

2445

Report Numbers: TRC-95-V006

Rear Impact Full-Scale Crash Testing  
for Upgrade of  
FMVSS 301 Test Procedure

Deformable Impactor into Rear of  
1996 Plymouth Voyager  
at 80 kph with 70% Overlap  
TRC Test Number: 960322

Prepared by:  
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April 19, 1996

Final Report

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2442

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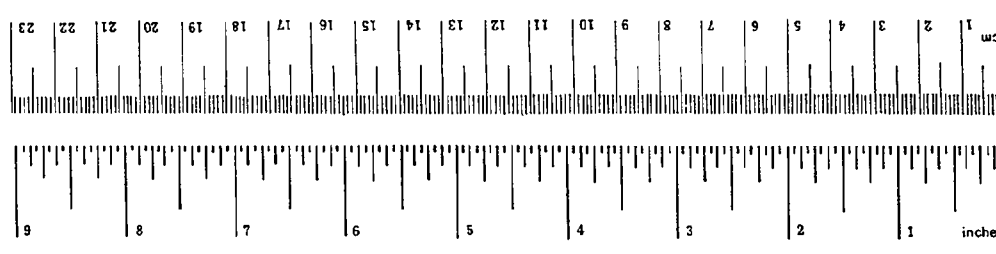
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NHTSA, Office of Vehicle Safety Compliance

Date \_\_\_\_\_

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<p>16. Abstract</p> <p>An 80 kph deformable impactor rear crash test with 70% overlap was conducted on a 1996 Plymouth Voyager minivan at Transportation Research Center Inc. on March 22, 1996. This test was conducted to determine vehicle and occupant response in the rear 70% overlap test mode. The impactor's velocity was 81.5 kph. The impactor's weight was 1342 kg. The vehicle's maximum crush was 435 millimeters. The ambient temperature was -3° C.</p> <p>The driver's Head Injury Criteria (HIC) was 690. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 15.8 g. The driver's chest maximum deflection was 2 mm. The driver's left and right femur maximum axial forces were 1945 N and 1129 N, respectively.</p> <p>The passenger's HIC was 1578. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 15.5 g. The passenger's chest maximum deflection was 3 mm. The passenger's left and right femur maximum axial forces were 2067 N and 2032 N, respectively.</p>			
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## METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures			Approximate Conversions from Metric Measures					
Symbol	When You Know	Multiply by	To Find	Symbol	When You Know	Multiply by	To Find	Symbol
<b>LENGTH</b>								
in	inches	2.5	centimeters	cm	millimeters	0.04	inches	in
ft	feet	30	centimeters	cm	centimeters	0.4	inches	in
yd	yards	0.9	meters	m	meters	3.3	feet	ft
mi	miles	1.5	kilometers	km	kilometers	0.6	yards	yd
mi	miles	1.6	kilometers	km	kilometers	0.6	miles	mi
<b>AREA</b>								
in <sup>2</sup>	square inches	6.5	square centimeters	cm <sup>2</sup>	square centimeters	0.16	square inches	in <sup>2</sup>
ft <sup>2</sup>	square feet	0.09	square meters	m <sup>2</sup>	square meters	1.2	square yards	yd <sup>2</sup>
yd <sup>2</sup>	square yards	0.8	square meters	m <sup>2</sup>	square meters	0.4	square miles	mi <sup>2</sup>
mi <sup>2</sup>	square miles	2.6	square kilometers	km <sup>2</sup>	square kilometers	0.4	acres	ac
ac	acres	0.4	hectares	ha	hectares (10,000 m <sup>2</sup> )	2.5	acres	ac
<b>MASS (weight)</b>								
oz	ounces	28	grams	g	grams	0.035	ounces	oz
lb	pounds	0.45	kilograms	kg	kilograms	2.2	pounds	lb
lb	short tons (2000 lb)	0.9	tonnes	t	tonnes (1000 kg)	1.1	short tons	sh
<b>VOLUME</b>								
tsp	teaspoons	5	milliliters	ml	milliliters	0.03	fluid ounces	fl oz
Tbsp	tablespoons	15	milliliters	ml	liters	2.1	pints	pt
fl oz	fluid ounces	30	milliliters	ml	liters	1.06	quarts	qt
c	cups	0.24	liters	l	liters	0.26	gallons	gal
pt	pints	0.47	liters	l	cubic meters	35	cubic feet	ft <sup>3</sup>
qt	quarts	0.95	liters	l	cubic meters	1.3	cubic yards	yd <sup>3</sup>
gal	gallons	3.8	liters	l	cubic meters	0.03	cubic feet	ft <sup>3</sup>
ft <sup>3</sup>	cubic feet	0.03	cubic meters	m <sup>3</sup>	cubic meters	0.76	cubic yards	yd <sup>3</sup>
yd <sup>3</sup>	cubic yards	0.76	cubic meters	m <sup>3</sup>				
<b>TEMPERATURE (exact)</b>								
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



\*1 m = 2.54 (exactly). For other exact conversions and more detailed tables, see NIST Misc. Publ. 280, Units of Weights and Measures, Price \$2.25, SD Catalog No. C13.10286.

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Section 1.0

**Purpose and Test Procedure**

Purpose

This crash test was conducted to determine vehicle and occupant response in the 80 kph rear impact with 70% overlap test mode. The test was performed on a 1996 Plymouth Voyager minivan.

### Test Procedure

This test was conducted per Contract No. DTRS57-95-C-00011, Technical Task Directive No. 1, "Rear Impact Full-Scale Crash Testing for Upgrade of FMVSS 301 Test Procedure."

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

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

The deformable impactor was instrumented with five (5) force load cells to measure longitudinal axis forces on the barrier face.

The impactor's specified velocity range was 80.1 to 81.8 kph.

Both dummies were instrumented with head center of gravity and Position 1, 2, and 3 accelerometers to measure longitudinal, lateral, and vertical accelerations; neck upper and lower 6-axis load cells to measure longitudinal, lateral, and vertical force and moments; chest and pelvis accelerometers to measure longitudinal, lateral, and vertical axis accelerations; and with left and right femur load cells to measure axial forces. Each Part 572 E dummy's instrumentation also included a chest potentiometer to measure longitudinal deflection. Additionally, the driver dummy was instrumented with shoulder and lap belt load cells.

The seventy-six (76) data channels were digitally sampled at 12,500 samples per second and processed per Sections 11.13 through 11.15 of the Laboratory Test Procedure.

The crash event was recorded by thirteen (13) high-speed motion picture cameras.

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

Section 2.0

Rear Deformable Barrier Impact Test Summary

### Test Results Summary

This 80 kph rear crash test with 70% overlap was conducted at TRC on March 22, 1996.

No fluid spilled from the vehicle's fuel system following the impact.

The test vehicle, a 1996 Plymouth Voyager minivan, was equipped with airbags and three-point unbelted at the driver's and right front passenger's seating positions. The vehicle's test weight was 1946 kg. The vehicle's maximum static crush was 435 mm.

The driver's HIC was 690. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 15.8 g. The driver's chest maximum deflection was 2 mm. The driver's left and right femur maximum compressive forces were 1945 N and 1129 N, respectively.

The right front passenger's HIC was 1578. The right front passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 15.5 g. The right front passenger's chest maximum deflection was 3 mm. The right front passenger's left and right femur maximum compressive forces were 2067 kg and 2032 kg, respectively.

Following the impact, no fluid spilled from the vehicle's fuel system.

Table 1 Crash Test Summary

Test type:	80 kph rear impact with 70% overlap
Test date:	03/22/96
Test time:	1530
Ambient temperature at impact area:	-3° C
Vehicle year/make/ model/body style:	1996/Plymouth/Voyager/minivan
Vehicle test weight:	1946 kg
Impact angle <sup>1</sup> :	180°
Impact velocity <sup>2</sup> :	
Primary:	81.5 kph
Secondary:	81.6 kph
Maximum static crush:	435 mm
Number of cameras:	
High-speed:	13
Door opening data:	
Left-front:	Easy
Right-front:	Easy
Impact Location:	12 mm high of target center 6 mm left of target center

<sup>1</sup> With respect to tow track centerline.

<sup>2</sup> Speed trap measurement ( $\pm$  .08 kph accuracy)

Table 1 Crash Test Summary, Cont'd.

Dummies:	<u>Driver #34</u>	<u>Passenger #35</u>
Type:	Part 572 E	Part 572 E
Location:	Left front	Right front
Restraint:	Airbag/3-point unbelt	Airbag/3-point unbelt
Number of data channels:	30	30
Front seat data:		
Seat track failure:	None	None
Seat back failure:	Yes	Yes
Visible dummy contact points:		
Head:	Head rest	Head rest/B-pillar
Chest:	None	None
Abdomen:	None	None
Left knee:	None	None
Right knee:	None	None

Table 2 Test Vehicle Information

Vehicle year/make/  
model/body style: 1996/Plymouth/Voyager/minivan

Color: Island Teal

VIN: 2P4FP25B2TR549233

Engine data:

Placement: Transverse

Cylinders: 4

Displacement: 2.4 liters

Transmission data: 3 speed,    manual,   X automatic,    overdrive

Final drive:   x fwd,    rwd,    4wd

Date vehicle received: 03/19/96

Odometer reading: 101

Dealer's name  
and address: George Byers Sons, Inc.  
390 E. Broad Street  
Columbus, OH 43216

Accessories:

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

Certification data from vehicle's label:

Vehicle manufactured by: Chrysler Corporation

Date of manufacture: 10/95

VIN: 2P4FP25B2TR549233

GVWR: 2268 kg

GAWR: Front: 1202 kg

Rear: 1225 kg

Table 2 Test Vehicle Information, Cont'd.

Size of tires on vehicle: P205/75R14  
Spare tire: Temporary  
Type of front seats: Bucket

Tire & capacity data from vehicle's label:

Recommended tire size: P205/75R14  
Recommended cold tire pressure:  
Front: 241 kPa  
Rear: 241 kPa  
Designated Seating Capacity:  
Front 2  
Rear 5  
Total 7  
Vehicle Capacity Weight: 136 kg

Test vehicle attitudes:

Delivered attitude:	LF: 767 mm	RF: 772 mm	LR: 767 mm	RR: 777 mm
Pre-test attitude:	LF: 727 mm	RF: 720 mm	LR: 764 mm	RR: 764 mm
Post-test attitude:	LF: 729 mm	RF: 693 mm	LR: 889 mm	RR: 789 mm

Table 2 Test Vehicle Information, Cont'd.

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

Right front	475.0 kg	Right rear	338.0 kg
Left front	506.0 kg	Left rear	342.0 kg
Total front weight	981.0 kg	(59.1% of total vehicle weight)	
Total rear weight	680.0 kg	(40.9% of total vehicle weight)	
Total delivered weight	1661.0 kg		

Calculation of test vehicle's target test weight:

RCLW = Rated Cargo and Luggage Weight

UDW = Unloaded Delivered Weight (1661 kg)

VCW<sup>1</sup> = Vehicle Capacity Weight = NA

DSC = Designated Seating Capacity (NA)

RCLW = VCW - 68 (DSC) = 317 - 68 (4) = 136 kg

Target test weight = UDW + RCLW<sup>1</sup> + (Number of Hybrid III dummies x 76 kg per dummy)

Target test weight = 1661 + 136 + 152 = 1949 kg

Weight of test vehicle with required dummies and 136 kg of cargo weight:

Right front	582.0 kg	Right rear	377.5 kg
Left front	609.0 kg	Left rear	377.5 kg
Total front weight	1191.0 kg	(61.2% of total vehicle weight)	
Total rear weight	755.0 kg	(38.8% of total vehicle weight)	
Total test weight	1946.0 kg	(0.2% under target test weight)	

Weight of ballast secured in vehicle cargo area: 0

Components removed to meet target test weight: None

CG rearward of front wheel centerline: 1117 mm

Vehicle Wheelbase: 2880 mm

<sup>1</sup> From vehicle's tire load label.

Table 3 Post-Impact Data

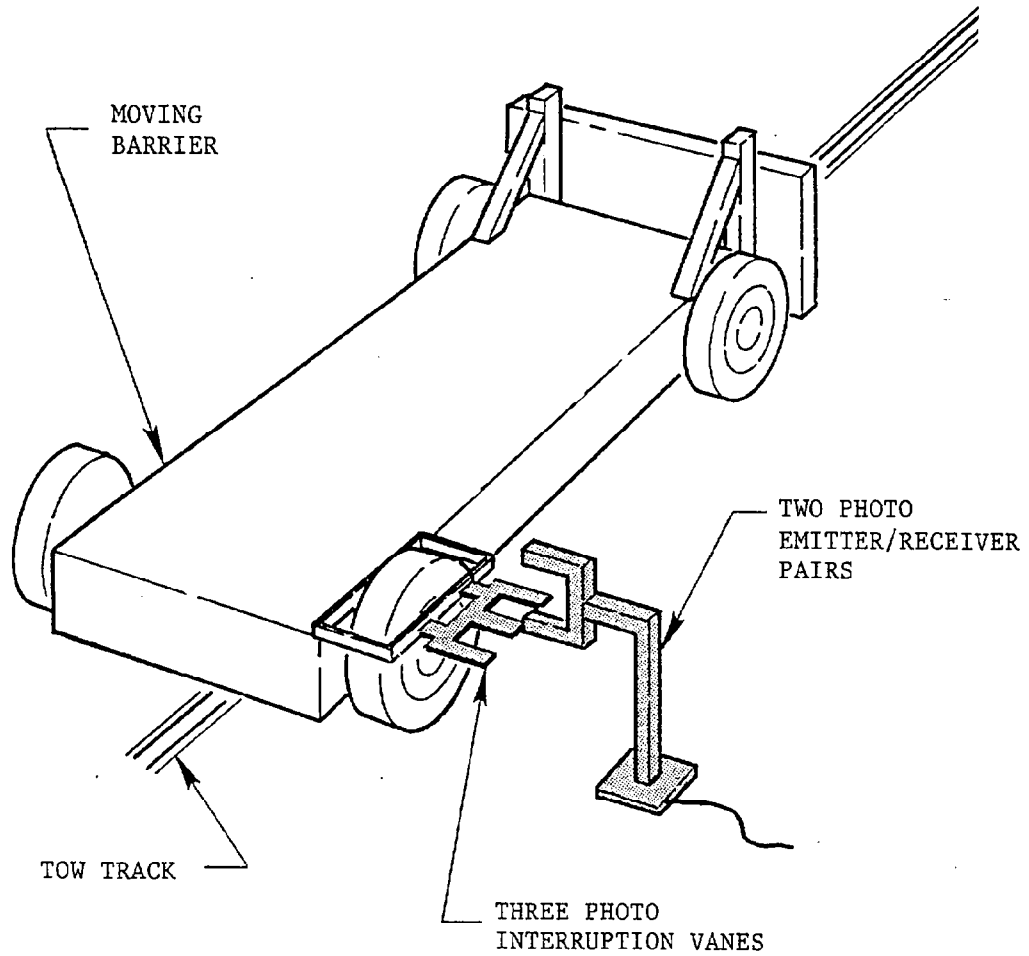
Test number: 960322  
Test date: 03/22/96  
Test time: 1530  
Test type: 80 kph rear impact with 70% overlap  
Impact angle: 180°  
Ambient temperature  
at impact area: -3° C  
Temperature in  
occupant compartment: 21° C  
Impact velocity:  
Primary: 81.5 kph  
Secondary: 81.6 kph  
Specified range: 80.1 to 81.8 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: 4429 mm C: 4506 mm R: 4424 mm  
Post-test: L: 4040 mm C: 4164 mm R: 4392 mm  
Total crush: L: 389 mm C: 342 mm R: 32 mm  
Average crush: 254 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

Test date: 03/22/96  
 Vehicle year/make/  
 model/body style: 1996/Plymouth/Voyager/minivan  
 Volpe No.: RT0305  
 VIN: 2P4FP25B2TR549233  
 Build date: 10/95  
 Test weight: 1946 kg  
 Vehicle wheelbase: 2880 mm  
 Maximum width: 1930 mm  
 Front overhang: 910 mm

Collision Deformation

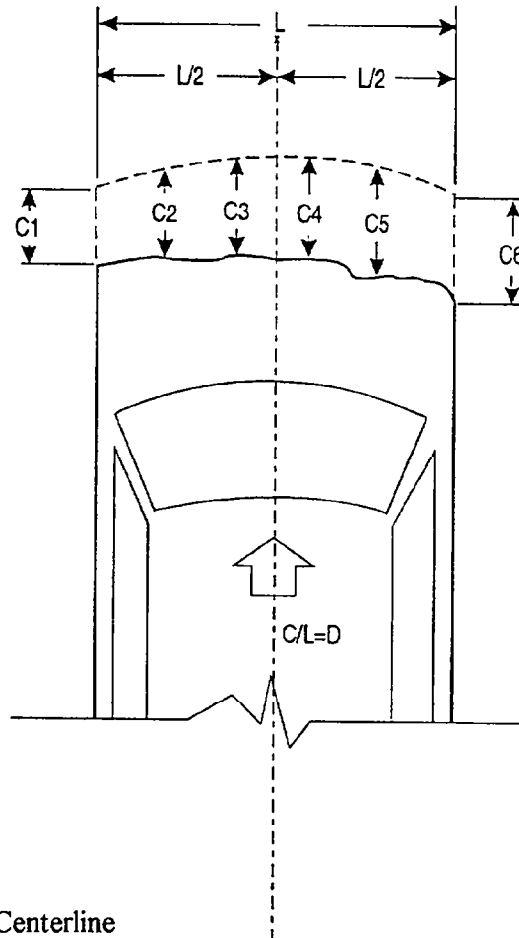
Classification (CDC) Code: 06BDEW2

Crush depth  
 measurements:

C1:	389 mm
C2:	435 mm
C3:	390 mm
C4:	378 mm
C5:	283 mm
C6:	32 mm

Midpoint of damage: D: Vehicle Longitudinal Centerline  
 4164 mm

Length of damaged  
 region: L: 1341 mm



Section 3.0

FMVSS 301 Data

Table 4 Dummy Injury Criteria

Maximum Acceleration

	Head				Chest		
	X	Y	Z	R	X	Y	Z
Driver	78.6 g	9.6 g	-48.9 g	90.9 g	15.8 g	-1.8 g	-10.7 g
Passenger	161.9 g	-51.0 g	-103.7 g	198.3 g	13.8 g	-7.5 g	-11.8 g

Maximum Femur Compressive Force

	Left Femur	Right Femur
Driver	1945 N	1129 N
Passenger	2067 N	2032 N

Head Injury Criteria<sup>1</sup>

	HIC	Time t <sub>1</sub>	Time t <sub>2</sub>
Driver	690	117.4 ms	153.4 ms
Passenger	1578	140.0 ms	145.6 ms

Head Maximum Resultant Acceleration<sup>2</sup>

	Acceleration	Time t <sub>1</sub>	Time t <sub>2</sub>
Driver	82.4 g	141.4 ms	145.0 ms
Passenger	154.0 g	141.2 ms	144.2 ms

Chest Maximum Resultant Acceleration<sup>2</sup>

	Acceleration	Time t <sub>1</sub>	Time t <sub>2</sub>
Driver	15.8 g	155.0 ms	158.0 ms
Passenger	15.5 g	143.2 ms	146.2 ms

Maximum Chest Deflection

Driver	2 mm
Passenger	3 mm

<sup>1</sup> As defined in FMVSS No. 208

<sup>2</sup> Defined as equal to or exceeding 0.003 sec. duration

Table 5 Fuel System Data

Vehicle year/make/model/body style:	1996/Plymouth/Voyager/minivan
Volpe No.:	RT0305
Fuel system capacity:	NA (from owner's manual)
Usable capacity:	67.4 liters (furnished by COTR)
Test volume range:	62.1 liters to 63.2 liters (92-94% of usable)
Actual test volume:	62.5 liters (with entire fuel system filled)
Test fluid type:	Stoddard solvent
Specific gravity:	0.764
Kinematic viscosity:	0.99 centistoke
Test fluid color:	purple
Type of fuel pump:	electric
Does the electric fuel pump operate with ignition switch "on" and the engine not operating.	No
Details of fuel system:	The fuel tank is located forward of the rear axle. The fuel filler neck is located on the left side. The fuel lines run along the right side to the front.

Table 6 FMVSS 301 Post-Impact Test Data

Test date: 03/22/96

Volpe No.: RT0305

Vehicle year/make/model/body style: 1996/Plymouth/Voyager/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 (48 kph)

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

Rear moving barrier (80 kph)

Lateral moving barrier (32 kph)

Fuel system fluid spillage measurements:

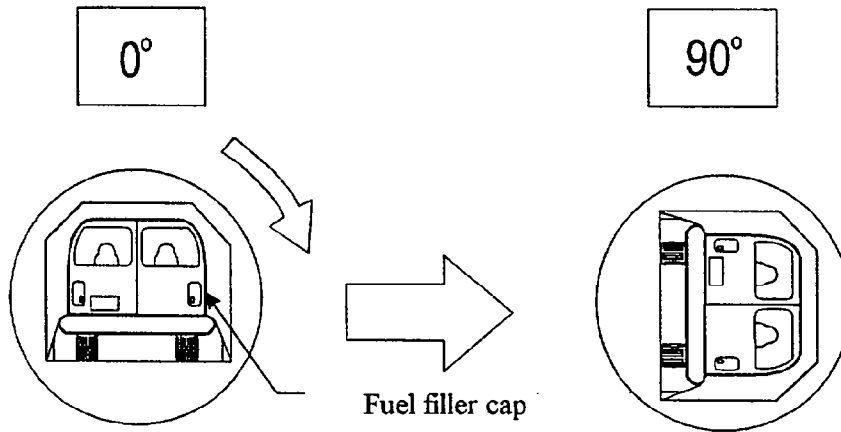
	<u>Test Results</u>	<u>Maximum Allowable</u>
1. From impact until vehicle motion ceases	0 g	28 g
2. 5-Minute period after vehicle motion ceases	0 g	140 g
3. Next 25 minutes after 5-minute period	0 g	28 g/1 min

Fuel system fluid spillage location(s): None

**Figure 3 FMVSS 301 Static Rollover Test Data**

Volpe No.: RT0305

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

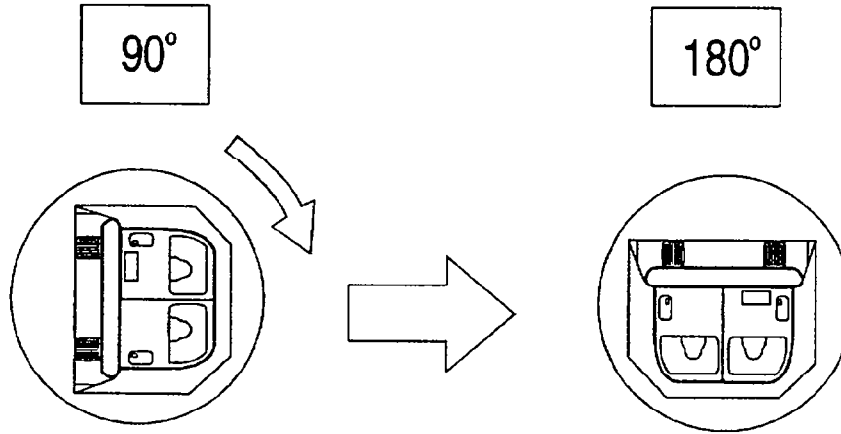
Fuel system fluid spillage measurements:

<u>0° to 90° rotation (fuel filler cap down)</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

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

Test phase



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

Time required for machine to rotate 90° = 2 minutes, 0 seconds  
 FMVSS 301 position hold time = 5 minutes, 0 seconds  
 Total = 7 minutes, 0 seconds  
 Next whole minute interval = 14 minutes

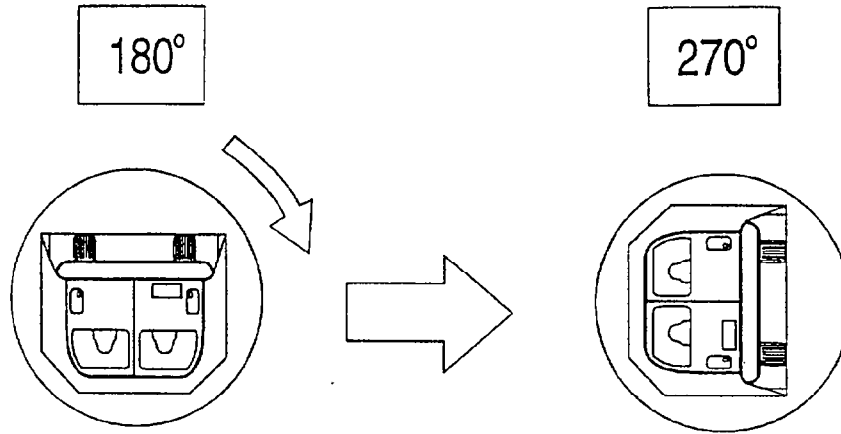
Fuel system fluid spillage measurements:

<u>90° to 180° 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

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

Test phase



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

Time required for machine to rotate 90° = 2 minutes, 0 seconds  
 FMVSS 301 position hold time = 5 minutes, 0 seconds  
 Total = 7 minutes, 0 seconds  
 Next whole minute interval = 21 minutes

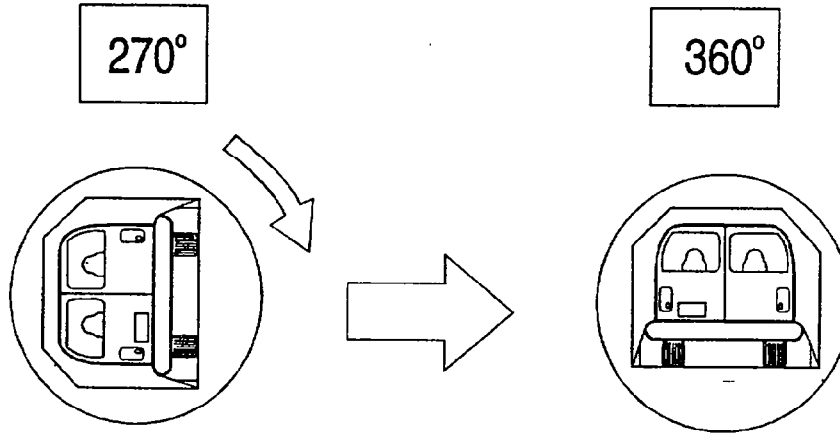
Fuel system fluid spillage measurements:

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

Fuel system fluid spillage location(s): None

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

Test phase



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

Time required for machine to rotate 90° = 2 minutes, 0 seconds  
 FMVSS 301 position hold time = 5 minutes, 0 seconds  
 Total = 7 minutes, 0 seconds  
 Next whole minute interval = 28 minutes

Fuel system fluid spillage measurements:

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

Fuel system fluid spillage location(s): None

Section 4.0

**Vehicle, Moving Deformable Barrier, Occupant, and Camera Measurements**

**Figure 4 Pre-test and Post-test Measurement Points**

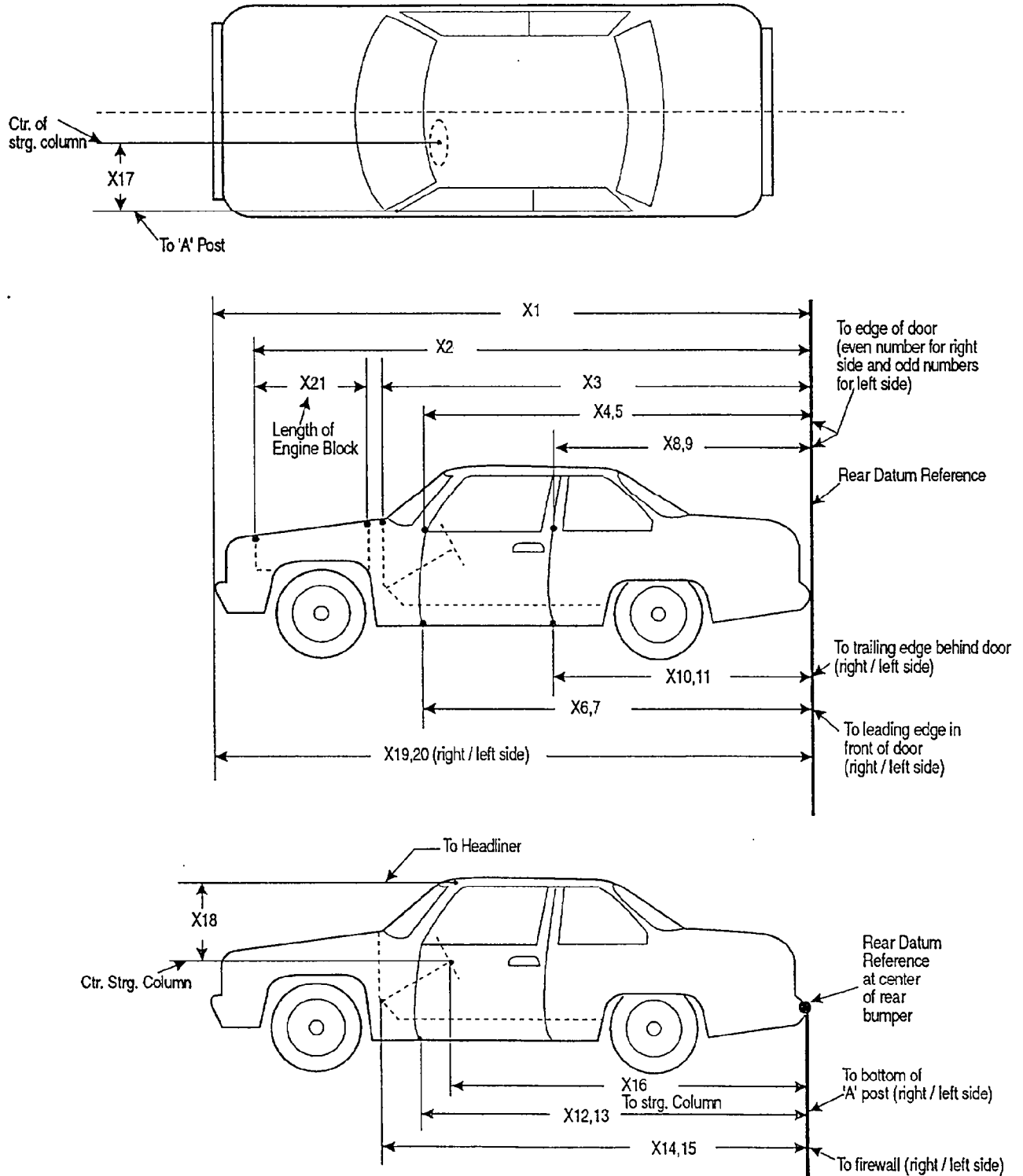


Table 7 Impacted Vehicle Measurements

Vehicle year/make/model/body style: 1996/Plymouth/Voyager/minivan

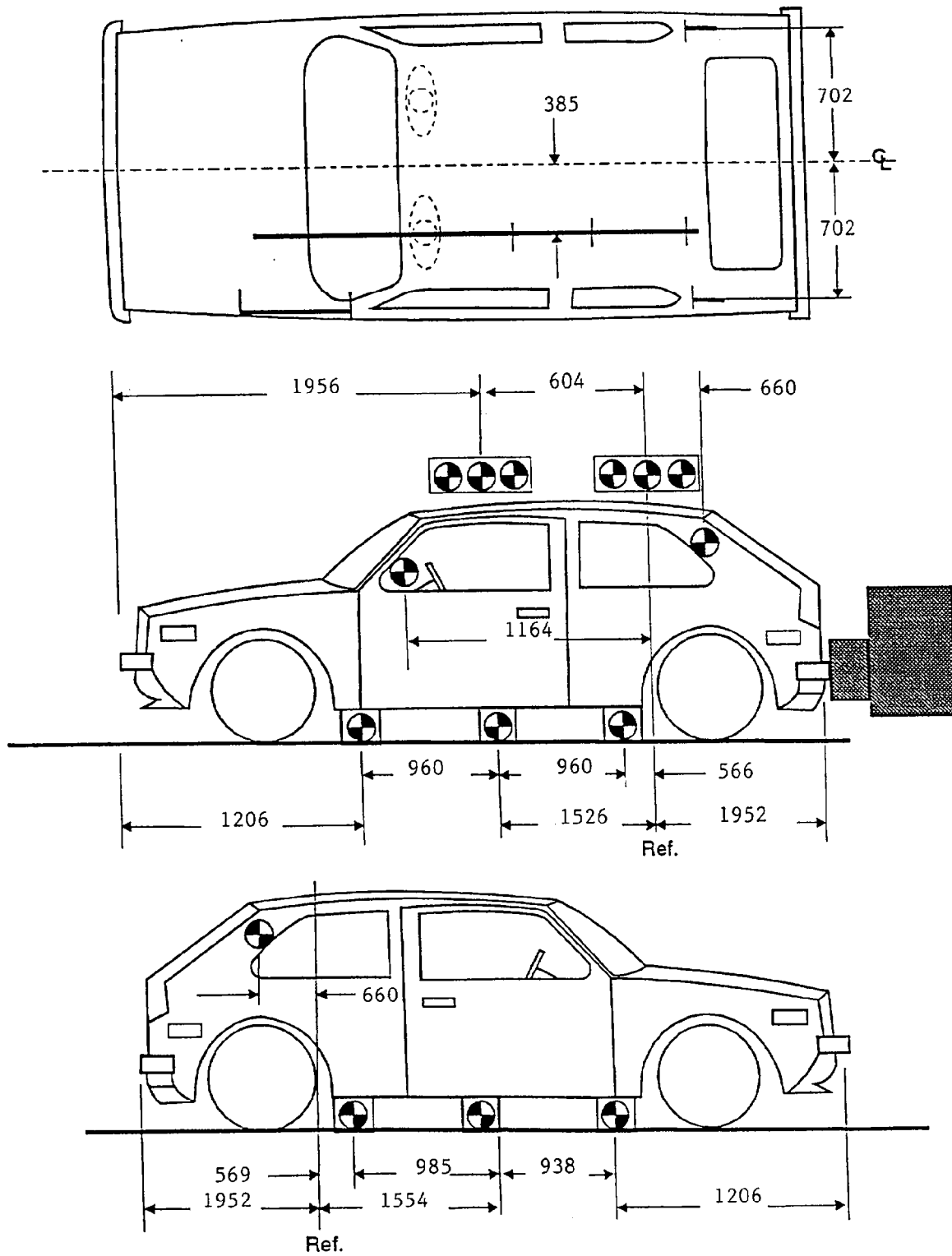
Test Number: 960322

No.	Type of measurement	Pre-test	Post-test	Difference
X1	Total length of vehicle at centerline	4512 mm	4164 mm	348 mm
X2	Rear surface of vehicle to front of engine block	275 mm	297 mm	-22 mm
X3	Rear surface of vehicle to firewall	514 mm	534 mm	-20 mm
X4	Rear surface of vehicle to upper leading edge of right door	1196 mm	1215 mm	-19 mm
X5	Rear surface of vehicle to upper leading edge of left door	1198 mm	1215 mm	-17 mm
X6	Rear surface of vehicle to lower leading edge of right door	1258 mm	1235 mm	23 mm
X7	Rear surface of vehicle to lower leading edge of left door	1234 mm	1231 mm	3 mm
X8	Rear surface of vehicle to upper trailing edge of right door	2175 mm	2196 mm	-21 mm
X9	Rear surface of vehicle to upper trailing edge of left door	2182 mm	2197 mm	-15 mm
X10	Rear surface of vehicle to lower trailing edge of right door	2190 mm	2185 mm	5 mm
X11	Rear surface of vehicle to lower trailing edge of left door	2192 mm	2190 mm	2 mm
X12	Rear surface of vehicle to bottom of "A" post on right side	1224 mm	1210 mm	14 mm
X13	Rear surface of vehicle to bottom of "A" post on left side	1228 mm	1215 mm	13 mm
X14	Rear surface of vehicle to firewall - right side	846 mm	869 mm	-23 mm
X15	Rear surface of vehicle to firewall - left side	858 mm	873 mm	-15 mm
X16	Rear surface of vehicle to steering wheel center	1632 mm	1620 mm	12 mm
X17	Center of steering column to "A" post	315 mm	305 mm	10 mm
X18	Center of steering column to headliner	479 mm	460 mm	19 mm
X19	Rear surface of vehicle to right side of front bumper	4424 mm	4552 mm	-128 mm
X20	Rear surface of vehicle to left side of front bumper	4429 mm	4125 mm	304 mm
X21	Length of engine block	530 mm	530 mm	0 mm

Table 8 Vehicle Measurements

No.	Description of Measurement	Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	4512	4164	348
X2	Front Surface of Vehicle to Bottom of "A" Post of Right Side	1224	1215	9
X3	Front Surface of Vehicle to Bottom of "A" Post of Left Side	1228	1235	-7
X4	Front Surface of Vehicle to Right Side of Rear Bumper	4424	4552	-128
X5	Front Surface of Vehicle to Left Side of Rear Bumper	4429	4125	304
X6	Right Front Sill to Ground Plane	186	263	-77
X7	Left Front Sill to Ground Plane	186	244	-58
X8	Right Rear Sill to Ground Plane	227	265	-38
X9	Left Rear Sill to Ground Plane	219	271	-52
X10	Wheelbase of Vehicle - Left Side	2880	2850	30
X11	Width of Vehicle at Maximum Width Point	1930	1950	-20
X12	Front Surface of Vehicle to Engine Target	275	297	-22
X13	Front Surface of Vehicle to Compartment Target	1962	2015	-53
X14	Front Surface of Vehicle to Rear Bumper Target	4435	4047	388
X15	Wheelbase of Vehicle - Right Side	2880	2900	-20

Figure 5 Vehicle Target Locations



(Dimensions in Millimeters)

**Table 9 Test Vehicle Rear Profile Data**

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

		<b>Pre-Test Profile</b>					
		<b>Vehicle Left</b>			<b>Vehicle Right</b>		
		pt. 1	pt. 2	pt. 3	pt. 4	pt. 5	pt. 6
Bottom of rear bumper	X	513	460	431	431	459	518
	Y	762	458	145	-151	-459	-762
	Z	378	373	372	373	376	377
Top of rear bumper	X	541	494	473	464	483	550
	Y	763	460	152	-146	-441	-744
	Z	549	552	546	535	543	544
Center of trunk	X	555	513	536	540	511	570
	Y	734	455	143	-155	-447	-734
	Z	841	848	839	840	844	837
		<b>Post-Test Profile</b>					
		<b>Vehicle Left</b>			<b>Vehicle Right</b>		
		pt. 1	pt. 2	pt. 3	pt. 4	pt. 5	pt. 6
Bottom of rear bumper	X	951	868	776	737	620	403
	Y	696	430	120	-178	-400	-597
	Z	482	497	494	488	550	655
Top of rear bumper	X	840	930	874	839	750	544
	Y	798	415	115	-190	-434	-670
	Z	555	663	652	652	690	629
Center of trunk	X	863	892	926	920	759	579
	Y	650	370	78	-220	-462	-688
	Z	784	836	888	909	880	833

Table 9 Test Vehicle Rear Profile Data, Cont'd.

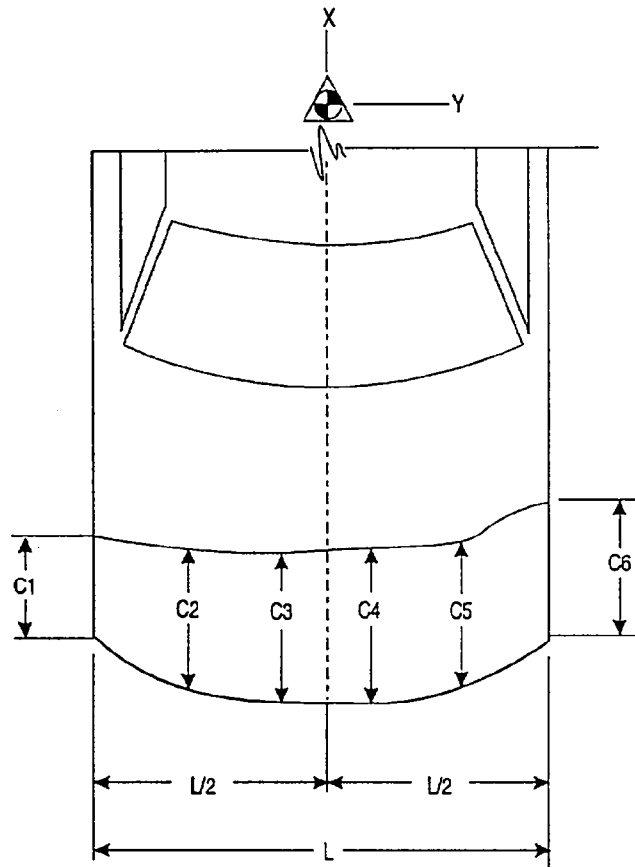
		Change					
		Vehicle Left			Vehicle Right		
		pt. 1	pt. 2	pt. 3	pt. 4	pt. 5	pt. 6
Bottom of rear bumper	X	-438	-408	-345	-306	-161	115
	Y	66	28	25	27	59	-165
	Z	-104	-124	-122	-115	-174	-278
Top of rear bumper	X	-299	-436	-401	-375	-267	6
	Y	-35	45	37	44	-7	-74
	Z	-6	-111	-106	-117	-147	-85
Center of trunk	X	-308	-379	-390	-380	-248	-9
	Y	84	85	65	65	15	-46
	Z	57	12	-49	-69	-36	4

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

+Y: Left from vehicle longitudinal centerline

+Z: Up from ground

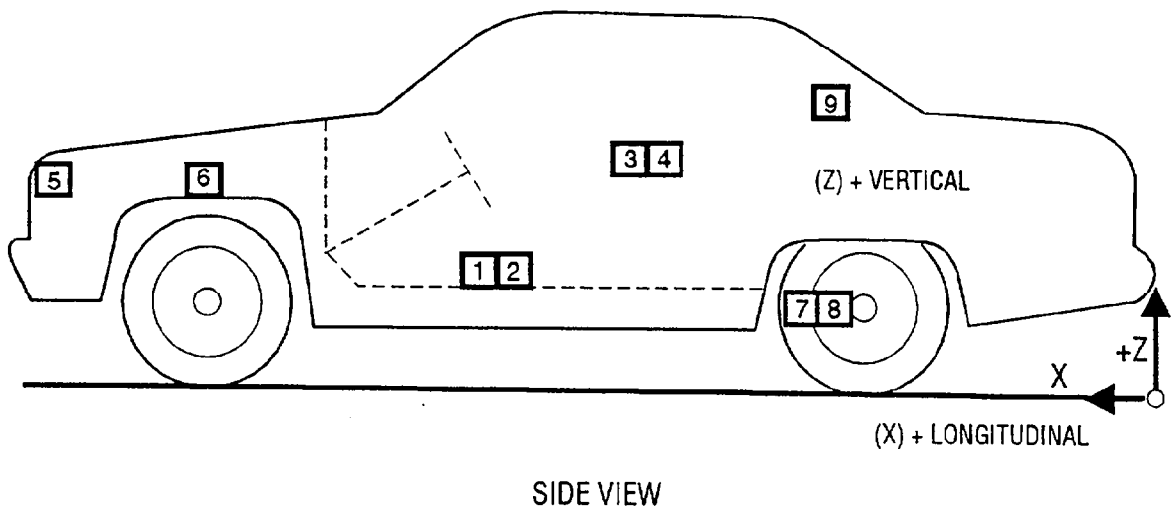
Figure 6 Vehicle Crush



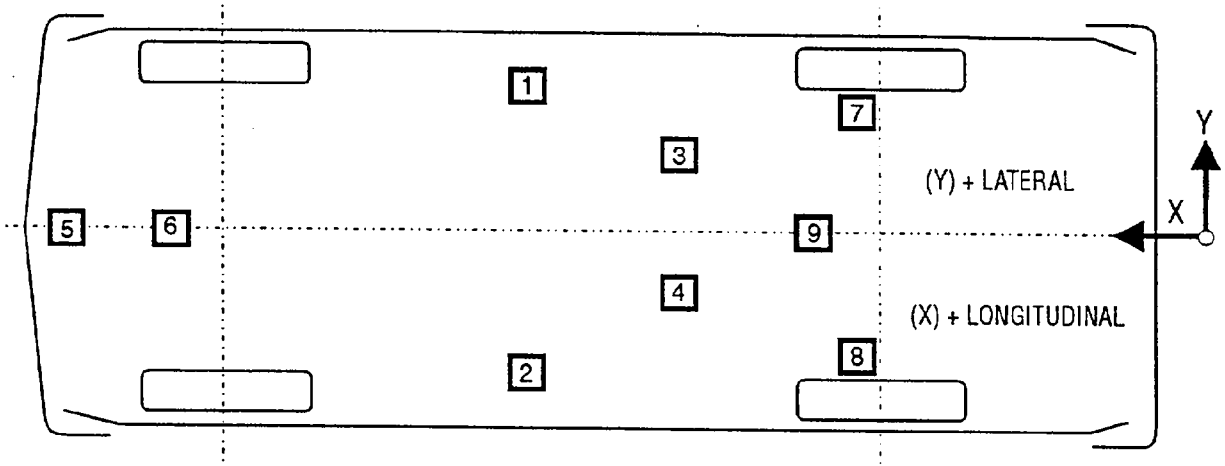
Notes: L is pre-test length of contact surface.  
 C1 through C6 are spaced equally apart.  
 CL is vehicle centerline.

	Pre-test	Post-test	Crush
L	1341 mm		
C1	4429 mm	4040 mm	389 mm
C2	4480 mm	4045 mm	435 mm
C3	4502 mm	4112 mm	390 mm
C4	4502 mm	4124 mm	378 mm
C5	4478 mm	4195 mm	283 mm
C6	4424 mm	4392 mm	32 mm
CL	4506 mm	4164 mm	342 mm

Figure 7 Vehicle Accelerometer Mounting Locations



SIDE VIEW



BOTTOM VIEW

Table 10 Pre- and Post-Test Position of Vehicle Accelerometer Mounting Locations

Accelerometer Description		X, Y, Z Location <sup>1</sup>		
		X	Y	Z
Left front seat outboard mounting rail	Pre	1675 mm	-650 mm	429 mm
	Post	1675 mm	-640 mm	471 mm
	Change	0 mm	-10 mm	-42 mm
Right front seat outboard mounting rail	Pre	1675 mm	650 mm	433 mm
	Post	1680 mm	640 mm	482 mm
	Change	-5 mm	10 mm	-49 mm
Left front seat back (mid-point of seat)	Pre	2352 mm	-443 mm	1094 mm
	Post	2450 mm	-436 mm	948 mm
	Change	-98 mm	-7 mm	146 mm
Right front seat back	Pre	2352 mm	395 mm	1071 mm
	Post	2437 mm	430 mm	955 mm
	Change	-85 mm	-35 mm	116 mm
Radiator support	Pre	170 mm	-10 mm	781 mm
	Post	170 mm	-10 mm	844 mm
	Change	0 mm	0 mm	-63 mm
Top of engine	Pre	362 mm	35 mm	885 mm
	Post	362 mm	35 mm	946 mm
	Change	0 mm	0 mm	-61 mm
Left rear wheel axle	Pre	3486 mm	-318 mm	194 mm
	Post	3486 mm	-295 mm	194 mm
	Change	0 mm	-23 mm	0 mm
Right rear wheel axle	Pre	3490 mm	268 mm	195 mm
	Post	3495 mm	295 mm	176 mm
	Change	-5 mm	-27 mm	19 mm
Rear package shelf (top of rear seat back)	Pre	4132 mm	28 mm	517 mm
	Post	NA	NA	NA
	Change	NA	NA	NA

<sup>1</sup> Reference Point: X - vertical plane at front bumper  
Y - vehicle centerline  
Z - ground

Table 11 Moving Barrier Face Static Crush

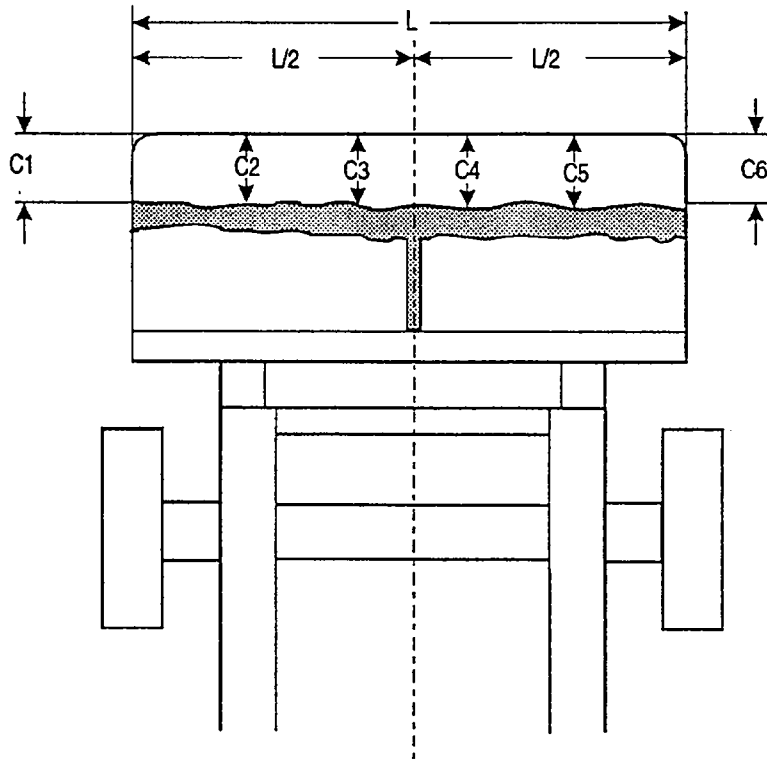
Location	Height	Zero distance at barrier centerline <sup>1</sup>																
		32	28	24	20	16	12	8	4	0	4	8	12	16	20	24	28	32
		Pre-test profile (distance in millimeters from reference plane <sup>2</sup> )																
Top of face	813	330	334	331	330	330	334	330	330	332	334	333	329	331	332	330	330	337
Mid-face	559	334	334	332	330	330	332	331	331	332	331	333	329	331	334	330	330	335
Bumper	432	246	231	231	230	228	230	227	230	230	231	230	229	231	231	229	229	253
		Post-test profile (distance in millimeters from reference plane <sup>2</sup> )																
Top of face	813	312	338	359	412	474	513	509	474	457	454	470	490	510	507	541	569	
Mid-face	559	301	318	333	358	412	480	521	553	571	589	612	619	636	638	652	676	
Bumper	432	159	186	226	277	325	389	447	478	502	490	492	500	525	541	573	611	
		Static crush (mm)																
Top of face	813	-18	4	28	78	143	183	175	144	127	122	137	161	179	175	211	232	
Mid-face	559	-33	-16	1	26	82	150	189	222	240	257	279	290	305	304	285	341	
Bumper	432	-87	-45	-5	47	95	161	217	251	270	260	262	271	294	310	344	358	

<sup>1</sup> Column readings are left to right across barrier face from left to right.

<sup>2</sup> Reference plane is the rear surface of the deformable barrier face.

All measurements are in millimeters.

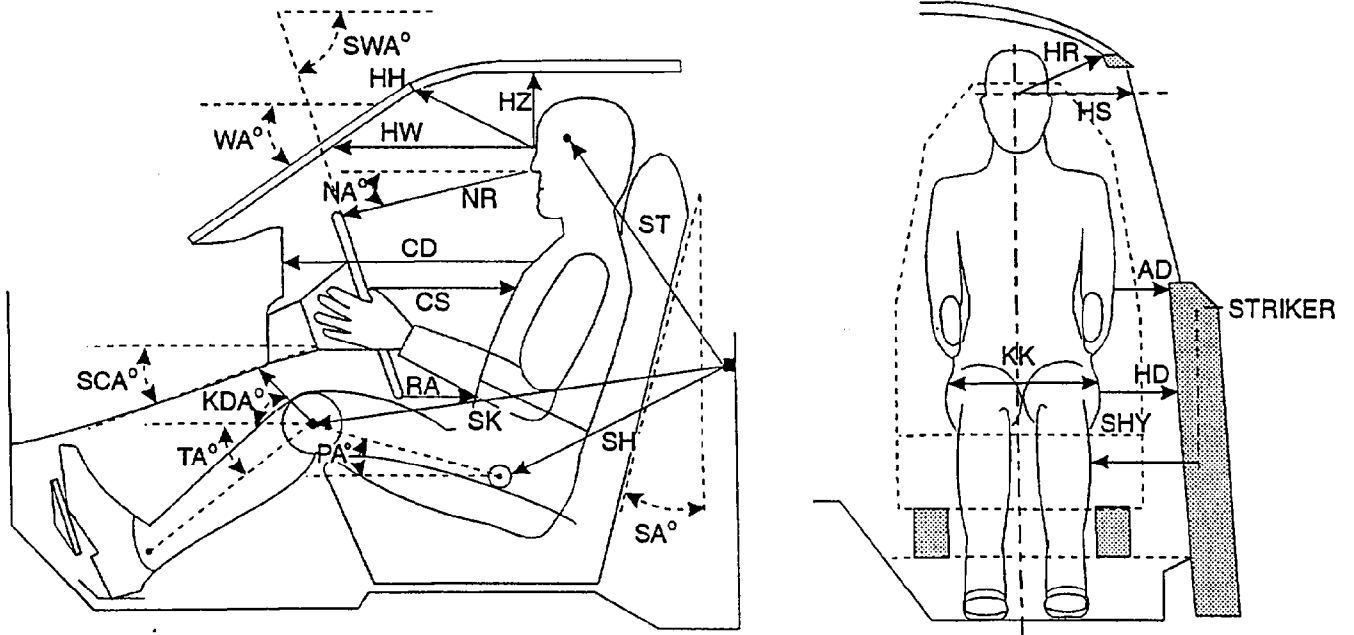
**Figure 8 Moving Deformable Barrier Face Crush**



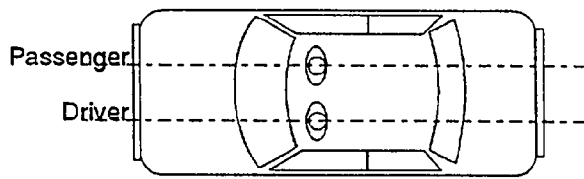
Notes: L is pre-test length of contact surface.  
 C1 through C6 are spaced equally apart.  
 CL is moving barrier centerline.

	Pre-test	Post-test	Crush
L	1677 mm		
C1	246 mm	159 mm	-87 mm
C2	230 mm	277 mm	47 mm
C3	230 mm	447 mm	217 mm
C4	231 mm	487 mm	256 mm
C5	231 mm	525 mm	294 mm
C6	253 mm	611 mm	358 mm
CL	230 mm	502 mm	272 mm

Figure 9 Dummy Measurement Locations for Front Seat Occupants



VERTICAL LONGITUDINAL PLANE



VERTICAL TRANSVERSE PLANE

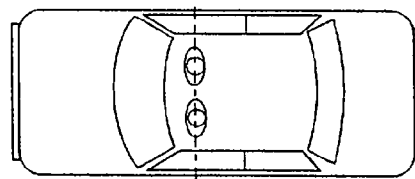
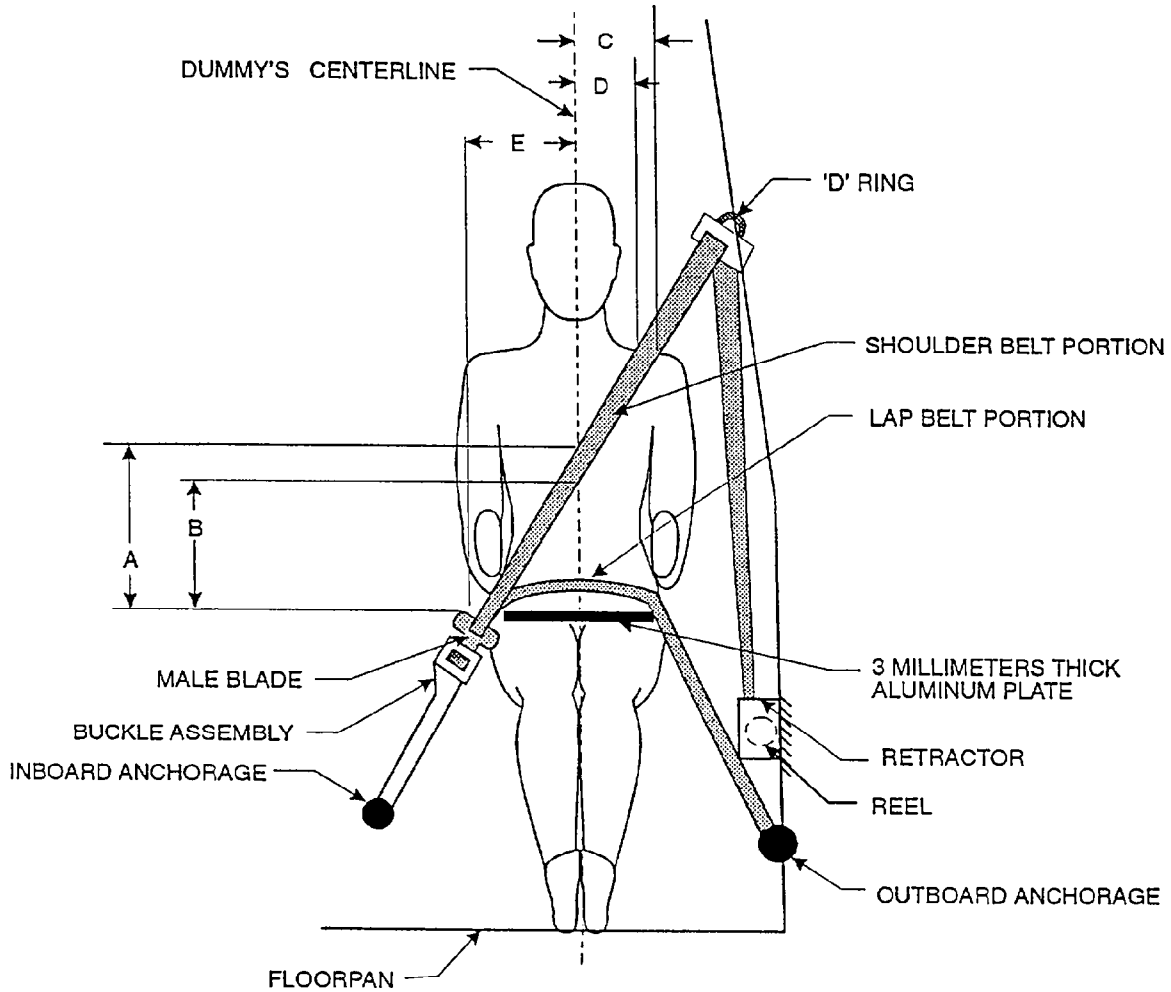


Table 12 Dummy Measurement Data For Front Seat Occupants

<u>Designation</u>	<u>Type of Measurement</u>	<u>Driver (Serial #34)</u>	<u>Passenger (Serial #35)</u>
WA	Windshield angle	28°	28°
SWA	Steering wheel angle	61°	NA
SCA	Steering column angle	29°	NA
SA	Seat back angle	24°	24°
HZ	Head to roof	207 mm	204 mm
HH	Head to header	342 mm	342 mm
HW	Head to windshield	562 mm	542 mm
HR	Head to side header	223 mm	204 mm
NR	Nose to rim	391 mm	NA
NA	Nose to rim angle	15°	NA
CD	Chest to dash	549 mm	555 mm
CS	Steering wheel to chest	298 mm	NA
RA	Rim to abdomen	150 mm	NA
KDL	Left knee to dash	183 mm	165 mm
KDR	Right knee to dash	202 mm	164 mm
KDA	Outboard knee to dash angle	19°	23°
PA	Pelvic angle	23°	22.5°
TA	Tibial angle	55°	46°
KK	Knee to knee	294 mm	247 mm
ST <sup>1</sup>	Striker to head	665 mm	665 mm
	Striker to head angle	13°	83°
SK <sup>1</sup>	Striker to knee	635 mm	635 mm
	Striker to knee angle	10°	9°
SH <sup>1</sup>	Striker to H-point	245 mm	251 mm
	Striker to H-point angle	4°	5°
SHY	Striker to H-point (Y dir.)	235 mm	220 mm
HS	Head to side window	345 mm	326 mm
HD	H-point to door	127 mm	128 mm
AD	Arm to door	129 mm	112 mm

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

Figure 10 Seat Belt Positioning Data



		Driver	Passenger
A	Top surface of aluminum plate to belt upper edge	314 mm	387 mm
B	Top surface of aluminum plate to belt lower edge	230 mm	300 mm
C	Dummy centerline to outer edge of belt at chest flesh top	129 mm	113 mm
D	Dummy centerline to inner edge of belt at chest flesh top	75 mm	58 mm
E	Dummy centerline to intersection of upper torso belt and lap belt	297 mm	306 mm

Figure 11 Camera Positions

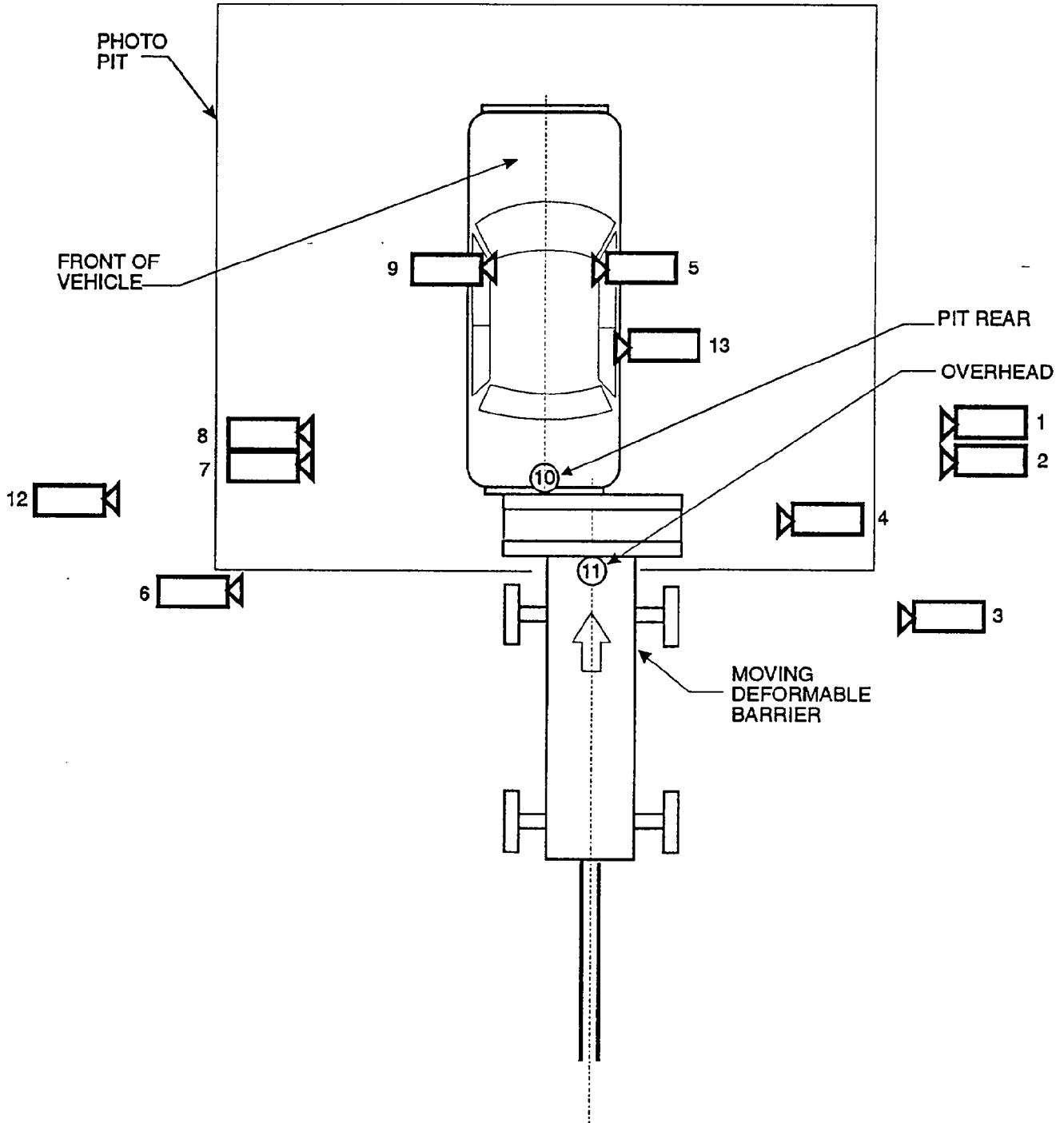


Table 13 Motion Picture Camera Locations

Vehicle year/make/model/body style: 1996/Plymouth/Voyager/minivan

Test number: 960322

Camera Number	View	Camera Positions <sup>1</sup>			Angle of Inclination <sup>2</sup>	Angle of Rotation <sup>3</sup>	Camera Lens	Film Speed
		X	Y	Z				
1	Right side vehicle	2134	12725	1168	NA	NA	25 mm	963 frames/s
2	Right side overall	356	13970	1123	NA	NA	13 mm	985 frames/s
3	Right MDB	1346	15723	864	NA	NA	25 mm	968 frames/s
4	Right close-up	737	5959	826	NA	NA	13 mm	1002 frames/s
5	Right front passenger onboard	NA	NA	NA	NA	NA	8 mm	492 frames/s
6	Left side MDB	588	13411	826	NA	NA	25 mm	965 frames/s
7	Left side close-up	635	6629	851	NA	NA	17 mm	NA <sup>4</sup> frames/s
8	Left side vehicle	2438	15646	1201	NA	NA	25 mm	1002 frames/s
9	Left front dummy onboard	NA	NA	NA	NA	NA	8 mm	505 frames/s
10	Underbody vehicle	NA	NA	NA	NA	NA	17 mm	998 frames/s
11	Overhead	NA	NA	NA	NA	NA	13 mm	500 frames/s
12	Left side overall	1219	14122	1153	NA	NA	13 mm	NA <sup>5</sup> frames/s
13	Driver's shoulder belt spoolout	NA	NA	NA	NA	NA	8 mm	992 frames/s

<sup>1</sup> +X: Forward from impact point MDB face

+Y: Rightward from monorail centerline

+Z: Upward from ground level

<sup>2</sup> +Angle of Inclination: Camera lens (upward from horizontal)

<sup>3</sup> +Angle of Rotation: Camera lens toward barrier from line perpendicular to monorail centerline

<sup>4</sup> Film was shredded due to camera malfunction

<sup>5</sup> Camera did not run due to camera malfunction

Appendix A

Photographs

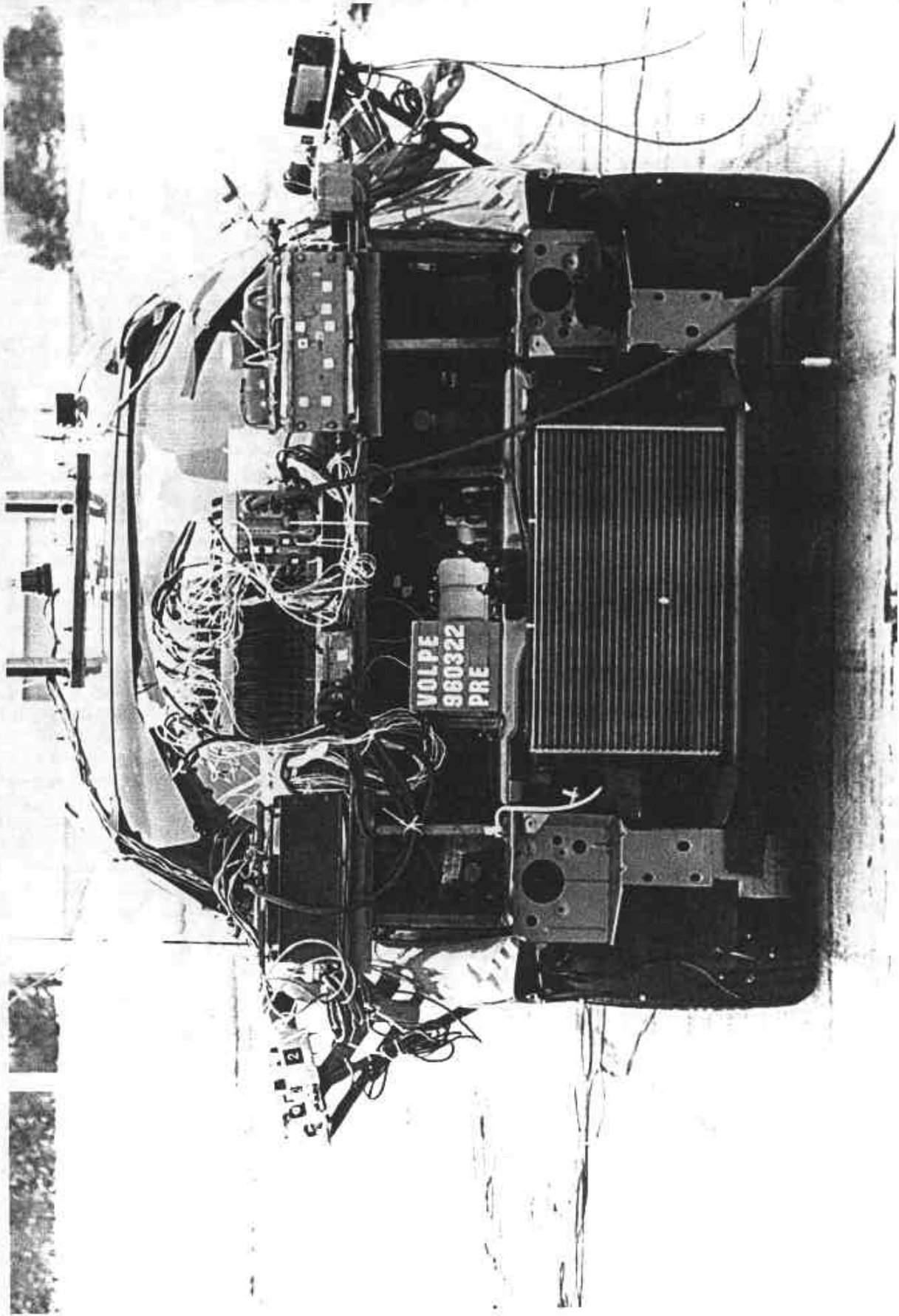


Figure A-1 Pre-Test Front View

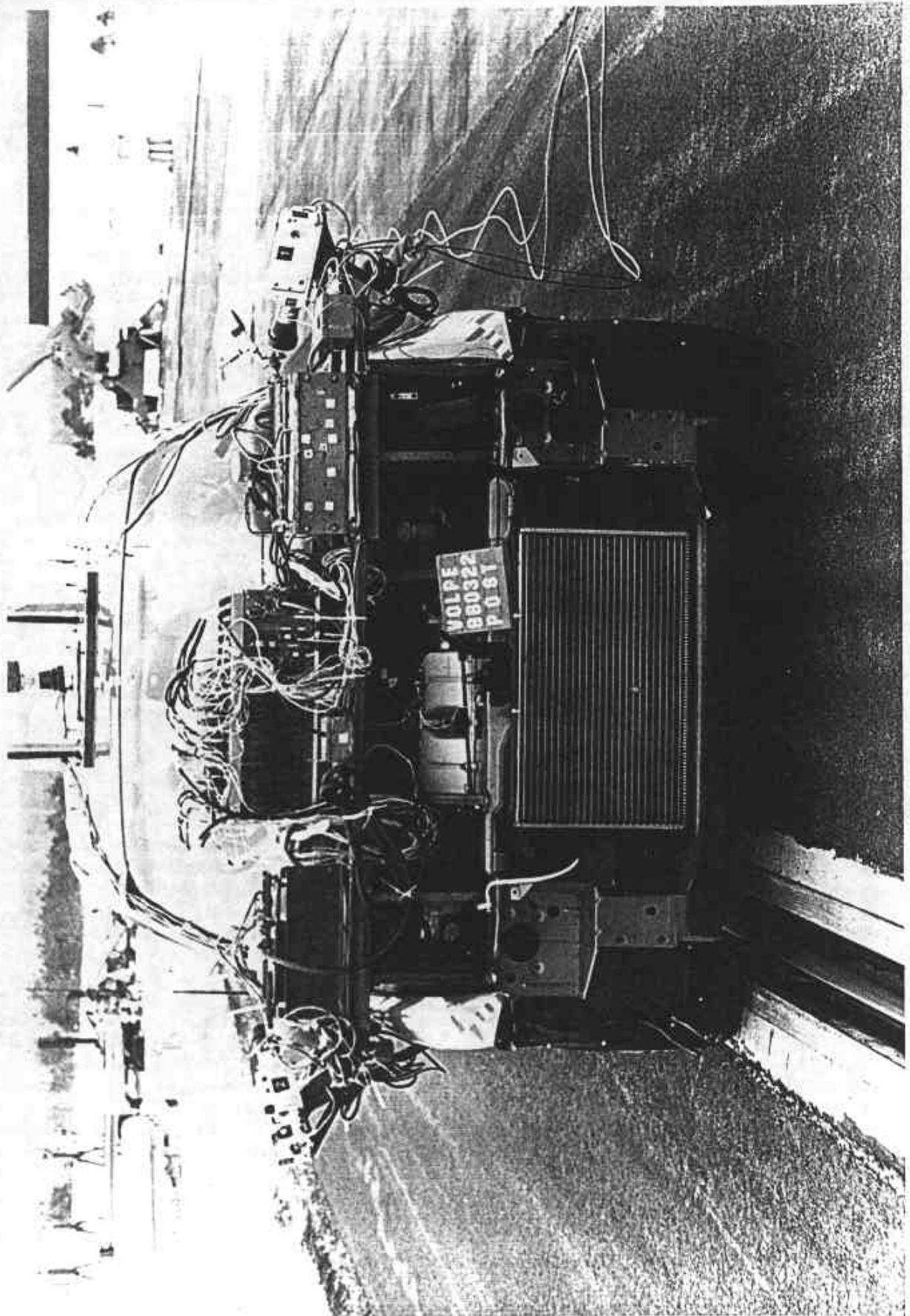


Figure A-2 Post-Test Front View

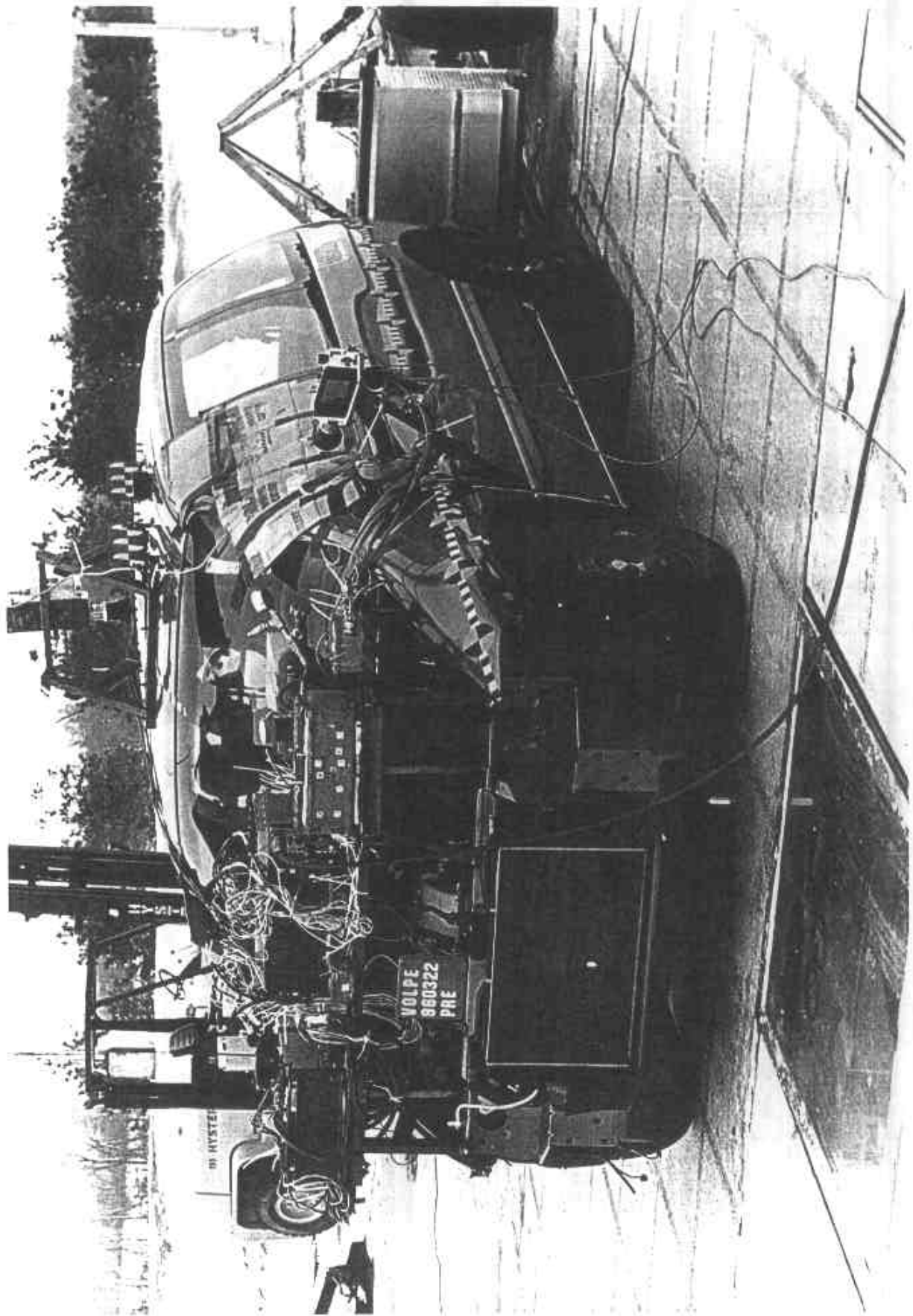


Figure A-3 Pre-Test Left Front Three-Quarter View

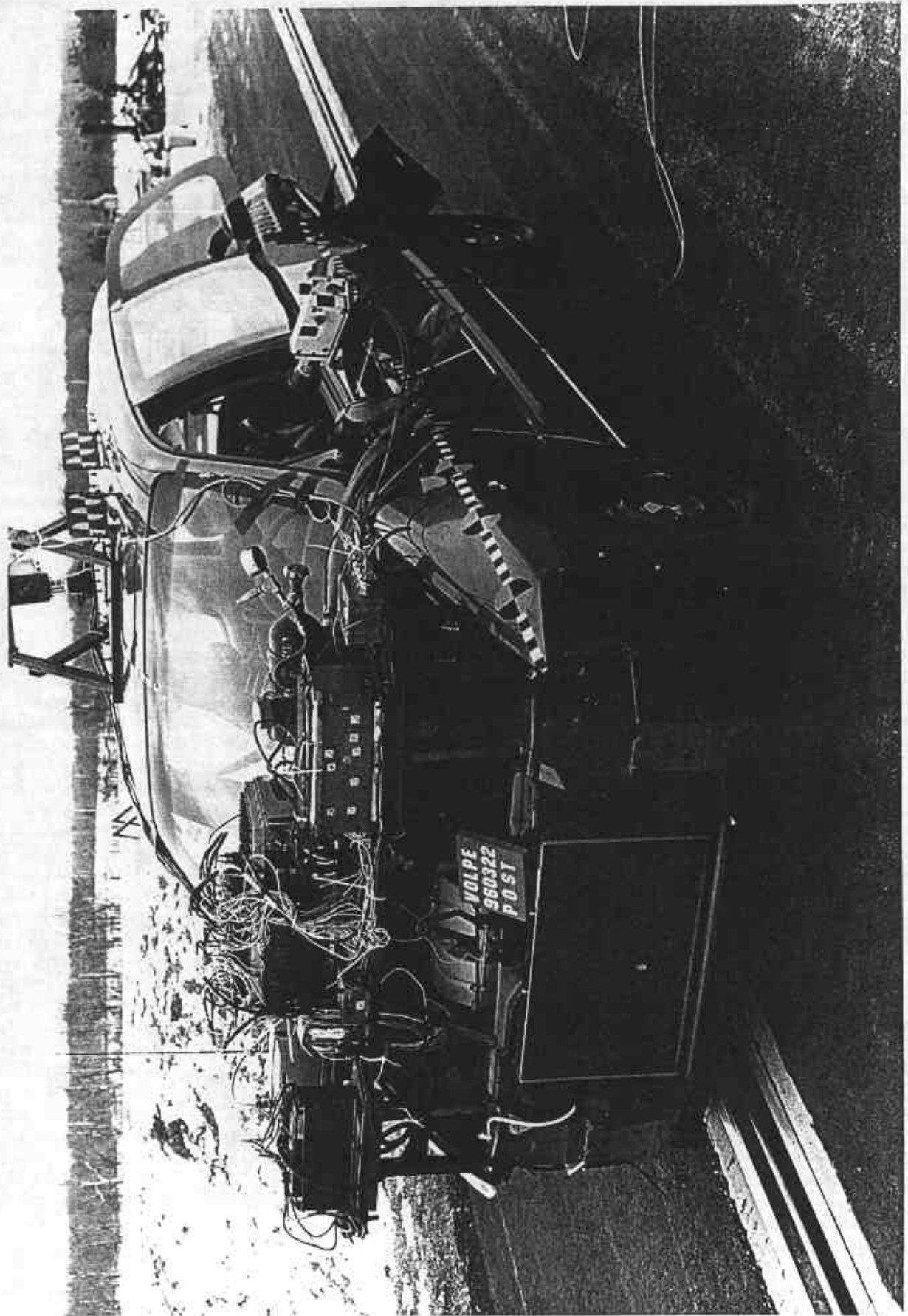


Figure A-4 Post-Test Left Front Three-Quarter View

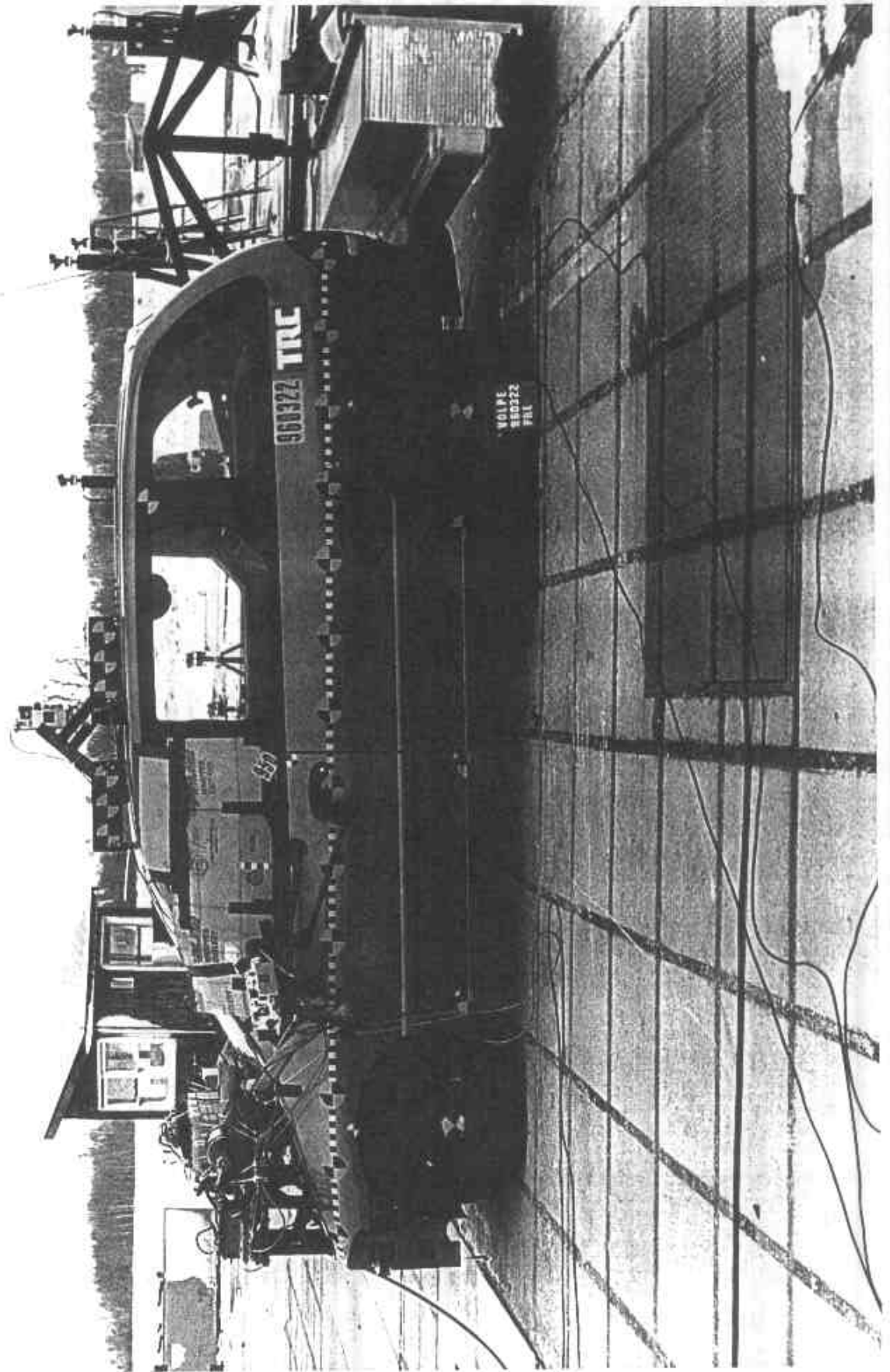


Figure A-5 Pre-Test Left Side View

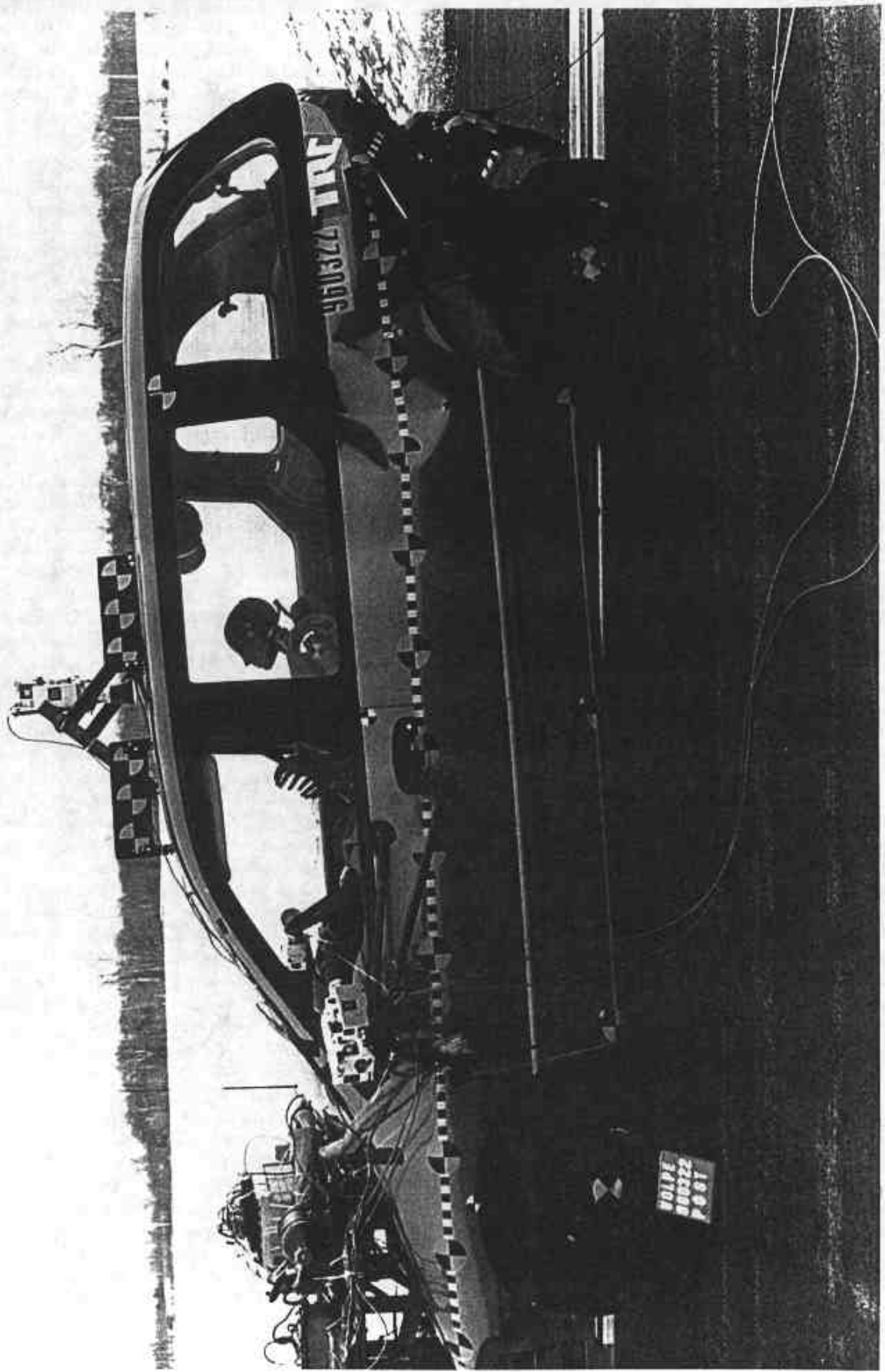


Figure A-6 Post-Test Left Side View

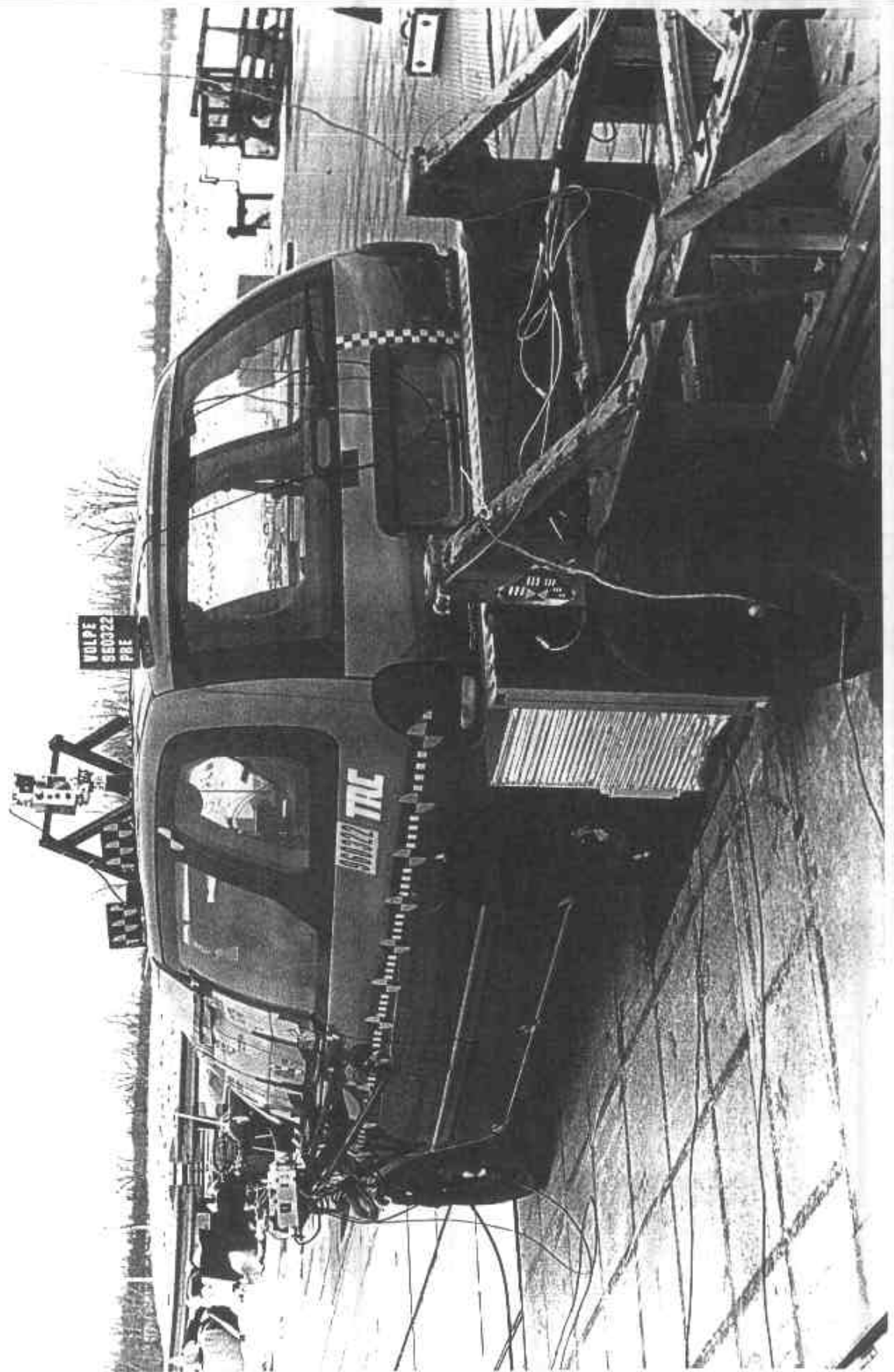


Figure A-7 Pre-Test Left Rear Three-Quarter View



Figure A-8 Post-Test Left Rear Three-Quarter View

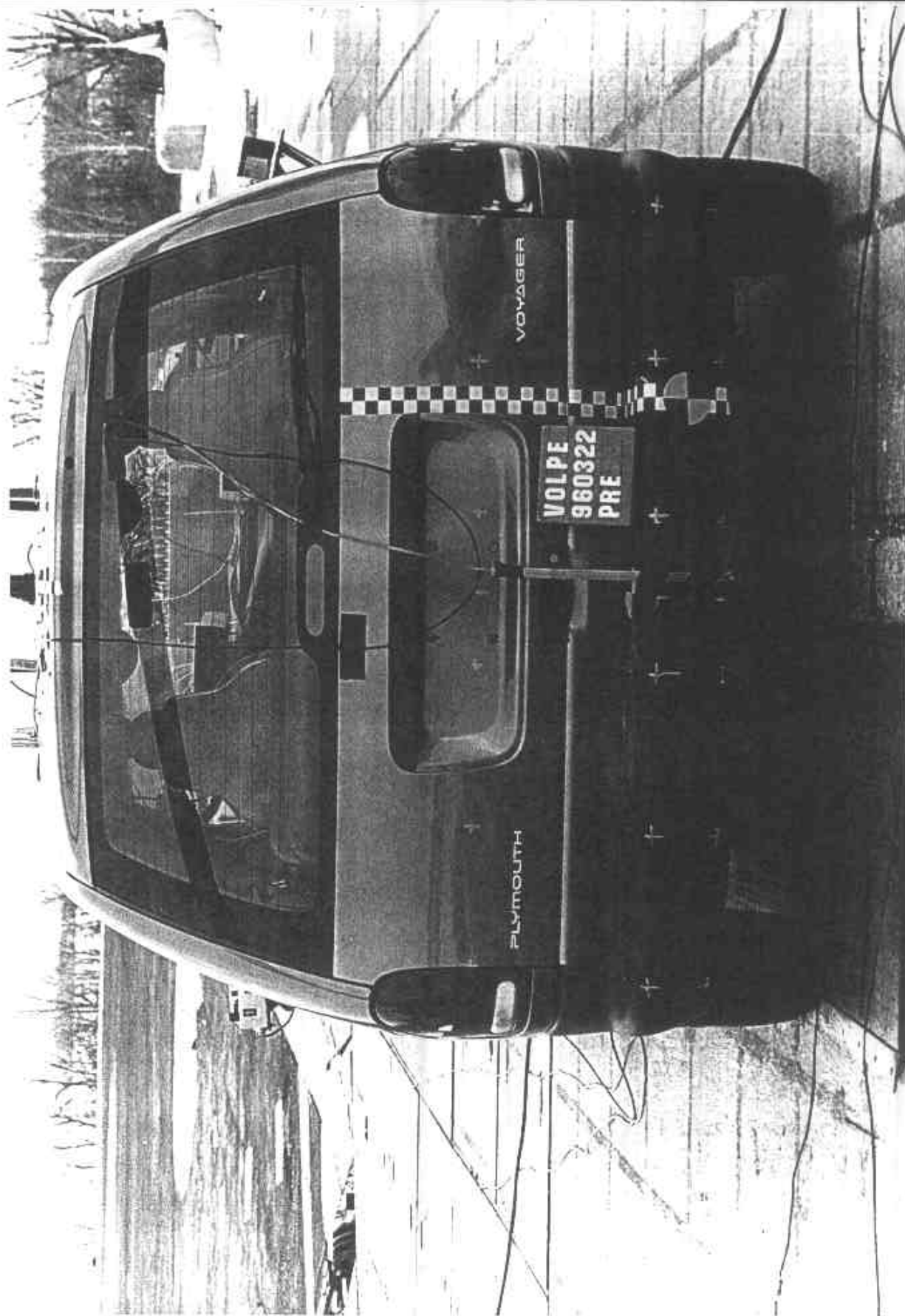


Figure A-9 Pre-Test Rear View

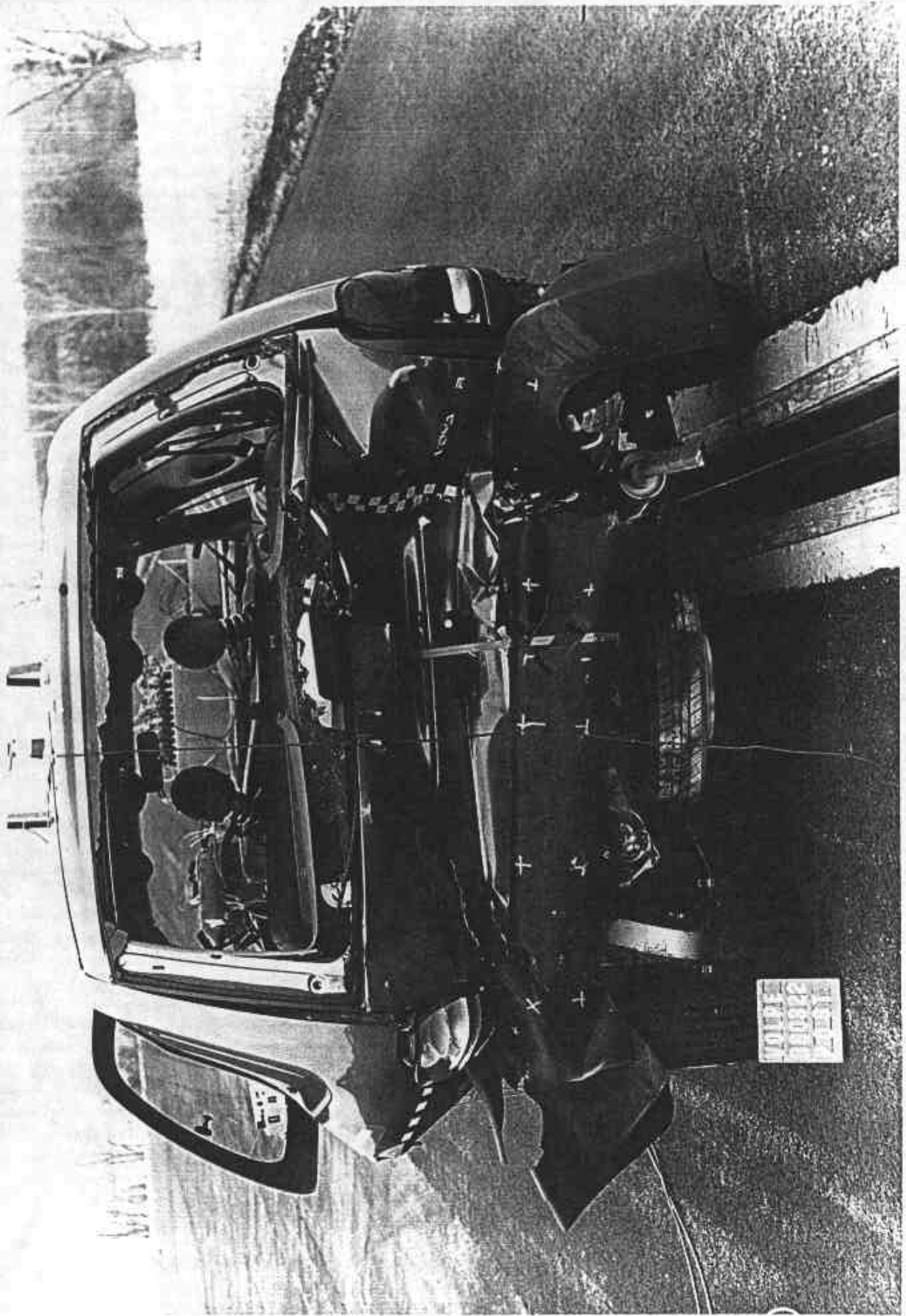


Figure A-10 Post-Test Rear View

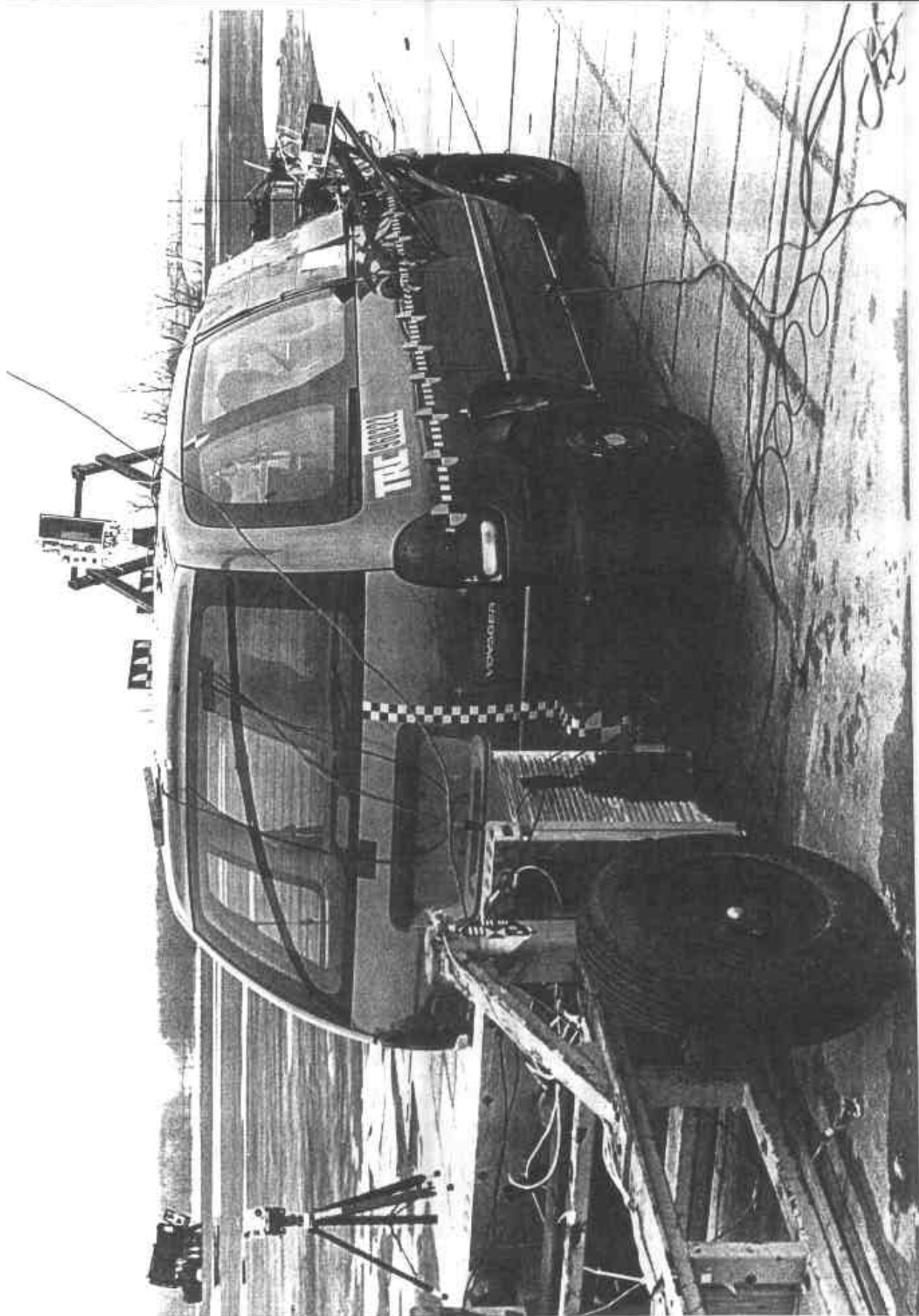


Figure A-11 Pre-Test Right Rear Three-Quarter View

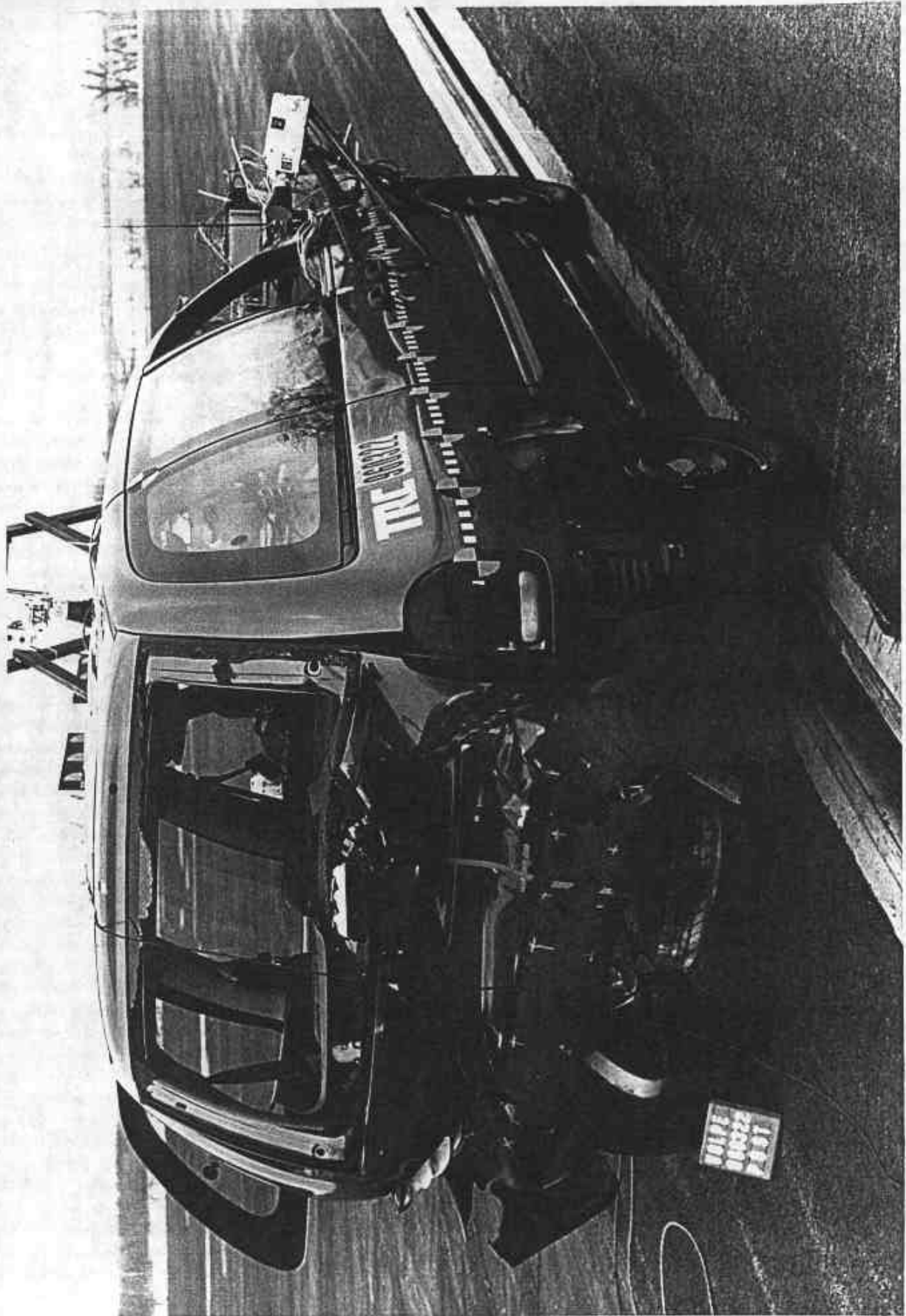


Figure A-12 Post-Test Right Rear Three-Quarter View

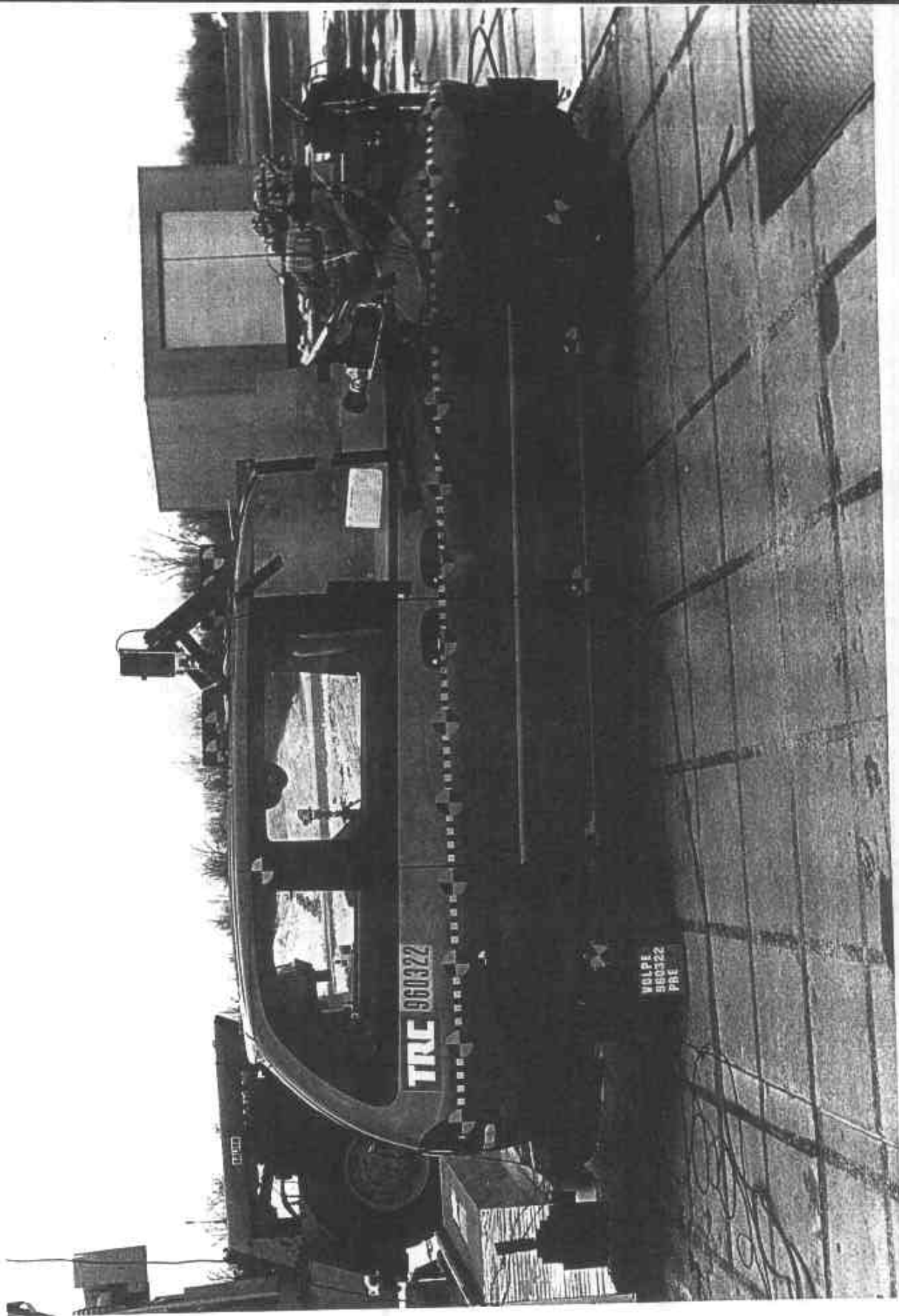


Figure A-13 Pre-Test Right Side View

A-14

960322

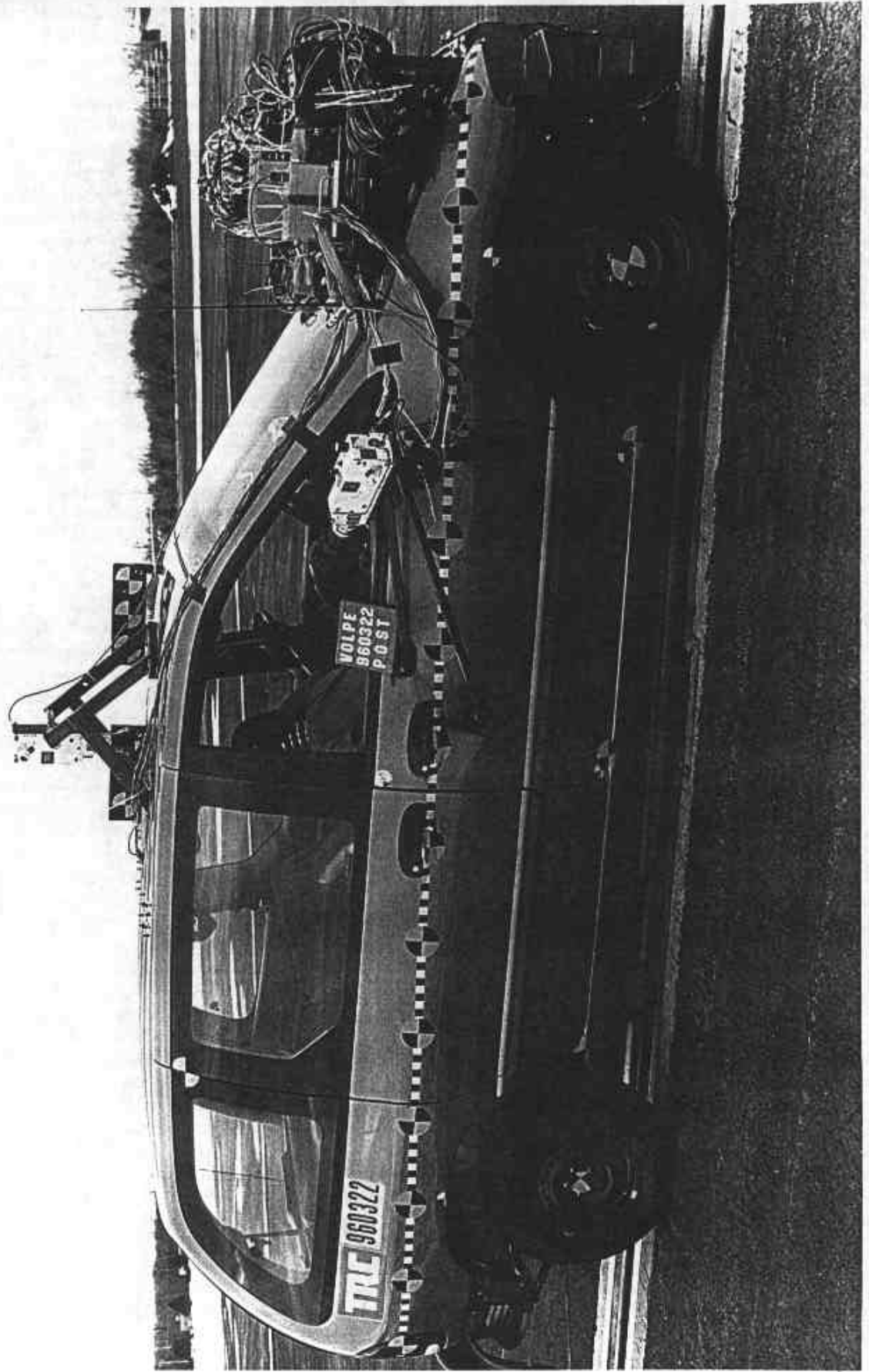


Figure A-14 Post-Test Right Side View

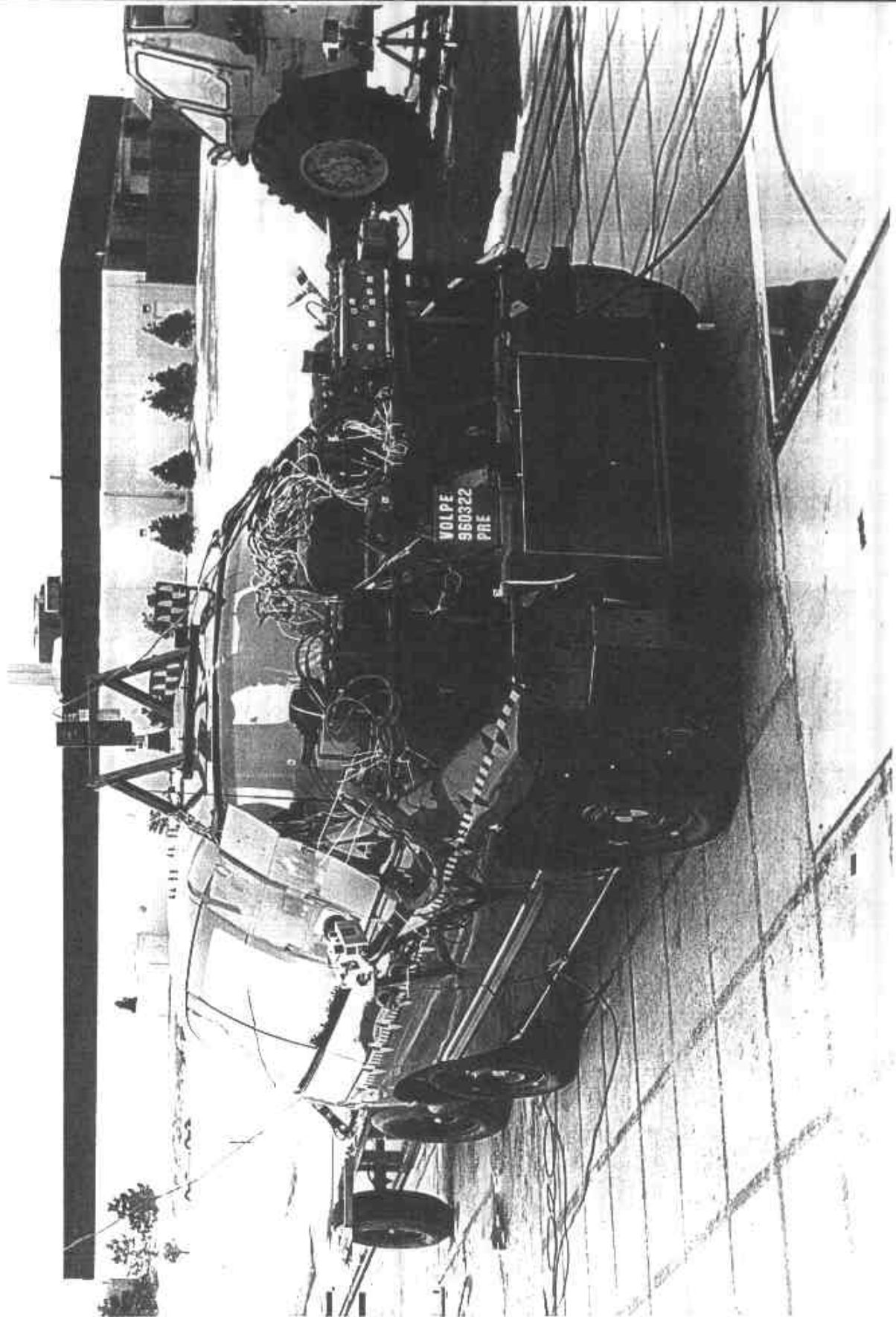


Figure A-15 Pre-Test Right Front Three-Quarter View

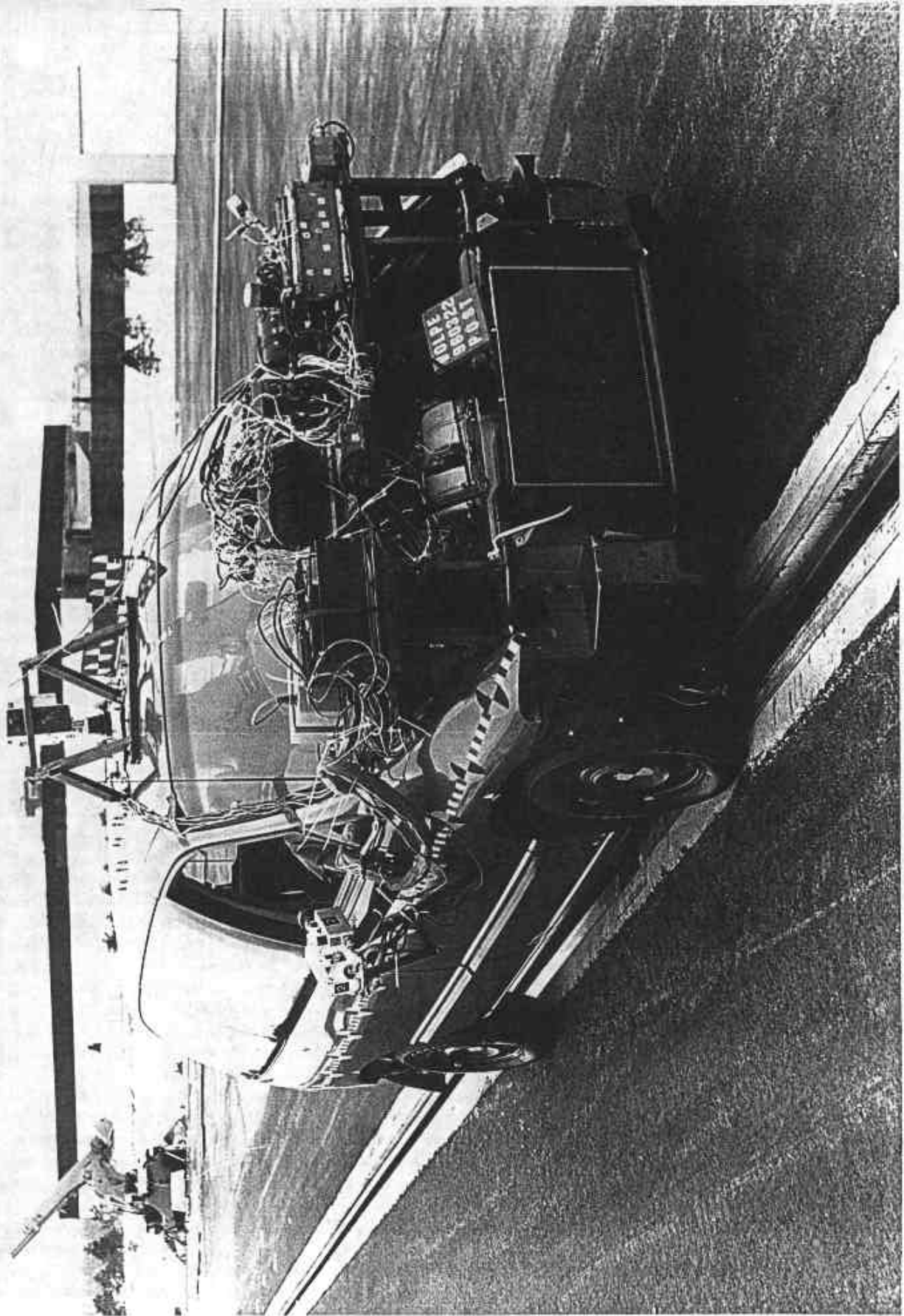


Figure A-16 Post-Test Right Front Three-Quarter View

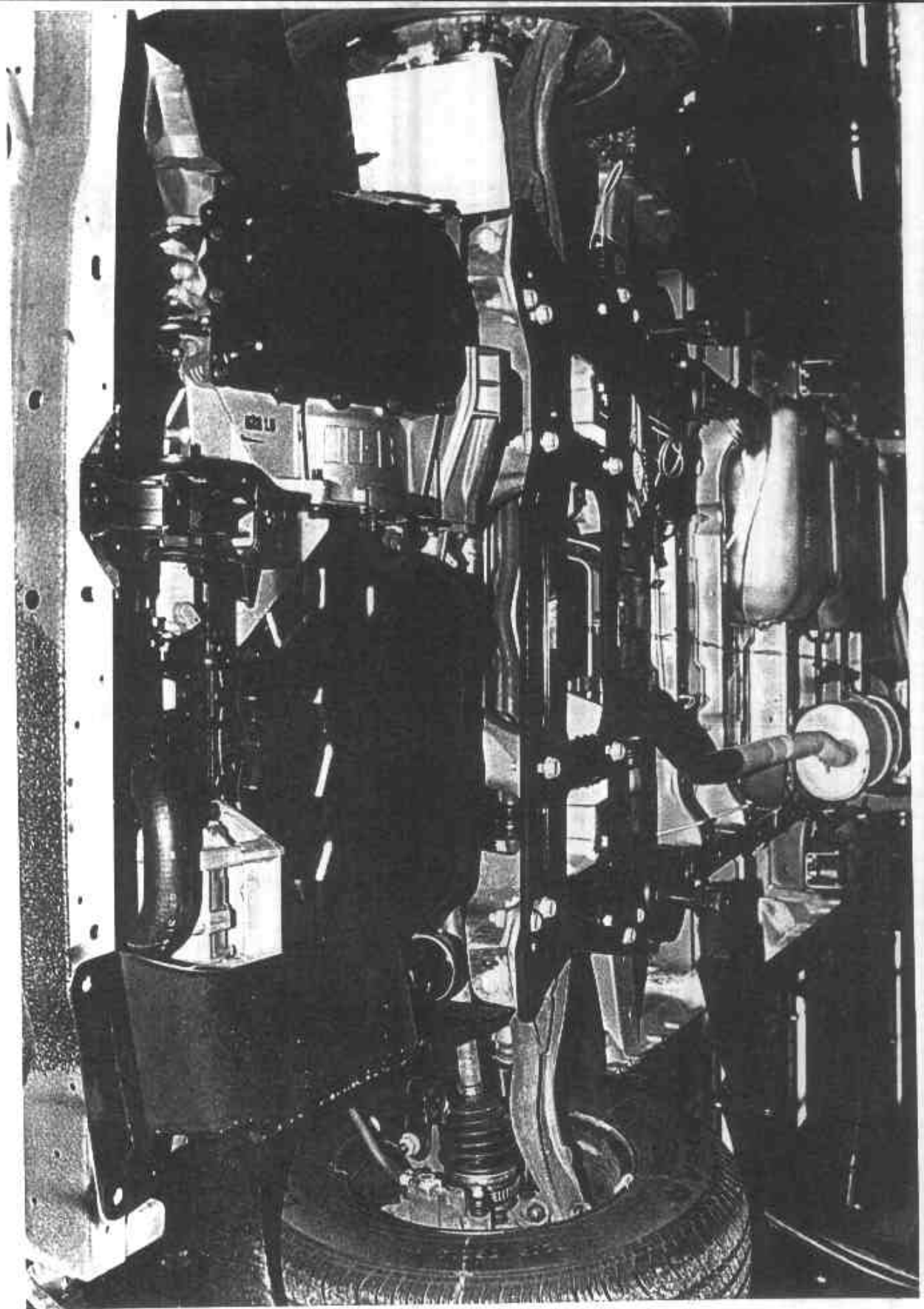


Figure A-17 Pre-Test Front Underbody View

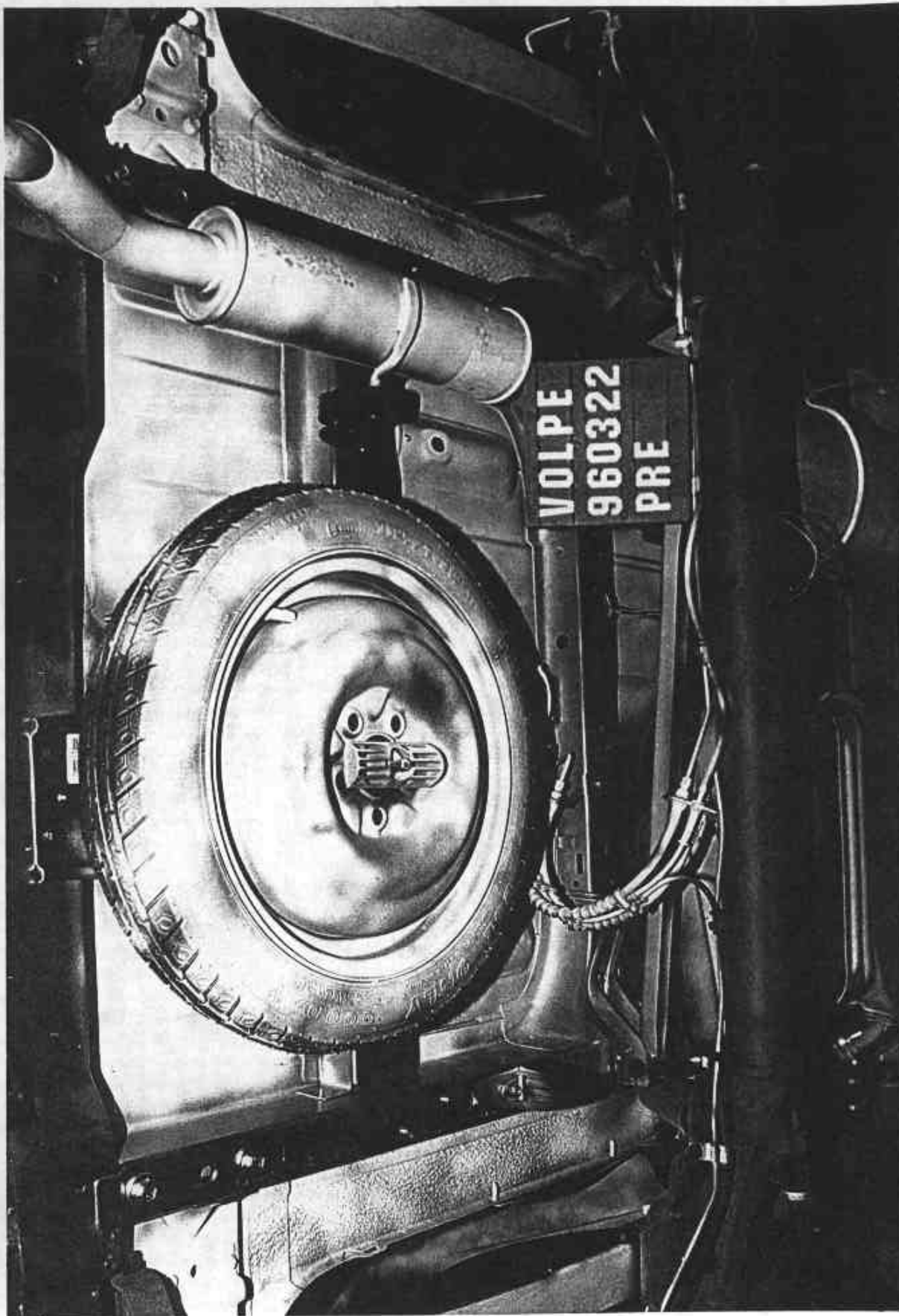


Figure A-18 Pre-Test Rear Underbody View

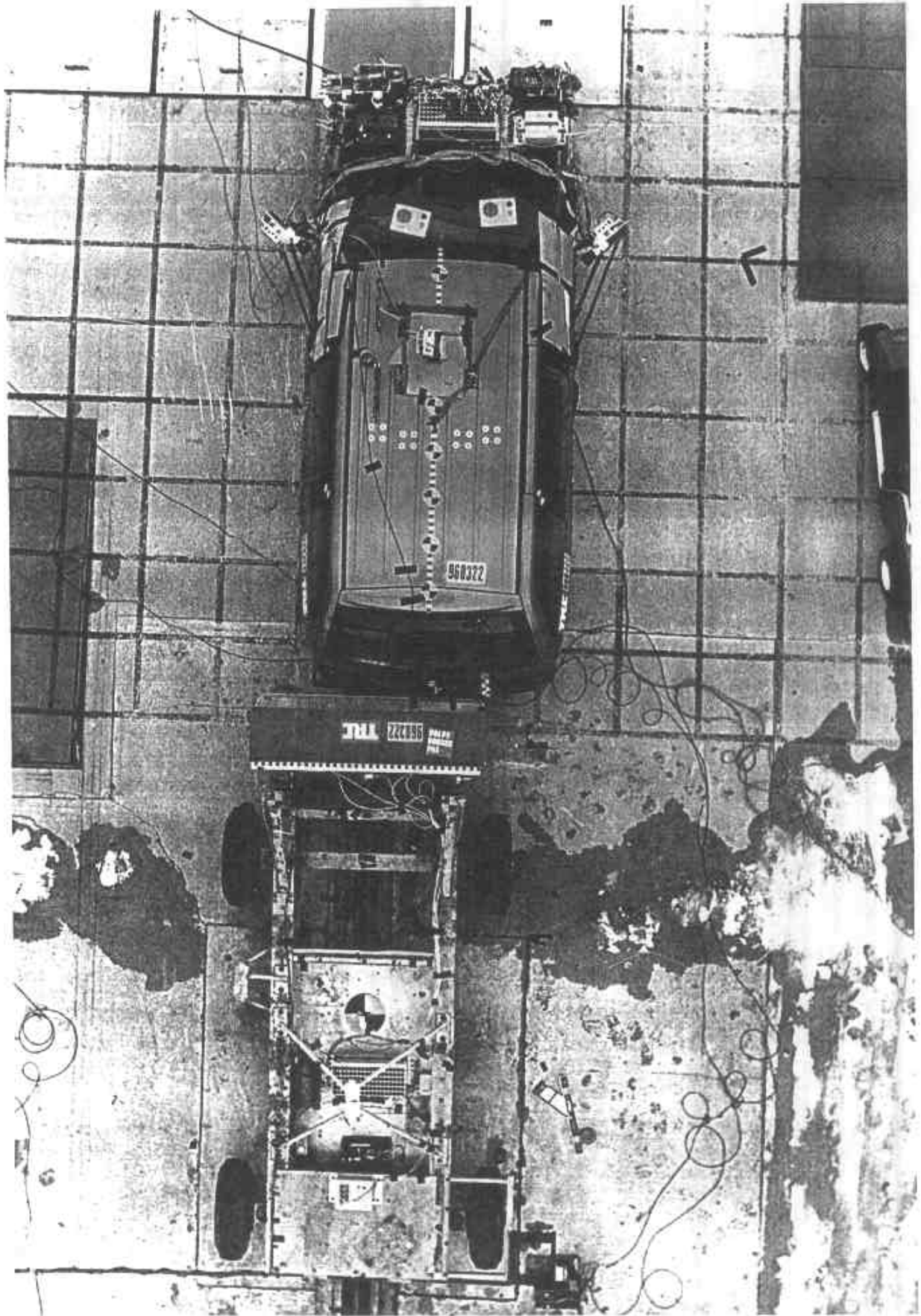


Figure A-19 Pre-Test Overhead - View 1

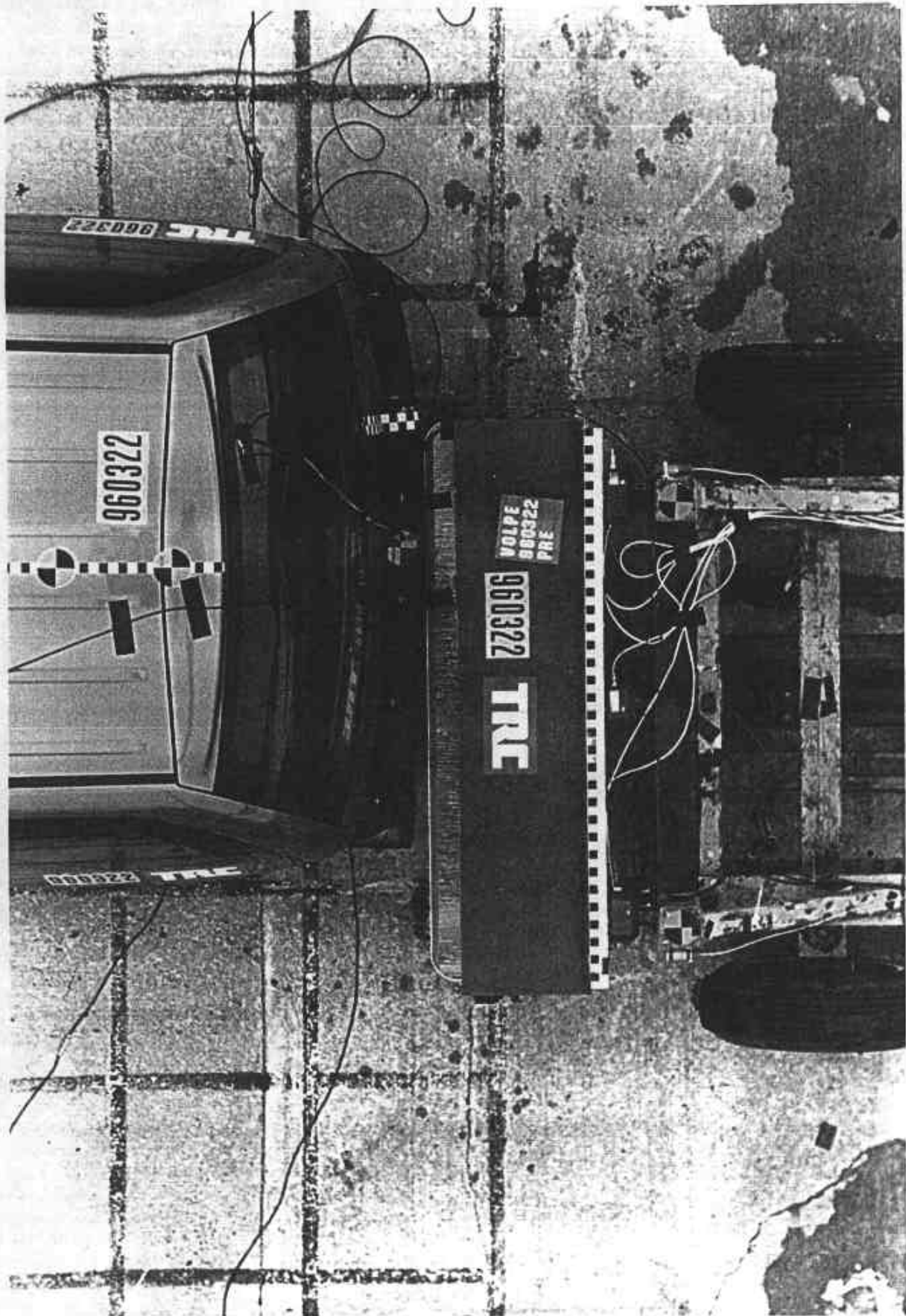


Figure A-20 Pre-Test Overhead - View 2

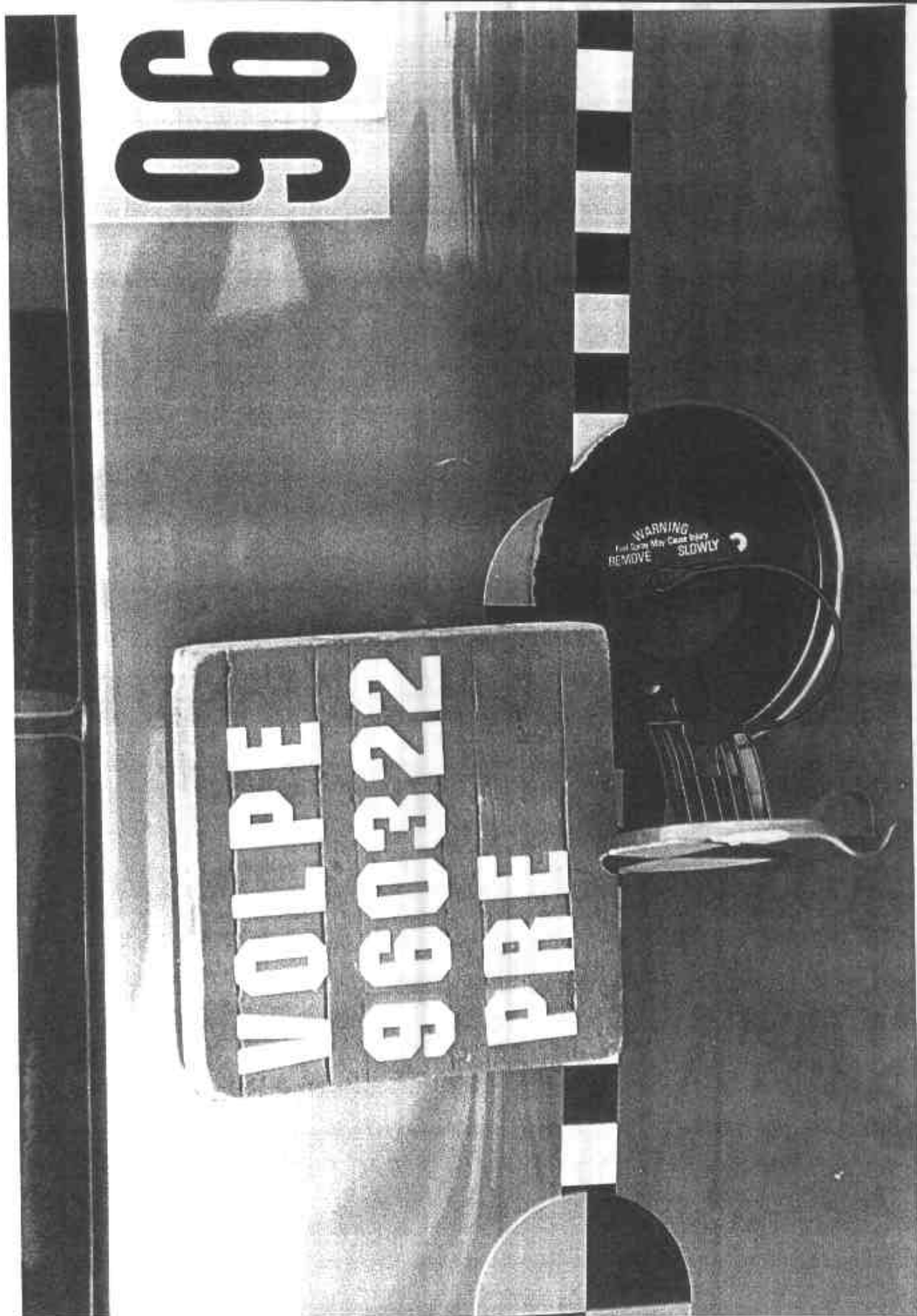


Figure A-21 Pre-Test Fuel Filler Cap View

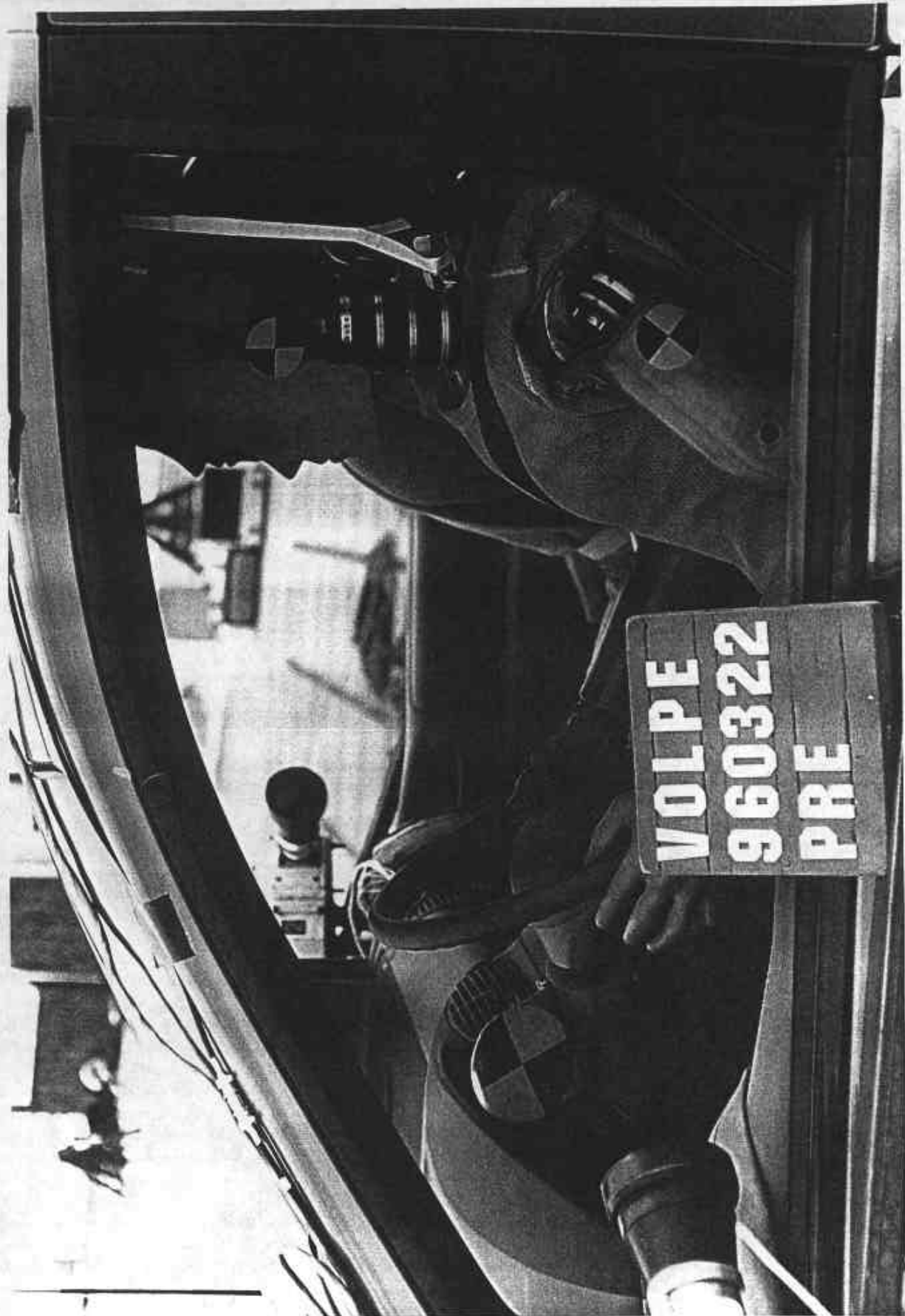


Figure A-22 Pre-Test Driver Dummy Position View

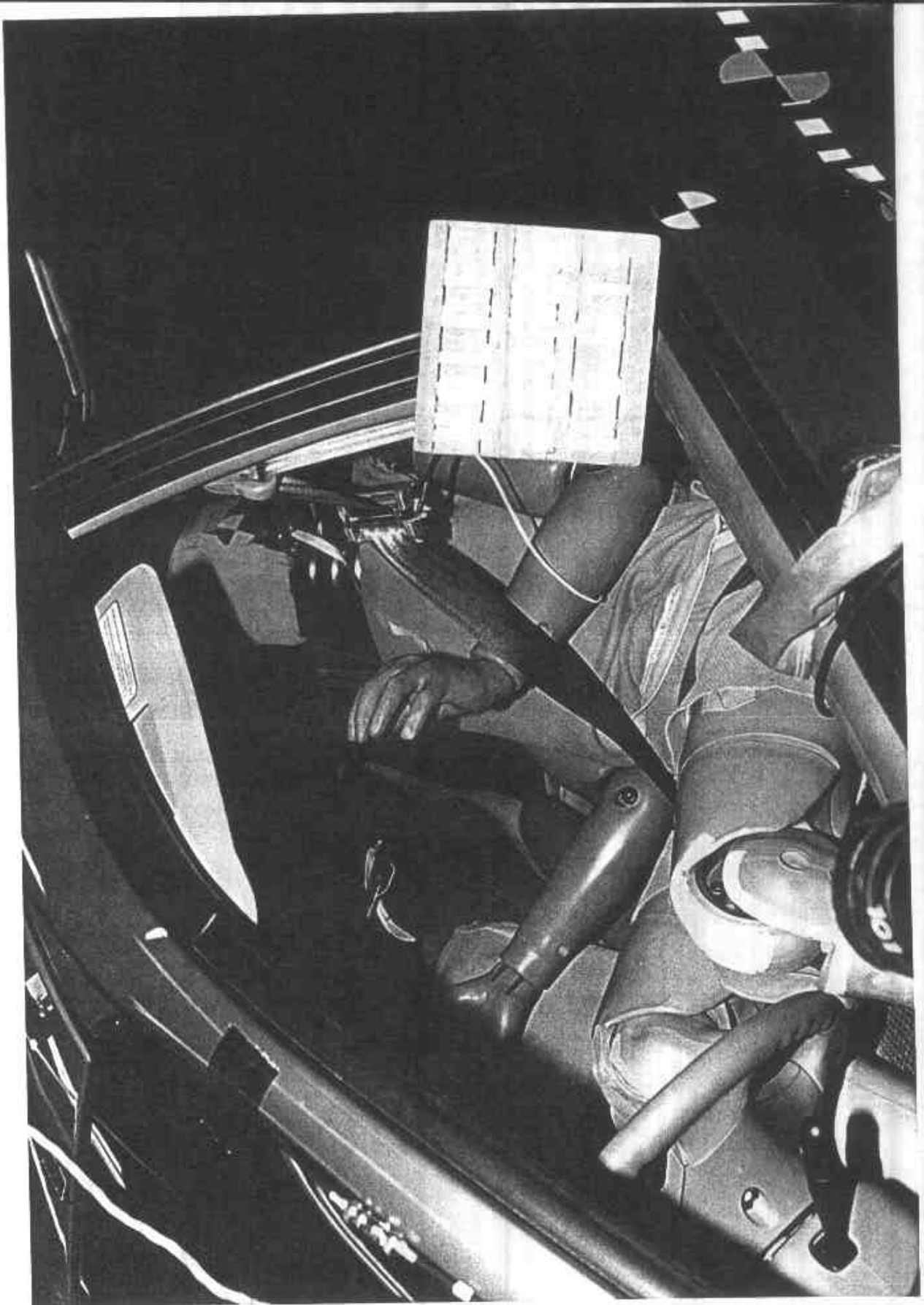


Figure A-23 Post-Test Driver Dummy Position View



Figure A-24 Pre-Test Passenger Dummy Position View



Figure A-25 Post-Test Passenger Dummy Position View



Figure A-26 Pre-Test Driver Dummy and Vehicle Interior - View 1

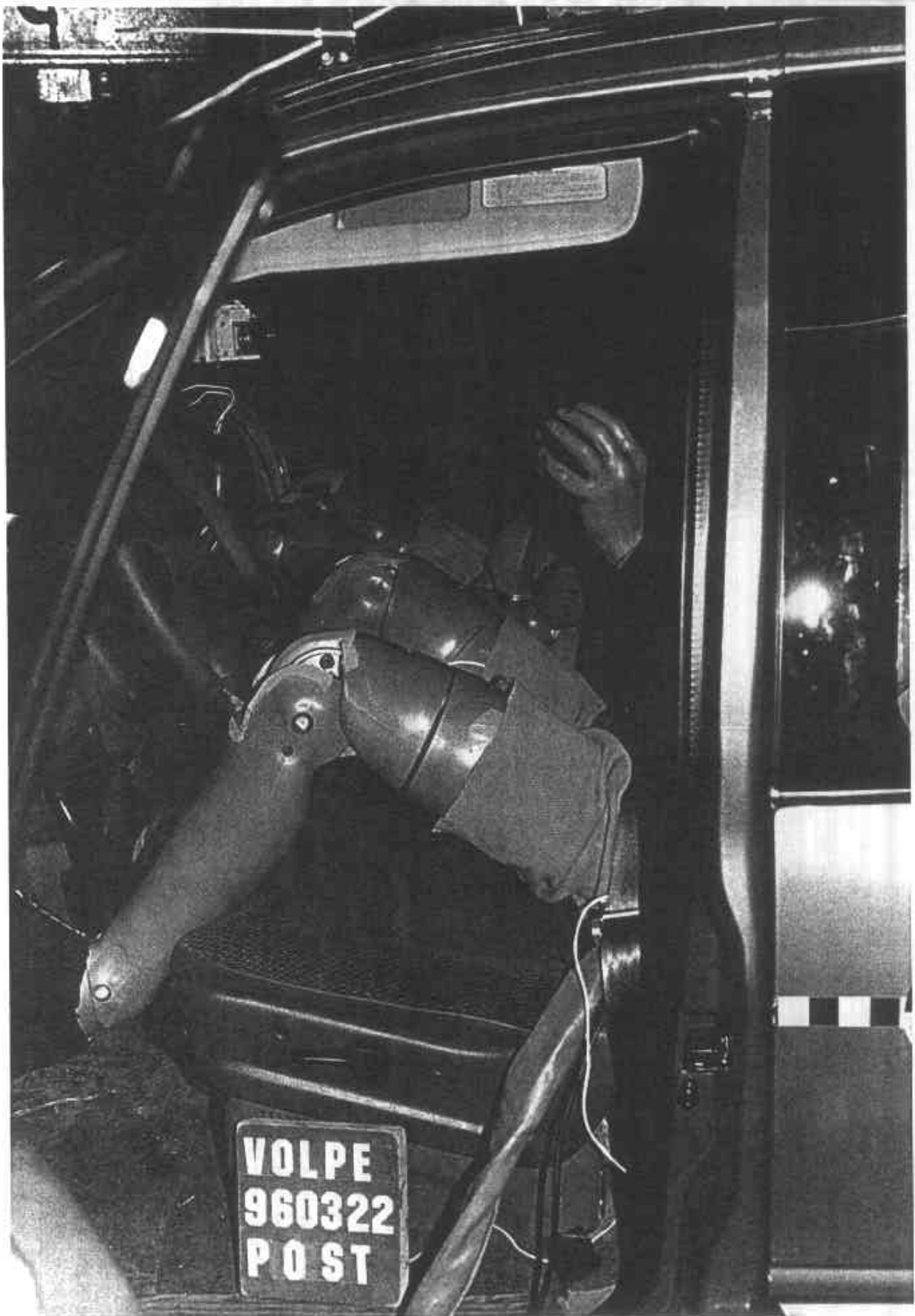


Figure A-27 Post-Test Driver Dummy and Vehicle Interior - View 1

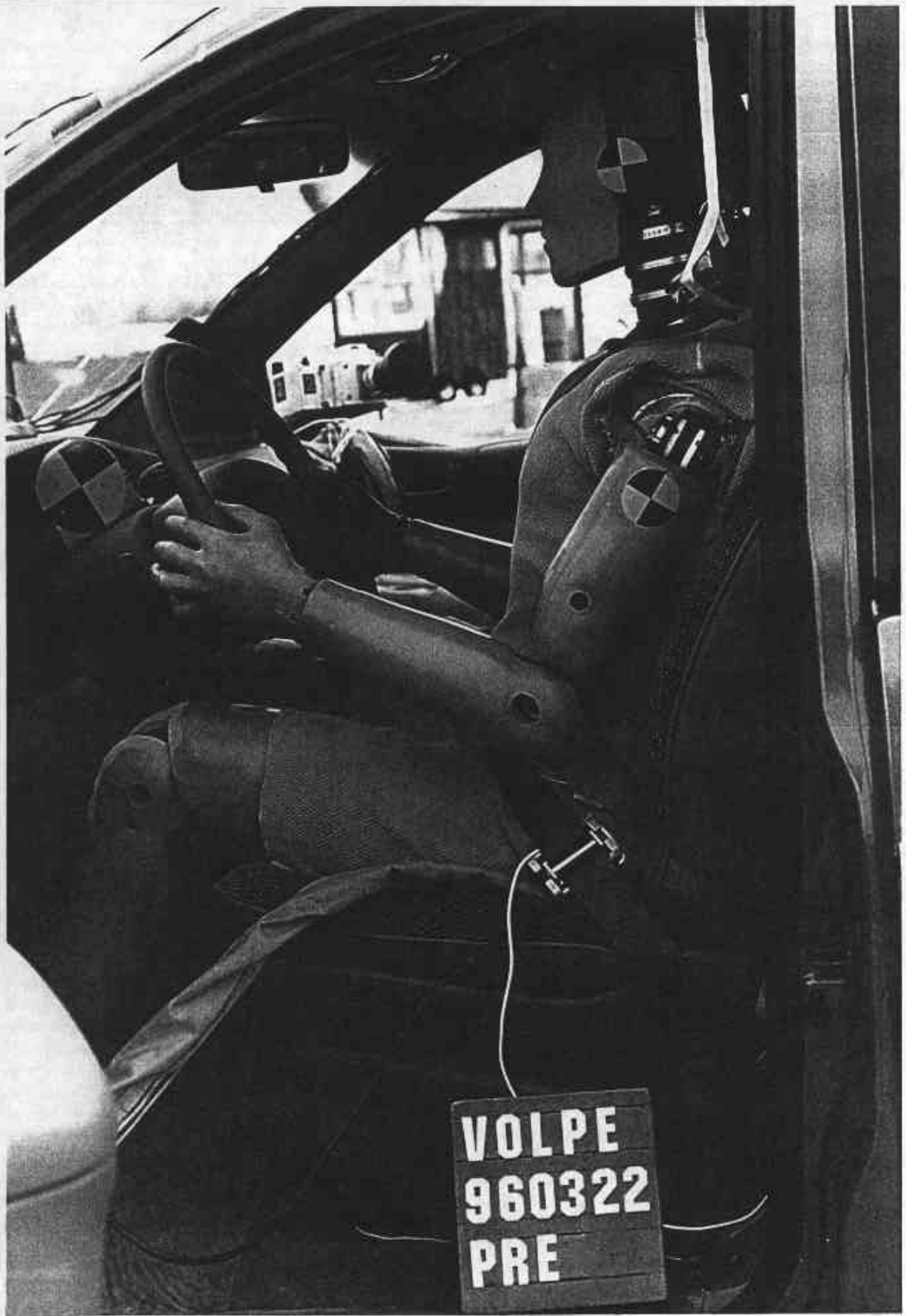


Figure A-28 Pre-Test Driver Dummy and Vehicle Interior - View 2

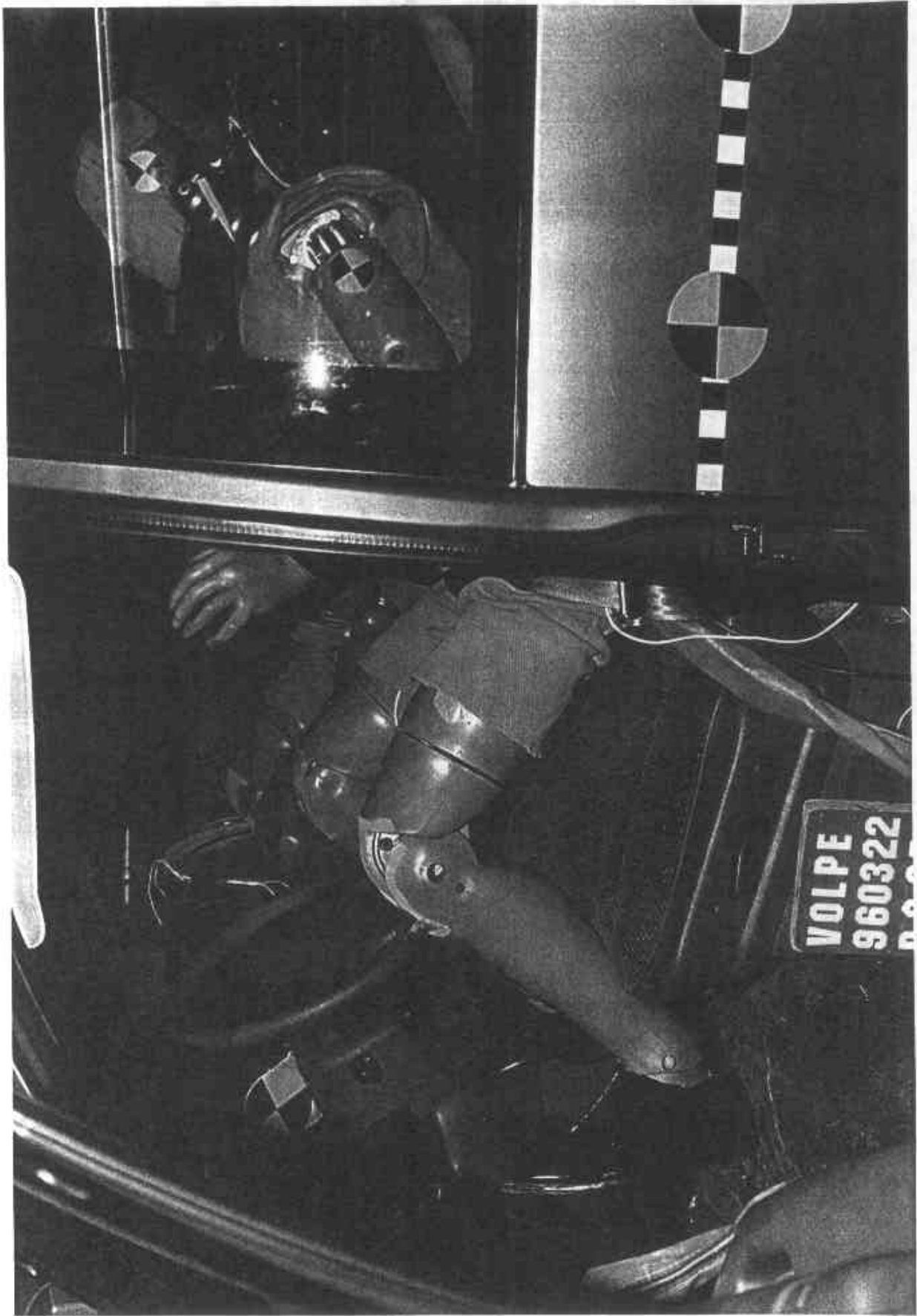


Figure A-29 Post-Test Driver Dummy and Vehicle Interior - View 2



Figure A-30 Pre-Test Passenger Dummy and Vehicle Interior - View 1

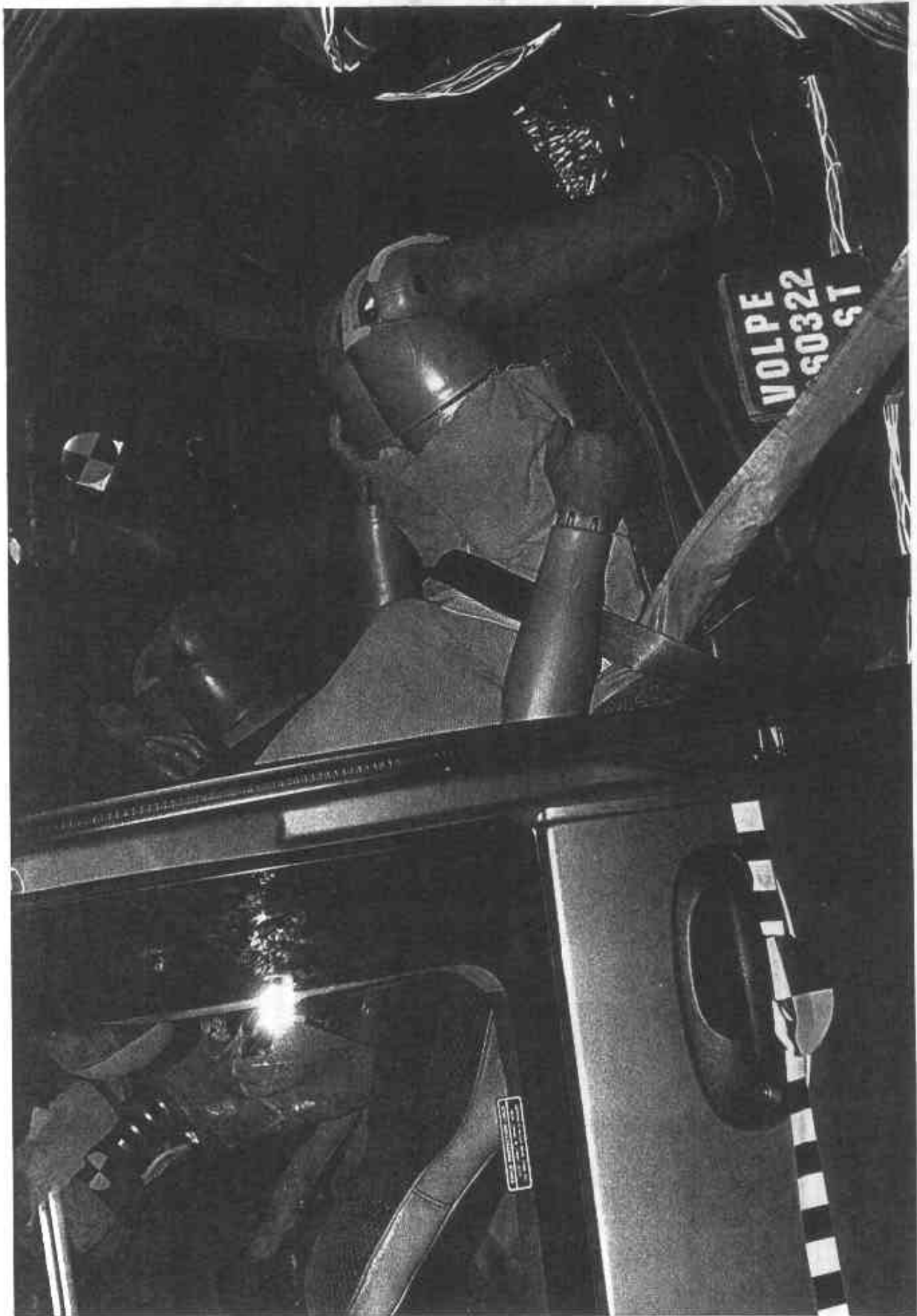


Figure A-31 Post-Test Passenger Dummy and Vehicle Interior - View 1



Figure A-32 Pre-Test Passenger Dummy and Vehicle Interior - View 2

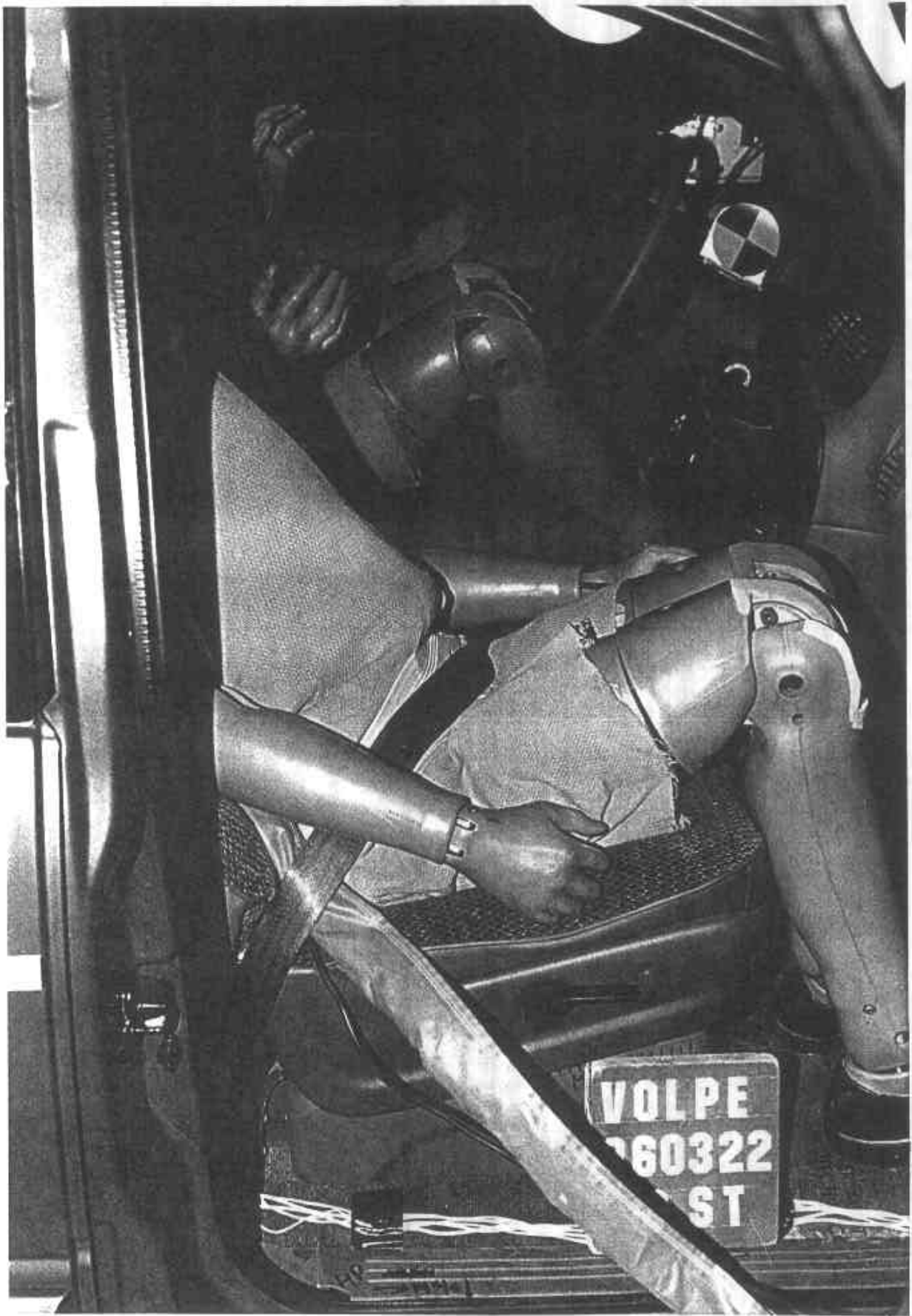


Figure A-33 Post-Test Passenger Dummy and Vehicle Interior - View 2

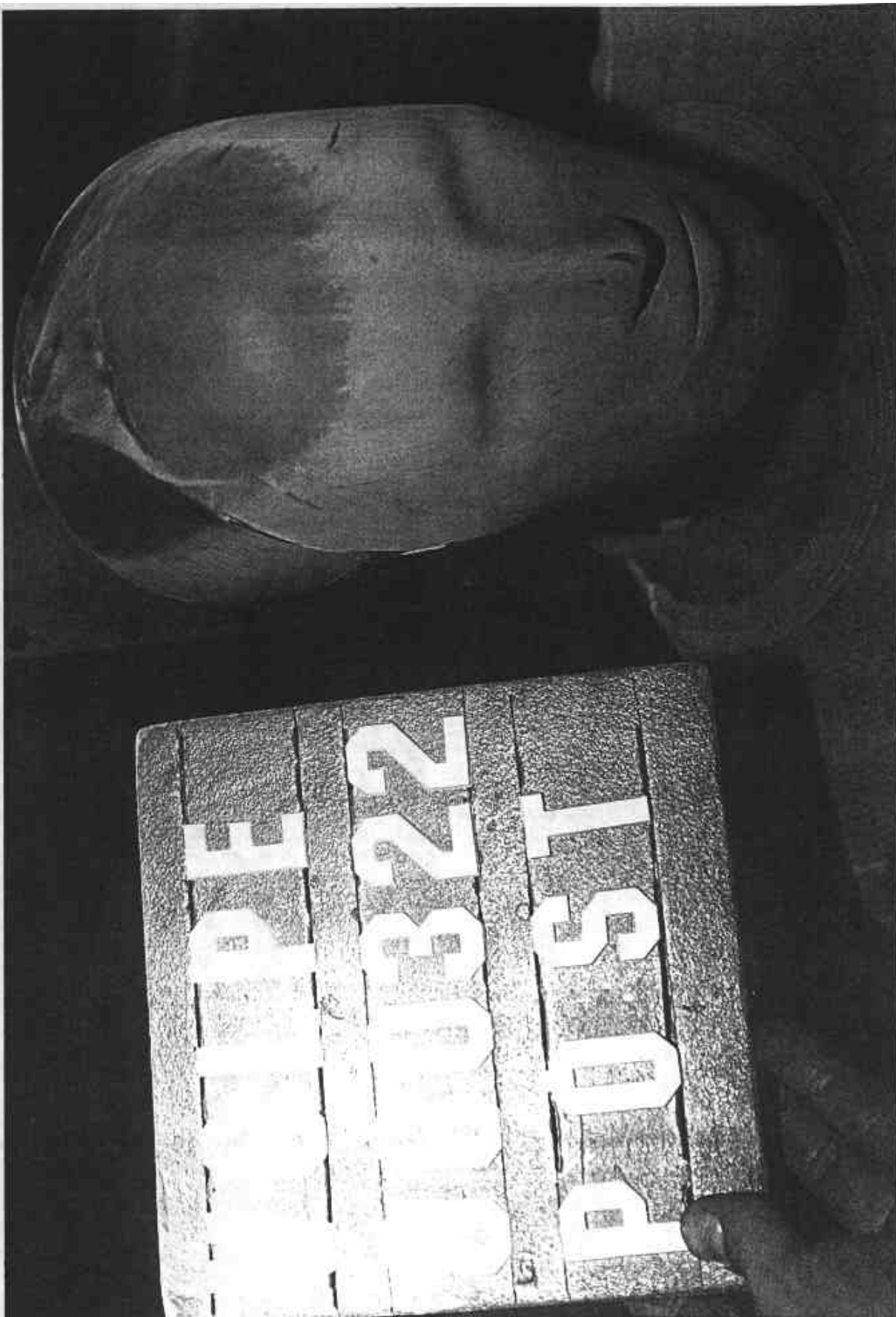


Figure A-34 Post-Test Driver Dummy Head Contact - View 1



Figure A-35 Post-Test Driver Dummy Head Contact - View 2



Figure A-36 Post-Test Driver Dummy Knee Contact View

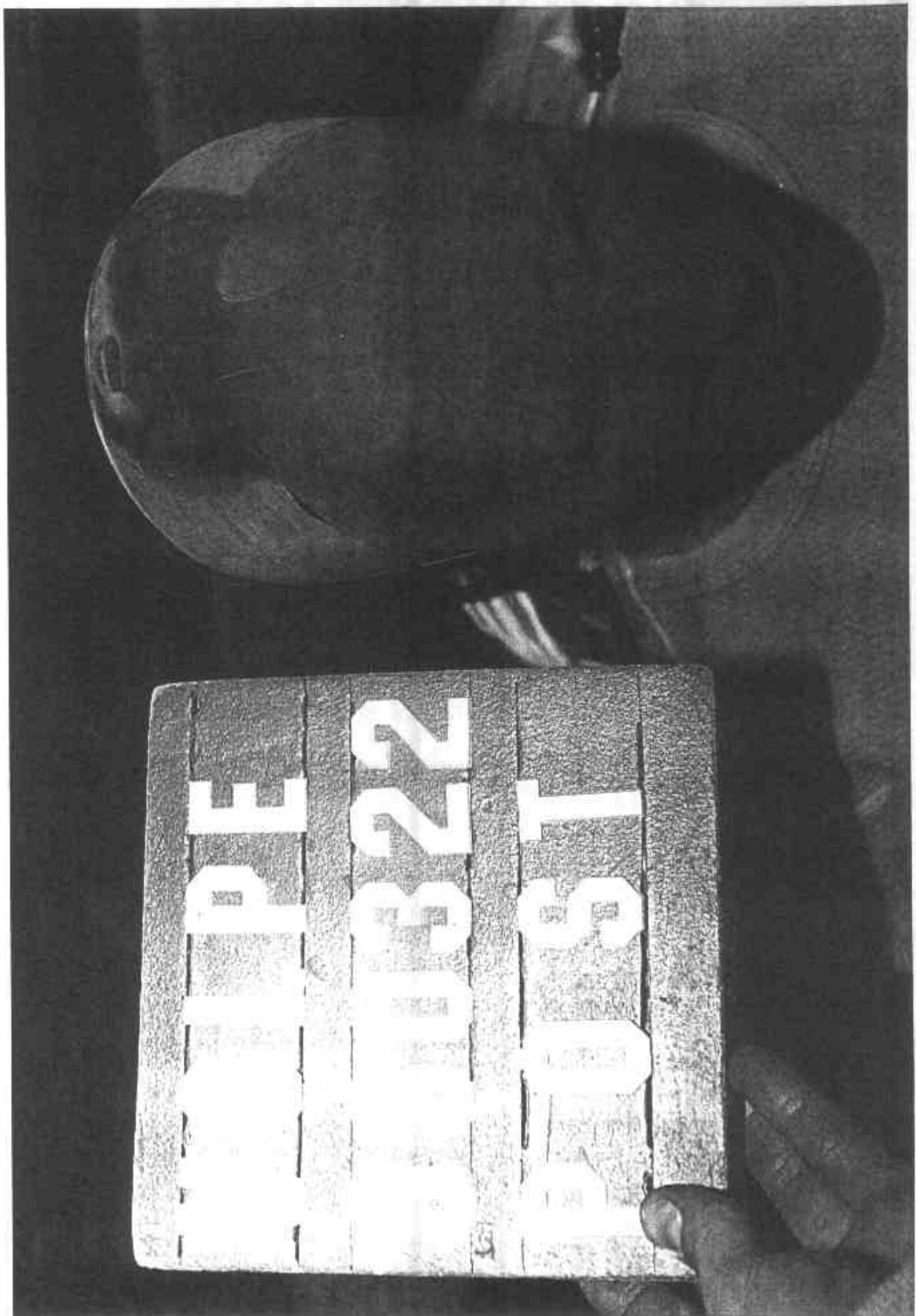


Figure A-37 Post-Test Passenger Dummy Head Contact - View 1



Figure A-38 Post-Test Passenger Dummy Head Contact - View 2

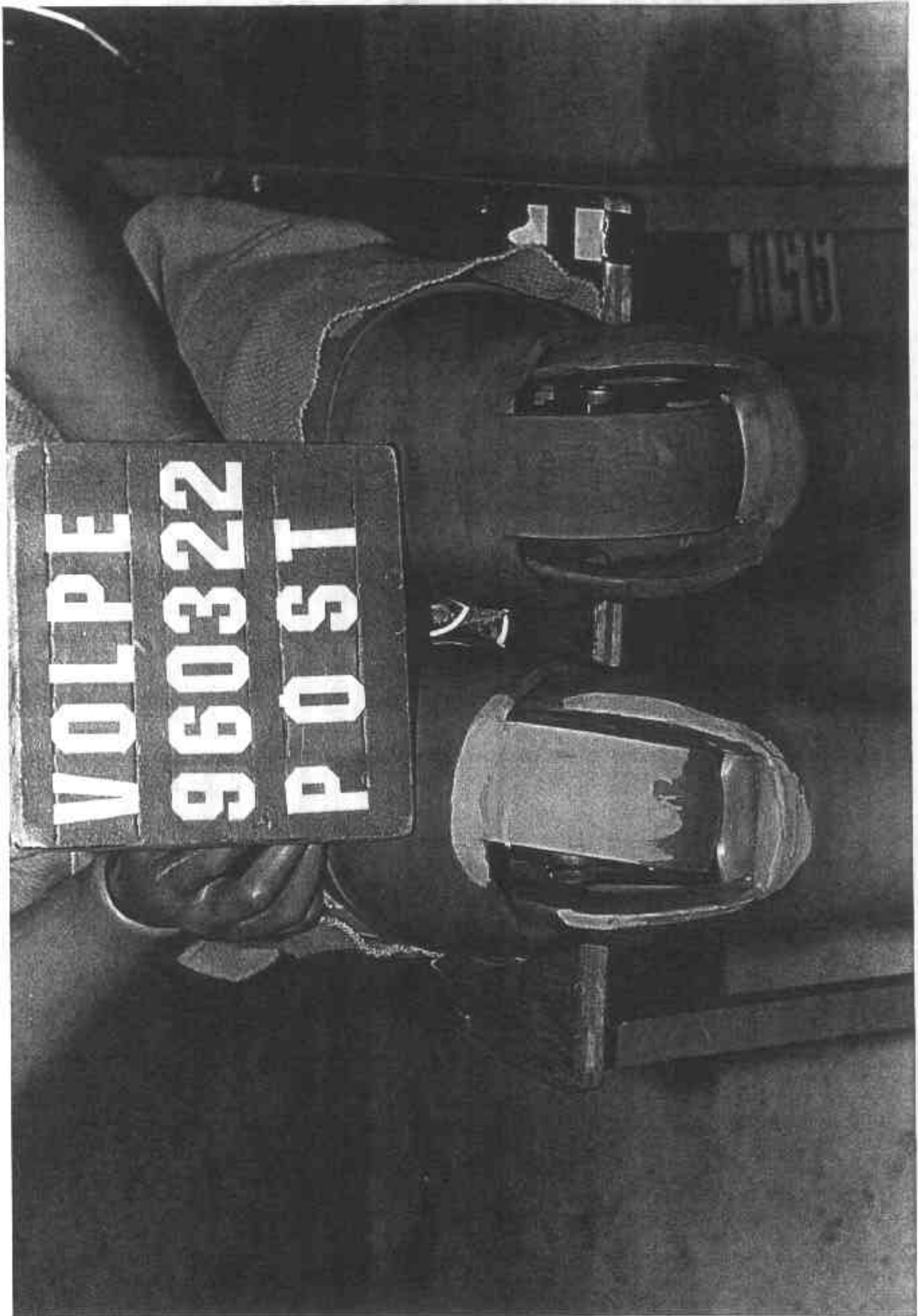


Figure A-39 Post-Test Passenger Dummy Knee Contact View

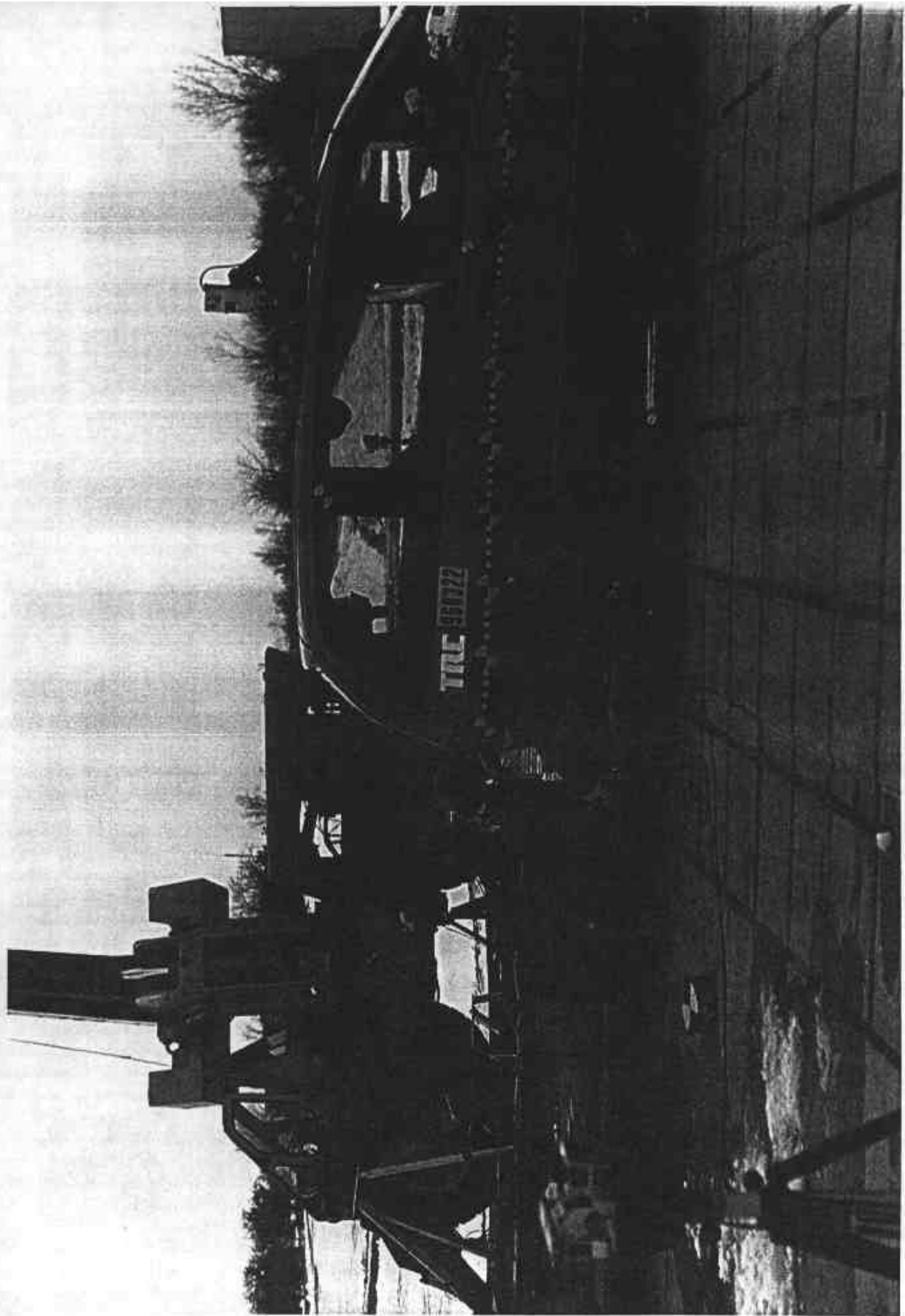


Figure A-40 Impact Event View

A-41

960322

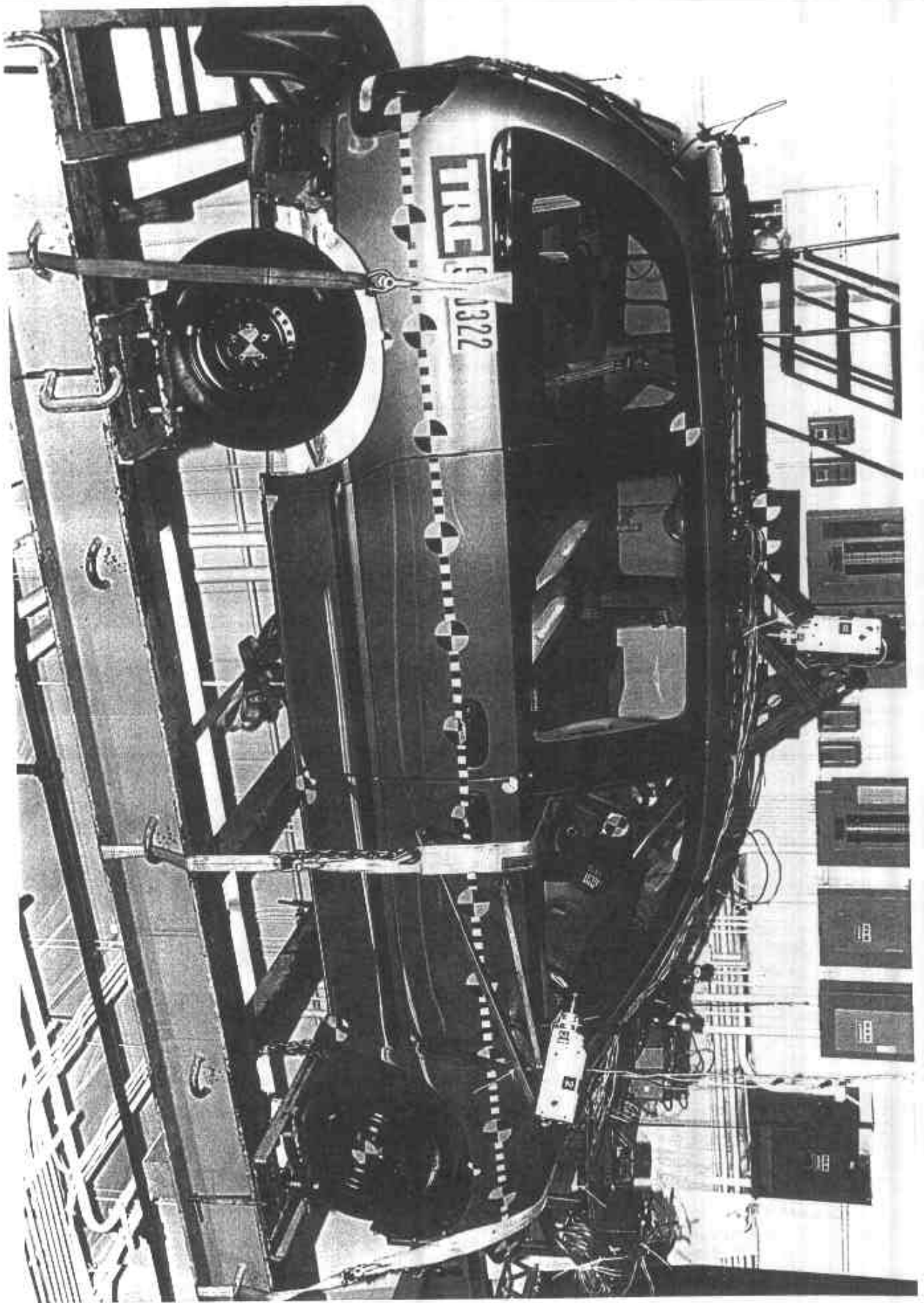


Figure A-41 Vehicle on Static Rollover Machine View

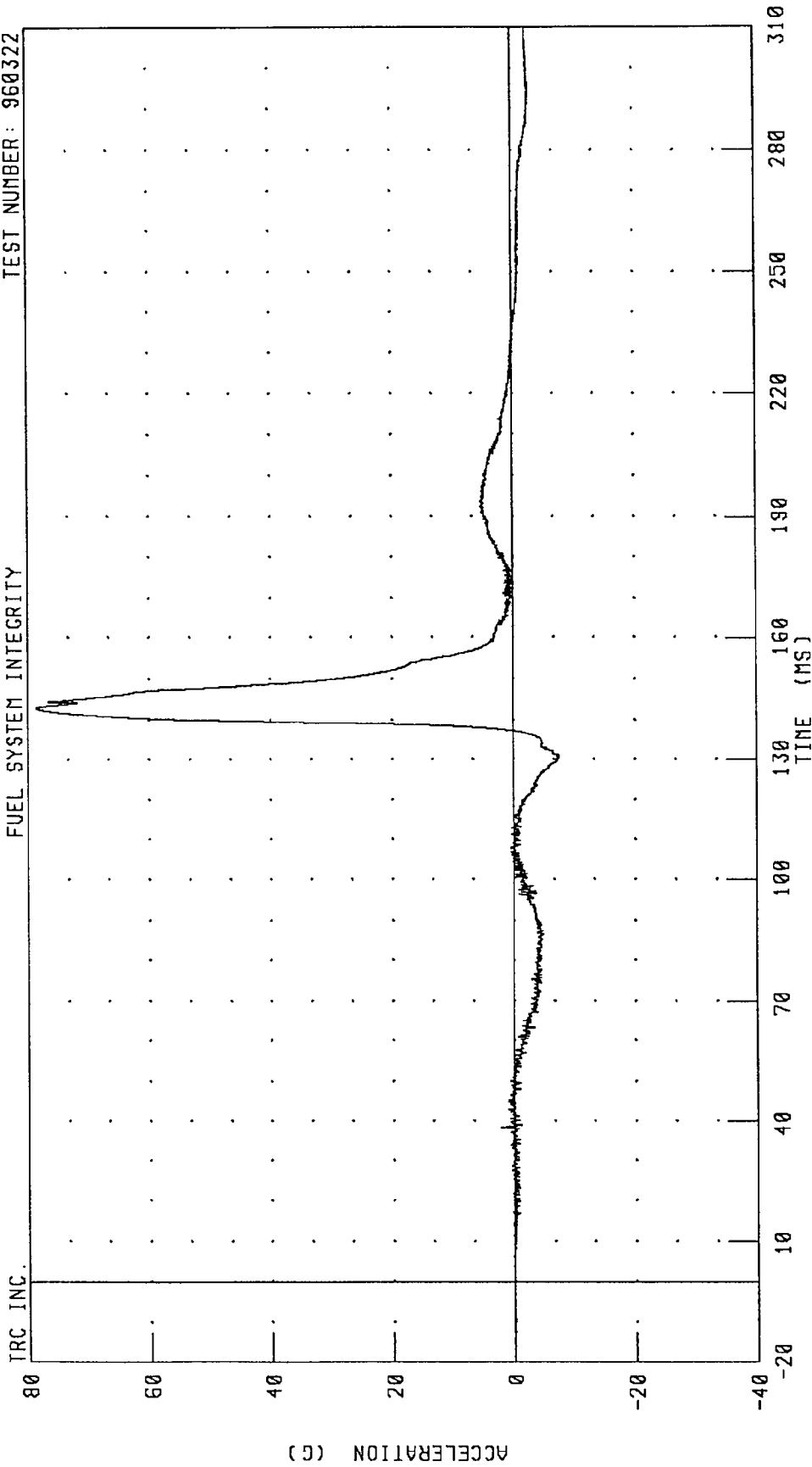
Appendix B

Data Plots

MOVING DEFORMABLE BARRIER INTO REAR OF A 1986 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER HEAD X-AXIS ACCELERATION

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY



CHANNEL: HEDXG1 FILTER: CH. CLASS 1000

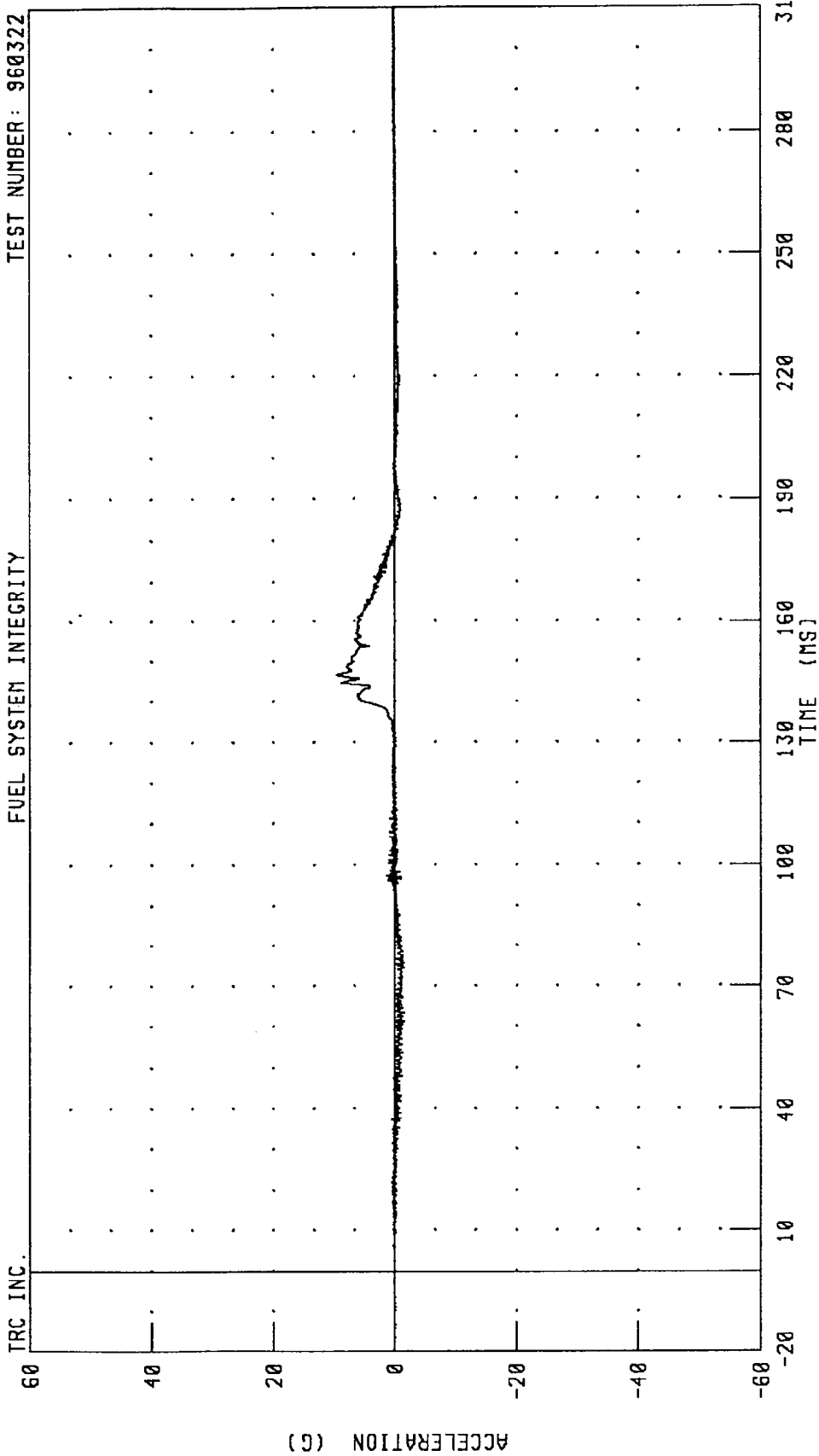
PEAK DATA: 78.55 G @ 142.96 MS; -7.62 G @ 130.40 MS

960322

MOVING DEFORMABLE BARRIER INTO REAR OF A 1986 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER HEAD Y-AXIS ACCELERATION

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY



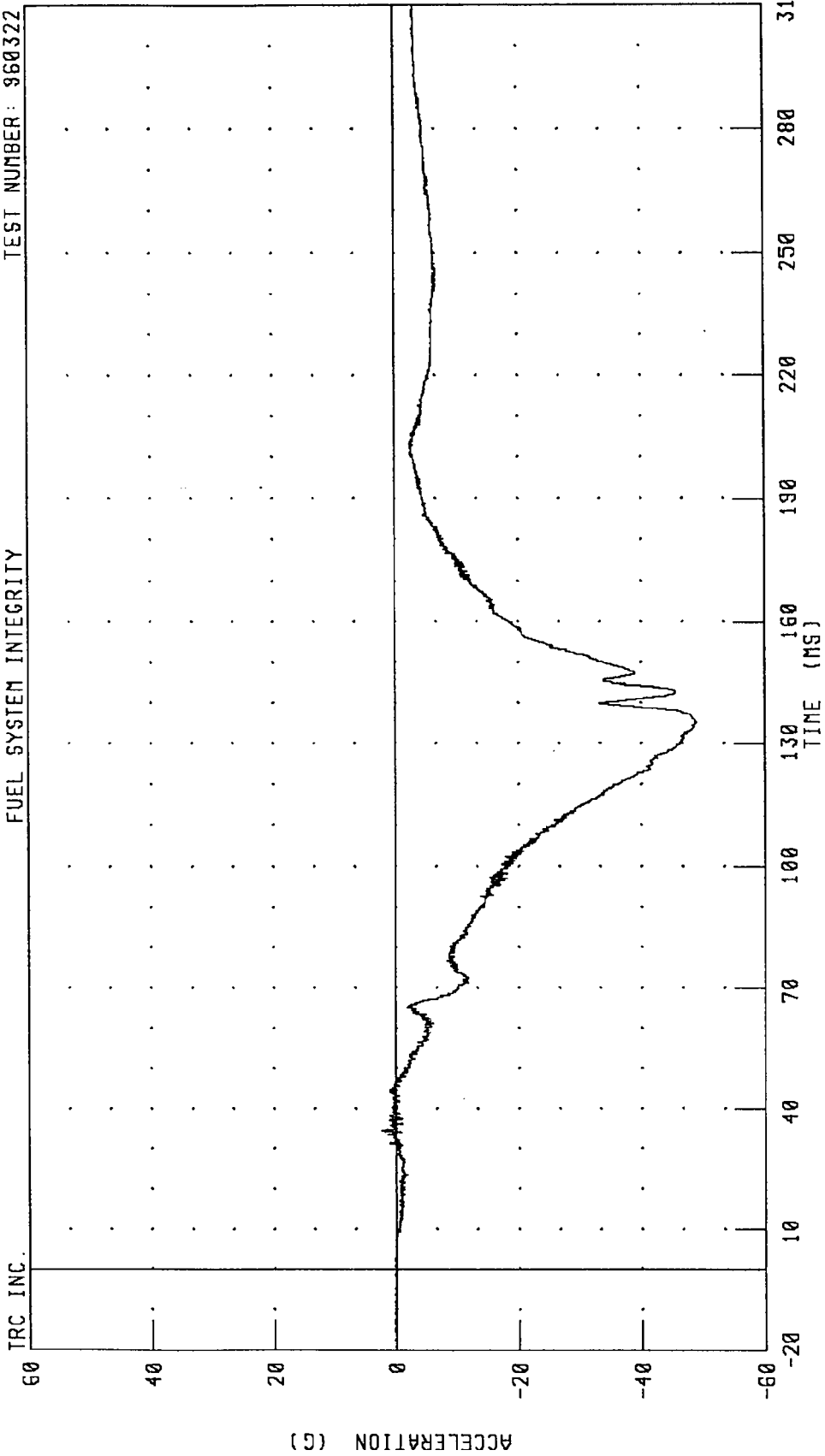
CHANNEL: HEDYG1 FILTER: CH. CLASS 1000

PEAK DATA: 9.59 G @ 146.64 MS; -1.55 G @ 61.20 MS

TRC INC.

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER HEAD Z-AXIS ACCELERATION  
FUEL SYSTEM INTEGRITY

TEST NUMBER: 960322



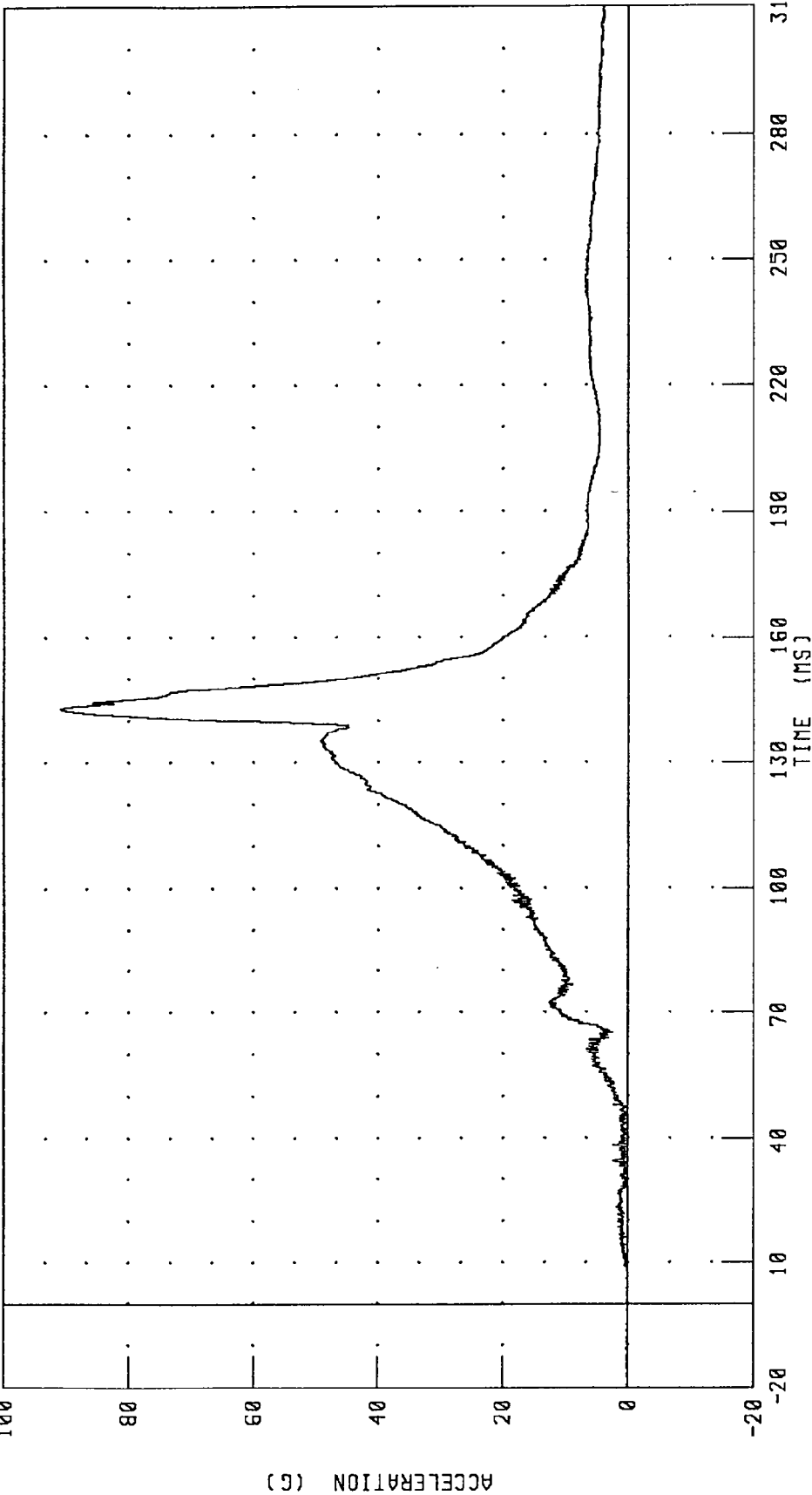
CHANNEL: HEDZG1 FILTER: CH. CLASS 1000  
PEAK DATA: 2.34 G @ 34.64 MS; -48.91 G @ 135.12 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER HEAD RESULTANT ACCELERATION

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

TRC INC.

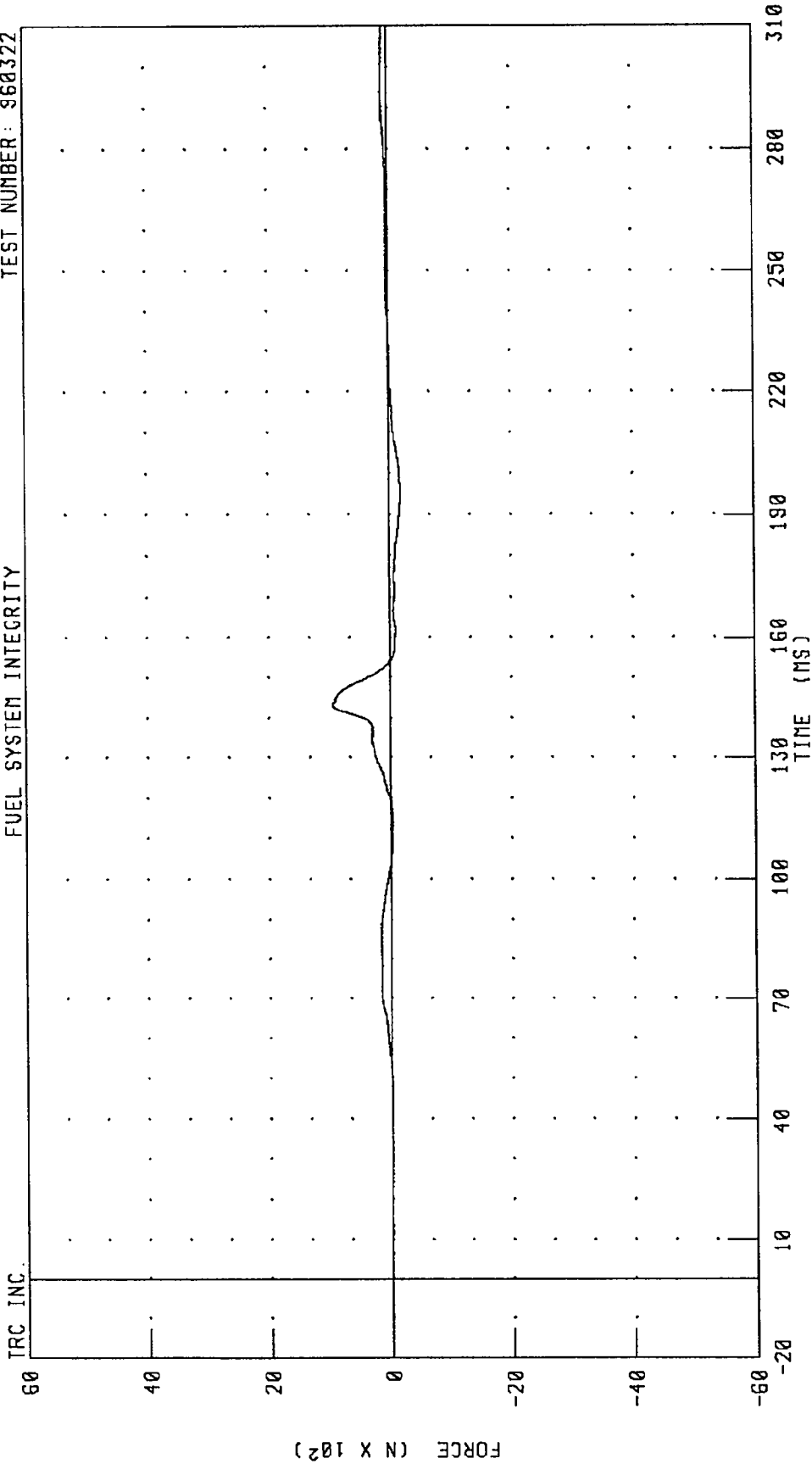


CHANNEL: HEDRG1 FILTER: CH. CLASS 1000

PEAK DATA: 90.87 G @ 142.96 MS; 0.02 G @ -20.00 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER UPPER NECK X-AXIS SHEAR FORCE

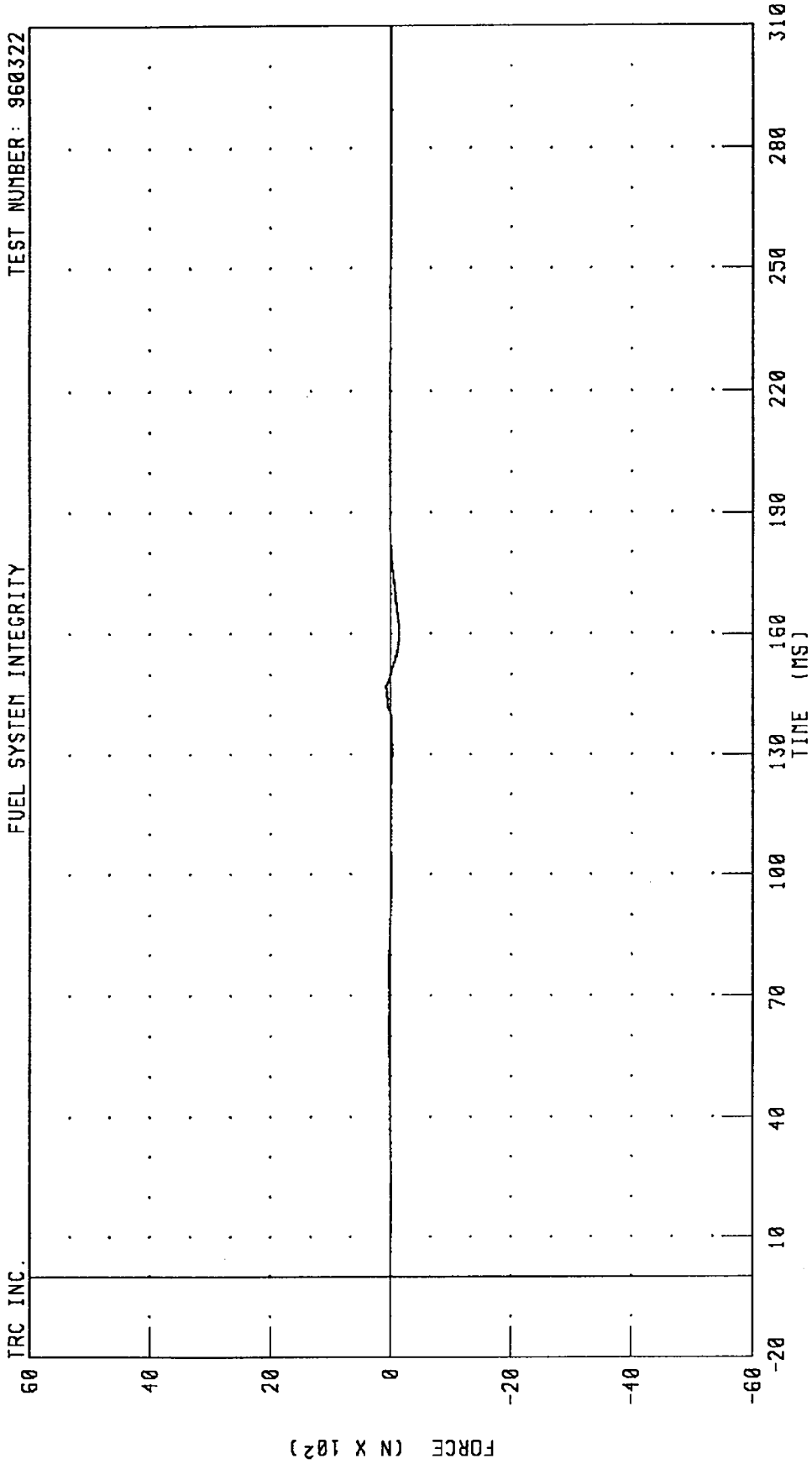
FUEL SYSTEM INTEGRITY  
TEST NUMBER: S60322



CHANNEL: NEKXF1 FILTER: CH. CLASS 1000  
PEAK DATA: 953.13 N @ 143.36 MS; -189.33 N @ 193.04 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER UPPER NECK Y-AXIS SHEAR FORCE

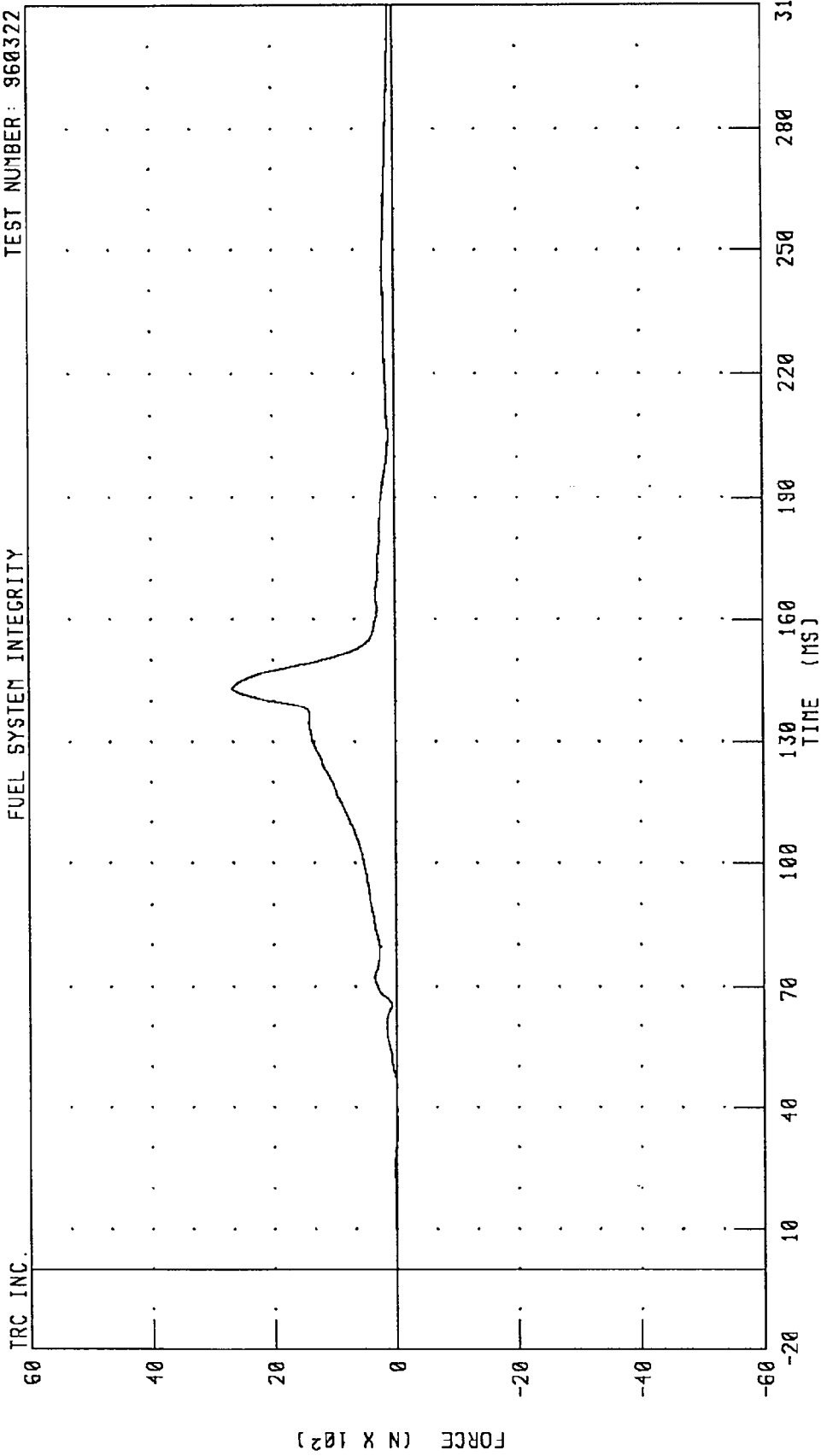
FUEL SYSTEM INTEGRITY TEST NUMBER: 960322



TRC INC. CHANNEL: NEKYF1 FILTER: CH. CLASS 1000 PEAK DATA: 84.63 N @ 146.96 MS; -141.56 N @ 159.68 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER UPPER NECK Z-AXIS AXIAL FORCE

FUEL SYSTEM INTEGRITY  
TEST NUMBER: 960322



TRC INC.  
CHANNEL: NEKZF1 FILTER: CH. CLASS 1000  
PEAK DATA: 2672.76 N @ 143.04 MS; -21.60 N @ 34.24 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER UPPER NECK MOMENT ABOUT X-AXIS

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

TRC INC.

180

120

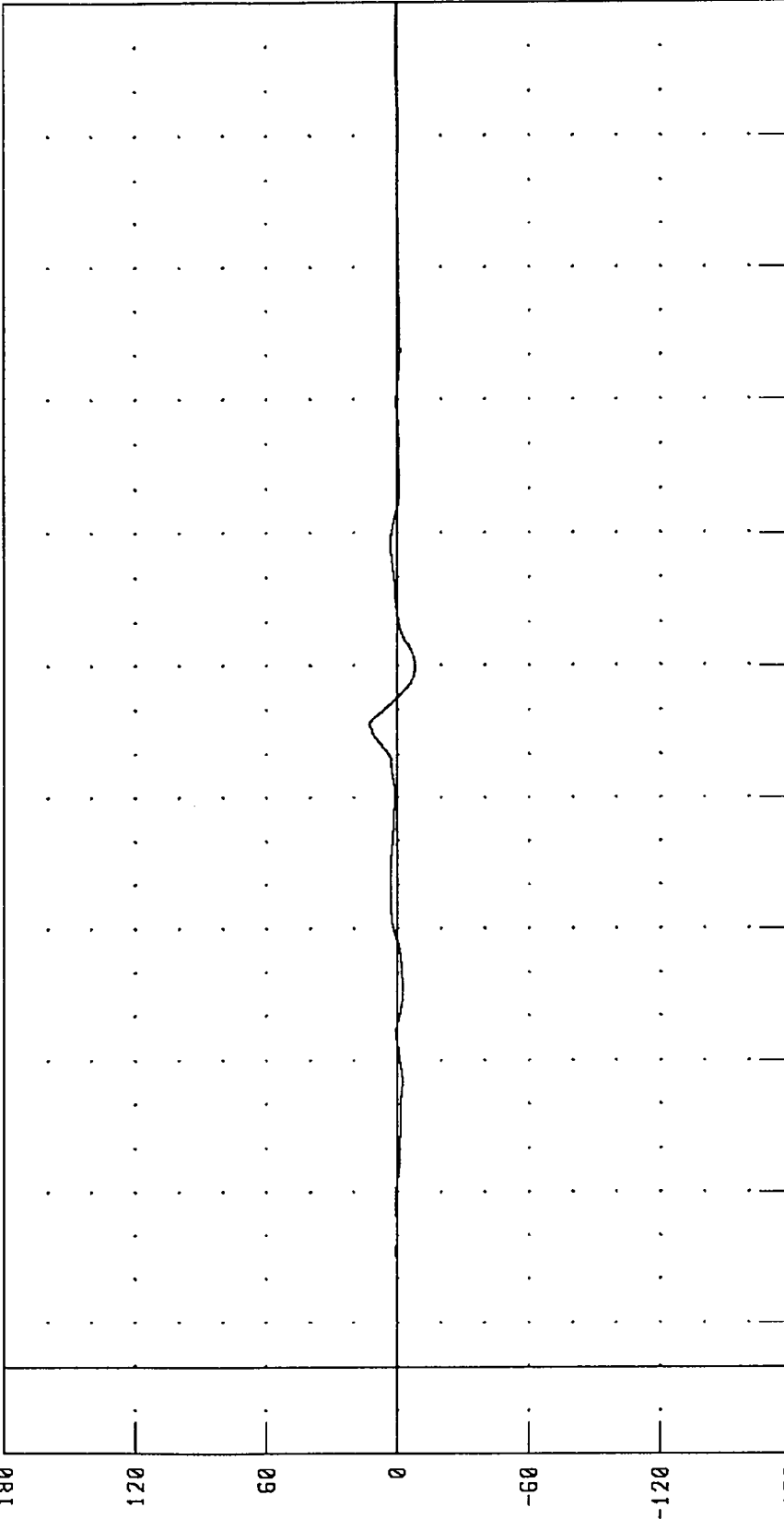
60

0

-60

-120

-180



180 160 140 120 100 80 60 40 20 0 -20 -40 -60 -80 -100 -120 -140 -160 -180

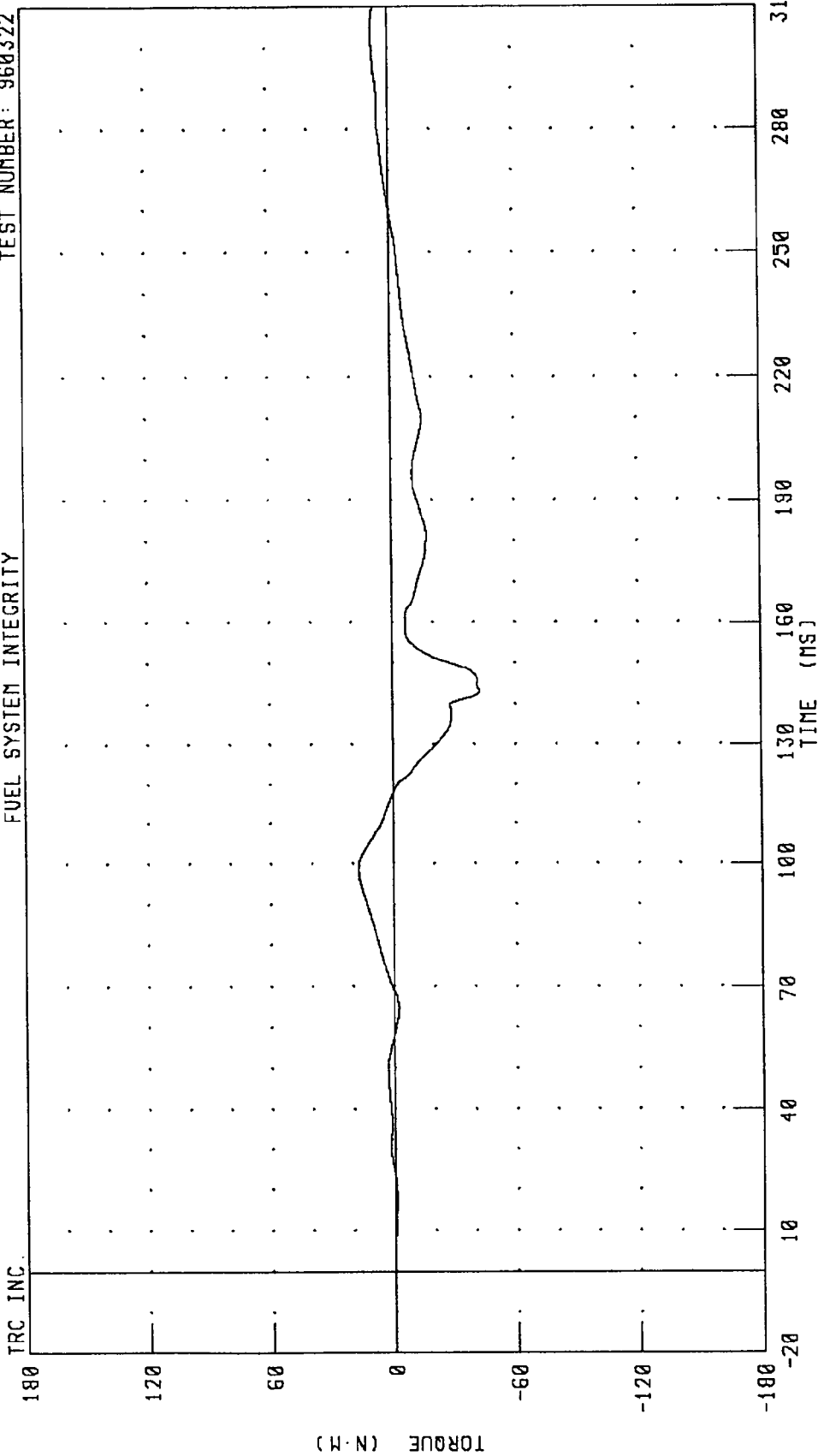
TIME (MS)

310 280 250 220 190 160 130 100 70 40 10

CHANNEL: NEKXMI FILTER: CH. CLASS 600 PEAK DATA: 12.76 N.M @ 147.04 MS; -8.16 N.M @ 160.16 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER UPPER NECK MOMENT ABOUT Y-AXIS  
FUEL SYSTEM INTEGRITY

TEST NUMBER: 960322

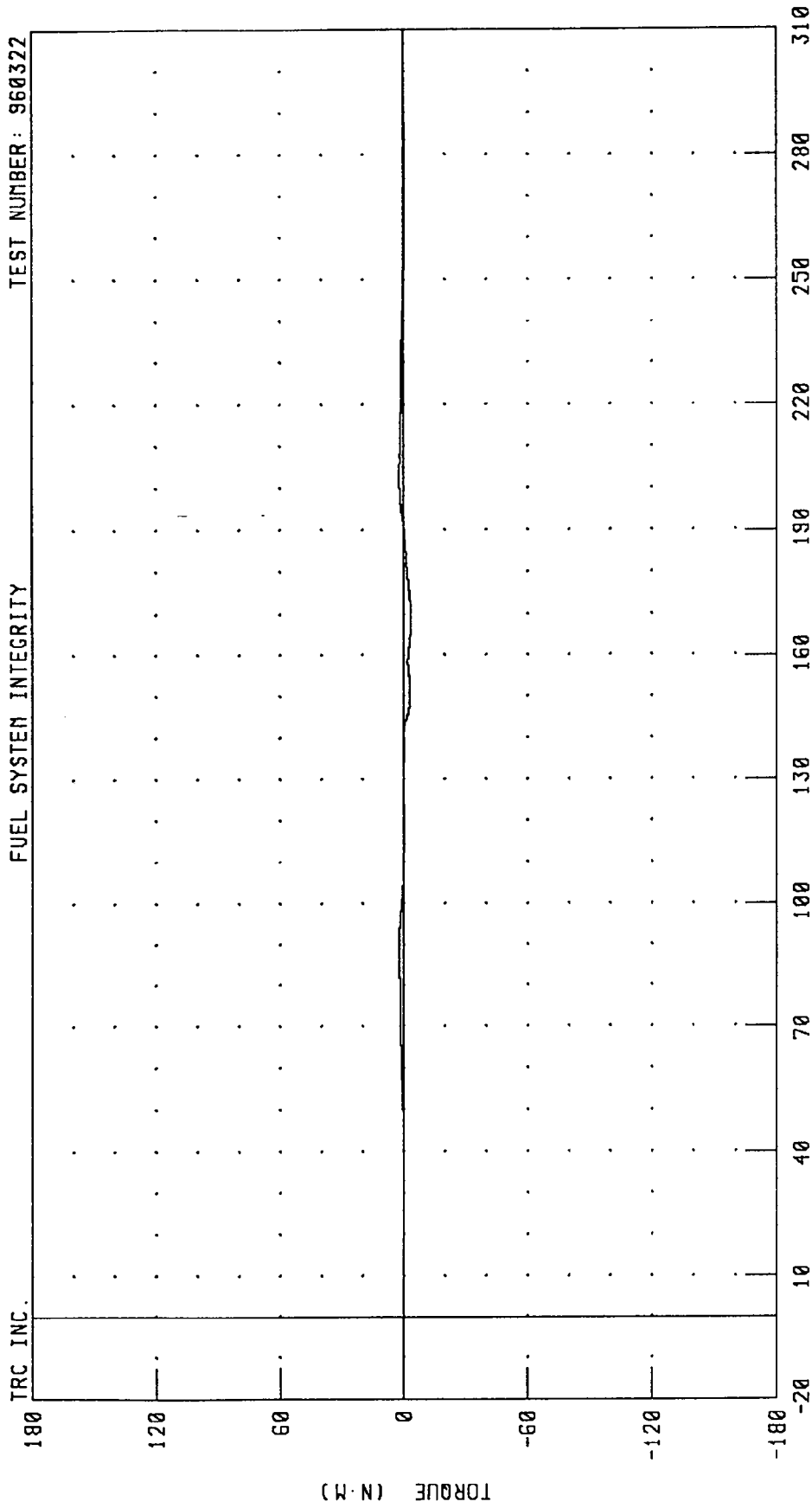


CHANNEL: NEKYM1 FILTER: CH. CLASS 600 PEAK DATA: 17.07 N·M @ 98.16 MS; -42.57 N·M @ 143.28 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER UPPER NECK MOMENT ABOUT Z-AXIS

TRC INC. TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

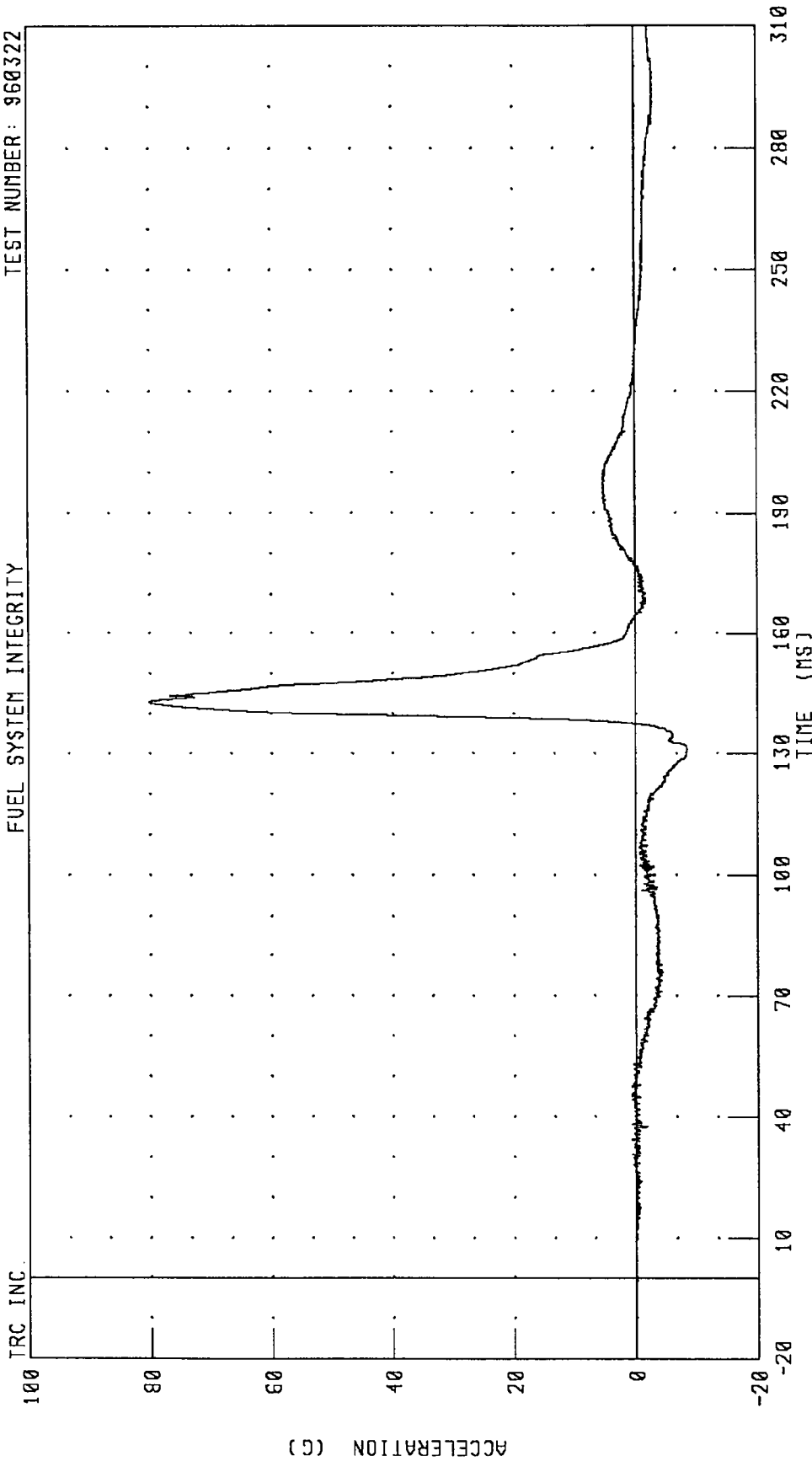


CHANNEL: NEKZM1 FILTER: CH. CLASS 600 PEAK DATA: 2.19 N-M @ 90.80 MS; -3.75 N-M @ 167.60 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER HEAD POSITION 1 X-AXIS ACCELERATION

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

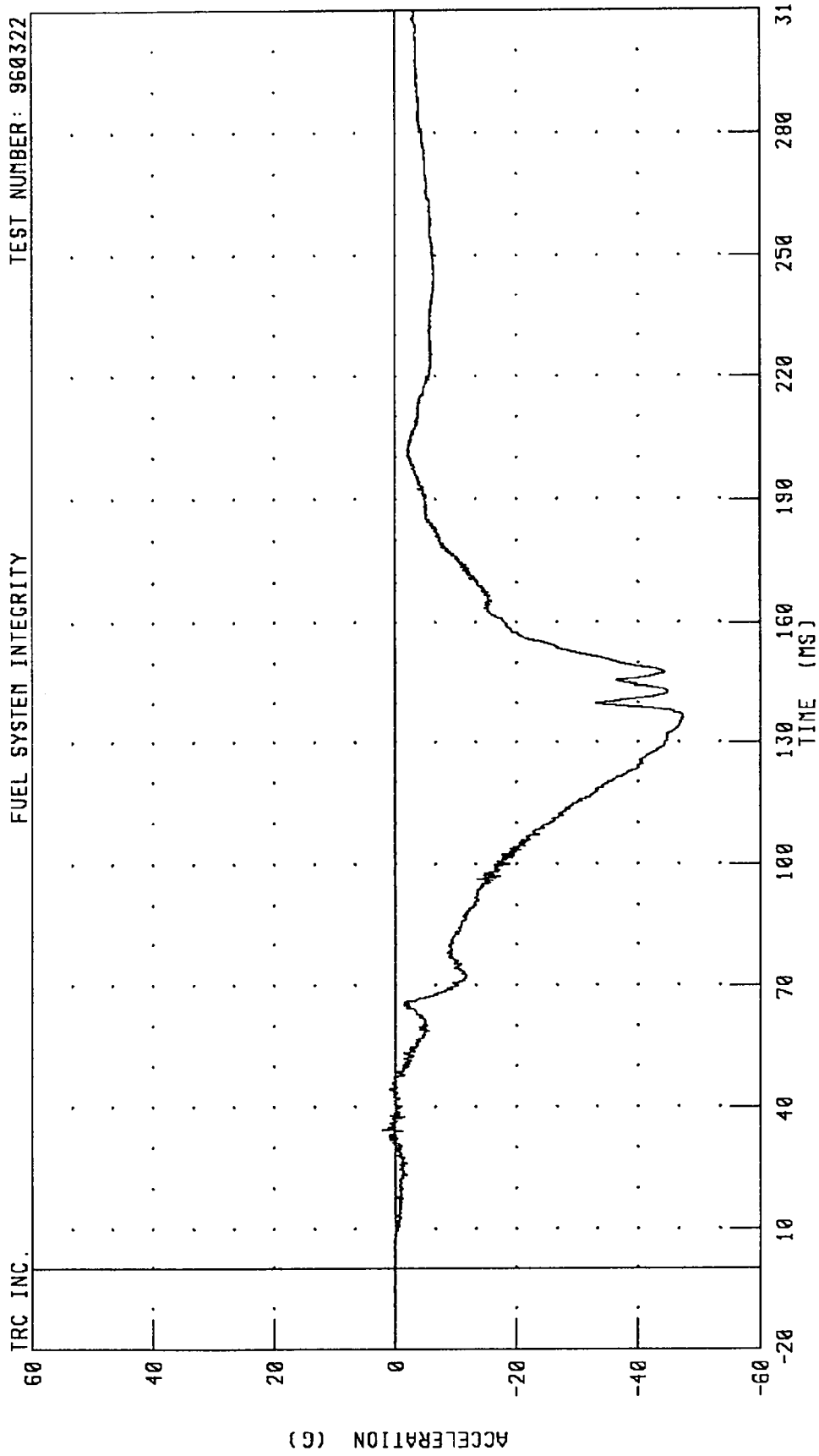


CHANNEL: HD1XG1 FILTER: CH. CLASS 1000

PEAK DATA: 80.17 G @ 142.88 MS; -8.45 G @ 130.40 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER HEAD POSITION 1 Z-AXIS ACCELERATION

TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960322



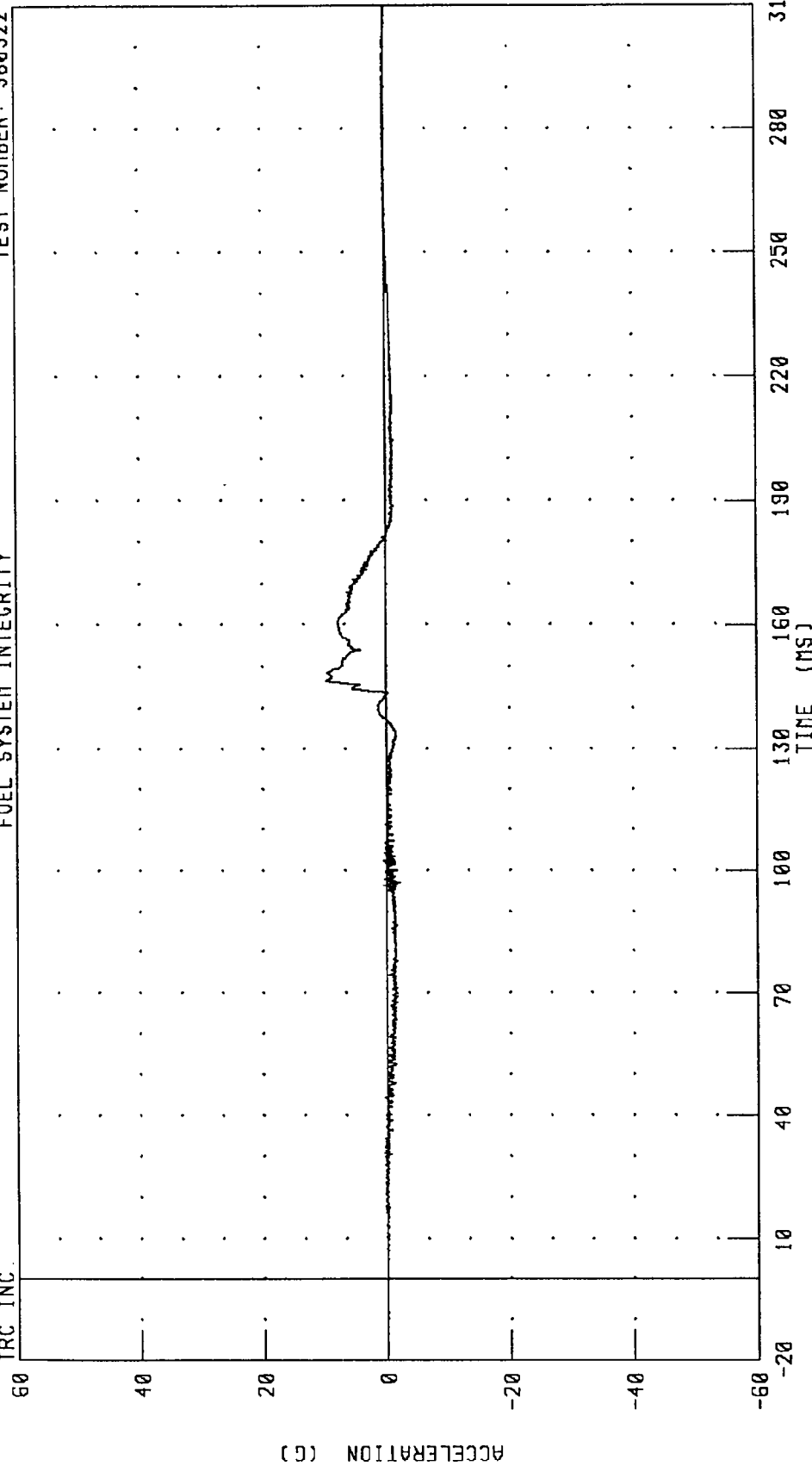
CHANNEL: HD1ZG1 FILTER: CH. CLASS 1000 PEAK DATA: 2.16 G @ 34.56 MS; -47.46 G @ 136.40 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER HEAD POSITION 2 Y-AXIS ACCELERATION

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: HD2YG1 FILTER: CH. CLASS 1000

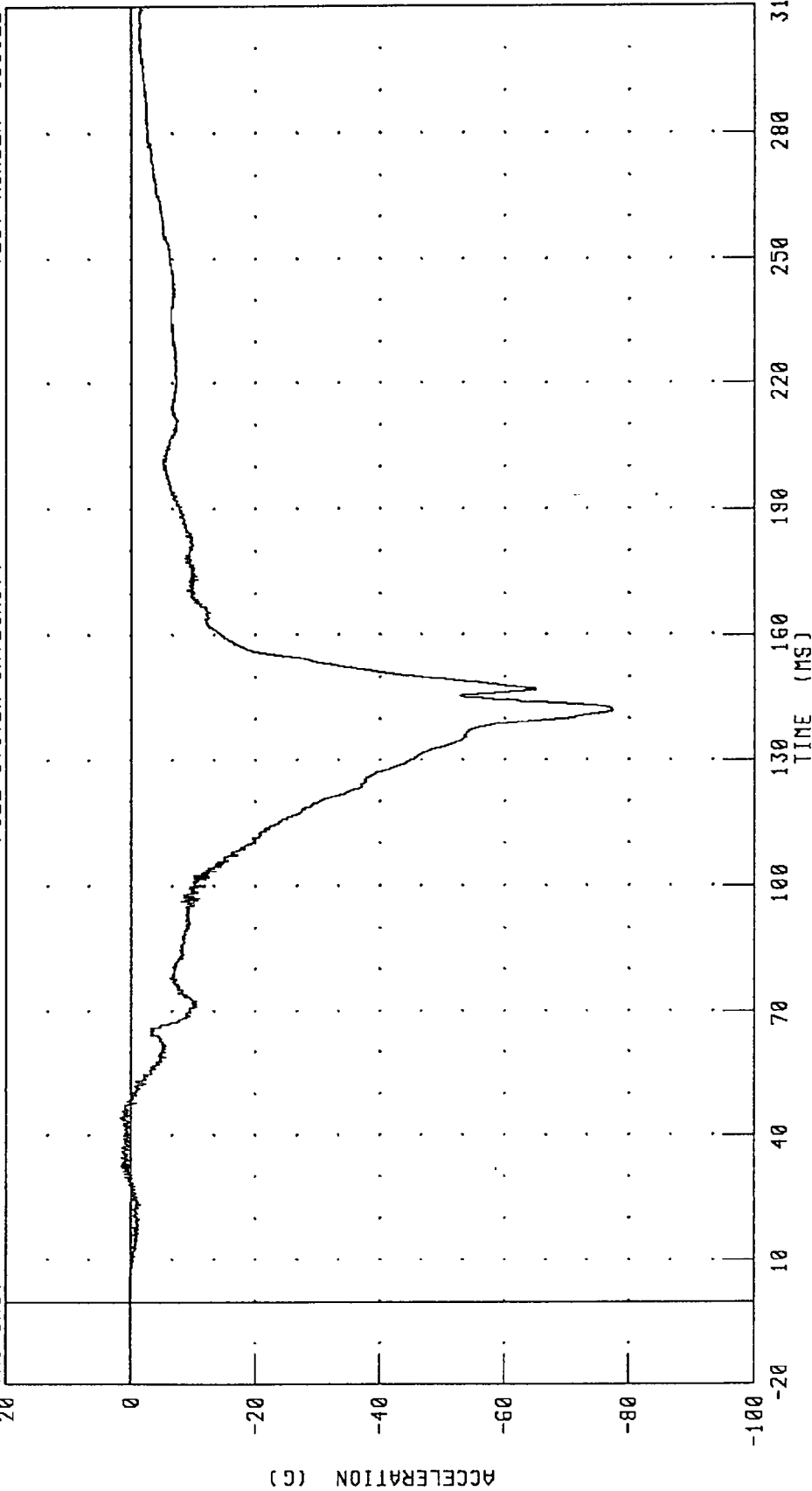
PEAK DATA: 9.62 G @ 146.72 MS; -2.16 G @ 97.20 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER HEAD POSITION 2 Z-AXIS ACCELERATION

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

IRC INC.



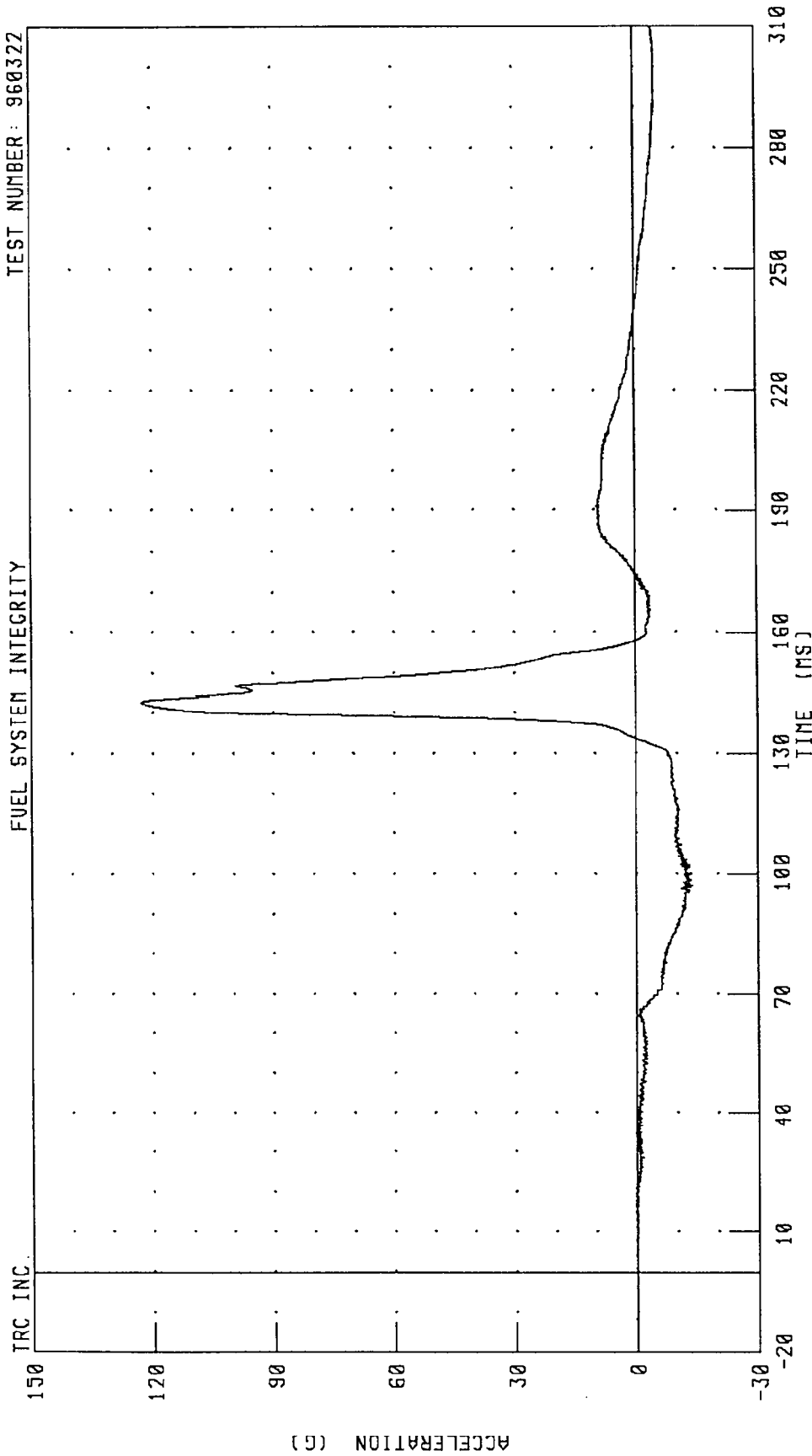
CHANNEL: HD2ZG1 FILTER: CH. CLASS 1000

PEAK DATA: 1.72 G @ 44.24 MS; -77.35 G @ 142.08 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1986 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER HEAD POSITION 3 X-AXIS ACCELERATION

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY



CHANNEL: HD3XG1 FILTER: CH. CLASS 1000 PEAK DATA: 122.81 G @ 142.72 MS; -13.80 G @ 97.20 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER HEAD POSITION 3 Y-AXIS ACCELERATION

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

TRC INC.

60

40

20

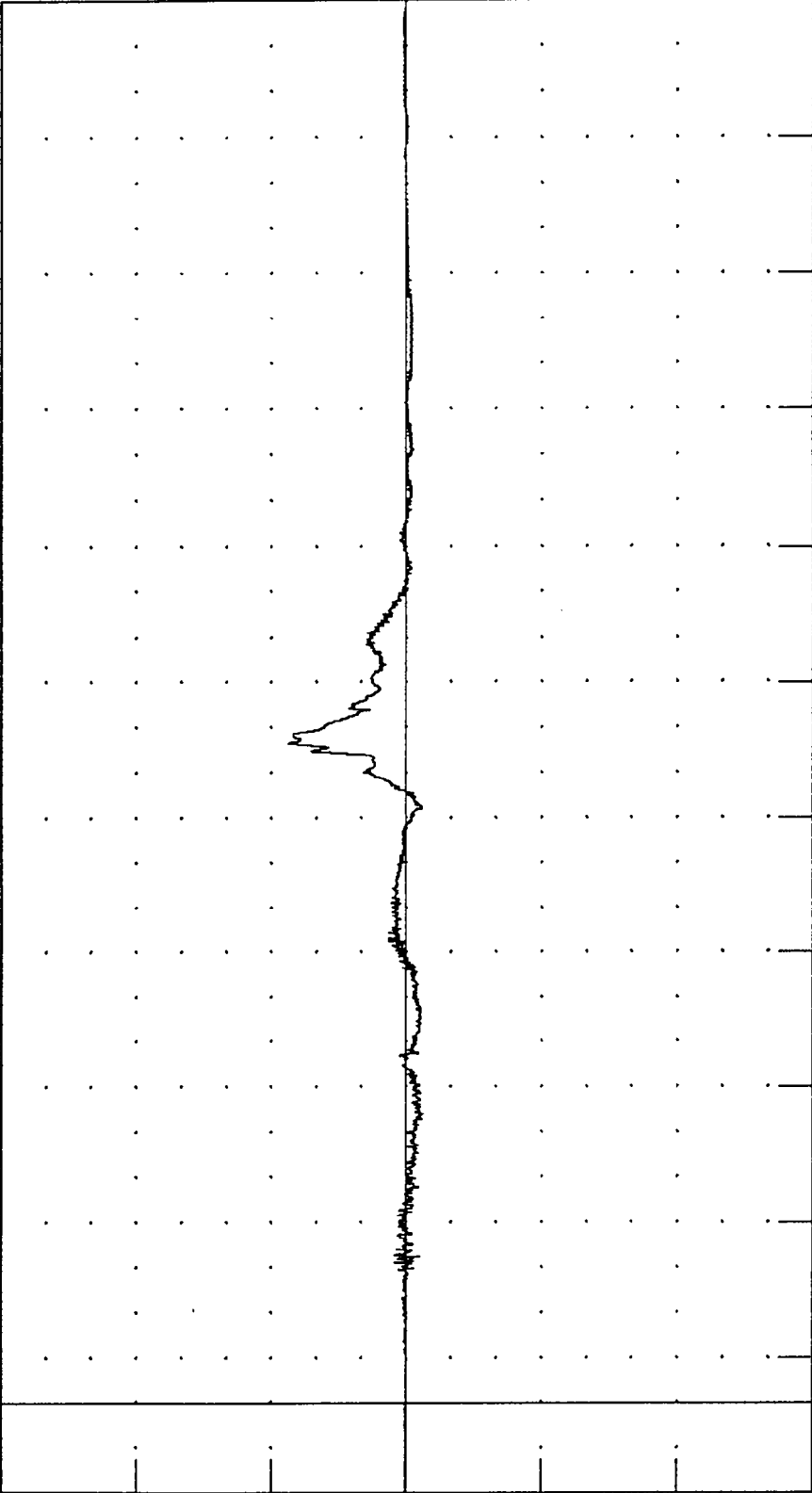
0

-20

-40

-60

ACCELERATION (G)



310 280 250 220 190 160 130 100 70 40 10 -20 -40 -60  
TIME (MS)

PEAK DATA: 17.48 G @ 146.56 MS; -2.55 G @ 64.08 MS

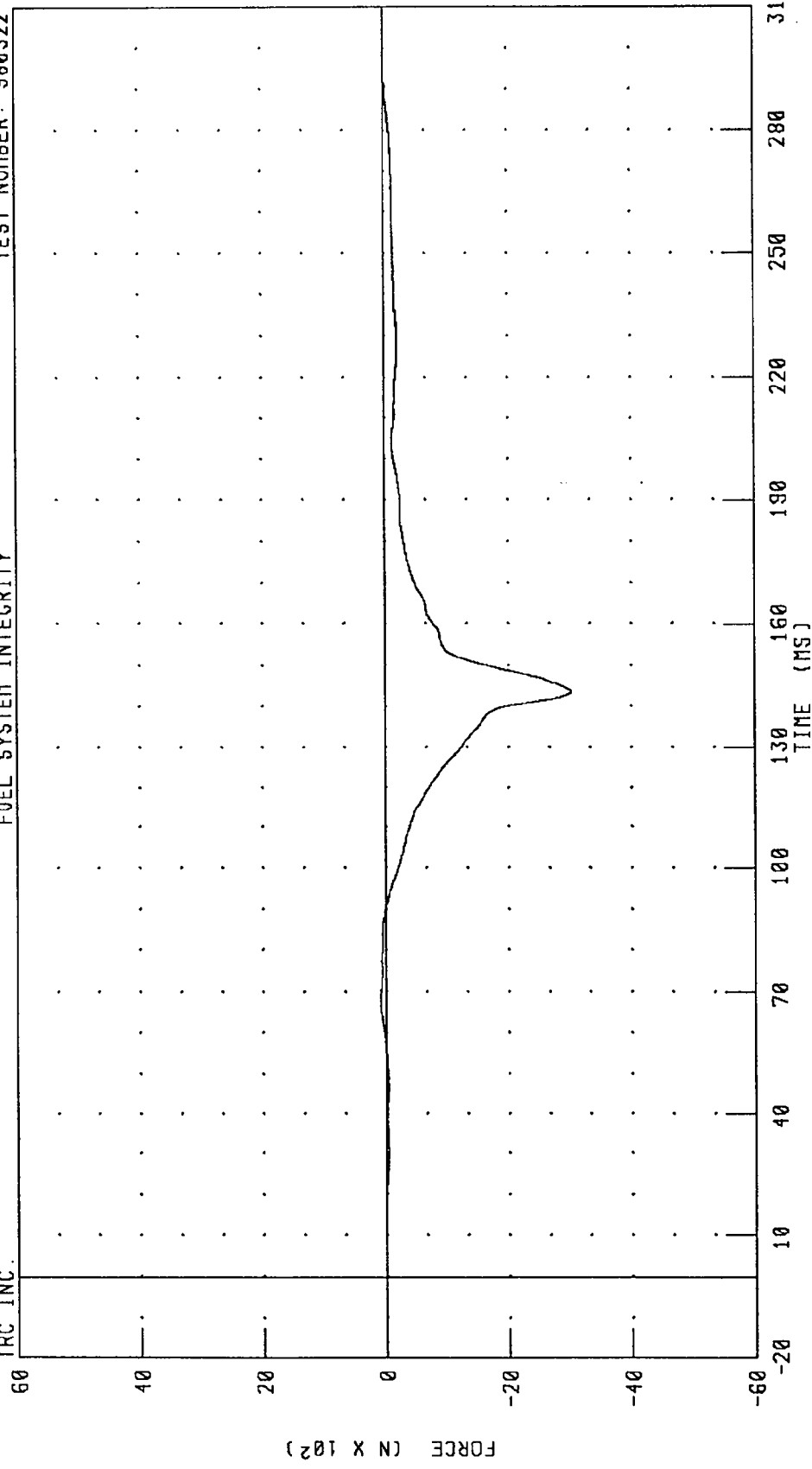
CHANNEL: HD3YG1 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER LOWER NECK X-AXIS SHEAR FORCE

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

TRC INC.



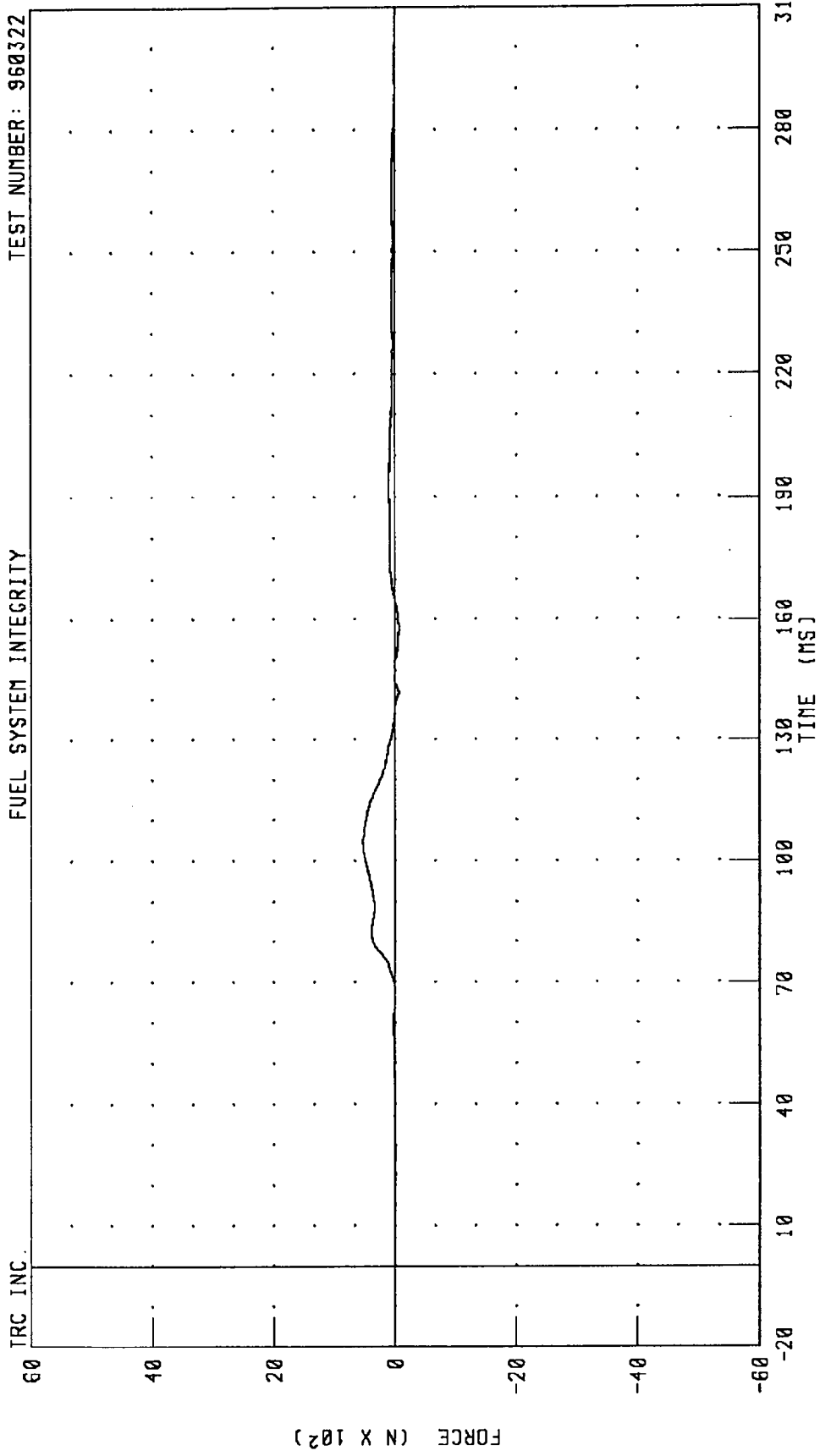
CHANNEL: NKLXF1 FILTER: CH. CLASS 1000

PEAK DATA: 84.13 N @ 65.04 MS; -3011.71 N @ 143.76 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER LOWER NECK Y-AXIS SHEAR FORCE

TEST NUMBER: 960322

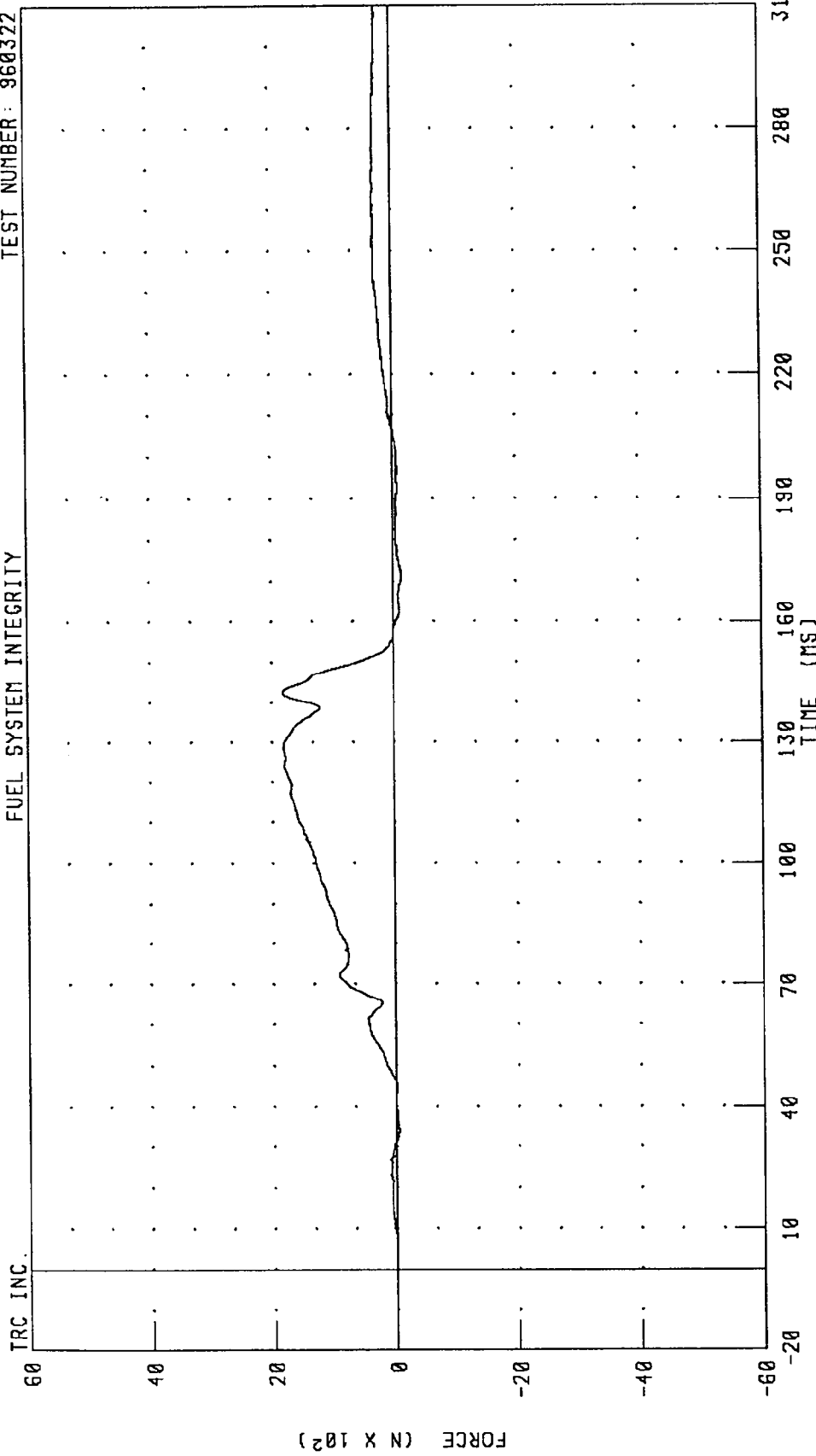
FUEL SYSTEM INTEGRITY



CHANNEL: NKLYF1 FILTER: CH. CLASS 1000 PEAK DATA: 535.49 N @ 104.32 MS; -71.21 N @ 141.84 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER LOWER NECK Z-AXIS AXIAL FORCE

FUEL SYSTEM INTEGRITY  
TEST NUMBER: 960322

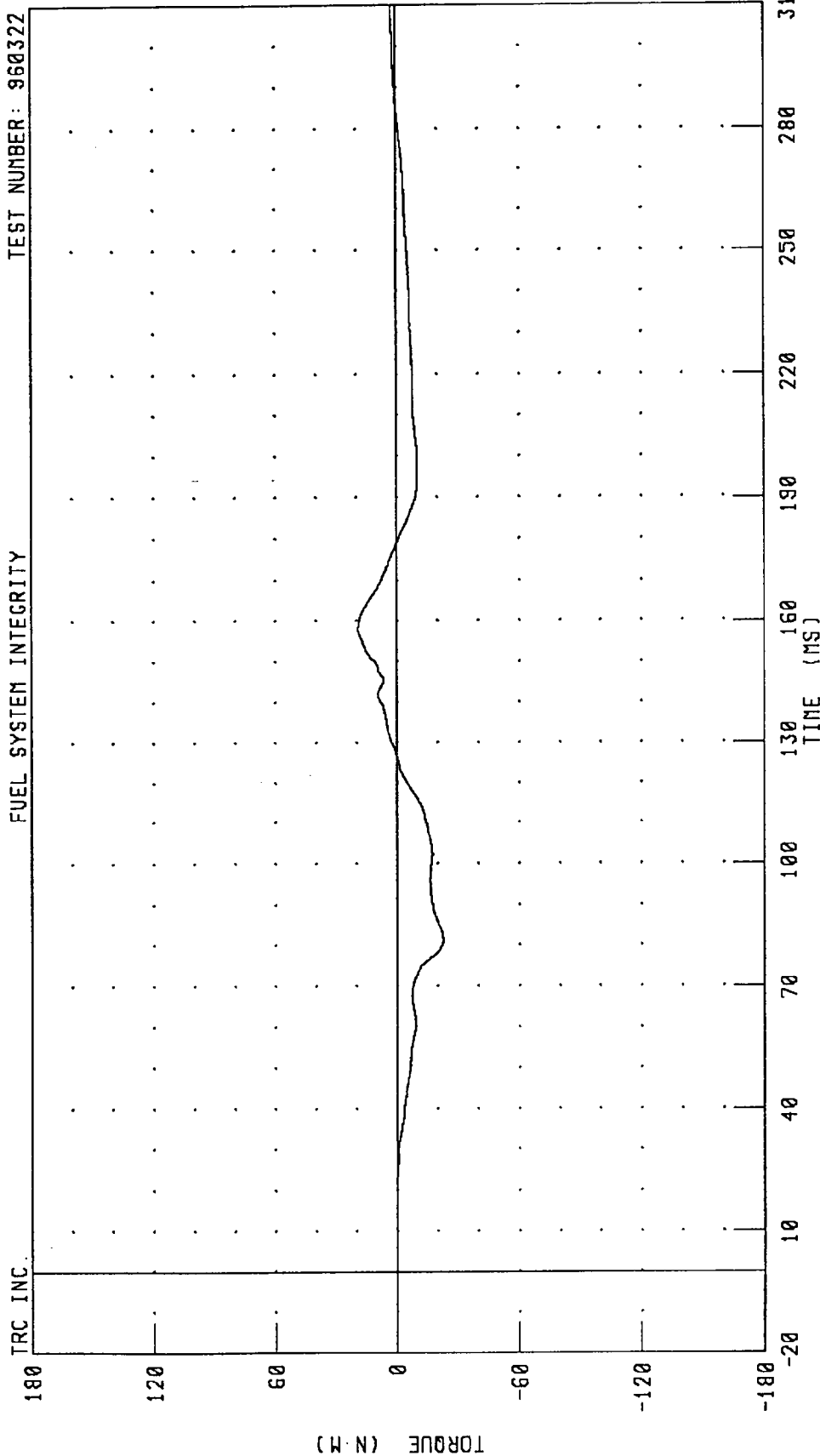


CHANNEL: NKLZF1 FILTER: CH. CLASS 1000  
PEAK DATA: 1828.49 N @ 142.32 MS; -134.78 N @ 170.96 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
 DRIVER LOWER NECK MOMENT ABOUT X-AXIS  
 FUEL SYSTEM INTEGRITY

TEST NUMBER: 960322

TRC INC.



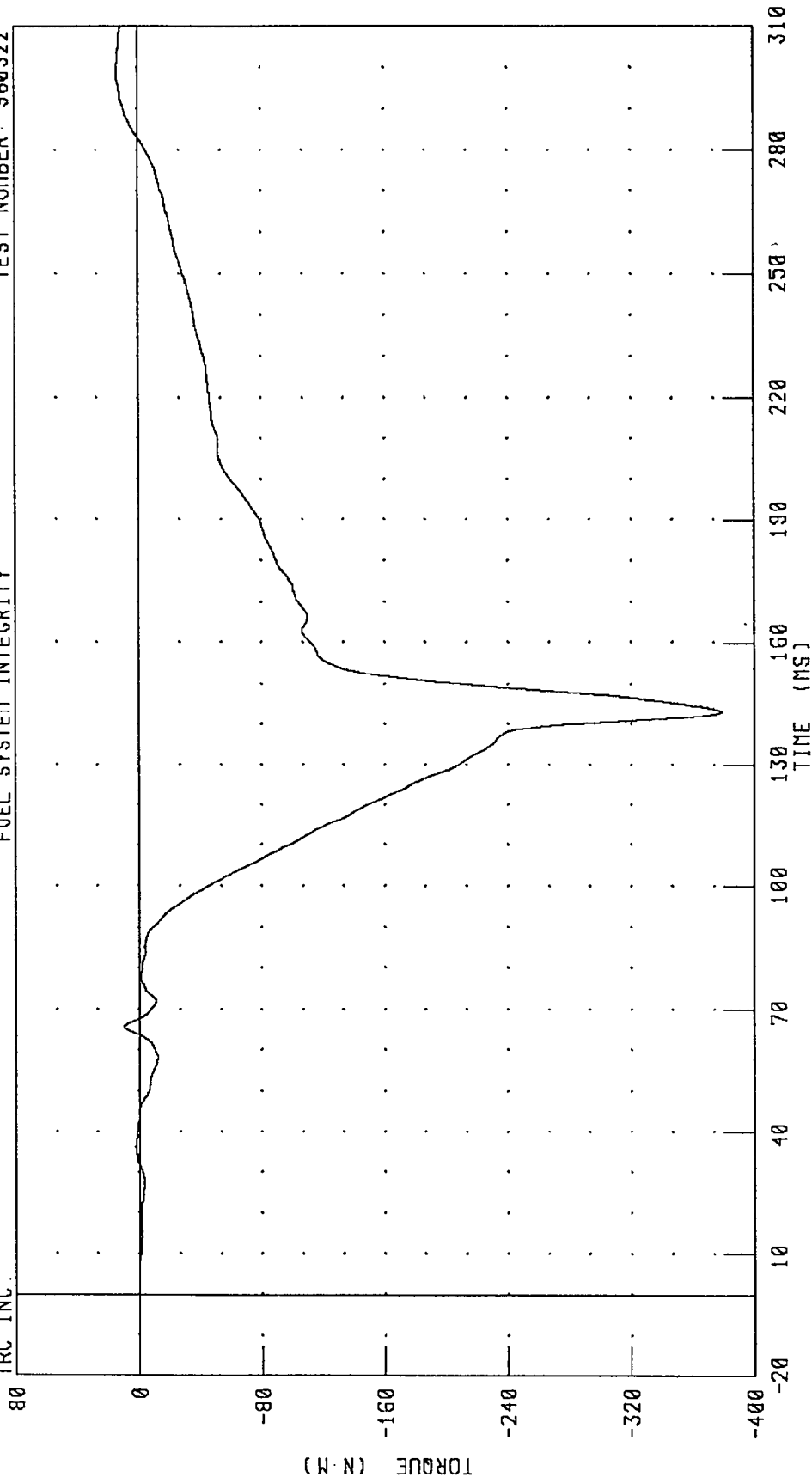
CHANNEL: NKLXM1 FILTER: CH. CLASS 600 PEAK DATA: 19.23 N.M @ 158.16 MS; -22.78 N.M @ 81.44 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER LOWER NECK MOMENT ABOUT Y-AXIS

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

TRC INC.



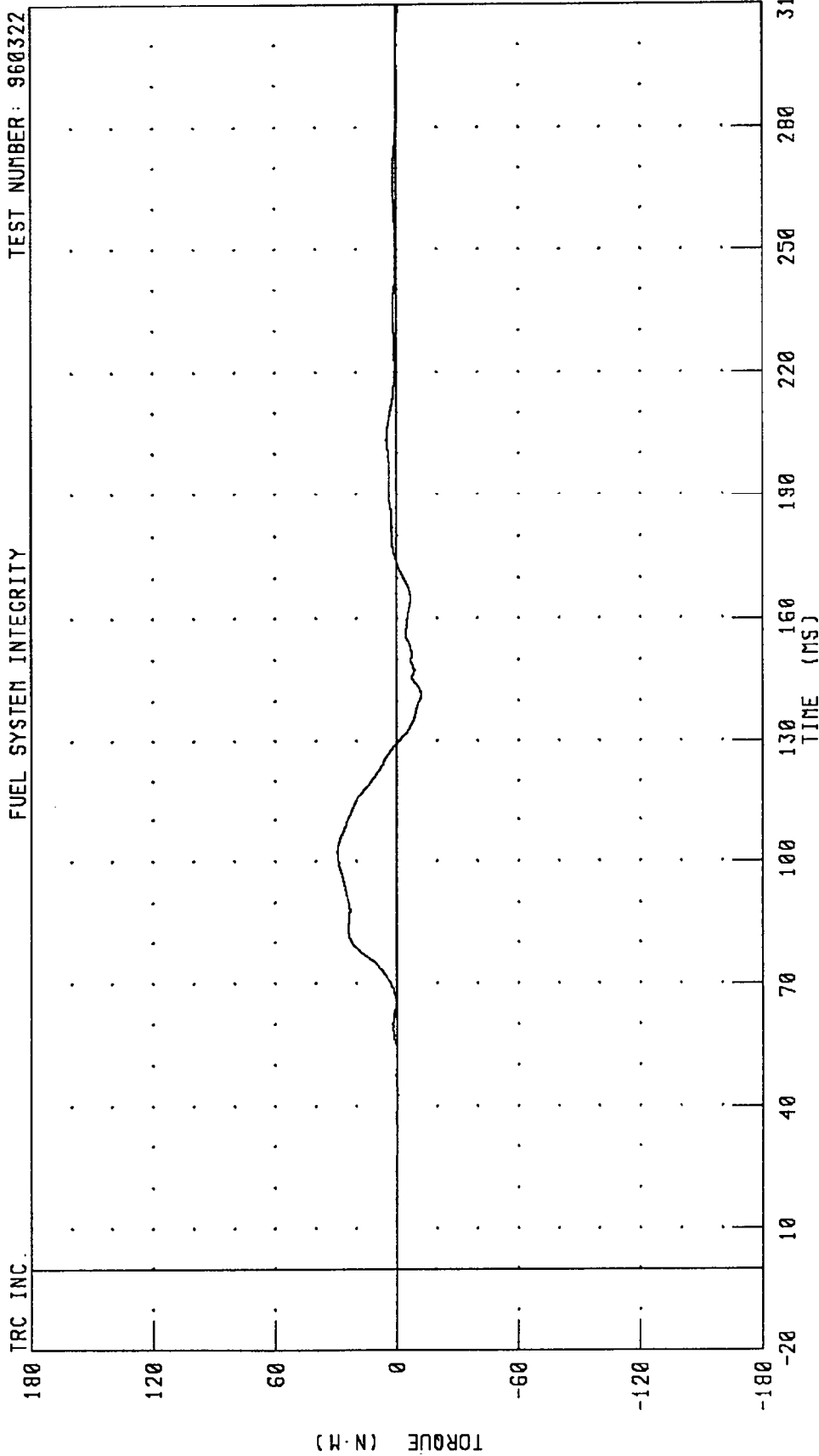
PEAK DATA: 13.38 N-M @ 299.04 MS; -378.60 N-M @ 143.28 MS

CHANNEL: NKLYM1 FILTER: CH. CLASS 600

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER LOWER NECK MOMENT ABOUT Z-AXIS

TRC INC. TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY



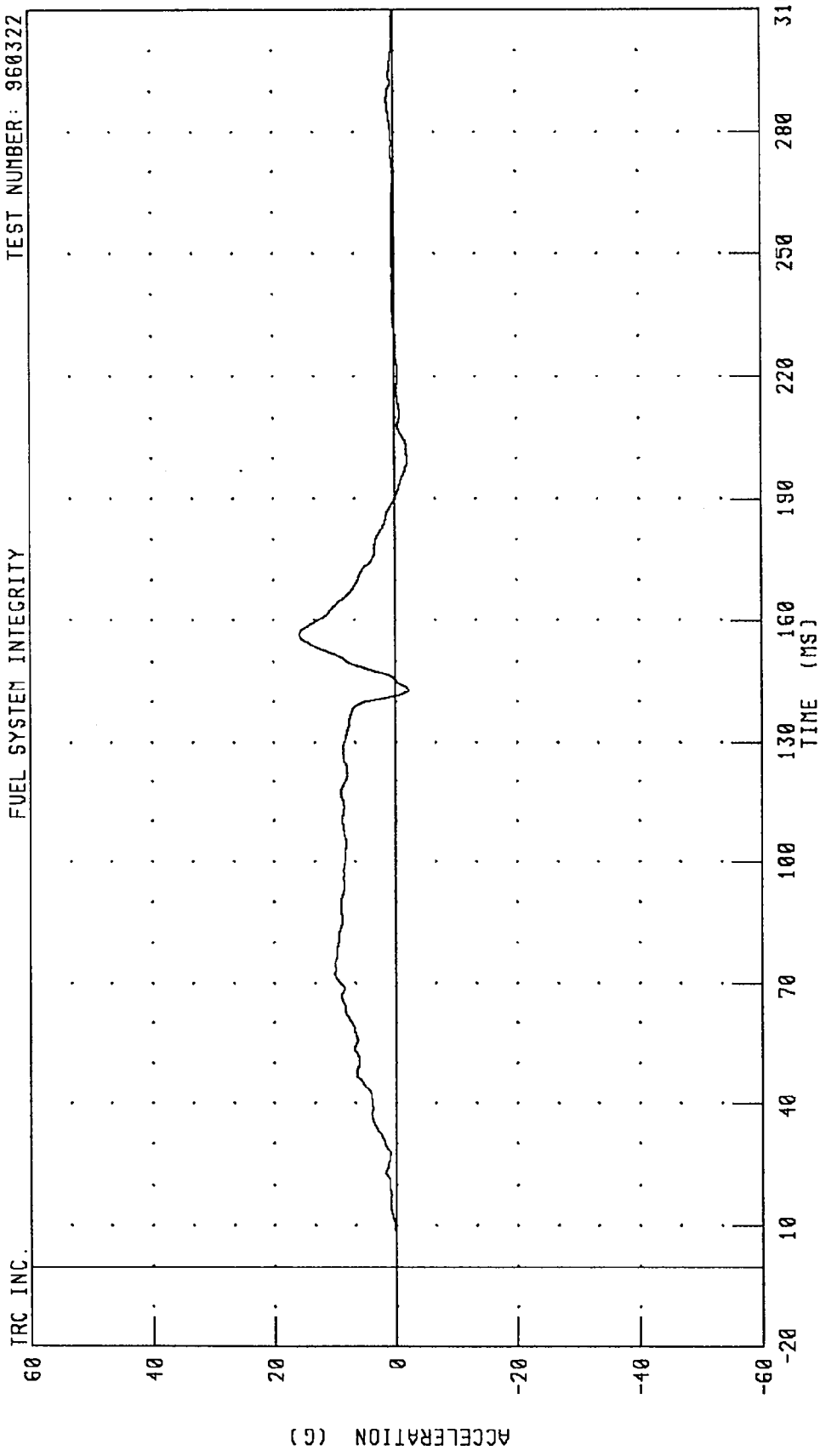
CHANNEL: NKLZM1 FILTER: CH. CLASS 600

PEAK DATA: 29.29 N·M @ 102.16 MS; -12.34 N·M @ 141.28 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER CHEST X-AXIS ACCELERATION

TEST NUMBER: 960322

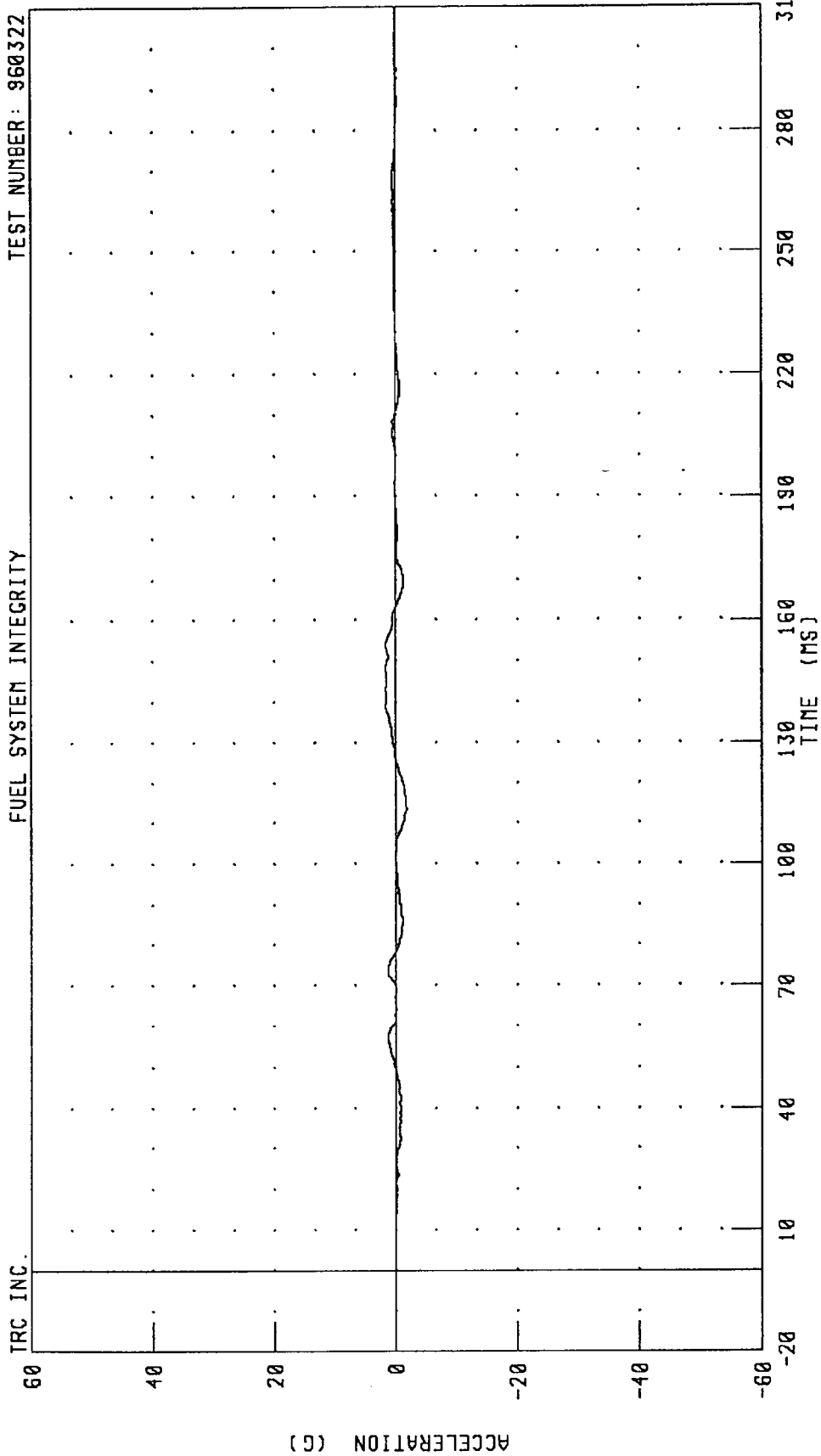
FUEL SYSTEM INTEGRITY



CHANNEL: CSTXG1 FILTER: CH. CLASS 180 PEAK DATA: 15.76 G @ 156.48 MS; -2.27 G @ 143.12 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
 DRIVER CHEST Y-AXIS ACCELERATION  
 FUEL SYSTEM INTEGRITY

TEST NUMBER: 960322

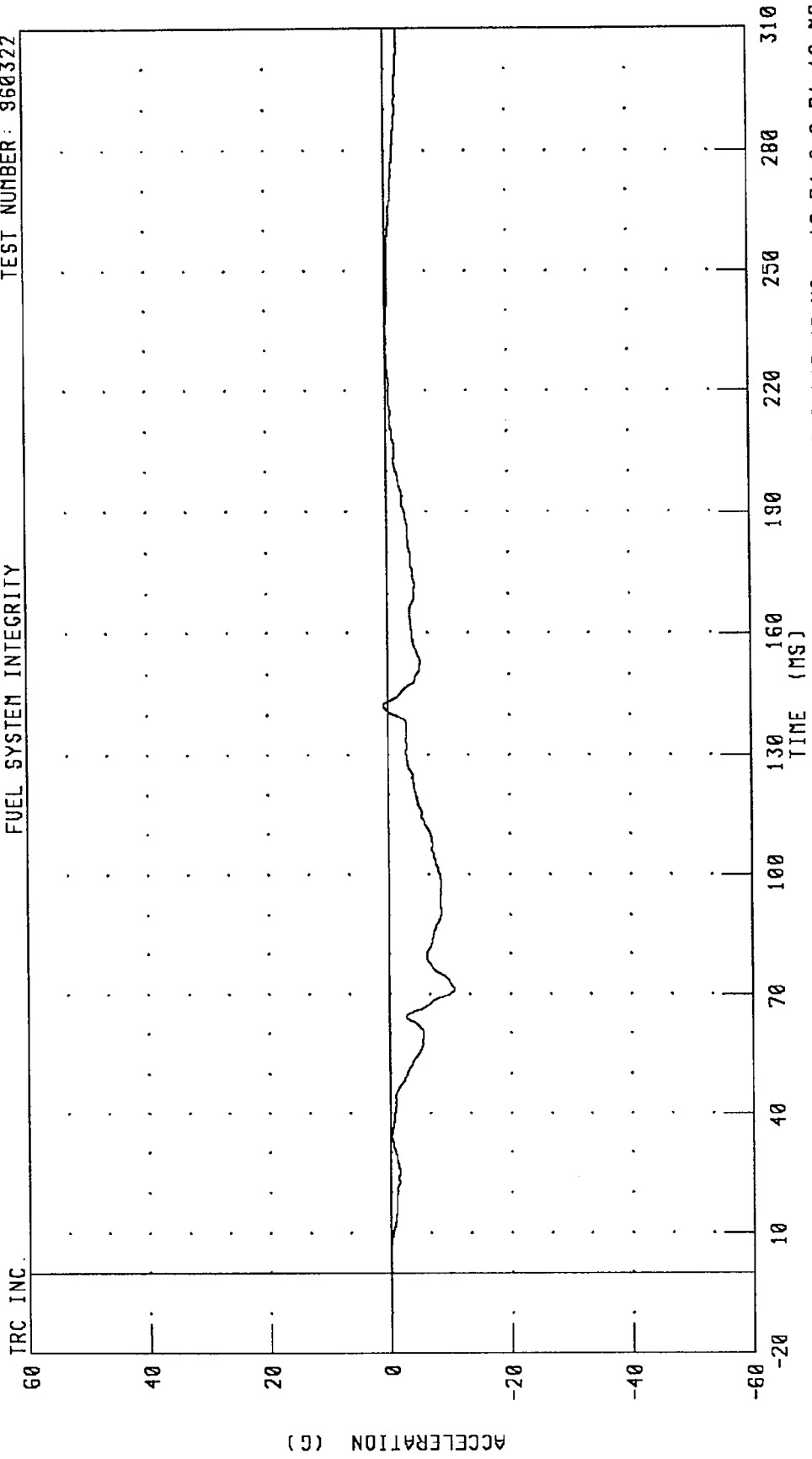


PEAK DATA: 1.75 G @ 148.24 MS; -1.78 G @ 173.52 MS

CHANNEL: CSTYG1 FILTER: CH. CLASS 180

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER CHEST Z-AXIS ACCELERATION

FUEL SYSTEM INTEGRITY TEST NUMBER: 960322



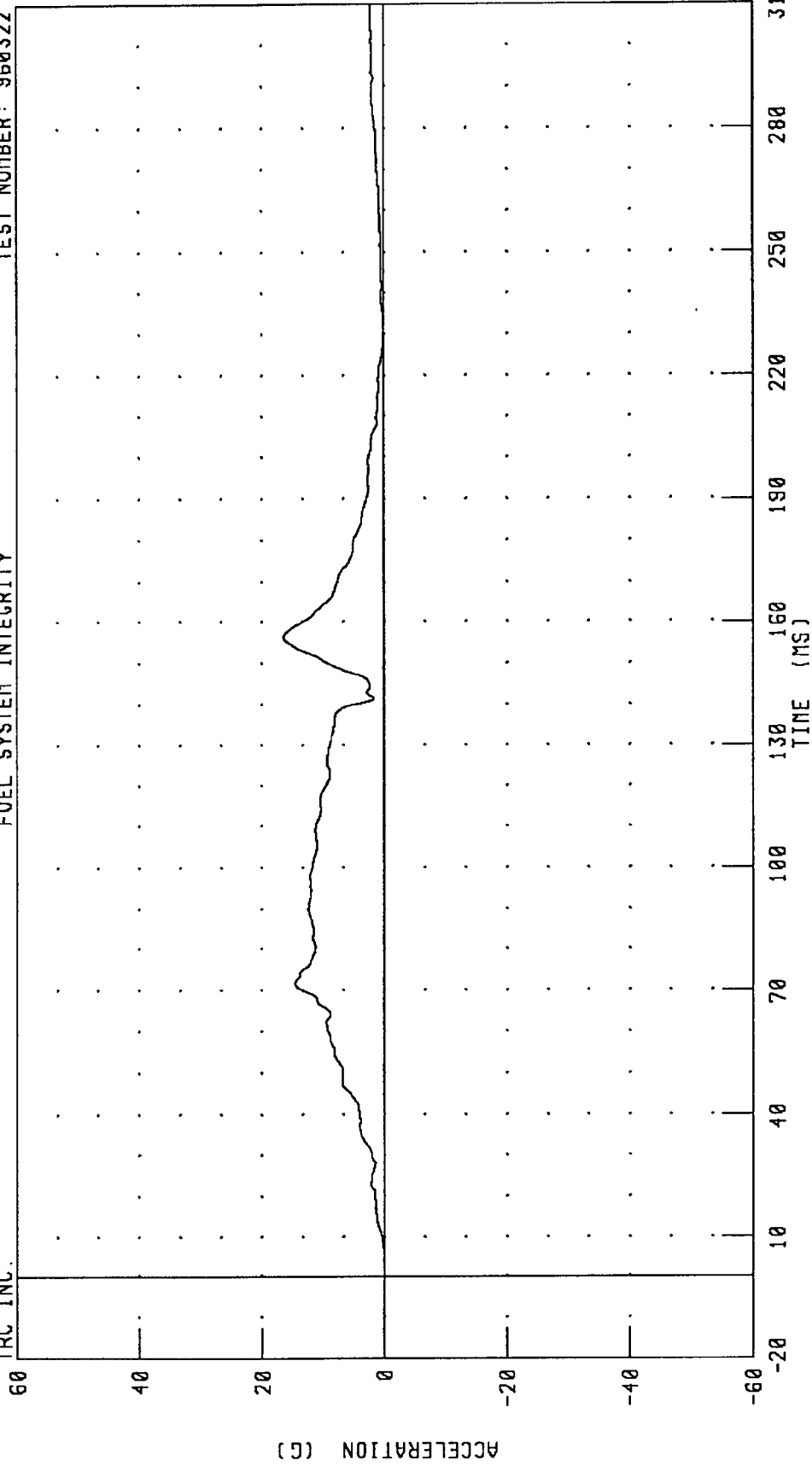
CHANNEL: CSTZG1 FILTER: CH. CLASS 180 PEAK DATA: 0.69 G @ 142.40 MS; -10.74 G @ 71.12 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER CHEST RESULTANT ACCELERATION

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

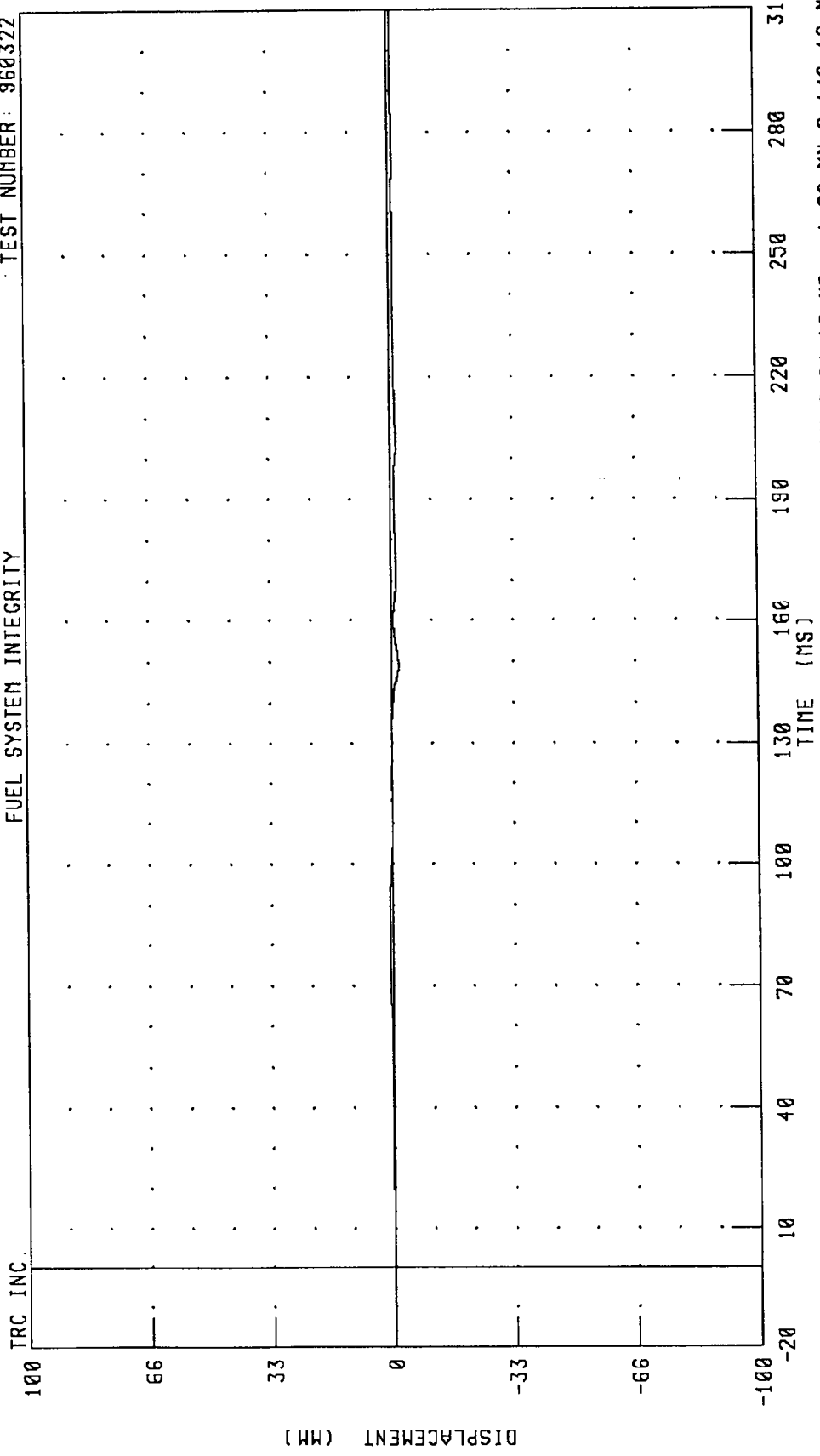
TRC INC.



CHANNEL: CSTRG1 FILTER: CH. CLASS 180 PEAK DATA: 16.43 G @ 156.32 MS; 0.00 G @ -20.00 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
 DRIVER CHEST DEFLECTION  
 FUEL SYSTEM INTEGRITY

TEST NUMBER: 960322



PEAK DATA: 0.94 MM @ 84.16 MS; -1.89 MM @ 149.12 MS

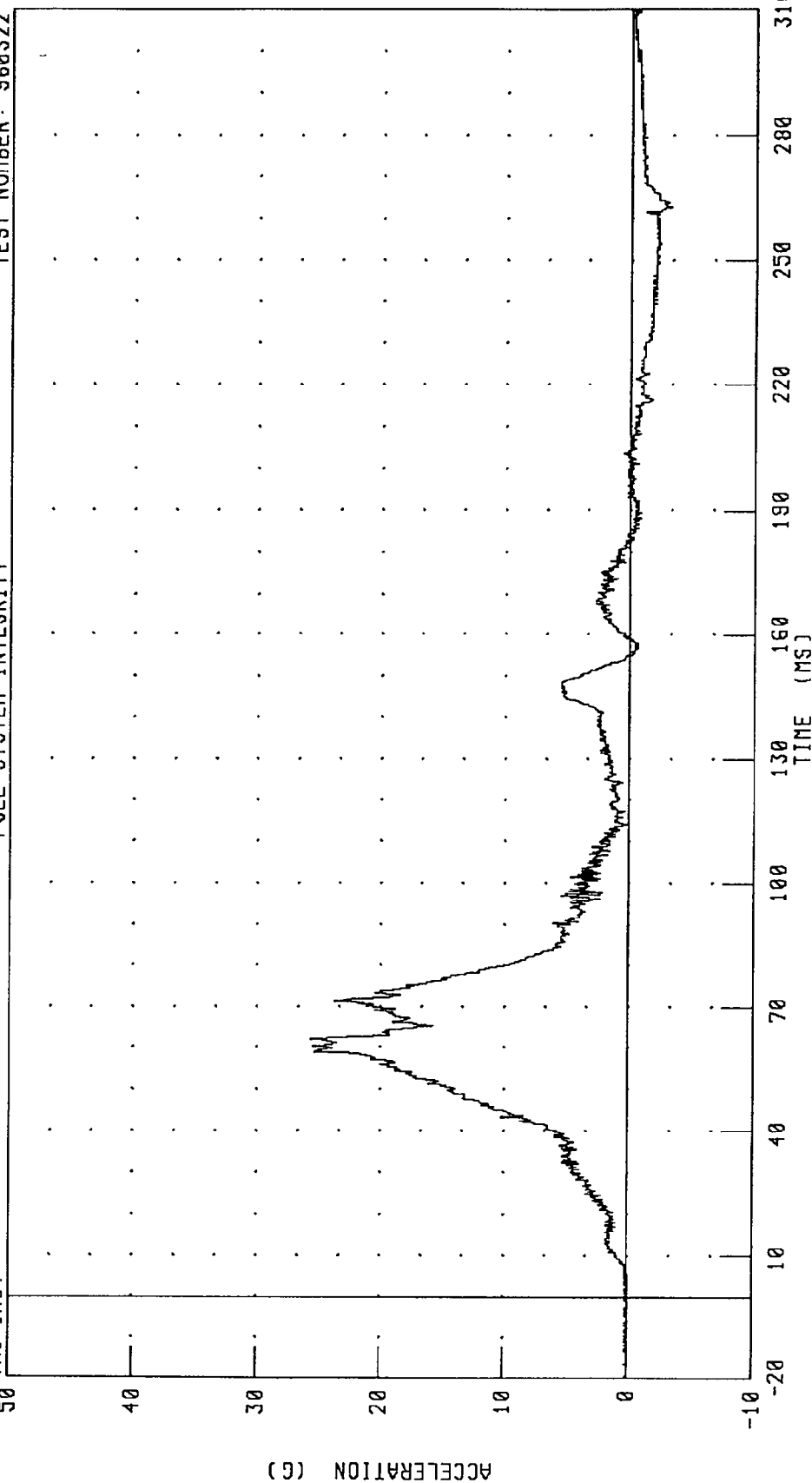
CHANNEL: CSTXD1 FILTER: CH. CLASS 180

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER PELVIS X-AXIS ACCELERATION

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

TRC INC.

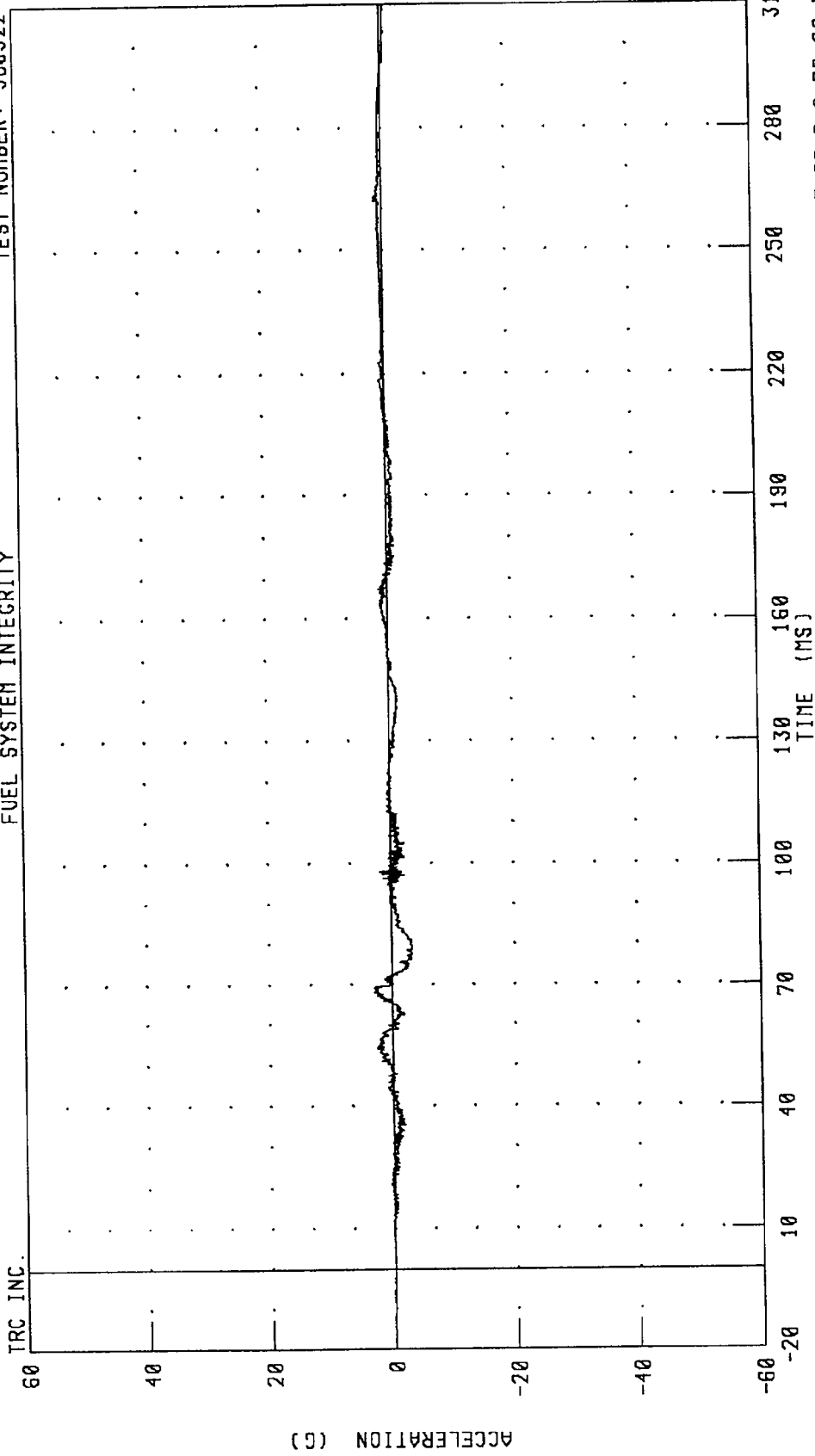


CHANNEL: PEVXG1 FILTER: CH. CLASS 1000

PEAK DATA: 25.70 G @ 62.00 MS; -3.16 G @ 262.88 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER PELVIS Y-AXIS ACCELERATION  
FUEL SYSTEM INTEGRITY

TEST NUMBER: 960322



CHANNEL: PEVYG1 FILTER: CH. CLASS 1000

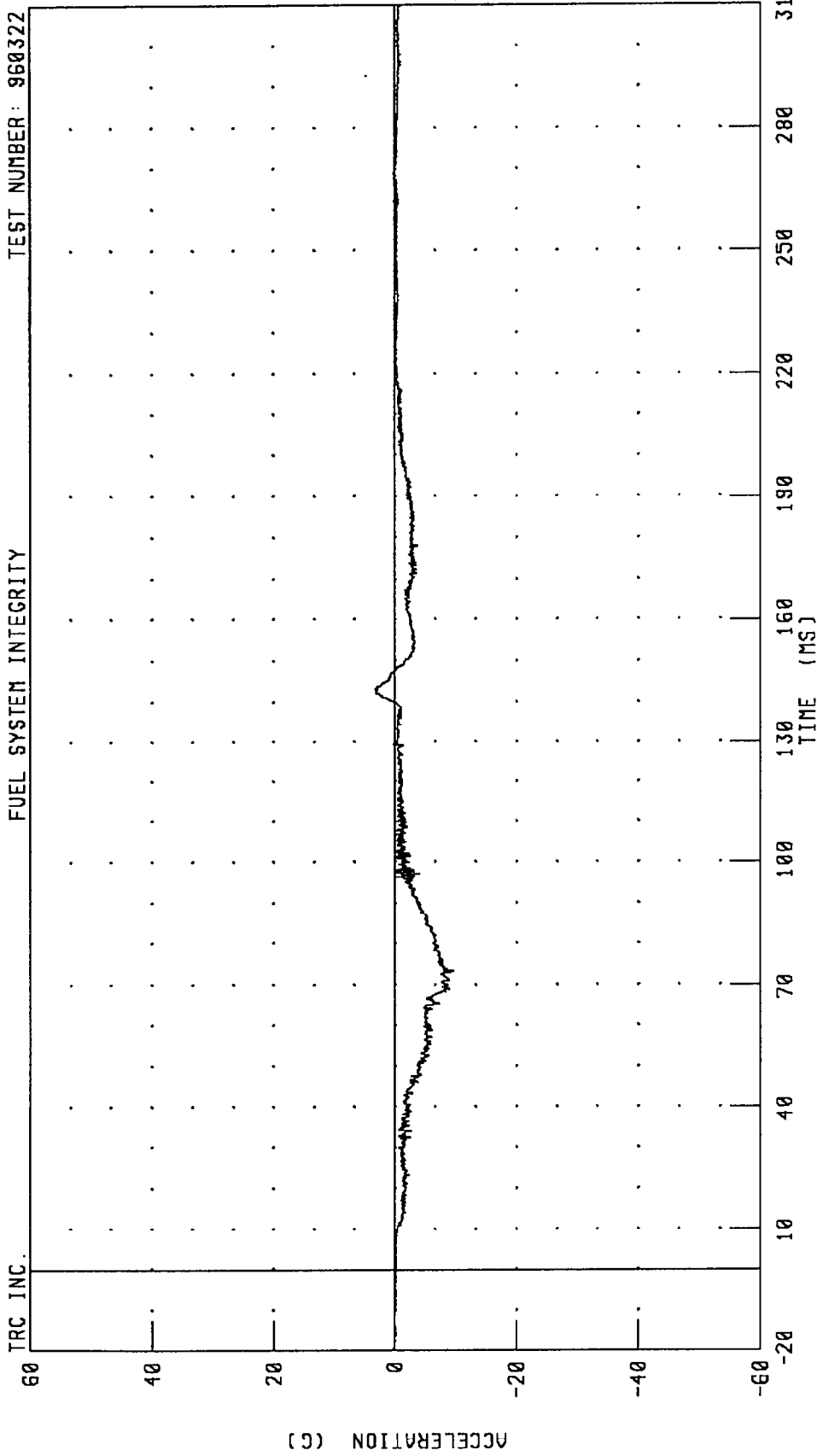
PEAK DATA: 2.89 G @ 68.16 MS; -3.36 G @ 77.60 MS

TRC INC.

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER PELVIS Z-AXIS ACCELERATION  
FUEL SYSTEM INTEGRITY

TEST NUMBER: 960322

TRC INC.

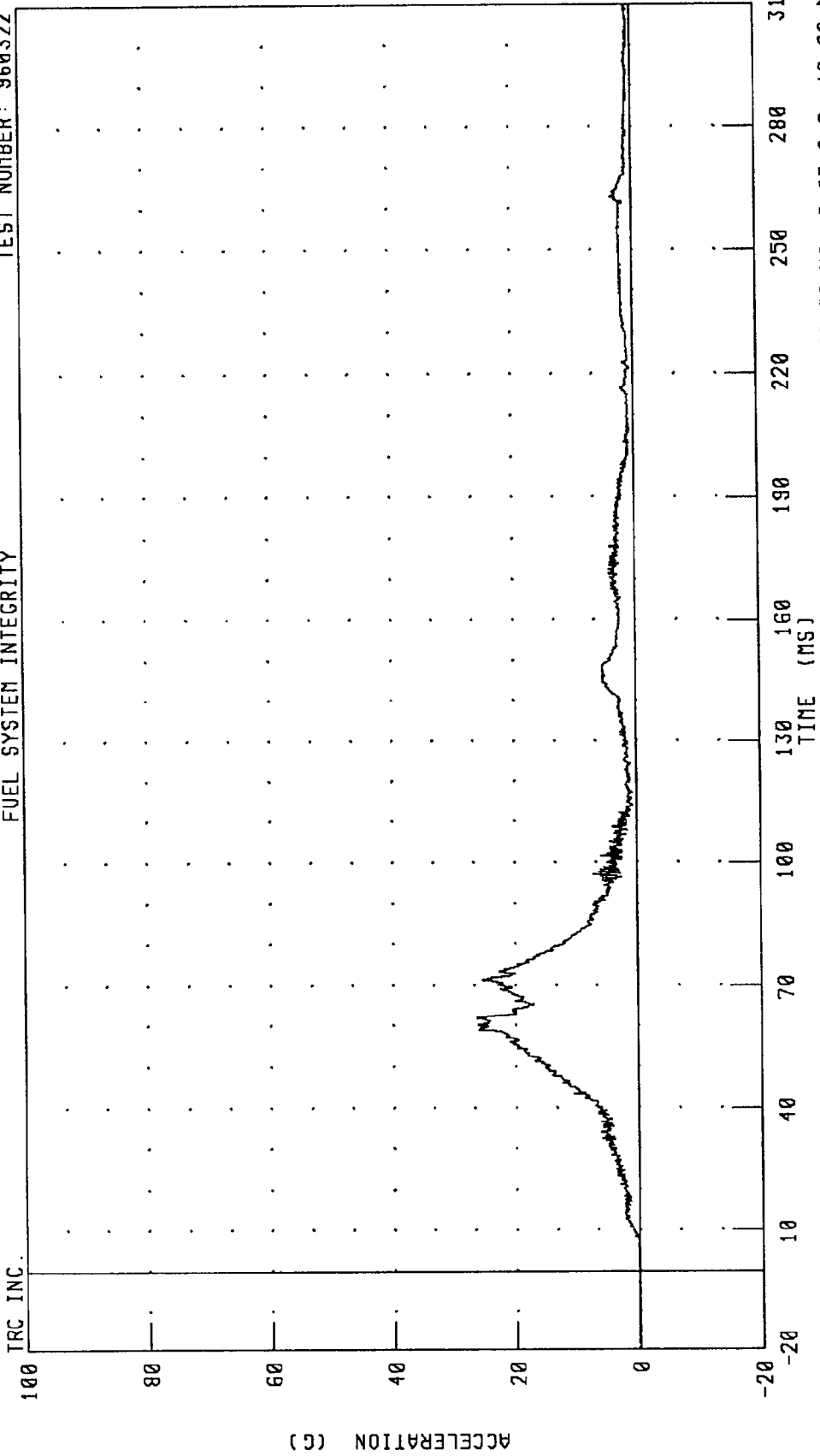


CHANNEL: PEVZG1 FILTER: CH. CLASS 1000

PEAK DATA: 3.21 G @ 143.20 MS; -9.58 G @ 73.28 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER PELVIS RESULTANT ACCELERATION  
FUEL SYSTEM INTEGRITY

TEST NUMBER: 960322



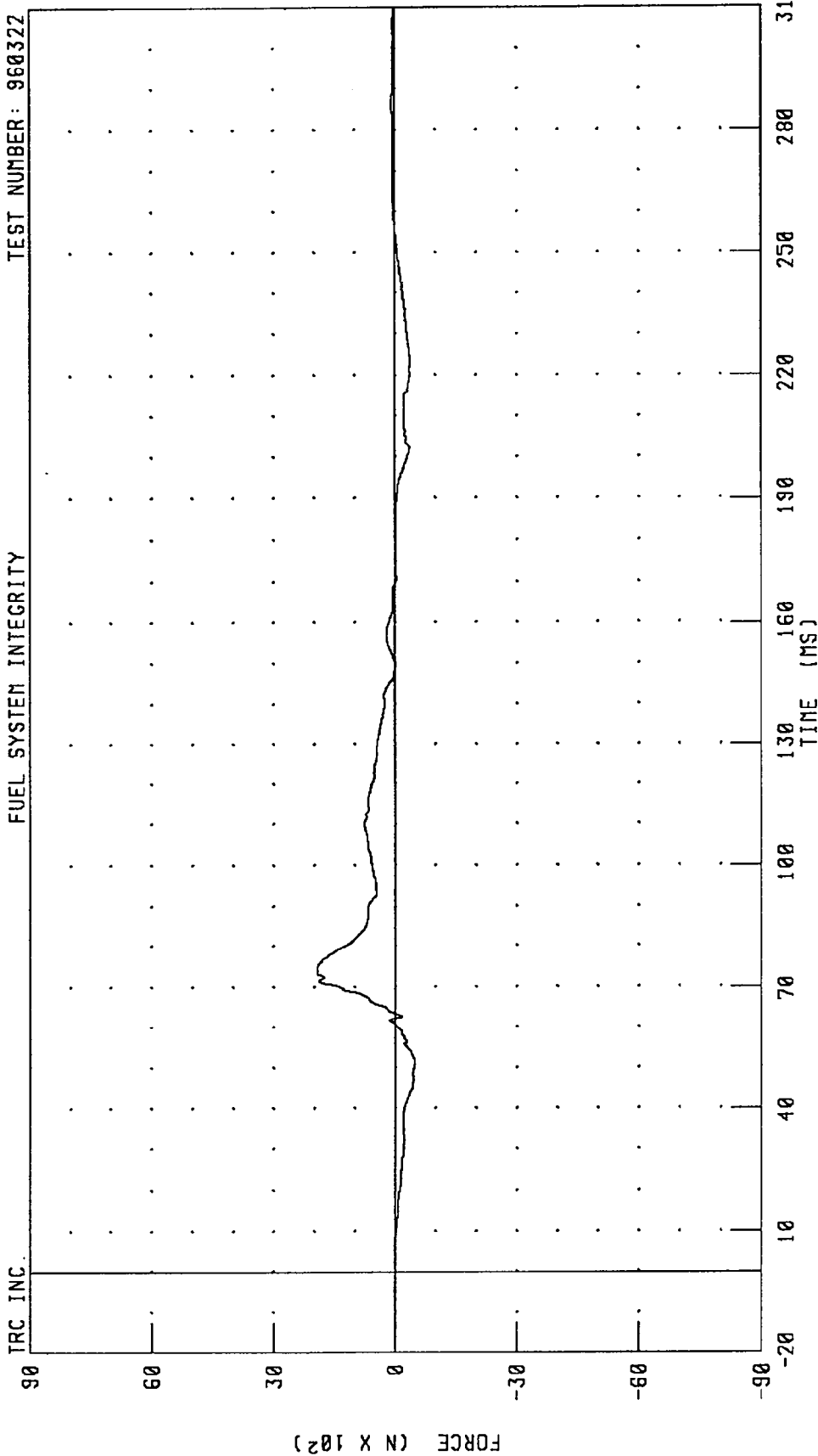
CHANNEL: PEVRG1 FILTER: CH. CLASS 1000

PEAK DATA: 26.30 G @ 62.00 MS; 0.07 G @ -19.92 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER LEFT FEMUR FORCE

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY



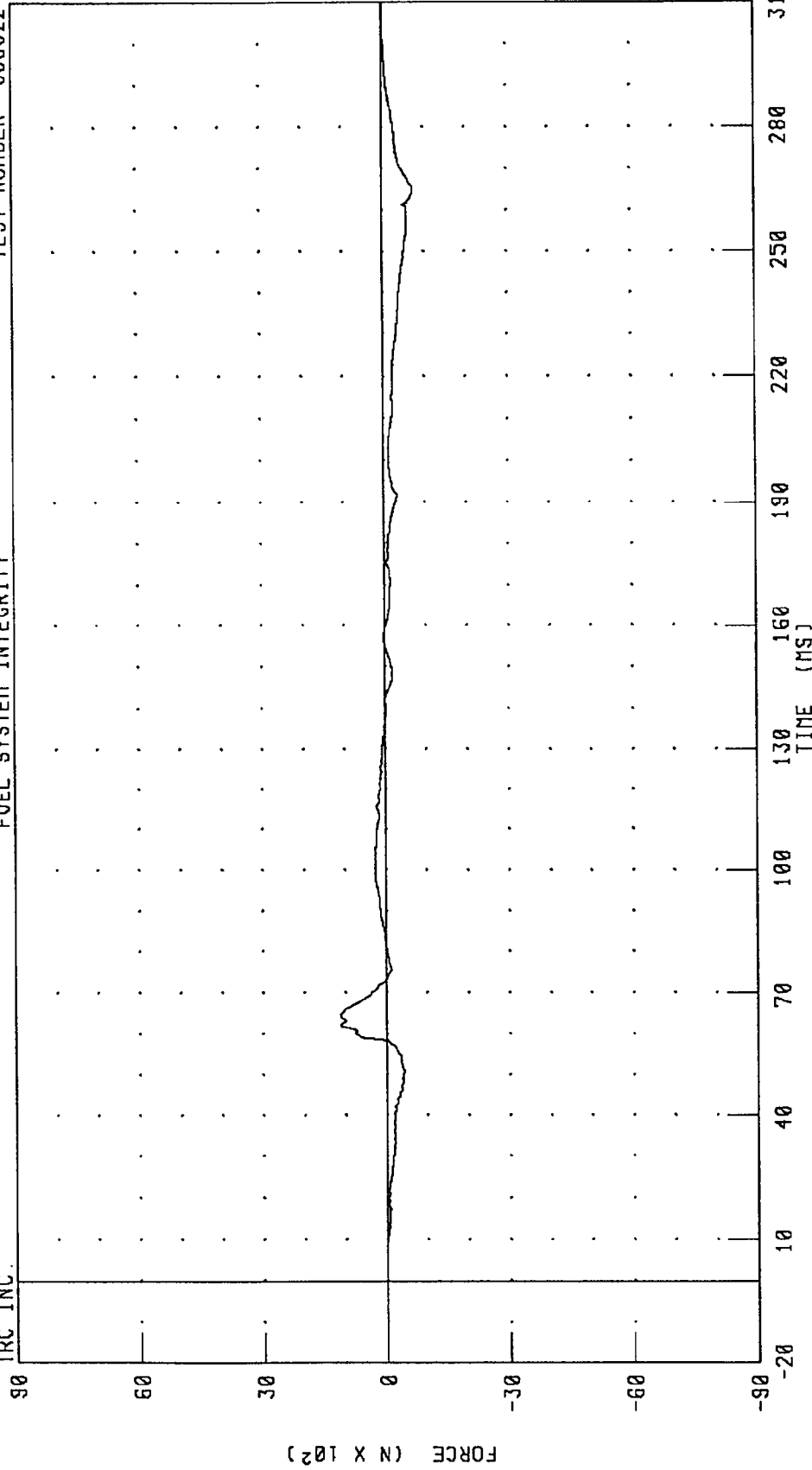
CHANNEL: LFMF1 FILTER: CH. CLASS 600 PEAK DATA: 1944.73 N @ 74.56 MS; -484.86 N @ 51.60 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER RIGHT FENUR FORCE

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 1128.77 N @ 64.40 MS; -739.47 N @ 264.16 MS

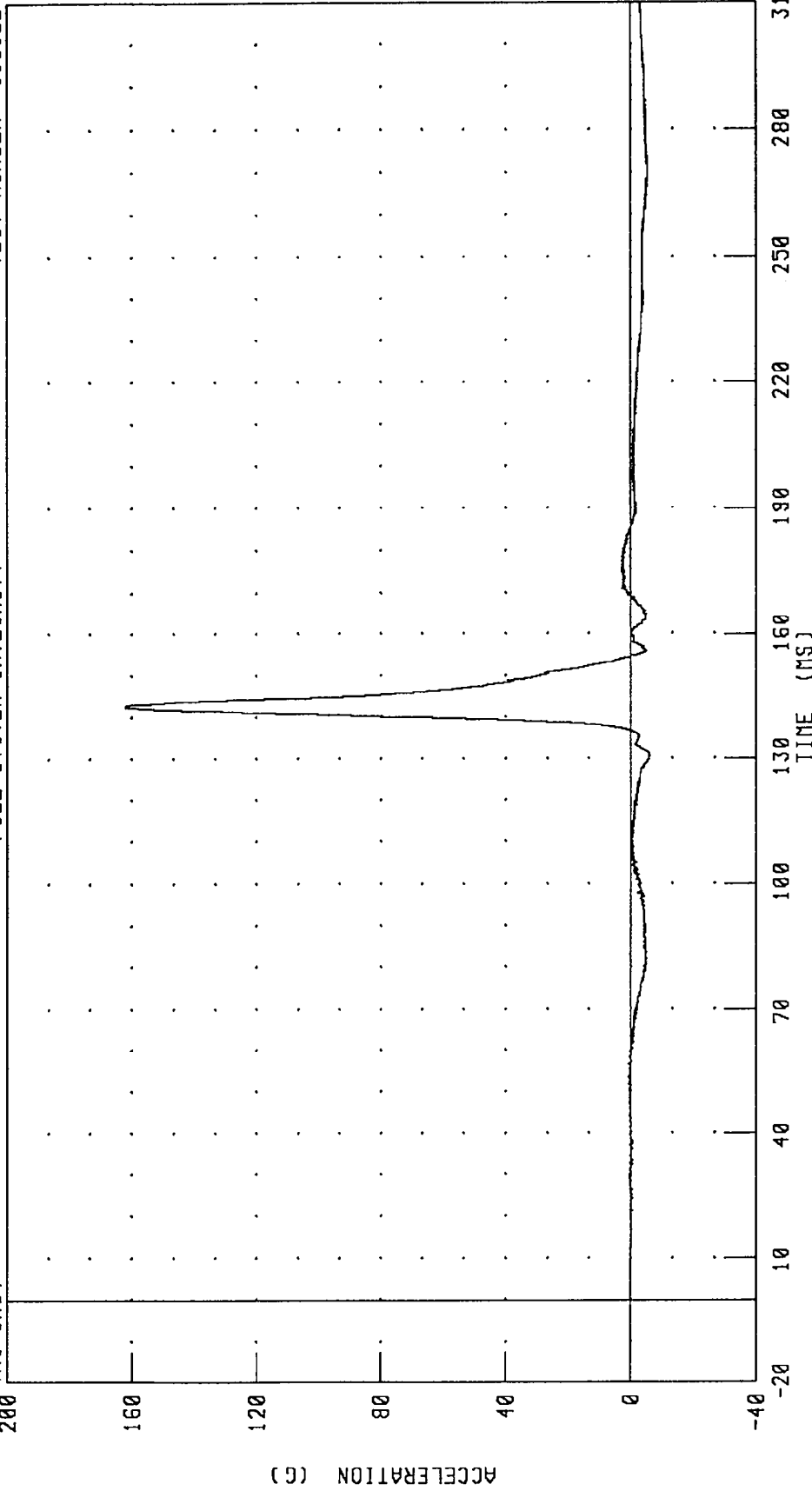
CHANNEL: RFMF1 FILTER: CH. CLASS 600

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
RIGHT FRONT PASSENGER HEAD X-AXIS ACCELERATION

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

TRC INC.



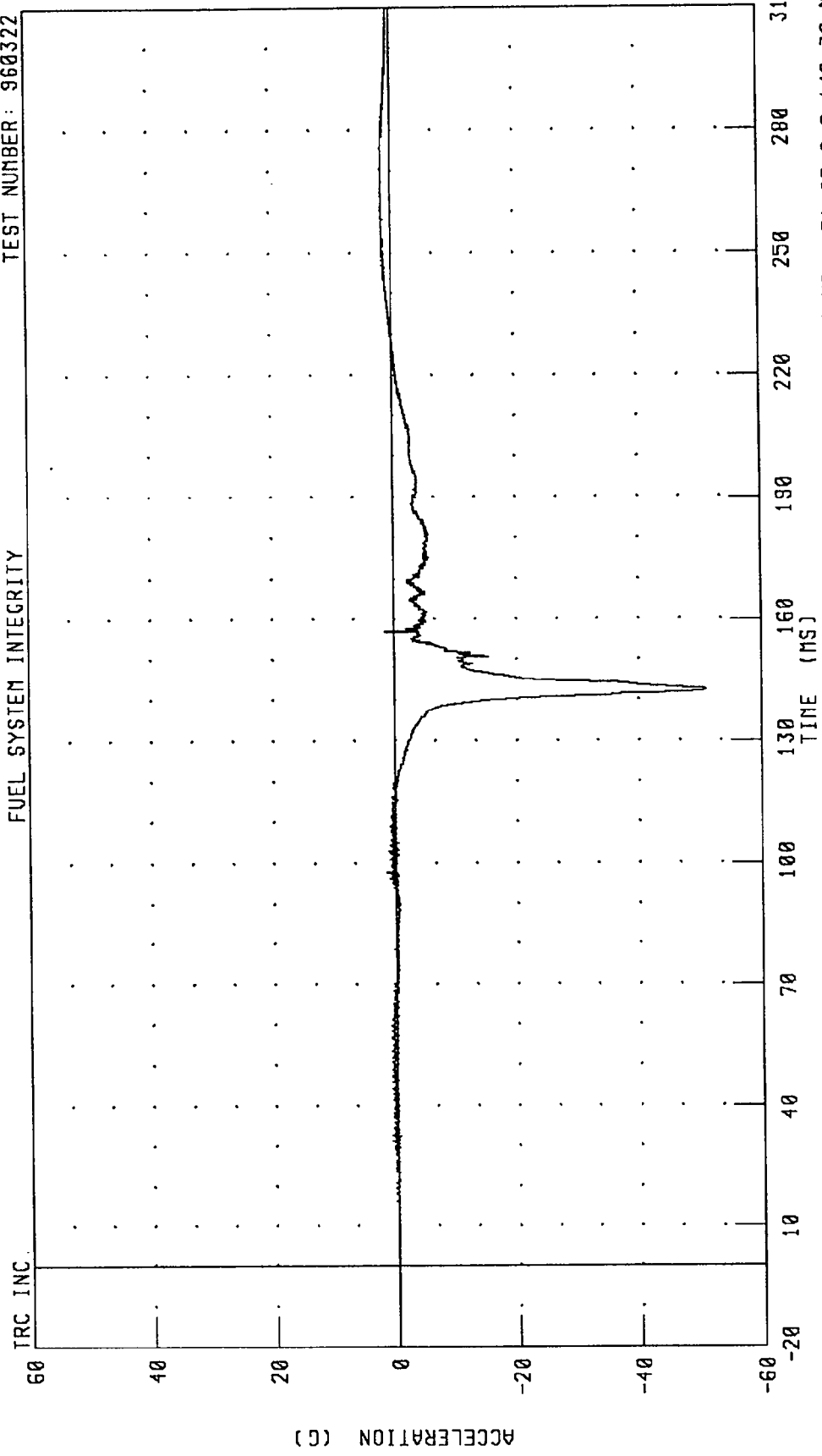
CHANNEL: HEDXG2 FILTER: CH. CLASS 1000

PEAK DATA: 161.94 G @ 142.48 MS; -5.95 G @ 130.56 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1986 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY



PEAK DATA: 1.67 G @ 258.48 MS; -51.03 G @ 142.32 MS

CHANNEL: HEDYG2 FILTER: CH. CLASS 1000

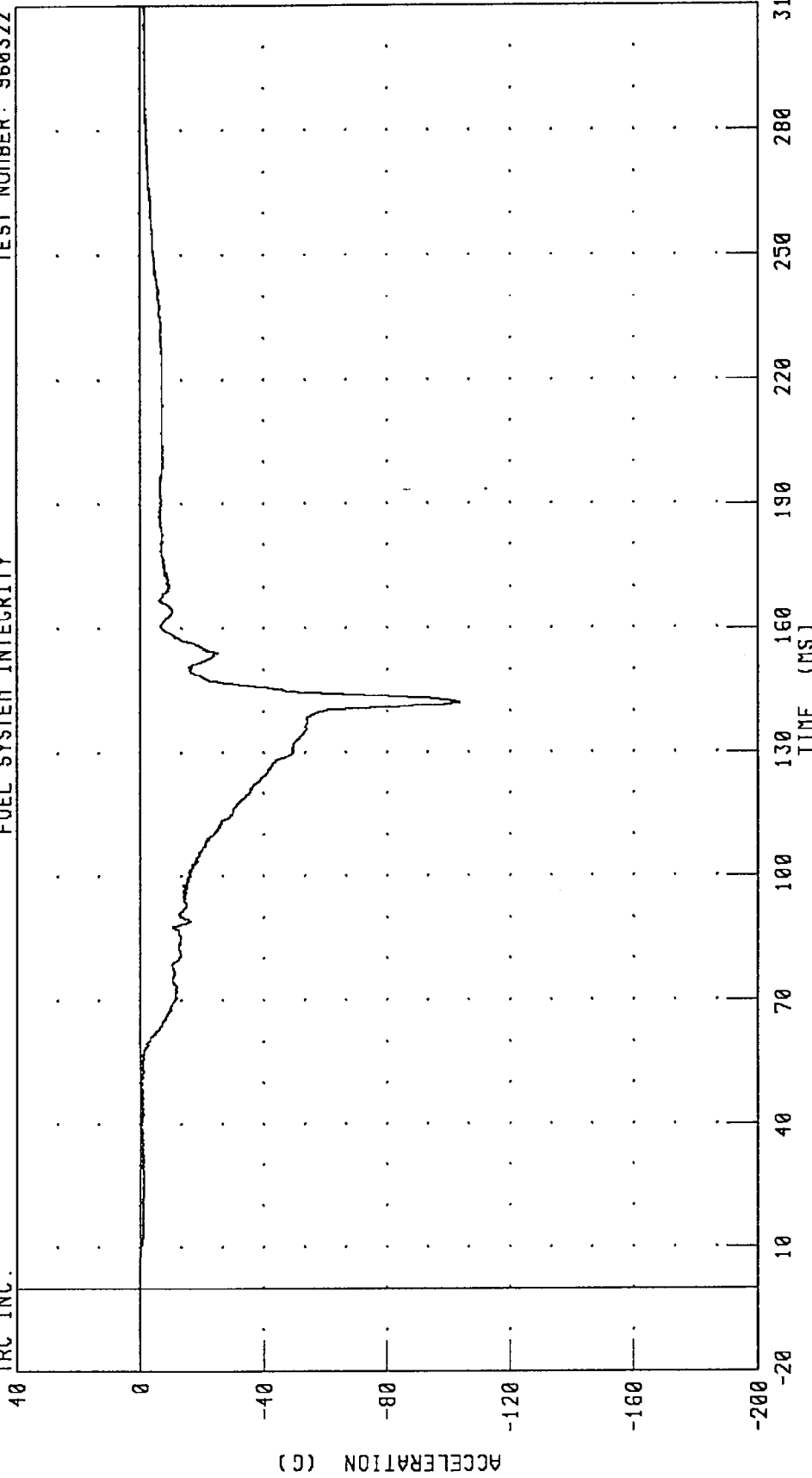
TRC INC.

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
RIGHT FRONT PASSENGER HEAD Z-AXIS ACCELERATION

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

TRC INC.



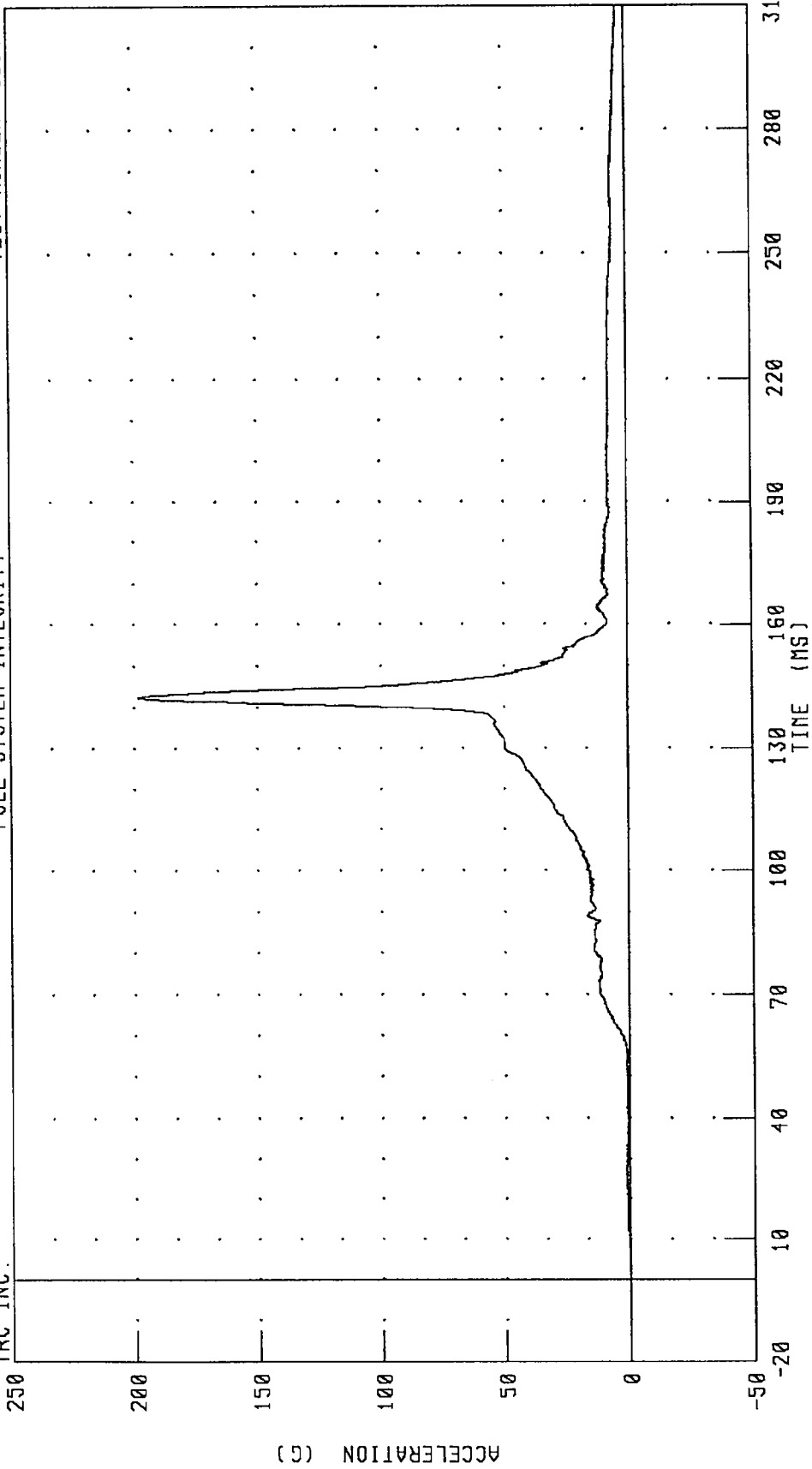
CHANNEL: HEDZG2 FILTER: CH. CLASS 1000  
PEAK DATA: 0.04 G @ -20.00 MS; -103.67 G @ 142.24 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
RIGHT FRONT PASSENGER HEAD RESULTANT ACCELERATION

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

TRC INC.



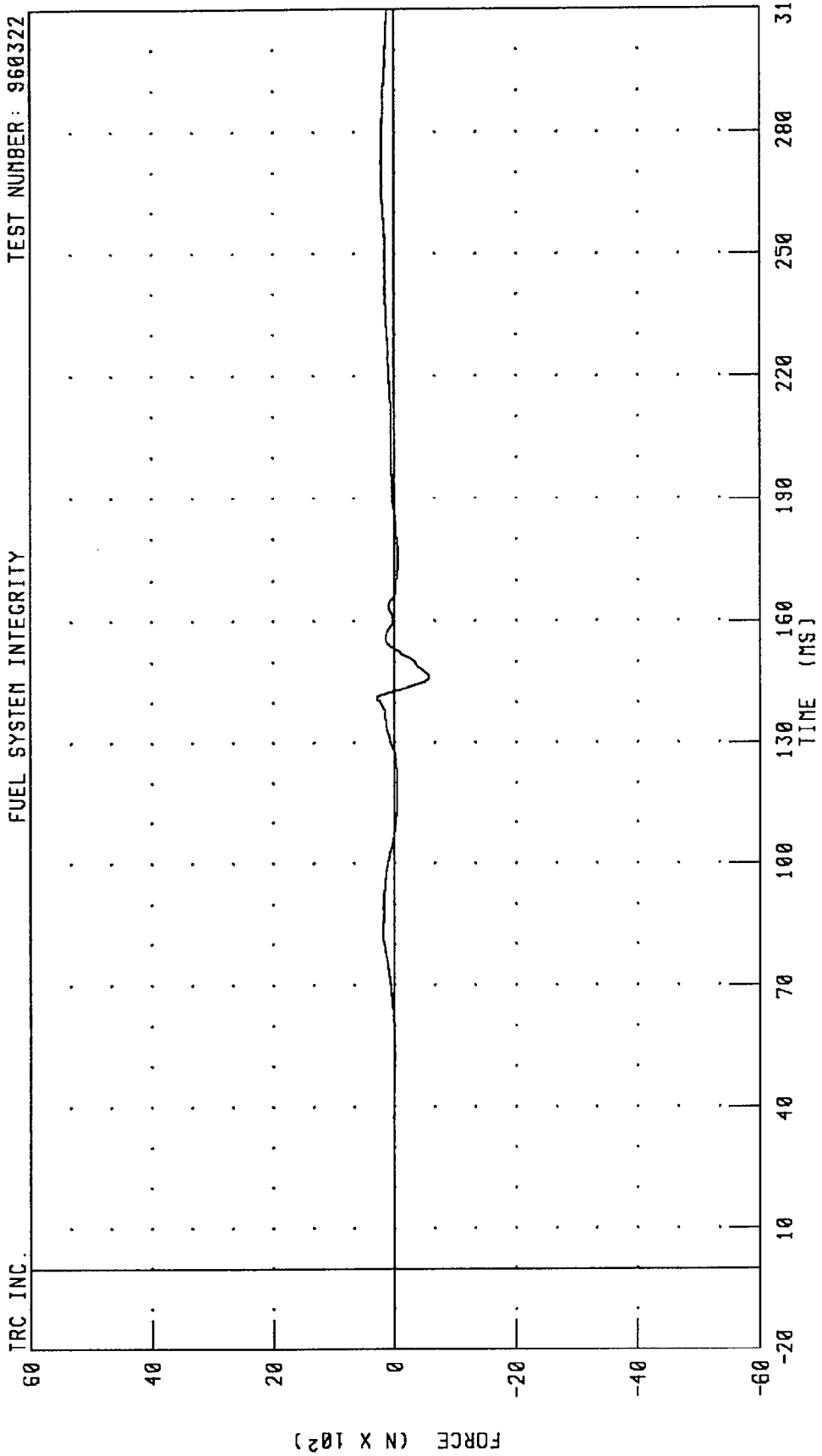
PEAK DATA: 198.33 G @ 142.48 MS; 0.11 G @ -20.00 MS

CHANNEL: HEDRG2 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
 RIGHT FRONT PASSENGER UPPER NECK X-AXIS SHEAR FORCE

TEST NUMBER: 960322

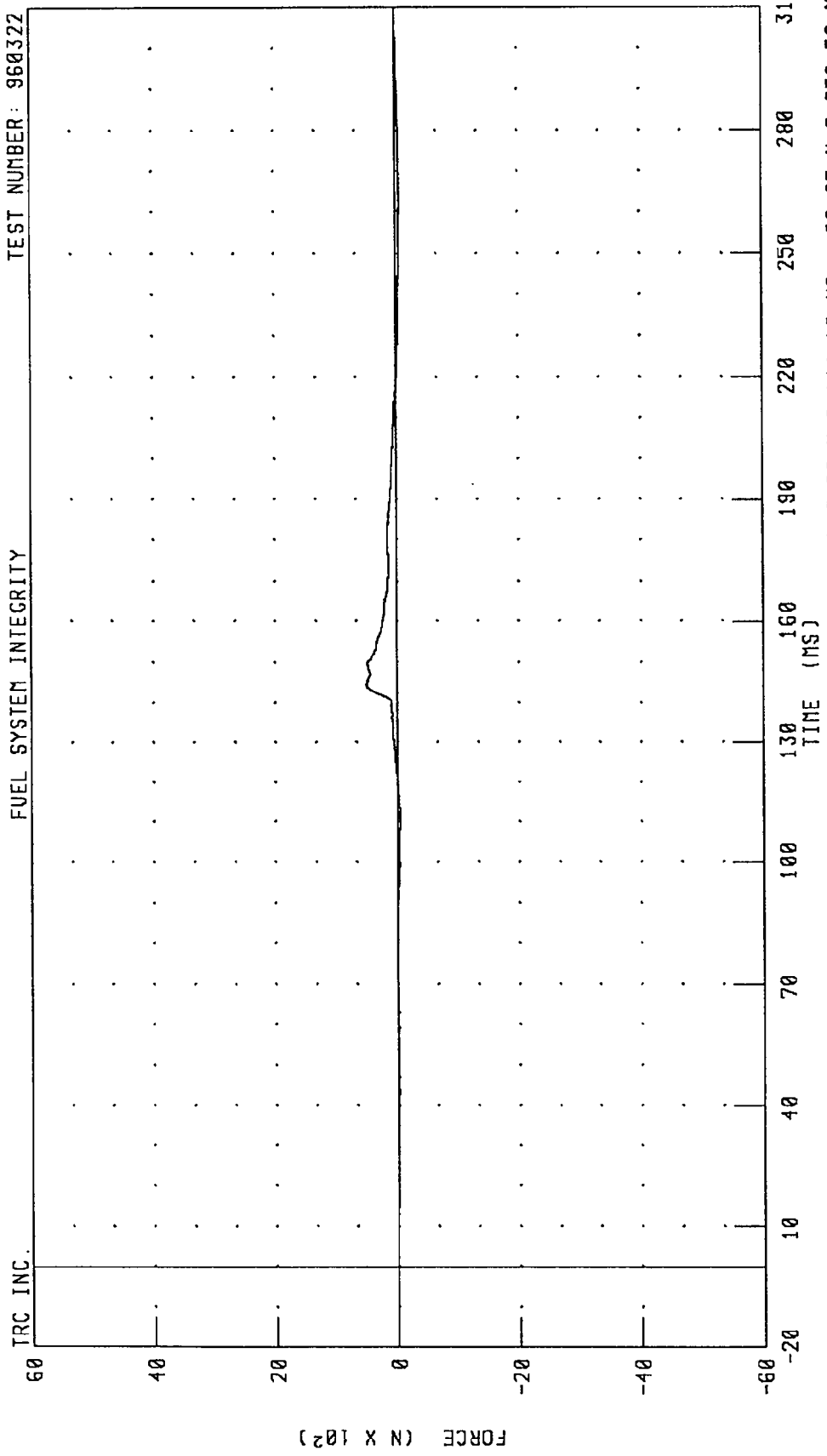
FUEL SYSTEM INTEGRITY



CHANNEL: NEKXF2 FILTER: CH. CLASS 1000 PEAK DATA: 296.57 N @ 141.20 MS; -576.97 N @ 146.32 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
 RIGHT FRONT PASSENGER UPPER NECK Y-AXIS SHEAR FORCE

TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960322

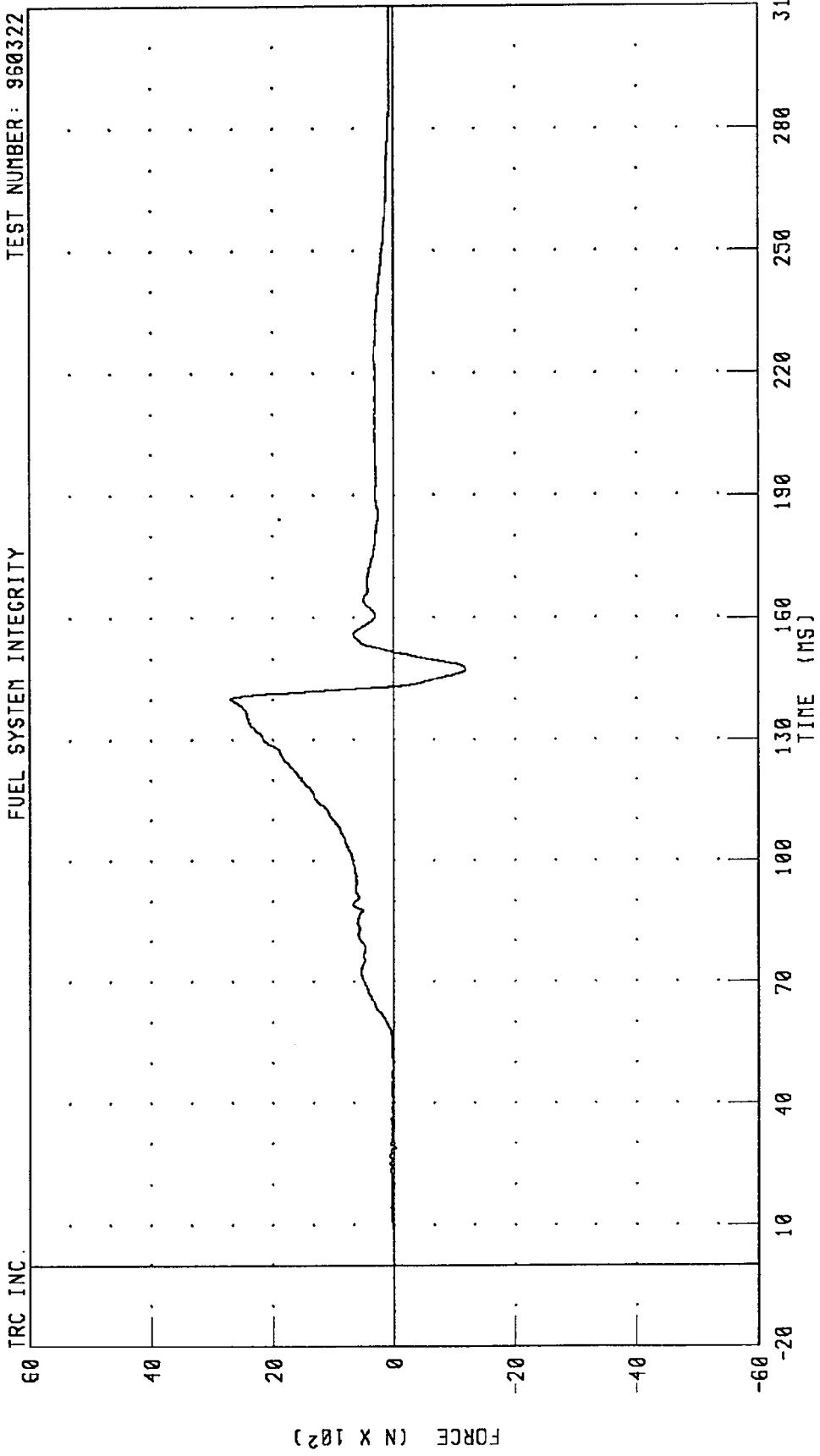


CHANNEL: NEKYF2 FILTER: CH. CLASS 1000 PEAK DATA: 509.29 N @ 144.16 MS; -60.05 N @ 259.52 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
RIGHT FRONT PASSENGER UPPER NECK Z-AXIS AXIAL FORCE

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY



CHANNEL: NEKZF2 FILTER: CH. CLASS 1000 PEAK DATA: 2697.85 N @ 140.16 MS; -1191.95 N @ 147.28 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
RIGHT FRONT PASSENGER UPPER NECK MOMENT ABOUT X-AXIS

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

TRC INC.

180

120

60

0

-60

-120

-180

TORQUE (N·M)

310

280

250

220

190

160

130

100

70

40

10

-20

TIME (MS)

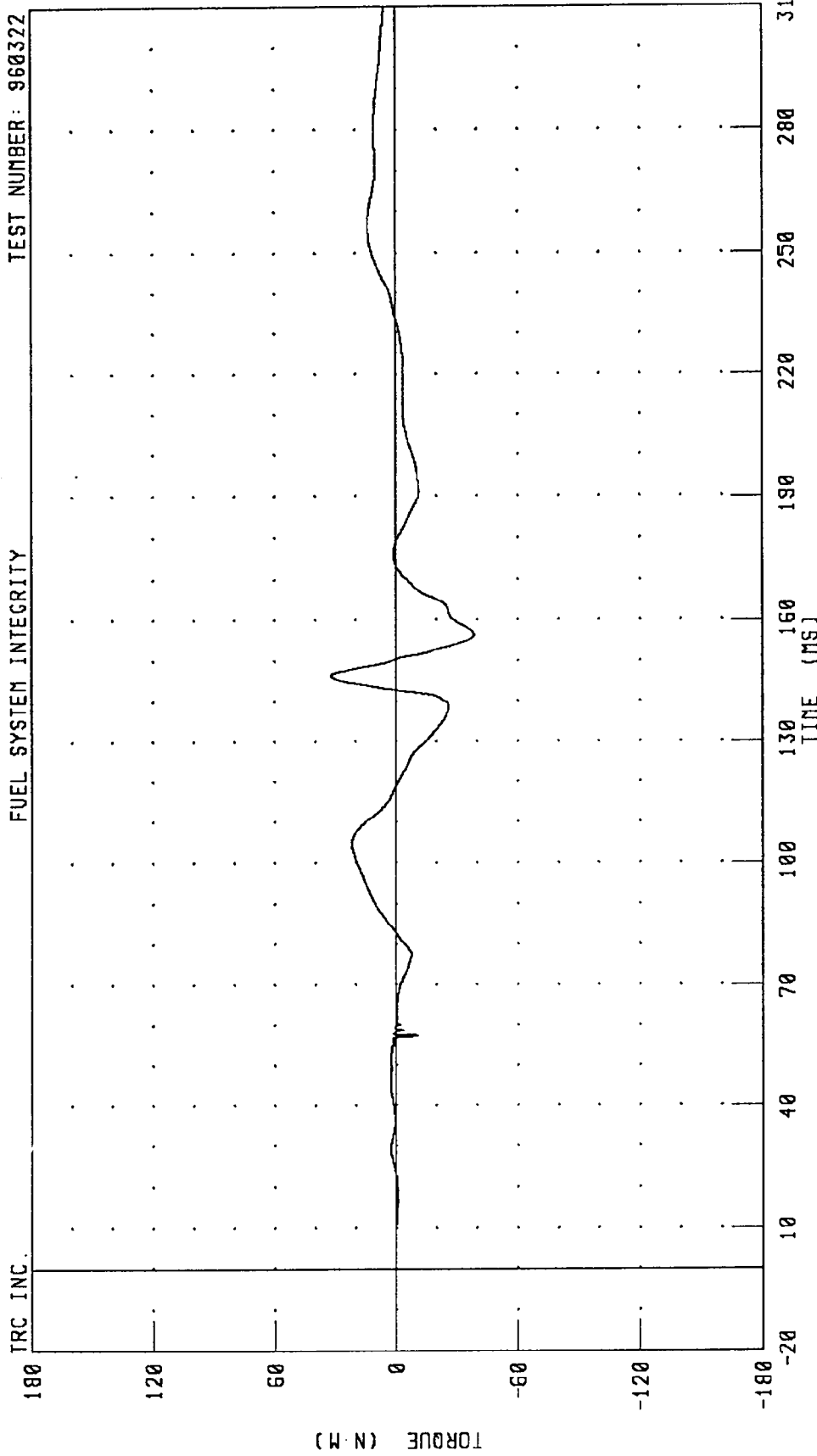
PEAK DATA: 42.05 N·M @ 146.00 MS; -11.51 N·M @ 168.64 MS

CHANNEL: NEKX12 FILTER: CH. CLASS 600

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
RIGHT FRONT PASSENGER UPPER NECK MOMENT ABOUT Y-AXIS

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

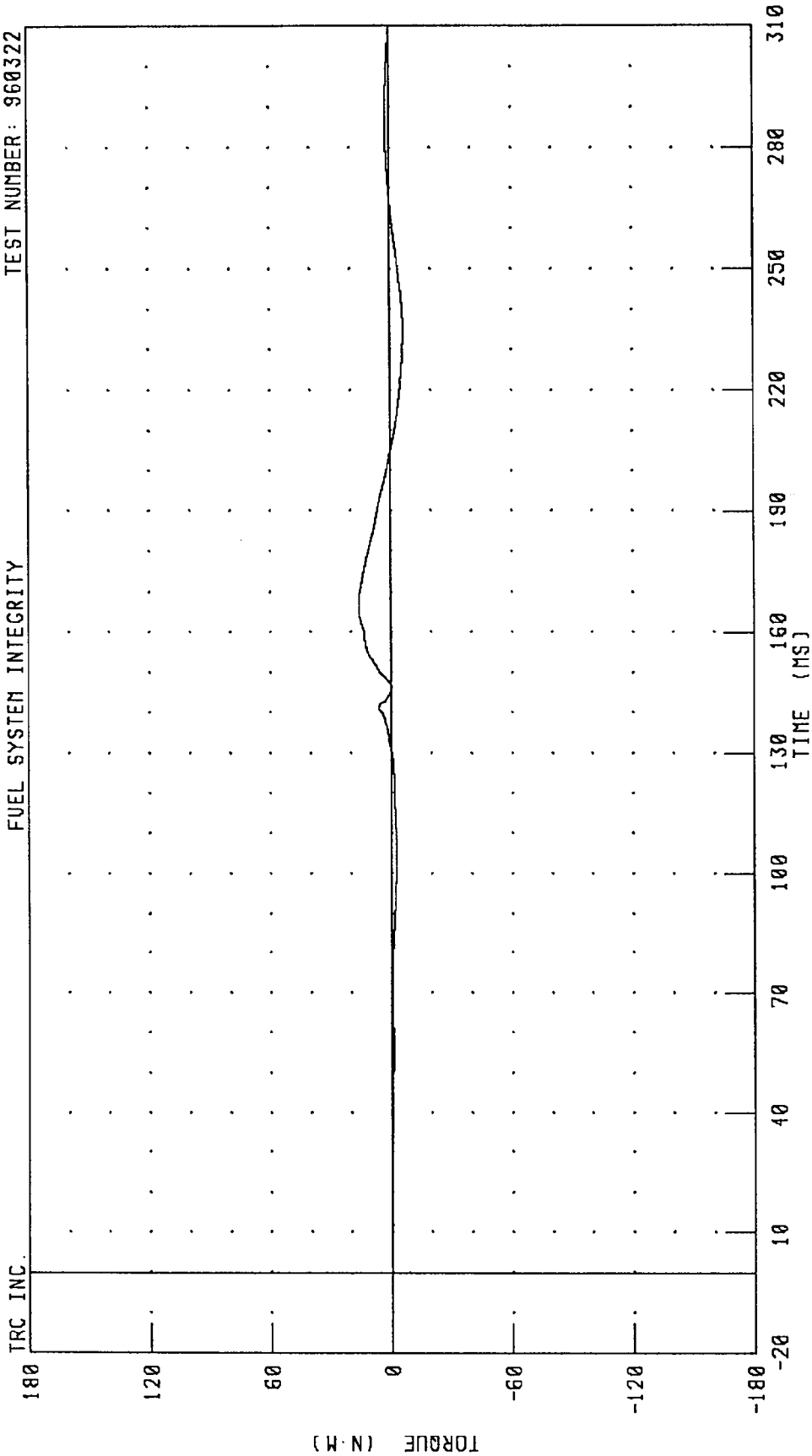


CHANNEL: NEKYM2 FILTER: CH. CLASS 600 PEAK DATA: 31.94 N.M @ 146.40 MS; -38.46 N.M @ 156.32 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
RIGHT FRONT PASSENGER UPPER NECK MOMENT ABOUT Z-AXIS

TEST NUMBER: 960322

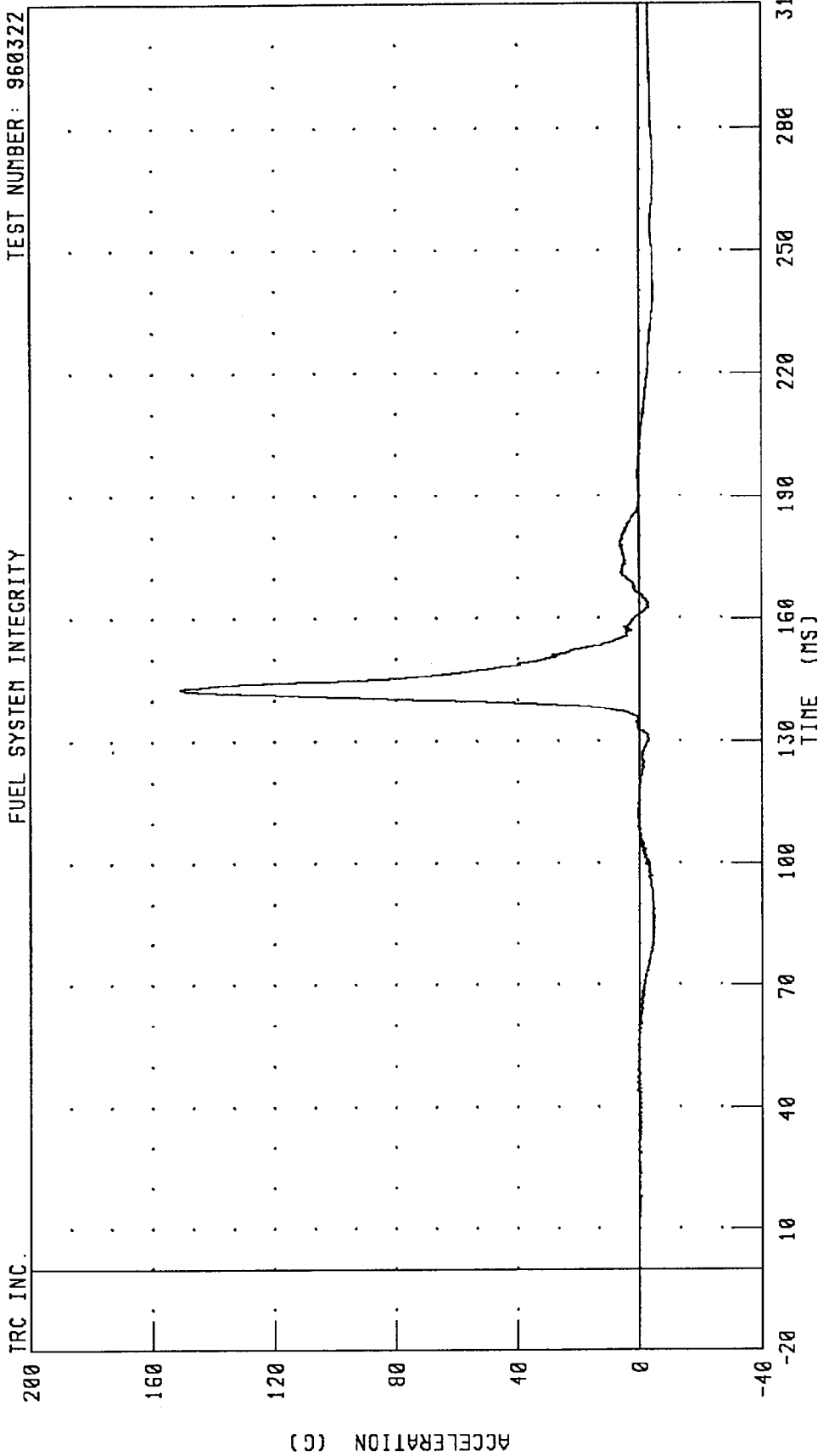
FUEL SYSTEM INTEGRITY



CHANNEL: NEKZM2 FILTER: CH. CLASS 600 PEAK DATA: 15.92 N.M @ 165.36 MS; -6.48 N.M @ 233.76 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
RIGHT FRONT PASSENGER HEAD POSITION 1 X-AXIS ACCELERATION

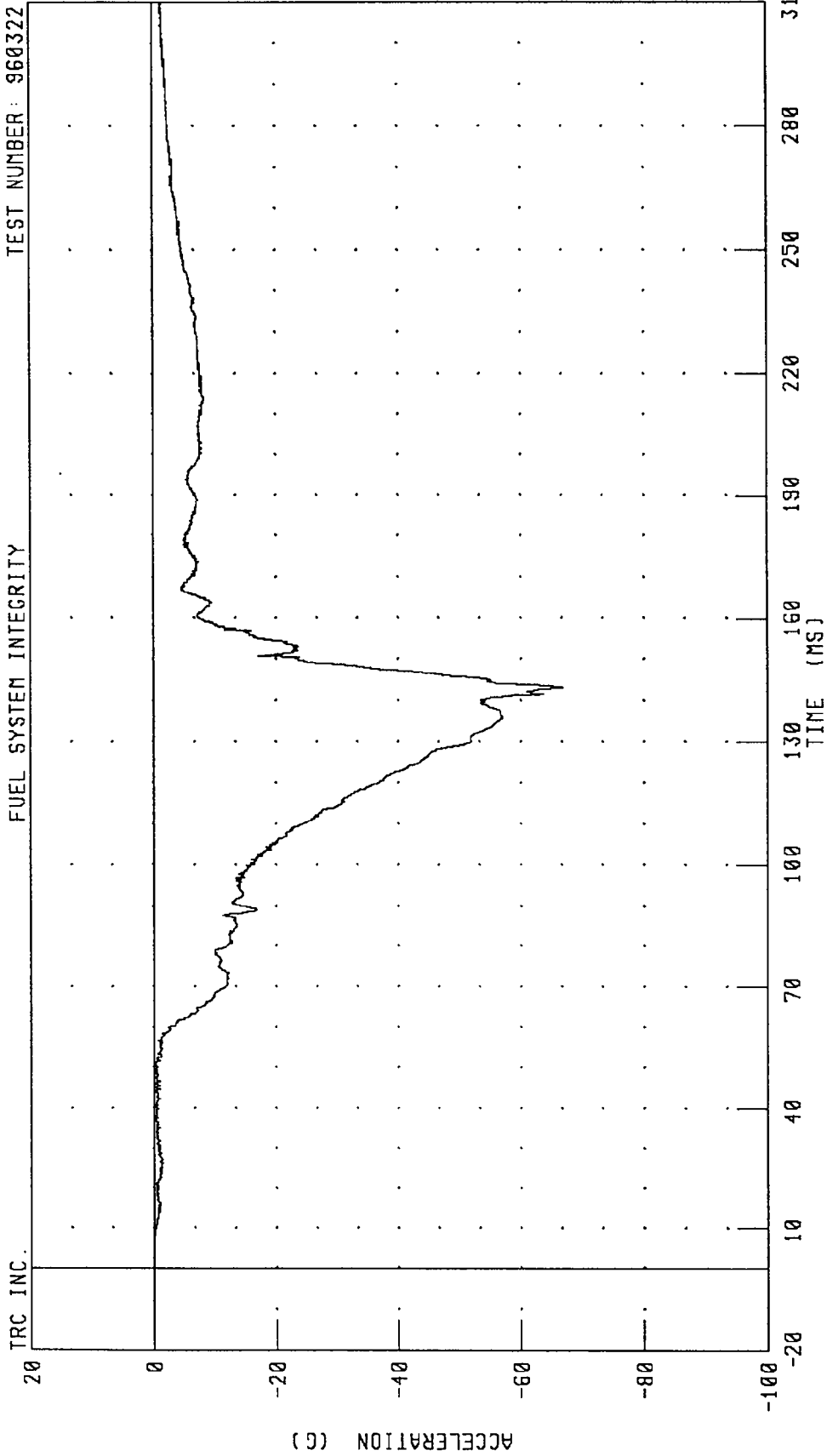
TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960322



CHANNEL: HD1XG2 FILTER: CH. CLASS 1000 PEAK DATA: 150.89 G @ 142.80 MS; -4.97 G @ 83.92 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1986 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
RIGHT FRONT PASSENGER HEAD POSITION 1 Z-AXIS ACCELERATION

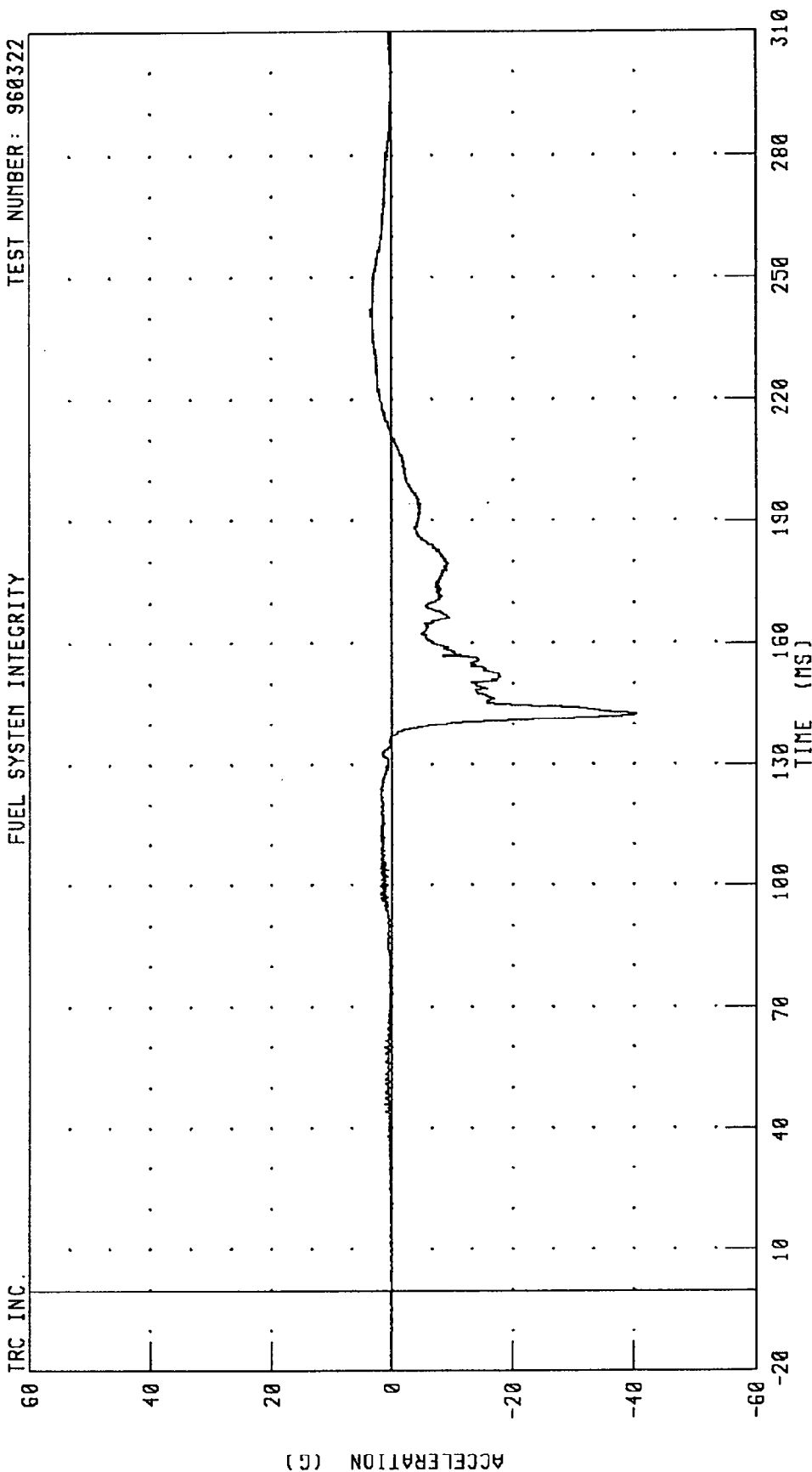
TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960322



CHANNEL: HD1ZG2 FILTER: CH. CLASS 1000 PEAK DATA: 0.20 G @ -8.08 MS; -66.99 G @ 143.20 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1986 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
RIGHT FRONT PASSENGER HEAD POSITION 2 Y-AXIS ACCELERATION

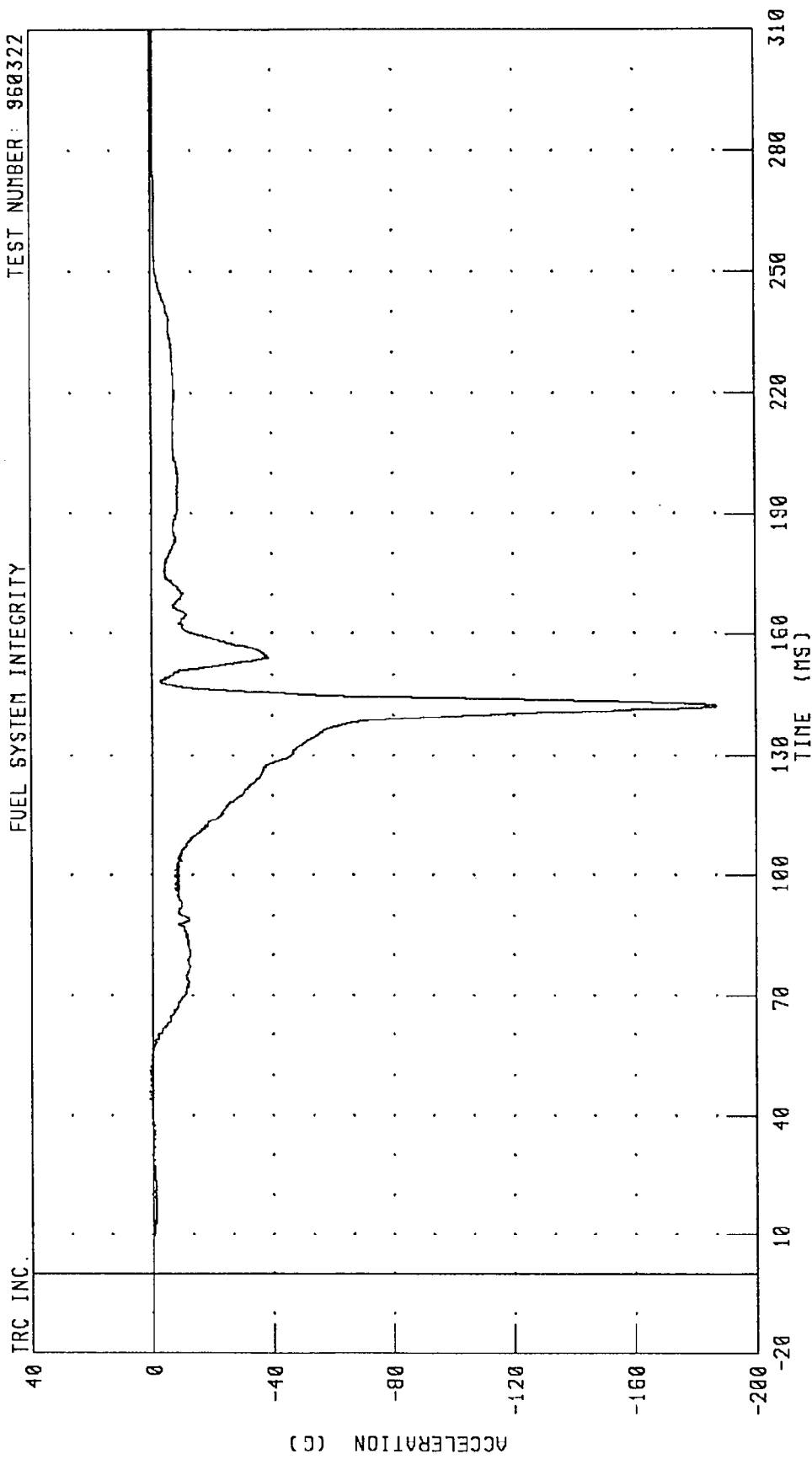
TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960322



CHANNEL: HD2YG2 FILTER: CH. CLASS 1000 PEAK DATA: 3.50 G @ 240.48 MS; -40.34 G @ 142.56 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
RIGHT FRONT PASSENGER HEAD POSITION 2 Z-AXIS ACCELERATION

TRC INC.  
FUEL SYSTEM INTEGRITY  
TEST NUMBER: 960322



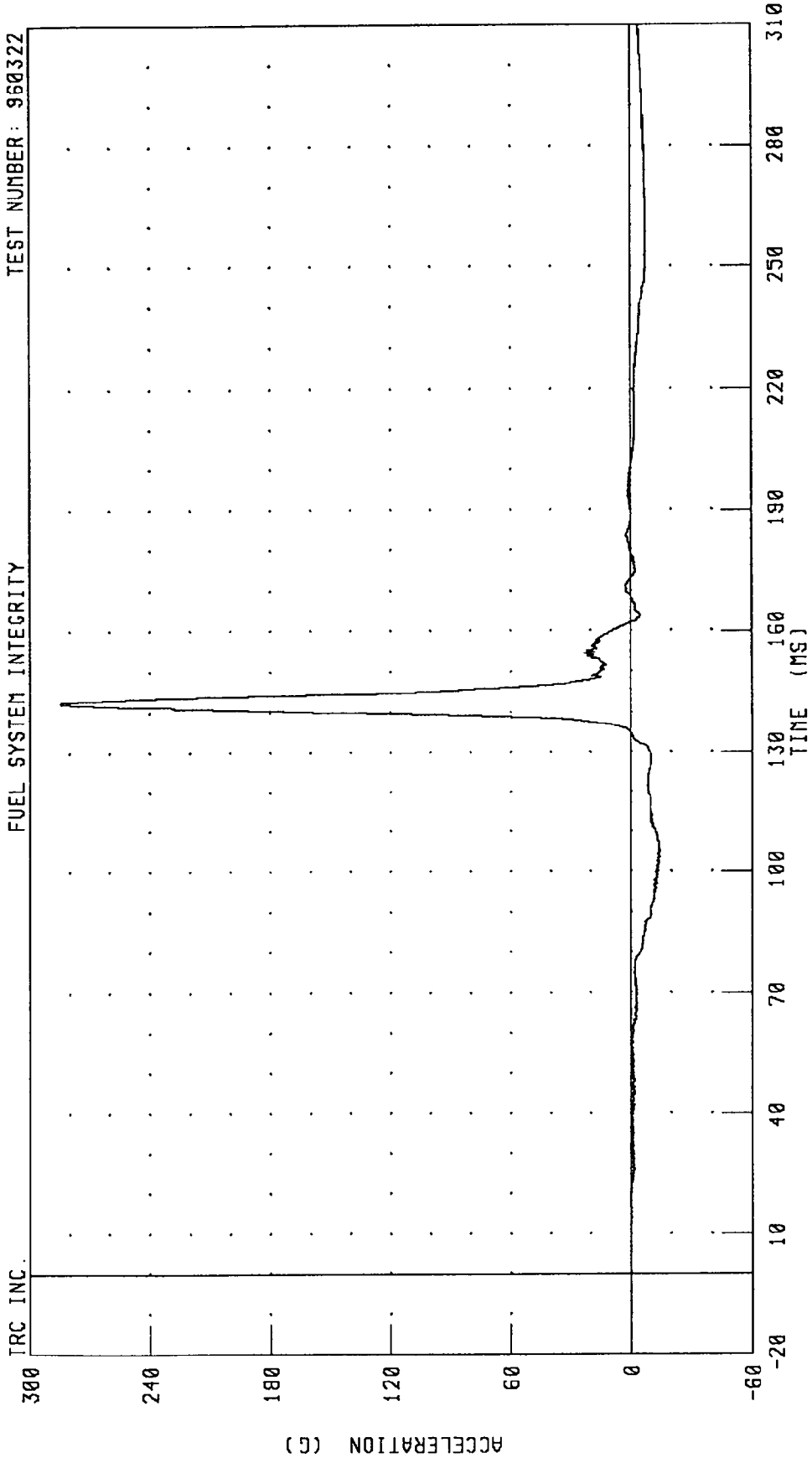
CHANNEL: HD2ZG2 FILTER: CH. CLASS 1000  
PEAK DATA: 0.99 G @ 44.24 MS; -186.94 G @ 142.32 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
RIGHT FRONT PASSENGER HEAD POSITION 3 X-AXIS ACCELERATION

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

TRC INC.



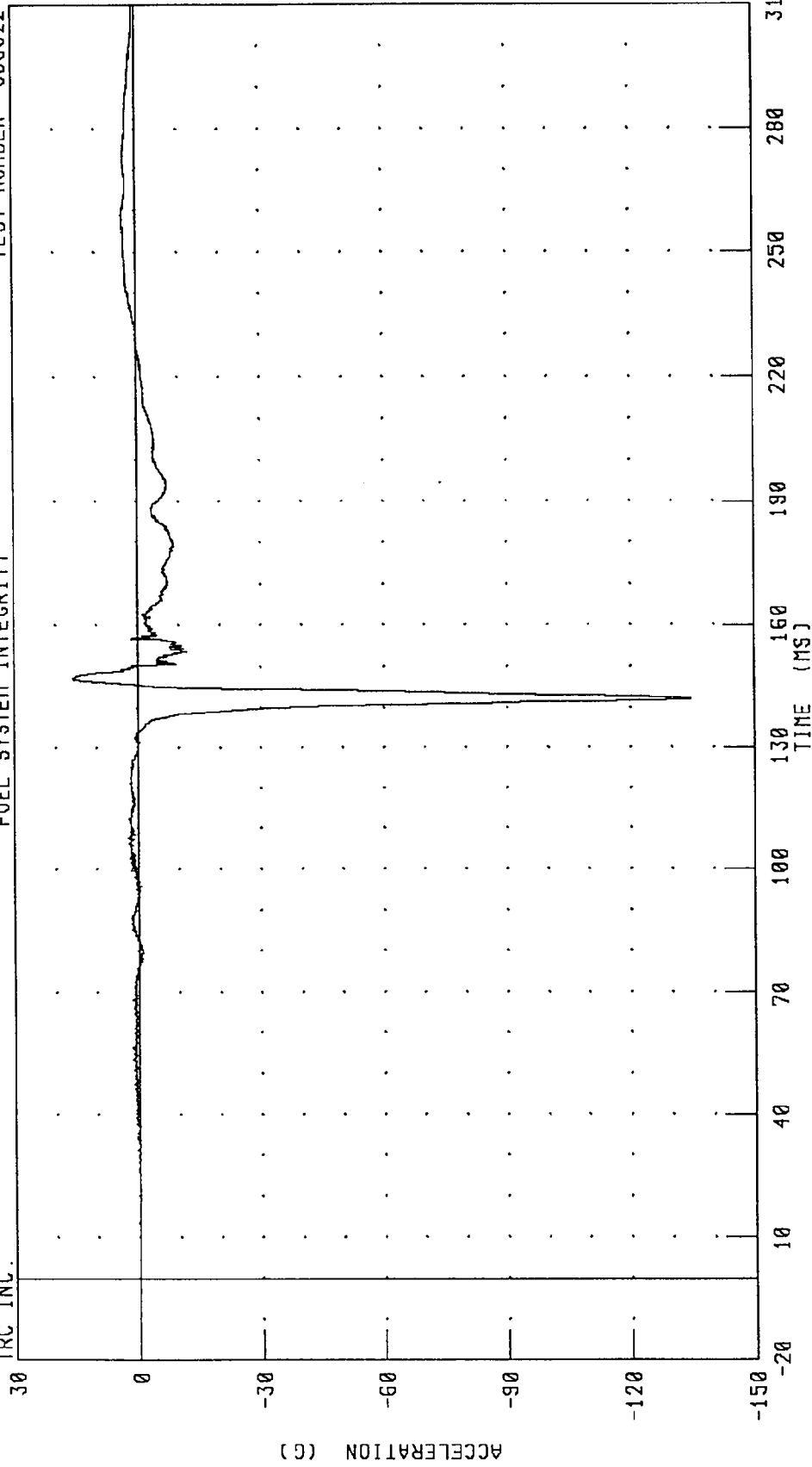
CHANNEL: HD3XG2 FILTER: CH. CLASS 1000 PEAK DATA: 284.50 G @ 142.56 MS; -14.67 G @ 103.52 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
RIGHT FRONT PASSENGER HEAD POSITION 3 Y-AXIS ACCELERATION

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

TRC INC.

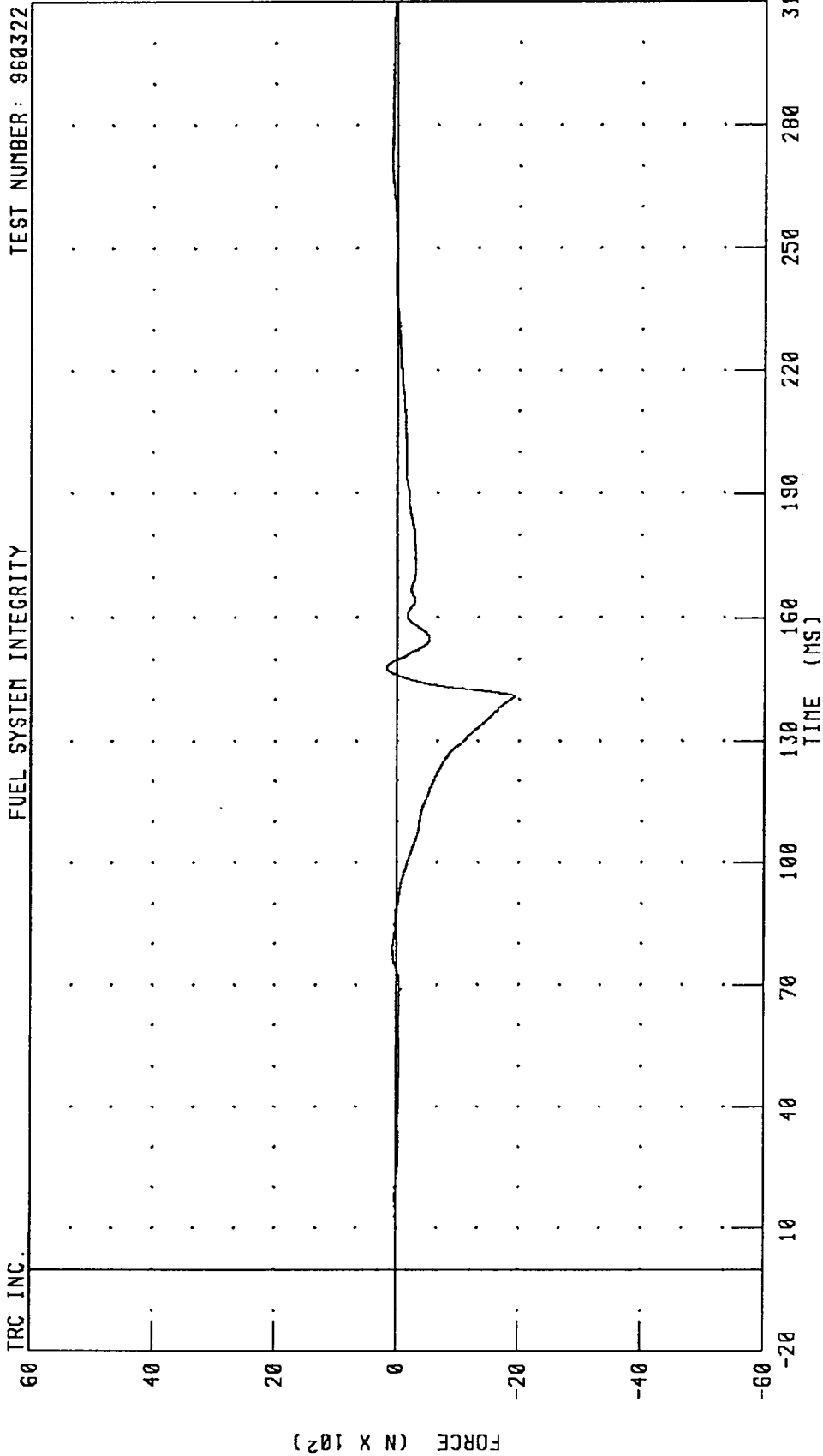


CHANNEL: HD3YG2 FILTER: CH. CLASS 1000

PEAK DATA: 15.82 G @ 147.20 MS; -134.63 G @ 142.24 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
RIGHT FRONT PASSENGER LOWER NECK X-AXIS SHEAR FORCE

FUEL SYSTEM INTEGRITY TEST NUMBER: 960322



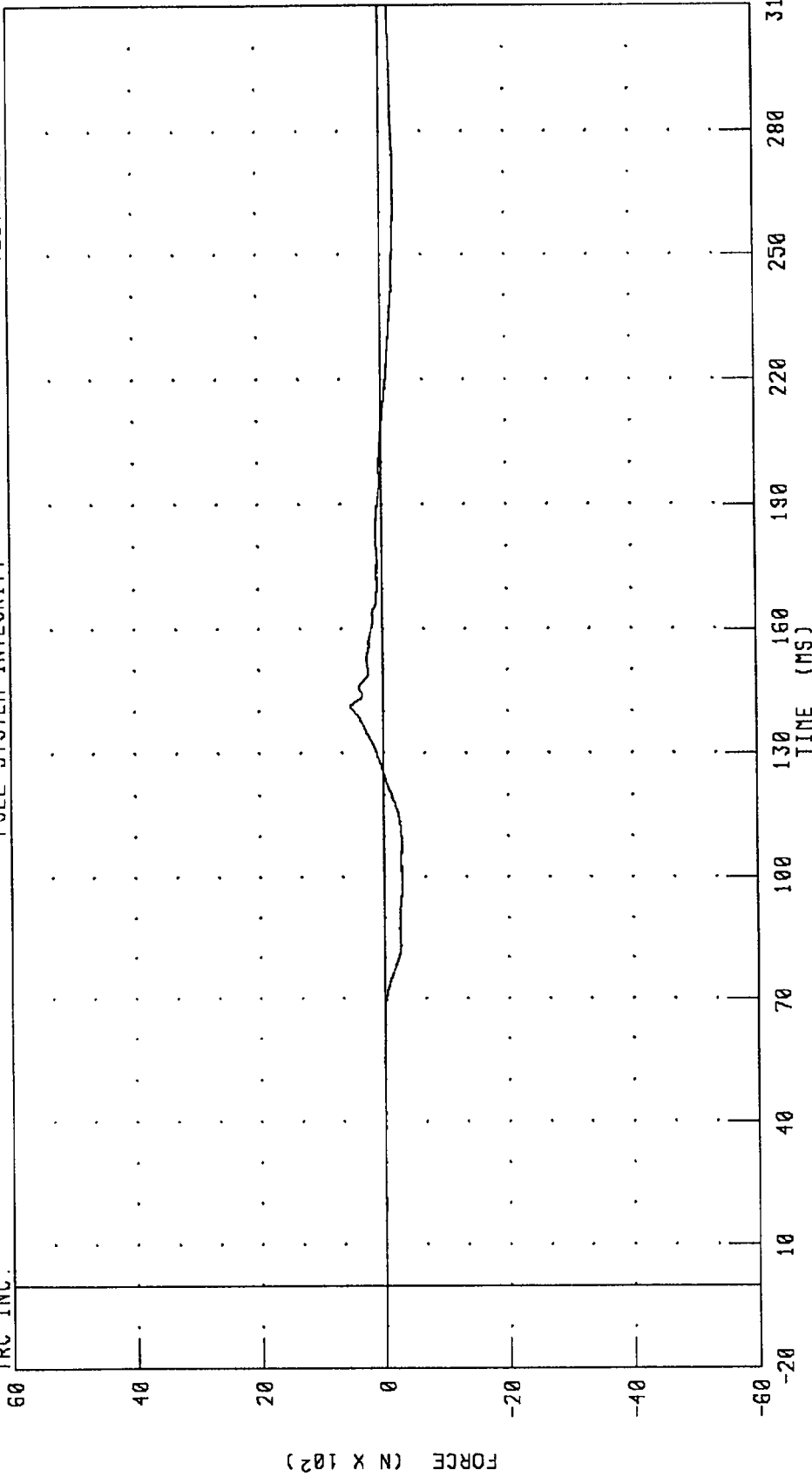
CHANNEL: NKLXF2 FILTER: CH. CLASS 1000 PEAK DATA: 175.77 N @ 147.76 MS; -1924.88 N @ 140.96 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
RIGHT FRONT PASSENGER LOWER NECK Y-AXIS SHEAR FORCE

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

TRC INC.

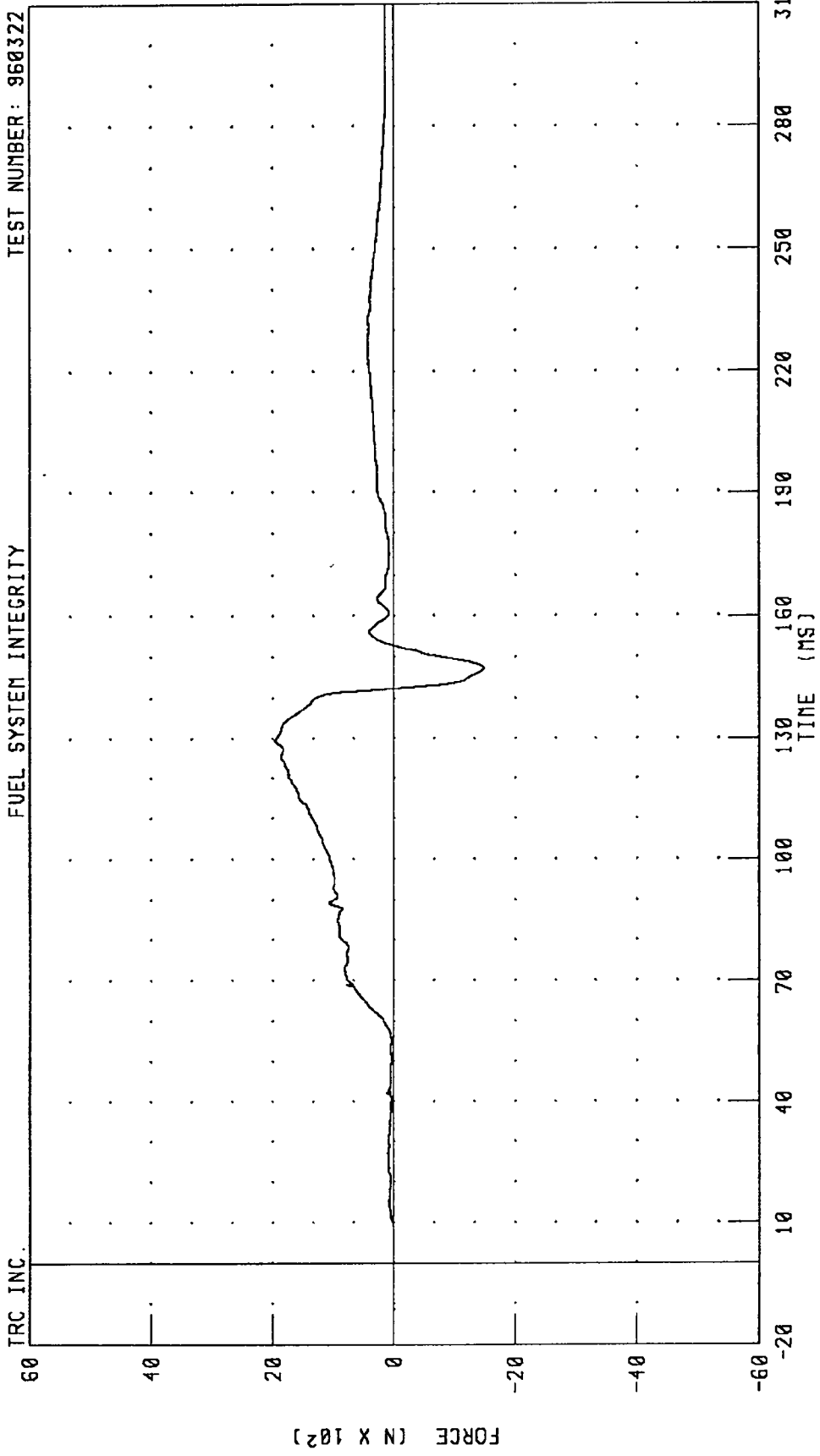


PEAK DATA: 524.38 N @ 141.28 MS; -290.35 N @ 96.48 MS

CHANNEL: NKLYF2 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
RIGHT FRONT PASSENGER LOWER NECK Z-AXIS AXIAL FORCE  
FUEL SYSTEM INTEGRITY

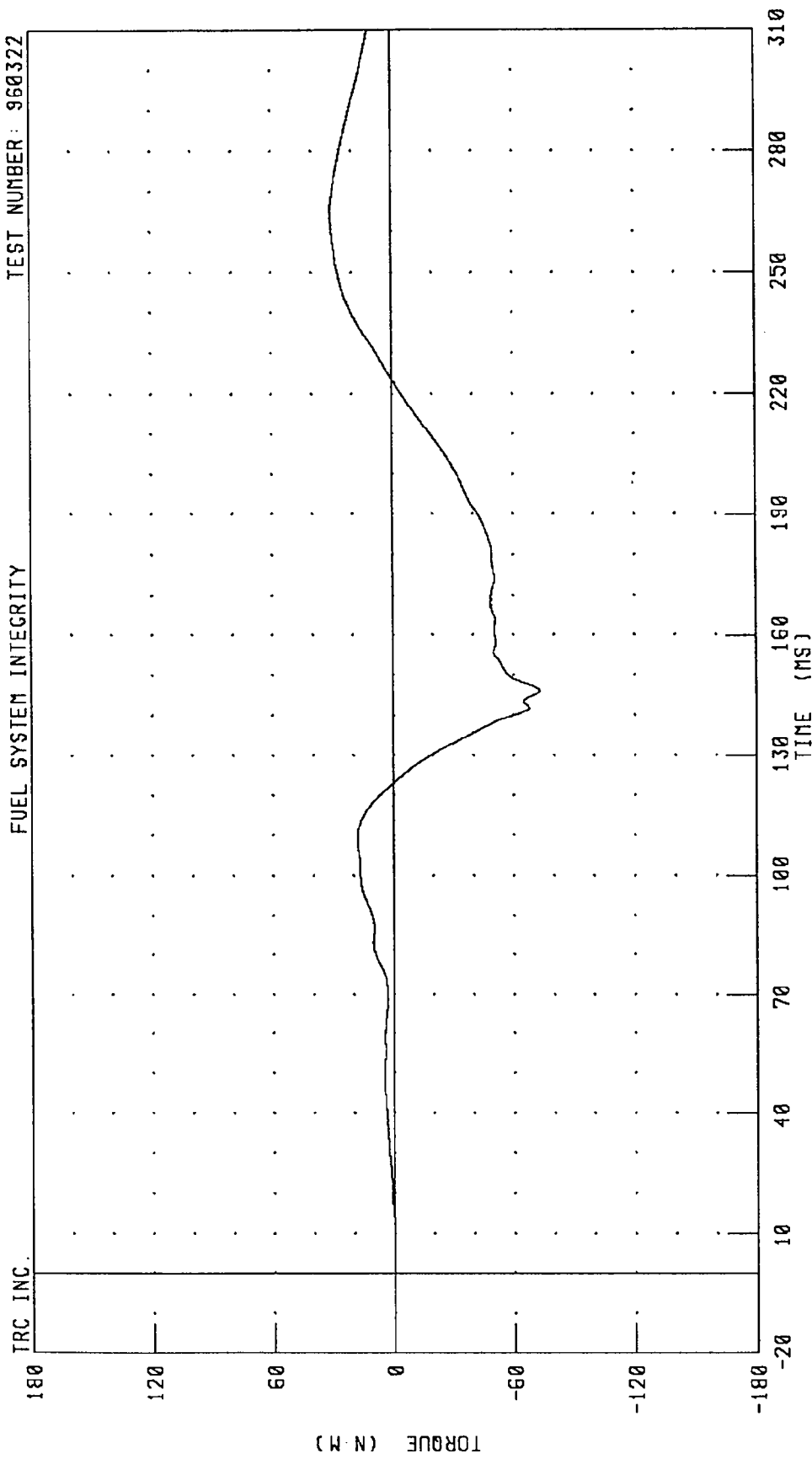
TEST NUMBER: 960322



CHANNEL: NKLZF2 FILTER: CH. CLASS 1000 PEAK DATA: 1960.08 N @ 129.52 MS; -1485.11 N @ 147.20 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
RIGHT FRONT PASSENGER LOWER NECK MOMENT ABOUT X-AXIS

FUEL SYSTEM INTEGRITY  
TEST NUMBER: 960322

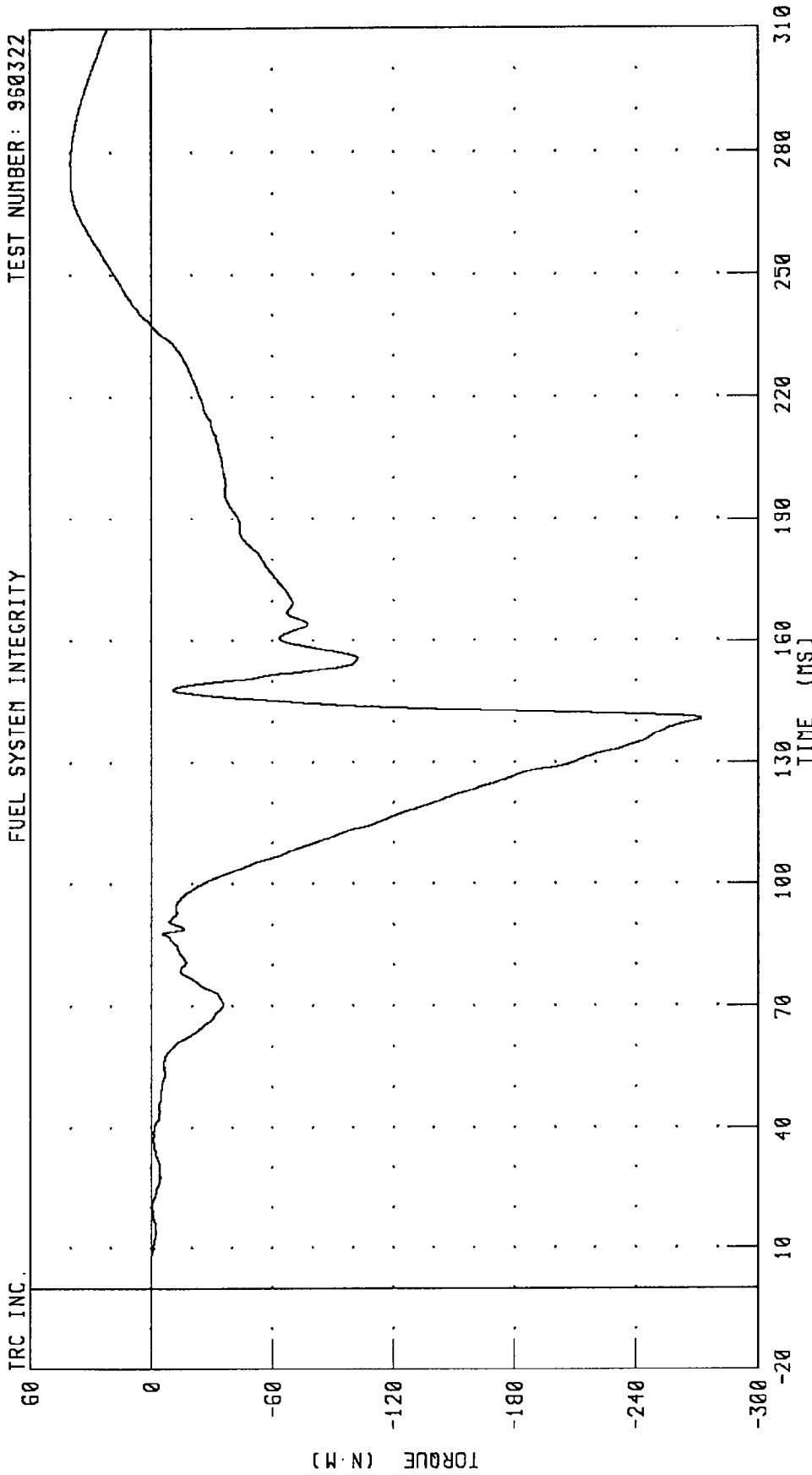


CHANNEL: NKLXM2 FILTER: CH. CLASS 600  
PEAK DATA: 30.52 N·M @ 264.72 MS; -72.98 N·M @ 146.24 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
RIGHT FRONT PASSENGER LOWER NECK MOMENT ABOUT Y-AXIS

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY



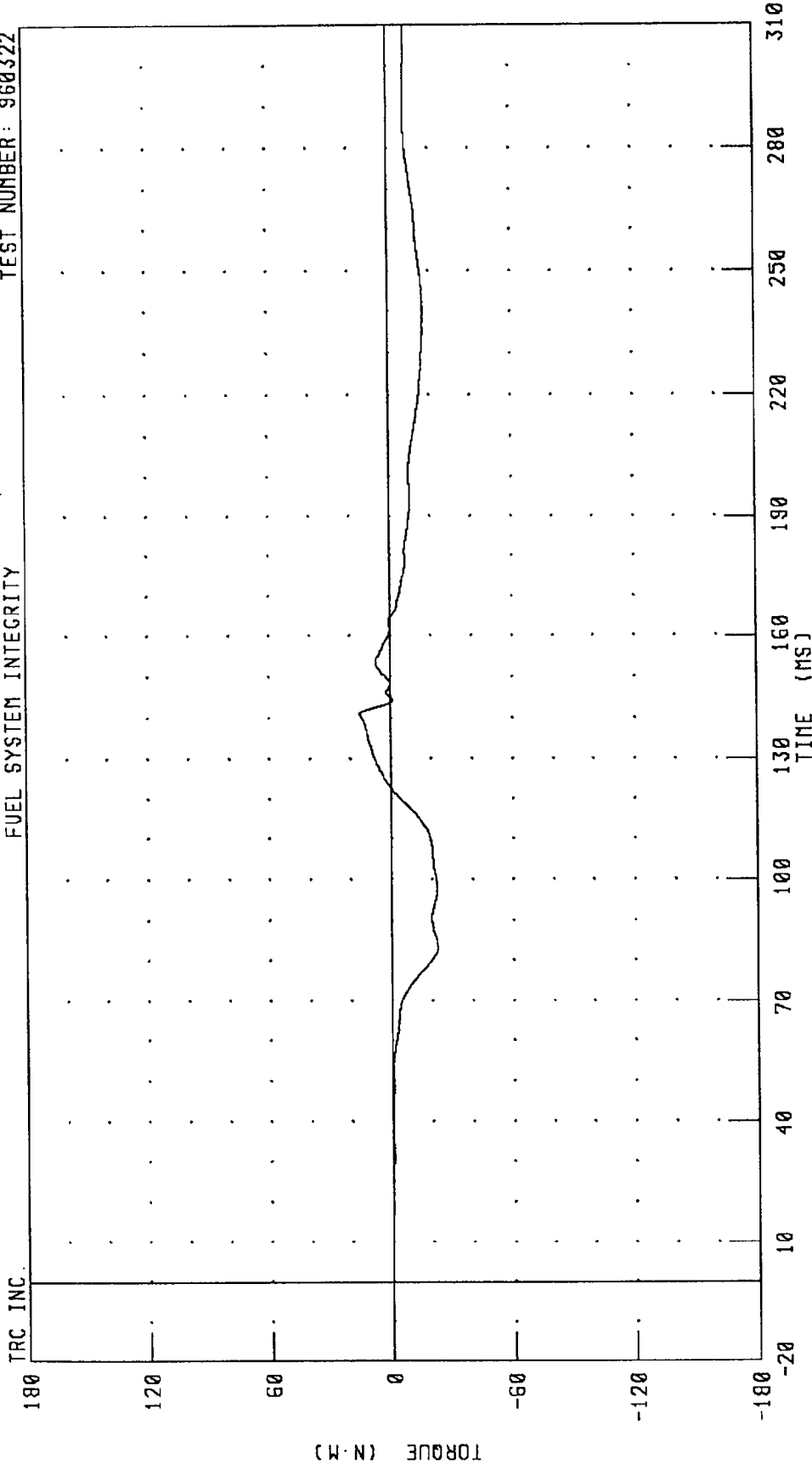
CHANNEL: NKLYM2 FILTER: CH. CLASS 600

PEAK DATA: 39.93 N.M @ 277.28 MS; -271.81 N.M @ 140.88 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
RIGHT FRONT PASSENGER LOWER NECK MOMENT ABOUT Z-AXIS

TEST NUMBER: 960322

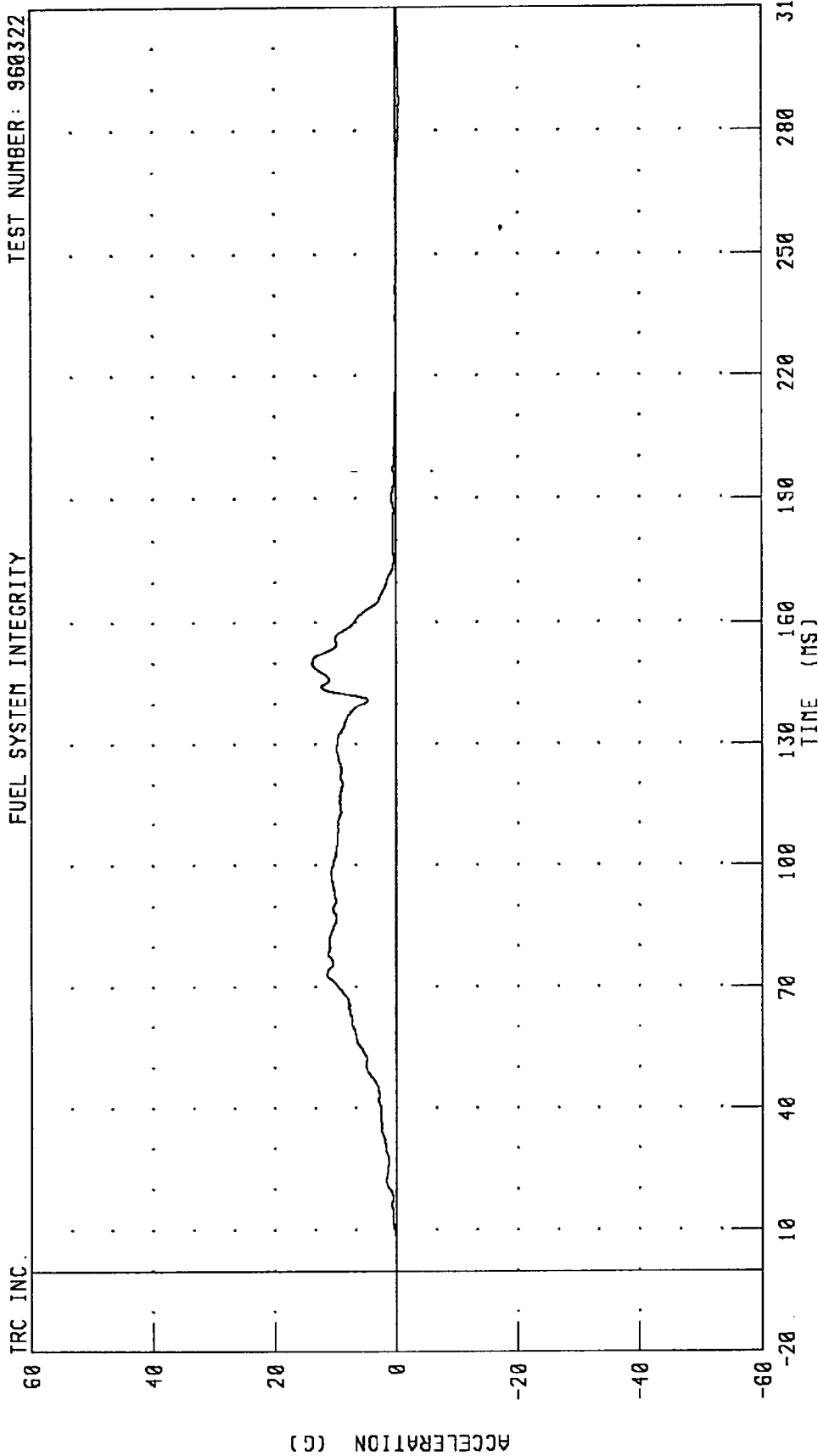
FUEL SYSTEM INTEGRITY



CHANNEL: NKLZM2 FILTER: CH. CLASS 600  
PEAK DATA: 15.13 N.M @ 141.04 MS; -22.81 N.M @ 83.04 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION

TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960322



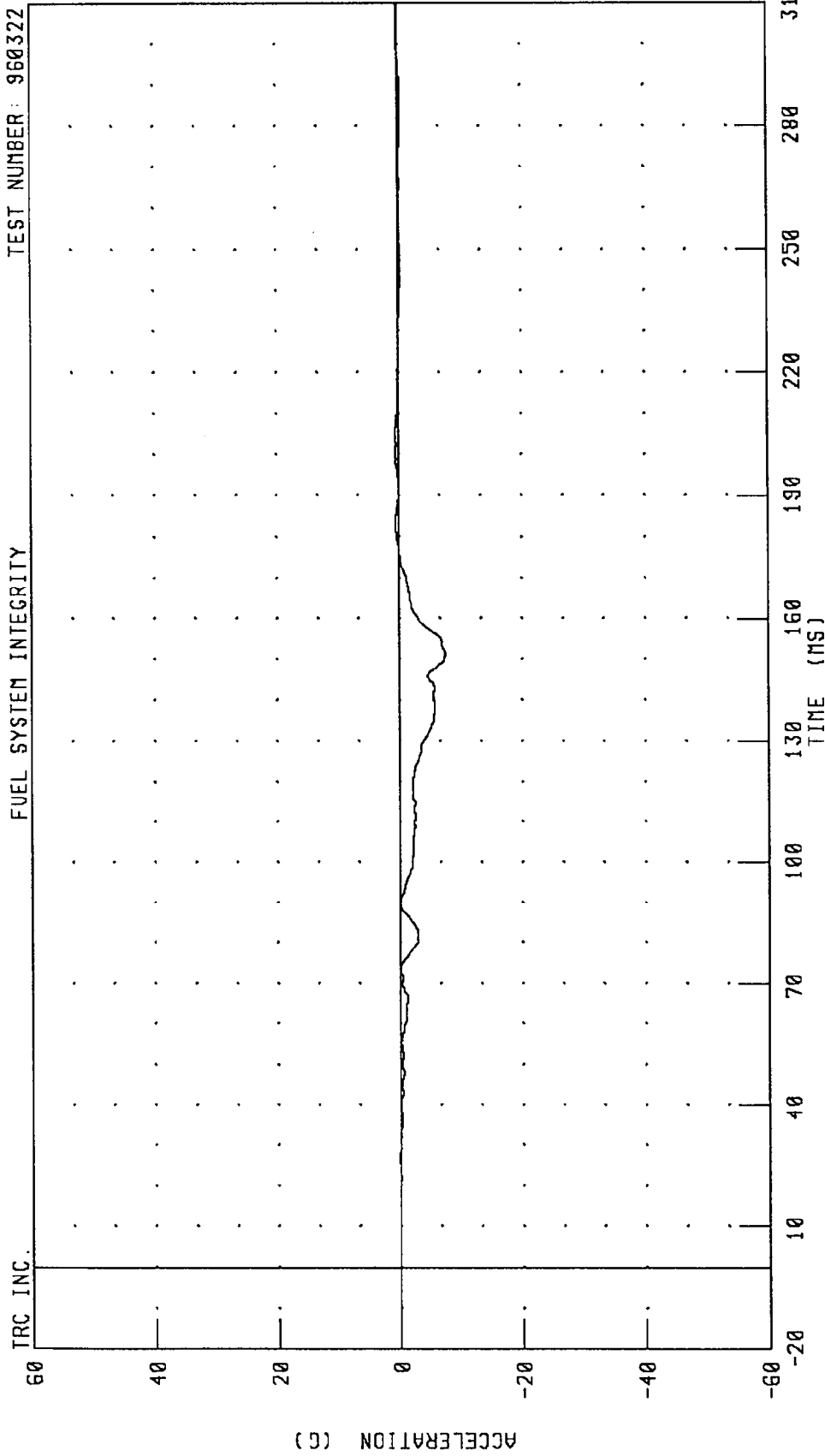
CHANNEL: CSTXG2 FILTER: CH. CLASS 180

PEAK DATA: 13.83 G @ 149.92 MS; -0.62 G @ 287.20 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
RIGHT FRONT PASSENGER CHEST Y-AXIS ACCELERATION

TRC INC. TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY



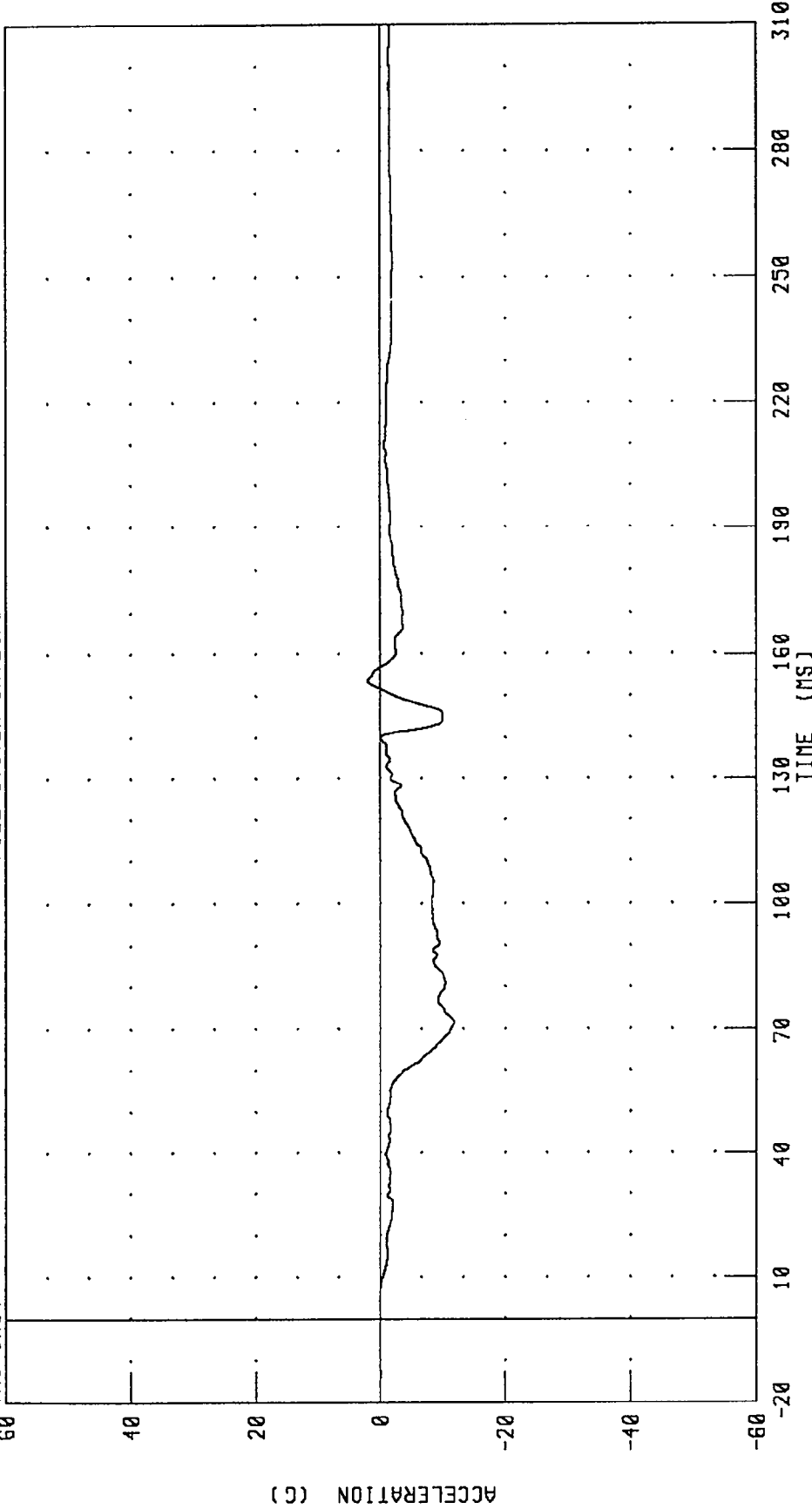
CHANNEL: CSTYG2 FILTER: CH. CLASS 180 PEAK DATA: 0.50 G @ 205.68 MS; -7.53 G @ 151.12 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
RIGHT FRONT PASSENGER CHEST Z-AXIS ACCELERATION

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

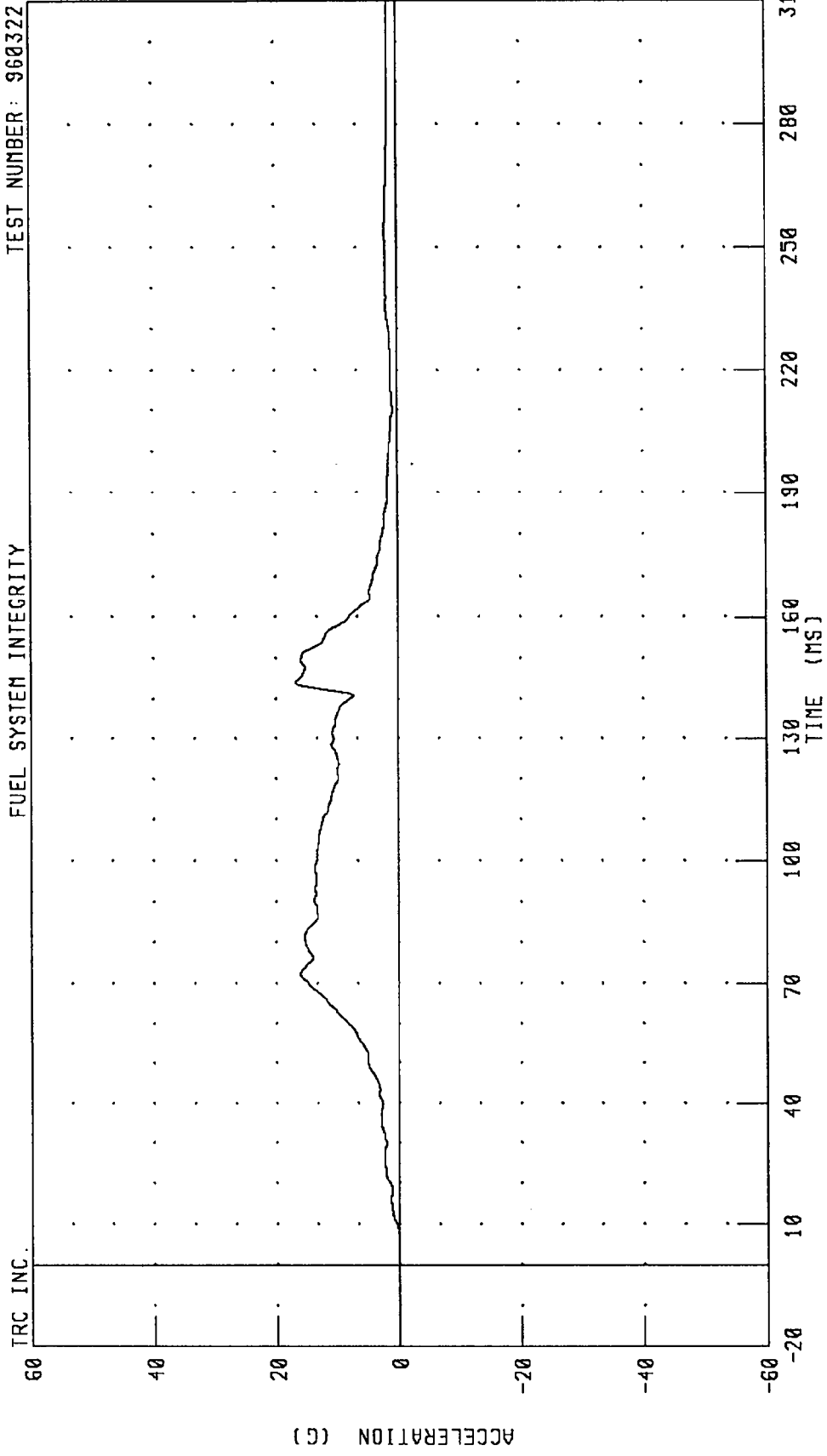
TRC INC.



CHANNEL: CSTZG2 FILTER: CH. CLASS 180 PEAK DATA: 2.02 G @ 153.76 MS; -11.82 G @ 71.60 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION

TEST NUMBER: 960322

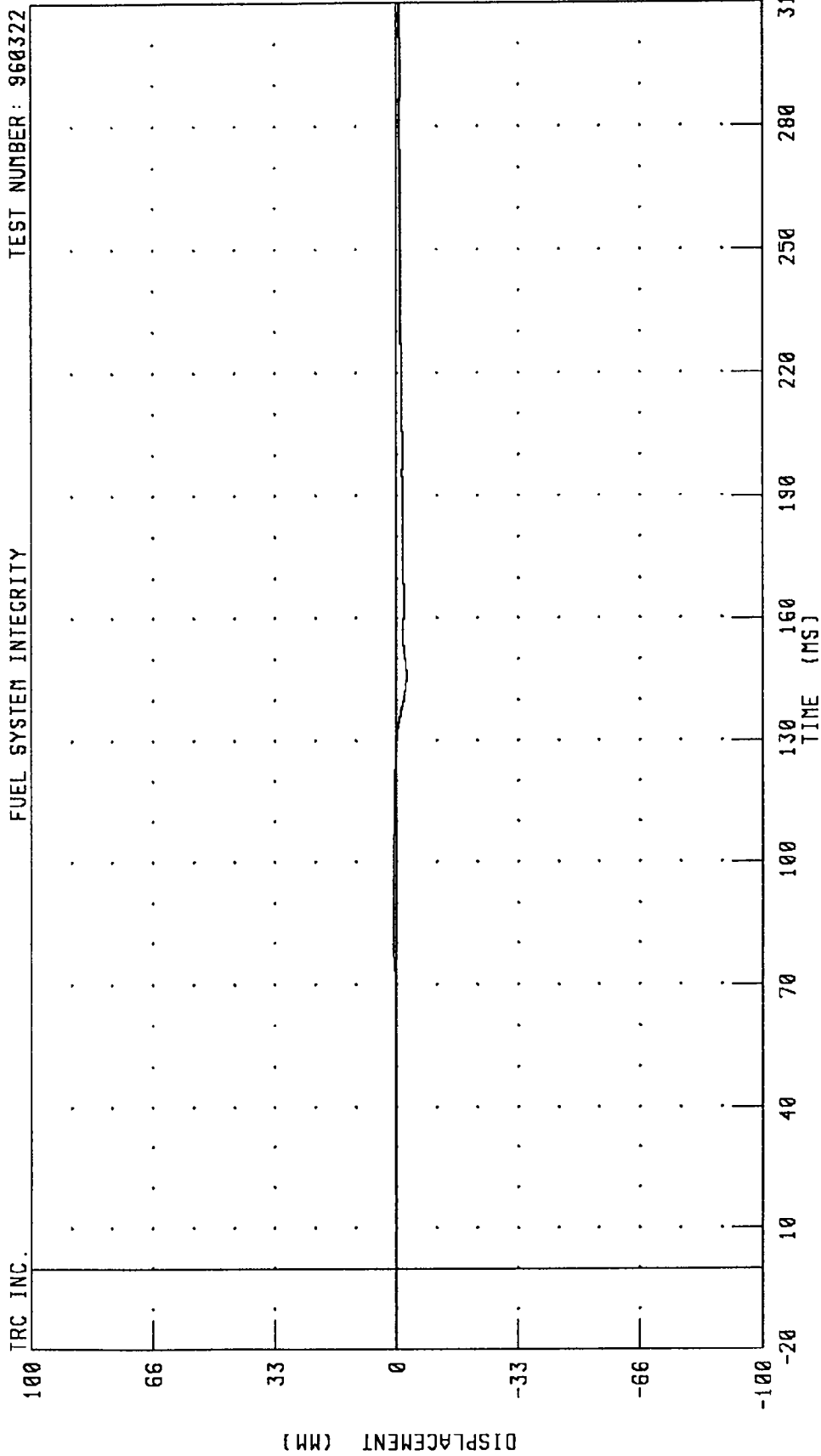


CHANNEL: CSTRG2 FILTER: CH. CLASS 180 PEAK DATA: 16.79 G @ 144.16 MS; 0.00 G @ -20.00 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
 RIGHT FRONT PASSENGER CHEST DEFLECTION

TEST NUMBER: 960322

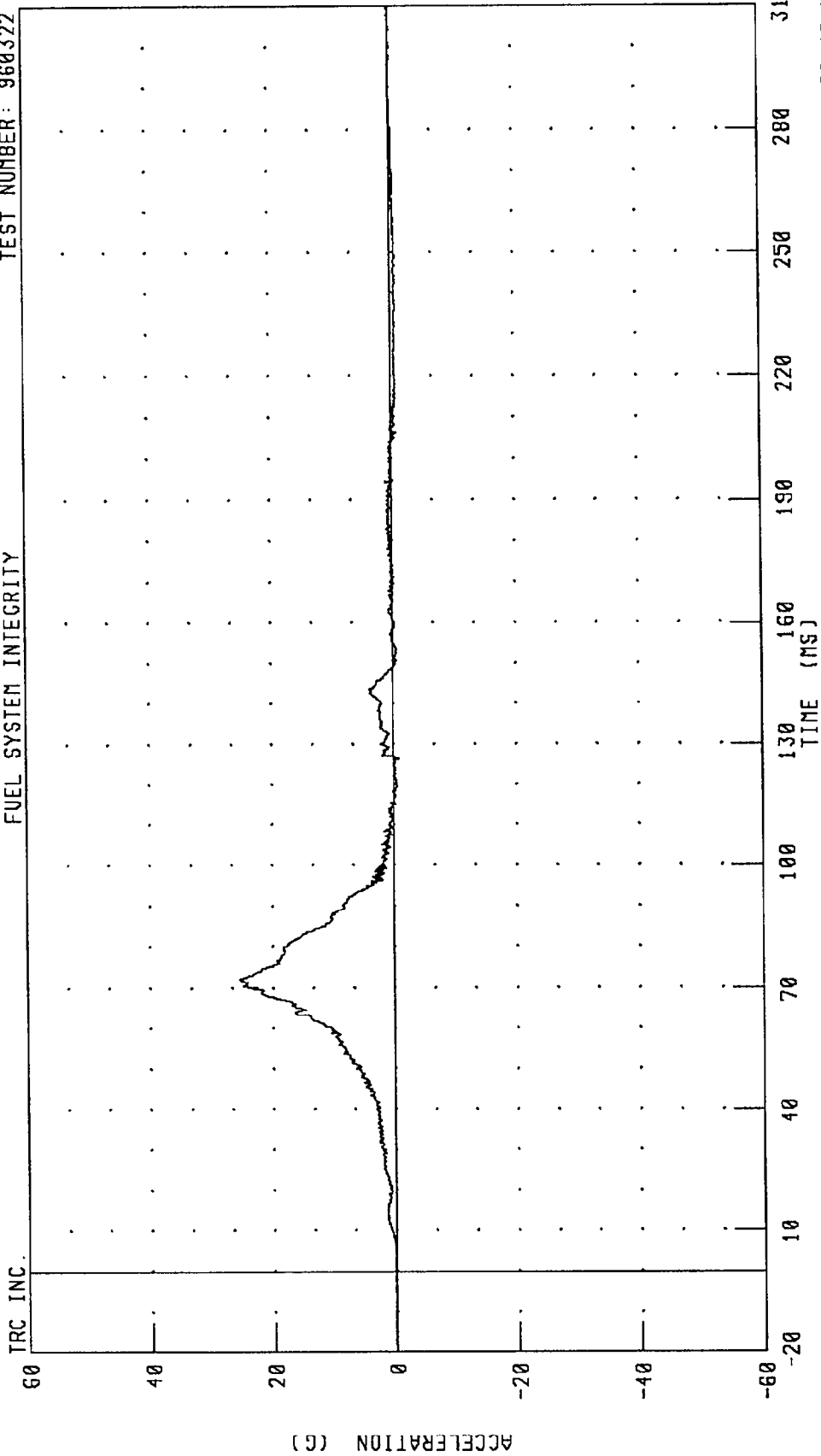
FUEL SYSTEM INTEGRITY



CHANNEL: CSTXD2 FILTER: CH. CLASS 180 PEAK DATA: 0.95 MM @ 83.60 MS; -2.73 MM @ 146.08 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
RIGHT FRONT PASSENGER PELVIS X-AXIS ACCELERATION  
FUEL SYSTEM INTEGRITY

TEST NUMBER: 960322



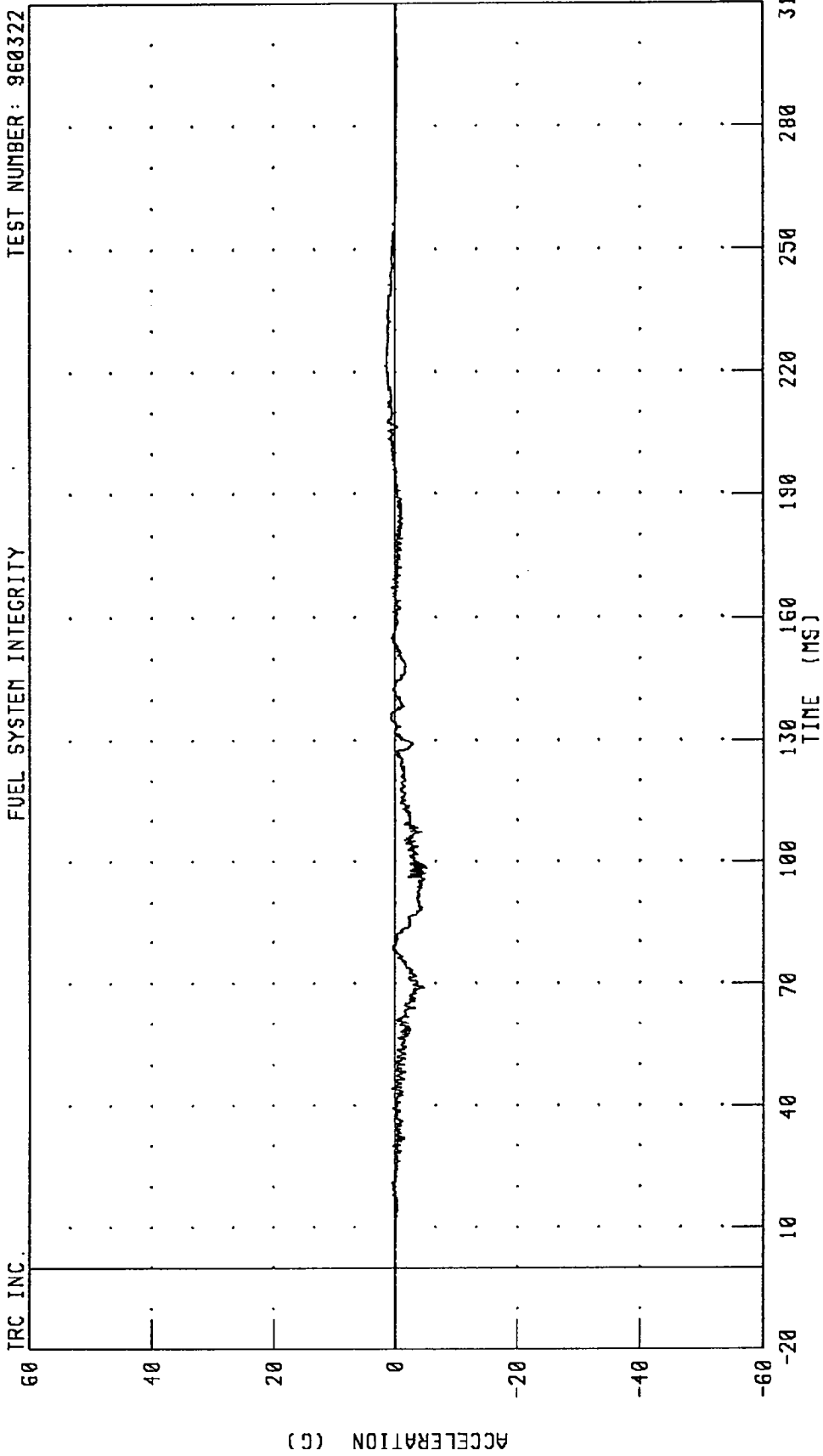
PEAK DATA: 25.38 G @ 72.16 MS; -0.91 G @ 126.48 MS

CHANNEL: PEVXG2 FILTER: CH. CLASS 1000

TRC INC.

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
RIGHT FRONT PASSENGER PELVIS Y-AXIS ACCELERATION

TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960322



CHANNEL: PEVYG2 FILTER: CH. CLASS 1000

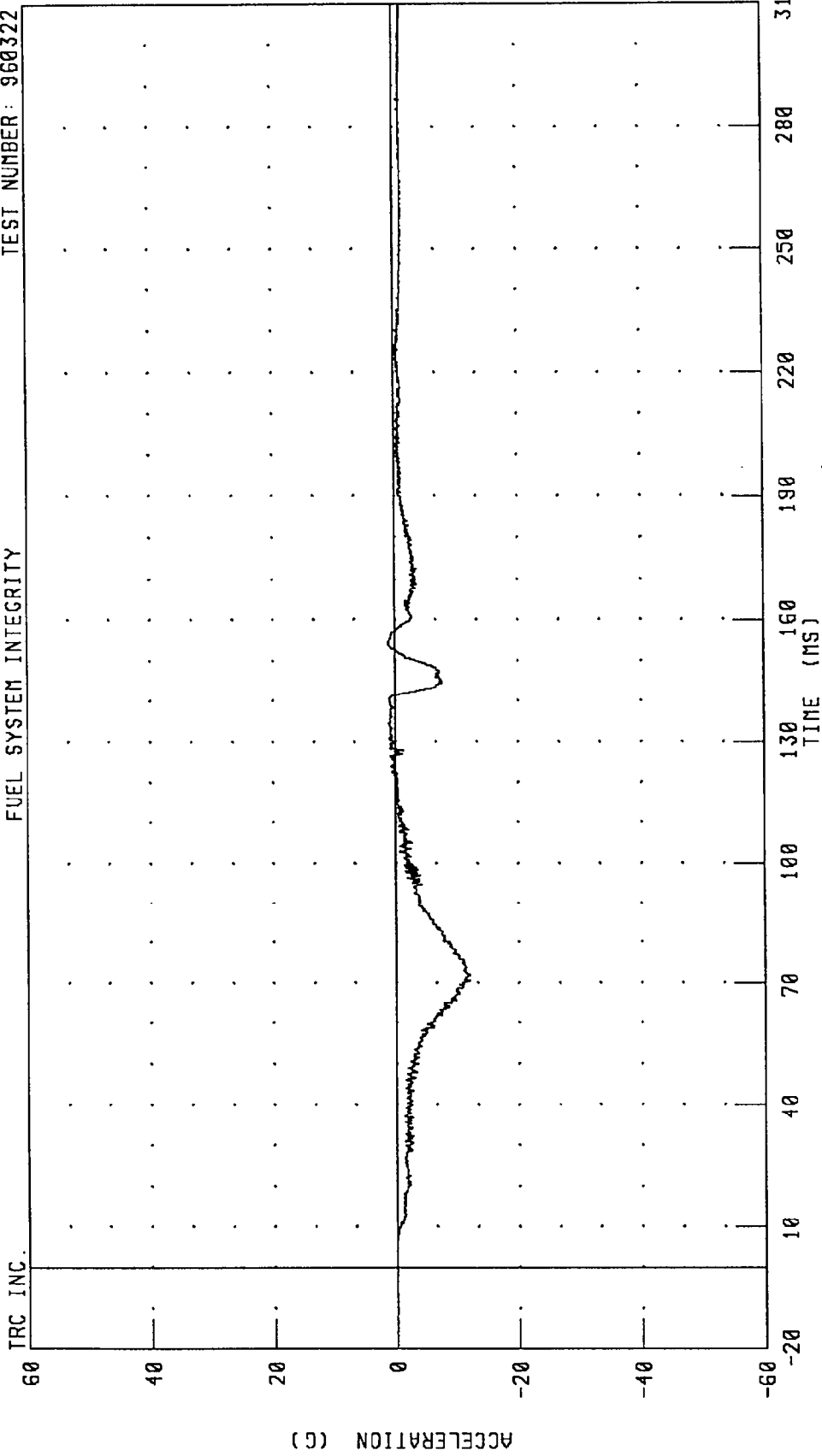
PEAK DATA: 1.64 G @ 221.60 MS; -5.24 G @ 98.48 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1986 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
RIGHT FRONT PASSENGER PELVIS Z-AXIS ACCELERATION

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

TRC INC.

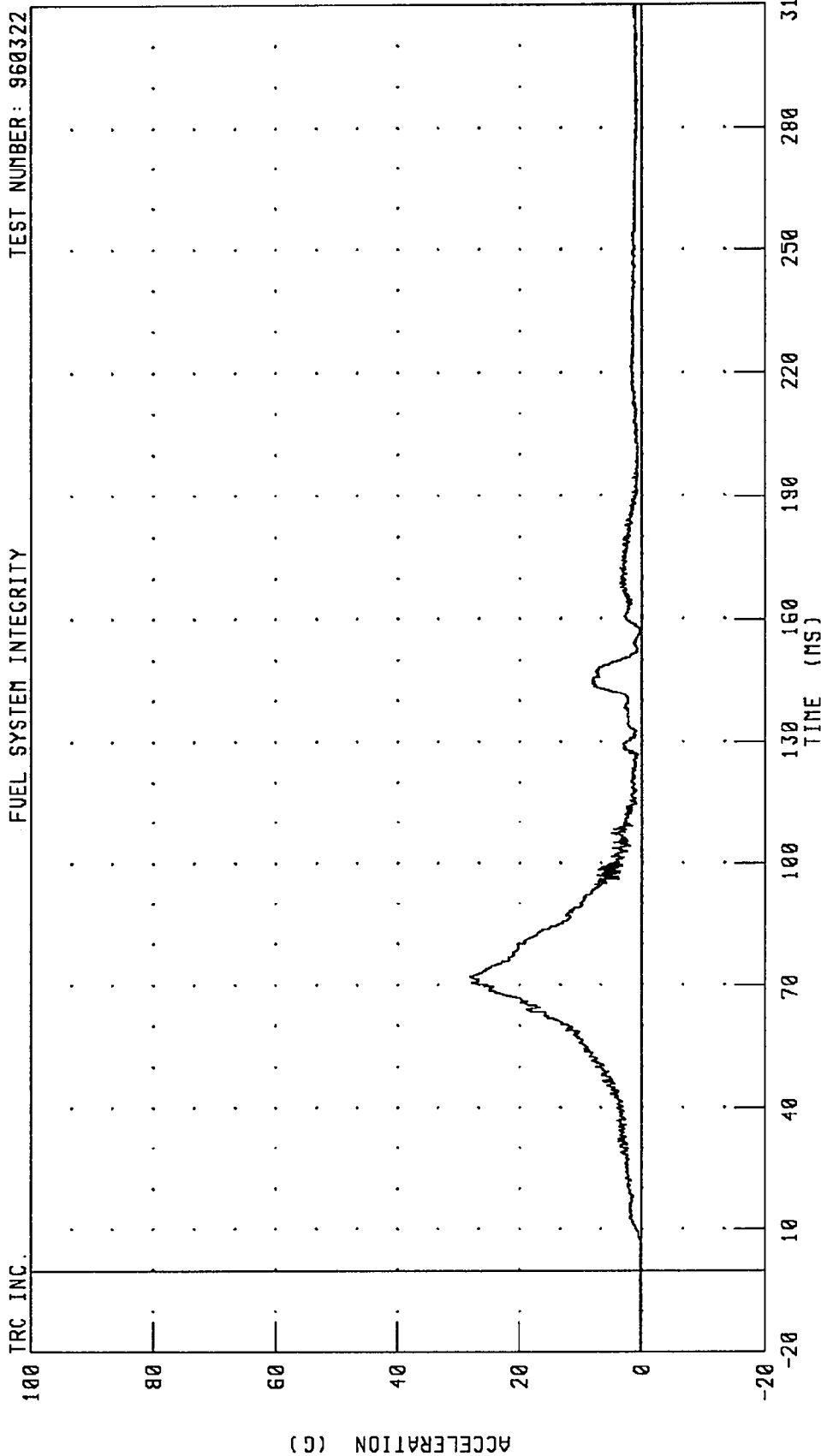


CHANNEL: PEVZG2 FILTER: CH. CLASS 1000

PEAK DATA: 1.22 G @ 134.40 MS; -11.93 G @ 70.48 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
RIGHT FRONT PASSENGER PELVIS RESULTANT ACCELERATION

TRC INC. TEST NUMBER: 960322

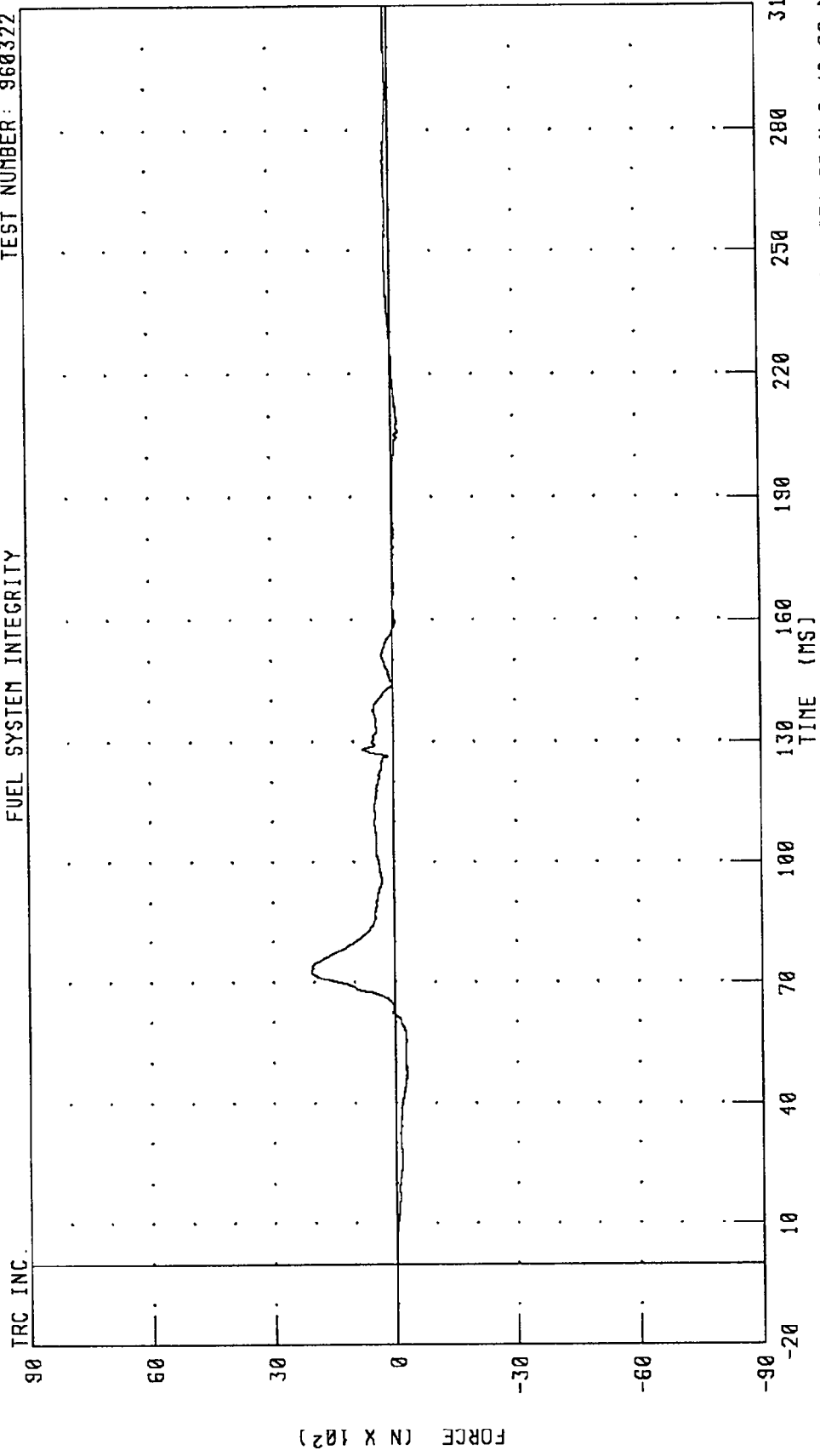


CHANNEL: PEVRG2 FILTER: CH. CLASS 1000

PEAK DATA: 28.23 G @ 72.16 MS; 0.11 G @ -20.00 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
 RIGHT FRONT PASSENGER LEFT FEMUR FORCE  
 FUEL SYSTEM INTEGRITY

TEST NUMBER: 960322

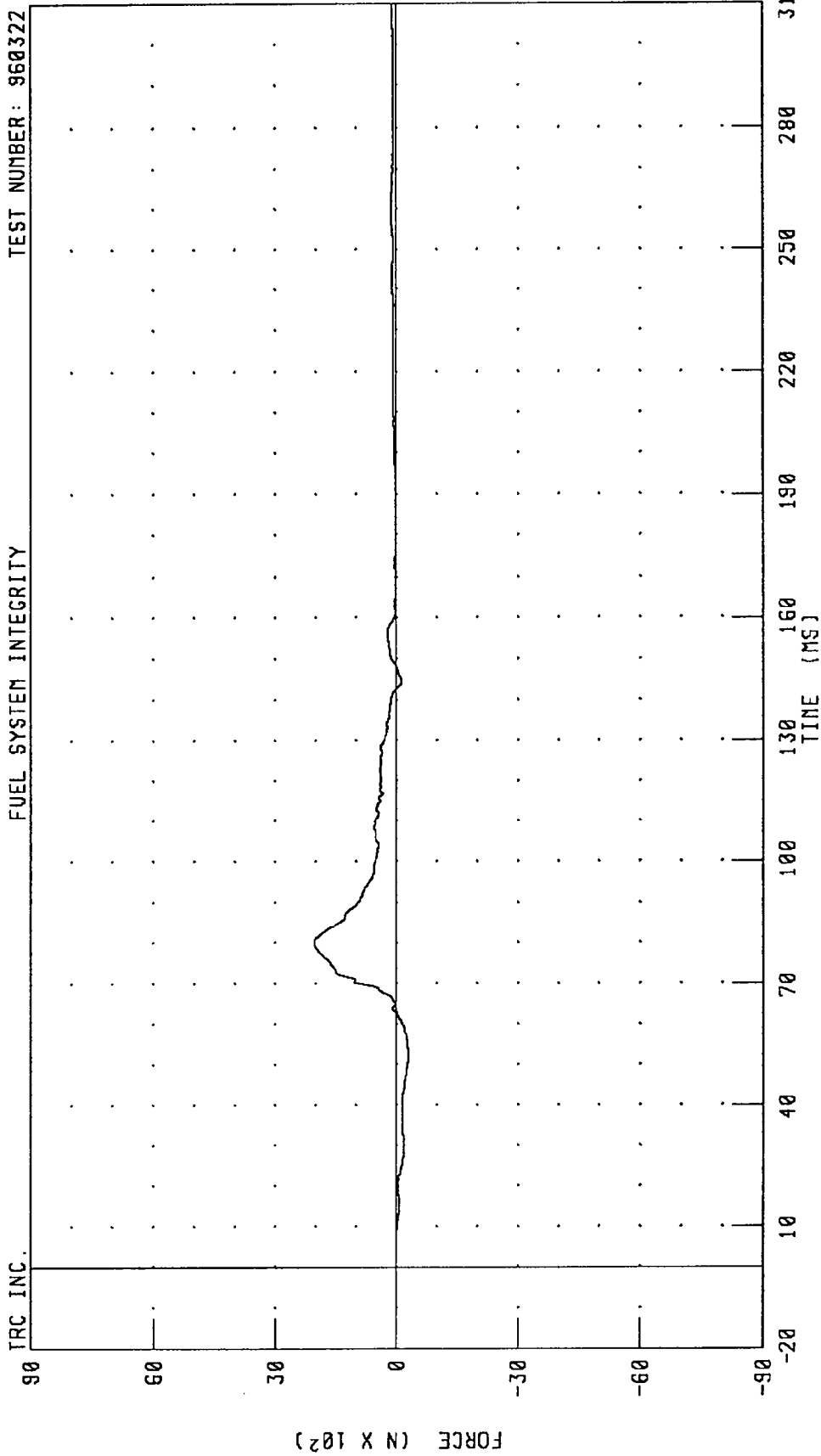


CHANNEL: LFMF2 FILTER: CH. CLASS 600

PEAK DATA: 2067.18 N @ 72.64 MS; -271.02 N @ 48.96 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
 RIGHT FRONT PASSENGER RIGHT FEMUR FORCE  
 FUEL SYSTEM INTEGRITY

TEST NUMBER: 960322



CHANNEL: RFMF2 FILTER: CH. CLASS 600 PEAK DATA: 2032.21 N @ 80.32 MS; -298.88 N @ 51.92 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
FRONT SEAT OUTBOARD MOUNTING RAIL X-AXIS ACCELERATION

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

TRC INC.

60

40

20

0

-20

-40

-60

ACCELERATION (G)

10

40

70

100

130

160

190

220

250

280

310

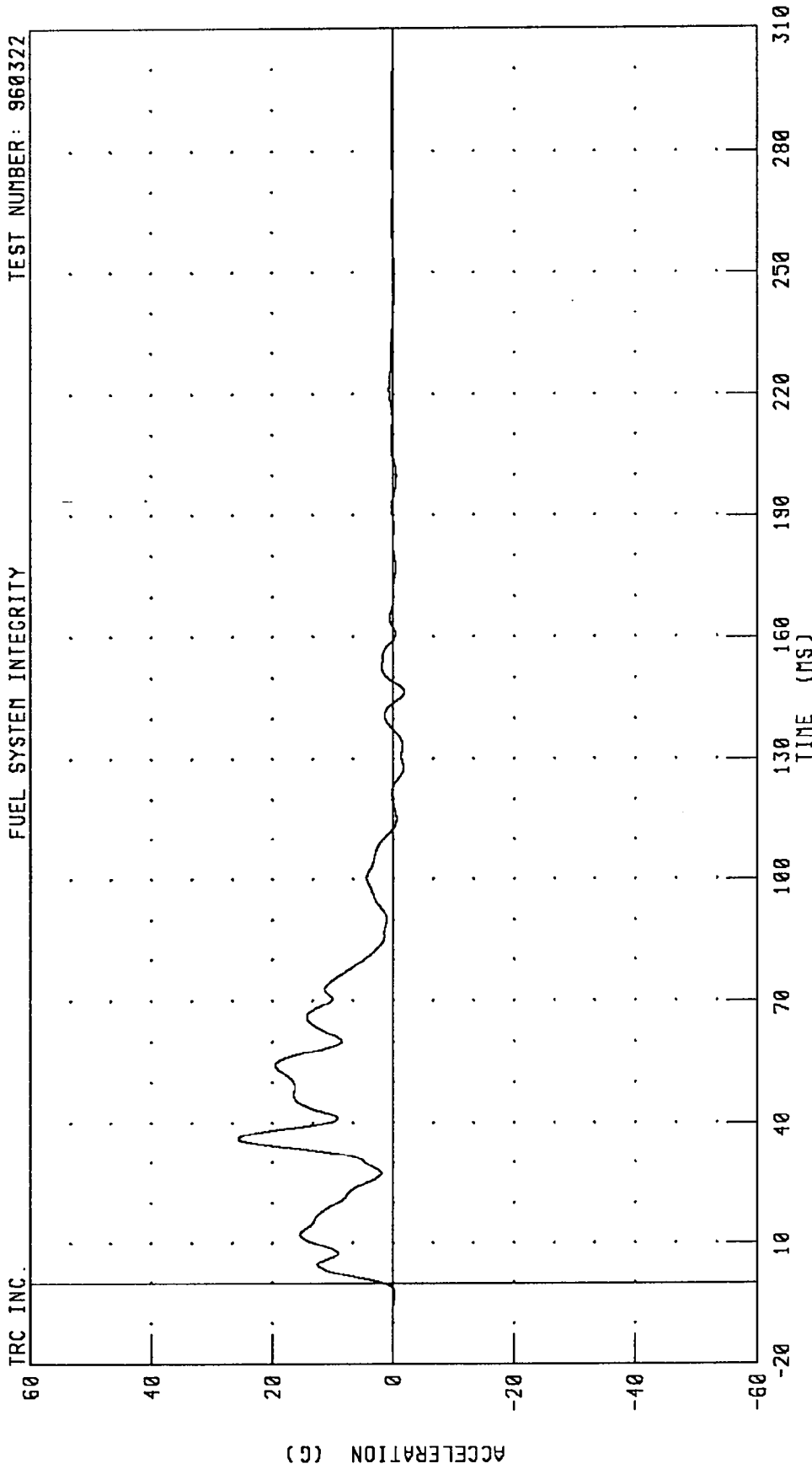
TIME (MS)

PEAK DATA: 28.58 G @ 35.92 MS; -1.44 G @ 131.60 MS

CHANNEL: TLFXG1 FILTER: CH. CLASS 60

MOVING DEFORMABLE BARRIER INTO REAR OF A 1986 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
FRONT SEAT OUTBOARD MOUNTING RAIL X-AXIS ACCELERATION

TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960322



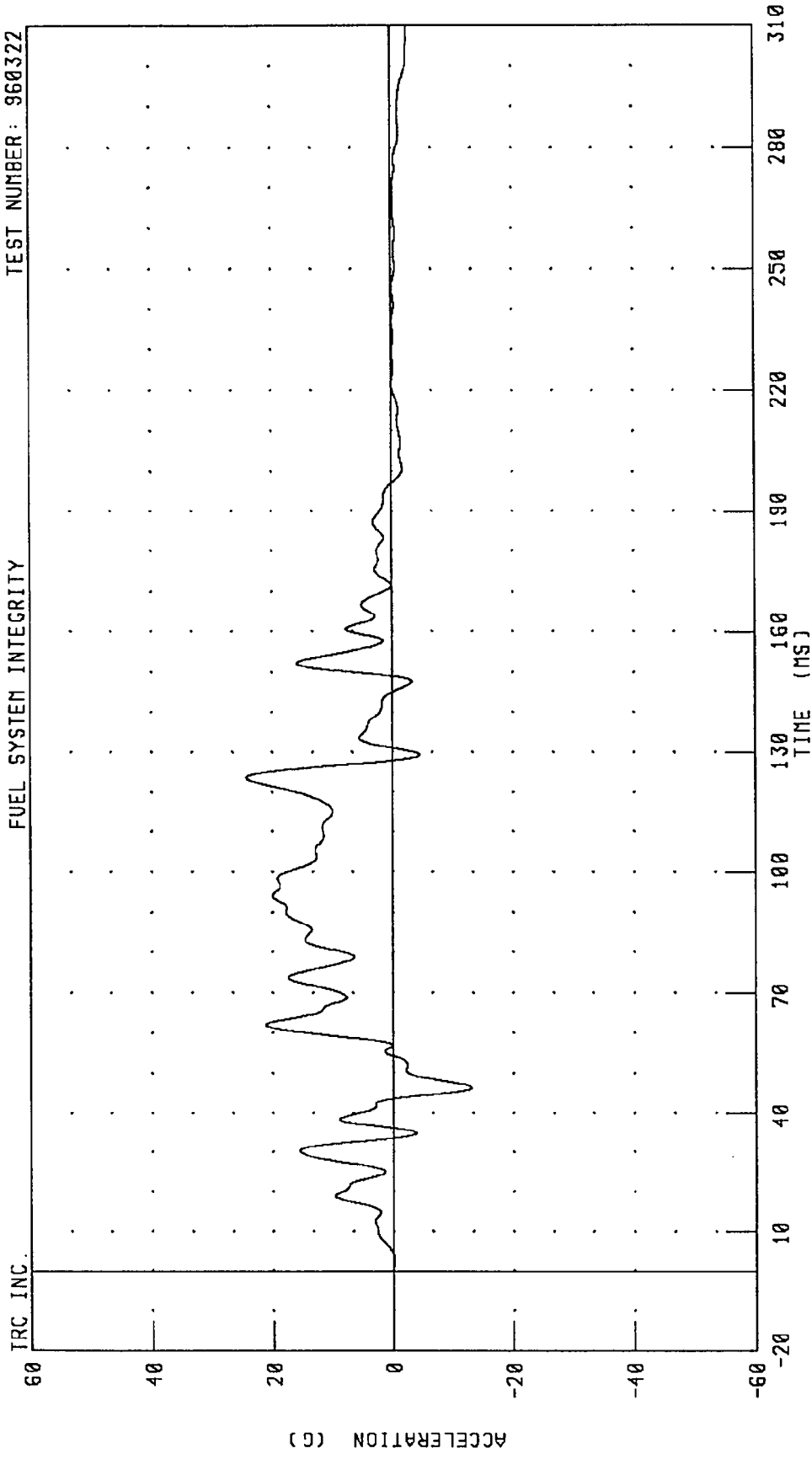
CHANNEL: TRFXG1 FILTER: CH. CLASS 60 PEAK DATA: 25.65 G @ 36.32 MS; -1.86 G @ 146.64 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
FRONT SEAT BACK MID X-AXIS ACCELERATION

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

TRC INC.

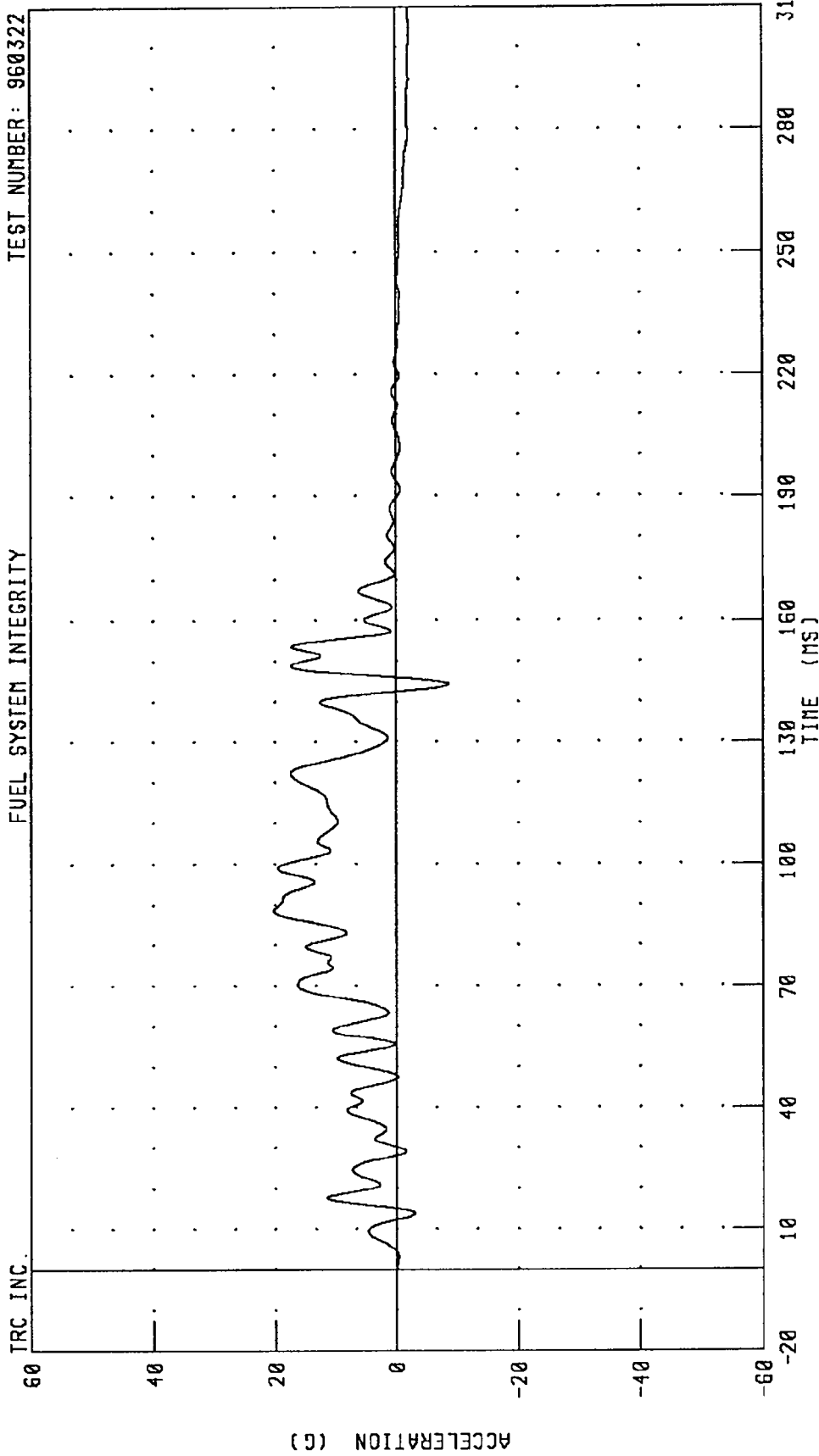


CHANNEL: TLFXG2 FILTER: CH. CLASS 60 PEAK DATA: 24.31 G @ 123.76 MS; -13.07 G @ 46.40 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
FRONT SEAT BACK MID X-AXIS ACCELERATION

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY



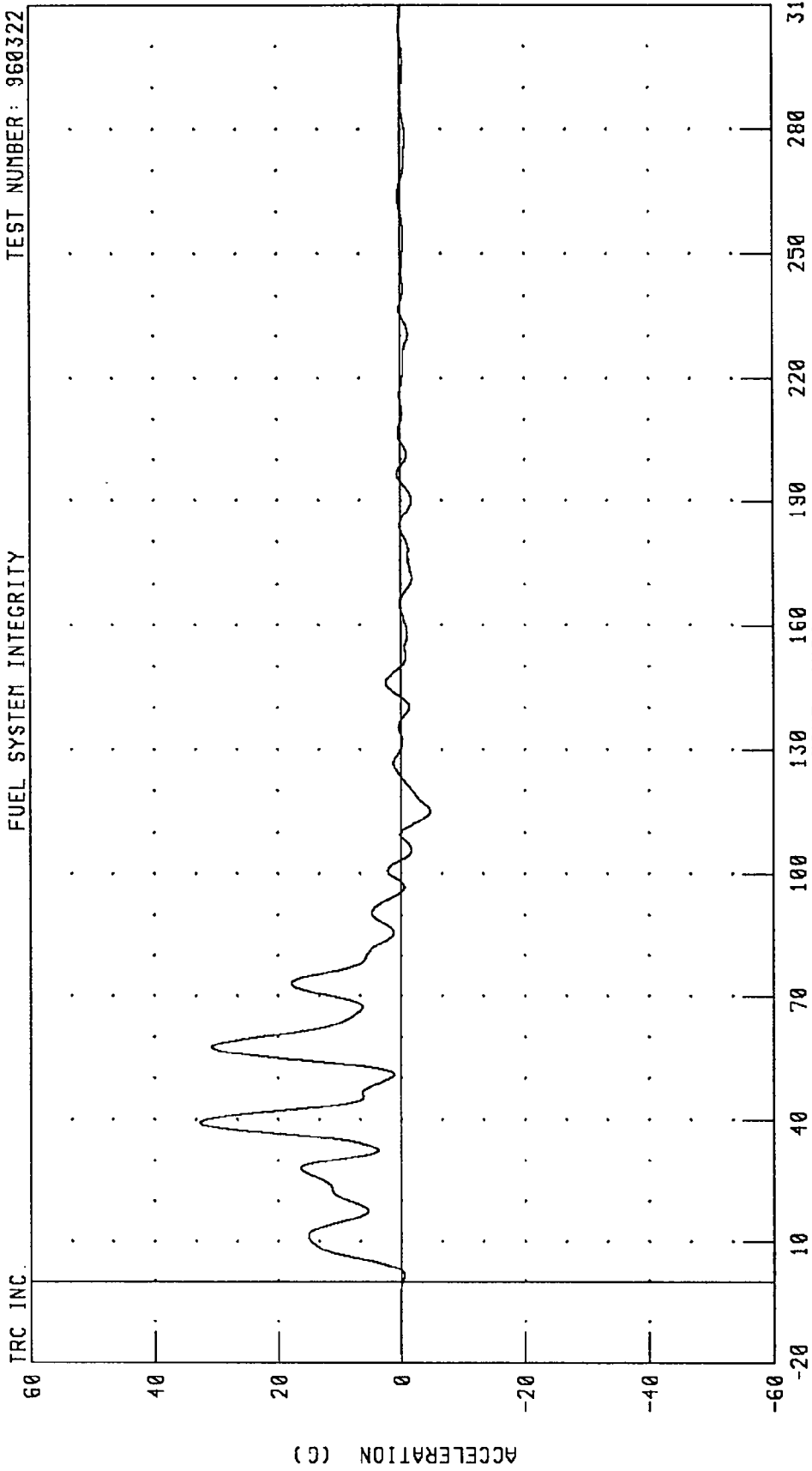
CHANNEL: TRFXG2 FILTER: CH. CLASS 60 PEAK DATA: 20.26 G @ 88.64 MS; -8.61 G @ 144.32 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
RADIATOR SUPPORT X-AXIS ACCELERATION

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: FFCXG FILTER: CH. CLASS 60 PEAK DATA: 32.63 G @ 39.28 MS; -4.80 G @ 115.20 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
ENGINE TOP X-AXIS ACCELERATION  
FUEL SYSTEM INTEGRITY

TEST NUMBER: 960322

TRC INC.

60

40

20

0

-20

-40

-60

ACCELERATION (G)

10

40

70

100

130

160

190

220

250

280

310

TIME (MS)

PEAK DATA: 29.26 G @ 36.24 MS; -7.01 G @ 131.04 MS

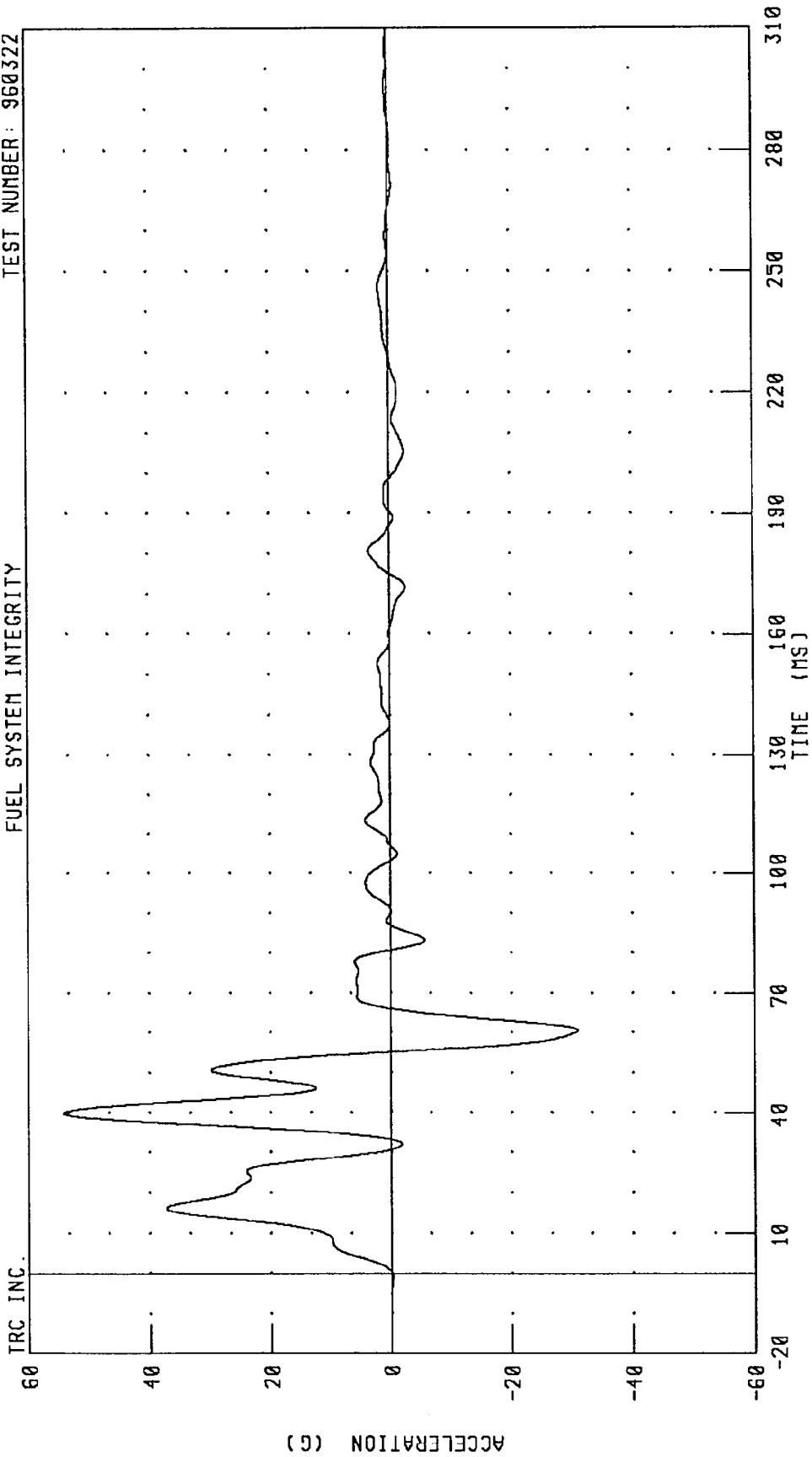
CHANNEL: ENGXG

FILTER: CH. CLASS 60

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
REAR WHEEL AXLE X-AXIS ACCELERATION

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

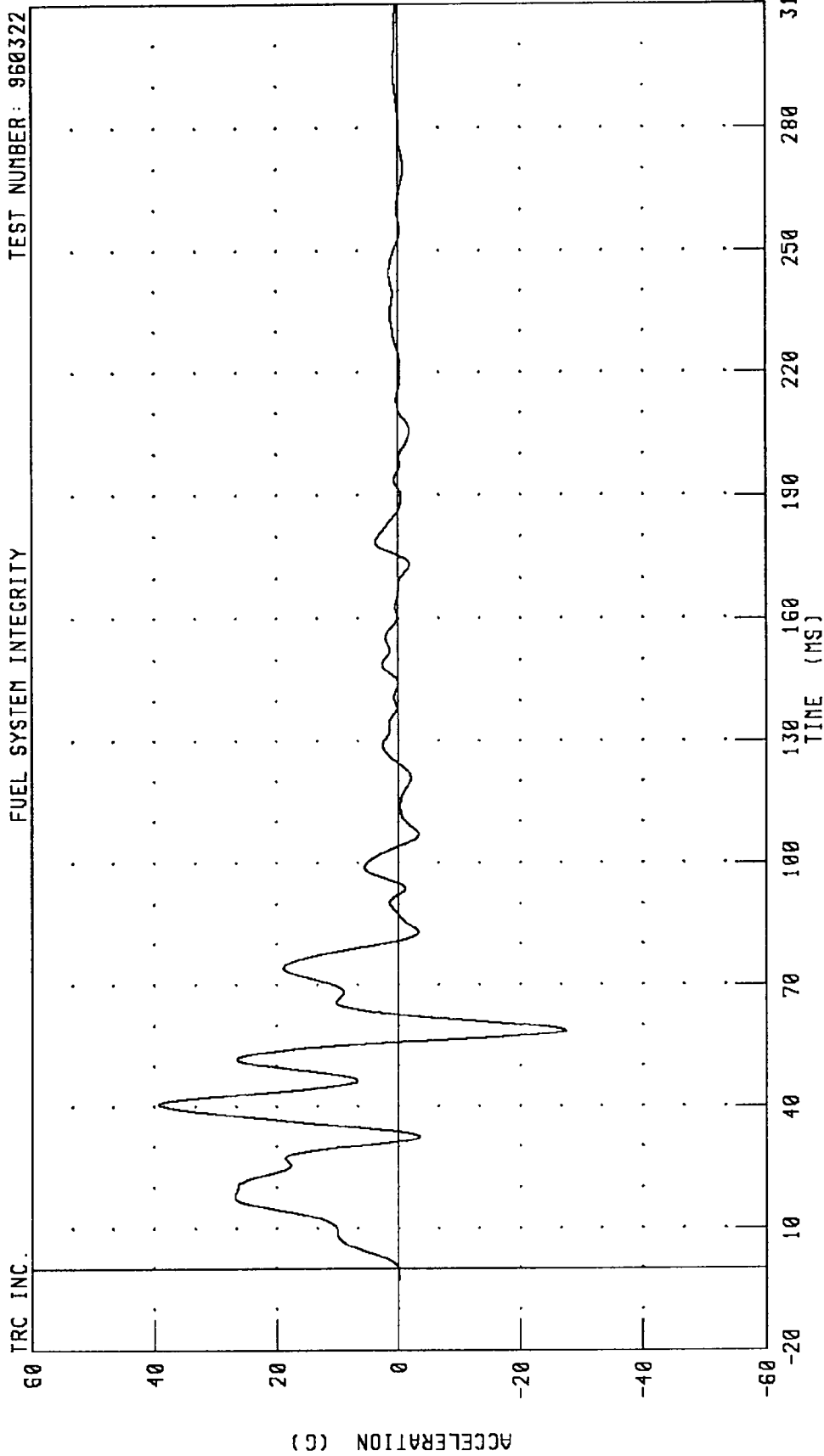


CHANNEL: RAXXG1 FILTER: CH. CLASS 60

960322

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
REAR WHEEL AXLE X-AXIS ACCELERATION

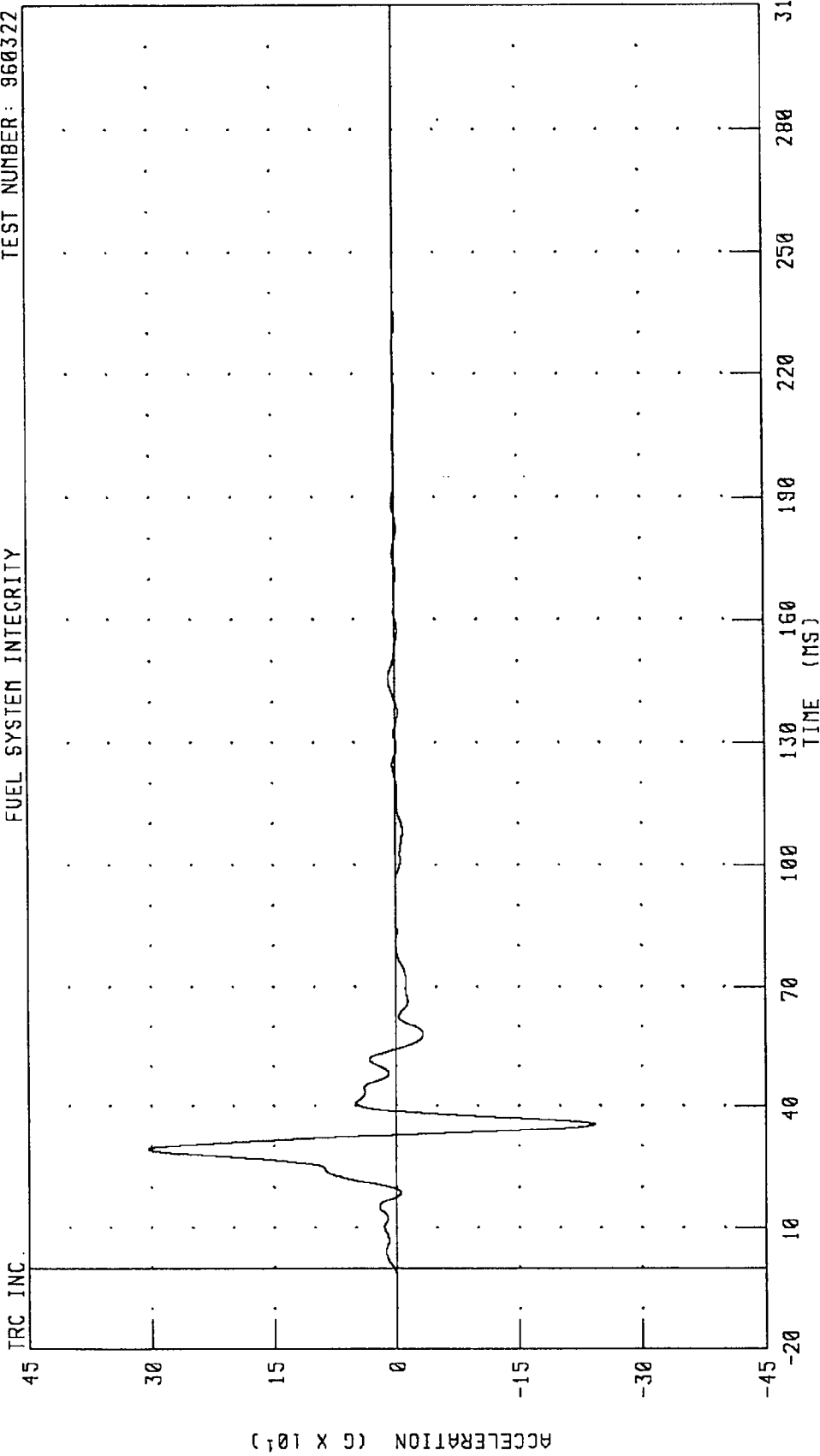
TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960322



CHANNEL: RAXXG2 FILTER: CH. CLASS 60 PEAK DATA: 39.21 G @ 40.64 MS; -27.42 G @ 58.80 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
PACKAGE SHELF X-AXIS ACCELERATION  
FUEL SYSTEM INTEGRITY

TEST NUMBER: 960322



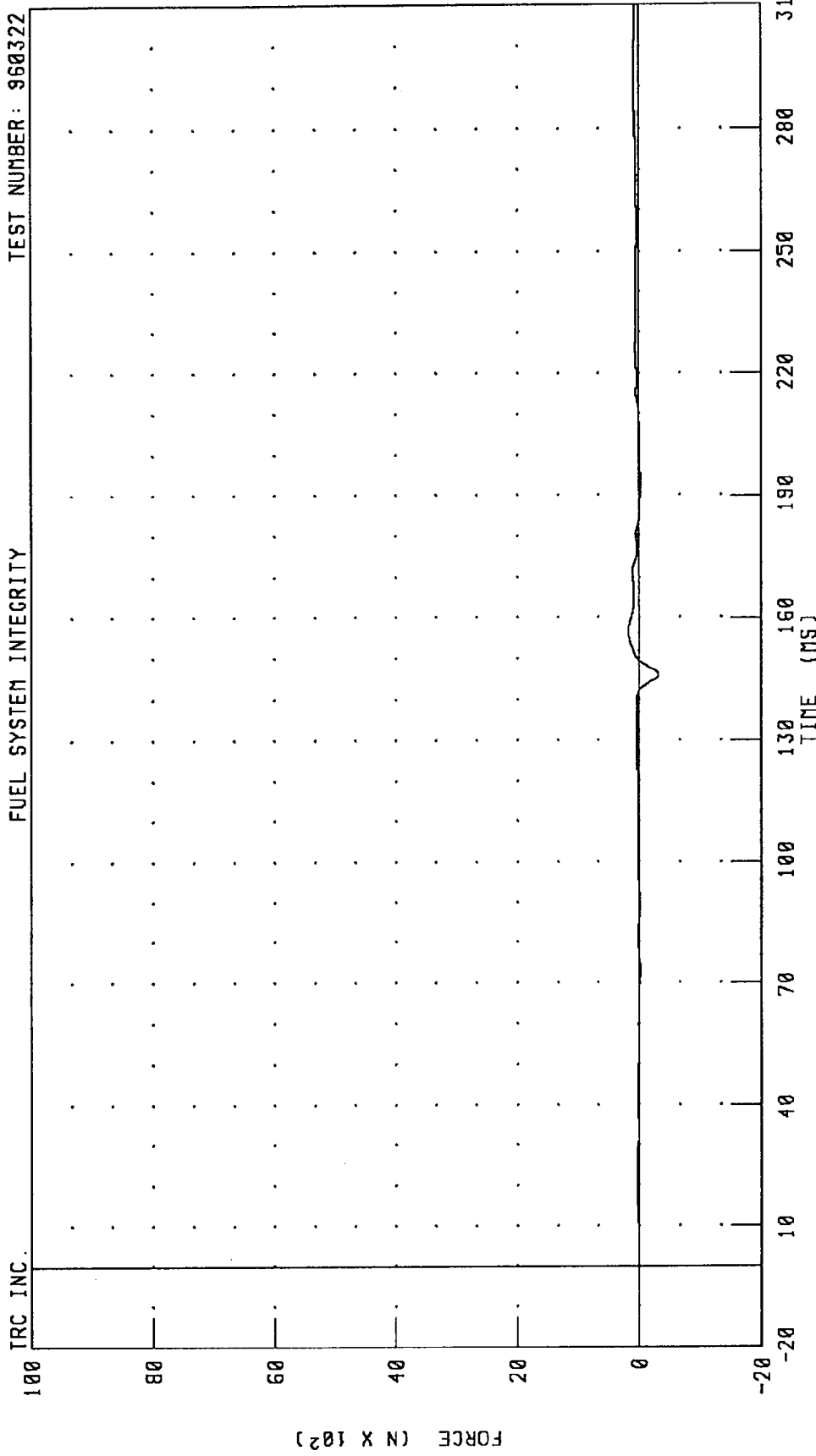
CHANNEL: TCRXG FILTER: CH. CLASS 60 PEAK DATA: 303.68 G @ 29.28 MS; -242.19 G @ 35.44 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER SHOULDER BELT FORCE

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

IRC INC.



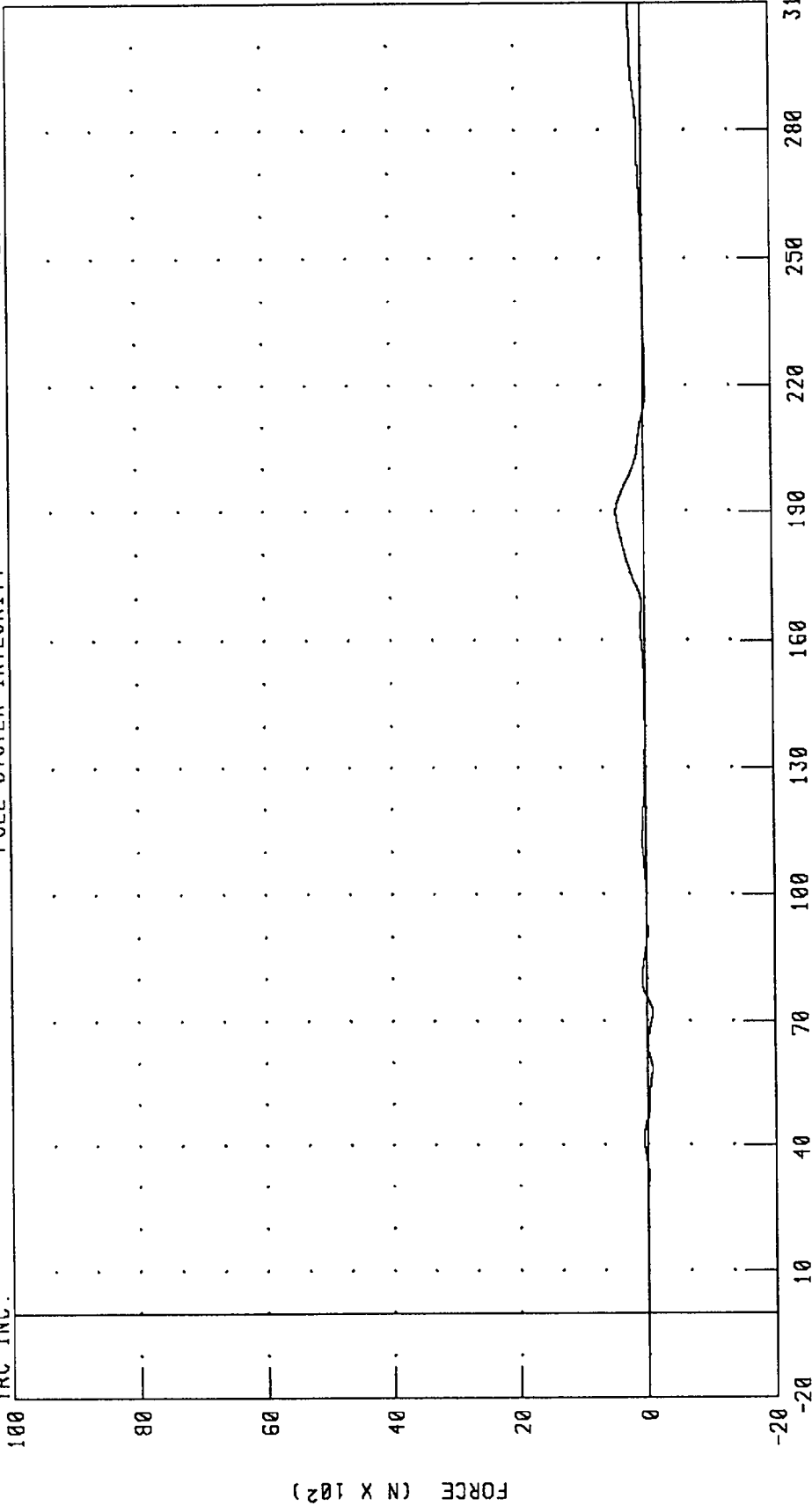
CHANNEL: SHBF1 FILTER: CH. CLASS 60 PEAK DATA: 172.49 N @ 156.56 MS; -314.90 N @ 146.08 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
DRIVER LAP BELT OUTBOARD FORCE

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

TRC INC.



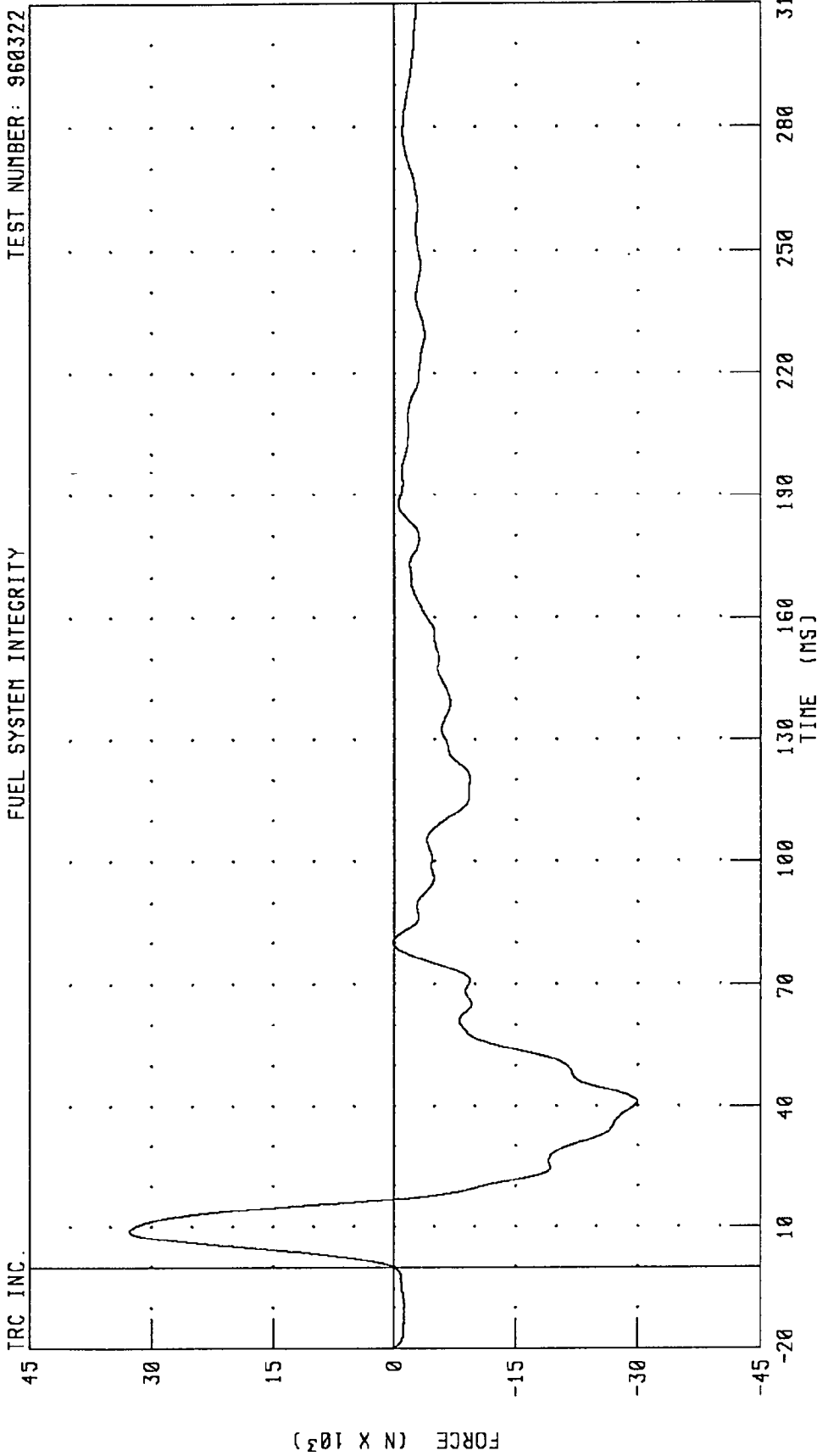
CHANNEL: LBOF1 FILTER: CH. CLASS 60

PEAK DATA: 438.90 N @ 189.84 MS; -80.46 N @ 72.08 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
BARRIER FRONT TOP LEFT FORCE

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

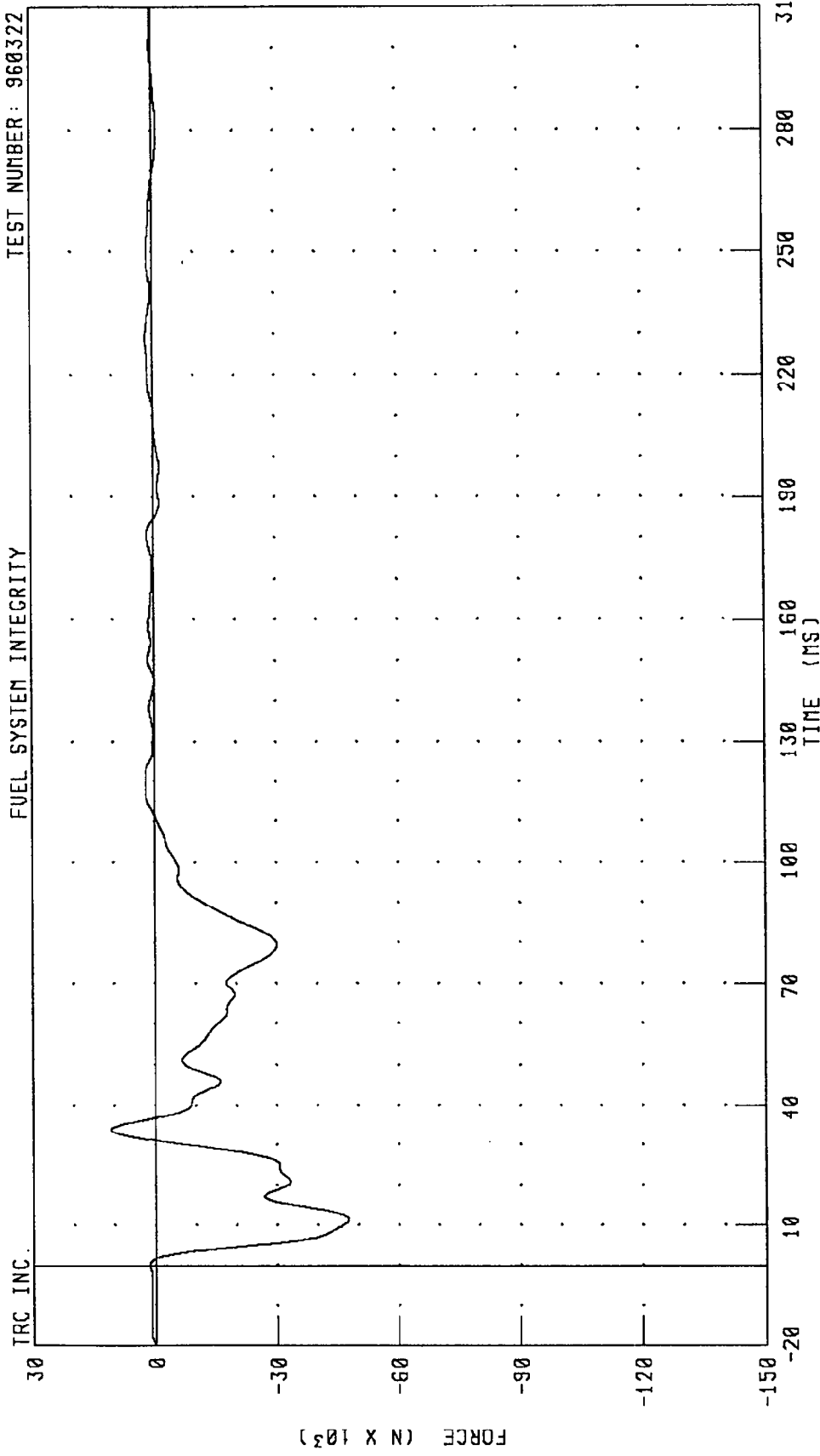


CHANNEL: BFFXF1 FILTER: CH. CLASS 60 PEAK DATA: 32693.95 N @ 8.88 MS; -29938.62 N @ 41.12 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1986 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
BARRIER FRONT BOTTOM LEFT FORCE

TRC INC. TEST NUMBER: 960322

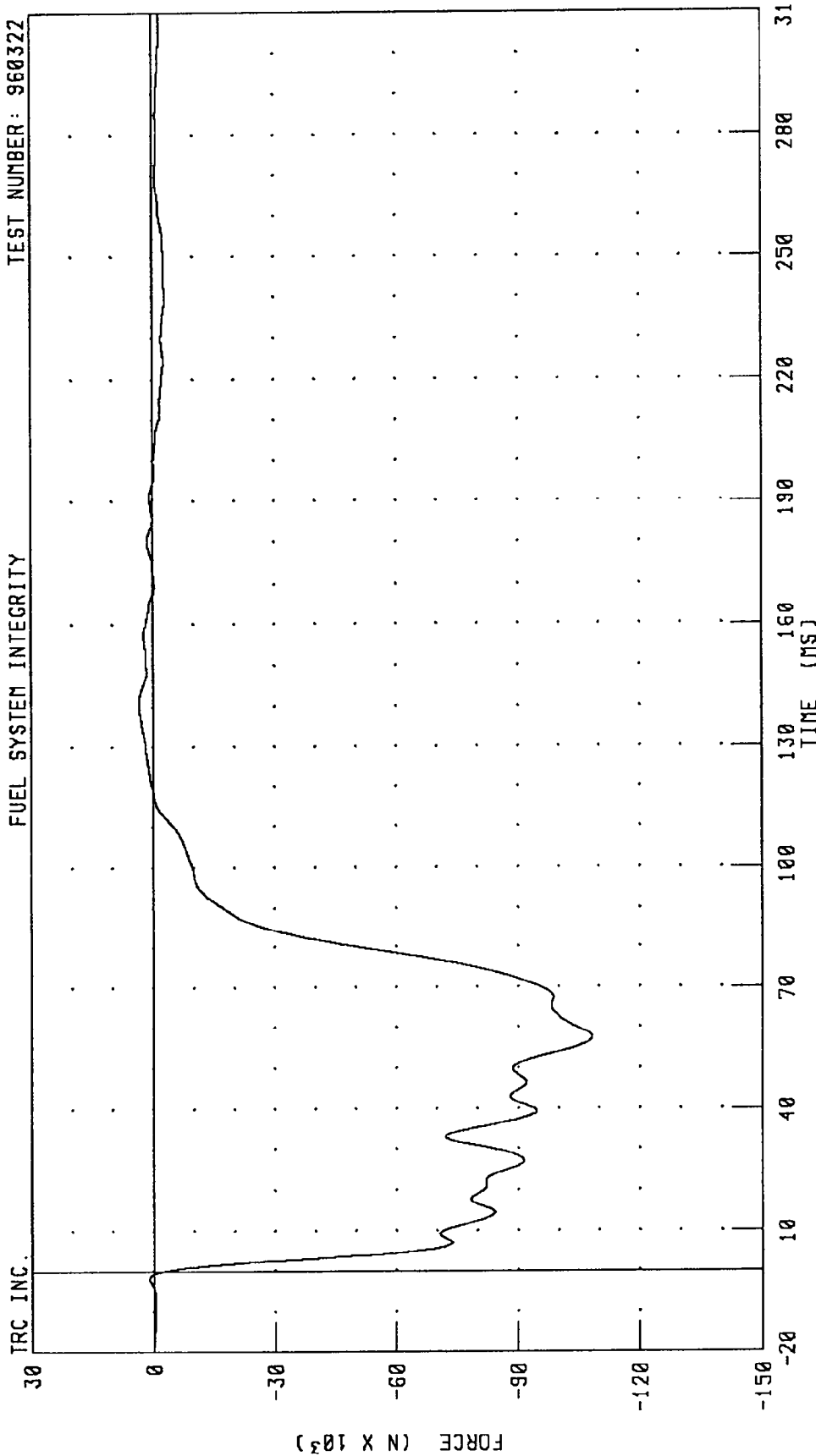
FUEL SYSTEM INTEGRITY



CHANNEL: BFFXF2 FILTER: CH. CLASS 60 PEAK DATA: 10855.08 N @ 33.84 MS; -47619.51 N @ 11.44 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
 BARRIER FRONT BOTTOM RIGHT FORCE

FUEL SYSTEM INTEGRITY TEST NUMBER: 960322



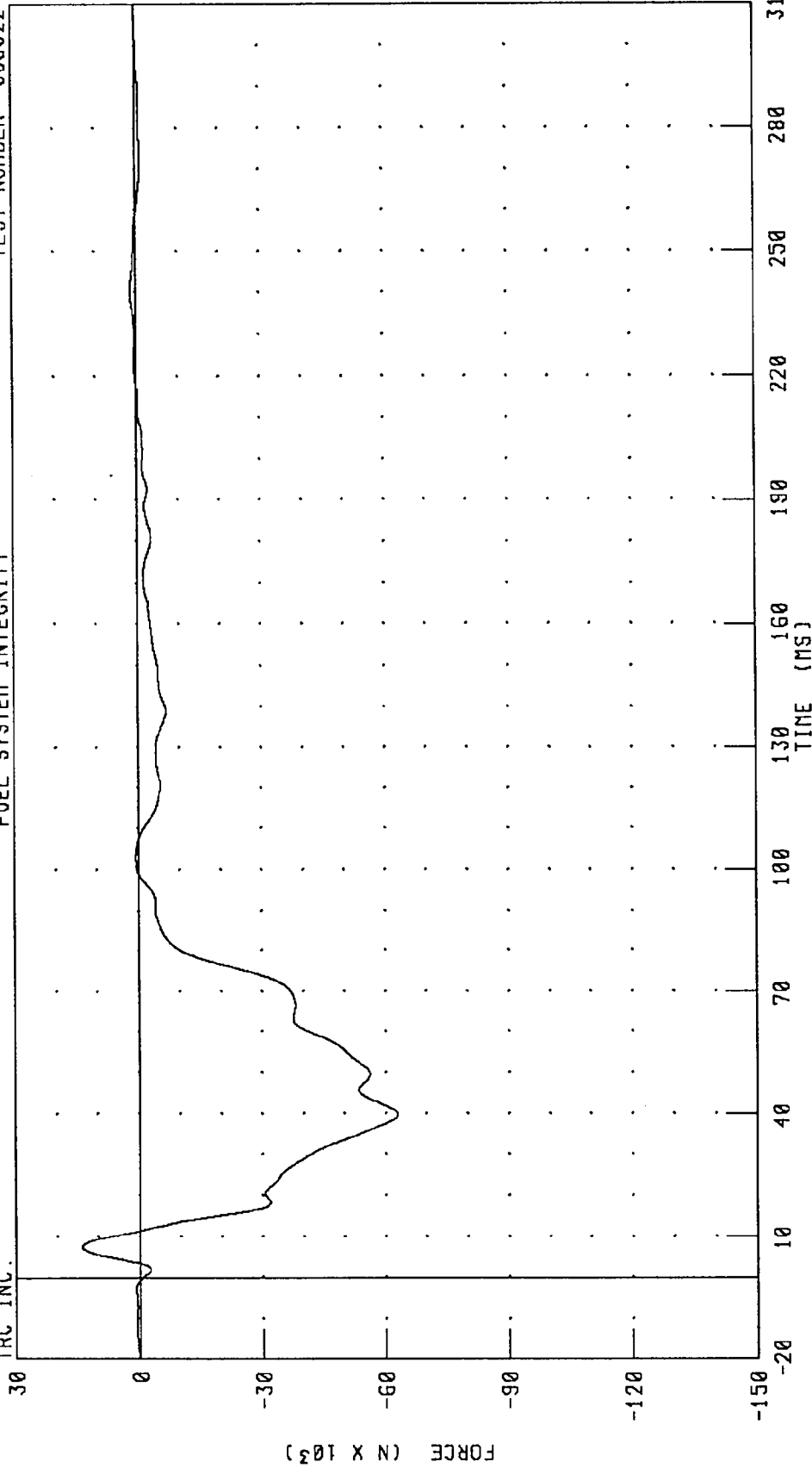
CHANNEL: BFFXF3 FILTER: CH. CLASS 60 PEAK DATA: 3352.12 N @ 140.72 MS; -108329.85 N @ 57.44 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
BARRIER FRONT TOP RIGHT FORCE

TEST NUMBER: 960322

FUEL SYSTEM INTEGRITY

TRC INC.

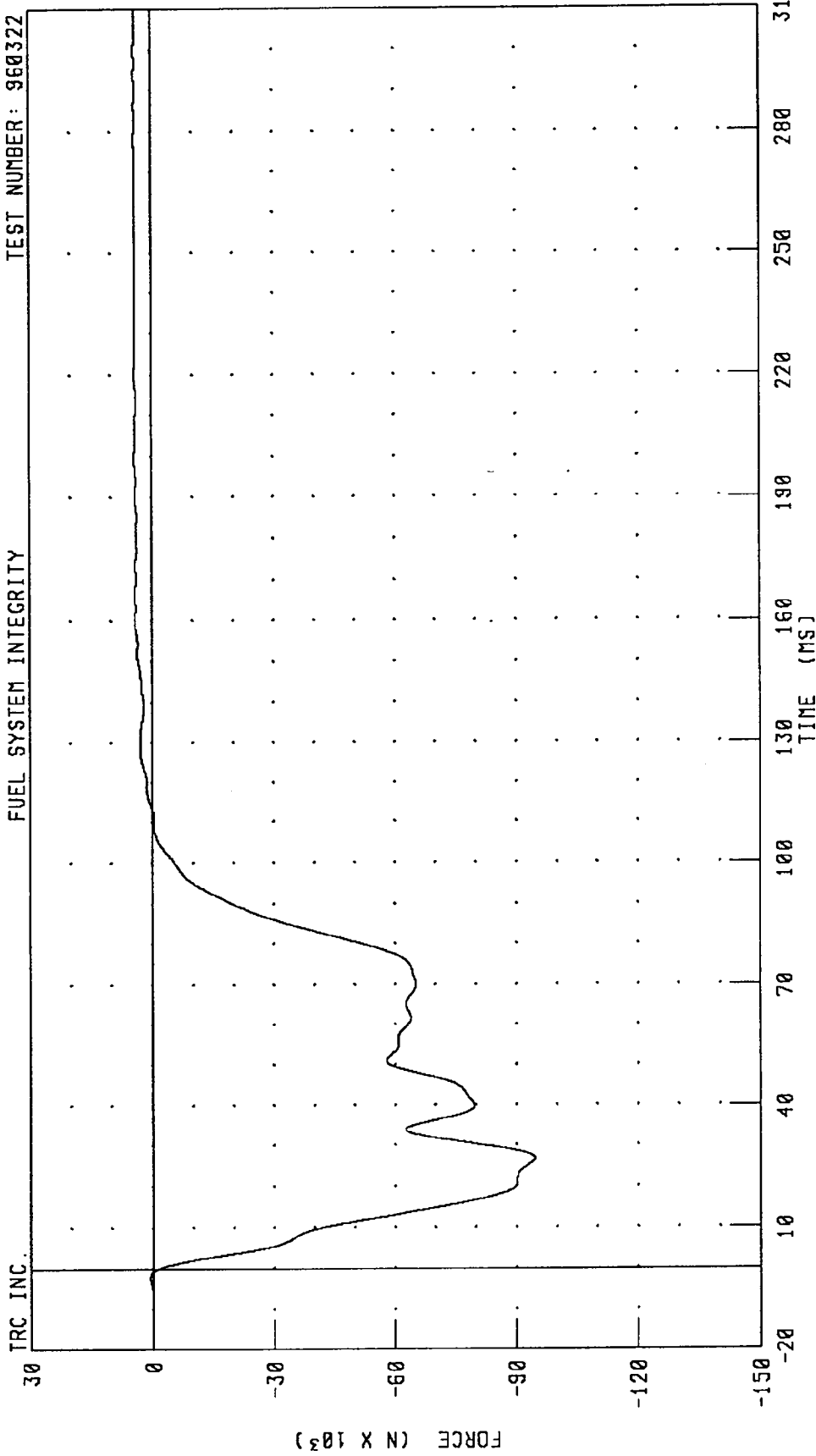


PEAK DATA: 13876.18 N @ 7.44 MS; -63013.50 N @ 39.76 MS

CHANNEL: BFFXF4 FILTER: CH. CLASS 60

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 PLYMOUTH VOYAGER AT 80 KPH AND 70% OVERLAP  
BARRIER FRONT CENTER FORCE

TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960322



CHANNEL: BFFXF5 FILTER: CH. CLASS 60 PEAK DATA: 4265.75 N @ 220.24 MS; -94522.04 N @ 26.72 MS

Appendix C

Dummy Calibration Information

**Pre-Test Calibration**

**Serial Number 34**

TRANSPORTATION RESEARCH CENTER INC.  
 HYBRID III EXTERNAL DIMENSIONS  
 34 VECTOR

11-JUL-95

TRC INC. TEST NO: 34C1ED1 572E SN34 EXT.DIMENSION CAL01

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	991. MM
WAIST CIRCUMFERENCE	(Z)	836 - 866 MM	856. MM
CHEST DEPTH	(O)	213 - 229 MM	218. MM
H-POINT HEIGHT	(C)	84 - 89 MM	86. 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	884. MM
THIGH CLEARANCE	(F)	140 - 155 MM	155. MM
BUTTOCK KNEE LENGTH	(K)	579 - 605 MM	602. MM
BUTTOCK POPLITEAL LENGTH	(N)	452 - 478 MM	472. MM
POPLITEAL HEIGHT	(L)	429 - 455 MM	439. MM
KNEE PIVOT HEIGHT	(M)	485 - 500 MM	498. MM
FOOT LENGTH	(P)	252 - 267 MM	254. 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	427. MM
SHOULDER PIVOT HEIGHT	(B)	506 - 521 MM	513. MM
ELBOW REST HEIGHT	(J)	191 - 211 MM	208. MM
SHOULDER-ELBOW LENGTH	(I)	330 - 345 MM	335. MM
BACK OF ELBOW TO WRIST PIVOT	(G)	290 - 305 MM	295. MM

DUMMY MEETS SPECIFICATIONS  
 TECHNICIAN *Richard Le Van*

RUN NUMBER: 071295.1424

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III

06-MAR-96

TRC INC.

TEST NO: 34C1HD3

572E SN34 HEAD DROP CAL 01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	39.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	263.60 G
PEAK LATERAL ACCELERATION	15 G MAX	-8.63 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN

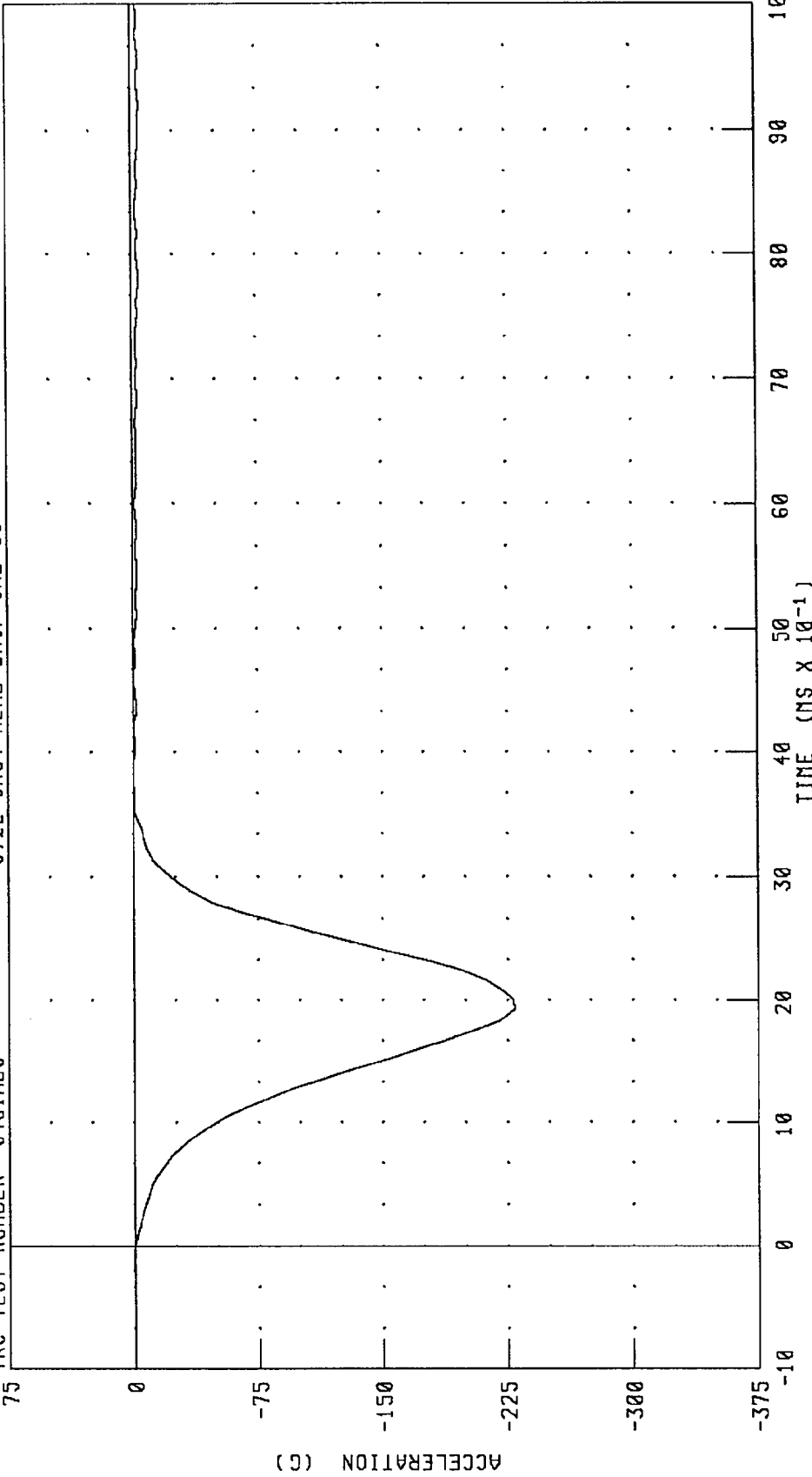
*Richard Le Van*

RUN NUMBER: 030696.1057;1

PART 572-E HYBRID III HEAD CALIBRATION  
 HEAD ACCELERATION X AXIS  
 572E SN34 HEAD DROP CAL 01

TRC TEST NUMBER: 34C1H03

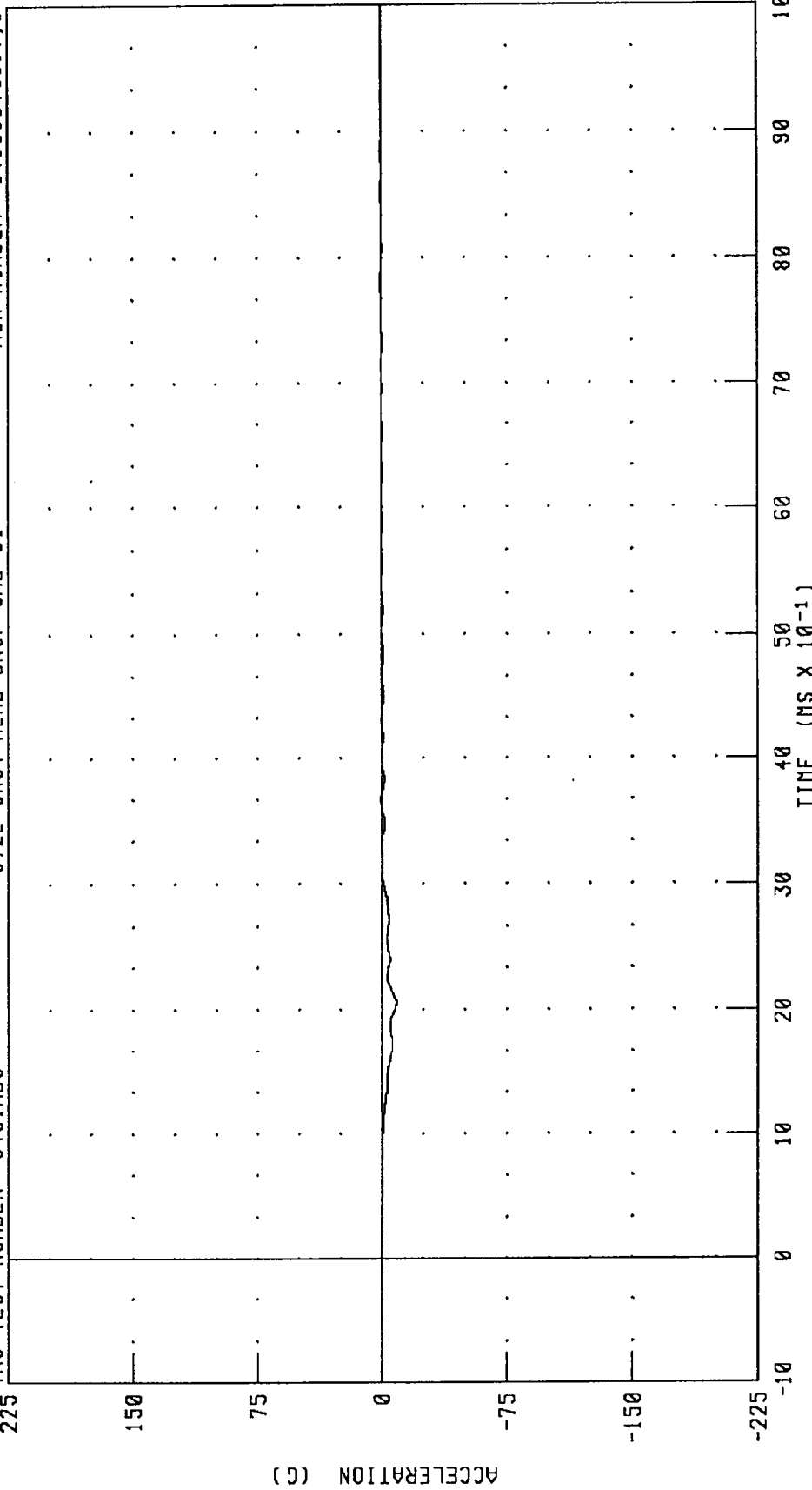
RUN NUMBER: 041896.0817;1



CHANNEL: HEDXG FILTER: CH. CLASS 1000 PEAK DATA: 0.34 G @ -0.08 MS; -229.24 G @ 1.92 MS

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

TRC TEST NUMBER: 34C1H03      572E SN34 HEAD DROP CAL 01      RUN NUMBER: 041896.0817;1

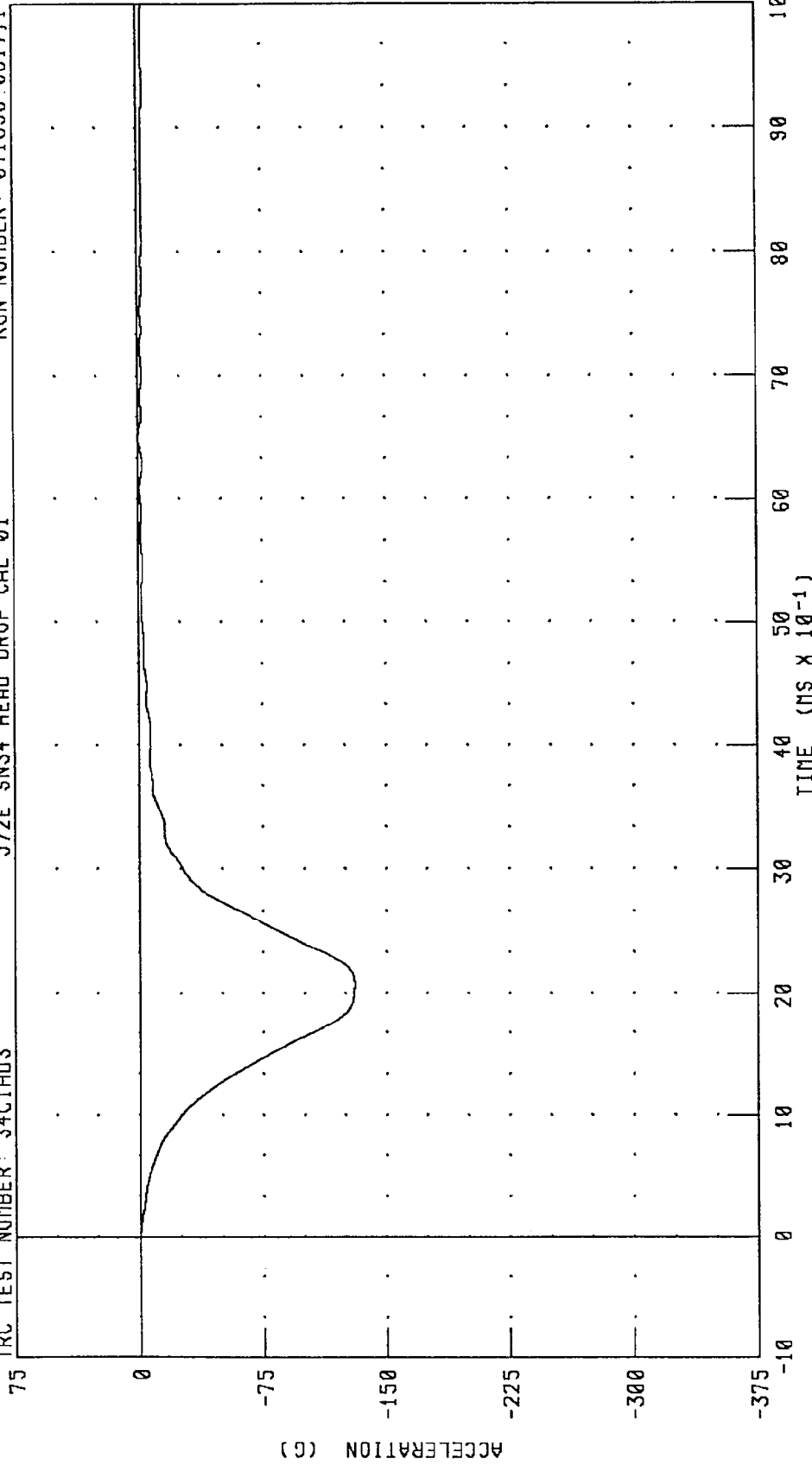


CHANNEL: HEDYG      FILTER: CH. CLASS 1000      PEAK DATA: 0.67 G @ 7.76 MS; -8.63 G @ 2.08 MS

PART 572-E HYBRID III HEAD CALIBRATION  
HEAD ACCELERATION Z AXIS  
572E SN34 HEAD DROP CAL 01

RUN NUMBER: 041896.0817;1

TRC TEST NUMBER: 34C1HD3



PEAK DATA: 0.00 G @ -0.32 MS; -130.81 G @ 2.08 MS

CHANNEL: HEDZG FILTER: CH. CLASS 1000

PART 572-E HYBRID III HEAD CALIBRATION  
HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: 34CIH03

572E SN34 HEAD DROP CAL 01

RUN NUMBER: 041896.0817.1

375

300

225

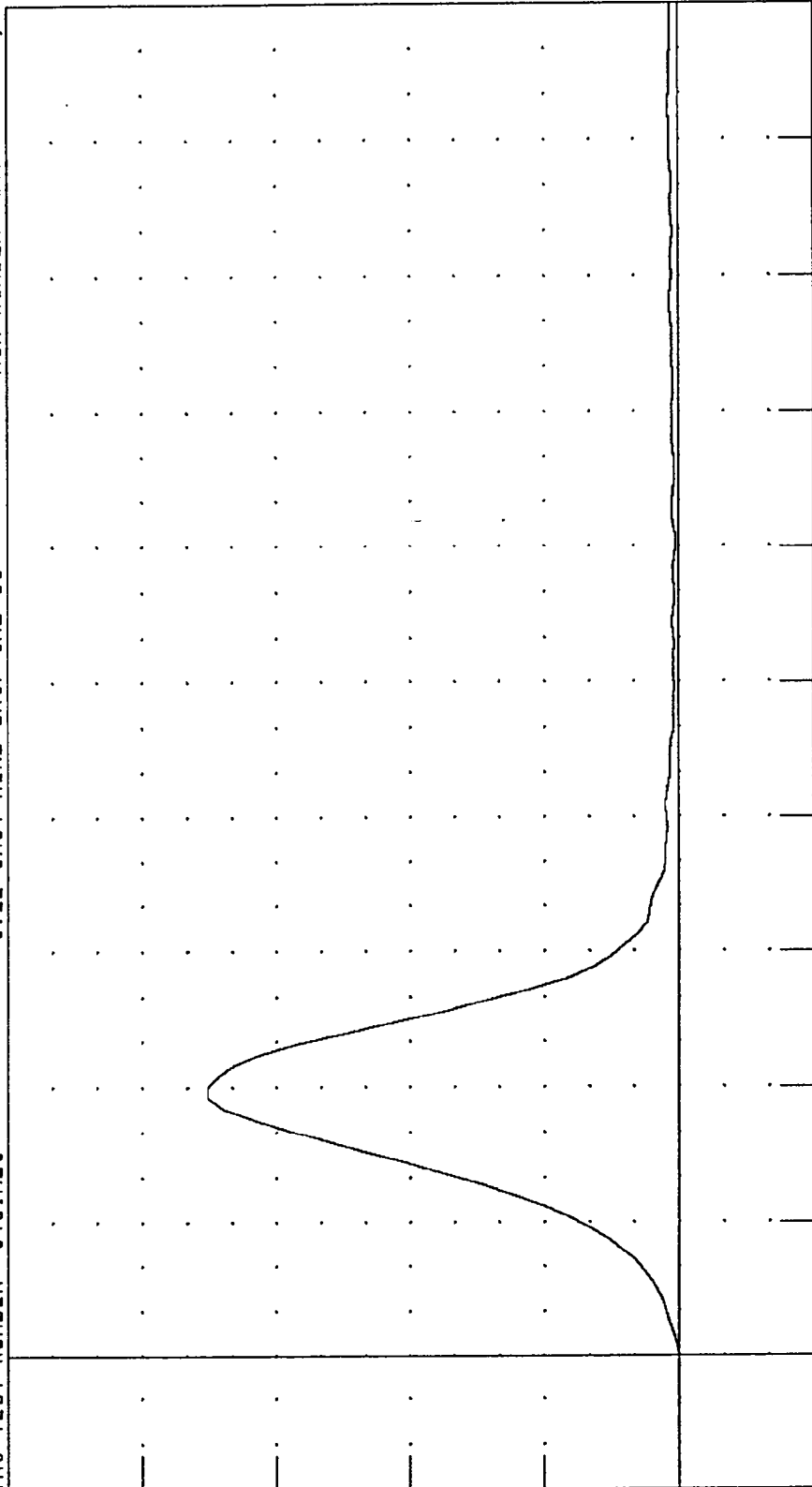
150

75

0

-75

ACCELERATION (G)



PEAK DATA: 263.61 G @ 2.00 MS; 0.02 G @ -0.24 MS

CHANNEL: HEDRG FILTER: CH. CLASS 1000

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

HYBRID III

11-JUL-95

TRC INC. TEST NO: 34C1NF1 572E SN34 NECK FLEXION CAL01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	63.0 %
IMPACT VELOCITY	6.89 - 7.13 M/S	6.99 M/S
PENDULUM DECELERATION	10 MS   22.50 - 27.50 G	22.98 G
	20 MS   17.60 - 22.60 G	19.34 G
	30 MS   12.50 - 18.50 G	14.91 G
MAX PENDULUM G	29 G MAX	23.79 G
MAX PENDULUM G ABOVE 30 MS	29 G MAX	14.89 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G	34 - 42 MS	38.16 MS
D PLANE	MAX   64 - 78 DEG.	72.72 DEG.
ROTATION	TIME   57 - 64 MS	60.24 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX   88.2 - 108.5 NM	90.00 NM
	TIME   47 - 58 MS	51.60 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO	113 - 128 MS	117.76 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO	97 - 107 MS	103.44 MS

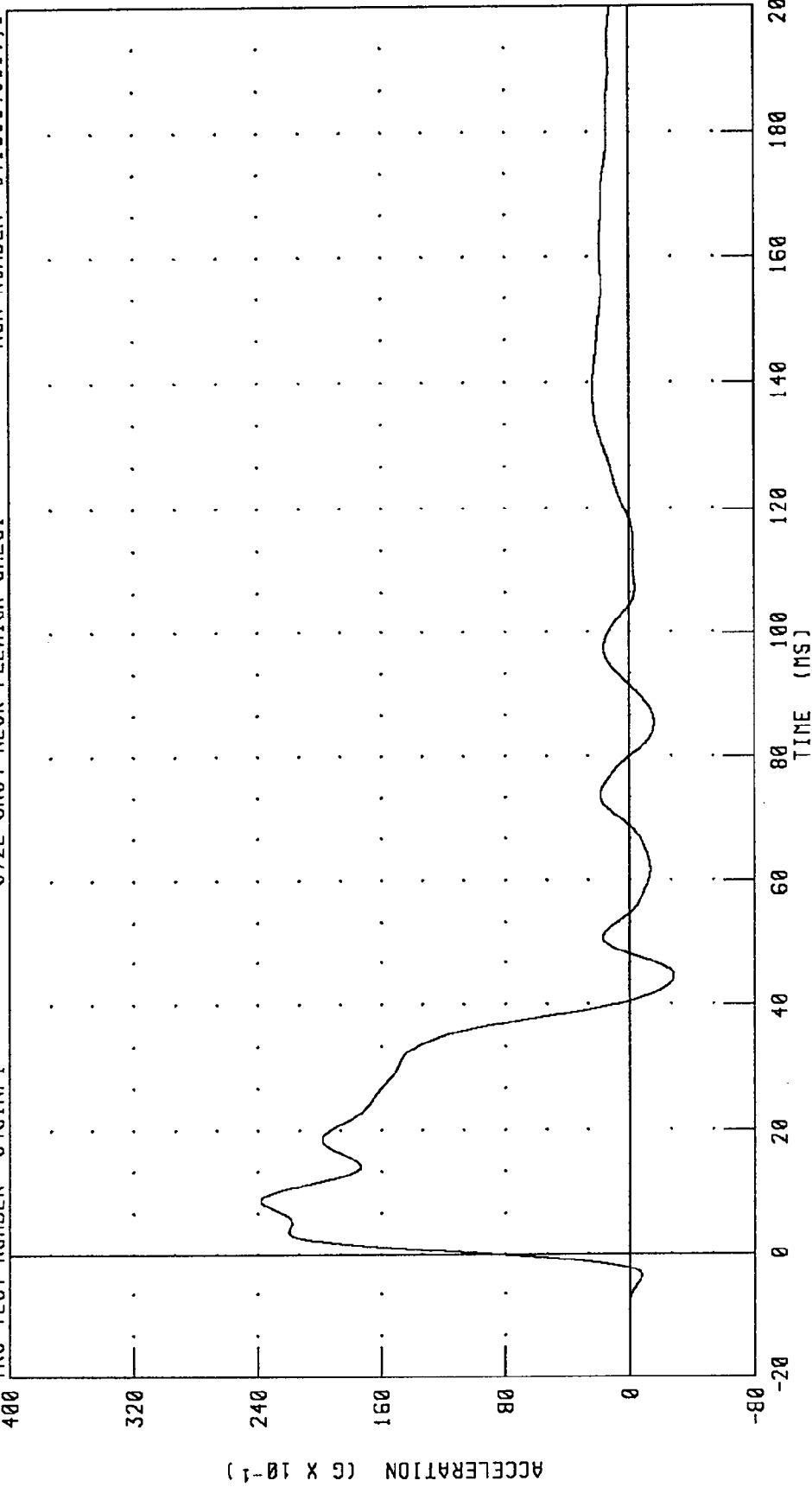
TEST MEETS SPECIFICATIONS

TECHNICIAN Richard L. Van

RUN NUMBER: 071195.1004;1

PART 572-E HYBRID III NECK FLEXION CALIBRATION  
PENDULUM DECELERATION

TRC TEST NUMBER: 34C1NF1      572E SN34 NECK FLEXION CAL01      RUN NUMBER: 041896.0817;1



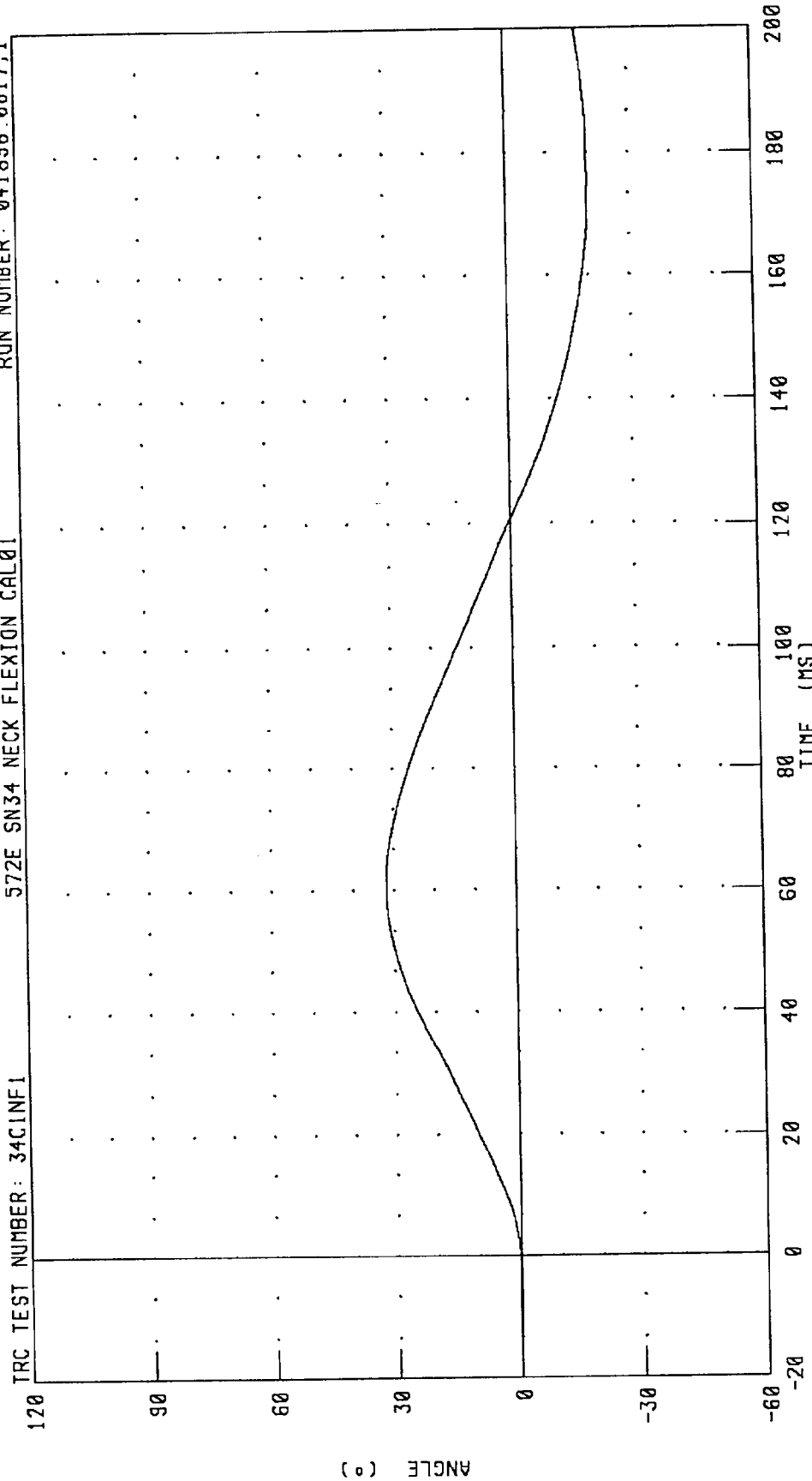
CHANNEL: PENXC      FILTER: CH. CLASS 60      PEAK DATA: 23.79 G @ 8.80 MS; -2.85 G @ 44.48 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION  
ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 34CINF1

572E SN34 NECK FLEXION CAL01

RUN NUMBER: 041896.0817,1



PEAK DATA: 31.85 ° @ 61.52 MS; -19.92 ° @ 175.76 MS

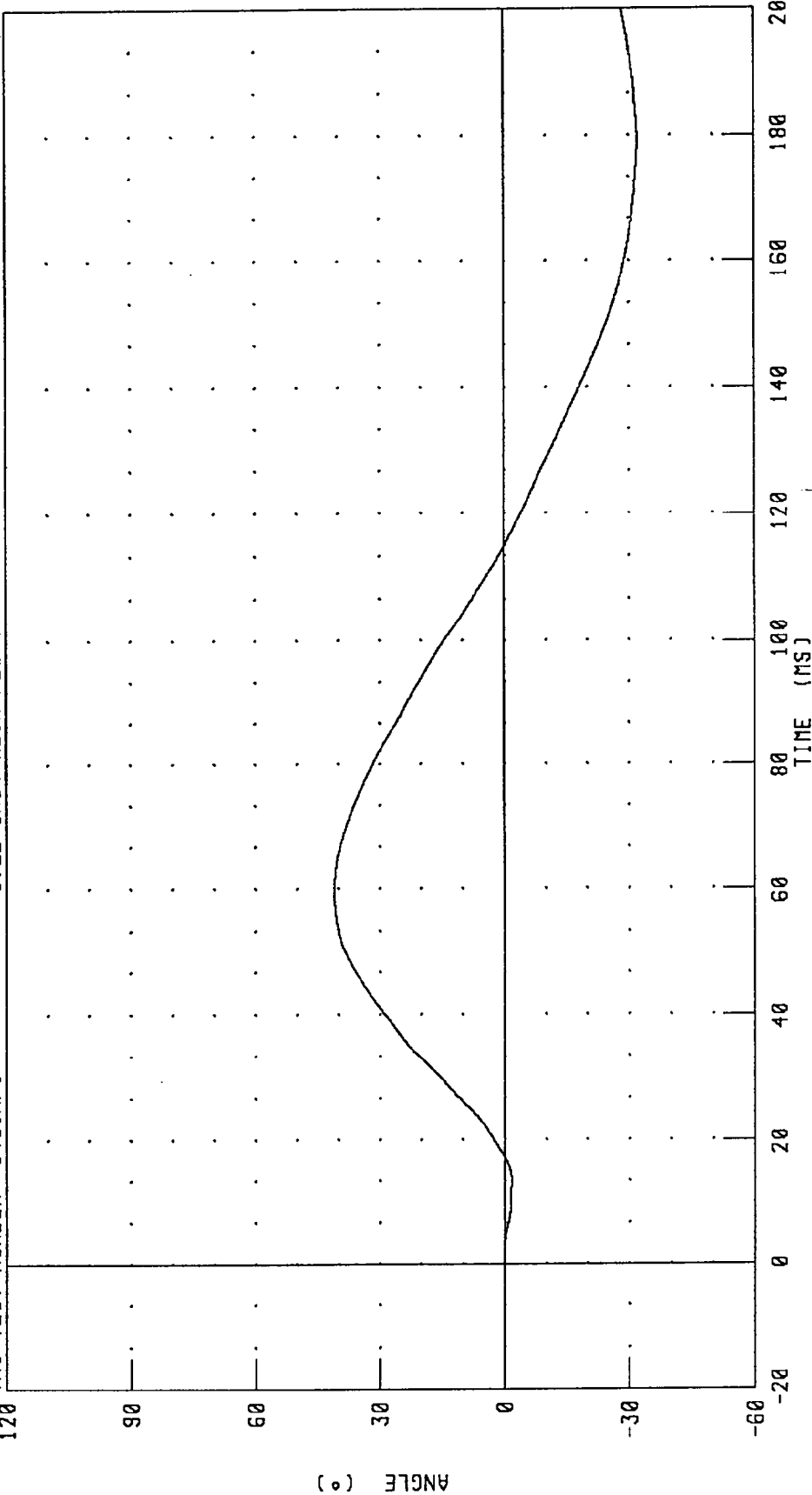
CHANNEL: BETA FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 34CINF1

572E SN34 NECK FLEXION CAL01

RUN NUMBER: 041896.0817j1



CHANNEL: THETA FILTER: CH. CLASS 60

PEAK DATA: 40.90 ° @ 59.60 MS; -32.12 ° @ 179.12 MS

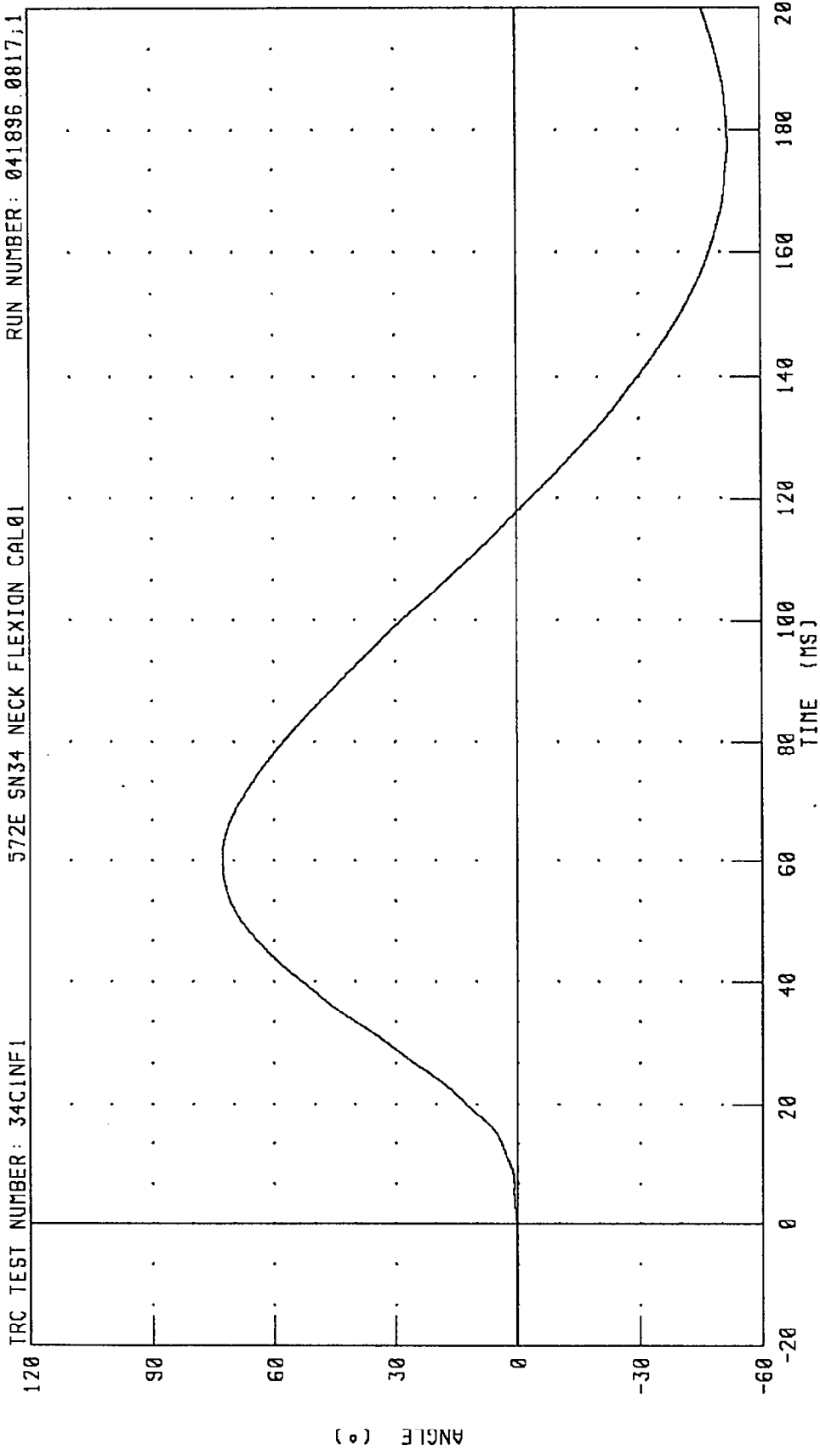
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 34CINF1

572E SN34 NECK FLEXION CAL01

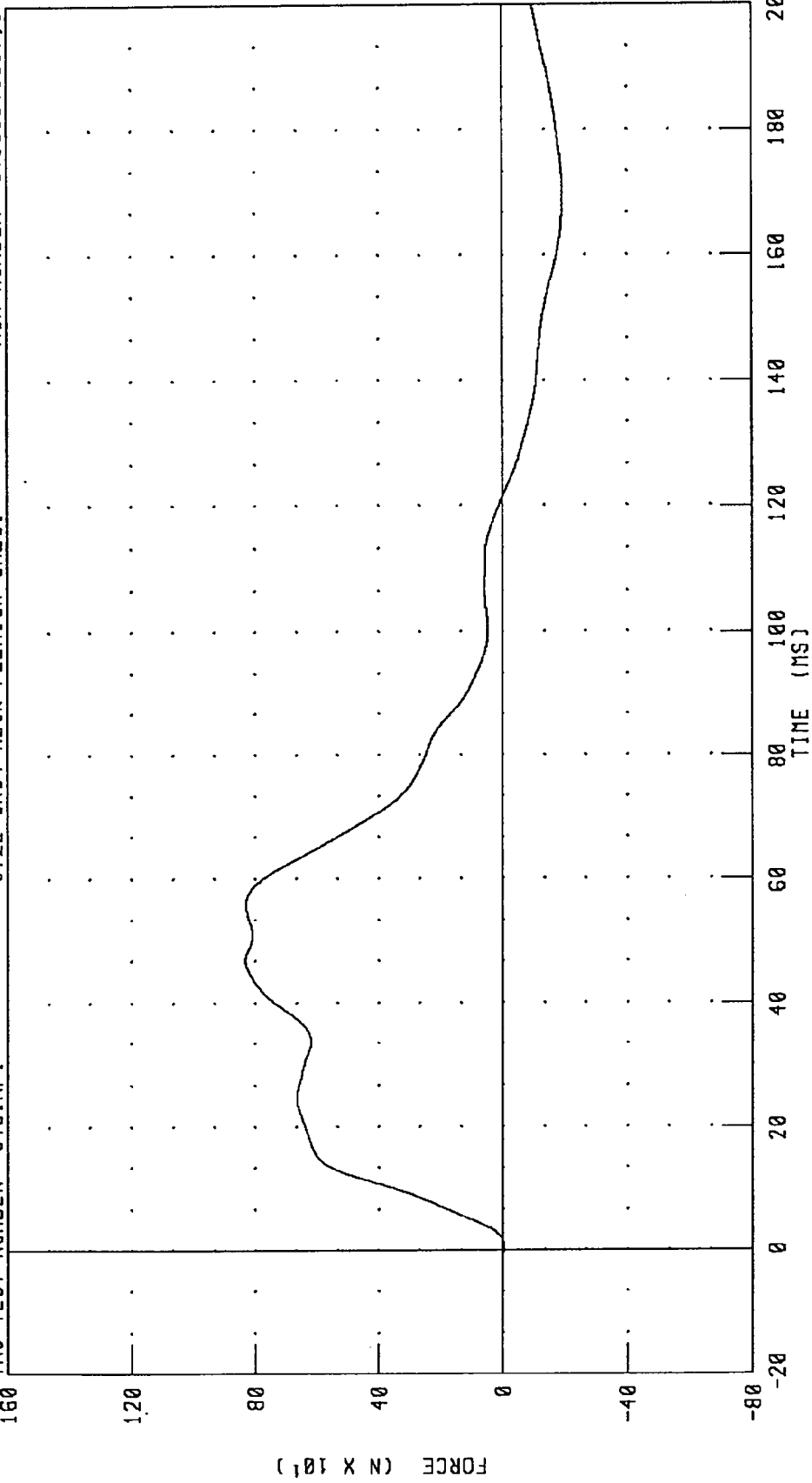
RUN NUMBER: 041896.0817;1



CHANNEL: TOTAL FILTER: CH. CLASS 60 PEAK DATA: 72.73 ° @ 60.24 MS; -51.93 ° @ 177.44 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION  
NECK FORCE X AXIS

TRC TEST NUMBER: 34CINF1      572E SN34 NECK FLEXION CAL01      RUN NUMBER: 041896.0817;1



CHANNEL: NEKXF      FILTER: CH. CLASS 60      PEAK DATA: 832.72 N @ 46.80 MS; -192.96 N @ 169.52 MS

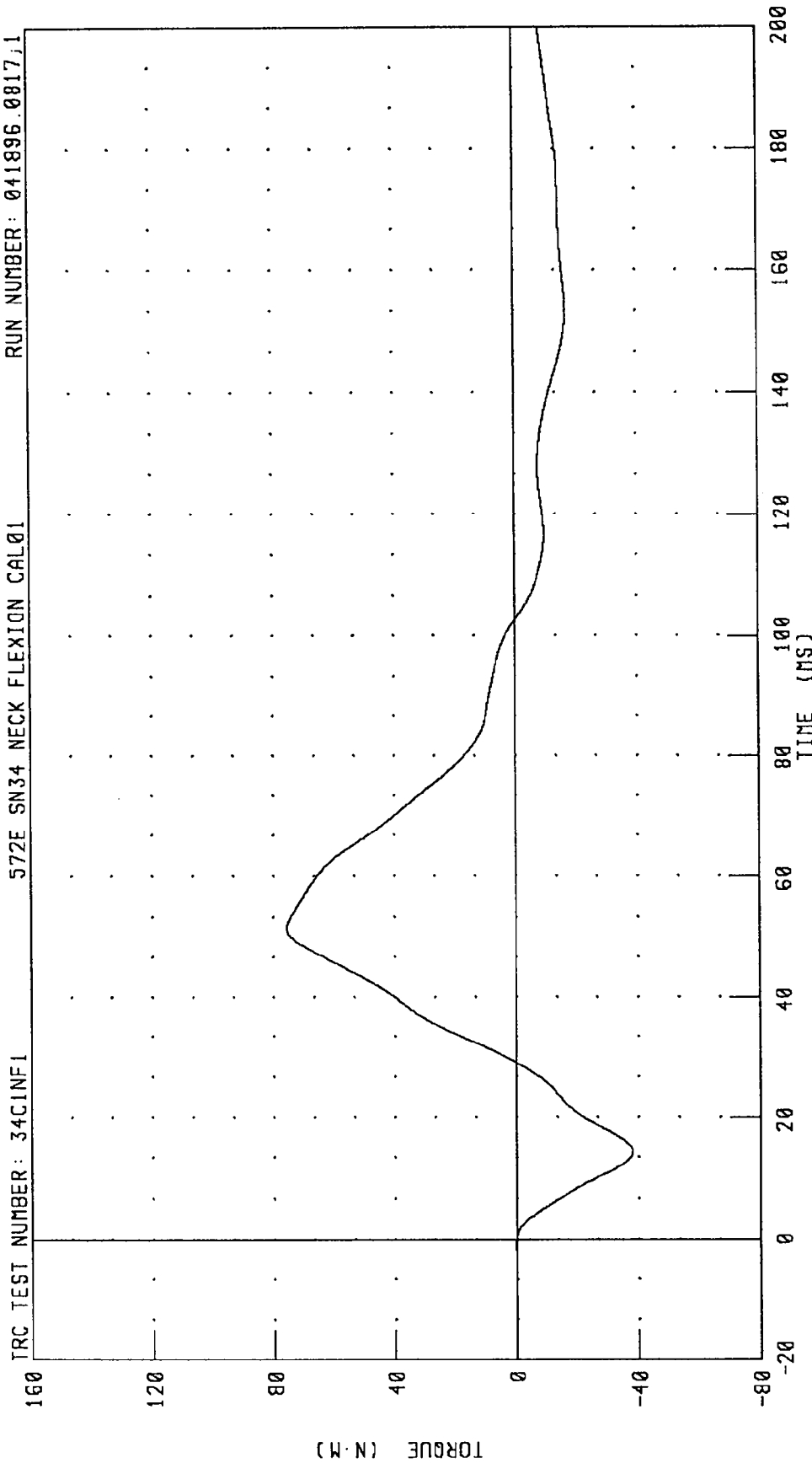
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 34CINF1

572E SN34 NECK FLEXION CAL01

RUN NUMBER: 041896.0817,1

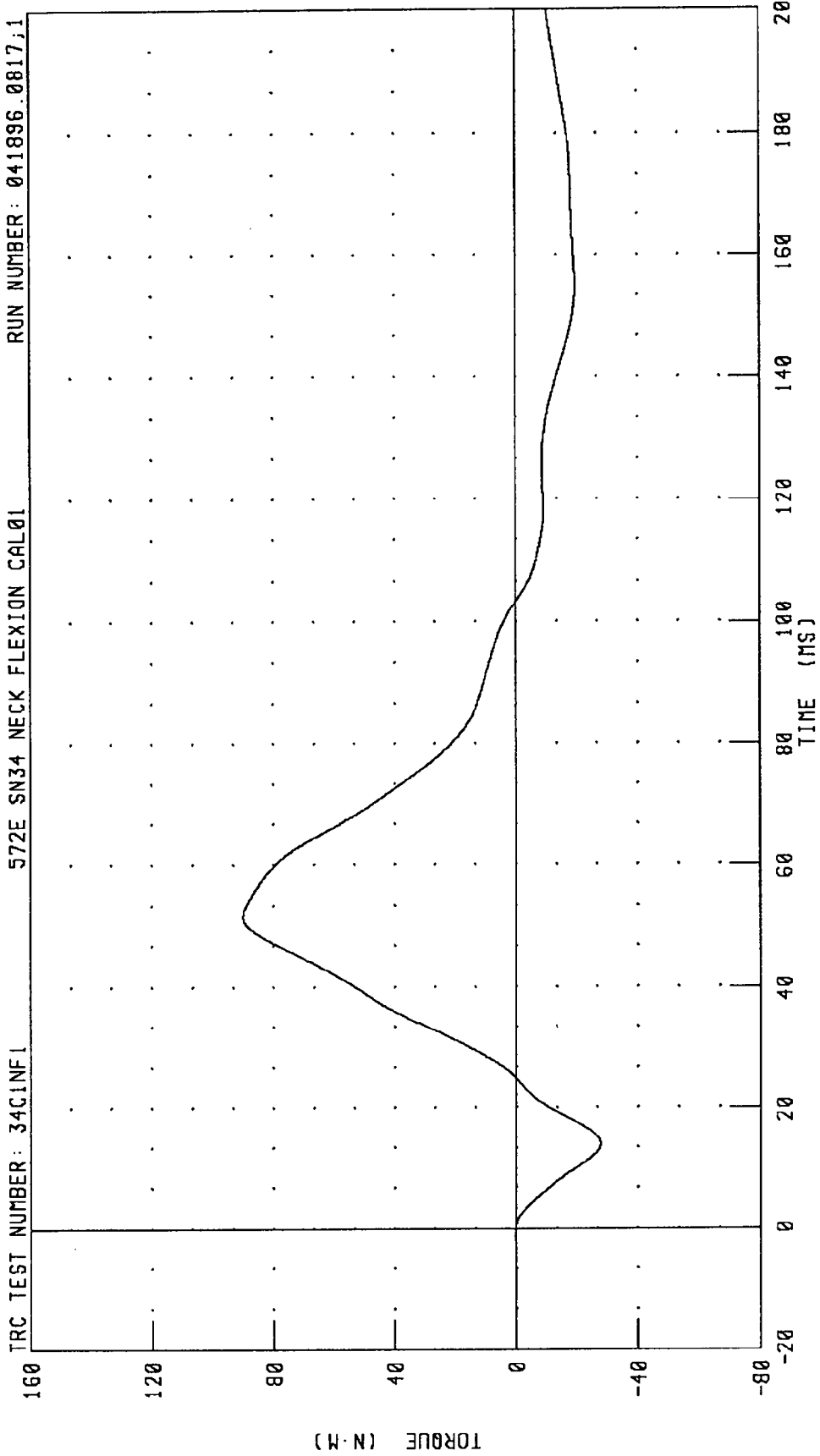


CHANNEL: NEKYM FILTER: CH. CLASS 60 PEAK DATA: 75.60 N.M @ 51.52 MS; -37.99 N.M @ 14.32 MS

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

TRC TEST NUMBER: 34C1NFI      RUN NUMBER: 041896.0817.1

572E SN34 NECK FLEXION CAL01



CHANNEL: NEKOM      FILTER: CH. CLASS 60      PEAK DATA: 90.00 N.M @ 51.60 MS; -27.68 N.M @ 14.00 MS

TRANSPORTATION RESEARCH CENTER INC.

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

HYBRID III

11-JUL-95

TRC INC. TEST NO: 34C1NE1 572E SN34 NECK EXT. CAL01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6 - 22.2 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	63.0 %
IMPACT VELOCITY	5.95 - 6.19 M/S	6.05 M/S
PENDULUM DECELERATION	10 MS   17.20 - 21.20 G	18.10 G
	20 MS   14.00 - 19.00 G	16.16 G
	30 MS   11.00 - 16.00 G	12.32 G
MAX PENDULUM G	22 G MAX	18.73 G
MAX PENDULUM G ABOVE 30 MS	22 G MAX	12.28 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G	38 - 46 MS	39.36 MS
D PLANE	MAX   81 - 106 DEG.	97.53 DEG.
ROTATION	TIME   72 - 82 MS	74.80 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN   -80.0/-52.9 NM	-71.59 NM
	TIME   65 - 79 MS	69.76 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO	147 - 174 MS	154.56 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO	120 - 148 MS	142.80 MS

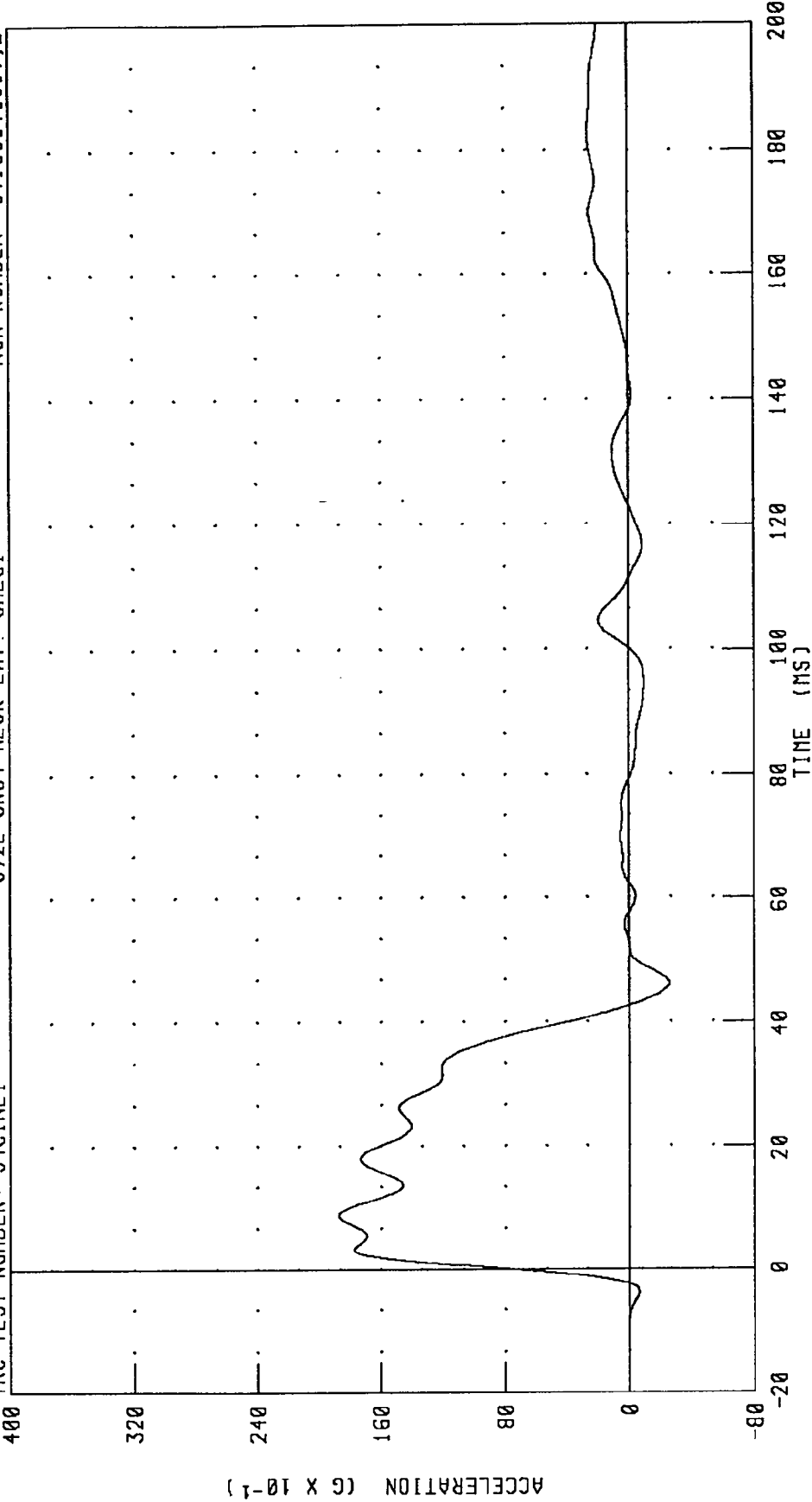
TEST MEETS SPECIFICATIONS

TECHNICIAN Richard L. Van

RUN NUMBER: 071195.1058;2

PART 572-E HYBRID III NECK EXTENSION CALIBRATION  
PENDULUM DECELERATION

TRC TEST NUMBER: 34CINE1      572E SN34 NECK EXT. CAL01      RUN NUMBER: 041896.0817;2



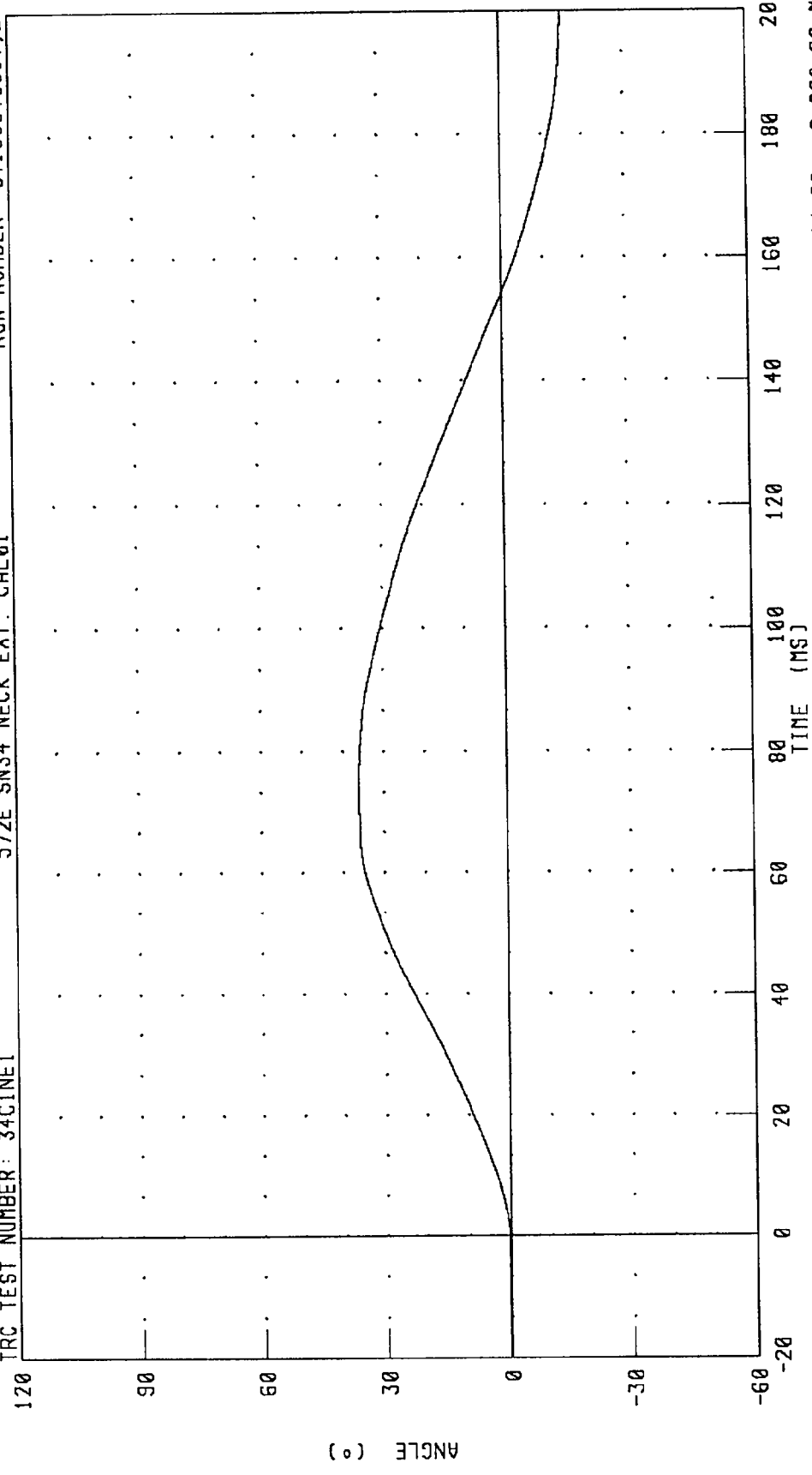
CHANNEL: PENXG      FILTER: CH. CLASS 60      PEAK DATA: 18.74 G @ 8.80 MS; -2.54 G @ 46.08 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION  
ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 34CINE1

572E SN34 NECK EXT. CAL01

RUN NUMBER: 041896.0817.2



PEAK DATA: 36.08 ° @ 73.76 MS; -14.89 ° @ 200.00 MS

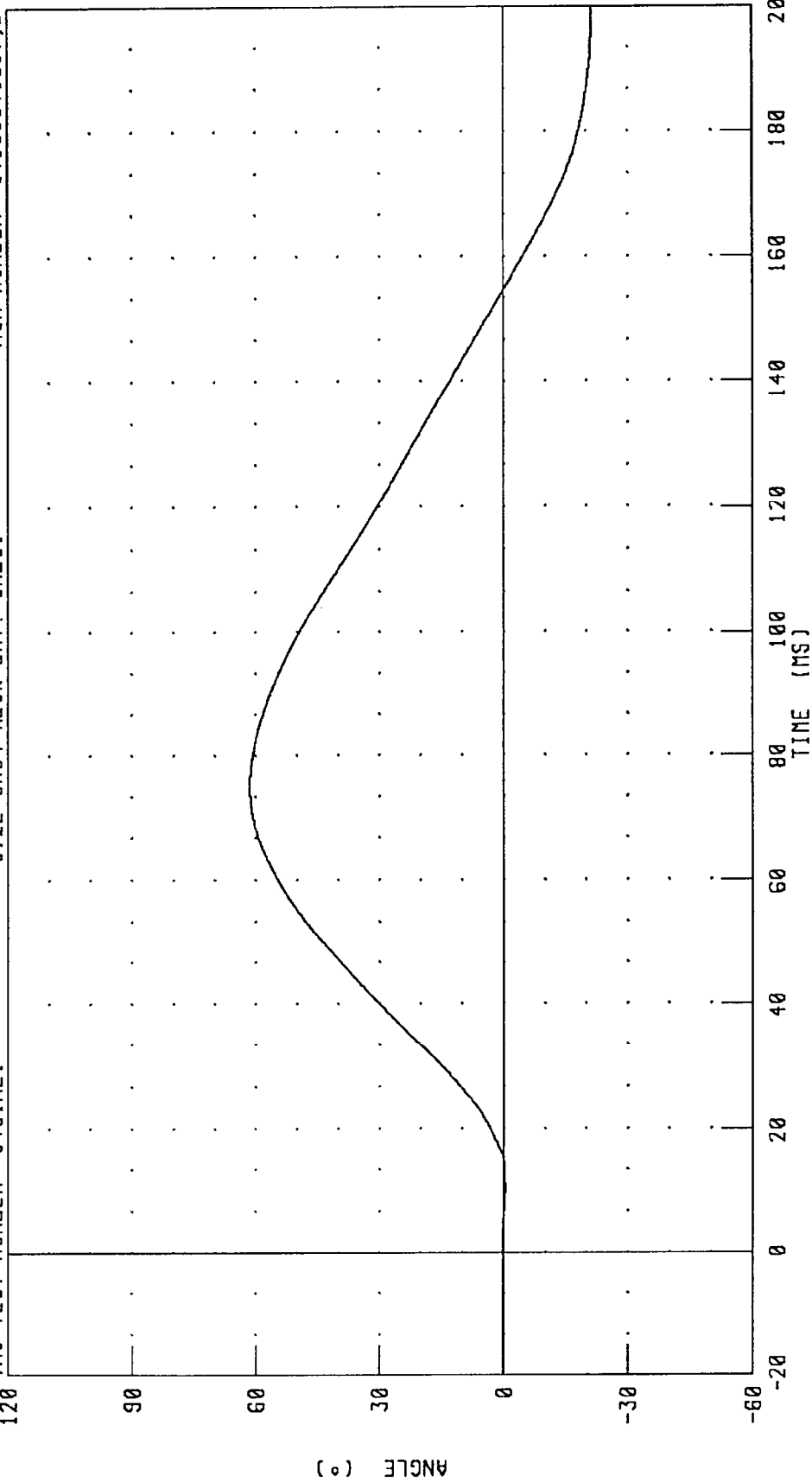
CHANNEL: BETA FILTER: CH. CLASS 60

ANGLE (°)

TIME (MS)

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

IRC TEST NUMBER: 34CINEI      572E SN34 NECK EXT. CAL01      RUN NUMBER: 041896.0817;2



CHANNEL: THETA      FILTER: CH. CLASS 60      PEAK DATA: 61.46 ° @ 75.04 MS; -21.34 ° @ 198.96 MS

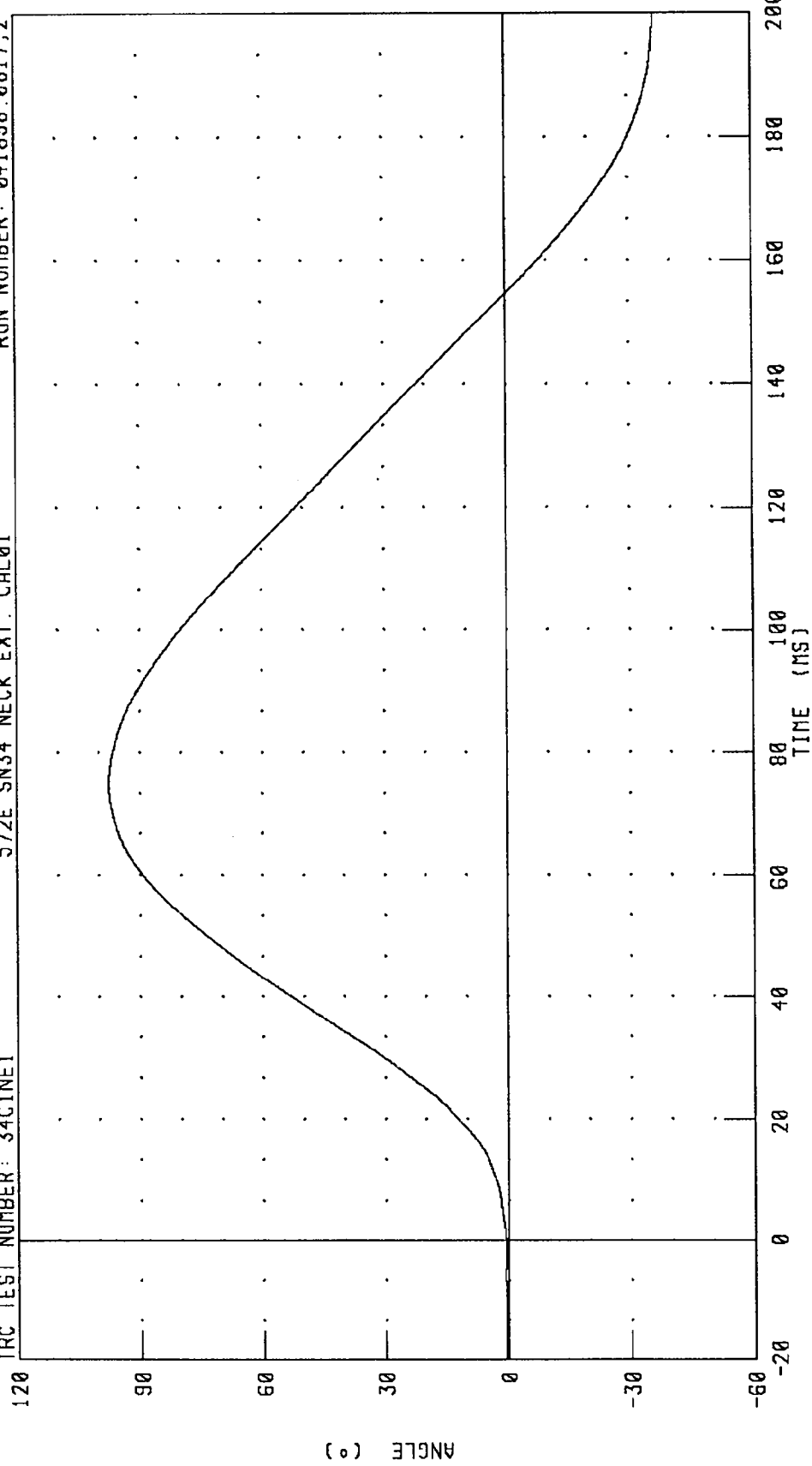
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 34CINE1

572E SN34 NECK EXT. CAL01

RUN NUMBER: 041896.0817;2

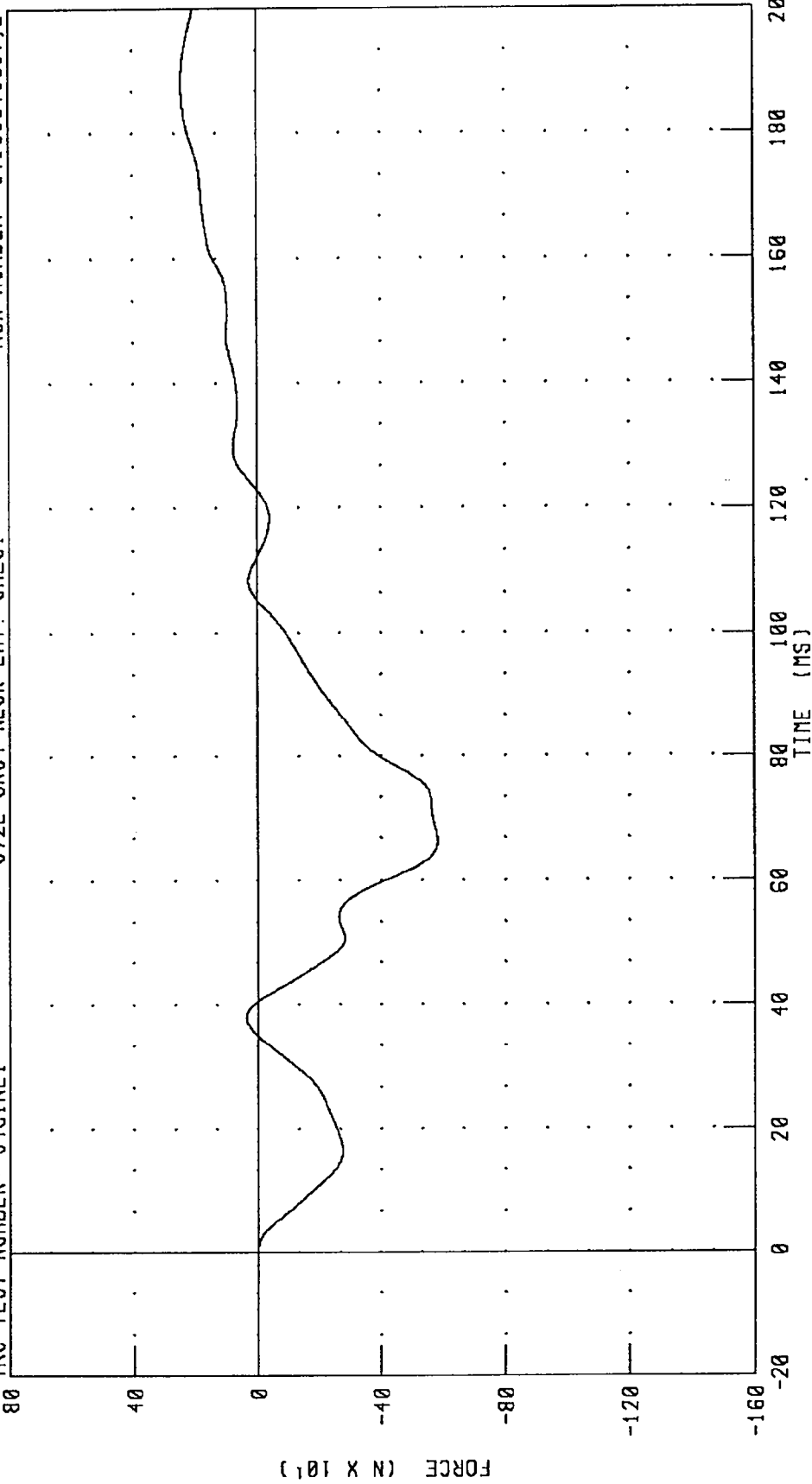


CHANNEL: TOTAN FILTER: CH. CLASS 60

PEAK DATA: 97.53 ° @ 74.80 MS; -36.22 ° @ 199.60 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION  
NECK FORCE X AXIS

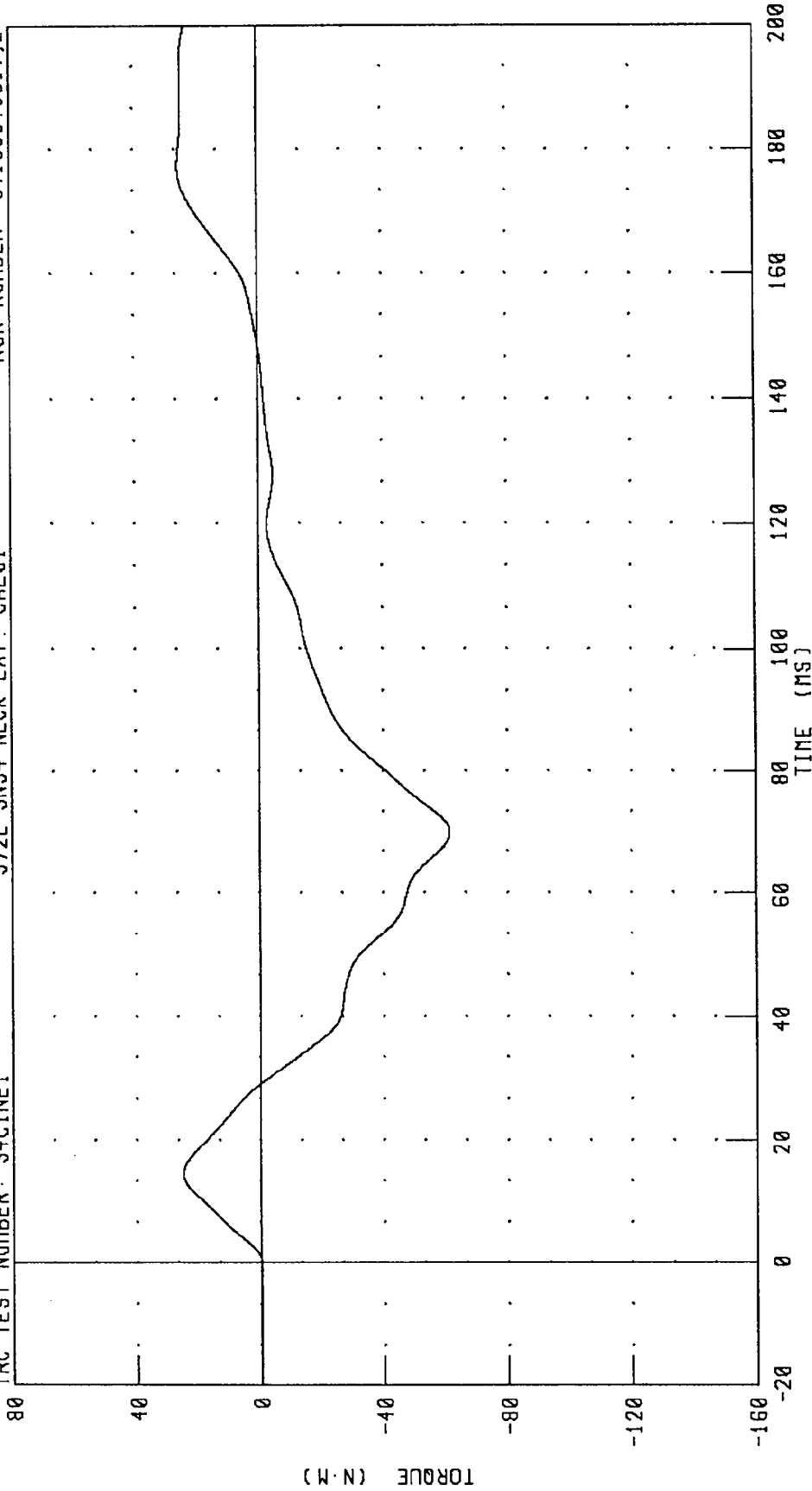
TRC TEST NUMBER: 34CINE1      572E SN34 NECK EXT. CAL01      RUN NUMBER: 041896.0817;2



CHANNEL: NEKXF      FILTER: CH. CLASS 60      PEAK DATA: 242.60 N e 188.08 MS; -581.96 N e 66.08 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION  
NECK MOMENT Y AXIS

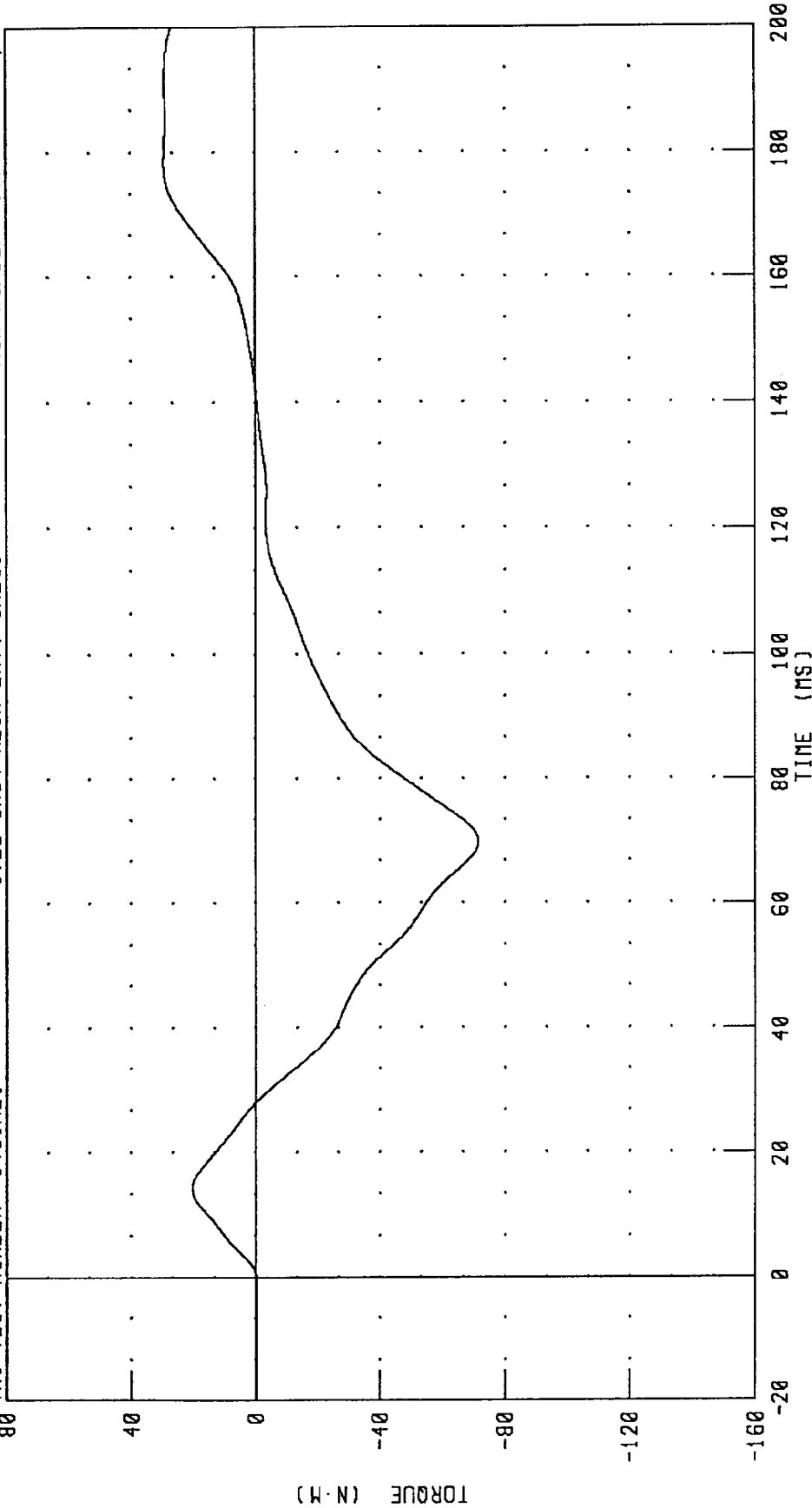
TRC TEST NUMBER: 34CINE1      572E SN34 NECK EXT. CAL01      RUN NUMBER: 041896.0817.2



CHANNEL: NEKYM      FILTER: CH. CLASS 60      PEAK DATA: 25.59 N·M @ 177.36 MS; -61.48 N·M @ 69.84 MS

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

TRC TEST NUMBER: 34CINE1      572E SN34 NECK EXT. CAL01      RUN NUMBER: 041896.0817.2



CHANNEL: NEKOM      FILTER: CH. CLASS 60      PEAK DATA: 29.29 N·M @ 178.48 MS; -71.59 N·M @ 69.76 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III

16-FEB-96

TRC INC.

TEST NO: 34C1TH2

572E SN34 H.S.THORAX CAL01

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	20.8 DEG. C
RELATIVE HUMIDITY	10 - 70 %	26.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.65 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	68.3 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5757. N
INTERNAL HYSTERESIS	69% - 85%	71.1%

TEST MEETS SPECIFICATIONS

TECHNICIAN Richard L. Van

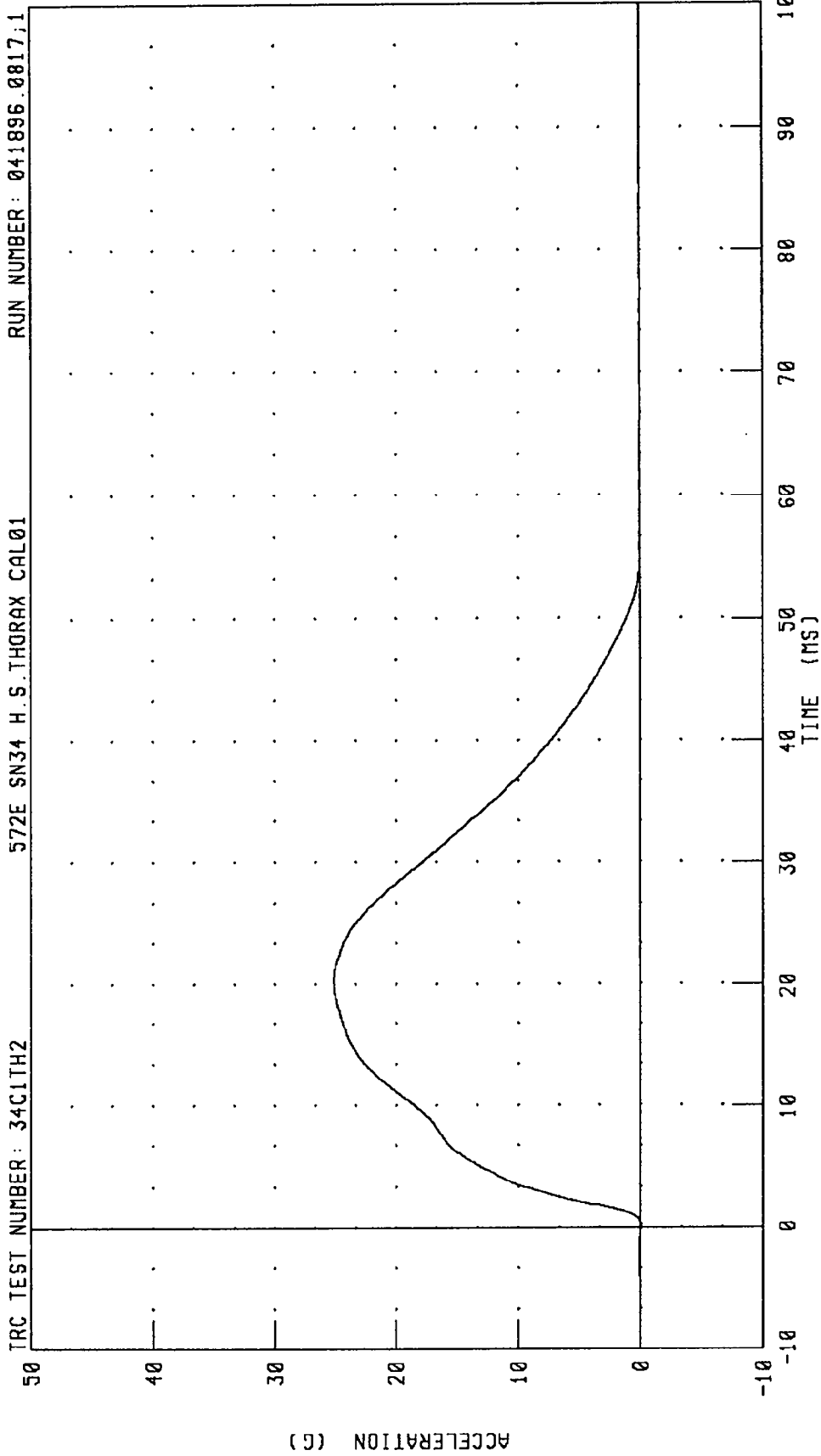
RUN NUMBER: 021696.1507;1

PART 572-E HYBRID III THORAX CALIBRATION  
PENDULUM DECELERATION

TRC TEST NUMBER: 34C1TH2

572E SN34 H.S. THORAX CAL01

RUN NUMBER: 041896.0817;1

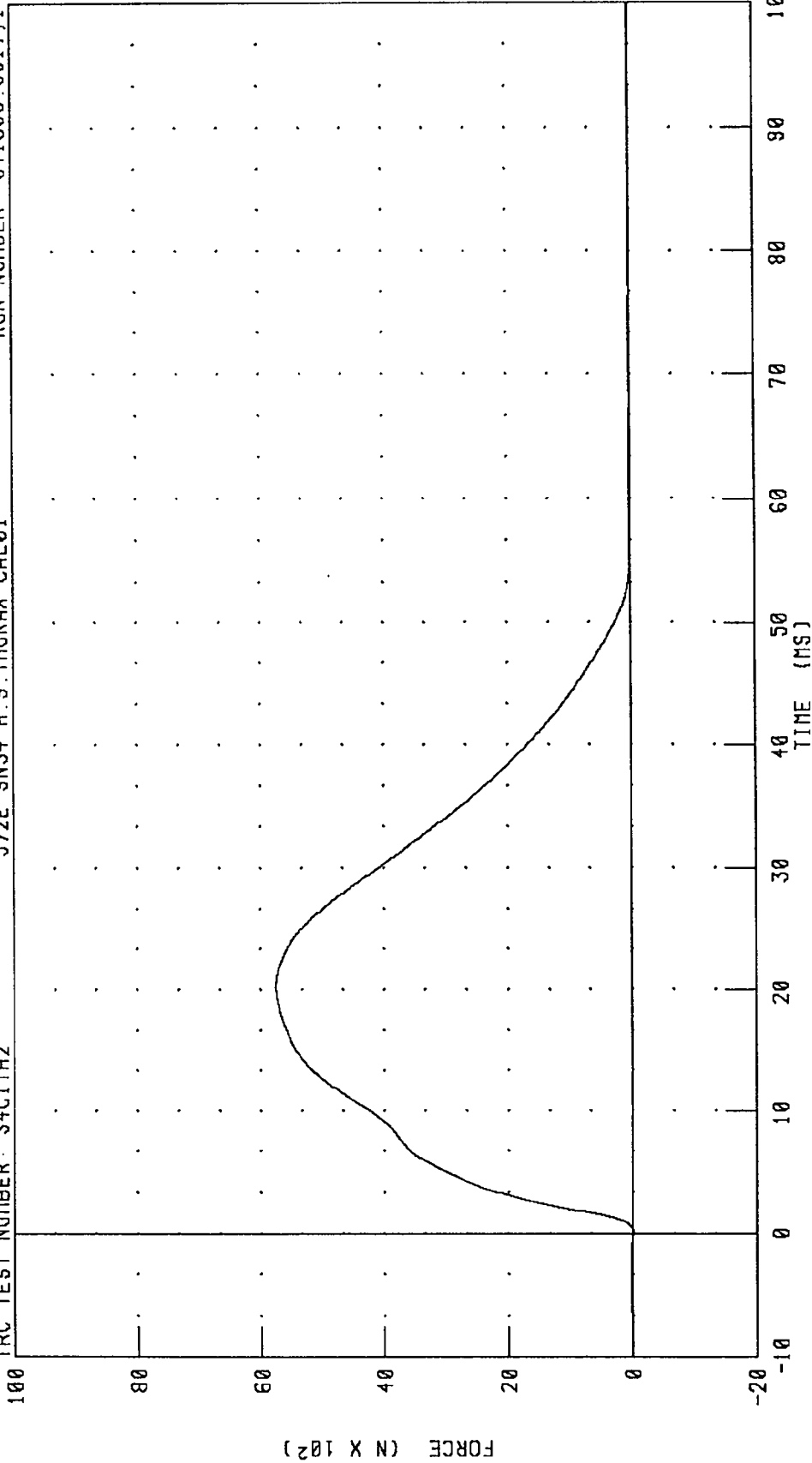


CHANNEL: PENXG FILTER: CH. CLASS 180

PEAK DATA: 25.13 G @ 20.24 MS; -0.03 G @ 0.08 MS

PART 572-E HYBRID III THORAX CALIBRATION  
PENDULUM FORCE

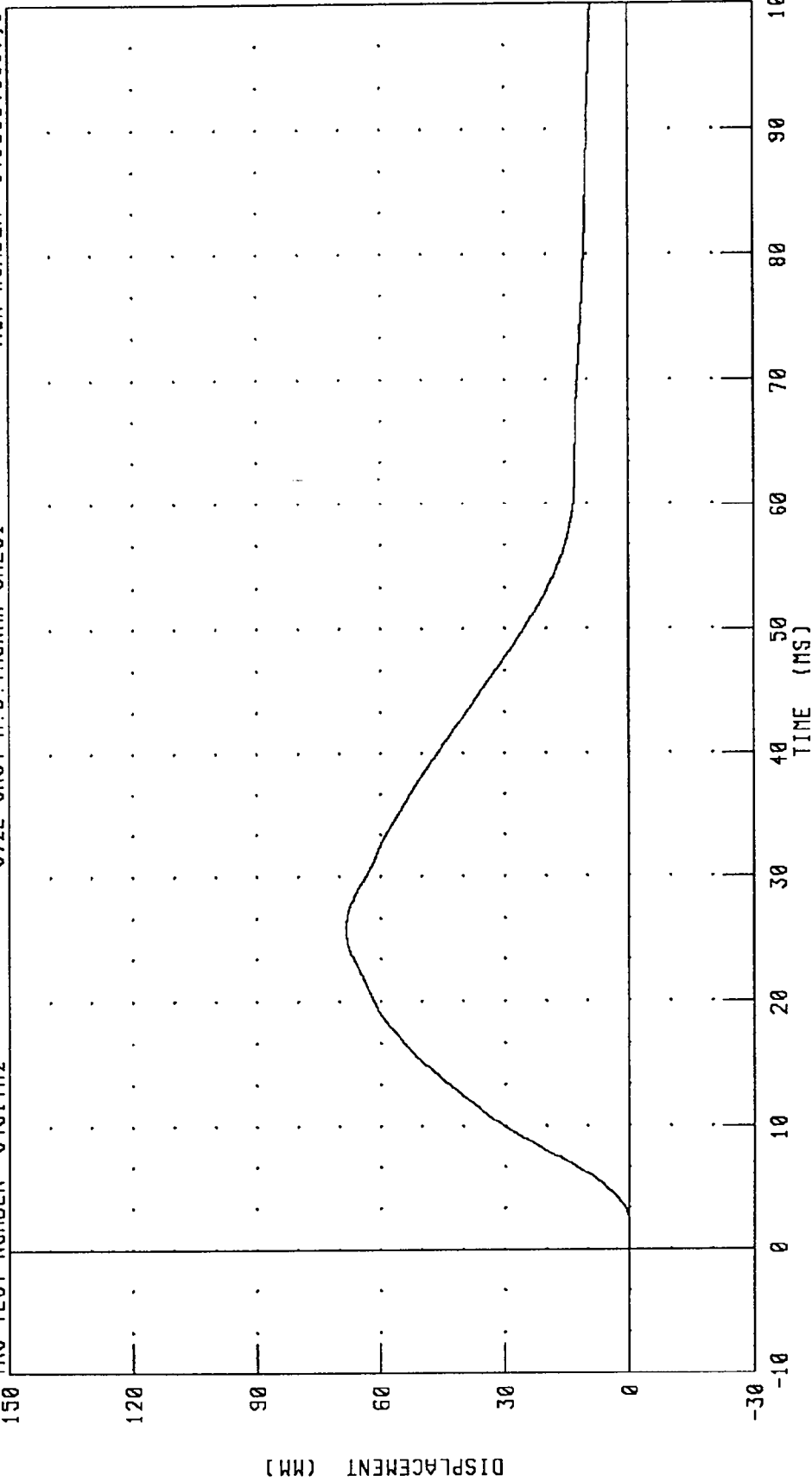
TRC TEST NUMBER: 34C1TH2      572E SN34 H.S. THORAX CAL01      RUN NUMBER: 041896.0817.1



CHANNEL: PENXF      FILTER: CH. CLASS 180      PEAK DATA: 5757.30 N e 20.24 MS; -6.72 N e 0.08 MS

PART 572-E HYBRID III THORAX CALIBRATION  
STERNUM DISPLACEMENT

TRC TEST NUMBER: 34C1TH2      572E SN34 H.S. THORAX CAL01      RUN NUMBER: 041896.0817j.1



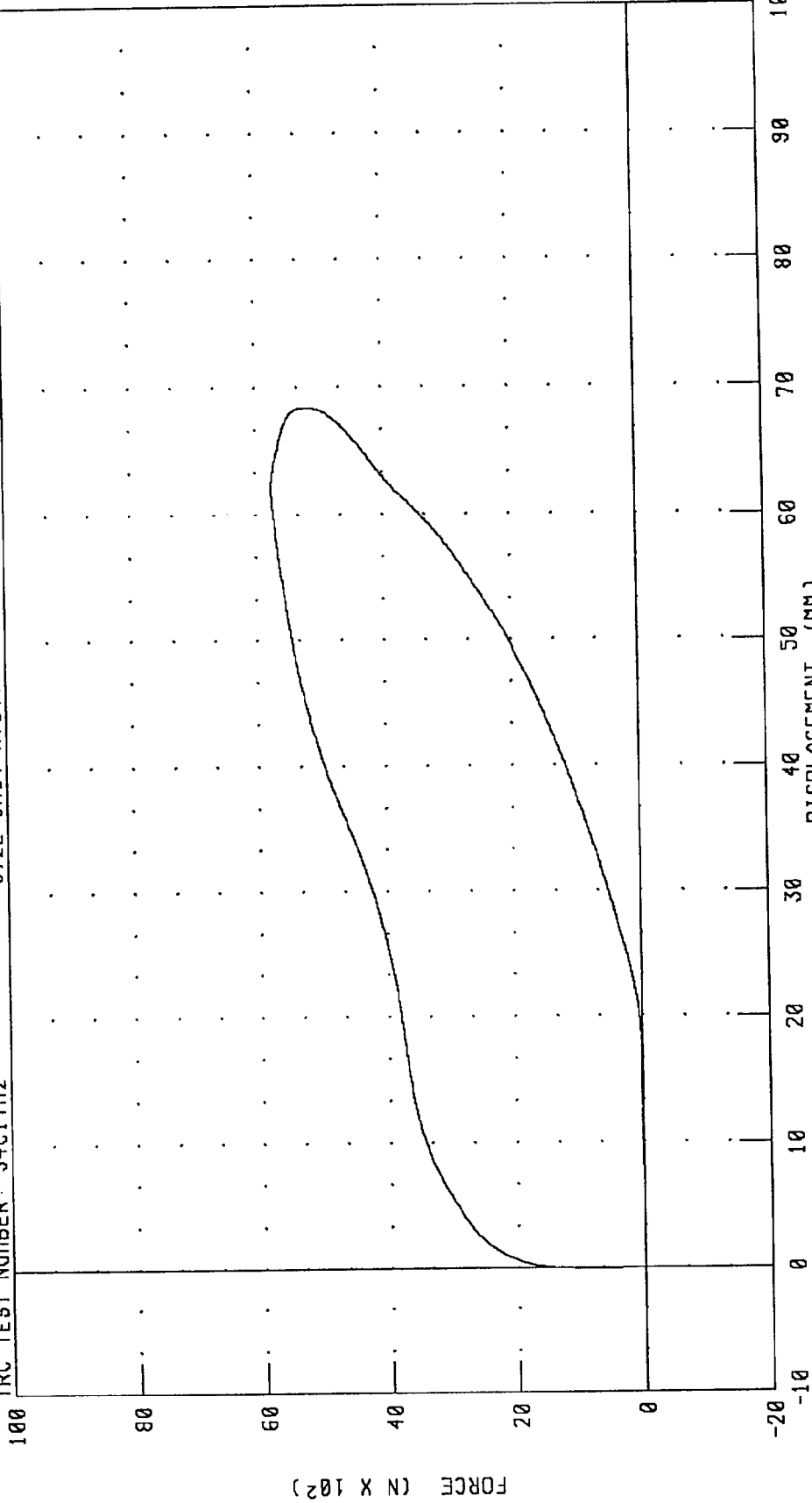
CHANNEL: CSTXD      FILTER: CH. CLASS 180      PEAK DATA: 68.38 MM @ 25.76 MS; -0.04 MM @ -9.68 MS

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

TRC TEST NUMBER: 34C1TH2

572E SN34 H.S. THORAX CAL01

RUN NUMBER: 041896.0017,1



CHANNEL: CSTXD FILTER: CH. CLASS 180  
PENXF CH. CLASS 180

PEAK DATA: 68.38 NM @ 25.76 MS; -0.04 NM @ -9.68 MS  
5757.30 N @ 20.24 MS; -6.72 N @ 0.08 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III

11-JUL-95

TRC INC.

TEST NO: 34C1RK1

572E SN34 RIGHT KNEE CAL 01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	63.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5589.1 N

TEST MEETS SPECIFICATIONS

TECHNICIAN

*Richard LeVan*

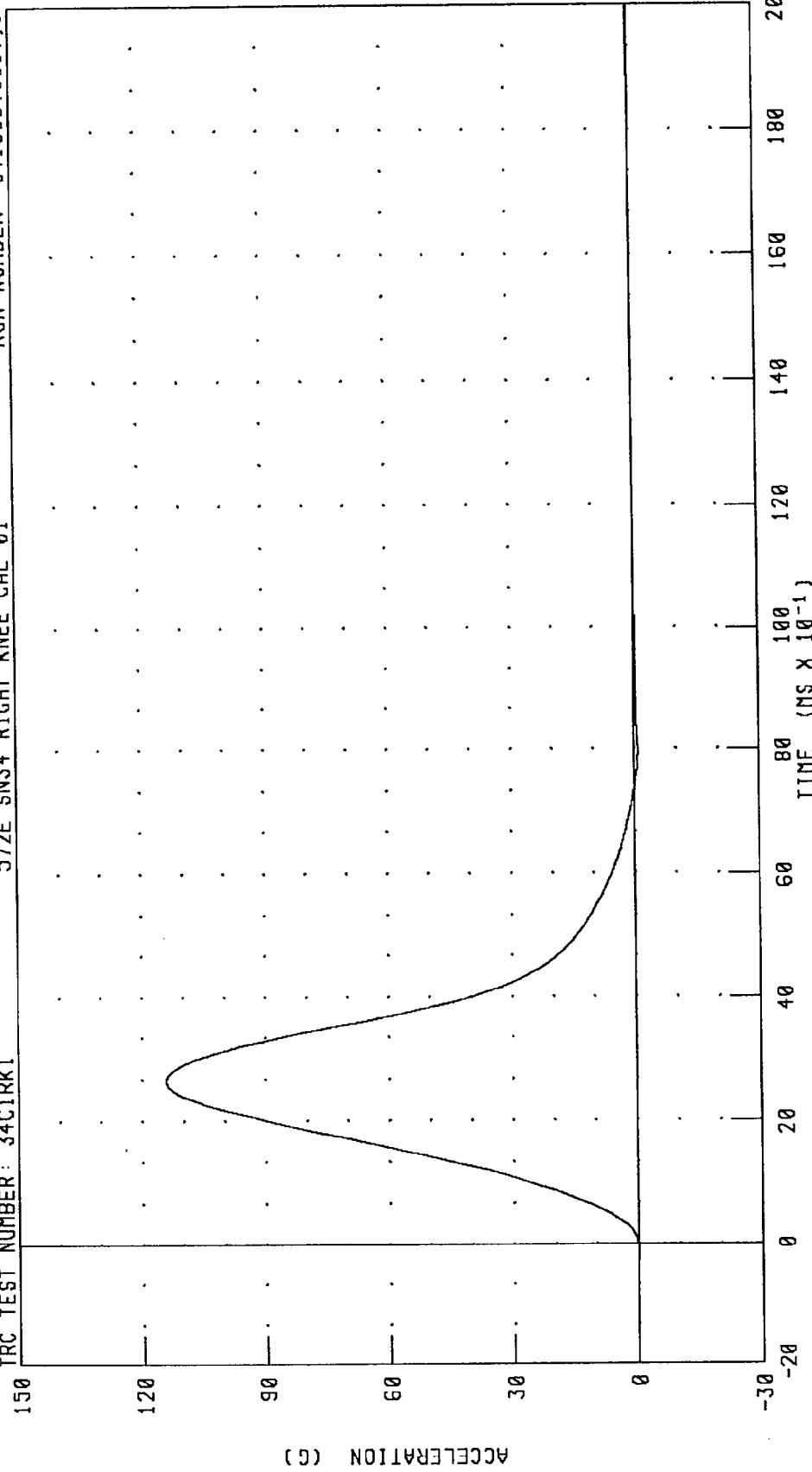
RUN NUMBER: 071195.1244;1

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

TRC TEST NUMBER: 34CIRK1

572E SN34 RIGHT KNEE CAL 01

RUN NUMBER: 041896.0817,1



CHANNEL: PENXG FILTER: CH. CLASS 600

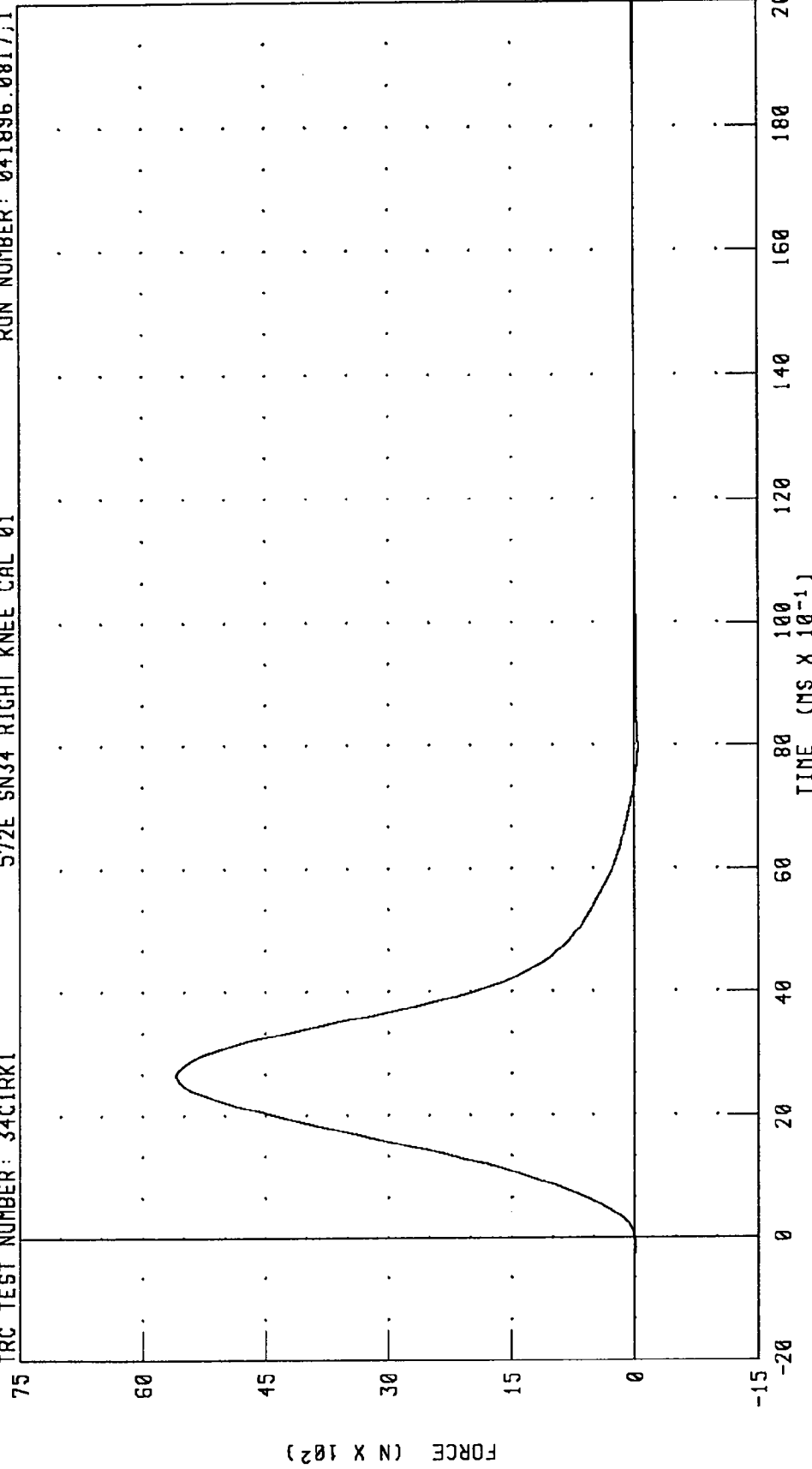
PEAK DATA: 114.23 G @ 2.64 MS; -0.86 G @ 7.92 MS

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

TRC TEST NUMBER: 34CIRK1

572E SN34 RIGHT KNEE CAL 01

RUN NUMBER: 041896.0817.1



CHANNEL: PENXF FILTER: CH. CLASS 600 PEAK DATA: 5589.18 N @ 2.64 MS; -42.00 N @ 7.92 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III

11-JUL-95

TRC INC.

TEST NO: 34C1LK1

572E SN34 LEFT KNEE CAL01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	63.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.10 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5684.2 N

TEST MEETS SPECIFICATIONS

TECHNICIAN

*Richard LeVan*

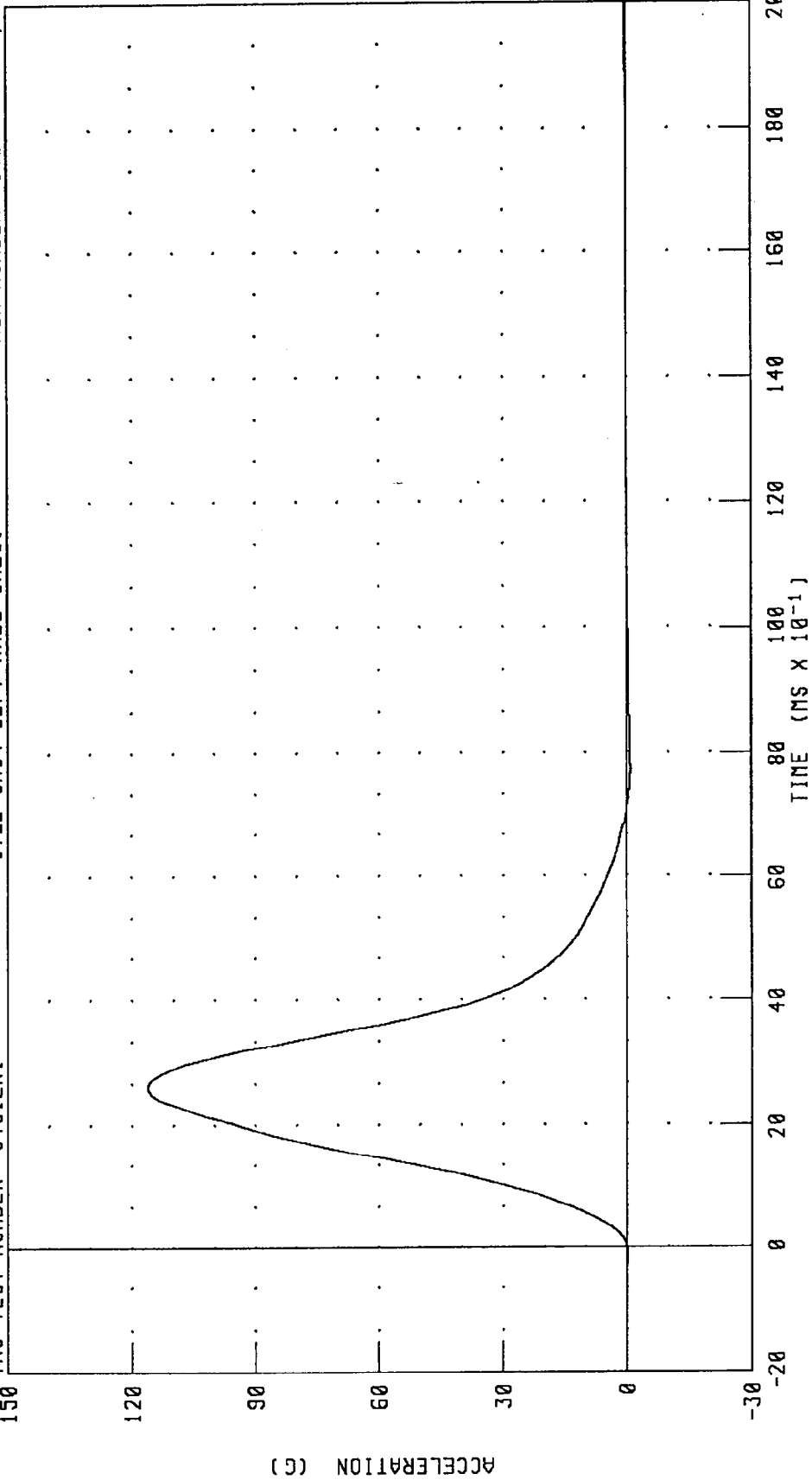
RUN NUMBER: 071195.1240;2

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

572E SN34 LEFT KNEE CAL01

IRC TEST NUMBER: 34C1LKI

RUN NUMBER: 041896.0817;2



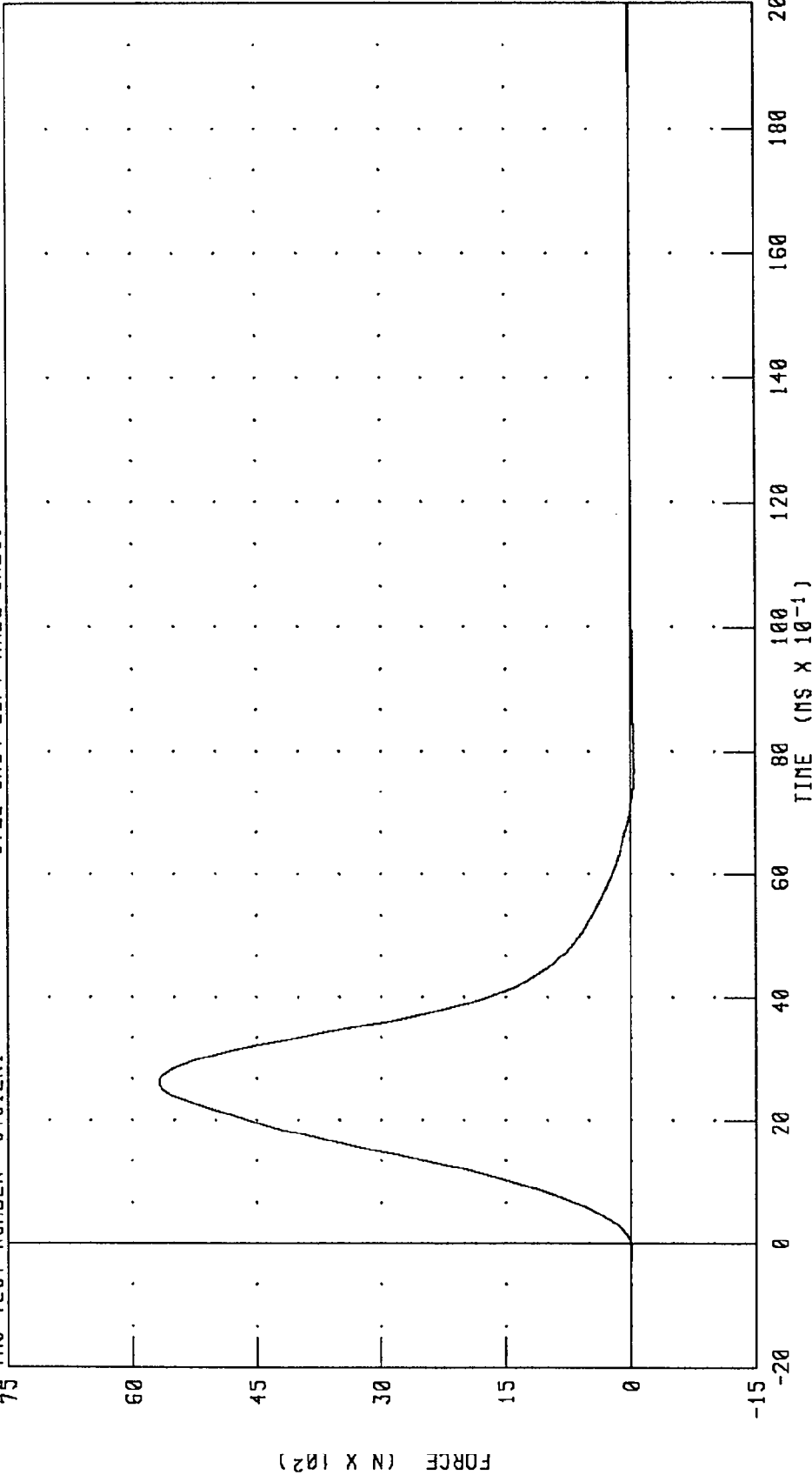
CHANNEL: PENXG FILTER: CH. CLASS 600 PEAK DATA: 116.17 G @ 2.64 MS; -0.84 G @ 7.68 MS

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

TRC TEST NUMBER: 34C1LKI

572E SN34 LEFT KNEE CAL01

RUN NUMBER: 041896.0817,2



CHANNEL: PENXF FILTER: CH. CLASS 600 PEAK DATA: 5684.20 N @ 2.64 MS; -41.11 N @ 7.68 MS

Pre-Test Calibration

Serial Number 35

TRANSPORTATION RESEARCH CENTER INC.  
 HYBRID III EXTERNAL DIMENSIONS  
 35 VECTOR

11-JUL-95

TRC INC. TEST NO: 35C1ED1 572E SN35 EXT.DIMENSION CAL01

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	988. MM
WAIST CIRCUMFERENCE	(Z)	836 - 866 MM	848. MM
CHEST DEPTH	(O)	213 - 229 MM	218. MM
H-POINT HEIGHT	(C)	84 - 89 MM	86. 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	886. MM
THIGH CLEARANCE	(F)	140 - 155 MM	152. MM
BUTTOCK KNEE LENGTH	(K)	579 - 605 MM	602. MM
BUTTOCK POPLITEAL LENGTH	(N)	452 - 478 MM	475. MM
POPLITEAL HEIGHT	(L)	429 - 455 MM	442. MM
KNEE PIVOT HEIGHT	(M)	485 - 500 MM	500. MM
FOOT LENGTH	(P)	252 - 267 MM	254. MM
FOOT BREADTH	(W)	91 - 107 MM	94. MM
SHOULDER PIVOT FROM BACKLINE	(E)	84 - 94 MM	91. MM
SHOULDER BREADTH	(V)	422 - 437 MM	427. MM
SHOULDER PIVOT HEIGHT	(B)	506 - 521 MM	511. MM
ELBOW REST HEIGHT	(J)	191 - 211 MM	203. MM
SHOULDER-ELBOW LENGTH	(I)	330 - 345 MM	343. MM
BACK OF ELBOW TO WRIST PIVOT	(G)	290 - 305 MM	297. MM

DUMMY MEETS SPECIFICATIONS  
 TECHNICIAN Richard Sevan

RUN NUMBER: 071295.1437

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III

09-NOV-95

TRC INC.

TEST NO: 35C1HD2

572E SN35 HEAD DROP CAL 01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	30.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	262.44 G
PEAK LATERAL ACCELERATION	15 G MAX	-9.03 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN Richard L. Loran

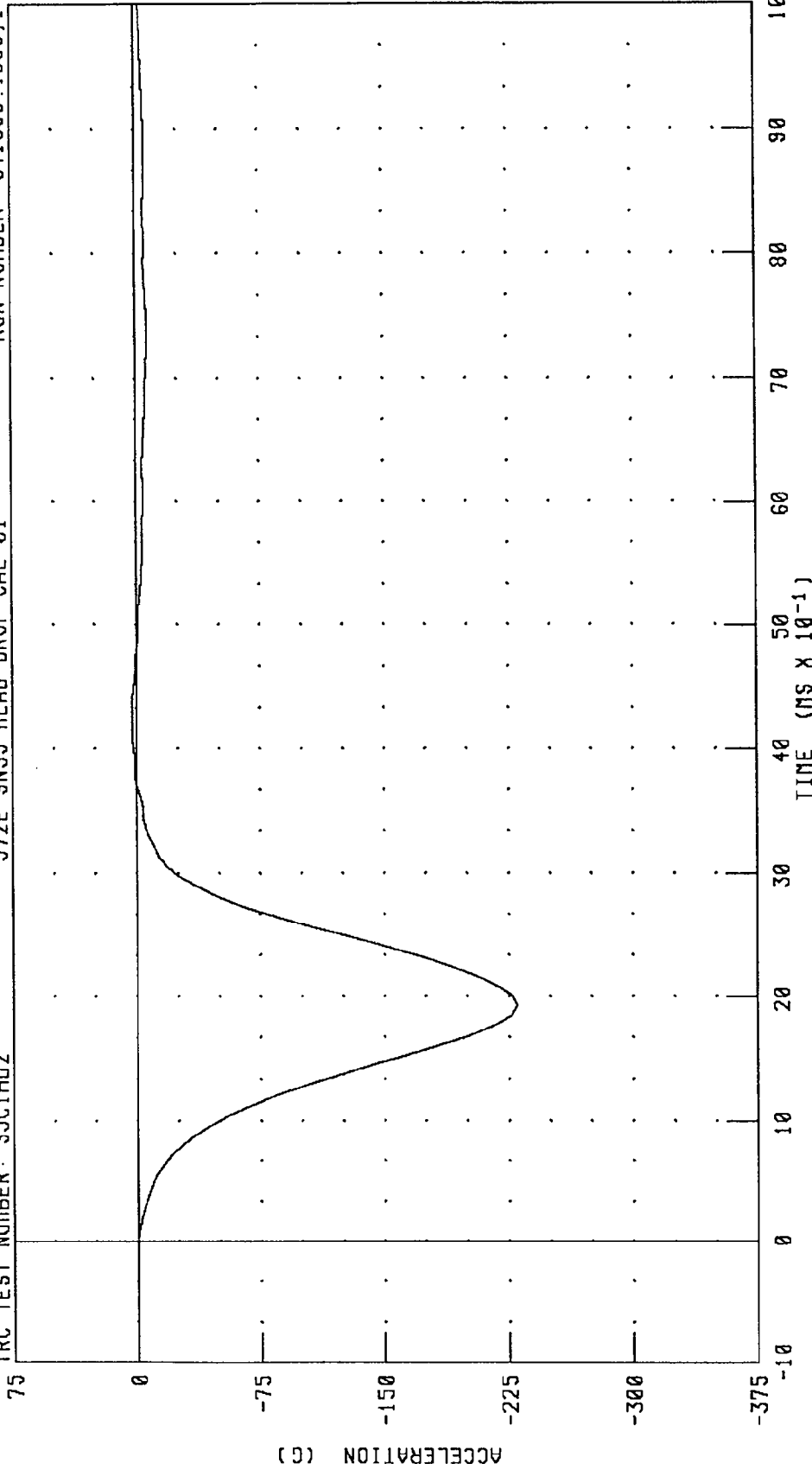
RUN NUMBER: 110995.1358;1

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

TRC TEST NUMBER: 35C1H02

572E SN35 HEAD DROP CAL 01

RUN NUMBER: 041896.1035;1



CHANNEL: HEDXG FILTER: CH. CLASS 1000

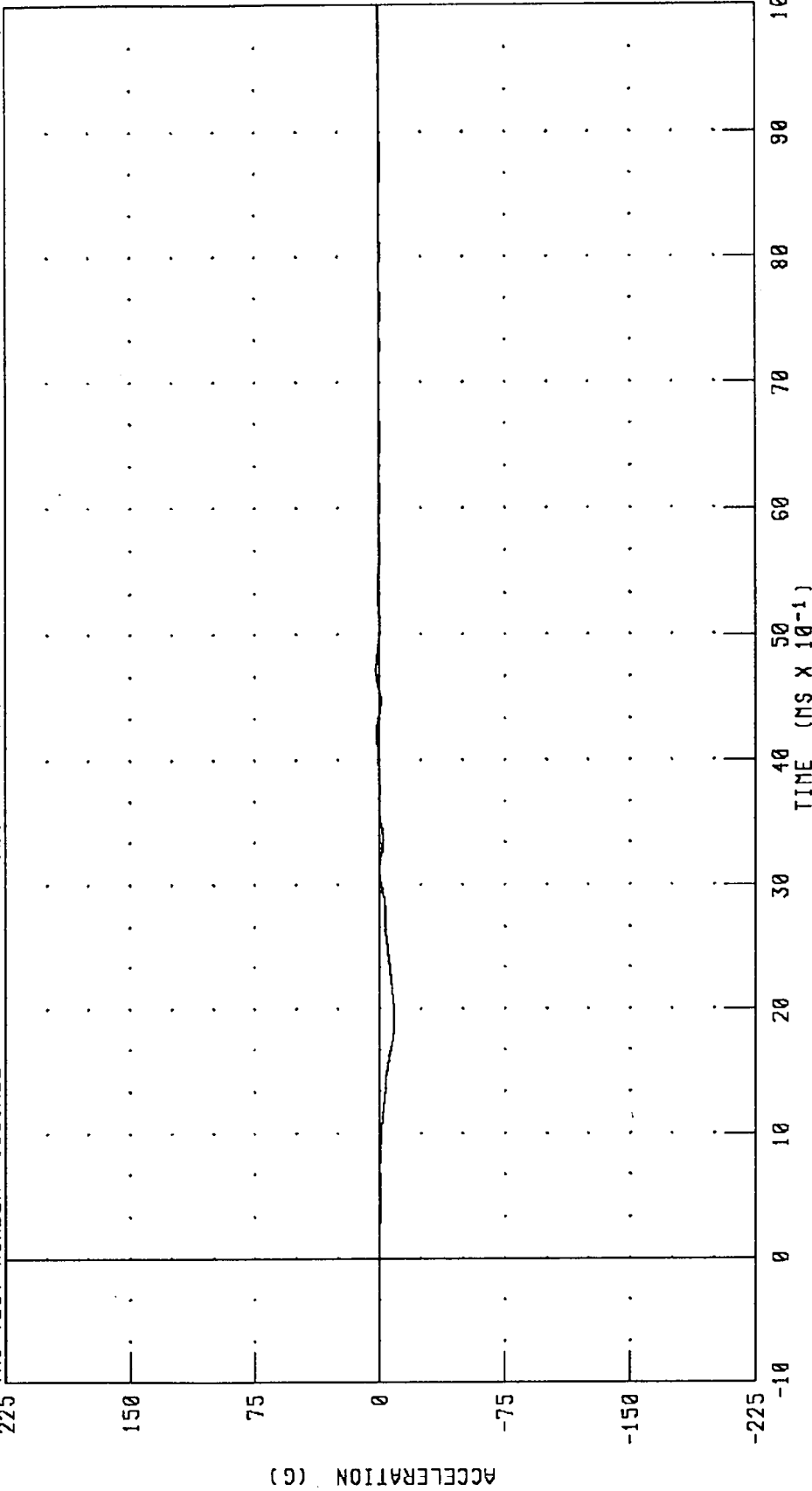
PEAK DATA: 2.37 G @ 4.40 MS; -230.10 G @ 1.92 MS

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

IRC TEST NUMBER: 35C1HD2

572E SN35 HEAD DROP CAL 01

RUN NUMBER: 041896.1035;1



PEAK DATA: 2.20 G @ 4.72 MS; -9.04 G @ 1.92 MS

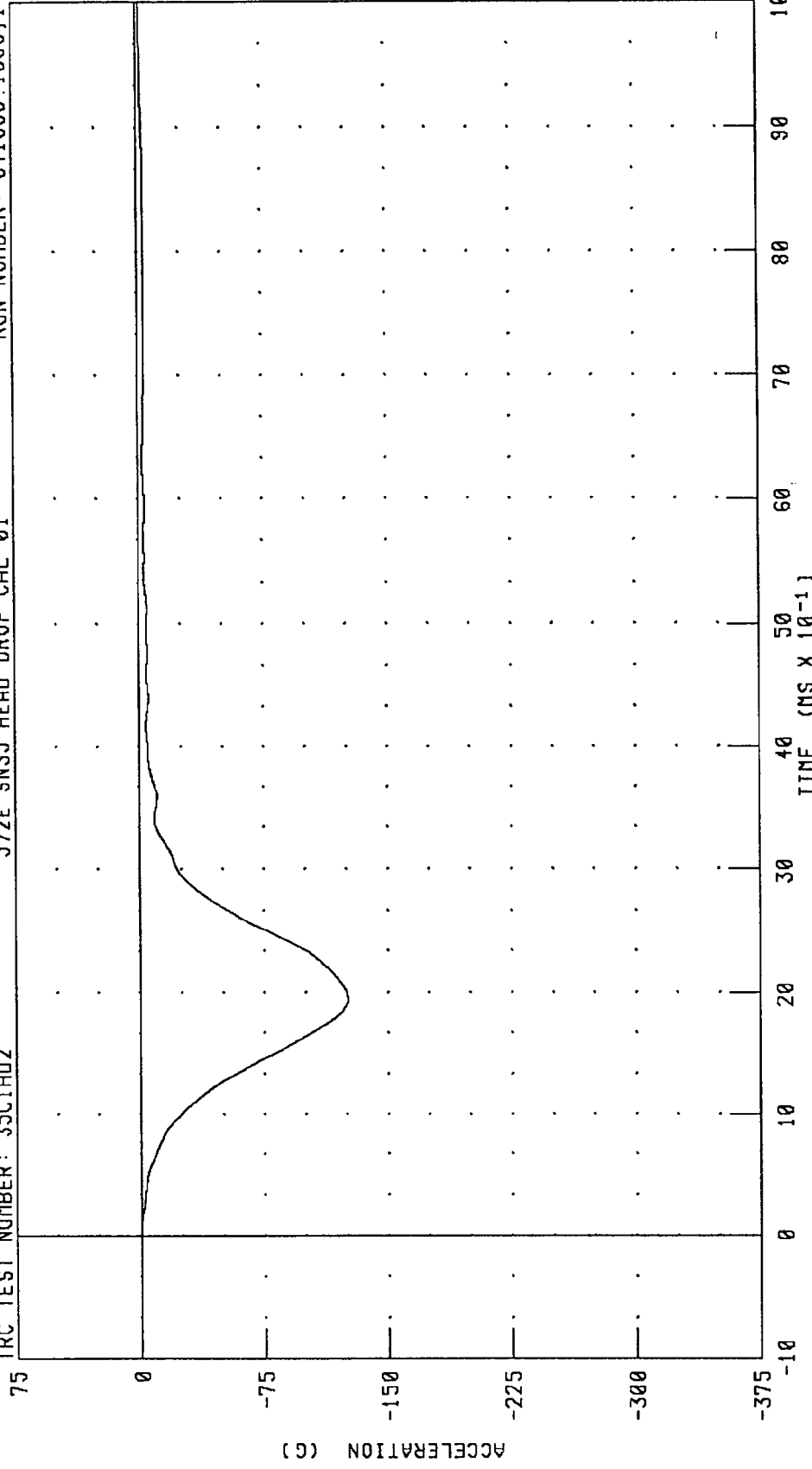
CHANNEL: HEDYG FILTER: CH. CLASS 1000

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

TRC TEST NUMBER: 35C1HD2

572E SN35 HEAD DROP CAL 01

RUN NUMBER: 041896.1035;1



CHANNEL: HEDZG FILTER: CH. CLASS 1000

PEAK DATA: -0.01 G @ -0.24 MS; -125.90 G @ 1.92 MS

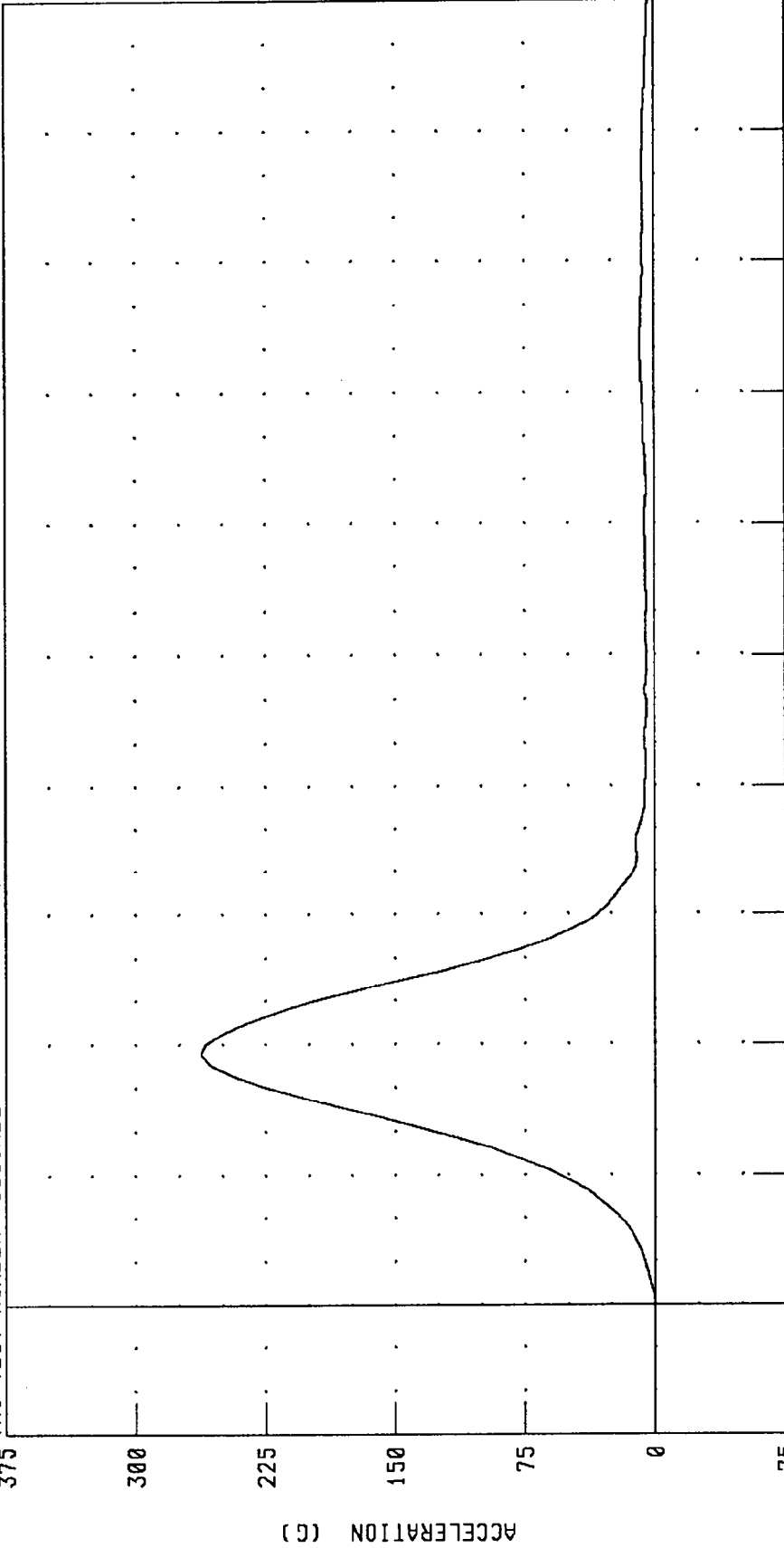
PART 572-E HYBRID III HEAD CALIBRATION  
HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: 35C1HD2

572E SN35 HEAD DROP CAL 01

RUN NUMBER: 041896.1035;1

375



PEAK DATA: 262.45 G @ 1.92 MS; 0.02 G @ -0.32 MS

CHANNEL: HEDRG FILTER: CH. CLASS 1000

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

HYBRID III

11-JUL-95

TRC INC. TEST NO: 35C1NF1 572E SN35 NECK FLEXION CAL01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	63.0 %
IMPACT VELOCITY	6.89 - 7.13 M/S	6.99 M/S
PENDULUM DECELERATION	10 MS   22.50 - 27.50 G	22.98 G
	20 MS   17.60 - 22.60 G	20.12 G
	30 MS   12.50 - 18.50 G	15.08 G
MAX PENDULUM G	29 G MAX	23.77 G
MAX PENDULUM G ABOVE 30 MS	29 G MAX	15.03 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G	34 - 42 MS	37.36 MS
D PLANE	MAX   64 - 78 DEG.	70.37 DEG.
ROTATION	TIME   57 - 64 MS	58.00 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX   88.2 - 108.5 NM	96.89 NM
	TIME   47 - 58 MS	50.00 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO	113 - 128 MS	114.48 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO	97 - 107 MS	99.60 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Richard LeVan

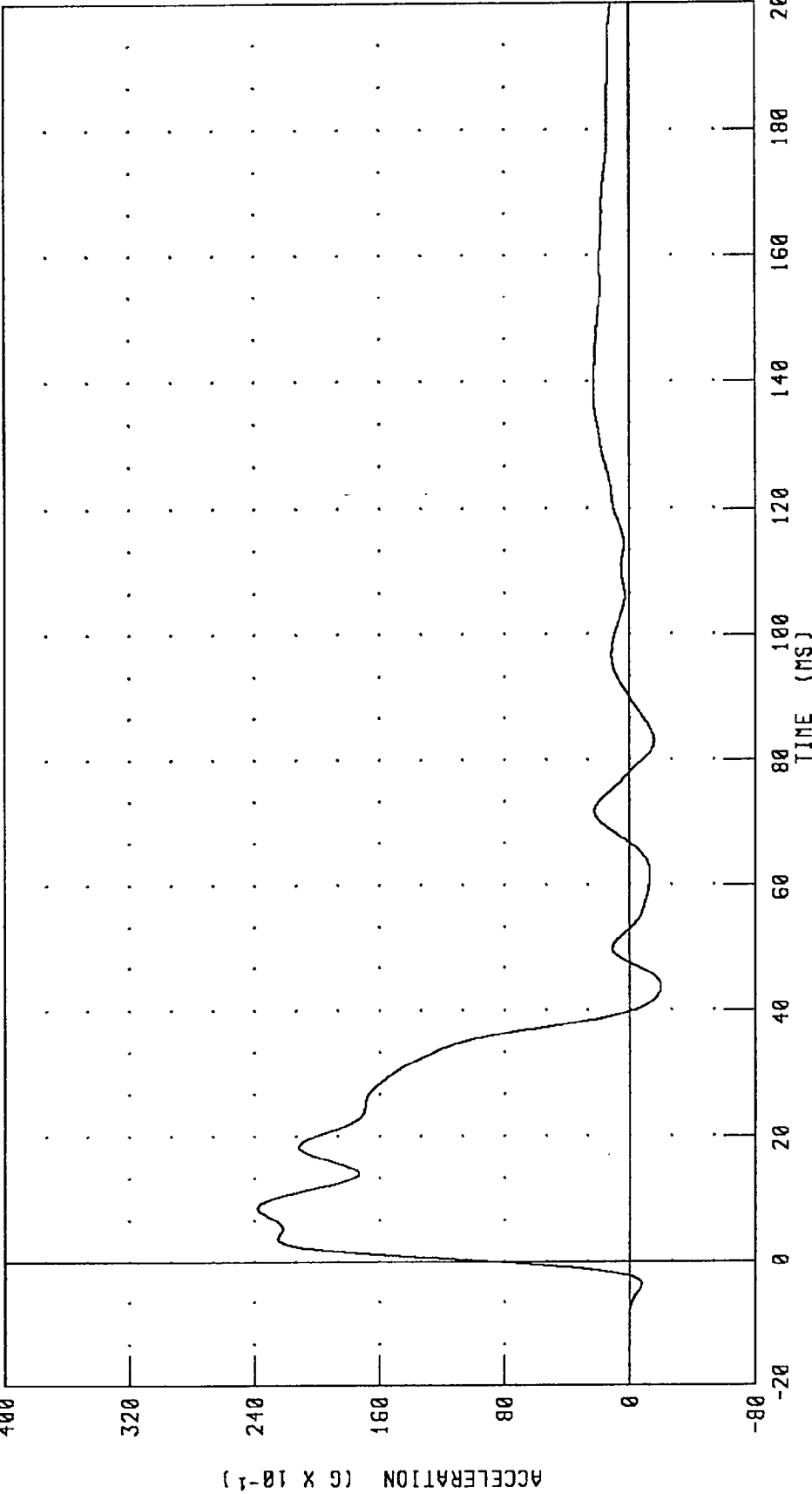
RUN NUMBER: 071195.0843;2

PART 572-E HYBRID III NECK FLEXION CALIBRATION  
PENDULUM DECELERATION

TRC TEST NUMBER: 35CINF1

572E SN35 NECK FLEXION CAL01

RUN NUMBER: 041896.1035;2



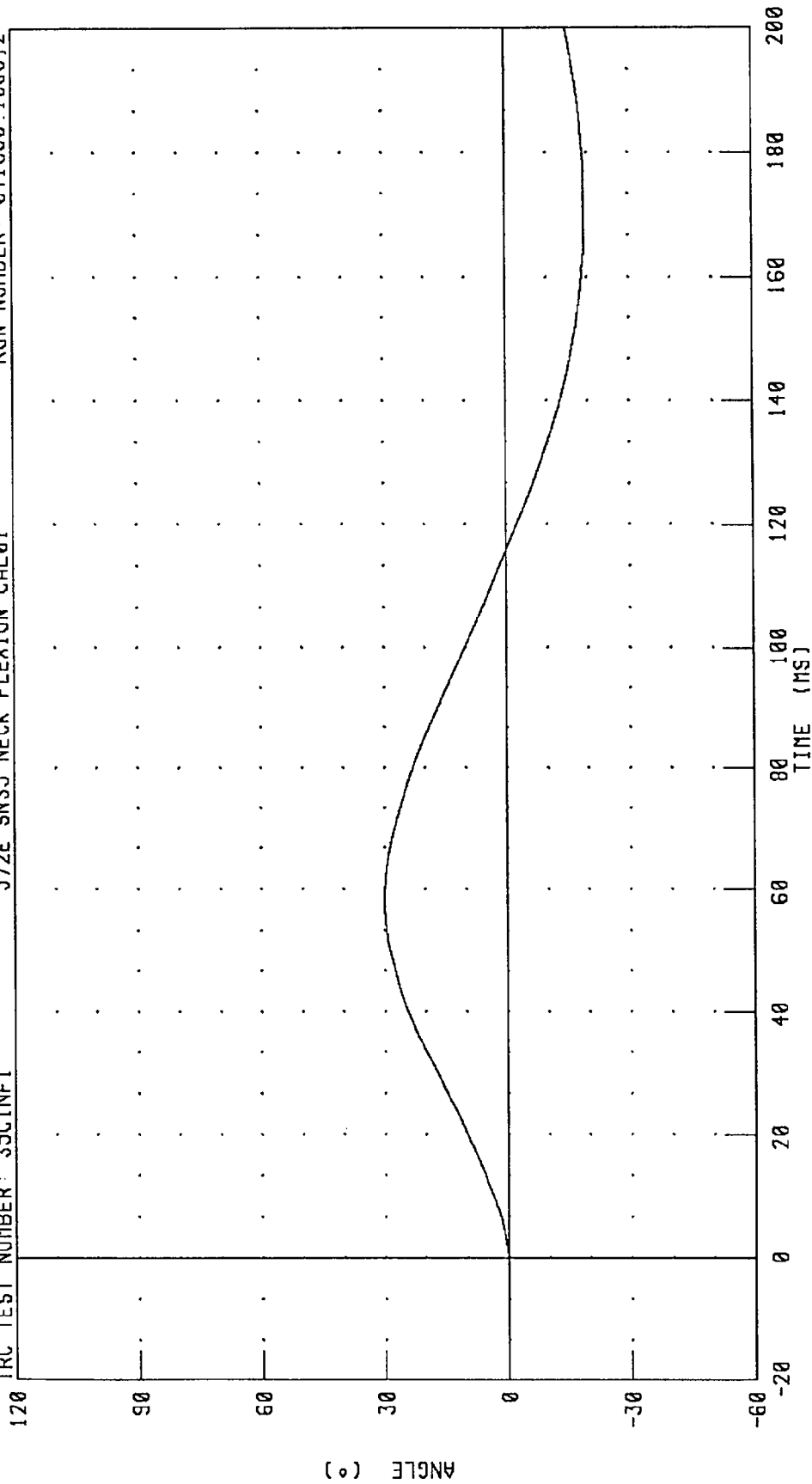
PEAK DATA: 23.78 G @ 8.64 MS; -1.97 G @ 43.76 MS

CHANNEL: PENXC FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK FLEXION CALIBRATION  
 ROTATION ABOUT BASE OF NECK  
 572E SN35 NECK FLEXION CAL01

TRC TEST NUMBER: 35CINF1

RUN NUMBER: 041896.1035;2



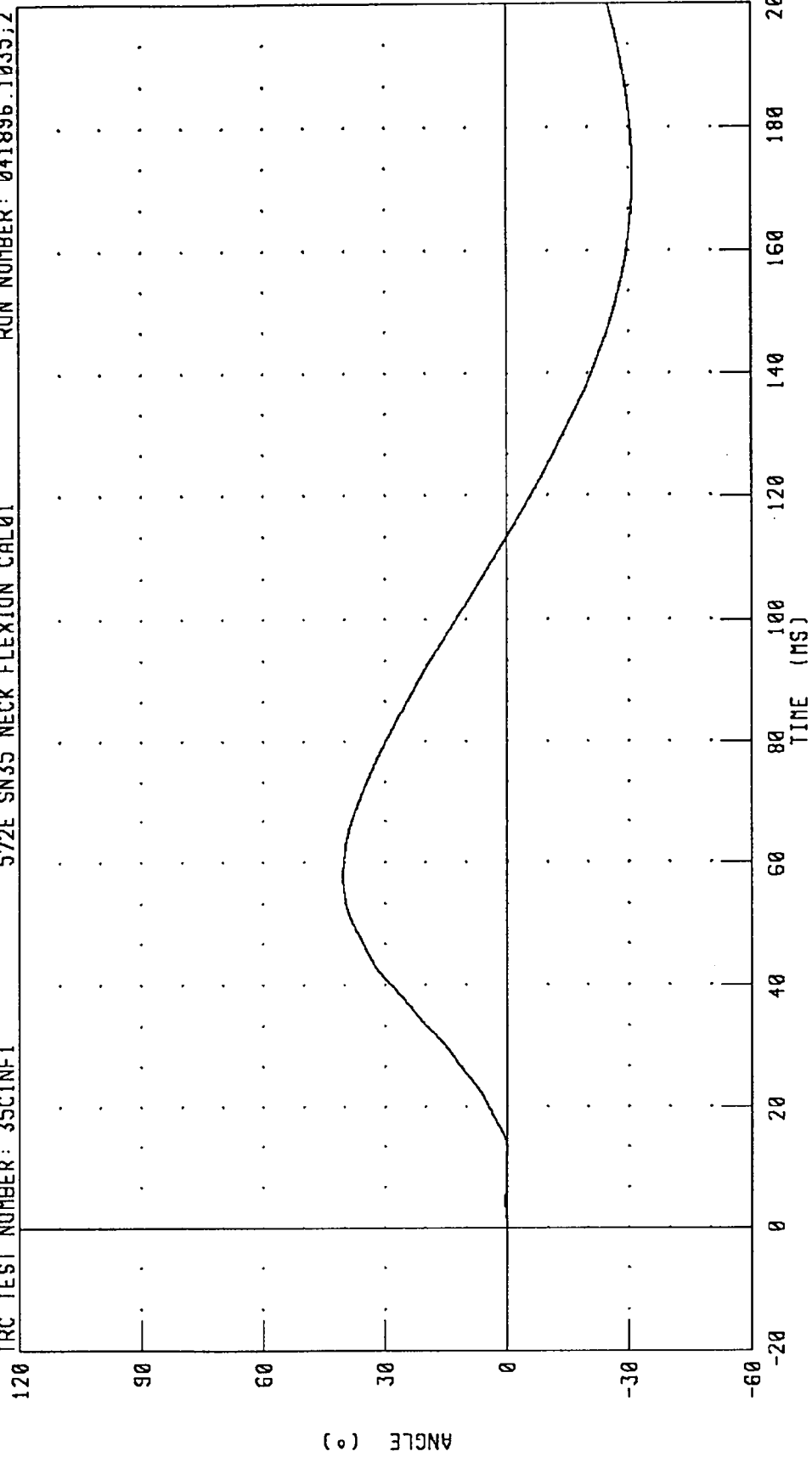
CHANNEL: BETA FILTER: CH. CLASS 60  
 PEAK DATA: 30.01 ° @ 58.24 MS; -19.33 ° @ 167.52 MS

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

TRC TEST NUMBER: 35CINF1

572E SN35 NECK FLEXION CAL01

RUN NUMBER: 041896.1035;2



CHANNEL: THETA FILTER: CH. CLASS 60 PEAK DATA: 40.37 ° @ 57.76 MS; -30.85 ° @ 169.84 MS

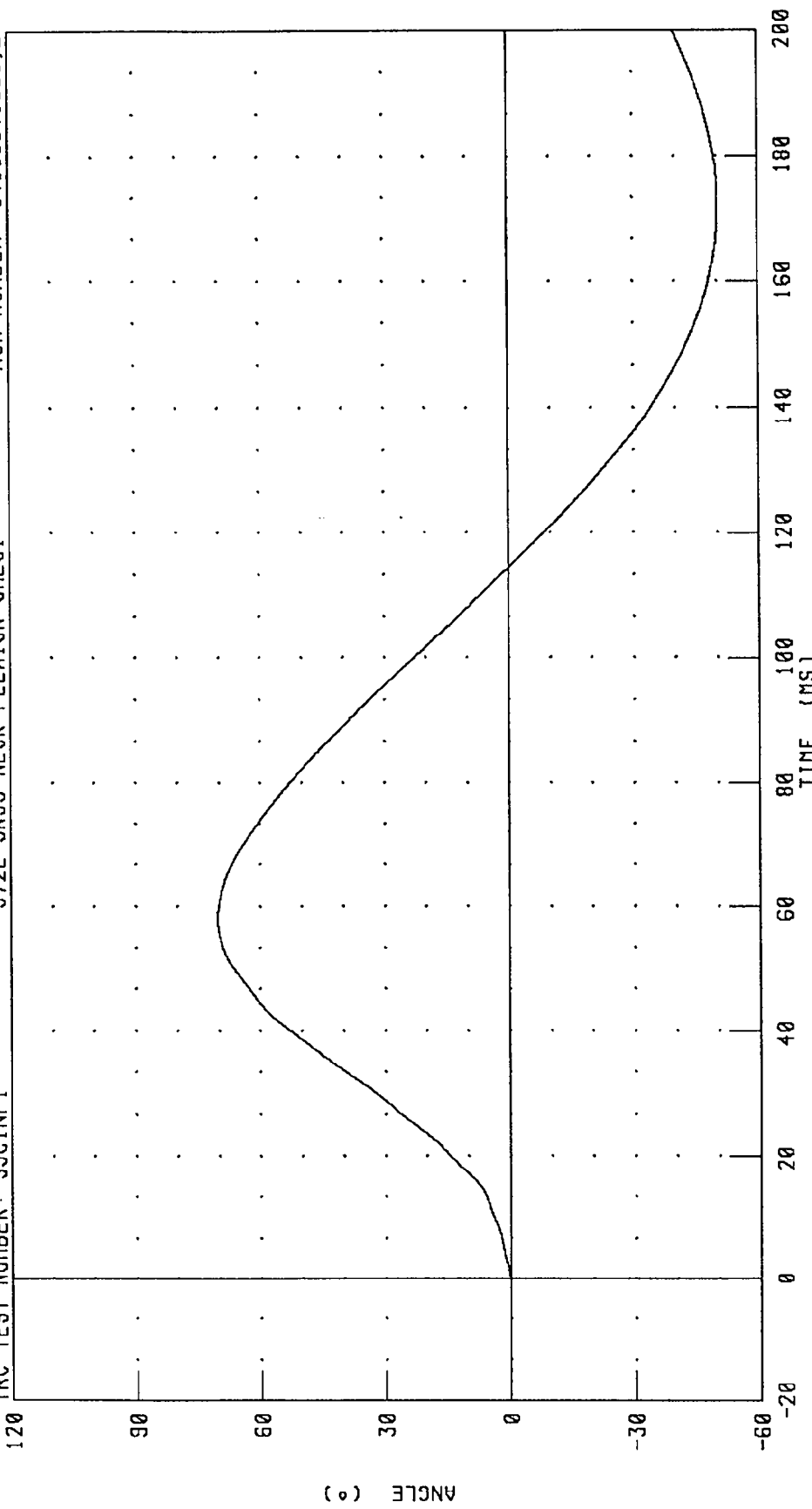
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 35CINF1

572E SN35 NECK FLEXION CAL01

RUN NUMBER: 041896.1035;2



CHANNEL: TOTAN FILTER: CH. CLASS 60 PEAK DATA: 70.38 @ 58.00 MS; -50.17 @ 169.52 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION  
NECK FORCE X AXIS

TRC TEST NUMBER: 35CINF1

572E SN35 NECK FLEXION CAL01

RUN NUMBER: 041896.1035;2

160

120

80

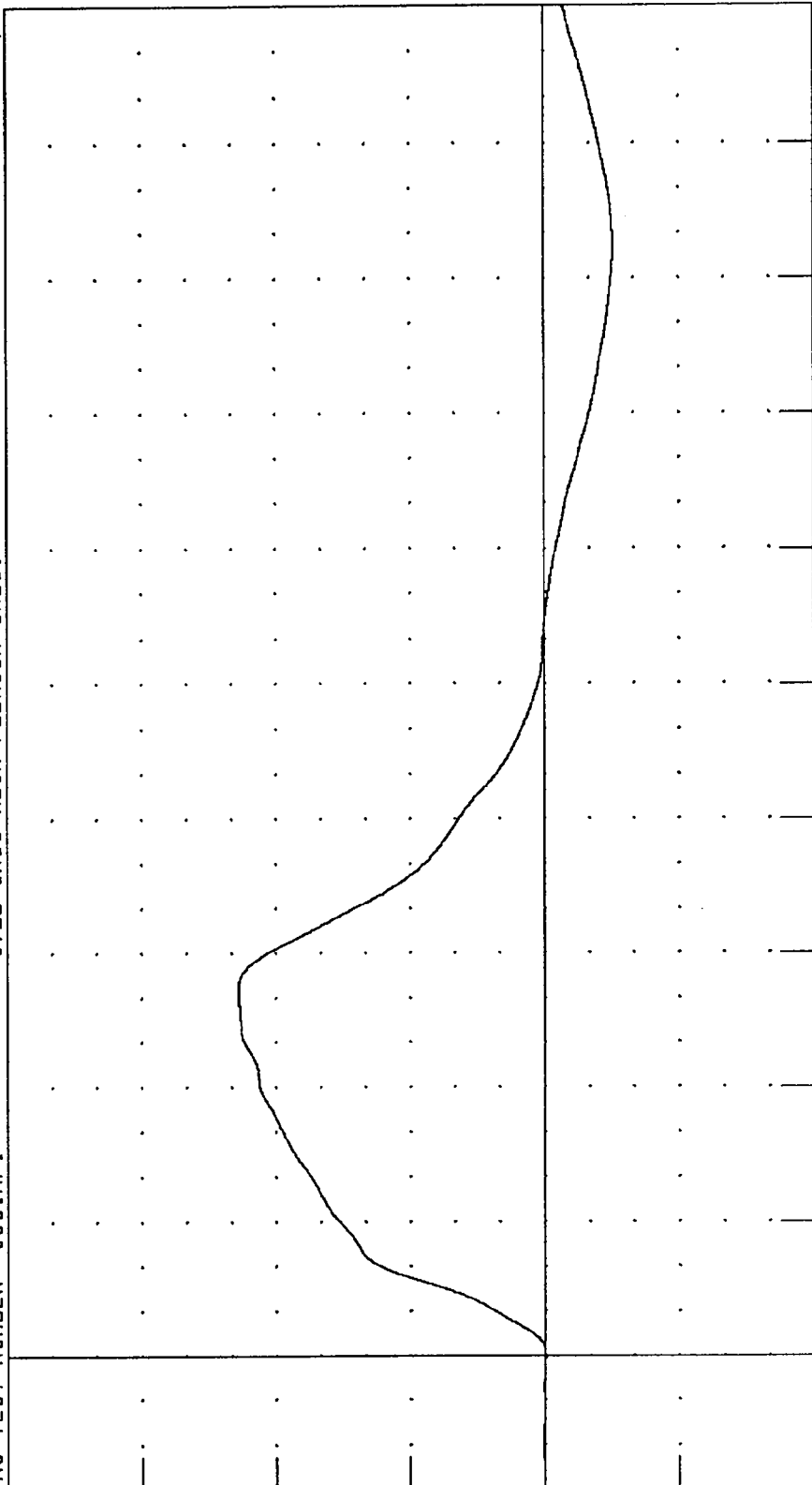
40

0

-40

-80

FORCE (N X 10<sup>1</sup>)



200  
180  
160  
140  
120  
100  
80  
TIME (MS)

PEAK DATA: 912.76 N @ 54.56 MS; -205.59 N @ 164.80 MS

CHANNEL: NEKXF FILTER: CH. CLASS 60

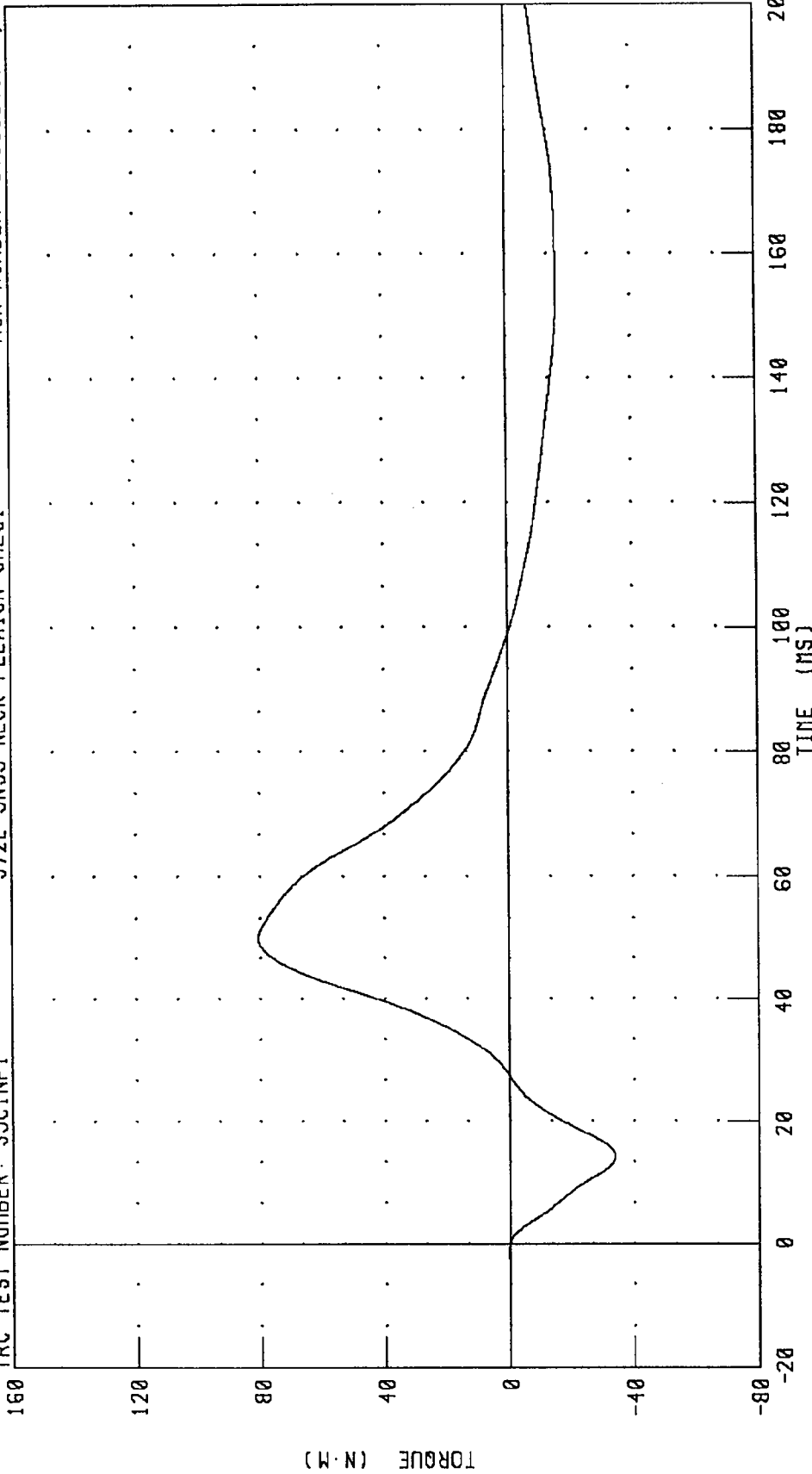
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 35CINF1

572E SN35 NECK FLEXION CAL01

RUN NUMBER: 041896.1035;2



CHANNEL: NEKYM FILTER: CH. CLASS 60

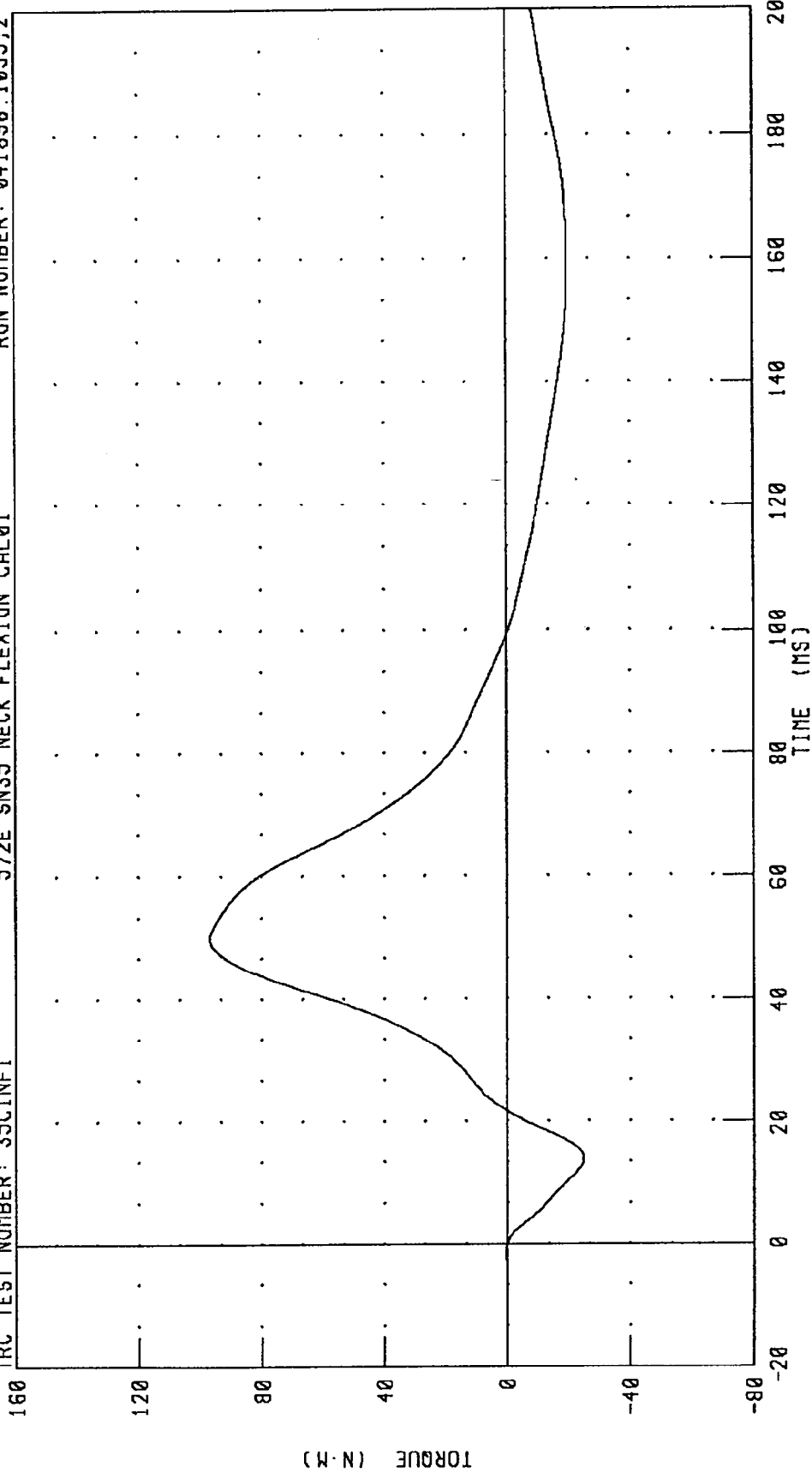
PEAK DATA: 80.78 N·M @ 50.00 MS; -33.90 N·M @ 14.24 MS

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

TRC TEST NUMBER: 35CINFI

572E SN35 NECK FLEXION CAL01

RUN NUMBER: 041896.1035J2



PEAK DATA: 96.89 N·M @ 50.00 MS; -24.77 N·M @ 13.84 MS

CHANNEL: NEKOM FILTER: CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

HYBRID III

11-JUL-95

TRC INC. TEST NO: 35C1NE1 572E SN35 NECK EXT. CAL01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6 - 22.2 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	63.0 %
IMPACT VELOCITY	5.95 - 6.19 M/S	6.00 M/S
PENDULUM DECELERATION	10 MS   17.20 - 21.20 G	17.48 G
	20 MS   14.00 - 19.00 G	15.59 G
	30 MS   11.00 - 16.00 G	14.31 G
MAX PENDULUM G	22 G MAX	18.20 G
MAX PENDULUM G ABOVE 30 MS	22 G MAX	14.27 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G	38 - 46 MS	39.04 MS
D PLANE	MAX   81 - 106 DEG.	96.12 DEG.
ROTATION	TIME   72 - 82 MS	74.08 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN   -80.0/-52.9 NM	-65.59 NM
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO	TIME   65 - 79 MS	69.76 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO	147 - 174 MS	156.00 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO	120 - 148 MS	134.80 MS

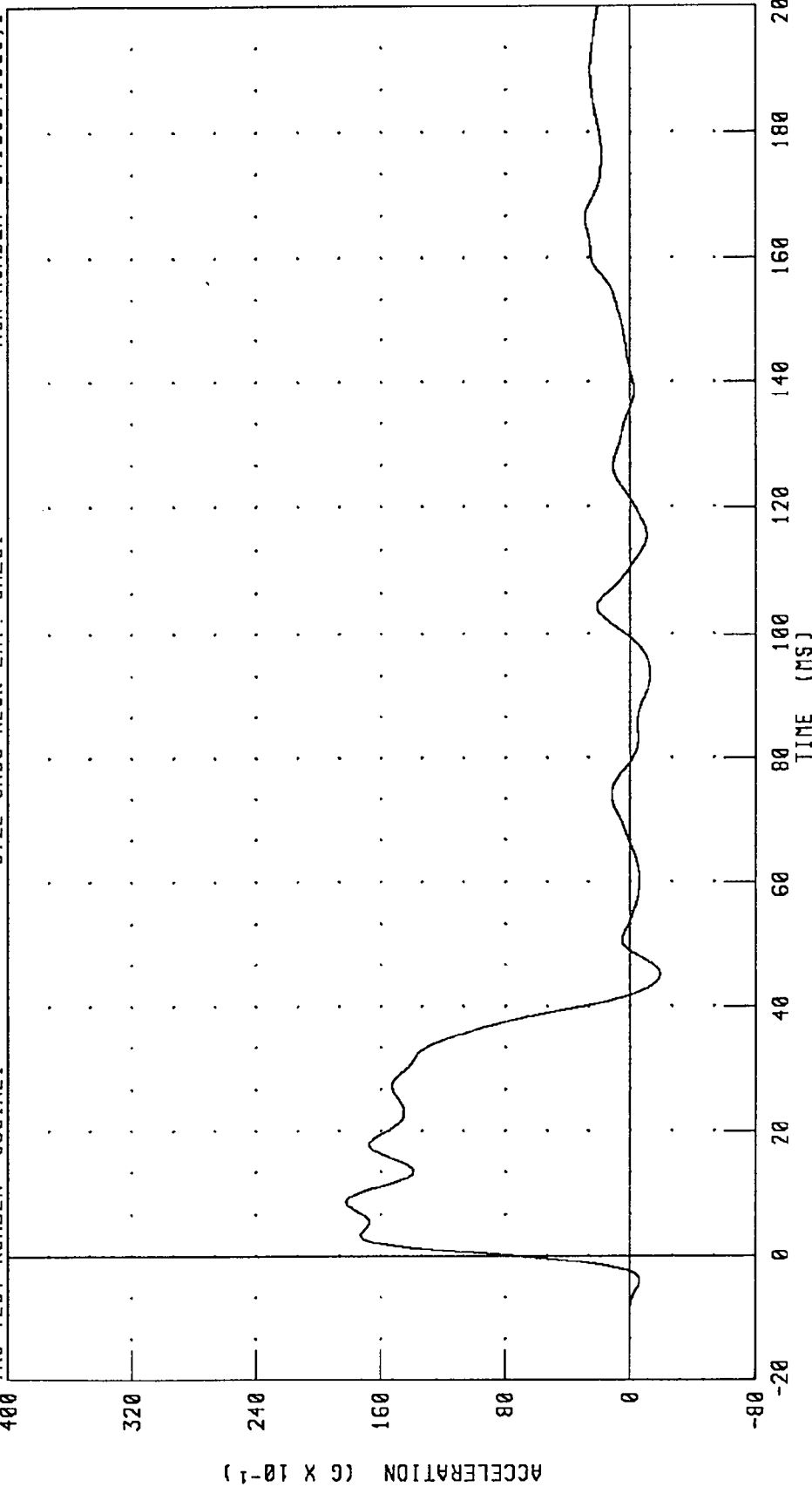
TEST MEETS SPECIFICATIONS

TECHNICIAN Richard Le Van

RUN NUMBER: 071195.0855;1

PART 572-E HYBRID III NECK EXTENSION CALIBRATION  
PENDULUM DECELERATION

TRC TEST NUMBER: 35C1NE1      572E SN35 NECK EXT. CAL01      RUN NUMBER: 041896.1035;1



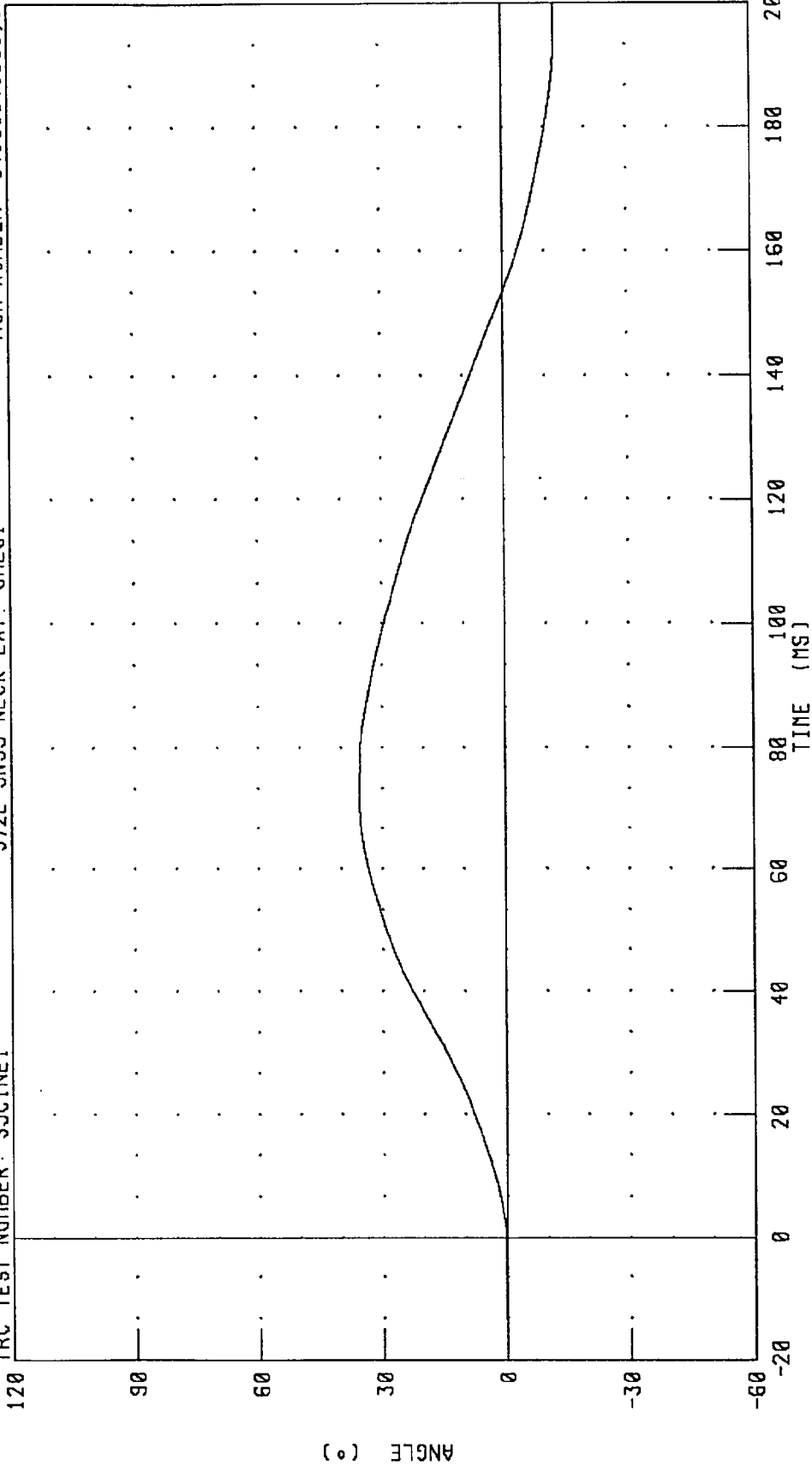
CHANNEL: PENXC      FILTER: CH. CLASS 60      PEAK DATA: 18.21 G @ 8.64 MS; -1.91 G @ 45.20 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION  
ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 35C1NE1

572E SN35 NECK EXT. CAL01

RUN NUMBER: 041896.1035,1

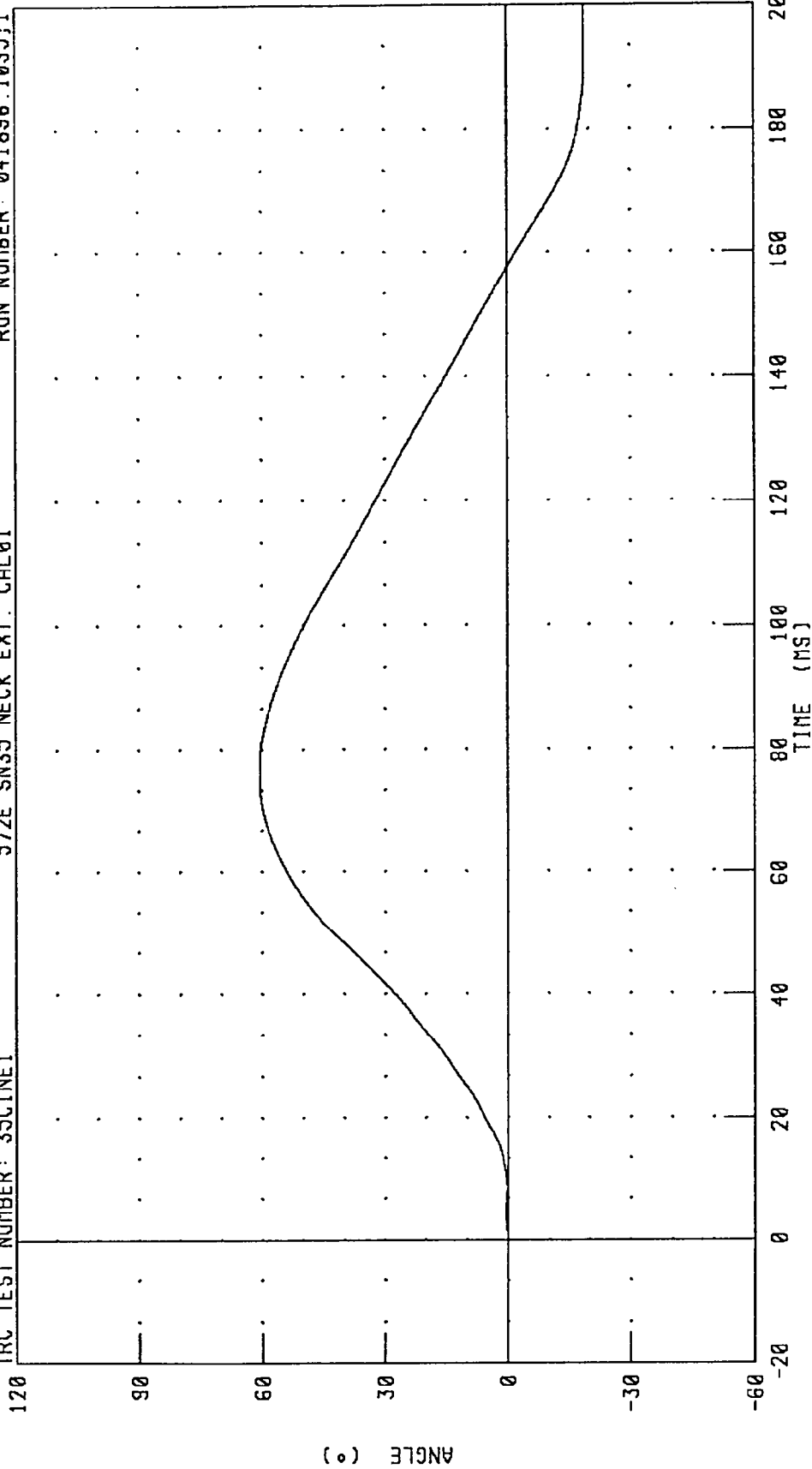


PEAK DATA: 35.65 ° @ 72.64 MS; -12.75 ° @ 197.84 MS

CHANNEL: BETA FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 35CINE1      572E SN35 NECK EXT. CAL01      RUN NUMBER: 041896.1035;1



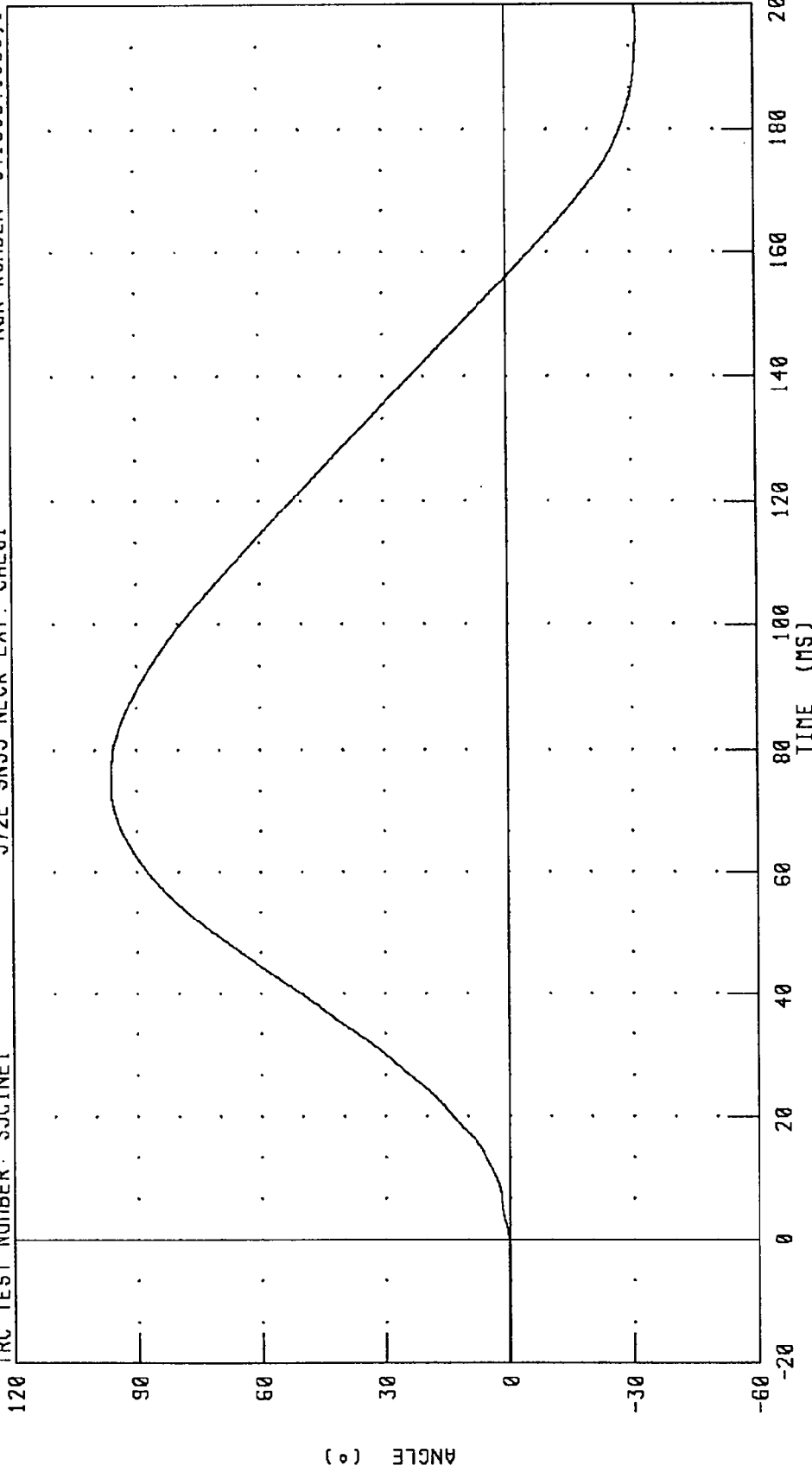
CHANNEL: THETA      FILTER: CH. CLASS 60      PEAK DATA: 60.59 ° @ 76.32 MS; -18.87 ° @ 194.56 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION  
TOTAL ROTATION

TRC TEST NUMBER: 35CINE1

572E SN35 NECK EXT. CAL01

RUN NUMBER: 041896.1035;1

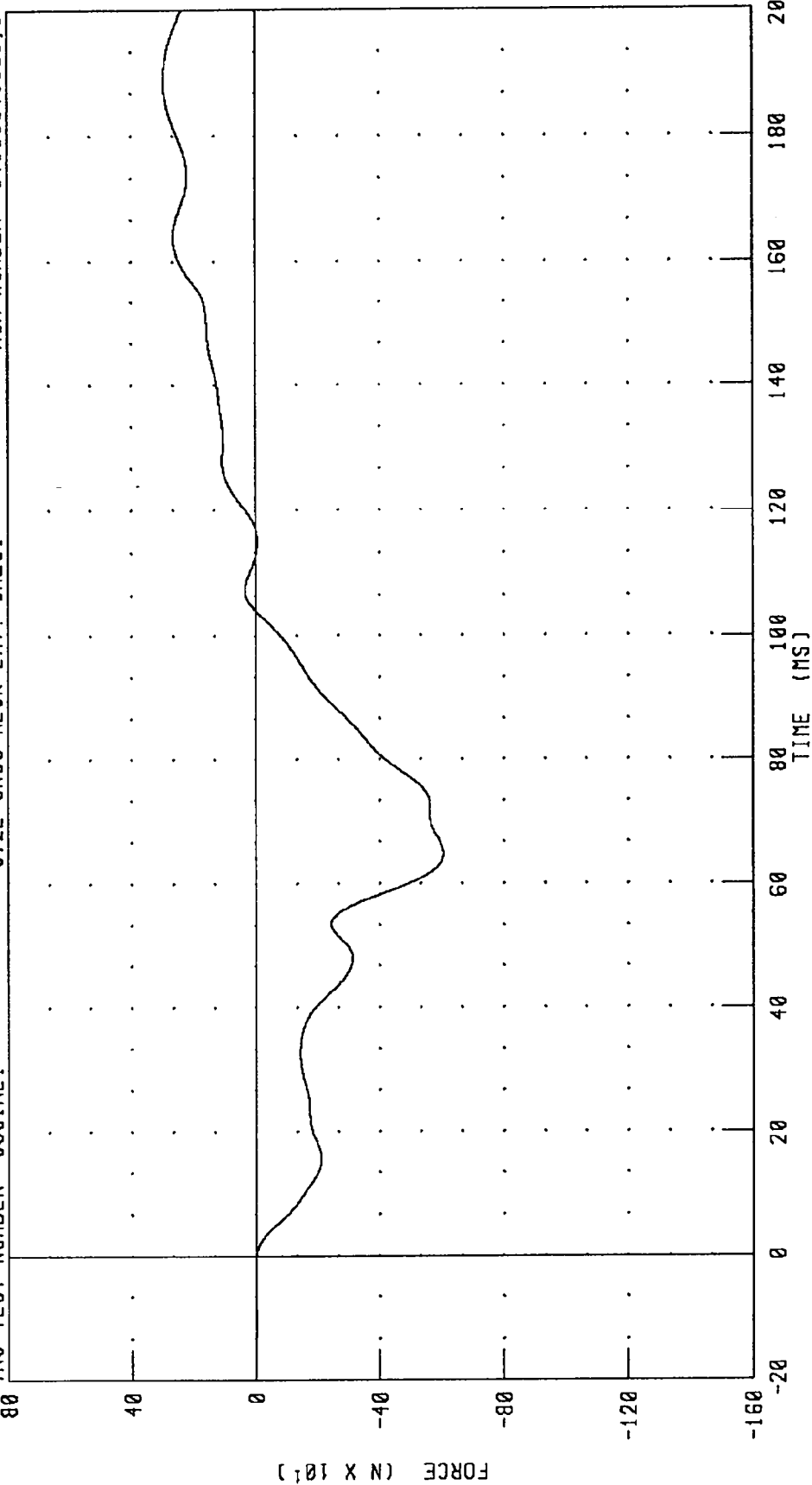


CHANNEL: TOTAL FILTER: CH. CLASS 60

PEAK DATA: 96.13 ° @ 74.08 MS; -31.61 ° @ 195.20 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION  
NECK FORCE X AXIS

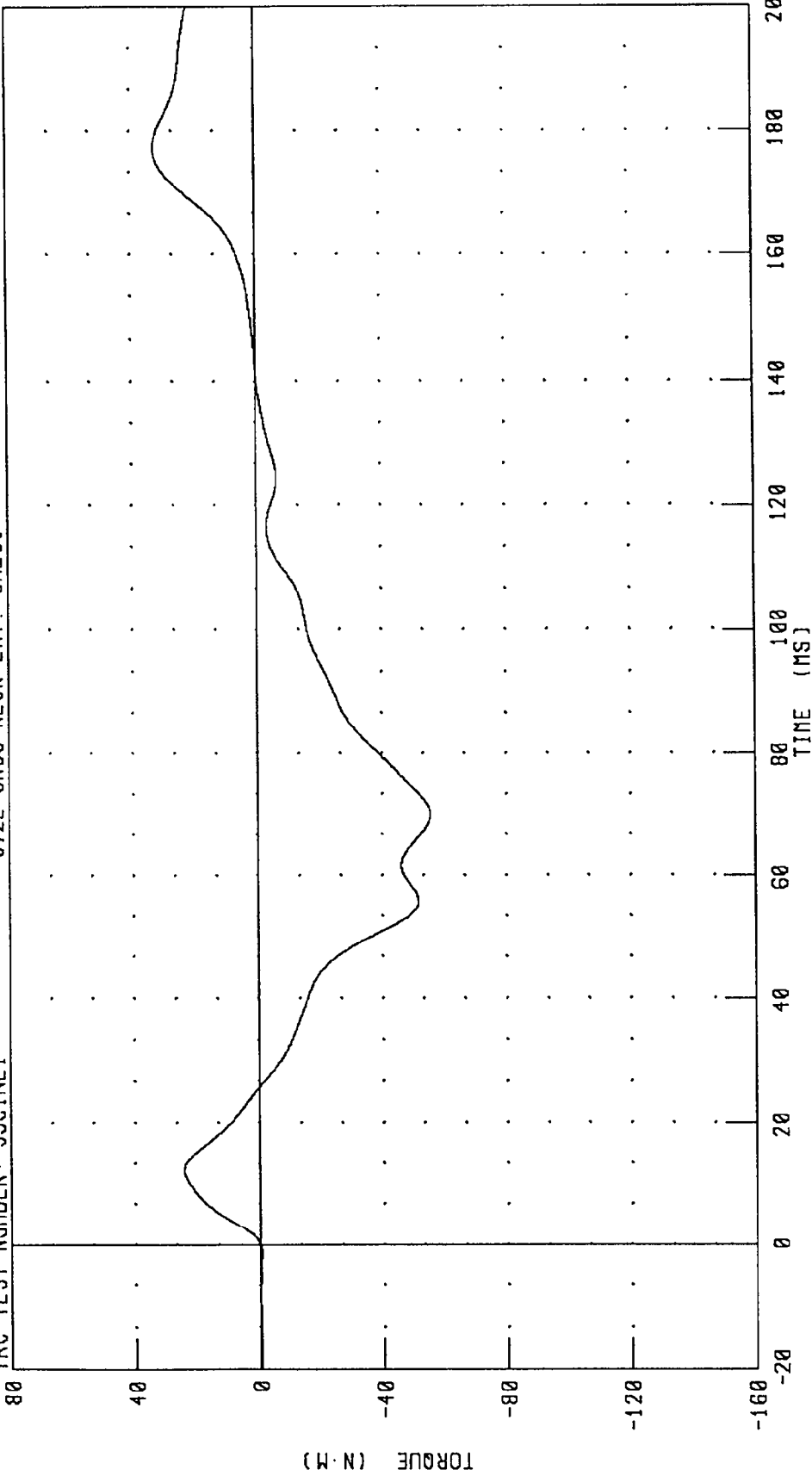
TRC TEST NUMBER: 35CINE1      572E SN35 NECK EXT. CAL01      RUN NUMBER: 041896.1035;1



CHANNEL: NEKXF      FILTER: CH. CLASS 60      PEAK DATA: 294.85 N @ 188.88 MS; -605.24 N @ 64.72 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION  
NECK MOMENT Y AXIS

TRC TEST NUMBER: 35CINE1      572E SN35 NECK EXT. CAL01      RUN NUMBER: 041896.1035;1

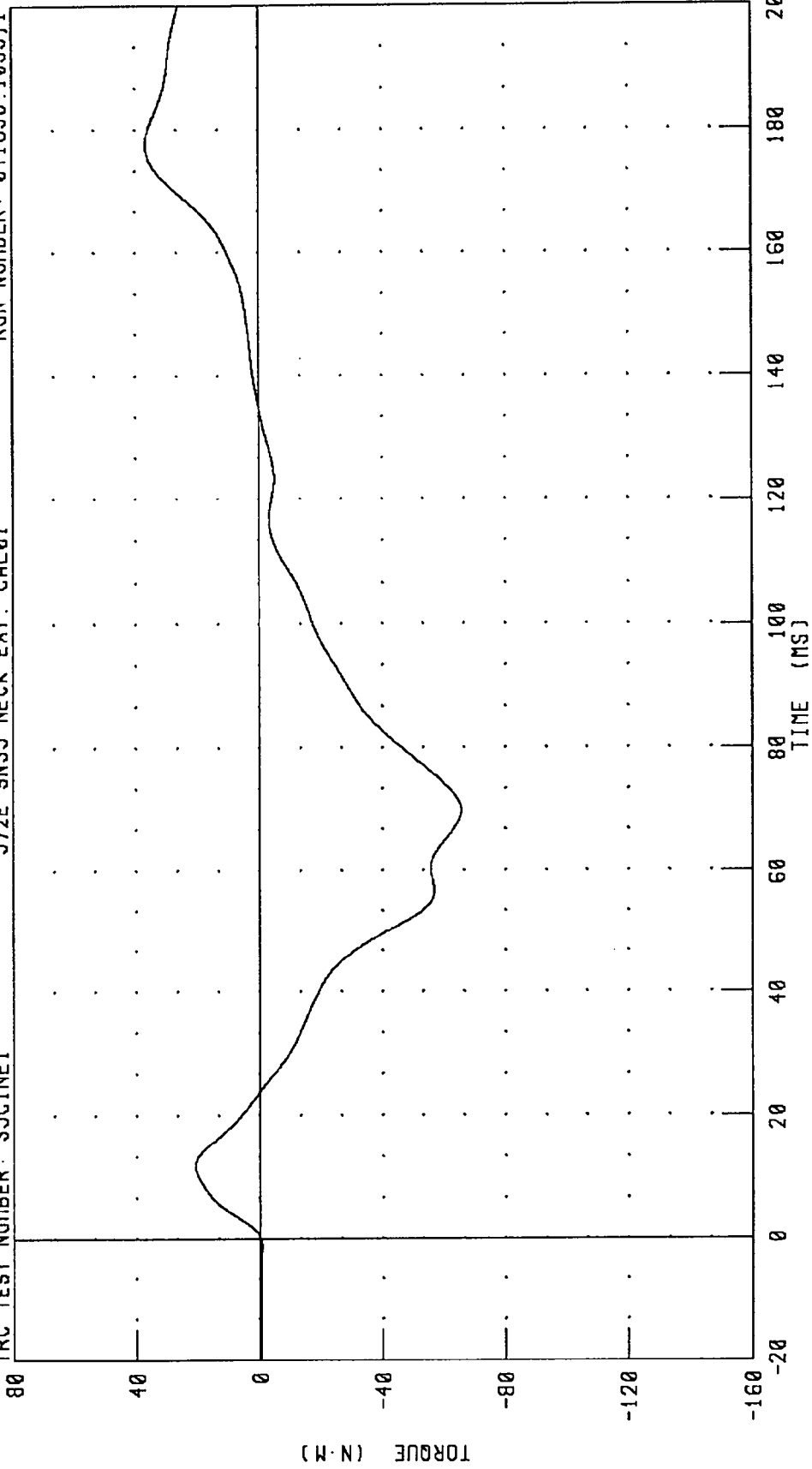


PEAK DATA: 32.44 N·M @ 177.28 MS; -55.54 N·M @ 69.92 MS

CHANNEL: NEKYH      FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 35CINE1      572E SN35 NECK EXT. CAL01      RUN NUMBER: 041896.1035J1



CHANNEL: NEKOM      FILTER: CH. CLASS 60      PEAK DATA: 36.57 N.M @ 177.68 MS; -65.59 N.M @ 69.76 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III

11-JUL-95

TRC INC.

TEST NO: 35C1TH1

572E SN35 H.S.THORAX CAL01

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.4 DEG. C
RELATIVE HUMIDITY	10 - 70 %	63.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.62 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	66.7 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5608. N
INTERNAL HYSTERESIS	69% - 85%	73.6%

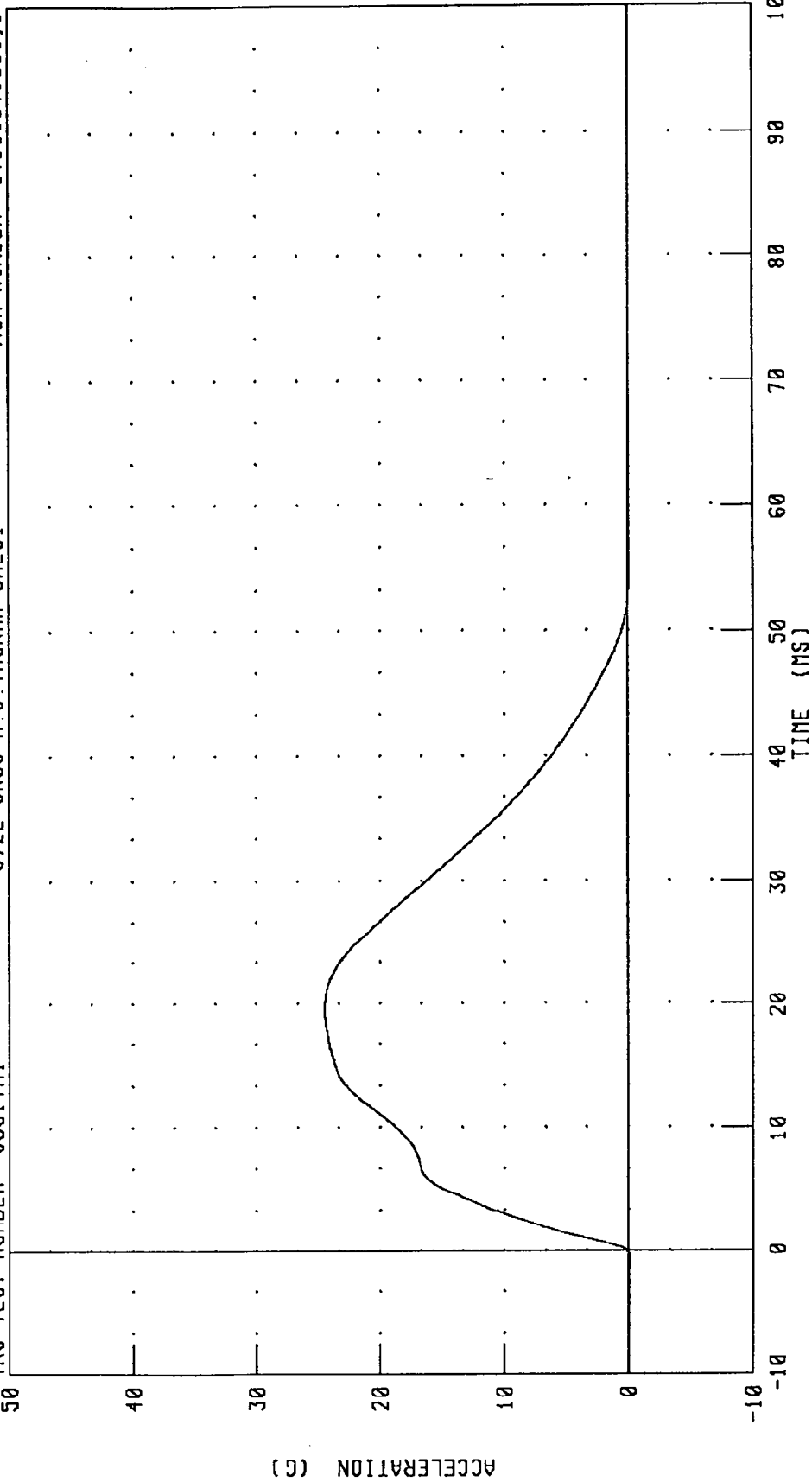
TEST MEETS SPECIFICATIONS

TECHNICIAN Richard L. Van

RUN NUMBER: 071195.1433;1

PART 572-E HYBRID III THORAX CALIBRATION  
PENDULUM DECELERATION

TRC TEST NUMBER: 35C1TH1      572E SN35 H.S.THORAX CAL01      RUN NUMBER: 041896.1035;1



CHANNEL: PENXG      FILTER: CH. CLASS 180

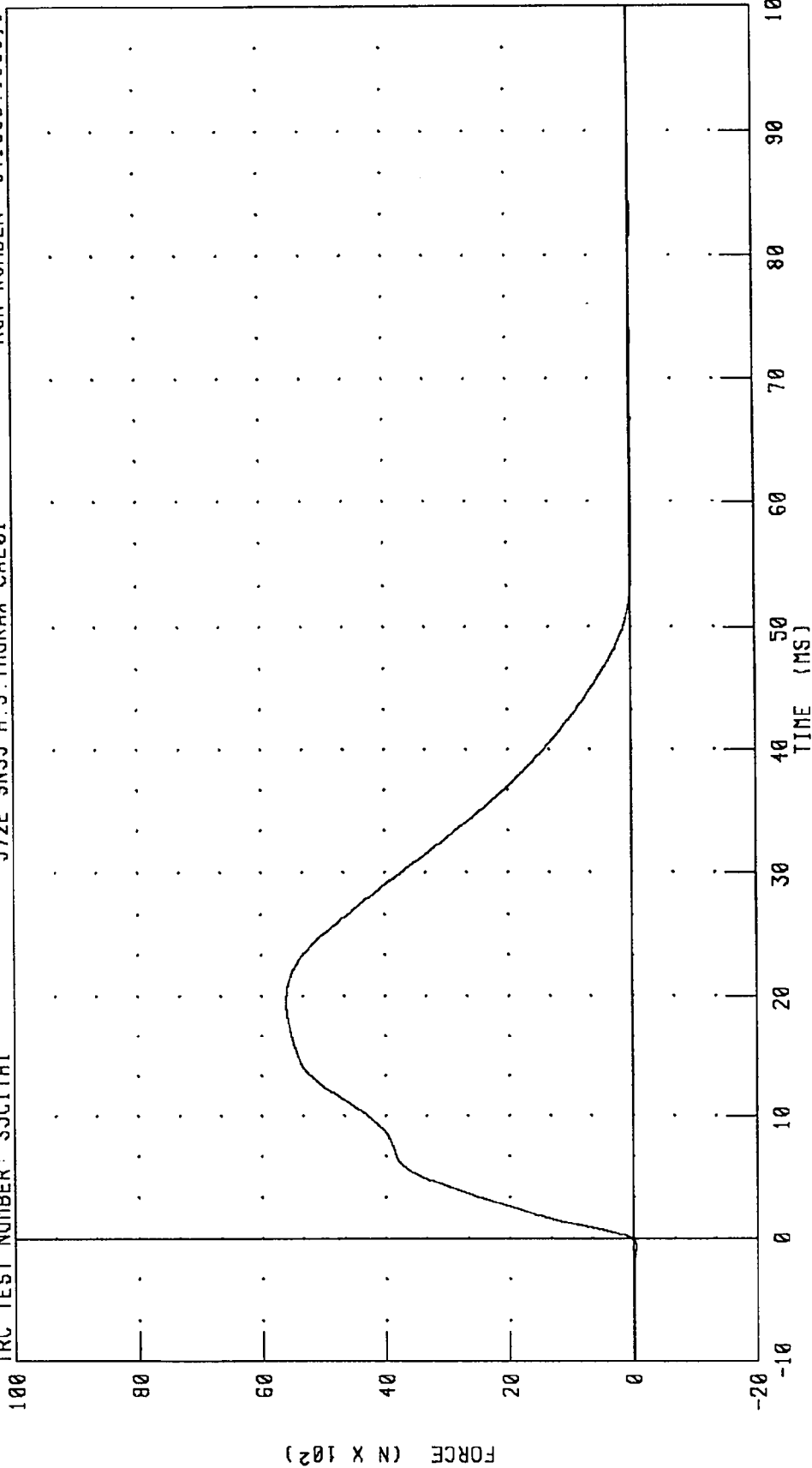
PEAK DATA: 24.48 G @ 19.52 MS; -0.19 G @ -0.64 MS

PART 572-E HYBRID III THORAX CALIBRATION  
PENDULUM FORCE

TRC TEST NUMBER: 35C1TH1

572E SN35 H. S. THORAX CAL01

RUN NUMBER: 041896.1035.1



CHANNEL: PENXF FILTER: CH. CLASS 180

PEAK DATA: 5608.25 N @ 19.52 MS; -42.97 N @ -0.64 MS

PART 572-E HYBRID III THORAX CALIBRATION  
STERNUM DISPLACEMENT

TRC TEST NUMBER: 35C1TH1

572E SN35 H.S. THORAX CAL01

RUN NUMBER: 041896.1035;1

150

120

90

60

30

0

-30

-10

0

10

20

30

40

50

60

70

80

90

100

100

DISPLACEMENT (MM)

TIME (MS)

PEAK DATA: 66.71 MM @ 24.64 MS; -0.05 MM @ 0.96 MS

CHANNEL: CSTXD FILTER: CH. CLASS 180

960322

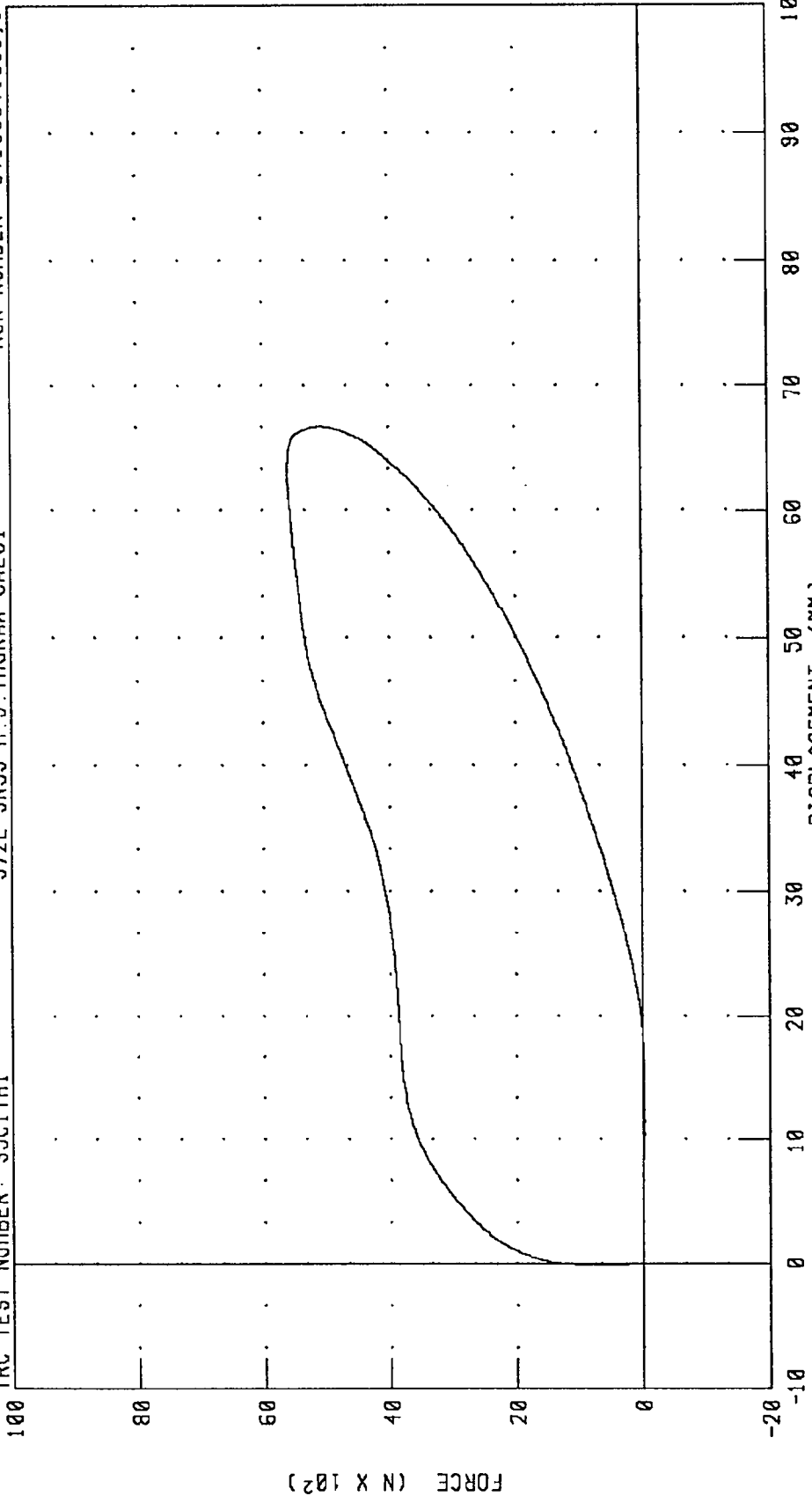
C-62

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

TRC TEST NUMBER: 35C1TH1

572E SN35 H.S. THORAX CAL01

RUN NUMBER: 041896.1035.1



CHANNEL: CSTXD FILTER: CH. CLASS 180  
PENXF CH. CLASS 180  
PEAK DATA: 66.71 MM @ 24.64 MS; -0.05 MM @ 0.96 MS  
5608.25 N @ 19.52 MS; -42.97 N @ -0.64 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III

11-JUL-95

TRC INC.

TEST NO: 35C1RK1

572E SN35 RIGHT KNEE CAL 01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	63.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.10 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	4893.6 N

TEST MEETS SPECIFICATIONS

TECHNICIAN

*Richard L. Van*

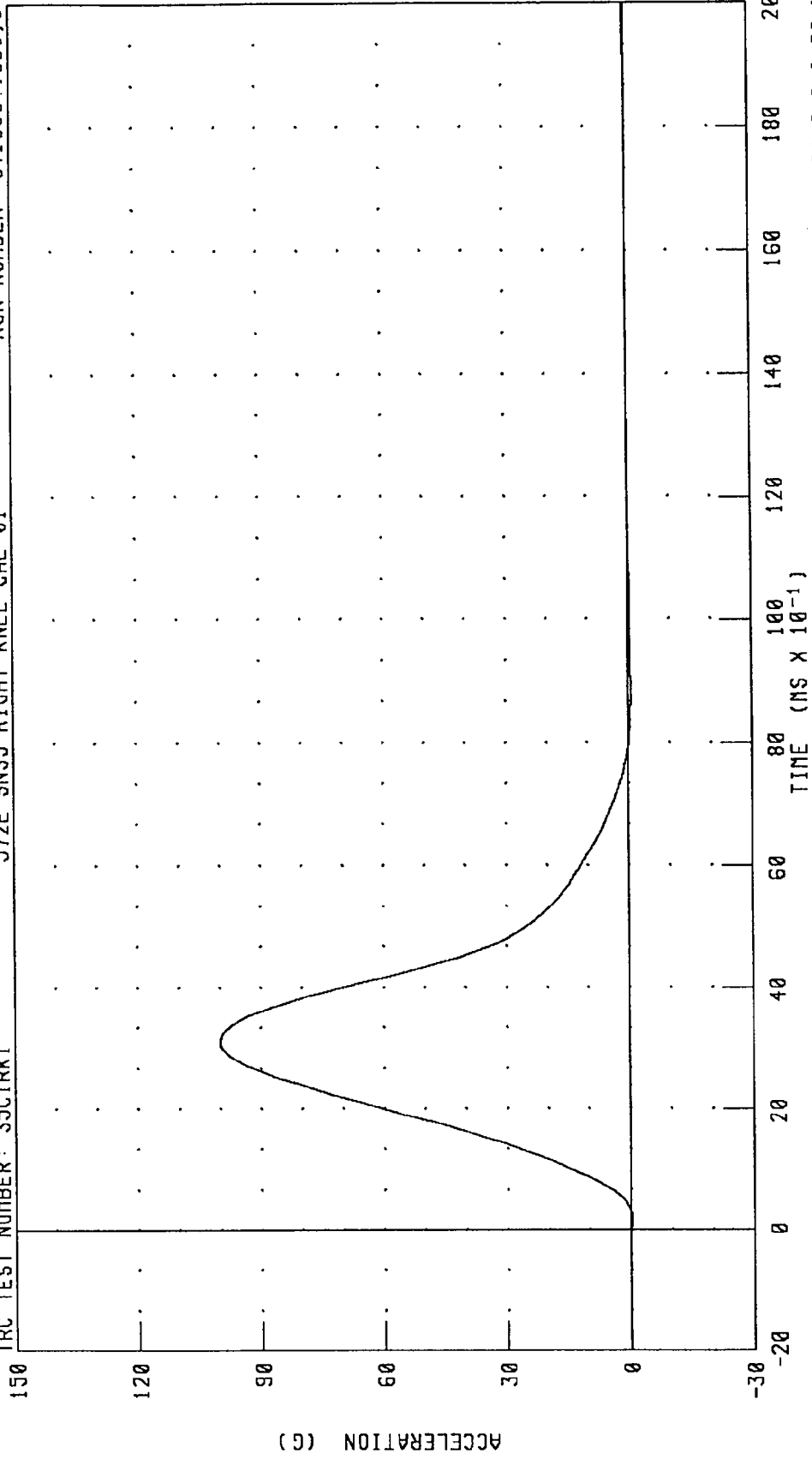
RUN NUMBER: 071195.1336;3

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

TRC TEST NUMBER: 35CIRK1

572E SN35 RIGHT KNEE CAL 01

RUN NUMBER: 041896.1035,3

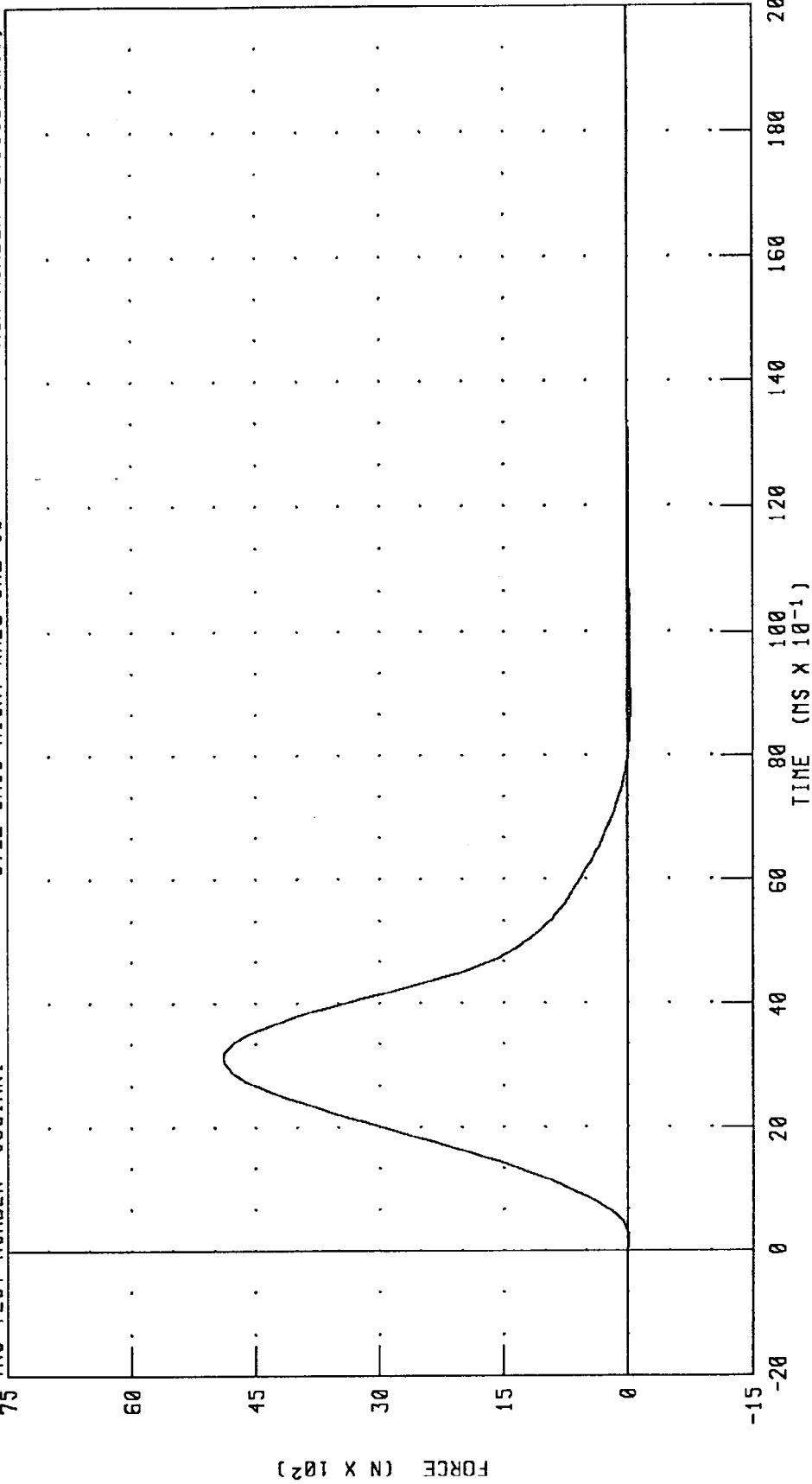


CHANNEL: PENXG FILTER: CH. CLASS 600

PEAK DATA: 100.02 G @ 3.12 MS; -0.64 G @ 8.88 MS

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

TRC TEST NUMBER: 35CIRKI 572E SN35 RIGHT KNEE GAL 01 RUN NUMBER: 041896.1035;3



CHANNEL: PENXF FILTER: CH. CLASS 600 PEAK DATA: 4893.61 N @ 3.12 MS; -31.34 N @ 8.88 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III

11-JUL-95

TRC INC.

TEST NO: 35C1LK1

572E SN35 LEFT KNEE CAL 01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	63.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	4747.9 N

TEST MEETS SPECIFICATIONS

TECHNICIAN

*Richard LeVan*

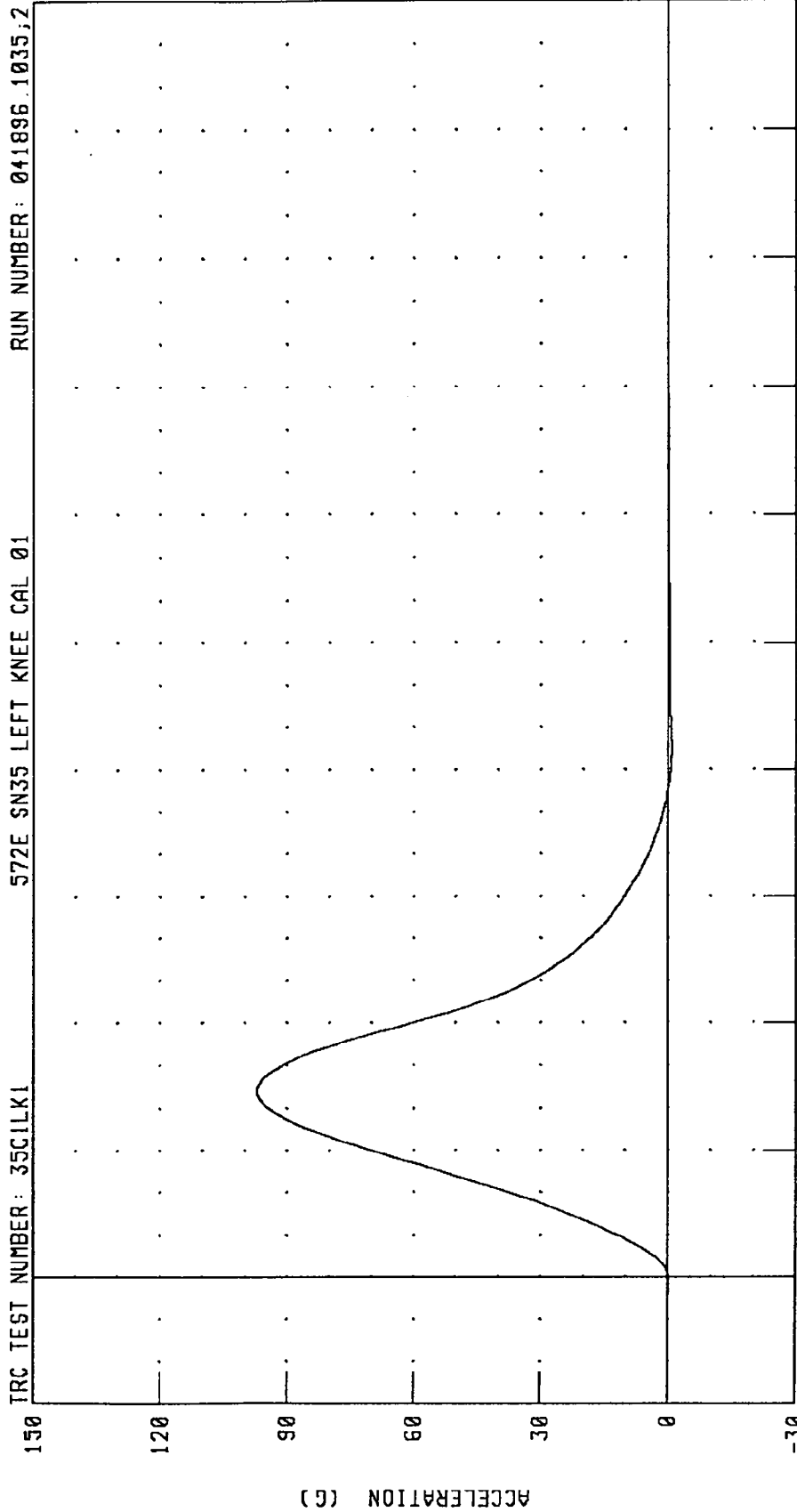
RUN NUMBER: 071195.1251;2

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

IRC TEST NUMBER: 35C1LKI

572E SN35 LEFT KNEE CAL 01

RUN NUMBER: 041896.1035.2



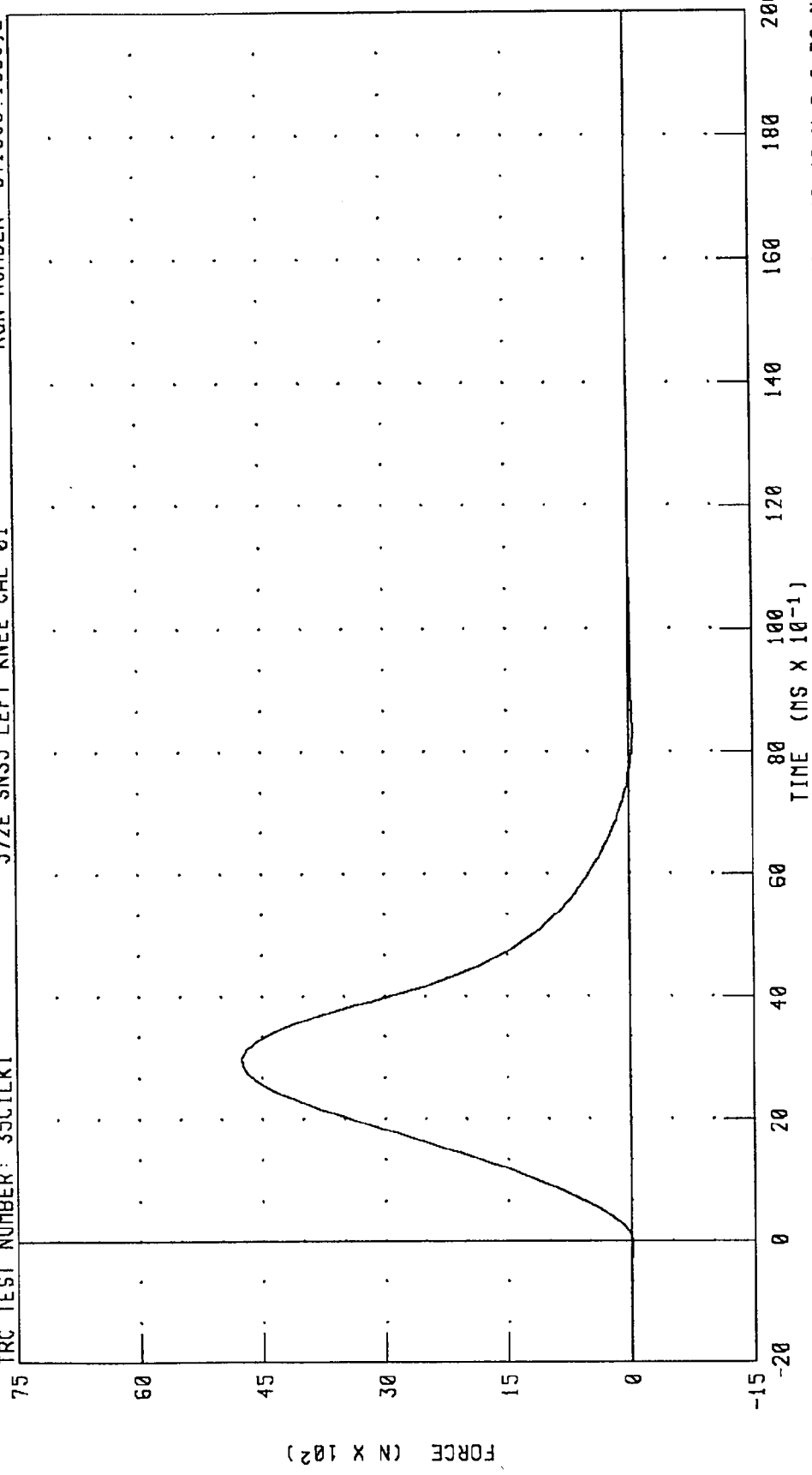
CHANNEL: PENXC FILTER: CH. CLASS 600

PEAK DATA: 97.04 G @ 2.96 MS; -0.87 G @ 8.32 MS

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

TRC TEST NUMBER: 35C1LKI      RUN NUMBER: 041896.1035;2

572E SN35 LEFT KNEE CAL 01



CHANNEL: PENXF      FILTER: CH. CLASS 600      PEAK DATA: 4747.92 N @ 2.96 MS; -42.49 N @ 8.32 MS

Appendix D

Miscellaneous Test Information

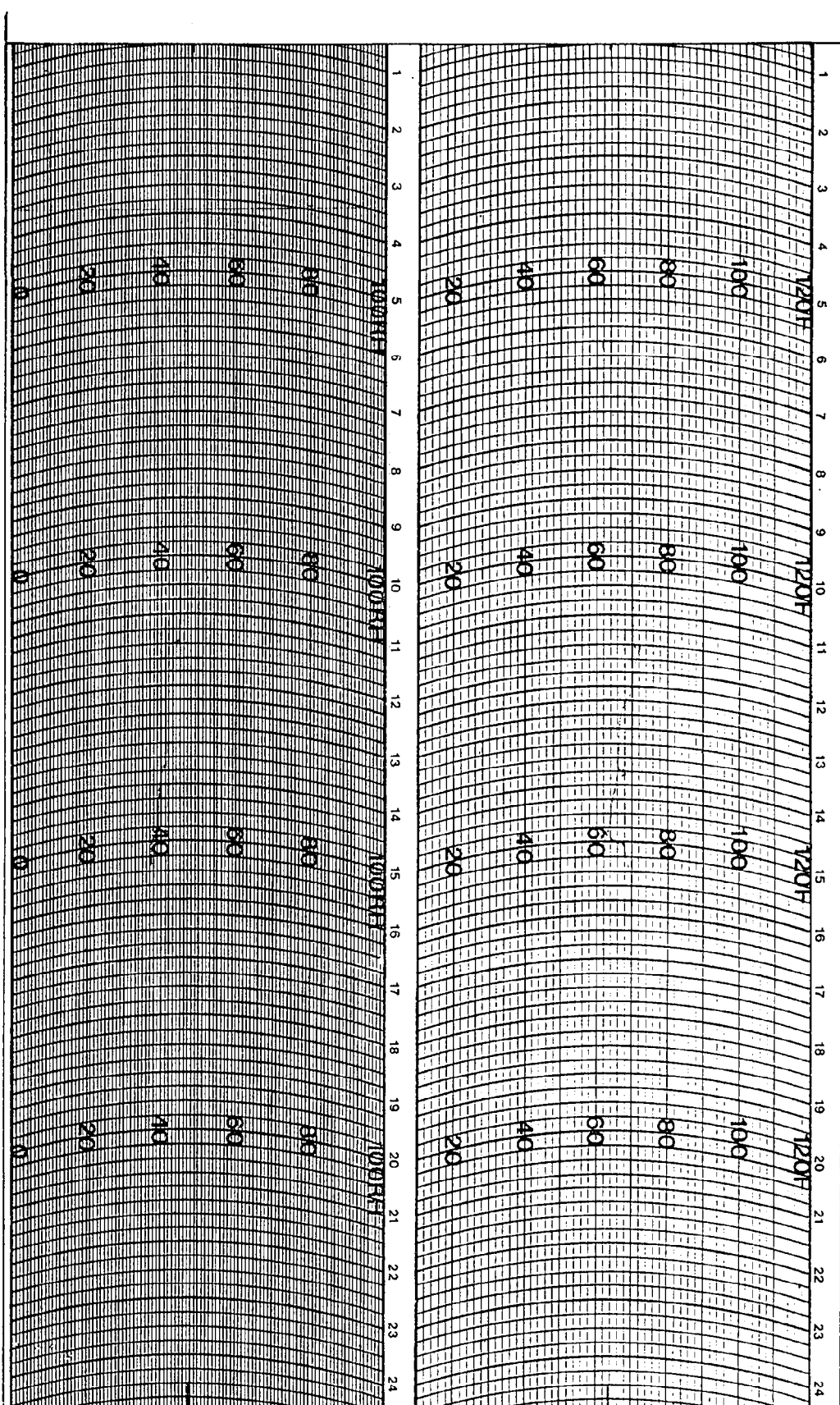
Sign Convention  
NHTSA Data Tape Reference Guide

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

Frequency Response Classes  
SAE J211 OCT88

<u>Typical Test Measurements</u>	<u>Channel Class</u>
<b>Vehicle Structural Accelerations for use in:</b>	
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
<b>Anthropomorphic Test Device</b>	
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

GHART # C31T D MF  
 PART # 699123

960322

STATION \_\_\_\_\_ DATE ON \_\_\_\_\_ DATE OFF \_\_\_\_\_