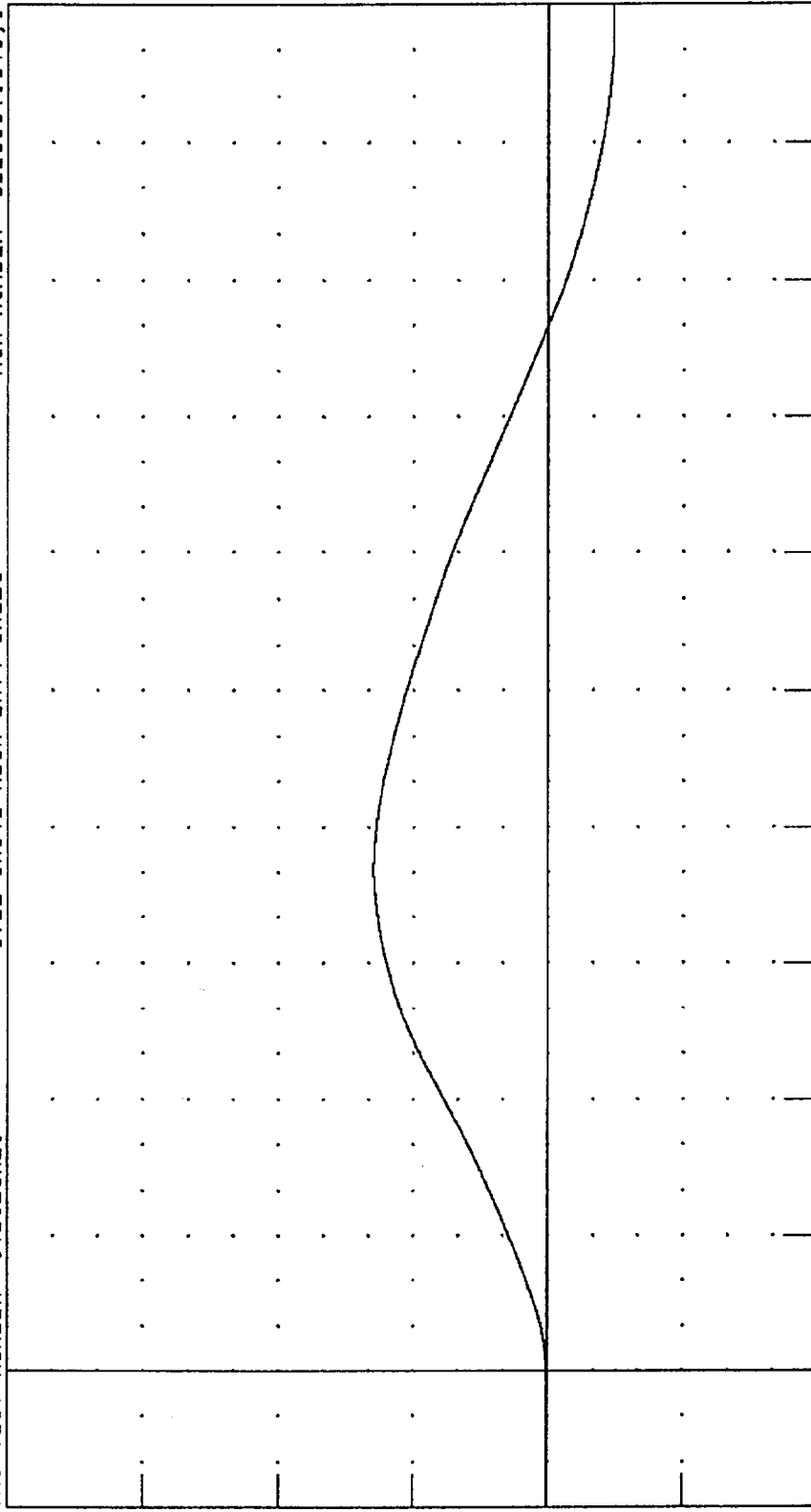
30

0

-30

-60

ANGLE (°)



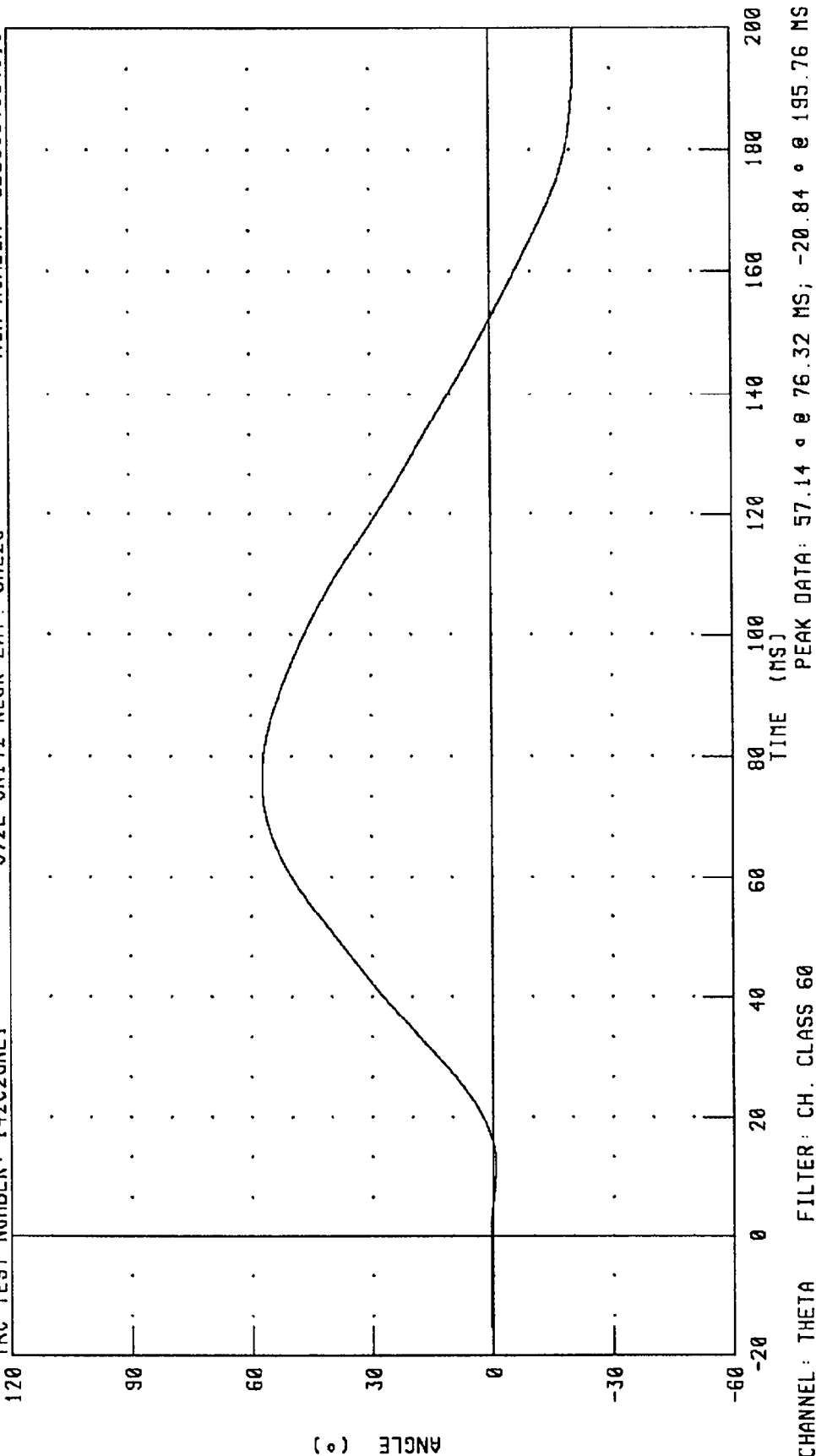
PEAK DATA: 38.79 ° @ 73.84 MS; -14.37 ° @ 197.28 MS

CHANNEL: BETA FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 142C26NE1 RUN NUMBER: 022895.1346;1

572E SN142 NECK EXT. CAL26



CHANNEL: THETA FILTER: CH. CLASS 60

PEAK DATA: 57.14 ° @ 76.32 MS; -20.84 ° @ 195.76 MS

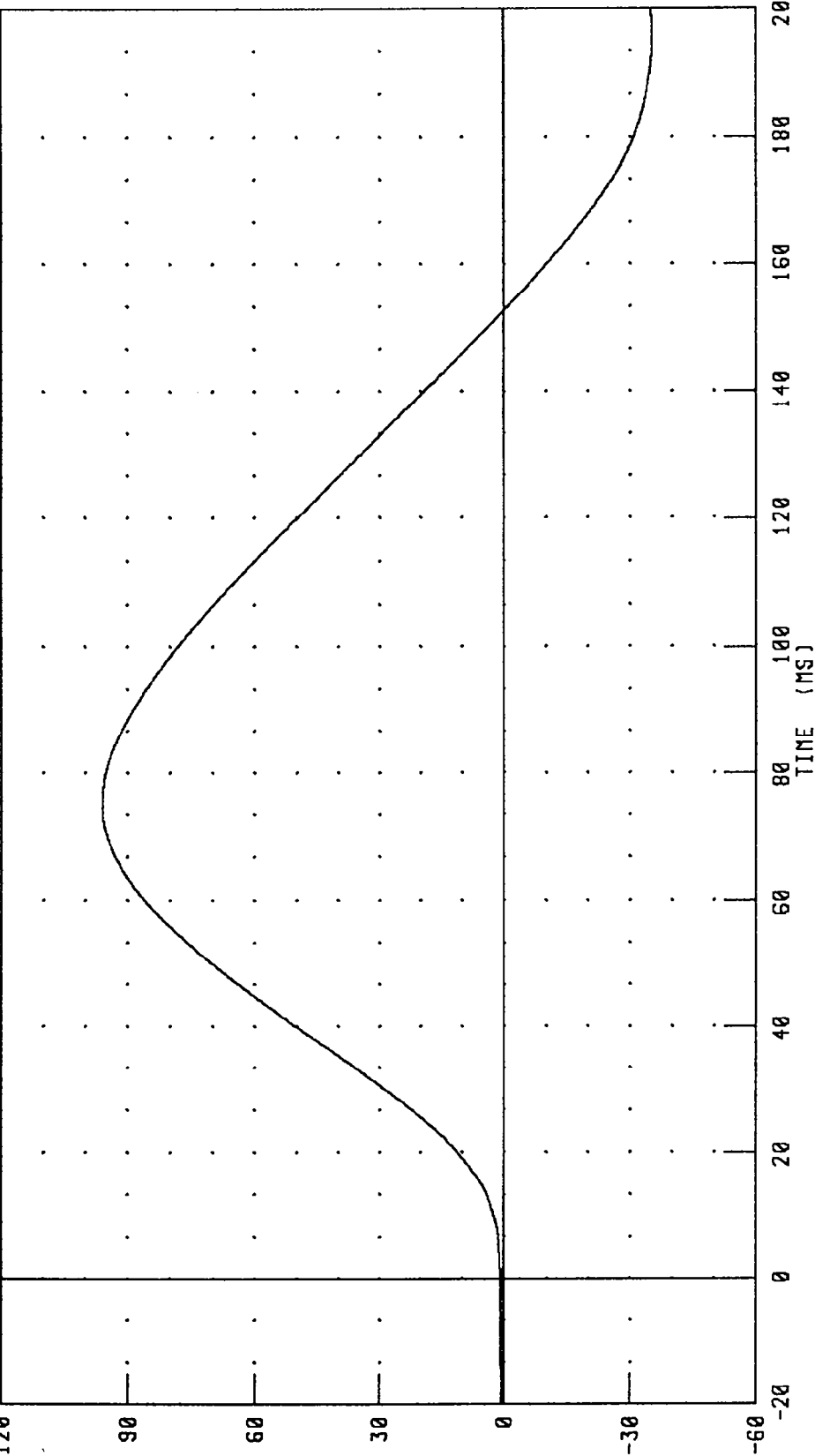
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 142C26NE1

572E SN142 NECK EXT. CAL26

RUN NUMBER: 022895.1346;1



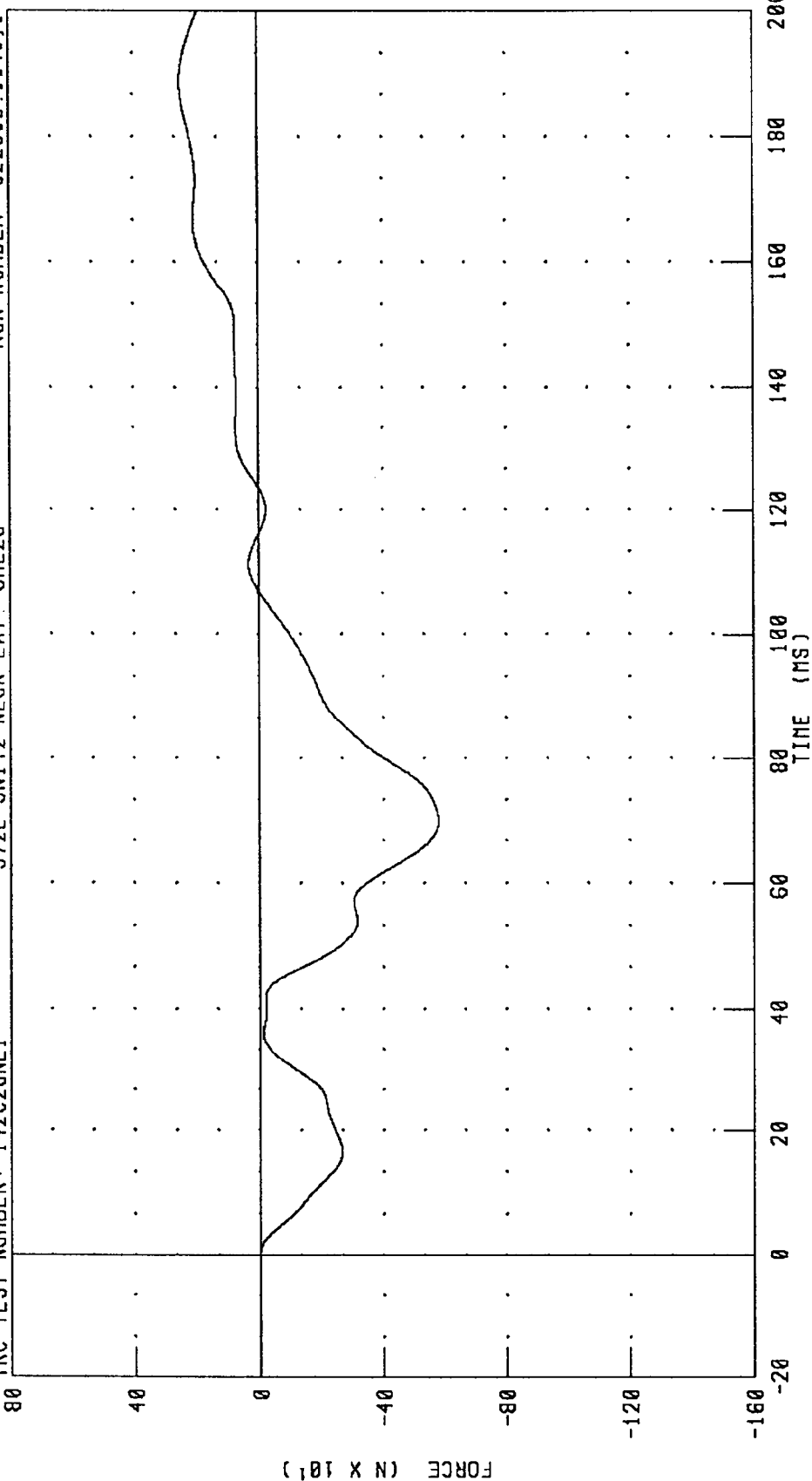
CHANNEL: TOTAL FILTER: CH. CLASS 60

PEAK DATA: 95.90 ° @ 74.72 MS; -35.21 ° @ 195.84 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 142C26NE1 572E SN142 NECK EXT. CAL26 RUN NUMBER: 022895.1346;1



PEAK DATA: 249.76 N @ 188.72 MS; -579.67 N @ 69.84 MS

CHANNEL: NEKXF FILTER: CH. CLASS 60

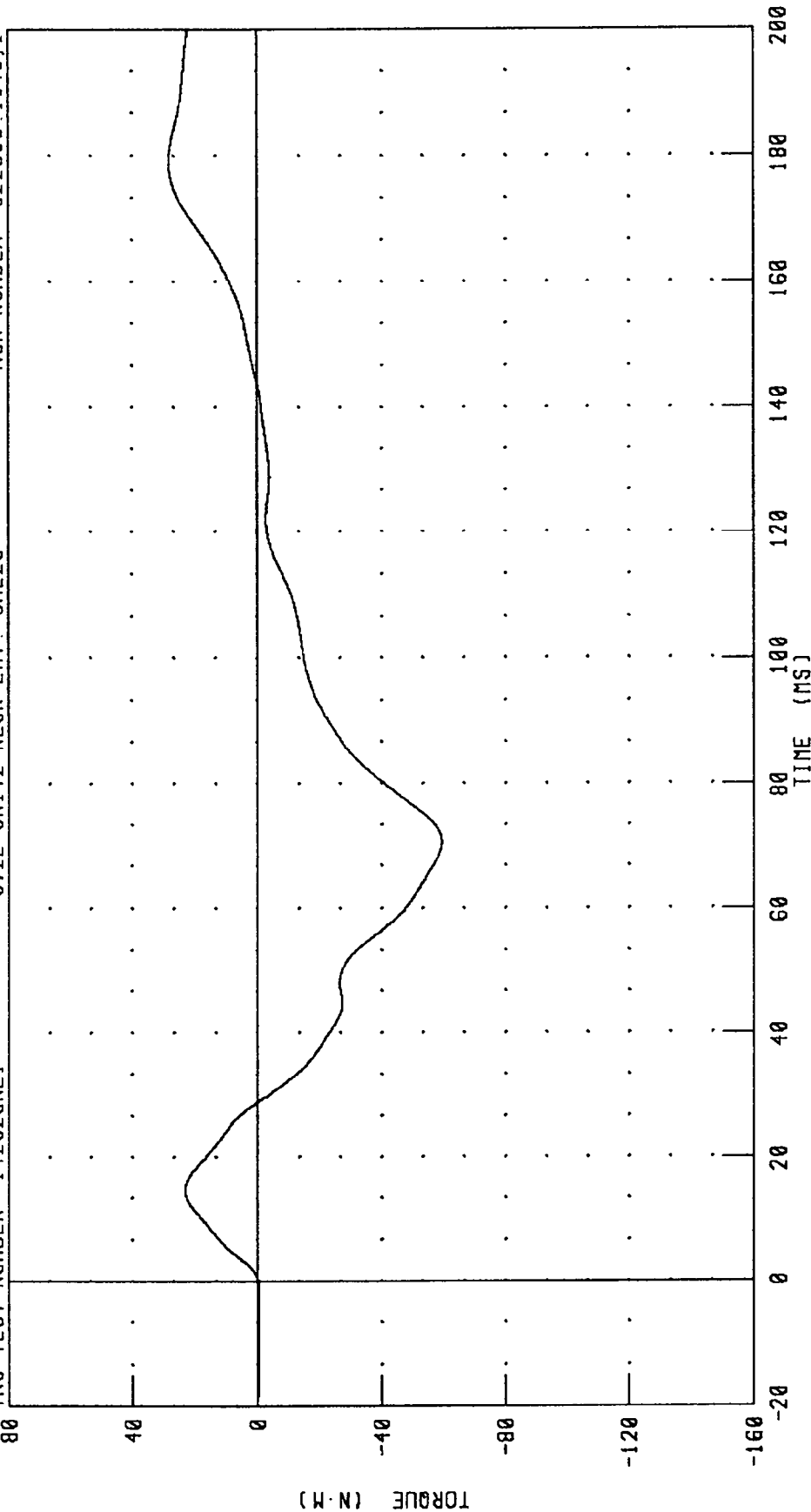
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 142C26NE1

572E SN142 NECK EXT. CAL26

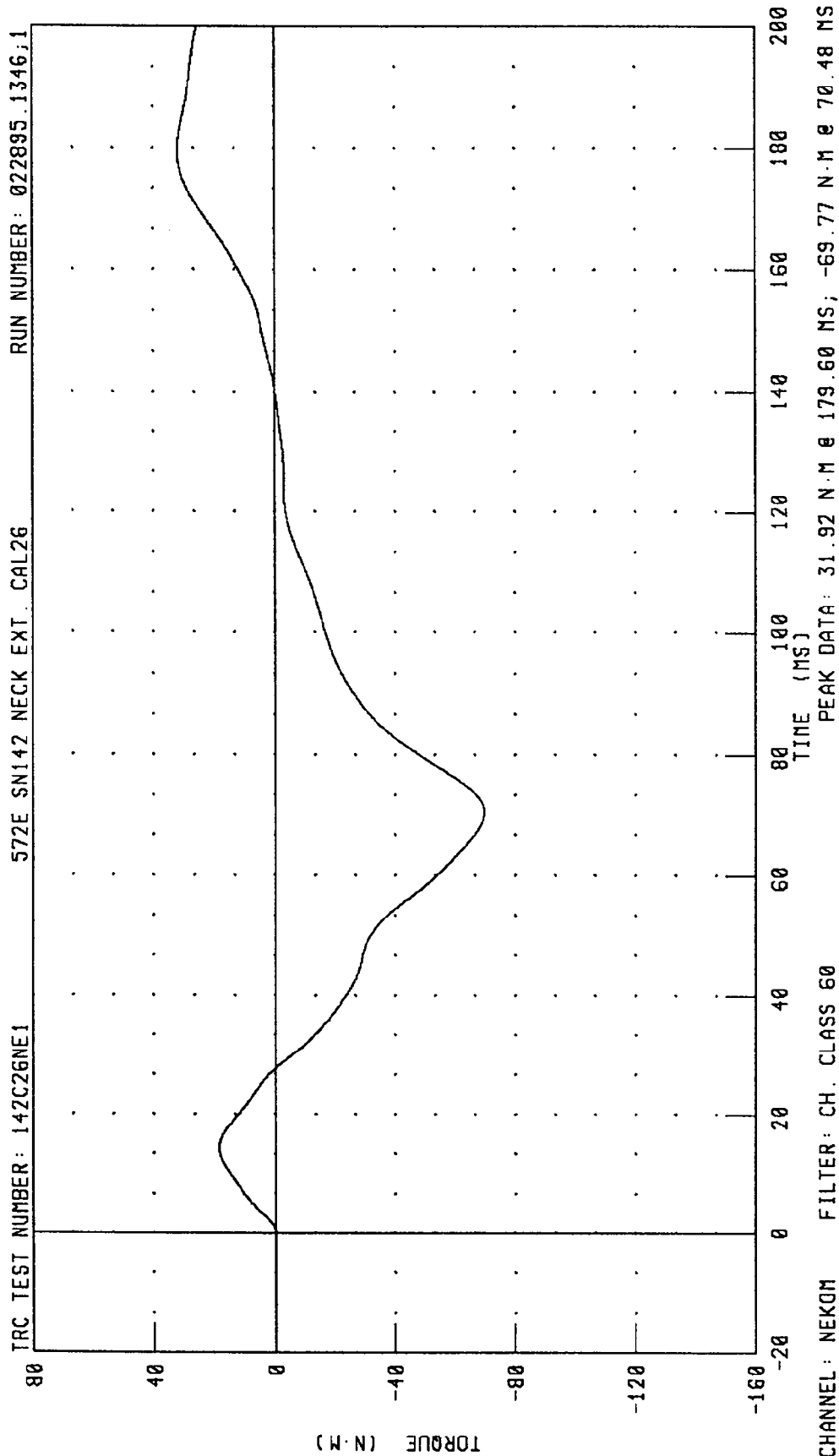
RUN NUMBER: 022895.1346;1



PEAK DATA: 28.08 N-M @ 179.12 MS; -59.48 N-M @ 70.56 MS

CHANNEL: NEKYM FILTER: CH. CLASS 60

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



TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III

25-JAN-95

TRC INC.

TEST NO: 142C26TH12

572E SN 142 H.S.THORAX CAL 26

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	25.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.68 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	66.6 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5652. N
INTERNAL HYSTERESIS	69% - 85%	75.1%

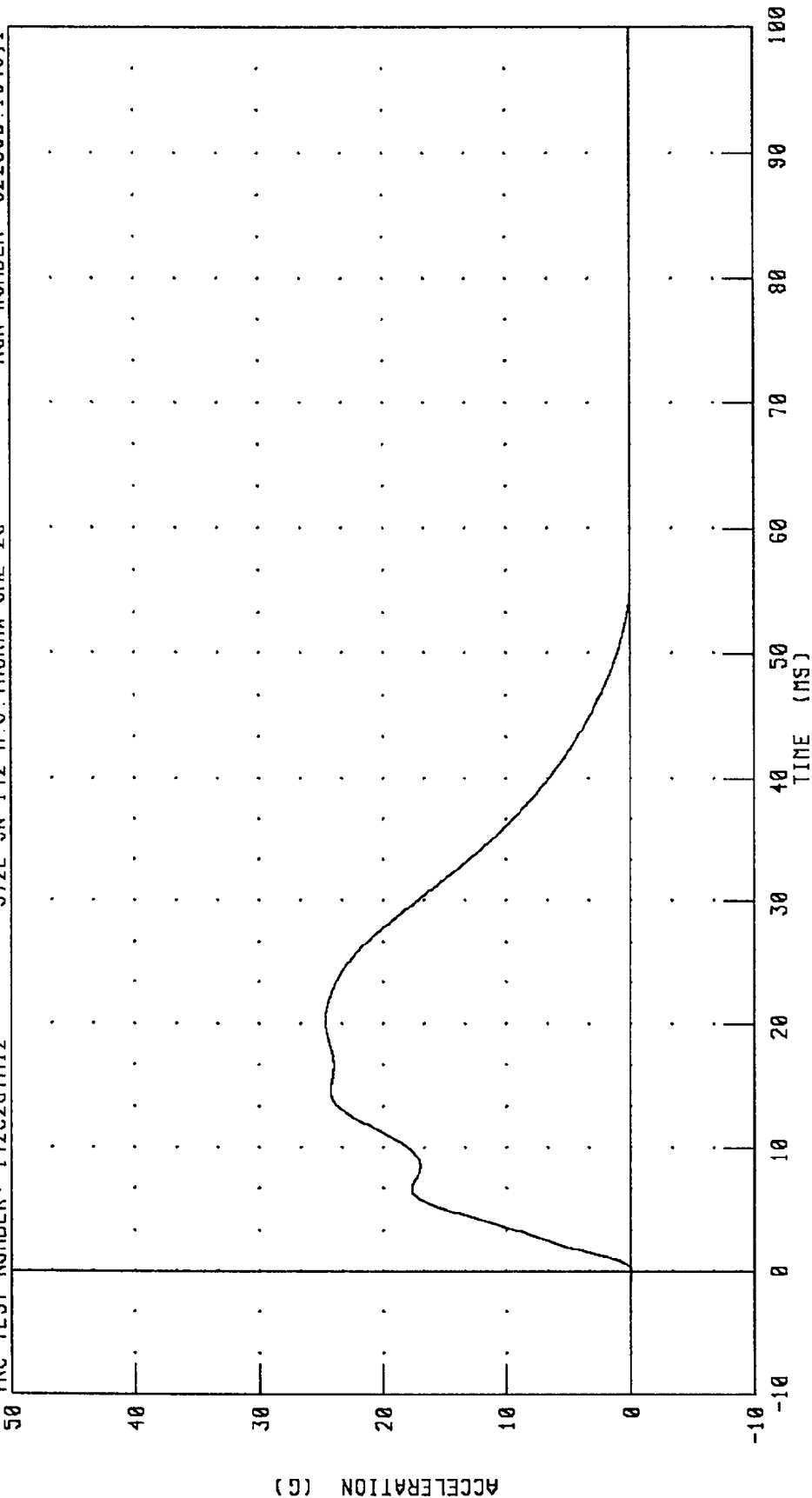
TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

RUN NUMBER: 012595.1305;1

PART 572-E HYBRID III THORAX CALIBRATION
 PENDULUM DECELERATION

TRC TEST NUMBER: 142C26TH12 572E SN 142 H.S. THORAX CAL 26 RUN NUMBER: 022895.1346;1

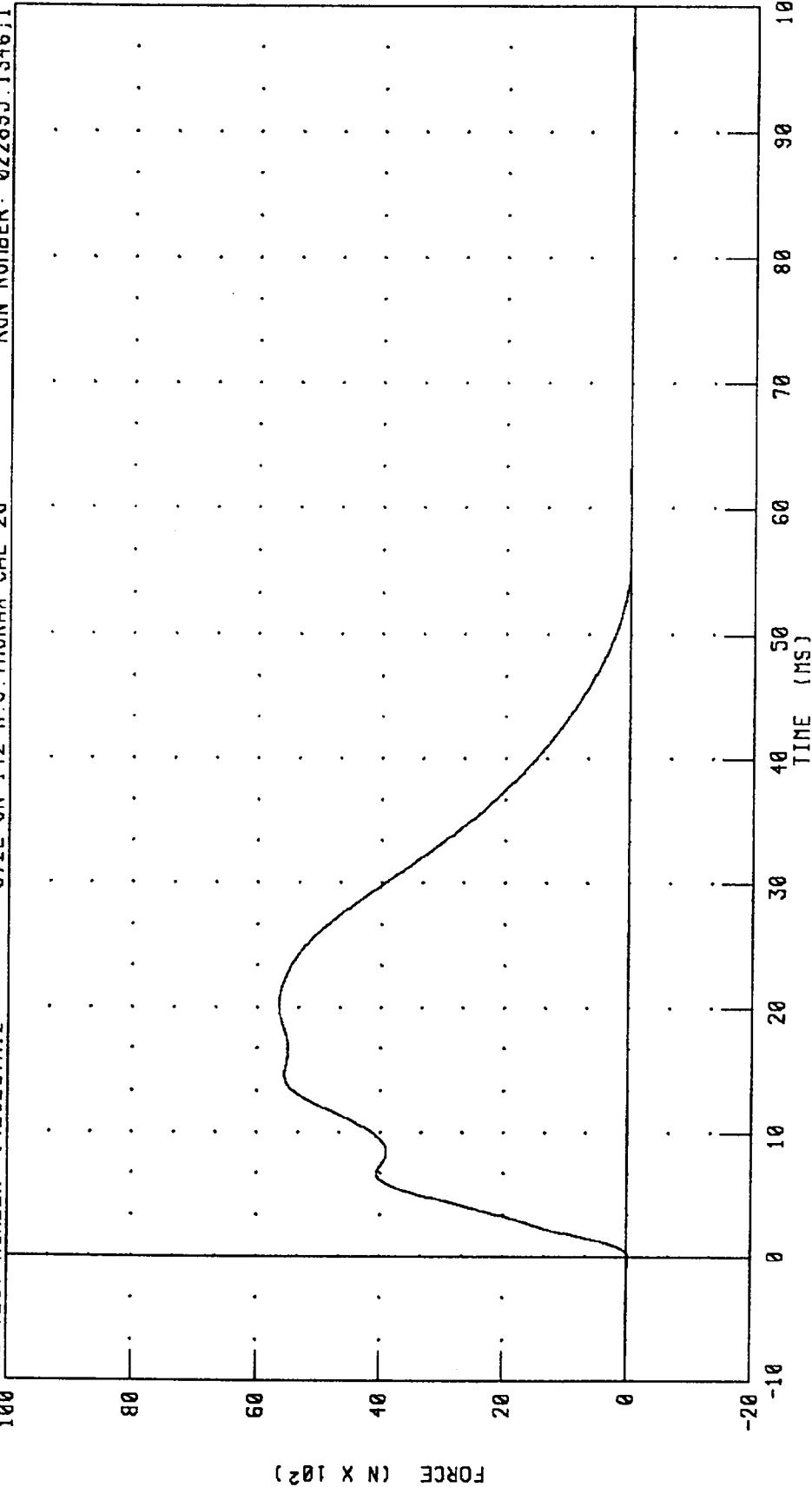


PEAK DATA: 24.67 G @ 20.24 MS; -0.09 G @ -0.16 MS

CHANNEL: PENXG FILTER: CH. CLASS 180

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM FORCE

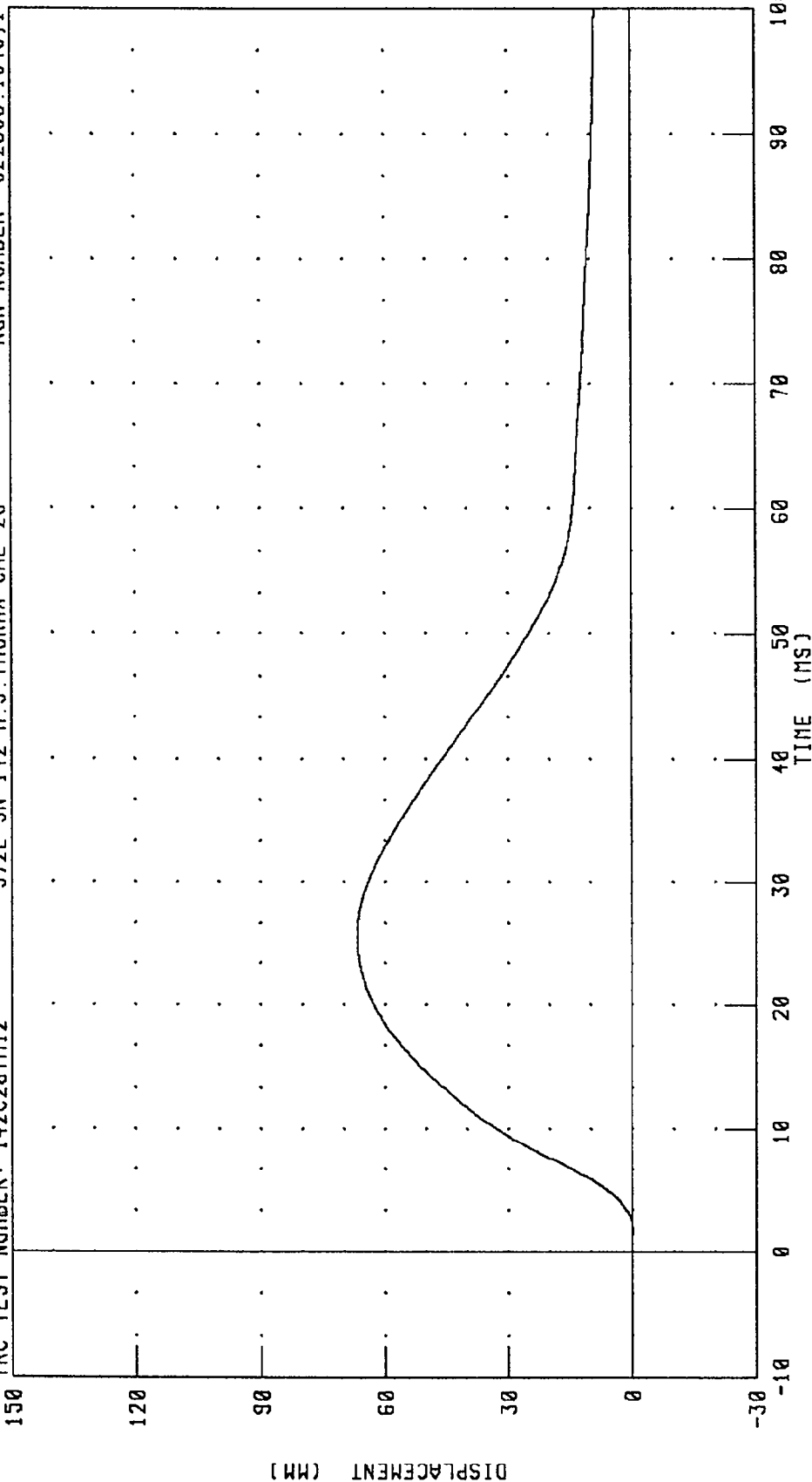
TRC TEST NUMBER: 142C26TH12 572E SN 142 H.S. THORAX CAL 26 RUN NUMBER: 022895.1346.1



CHANNEL: PENXF FILTER: CH. CLASS 180 PEAK DATA: 5652.18 N @ 20.24 MS; -19.72 N @ -0.16 MS

PART 572-E HYBRID III THORAX CALIBRATION STERNUM DISPLACEMENT

TRC TEST NUMBER: 142C26TH12 572E SN 142 H.S. THORAX CAL 26 RUN NUMBER: 022895.1346;1



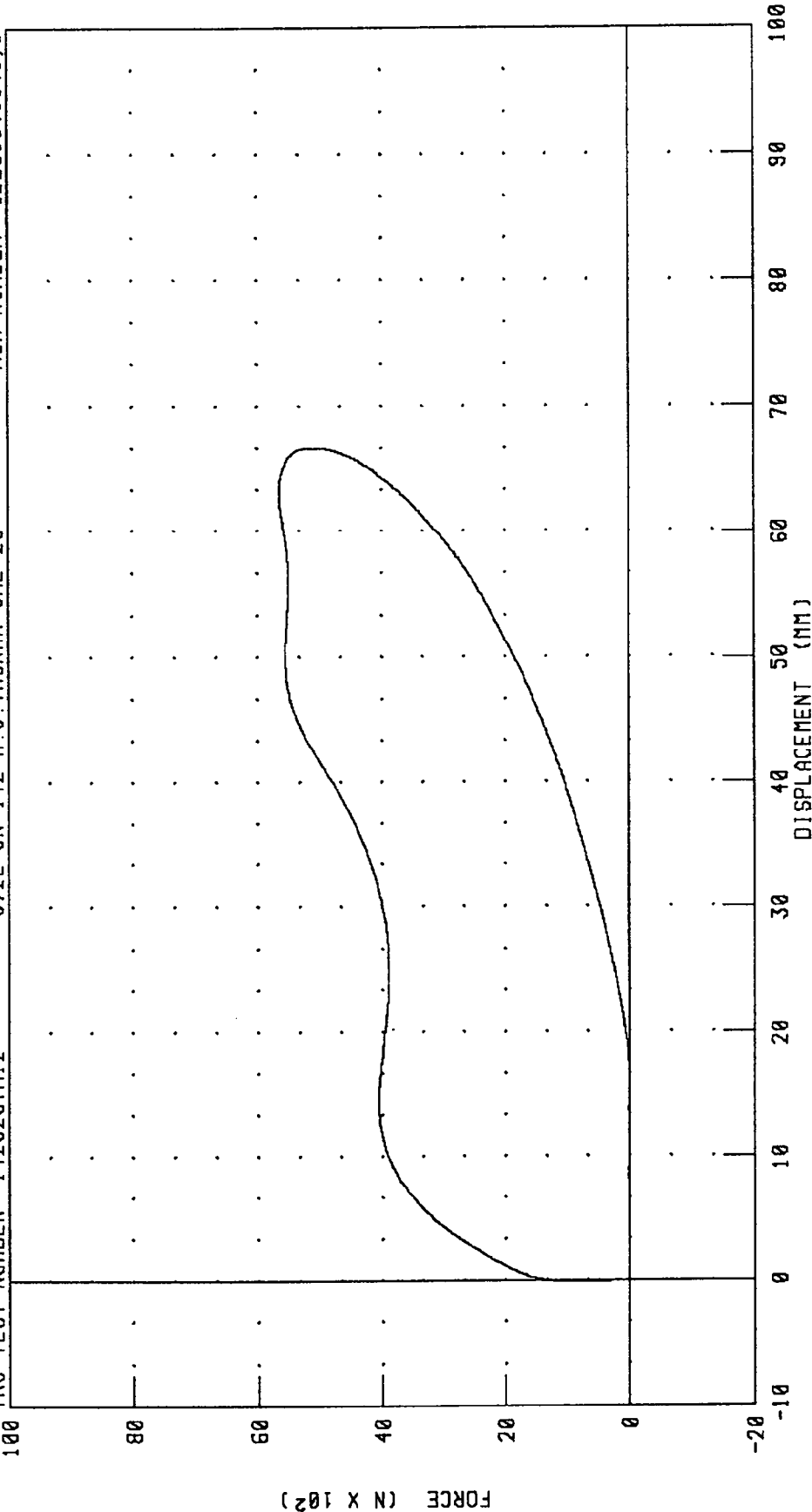
CHANNEL: CSTXD FILTER: CH. CLASS 180

PEAK DATA: 66.68 MM @ 25.68 MS; -0.07 MM @ 1.76 MS

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

TRC TEST NUMBER: 142C26TH12 RUN NUMBER: 022895.1346,1

572E SN 142 H.S.THORAX CAL 26



CHANNEL: CSTXD
PENXF

FILTER: CH. CLASS 180
CH. CLASS 180

PEAK DATA:

66.68 MM @ 25.68 MS; -0.07 NM @ 1.76 NS
5652.18 N @ 20.24 MS; -19.72 N @ -0.16 NS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III

09-JAN-95

TRC INC.

TEST NO: 142C26RK1

572E SN142 RIGHT KNEE CAL 26

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	26.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.13 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4714 - 5783 N	5594.3 N

TEST MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

RUN NUMBER: 010995.0832;1

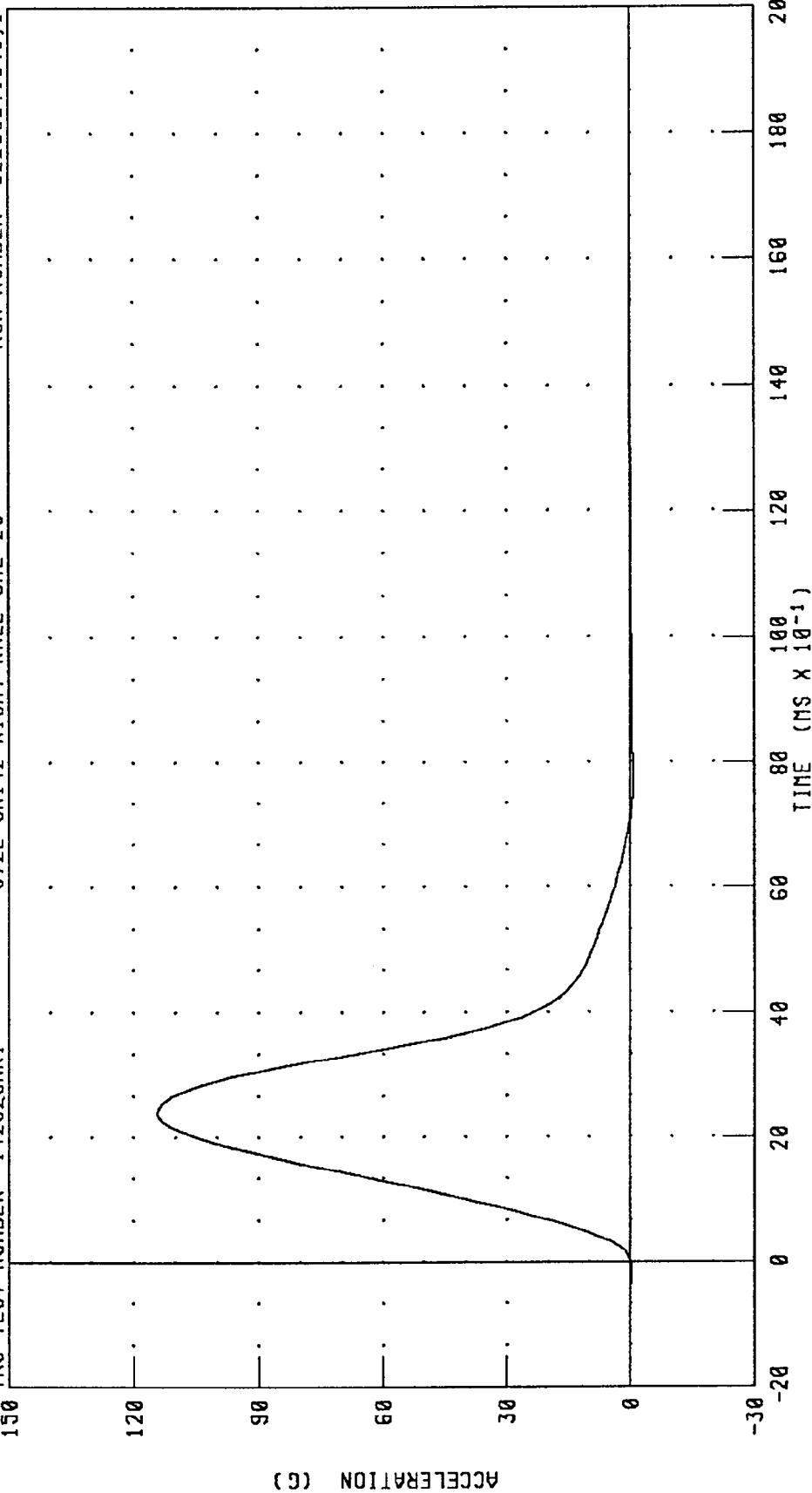
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM DECELERATION (5 KG PEND.)

TRC TEST NUMBER: 142C26RK1

572E SN142 RIGHT KNEE CAL 26

RUN NUMBER: 022895.1346;1



PEAK DATA: 114.34 G @ 2.40 MS; -0.75 G @ 7.76 MS

CHANNEL: PENXG FILTER: CH. CLASS 600

PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

572E SN142 RIGHT KNEE CAL 26

TRC TEST NUMBER: 142C26RK1

75

60

45

30

15

0

-15

-20

0

20

40

60

80

100

120

140

160

180

200

220

240

260

280

300

320

340

360

380

400

420

440

460

480

500

520

540

560

580

600

620

640

660

680

700

720

740

760

780

800

820

840

860

880

900

920

940

960

980

1000

1020

1040

1060

1080

1100

1120

1140

1160

1180

1200

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1760

1780

1800

1820

1840

1860

1880

1900

1920

1940

1960

1980

2000

2020

2040

2060

2080

2100

2120

2140

2160

2180

2200

2220

2240

2260

2280

2300

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4080

4100

4120

4140

4160

4180

4200

4220

4240

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4900

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4940

4960

4980

5000

5020

5040

5060

5080

5100

5120

5140

5160

5180

5200

5220

5240

5260

5280

5300

5320

5340

5360

5380

5400

5420

5440

5460

5480

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III

09-JAN-95

TRC INC.

TEST NO: 142C26LK1

572E SN142 LEFT KNEE CAL 26

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	26.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.09 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4714 - 5783 N	4789.6 N

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

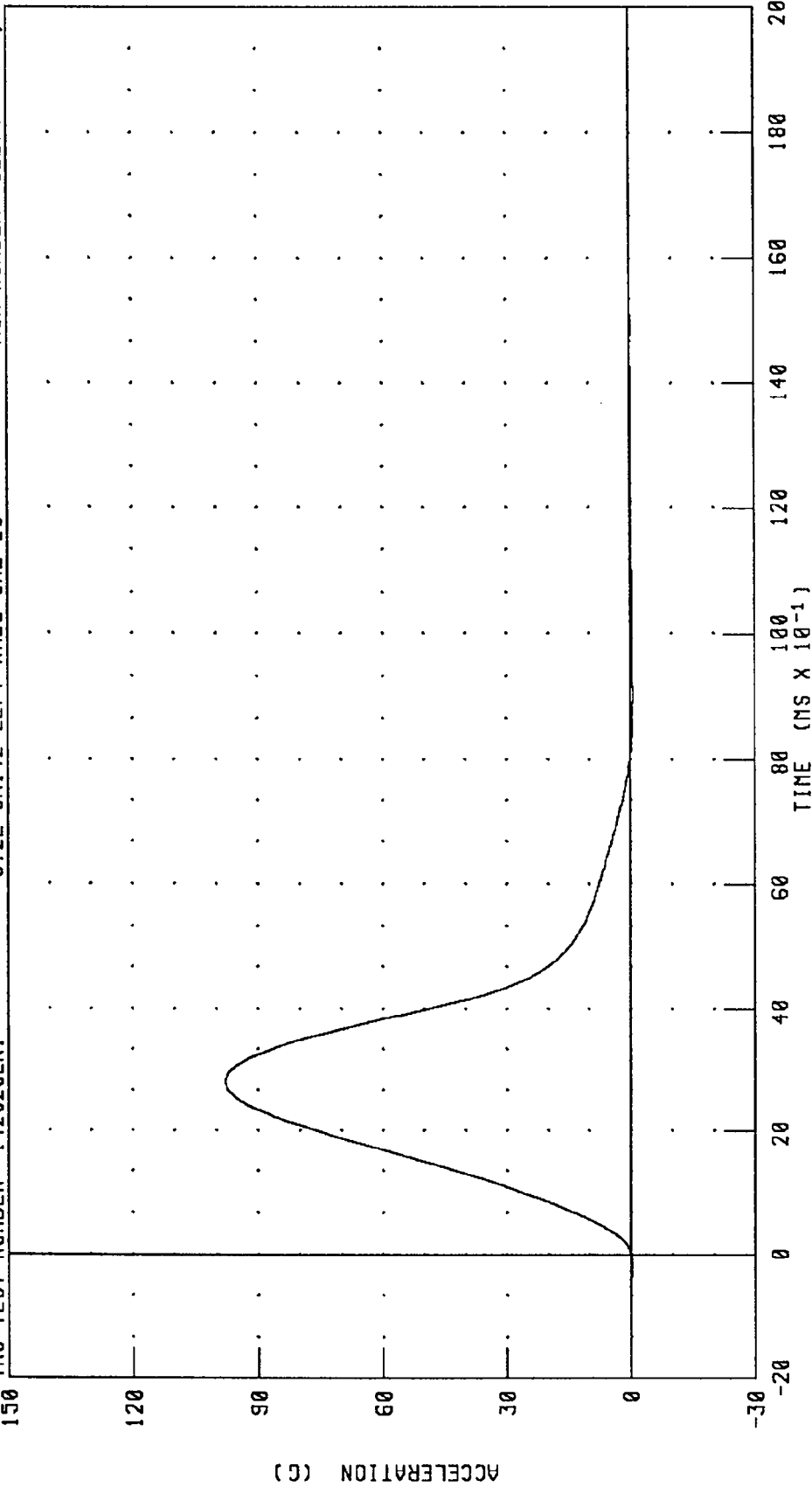
RUN NUMBER: 010995.1010;2

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

TRC TEST NUMBER: 142C26LK1

572E SN142 LEFT KNEE CAL 26

RUN NUMBER: 022895.1346;2



PEAK DATA: 97.89 G @ 2.80 MS; -0.58 G @ 9.04 MS

CHANNEL: PENXG FILTER: CH. CLASS 600

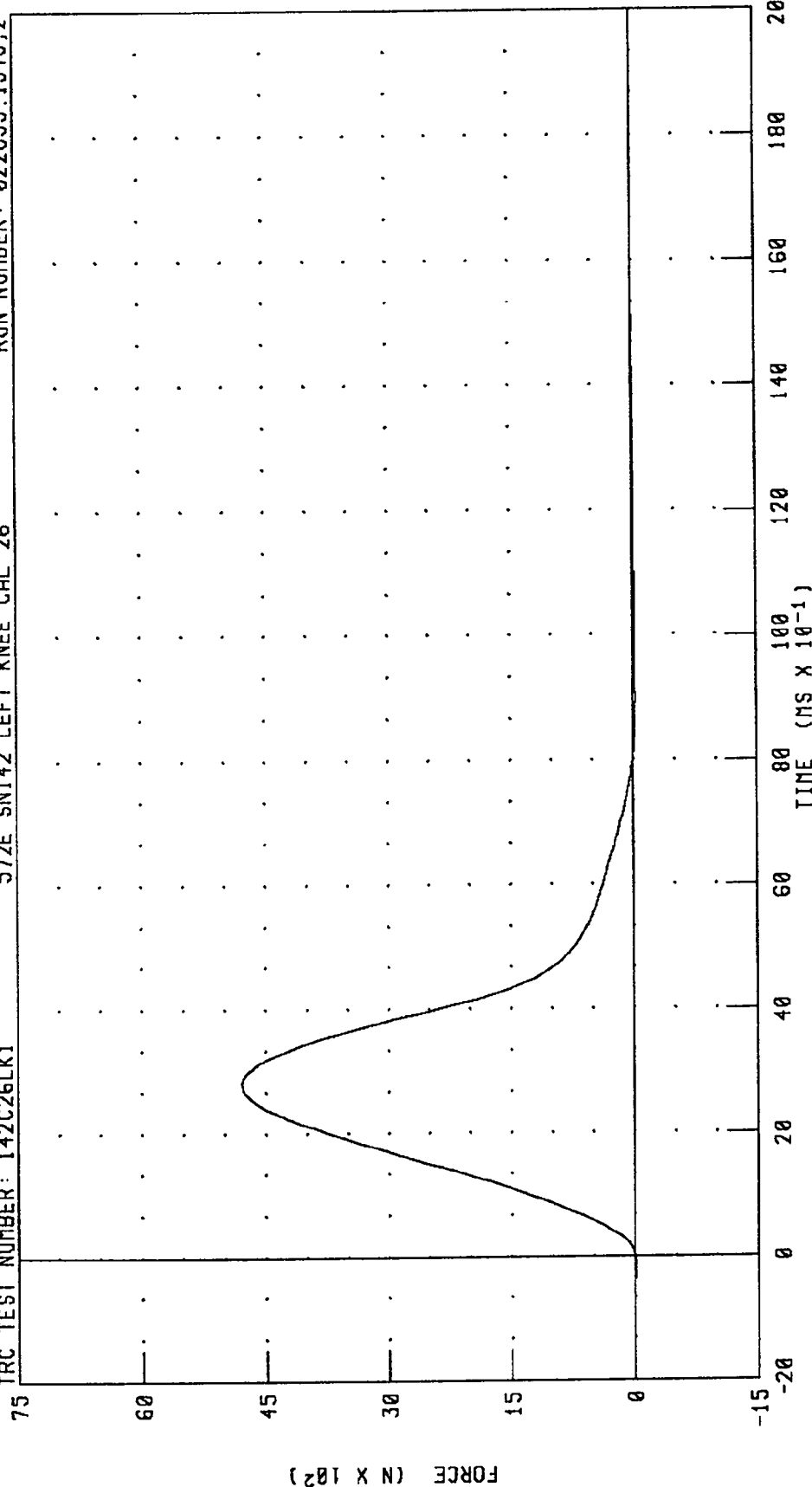
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 142C26LK1

572E SN142 LEFT KNEE CAL 26

RUN NUMBER: 022895.1346;2



PEAK DATA: 4789.66 N @ 2.80 MS; -28.48 N @ 9.04 MS

CHANNEL: PENXF FILTER: CH. CLASS 600

Pre-test Certification Data

Passenger Dummy S/N: 192

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III EXTERNAL DIMENSIONS

192 ALDERSON

25-JAN-95

TRC INC.

TEST NO: 192C25ED1

572E SN192 EXT.DIMENSION CAL25

TEST PARAMETER	(DIMEN.)	SPECIFICATION	TEST RESULTS
LOCATION FOR CHEST CIRCUMFERENCE (AA)		429 - 434 MM	432. MM
LOCATION FOR WAIST CIRCUMFERENCE (BB)		226 - 231 MM	229. MM
CHEST CIRCUMFERENCE (Y)		970 -1001 MM	980. MM
WAIST CIRCUMFERENCE (Z)		836 - 866 MM	851. MM
CHEST DEPTH (O)		213 - 229 MM	218. MM
H-POINT HEIGHT (C)		84 - 89 MM	84. MM
H-POINT FROM SEATBACK (D)		135 - 140 MM	135. MM
SKULL CAP TO BACKLINE (H)		41 - 46 MM	43. MM
TOTAL SITTING HEIGHT (A)		879 - 889 MM	889. MM
THIGH CLEARANCE (F)		140 - 155 MM	150. MM
BUTTOCK KNEE LENGTH (K)		579 - 605 MM	597. MM
BUTTOCK POPLITEAL LENGTH (N)		452 - 478 MM	470. MM
POPLITEAL HEIGHT (L)		429 - 455 MM	447. MM
KNEE PIVOT HEIGHT (M)		485 - 500 MM	493. MM
FOOT LENGTH (P)		252 - 267 MM	259. MM
FOOT BREADTH (W)		91 - 107 MM	102. MM
SHOULDER PIVOT FROM BACKLINE (E)		84 - 94 MM	94. MM
SHOULDER BREADTH (V)		422 - 437 MM	429. MM
SHOULDER PIVOT HEIGHT (B)		506 - 521 MM	516. MM
ELBOW REST HEIGHT (J)		191 - 211 MM	211. MM
SHOULDER-ELBOW LENGTH (I)		330 - 345 MM	345. MM
BACK OF ELBOW TO WRIST PIVOT (G)		290 - 305 MM	290. MM

DUMMY MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

RUN NUMBER: 012595.1352

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III

25-JAN-95

TRC INC.

TEST NO: 192C25HD1

572E SN192 HEAD DROP CAL 25

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	25.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	229.49 G
PEAK LATERAL ACCELERATION	15 G MAX	-8.03 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

RUN NUMBER: 012595.1011;1

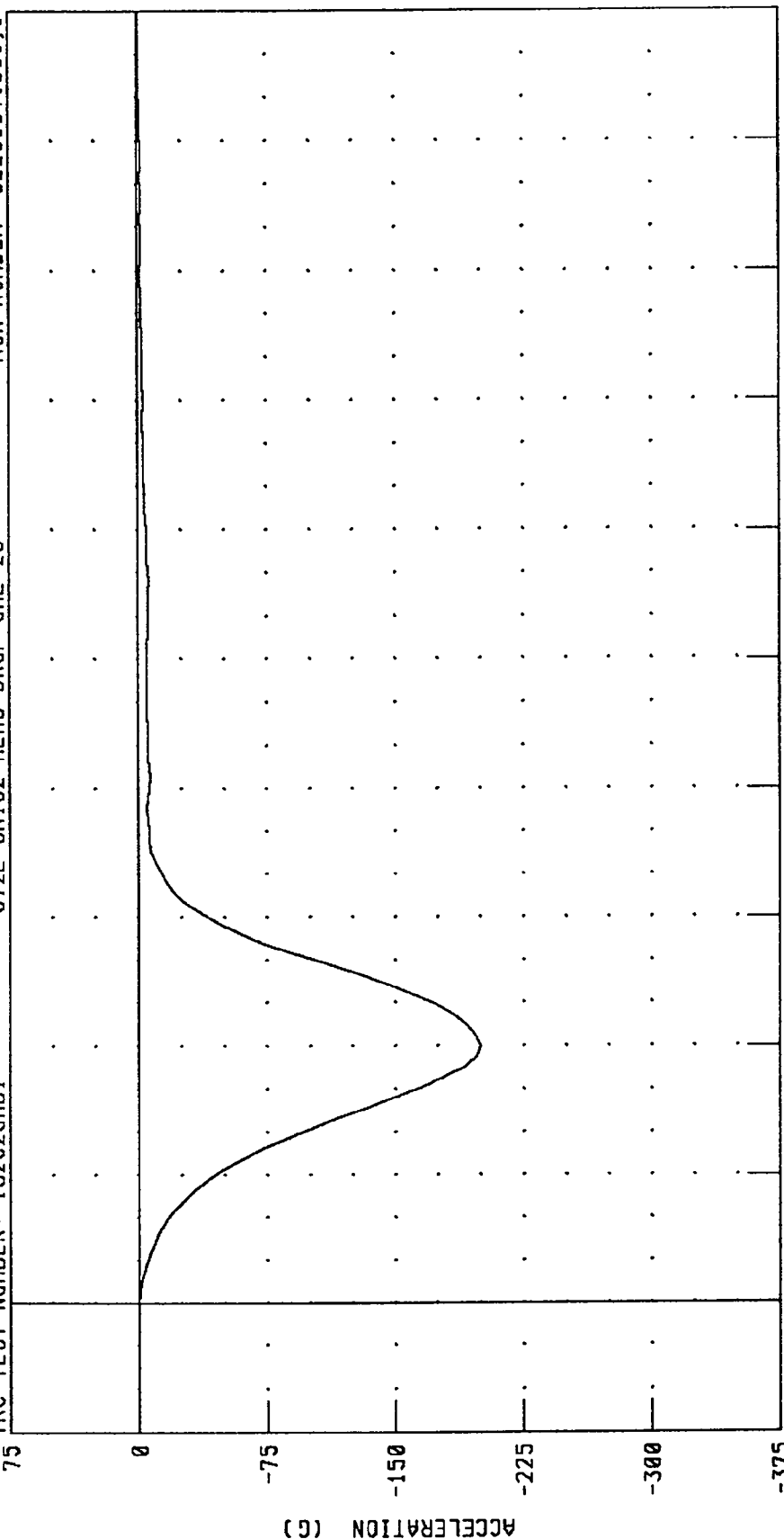
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION X AXIS

572E SN192 HEAD DROP CAL 25 RUN NUMBER: 022895.1353.1

TRC TEST NUMBER: 192C25HD1

75



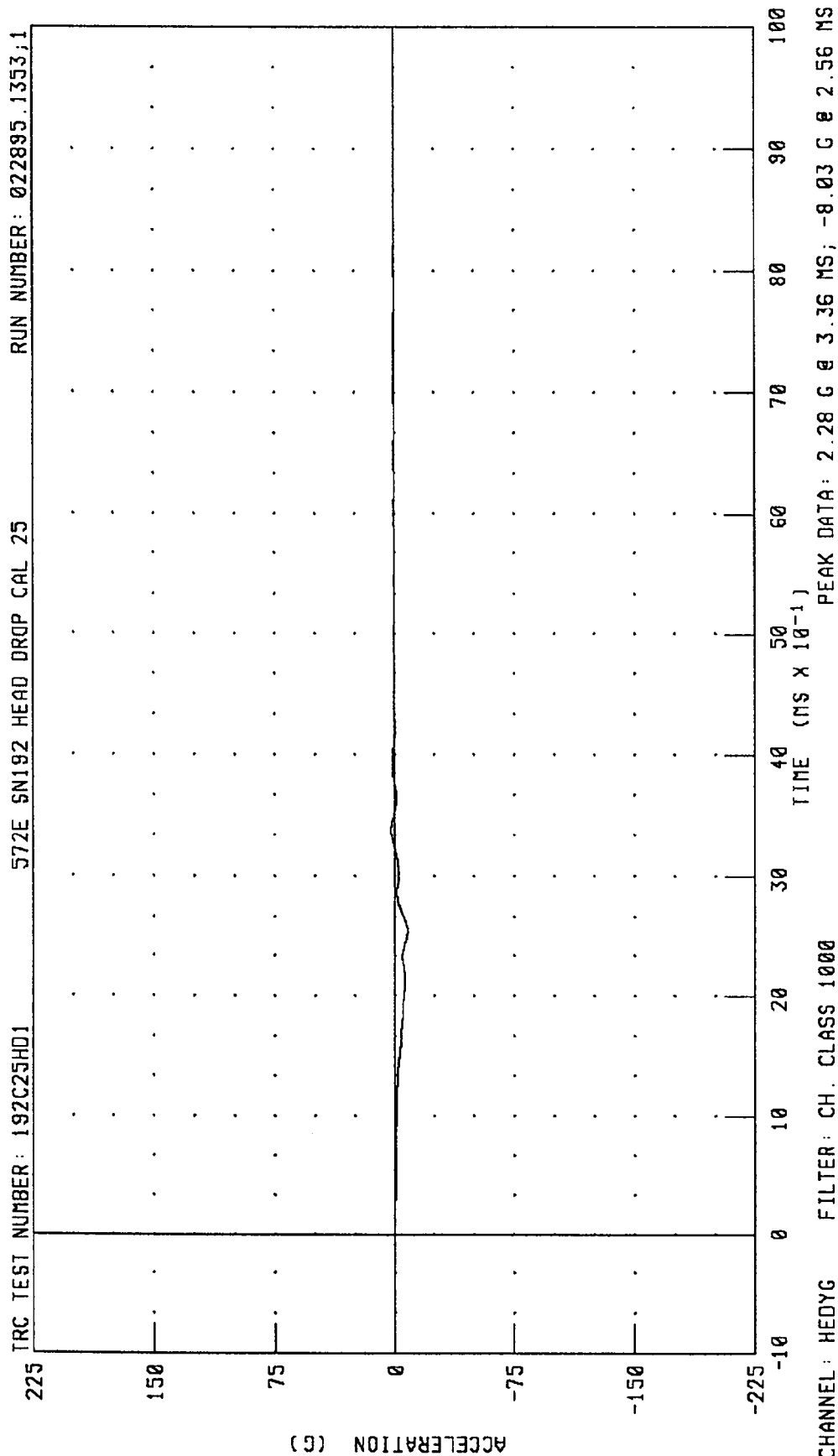
ACCELERATION (G)

TIME (MS X 10⁻¹)

PEAK DATA: 0.04 G @ -0.72 MS; -199.84 G @ 2.00 MS

CHANNEL: HEDXC FILTER: CH. CLASS 1000

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

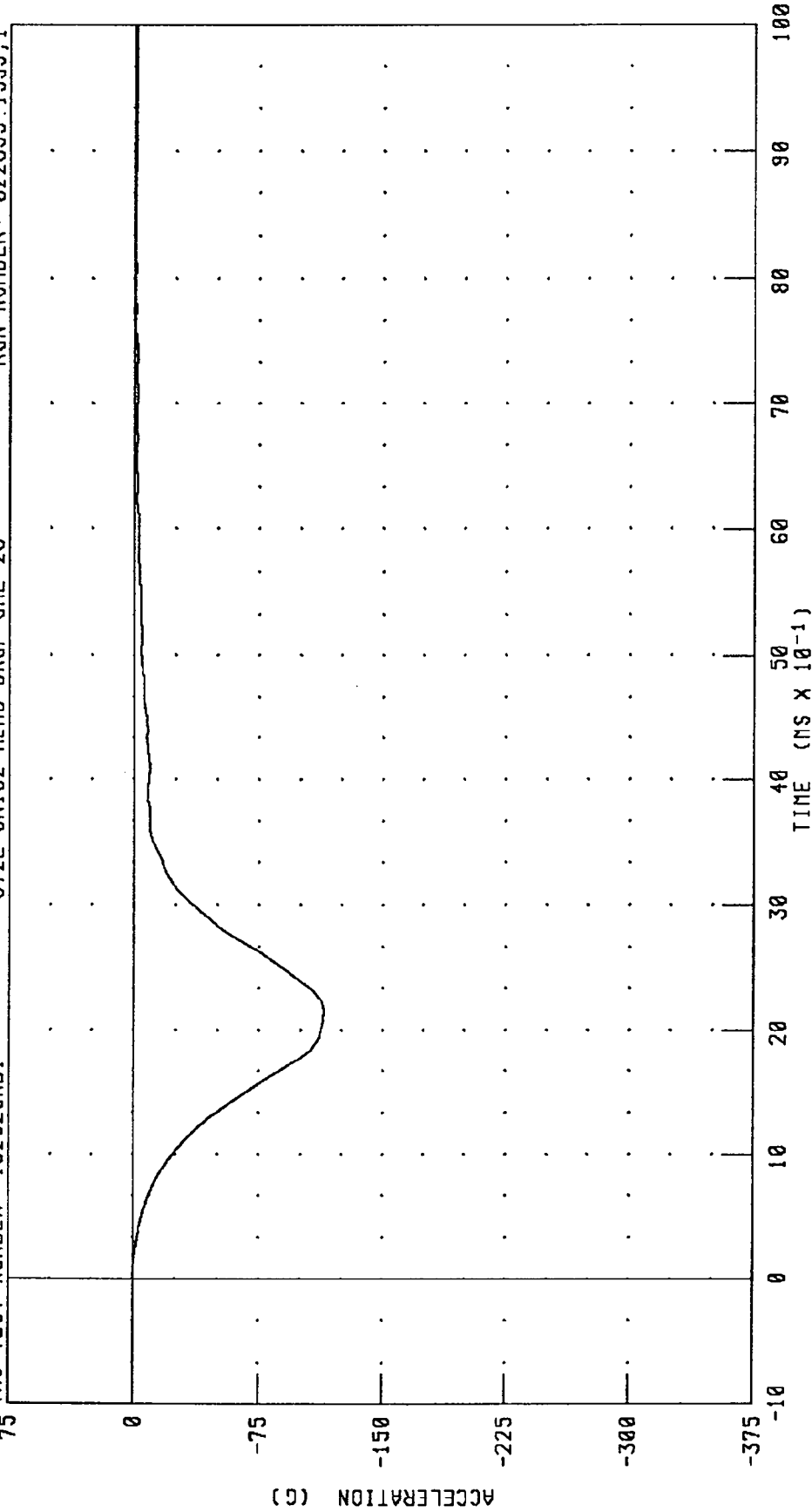


PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Z AXIS

572E SN192 HEAD DROP CAL 25 RUN NUMBER: 022895.1353;1

TRC TEST NUMBER: 192C25HD1



CHANNEL: HEDZG FILTER: CH. CLASS 1000

PEAK DATA: -0.02 G @ -0.24 MS; -114.57 G @ 2.16 MS

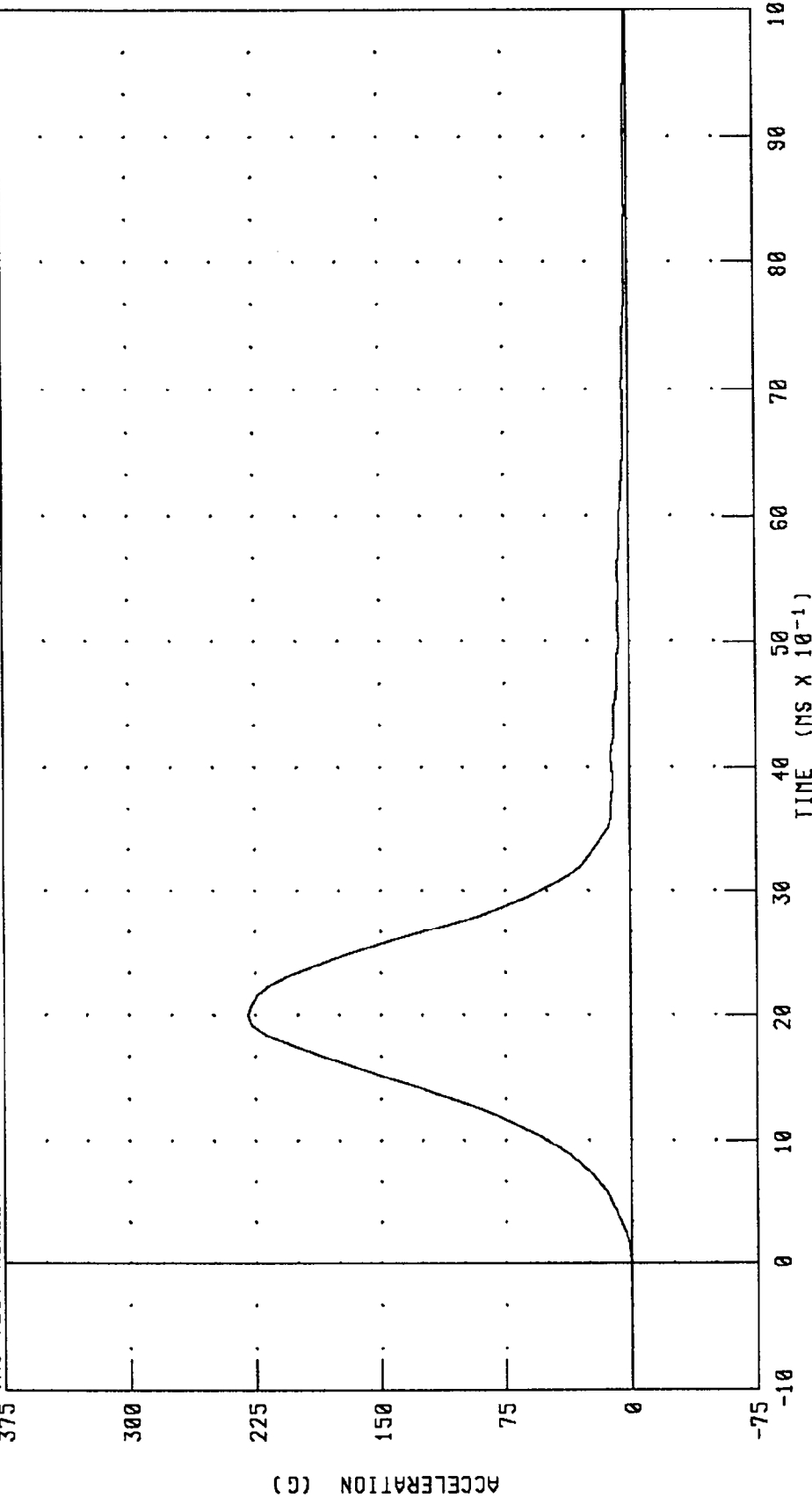
PART 572-E HYBRID III HEAD CALIBRATION

HEAD RESULTANT ACCELERATION

572E SN192 HEAD DROP CAL 25

RUN NUMBER: 022895.1353,1

TRC TEST NUMBER: 192C25HD1



CHANNEL: HEDRG FILTER: CH. CLASS 1000

PEAK DATA: 229.49 G @ 2.00 MS; 0.04 G @ -0.16 MS

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

HYBRID III

25-JAN-95

TRC INC. TEST NO: 192C25NF1 572E SN192 NECK FLEXION CAL25

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	25.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	7.06 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	22.58 G
	20 MS	17.60 - 22.60 G	20.88 G
	30 MS	12.50 - 18.50 G	17.77 G
MAX PENDULUM G		29 G MAX	23.24 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	17.75 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	38.24 MS
D PLANE	MAX	64 - 78 DEG.	65.20 DEG.
ROTATION	TIME	57 - 64 MS	57.28 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	92.02 NM
	TIME	47 - 58 MS	50.40 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	113.68 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	102.96 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Char. Middleton

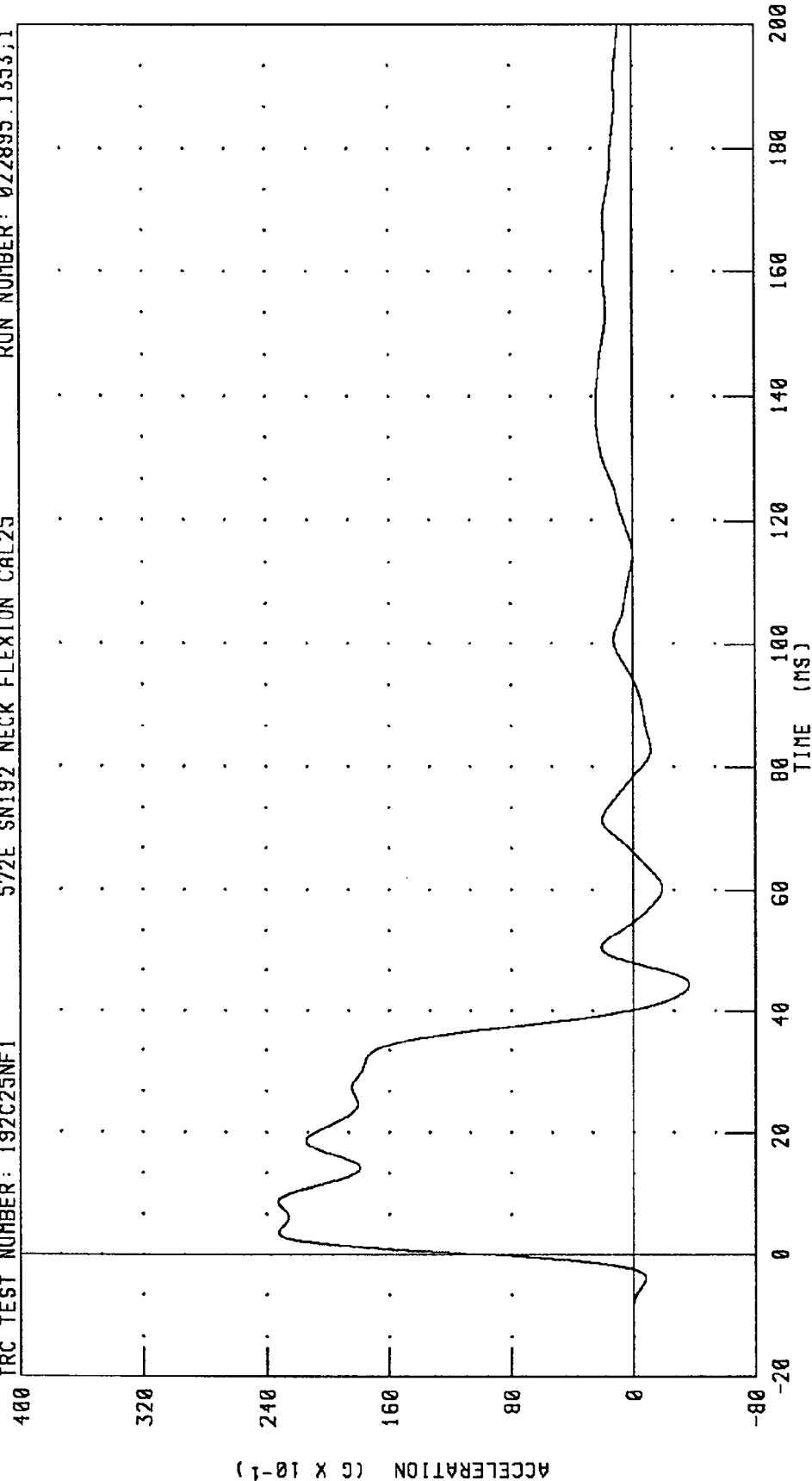
RUN NUMBER: 012595.1059;1

PART 572-E HYBRID III NECK FLEXION CALIBRATION PENDULUM DECELERATION

IRC TEST NUMBER: 192C25NF1

572E SN192 NECK FLEXION CAL25

RUN NUMBER: 022895.1353;1



PEAK DATA: 23.24 G @ 8.72 MS; -3.65 G @ 44.40 MS

CHANNEL: PENXG FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN192 NECK FLEXION CAL25

TRC TEST NUMBER: 192C25NF1

120

90

60

30

0

RUN NUMBER: 022895.1353.1

TIME (MS)

80

100

120

140

160

180

200

PEAK DATA: 28.74 ° @ 56.88 MS; -16.50 ° @ 168.32 MS

CHANNEL: BETA

FILTER: CH. CLASS 60

ANGLE (°)

-20

-30

-60

0

30

60

90

120

140

160

180

200

220

240

260

280

300

320

340

360

380

400

420

440

460

480

500

520

540

560

580

600

620

640

660

680

700

720

740

760

780

800

820

840

860

880

900

920

940

960

980

1000

1020

1040

1060

1080

1100

1120

1140

1160

1180

1200

1220

1240

1260

1280

1300

1320

1340

1360

1380

1400

1420

1440

1460

1480

1500

1520

1540

1560

1580

1600

1620

1640

1660

1680

1700

1720

1740

1760

1780

1800

1820

1840

1860

1880

1900

1920

1940

1960

1980

2000

2020

2040

2060

2080

2100

2120

2140

2160

2180

2200

2220

2240

2260

2280

2300

2320

2340

2360

2380

2400

2420

2440

2460

2480

2500

2520

2540

2560

2580

2600

2620

2640

2660

2680

2700

2720

2740

2760

2780

2800

2820

2840

2860

2880

2900

2920

2940

2960

2980

3000

3020

3040

3060

3080

3100

3120

3140

3160

3180

3200

3220

3240

3260

3280

3300

3320

3340

3360

3380

3400

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3660

3680

3700

3720

3740

3760

3780

3800

3820

3840

3860

3880

3900

3920

3940

3960

3980

4000

4020

4040

4060

4080

4100

4120

4140

4160

4180

4200

4220

4240

4260

4280

4300

4320

4340

4360

4380

4400

4420

4440

4460

4480

4500

4520

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4560

4580

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4620

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4700

4720

4740

4760

4780

4800

4820

4840

4860

4880

4900

4920

4940

4960

4980

5000

5020

5040

5060

5080

5100

5120

5140

5160

5180

5200

5220

5240

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5360

5380

5400

5420

5440

5460

5480

5500

5520

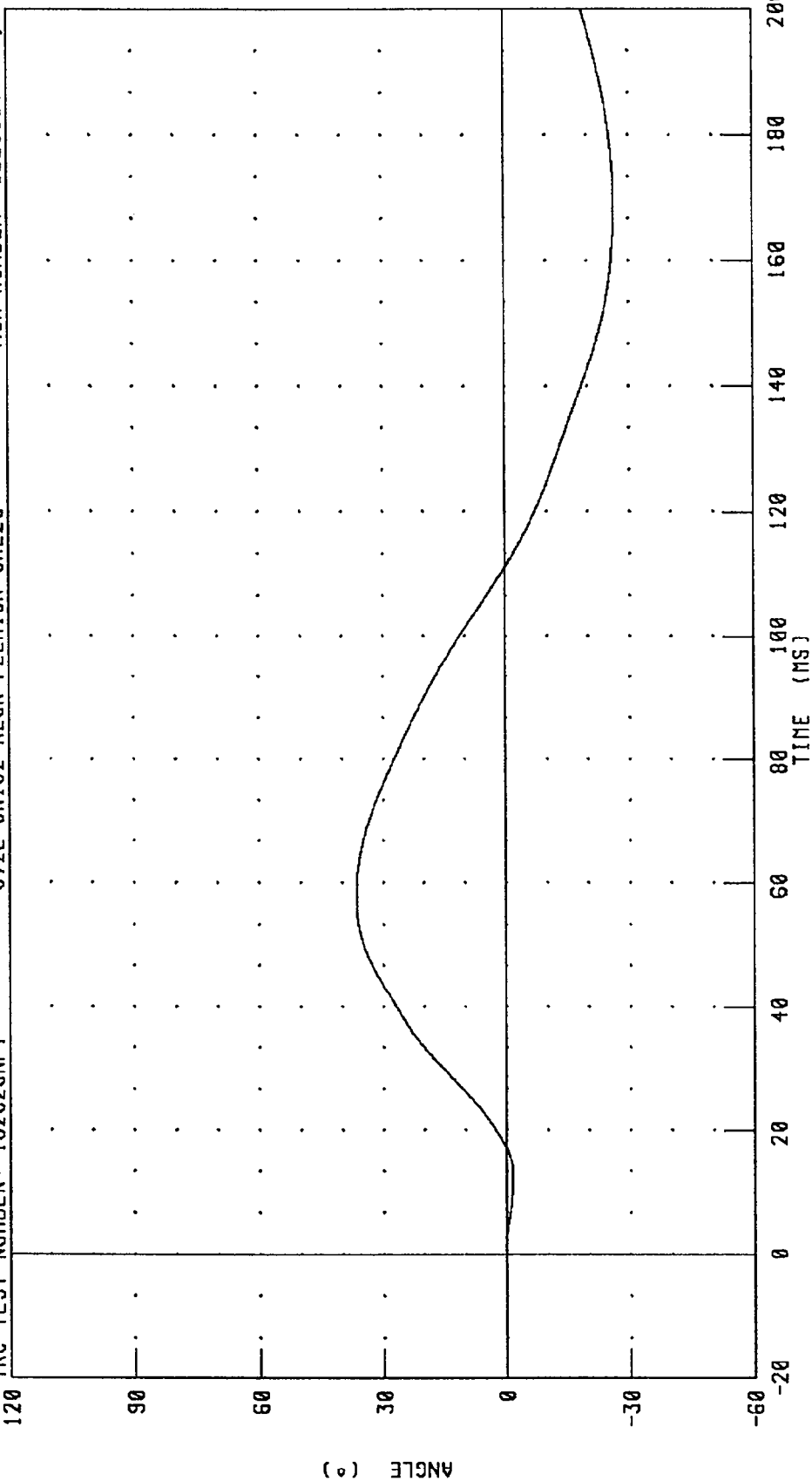
554

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

TRC TEST NUMBER: 192C25NF1

572E SN192 NECK FLEXION CAL25

RUN NUMBER: 022895.1353;1



PEAK DATA: 36.47 ° @ 58.00 MS; -26.44 ° @ 169.92 MS

CHANNEL: THETA FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK FLEXION CALIBRATION

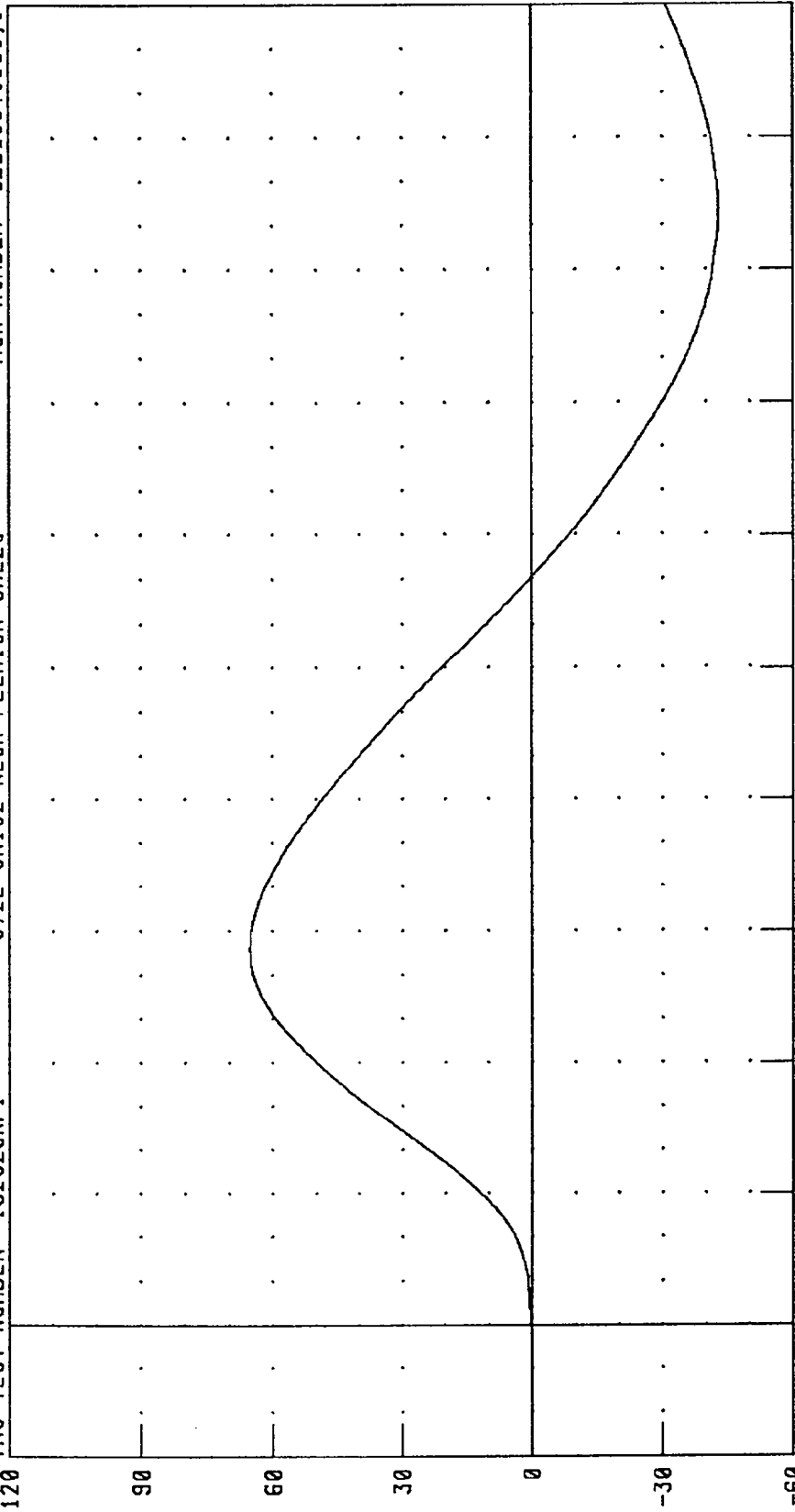
TOTAL ROTATION

TRC TEST NUMBER: 192C25NF1

572E SN192 NECK FLEXION CAL25

RUN NUMBER: 022895.1353;1

120



CHANNEL: TOTAN FILTER: CH. CLASS 60

PEAK DATA: 65.20 ° @ 57.28 MS; -42.94 ° @ 168.40 MS

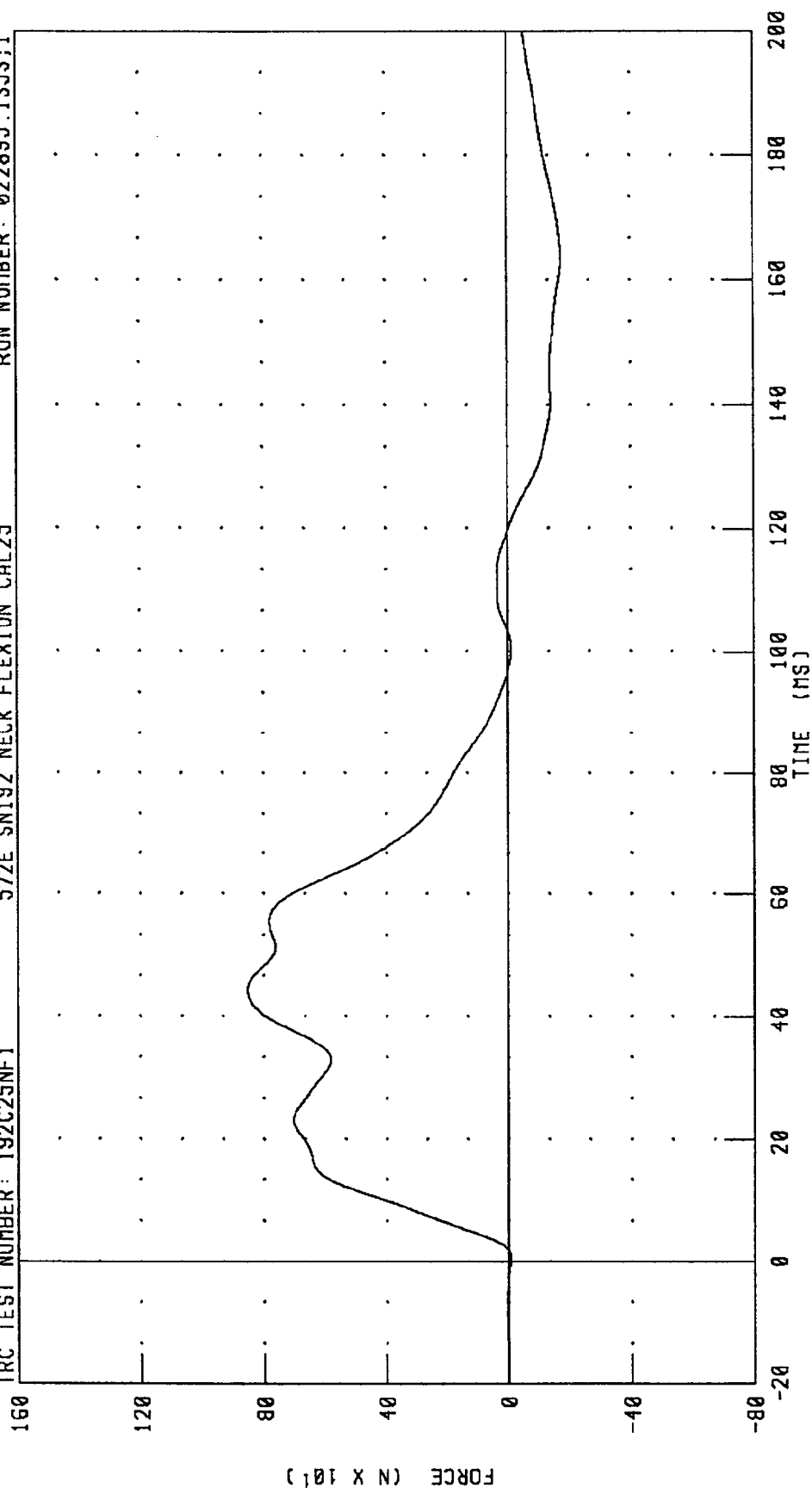
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 192C25NF1

572E SN192 NECK FLEXION CAL25

RUN NUMBER: 022895.1353;1



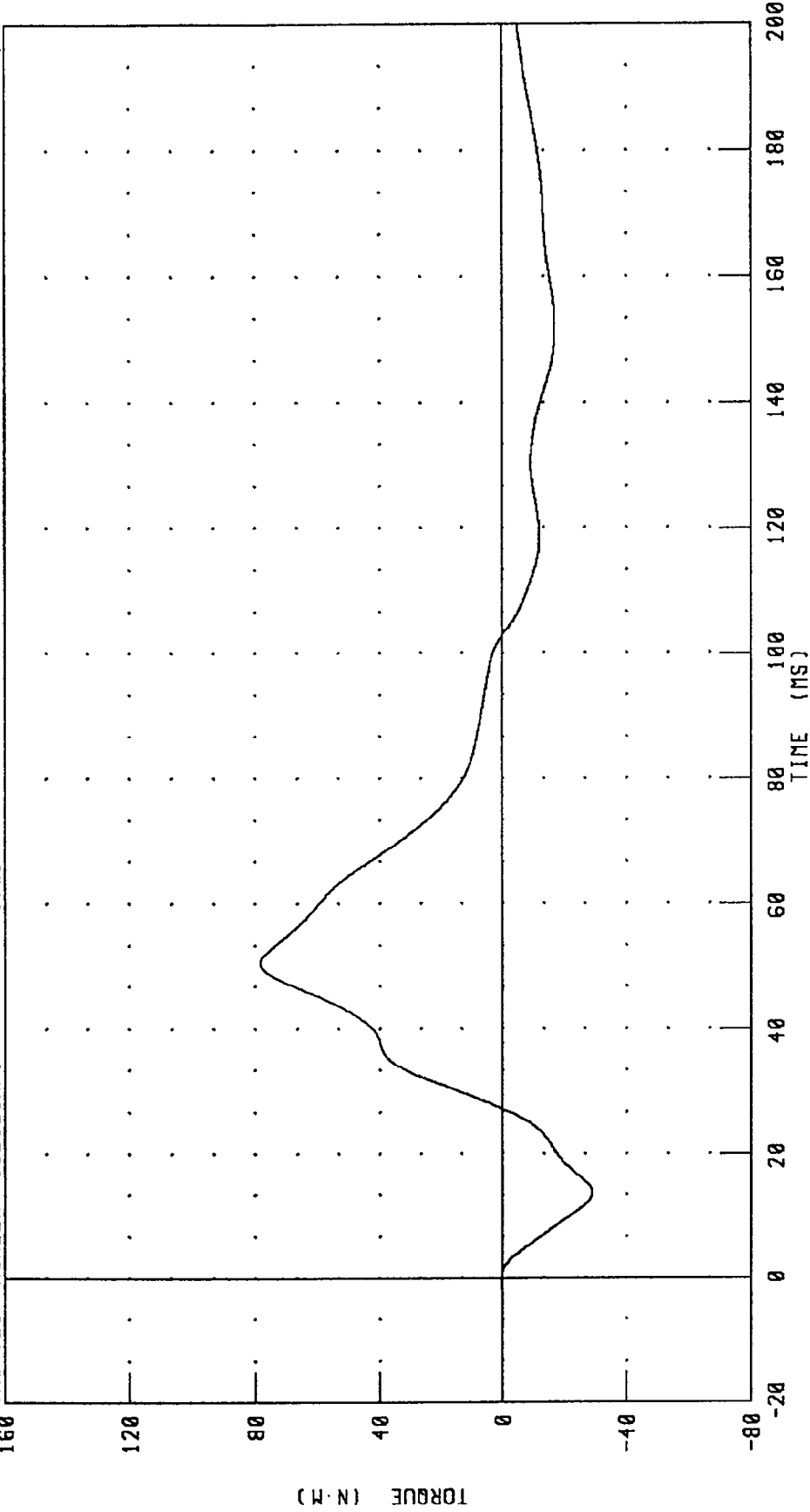
PEAK DATA: 853.28 N @ 44.24 MS, -175.10 N @ 163.68 MS

CHANNEL: NEKXF FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

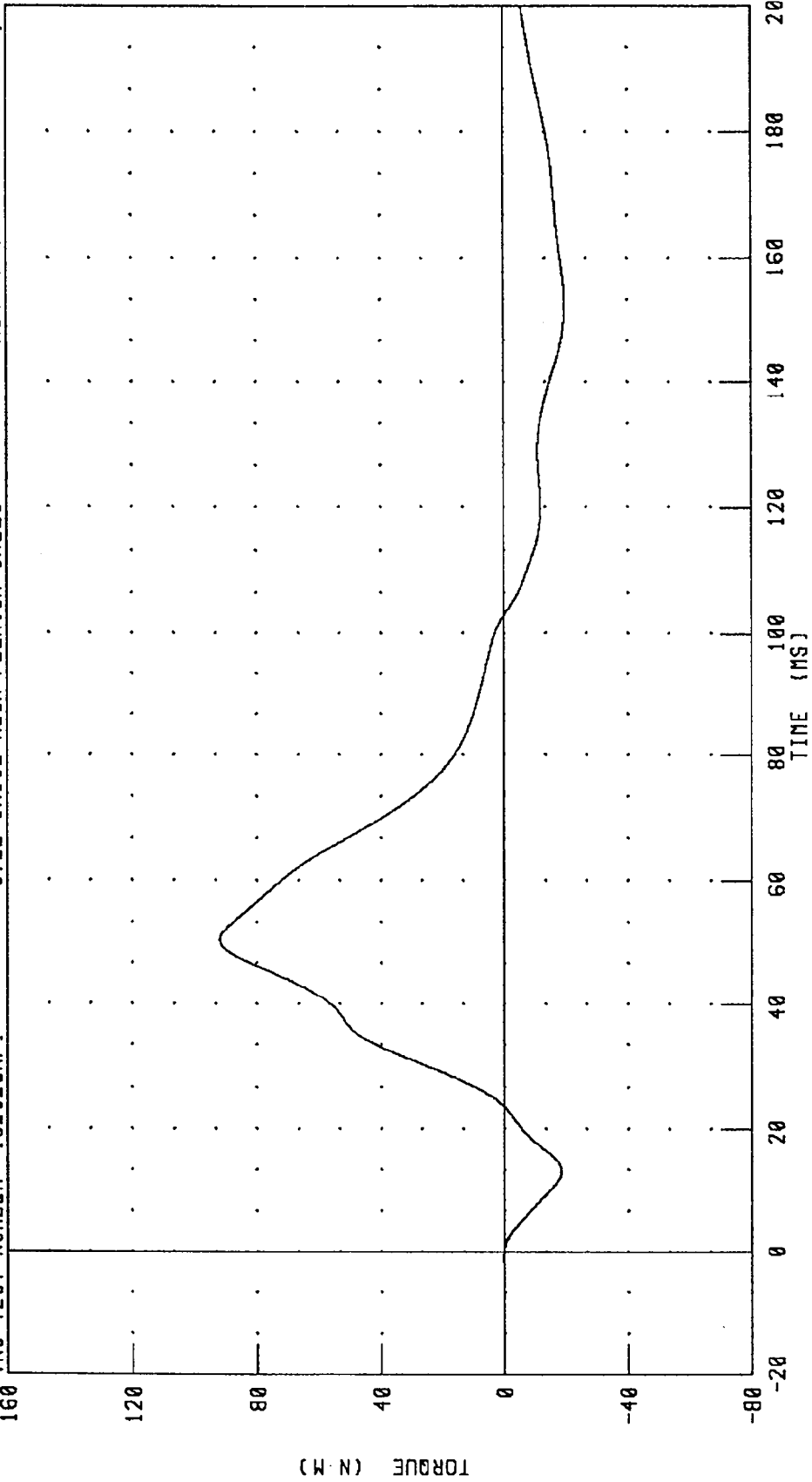
TRC TEST NUMBER: 192C25NF1 572E SN192 NECK FLEXION CAL25 RUN NUMBER: 022895.1353.1



CHANNEL: NEKYH FILTER: CH. CLASS 60 PEAK DATA: 78.41 N-M @ 50.48 MS; -28.87 N-M @ 13.68 MS

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

TRC TEST NUMBER: 192C25NF1 572E SN192 NECK FLEXION CAL25 RUN NUMBER: 022895.1353.1



PEAK DATA: 92.02 N·M @ 50.40 MS; -19.68 N·M @ 152.64 MS

CHANNEL: NEKOM FILTER: CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

HYBRID III

25-JAN-95

TRC INC. TEST NO: 192C25NE1 572E SN192 NECK EXT. CAL25

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	25.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.05 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	18.44 G
	20 MS	14.00 - 19.00 G	14.52 G
	30 MS	11.00 - 16.00 G	14.60 G
MAX PENDULUM G		22 G MAX	19.28 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	14.56 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	42.16 MS
D PLANE	MAX	81 - 106 DEG.	92.06 DEG.
ROTATION	TIME	72 - 82 MS	74.80 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-56.74 NM
	TIME	65 - 79 MS	71.60 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	157.44 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	140.08 MS

TEST MEETS SPECIFICATIONS

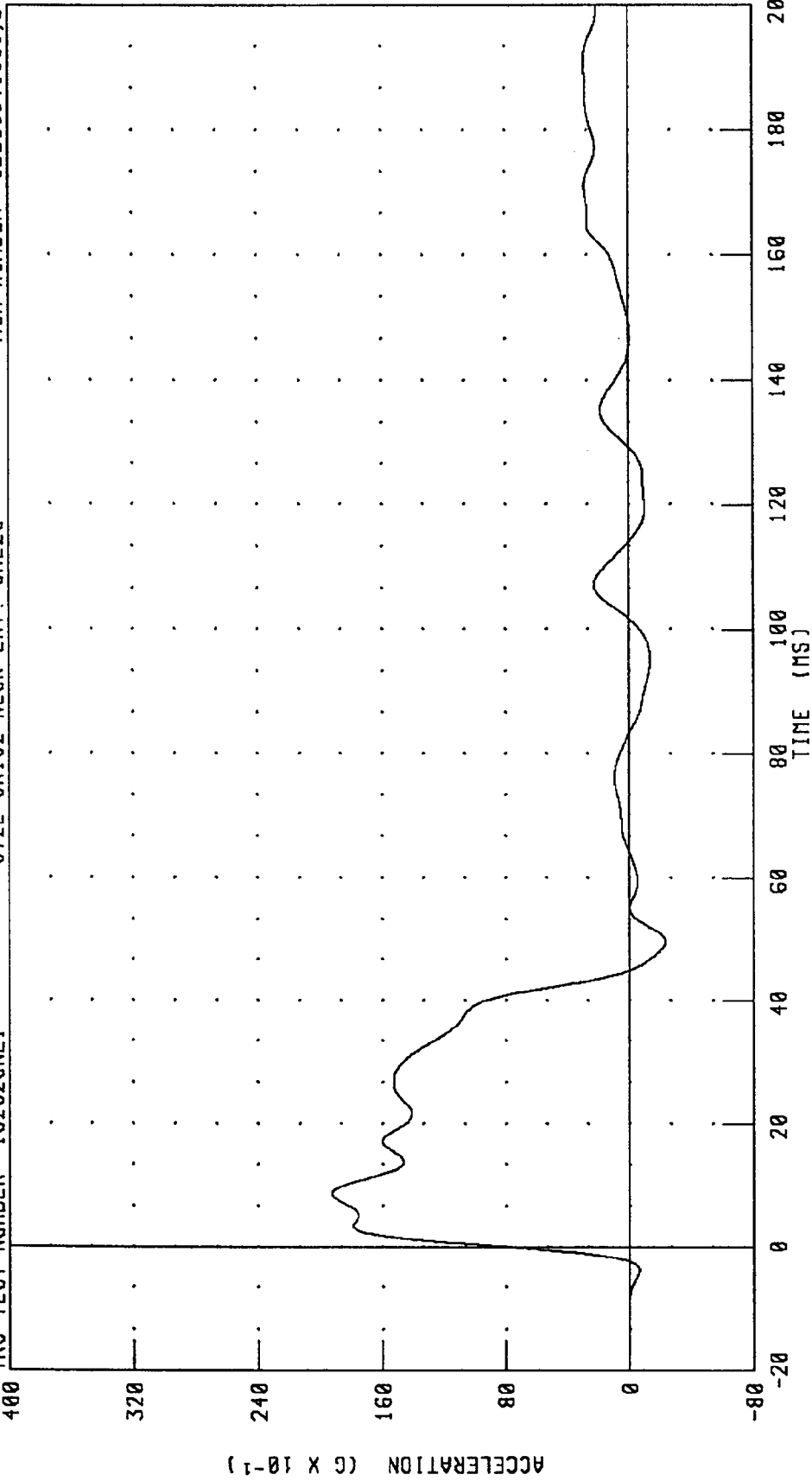
TECHNICIAN Chas. Middleton

RUN NUMBER: 012595.1219;2

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
 PENDULUM DECELERATION

TRC TEST NUMBER: 192C25NE1 RUN NUMBER: 022895.1353;2

572E SN192 NECK EXT. CAL25

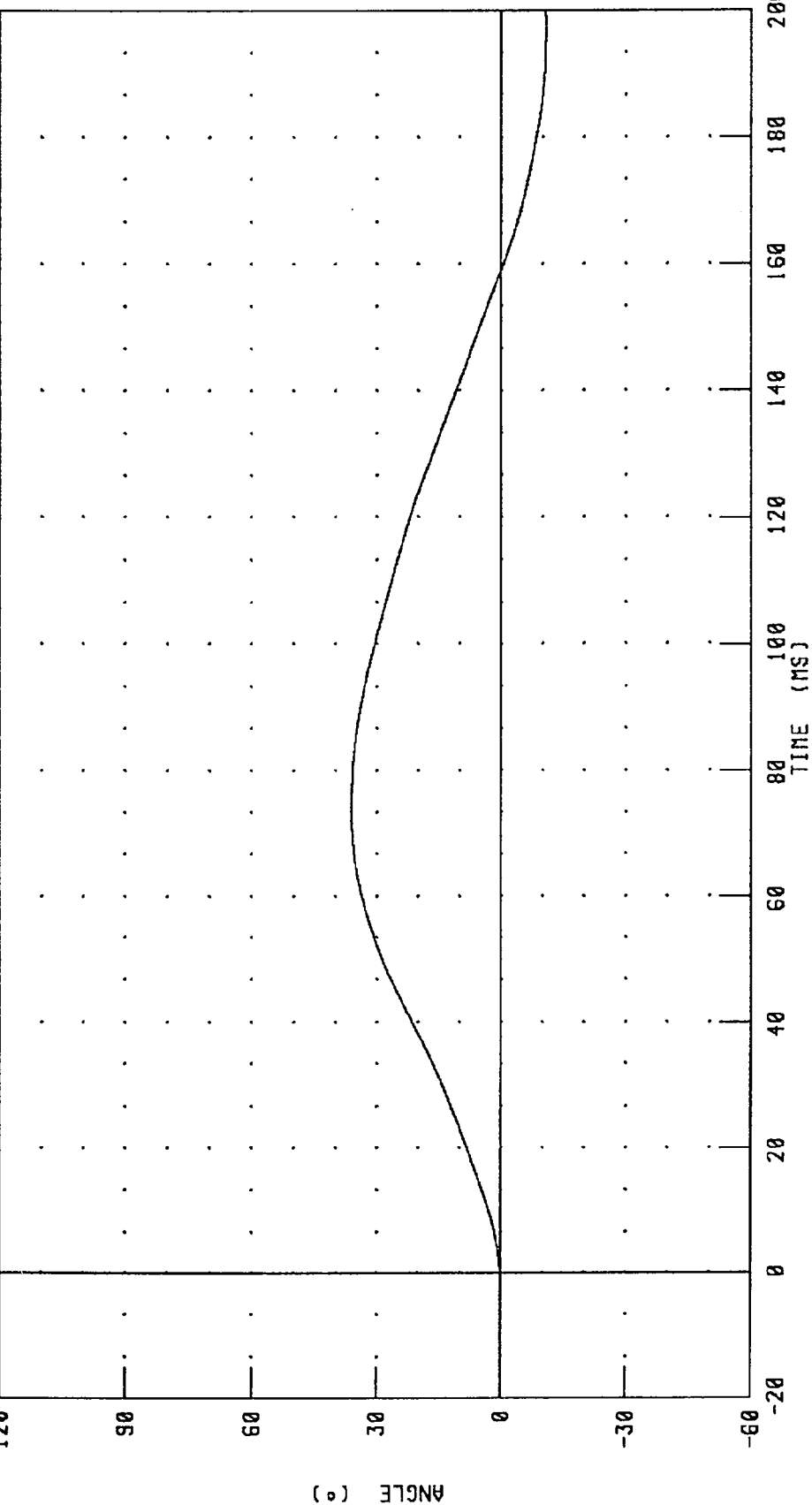


CHANNEL: PENXG FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

120 IRC TEST NUMBER: 192C25NE1 572E SN192 NECK EXT. CAL25 RUN NUMBER: 022895.1353;2

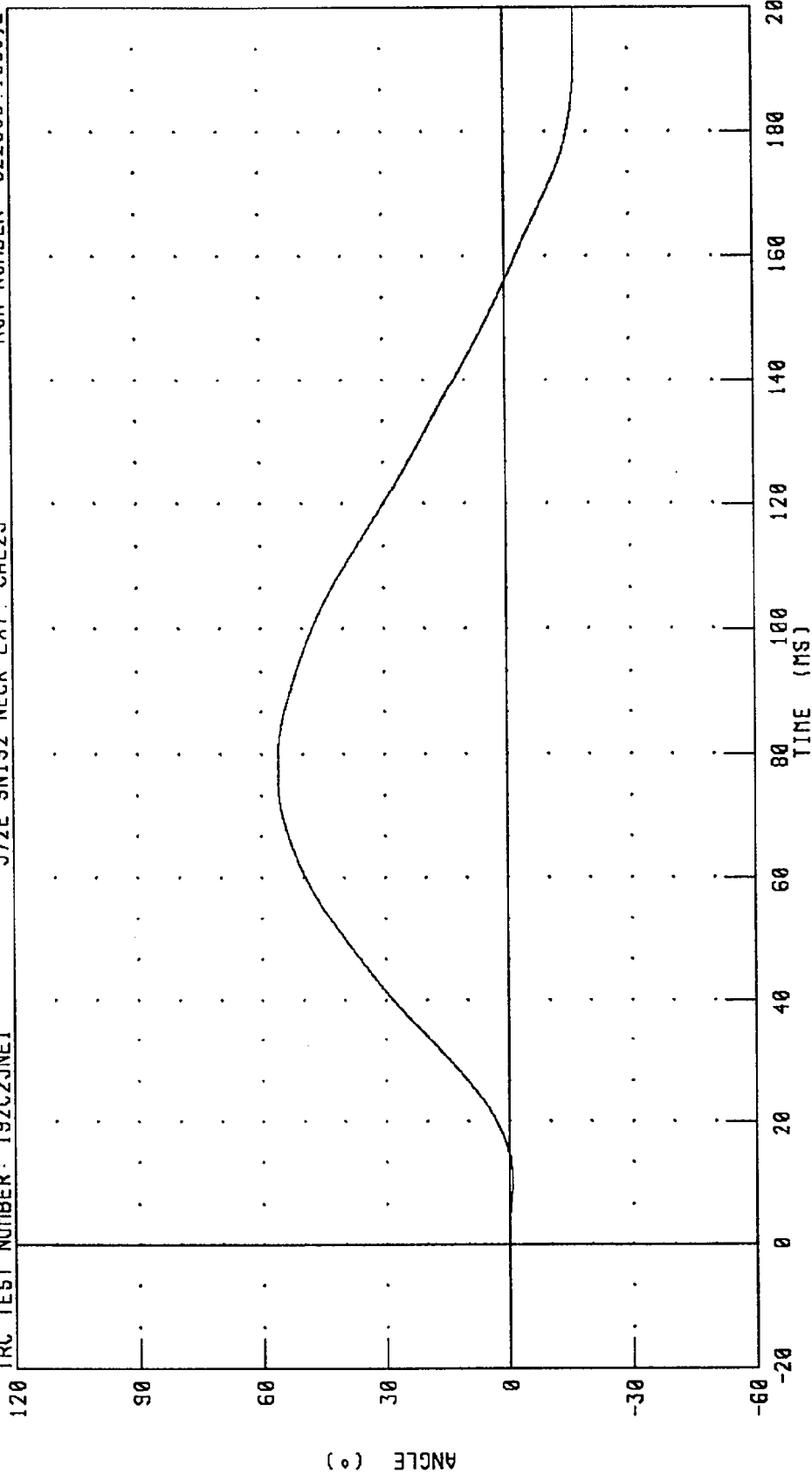


CHANNEL: BETA FILTER: CH. CLASS 60 PEAK DATA: 36.16 ° @ 73.84 MS; -10.79 ° @ 197.04 MS

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

TRC TEST NUMBER: 192C25NE1 RUN NUMBER: 022895.1353;2

572E SN192 NECK EXT. CAL25



CHANNEL: THETA FILTER: CH. CLASS 60

PEAK DATA: 55.95 ° @ 78.40 MS; -17.00 ° @ 198.64 MS

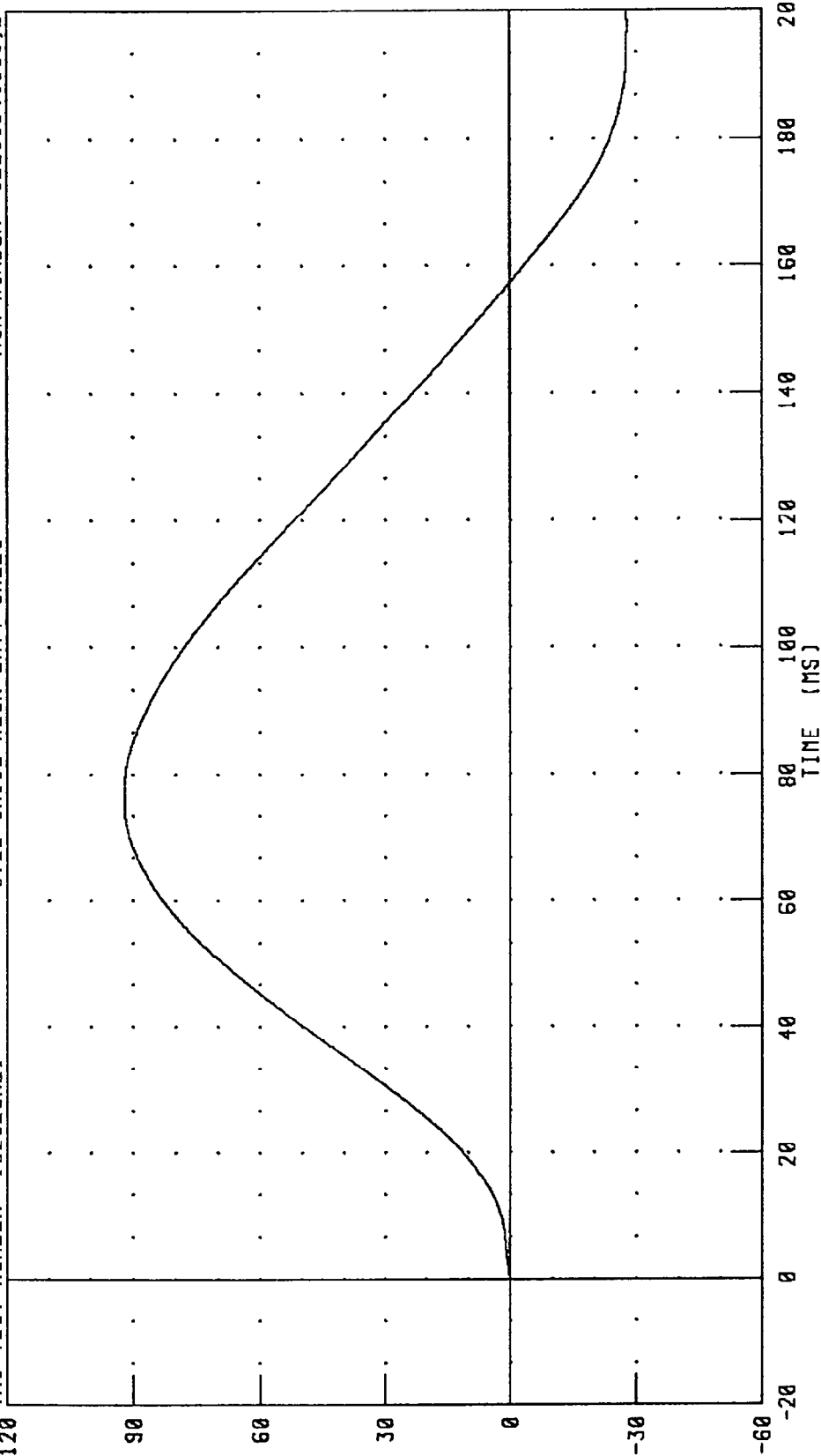
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 192C25NE1

572E SN192 NECK EXT. CAL25

RUN NUMBER: 022895.135312



PEAK DATA: 92.07 ° @ 74.80 MS; -27.78 ° @ 197.52 MS

CHANNEL: TOTAL FILTER: CH. CLASS 60

ANGLE (°)

TIME (MS)

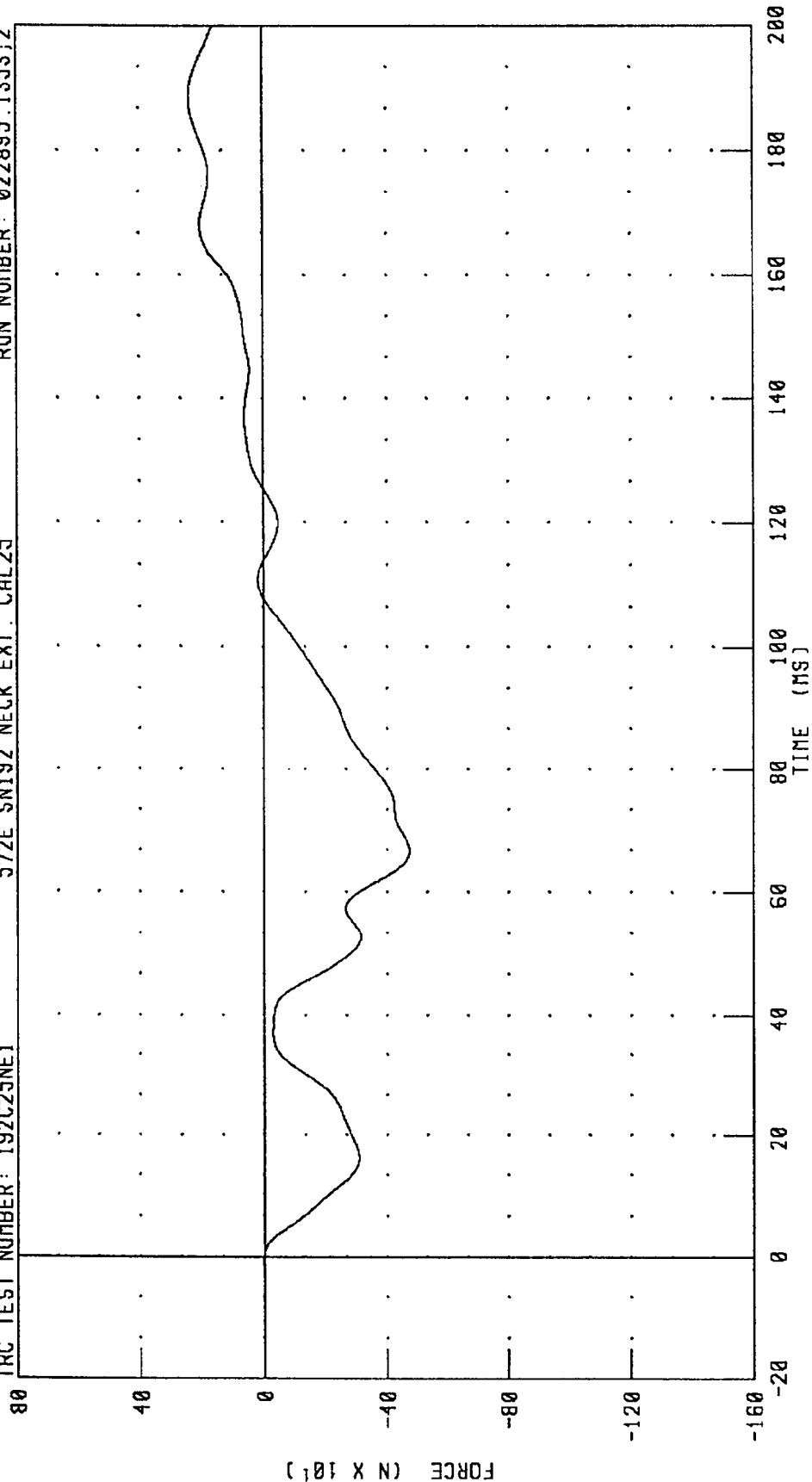
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 192C25NE1

572E SN192 NECK EXT. CAL25

RUN NUMBER: 022895.1353;2



CHANNEL: NEKXF FILTER: CH. CLASS 60

PEAK DATA: 238.34 N @ 188.56 MS; -474.09 N @ 66.56 MS

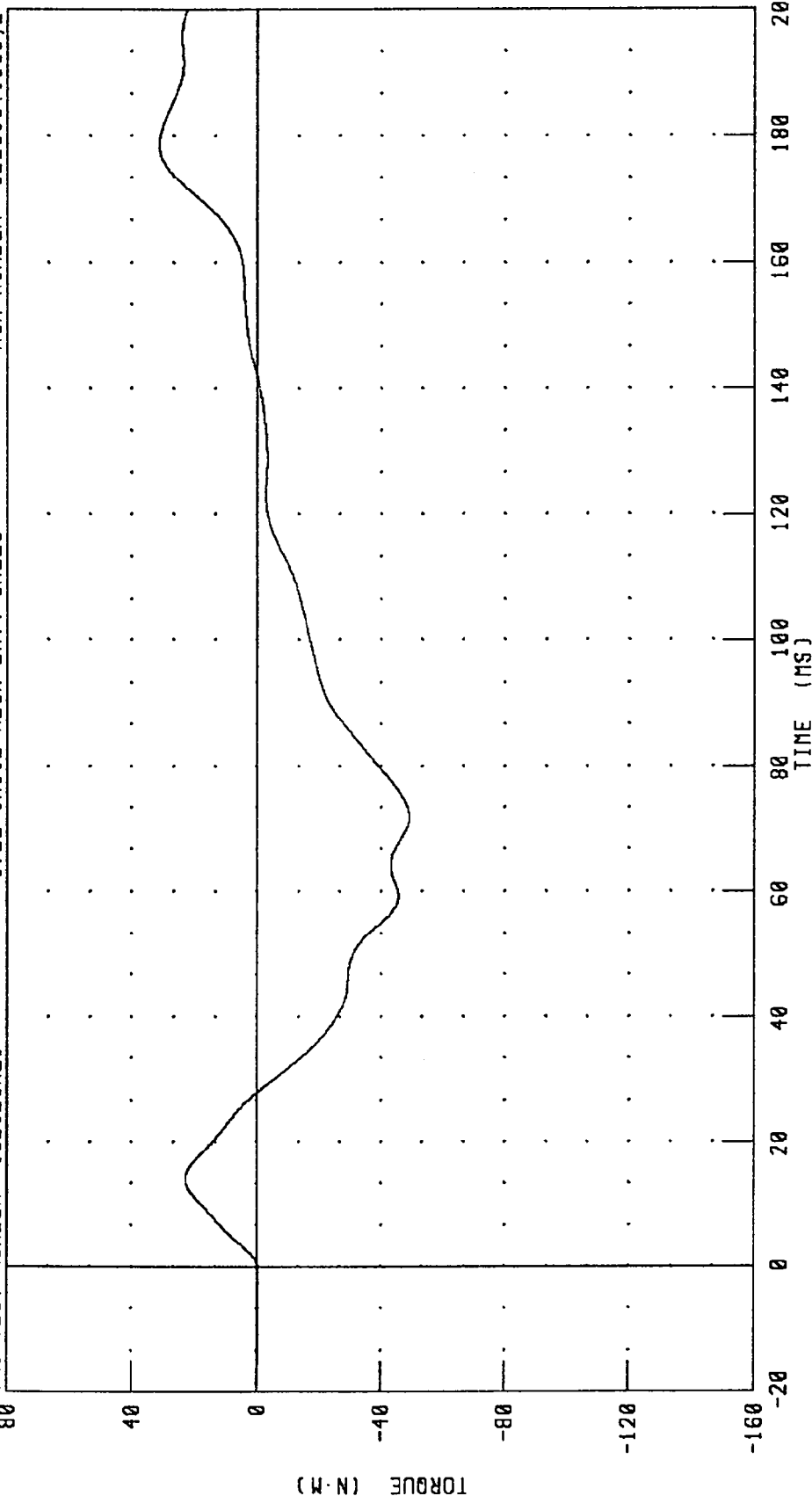
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 192C25NE1

572E SN192 NECK EXT. CAL25

RUN NUMBER: 022895.1353;2



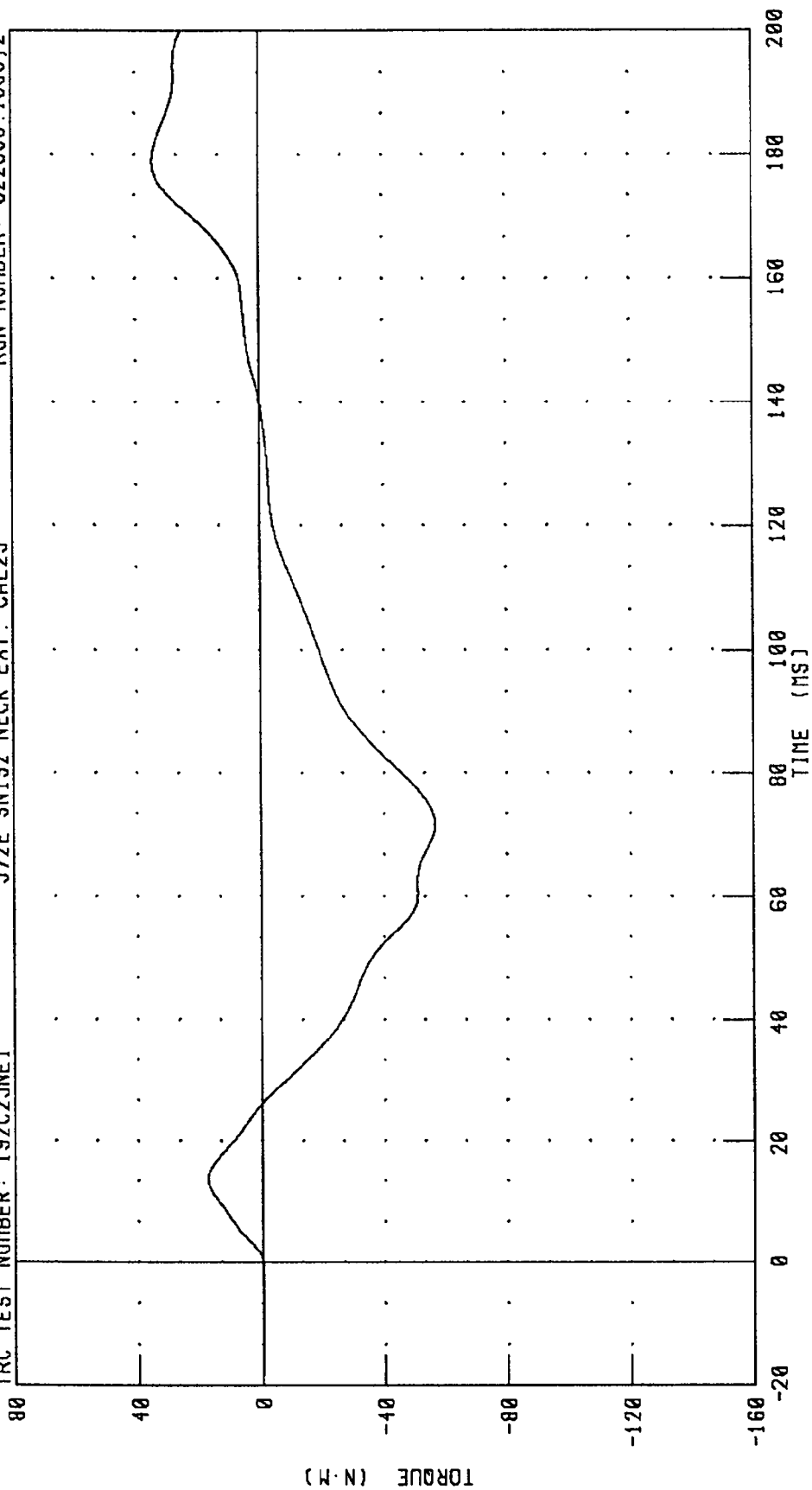
PEAK DATA: 31.14 N.M @ 178.56 MS; -49.10 N.M @ 71.76 MS

CHANNEL: NEKYM FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 192C25NE1 RUN NUMBER: 022895.1353;2

572E SN192 NECK EXT. CAL25



PEAK DATA: 34.39 N·M @ 178.96 MS; -56.74 N·M @ 71.60 MS

CHANNEL: NEKOM FILTER: CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III

25-JAN-95

TRC INC.

TEST NO: 192C25TH1

572E SN192 H.S.THORAX CAL25

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	25.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.62 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	65.2 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5680. N
INTERNAL HYSTERESIS	69% - 85%	71.9%

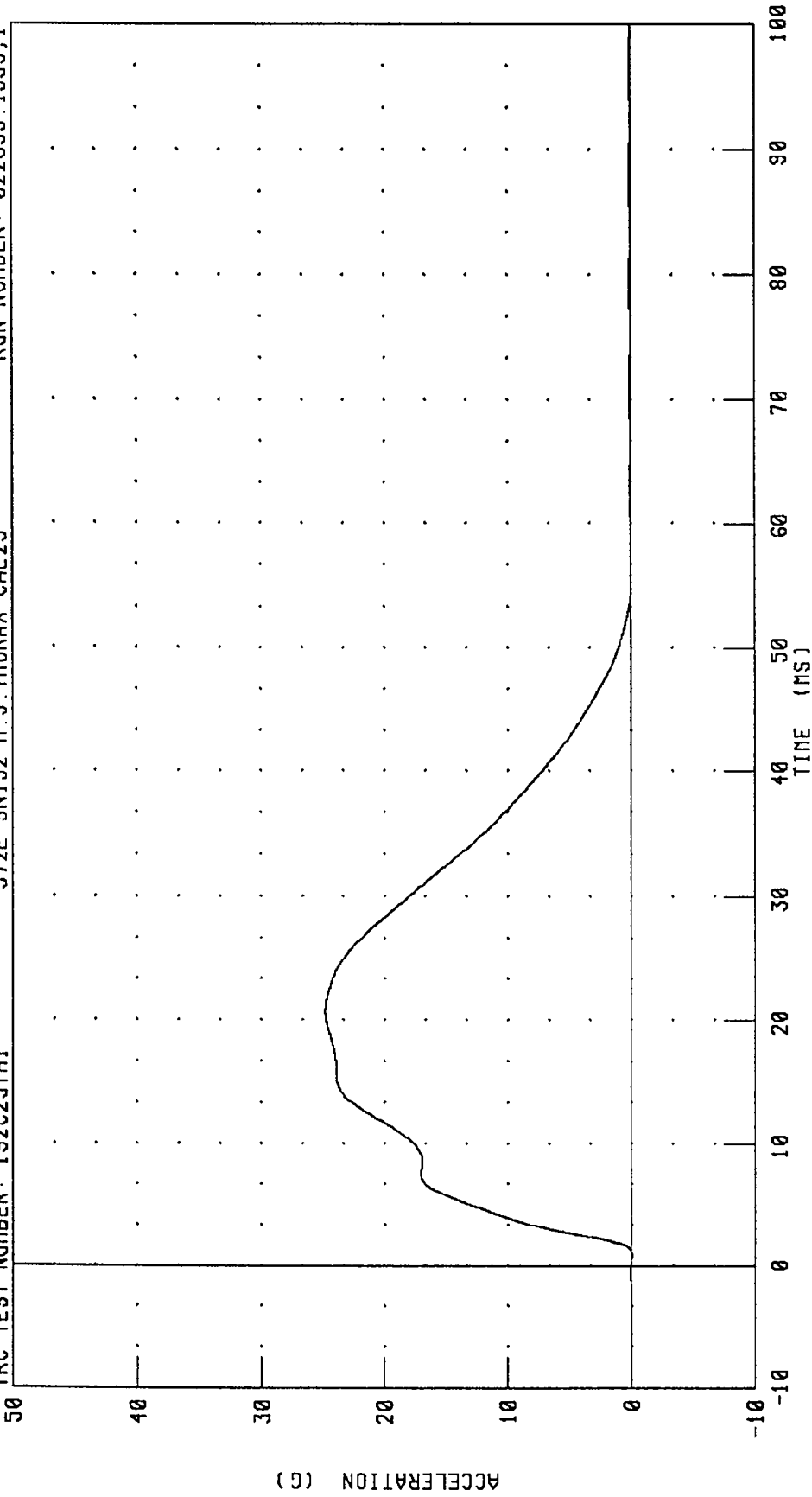
TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

RUN NUMBER: 012595.1323;1

PART 572-E HYBRID III THORAX CALIBRATION
 PENDULUM DECELERATION

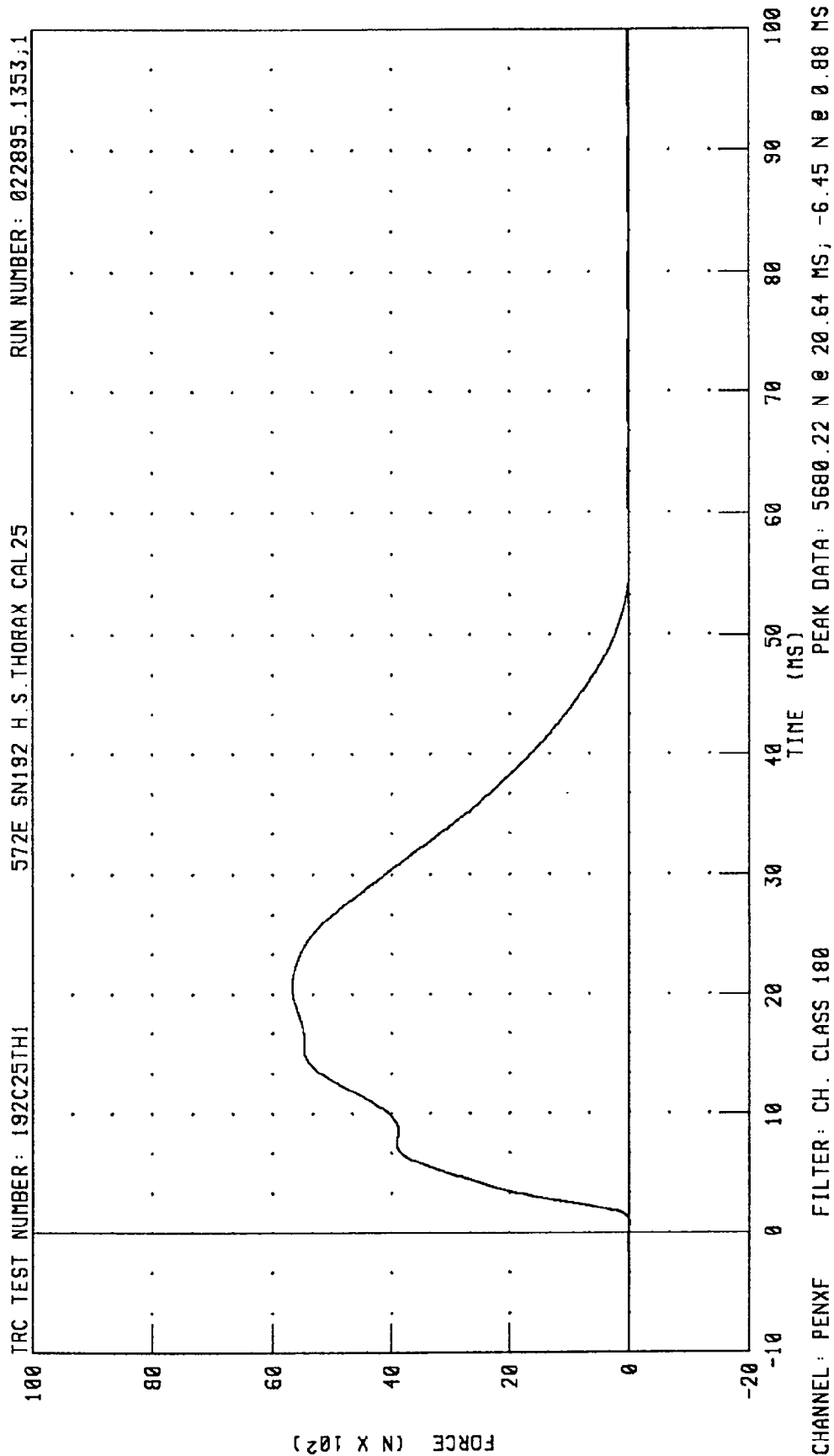
TRC TEST NUMBER: 192C25TH1 572E SN192 H.S. THORAX CAL25 RUN NUMBER: 022895.1353;1



CHANNEL: PENXG FILTER: CH. CLASS 180 PEAK DATA: 24.80 G @ 20.64 MS; -0.03 G @ 0.88 MS

PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM FORCE

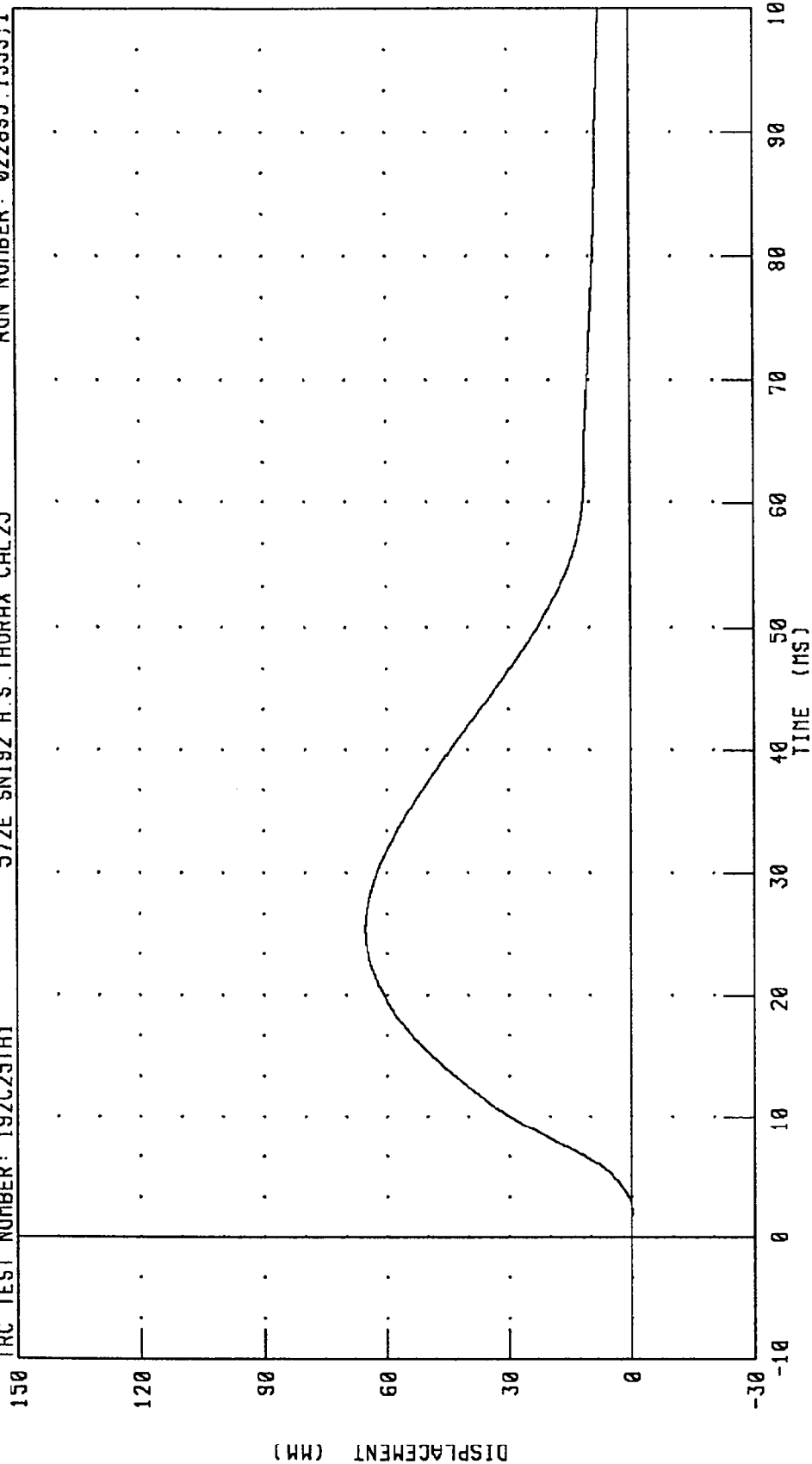


PART 572-E HYBRID III THORAX CALIBRATION
STERNUM DISPLACEMENT

TRC TEST NUMBER: 192C25TH1

572E SN192 H.S. THORAX CAL25

RUN NUMBER: 022895.1353,1



PEAK DATA: 65.24 MM @ 25.36 MS; -0.07 MM @ 2.16 MS

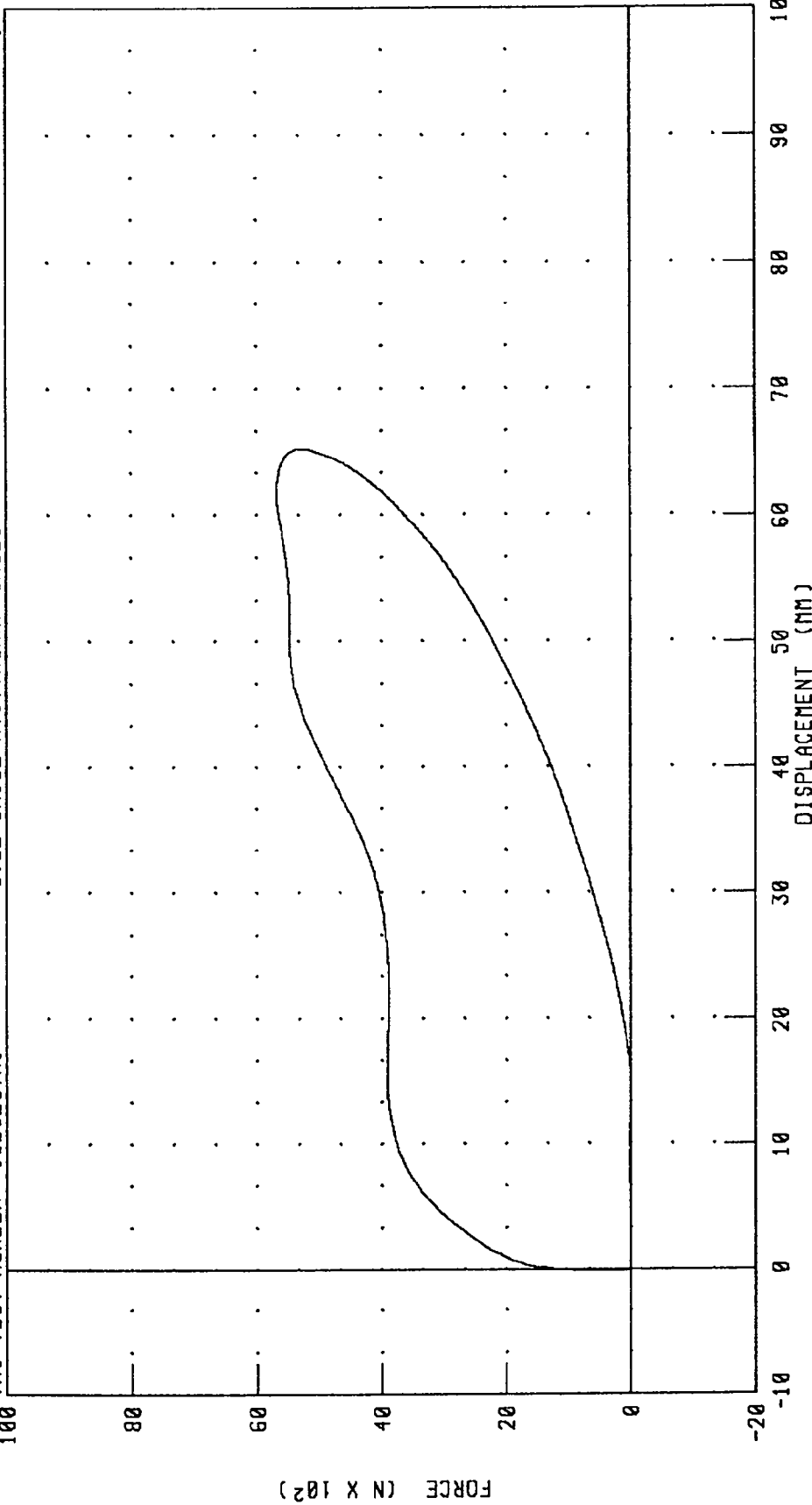
CHANNEL: CSTXD FILTER: CH. CLASS 180

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

IRC TEST NUMBER: 192C25TH1

572E SN192 H.S. THORAX CAL25

RUN NUMBER: 022895.1353.1



CHANNEL: CSTXD
PENXF

FILTER: CH. CLASS 180
CH. CLASS 180

DISPLACEMENT (MM)

PEAK DATA:

65.24 mm @ 25.36 ms; -0.07 mm @ 2.16 ms
5680.22 N @ 20.64 ms; -6.45 N @ 0.88 ms

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III

25-JAN-95

TRC INC.

TEST NO: 192C25RK1

572E SN192 RIGHT KNEE CAL 25

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	25.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.10 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4714 - 5783 N	5421.4 N

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. M. Mudd

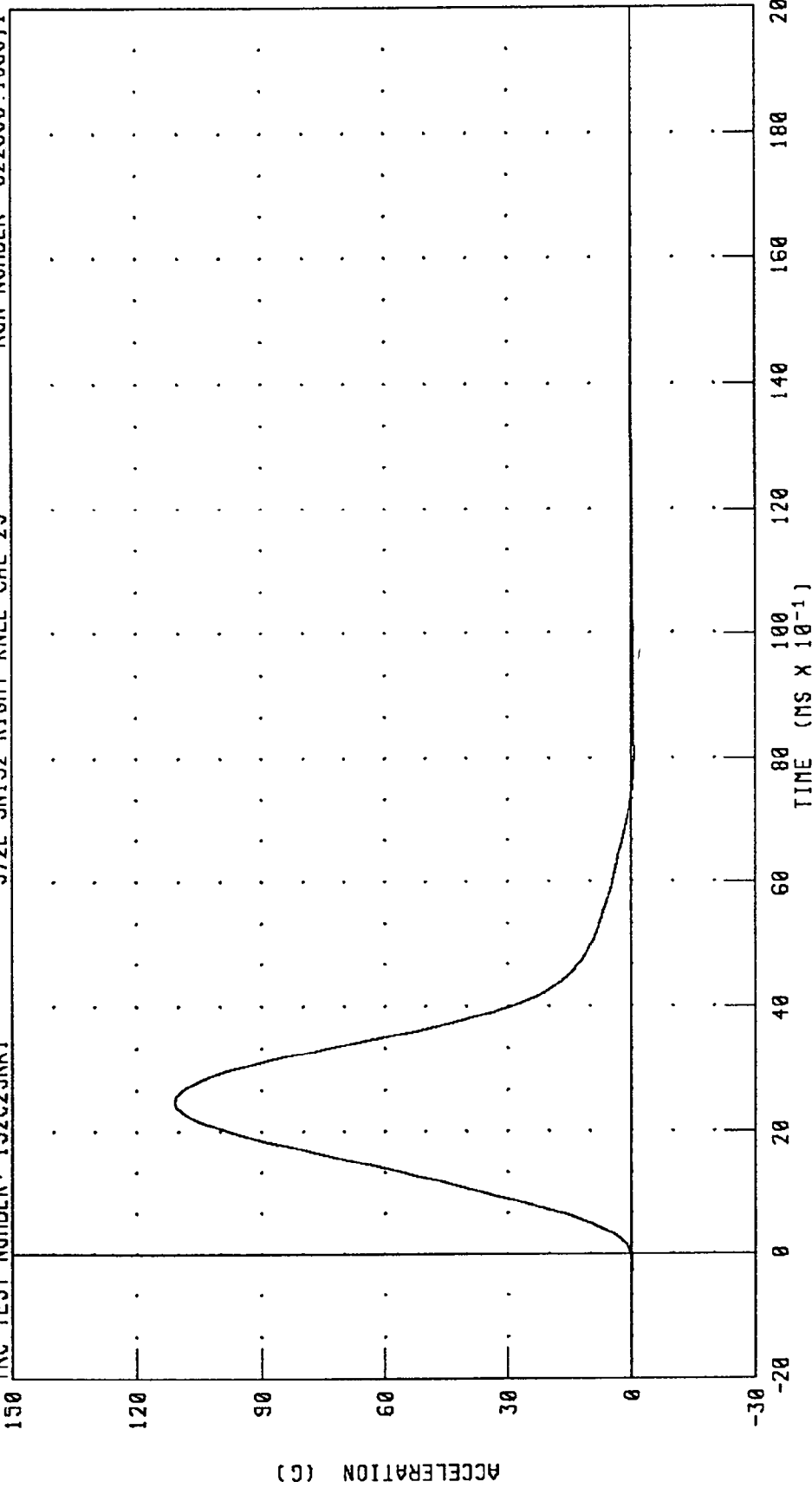
RUN NUMBER: 012595.1052;1

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

TRC TEST NUMBER: 192C25RK1

572E SNI92 RIGHT KNEE CAL 25

RUN NUMBER: 022895.1353,1



CHANNEL: PENXG FILTER: CH. CLASS 600

PEAK DATA: 110.81 G @ 2.48 MS; -0.59 G @ 8.08 MS

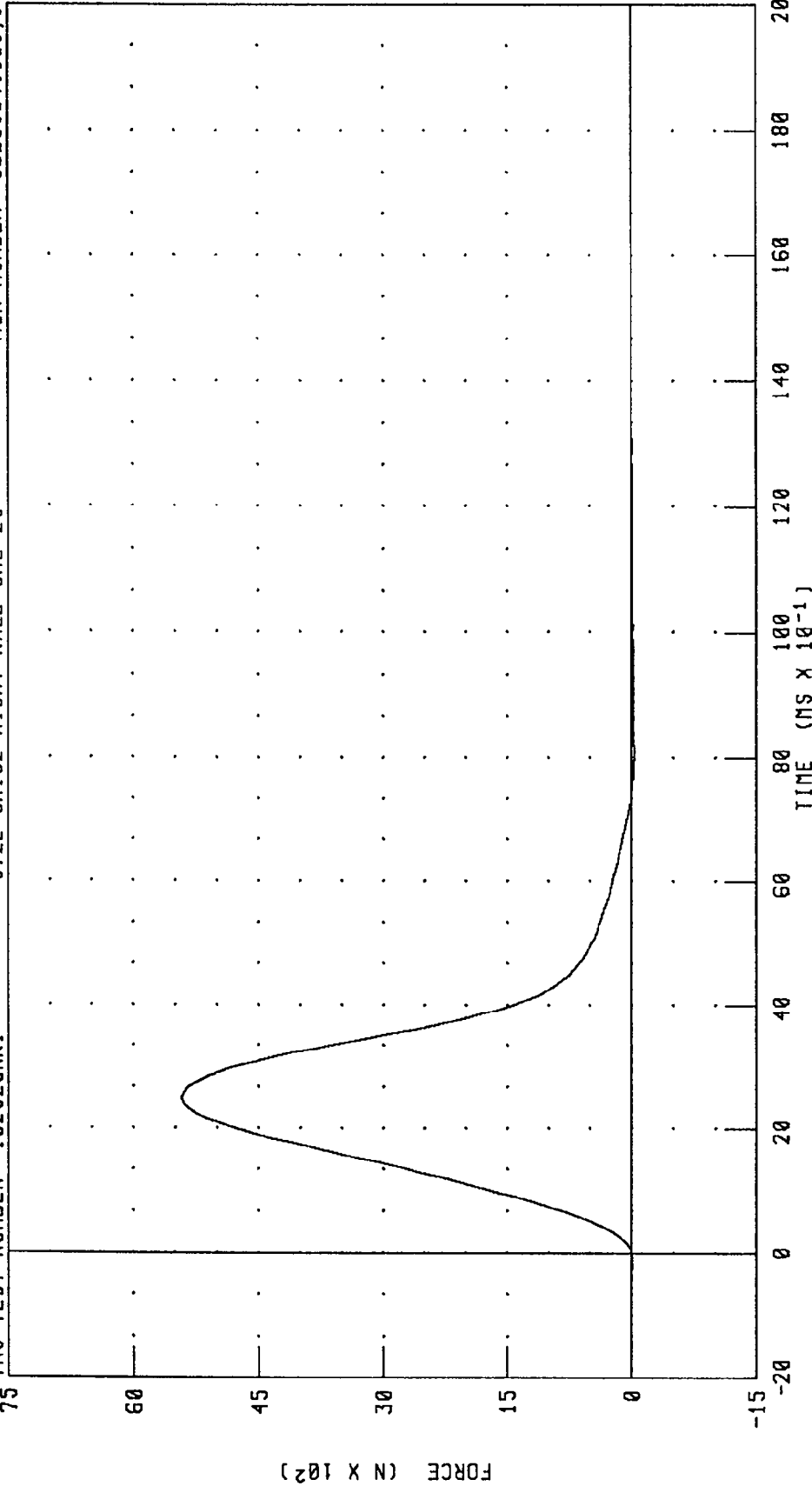
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 192C25RK1

572E SN192 RIGHT KNEE CAL 25

RUN NUMBER: 022895.1353;1



CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 5421.48 N @ 2.48 MS; -28.95 N @ 8.08 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III

26-DEC-94

TRC INC.

TEST NO: 192C24LK1

572E SN192 LEFT KNEE CAL 24

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	25.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4714 - 5783 N	5124.3 N

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

RUN NUMBER: 012595.1048;1

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

TRC TEST NUMBER: 192C24LK1

572E SN192 LEFT KNEE CAL 24

RUN NUMBER: 022895.1353,1

150

120

90

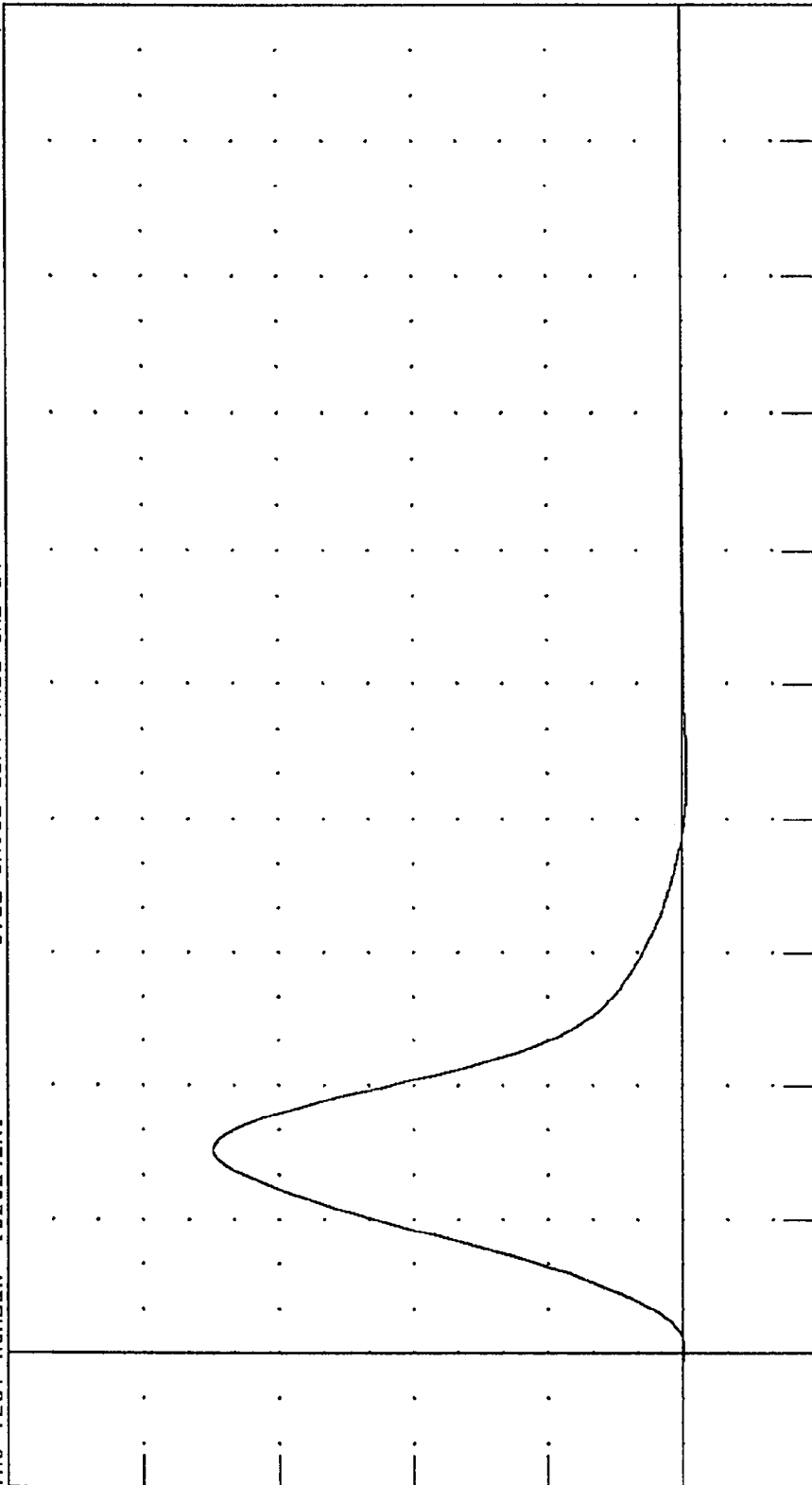
60

30

0

-30

ACCELERATION (G)



TIME (MS X 10⁻¹)

200

180

160

140

120

100

80

60

40

20

0

CHANNEL: PENXG

FILTER: CH. CLASS 600

PEAK DATA:

104.73 G @ 3.04 MS, -1.03 G @ 8.72 MS

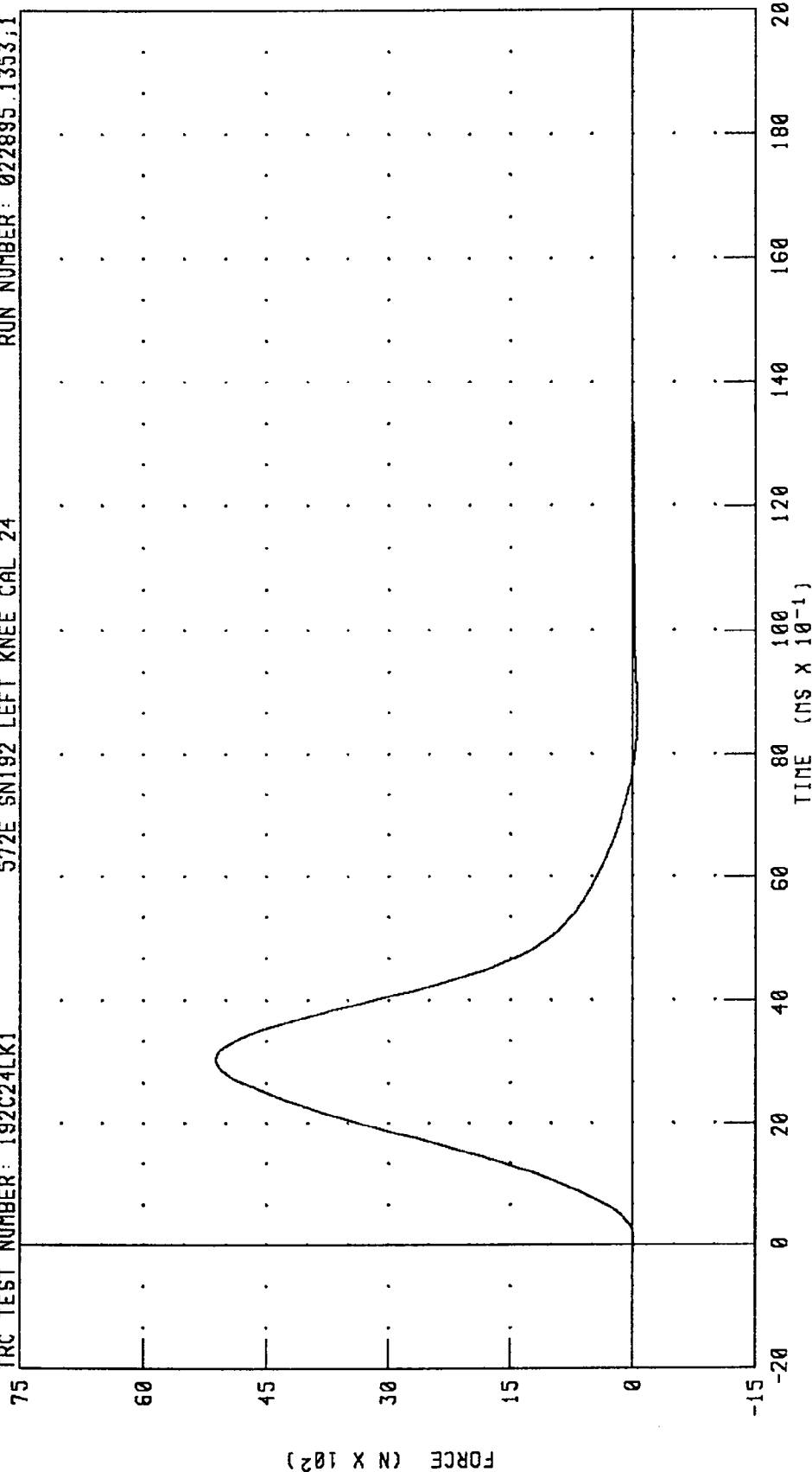
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 192C24LK1

572E SN192 LEFT KNEE CAL 24

RUN NUMBER: 022895.1353,1



CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 5124.36 N @ 3.04 MS; -50.41 N @ 8.72 MS

Appendix D

Miscellaneous Test Information

Dummy Instrument Calibrations

Driver Dummy #142

	Serial Number	Model Number	Manufacturer	Calibration Date	
				Last	Due
Head X-axis accelerometer	AGR73	7264	Endevco	12/30/94	06/30/95
Head Y-axis accelerometer	CY32H	7264	Endevco	08/29/94	03/01/95
Head Z-axis accelerometer	DB81H	7264	Endevco	08/29/94	03/01/95
Chest X-axis accelerometer	A79GJ	7264	Endevco	08/25/94	02/25/95
Chest Y-axis accelerometer	AC8W6	7264	Endevco	08/29/94	03/01/95
Chest Z-axis accelerometer	CW42H	7264	Endevco	08/29/94	03/01/95
Left femur force load cell	901	2430	GSE	08/30/94	03/01/95
Right femur force load cell	902	2430	GSE	08/30/94	03/01/95
Neck X-axis force load cell ¹	0280	1716	Denton	08/30/94	03/01/95
Neck Y-axis force load cell ¹	0280	1716	Denton	08/30/94	03/01/95
Neck Z-axis force load cell ¹	0280	1716	Denton	08/30/94	03/01/95
Neck Moment about X-axis load cell ¹	0280	1716	Denton	08/30/94	03/01/95
Neck Moment about Y-axis load cell ¹	0280	1716	Denton	08/30/94	03/01/95
Neck Moment about Z-axis load cell ¹	0280	1716	Denton	08/30/94	03/01/95
Pelvis X-axis accelerometer	AJ8A6	7264	Endevco	10/11/94	04/11/95
Pelvis Y-axis accelerometer	AJ8J7	7264	Endevco	10/11/94	04/11/95
Pelvis Z-axis accelerometer	AJ789	7264	Endevco	10/11/94	04/11/95
Chest deflection potentiometer ¹	90320B	81422A	Vernitech	08/29/94	03/01/95
Lap belt force load cell	616	3419	Lebow	08/19/94	02/19/95
Shoulder belt force load cell	610	3419	Lebow	08/19/94	02/19/95

¹ Hybrid III use only.

Dummy Instrument Calibrations

Right Front Passenger Dummy #192

	Serial Number	Model Number	Manufacturer	Calibration Date Last	Due
Head X-axis accelerometer	AAL82	7264	Endevco	08/30/94	03/01/95
Head Y-axis accelerometer	A84JJ	7264	Endevco	08/30/94	03/01/95
Head Z-axis accelerometer	DW04J	7264	Endevco	08/30/94	03/01/95
Chest X-axis accelerometer	CT22H	7264	Endevco	08/30/94	03/01/95
Chest Y-axis accelerometer	AC708	7264	Endevco	08/30/94	03/01/95
Chest Z-axis accelerometer	CW59H	7264	Endevco	08/30/94	03/01/95
Left femur force load cell	986	2430	GSE	08/30/94	03/01/95
Right femur force load cell	987	2430	GSE	08/30/94	03/01/95
Neck X-axis force load cell ¹	085	1716	Denton	08/30/94	03/01/95
Neck Y-axis force load cell ¹	085	1716	Denton	08/30/94	03/01/95
Neck Z-axis force load cell ¹	085	1716	Denton	08/30/94	03/01/95
Neck Moment about X-axis load cell ¹	085	1716	Denton	08/30/94	03/01/95
Neck Moment about Y-axis load cell ¹	085	1716	Denton	08/30/94	03/01/95
Neck Moment about Z-axis load cell ¹	085	1716	Denton	08/30/94	03/01/95
Pelvis X-axis accelerometer	AJ694	7264	Endevco	10/11/94	04/11/95
Pelvis Y-axis accelerometer	AJ656	7264	Endevco	10/11/94	04/11/95
Pelvis Z-axis accelerometer	AJ788	7264	Endevco	10/11/94	04/11/95
Chest deflection potentiometer ¹	87313-96	81422A	Vernitech	08/30/94	03/01/95
Lap belt force load cell	236	3419	Lebow	08/19/94	02/19/95
Shoulder belt force load cell	615	3419	Lebow	08/19/94	02/19/95

¹Hybrid III use only.

Vehicle and Calibration Laboratory Instrument Calibrations

Vehicle Accelerometers

	Serial Number	Model Number	Manufacturer	Calibration Date	
				Last	Due
Left rear seat crossmember X-axis	DT96JT	7264	Endevco	11/07/94	05/07/95
Left rear seat crossmember X-axis redundant	AGRG7	7264	Endevco	02/03/95	07/03/95
Right rear seat crossmember X-axis	DW12J	7264	Endevco	12/13/94	03/13/95
Right rear seat crossmember X-axis redundant	DY12J	7264	Endevco	12/08/94	06/08/95
Engine top X-axis	AGRF1	7264	Endevco	12/30/94	06/30/95
Engine bottom X-axis	ACCJ0	7264	Endevco	09/08/94	03/08/95
Right brake caliper X-axis	CY19H	7264	Endevco	01/12/95	07/12/95
Left brake caliper X-axis	AGR85	7264	Endevco	10/07/95	04/07/95
Instrument panel center X-axis	DW34JC	7264	Endevco	10/27/94	04/27/95

Calibration Laboratory Instruments

	Serial Number	Model Number	Manufacturer	Calibration Date	
				Last	Due
Neck bending pendulum accelerometer	CB27	7232	Endevco	09/26/94	03/26/95
Neck bending rotary potentiometer	NA	35435-1-102	Bournes	Mfr. Specification	
Neck bending linear potentiometer	NA	5184-2051846003	Bournes	09/26/94	03/26/95
Thorax/Hybrid II femur pendulum accelerometer	CC64	7232	Endevco	09/26/94	03/26/95
Lumbar flexion force gauge	NA	DPPH-50	Chatillon	05/03/89	repaired
Lumbar flexion rotation gauge	CP17-0601-1	7020	Humphrey	Mfr. Specification	
Abdomen compression displacement gauge	4075-175	80294-2051941504	Bournes	09/26/94	03/26/95
Abdomen compression force gauge	3443	3167	Lebow	09/26/94	03/26/95
Hybrid III femur pendulum accelerometer	CG83	7232	Endevco	09/26/94	03/26/95

Sign Convention
NHTSA Data Tape Reference Guide

Accelerometers:

+X: Forward
+Y: Leftward
+Z: Upward

Potentiometers:

+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)

Load cells:

+Femur force: Tension
+Seat belt force: Tension
+Barrier force: Tension

Neck load cells:

+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

Tibia load cells:

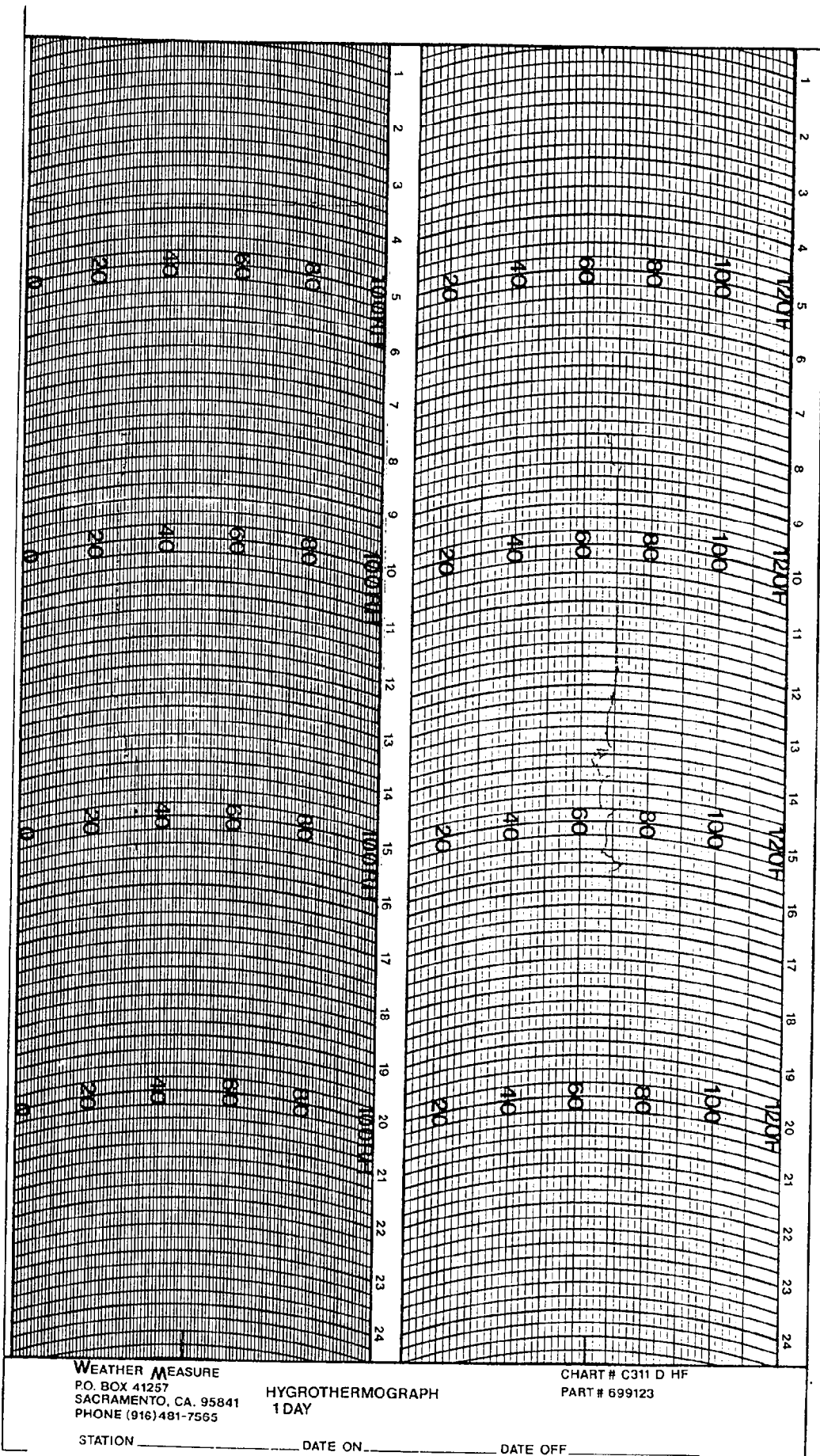
+X force: Tension
+Y force: Tension
+Z force: Tension
+X moment: Bottom of tibia moving leftward
+Y moment: Bottom of tibia moving rearward

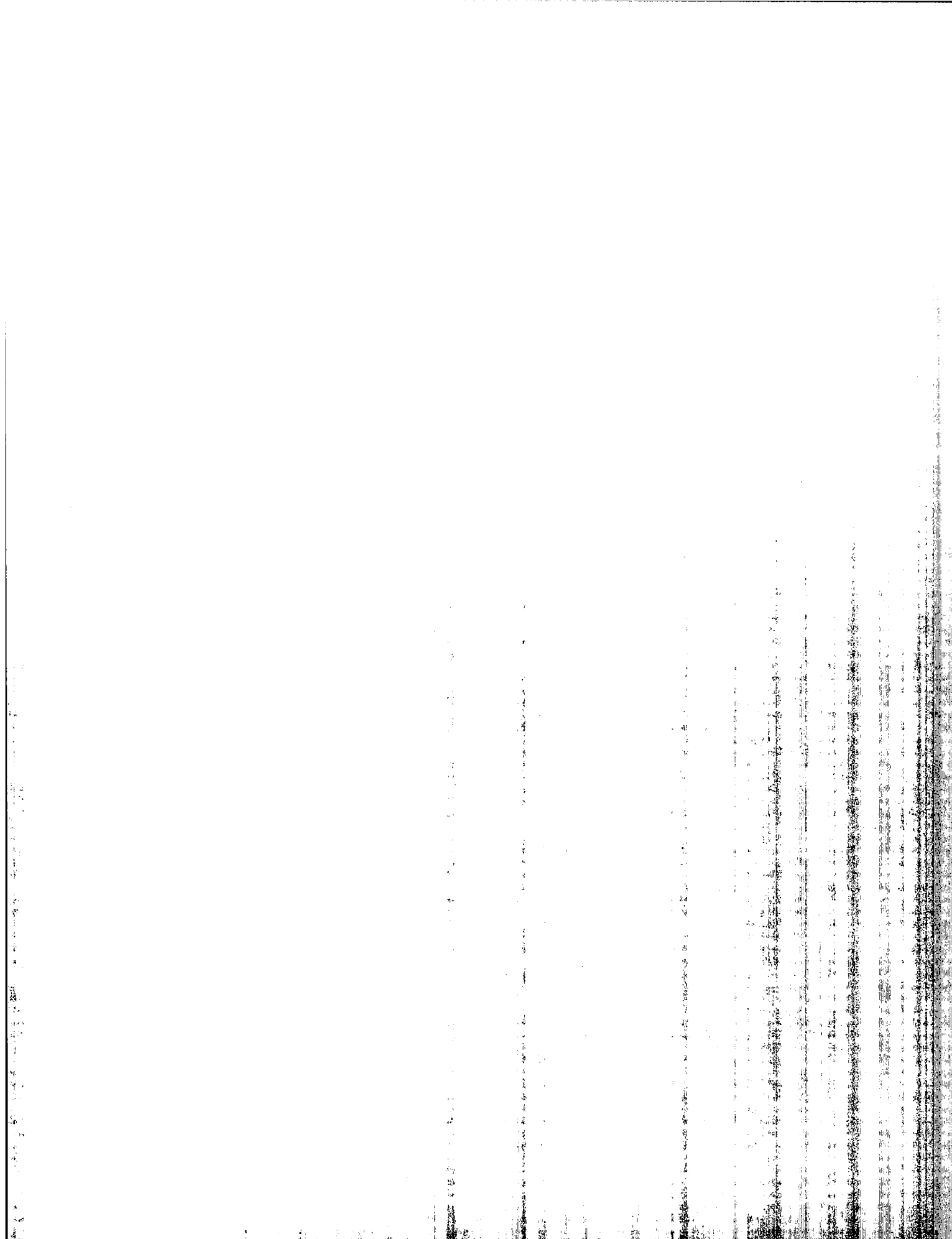
Frequency Response Classes

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







Appendix E

Restraint System Instructions from Owner's Manual

Safety Belts: They're for Everyone

This part of the manual tells you how to use safety belts properly. It also tells you some things you should not do with safety belts.

And it explains the Supplemental Inflatable Restraint, or "air bag" system.



CAUTION:

Don't let anyone ride where he or she can't wear a safety belt properly. If you are in a crash and you're not wearing a safety belt, your injuries can be much worse. You can hit things inside the vehicle or be ejected from it. You can be seriously injured or killed. In the same crash, you might not be if you are buckled up. Always fasten your safety belt, and check that your passengers' belts are fastened properly too.



Your vehicle has a light that comes on as a reminder to buckle up. (See "Safety Belt Reminder Light" in the Index.)

In many states and Canadian provinces, the law says to wear safety belts. Here's why: *They work.*

You never know if you'll be in a crash. If you do have a crash, you don't know if it will be a bad one.

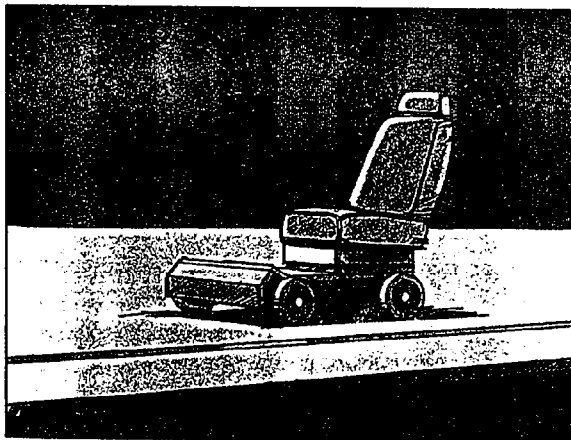
A few crashes are mild, and some crashes can be so serious that even buckled up a person wouldn't survive. But most crashes are in between. In many of them, people who buckle up can survive and sometimes walk away. Without belts they could have been badly hurt or killed.

After more than 25 years of safety belts in vehicles, the facts are clear. In most crashes buckling up does matter ... a lot!

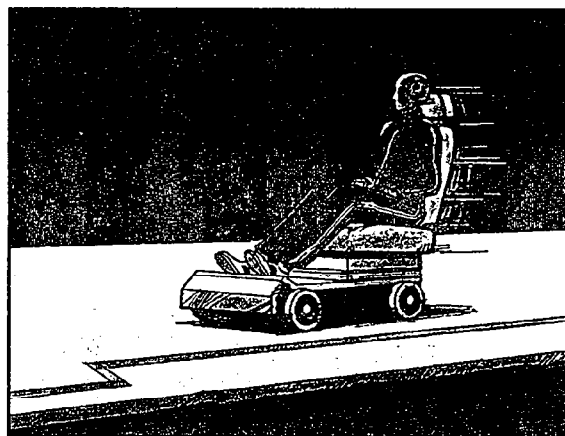
1-5

Why Safety Belts Work

When you ride in or on anything, you go as fast as it goes.

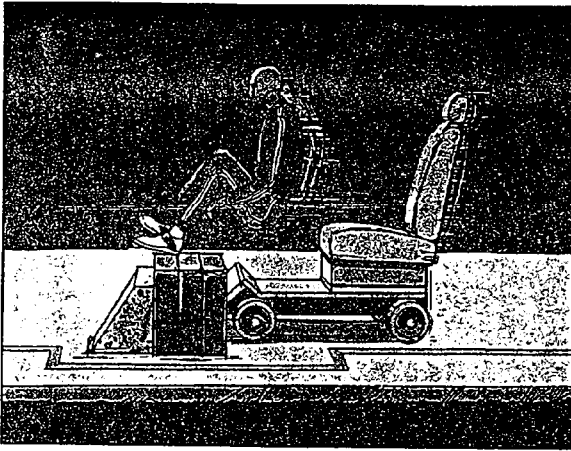


Take the simplest vehicle. Suppose it's just a seat on wheels.



Put someone on it.

1-6



Get it up to speed. Then stop the vehicle. The rider doesn't stop.



The person keeps going until stopped by something. In a real vehicle, it could be the windshield ...

1-7


or the instrument panel ...



or the safety belts!

With safety belts, you slow down as the vehicle does. You get more time to stop. You stop over more distance, and your strongest bones take the forces. That's why safety belts make such good sense.

1-8

Here Are Questions Many People Ask About Safety Belts -- and the Answers

Q: Won't I be trapped in the vehicle after an accident if I'm wearing a safety belt?

A: You *could* be -- whether you're wearing a safety belt or not. But you can unbuckle a safety belt, even if you're upside down. And your chance of being conscious during and after an accident, so you *can* unbuckle and get out, is *much* greater if you are belted.

Q: Why don't they just put in air bags so people won't have to wear safety belts?

A: Air bags are in many vehicles today and will be in more of them in the future. But they are supplemental systems only; so they work *with* safety belts -- not instead of them. Every air bag system ever offered for sale has required the use of safety belts. Even if you're in a vehicle that has air bags, you still have to buckle up to get the most protection. That's true not only in frontal collisions, but especially in side and other collisions.

Q: If I'm a good driver, and I never drive far from home, why should I wear safety belts?

A: You may be an excellent driver, but if you're in an accident -- even one that isn't your fault -- you and your passengers can be hurt. Being a good driver doesn't protect you from things beyond your control, such as bad drivers.

Most accidents occur within 25 miles (40 km) of home. And the greatest number of serious injuries and deaths occur at speeds of less than 40 mph (65 km/h).

Safety belts are for everyone.

1-9

How to Wear Safety Belts Properly

Adults

This part is only for people of adult size.

Be aware that there are special things to know about safety belts and children. And there are different rules for smaller children and babies. If a child will be riding in your Chevrolet, see the part of this manual called "Children." Follow those rules for everyone's protection.

First, you'll want to know which restraint systems your vehicle has.

We'll start with the driver position.

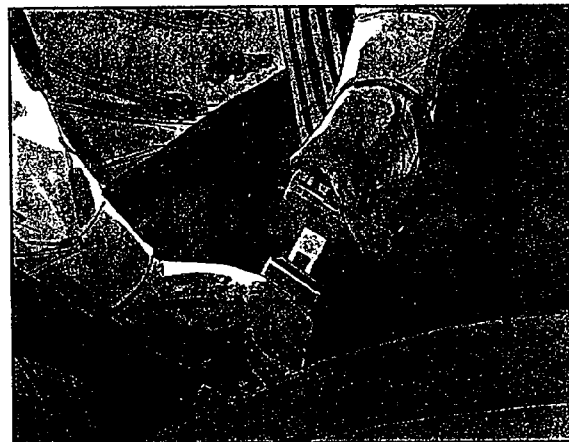
Driver Position

This part describes the driver's restraint system.

Lap-Shoulder Belt

The driver has a lap-shoulder belt. Here's how to wear it properly.

1. Close and lock the door.
2. Adjust the seat (to see how, see "Seats" in the Index) so you can sit up straight.



3. Pick up the latch plate and pull the belt across you. Don't let it get twisted.

The shoulder belt may lock if you pull the belt across you very quickly. If this happens, let the belt go back slightly to unlock it. Then pull the belt across you more slowly.

1-10

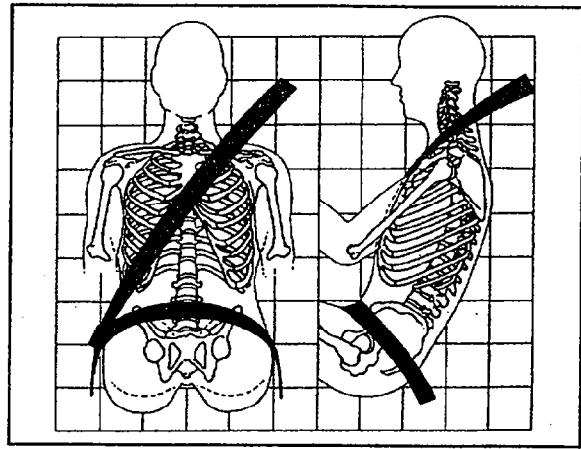
4. Push the latch plate into the buckle until it clicks.

Pull up on the latch plate to make sure it is secure. If the belt isn't long enough, see "Safety Belt Extender" at the end of this section.

Make sure the release button on the buckle is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.



5. To make the lap part tight, pull down on the buckle end of the belt as you pull up on the shoulder belt.



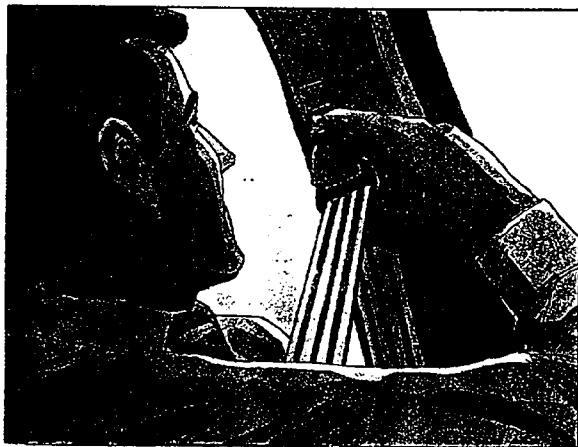
The lap part of the belt should be worn low and snug on the hips, just touching the thighs. In a crash, this applies force to the strong pelvic bones. And you'd be less likely to slide under the lap belt. If you slid under it, the belt would apply force at your abdomen. This could cause serious or even fatal injuries. The shoulder belt should go over the shoulder and across the chest. These parts of the body are best able to take belt restraining forces.

The safety belt locks if there's a sudden stop or crash, or if you pull the belt very quickly out of the retractor.

1-11

Shoulder Belt Height Adjuster

Before you begin to drive, move the shoulder belt adjuster to the height that is right for you.

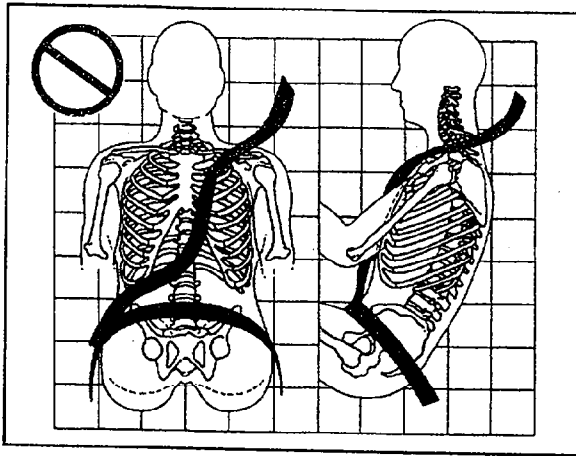


To move it down, squeeze the release lever and move the height adjuster to the desired position. You can move the adjuster up just by pushing up on the shoulder belt guide. After you move the adjuster to where you want it, try to move it down without squeezing the release lever to make sure it has locked into position.

Adjust the height so that the shoulder portion of the belt is centered on your shoulder. The belt should be away from your face and neck, but not falling off your shoulder.

1-12

Q: What's wrong with this?

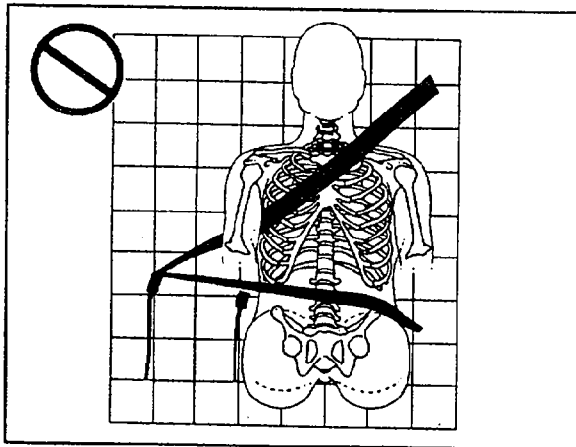


CAUTION:
You can be seriously hurt if your shoulder belt is too loose. In a crash you would move forward too much, which could increase injury. The shoulder belt should fit against your body.

A: The shoulder belt is too loose. It won't give nearly as much protection this way.

1-13

Q: What's wrong with this?

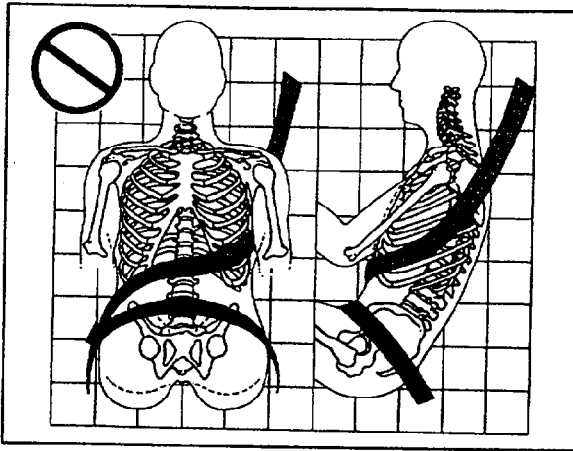


CAUTION:
You can be seriously injured if your belt is buckled in the wrong place like this. In a crash, the belt would go up over your abdomen. The belt forces would be there, not at the pelvic bones. This could cause serious internal injuries. Always buckle your belt into the buckle nearest you.

A: The belt is buckled in the wrong place.

1-14

Q: What's wrong with this?



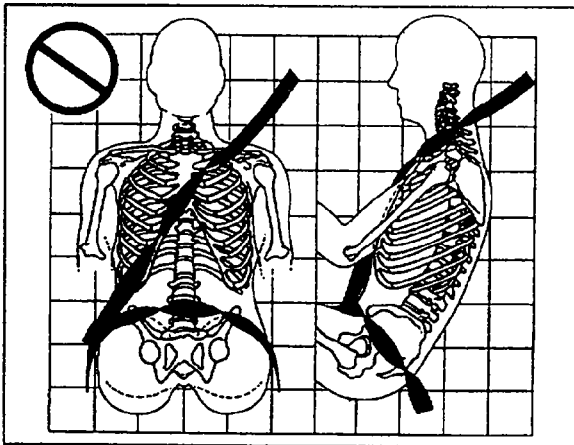
⚠ CAUTION:

You can be seriously injured if you wear the shoulder belt under your arm. In a crash, your body would move too far forward, which would increase the chance of head and neck injury. Also, the belt would apply too much force to the ribs, which aren't as strong as shoulder bones. You could also severely injure internal organs like your liver or spleen.

A: The shoulder belt is worn under the arm. It should be worn over the shoulder at all times.

1-15

Q: What's wrong with this?



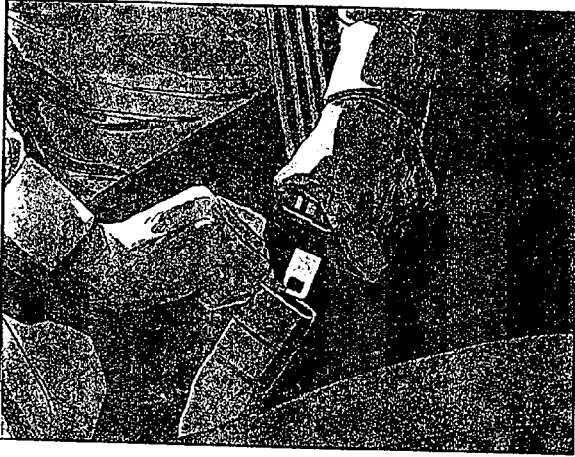
⚠ CAUTION:

You can be seriously injured by a twisted belt. In a crash, you wouldn't have the full width of the belt to spread impact forces. If a belt is twisted, make it straight so it can work properly, or ask your dealer to fix it.

A: The belt is twisted across the body.

1-16

To unlatch the belt, just push the button on the buckle. The belt should go back out of the way.



Before you close the door, be sure the belt is out of the way. If you slam the door on it, you can damage both the belt and your vehicle.

Air Bag System

This part explains the air bag system.

Your Chevrolet has two air bags -- one air bag for the driver and another air bag for the right front passenger.

Here are the most important things to know about the air bag system:

CAUTION:

You can be severely injured or killed in a crash if you aren't wearing your safety belt -- even if you have an air bag. Wearing your safety belt during a crash helps reduce your chance of hitting things inside the vehicle or being ejected from it. The air bag is only a "supplemental restraint." That is, it works with safety belts but doesn't replace them. Air bags are designed to work only in moderate to severe crashes where the front of your vehicle hits something. They aren't designed to inflate at all in rollover, rear, side, or low-speed frontal crashes. Everyone in your vehicle, including the driver, should wear a safety belt properly -- whether or not there's an air bag for that person.

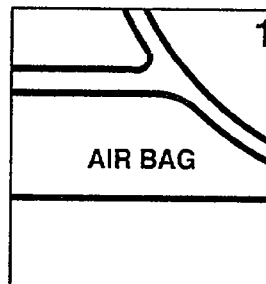
1-17

CAUTION:

Air bags inflate with great force, faster than the blink of an eye. If you're too close to an inflating air bag, it could seriously injure you. Safety belts help keep you in position for an air bag inflation in a crash. Always wear your safety belt, even with an air bag. The driver should sit as far back as possible while still maintaining control of the vehicle.

CAUTION:

An inflating air bag can seriously injure small children. Always secure children properly in your vehicle. To read how, see the part of this manual called "Children" and the caution label on the right front passenger's safety belt.

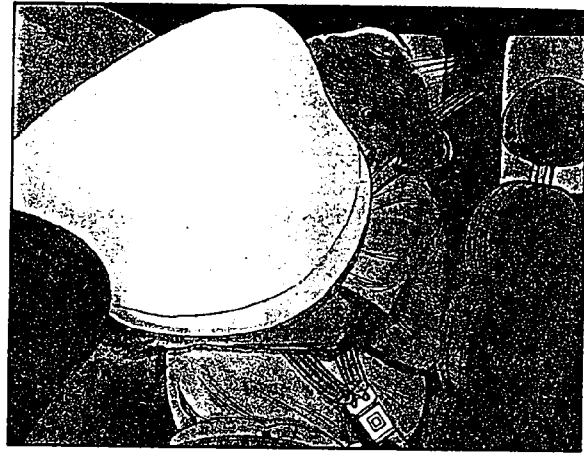
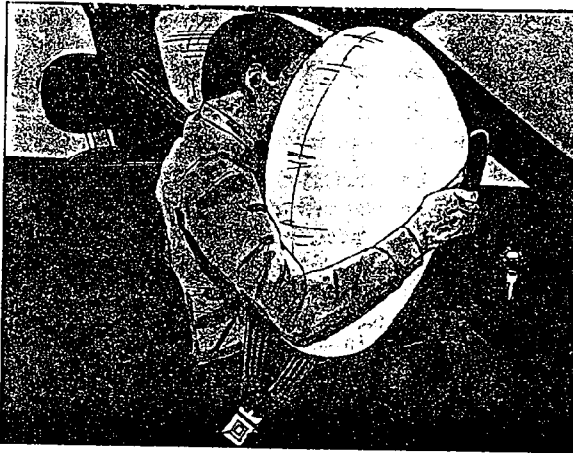


1 There is an air bag readiness light on the instrument panel, which shows AIR BAG or the air bag symbol.

The system checks the air bag's electrical system for malfunctions. The light tells you if there is an electrical problem. See "Air Bag Readiness Light" in the Index for more information.

1-18

How the Air Bag System Works



Where is the air bag?

The driver's air bag is in the middle of the steering wheel. The right front passenger's air bag is in the instrument panel on the passenger's side.

1-19

CAUTION:

Don't put anything on, or attach anything to, the steering wheel or instrument panel. Also, don't put anything (such as pets, or objects) between any occupant and the steering wheel or instrument panel. If something is between an occupant and an air bag, it could affect the performance of the air bag -- or worse, it could cause injury.

When should an air bag inflate?

The air bag is designed to inflate in moderate to severe frontal or near-frontal crashes. The air bag will inflate only if the impact speed is above the system's designed "threshold level." If your vehicle goes straight into a wall that doesn't move or deform, the threshold level is about 9 to 15 mph (14 to 24 km/h). The threshold level can vary, however, with specific vehicle design, so that it can be somewhat above or below this range. If your vehicle strikes something that will move or deform, such as a parked car, the threshold level will be higher. The air bag is not designed to inflate in rollovers, side impacts, or rear impacts, because inflation would not help the occupant.

1-20

In any particular crash, no one can say whether an air bag should have inflated simply because of the damage to a vehicle or because of what the repair costs were. Inflation is determined by the angle of the impact and the vehicle's deceleration. Vehicle damage is only one indication of this.

What makes an air bag inflate?

In a frontal or near-frontal impact of sufficient severity, the air bag sensing system detects that the vehicle is suddenly stopping as a result of a crash. The sensing system triggers a chemical reaction of the sodium azide sealed in the inflator. The reaction produces nitrogen gas, which inflates the air bag. The inflator, air bag, and related hardware are all part of the air bag modules packed inside the steering wheel and in the instrument panel in front of the right front passenger.

How does an air bag restrain?

In moderate to severe frontal or near-frontal collisions, even belted occupants can contact the steering wheel or the instrument panel. The air bag supplements the protection provided by safety belts. Air bags distribute the force of the impact more evenly over the occupant's upper body, stopping the occupant more gradually. But air bags would not help you in many types of collisions, including rollovers and rear and side impacts, primarily because an occupant's motion is not toward the air bag. Air bags should never be regarded as anything more than a supplement to safety belts, and then only in moderate to severe frontal or near-frontal collisions.

What will you see after an air bag inflates?

After the air bag inflates, it quickly deflates. This occurs so quickly that some people may not even realize the air bag inflated. Some components of the air bag module in the steering wheel hub for the driver's air bag, or the instrument panel for the right front passenger's bag, will be hot for a short time, but the part of the bag that comes into contact with you will not be hot to the touch. There will be some smoke and dust coming from vents in the deflated air bags. Air bag inflation will not prevent the driver from seeing or from being able to steer the vehicle, nor will it stop people from leaving the vehicle.

CAUTION:

When an air bag inflates, there is dust in the air. This dust could cause breathing problems for people with a history of asthma or other breathing trouble. To avoid this, everyone in the vehicle should get out as soon as it is safe to do so. If you have breathing problems but can't get out of the vehicle after an air bag inflates, then get fresh air by opening a window or door.

In many crashes severe enough to inflate an air bag, windshields are broken by vehicle deformation. Additional windshield breakage may also occur from the right front passenger air bag.

- The air bags are designed to inflate only once. After they inflate, you'll need some new parts for your air bag system. If you don't get them, the air bag system won't be there to help protect you in another crash. A new system will include air bag modules and possibly other parts. The service manual for your vehicle covers the need to replace other parts.

1-21

- Your vehicle is equipped with a diagnostic module, which records information about the air bag system. The module records information about the readiness of the system, when the sensors are activated and driver's safety belt usage at deployment.
- Let only qualified technicians work on your air bag system. Improper service can mean that your air bag system won't work properly. See your dealer for service.

NOTICE:

If you damage the cover for the driver's or the right front passenger's air bag, they may not work properly. You may have to replace the air bag module in the steering wheel or both the air bag module and the instrument panel for the right front passenger's air bag. Do not open or break the air bag covers.

Servicing Your Air Bag-Equipped Chevrolet

Air bags affect how your Chevrolet should be serviced. There are parts of the air bag system in several places around your vehicle. You don't want the system to inflate while someone is working on your vehicle. Your Chevrolet dealer and the 1995 Lumina Service Manual have information about servicing your vehicle and the air bag system. To purchase a service manual, see "Service Publications" in the Index.

The air bag system does not need regular maintenance.

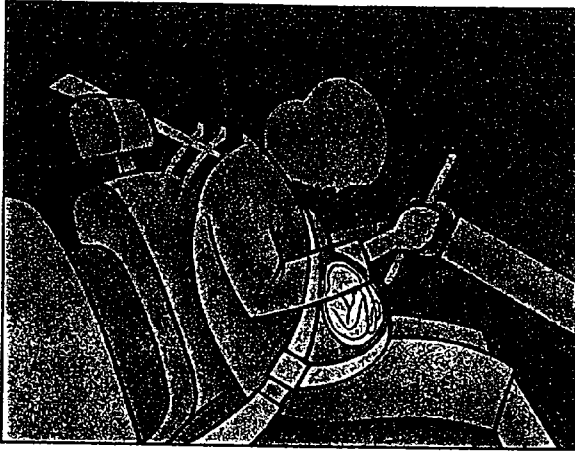
CAUTION:

For up to 10 seconds after the ignition key is turned off and the battery is disconnected, an air bag can still inflate during improper service. You can be injured if you are close to an air bag when it inflates. Avoid wires wrapped with yellow tape, or yellow connectors. They are probably part of the air bag system. Be sure to follow proper service procedures, and make sure the person performing work for you is qualified to do so.

Safety Belt Use During Pregnancy

Safety belts work for everyone, including pregnant women. Like all occupants, they are more likely to be seriously injured if they don't wear safety belts.

A pregnant woman should wear a lap-shoulder belt, and the lap portion should be worn as low as possible throughout the pregnancy.



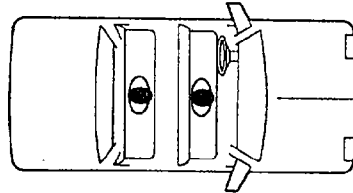
The best way to protect the fetus is to protect the mother. When a safety belt is worn properly, it's more likely that the fetus won't be hurt in a crash. For pregnant women, as for anyone, the key to making safety belts effective is wearing them properly.

Right Front Passenger Position

The right front passenger's safety belt works the same way as the driver's safety belt. See "Driver Position," earlier in this section.

When the shoulder belt is pulled out all the way, it will lock. If it does, let it go back all the way and start again.

Center Passenger Position



Lap Belt

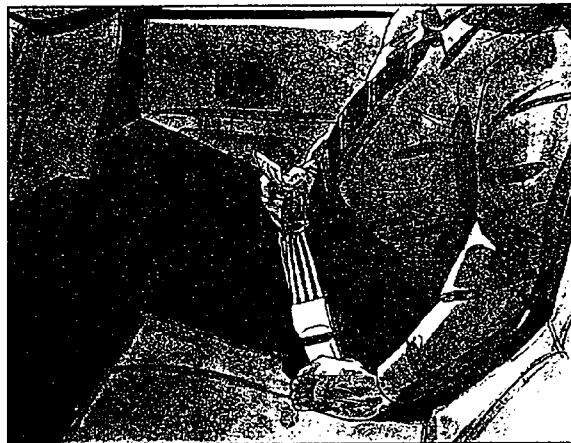
If your vehicle has a bench seat, someone can sit in the center position.

1-23



When you sit in a center seating position, you have a lap safety belt, which has no retractor. To make the belt longer, tilt the latch plate and pull it along the belt.

To make the belt shorter, pull its free end as shown until the belt is snug.



Buckle, position and release it the same way as the lap part of a lap-shoulder belt. If the belt isn't long enough, see "Safety Belt Extender" at the end of this section.

Make sure the release button on the buckle is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.

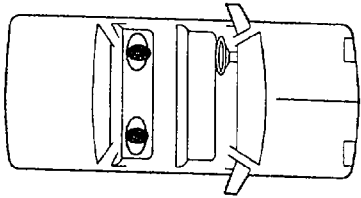
1-24

Rear Seat Passengers

It's very important for rear seat passengers to buckle up! Accident statistics show that unbelted people in the rear seat are hurt more often in crashes than those who are wearing safety belts.

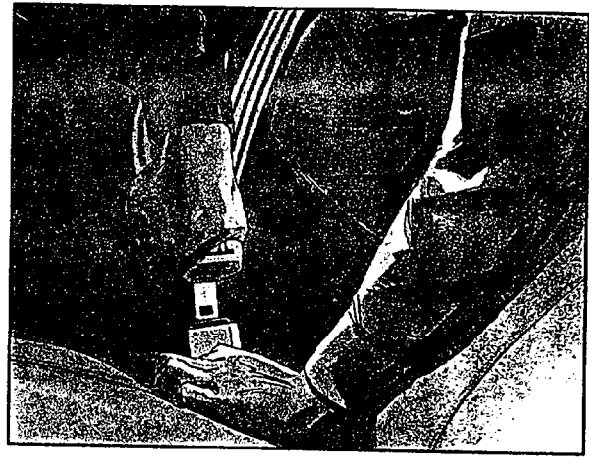
Rear passengers who aren't safety belted can be thrown out of the vehicle in a crash. And they can strike others in the vehicle who are wearing safety belts.

Rear Seat Outside Passenger Positions



Lap-Shoulder Belt

The positions next to the windows have lap-shoulder belts. Here's how to wear one properly.



1. Pick up the latch plate and pull the belt across you. Don't let it get twisted.

The shoulder belt may lock if you pull the belt across you very quickly. If this happens, let the belt go back slightly to unlock it. Then pull the belt across you more slowly.

1-25

2. Push the latch plate into the buckle until it clicks.

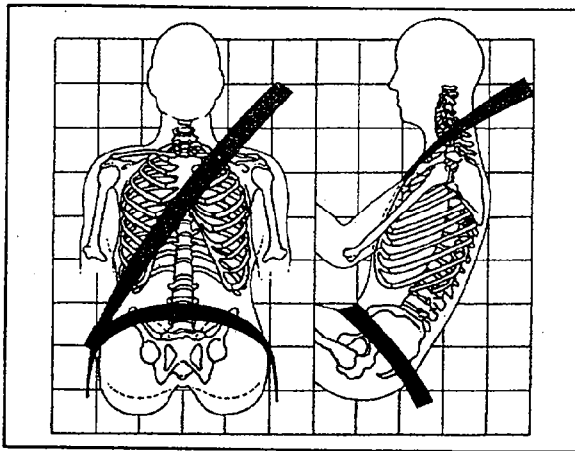
Pull up on the latch plate to make sure it is secure.

When the shoulder belt is pulled out all the way, it will lock. If it does, let it go back all the way and start again. If the belt is not long enough, see "Safety Belt Extender" at the end of this section. Make sure the release button on the buckle is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.



3. To make the lap part tight, pull down on the buckle end of the belt as you pull up on the shoulder part.

1-26



The safety belt locks if there's a sudden stop or a crash, or if you pull the belt very quickly out of the retractor.

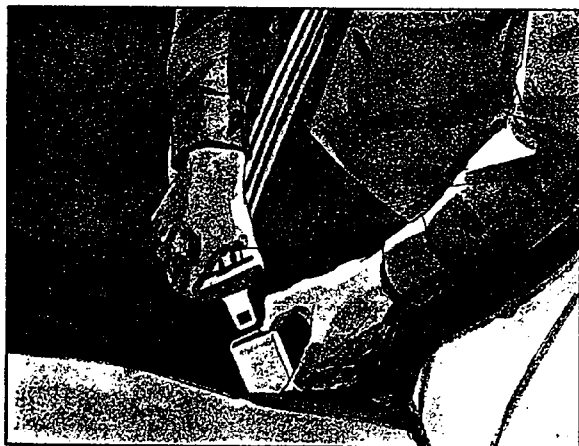


CAUTION:

You can be seriously hurt if your shoulder belt is too loose. In a crash you would move forward too much, which could increase injury. The shoulder belt should fit against your body.

The lap part of the belt should be worn low and snug on the hips, just touching the thighs. In a crash, this applies force to the strong pelvic bones. And you'd be less likely to slide under the lap belt. If you slid under it, the belt would apply force at your abdomen. This could cause serious or even fatal injuries. The shoulder belt should go over the shoulder and across the chest. These parts of the body are best able to take belt restraining forces.

1-27



To unlatch the belt, just push the button on the buckle.

Rear Safety Belt Comfort Guides for Children and Small Adults

Rear shoulder belt comfort guides will provide added comfort for children who have outgrown child restraints and for small adults. The comfort guides pull the shoulder belts away from the neck and head.



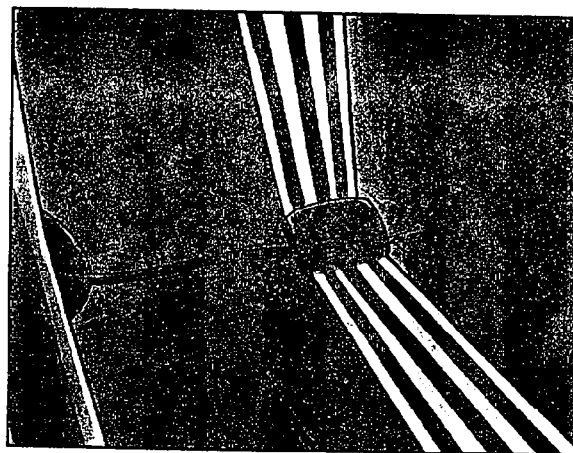
There is one guide for each outside passenger position in the rear seat. You will find them tucked in between the seatback and the interior body, about half-way down the edge of the seatback. Here is how you should install the comfort guides on the shoulder belts:

1. Pull the elastic cord out from between the edge of the seatback and the interior body to remove the guide from its storage clip.

1-28

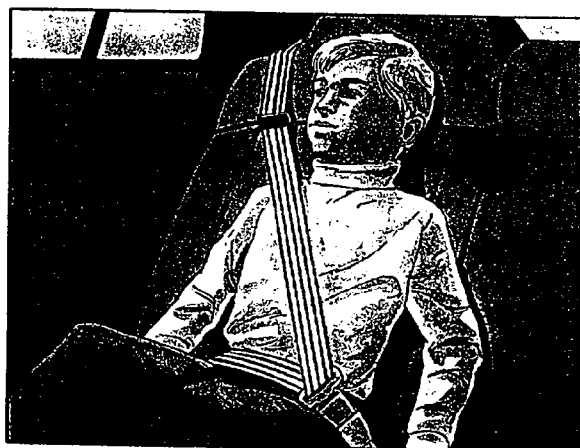


2. Slide the guide under and past the belt. The elastic cord must be under the belt. Then, place the guide over the belt, and insert the two edges of the belt into the slots of the guide.



3. Be sure that the belt is not twisted and it lies flat. The elastic cord must be under the belt and the guide on top.

1-29



4. Buckle the belt around the child, and make sure that both the lap belt and the shoulder belt are secured properly. Make sure that the shoulder belt crosses the shoulder. See "Safety Belts, Rear Seat Passengers" in the Index.

To remove and store the comfort guides, just perform these steps in reverse order. Squeeze the belt edges together so that you can take them out from the guides. Pull the guide upward to expose its storage clip, and then slide the guide onto the clip. Rotate the guide and clip inward and in between the seatback and the interior body, leaving only the loop of elastic cord exposed.

1-30

Children

Everyone in a vehicle needs protection! That includes infants and all children smaller than adult size. In fact, the law in every state in the United States and in every Canadian province says children up to some age must be restrained while in a vehicle.

Smaller Children and Babies

CAUTION:

Smaller children and babies should always be restrained in a child or infant restraint. The instructions for the restraint will say whether it is the right type and size for your child. A very young child's hip bones are so small that a regular belt might not stay low on the hips as it should. Instead, the belt will likely be over the child's abdomen. In a crash the belt would apply force right on the child's abdomen, which could cause serious or fatal injuries. So, be sure that any child small enough for one is always properly restrained in a child or infant restraint.

1-31



CAUTION:

Never hold a baby in your arms while riding in a vehicle. A baby doesn't weigh much -- until a crash. During a crash a baby will become so

CAUTION: (Continued)

CAUTION: (Continued)

heavy you can't hold it. For example, in a crash at only 25 mph (40 km/h), a 12-pound (5.5 kg) baby will suddenly become a 240-pound (110 kg) force on your arms. The baby would be almost impossible to hold.

Secure the baby in an infant restraint.



1-32

Child Restraints

Be sure to follow the instructions for the restraint. You may find these instructions on the restraint itself or in a booklet, or both. These restraints use the belt system in your vehicle, but the child also has to be secured within the restraint to help reduce the chance of personal injury. The instructions that come with the infant or child restraint will show you how to do that.

Where to Put the Restraint

Accident statistics show that children are safer if they are restrained in the rear rather than the front seat. We at General Motors therefore recommend that you put your child restraint in the rear seat. *Never* put a rear-facing child restraint in the front passenger seat. Here's why:

CAUTION:

A child in a rear-facing child restraint can be seriously injured if the right front passenger's air bag inflates. This is because the back of a rear-facing child restraint would be very close to the inflating air bag. Always secure a rear-facing child restraint in the rear seat.

You may, however, secure a forward-facing child restraint in the right front seat. Before you secure a forward-facing child restraint, always move the front passenger seat as far back as it will go. Or, secure the child restraint in the rear seat.

1-33

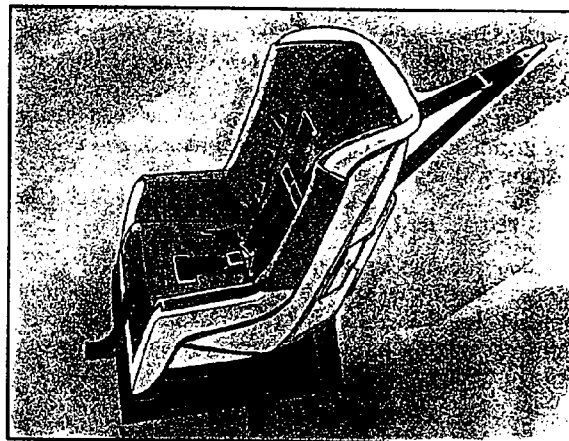
CAUTION:

A child in a child restraint in the center front seat can be badly injured by the passenger air bag if it inflates. *Never* use a child restraint in the center front seat. It's always better to secure a child restraint in the rear seat. You may, however, secure a forward-facing child restraint in the right front passenger seat, but only with the seat moved all the way back.

Wherever you install it, be sure to secure the child restraint properly.

Keep in mind that an unsecured child restraint can move around in a collision or sudden stop and injure people in the vehicle. Be sure to properly secure any child restraint in your vehicle -- even when no child is in it.

Top Strap



If your child restraint has a top strap, it should be anchored. If you need to have an anchor installed, you can ask your Chevrolet dealer to put it in for you. If you want to install an anchor yourself, your dealer can tell you how to do it.

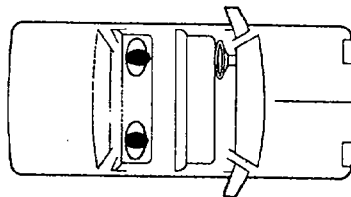
1-34

For cars first sold in Canada, child restraints with a top strap must be anchored according to Canadian Law.

Your dealer can obtain the hardware kit and install it for you, or you may install it yourself using the instructions provided in the kit.

Use the tether hardware kit available from the dealer. The hardware and installation instructions were specifically designed for this vehicle.

Securing a Child Restraint in a Rear Outside Seat Position



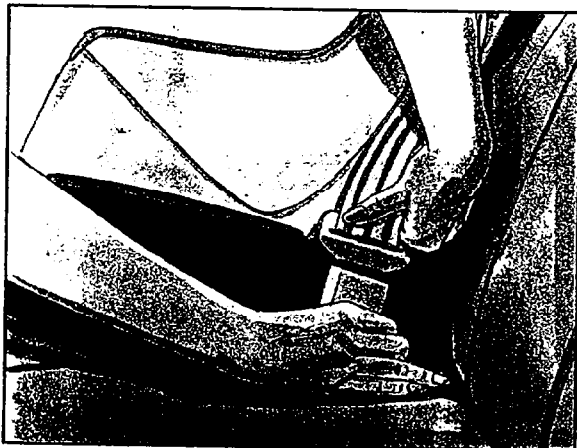
You'll be using the lap-shoulder belt. See the earlier part about the top strap if the child restraint has one.

1. Put the restraint on the seat. Follow the instructions for the child restraint.
2. Secure the child in the child restraint as the instructions say.
3. Pick up the latch plate, and run the lap and shoulder portions of the vehicle's safety belt through or around the restraint. The child restraint instructions will show you how.

If the shoulder belt goes in front of the child's face or neck, put it behind the child restraint.

1-35

4. Buckle the belt. Make sure the release button is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.

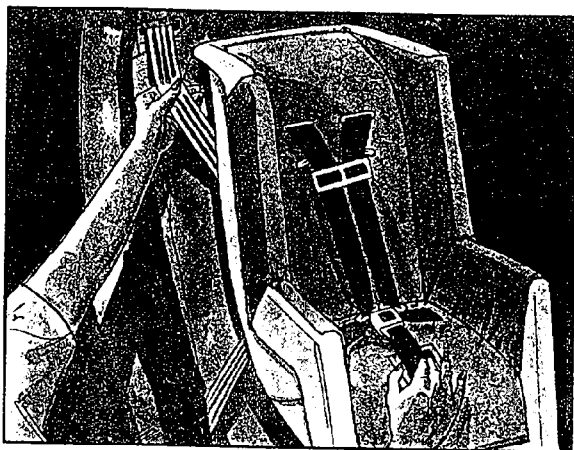


5. Pull the rest of the shoulder belt all the way out of the retractor to set the lock.

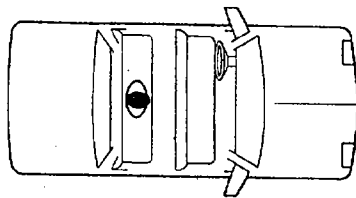


1-36

6. To tighten the belt, feed the shoulder belt into the retractor while you push down on the child restraint.



Securing a Child Restraint in the Center Rear Seat Position



You'll be using the lap belt.

CAUTION:

A child in a child restraint in the center front seat can be badly injured by the right front passenger air bag if it inflates. Never secure a child restraint in the center front seat. It's always better to secure a child restraint in the rear seat. You may, however, secure a forward-facing child restraint in the right front passenger seat, but only with the seat moved all the way back.

7. Push and pull the child restraint in different directions to be sure it is secure.

To remove the child restraint, just unbuckle the vehicle's safety belt and let it go back all the way. The safety belt will move freely again and be ready to work for an adult or larger child passenger.

1-37

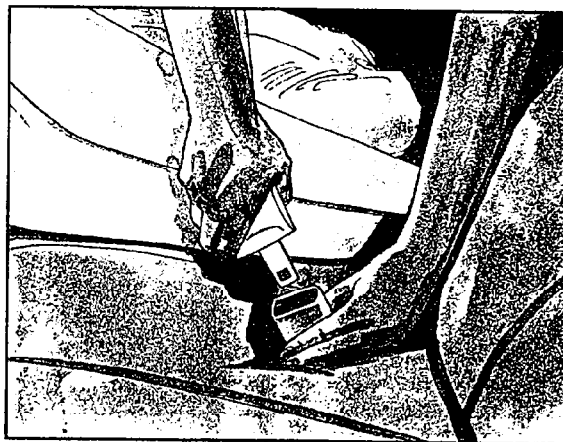
See the earlier part about the top strap if the child restraint has one.

1. Make the belt as long as possible by tilting the latch plate and pulling it along the belt.



2. Put the restraint on the seat. Follow the instructions for the child restraint.
3. Secure the child in the child restraint as the instructions say.

4. Run the vehicle's safety belt through or around the restraint. The child restraint instructions will show you how.



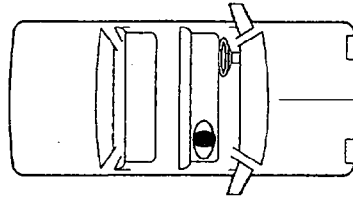
5. Buckle the belt. Make sure the release button is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.

1-38

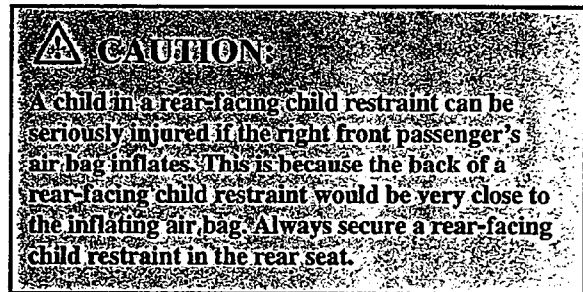
6. To tighten the belt, pull its free end while you push down on the child restraint.
7. Push and pull the child restraint in different directions to be sure it is secure. If the child restraint isn't secure, turn the latch plate over and buckle it again. Then see if it is secure. If it isn't, secure the restraint in a different place in the vehicle and contact the child restraint maker for their advice about how to attach the child restraint properly.

To remove the child restraint, just unbuckle the vehicle's safety belt. It will be ready to work for an adult or larger child passenger.

Securing a Child Restraint in the Right Front Seat Position



Your vehicle has a right front passenger air bag. *Never* put a rear-facing child restraint in this seat. Here's why:

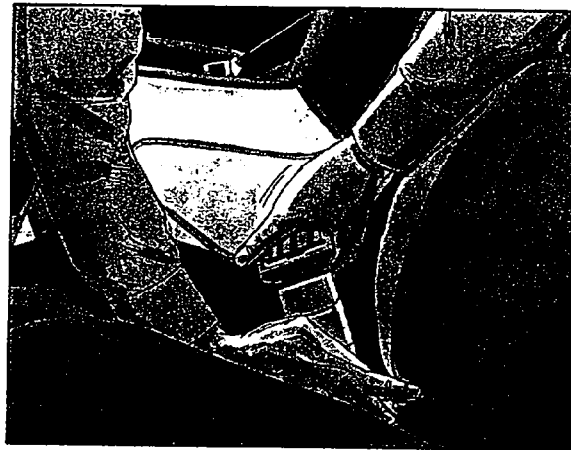


1-39

You'll be using the lap-shoulder belt. See the earlier part about the top strap if the child restraint has one.

1. Because your vehicle has a right front passenger air bag, always move the seat as far back as it will go before securing a forward-facing child restraint. (See "Seats" in the Index.)
2. Put the restraint on the seat. Follow the instructions for the child restraint.
3. Secure the child in the child restraint as the instructions say.
4. Pick up the latch plate, and run the lap and shoulder portions of the vehicle's safety belt through or around the restraint. The child restraint instructions will show you how.

If the shoulder belt goes in front of the child's face or neck, put it behind the child restraint.

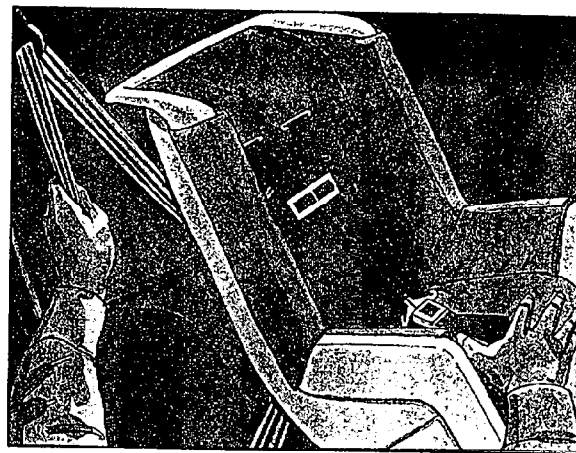
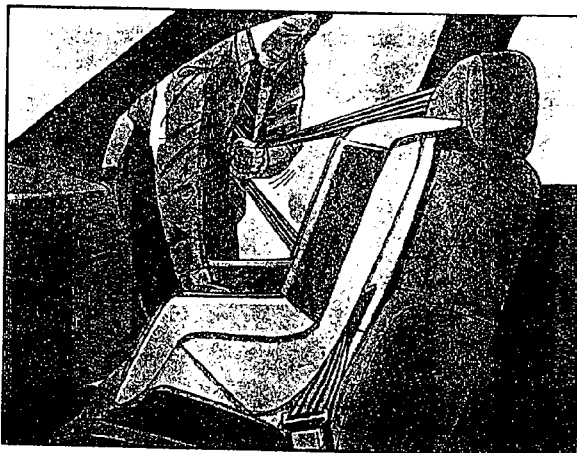


5. Buckle the belt.

Make sure the release button is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.

1-40

6. Pull the rest of the shoulder belt all the way out of the retractor to set the lock.



7. To tighten the belt, feed the shoulder belt back into the retractor while you push down on the child restraint.
8. Push and pull the child restraint in different directions to be sure it is secure.

To remove the child restraint, just unbuckle the vehicle's safety belt and let it go back all the way.

The safety belt will move freely again and be ready to work for an adult or larger child passenger.

1-41

Larger Children



Children who have outgrown child restraints should wear the vehicle's safety belts.

If you have the choice, a child should sit next to a window so the child can wear a lap-shoulder belt and get the additional restraint a shoulder belt can provide.

Accident statistics show that children are safer if they are restrained in the rear seat. But they need to use the safety belts properly.

- Children who aren't buckled up can be thrown out in a crash.
- Children who aren't buckled up can strike other people who are.

1-42



⚠ CAUTION:

Never do this.

Here two children are wearing the same belt. The belt can't properly spread the impact forces. In a crash, the two children can be crushed together and seriously injured. A belt must be used by only one person at a time.

1-43

Q: What if a child is wearing a lap-shoulder belt, but the child is so small that the shoulder belt is very close to the child's face or neck?

A: Move the child toward the center of the vehicle, but be sure that the shoulder belt still is on the child's shoulder, so that in a crash the child's upper body would have the restraint that belts provide. If the child is sitting in a rear seat outside position, see "Rear Safety Belt Comfort Guides" in the Index. If the child is so small that the shoulder belt is still very close to the child's face or neck, you might want to place the child in the center seat position, the one that has only a lap belt.



1-44

⚠ CAUTION:

Never do this:

Here a child is sitting in a seat that has a lap-shoulder belt, but the shoulder part is behind the child. If the child wears the belt in this way, in a crash the child might slide under the belt. The belt's force would then be applied right on the child's abdomen. That could cause serious or fatal injuries.

Wherever the child sits, the lap portion of the belt should be worn low and snug on the hips, just touching the child's thighs. This applies belt force to the child's pelvic bones in a crash.

Safety Belt Extender

If the vehicle's safety belt will fasten around you, you should use it.

But if a safety belt isn't long enough to fasten, your dealer will order you an extender. It's free. When you go in to order it, take the heaviest coat you will wear, so the extender will be long enough for you. The extender will be just for you, and just for the seat in your vehicle that you choose. Don't let someone else use it, and use it only for the seat it is made to fit. To wear it, just attach it to the regular safety belt.

1-45

Checking Your Restraint Systems

Now and then, make sure all your belts, buckles, latch plates, retractors, anchorages and reminder systems are working properly. Look for any other loose or damaged restraint system parts. If you see anything that might keep a restraint system from doing its job, have it repaired.

Torn or frayed belts may not protect you in a crash. They can rip apart under impact forces. If a belt is torn or frayed, get a new one right away.

Replacing Seat and Restraint System Parts After a Crash

If you've had a crash, do you need new belts?

After a very minor collision, nothing may be necessary. But if the belts were stretched, as they would be if worn during a more severe crash, then you need new belts.

If belts are cut or damaged, replace them. Collision damage also may mean you will need to have safety belt or seat parts repaired or replaced. New parts and repairs may be necessary even if the belt wasn't being used at the time of the collision.