V2439

Report Numbers: TRC-95-V008

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

Deformable Impactor into Rear of
1996 Dodge Neon
at 80 kph with 70% Right Side Overlap
TRC Test Number: 960417

Prepared by:
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10820 State Route 347
East Liberty, OH 43319

May 15, 1996
Final Report

Prepared for:
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16. Abstract

An 80 kph deformable impactor rear crash test with 70% right side overlap was conducted on a 1996 Dodge Neon at Transportation Research Center Inc. on April 17, 1996. This test was conducted to determine vehicle and occupant response in the rear 70% right side overlap test mode. The test vehicle's weight was 1360 kg. The impactor's velocity was 82.1 kph. The impactor's weight was 1344 kg. The vehicle's maximum crush was 1067 millimeters. The ambient temperature was 9° C.

The driver's Head Injury Criteria (HIC) was 739. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 22.2 g. The driver's chest maximum deflection was 2 mm. The driver's left and right femur maximum axial forces were 668 N and 554 N, respectively.

The passenger's HIC was 1423. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 43.0 g. The passenger's chest maximum deflection was 1 mm. The passenger's left and right femur maximum axial forces were 784 N and 546 N, respectively.

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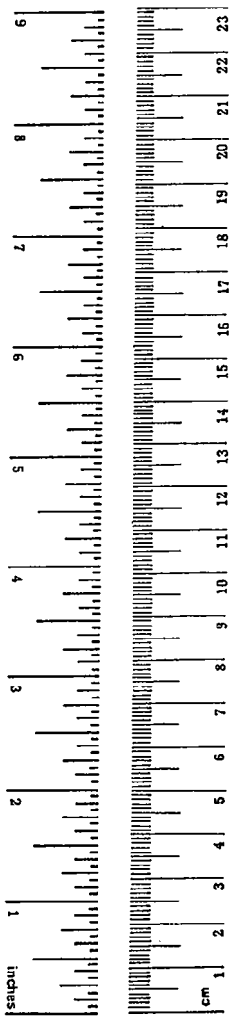
METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

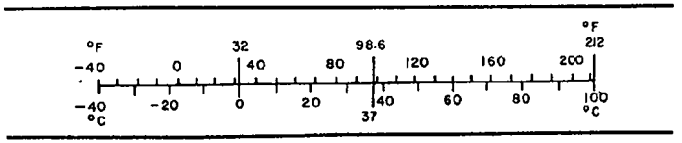
Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2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

*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures. Price $2.25. SD Catalog No. C13.10:286.



Approximate Conversions from Metric Measures

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



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Section 1.0

Purpose and Test Procedure

Purpose

This crash test was conducted to determine vehicle and occupant response in the 80 kph rear impact with 70% right side overlap test mode. The test was performed on a 1996 Dodge Neon 4-door sedan.

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. Each dummy was restrained by a three-point unibelt.

The deformable impactor was instrumented with five (5) force load cells to measure longitudinal axis forces on the barrier face. The deformable barrier face was positioned 229 mm from ground level.

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. The driver dummy's lap and shoulder belt were each instrumented with a load cell.

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 TP-208-09.

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% right side overlap was conducted at TRC on April 7, 1996.

The test vehicle, a 1996 Dodge Neon 4-door sedan, was equipped with airbags and three-point unibelts at the driver's and right front passenger's seating positions. The vehicle's test weight was 1360 kg. The vehicle's maximum static crush was 1067 mm.

The driver's HIC was 739. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 22.2 g. The driver's chest maximum deflection was 2 mm. The driver's left and right femur maximum compressive forces were 668 N and 554 N, respectively.

The right front passenger's HIC was 1423. The right front passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 43.0 g. The right front passenger's chest maximum deflection was 1 mm. The right front passenger's left and right femur maximum compressive forces were 784 N and 546 N, respectively.

A large amount of fuel system spillage occurred at impact and continued for the next thirty minutes immediately following the impact. The static rollover test was not conducted.

Data Acquisition Explanations

The driver's head Position 1 X-axis accelerometer, HD1XG1, recorded a questionable data spike at 201 milliseconds.

The left and right rear axle X-axis accelerometers, RAXXG1 and RAXXG2, lost data at 50 milliseconds as a result of the accelerometer's cables being cut by the vehicle's crush on impact.

Table 1 Crash Test Summary

Test type:	80 kph rear impact with 70% right side overlap
Test date:	04/17/96
Test time:	1042
Ambient temperature at impact area:	9° C
Vehicle year/make/ model/body style:	1996/Dodge/Neon/4-door sedan
Vehicle test weight:	1360 kg
Impact angle[1]:	180°
Impact velocity[2]:	
Primary:	82.1 kph
Secondary[3]:	81.8 kph
Maximum static crush:	1067 mm
Number of cameras:	
High-speed:	13
Door opening data:	
Left-front:	Difficult
Right-front:	Difficult

[1] With respect to tow track centerline.
[2] Speed trap measurement (± .08 kph accuracy)
[3] The secondary light trap failed.

Table 1 Crash Test Summary, Cont'd.

Dummies:	Driver #34	Passenger #35
Type:	Part 572 E	Part 572 E
Location:	Left front	Right front
Restraint:	Airbag/3-point unibelt	Airbag/3-point unibelt
Number of data channels:	30	30
Front seat data:		
Seat track failure:	None	None
Seat back failure:	Seat back deformed	Seat back deformed
Visible dummy contact points:		
Head:	Rear seat back	Right rear door inner panel and rear seat back
Chest:	None	None
Abdomen:	None	None
Left knee:	Steering wheel	None
Right knee:	Steering wheel	None

Table 2 Test Vehicle Information

Vehicle year/make/ model/body style:	1996/Dodge/Neon/4-door sedan			
Color:	White			
VIN:	1B3ES27C6TD582115			
Engine data:				
Placement:	Lateral/transverse			
Cylinders:	4			
Displacement:	2.0 liters			
Transmission data:	_5_ speed,	_X_ manual,	__automatic,	_overdrive
Final drive:	_x_ fwd,	__rwd,	__4wd	
Date vehicle received:	03/06/96			
Odometer reading:	67			
Dealer's name and address:	Byers Dublin Dodge 6851 Village Parkway Dublin, OH 43017			

Accessories:

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

Certification data from vehicle's label:

Vehicle manufactured by:		Chrysler Corporation
Date of manufacture:		12/95
VIN:		1B3ES27C6TD582115
GVWR:		1543 kg
GAWR:	Front:	853 kg
	Rear:	725 kg

Table 2 Test Vehicle Information, Cont'd.

Size of tires on vehicle:	P185/65R14
Spare tire:	T115/70D14
Type of front seats:	Bucket

Tire & capacity data from vehicle's label:

Recommended tire size:	P165/80R13
Recommended cold tire pressure:	
Front:	220 kPa
Rear:	220 kPa
Designated Seating Capacity:	
Front	2
Rear	3
Total	5
Vehicle Capacity Weight:	392 kg

Test vehicle attitudes:

Delivered attitude:	LF: 659 mm	RF: 661 mm	LR: 678 mm	RR: 679 mm
Pre-test attitude:	LF: 623 mm	RF: 617 mm	LR: 653 mm	RR: 655 mm
Post-test attitude:	LF: 620 mm	RF: 614 mm	LR: 650 mm	RR: 648 mm

Table 2 Test Vehicle Information, Cont'd.

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

Right front	339	kg	Right rear	205	kg
Left front	358	kg	Left rear	203	kg
Total front weight	697	kg	(63.1% of total vehicle weight)		
Total rear weight	408	kg	(36.9% of total vehicle weight)		
Total delivered weight	1105	kg			

Calculation of test vehicle's target test weight:

RCLW = Rated Cargo and Luggage Weight

UDW = Unloaded Delivered Weight (1105 kg)

VCW[1] = Vehicle Capacity Weight = 392

DSC = Designated Seating Capacity (5)

RCLW = VCW - 68 (DSC) = 392 - 68 (5) = 52

Target test weight = UDW + RCLW[1] + (Number of Hybrid III dummies x 76 kg per dummy)

Target test weight = 1105 + 52 + 152 = 1309 kg

Weight of test vehicle with required dummies and 103 kg of cargo weight:

Right front	429	kg	Right rear	246	kg
Left front	438	kg	Left rear	247	kg
Total front weight	867	kg	(63.8% of total vehicle weight)		
Total rear weight	493	kg	(36.2% of total vehicle weight)		
Total test weight	1360	kg	(2.0% over target test weight)		

Weight of ballast secured in vehicle cargo area: 0

Components removed to meet target test weight: Grill, radiator, power steering pump, alternator, head lights, front bumper

CG rearward of front wheel centerline: 957 mm

Vehicle Wheelbase: 2640 mm

[1] From vehicle's tire load label.

Table 3 Post-Impact Data

Test number:	960417
Test date:	04/17/96
Test time:	1042
Test type:	80 kph rear impact with 70% right side overlap
Impact angle:	180°
Ambient temperature at impact area:	9° C
Temperature in occupant compartment:	18° C

Impact velocity:

Primary:	82.1 kph
Secondary	81.8 kph
Specified range:	78.5 to 81.5 kph

Distance from vehicle to barrier:

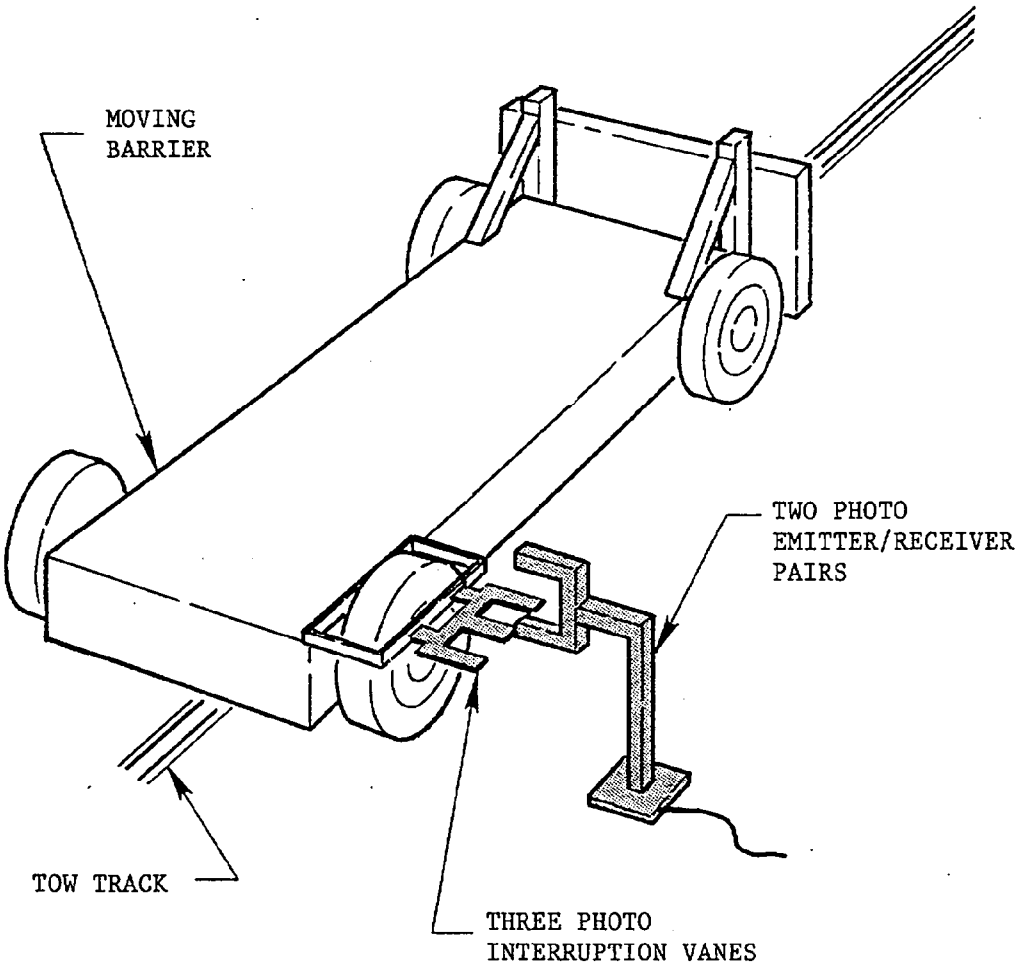
Entering velocity trap:	356 mm
Exiting velocity trap:	51 mm

Test vehicle static crush:

Overall length of test vehicle:

Pre-test:	L:	4288 mm	C:	4367 mm	R:	4289 mm
Post-test:	L:	3874 mm	C:	3300 mm	R:	3354 mm
Total crush:	L:	414 mm	C	1067 mm	R:	935 mm
Average crush:	805 mm					

Figure 1 Impact Velocity Measurement System

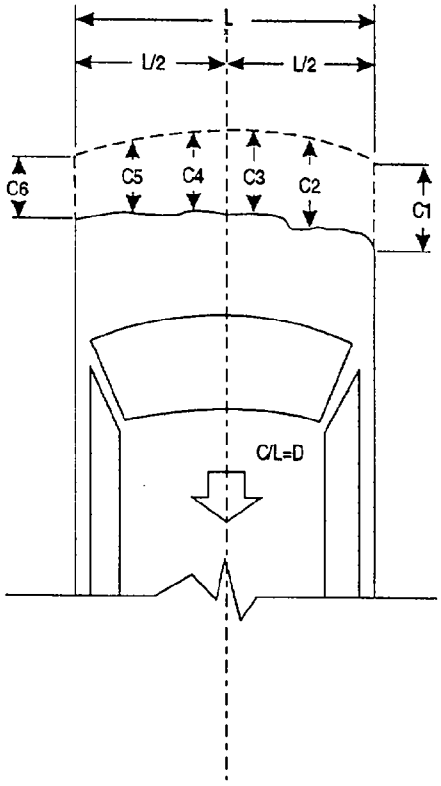


The final vane clears the final emitter/receiver pair 51 millimeters before impact.

The vanes have 305-millimeter spacing.

Figure 2 Accident Investigation Division Data

Test date:	04/17/96
Vehicle year/make/ model/body style:	1996/Dodge/Neon/4-door sedan
VIN:	1B3ES27C6TD582115
Build date:	12/95
Test weight:	1360 kg
Vehicle wheelbase:	2640 mm
Maximum width:	1704 mm
Rear overhang:	865 mm



Collision Deformation

Classification (CDC) Code: 06BDEW5

Crush depth measurements:	C1: 434 mm
	C2: 630 mm
	C3: 937 mm
	C4: 1025 mm
	C5: 986 mm
	C6: 964 mm
Midpoint of damage:	D: Vehicle Longitudinal Centerline
Length of damaged region:	L: 1194 mm

Section 3.0

FMVSS 301 Data

Table 4 Dummy Injury Criteria

Maximum Acceleration

	Head				Chest		
	X	Y	Z	R	X	Y	Z
Driver	90.9 g	38.7 g	-31.4 g	103.1 g	21.0 g	7.0 g	-10.7 g
Passenger	168.7 g	32.6 g	-50.4 g	176.7 g	43.8 g	10.1 g	-11.8 g

Maximum Femur Compressive Force

	Left Femur	Right Femur
Driver	668 N	554 N
Passenger	784 N	546 N

Head Injury Criteria[1]

	HIC	Time t_1	Time t_2
Driver	739	117.5 ms	134.5 ms
Passenger	1423	106.0 ms	118.0 ms

Head Maximum Resultant Acceleration[2]

	Acceleration	Time t_1	Time t_2
Driver	95.4 g	126.3 ms	129.3 ms
Passenger	133.3 g	113.6 ms	116.5 ms

Chest Maximum Resultant Acceleration[2]

	Acceleration	Time t_1	Time t_2
Driver	22.2 g	112.8 ms	115.8 ms
Passenger	43.0 g	102.6 ms	106.3 ms

Maximum Chest Deflection

Driver	2 mm
Passenger	1 mm

[1] As defined in FMVSS No. 208
[2] Defined as equal to or exceeding 0.003 sec. duration

Table 5 Fuel System Data

Vehicle year/make/model/body style:	1996/Dodge/Neon/4-door sedan
Fuel system capacity:	47.5 liters (from owner's manual)
Usable capacity:	42.4 liters (furnished by COTR)
Test volume range:	39.0 liters to 39.9 liters (92-94% of usable)
Actual test volume:	39.7 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 in front of the rear axle. The fuel filler neck is located on the right side. The fuel lines run along the right side to the front.

Table 6 FMVSS 301 Post-Impact Test Data

Test date: 04/17/96

Vehicle year/make/model/body style: 1996/Dodge/Neon/4-door sedan

Test requirements:

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

Test vehicle impact type:

____ Frontal (48 kph)

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

__X__ Rear moving barrier (80 kph)

____ Lateral moving barrier (32 kph)

Fuel system fluid spillage measurements:

		Test Results	Maximum Allowable
1.	From impact until vehicle motion ceases	See Note[1]	28 g
2.	5-Minute period after vehicle motion ceases	2200 g	140 g
3.	Next 25 minutes after 5-minute period	8706 g	28 g/1 min

Fuel system fluid spillage location(s): Fuel tank

[1] A large amount of fuel system fluid occurred from the time of impact until motion ceased.

Section 4.0

Vehicle, Moving Deformable Barrier, Occupant, and Camera Measurements

Figure 3 Pre-test and Post-test Measurement Points

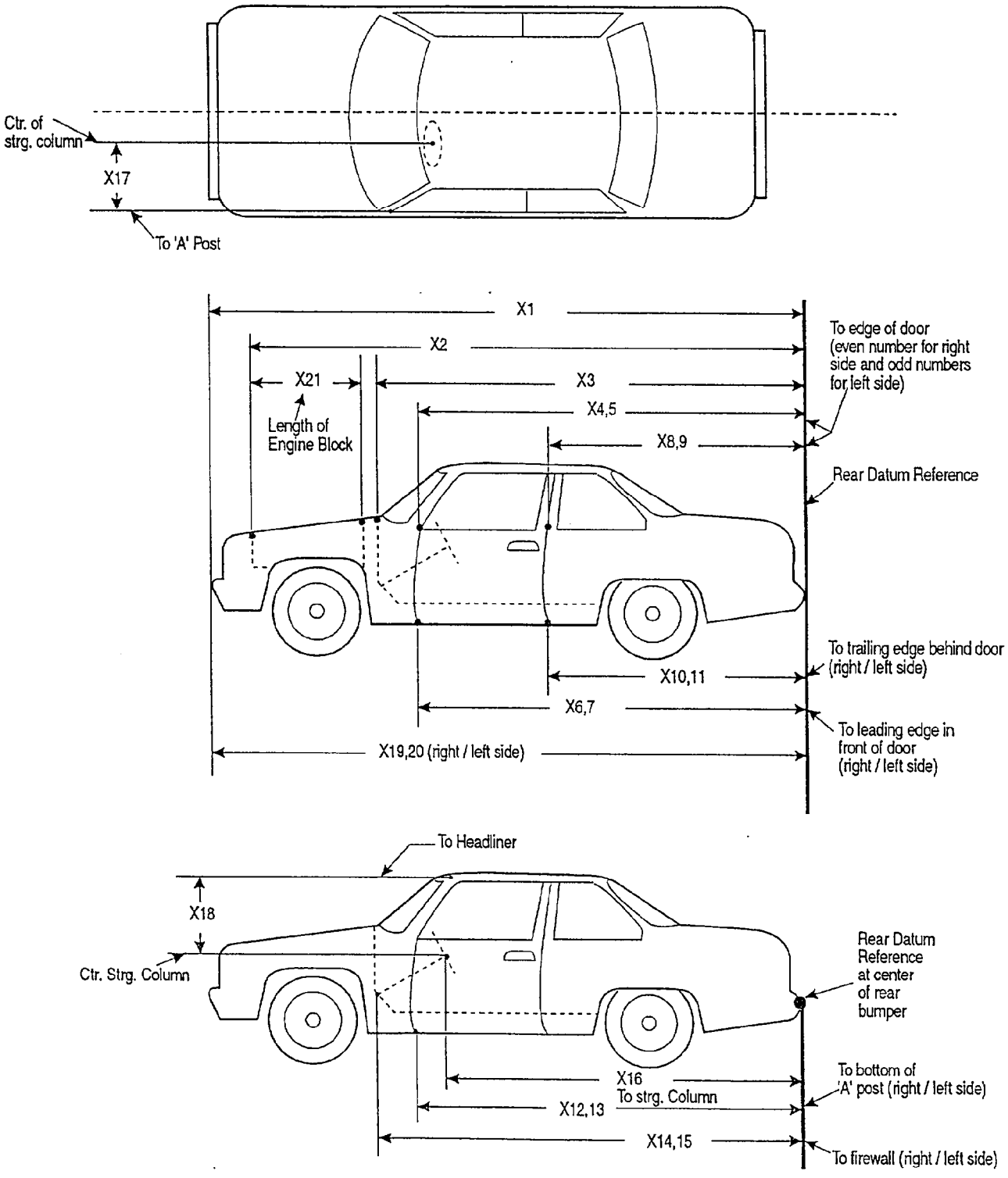


Table 7 Impacted Vehicle Measurements

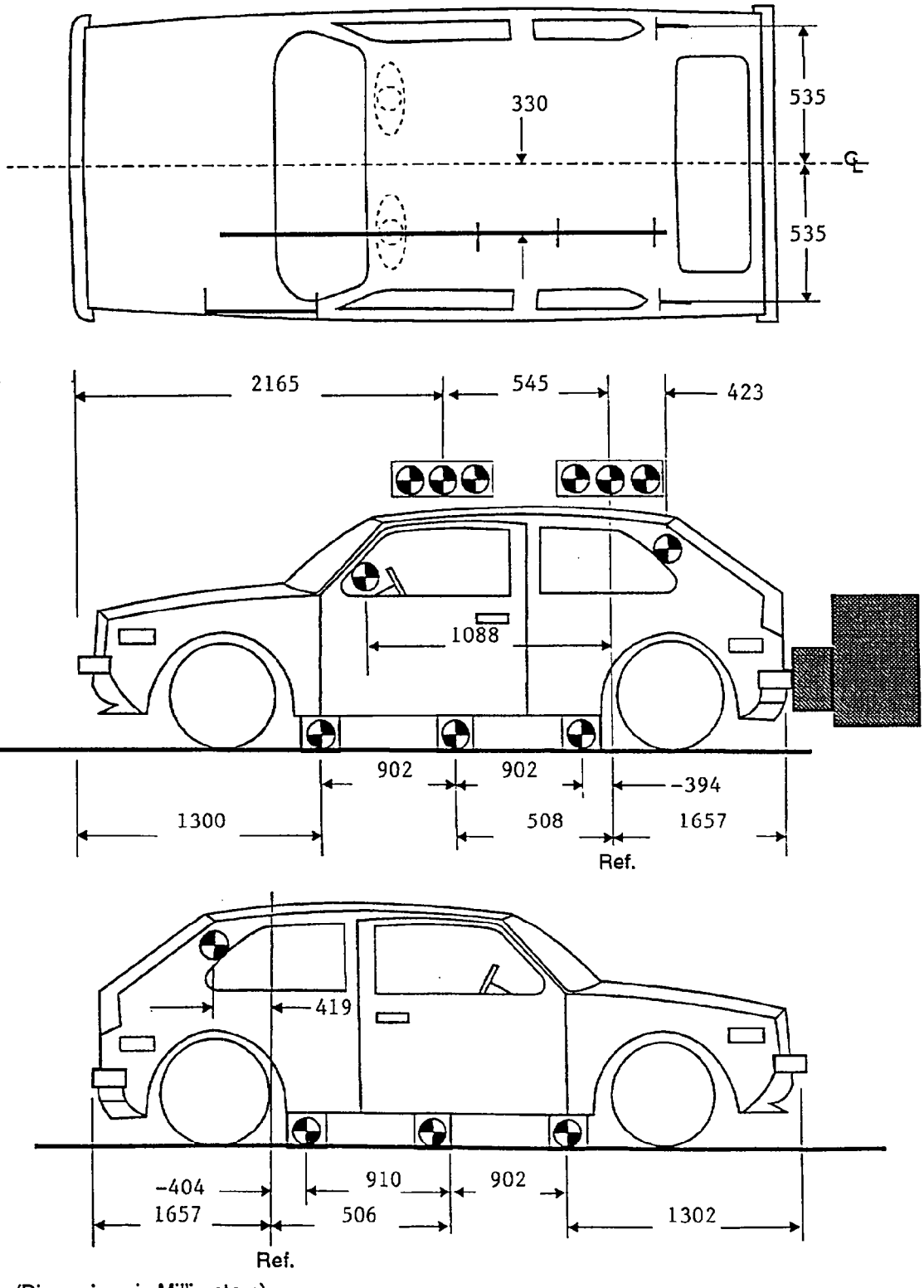
Vehicle year/make/model/body style: 1996/Dodge/Neon/4-door sedan Test Number: 960417

No.	Type of measurement	Pre-test	Post-test	Diff.
X1	Total length of vehicle at centerline	4367 mm	3300 mm	1067 mm
X2	Rear surface of vehicle to front of engine block	429 mm	448 mm	-19 mm
X3	Rear surface of vehicle to firewall	985 mm	998 mm	-13 mm
X4	Rear surface of vehicle to upper leading edge of right door	1392 mm	1405 mm	-13 mm
X5	Rear surface of vehicle to upper leading edge of left door	1388 mm	1401 mm	-13 mm
X6	Rear surface of vehicle to lower leading edge of right door	1356 mm	1339 mm	17 mm
X7	Rear surface of vehicle to lower leading edge of left door	1354 mm	1327 mm	27 mm
X8	Rear surface of vehicle to upper trailing edge of right door	2414 mm	2424 mm	-10 mm
X9	Rear surface of vehicle to upper trailing edge of left door	2424 mm	2435 mm	-11 mm
X10	Rear surface of vehicle o lower trailing edge of right door	2414 mm	2392 mm	22 mm
X11	Rear surface of vehicle to lower trailing edge of left door	2412 mm	2382 mm	30 mm
X12	Rear surface of vehicle to bottom of "A" post on right side	1384 mm	1425 mm	-41 mm
X13	Rear surface of vehicle to bottom of "A" post on left side	1396 mm	1397 mm	-1 mm
X14	Rear surface of vehicle to firewall - right side	1075 mm	1088 mm	-13 mm
X15	Rear surface of vehicle to firewall - left side	1075 mm	1085 mm	-10 mm
X16	Rear surface of vehicle to steering wheel center	1801 mm	1820 mm	-19 mm
X17	Center of steering column to "A" post	298 mm	265 mm	33 mm
X18	Center of steering column to headliner	440 mm	435 mm	5 mm
X19	Rear surface of vehicle to right side of front bumper	4289 mm	3354 mm	935 mm
X20	Rear surface of vehicle to left side of front bumper	4288 mm	3874 mm	414 mm
X21	Length of engine block	472 mm	472 mm	0 mm

Table 8 Vehicle Measurements

No.	Description of Measurement	Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	4367	3300	1067
X2	Front Surface of Vehicle to Bottom of "A" Post of Right Side	1384	1425	-41
X3	Front Surface of Vehicle to Bottom of "A" Post of Left Side	1396	1397	-1
X4	Front Surface of Vehicle to Right Side of Rear Bumper	4289	3354	935
X5	Front Surface of Vehicle to Left Side of Rear Bumper	4288	3874	414
X6	Right Front Sill to Ground Plane	130	123	7
X7	Left Front Sill to Ground Plane	130	210	-80
X8	Right Rear Sill to Ground Plane	161	100	61
X9	Left Rear Sill to Ground Plane	159	178	-19
X10	Wheelbase of Vehicle - Left Side	2640	2620	20
X11	Width of Vehicle at Maximum Width Point	1704	2141	-437
X12	Front Surface of Vehicle to Engine Target	429	448	-19
X13	Front Surface of Vehicle to Compartment Target	2165	2200	-35
X14	Front Surface of Vehicle to Rear Bumper Target	4312	3273	1039
X15	Wheelbase of Vehicle - Right Side	2640	1985	655

Figure 4 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 support brackets. Y-axis measurements are left and right of the original vehicle centerline. Y-axis measurements (6 points) should divide the width of the car and be clearly indicated on the form. Z-axis (height) measurements are from the ground.

Pre-Test Profile

		Vehicle Left			Vehicle Right		
		pt. 1	pt. 2	pt. 3	pt. 4	pt. 5	pt. 6
Bottom of rear bumper	X	4686	4729	4735	4730	4745	4686
	Y	652	399	148	-120	-385	-652
	Z	400	395	377	384	405	404
Top of rear bumper	X	4659	4670	4747	4744	4724	4660
	Y	651	392	130	-122	-385	-655
	Z	643	645	640	640	641	645
Center of trunk	X	4605	4668	4686	4685	4660	4596
	Y	632	398	131	-111	-390	-640
	Z	908	843	858	852	848	903

Post-Test Profile

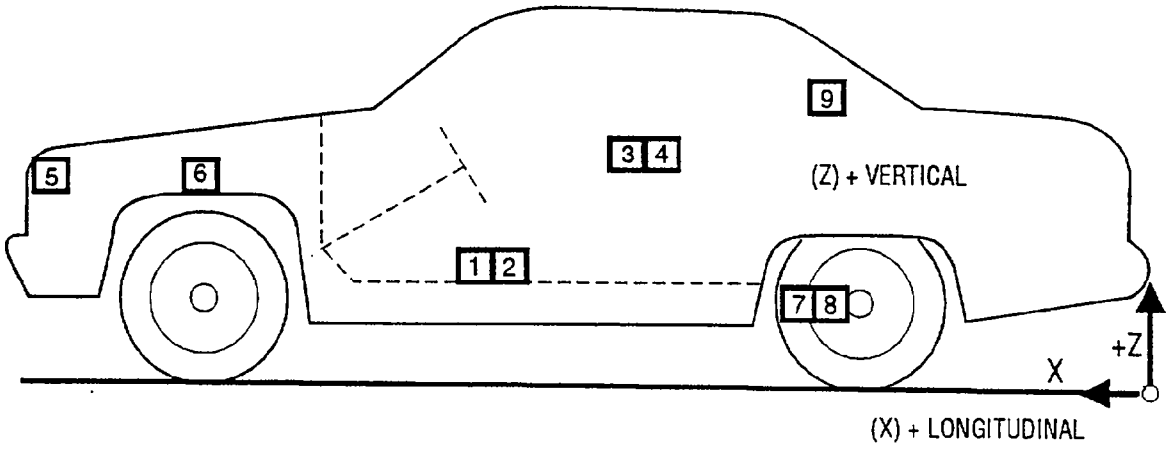
		Vehicle Left			Vehicle Right		
		pt. 1	pt. 2	pt. 3	pt. 4	pt. 5	pt. 6
Bottom of rear bumper	X	4326	4083	3830	3785	3819	3740
	Y	305	189	107	-120	-403	-655
	Z	490	478	460	450	476	455
Top of rear bumper	X	4225	4040	3810	3719	3738	3696
	Y	429	220	88	-111	-368	-645
	Z	705	736	730	707	690	665
Center of trunk	X	4414	4367	4290	4265	4205	4135
	Y	625	385	130	-118	-395	-642
	Z	1167	1075	1068	1044	1013	1070

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

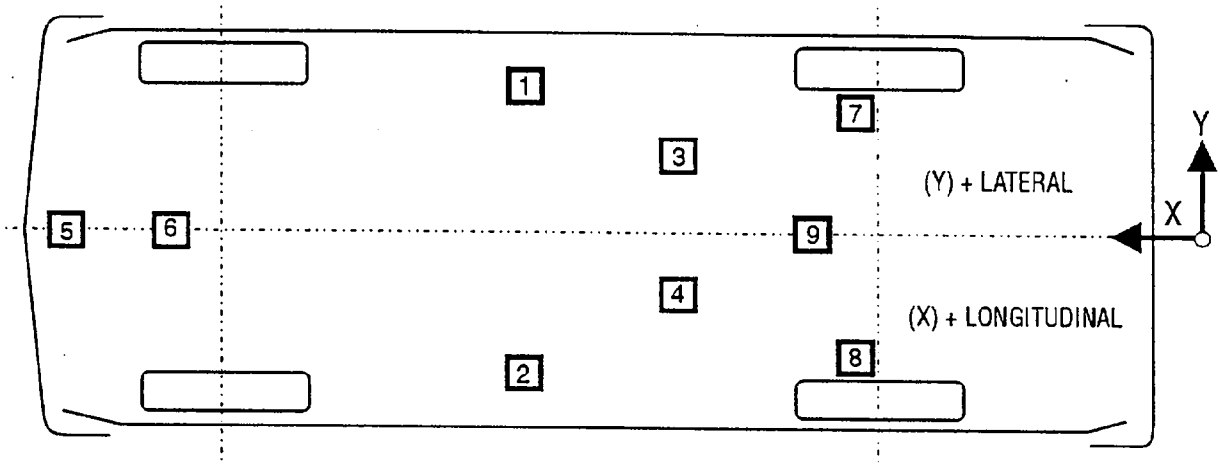
		Change					
		Vehicle Left			Vehicle Right		
		pt. 1	pt. 2	pt. 3	pt. 4	pt. 5	pt. 6
Bottom of rear bumper	X	360	646	905	945	926	946
	Y	-347	-210	-41	0	-18	-3
	Z	90	83	83	66	71	51
Top of rear bumper	X	434	630	937	1025	986	964
	Y	-222	-172	-42	11	17	10
	Z	62	91	90	67	49	20
Center of trunk	X	191	301	396	420	455	461
	Y	-7	-13	-1	-7	-5	-2
	Z	259	232	210	192	165	167

+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 5 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[1]		
		X	Y	Z
Left front seat outboard mounting rail	Pre	1965 mm	572 mm	304 mm
	Post	1831 mm	570 mm	324 mm
	Change	134 mm	-2 mm	20 mm
Right front seat outboard mounting rail	Pre	1965 mm	-572 mm	309 mm
	Post	1917 mm	-574 mm	225 mm
	Change	48 mm	-2 mm	-84 mm
Left front seat back (mid-point of seat)	Pre	2536 mm	360 mm	772 mm
	Post	2750 mm	275 mm	608 mm
	Change	-214 mm	-85 mm	-164 mm
Right front seat back (mid-point of seat)	Pre	2536 mm	-360 mm	826 mm
	Post	2610 mm	-380 mm	733 mm
	Change	-74 mm	-20 mm	-93 mm
Radiator support	Pre	229 mm	105 mm	607 mm
	Post	230 mm	105 mm	695 mm
	Change	-1 mm	0 mm	88 mm
Top of engine	Pre	713 mm	131 mm	728 mm
	Post	717 mm	145 mm	770 mm
	Change	-4 mm	14 mm	42 mm
Left rear wheel axle	Pre	3492 mm	265 mm	257 mm
	Post	3084 mm	450 mm	364 mm
	Change	408 mm	185 mm	107 mm
Right rear wheel axle	Pre	3492 mm	-265 mm	253 mm
	Post	2828 mm	-170 mm	327 mm
	Change	664 mm	95 mm	74 mm
Rear package shelf (top of rear seat back)	Pre	3607 mm	0 mm	986 mm
	Post	3350 mm	0 mm	960 mm
	Change	257 mm	0 mm	-26 mm

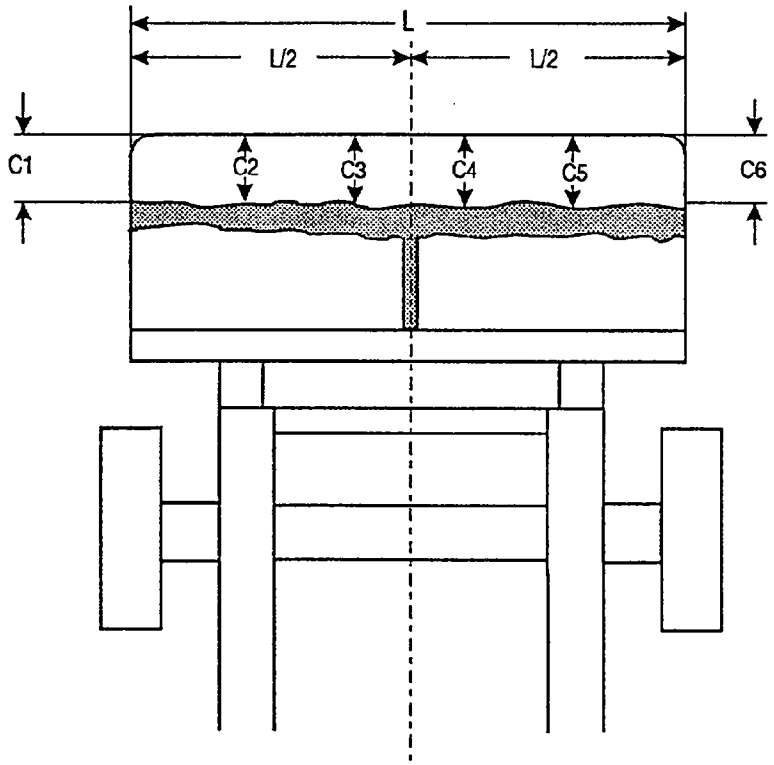
[1] Reference Point: X - vertical plane at front bumper
Y - vehicle centerline
Z - ground

Table 11 Moving Deformable Barrier Face Static Crush

Location	Height	813	711	610	508	406	305	203	102	0	102	203	305	406	508	610	711	813
		Zero distance at barrier centerline[1]																
		Pre-test profile (distance in millimeters from reference plane[2])																
Top of face	762	336	333	327	326	326	325	320	318	330	328	328	318	318	318	314	311	310
Mid-face	508	334	334	332	331	327	326	324	322	328	326	322	323	321	320	318	314	312
Bumper	381	255	231	227	227	226	226	224	222	227	227	225	221	220	220	218	217	237
		Post-test profile (distance in millimeters from reference plane[2])																
Top of face	762	313	323	328	331	346	360	379	394	381	367	357	360	366	377	393	428	492
Mid-face	508	302	308	316	328	334	337	358	380	393	403	414	421	403	390	464	543	619
Bumper	381	221	212	223	234	245	256	266	273	290	295	311	330	345	369	394	427	459
		Static crush (mm)																
Top of face	762	-23	-10	1	5	20	35	59	76	51	39	29	42	48	59	79	117	182
Mid-face	508	-32	-26	-16	-3	7	11	34	58	65	77	42	61	82	70	146	229	307
Bumper	381	-34	-19	-4	7	19	30	42	51	63	68	86	109	125	149	176	210	222

[1] Column readings are left to right across barrier face from left to right.
[2] Reference plane is the rear surface of the deformable barrier face.
All measurements are in millimeters.

Figure 6 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	1639 mm		
C1	237 mm	459 mm	222 mm
C2	218 mm	330 mm	112 mm
C3	221 mm	290 mm	69 mm
C4	226 mm	256 mm	30 mm
C5	227 mm	223 mm	-4 mm
C6	255 mm	221 mm	-34 mm
CL	227 mm	290 mm	63 mm

Figure 7 Dummy Measurement Locations for Front Seat Occupants

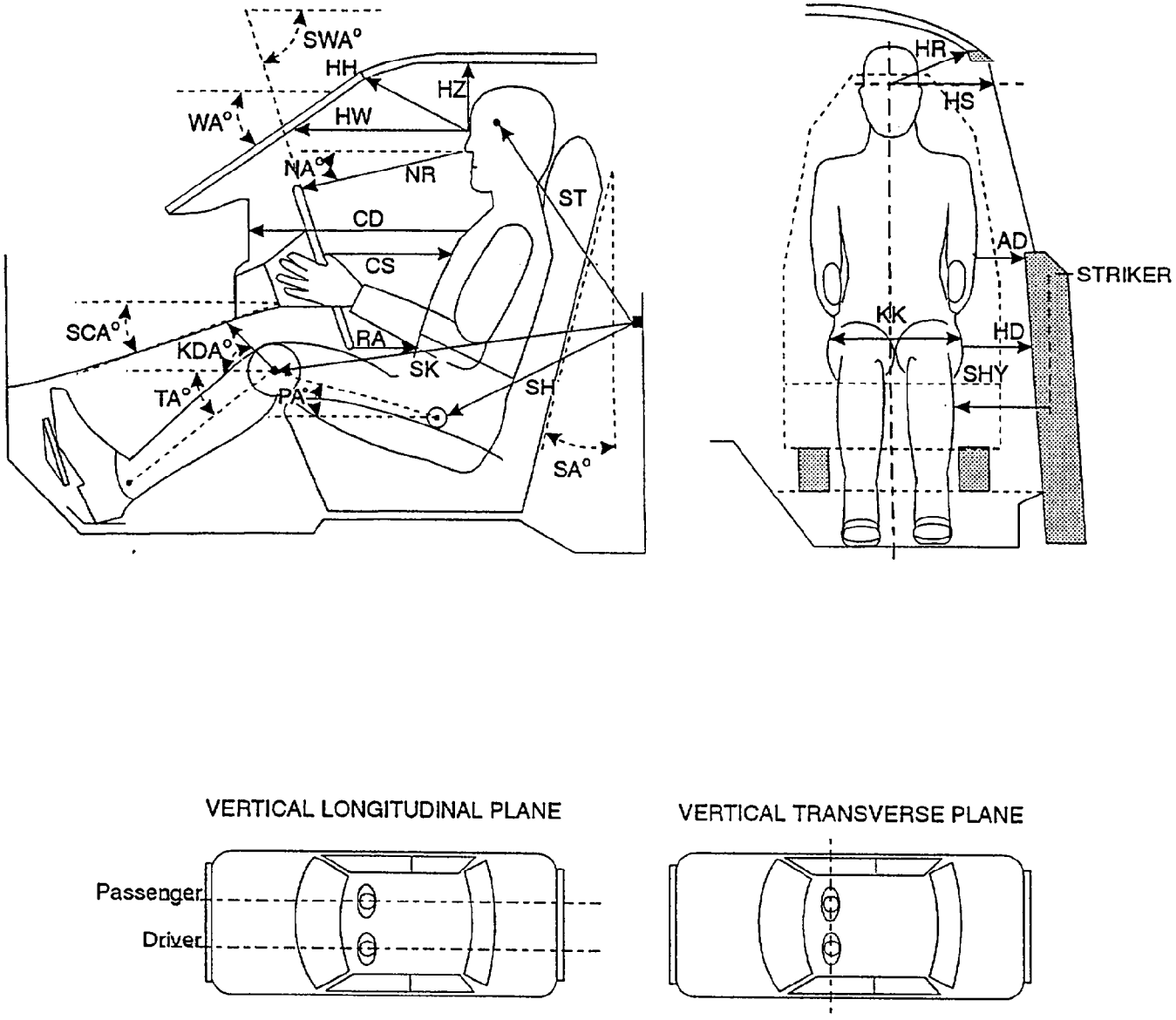
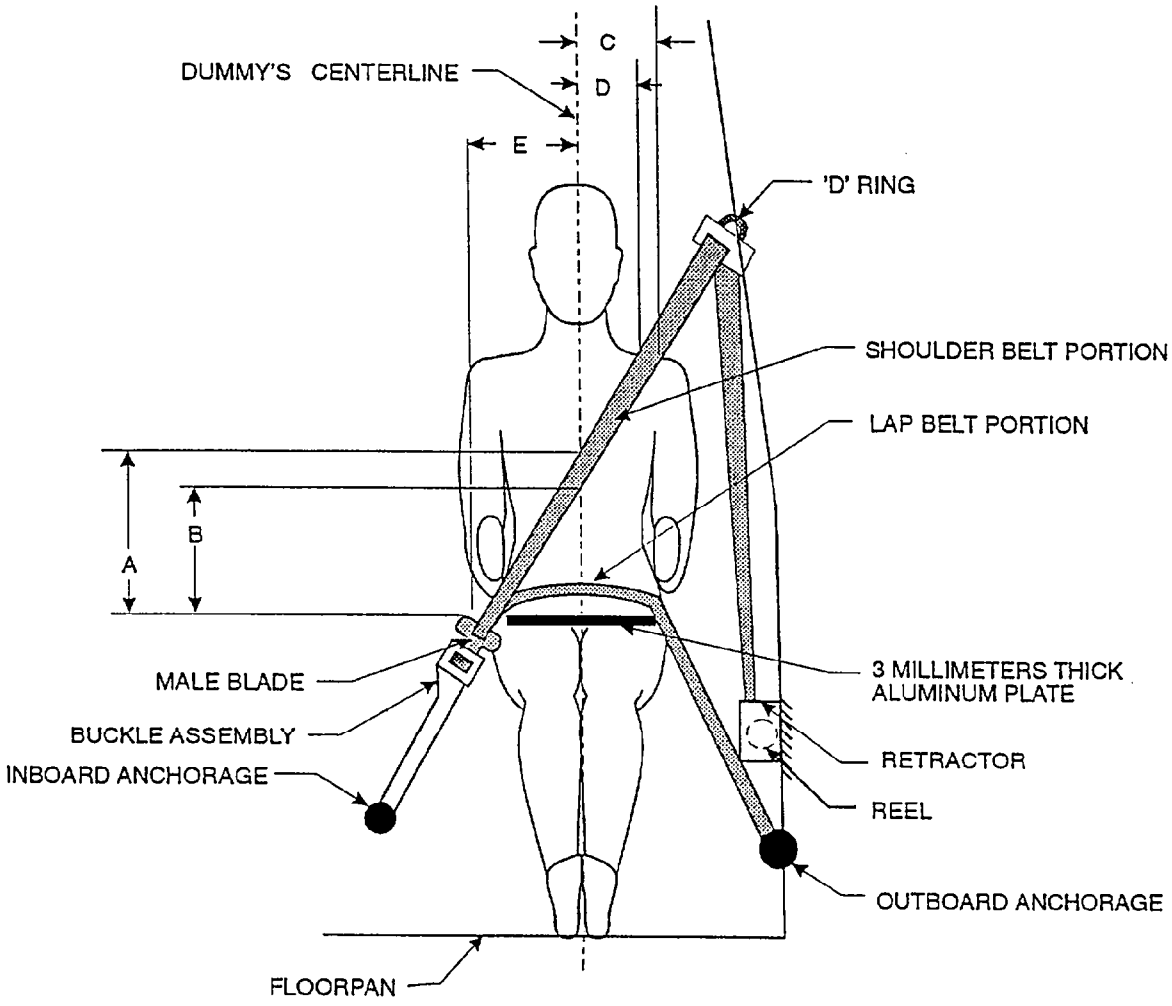


Table 12 Dummy Measurement Data For Front Seat Occupants

Designation	Type of Measurement	Driver (Serial #34)	Passenger (Serial #35)
WA	Windshield angle	27°	NA
SWA	Steering wheel angle	67°	NA
SCA	Steering column angle	23°	NA
SA	Seat back angle	18°	18°
HZ	Head to roof	197 mm	191 mm
HH	Head to header	325 mm	317 mm
HW	Head to windshield	539 mm	543 mm
HR	Head to side header	215 mm	194 mm
NR	Nose to rim	404 mm	NA
NA	Nose to rim angle	20°	NA
CD	Chest to dash	530 mm	476 mm
CS	Steering wheel to chest	299 mm	NA
RA	Rim to abdomen	172 mm	NA
KDL	Left knee to dash	161 mm	162 mm
KDR	Right knee to dash	149 mm	165 mm
KDA	Outboard knee to dash angle	32°	32°
PA	Pelvic angle	22.5°	23°
TA	Tibial angle	39°	37°
KK	Knee to knee	297 mm	267 mm
ST[1]	Striker to head	531 mm	533 mm
	Striker to head angle	-82°	-87°
SK[1]	Striker to knee	562 mm	554 mm
	Striker to knee angle	4°	0°
SH[1]	Striker to H-point	219 mm	221 mm
	Striker to H-point angle	28°	29°
SHY	Striker to H-point (Y dir.)	235 mm	242 mm
HS	Head to side window	303 mm	282 mm
HD	H-point to door	110 mm	118 mm
AD	Arm to door	87 mm	86 mm

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

Figure 8 Seat Belt Positioning Data



		Driver	Passenger
A	Top surface of aluminum plate to belt upper edge	351 mm	349 mm
B	Top surface of aluminum plate to belt lower edge	271 mm	269 mm
C	Dummy centerline to outer edge of belt at chest flesh top	112 mm	130 mm
D	Dummy centerline to inner edge of belt at chest flesh top	44 mm	72 mm
E	Dummy centerline to intersection of upper torso belt and lap belt	210 mm	255 mm

Figure 9 Camera Positions

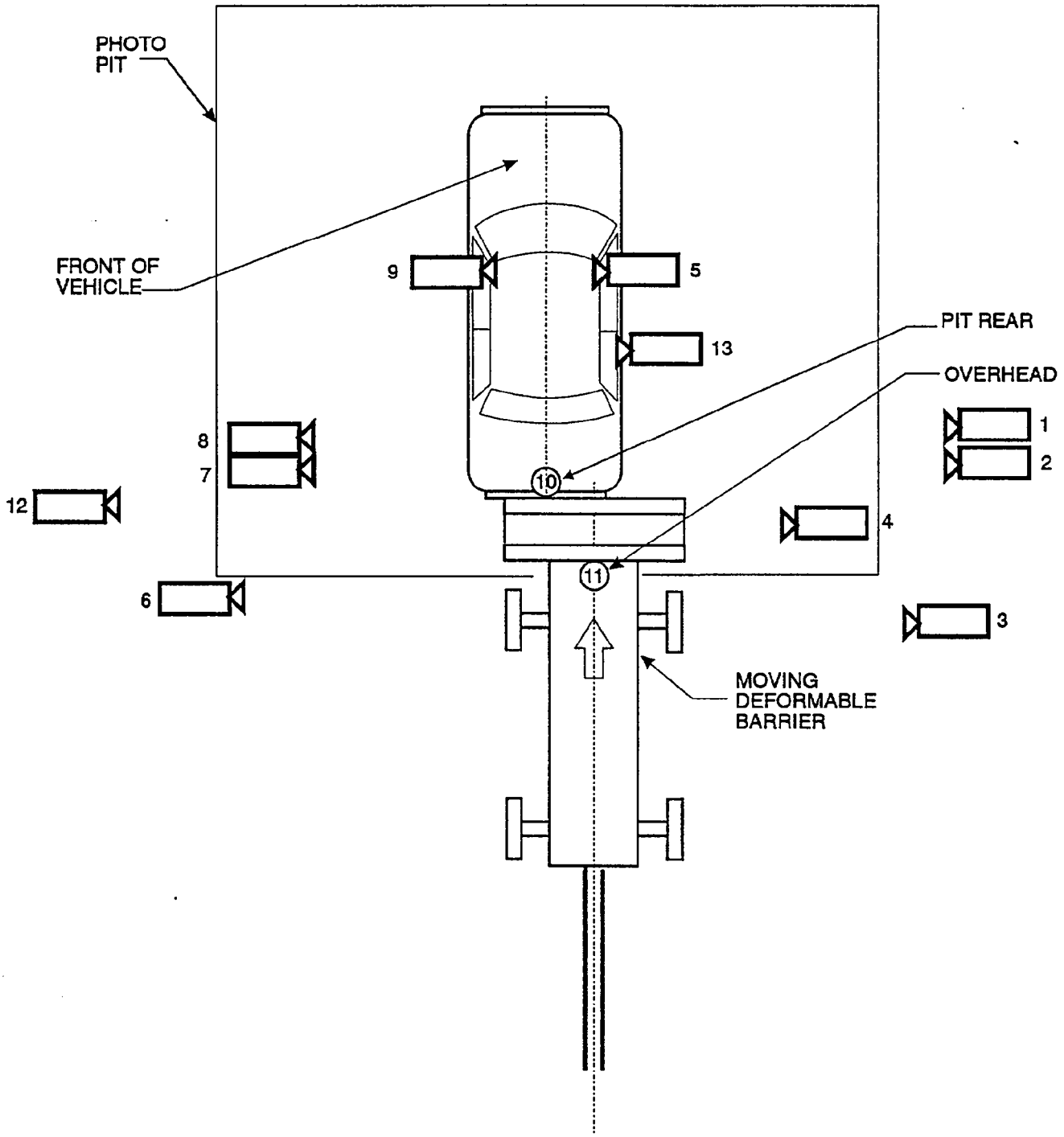


Table 13 Motion Picture Camera Locations

Vehicle year/make/model/body style: 1996/Dodge/Neon/4-door sedan

Test number: 960417

Camera Number	View	Camera Positions[1] X	Y	Z	Angle of Inclination[2]	Angle of Rotation[3]	Camera Lens	Film Speed
1	Right side vehicle	7,772 mm	6,934 mm	838 mm	0°	0°	25 mm	983 frames/s
2	Right side overall	813 mm	6,274 mm	1,092 mm	0°	0°	13 mm	995 frames/s
3	Right MDB	-1,372 mm	10,236 mm	914 mm	0°	0°	25 mm	980 frames/s
4	Right close-up	305 mm	4,877 mm	1,092 mm	-3°	0°	17 mm	1003 frames/s
5	Right front passenger onboard	NA	NA	NA	NA	NA	8 mm	730 frames/s
6	Left side MDB	-787 mm	-10,160 mm	838 mm	0°	0°	25 mm	980 frames/s
7	Left side close-up	432 mm	-7,442 mm	991 mm	-3°	0°	17 mm	1003 frames/s
8	Left side vehicle	2,565 mm	-11,227 mm	1,168 mm	-2°	0°	25 mm	995 frames/s
9	Driver onboard	NA	NA	NA	NA	NA	8 mm	800 frames/s
10	Underbody vehicle	NA	NA	NA	90°	0°	17 mm	985 frames/s
11	Overhead	0 mm	0 mm	10,668 mm	90°	0°	13 mm	912 frames/s
12	Left side overall	1,041 mm	-12,675 mm	1,092 mm	0°	0°	13 mm	1000 frames/s
13	Seat back view	0 mm	0 mm	10,668 mm	NA	NA	35 mm	763 frames/s

[1] +X: Forward from impact point MDB face
+Y: Rightward from monorail centerline
+Z: Upward from ground level

[2] +Angle of Inclination: Camera lens (upward from horizontal)

[3] +Angle of Rotation: Camera lens toward barrier from line perpendicular to monorail centerline

Appendix A

Photographs

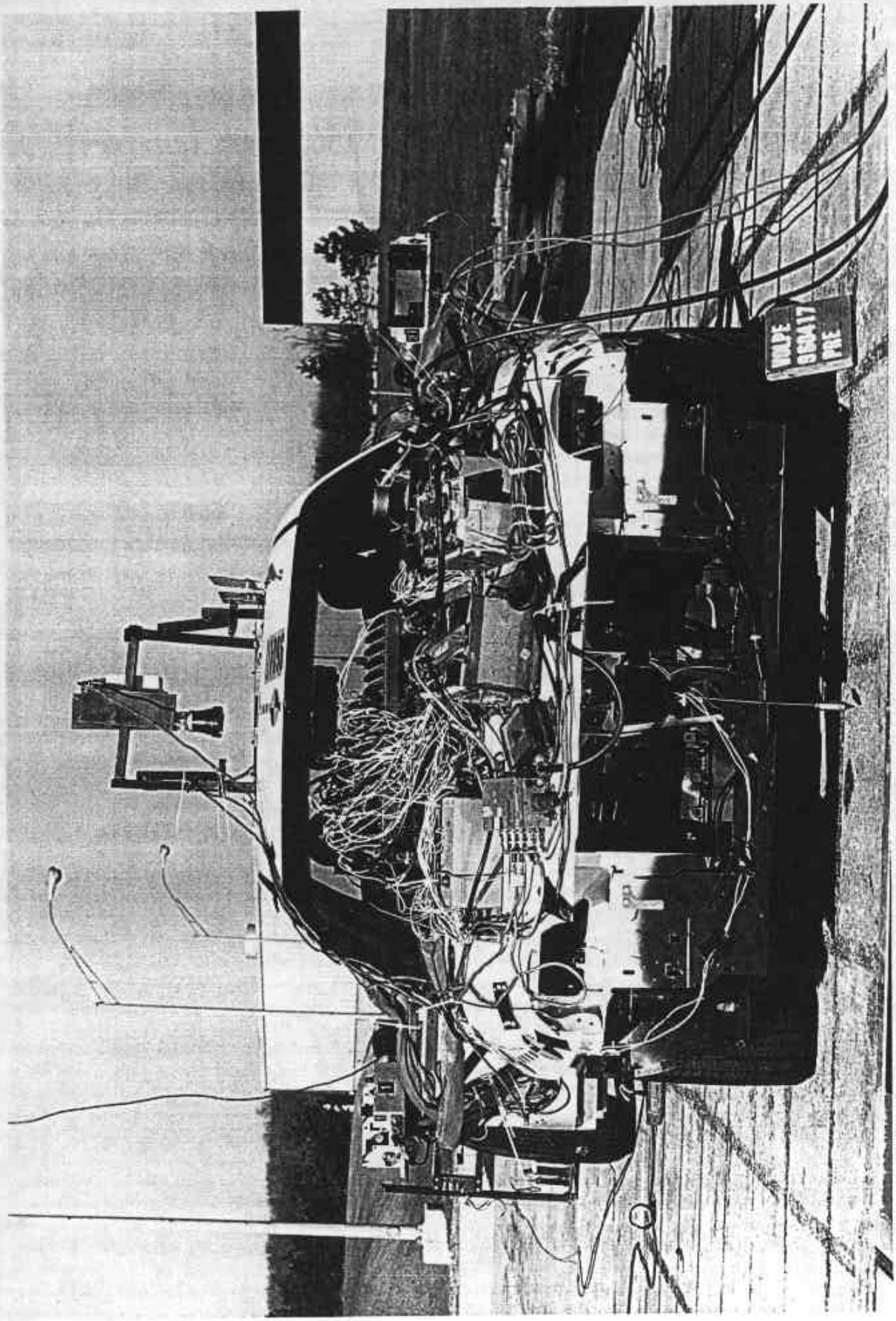


Figure A-1 Pre-Test Front View

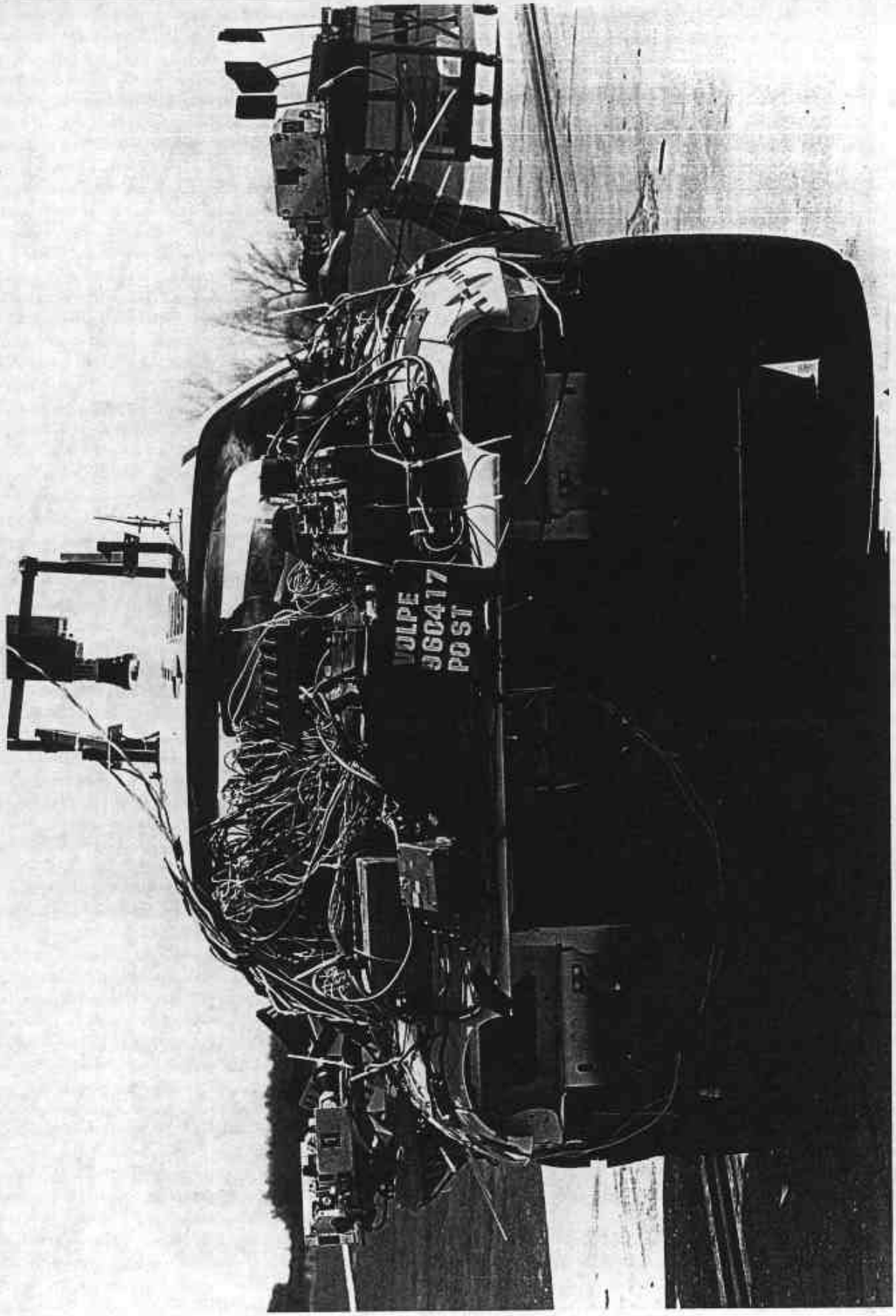


Figure A-2 Post-Test Front View

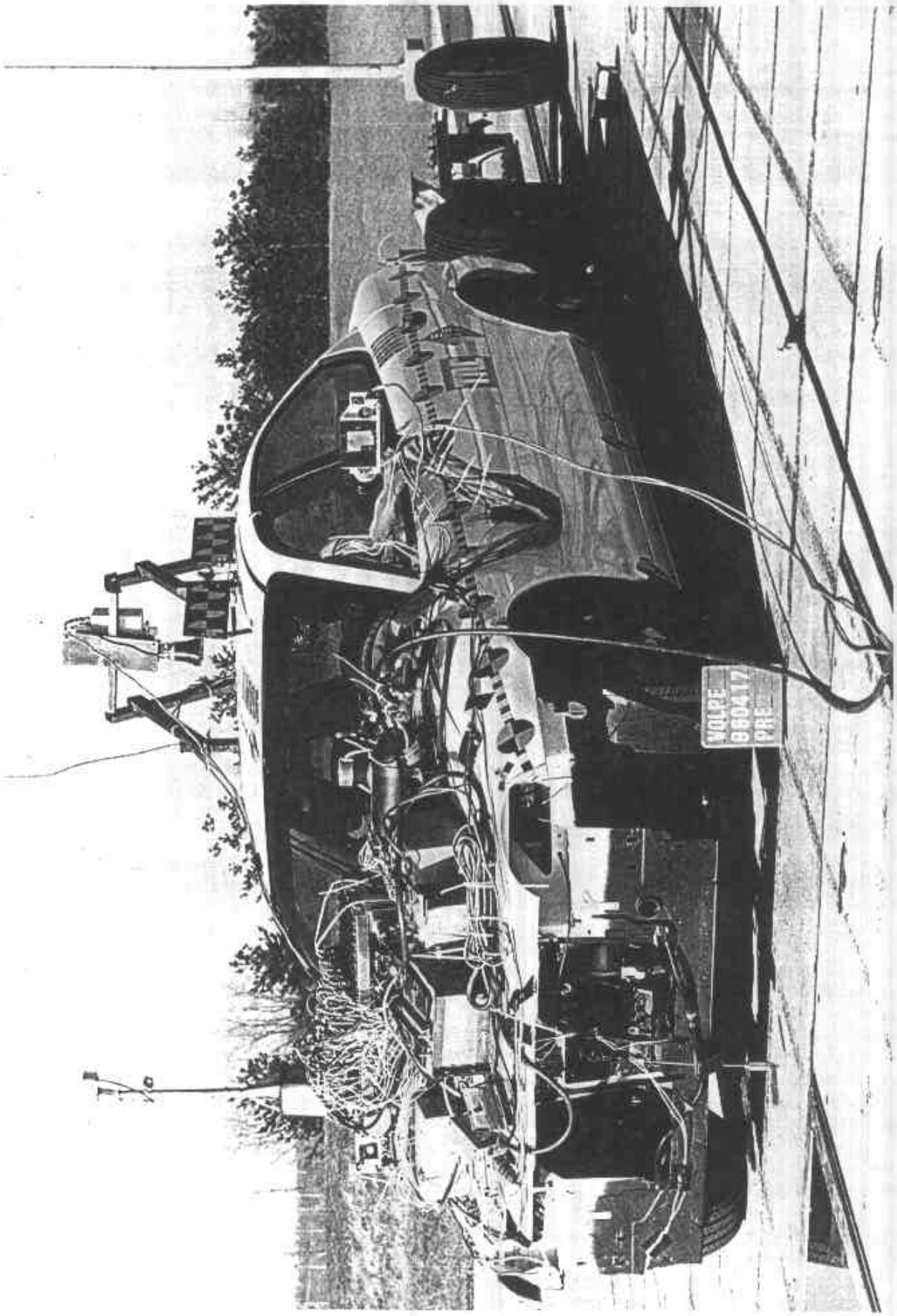


Figure A-3 Pre-Test Left Front Three-Quarter View

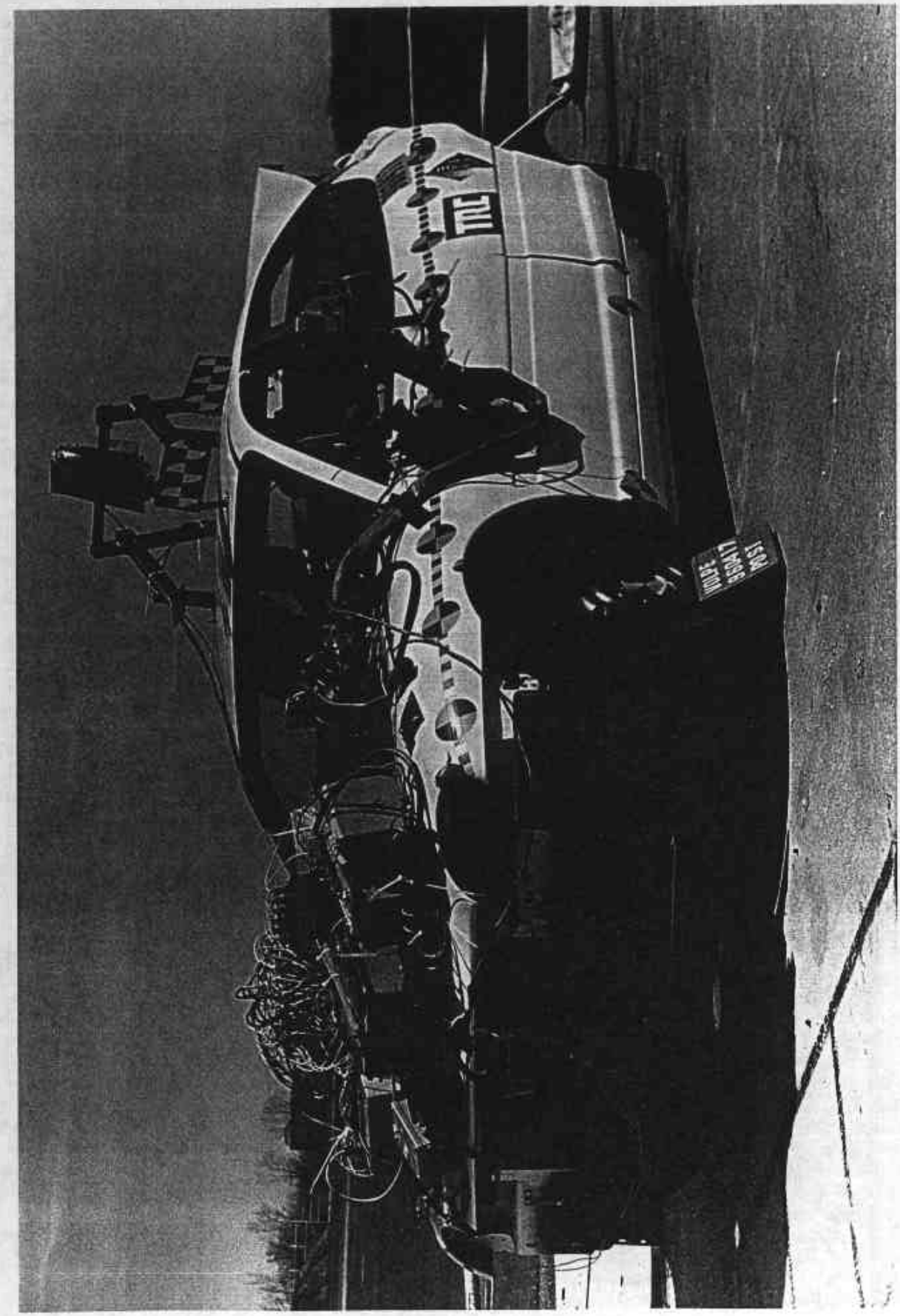


Figure A-4 Post-Test Left Front Three-Quarter View

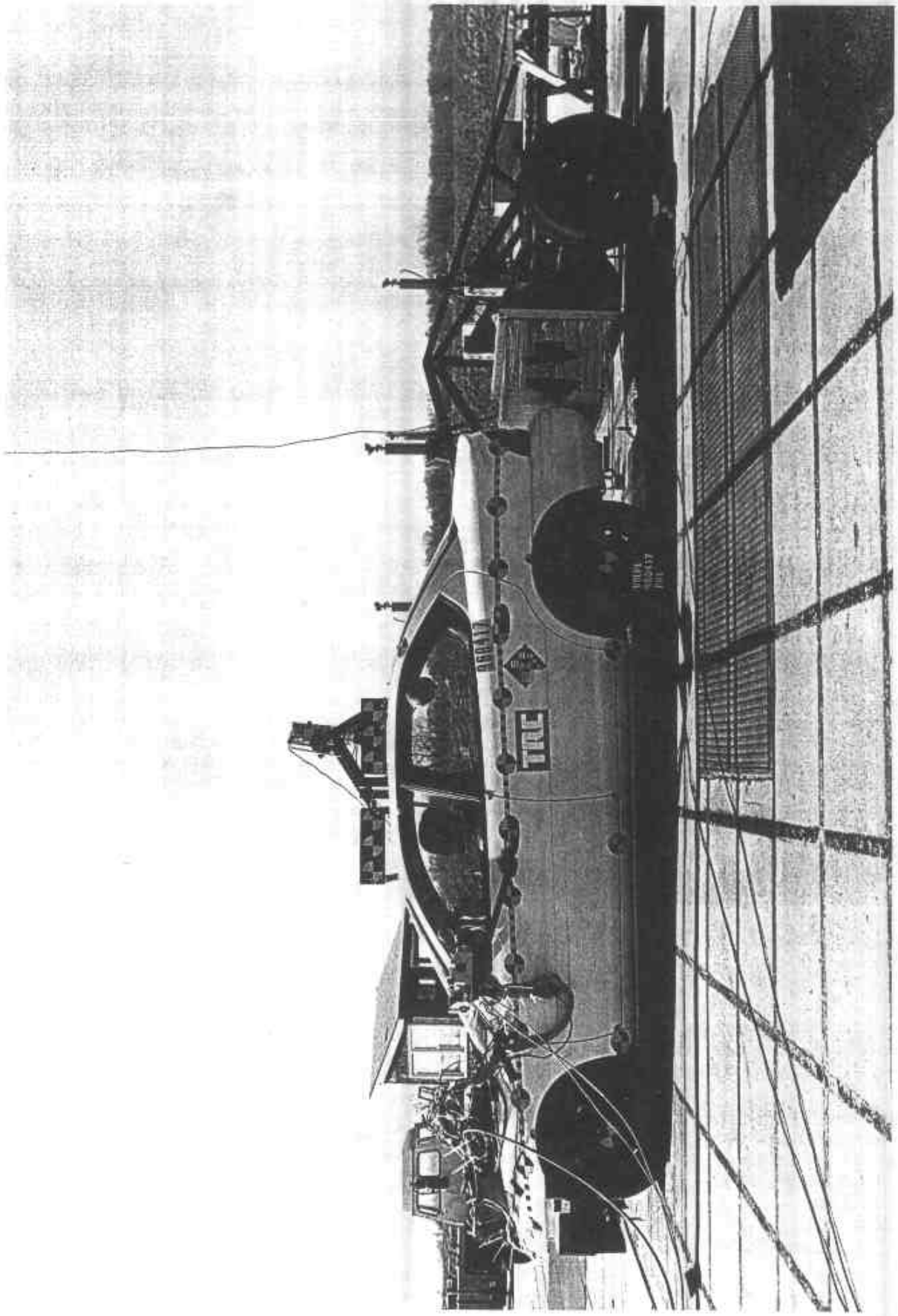


Figure A-5 Pre-Test Left Side View

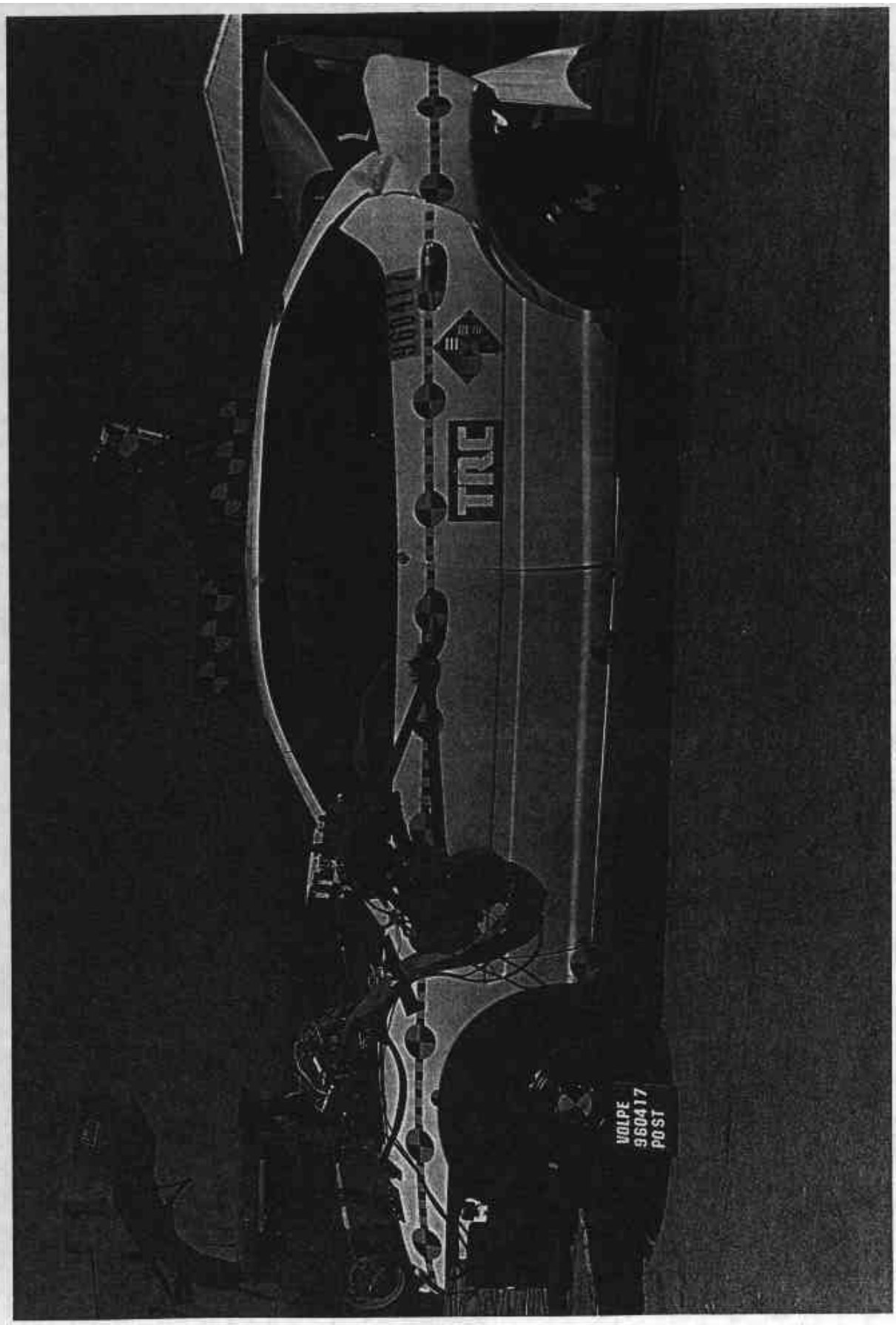


Figure A-6 Post-Test Left Side View

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

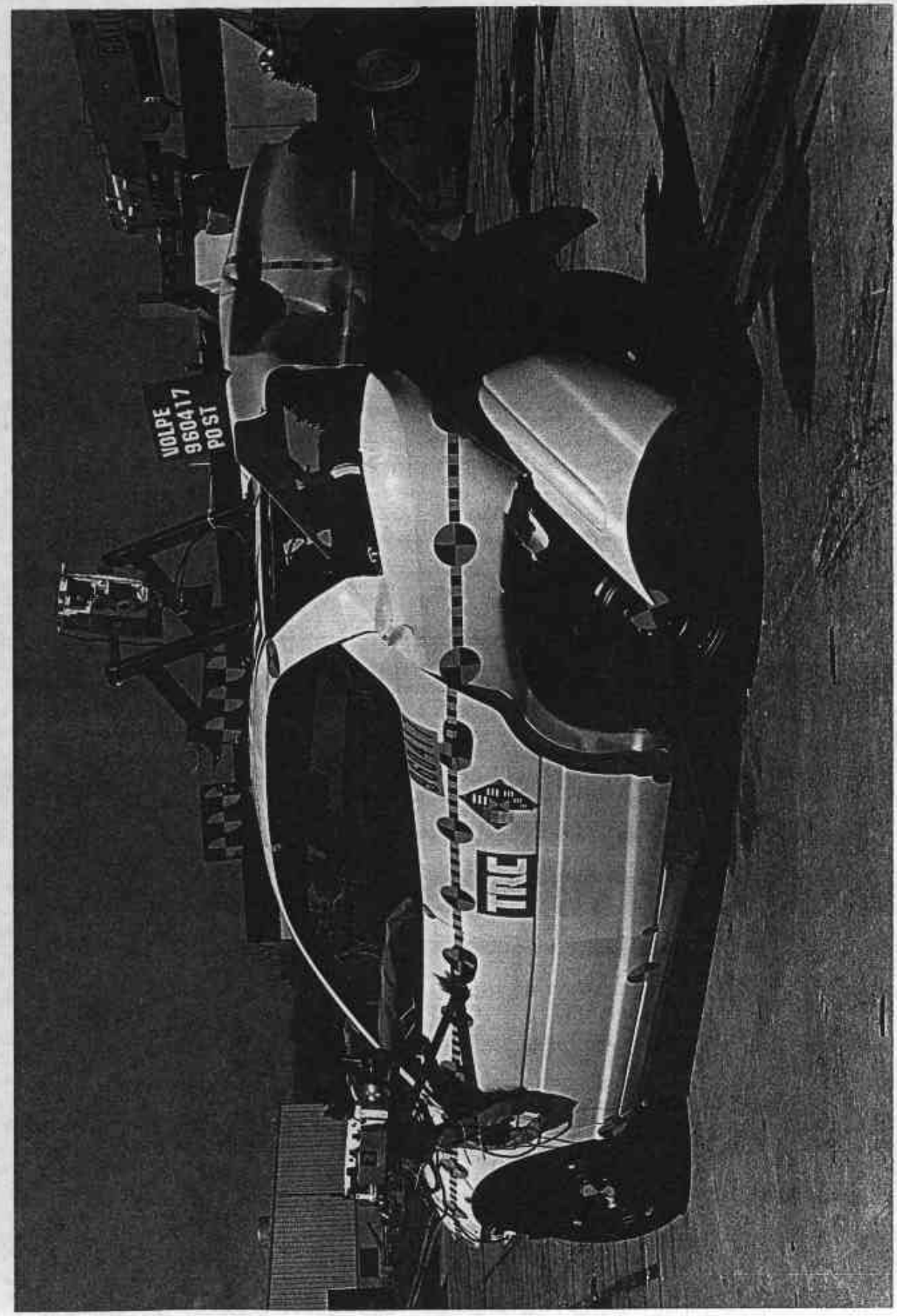


Figure A-8 Post-Test Left Rear Three-Quarter View

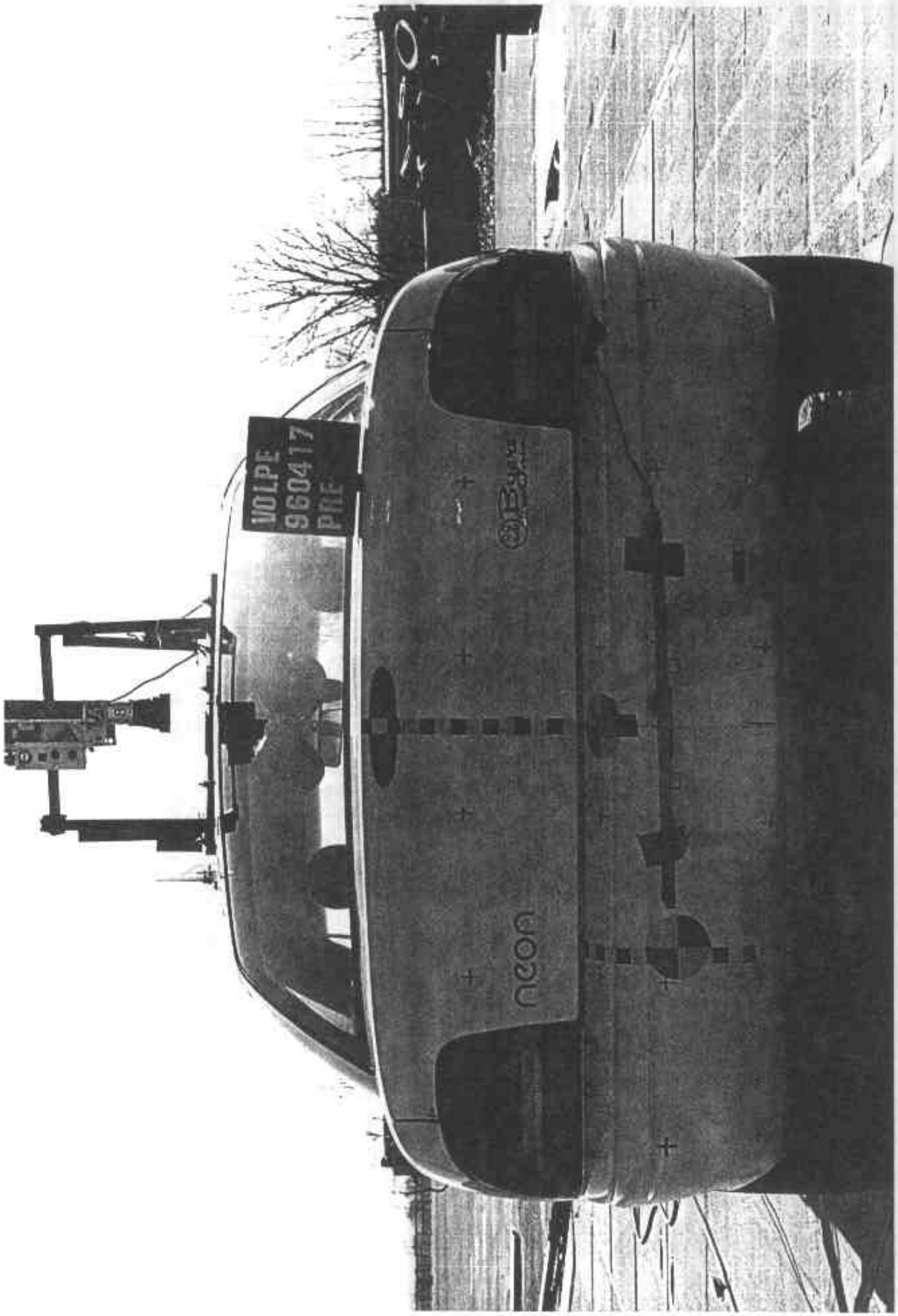


Figure A-9 Pre-Test Rear View

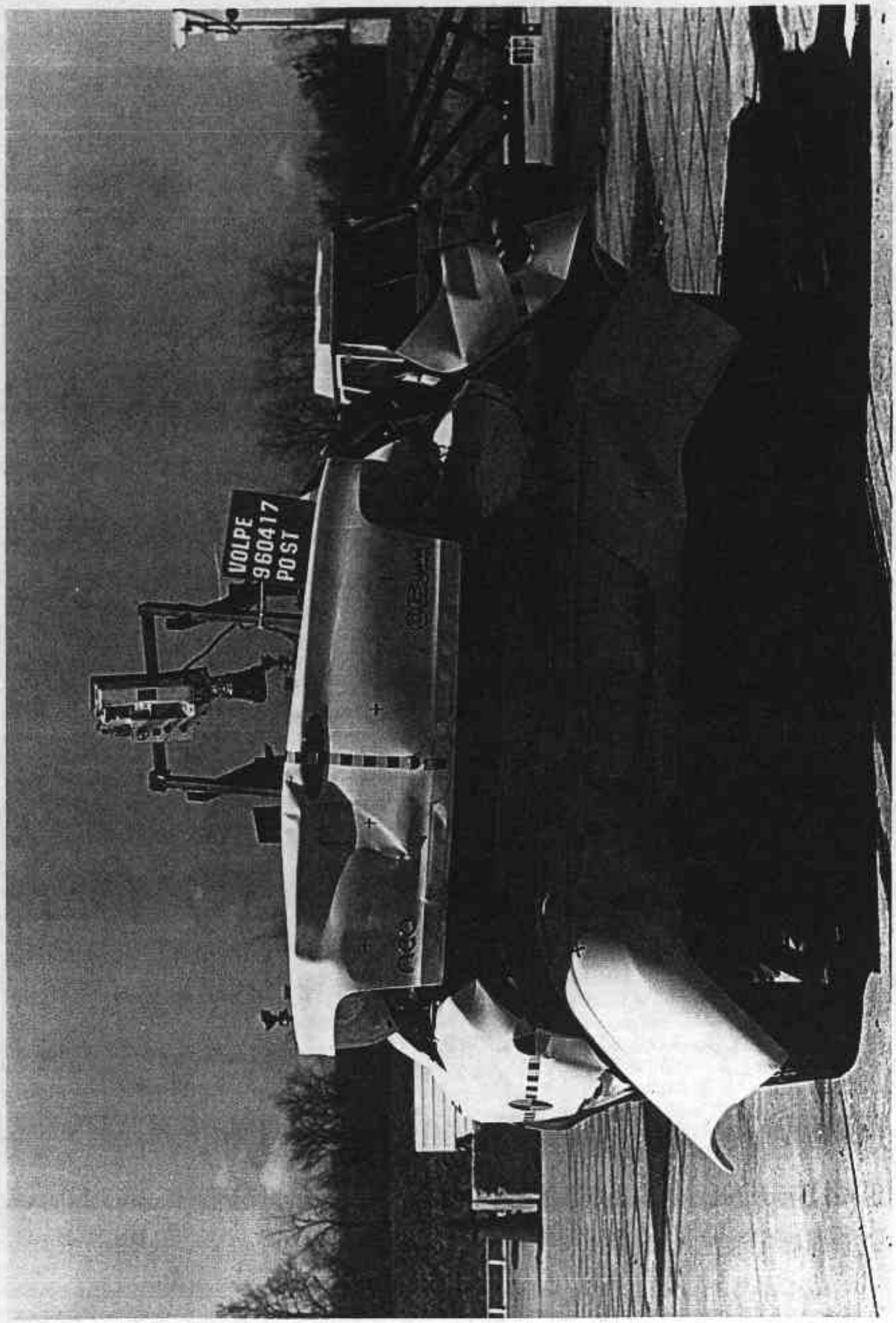


Figure A-10 Post-Test Rear View

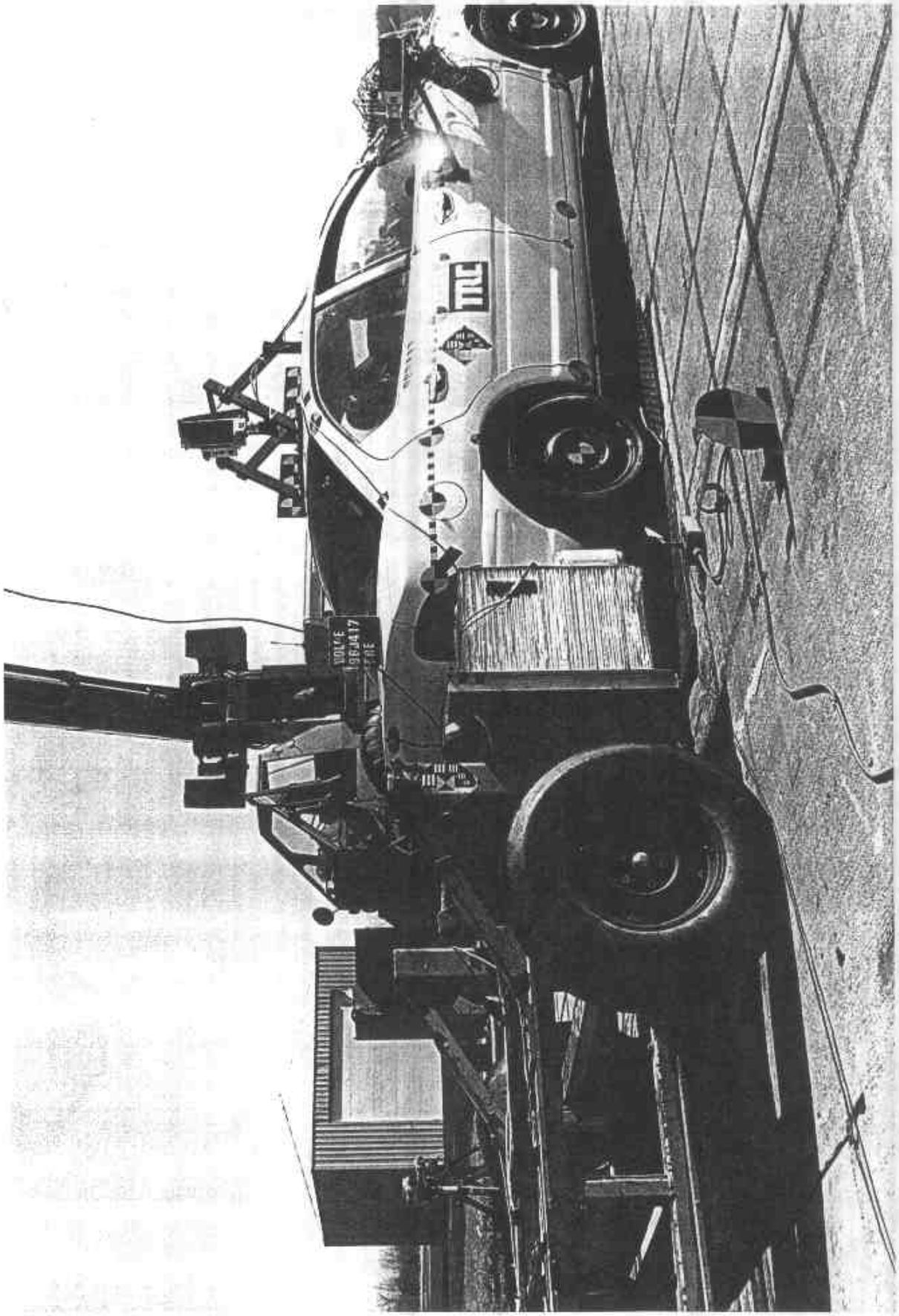


Figure A-11 Pre-Test Right Rear Three-Quarter View

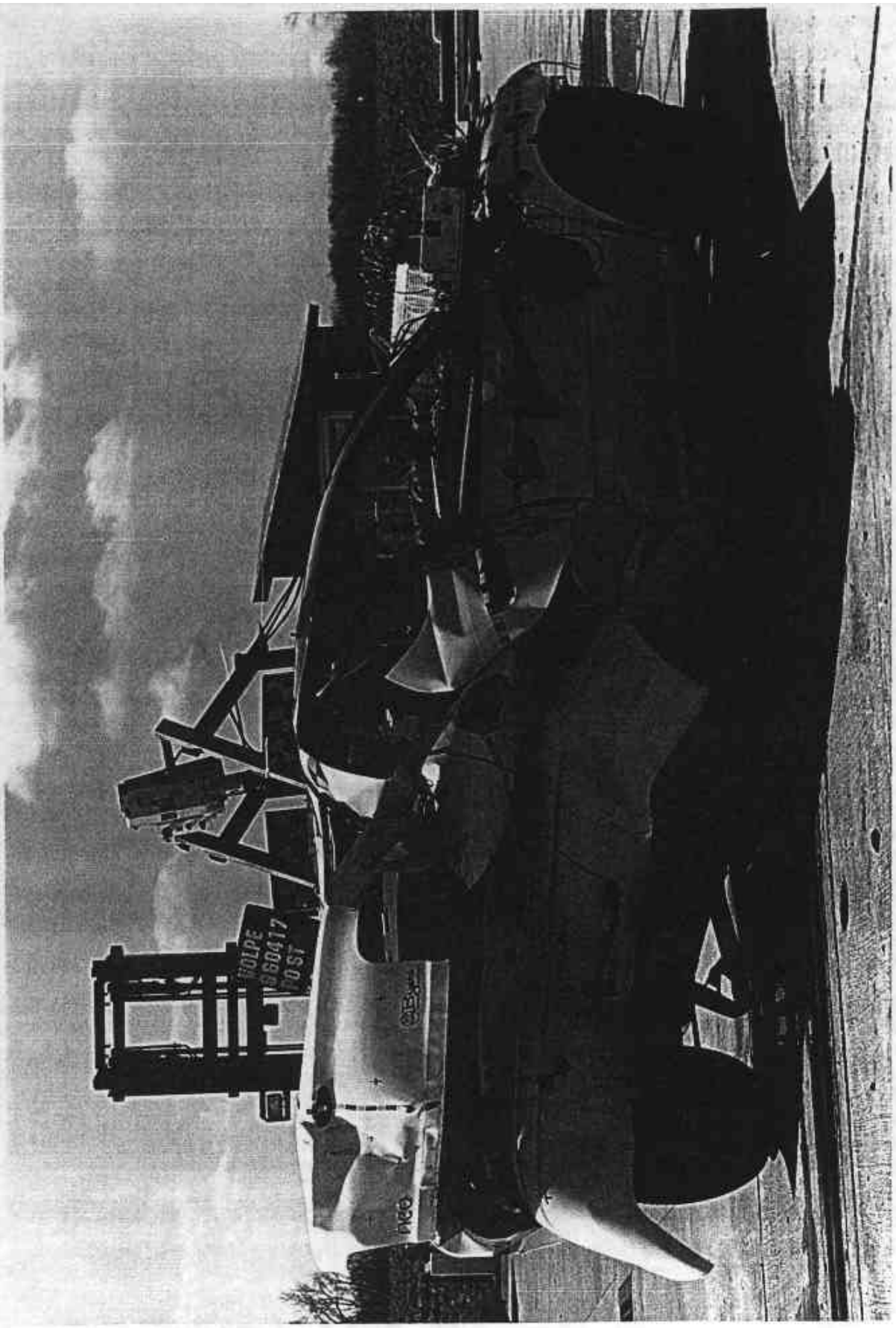


Figure A-12 Post-Test Right Rear Three-Quarter View

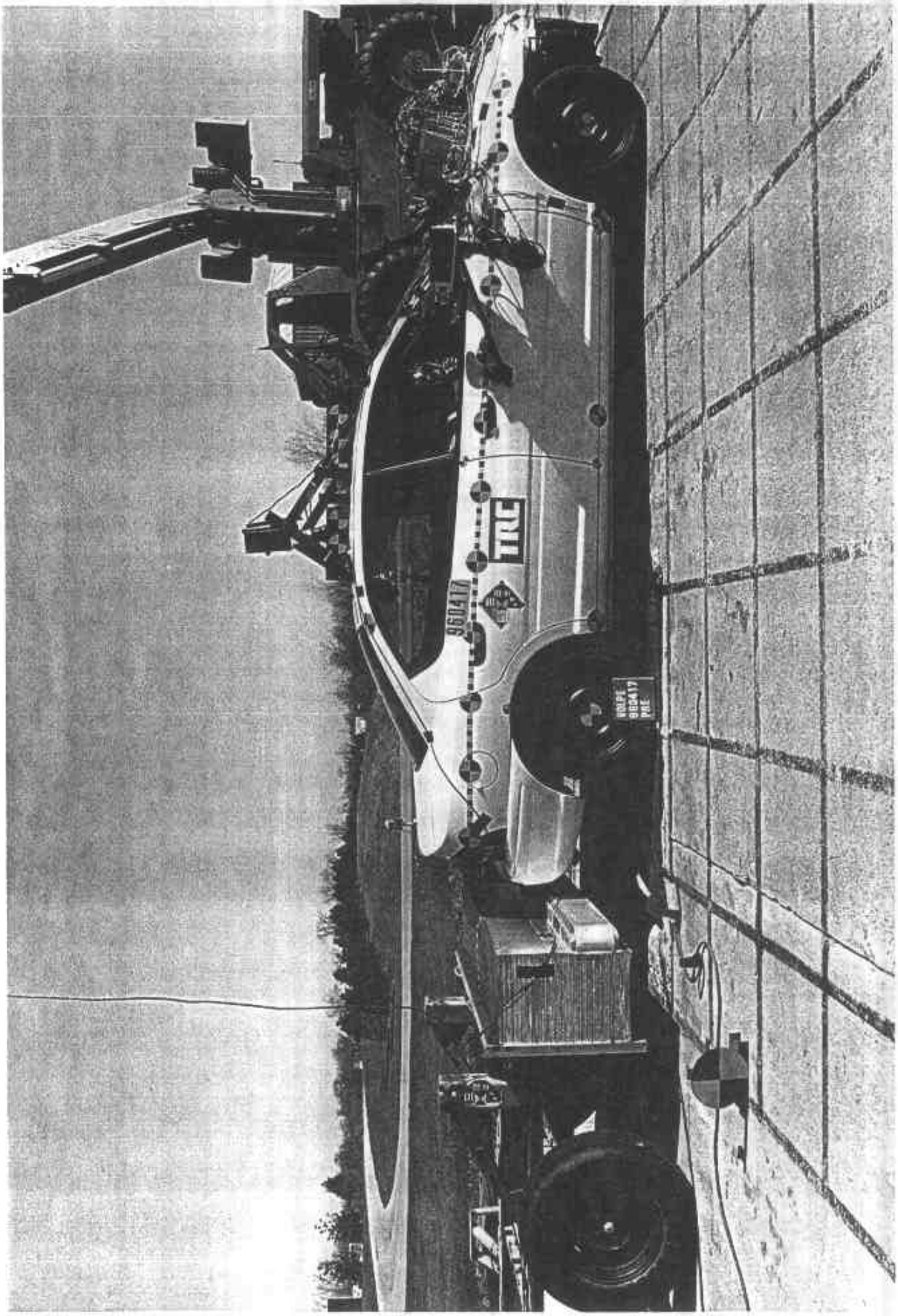


Figure A-13 Pre-Test Right Side View

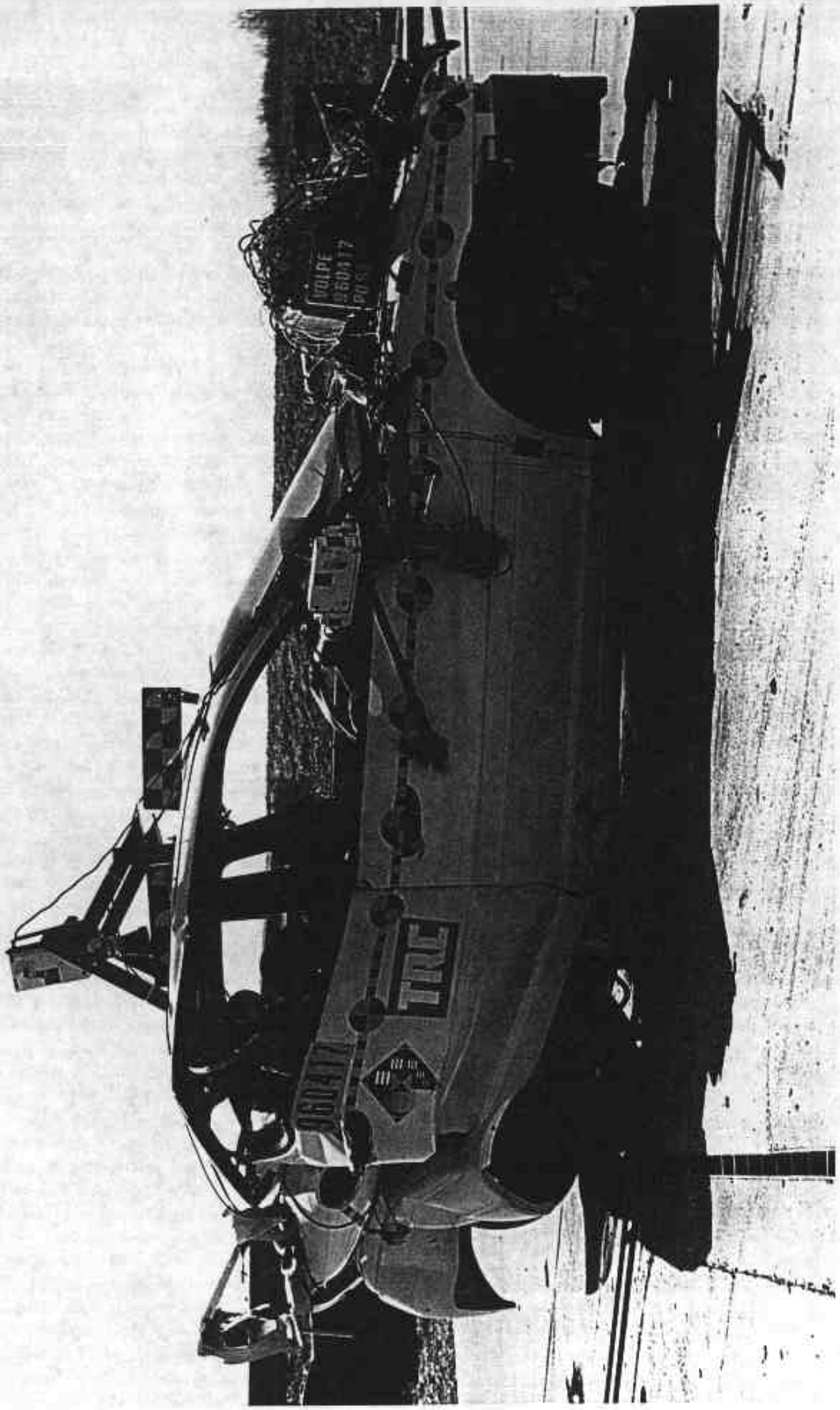


Figure A-14 Post-Test Right Side View

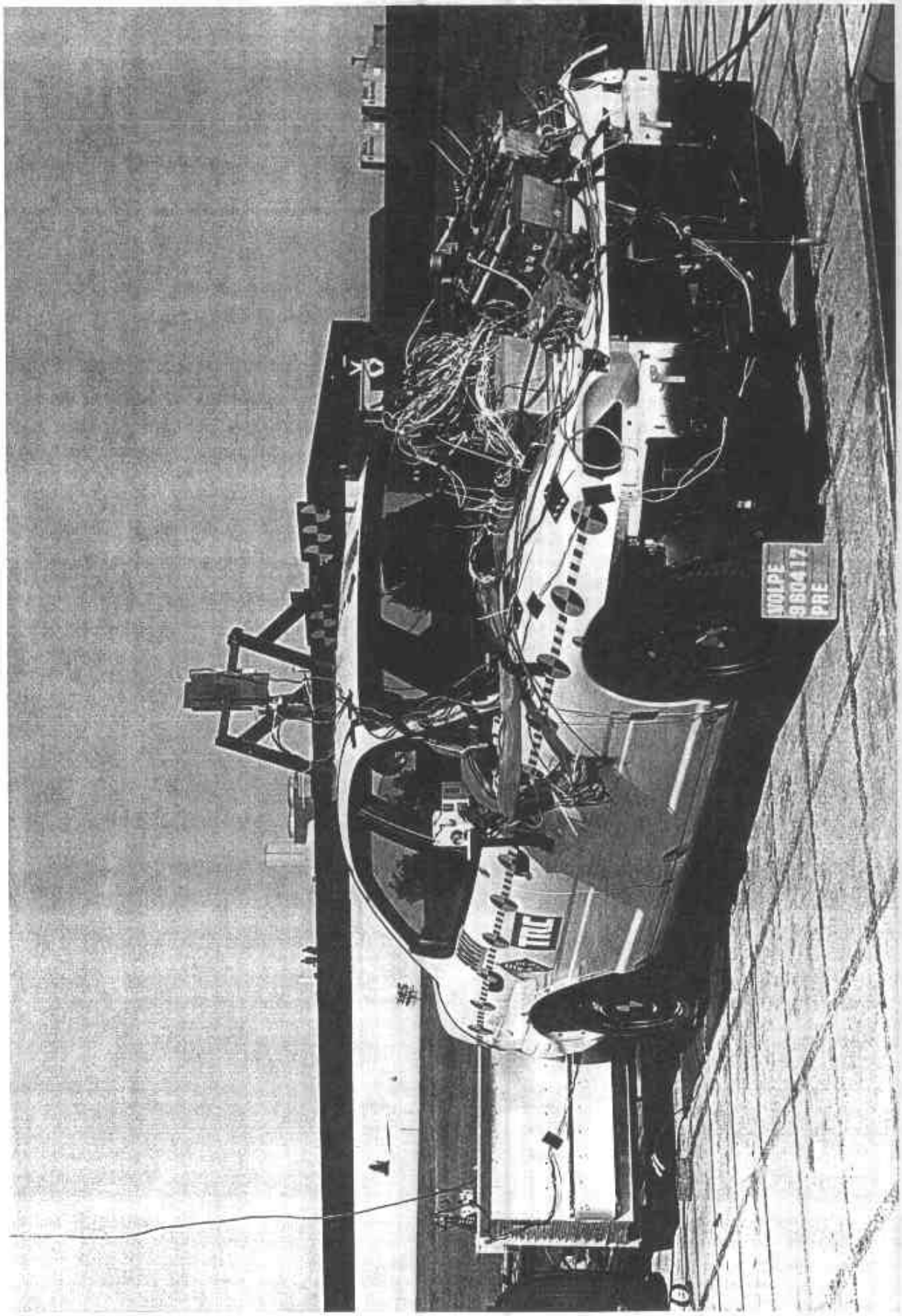


Figure A-15 Pre-Test Right Front Three-Quarter View

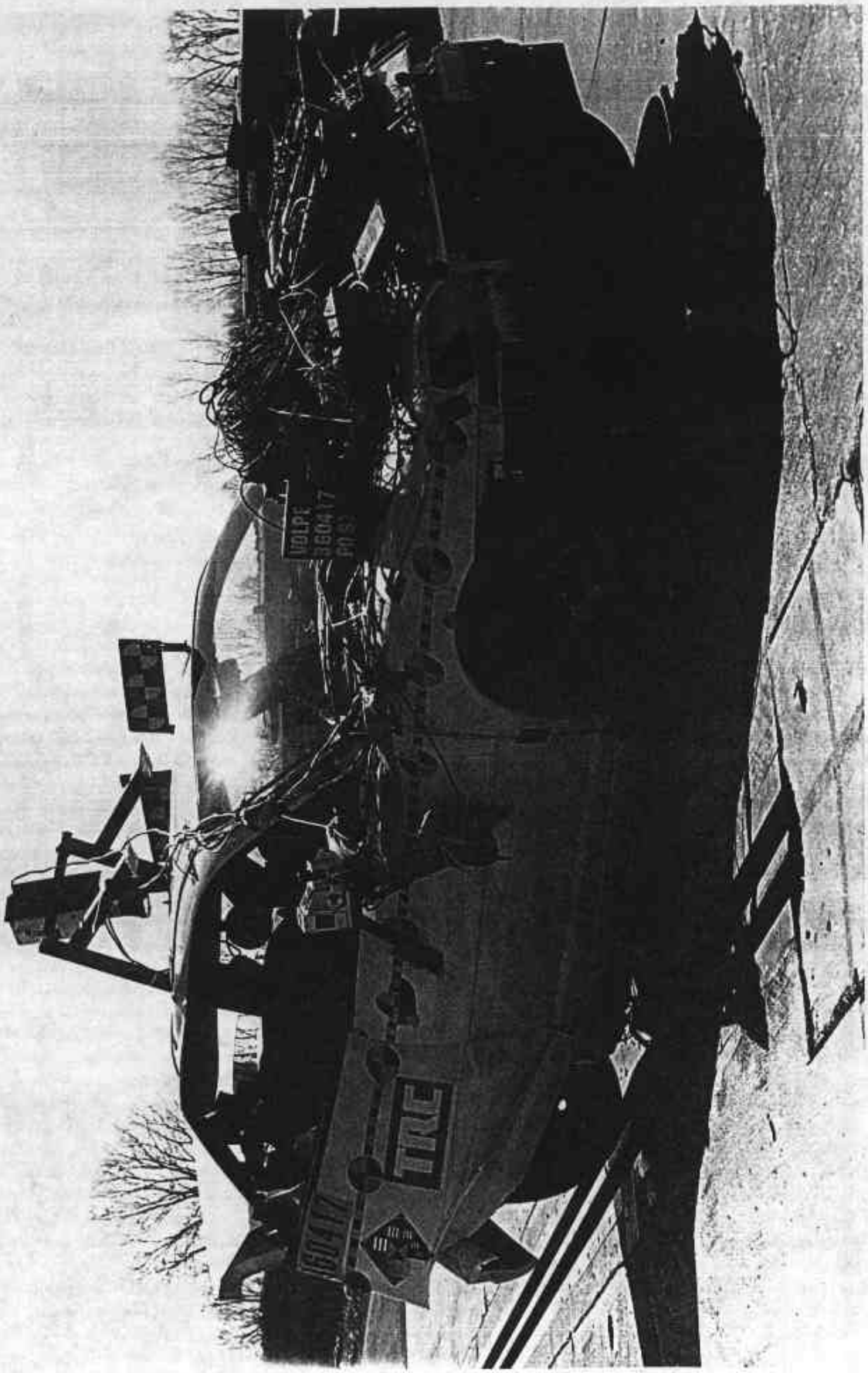


Figure A-16 Post-Test Right Front Three-Quarter View

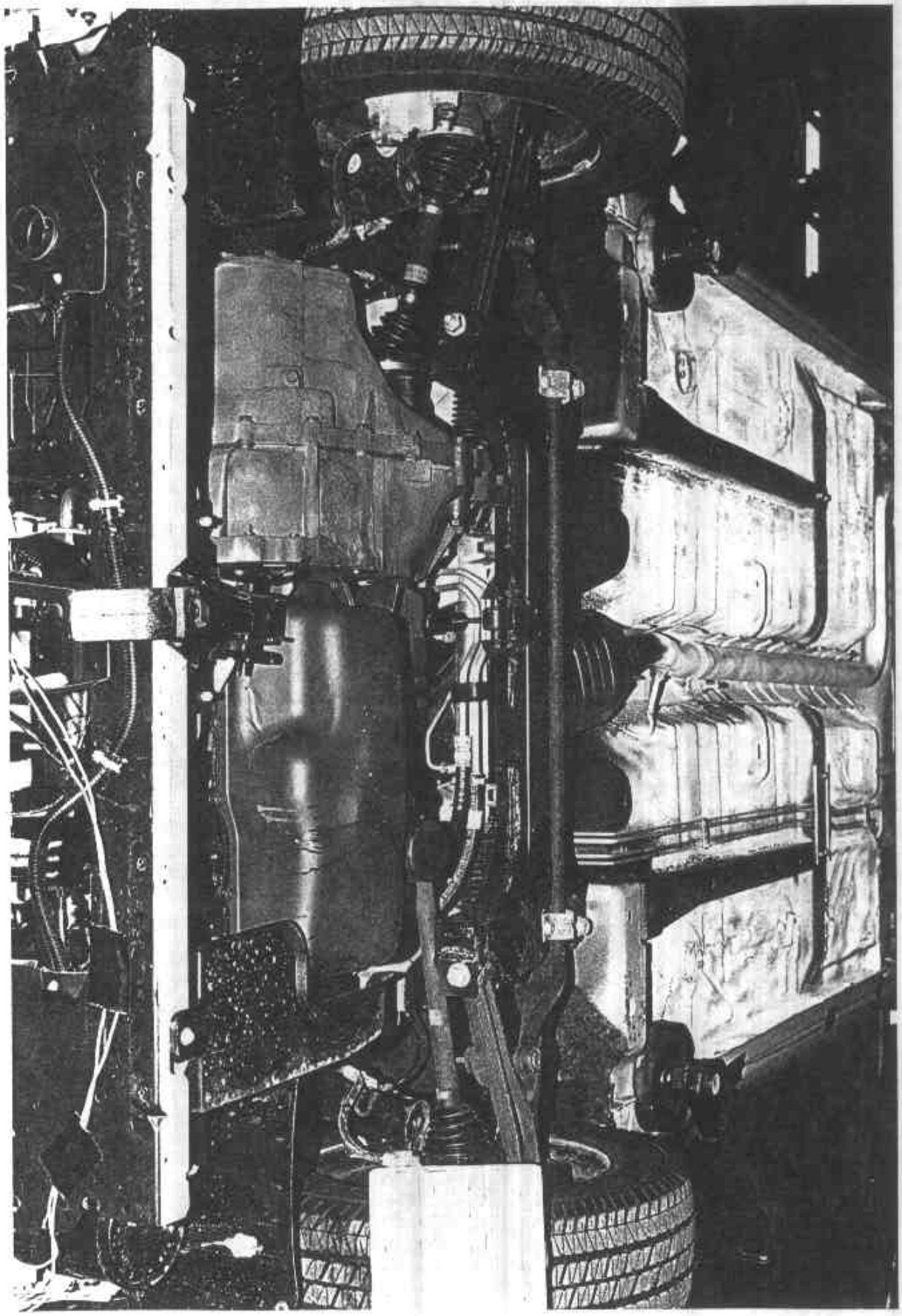


Figure A-17 Pre-Test Front Underbody View

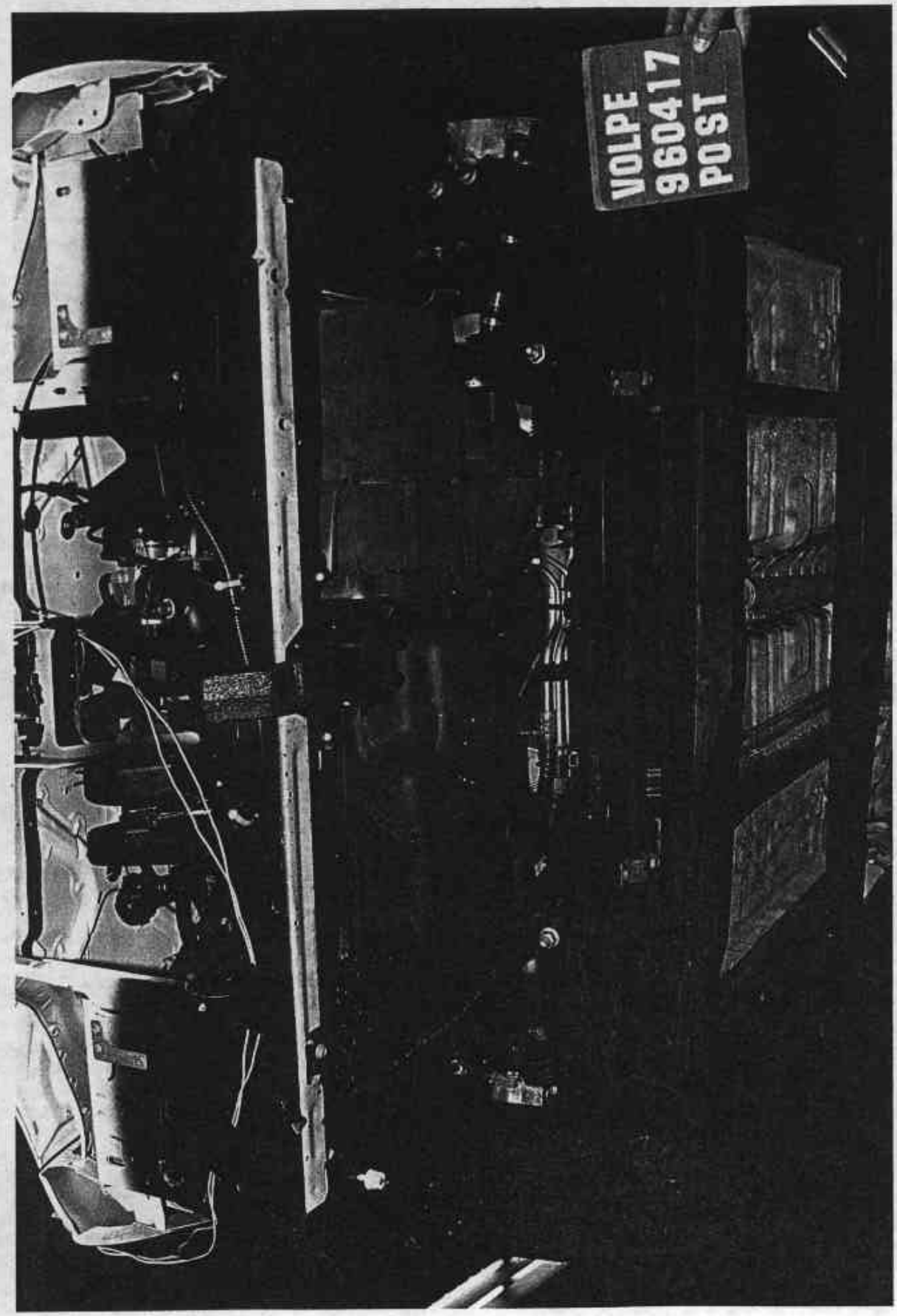


Figure A-18 Post-Test Front Underbody View

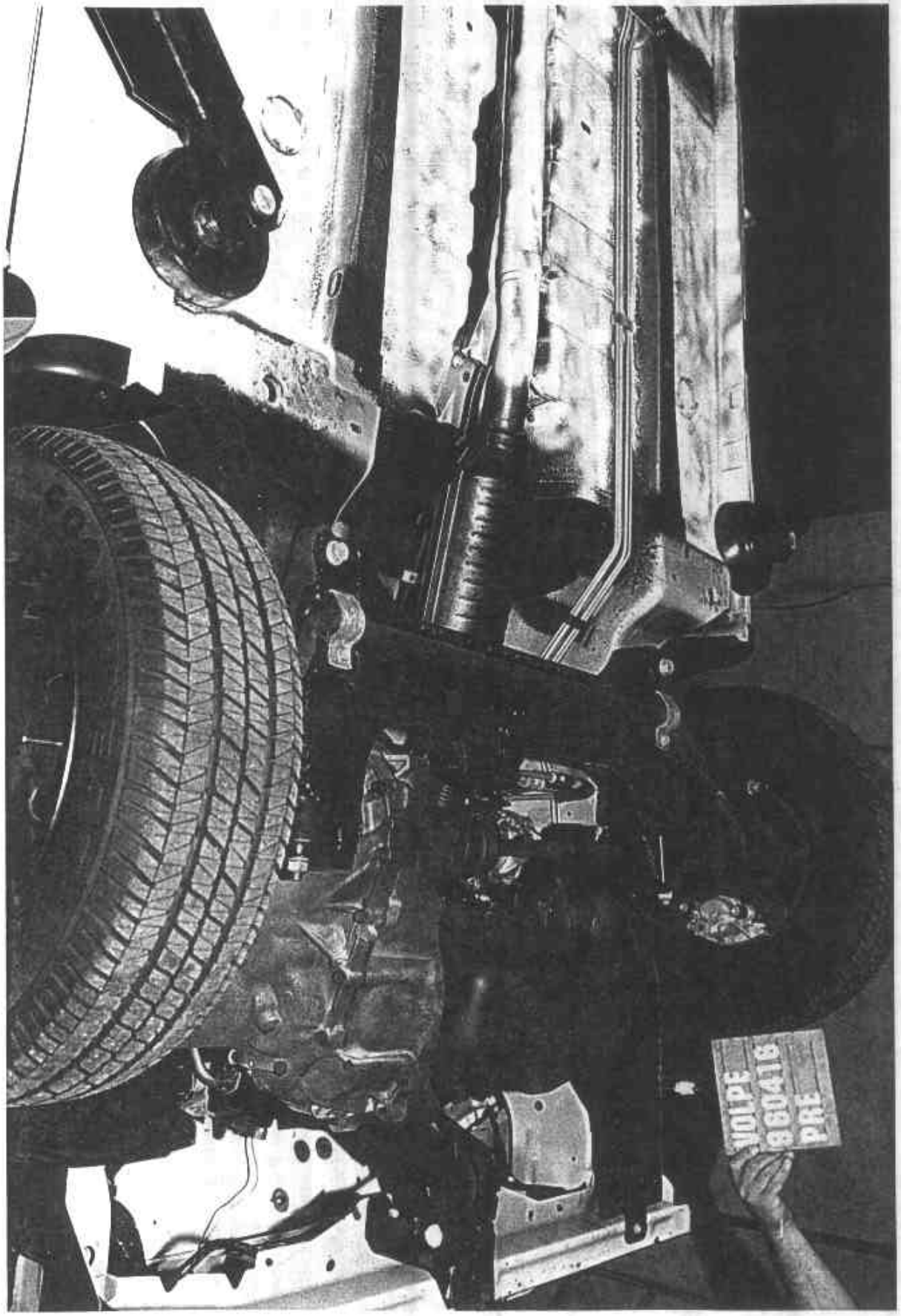


Figure A-19 Pre-Test Left Front Underbody View

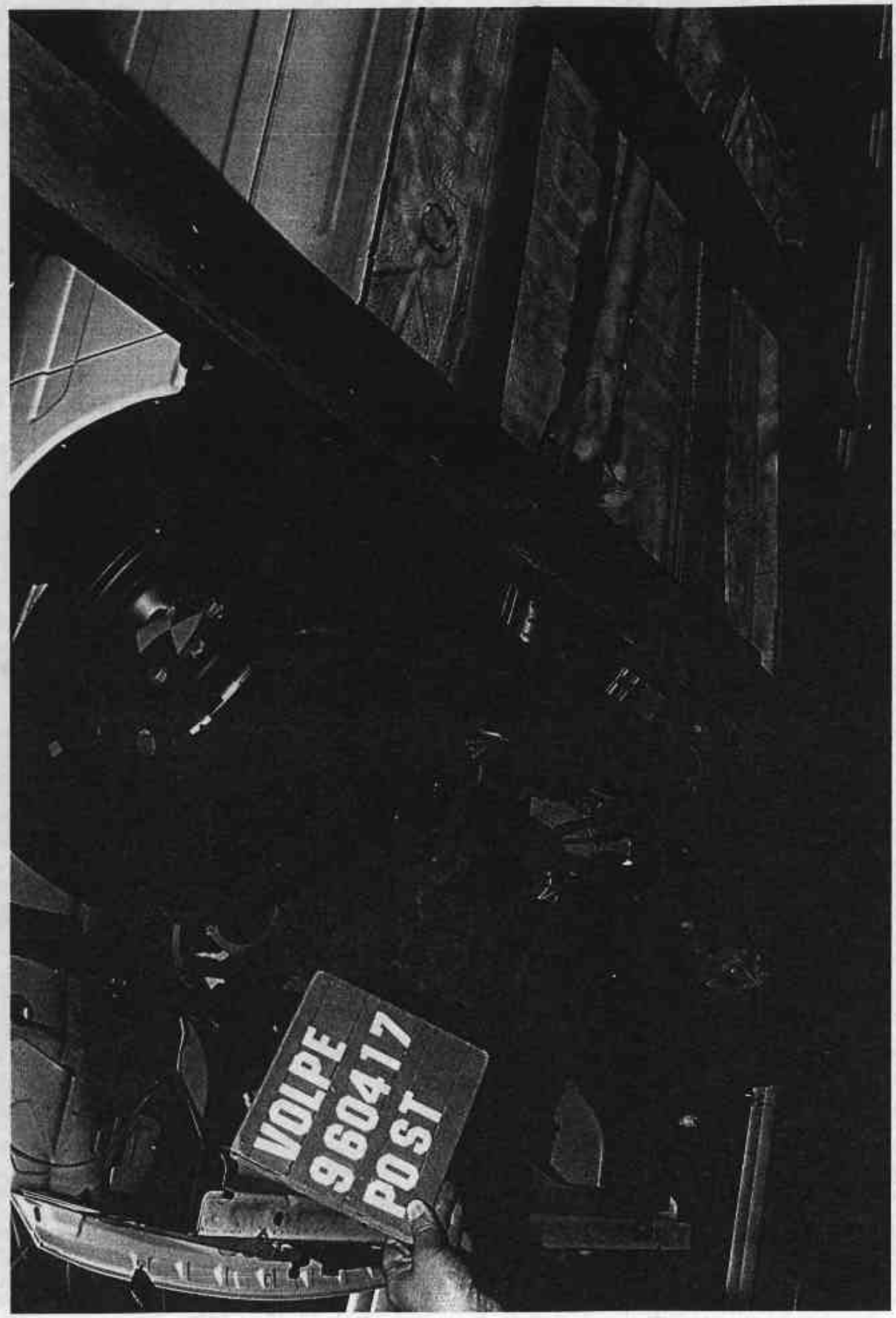


Figure A-20 Post-Test Left Front Underbody View

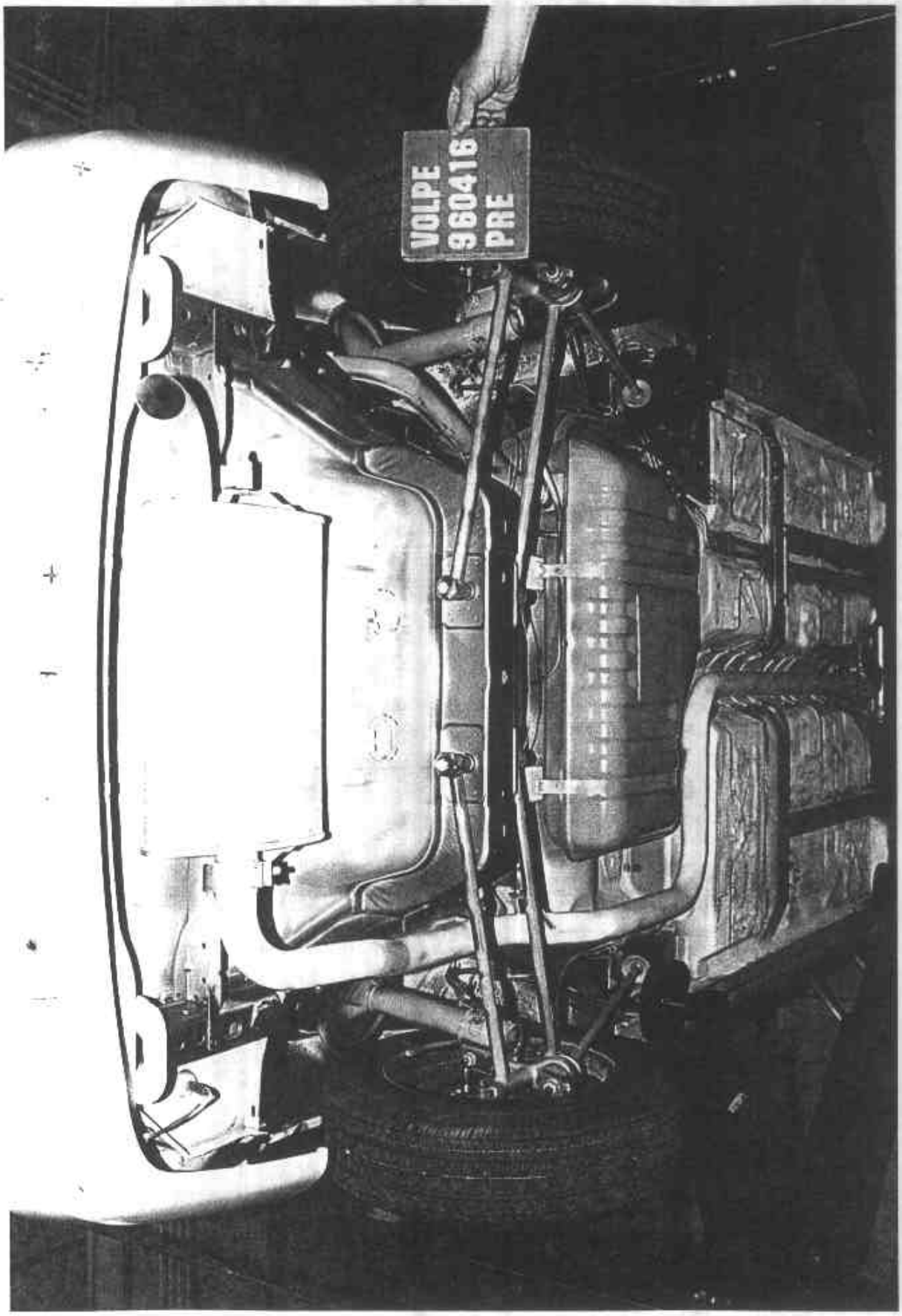


Figure A-21 Pre-Test Rear Underbody View

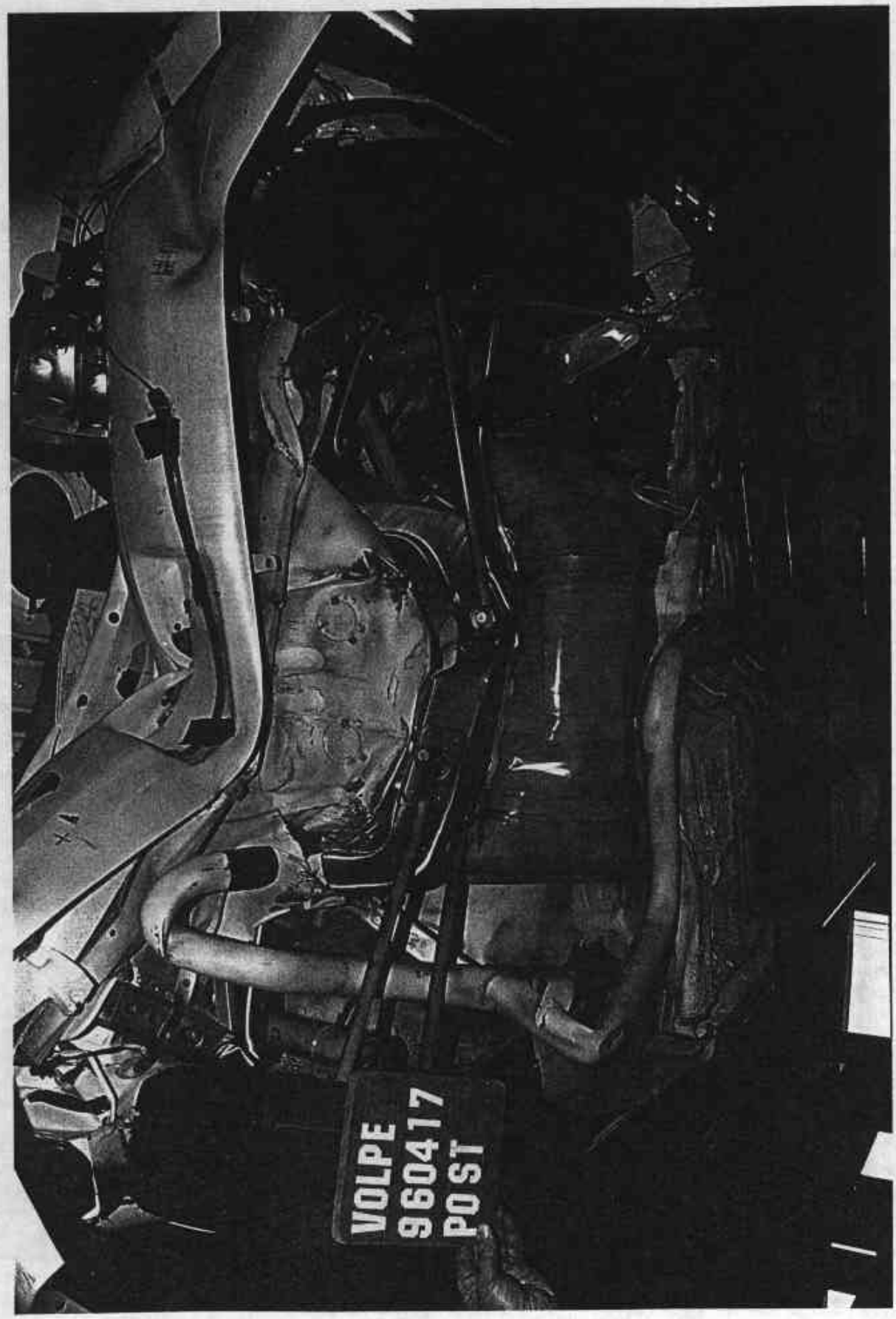


Figure A-22 Post-Test Rear Underbody View

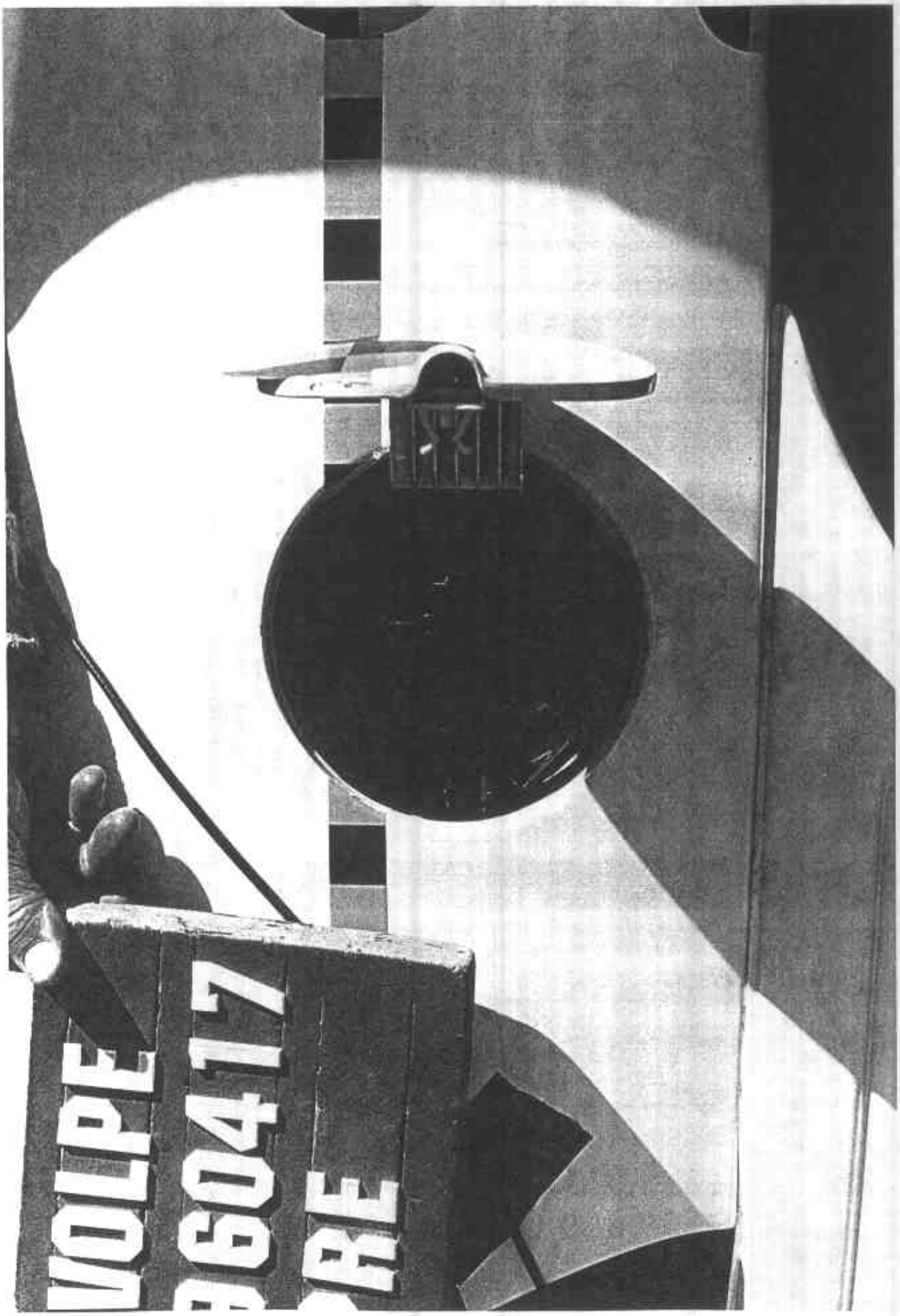


Figure A-23 Pre-Test Fuel Filler Cap View

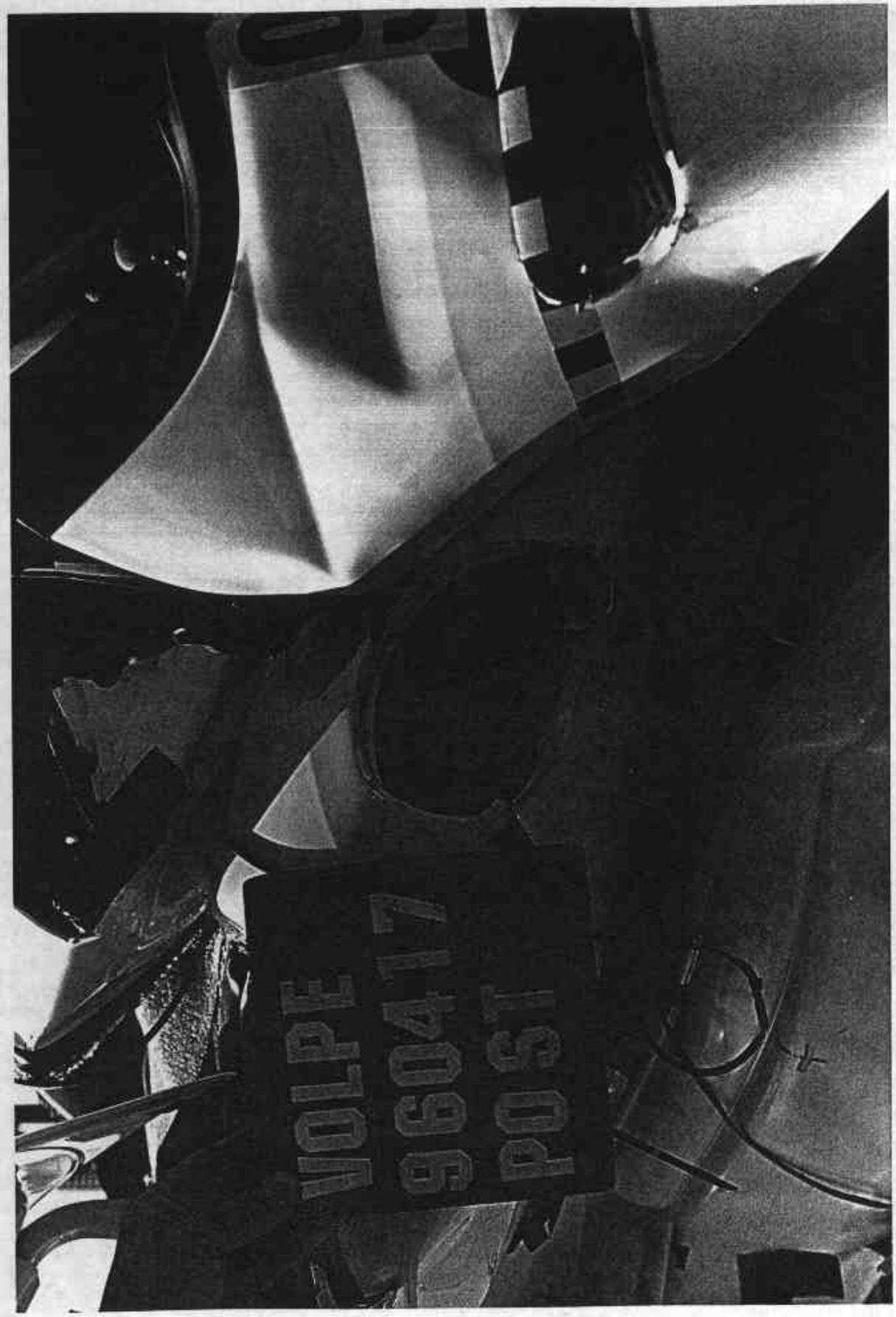


Figure A-24 Post-Test Fuel Filler Cap View

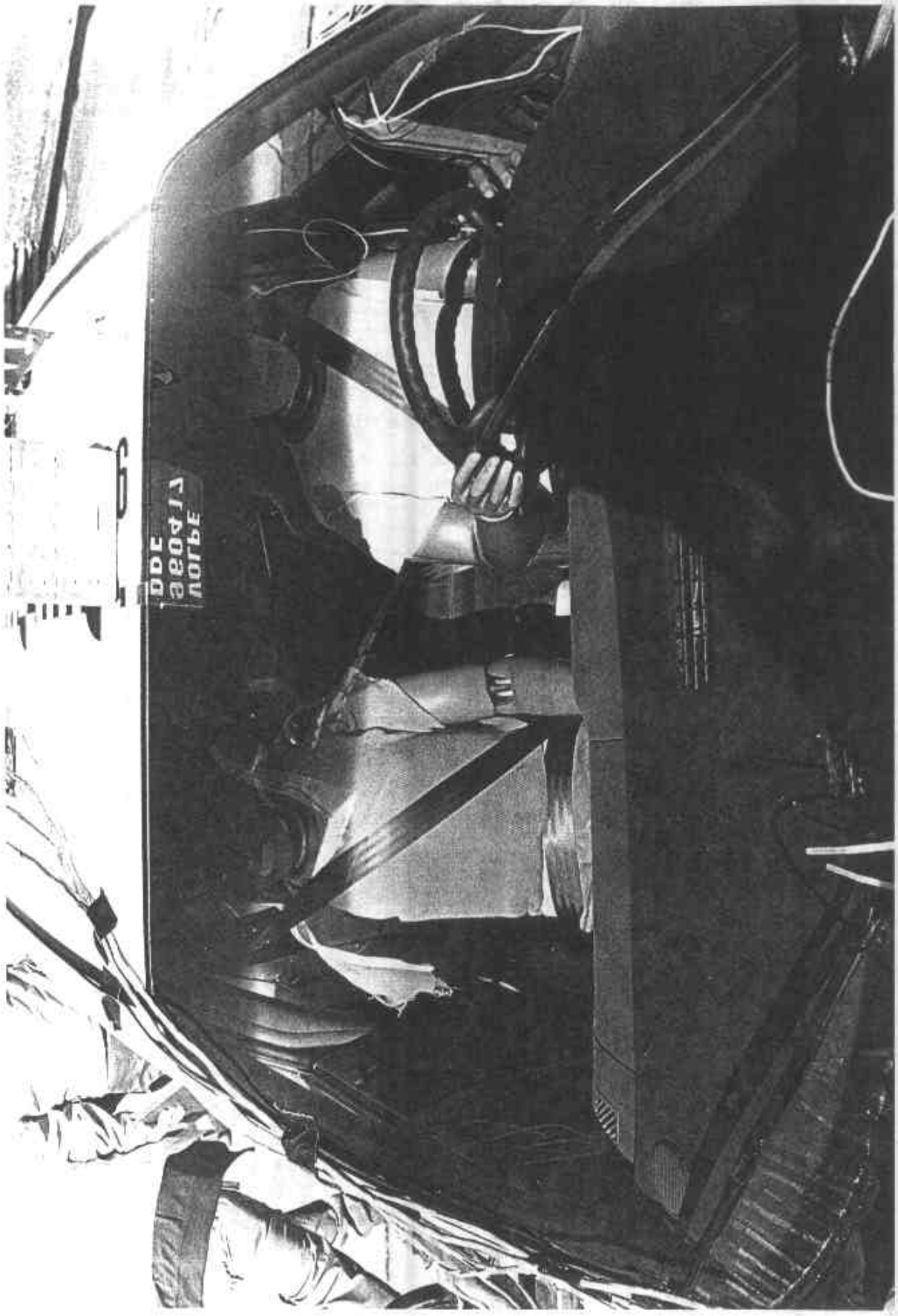


Figure A-25 Pre-Test Windshield View

Figure A-26 Post-Test Windshield View

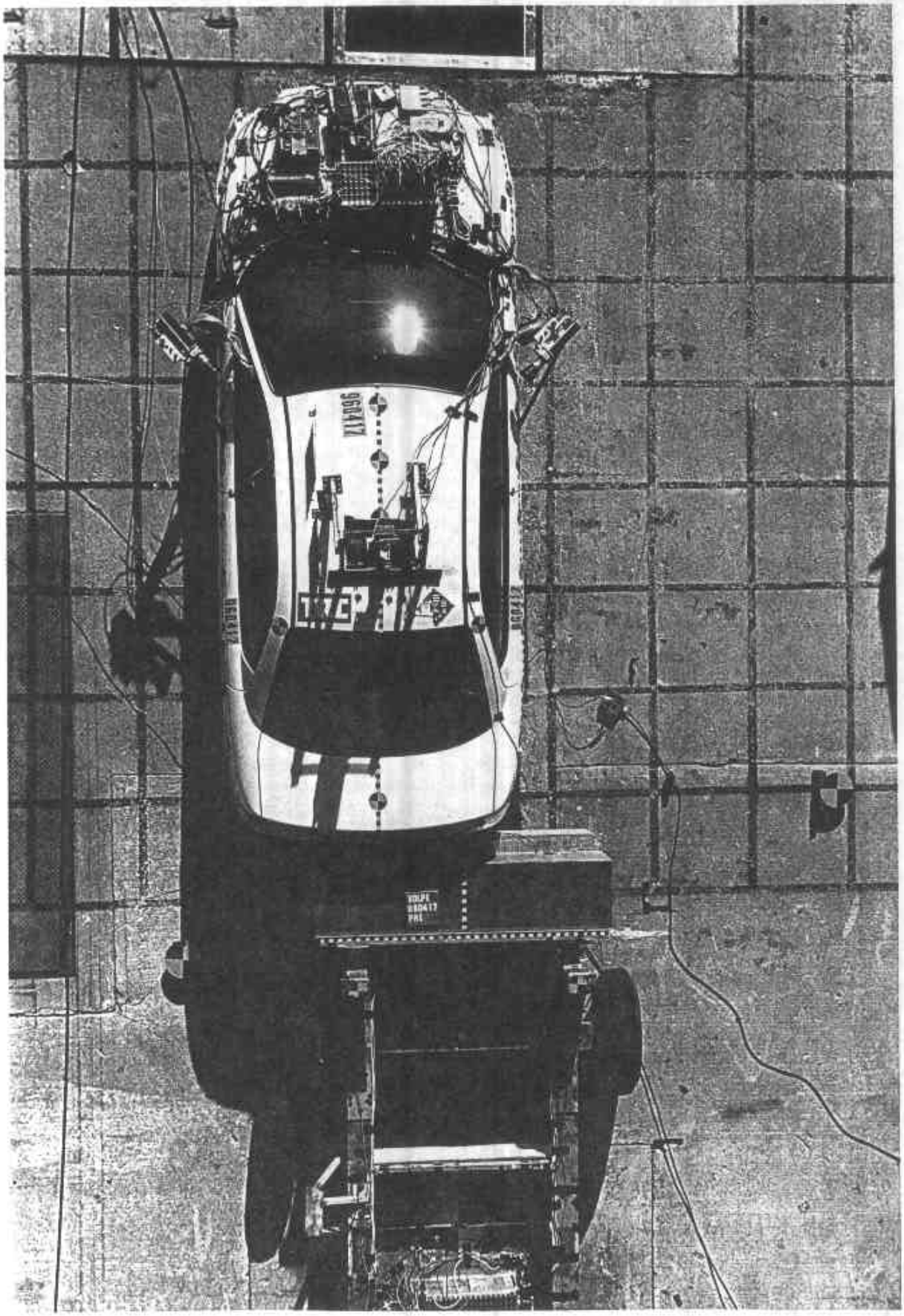


Figure A-27 Pre-Test Barrier to Vehicle Alignment Overhead View

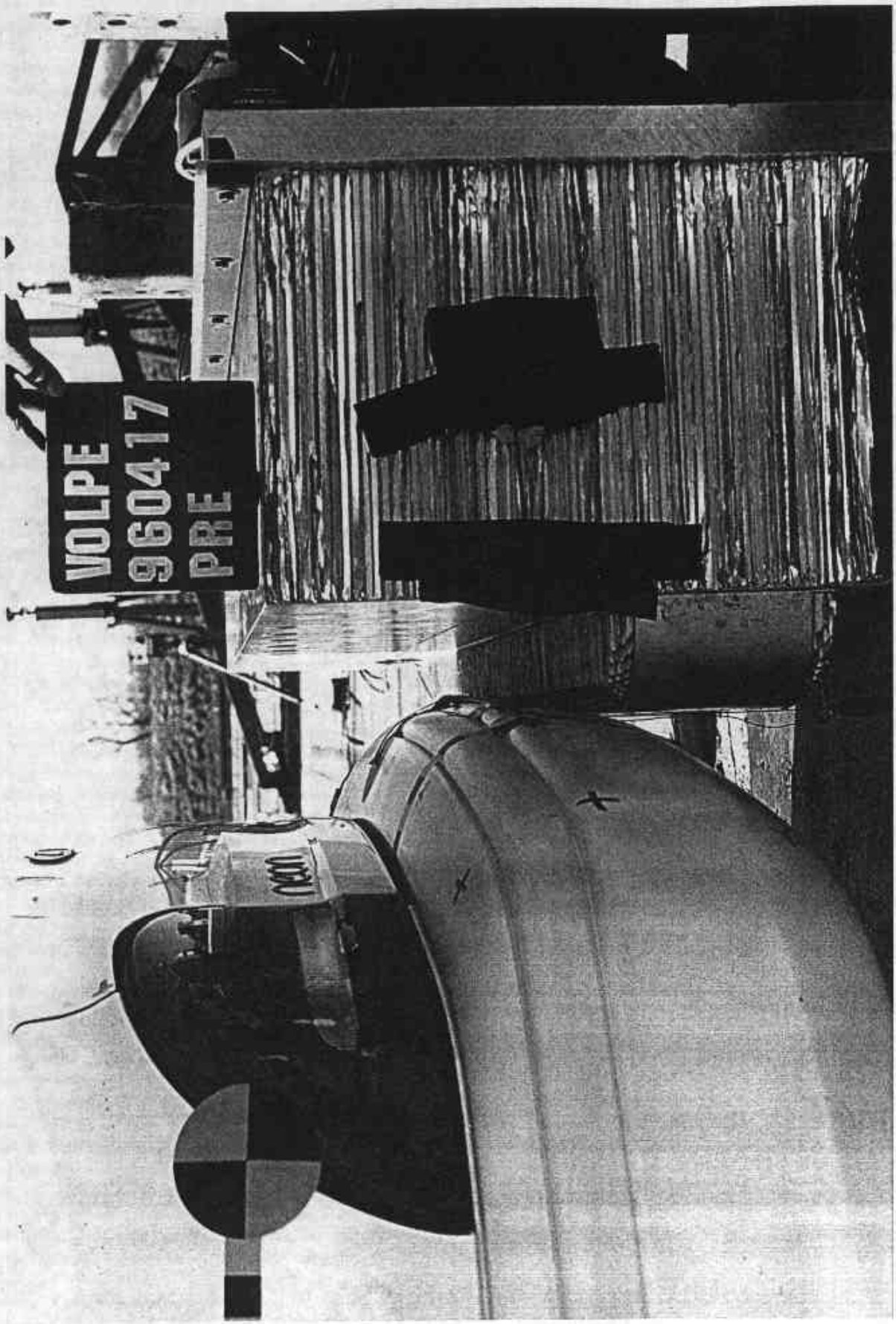


Figure A-28 Pre-Test Barrier to Vehicle Alignment Left Side View

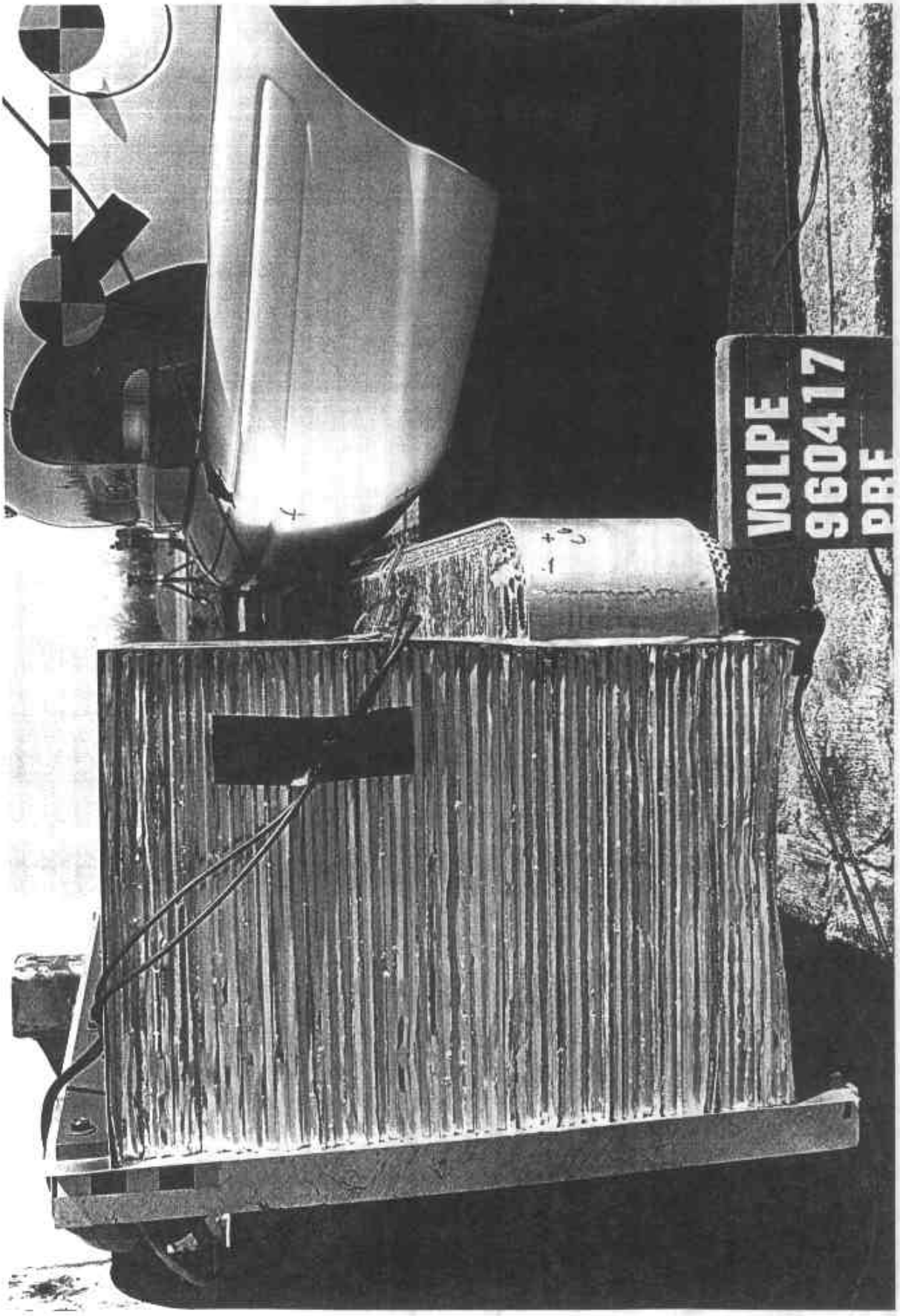


Figure A-29 Pre-Test Barrier to Vehicle Alignment Right Side View

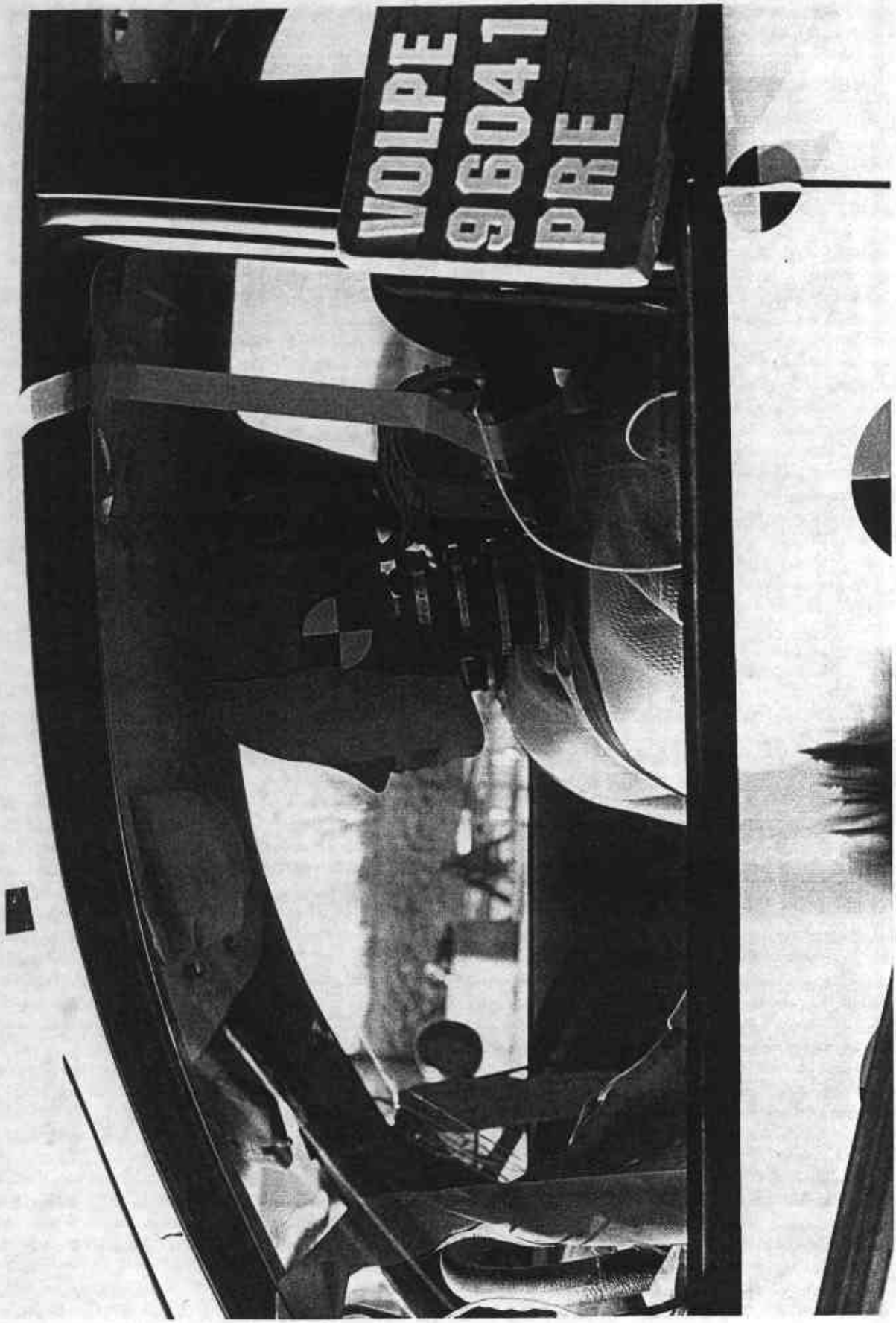


Figure A-30 Pre-Test Driver Dummy Position View

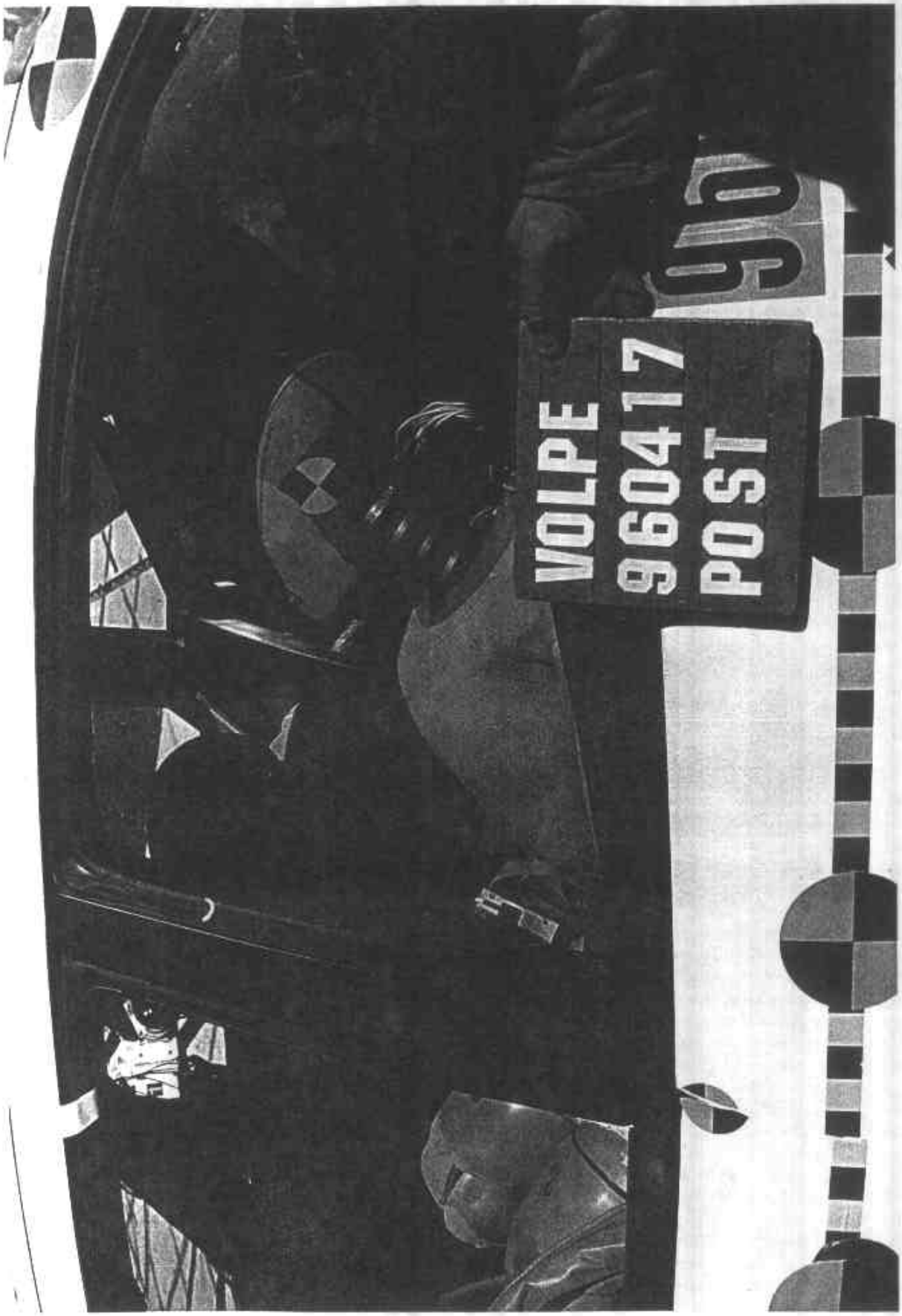


Figure A-31 Post-Test Driver Dummy Position View

Figure A-32 Pre-Test Passenger Dummy Position View

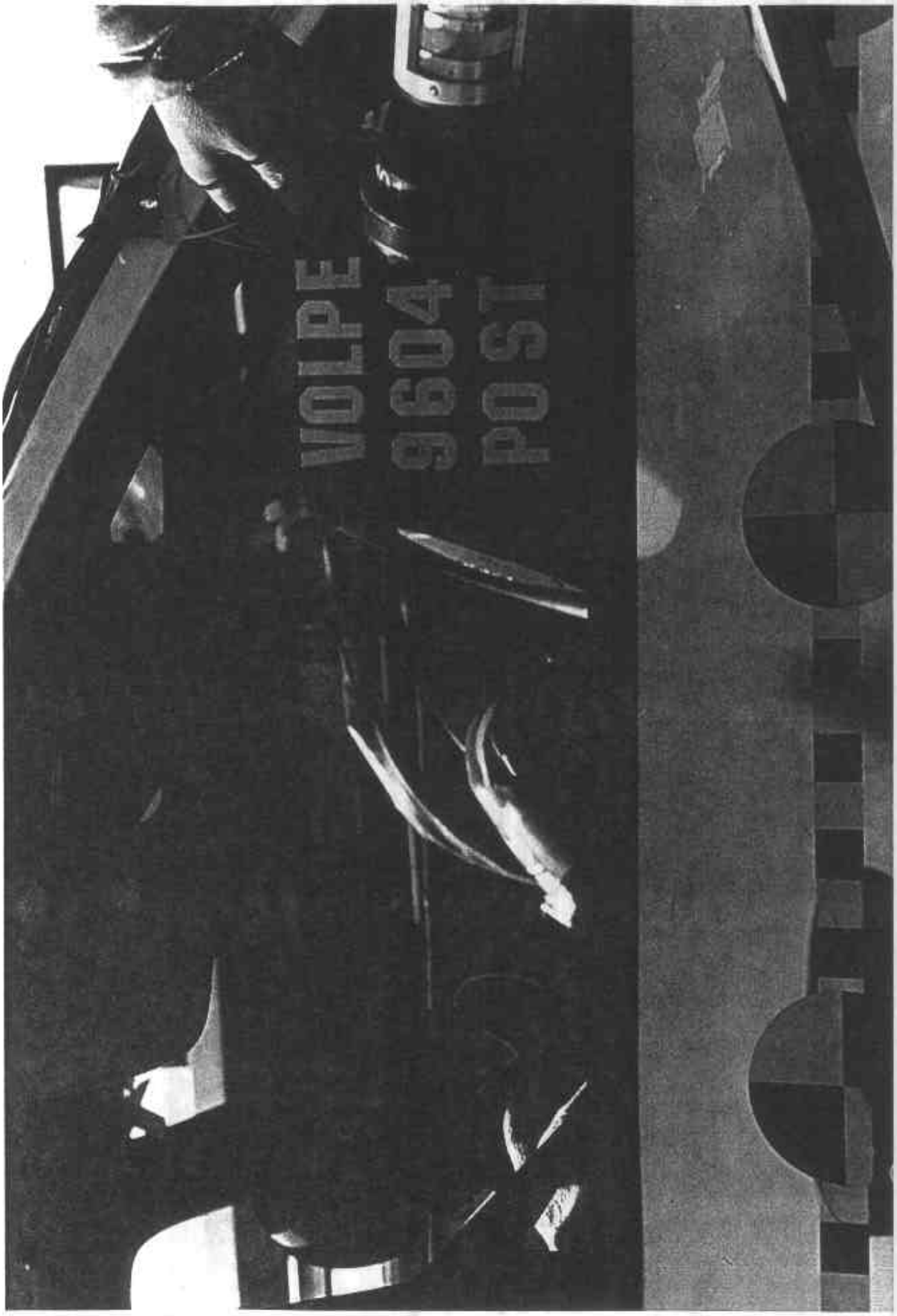


Figure A-33 Post-Test Passenger Dummy Position View

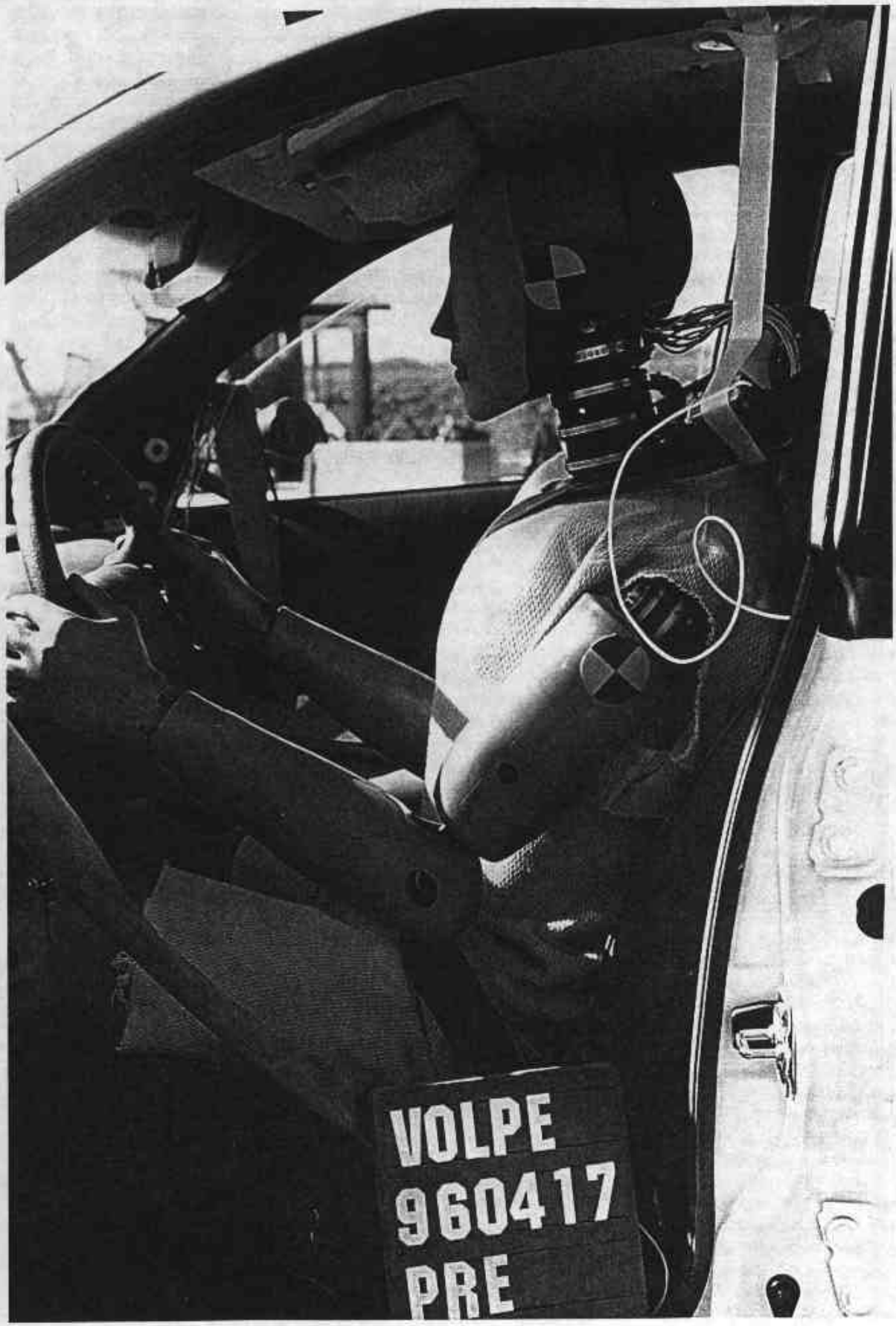


Figure A-34 Pre-Test Driver Dummy & Vehicle Interior - View 1

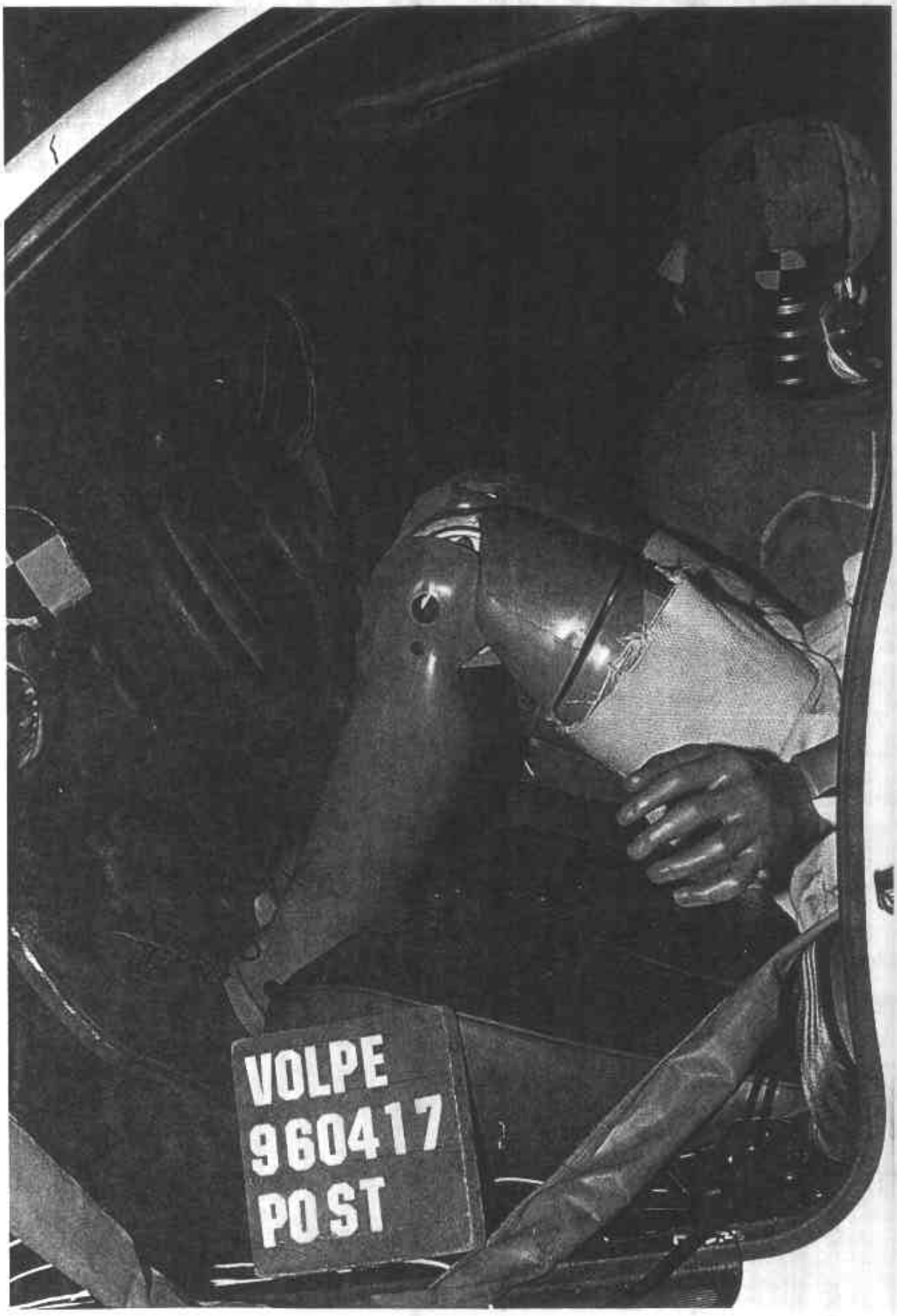


Figure A-35 Post-Test Driver Dummy & Vehicle Interior - View 1

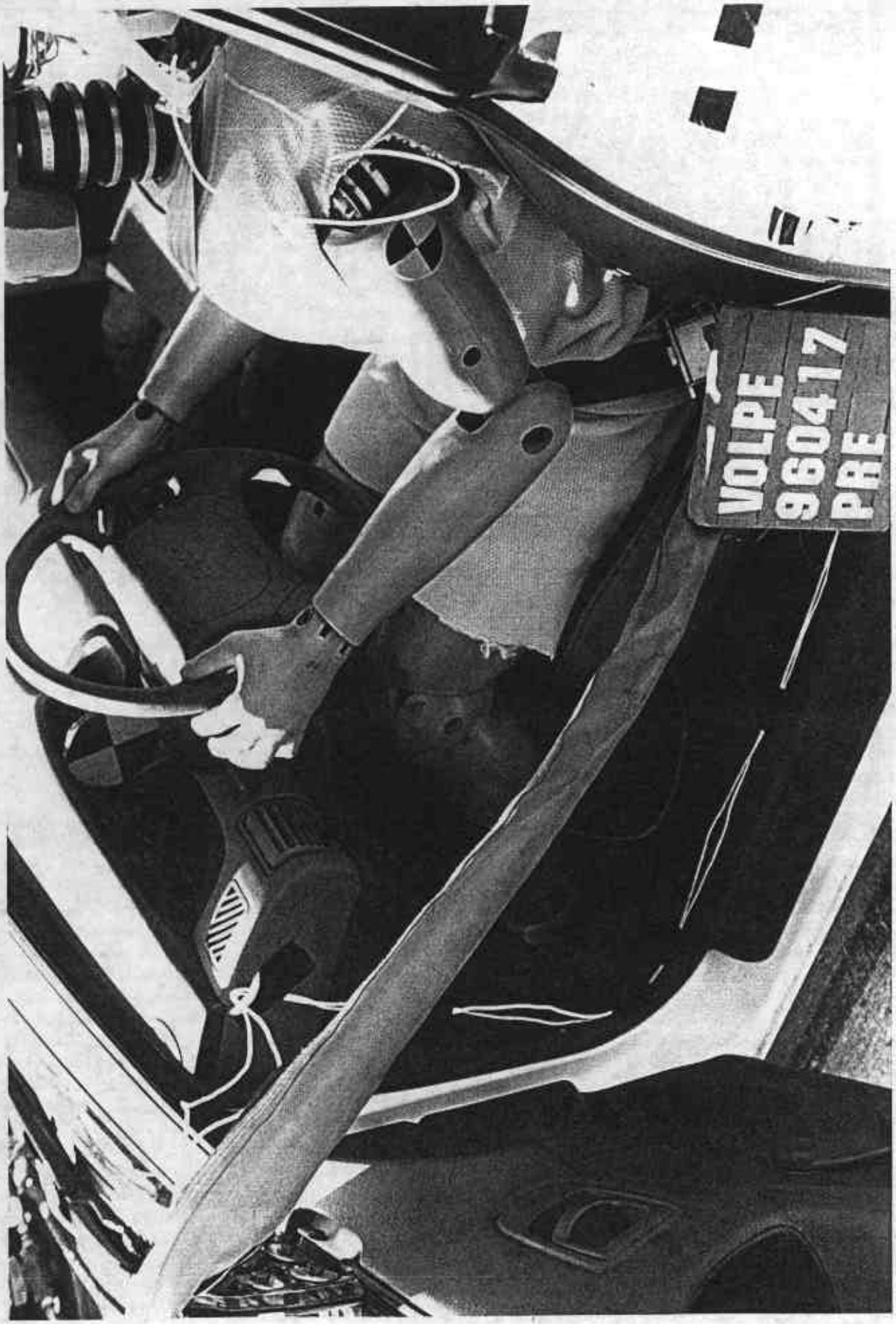


Figure A-36 Pre-Test Driver Dummy & Vehicle Interior - View 2

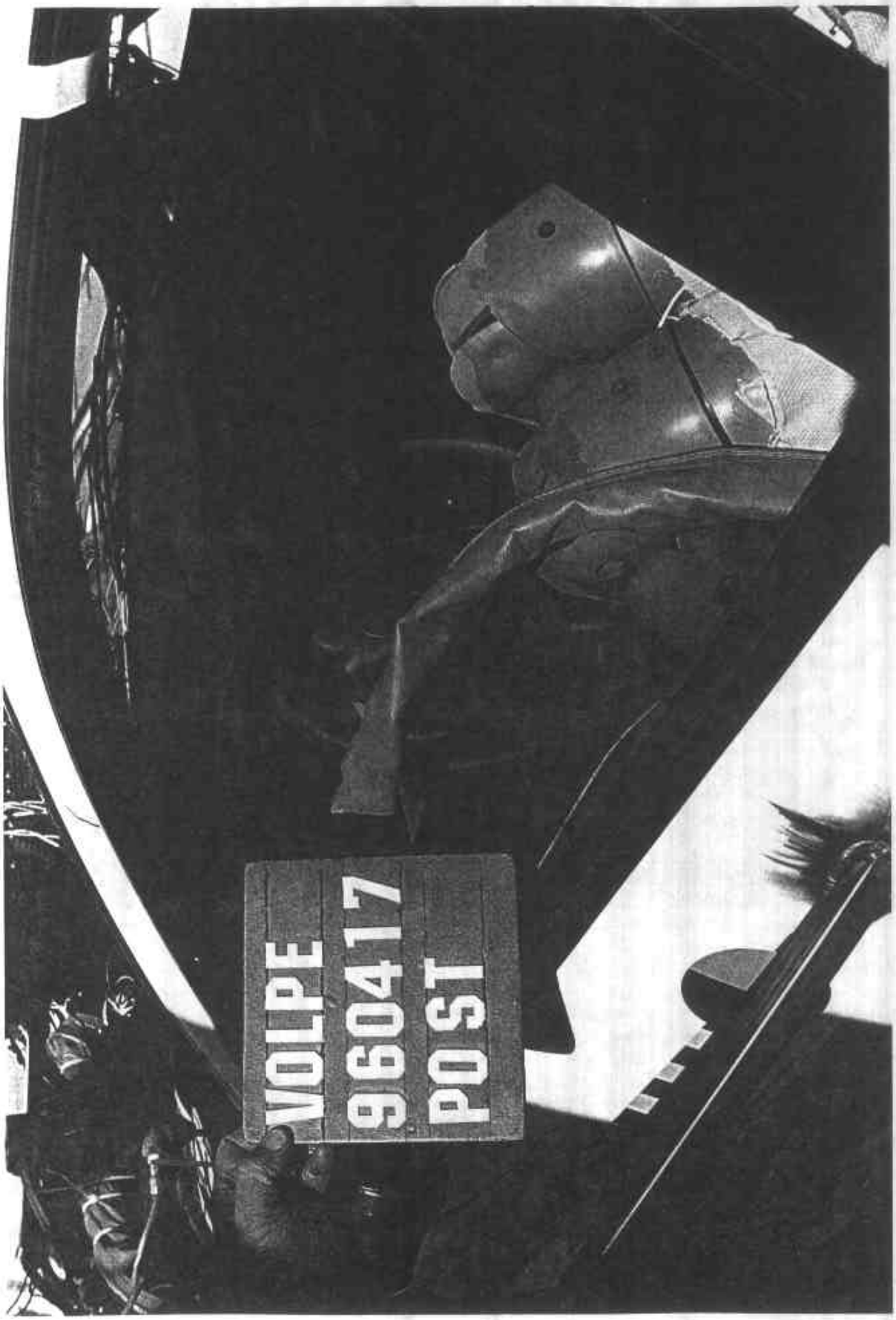


Figure A-37 Post-Test Driver Dummy & Vehicle Interior - View 2

Figure A-38 Pre-Test Passenger Dummy & Vehicle Interior - View 1

Figure A-39 Pre-Test Passenger Dummy & Vehicle Interior - View 2

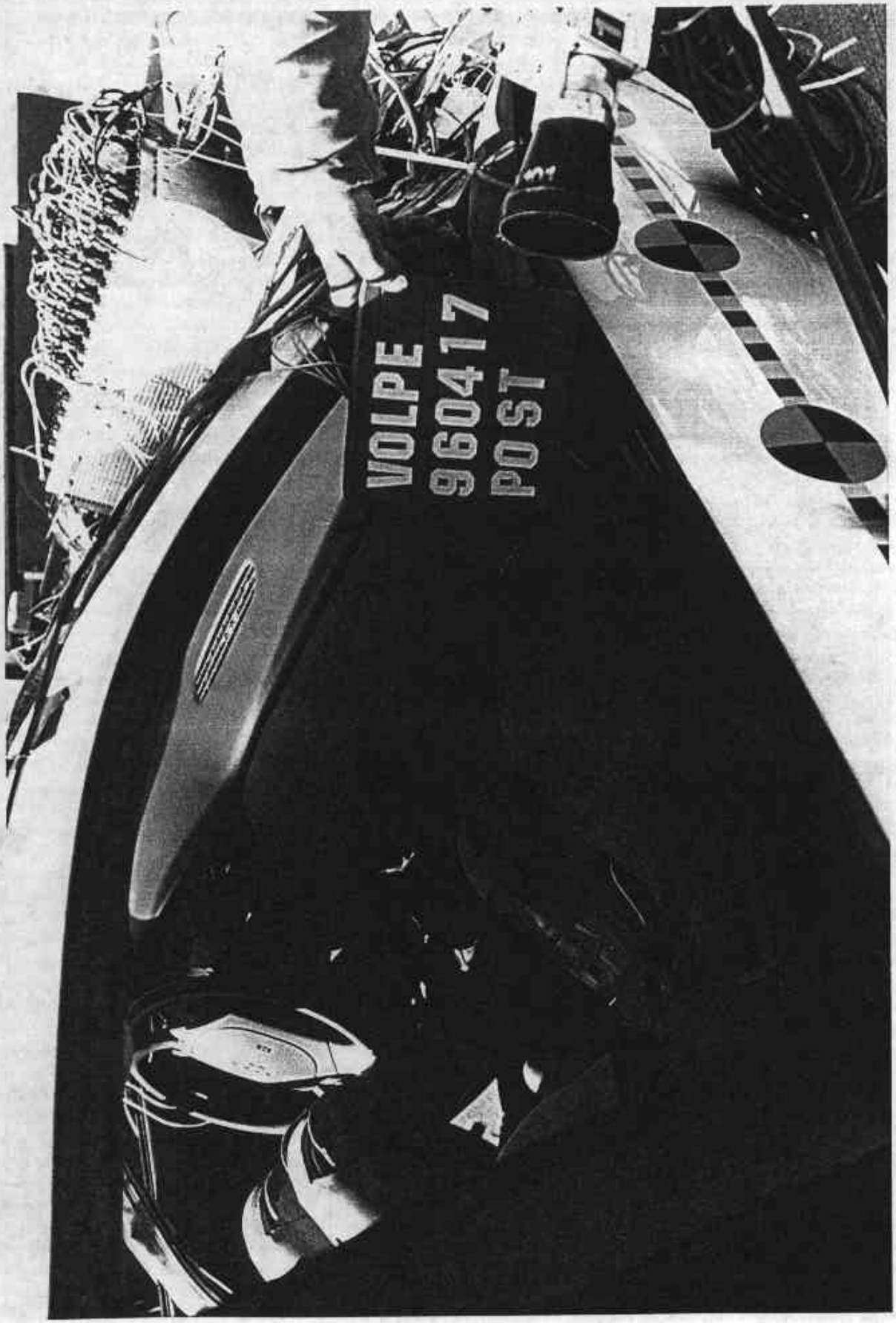


Figure A-40 Post-Test Passenger Dummy & Vehicle Interior View

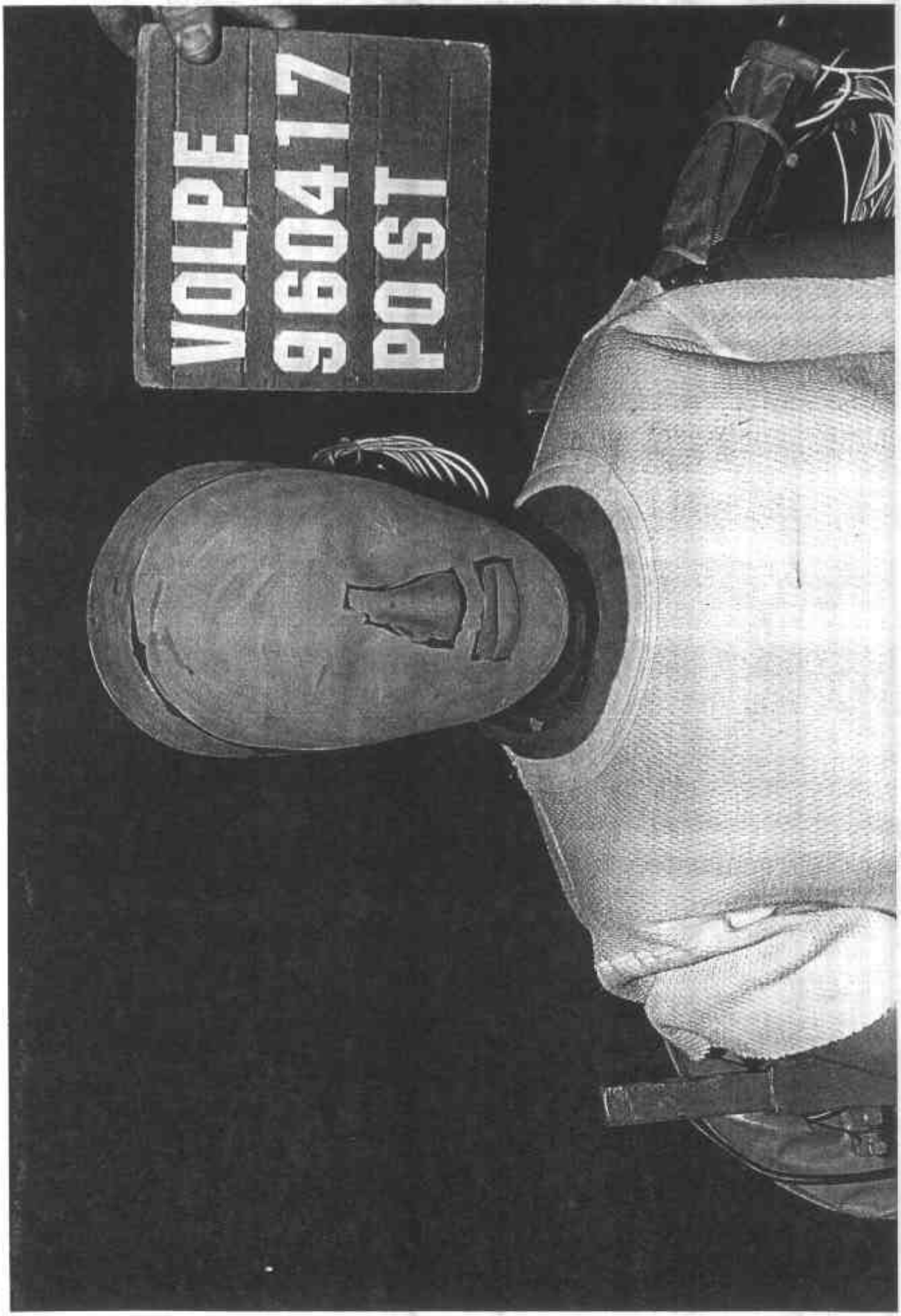


Figure A-41 Post-Test Driver Dummy Head Contact - View 1

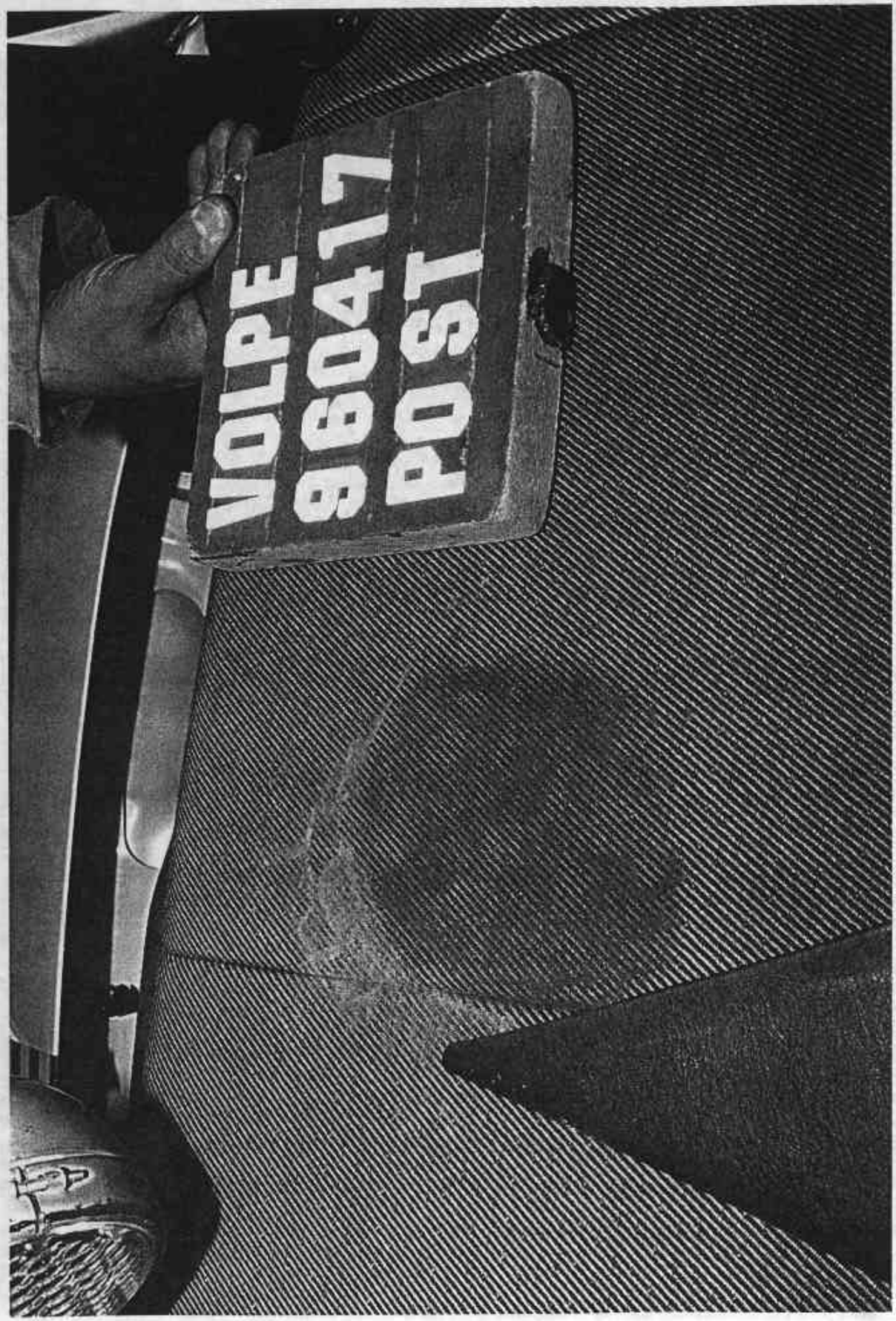


Figure A-42 Post-Test Driver Dummy Head Contact - View 2

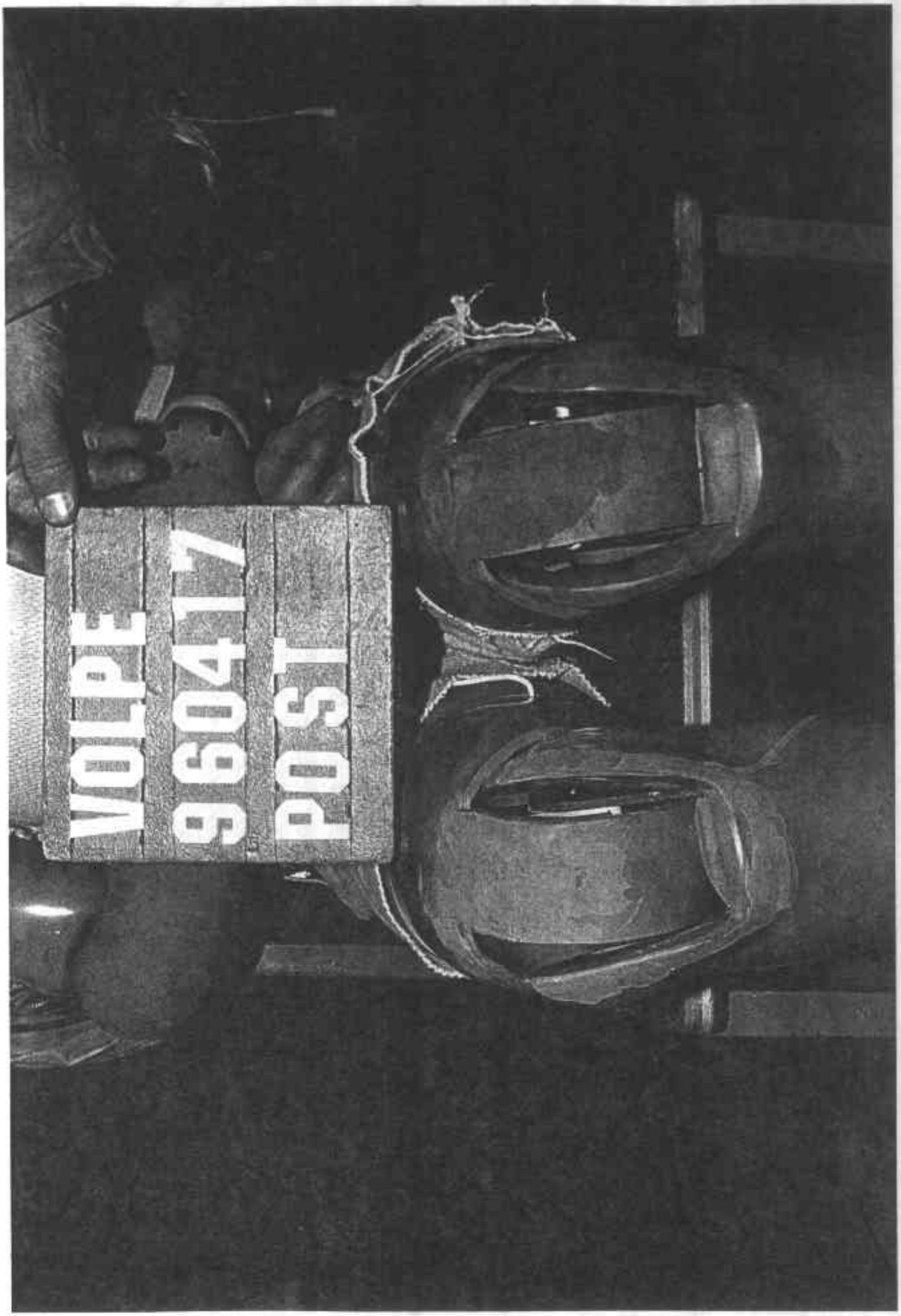


Figure A-43 Post-Test Driver Dummy Knee Contact - View 1

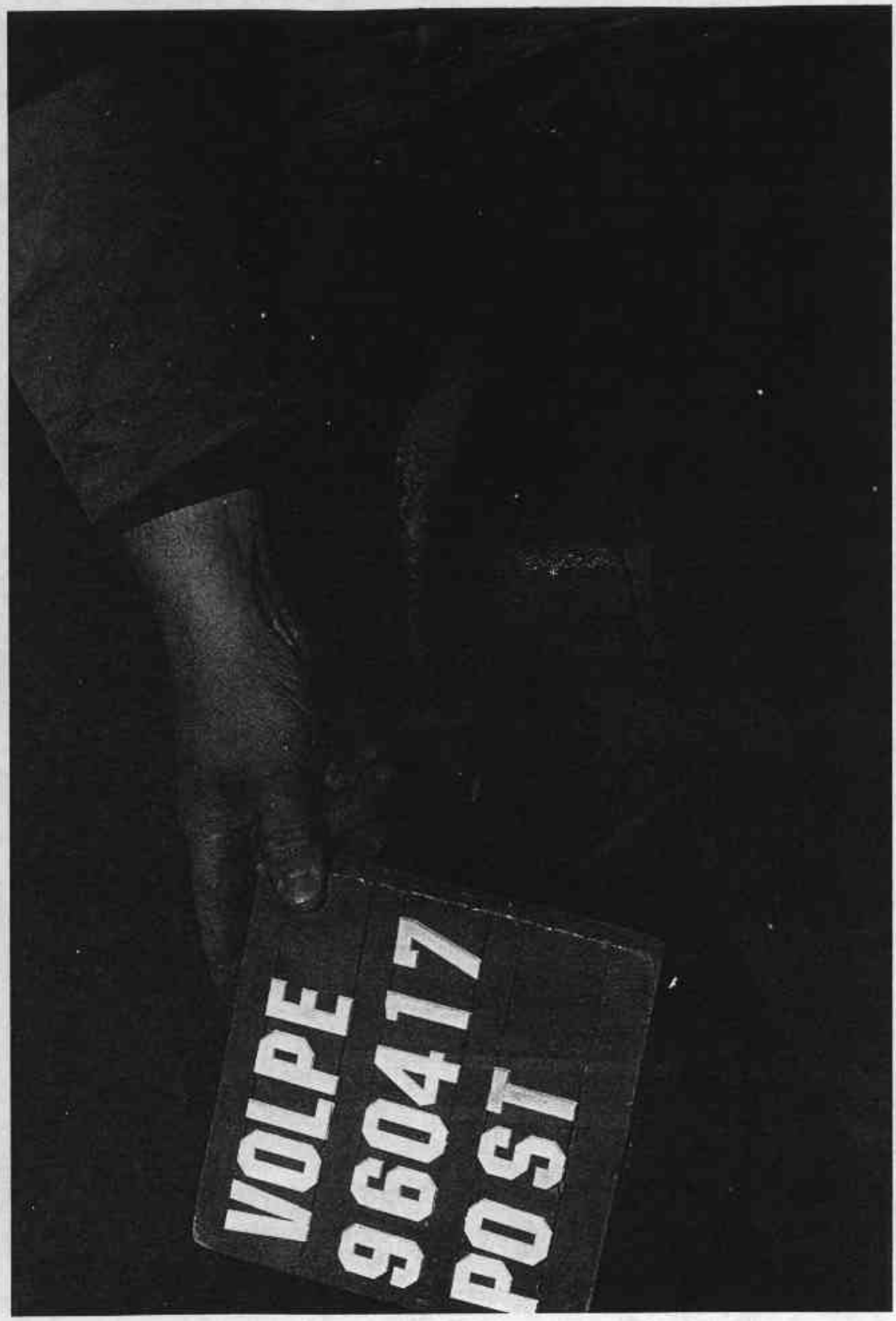


Figure A-44 Post-Test Driver Dummy Knee Contact - View 2

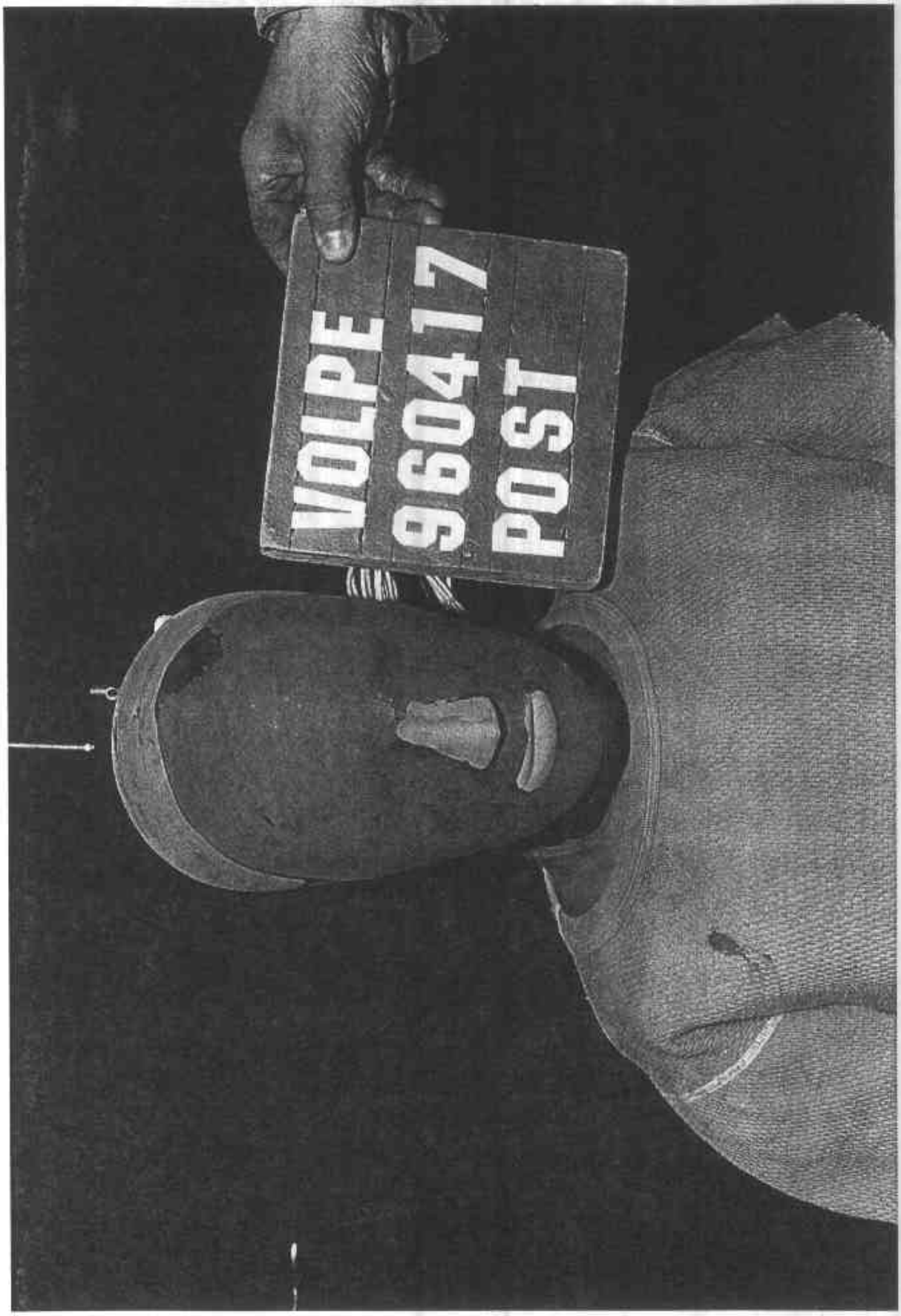


Figure A-45 Post-Test Passenger Dummy Head Contact - View 1

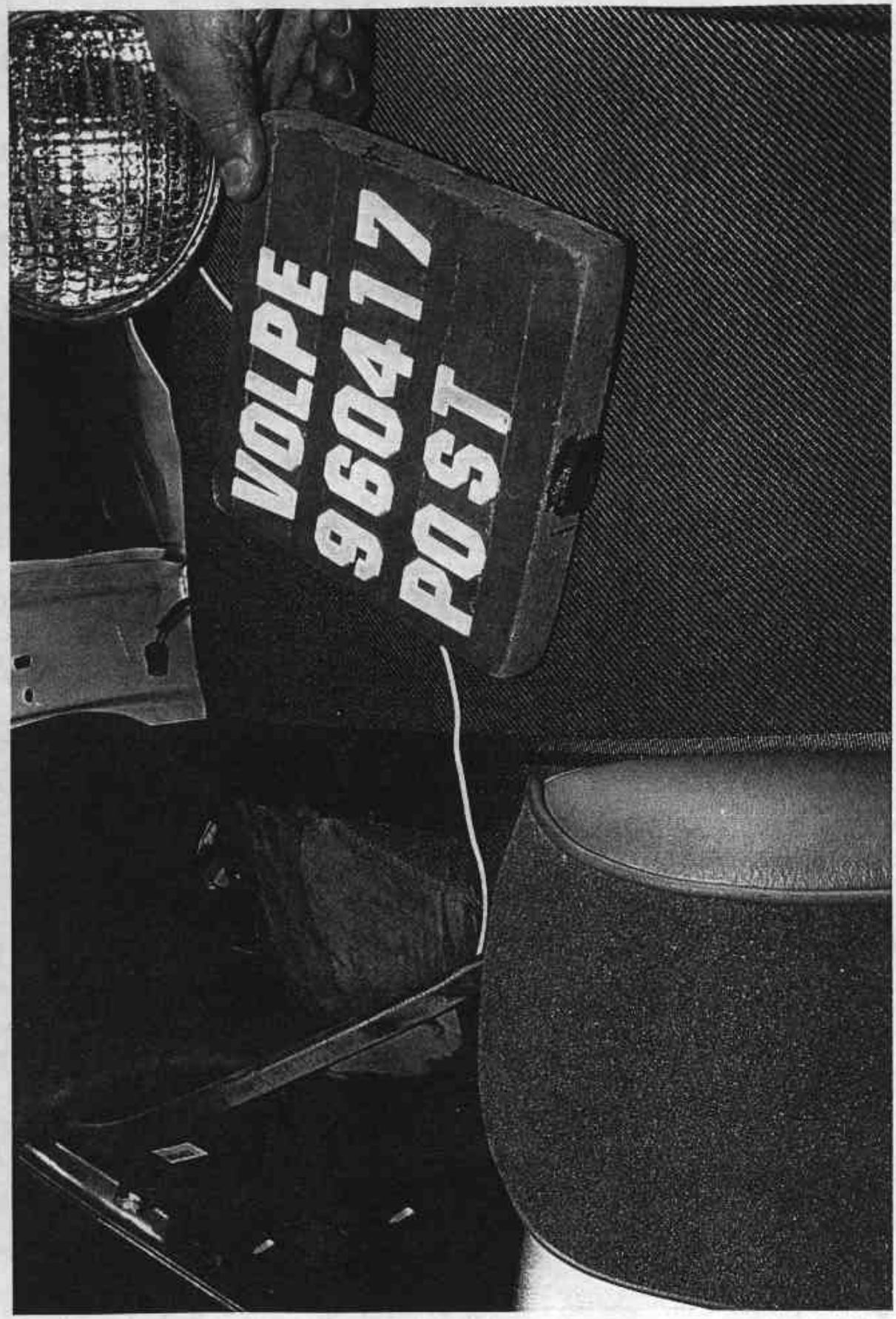


Figure A-46 Post-Test Passenger Dummy Head Contact - View 2

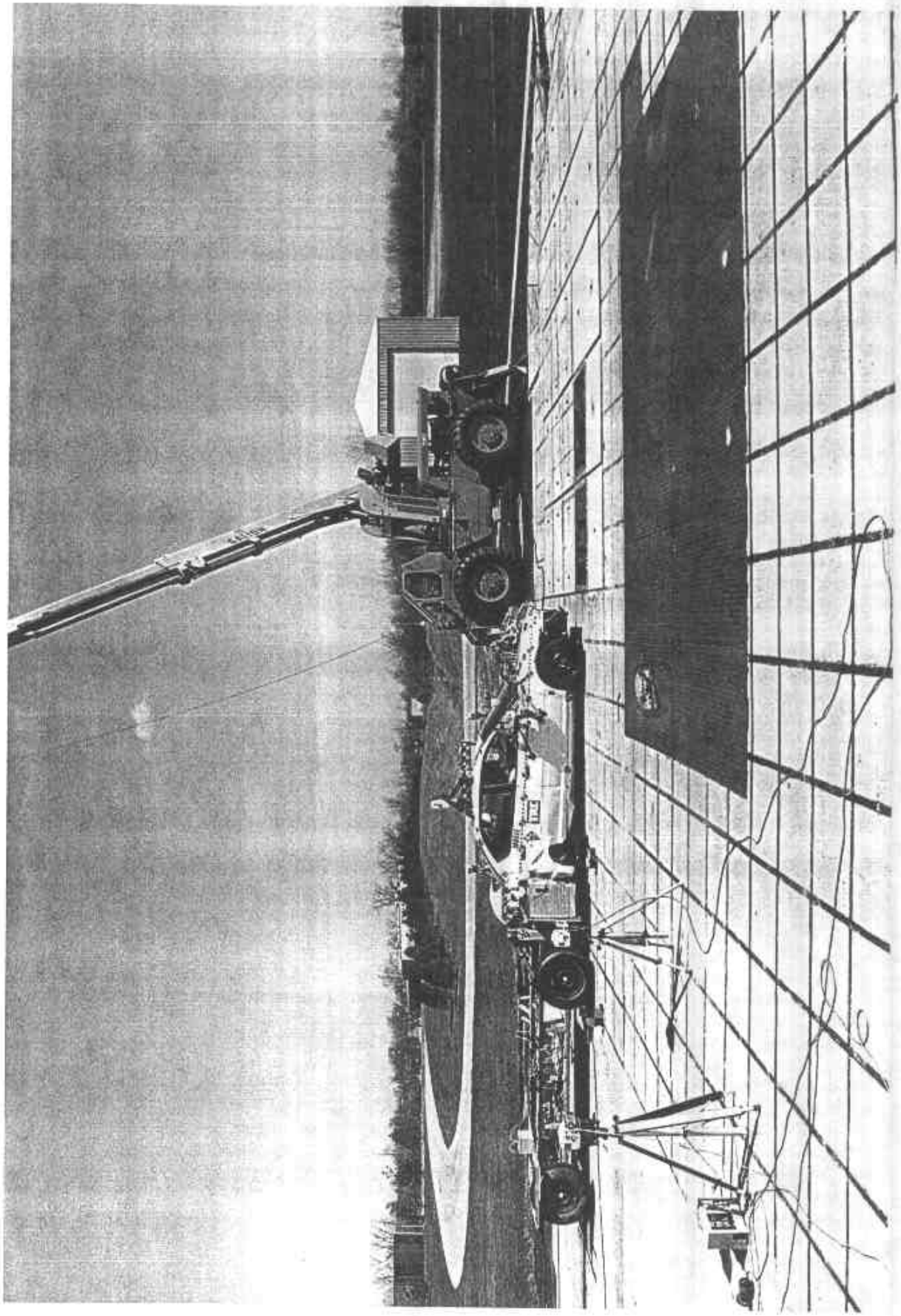


Figure A-47 Impact Event - View 1

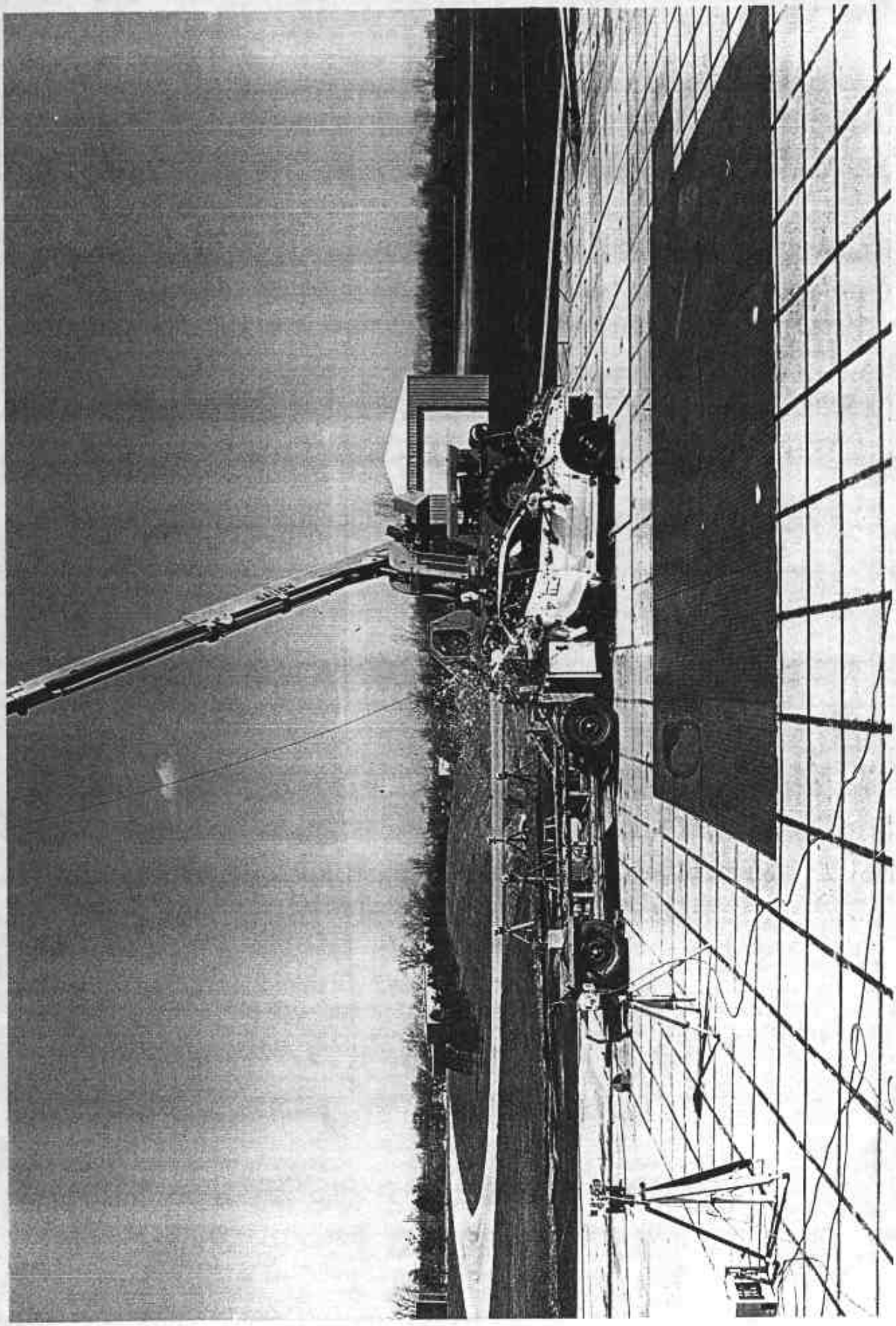


Figure A-48 Impact Event - View 2

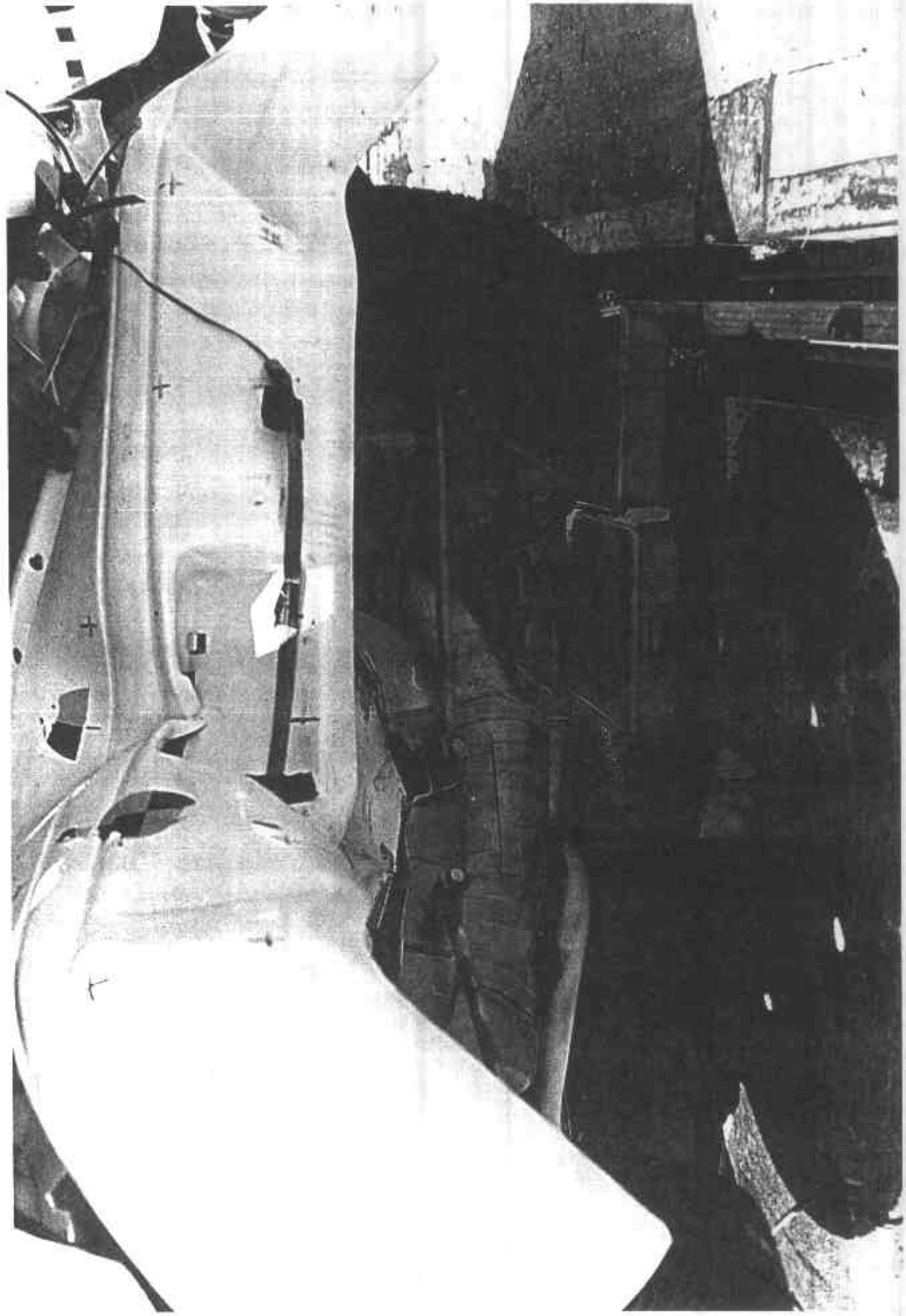


Figure A-49 Post-Test Vehicle Fuel System Fluid Spillage

Figure A-50 Post-Test Barrier Face Left Side View

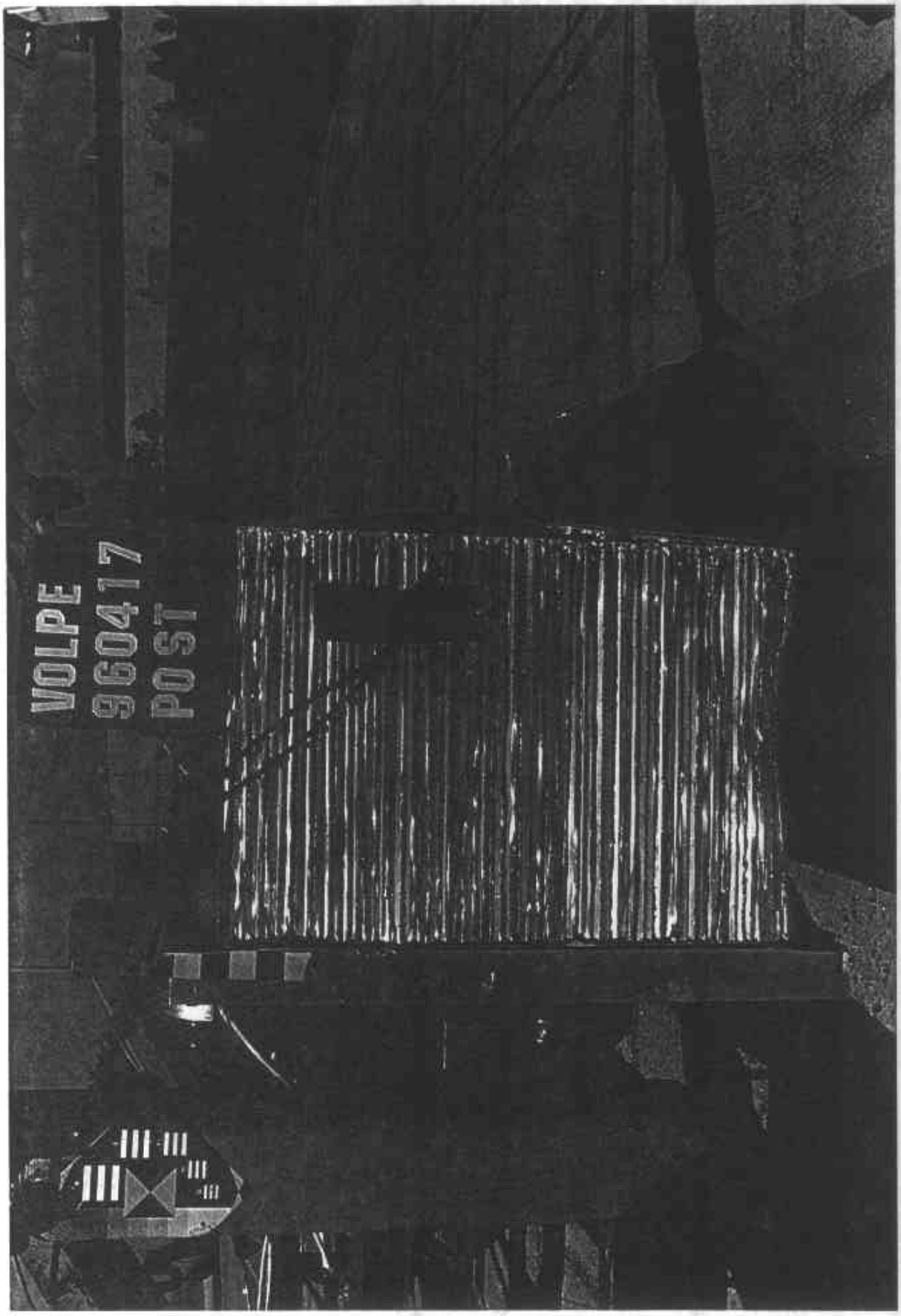


Figure A-51 Post-Test Barrier Face Right Side View

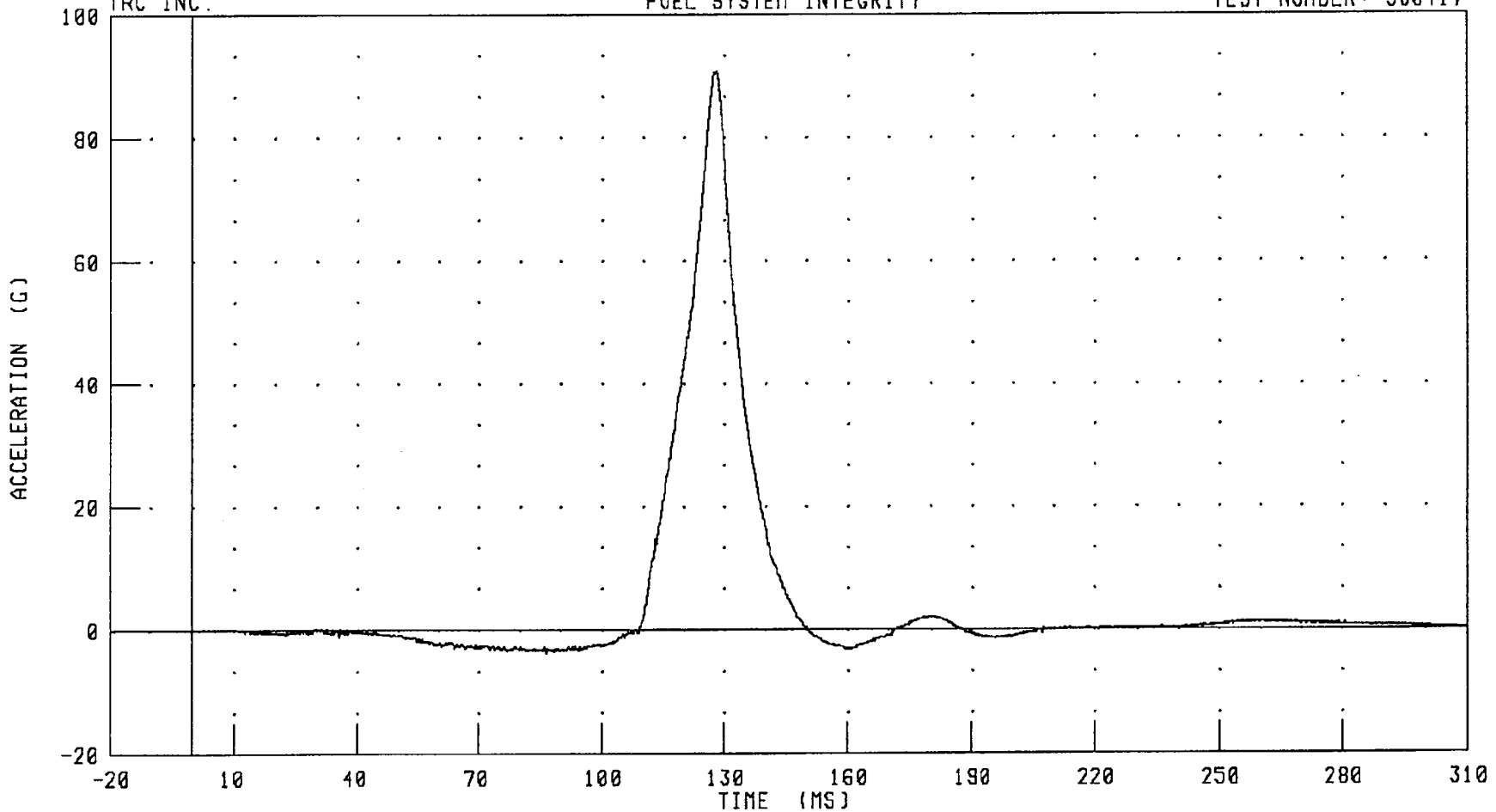
Appendix B

Data Plots

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

DRIVER HEAD X-AXIS ACCELERATION

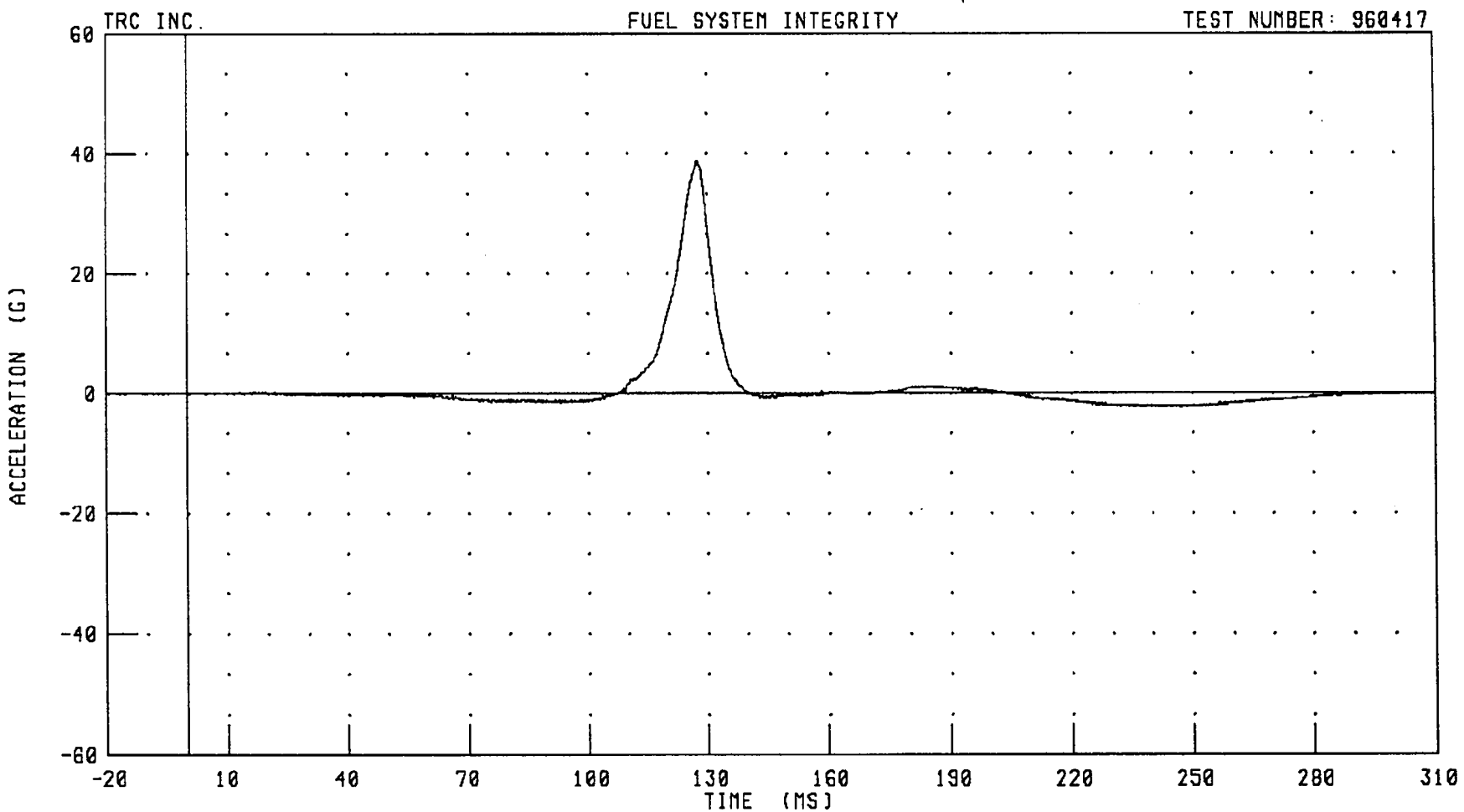
TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960417



CHANNEL: HEDXG1 FILTER: CH. CLASS 1000 PEAK DATA: 90.87 G @ 128.08 MS; -3.71 G @ 86.32 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

DRIVER HEAD Y-AXIS ACCELERATION



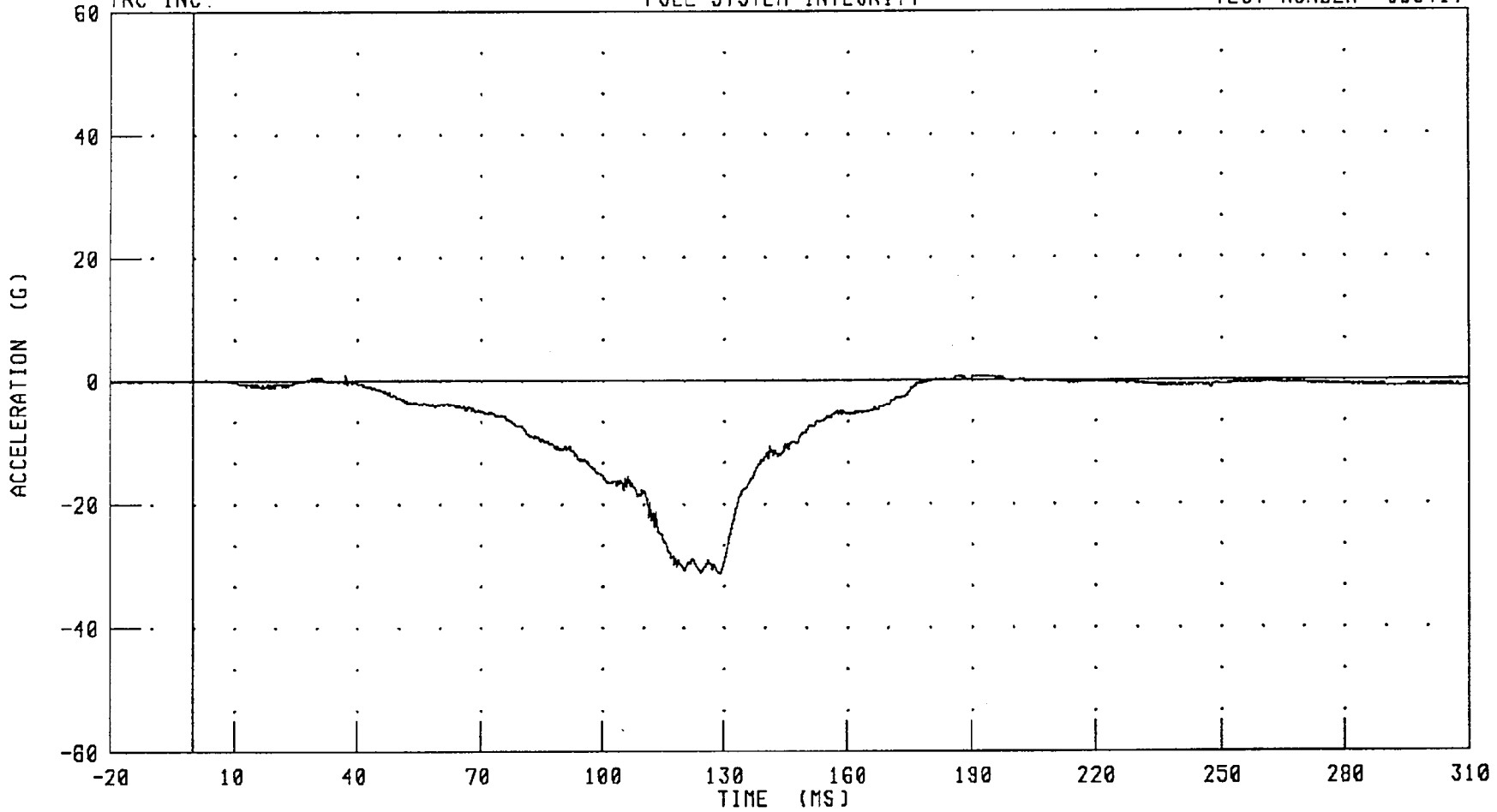
CHANNEL: HEDYG1 FILTER: CH. CLASS 1000 PEAK DATA: 38.74 G @ 127.60 MS; -2.33 G @ 247.04 MS

960417

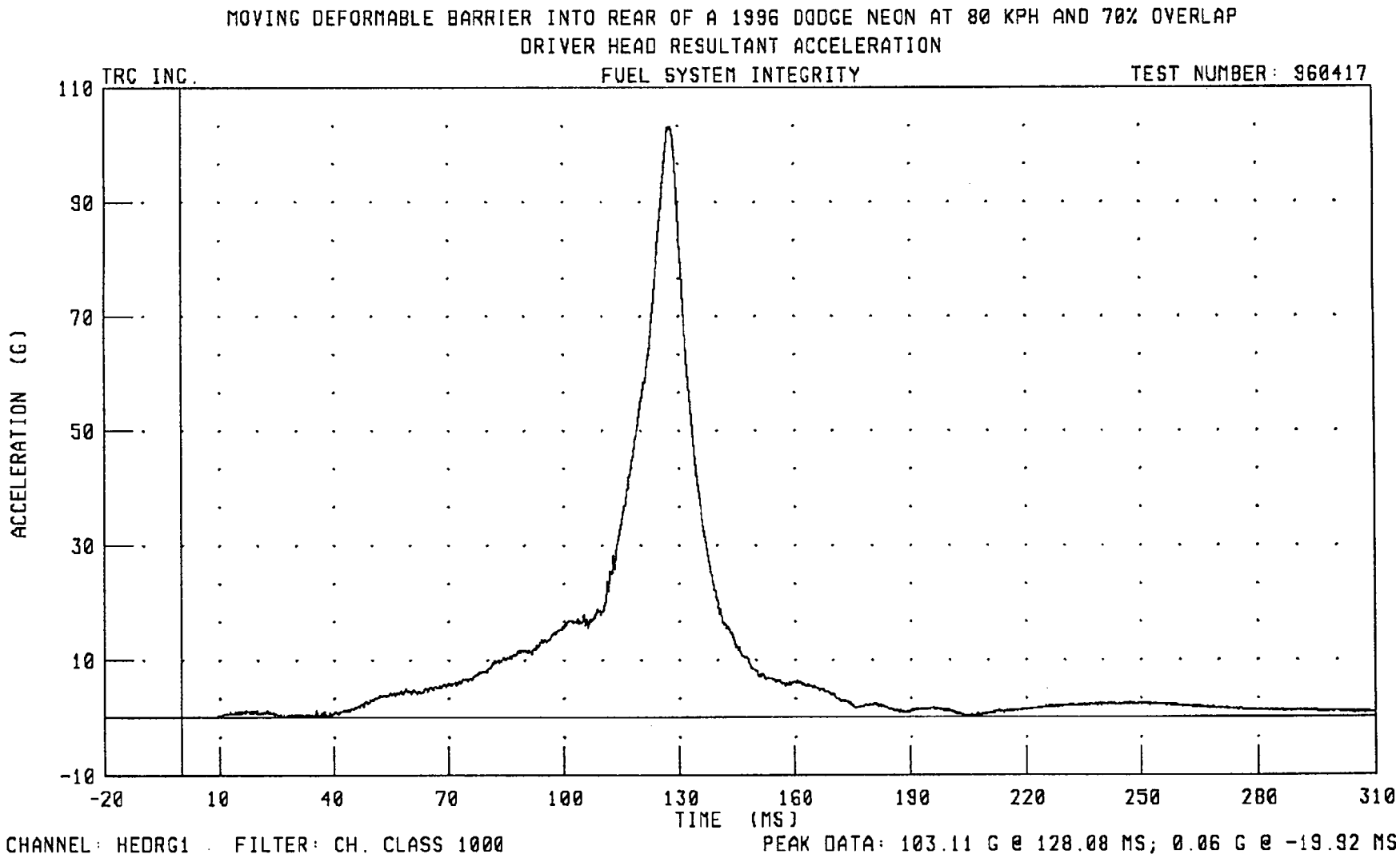
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

DRIVER HEAD Z-AXIS ACCELERATION

TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960417



CHANNEL: HEDZG1 FILTER: CH. CLASS 1000 PEAK DATA: 0.85 G @ 37.20 MS; -31.35 G @ 129.12 MS

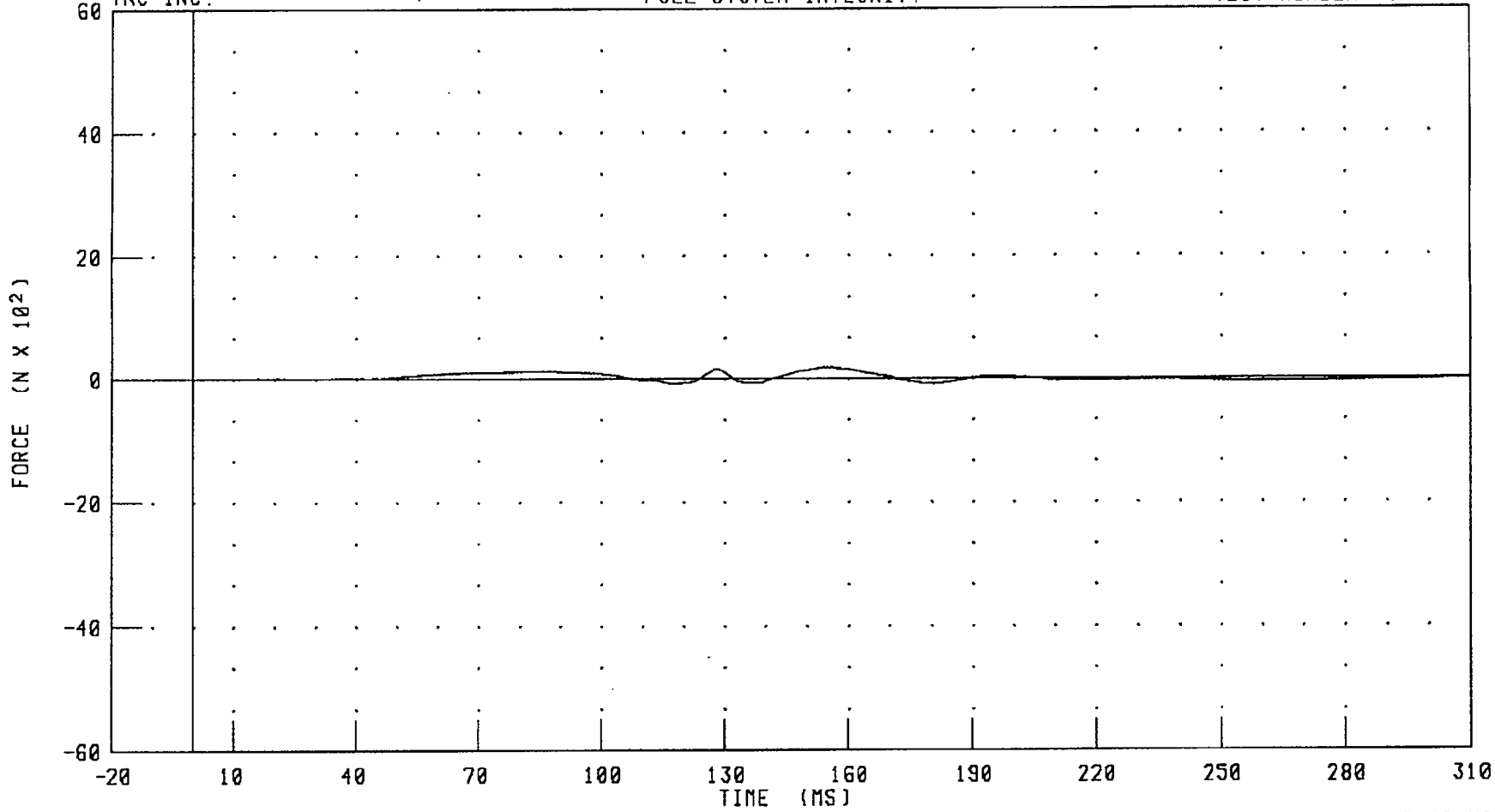

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP
DRIVER HEAD RESULTANT ACCELERATION
TRC INC.
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960417
ACCELERATION (G)
110
90
70
50
30
10
-10
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDRG1
FILTER: CH. CLASS 1000
PEAK DATA: 103.11 G @ 128.08 MS; 0.06 G @ -19.92 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

DRIVER UPPER NECK X-AXIS SHEAR FORCE

TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960417



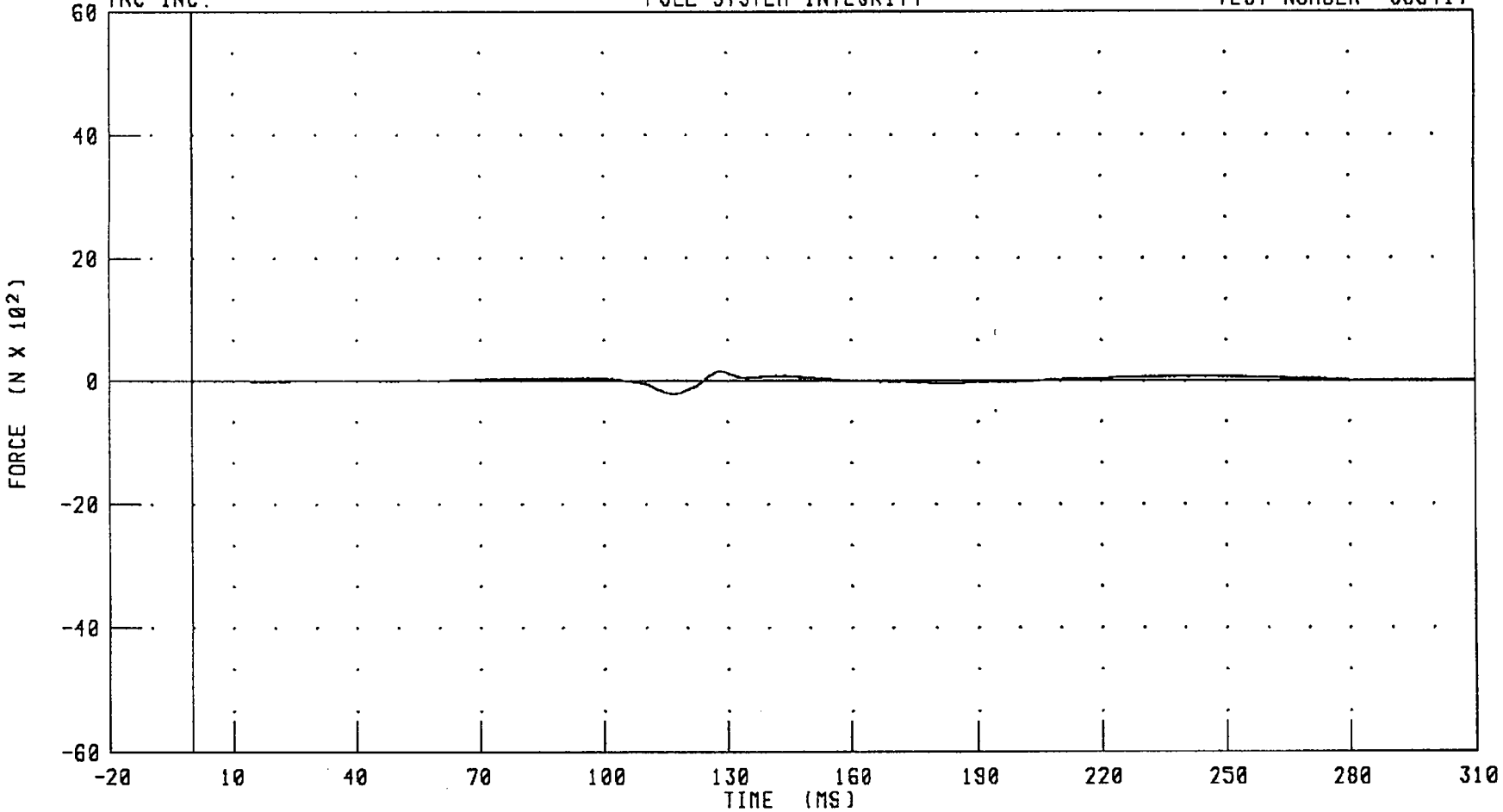
CHANNEL: NEKXF1 FILTER: CH. CLASS 1000 PEAK DATA: 183.99 N @ 155.04 MS; -94.02 N @ 180.48 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

DRIVER UPPER NECK Y-AXIS SHEAR FORCE

TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960417



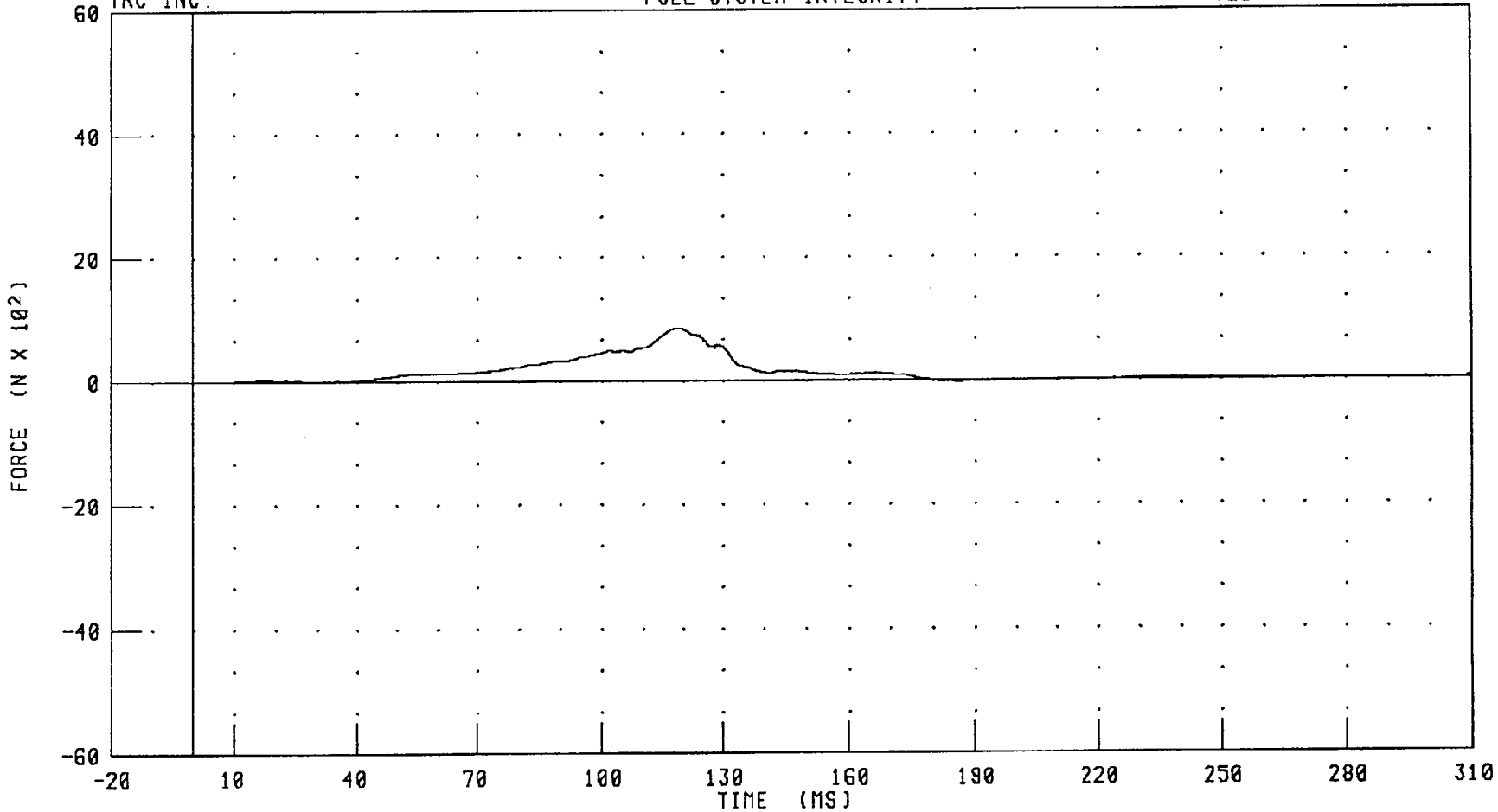
CHANNEL: NEKYF1 FILTER: CH. CLASS 1000 PEAK DATA: 156.94 N @ 128.00 MS; -217.14 N @ 116.48 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

DRIVER UPPER NECK Z-AXIS AXIAL FORCE

TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960417

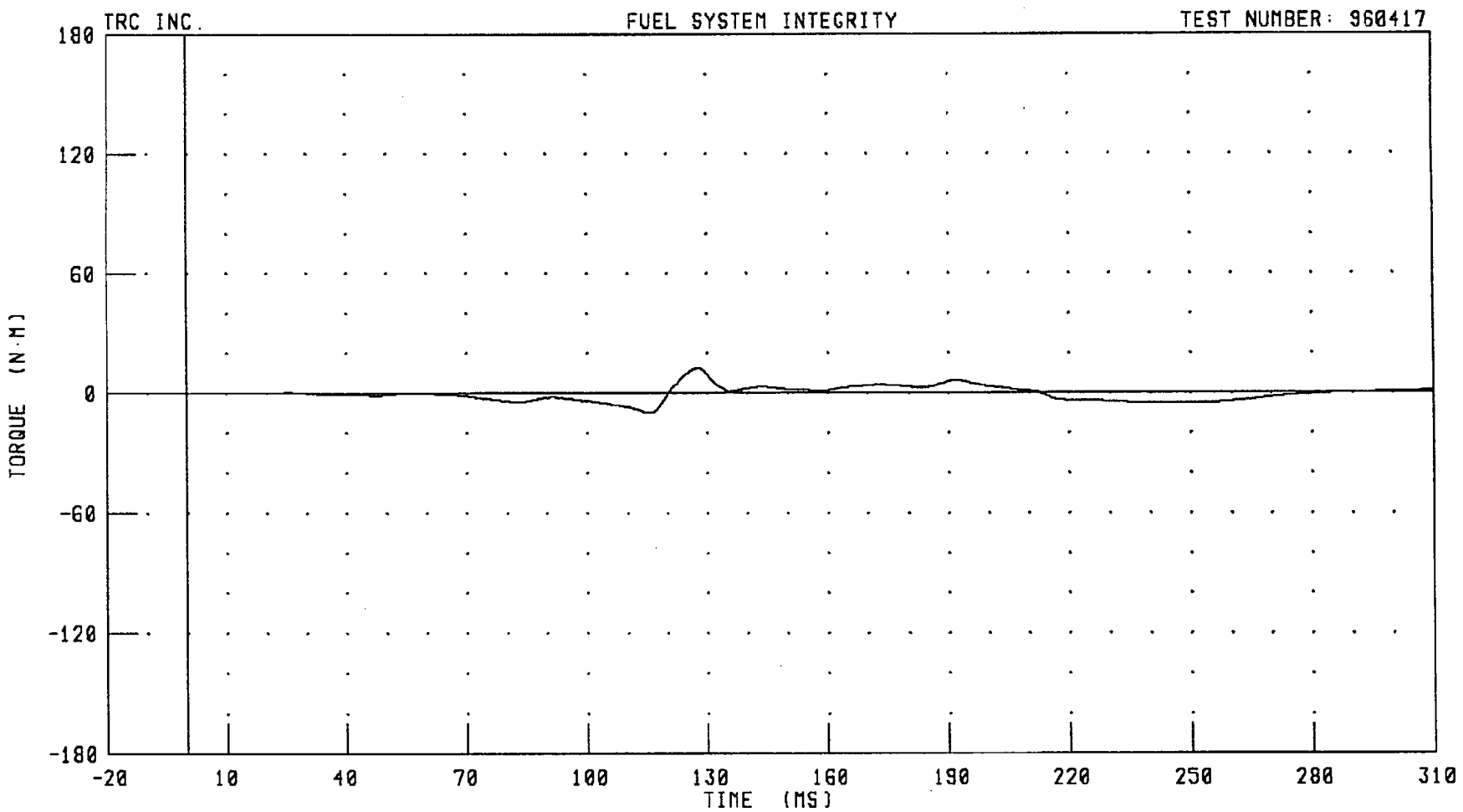


CHANNEL: NEKZF1 FILTER: CH. CLASS 1000 PEAK DATA: 856.21 N @ 118.48 MS; -25.98 N @ 185.28 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

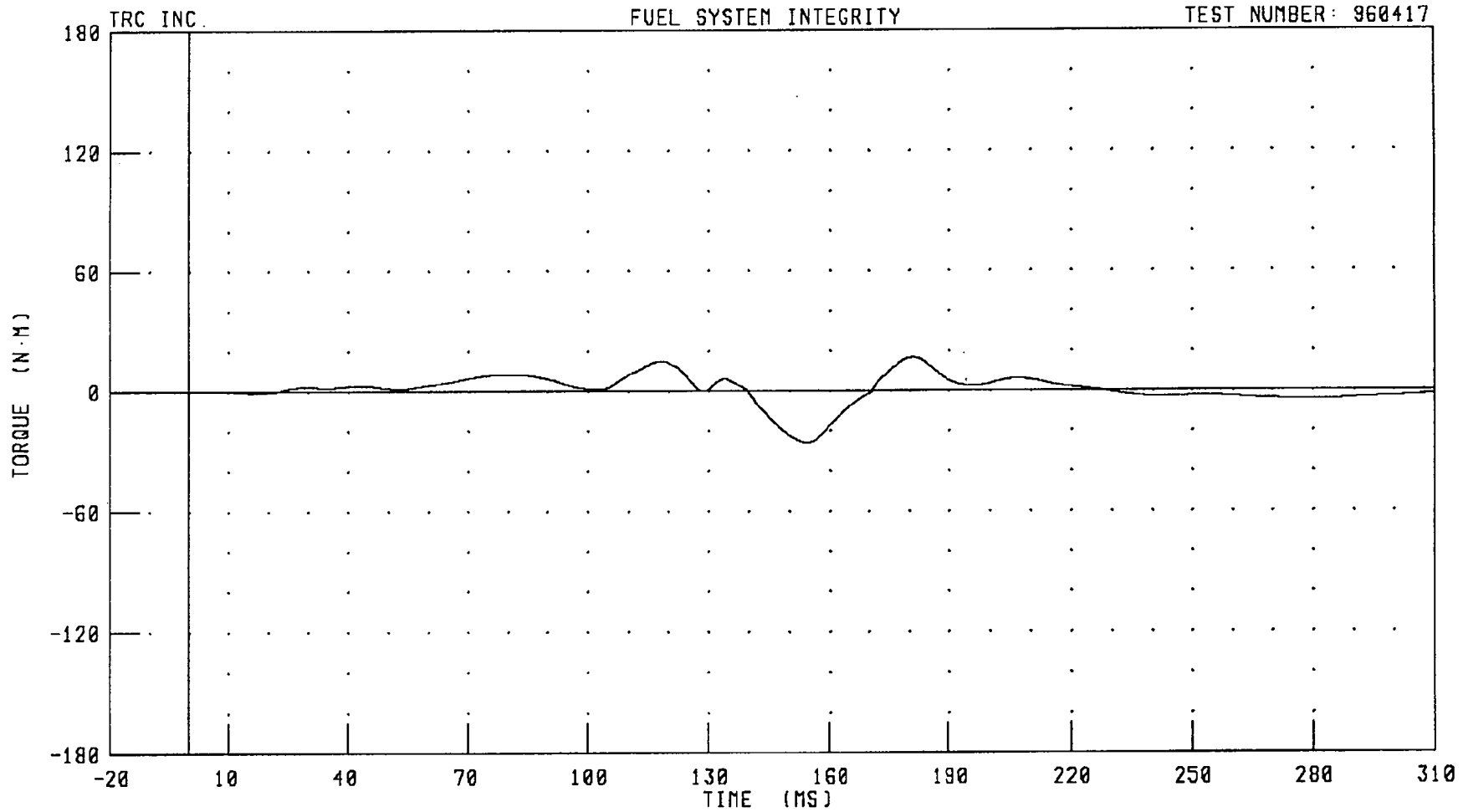
DRIVER UPPER NECK MOMENT ABOUT X-AXIS



CHANNEL: NEKXM1 FILTER: CH. CLASS 600 PEAK DATA: 12.47 N-M @ 127.60 MS; -9.82 N-M @ 115.36 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP
DRIVER UPPER NECK MOMENT ABOUT Y-AXIS



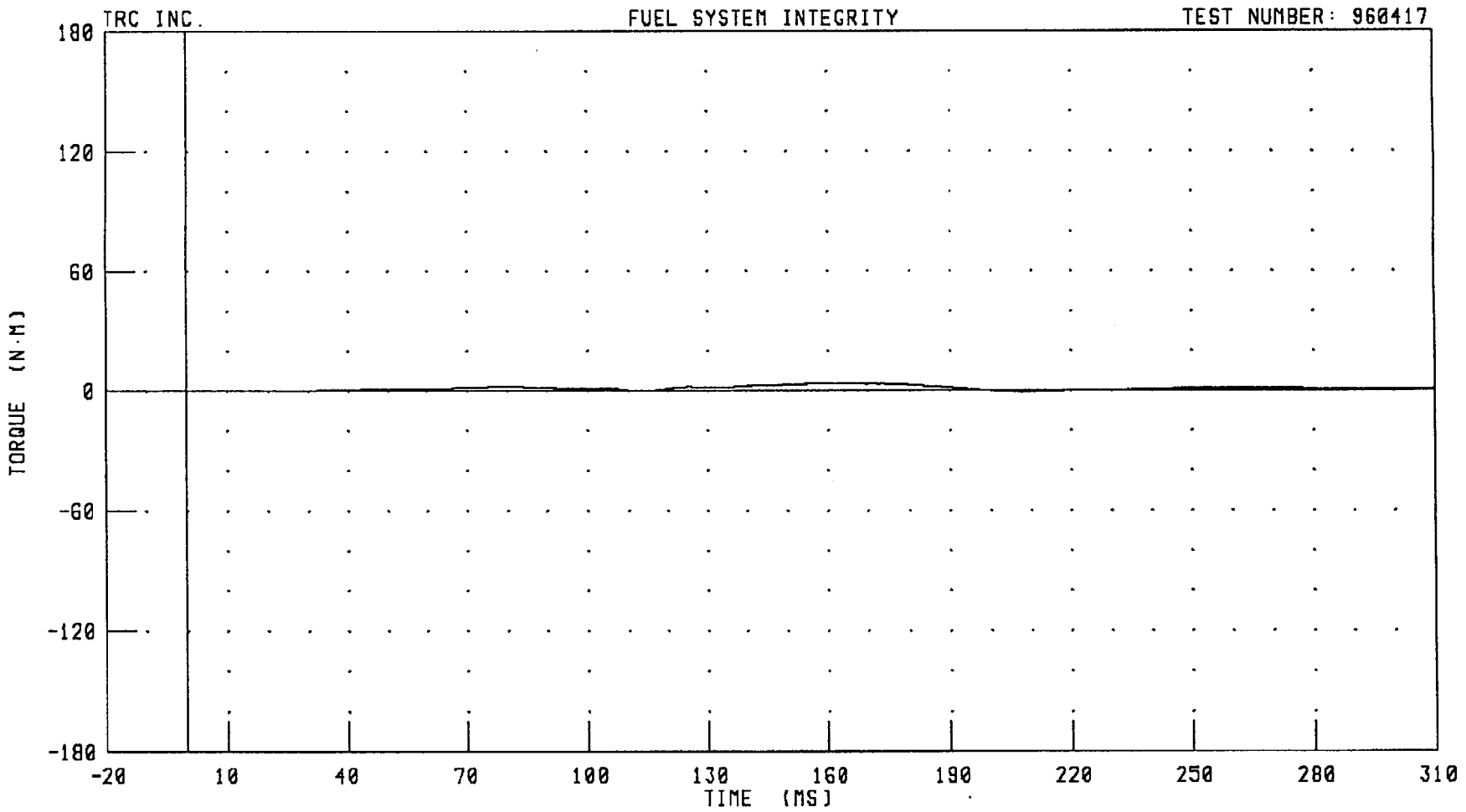
CHANNEL: NEKYM1 FILTER: CH. CLASS 600

PEAK DATA: 16.59 N·M @ 180.96 MS; -25.86 N·M @ 154.08 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

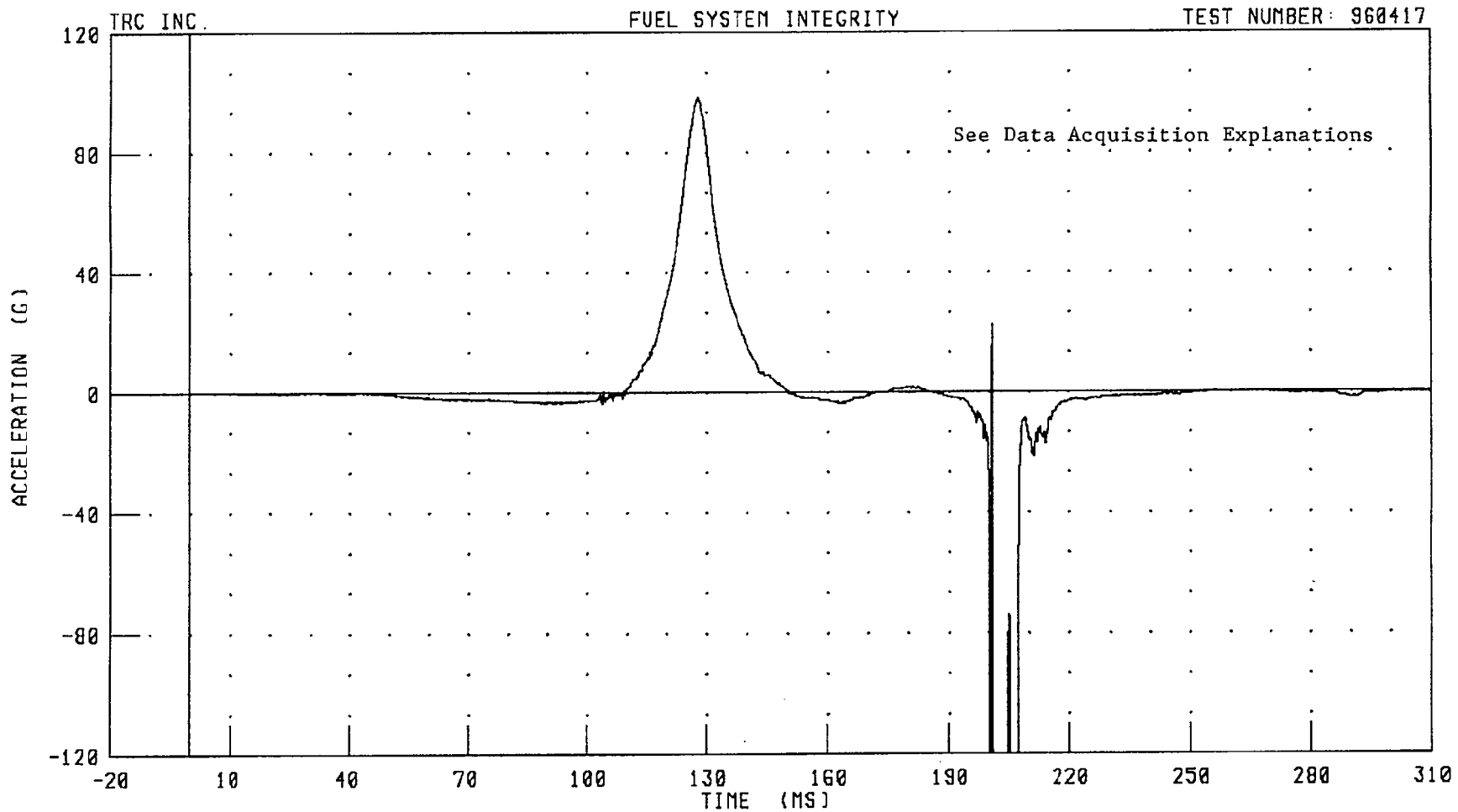
DRIVER UPPER NECK MOMENT ABOUT Z-AXIS



CHANNEL: NEKZM1 FILTER: CH. CLASS 600 PEAK DATA: 3.61 N-M @ 159.28 MS; -0.80 N-M @ 209.44 MS

960417

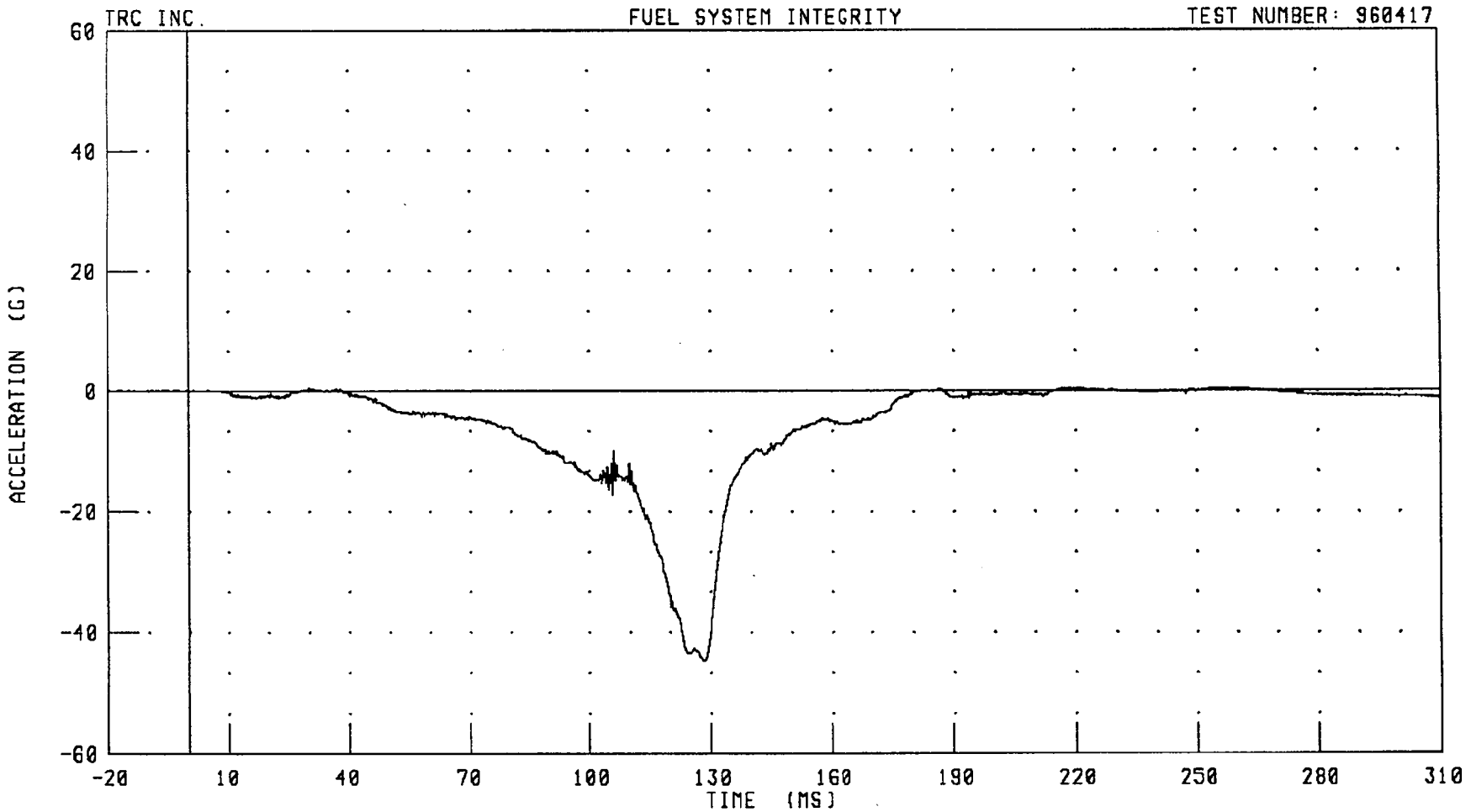
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP
DRIVER HEAD POSITION 1 X-AXIS ACCELERATION



CHANNEL: H01XG1 FILTER: CH. CLASS 1000 PEAK DATA: 98.24 G @ 127.92 MS; -403.00 G @ 200.56 MS

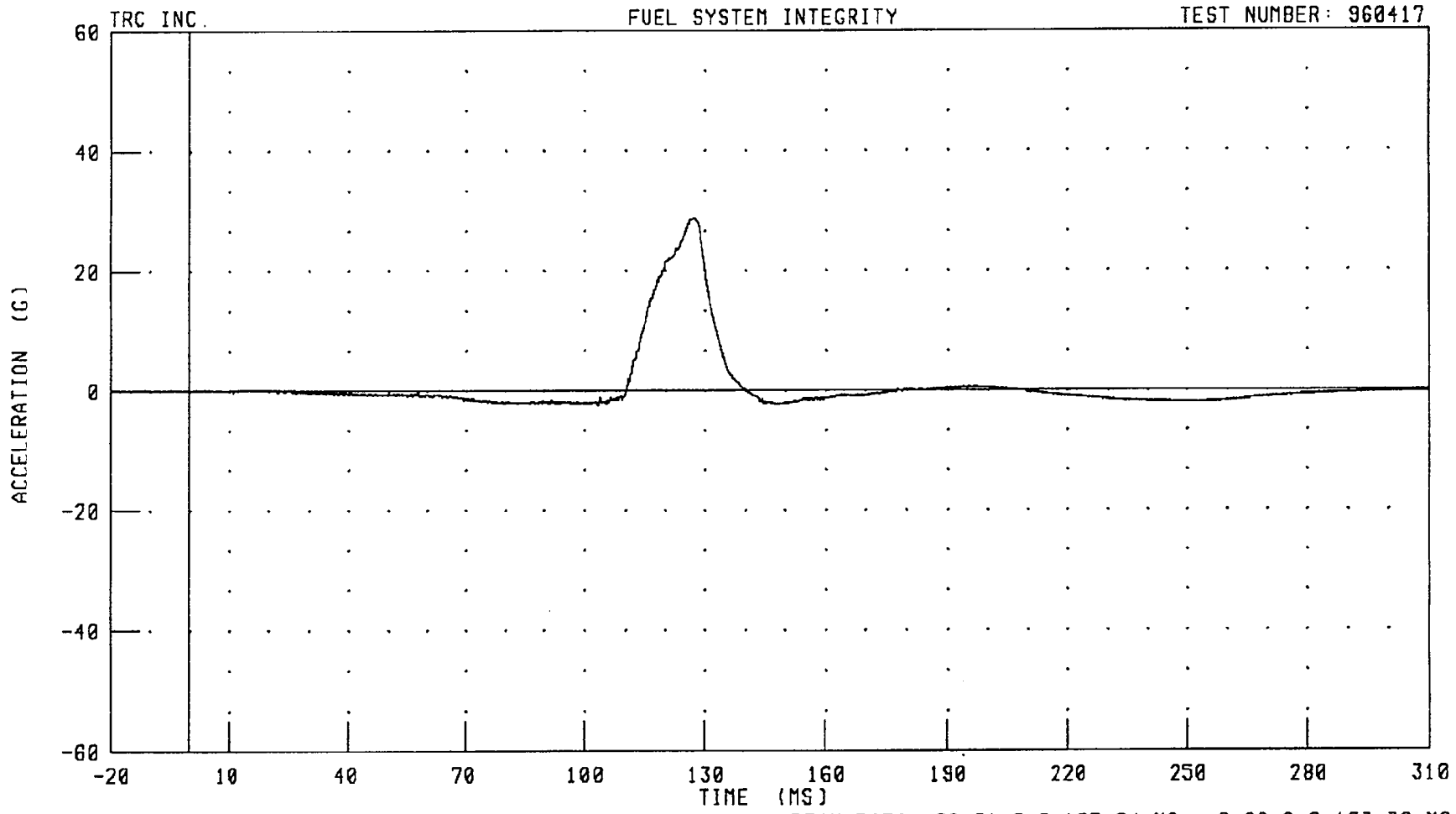
960417

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



960417

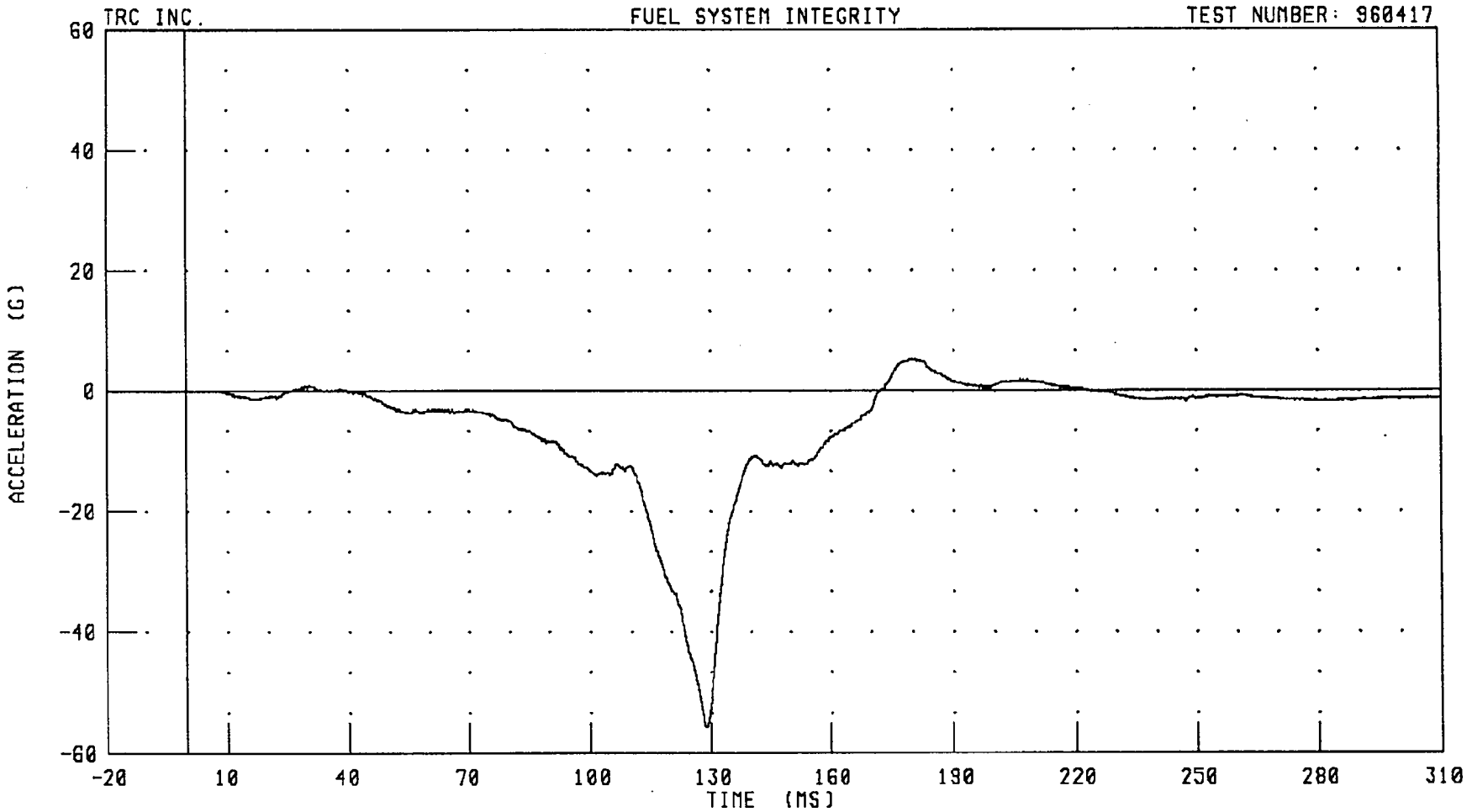
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP
DRIVER HEAD POSITION 2 Y-AXIS ACCELERATION



CHANNEL: H02YG1 FILTER: CH. CLASS 1000 PEAK DATA: 28.81 G @ 127.04 MS; -2.60 G @ 103.36 MS

960417

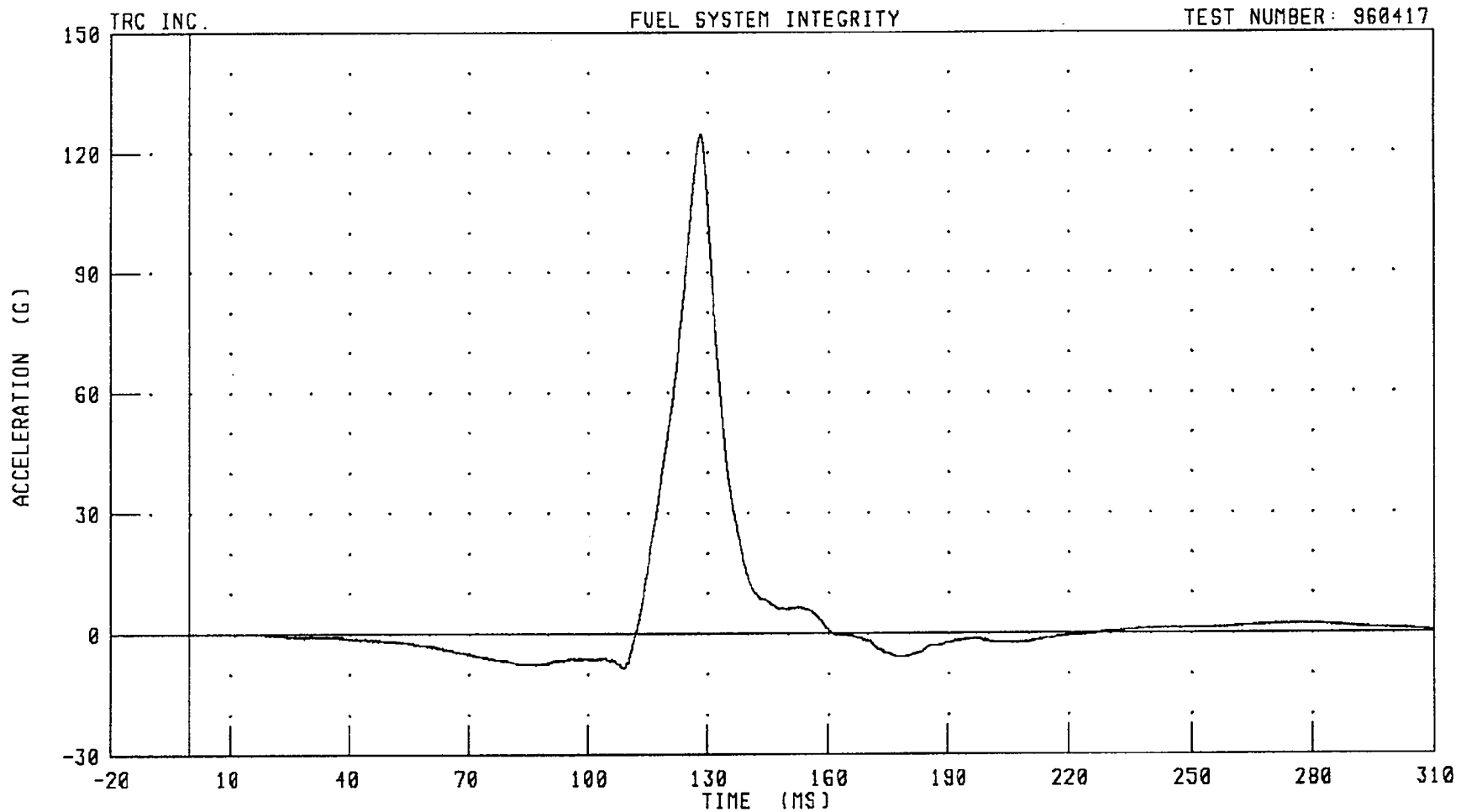
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP
DRIVER HEAD POSITION 2 Z-AXIS ACCELERATION



CHANNEL: HD2ZG1 FILTER: CH. CLASS 1000 PEAK DATA: 5.33 G @ 179.52 MS; -55.69 G @ 128.56 MS

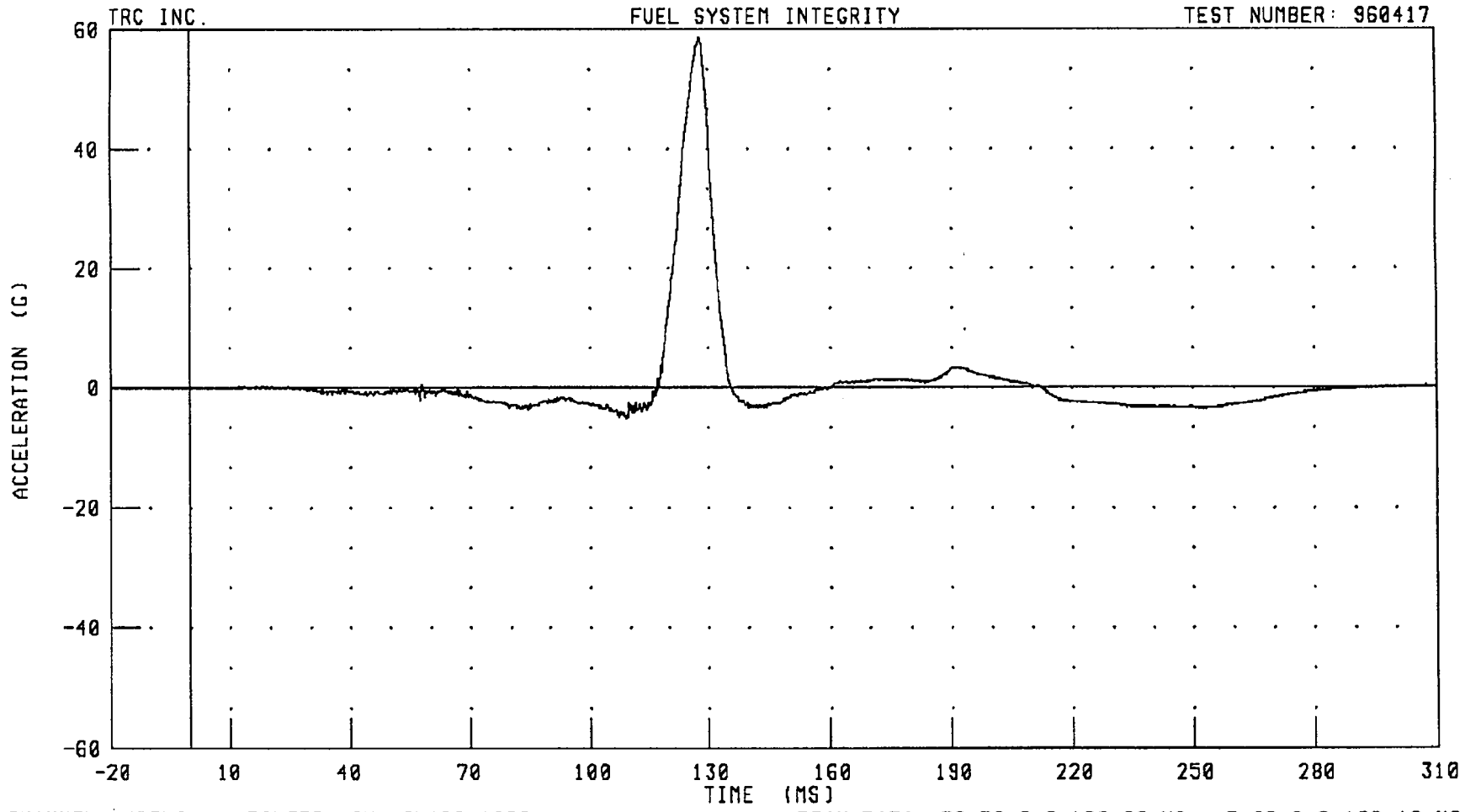
960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP
DRIVER HEAD POSITION 3 X-AXIS ACCELERATION



960417

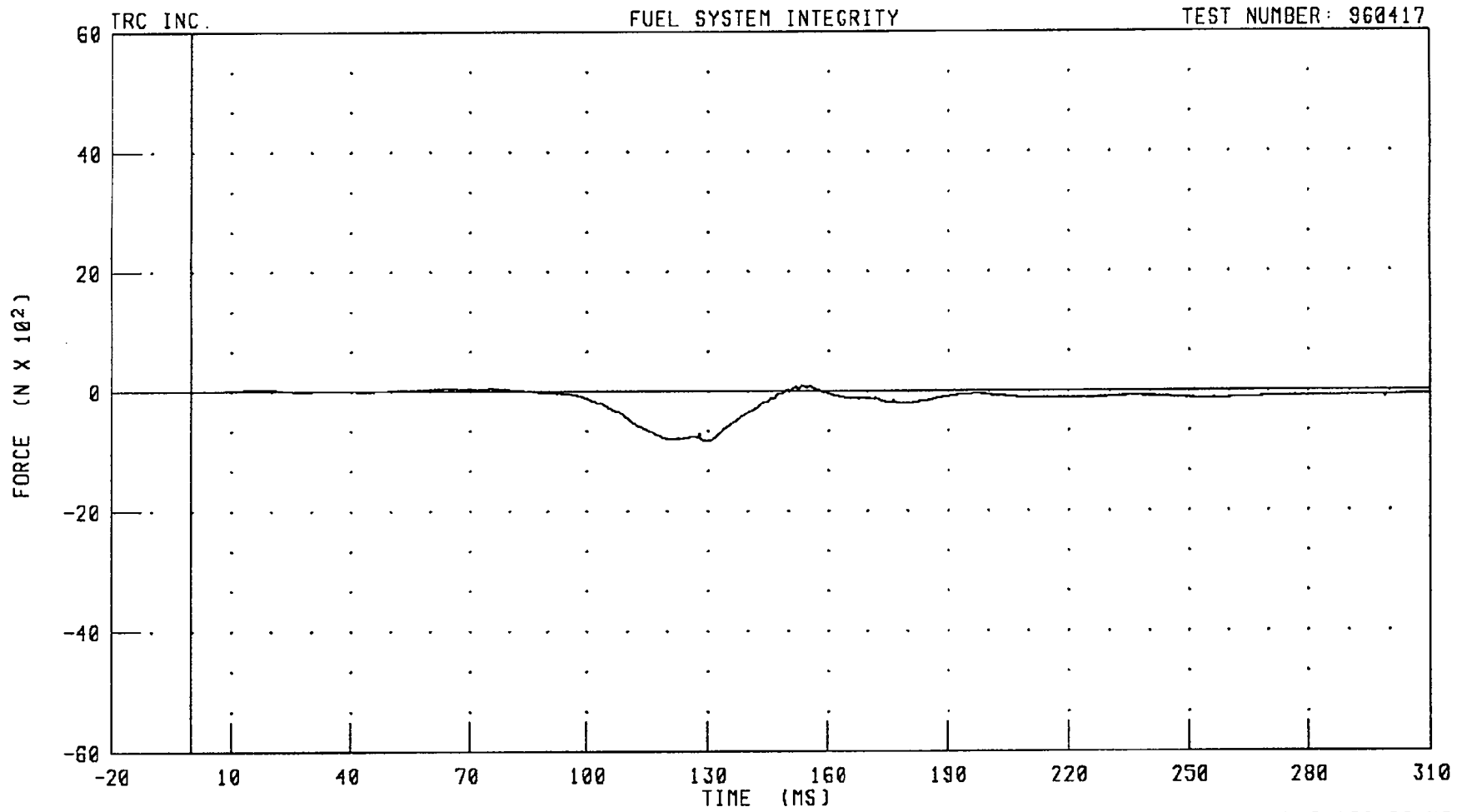
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP
DRIVER HEAD POSITION 3 Y-AXIS ACCELERATION



CHANNEL: HD3YG1 FILTER: CH. CLASS 1000 PEAK DATA: 58.58 G @ 128.00 MS; -5.26 G @ 109.12 MS

960417

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

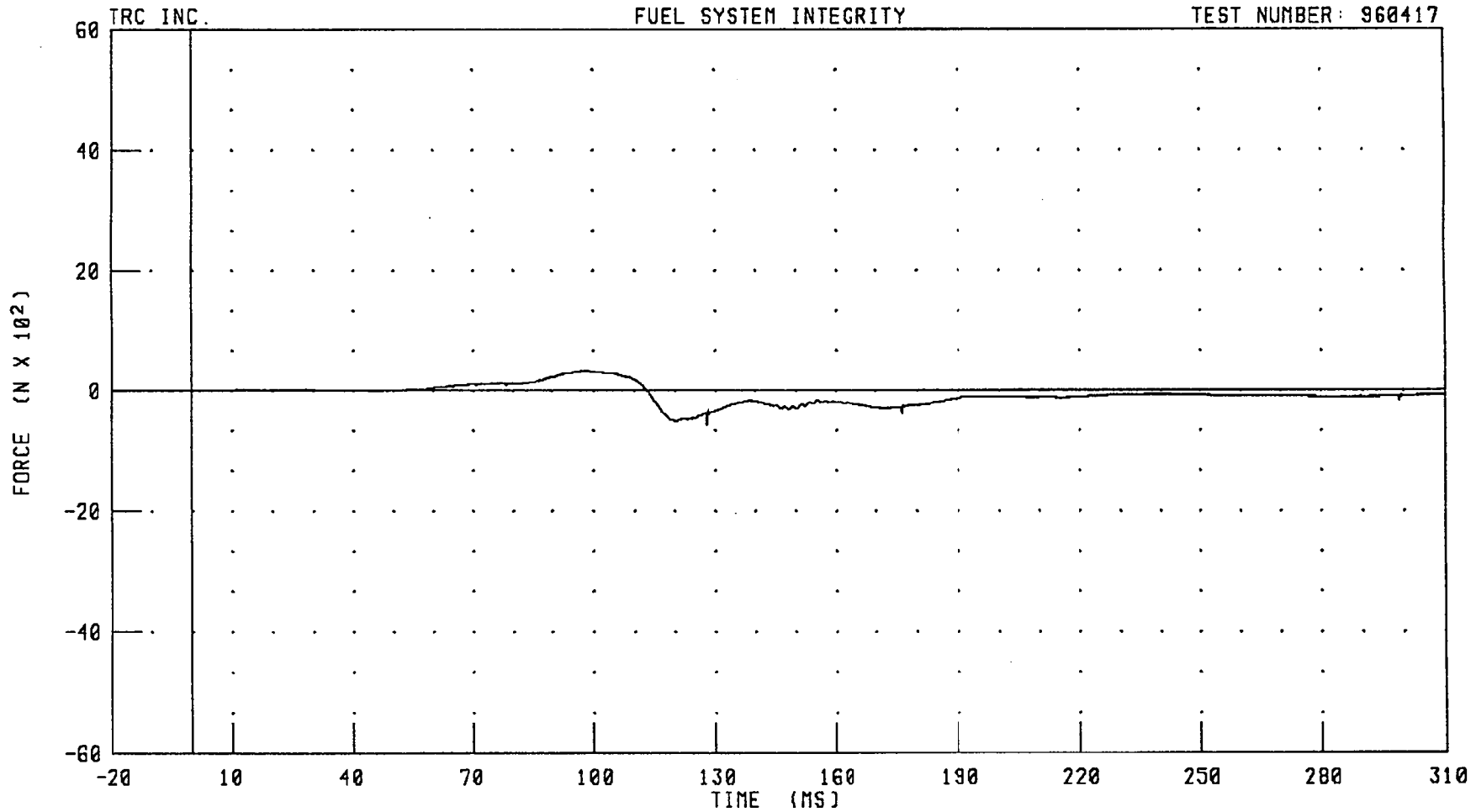


CHANNEL: NKLXF1 FILTER: CH. CLASS 1000 PEAK DATA: 84.92 N @ 153.44 MS; -827.53 N @ 129.60 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

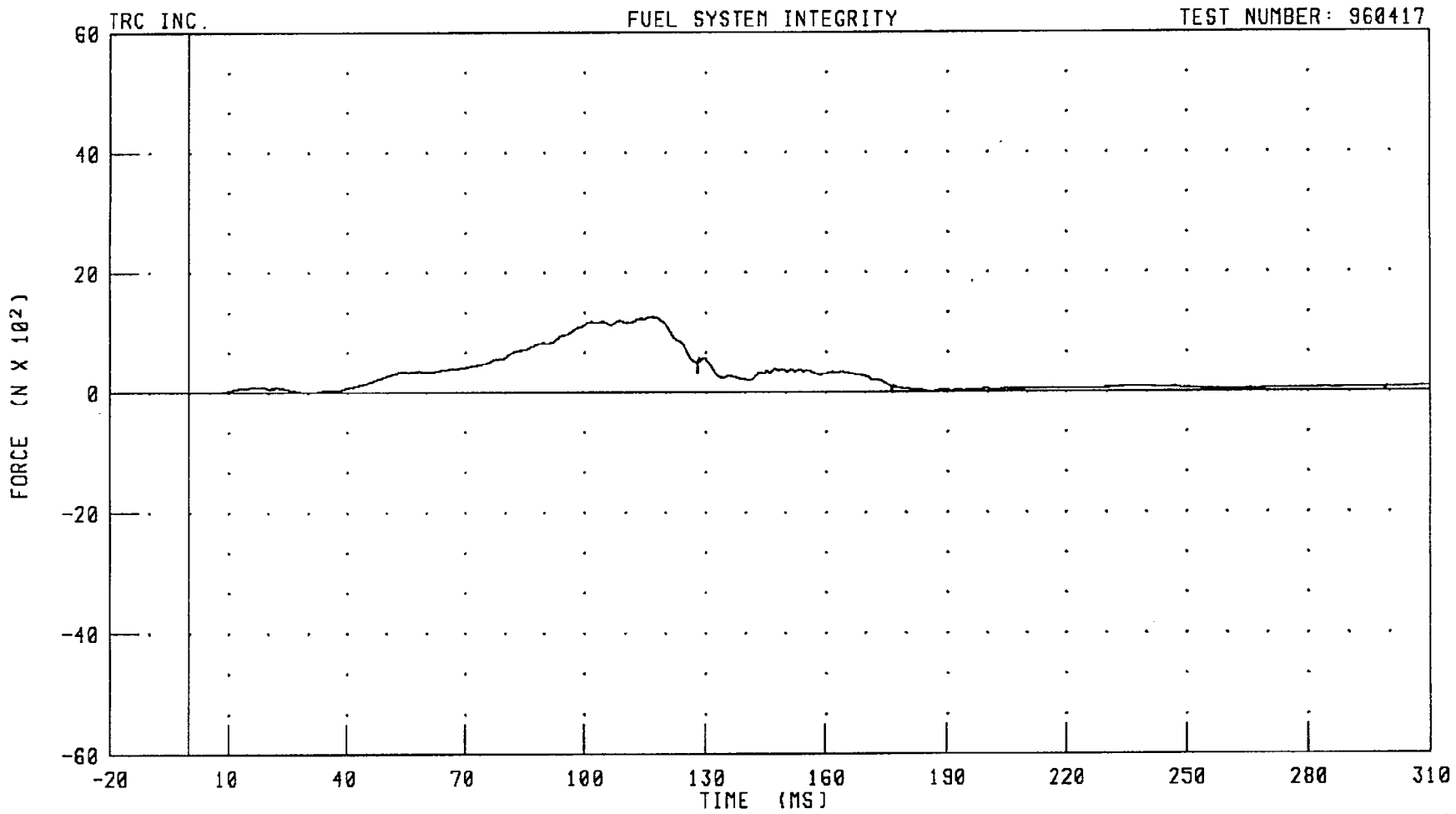
DRIVER LOWER NECK Y-AXIS SHEAR FORCE



CHANNEL: NKLYF1 FILTER: CH. CLASS 1000 PEAK DATA: 319.97 N @ 96.96 MS; -573.78 N @ 128.00 MS

960417

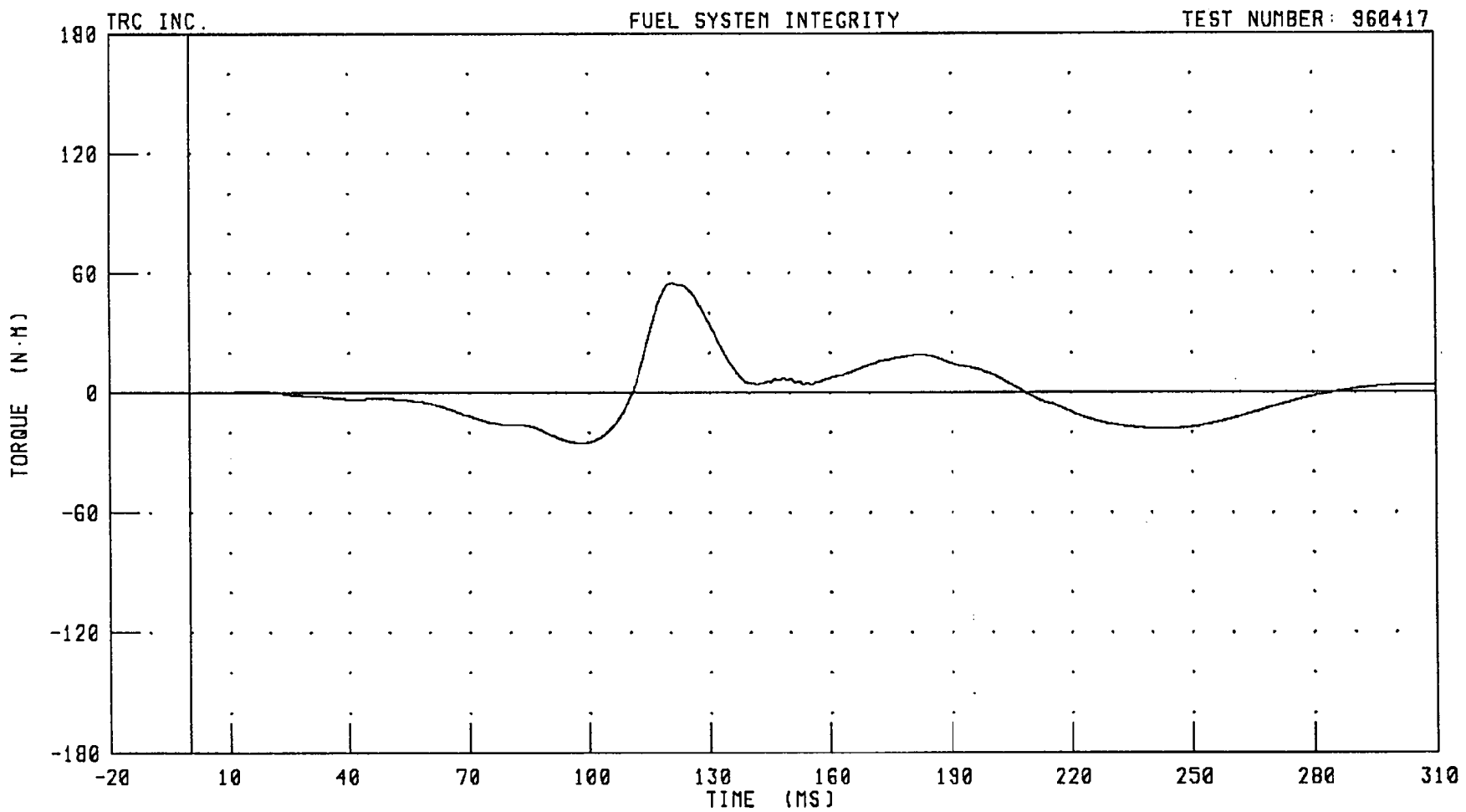
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP
DRIVER LOWER NECK Z-AXIS AXIAL FORCE
FUEL SYSTEM INTEGRITY



CHANNEL: NKLZF1 FILTER: CH. CLASS 1000 PEAK DATA: 1265.81 N @ 116.88 MS; -12.60 N @ 29.92 MS

960417

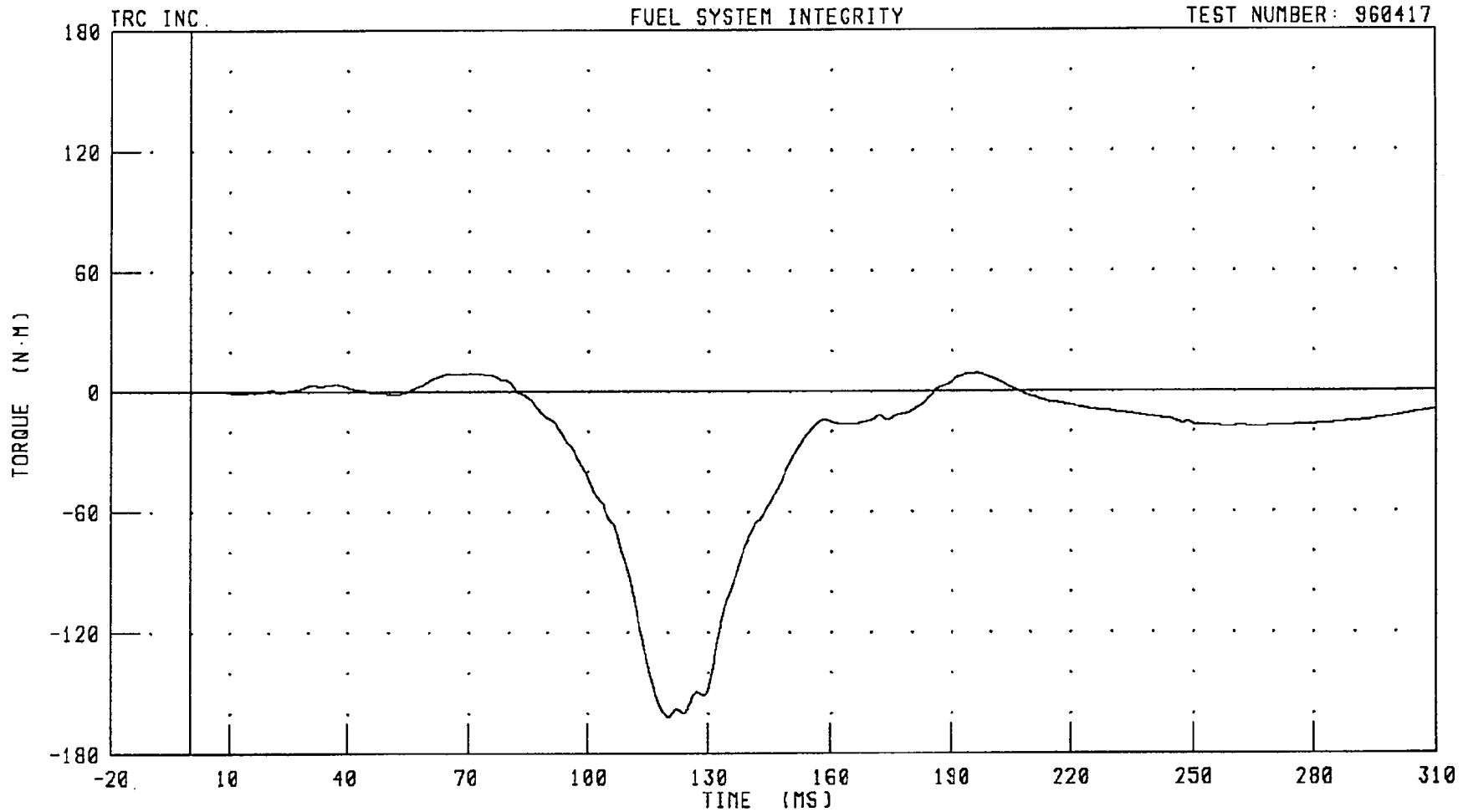
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP
DRIVER LOWER NECK MOMENT ABOUT X-AXIS



CHANNEL: NKLXM1 FILTER: CH. CLASS 600 PEAK DATA: 54.92 N·M @ 120.72 MS; -25.59 N·M @ 98.24 MS

960417

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



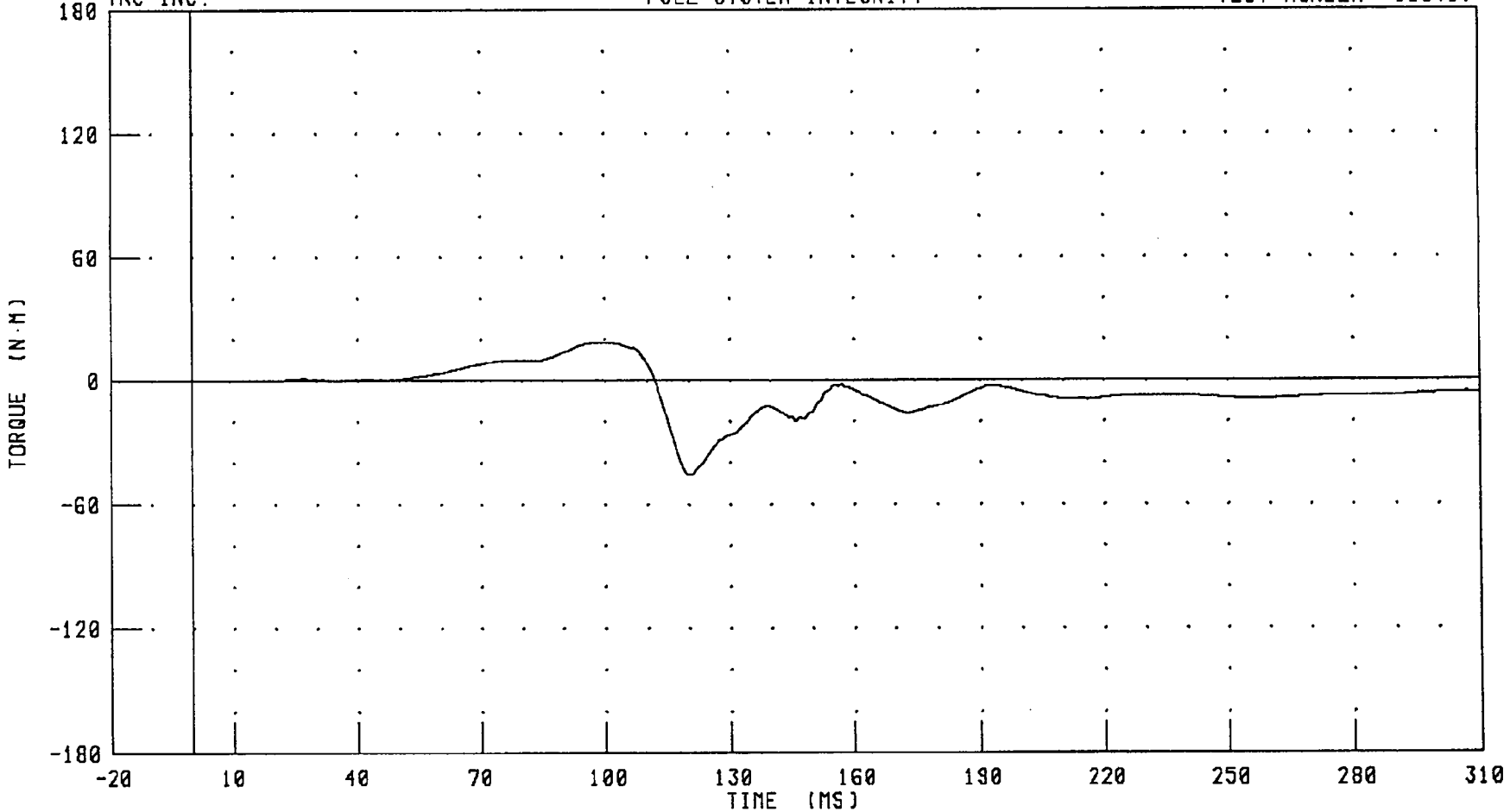
CHANNEL: NKLYM1 FILTER: CH. CLASS 600 PEAK DATA: 9.01 N-M @ 196.56 MS; -161.88 N-M @ 120.24 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

DRIVER LOWER NECK MOMENT ABOUT Z-AXIS

TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960417



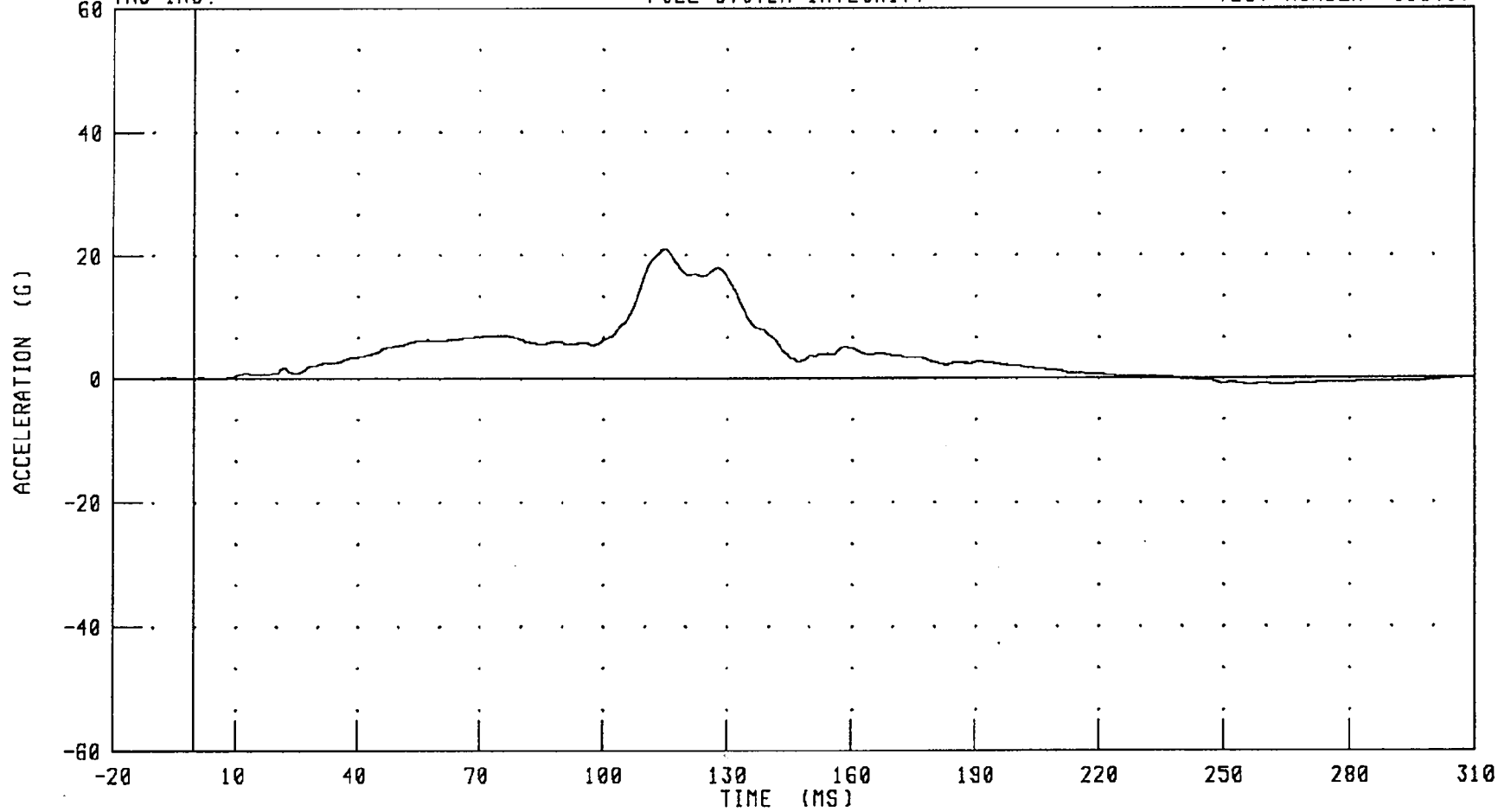
CHANNEL: NKLZM1 FILTER: CH. CLASS 600 PEAK DATA: 18.51 N·M @ 98.08 MS; -45.92 N·M @ 120.24 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

DRIVER CHEST X-AXIS ACCELERATION

TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960417



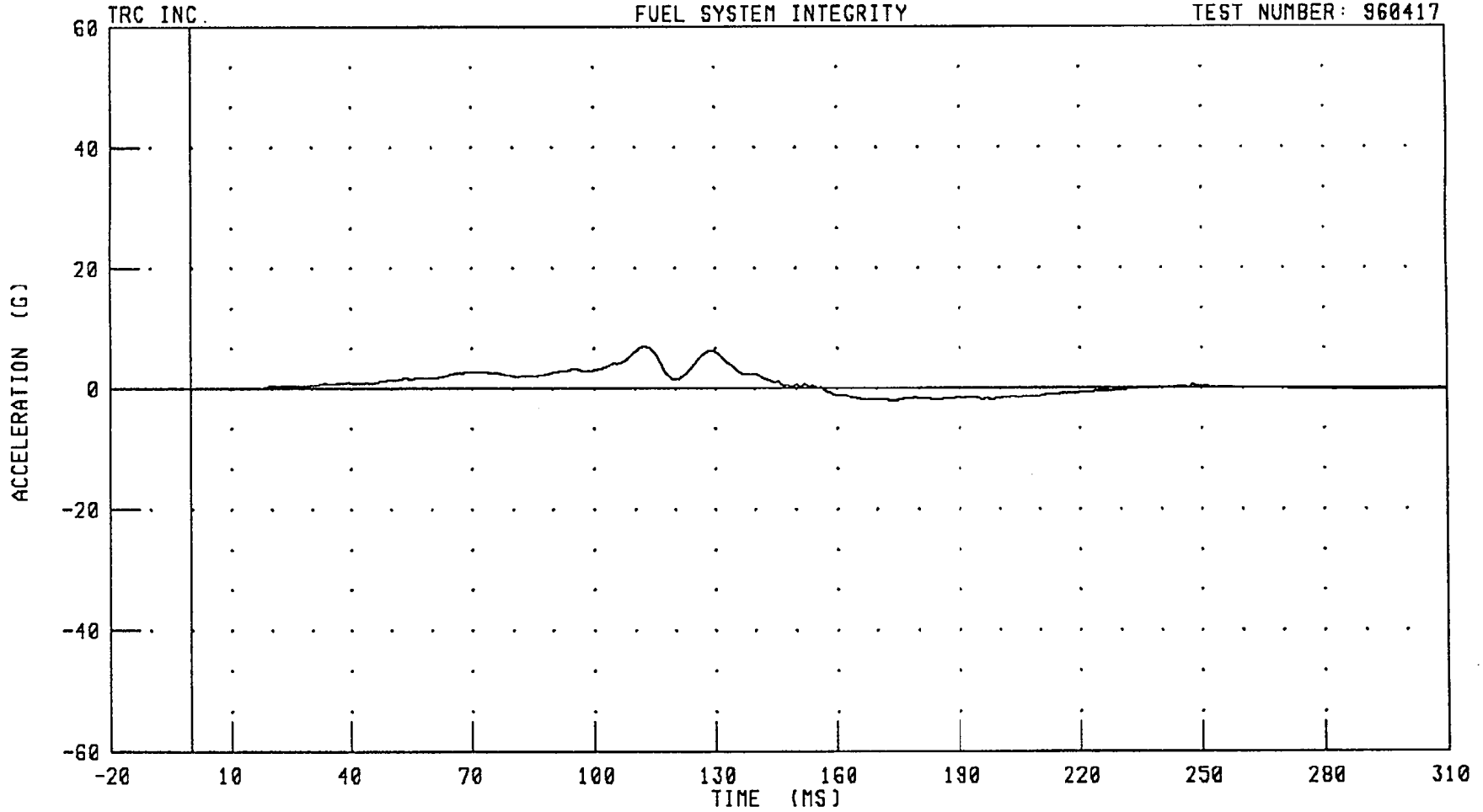
CHANNEL: CSTXG1 FILTER: CH. CLASS 180 PEAK DATA: 21.00 G @ 114.88 MS; -1.05 G @ 256.40 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

DRIVER CHEST Y-AXIS ACCELERATION

TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960417



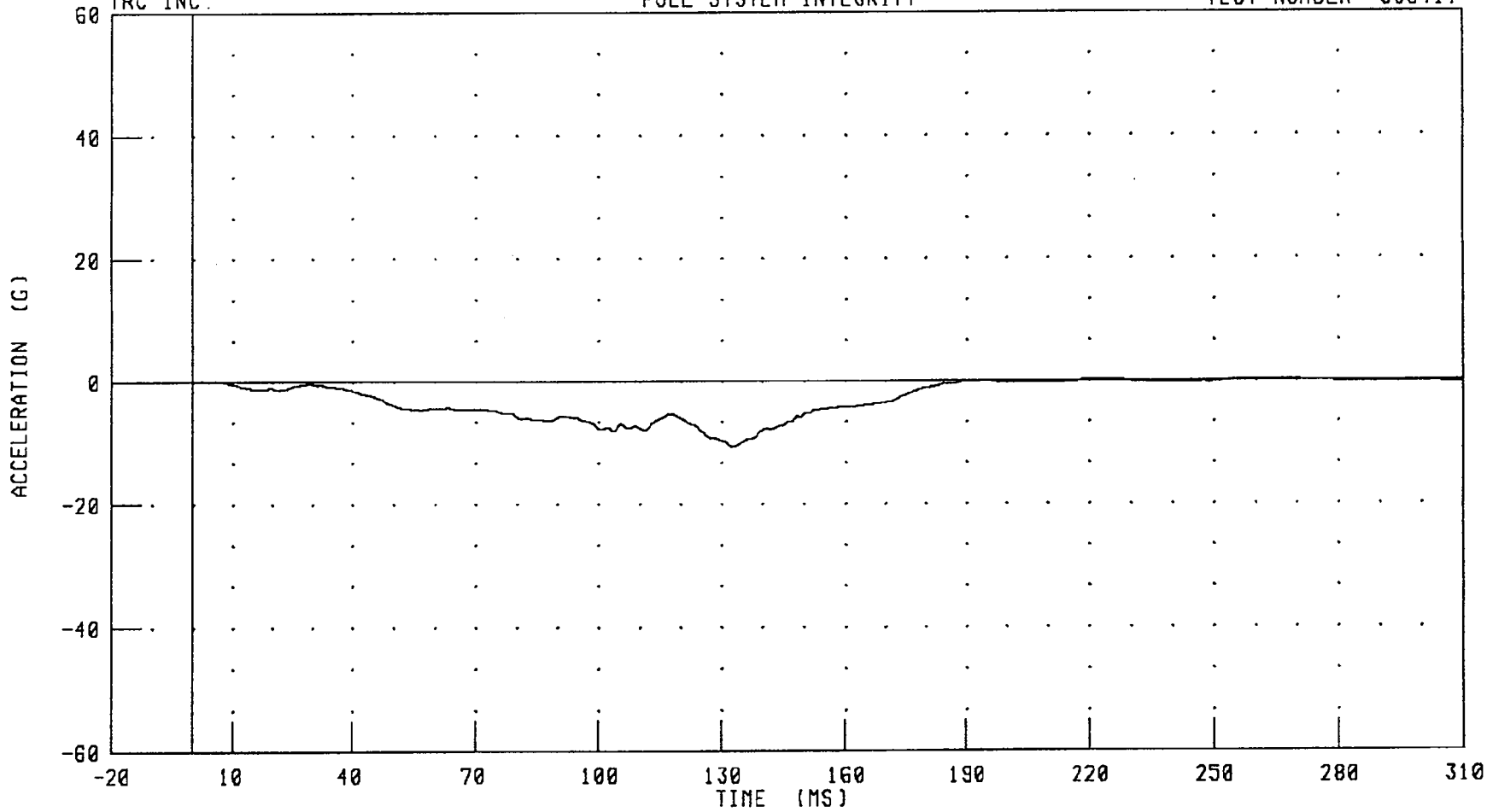
CHANNEL: CSTYG1 FILTER: CH. CLASS 180 PEAK DATA: 6.97 G @ 112.56 MS; -2.01 G @ 174.08 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

DRIVER CHEST Z-AXIS ACCELERATION

TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960417



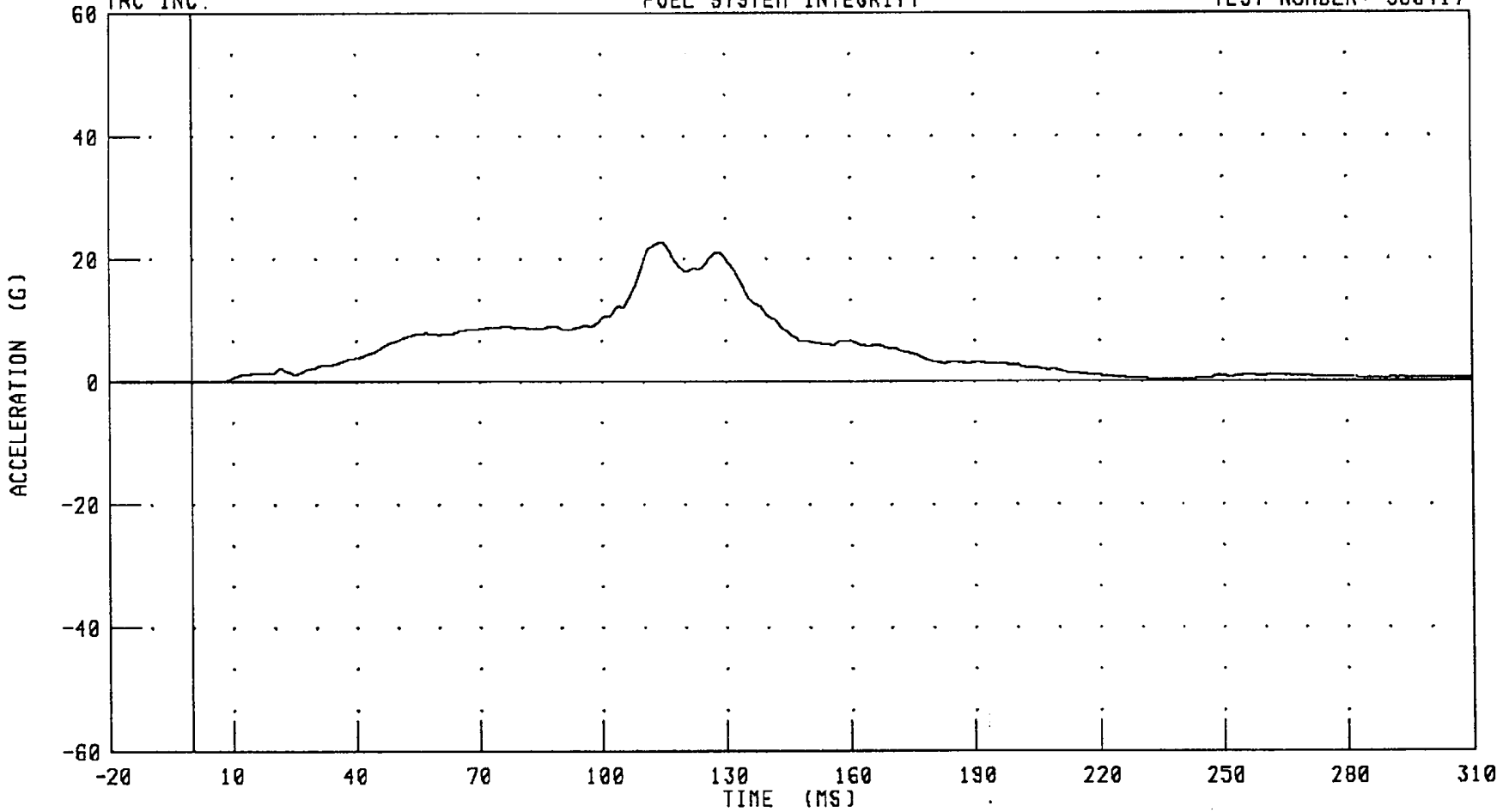
CHANNEL: CSTZG1 FILTER: CH. CLASS 180 PEAK DATA: 0.25 G @ 260.56 MS; -10.65 G @ 132.88 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

DRIVER CHEST RESULTANT ACCELERATION

TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960417



CHANNEL: CSTRG1 FILTER: CH. CLASS 180 PEAK DATA: 22.77 G @ 114.48 MS; 0.01 G @ -20.00 MS

960417

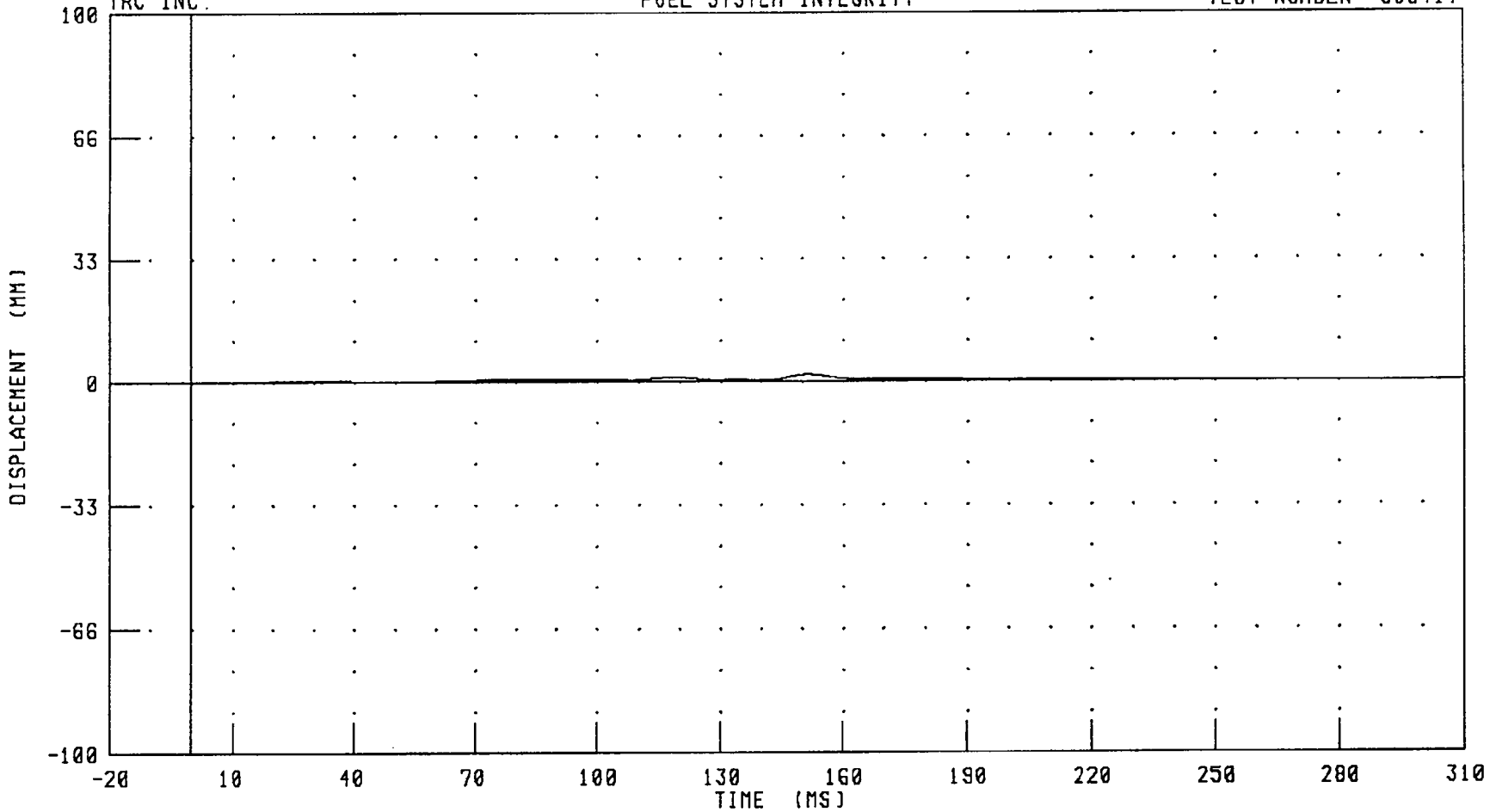
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

DRIVER CHEST DEFLECTION

FUEL SYSTEM INTEGRITY

TRC INC.

TEST NUMBER: 960417



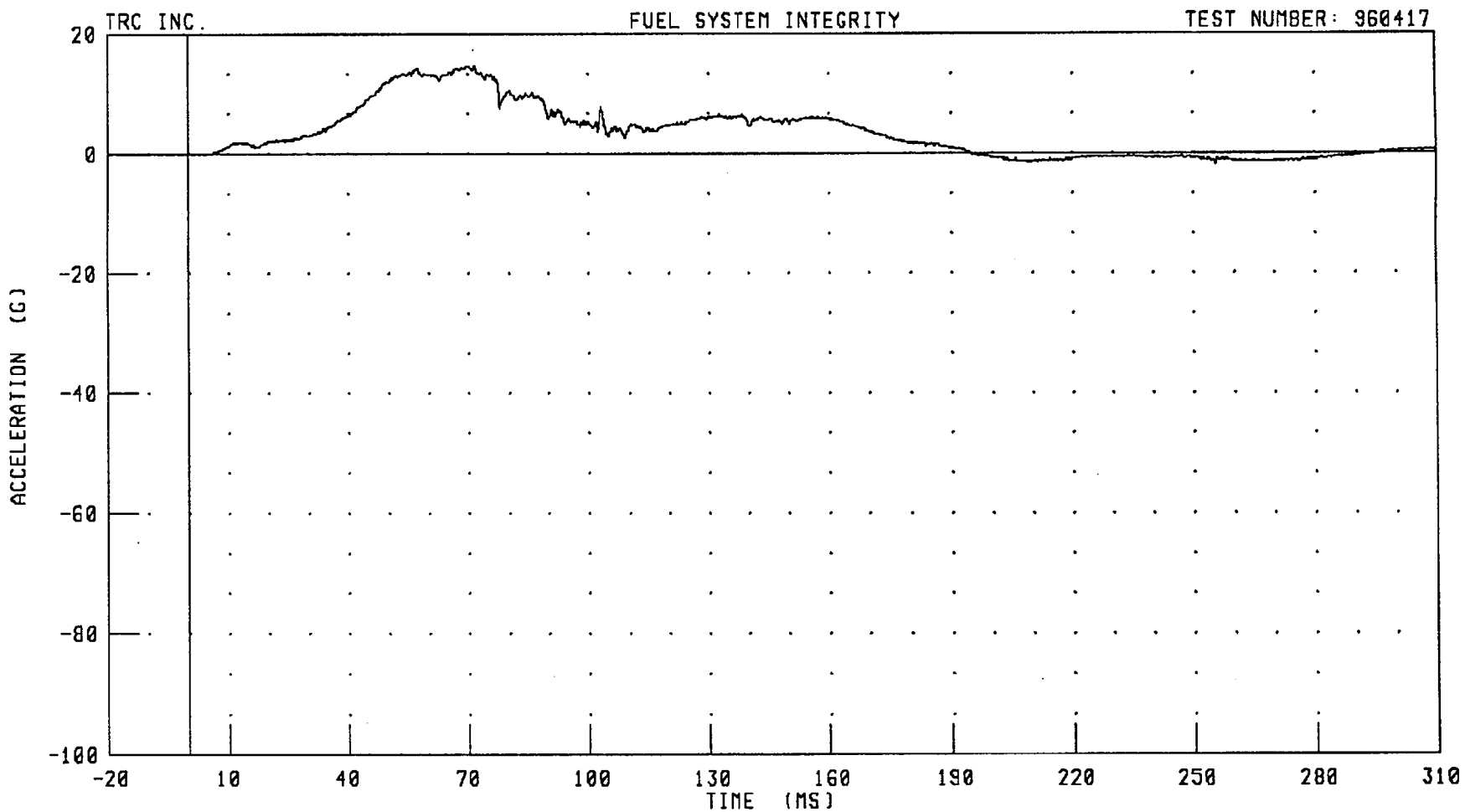
CHANNEL: CSTX01 FILTER: CH. CLASS 180

PEAK DATA: 1.88 MM @ 151.28 MS; -0.01 MM @ -17.12 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

DRIVER PELVIS X-AXIS ACCELERATION

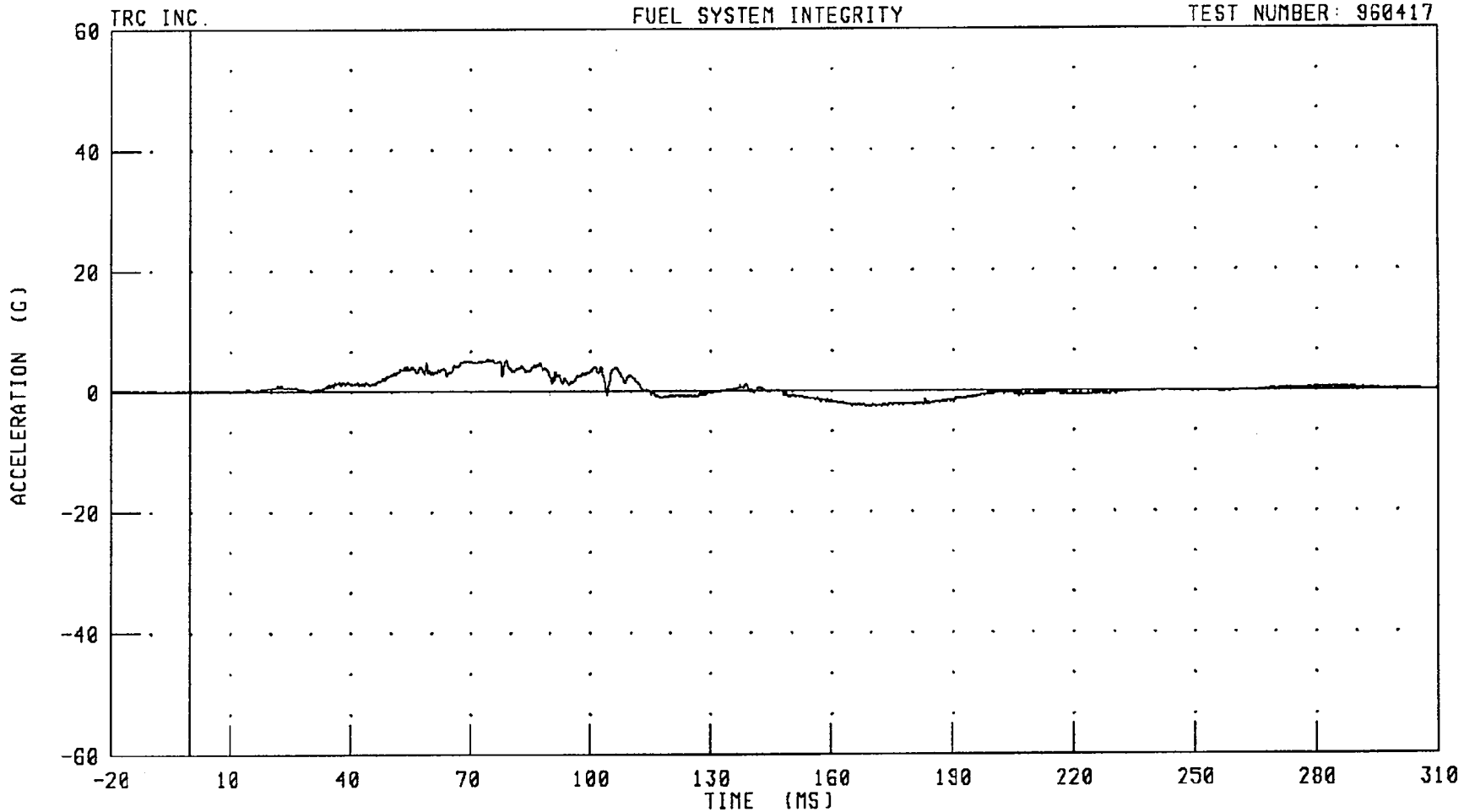


CHANNEL: PEVXG1 FILTER: CH. CLASS 1000 PEAK DATA: 14.77 G @ 71.76 MS; -1.92 G @ 255.68 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

DRIVER PELVIS Y-AXIS ACCELERATION

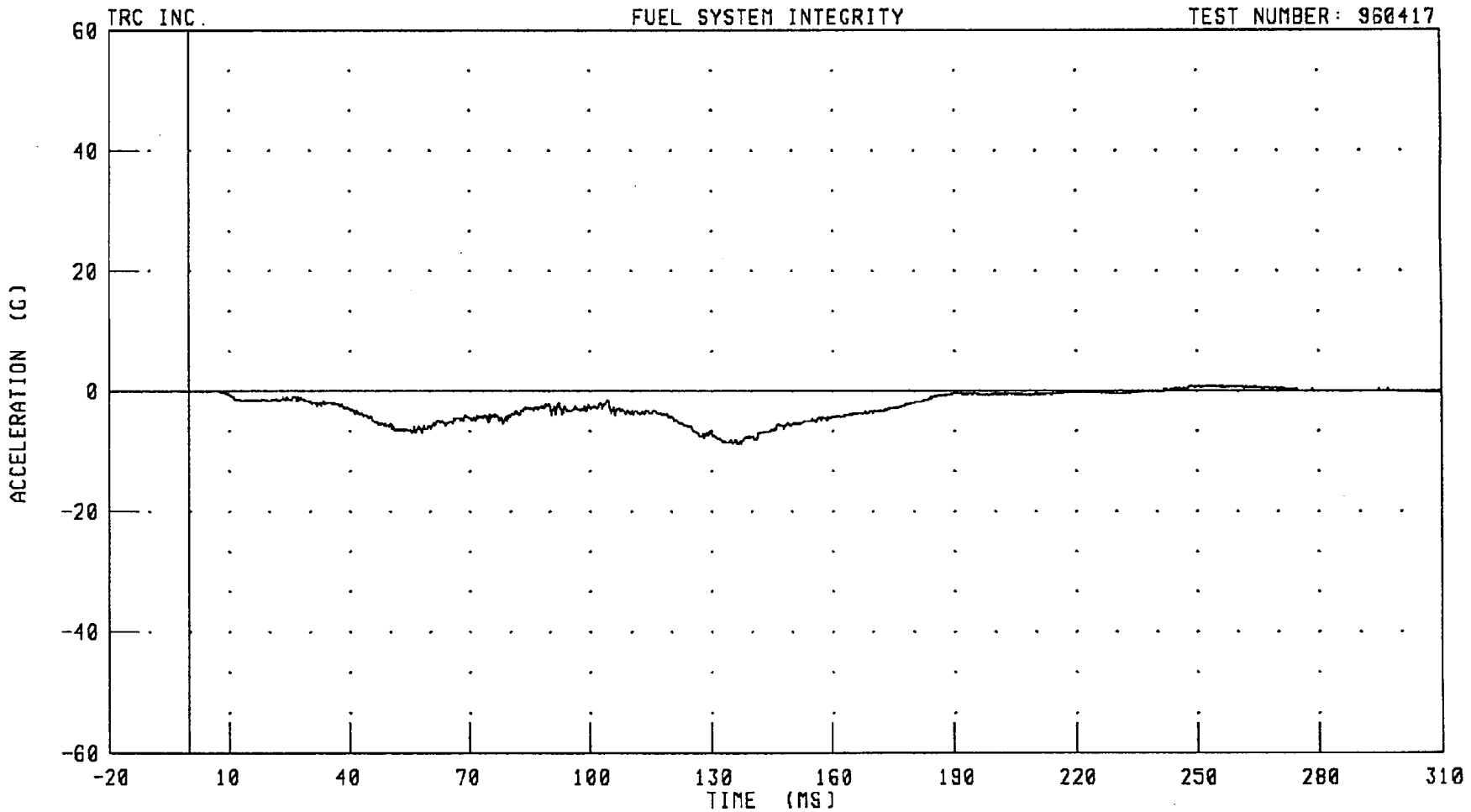


CHANNEL: PEVYG1 FILTER: CH. CLASS 1000 PEAK DATA: 5.46 G @ 74.40 MS; -2.55 G @ 165.20 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

DRIVER PELVIS Z-AXIS ACCELERATION



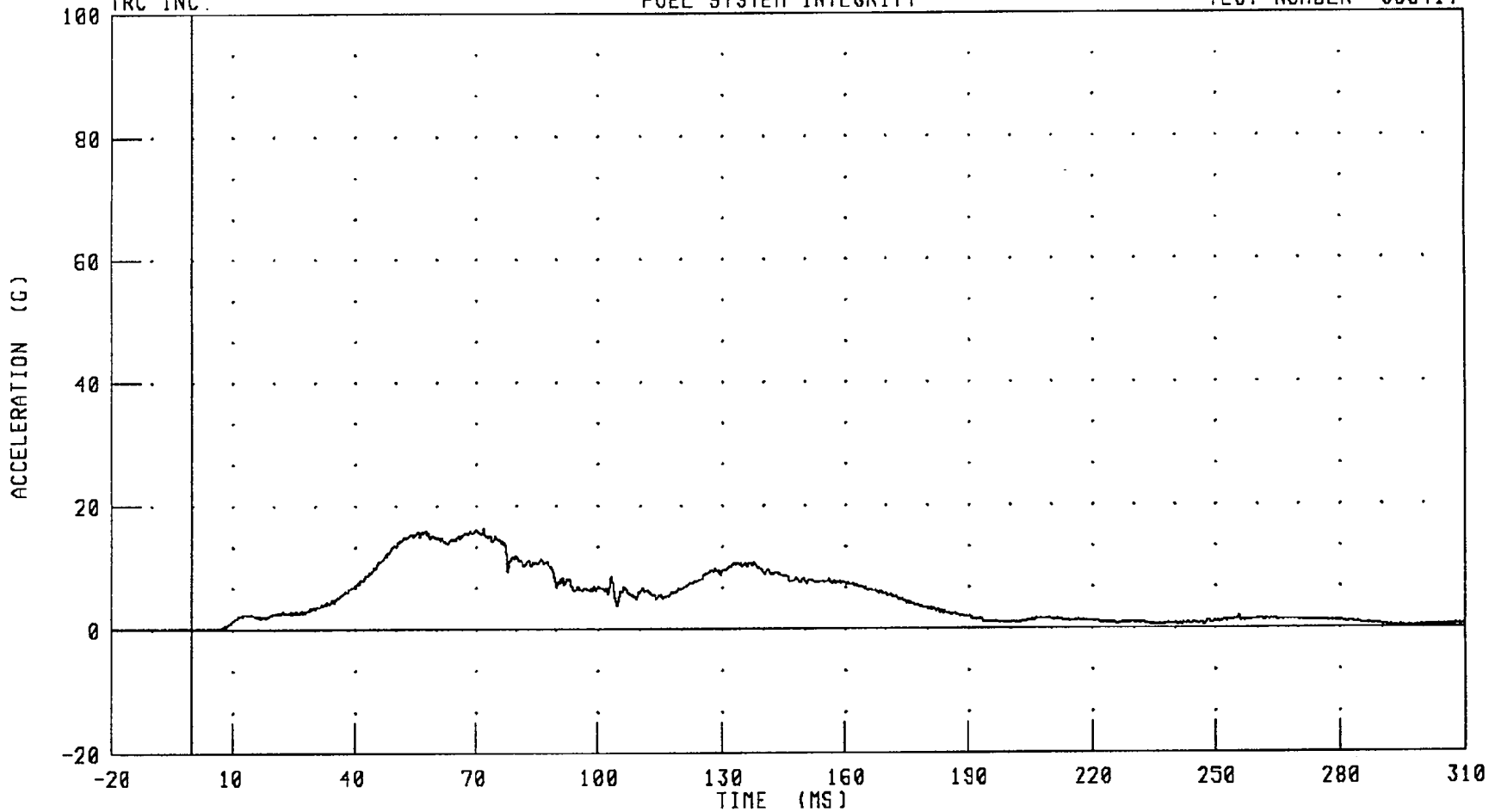
CHANNEL: PEVZG1 FILTER: CH. CLASS 1000 PEAK DATA: 0.88 G @ 248.56 MS; -8.75 G @ 135.28 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

DRIVER PELVIS RESULTANT ACCELERATION

TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960417



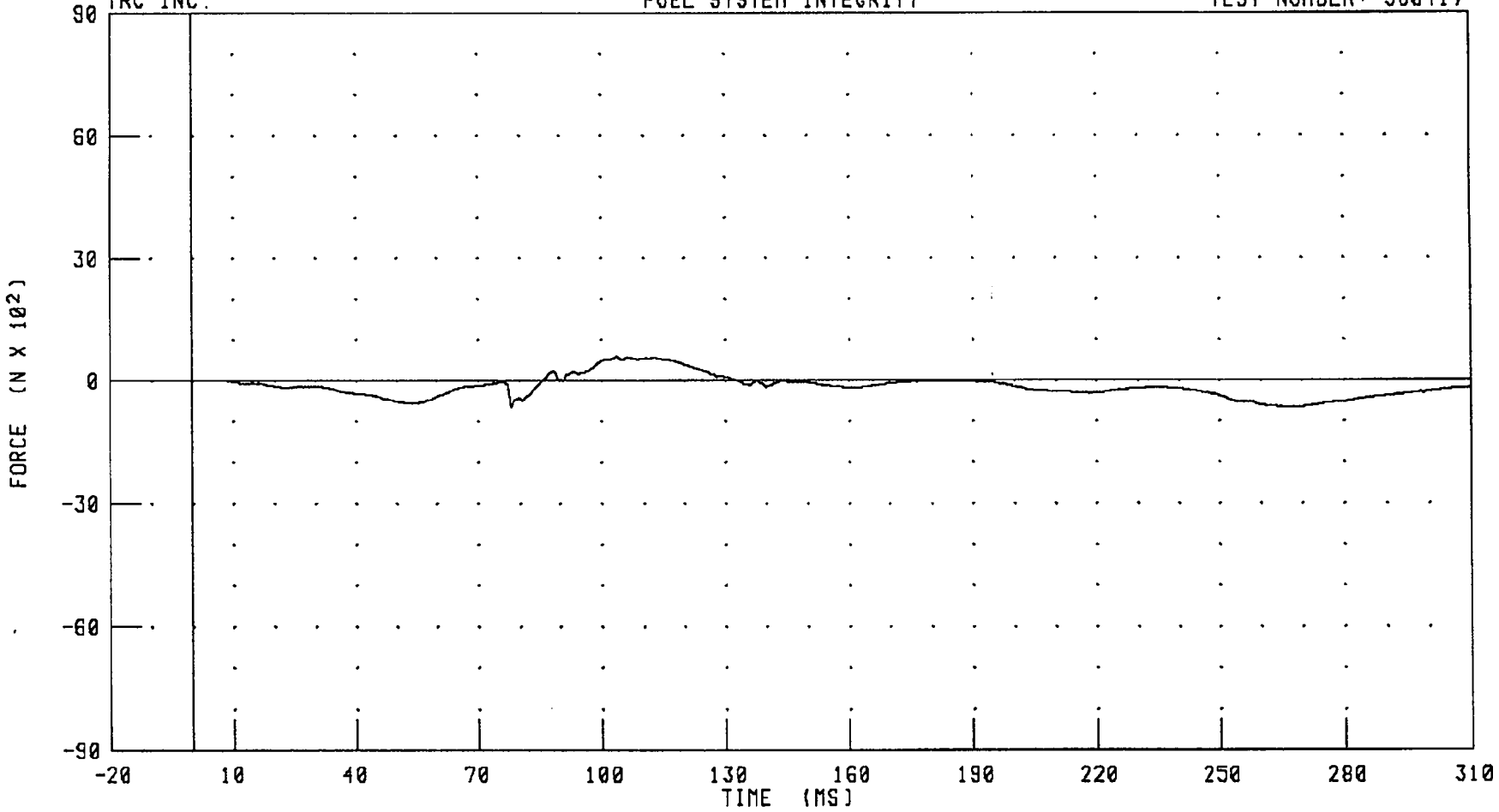
CHANNEL: PEVRG1 FILTER: CH. CLASS 1000 PEAK DATA: 16.28 G @ 71.76 MS; 0.11 G @ -17.84 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

DRIVER LEFT FEMUR FORCE

TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960417



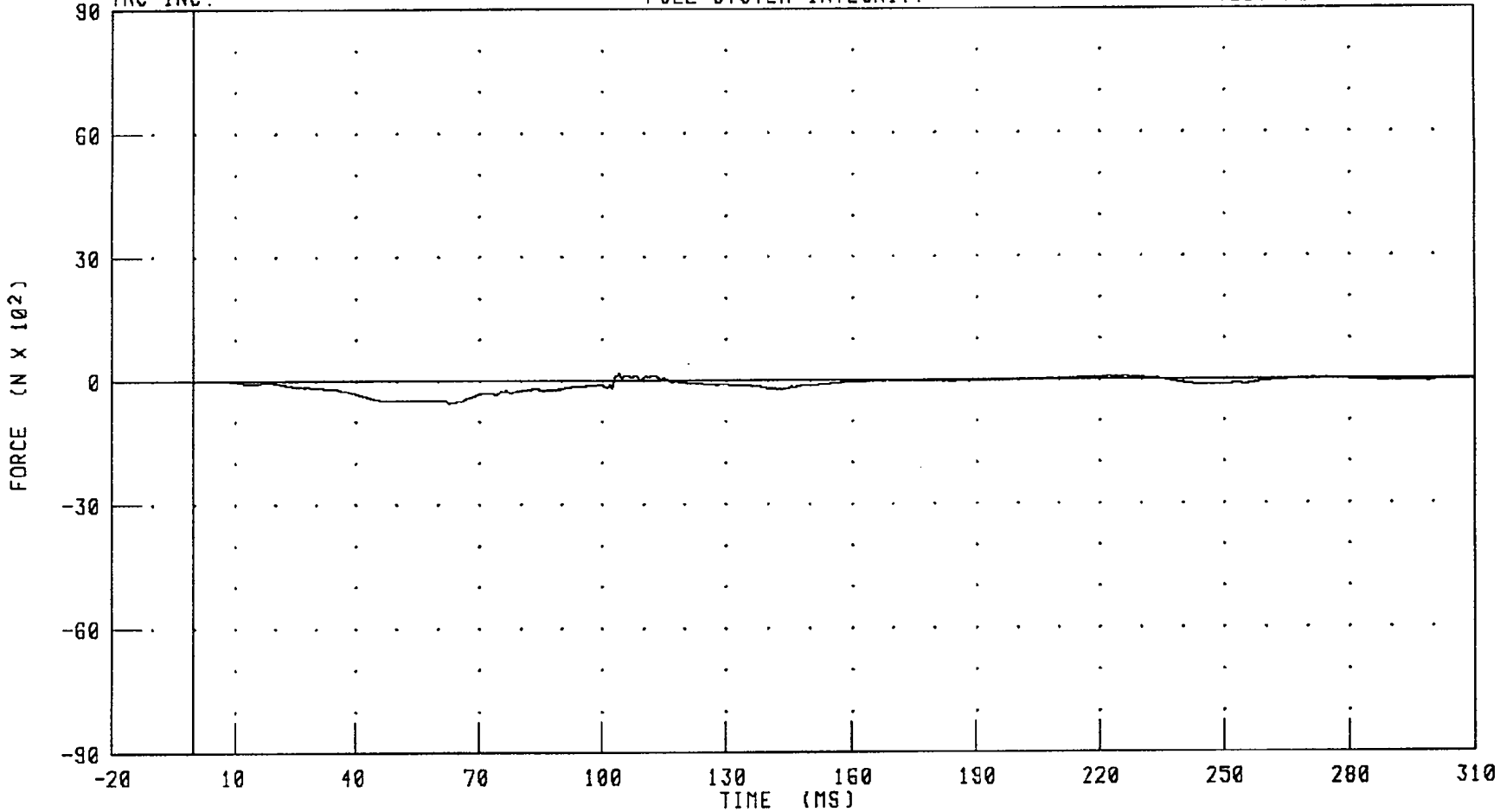
CHANNEL: LFMF1 FILTER: CH. CLASS 600 PEAK DATA: 582.64 N @ 103.68 MS; -667.60 N @ 268.00 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

DRIVER RIGHT FEMUR FORCE

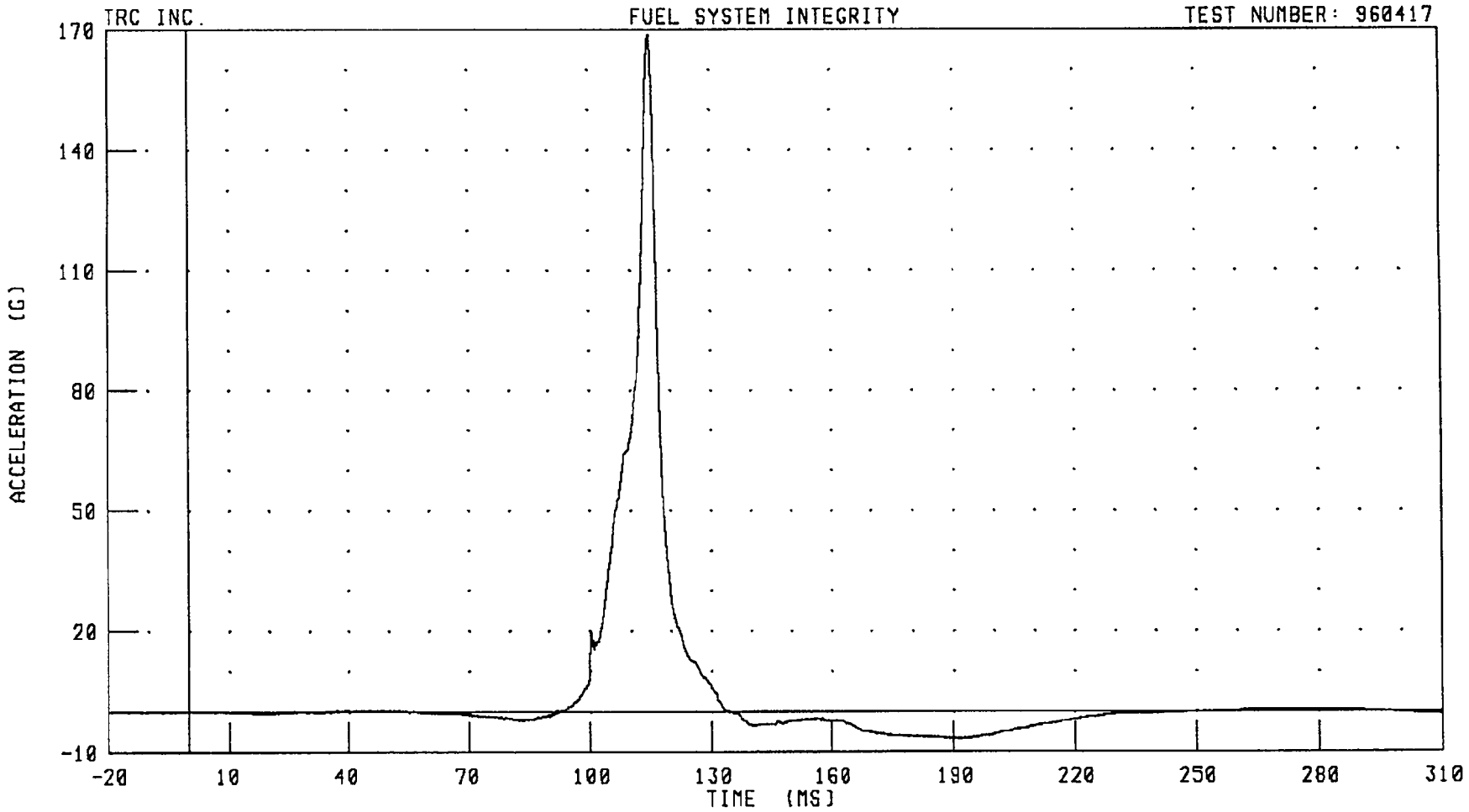
TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960417



CHANNEL: RFMFI FILTER: CH. CLASS 600 PEAK DATA: 170.21 N @ 104.16 MS; -553.54 N @ 62.88 MS

960417

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



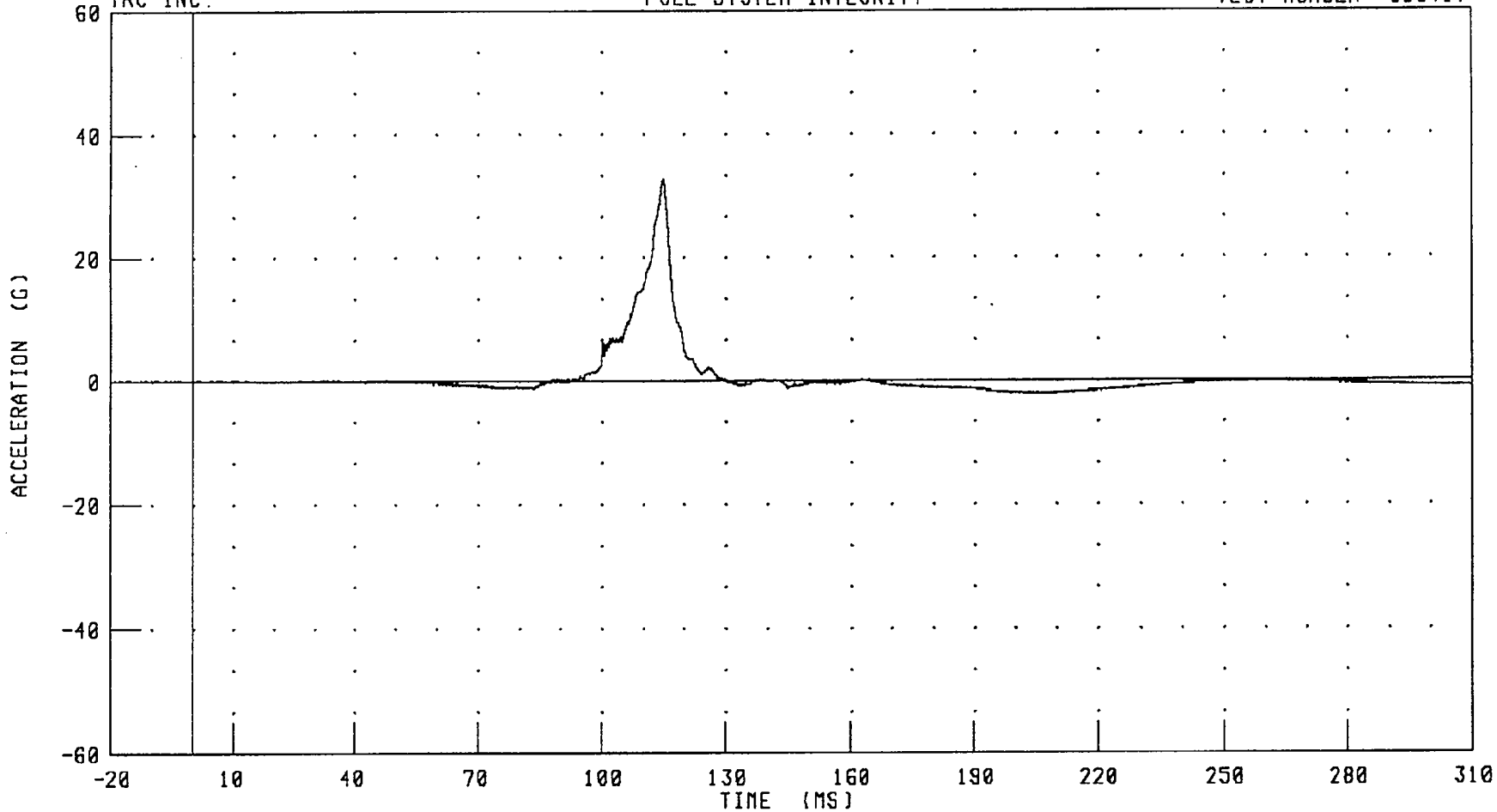
CHANNEL: HEDXG2 FILTER: CH. CLASS 1000 PEAK DATA: 168.68 G @ 115.28 MS; -6.50 G @ 187.52 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION

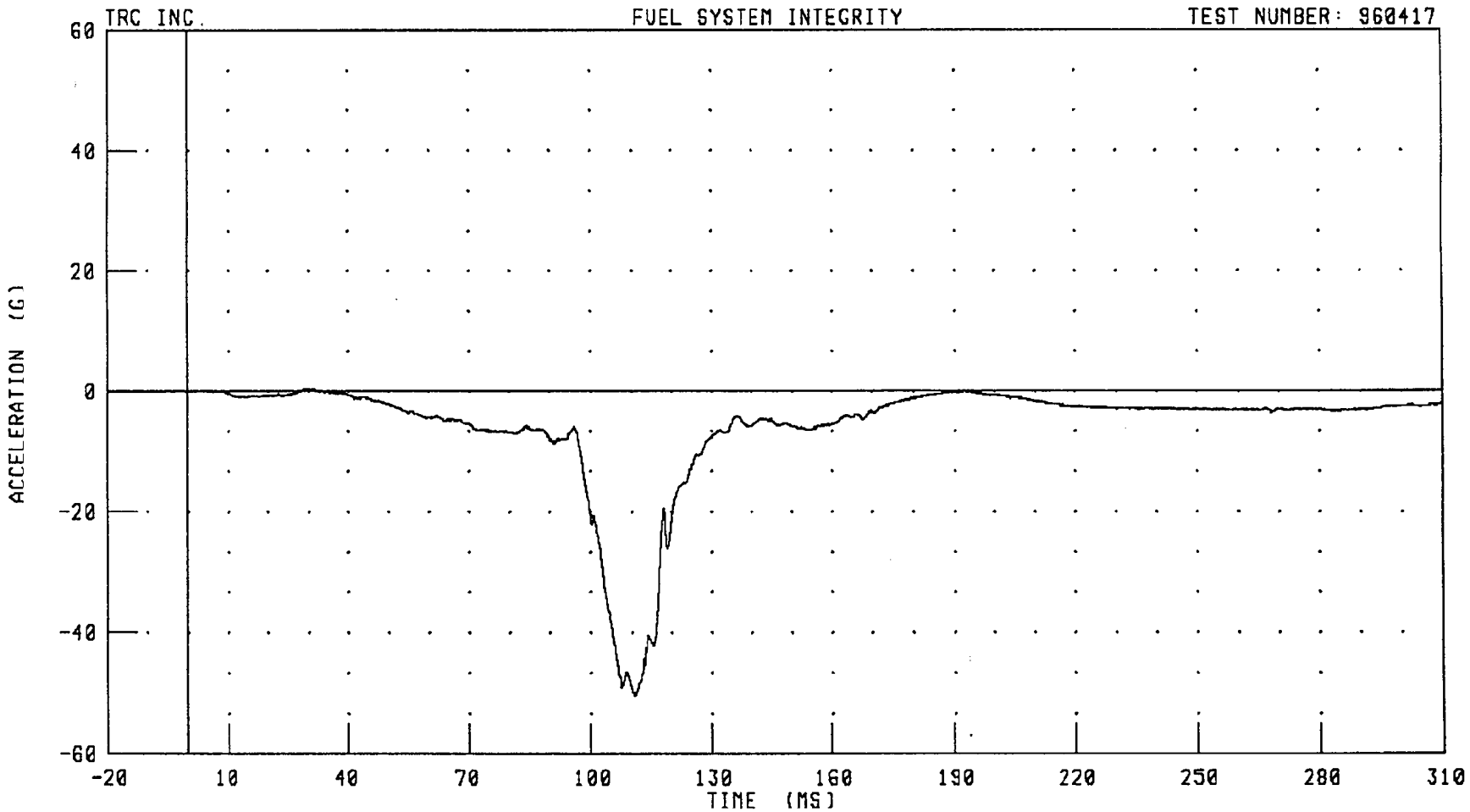
TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960417



CHANNEL: HEDYG2 FILTER: CH. CLASS 1000 PEAK DATA: 32.63 G @ 114.88 MS; -2.17 G @ 199.04 MS

960417

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

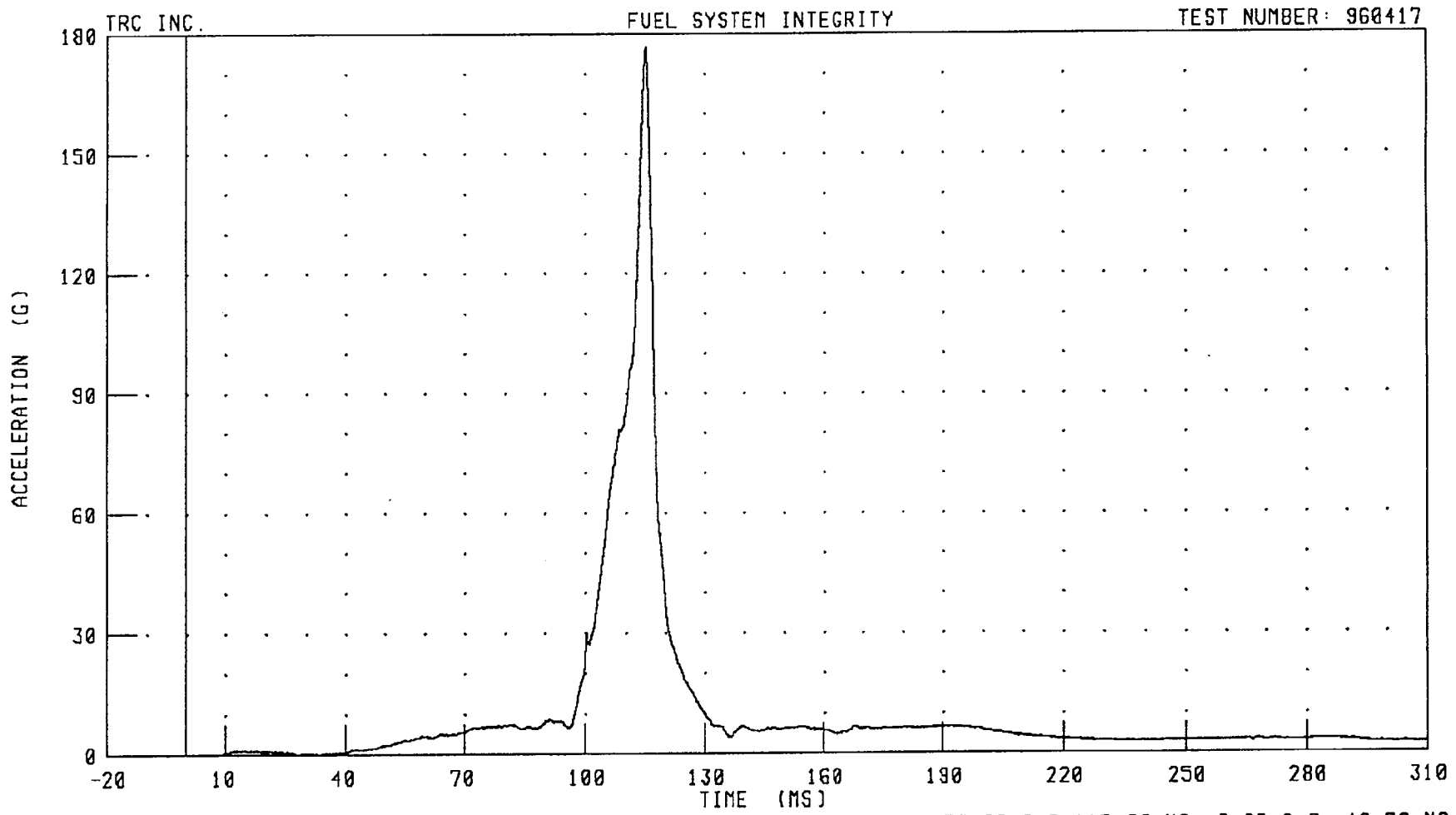


CHANNEL: HEDZG2 FILTER: CH. CLASS 1000 PEAK DATA: 0.28 G @ 28.88 MS; -50.40 G @ 110.64 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

RIGHT FRONT PASSENGER HEAD RESULTANT ACCELERATION



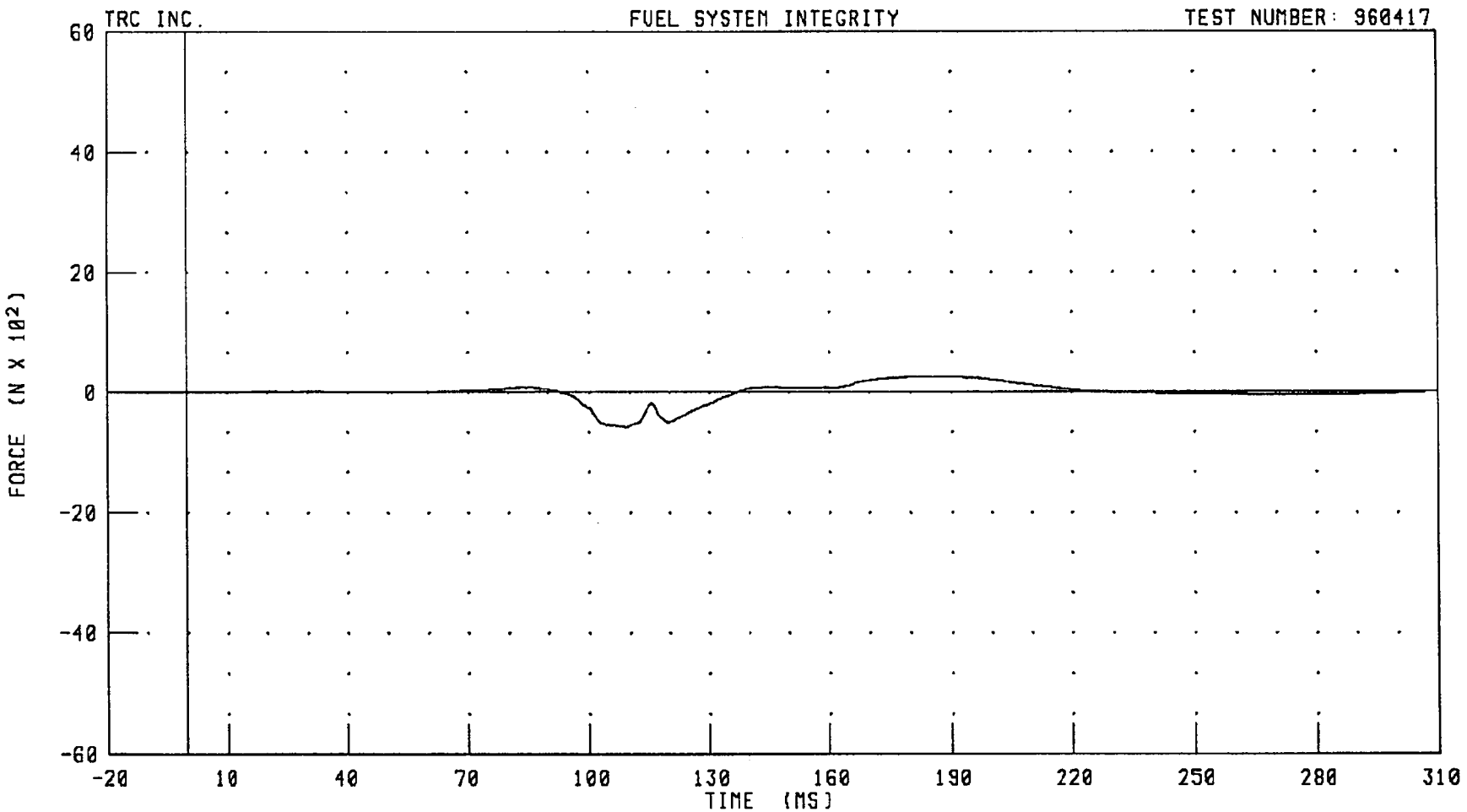
CHANNEL: HEDRG2 FILTER: CH. CLASS 1000

PEAK DATA: 176.68 G @ 115.28 MS; 0.09 G @ -19.76 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

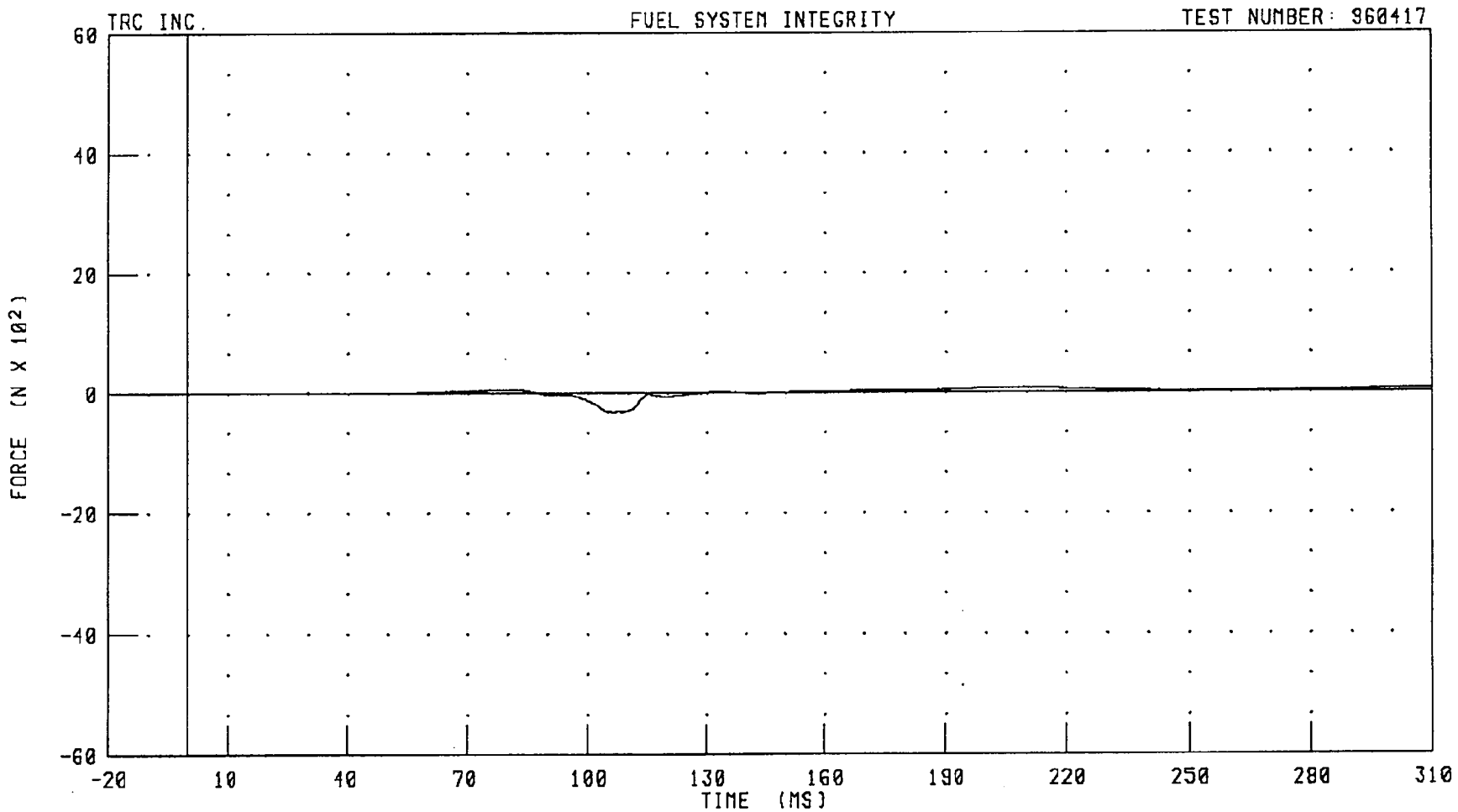
RIGHT FRONT PASSENGER UPPER NECK X-AXIS SHEAR FORCE



CHANNEL: NEKXF2 FILTER: CH. CLASS 1000 PEAK DATA: 259.73 N @ 183.12 MS; -587.74 N @ 109.20 MS

960417

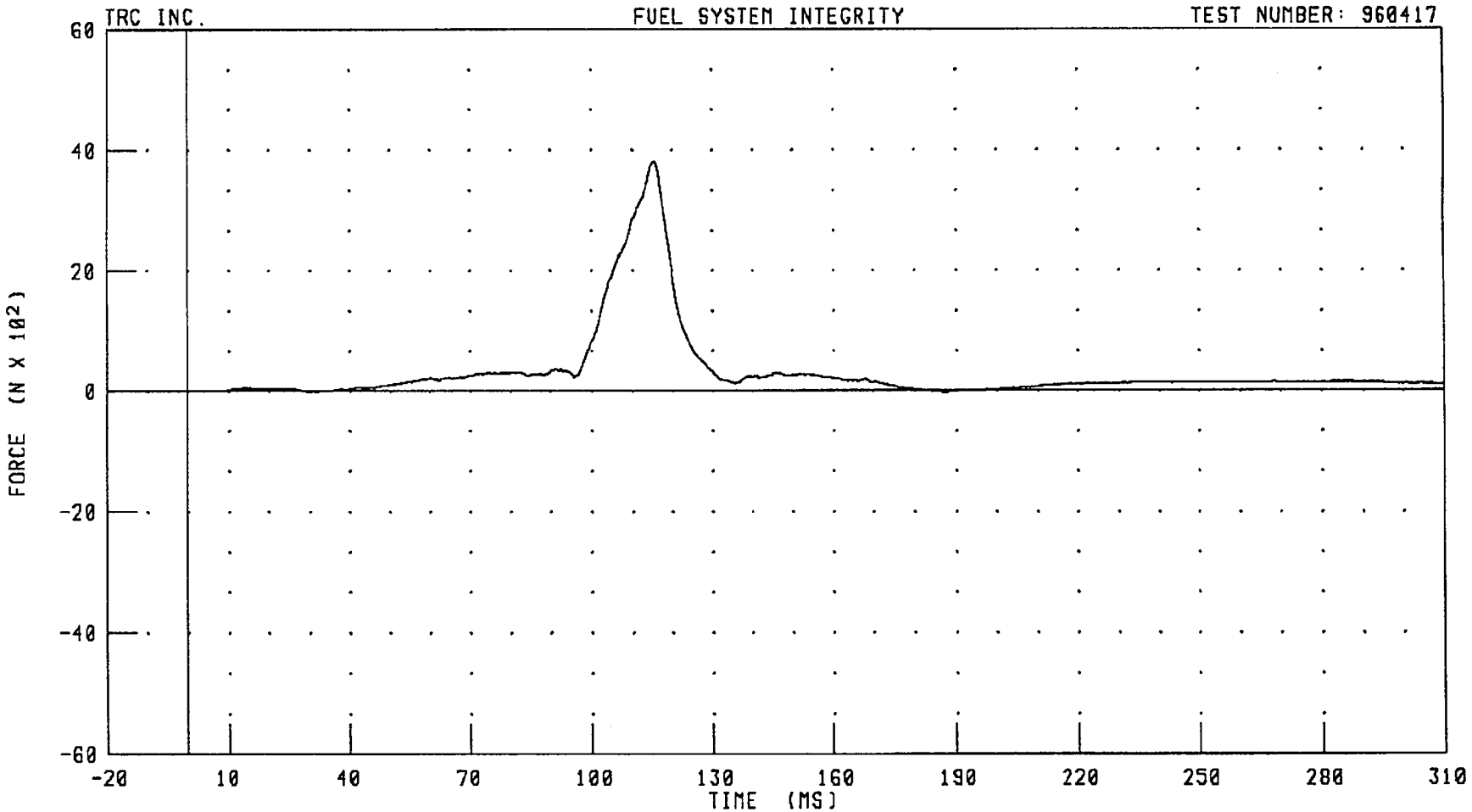
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER UPPER NECK Y-AXIS SHEAR FORCE



CHANNEL: NEKYF2 FILTER: CH. CLASS 1000 PEAK DATA: 79.90 N @ 209.52 MS; -324.28 N @ 106.48 MS

960417

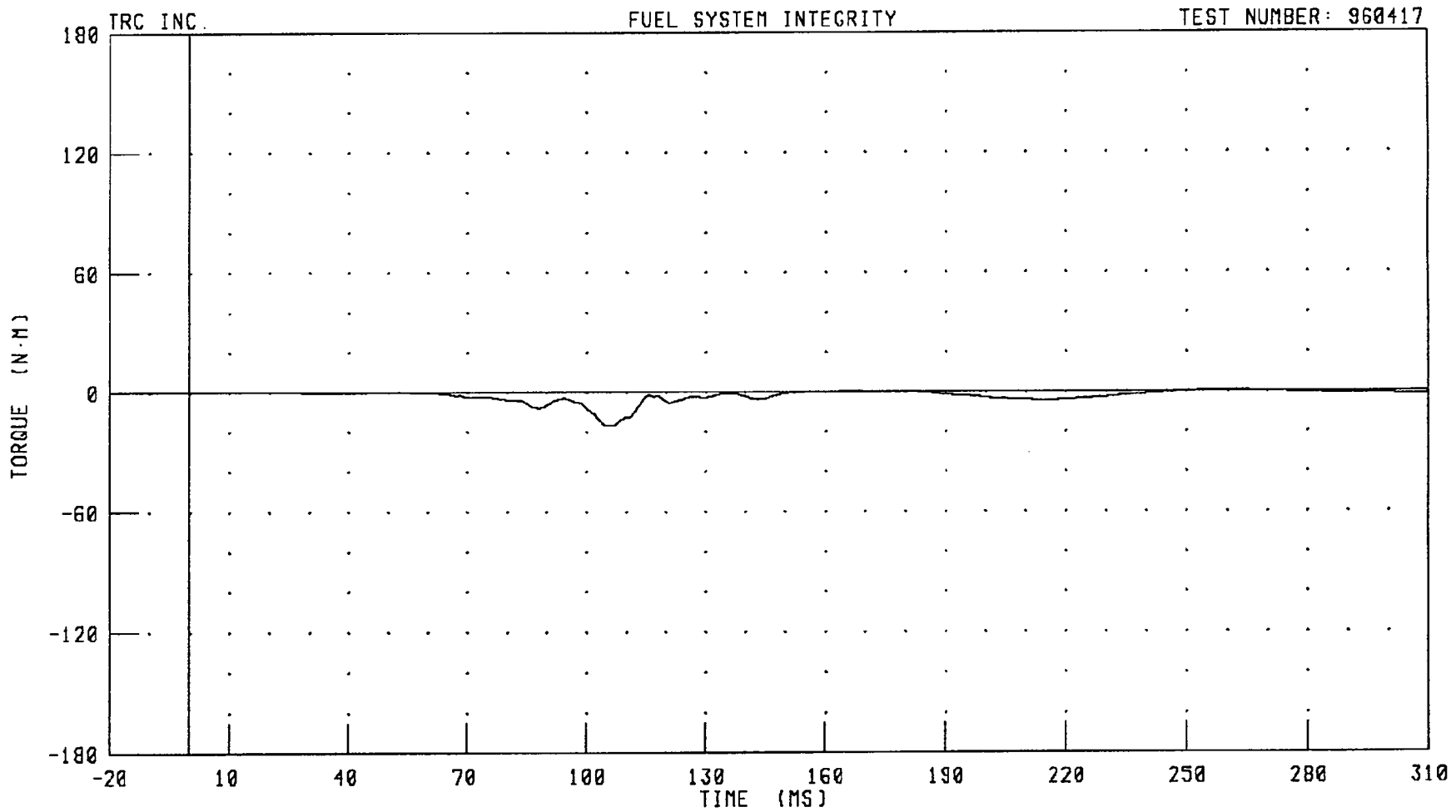
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER UPPER NECK Z-AXIS AXIAL FORCE



CHANNEL: NEKZF2 FILTER: CH. CLASS 1000 PEAK DATA: 3812.83 N @ 115.68 MS; -31.36 N @ 187.44 MS

960417

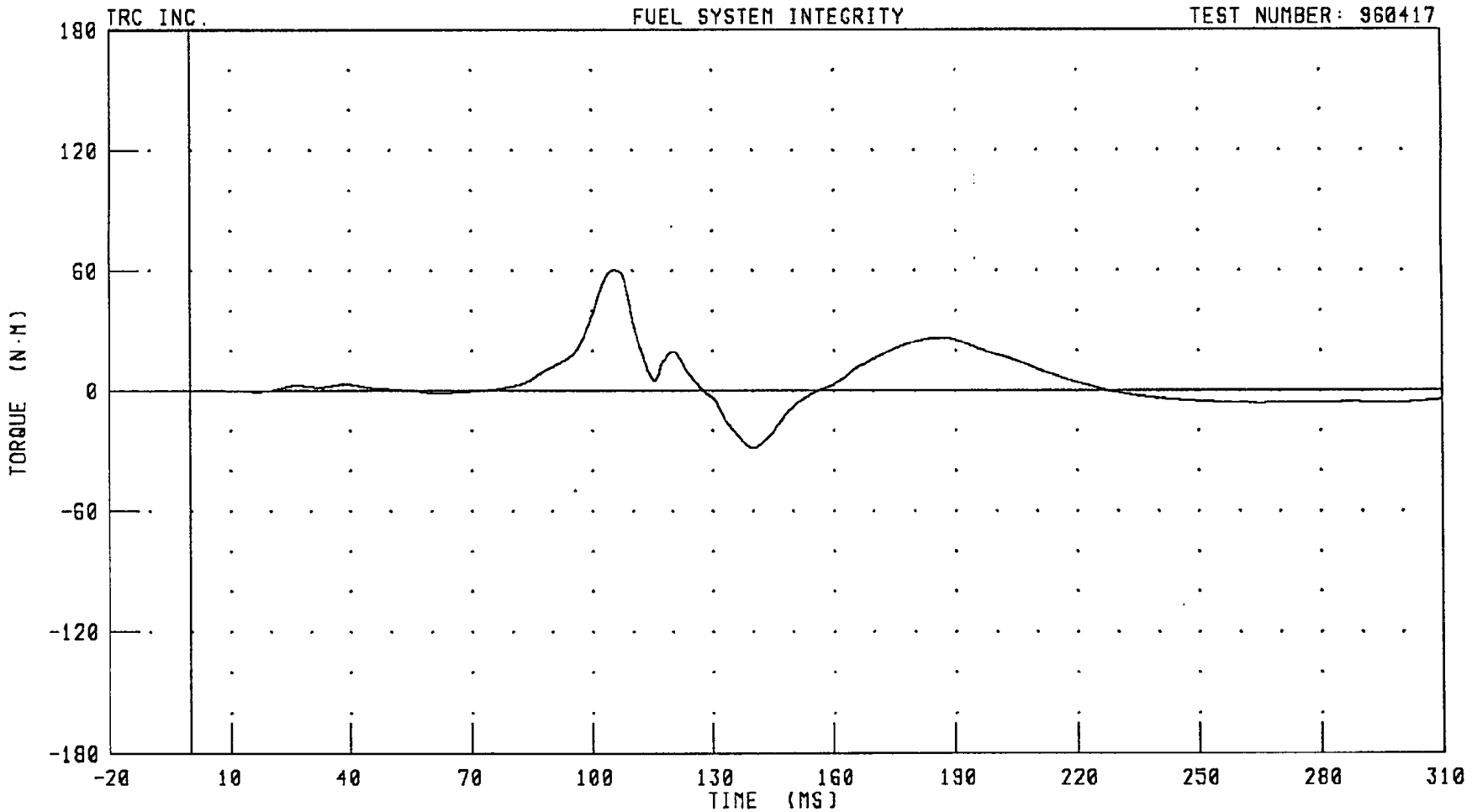
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER UPPER NECK MOMENT ABOUT X-AXIS



CHANNEL: NEKXM2 FILTER: CH. CLASS 600 PEAK DATA: 0.48 N-M @ 167.44 MS; -16.79 N-M @ 105.04 MS

960417

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

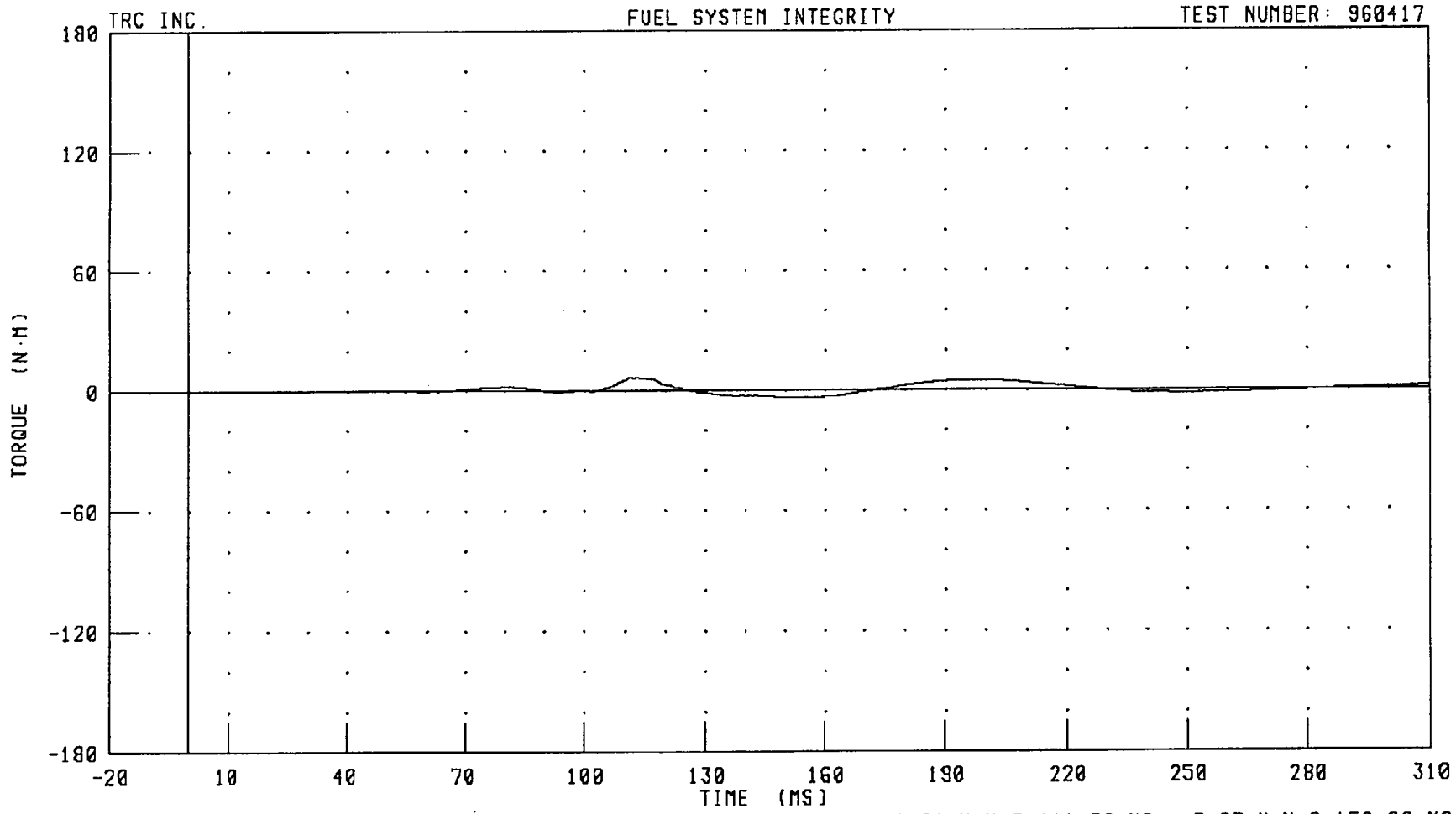


CHANNEL: NEKYM2 FILTER: CH. CLASS 600 PEAK DATA: 60.47 N-M @ 105.60 MS; -28.51 N-M @ 140.08 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

RIGHT FRONT PASSENGER UPPER NECK MOMENT ABOUT Z-AXIS

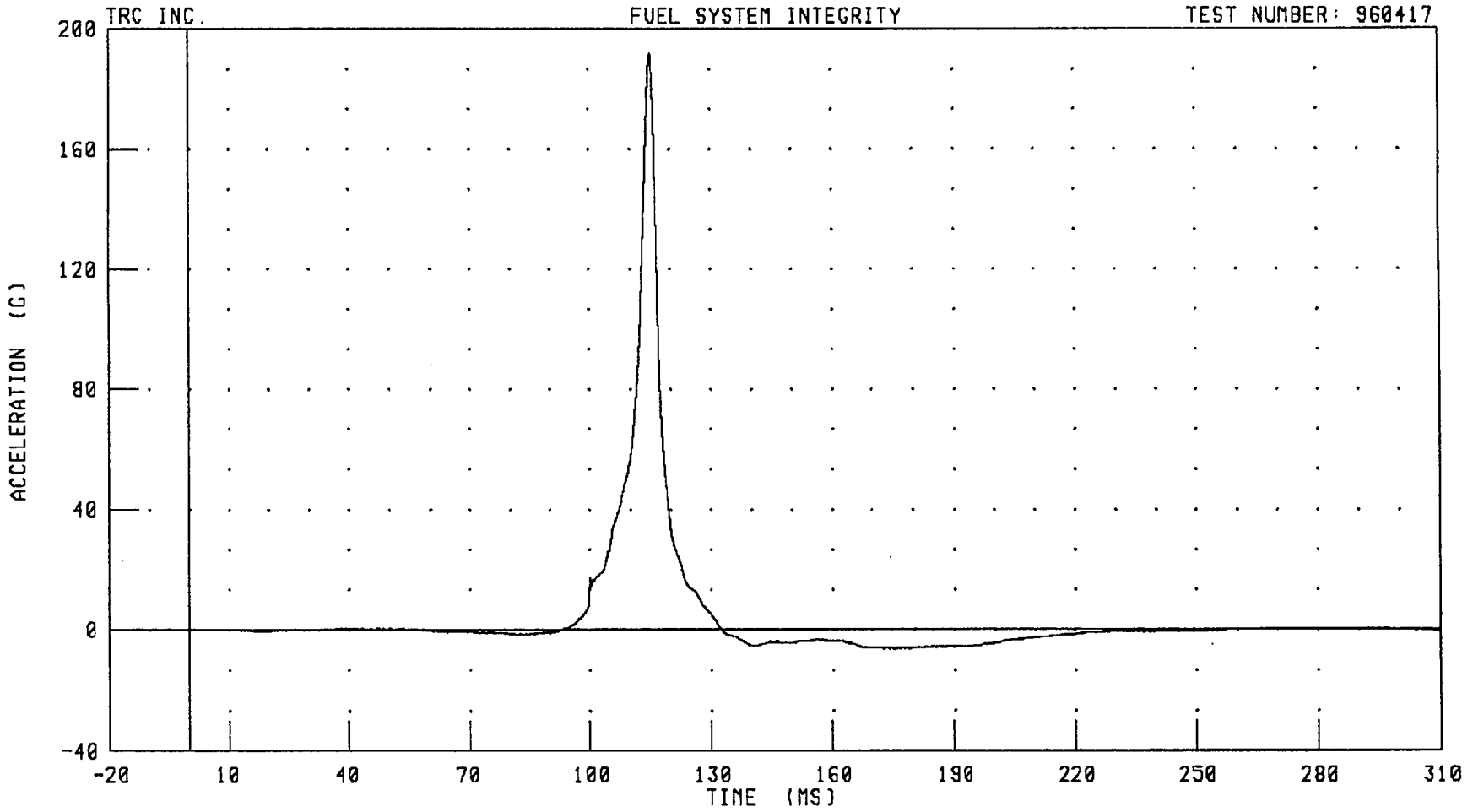


CHANNEL: NEKZM2 FILTER: CH. CLASS 600

PEAK DATA: 6.81 N-M @ 111.36 MS; -3.63 N-M @ 152.08 MS

960417

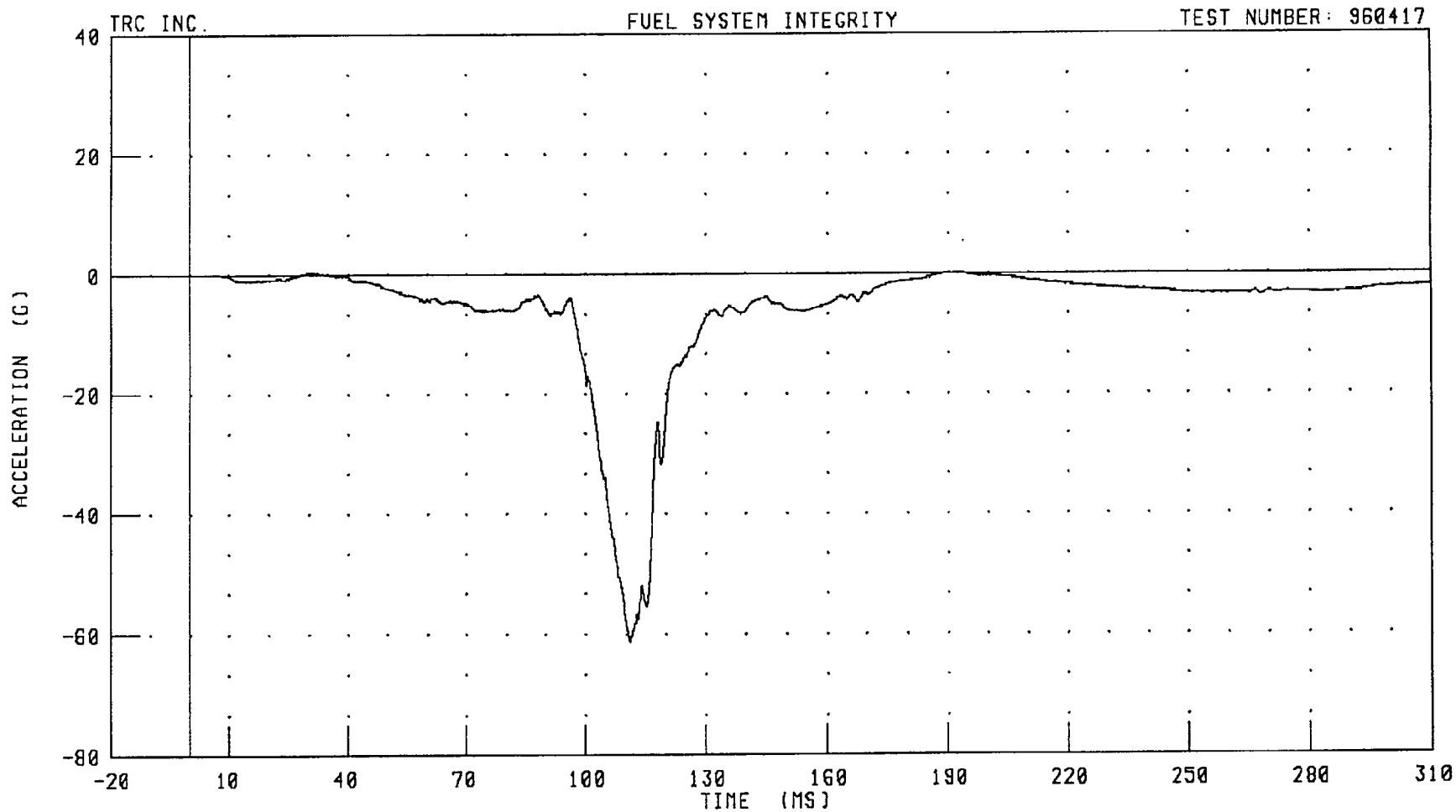
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER HEAD POSITION 1 X-AXIS ACCELERATION



CHANNEL: HD1XG2 FILTER: CH. CLASS 1000 PEAK DATA: 191.73 G @ 115.12 MS; -6.33 G @ 172.96 MS

960417

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



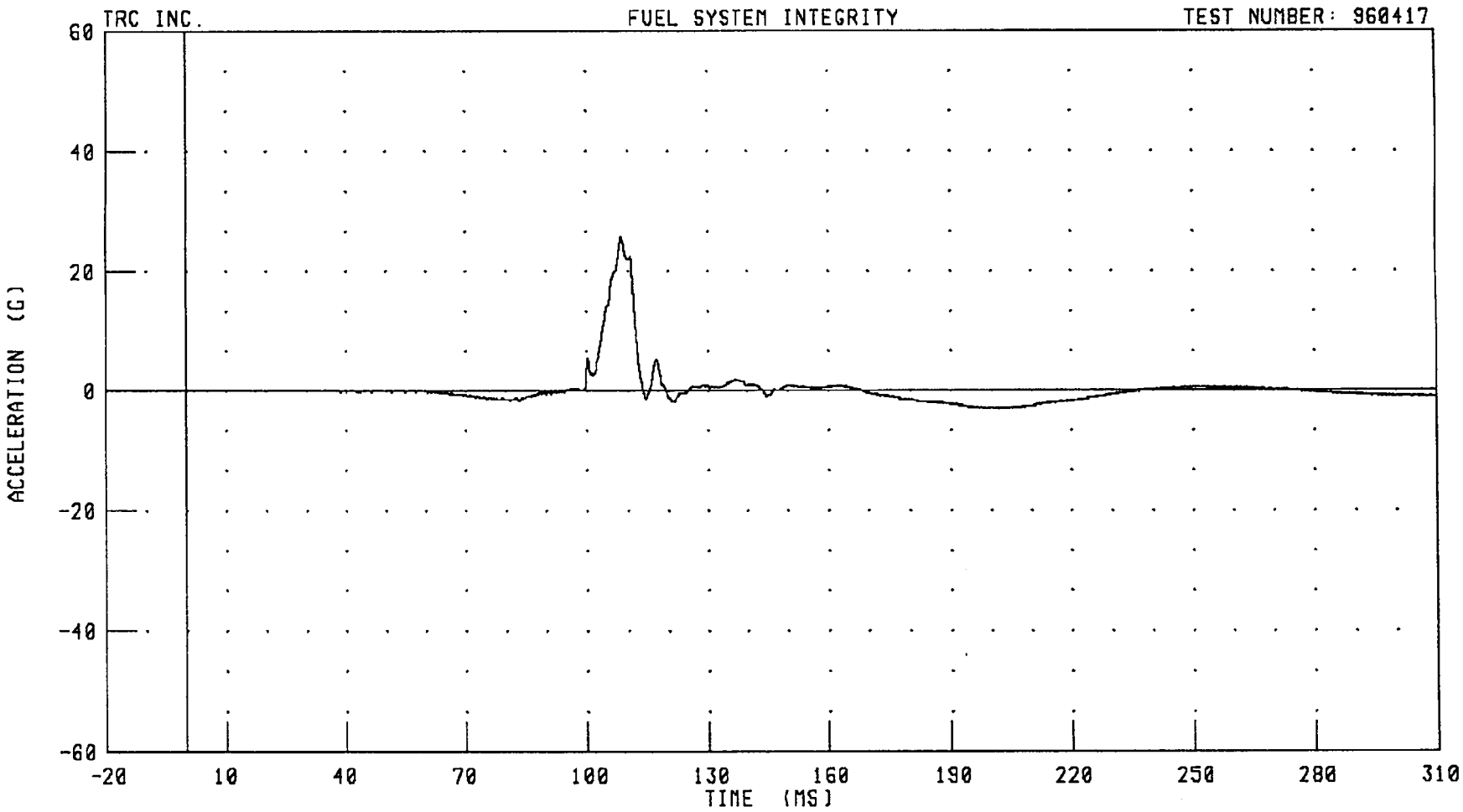
CHANNEL: HD1ZG2 FILTER: CH. CLASS 1000

PEAK DATA: 0.40 G @ 29.52 MS; -61.25 G @ 111.04 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

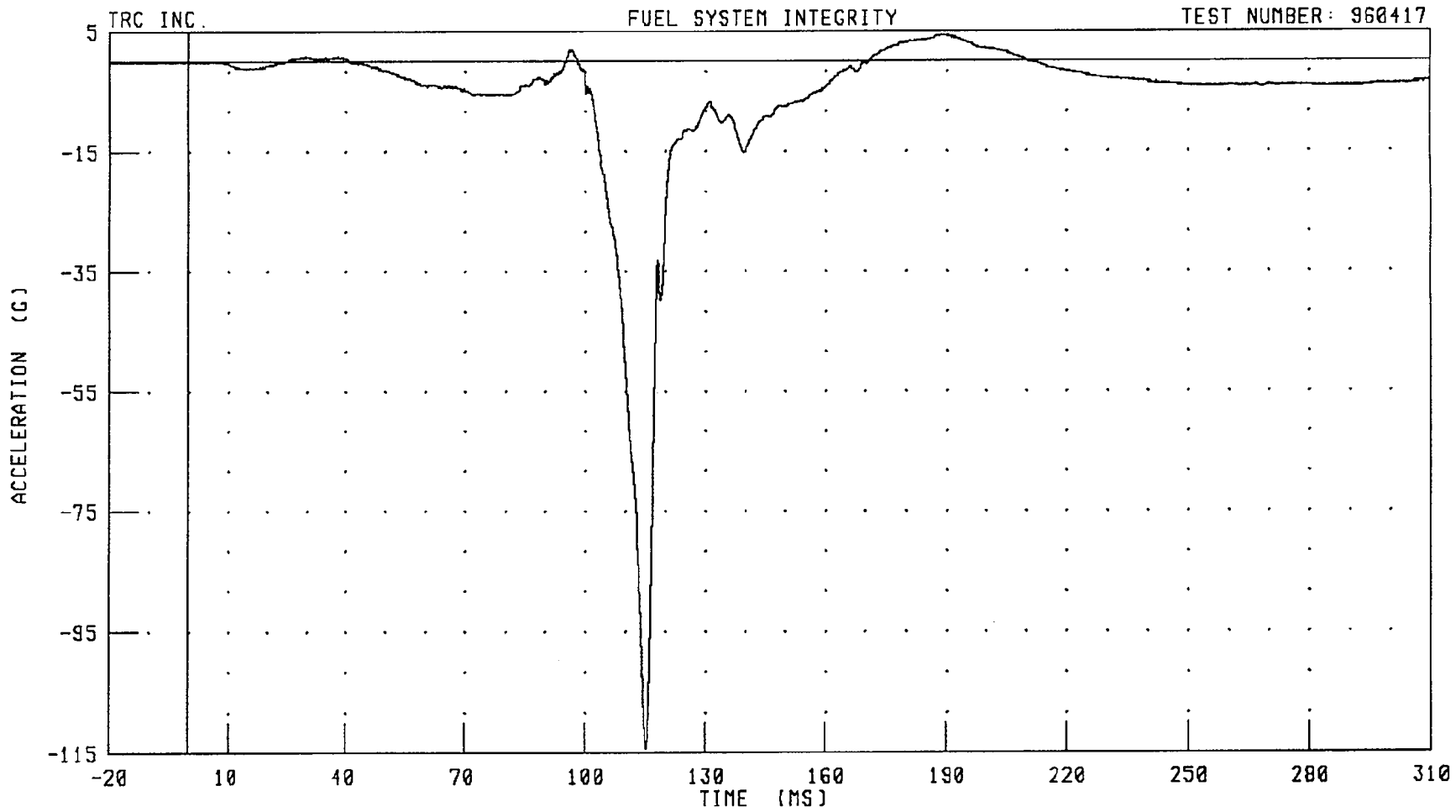
RIGHT FRONT PASSENGER HEAD POSITION 2 Y-AXIS ACCELERATION



CHANNEL: HD2YG2 FILTER: CH. CLASS 1000 PEAK DATA: 25.68 G @ 108.48 MS; -3.02 G @ 197.20 MS

960417

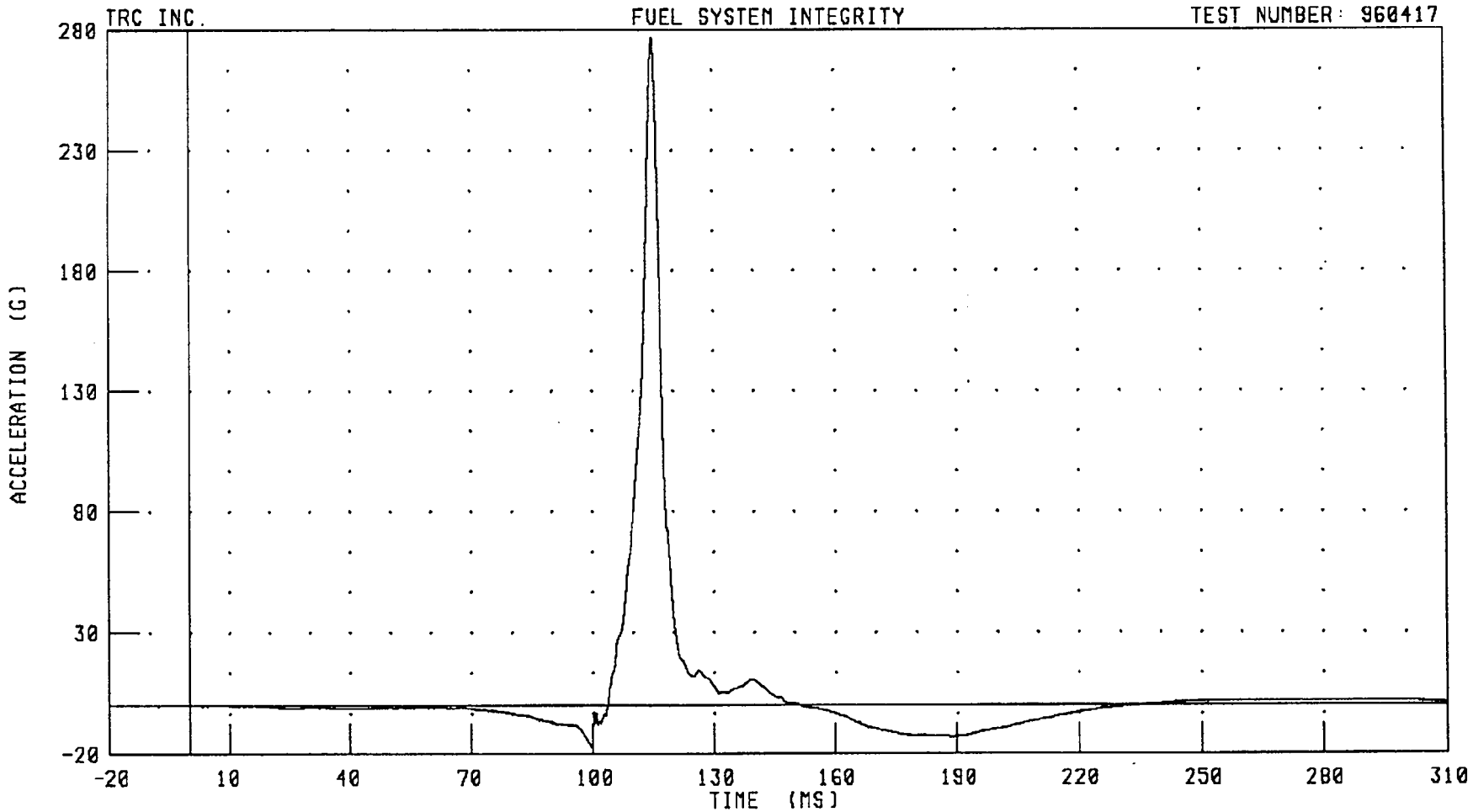
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER HEAD POSITION 2 Z-AXIS ACCELERATION



CHANNEL: HD2ZG2 FILTER: CH. CLASS 1000 PEAK DATA: 4.24 G @ 187.60 MS; -114.17 G @ 115.28 MS

960417

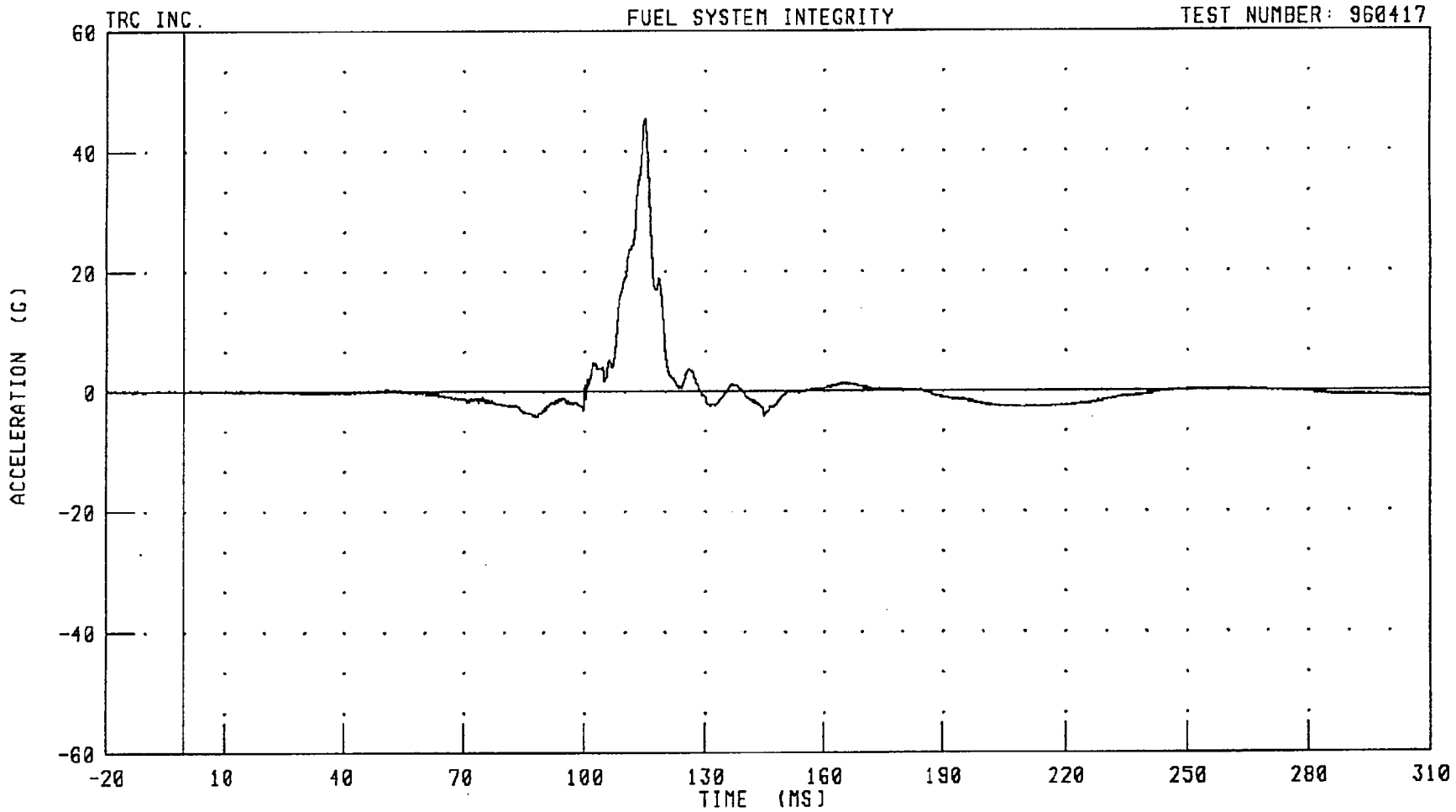
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER HEAD POSITION 3 X-AXIS ACCELERATION



CHANNEL: H03XG2 FILTER: CH. CLASS 1000 PEAK DATA: 276.66 G @ 115.20 MS; -17.18 G @ 99.68 MS

960417

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

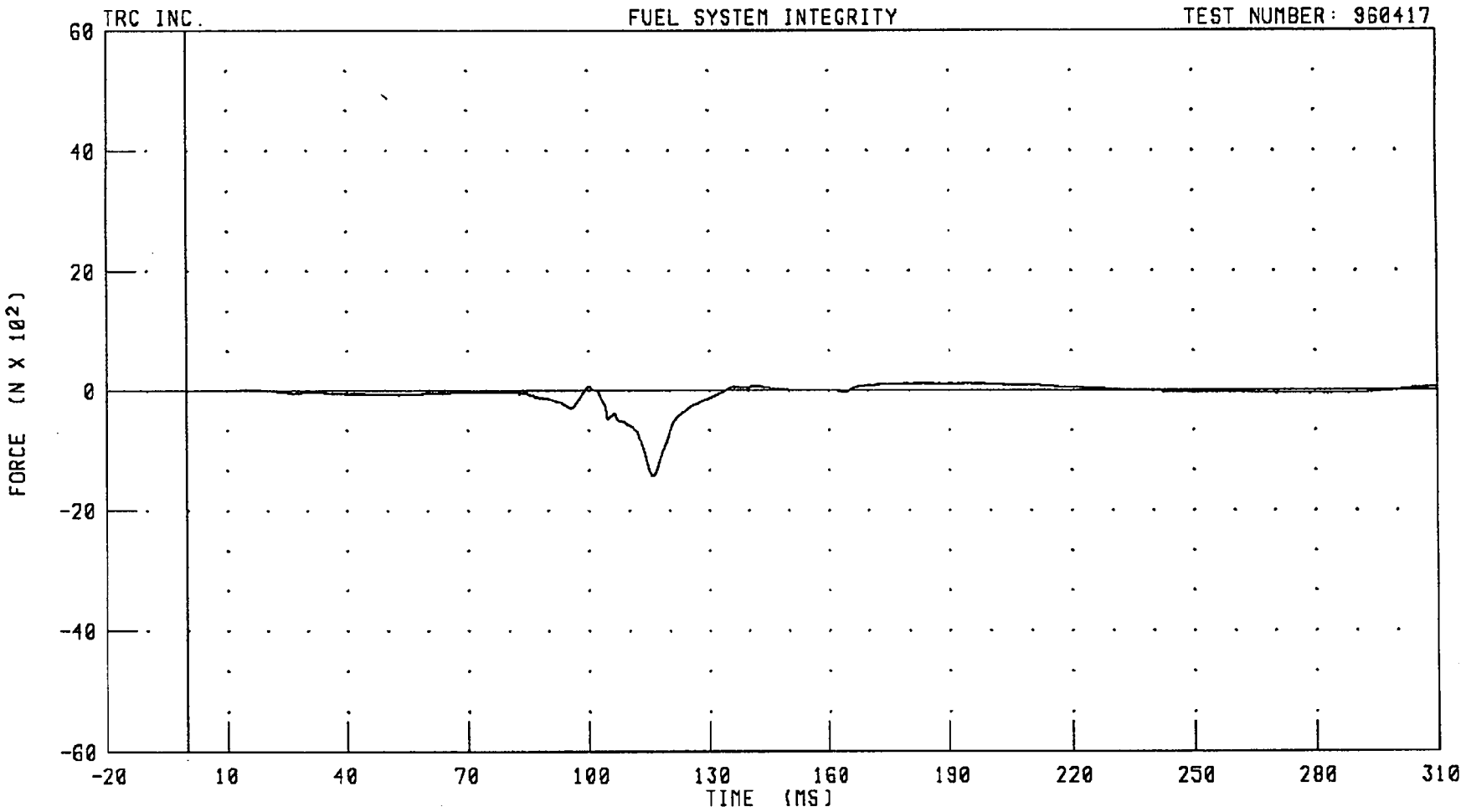


CHANNEL: HD3YG2 FILTER: CH. CLASS 1000 PEAK DATA: 45.35 G @ 115.12 MS; -4.14 G @ 87.20 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

RIGHT FRONT PASSENGER LOWER NECK X-AXIS SHEAR FORCE

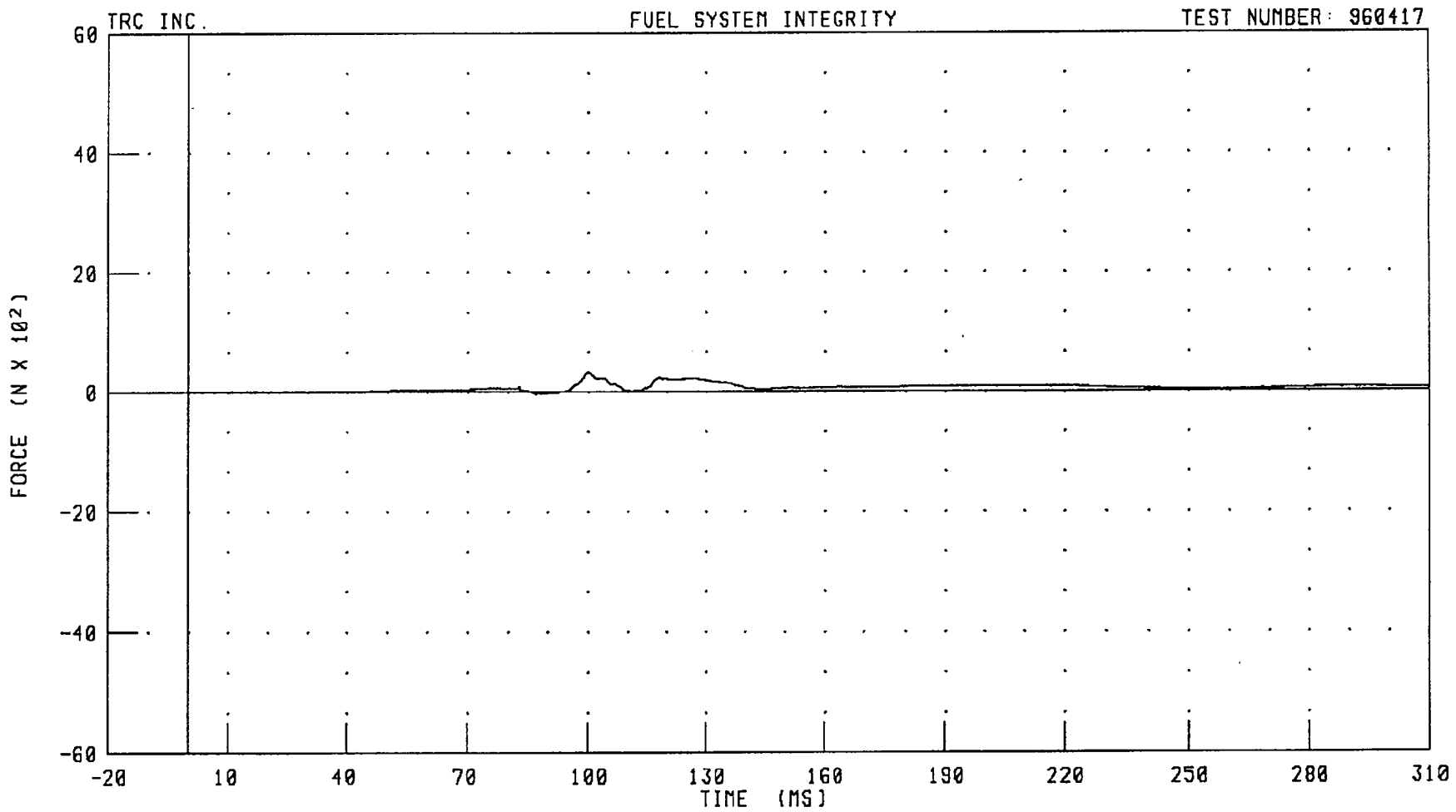


CHANNEL: NKLXF2 FILTER: CH. CLASS 1000 PEAK DATA: 117.76 N @ 178.88 MS; -1421.85 N @ 115.92 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

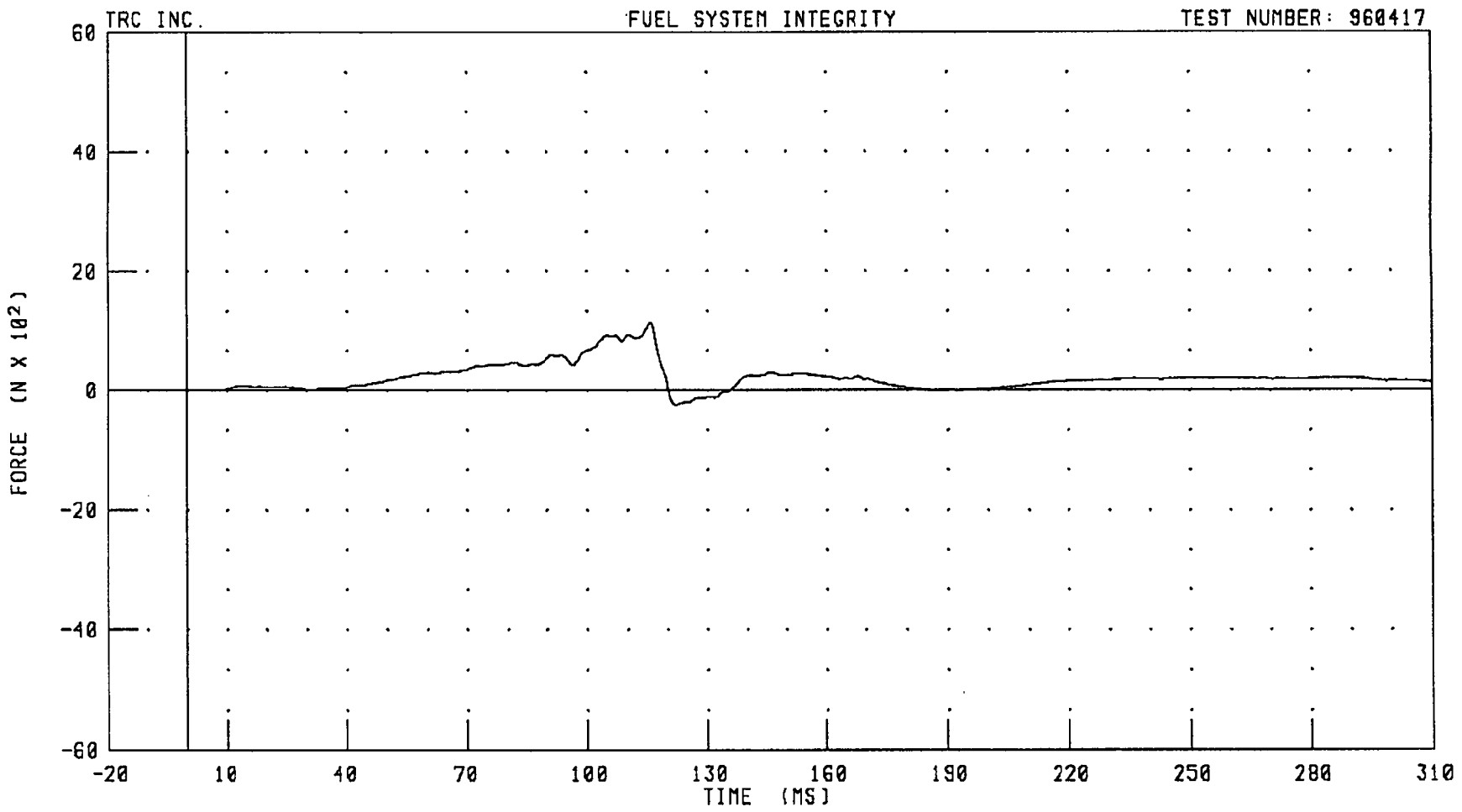
RIGHT FRONT PASSENGER LOWER NECK Y-AXIS SHEAR FORCE



CHANNEL: NKLYF2 FILTER: CH. CLASS 1000 PEAK DATA: 332.46 N @ 99.92 MS; -45.58 N @ 87.12 MS

960417

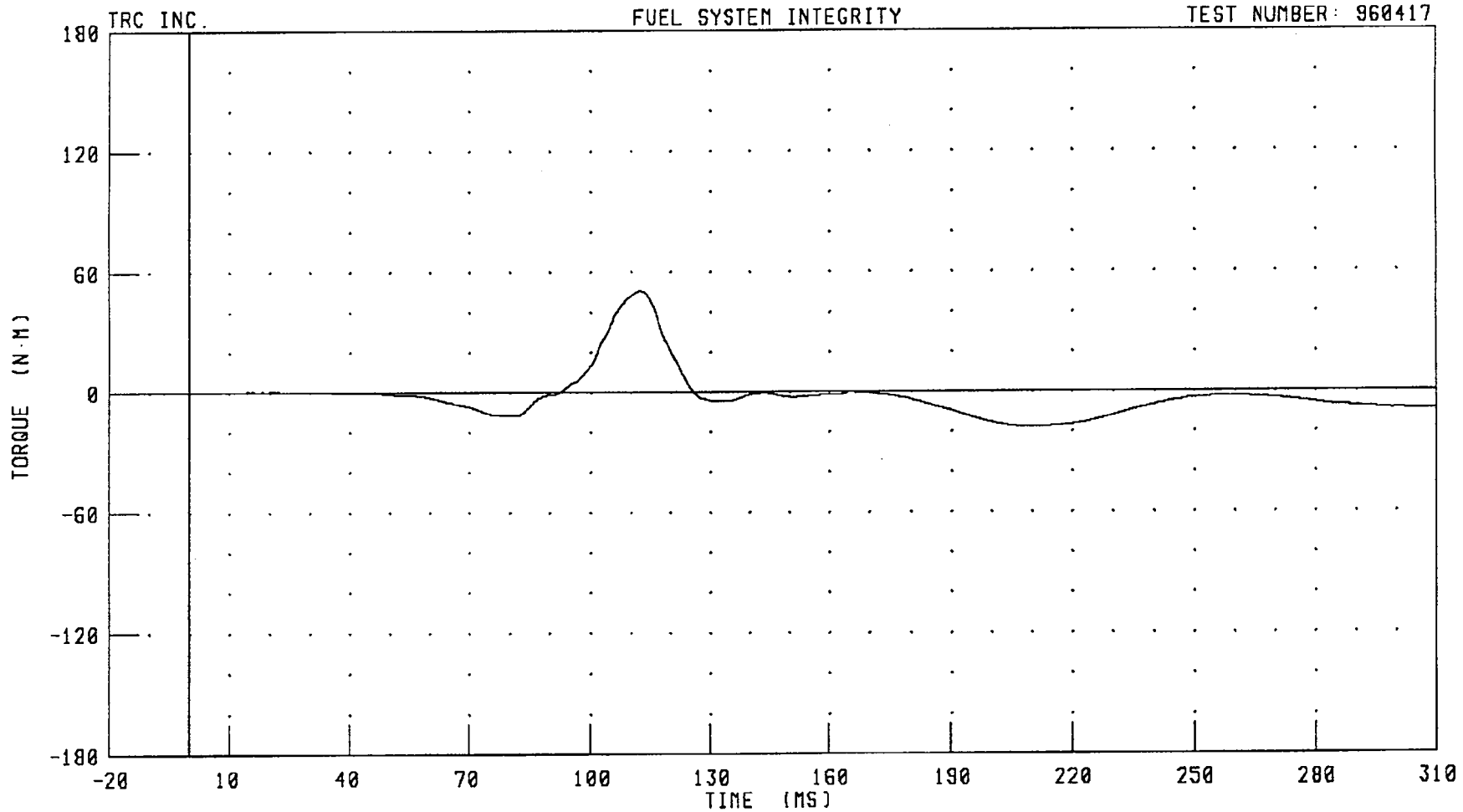
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER LOWER NECK Z-AXIS AXIAL FORCE



CHANNEL: NKLZF2 FILTER: CH. CLASS 1000 PEAK DATA: 1127.87 N @ 115.68 MS; -252.81 N @ 122.24 MS

960417

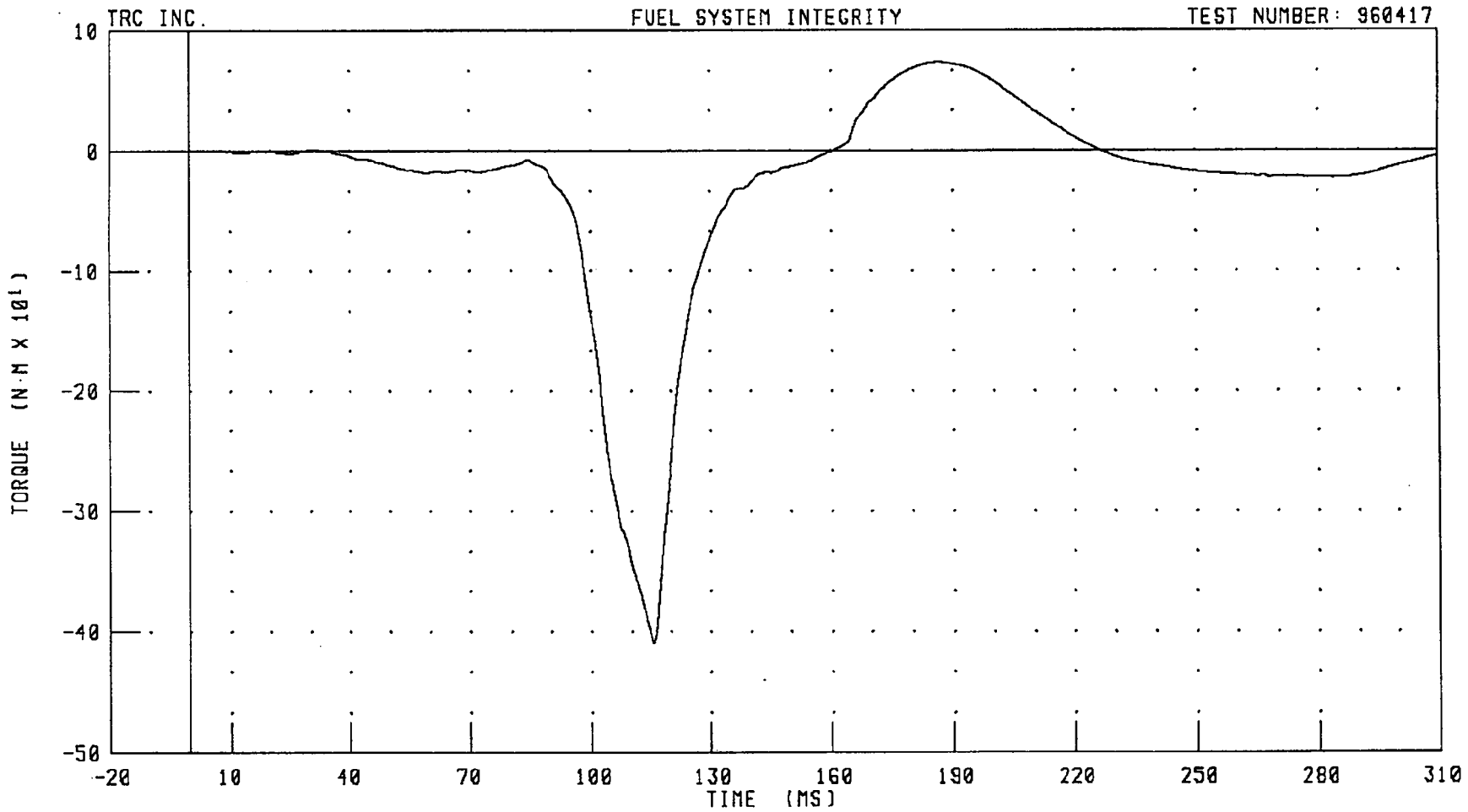
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER LOWER NECK MOMENT ABOUT X-AXIS



CHANNEL: NKLXM2 FILTER: CH. CLASS 600 PEAK DATA: 50.69 N-M @ 112.32 MS; -17.99 N-M @ 210.40 MS

960417

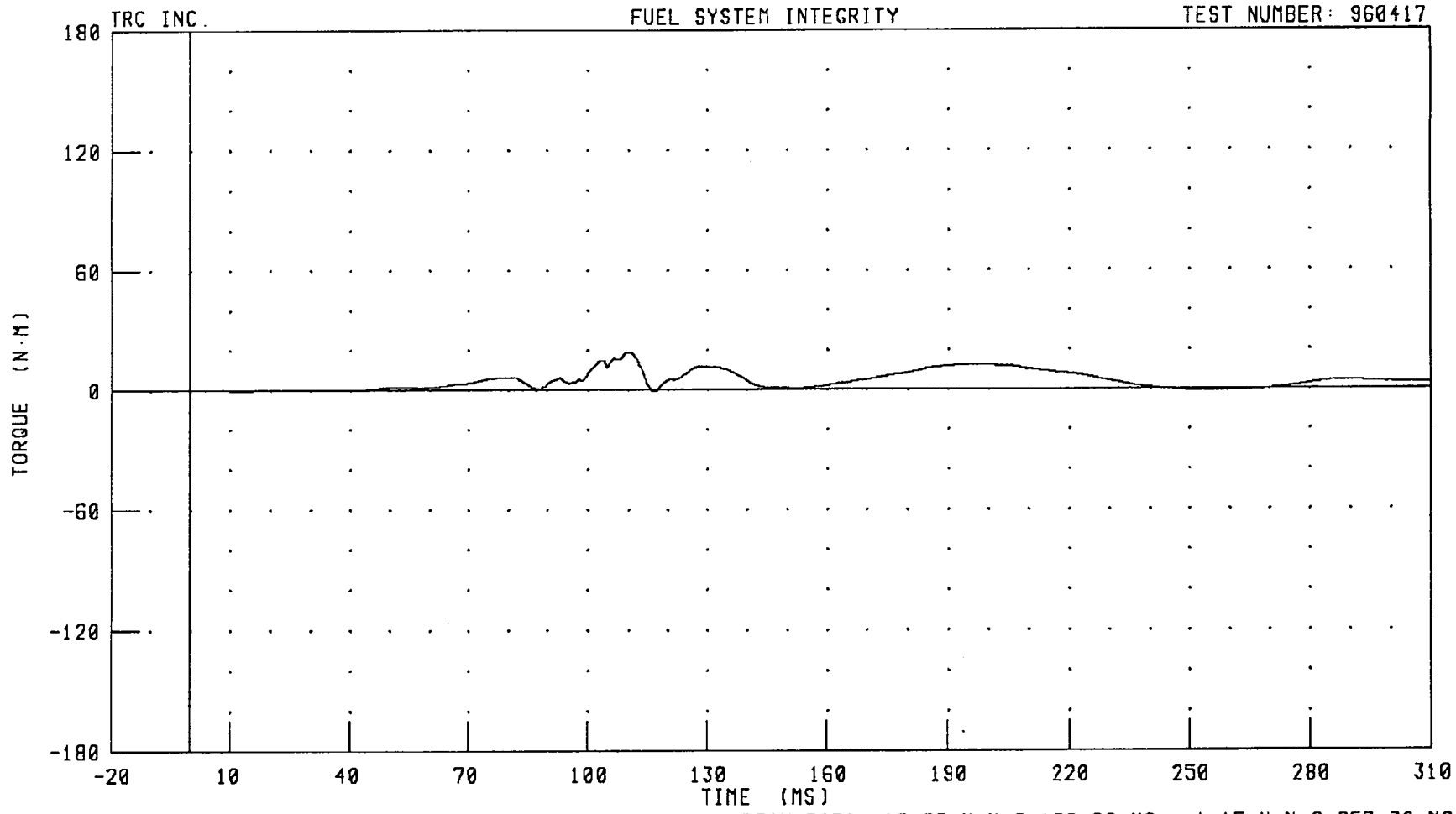
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER LOWER NECK MOMENT ABOUT Y-AXIS



CHANNEL: NKLYM2 FILTER: CH. CLASS 600 PEAK DATA: 73.14 N·M @ 187.36 MS; -409.35 N·M @ 115.68 MS

960417

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

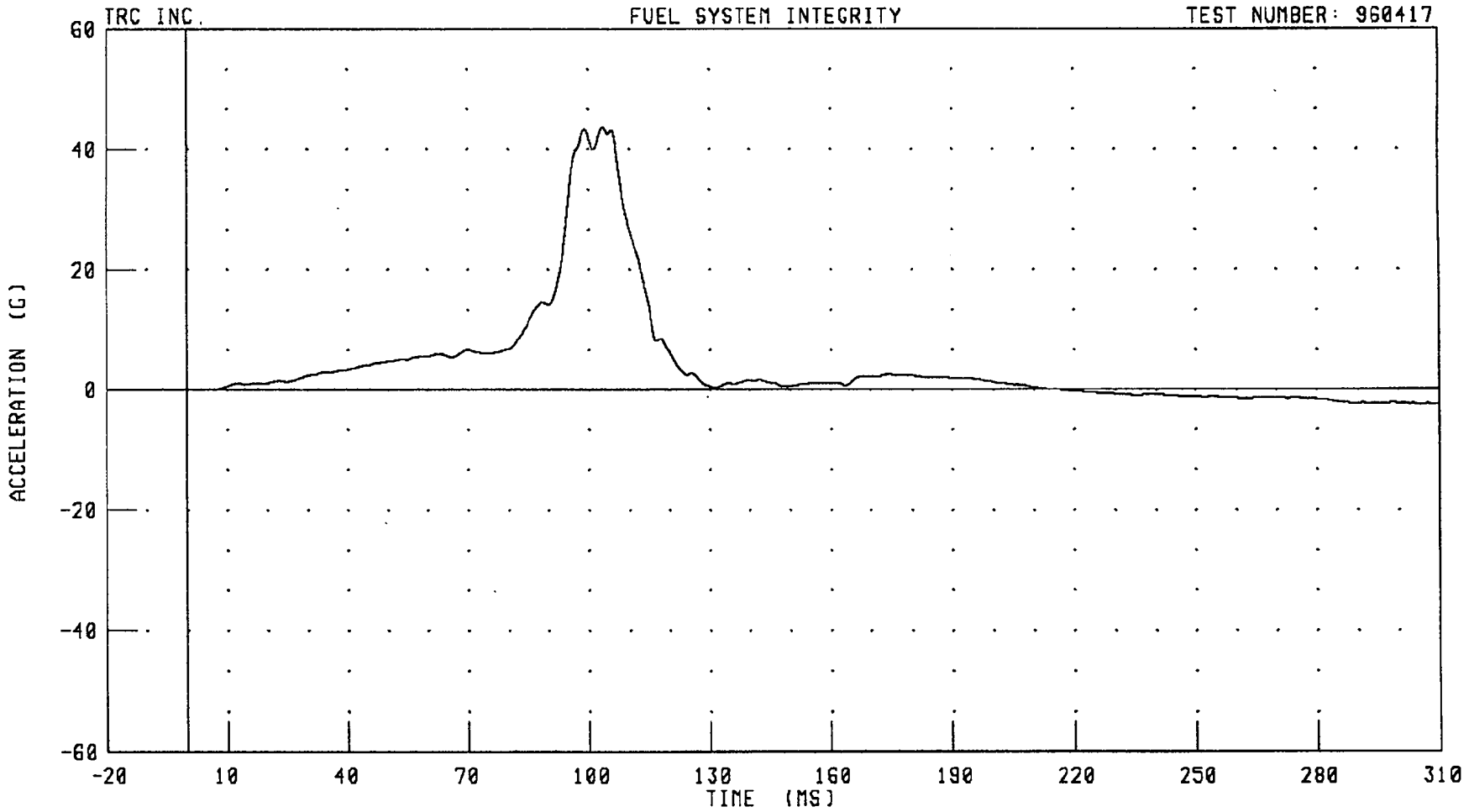


CHANNEL: NKLZM2 FILTER: CH. CLASS 600 PEAK DATA: 18.93 N-M @ 109.68 MS; -1.15 N-M @ 257.36 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

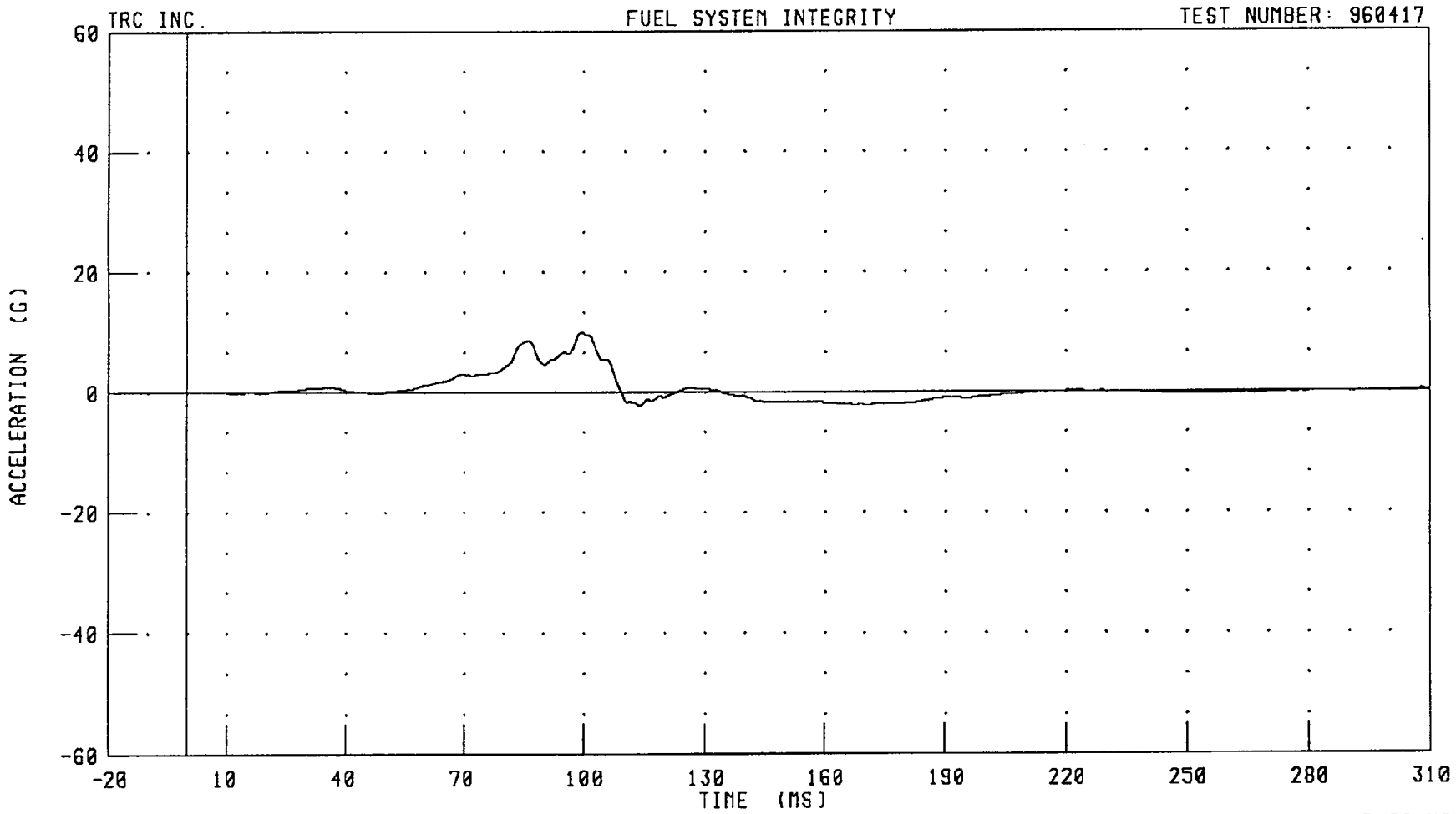
RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION



CHANNEL: CSTXG2 FILTER: CH. CLASS 180 PEAK DATA: 43.76 G @ 103.76 MS; -2.49 G @ 306.00 MS

960417

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

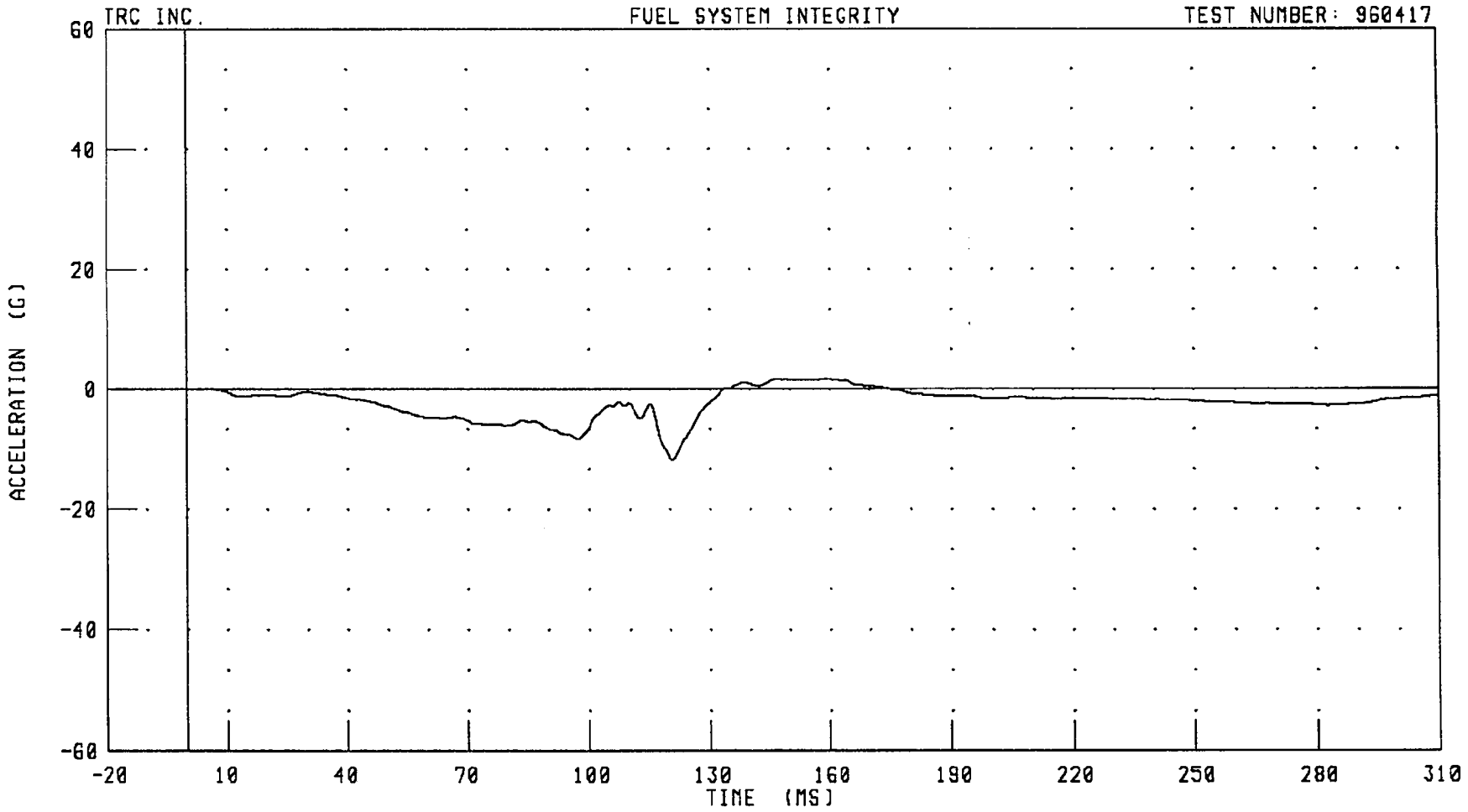


CHANNEL: CSTYG2 FILTER: CH. CLASS 180 PEAK DATA: 10.08 G @ 99.52 MS; -2.22 G @ 113.92 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

RIGHT FRONT PASSENGER CHEST Z-AXIS ACCELERATION

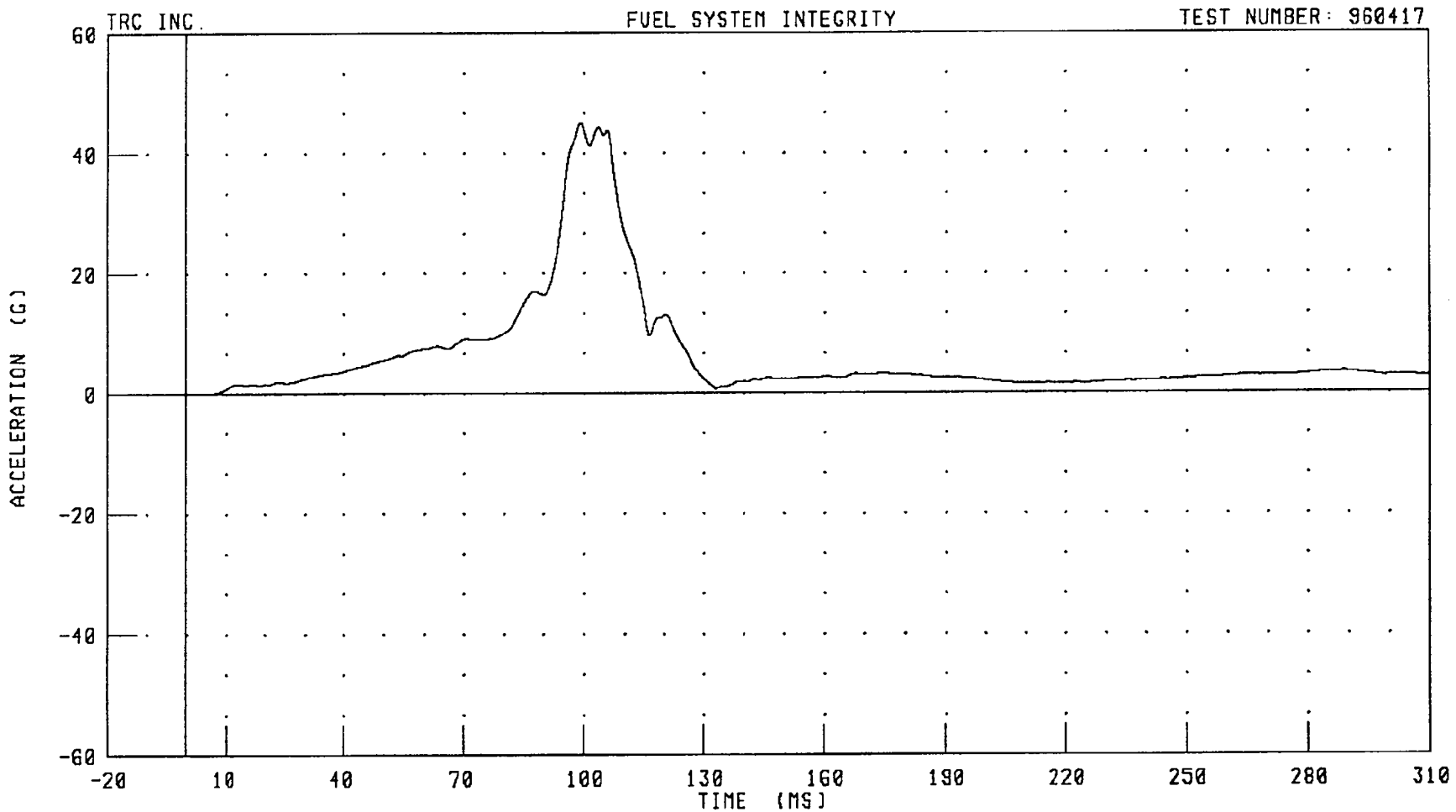


CHANNEL: CSTZG2 FILTER: CH. CLASS 180 PEAK DATA: 1.68 G @ 159.12 MS; -11.79 G @ 120.80 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION



CHANNEL: CSTRG2 FILTER: CH. CLASS 180

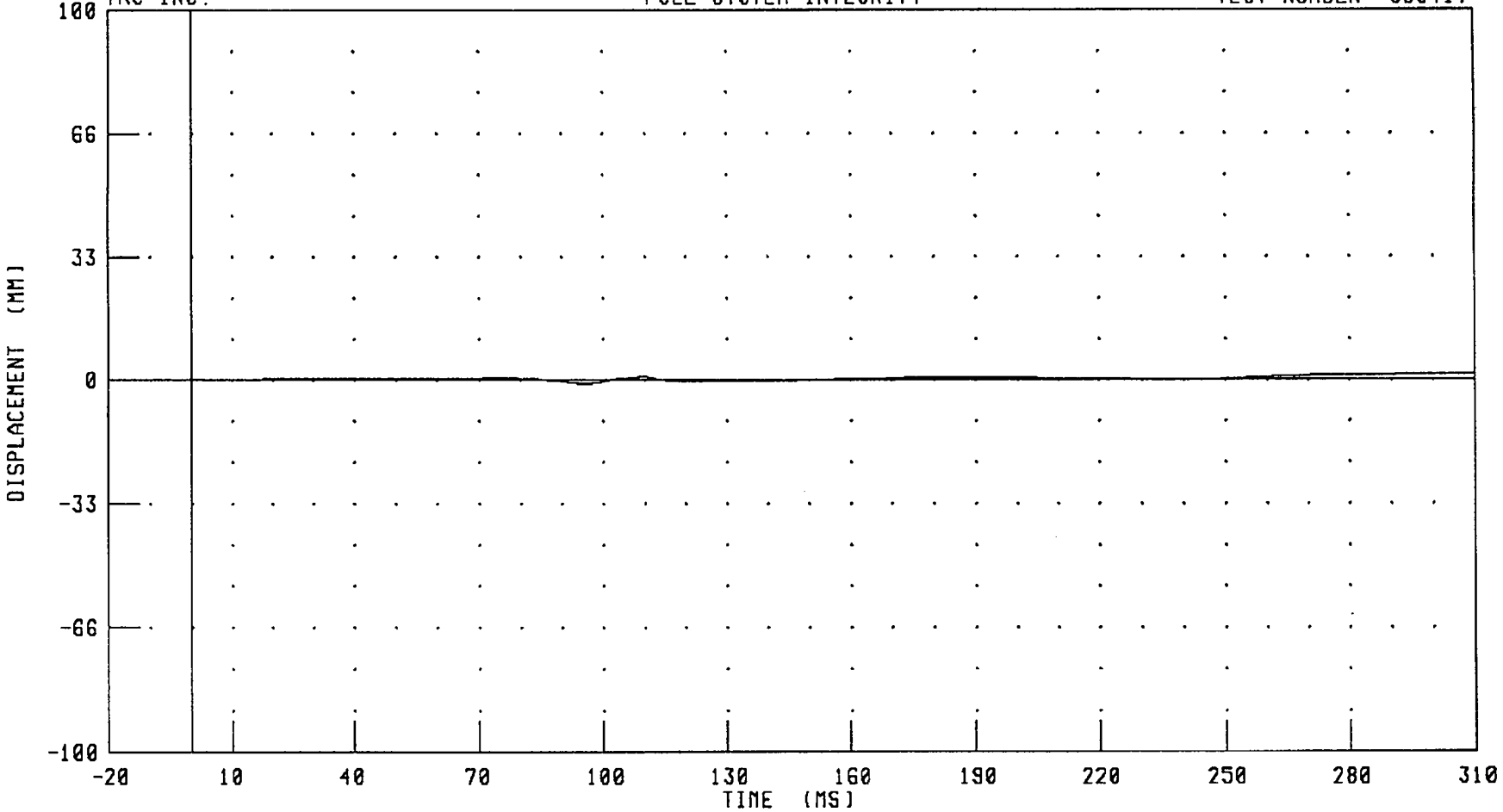
PEAK DATA: 45.06 G @ 99.28 MS; 0.00 G @ -20.00 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

RIGHT FRONT PASSENGER CHEST DEFLECTION

TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960417

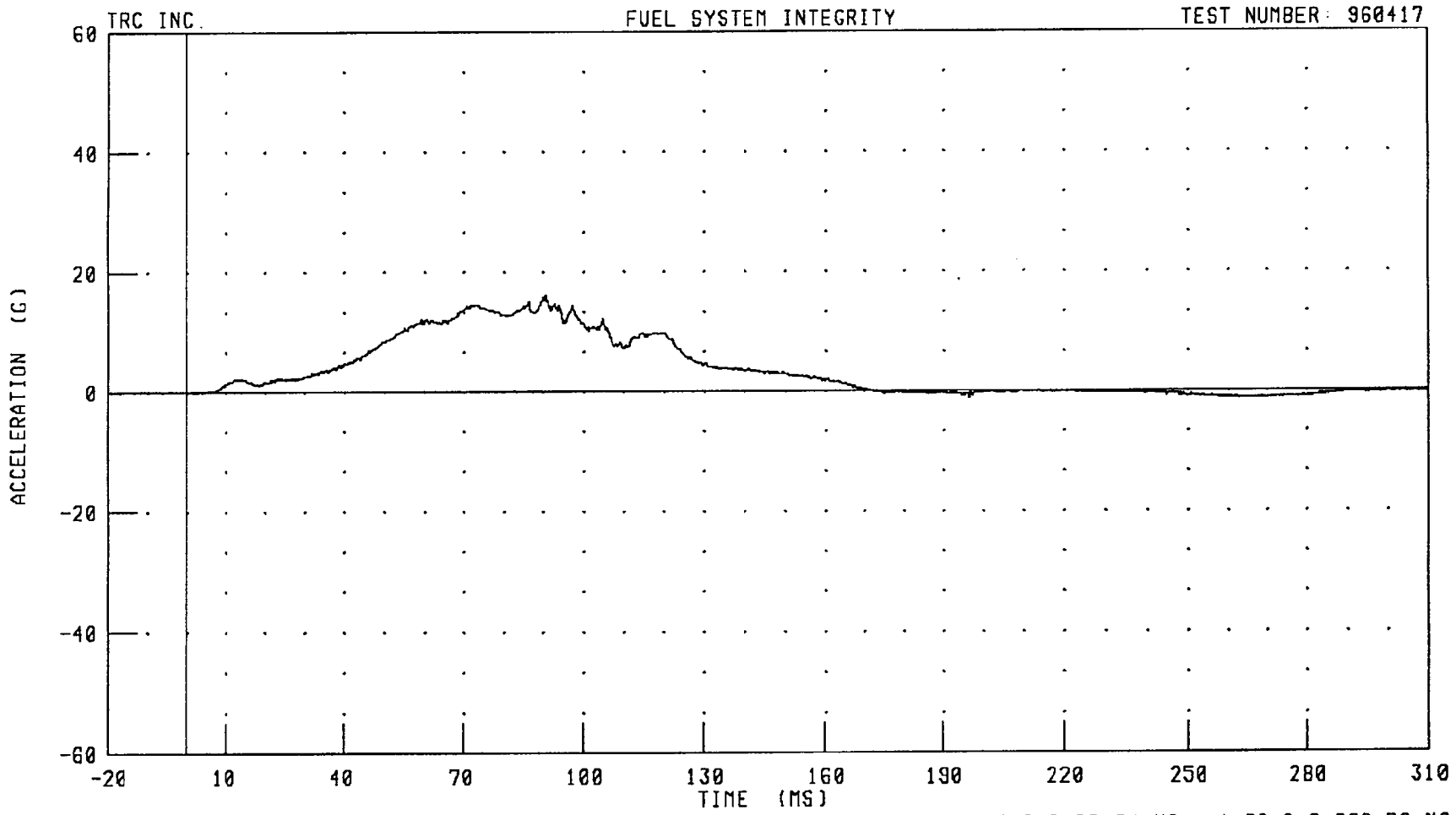


CHANNEL: CSTX02 FILTER: CH. CLASS 180 PEAK DATA: 1.49 MM @ 306.00 MS; -1.09 MM @ 95.52 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

RIGHT FRONT PASSENGER PELVIS X-AXIS ACCELERATION

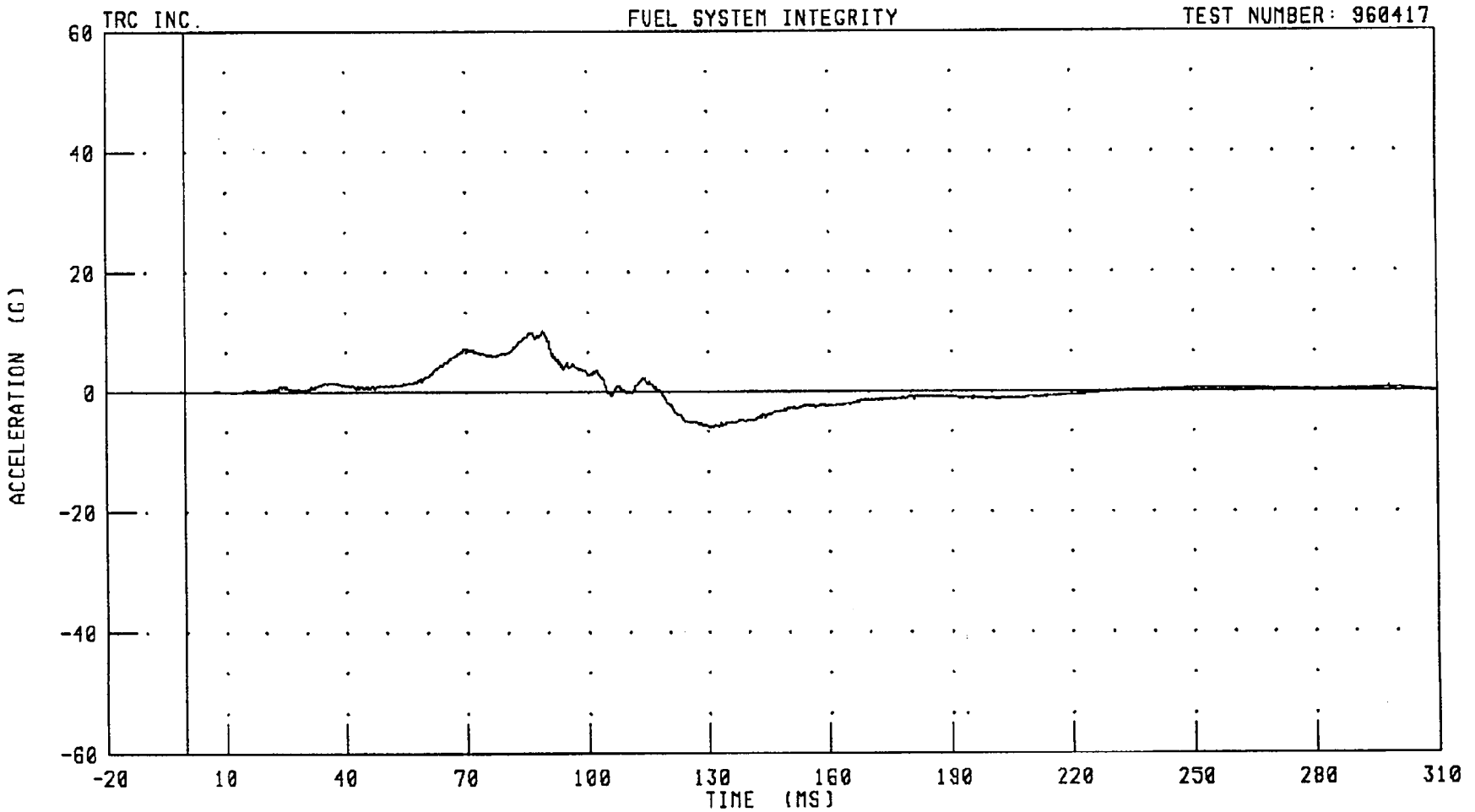


CHANNEL: PEVXG2 FILTER: CH. CLASS 1000 PEAK DATA: 16.08 G @ 90.64 MS; -1.36 G @ 262.72 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

RIGHT FRONT PASSENGER PELVIS Y-AXIS ACCELERATION

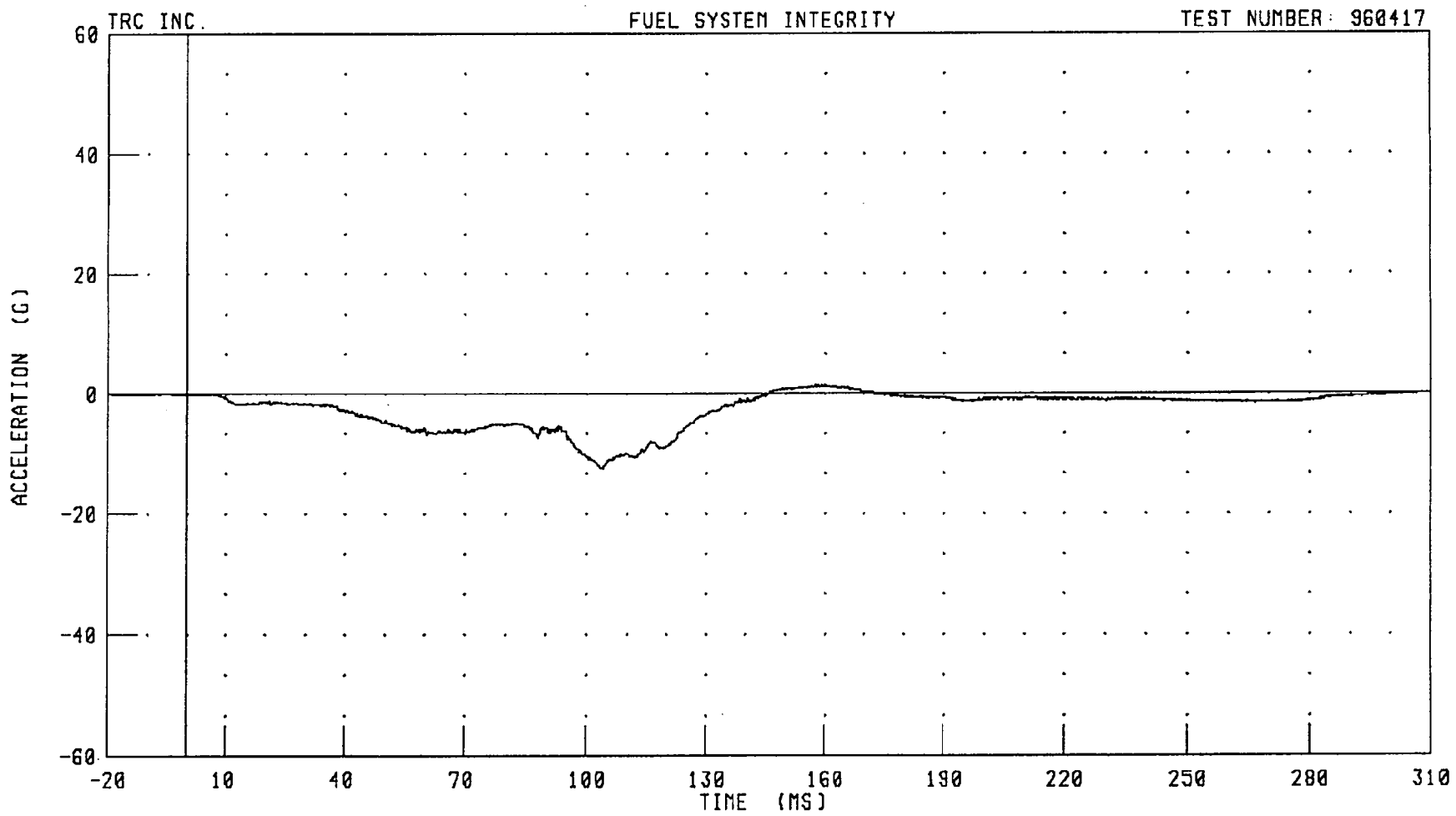


CHANNEL: PEVYG2 FILTER: CH. CLASS 1000 PEAK DATA: 10.39 G @ 88.96 MS; -5.89 G @ 130.32 MS

960417

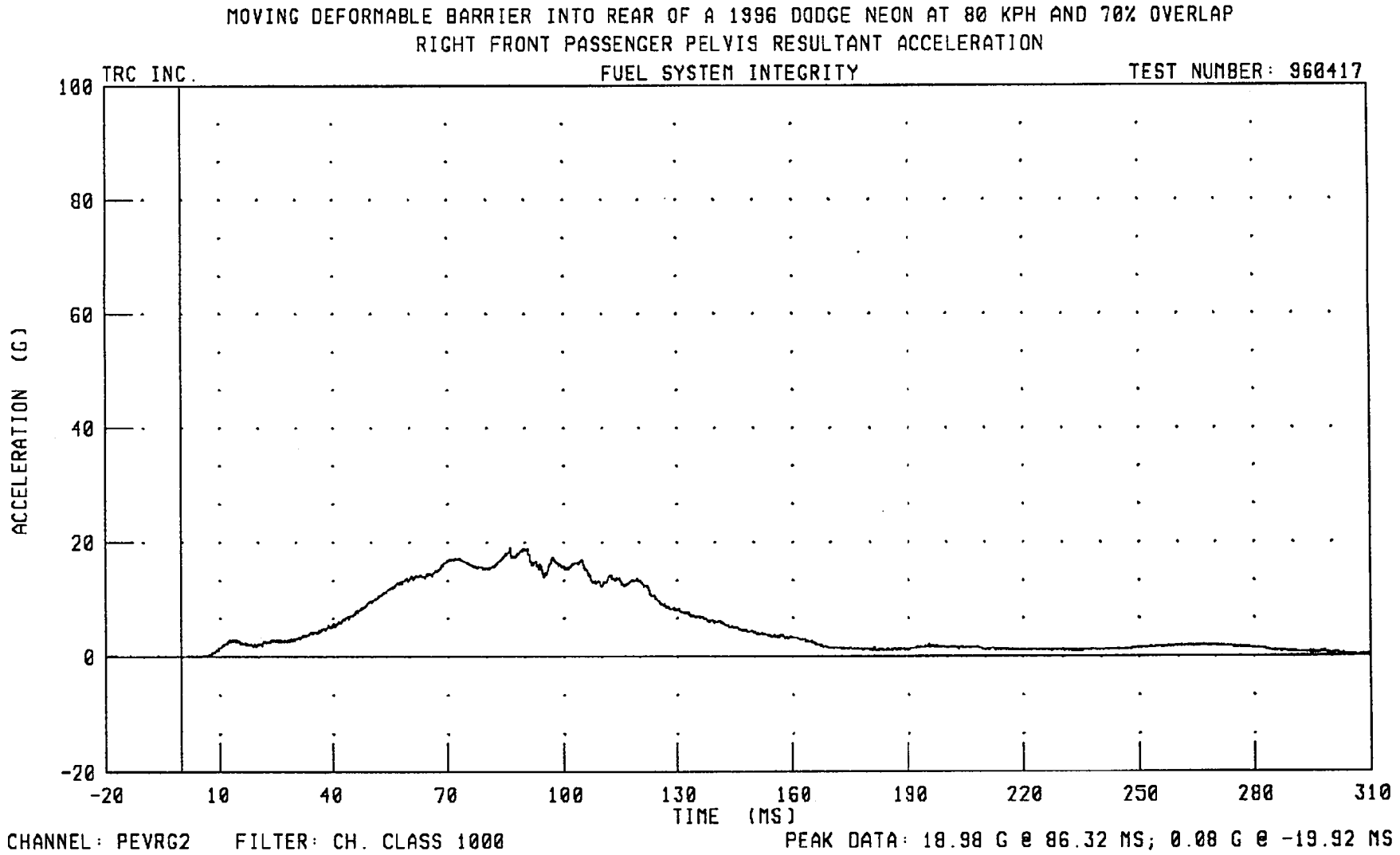
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

RIGHT FRONT PASSENGER PELVIS Z-AXIS ACCELERATION



CHANNEL: PEVZG2 FILTER: CH. CLASS 1000 PEAK DATA: 1.45 G @ 157.68 MS; -12.48 G @ 103.52 MS

960417

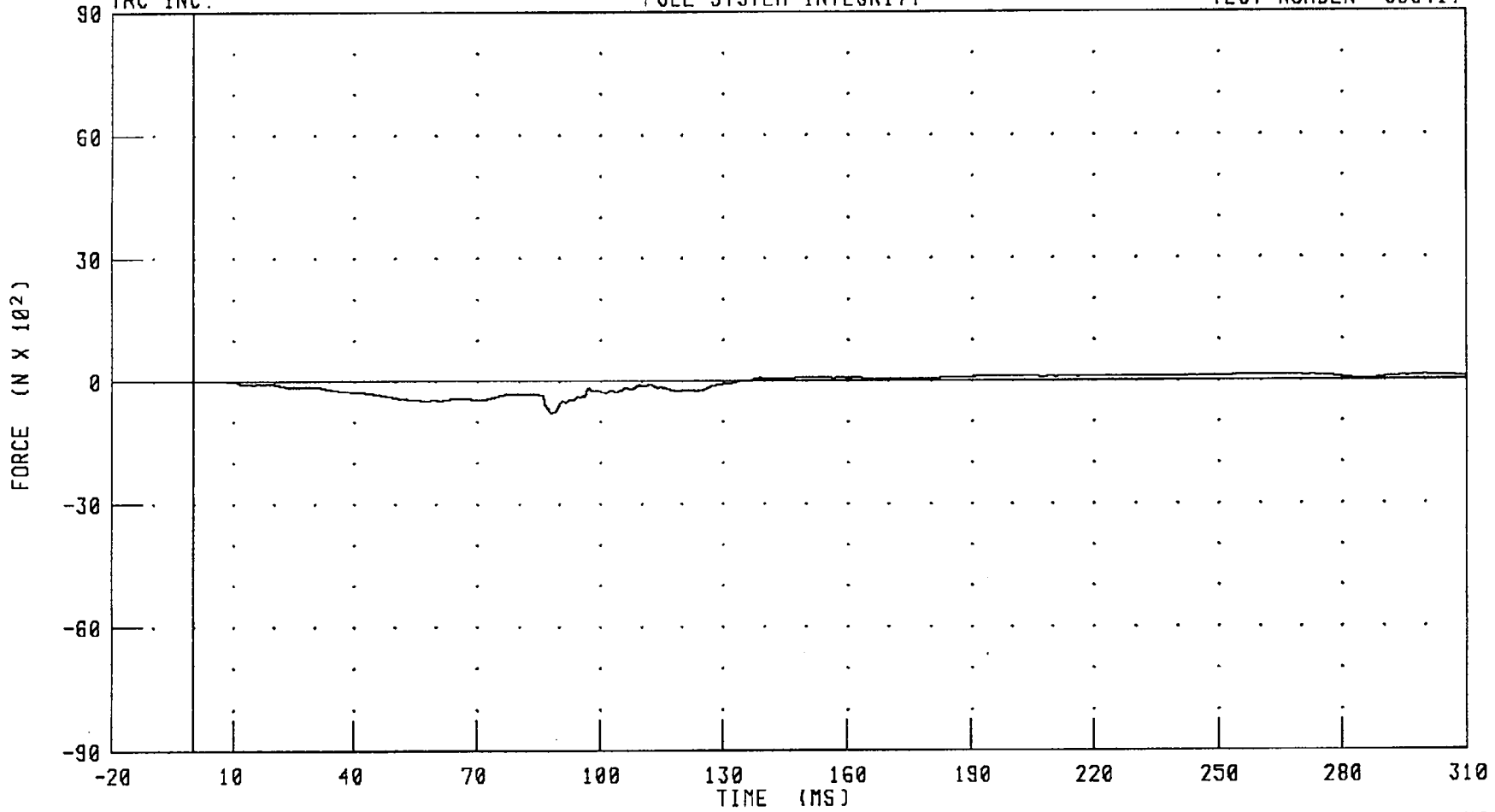

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER PELVIS RESULTANT ACCELERATION
TRC INC.
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960417
ACCELERATION (G)
100
80
60
40
20
0
-20
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: PEVRG2
FILTER: CH. CLASS 1000
PEAK DATA: 18.98 G @ 86.32 MS; 0.08 G @ -19.92 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

RIGHT FRONT PASSENGER LEFT FEMUR FORCE

TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960417

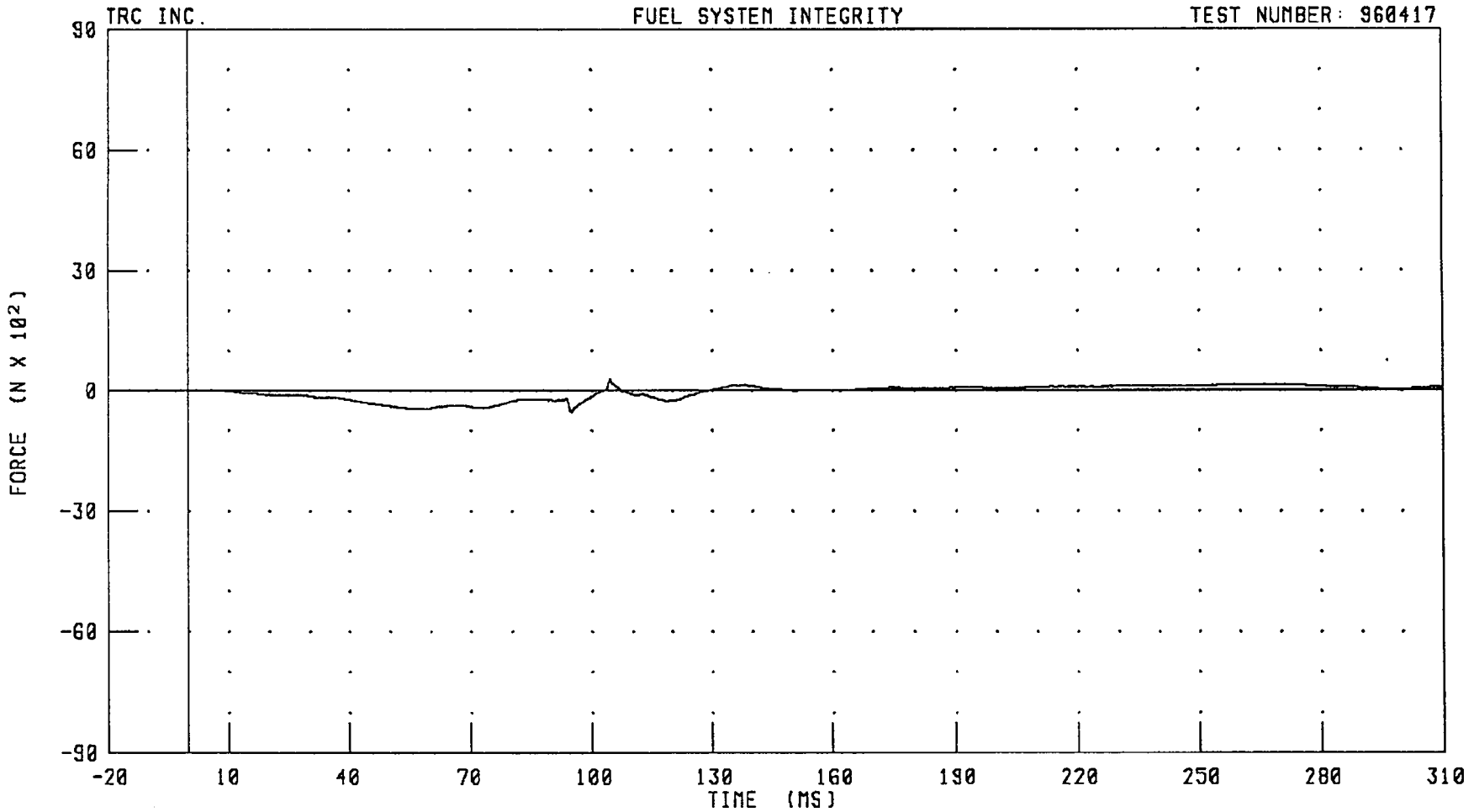


CHANNEL: LFMF2 FILTER: CH. CLASS 600 PEAK DATA: 128.04 N @ 268.96 MS; -784.26 N @ 88.16 MS

99-8

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER RIGHT FEMUR FORCE



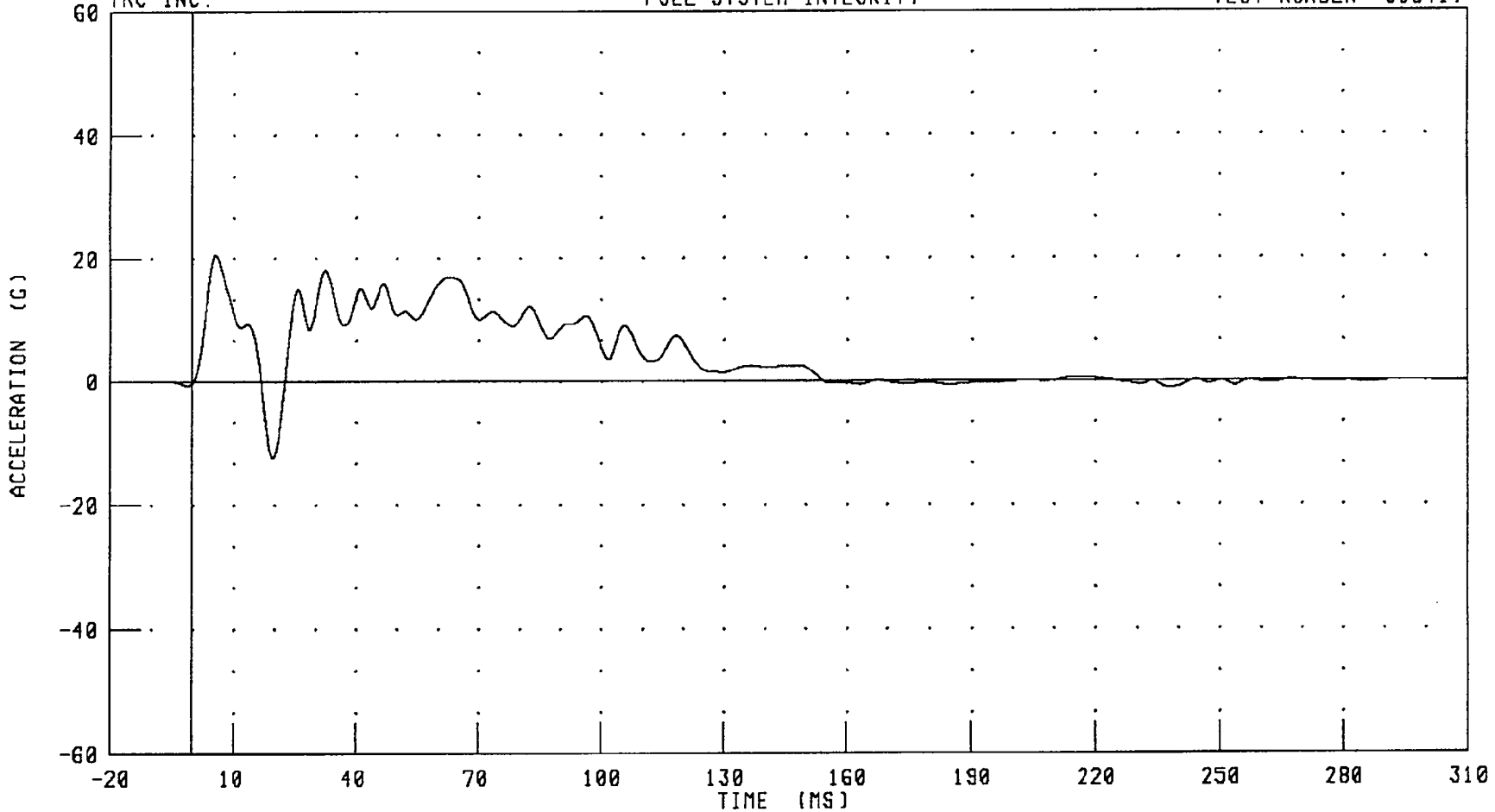
CHANNEL: RFMF2 FILTER: CH. CLASS 600 PEAK DATA: 273.42 N @ 104.64 MS; -546.11 N @ 95.04 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

FRONT SEAT OUTBOARD MOUNTING RAIL X-AXIS ACCELERATION

TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960417

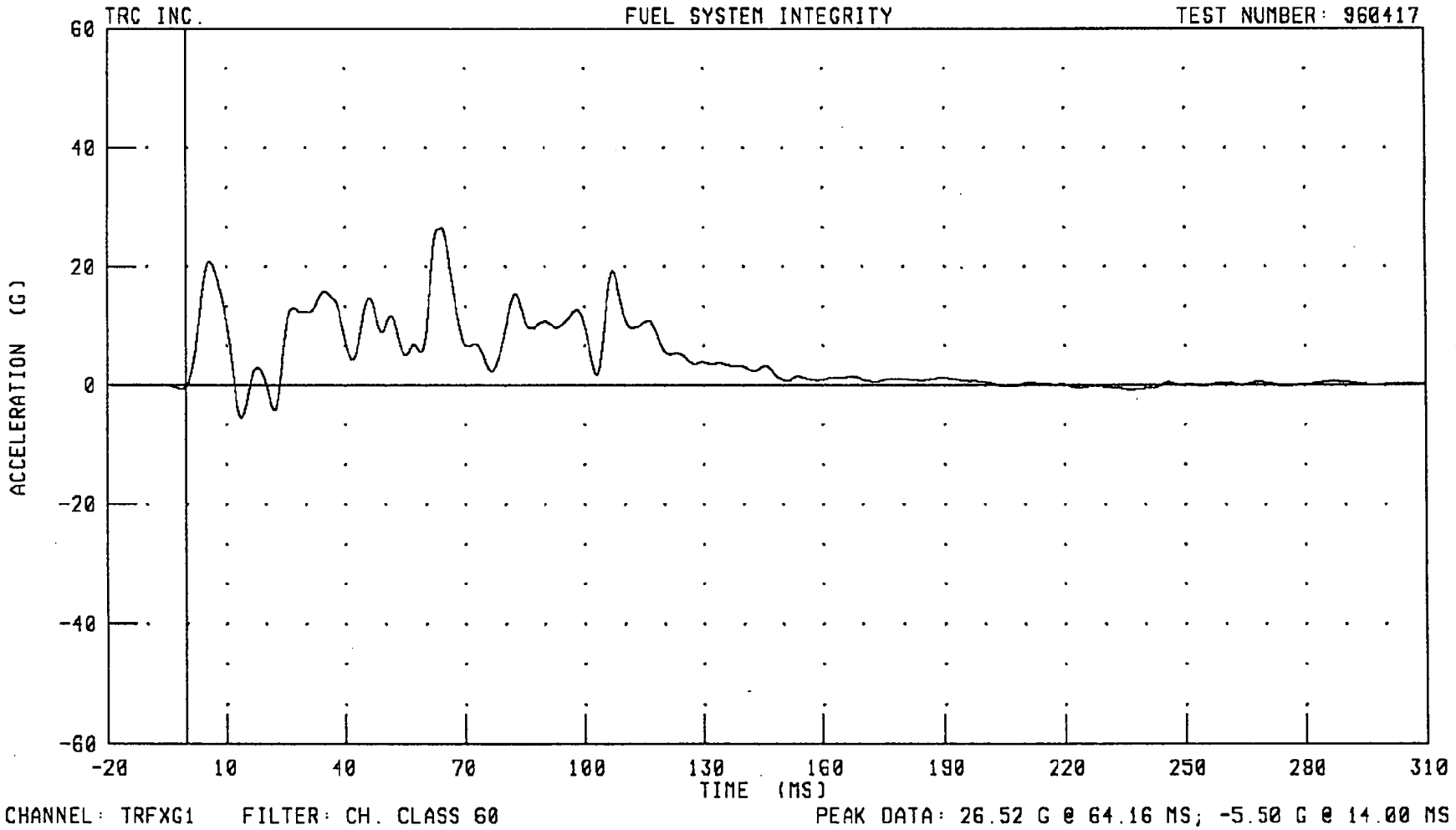


CHANNEL: TLFXG1 FILTER: CH. CLASS 60 PEAK DATA: 20.60 G @ 5.68 MS; -12.40 G @ 19.60 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

FRONT SEAT OUTBOARD MOUNTING RAIL X-AXIS ACCELERATION



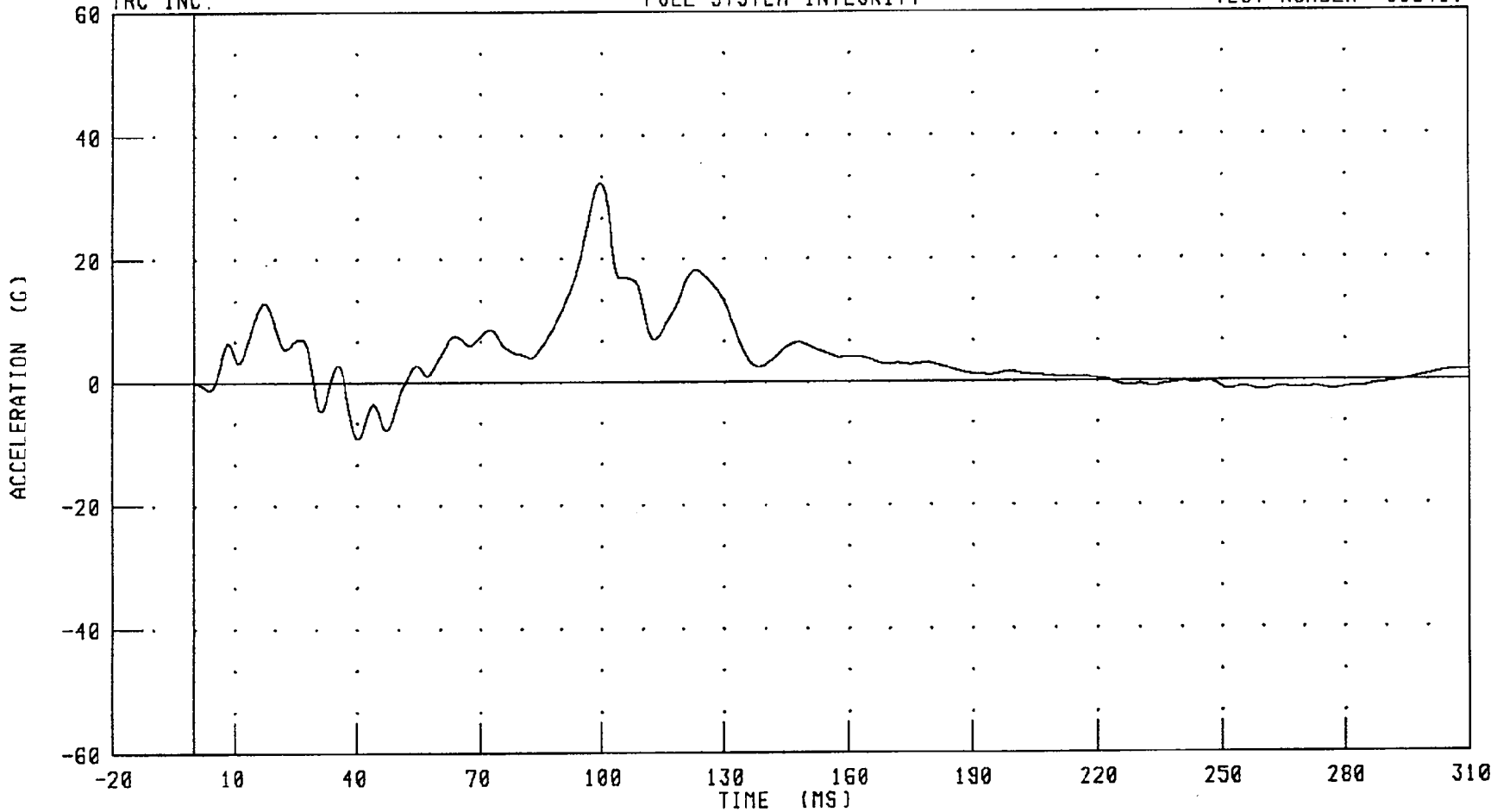
CHANNEL: TRFXG1 FILTER: CH. CLASS 60 PEAK DATA: 26.52 G @ 64.16 MS; -5.50 G @ 14.00 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

FRONT SEAT BACK MID X-AXIS ACCELERATION

TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960417



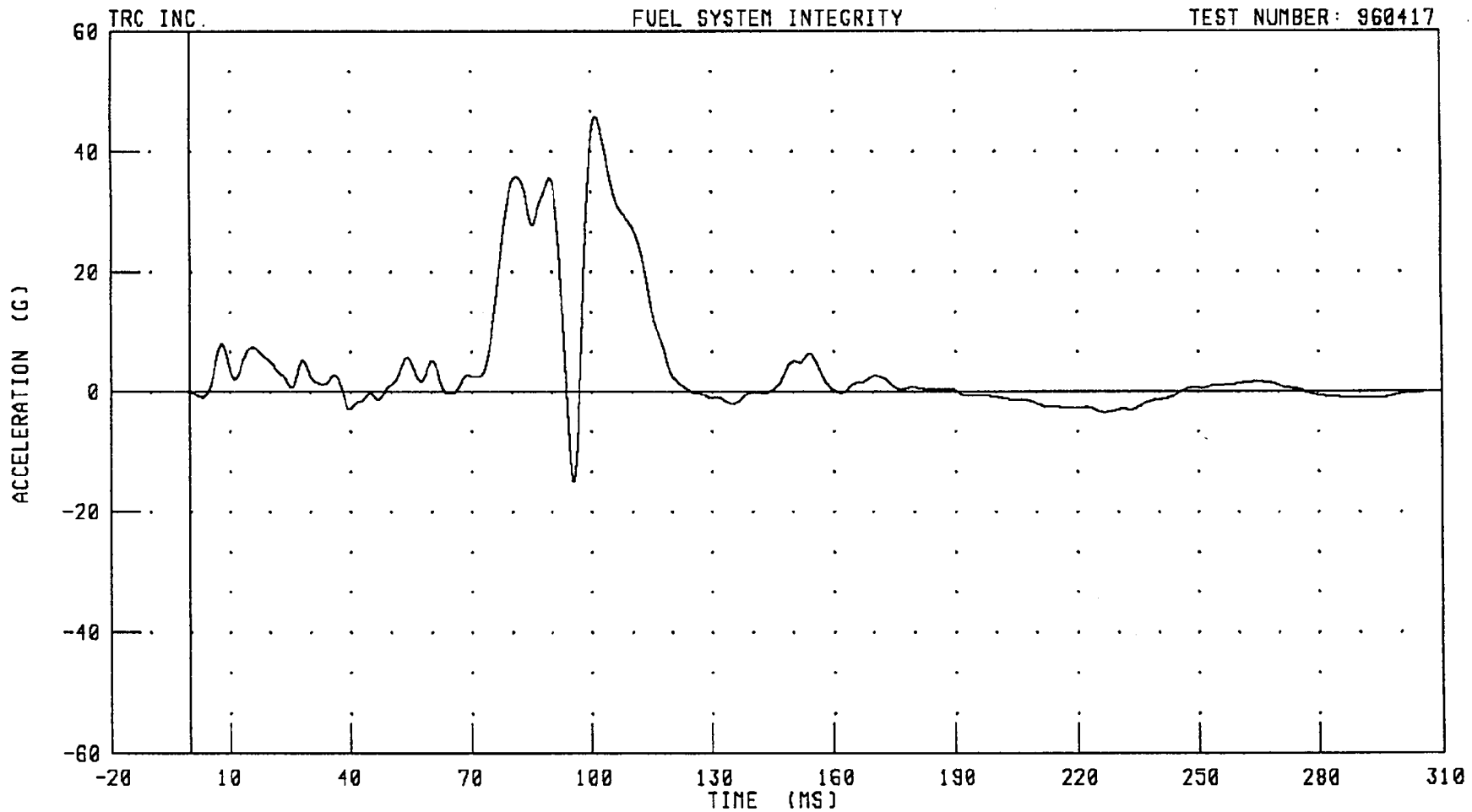
CHANNEL: TLFXG2 FILTER: CH. CLASS 60

PEAK DATA: 32.37 G @ 99.68 MS; -9.12 G @ 40.24 MS

960417

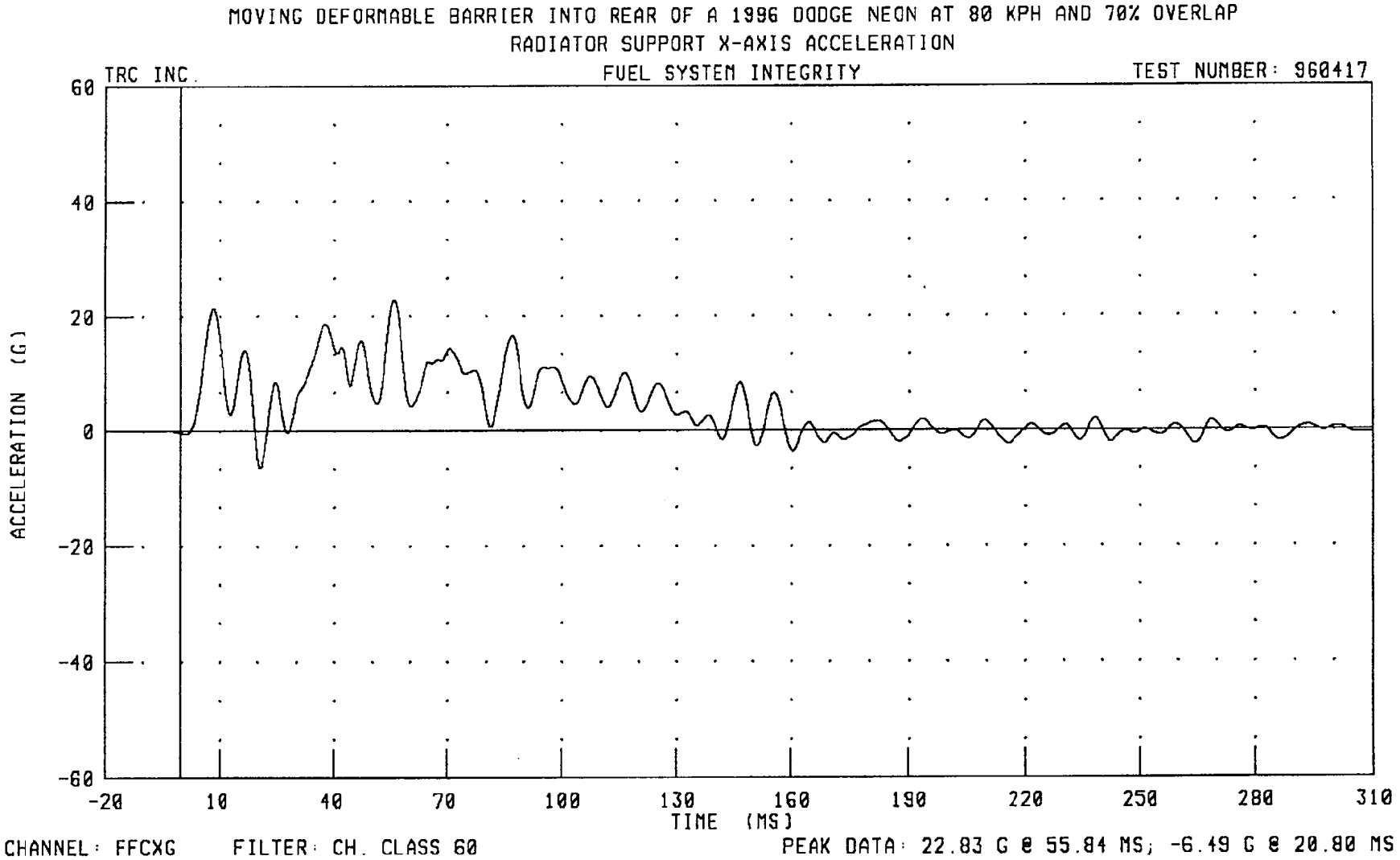
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

FRONT SEAT BACK MID X-AXIS ACCELERATION



CHANNEL: TRFXG2 FILTER: CH. CLASS 60 PEAK DATA: 45.79 G @ 101.28 MS; -14.96 G @ 95.60 MS

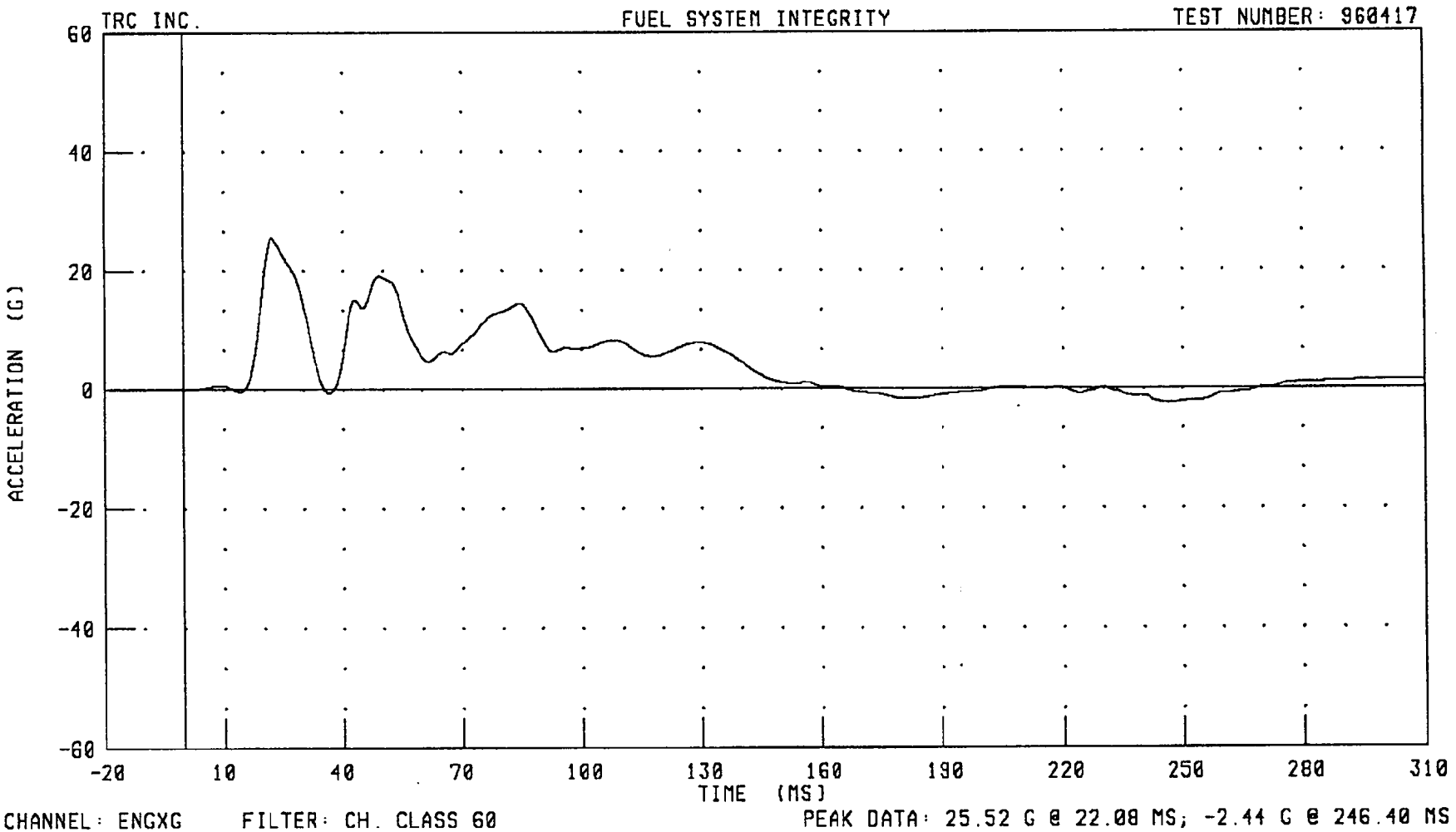
960417


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP
RADIATOR SUPPORT X-AXIS ACCELERATION
TRC INC.
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960417
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: FFCXG
FILTER: CH. CLASS 60
PEAK DATA: 22.83 G @ 55.84 MS; -6.49 G @ 20.80 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

ENGINE TOP X-AXIS ACCELERATION

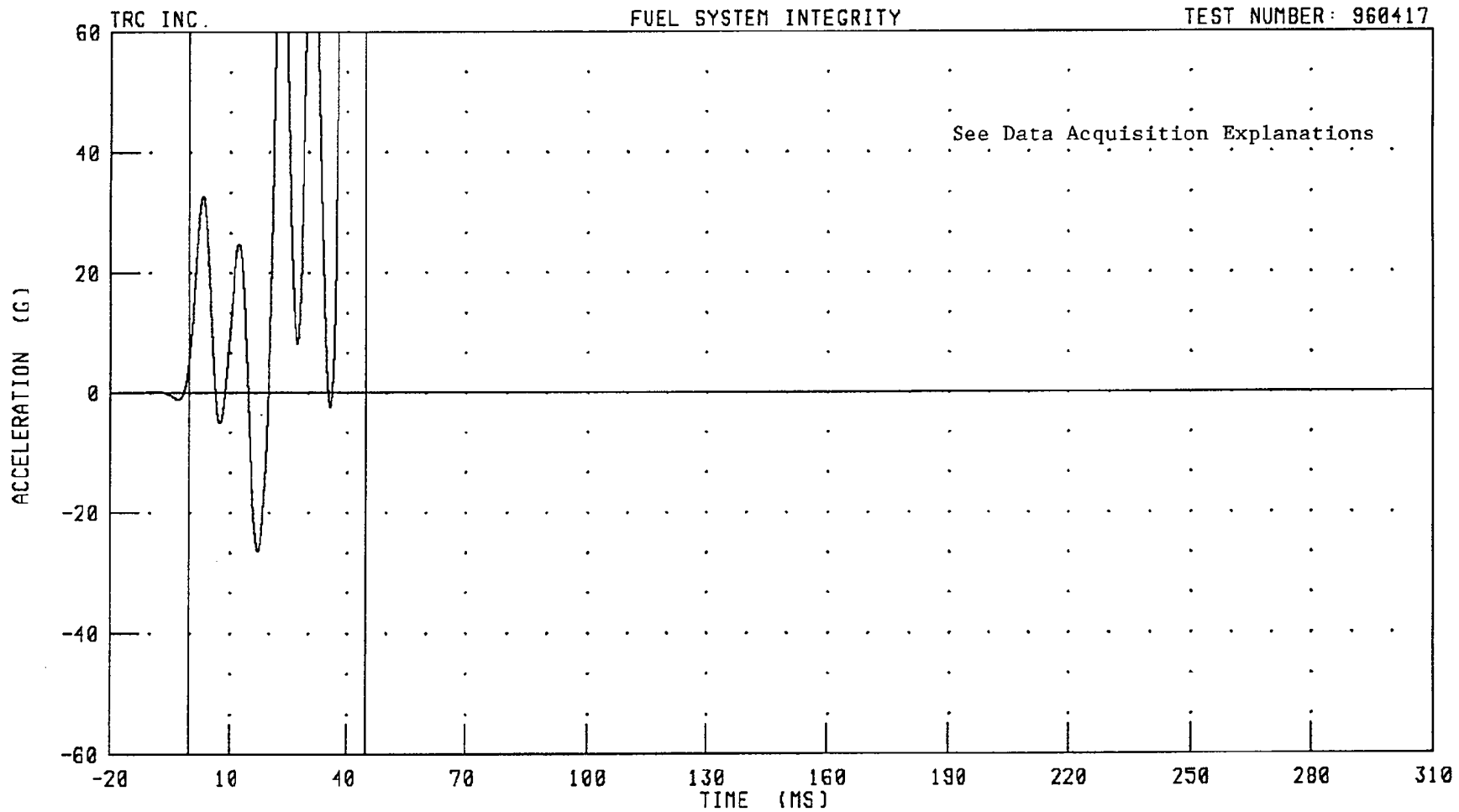


CHANNEL: ENGXG FILTER: CH. CLASS 60 PEAK DATA: 25.52 G @ 22.08 MS; -2.44 G @ 246.40 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

REAR WHEEL AXLE X-AXIS ACCELERATION

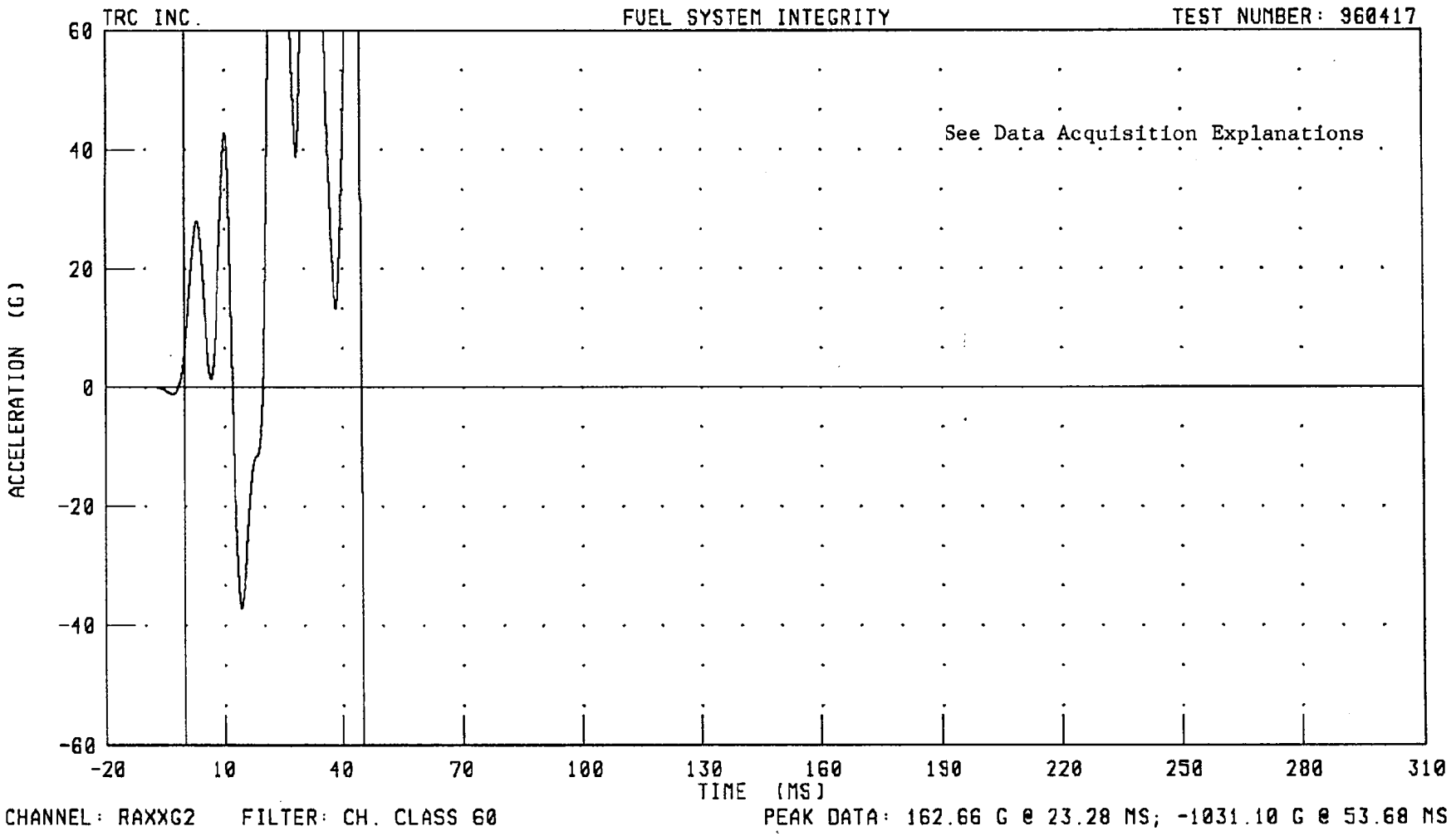


CHANNEL: RAXXG1 FILTER: CH. CLASS 60 PEAK DATA: 849.20 G @ 42.16 MS; -1067.36 G @ 49.84 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

REAR WHEEL AXLE X-AXIS ACCELERATION



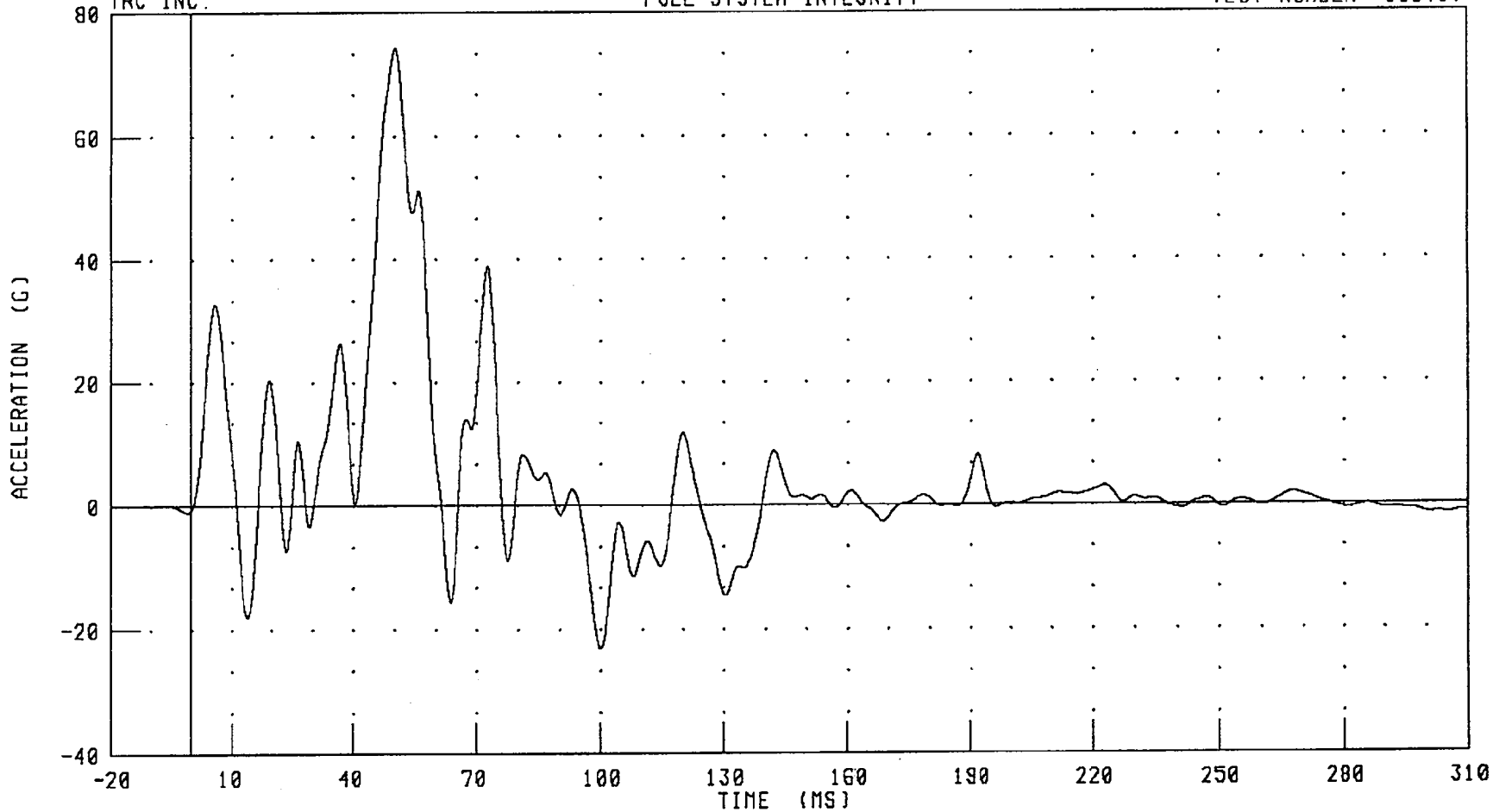
CHANNEL: RAXXG2 FILTER: CH. CLASS 60 PEAK DATA: 162.66 G @ 23.28 MS; -1031.10 G @ 53.68 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

PACKAGE SHELF X-AXIS ACCELERATION

TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960417



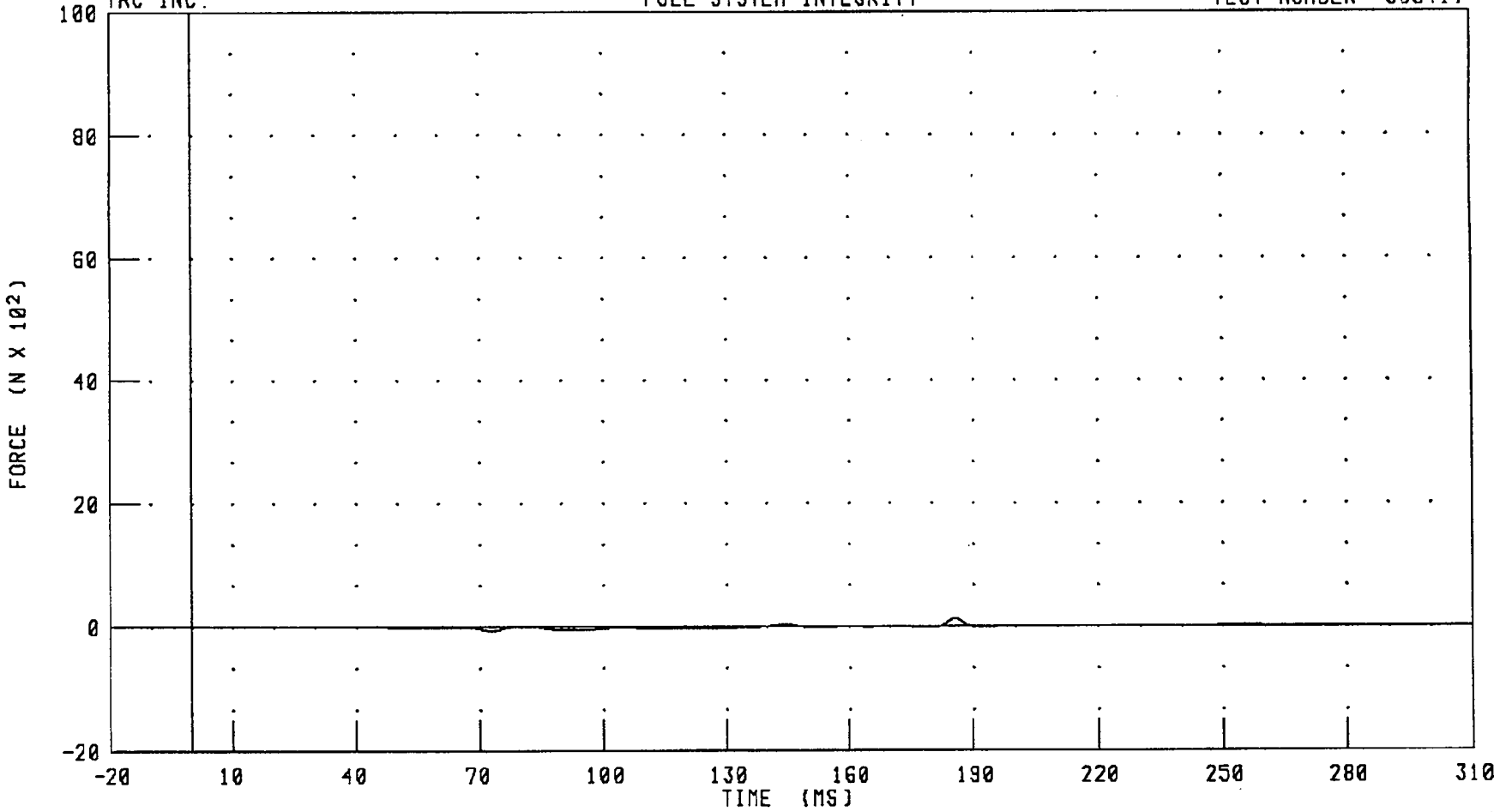
CHANNEL: TCRXG FILTER: CH. CLASS 60 PEAK DATA: 74.12 G @ 50.24 MS; -23.04 G @ 100.08 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

DRIVER SHOULDER BELT FORCE

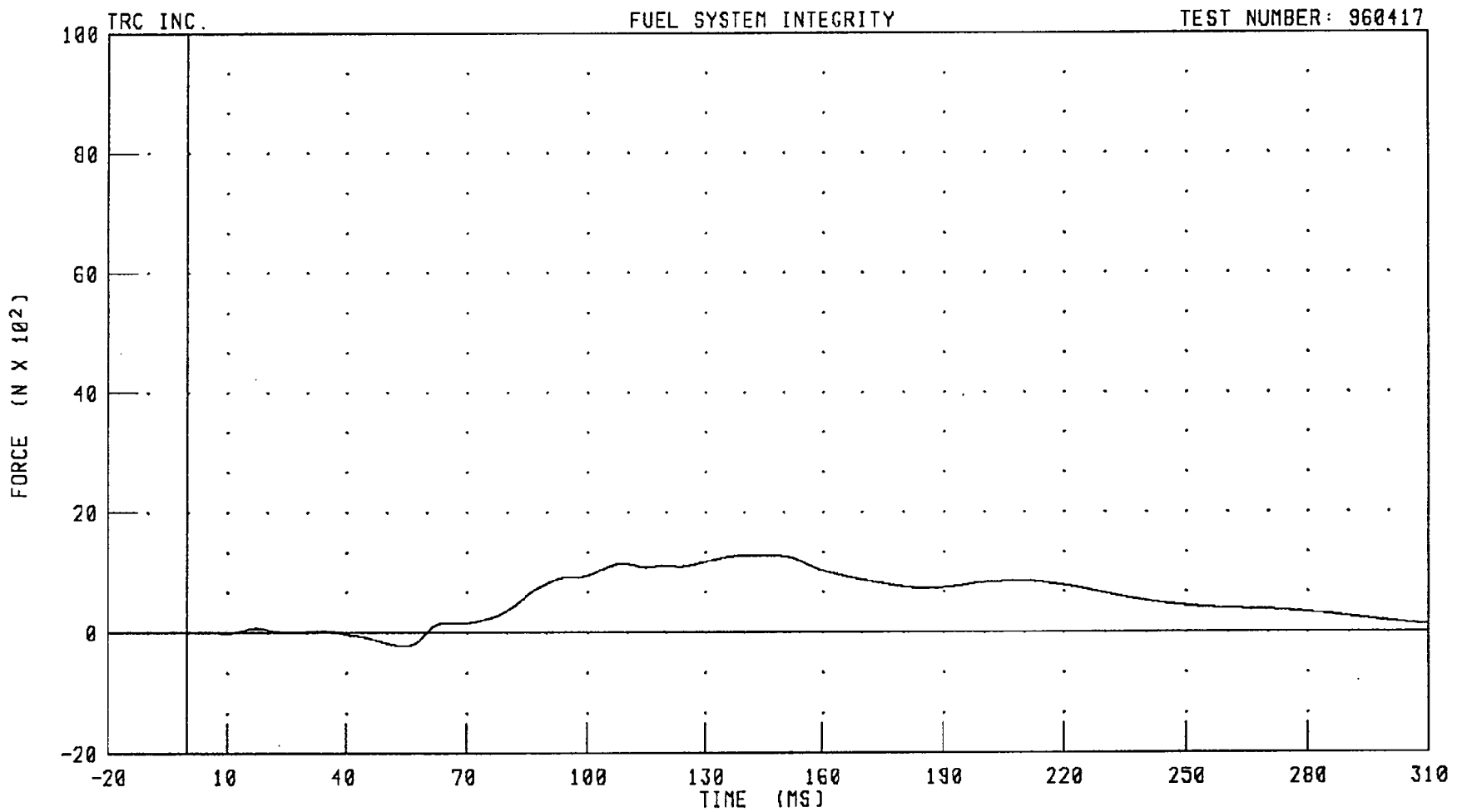
TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960417



CHANNEL: SHBF1 FILTER: CH. CLASS 60 PEAK DATA: 130.00 N @ 185.36 MS; -61.83 N @ 72.88 MS

960417

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



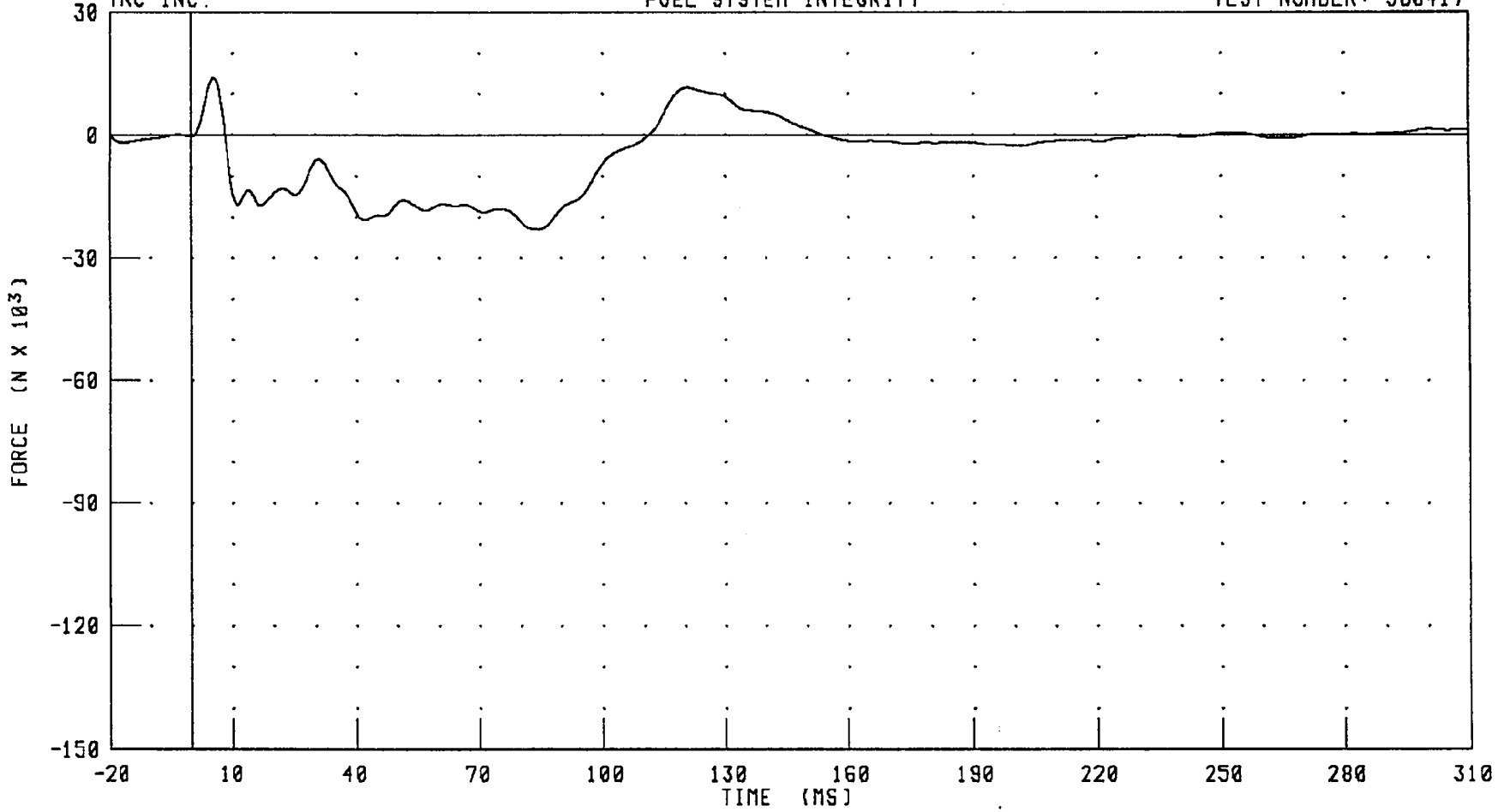
CHANNEL: LBOF1 FILTER: CH. CLASS 60 PEAK DATA: 1277.07 N @ 141.60 MS; -220.70 N @ 54.56 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

BARRIER FRONT TOP LEFT FORCE

TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960417



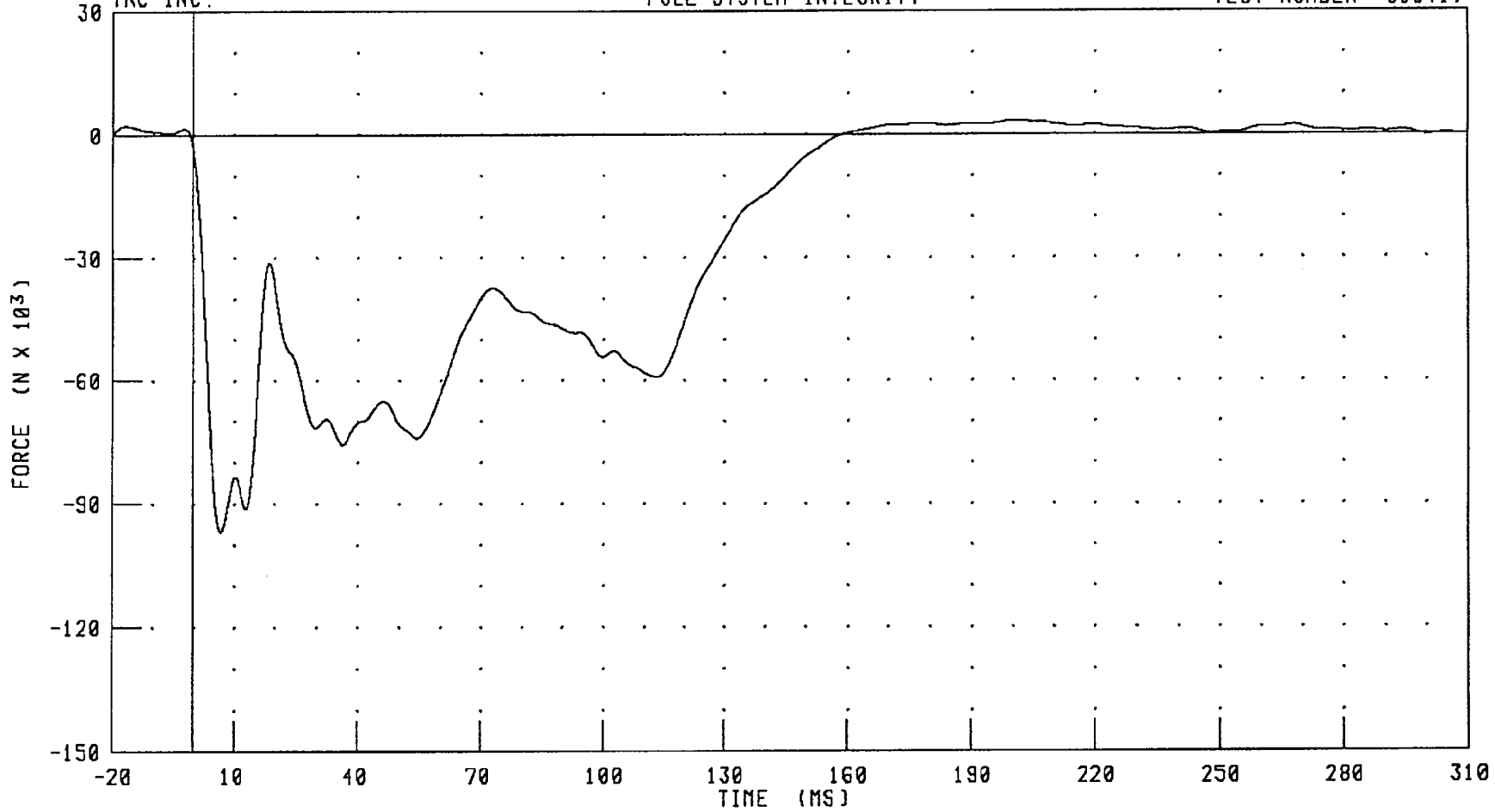
CHANNEL: BFFXF1 FILTER: CH. CLASS 60 PEAK DATA: 13940.76 N @ 5.28 MS; -22960.54 N @ 84.16 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

BARRIER FRONT BOTTOM LEFT FORCE

TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960417



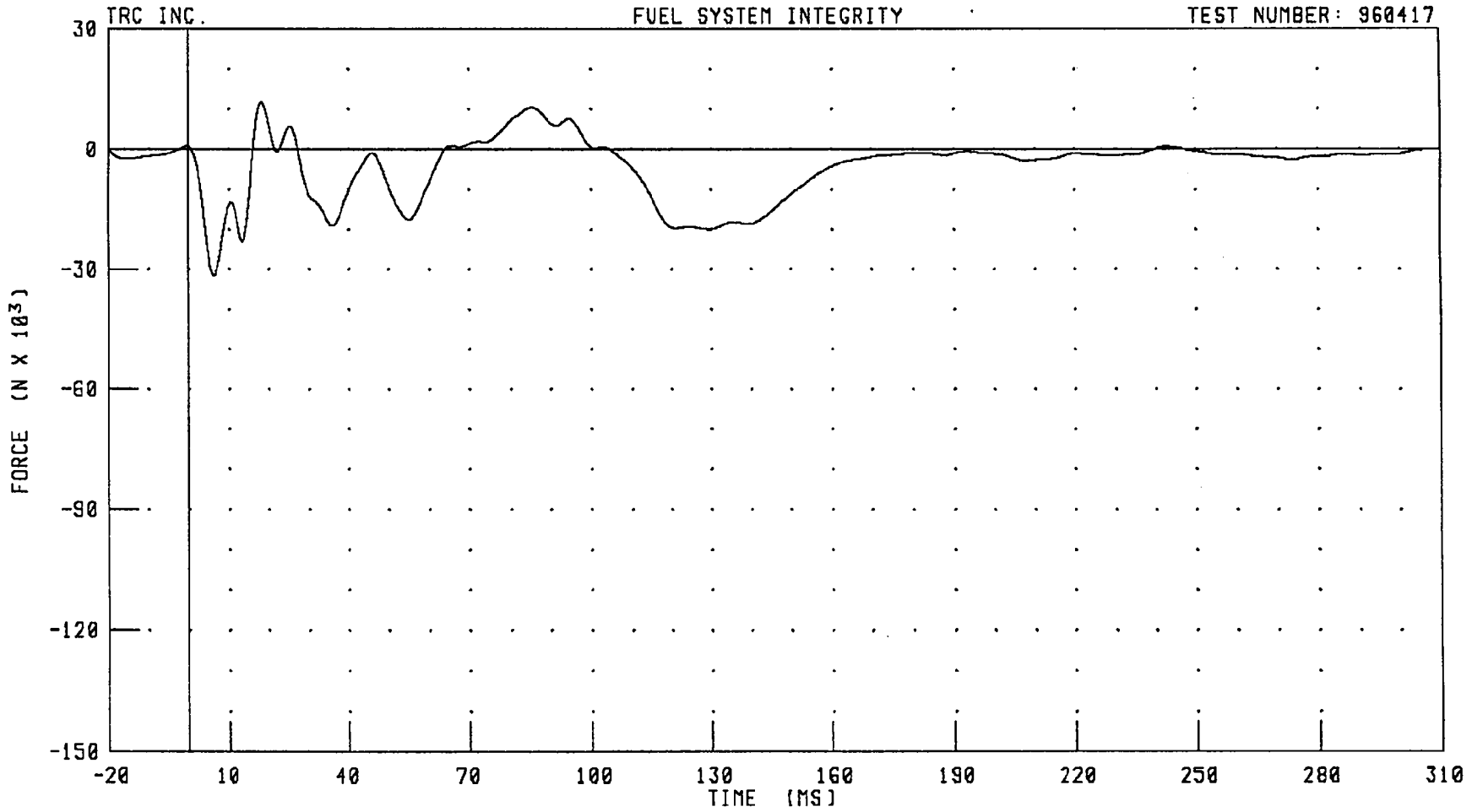
CHANNEL: BFFXF2 FILTER: CH. CLASS 60 PEAK DATA: 3351.56 N @ 200.40 MS; -96942.30 N @ 6.72 MS

08-B

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

BARRIER FRONT BOTTOM RIGHT FORCE

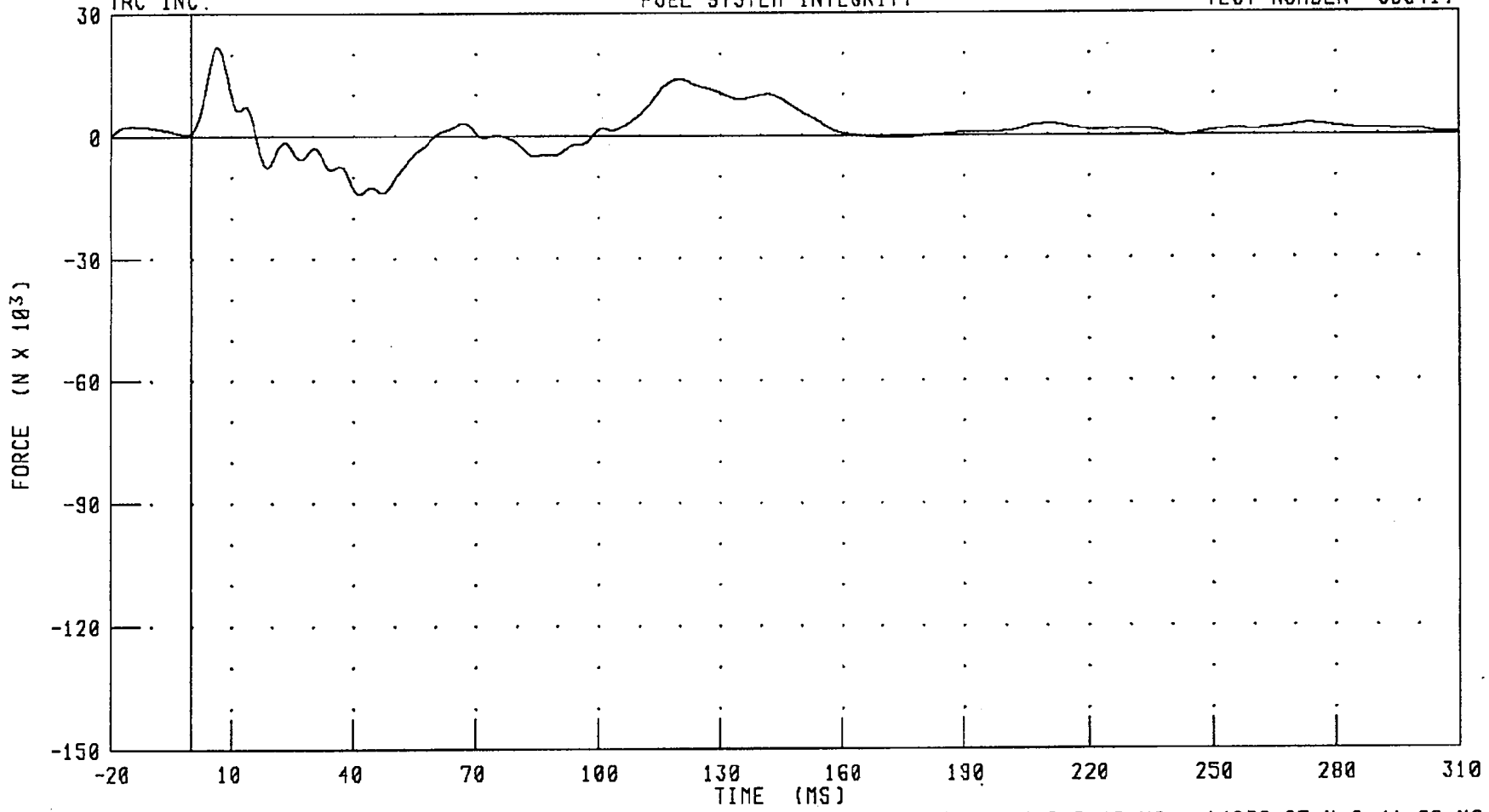


CHANNEL: BFFXF3 FILTER: CH. CLASS 60 PEAK DATA: 11678.39 N @ 18.32 MS; -31601.45 N @ 6.24 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

BARRIER FRONT TOP RIGHT FORCE

TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960417



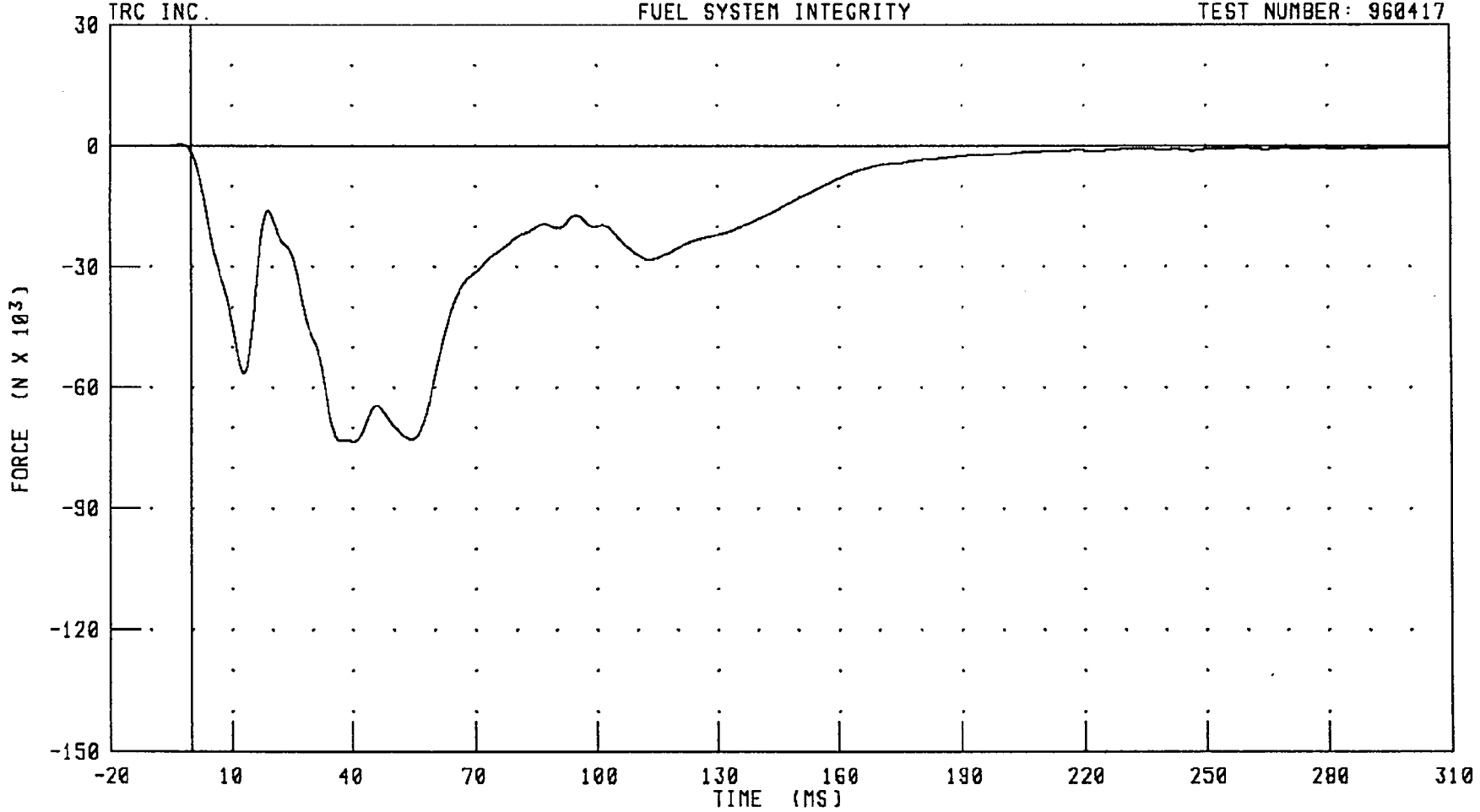
CHANNEL: BFFXF4 FILTER: CH. CLASS 60 PEAK DATA: 21844.70 N @ 6.48 MS; -14038.65 N @ 41.60 MS

960417

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 DODGE NEON AT 80 KPH AND 70% OVERLAP

BARRIER FRONT CENTER FORCE

TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960417



CHANNEL: BFFXF5 FILTER: CH. CLASS 60 PEAK DATA: 387.63 N @ -2.72 MS; -73405.52 N @ 40.40 MS

960417

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 LeDuc RUN NUMBER: 071295.1424

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III 11-APR-96

TRC INC. TEST NO: 34C1HD4 572E SN34 HEAD DROP CAL 01

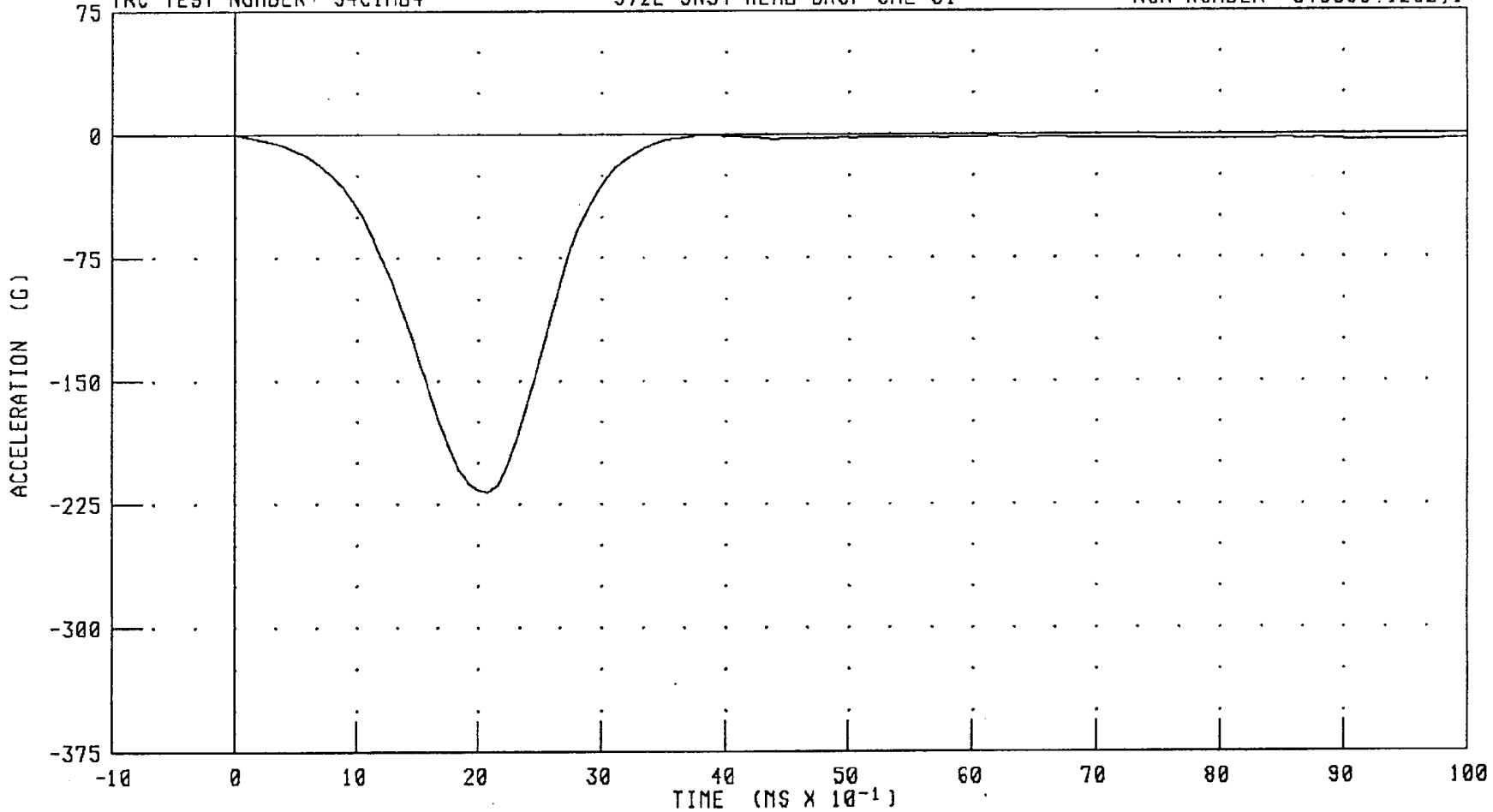
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	30.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	252.78 G
PEAK LATERAL ACCELERATION	15 G MAX	3.88 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN Richard LeVan RUN NUMBER: 041196.0809;1

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

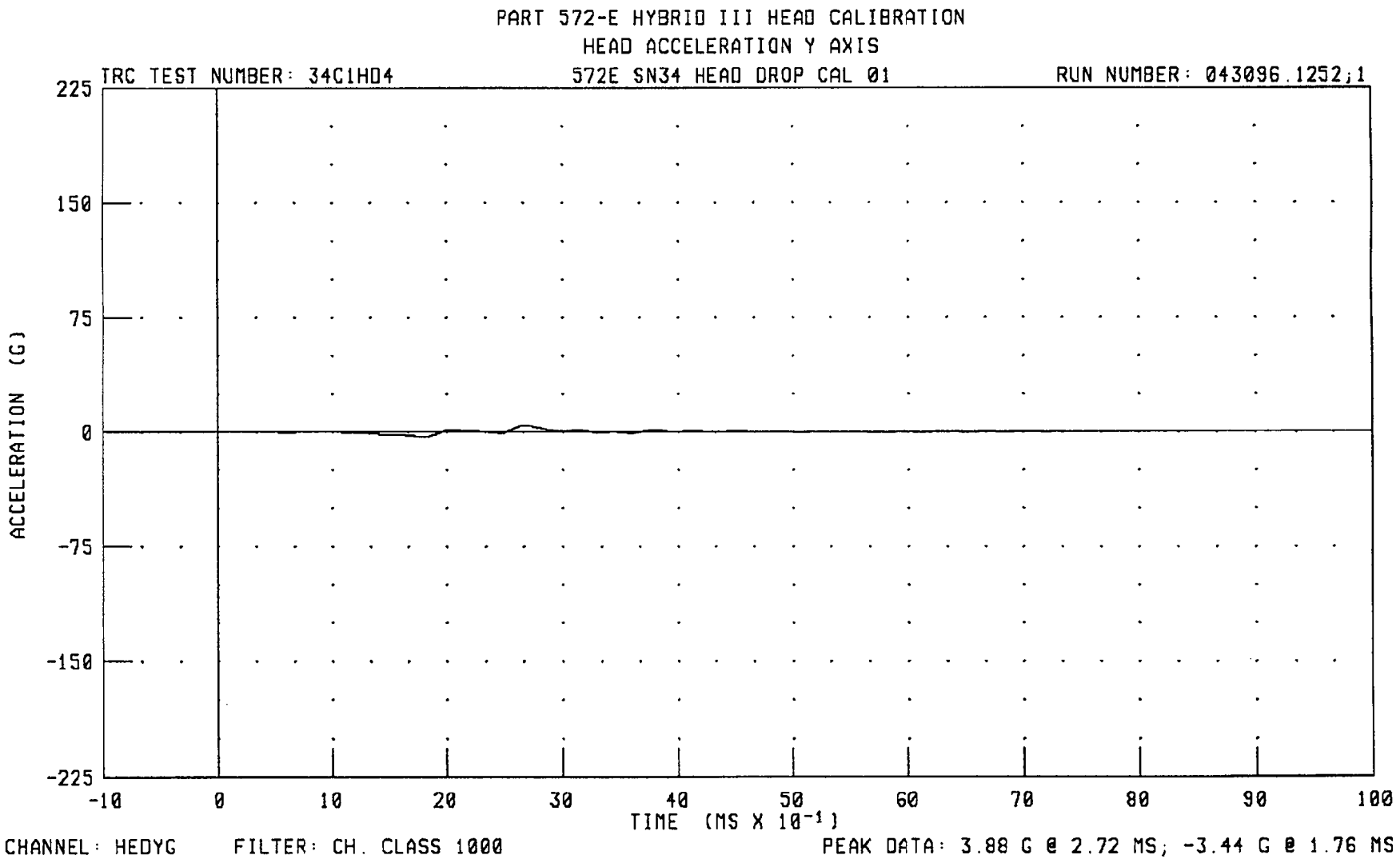
TRC TEST NUMBER: 34C1H04 572E SN34 HEAD DROP CAL 01 RUN NUMBER: 043096.1252;1



CHANNEL: HEDXG FILTER: CH. CLASS 1000 PEAK DATA: 0.07 G @ -0.56 MS; -217.70 G @ 2.08 MS

C-5

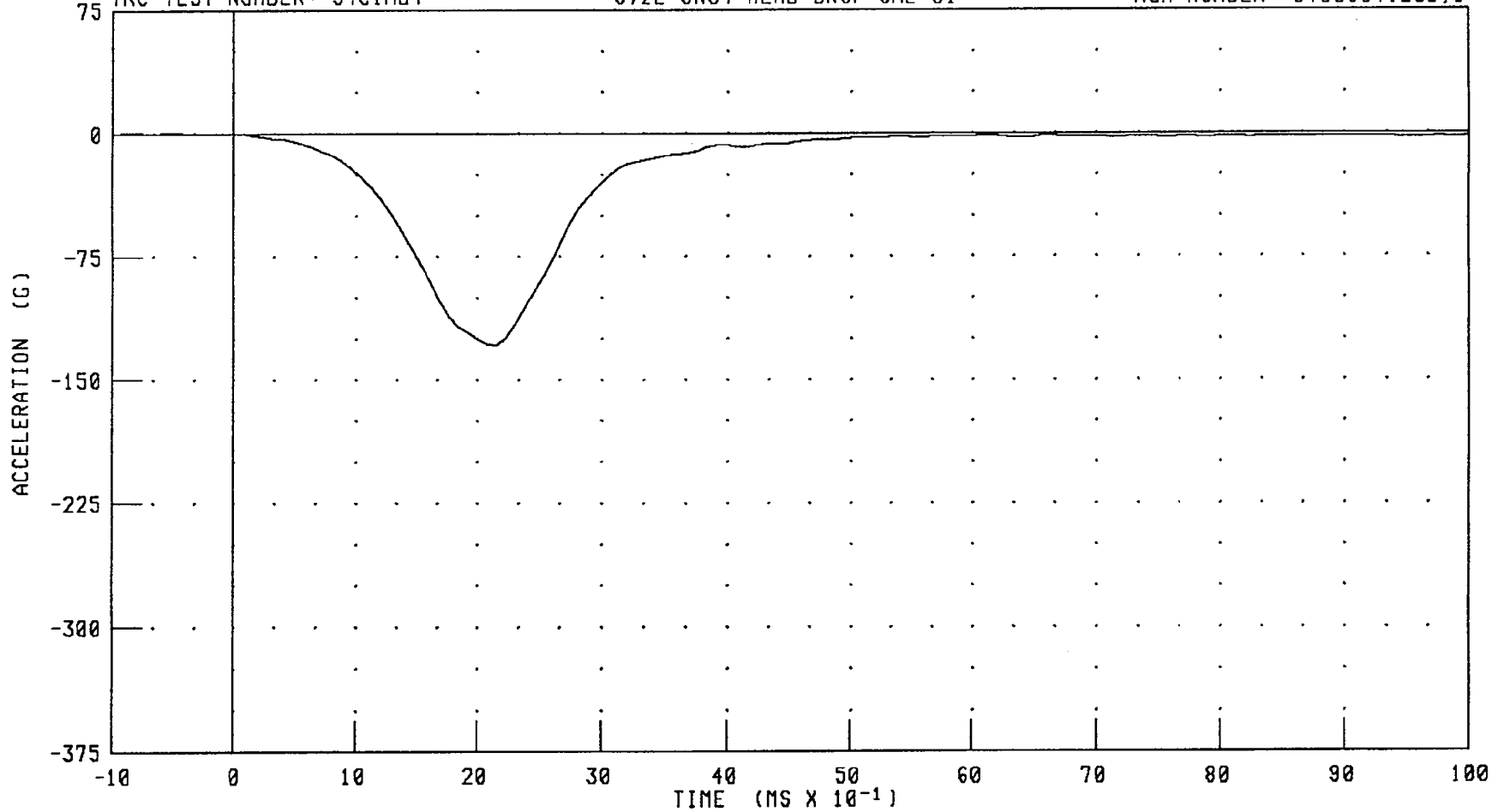
960417


PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Y AXIS
TRC TEST NUMBER: 34C1HD4
572E SN34 HEAD DROP CAL 01
RUN NUMBER: 043096.1252;1
225
150
75
0
-75
-150
-225
ACCELERATION (G)
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS X 10⁻¹)
CHANNEL: HEDYG
FILTER: CH. CLASS 1000
PEAK DATA: 3.88 G @ 2.72 MS; -3.44 G @ 1.76 MS

960417

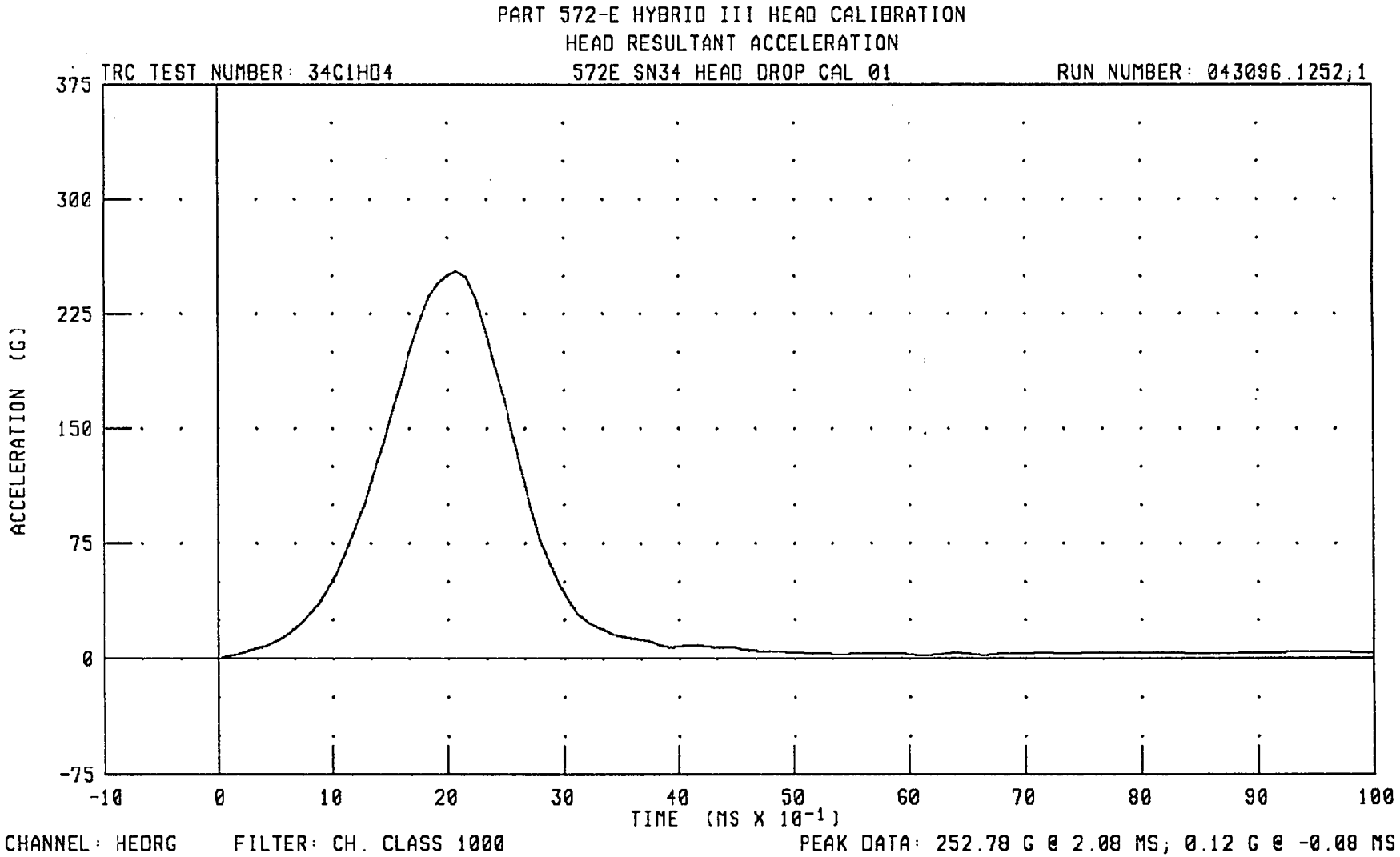
PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Z AXIS

TRC TEST NUMBER: 34C1HD4 572E SN34 HEAD DROP CAL 01 RUN NUMBER: 043096.1252;1



CHANNEL: HEDZG FILTER: CH. CLASS 1000 PEAK DATA: 0.46 G @ -0.88 MS; -129.10 G @ 2.16 MS

960417


PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION
TRC TEST NUMBER: 34C1HD4
572E SN34 HEAD DROP CAL 01
RUN NUMBER: 043096.1252;1
ACCELERATION (G)
375
300
225
150
75
0
-75
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS X 10⁻¹)
CHANNEL: HEDRG
FILTER: CH. CLASS 1000
PEAK DATA: 252.78 G @ 2.08 MS; 0.12 G @ -0.08 MS

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

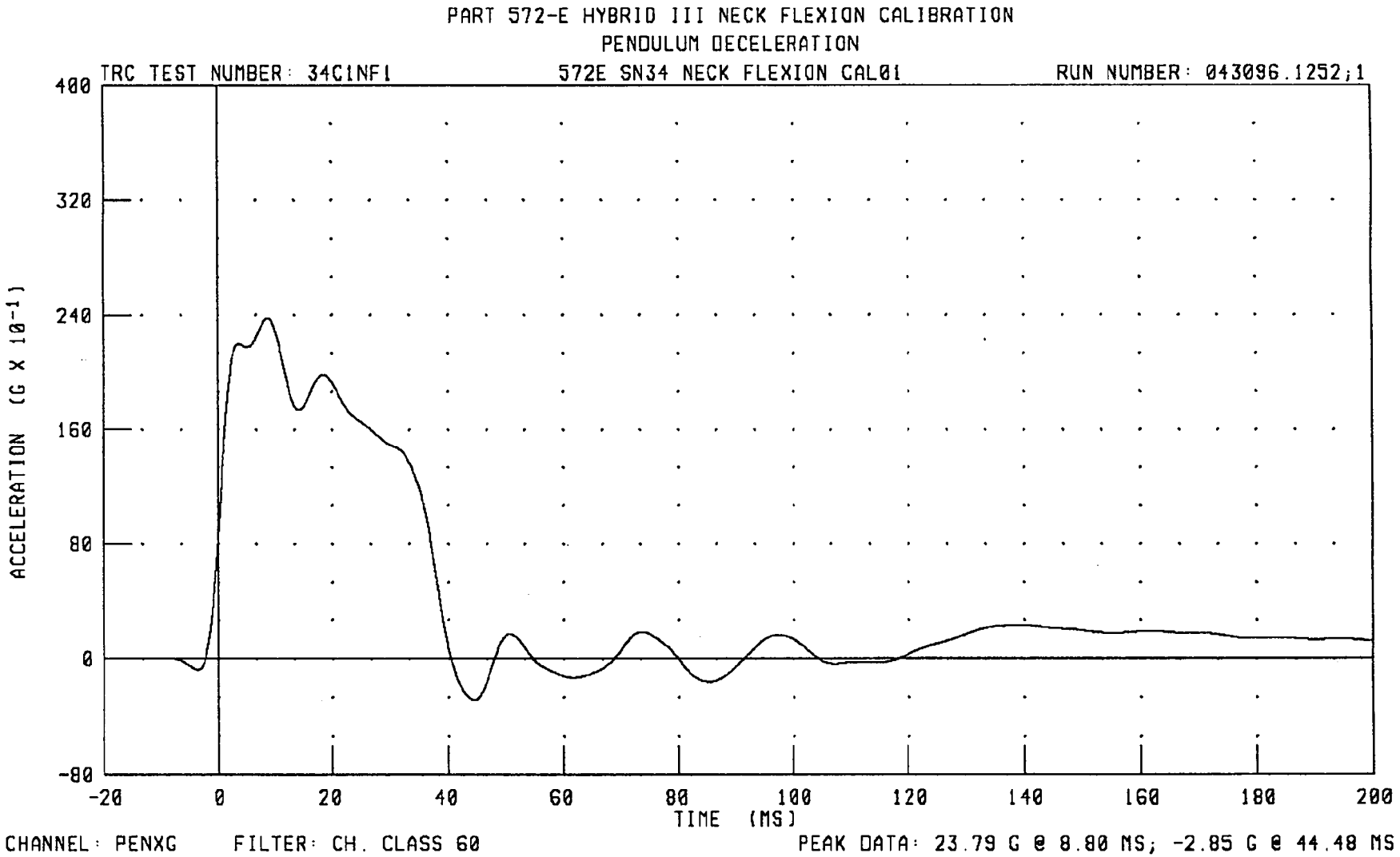
HYBRID III 11-JUL-95

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 ROTATION	MAX	64 - 78 DEG.	72.72 DEG.
	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

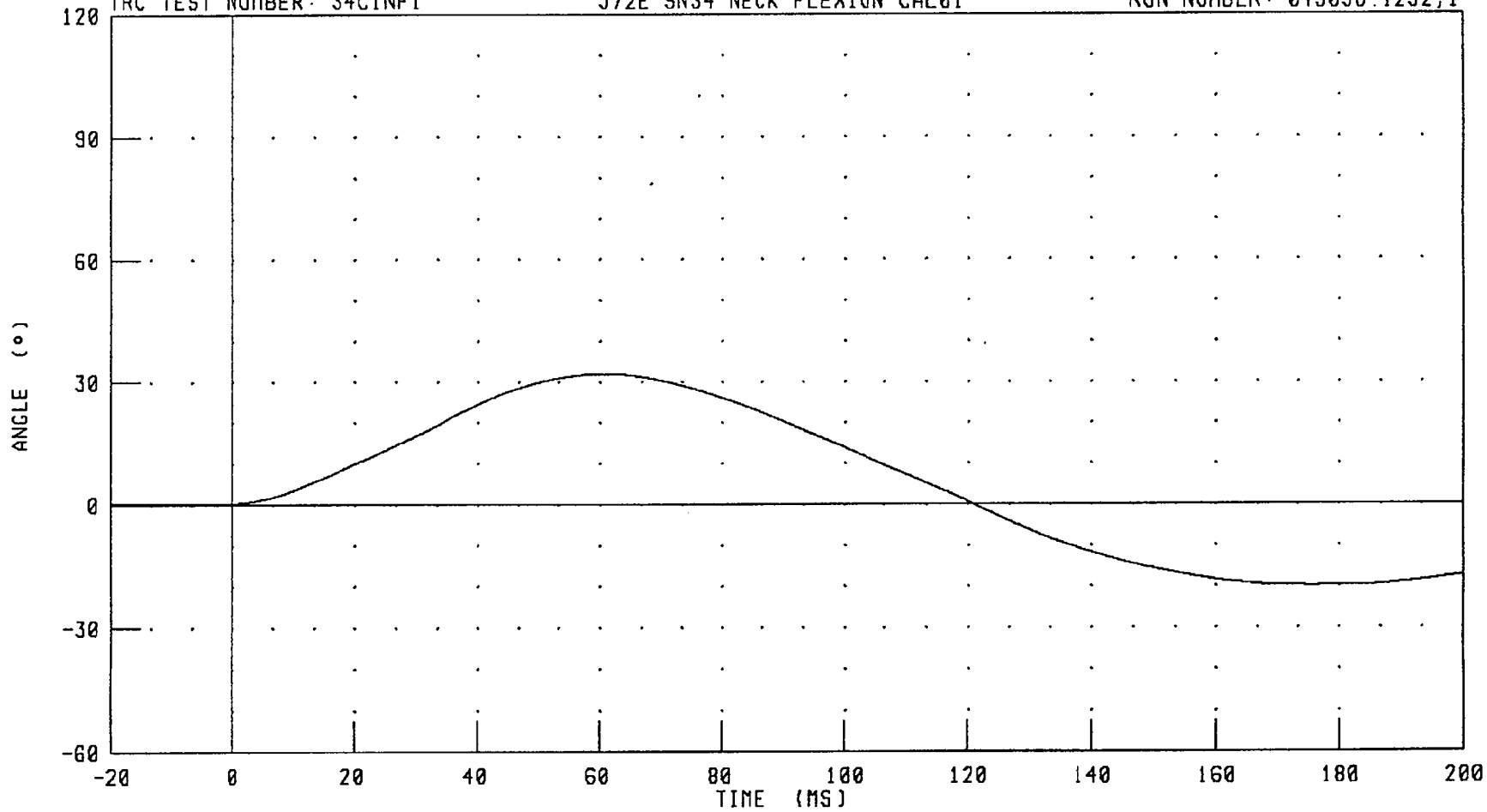
TEST MEETS SPECIFICATIONS

TECHNICIAN Richard LeVan 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: 043096.1252;1
ACCELERATION (G X 10-1)
400
320
240
160
80
0
-80
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: PENXG
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: 34C1NF1 572E SN34 NECK FLEXION CAL01 RUN NUMBER: 043096.1252;1



CHANNEL: BETA FILTER: CH. CLASS 60 PEAK DATA: 31.85 ° @ 61.52 MS; -19.92 ° @ 175.76 MS

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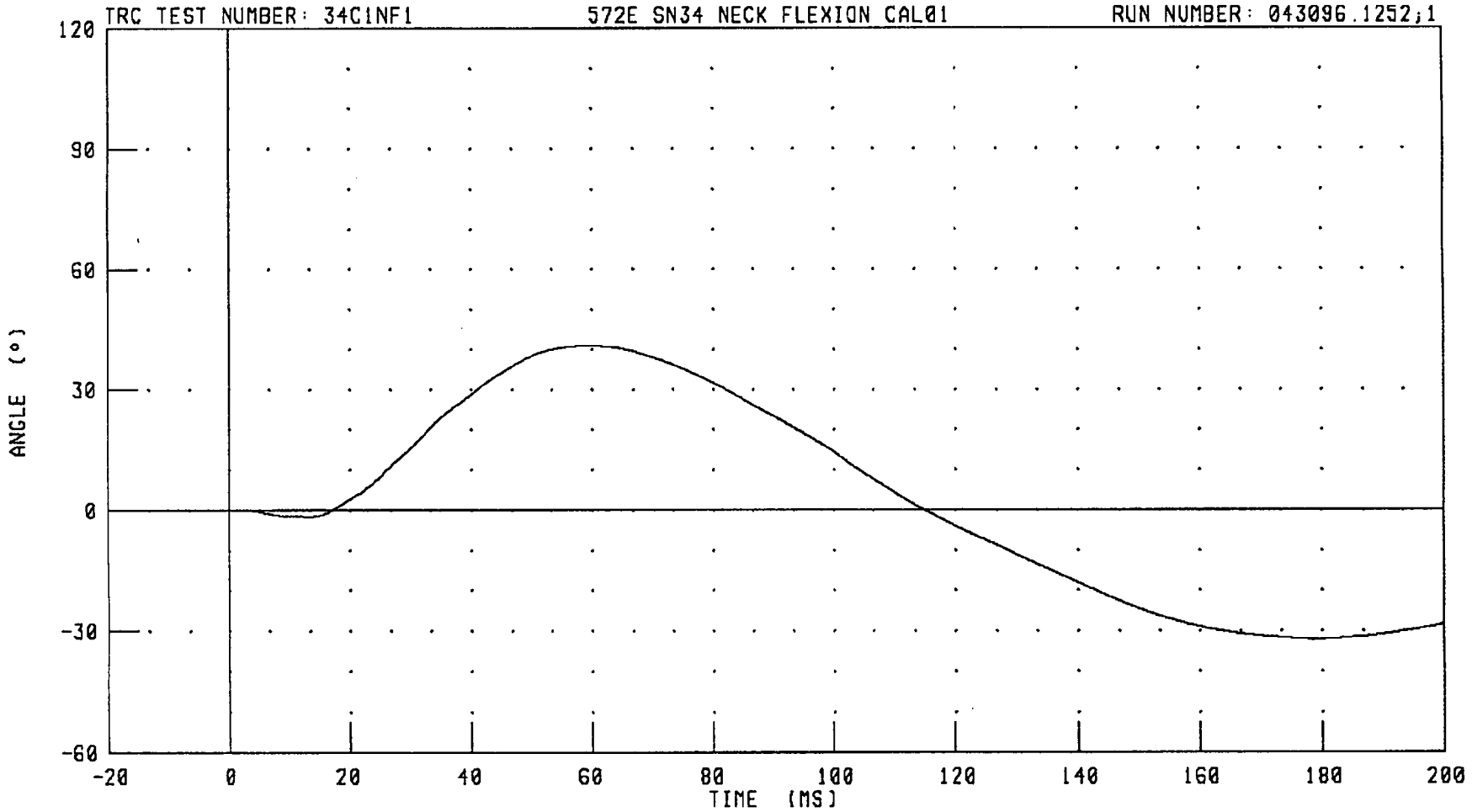
PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE



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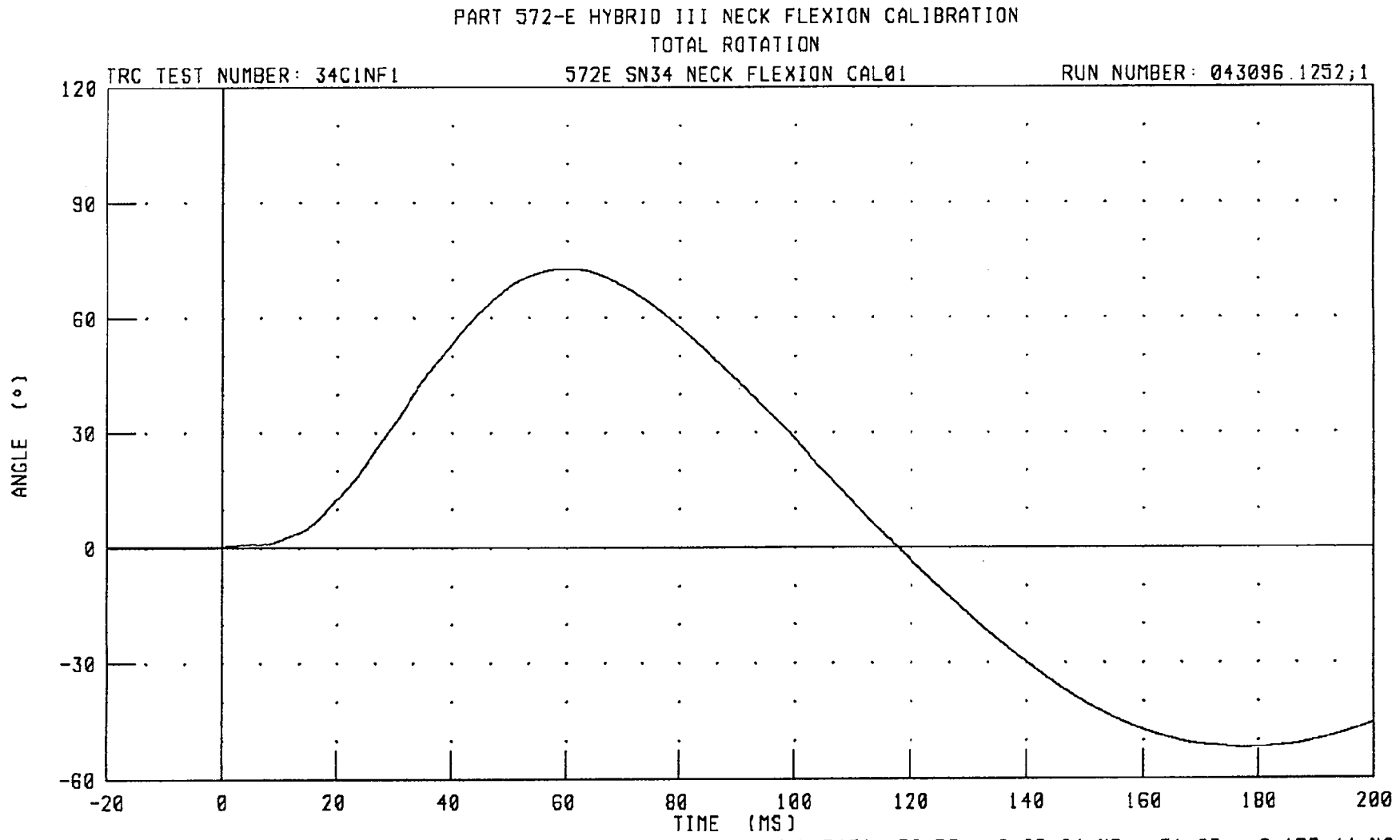
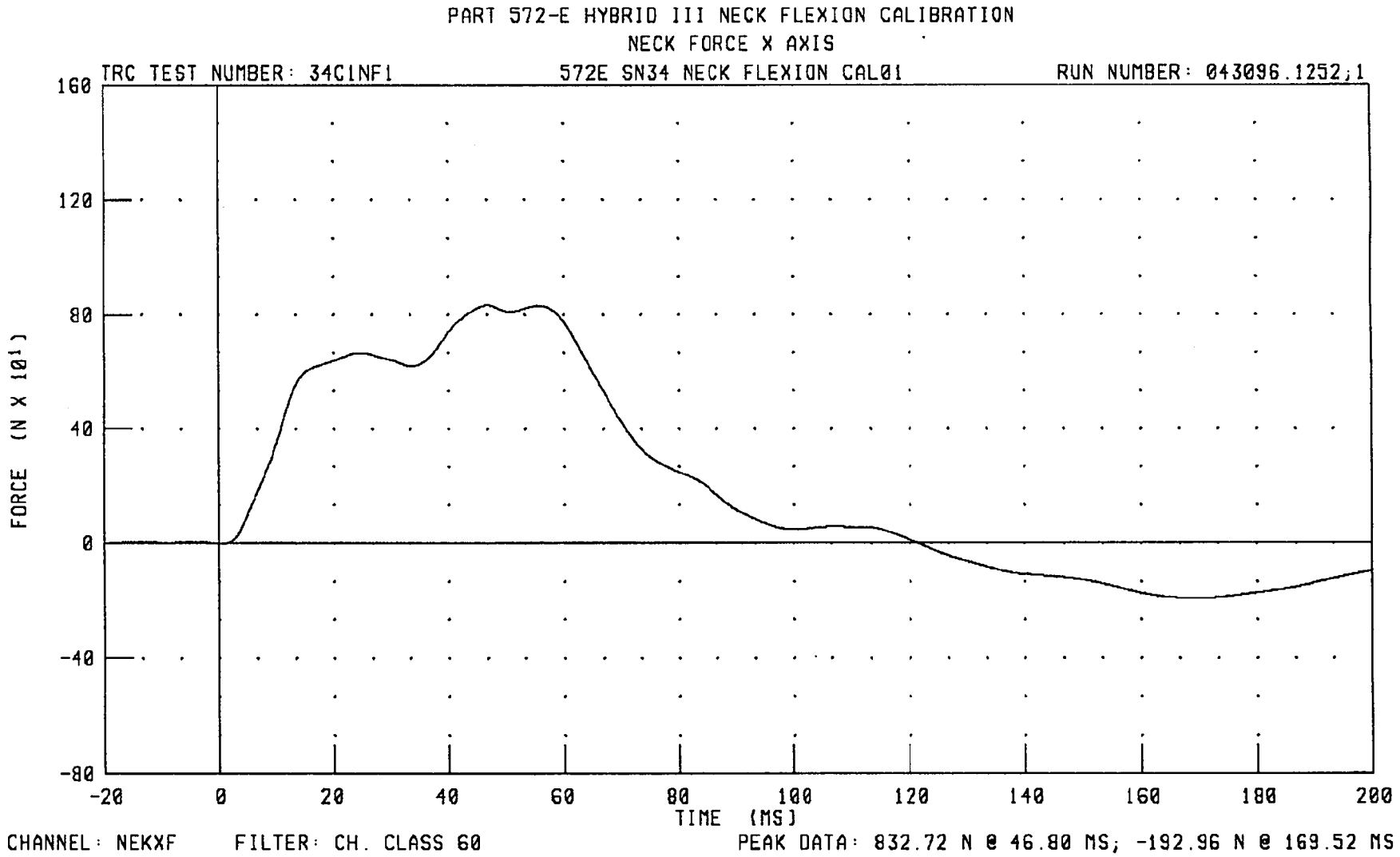
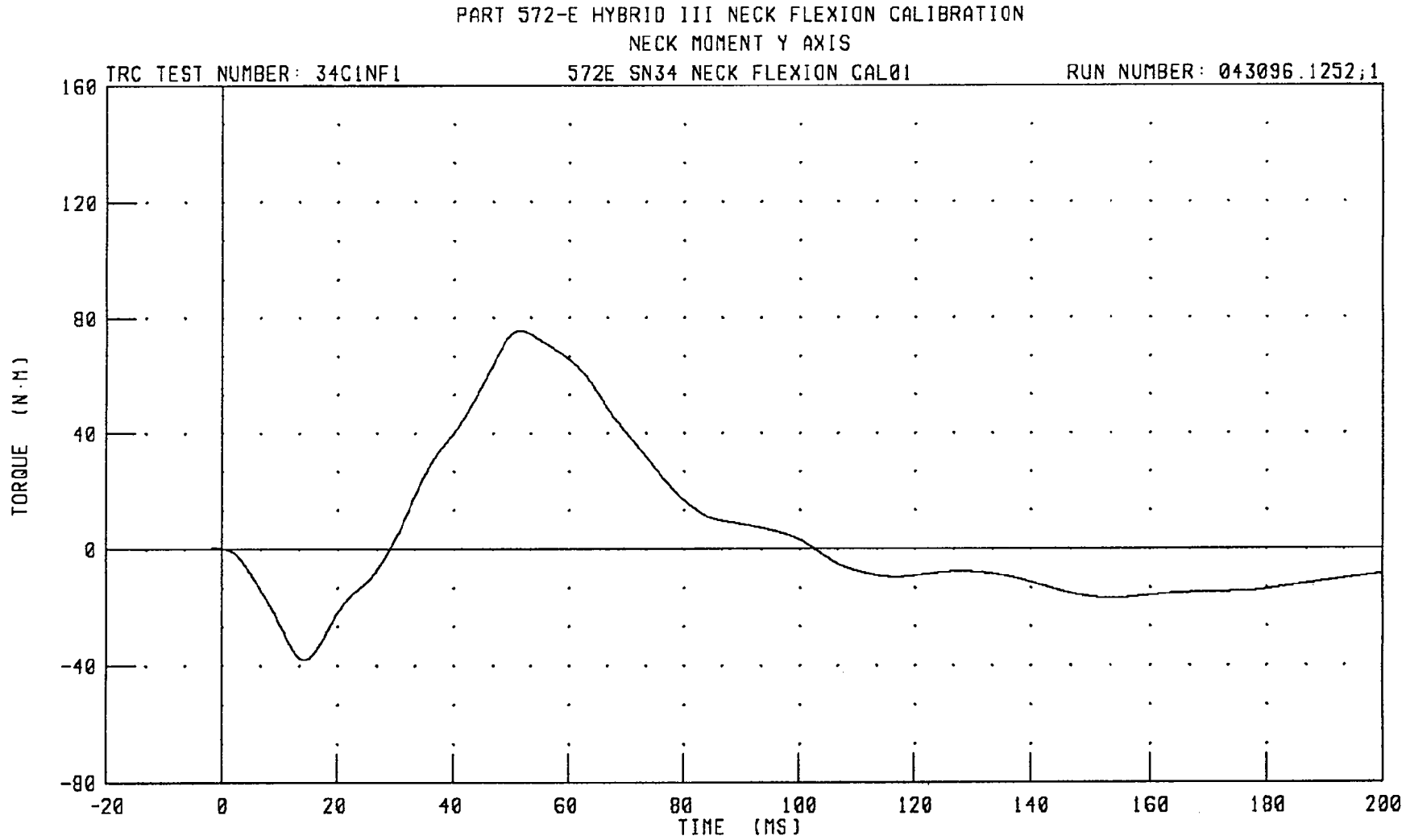
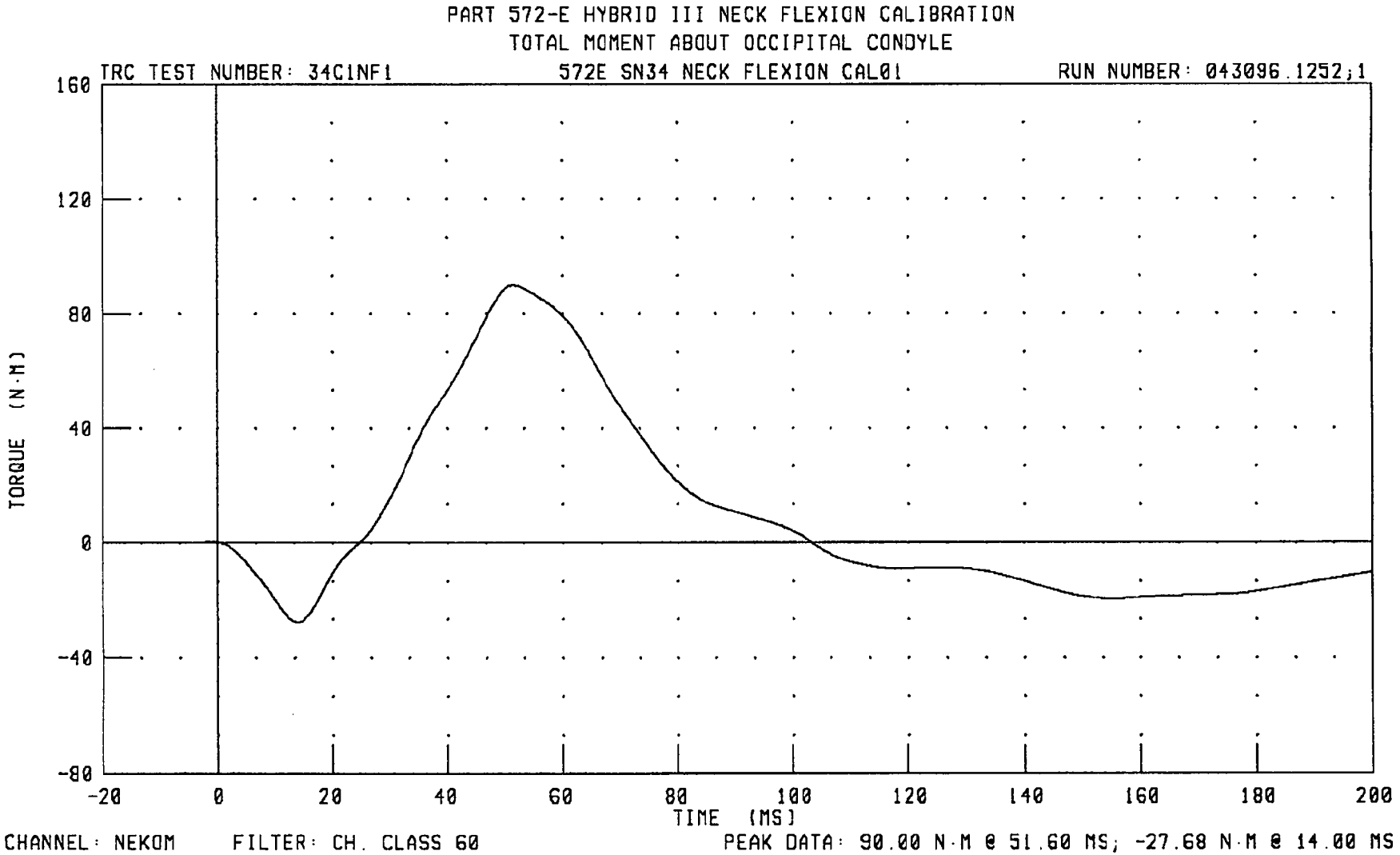

PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL ROTATION
TRC TEST NUMBER: 34C1NF1
572E SN34 NECK FLEXION CAL01
RUN NUMBER: 043096.1252;1
120
90
60
30
0
-30
-60
ANGLE (°)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: TOTAN
FILTER: CH. CLASS 60
PEAK DATA: 72.73 ° @ 60.24 MS; -51.93 ° @ 177.44 MS


PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK FORCE X AXIS
TRC TEST NUMBER: 34C1NF1
572E SN34 NECK FLEXION CAL01
RUN NUMBER: 043096.1252;1
160
120
80
40
0
-40
-80
FORCE (N X 10¹)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
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: 34C1NF1
572E SN34 NECK FLEXION CAL01
RUN NUMBER: 043096.1252;1
160
120
80
40
0
-40
-80
TORQUE (N·M)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
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: 34C1NF1
572E SN34 NECK FLEXION CAL01
RUN NUMBER: 043096.1252;1
160
120
80
40
0
-40
-80
TORQUE (N·M)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
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

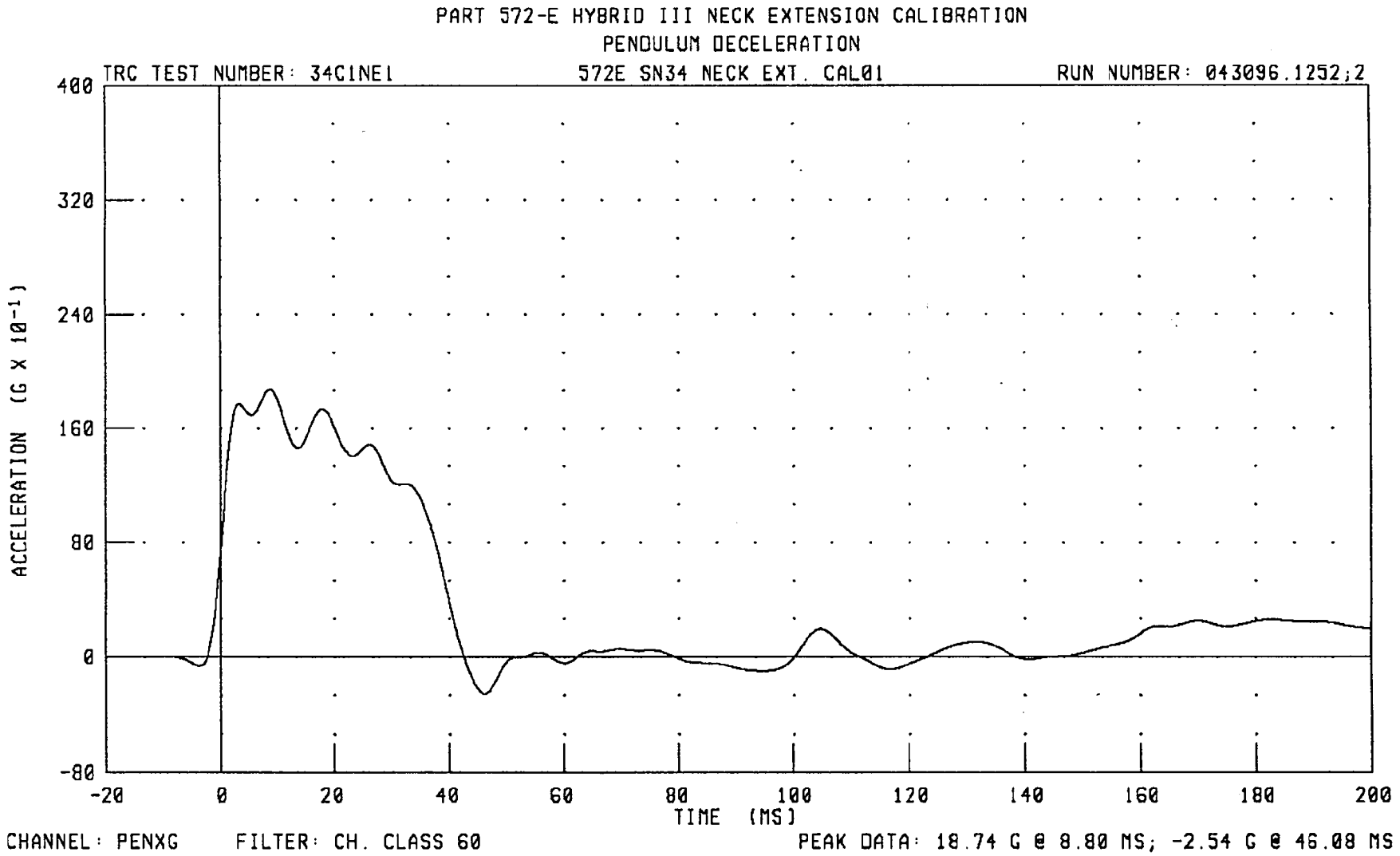
HYBRID III 11-JUL-95

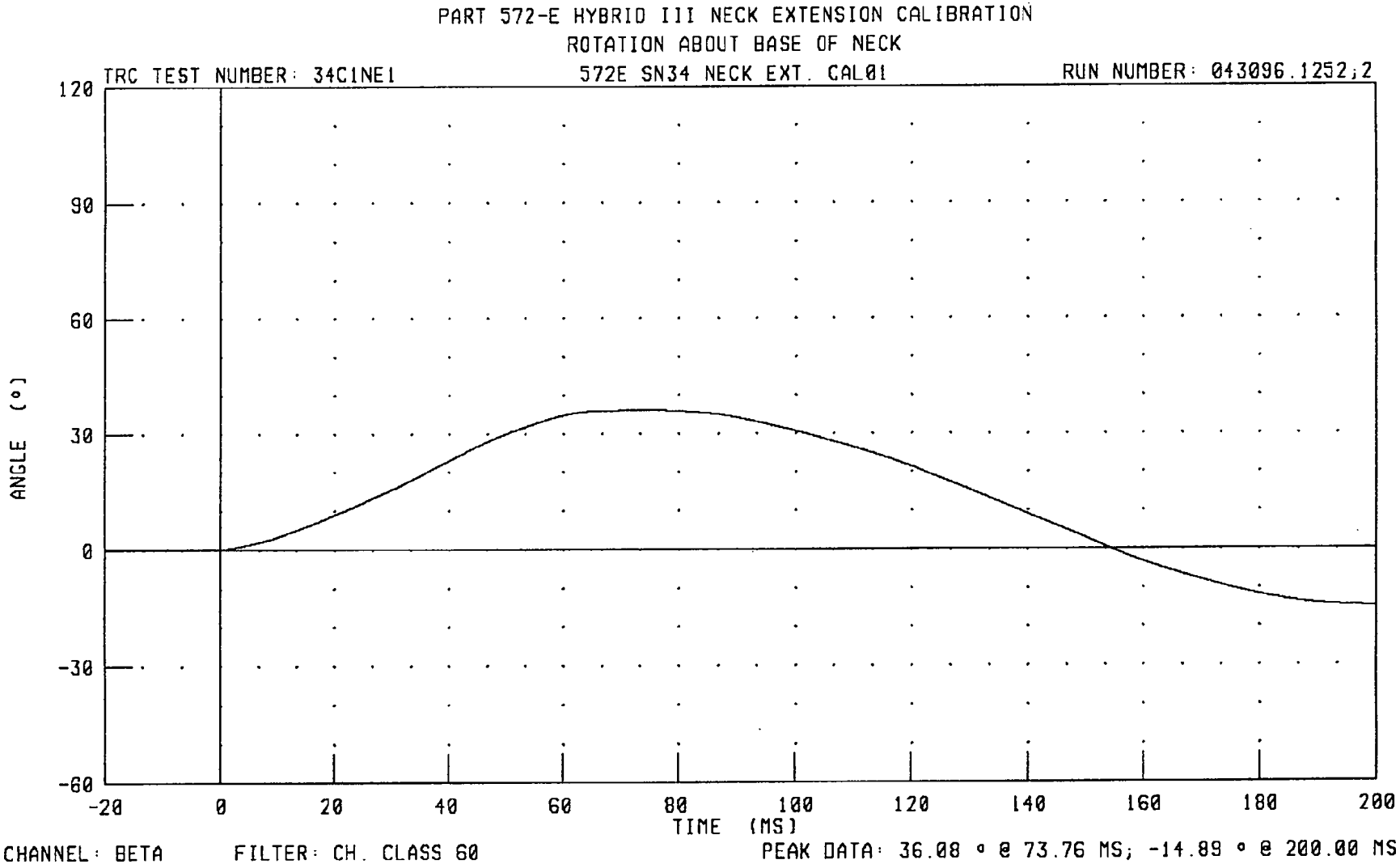
TRC INC. TEST NO: 34C1NE1 572E SN34 NECK EXT. CAL01

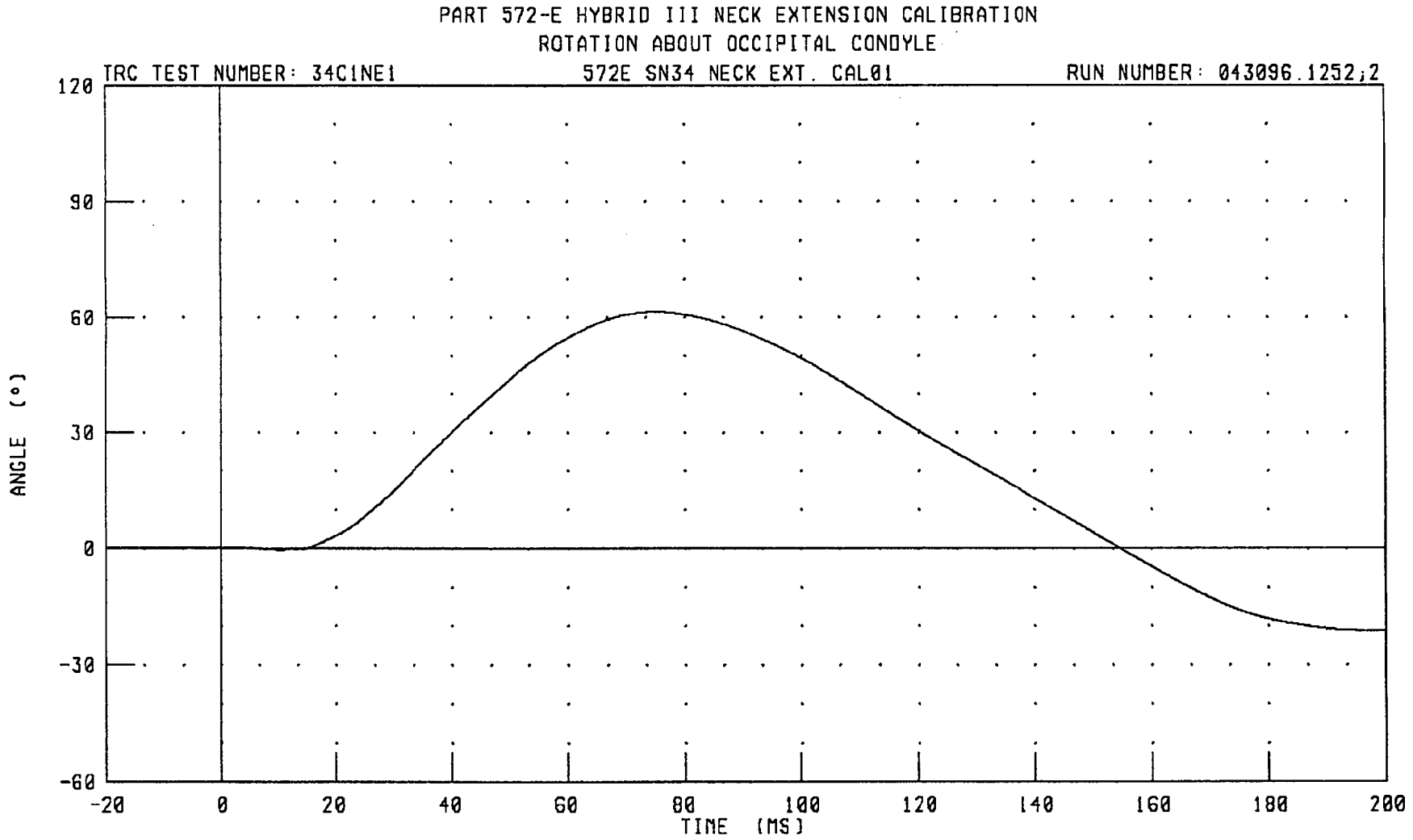
TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY		10 - 70 %	63.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.05 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	18.10 G
	20 MS	14.00 - 19.00 G	16.16 G
	30 MS	11.00 - 16.00 G	12.32 G
MAX PENDULUM G		22 G MAX	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 ROTATION	MAX	81 - 106 DEG.	97.53 DEG.
	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  RUN NUMBER: 071195.1058;2

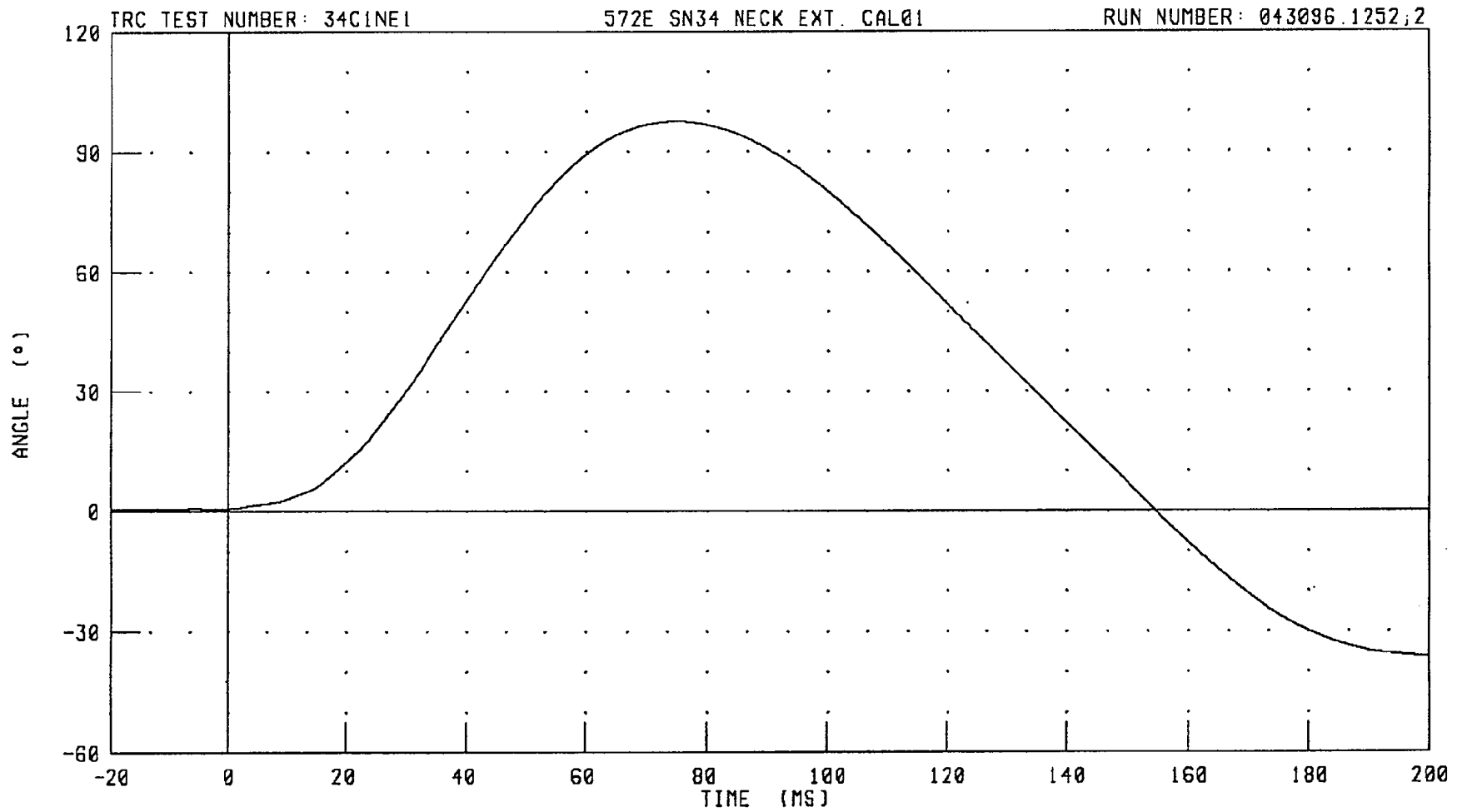

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
PENDULUM DECELERATION
TRC TEST NUMBER: 34C1NE1
572E SN34 NECK EXT. CAL01
RUN NUMBER: 043096.1252;2
ACCELERATION (G X 10-1)
400
320
240
160
80
0
-80
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: PENXG
FILTER: CH. CLASS 60
PEAK DATA: 18.74 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: 34C1NE1
572E SN34 NECK EXT. CAL01
RUN NUMBER: 043096.1252;2
ANGLE (°)
120
90
60
30
0
-30
-60
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: BETA
FILTER: CH. CLASS 60
PEAK DATA: 36.08 ° @ 73.76 MS; -14.89 ° @ 200.00 MS


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 34C1NE1
572E SN34 NECK EXT. CAL01
RUN NUMBER: 043096.1252;2
ANGLE (°)
120
90
60
30
0
-30
-60
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
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



CHANNEL: TOTAN FILTER: CH. CLASS 60

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

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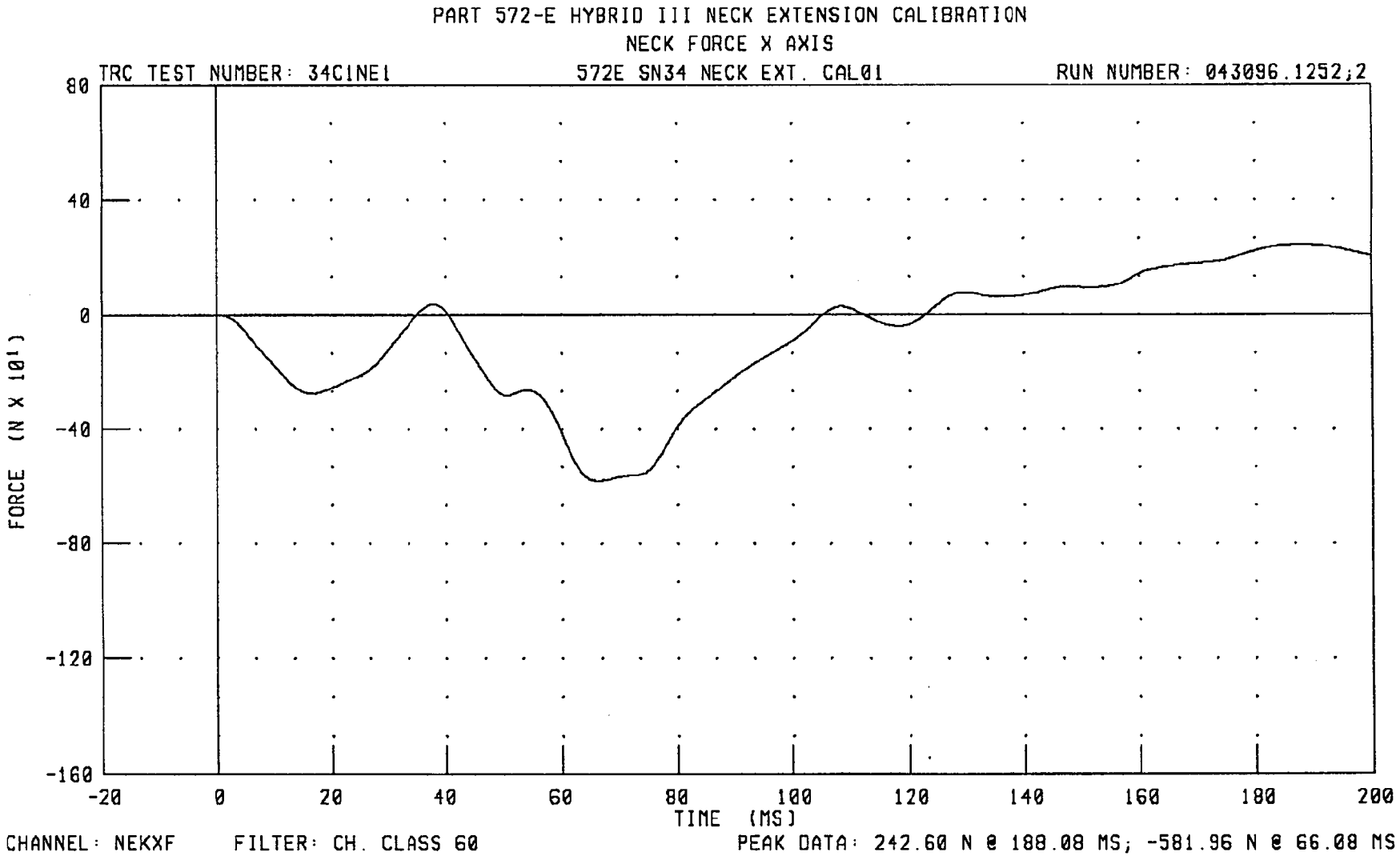
PART 572-E HYBRID III NECK EXTENSION CALIBRATION
NECK FORCE X AXIS
TRC TEST NUMBER: 34CINE1
572E SN34 NECK EXT. CAL01
RUN NUMBER: 043096.1252;2
80
40
0
-40
-80
-120
-160
FORCE (N X 10¹)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKXF
FILTER: CH. CLASS 60
PEAK DATA: 242.60 N @ 188.08 MS; -581.96 N @ 66.08 MS

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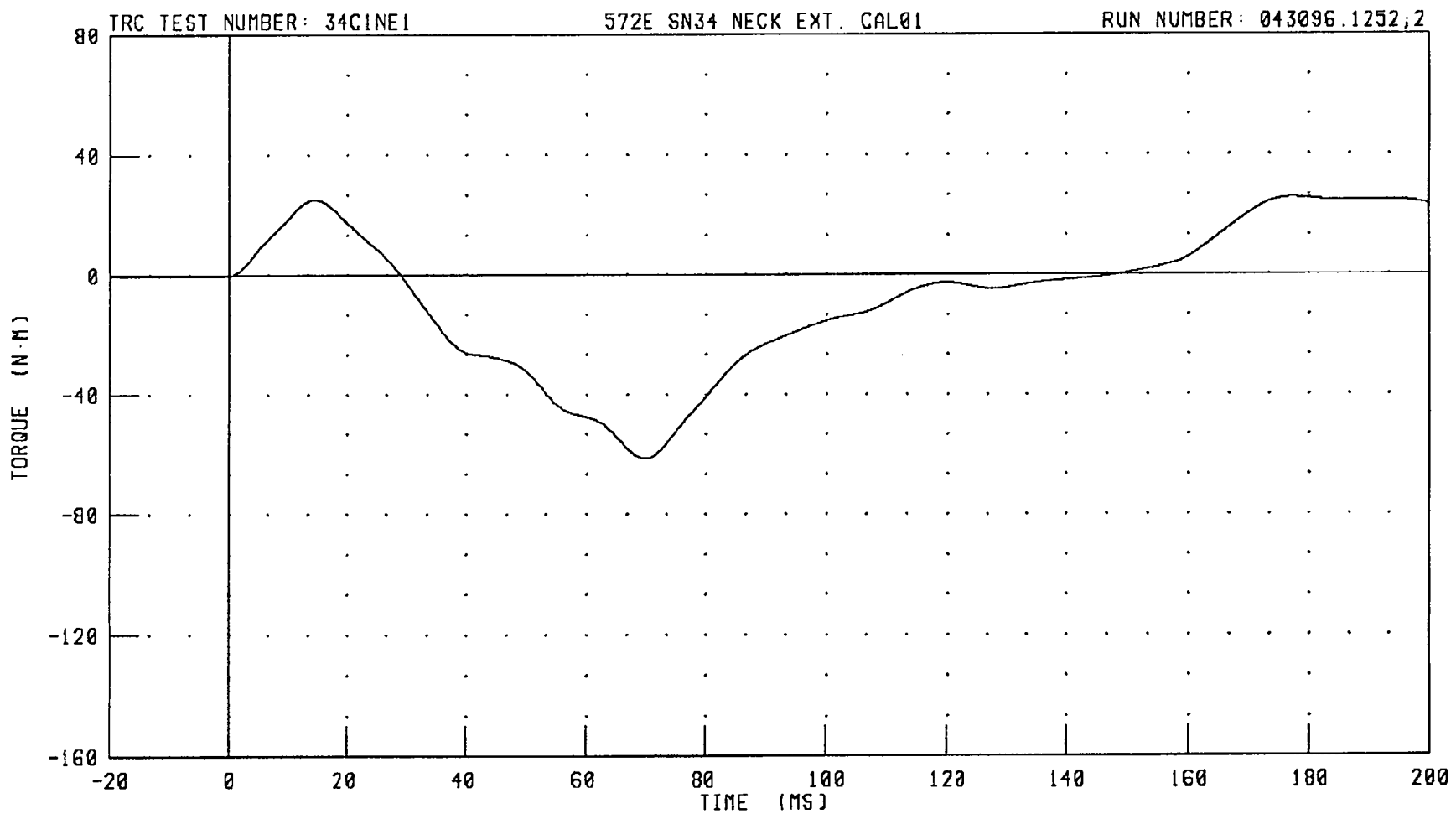
PART 572-E HYBRID III NECK EXTENSION CALIBRATION
NECK MOMENT Y AXIS



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

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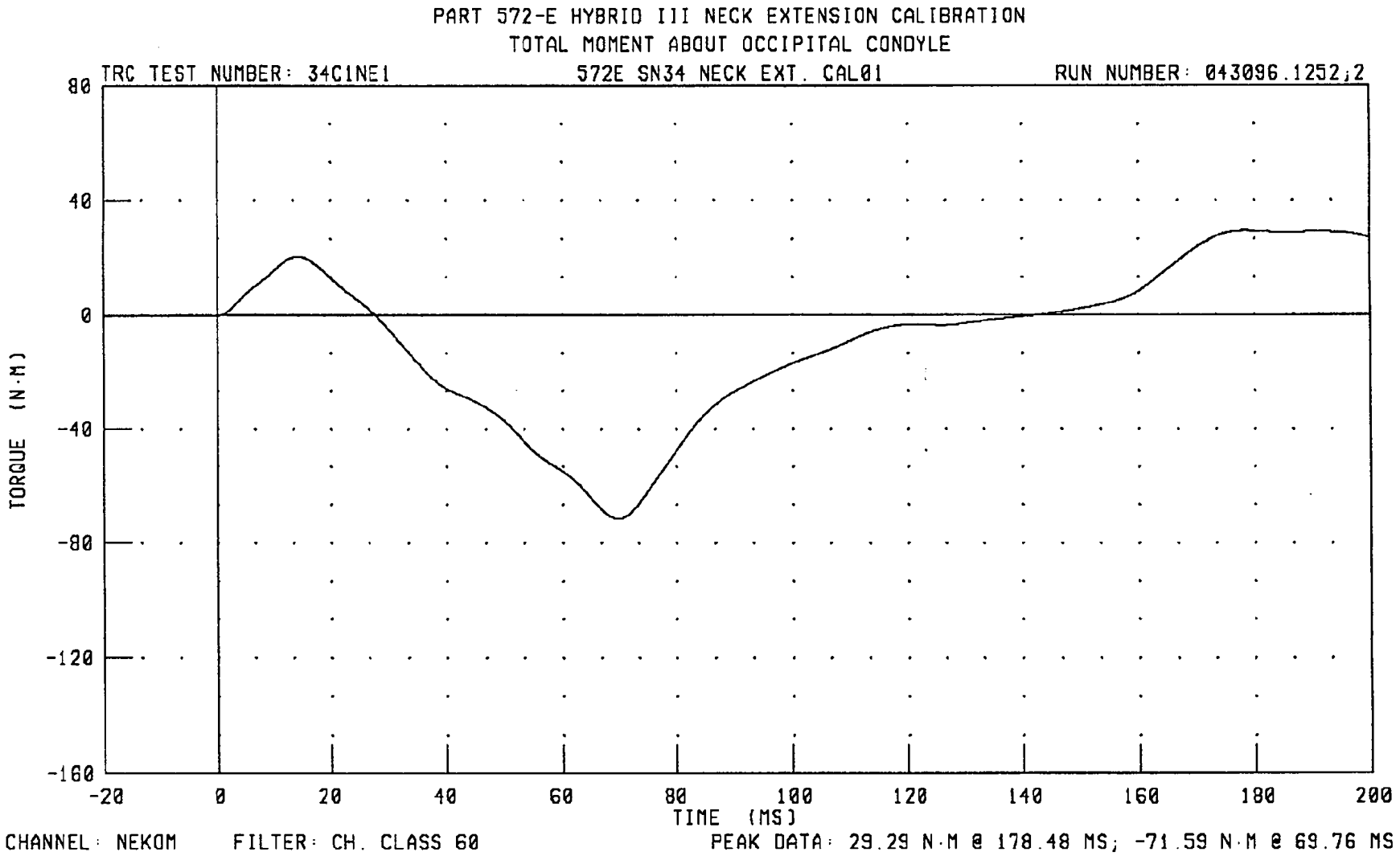

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 34C1NE1
572E SN34 NECK EXT. CAL01
RUN NUMBER: 043096.1252;2
80
40
0
-40
-80
-120
-160
TORQUE (N-M)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKOM
FILTER: CH. CLASS 60
PEAK DATA: 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

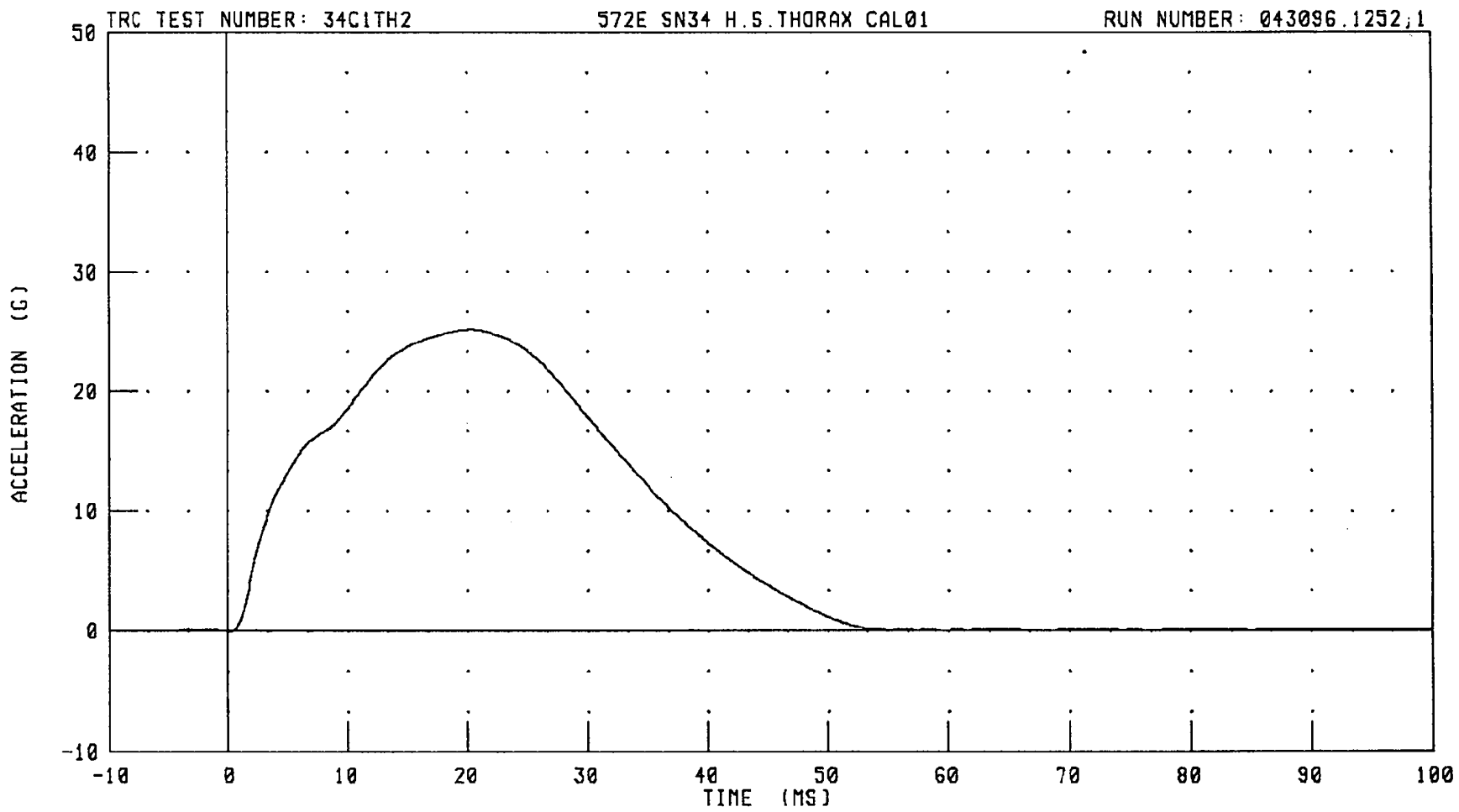
TRC INC. TEST NO: 34C1TH2 572E SN34 H.S.THORAX CAL01

TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
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  RUN NUMBER: 021696.1507;1

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION



CHANNEL: PENXG FILTER: CH. CLASS 180 PEAK DATA: 25.13 G @ 20.24 MS; -0.03 G @ 0.08 MS

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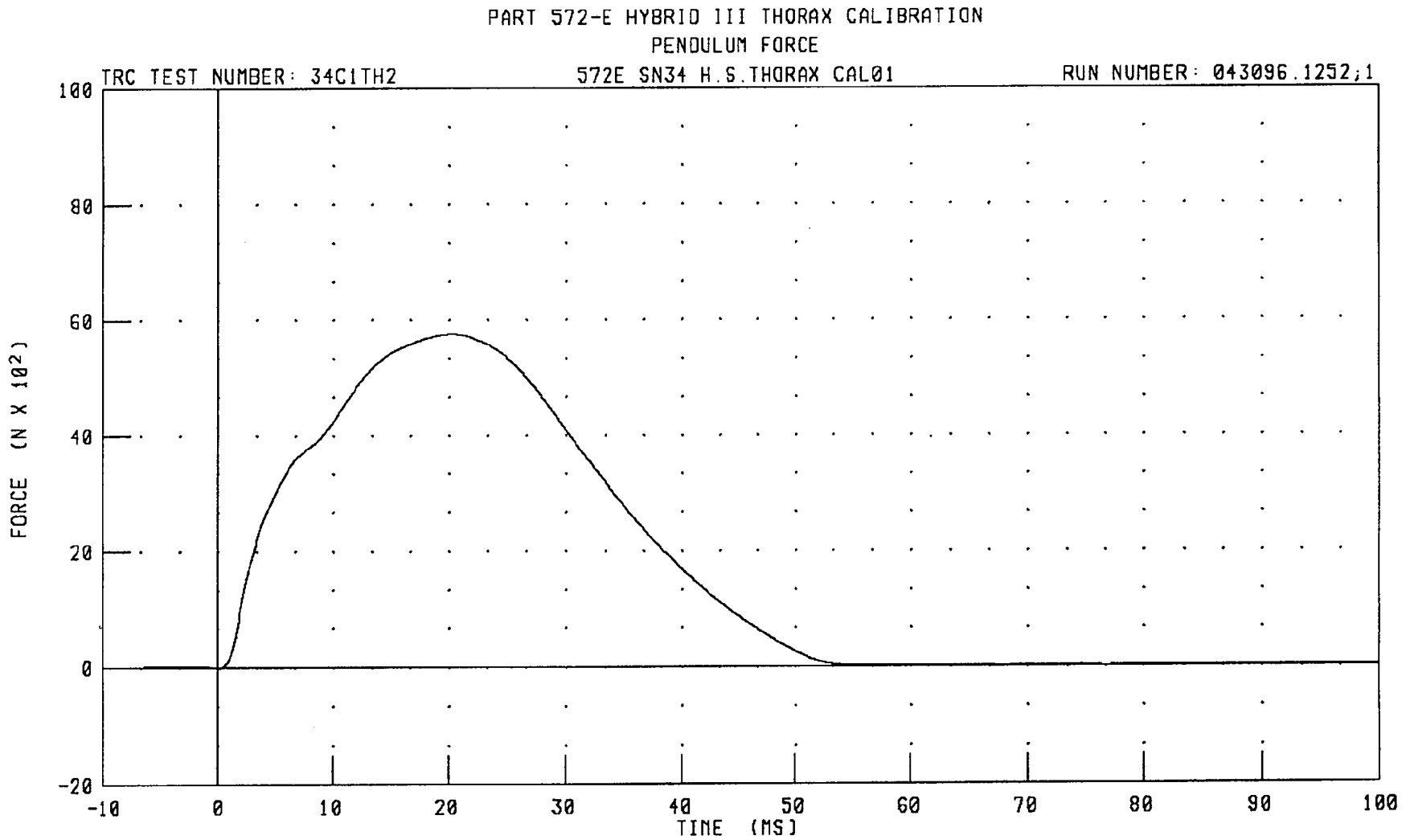
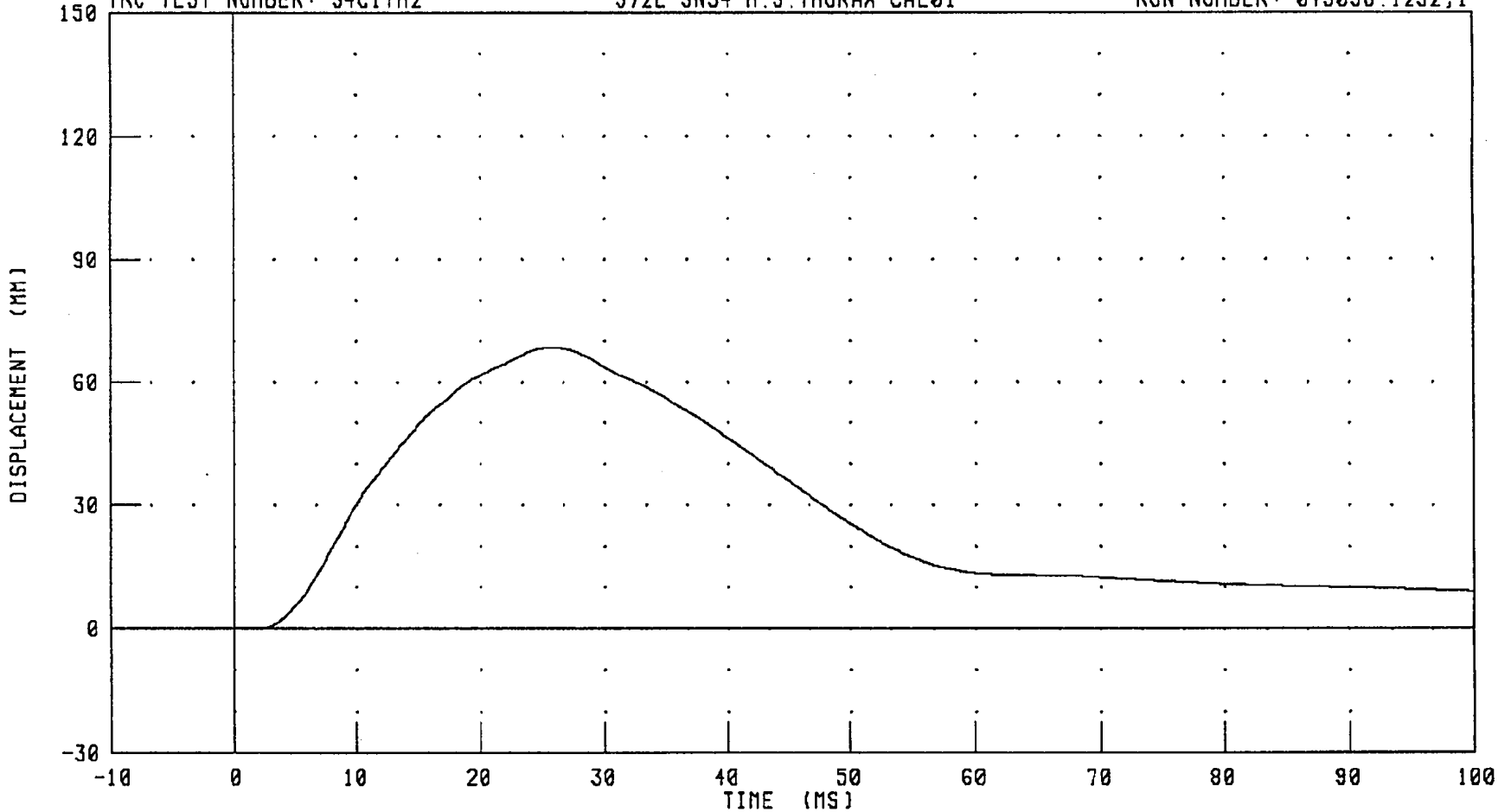

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM FORCE
TRC TEST NUMBER: 34C1TH2
572E SN34 H.S.THORAX CAL01
RUN NUMBER: 043096.1252;1
100
80
60
40
20
0
-20
FORCE (N X 10²)
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS)
CHANNEL: PENXF
FILTER: CH. CLASS 180
PEAK DATA: 5757.30 N @ 20.24 MS; -6.72 N @ 0.08 MS

960417

PART 572-E HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

TRC TEST NUMBER: 34C1TH2 572E SN34 H.S.THORAX CAL01 RUN NUMBER: 043096.1252;1

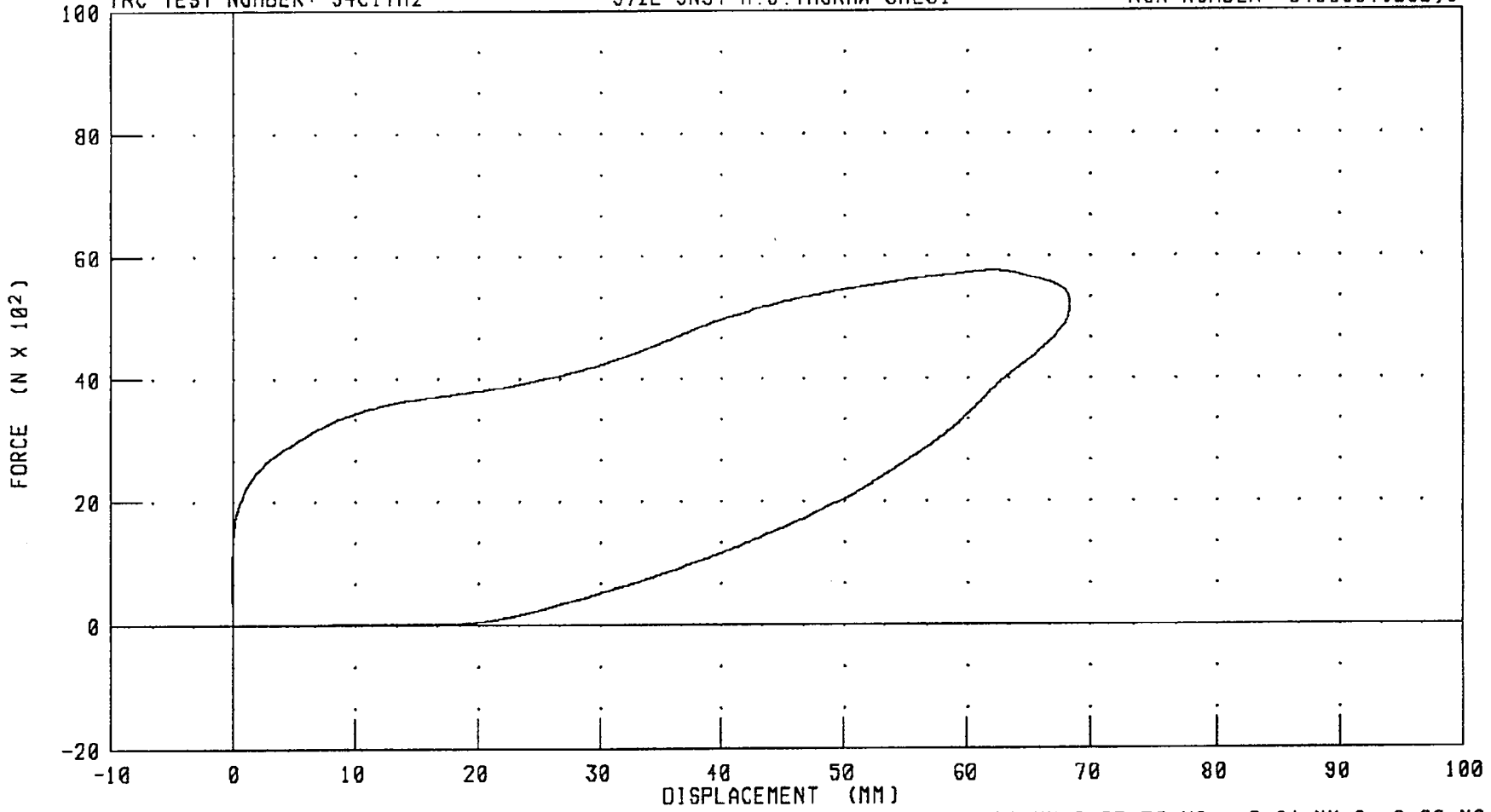


CHANNEL: CSTXD FILTER: CH. CLASS 180 PEAK DATA: 68.38 MM @ 25.76 MS; -0.04 MM @ -9.68 MS

960417

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

TRC TEST NUMBER: 34C1TH2 572E SN34 H.S.THORAX CAL01 RUN NUMBER: 043096.1252;1



CHANNEL: CSTXD FILTER: CH. CLASS 180 PEAK DATA: 68.38 MM @ 25.76 MS; -0.04 MM @ -9.68 MS
PENXF CH. CLASS 180 5757.30 N @ 20.24 MS; -6.72 N @ 0.08 MS

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TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

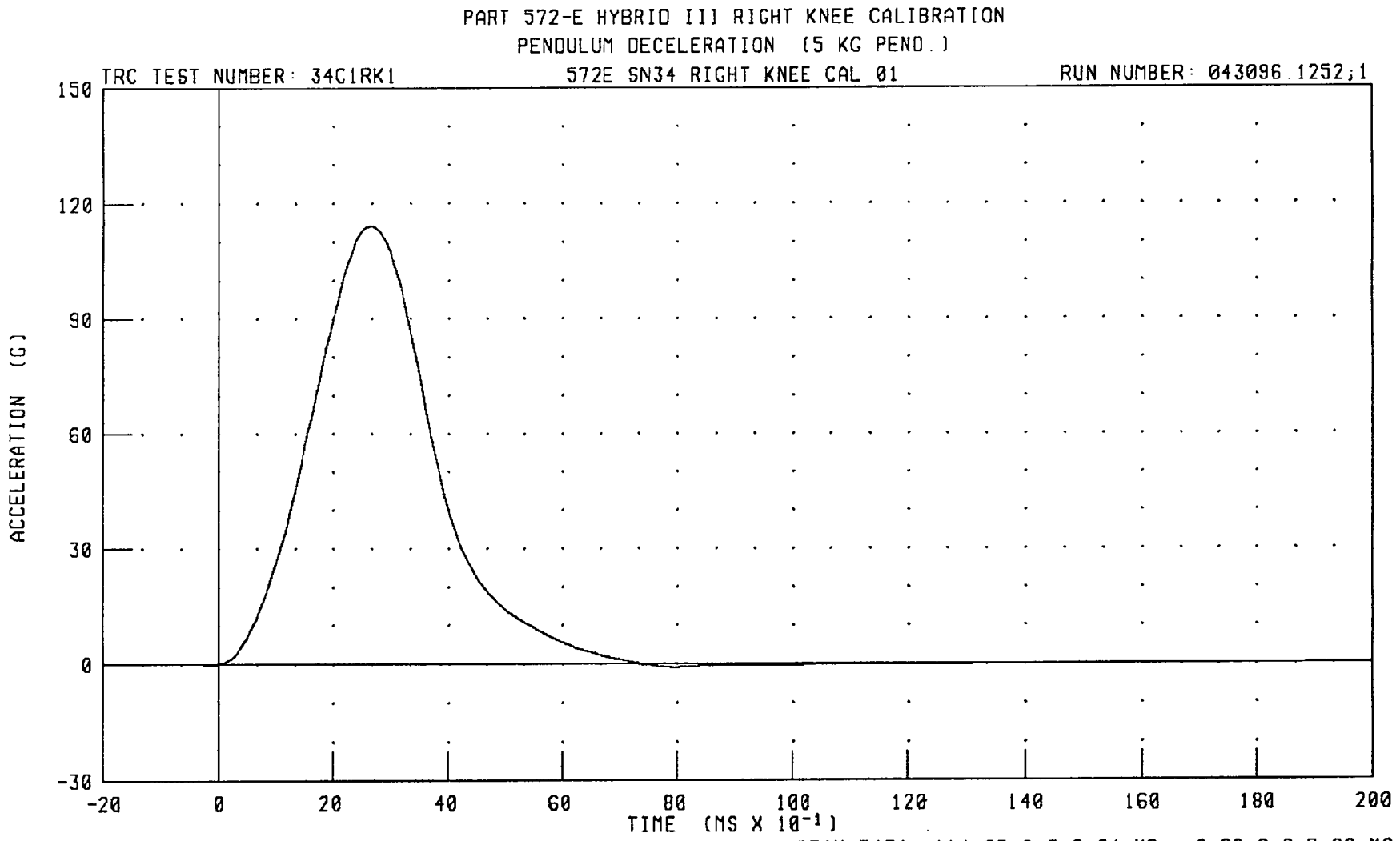
HYBRID III 11-JUL-95

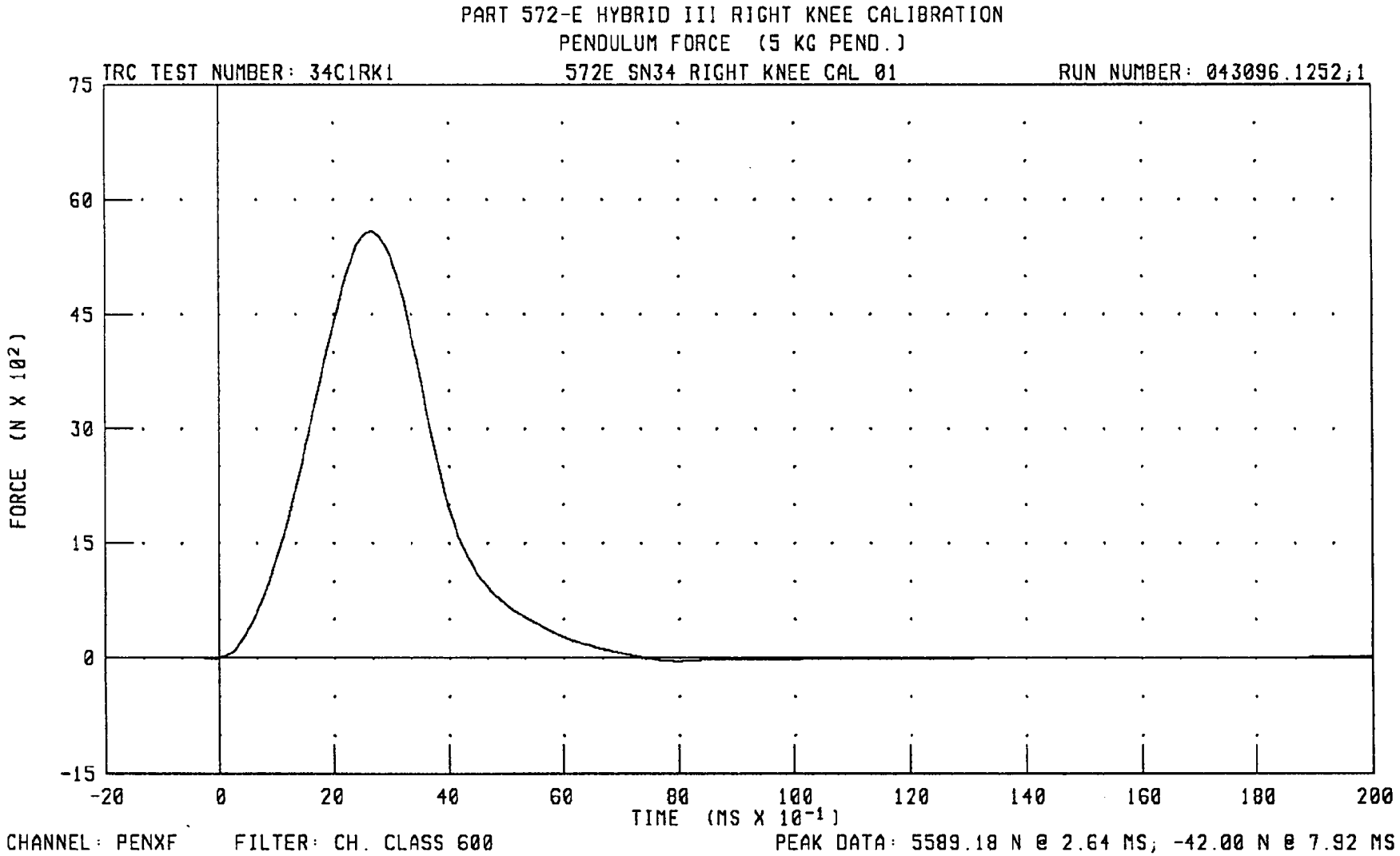
TRC INC. TEST NO: 34C1RK1 572E SN34 RIGHT KNEE CAL 01

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: 34C1RK1
572E SN34 RIGHT KNEE CAL 01
RUN NUMBER: 043096.1252;1
ACCELERATION (G)
150
120
90
60
30
0
-30
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS X 10⁻¹)
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: 34C1RK1
572E SN34 RIGHT KNEE CAL 01
RUN NUMBER: 043096.1252;1
FORCE (N X 10²)
75
60
45
30
15
0
-15
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS X 10⁻¹)
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

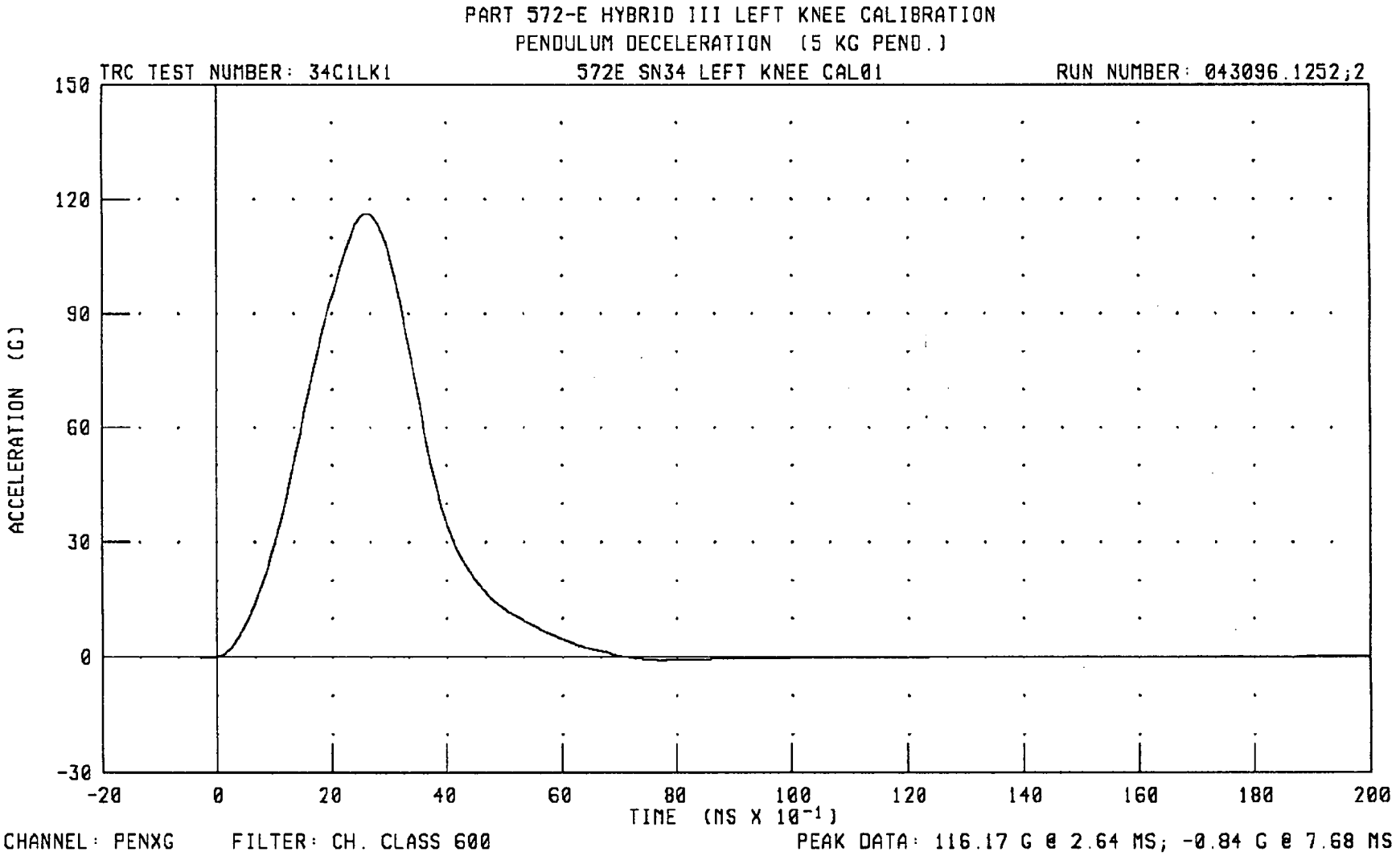
HYBRID III 11-JUL-95

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

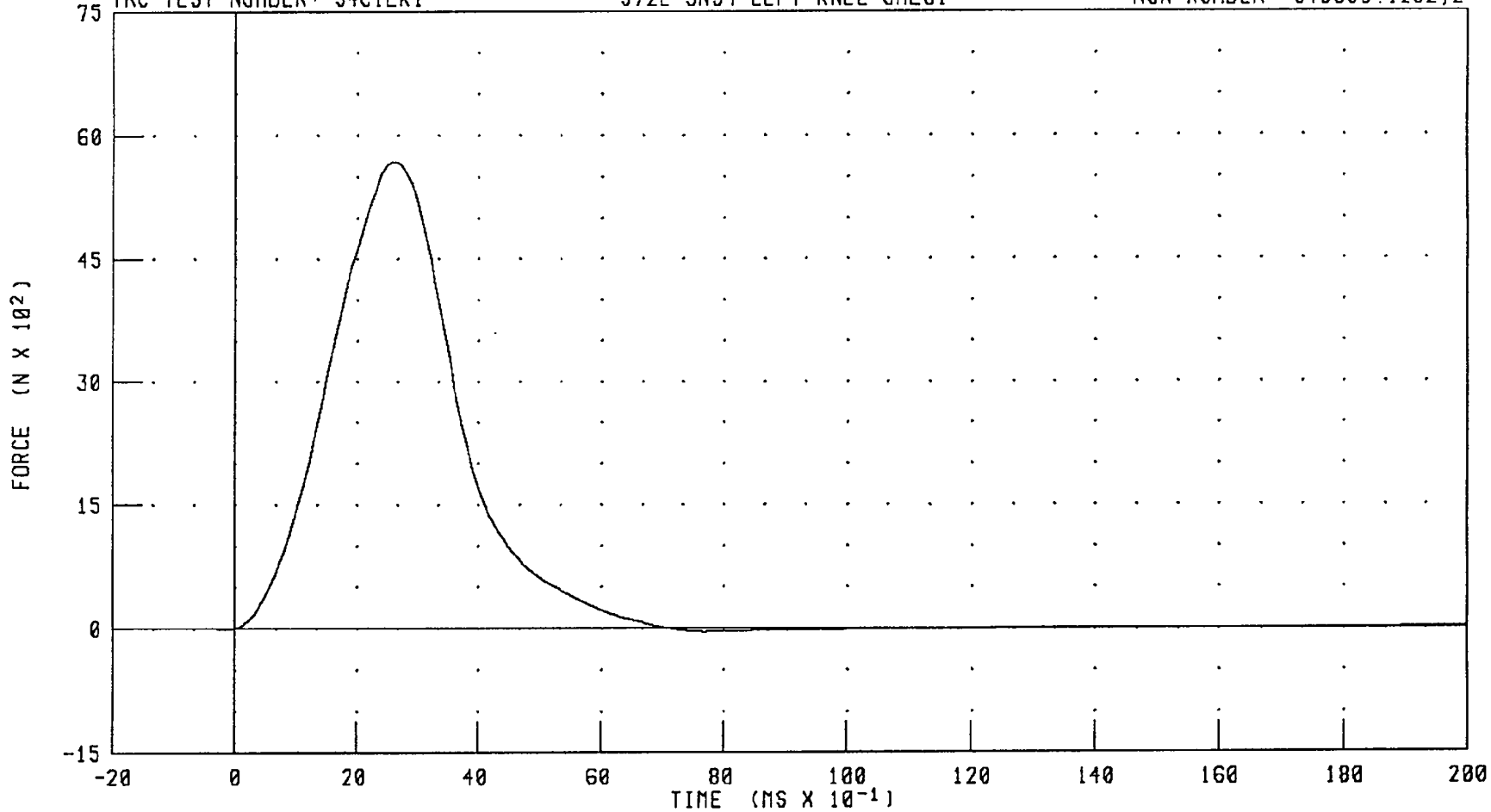
TEST MEETS SPECIFICATIONS

TECHNICIAN Richard LeVan RUN NUMBER: 071195.1240;2


PART 572-E HYBRID III LEFT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)
TRC TEST NUMBER: 34C1LK1
572E SN34 LEFT KNEE CAL01
RUN NUMBER: 043096.1252;2
ACCELERATION (G)
150
120
90
60
30
0
-30
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS X 10⁻¹)
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: 34C1LK1 572E SN34 LEFT KNEE CAL01 RUN NUMBER: 043096.1252;2



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

960417

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 LeCan RUN NUMBER: 071295.1437

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

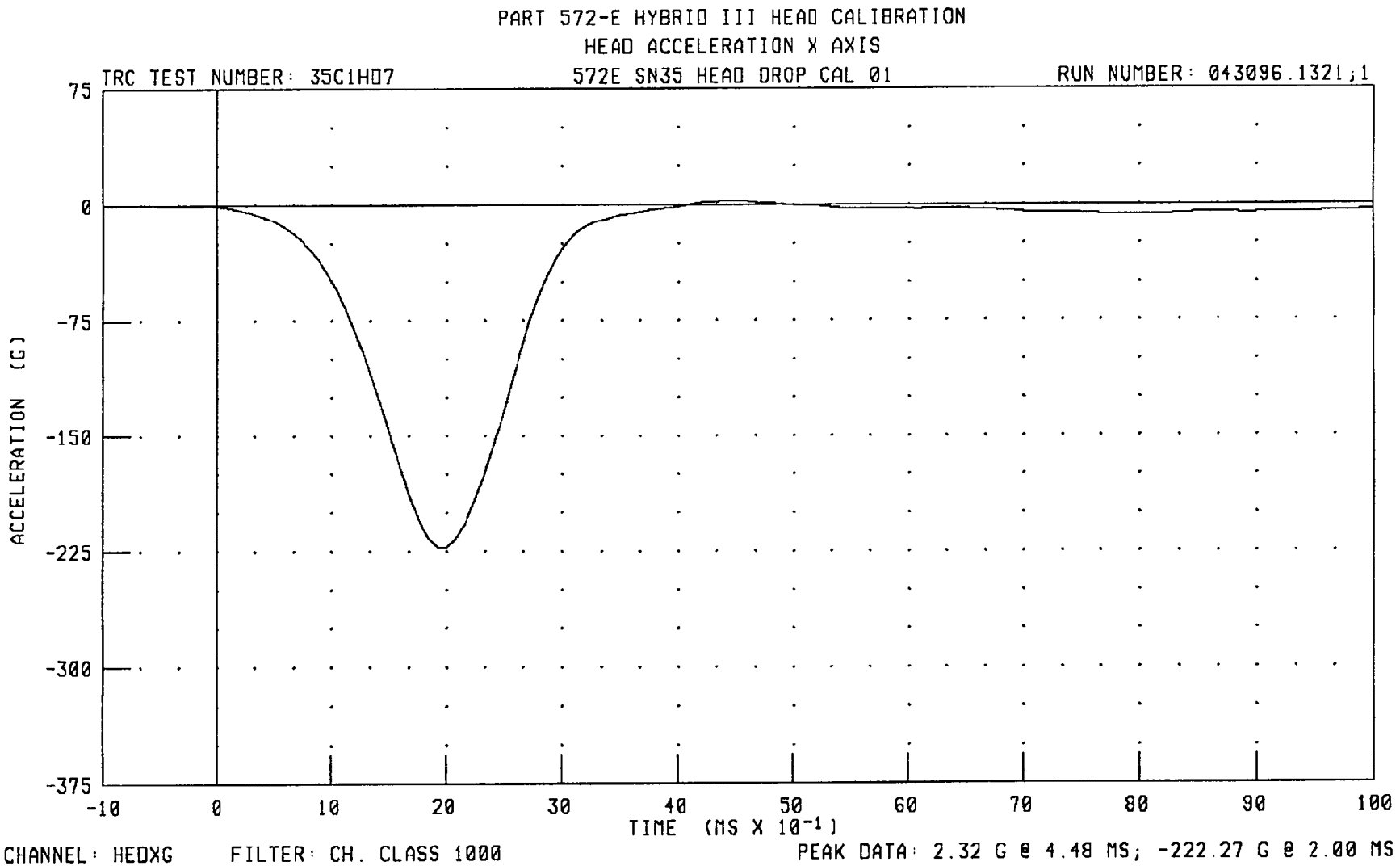
HYBRID III 02-APR-96

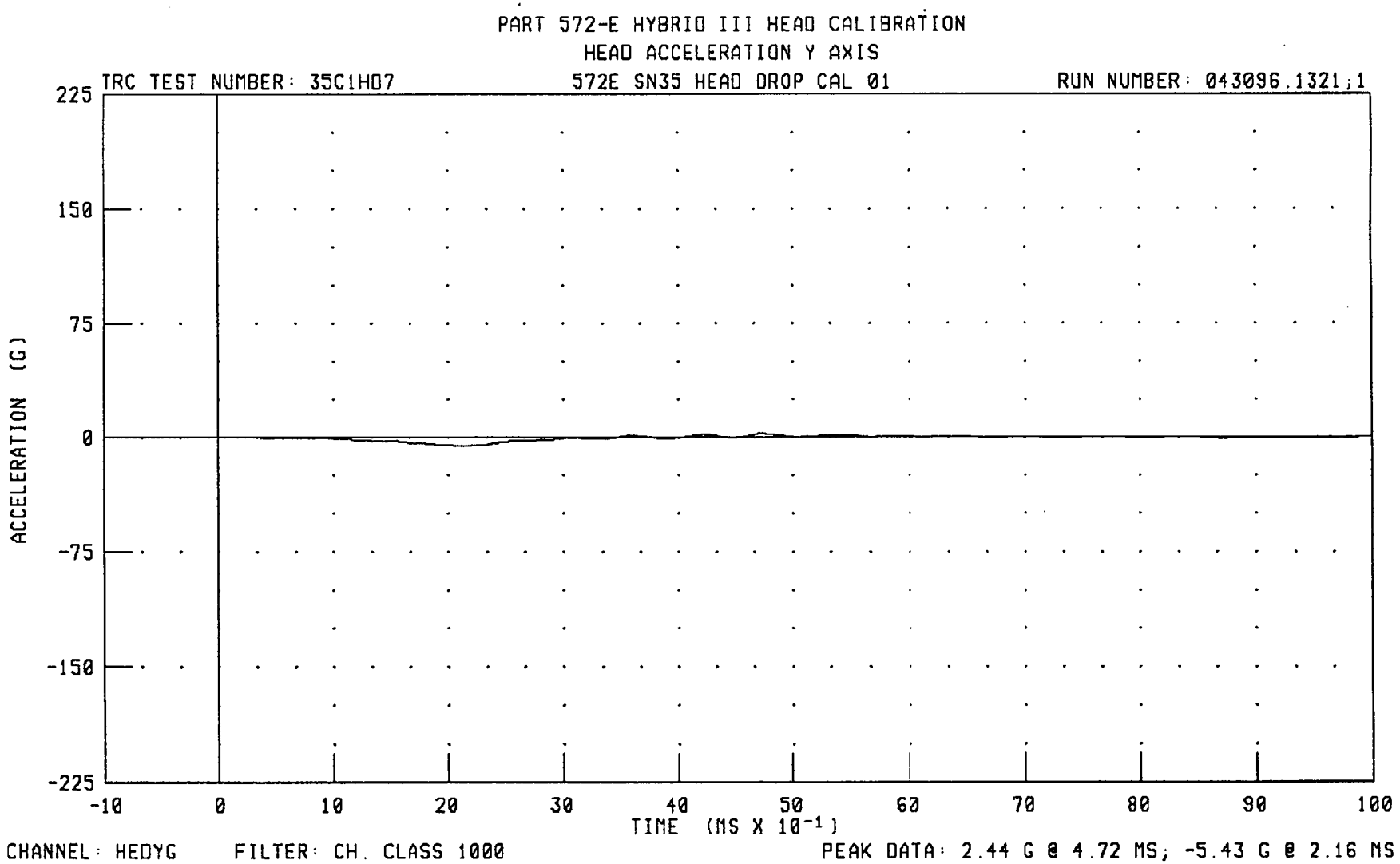
TRC INC. TEST NO: 35C1HD7 572E SN35 HEAD DROP CAL 01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	31.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	253.49 G
PEAK LATERAL ACCELERATION	15 G MAX	-5.42 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN  RUN NUMBER: 040296.0843;1


PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION X AXIS
TRC TEST NUMBER: 35C1H07
572E SN35 HEAD DROP CAL 01
RUN NUMBER: 043096.1321;1
75
0
-75
-150
-225
-300
-375
ACCELERATION (G)
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS X 10-1)
CHANNEL: HEDXG
FILTER: CH. CLASS 1000
PEAK DATA: 2.32 G @ 4.48 MS; -222.27 G @ 2.00 MS


PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Y AXIS
TRC TEST NUMBER: 35C1H07
572E SN35 HEAD DROP CAL 01
RUN NUMBER: 043096.1321;1
225
150
75
0
-75
-150
-225
ACCELERATION (G)
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS X 10-1)
CHANNEL: HEDYG
FILTER: CH. CLASS 1000
PEAK DATA: 2.44 G @ 4.72 MS; -5.43 G @ 2.16 MS

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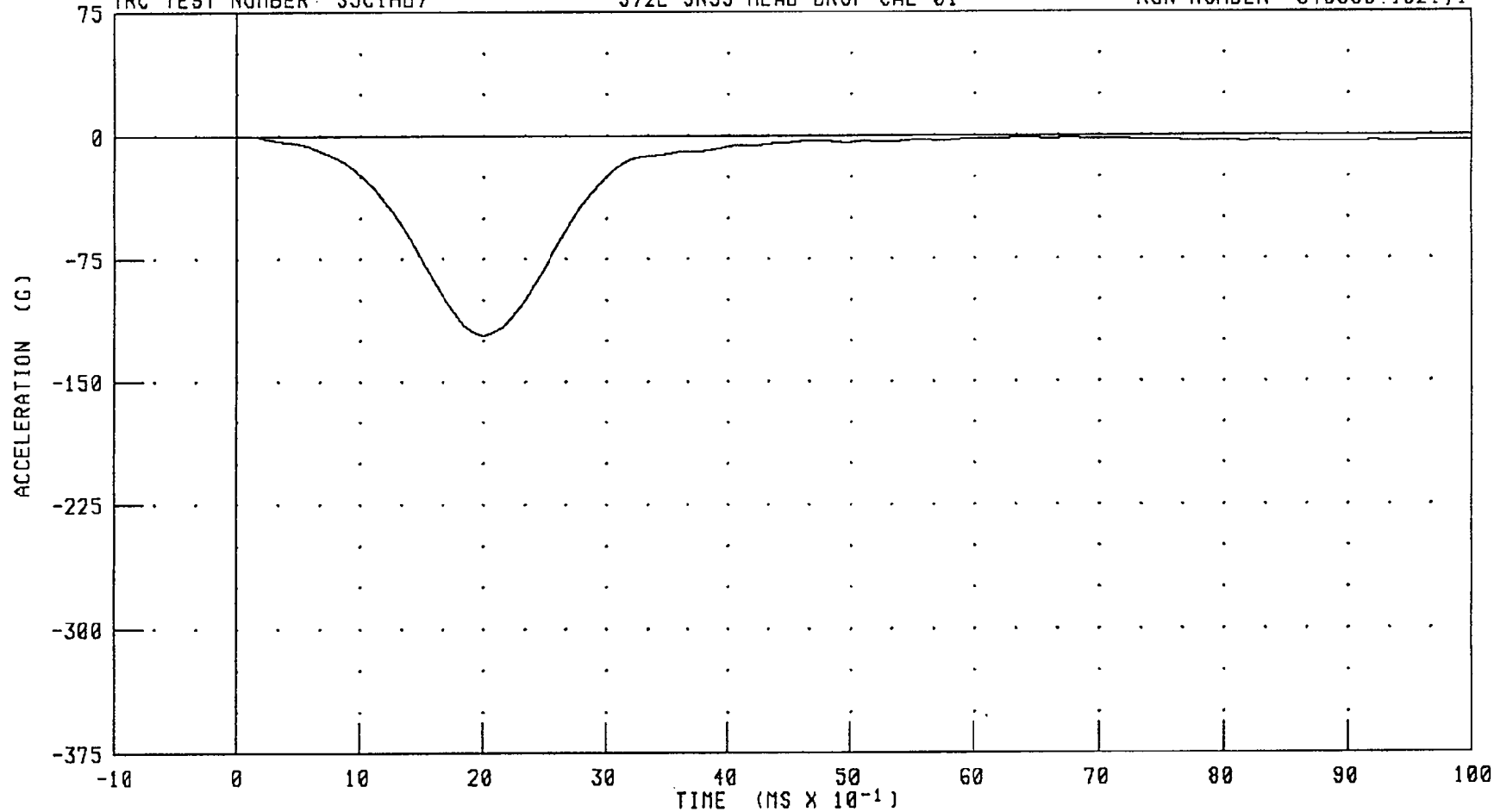
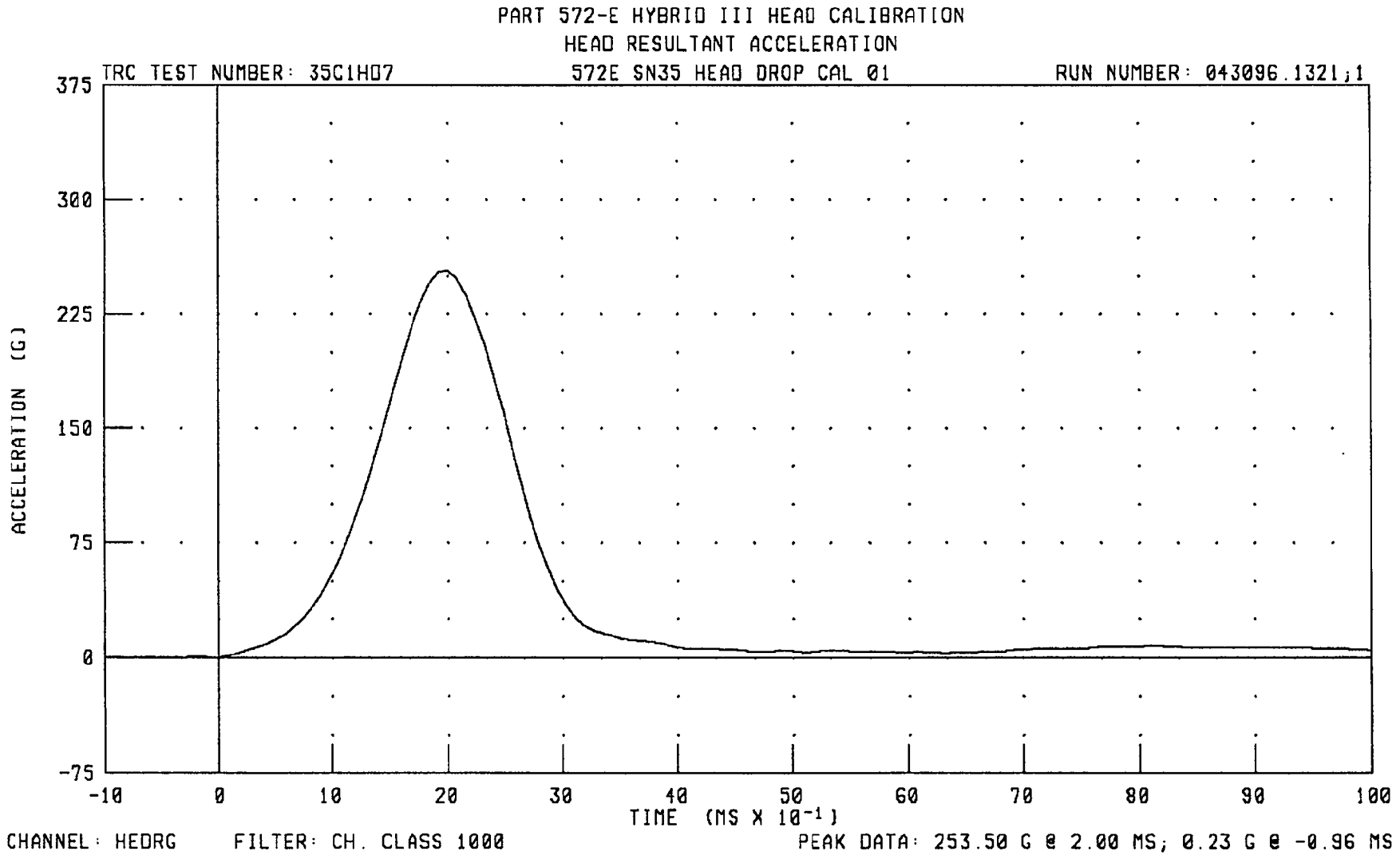
PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Z AXIS

TRC TEST NUMBER: 35C1H07 572E SN35 HEAD DROP CAL 01 RUN NUMBER: 043096.1321;1



CHANNEL: HEDZG FILTER: CH. CLASS 1000 PEAK DATA: 0.03 G @ -0.88 MS; -121.78 G @ 2.00 MS


PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION
TRC TEST NUMBER: 35C1H07
572E SN35 HEAD DROP CAL 01
RUN NUMBER: 043096.1321;1
375
300
225
150
75
0
-75
ACCELERATION (G)
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS X 10-1)
CHANNEL: HEDRG
FILTER: CH. CLASS 1000
PEAK DATA: 253.50 G @ 2.00 MS; 0.23 G @ -0.96 MS

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

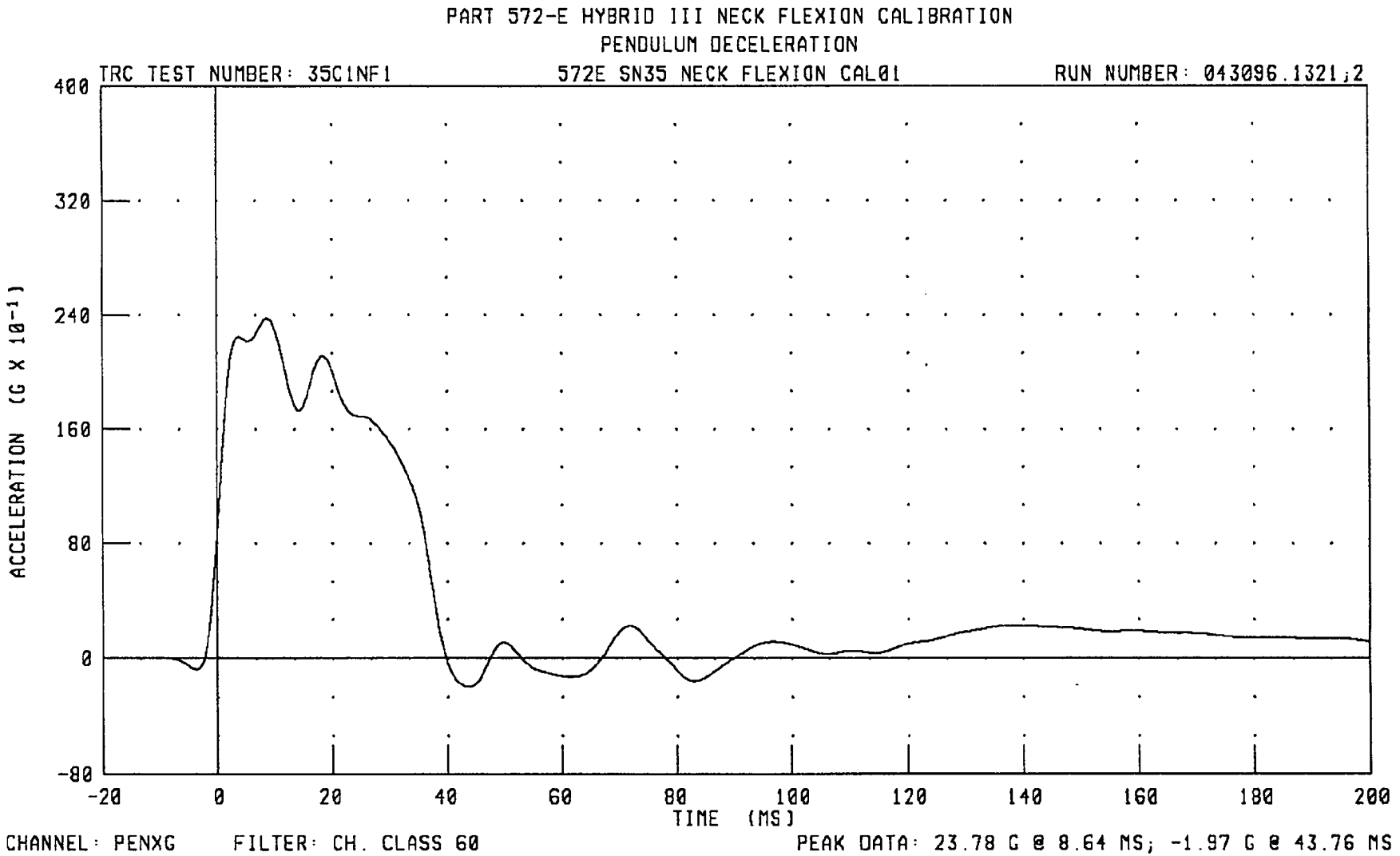
HYBRID III 11-JUL-95

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 ROTATION	MAX	64 - 78 DEG.	70.37 DEG.
	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

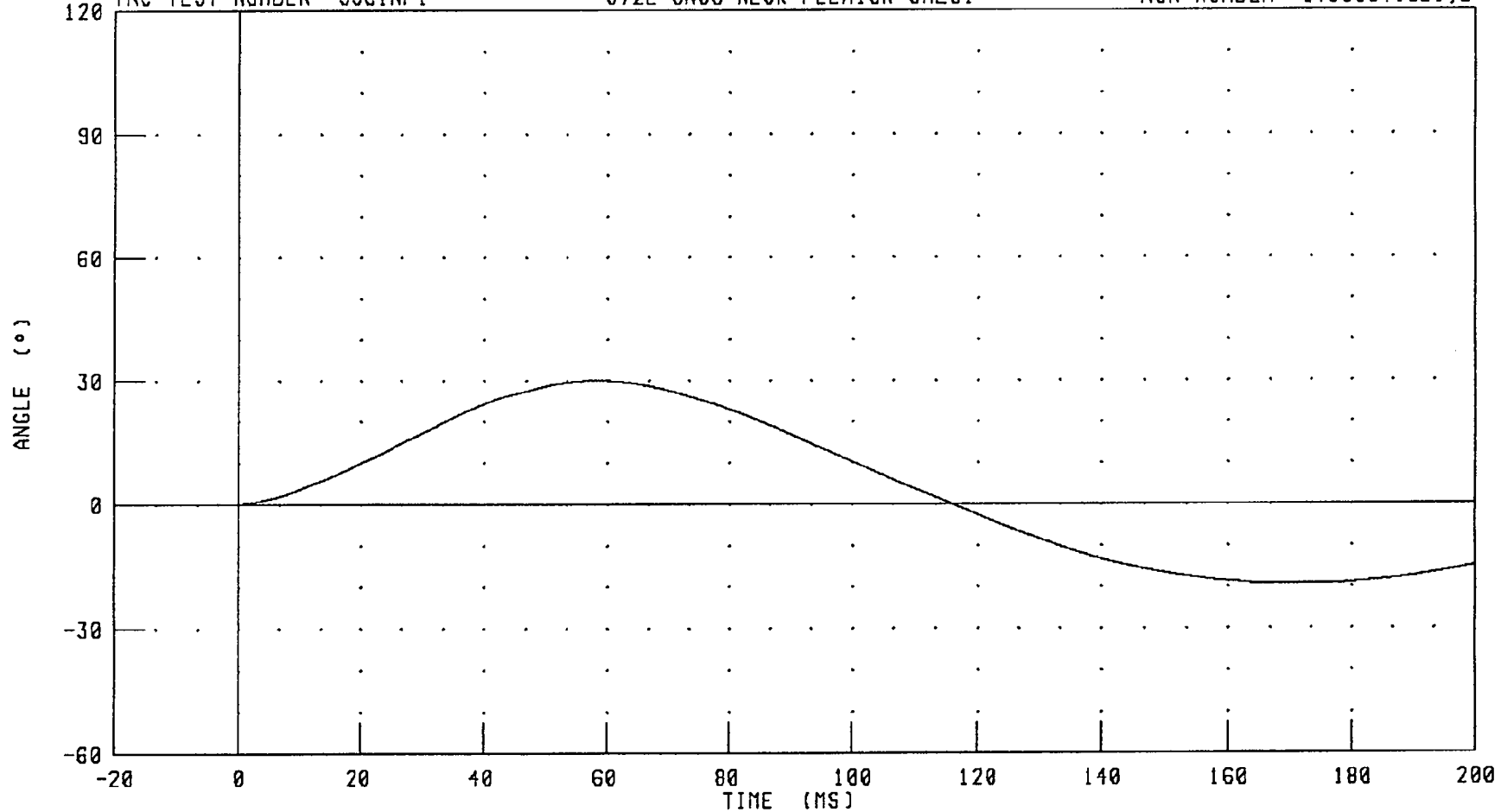
TEST MEETS SPECIFICATIONS

TECHNICIAN Richard LeVan RUN NUMBER: 071195.0843;2


PART 572-E HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION
TRC TEST NUMBER: 35C1NF1
572E SN35 NECK FLEXION CAL01
RUN NUMBER: 043096.1321;2
ACCELERATION (G X 10⁻¹)
400
320
240
160
80
0
-80
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: PENXG
FILTER: CH. CLASS 60
PEAK DATA: 23.78 G @ 8.64 MS; -1.97 G @ 43.76 MS

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

TRC TEST NUMBER: 35CINF1 572E SN35 NECK FLEXION CAL01 RUN NUMBER: 043096.1321;2



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

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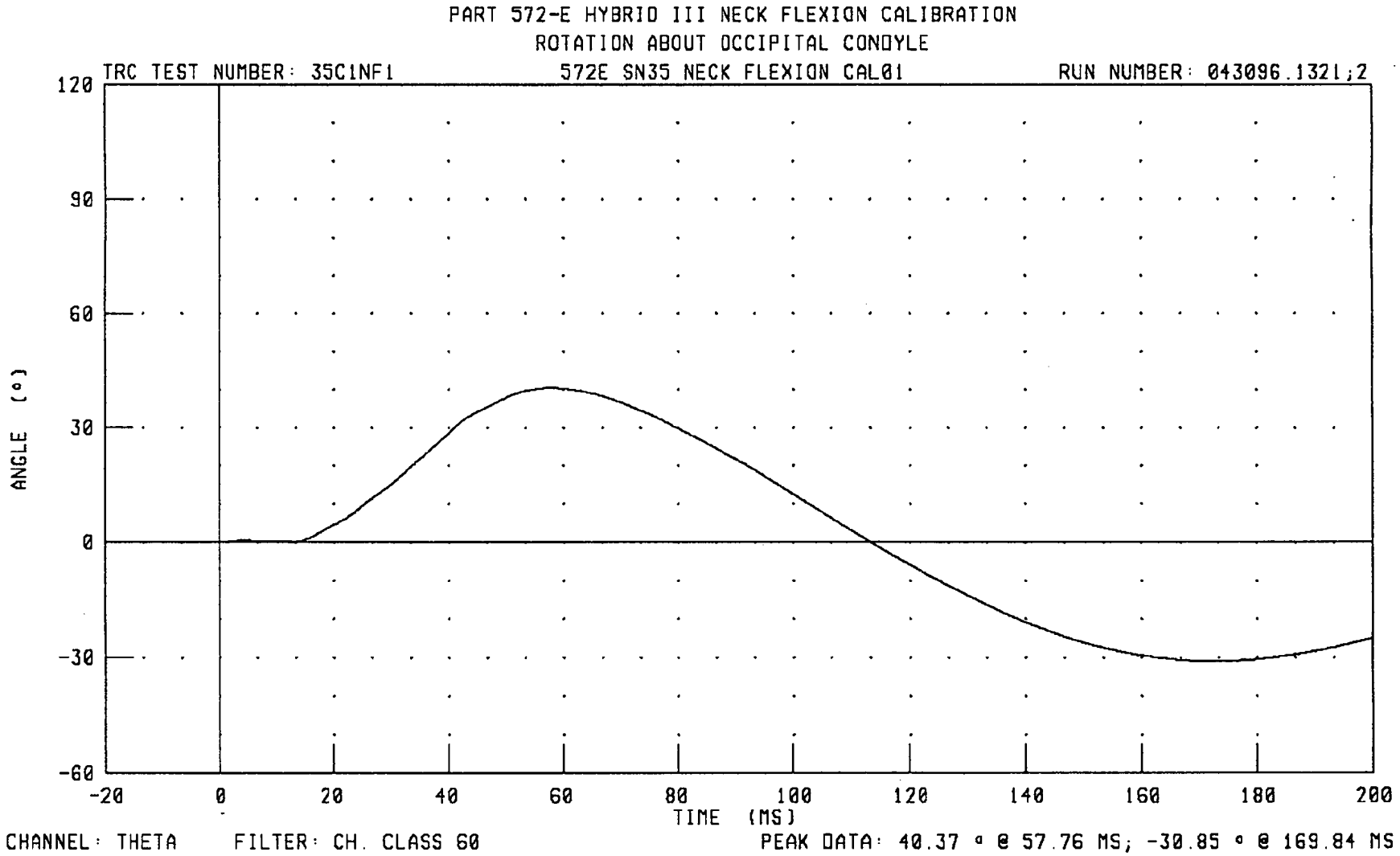
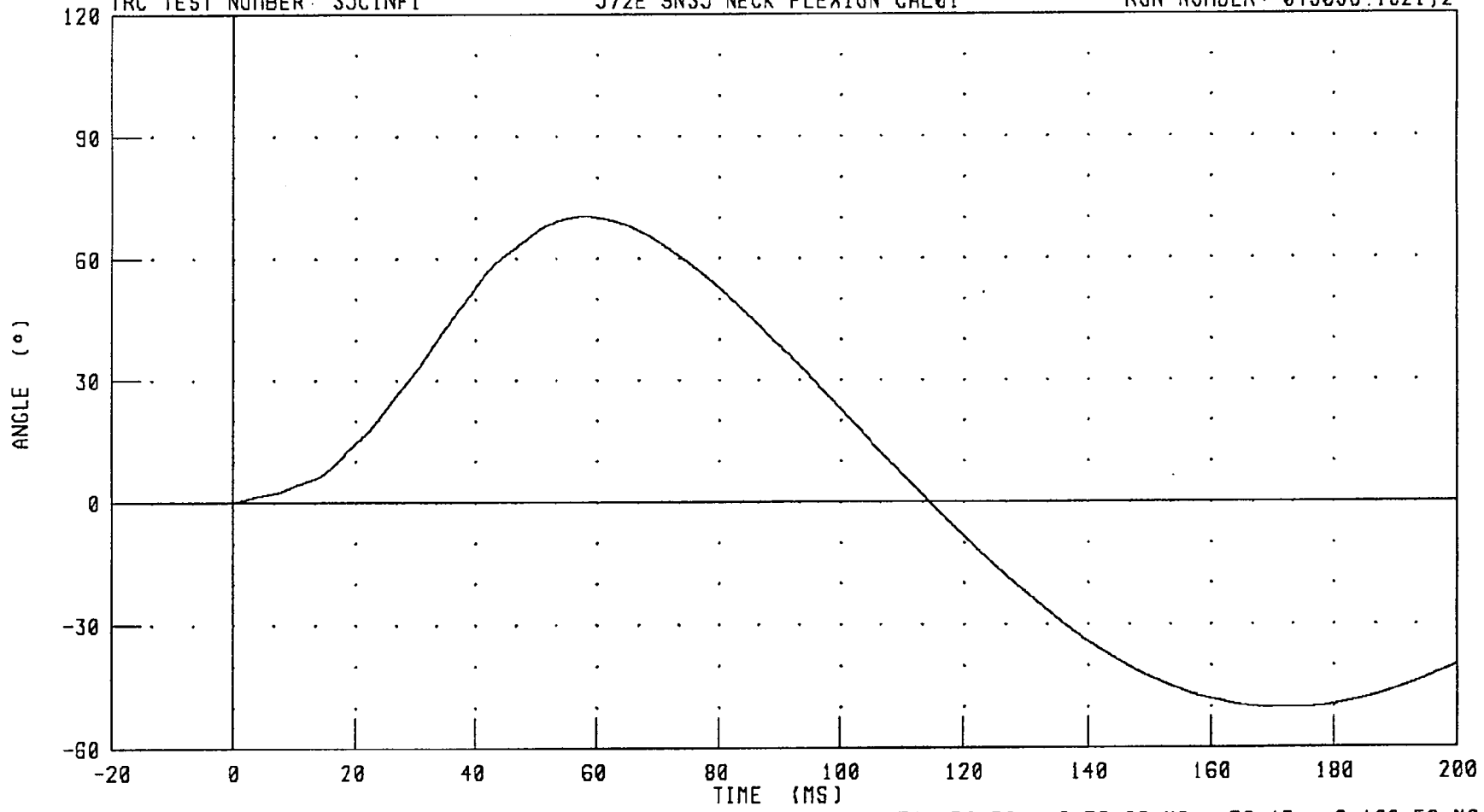

PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 35C1NF1
572E SN35 NECK FLEXION CAL01
RUN NUMBER: 043096.1321;2
120
90
60
30
0
-30
-60
ANGLE (°)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: THETA
FILTER: CH. CLASS 60
PEAK DATA: 40.37 ° @ 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: 043096.1321;2



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

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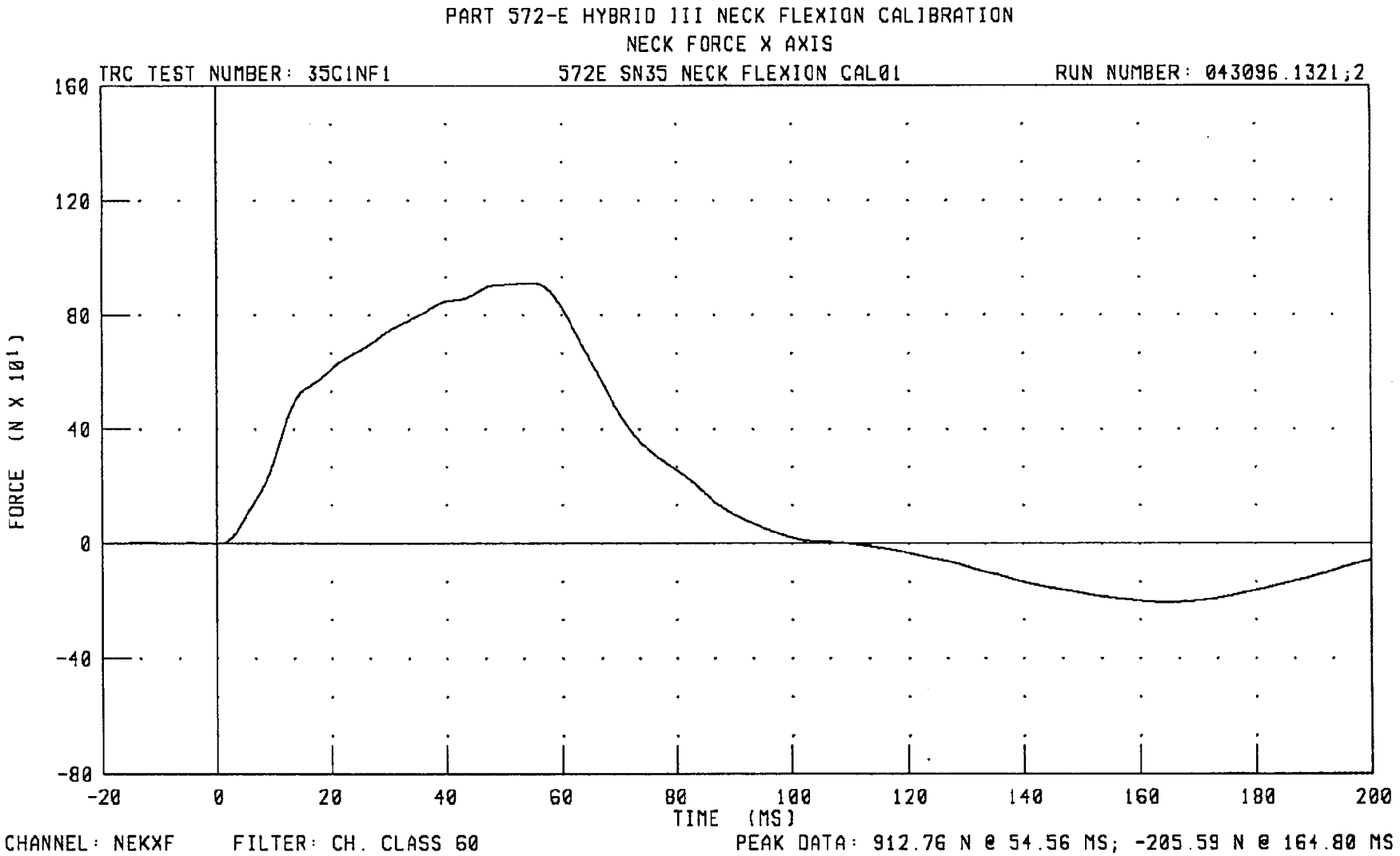
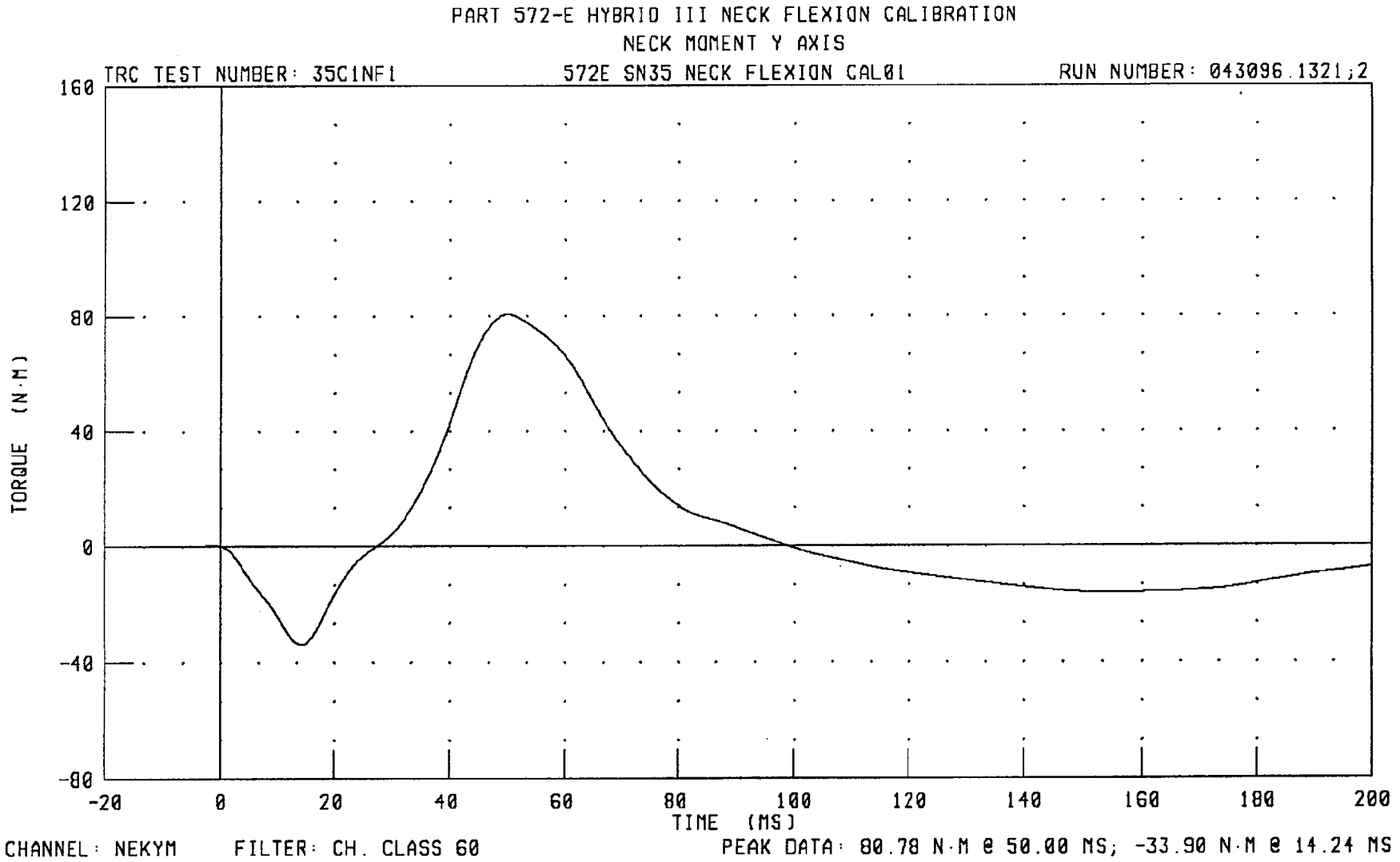

PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK FORCE X AXIS
TRC TEST NUMBER: 35C1NF1
572E SN35 NECK FLEXION CAL01
RUN NUMBER: 043096.1321;2
160
120
80
40
0
-40
-80
FORCE (N X 10¹)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKXF
FILTER: CH. CLASS 60
PEAK DATA: 912.76 N @ 54.56 MS; -205.59 N @ 164.80 MS


PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK MOMENT Y AXIS
TRC TEST NUMBER: 35C1NF1
572E SN35 NECK FLEXION CAL01
RUN NUMBER: 043096.1321;2
160
120
80
40
0
-40
-80
TORQUE (N-M)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKYM
FILTER: CH. CLASS 60
PEAK DATA: 80.78 N-M @ 50.00 MS; -33.90 N-M @ 14.24 MS

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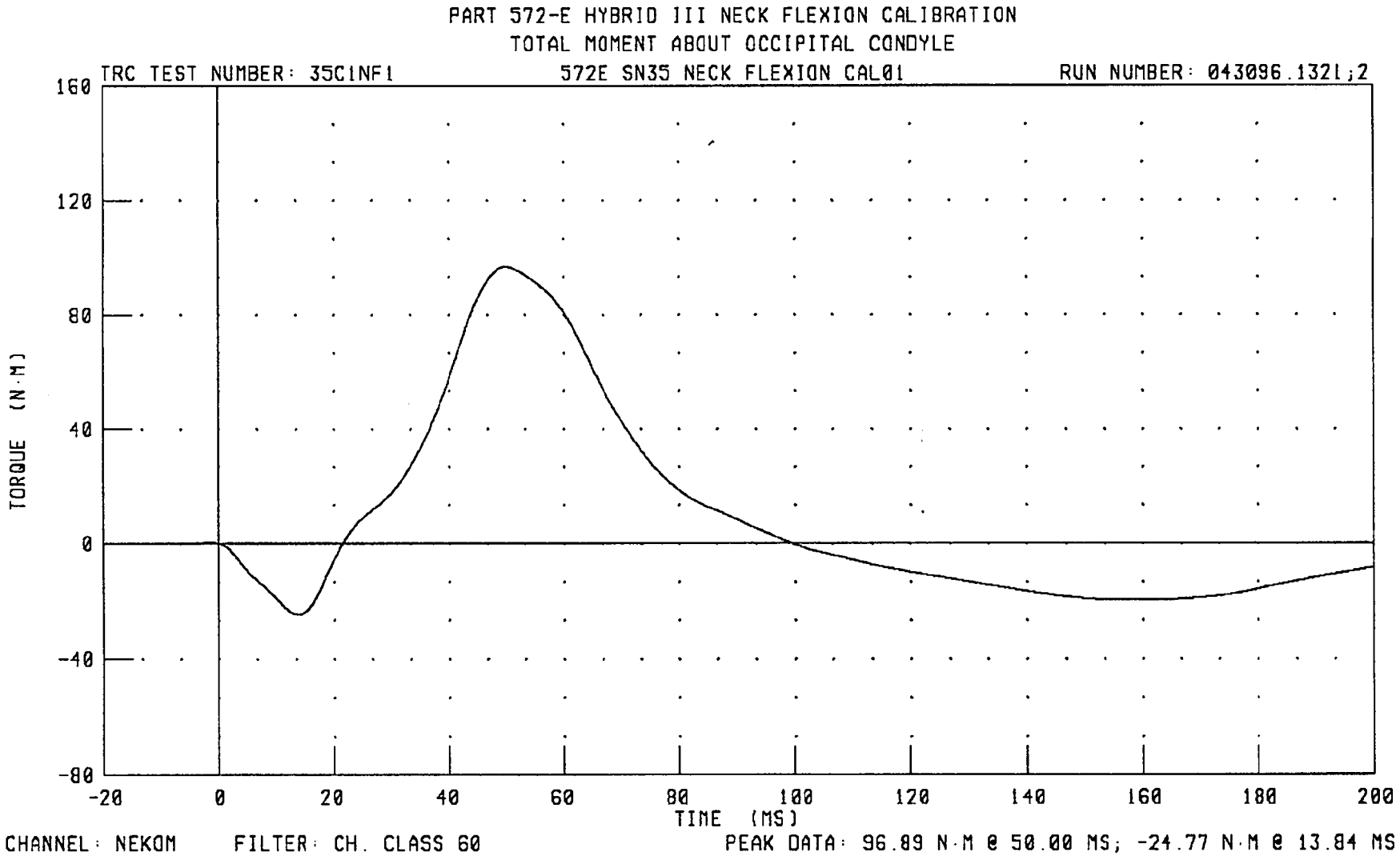
PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 35C1NF1
572E SN35 NECK FLEXION CAL01
RUN NUMBER: 043096.1321;2
160
120
80
40
0
-40
-80
TORQUE (N·M)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKOM
FILTER: CH. CLASS 60
PEAK DATA: 96.89 N·M @ 50.00 MS; -24.77 N·M @ 13.84 MS

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TRANSPORTATION RESEARCH CENTER INC.

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

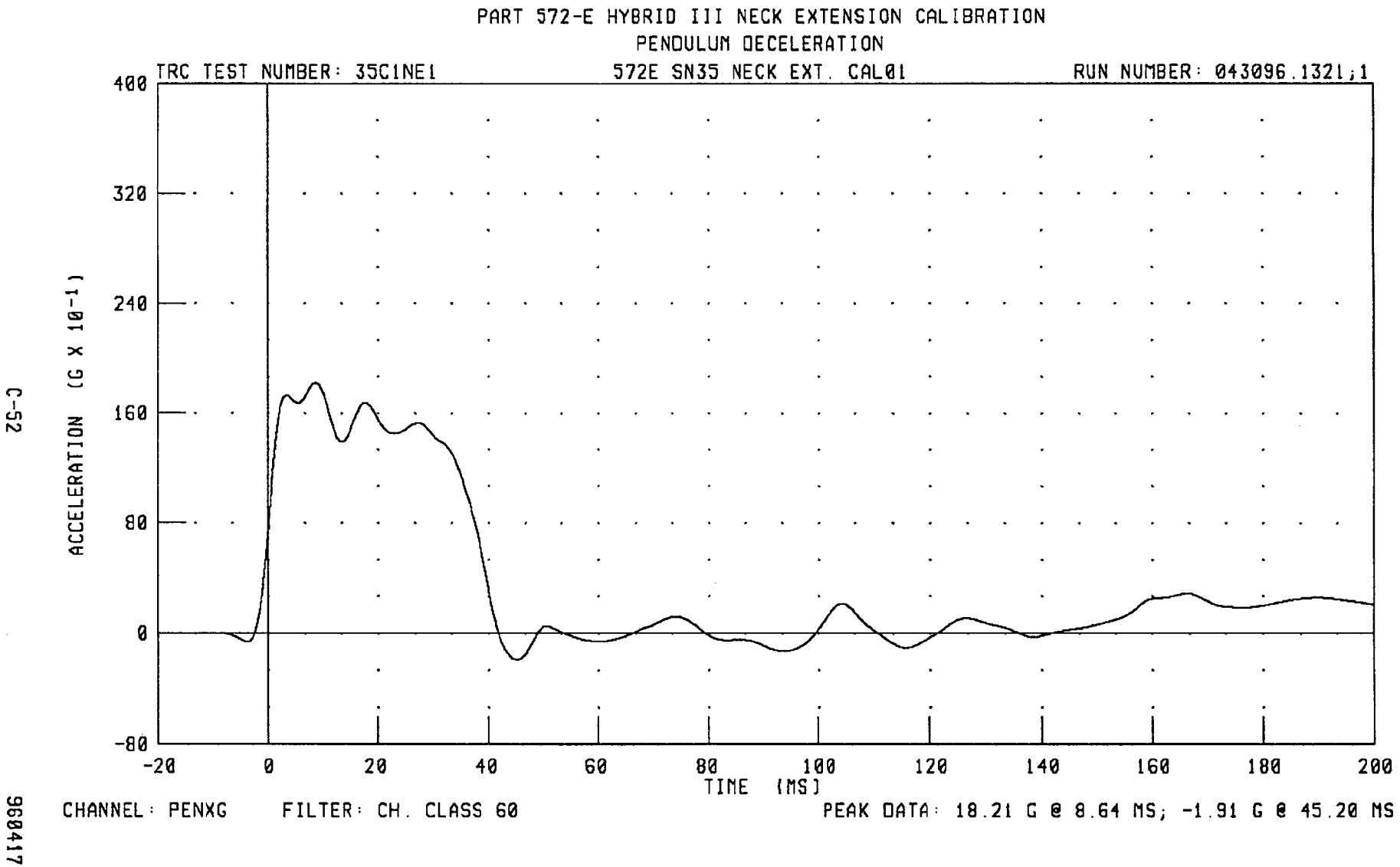
HYBRID III 11-JUL-95

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 ROTATION	MAX	81 - 106 DEG.	96.12 DEG.
	TIME	72 - 82 MS	74.08 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-65.59 NM
	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 S 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: 043096.1321;1
ACCELERATION (G X 10-1)
400
320
240
160
80
0
-80
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: PENXG
FILTER: CH. CLASS 60
PEAK DATA: 18.21 G @ 8.64 MS; -1.91 G @ 45.20 MS

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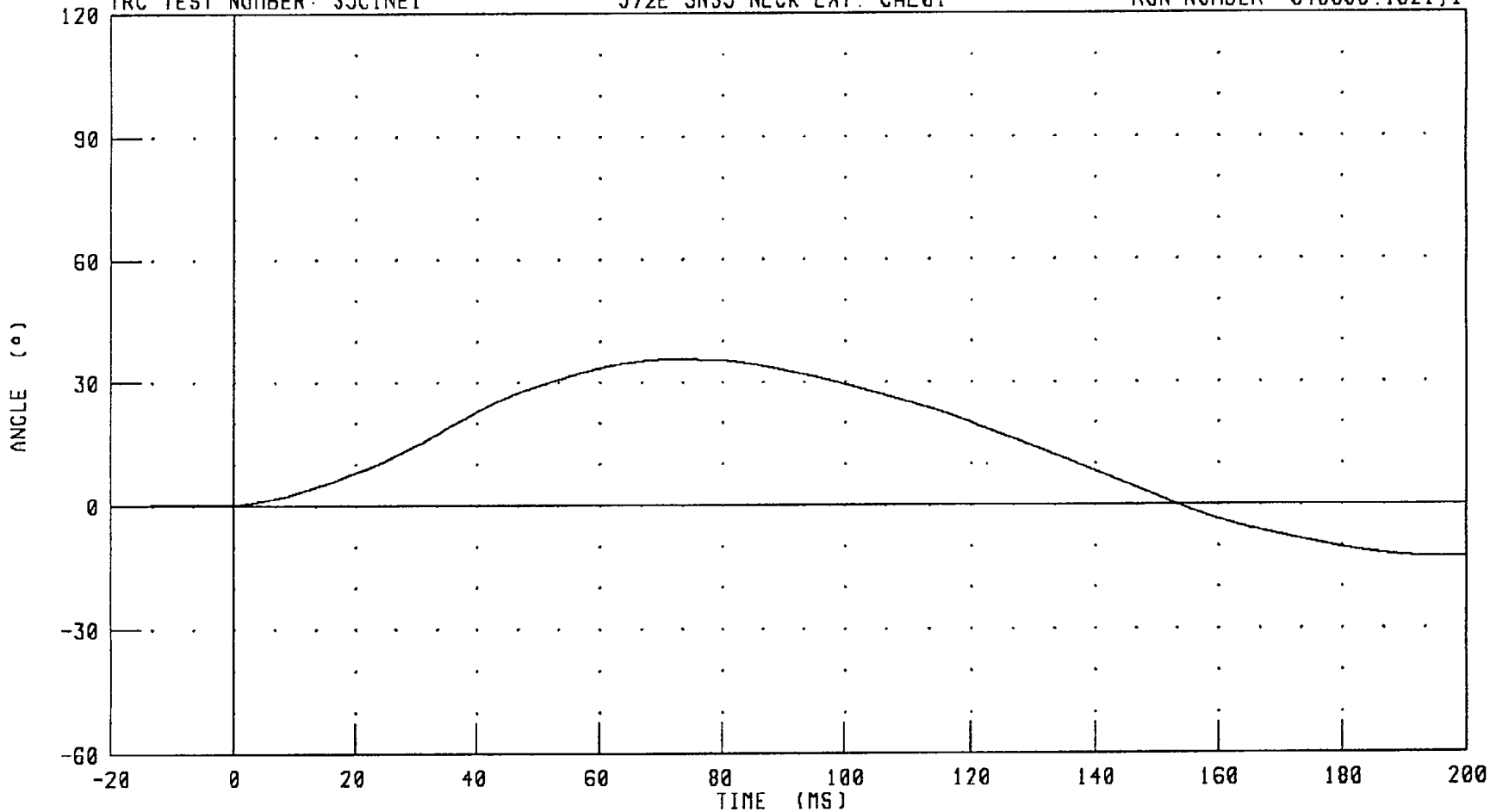
PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 35C1NE1 572E SN35 NECK EXT. CAL01 RUN NUMBER: 043096.1321;1



CHANNEL: BETA FILTER: CH. CLASS 60 PEAK DATA: 35.65 ° @ 72.64 MS; -12.75 ° @ 197.84 MS

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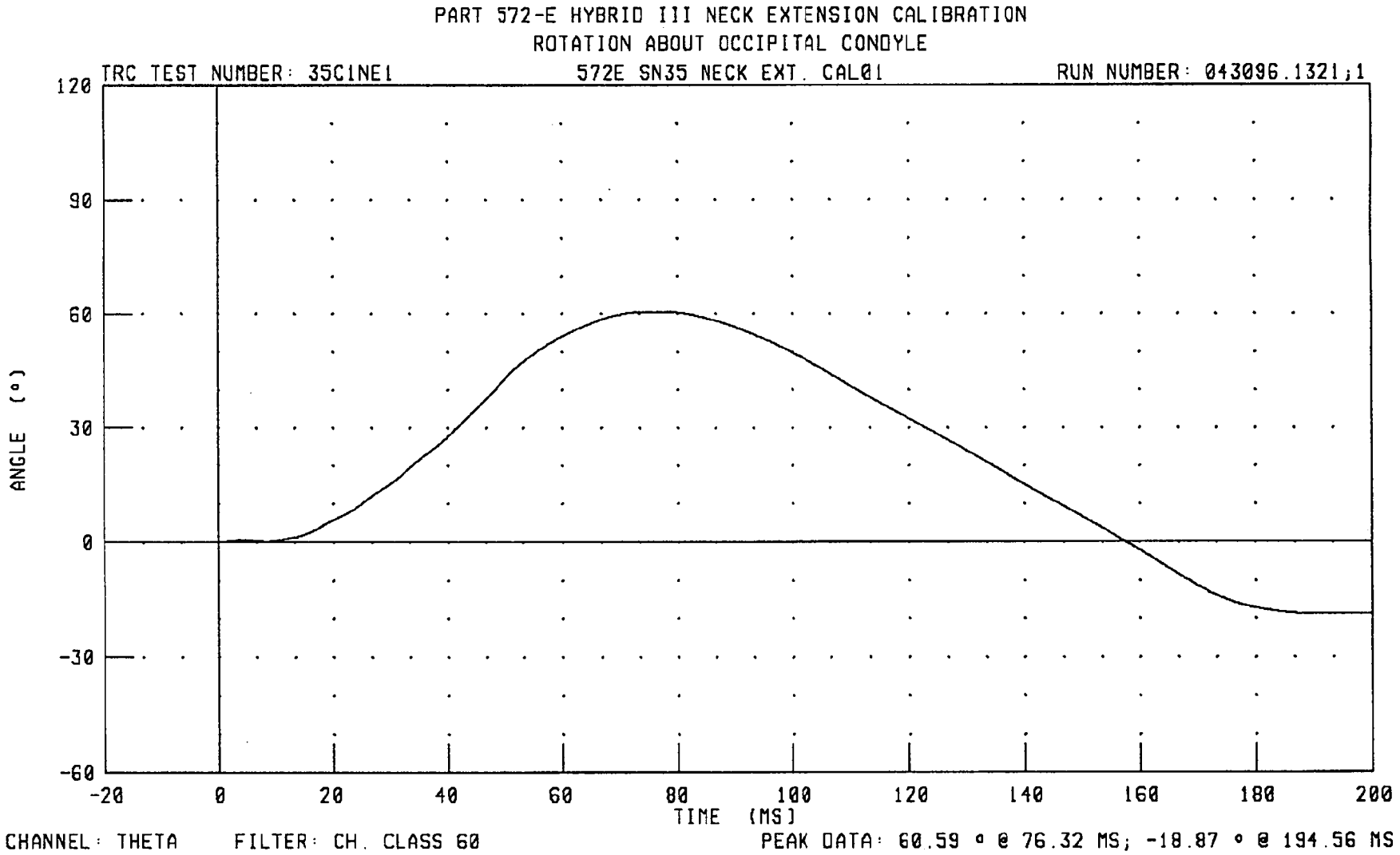
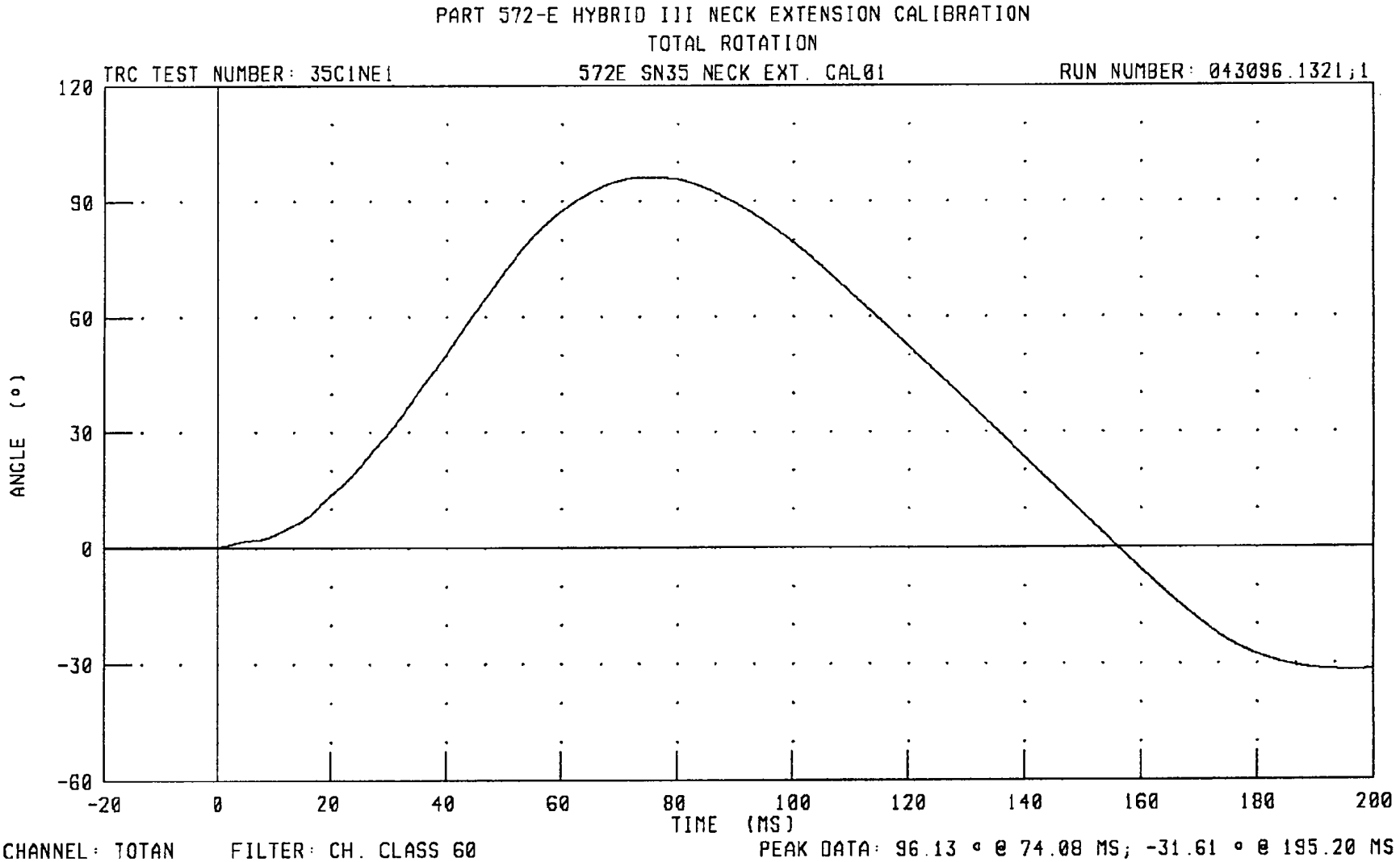
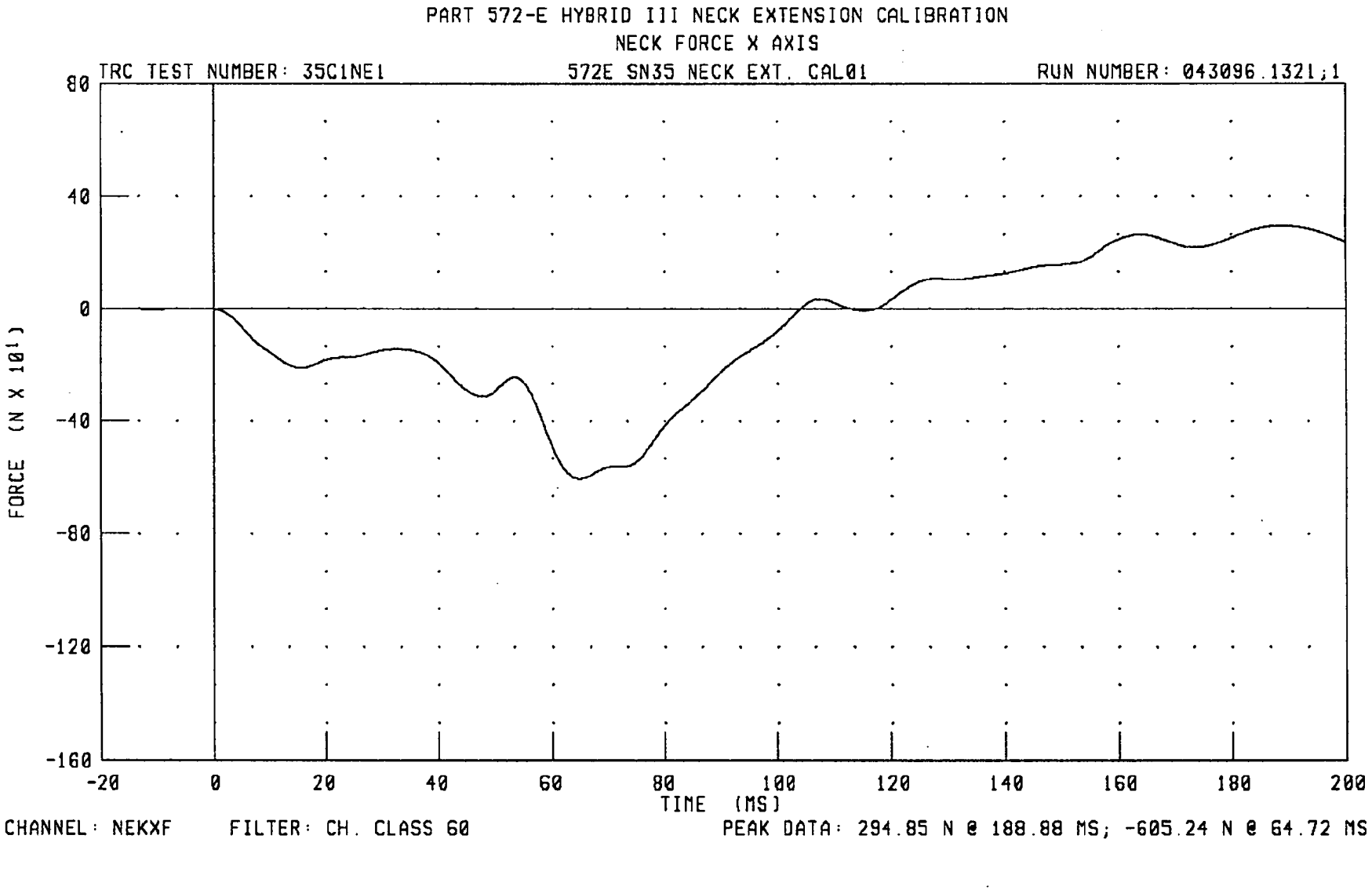

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 35C1NE1
572E SN35 NECK EXT. CAL01
RUN NUMBER: 043096.1321;1
ANGLE (°)
120
90
60
30
0
-30
-60
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: THETA
FILTER: CH. CLASS 60
PEAK DATA: 60.59 ° @ 76.32 MS; -18.87 ° @ 194.56 MS


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL ROTATION
TRC TEST NUMBER: 35C1NE1
572E SN35 NECK EXT. CAL01
RUN NUMBER: 043096.1321;1
120
90
60
30
0
-30
-60
ANGLE (°)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: TOTAN
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: 35C1NE1
572E SN35 NECK EXT. CAL01
RUN NUMBER: 043096.1321;1
80
40
0
-40
-80
-120
-160
FORCE (N X 10¹)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKXF
FILTER: CH. CLASS 60
PEAK DATA: 294.85 N @ 188.88 MS; -605.24 N @ 64.72 MS

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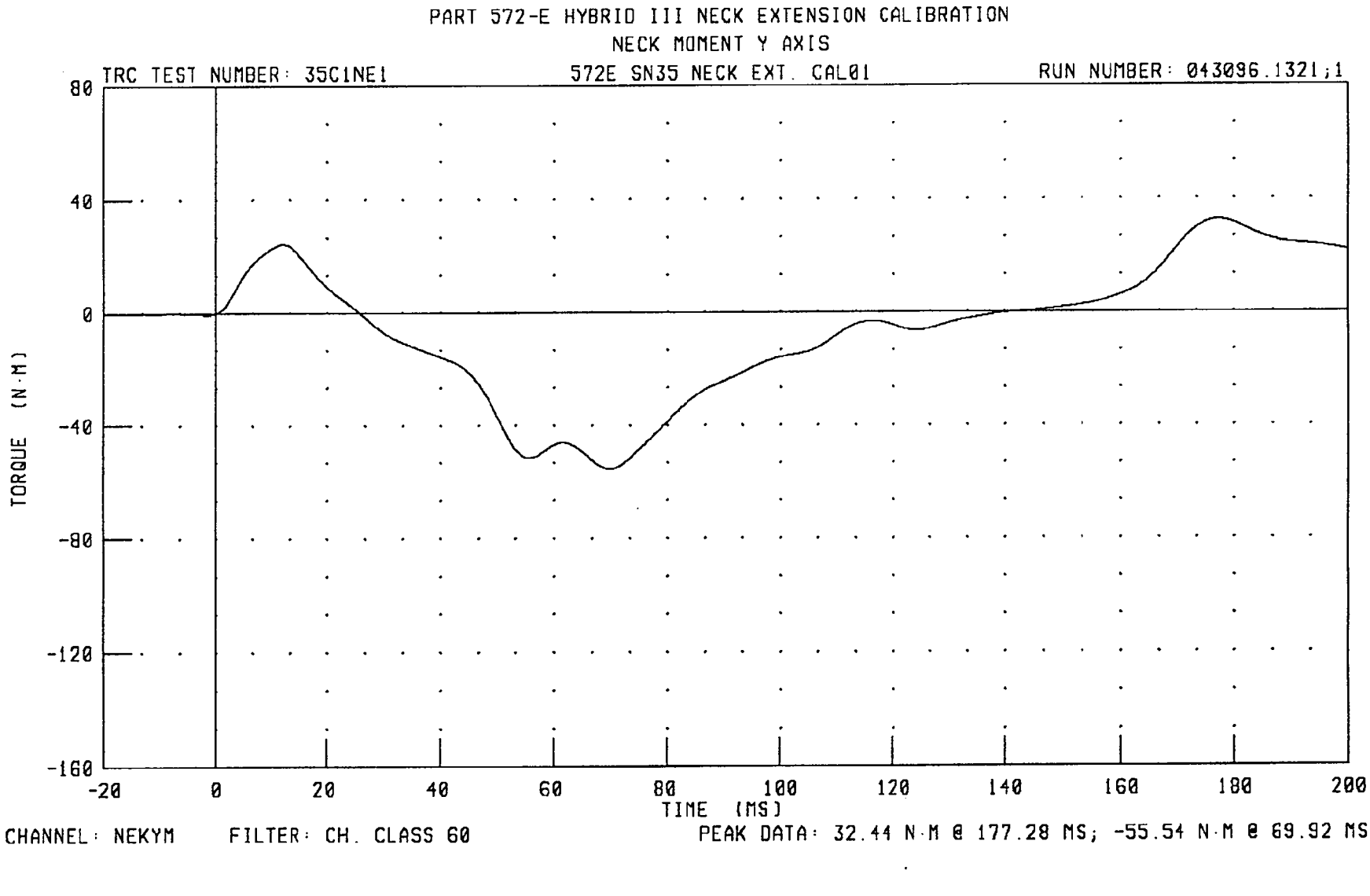
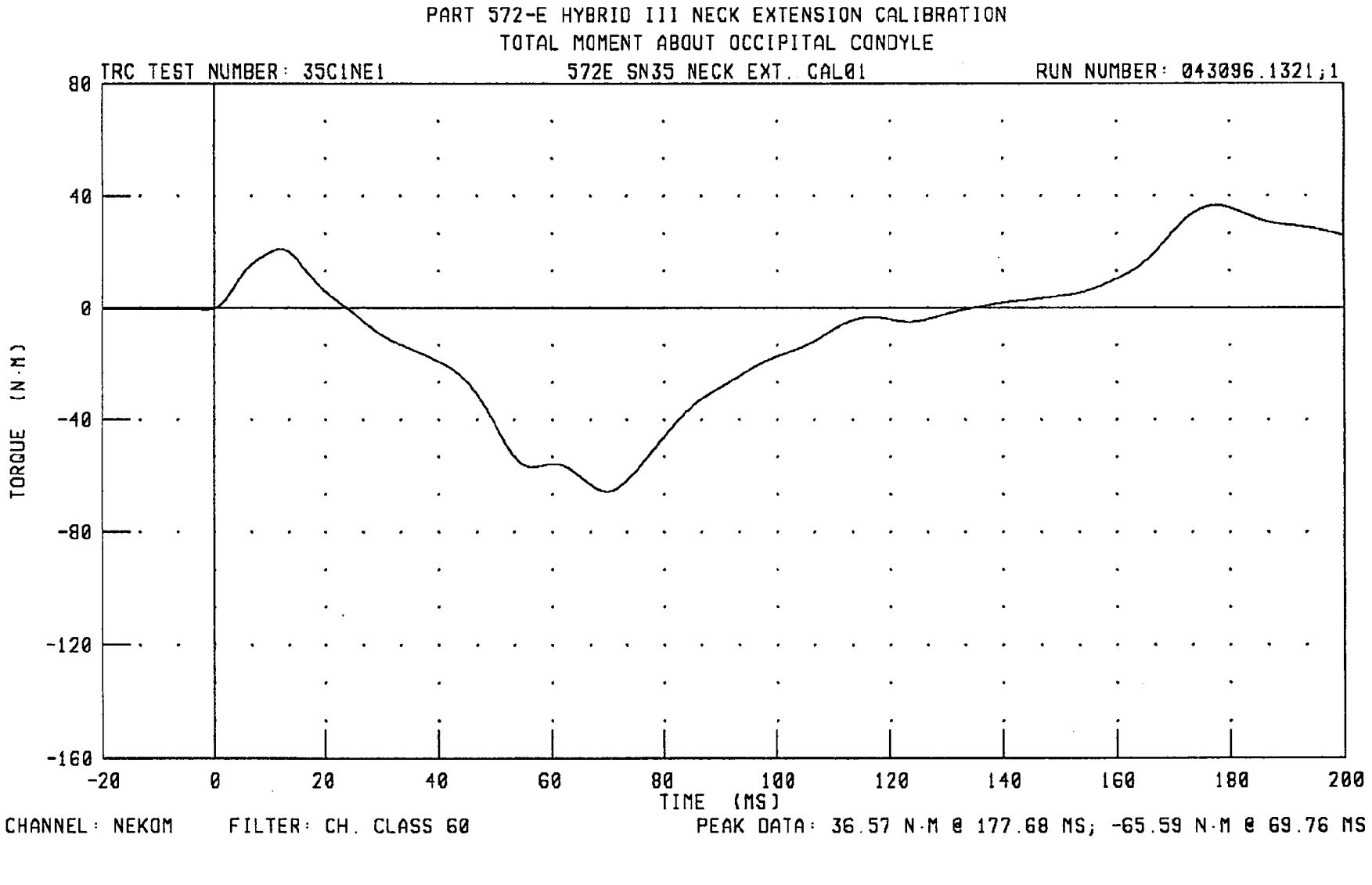

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
NECK MOMENT Y AXIS
TRC TEST NUMBER: 35C1NE1
572E SN35 NECK EXT. CAL01
RUN NUMBER: 043096.1321;1
80
40
0
-40
-80
-120
-160
TORQUE (N-M)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKYM
FILTER: CH. CLASS 60
PEAK DATA: 32.44 N-M @ 177.28 MS; -55.54 N-M @ 69.92 MS

960417


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 35C1NE1
572E SN35 NECK EXT. CAL01
RUN NUMBER: 043096.1321;1
80
40
0
-40
-80
-120
-160
TORQUE (N-M)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKOM
FILTER: CH. CLASS 60
PEAK DATA: 36.57 N-M @ 177.68 MS; -65.59 N-M @ 69.76 MS

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TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

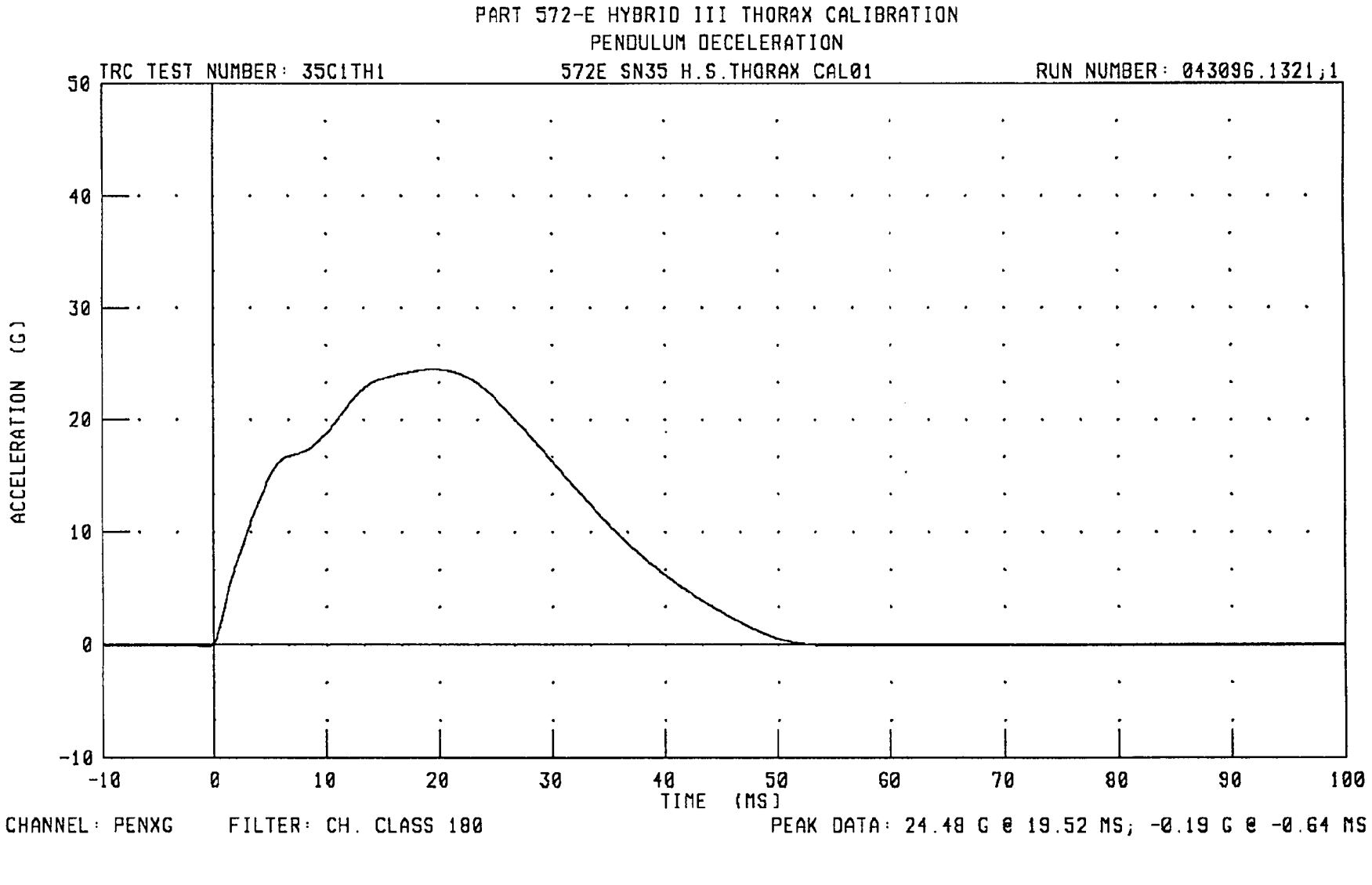
HYBRID III 11-JUL-95

TRC INC. TEST NO: 35C1TH1 572E SN35 H.S.THORAX CAL01

TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
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

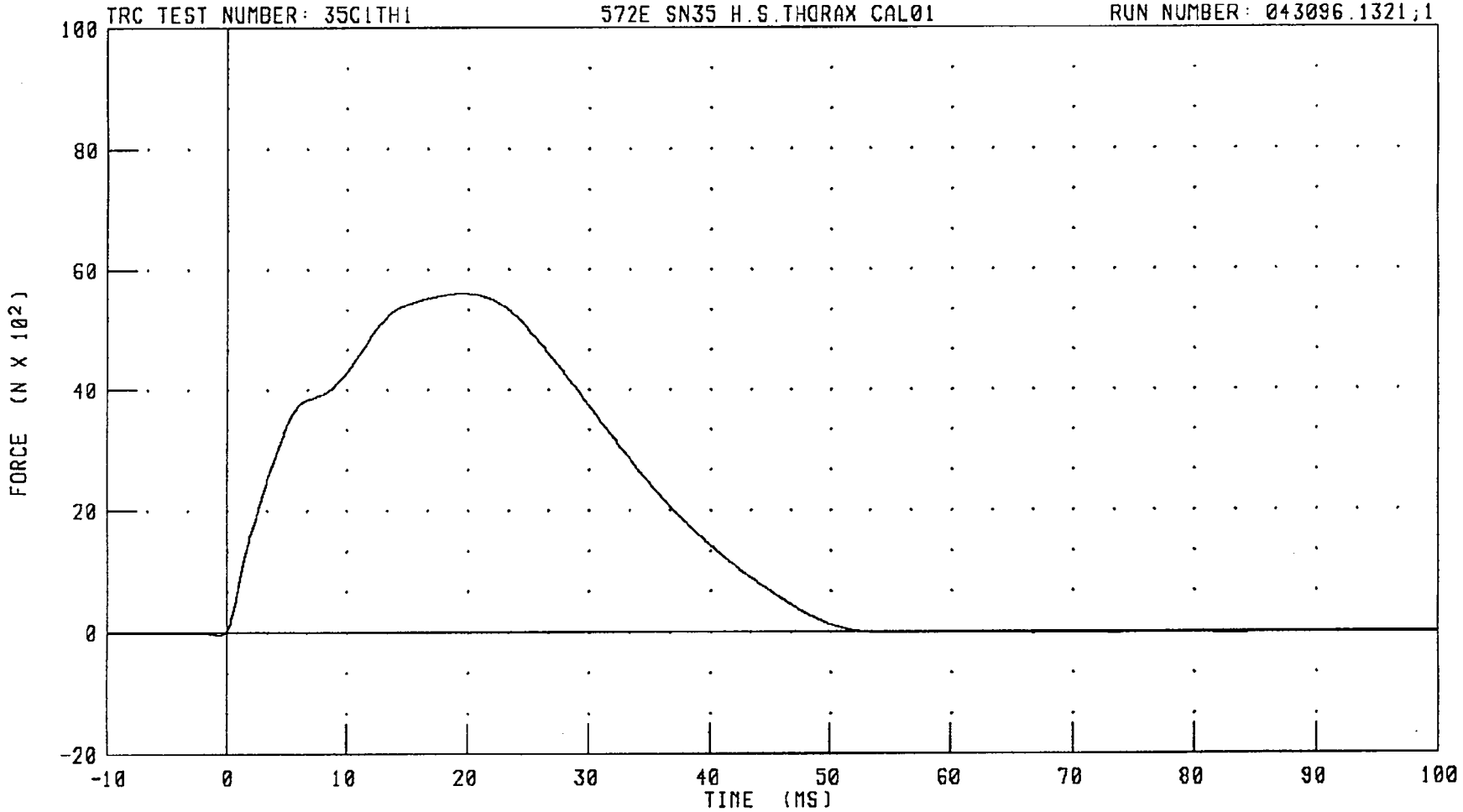
TECHNICIAN Richard LeVan RUN NUMBER: 071195.1433;1


PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION
TRC TEST NUMBER: 35C1TH1
572E SN35 H.S.THORAX CAL01
RUN NUMBER: 043096.1321;1
ACCELERATION (G)
50
40
30
20
10
0
-10
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS)
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: 043096.1321;1



CHANNEL: PENXF FILTER: CH. CLASS 180 PEAK DATA: 5608.25 N @ 19.52 MS; -42.97 N @ -0.64 MS

19-C

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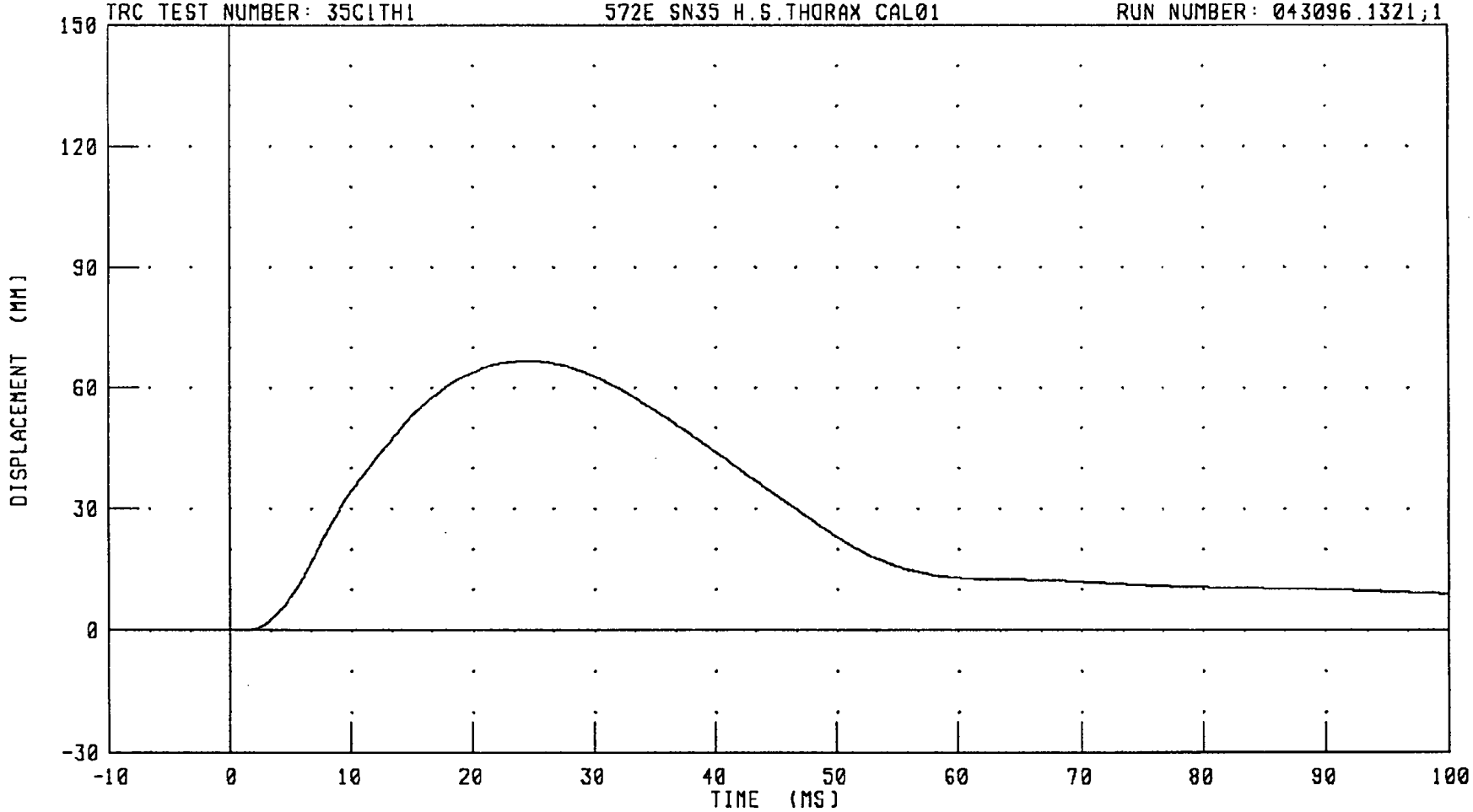
PART 572-E HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

TRC TEST NUMBER: 35C1TH1 572E SN35 H.S.THORAX CAL01 RUN NUMBER: 043096.1321;1



CHANNEL: CSTXD FILTER: CH. CLASS 180 PEAK DATA: 66.71 MM @ 24.64 MS; -0.05 MM @ 0.96 MS

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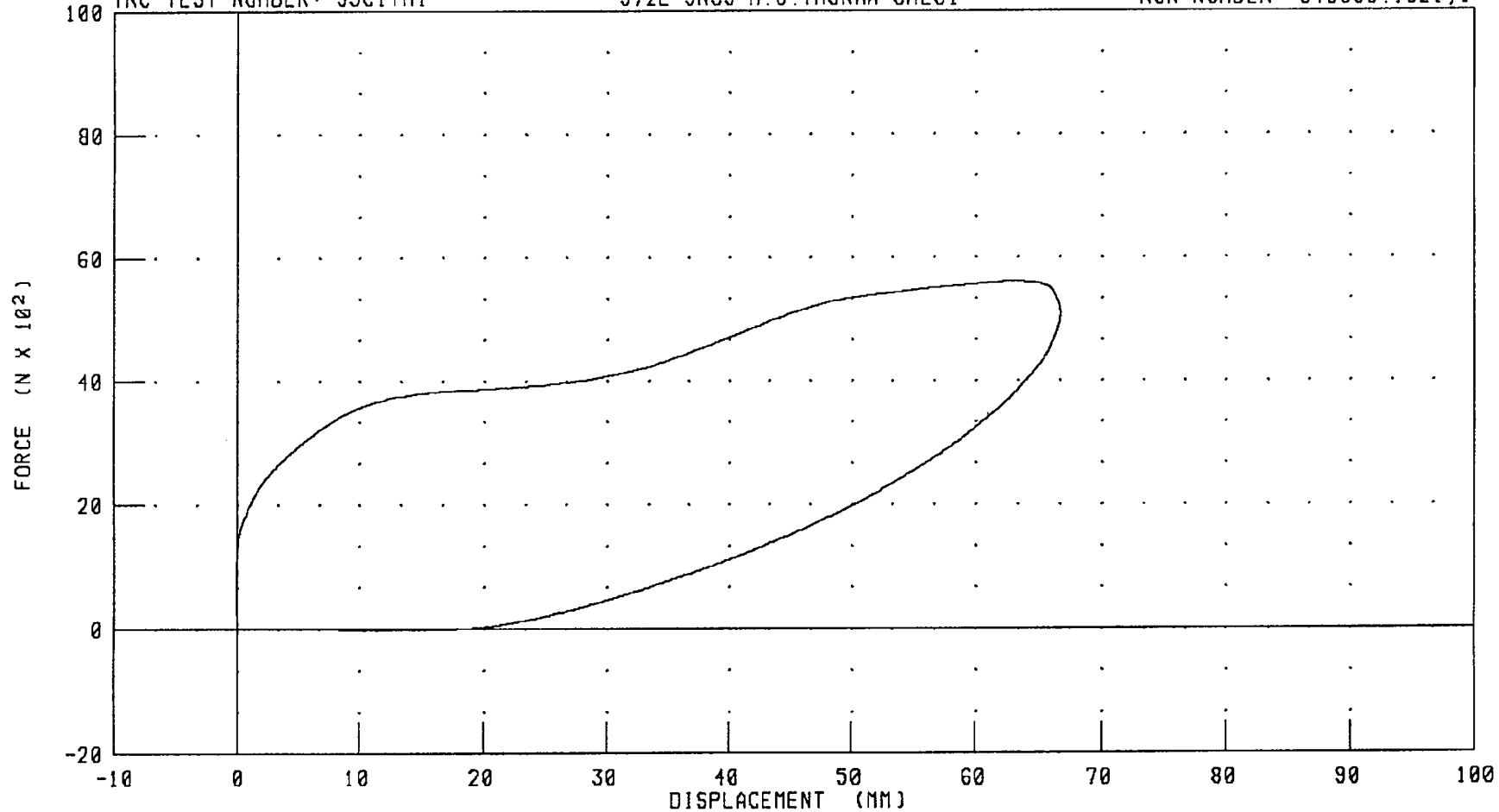
PART 572-E HYBRID III THORAX CALIBRATION
CHEST DISPLACEMENT VS PENDULUM FORCE

TRC TEST NUMBER: 35C1TH1 572E SN35 H.S.THORAX CAL01 RUN NUMBER: 043096.1321;1



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

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TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

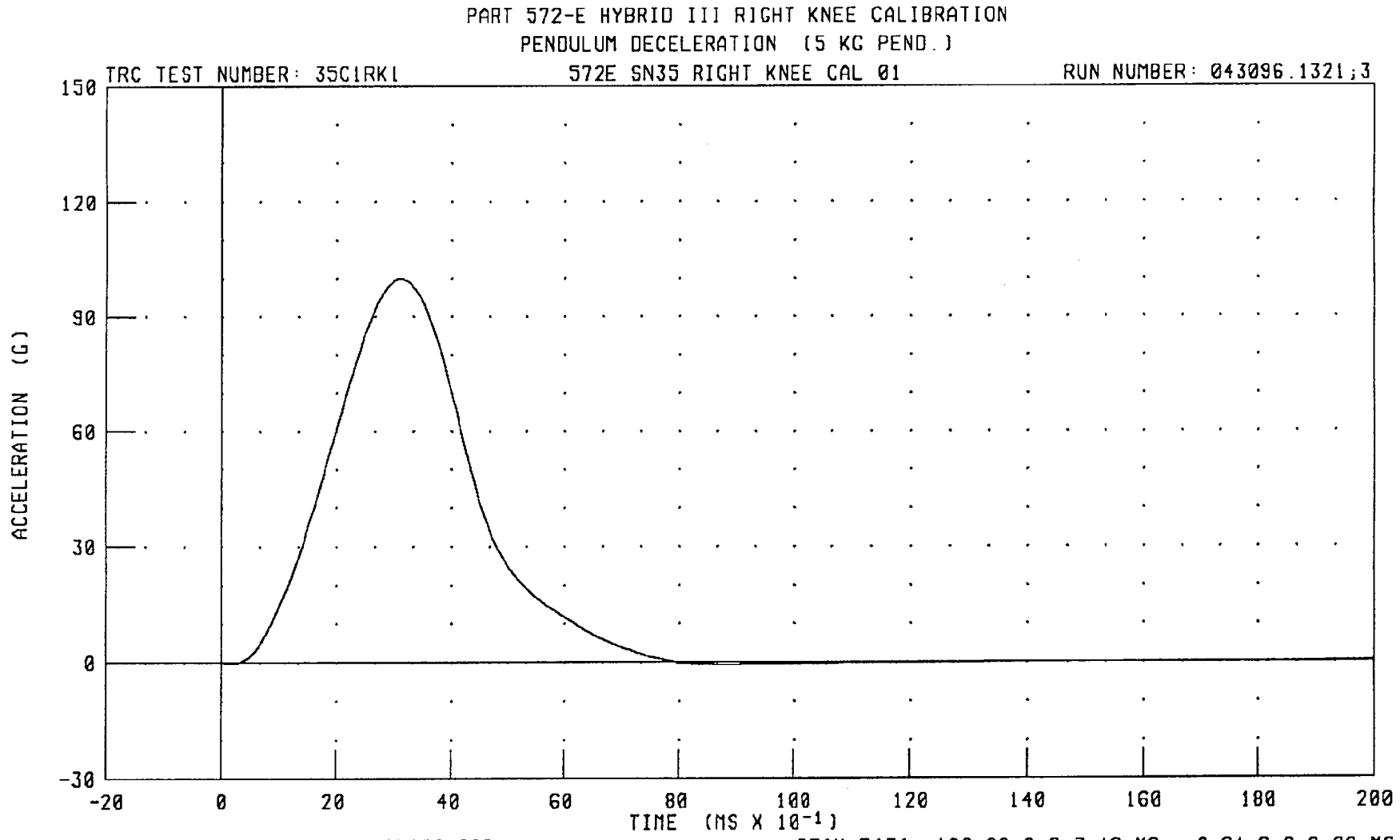
HYBRID III 11-JUL-95

TRC INC. TEST NO: 35C1RK1 572E SN35 RIGHT KNEE CAL 01

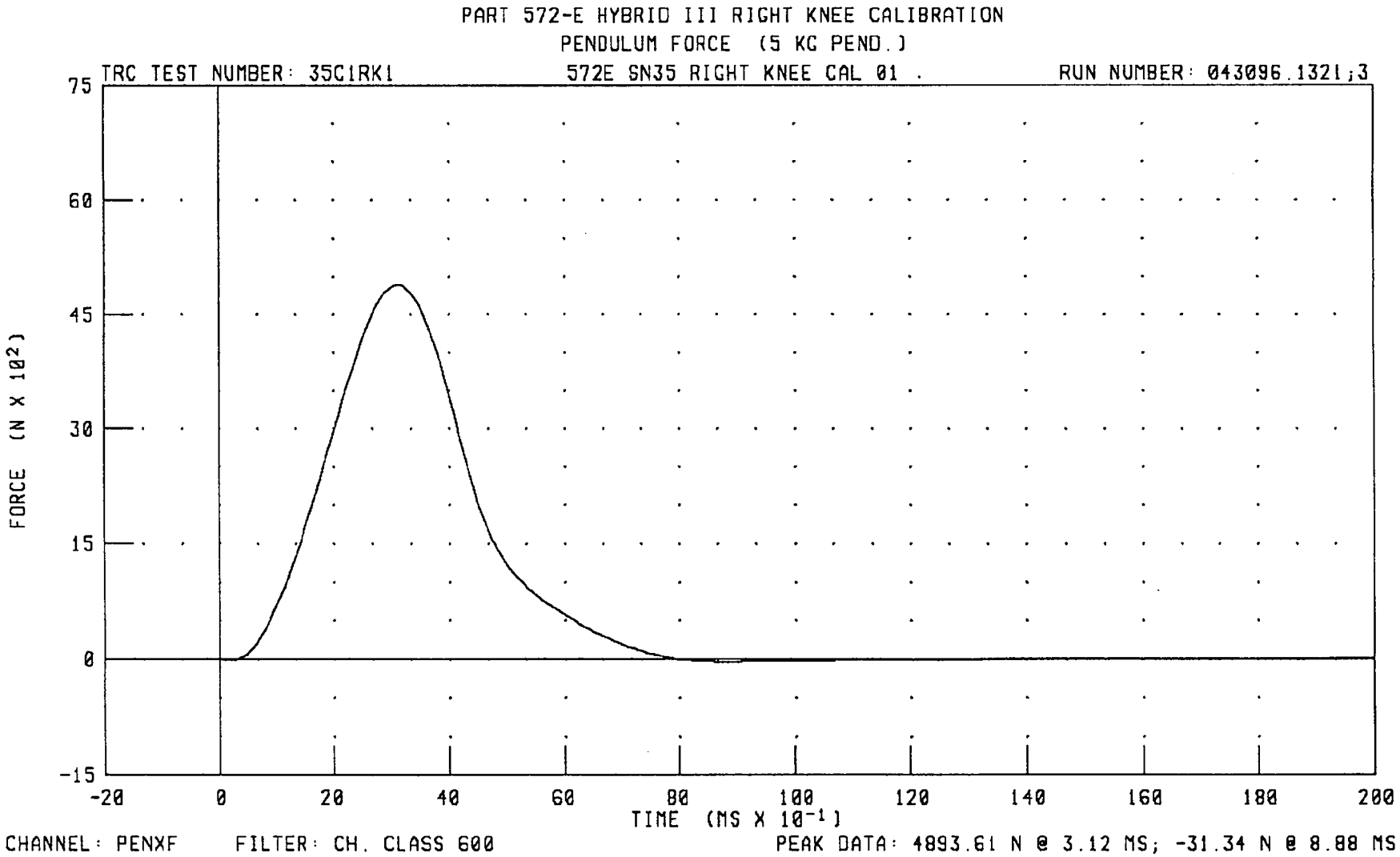
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	63.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.10 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	4893.6 N

TEST MEETS SPECIFICATIONS

TECHNICIAN  RUN NUMBER: 071195.1336;3


PART 572-E HYBRID III RIGHT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)
TRC TEST NUMBER: 35C1RK1
572E SN35 RIGHT KNEE CAL 01
RUN NUMBER: 043096.1321;3
ACCELERATION (G)
150
120
90
60
30
0
-30
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS X 10⁻¹)
CHANNEL: PENXG
FILTER: CH. CLASS 600
PEAK DATA: 100.02 G @ 3.12 MS; -0.64 G @ 8.88 MS

960417


PART 572-E HYBRID III RIGHT KNEE CALIBRATION
PENDULUM FORCE (5 KG PEND.)
TRC TEST NUMBER: 35C1RK1
572E SN35 RIGHT KNEE CAL 01 .
RUN NUMBER: 043096.1321;3
FORCE (N X 10²)
75
60
45
30
15
0
-15
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS X 10⁻¹)
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

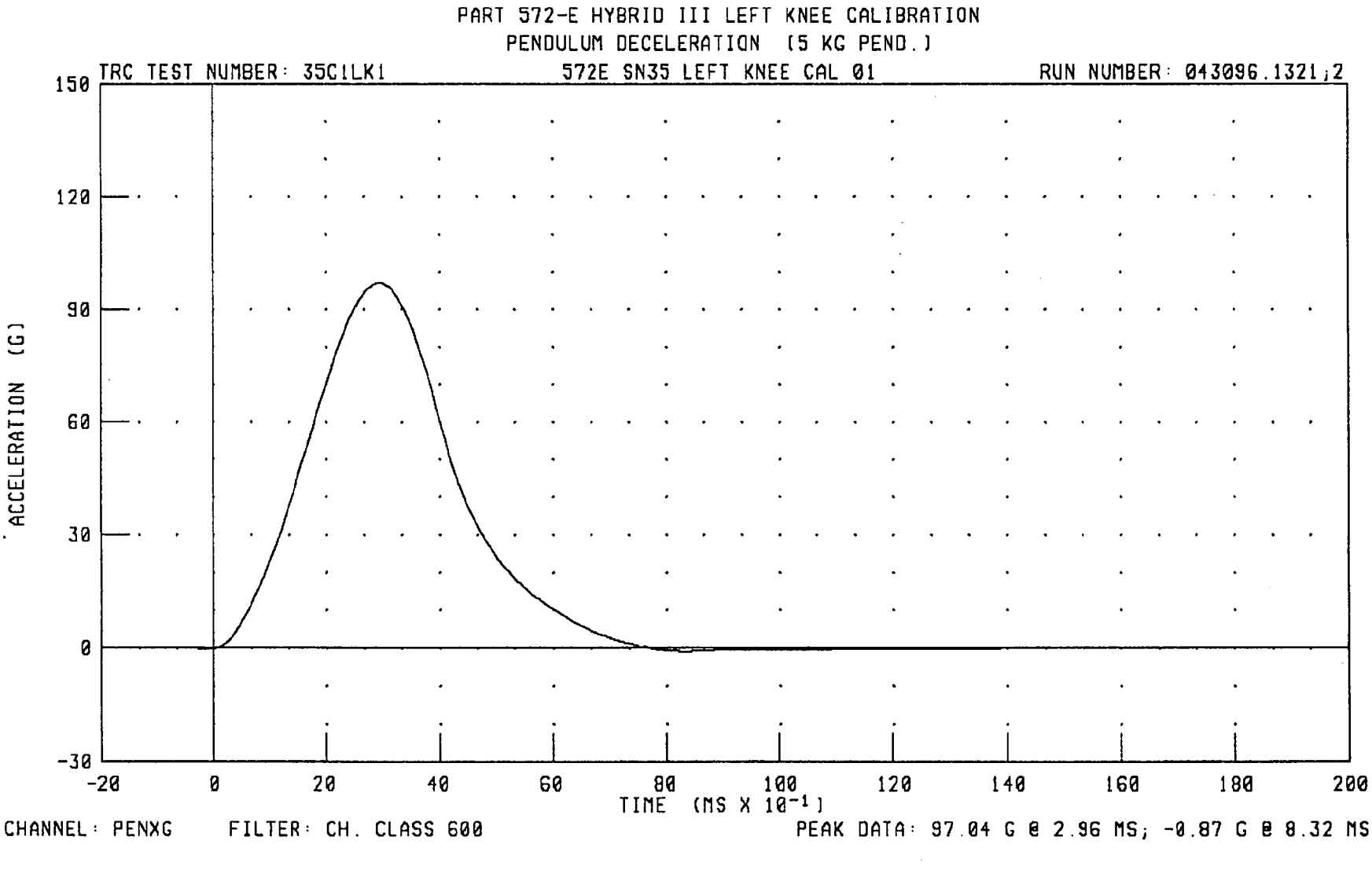
HYBRID III 11-JUL-95

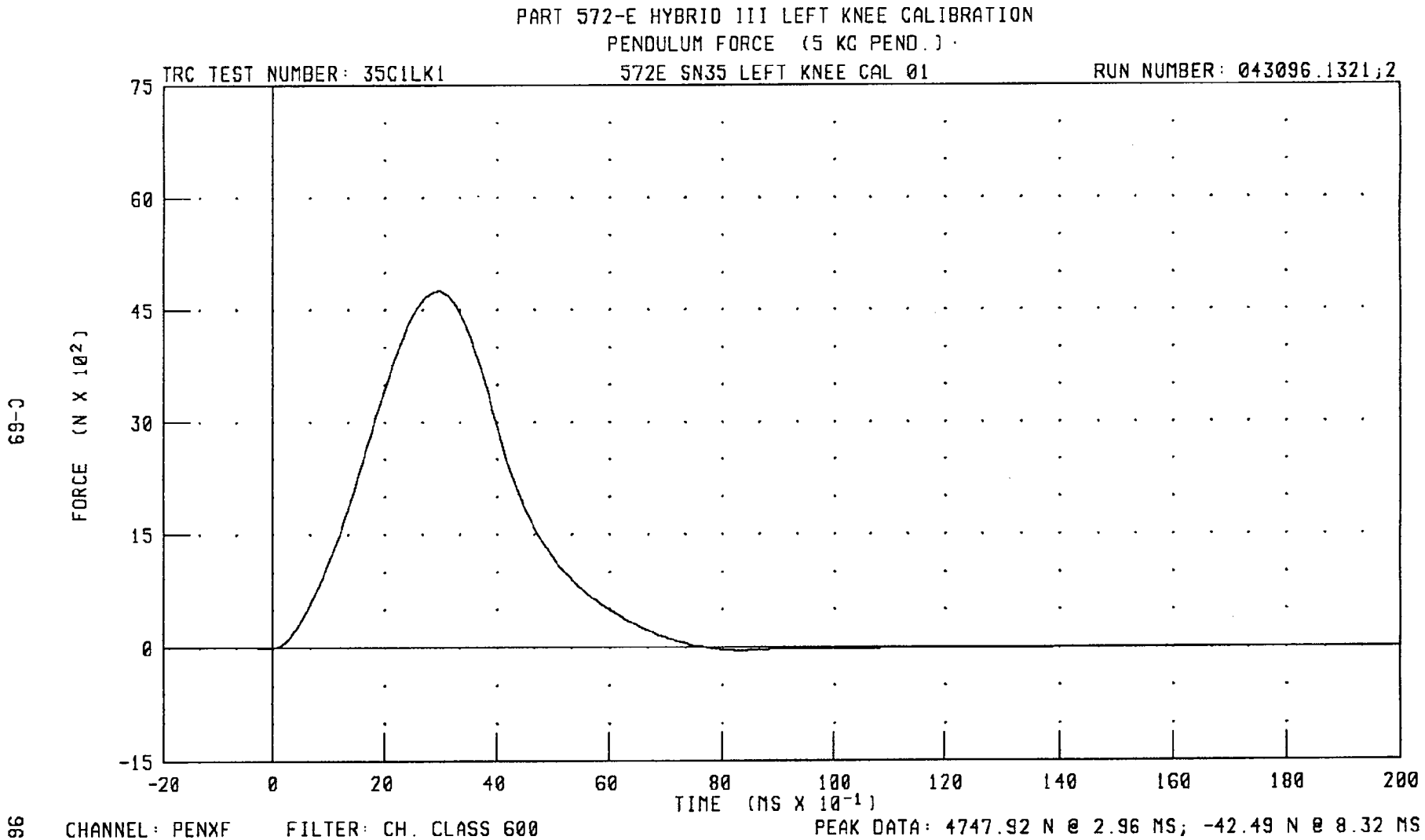
TRC INC. TEST NO: 35C1LK1 572E SN35 LEFT KNEE CAL 01

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  RUN NUMBER: 071195.1251;2


PART 572-E HYBRID III LEFT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)
TRC TEST NUMBER: 35C1LK1
572E SN35 LEFT KNEE CAL 01
RUN NUMBER: 043096.1321;2
ACCELERATION (G)
150
120
90
60
30
0
-30
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS X 10⁻¹)
CHANNEL: PENXG
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: 35C1LK1
572E SN35 LEFT KNEE CAL 01
RUN NUMBER: 043096.1321;2
FORCE (N X 10²)
75
60
45
30
15
0
-15
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS X 10⁻¹)
CHANNEL: PENXF
FILTER: CH. CLASS 600
PEAK DATA: 4747.92 N @ 2.96 MS; -42.49 N @ 8.32 MS

960417

Appendix D

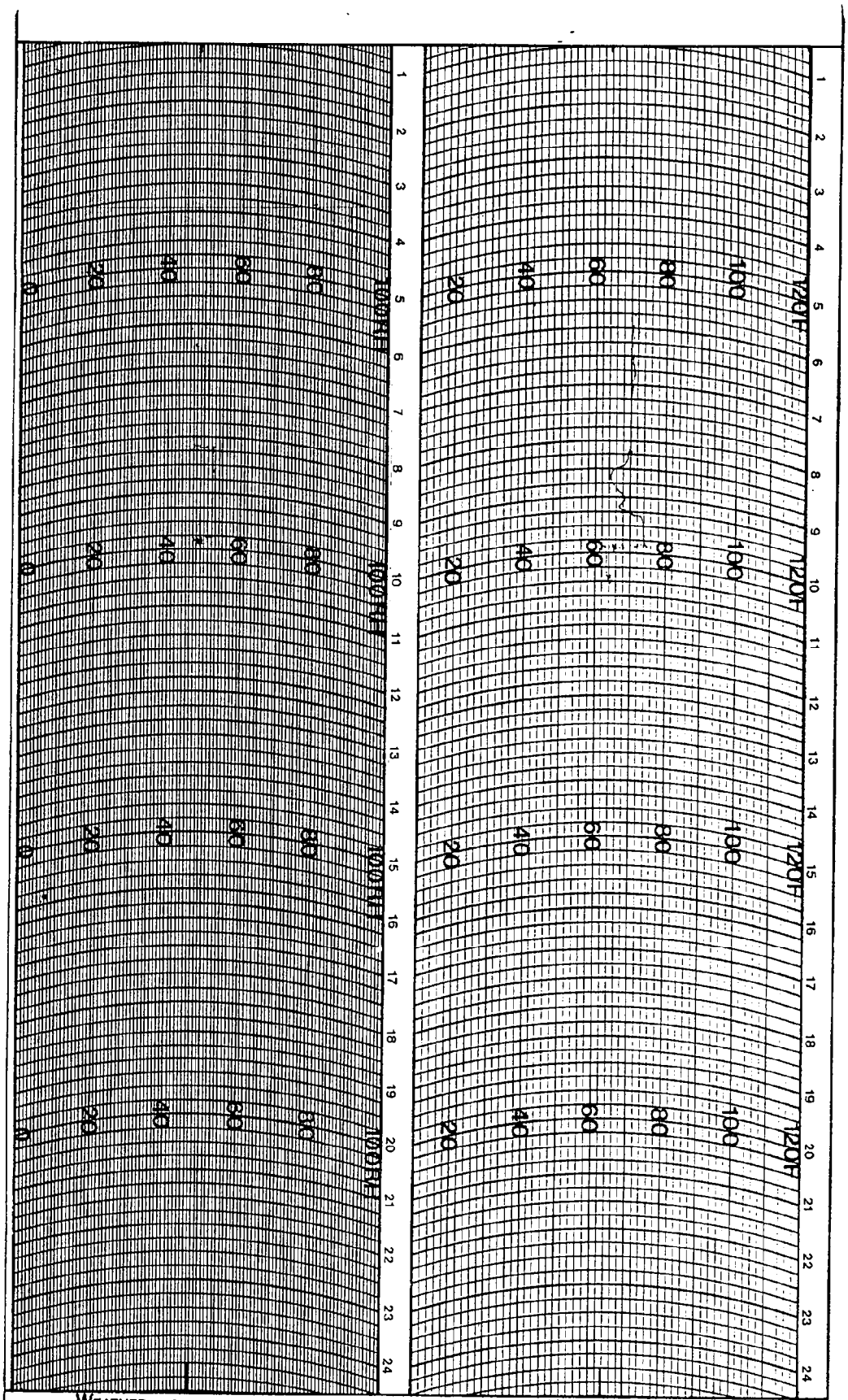
Miscellaneous Test Information

Sign Convention
NHTSA Data Tape Reference Guide

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

Frequency Response Classes
SAE J211 OCT88

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



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

HYGROTHERMOGRAPH
1 DAY

CHART # C311 D HF
PART # 699123

STATION _____ DATE ON _____ DATE OFF _____