

Report Number TRC-96-N04

New Car Assessment Program (NCAP)

Frontal Barrier Impact Test

Chrysler Corporation
1996 Dodge Grand Caravan SE
minivan

NHTSA Number: MT0304

TRC Test Number: 951108

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



December 7, 1995

Final Report

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400 Seventh Street, S.W.
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Report prepared by:

Kevin W. Looker

Kevin W. Looker, Project Engineer
Transportation Research Center Inc.

Date 12-27-95

Report approved by:

Jeffery W. Sankey by JCS

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

Date 12-27-95

Final report accepted by:

[Signature]

Manager, New Car Assessment Program
NHTSA, Office of Market Incentives

Date DEC 14 1995

H. S. Chu

Contracting Officer's Technical Representative (COTR),
NHTSA, Office of Market Incentives

Date DEC 14 1995

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16. Abstract A 56 kph (35 mph) frontal load cell barrier impact test was conducted on a 1996 Dodge Grand Caravan SE minivan, NHTSA No. MT0304, at Transportation Research Center Inc. on November 8, 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 553 millimeters. The ambient temperature was 21° C. The driver's Head Injury Criteria (HIC) was 879. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 53.6 g. The driver's maximum chest deflection was 42 mm. The driver's left and right femur maximum axial forces were 5054 N and 4596 N, respectively. The passenger's HIC was 403. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 46.2 g. The passenger's maximum chest deflection was 38 mm. The passenger's left and right femur maximum axial forces were 6339 N and 6700 N, respectively.			
17. Key Words 56 kph (35 mph) Frontal Barrier Impact Test: New Car Assessment Program (NCAP) FMVSS 208, "Occupant Crash Protection" FMVSS 212, "Windshield Retention" FMVSS 219, "Windshield Zone Intrusion" FMVSS 301, "Fuel System Integrity"		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Admin. Technical Reference Division Nassif Building, Room 5108 400 Seventh Street, S.W. Washington, DC 20590	
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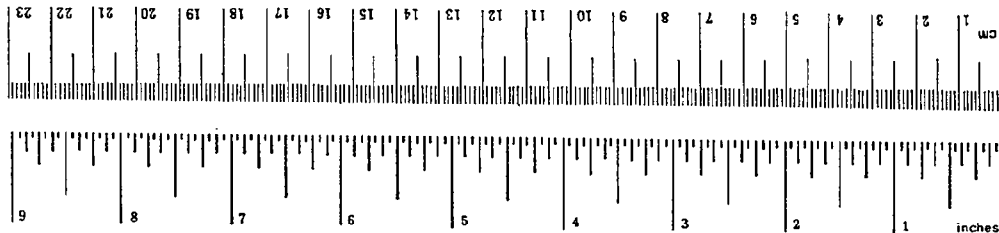
METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
in ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	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
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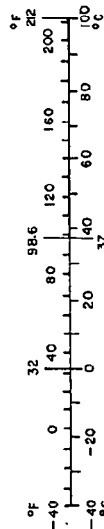


Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares (10,000 m ²)	2.6	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
----	---------------------	-------------------	------------------------	----



*1 in = 2.54 (exactly). 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.

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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 1996 Dodge Grand Caravan SE minivan, NHTSA Number MT0304, 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 first use of the driver dummy and the passenger dummy.

Both dummies were instrumented with primary and redundant head and chest accelerometers to measure longitudinal, lateral, and vertical accelerations, and with left and right femur load cells to measure axial forces. The dummies were also instrumented with neck moment and force load cells, chest deflection potentiometers, and foot accelerometers to measure longitudinal and vertical axis accelerations. In addition, the driver dummy's lower legs were instrumented with upper and lower tibia load cells to measure forces and moments.

The one-hundred-ten (110) data channels were digitally sampled and recorded 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 November 8, 1995.

The test vehicle, a 1996 Dodge Grand Caravan SE minivan, NHTSA Number MT0304, was equipped with a 3.3-liter transverse engine, automatic transmission, power steering, and power brakes. The vehicle's test weight was 2003 kg. The vehicle's impact speed was 56.2 kph. The vehicle sustained 553 mm of static crush during the impact.

The driver's Head Injury Criteria (HIC) was 879. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 53.6 g. The driver's maximum chest deflection was 42 mm. The driver's left and right femur maximum axial forces were 5054 N and 4596 N, respectively.

The right front passenger's HIC was 403. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 46.2 g. The passenger's maximum chest deflection was 38 mm. The passenger's left and right femur maximum axial forces were 6339 N and 6700 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 dummy's neck Z-axis axial force data channel, NEKZF1, recorded questionable data because the device's cable pulled loose from its connector.

The driver dummy's neck X-axis shear force data channel, NEKXF1, recorded questionable data spikes between 10 and 50 milliseconds because the device's connector malfunctioned.

The driver dummy's left lower tibia moment about Y-axis data channel, ANLYM1, exceeded its full scale output at approximately 52 milliseconds.

The driver dummy's right lower tibia moment about Y-axis data channel, ANRYM1, exceeded its full scale output at approximately 59 milliseconds.

The vehicle's engine bottom X-axis acceleration data channel, ENGXG2, exceeded its full scale output at approximately 34 milliseconds.

The vehicle's right brake caliper X-axis acceleration data channel, BCRXG1, recorded questionable data because the device's cable was pinched by vehicle crush.

The driver shoulder belt displacement data channel, SHBD1, recorded questionable data because the driver dummy's umbilical struck the string pot's string during the impact event.

The driver shoulder belt displacement mechanical measurement was lost because the driver dummy's umbilical struck the string that was sewn to the seat belt during the impact event.

Table 1 Crash Test Summary

NHTSA number:	MT0304	
Test type:	Frontal Load Cell Barrier	
Test date:	11/08/95	
Test time:	1618	
Ambient temperature:	21° C	
Vehicle year/make/ model/body style:	1996/Dodge/Grand Caravan SE/minivan	
Vehicle test weight:	2003 kg	
Impact angle ¹ :	0°	
Impact velocity ² :	Primary = 56.2 kph Secondary = 56.2 kph	
Maximum static crush:	553 mm	
Average rebound:	333 mm	
Dummies:	Driver #192	Passenger #142
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:	110	
Number of cameras:	High-speed	16
	Real-time	2

¹ With respect to tow track centerline.

² Speed trap measurement (± .08 kph accuracy)

³ The secondary light trap failed.

Table 2 Test Vehicle Information

Vehicle year/make/ model/body style:	1996/Dodge/Grand Caravan SE/minivan		
Color:	Silver		
VIN:	1B4GP44R5TB245375		
NHTSA number:	MT0304		
Engine data:			
Placement:	transverse		
Cylinders:	6		
Displacement	3.3 liters		
Transmission data:	☒ 4 speed, ☐ manual, ☒ automatic, ☐ overdrive ☒ FWD, ☐ RWD, ☐ 4WD		
Date vehicle received:	11/06/95		
Odometer reading:	63		
Dealer's name and address:	Trader Bud's Westside Dodge 4000 West Broad Street Columbus, OH 43228		
<u>Accessories:</u>			
Power steering	Yes	Automatic transmission	Yes
Power brakes	Yes	Automatic speed control	Yes
Power seats	No	Tilting steering wheel	Yes
Power windows	Yes	Telescoping steering wheel	No
Tinted glass	Yes	Air conditioning	Yes
Radio	Yes	Anti-skid brake	Yes
Clock	Yes	Rear window defroster	Yes
Other	None		

Certification data from vehicle's label:

Vehicle manufactured by:	Chrysler Corporation
Date of manufacture:	10/95
VIN:	1B4GP44R5TB245375
GVWR:	2427 kg
GAWR: Front:	1246 kg
Rear:	1246 kg

Table 2 Test Vehicle Information, Cont'd.

Size of tires: P215/65R15

Tire pressure with maximum
capacity vehicle load:

Front: 240 kPa

Rear: 240 kPa

Spare tire: Goodyear, T145/90D16

Type of front seats: Bucket

Tire & capacity data from vehicle's label:

Recommended tire size: P215/65R15

Recommended cold tire pressure:

Front: 240 kPa

Rear: 240 kPa

Designated seating capacity:

Front 2

Rear 5

Total 7

Vehicle capacity weight: 522 kg

Luggage weight: NA

Test vehicle attitude:

Delivered attitude: LF 769 mm; RF 769 mm; LR 764 mm; RR 767 mm

Pre-test attitude: LF 745 mm; RF 731 mm; LR 739 mm; RR 734 mm

Post-test attitude: LF 870 mm; RF 803 mm; LR 871 mm; RR 854 mm

Table 2 Test Vehicle Information Cont'd

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

Right front	494 kg	Right rear	384 kg
Left front	556 kg	Left rear	381 kg
Total front weight	1050 kg	(57.9% of total vehicle weight)	
Total rear weight	765 kg	(42.1% of total vehicle weight)	
Total delivered weight	1815 kg		

Calculation of test vehicle's target test weight:

RCLW = Rated cargo and luggage weight

UDW = Unloaded delivered weight (1815 kg)

VCW¹ = Vehicle capacity weight (522 kg)

DSC = Designated seating capacity (7)

RCLW = VCW - 68 (DSC) = 392 - 68(5) = 46 kg

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

Target test weight = 1815 + 46 + 152

Target test weight = 2013 kg

Weight of test vehicle with required dummies and 36 kg of cargo weight:

Right front	549 kg	Right rear	441 kg
Left front	582 kg	Left rear	431 kg
Total front weight	1131 kg	(56.5% of total vehicle weight)	
Total rear weight	872 kg	(43.5% of total vehicle weight)	
Total test weight	2003 kg	(0.5% under target test weight)	

Weight of ballast secured in vehicle: 0 kg

Components removed to meet target test weight Rear bumper skin, rear speakers, left rear seat belt retractor, left rear interior side panel

CG rearward of front wheel centerline: 1319 mm

Vehicle wheelbase: 3030 mm

¹ From the vehicle's recommended tire pressure label.

Table 3 Post-Impact Data

Test number: 951108
NHTSA number: MT0304
Test date: 11/08/95
Test time: 1618
Test type: Frontal load cell barrier
Impact angle: 0°
Ambient temperature
at impact area: 21° 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:

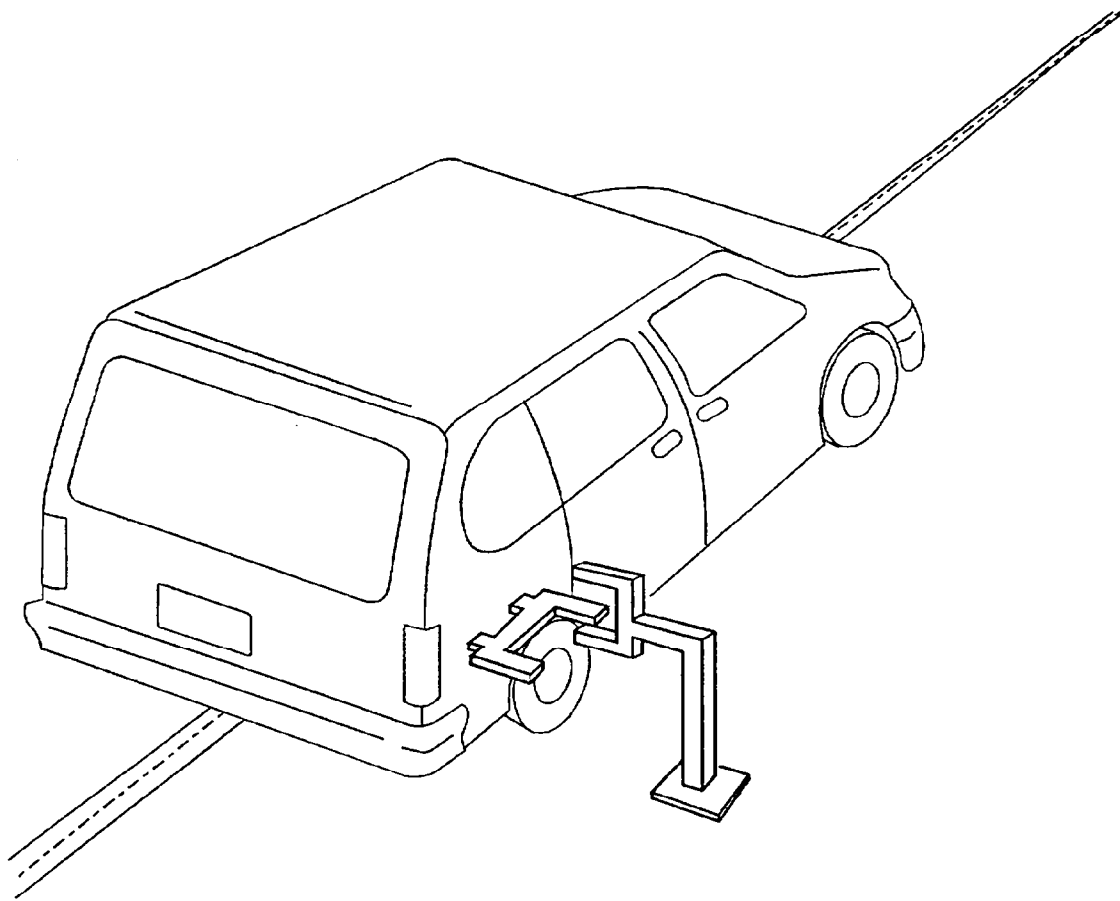
Pre-test: L 4888 mm; C 5060 mm; R 4888 mm
Post-test: L 4435 mm; C 4530 mm; R 4485 mm
Total crush: L 453 mm; C 529 mm; R 403 mm
Average crush: 459 mm

Test vehicle rebound from flat barrier:

Distance from test vehicle to barrier:

Post-test: L 364 mm; C 315 mm; R 319 mm
Average rebound 333 mm

Figure 1 Impact Velocity Measurement System



The final vane clears the final 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: MT0304
 Test date: 11/08/95
 Vehicle year/make/
 model/body style: 1996/Dodge/Grand Caravan SE/minivan
 Vehicle size category: Special purpose
 VIN: 1B4GP44R5TB245375
 Build date: 10/95
 Test weight: 2003 kg
 Vehicle wheelbase: 3030 mm
 Maximum width: 1932 mm
 Front overhang: 920 mm

Collision Deformation
 Classification (CDC) code: 12FDEW3

Crush depth
 measurements:

C1	=	453 mm
C2	=	540 mm
C3	=	553 mm
C4	=	494 mm
C5	=	442 mm
C6	=	395 mm

Midpoint of damage: D: Vehicle Longitudinal Centerline

Length of damaged region: L: 1524 mm

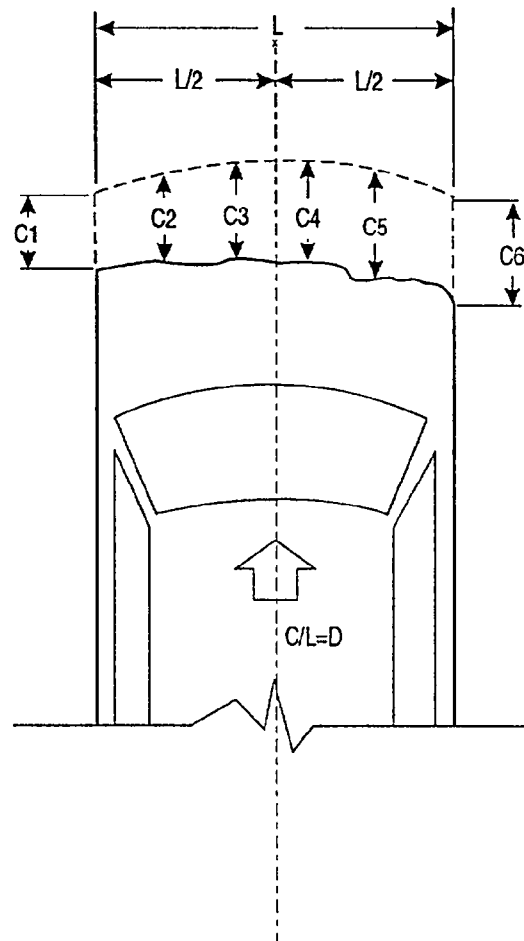


Figure 3 Vehicle Accelerometer Placement

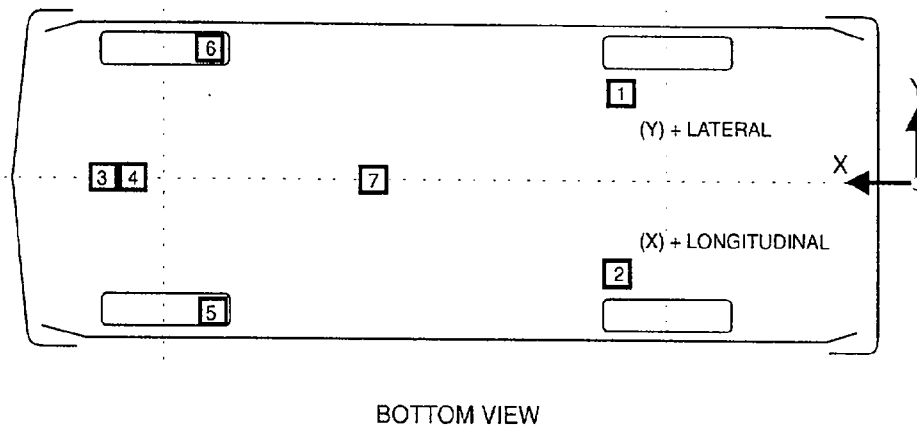
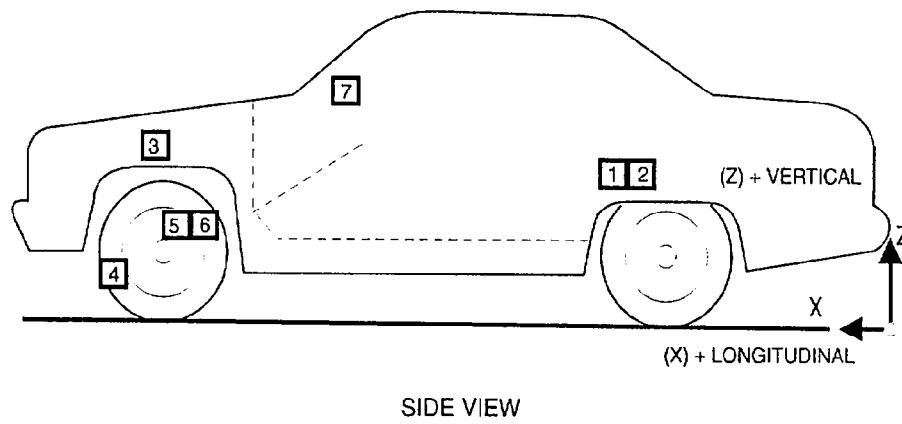


Table 4 Vehicle Accelerometer Locations and Data Summary

TEST NUMBER: 951108 No. LOCATION	X	Y	Z	POSITIVE DIRECTION	NEGATIVE DIRECTION
1 LEFT REAR SEAT CROSSMEMBER LONGITUDINAL REDUNDANT	2560 mm	742 mm	413 mm	2.0 g @ 166.8 ms 1.9 g @ 166.2 ms	39.2 g @ 36.5 ms 38.6 g @ 36.5 ms
2 RIGHT REAR SEAT CROSSMEMBER LONGITUDINAL REDUNDANT	2570 mm	-742 mm	400 mm	1.9 g @ 167.1 ms 1.9 g @ 167.3 ms	36.2 g @ 36.7 ms 36.5 g @ 36.7 ms
3 ENGINE TOP LONGITUDINAL	595 mm	-60 mm	770 mm	34.1 g @ 38.7 ms	159.5 g @ 31.0 ms
4 ENGINE BOTTOM LONGITUDINAL ¹	833 mm	-99 mm	220 mm	37.9 g @ 34.1 ms	154.8 g @ 28.7 ms
5 RIGHT BRAKE CALIPER LONGITUDINAL ¹	835 mm	-701 mm	307 mm	---	---
6 LEFT BRAKE CALIPER LONGITUDINAL	828 mm	701 mm	300 mm	55.9 g @ 58.0 ms	166.2 g @ 39.0 ms
7 INSTRUMENT PANEL CENTER LONGITUDINAL	1170 mm	0 mm	1107 mm	24.8 g @ 25.3 ms	67.2 g @ 29.7 ms

* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN MILLIMETERS. X-AXIS
LOCATIONS ARE MEASURED REARWARD FROM THE FRONT BUMPER.

REFERENCE: X: + FORWARD ACCELERATION

Y: + LEFT FROM VEHICLE CENTERLINE

Z: + UP FROM GROUND LEVEL

¹ See DATA ACQUISITION EXPLANATIONS

Table 5 Post-Impact Dummy/Vehicle Data

Visible Dummy Contact Points:

	<u>Driver #192</u>	<u>Passenger #142</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: There was no damage to the glazing.

Other Notable Impact Effects: None

Table 6 FMVSS 208 Data Summary

Vehicle year/make/
model/body style: 1996/Dodge/Grand Caravan SE/minivan
Vehicle NHTSA number: MT0304
Test date: 11/08/95

	Driver Dummy #192		Passenger Dummy #142	
<u>Maximum Accelerations:</u>				
Head X-axis	-77.6	g	-51.2	g
Head Y-axis	18.7	g	14.7	g
Head Z-axis	13.0	g	-14.2	g
Head resultant	79.3	g	53.3	g
Chest X-axis	-54.5	g	-48.4	g
Chest Y-axis	7.5	g	-7.0	g
Chest Z-axis	9.0	g	11.5	g
Chest resultant ¹	53.6	g	46.2	g
Chest resultant time interval ²	.003	sec	.003	sec
<u>Head Injury Criteria (HIC) Values:</u>				
HIC ²	879		403	
HIC starting time	60.160	sec	65.600	sec
HIC ending time	89.040	sec	100.320	sec
Avg. head resultant accel. during HIC time interval	62.1	g	42.2	g
<u>Maximum Chest Deflections:</u>				
Chest X-axis	-42	mm	-38	mm
Maximum chest deflection time	.072	sec	.074	sec
<u>Maximum Compressive Femur Forces:</u>				
Left femur	5054	N	6339	N
Right femur	4596	N	6700	N
<u>Maximum Seat Belt Forces:</u>				
Lap belt	2953	N	1943	N
Shoulder belt	5926	N	4518	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 Data Summary

Vehicle year/make/
model/body style: 1996/Dodge/Grand CaravanSE/minivan
Vehicle NHTSA number: MT0304
Test date: 11/08/95

	Driver Dummy #192	Passenger Dummy #142
<u>Maximum Forces</u>		
Neck X-axis shear force	280 N	-862 N
Neck Y-axis shear force	257 N	116 N
Neck Z-axis axial force	NA ¹ N	349 N
 <u>Maximum Moments</u>		
Neck moment about X-axis	24.4 N·m	12.4 N·m
Neck moment about Y-axis	-32.7 N·m	91.1 N·m
Neck moment about Z-axis ¹	16.8 N·m	19.3 N·m
 <u>Maximum Accelerations:</u>		
Pelvis X-axis	-57.4 g	-64.7 g
Pelvis Y-axis	11.6 g	-10.4 g
Pelvis Z-axis	24.0 g	28.7 g
Pelvis resultant	61.0 g	66.5 g

¹ See data acquisition explanations.

Table 7 Hybrid III Data Summary, Cont'd.

Vehicle year/make/
model/body style: 1996/Dodge/Grand Caravan SE/minivan
Vehicle NHTSA number: MT0304
Test date: 11/08/95

	Driver Dummy #192	Passenger Dummy #142
Left upper tibia moment about X-axis	-110.3 N·m	NA
Left upper tibia moment about Y-axis	163.2 N·m	NA
Right upper tibia moment about X-axis	45.4 N·m	NA
Right upper tibia moment about Y-axis	166.0 N·m	NA
Left lower tibia X-axis force	-2468 N	NA
Left lower tibia Z-axis force	-4330 N	NA
Left lower tibia moment about Y-axis ¹	-397.7 N·m	NA
Right lower tibia X-axis force	-1655 N	NA
Right lower tibia Z-axis force	-2110 N	NA
Right lower tibia moment about Y-axis ¹	-397.2 N·m	NA
Left foot X-axis acceleration	318.9 g	-178.0 g
Left foot Z-axis acceleration at heel ¹	-532.4	153.9 g
Left foot Z-axis acceleration at toe ¹	-451.0 g	-477.5 g
Right foot X-axis acceleration	-190.2 g	-203.2 g
Right foot Z-axis acceleration at heel	178.9 g	145.1 g
Right foot Z-axis acceleration at toe ¹	523.0 g	-373.8 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 impacted the airbag. The dummy was restrained by the airbag and 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 seated 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 impacted the airbag as the dummy's head rotated forward. The dummy was restrained by the passenger's airbag and the three-point unbelt. The dummy rebounded rearward 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.

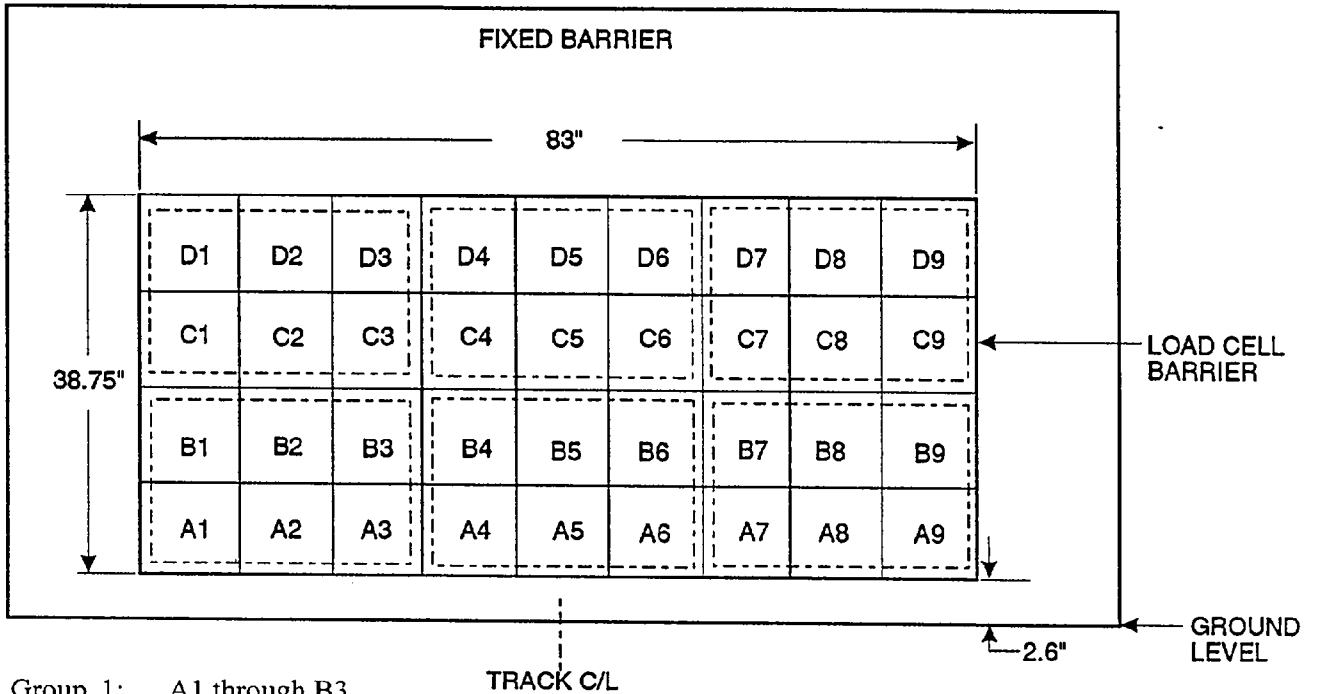
Table 8 Seat Belt Performance Assessment Test Data

	Driver	Passenger
<u>Belt length data:</u>		
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems.	2719 mm	2772 mm
Shoulder belt length as measured on Part 572 dummy.	898 mm	912 mm
Lap belt length as measured on Part 572 dummy.	1003 mm	1007 mm
<u>Shoulder belt spool-off length:</u>		
As determined by film analysis	71 mm	61 mm
As determined mechanically	NA ¹	94 mm
As determined electronically	NA ¹	73 mm
<u>Belt stretch length:</u>		
As measured mechanically	0 mm/m	7 mm/m
As measured electronically	256 mm/m	36 mm/m
<u>Retractor lock-up time:</u>		
As determined by shoulder belt spool-off	70 msec	80 msec

¹ See Data Acquisition Explanations.

Figure 4 Load Cell Barrier Configuration

36 LOAD CELLS
4 ROWS
9 COLUMNS
FRONT VIEW



- 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	1.5	kN	@	5.2 ms	98.3	kN	@	20.2 ms
Total group 2	0.2	kN	@	297.8 ms	286.1	kN	@	31.6 ms
Total group 3	0.7	kN	@	3.5 ms	120.6	kN	@	20.2 ms
Total group 4	1.6	kN	@	198.0 ms	167.8	kN	@	33.4 ms
Total group 5	1.3	kN	@	180.7 ms	138.0	kN	@	31.5 ms
Total group 6	1.6	kN	@	200.3 ms	78.7	kN	@	32.2 ms
Total load cell force	4.2	kN	@	199.9 ms	808.8	kN	@	32.0 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.:

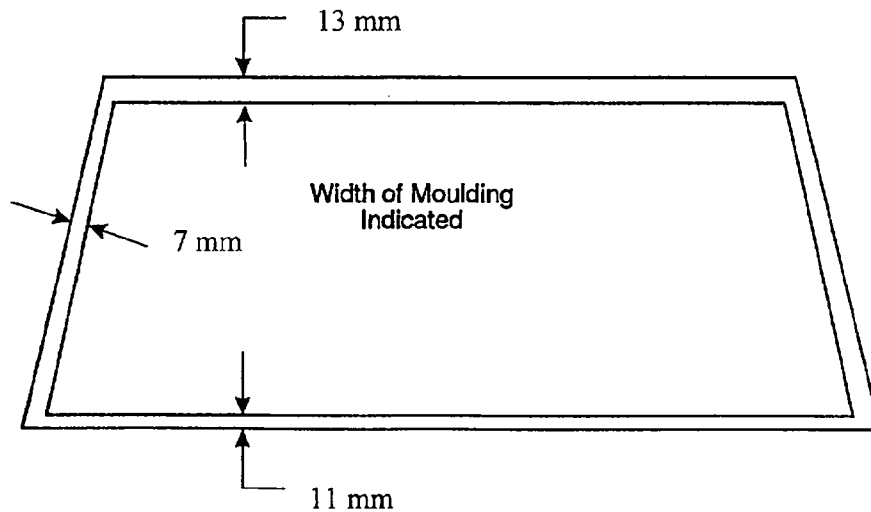
Plastic trim around outer perimeter, adhesive around inner perimeter.

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	2346 mm	2346 mm	100
Left side	2346 mm	2346 mm	100
Total	4692 mm	4692 mm	100

Pre-test windshield mounting material temperature: 21° C



Front view of windshield¹

Loss of windshield retention lengths: There was no loss of windshield retention.

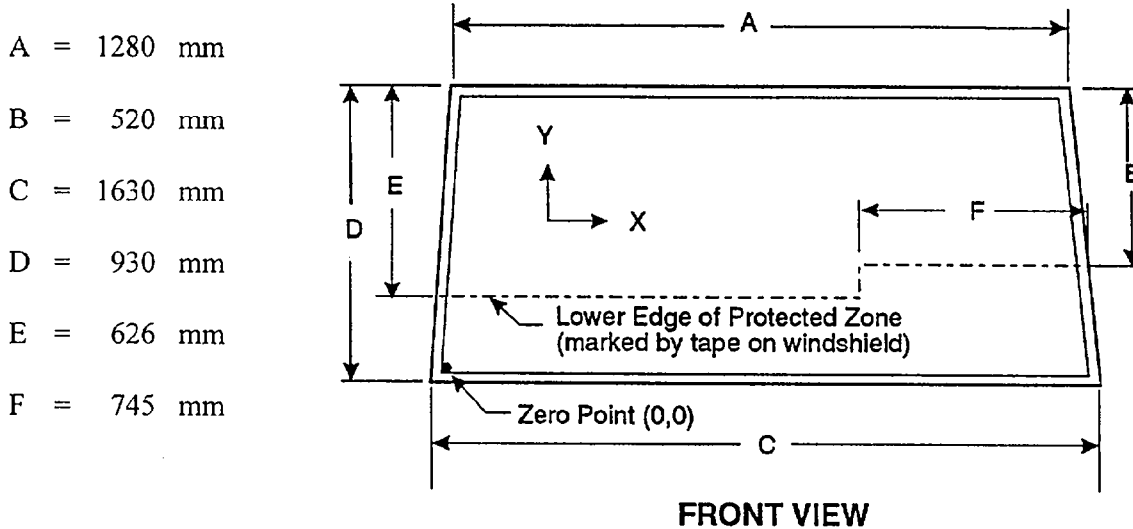
¹ Indicate areas of loss of retention, if any, on windshield diagram.

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:



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:	1996/Dodge/Grand Caravan SE/minivan
NHTSA number:	MT0304
Fuel system capacity:	75.8 liters (from owner's manual)
Usable capacity:	75.7 liters (furnished by COTR)
Test volume range:	69.7 liters to 71.2 liters (92-94% of usable)
Actual test volume:	70.5 liters (with entire fuel system filled)
Test fluid type:	Stoddard solvent
Specific gravity:	0.764
Kinematic viscosity:	0.99 centistoke
Test fluid color:	Purple
Did electric fuel pump operate with ignition switch "on" and the engine not operating.	No
Details of fuel system:	The fuel filler cap is on the left side of the vehicle forward of the rear axle. The fuel filler neck enters the left side of the fuel tank. The fuel tank is located in front of the rear axle along the inside edge of the left frame rail. The fuel lines come out of the top of the tank, cross over to the vehicle's right side, and follow the inside of the right frame rail to the engine compartment.

Table 11 FMVSS 301 Post-Impact Test Data

NHTSA number: MT0304

Test date: 11/08/95

Vehicle year/make/
model/body style: 1996/Dodge/Grand Caravan SE/minivan

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:

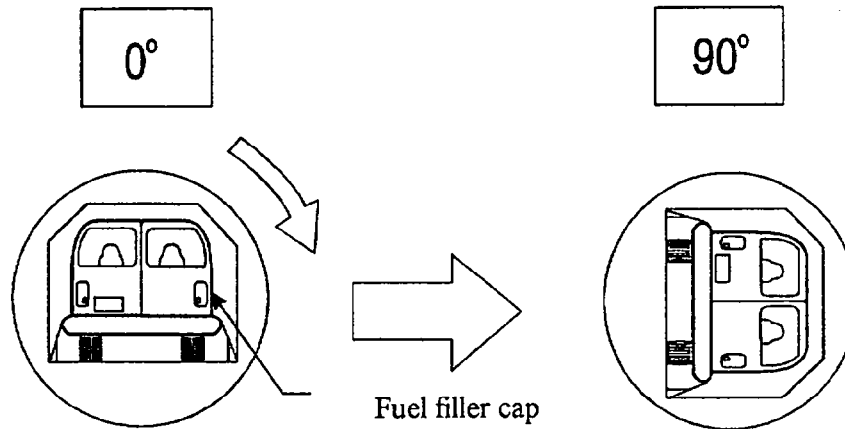
	Test Results	Maximum Allowable
1. From impact until vehicle motion ceases.....	0 g	28 g
2. 5-minute period after vehicle motion ceases.....	0 g	142 g
3. Next 25 minutes after 5-minute period	0 g	28 g/min

Fuel system fluid spillage location(s): None

Figure 7 FMVSS 301 Static Rollover Test Data

NHTSA number: MT0304

Test phase



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

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

FMVSS 301 position hold time = 5 minutes, 0 seconds

Total = 7 minutes, 0 seconds

Next whole minute interval = 7 minutes

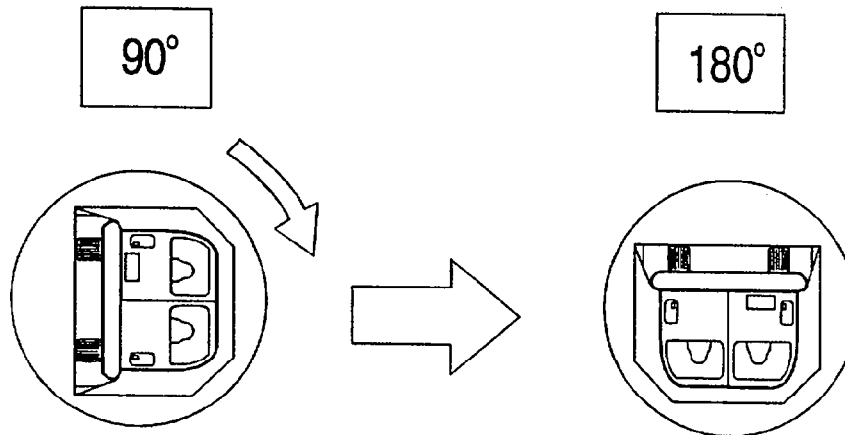
Fuel system fluid spillage measurements:

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

Fuel system fluid spillage location(s): None

Figure 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

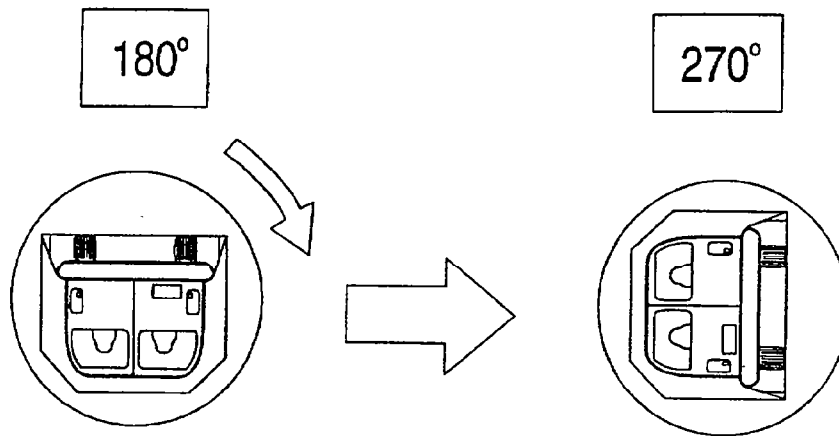
Fuel system fluid spillage measurements:

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

Fuel system fluid spillage location(s): None

Figure 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		

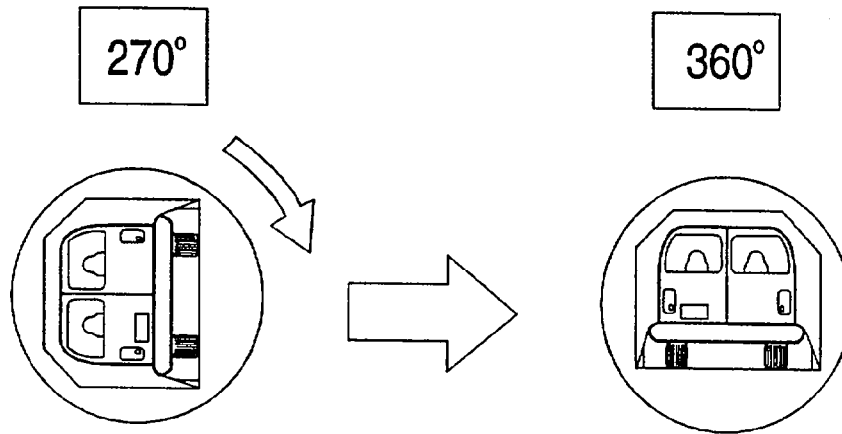
Fuel system fluid spillage measurements:

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

Fuel system fluid spillage location(s): None

Figure 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:

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

Fuel system fluid spillage location(s): None

Section 4.0

Occupant, Camera, and Vehicle Information

Figure 8 Dummy Measurement Locations for Front Seat Occupants

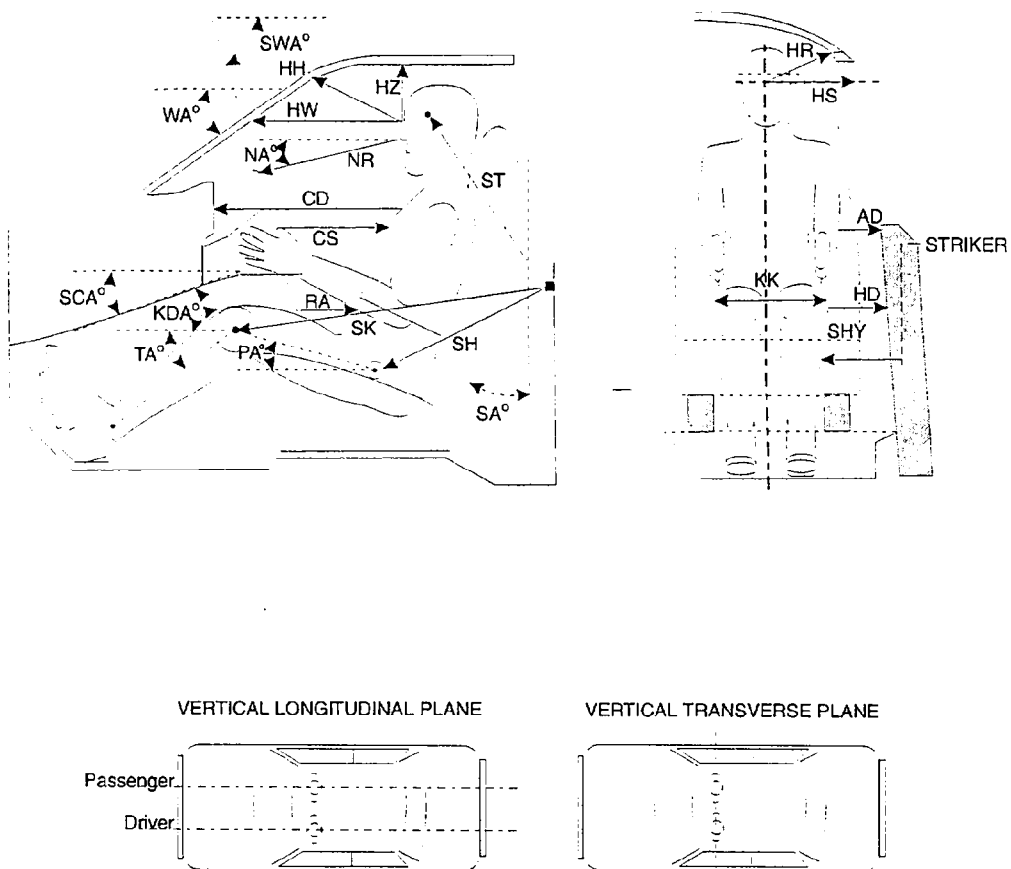


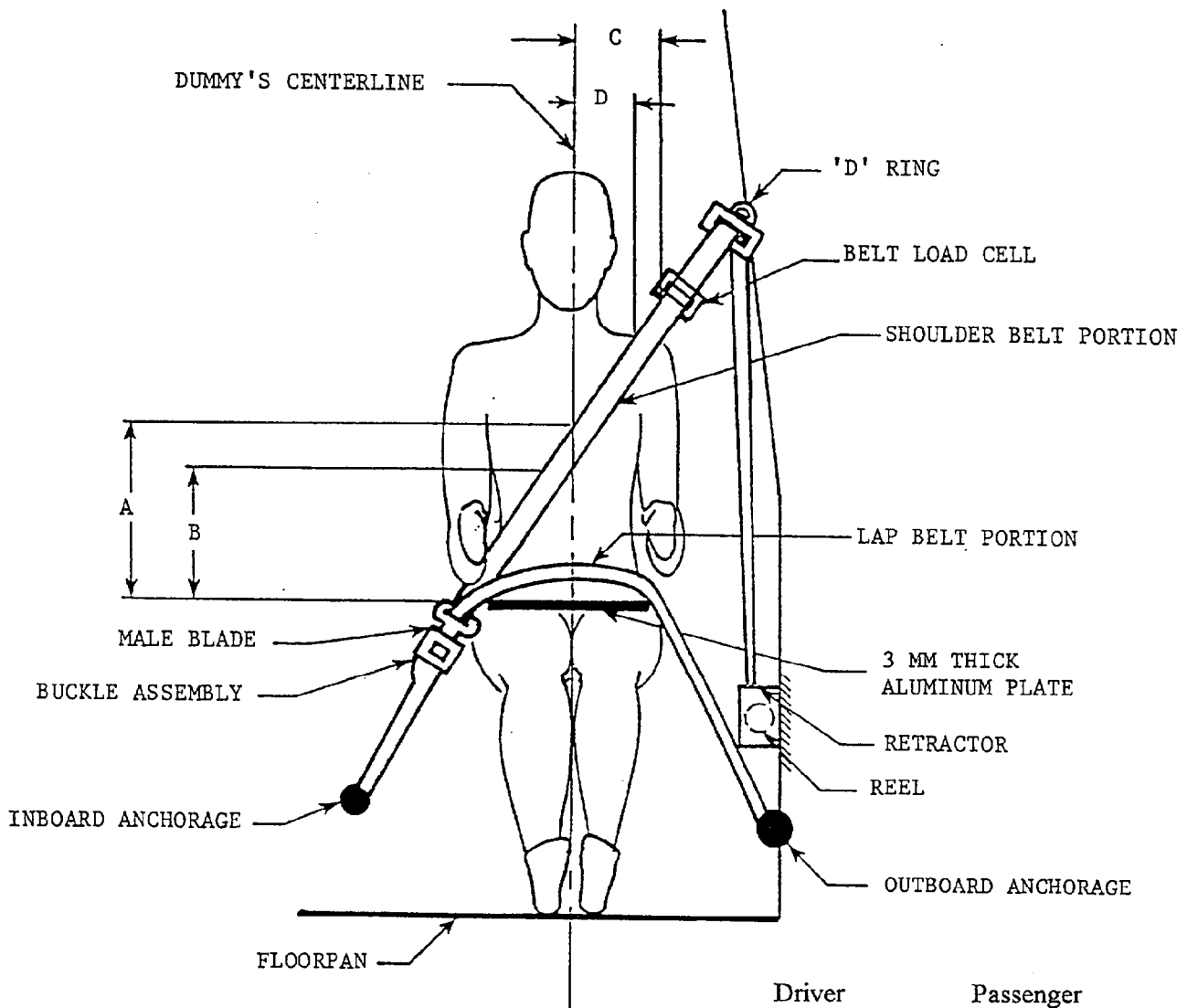
Table 12 Dummy Measurement Data For Front Seat Occupants

Designation	Type of Measurement	Driver (Serial #192)	Passenger (Serial #142)
WA	Windshield angle	29°	NA
SWA	Steering wheel angle	64°	NA
SCA	Steering column angle	23°	NA
SA	Seat back angle	18°	18°
HZ	Head to roof	214 mm	207 mm
HH	Head to header	344 mm	332 mm
HW	Head to windshield	607 mm	550 mm
HR	Head to side header	220 mm	214 mm
NR	Nose to rim	370 mm	NA
NA	Nose to rim angle	14°	NA
CD	Chest to dash	558 mm	541 mm
CS	Steering wheel to chest	293 mm	NA
RA	Rim to abdomen	167 mm	NA
KDL	Left knee to dash	194 mm	158 mm
KDR	Right knee to dash	198 mm	157 mm
KDA	Outboard knee to dash angle	20°	23°
PA	Pelvic angle	23°	25°
TA	Tibial angle	50°	47°
KK	Knee to knee	293 mm	269 mm
ST ¹	Striker to head	664 mm	661 mm
	Striker to head angle	-78°	-78°
SK ¹	Striker to knee	642 mm	659 mm
	Striker to knee angle	-8°	-8°
SH ¹	Striker to H-point	238 mm	267 mm
	Striker to H-point angle	-1°	0°
SHY	Striker to H-point (Y dir.)	227 mm	235 mm
HS	Head to side window	325 mm	313 mm
HD	H-point to door	145 mm	123 mm
AD	Arm to door	92 mm	35 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 above the striker.

Figure 9 Seat Belt Positioning Data



	Driver	Passenger
A - Top surface of aluminum plate to belt upper edge	302 mm	347 mm
B - Top surface of aluminum plate to belt lower edge	223 mm	250 mm
C - Dummy centerline to outer edge of belt at chest flesh top	118 mm	130 mm
D - Dummy centerline to inner edge of belt at chest flesh top	61 mm	72 mm
Lap belt tension	13 N	18 N
Shoulder belt tension	18 N	18 N
Position of adjustable belt anchorage	2nd down from top	2nd down from top

Figure 10 Camera Positions

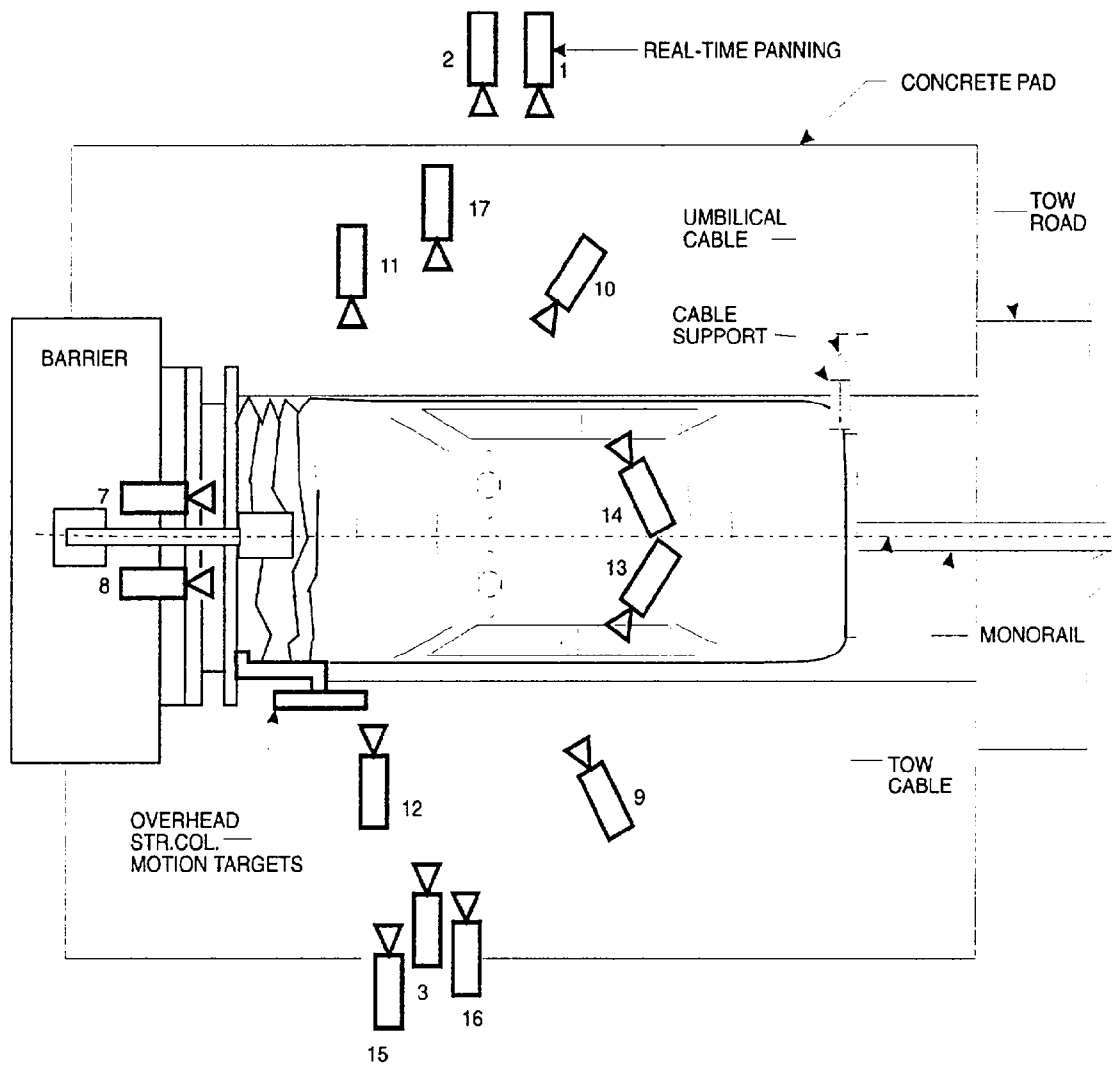


Figure 10 Camera Positions, Cont'd.

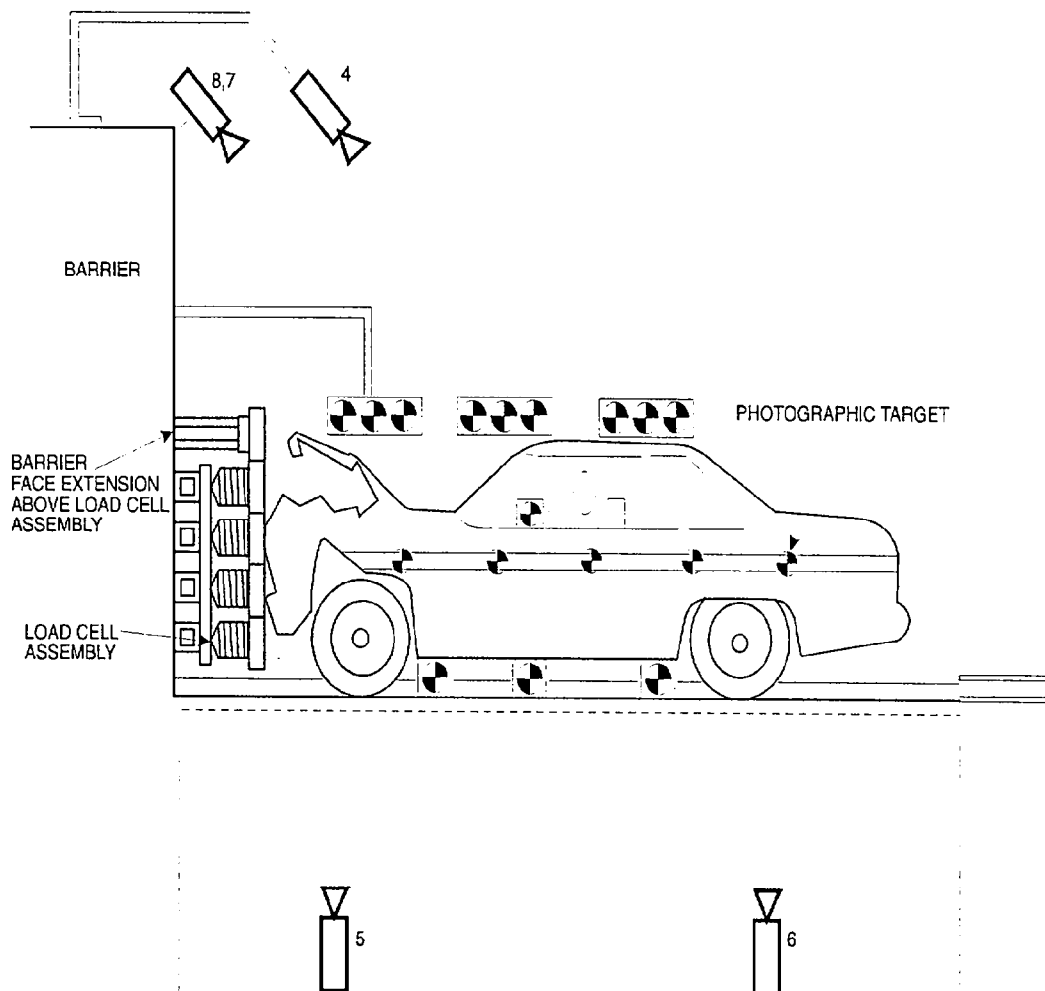


Table 13 Motion Picture Camera Locations

Test Number: 951108

Vehicle year/make/model/body style: 1996/Dodge/Grand Caravan SE/minivan

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	510 frames/s
3	Dummy kinematics	-1054 mm	7493 mm	1118 mm	-12°	5613 mm	25 mm	990 frames/s
4	Windshield damage	-925 mm	0 mm	2489 mm	-40°	NA mm	13 mm	508 frames/s
5	Crush & fluid spillage	-1283 mm	0 mm	-2347 mm	90°	NA mm	13 mm	995 frames/s
6	Fluid spillage	-2522 mm	0 mm	-2515 mm	90°	NA mm	13 mm	1005 frames/s
7	Passenger kinematics	-114 mm	-351 mm	2159 mm	-40°	NA mm	17 mm	500 frames/s
8	Driver kinematics	-173 mm	368 mm	2159 mm	-41°	NA mm	17 mm	498 frames/s
9	Driver kinematics	-4572 mm	1854 mm	2591 mm	-27°	2045 mm	25 mm	488 frames/s
10	Passenger kinematics	-4674 mm	-1880 mm	2540 mm	-26°	1753 mm	25 mm	488 frames/s
11	Windshield intrusion	-968 mm	-7775 mm	1118 mm	0°	NA mm	50 mm	510 frames/s
12	Windshield intrusion	-1346 mm	7859 mm	1074 mm	0°	NA mm	50 mm	505 frames/s
13	Driver seat belt movement	-2032 mm	NA	NA	NA	NA mm	NA mm	546 frames/s
14	Passenger seat belt movement	-2032 mm	NA	NA	NA	NA mm	NA mm	500 frames/s
15	Column movement	-2438 mm	7264 mm	2616 mm	-14°	NA mm	25 mm	500 frames/s
16	Column movement	-2438 mm	7264 mm	1908 mm	-9°	NA mm	25 mm	498 frames/s
17	Passenger kinematics	-986 mm	-5354 mm	1151 mm	7°	6071 mm	25 mm	983 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

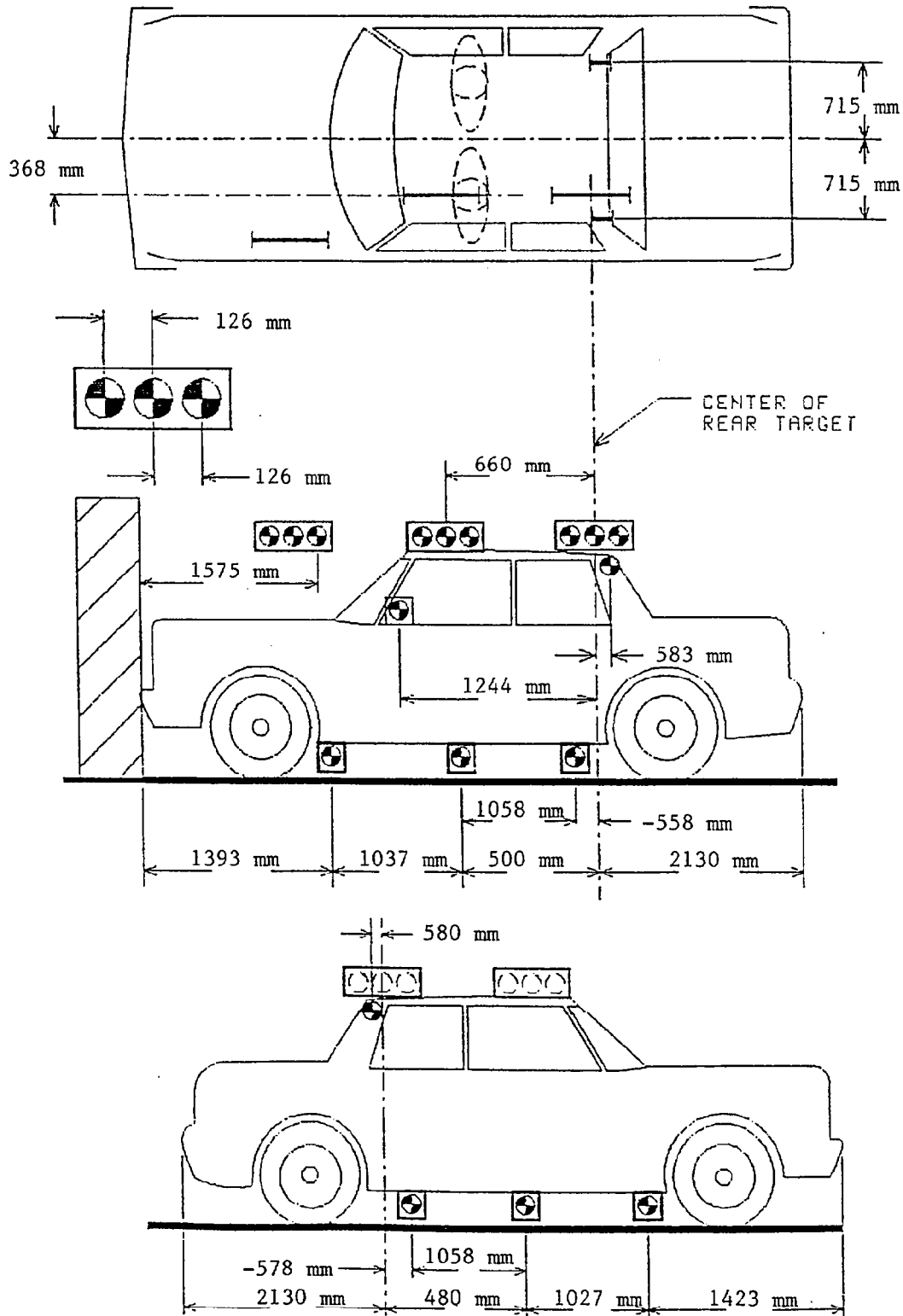


Figure 12 Pre-Test And Post-Test Measurement Points

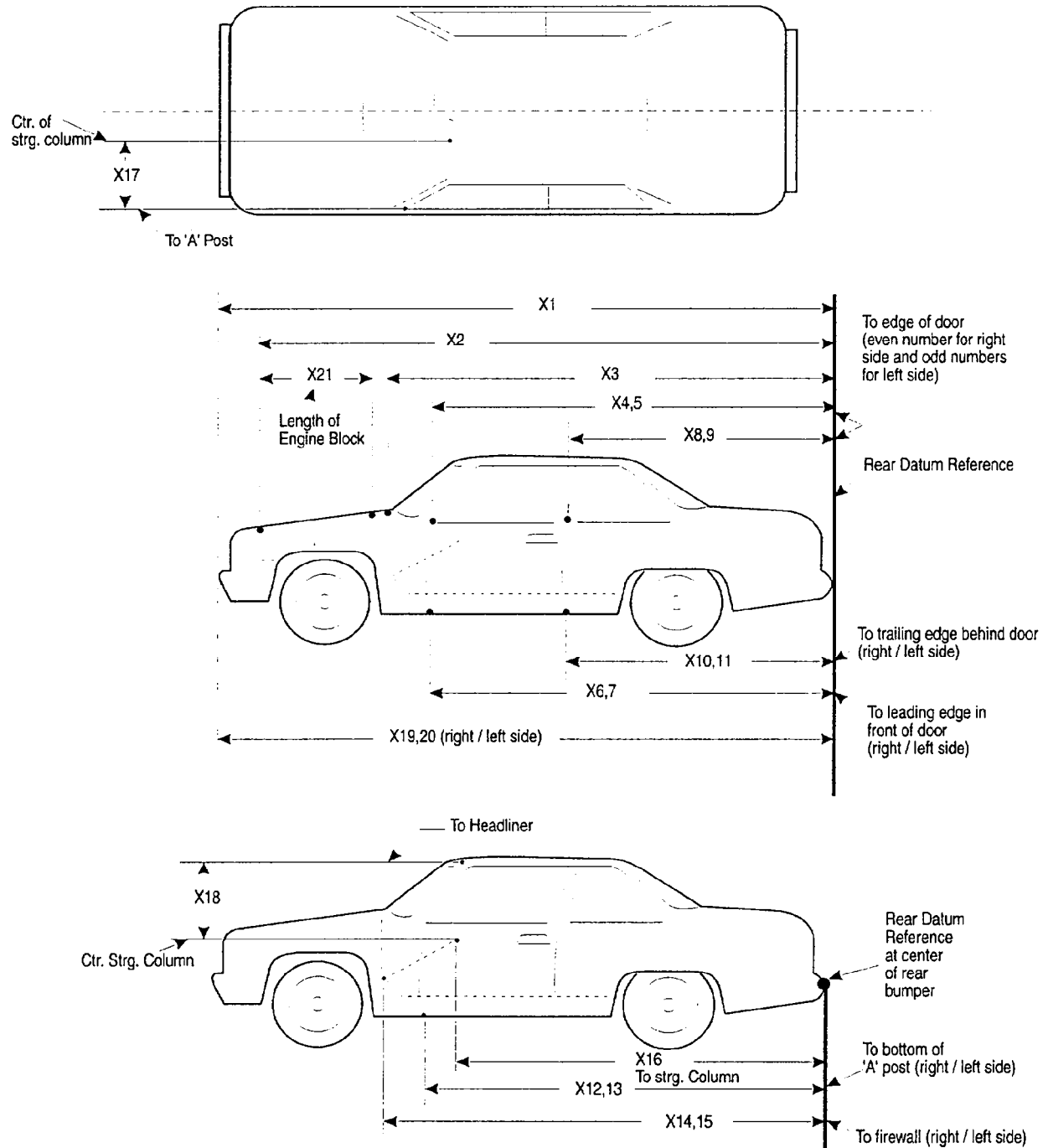


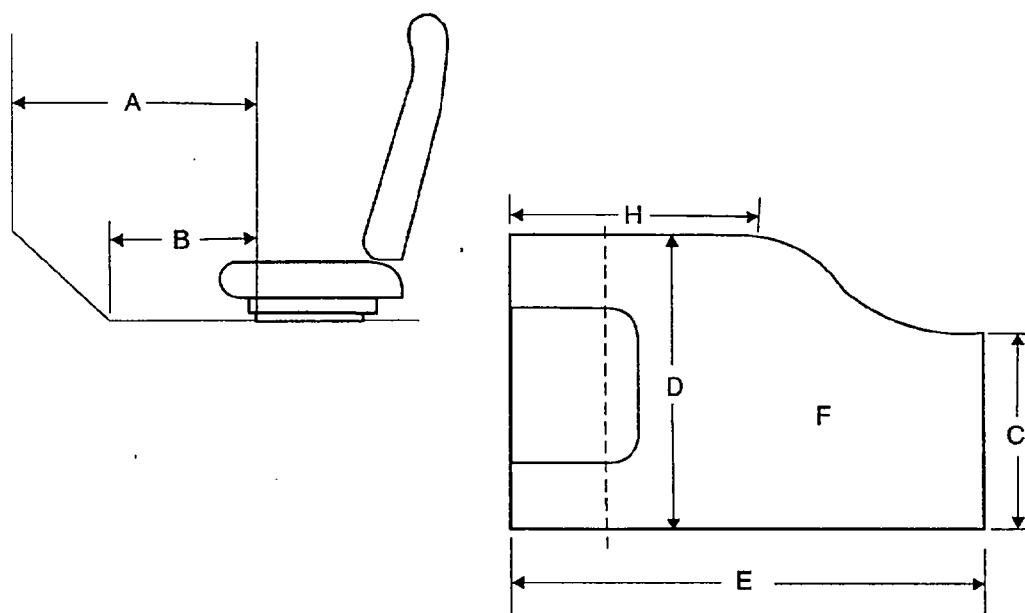
Table 14 Impacted Vehicle Measurements

Vehicle Make/Model: Dodge/Grand Caravan SE

Test Number: 951108

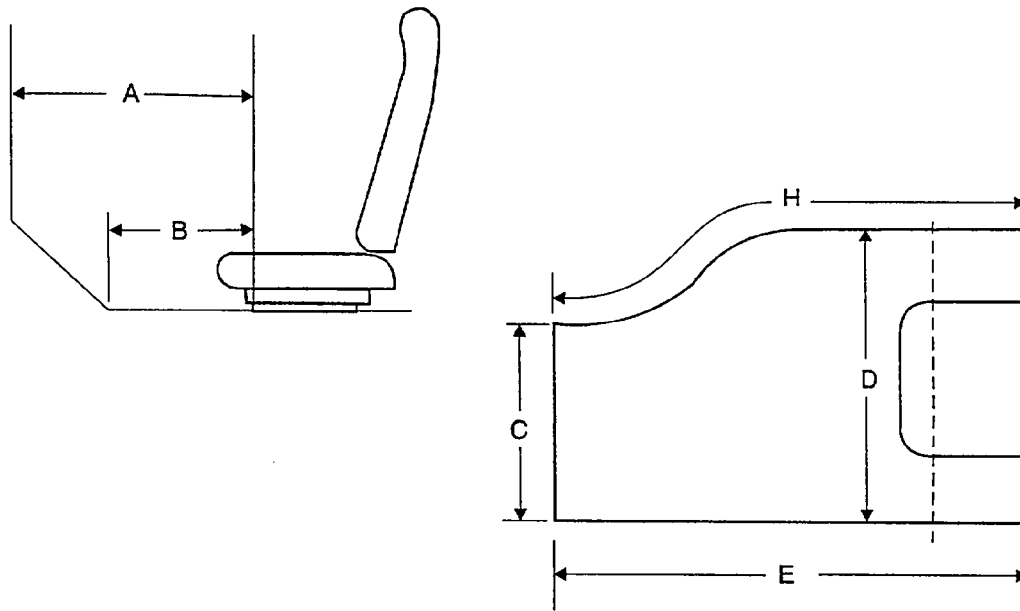
No.	Type of measurement	Pre-test	Post-test	Diff.
X1	Total length of vehicle at centerline	5060 mm	4530 mm	530 mm
X2	Rear surface of vehicle to front of engine block	4559 mm	4254 mm	305 mm
X3	Rear surface of vehicle to firewall	3945 mm	3738 mm	207 mm
X4	Rear surface of vehicle to upper leading edge of right door	3680 mm	3682 mm	-2 mm
X5	Rear surface of vehicle to upper leading edge of left door	3654 mm	3679 mm	-25 mm
X6	Rear surface of vehicle to lower leading edge of right door	3550 mm	3631 mm	-81 mm
X7	Rear surface of vehicle to lower leading edge of left door	3639 mm	3624 mm	15 mm
X8	Rear surface of vehicle to upper trailing edge of right door	2635 mm	2646 mm	-11 mm
X9	Rear surface of vehicle to upper trailing edge of left door	2630 mm	2644 mm	-14 mm
X10	Rear surface of vehicle to lower trailing edge of right door	2640 mm	2626 mm	14 mm
X11	Rear surface of vehicle to lower trailing edge of left door	2645 mm	2626 mm	19 mm
X12	Rear surface of vehicle to bottom of "A" post on right side	3660 mm	3648 mm	12 mm
X13	Rear surface of vehicle to bottom of "A" post on left side	3654 mm	3648 mm	6 mm
X14	Rear surface of vehicle to firewall - right side	3993 mm	3945 mm	48 mm
X15	Rear surface of vehicle to firewall - left side	3993 mm	3970 mm	23 mm
X16	Rear surface of vehicle to steering wheel center	3267 mm	3219 mm	48 mm
X17	Center of steering column to "A" post	329 mm	294 mm	35 mm
X18	Center of steering column to headliner	485 mm	357 mm	128 mm
X19	Rear surface of vehicle to right side of front bumper	4888 mm	4485 mm	403 mm
X20	Rear surface of vehicle to left side of front bumper	4888 mm	4435 mm	453 mm
X21	Length of engine block	400 mm	400 mm	0 mm

Figure 13 Static Footwell Deformation
(Driver's Side)



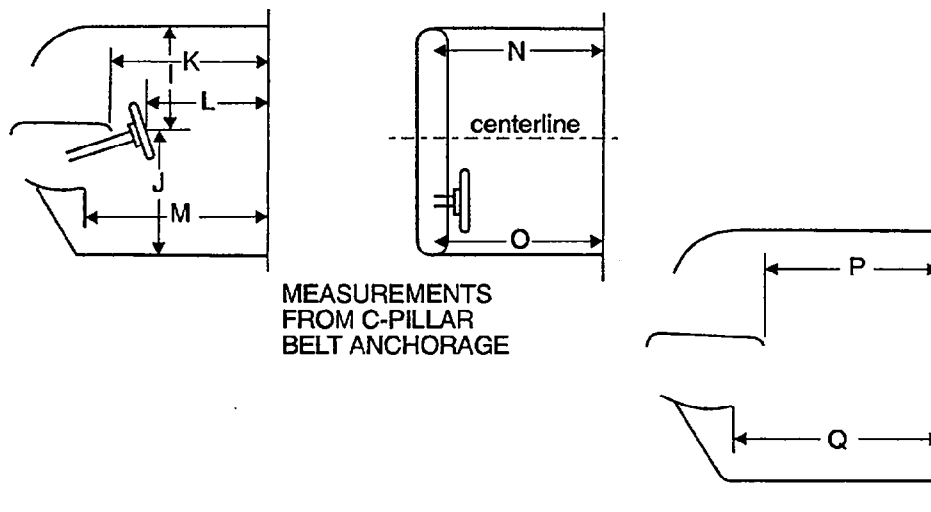
Measurement	Pre-Test	Post-Test	Difference
A	722 mm	389 mm	333 mm
B	496 mm	329 mm	167 mm
C	323 mm	290 mm	33 mm
D	529 mm	531 mm	-2 mm
E	930 mm	785 mm	145 mm
H	901 mm	851 mm	50 mm

Figure 14 Static Footwell Deformation
(Passenger's Side)



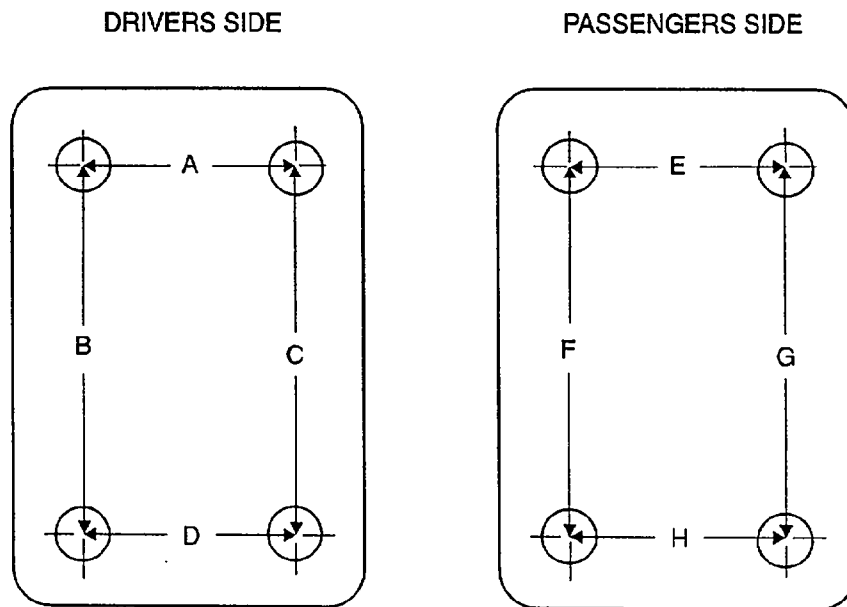
Measurement	Pre-Test	Post-Test	Difference
A	700 mm	400 mm	300 mm
B	482 mm	408 mm	74 mm
C	228 mm	231 mm	-3 mm
D	500 mm	492 mm	8 mm
E	932 mm	715 mm	217 mm
H	1077 mm	860 mm	217 mm

Figure 15 Static Passenger Compartment Intrusion



Measurement	Pre-Test	Post-Test	Difference
I	461 mm	366 mm	95 mm
J	703 mm	782 mm	-79 mm
K	806 mm	811 mm	-5 mm
L	521 mm	568 mm	-47 mm
M	791 mm	775 mm	16 mm
N	952 mm	951 mm	1 mm
O	957 mm	947 mm	10 mm
P	763 mm	759 mm	4 mm
Q	802 mm	758 mm	44 mm

Figure 16 Underbody Floorboard Deformation



Measurement	Pre-Test	Post-Test	Difference
A	309 mm	NA ¹	NA ¹
B	671 mm	NA ¹	NA ¹
C	555 mm	547	108
D	436 mm	454	-18
E	391 mm	NA ¹	NA ¹
F	487 mm	471	16
G	679 mm	NA ¹	NA ¹
H	445 mm	460	-15

¹ Targets fell off of the vehicle during the impact event.

Appendix A

Photographs

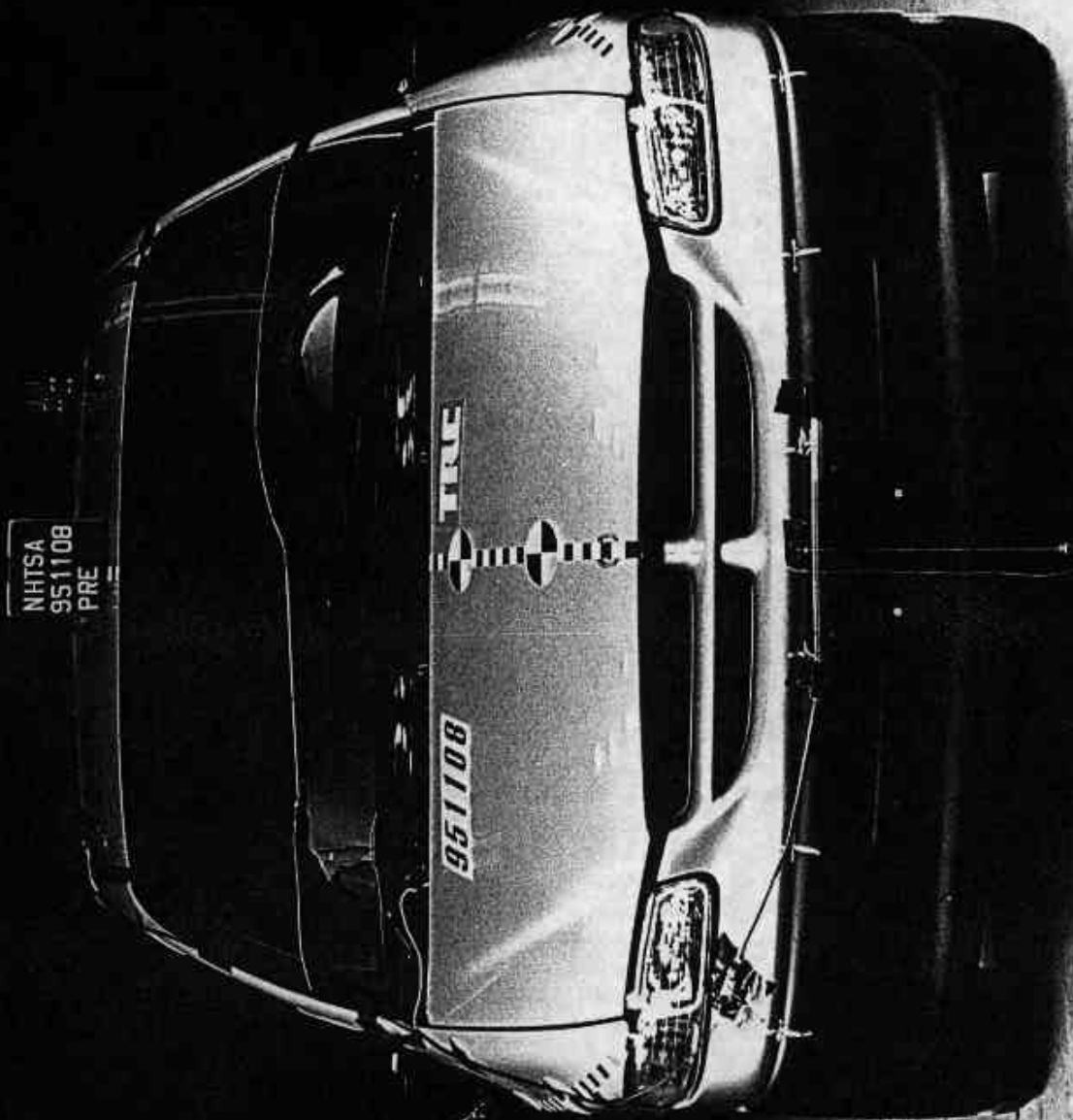


Figure A-1. Pre-Test Front View
A-2

951108

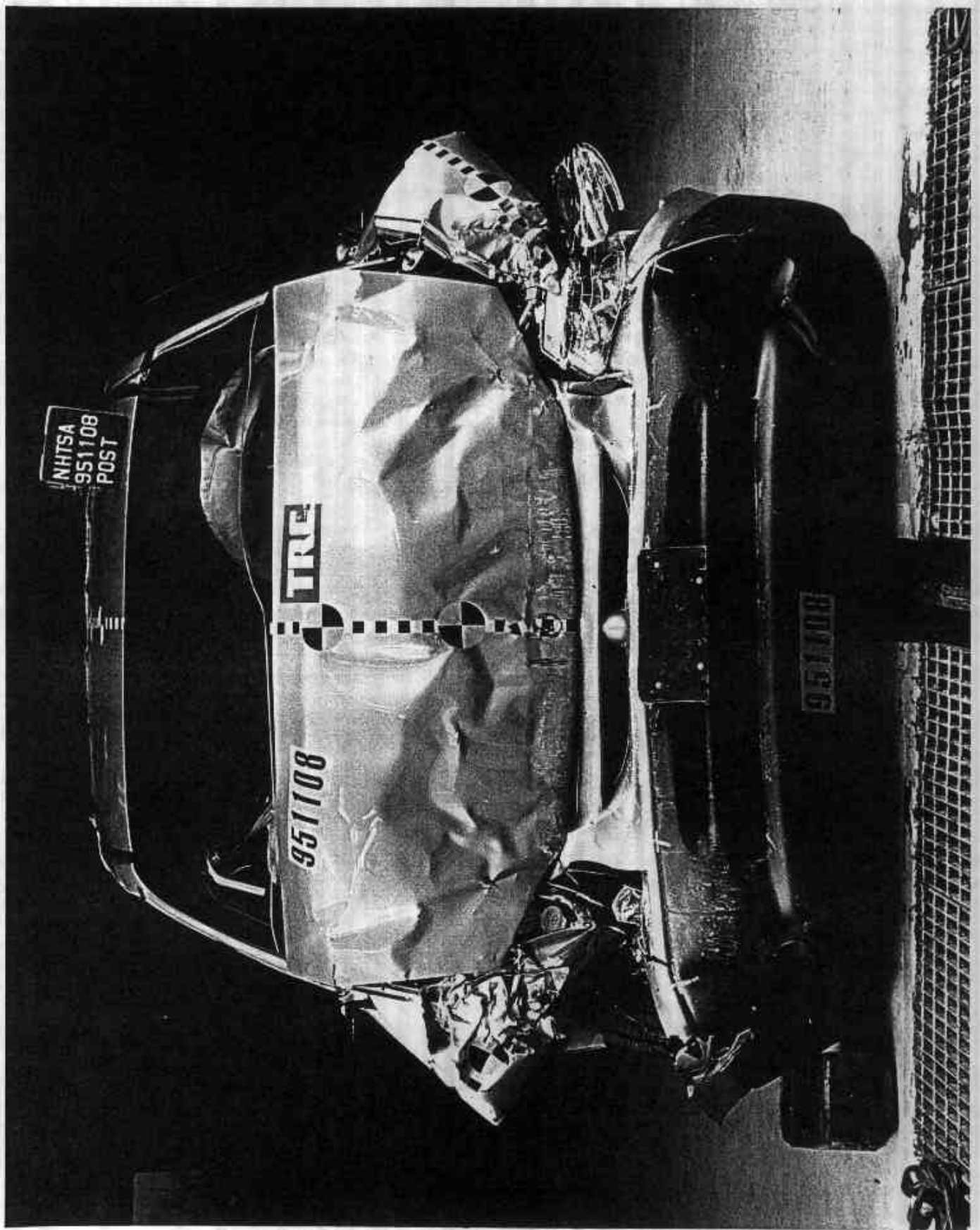


Figure A-2. Post-Test Front View
A-3

951108

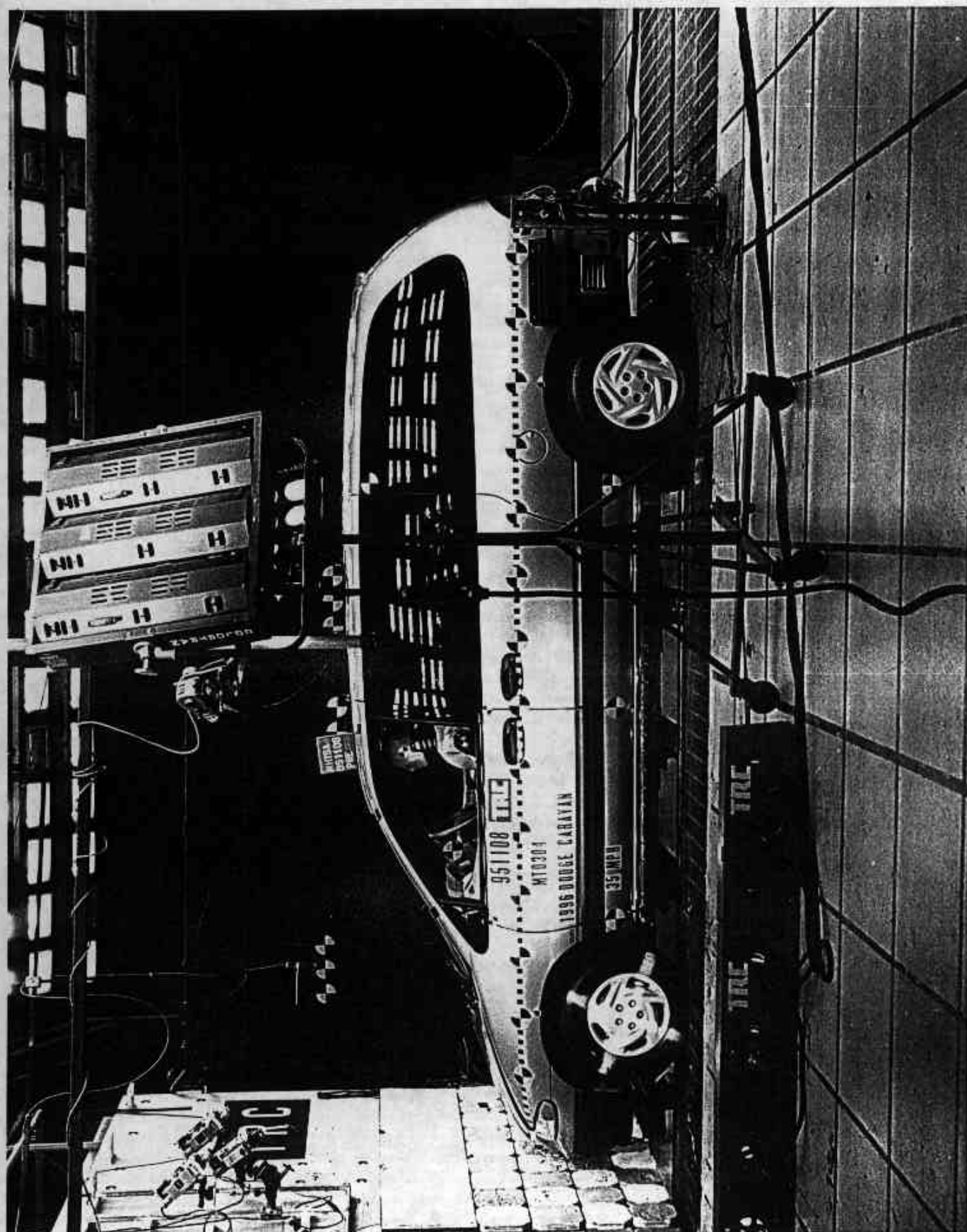


Figure A-3. Pre-Test Left Side View
A-4

951108

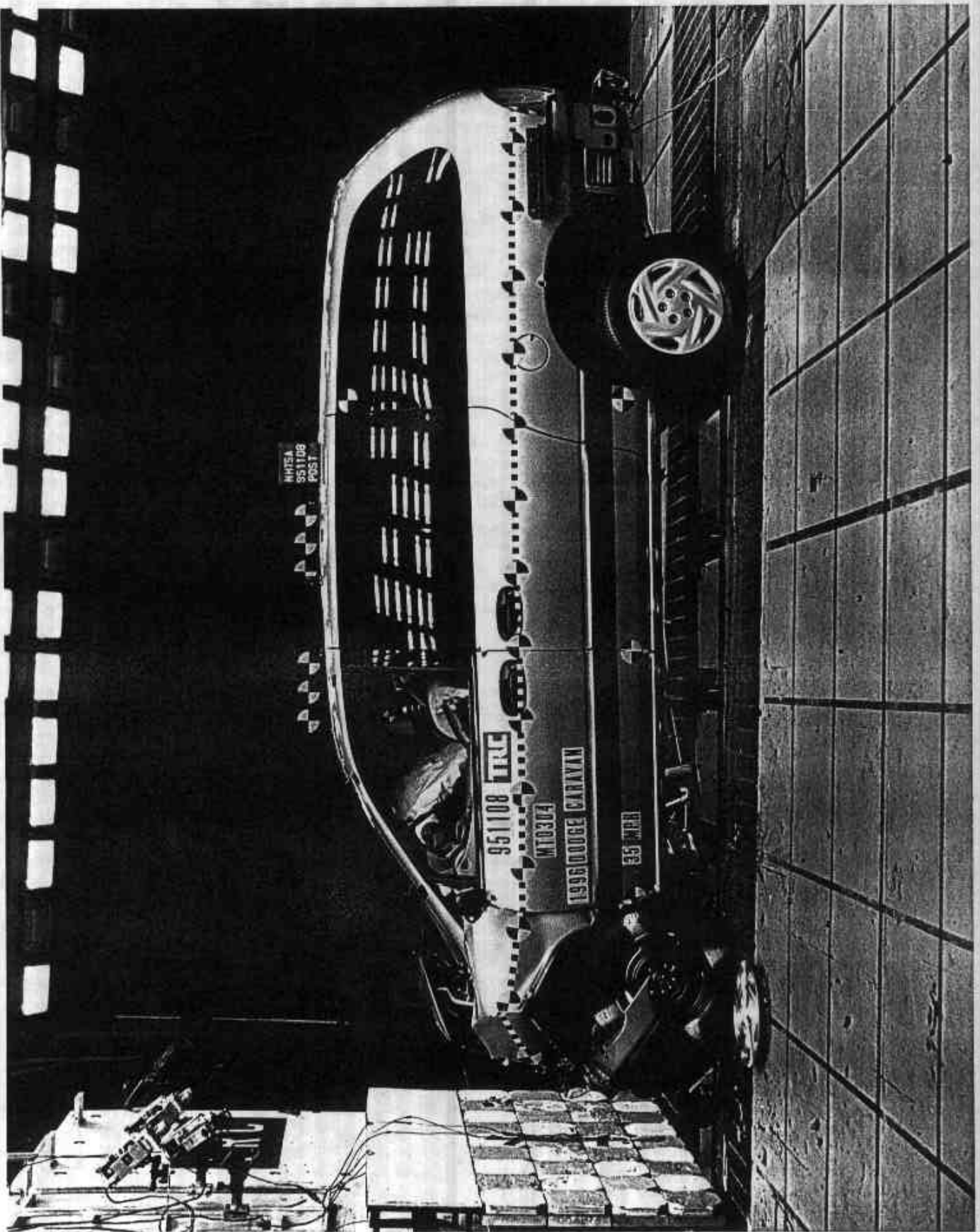


Figure A-4. Post-Test Left Side View
A-5

951108

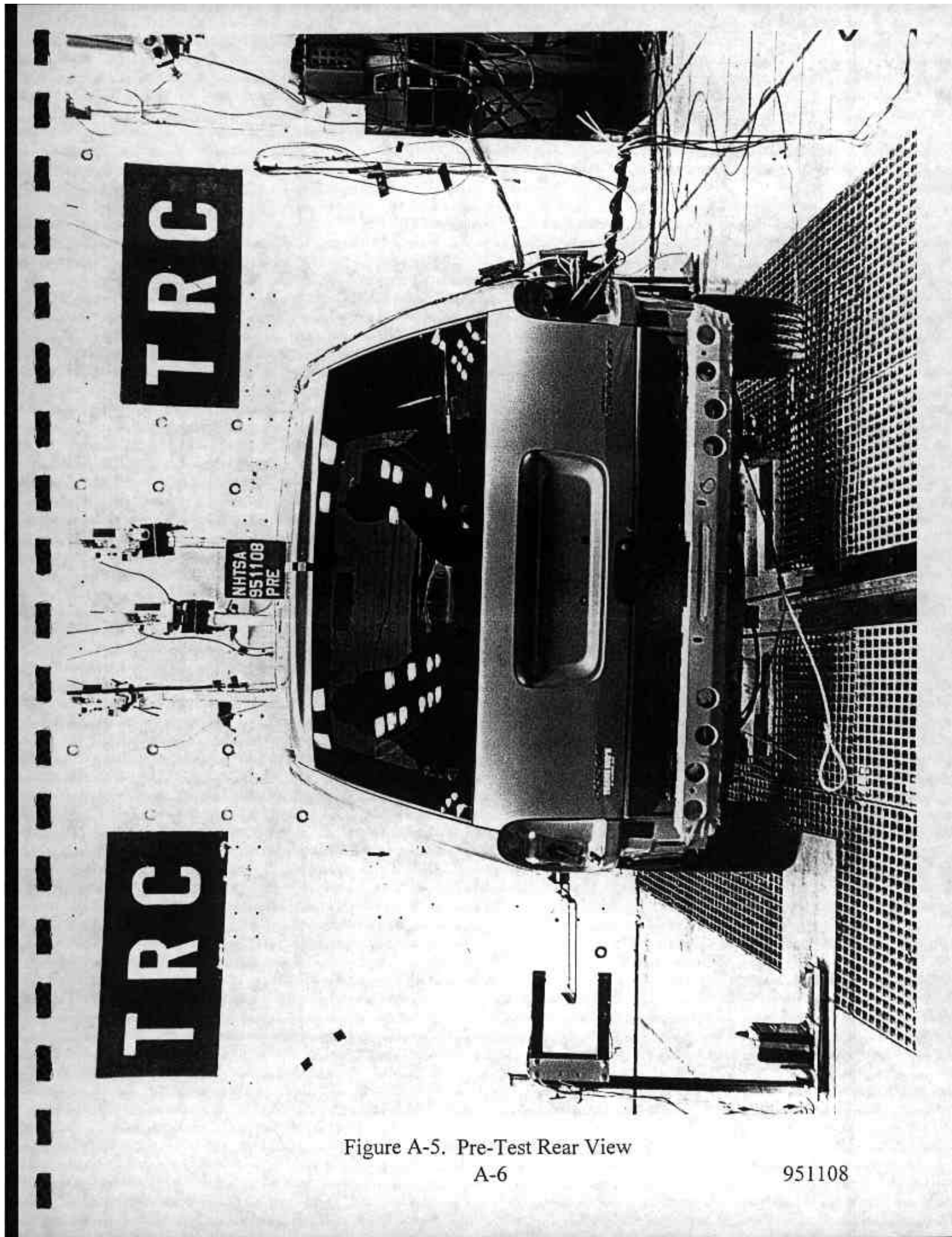


Figure A-5. Pre-Test Rear View
A-6

951108

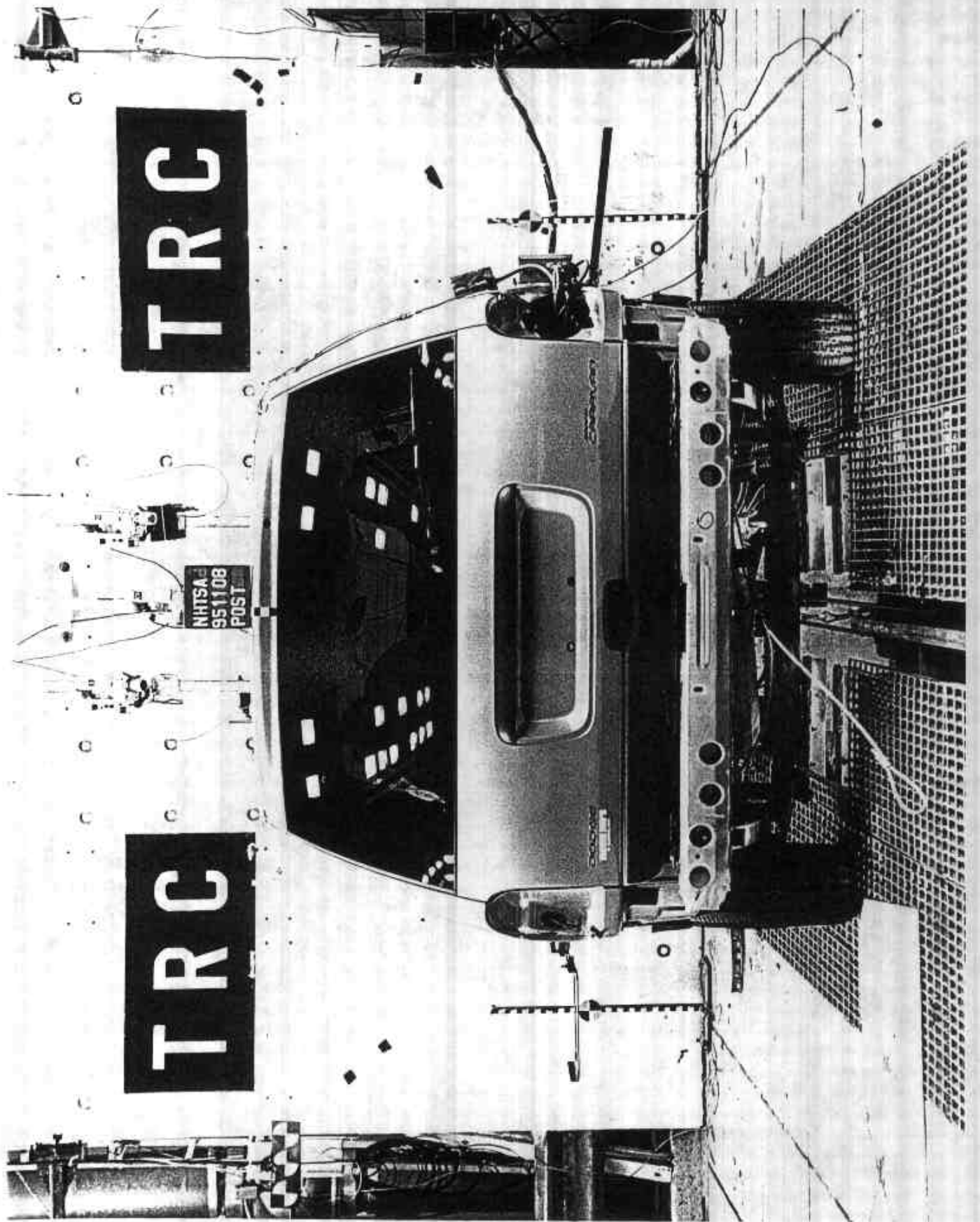


Figure A-6. Post-Test Rear View
A-7

951108

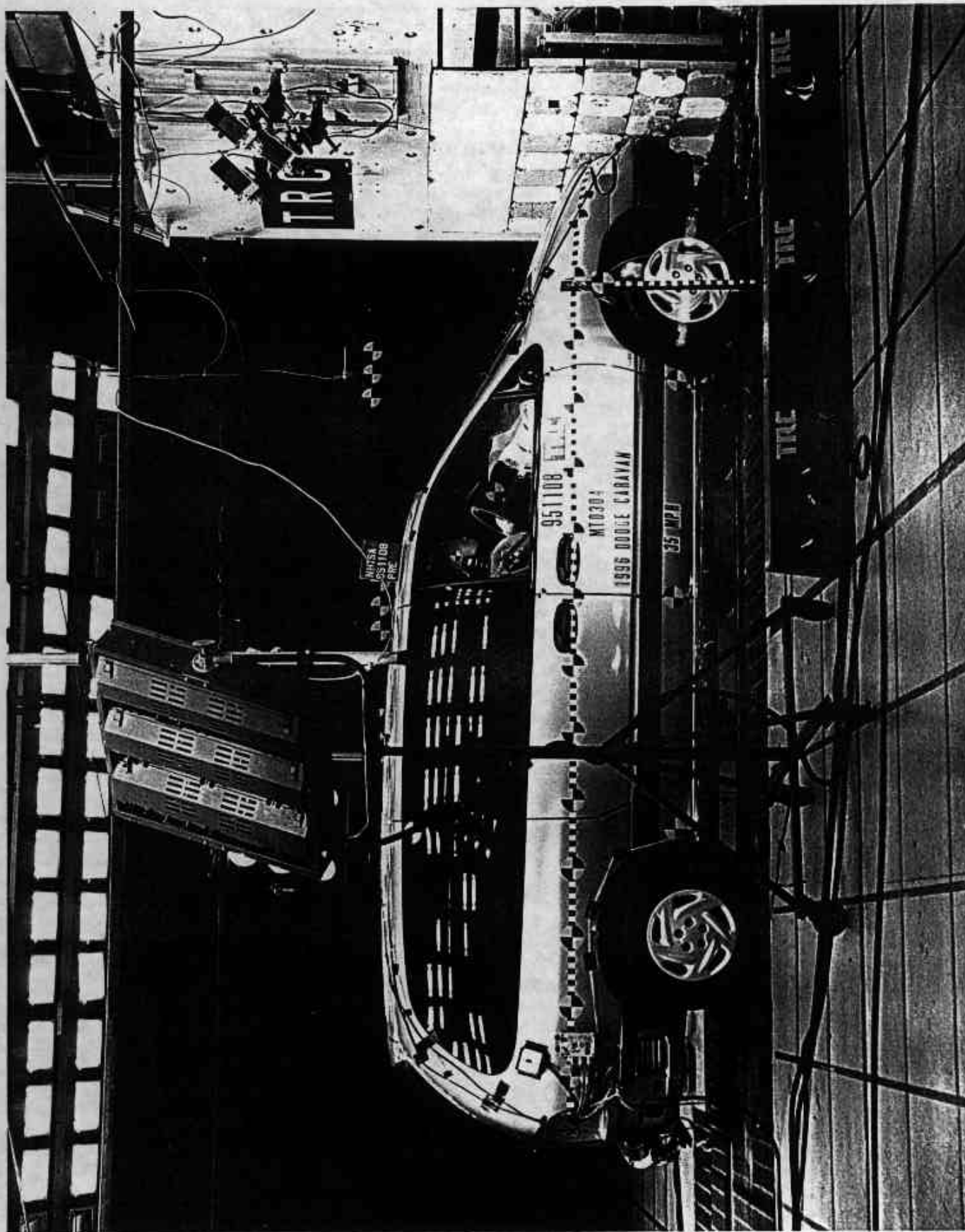


Figure A-7. Pre-Test Right Side View
A-8

951108

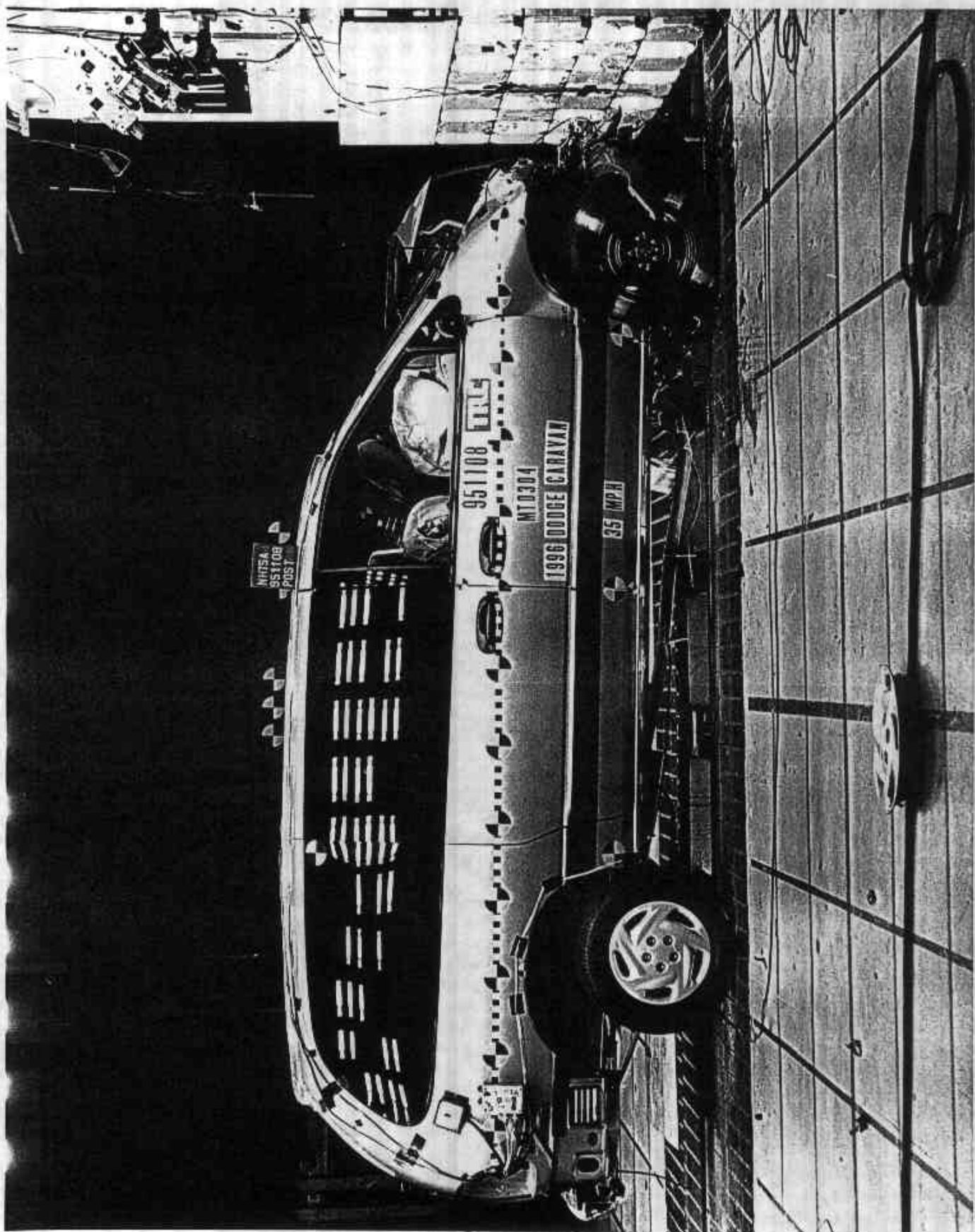


Figure A-8. Post-Test Right Side View
A-9

951108

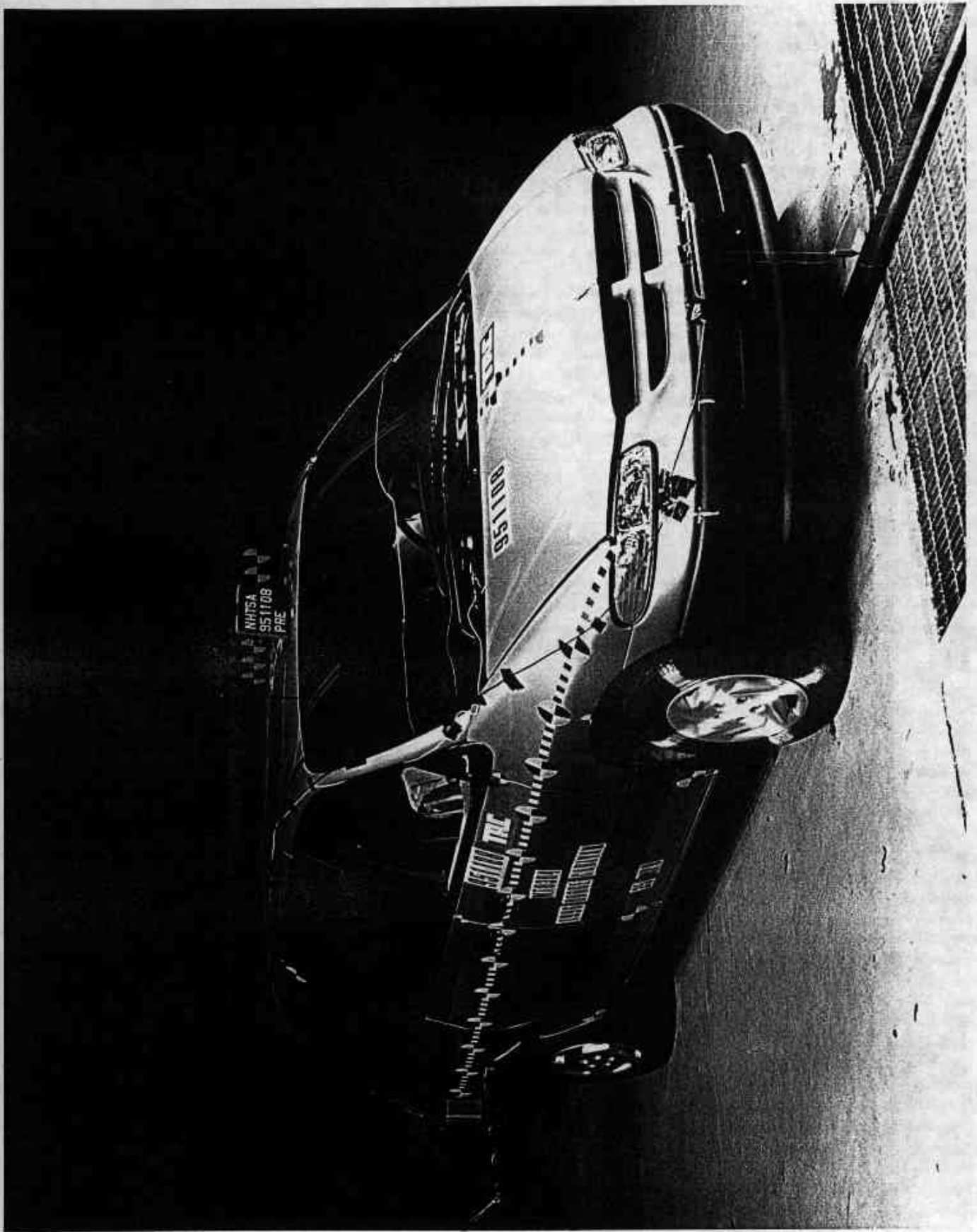


Figure A-9. Pre-Test Right Front Three-Quarter View
A-10

951108

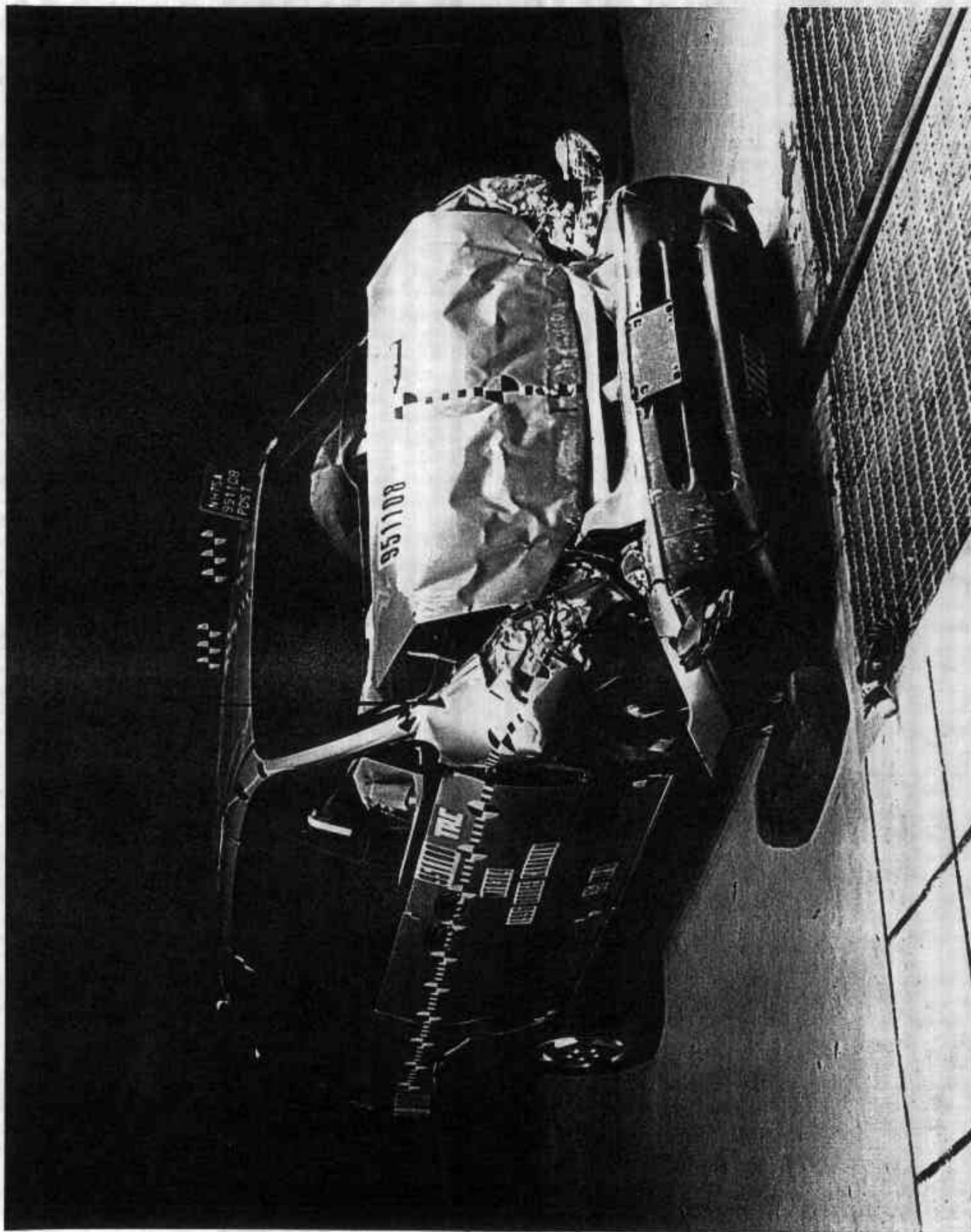


Figure A-10. Post-Test Right Front Three-Quarter View
A-11

951108

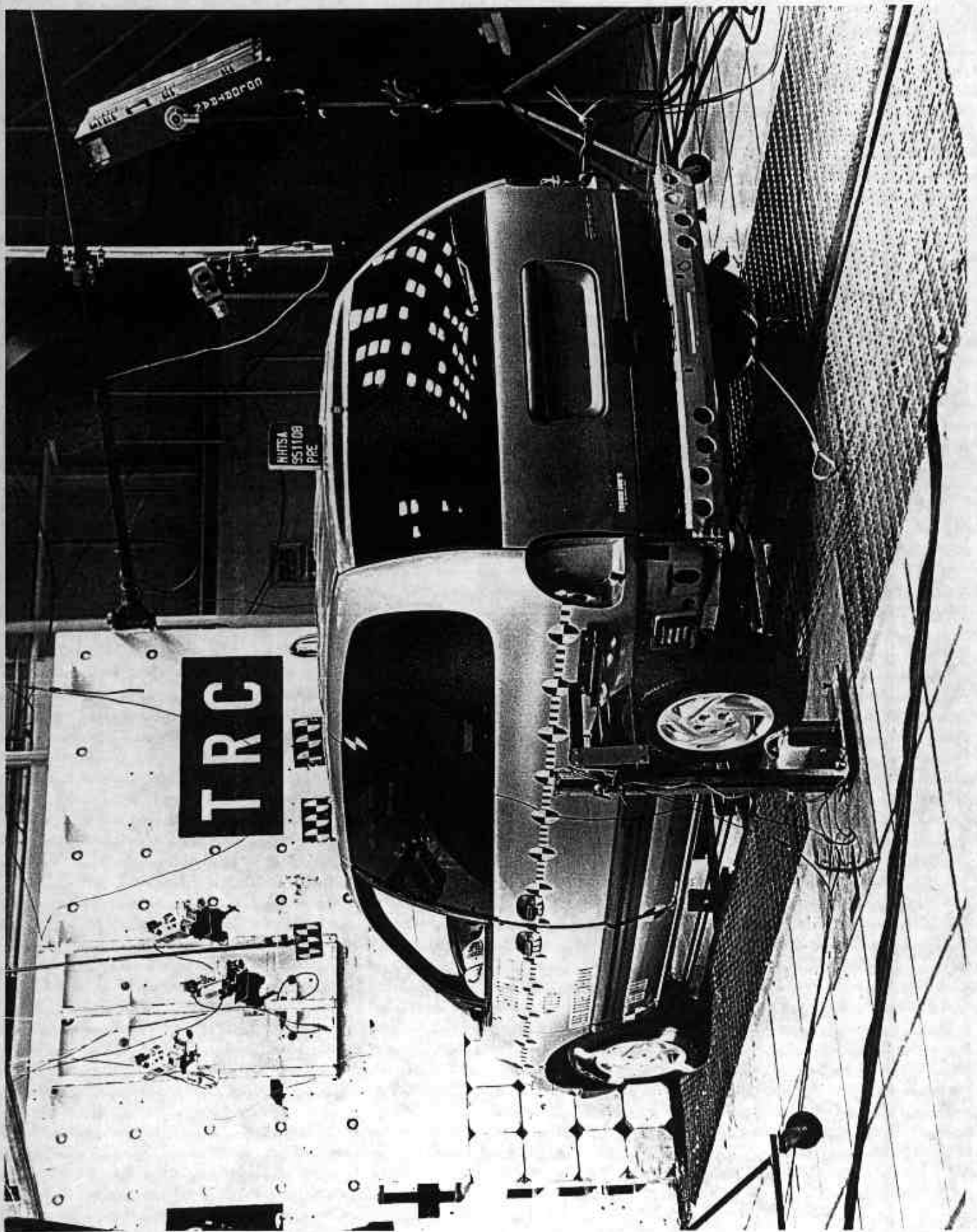


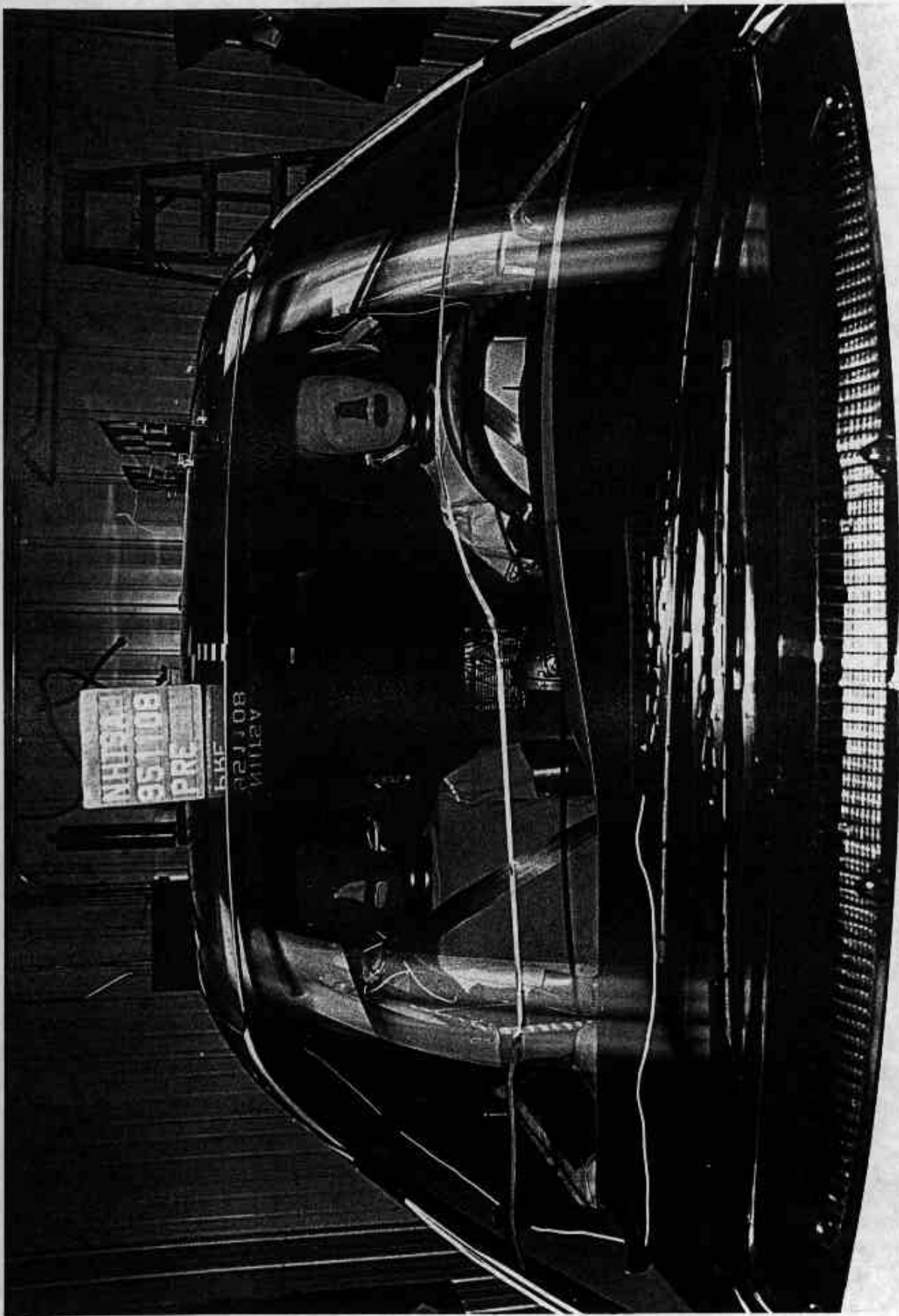
Figure A-11. Pre-Test Left Rear Three-Quarter View
A-12

951108



Figure A-12. Post-Test Left Rear Three-Quarter View
A-13

951108



951108

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

951108

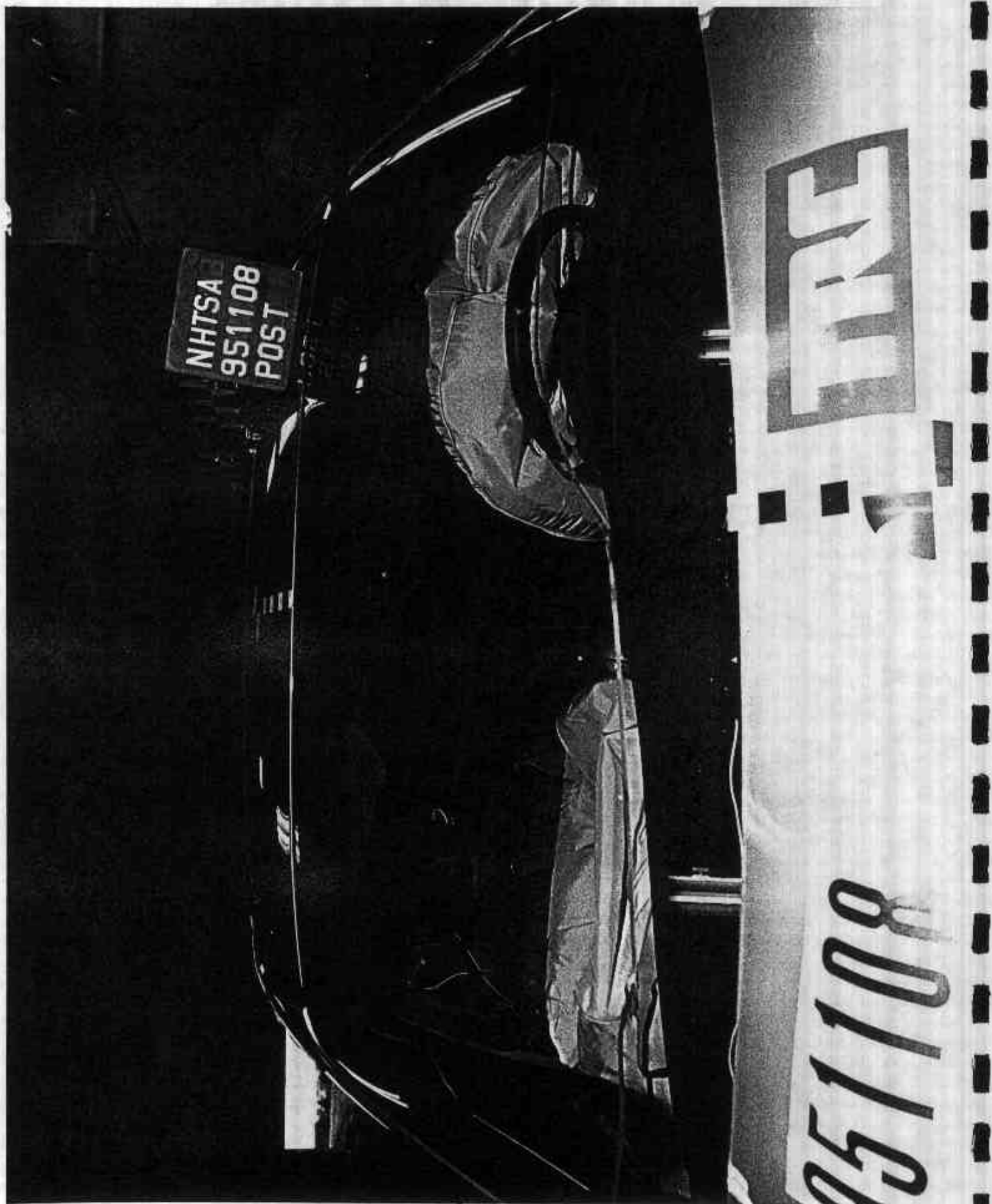


Figure A-14. Post-Test Windshield View
A-15

951108

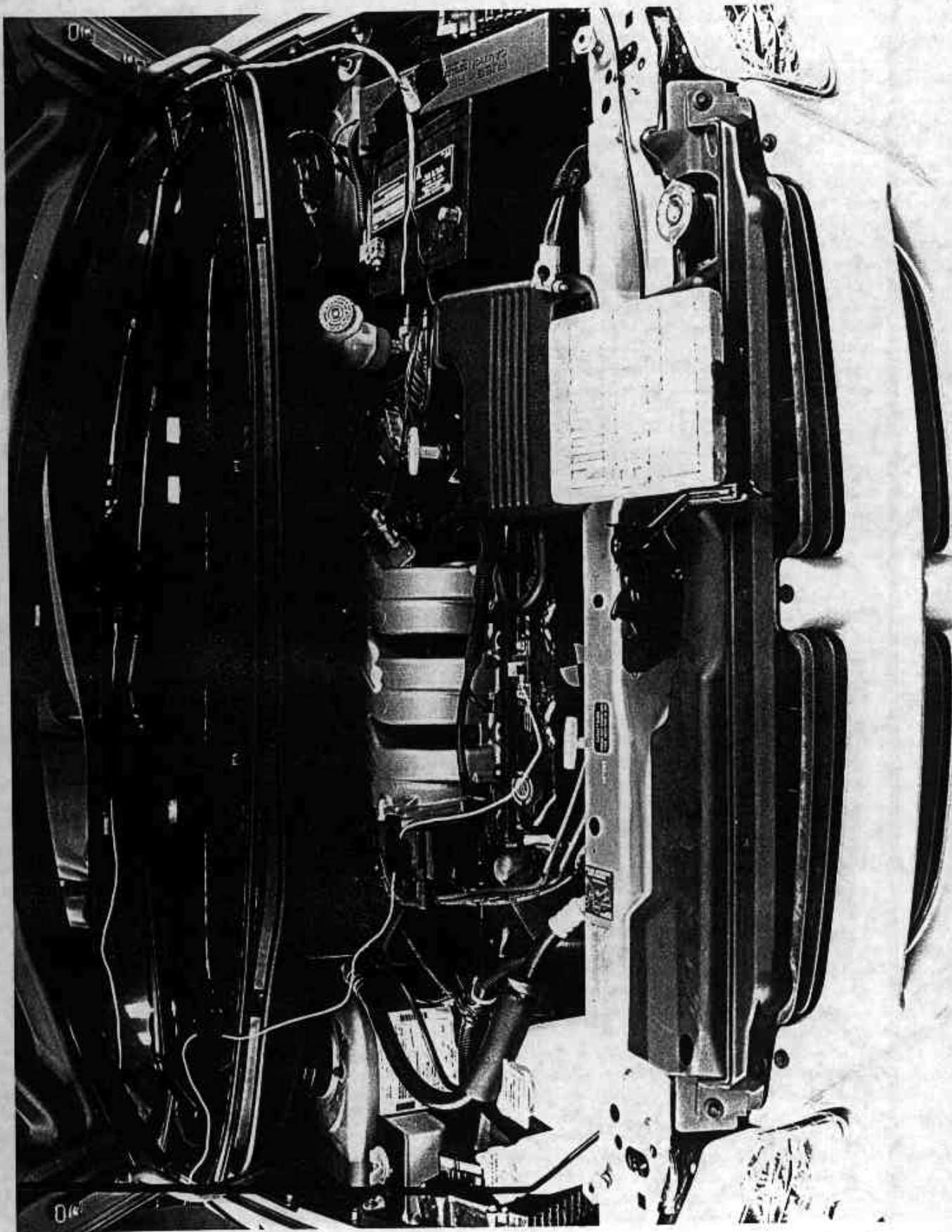


Figure A-15. Pre-Test Engine Compartment View

A-16

951108

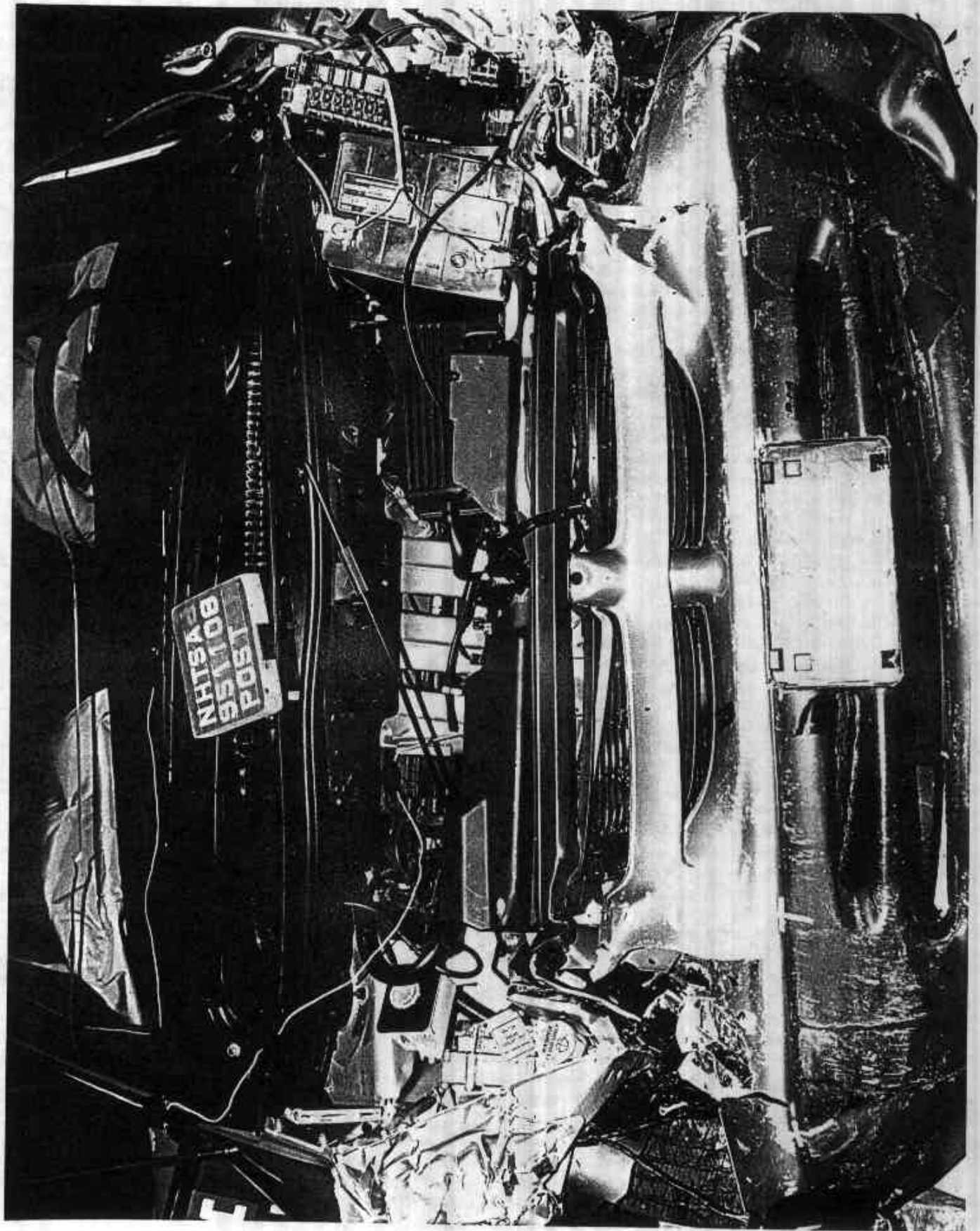


Figure A-16. Post-Test Engine Compartment View
A-17

951108



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

A-18

951108

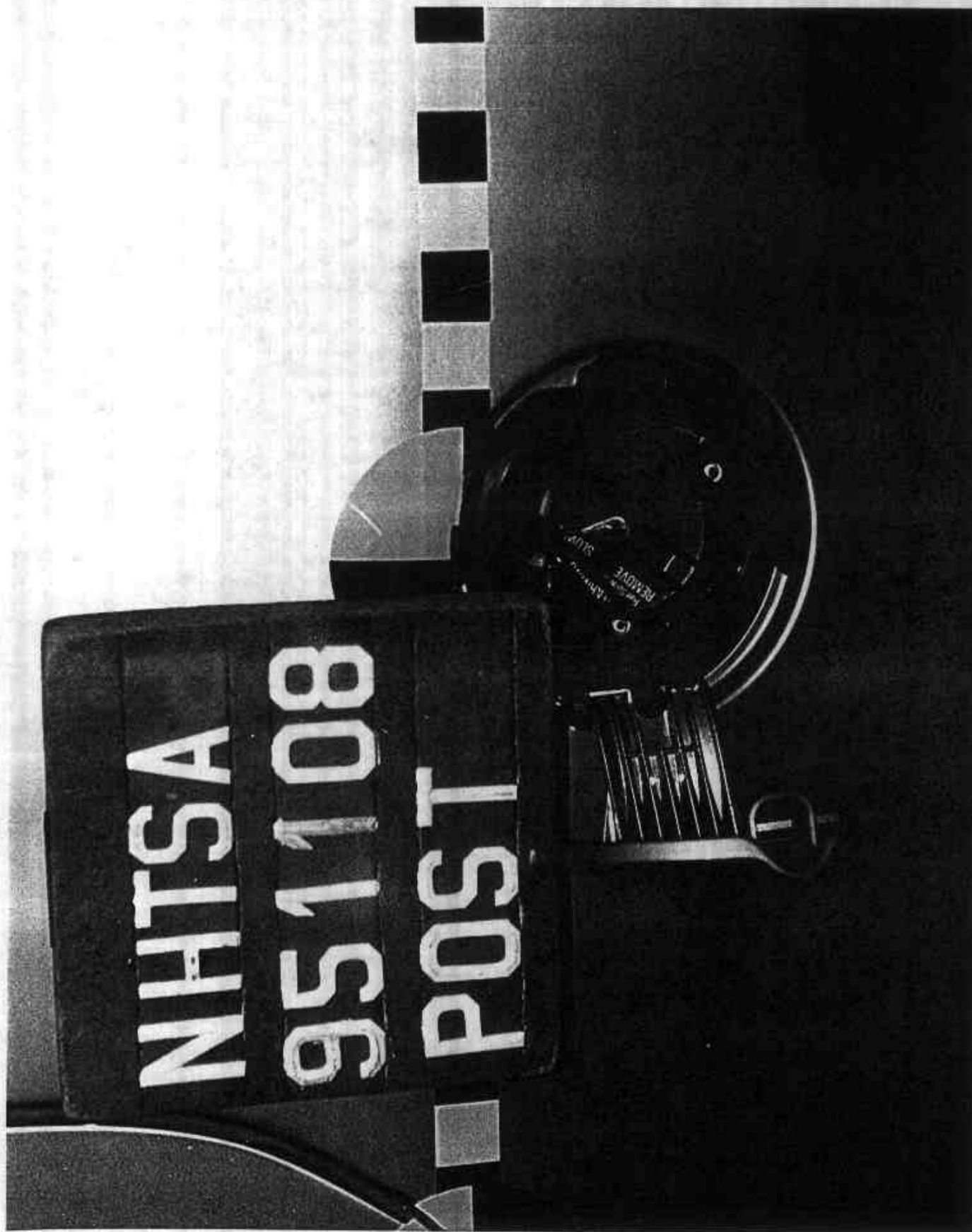


Figure A-18. Post-Test Fuel Filler Cap View
A-19

951108



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

A-20

951108

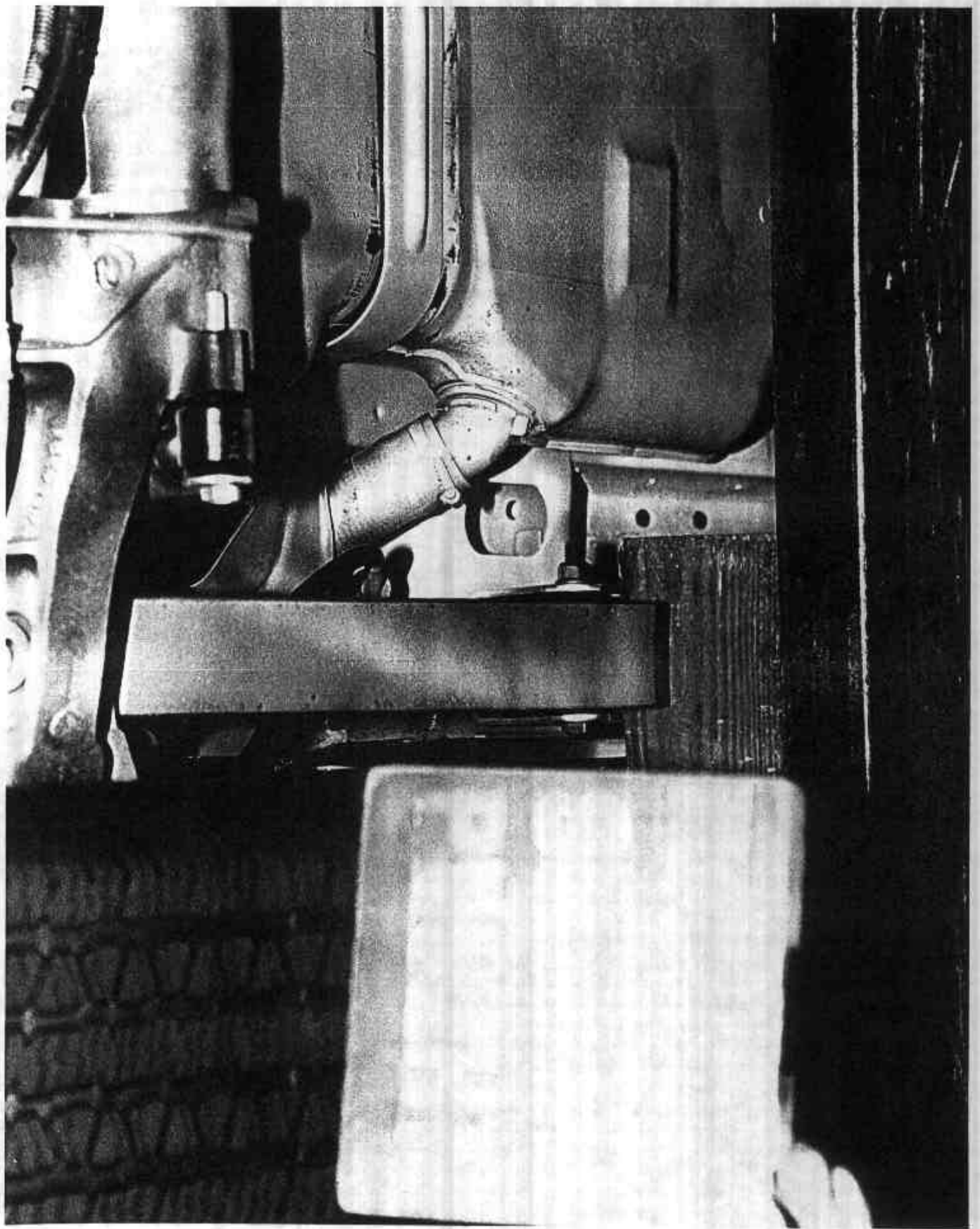


Figure A-20. Post-Test Fuel Filler Neck View
A-21

951108

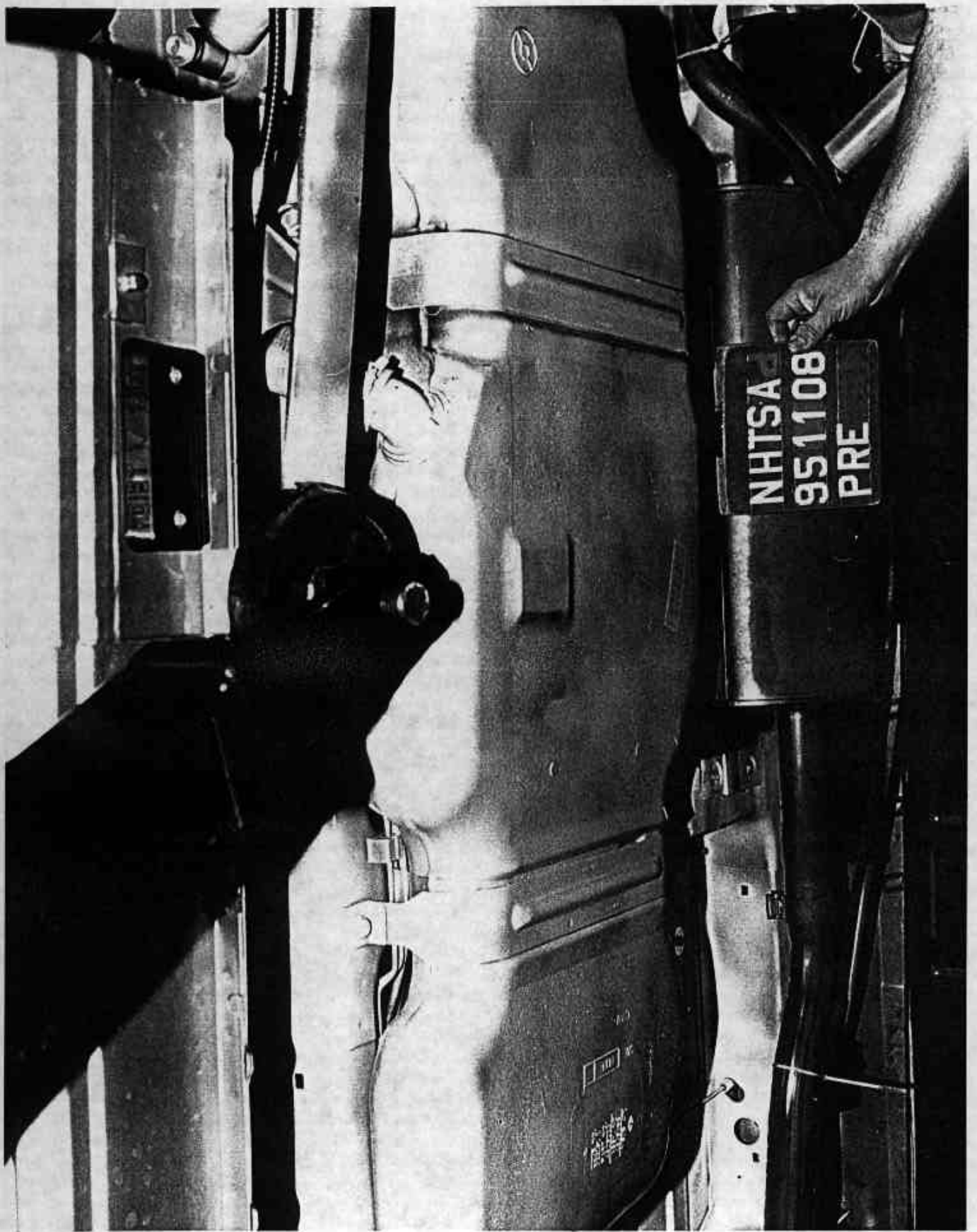


Figure A-21. Pre-Test Fuel Tank View
A-22

951108

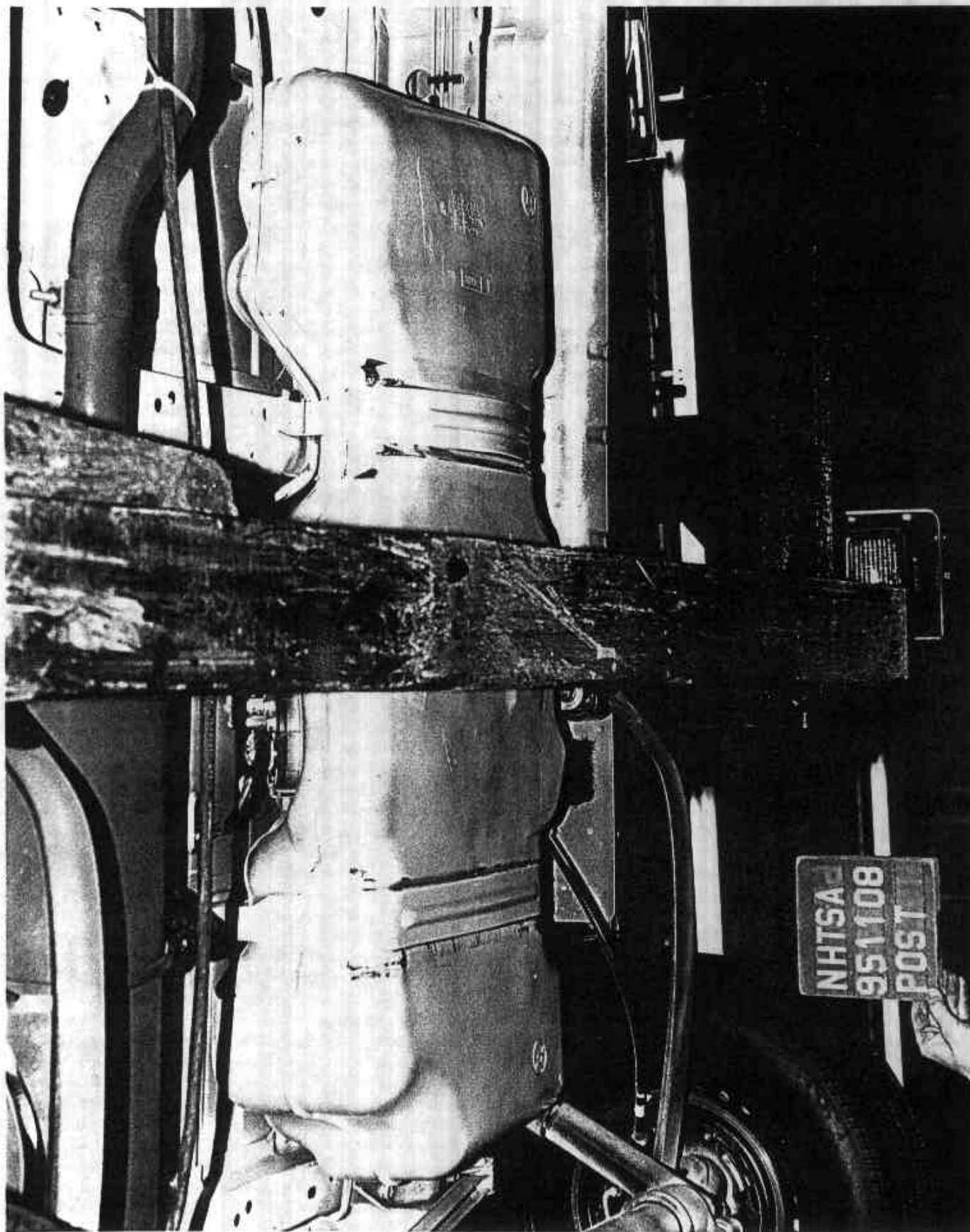


Figure A-22. Post-Test Fuel Tank View
A-23

951108

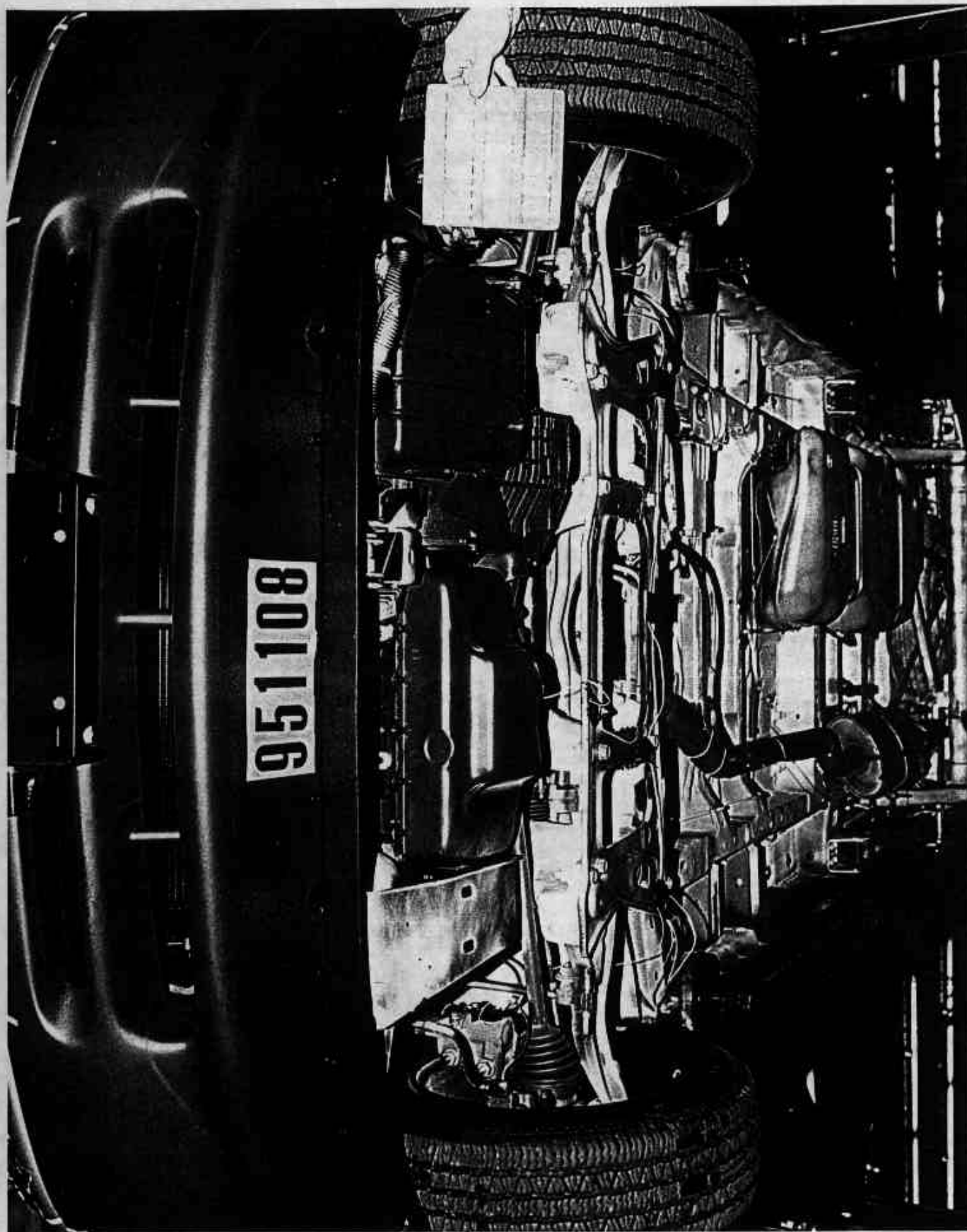


Figure A-23. Pre-Test Front Underbody View
A-24

951108

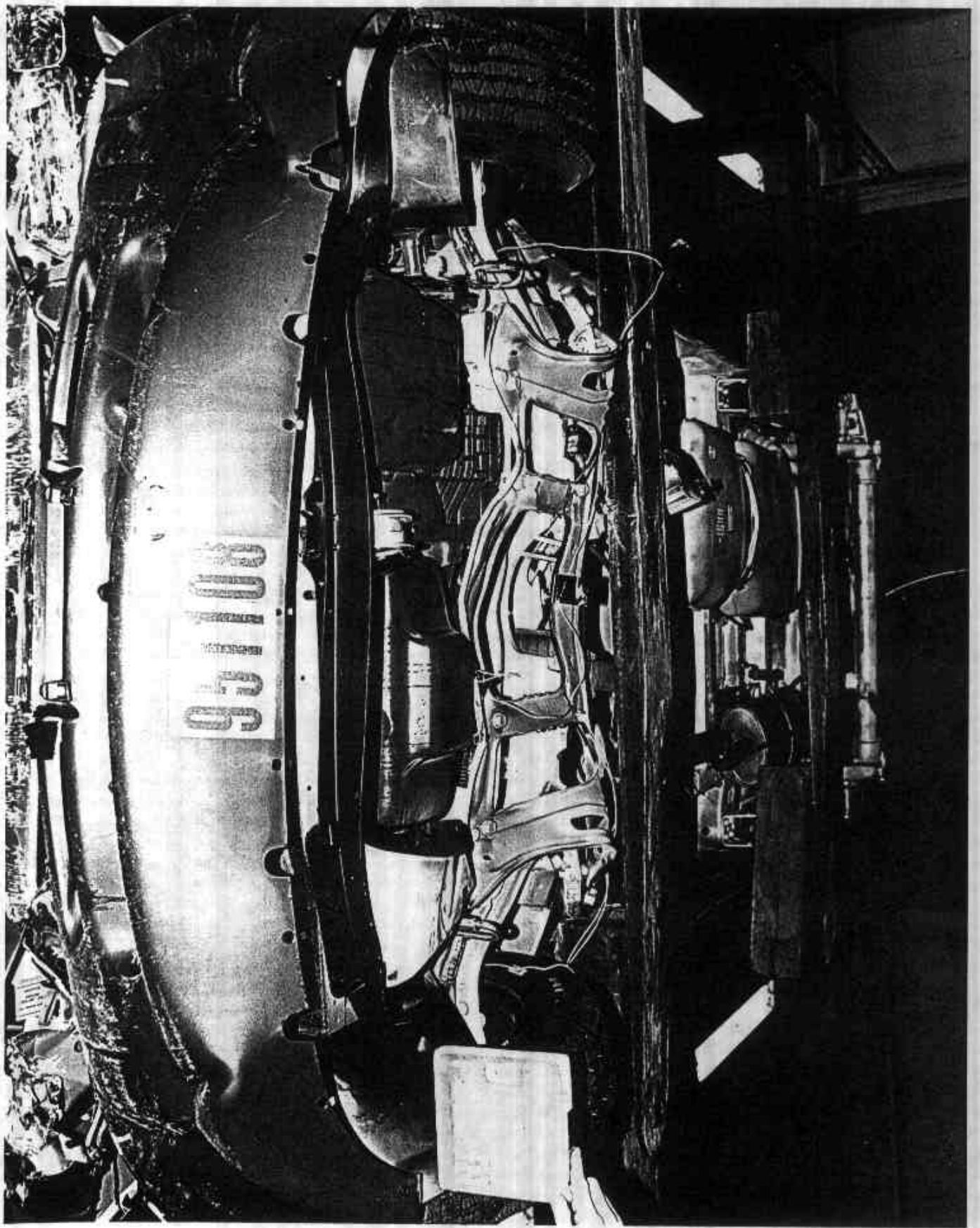


Figure A-24. Post-Test Front Underbody View
A-25

951108

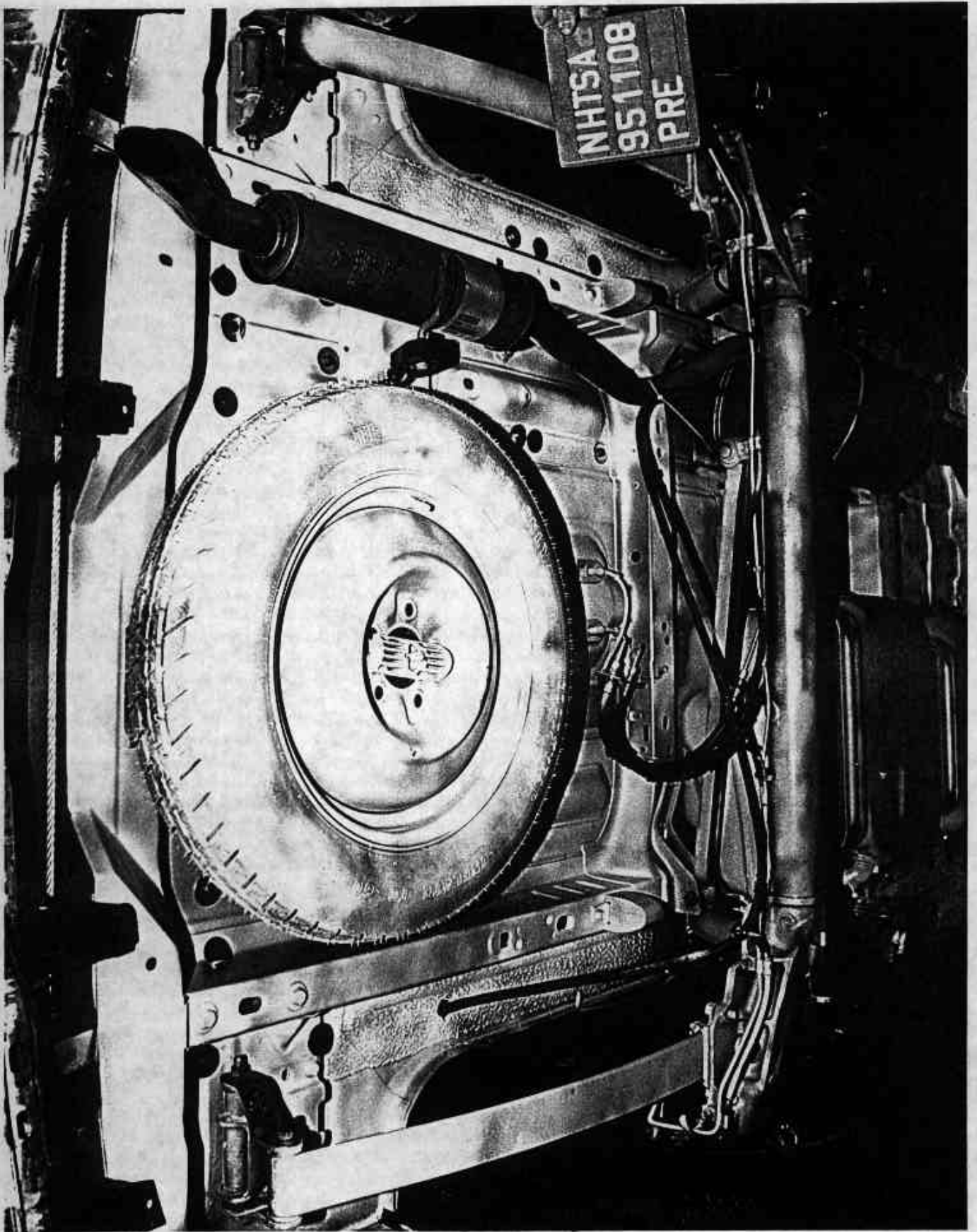


Figure A-25. Pre-Test Rear Underbody View
A-26

951108

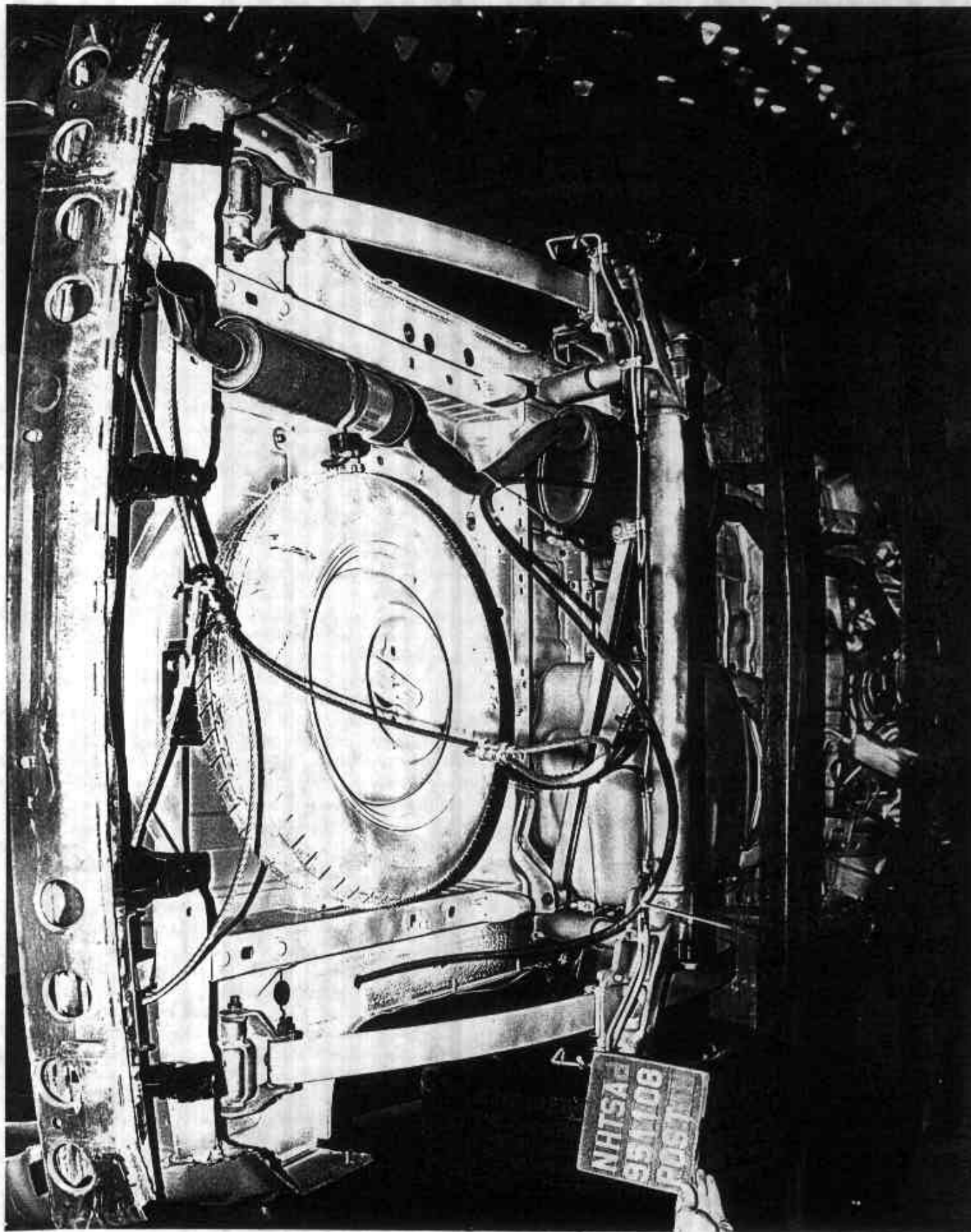


Figure A-26. Post-Test Rear Underbody View
A-27

951108

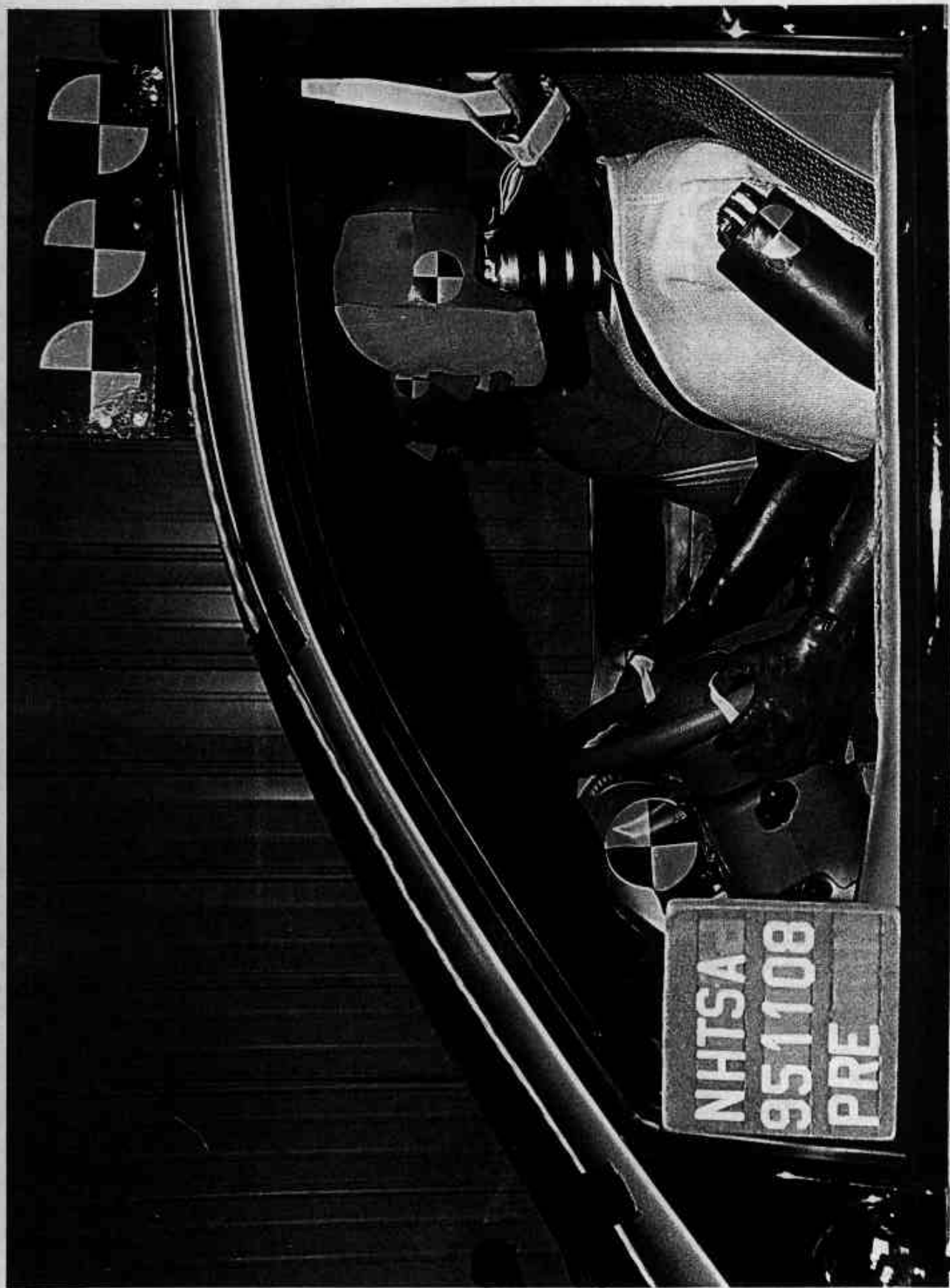


Figure A-27. Pre-Test Driver Dummy Position - View 1

A-28

951108

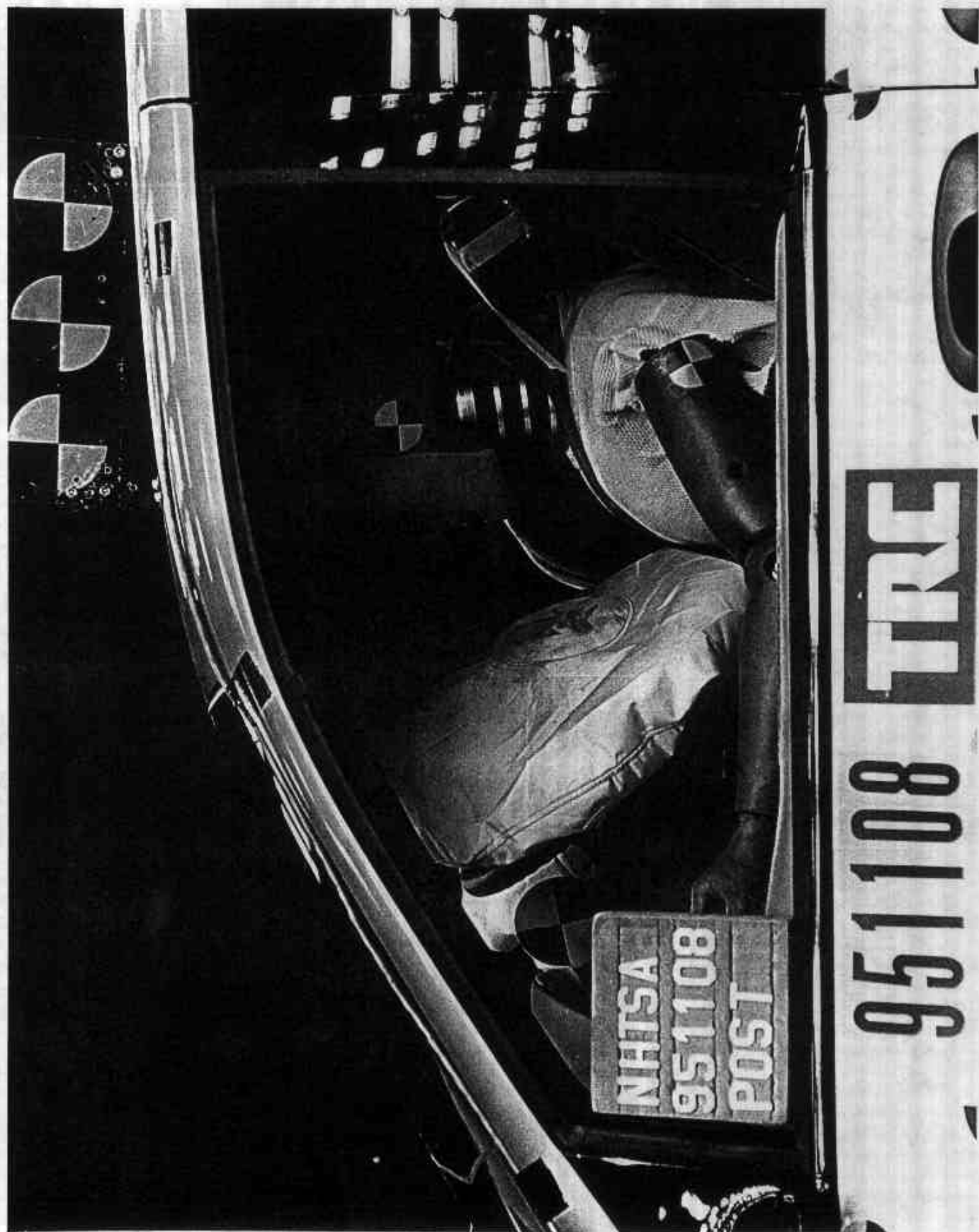


Figure A-28. Post-Test Driver Dummy Position - View 1

A-29

951108

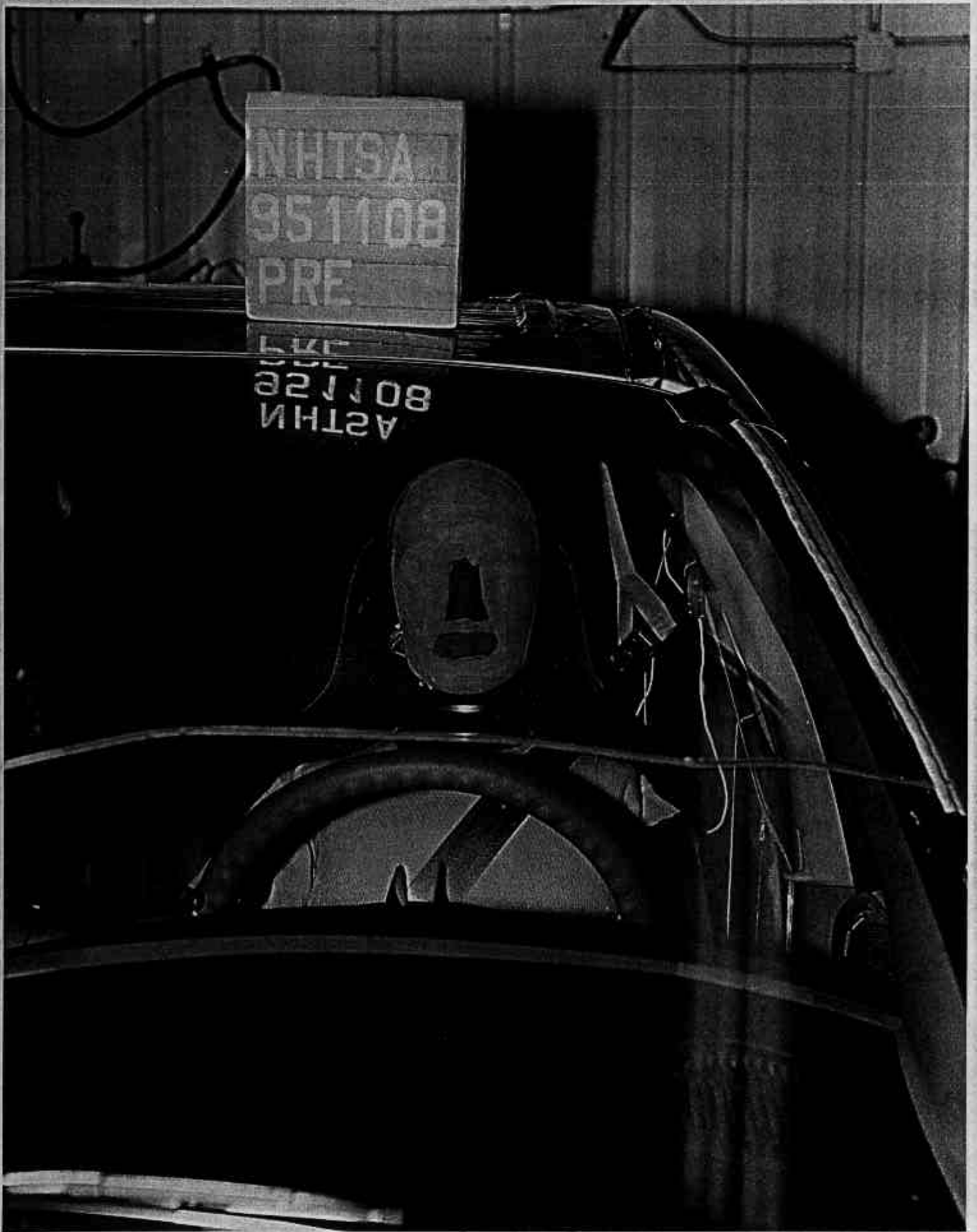


Figure A-29. Pre-Test Driver Dummy Position - View 2

A-30

951108

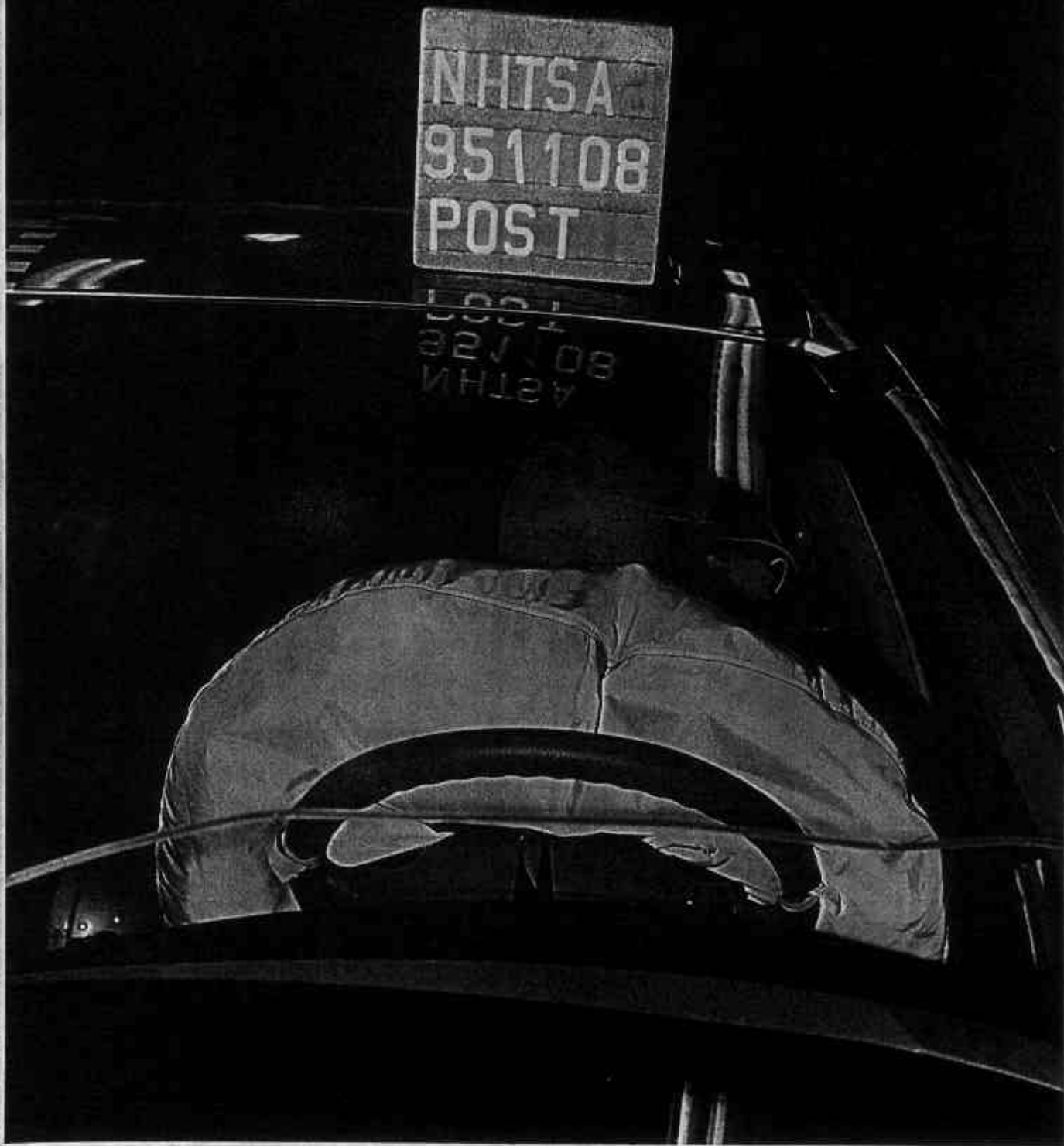


Figure A-30. Post-Test Driver Dummy Position - View 2

A-31

951108



Figure A-31. Pre-Test Passenger Dummy Position - View 1
A-32

951108

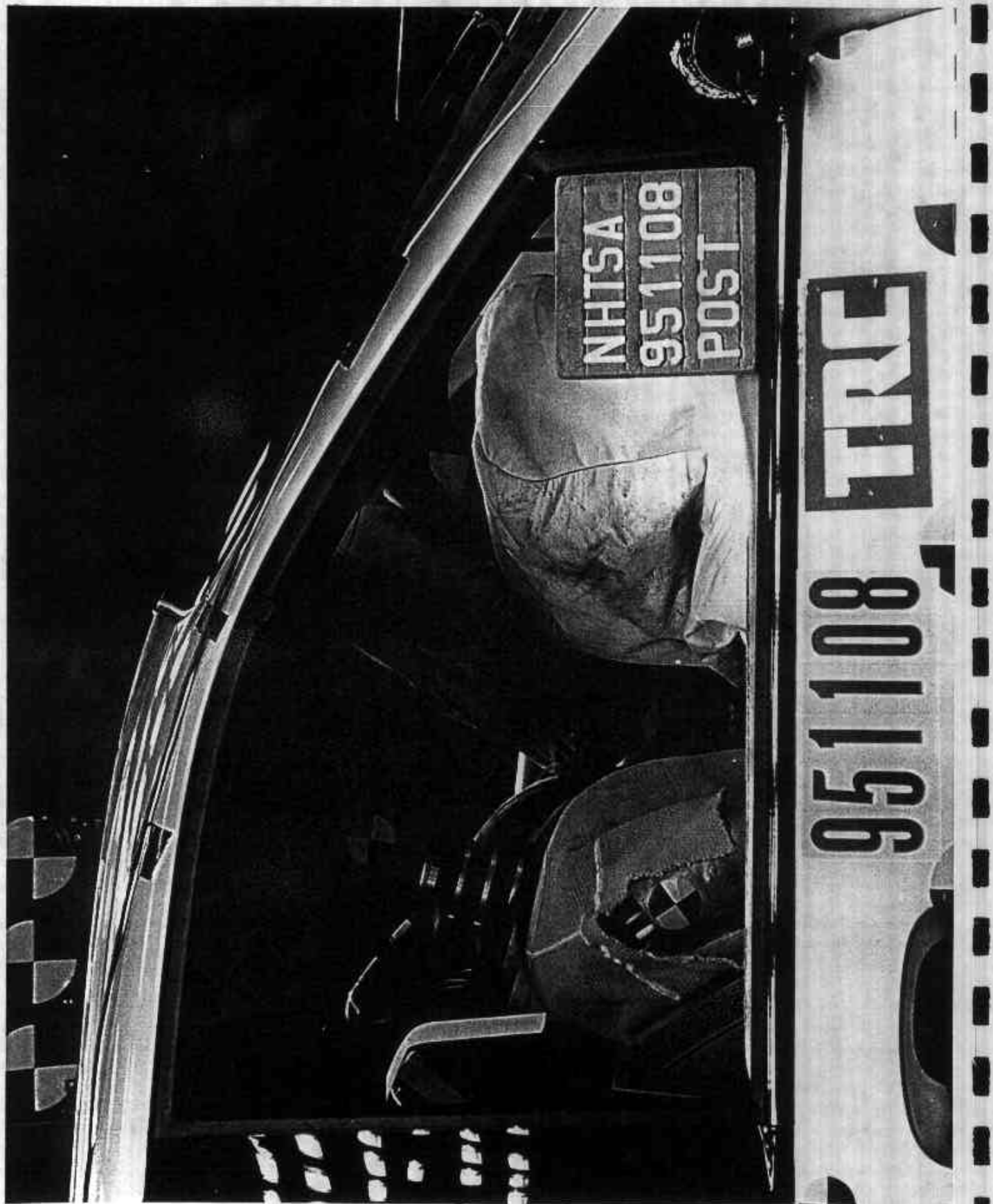


Figure A-32. Post-Test Passenger Dummy Position - View 1



Figure A-33. Pre-Test Passenger Dummy Position - View 2

A-34

951108

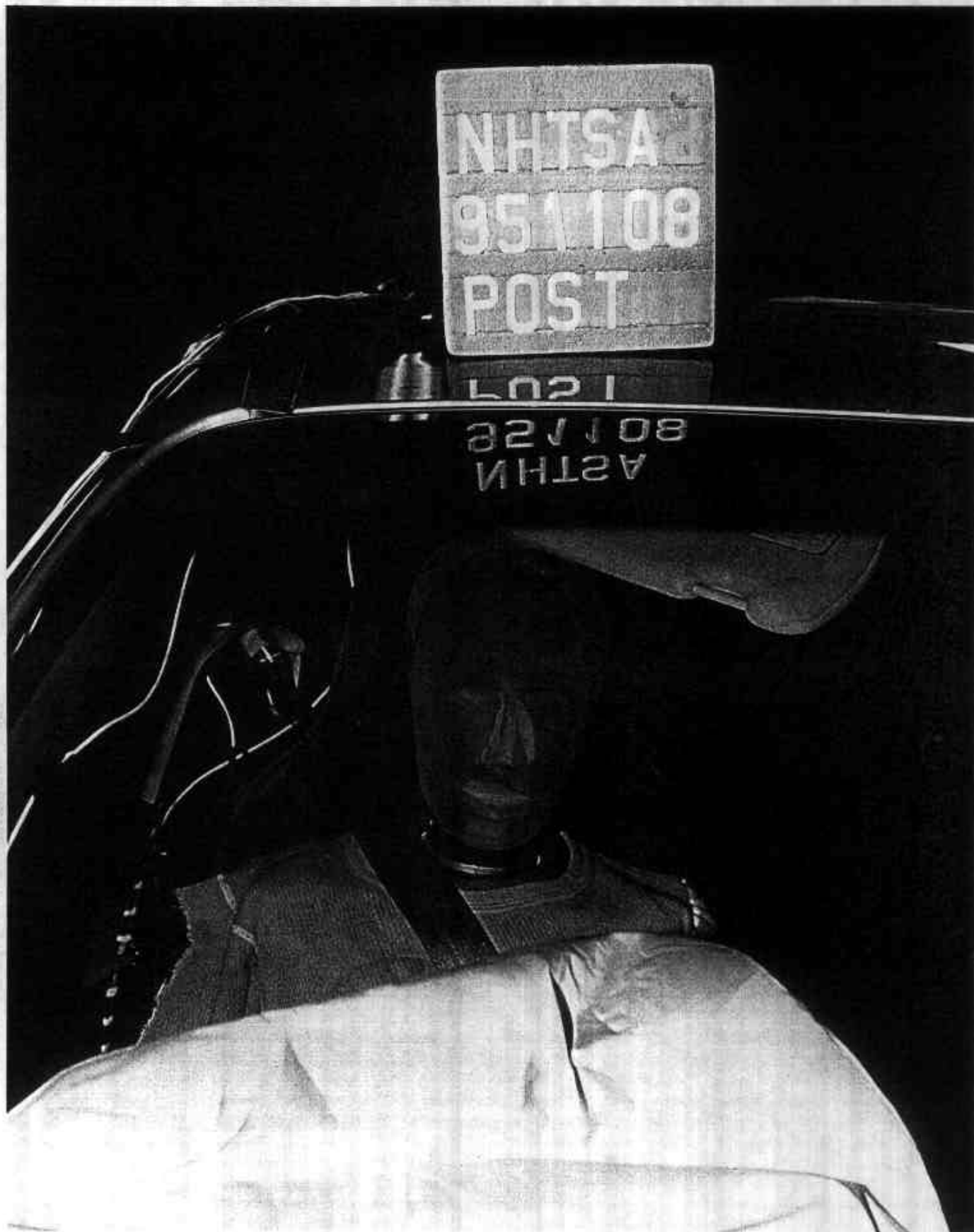


Figure A-34. Post-Test Passenger Dummy Position - View 2
A-35

951108



Figure A-35. Pre-Test Driver Dummy & Vehicle Interior - View 1

A-36

951108



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

A-37

951108



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

A-38

951108



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

A-39

951108



Figure A-39. Pre-Test Passenger Dummy & Vehicle Interior - View 1

A-40

951108



Figure A-40. Post-Test Passenger Dummy & Vehicle Interior - View 1

A-41

951108

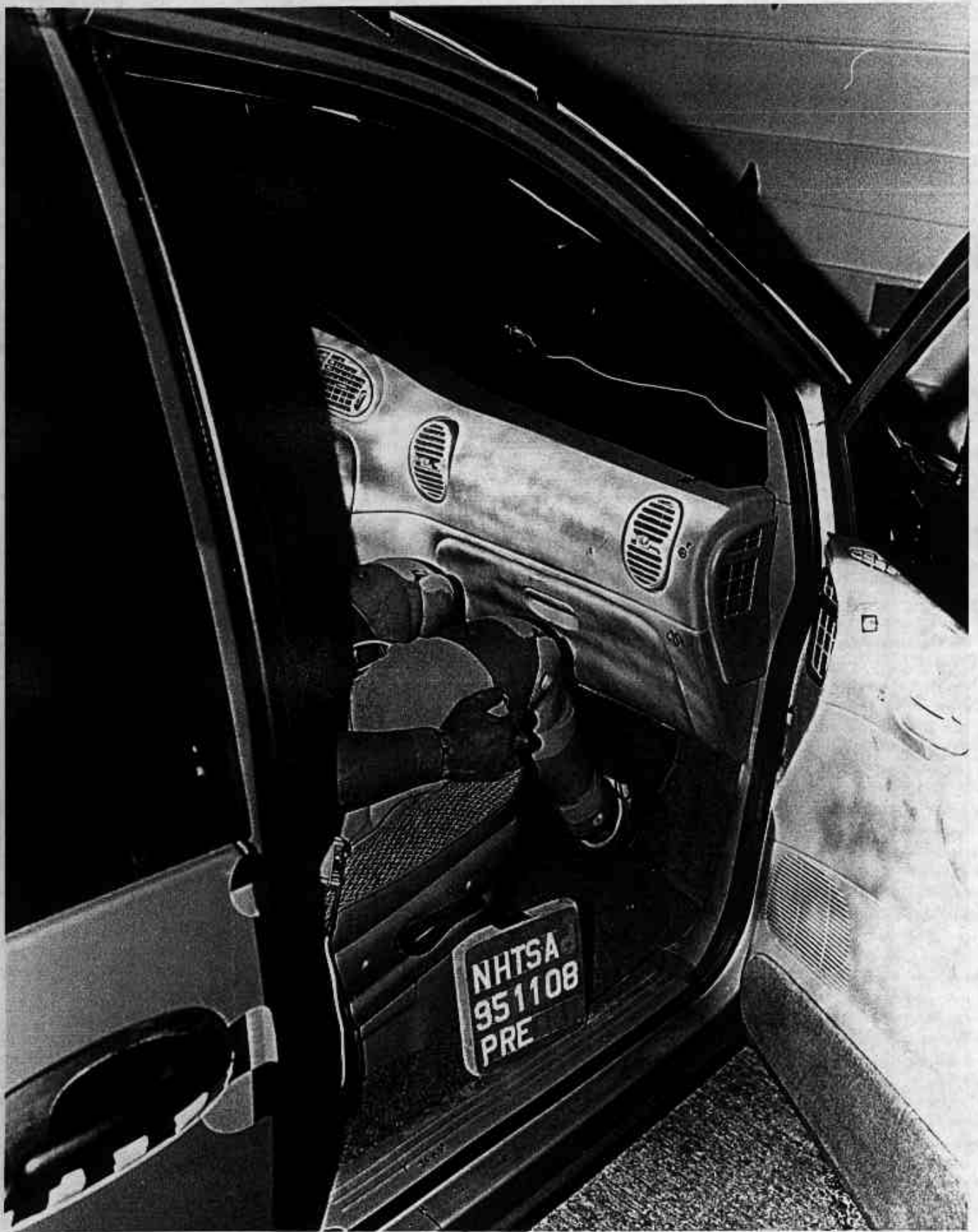


Figure A-41. Pre-Test Passenger Dummy & Vehicle Interior - View 2

A-42

951108

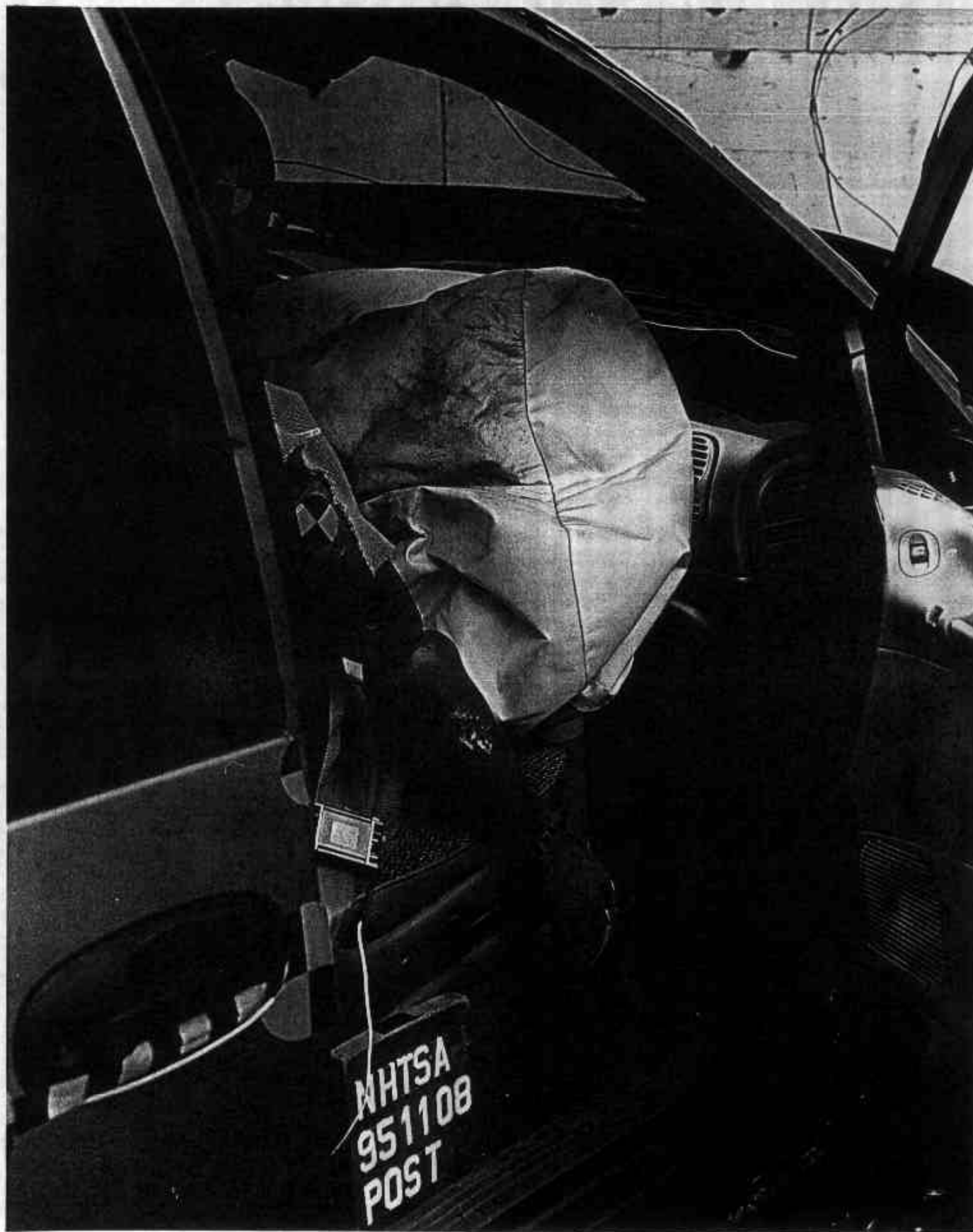


Figure A-42. Post-Test Passenger Dummy & Vehicle Interior - View 2

A-43

951108

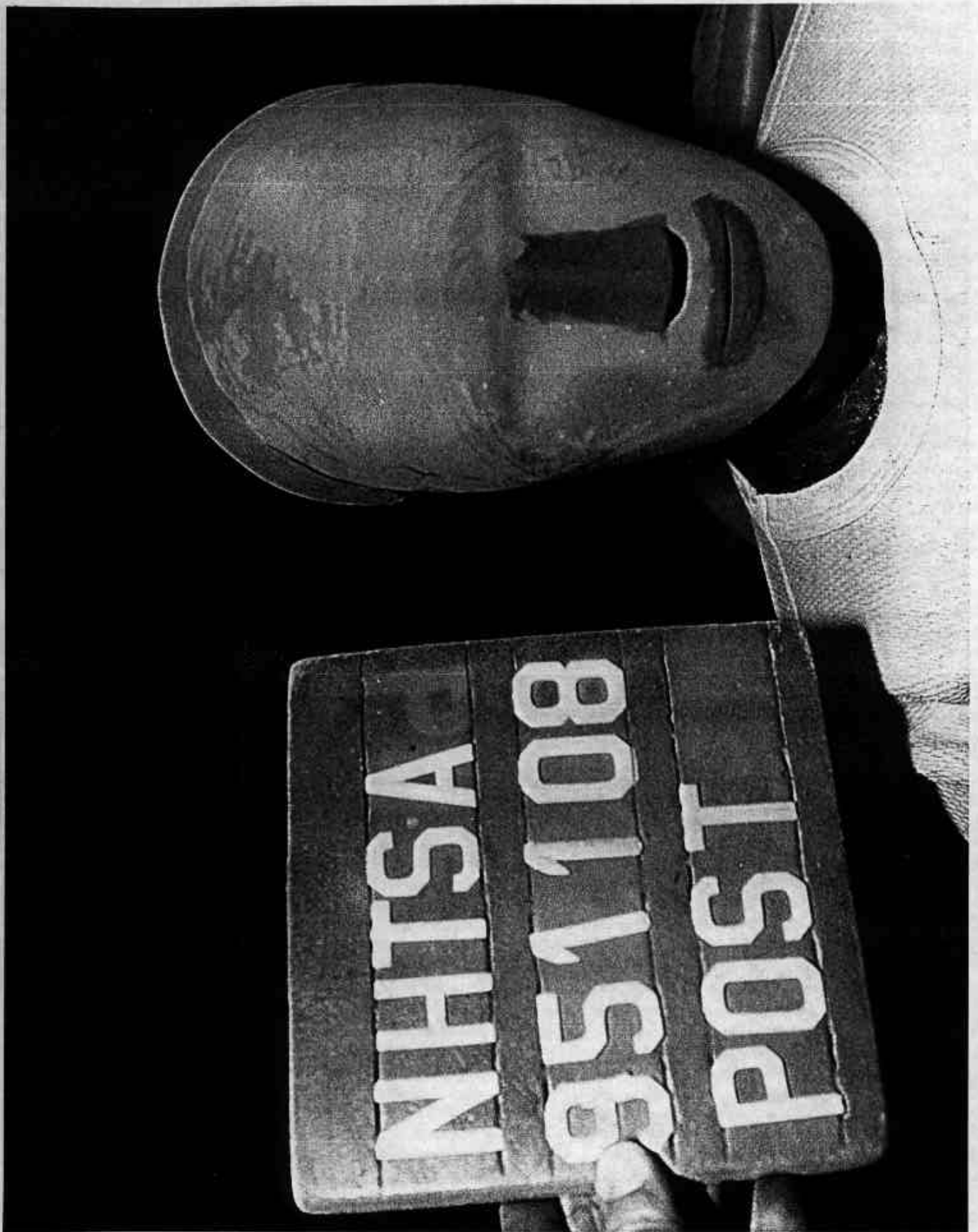


Figure A-43. Post-Test Driver Dummy Head Contact - View 1

A-44

951108



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

A-45

951108

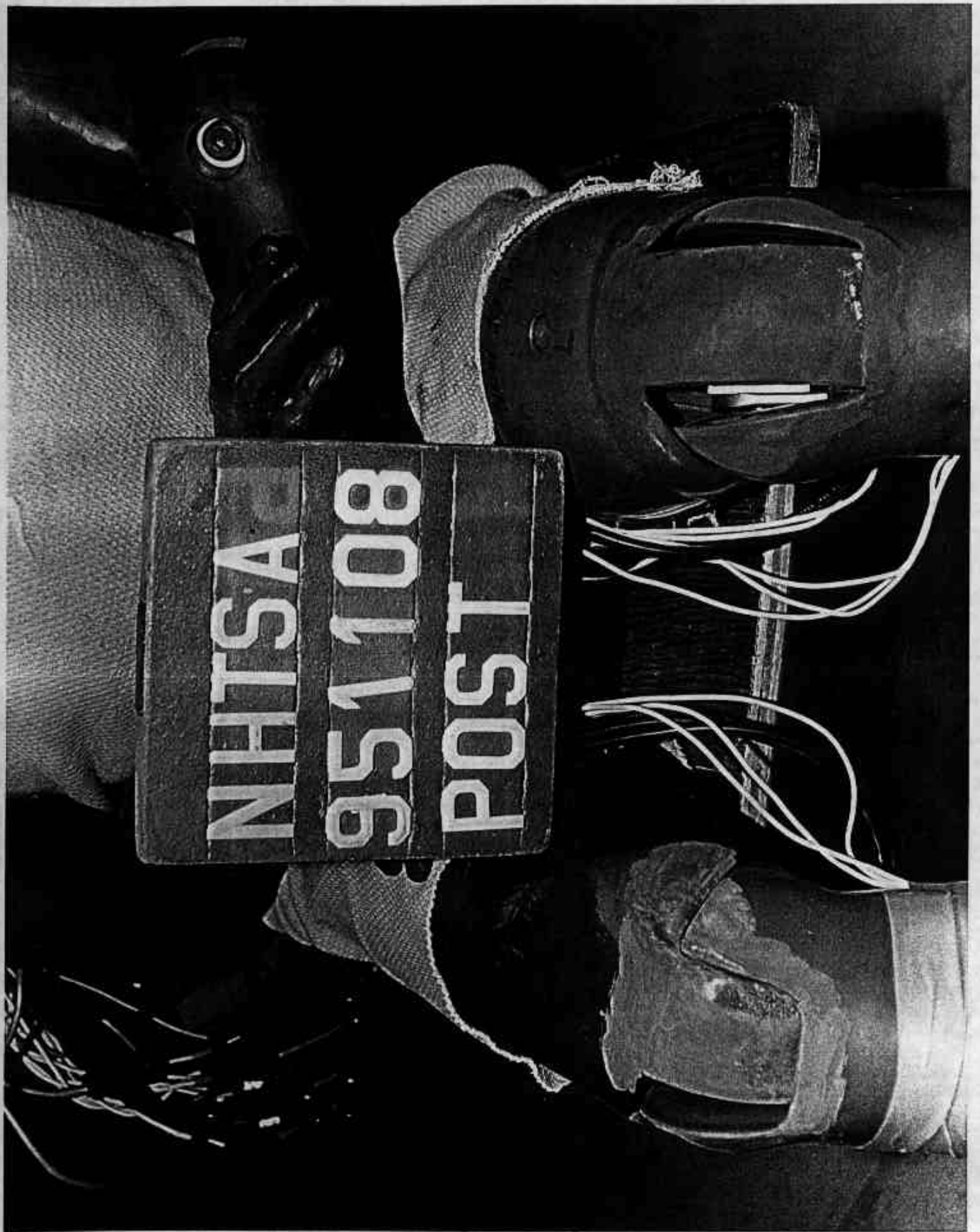


Figure A-45. Post-Test Driver Dummy Knee Contact - View 1

A-46

951108

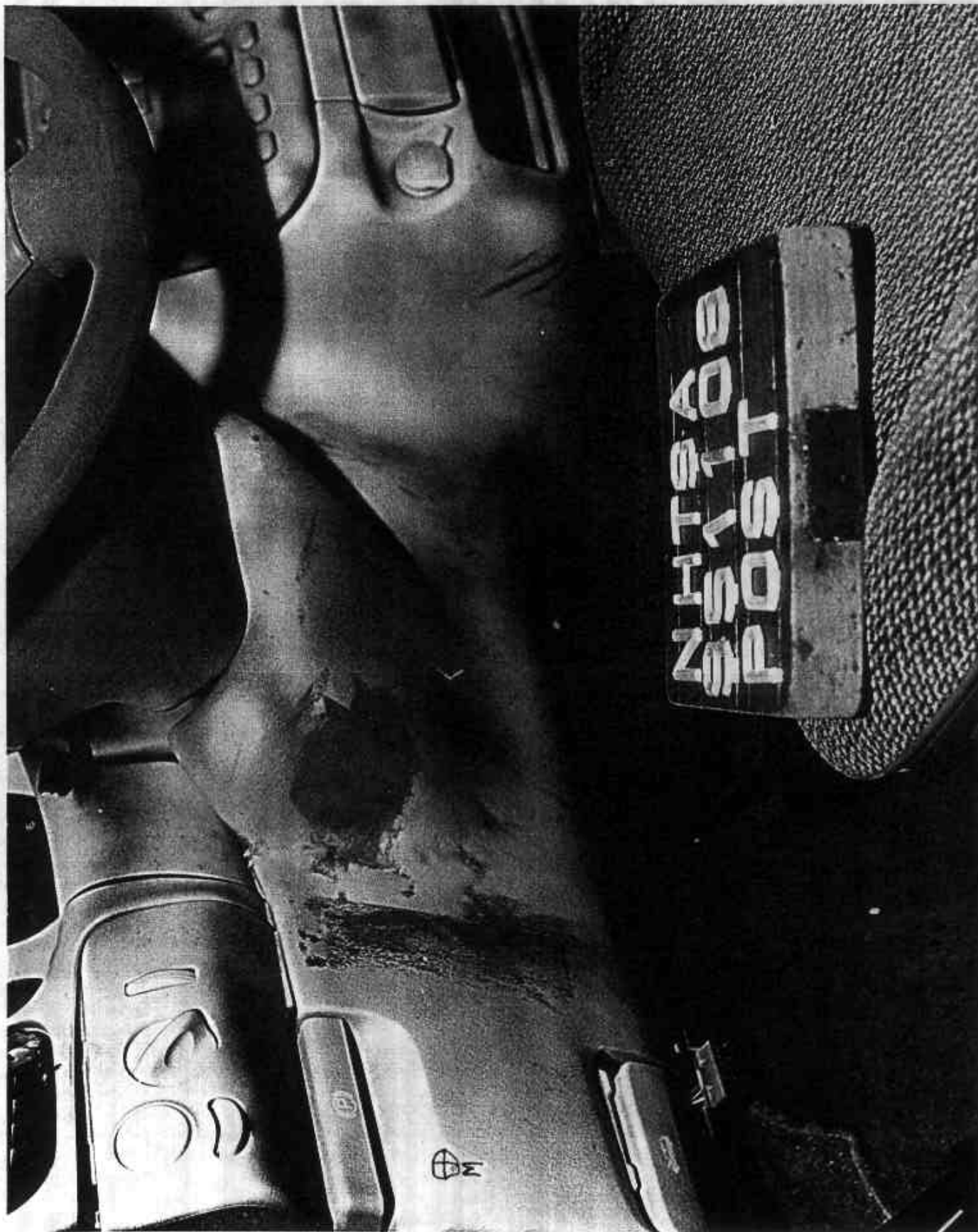


Figure A-46. Post-Test Driver Dummy Knee Contact - View 2

A-47

951108



Figure A-47. Post-Test Passenger Dummy Head Contact - View 1

A-48

951108



Figure A-48. Post-Test Passenger Dummy Head Contact - View 2

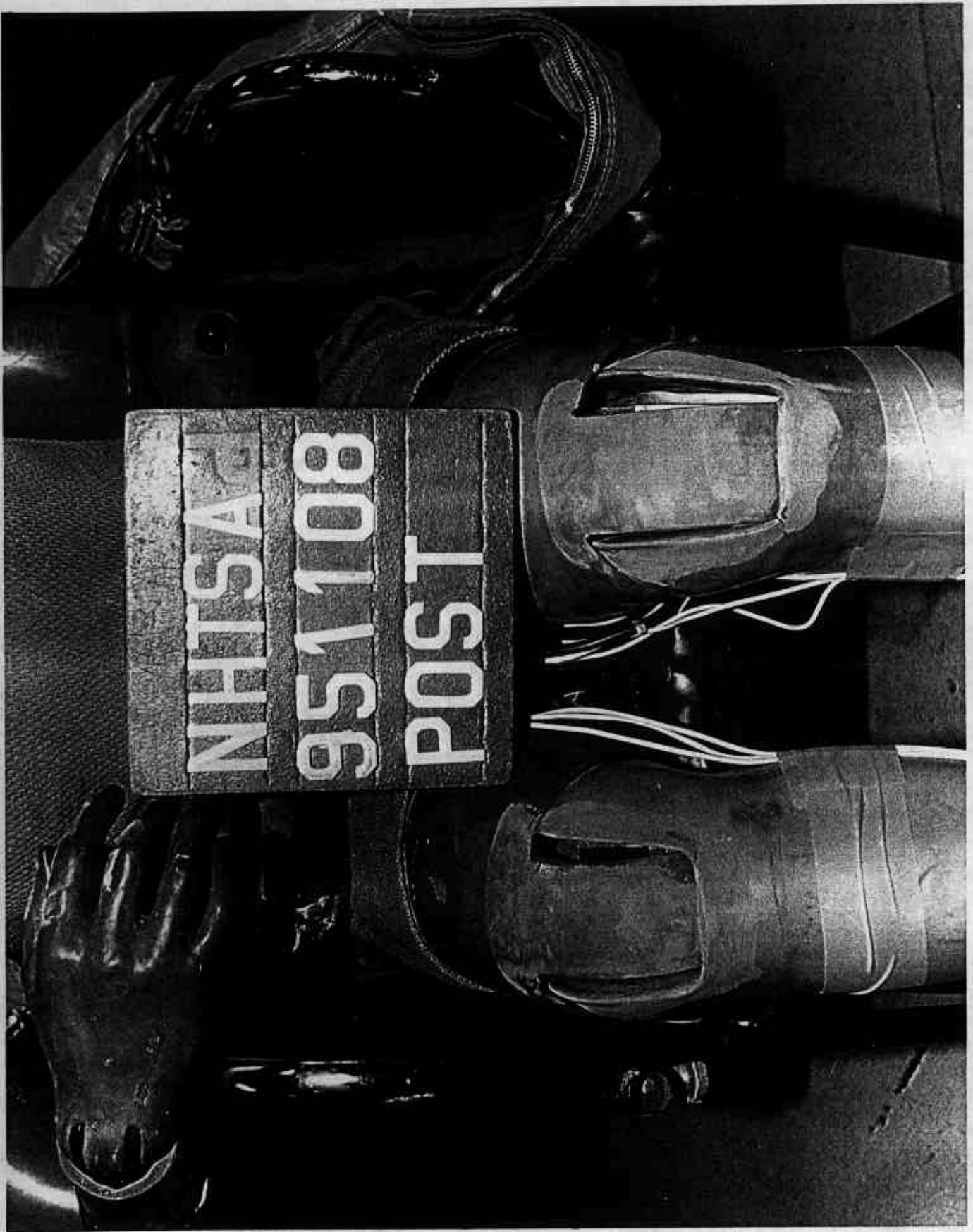


Figure A-49. Post-Test Passenger Dummy Knee Contact - View 1
A-50

951108



Figure A-50. Post-Test Passenger Dummy Knee Contact - View 2

A-51

951108

MFD BY	CHRYSLER CORPORATION	DATE OF MFR	10-95	GAWR	05350 LB	2427 KG
GAWR FRONT	2746 LB	1246 KG	WITH TIRES	P215/65R15	RIMS AT	15 X 6.5
GAWR REAR	2746 LB	1246 KG	WITH TIRES	P215/65R15	RIMS AT	15 X 6.5
					PSI COLD	35
					PSI COLD	35

THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.

VIN: 1B4GP44R5TB245375 TYPE: MPV

181272 954 PUNTS/IN VEHICLE MADE IN U.S.A. BIRTHDAY

SINGLE X INCH

Figure A-51. Pre-Test Vehicle Certification Label View

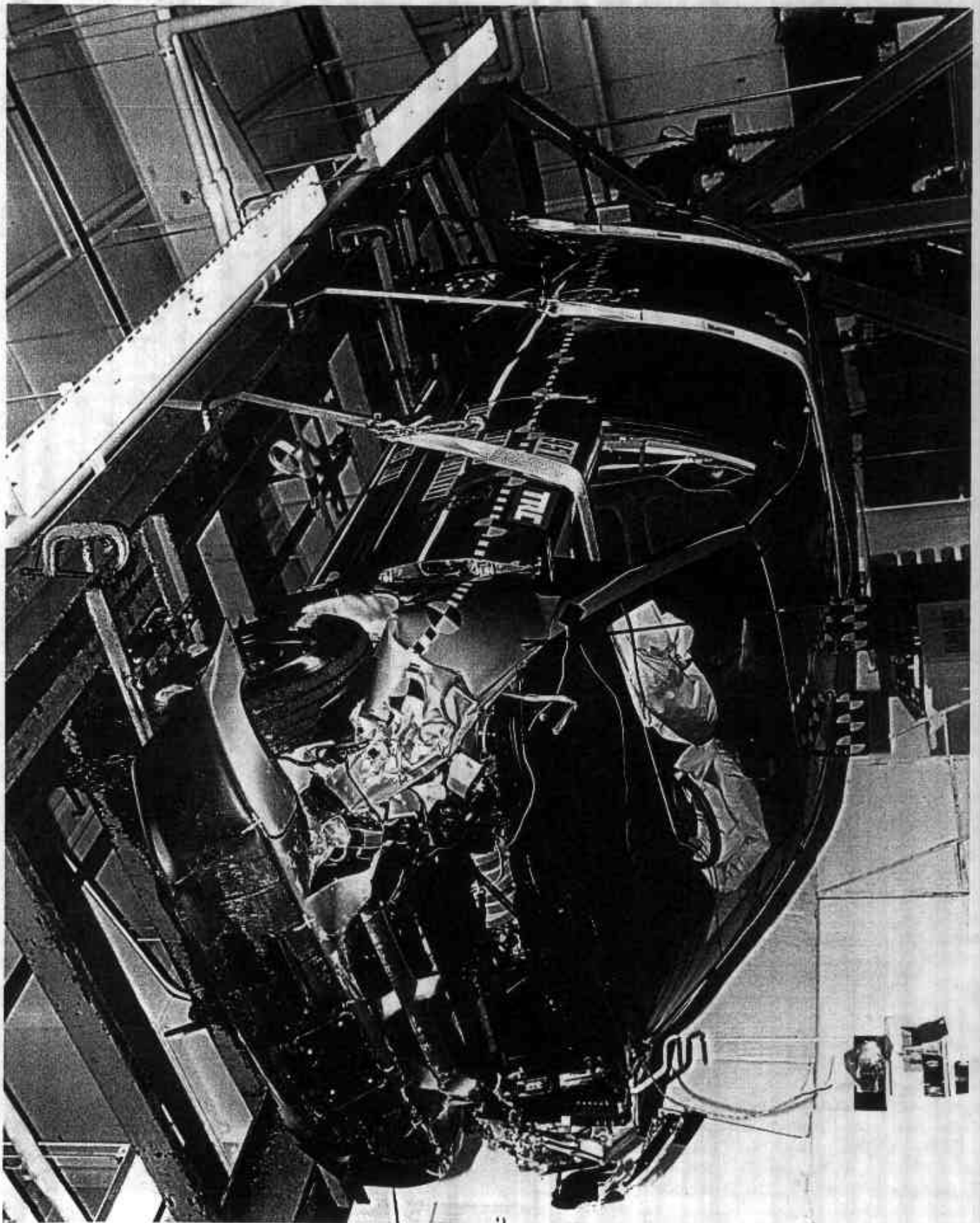


Figure A-52. Post-Test Vehicle on Static Rollover Machine View

A-53

951108

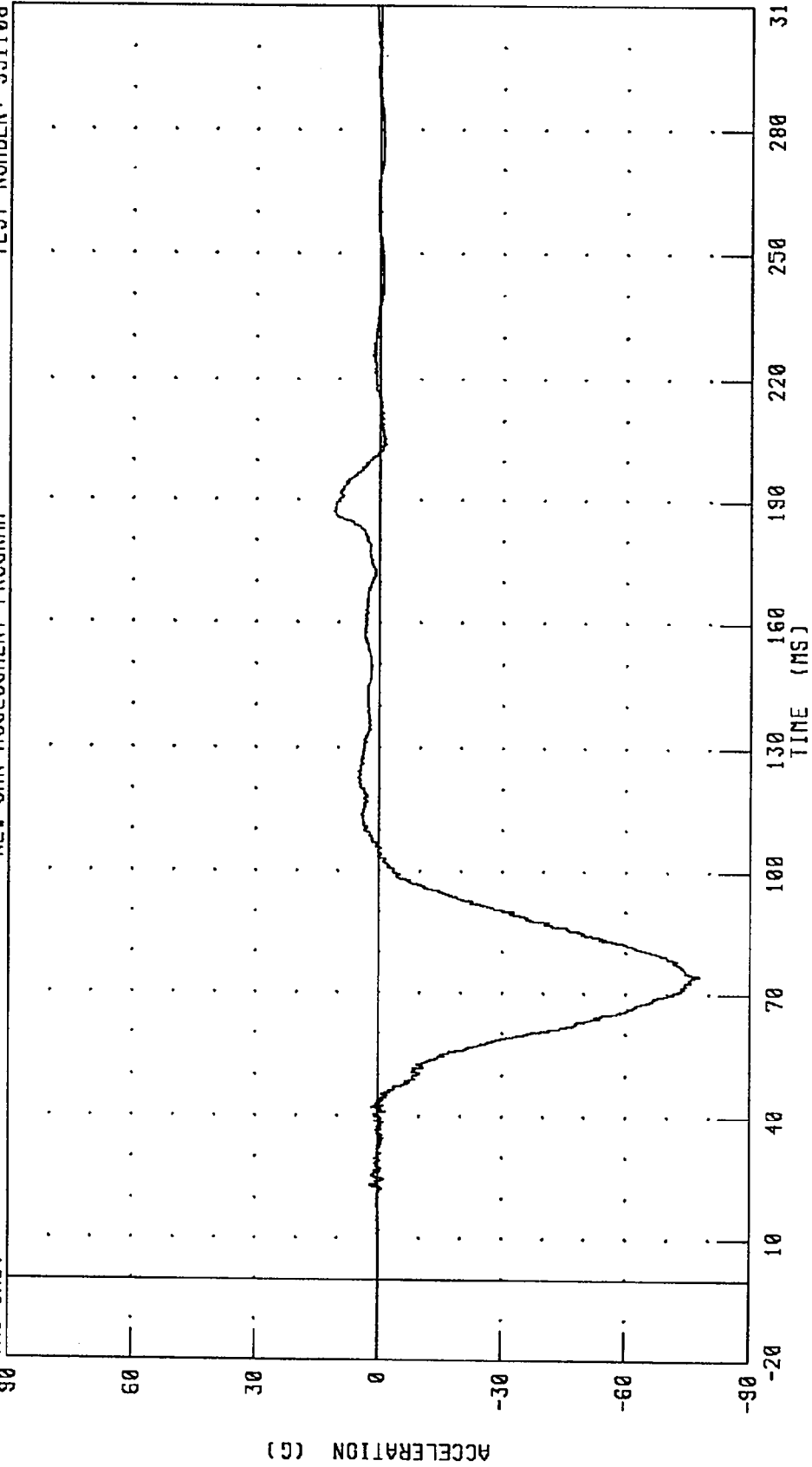
Appendix B

Data Plots

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
DRIVER HEAD X-AXIS ACCELERATION
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

TRC INC.



CHANNEL: HEDXG1 FILTER: CH. CLASS 1000

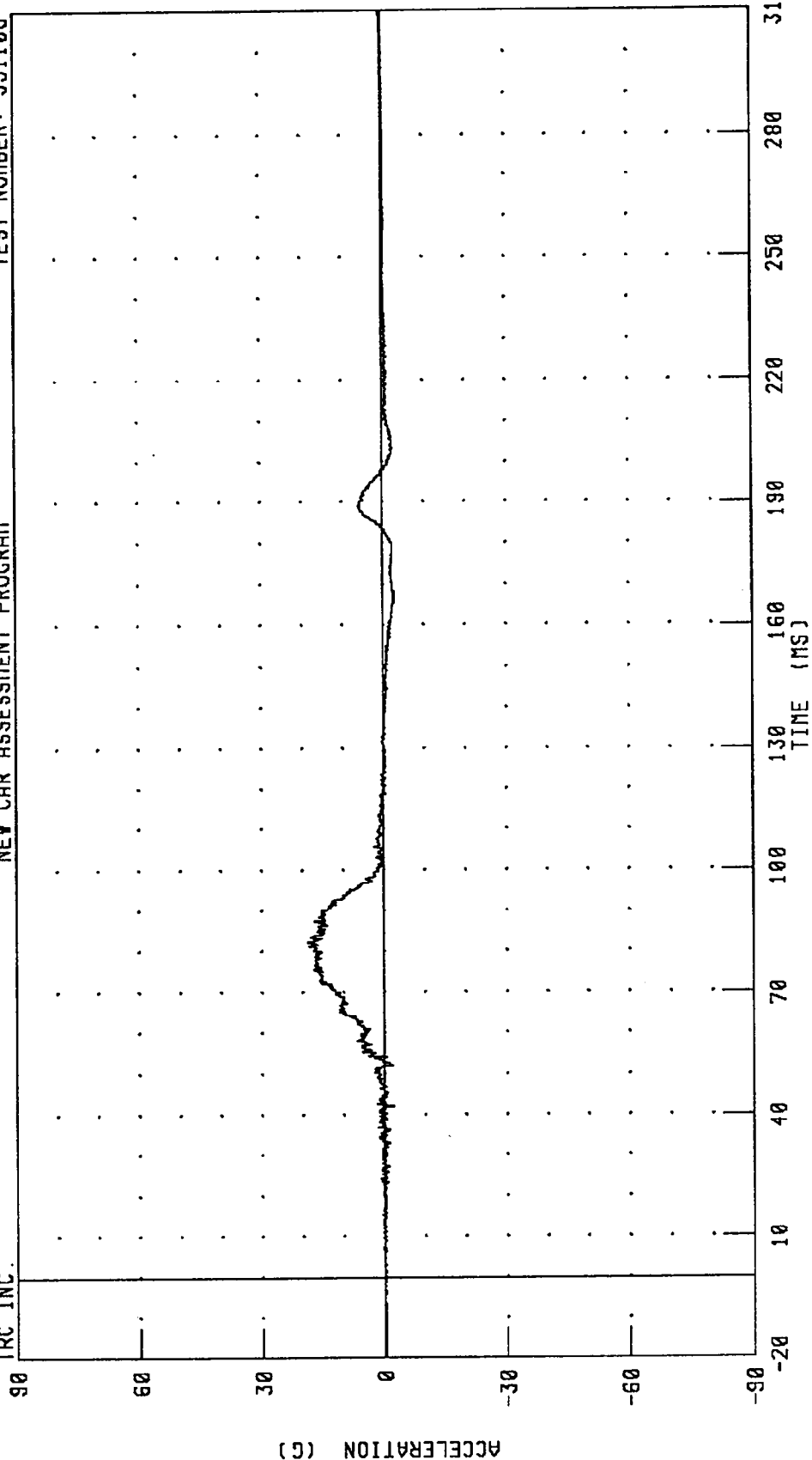
PEAK DATA: 11.17 G @ 187.28 MS; -77.62 G @ 74.40 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER HEAD Y-AXIS ACCELERATION

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 18.72 G @ 82.32 MS; -2.75 G @ 165.28 MS

CHANNEL: HEDYG1 FILTER: CH. CLASS 1000

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER HEAD Z-AXIS ACCELERATION
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

TRC INC.

90

60

30

0

-30

-60

-90

ACCELERATION (G)

TIME (MS)

310

280

250

220

190

160

130

100

70

40

10

-20

CHANNEL: HEDZG1 FILTER: CH. CLASS 1000

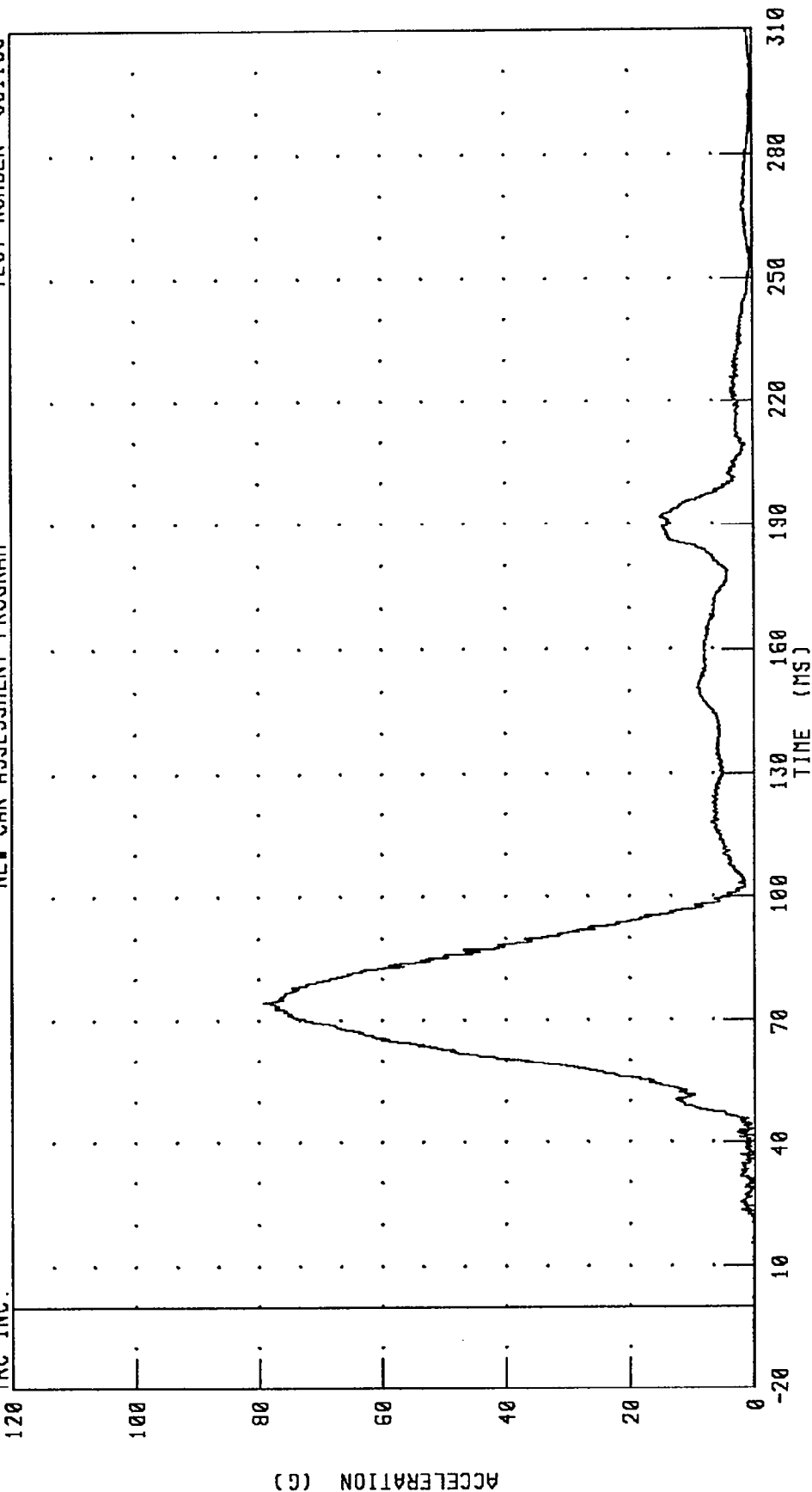
PEAK DATA: 13.05 G @ 87.28 MS; -10.30 G @ 191.84 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
DRIVER HEAD RESULTANT ACCELERATION

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



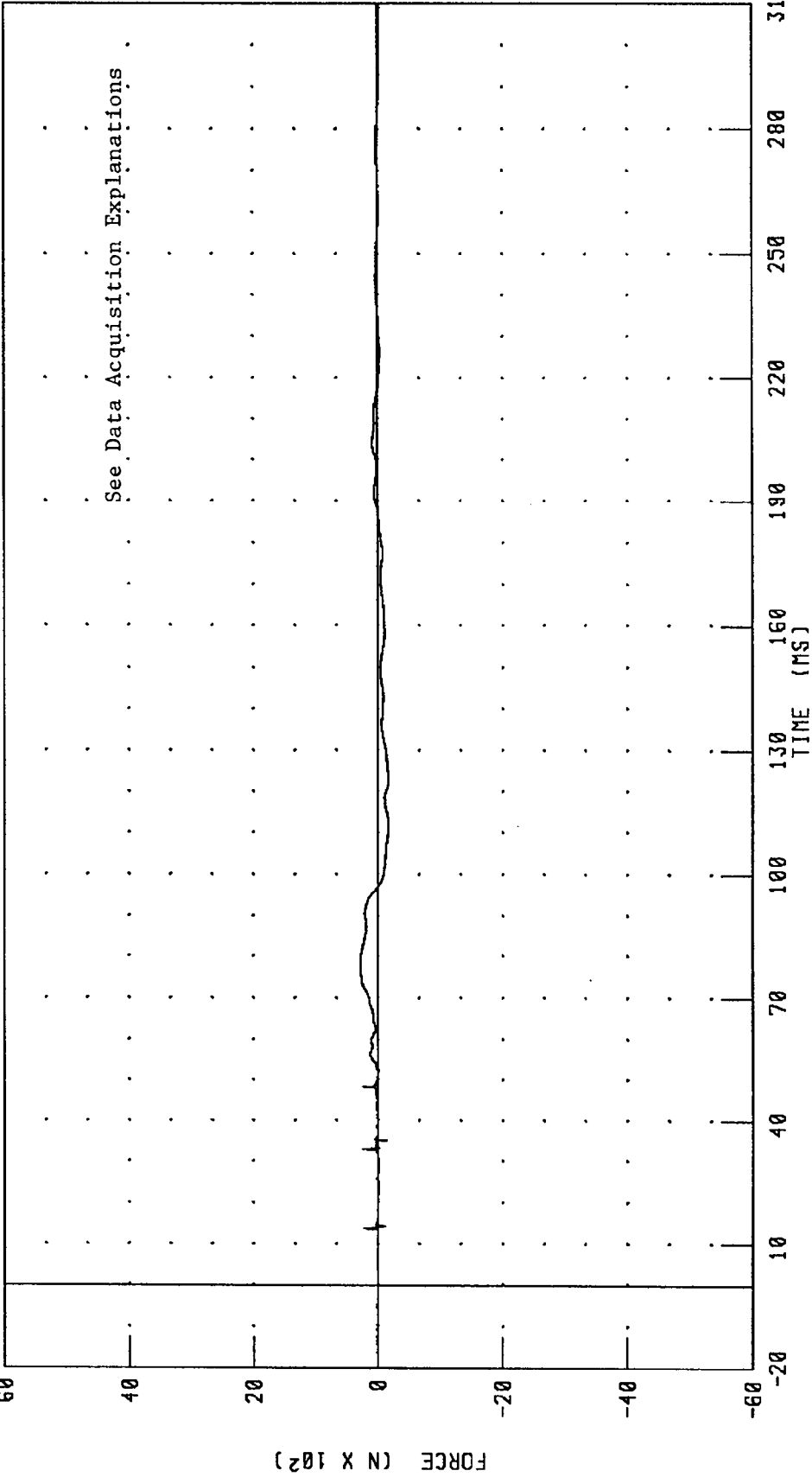
CHANNEL: HEDRG1 FILTER: CH. CLASS 1000

PEAK DATA: 79.28 G @ 74.40 MS; 0.10 G @ 6.16 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER NECK X-AXIS SHEAR FORCE
 NEV CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

TRC INC.



PEAK DATA: 280.20 N @ 78.56 MS; -176.39 N @ 110.80 MS

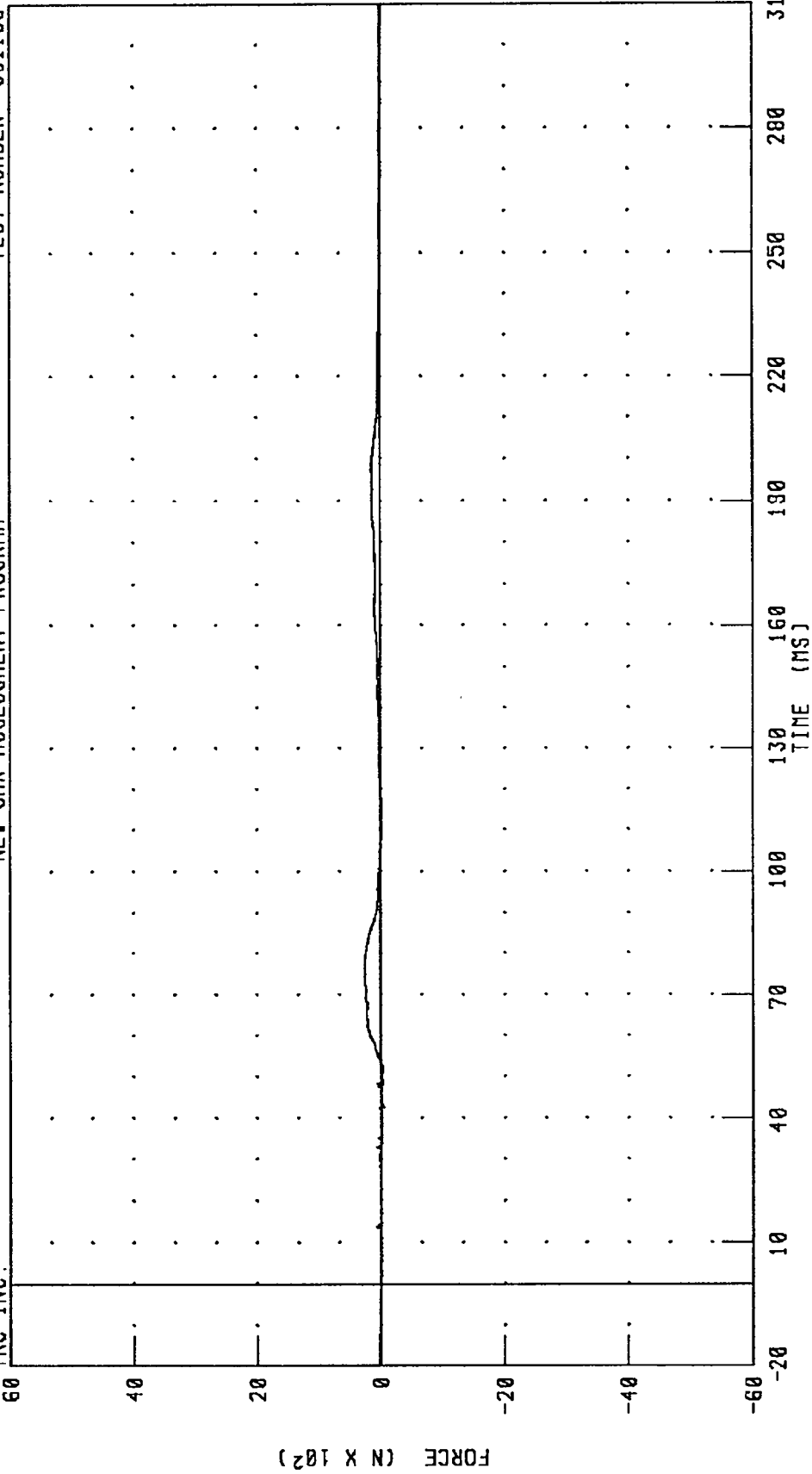
CHANNEL: NEKXF1 FILTER: CH. CLASS 1000

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
DRIVER NECK Y-AXIS SHEAR FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



CHANNEL: NEKYF1 FILTER: CH. CLASS 1000

PEAK DATA: 256.70 N @ 72.40 MS; -51.75 N @ 42.72 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER NECK Z-AXIS AXIAL FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

IRC INC.

60

40

20

0

-20

-40

-60

FORCE (N X 10²)

10

40

70

100

130

160

190

220

250

280

310

TIME (MS)

See Data Acquisition Explanations

Channel: NEKZF1

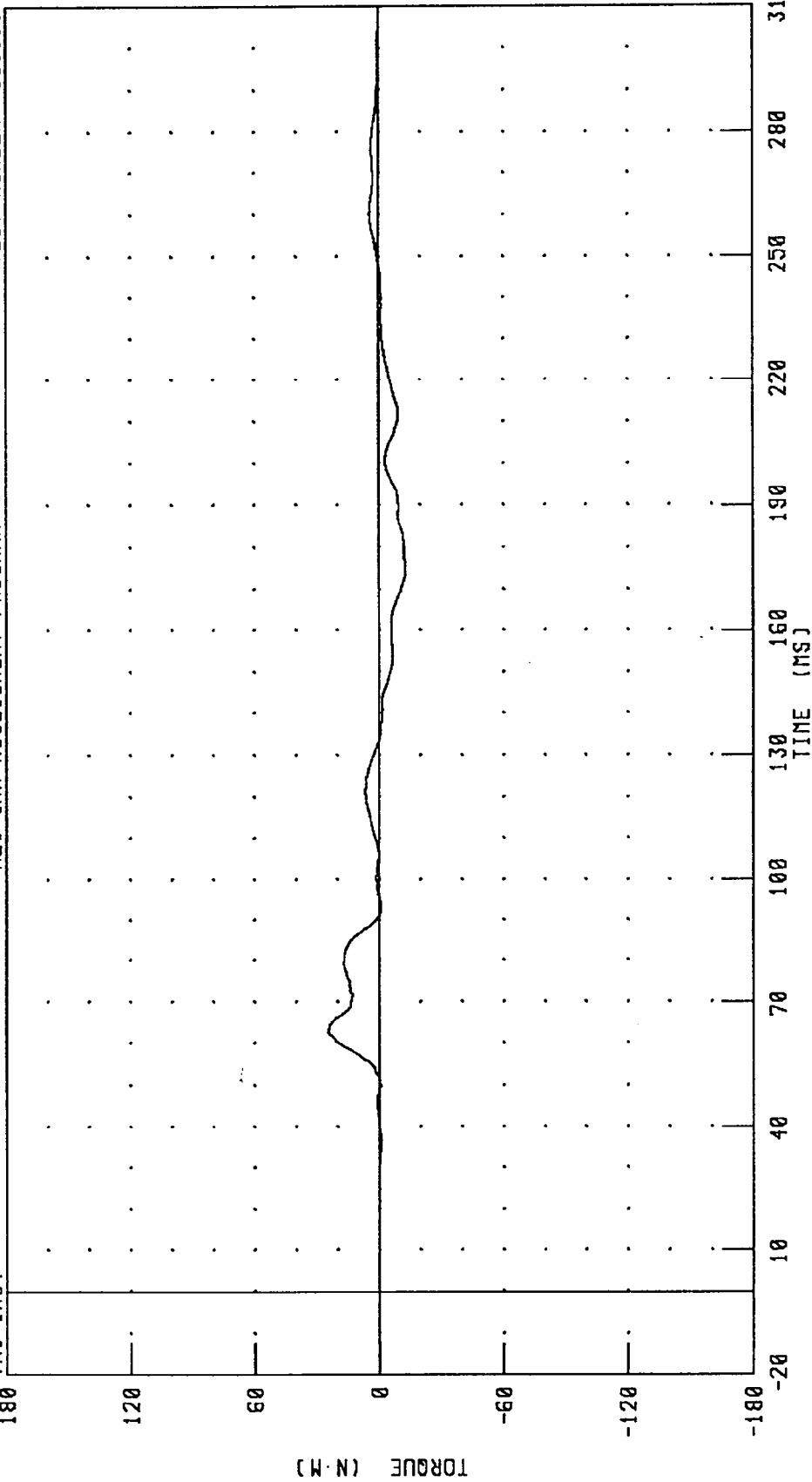
Filter: CH. CLASS 1000

Peak Data: 420.52 N @ 47.60 MS; -1705.73 N @ 13.84 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER NECK MOMENT ABOUT X AXIS
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

TRC INC.



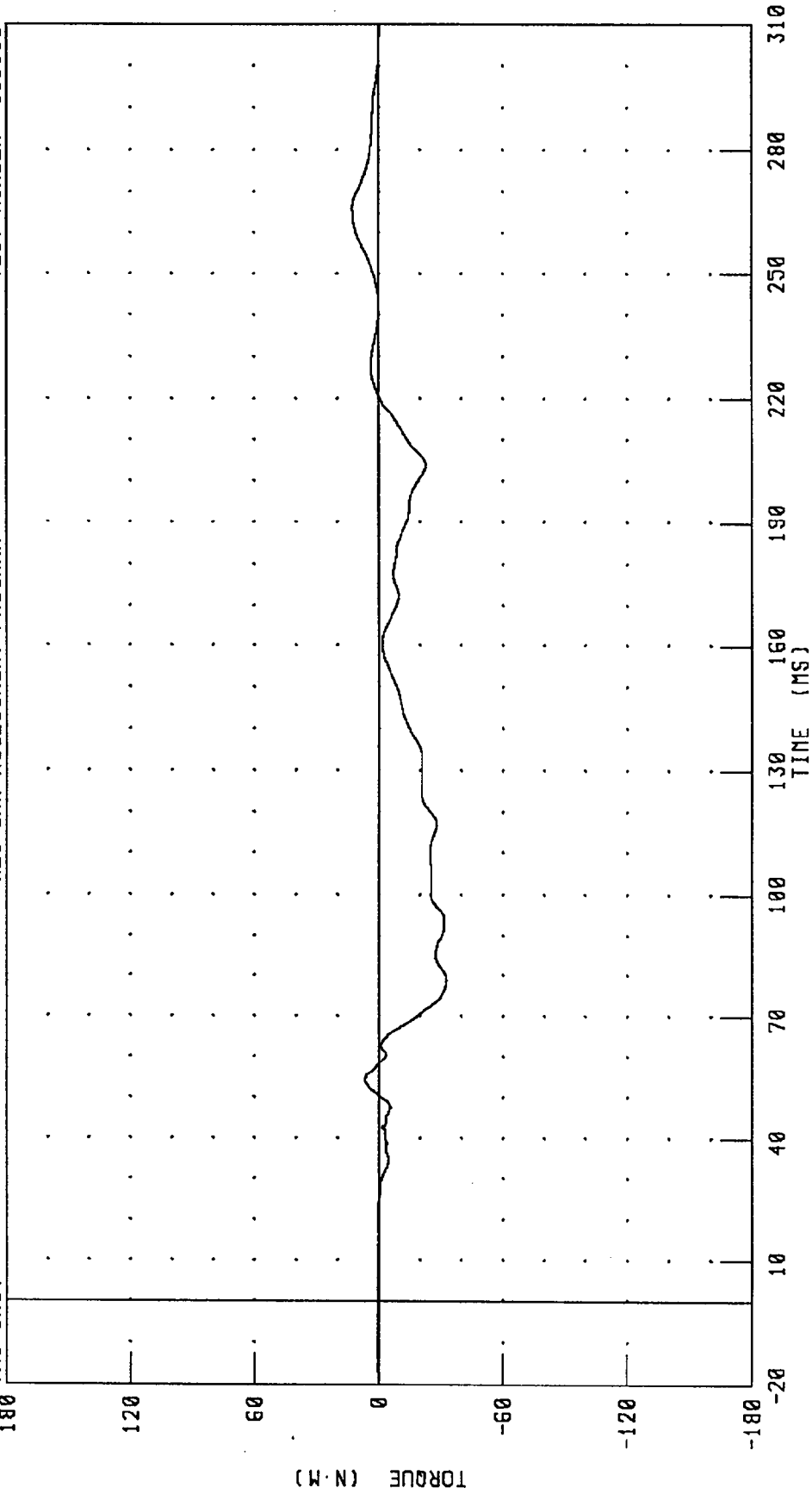
PEAK DATA: 24.44 N.M @ 62.80 MS; -12.89 N.M @ 174.32 MS

CHANNEL: NEKXMI FILTER: CH. CLASS 600

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER NECK MOMENT ABOUT Y AXIS
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

TRC INC.



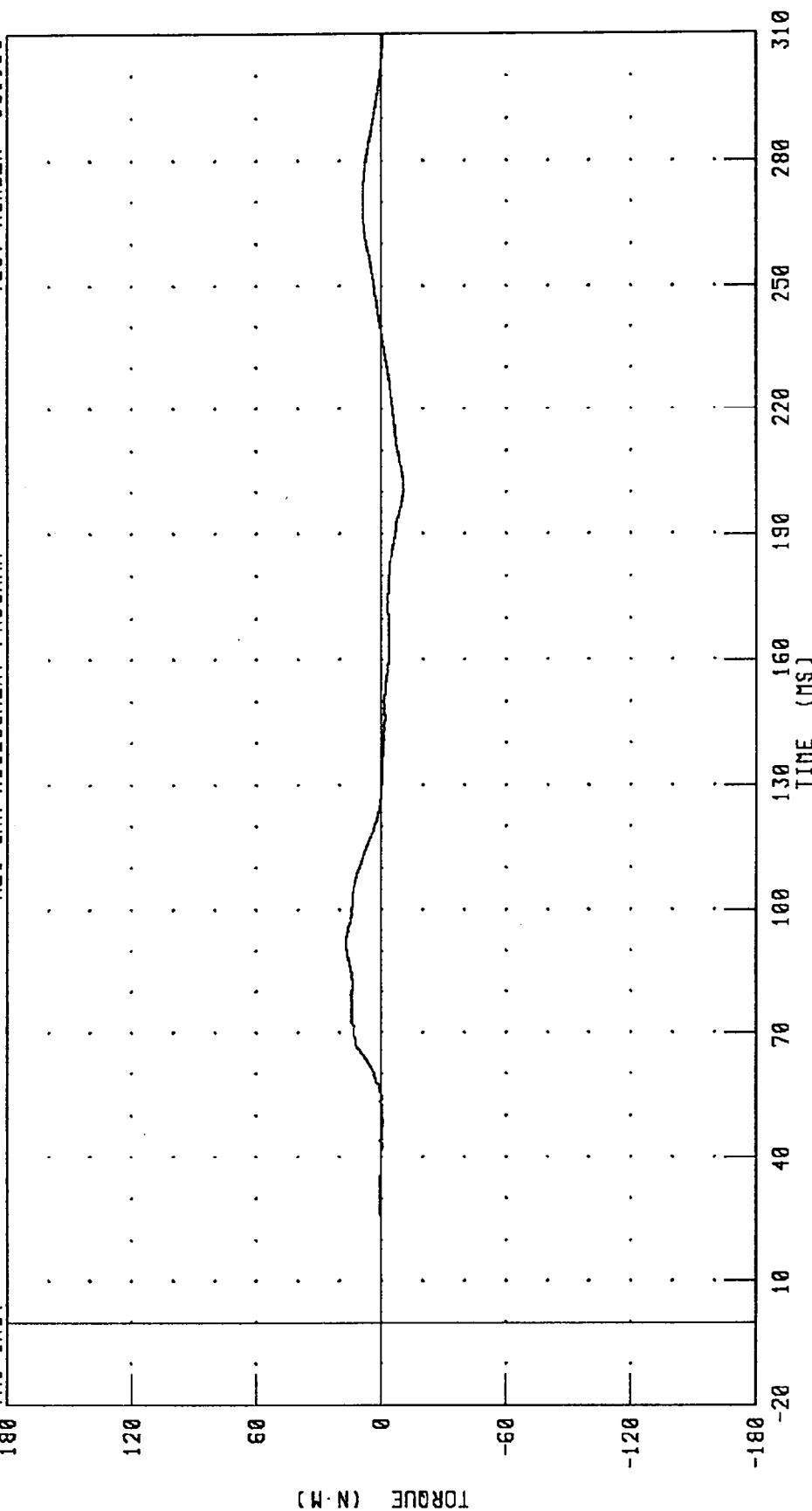
CHANNEL: NEKYM1 FILTER: CH. CLASS 600

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER NECK MOMENT ABOUT Z AXIS

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 16.79 N·M @ 92.00 MS; -10.86 N·M @ 201.68 MS

CHANNEL: NEKZM1 FILTER: CH. CLASS 600

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER CHEST X-AXIS ACCELERATION
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

TRC INC.

60

40

20

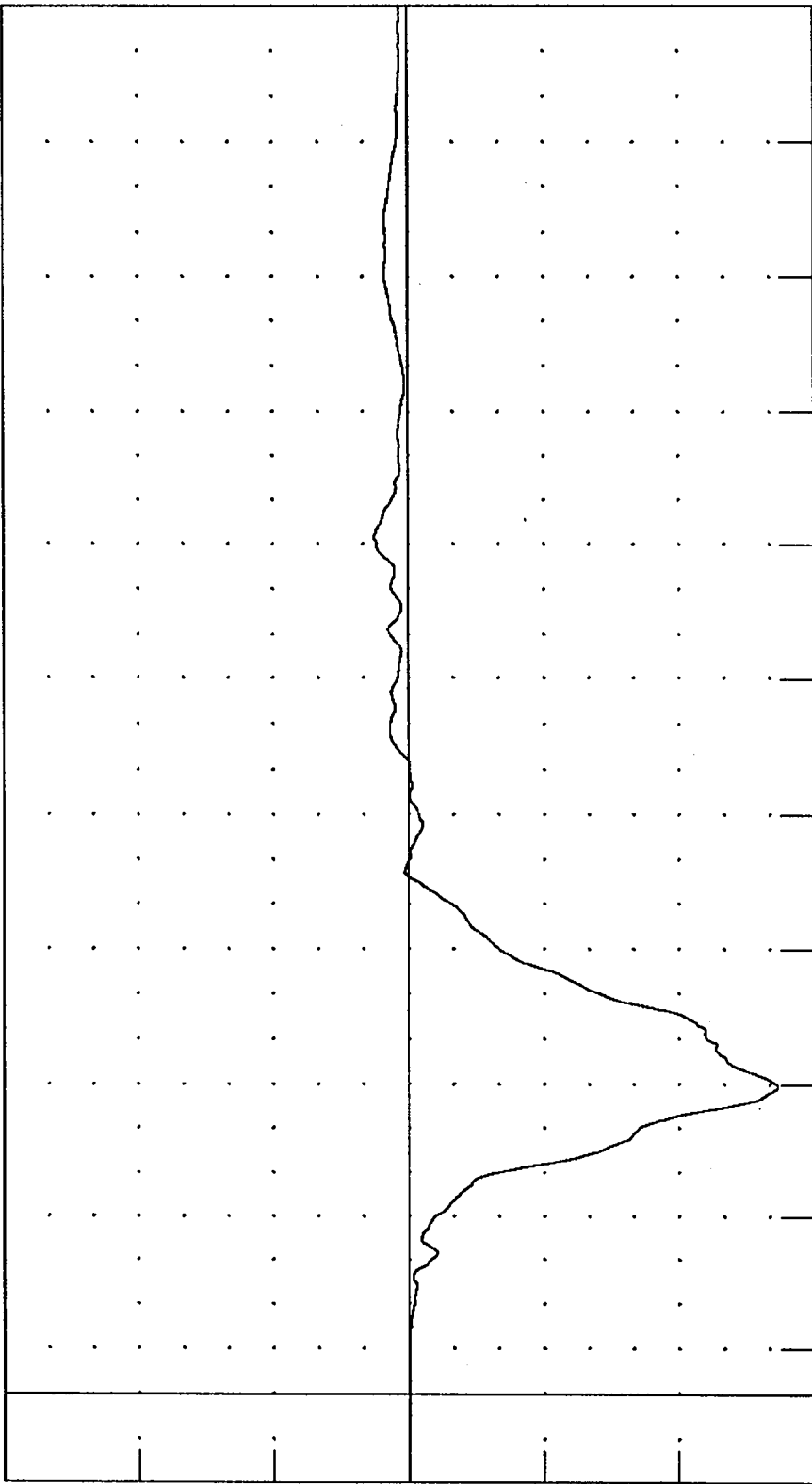
0

-20

-40

-60

ACCELERATION (G)



TIME (MS)

310

280

250

220

190

160

130

100

70

40

10

-20

-40

-60

60

40

20

0

-20

-40

-60

CHANNEL: CSTXG1 FILTER: CH. CLASS 180

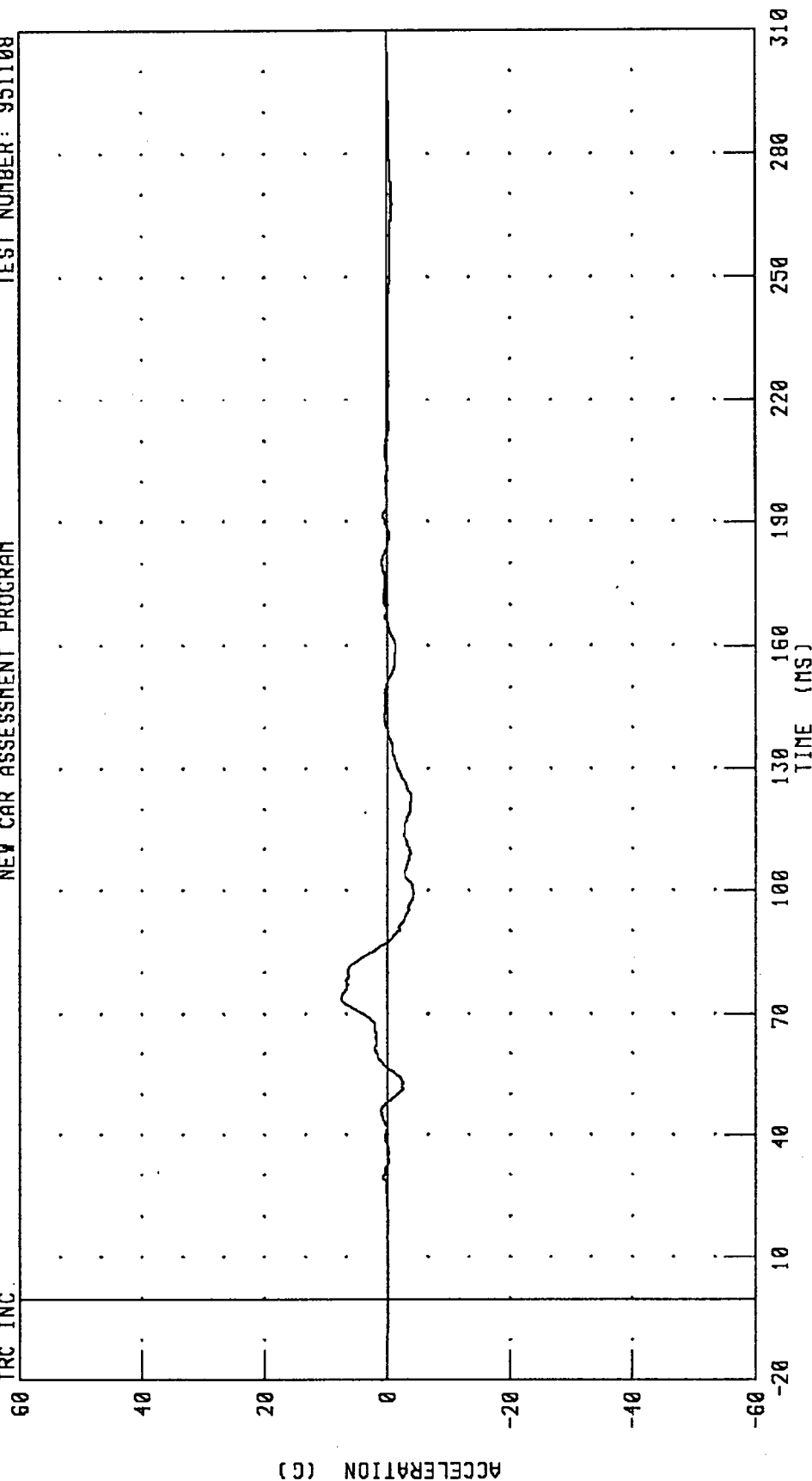
PEAK DATA: 5.06 G @ 191.60 MS; -54.52 G @ 69.60 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST Y-AXIS ACCELERATION

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



CHANNEL: CSTYG1 FILTER: CH. CLASS 180

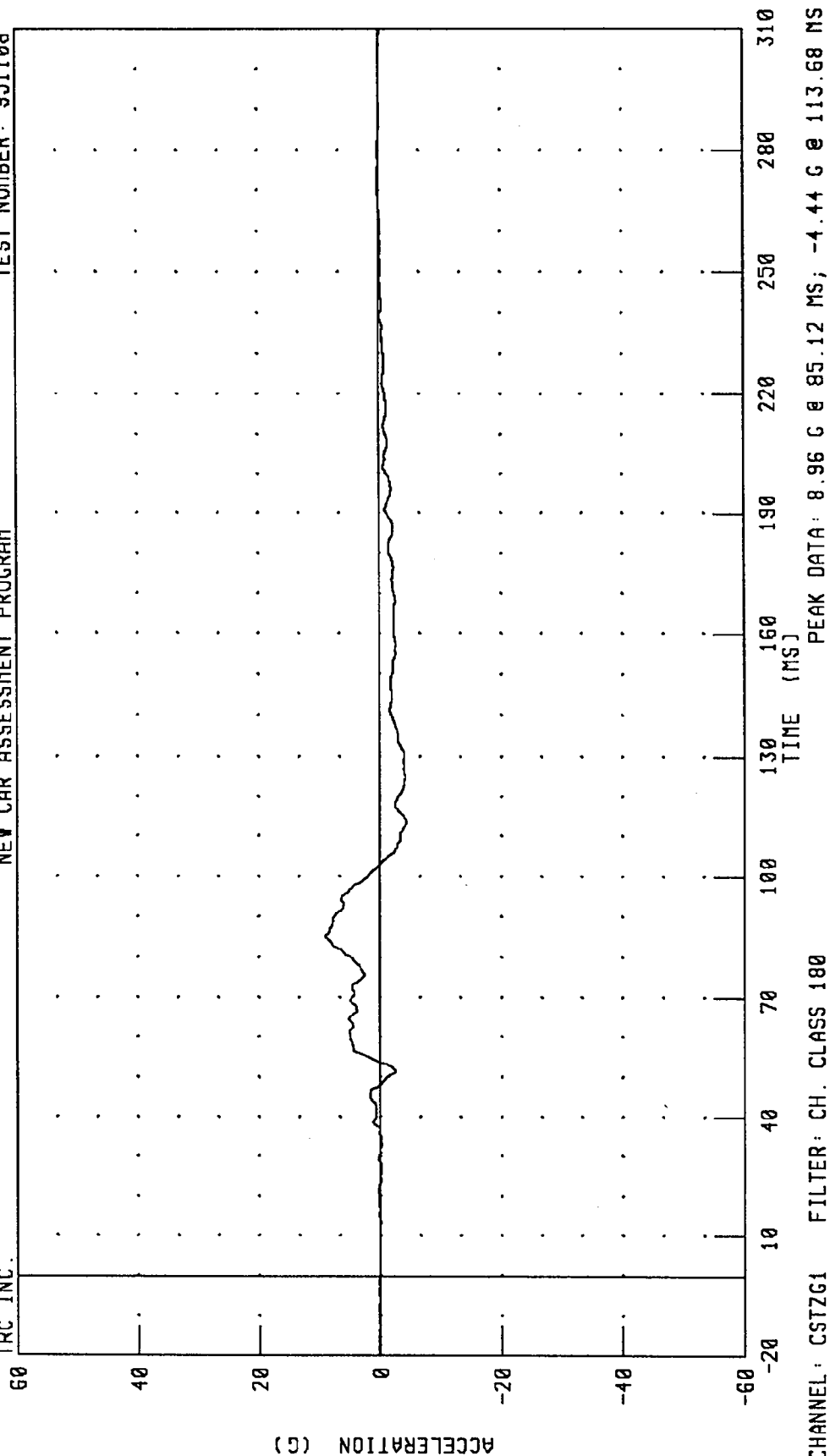
PEAK DATA: 7.49 G @ 73.60 MS; -4.31 G @ 99.28 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST Z-AXIS ACCELERATION

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



CHANNEL: CSTZG1 FILTER: CH. CLASS 180

PEAK DATA: 8.96 G @ 85.12 MS; -4.44 G @ 113.68 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST RESULTANT ACCELERATION

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.

120

100

80

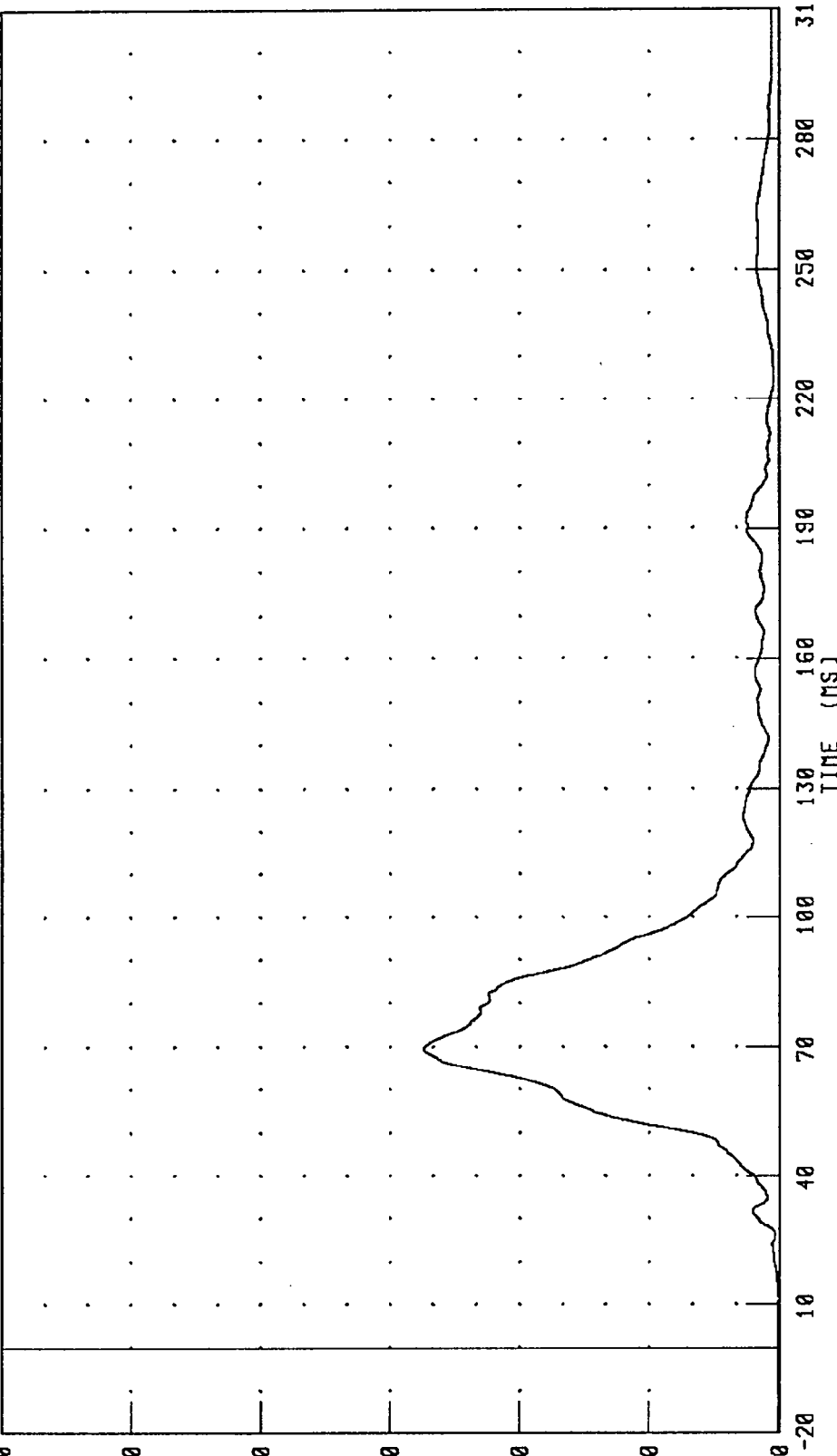
60

40

20

0

ACCELERATION (G)



CHANNEL: CSTRG1 FILTER: CH. CLASS 180

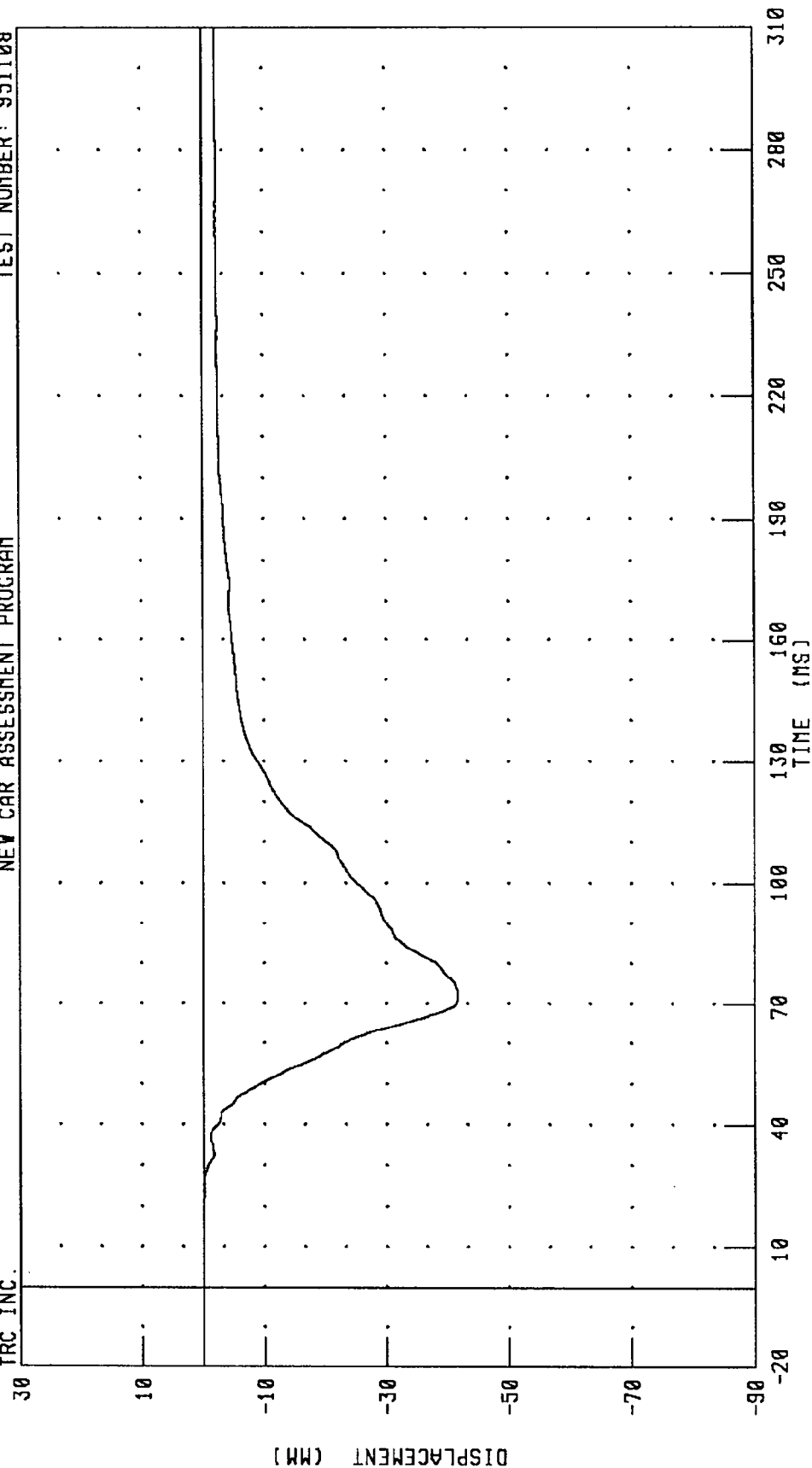
PEAK DATA: 54.83 G @ 69.60 MS; 0.01 G @ -20.00 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST DEFLECTION

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 0.01 MM @ -8.24 MS; -41.72 MM @ 72.24 MS

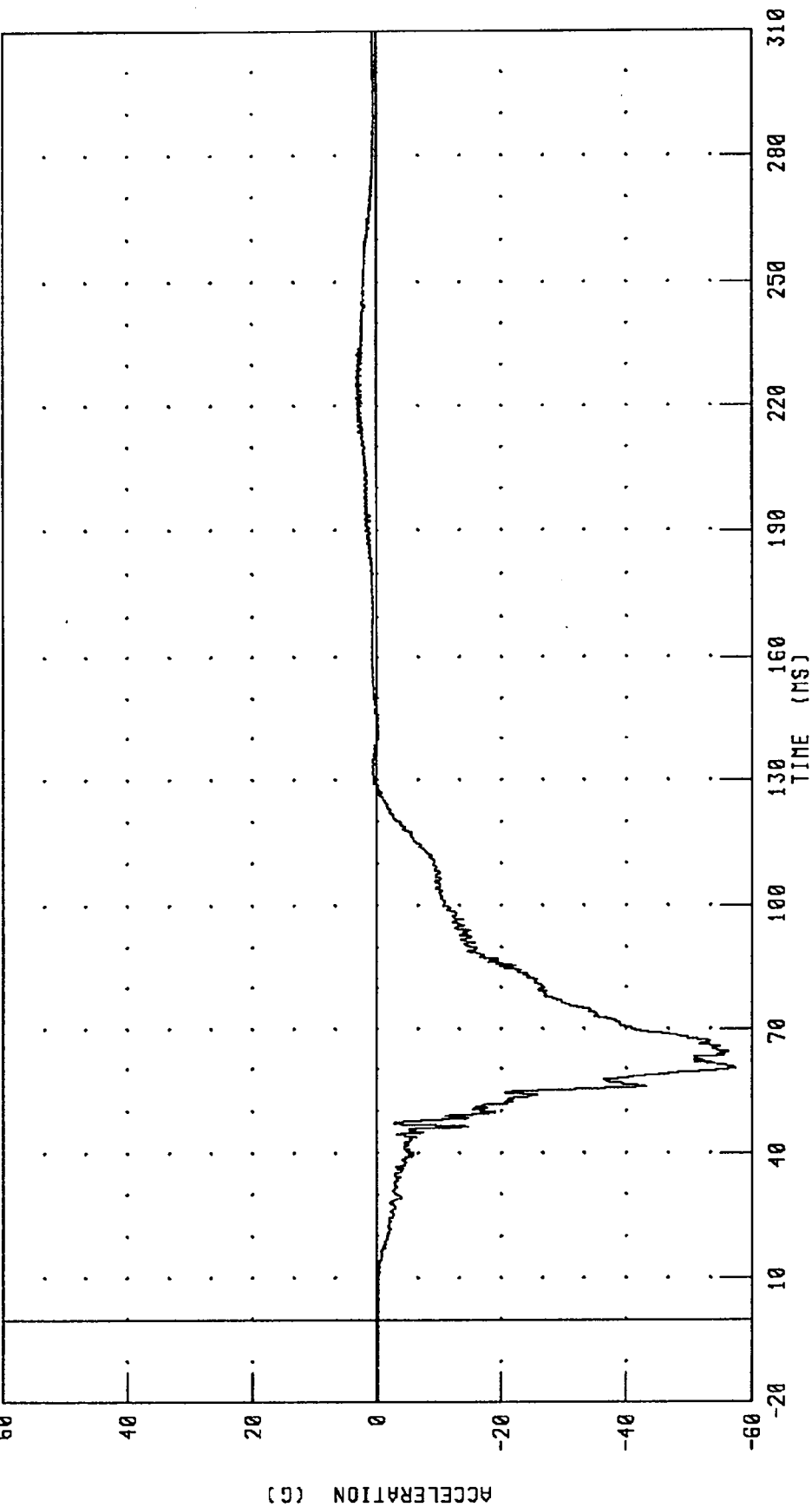
CHANNEL: CSTXD1 FILTER: CH. CLASS 180

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER PELVIS X-AXIS ACCELERATION

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



CHANNEL: PEVXG1 FILTER: CH. CLASS 1000

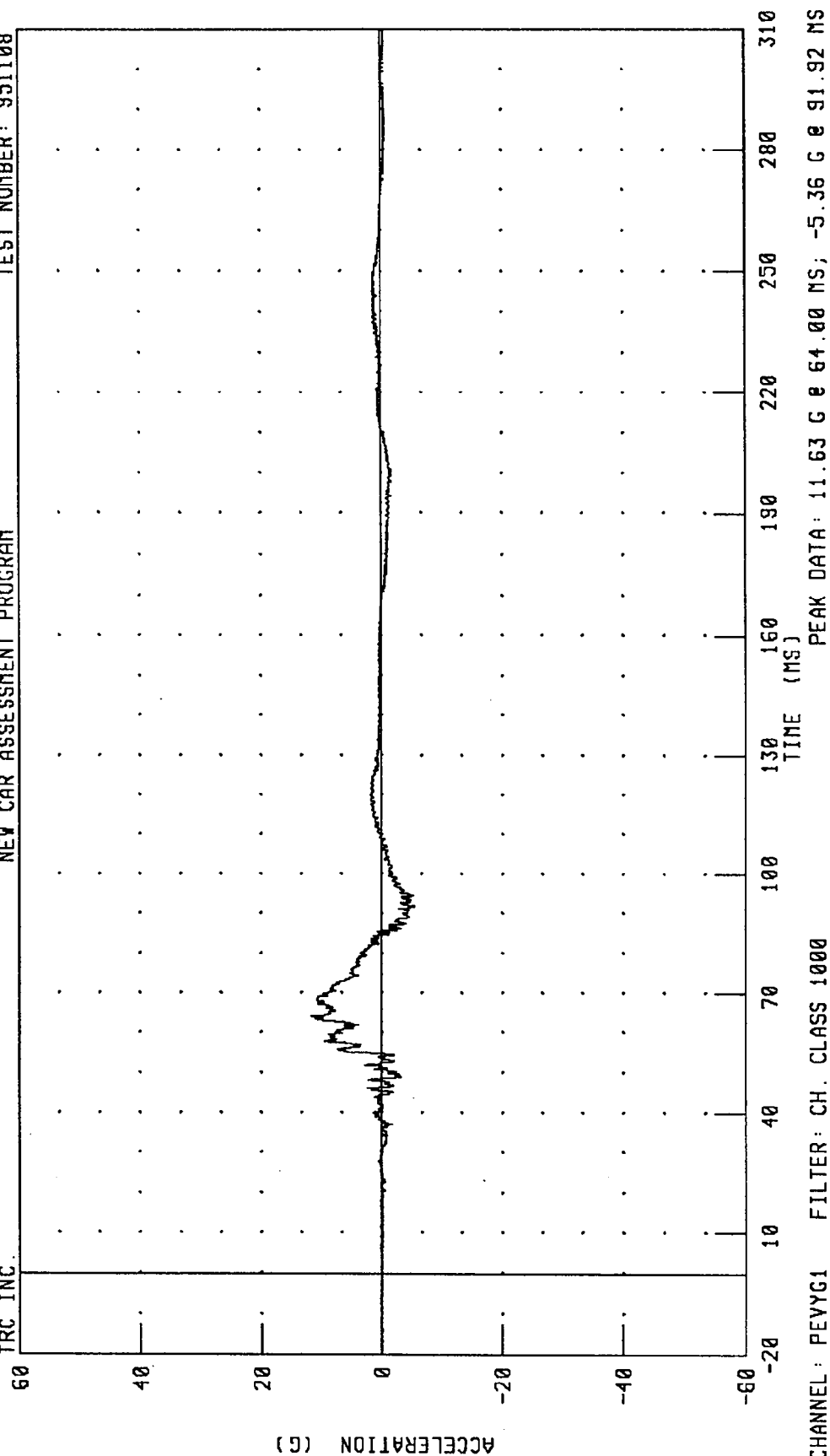
PEAK DATA: 3.21 G @ 222.00 MS; -57.45 G @ 60.08 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER PELVIS Y-AXIS ACCELERATION

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



CHANNEL: PEVYG1 FILTER: CH. CLASS 1000 PEAK DATA: 11.63 G @ 64.00 MS; -5.36 G @ 91.92 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER PELVIS Z-AXIS ACCELERATION
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

TRC INC.

60

40

20

ACCELERATION (G)

-20

-40

-60

310

280

250

220

190

160

130

100

70

40

10

-20

TIME (MS)

CHANNEL: PEVZG1 FILTER: CH. CLASS 1000

PEAK DATA: 23.96 G @ 73.76 MS; -5.77 G @ 123.60 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
DRIVER PELVIS RESULTANT ACCELERATION

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

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

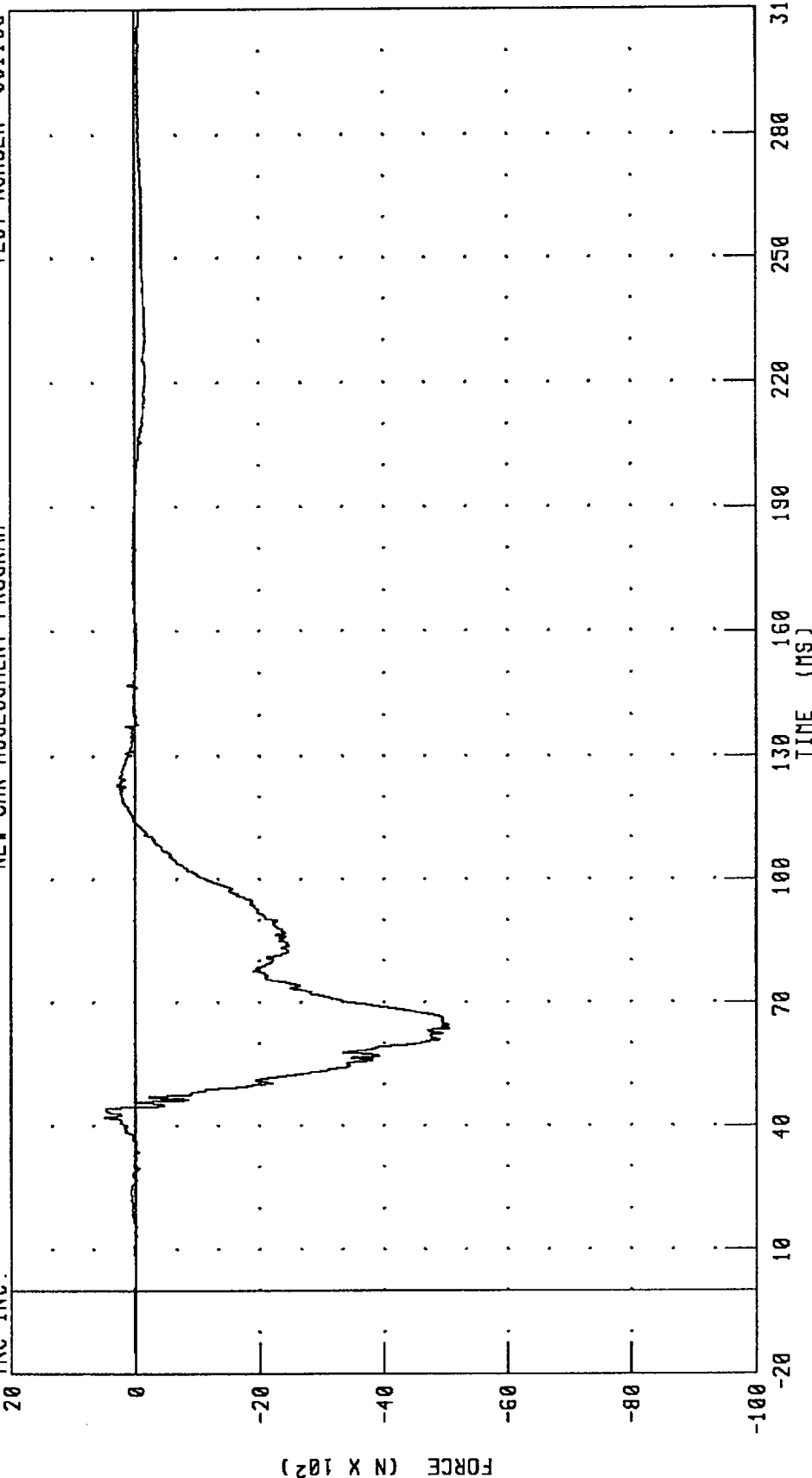
CHANNEL: PEVRG1 FILTER: CH. CLASS 1000

PEAK DATA: 61.03 G @ 63.92 MS; 0.10 G @ 7.76 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER LEFT FEMUR FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

TRC INC.



PEAK DATA: 483.32 N @ 42.08 MS; -5054.35 N @ 63.84 MS

CHANNEL: LFMF1 FILTER: CH. CLASS 600

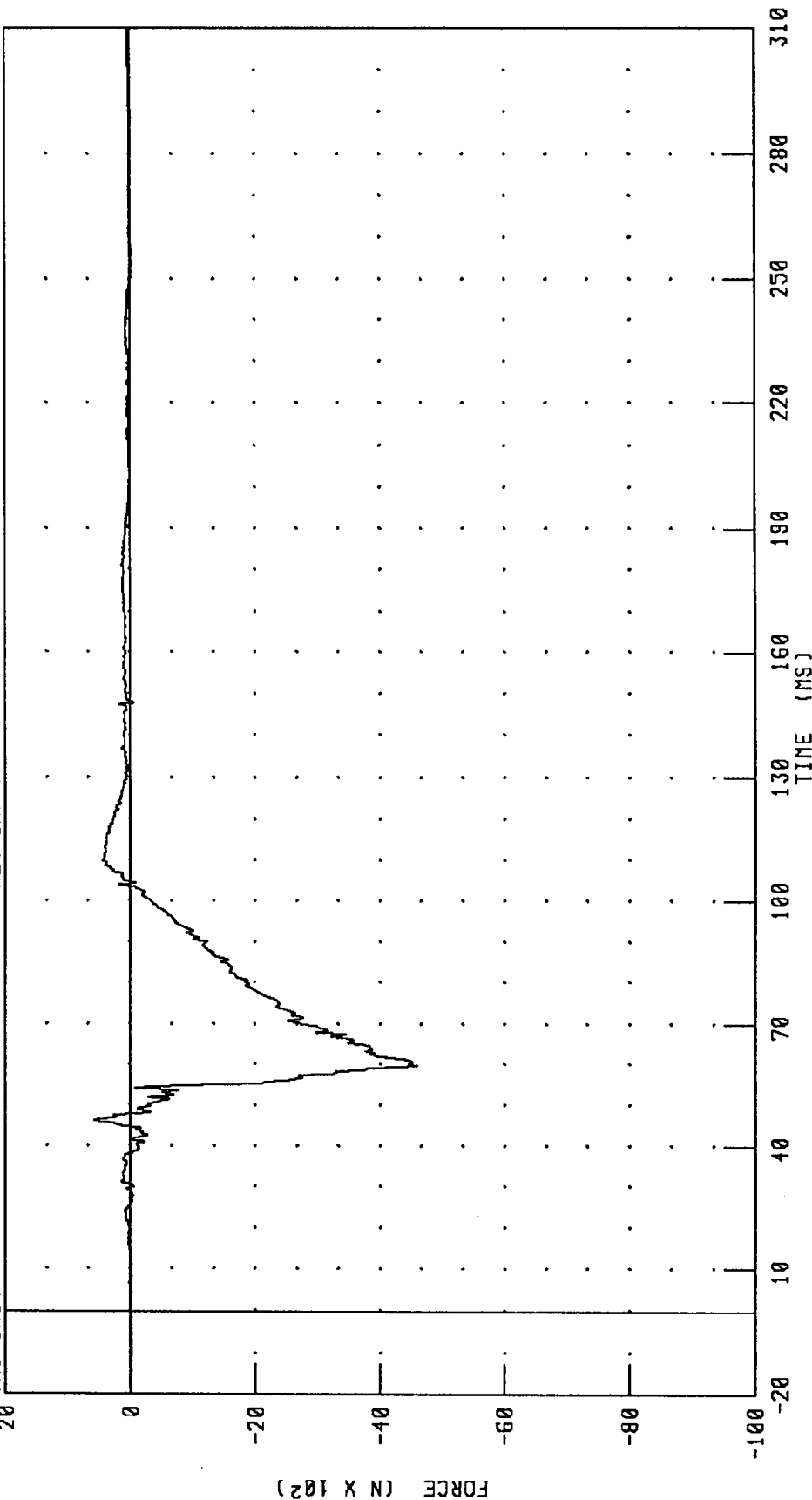
1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER

DRIVER RIGHT FEMUR FORCE

NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

TRC INC.



CHANNEL: RFMFI FILTER: CH. CLASS 600

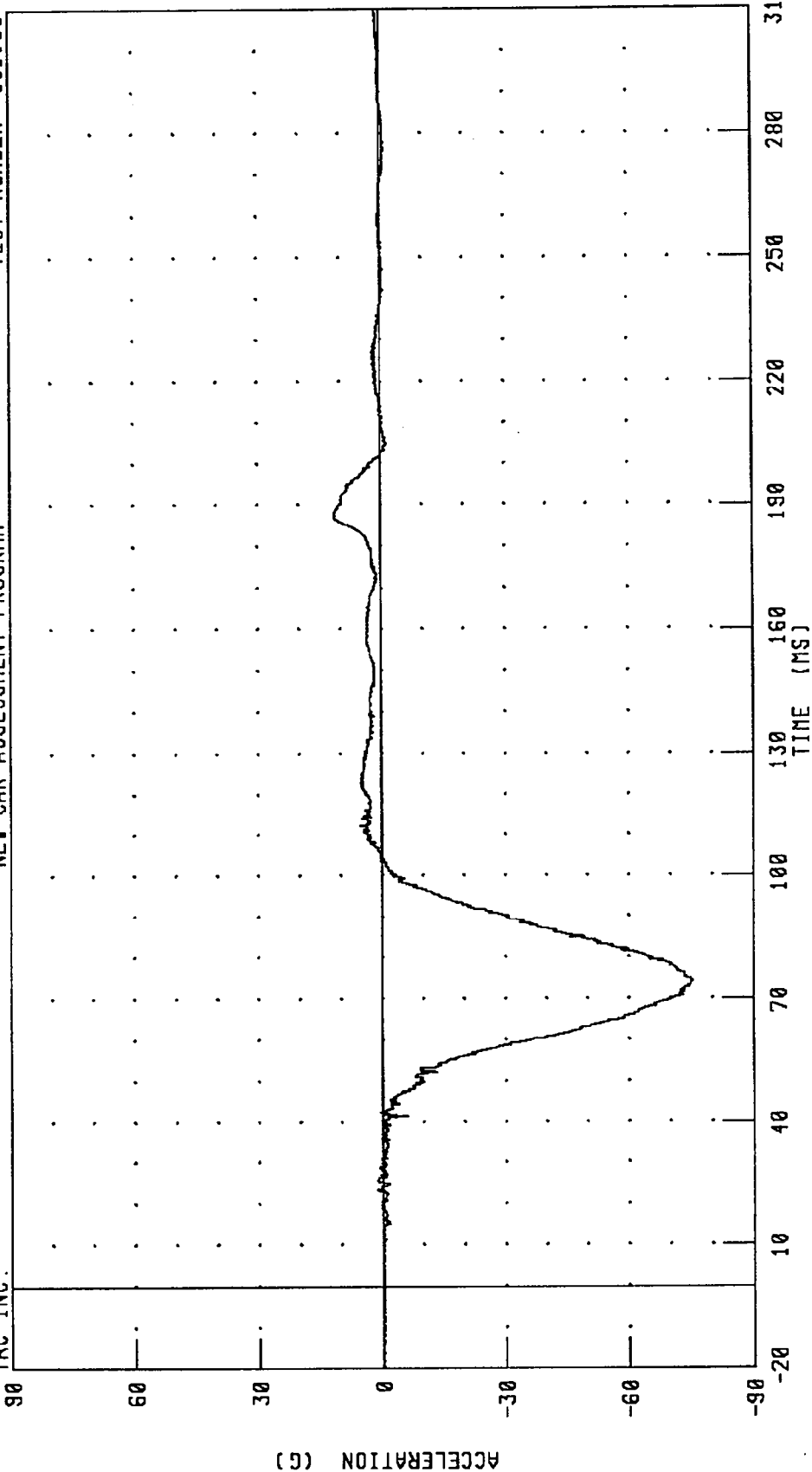
PEAK DATA: 571.42 N @ 46.32 MS; -4596.08 N @ 59.68 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
DRIVER HEAD X-AXIS ACCELERATION - REDUNDANT

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



CHANNEL: HEDXR1 FILTER: CH. CLASS 1000

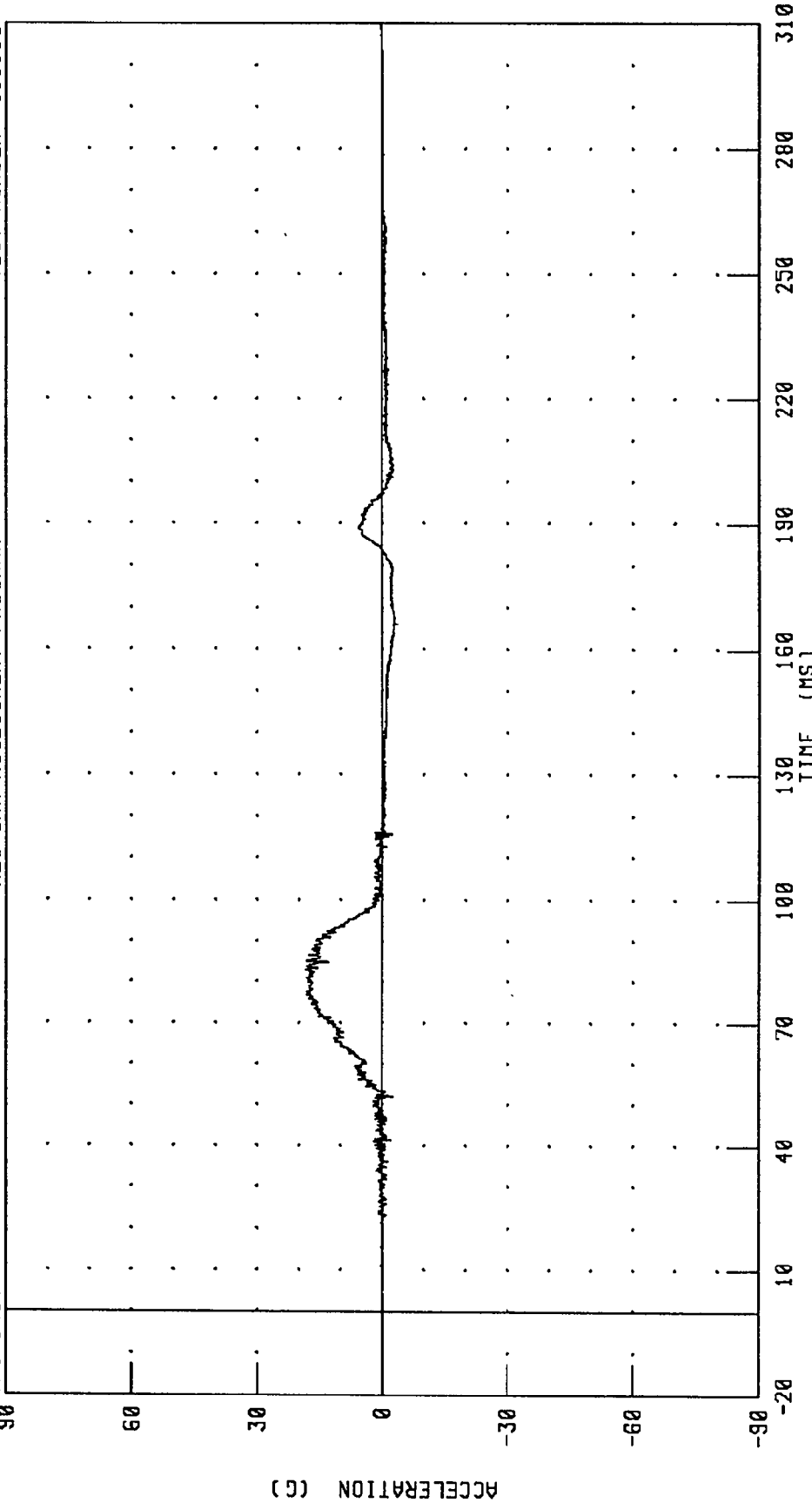
PEAK DATA: 11.48 G @ 187.04 MS; -75.43 G @ 74.08 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER HEAD Y-AXIS ACCELERATION - REDUNDANT

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



CHANNEL: HEDYR1 FILTER: CH. CLASS 1000

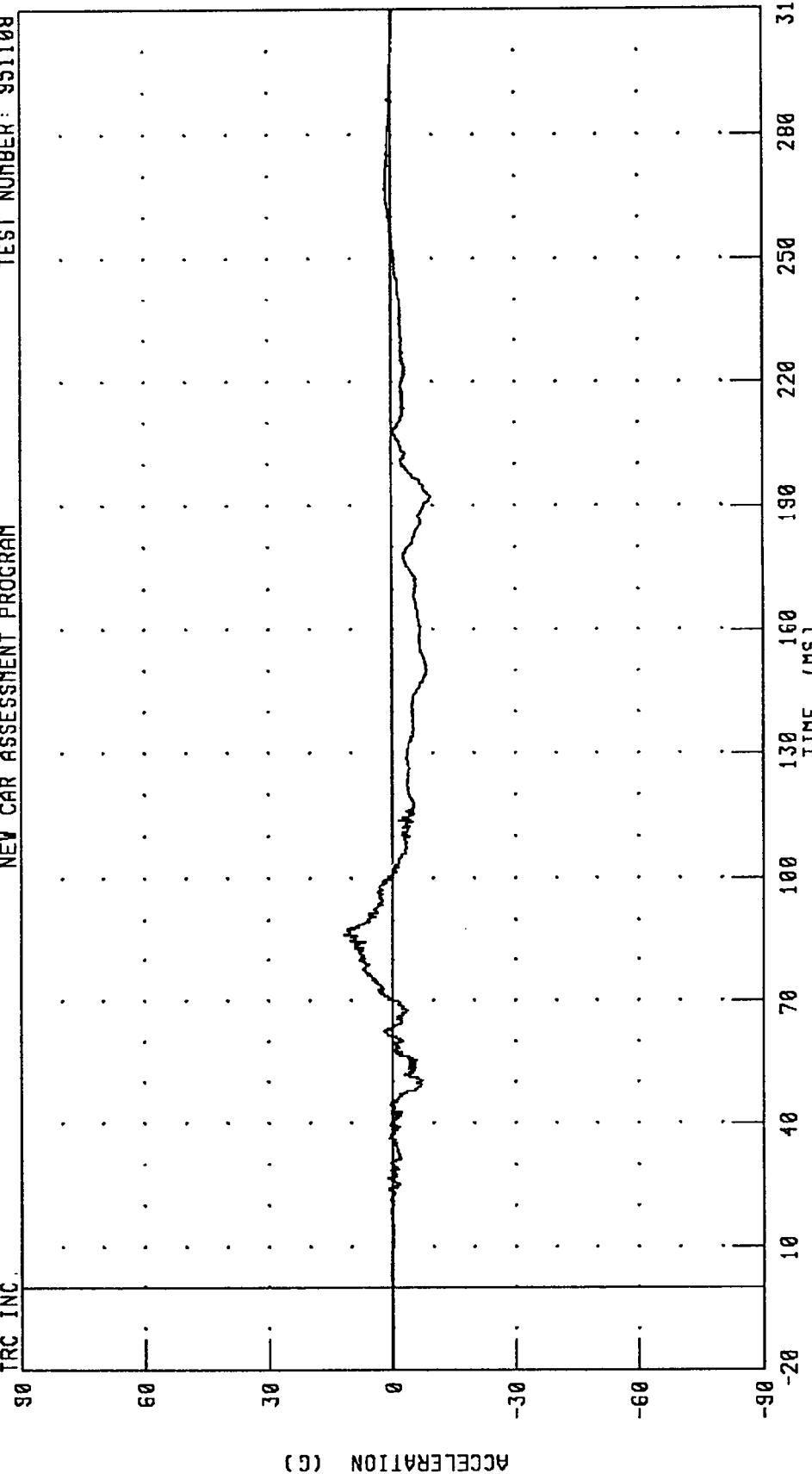
PEAK DATA: 18.41 G @ 82.88 MS; -3.66 G @ 166.24 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER HEAD Z-AXIS ACCELERATION - REDUNDANT

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 11.64 G @ 86.64 MS; -9.68 G @ 192.08 MS

CHANNEL: HEDZR1 FILTER: CH. CLASS 1000

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
DRIVER HEAD RESULTANT ACCELERATION - REDUNDANT

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.

120

100

80

60

40

20

0

ACCELERATION (G)

TIME (MS)

310

280

250

220

190

160

130

100

70

40

10

CHANNEL: HEDRR1 FILTER: CH. CLASS 1000

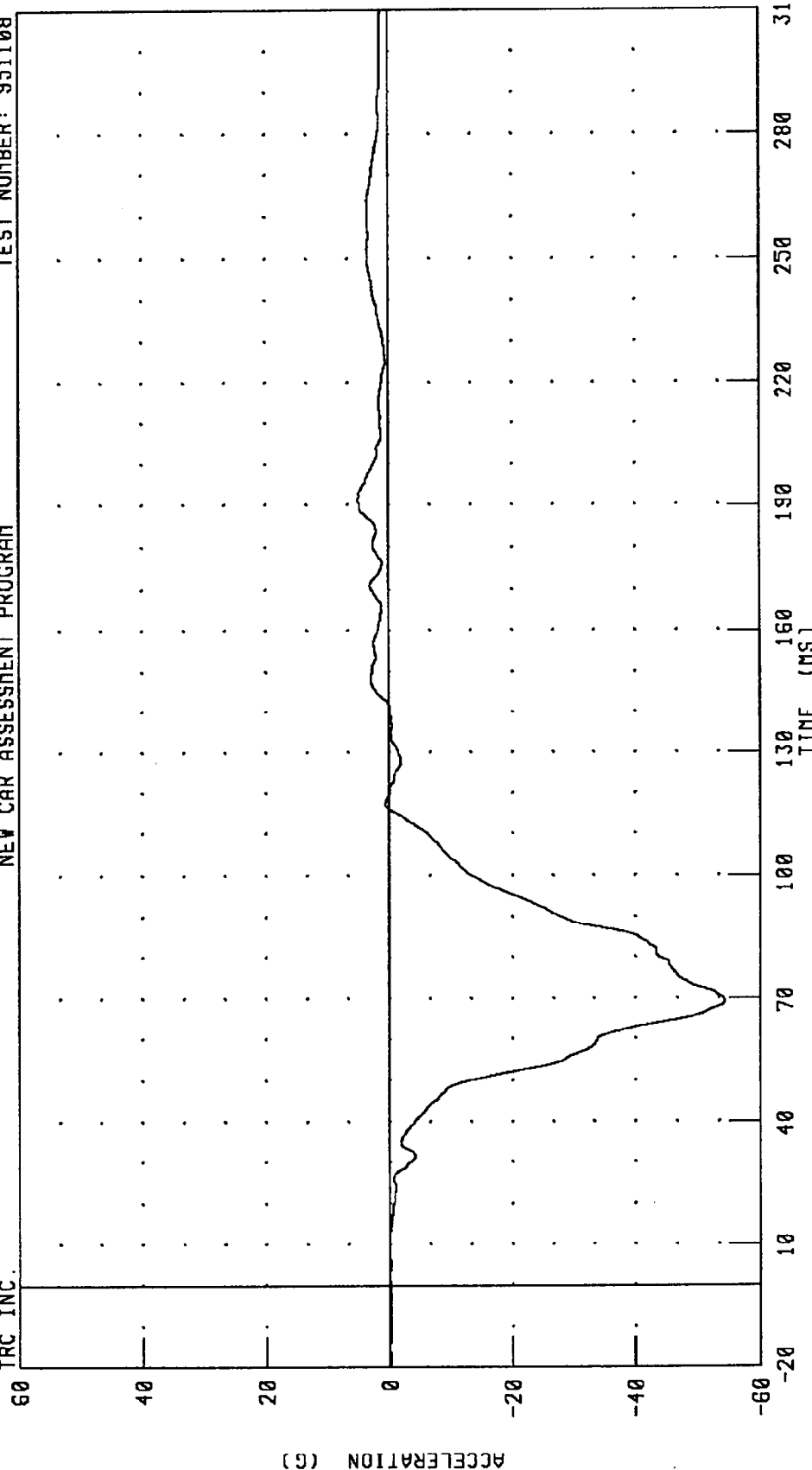
PEAK DATA: 77.11 G @ 74.16 MS; 0.07 G @ -5.12 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST X-AXIS ACCELERATION - REDUNDANT

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 5.07 G @ 191.28 MS; -54.33 G @ 69.12 MS

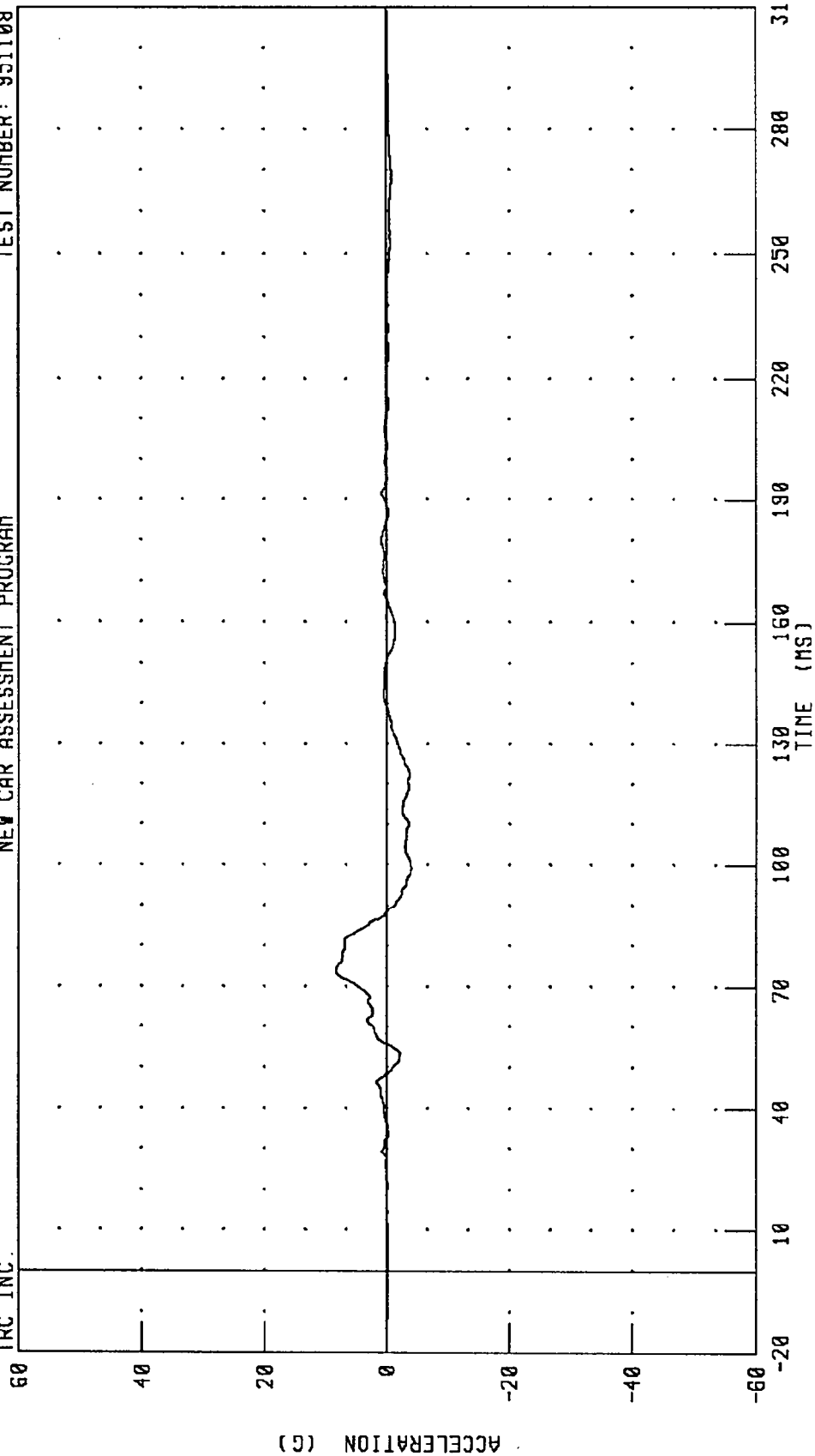
CHANNEL: CSTXR1 FILTER: CH. CLASS 180

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST Y-AXIS ACCELERATION - REDUNDANT

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



CHANNEL: CSTYR1 FILTER: CH. CLASS 180

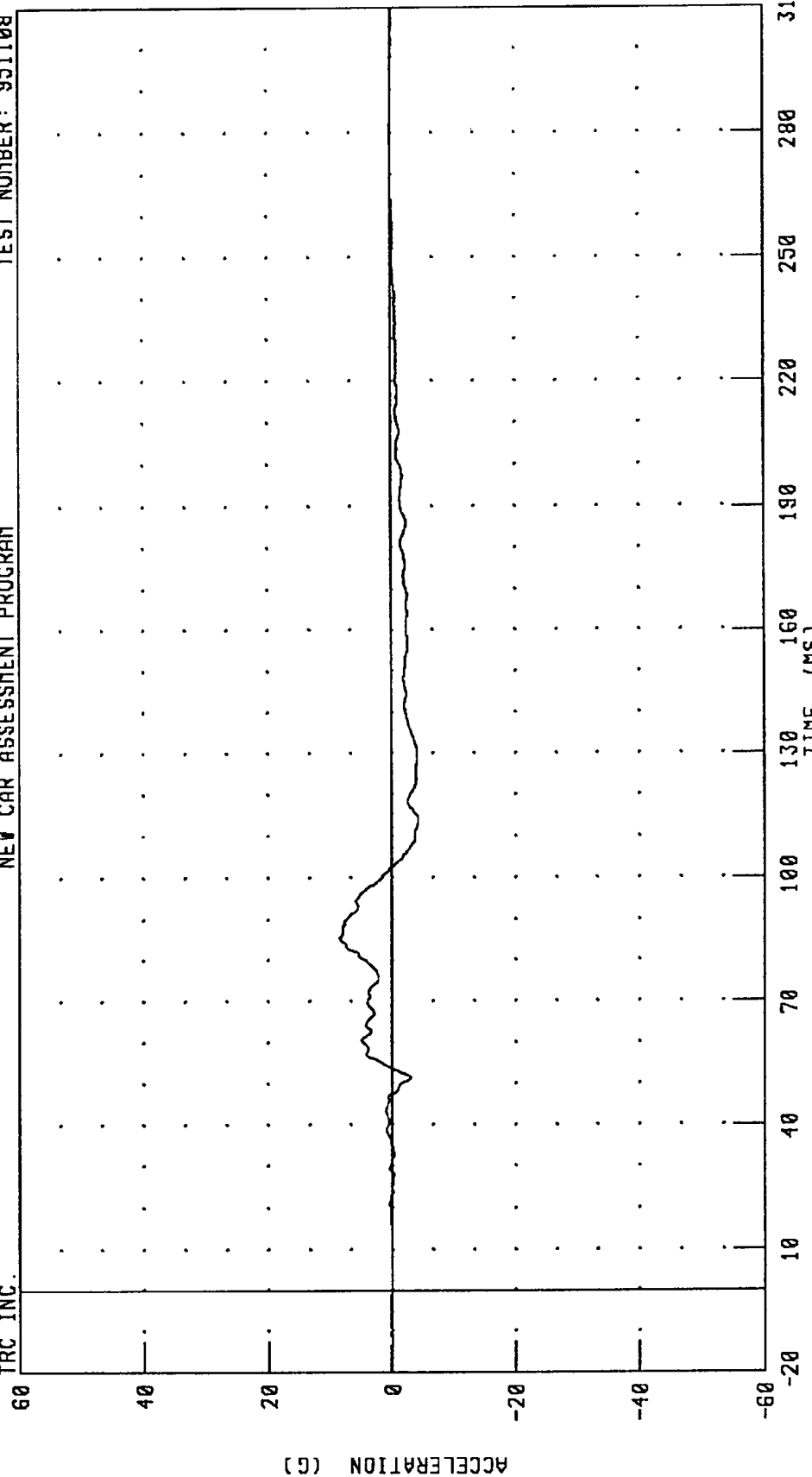
PEAK DATA: 8.33 G @ 73.68 MS; -3.98 G @ 99.28 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER CHEST Z-AXIS ACCELERATION - REDUNDANT

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 8.39 G @ 85.60 MS; -4.26 G @ 113.76 MS

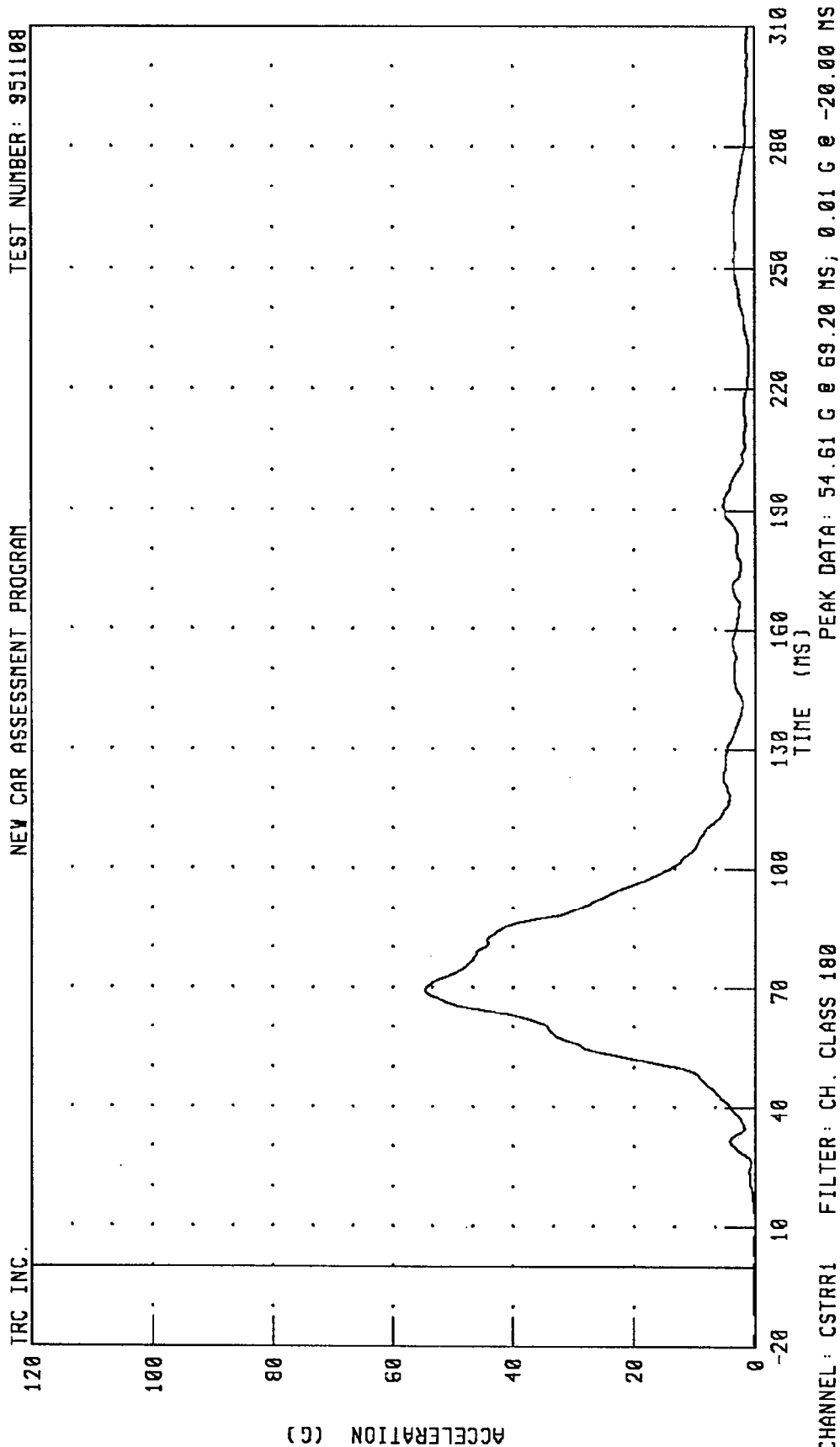
CHANNEL: CSTZR1 FILTER: CH. CLASS 180

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER CHEST RESULTANT ACCELERATION - REDUNDANT

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



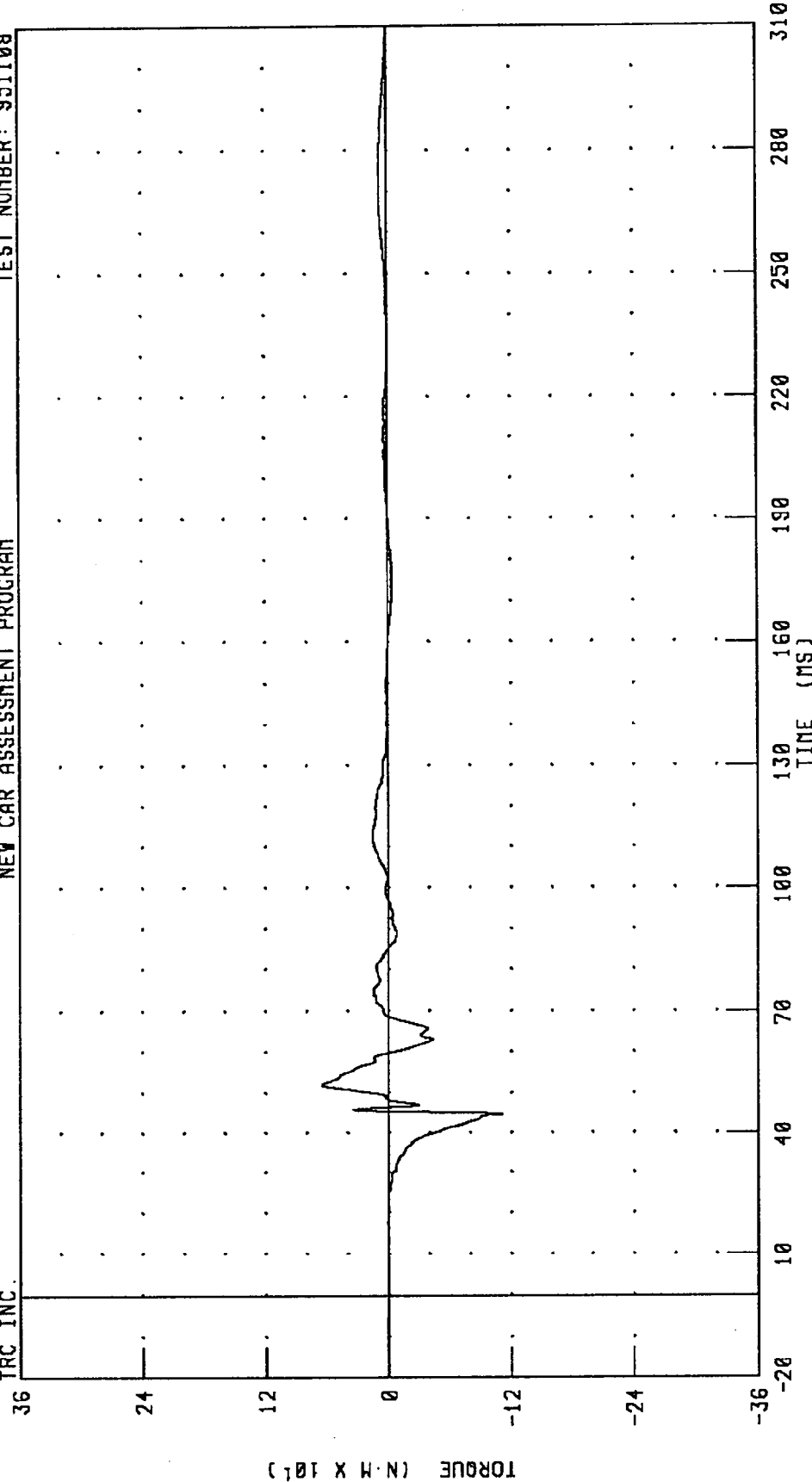
CHANNEL: CSTRR1 FILTER: CH. CLASS 180

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
DRIVER LEFT UPPER TIBIA MOMENT ABOUT X AXIS

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 65.18 N-M @ 51.92 MS; -110.28 N-M @ 44.72 MS

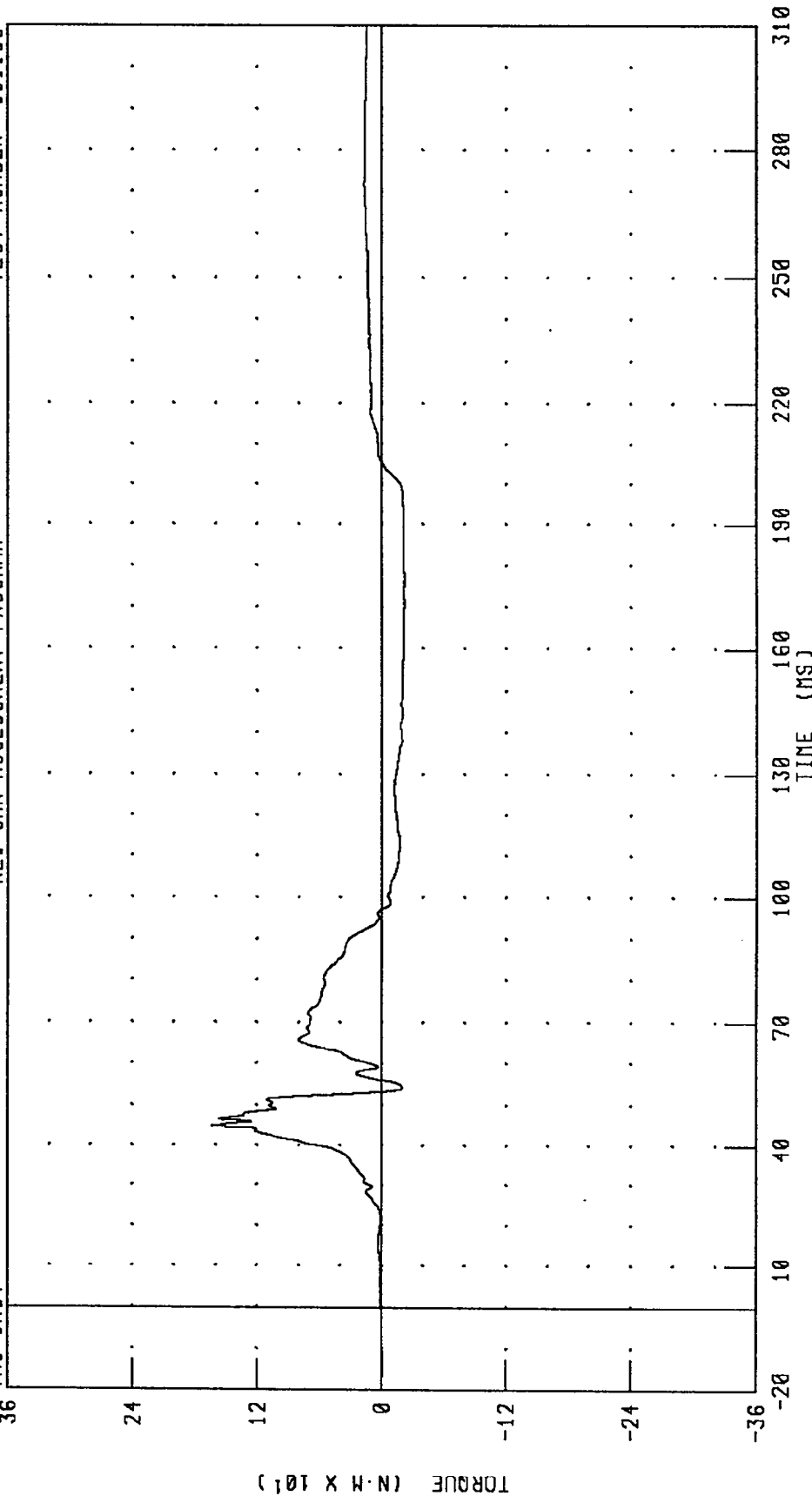
CHANNEL: TBLXM1 FILTER: CH. CLASS 600

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
DRIVER LEFT UPPER TIBIA MOMENT ABOUT Y AXIS

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

IRC INC.



CHANNEL: TBLYM1 FILTER: CH. CLASS 600

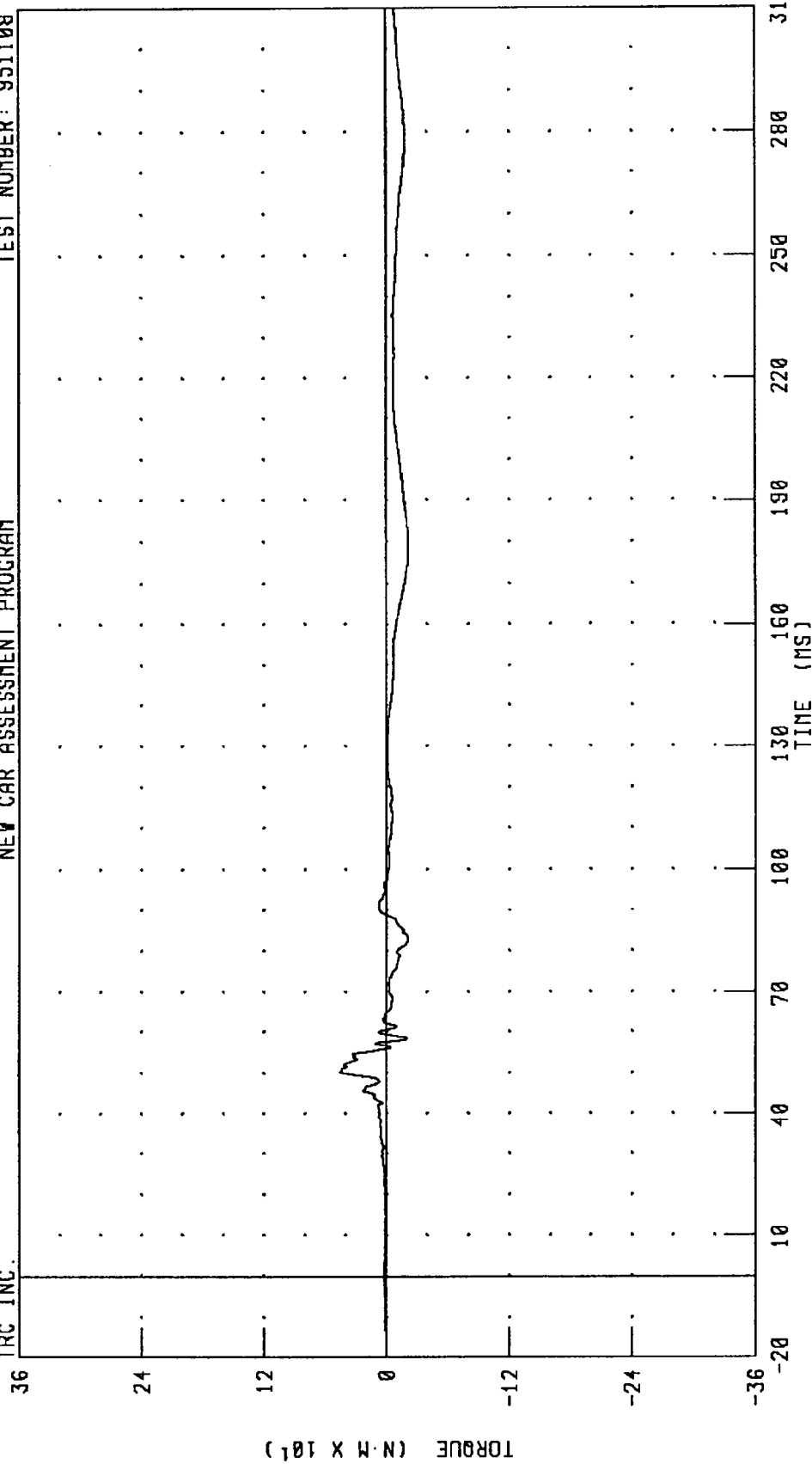
PEAK DATA: 163.23 N·m @ 44.96 MS; -22.02 N·m @ 171.44 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER RIGHT UPPER TIBIA MOMENT ABOUT X AXIS

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



CHANNEL: TBRXM1 FILTER: CH. CLASS 600

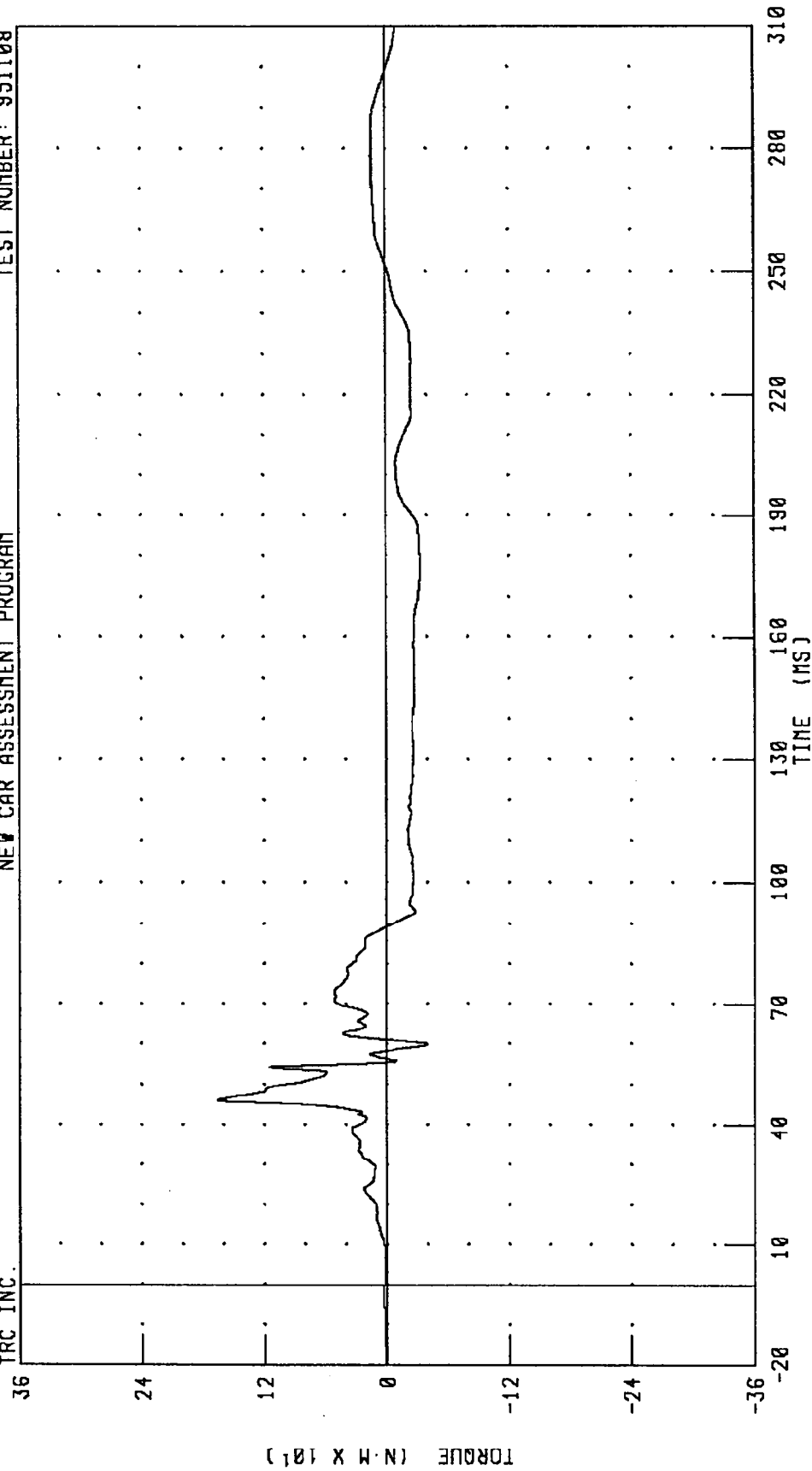
PEAK DATA: 45.41 N-M @ 50.24 MS; -21.70 N-M @ 180.40 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER RIGHT UPPER TIBIA MOMENT ABOUT Y AXIS

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



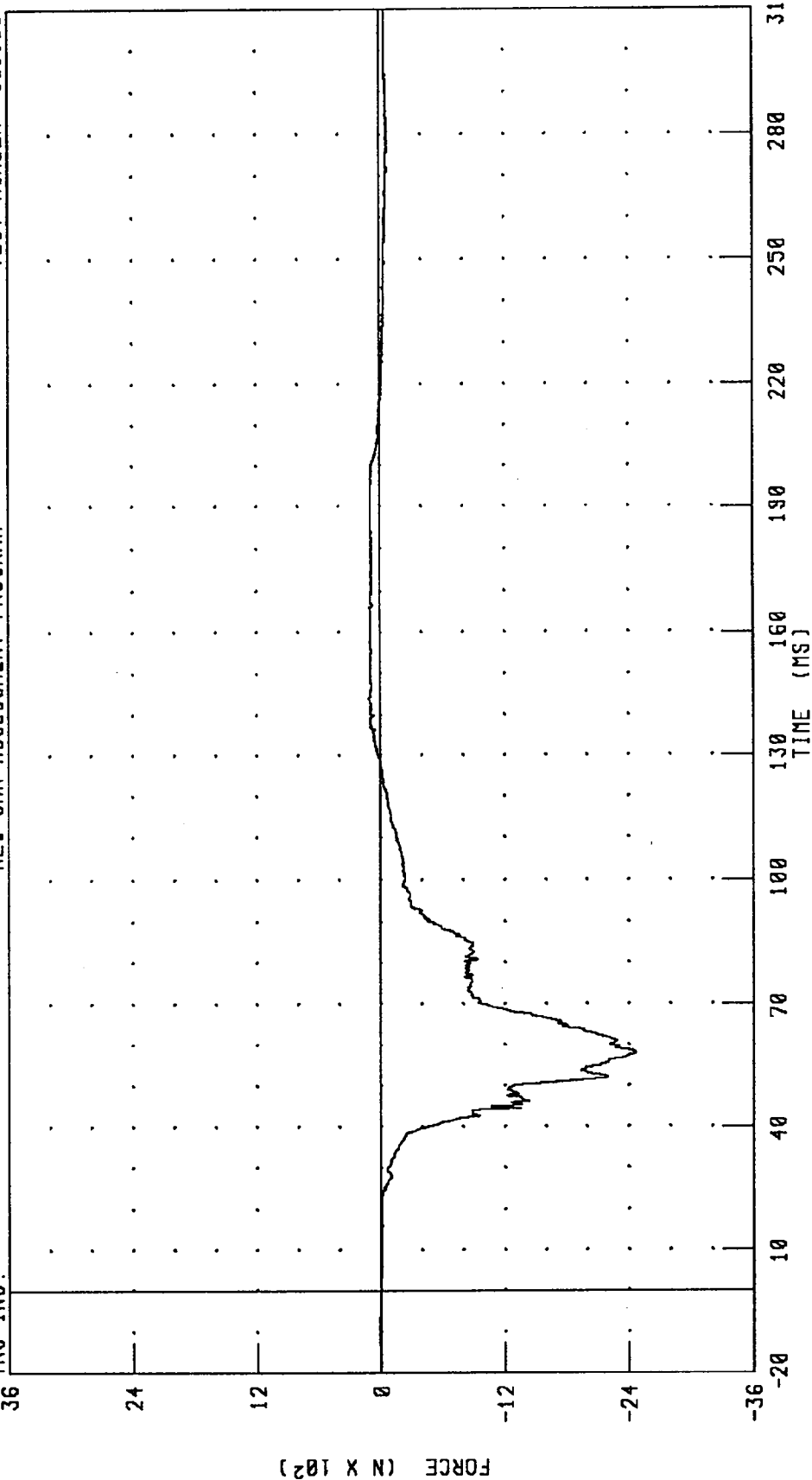
CHANNEL: TBRYM1 FILTER: CH. CLASS 600

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
DRIVER LEFT LOWER TIBIA X-AXIS FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



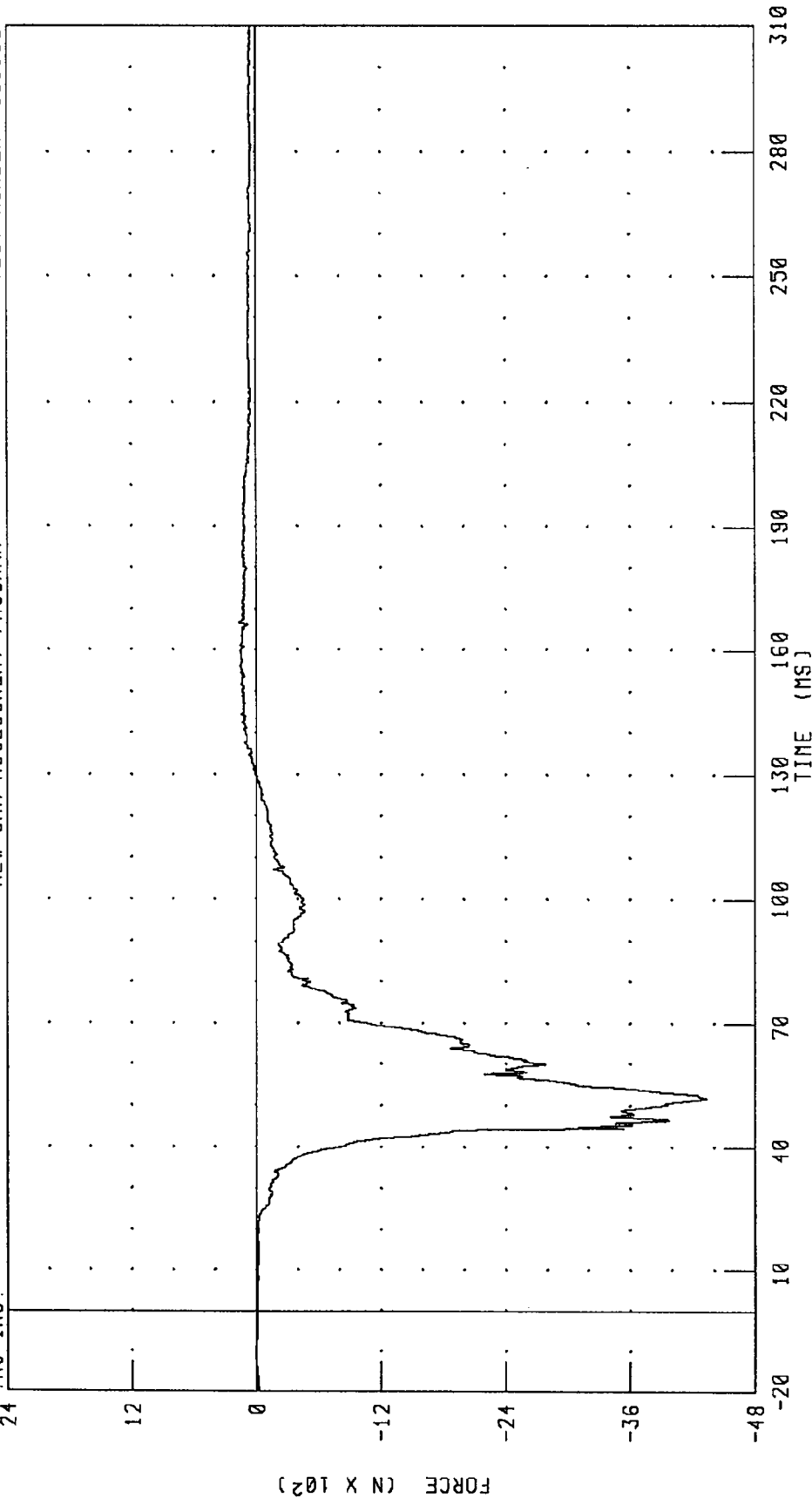
PEAK DATA: 114.33 N @ 144.08 MS; -2467.69 N @ 57.92 MS

CHANNEL: ANLXF1 FILTER: CH. CLASS 600

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER LEFT LOWER TIBIA Z-AXIS FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

TRC INC.



PEAK DATA: 162.61 N @ 166.80 MS; -4329.78 N @ 51.76 MS

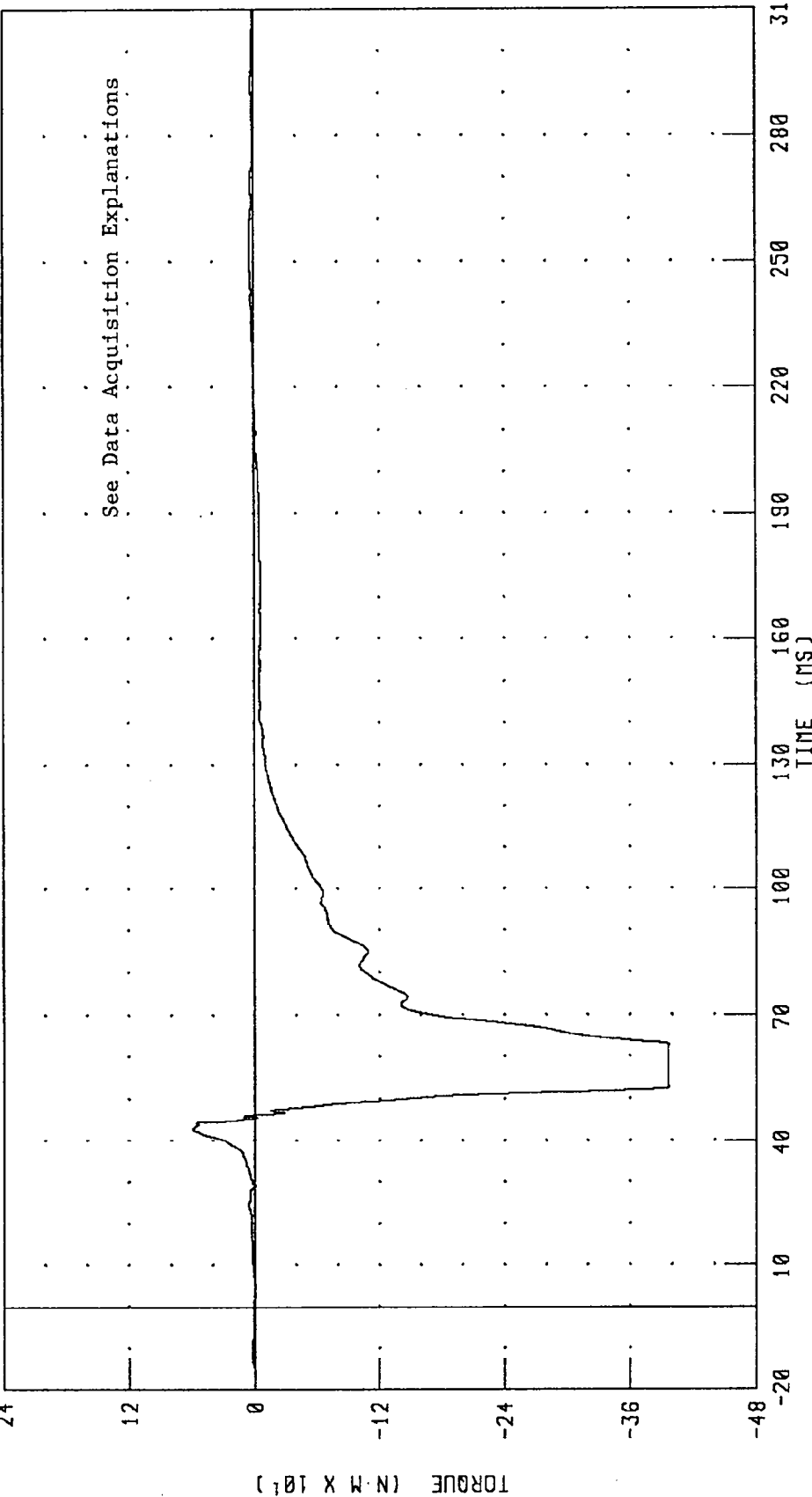
CHANNEL: ANLZF1 FILTER: CH. CLASS 600

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
DRIVER LEFT LOWER TIBIA MOMENT ABOUT Y AXIS

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 59.62 N-M @ 42.80 MS; -397.68 N-M @ 52.72 MS

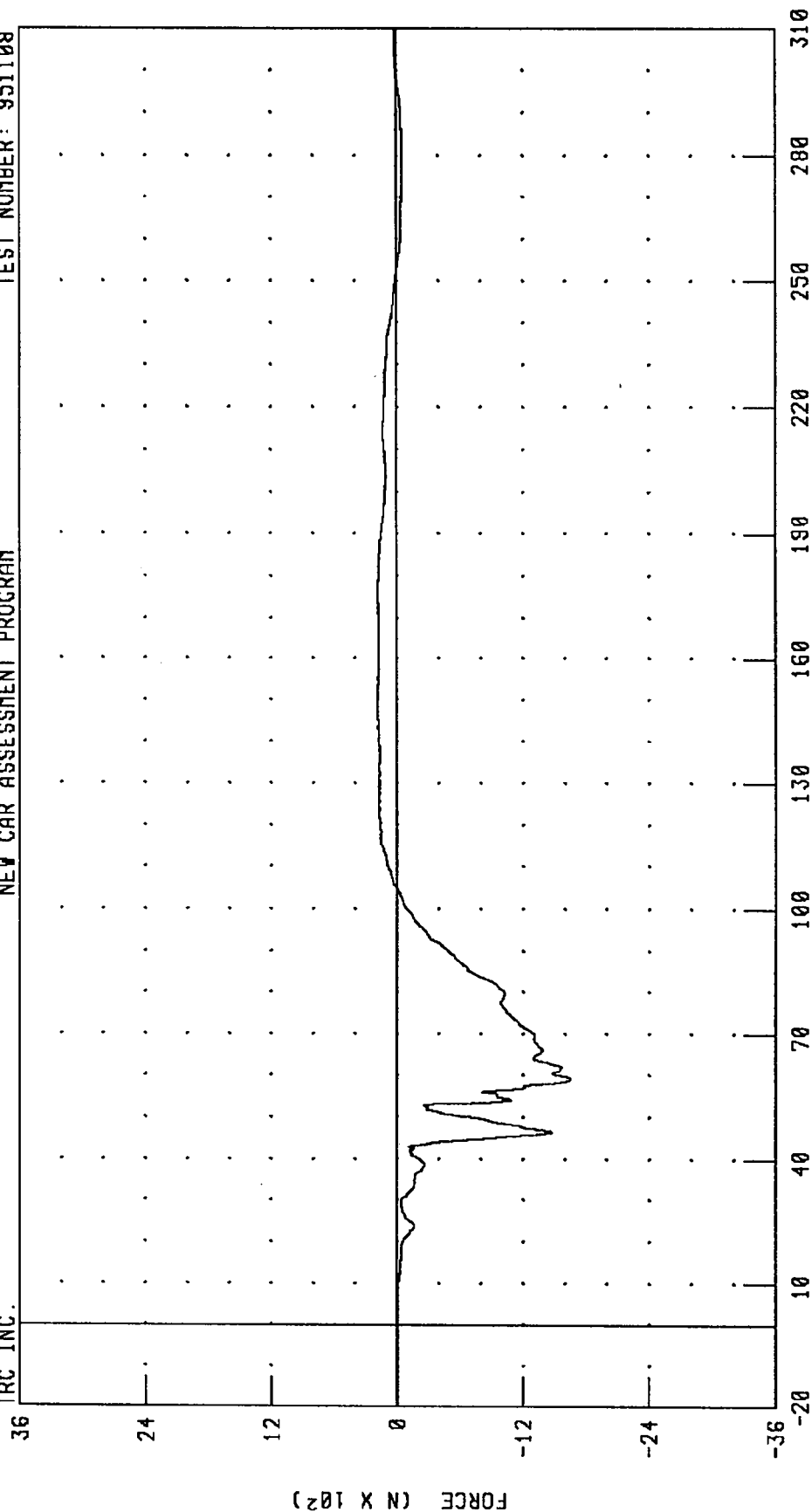
CHANNEL: ANLYM1 FILTER: CH. CLASS 600

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
DRIVER RIGHT LOWER TIBIA X-AXIS FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



CHANNEL: ANRXF1 FILTER: CH. CLASS 600

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER RIGHT LOWER TIBIA Z-AXIS FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.

36

24

12

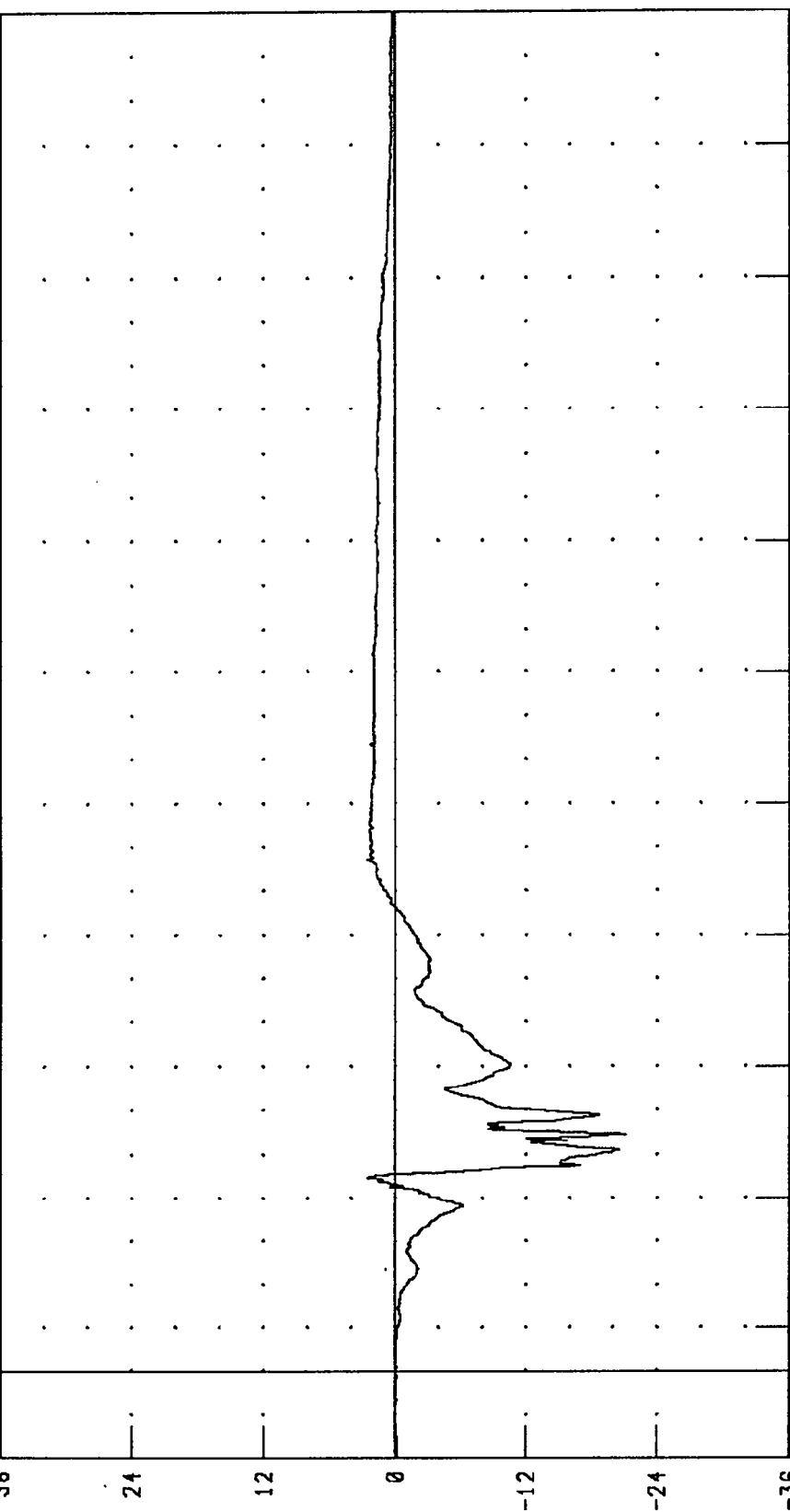
0

-12

-24

-36

FORCE (N X 10²)



310

280

250

220

190

160

130

100

70

40

10

-20

-36

TIME (MS)

PEAK DATA: 253.46 N @ 44.80 MS; -2109.93 N @ 54.56 MS

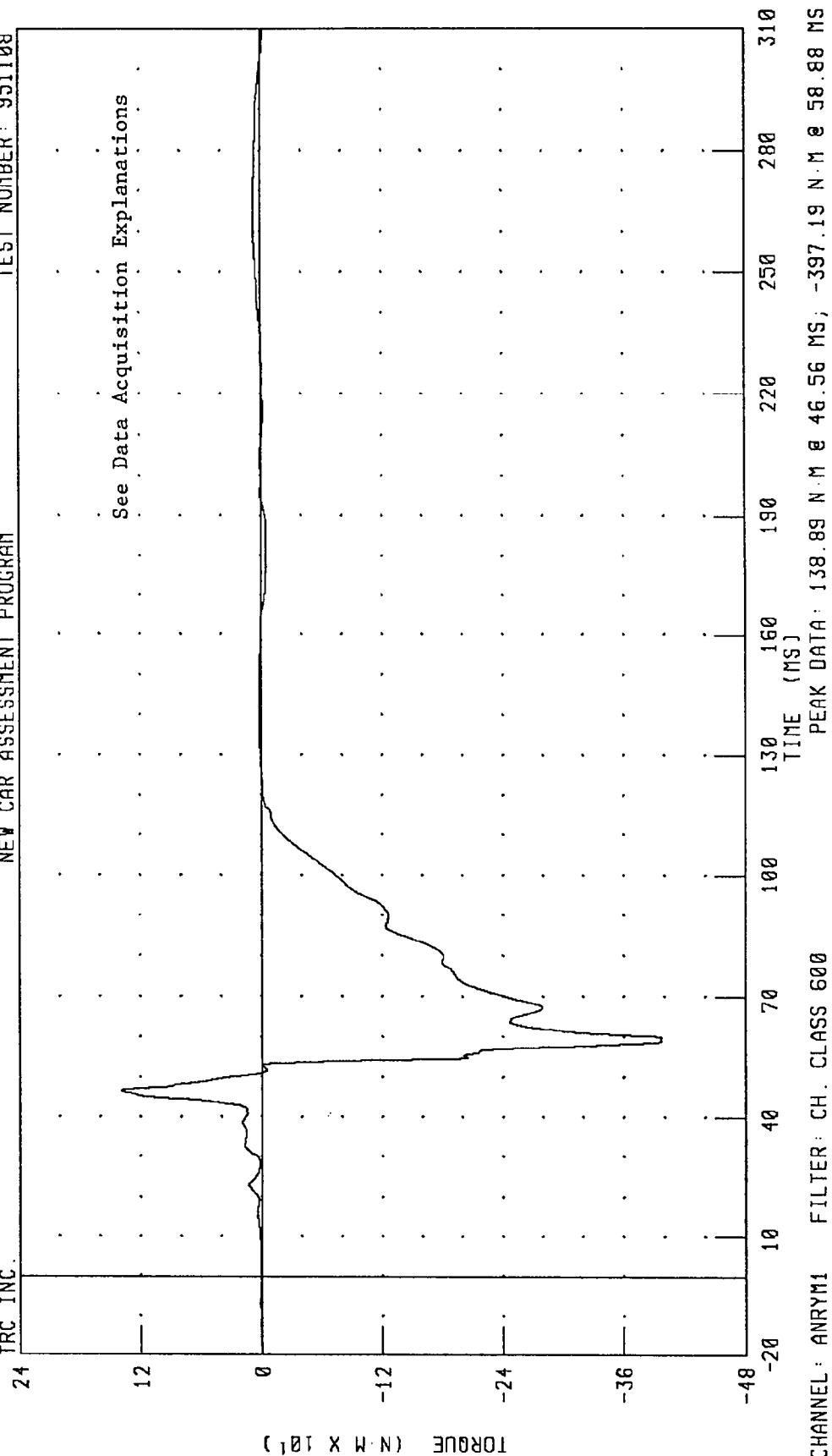
CHANNEL: ANRZF1 FILTER: CH. CLASS 600

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
DRIVER RIGHT LOWER TIBIA MOMENT ABOUT Y AXIS

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



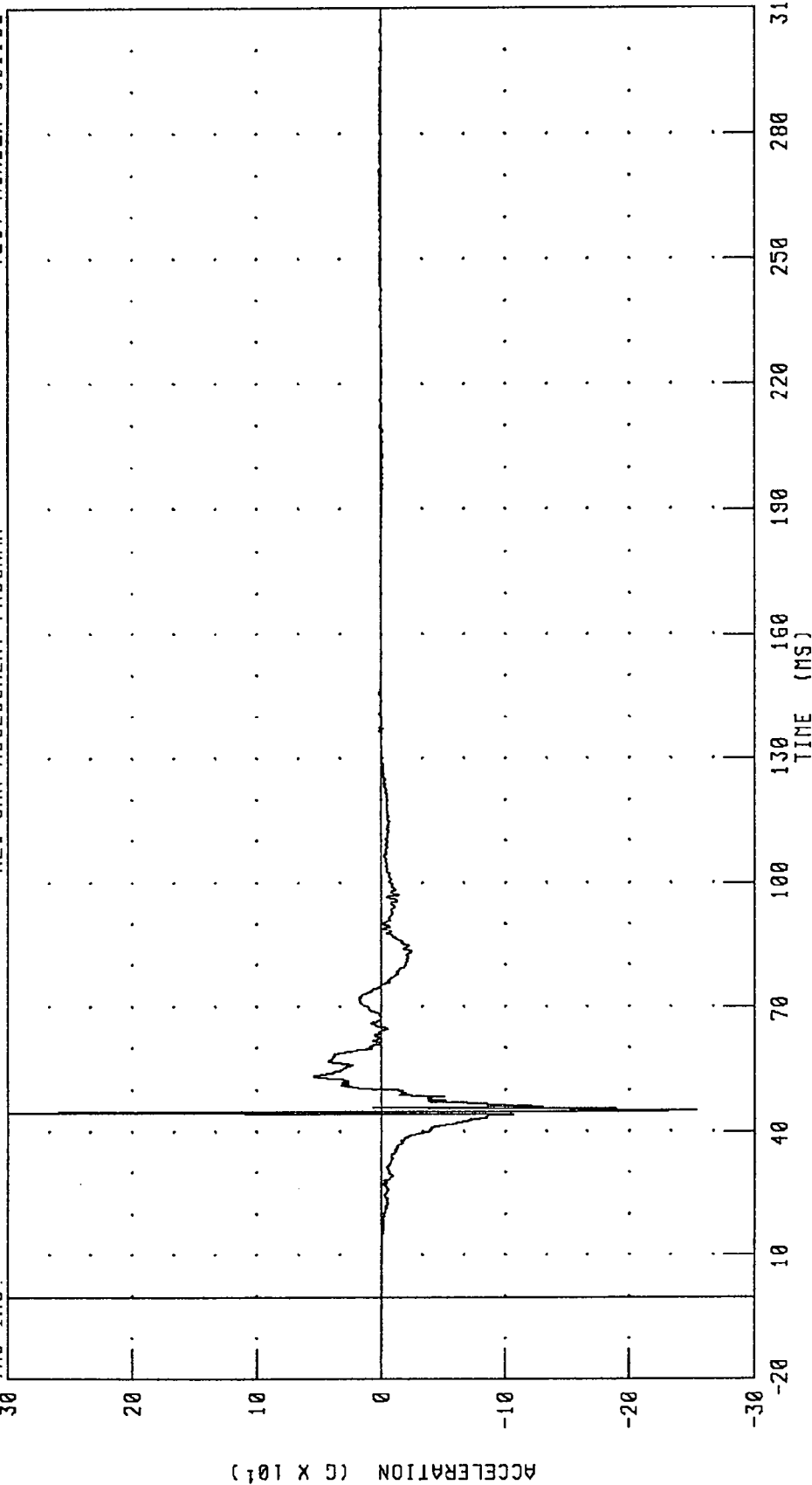
CHANNEL: ANRYM1 FILTER: CH. CLASS 600

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER LEFT FOOT X-AXIS ACCELERATION

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 318.94 G @ 44.64 MS; -254.19 G @ 45.04 MS

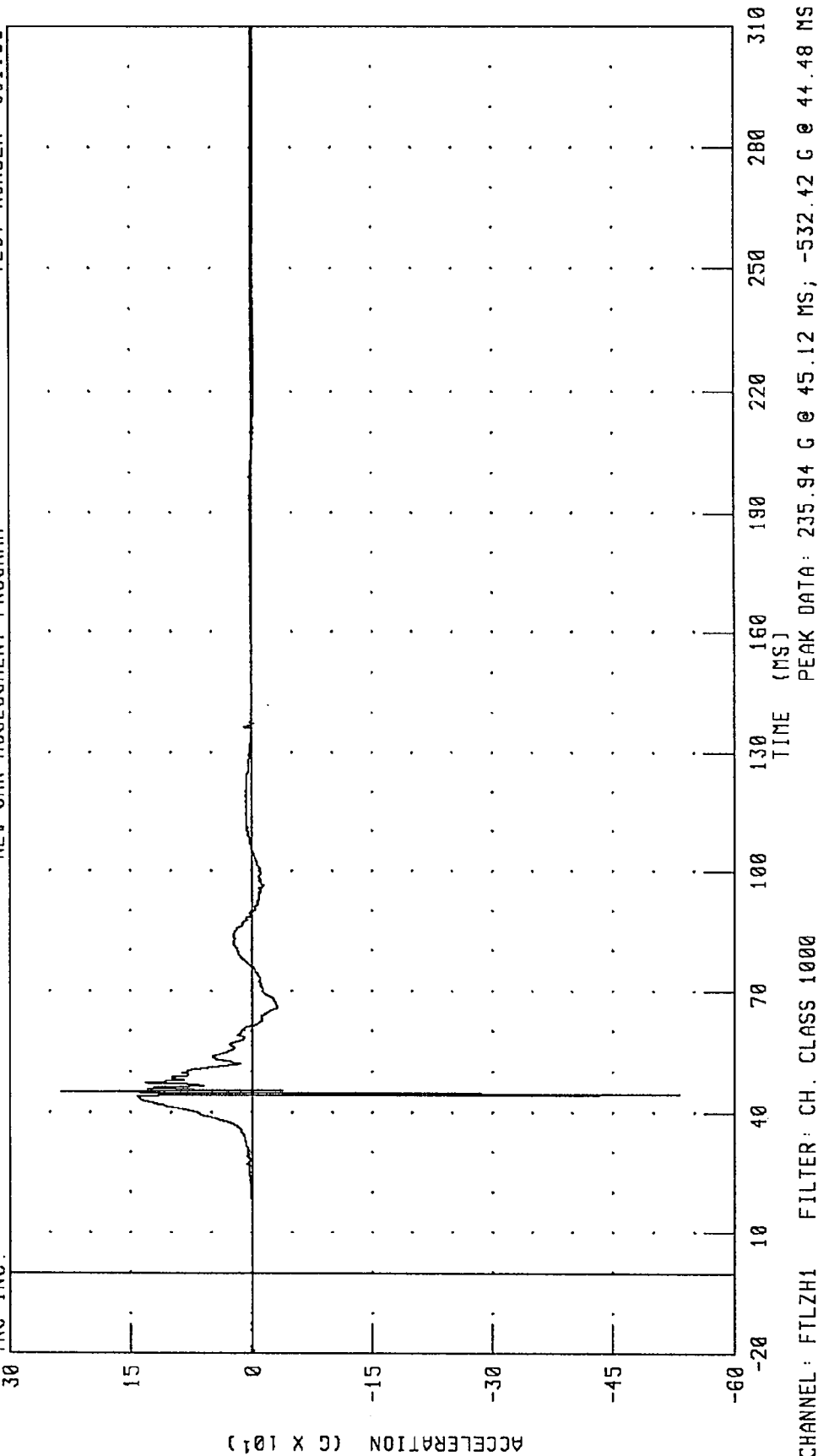
CHANNEL: FTLXG1 FILTER: CH. CLASS 1000

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
DRIVER LEFT FOOT Z-AXIS ACCELERATION AT HEEL

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



CHANNEL: FTLZH1 FILTER: CH. CLASS 1000

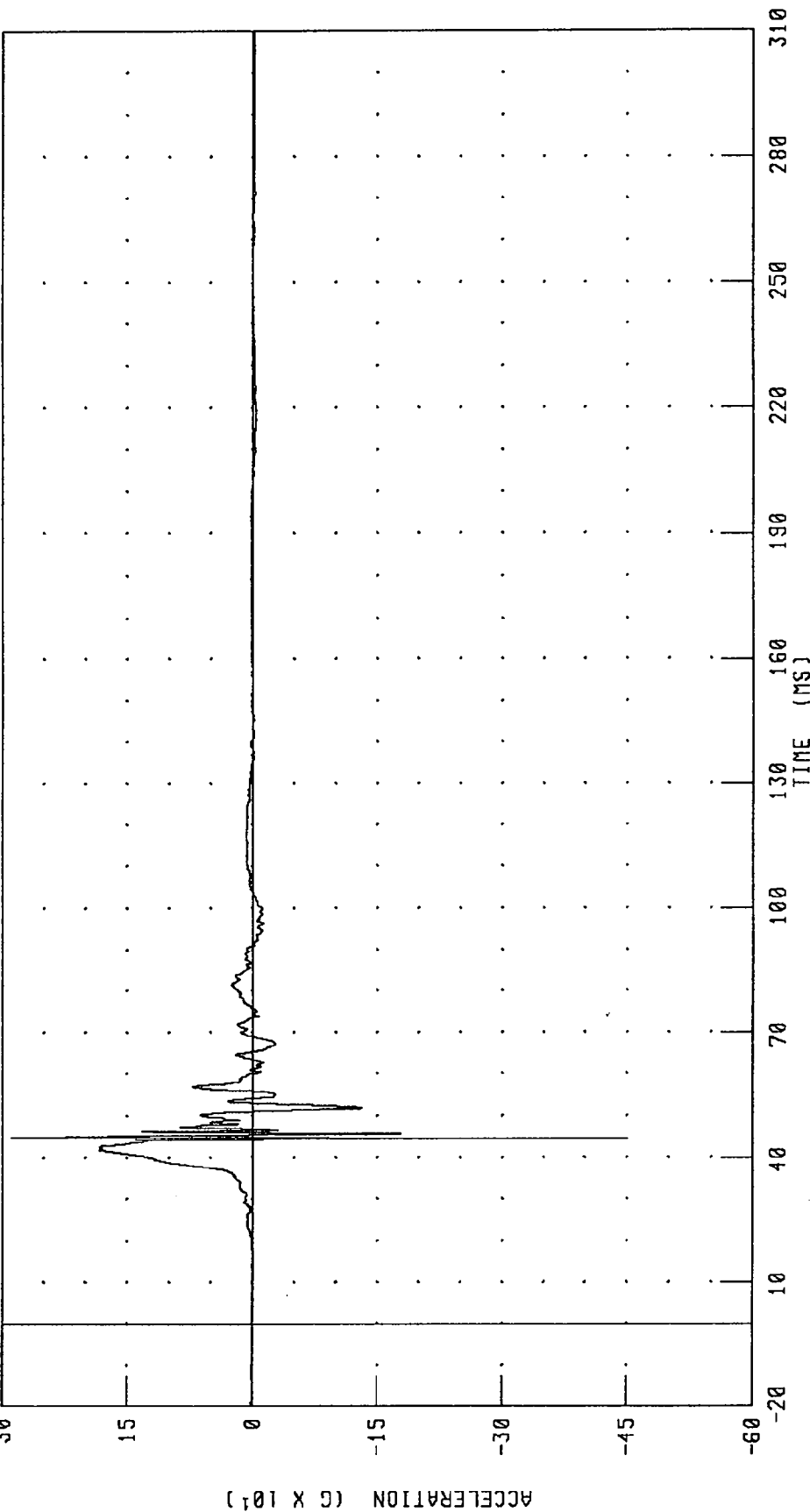
PEAK DATA: 235.94 G @ 45.12 MS; -532.42 G @ 44.48 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
DRIVER LEFT FOOT Z-AXIS ACCELERATION AT TOE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 289.53 G @ 44.88 MS; -451.00 G @ 44.56 MS

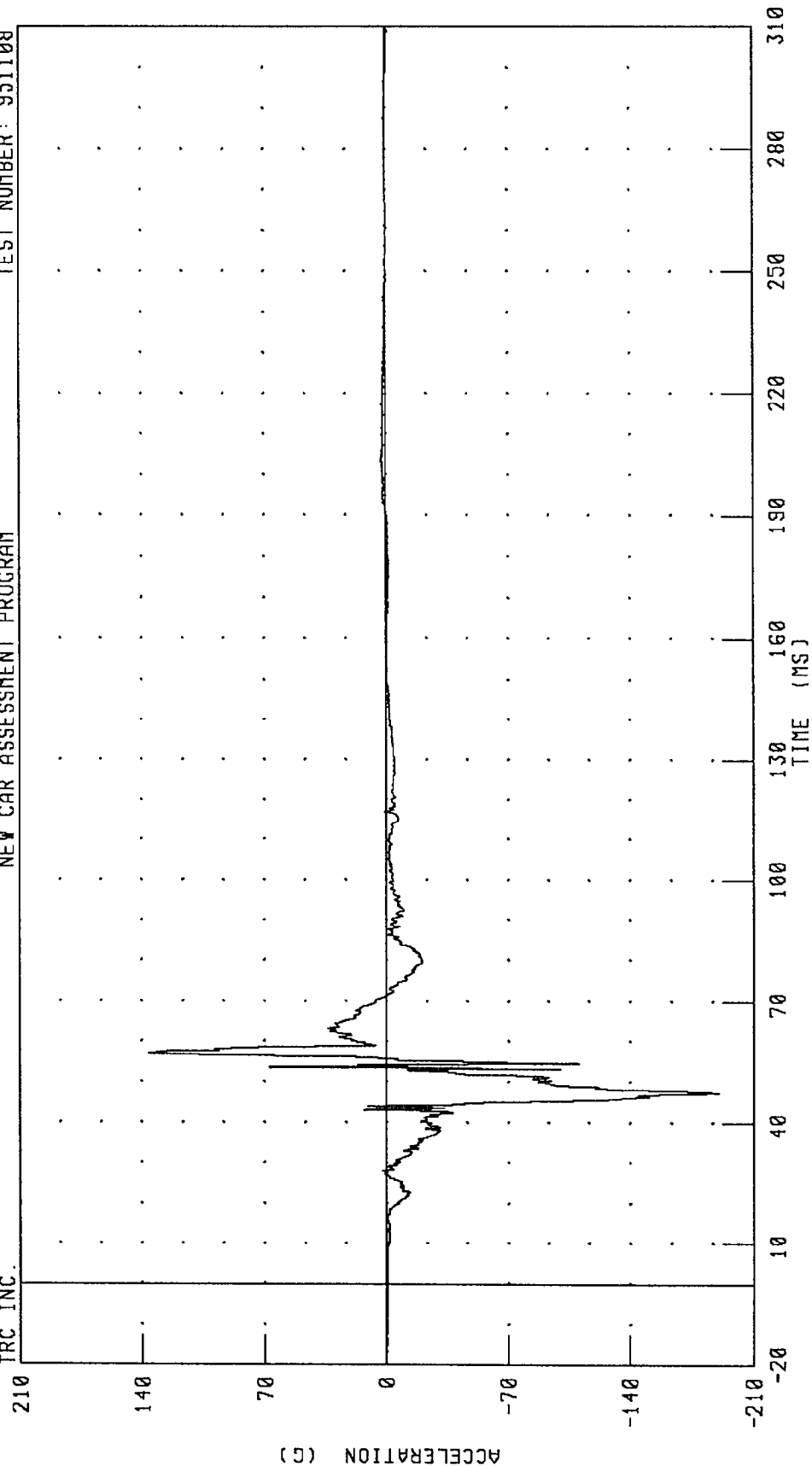
CHANNEL: FTLZT1 FILTER: CH. CLASS 1000

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER RIGHT FOOT X-AXIS ACCELERATION

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 136.27 G @ 56.96 MS; -190.20 G @ 47.36 MS

CHANNEL: FTRXG1 FILTER: CH. CLASS 1000

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
DRIVER RIGHT FOOT Z-AXIS ACCELERATION AT HEEL

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.

200

150

100

50

0

-50

-100

ACCELERATION (G)

TIME (MS)

130

160

190

220

250

280

310

CHANNEL: FTRZH1 FILTER: CH. CLASS 1000

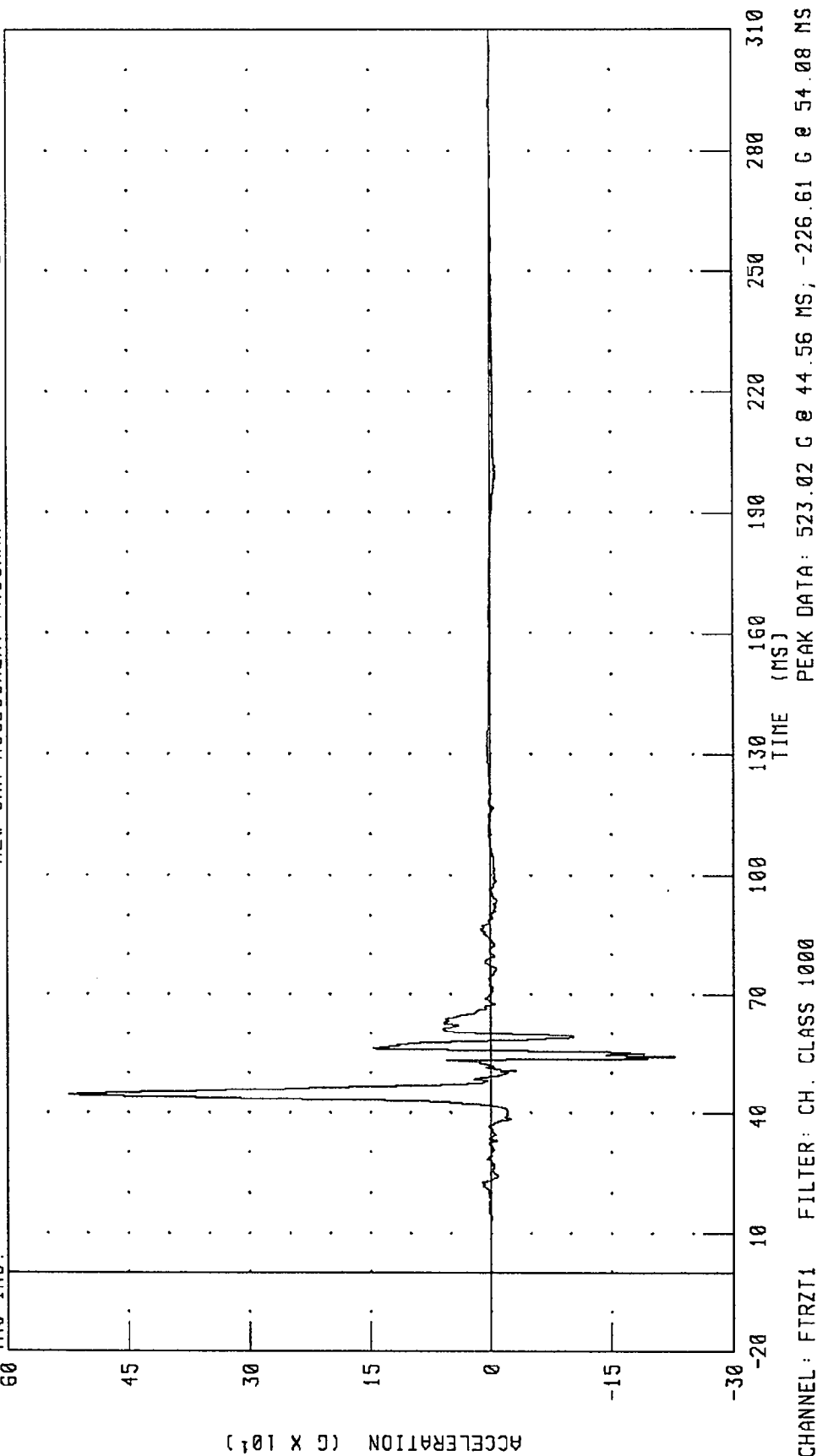
PEAK DATA: 178.94 G @ 44.64 MS; -25.30 G @ 53.28 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
DRIVER RIGHT FOOT Z-AXIS ACCELERATION AT TOE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

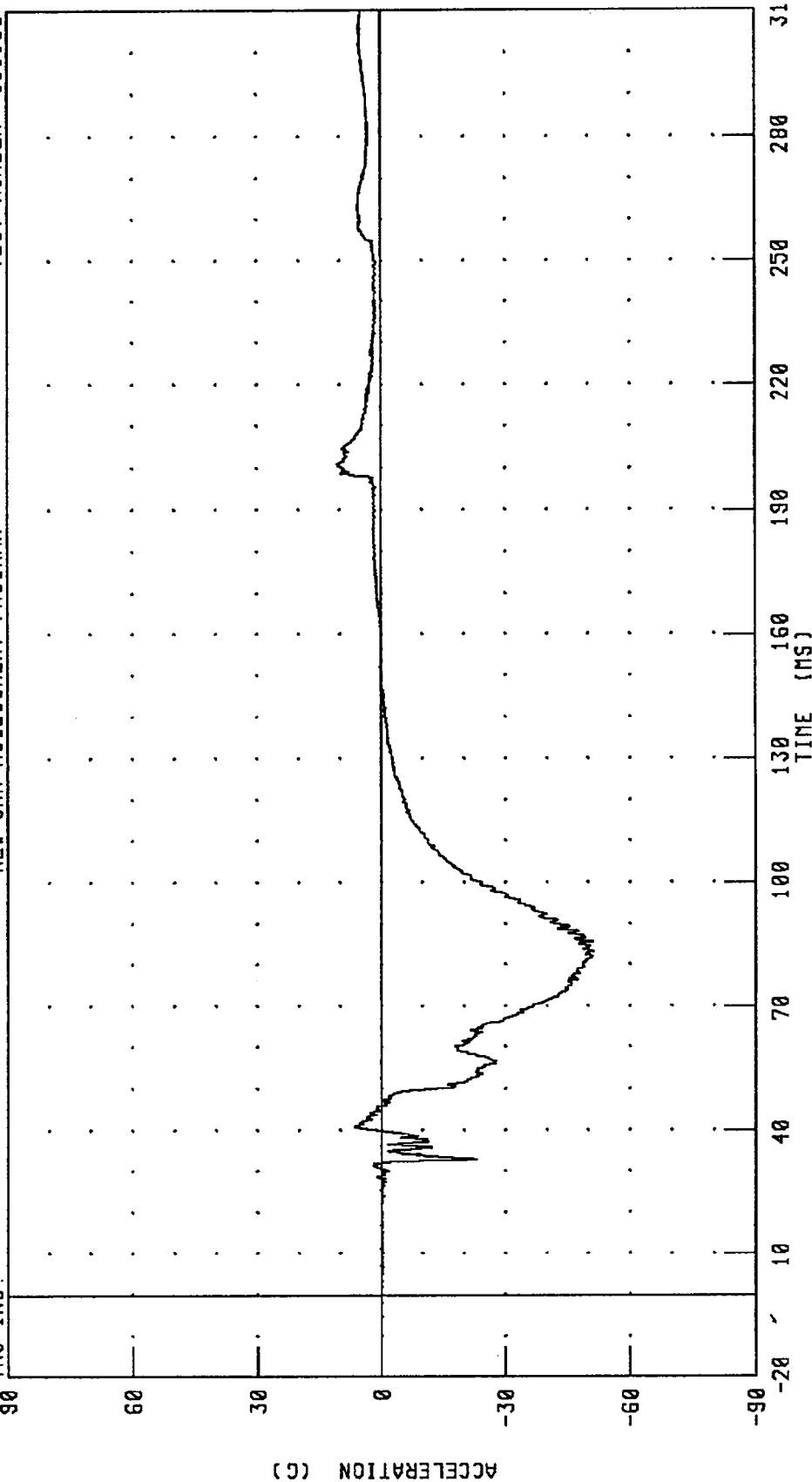
TRC INC.



1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD X-AXIS ACCELERATION
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

TRC INC.



PEAK DATA: 10.57 G @ 200.96 MS; -51.19 G @ 83.20 MS

CHANNEL: HEDXG2 FILTER: CH. CLASS 1000

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD Y-AXIS ACCELERATION
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

TRC INC.

90

60

30

ACCELERATION (G)

0

-30

-60

-90

310

280

250

220

190

160

130

100

70

40

10

-20

TIME (MS)

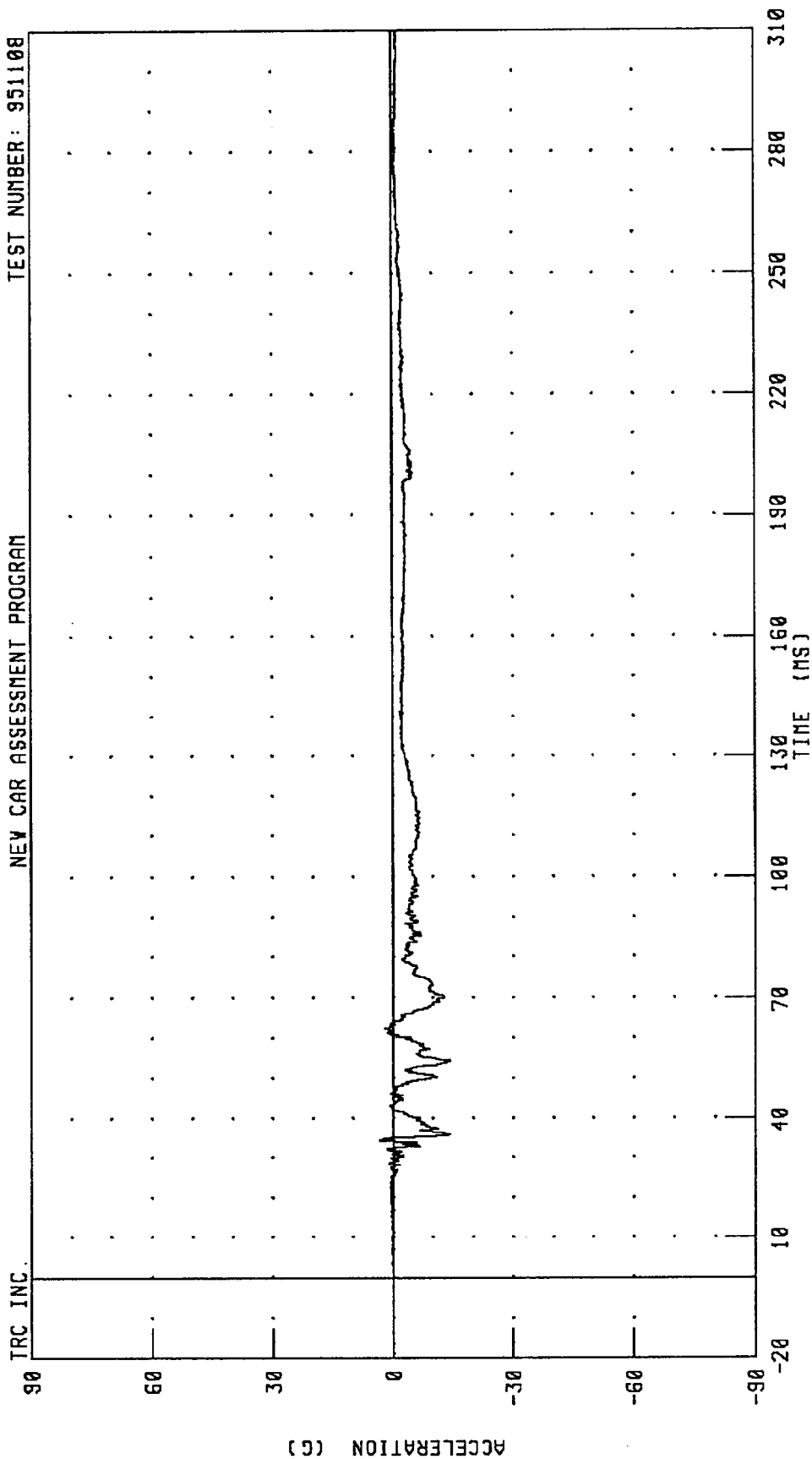
CHANNEL: HEDYG2 FILTER: CH. CLASS 1000

PEAK DATA: 14.74 G @ 85.68 MS; -6.56 G @ 33.60 MS

951108

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD Z-AXIS ACCELERATION
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

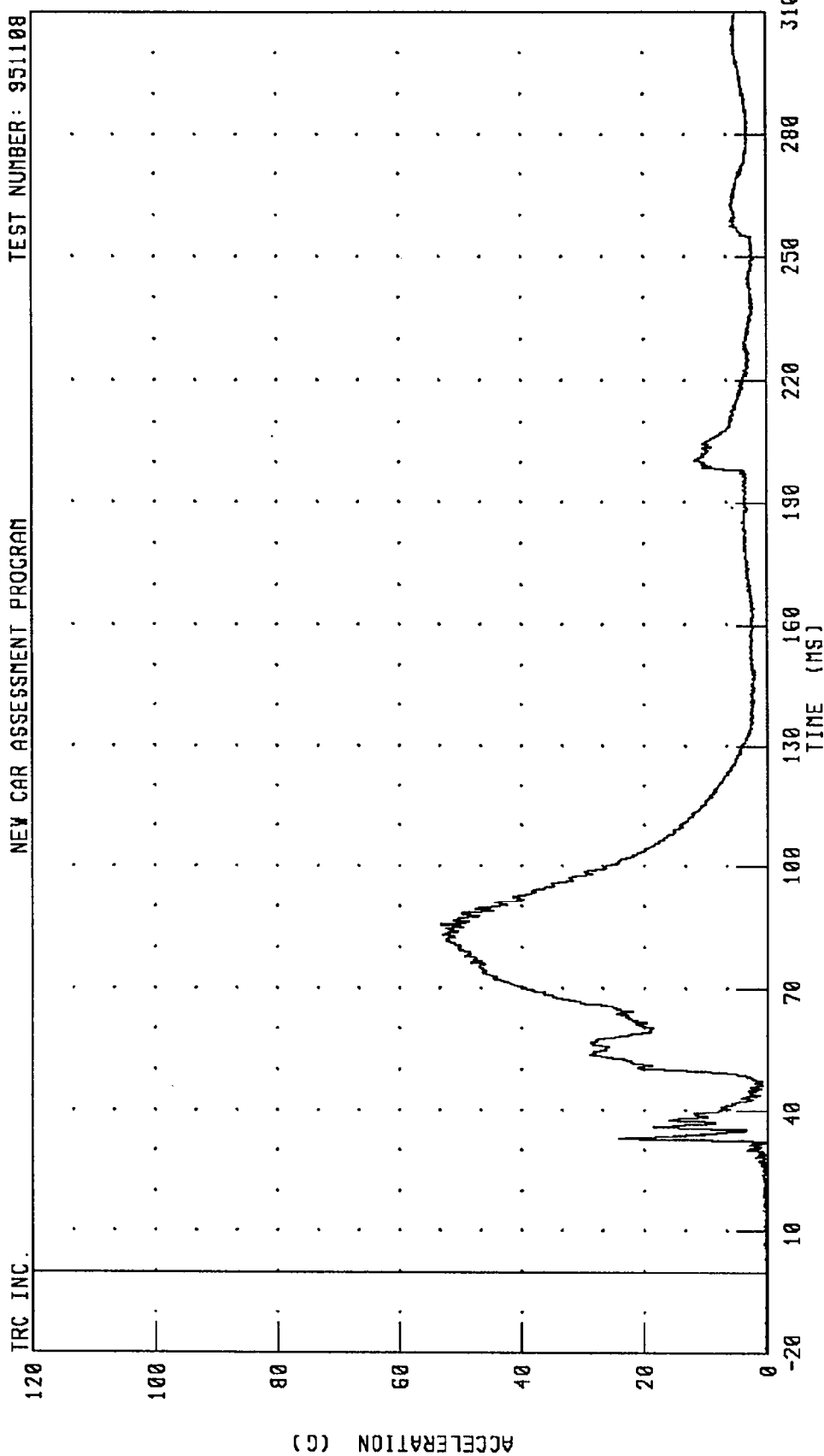


PEAK DATA: 3.35 G @ 34.32 MS; -14.17 G @ 35.92 MS

CHANNEL: HEDZG2 FILTER: CH. CLASS 1000

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD RESULTANT ACCELERATION
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108



PEAK DATA: 53.31 G @ 85.68 MS; 0.07 G @ -19.12 MS

CHANNEL: HEDRG2 FILTER: CH. CLASS 1000

TRC INC.

ACCELERATION (G)

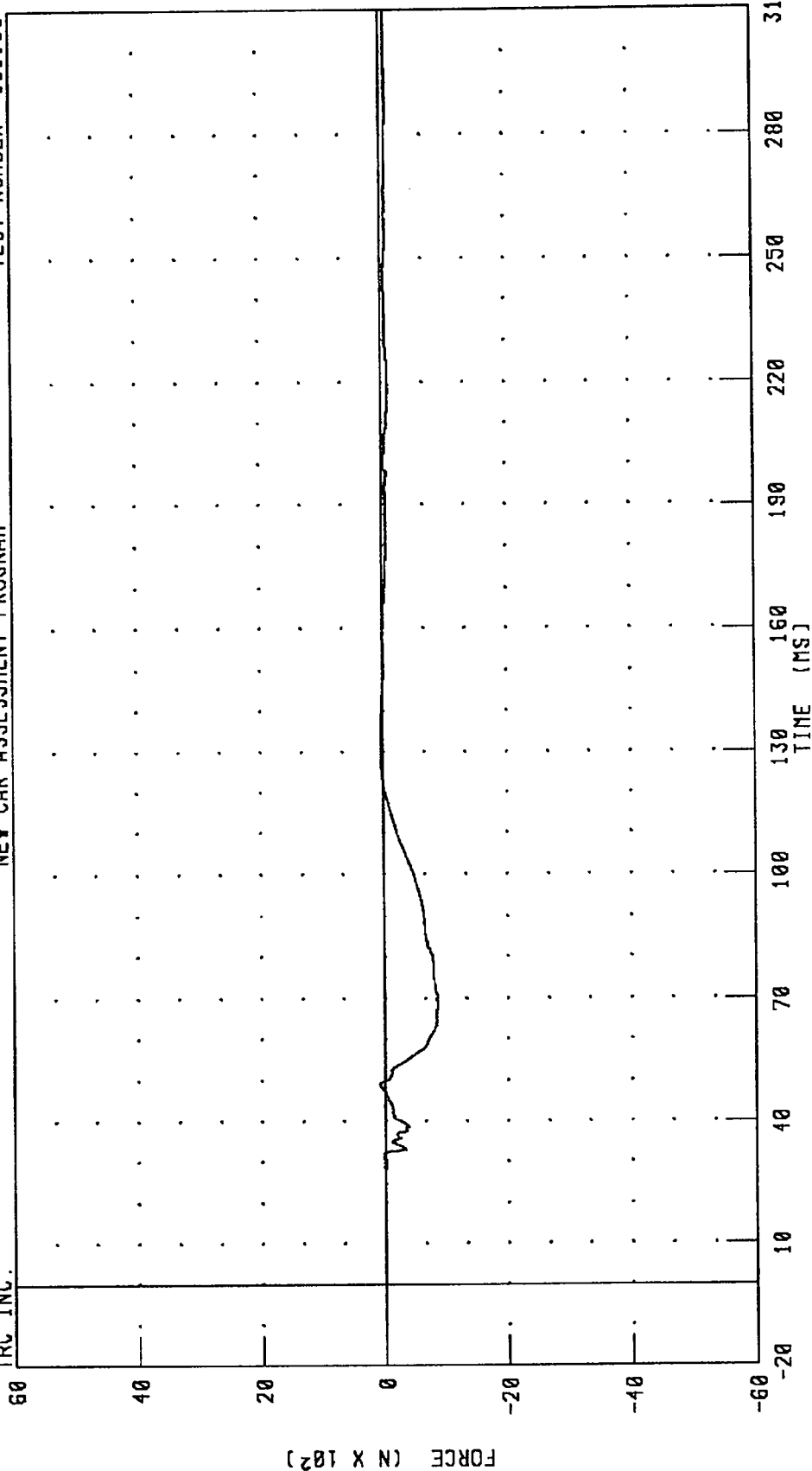
TIME (MS)

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK X-AXIS SHEAR FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 81.24 N @ 48.96 MS; -862.09 N @ 68.40 MS

CHANNEL: NEKXF2 FILTER: CH. CLASS 1000

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK Y-AXIS SHEAR FORCE
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

TRC INC.

60

40

20

0

-20

-40

-60

FORCE (N X 10²)

TIME (MS)

130 160 190 220 250 280 310

100 70 40 10

-20

60

40

20

0

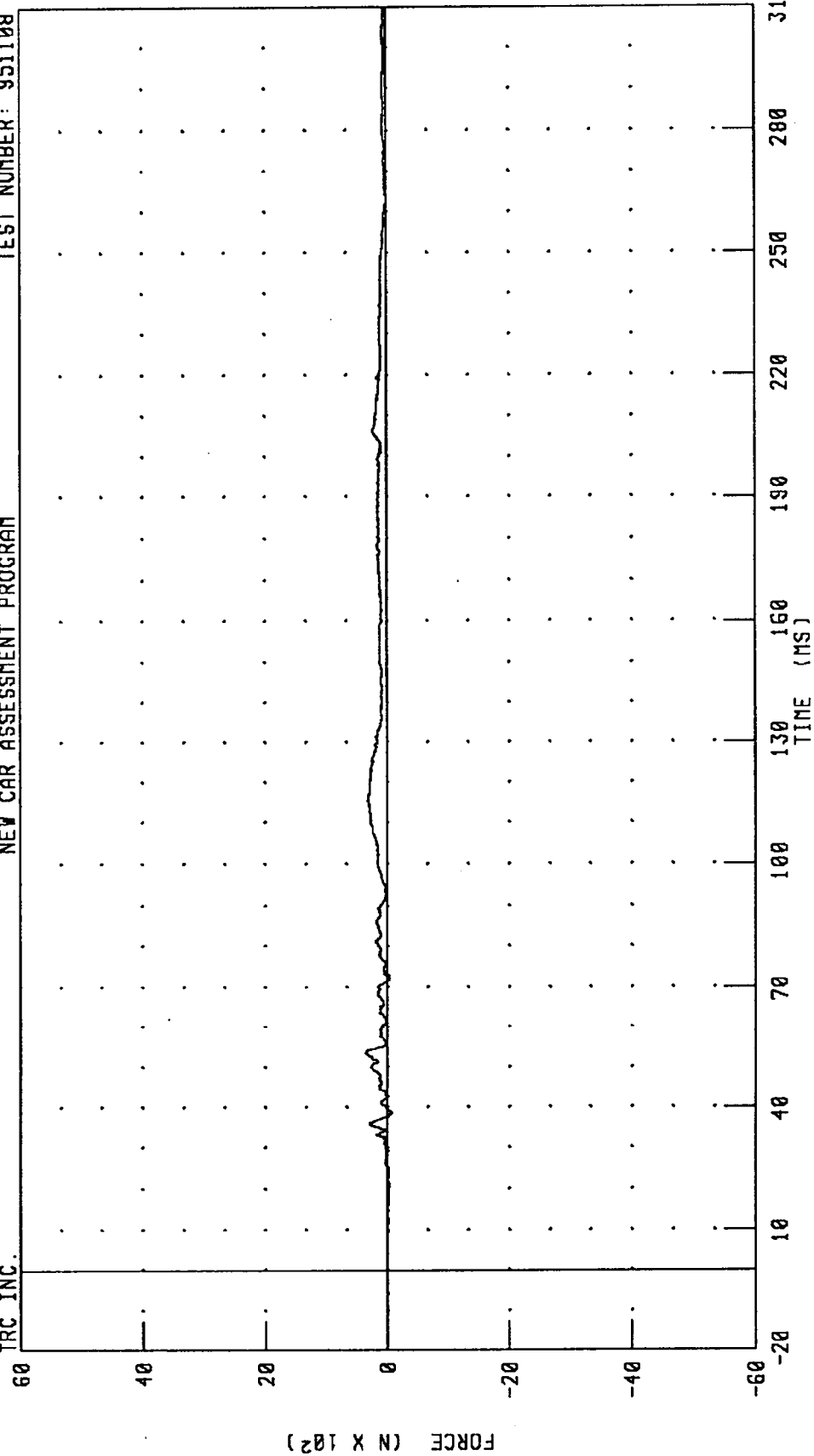
CHANNEL: NEKYF2 FILTER: CH. CLASS 1000 PEAK DATA: 116.42 N @ 90.64 MS; -70.62 N @ 69.44 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK Z-AXIS AXIAL FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



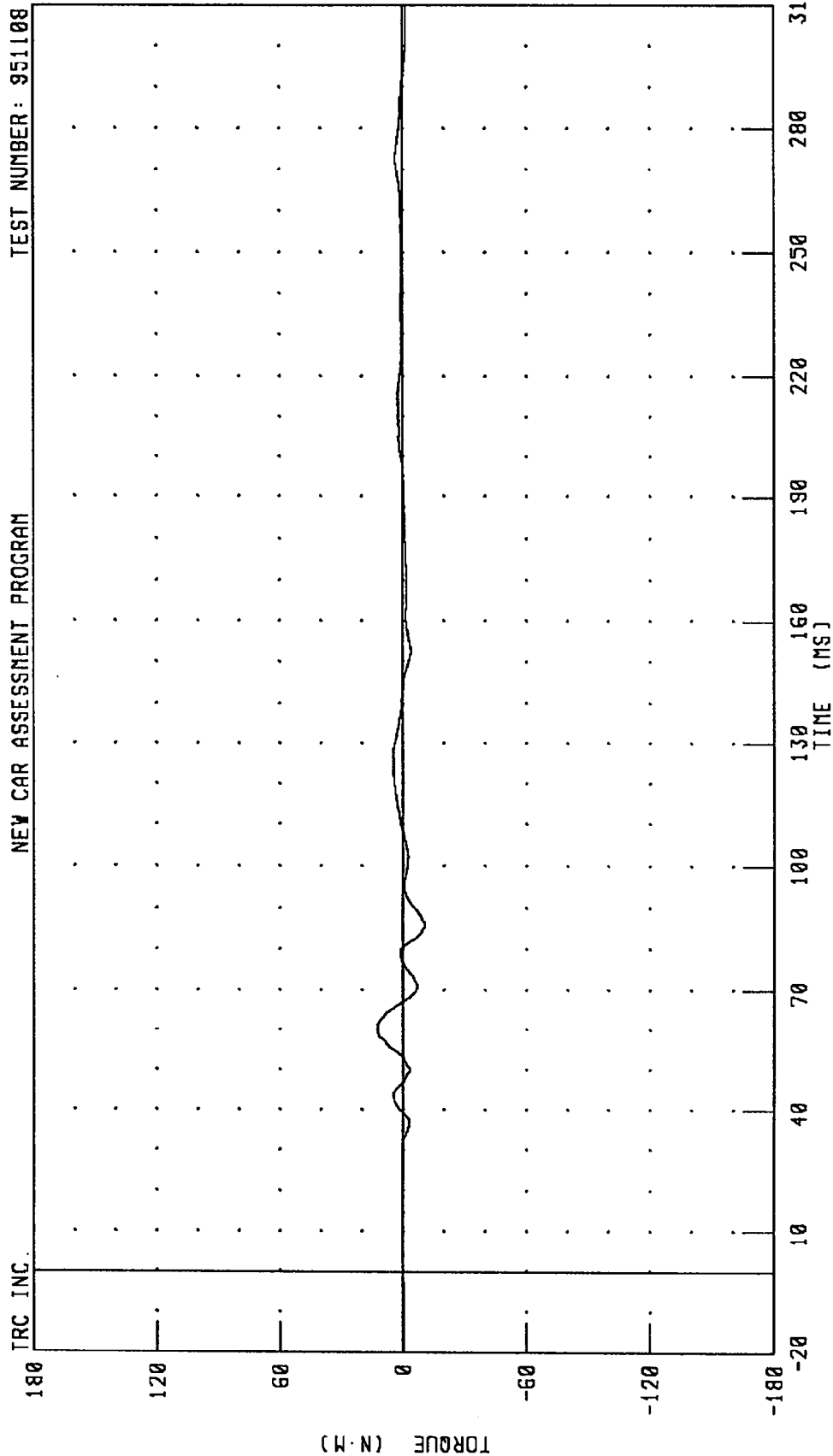
PEAK DATA: 348.99 N @ 53.52 MS; -68.40 N @ 38.48 MS

CHANNEL: NEKZF2 FILTER: CH. CLASS 1000

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK MOMENT ABOUT X AXIS

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM



PEAK DATA: 12.43 N-M @ 60.08 MS; -10.82 N-M @ 85.76 MS

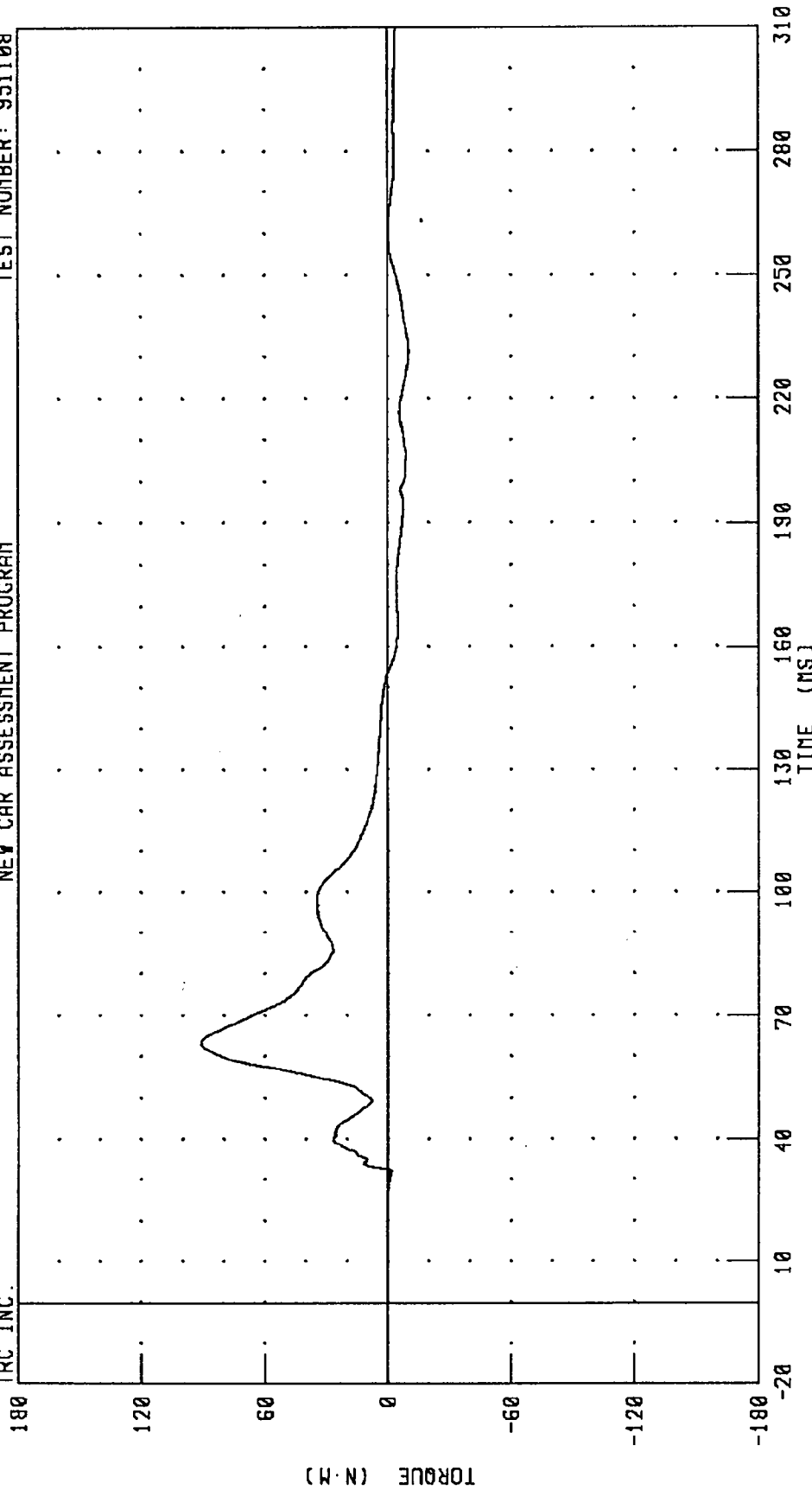
CHANNEL: NEKM2 FILTER: CH. CLASS 600

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK MOMENT ABOUT Y AXIS

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 91.10 N-M @ 63.36 MS, -10.43 N-M @ 231.12 MS

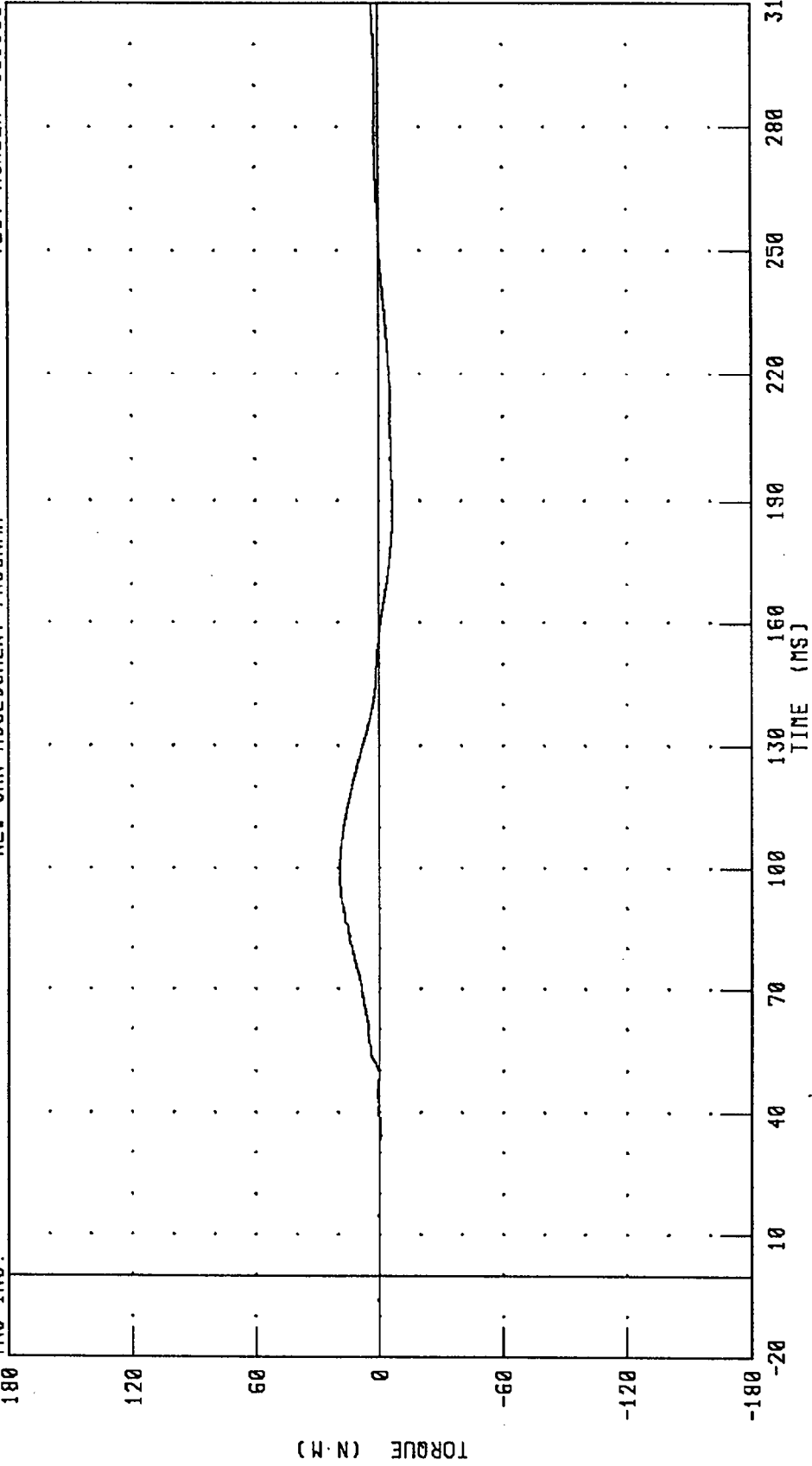
CHANNEL: NEKYM2 FILTER: CH. CLASS 600

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK MOMENT ABOUT Z AXIS

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



CHANNEL: NEKZM2 FILTER: CH. CLASS 600

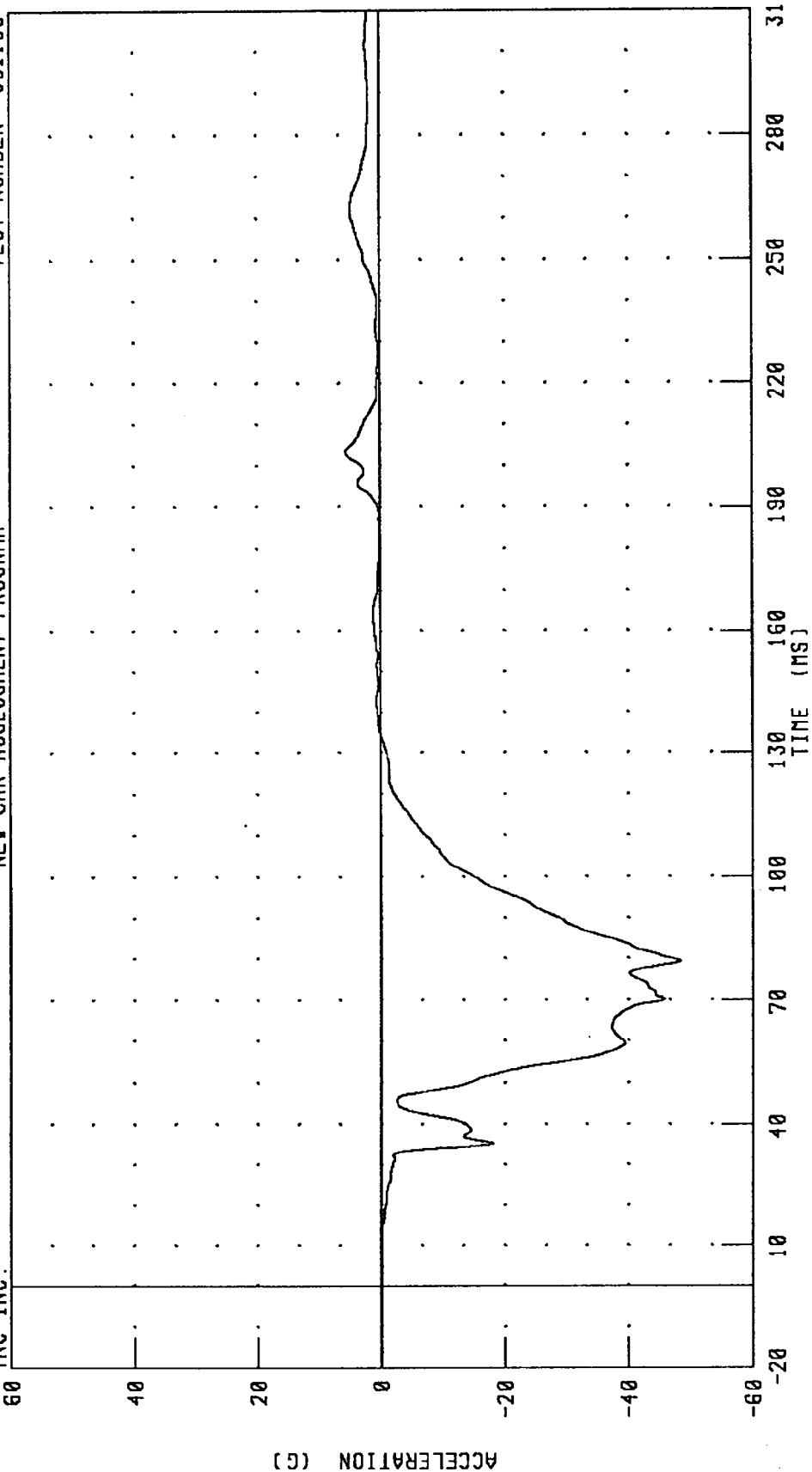
PEAK DATA: 19.30 N-M @ 100.24 MS; -6.63 N-M @ 190.96 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST X-AXIS ACCELERATION

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



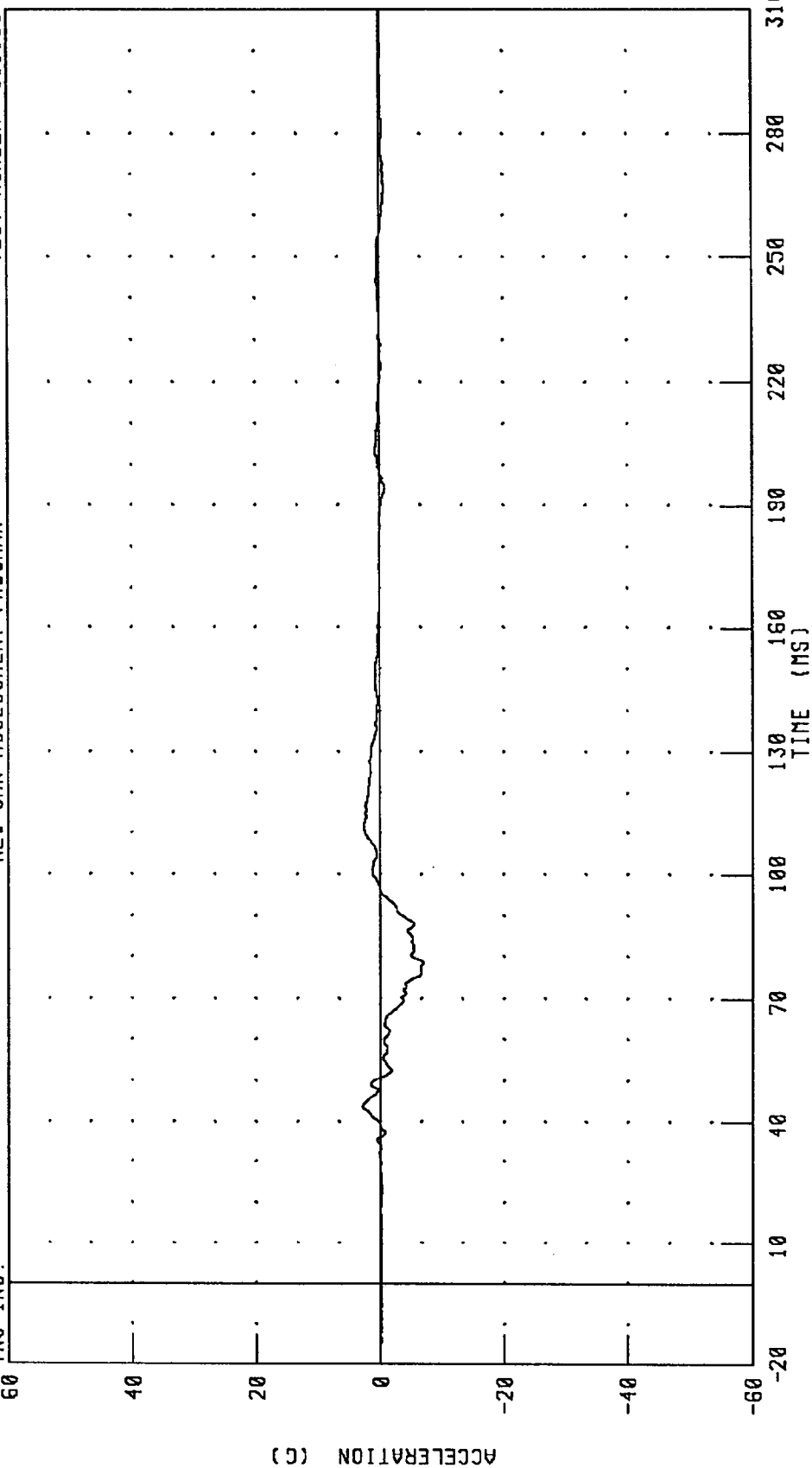
CHANNEL: CSTXG2 FILTER: CH. CLASS 180

PEAK DATA: 5.61 G @ 203.28 MS; -48.37 G @ 79.36 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST Y-AXIS ACCELERATION
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

TRC INC.



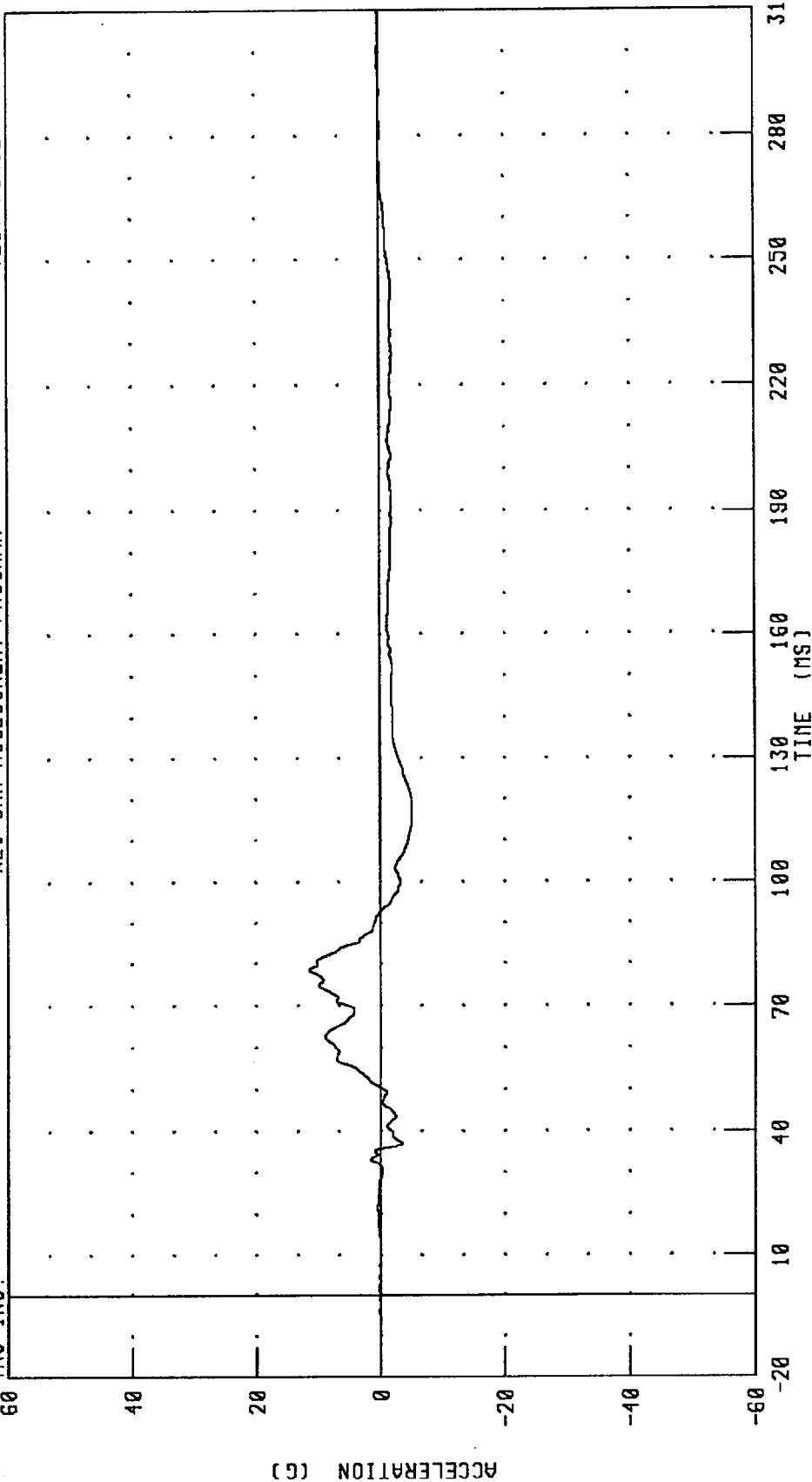
CHANNEL: CSTYG2 FILTER: CH. CLASS 180

PEAK DATA: 2.83 G @ 43.68 MS; -6.95 G @ 78.64 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST Z-AXIS ACCELERATION
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

TRC INC.



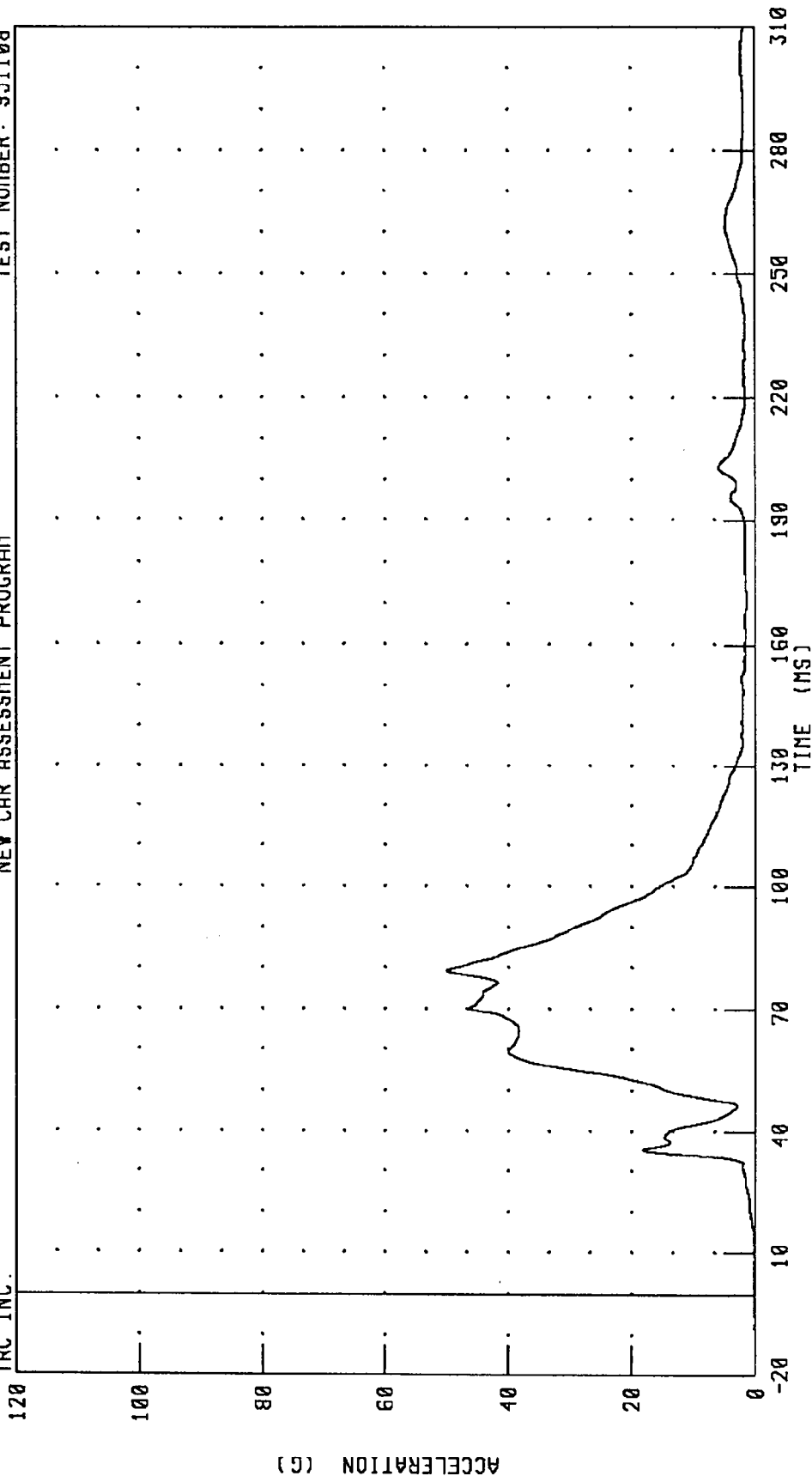
CHANNEL: CSTZG2 FILTER: CH. CLASS 180

PEAK DATA: 11.54 G @ 78.56 MS; -5.15 G @ 115.76 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST RESULTANT ACCELERATION
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

TRC INC.

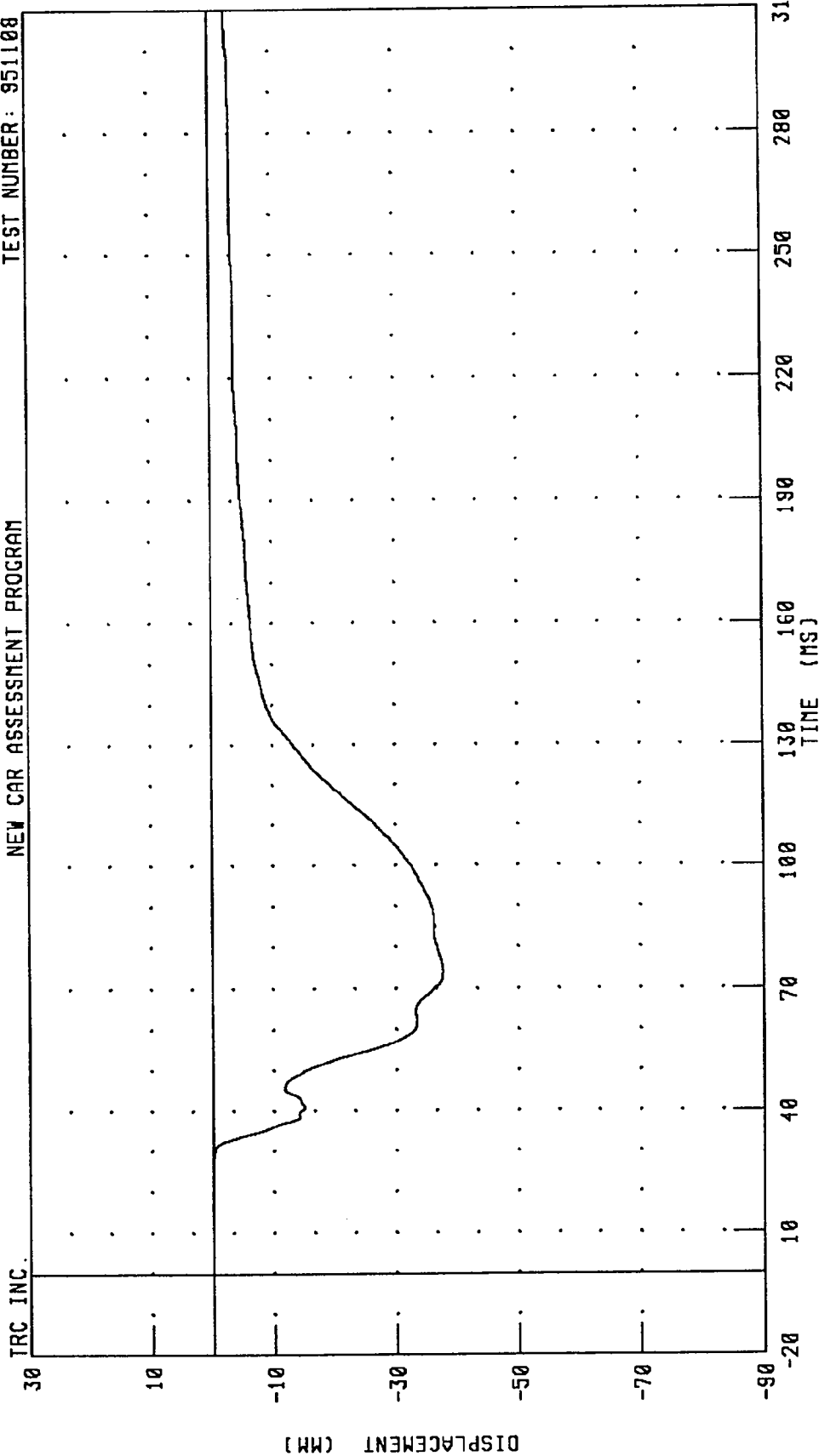


CHANNEL: CSTRG2 FILTER: CH. CLASS 180

PEAK DATA: 49.94 G @ 79.28 MS; 0.01 G @ -20.00 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST DEFLECTION
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

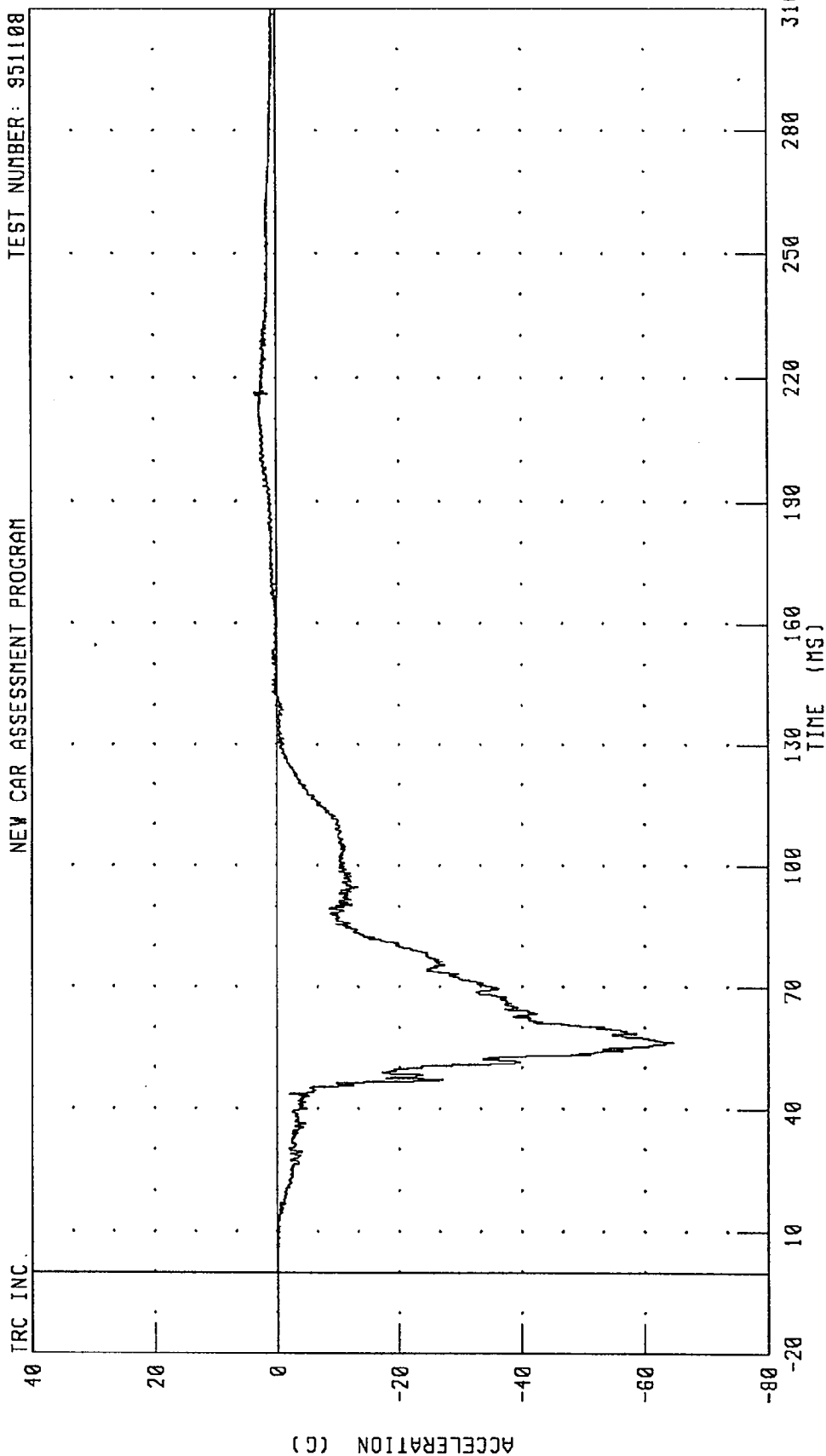


PEAK DATA: 0.02 MM @ -15.12 MS; -37.70 MM @ 74.24 MS

CHANNEL: CSTXD2 FILTER: CH. CLASS 180

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER PELVIS X-AXIS ACCELERATION
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

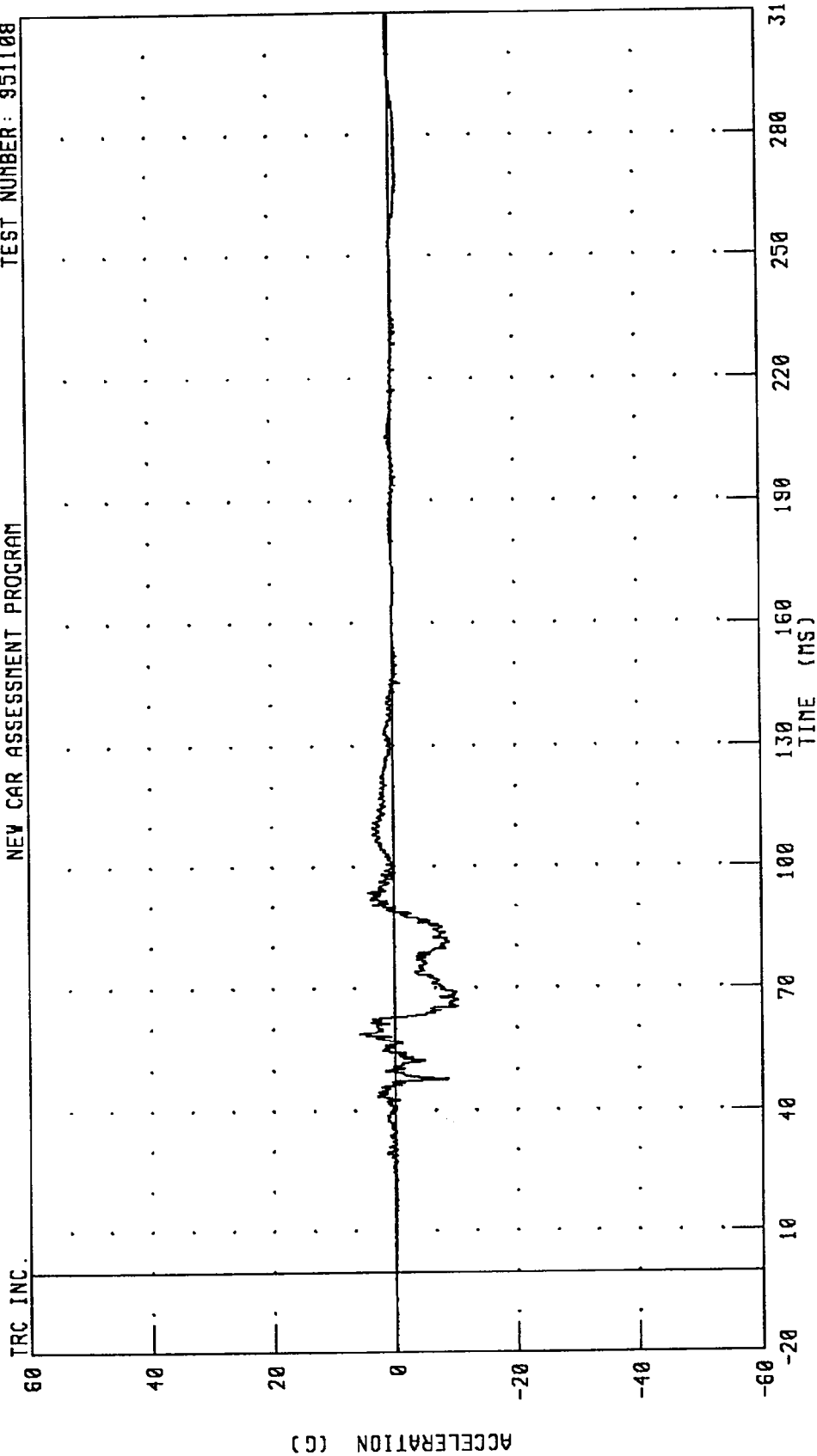


CHANNEL: PEVXG2 FILTER: CH. CLASS 1000

PEAK DATA: 3.53 G @ 216.40 MS; -64.71 G @ 56.32 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER PELVIS Y-AXIS ACCELERATION
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108



PEAK DATA: 5.69 G @ 58.88 MS; -10.39 G @ 65.60 MS

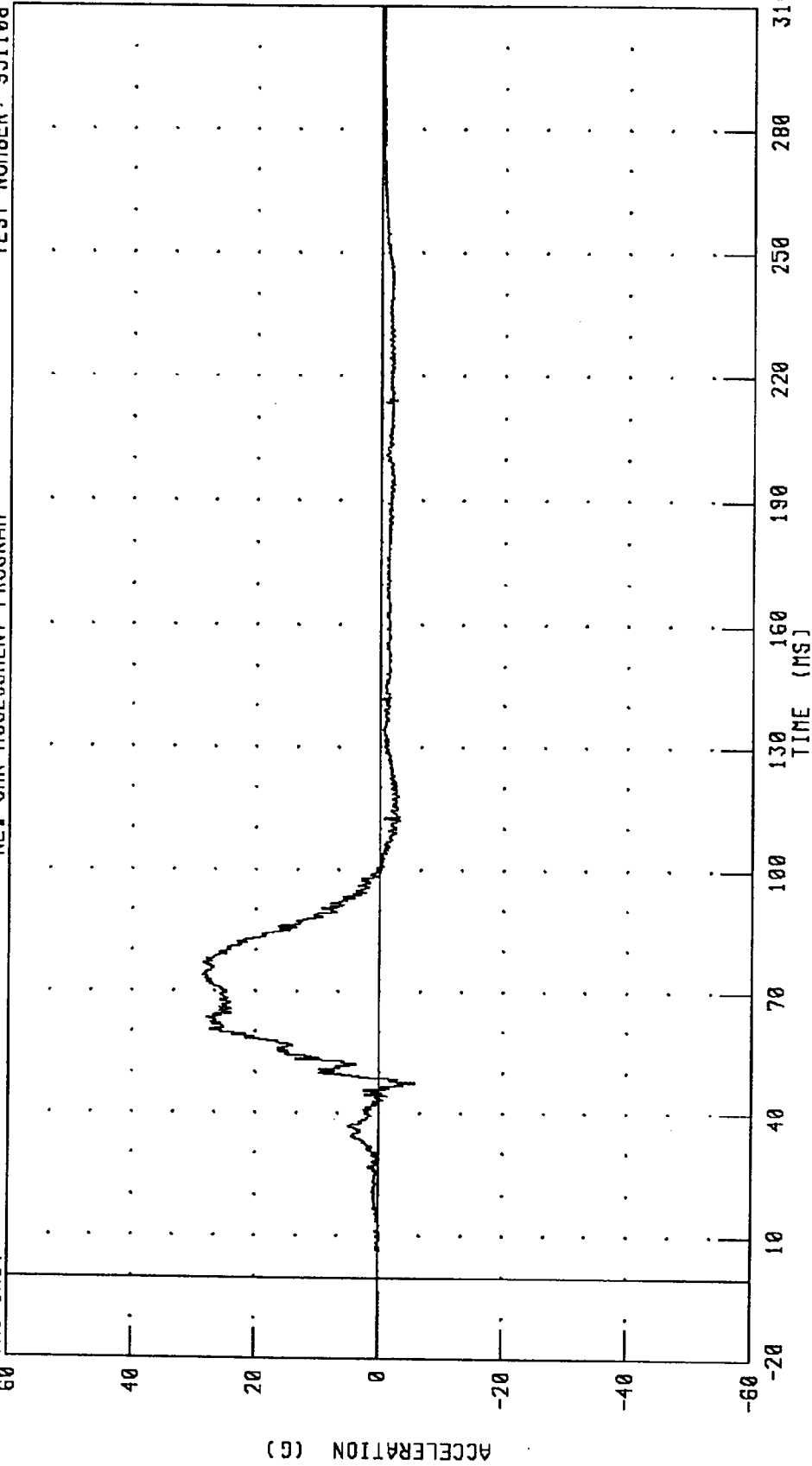
CHANNEL: PEVYG2 FILTER: CH. CLASS 1000

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER PELVIS Z-AXIS ACCELERATION

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.

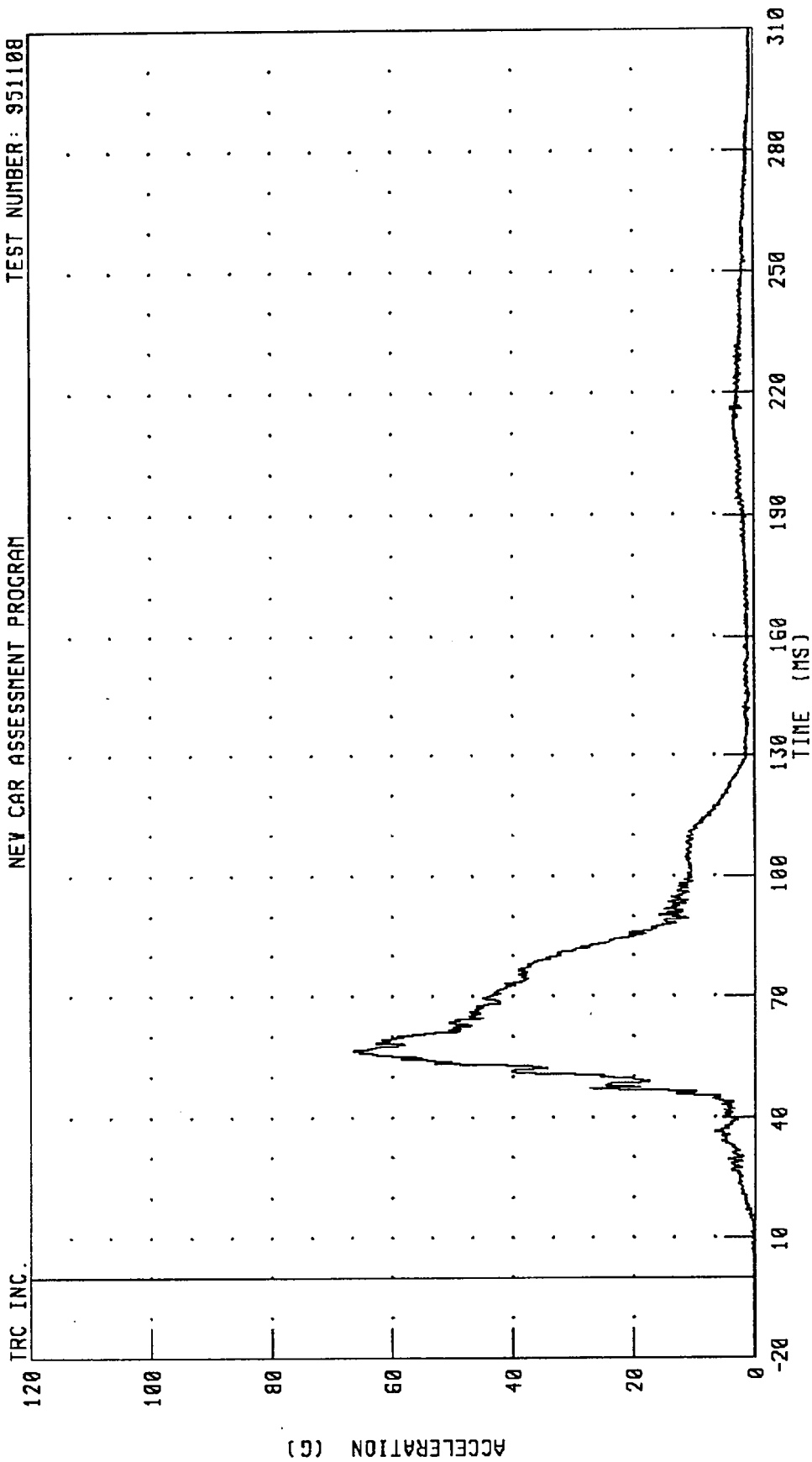


CHANNEL: PEVZG2 FILTER: CH. CLASS 1000

PEAK DATA: 28.70 G @ 74.08 MS; -5.79 G @ 47.44 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER PELVIS RESULTANT ACCELERATION
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108



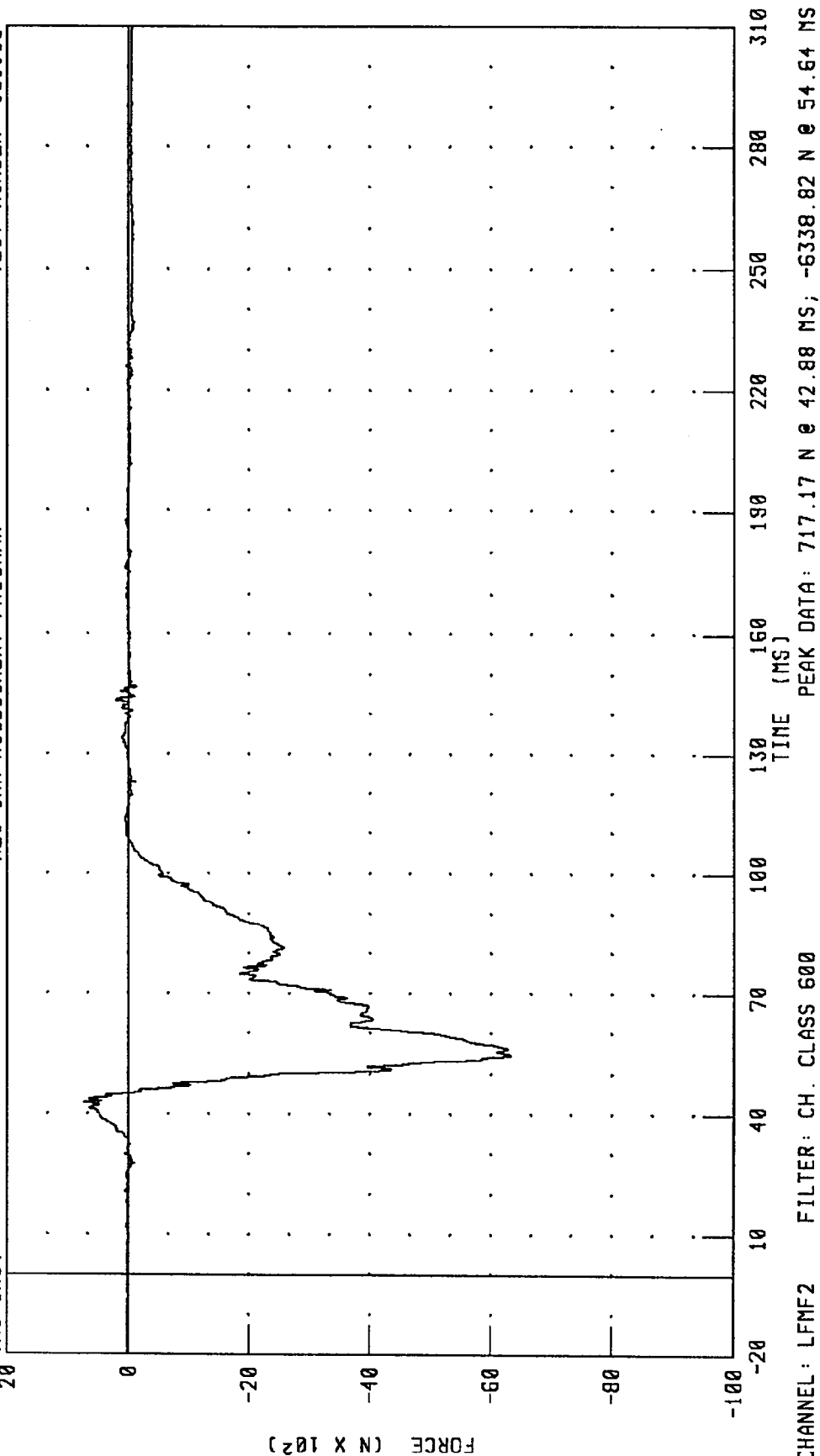
CHANNEL: PEVRG2 FILTER: CH. CLASS 1000

PEAK DATA: 66.51 G @ 56.32 MS; 0.09 G @ -18.48 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 PASSENGER LEFT FEMUR FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

TRC INC.



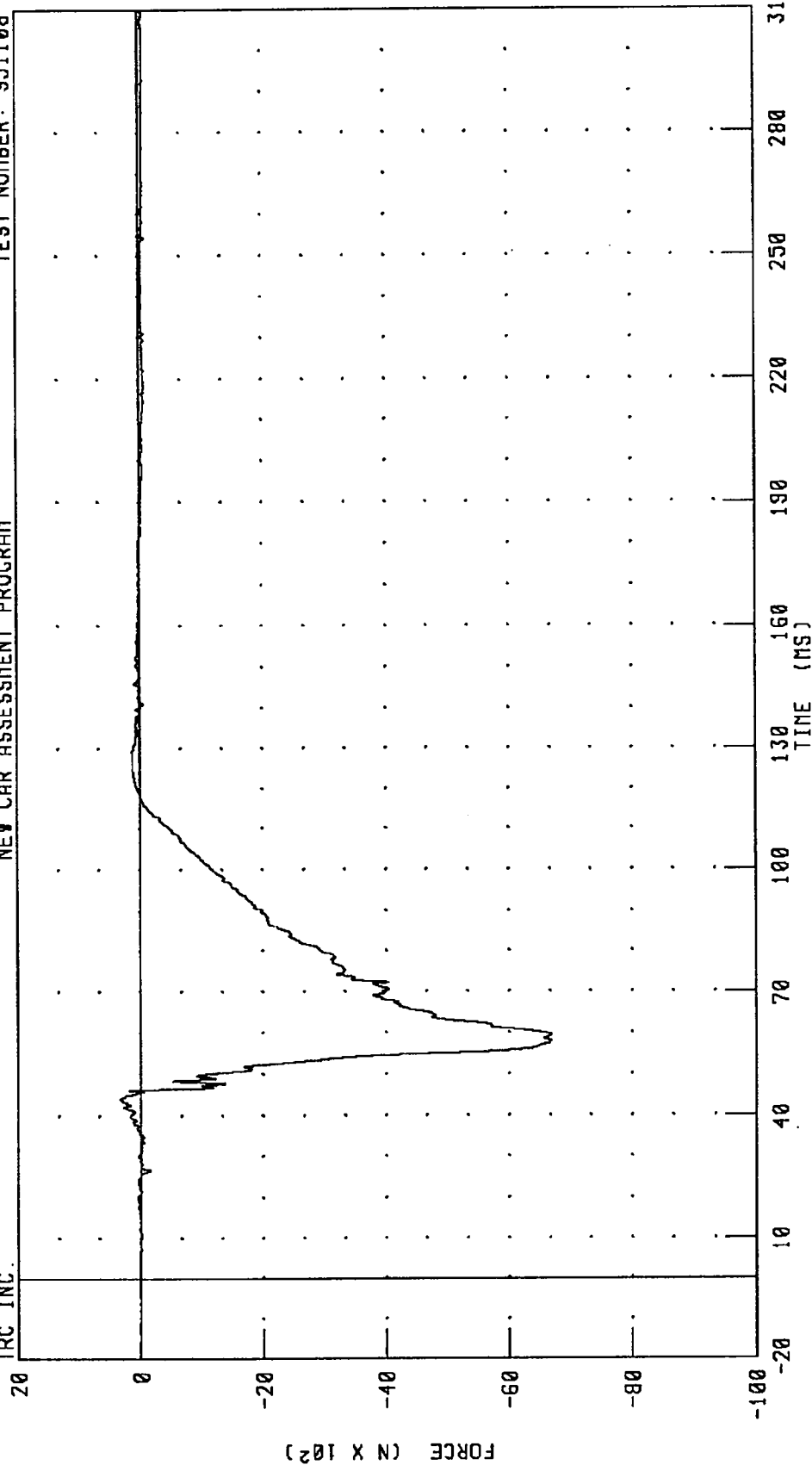
CHANNEL: LFMF2 FILTER: CH. CLASS 600

951156

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER RIGHT FENUR FORCE
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

TRC INC.



PEAK DATA: 329.73 N @ 44.08 MS; -6699.94 N @ 59.52 MS

FILTER: CH. CLASS 600

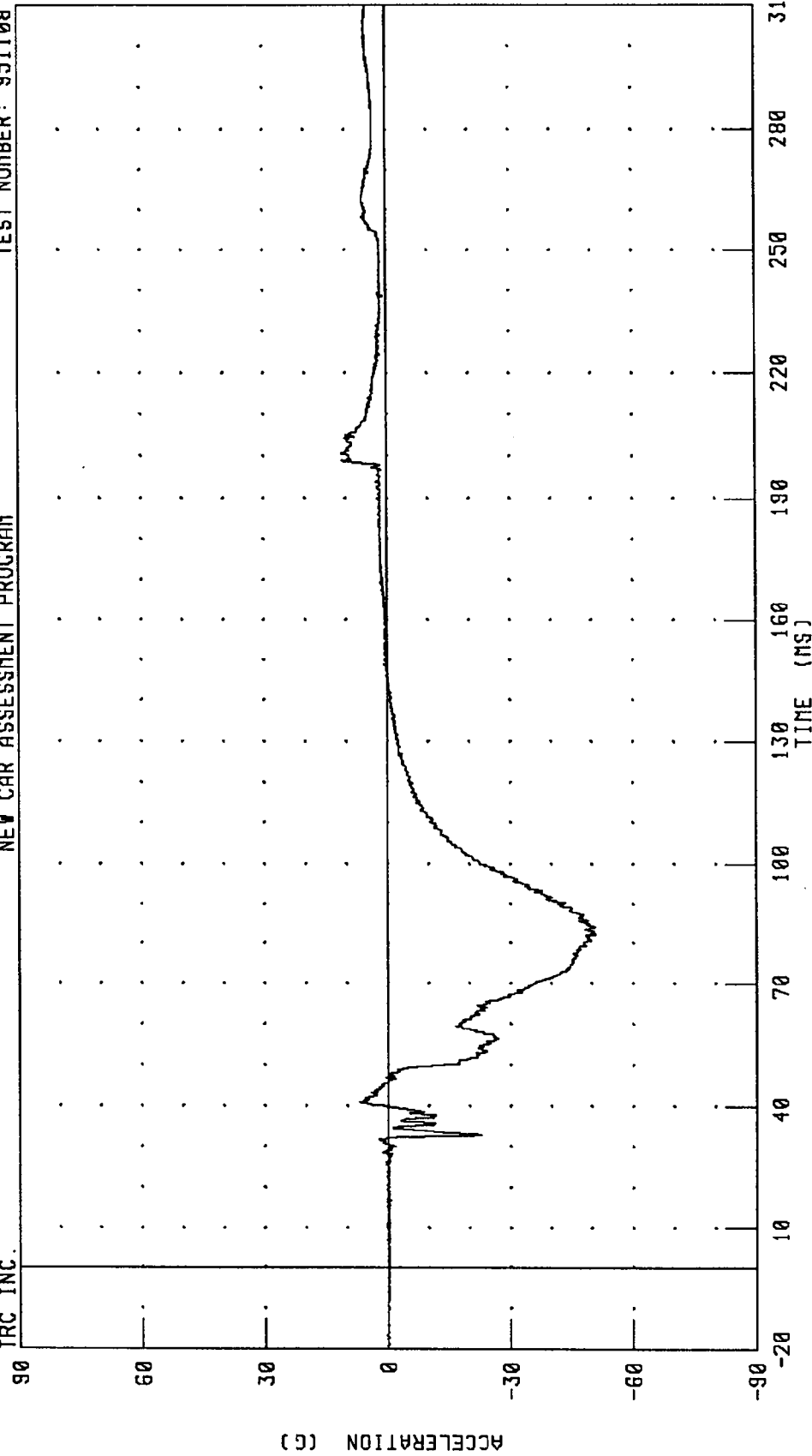
CHANNEL: RFMF2

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD X-AXIS ACCELERATION - REDUNDANT

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



CHANNEL: HEDXR2 FILTER: CH. CLASS 1000

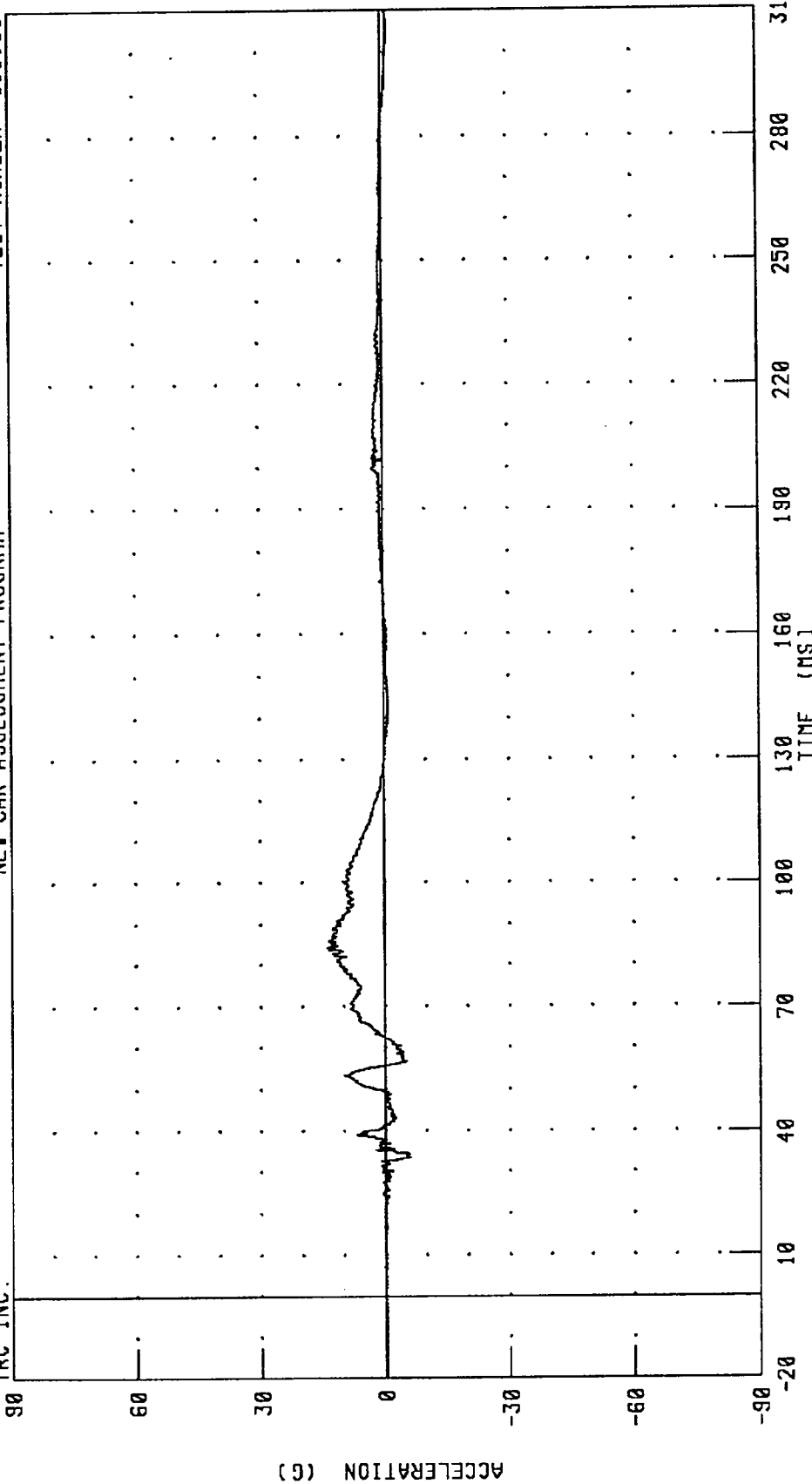
PEAK DATA: 10.83 G @ 198.96 MS; -50.84 G @ 82.32 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD Y-AXIS ACCELERATION - REDUNDANT

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 13.97 G @ 84.24 MS; -6.17 G @ 33.60 MS

CHANNEL: HEDYR2 FILTER: CH. CLASS 1000

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD Z-AXIS ACCELERATION - REDUNDANT

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.

90

60

30

0

-30

-60

-90

ACCELERATION (G)

TIME (MS)

310

280

250

220

190

160

130

100

70

40

10

-20

CHANNEL: HEDZR2 FILTER: CH. CLASS 1000

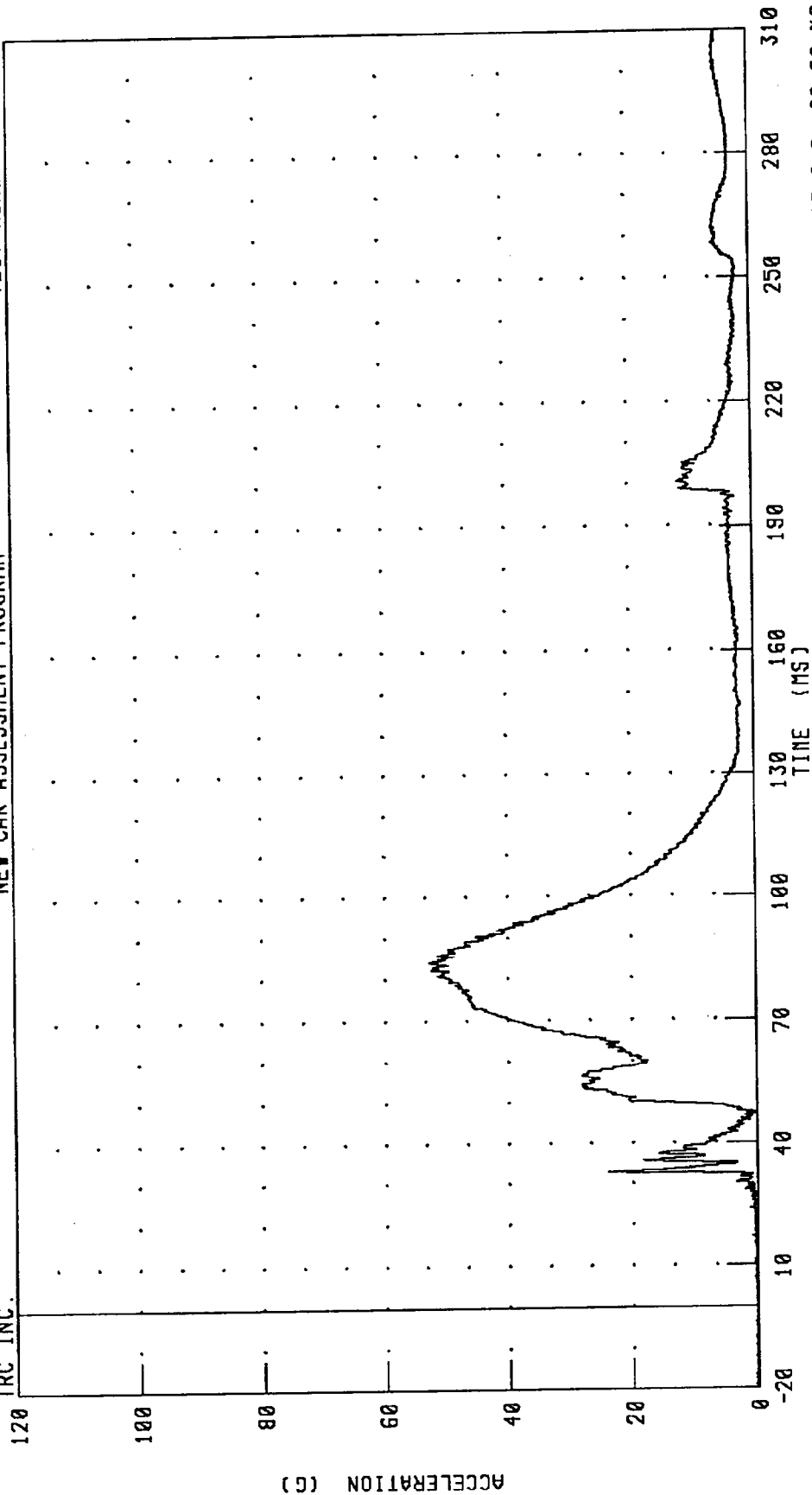
PEAK DATA: 3.69 G @ 34.32 MS; -14.51 G @ 35.92 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD RESULTANT ACCELERATION - REDUNDANT

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 52.77 G @ 84.16 MS; 0.13 G @ -20.00 MS

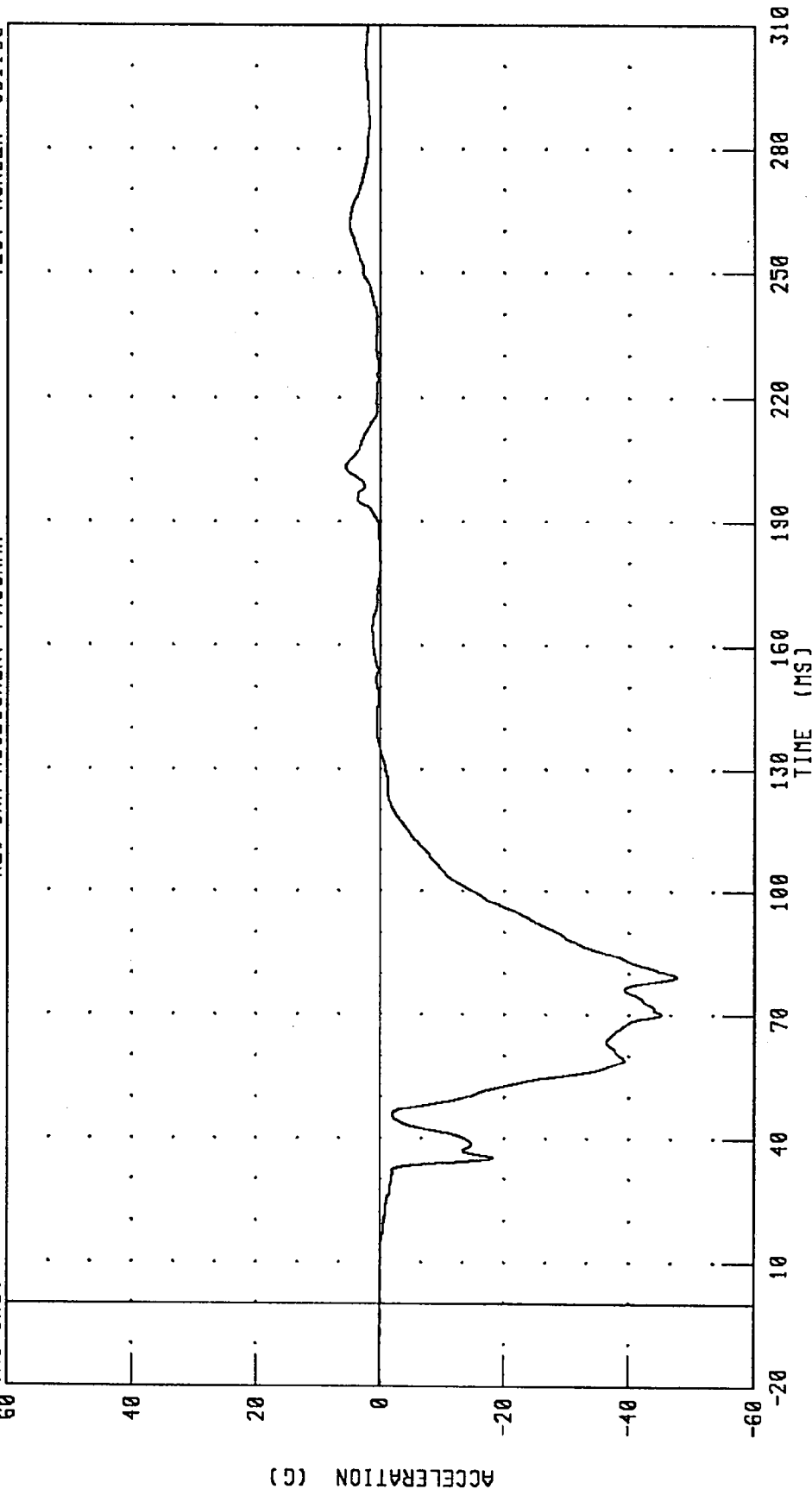
CHANNEL: HEDRR2 FILTER: CH. CLASS 1000

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST X-AXIS ACCELERATION - REDUNDANT

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.

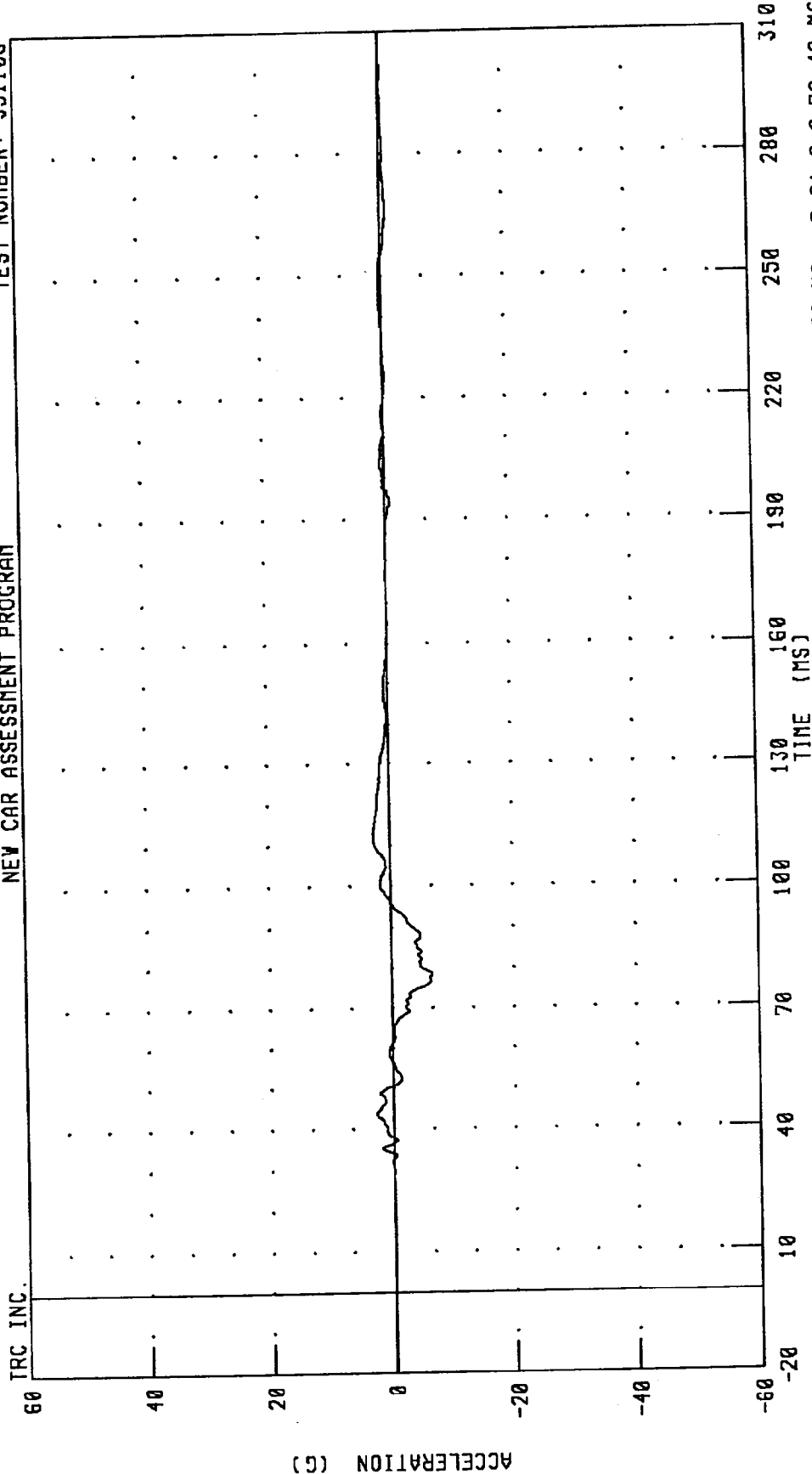


CHANNEL: CSTXR2 FILTER: CH. CLASS 180

PEAK DATA: 5.63 G @ 203.36 MS; -47.69 G @ 79.36 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST Y-AXIS ACCELERATION - REDUNDANT
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108



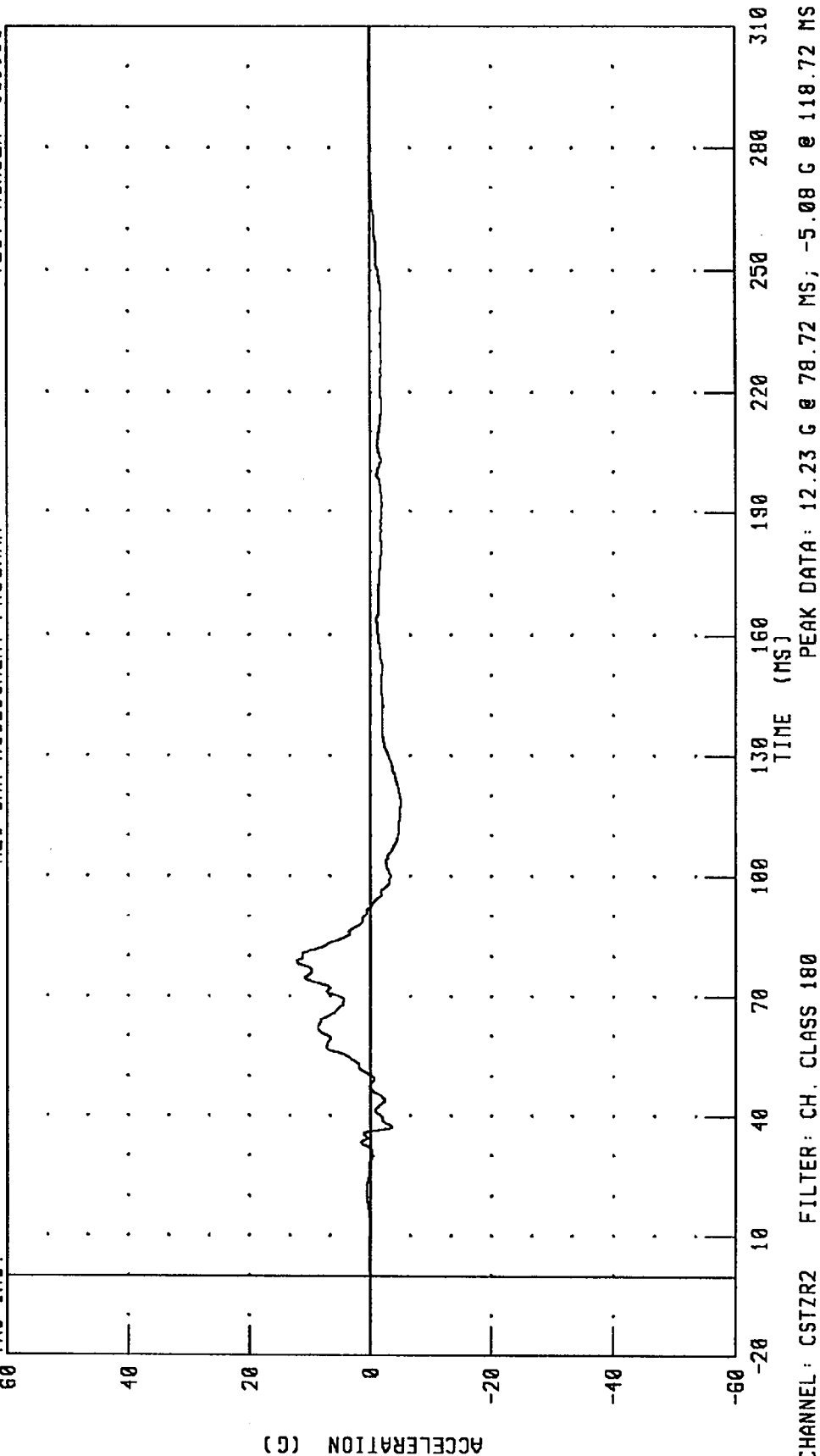
CHANNEL: CSTYR2 FILTER: CH. CLASS 180

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST Z-AXIS ACCELERATION - REDUNDANT

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



CHANNEL: CSTZR2 FILTER: CH. CLASS 180

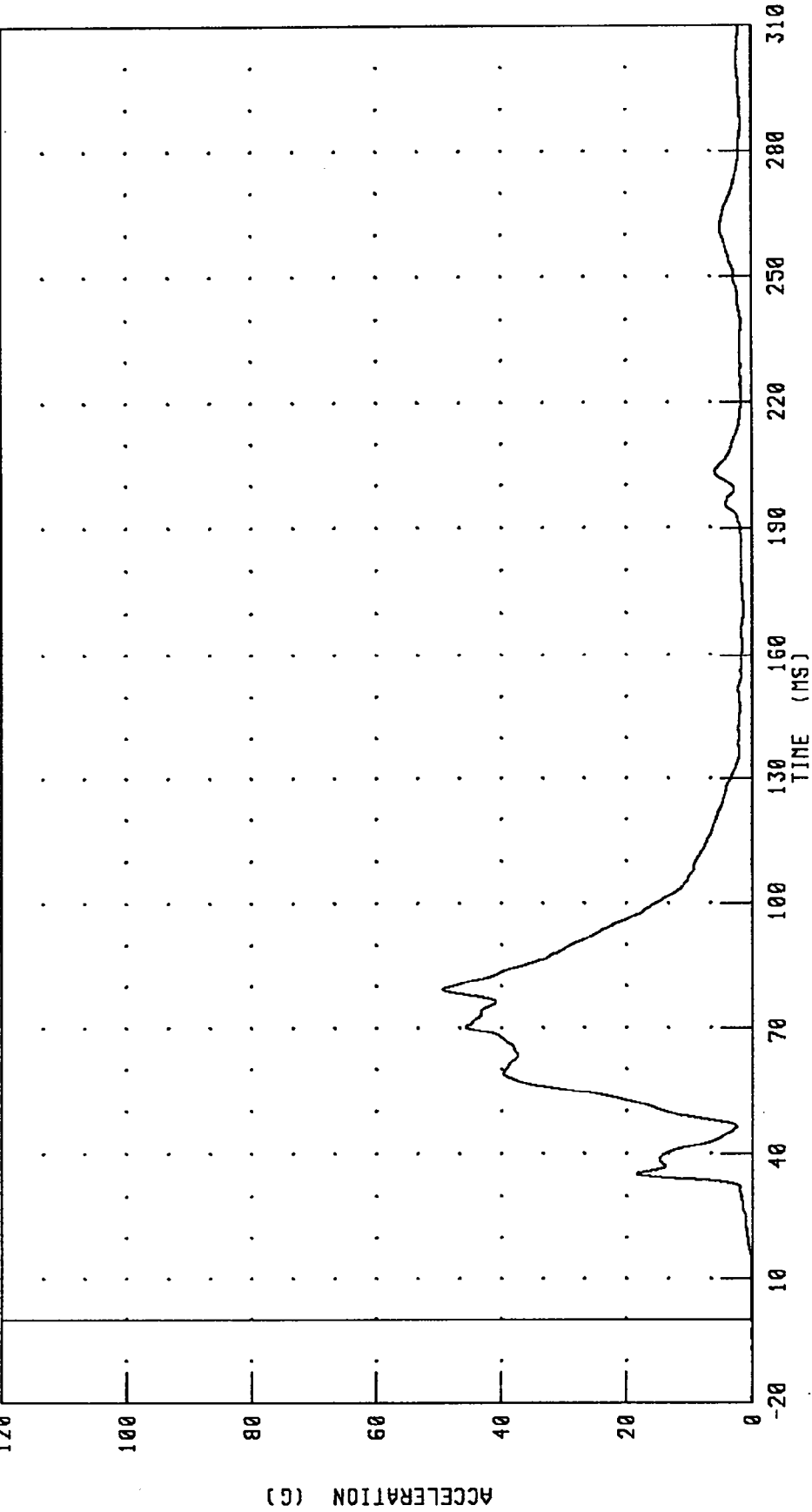
PEAK DATA: 12.23 G @ 78.72 MS; -5.08 G @ 118.72 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST RESULTANT ACCELERATION - REDUNDANT

NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

TRC INC.



CHANNEL: CSTR2 FILTER: CH. CLASS 180

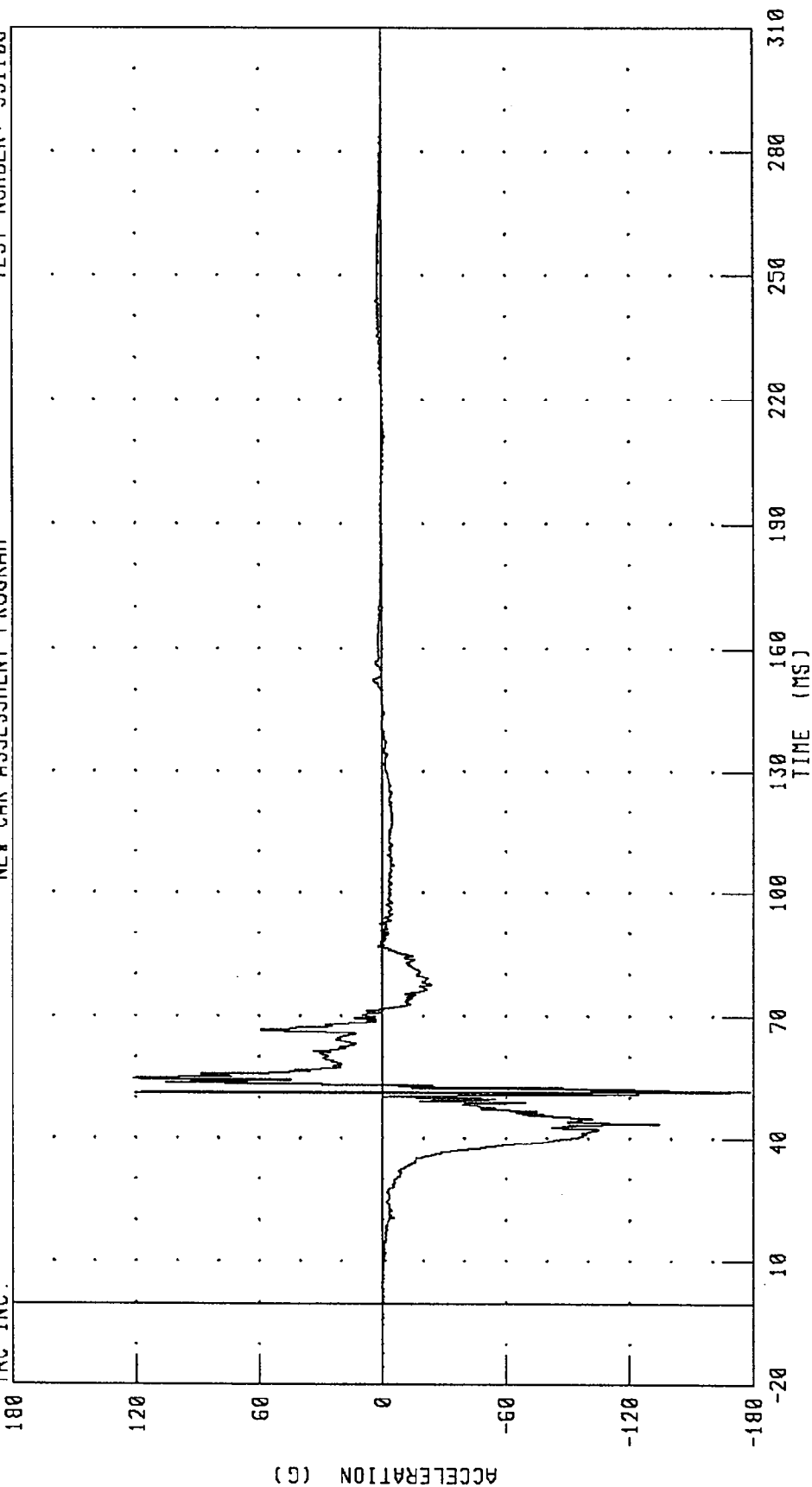
PEAK DATA: 49.45 G @ 79.28 MS; 0.02 G @ -20.00 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER LEFT FOOT X-AXIS ACCELERATION

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



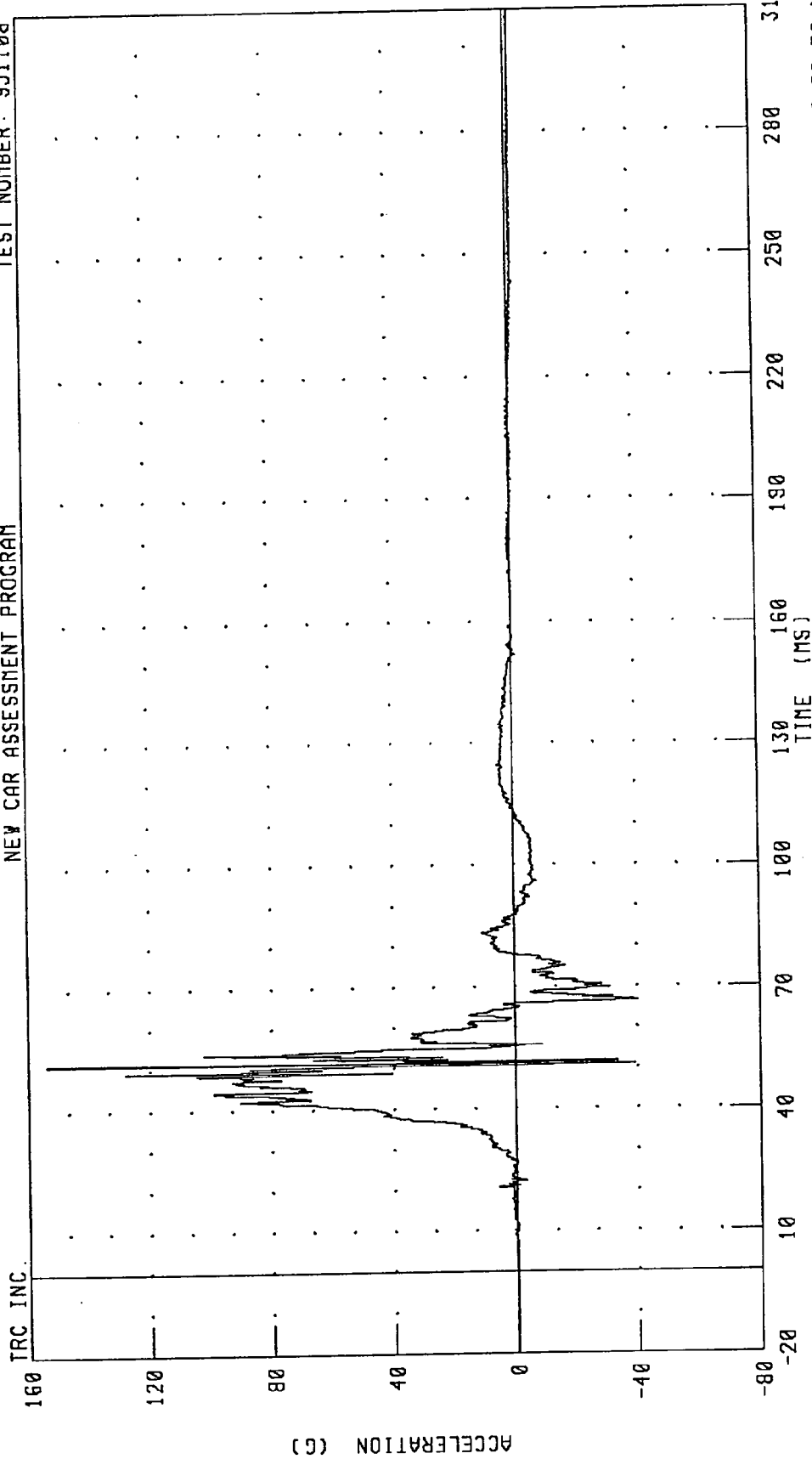
PEAK DATA: 121.65 G @ 54.72 MS; -178.04 G @ 51.60 MS

CHANNEL: FTLXG2 FILTER: CH. CLASS 1000

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER LEFT FOOT Z-AXIS ACCELERATION AT HEEL

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM



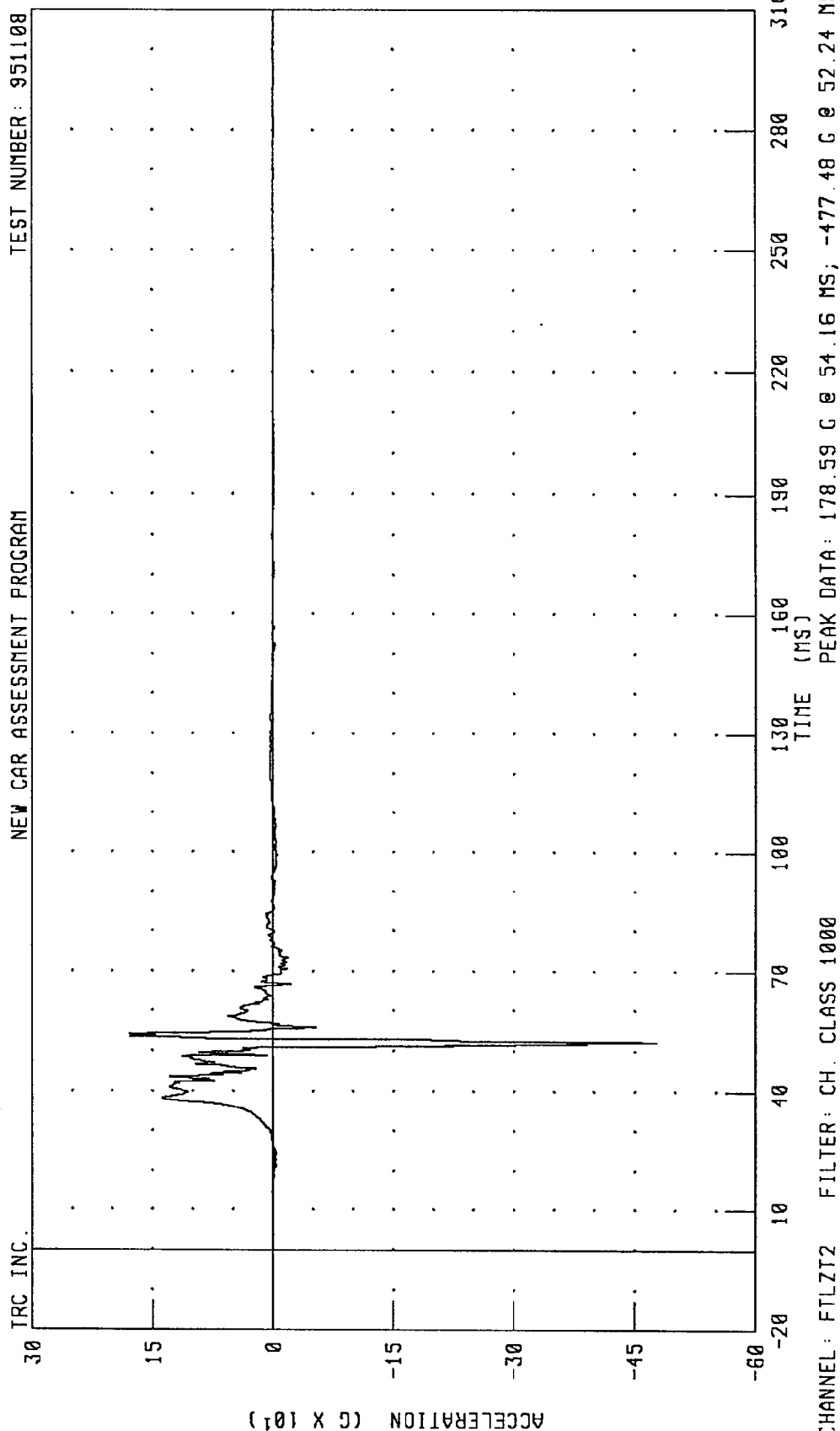
PEAK DATA: 153.90 G @ 51.28 MS; -40.16 G @ 66.72 MS

CHANNEL: FTLZH2 FILTER: CH. CLASS 1000

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER LEFT FOOT Z-AXIS ACCELERATION AT TOE

NEW CAR ASSESSMENT PROGRAM

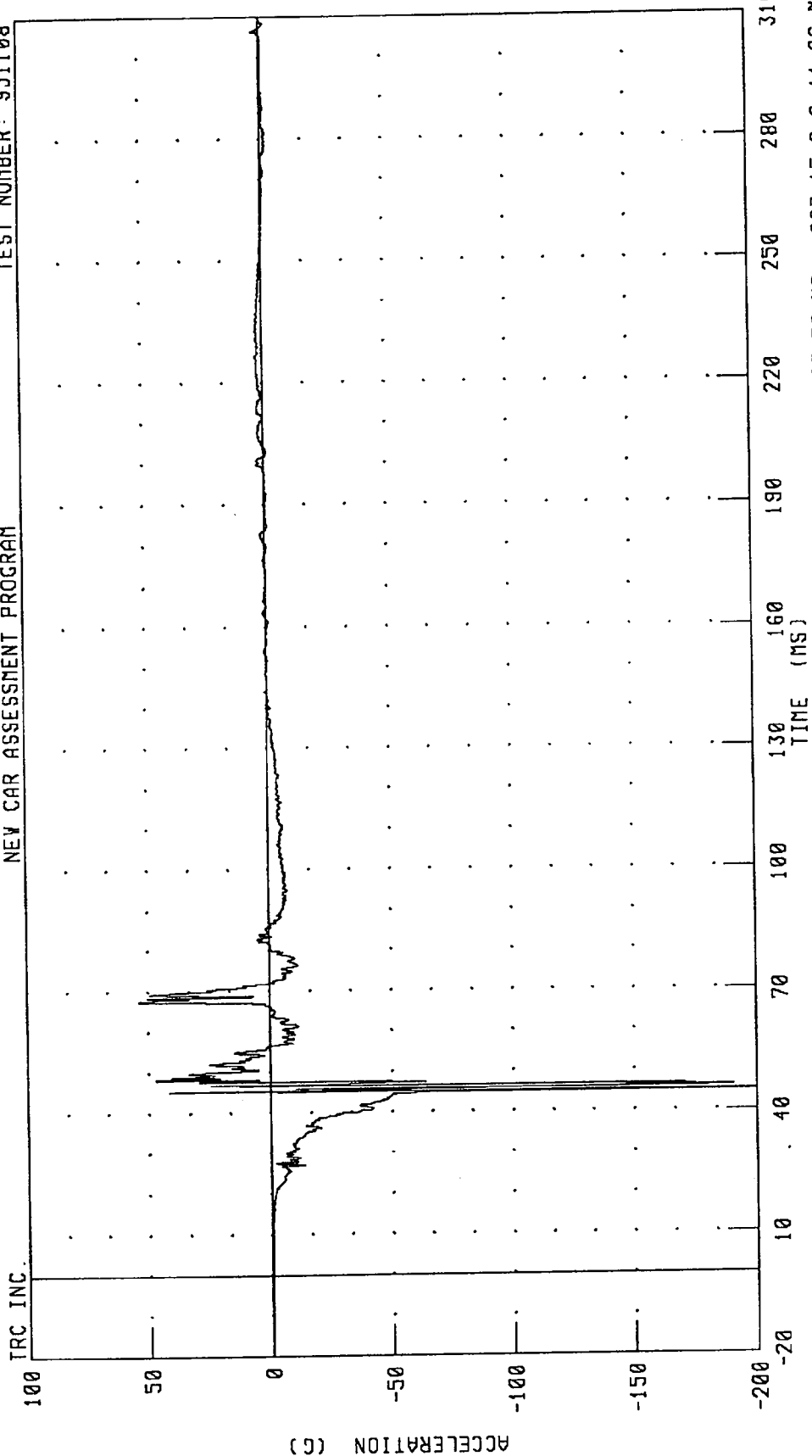
TEST NUMBER: 951108



CHANNEL: FTLZT2 FILTER: CH. CLASS 1000

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER RIGHT FOOT X-AXIS ACCELERATION
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108



PEAK DATA: 53.79 G @ 67.52 MS; -203.15 G @ 44.96 MS

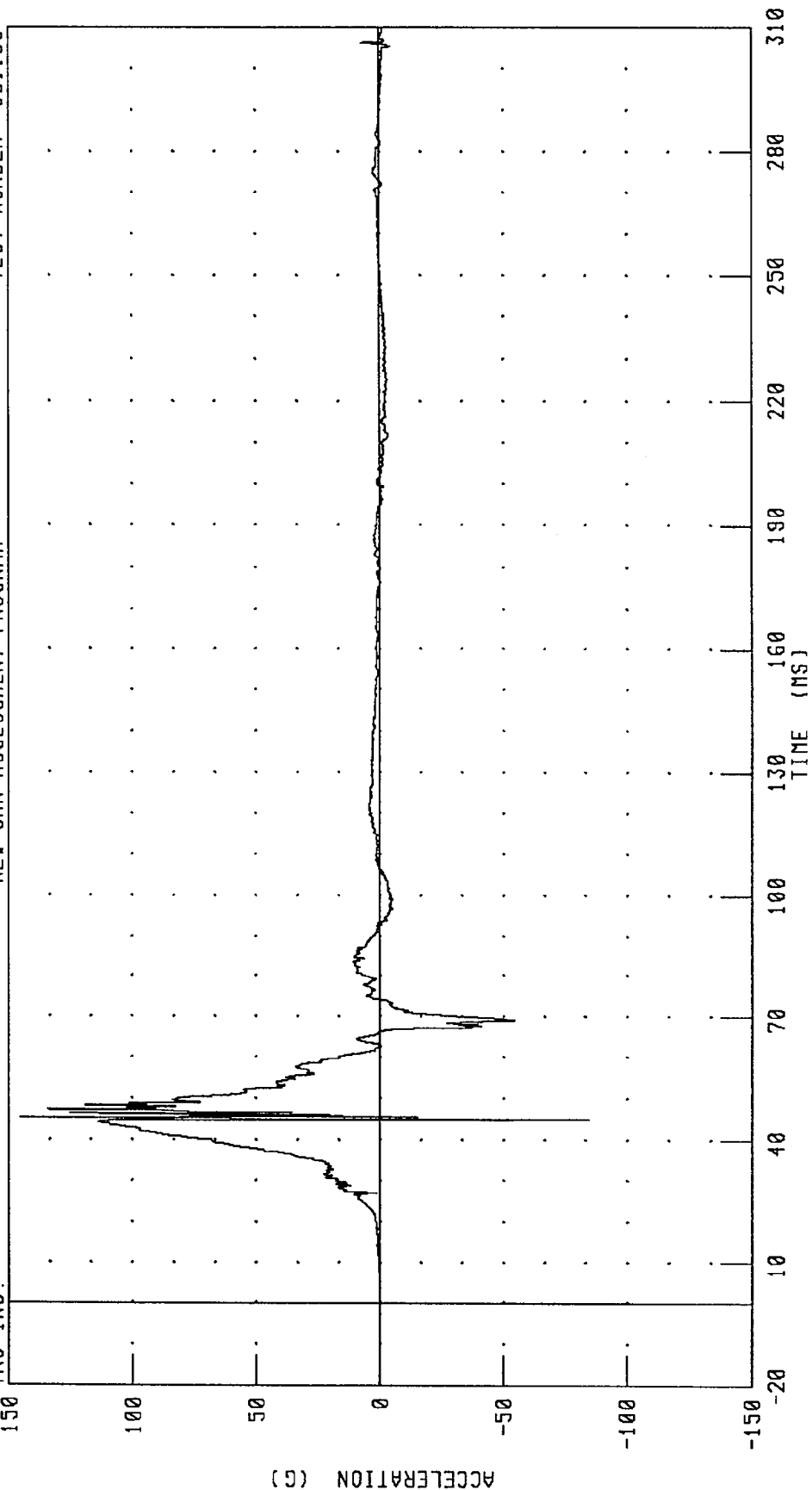
CHANNEL: FTRXG2 FILTER: CH. CLASS 1000

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER RIGHT FOOT Z-AXIS ACCELERATION AT HEEL

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 145.14 G @ 45.36 MS; -84.44 G @ 45.04 MS

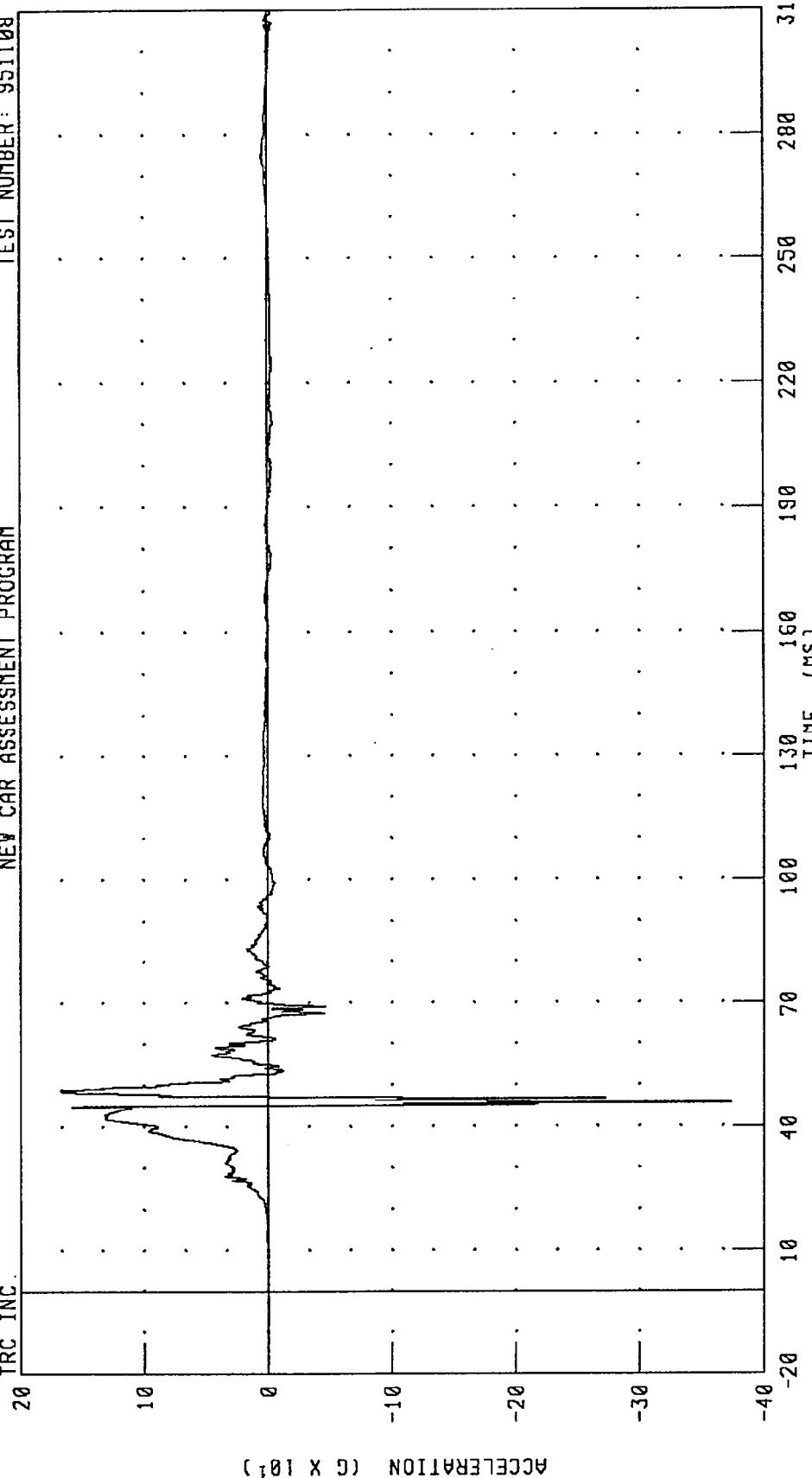
CHANNEL: FTRZH2 FILTER: CH. CLASS 1000

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER RIGHT FOOT Z-AXIS ACCELERATION AT TOE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.

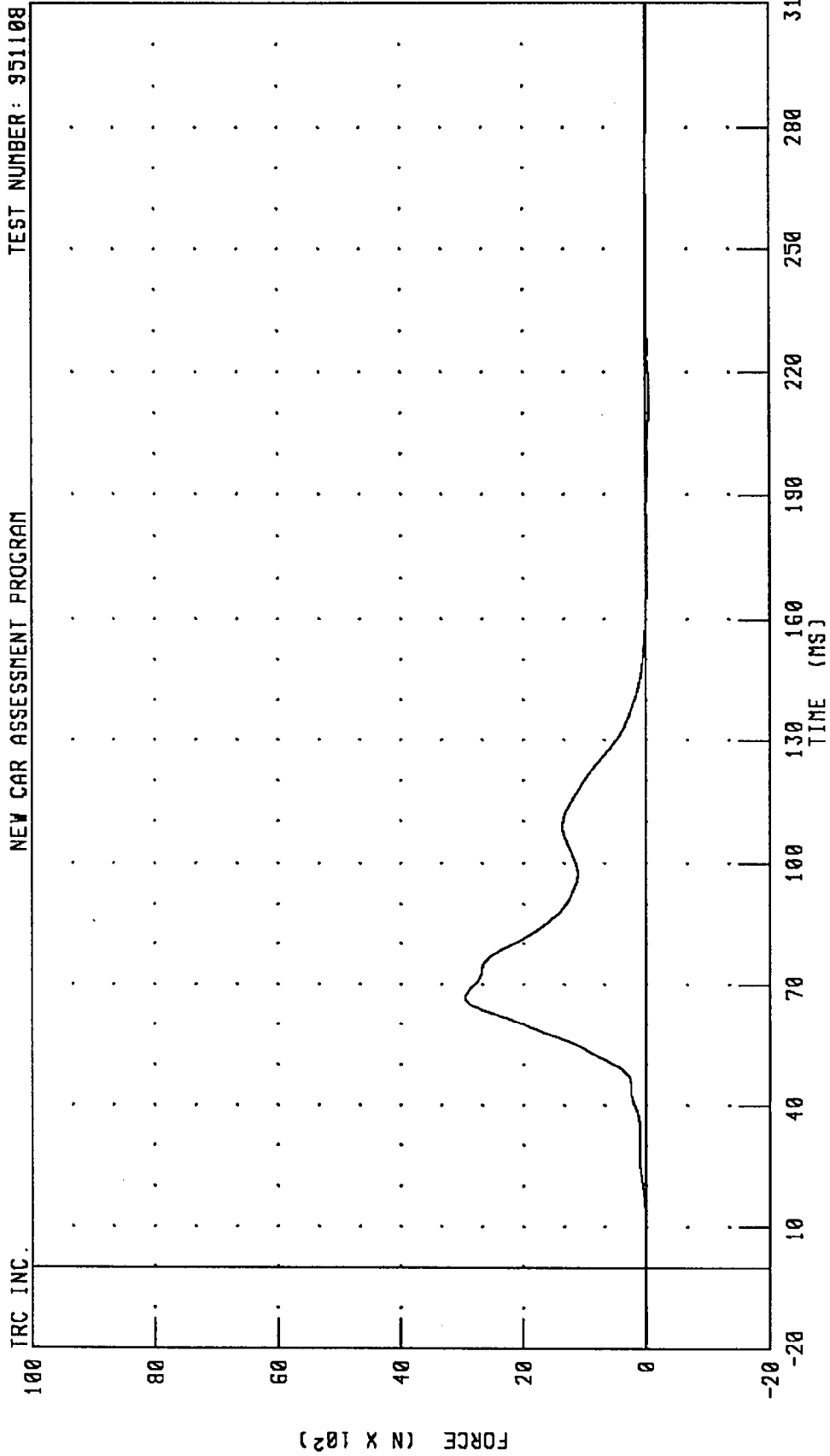


PEAK DATA: 167.95 G @ 48.64 MS; -373.78 G @ 45.68 MS

CHANNEL: FTRZT2 FILTER: CH. CLASS 1000

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER LAP BELT OUTBOARD FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

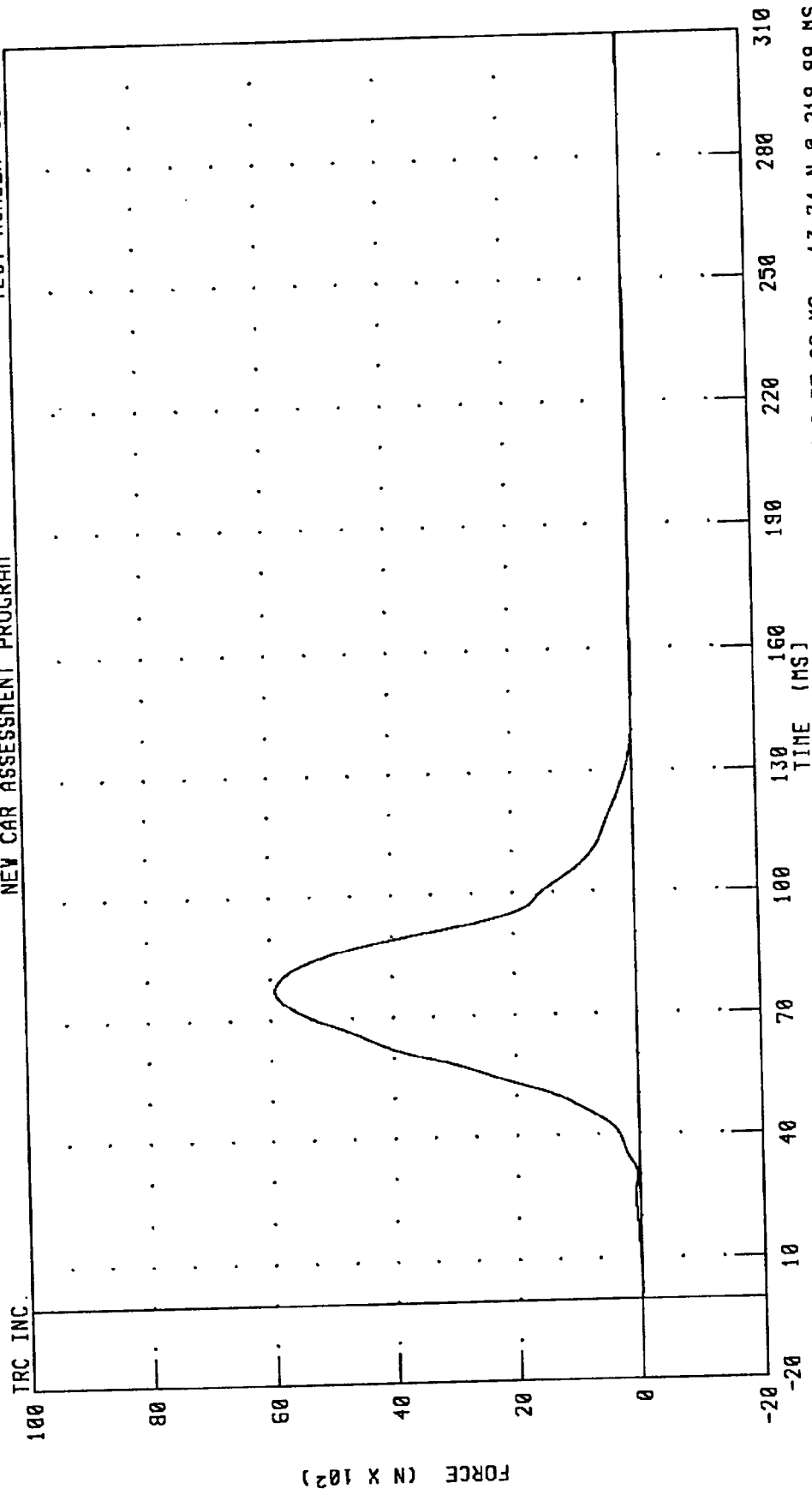


CHANNEL: LBOF1 FILTER: CH. CLASS 60

PEAK DATA: 2952.79 N @ 66.80 MS; -44.39 N @ 218.00 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
DRIVER SHOULDER BELT FORCE
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108



PEAK DATA: 5926.36 N @ 77.20 MS; -13.74 N @ 218.88 MS

CHANNEL: SHBF1 FILTER: CH. CLASS 60

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
DRIVER SHOULDER BELT DISPLACEMENT

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.

250

200

150

100

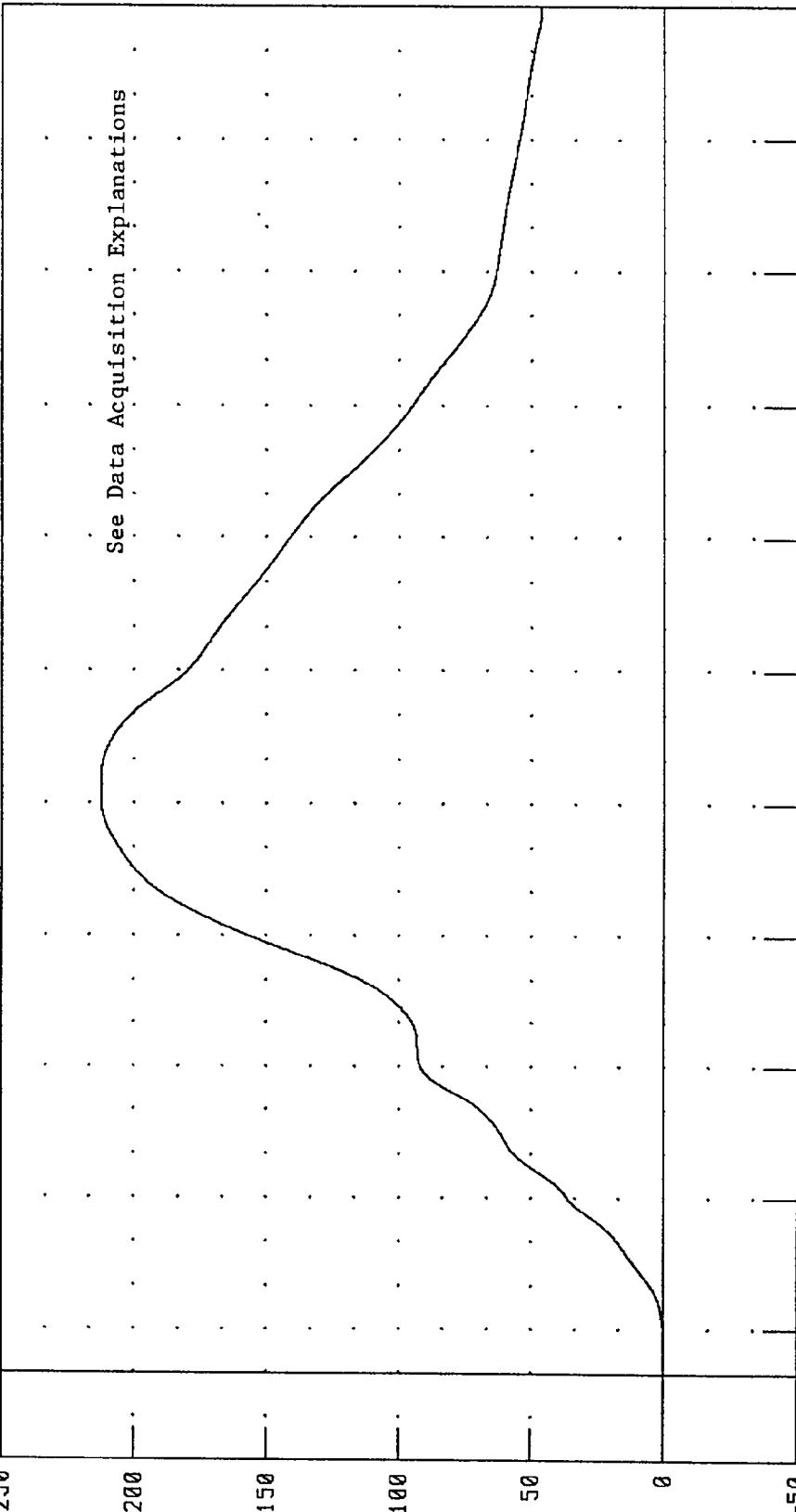
50

0

-50

DISPLACEMENT (MM)

See Data Acquisition Explanations



TIME (MS)

130 160 190 220 250 280 310

CHANNEL: SHB01 FILTER: CH. CLASS 60

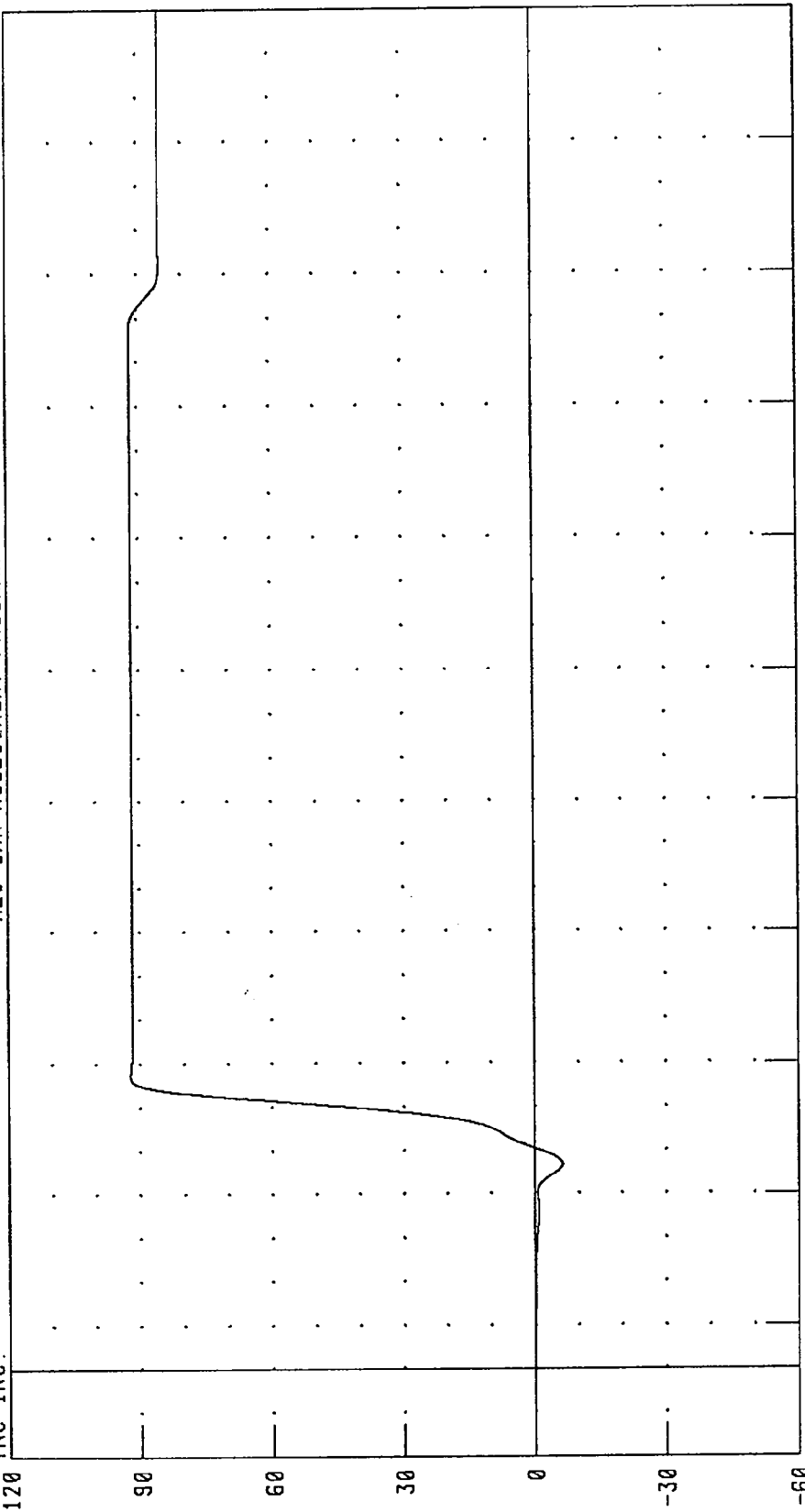
PEAK DATA: 212.32 MM @ 130.64 MS; -0.02 MM @ 6.72 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER SEAT BELT EXTENSION
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

TRC INC.

DISPLACEMENT (MM X 10⁻¹)



PEAK DATA: 9.21 MM @ 67.36 MS; -0.64 MM @ 46.80 MS

CHANNEL: SBED1 FILTER: CH. CLASS 60

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER LAP BELT OUTBOARD FORCE
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

TRC INC.

100

80

FORCE (N X 10²)

60

40

20

0

-20

310 280 250 220 190 160 130 100 70 40 10 TIME (MS)

CHANNEL: LBOF2 FILTER: CH. CLASS 60

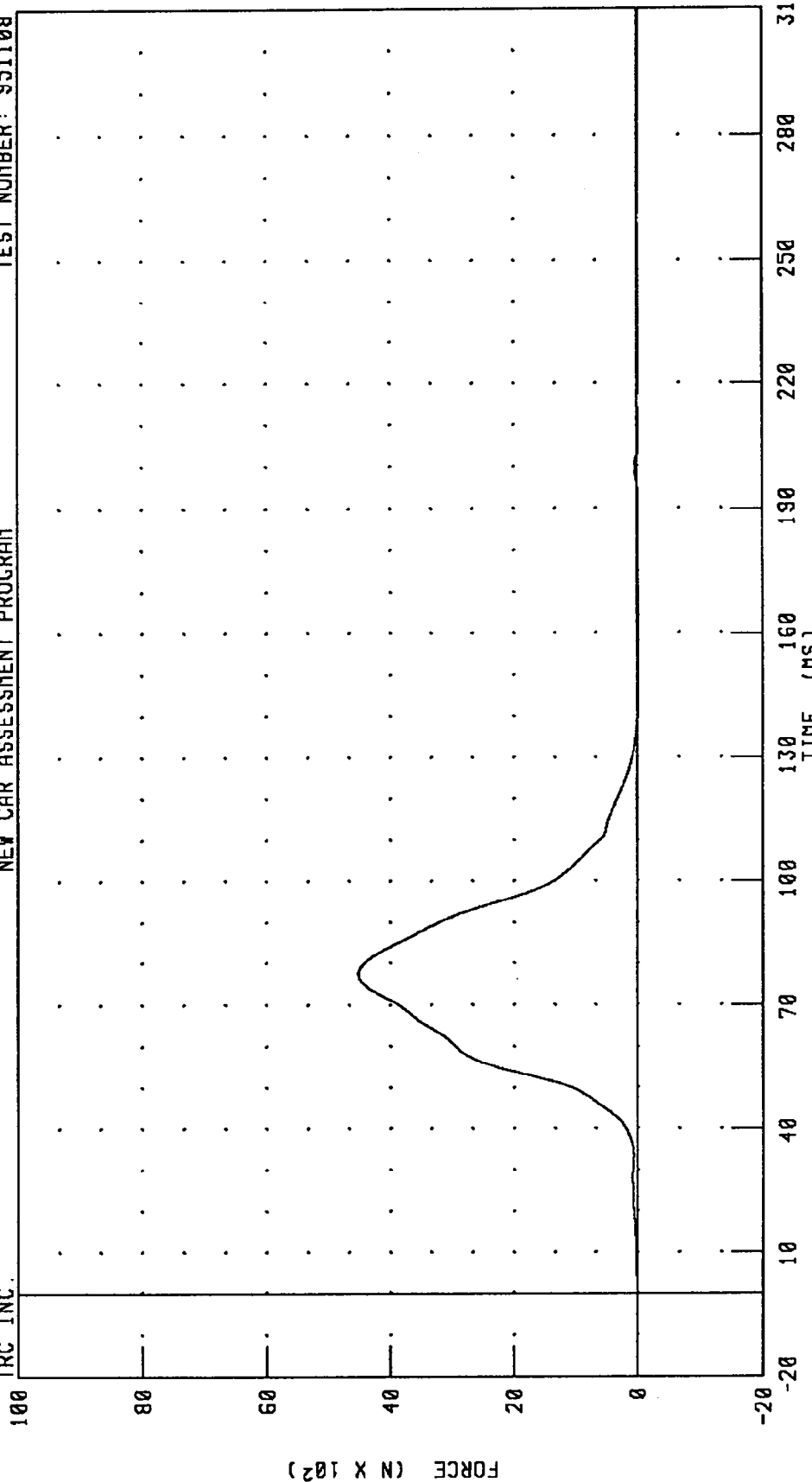
PEAK DATA: 1943.44 N @ 60.40 MS; -11.99 N @ 242.72 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER SHOULDER BELT FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 4517.93 N @ 77.52 MS; -19.67 N @ 205.28 MS

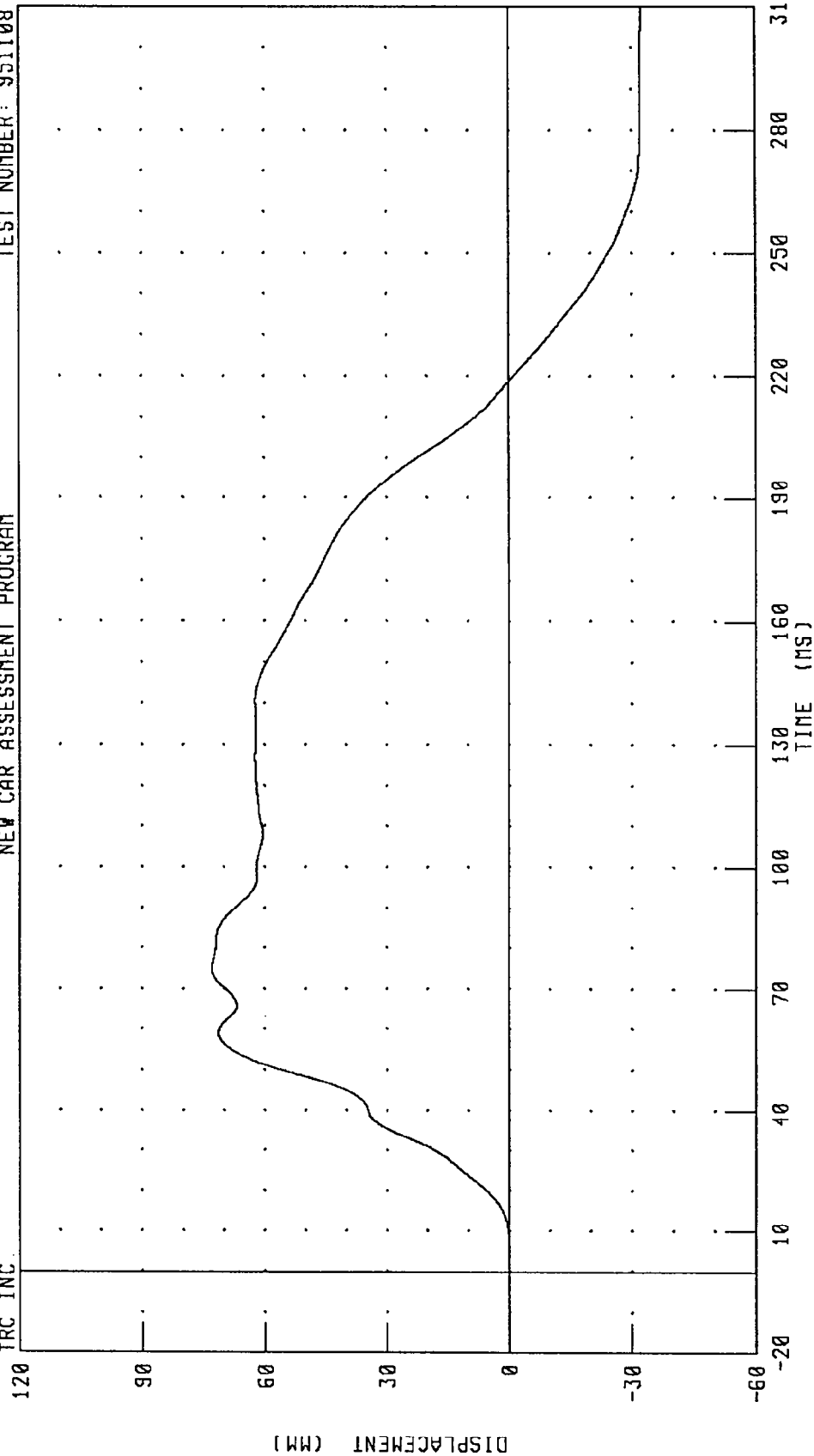
CHANNEL: SHBF2 FILTER: CH. CLASS 60

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER SHOULDER BELT DISPLACEMENT

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.

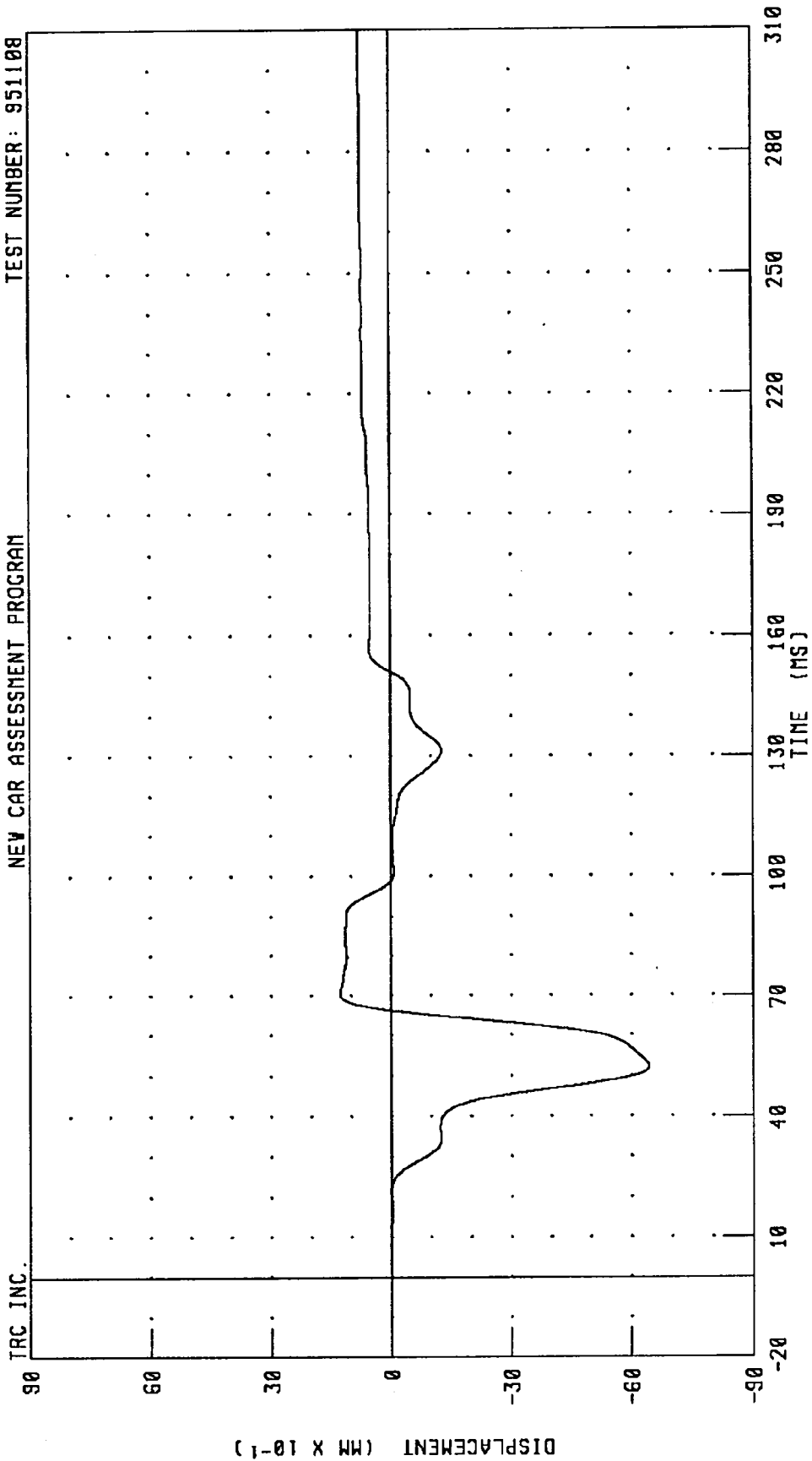


PEAK DATA: 72.98 MM @ 75.04 MS; -32.30 MM @ 309.36 MS

CHANNEL: SHBD2 FILTER: CH. CLASS 60

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER SEAT BELT EXTENSION
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

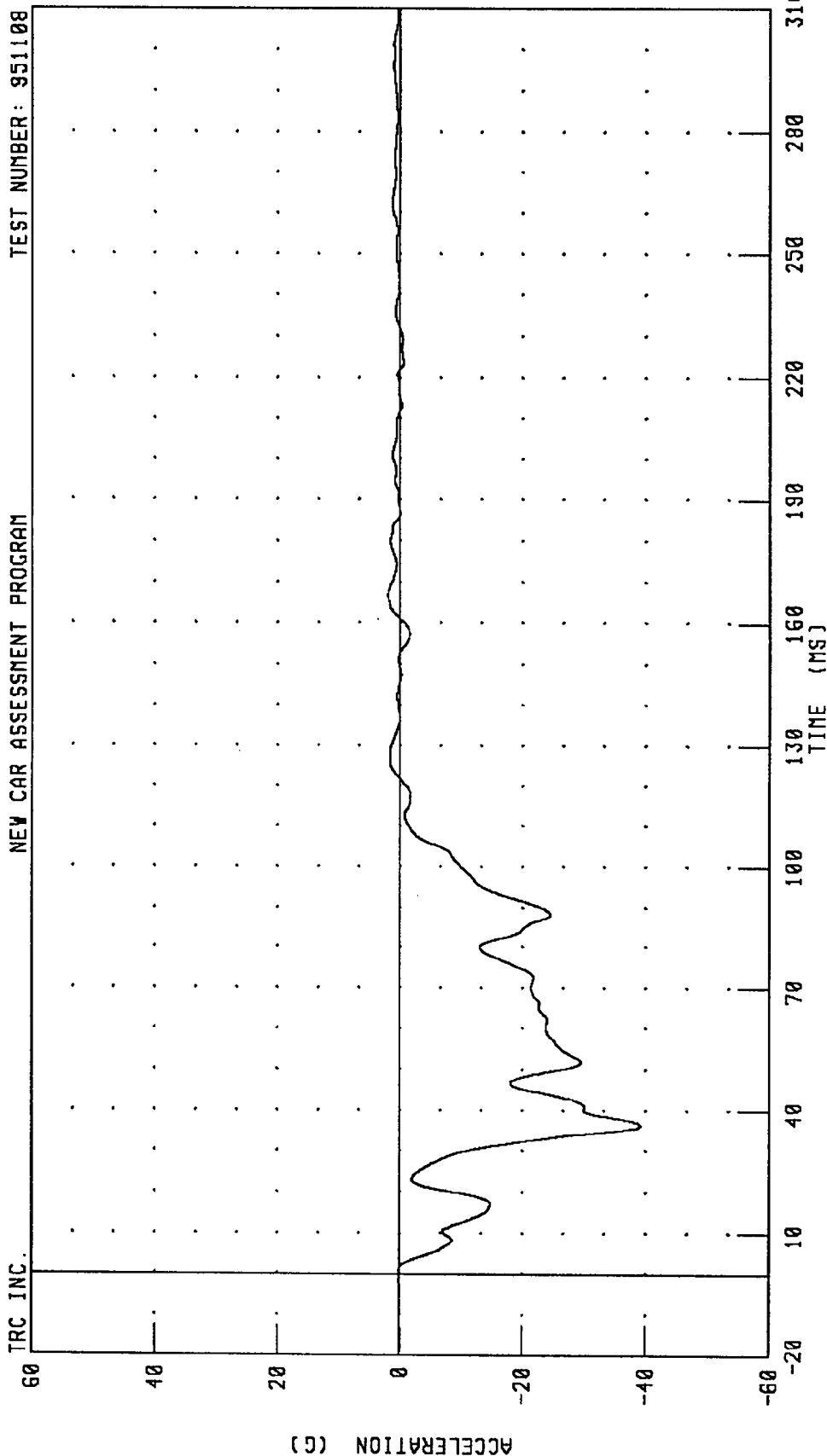


PEAK DATA: 1.28 NM @ 70.48 MS; -6.43 NM @ 52.24 MS

CHANNEL: SBED2 FILTER: CH. CLASS 60

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 LEFT REAR SEAT X-AXIS ACCELERATION
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108



PEAK DATA: 1.96 G @ 166.80 MS; -39.20 G @ 36.48 MS

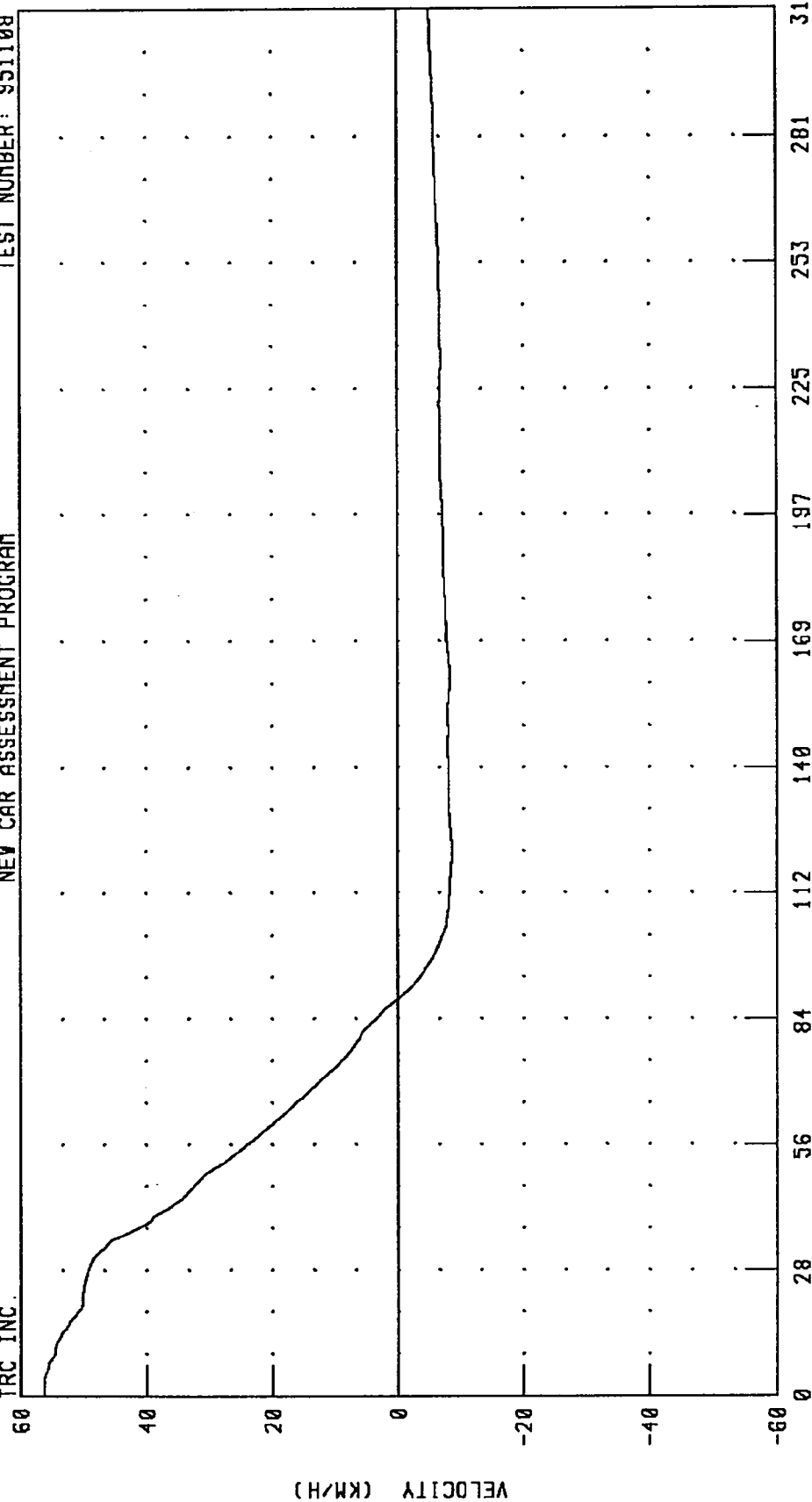
CHANNEL: TLRXG1 FILTER: CH. CLASS 60

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LEFT REAR SEAT X-AXIS VELOCITY

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 56.21 KN/H @ 3.44 MS; -8.61 KN/H @ 120.96 MS

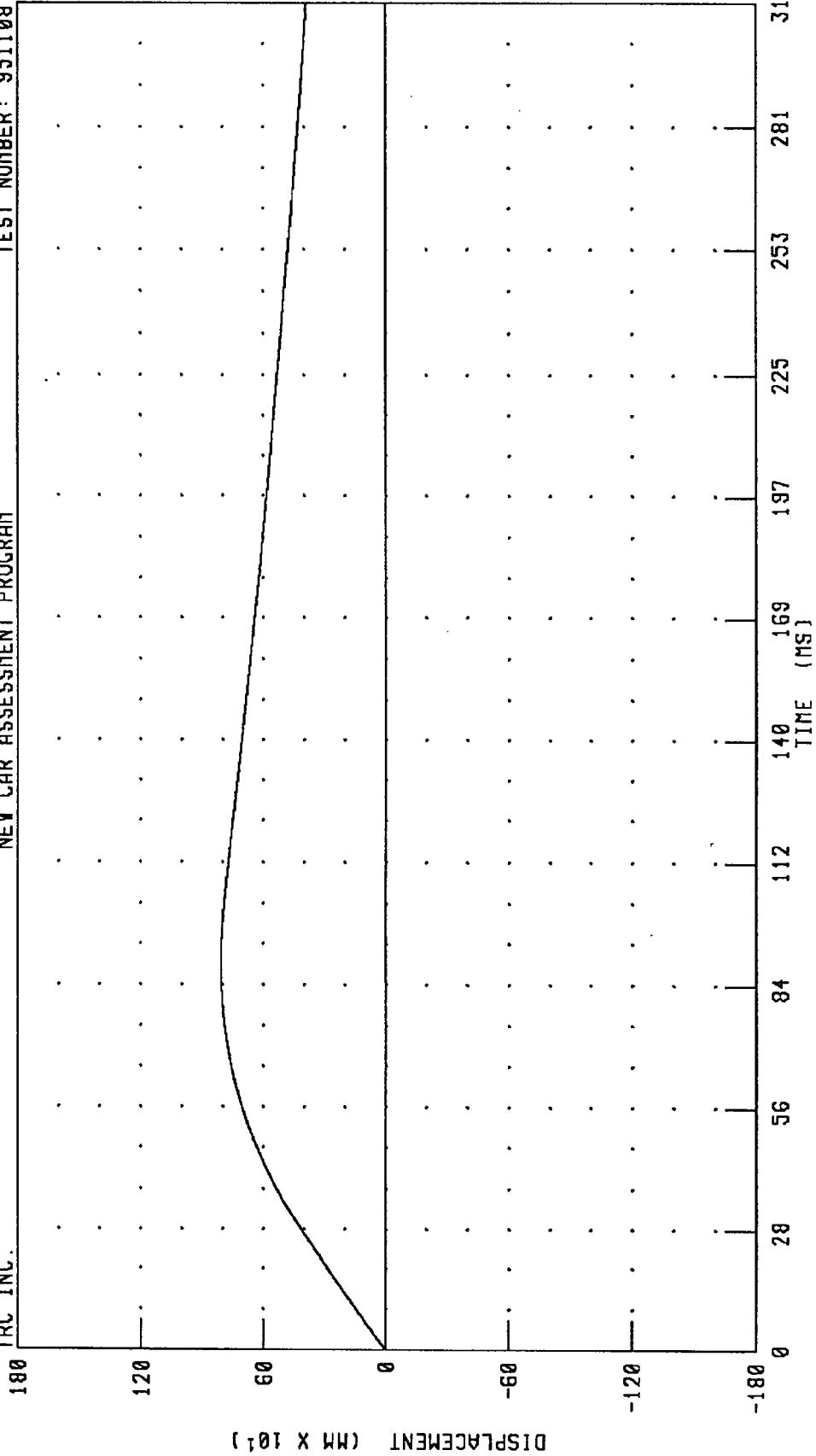
CHANNEL: TLRXV1 FILTER: CH. CLASS 180

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LEFT REAR SEAT X-AXIS DISPLACEMENT

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



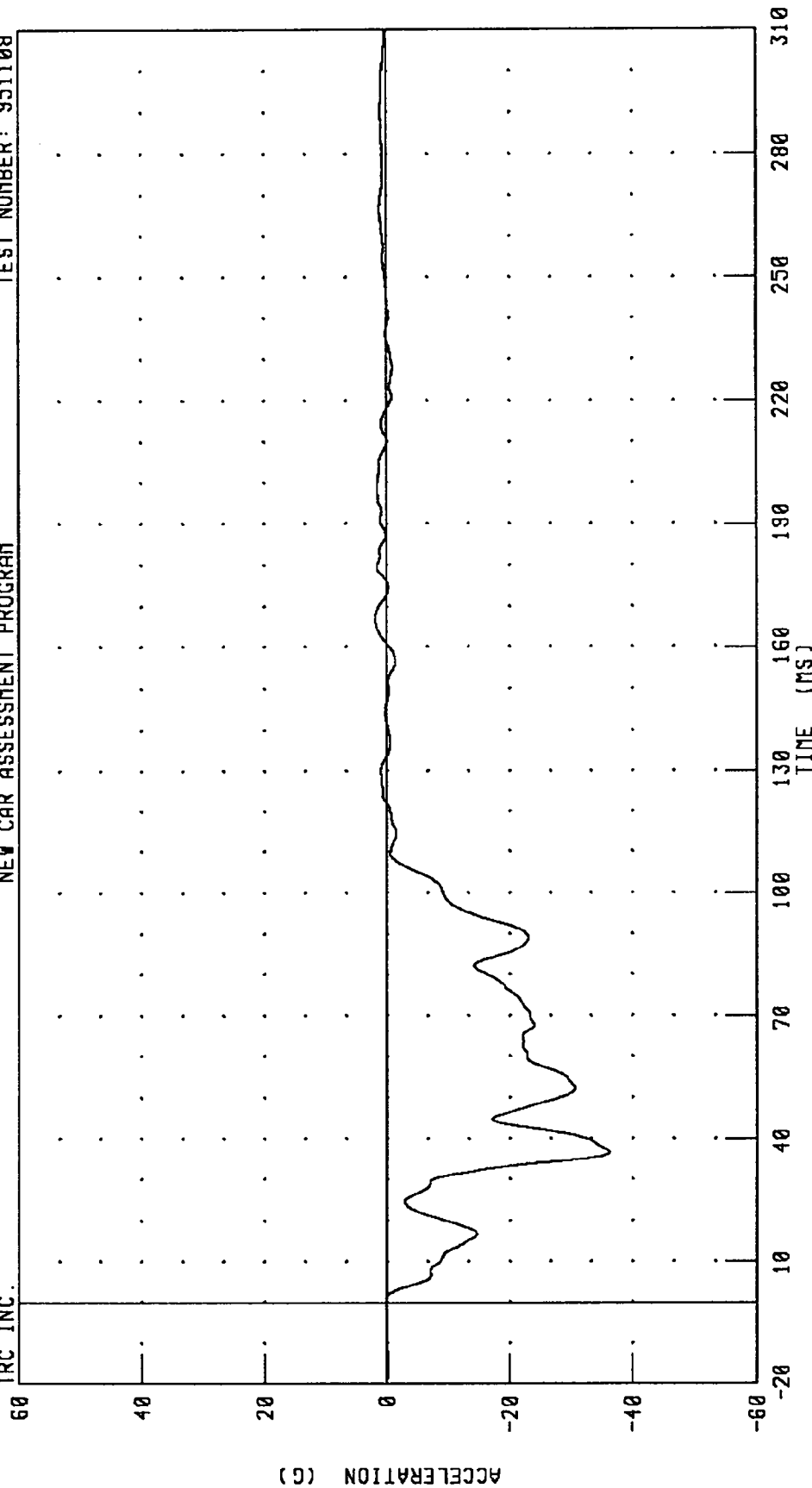
CHANNEL: TLRXD1 FILTER: CH. CLASS 180 PEAK DATA: 809.68 MM @ 89.04 MS; 0.00 MM @ 0.00 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 RIGHT REAR SEAT X-AXIS ACCELERATION

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.

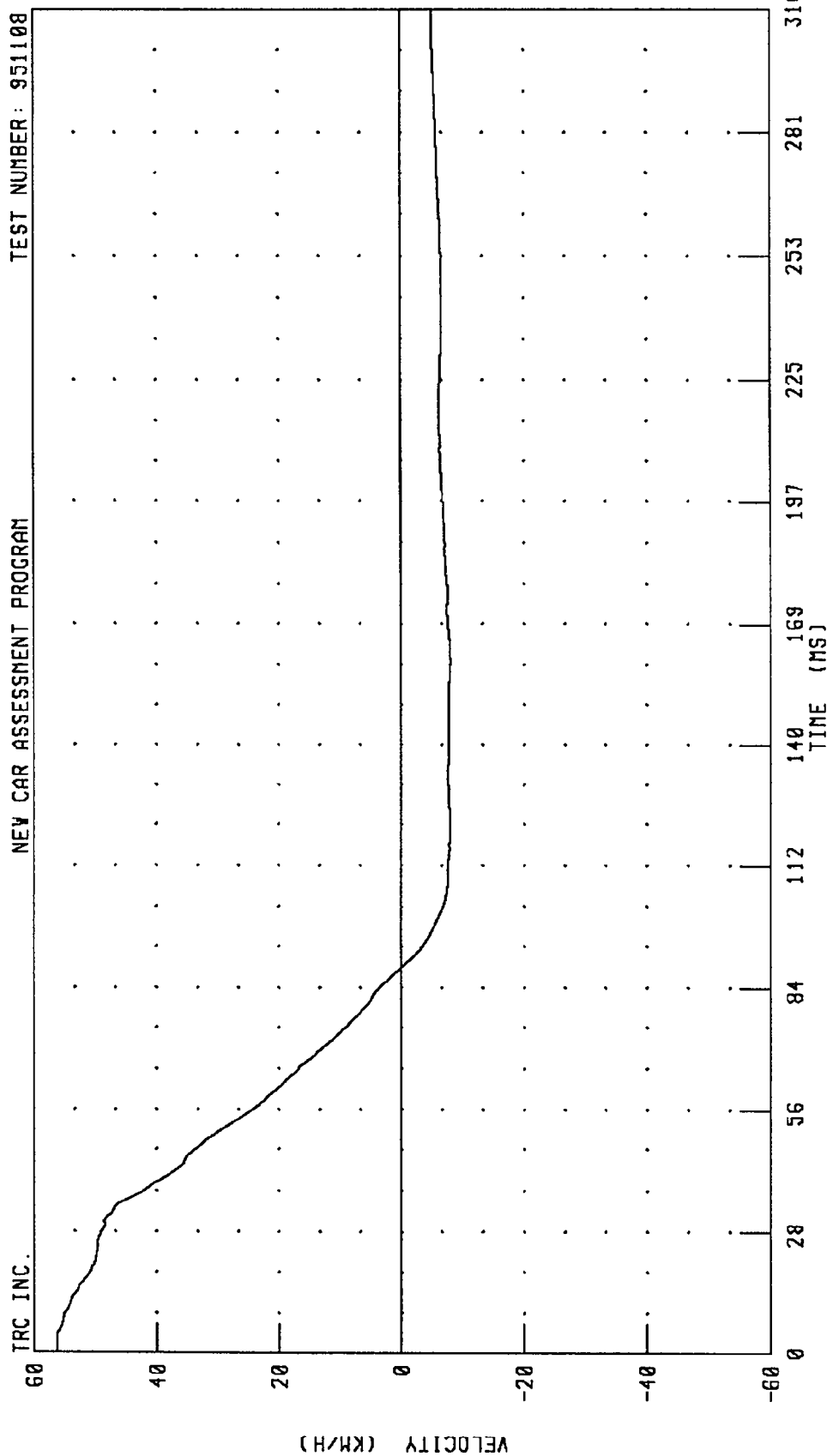


CHANNEL: TRRXG1 FILTER: CH. CLASS 60

PEAK DATA: 1.88 G @ 167.12 MS; -36.24 G @ 36.72 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 RIGHT REAR SEAT X-AXIS VELOCITY
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

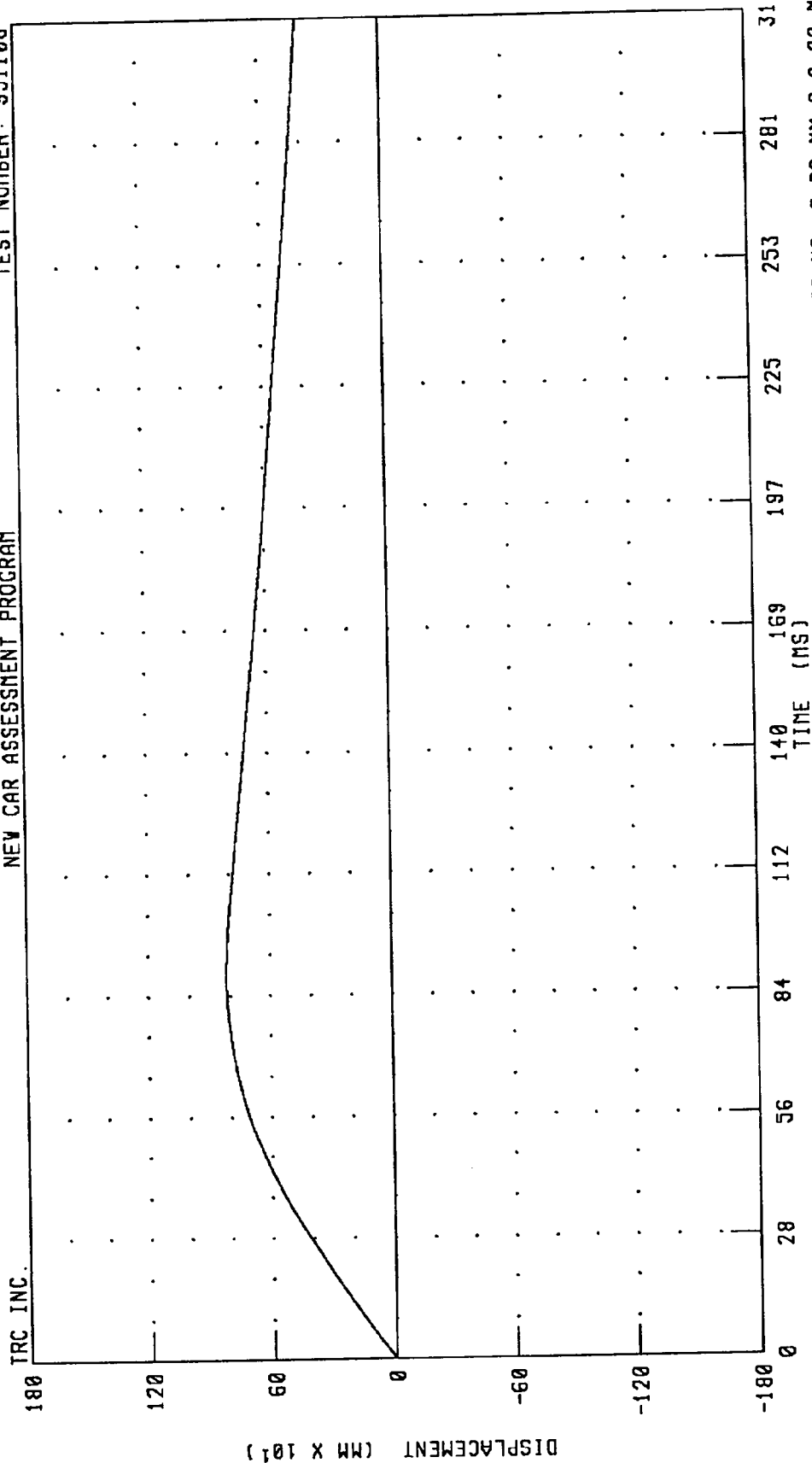


PEAK DATA: 56.21 KM/H @ 3.60 MS; -8.04 KM/H @ 160.40 MS

CHANNEL: TRRXV1 FILTER: CH. CLASS 180

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 RIGHT REAR SEAT X-AXIS DISPLACEMENT
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108



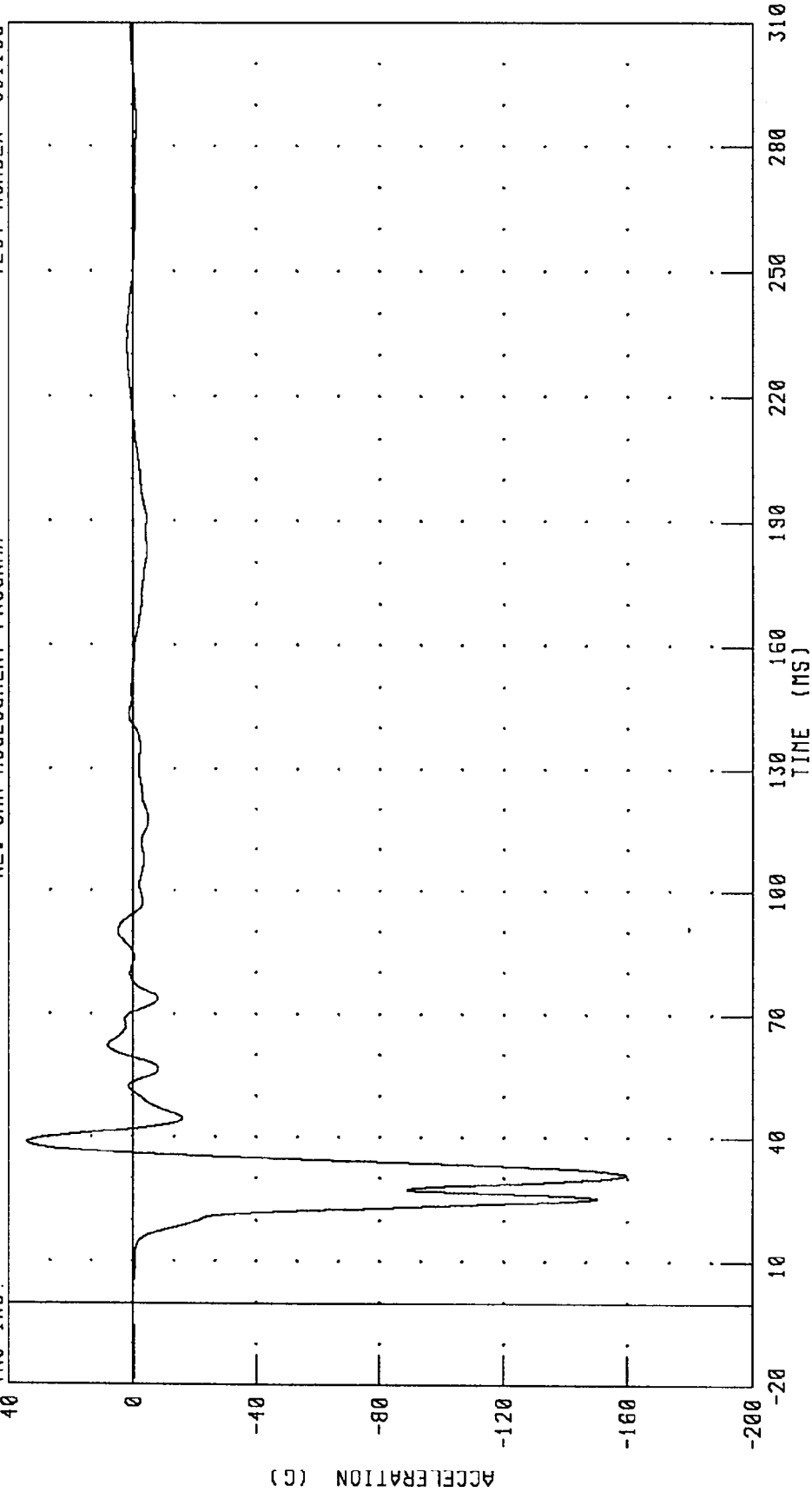
PEAK DATA: 816.70 MM @ 89.28 MS; 0.00 MM @ 0.00 MS

CHANNEL: TRRXD1 FILTER: CH. CLASS 180

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
ENGINE TOP X-AXIS ACCELERATION
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

TRC INC.



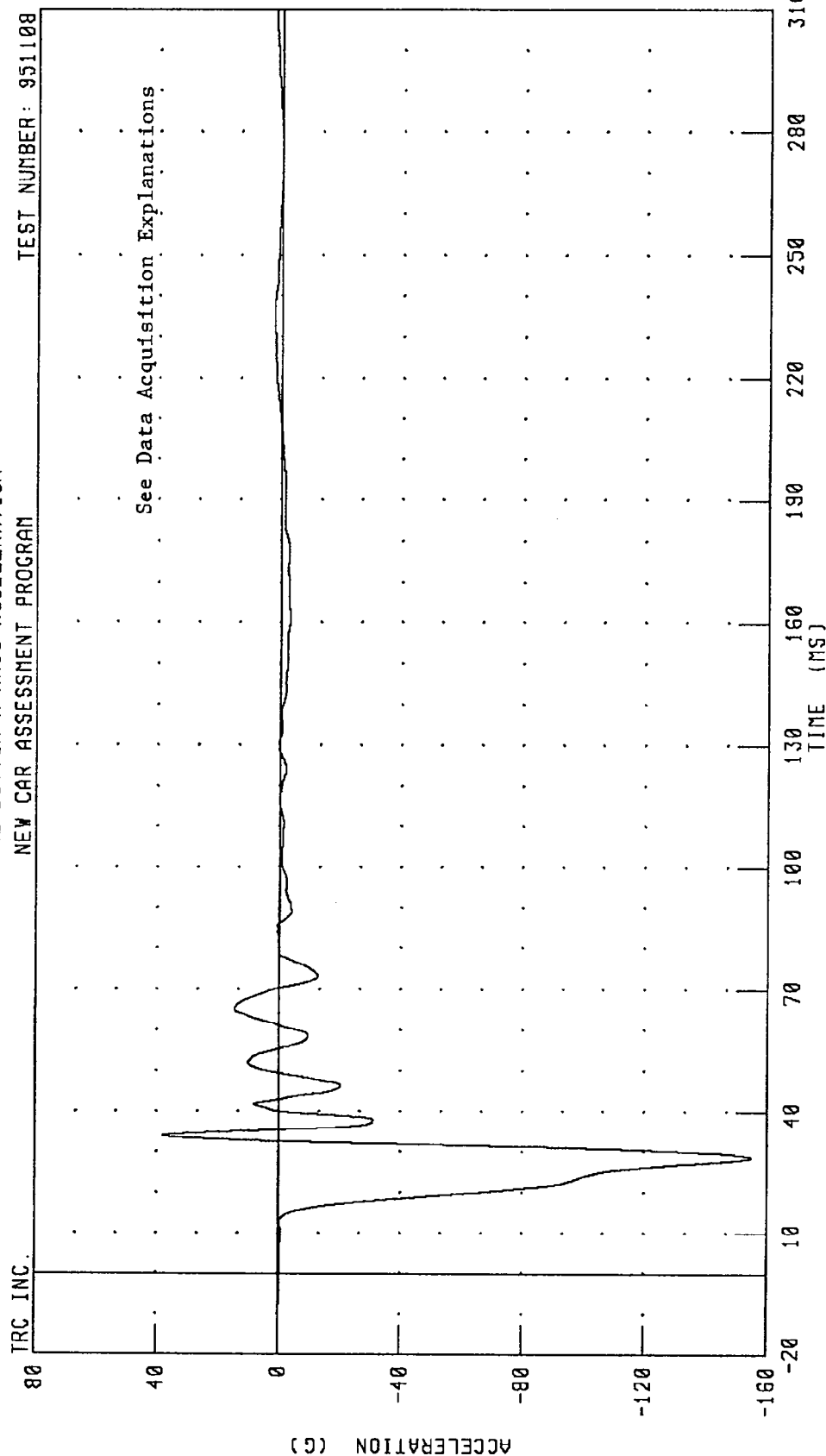
CHANNEL: ENGCG1 FILTER: CH. CLASS 60

PEAK DATA: 34.07 G @ 38.72 MS; -159.53 G @ 30.96 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
ENGINE BOTTOM X-AXIS ACCELERATION

NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108



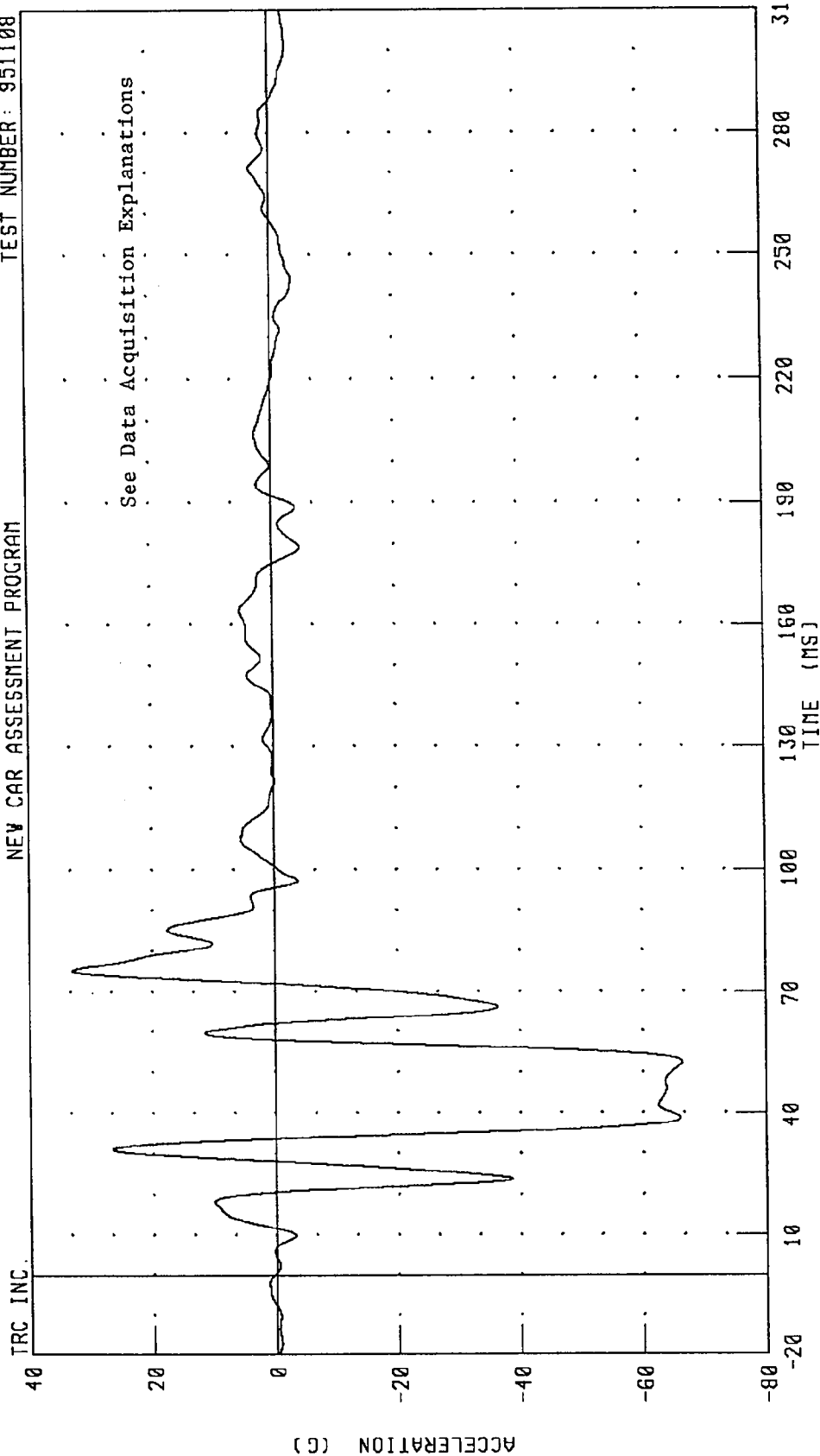
CHANNEL: ENCG2 FILTER: CH. CLASS 60

PEAK DATA: 37.89 G @ 34.08 MS; -154.80 G @ 28.72 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
RIGHT BRAKE CALIPER X-AXIS ACCELERATION

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM



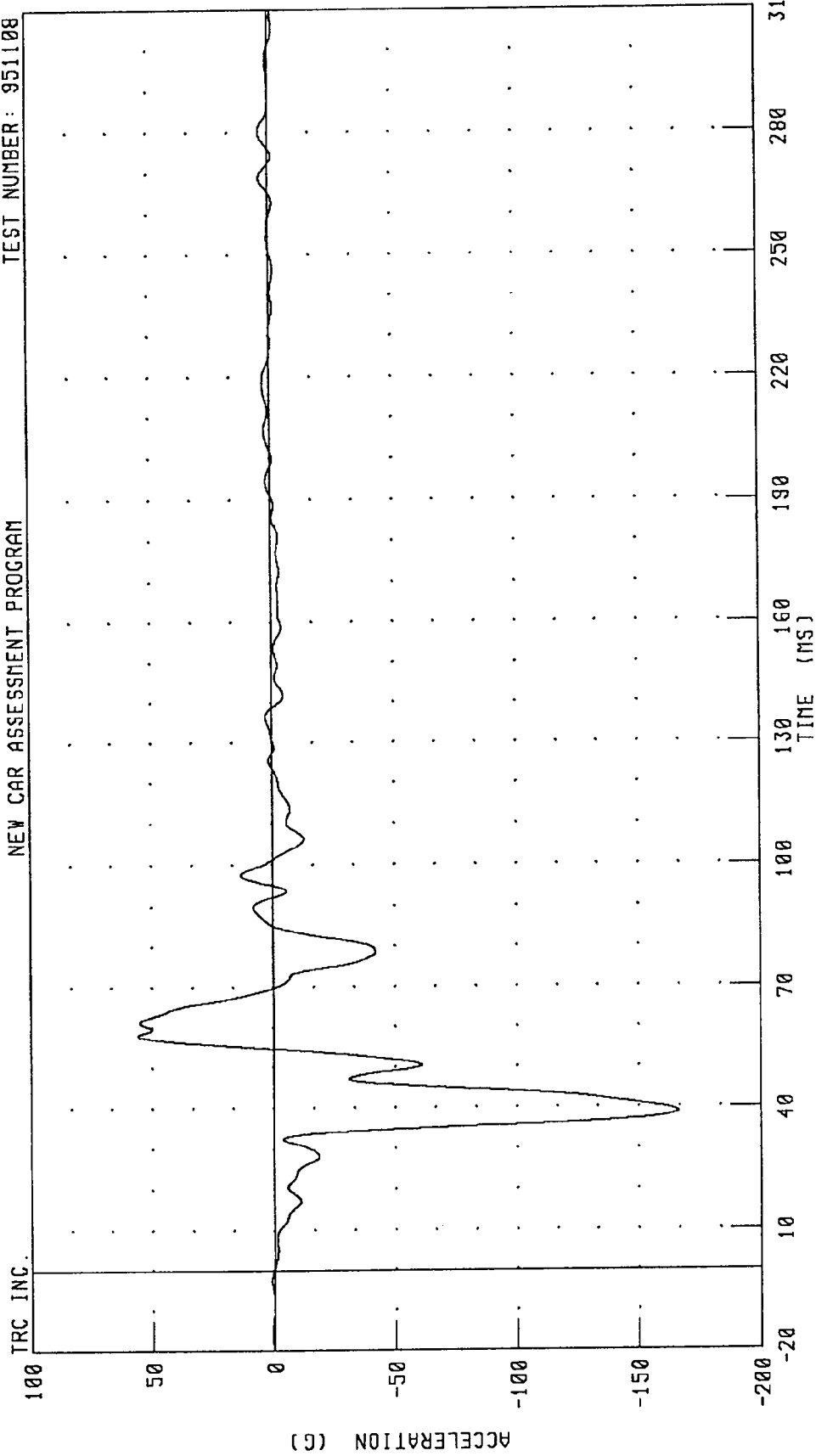
CHANNEL: BCRXG1 FILTER: CH. CLASS 60

PEAK DATA: 33.03 G @ 75.28 MS; -66.38 G @ 52.40 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LEFT BRAKE CALIPER X-AXIS ACCELERATION

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM



CHANNEL: BCLXG1 FILTER: CH. CLASS 60

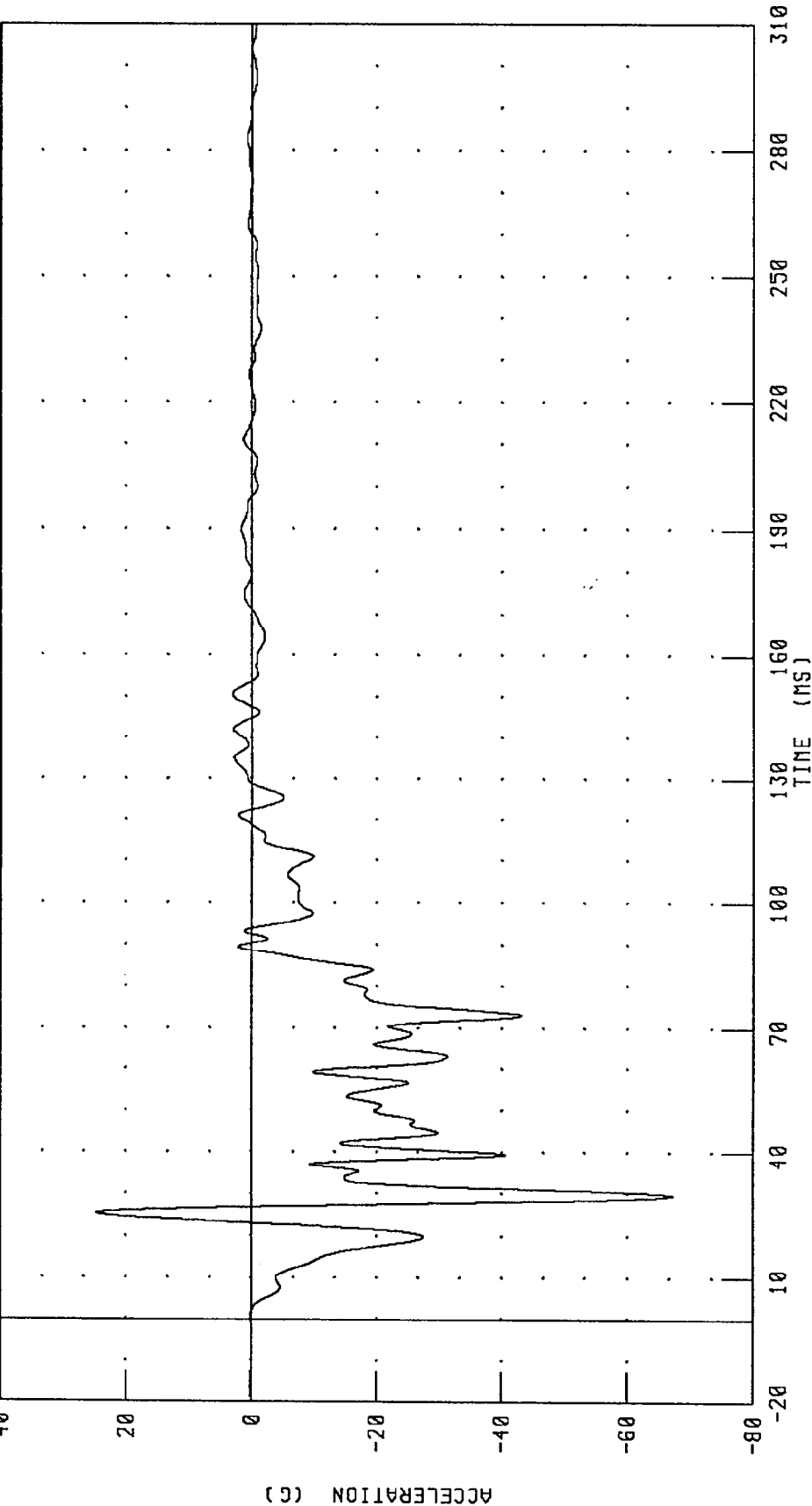
PEAK DATA: 55.87 G @ 58.00 MS; -166.23 G @ 38.96 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
INSTRUMENT PANEL CENTER X-AXIS ACCELERATION

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 24.78 G @ 25.28 MS, -67.17 G @ 29.68 MS

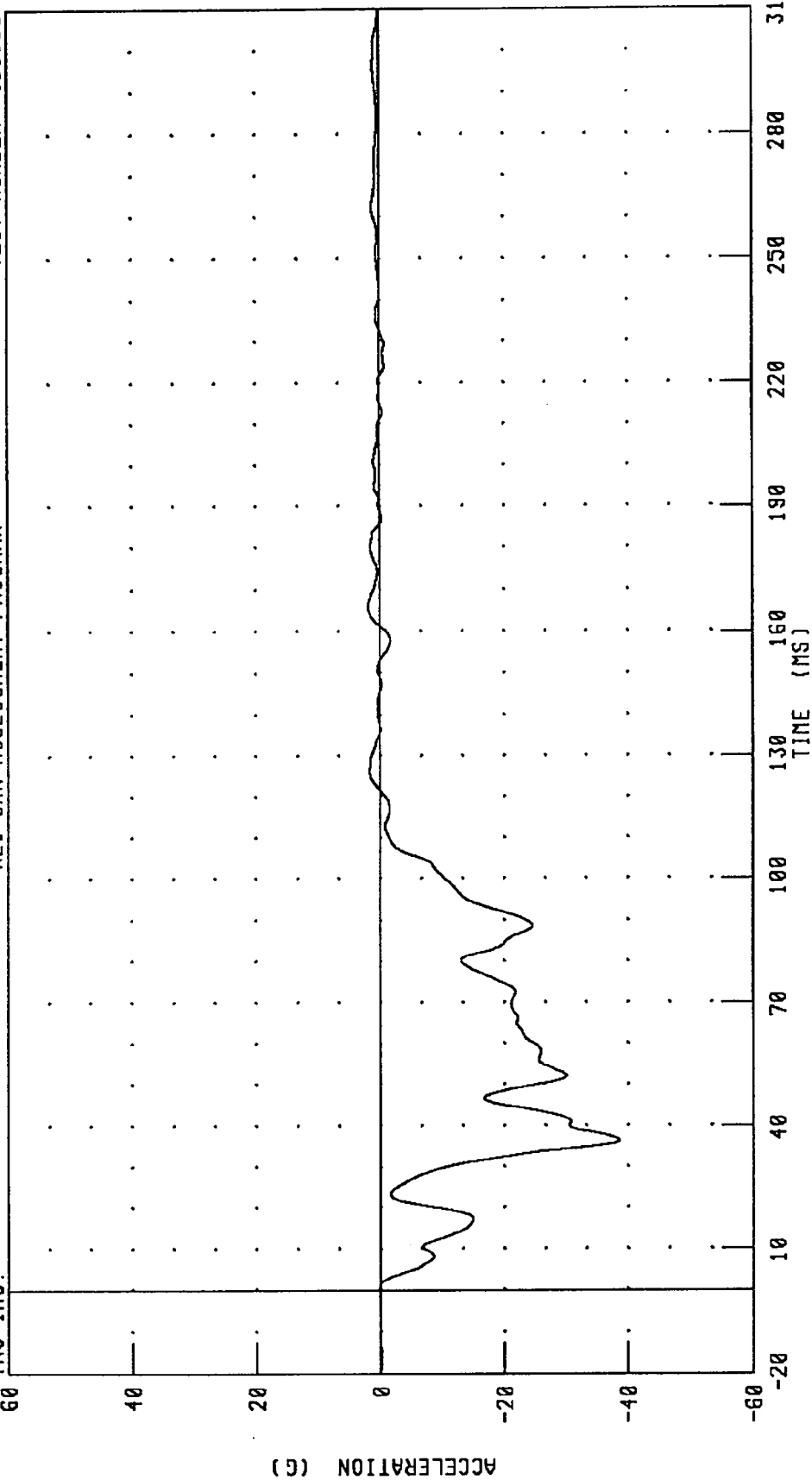
CHANNEL: DPCXG1 FILTER: CH. CLASS 60

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LEFT REAR SEAT REDUNDANT X-AXIS ACCELERATION

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



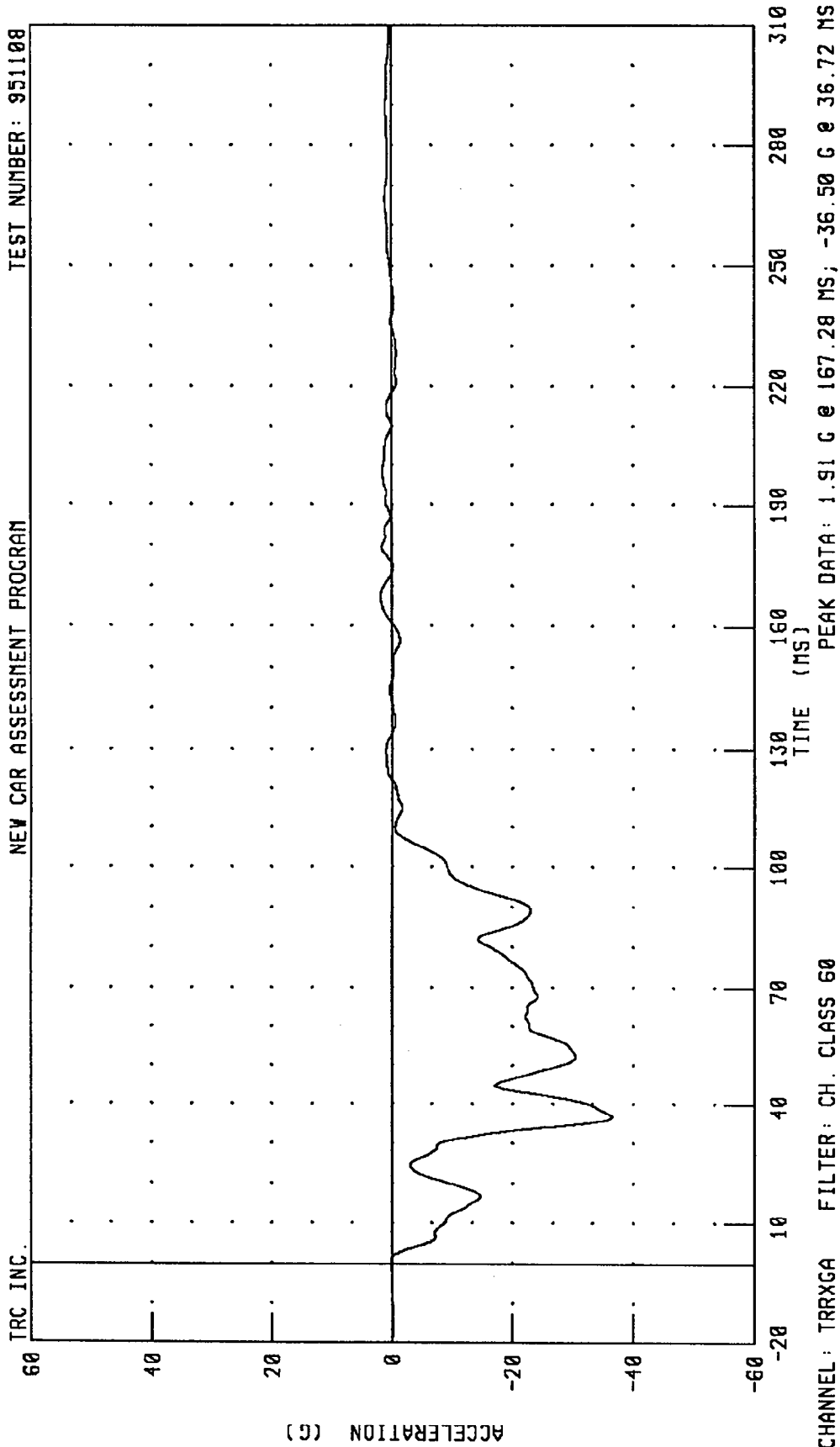
CHANNEL: TLRXGA FILTER: CH. CLASS 60

PEAK DATA: 1.85 G @ 166.16 MS; -38.60 G @ 36.48 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
RIGHT REAR SEAT REDUNDANT X-AXIS ACCELERATION
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

TRC INC.



CHANNEL: TRRXGA FILTER: CH. CLASS 60

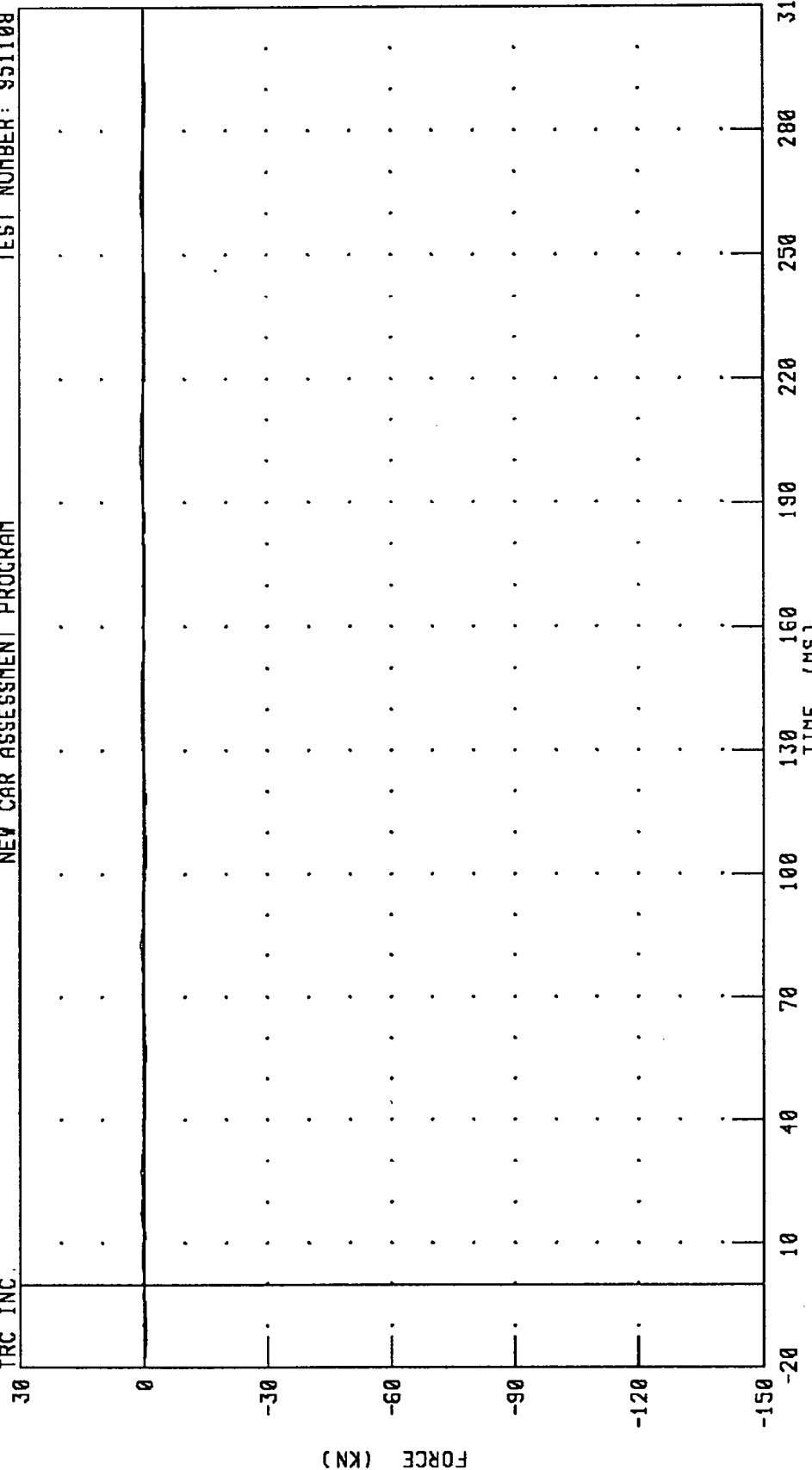
PEAK DATA: 1.91 G @ 167.28 MS; -36.50 G @ 36.72 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A1 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 0.64 KN @ 82.80 MS; -0.57 KN @ 56.72 MS

FILTER: CH. CLASS 60

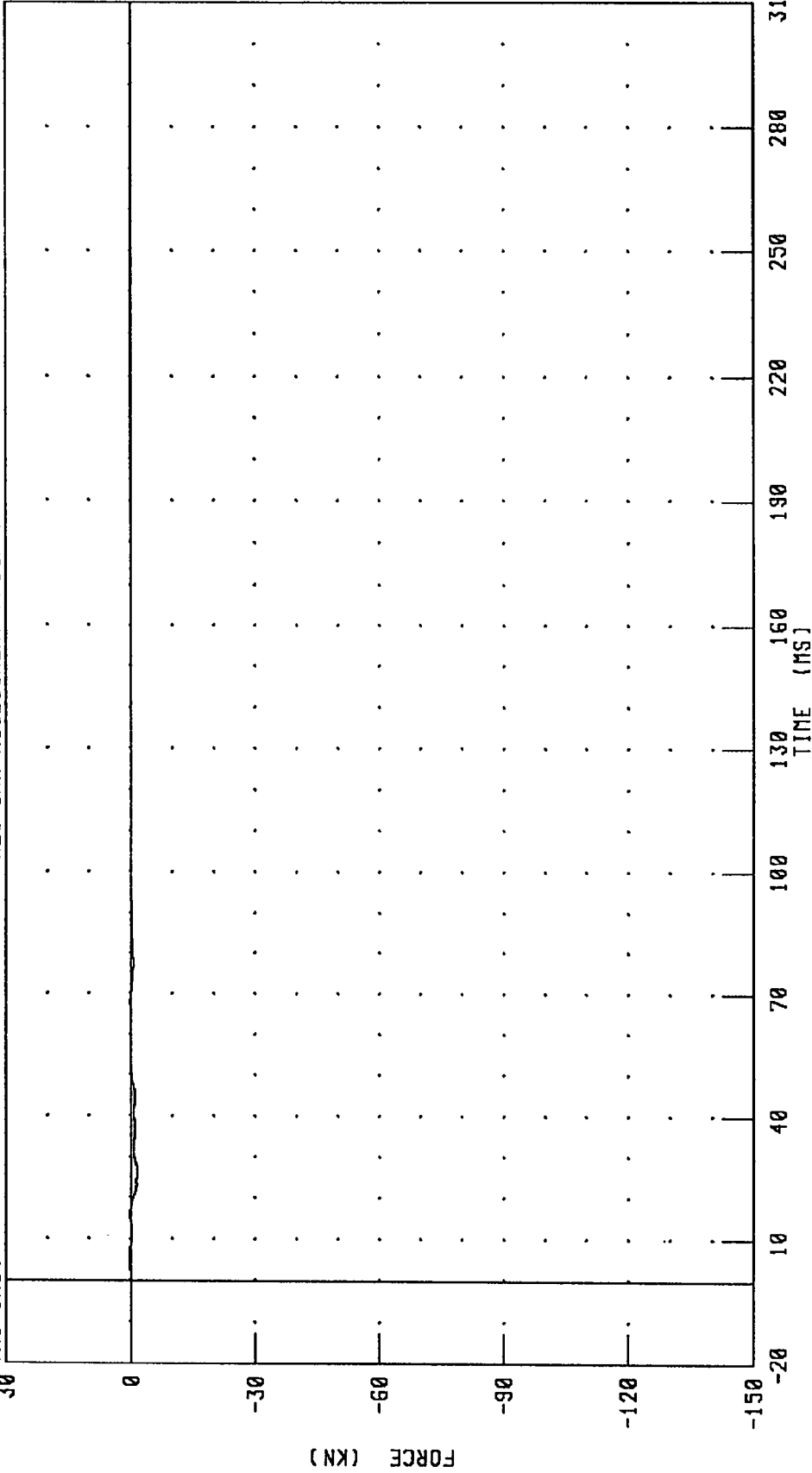
CHANNEL: BA1F

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A2 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 0.22 KN @ 5.68 MS; -1.55 KN @ 26.64 MS

FILTER: CH. CLASS 60

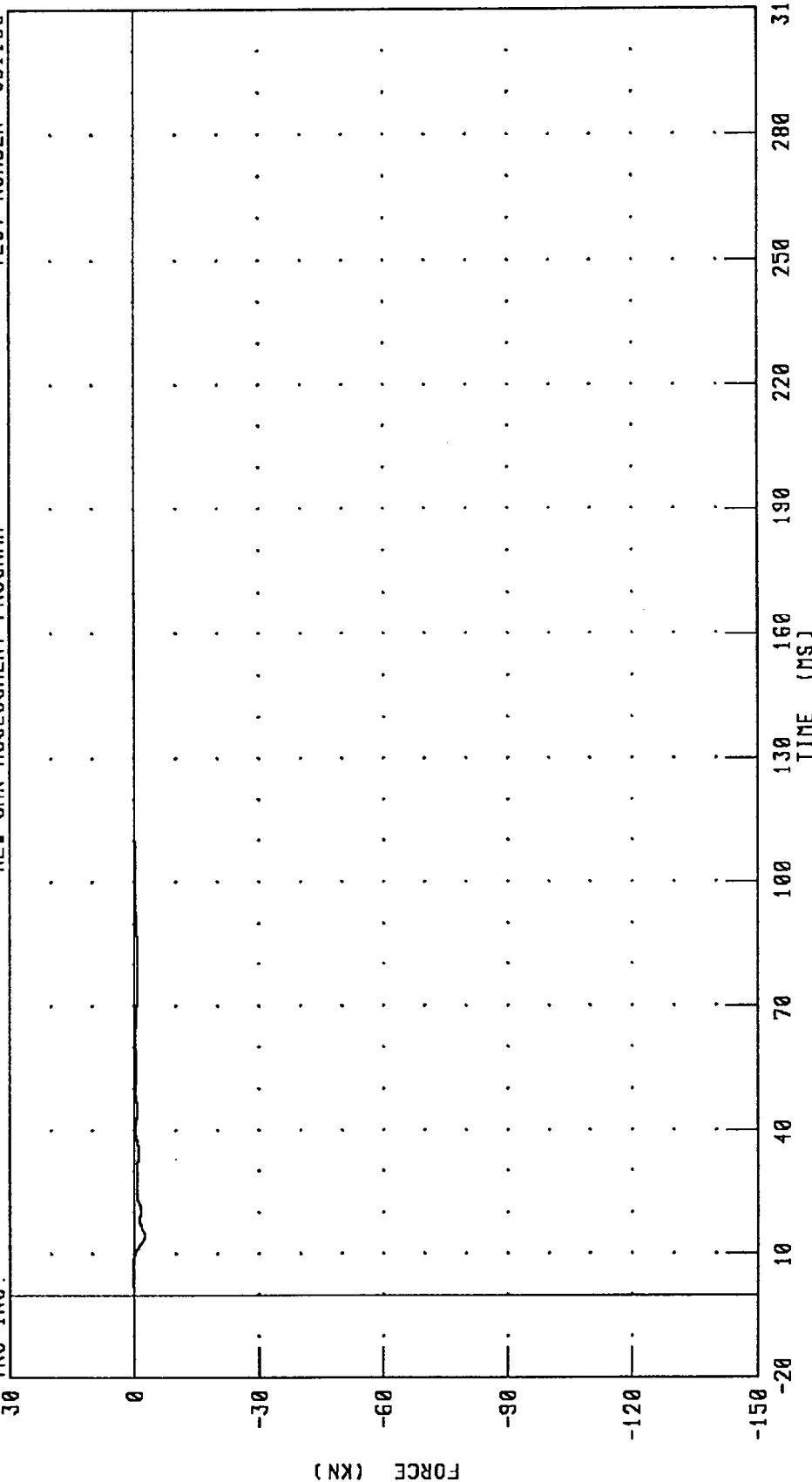
CHANNEL: BA2F

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A3 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



CHANNEL: BA3F

FILTER: CH. CLASS 60

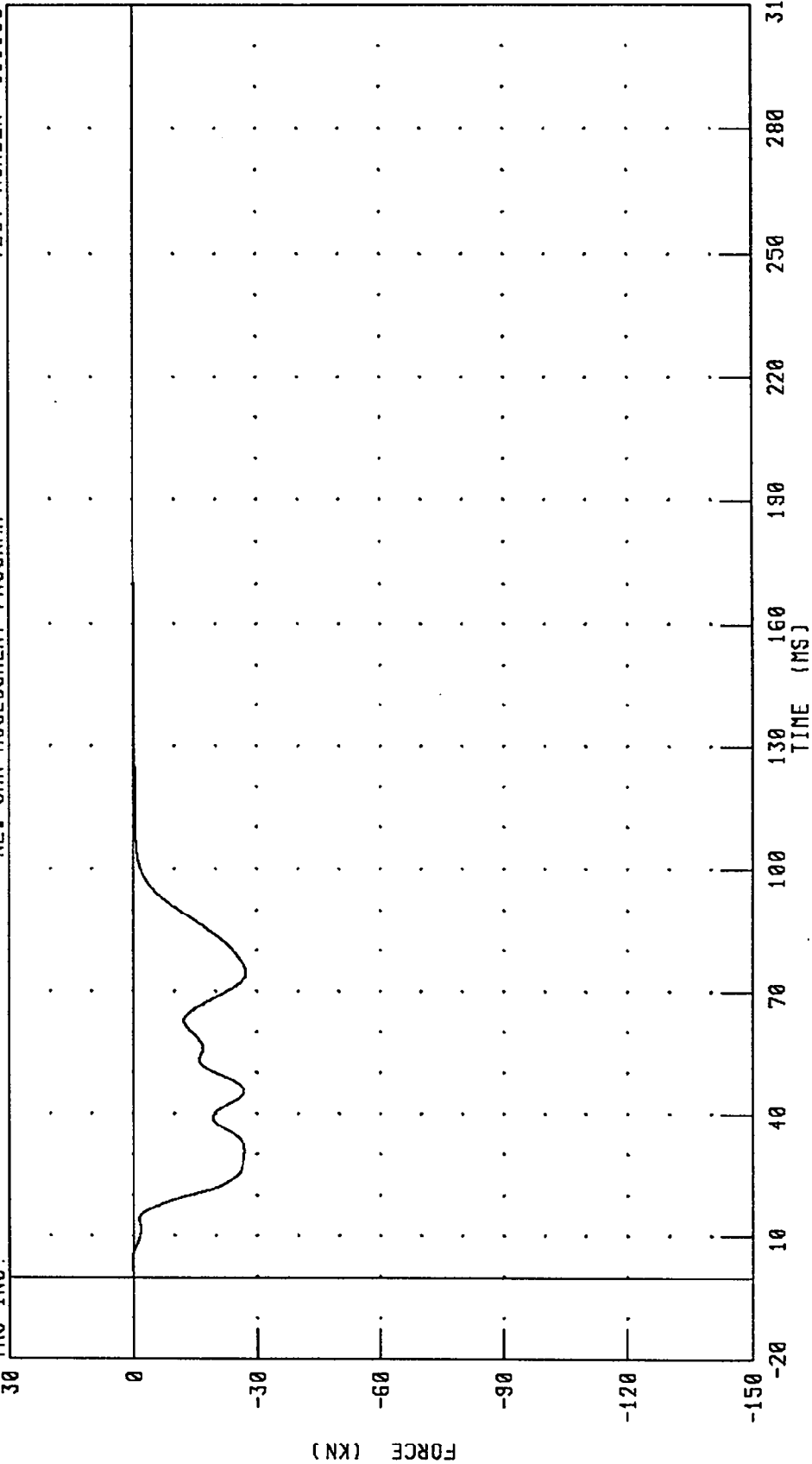
PEAK DATA: 0.27 KN @ 6.48 MS; -2.55 KN @ 14.48 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A4 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



CHANNEL: BA4F

FILTER: CH. CLASS 60

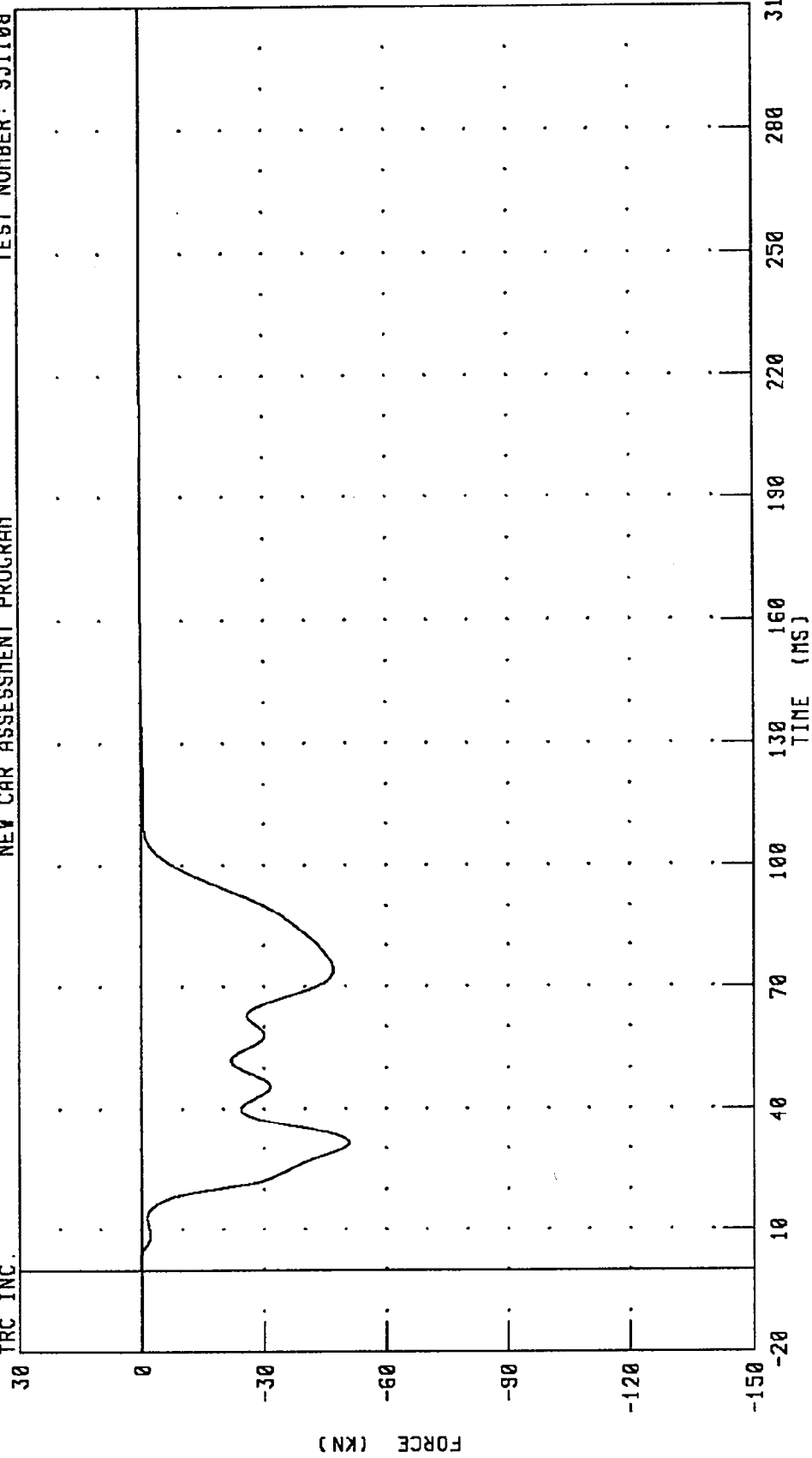
PEAK DATA: 0.24 KN @ 4.16 MS; -27.34 KN @ 74.72 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A5 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 0.25 KN @ 2.32 MS; -50.81 KN @ 31.52 MS

FILTER: CH. CLASS 60

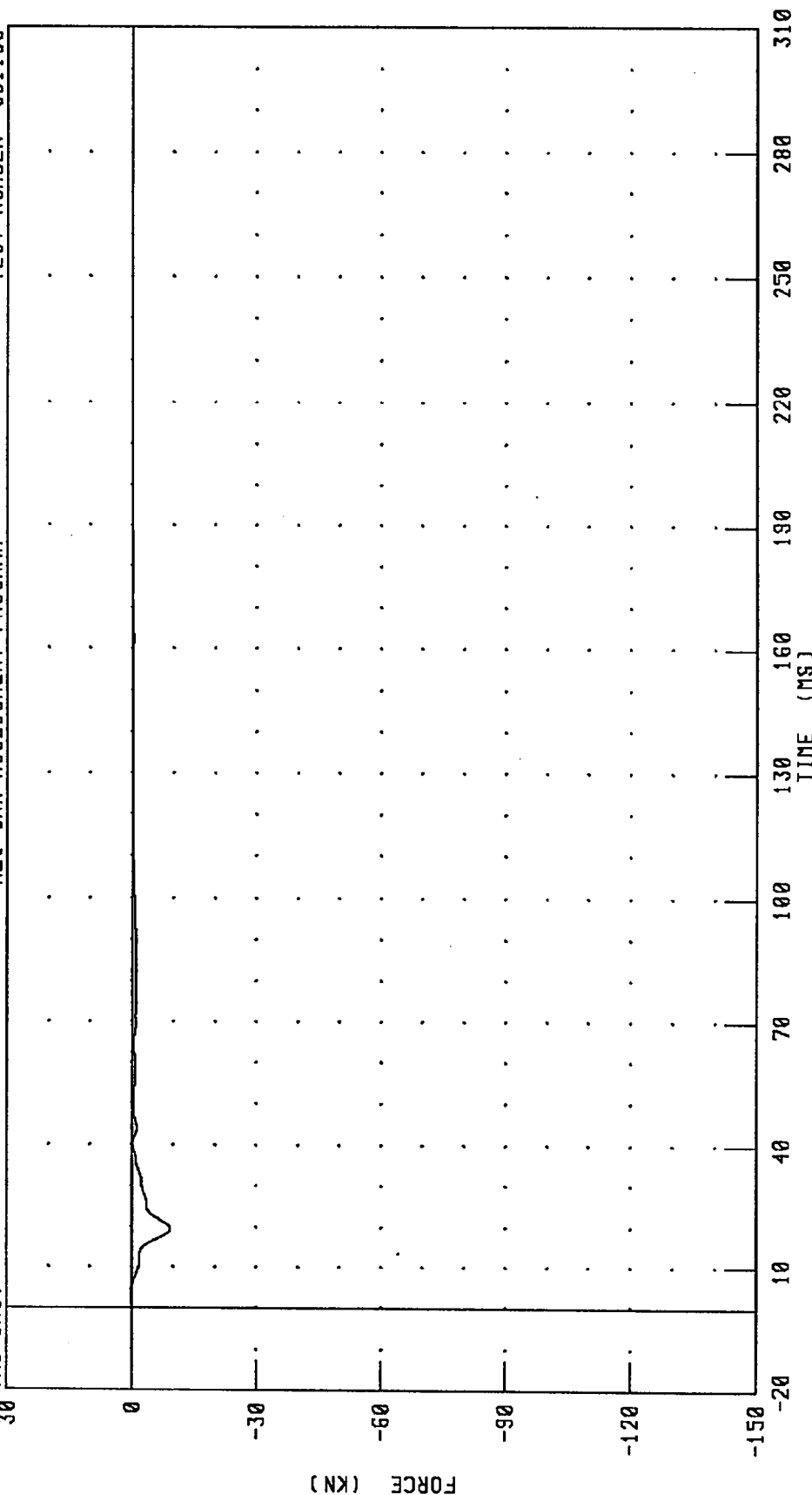
CHANNEL: BASF

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A6 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 0.24 KN @ 3.36 MS; -9.26 KN @ 19.52 MS

FILTER: CH. CLASS 60

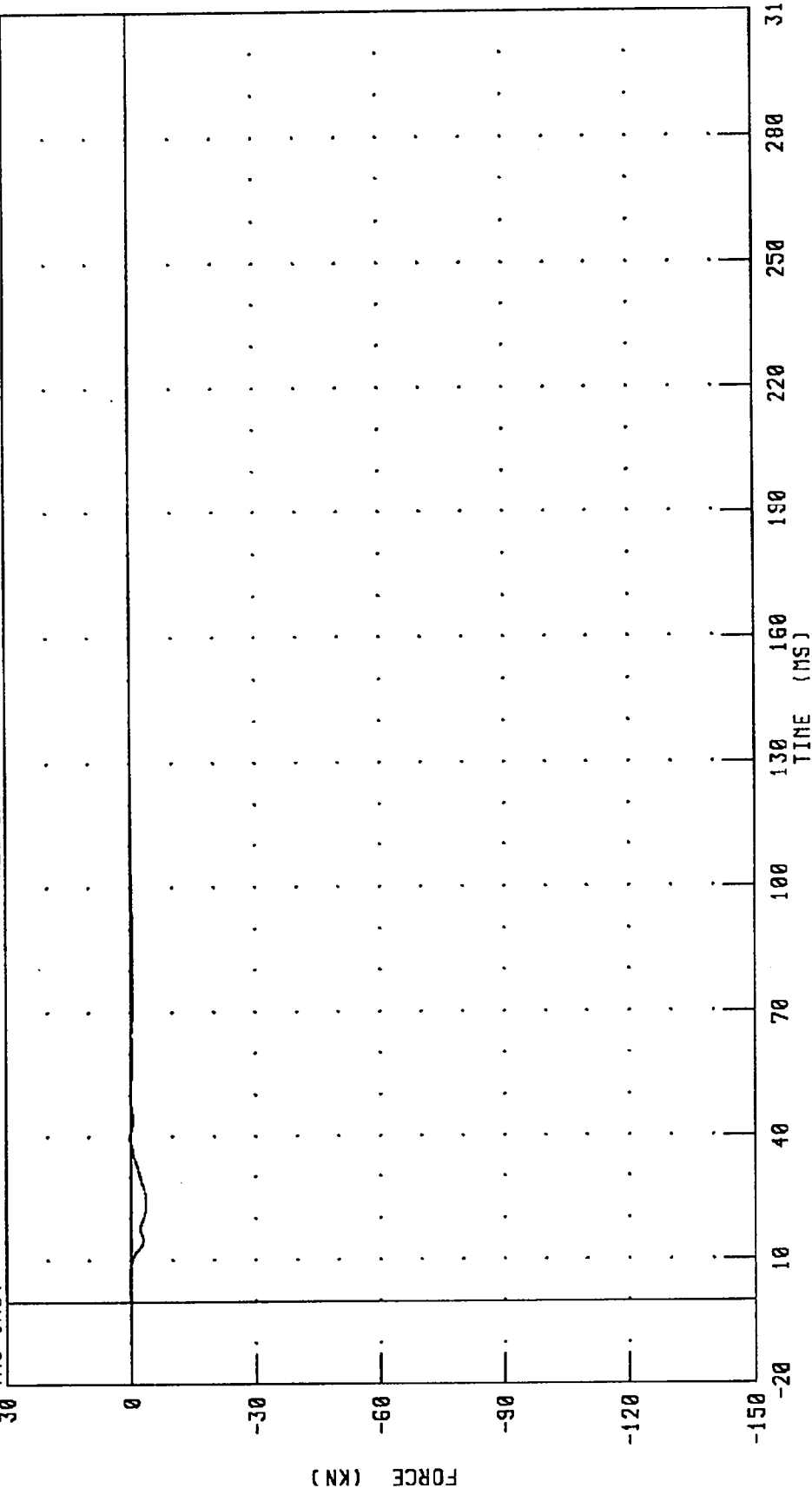
CHANNEL: BA6F

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A7 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 0.19 KN @ 4.80 MS; -3.64 KN @ 24.24 MS

FILTER: CH. CLASS 60

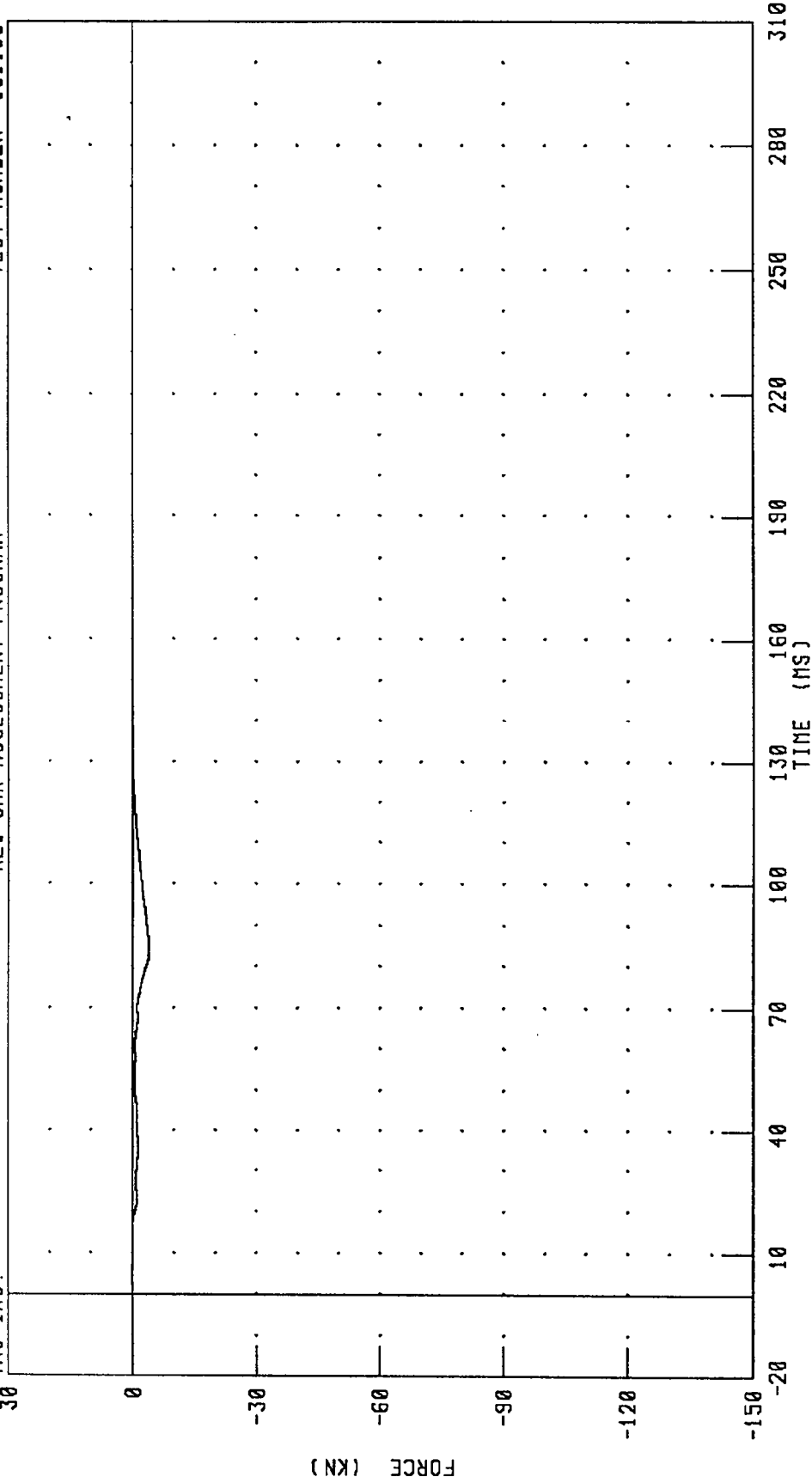
CHANNEL: BA7F

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A8 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 0.18 KN @ 4.80 MS; -3.94 KN @ 83.52 MS

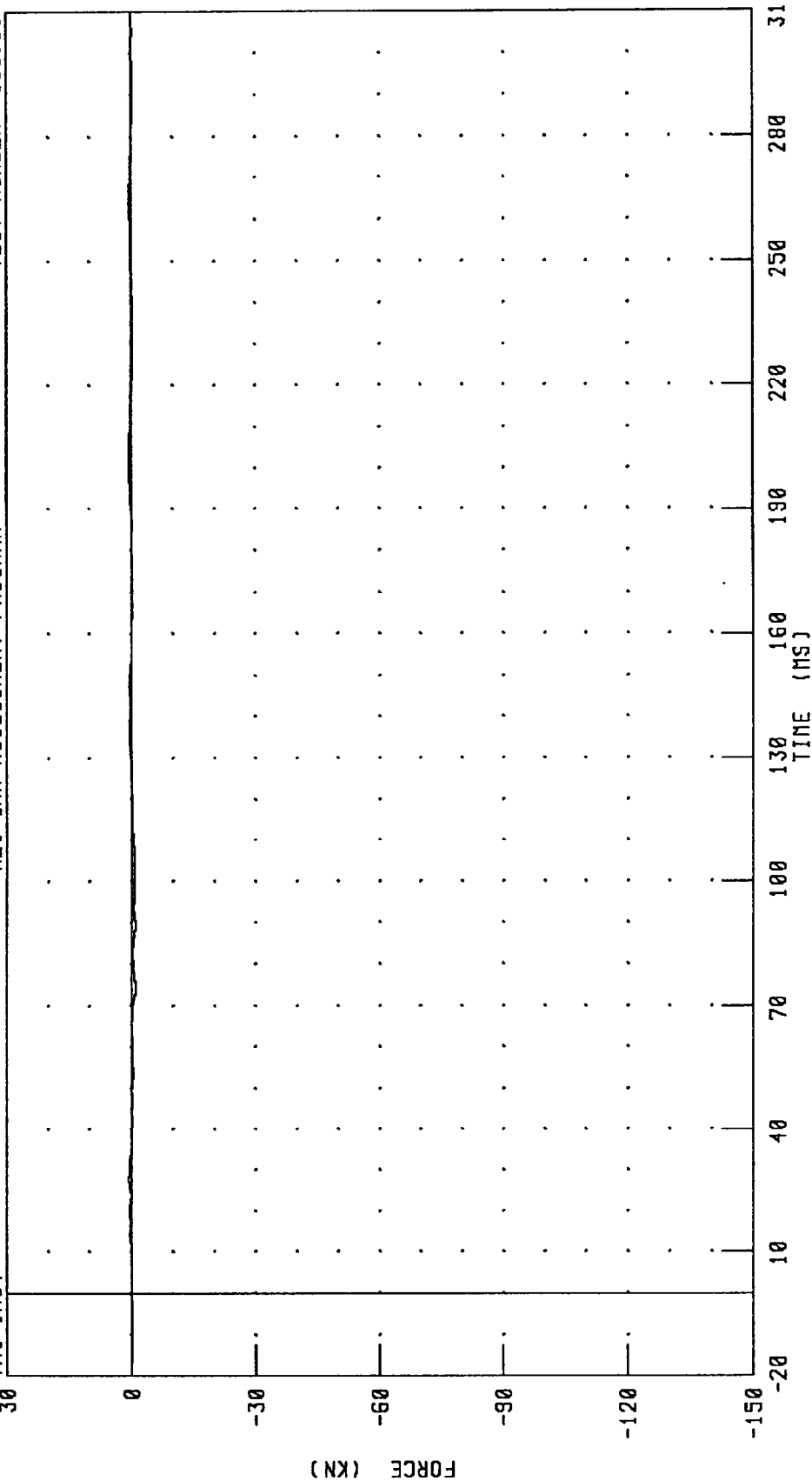
FILTER: CH. CLASS 60

CHANNEL: BA8F

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A9 FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

TRC INC.



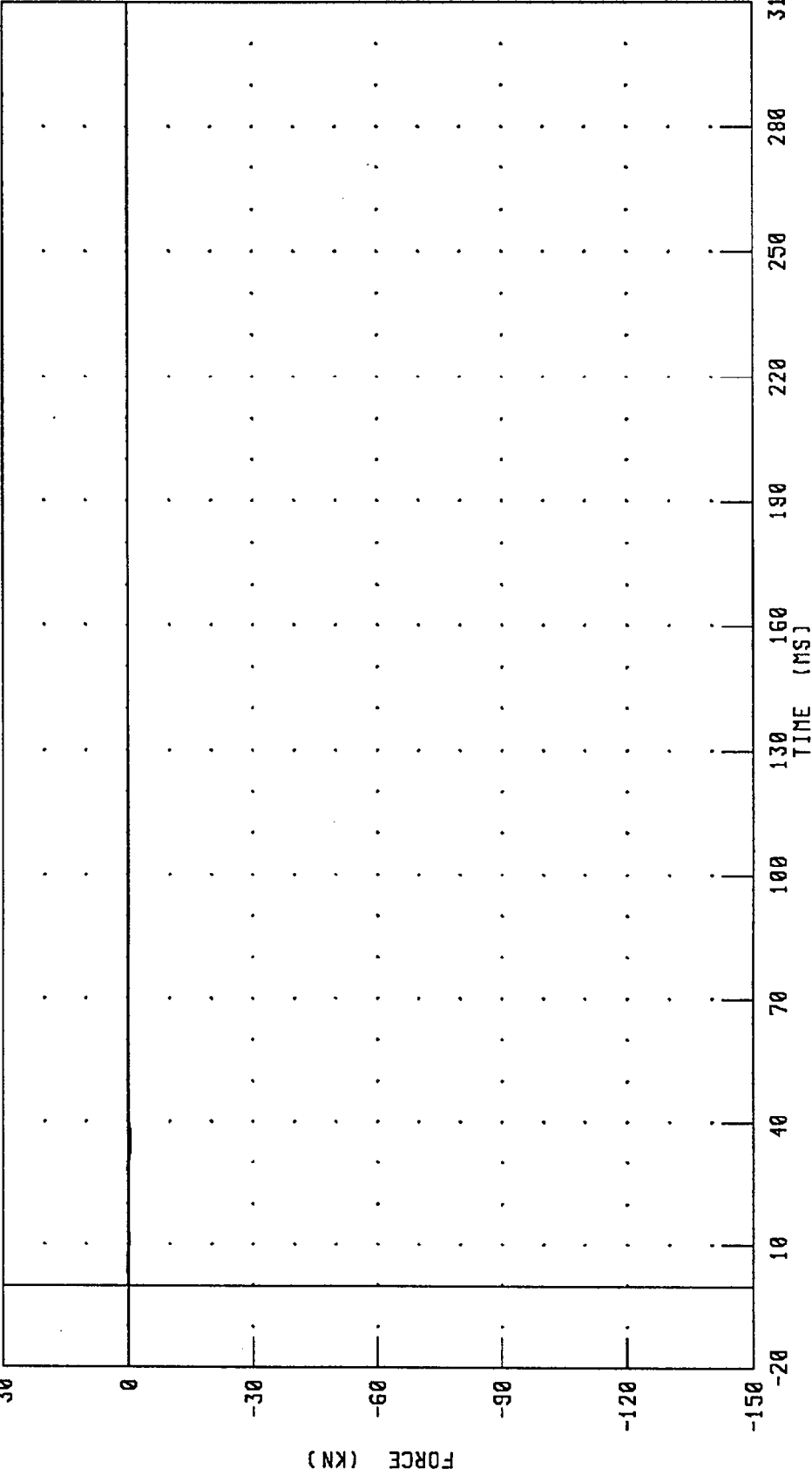
PEAK DATA: 0.63 KN @ 27.60 MS; -1.14 KN @ 74.32 MS

FILTER: CH. CLASS 60

CHANNEL: BA9F

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B1 FORCE

TRC INC. NEW CAR ASSESSMENT PROGRAM TEST NUMBER: 951108



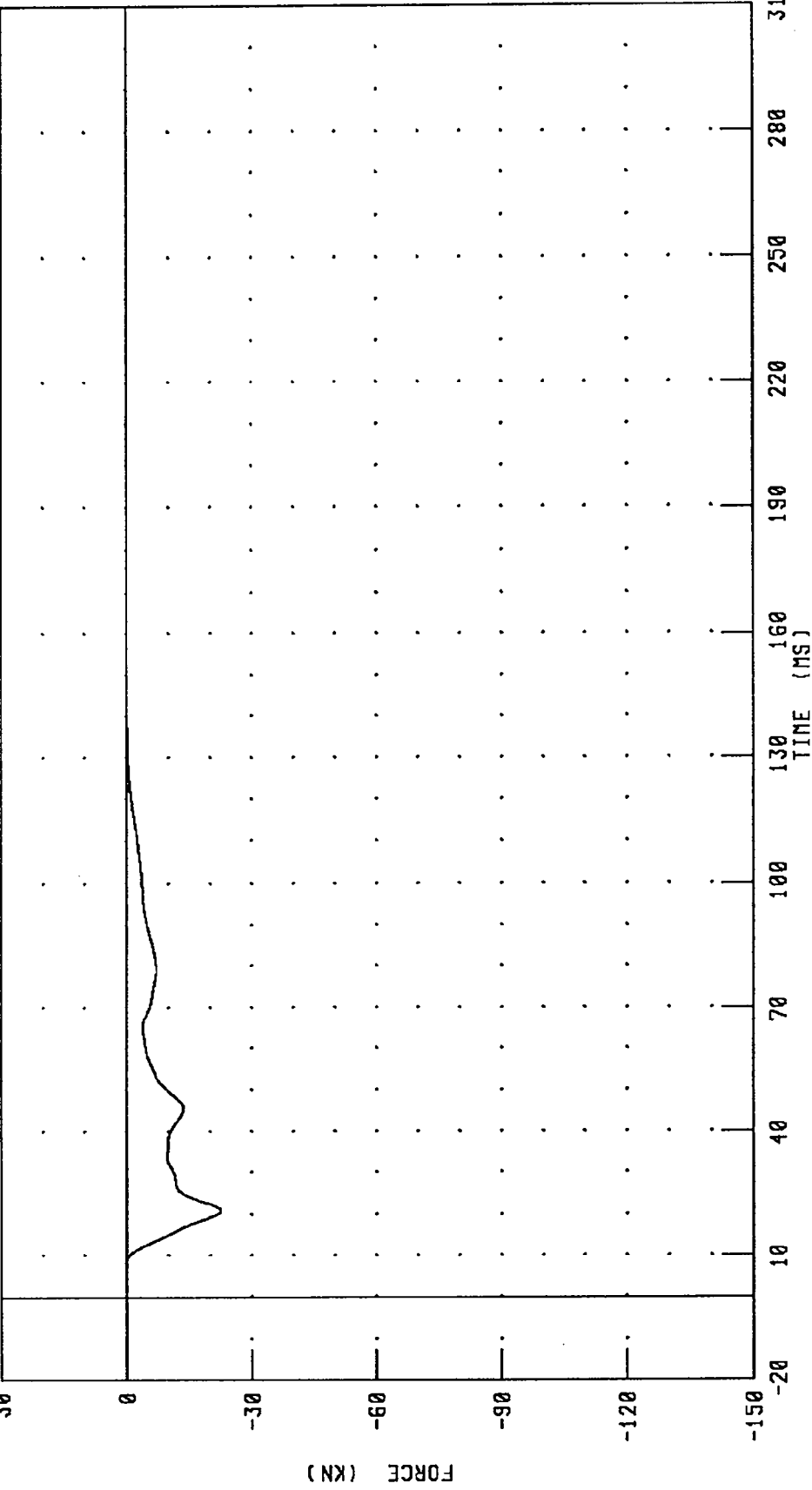
CHANNEL: BB1F FILTER: CH. CLASS 60 PEAK DATA: 0.17 KN @ 5.84 MS; -0.53 KN @ 35.68 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B2 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



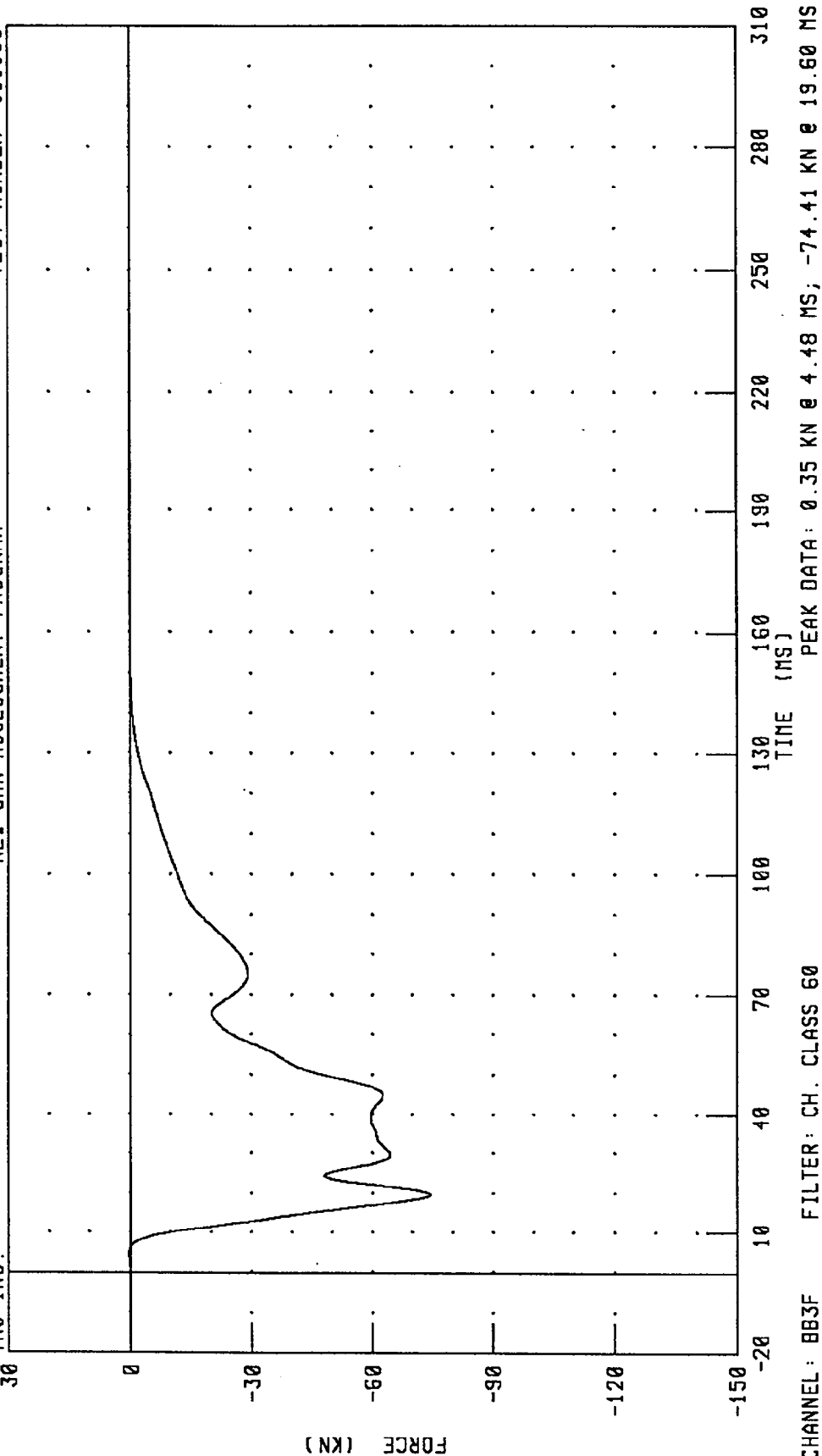
CHANNEL: BB2F FILTER: CH. CLASS 60

PEAK DATA: 0.26 KN @ 7.04 MS; -22.52 KN @ 20.88 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION B3 FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

TRC INC.



CHANNEL: BB3F

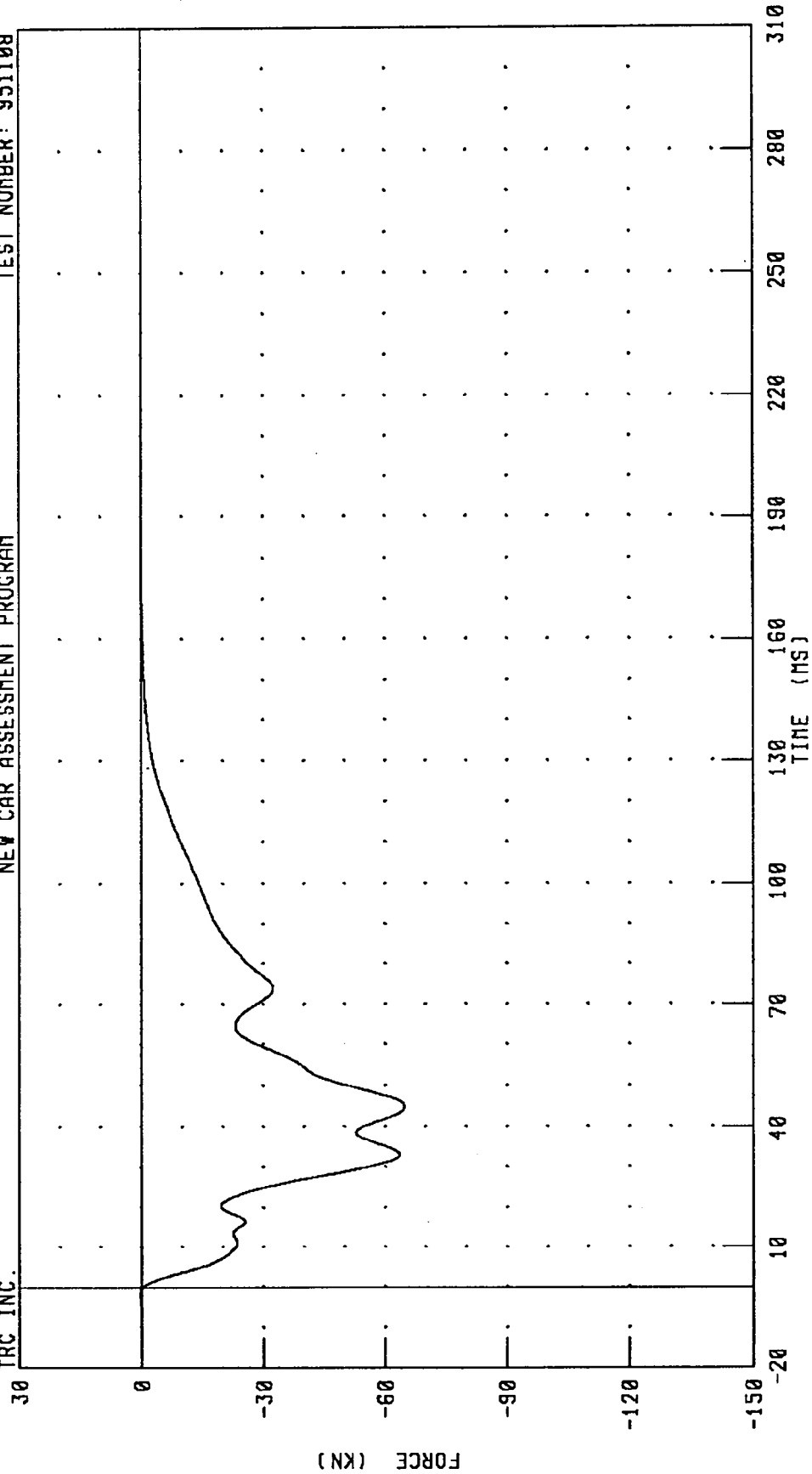
FILTER: CH. CLASS 60

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B4 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



CHANNEL: BB4F FILTER: CH. CLASS 60

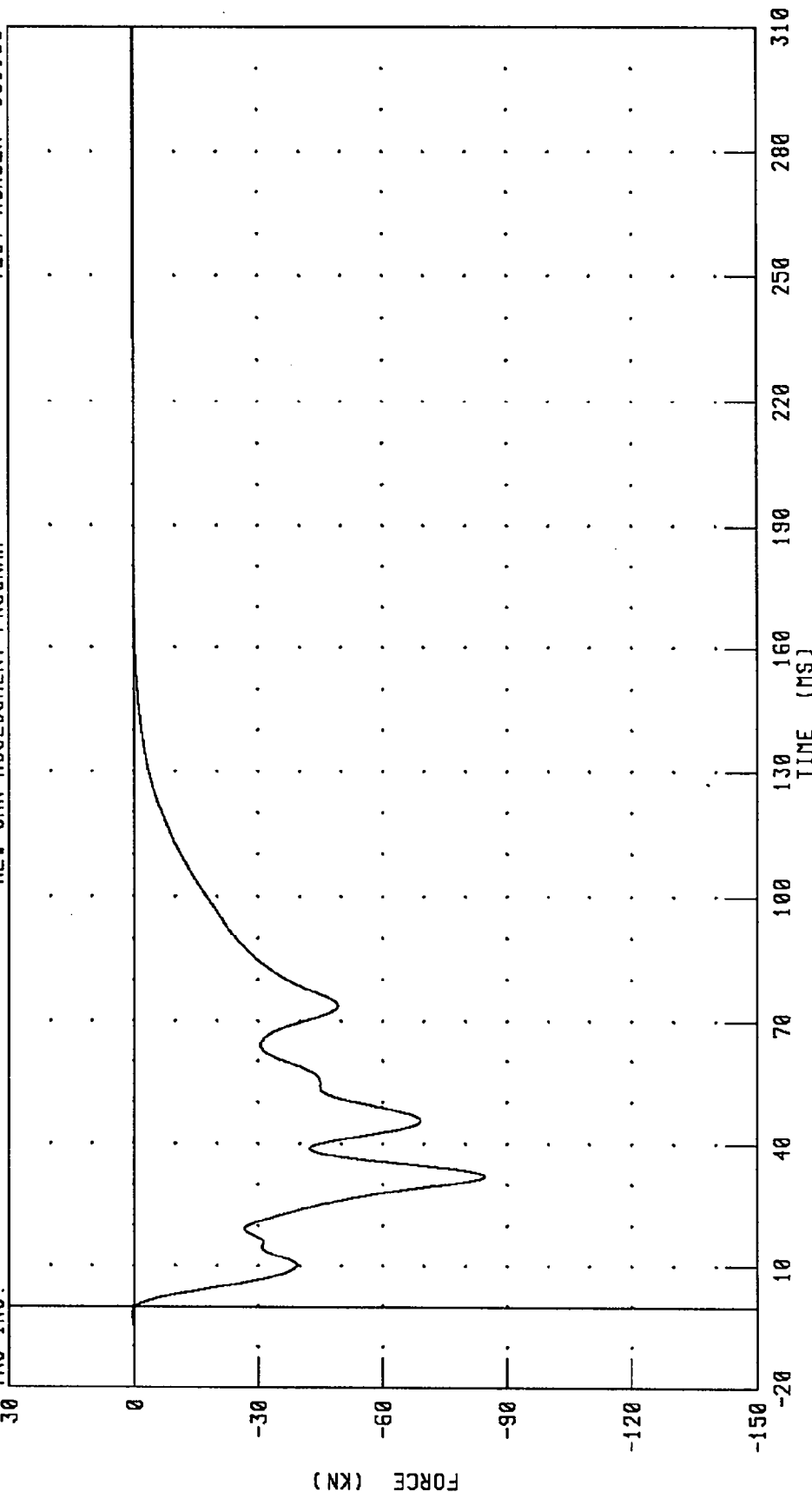
PEAK DATA: 0.35 KN @ -1.92 MS; -64.85 KN @ 44.96 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B5 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 0.42 KN @ -1.92 MS; -84.70 KN @ 32.16 MS

FILTER: CH. CLASS 60

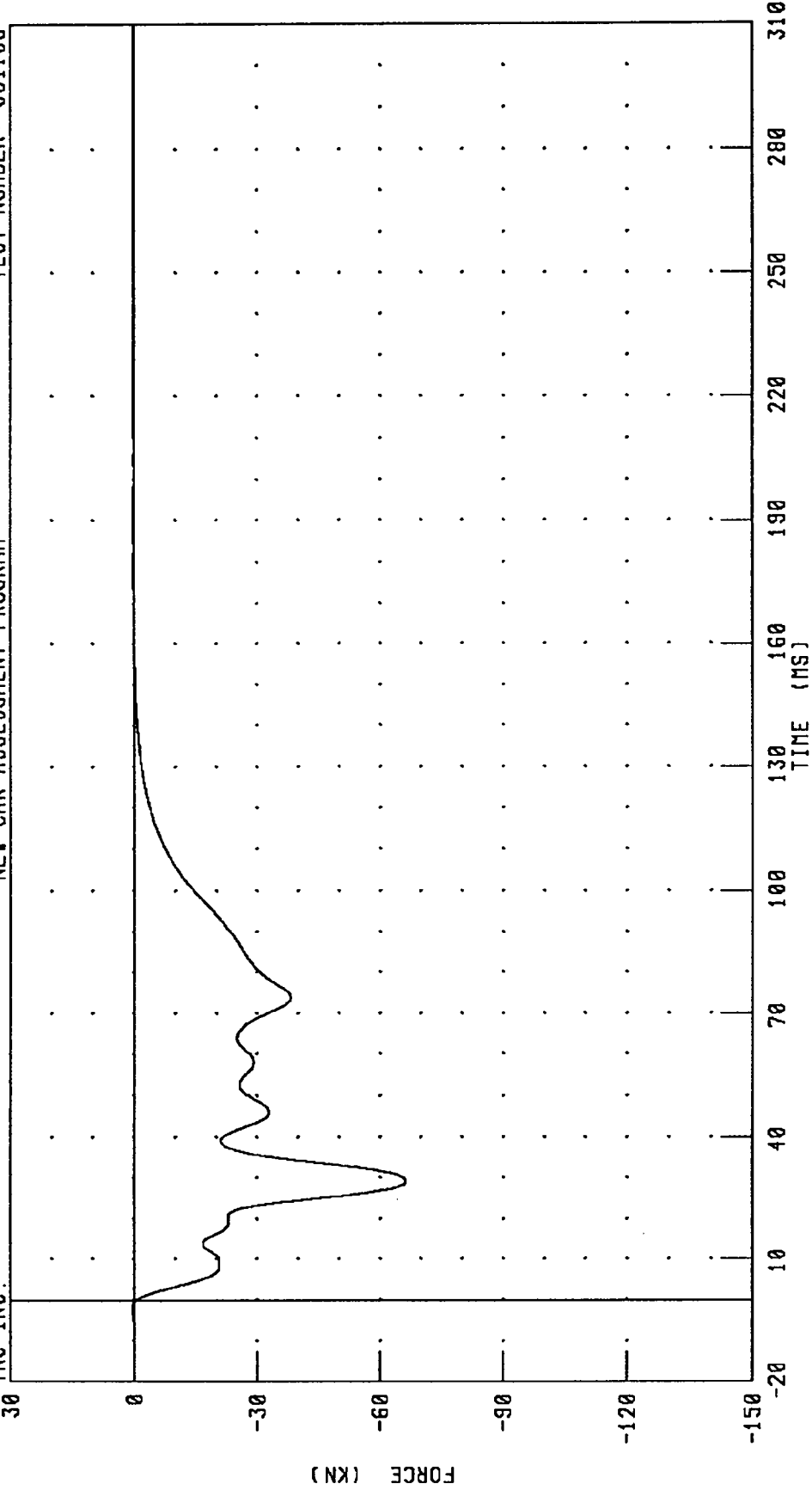
CHANNEL: BB5F

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B6 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.

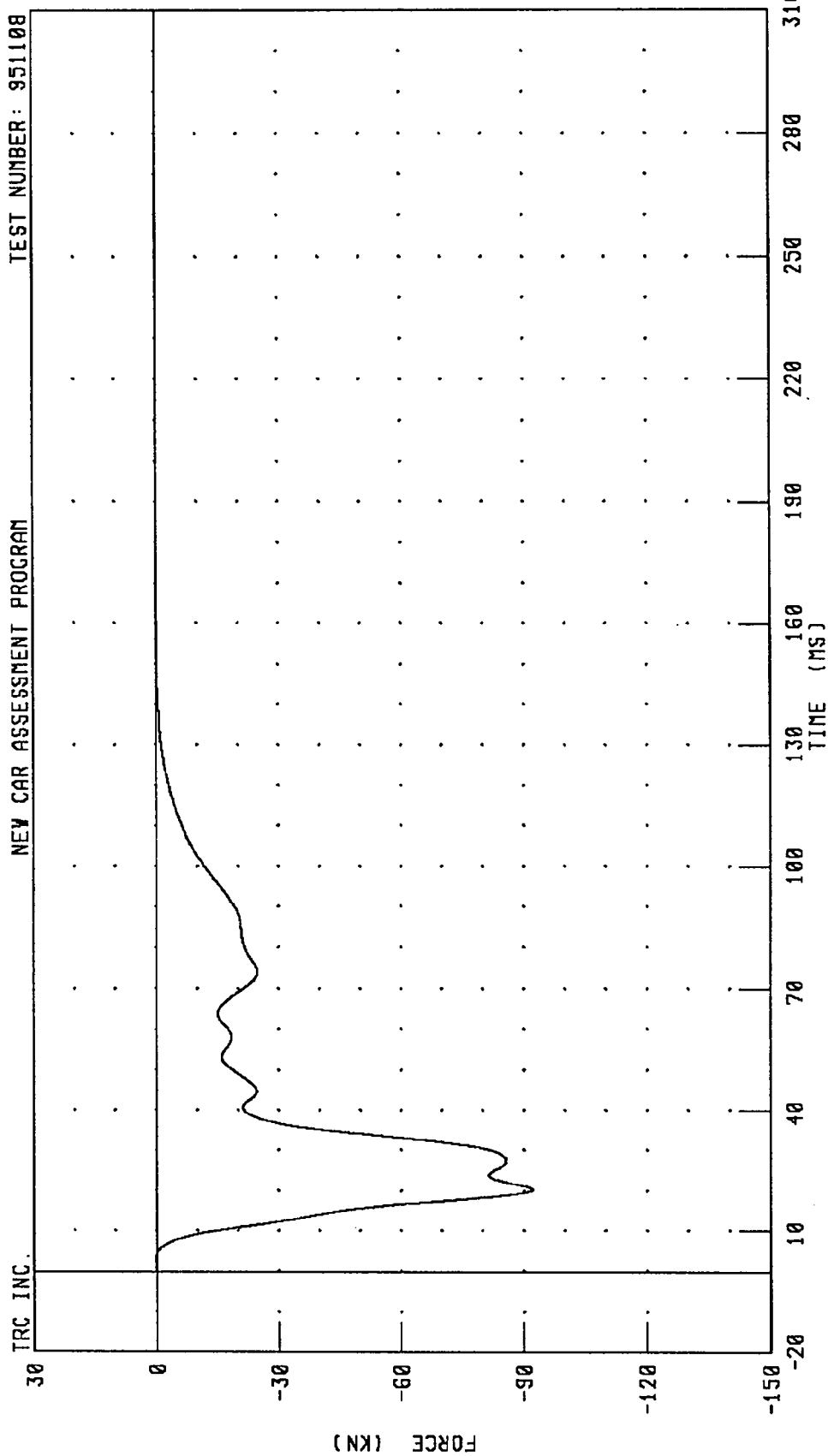


PEAK DATA: 0.40 KN @ -2.00 MS; -66.18 KN @ 29.28 MS

CHANNEL: 886F FILTER: CH. CLASS 60

- 1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION B7 FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108



PEAK DATA: 0.26 KN @ 2.80 MS; -92.14 KN @ 20.32 MS

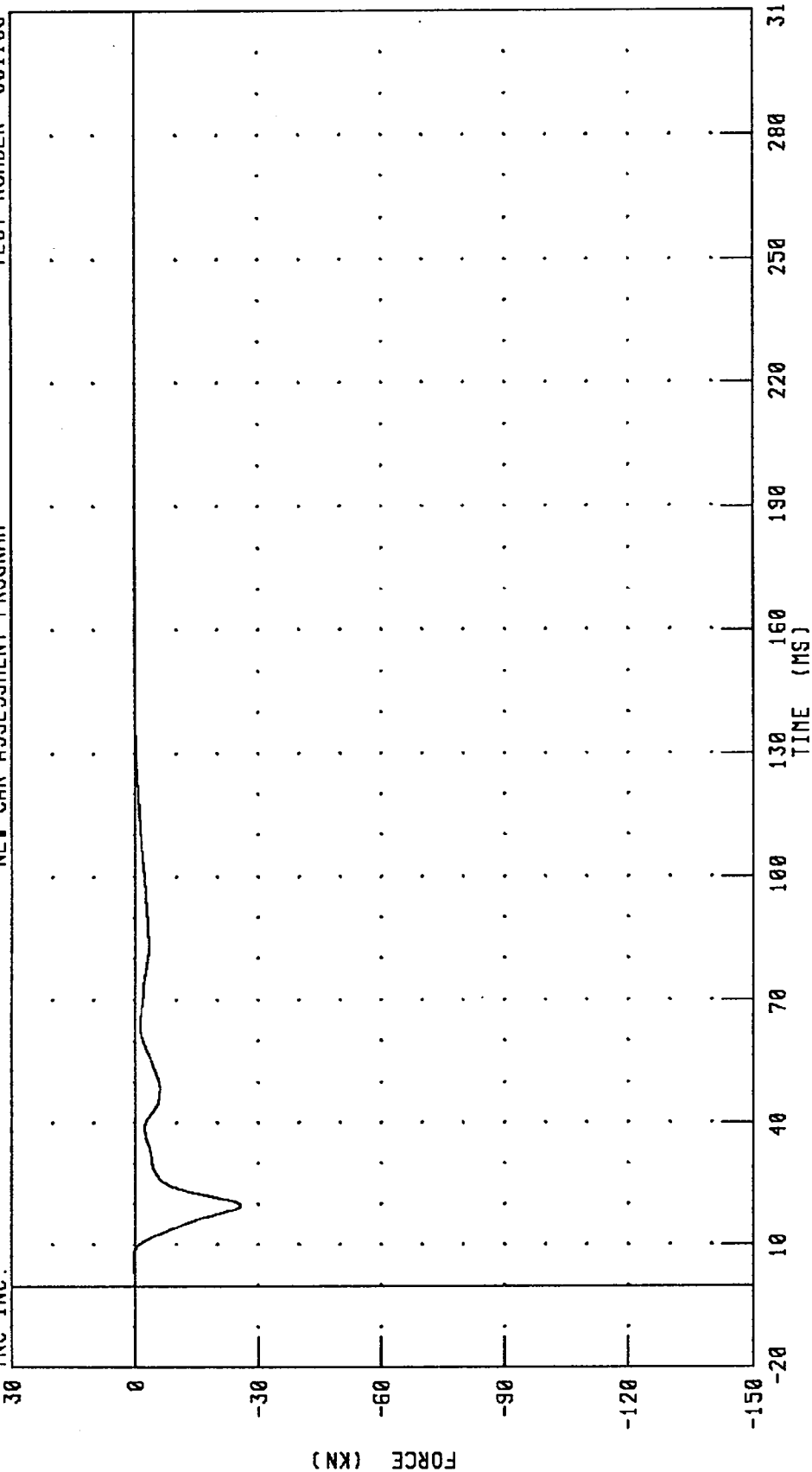
CHANNEL: 887F FILTER: CH. CLASS 60

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B8 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 0.25 KN @ 7.12 MS; -25.72 KN @ 19.76 MS

FILTER: CH. CLASS 60

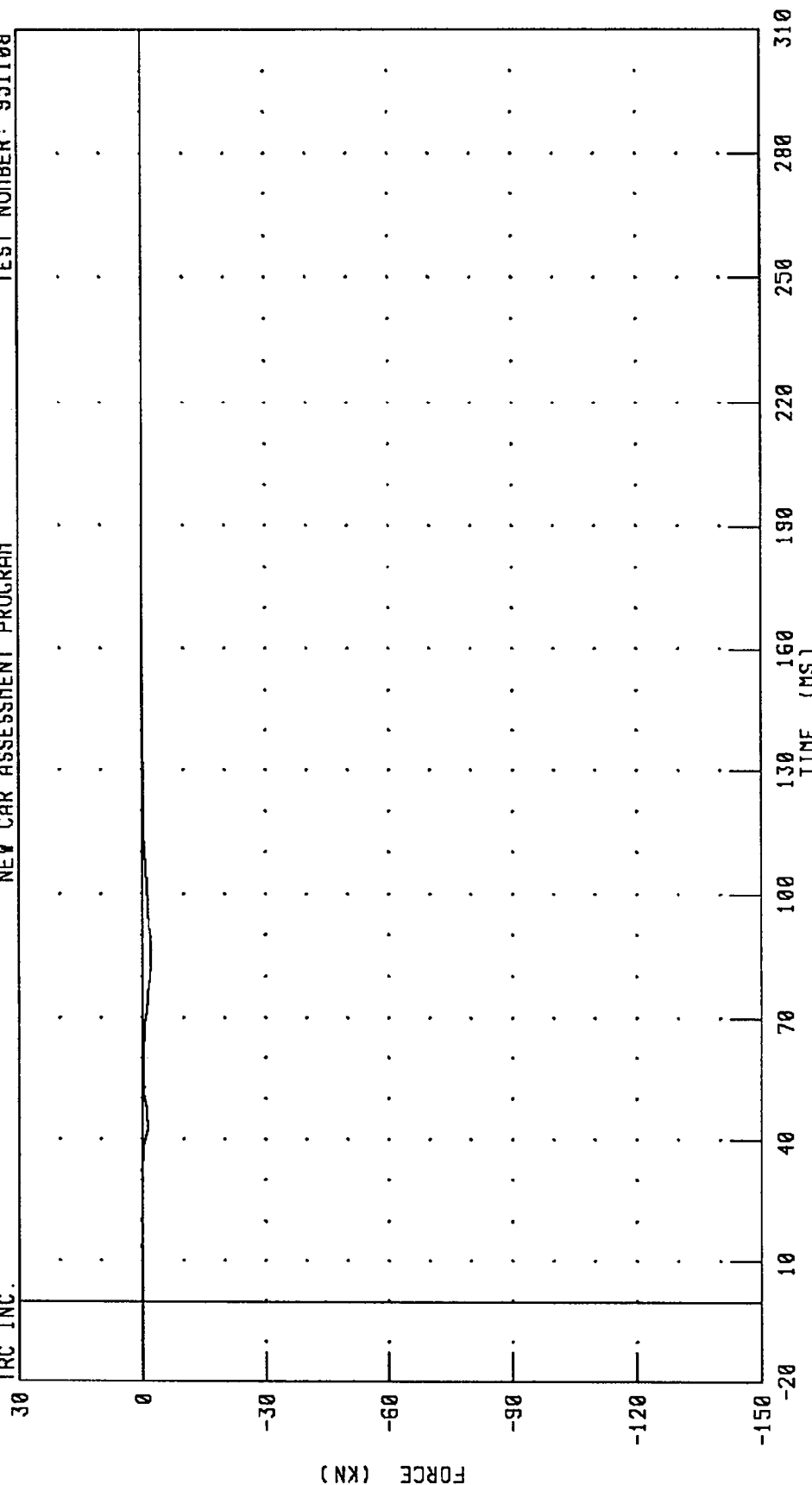
CHANNEL: BB8F

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B9 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



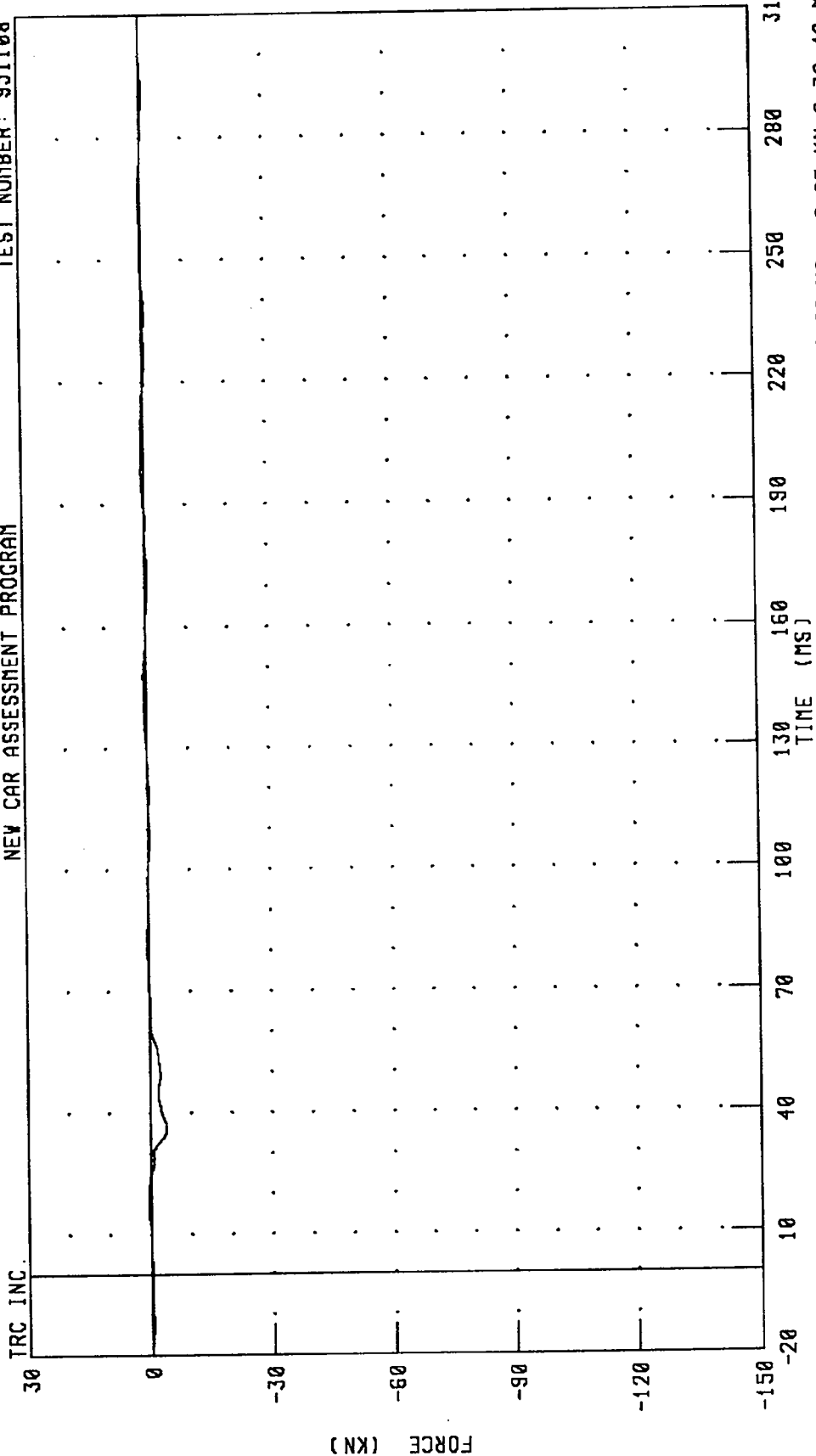
PEAK DATA: 0.10 KN @ 20.32 MS; -2.14 KN @ 86.48 MS

FILTER: CH. CLASS 60

CHANNEL: BBSF

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C1 FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108



PEAK DATA: 0.61 KN @ 148.00 MS; -3.95 KN @ 36.40 MS

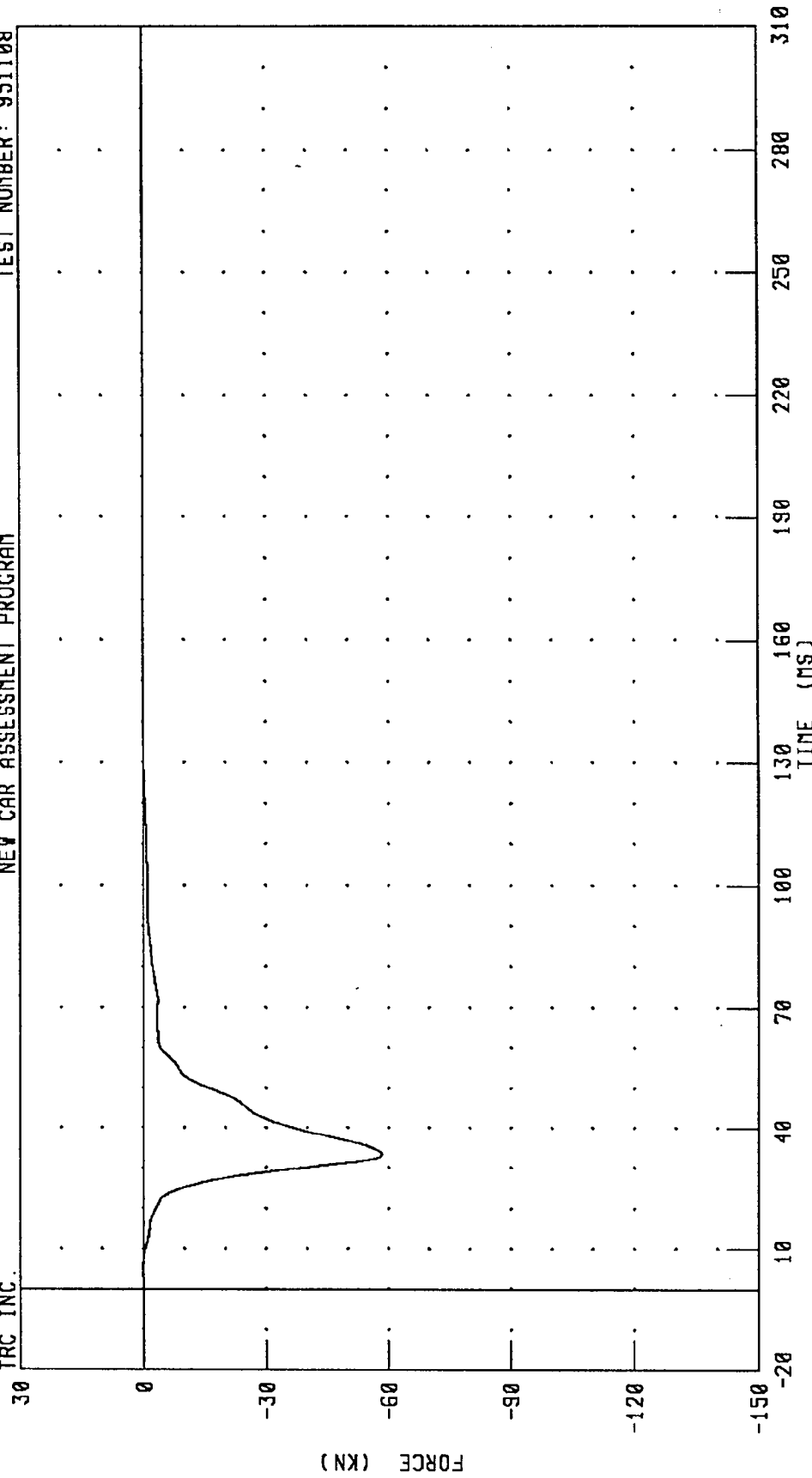
CHANNEL: BC1F FILTER: CH. CLASS 60

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C2 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 0.11 KN @ 4.56 MS; -58.41 KN @ 33.28 MS

FILTER: CH. CLASS 60

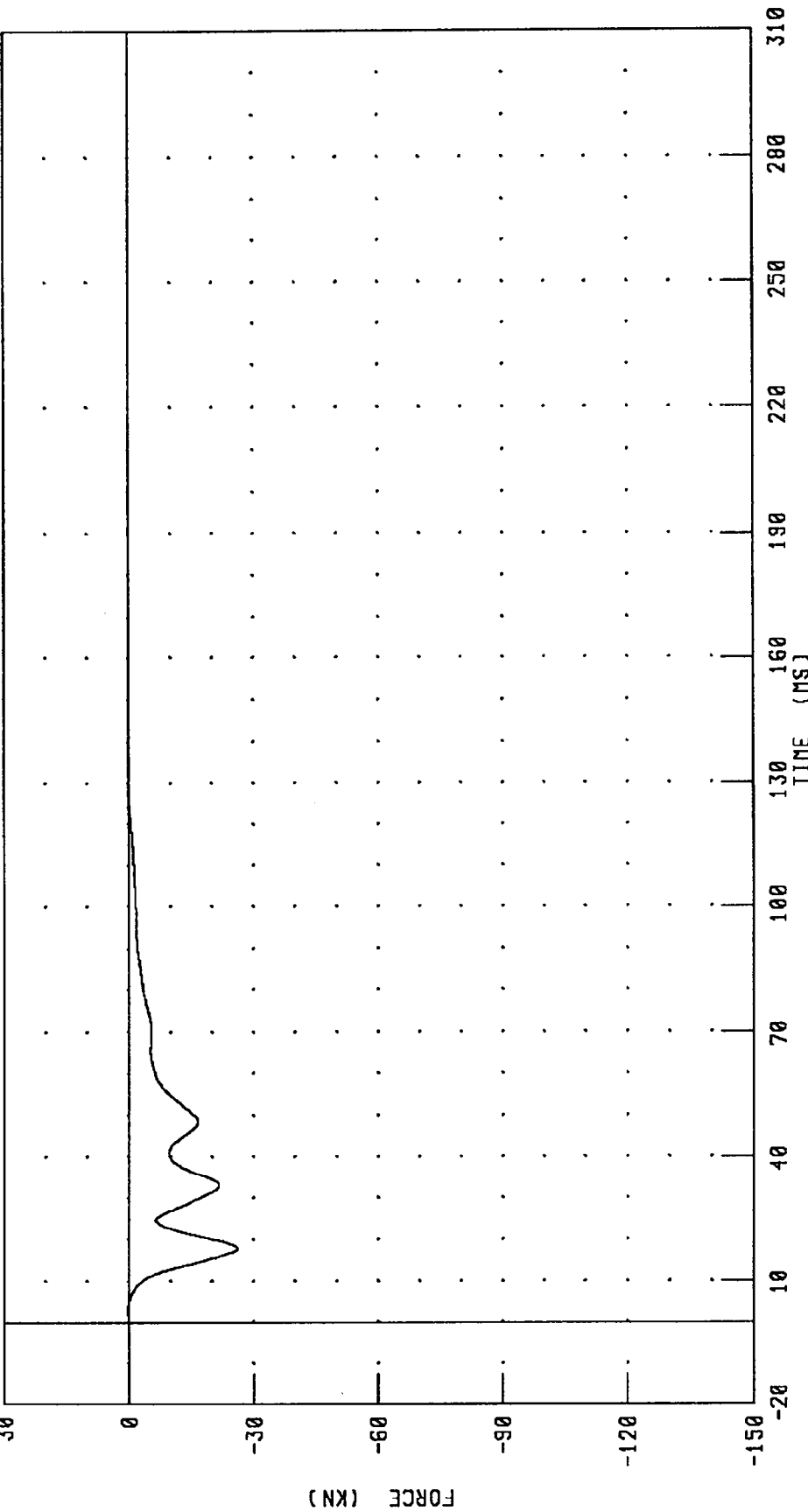
CHANNEL: BC2F

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C3 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 0.13 KN @ 2.88 MS; -26.19 KN @ 17.92 MS

FILTER: CH. CLASS 60

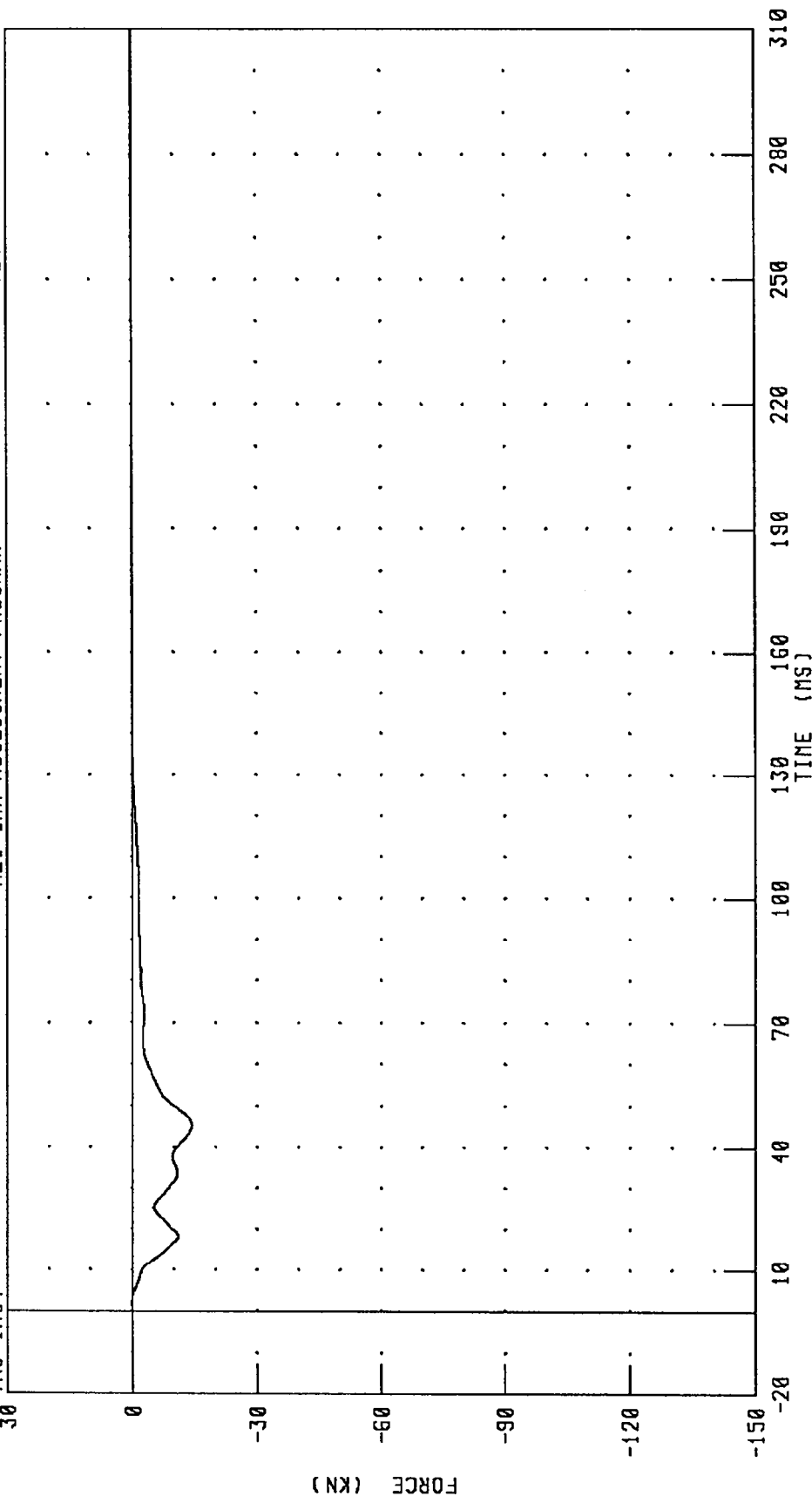
CHANNEL: BC3F

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C4 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 0.10 KN @ 1.76 MS; -14.24 KN @ 45.44 MS

FILTER: CH. CLASS 60

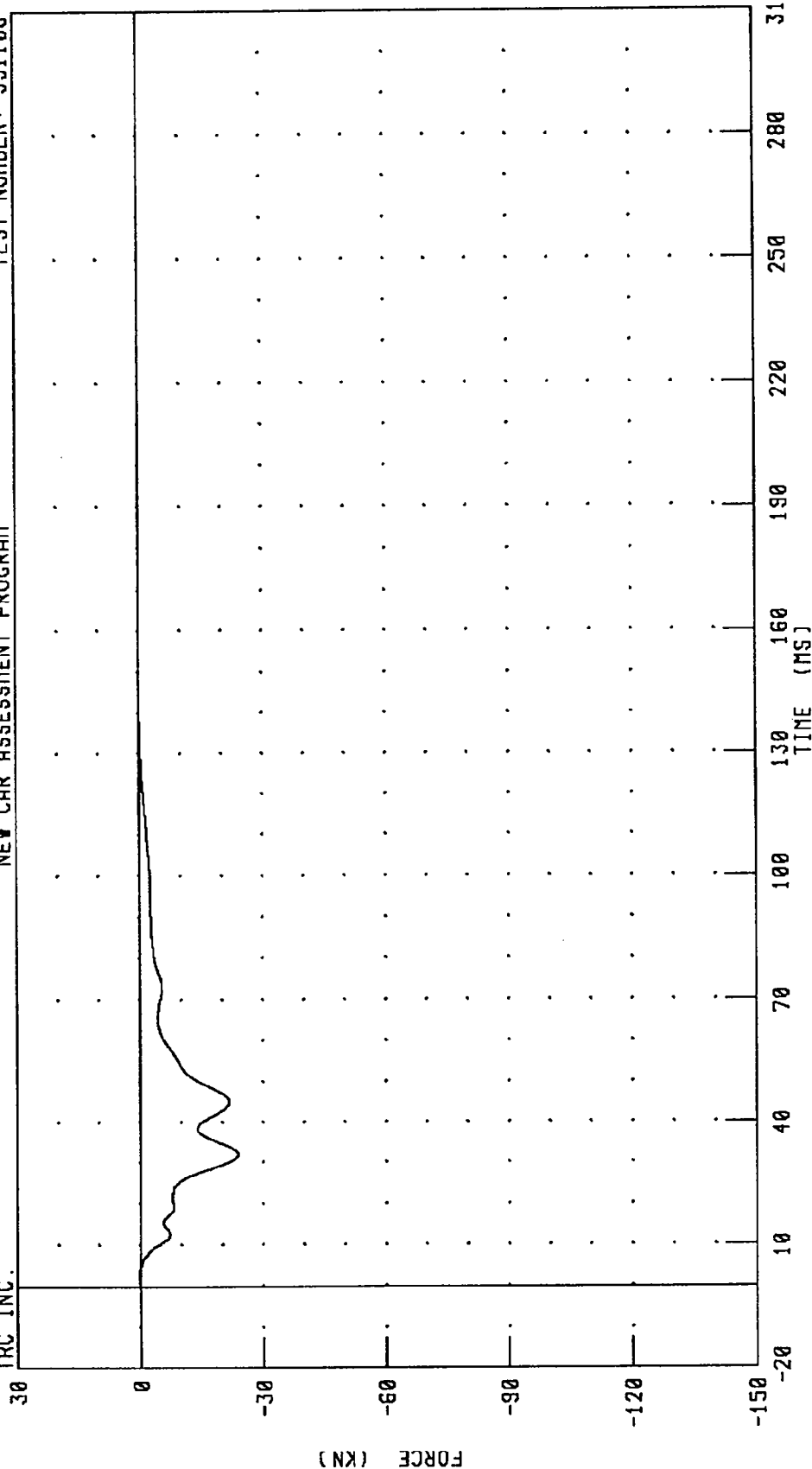
CHANNEL: BC4F

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C5 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 0.19 KN @ 2.48 MS; -23.84 KN @ 32.00 MS

FILTER: CH. CLASS 60

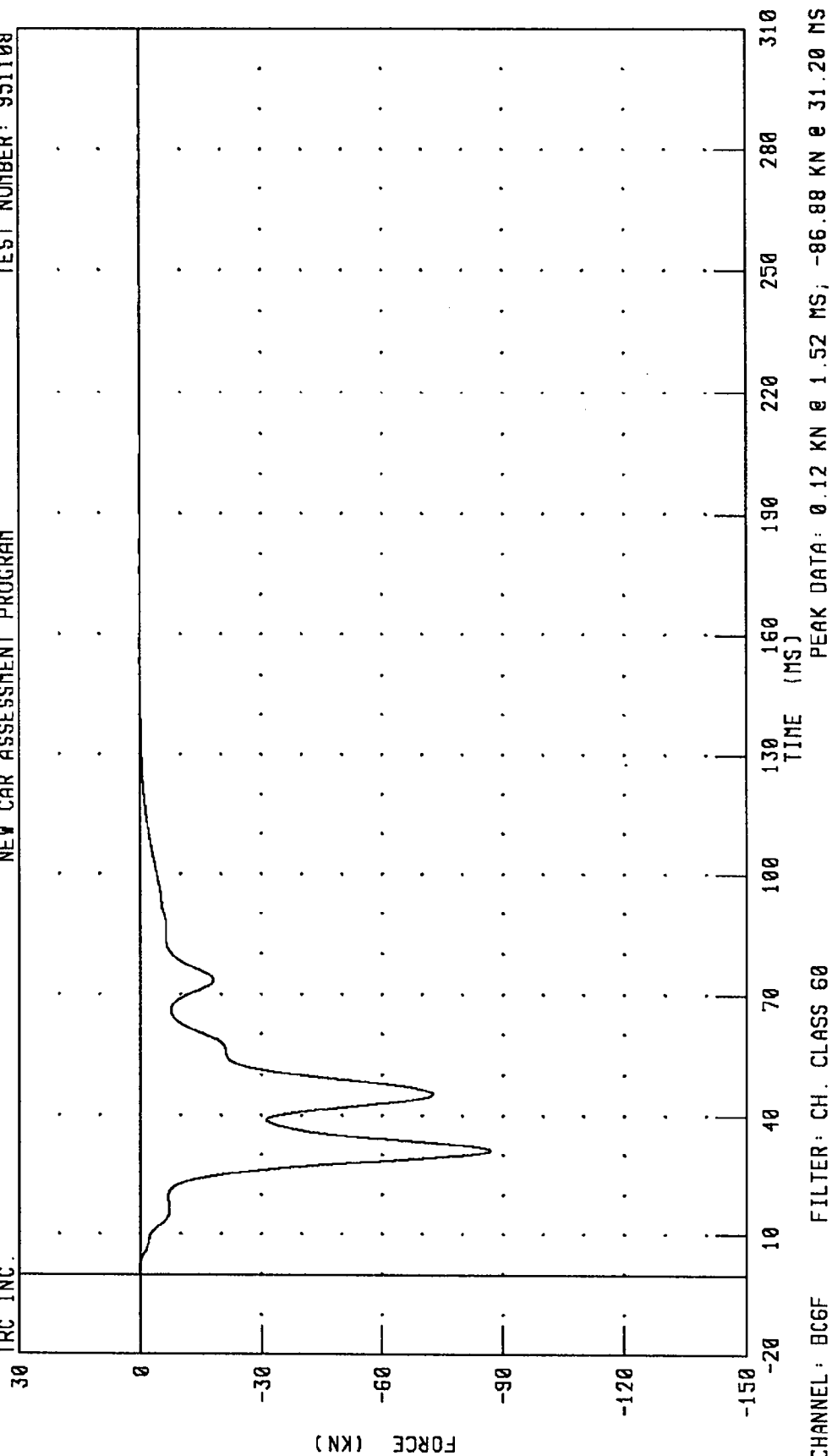
CHANNEL: BC5F

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C6 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



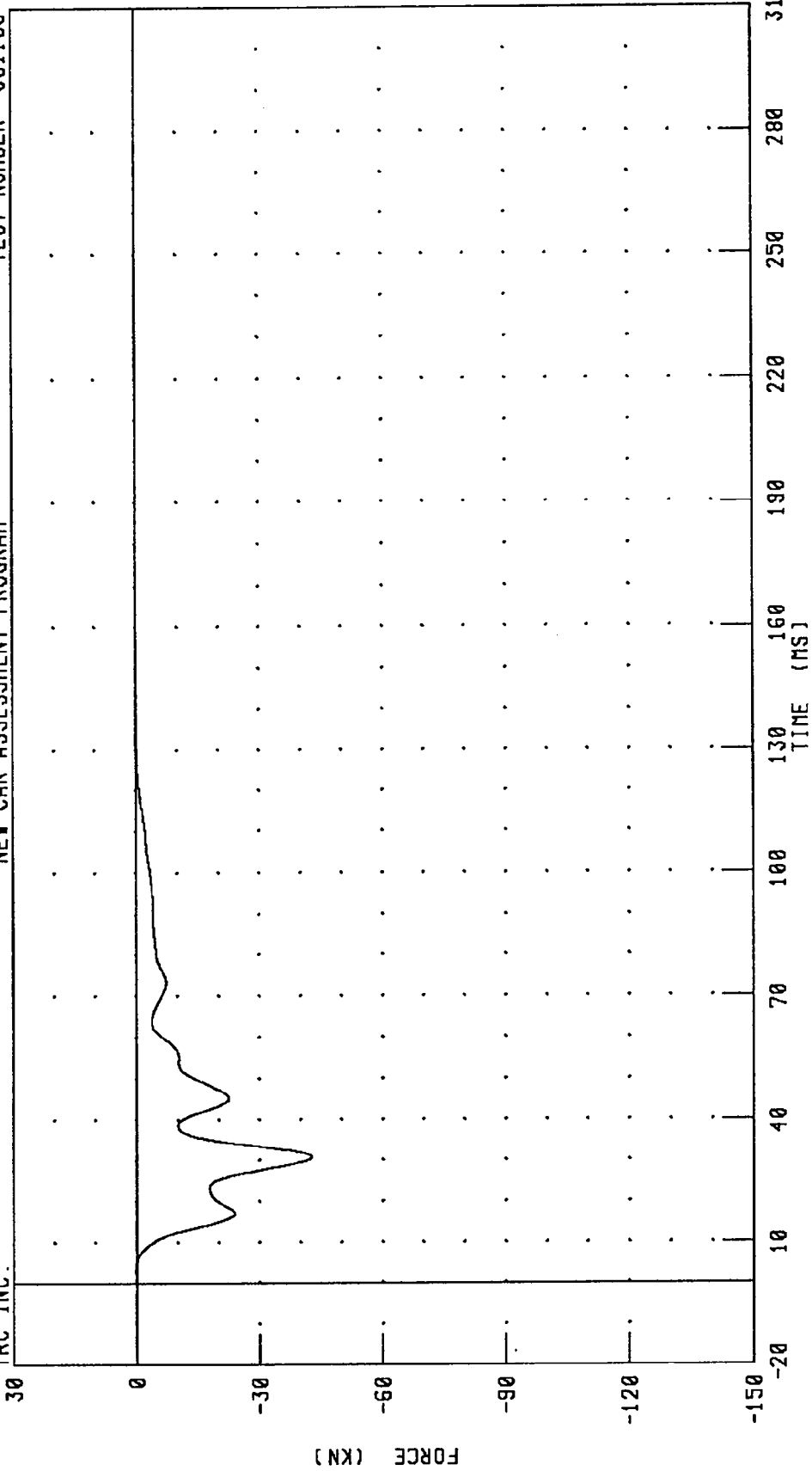
CHANNEL: BC6F FILTER: CH. CLASS 60

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C7 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 0.09 KN @ 2.80 MS; -42.79 KN @ 30.88 MS

FILTER: CH. CLASS 60

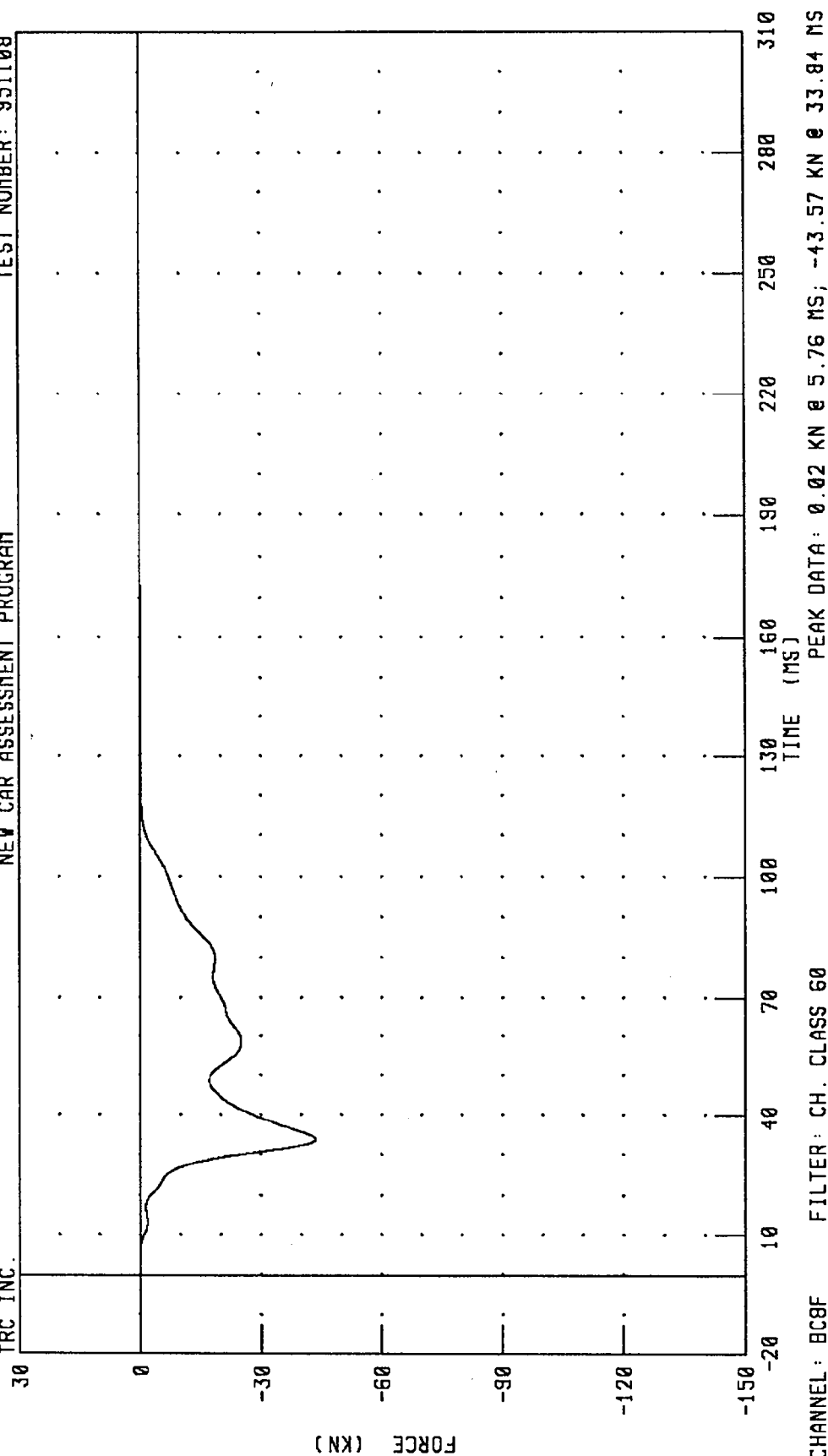
CHANNEL: BC7F

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION CB FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 0.02 KN @ 5.76 MS; -43.57 KN @ 33.84 MS

FILTER: CH. CLASS 60

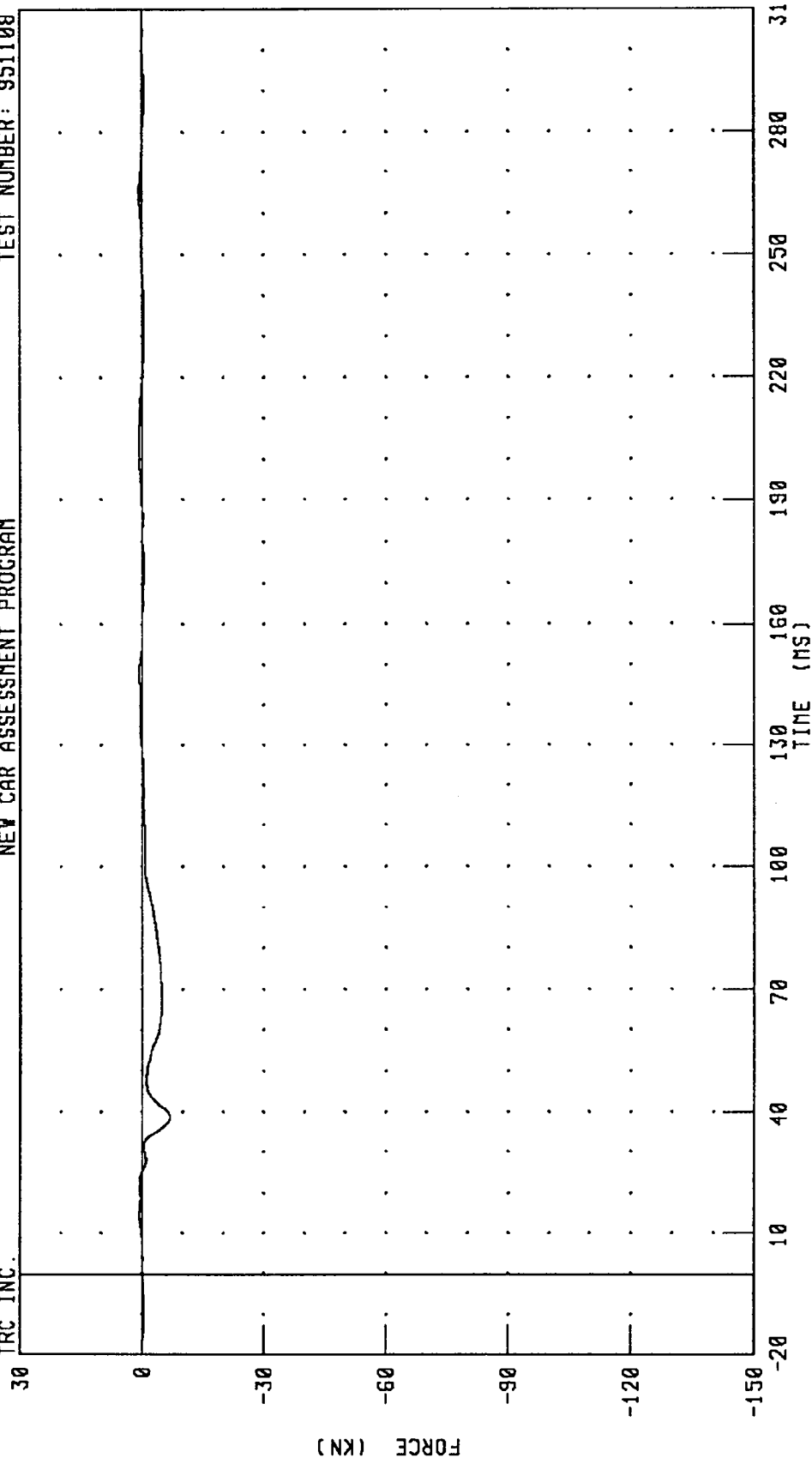
CHANNEL: BC8F

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C9 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 0.76 KN @ 147.68 MS; -6.94 KN @ 38.80 MS

FILTER: CH. CLASS 60

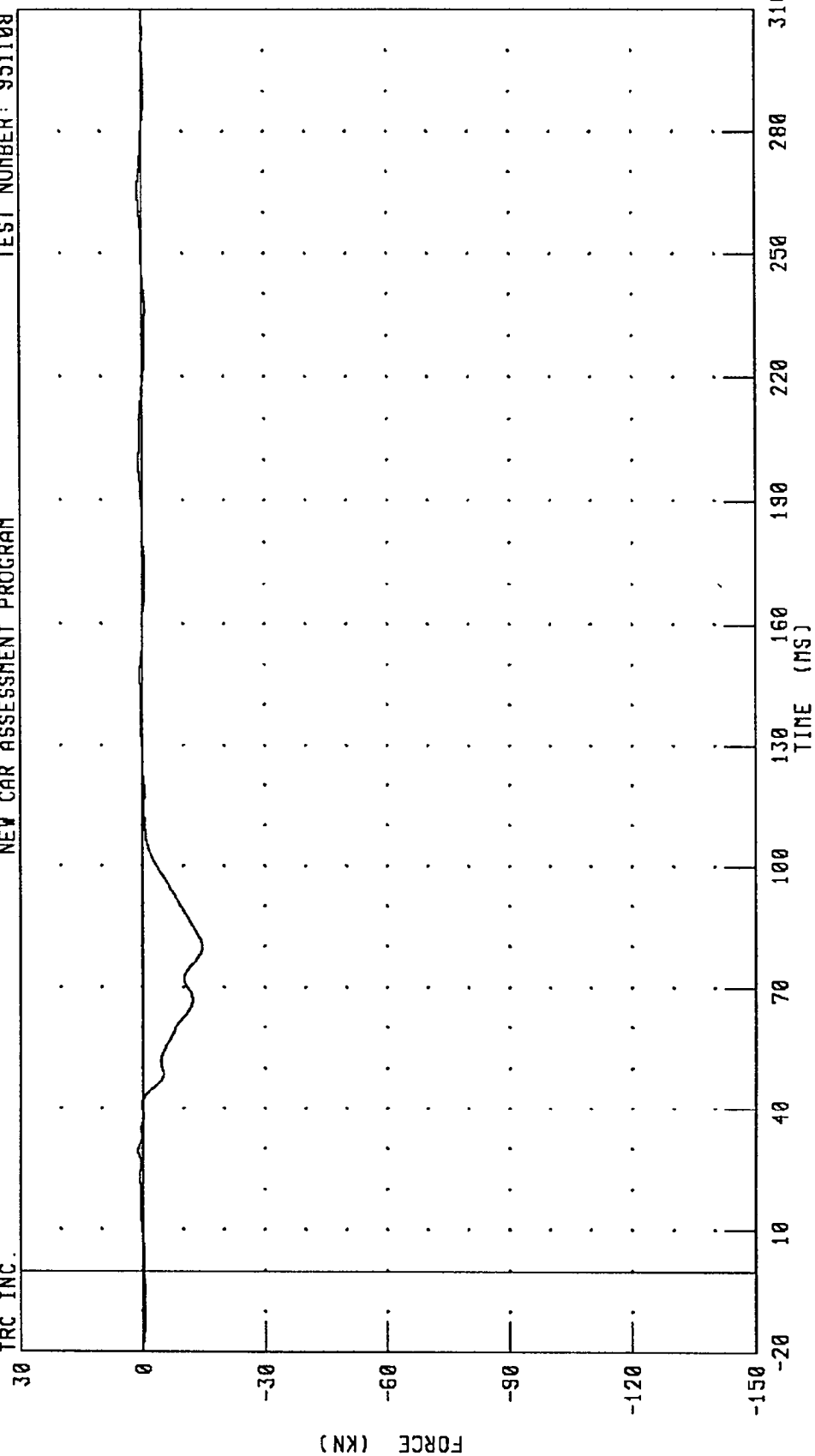
CHANNEL: BC9F

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D1 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 1.21 KN @ 29.52 MS; -14.59 KN @ 80.00 MS

FILTER: CH. CLASS 60

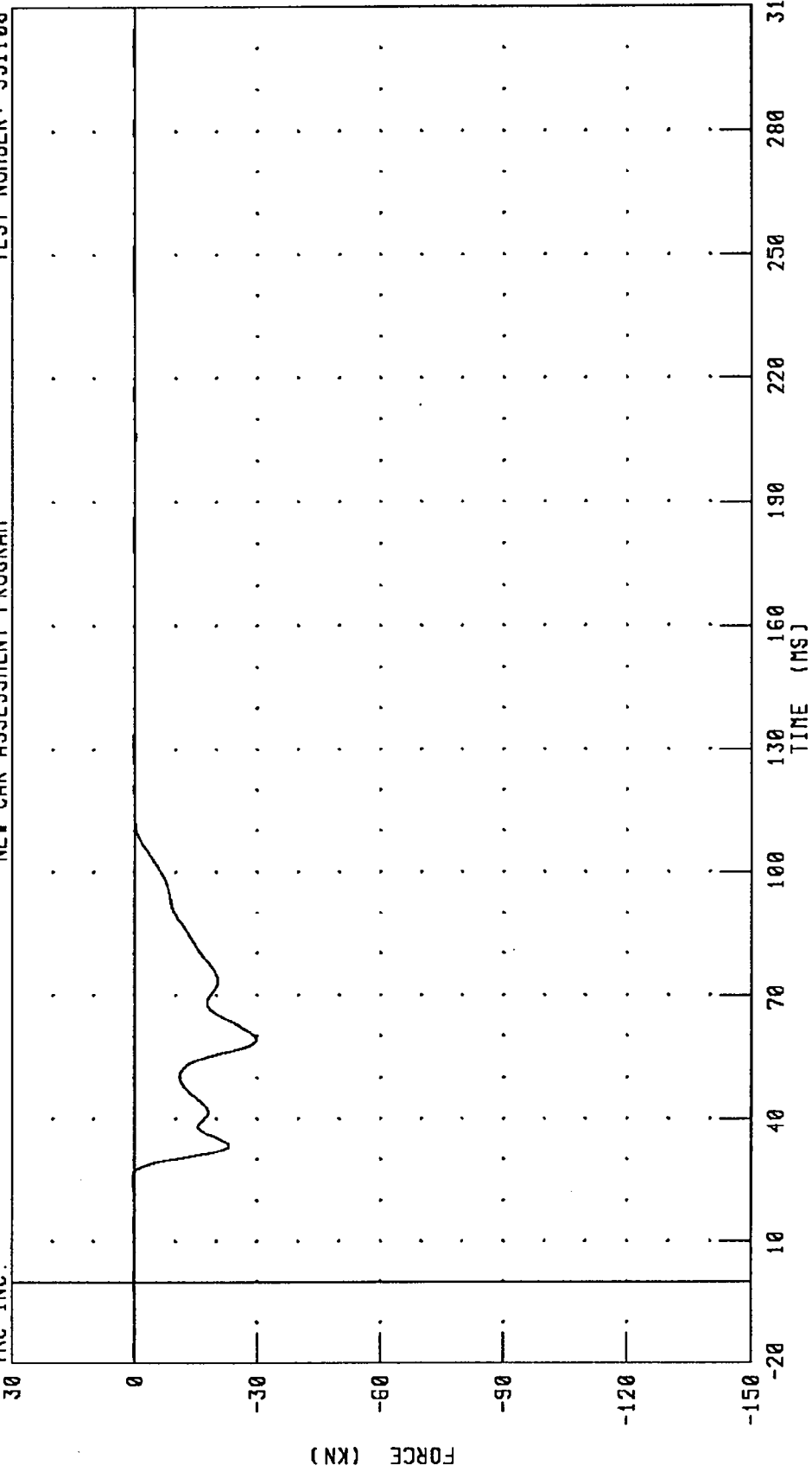
CHANNEL: BD1F

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D2 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 0.49 KN @ 25.04 MS; -29.78 KN @ 59.12 MS

FILTER: CH. CLASS 60

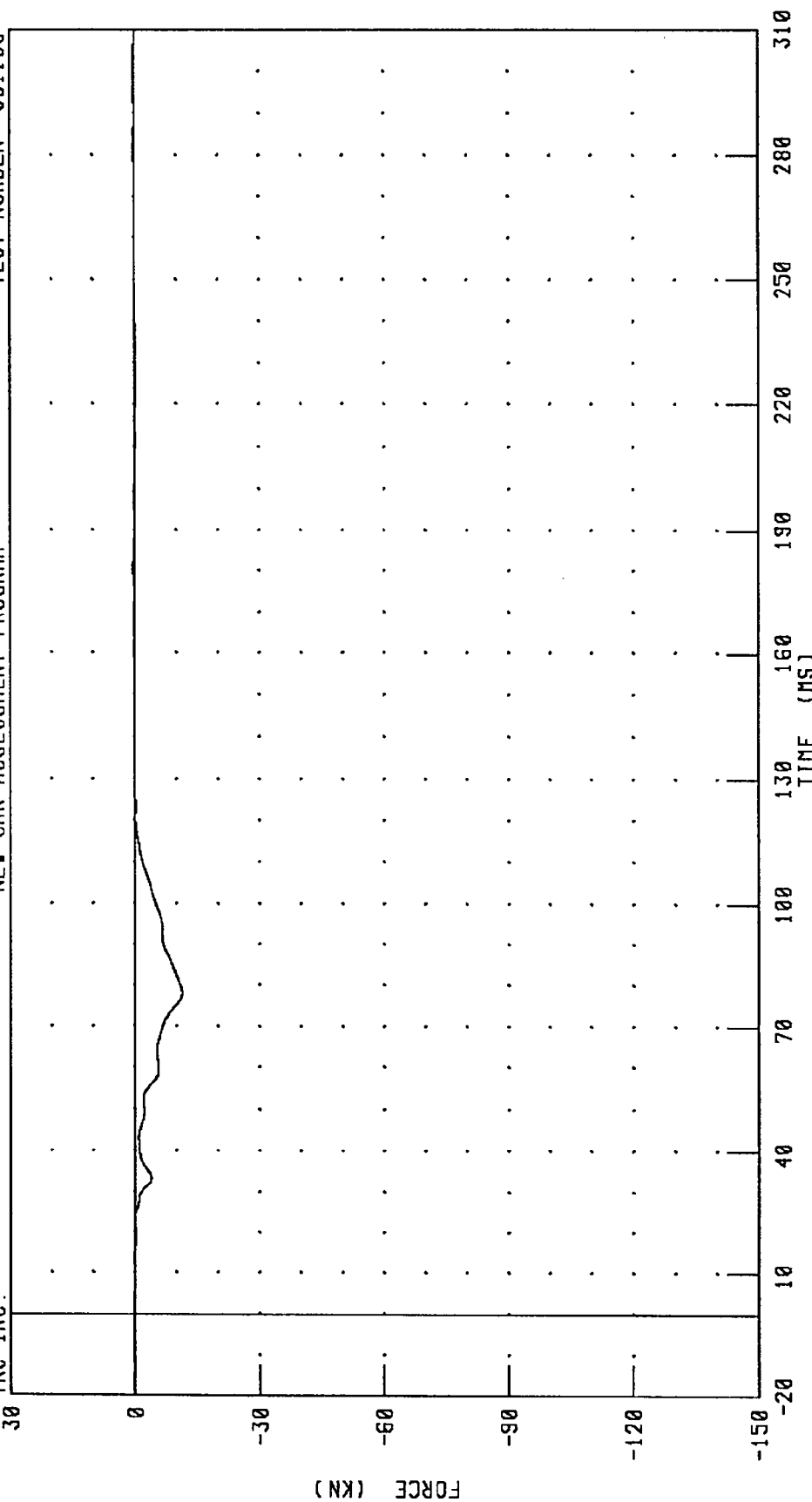
CHANNEL: BD2F

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D3 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 0.40 KN @ 180.48 MS; -11.38 KN @ 78.08 MS

FILTER: CH. CLASS 60

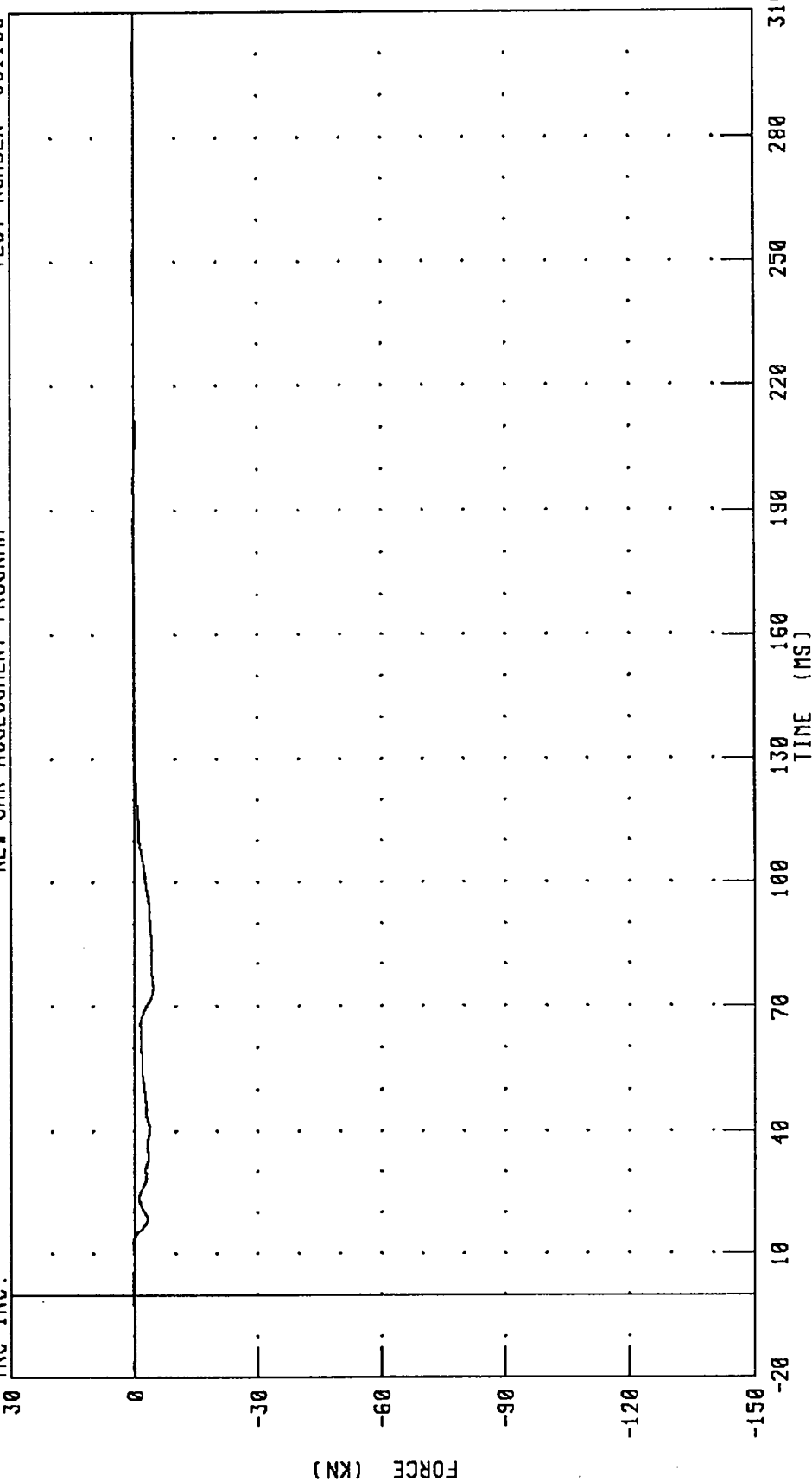
CHANNEL: BD3F

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D4 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 0.33 KN @ 180.40 MS; -4.50 KN @ 74.40 MS

FILTER: CH. CLASS 60

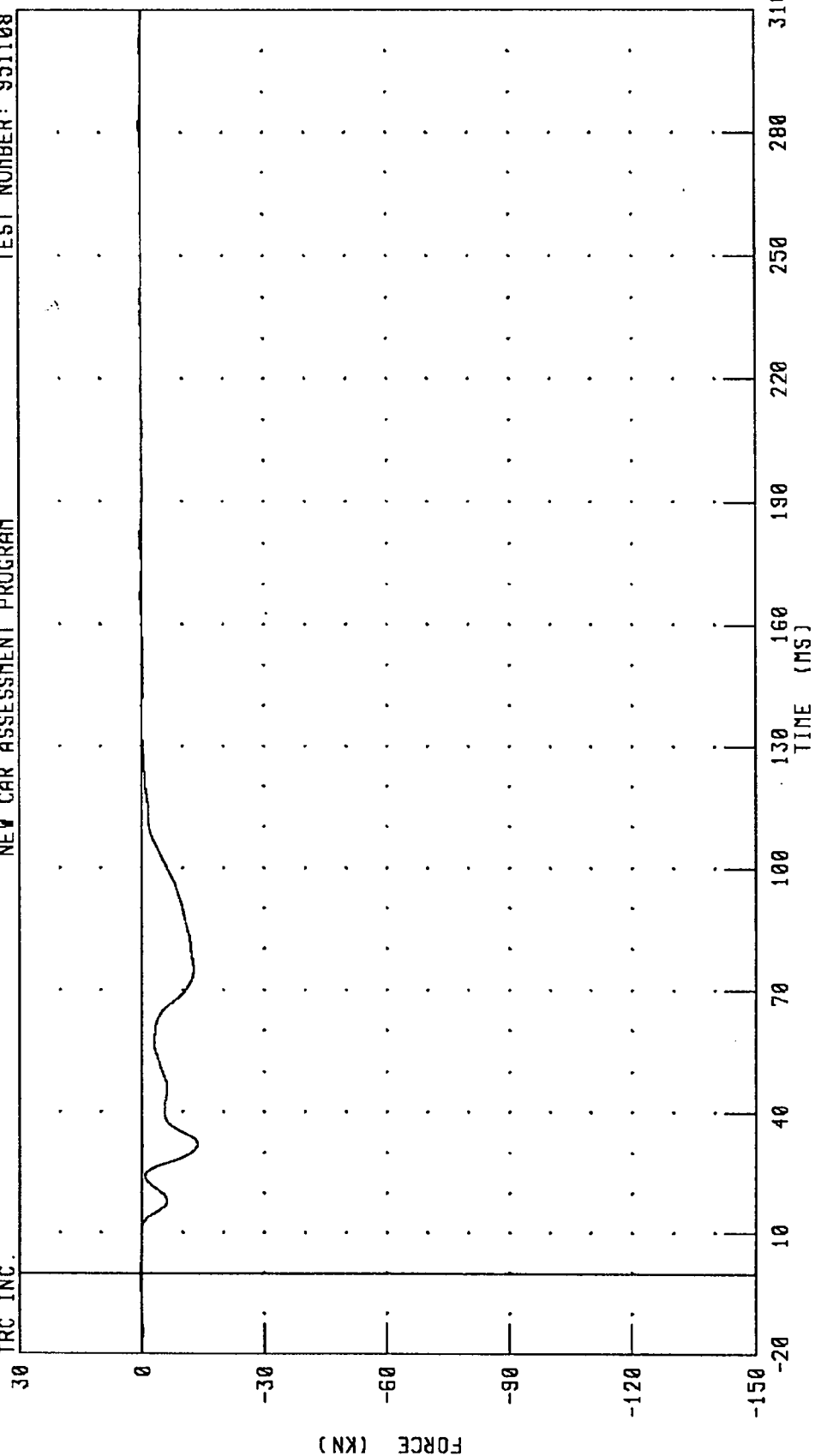
CHANNEL: BD4F

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D5 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 0.47 KN @ 180.64 MS; -13.72 KN @ 32.24 MS

FILTER: CH. CLASS 60

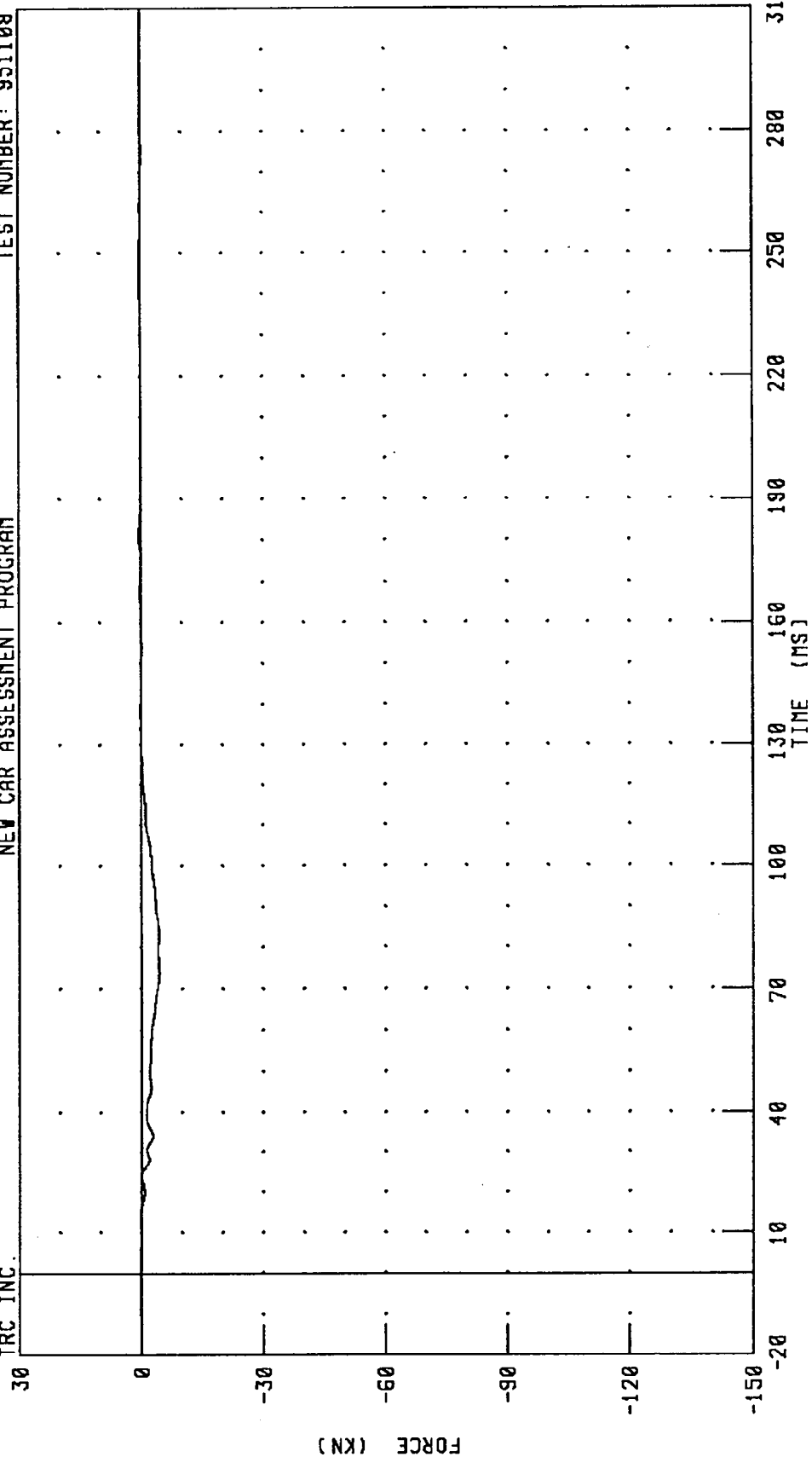
CHANNEL: B05F

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D6 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



CHANNEL: BD6F

FILTER: CH. CLASS 60

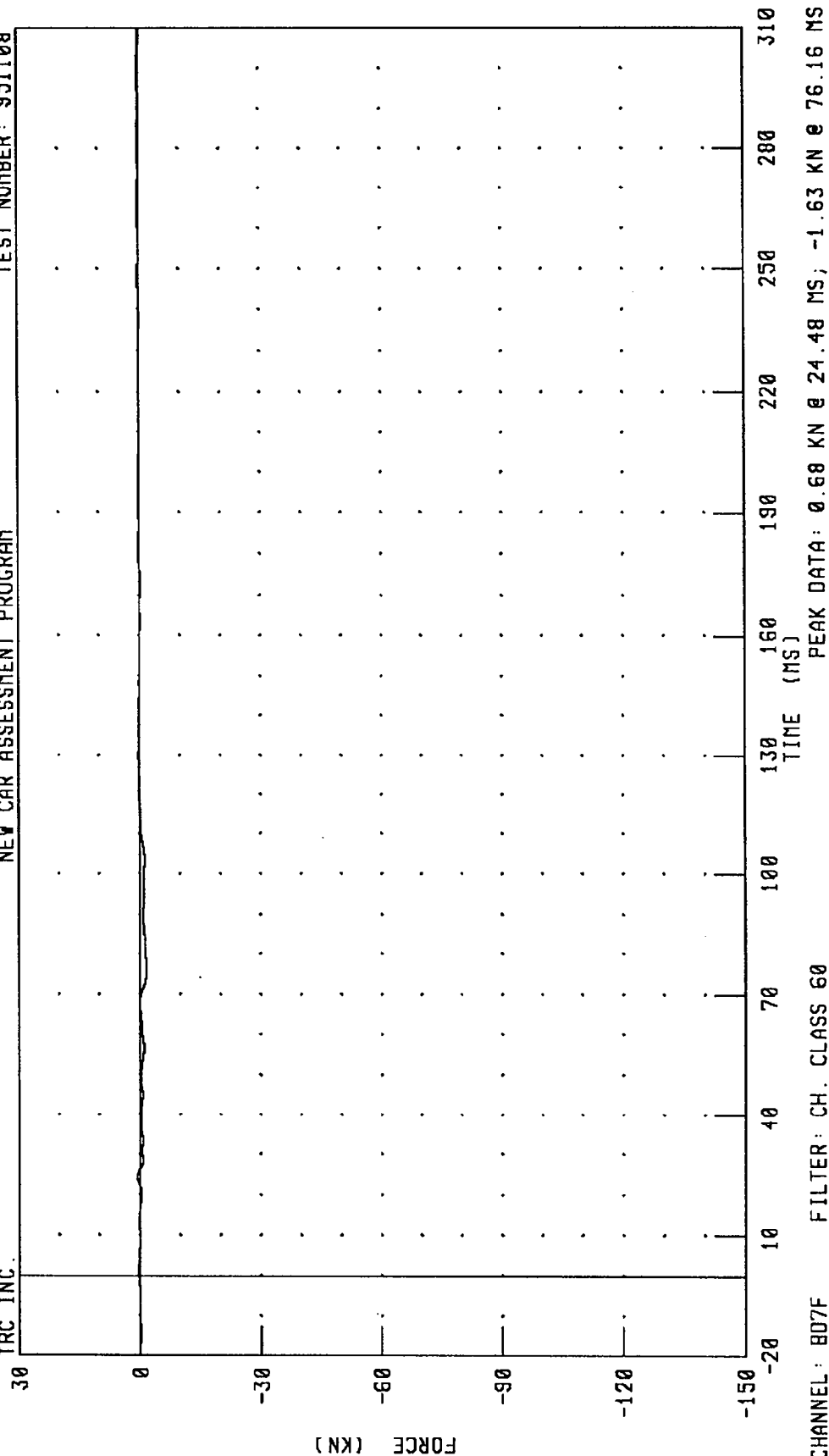
PEAK DATA: 0.41 KN @ 180.96 MS; -4.49 KN @ 73.84 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D7 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



CHANNEL: B07F

FILTER: CH. CLASS 60

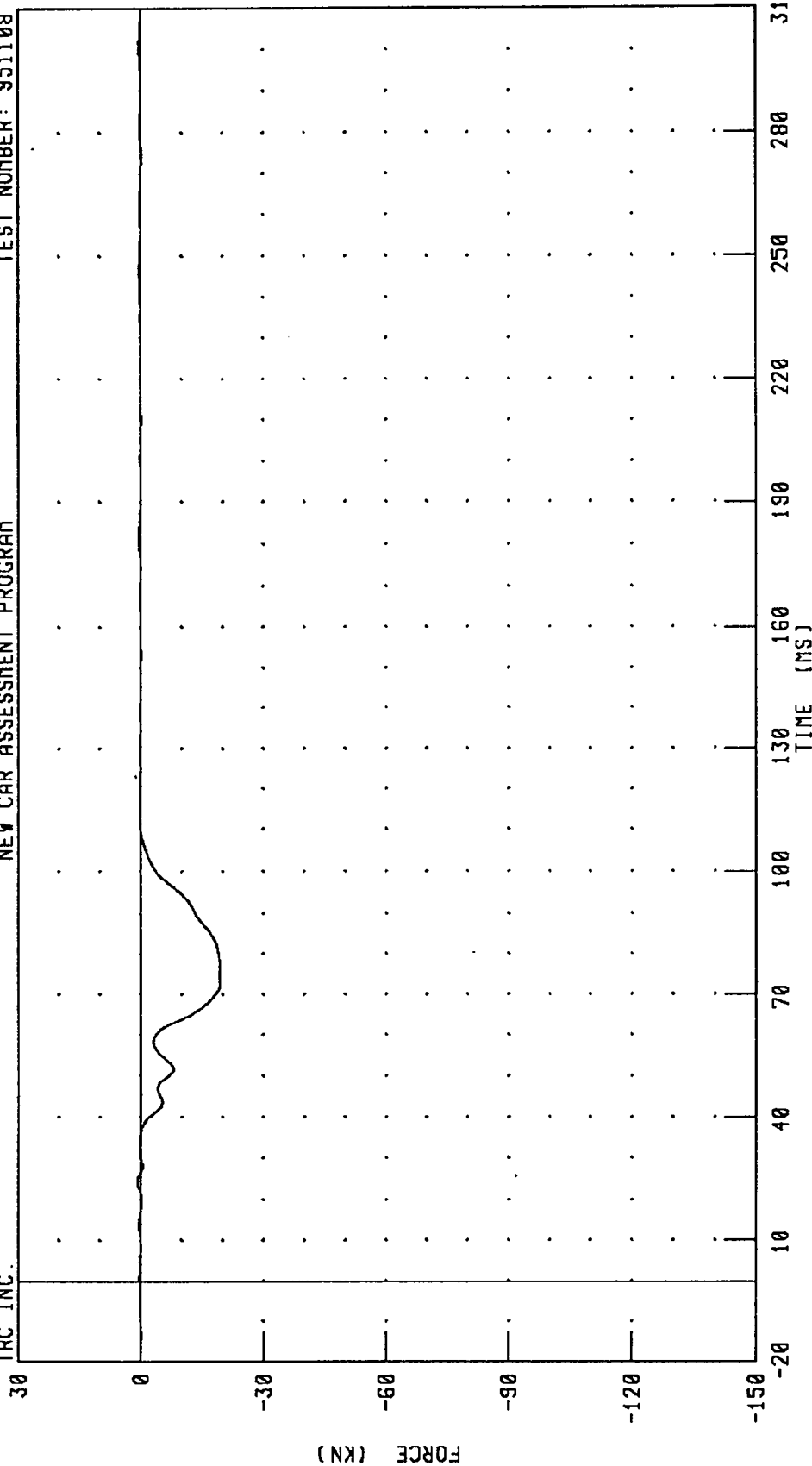
PEAK DATA: 0.68 KN @ 24.48 MS; -1.63 KN @ 76.16 MS

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D8 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 0.78 KN @ 24.40 MS; -19.46 KN @ 73.04 MS

FILTER: CH. CLASS 60

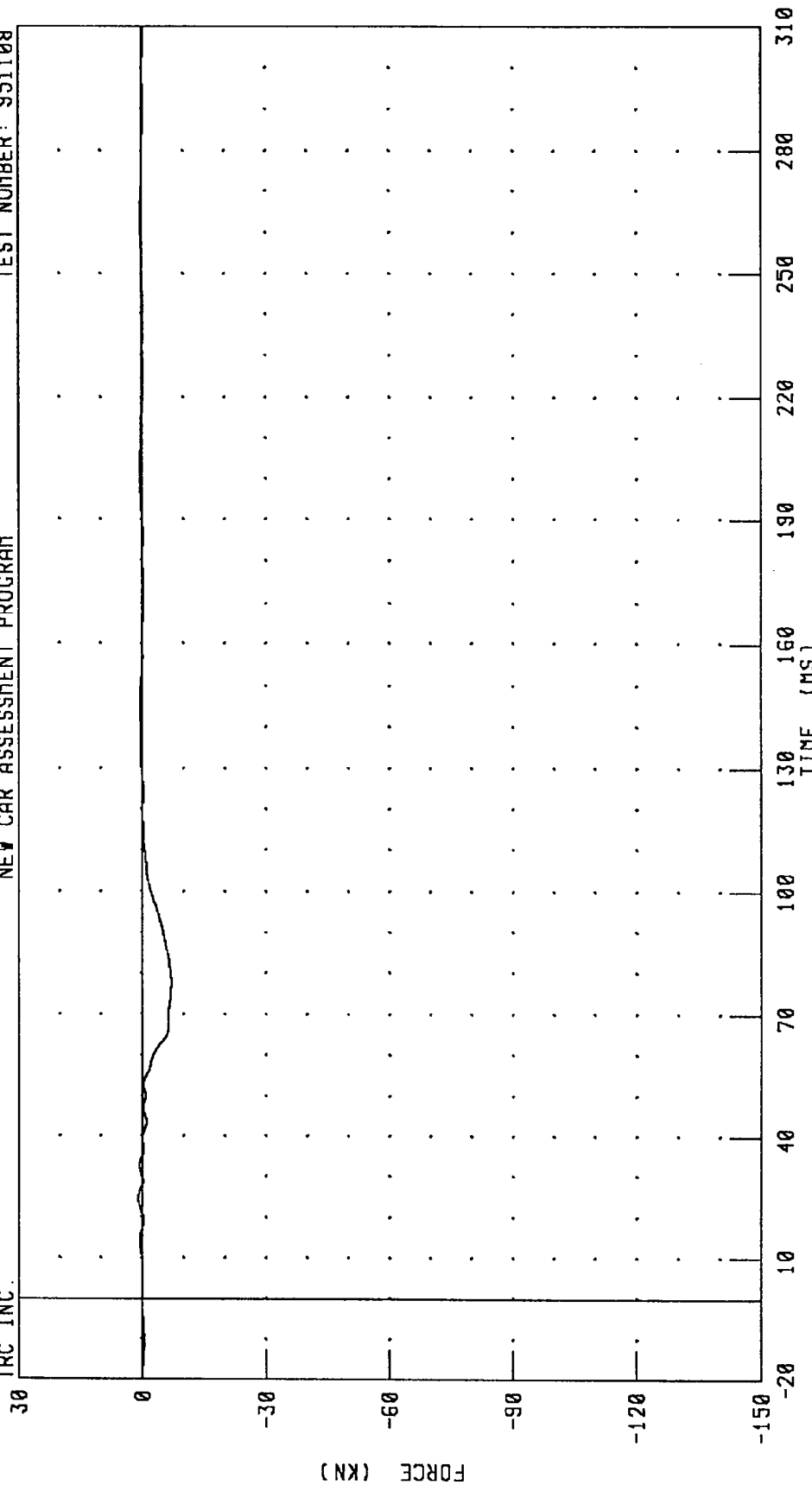
CHANNEL: B08F

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D9 FORCE

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 0.89 KN @ 24.64 MS; -7.10 KN @ 77.76 MS

FILTER: CH. CLASS 60

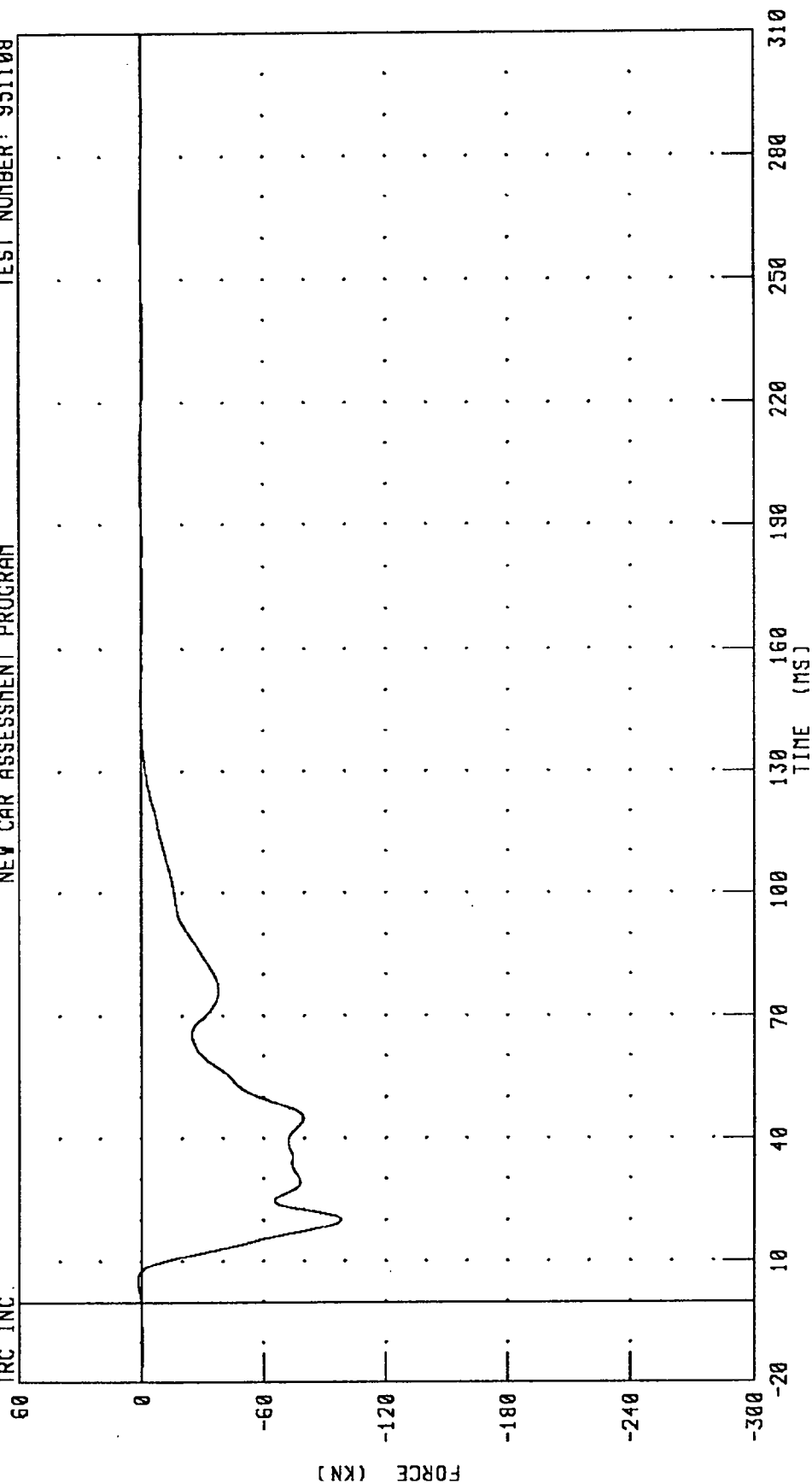
CHANNEL: BD9F

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 1 FORCE TOTAL

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 1.50 KN @ 5.20 MS; -98.33 KN @ 20.16 MS

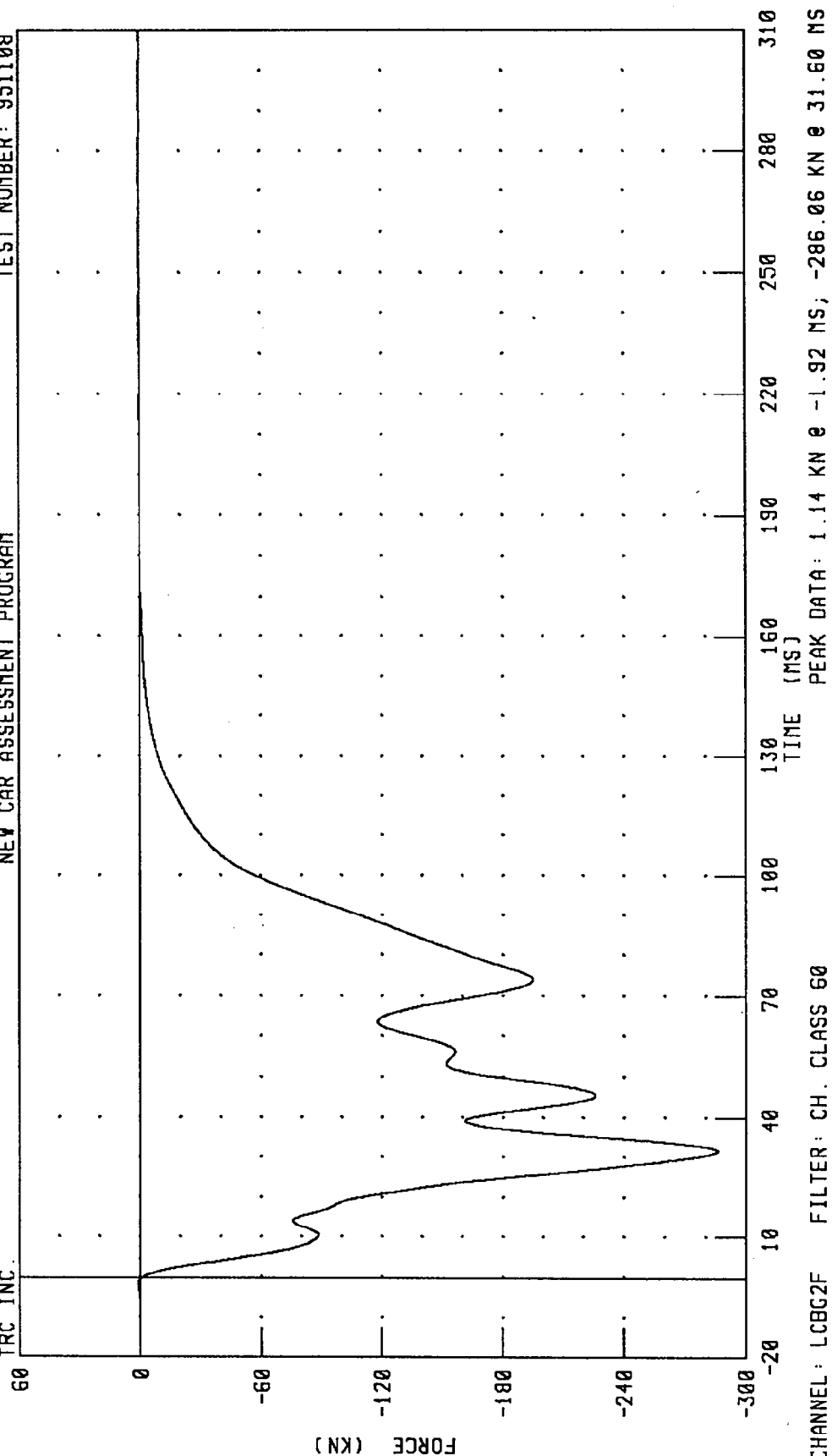
CHANNEL: LCBG1F FILTER: CH. CLASS 60

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 2 FORCE TOTAL

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 1.14 KN @ -1.92 MS; -286.06 KN @ 31.60 MS

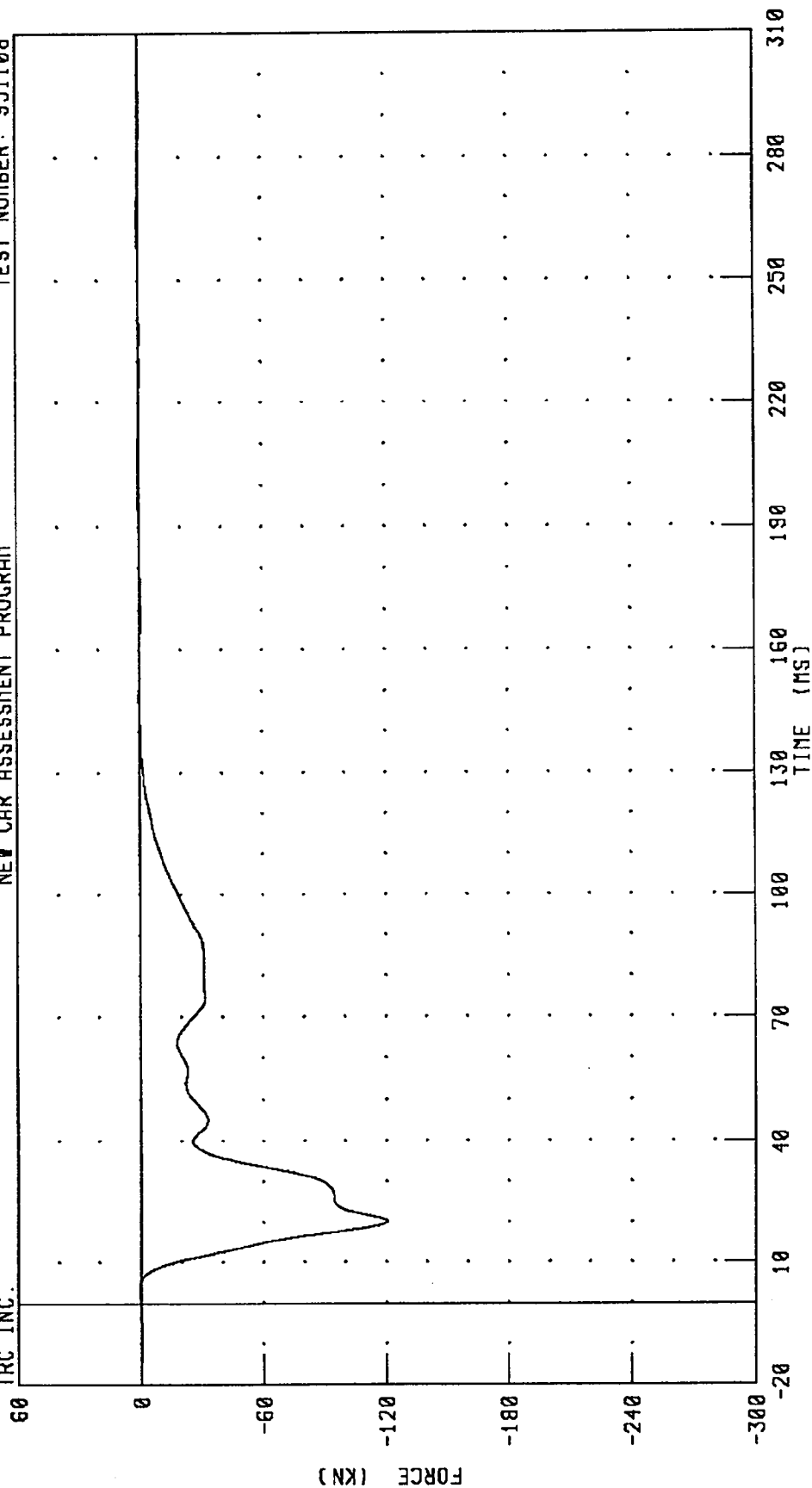
CHANNEL: LCBG2F FILTER: CH. CLASS 60

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER GROUP # 3 FORCE TOTAL

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 0.67 KN @ 3.52 MS; -120.56 KN @ 20.16 MS

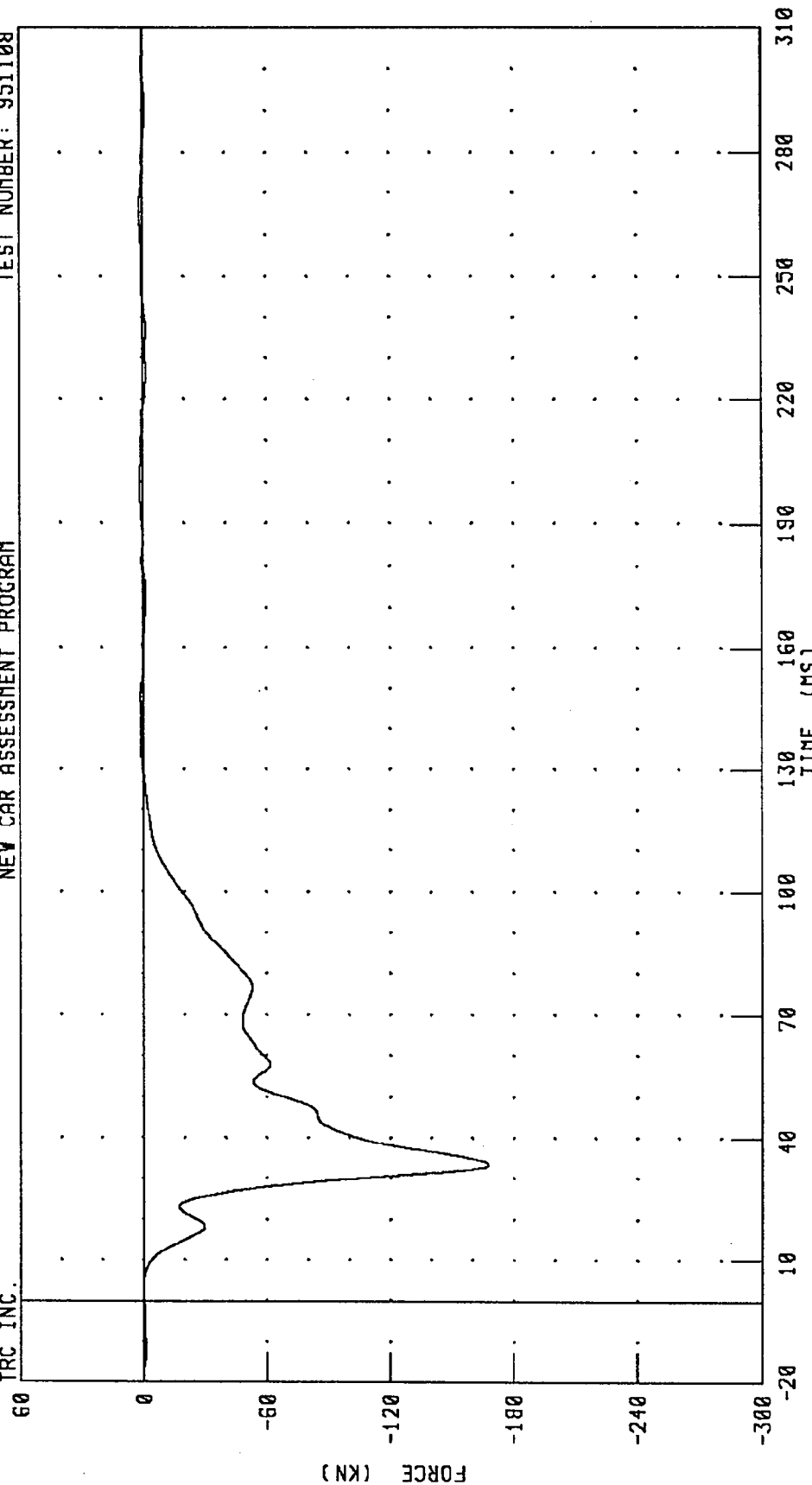
CHANNEL: LCBG3F FILTER: CH. CLASS 60

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 4 FORCE TOTAL

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 1.62 KN @ 198.00 MS; -167.82 KN @ 33.36 MS

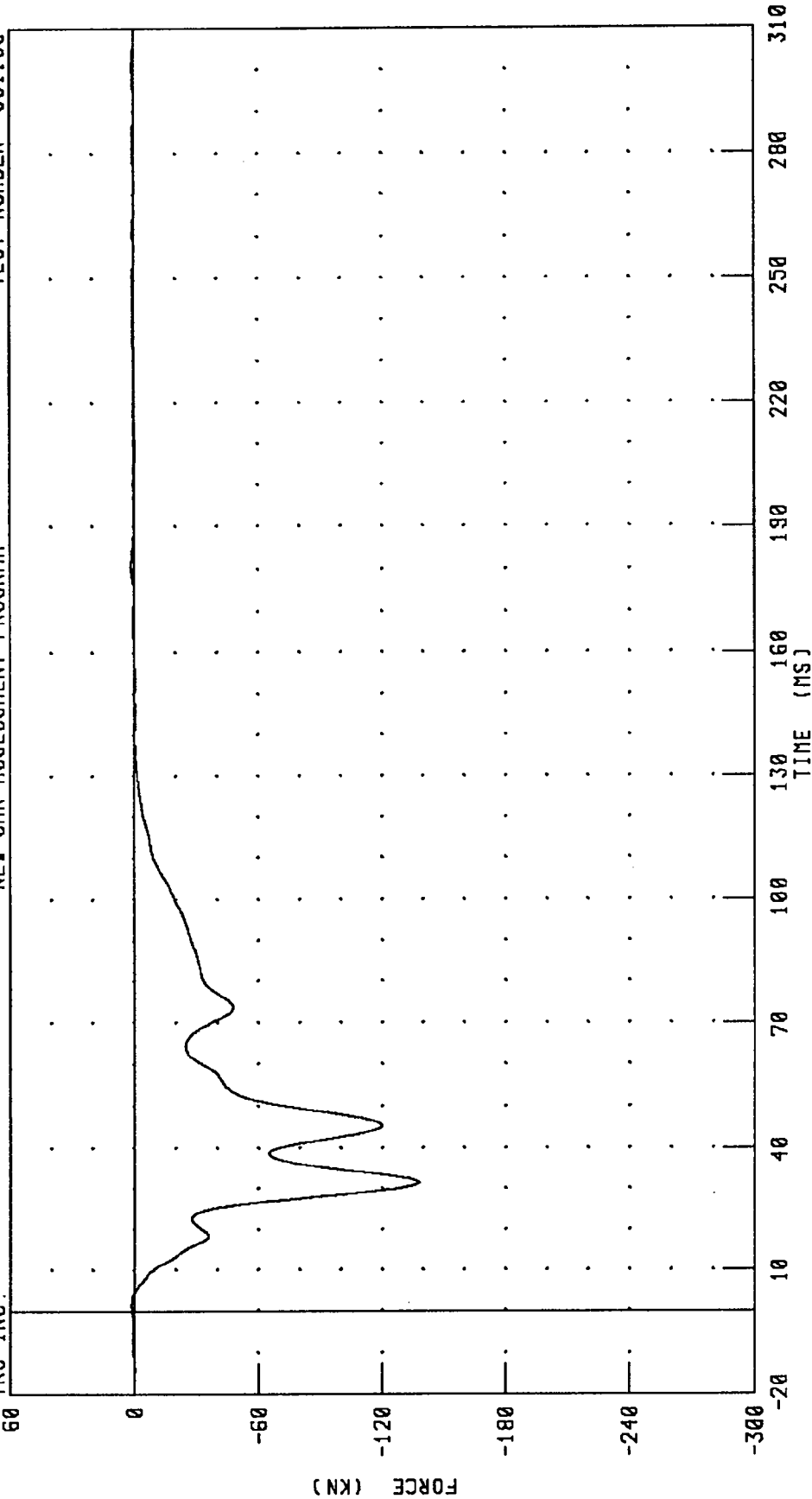
CHANNEL: LCBG4F FILTER: CH. CLASS 60

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 5 FORCE TOTAL

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 1.29 KN @ 180.72 MS; -138.04 KN @ 31.52 MS

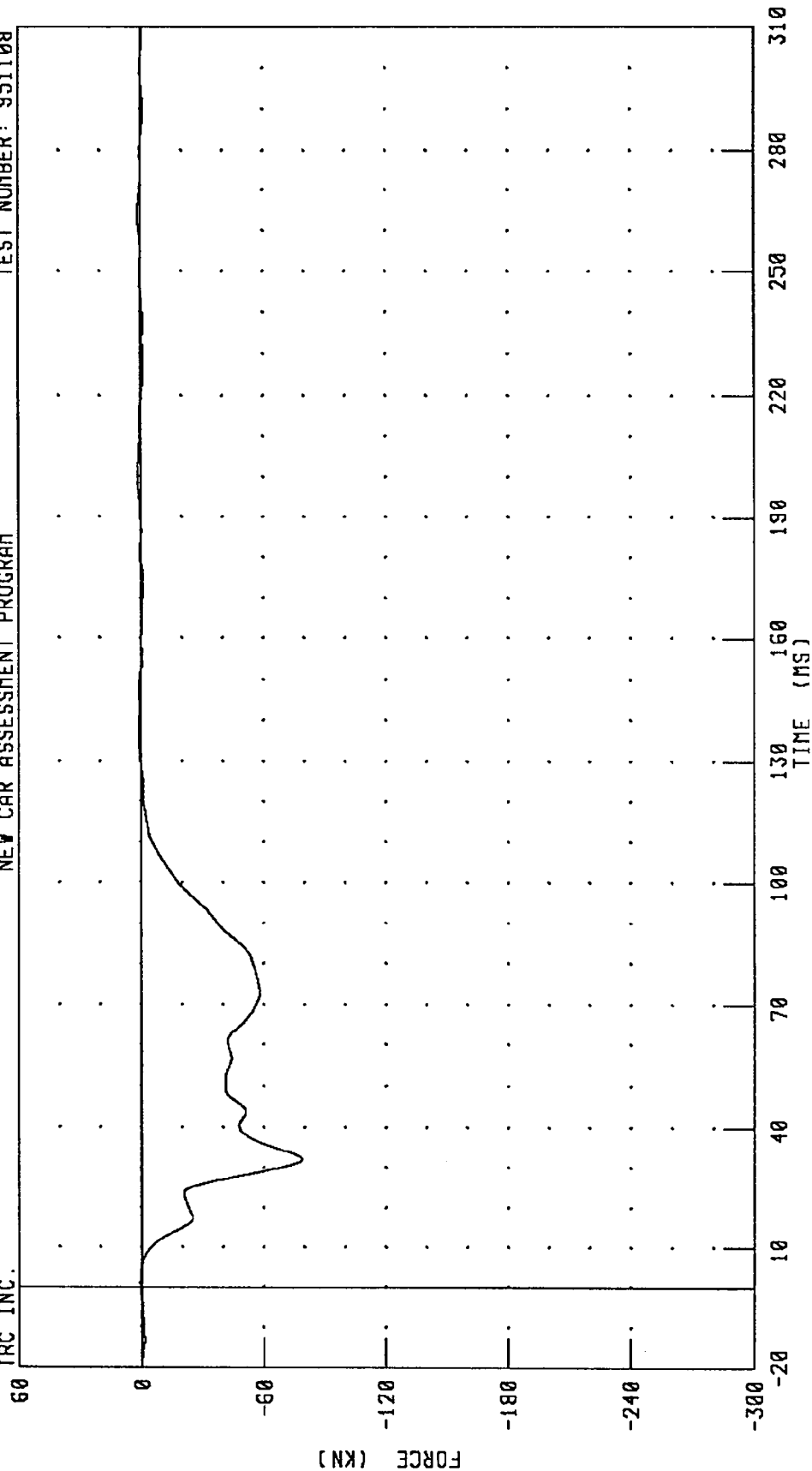
CHANNEL: LCBG5F FILTER: CH. CLASS 60

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 6 FORCE TOTAL

TEST NUMBER: 951108

NEW CAR ASSESSMENT PROGRAM

TRC INC.

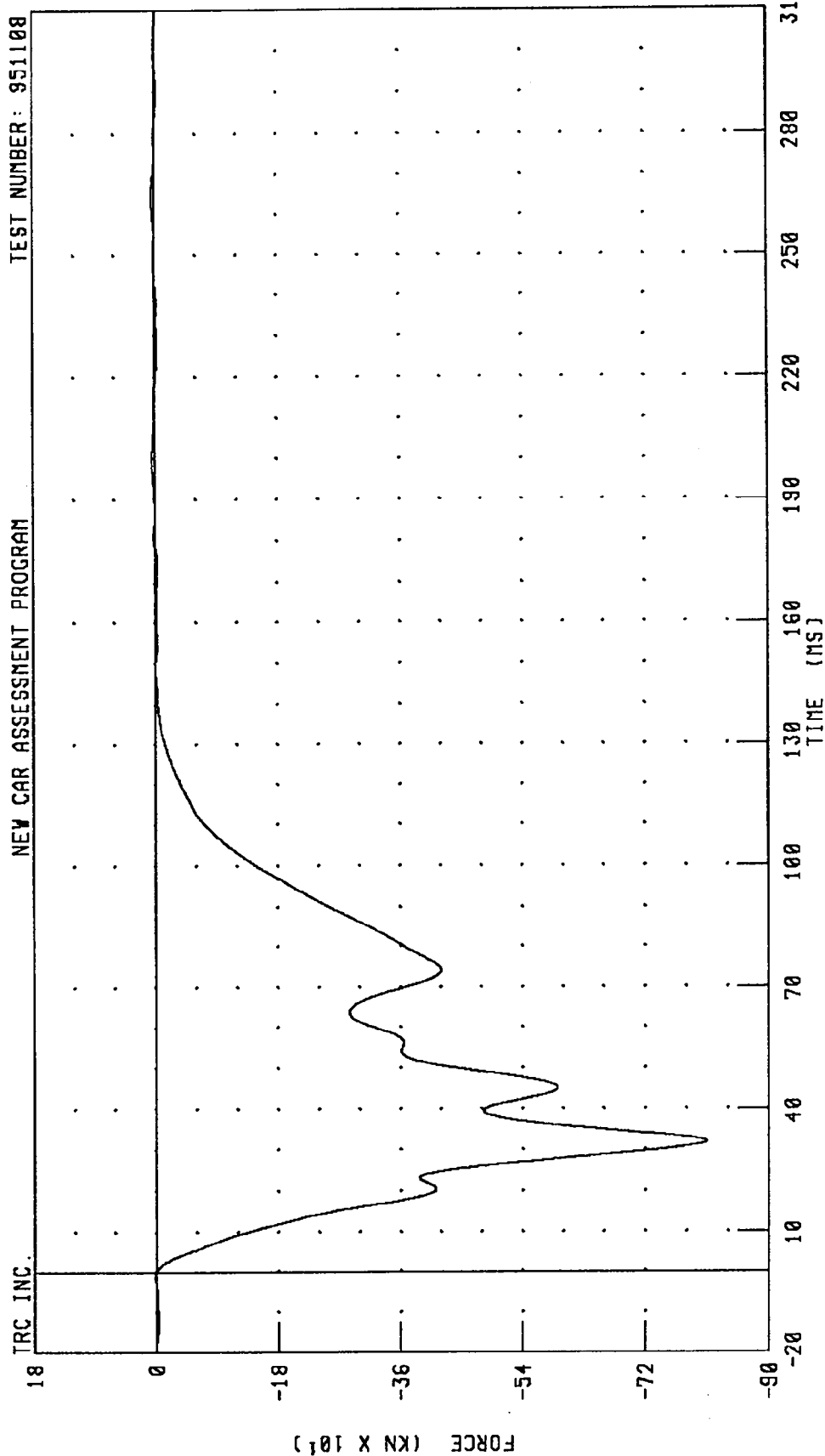


PEAK DATA: 1.56 KN @ 200.32 MS; -78.71 KN @ 32.16 MS

CHANNEL: LCBG6F FILTER: CH. CLASS 60

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 TOTAL LOAD CELL BARRIER FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108



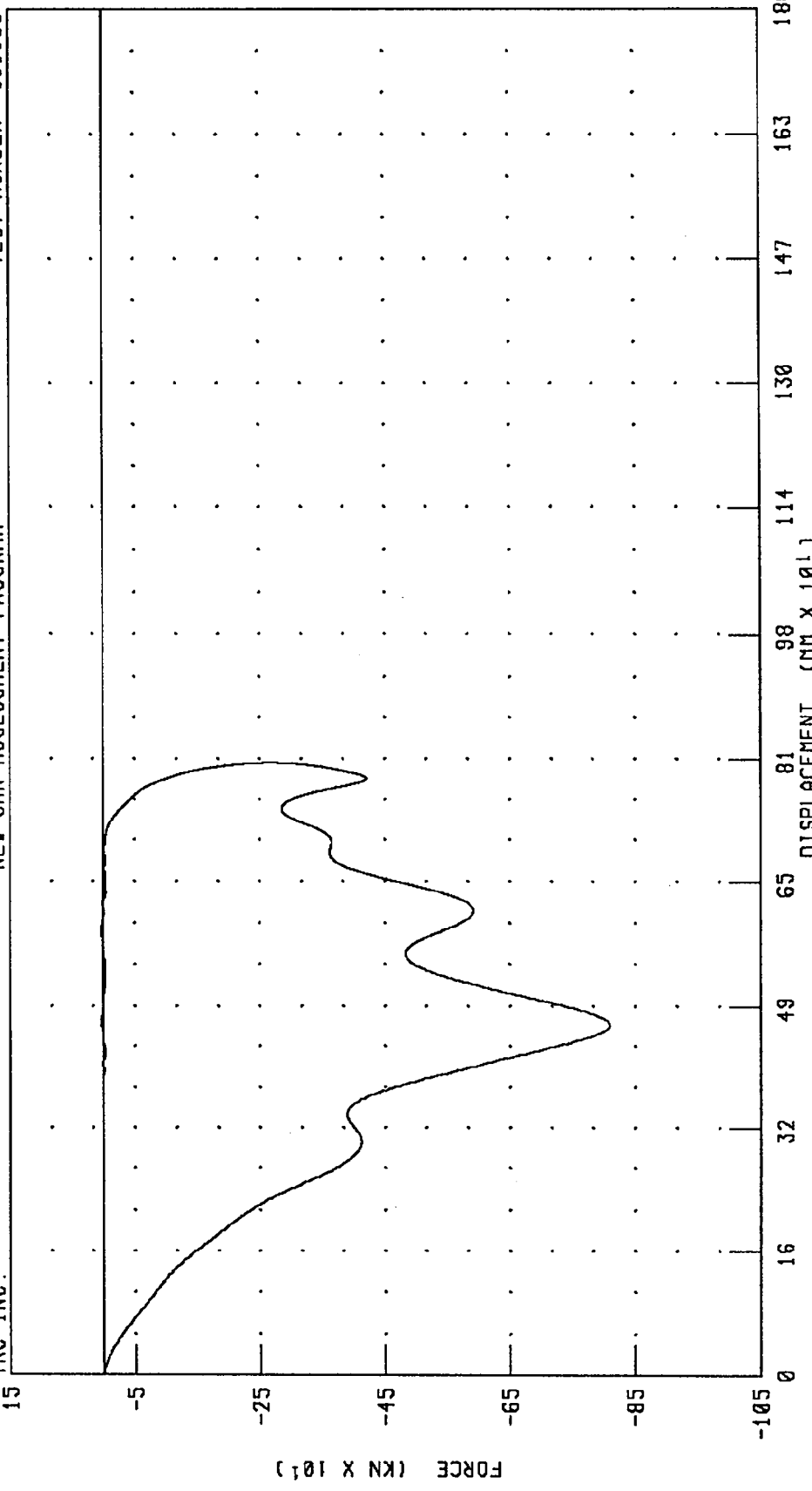
PEAK DATA: 4.24 KN @ 199.92 MS; -808.77 KN @ 32.00 MS

CHANNEL: LCBGT FILTER: CH. CLASS 60

1996 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 TOTAL LOAD CELL BARRIER FORCE VS AVERAGE VEHICLE X-AXIS DISPLACEMENT
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 951108

TRC INC.



CHANNEL: 0THXD FILTER: CH. CLASS 180
 LCBGT CH. CLASS 60
 PEAK DATA: 813.19 NM @ 89.12 MS;
 4.24 KN @ 199.92 MS; -808.77 KN @ 32.00 MS

Appendix C

Dummy Certification Data

Pre-test Certification Data

Driver Dummy S/N: 192

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III EXTERNAL DIMENSIONS

192 ALDERSON

07-NOV-95

TRC INC. TEST NO: 192C28ED1 572E SN192 EXT.DIMENSION CAL28

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

John R. Clawidge

RUN NUMBER: 111695.0906

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III

07-NOV-95

TRC INC.

TEST NO: 192C28HD1

572E SN192 HEAD DROP CAL 28

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	52.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	245.56 G
PEAK LATERAL ACCELERATION	15 G MAX	-3.28 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

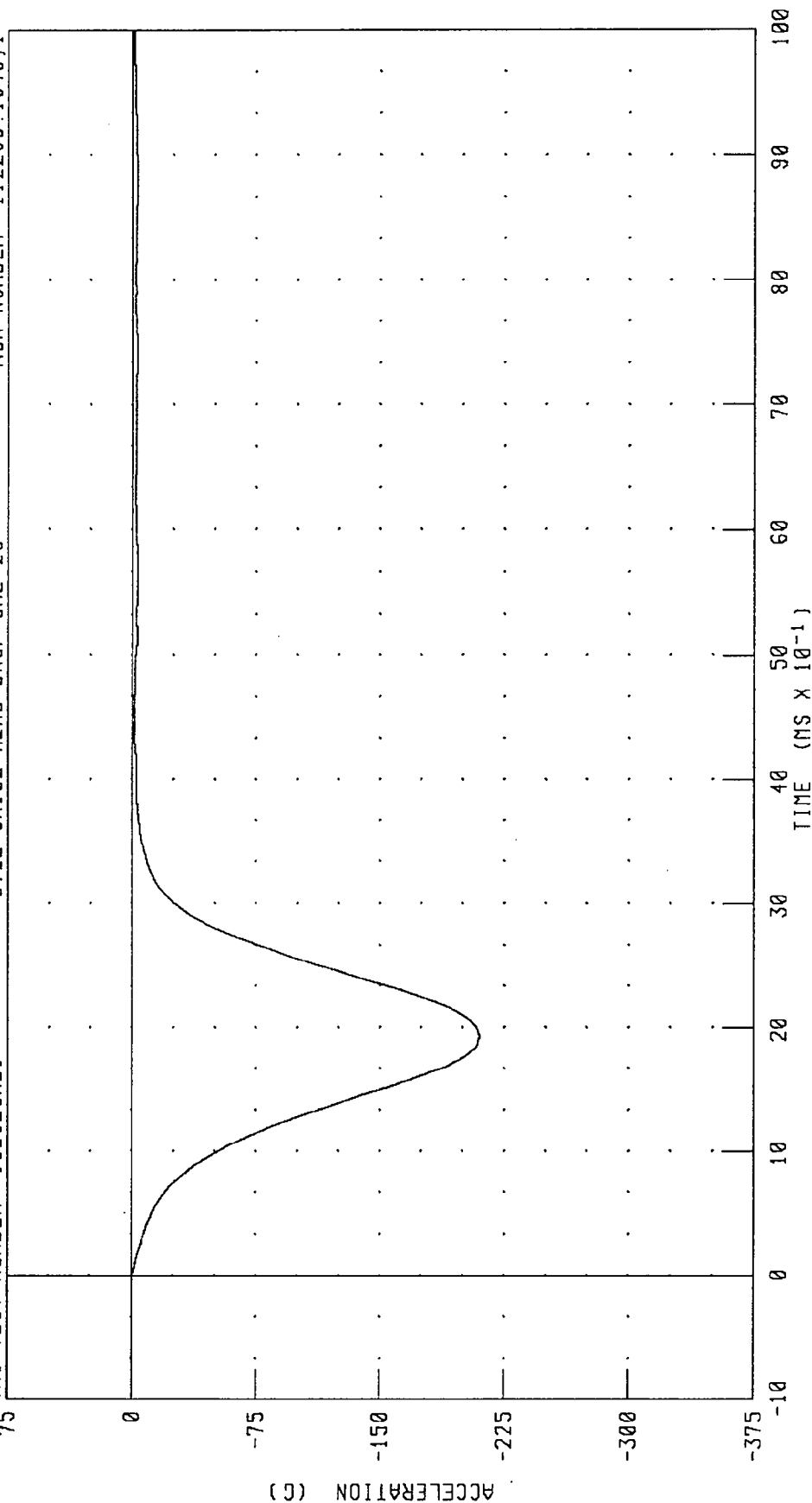
TECHNICIAN

John K. Clauwige

RUN NUMBER: 110795.1216;1

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

TRC TEST NUMBER: 192C28HD1 572E SN192 HEAD DROP CAL 28 RUN NUMBER: 112295.1340;1

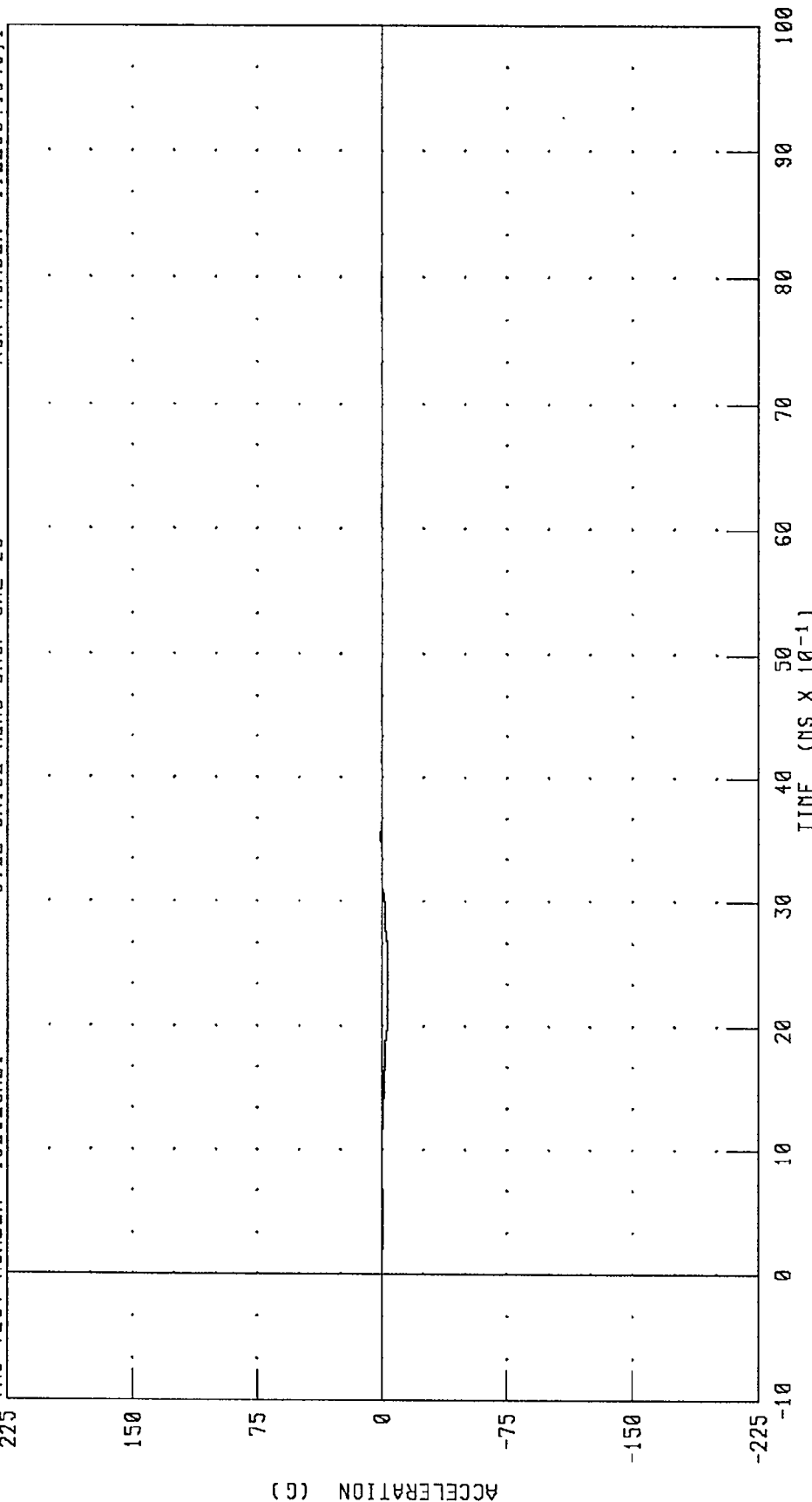


CHANNEL: HEDXG FILTER: CH. CLASS 1000

PEAK DATA: 0.04 G @ -0.16 MS, -210.56 G @ 1.92 MS

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

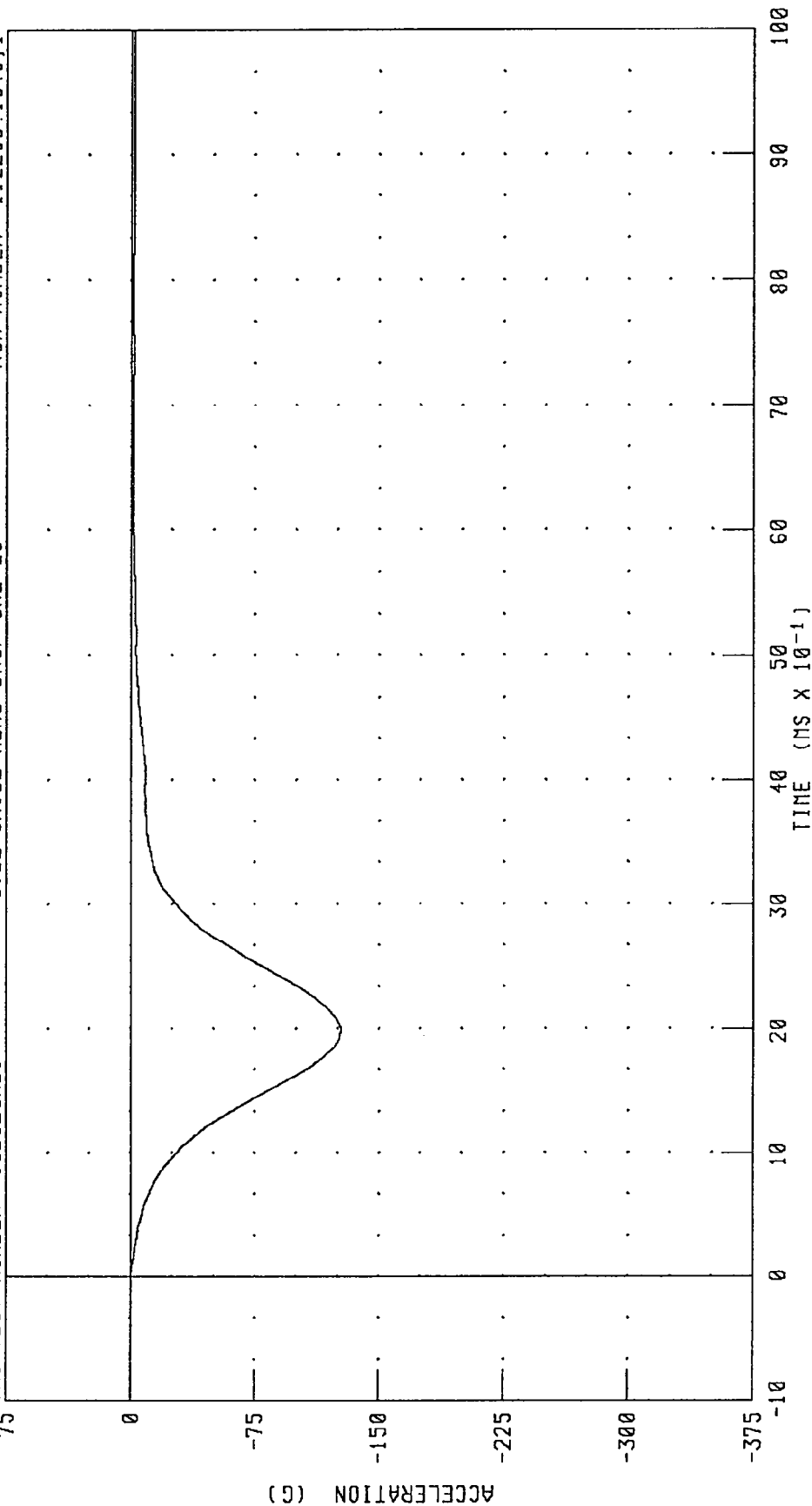
TRC TEST NUMBER: 192C28HD1 572E SN192 HEAD DRGP CAL 28 RUN NUMBER: 112295.1340;1



CHANNEL: HEDYG FILTER: CH. CLASS 1000

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

TRC TEST NUMBER: 192C28HD1 572E SN192 HEAD DROP CAL 28 RUN NUMBER: 112295.1340;1



PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: 192C28HD1

572E SN192 HEAD DROP CAL 28

RUN NUMBER: 112295.1340,1

375

300

225

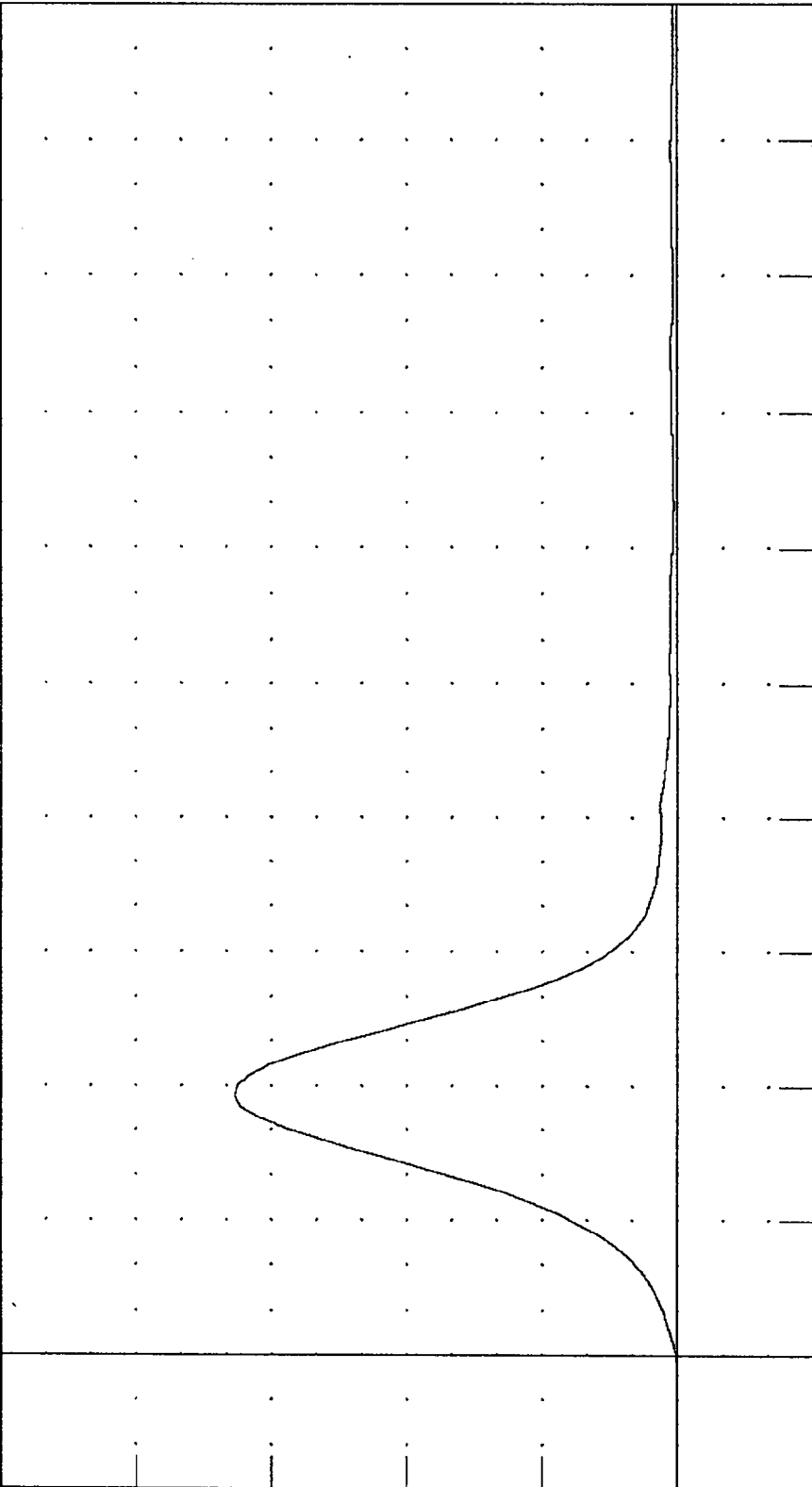
150

75

0

-75

ACCELERATION (G)



TIME (MS X 10⁻¹)

100

90

80

70

60

50

40

30

20

10

0

-10

CHANNEL: HEDRG FILTER: CH. CLASS 1000

PEAK DATA: 245.56 G @ 1.92 MS; 0.00 G @ -0.88 MS

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

HYBRID III

07-NOV-95

TRC INC. TEST NO: 192C28NF1 572E SN192 NECK FLEXION CAL28

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY		10 - 70 %	52.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	6.93 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	22.77 G
	20 MS	17.60 - 22.60 G	19.77 G
	30 MS	12.50 - 18.50 G	15.95 G
MAX PENDULUM G		29 G MAX	23.37 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	15.91 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	37.92 MS
D PLANE	MAX	64 - 78 DEG.	74.71 DEG.
ROTATION	TIME	57 - 64 MS	62.40 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	99.65 NM
	TIME	47 - 58 MS	52.16 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	120.72 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	102.72 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN

John K. Claughe

RUN NUMBER: 110795.1424;5

PART 572-E HYBRID III NECK FLEXION CALIBRATION
 PENDULUM DECELERATION

TRC TEST NUMBER: 192C28NF1 RUN NUMBER: 112295.1340;5

572E SN192 NECK FLEXION CAL28

400

320

240

160

80

0

-80

ACCELERATION (G X 10⁻¹)

TIME (MS)

200

180

160

140

120

100

80

60

40

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

-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

-3420

-3440

-3460

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-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

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-4500

-4520

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-4800

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-4840

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-4880

-4900

-4920

-4940

-4960

-4980

-5000

-5020

-5040

-5060

-5080

-5100

-5120

-5140

-5160

-5180

-5200

-5220

-5240

-5260

-5280

-5300

-532

PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 197C28NF1

572E SN192 NECK FLEXION CAL28

RUN NUMBER: 112295.1340;5

120

90

60

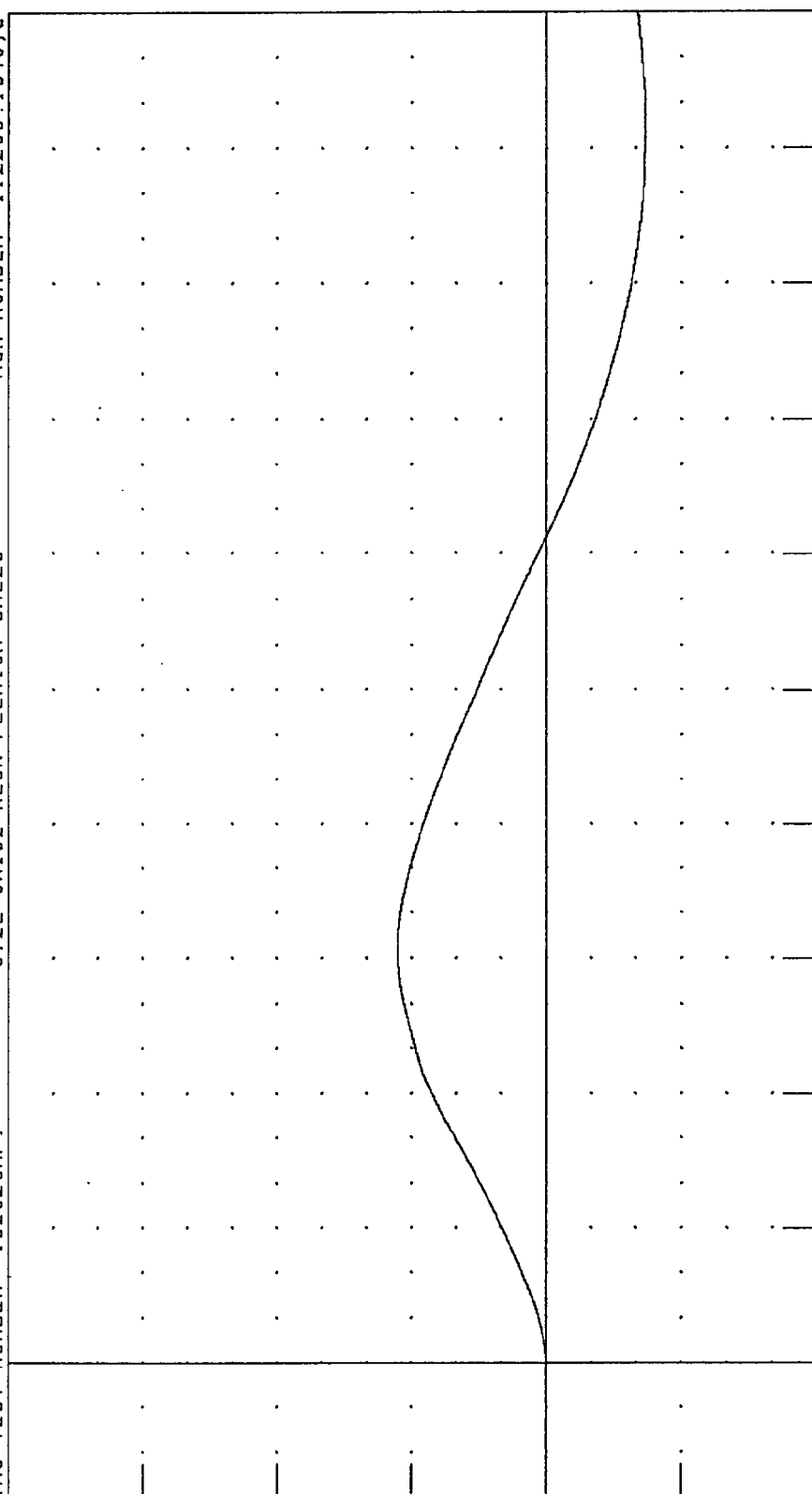
30

0

-30

-60

ANGLE (°)



TIME (MS)

200

180

160

140

120

100

80

60

40

20

0

-20

-60

CHANNEL: BETA FILTER: CH. CLASS 60

PEAK DATA: 33.12 ° @ 61.60 MS; -22.08 ° @ 184.32 MS

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

TRC TEST NUMBER: 192C28NF1 RUN NUMBER: 112295.1340,5

572E SN192 NECK FLEXION CAL28

120

90

60

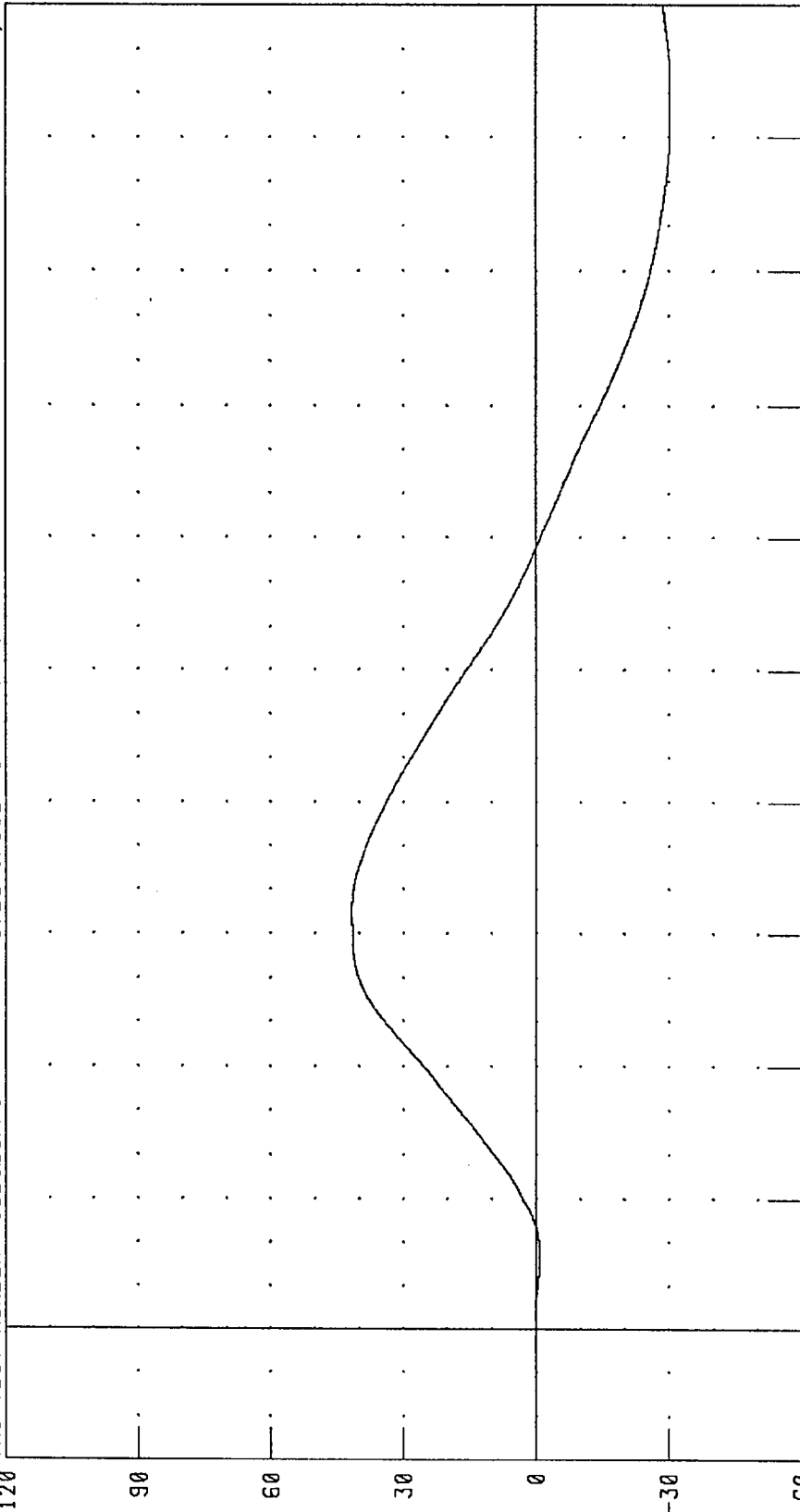
30

0

-30

-60

ANGLE (°)



TIME (MS)

200

180

160

140

120

100

80

60

40

20

0

-20

-40

-60

-80

-100

-120

-140

-160

-180

-200

-240

-280

-320

-360

-400

-440

-480

-520

-560

-600

-640

-680

-720

-760

-800

-840

-900

951108

CHANNEL: THETA FILTER: CH. CLASS 60

PEAK DATA: 41.63 ° @ 63.20 MS; -30.24 ° @ 188.56 MS

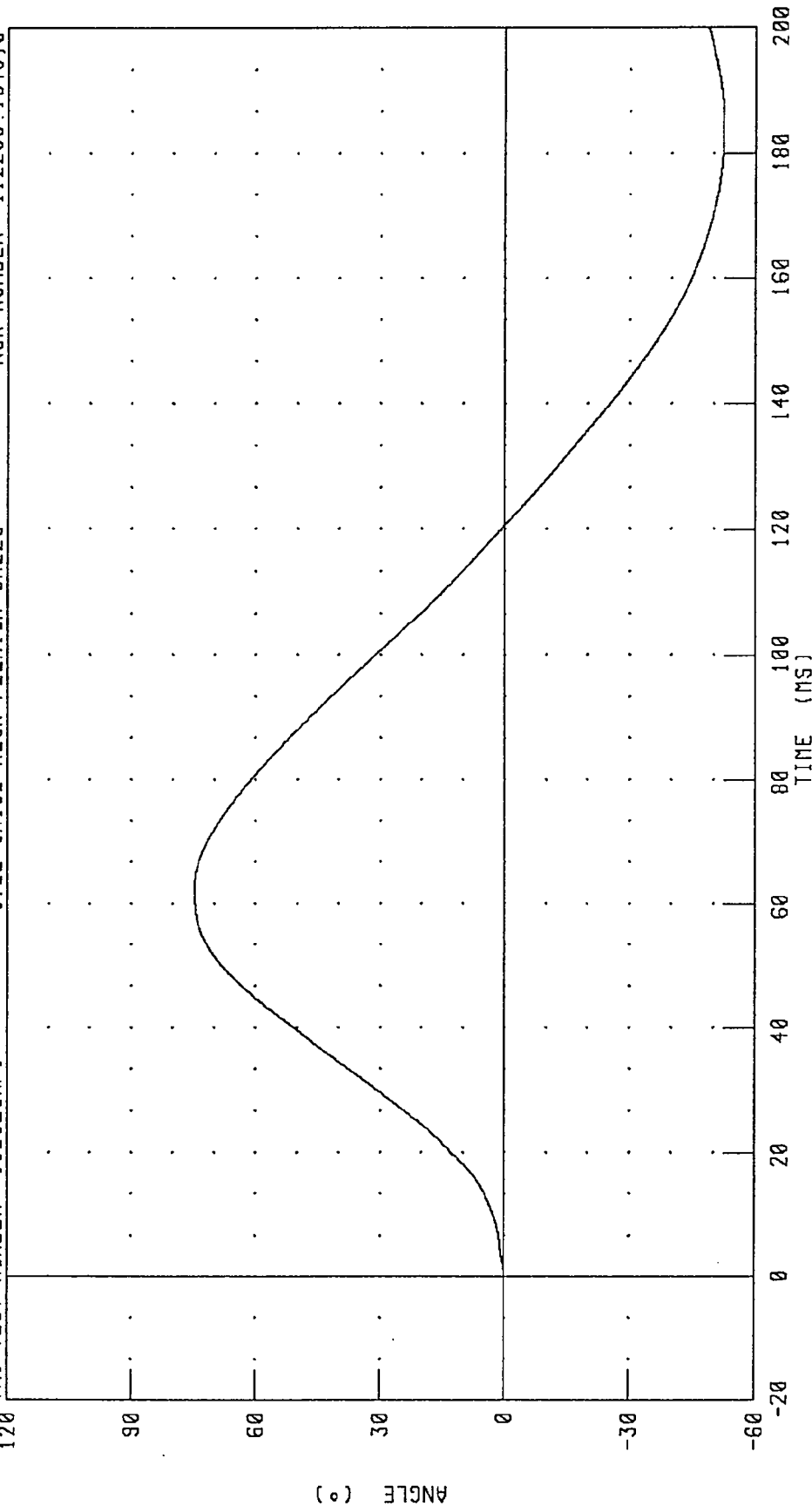
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

IRC TEST NUMBER: 192C28NF1

572E SN192 NECK FLEXION CAL28

RUN NUMBER: 112295.1340;5



PEAK DATA: 74.71 ° @ 62.40 MS; -52.31 ° @ 183.12 MS

CHANNEL: TOTAN FILTER: CH. CLASS 60

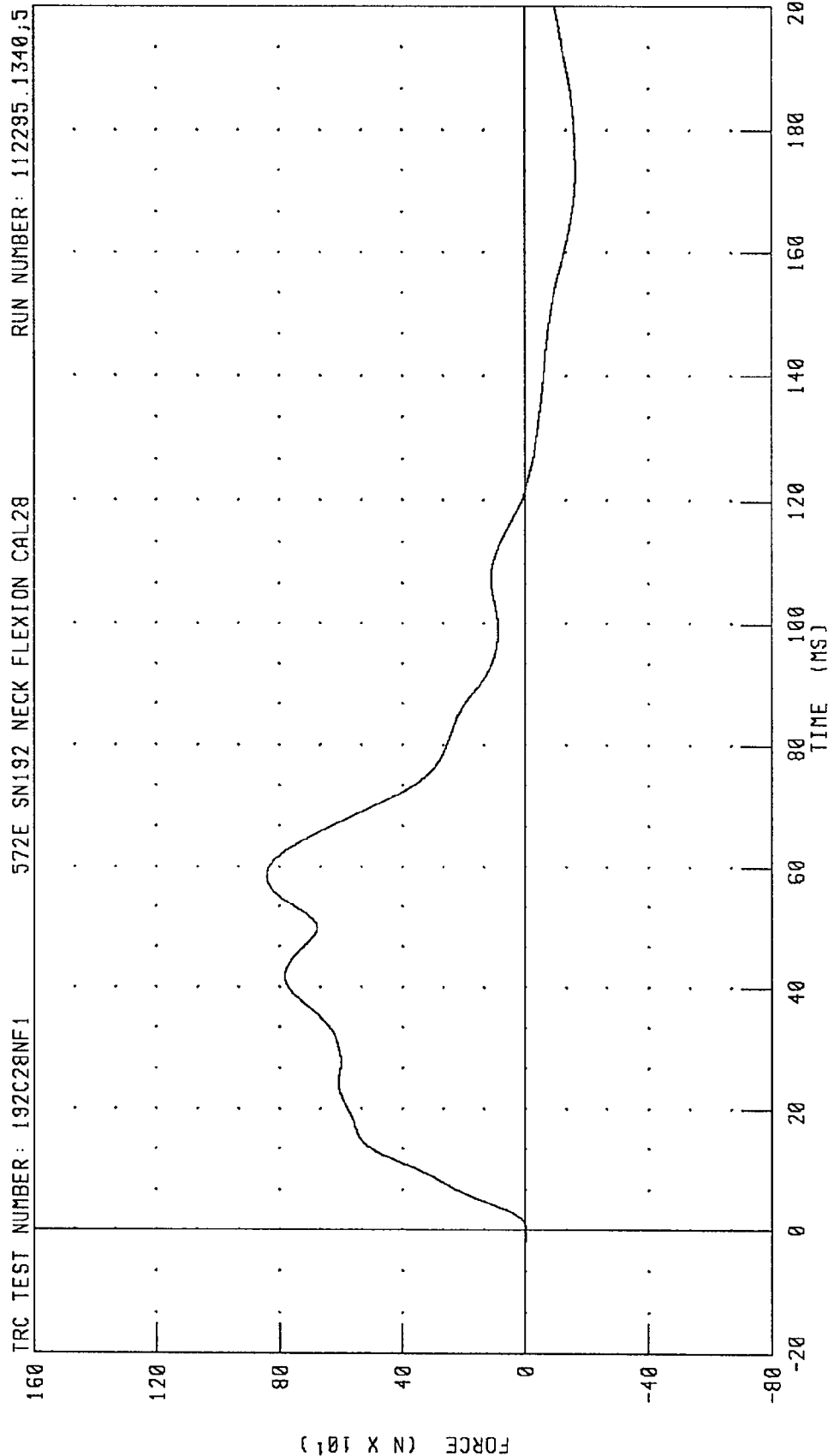
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 192C28NF1

572E SN192 NECK FLEXION CAL28

RUN NUMBER: 112295.1340;5



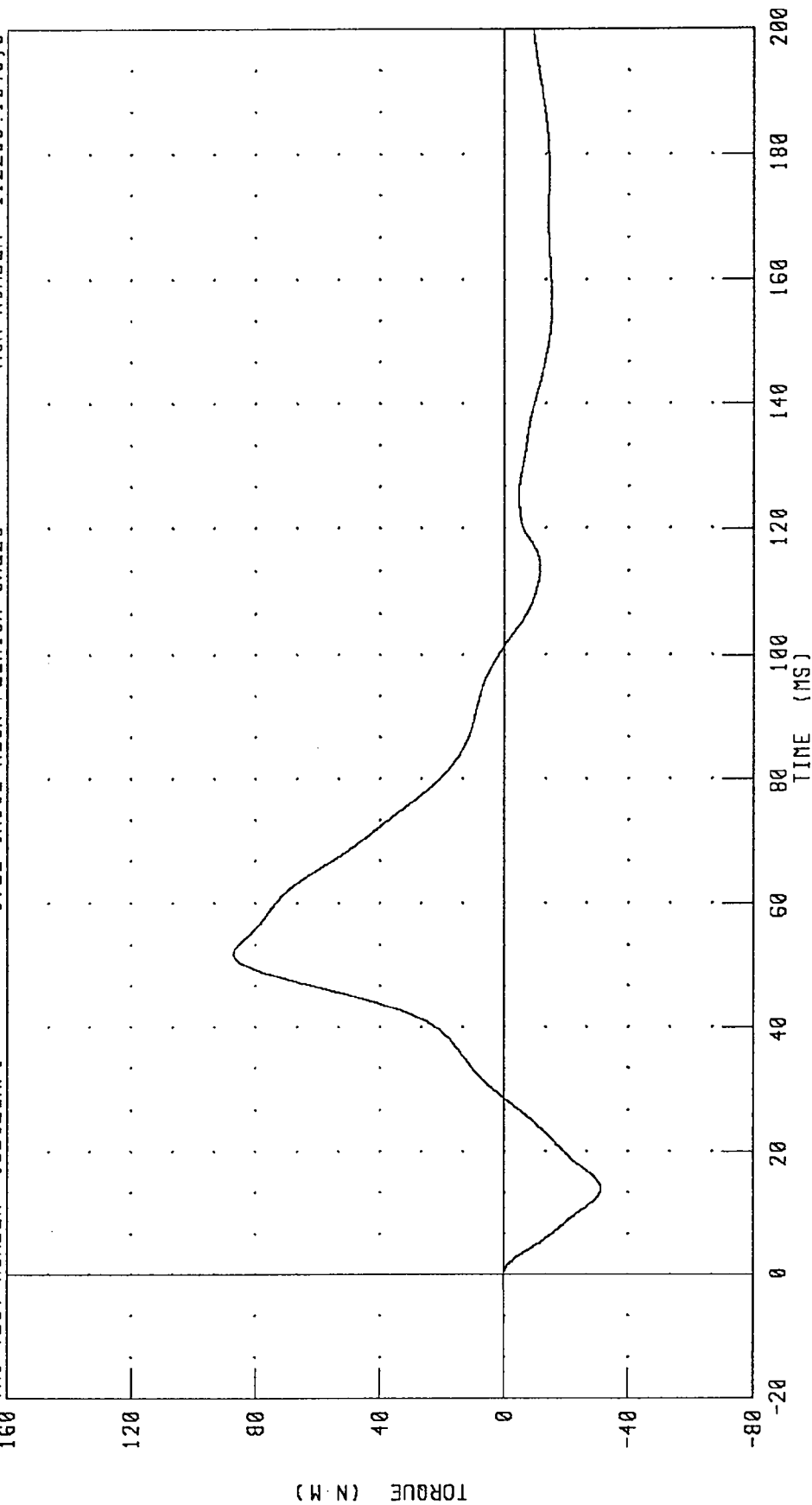
PEAK DATA: 841.91 N @ 58.56 MS; -164.50 N @ 173.12 MS

CHANNEL: NEKXF FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 192C28NF1 572E SN192 NECK FLEXION CAL28 RUN NUMBER: 112295.1340;5

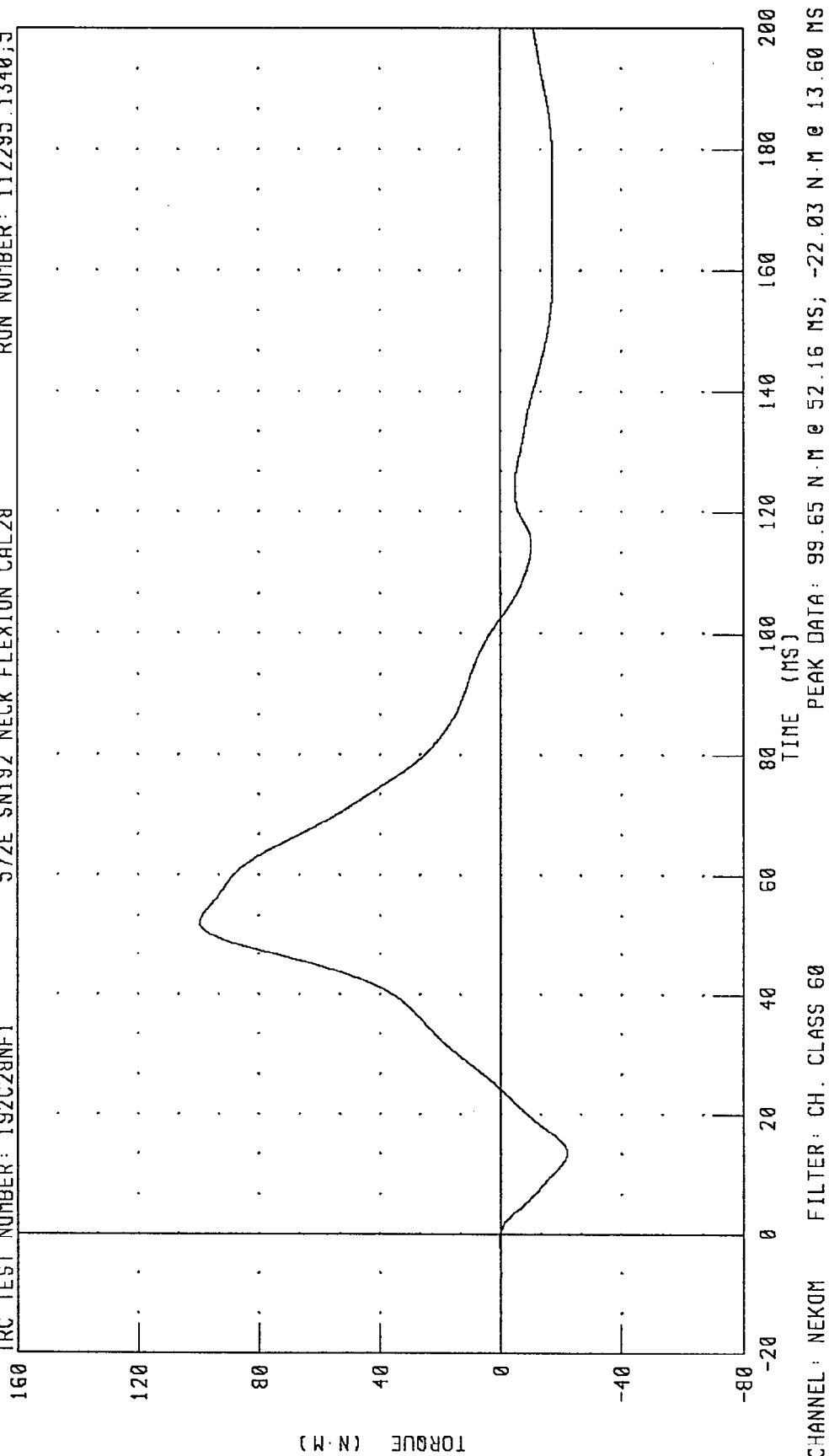


CHANNEL: NEKYM FILTER: CH. CLASS 60 PEAK DATA: 87.02 N-M @ 51.84 MS; -31.15 N-M @ 14.00 MS

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

TRC TEST NUMBER: 192028NF1 RUN NUMBER: 112295.1340;5

572E SN192 NECK FLEXION CAL28



CHANNEL: NEKOM FILTER: CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

HYBRID III

07-NOV-95

TRC INC. TEST NO: 192C28NE1 572E SN192 NECK EXT. CAL28

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY		10 - 70 %	52.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.00 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	17.54 G
	20 MS	14.00 - 19.00 G	16.98 G
	30 MS	11.00 - 16.00 G	13.88 G
MAX PENDULUM G		22 G MAX	18.25 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	13.85 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	40.24 MS
D PLANE	MAX	81 - 106 DEG.	101.22 DEG.
ROTATION	TIME	72 - 82 MS	77.52 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-70.60 NM
	TIME	65 - 79 MS	72.88 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	163.52 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	138.56 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN

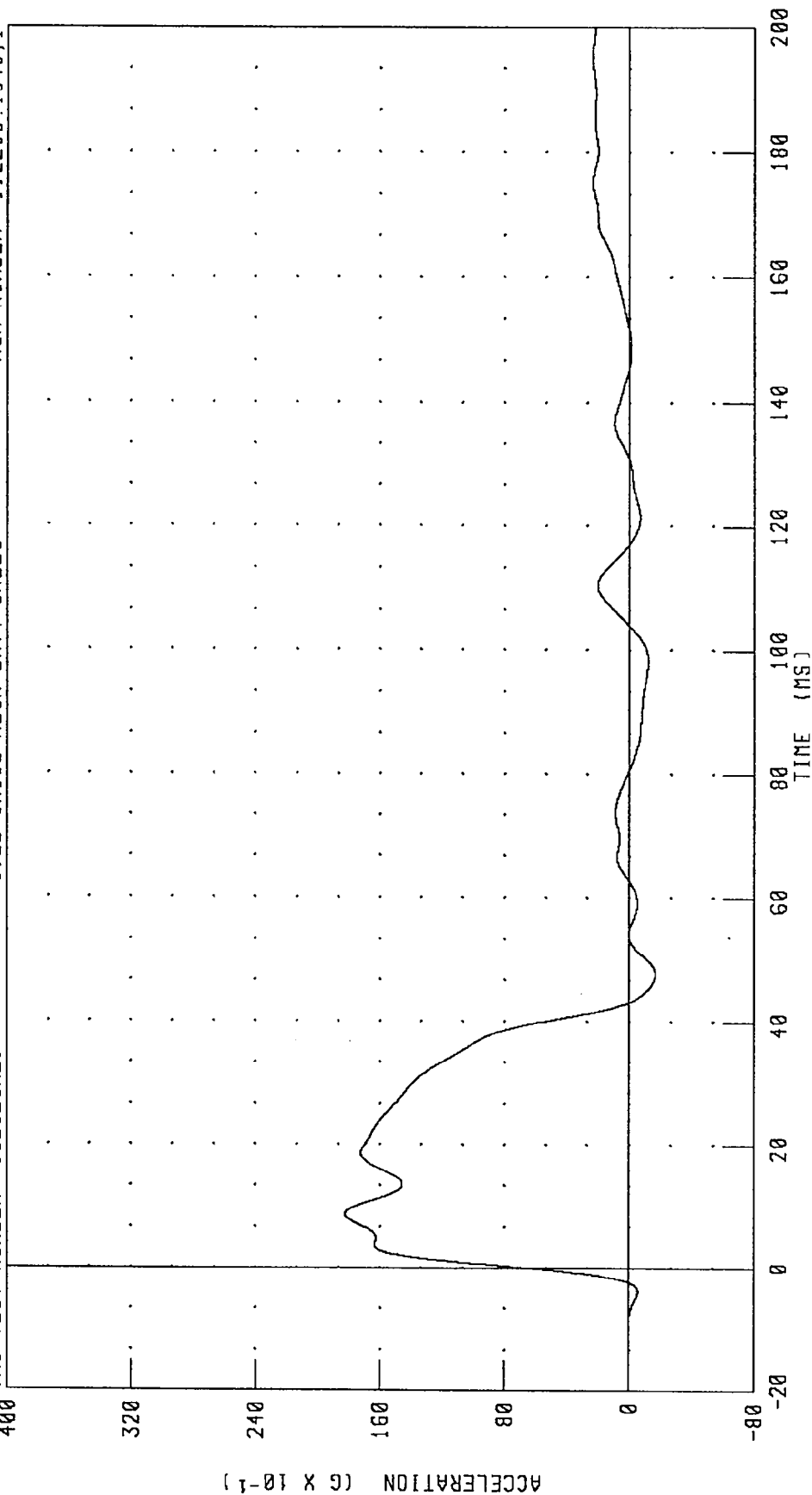
John K. Clauwidge

RUN NUMBER: 110795.1445;1

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

IRC TEST NUMBER: 192C28NE1 572E SN192 NECK EXT. CAL28 RUN NUMBER: 112295.1340;1



CHANNEL: PENXG FILTER: CH. CLASS 60 PEAK DATA: 18.26 G @ 8.72 MS; -1.66 G @ 47.68 MS

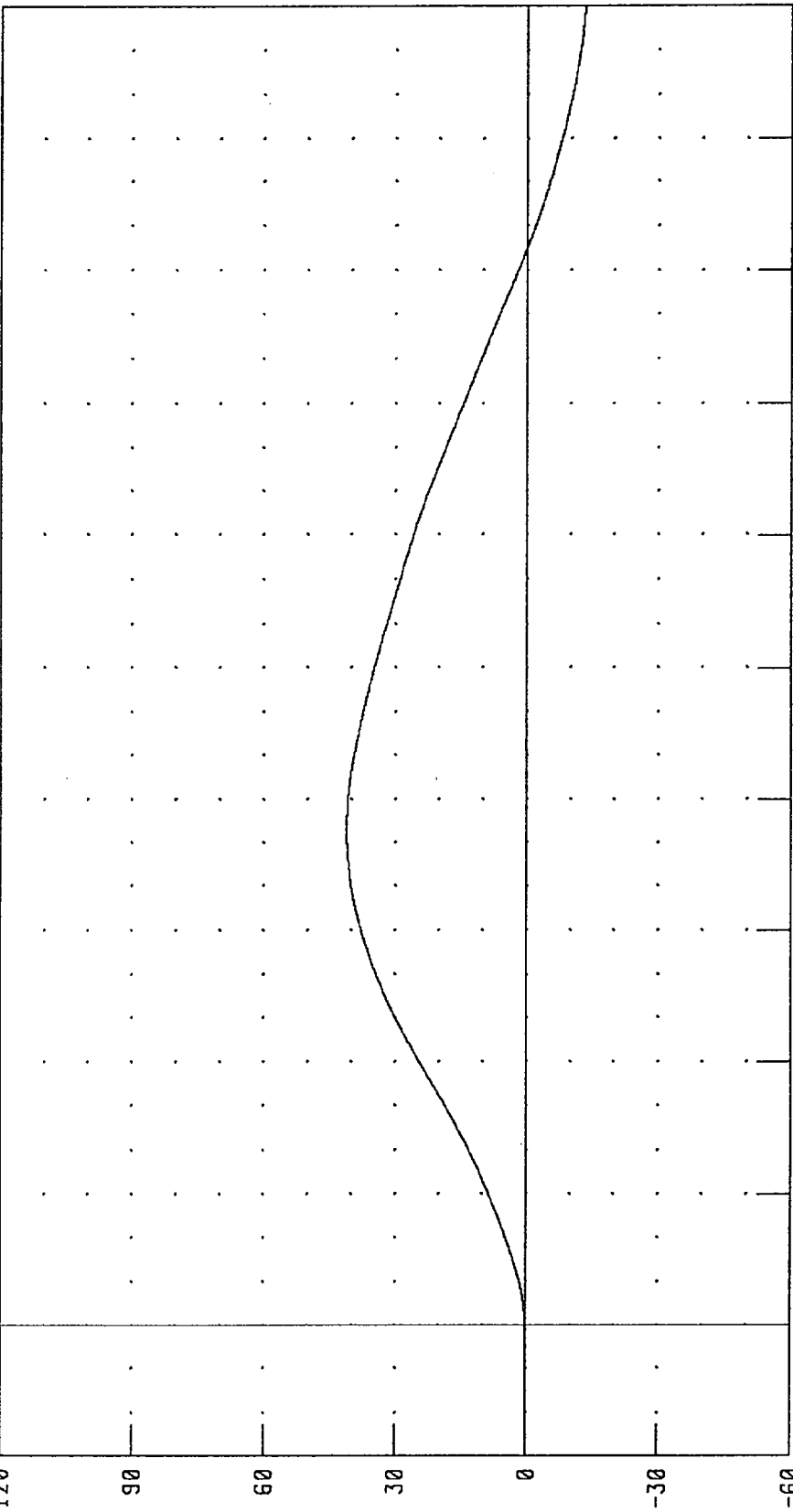
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN192 NECK EXT. CAL28 RUN NUMBER: 112295.1340;1

IRC TEST NUMBER: 192C28NE1

120



TIME (MS)

CHANNEL: BETA FILTER: CH. CLASS 60

PEAK DATA: 41.09 ° @ 74.72 MS; -13.17 ° @ 200.00 MS

ANGLE (°)

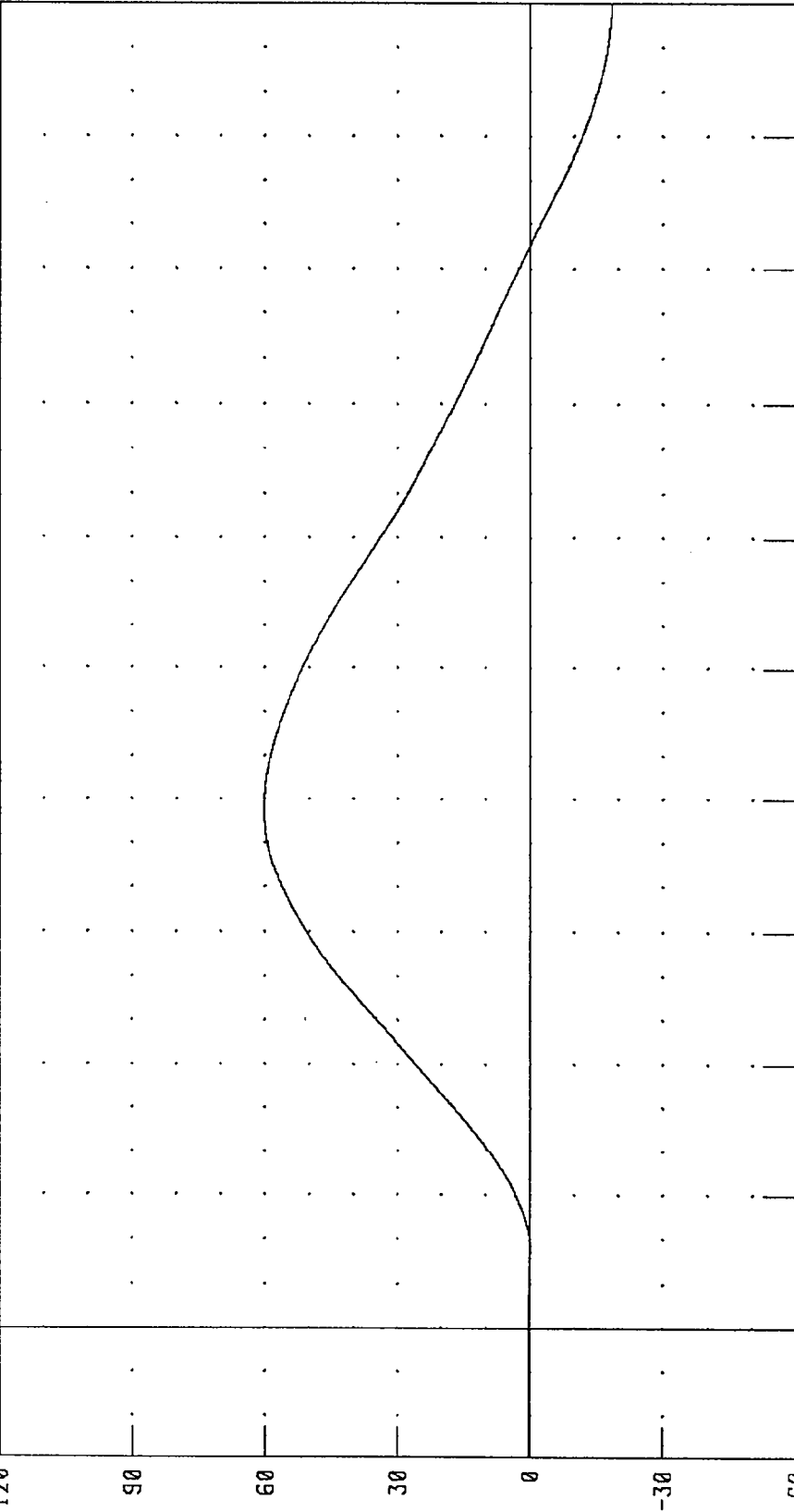
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

572E SN192 NECK EXT CAL28 RUN NUMBER: 112295.1340,1

IRC TEST NUMBER: 192C28NE1

120



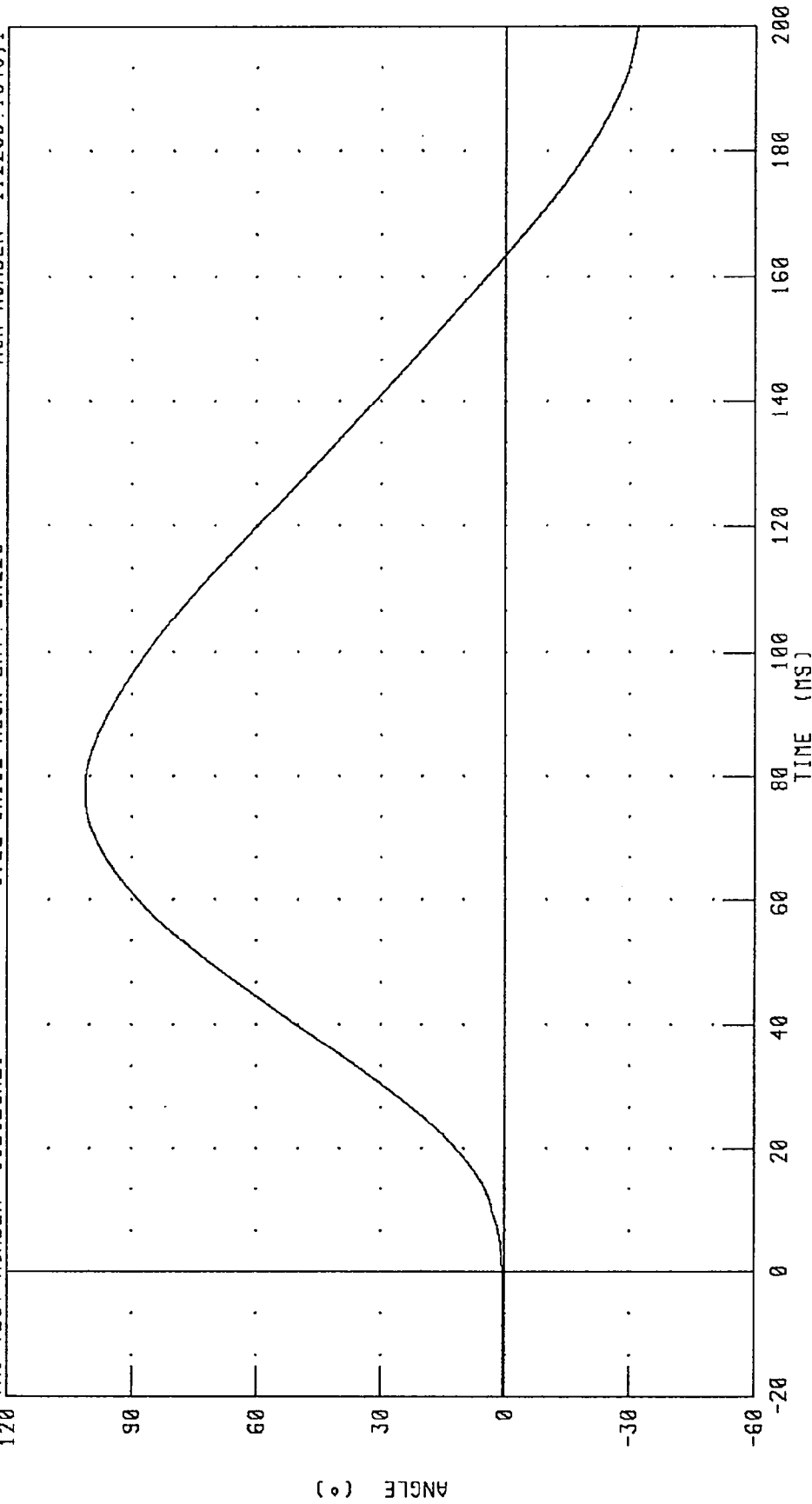
PEAK DATA: 60.17 ° @ 78.56 MS; -18.57 ° @ 200.00 MS

CHANNEL: THETA FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 192C28NE1 572E SNI92 NECK EXT. CAL28 RUN NUMBER: 112295.1340;1



CHANNEL: TOTAN FILTER: CH. CLASS 60 PEAK DATA: 101.22 ° @ 77.52 MS; -31.74 ° @ 200.00 MS

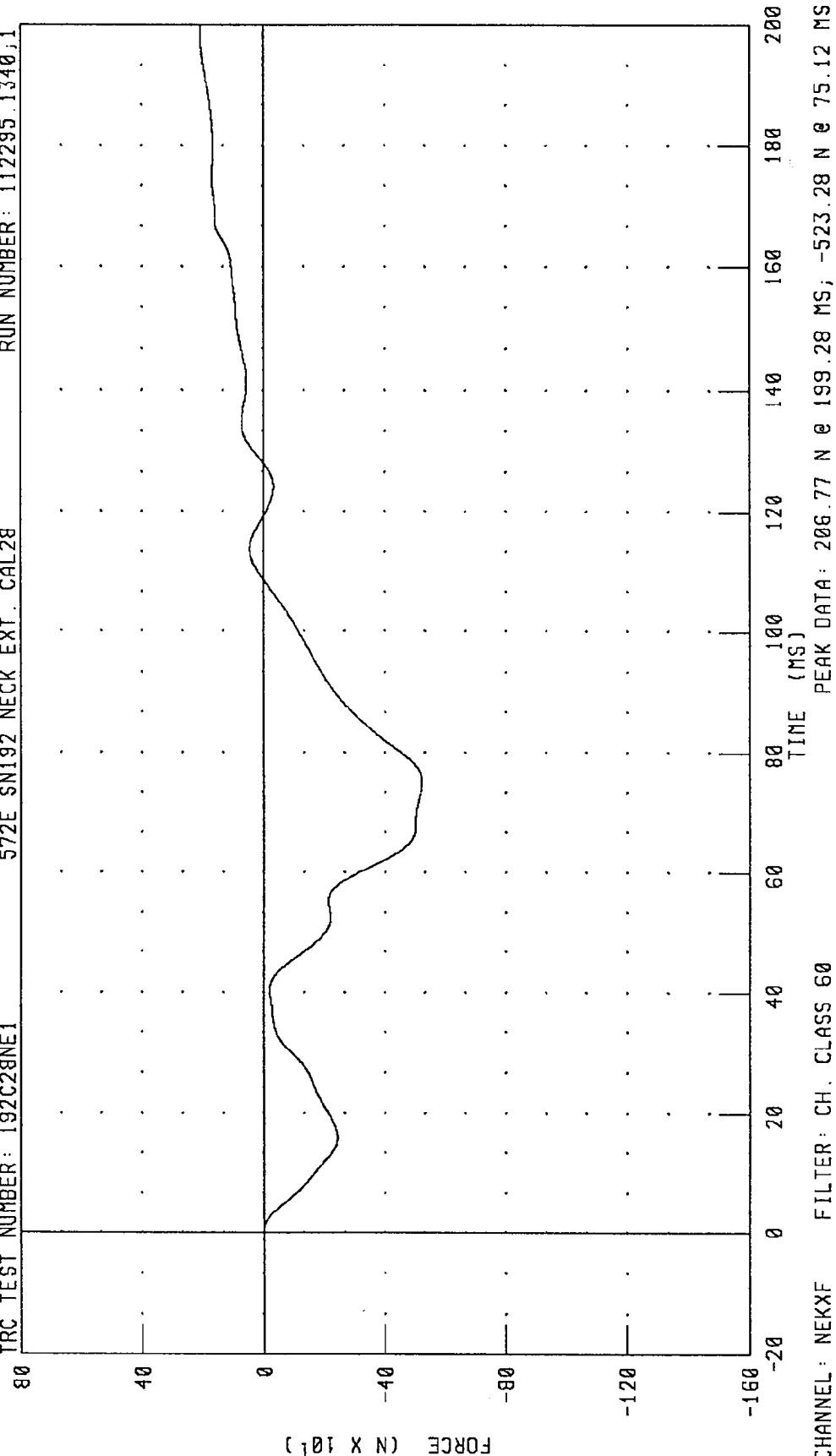
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 192C28NE1

572E SN192 NECK EXT. CAL28

RUN NUMBER: 112295.1340,1



CHANNEL: NEKXF FILTER: CH. CLASS 60

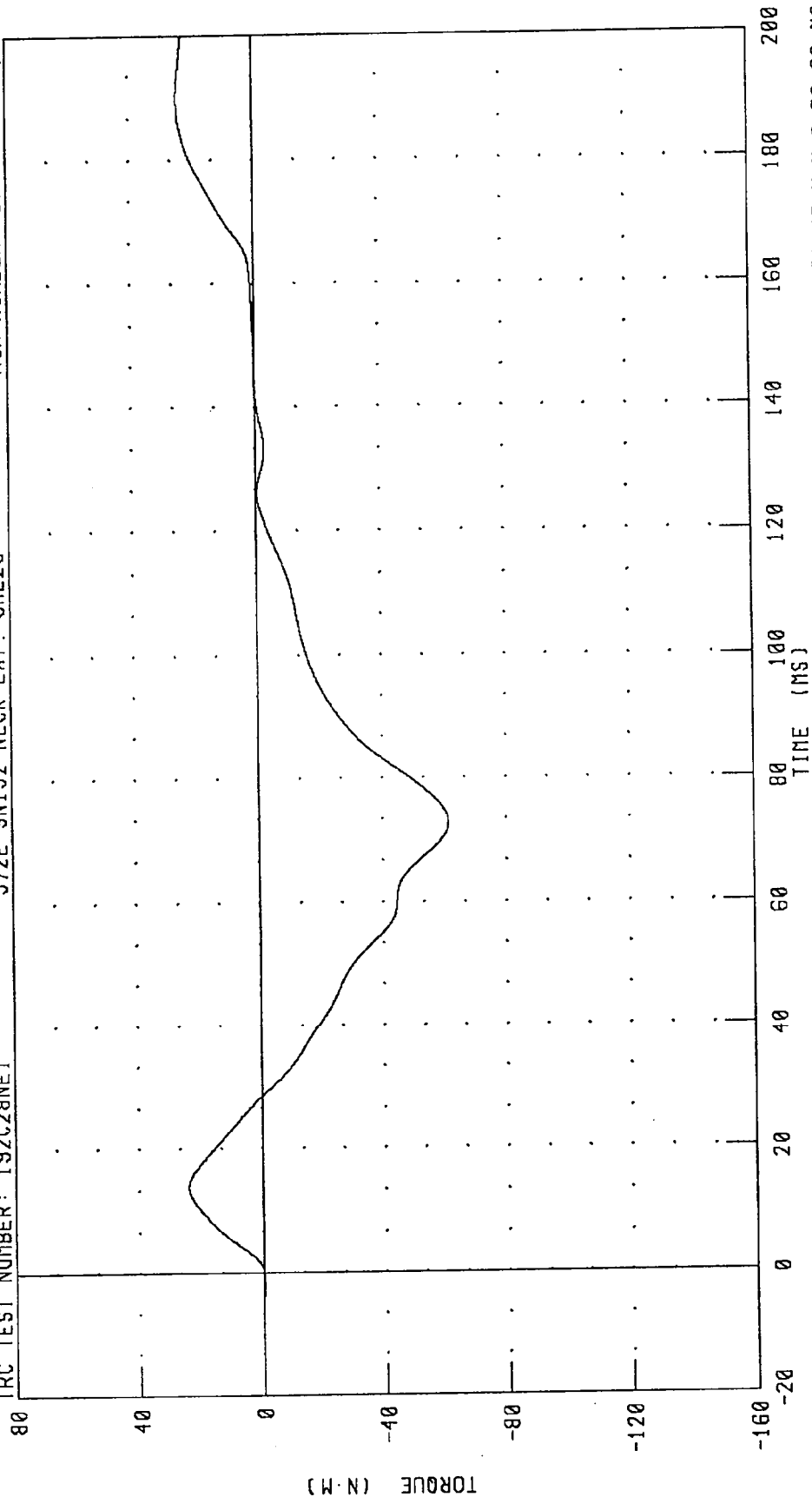
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 192C28NE1

572E SN192 NECK EXT. CAL2B

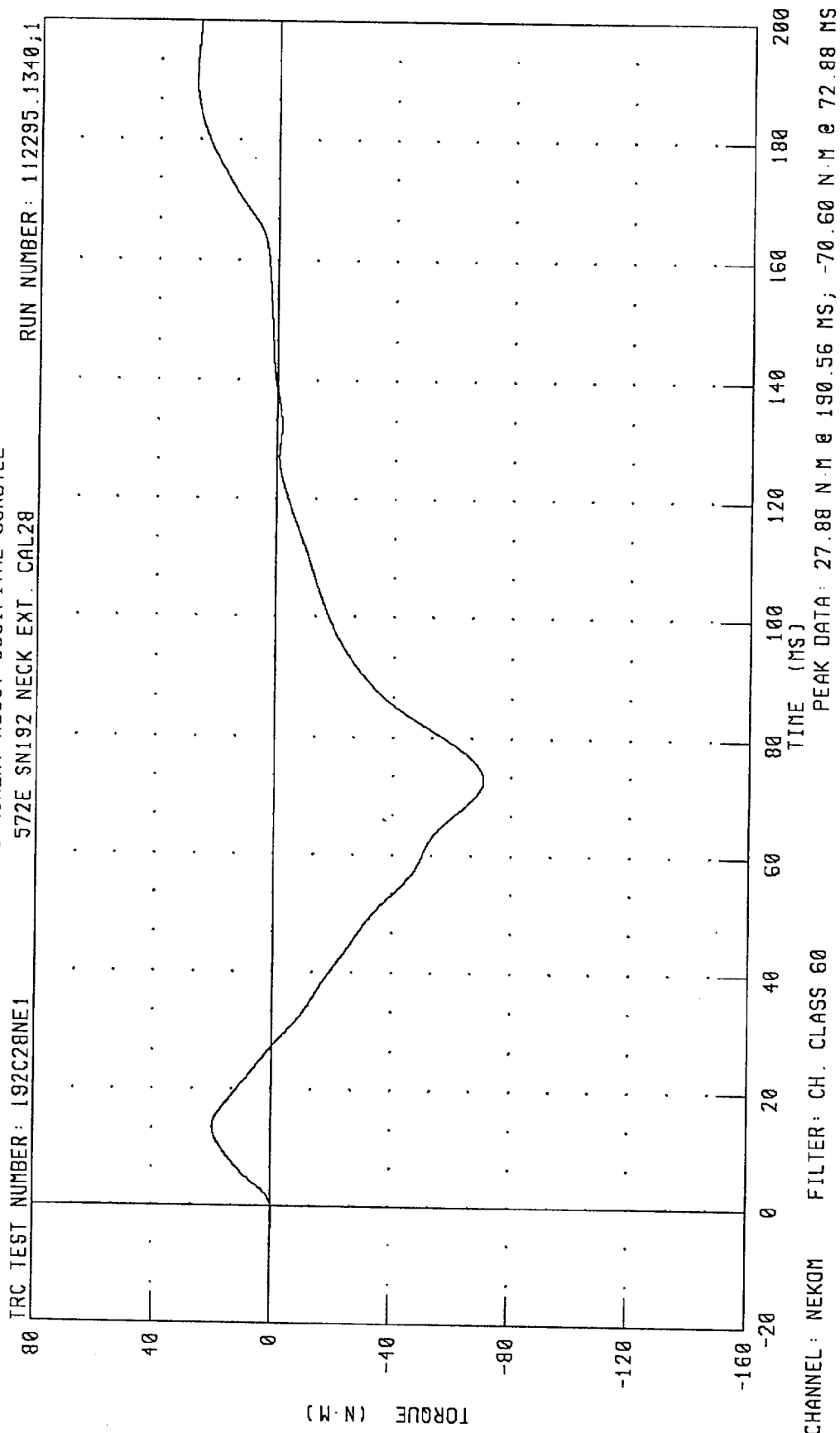
RUN NUMBER: 112295.1340;1



PEAK DATA: 24.57 N.M @ 189.92 MS; -61.43 N.M @ 72.80 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

07-NOV-95

TRC INC.

TEST NO: 192C28TH1

572E SN192 H.S.THORAX CAL28

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	20.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	52.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.71 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	64.8 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5807. N
INTERNAL HYSTERESIS	69% - 85%	72.4%

TEST MEETS SPECIFICATIONS

TECHNICIAN

John K. Clavidge

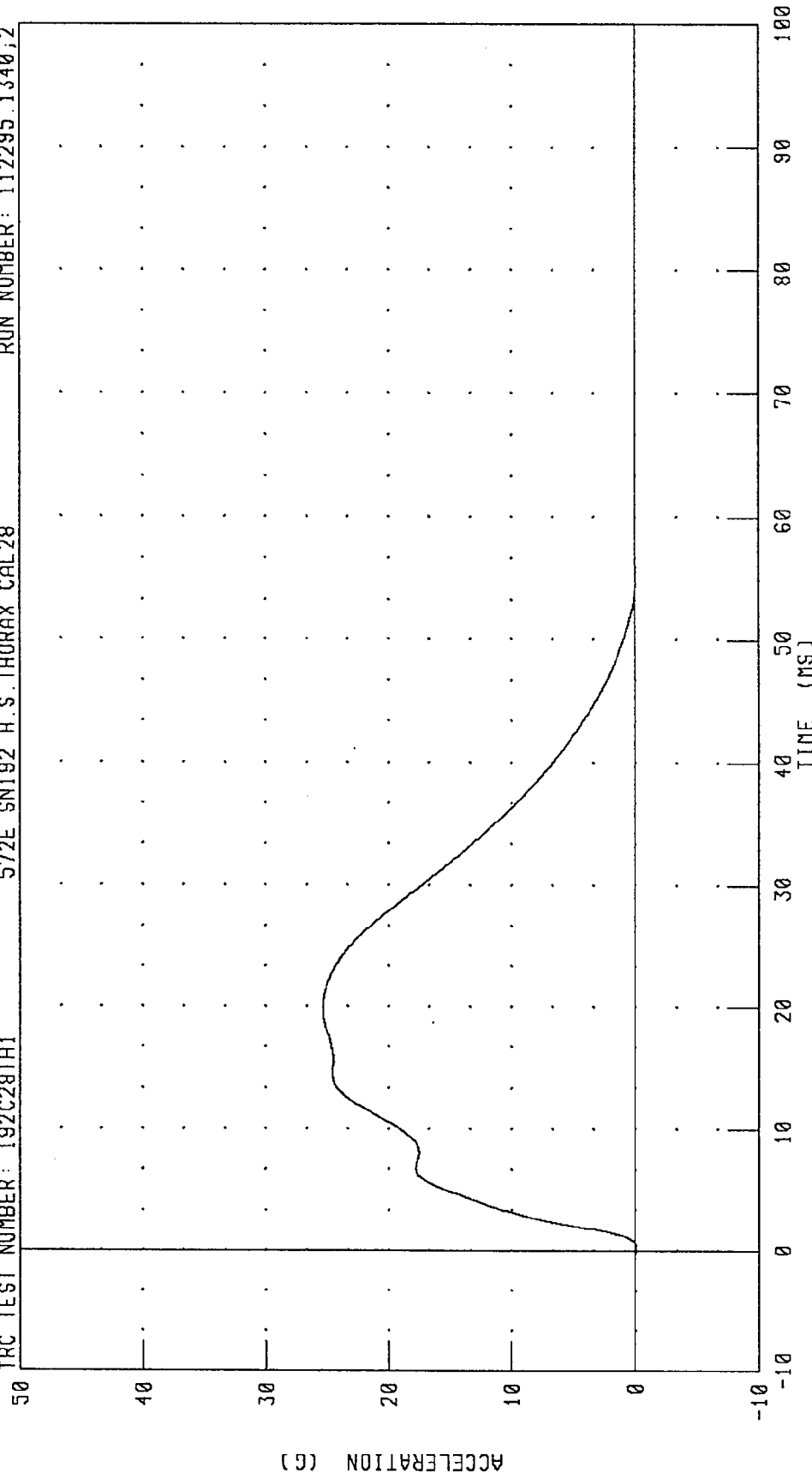
RUN NUMBER: 110795.1712;2

PART 572-E HYBRID III THORAX CALIBRATION PENDULUM DECELERATION

TRC TEST NUMBER: 192C28TH1

572E SN192 H.S. THORAX CAL28

RUN NUMBER: 112295.1340;2



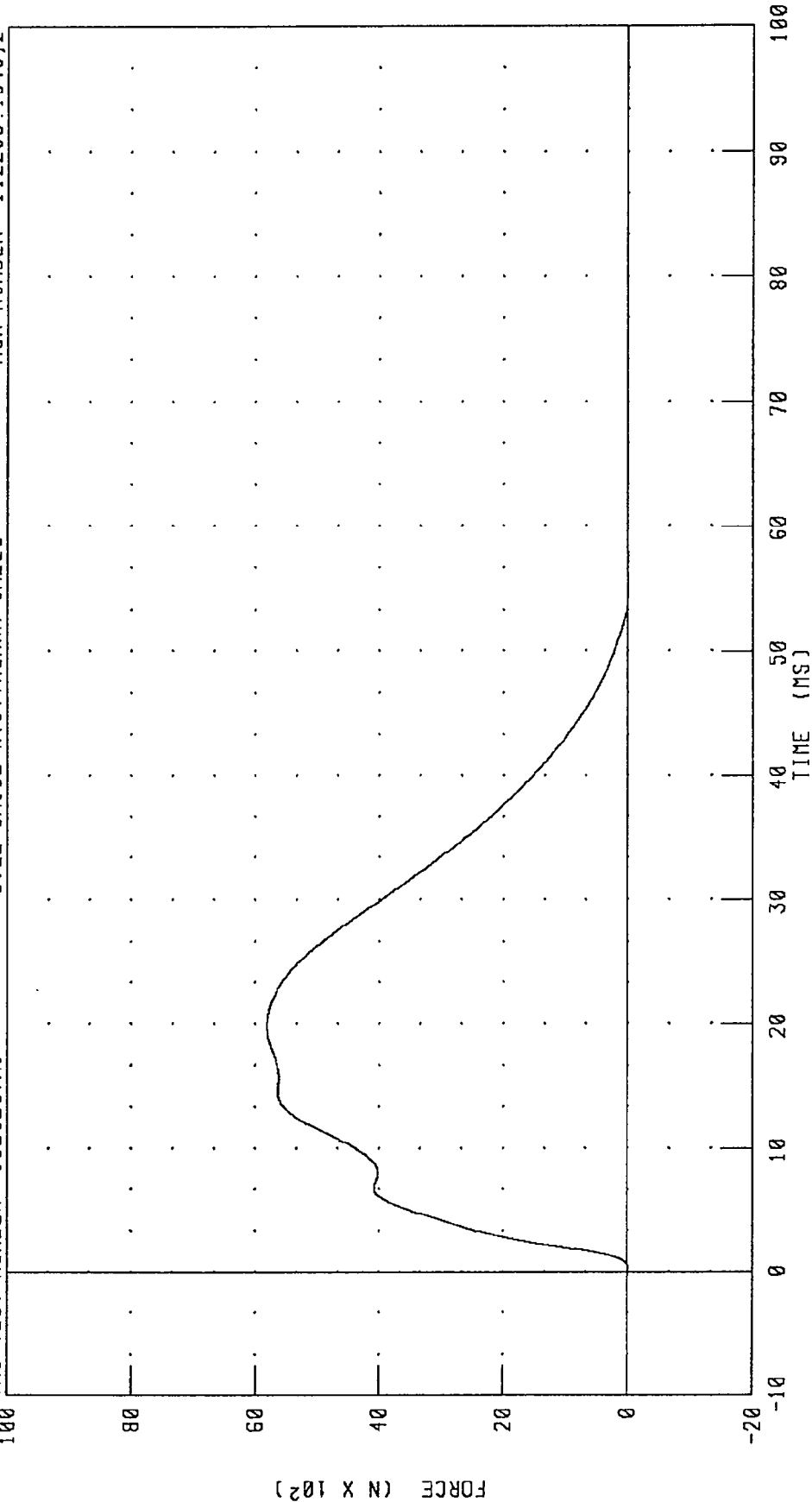
PEAK DATA: 25.35 G @ 19.76 MS; -0.07 G @ 0.24 MS

CHANNEL: PENXC FILTER: CH. CLASS 180

PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM FORCE

IRC TEST NUMBER: 192C28TH1 572E SN192 H.S. THORAX CAL28 RUN NUMBER: 112295.1340;2

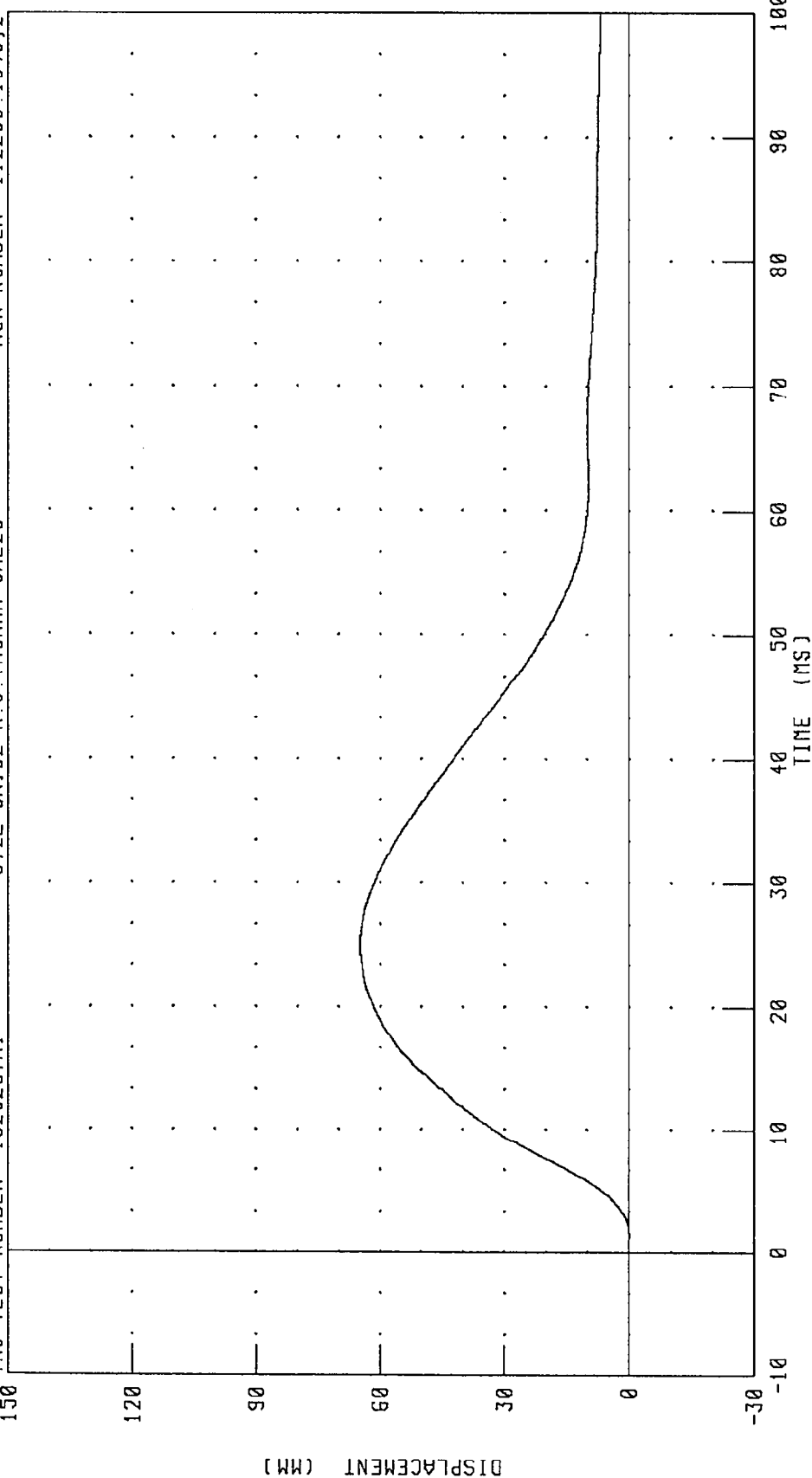


PEAK DATA: 5807.71 N @ 19.76 MS; -16.03 N @ 0.24 MS

CHANNEL: PENXF FILTER: CH. CLASS 180

PART 572-E HYBRID III THORAX CALIBRATION STERNUM DISPLACEMENT

TRC TEST NUMBER: 192C28TH1 572E SN192 H.S. THORAX CAL28 RUN NUMBER: 112295.1340;2

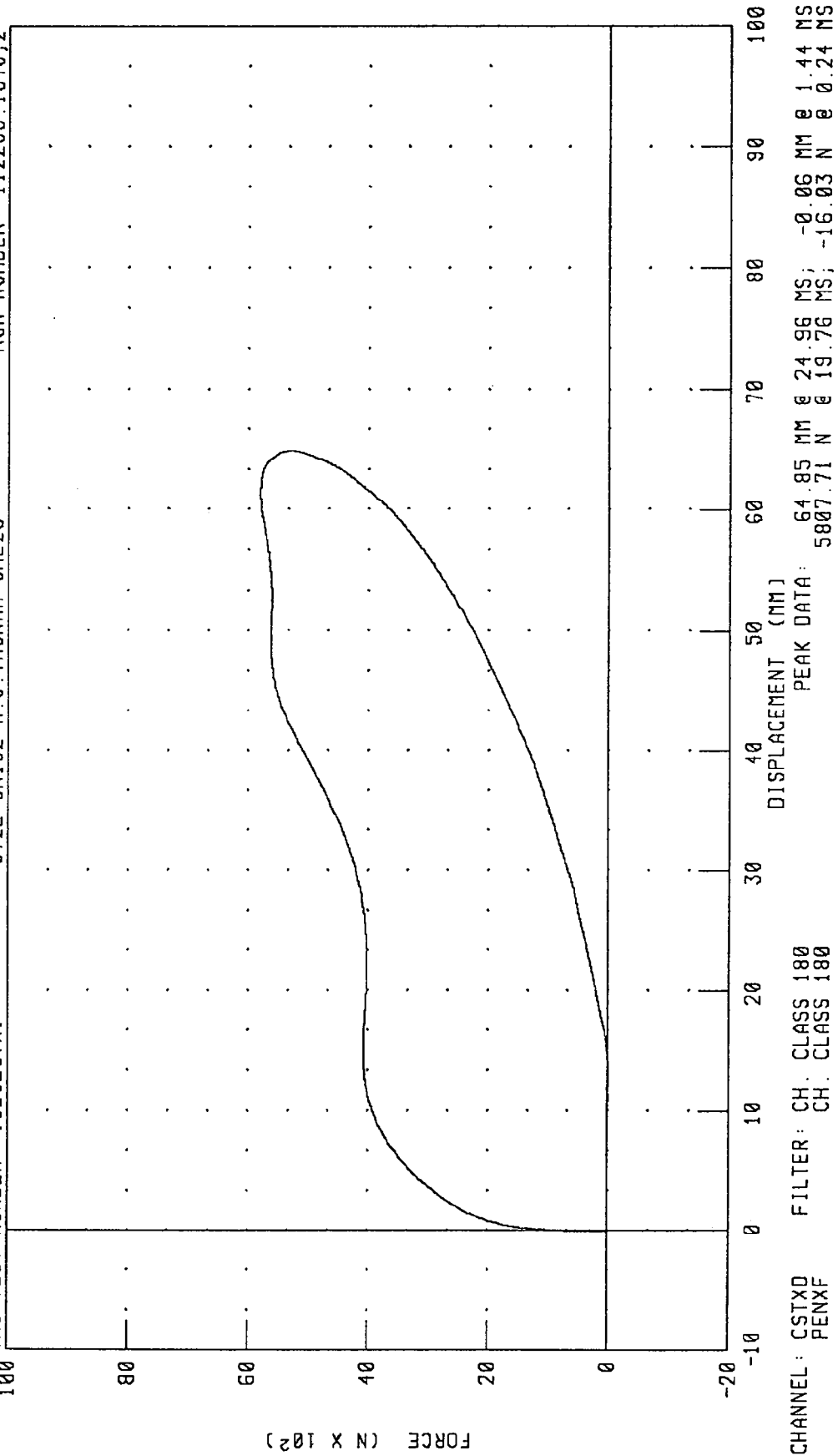


PEAK DATA: 64.85 MM @ 24.96 MS; -0.06 MM @ 1.44 MS

CHANNEL: CSTXD FILTER: CH. CLASS 180

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

TRC TEST NUMBER: 192C28TH1 572E SN192 H.S. THORAX CAL28 RUN NUMBER: 112285.1340;2



TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III

07-NOV-95

TRC INC.

TEST NO: 192C28RK1

572E SN192 RIGHT KNEE CAL 28

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	52.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5157.5 N

TEST MEETS SPECIFICATIONS

TECHNICIAN

John K. Clavidge

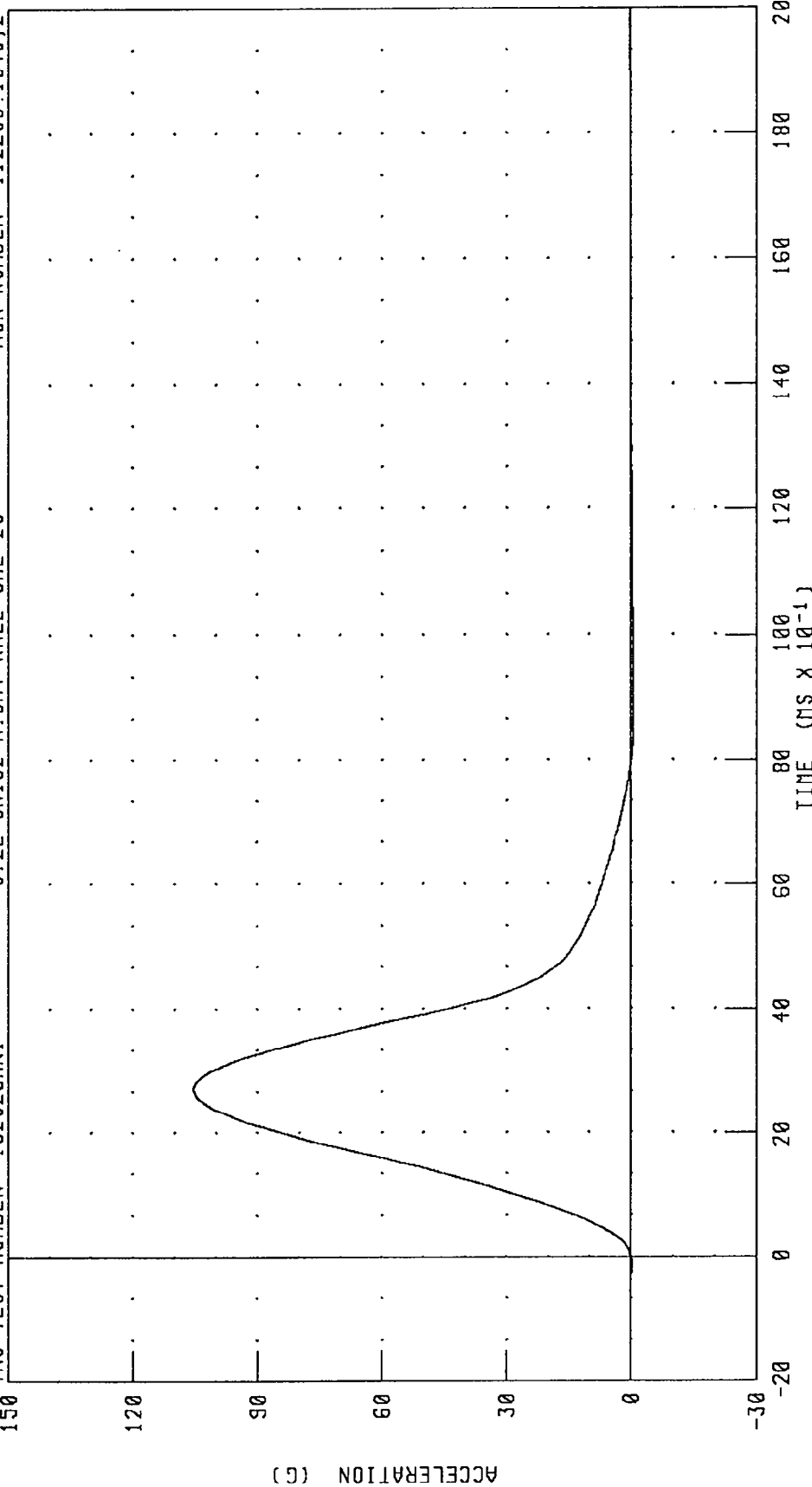
RUN NUMBER: 110795.1332;2

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

TRC TEST NUMBER: 192C28RK1

572E SN192 RIGHT KNEE CAL 28

RUN NUMBER: 112295.1340.2



CHANNEL: PENXG FILTER: CH. CLASS 600

PEAK DATA: 105.41 G @ 2.72 MS; -0.49 G @ 9.36 MS

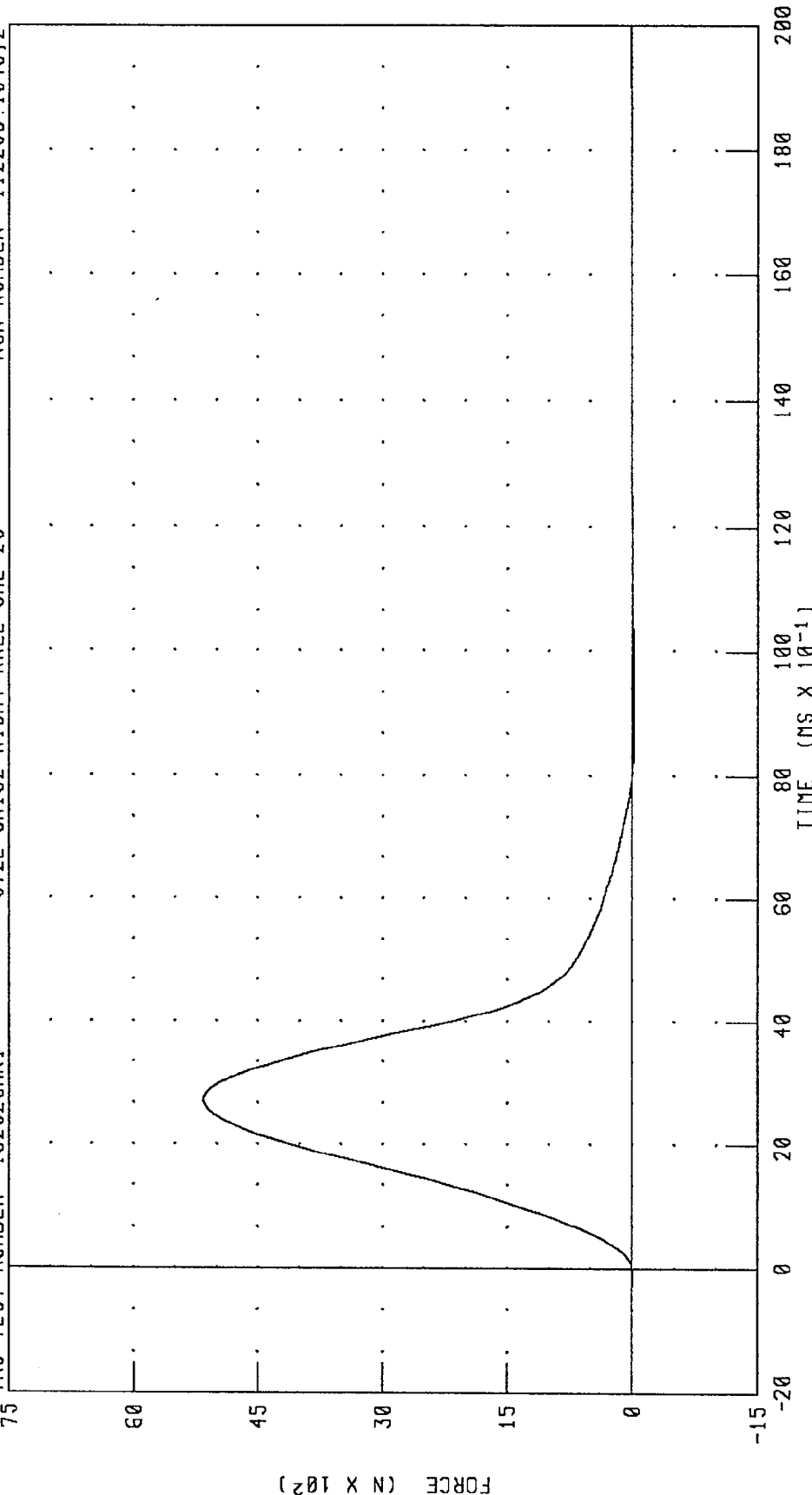
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

RUN NUMBER: 112295.1340;2

TRC TEST NUMBER: 192C28RK1

572E SN192 RIGHT KNEE CAL 28



PEAK DATA: 5157.55 N @ 2.72 MS; -23.75 N @ 9.36 MS

FILTER: CH. CLASS 600

CHANNEL: PENXF

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III

07-NOV-95

TRC INC.

TEST NO: 192C28LK1

572E SN192 LEFT KNEE CAL 28

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	52.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.12 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5129.7 N

TEST MEETS SPECIFICATIONS

TECHNICIAN

John K. Clavidge

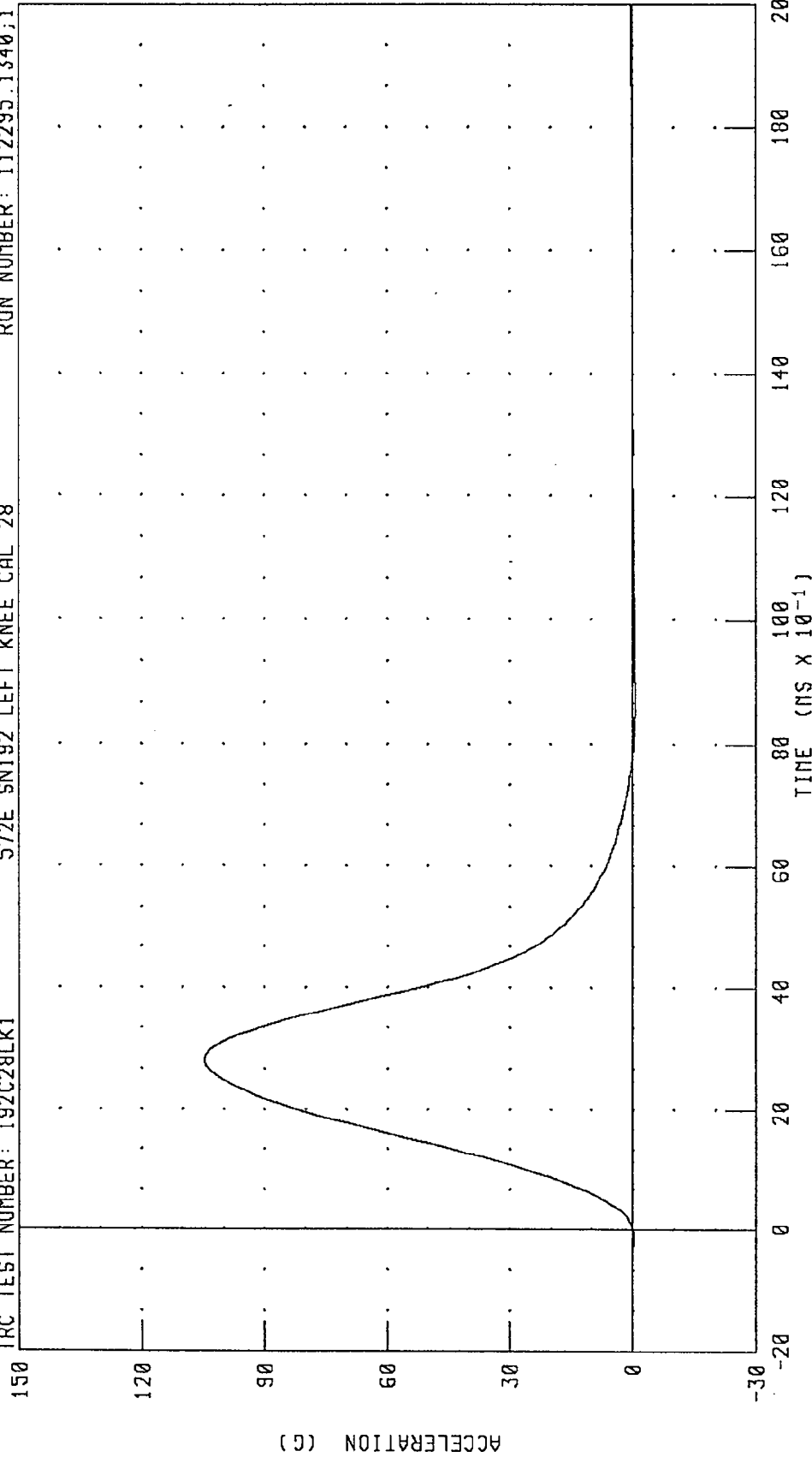
RUN NUMBER: 110795.1247;1

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

TRC TEST NUMBER: 192C28LK1

572E SN192 LEFT KNEE CAL 28

RUN NUMBER: 112295.1340;1



CHANNEL: PENXC FILTER: CH. CLASS 600

PEAK DATA: 104.84 G @ 2.80 MS; -0.64 G @ 8.64 MS

PART 572-E HYBRID III LEFT KNEE CALIBRATION

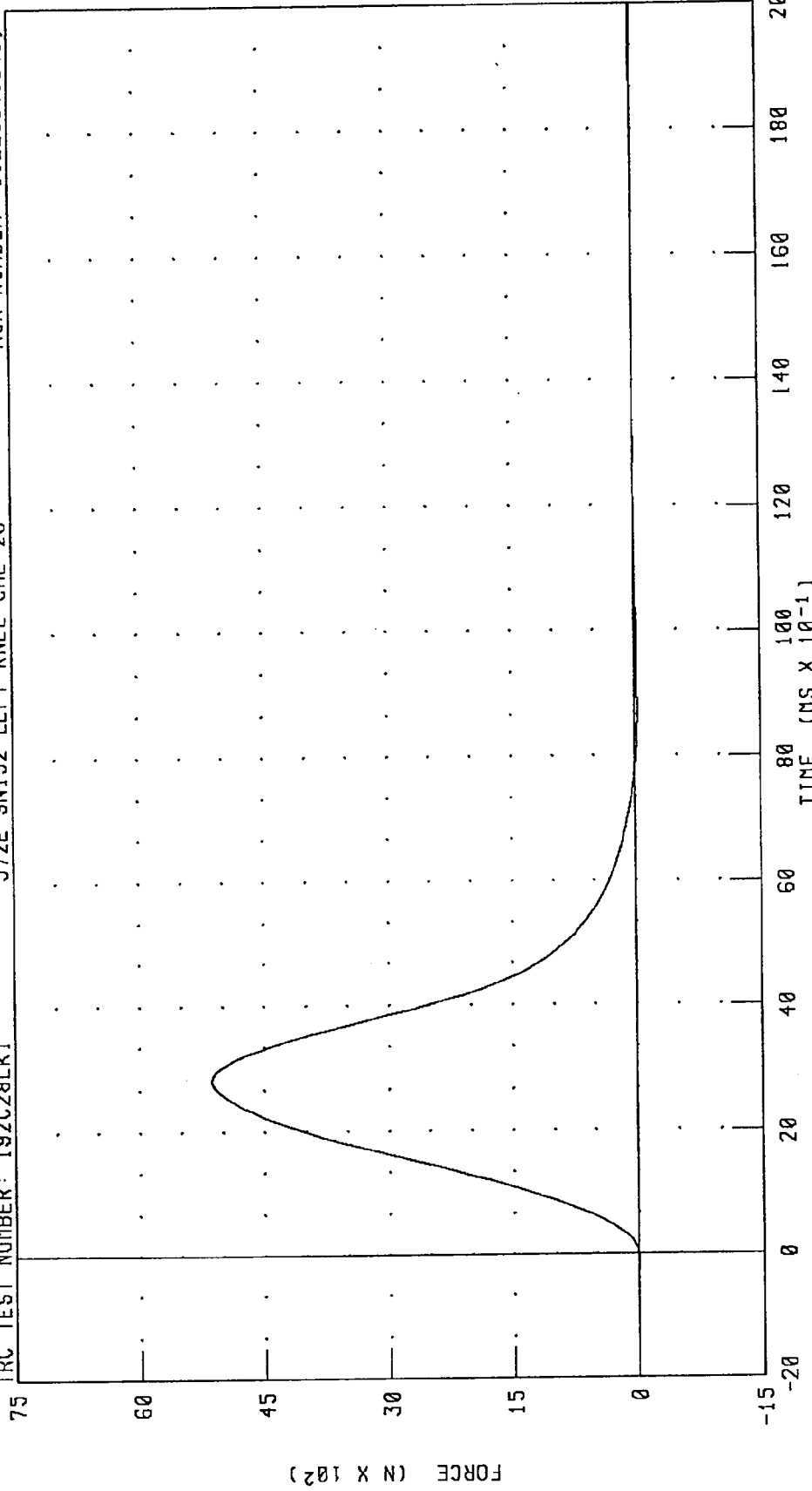
PENDULUM FORCE (5 KG PEND.)

572E SN192 LEFT KNEE CAL 28

572E SN192 LEFT KNEE CAL 28

TRC TEST NUMBER: 192C28LK1

RUN NUMBER: 112295.1340;1



PEAK DATA: 5129.78 N @ 2.80 MS; -31.10 N @ 8.64 MS

CHANNEL: PENXF FILTER: CH. CLASS 600

Pre-test Certification Data

Passenger Dummy S/N: 142

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III EXTERNAL DIMENSIONS

142 HUMANOID

07-NOV-95

TRC INC.

TEST NO: 142C29ED1

572E SN142 EXT.DIMENSION CAL29

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*John R. Claudge*

RUN NUMBER: 111695.0902

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III

07-NOV-95

TRC INC.

TEST NO: 142C29HD1

572E SN142 HEAD DROP CAL 29

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	52.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	261.83 G
PEAK LATERAL ACCELERATION	15 G MAX	-2.05 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

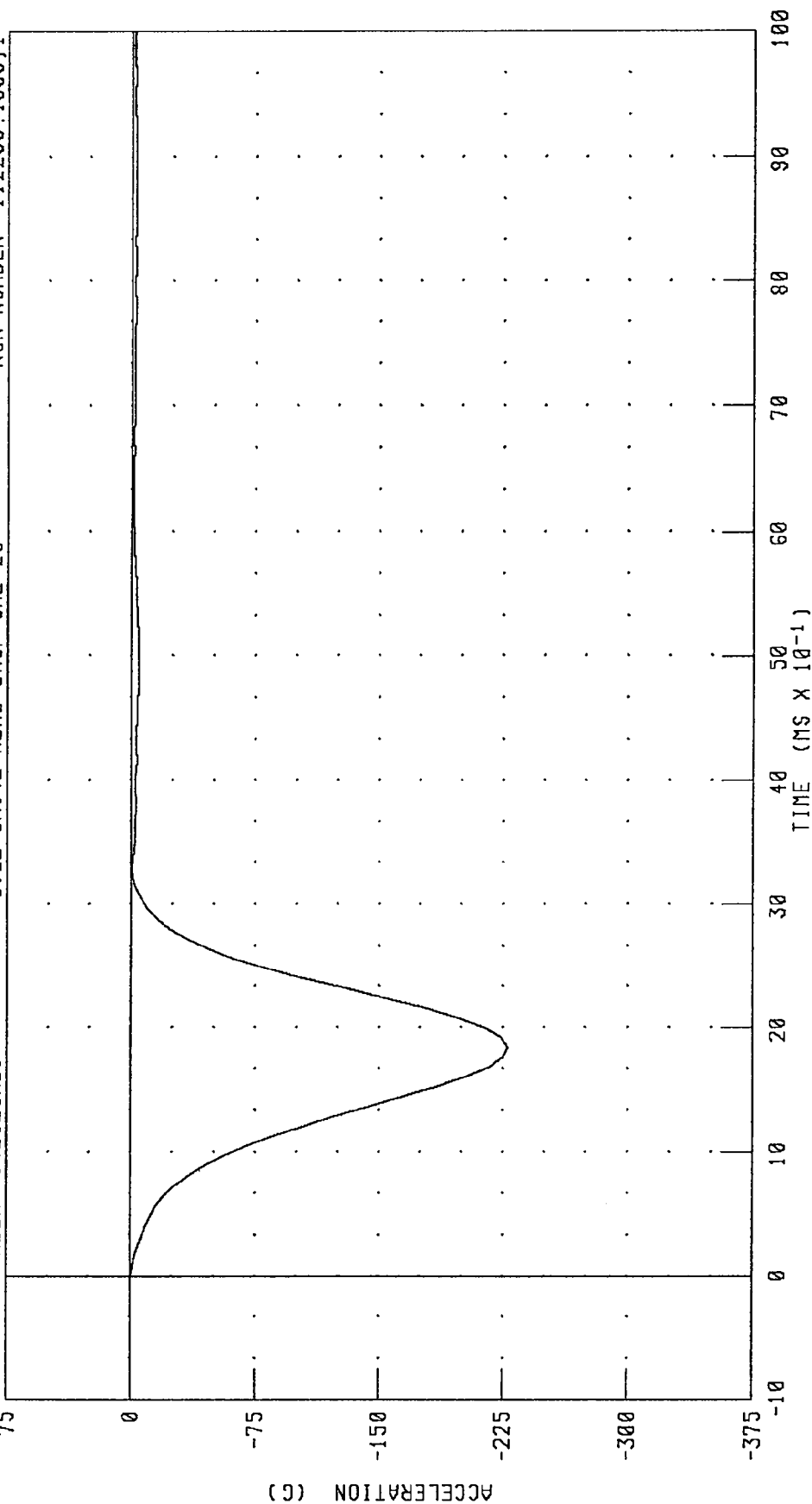
TECHNICIAN

John K. Clavidge

RUN NUMBER: 110795.1240;1

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

TRC TEST NUMBER: 142C29HD1 572E SN142 HEAD DROP CAL 29 RUN NUMBER: 112295.1353,1



CHANNEL: HEDXC FILTER: CH. CLASS 1000 PEAK DATA: 0.08 G @ -0.08 MS; -227.91 G @ 1.84 MS

PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

572E SN142 HEAD DROP CAL 29

TRC TEST NUMBER: 142C29HD1

225

150

75

0

-75

-150

-225

ACCELERATION (G)

TIME (NS X 10⁻¹)

40 50 60 70 80 90 100

PEAK DATA: 0.98 G @ 3.36 MS; -2.06 G @ 2.24 MS

CHANNEL: HEDYG FILTER: CH. CLASS 1000

951108

C-40

RUN NUMBER: 112295.1353,1

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

572E SN142 HEAD DROP CAL 29 RUN NUMBER: 112295.1353;1

IRC TEST NUMBER: 142C29HD1

75

0

-75

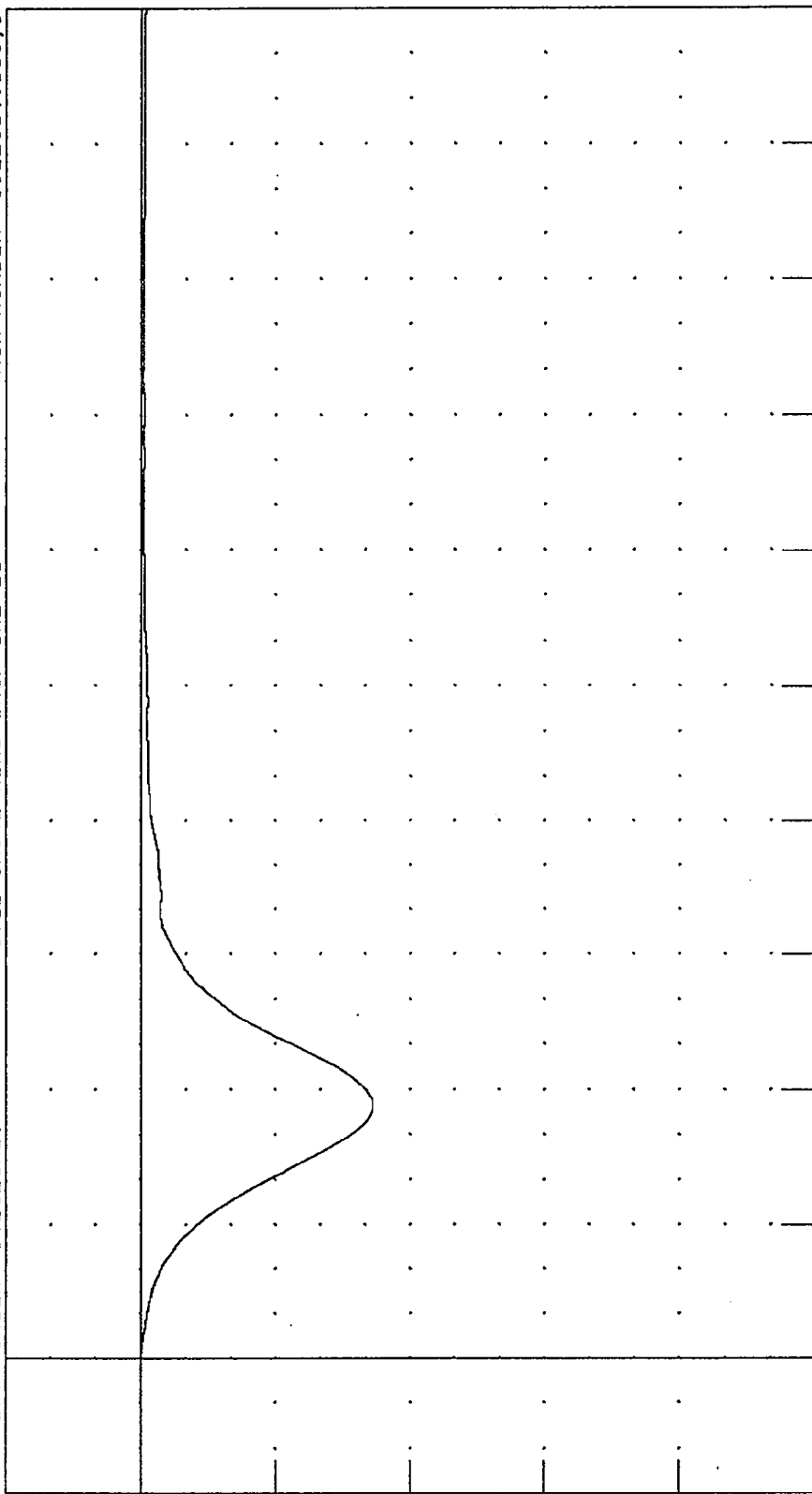
-150

-225

-300

-375

ACCELERATION (G)



TIME (MS X 10⁻¹)

100

90

80

70

60

50

40

30

20

10

0

-10

PEAK DATA: 0.01 G @ -0.08 MS; -128.90 G @ 1.84 MS

CHANNEL: HEDZG FILTER: CH. CLASS 1000

PART 572-E HYBRID III HEAD CALIBRATION
 HEAD RESULTANT ACCELERATION
 572E SN142 HEAD DROP CAL 29

RUN NUMBER: 112295.1353;1

IRC TEST NUMBER: 142C29HD1

375

300

ACCELERATION (G)

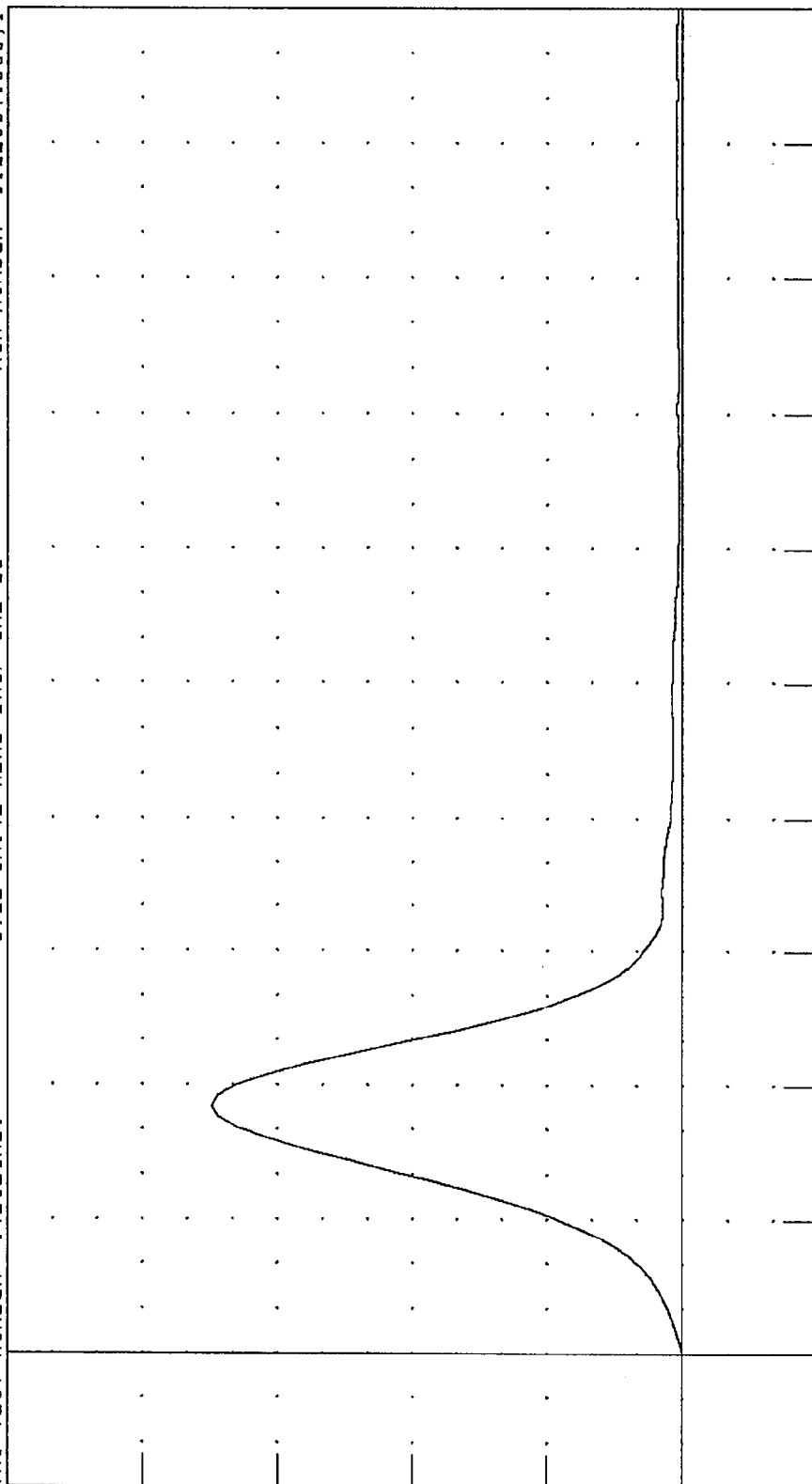
225

150

75

0

-75



TIME (NS X 10⁻¹)

100

90

80

70

60

50

40

30

20

10

0

PEAK DATA: 261.84 G @ 1.84 MS; 0.01 G @ -0.56 MS

FILTER: CH. CLASS 1000

CHANNEL: HEDRG

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

HYBRID III

07-NOV-95

TRC INC. TEST NO: 142C29NF1 572E SN142 NECK FLEXION CAL29

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY		10 - 70 %	52.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	6.99 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	23.67 G
	20 MS	17.60 - 22.60 G	21.57 G
	30 MS	12.50 - 18.50 G	17.99 G
MAX PENDULUM G		29 G MAX	24.42 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	17.89 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	35.12 MS
D PLANE	MAX	64 - 78 DEG.	72.21 DEG.
ROTATION	TIME	57 - 64 MS	58.80 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	100.85 NM
	TIME	47 - 58 MS	48.88 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	113.52 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	100.64 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN

John L. Claudy

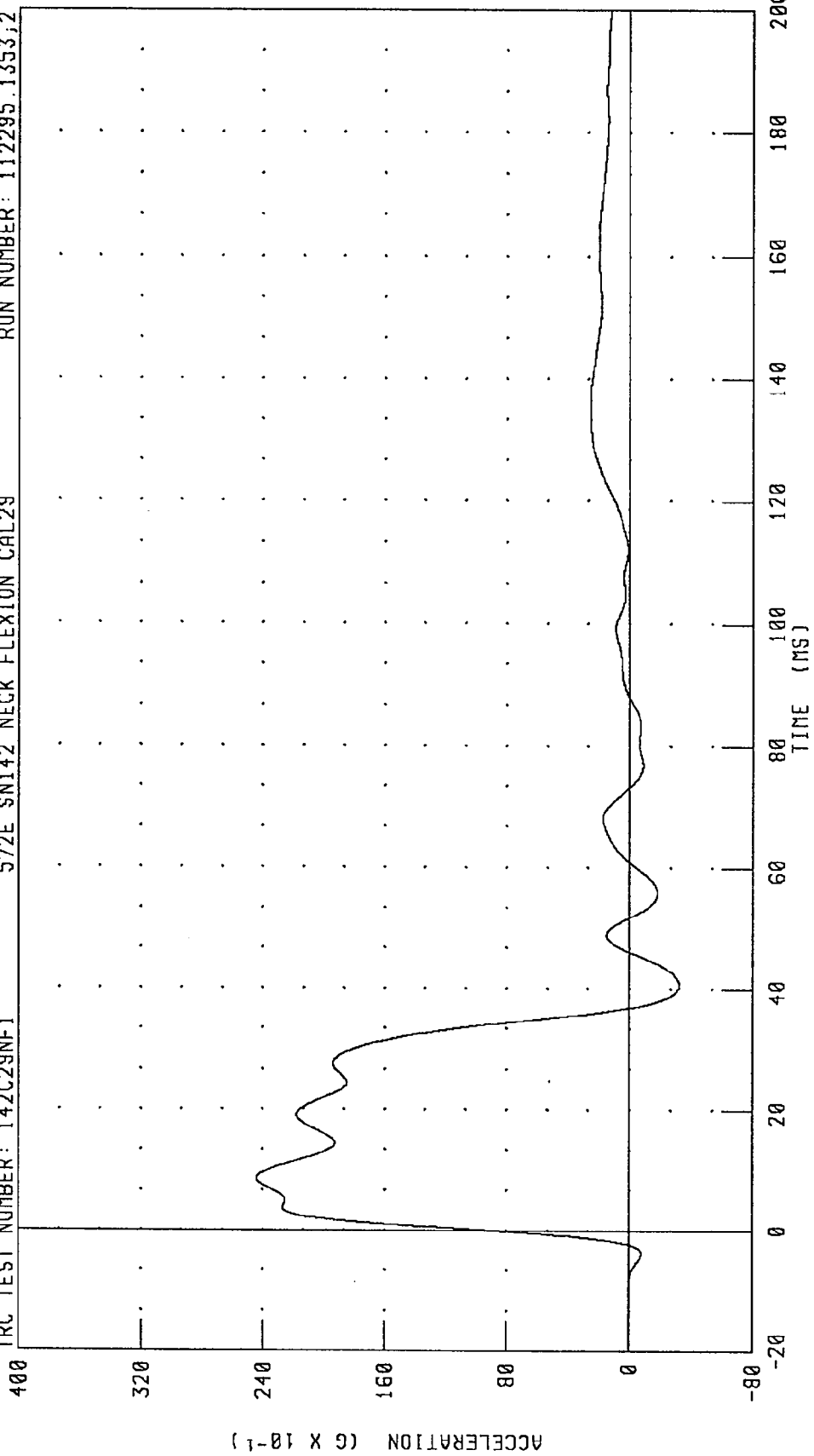
RUN NUMBER: 110795.1557;2

PART 572-E HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION

TRC TEST NUMBER: 142C29NF1

572E SN142 NECK FLEXION CAL29

RUN NUMBER: 112295.1353;2



PEAK DATA: 24.43 G @ 8.56 MS; -3.22 G @ 40.64 MS

CHANNEL: PENXG FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN142 NECK FLEXION CAL29

TRC TEST NUMBER: 142C28NF1

120

90

60

30

0

RUN NUMBER: 112295.1353,2

TIME (MS)

80 100 120 140 160 180 200

ANGLE (°)

-30

-60

0

30

60

90

120

150

180

210

240

270

300

330

360

390

420

450

480

510

540

570

600

630

660

690

720

750

780

810

840

870

900

930

960

990

1020

1050

1080

1110

1140

1170

1200

1230

1260

1290

1320

1350

1380

1410

1440

1470

1500

1530

1560

1590

1620

1650

1680

1710

1740

1770

1800

1830

1860

1890

1920

1950

1980

2010

2040

2070

2100

2130

2160

2190

2220

2250

2280

2310

2340

2370

2400

2430

2460

2490

2520

2550

2580

2610

2640

2670

2700

2730

2760

2790

2820

2850

2880

2910

2940

2970

3000

3030

3060

3090

3120

3150

3180

3210

3240

3270

3300

3330

3360

3390

3420

3450

3480

3510

3540

3570

3600

3630

3660

3690

3720

3750

3780

3810

3840

3870

3900

3930

3960

3990

4020

4050

4080

4110

4140

4170

4200

4230

4260

4290

4320

4350

4380

4410

4440

4470

4500

4530

4560

4590

4620

4650

4680

4710

4740

4770

4800

4830

4860

4890

4920

4950

4980

5010

5040

5070

5100

5130

5160

5190

5220

5250

5280

5310

5340

5370

5400

5430

5460

5490

5520

5550

5580

5610

5640

5670

5700

5730

5760

5790

5820

5850

5880

5910

5940

5970

6000

6030

6060

6090

6120

6150

6180

6210

6240

6270

6300

6330

6360

6390

6420

6450

6480

6510

6540

6570

6600

6630

6660

6690

6720

6750

6780

6810

6840

6870

6900

6930

6960

6990

7020

7050

7080

7110

7140

7170

7200

7230

7260

7290

7320

7350

7380

7410

7440

7470

7500

7530

7560

7590

7620

7650

7680

7710

7740

7770

7800

7830

7860

7890

7920

7950

7980

8010

8040

8070

8100

8130

8160

8190

8220

8250

8280

8310

8340

8370

8400

8430

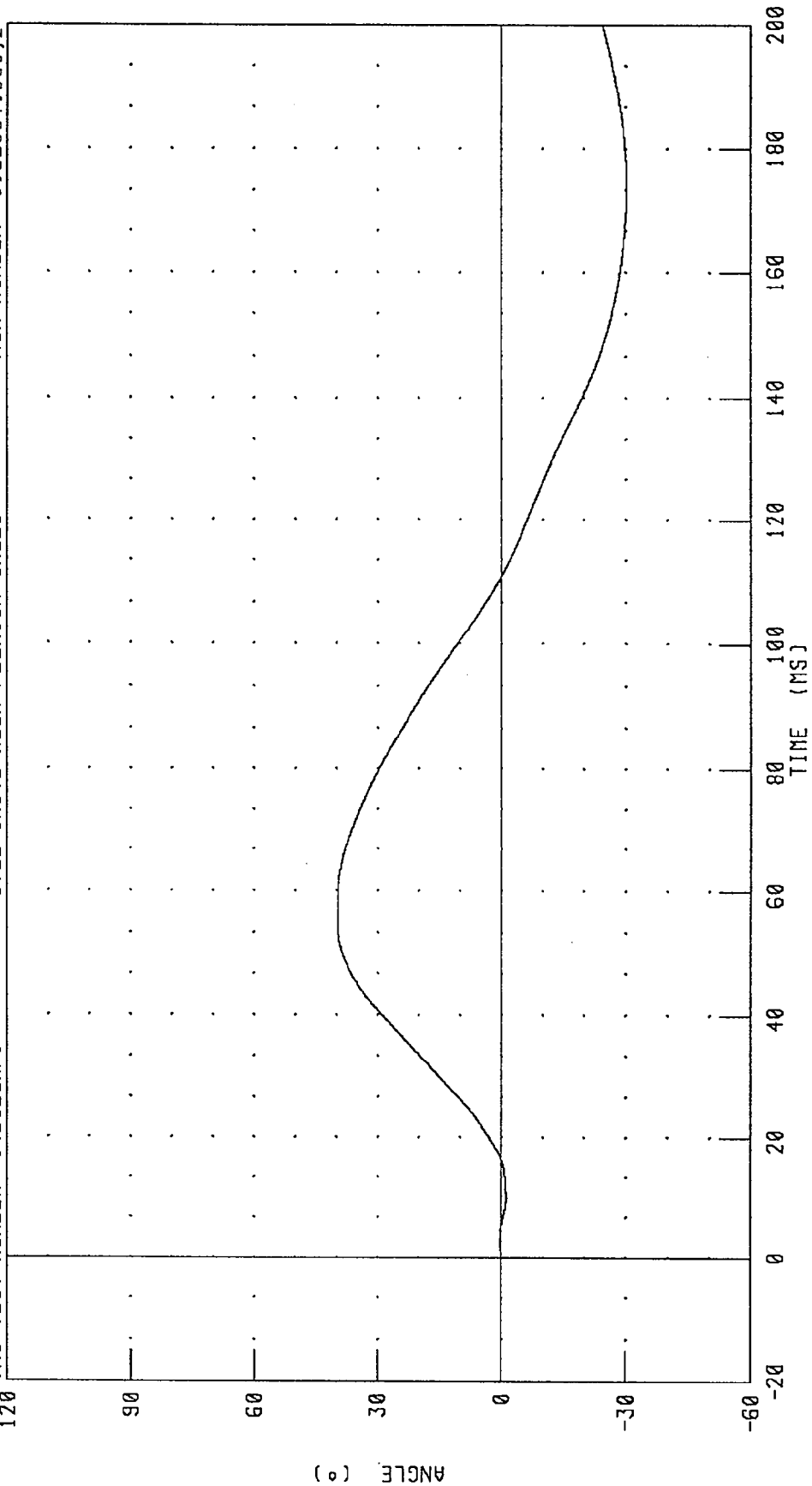
8460

8490

8520

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

TRC TEST NUMBER: 142C29NF1 572E SN142 NECK FLEXION CAL29 RUN NUMBER: 112295.1353;2



CHANNEL: THETA FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK FLEXION CALIBRATION

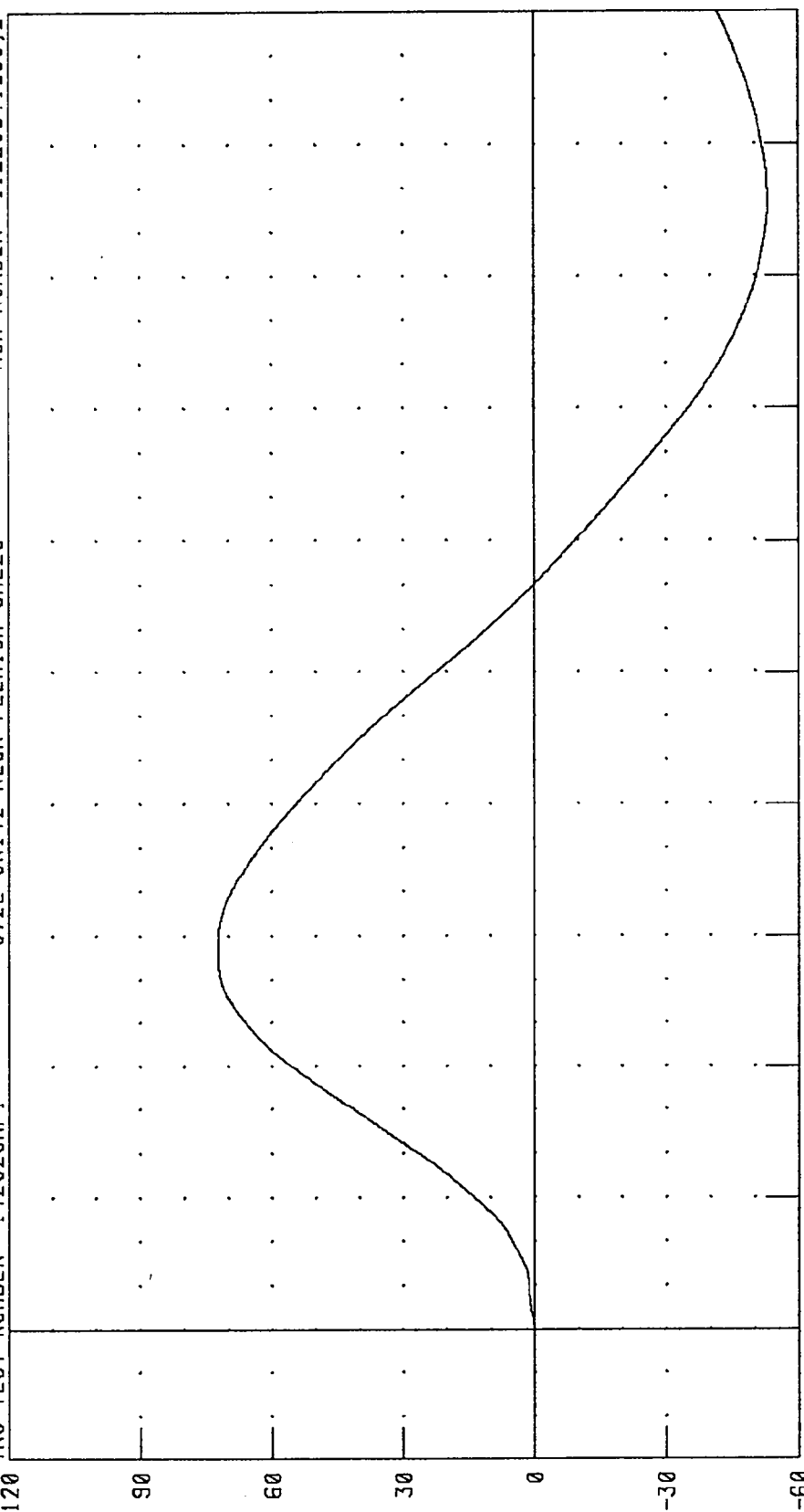
TOTAL ROTATION

TRC TEST NUMBER: 142C29NF1

572E SN142 NECK FLEXION CAL29

RUN NUMBER: 112295.1353;2

120



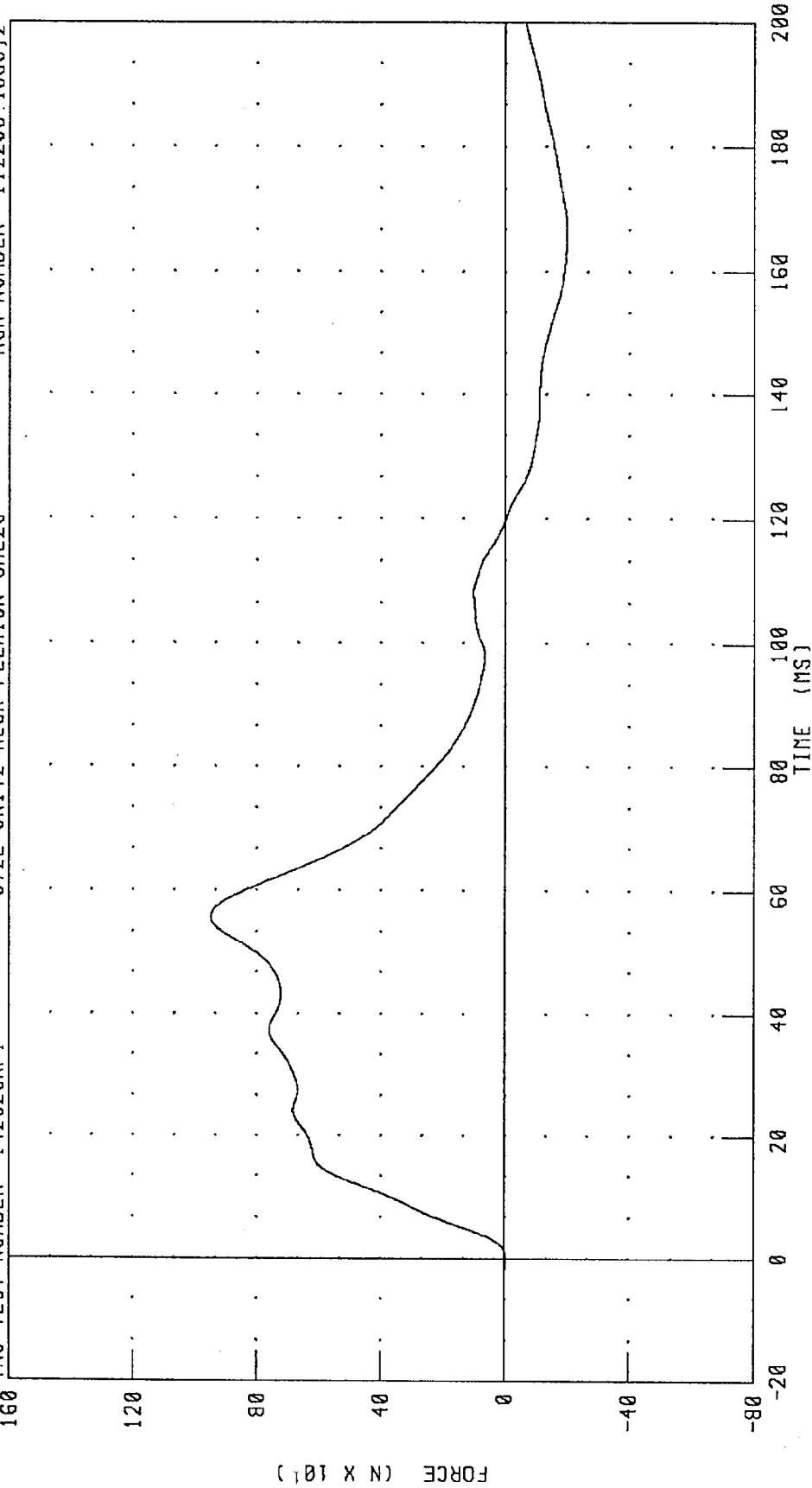
CHANNEL: TOTAL FILTER: CH. CLASS 60

PEAK DATA: 72.21 ° @ 58.80 MS, -52.98 ° @ 170.72 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 142C29NF1 572E SN142 NECK FLEXION CAL29 RUN NUMBER: 112295.1353;2



PEAK DATA: 949.72 N @ 55.68 MS; -200.53 N @ 166.24 MS

CHANNEL: NEKXF FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

IRC TEST NUMBER: 142C29NF1

572E SN142 NECK FLEXION CAL29

RUN NUMBER: 112295.1353;2

160

120

80

40

0

-40

-80

TORQUE (N·M)

TIME (MS)

200

180

160

140

120

100

80

60

40

20

0

-20

-40

-60

PEAK DATA: 87.10 N·M @ 48.64 MS; -34.88 N·M @ 14.00 MS

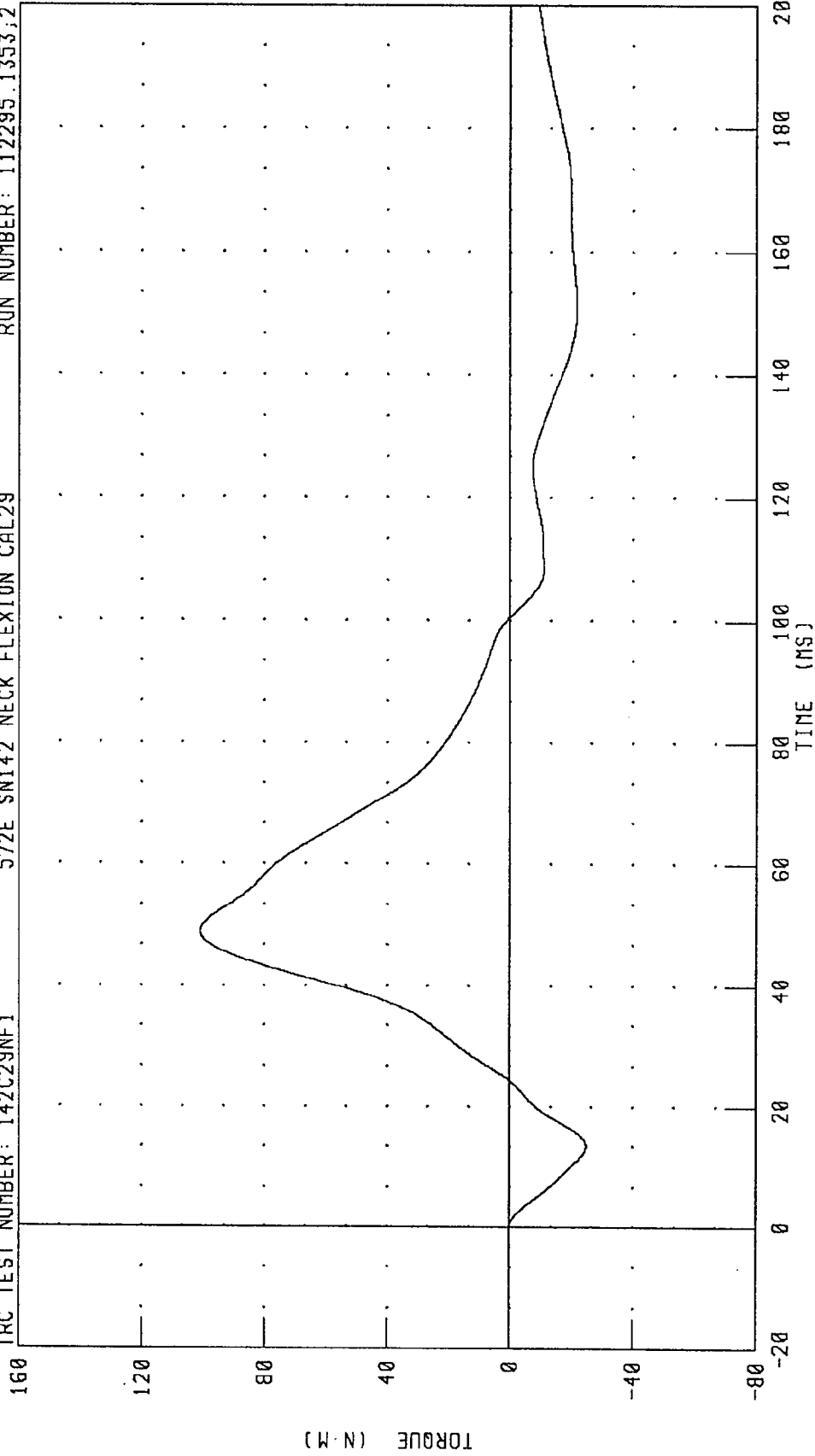
CHANNEL: NEKYM FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 142C29NF1

572E SN142 NECK FLEXION CAL29

RUN NUMBER: 112295.1353;2



PEAK DATA: 100.85 N·M @ 48.88 MS; -24.91 N·M @ 13.44 MS

CHANNEL: NEKOM FILTER: CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

HYBRID III

07-NOV-95

TRC INC. TEST NO: 142C29NE1 572E SN142 NECK EXT. CAL29

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY		10 - 70 %	52.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.05 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	18.13 G
	20 MS	14.00 - 19.00 G	16.85 G
	30 MS	11.00 - 16.00 G	13.23 G
MAX PENDULUM G		22 G MAX	18.56 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	13.19 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	39.76 MS
D PLANE	MAX	81 - 106 DEG.	96.63 DEG.
ROTATION	TIME	72 - 82 MS	74.00 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-71.35 NM
	TIME	65 - 79 MS	69.92 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	152.16 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	136.72 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN

John K. Clumidge

RUN NUMBER: 110795.1610;1

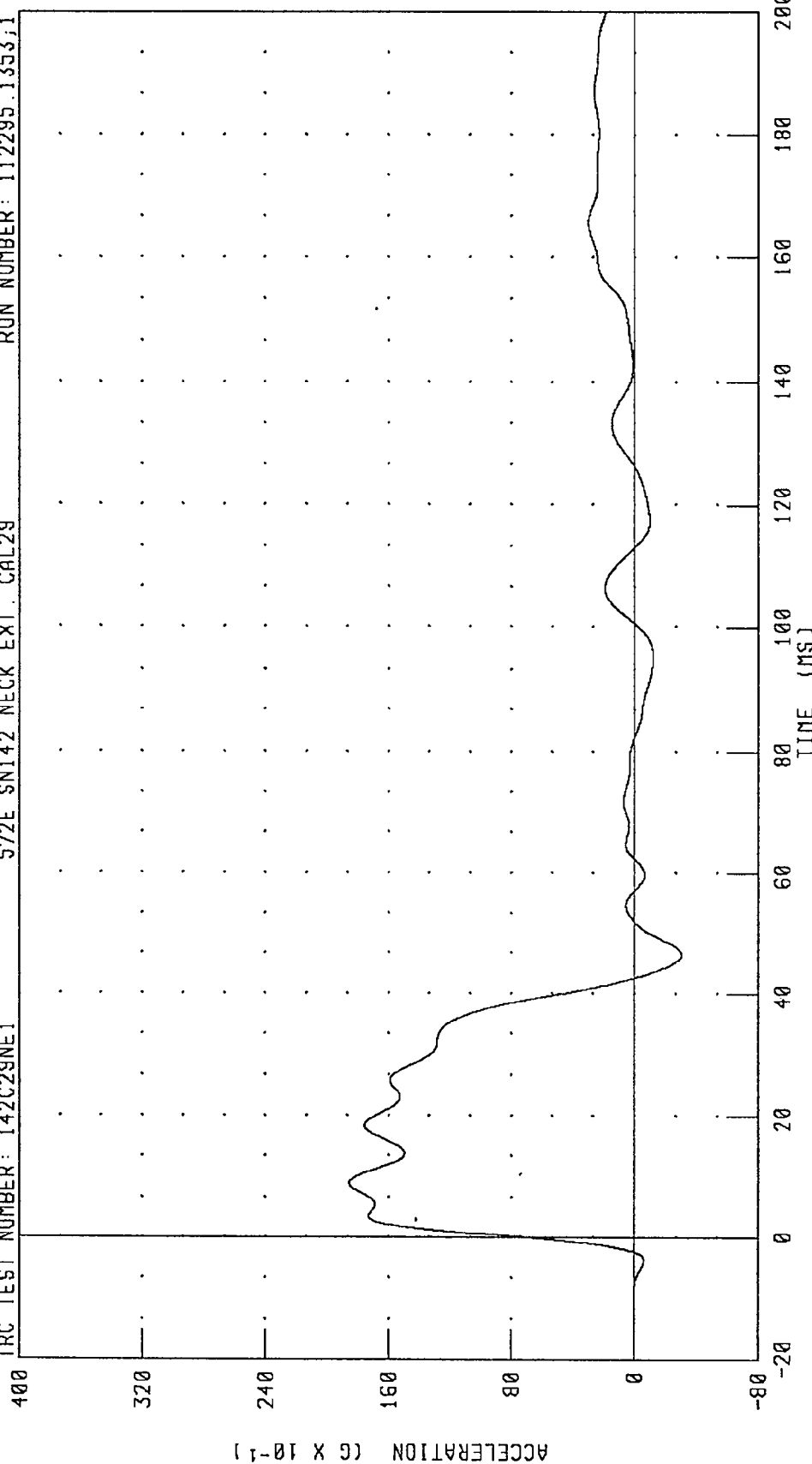
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 142C28NE1

572E SN142 NECK EXT. CAL29

RUN NUMBER: 112295.1353;1



PEAK DATA: 18.56 G @ 8.96 MS; -3.06 G @ 46.48 MS

CHANNEL: PENXC FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN142 NECK EXT. CAL29

TRC TEST NUMBER: 142C29NE1

120

90

60

30

0

-30

-60

ANGLE (°)

0

20

40

60

80

100

120

140

160

180

200

TIME (MS)

PEAK DATA: 40.52 @ 73.36 MS, -14.05 @ 195.52 MS

CHANNEL: BETA

FILTER: CH. CLASS 60

RUN NUMBER: 112295.1353.1

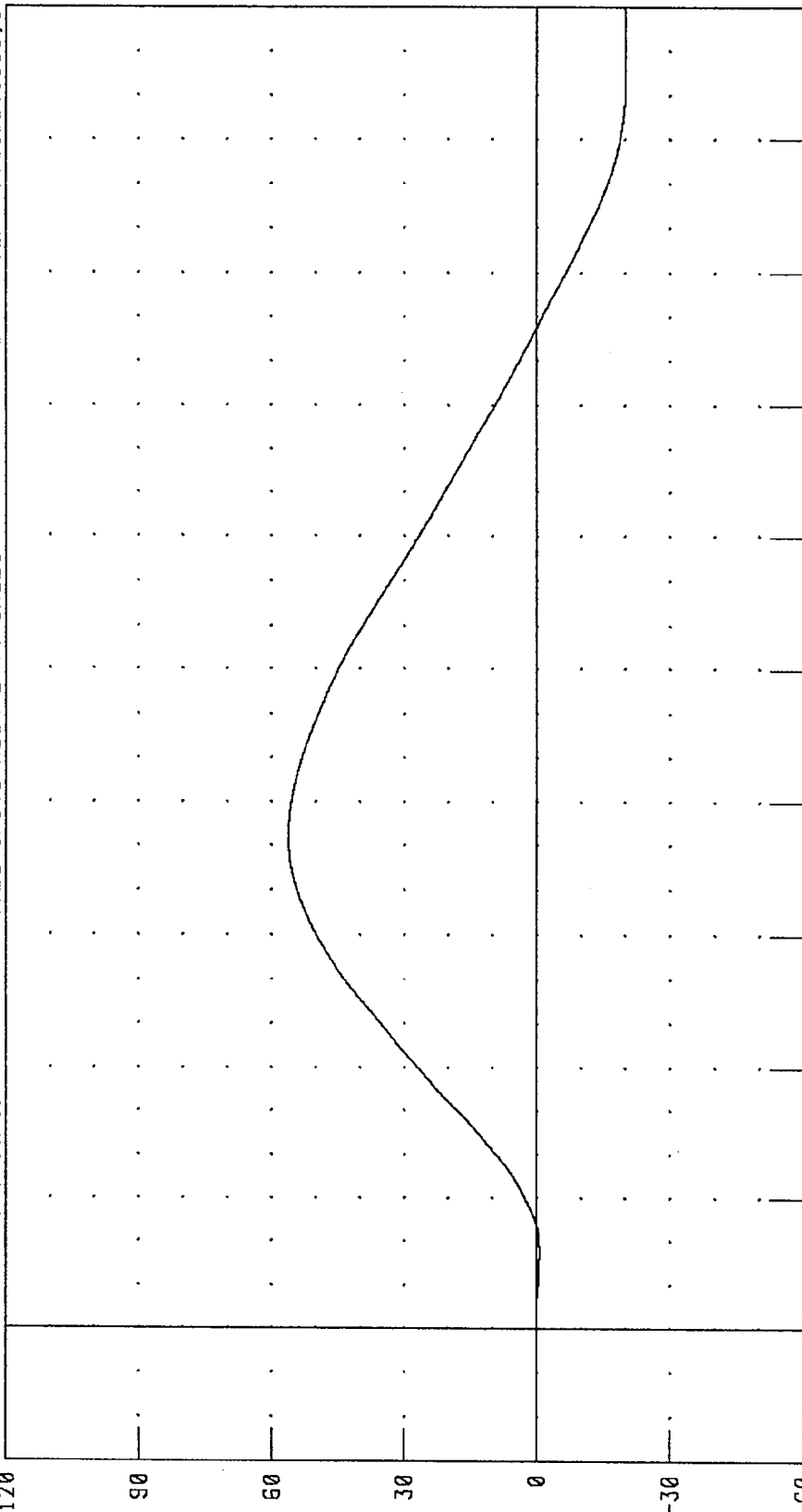
PART 572-E HYBRID III NECK EXTENSION CALIBRATION ROTATION ABOUT OCCIPITAL CONDYLE

IRC TEST NUMBER: 142C29NE1

572E SN142 NECK EXT. CAL29

RUN NUMBER: 112295.1353,1

120



PEAK DATA: 56.13 ° @ 74.80 MS; -20.04 ° @ 188.16 MS

CHANNEL: THETA FILTER: CH. CLASS 60

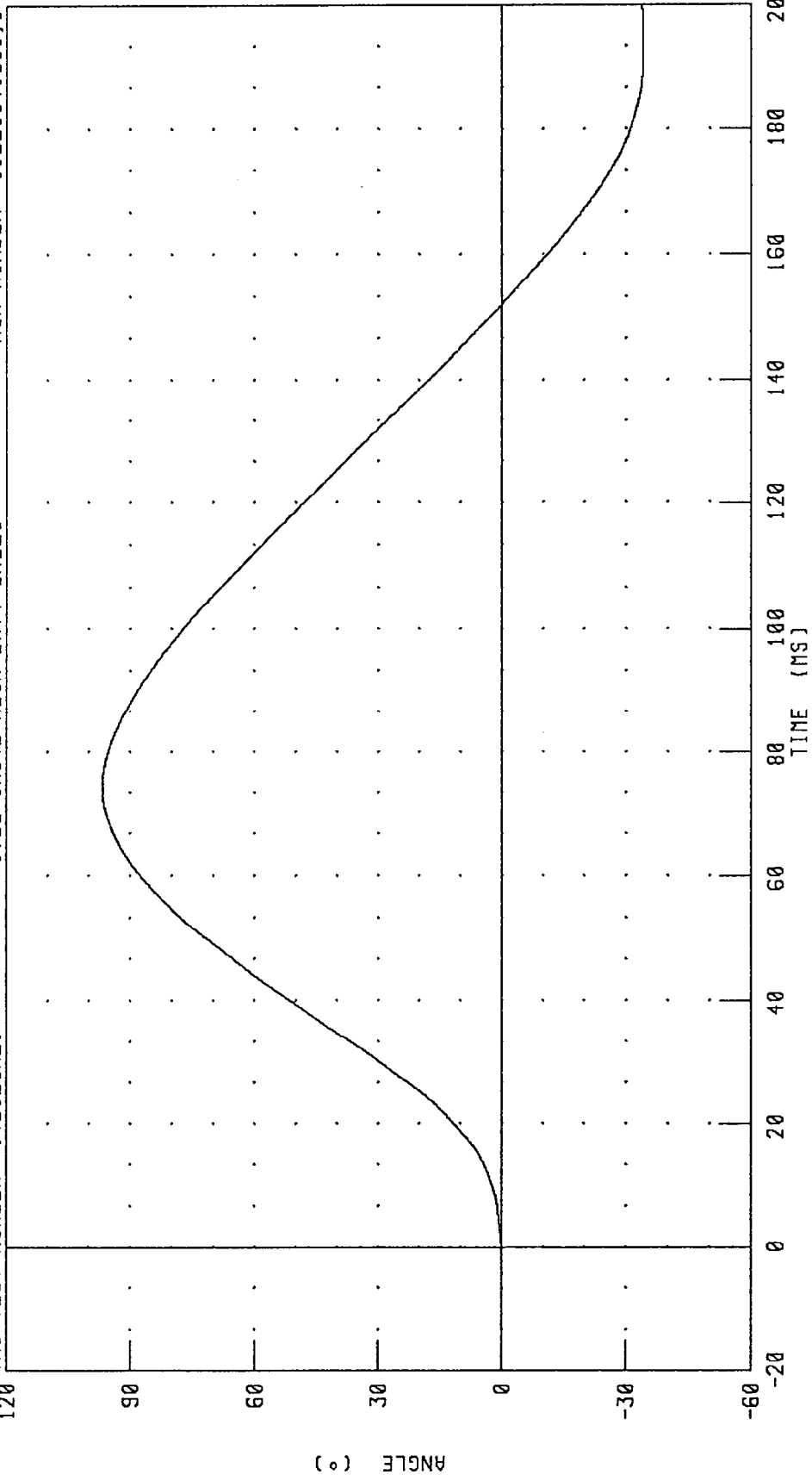
ANGLE (°)

TIME (MS)

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 142028NE1 572E SN142 NECK EXT. CAL28 RUN NUMBER: 112295.1353;1



CHANNEL: TOTAL FILTER: CH. CLASS 60

PEAK DATA: 96.63 ° @ 74.00 MS; -34.09 ° @ 196.08 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 142C29NE1

572E SN142 NECK EXT. CAL28

RUN NUMBER: 112295.1353,1

80

40

0

-40

-80

-120

-160

FORCE (N X 10¹)

TIME (MS)

200

180

160

140

120

100

80

60

40

20

0

-20

PEAK DATA: 251.12 N @ 188.08 MS; -565.91 N @ 65.92 MS

FILTER: CH. CLASS 60

CHANNEL: NEKXF

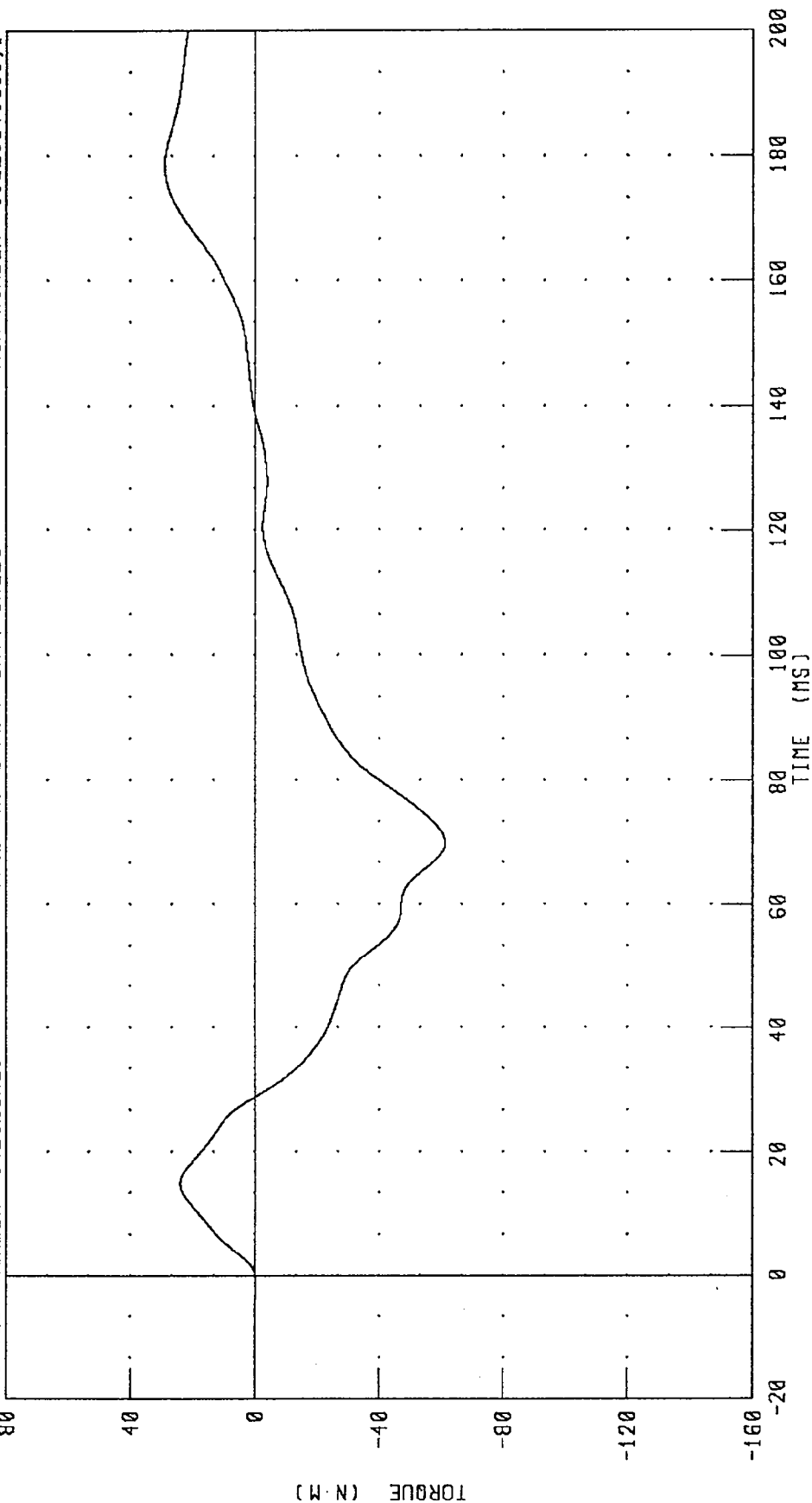
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 142C29NE1

572E SN142 NECK EXT. CAL29

RUN NUMBER: 112295.1353;1



PEAK DATA: 28.79 N.M @ 178.48 MS; -61.39 N.M @ 69.92 MS

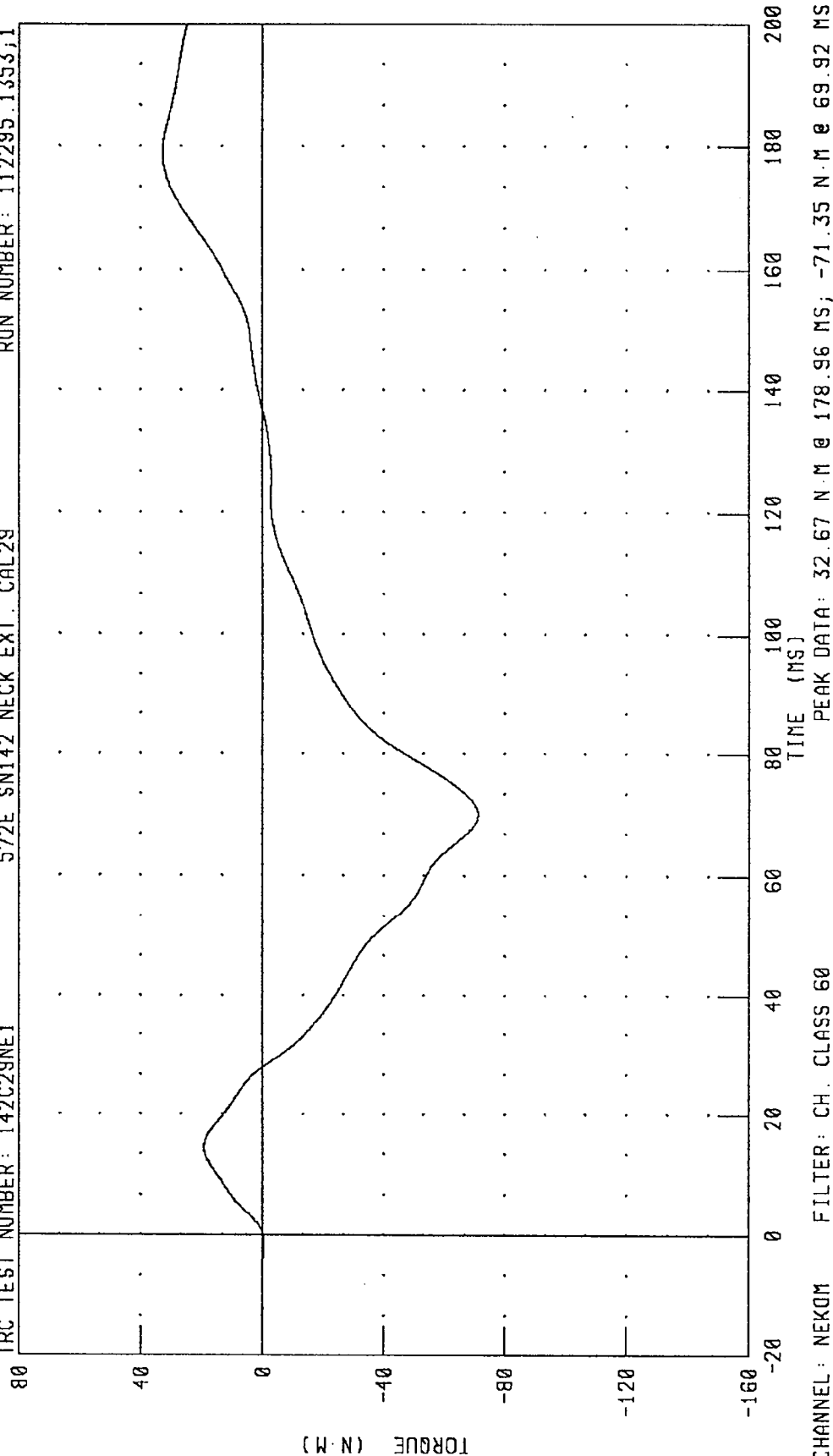
CHANNEL: NEKYM FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 142C29NE1

572E SN142 NECK EXT. CAL28

RUN NUMBER: 112295.1353,1



TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III

08-NOV-95

TRC INC.

TEST NO: 142C29TH1

572E SN142 H.S.THORAX CAL29

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	38.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.68 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	67.7 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5724. N
INTERNAL HYSTERESIS	69% - 85%	73.8%

TEST MEETS SPECIFICATIONS

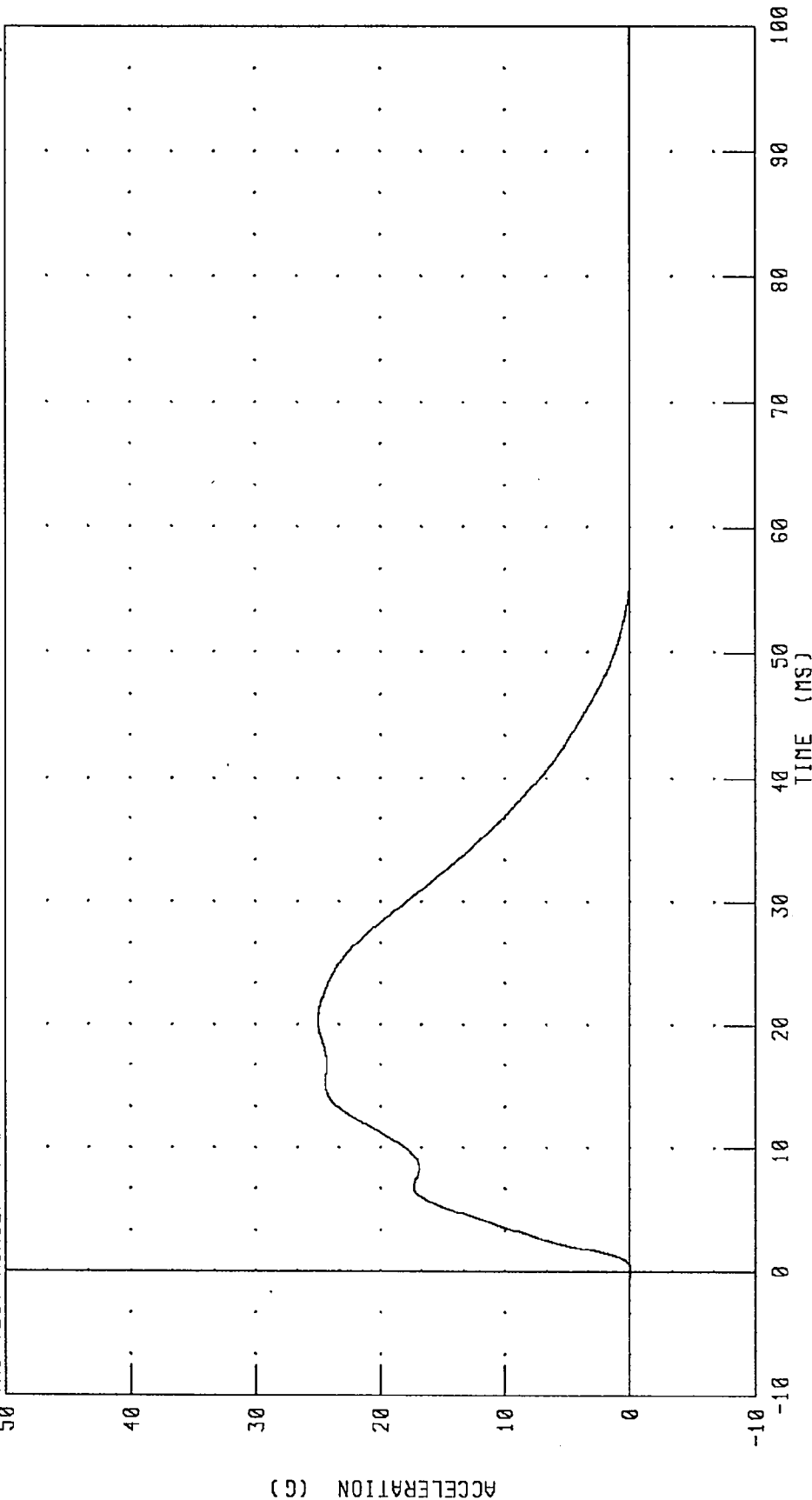
TECHNICIAN

John K. Clavidge

RUN NUMBER: 110895.0740;1

PART 572-E HYBRID III THORAX CALIBRATION PENDULUM DECELERATION

TRC TEST NUMBER: 142C29TH1 572E SN142 H.S. THORAX CAL29 RUN NUMBER: 112295.1353;1

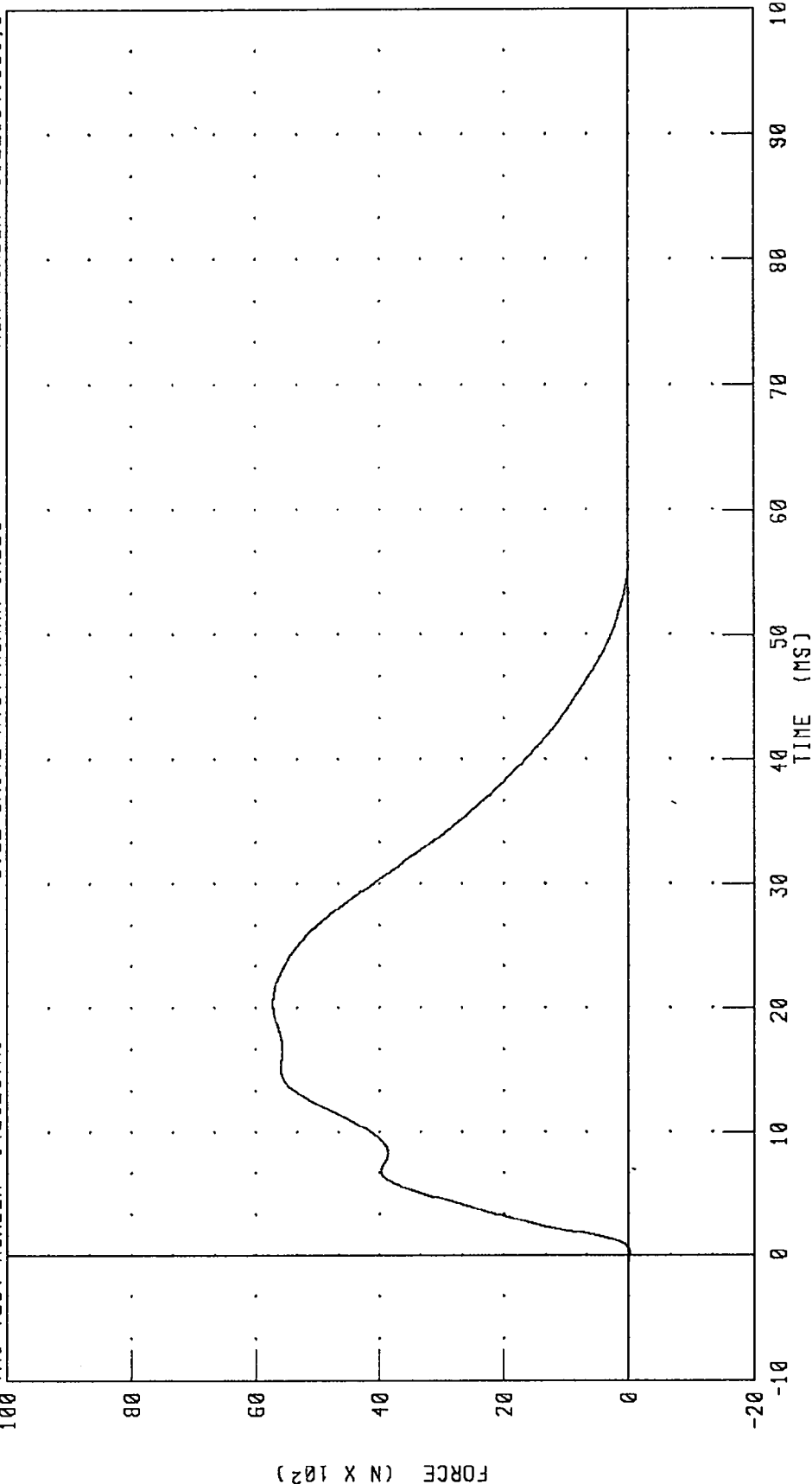


PEAK DATA: 24.99 G @ 20.40 MS; -0.10 G @ 0.24 MS

CHANNEL: PENXC FILTER: CH. CLASS 180

PART 572-E HYBRID III THORAX CALIBRATION PENDULUM FORCE

TRC TEST NUMBER: 142C29TH1 572E SN142 H.S. THORAX CAL29 RUN NUMBER: 112295.1353;1



CHANNEL: PENXF FILTER: CH. CLASS 180 PEAK DATA: 5724.19 N @ 20.40 MS; -22.28 N @ 0.24 MS

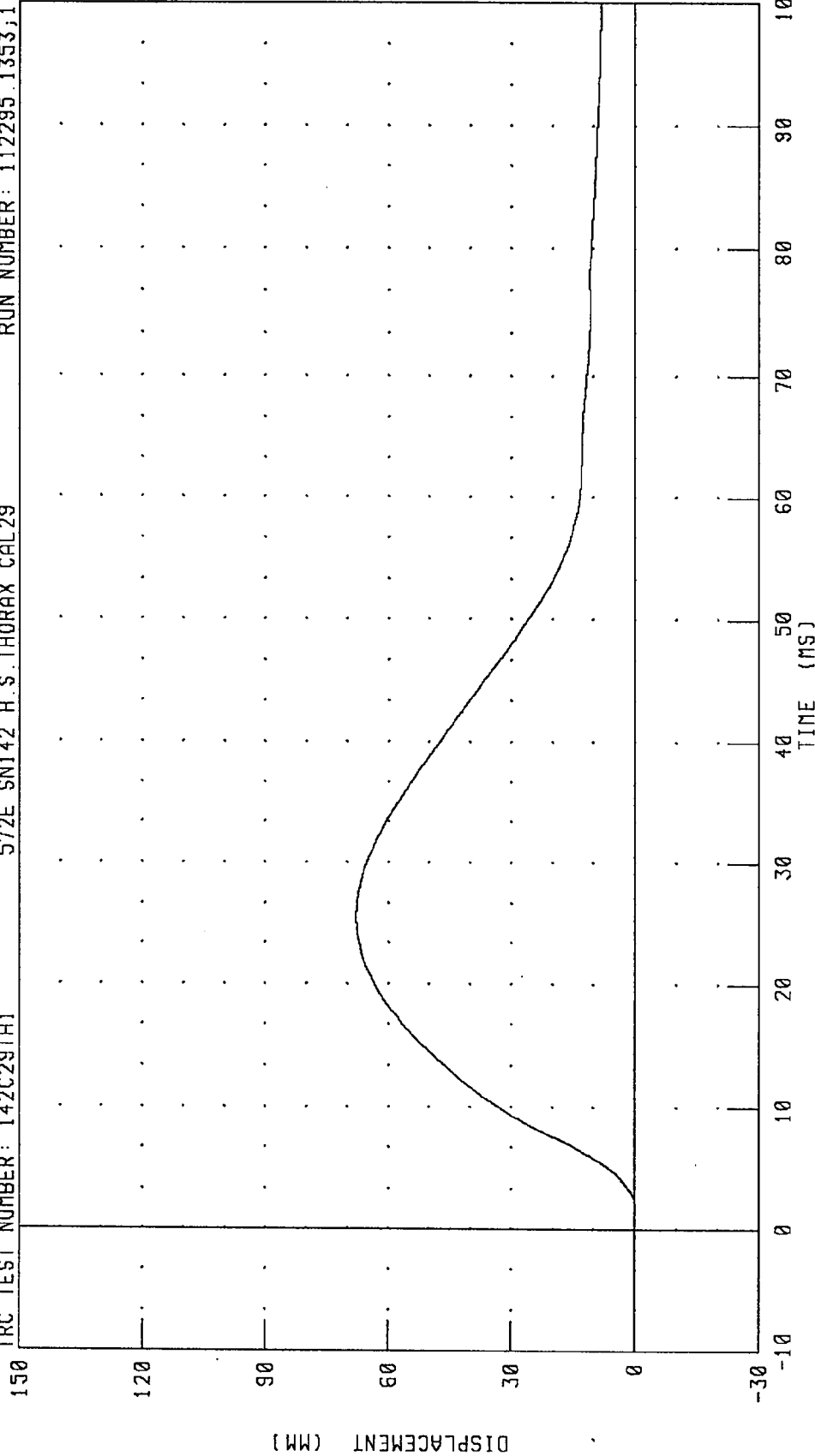
PART 572-E HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

TRC TEST NUMBER: 142C29TH1

572E SNI42 H.S. THORAX CAL29

RUN NUMBER: 112295.1353;1



PEAK DATA: 67.78 MM @ 25.28 MS; -0.08 MM @ 1.84 MS

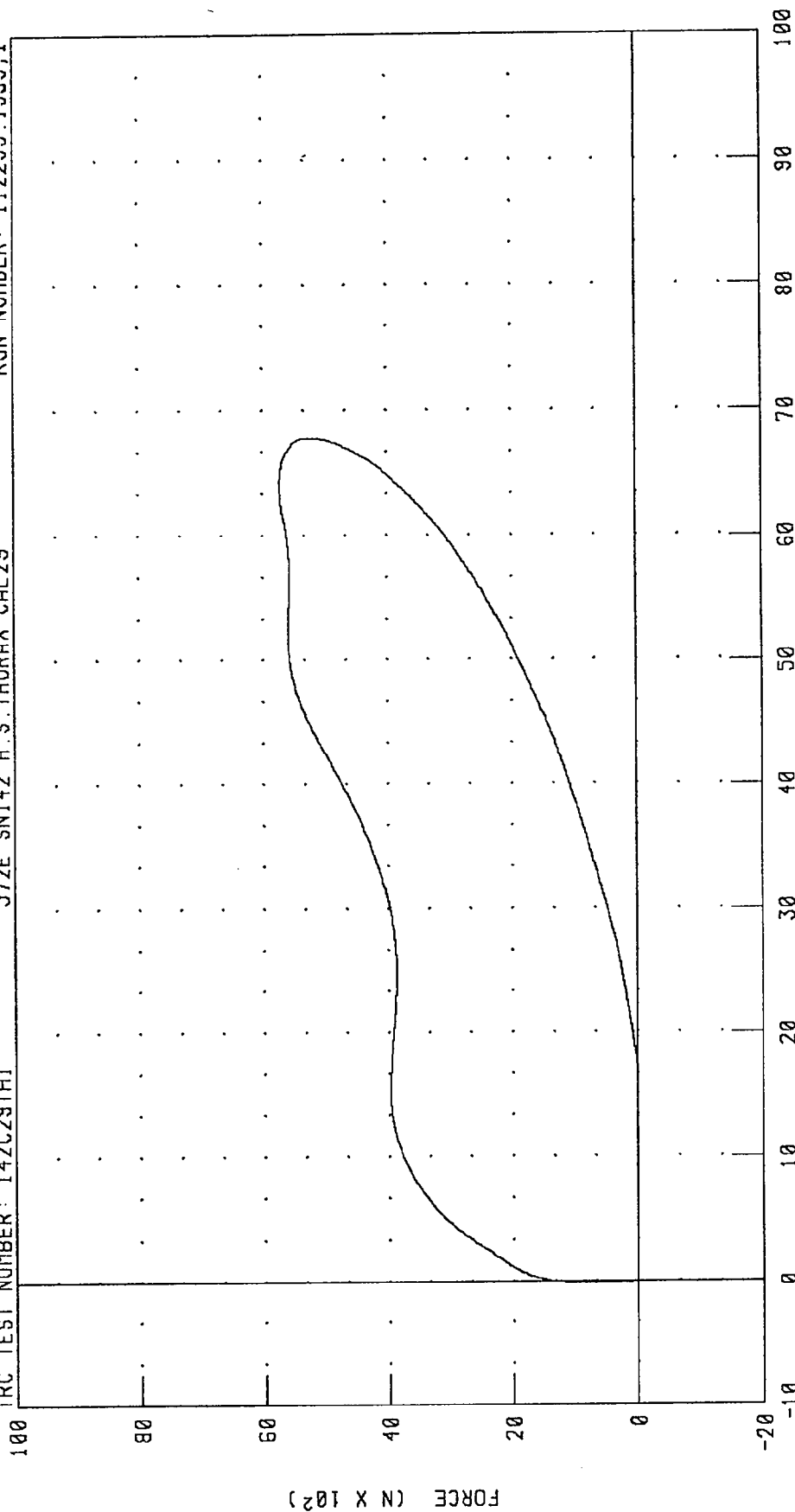
CHANNEL: CSTXD FILTER: CH. CLASS 180

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

TRC TEST NUMBER: 142C29TH1

572E SN142 H.S. THORAX CAL29

RUN NUMBER: 112295.1353;1



CHANNEL: CSTXD
PENXF

FILTER: CH. CLASS 180
CH. CLASS 180

DISPLACEMENT (MM)

PEAK DATA:

67.78 MM @ 25.28 MS; -0.08 MM @ 1.84 MS
5724.19 N @ 20.40 MS; -22.28 N @ 0.24 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III

07-NOV-95

TRC INC.

TEST NO: 142C29RK1

572E SN142 RIGHT KNEE CAL 29

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	52.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.12 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5691.0 N

TEST MEETS SPECIFICATIONS

TECHNICIAN

John K. Churidge

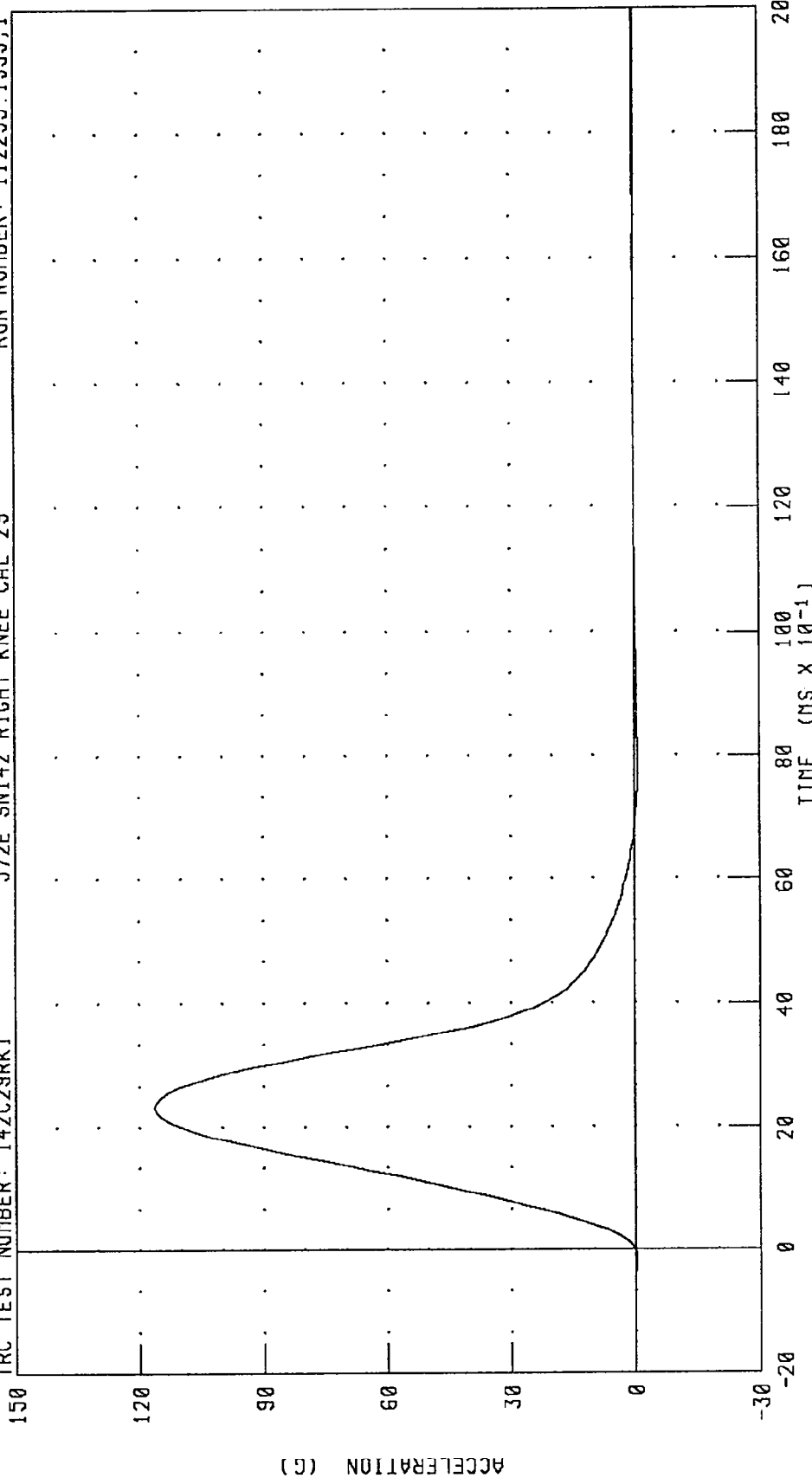
RUN NUMBER: 110795.1300;1

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

TRC TEST NUMBER: 142C29RK1

572E SN142 RIGHT KNEE CAL 29

RUN NUMBER: 112295.1353;1



PEAK DATA: 116.31 G @ 2.32 MS; -0.67 G @ 7.84 MS

CHANNEL: PENXG FILTER: CH. CLASS 600

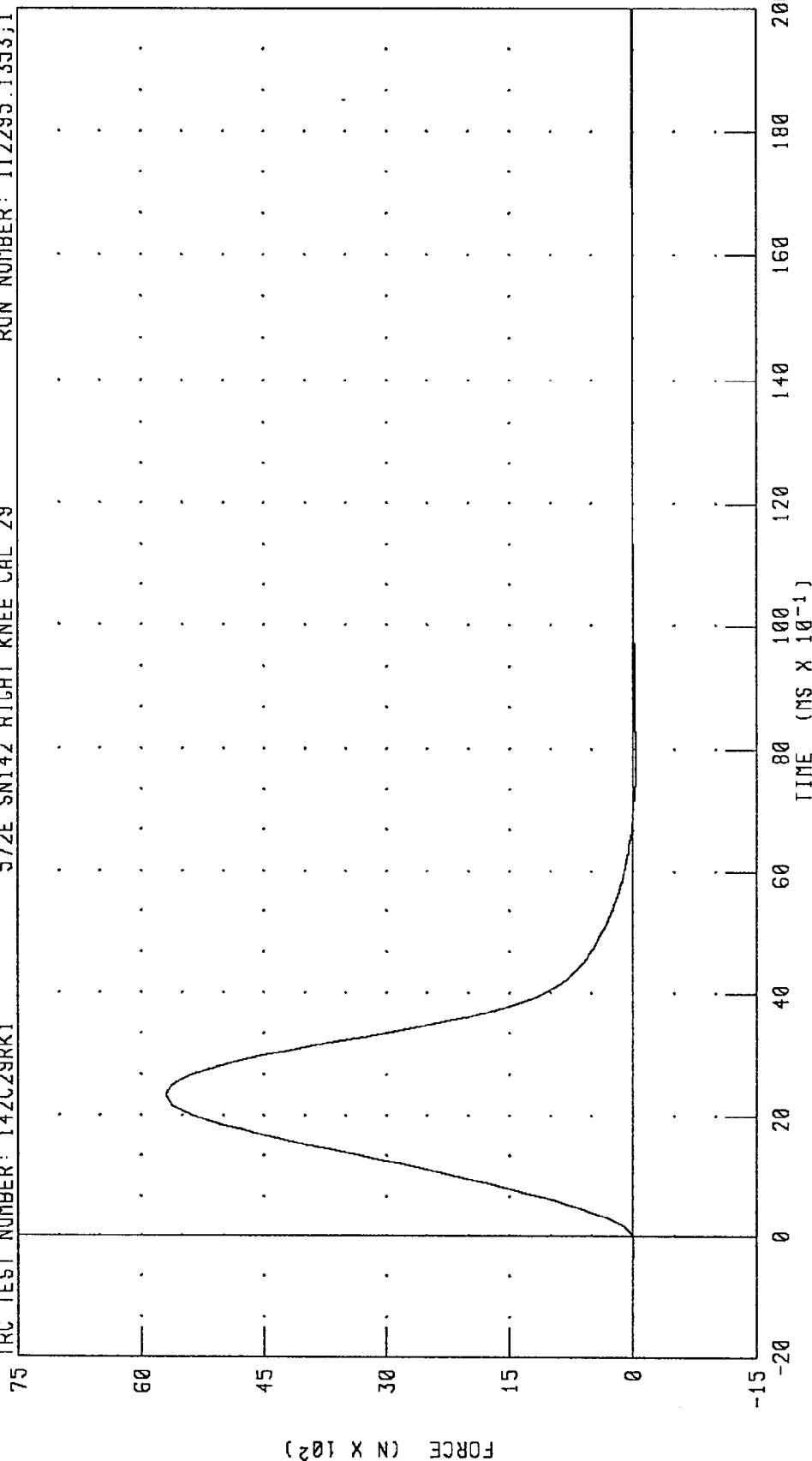
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 142C29RK1

572E SNI42 RIGHT KNEE CAL 29

RUN NUMBER: 112295.1353;1



CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 5691.03 N @ 2.32 MS; -33.01 N @ 7.84 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III

07-NOV-95

TRC INC.

TEST NO: 142C29LK1

572E SN142 LEFT KNEE CAL 29

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	52.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5157.4 N

TEST MEETS SPECIFICATIONS

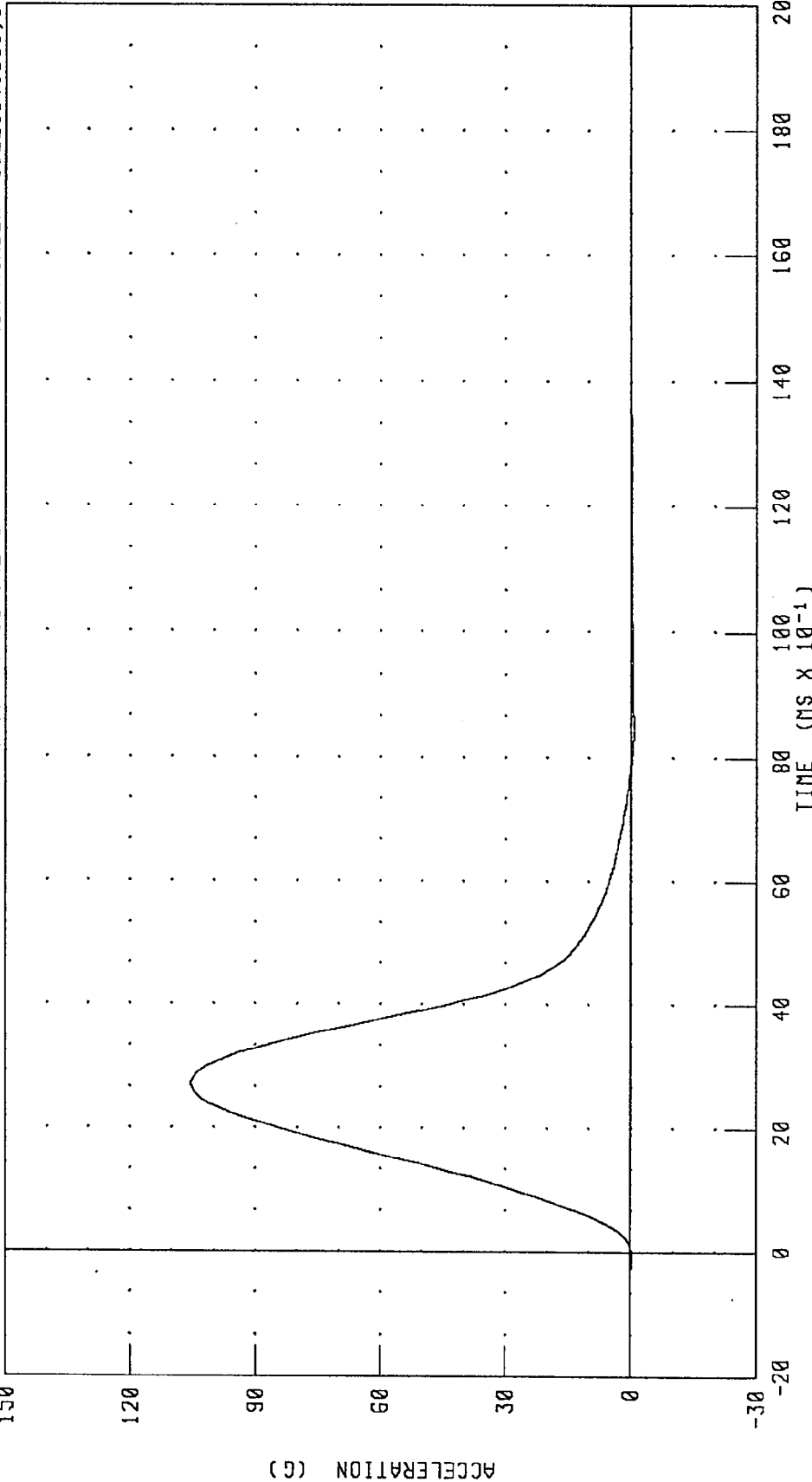
TECHNICIAN

John K. Cawdye

RUN NUMBER: 110795.1255;1

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

TRC TEST NUMBER: 142C29LK1 572E SN142 LEFT KNEE CAL 29 RUN NUMBER: 112295.1353,1



CHANNEL: PENXG FILTER: CH. CLASS 600 PEAK DATA: 105.41 G @ 2.72 MS; -0.64 G @ 8.48 MS

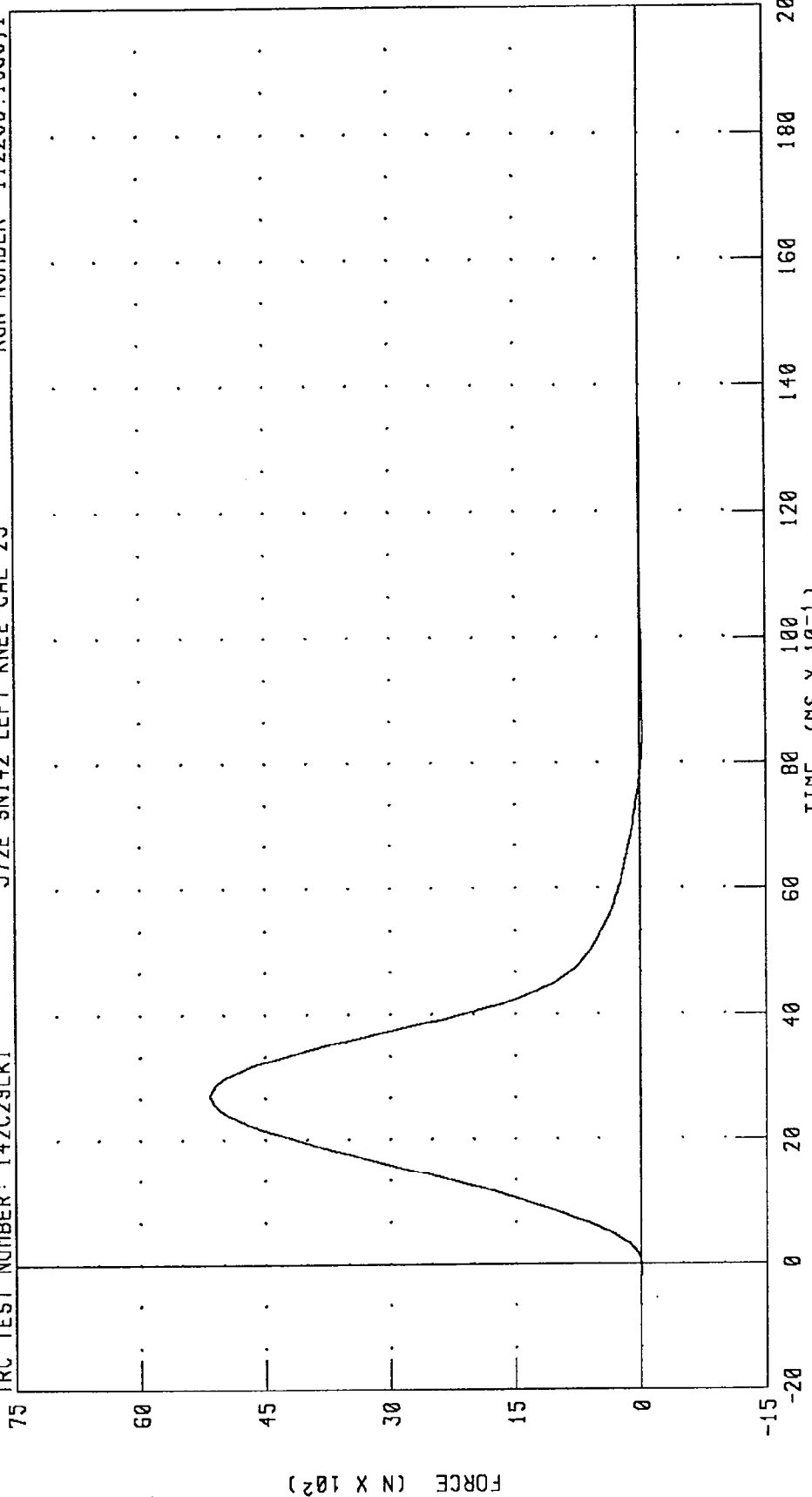
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 142C29LK1

572E SN142 LEFT KNEE CAL 29

RUN NUMBER: 112295.1353;1



CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 5157.44 N @ 2.72 MS; -31.14 N @ 8.48 MS

Appendix D

Miscellaneous Test Information

Dummy Instrument Calibrations

Driver Dummy #192

	Serial Number	Model Number	Manufacturer	Calibration Date	
				Last	Due
Head X-axis accelerometer	AAL82	7264	Endevco	08/30/95	03/01/96
Head X-axis accelerometer-redundant	AJ8J7	7264	Endevco	08/30/95	03/01/96
Head Y-axis accelerometer	A84JJ	7264	Endevco	08/30/95	03/01/96
Head Y-axis accelerometer-redundant	AJ8A6	7264	Endevco	08/30/95	03/01/96
Head Z-axis accelerometer	FH87J	7264	Endevco	08/30/95	03/01/96
Head Z-axis accelerometer-redundant	AC8W6	7264	Endevco	08/30/95	03/01/96
Chest X-axis accelerometer	CT22H	7264	Endevco	08/30/95	03/01/96
Chest X-axis accelerometer-redundant	A79GJ	7264	Endevco	08/30/95	03/01/96
Chest Y-axis accelerometer	AC708	7264	Endevco	08/30/95	03/01/96
Chest Y-axis accelerometer-redundant	AGR69	7264	Endevco	08/30/95	03/01/96
Chest Z-axis accelerometer	CW59H	7264	Endevco	08/30/95	03/01/96
Chest Z-axis accelerometer-redundant	DB74H	7264	Endevco	08/30/95	03/01/96
Left femur force load cell	986	2430	GSE	08/30/95	03/01/96
Right femur force load cell	987	2430	GSE	08/30/95	03/01/96
Neck X-axis force load cell ¹	85	1716	Denton	08/30/95	03/01/96
Neck Y-axis force load cell ¹	85	1716	Denton	08/30/95	03/01/96
Neck Z-axis force load cell ¹	85	1716	Denton	08/30/95	03/01/96
Neck Moment about X-axis load cell ¹	85	1716	Denton	08/30/95	03/01/96
Neck Moment about Y-axis load cell ¹	85	1716	Denton	08/30/95	03/01/96
Neck Moment about Z-axis load cell ¹	85	1716	Denton	08/30/95	03/01/96
Pelvis X-axis accelerometer	AJ694	7264	Endevco	08/30/95	03/01/96
Pelvis Y-axis accelerometer	AJ656	7264	Endevco	08/30/95	03/01/96
Pelvis Z-axis accelerometer	AJ788	7264	Endevco	08/30/95	03/01/96
Chest deflection potentiometer	87313-96	14CB1-2981	Vernitech	08/30/95	03/01/96
Lap belt force load cell	249	3419	Lebow	07/14/95	01/14/96
Shoulder belt force load cell	590	3419	Lebow	07/14/95	01/14/96

¹ Hybrid III use only.

Dummy Instrument Calibrations, Cont'd.

Driver Dummy #192

	Serial Number	Model Number	Manufacturer	Calibration Date	
				Last	Due
Left upper tibia moment about X-axis load cell	46	1583	Denton	10/03/95	04/03/96
Left upper tibia moment about Y-axis load cell	46	1583	Denton	10/03/95	04/03/96
Right upper tibia moment about X-axis load cell	35	1583	Denton	10/03/95	04/03/96
Right upper tibia moment about Y-axis load cell	35	1583	Denton	10/03/95	04/03/96
Left Lower tibia X-axis force load cell	42	1584	Denton	10/03/95	04/03/96
Left Lower tibia Z-axis force load cell	42	1584	Denton	10/03/95	04/03/96
Left Lower tibia moment about Y-axis load cell	42	1584	Denton	10/03/95	04/03/96
Right Lower tibia X-axis force load cell	39	1584	Denton	10/03/95	04/03/96
Right Lower tibia Z-axis force load cell	39	1584	Denton	10/03/95	04/03/96
Right Lower tibia moment about Y-axis load cell	39	1584	Denton	10/03/95	04/03/96
Left foot X-axis accelerometer	10073	7264	Endevco	10/17/95	04/17/96
Left foot heel Z-axis accelerometer	10077	7264	Endevco	10/16/95	04/16/96
Left foot toe Z-axis accelerometer	10101	7264	Endevco	10/17/95	04/17/96
Right foot X-axis accelerometer	APYT4	7264	Endevco	10/17/95	04/17/96
Right foot heel Z-axis accelerometer	APOR8	7264	Endevco	10/17/95	04/17/96
Right foot toe Z-axis accelerometer	10076	7264	Endevco	10/16/95	04/16/96

Dummy Instrument Calibrations
Right Front Passenger Dummy #142

	Serial Number	Model Number	Manufacturer	Calibration Date	
				Last	Due
Head X-axis accelerometer	A74JJ	7264	Endevco	09/01/95	03/01/96
Head X-axis accelerometer-redundant	AC8L5	7264	Endevco	09/01/95	03/01/96
Head Y-axis accelerometer	ACCR7	7264	Endevco	09/01/95	03/01/96
Head Y-axis accelerometer-redundant	AC872	7264	Endevco	09/01/95	03/01/96
Head Z-axis accelerometer	ACCJ1	7264	Endevco	09/01/95	03/01/96
Head Z-axis accelerometer-redundant	A68JJ	7264	Endevco	09/01/95	03/01/96
Chest X-axis accelerometer	AC721	7264	Endevco	09/01/95	03/01/96
Chest X-axis accelerometer-redundant	A65JJ	7264	Endevco	09/01/95	03/01/96
Chest Y-axis accelerometer	CY47H	7264	Endevco	09/01/95	03/01/96
Chest Y-axis accelerometer-redundant	FH14J	7264	Endevco	09/01/95	03/01/96
Chest Z-axis accelerometer	AAL44	7264	Endevco	09/01/95	03/01/96
Chest Z-axis accelerometer-redundant	AC745	7264	Endevco	09/01/95	03/01/96
Left femur force load cell	903	2430	GSE	09/01/95	03/01/96
Right femur force load cell	904	2430	GSE	09/01/95	03/01/96
Neck X-axis force load cell ¹	280	1716	Denton	09/01/95	03/01/96
Neck Y-axis force load cell ¹	280	1716	Denton	09/01/95	03/01/96
Neck Z-axis force load cell ¹	280	1716	Denton	09/01/95	03/01/96
Neck Moment about X-axis load cell ¹	280	1716	Denton	09/01/95	03/01/96
Neck Moment about Y-axis load cell ¹	280	1716	Denton	09/01/95	03/01/96
Neck Moment about Z-axis load cell ¹	280	1716	Denton	09/01/95	03/01/96
Pelvis X-axis accelerometer	CY63H	7264	Endevco	09/01/95	03/01/96
Pelvis Y-axis accelerometer	AMWA9	7264	Endevco	09/01/95	03/01/96
Pelvis Z-axis accelerometer	ANA55	7264	Endevco	09/01/95	03/01/96
Chest deflection potentiometer ¹	142	14CB1-2981	Vernitech	09/01/95	03/01/96
Lap belt force load cell	234	3419	Lebow	07/14/95	01/14/96
Shoulder belt force load cell	612	3419	Lebow	07/14/95	01/14/96

¹ Hybrid III use only.

Dummy Instrument Calibrations
Right Front Passenger Dummy #142

	Serial Number	Model Number	Manufacturer	Calibration Date	
				Last	Due
Left foot X-axis accelerometer	APOA1	7264	Endevco	10/16/95	04/16/96
Left foot heel Z-axis accelerometer	10102	7264	Endevco	10/16/95	04/16/96
Left foot toe Z-axis accelerometer	10074	7264	Endevco	10/16/95	04/16/96
Right foot X-axis accelerometer	10088	7264	Endevco	10/16/95	04/16/96
Right foot heel Z-axis accelerometer	10089	7264	Endevco	10/16/95	04/16/96
Right foot toe Z-axis accelerometer	10087	7264	Endevco	10/17/95	04/17/96

Vehicle and Calibration Laboratory Instrument Calibrations

Vehicle Accelerometers

	Serial Number	Model Number	Manufacturer	Calibration Date	
				Last	Due
Left rear seat crossmember X-axis	10240	7264	Endevco	10/31/95	05/01/96
Left rear seat crossmember X-axis redundant	10232	7264	Endevco	10/31/95	05/01/96
Right rear seat crossmember X-axis	10233	7264	Endevco	10/31/95	05/01/96
Right rear seat crossmember X-axis redundant	FG17J	7264	Endevco	10/24/95	04/24/96
Engine top X-axis	AGRF1	7264	Endevco	10/31/95	05/01/96
Engine bottom X-axis	DW48JC	7264	Endevco	09/07/95	03/07/96
Right brake caliper X-axis	FH45J	7264	Endevco	09/27/95	03/27/96
Left brake caliper X-axis	DK71J	7264	Endevco	09/08/95	03/08/96
Instrument panel center X-axis	10103	7264	Endevco	09/08/95	03/08/96

Calibration Laboratory Instruments

	Serial Number	Model Number	Manufacturer	Calibration Date	
				Last	Due
Neck bending pendulum accelerometer	CB27	7232	Endevco	09/19/95	03/19/96
Neck bending rotary potentiometer	NA	35435-1-102	Bournes	Mfr. Specification	
Neck bending linear potentiometer	NA	5184-2051846003	Bournes	09/19/95	03/19/96
Thorax/Hybrid II femur pendulum accelerometer	CC64	7232	Endevco	09/19/95	03/19/96
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	09/19/95	03/19/96
Abdomen compression force gauge	3443	3167	Lebow	09/19/95	03/19/96
Hybrid III femur pendulum accelerometer	CG83	7232	Endevco	09/19/95	03/19/96

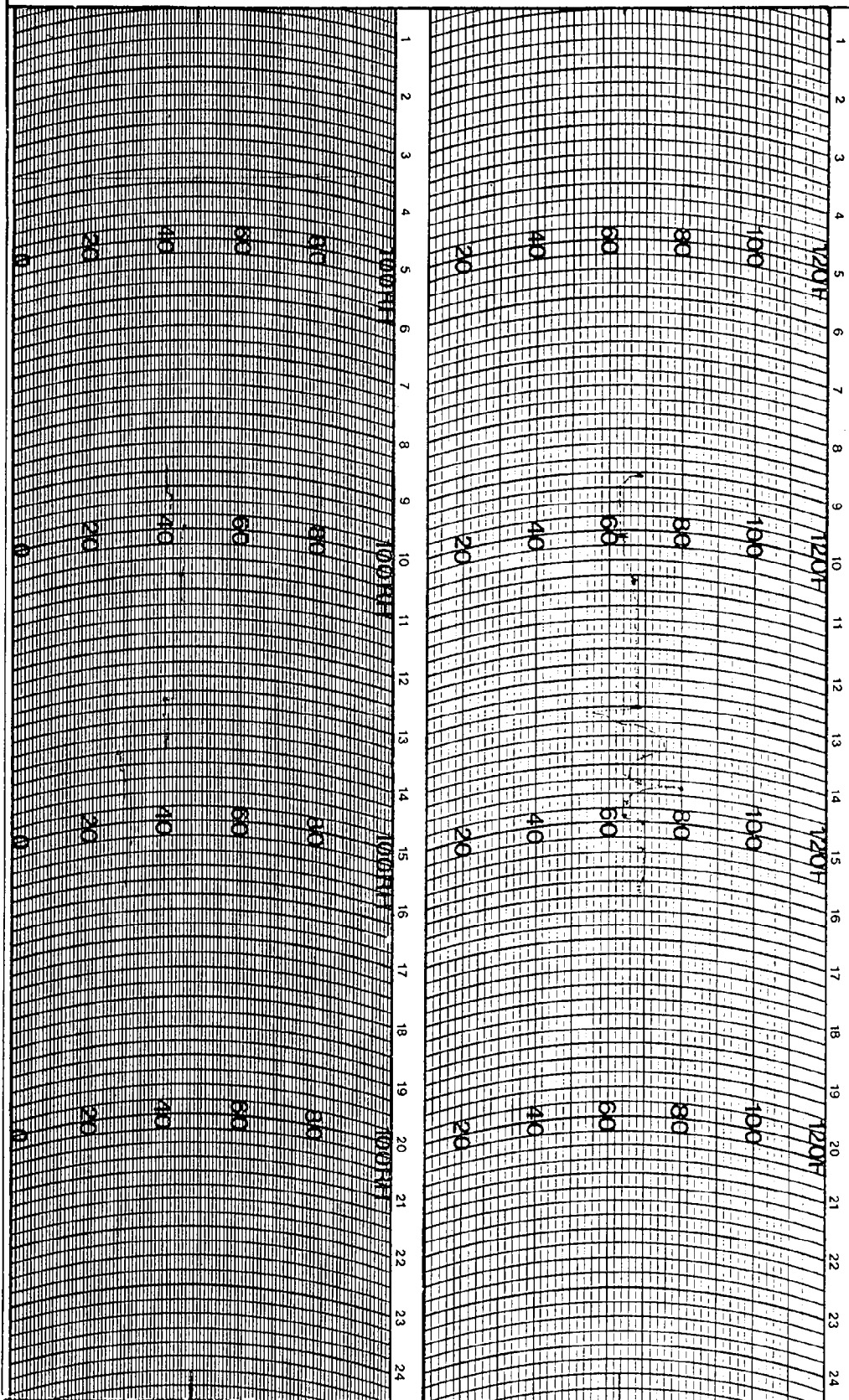
Sign Convention
NHTSA Data Tape Reference Guide

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

Frequency Response Classes

SAE J211 OCT88

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



WEATHER MEASURE
P.O. BOX 41257
SACRAMENTO, CA. 95841
PHONE (916) 481-7565

HYGROTHERMOGRAPH
1 DAY

CHART # C311 D HF
PART # 699123

STATION 951108

DATE ON _____ DATE OFF _____

Appendix E

Restraint System Instructions from Owner's Manual

OCCUPANT RESTRAINTS

One of the most important safety features in your vehicle is the restraint system. This system includes the front and rear seat belts and the driver's and passenger side airbags. Your seat belts can also be used to hold infant and child restraint systems if you will be carrying children too small for adult-size belts.

Please pay careful attention to the information in this section. It tells you how to use your restraint system properly to keep you and your passengers as safe as possible.

WARNING!

In a collision, you and your passengers can suffer much greater injuries if you are not properly buckled up. You can strike parts on the inside of your vehicle or other passengers, or you can be thrown out of the vehicle. Always be sure you and others in your vehicle are buckled up properly.

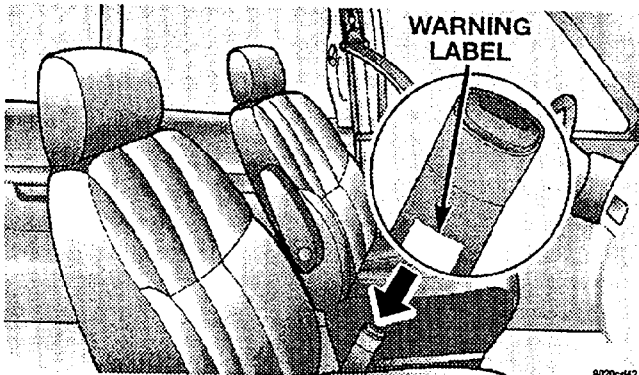
Buckle up even though you are an excellent driver. Even on short trips. Someone on the road may be a poor driver and cause a collision which includes you. And this can happen far away from home or on your own street.

Research has shown that seat belts save lives and they can reduce the seriousness of injuries in a collision. Some of the worst injuries happen when people are thrown from the vehicle. Seat belts provide protection against that, and they reduce the risk of injury caused by striking the inside of the vehicle. Everyone in a motor vehicle needs to be buckled up **all the time**.

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Seat Belt Label

A label has been placed on the inside of the buckle of each of your front seat belts. After a collision of certain severity, where a front seat belt was in use, the buckle will extend from behind the side trim panel of the seat. An orange label will then be exposed. When any part of this label becomes visible, it means that the seat belt must be replaced.



WARNING!

Buckle assembly must be replaced after a collision, or if any orange portion of the label is visible. This seat belt will no longer protect you properly. Failure to replace the assembly may result in severe personal injuries if a collision occurs.

Unibelts

The UNIBELT, or single continuous-belt restraint system, is installed for the driver, front seat passenger, and right and left rear seating positions.

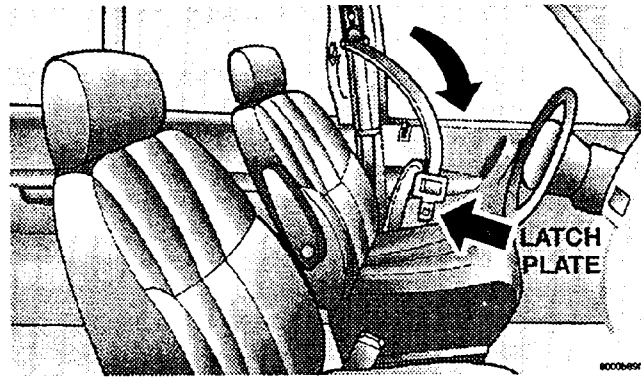
Each unbelt is a combined lap/shoulder belt system. The belt webbing retractor will lock only during very sudden stops or impacts. This feature allows the shoulder part of the belt to move freely with you under normal conditions. But in a collision, the belt will lock and reduce the risk of your striking the inside of the vehicle or being thrown out.

WARNING!

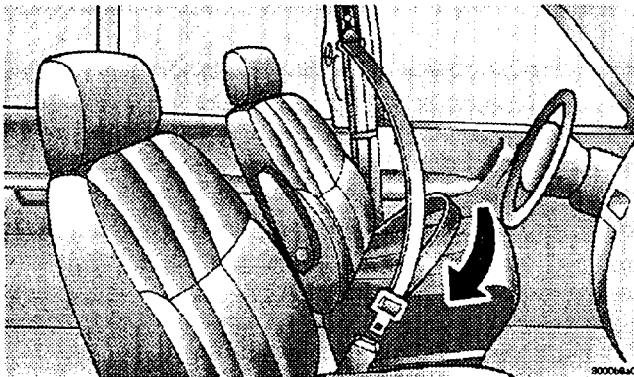
Wearing a seat belt incorrectly is dangerous. Seat belts are designed to go around the large bones of your body. These are the strongest parts of your body and can take the forces of a collision the best. Wearing your belt in the wrong place could make your injuries in a collision much worse. You might suffer internal injuries, or you could even slide out of part of the belt. Follow these instructions to wear your seat belt safely and to keep your passengers safe, too.

Unibelt Operating Instructions

1. Enter the vehicle and close the door. Sit back and adjust the seat.
2. The seat belt latch plate is above the back of your seat. Grasp the latch plate and pull out the belt. Slide the latch plate up the webbing as far as necessary to make the belt go around your lap.



3. When the belt is long enough to fit, insert the latch plate into the buckle until you hear a "click".



WARNING!

- A belt that is buckled into the wrong buckle will not protect you properly. The lap portion could ride too high on your body, possibly causing internal injuries. Always buckle your belt into the buckle nearest you.
- A belt that is too loose will not protect you as well. In a sudden stop you could move too far forward, increasing the possibility of injury. Wear your seat belt snugly.
- A belt that is worn under your arm is very dangerous. Your body could fall into the inside surfaces of the vehicle in a collision, increasing head and neck injury. And a belt worn under the arm can cause internal injuries. Ribs aren't as strong as shoulder bones. Wear the belt over your shoulder so that your strongest bones will take the force in a collision.

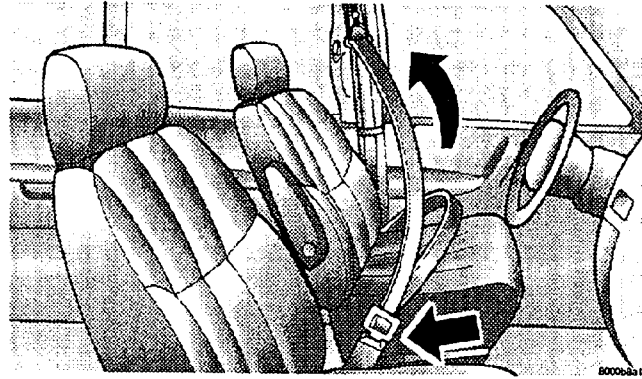
4. Position the lap belt across your thighs, below your abdomen. To remove slack in the lap belt portion, pull up a bit on the shoulder belt. To loosen the lap belt if it is too

tight, tilt the latch plate and pull on the lap belt. A snug lap belt reduces the risk of sliding under the belt in a collision.

WARNING!

A lap belt worn too high can increase the risk of internal injury in a collision. The belt forces won't be at the strong hip and pelvic bones, but across your abdomen. Always wear the lap belt as low as possible and keep it snug.

5. Position the lap/shoulder belt on your chest so that it is comfortable and not resting on your neck. The retractor will withdraw any slack in the belt.



WARNING!

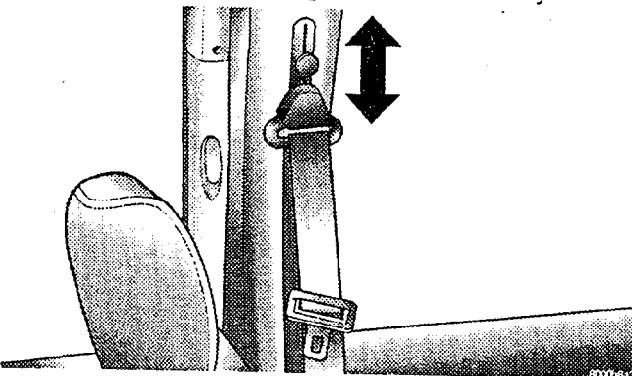
A twisted belt can't do its job as well. In a collision it could even cut into you. Be sure the belt is straight. Use the unbelt untwisting procedure outlined in this section. If this does not straighten the belt, take it to your dealer to have it fixed.

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6. To release the belt, push the red button on the buckle. The belt will automatically retract to its stowed position. If necessary, slide the latch plate down the webbing to allow it to retract fully.

Adjustable Upper Shoulder Belt Anchorage

In the front seat and the second row outboard seats, the shoulder belt can be adjusted upward or downward to position the belt away from your neck. Push up or down on the release lever to release the anchorage, and then move it up or down to the position that serves you best.



As a guide, if you are shorter than average, you will prefer a lower position, and if you are taller than average, you'll prefer a higher position. When you release the anchorage, try to move it up or down to make sure that it is locked in position.

In the rear most seat, move toward the center of the seat to position the belt away from your neck.

Seat Belts and Pregnant Women

We recommend that pregnant women use the seat belts throughout their pregnancies. Keeping the mother safe is the best way to keep the baby safe.

Pregnant women should wear the lap part of the belt across the thighs and as snug across the hips as possible. Keep the belt low so that it does not come across the abdomen. That way the strong bones of the hips will take the force if there is a collision.

WARNING!

A frayed or torn belt could rip apart in a collision and leave you with no protection. Inspect the belt system periodically, checking for cuts, frays, or loose parts. Damaged parts must be replaced immediately. Do not disassemble or modify the system. Seat belt assemblies must be replaced after an accident if they have been damaged (bent retractor, torn webbing, etc.).

Center Seat Lap Belts

Center seating positions have a lap belt only. To fasten a lap belt, slip the latch plate into the buckle. To lengthen a lap belt, tilt the latch plate and pull. To remove slack, pull the loose end of the webbing.

Wear the belt snug against the hips. Sit back and erect in the seat, then adjust the belt as tightly as is comfortable.

WARNING!

- A lap belt worn too loose or too high is dangerous.
- A belt worn too loose can allow you to slip down and under the belt in a collision.
- A belt that is too high will apply crash forces to the abdomen, not to the stronger hip bones. In either case, the risk of internal injuries is greater. Wear the lap belt low and snug.
- Belting two people into one seat belt can lead to greater injury. People belted together can crash into one another in an accident, hurting one another badly. Never use a unbelt or a lap belt for more than one person, no matter what their size.

Seat Belt Extender

If a seat belt is too short, even when fully extended and when the adjustable upper shoulder belt anchorage (if so equipped) is in the lowest position, your dealer can provide you with a seat belt extender. This extender should be used only if the existing belt is not long

enough. When it is not required, remove the extender and stow it.

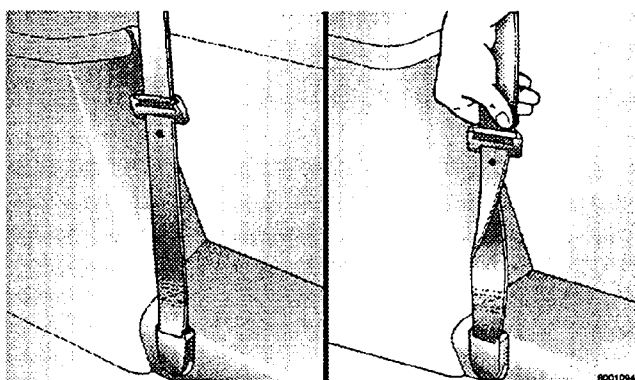
WARNING!

Using a seat belt extender when not needed can increase the risk of injury in a collision. Only use when the lap belt is not long enough when it is worn low and snug, and in the recommended seating positions. Remove and stow when not needed.

Latch Plate Untwisting Procedure

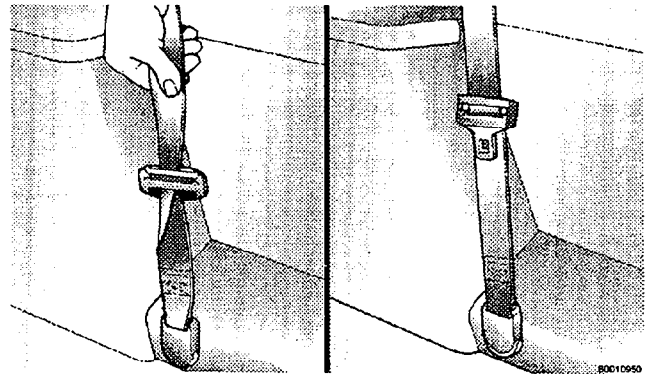
Use the following procedure to untwist a twisted latch plate:

1. Position the latchplate as close as possible to the lower anchor point.



2. At approximately 6 to 12 inches above the latchplate, grasp and twist the webbing 180° to create a fold that begins immediately above the latchplate.

3. Slide the latchplate upward over the folded webbing. Care must be taken at the start of this procedure to ensure that the folded webbing enters the slot at the top of the latchplate.



4. Continue to slide the latchplate upward until it has cleared the portion of folded webbing. Release the webbing and verify that the latch plate has been properly untwisted.

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Chrysler Integrated Child Seat—Optional

Operating instructions for this seat are included with the seat. If the instructions are not with the seat or in the Owner's Manual Package, replacement instructions can be obtained.

To obtain replacement instructions:

Use the order form at the back of this manual and specify publication number 81-016-2050.

Child Restraint

Everyone in your vehicle needs to be buckled up all the time, babies and children, too.

WARNING!

In a collision, an unrestrained child, even a tiny baby, can become a missile inside the vehicle. The force required to hold even an infant on your lap could become so great that you could not hold the child, no matter how strong you are. The child and others could be badly injured. Any child riding in your vehicle should be in a proper restraint for the child's size.

All states and Canadian provinces require small children to ride in proper restraint systems. This is the law, and you can be prosecuted for ignoring it.

Infants and Small Children

There are different sizes and types of restraints for children from newborn size to the bigger child almost large enough for an adult safety belt. Use the restraint that is correct for your child.

Two different child restraint systems are generally available:

- The infant carrier for babies weighing up to 20 lbs. (9 kg.)
- The child seat for small children over 20 lbs.

In addition, some manufacturers make systems that can be first used as an infant carrier, and then converted to a child seat as the child grows.

Here are some tips on getting the most out of your child restraint:

- Before buying any restraint system, make sure that it has a label certifying that it meets Motor Vehicle Safety Standard 213. Chrysler also recommends that before you buy a child restraint, you try it in the vehicle seats where you will use it.
- The restraint must be appropriate for your child's weight and height. Check the label on the restraint for this, too.

- Install the restraint in the rear seat if possible. According to accident statistics, children are safer when properly restrained in the rear seats than in the front.
- Carefully follow the instructions that come with the restraint. If you install the restraint improperly, it may not work when you need it.

WARNING!

Improper installation can lead to failure of an infant or child restraint. It could come loose in a collision. The child could be badly injured or killed. Follow the manufacturer's directions exactly when installing an infant or child restraint.

- Infant and child restraints are secured in the vehicle seats by the lap belt or the lap part of the lap/shoulder belt. In the rear seats, you may have trouble tightening the belt on the child restraint because the buckle or latch plate interferes with the belt path opening on the restraint. Disconnect the latch plate from the buckle and twist the short buckle-end belt several turns to

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shorten it. Reassemble the latch plate to the buckle with the release button so that it is facing out.

- In the center rear seat, if the belt still can't be tightened, or if pulling and pushing on the restraint loosens the belt, you may need to do something more. Disconnect the latch plate from the buckle, turn it over, and reconnect it to the buckle. If you still can't make the child restraint secure, try a different seating position.
- Some child seat manufacturer's recommend the use of a top anchorage (tether) strap in addition to the lap belt. Your vehicle has tether strap anchorages behind some rear seating positions for use with these child seats. Your dealer can provide you with anchorage hardware and installation instructions.
- Buckle the child into the seat exactly as the seat manufacturer's directions tell you. The cinching latch plate will keep the belt tight.
- When your infant carrier or child seat is not in use, secure it with the seat belt or remove it from the

vehicle. Don't leave it loose in the vehicle. In a sudden stop or collision, it could strike occupants and injure them.

Children Too Large For Child Seats

Children who are too large for child seats and who can sit upright by themselves should use the available lap/shoulder belts for best protection.

- Make sure that the child is seated upright in the seat.
- The lap belt should be fastened low on the hips and as snug as possible.
- Check belt fit periodically. A child's squirming or slouching can move the belt out of position.

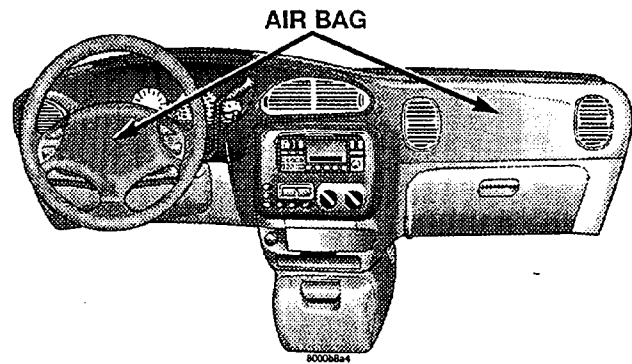
If the shoulder belt contacts the face or neck, even when the adjustable upper shoulder belt anchorage (if so equipped) is in the lowest position, move the child closer to the middle of the vehicle. If this doesn't solve the problem, move the child to the center rear seating position and use the lap belt.

Booster seats that may help overcome this problem are also available for use with lap/shoulder belts. Before

buying a booster seat, make sure that it has a label certifying that it meets applicable Motor Vehicle Safety Standards. Make sure that it is satisfactory for use in this vehicle.

Driver and Right Front Passenger Supplemental Restraint System - Airbag

This vehicle has airbags for the driver and right front passenger as a supplement to the seat belt restraint systems. The driver's airbag is mounted in the steering wheel. The passenger side airbag is mounted in the instrument panel above the glove compartment. These airbags inflate in higher speed frontal impacts. They work with the instrument panel knee bolsters and the seat belts to provide improved protection for the driver and right front passenger.



WARNING!

Relying on airbags alone could lead to more severe injuries in a collision. The airbags do not provide any restraint in side or rear collisions or rollovers. Always wear the seat belt.

The seat belt system is designed to protect you in many types of collisions. The airbags deploy only in frontal collisions. They will not deploy in collisions at slow speed. But even in collisions where the airbags deploy, you need the seat belt to keep you in the right position for the airbags to protect you properly.

Ignoring the AIRBAG light in your message center could mean you won't have the airbags to protect you in a collision. If the light does not come on when starting, stays on for more than 8 seconds after you start the vehicle, or if it comes on as you drive, have the airbag system checked right away.

The airbag system consists of the following:

- Airbag Control Module and Internal Crash Sensor

- AIRBAG Light
- Driver and Passenger Airbag/Inflator Units
- Unique Steering Wheel and Column
- Unique Instrument Panel
- Interconnecting Wiring
- Knee Impact Bolster

How The Airbag System Works

- The Airbag Control Module in the occupant compartment determines if a frontal impact is severe enough to require the airbags. The sensor in the control module will not detect side, rollover, or rear impacts. Switches in the control module are connected to the airbag inflator unit.

This module also monitors the readiness of the electronic parts of the system whenever the ignition switch is in the START or RUN positions. These include all of the items listed above except the knee bolster, instrument panel and the steering wheel and column.

The airbag control module also turns on the Airbag light in the instrument panel for 6 to 8 seconds when the ignition is first turned on, then turns the light off. If it detects a malfunction in any part of the system, it turns on the light either momentarily or continuously.

- The Airbag/Inflator Units are in the center of the steering wheel and the instrument panel. The words SRS/AIRBAG are embossed on the airbag covers.

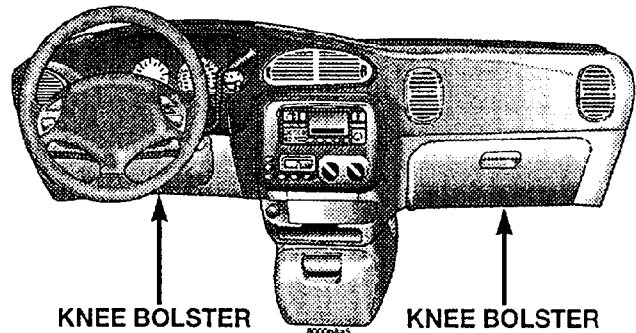
WARNING!

Do not put anything on or around the airbag covers or attempt to manually open them. You may damage the airbags and you could be injured because the airbags are not there to protect you. These protective covers for the airbag cushions are designed to open only when the airbags are inflating.

When the airbag control module detects an impact requiring the airbags, the control module sends a signal to the inflator units. A large quantity of non-toxic nitrogen and argon gas is generated to inflate the airbags. The airbag covers separate and fold out of the way as the

airbags inflate to their full size. The airbags fully inflate in about 50 milliseconds. This is only about half of the time it takes you to blink your eyes. The airbags then quickly deflate while helping to restrain the driver and right front passenger. The airbag gas is vented through the airbag material towards the instrument panel. In this way the airbags do not interfere with your control of the vehicle.

- The Knee Impact Bolsters help protect the knees and position you for the best interaction with the airbags.



WARNING!

- Being too close to the steering wheel or instrument panel during airbag deployment could cause serious injury. Airbags need room to inflate. Sit back, comfortably extending your arms to reach the steering wheel or instrument panel.
- A rearward-facing child restraint should only be used in a rear seat. A child may be seriously or fatally injured in a rearward-facing child restraint placed in the front seat if the restraint is struck by a deploying passenger airbag.

If A Deployment Occurs

The airbag system is designed to deploy when the airbag control module detects a moderate-to-severe frontal collision, to help restrain the driver and right front passenger, and then immediately deflate.

NOTE: A frontal collision that is not severe enough to need airbag protection will not activate the system. This does not mean something is wrong with the airbag system.

If you do have a collision which deploys the airbag, any or all of the following may occur:

- The nylon airbag material may sometimes cause abrasions and/or skin reddening to the driver and right front passenger as the airbags deploy and unfold.
- The abrasions are similar to friction rope burns or those you might get sliding along a carpet or gymnasium floor. They are not caused by contact with chemicals. They are not permanent and normally heal quickly. However, if you haven't healed significantly within a few days, or if you have any blistering, see your doctor immediately.
- As the airbags deflate you may see some smoke-like particles. The particles are a normal by-product of the process that generates the non-toxic nitrogen and argon gas used for airbag inflation. These airborne particles may irritate the skin, eyes, nose, or throat. If you have skin or eye irritation, rinse the area with cool water. For nose or throat irritation, move to fresh air. If the irritation continues, see your doctor.

- If these particles settle on your clothing, follow the garment manufacturer's instructions for cleaning.
- Your vehicle may be driveable after the airbags deploy. If so, you can tuck the deployed airbags inside the opening in the steering wheel hub and instrument panel trim covers to make driving somewhat easier.

WARNING!

Deployed airbags cannot protect you in another collision. Have the airbags replaced by an authorized dealer as soon as possible.

Transporting Pets

Airbags deploying in the front seat could harm your pet. An unrestrained pet will be thrown about and possibly injured, or injure a passenger during panic braking or in a collision.

Pets should be restrained in the rear seat in pet harnesses or pet carriers that are secured by seat belts.

Maintaining Your Airbag System

WARNING!

- Modifications to any part of the airbag system could cause it to fail when you need it. You could be injured because the airbag is not there to protect you. Do not modify the components or wiring, including adding any kind of badges or stickers to the airbag covers. Do not modify the front bumper or vehicle body structure.
- You need proper knee impact protection in a collision. Do not mount or locate any aftermarket equipment on or behind the knee bolsters.
- It is dangerous to try to repair any part of the airbag system yourself. Don't try to repair the airbag system. Be sure to tell anyone who works on your vehicle that it has airbags.

You will want to have the airbags ready for your protection in a collision. While the airbag Supplemental Re-

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42 THINGS TO KNOW BEFORE STARTING YOUR VEHICLE

straint System (SRS) is designed to be maintenance free, if any of the following occurs, have an authorized dealer service the system immediately.

- The AIRBAG light does not come on or flickers during the 6 to 8 seconds when the ignition switch is first turned on.
- The light remains on or flickers after the 6 to 8 second interval.
- The light flickers or comes on and remains on while driving.

ENGINE BREAK-IN RECOMMENDATIONS

A long break-in period is not required for the engine in your new vehicle.

Drive moderately during the first 300 miles (500 km). After the initial 60 miles (100 km), speeds up to 50 or 55 mph (80 or 90 km/h) are desirable.

While cruising, brief full-throttle acceleration, within the limits of local traffic laws, contributes to a good break-in. Wide open throttle acceleration in low gear can be detrimental and should be avoided.

The engine oil installed in the engine at the factory is a high quality energy conserving type lubricant. Oil changes should be consistent with anticipated climate conditions under which vehicle operations will occur. The recommended viscosity and quality grades are shown in Section 4 of this manual. NON-DETERGENT OR STRAIGHT MINERAL OILS MUST NEVER BE USED.

A new engine may consume some oil during its first few thousand miles of operation. This should be considered as a normal part of the break-in and not interpreted as an indication of difficulty.