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Report Numbers: TRC-95-V003

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

Deformable Impactor into Rear of
1993 Ford Mustang
at 80 kph with 50% Right Side Overlap
TRC Test Number: 951113

Prepared by:
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December 11, 1995

Final Report

Prepared for:
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TPES

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16. Abstract An 80 kph deformable impactor rear crash test with 50% overlap was conducted on a 1993 Ford Mustang 2-door coupe at Transportation Research Center Inc. on November 13, 1995. This test was conducted to determine vehicle and occupant response in the rear 50% right side overlap test mode. The impactor's velocity was 80.1 kph. The impactor's weight was 1333kg. The vehicle's maximum crush was 889 millimeters. The ambient temperature was 2° C. The driver's Head Injury Criteria (HIC) was 721. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 44.9 g. The driver's chest maximum deflection was 6 mm. The driver's left and right femur maximum axial forces were 1277 N and 405 N, respectively. The passenger's HIC was 1332. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 66.4 g. The passenger's chest maximum deflection was 3 mm. The passenger's left and right femur maximum axial forces were 682 N and 663 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. 280, Units of Weight and Measure, Price \$2.25, SD Circula No. C13.10280.

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

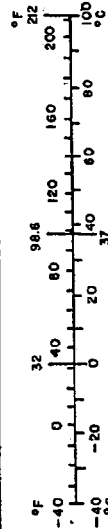


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Section 1.0

Purpose and Test Procedure

Purpose

This crash test was conducted to determine vehicle and occupant response in the 80 kph rear impact with 50% right side overlap test mode. The test was performed on a 1993 Ford Mustang 2-door coupe.

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 vehicle's attitudes were adjusted so that its rear bumper was 51 millimeters higher than the vehicle's rear bumper in Test Number 950713.

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 unbelt.

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

The impactor's specified velocity range was 78.5 to 81.5 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 50% right side overlap was conducted at TRC on November 13, 1995.

The test vehicle, a 1993 Ford Mustang 2-door coupe, was equipped with an airbag at the driver's seating position and three-point unibelts at the driver's and right front passenger's seating position. The vehicle's test weight was 1553.5 kg. The vehicle's maximum static crush was 889 mm.

The driver's HIC was 721. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 44.9 g. The driver's chest maximum deflection was 6 mm. The driver's left and right femur maximum compressive forces were 1277 N and 405 N, respectively.

The right front passenger's HIC was 1332. The right front passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 66.4 g. The right front passenger's chest maximum deflection was 3 mm. The right front passenger's left and right femur maximum compressive forces were 682 N and 663 N, respectively.

Immediately following the impact, fuel system fluid spillage occurred. During the first five minutes following the impact, approximately 971 grams of fluid spilled from the vehicle's fuel system. The fuel spillage appears to have come from the intersection of the fuel filler neck and the fuel tank.

Data Acquisition Explanations

The right medium tight barrier view camera and the left side close up view camera did not record data because each camera's film was broken by the drive sprocket not being securely engaged with the film.

The three vehicle onboard cameras stopped filming at approximately 150 milliseconds because the cameras' power cables were pulled from the batteries by the seat backs which reclined during the impact event.

The right front passenger dummy's head Position 1 X-axis acceleration data channel stopped recording data after approximately 100 milliseconds because the device's cable was cut by vehicle crush.

Table 1 Crash Test Summary

Test type:	80 kph rear impact with 50% right side overlap
Test date:	11/13/95
Test time:	1217
Ambient temperature at impact area:	2° C
Vehicle year/make/ model/body style:	1993/Ford/Mustang/2-door coupe
Vehicle test weight:	1553.5 kg
Impact angle ¹ :	180°
Impact velocity ² :	
Primary:	80.1 kph
Secondary ³ :	NA
Maximum static crush:	889 mm
Number of cameras:	
High-speed:	13
Door opening data:	
Left-front:	Easy
Right-front:	Difficult

¹ With respect to tow track centerline.

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

³ The secondary light trap failed.

Table 1 Crash Test Summary, Cont'd.

Dummies:	<u>Driver #35</u>	<u>Passenger #34</u>
Type:	Part 572 E	Part 572 E
Location:	Left front	Right front
Restraint:	Airbag/3-point unbelt	3-point unbelt
Number of data channels:	30	30
Front seat data:		
Seat track failure:	None	None
Seat back failure:	None	None
Visible dummy contact points:		
Head:	Rear seat cushion and header	Rear side interior trim
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: 1993/Ford/Mustang/2-door coupe

Color: Blue

VIN: 1FACP40M4PF137443

Engine data:

Placement: Longitudinal/Inline

Cylinders: 4

Displacement: 2.3 liters

Transmission data: 5 speed, X manual, __automatic, __overdrive

Final drive: __fwd, X rwd, __4wd

Date vehicle received:

Odometer reading: 29,803

Dealer's name
and address: NA

Accessories:

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

Certification data from vehicle's label:

Vehicle manufactured by: Ford Motor Company

Date of manufacture: 01/93

VIN: 1FACP40M4PF137443

GVWR: 1744 kg

GAWR: Front: 887 kg

Rear: 866 kg

Table 2 Test Vehicle Information, Cont'd.

Size of tires on vehicle: P195/75R14
Spare tire: Temporary
Type of front seats: Bucket

Tire & capacity data from vehicle's label:

Recommended tire size: P195/70R14

Recommended cold tire pressure:

Front: 240 kPa

Rear: 240 kPa

Designated Seating Capacity:

Front 2

Rear 2

Total 4

Vehicle Capacity Weight: 317 kg

Test vehicle attitudes:

Delivered attitude:	LF: 678 mm	RF: 681 mm	LR: 685 mm	RR: 685 mm
Fully loaded attitude:	LF: 667 mm	RF: 664 mm	LR: 645 mm	RR: 643 mm
Pre-test attitude:	LF: 647 mm	RF: 652 mm	LR: 675 mm	RR: 679 mm

Table 2 Test Vehicle Information, Cont'd.

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

Right front	352.0 kg	Right rear	279.5 kg
Left front	374.5 kg	Left rear	277.5 kg
Total front weight	726.5 kg	(56.6% of total vehicle weight)	
Total rear weight	557.0 kg	(43.4% of total vehicle weight)	
Total delivered weight	1283.5 kg		

Calculation of test vehicle's target test weight:

RCLW = Rated Cargo and Luggage Weight

UDW = Unloaded Delivered Weight (1283.5 kg)

VCW¹ = Vehicle Capacity Weight = 317

DSC = Designated Seating Capacity (4)

RCLW = VCW - 68 (DSC) = 317 - 68 (4) = 45

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

Target test weight = 1283.5 + 45 + 152 = 1480.5 kg

Weight of test vehicle with required dummies and 118 kg of cargo weight:

Right front	424.5 kg	Right rear	344.5 kg
Left front	440.5 kg	Left rear	344.0 kg
Total front weight	865.0 kg	(55.7% of total vehicle weight)	
Total rear weight	688.5 kg	(44.3% of total vehicle weight)	
Total test weight	1553.5 kg	(4.9% over target test weight)	

Weight of ballast secured in vehicle cargo area: 0

Components removed to meet target test weight: Front bumper, grill, head lights, starter, radiator, and alternator

CG rearward of front wheel centerline: 1129 mm

Vehicle Wheelbase: 2548 mm

¹ From vehicle's tire load label.

Table 3 Post-Impact Data

Test number: 951113
Test date: 11/13/95
Test time: 1217
Test type: 80 kph rear impact with 50% right side overlap
Impact angle: 180°
Ambient temperature
at impact area: 2° C
Temperature in
occupant compartment: 21° C
Impact velocity:
Primary: 80.1 kph
Secondary: NA¹
Specified range: 78.5 to 81.5 kph
Distance from vehicle to barrier:
Entering velocity trap: 356 mm
Exiting velocity trap: 51 mm

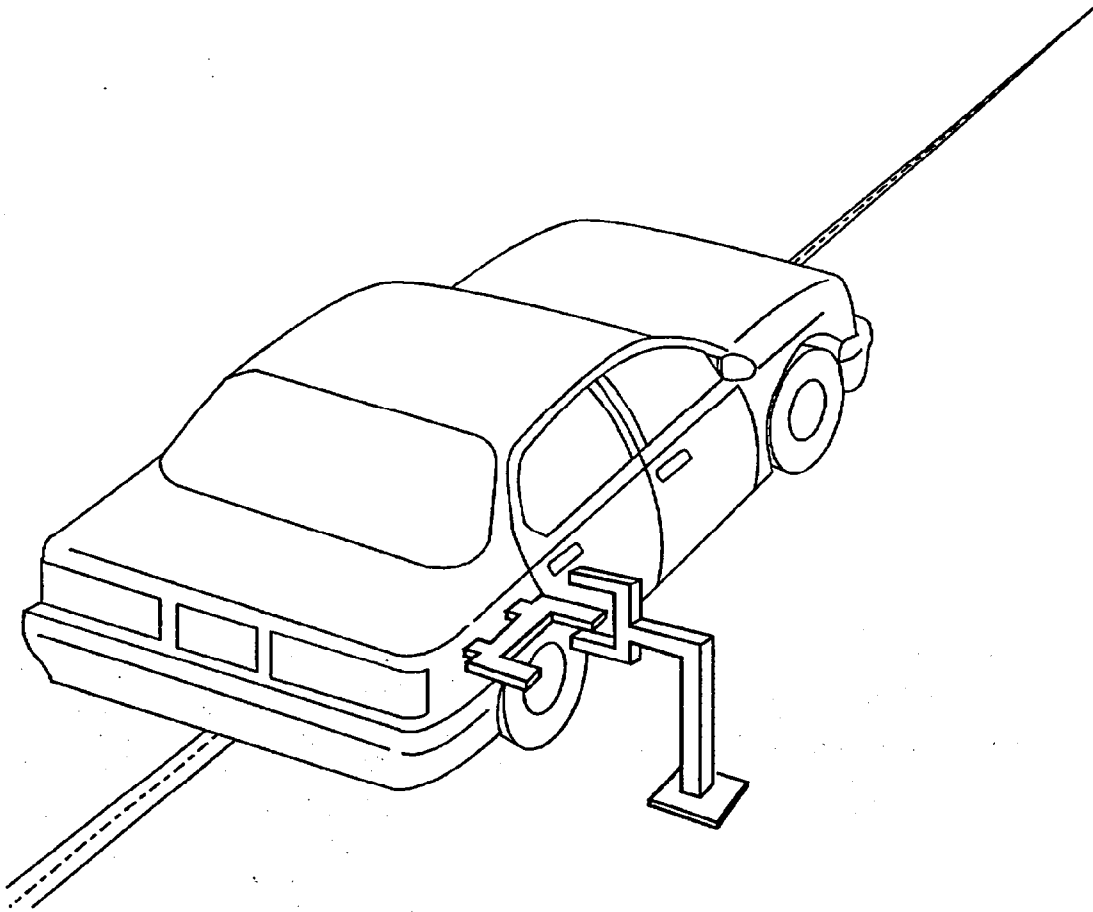
Test vehicle static crush:

Overall length of test vehicle:

Pre-test:	L: 4566 mm	C: 4585 mm	R: 4560 mm
Post-test:	L: 4471 mm	C: 4072 mm	R: 3800 mm
Total crush:	L: 95 mm	C: 513 mm	R: 760 mm
Average crush:	432 mm		

¹ The secondary light trap failed

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: 11/13/95
Vehicle year/make/model/body style: 1993/Ford/Mustang/2-door coupe
VIN: 1FACP40M4PF137443
Build date: 01/93
Test weight: 1553.5 kg
Vehicle wheelbase: 2548 mm
Maximum width: 1770 mm
Front overhang: 1057 mm

Collision Deformation

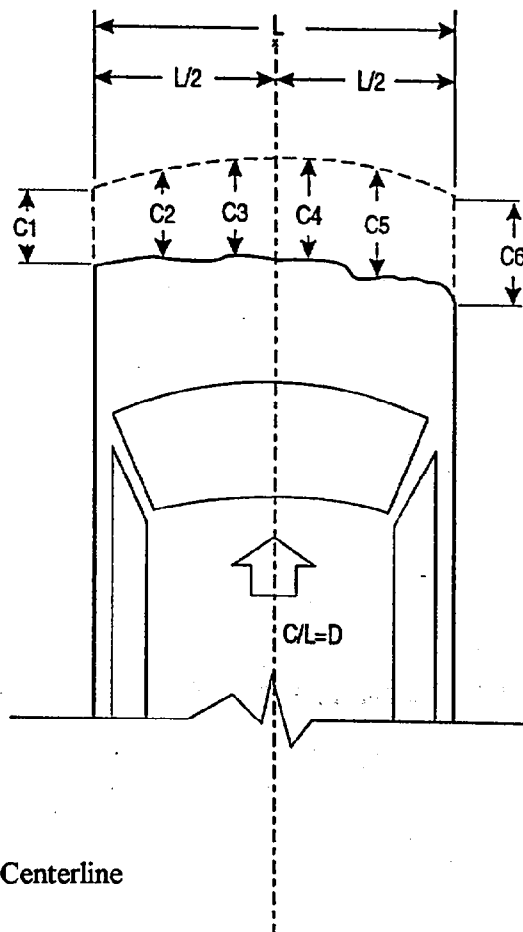
Classification (CDC) Code: 06BDEW5

Crush depth measurements:

C1:	59 mm
C2:	328 mm
C3:	545 mm
C4:	747 mm
C5:	709 mm
C6:	889 mm

Midpoint of damage: D: Vehicle Longitudinal Centerline

Length of damaged region: L: 1423 mm



Section 3.0

FMVSS 301 Data

Table 4 Dummy Injury Criteria

Maximum Acceleration

	Head				Chest		
	X	Y	Z	R	X	Y	Z
Driver	69.1 g	25.0 g	-49.4 g	84.2 g	43.2 g	16.8 g	-9.5 g
Passenger	156.7 g	25.5 g	-57.6 g	163.5 g	68.6 g	18.0 g	-11.9 g

Maximum Femur Compressive Force

	Left Femur	Right Femur
Driver	1277 N	405 N
Passenger	682 N	663 N

Head Injury Criteria¹

	HIC	Time t ₁	Time t ₂
Driver	721	111.9 ms	132.3 ms
Passenger	1332	94.1 ms	106.5 ms

Head Maximum Resultant Acceleration²

	Acceleration	Time t ₁	Time t ₂
Driver	78.7 g	120.3 ms	123.3 ms
Passenger	132.4 g	99.0 ms	102.0 ms

Chest Maximum Resultant Acceleration²

	Acceleration	Time t ₁	Time t ₂
Driver	44.9 g	109.7 ms	112.7 ms
Passenger	66.4 g	88.0 ms	90.9 ms

Maximum Chest Deflection

Driver	6 mm
Passenger	3 mm

¹ As defined in FMVSS No. 208

² Defined as equal to or exceeding 0.003 sec. duration

Dummy Kinematic Summary

Driver Dummy

Upon impact, the driver dummy went into the seat back and the seat back deformed rearward. The dummy's head rotated rearward and contacted the head restraint then the rear seat cushion as the rear of the car crushed forward. The dummy then rebounded forward and the film stopped running (see Data Acquisition Explanations).

Passenger Dummy

Upon impact, the passenger dummy went into the seat back and the seat back deformed rearward. The dummy's head rotated rearward and toward the right and contacted the rear side trim panel as the rear of the car crushed forward. The dummy then rebounded forward and the film stopped running (see Data Acquisition Explanations).

Table 5 Fuel System Data

Vehicle year/make/model/body style:	1993/Ford/Mustang/2-door coupe
Fuel system capacity:	15.4 (from owner's manual)
Usable capacity:	15.7 gal (furnished by COTR)
Test volume range:	14.4 gal to 14.8 gal (92-94% of usable)
Actual test volume:	14.6 gal (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 behind the rear axle. The fuel filler neck is located on the right side. The fuel lines run along the left side to the front.

Table 6 FMVSS 301 Post-Impact Test Data

Test date: 11/13/95

Vehicle year/make/model/body style: 1993/Ford/Mustang/2-door coupe

Test requirements:

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

Test vehicle impact type:

☐ Frontal (48 kph)

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

☒ Rear moving barrier (80 kph)

☐ Lateral moving barrier (32 kph)

Fuel system fluid spillage measurements:

	Test Results	Maximum Allowable
1. From impact until vehicle motion ceases	Small puddle	28 g
2. 5-Minute period after vehicle motion ceases	971 g	140 g
3. Next 25 minutes after 5-minute period	NA ¹	28 g/1 min

Fuel system fluid spillage location(s): Intersection of fuel filler neck and fuel tank.

¹ The test was ended after exceeding 140 g in the first five minutes.

Section 4.0

Vehicle, Moving Deformable Barrier, Occupant, and Camera Measurements

Figure 3 Pre-test and Post-test Measurement Points

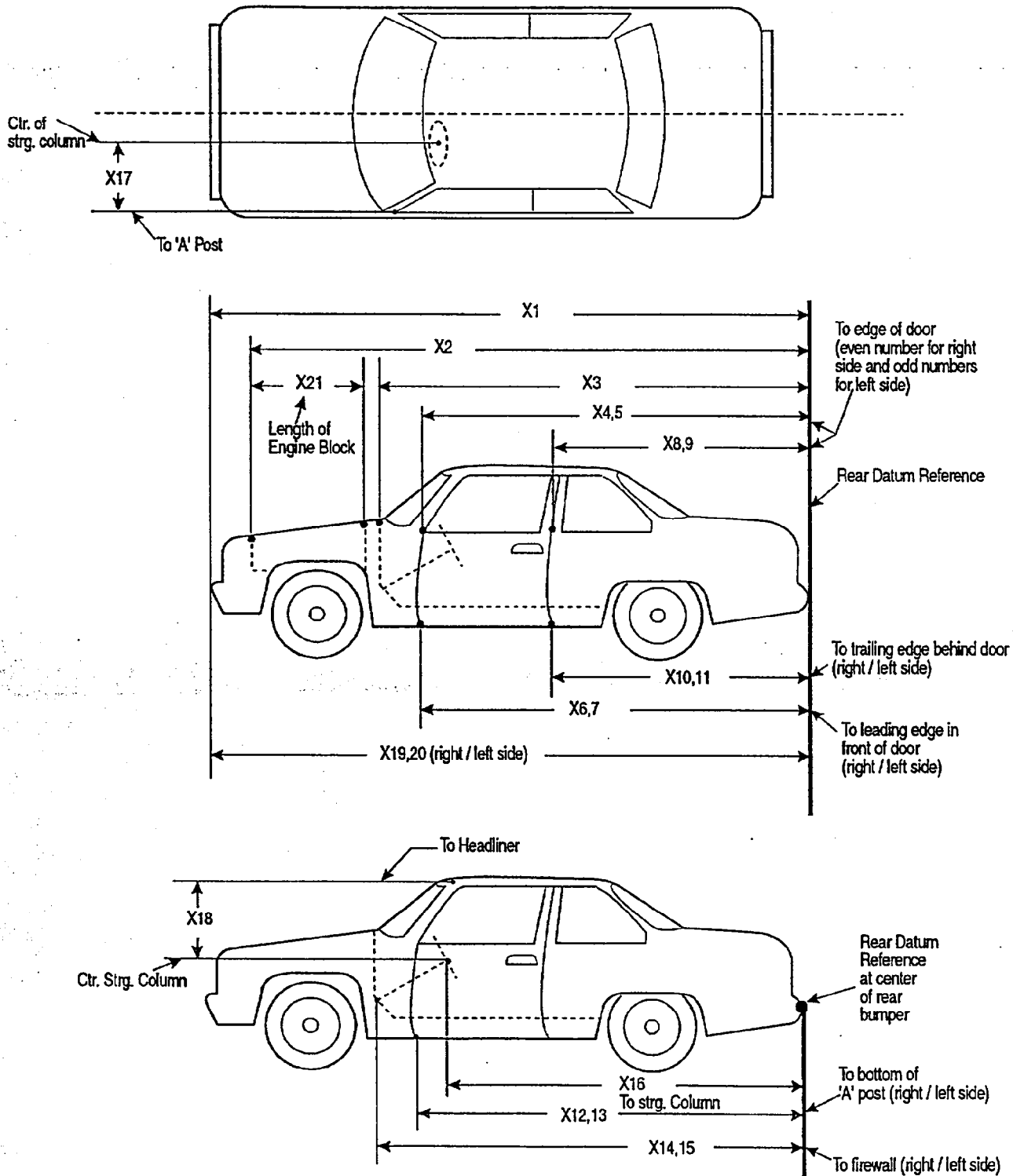


Table 7 Impacted Vehicle Measurements

Vehicle year/make/model/body style: 1993/Ford/Mustang/2-door coupe

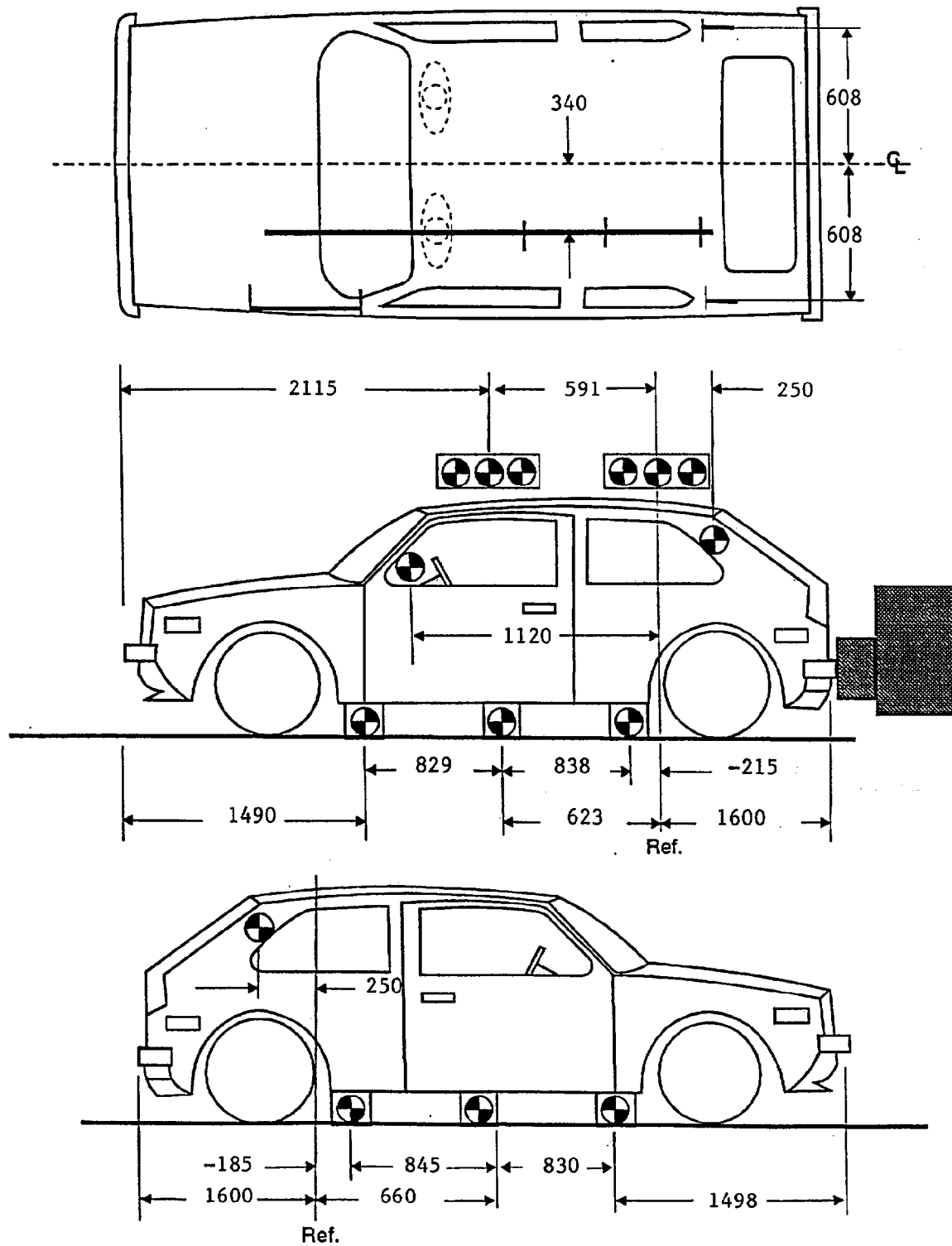
Test Number: 951113

No.	Type of measurement	Pre-test	Post-test	Diff.
X1	Total length of vehicle at centerline	4585 mm	4072 mm	513 mm
X2	Rear surface of vehicle to front of engine block	765 mm	793 mm	-28 mm
X3	Rear surface of vehicle to firewall	1343 mm	1360 mm	-17 mm
X4	Rear surface of vehicle to upper leading edge of right door	1704 mm	1703 mm	1 mm
X5	Rear surface of vehicle to upper leading edge of left door	1710 mm	1723 mm	-13 mm
X6	Rear surface of vehicle to lower leading edge of right door	1654 mm	1660 mm	-6 mm
X7	Rear surface of vehicle to lower leading edge of left door	1655 mm	1642 mm	13 mm
X8	Rear surface of vehicle to upper trailing edge of right door	2940 mm	2860 mm	80 mm
X9	Rear surface of vehicle to upper trailing edge of left door	2943 mm	2955 mm	-12 mm
X10	Rear surface of vehicle to lower trailing edge of right door	2950 mm	2865 mm	85 mm
X11	Rear surface of vehicle to lower trailing edge of left door	2950 mm	2940 mm	10 mm
X12	Rear surface of vehicle to bottom of "A" post on right side	1699 mm	1722 mm	-23 mm
X13	Rear surface of vehicle to bottom of "A" post on left side	1706 mm	1725 mm	-19 mm
X14	Rear surface of vehicle to firewall - right side	1358 mm	1369 mm	-11 mm
X15	Rear surface of vehicle to firewall - left side	1345 mm	1359 mm	-14 mm
X16	Rear surface of vehicle to steering wheel center	2045 mm	2064 mm	-19 mm
X17	Center of steering column to "A" post	310 mm	309 mm	1 mm
X18	Center of steering column to headliner	435 mm	457 mm	-22 mm
X19	Rear surface of vehicle to right side of front bumper	4560 mm	3800 mm	760 mm
X20	Rear surface of vehicle to left side of front bumper	4566 mm	4471 mm	95 mm
X21	Length of engine block	440 mm	440 mm	0 mm

Table 8 Vehicle Measurements

No.	Description of Measurement	Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	4585	4072	513
X2	Front Surface of Vehicle to Bottom of "A" Post of Right Side	1699	1722	-23
X3	Front Surface of Vehicle to Bottom of "A" Post of Left Side	1706	1725	-19
X4	Front Surface of Vehicle to Right Side of Rear Bumper	4560	3800	760
X5	Front Surface of Vehicle to Left Side of Rear Bumper	4560	4471	89
X6	Right Front Sill to Ground Plane	188	104	84
X7	Left Front Sill to Ground Plane	185	202	-17
X8	Right Rear Sill to Ground Plane	199	242	-43
X9	Left Rear Sill to Ground Plane	196	97	99
X10	Wheelbase of Vehicle - Left Side	2535	2554	-19
X11	Width of Vehicle at Maximum Width Point	1720	1937	-217
X12	Front Surface of Vehicle to Engine Target	765	793	-28
X13	Front Surface of Vehicle to Compartment Target	1845	1934	-89
X14	Front Surface of Vehicle to Rear Bumper Target	4585	4042	543
X15	Wheelbase of Vehicle - Right Side	2548	2195	353

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	4657	4695	4709	4708	4694	4655
	Y	731	439	149	-146	-438	-727
	Z	386	384	386	385	382	390
Top of rear bumper	X	4679	4709	4722	4724	4704	4674
	Y	730	438	147	-145	-436	-727
	Z	579	573	573	574	573	579
Center of trunk	X	4573	4602	4617	4615	4602	4573
	Y	695	440	146	-145	-438	-693
	Z	820	824	829	827	823	817
		Post-Test Profile					
		Vehicle Left			Vehicle Right		
		pt. 1	pt. 2	pt. 3	pt. 4	pt. 5	pt. 6
Bottom of rear bumper	X	4598	4367	4164	3961	3985	3766
	Y	427	175	-104	-412	-415	-962
	Z	666	754	718	726	747	554
Top of rear bumper	X	4581	4400	4194	4077	3976	3878
	Y	462	177	-90	-428	-715	-1002
	Z	482	465	449	428	433	408
Center of trunk	X	4512	4500	4265	4127	3935	3908
	Y	610	318	68	-235	-482	-900
	Z	295	278	276	241	245	258

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

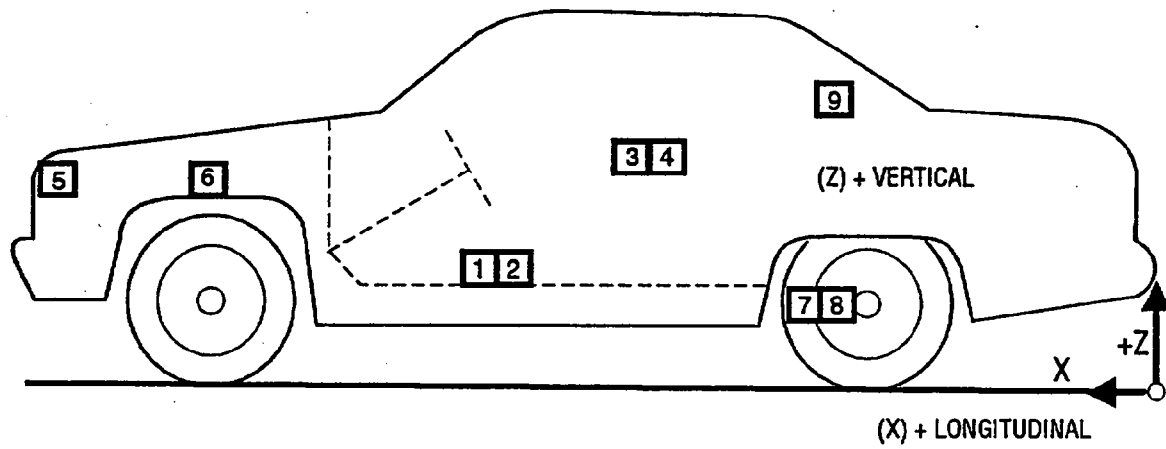
		Change					
		Vehicle Left			Vehicle Right		
		pt. 1	pt. 2	pt. 3	pt. 4	pt. 5	pt. 6
Bottom of rear bumper	X	59	328	545	747	709	889
	Y	304	264	253	266	-23	235
	Z	280	370	332	341	365	164
Top of rear bumper	X	98	309	528	647	728	796
	Y	268	261	237	283	279	275
	Z	97	108	124	146	140	171
Center of trunk	X	61	102	352	488	667	665
	Y	85	122	78	90	44	207
	Z	525	546	553	586	578	559

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

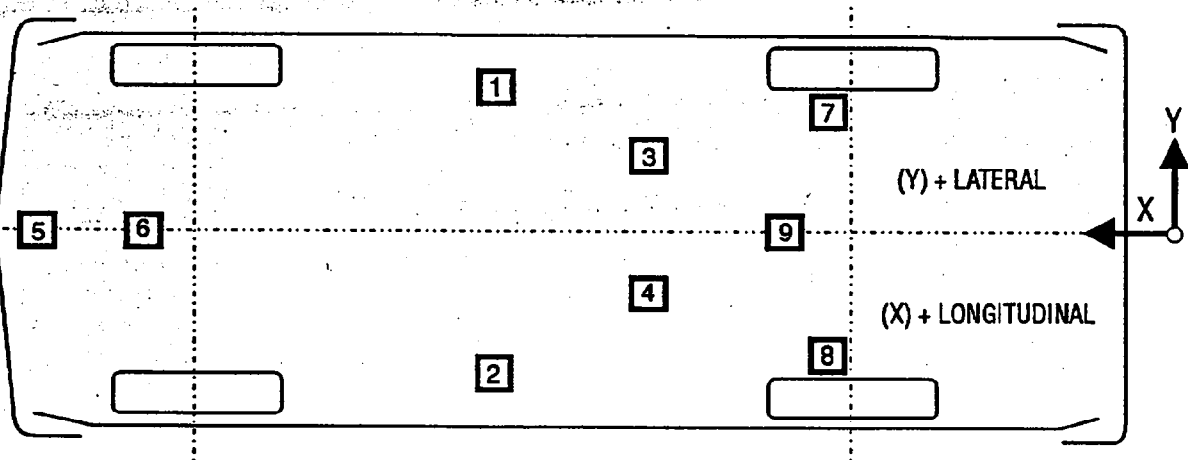
+Y: Left from vehicle longitudinal centerline

+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	2129 mm	575 mm	257 mm
	Post	2115 mm	575 mm	248 mm
	Change	14 mm	0 mm	9 mm
Right front seat outboard mounting rail	Pre	2131 mm	-577 mm	250 mm
	Post	2106 mm	-577 mm	0 mm
	Change	25 mm	0 mm	60 mm
Left front seat back (mid-point of seat)	Pre	2728 mm	380 mm	812 mm
	Post	2782 mm	380 mm	589 mm
	Change	-54 mm	0 mm	223 mm
Right front seat back (mid-point of seat)	Pre	2730 mm	-388 mm	819 mm
	Post	2761 mm	-392 mm	635 mm
	Change	-31 mm	4 mm	184 mm
Radiator support	Pre	333 mm	-181 mm	678 mm
	Post	307 mm	-181 mm	768 mm
	Change	26 mm	0 mm	-90 mm
Top of engine	Pre	1011 mm	29 mm	767 mm
	Post	1018 mm	29 mm	812 mm
	Change	-90 mm	0 mm	-45 mm
Left rear wheel axle	Pre	3530 mm	393 mm	298 mm
	Post	3543 mm	385 mm	269 mm
	Change	-13 mm	8 mm	29 mm
Right rear wheel axle	Pre	3535 mm	-393 mm	307 mm
	Post	3167 mm	-375 mm	279 mm
	Change	368 mm	-18 mm	28 mm
Rear package shelf (top of rear seat back)	Pre	3673 mm	-2 mm	910 mm
	Post	3467 mm	-2 mm	905 mm
	Change	206 mm	0 mm	5 mm

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

Table 11 Moving Deformable Barrier Face Static Crush

Zero distance at barrier centerline¹

Location	Height	813	711	610	508	406	305	203	102	0	102	203	305	406	508	610	711	813
Pre-test profile (distance in millimeters from reference plane ²)																		
Top of face	813	328	325	327	328	324	326	327	326	325	323	327	326	324	326	324	329	325
Mid-face	559	326	326	326	325	326	326	327	327	325	321	326	325	326	327	324	327	326
Bumper	432	255	224	225	224	224	224	225	225	224	220	225	224	225	225	224	225	251

Post-test profile (distance in millimeters from reference plane²)

Top of face	813	416	392	376	344	345	336	336	354	335	324	322	325	317	317	327	316	317
Mid-face	559	648	622	606	582	551	524	508	462	410	356	325	317	320	320	326	316	323
Bumper	432	621	564	542	521	500	481	455	419	361	300	259	226	190	161	129	103	97

Static crush (mm)

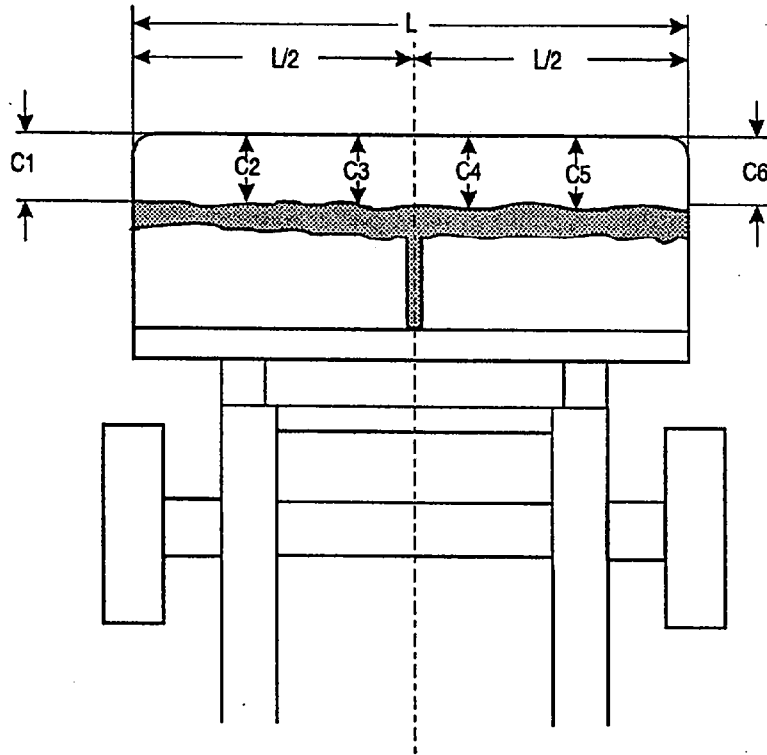
Top of face	813	88	67	49	16	21	10	9	28	10	1	-5	-1	-7	-9	3	-13	-8
Mid-face	559	322	296	280	257	225	198	181	135	85	35	-1	-8	-6	-7	2	-11	-3
Bumper	432	366	340	317	297	276	257	230	194	137	80	34	2	-35	-64	-95	-122	-154

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.

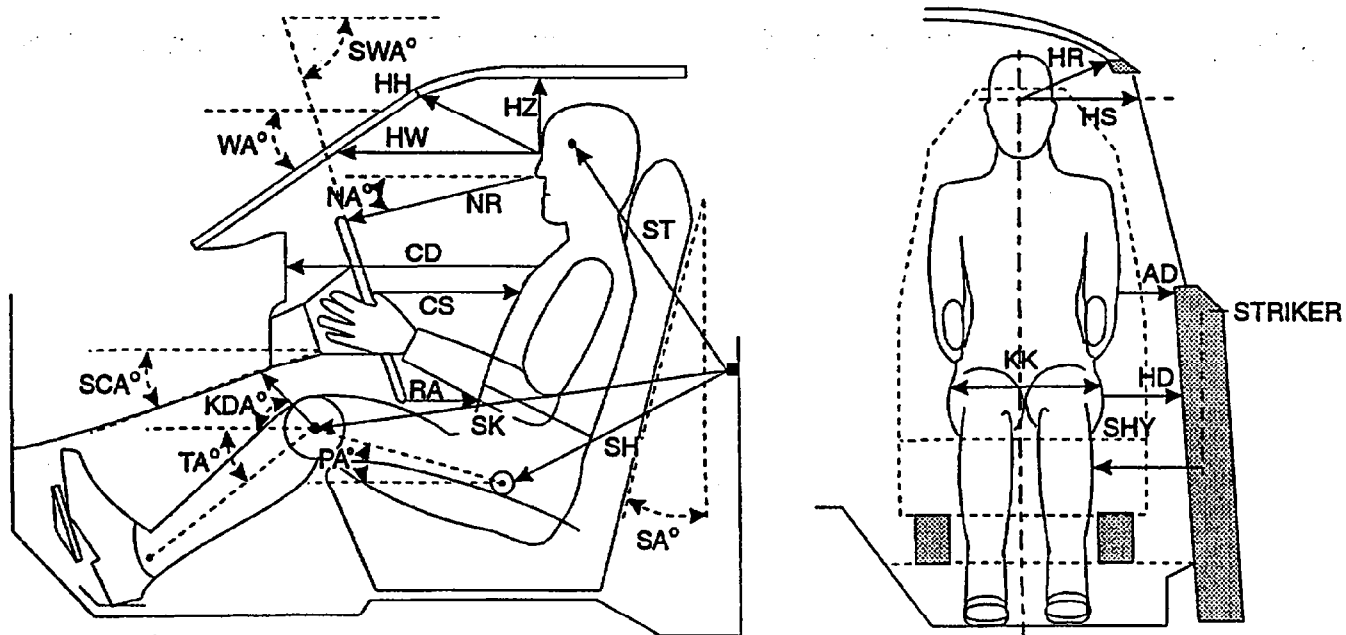
Figure 6 Moving Deformable Barrier Face Crush



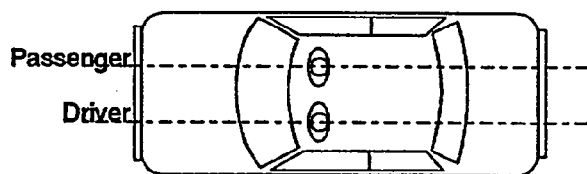
Notes: L is pre-test length of contact surface.
C1 through C6 are spaced equally apart.
CL is moving barrier centerline.

	Pre-test	Post-test	Crush
L	1651 mm		
C1	251 mm	97 mm	154 mm
C2	225 mm	161 mm	64 mm
C3	225 mm	259 mm	-34 mm
C4	225 mm	455 mm	-230 mm
C5	224 mm	521 mm	-297 mm
C6	255 mm	621 mm	-366 mm
CL	224 mm	361 mm	-137 mm

Figure 7 Dummy Measurement Locations for Front Seat Occupants



VERTICAL LONGITUDINAL PLANE



VERTICAL TRANSVERSE PLANE

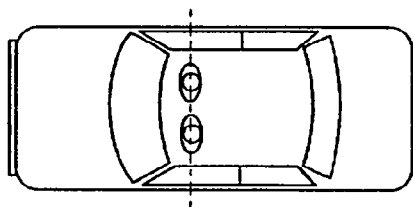
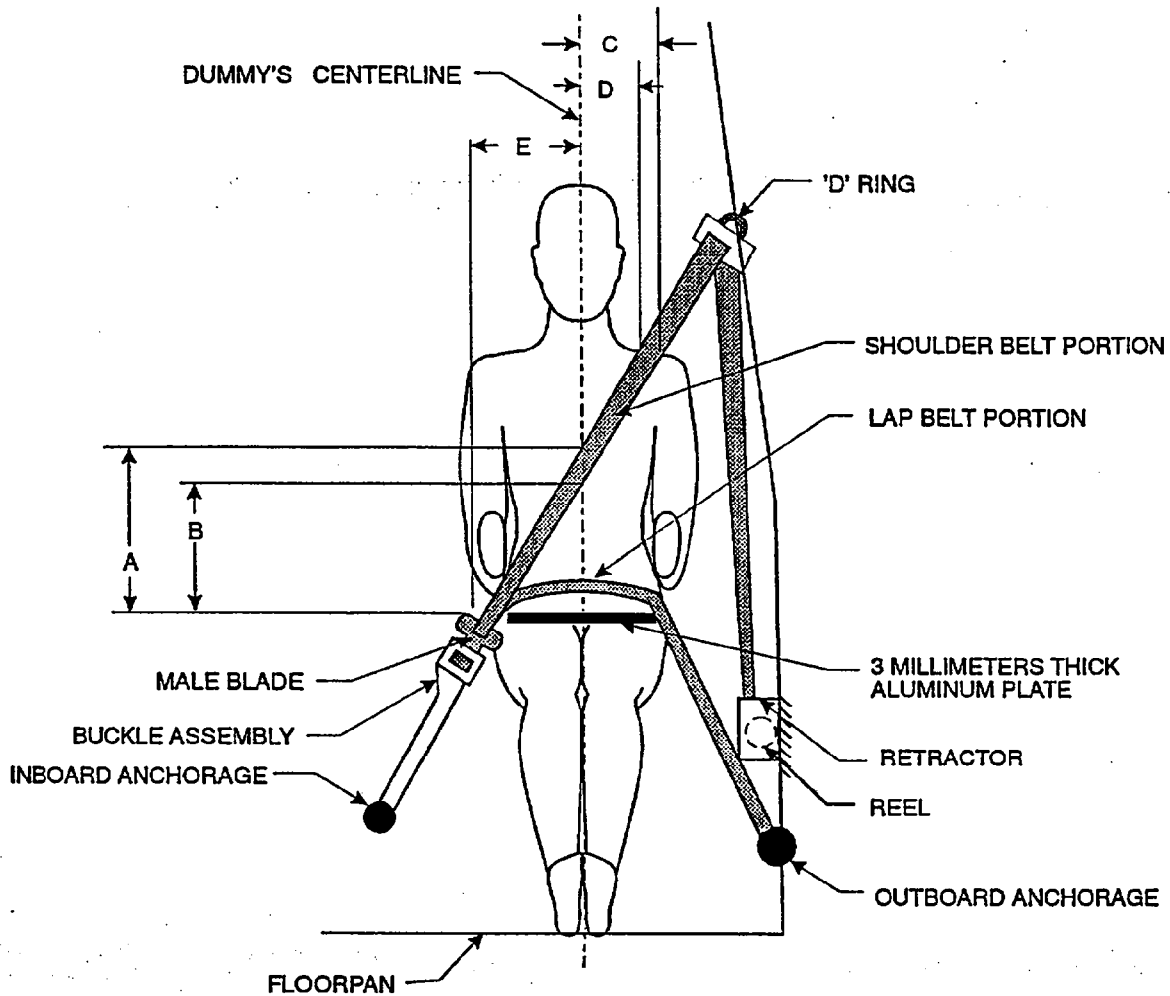


Table 12 Dummy Measurement Data For Front Seat Occupants

Designation	Type of Measurement	Driver (Serial #35)	Passenger (Serial #34)
WA	Windshield angle	38.5°	NA
SWA	Steering wheel angle	66°	NA
SCA	Steering column angle	24°	NA
SA	Seat back angle	20°	20°
HZ	Head to roof	163 mm	164 mm
HH	Head to header	295 mm	297 mm
HW	Head to windshield	432 mm	452 mm
HR	Head to side header	177 mm	172 mm
NR	Nose to rim	364 mm	NA
NA	Nose to rim angle	13°	NA
CD	Chest to dash	503 mm	547 mm
CS	Steering wheel to chest	291 mm	NA
RA	Rim to abdomen	166 mm	NA
KDL	Left knee to dash	144 mm	216 mm
KDR	Right knee to dash	152 mm	216 mm
KDA	Outboard knee to dash angle	23°	27°
PA	Pelvic angle	22°	23°
TA	Tibial angle	42°	30°
KK	Knee to knee	259 mm	254 mm
ST ¹	Striker to head	660 mm	617 mm
	Striker to head angle	-54°	-40°
SK ¹	Striker to knee	927 mm	893 mm
	Striker to knee angle	3°	8°
SH ¹	Striker to H-point	578 mm	538 mm
	Striker to H-point angle	21°	20°
SHY	Striker to H-point (Y dir.)	215 mm	216 mm
HS	Head to side window	245 mm	245 mm
HD	H-point to door	161 mm	165 mm
AD	Arm to door	74 mm	22 mm

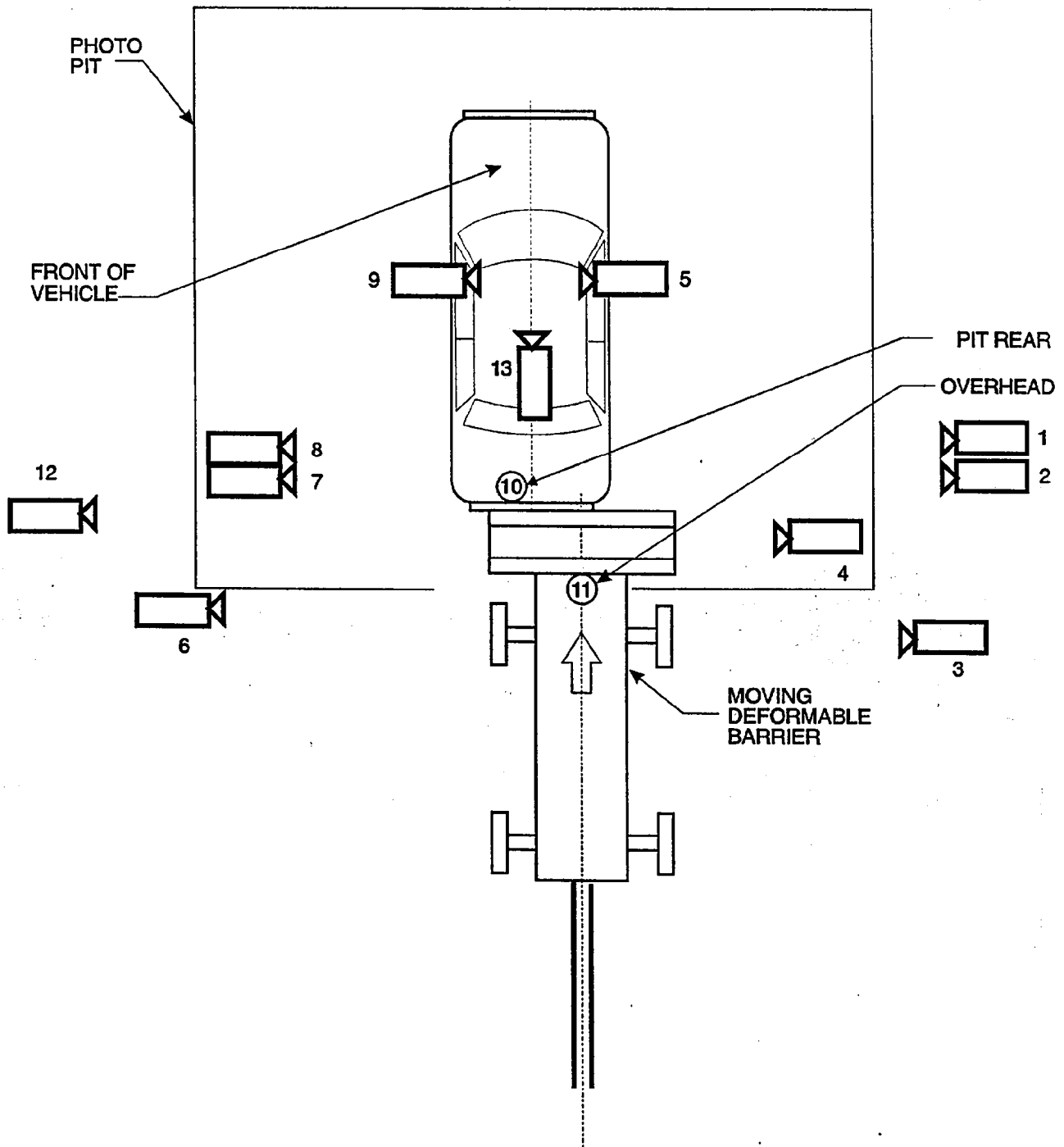
The seat back angle (SA°) is measured relative to vertical, all other angles are measured relative to horizontal.

Figure 8 Seat Belt Positioning Data



		Driver	Passenger
A	Top surface of aluminum plate to belt upper edge	279 mm	286 mm
B	Top surface of aluminum plate to belt lower edge	212 mm	220 mm
C	Dummy centerline to outer edge of belt at chest flesh top	131 mm	142 mm
D	Dummy centerline to inner edge of belt at chest flesh top	75 mm	78 mm
E	Dummy centerline to intersection of upper torso belt and lap belt	241 mm	250 mm

Figure 9 Camera Positions



Test number: 951113

Table 13 Motion Picture Camera Locations

Vehicle year/make/model/body style: 1993/Ford/Mustang/2-door coupe

Camera Number	View	Camera Positions ¹			Angle of Inclination ²	Angle of Rotation ³	Camera Lens	Film Speed
		X	Y	Z				
1	Right side vehicle	2134	12725	1168	0°	0°	25 mm	475 frames/s
2	Right side overall	-356	13970	1123	0°	0°	13 mm	500 frames/s
3	Right MDB	NA	NA	NA	0°	0°	25 mm	NA ⁴ frames/s
4	Right close-up	737	5867	826	-3°	0°	17 mm	508 frames/s
5	Right front passenger onboard	NA	NA	NA	NA	NA	8 mm	500 ⁴ frames/s
6	Left side MDB	1245	-13411	826	0°	0°	25 mm	480 frames/s
7	Left side close-up	737	-6629	851	-3°	0°	17 mm	NA ⁴ frames/s
8	Left side vehicle	2438	-15646	1201	-2°	0°	25 mm	500 frames/s
9	Driver onboard	NA	NA	NA	NA	NA	8 mm	475 ⁴ frames/s
10	Underbody vehicle	NA	NA	NA	90°	0°	17 mm	998 frames/s
11	Overhead	NA	NA	NA	90°	0°	13 mm	500 frames/s
12	Left side overall	1219	-14122	1147	0°	0°	13 mm	500 frames/s
13	Seat back view	NA	NA	NA	NA	NA	13 mm	505 ⁴ 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

⁴ See Data Acquisition Explanations

Appendix A

Photographs

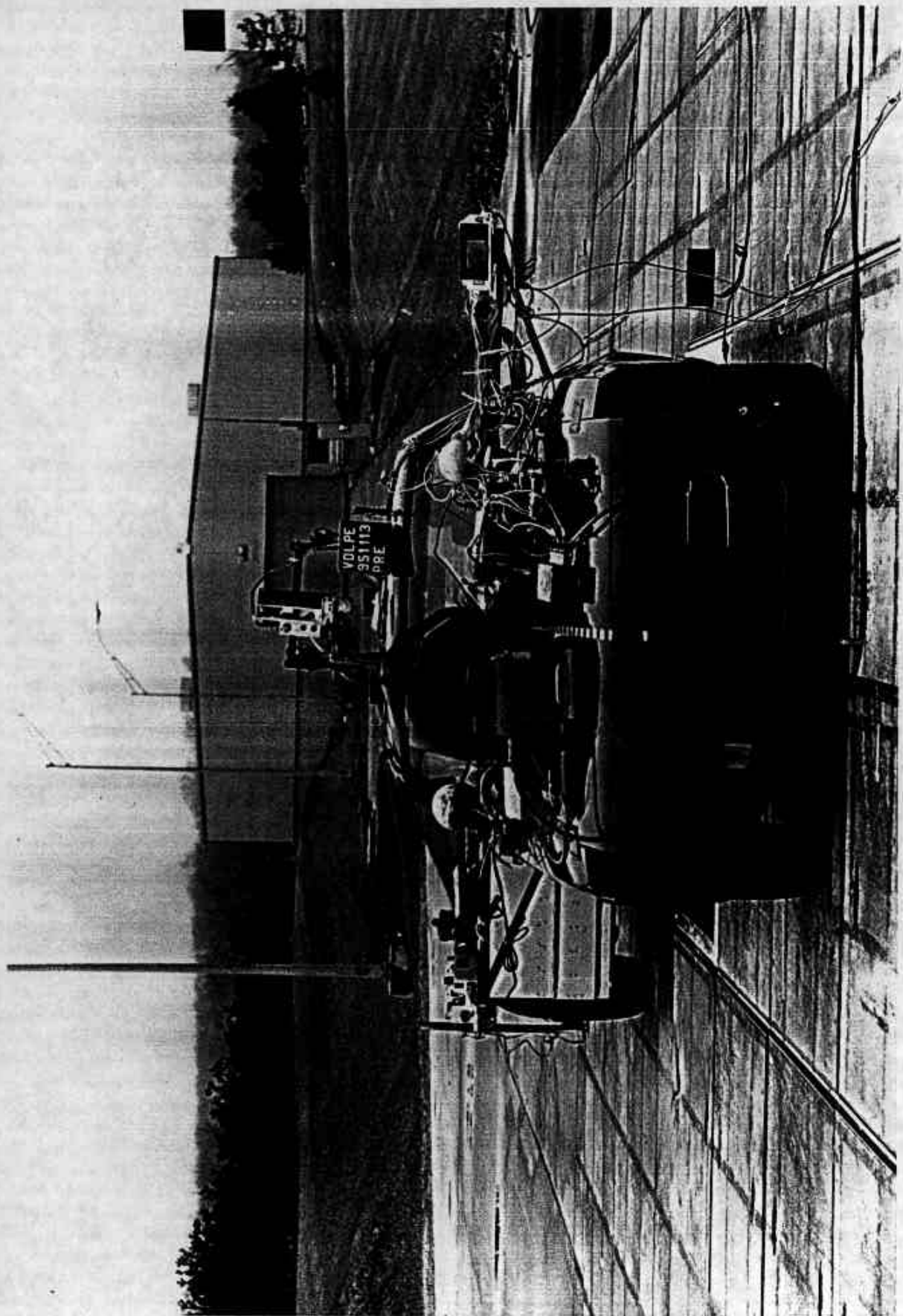


Figure A-1. Pre-Test Front View
A-2

951113

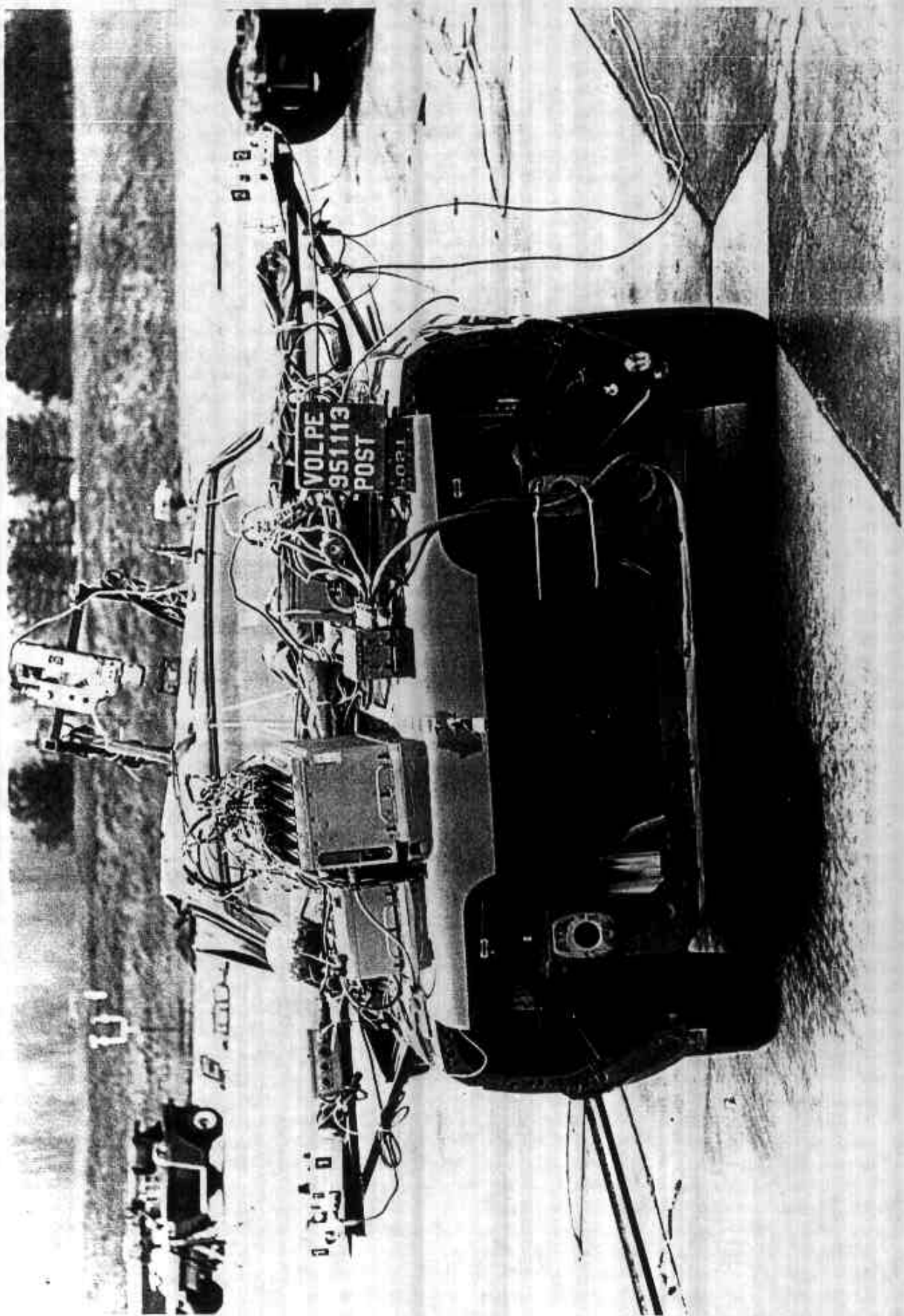


Figure A-2. Post-Test Front View
A-3

951113

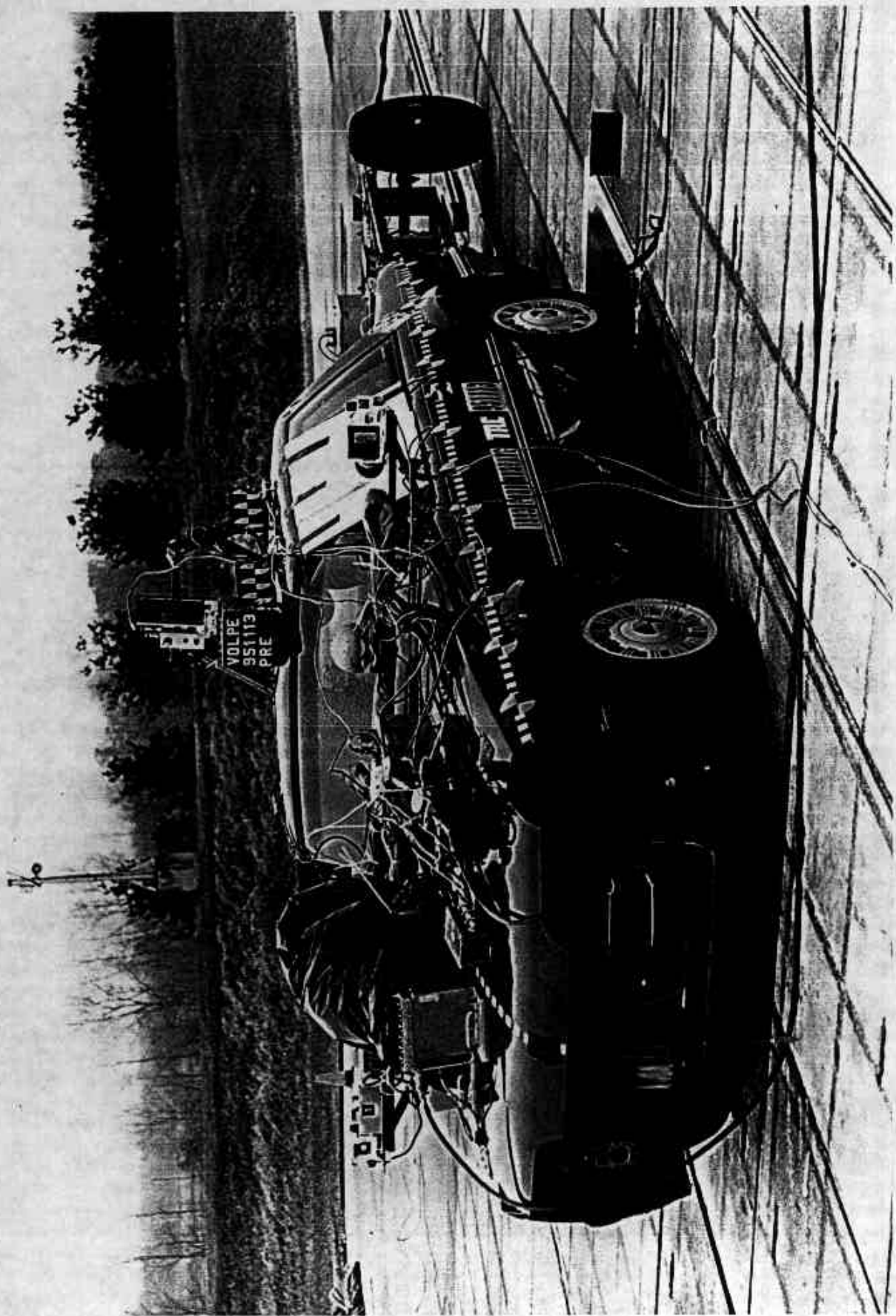


Figure A-3. Pre-Test Left Front Three-Quarter View
A-4

951113

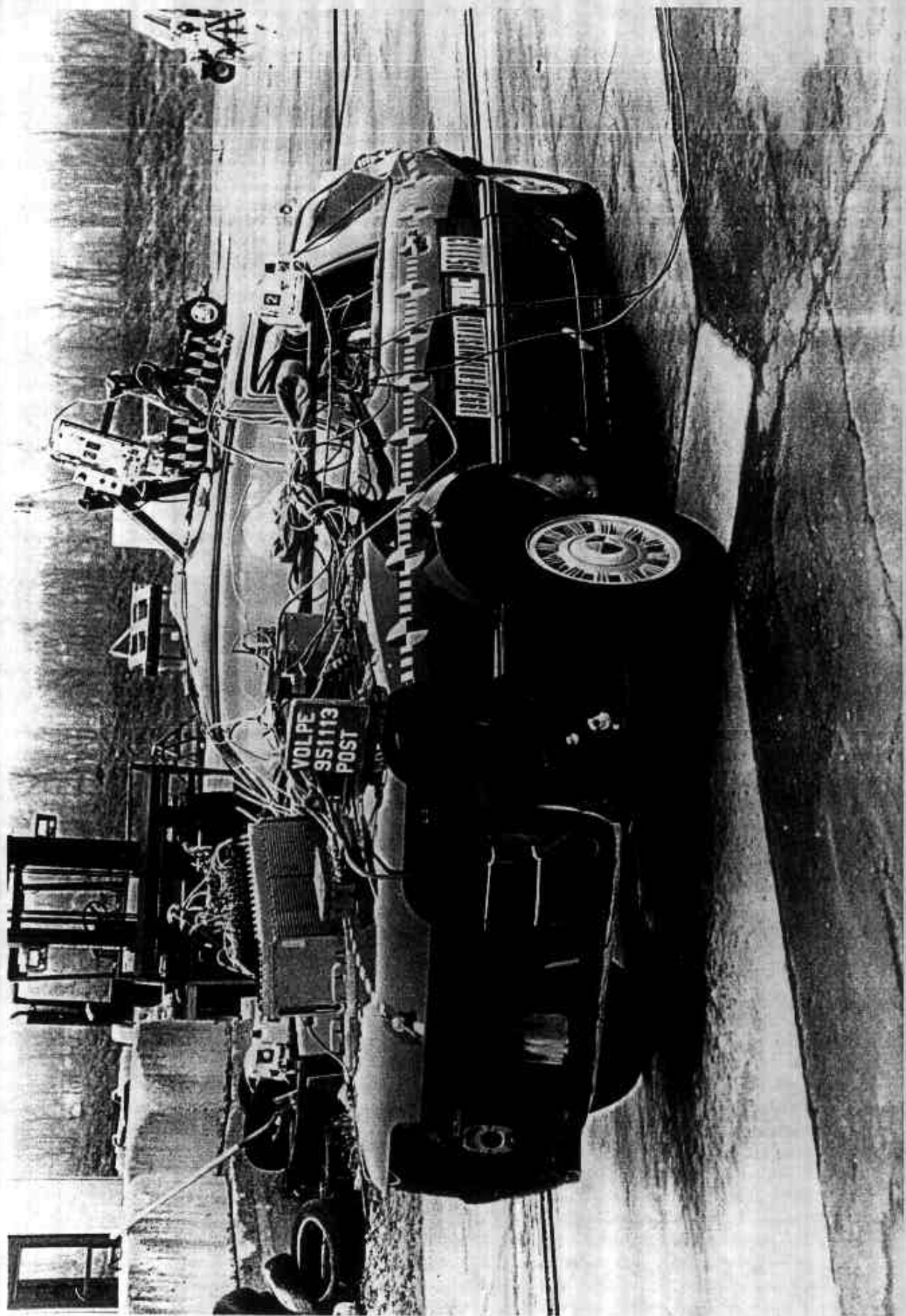


Figure A-4. Post-Test Left Front Three-Quarter View
A-5

951113

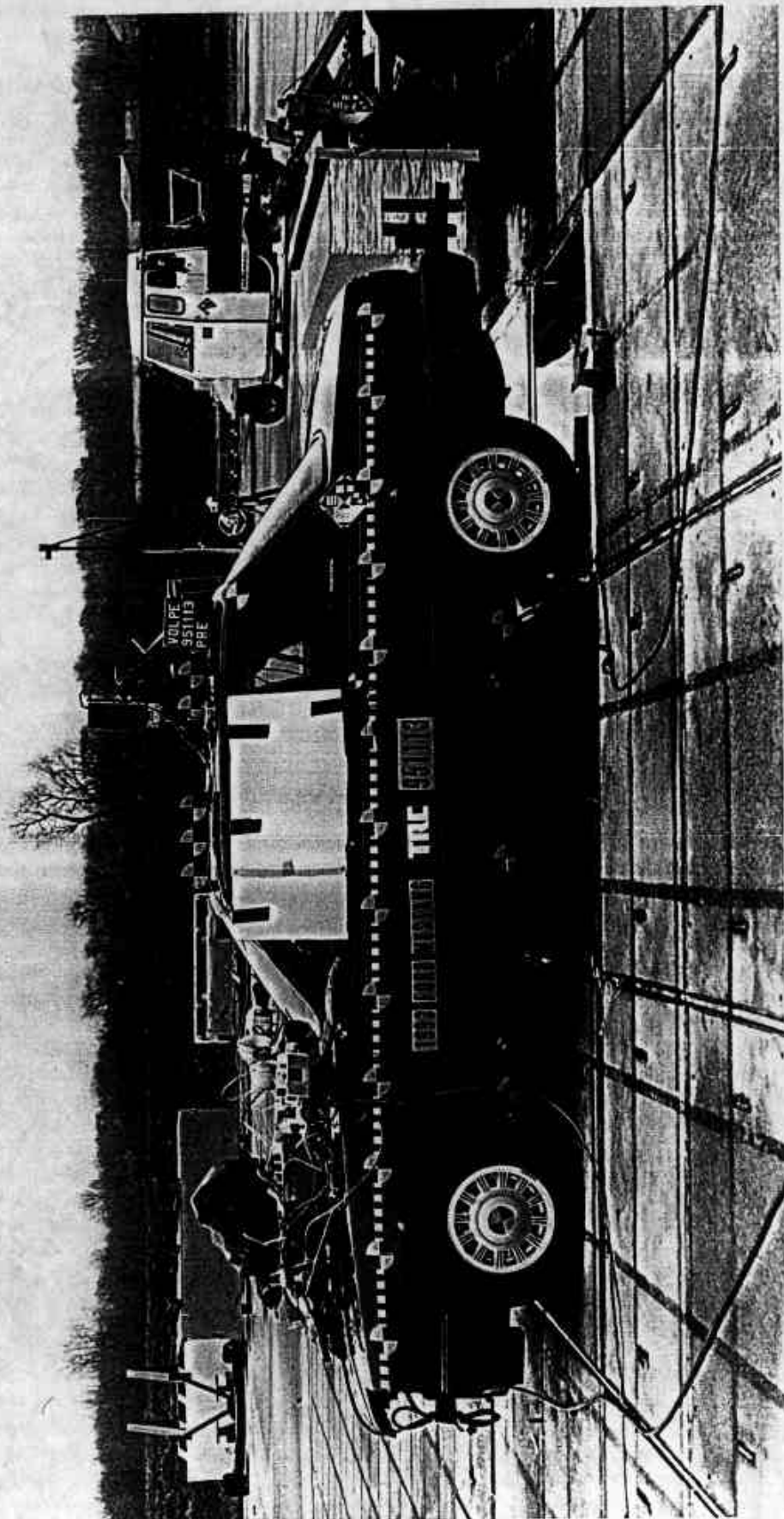


Figure A-5. Pre-Test Left Side View
A-6

951113

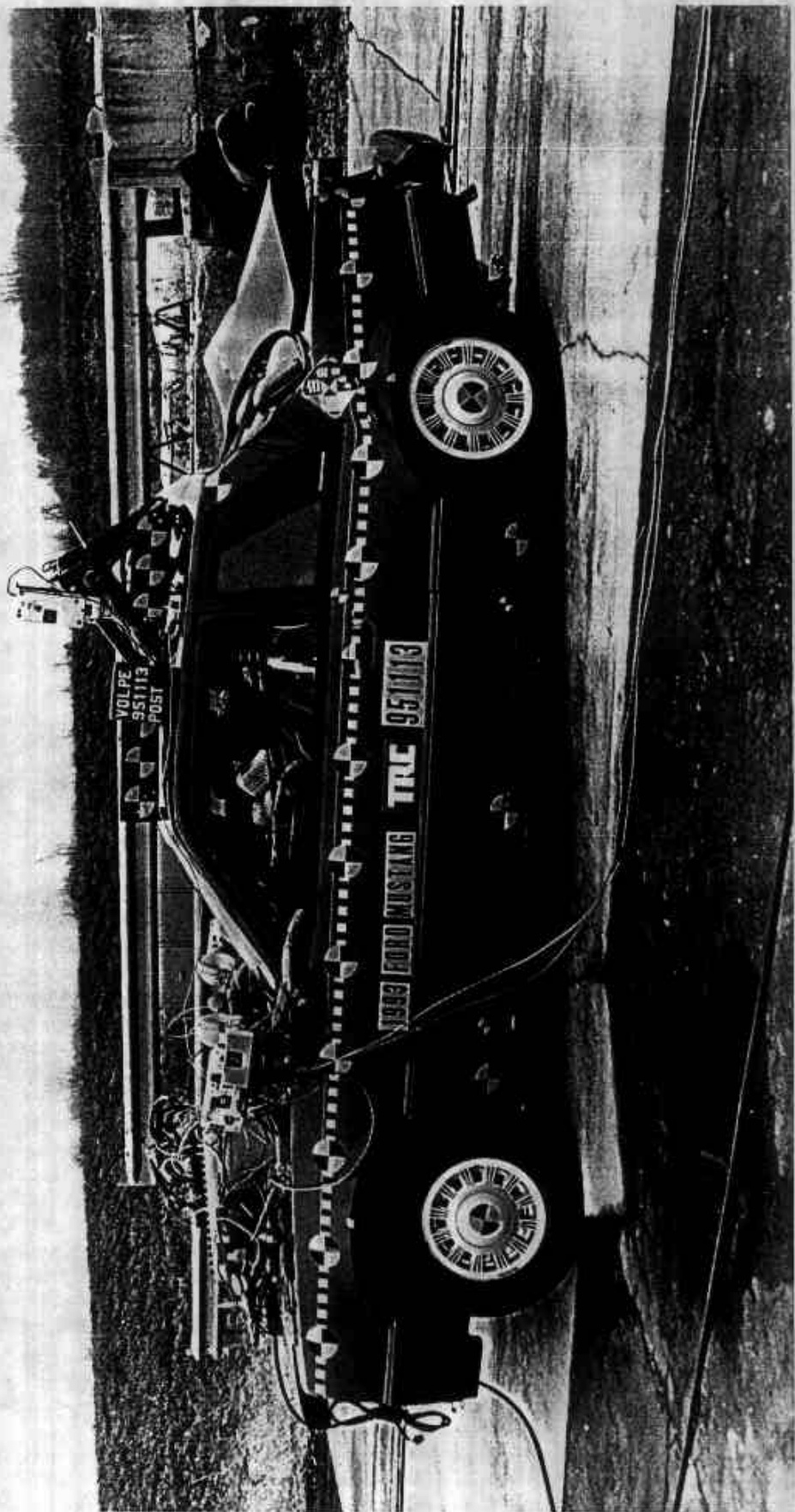


Figure A-6. Post-Test Left Side View
A-7

951113

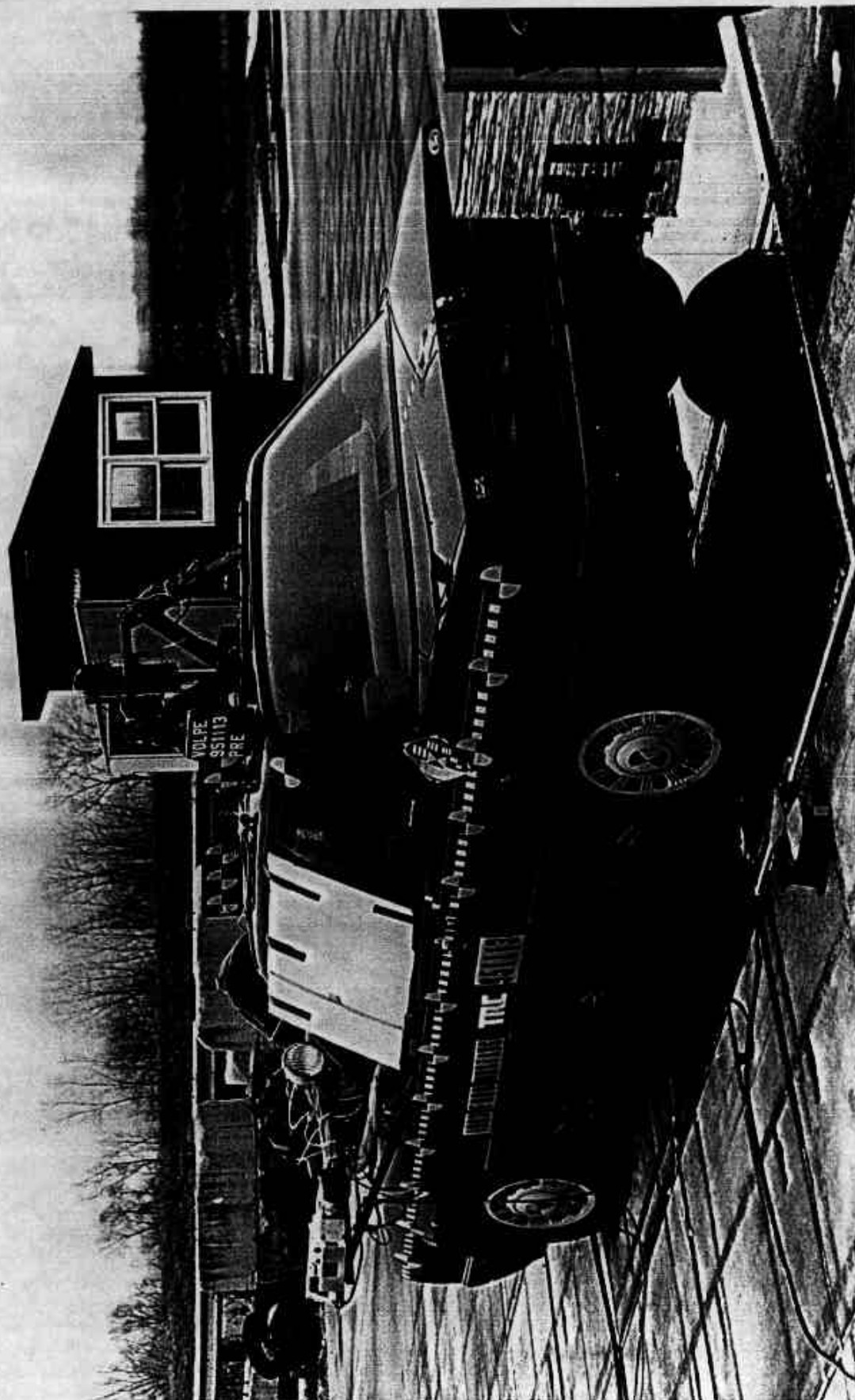


Figure A-7. Pre-Test Left Rear Three-Quarter View
A-8

951113

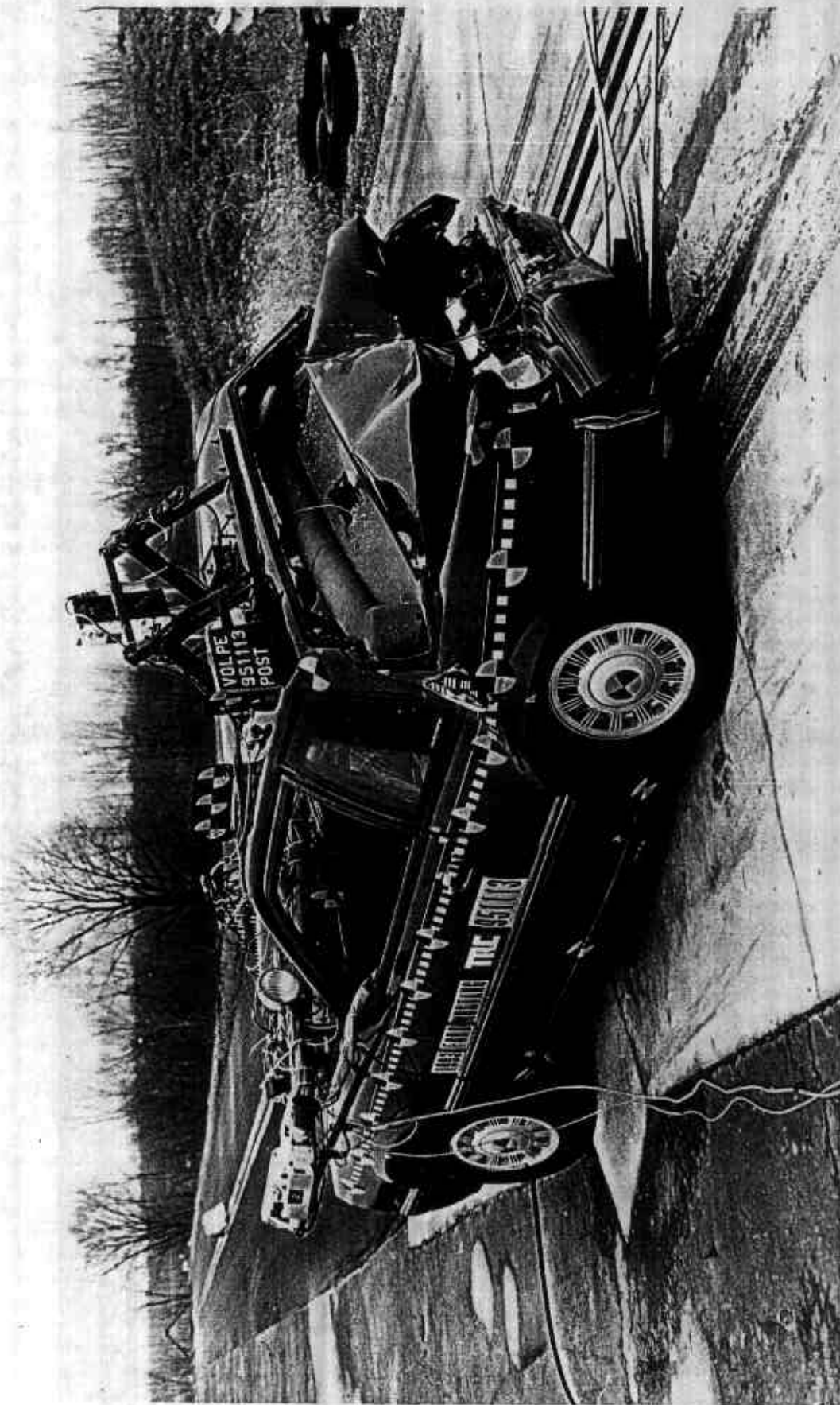


Figure A-8. Post-Test Left Rear Three-Quarter View
A-9

951113

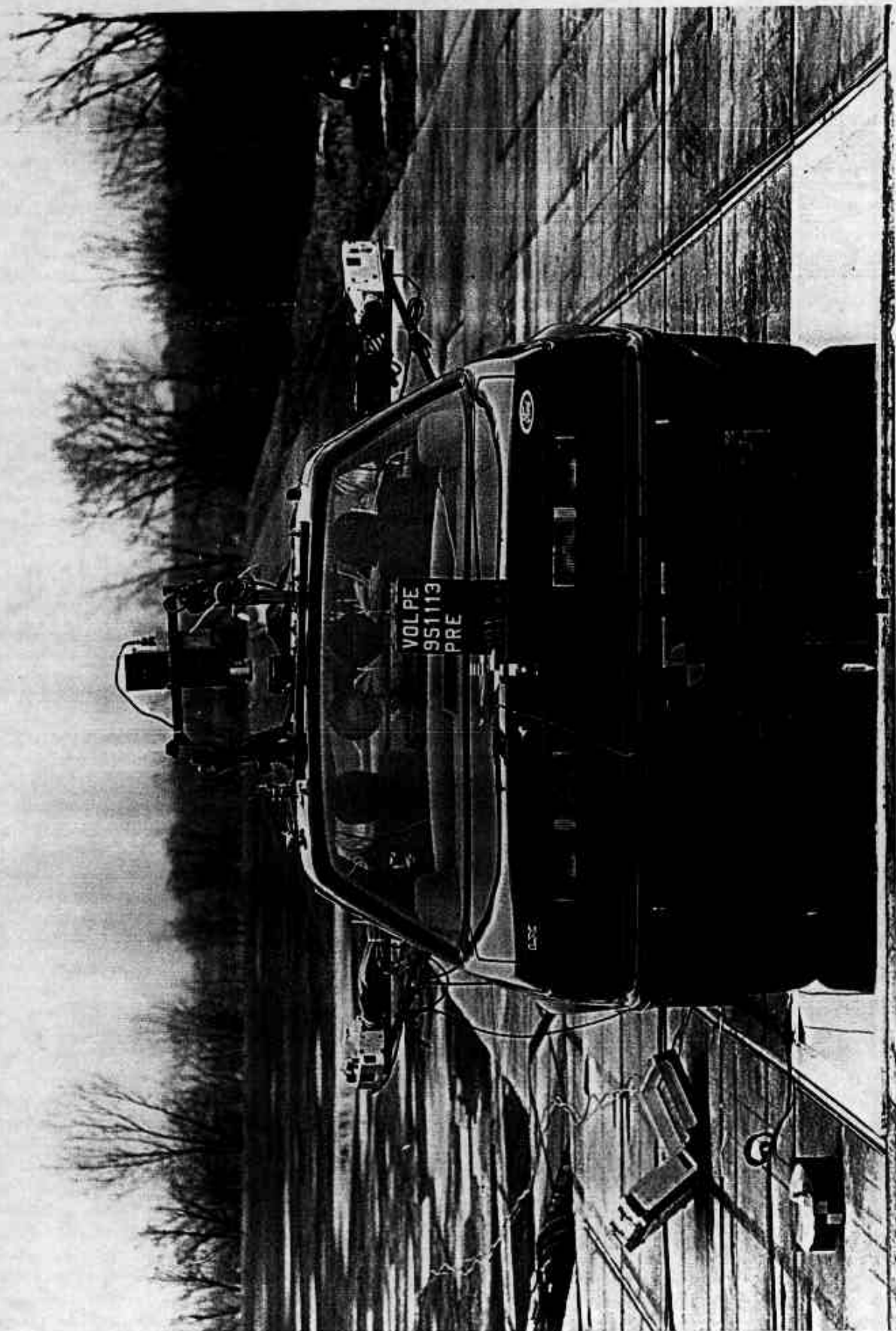


Figure A-9. Pre-Test Rear View
A-10

951113

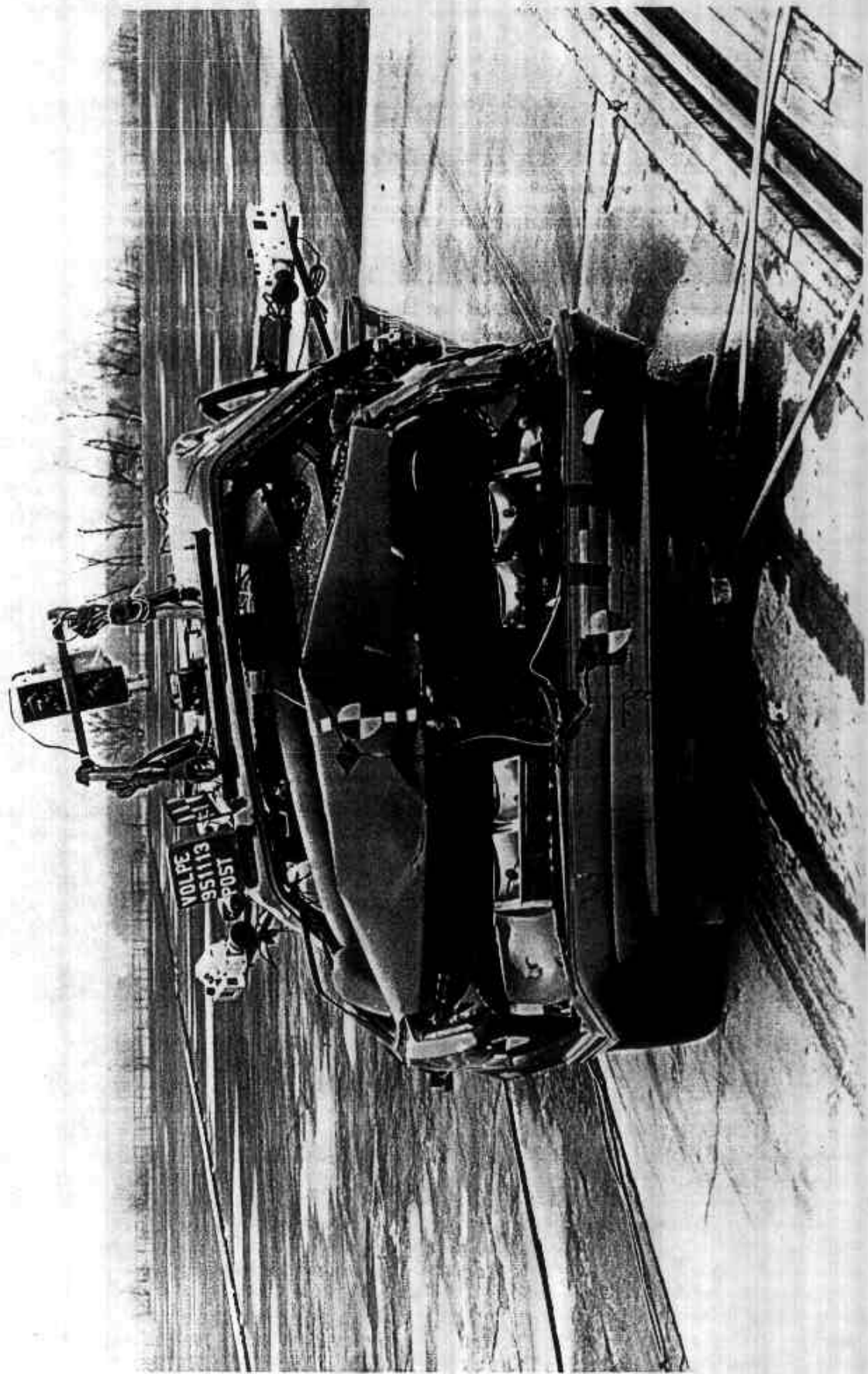


Figure A-10. Post-Test Rear View
A-11

951113

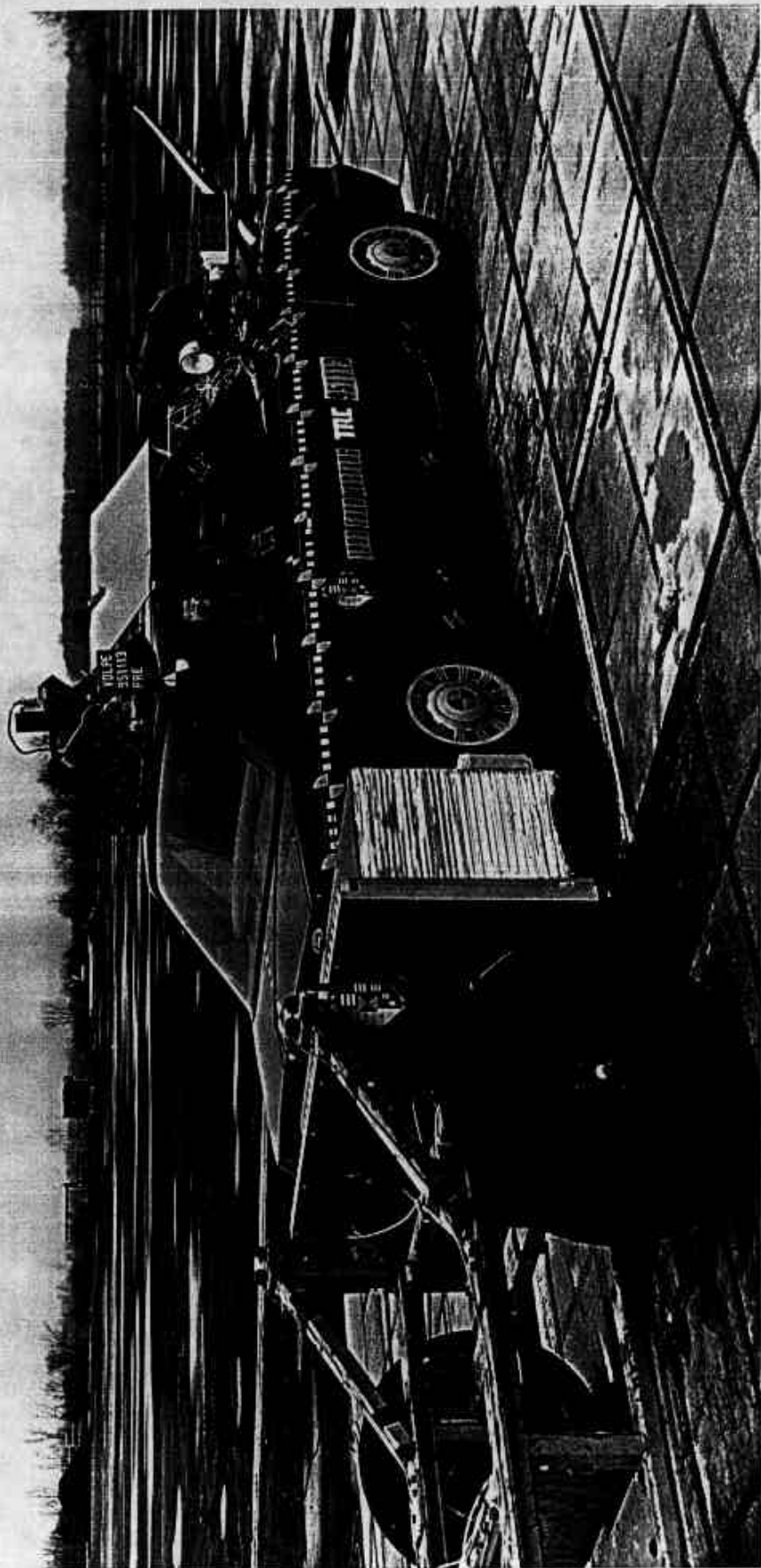


Figure A-11. Pre-Test Right Rear Three-Quarter View
A-12

951113

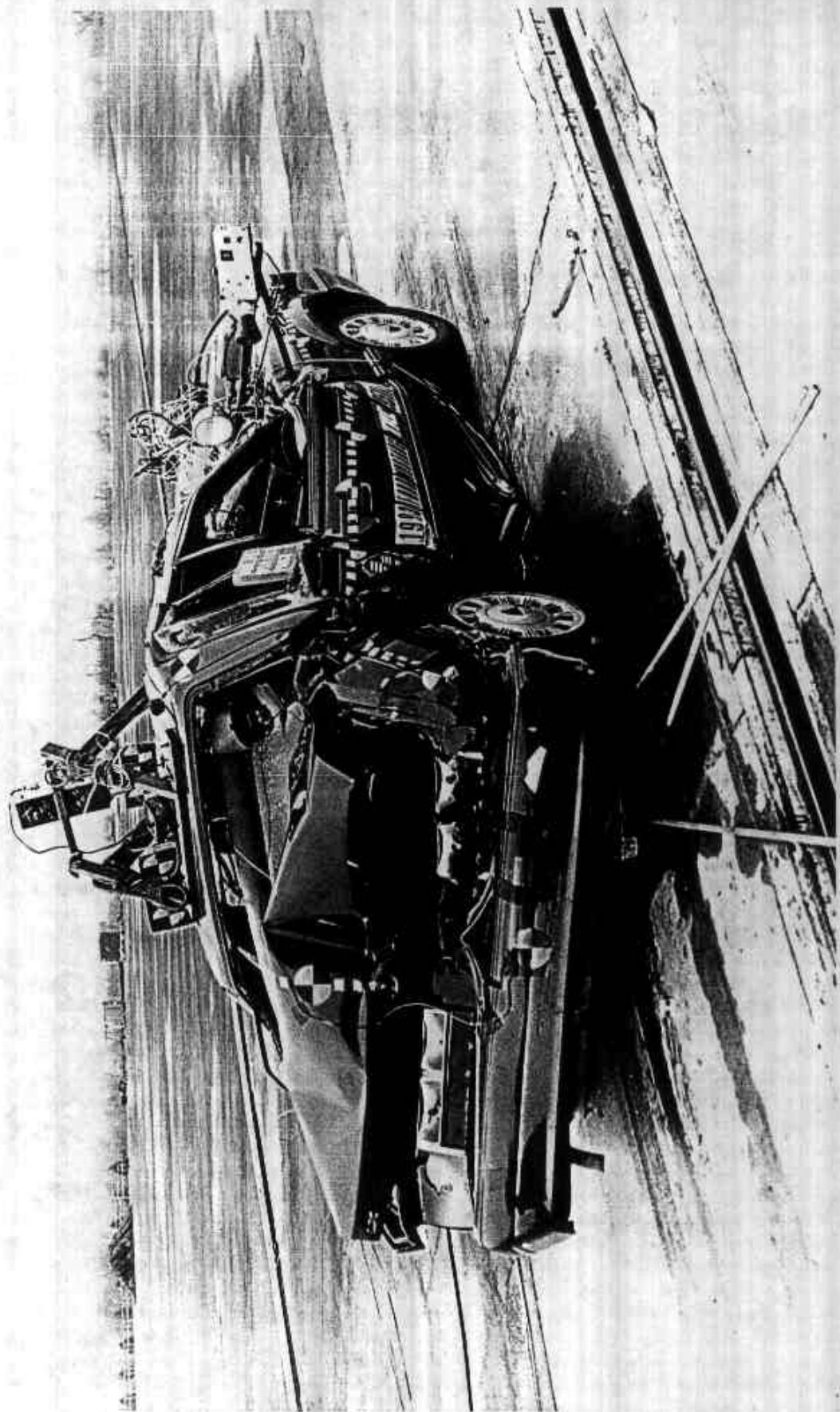


Figure A-12. Post-Test Right Rear Three-Quarter View
A-13

951113

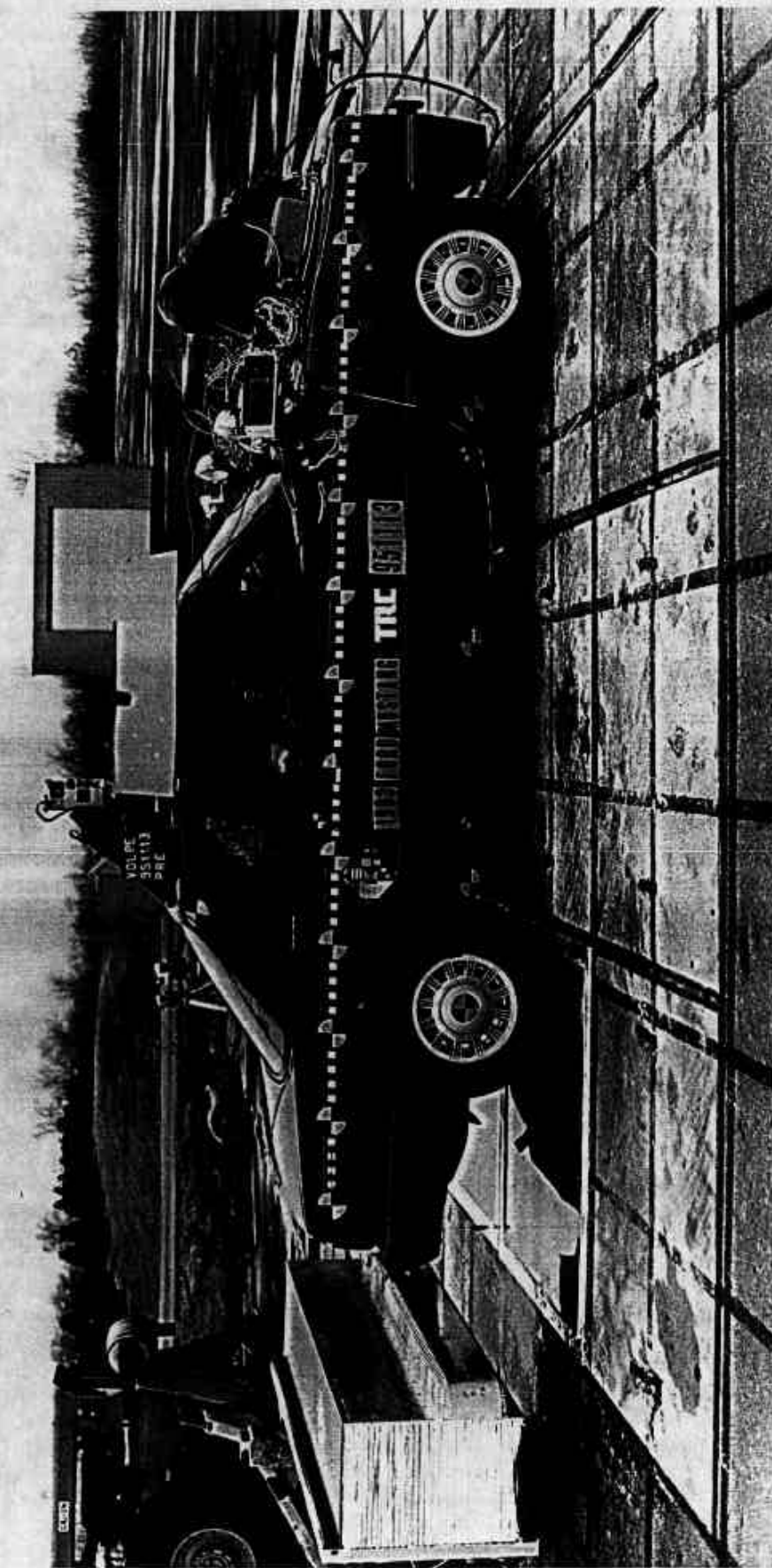


Figure A-13. Pre-Test Right Side View
A-14

951113

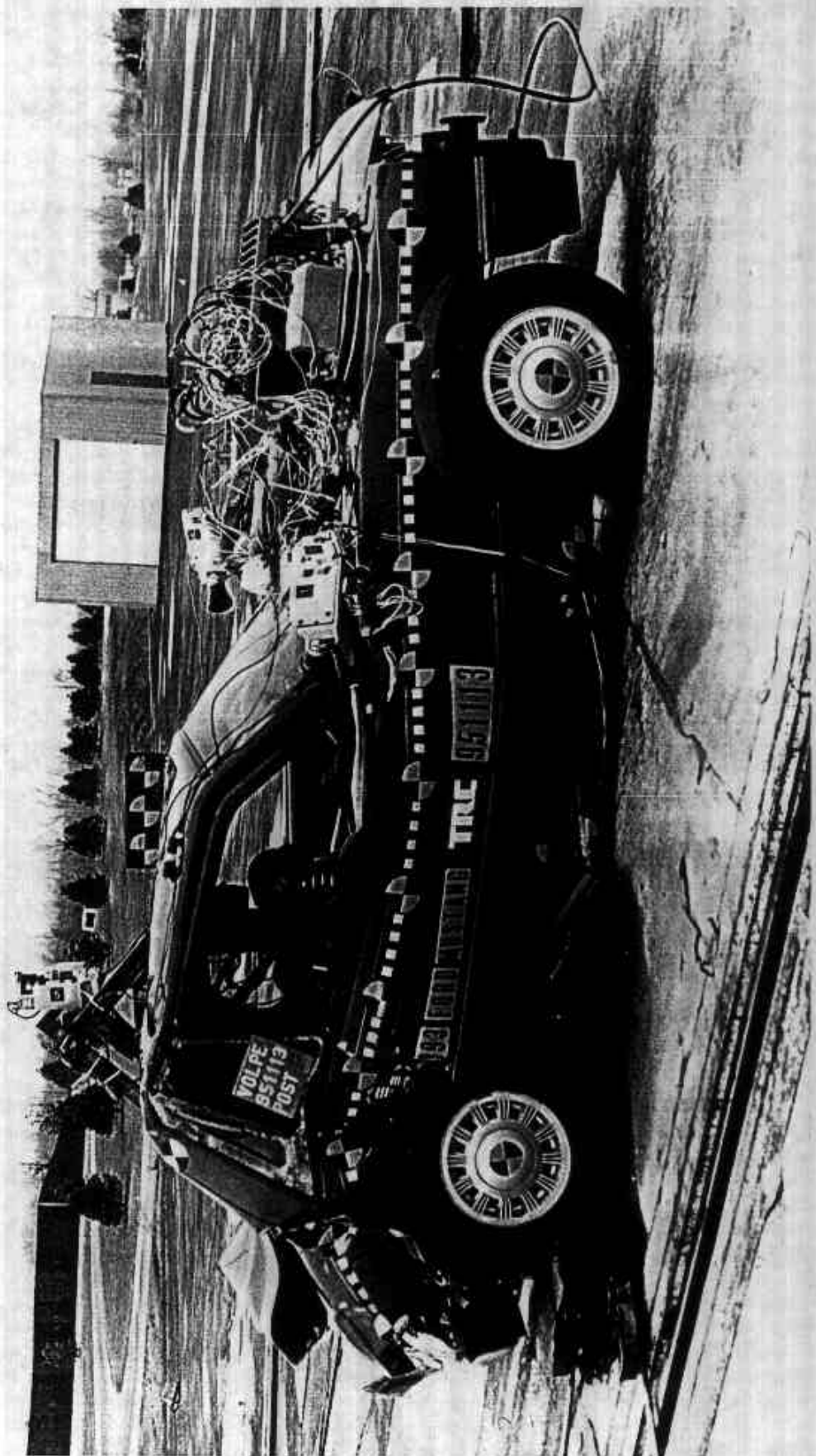


Figure A-14. Post-Test Right Side View
A-15

951113

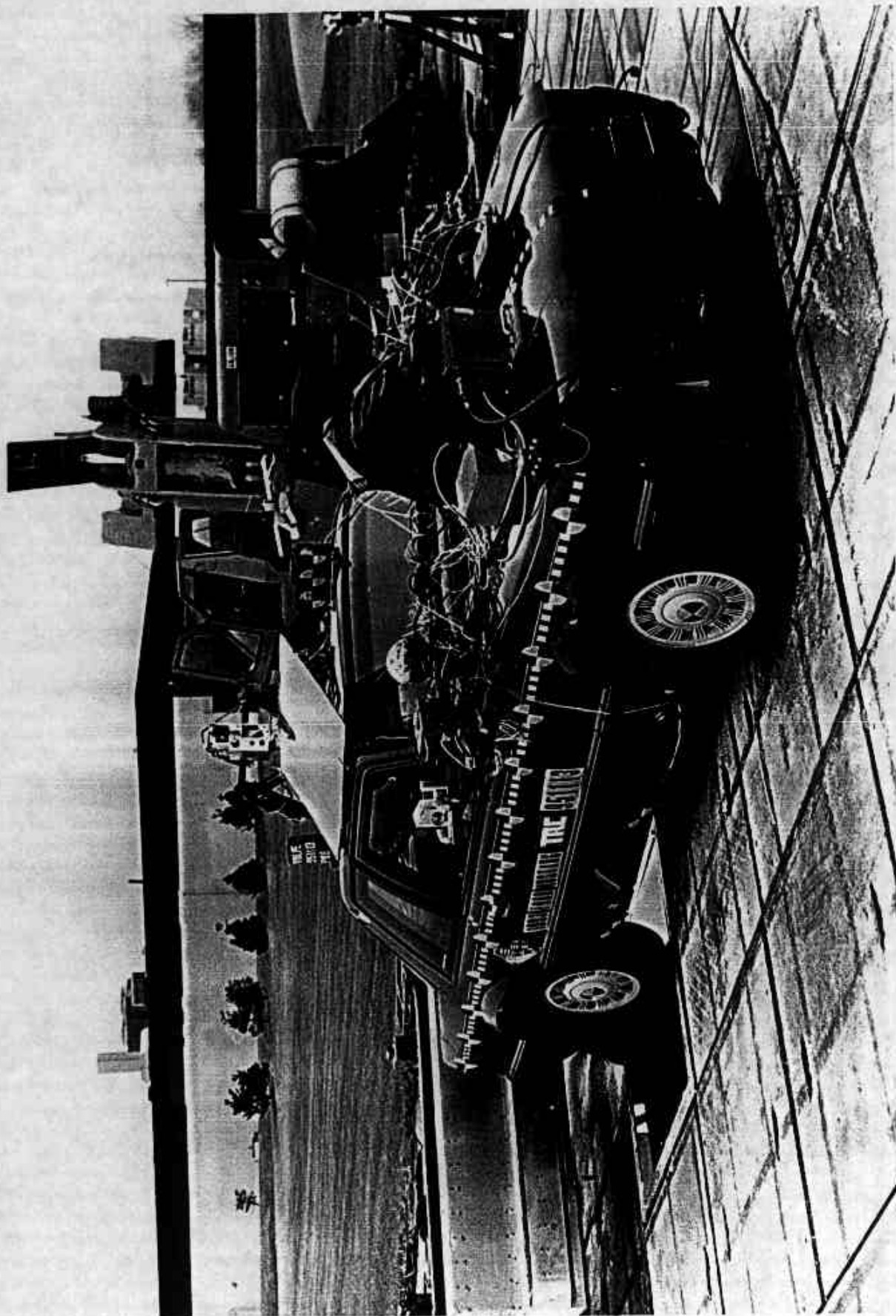


Figure A-15. Pre-Test Right Front Three-Quarter View
A-16

951113

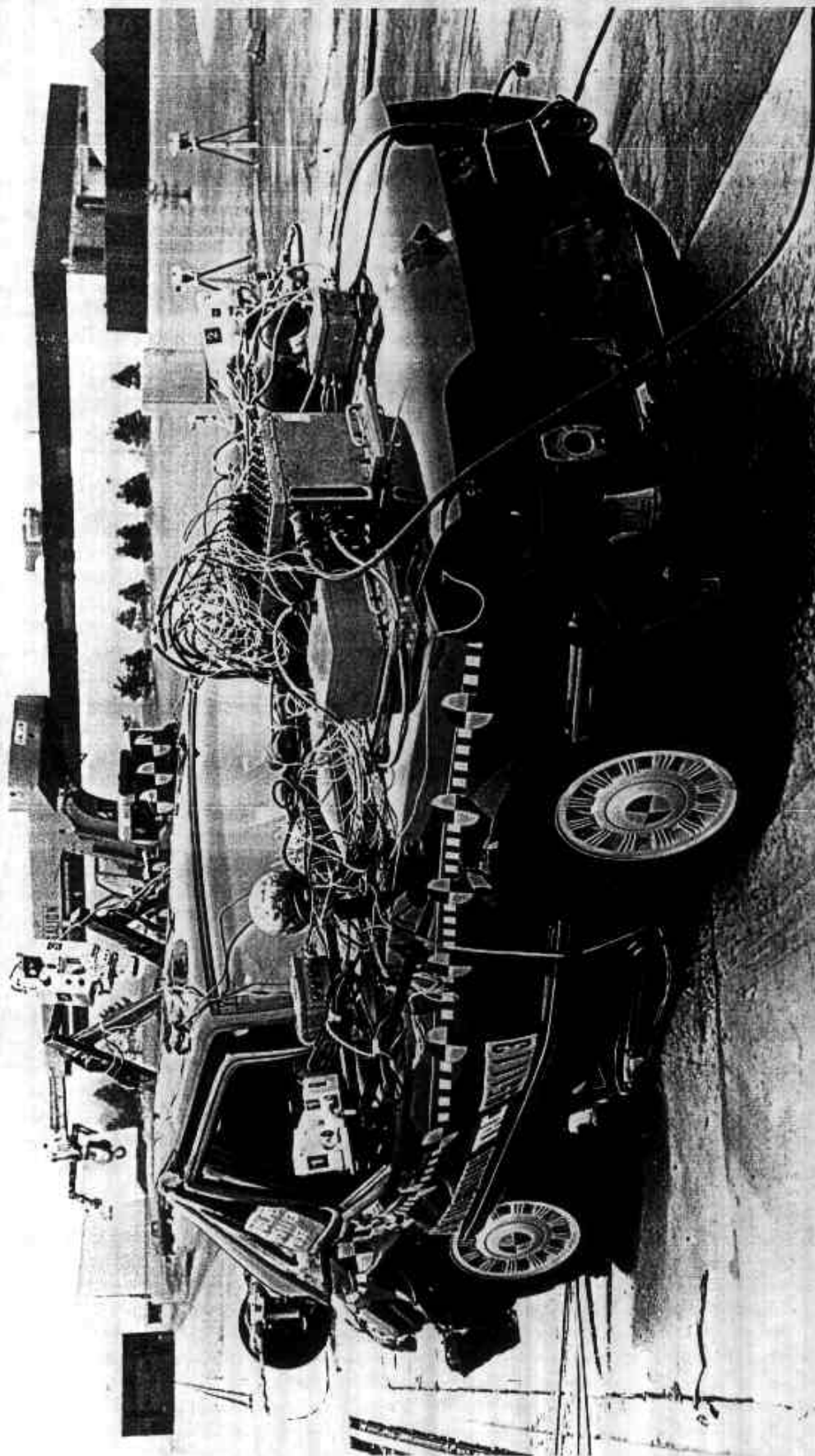


Figure A-16. Post-Test Right Front Three-Quarter View
A-17

951113

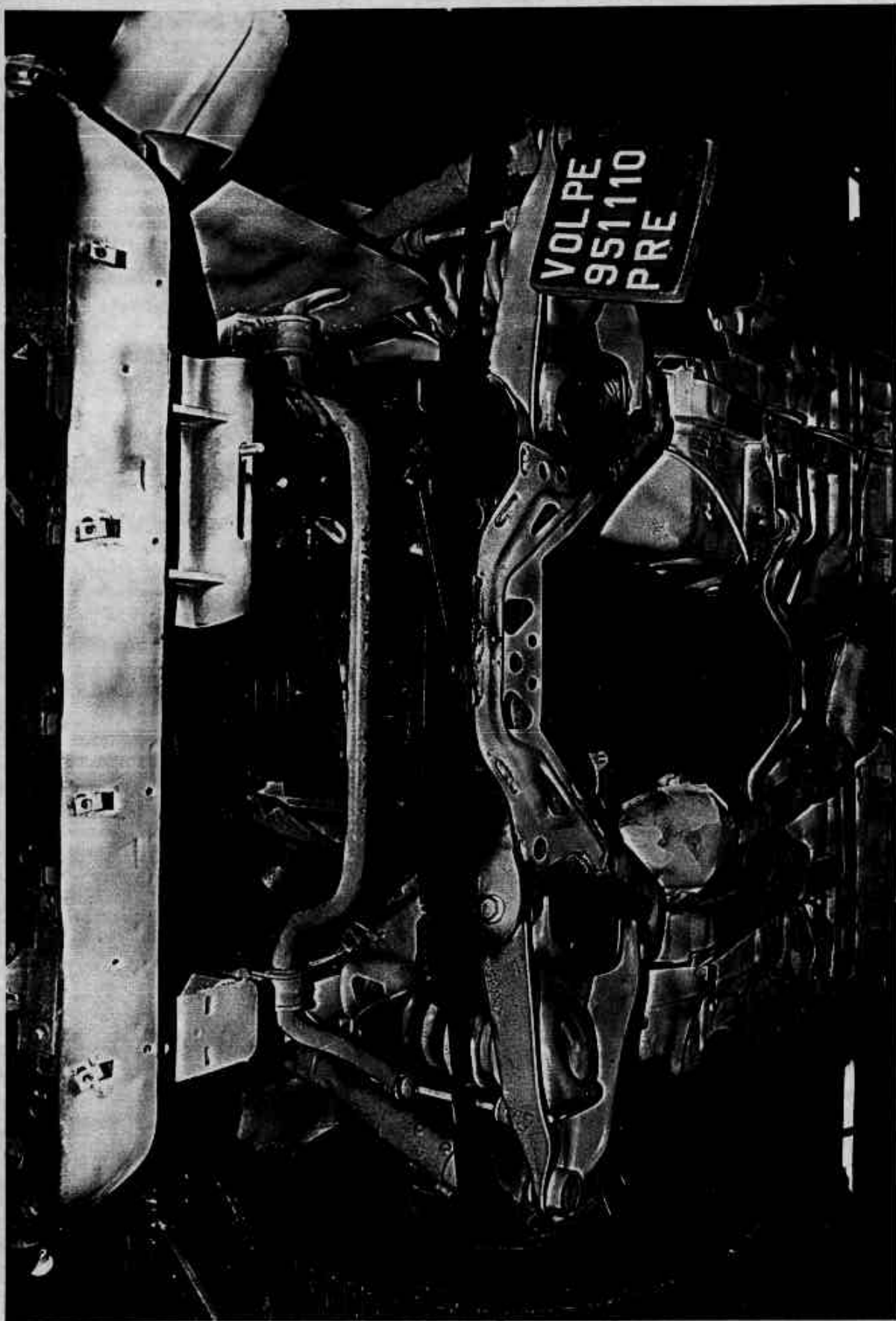


Figure A-17. Pre-Test Front Underbody - View 1
A-18

951113



Figure A-18. Pre-Test Front Underbody - View 2
A-19

951113

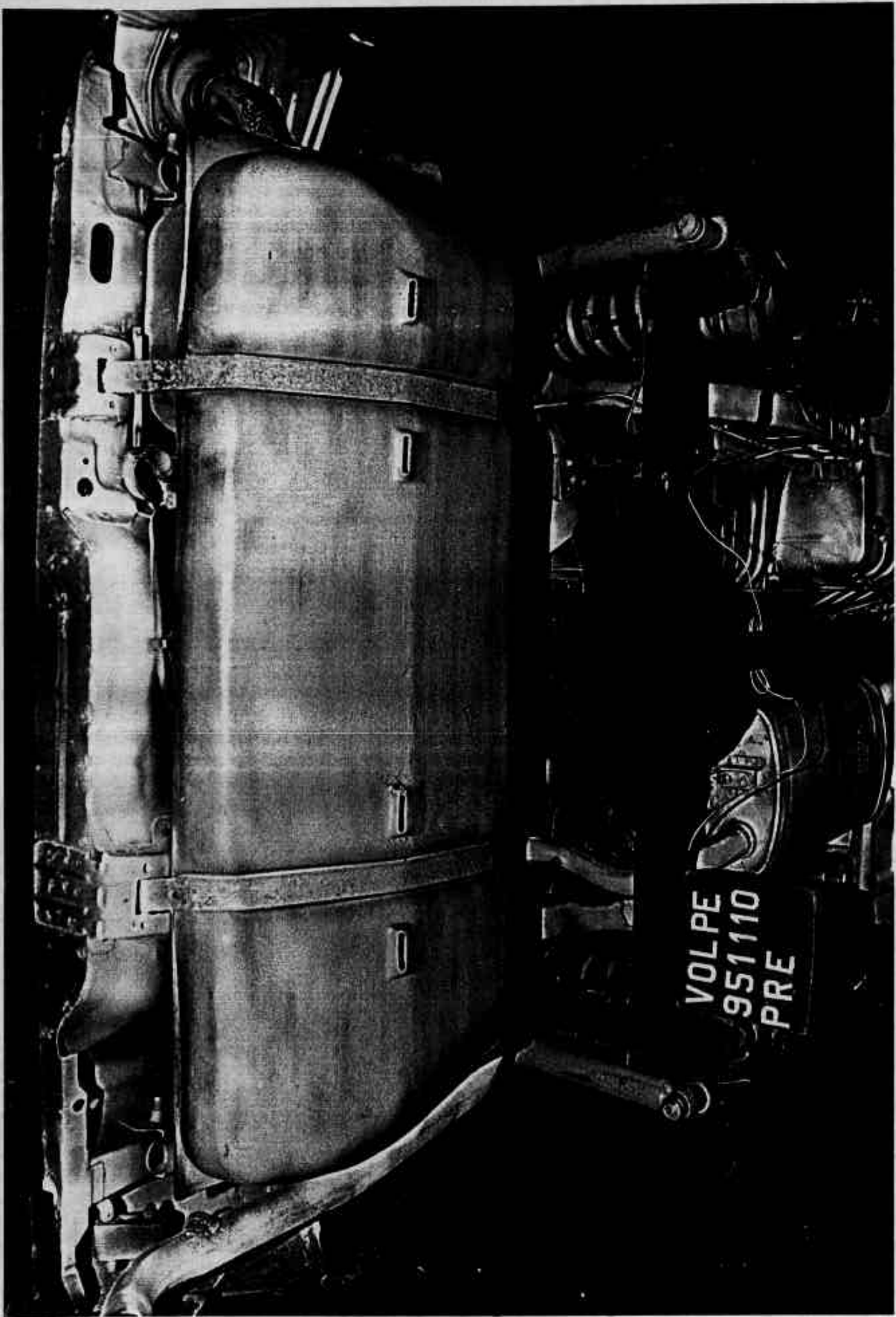


Figure A-19. Pre-Test Rear Underbody View
A-20

951113



Figure A-20. Post-Test Rear Underbody - View 1
A-21

951113



Figure A-21. Post-Test Rear Underbody - View 2
A-22

951113

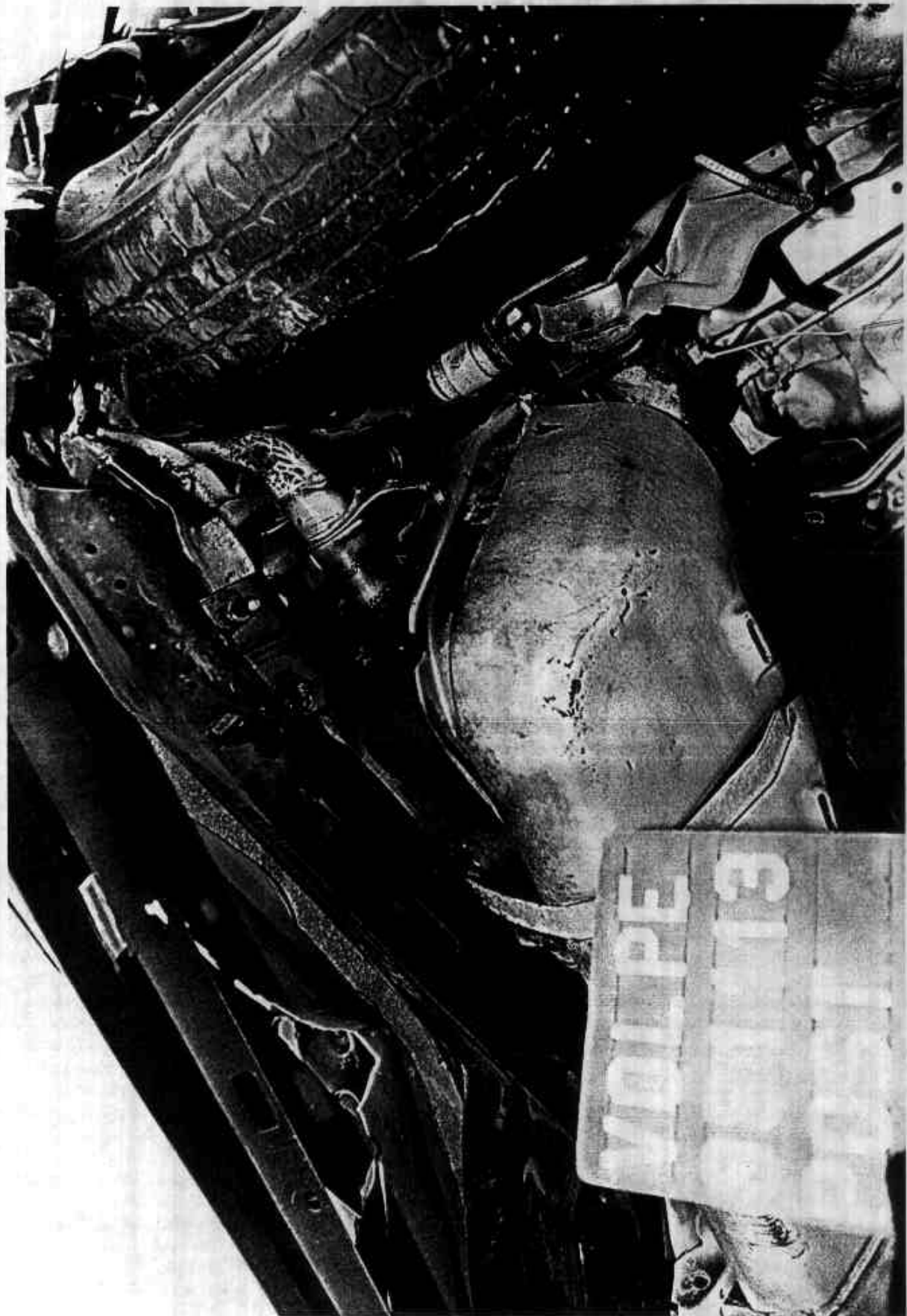


Figure A-22. Post-Test Fuel Tank/Fuel Filler Neck View
A-23

951113

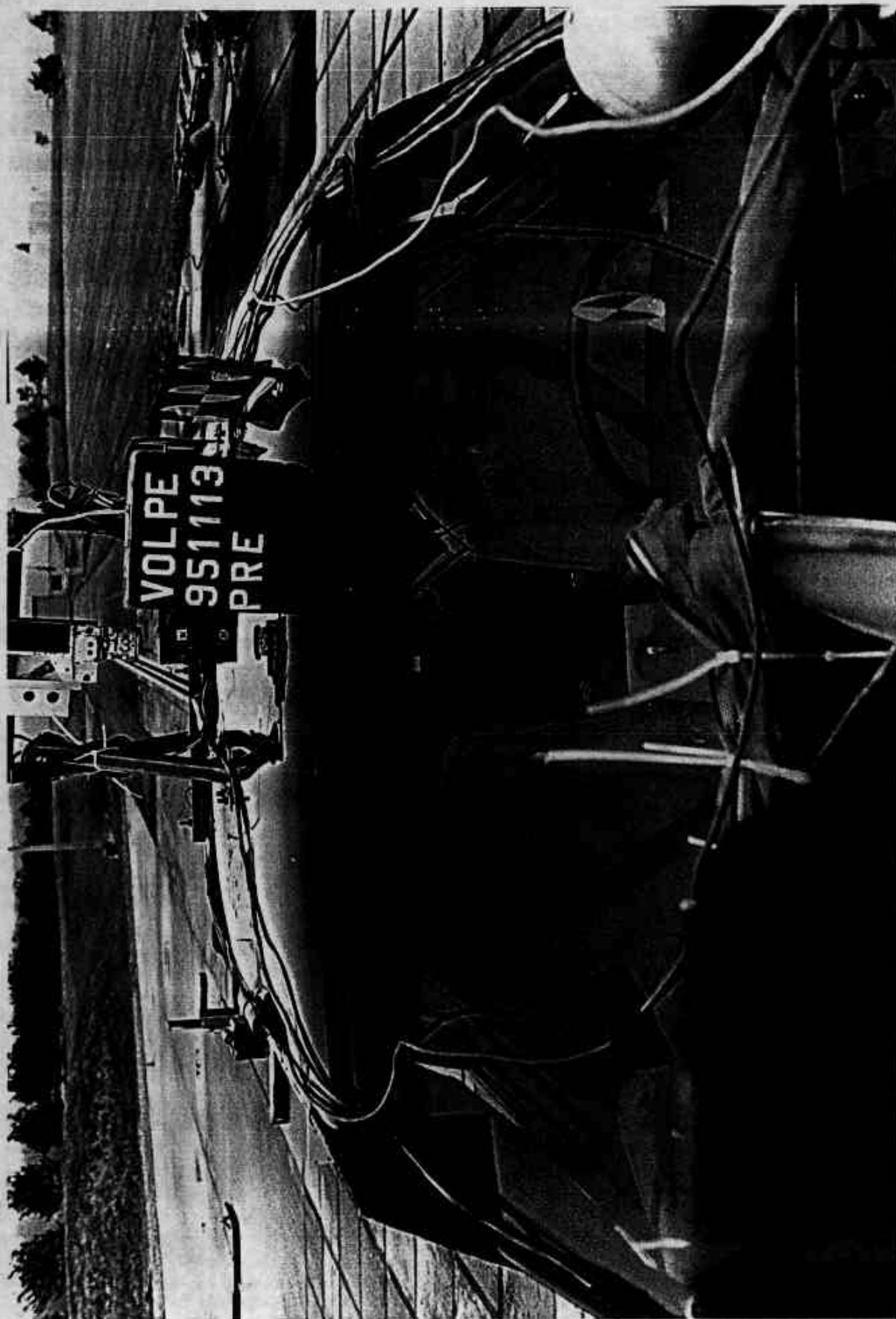


Figure A-23. Pre-Test Windshield View
A-24

951113



Figure A-24. Pre-Test Barrier to Vehicle Alignment View - Left
A-25

951113

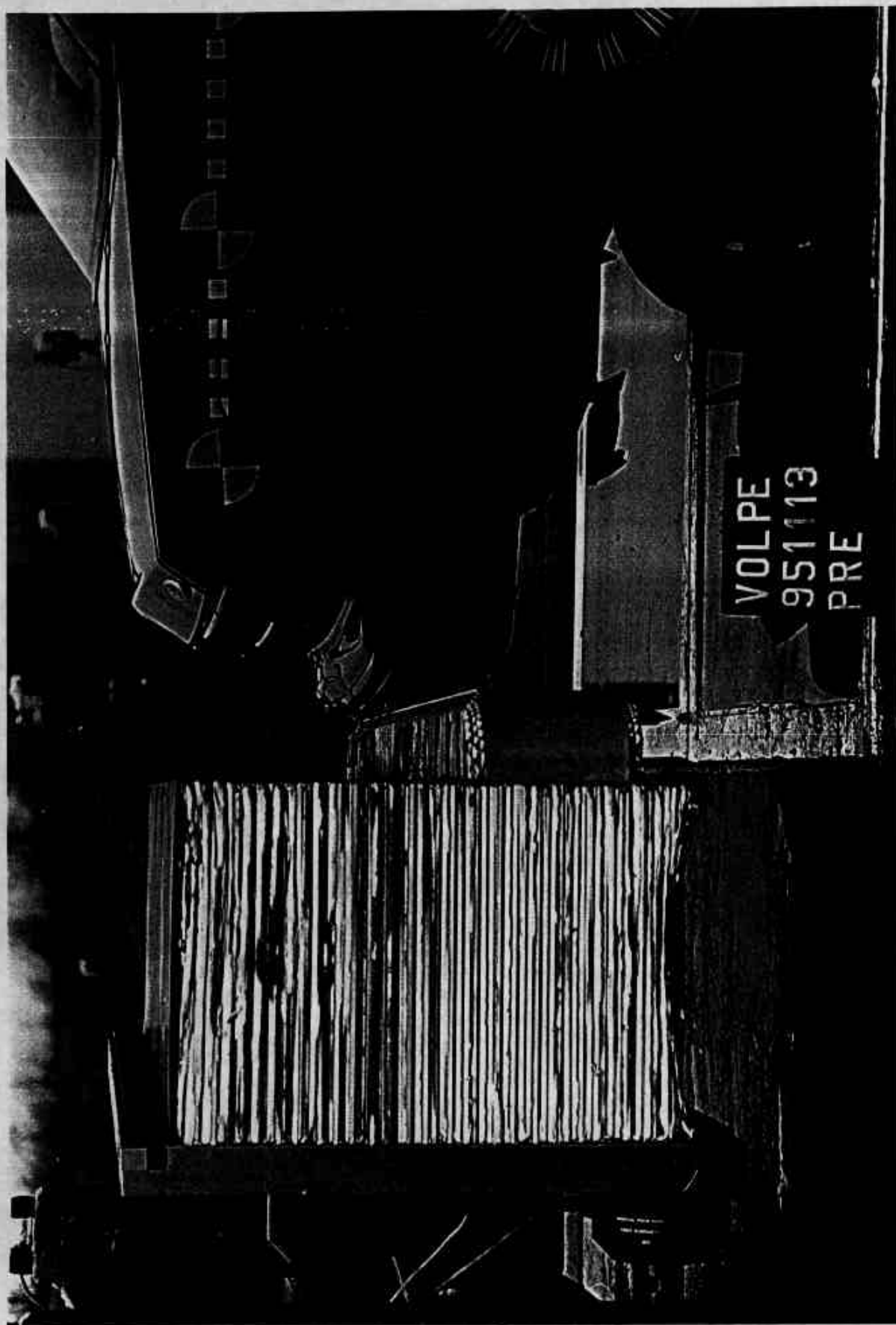


Figure A-25. Pre-Test Barrier to Vehicle Alignment View - Right

A-26

951113

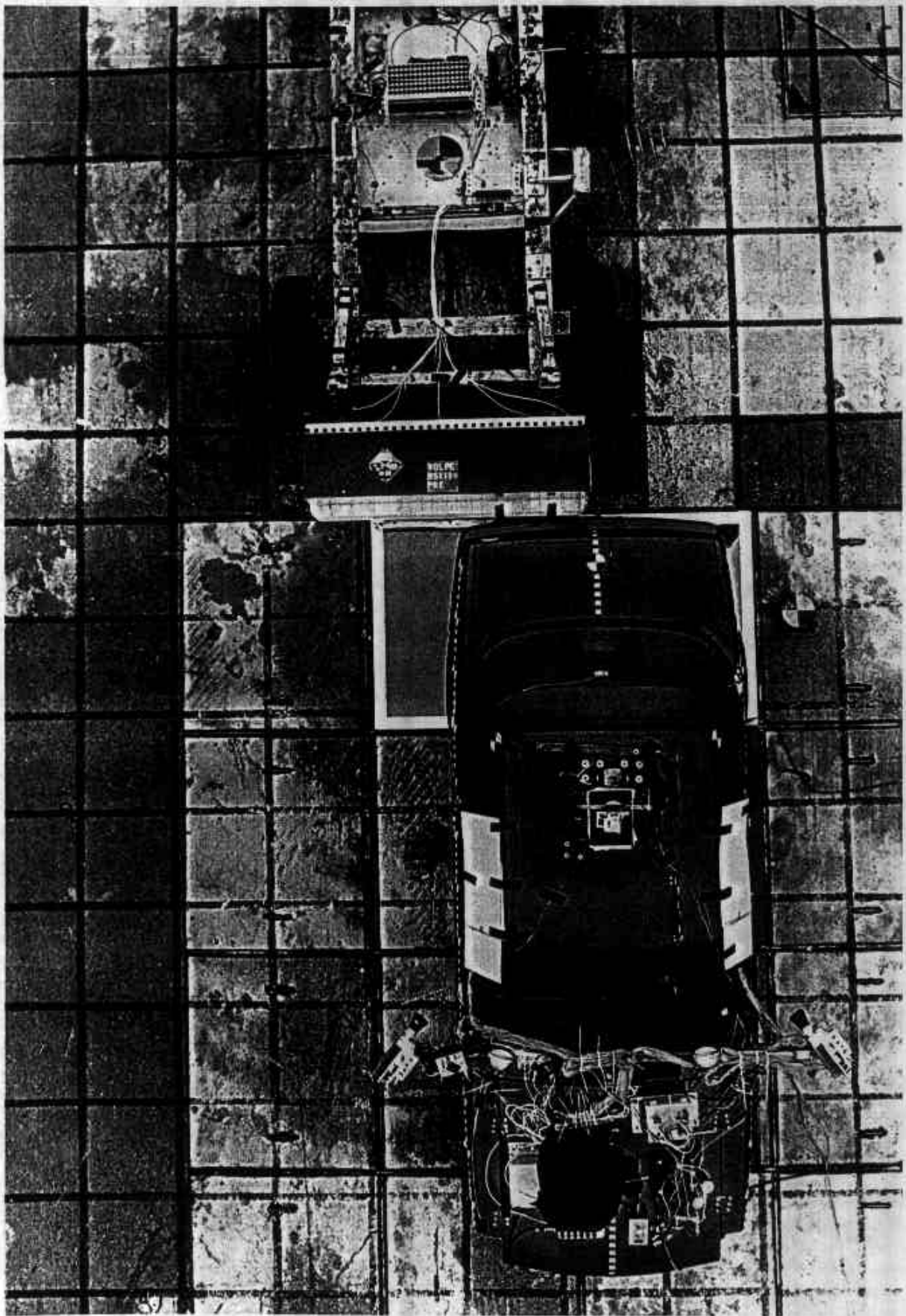


Figure A-26. Pre-Test Barrier to Vehicle Alignment View - Overhead

A-27

951113

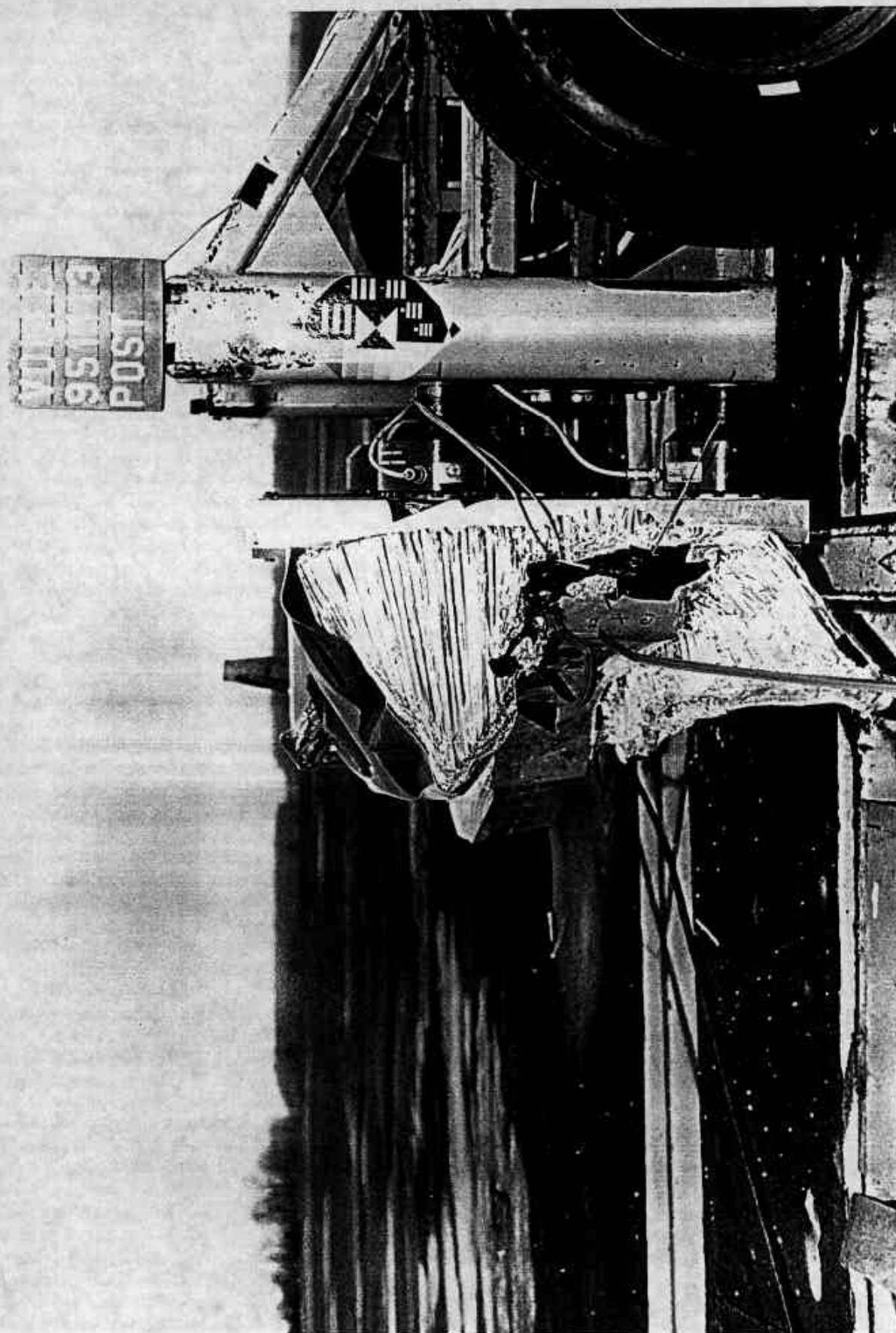


Figure A-27. Post-Test Barrier Face Deformation View - Left Side
A-28

951113

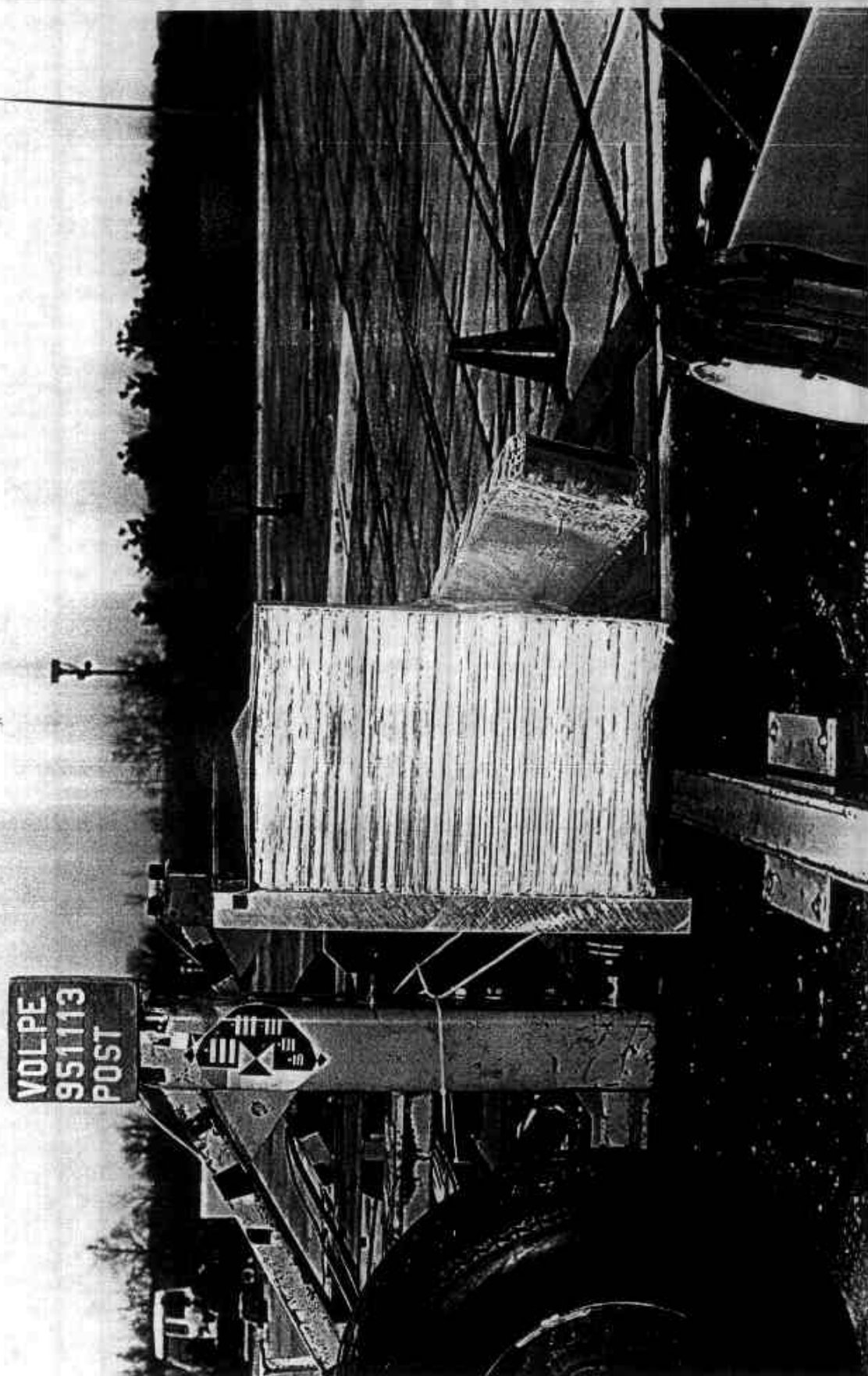


Figure A-28. Post-Test Barrier Face Deformation View - Right Side

A-29

951113

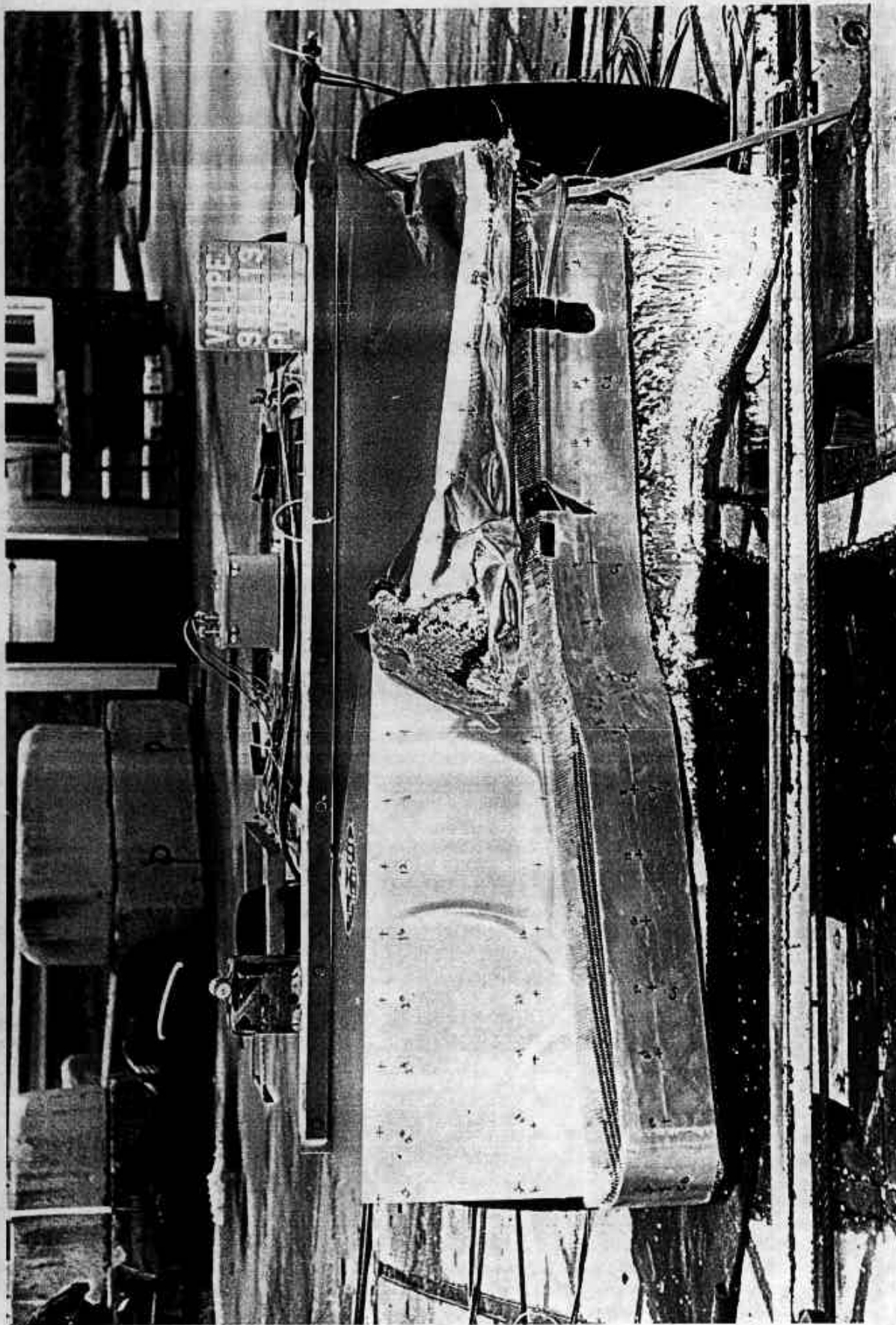


Figure A-29. Post-Test Barrier Face Deformation View - Front
A-30

951113

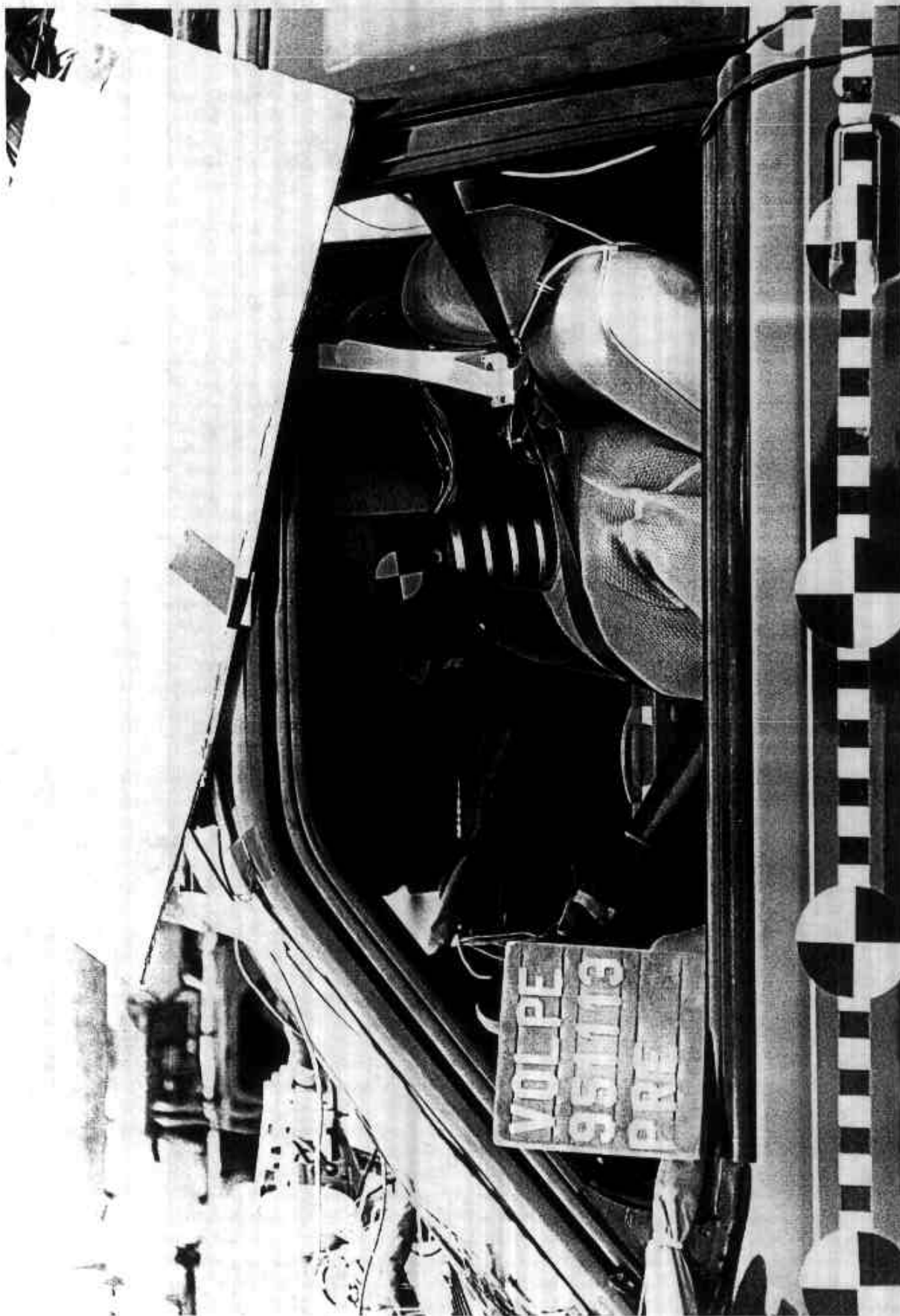


Figure A-30. Pre-Test Driver Dummy Position View
A-31

951113

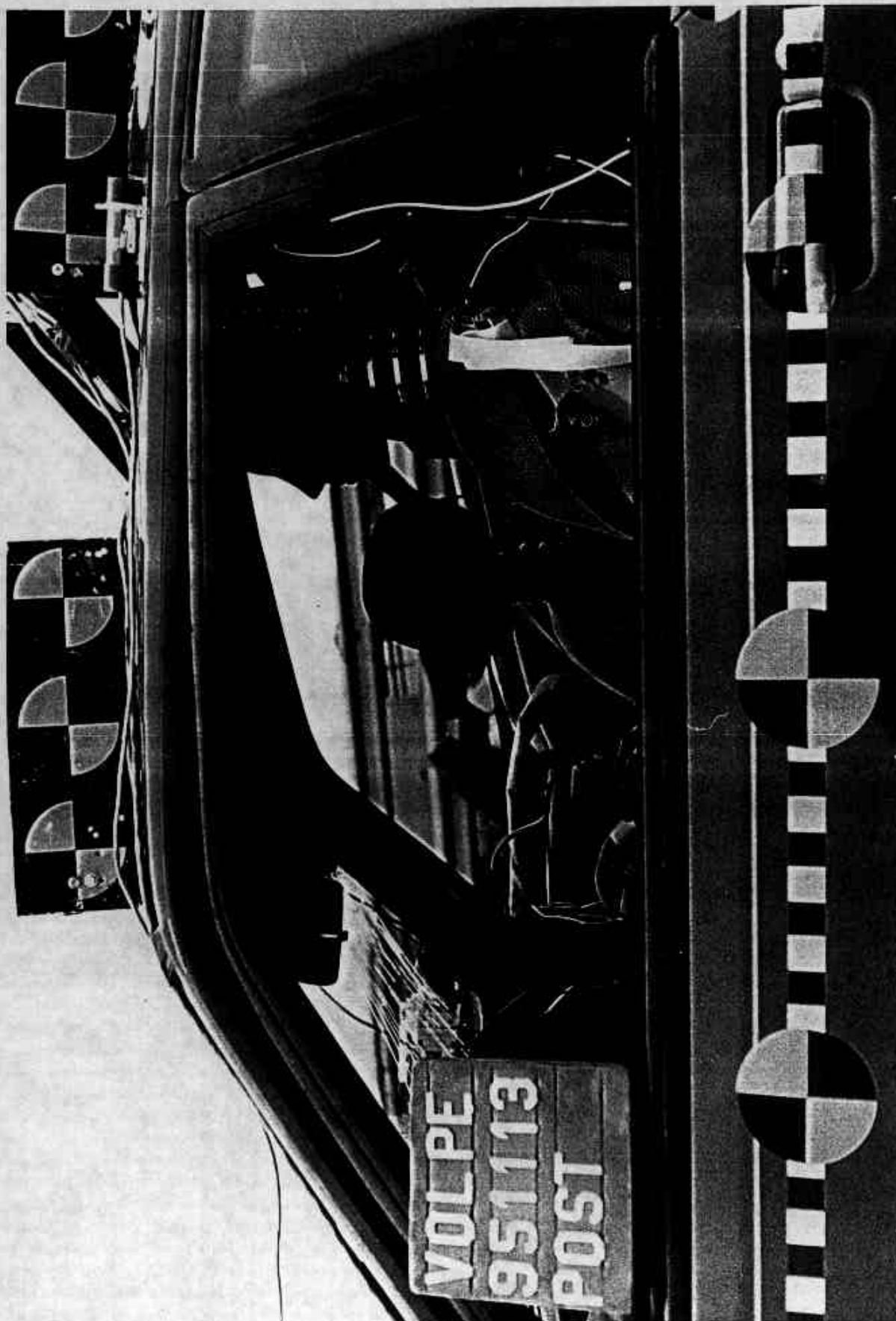


Figure A-31. Post-Test Driver Dummy Position View
A-32

951113



Figure A-32. Pre-Test Passenger Dummy Position View
A-33

951113



Figure A-33. Post-Test Passenger Dummy Position View
A-34

951113



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

A-35

951113



Figure A-35. Pre-Test Driver Dummy & Vehicle Interior - View 2
A-36

951113



Figure A-36. Post-Test Driver Dummy & Vehicle Interior View
A-37

951113



Figure A-37. Pre-Test Passenger Dummy & Vehicle Interior - View 1
A-38

951113



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

A-39

951113



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

A-40

951113

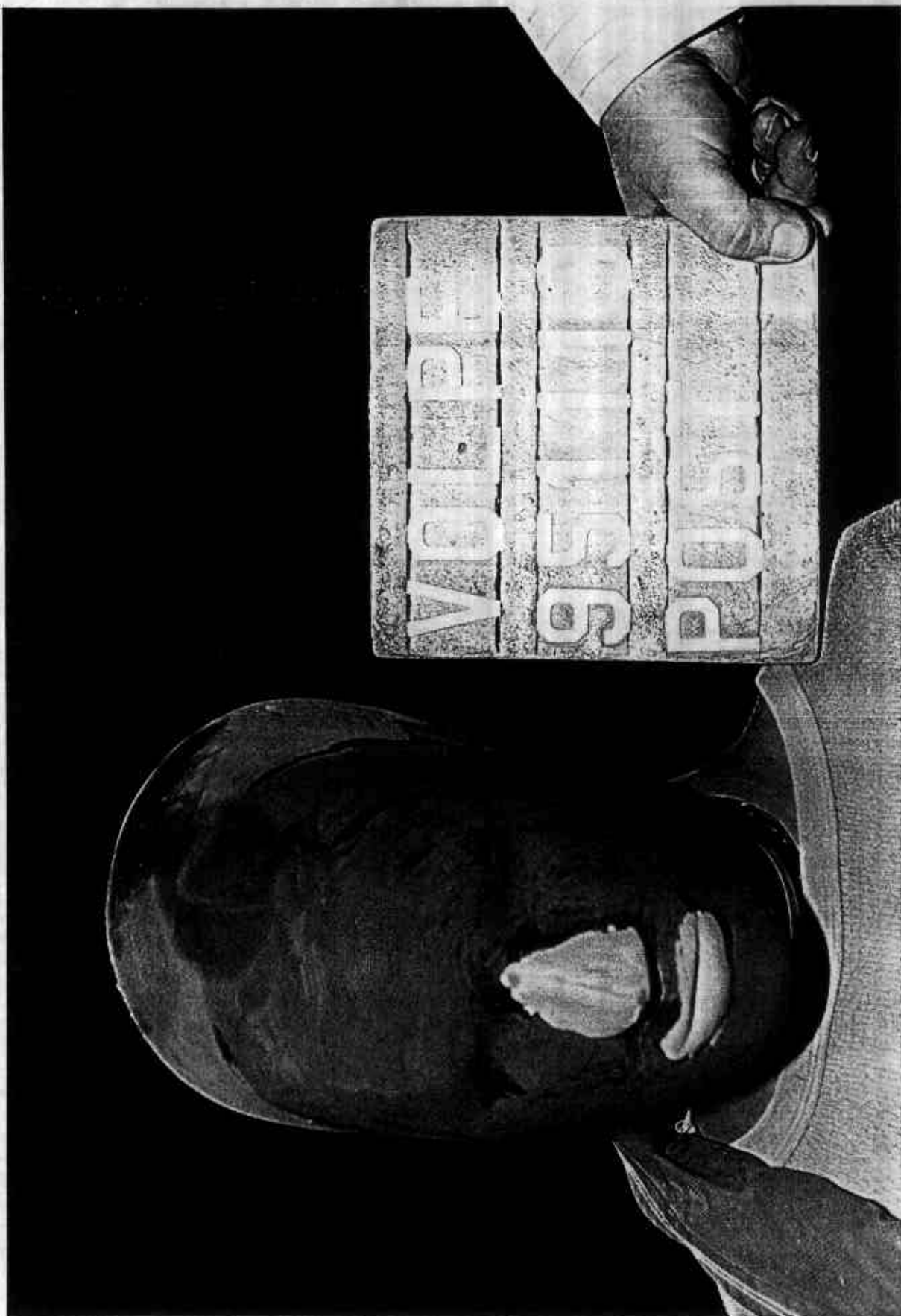


Figure A-40. Post-Test Driver Dummy Head Contact - View 1

A-41

951113



Figure A-41. Post-Test Driver Dummy Head Contact - View 2
A-42

951113

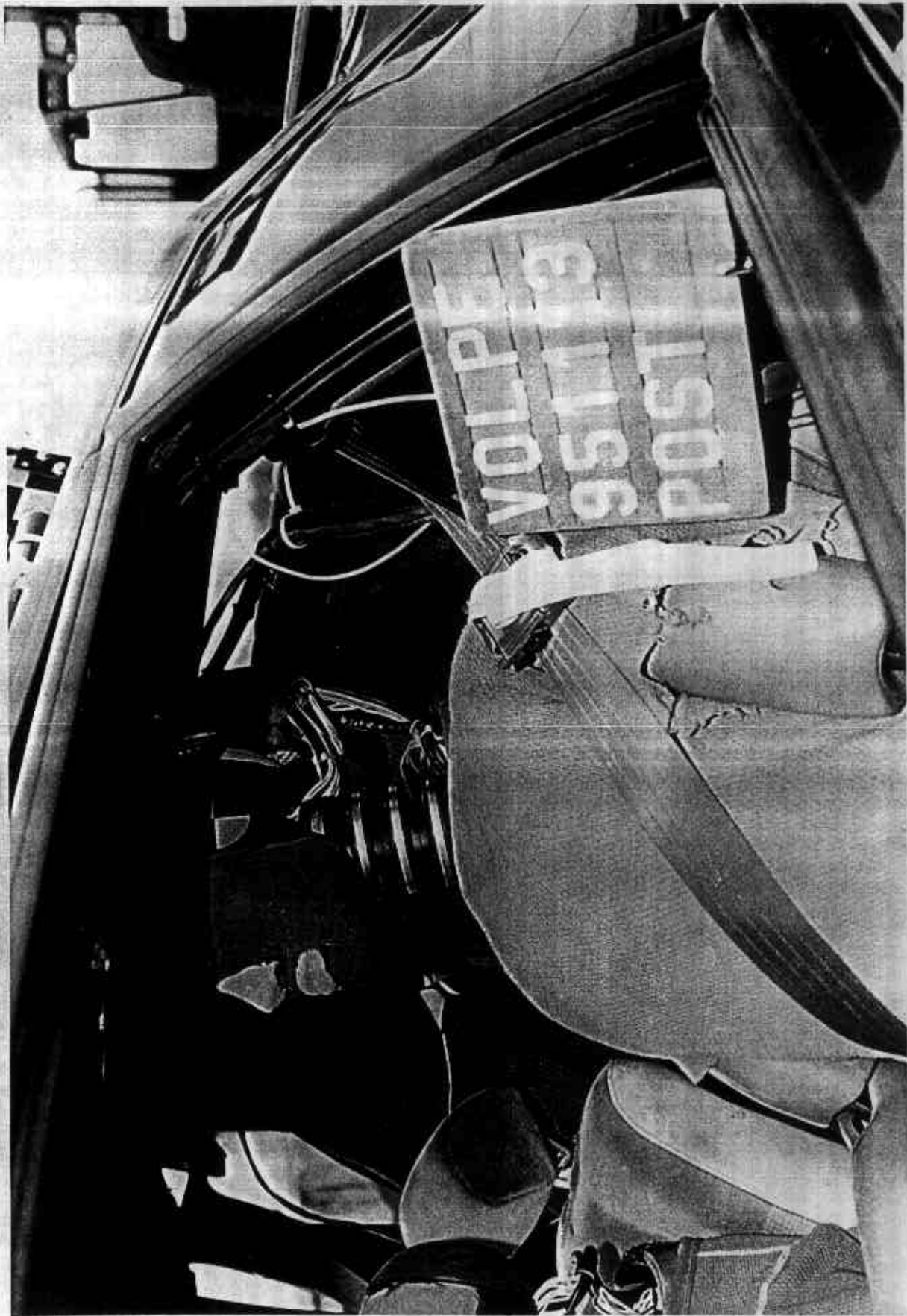


Figure A-42. Post-Test Driver Dummy Head Contact - View 3
A-43

951113

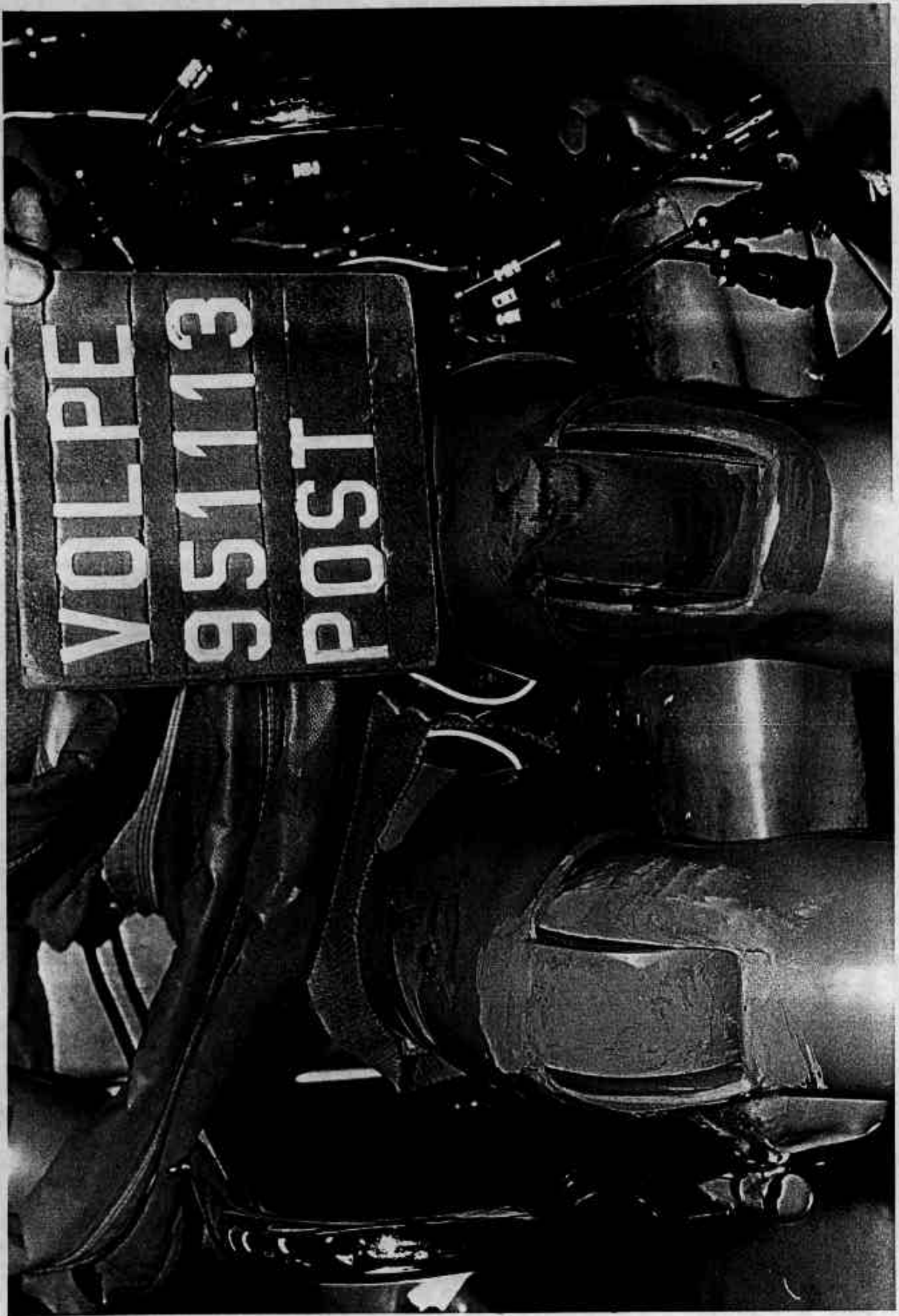


Figure A-43. Post-Test Driver Dummy Knee Contact View
A-44

951113

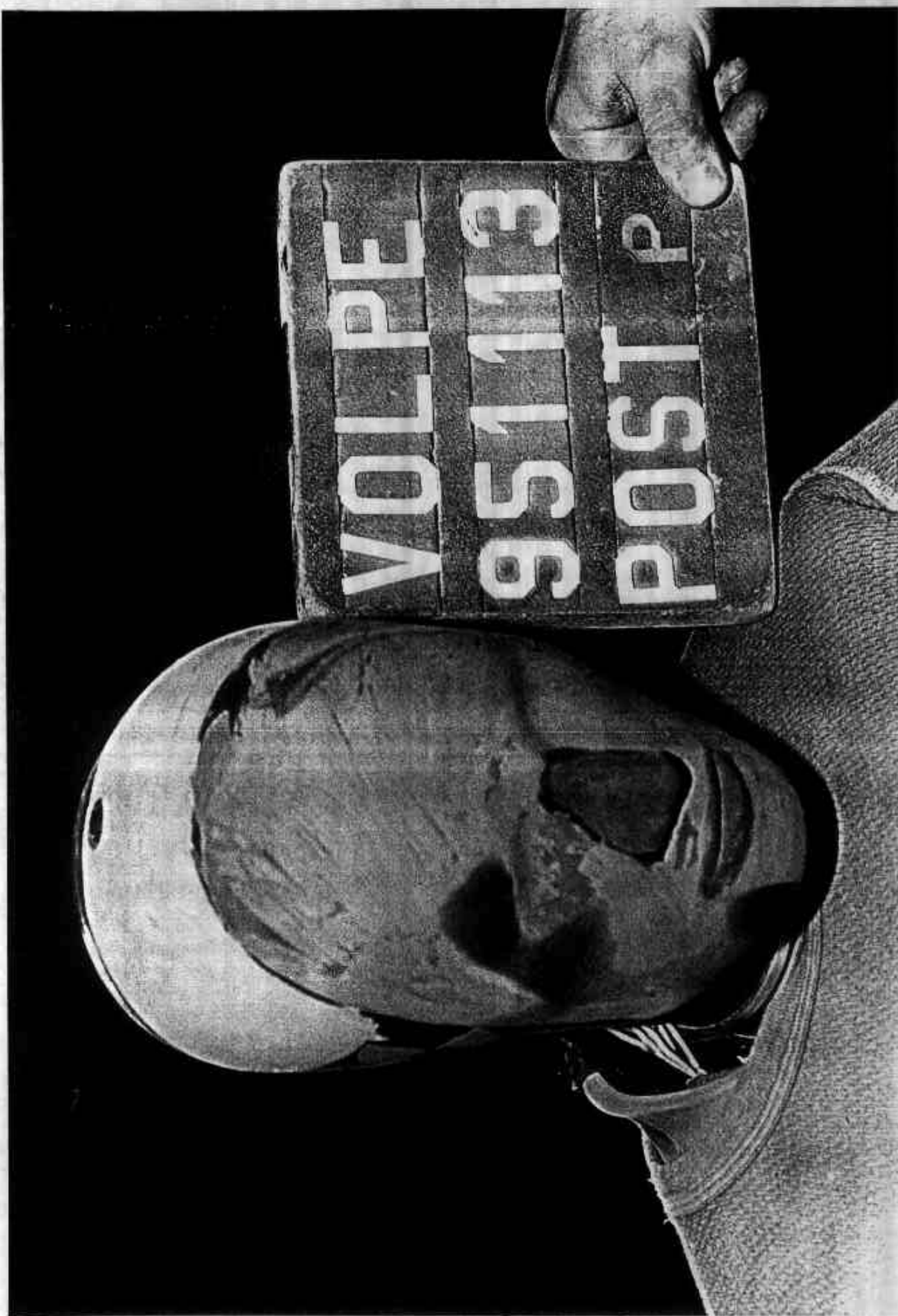


Figure A-44. Post-Test Passenger Dummy Head Contact - View 1
A-45

951113



Figure A-45. Post-Test Passenger Dummy Head Contact - View 2
A-46

951113

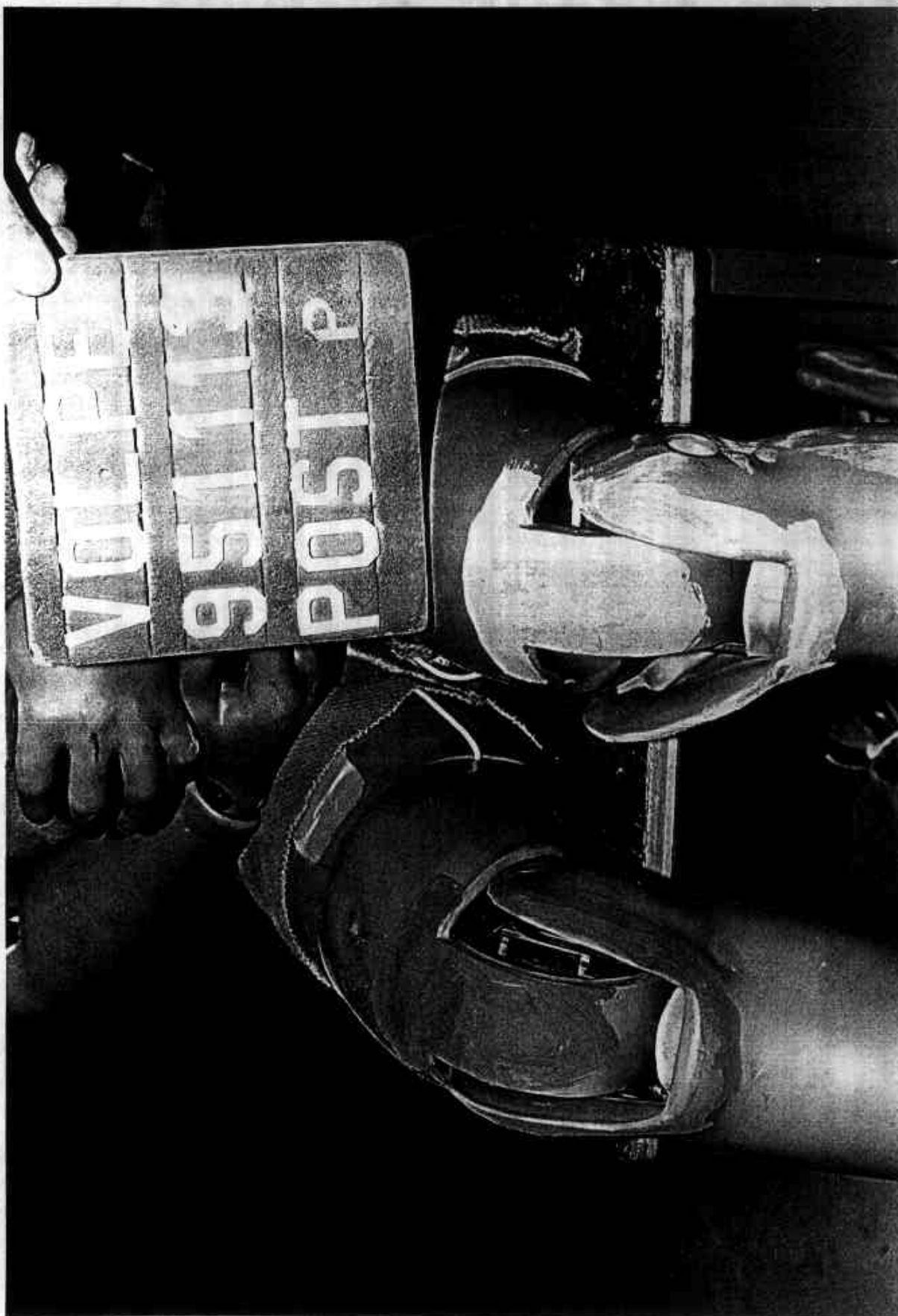


Figure A-46. Post-Test Passenger Dummy Knee Contact View

A-47

951113

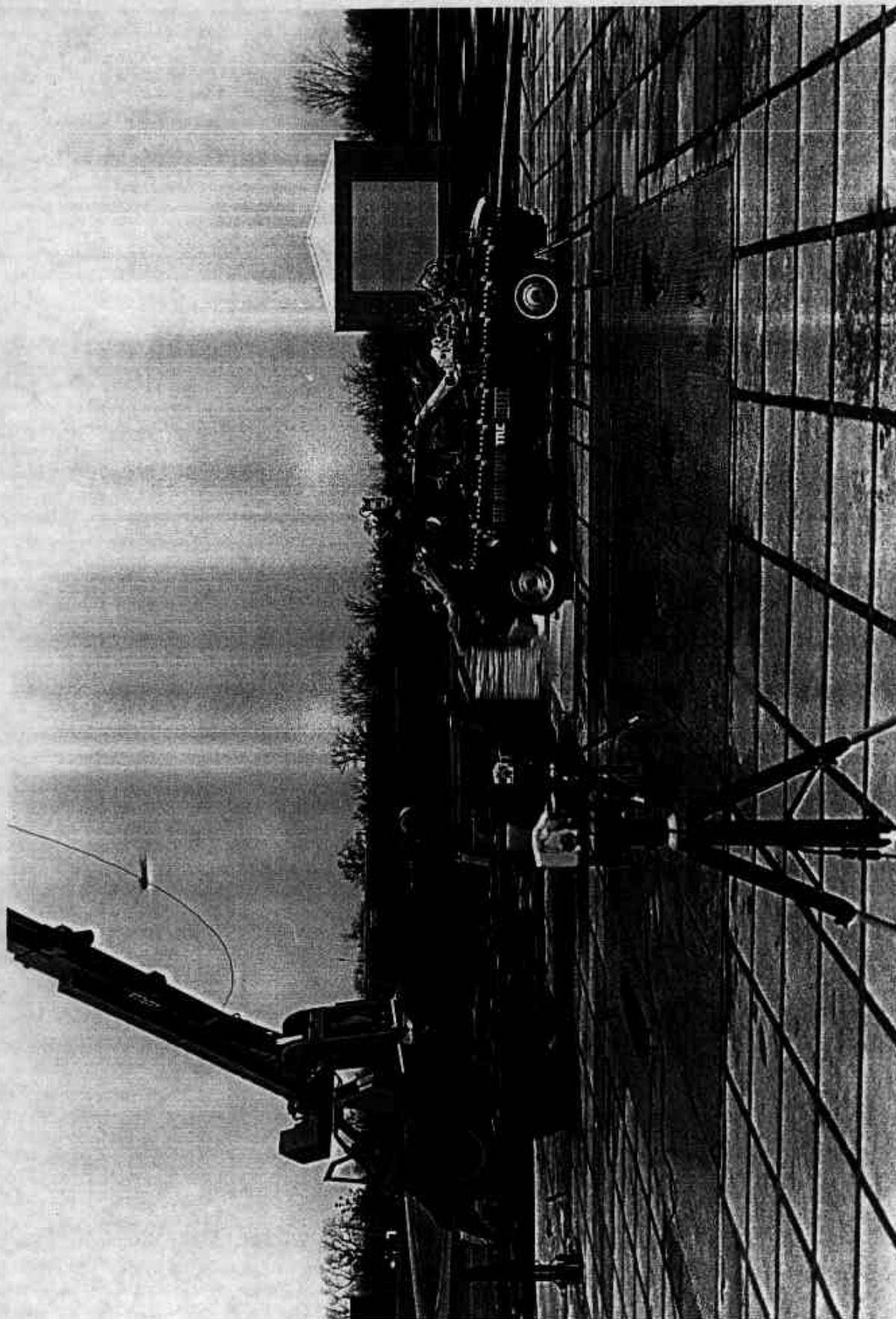


Figure A-47. Impact Event View
A-48

951113

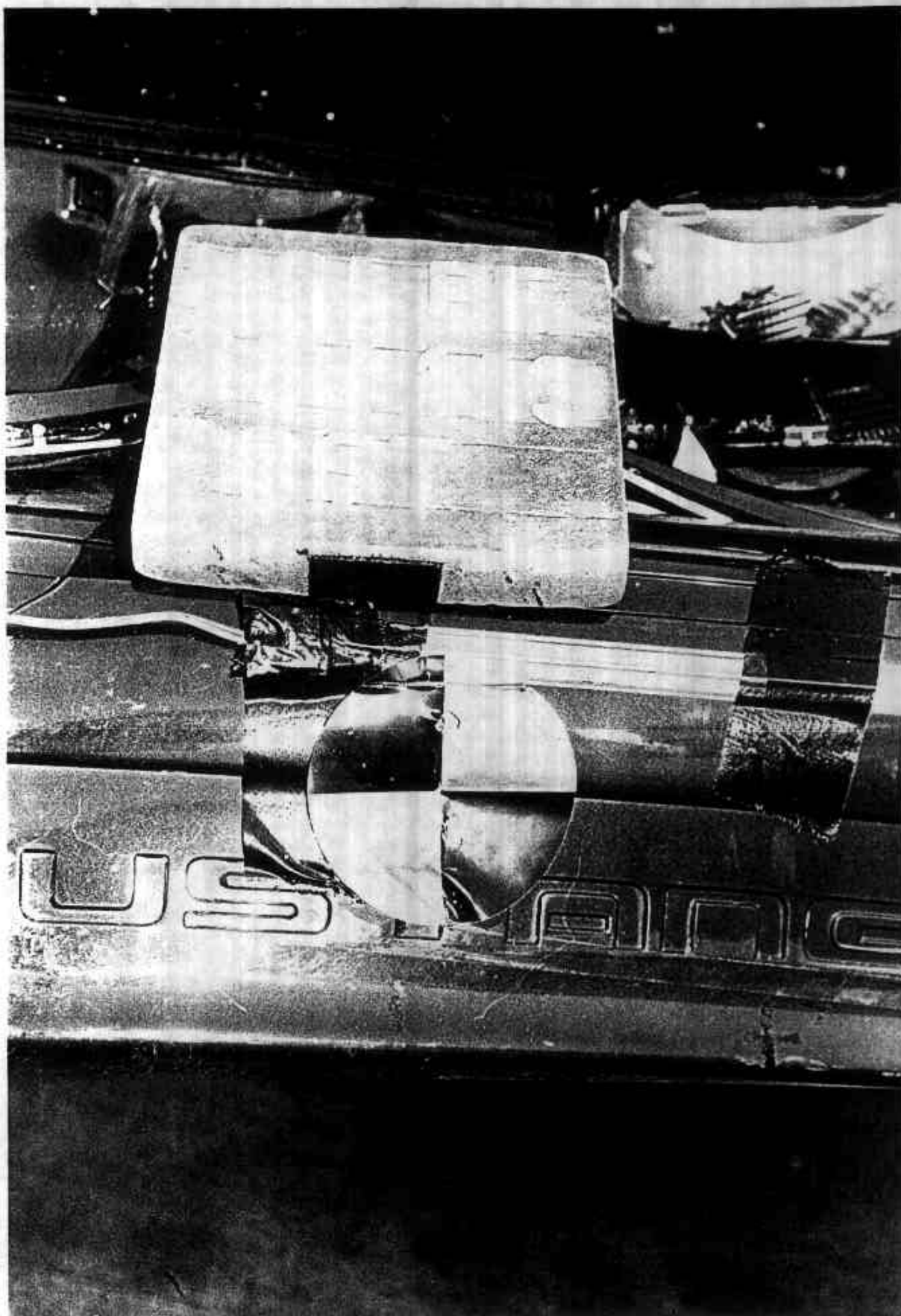


Figure A-48. Post-Test Impact Alignment View
A-49

951113

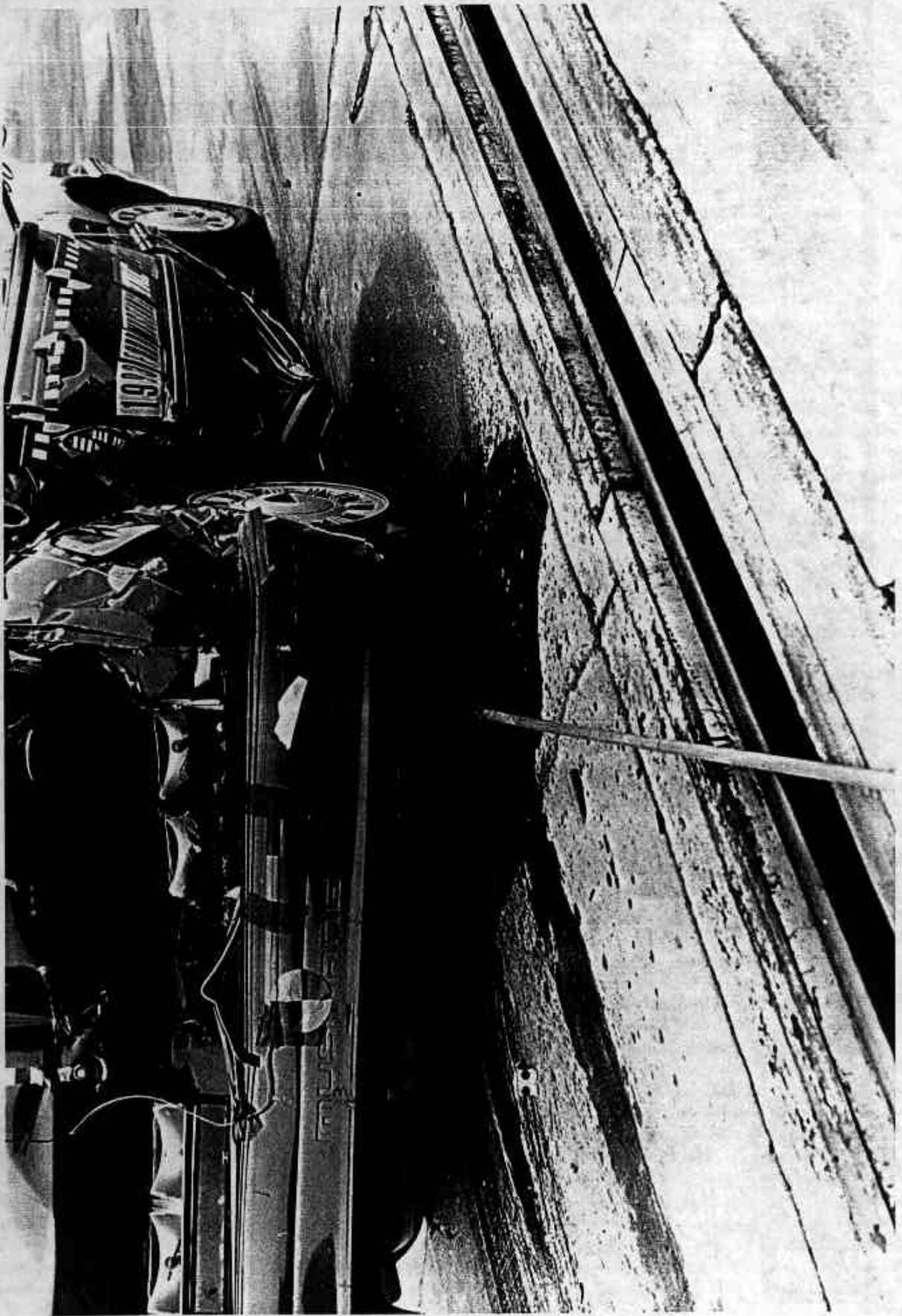


Figure A-49. Fuel System Fluid Spillage - First Five Minutes after Impact - View 1
A-50 951113

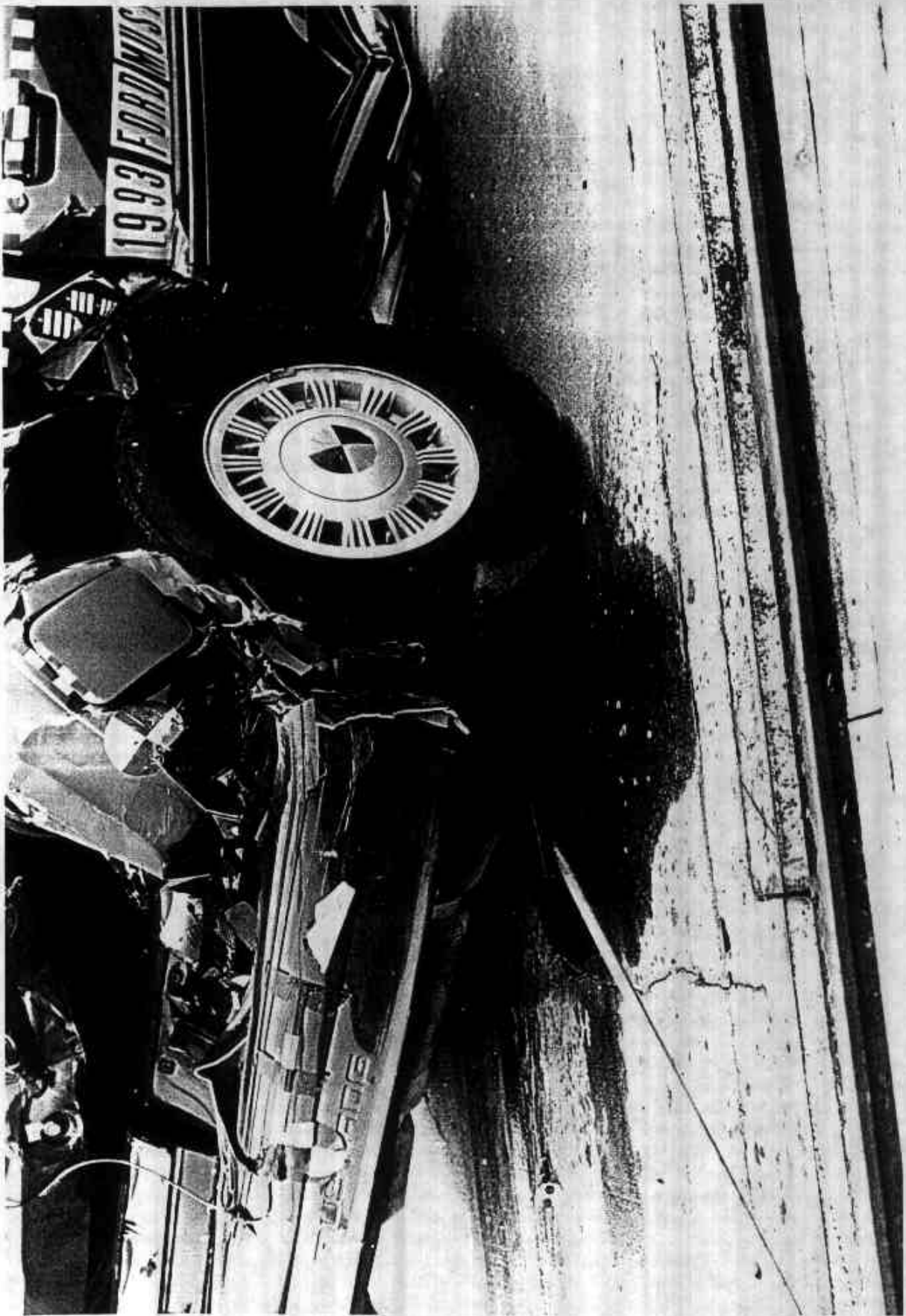


Figure A-50. Fuel System Fluid Spillage - First Five Minutes after Impact - View 2
A-51 951113



Figure A-51. Fuel System Fluid Spillage - First Five Minutes after Impact - View 3
A-52 951113

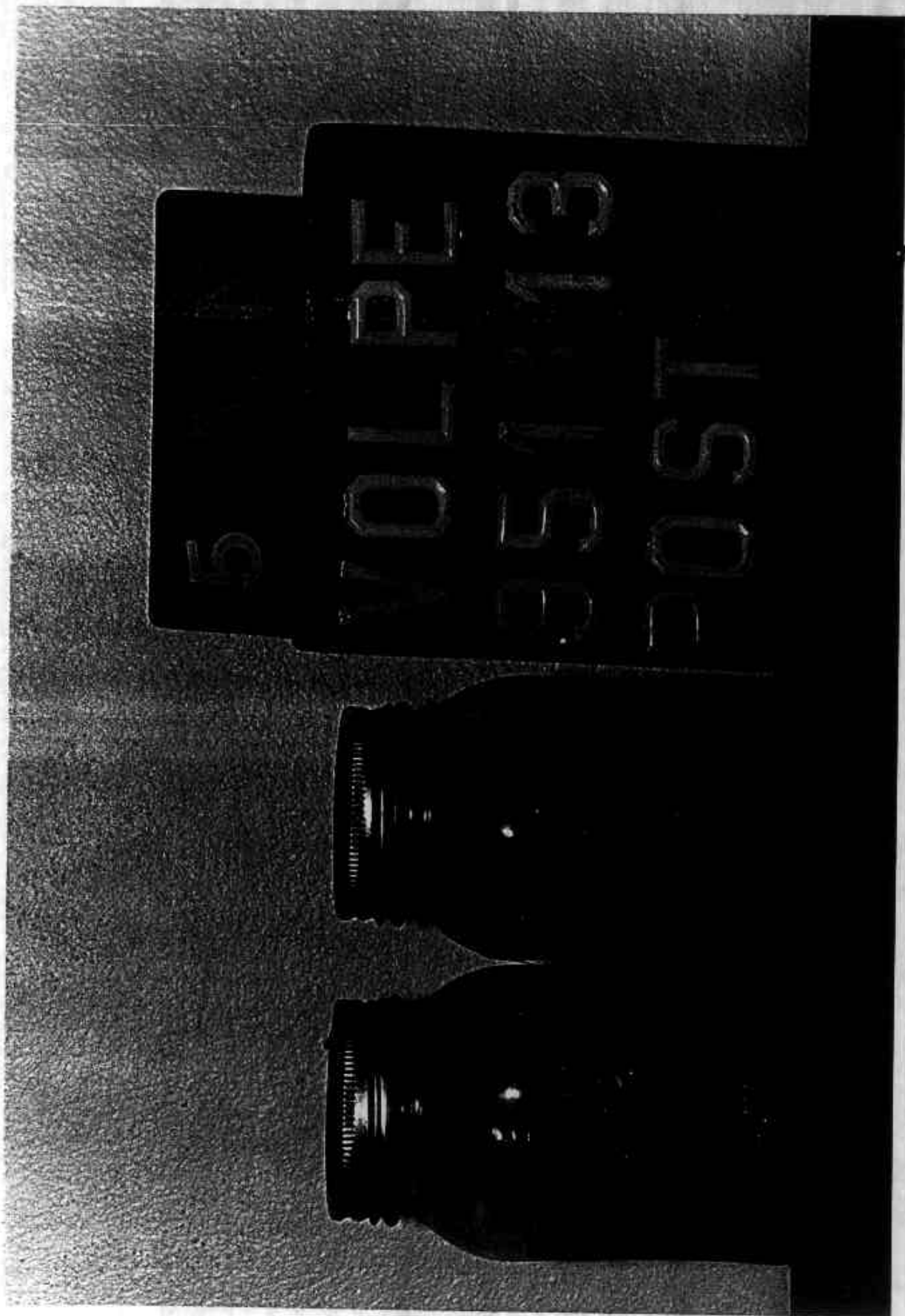


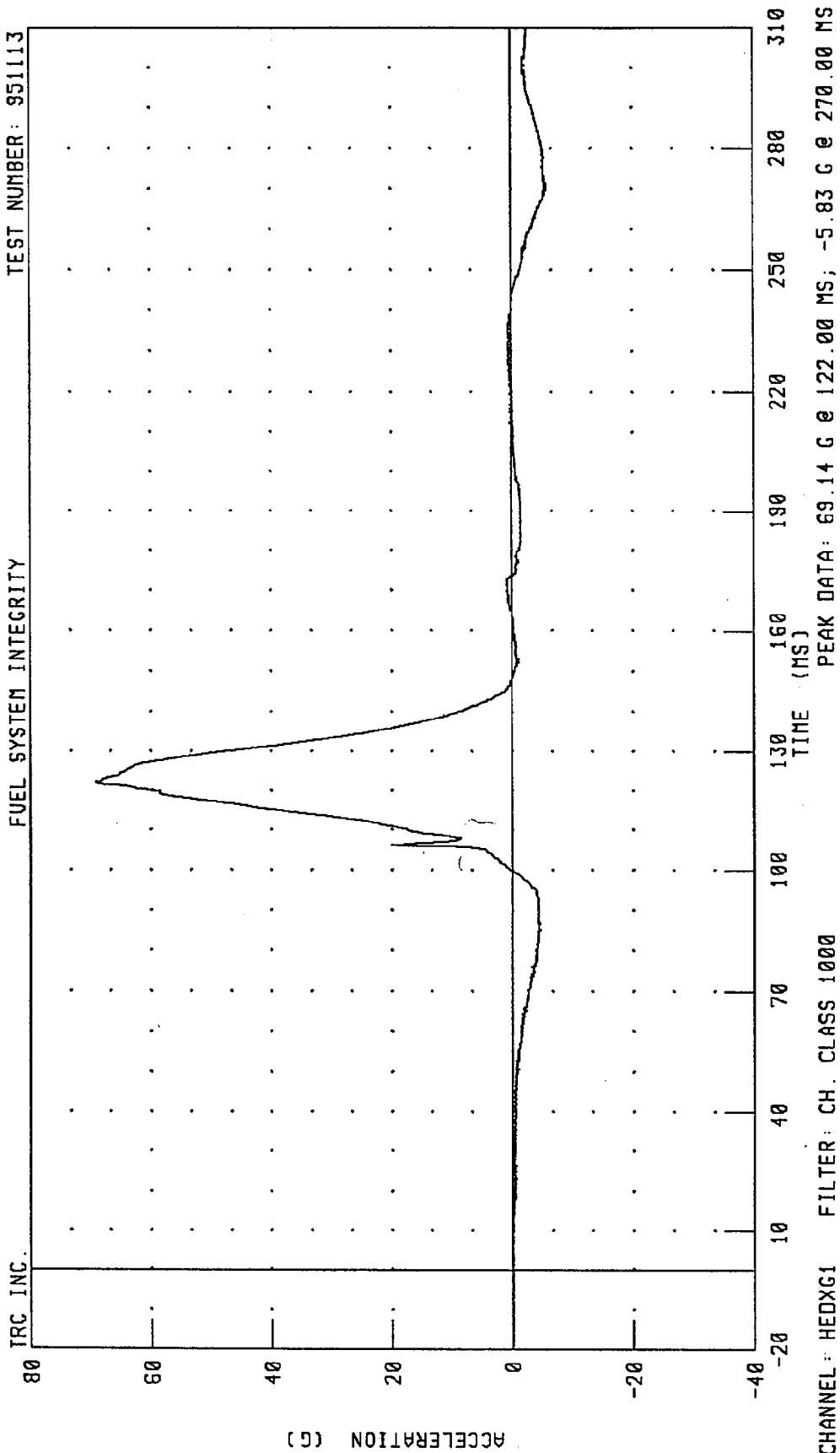
Figure A-52. Collected Fuel System Fluid Spillage View - First Five Minutes after Impact
A-53 951113

Appendix B

Data Plots

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
DRIVER HEAD X-AXIS ACCELERATION

FUEL SYSTEM INTEGRITY TEST NUMBER: 951113



PEAK DATA: 69.14 G @ 122.00 MS; -5.83 G @ 270.00 MS

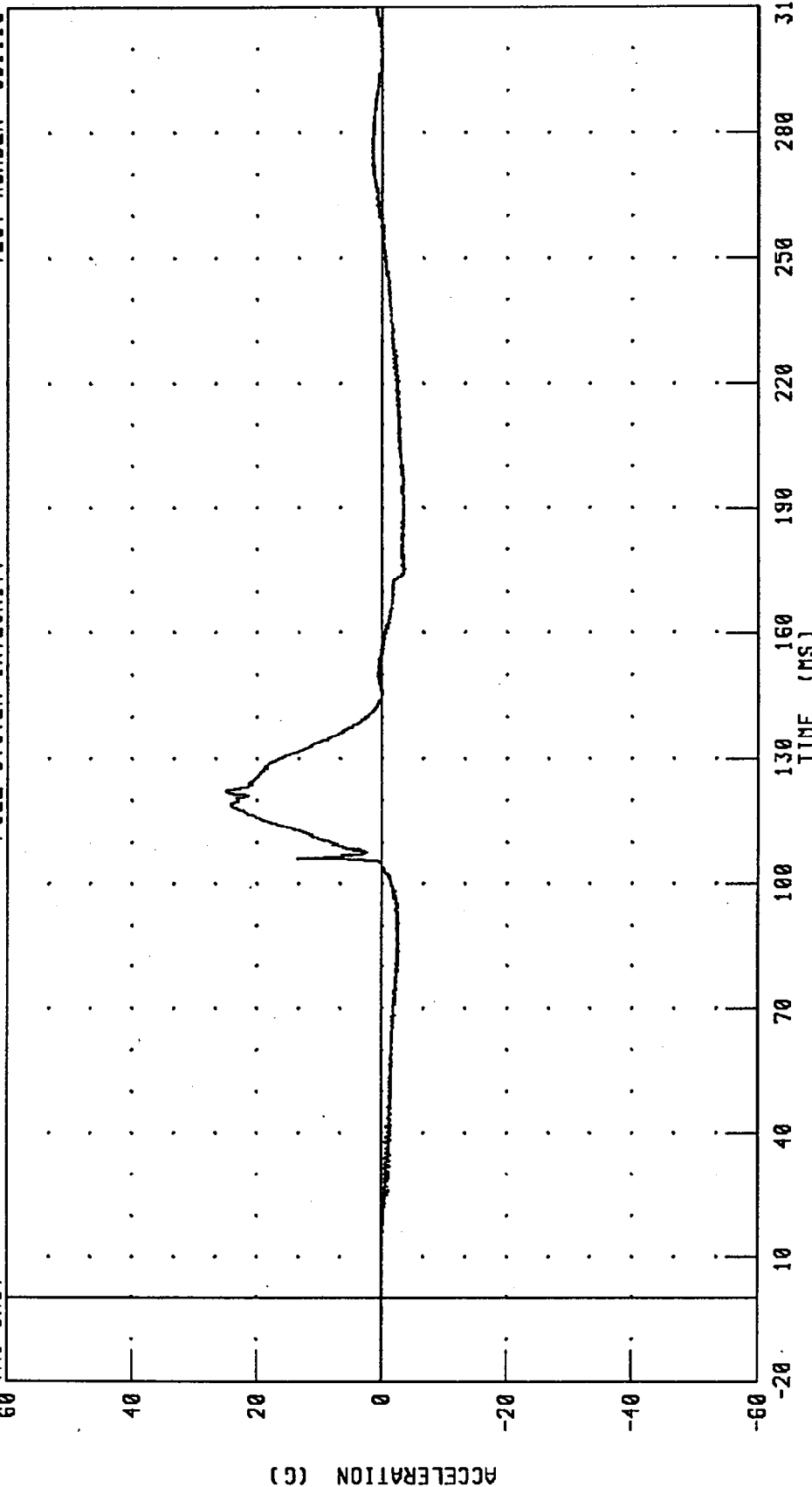
CHANNEL: HEDXG1 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 DRIVER HEAD Y-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 25.02 G @ 122.32 MS; -3.69 G @ 175.44 MS

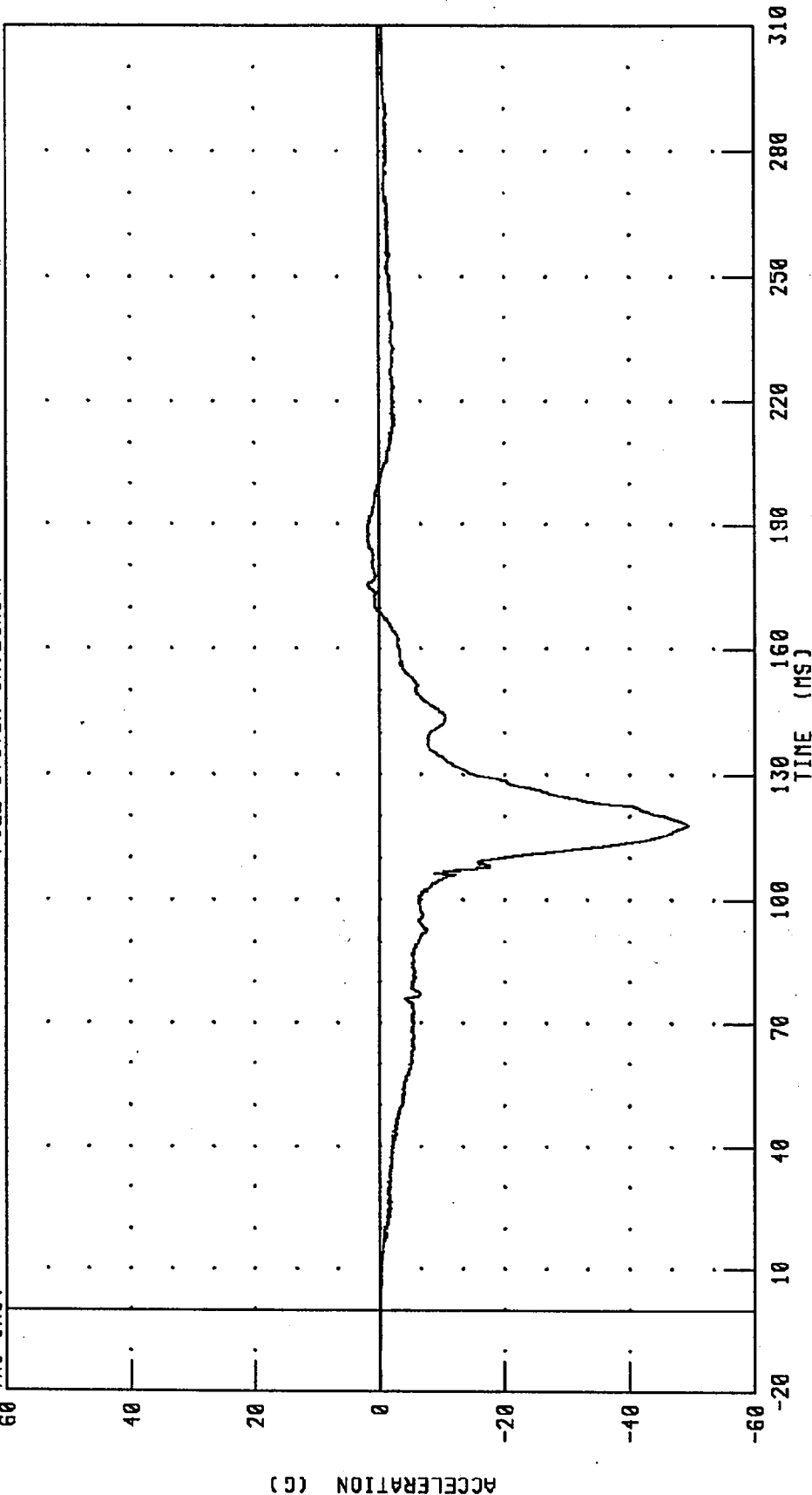
CHANNEL: HEDYG1 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
DRIVER HEAD Z-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



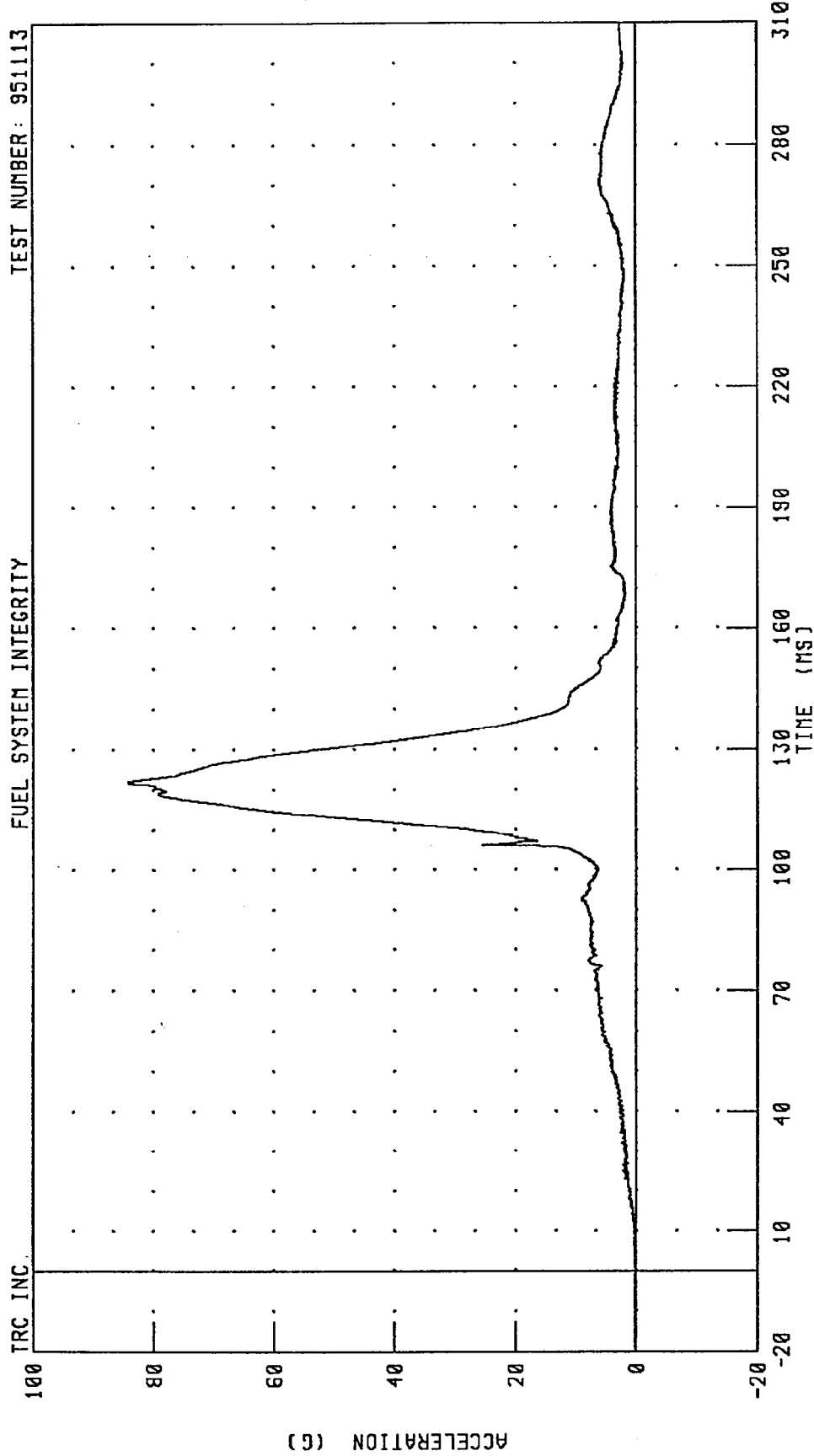
CHANNEL: HEDZG1 FILTER: CH. CLASS 1000

PEAK DATA: 1.84 G @ 175.44 MS, -49.43 G @ 117.92 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
DRIVER HEAD RESULTANT ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY



PEAK DATA: 84.17 G @ 122.00 MS; 0.13 G @ -19.76 MS

CHANNEL: HEDRG1 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
DRIVER UPPER NECK X-AXIS SHEAR FORCE

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.

60

40

20

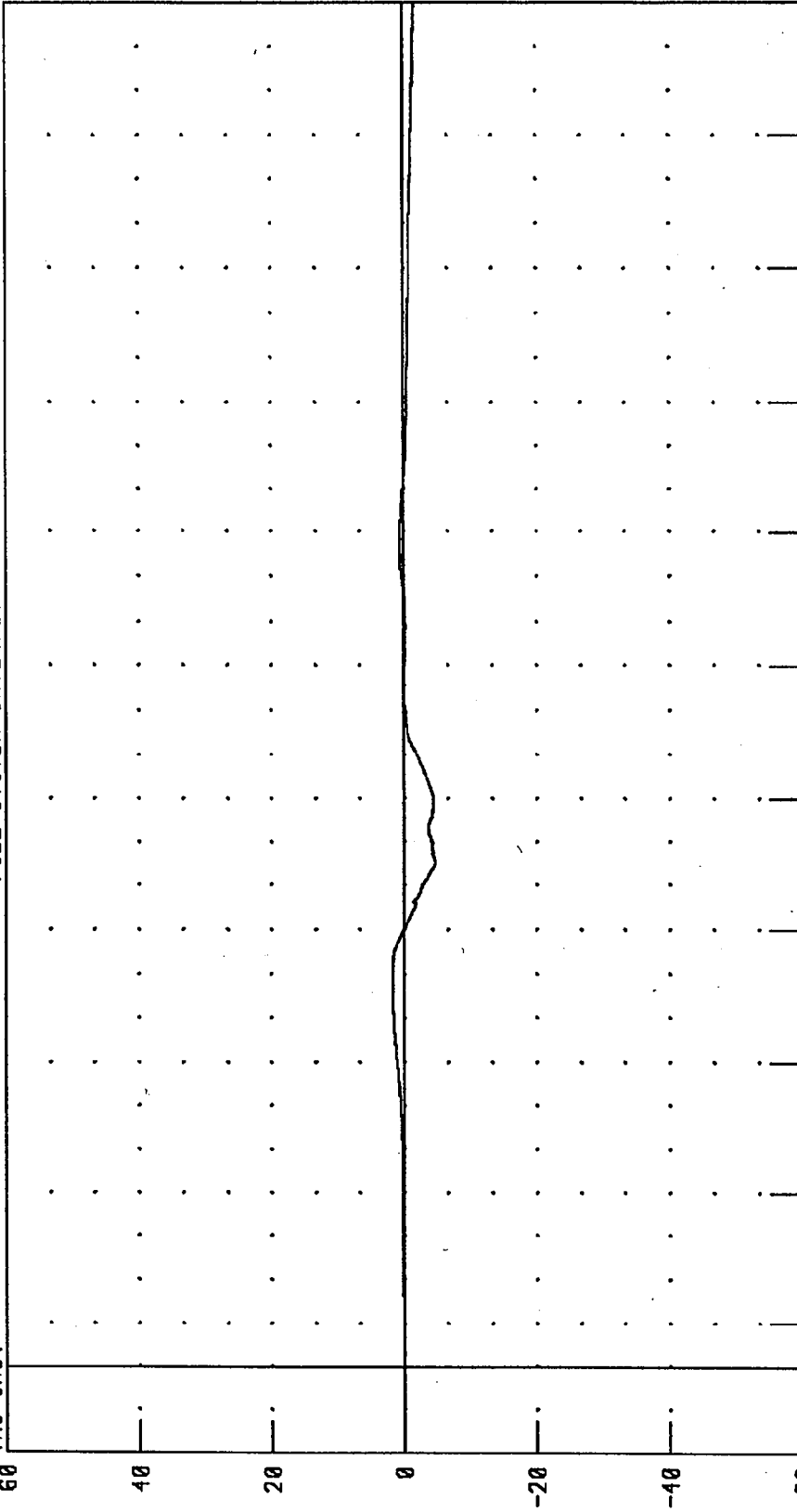
0

-20

-40

-60

FORCE (N X 10²)



TIME (MS)

310 280 250 220 190 160 130 100 70 40 10

CHANNEL: NEKXF1 FILTER: CH. CLASS 1000

PEAK DATA: 175.08 N @ 84.08 MS; -468.12 N @ 115.04 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
DRIVER UPPER NECK Y-AXIS SHEAR FORCE

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.

60

40

20

0

-20

-40

-60

FORCE (N X 10²)

310

280

250

220

190

160

130

100

70

40

10

-20

TIME (MS)

CHANNEL: NEKYF1 FILTER: CH. CLASS 1000

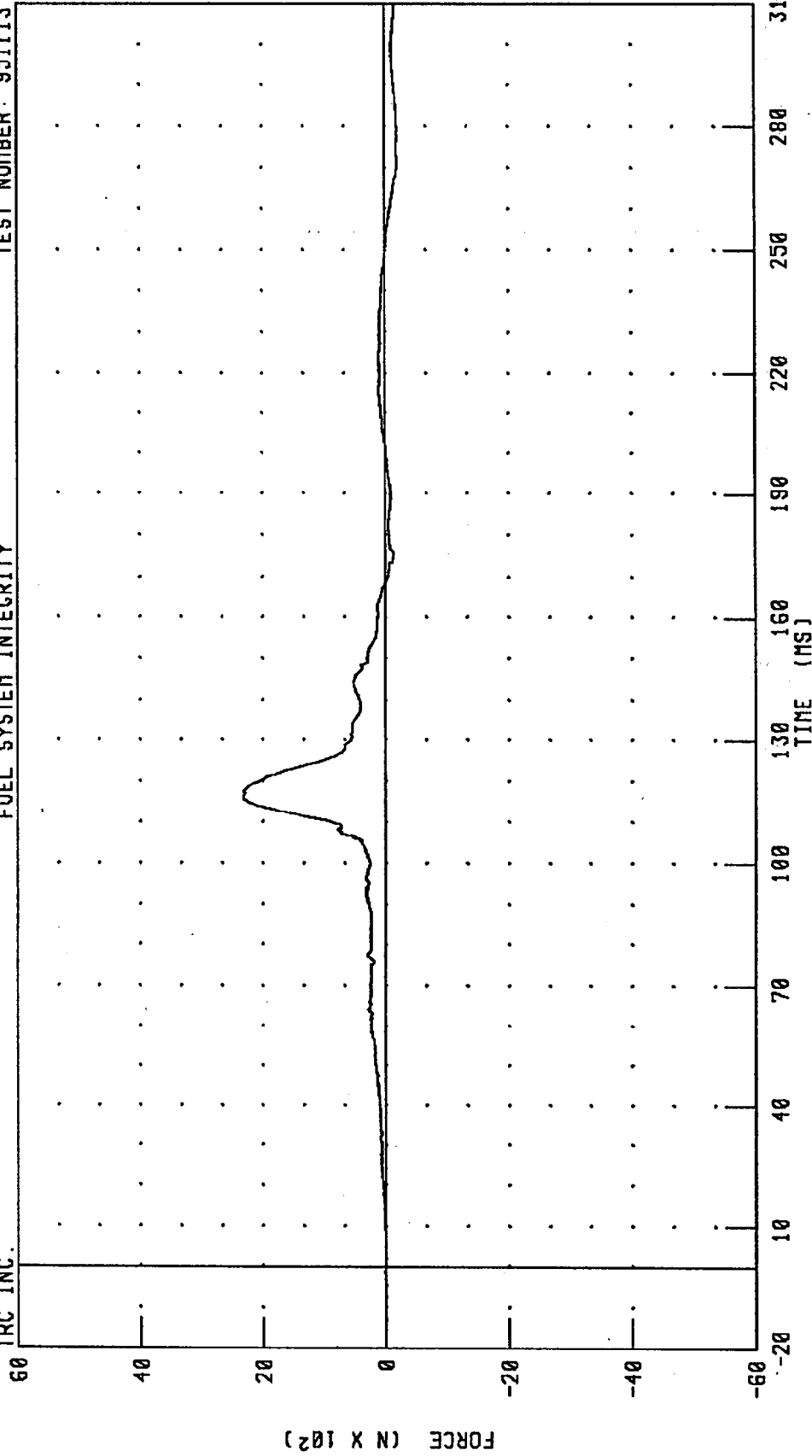
PEAK DATA: 104.03 N @ 179.28 MS; -465.30 N @ 115.76 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
DRIVER UPPER NECK Z-AXIS AXIAL FORCE

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: NEKZF1 FILTER: CH. CLASS 1000

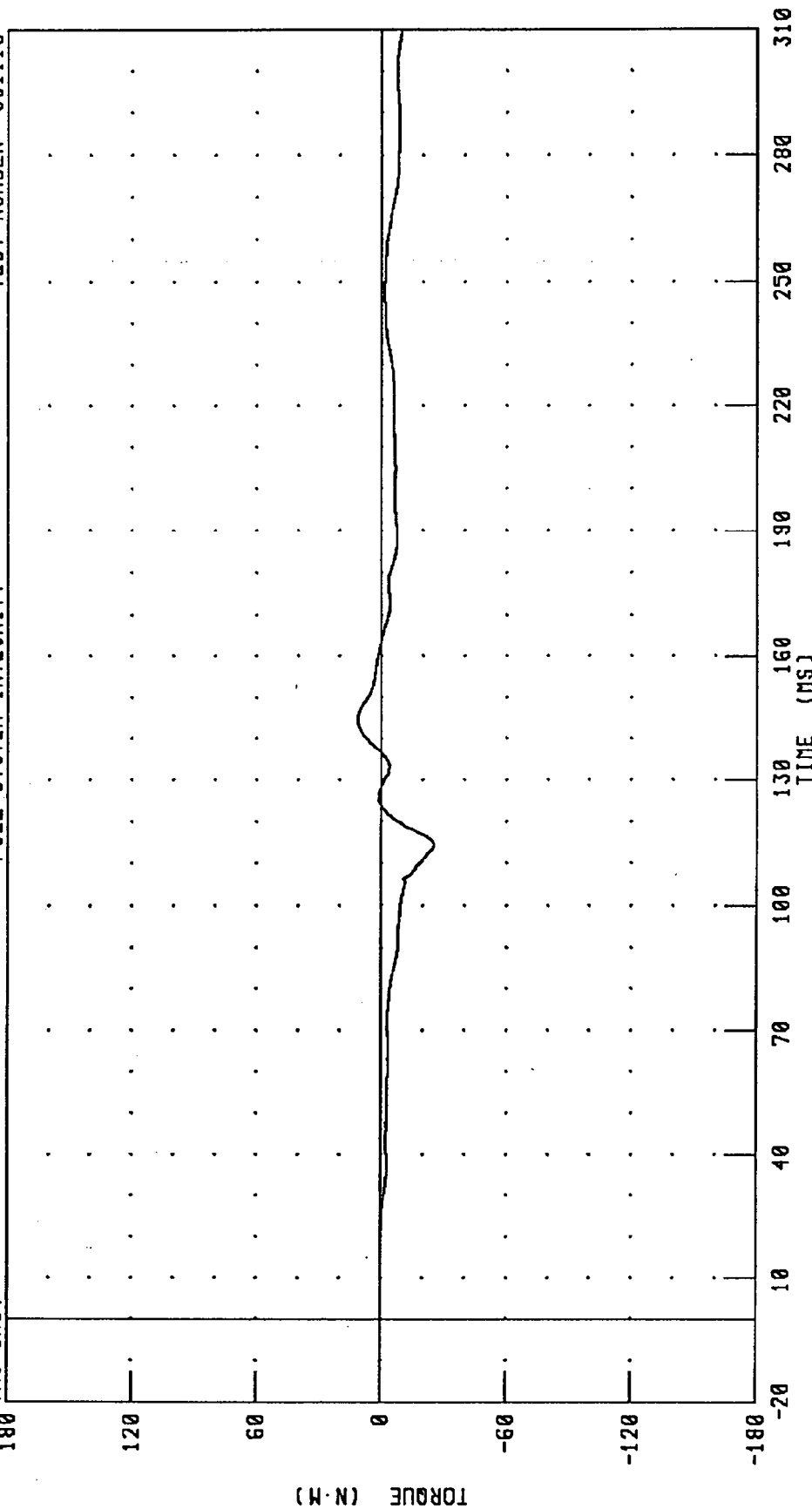
PEAK DATA: 2323.75 N @ 115.92 MS; -210.81 N @ 279.20 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 DRIVER UPPER NECK MOMENT ABOUT X-AXIS

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: NEKXM1 FILTER: CH. CLASS 600

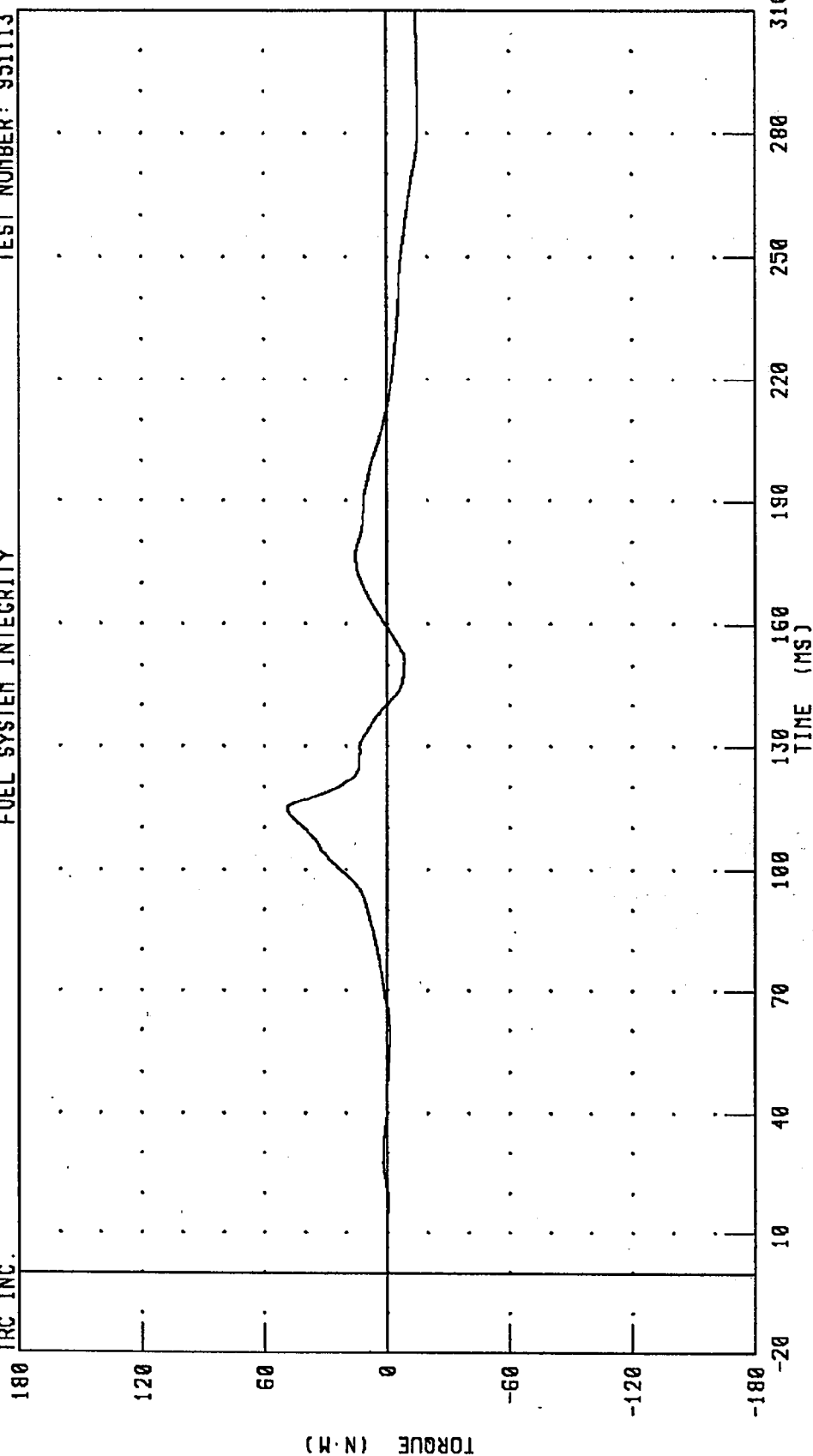
PEAK DATA: 11.17 N-M @ 144.56 MS; -25.29 N-M @ 114.64 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
DRIVER UPPER NECK MOMENT ABOUT Y-AXIS

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 48.91 N·m @ 114.40 ms; -15.42 N·m @ 283.04 ms

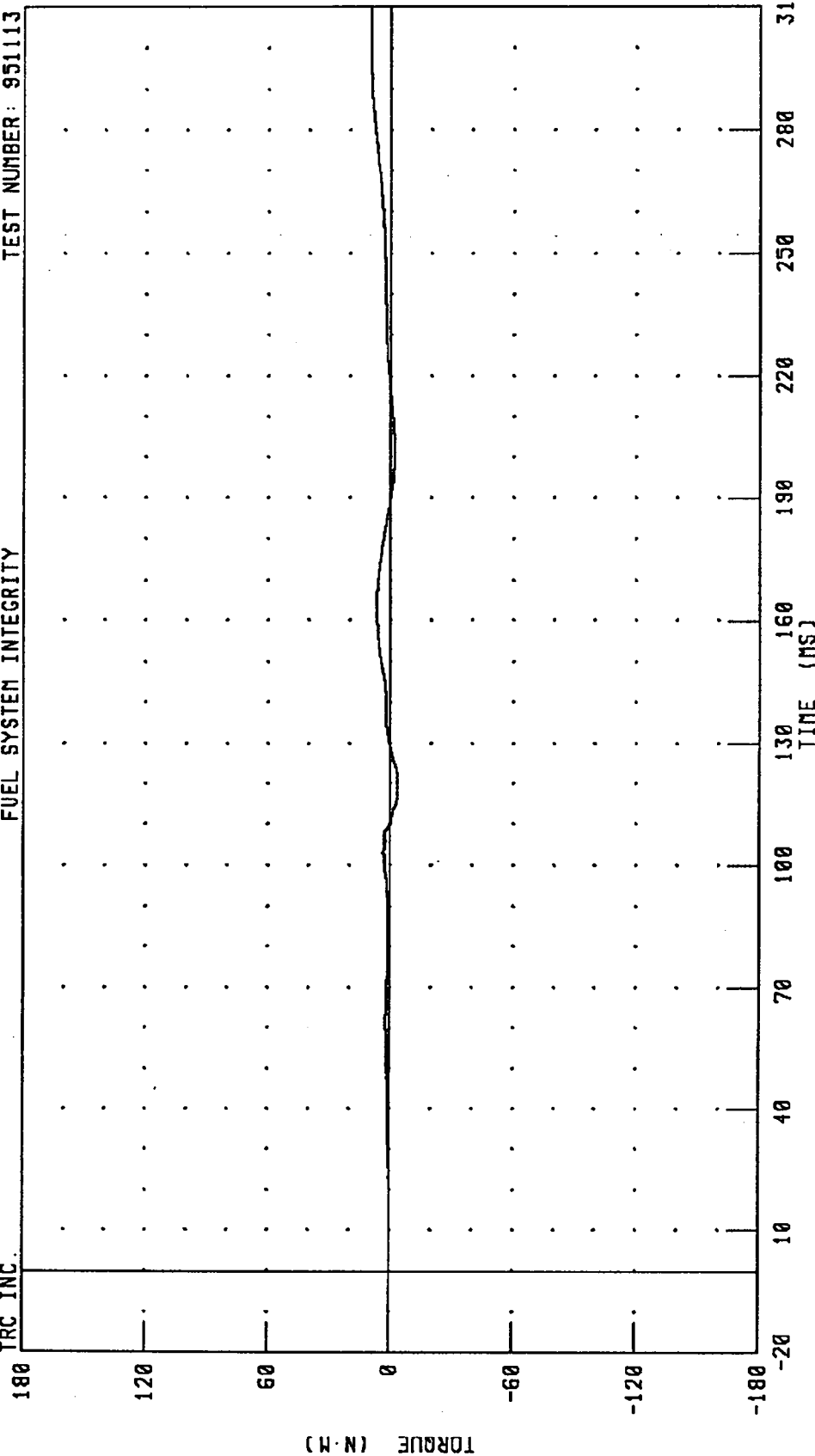
CHANNEL: NEKYM1 FILTER: CH. CLASS 600

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 DRIVER UPPER NECK MOMENT ABOUT Z-AXIS

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 9.64 N·m @ 307.12 ms; -3.70 N·m @ 117.28 ms

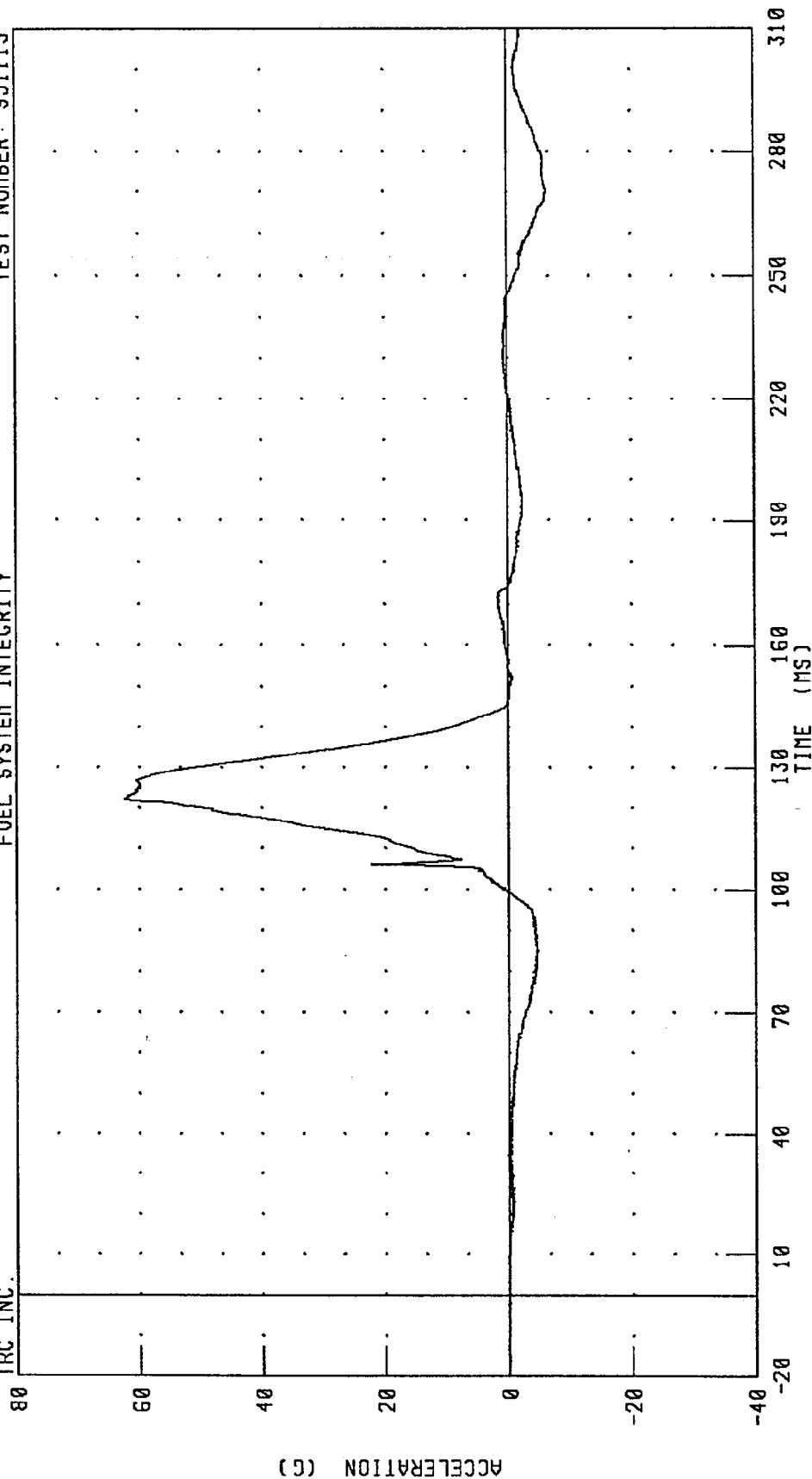
CHANNEL: NEKZM1 FILTER: CH. CLASS 600

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 DRIVER HEAD POSITION 1 X-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 62.42 G @ 122.16 MS; -6.48 G @ 270.00 MS

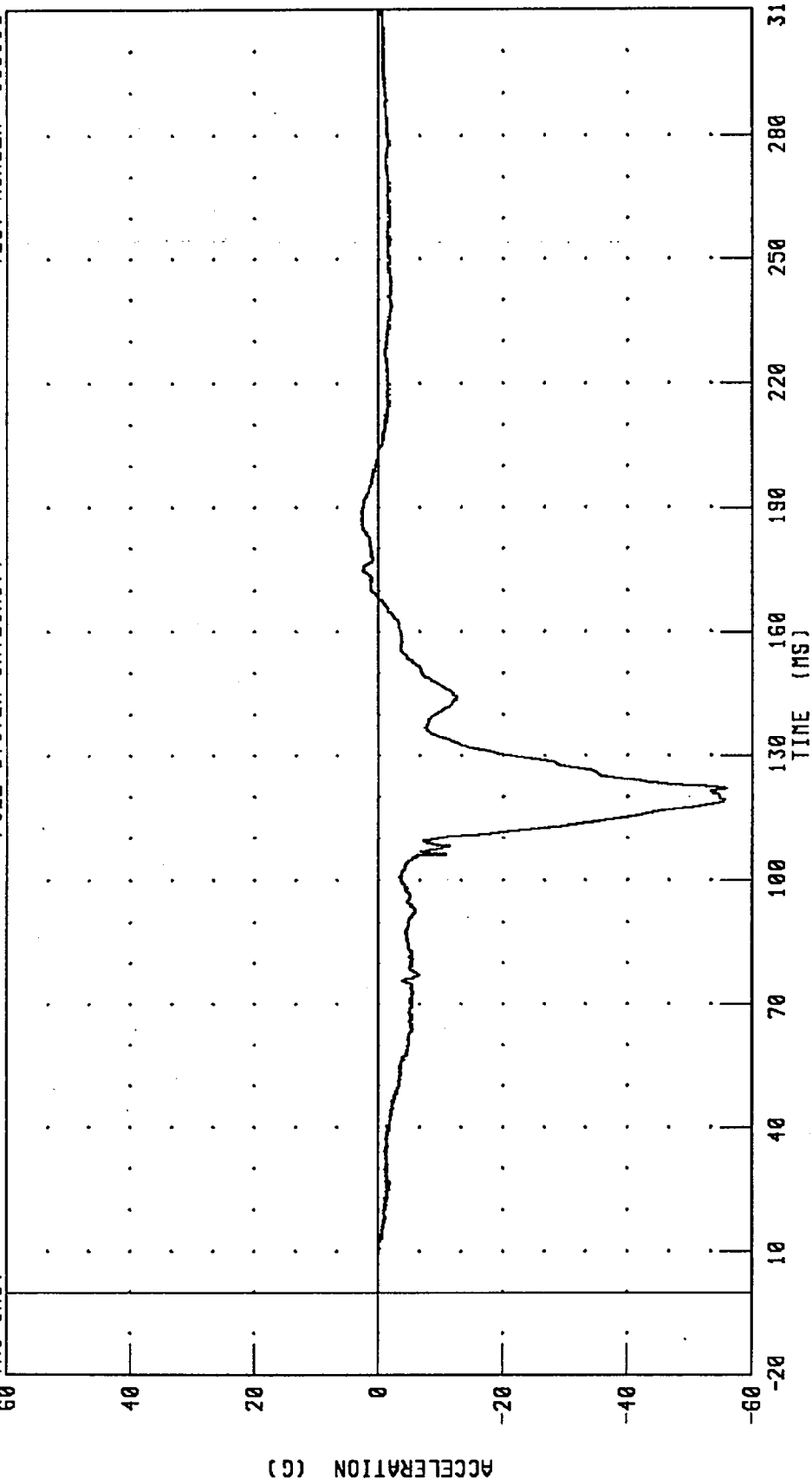
CHANNEL: HD1XG1 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
DRIVER HEAD POSITION 1 Z-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



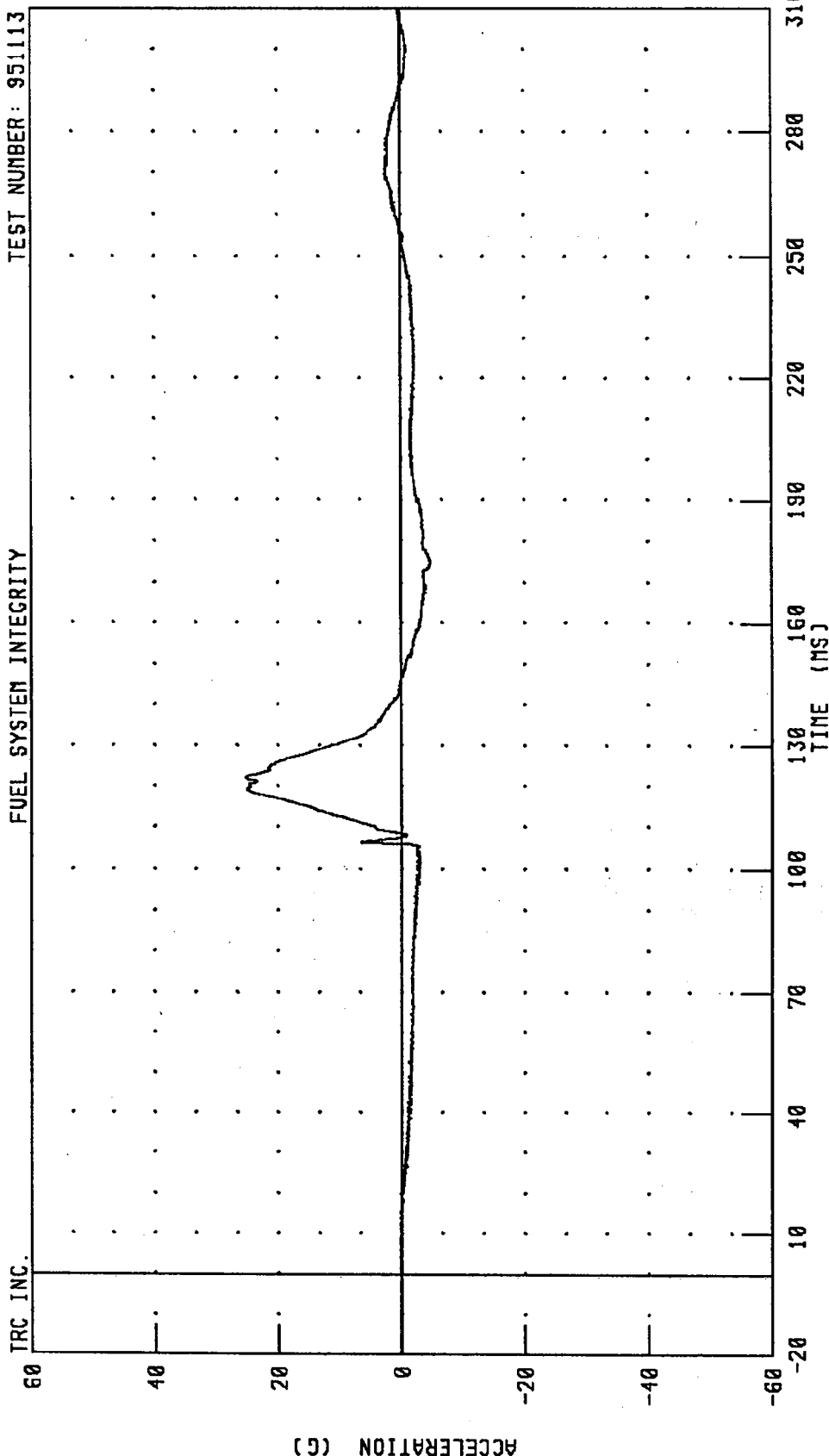
CHANNEL: HD1ZG1 FILTER: CH. CLASS 1000

PEAK DATA: 2.77 G @ 185.76 MS; -55.92 G @ 122.00 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 DRIVER HEAD POSITION 2 Y-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY



CHANNEL: H02YG1 FILTER: CH. CLASS 1000

PEAK DATA: 25.30 G @ 122.08 MS; -4.78 G @ 174.32 MS

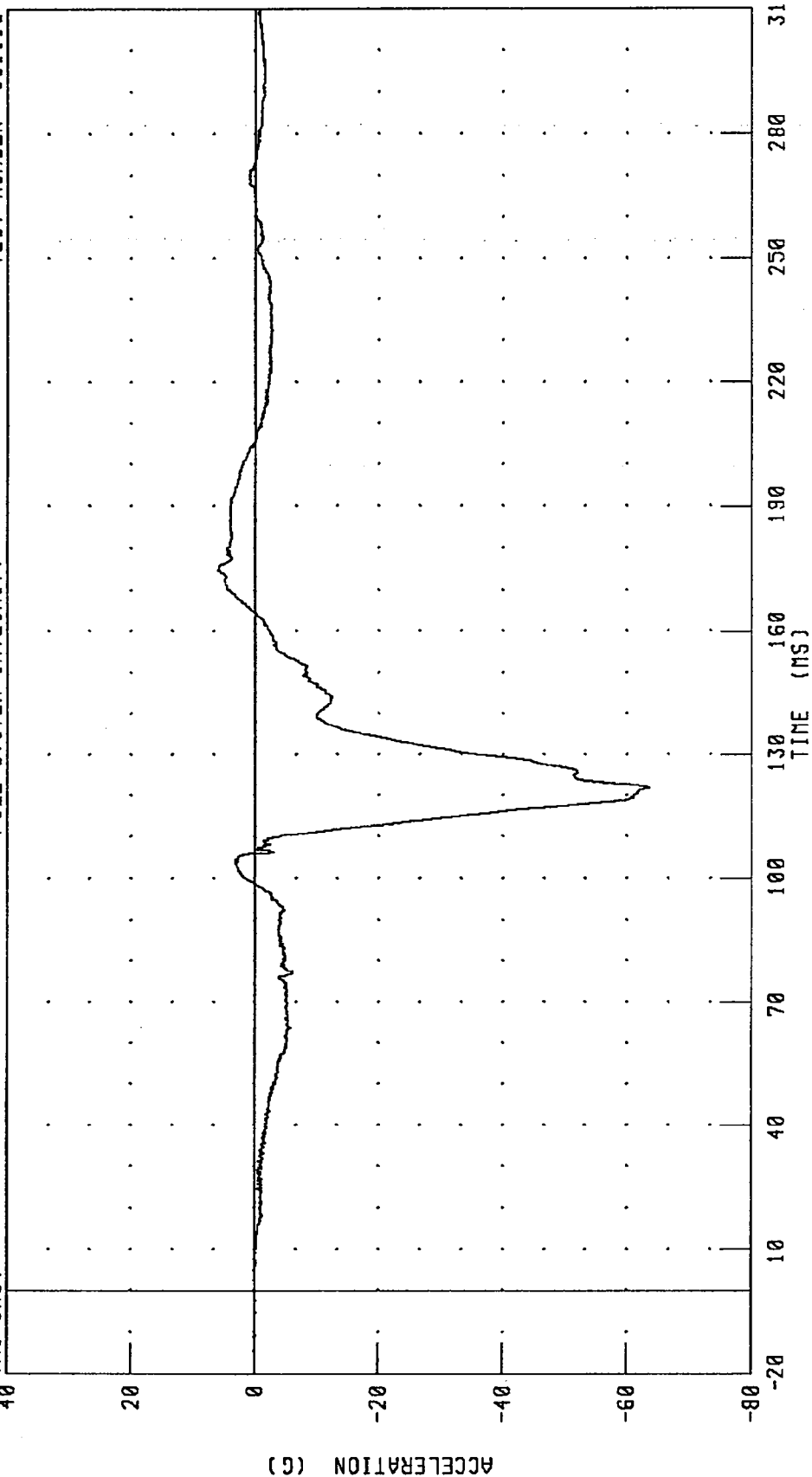
TRC INC.

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
DRIVER HEAD POSITION 2 Z-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: HD2ZG1 FILTER: CH. CLASS 1000

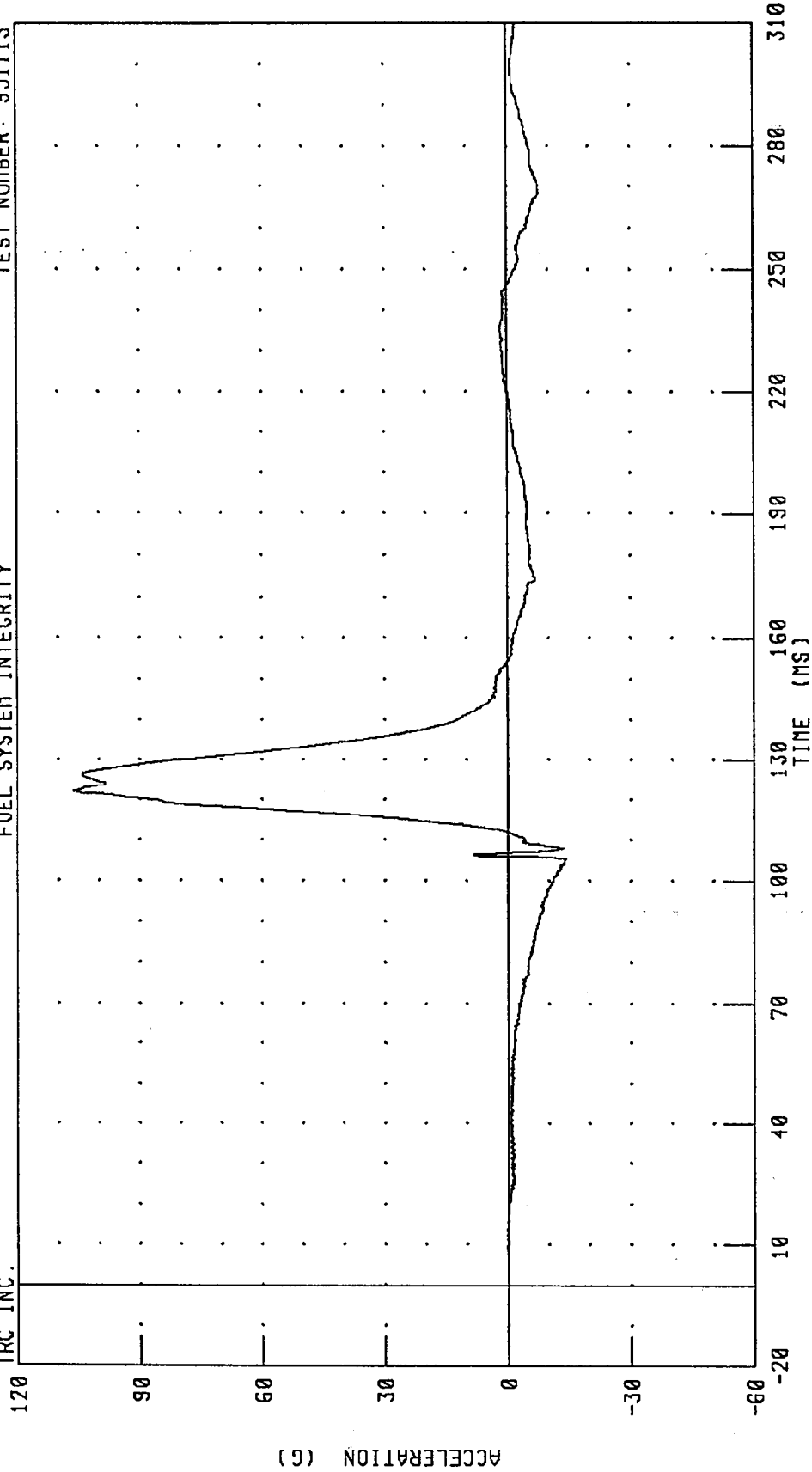
PEAK DATA: 5.89 G @ 174.72 MS; -63.62 G @ 121.92 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
DRIVER HEAD POSITION 3 X-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 106.17 G @ 122.08 MS; -14.21 G @ 105.36 MS

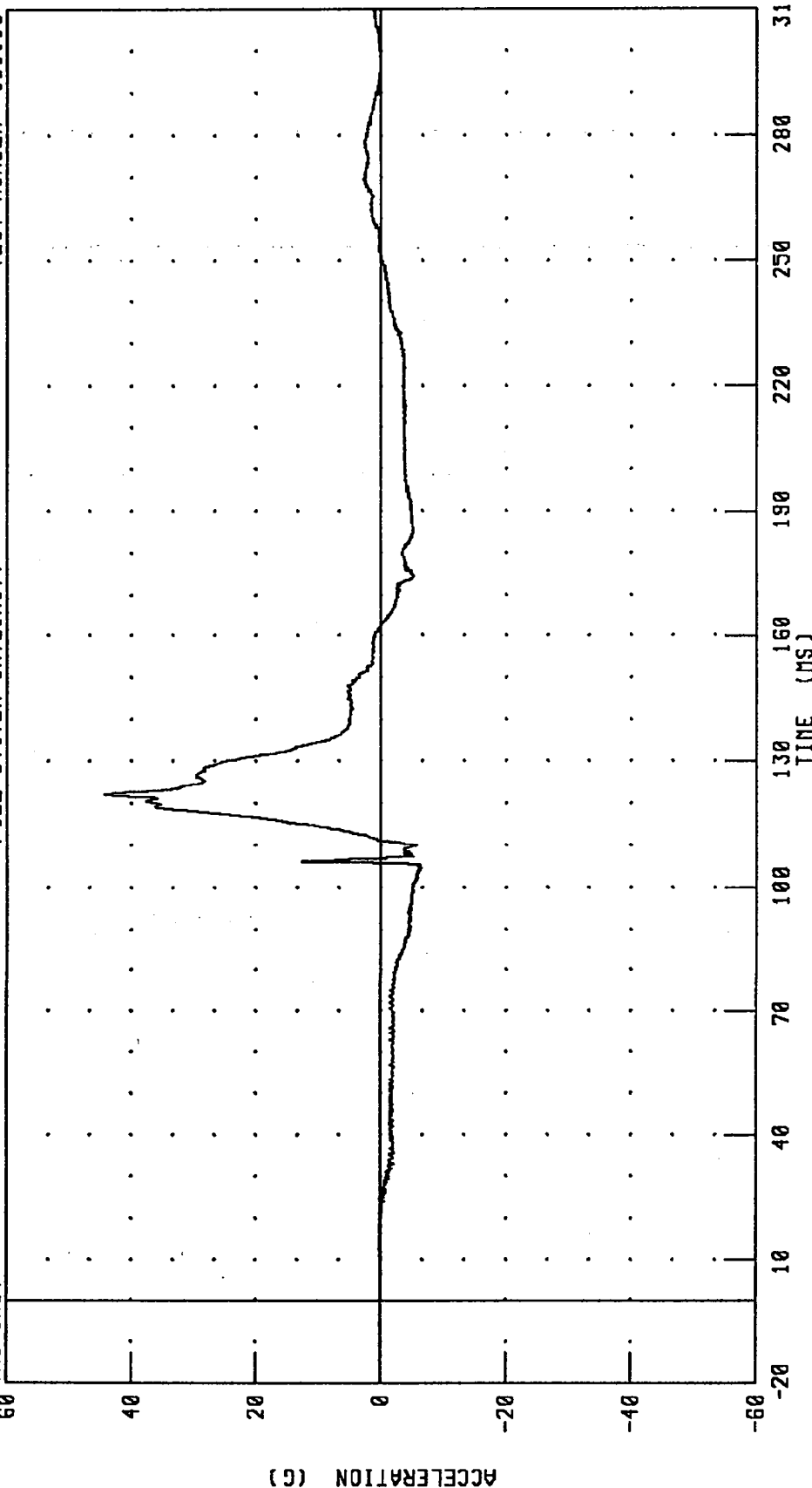
CHANNEL: HD3XC1 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
DRIVER HEAD POSITION 3 Y-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



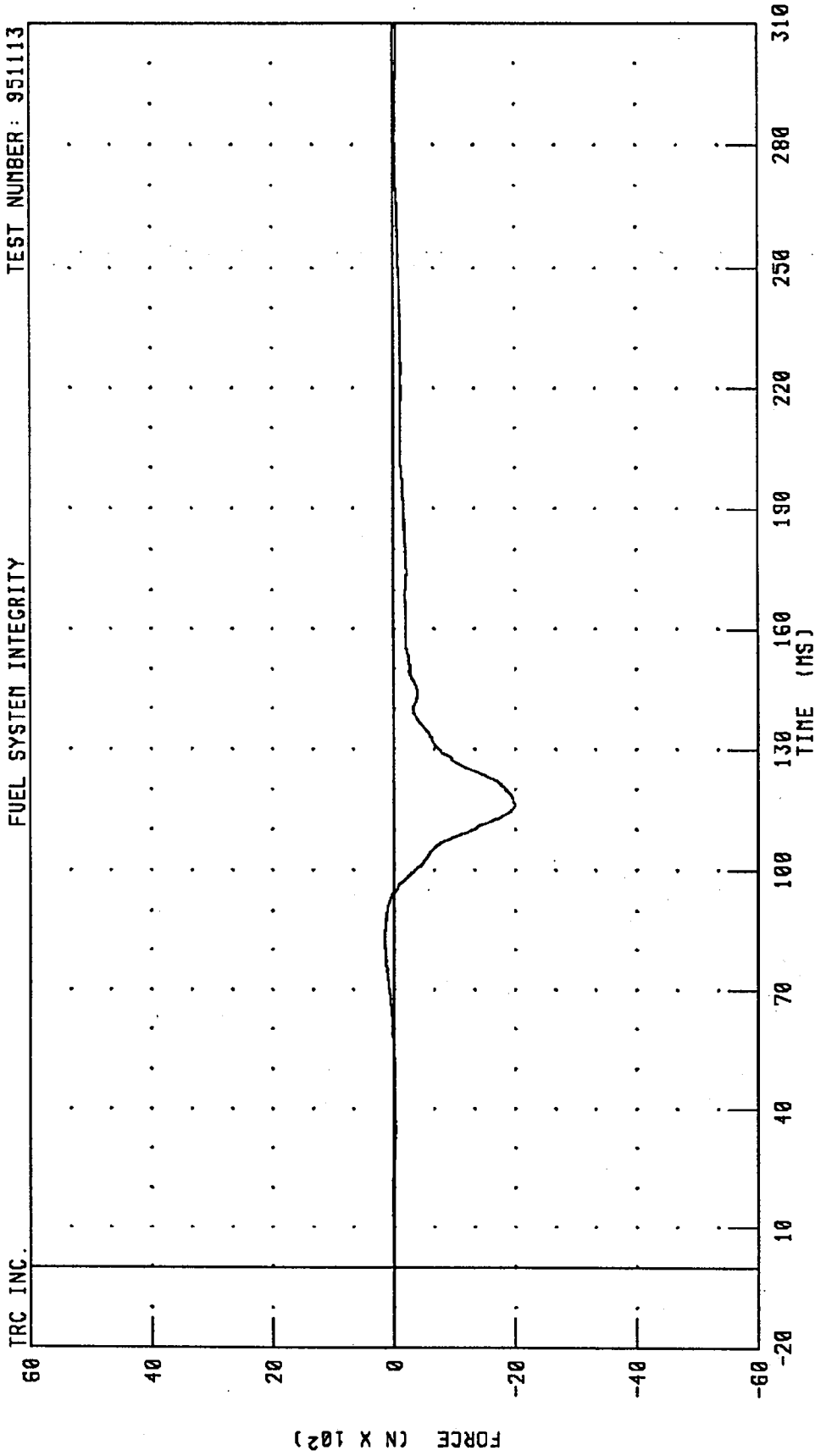
PEAK DATA: 44.17 G @ 122.16 MS; -6.50 G @ 104.56 MS

CHANNEL: HD3YG1 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
DRIVER LOWER NECK X-AXIS SHEAR FORCE

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY



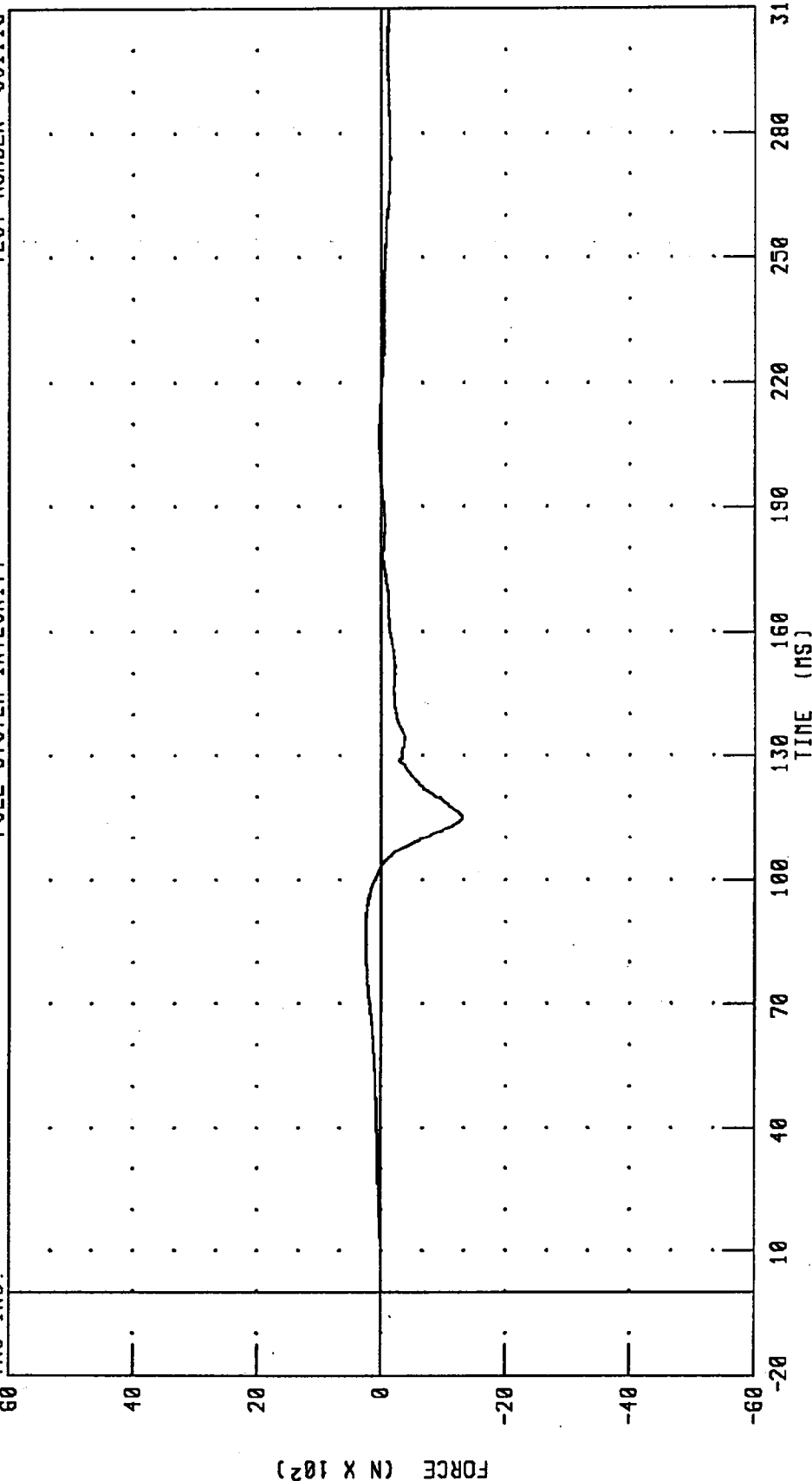
PEAK DATA: 156.36 N @ 81.20 MS; -1996.48 N @ 116.16 MS

CHANNEL: NKLXF1 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 DRIVER LOWER NECK Y-AXIS SHEAR FORCE
 FUEL SYSTEM INTEGRITY

TEST NUMBER: 951113

TRC INC.



PEAK DATA: 242.37 N @ 81.36 MS; -1308.88 N @ 114.88 MS

CHANNEL: NKLYF1 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
DRIVER LOWER NECK Z-AXIS AXIAL FORCE

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.

60

40

20

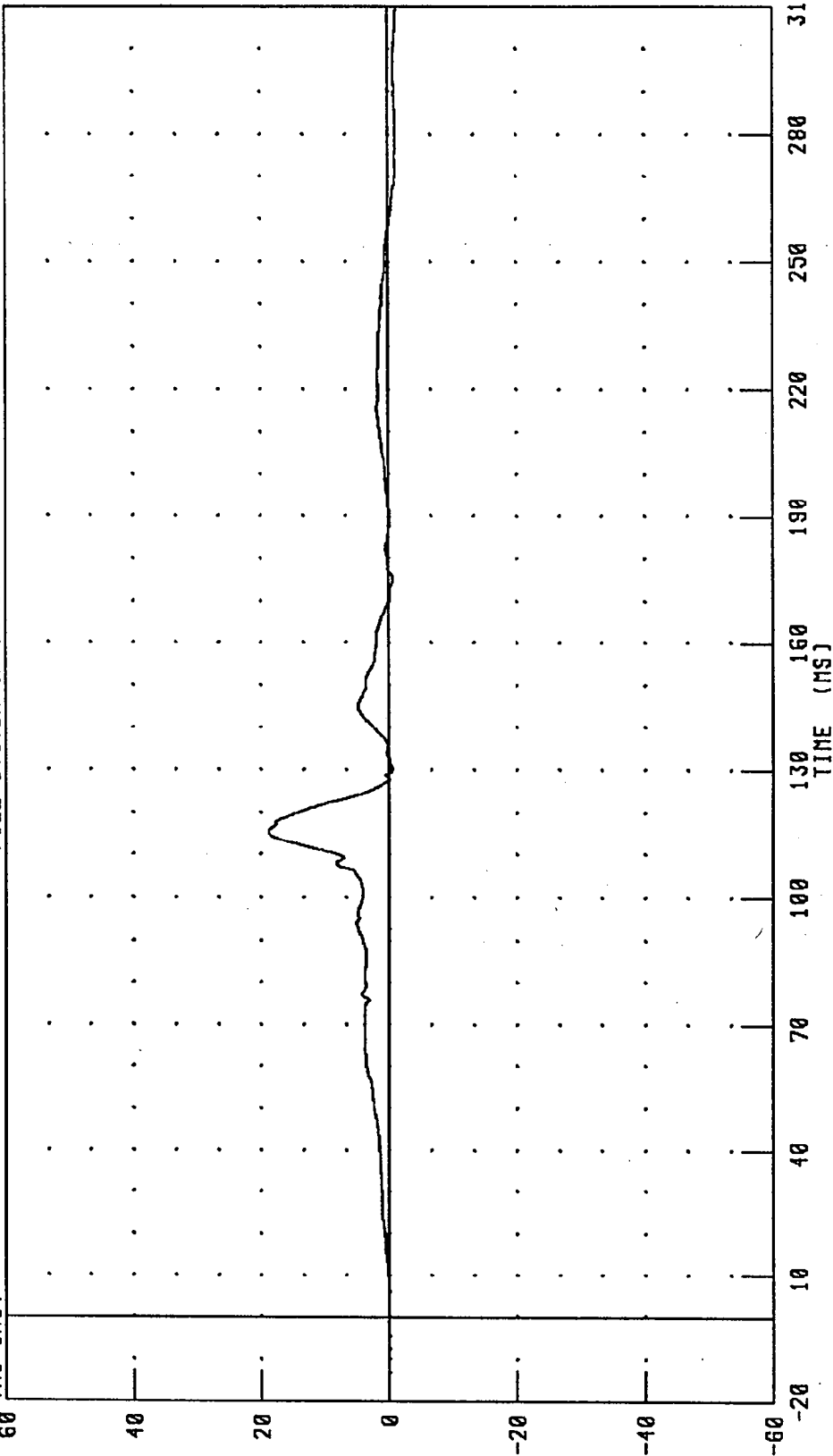
0

-20

-40

-60

FORCE (N X 10²)



CHANNEL: NKLZF1 FILTER: CH. CLASS 1000

PEAK DATA: 1886.65 N @ 115.20 MS, -138.79 N @ 309.76 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 DRIVER LOWER NECK MOMENT ABOUT X-AXIS

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.

180

120

60

0

-60

-120

-180

TORQUE (N·M)

20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 310

TIME (MS)

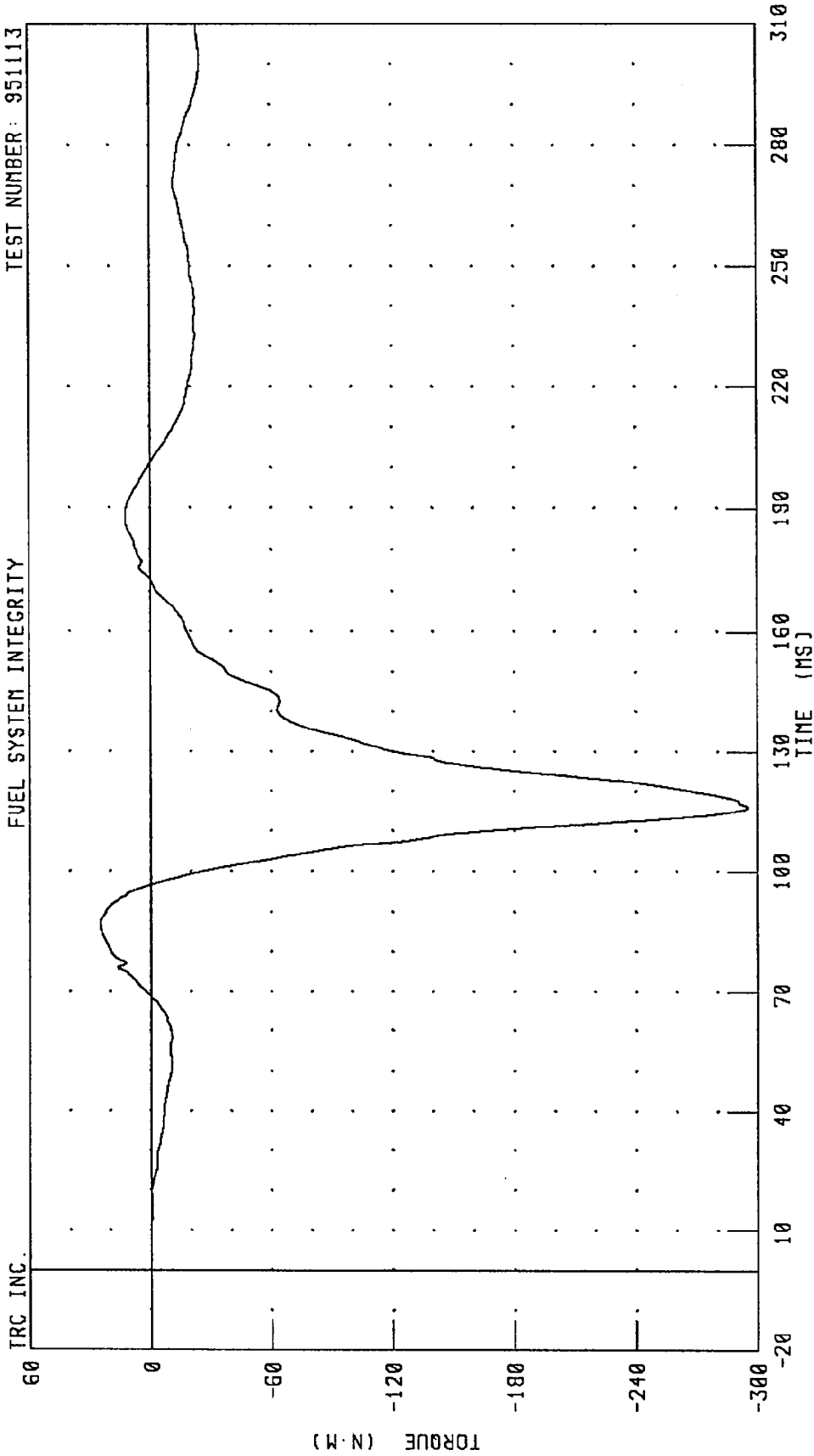
PEAK DATA: 109.26 N·M @ 115.68 MS; -31.61 N·M @ 194.96 MS

CHANNEL: NKLXMI FILTER: CH. CLASS 600

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
DRIVER LOWER NECK MOMENT ABOUT Y-AXIS

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY



PEAK DATA: 24.96 N.M @ 87.04 MS; -295.24 N.M @ 116.08 MS

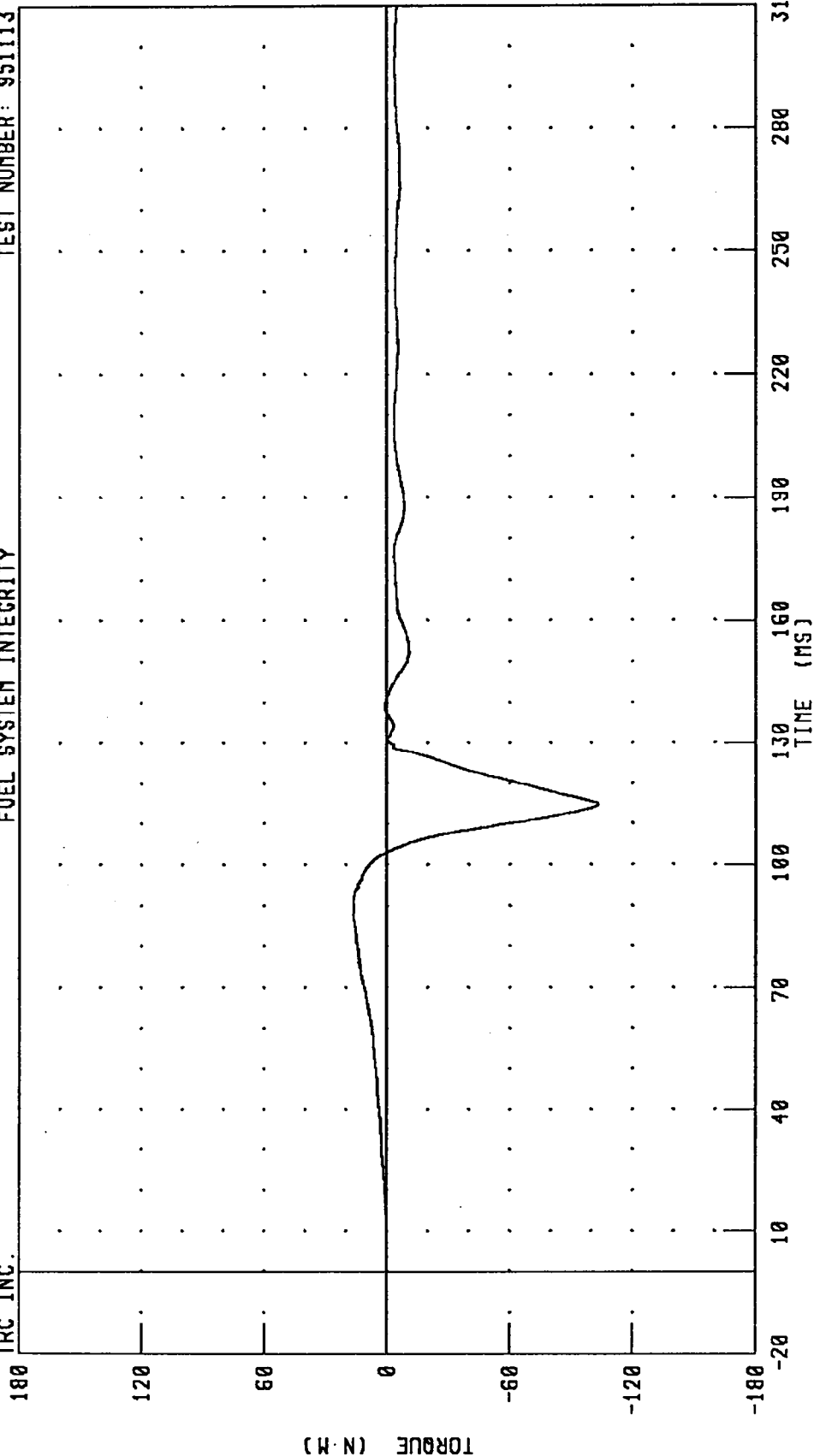
CHANNEL: NKLYM1 FILTER: CH. CLASS 600

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
DRIVER LOWER NECK MOMENT ABOUT Z-AXIS

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



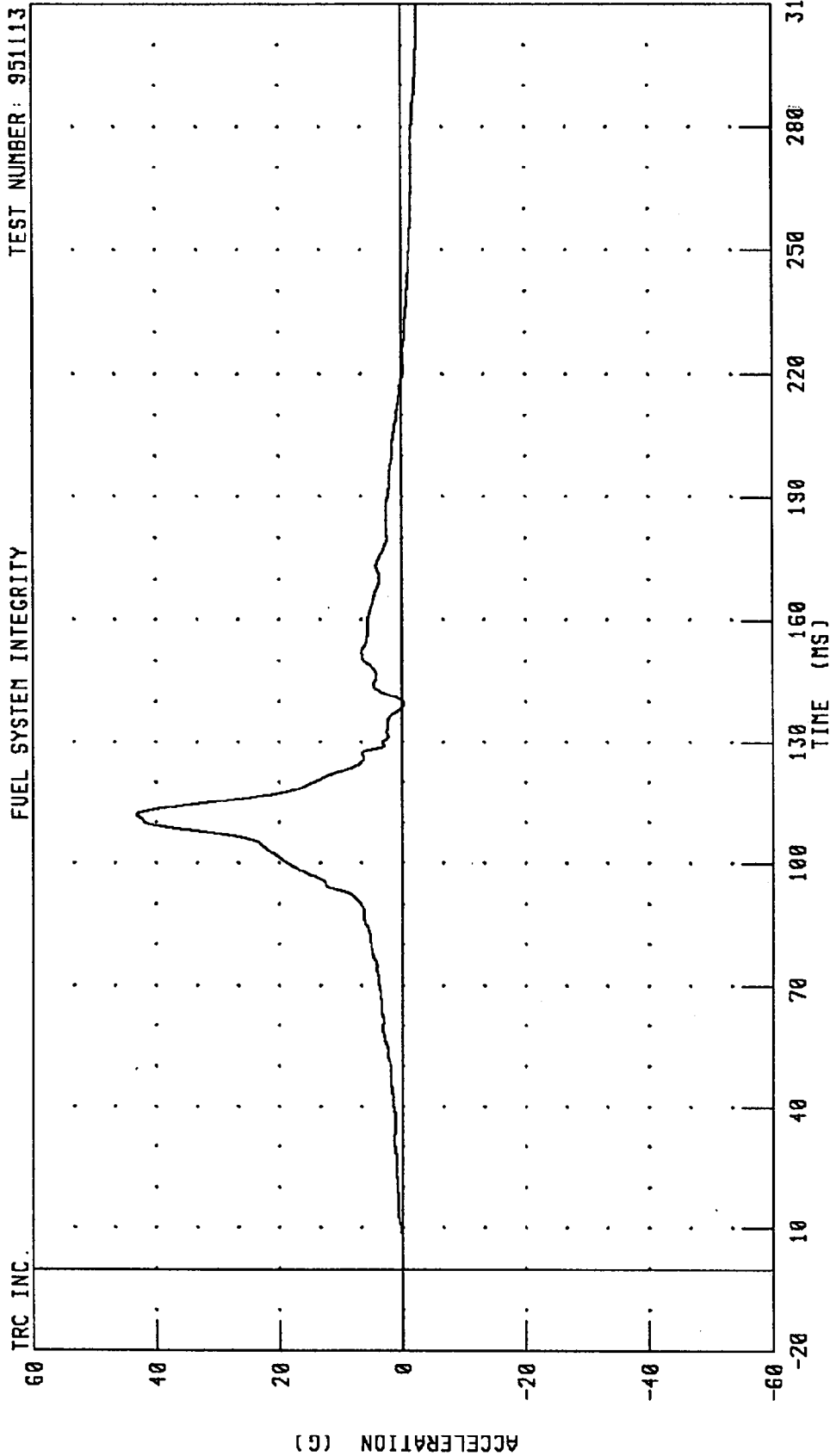
PEAK DATA: 16.38 N-M @ 90.40 MS; -103.09 N-M @ 114.96 MS

CHANNEL: NKLZM1 FILTER: CH, CLASS 600

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 DRIVER CHEST X-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY



PEAK DATA: 43.20 G @ 112.00 MS; -2.55 G @ 305.04 MS

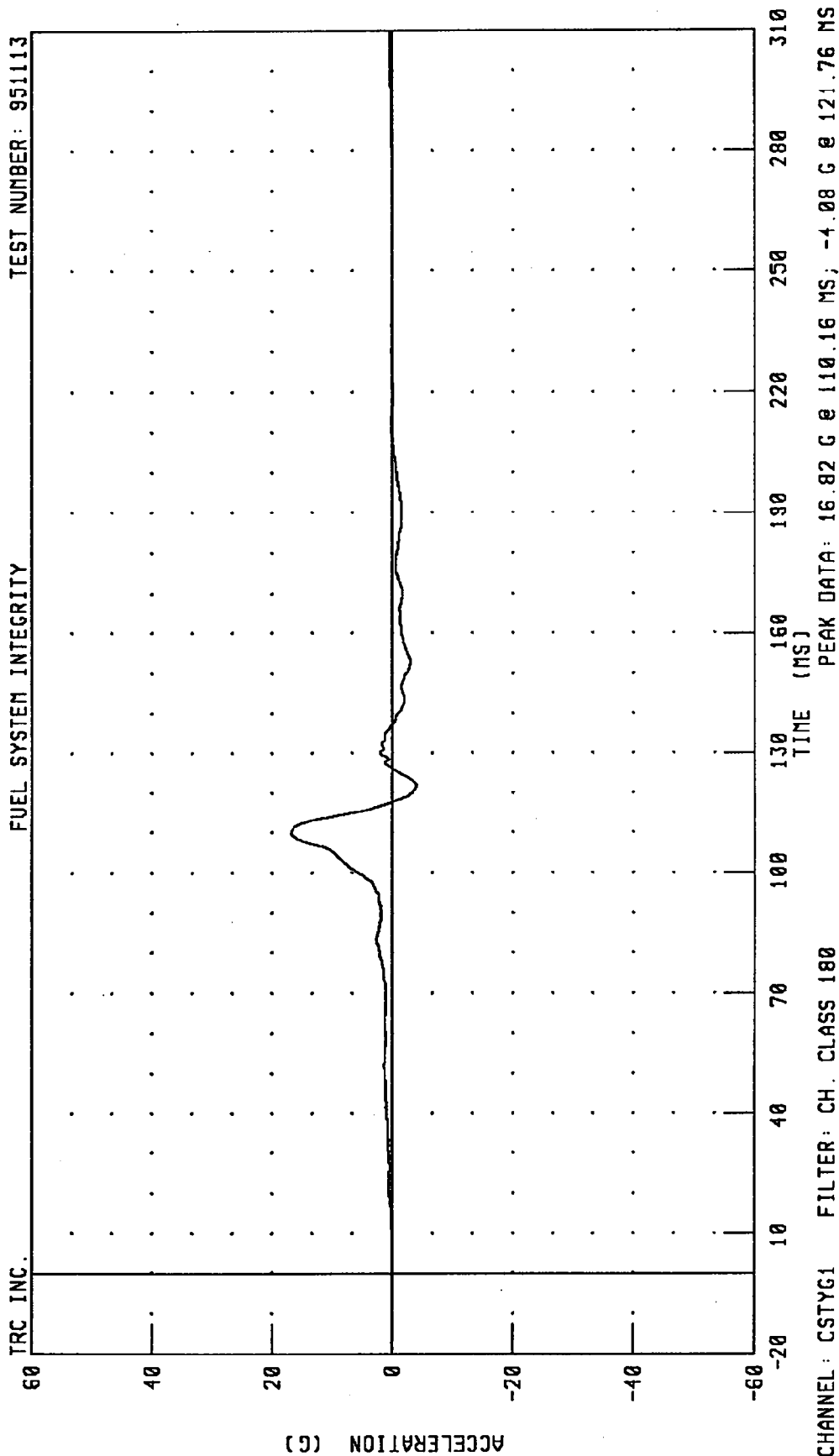
CHANNEL: CSTXG1 FILTER: CH. CLASS 180

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
DRIVER CHEST Y-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: CSTYG1 FILTER: CH. CLASS 180

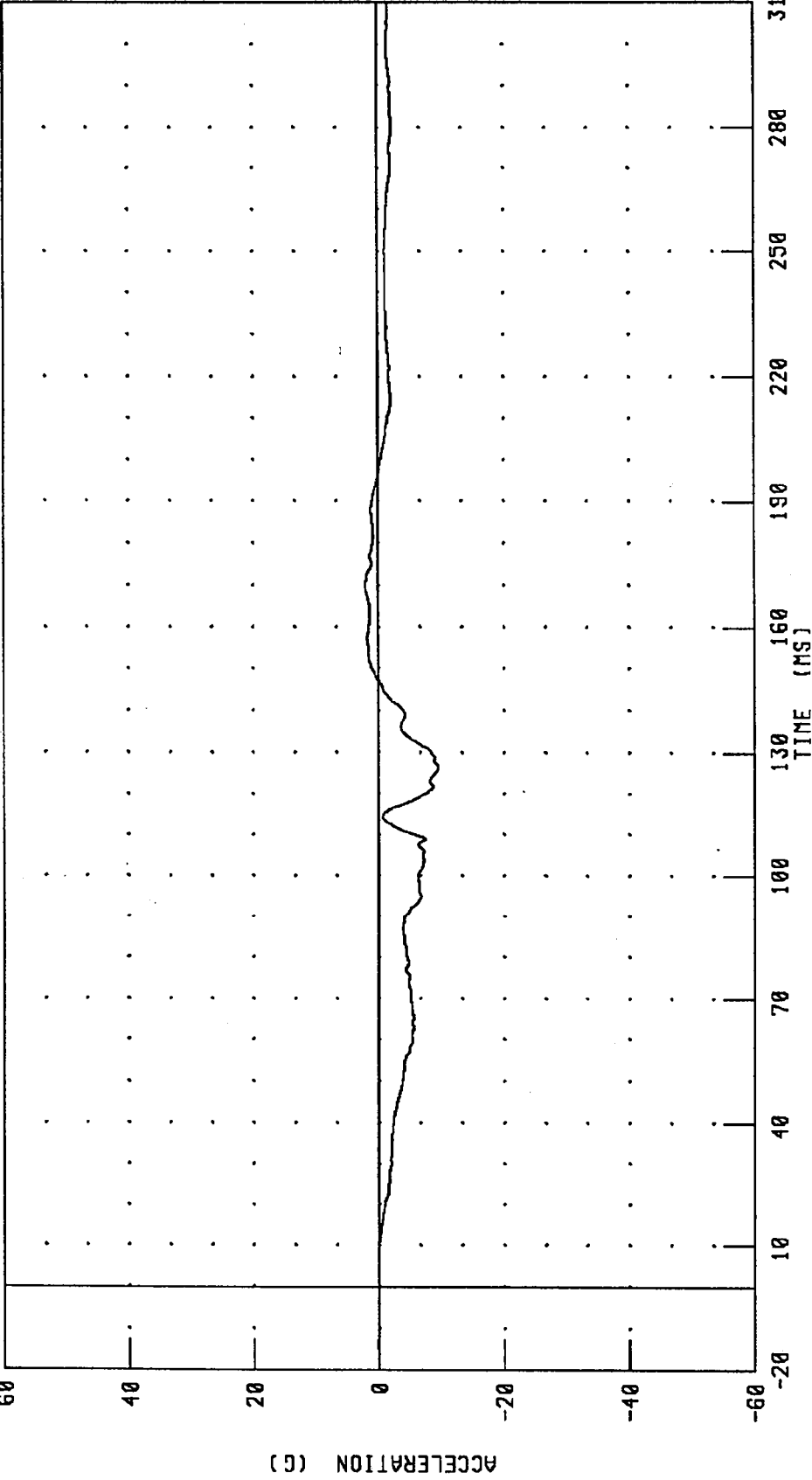
PEAK DATA: 16.82 G @ 110.16 MS; -4.08 G @ 121.76 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
DRIVER CHEST Z-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 2.04 G @ 169.68 MS; -9.55 G @ 126.48 MS

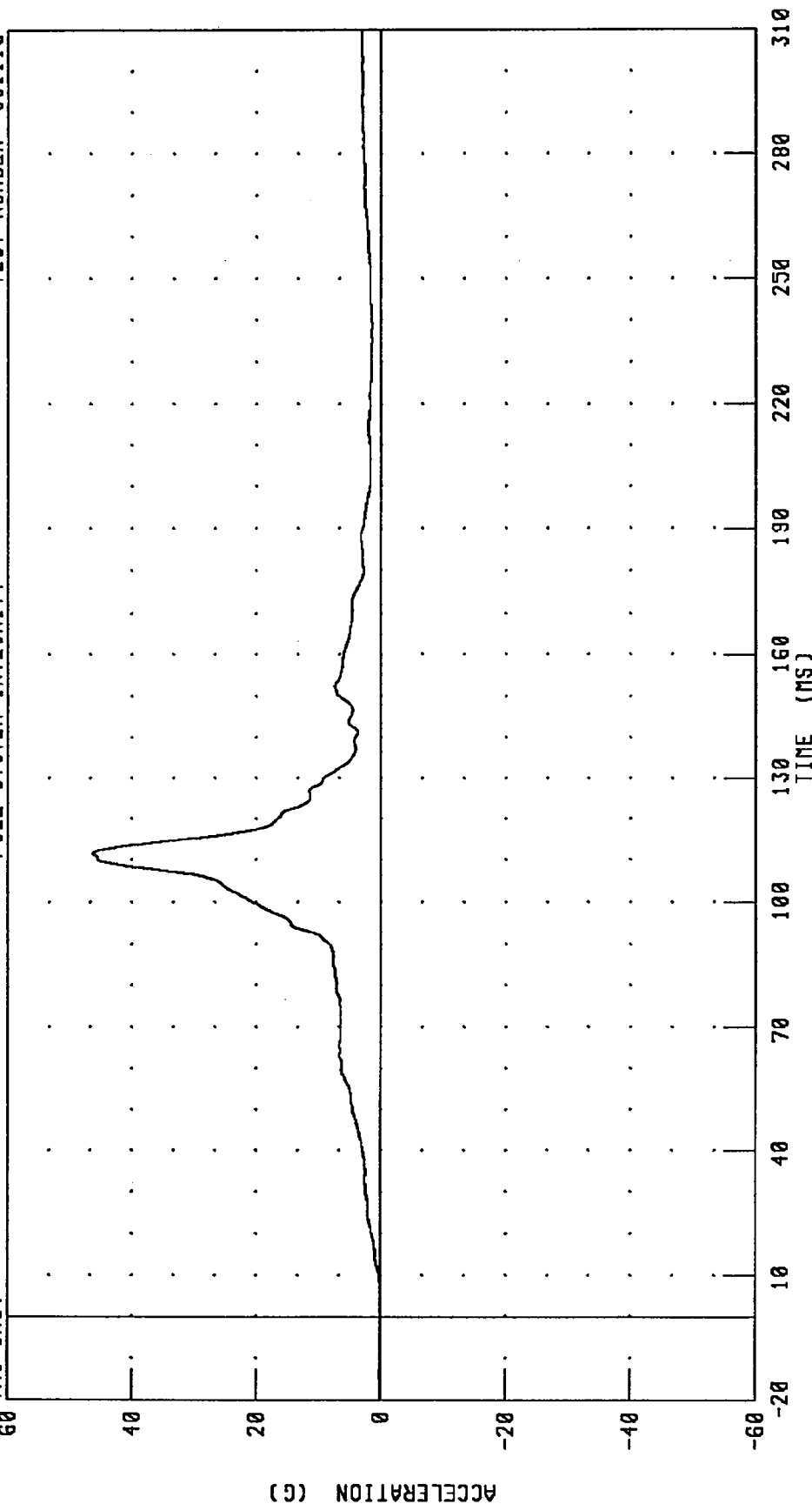
CHANNEL: CSTZG1 FILTER: CH. CLASS 180

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 DRIVER CHEST RESULTANT ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: CSTRG1 FILTER: CH. CLASS 180

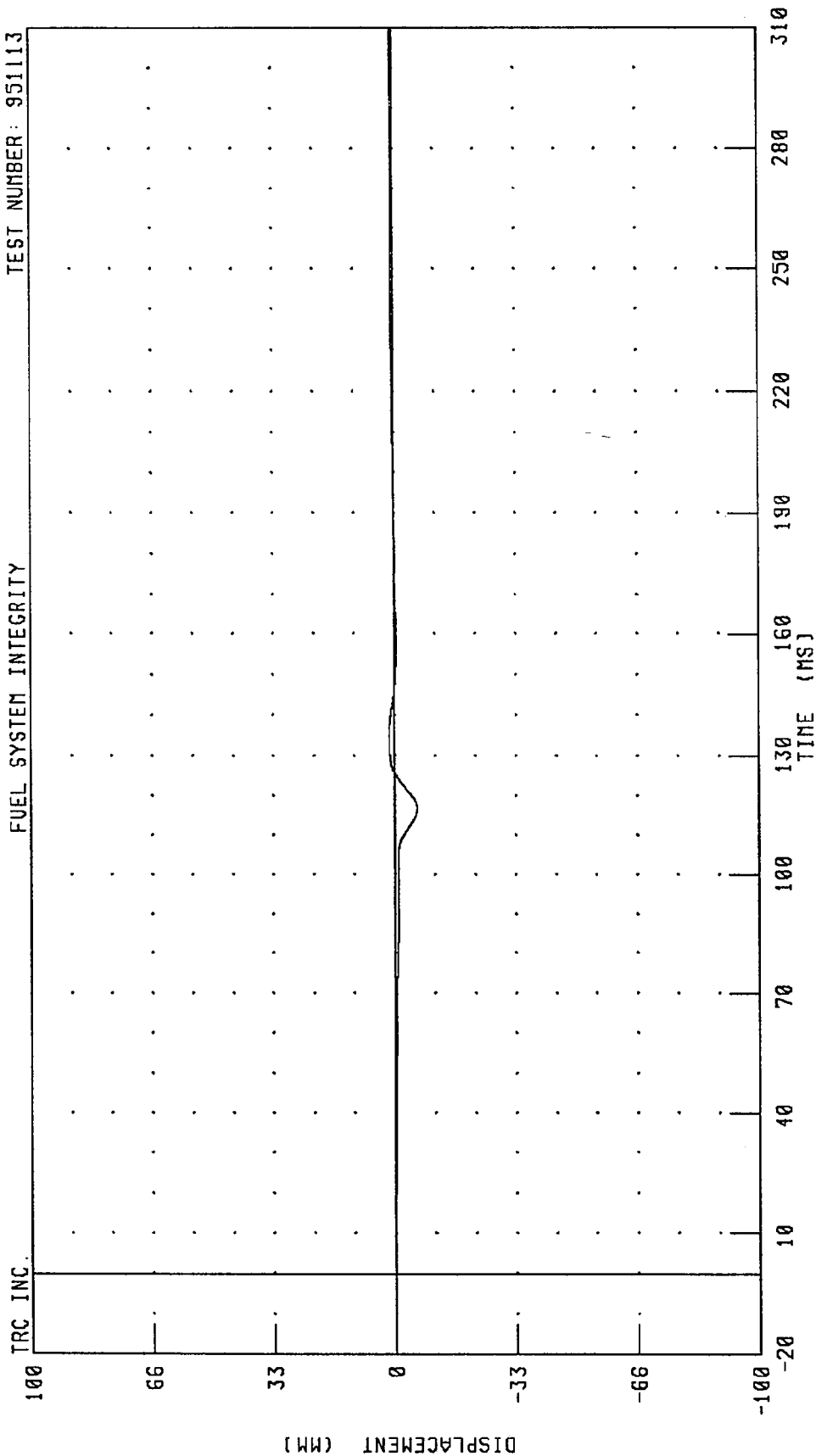
PEAK DATA: 46.16 G @ 111.84 MS; 0.01 G @ -20.00 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP

DRIVER CHEST DEFLECTION

FUEL SYSTEM INTEGRITY

TEST NUMBER: 951113



CHANNEL: CSTXD1 FILTER: CH. CLASS 180

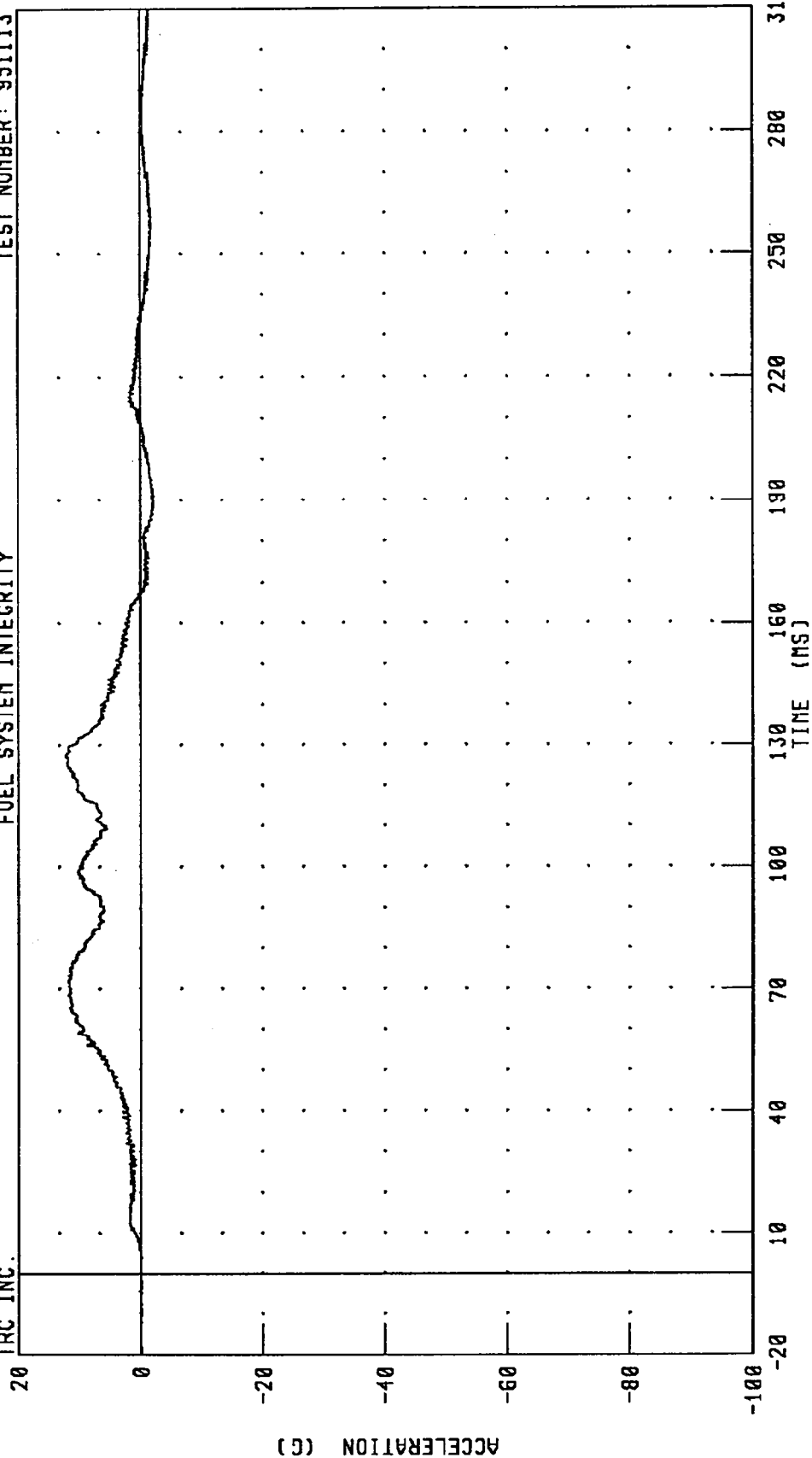
PEAK DATA: 1.50 MM @ 134.24 MS; -6.13 MM @ 116.80 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 DRIVER PELVIS X-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



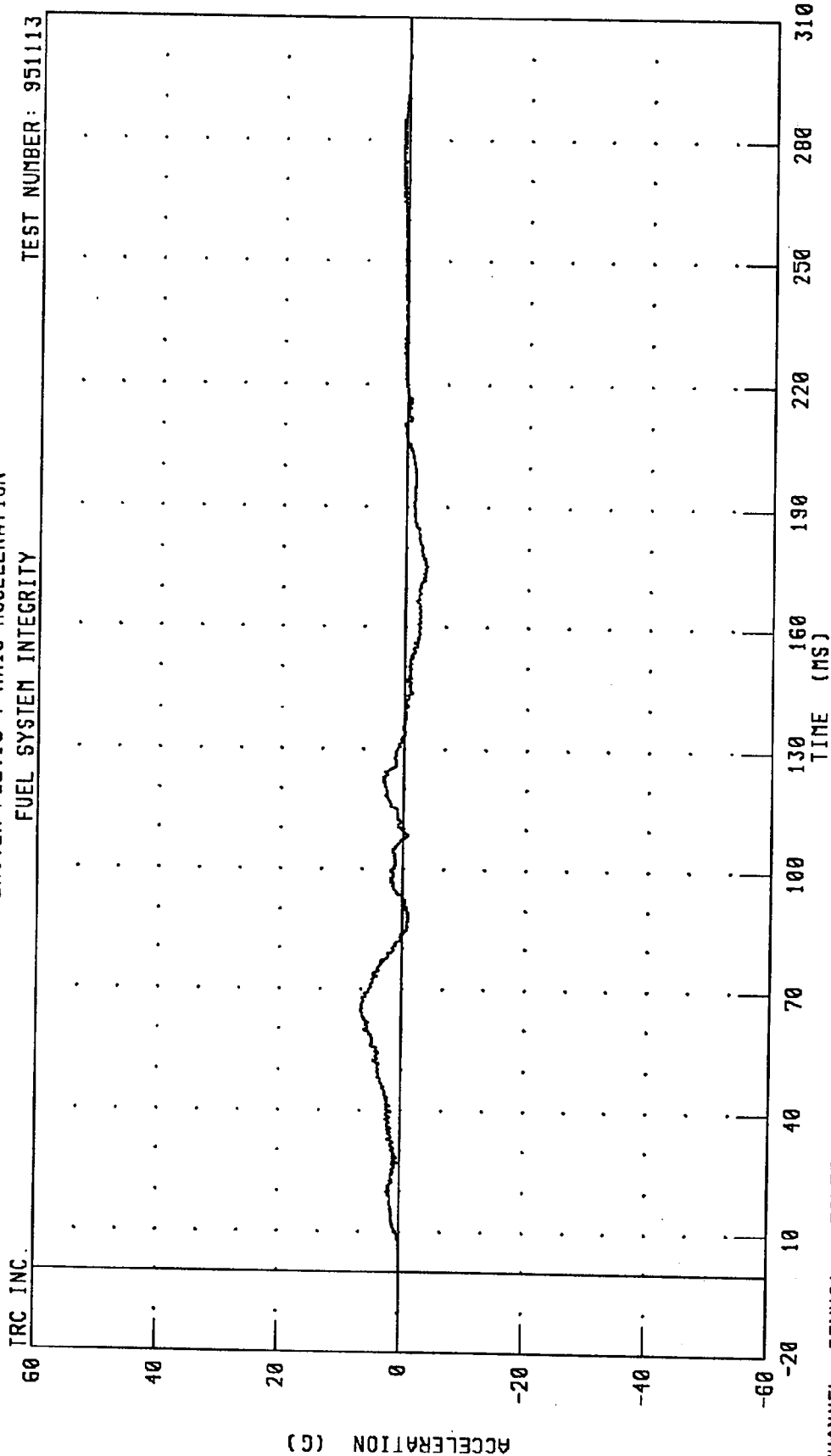
PEAK DATA: 12.25 G @ 127.28 MS; -2.31 G @ 188.32 MS

CHANNEL: PEVXG1 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 DRIVER PELVIS Y-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY



CHANNEL: PEVYG1 FILTER: CH. CLASS 1000

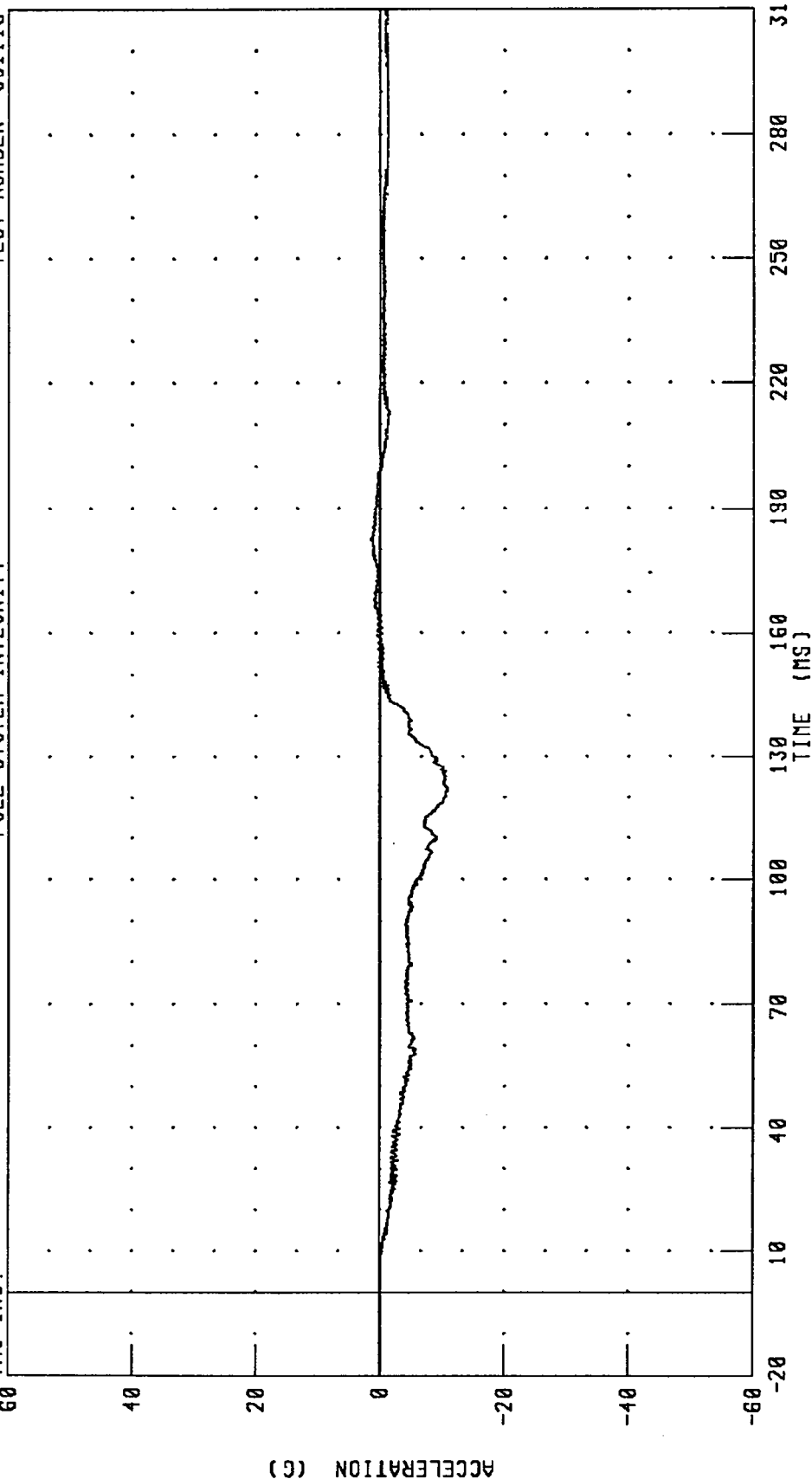
PEAK DATA: 6.85 G @ 64.96 MS; -3.53 G @ 175.60 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 DRIVER PELVIS Z-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



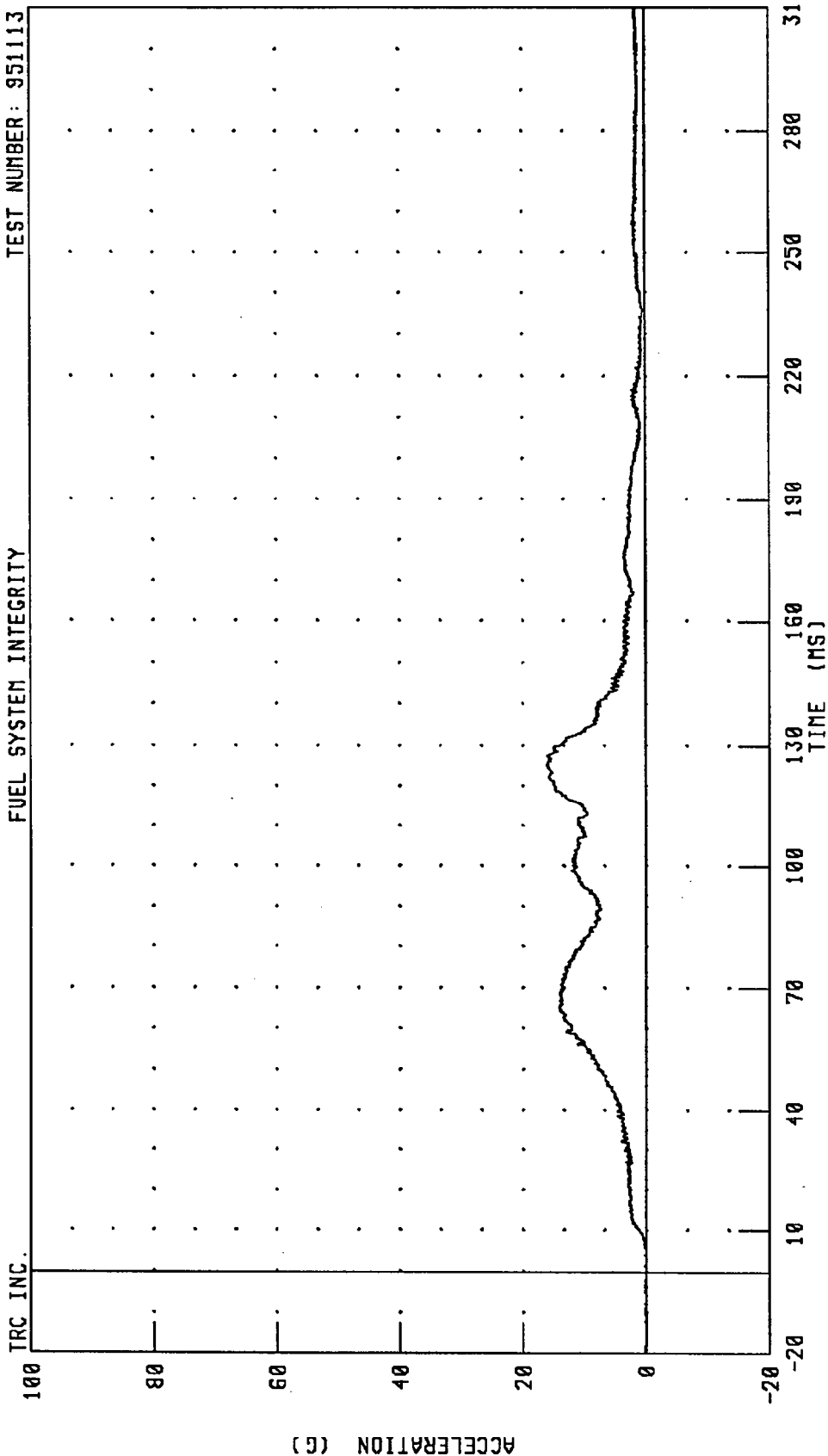
CHANNEL: PEVZG1 FILTER: CH. CLASS 1000

PEAK DATA: 1.45 G @ 182.24 MS; -10.87 G @ 121.68 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 DRIVER PELVIS RESULTANT ACCELERATION

TEST NUMBER: 951113

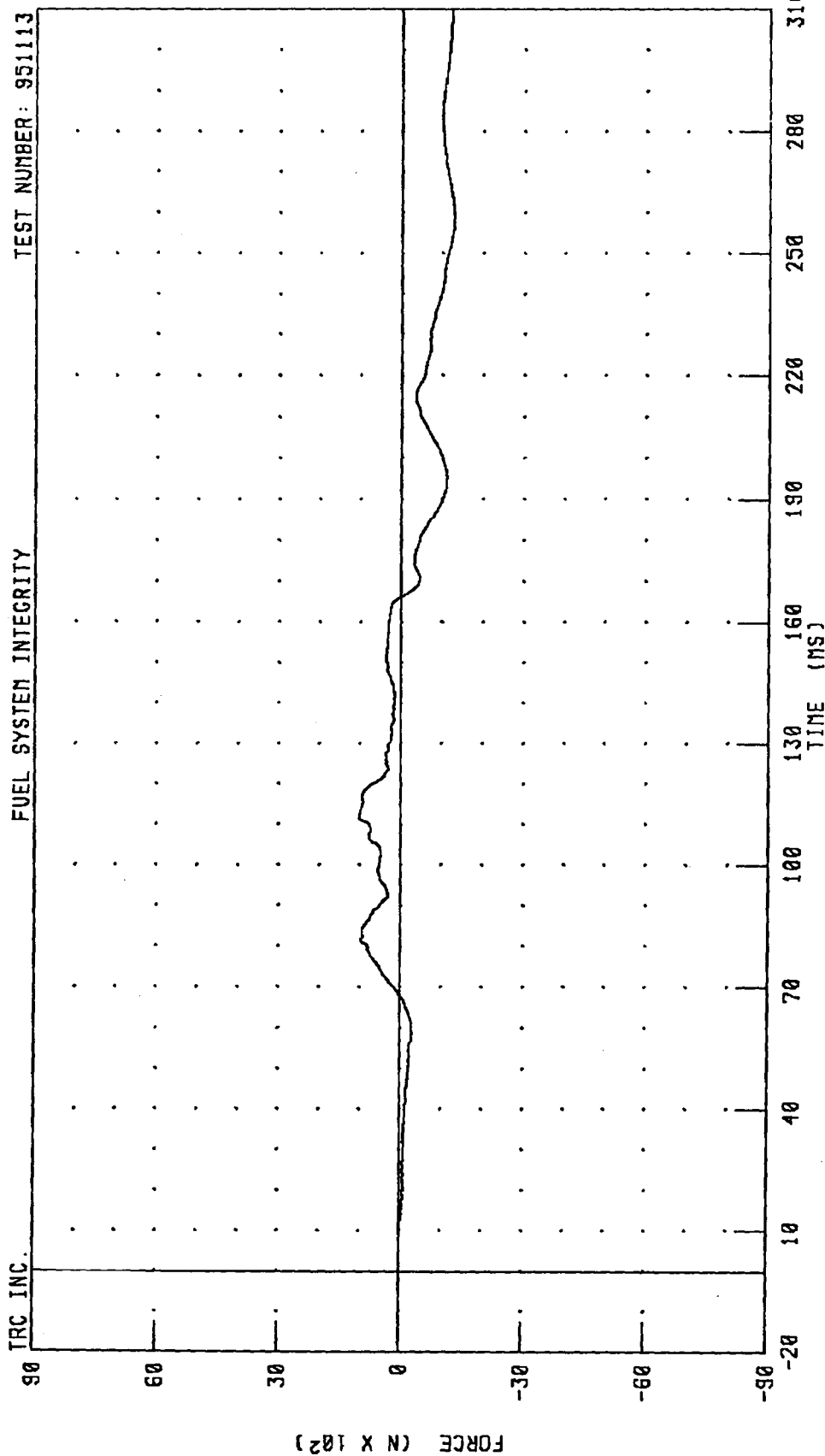
FUEL SYSTEM INTEGRITY



PEAK DATA: 16.09 G @ 125.12 MS; 0.09 G @ -19.68 MS

CHANNEL: PEVRG1 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
DRIVER LEFT FEMUR FORCE



CHANNEL: LFMF1 FILTER: CH. CLASS 600

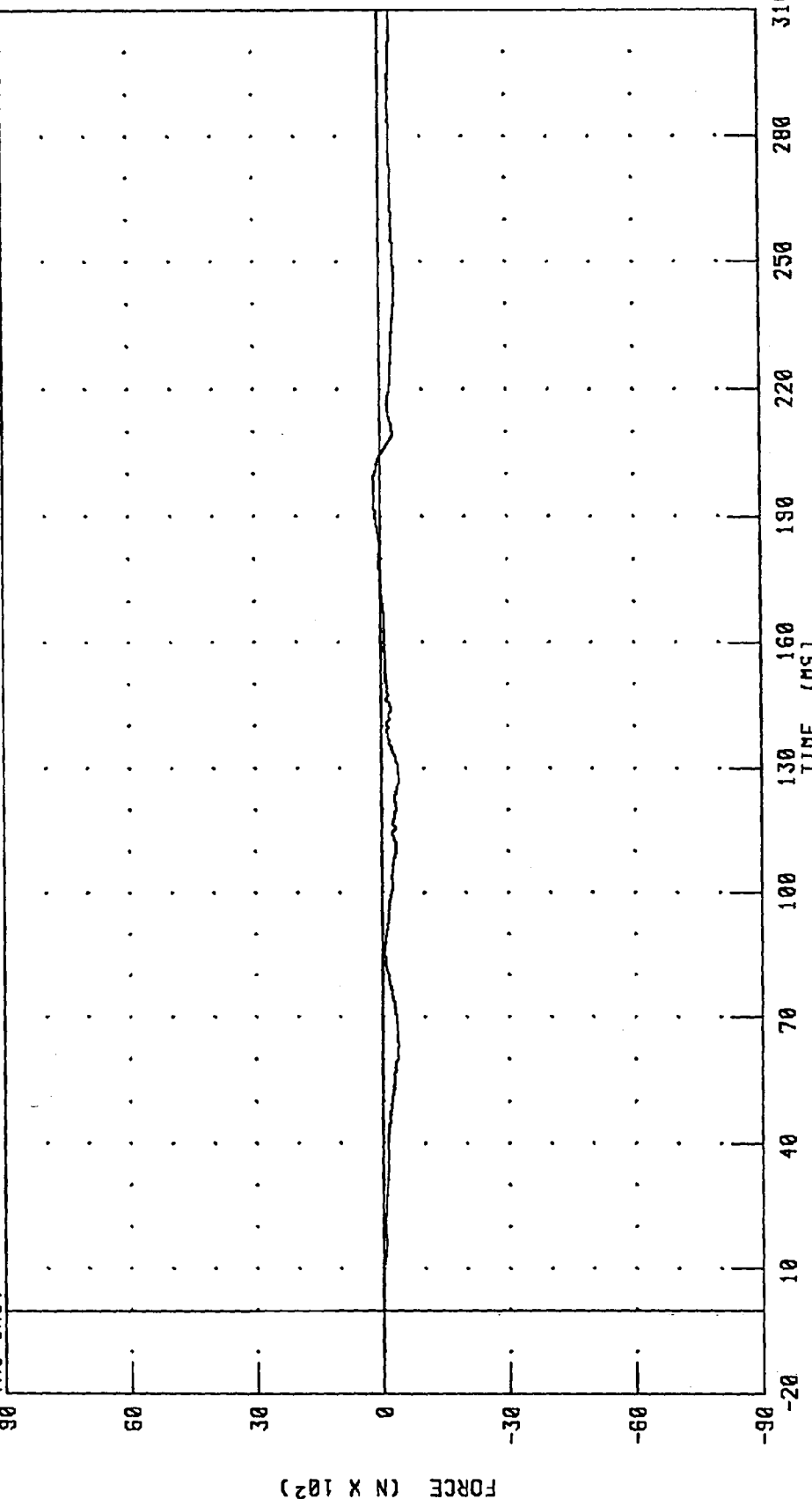
PEAK DATA: 1013.16 N @ 111.84 MS; -1277.34 N @ 258.88 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 DRIVER RIGHT FEMUR FORCE

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 162.78 N @ 197.84 MS; -405.32 N @ 126.96 MS

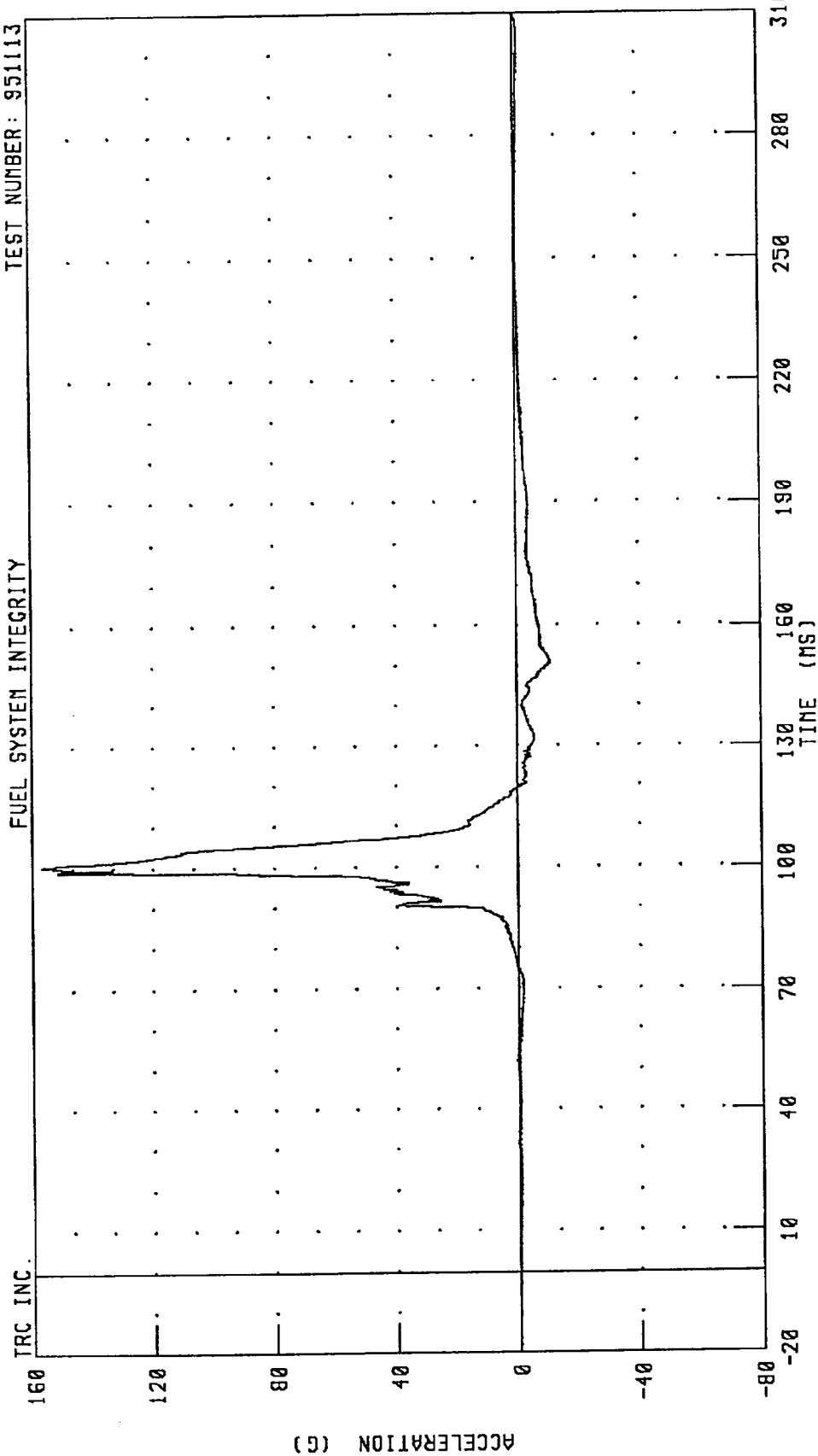
CHANNEL: RFMF1 FILTER: CH. CLASS 600

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
RIGHT FRONT PASSENGER HEAD X-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 156.71 G @ 100.48 MS; -10.75 G @ 150.64 MS

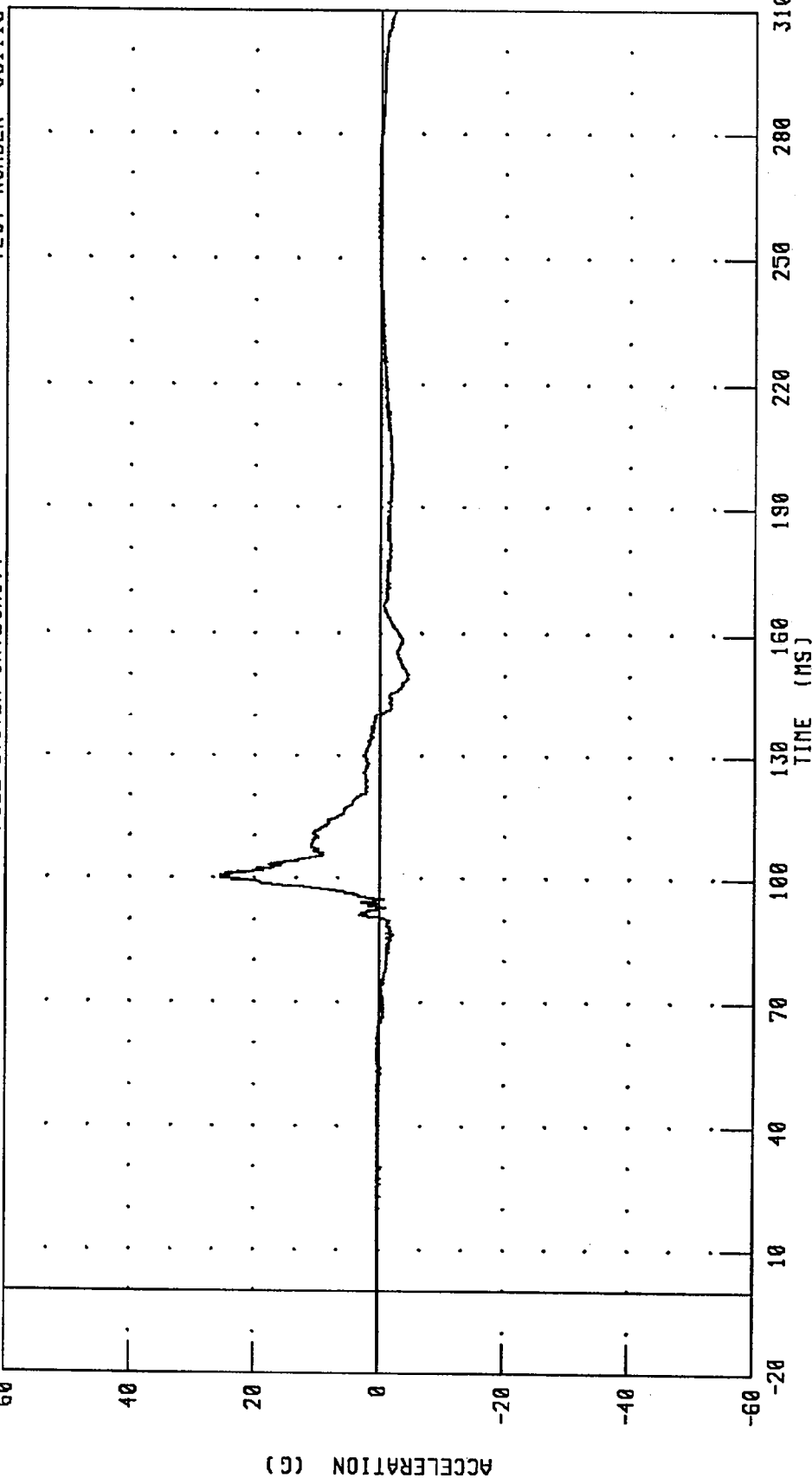
CHANNEL: HEDXC2 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: HEDYG2 FILTER: CH. CLASS 1000

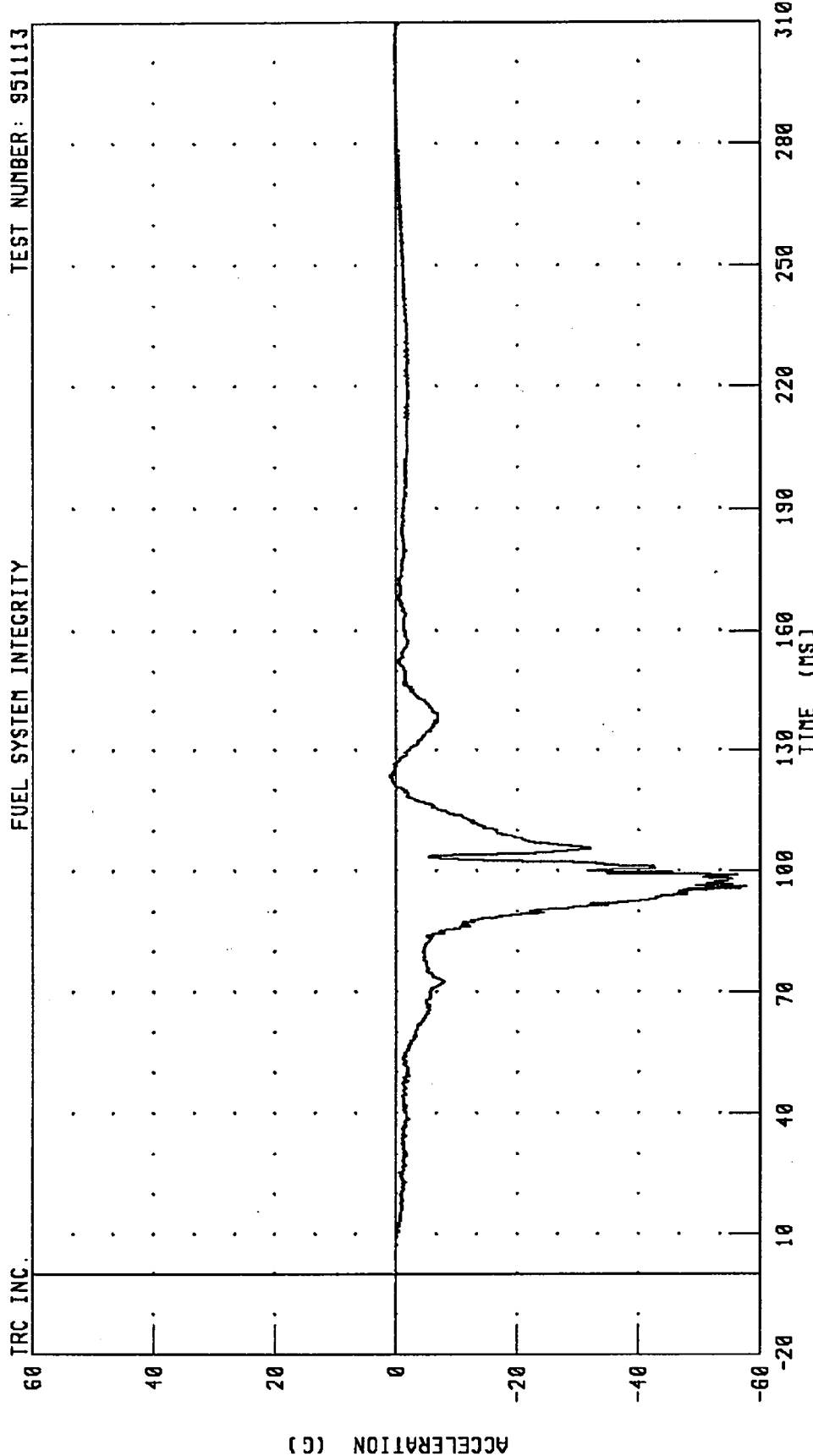
PEAK DATA: 25.55 G @ 100.08 MS; -4.58 G @ 149.36 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 RIGHT FRONT PASSENGER HEAD Z-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

IRC INC.



CHANNEL: HEDZG2 FILTER: CH. CLASS 1000

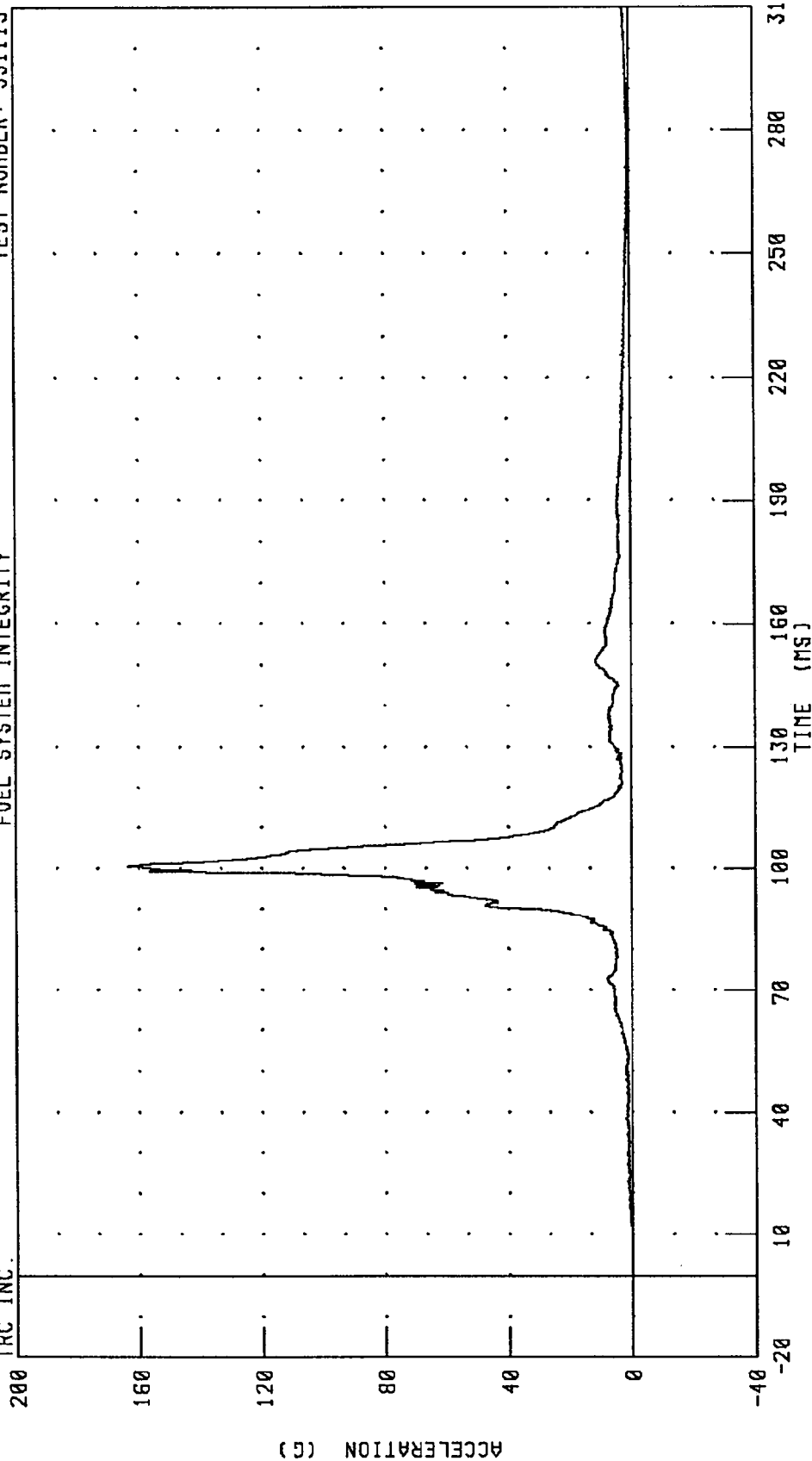
PEAK DATA: 0.94 G @ 123.44 MS; -57.57 G @ 96.00 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
RIGHT FRONT PASSENGER HEAD RESULTANT ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: HEDRG2 FILTER: CH. CLASS 1000

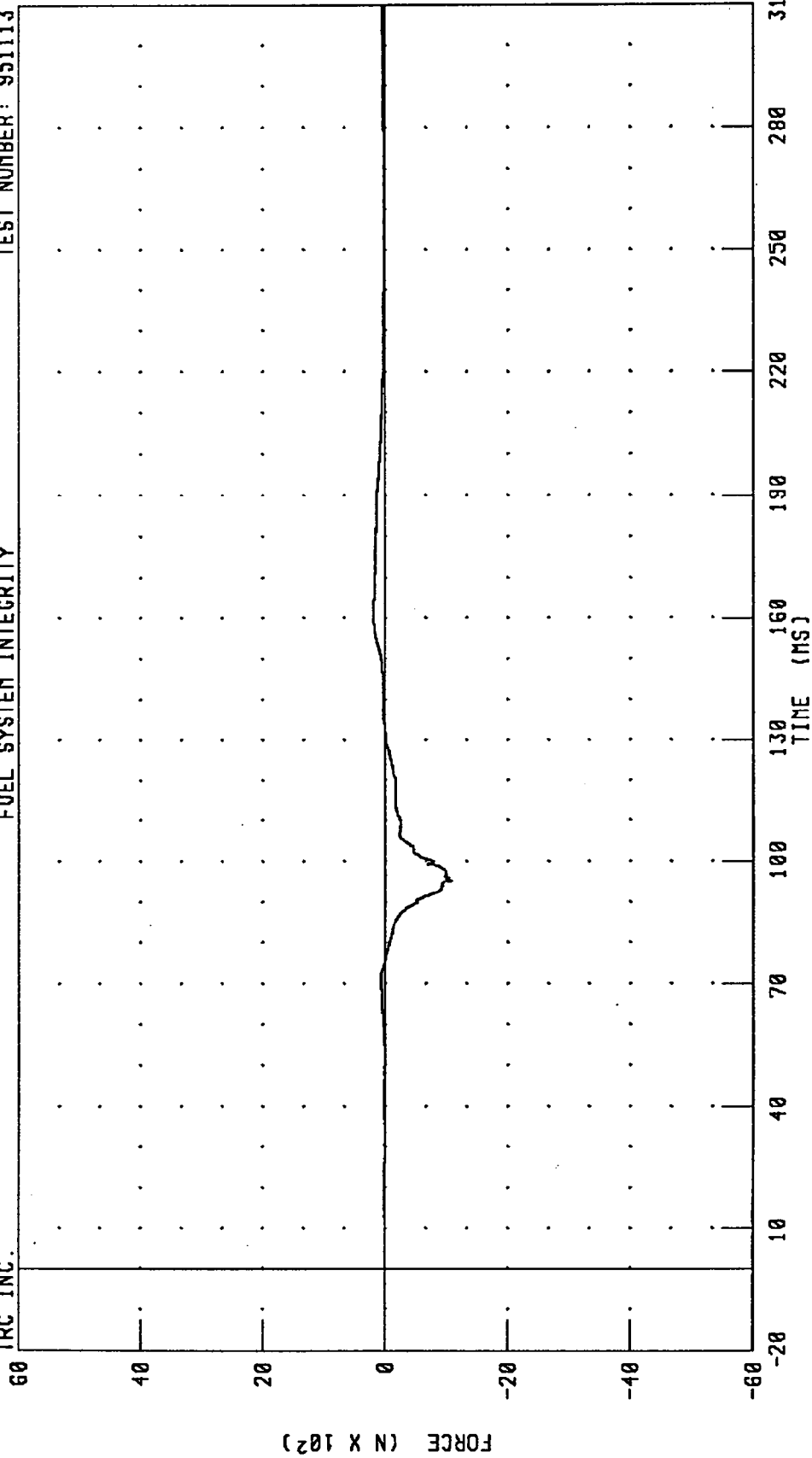
PEAK DATA: 163.52 G @ 100.48 MS; 0.09 G @ -19.84 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 RIGHT FRONT PASSENGER UPPER NECK X-AXIS SHEAR FORCE

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 188.88 N @ 159.76 MS; -1075.21 N @ 95.28 MS

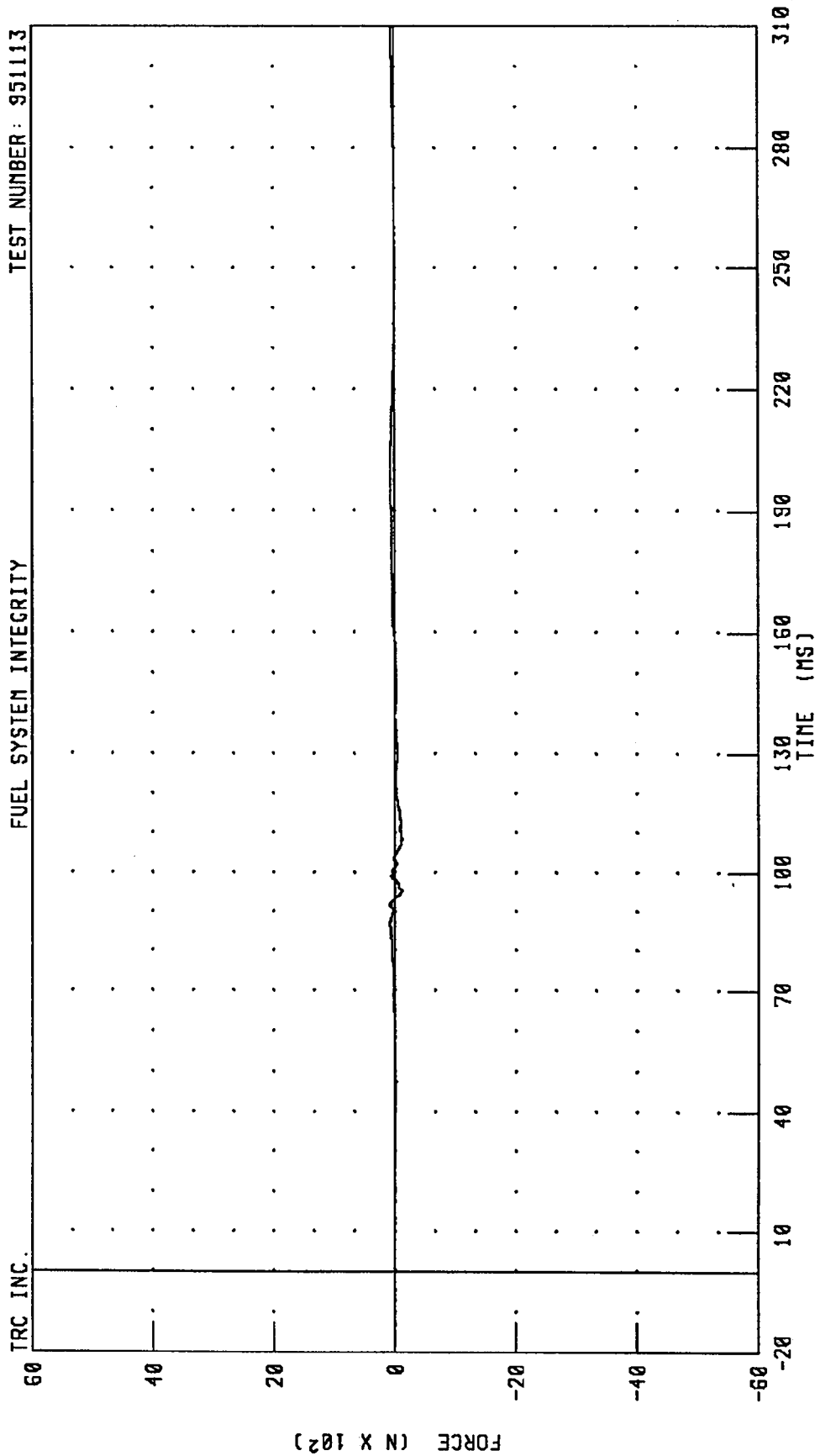
CHANNEL: NEKXF2 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 RIGHT FRONT PASSENGER UPPER NECK Y-AXIS SHEAR FORCE

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 83.25 N @ 86.40 MS; -116.84 N @ 95.20 MS

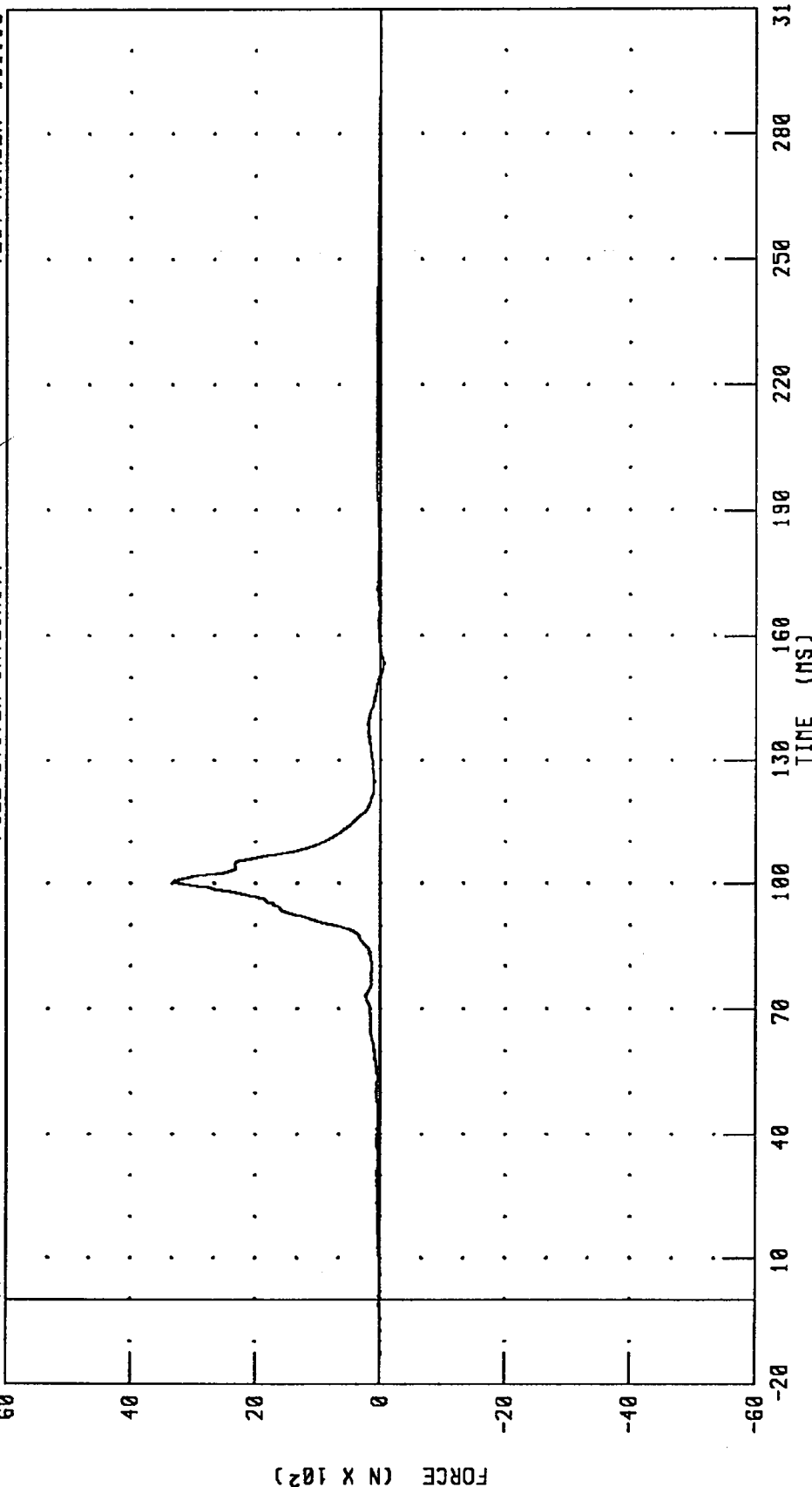
CHANNEL: NEKYF2 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 RIGHT FRONT PASSENGER UPPER NECK Z-AXIS AXIAL FORCE

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 3304.93 N @ 100.48 MS; -58.68 N @ 153.20 MS

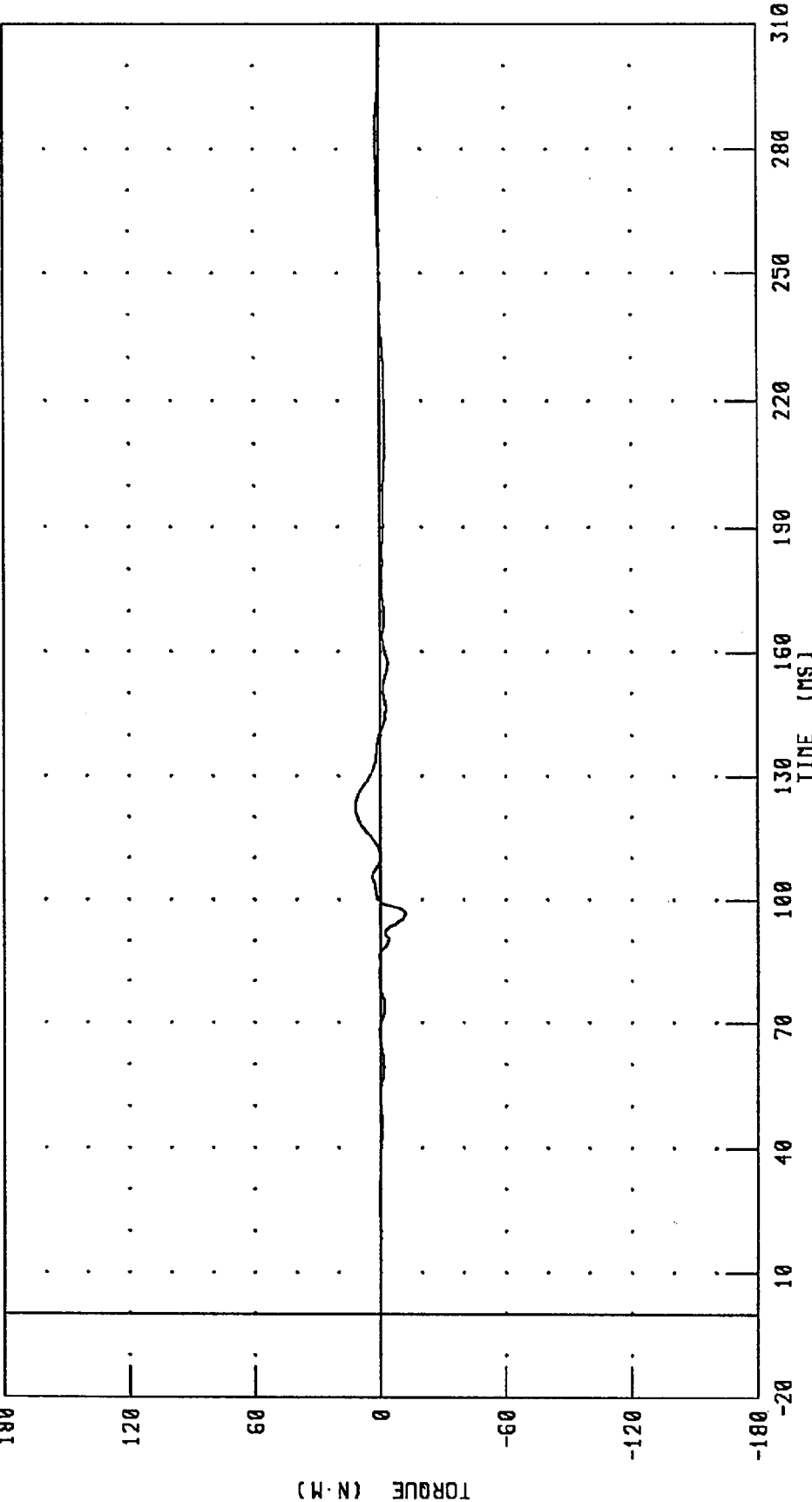
CHANNEL: NEKZF2 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
RIGHT FRONT PASSENGER UPPER NECK MOMENT ABOUT X-AXIS

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 11.86 N-M @ 122.80 MS; -12.04 N-M @ 96.72 MS

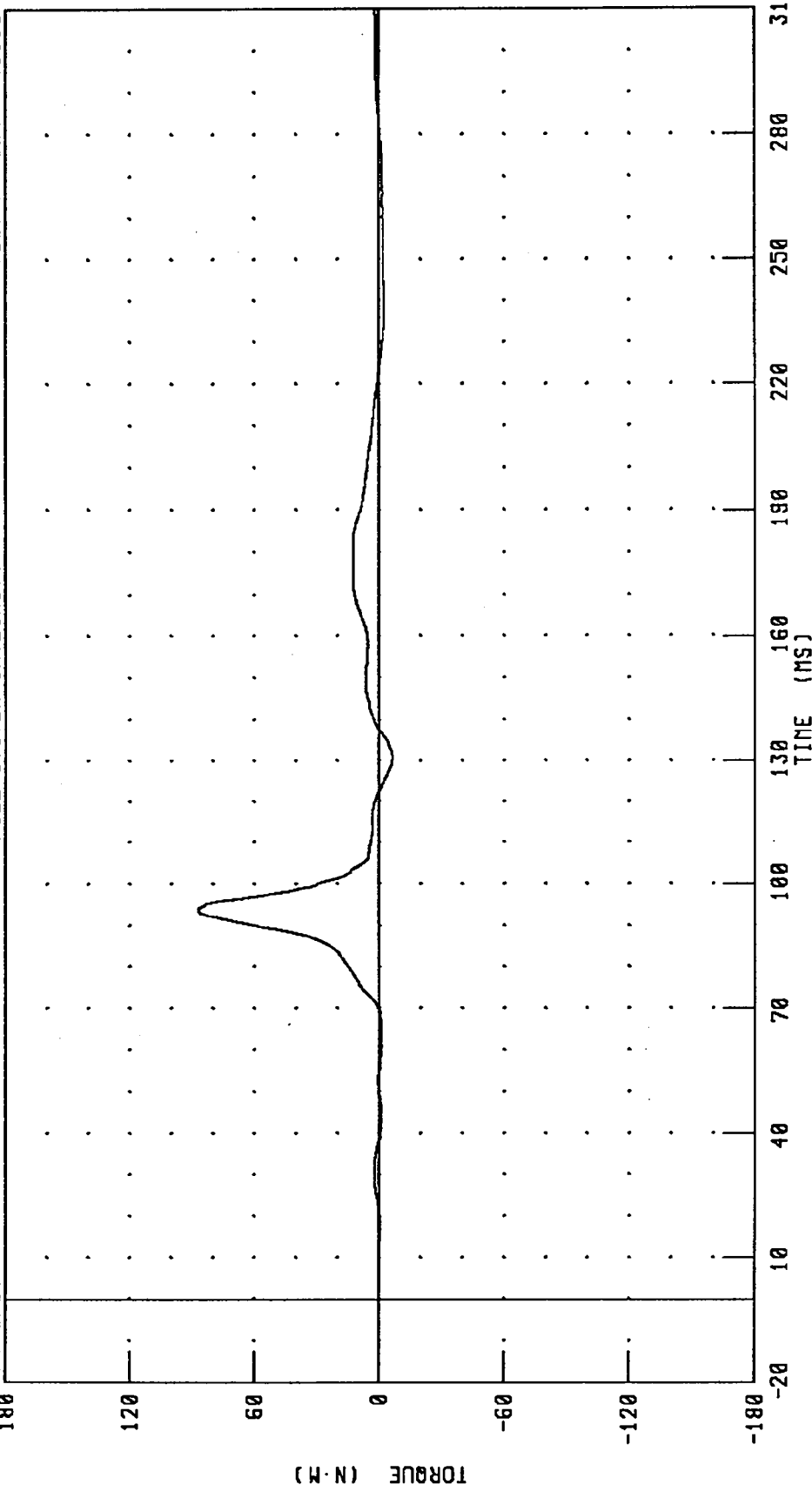
CHANNEL: NEKXM2 FILTER: CH. CLASS 600

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 RIGHT FRONT PASSENGER UPPER NECK MOMENT ABOUT Y-AXIS

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 86.91 N.M @ 93.84 MS; -6.49 N.M @ 130.56 MS

CHANNEL: NEKYM2 FILTER: CH. CLASS 600

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
RIGHT FRONT PASSENGER UPPER NECK MOMENT ABOUT Z-AXIS

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.

180

120

60

0

-60

-120

-180

TORQUE (N·M)

310

280

250

220

190

160

130

100

70

40

10

-20

TIME (MS)

CHANNEL: NEKZM2 FILTER: CH. CLASS 600

951113

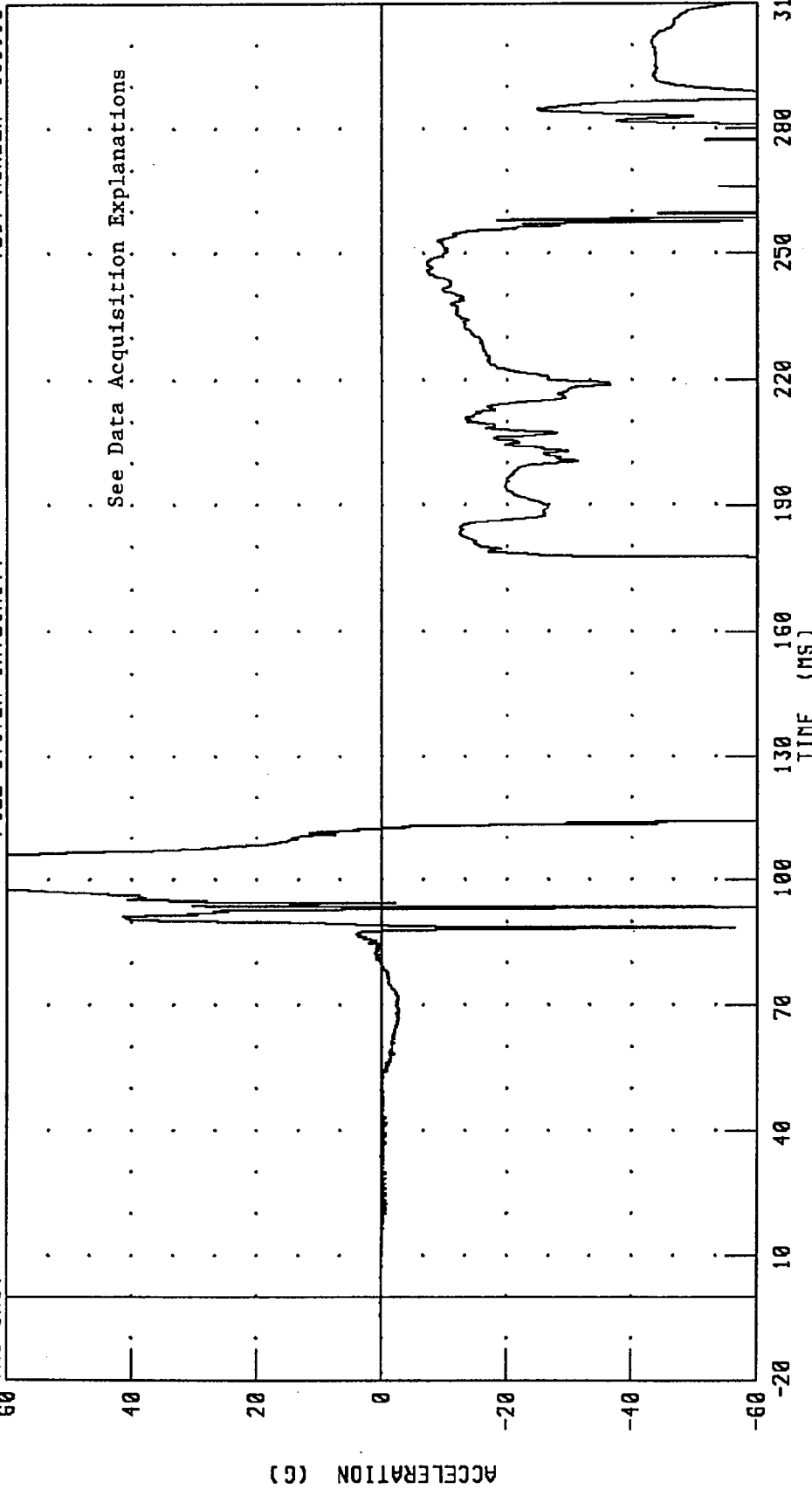
PEAK DATA: 9.92 N·M @ 185.52 MS; -14.57 N·M @ 137.04 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
RIGHT FRONT PASSENGER HEAD POSITION 1 X-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 166.82 G @ 100.32 MS; -402.60 G @ 115.92 MS

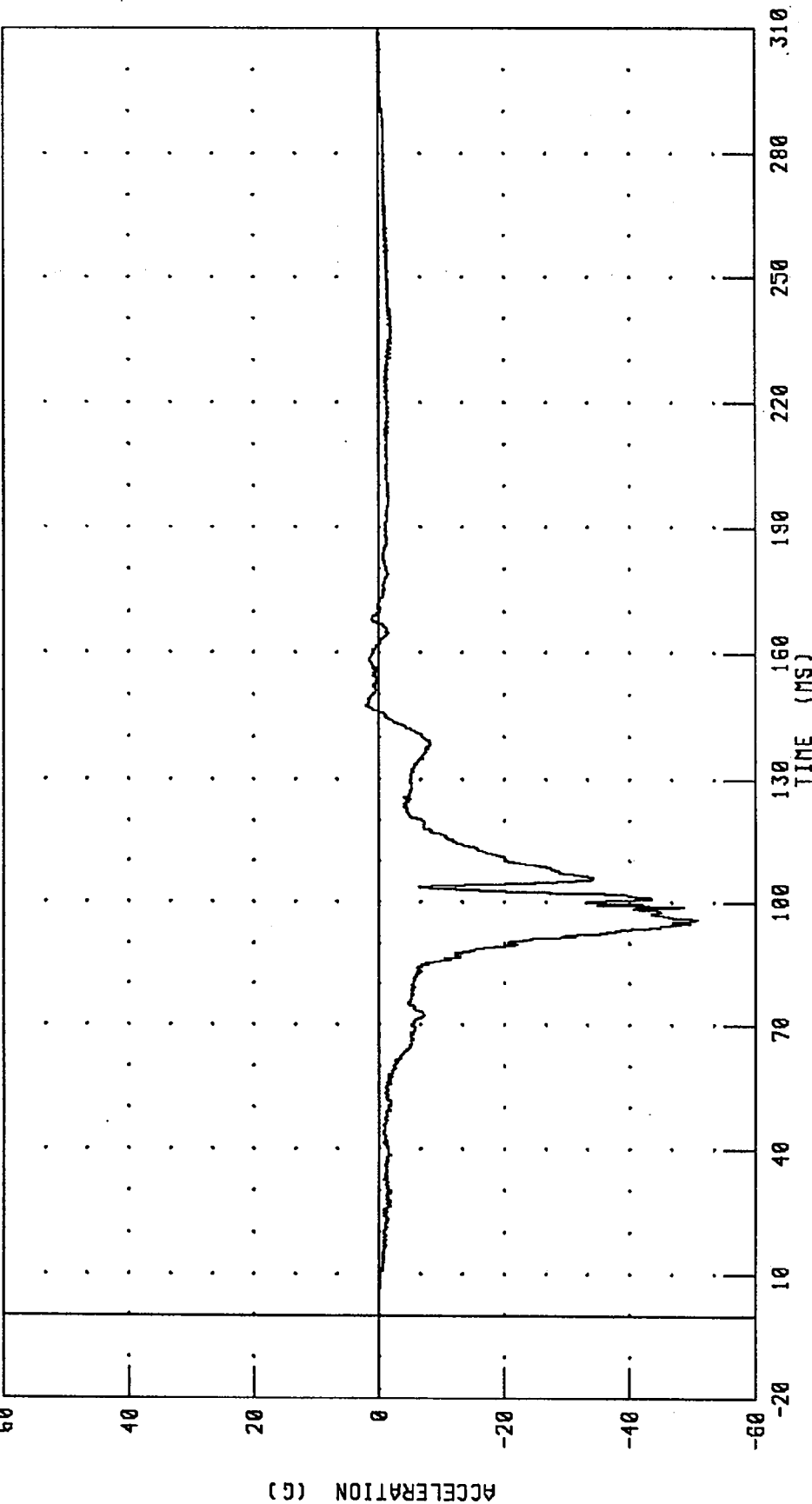
CHANNEL: HD1XG2 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 RIGHT FRONT PASSENGER HEAD POSITION 1 Z-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: HD1ZG2 FILTER: CH. CLASS 1000

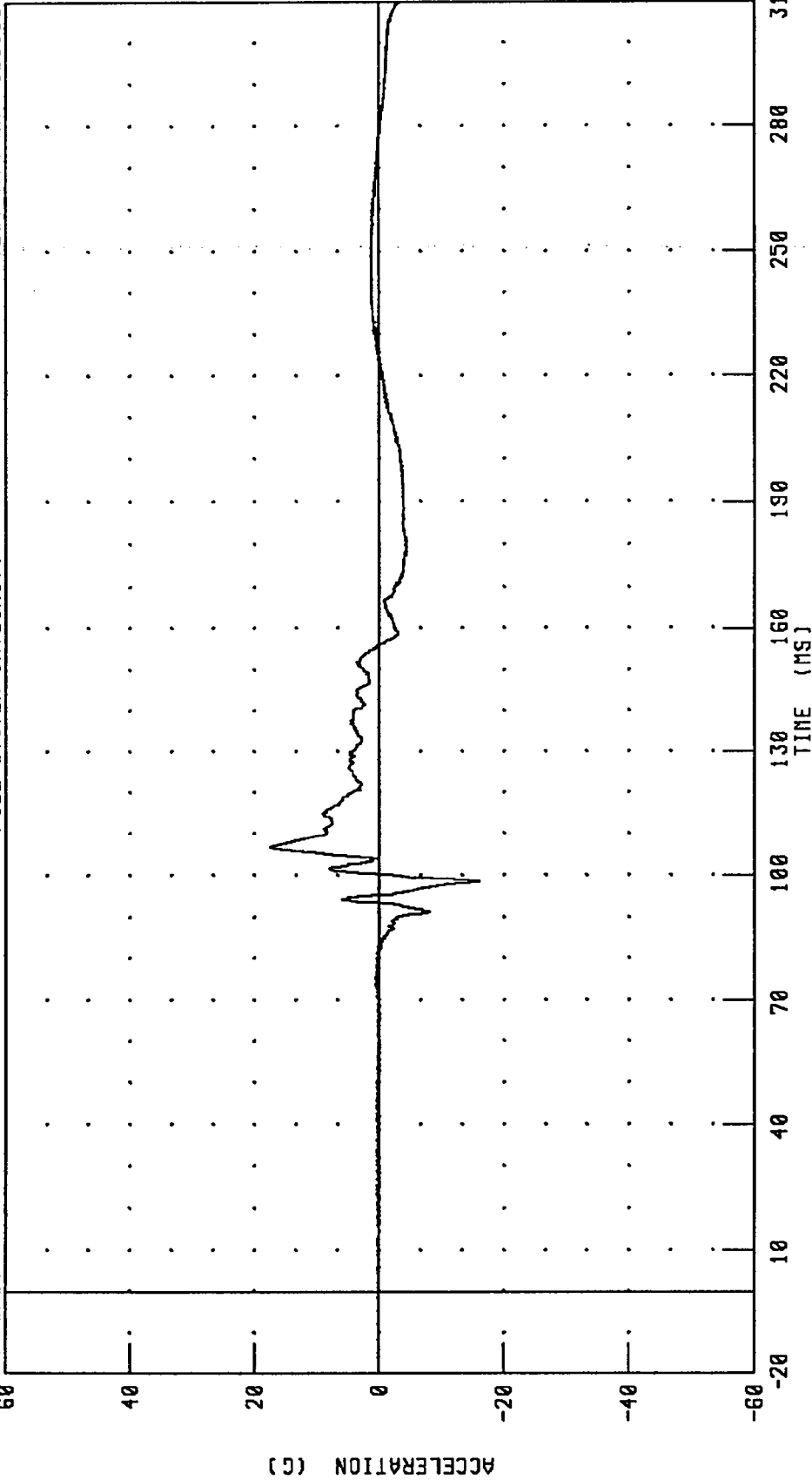
PEAK DATA: 1.97 G @ 147.60 MS; -50.80 G @ 95.84 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 RIGHT FRONT PASSENGER HEAD POSITION 2 Y-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



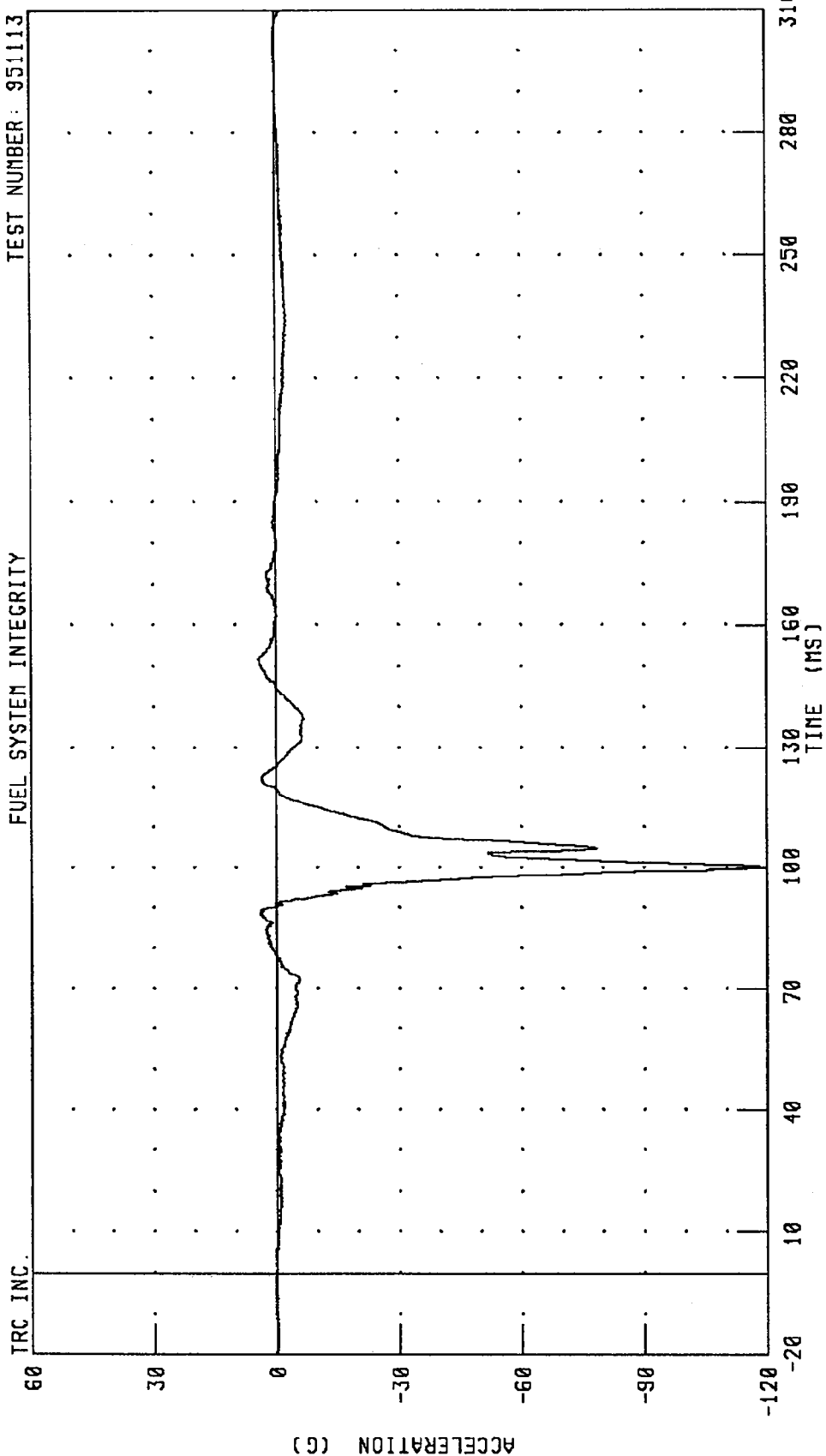
PEAK DATA: 17.47 G @ 106.56 MS; -16.10 G @ 98.56 MS

CHANNEL: HD2YG2 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 RIGHT FRONT PASSENGER HEAD POSITION 2 Z-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY



PEAK DATA: 4.35 G @ 151.68 MS; -118.07 G @ 100.32 MS

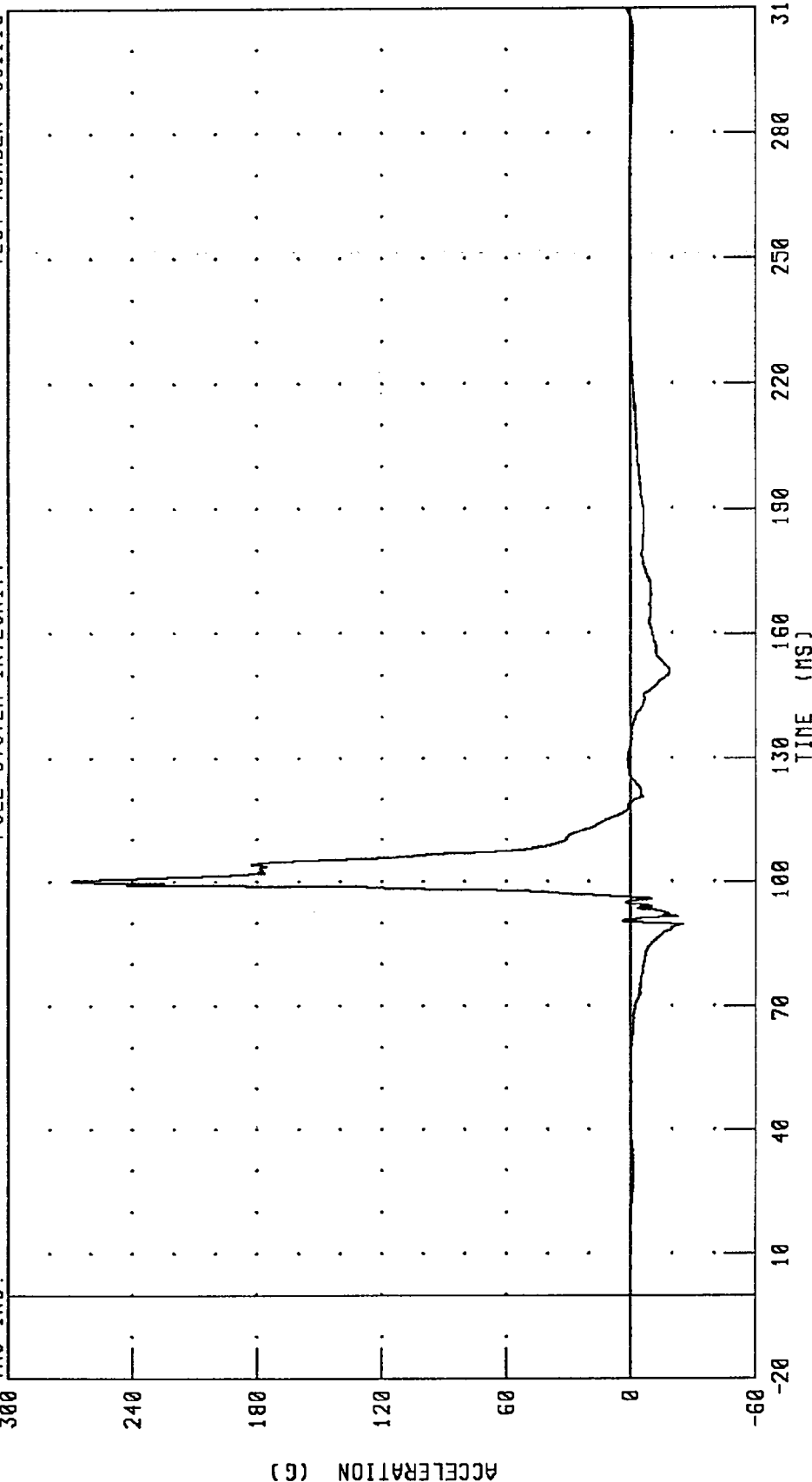
CHANNEL: HD2ZG2 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
RIGHT FRONT PASSENGER HEAD POSITION 3 X-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: HD3XG2 FILTER: CH. CLASS 1000

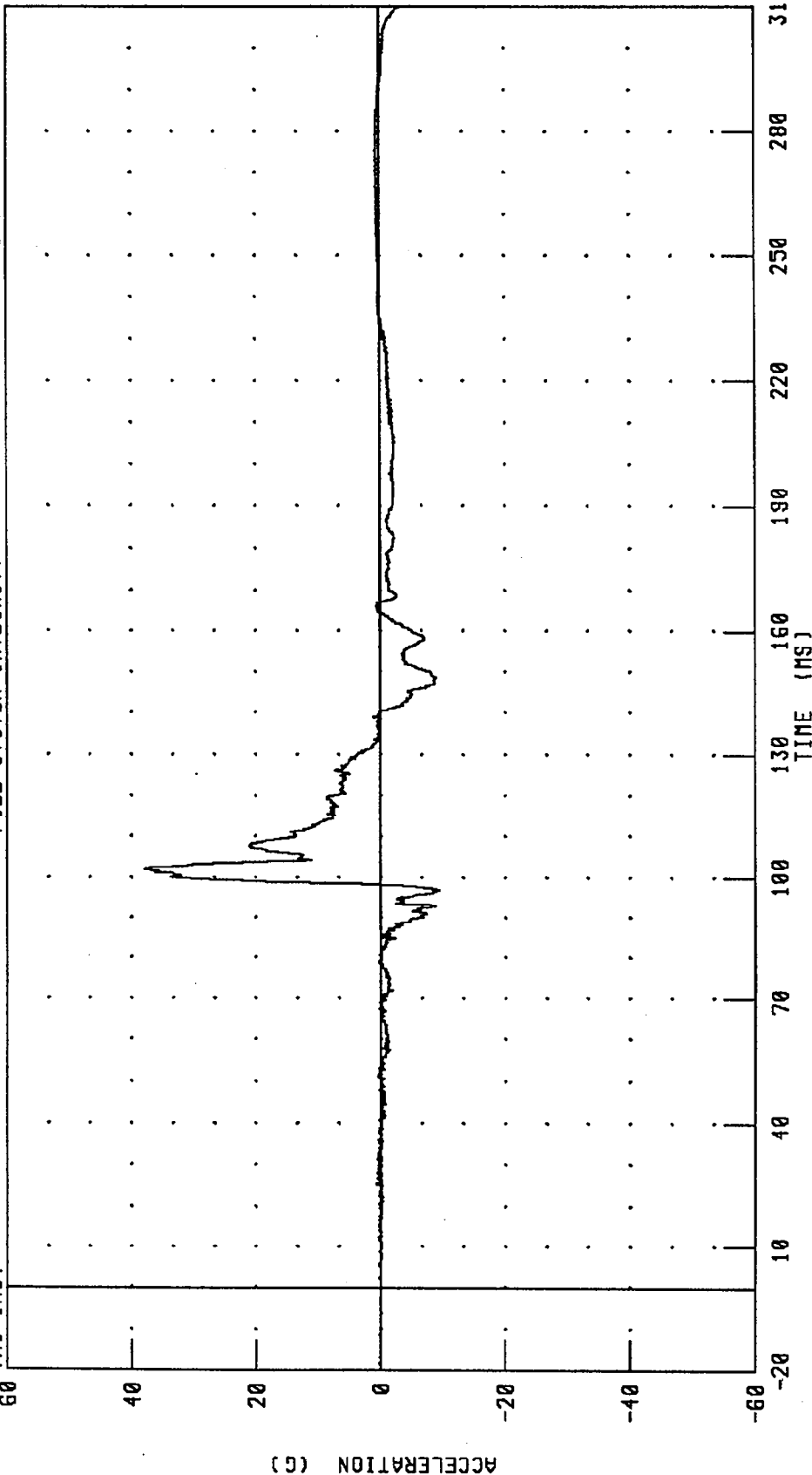
PEAK DATA: 269.27 G @ 100.24 MS; -25.04 G @ 89.68 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
RIGHT FRONT PASSENGER HEAD POSITION 3 Y-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: HD3YG2 FILTER: CH. CLASS 1000

PEAK DATA: 37.89 G @ 102.00 MS; -9.44 G @ 96.88 MS

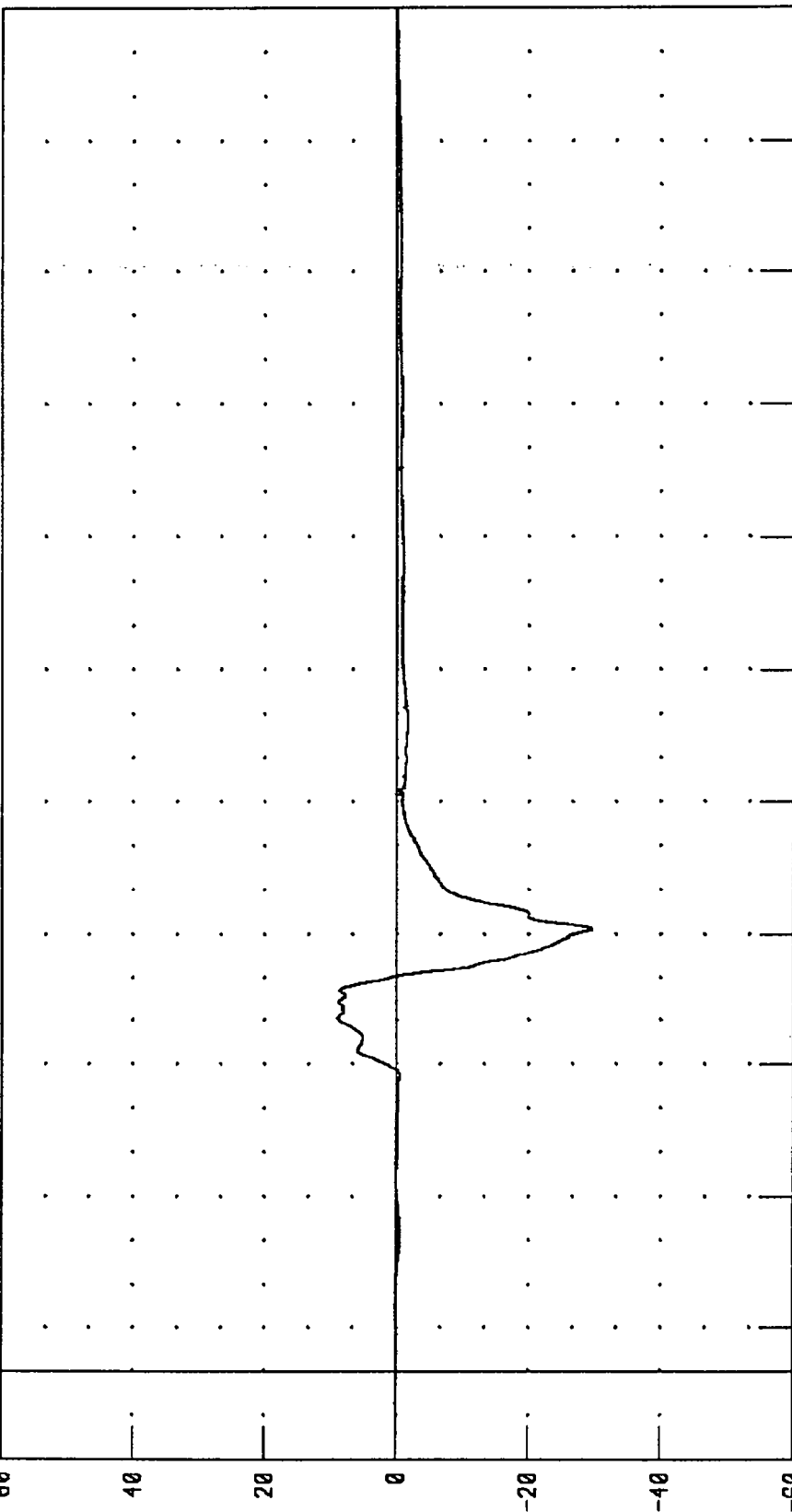
MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 RIGHT FRONT PASSENGER LOWER NECK X-AXIS SHEAR FORCE

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.

60



FORCE (N X 10²)

-60

-40

-20

0

20

40

60

TIME (MS)

10

20

30

40

50

60

70

80

90

100

110

120

130

140

150

160

170

180

190

200

210

220

230

240

250

260

270

280

290

300

310

951113

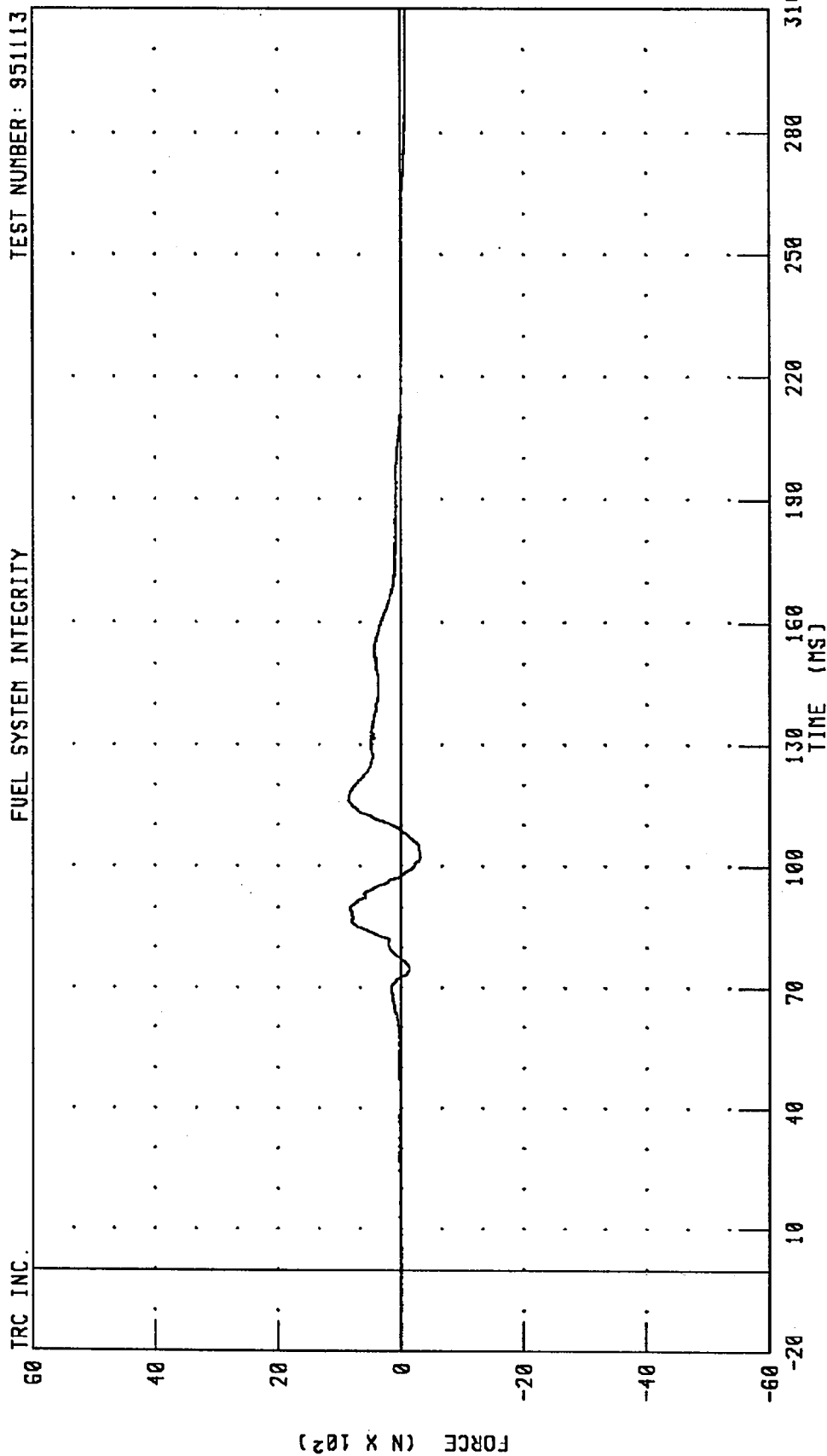
CHANNEL: NKLXF2 FILTER: CH. CLASS 1000

PEAK DATA: 895.77 N @ 80.40 MS; -2962.62 N @ 101.12 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 RIGHT FRONT PASSENGER LOWER NECK Y-AXIS SHEAR FORCE

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY



PEAK DATA: 857.49 N @ 116.16 MS; -316.77 N @ 101.92 MS

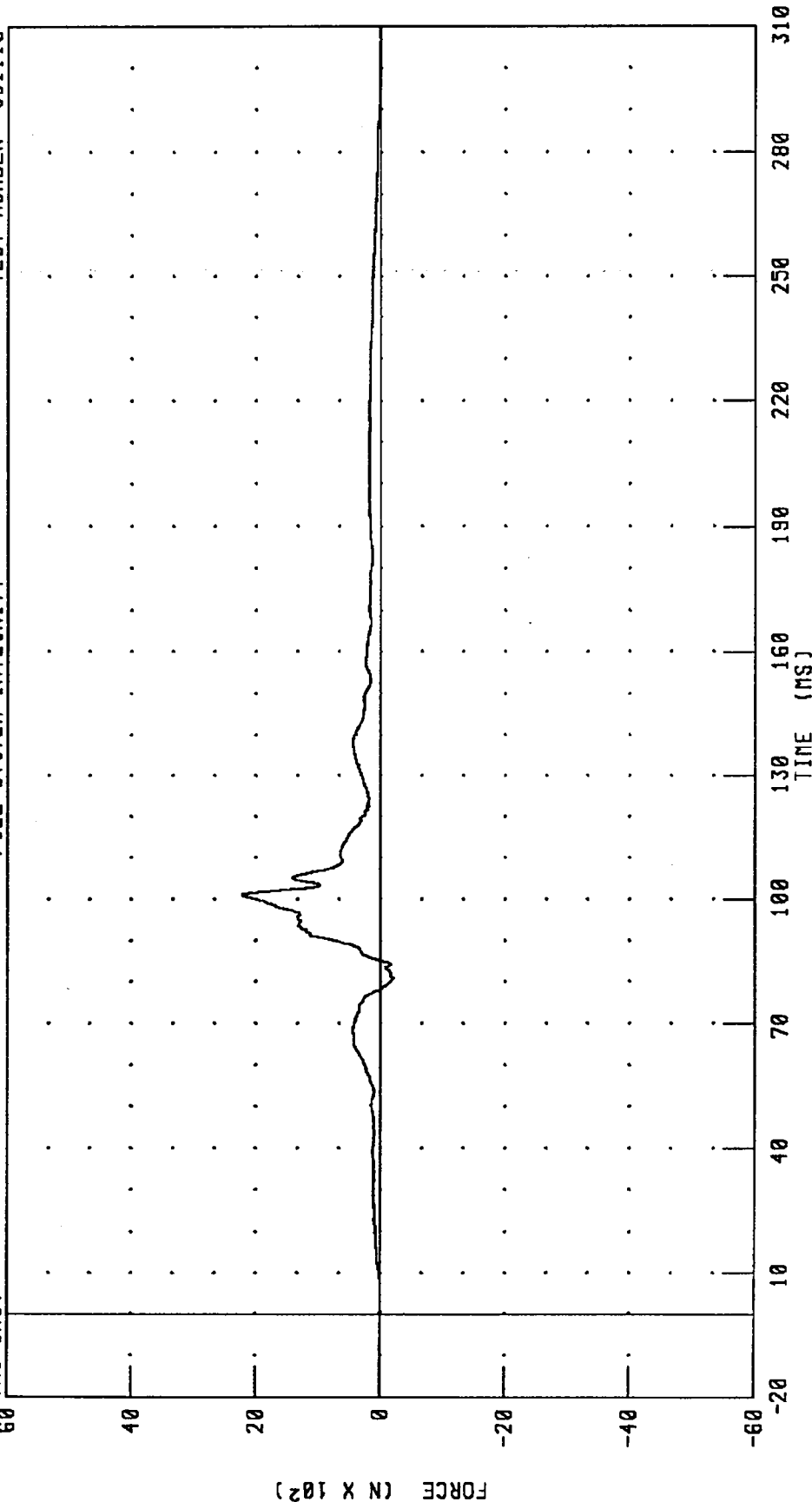
CHANNEL: NKLYF2 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 RIGHT FRONT PASSENGER LOWER NECK Z-AXIS AXIAL FORCE

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



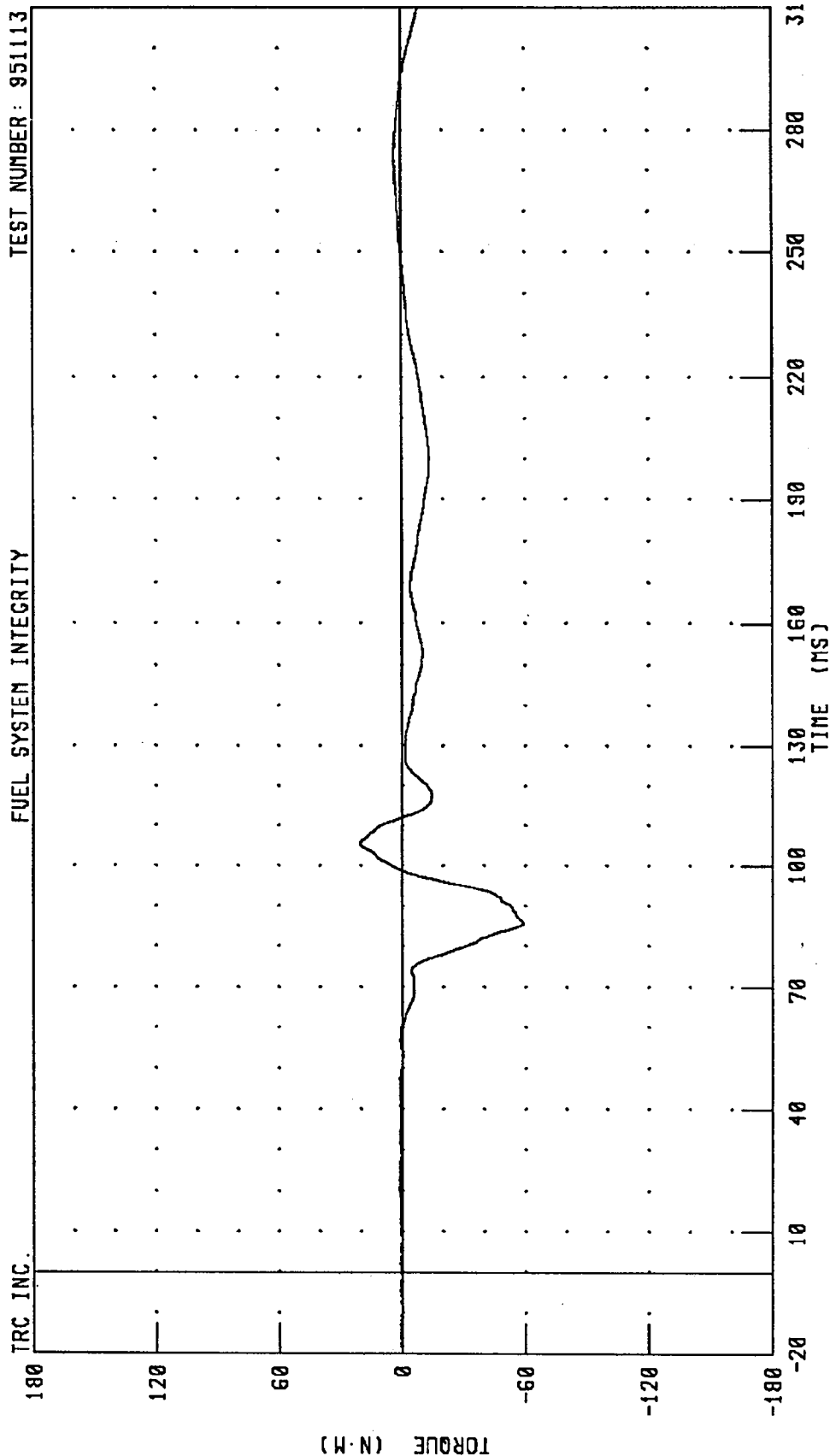
PEAK DATA: 2216.86 N @ 100.88 MS; -216.02 N @ 80.88 MS

CHANNEL: NKLZF2 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
RIGHT FRONT PASSENGER LOWER NECK MOMENT ABOUT X-AXIS

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY



PEAK DATA: 20.37 N·M @ 105.44 MS; -58.91 N·M @ 85.60 MS

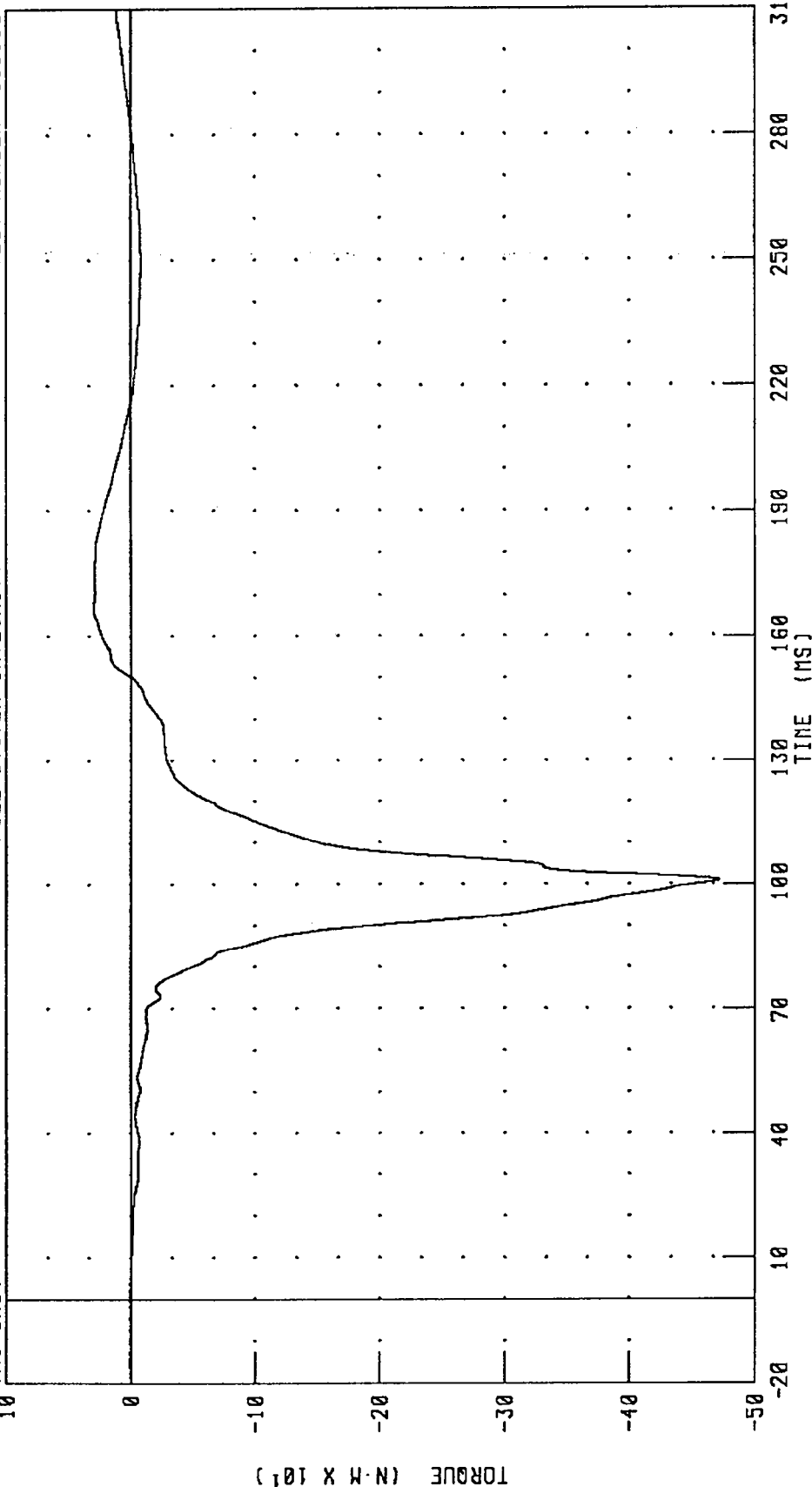
CHANNEL: NKLXN2 FILTER: CH. CLASS 600

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 RIGHT FRONT PASSENGER LOWER NECK MOMENT ABOUT Y-AXIS

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 29.83 N·M @ 167.52 MS; -471.38 N·M @ 100.96 MS

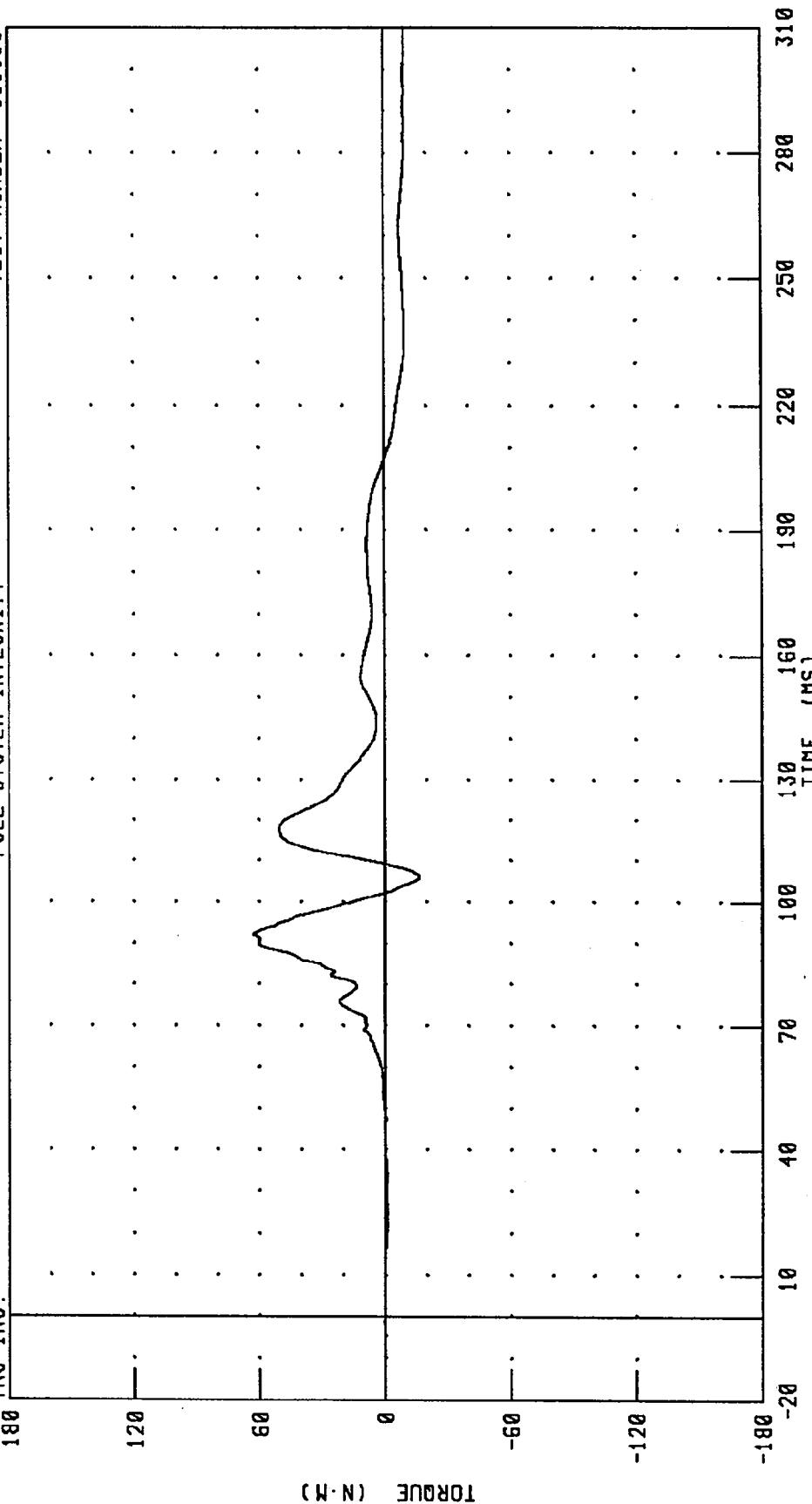
CHANNEL: NKLYM2 FILTER: CH. CLASS 600

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
RIGHT FRONT PASSENGER LOWER NECK MOMENT ABOUT Z-AXIS

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 63.08 N·M @ 92.32 MS; -16.43 N·M @ 106.16 MS

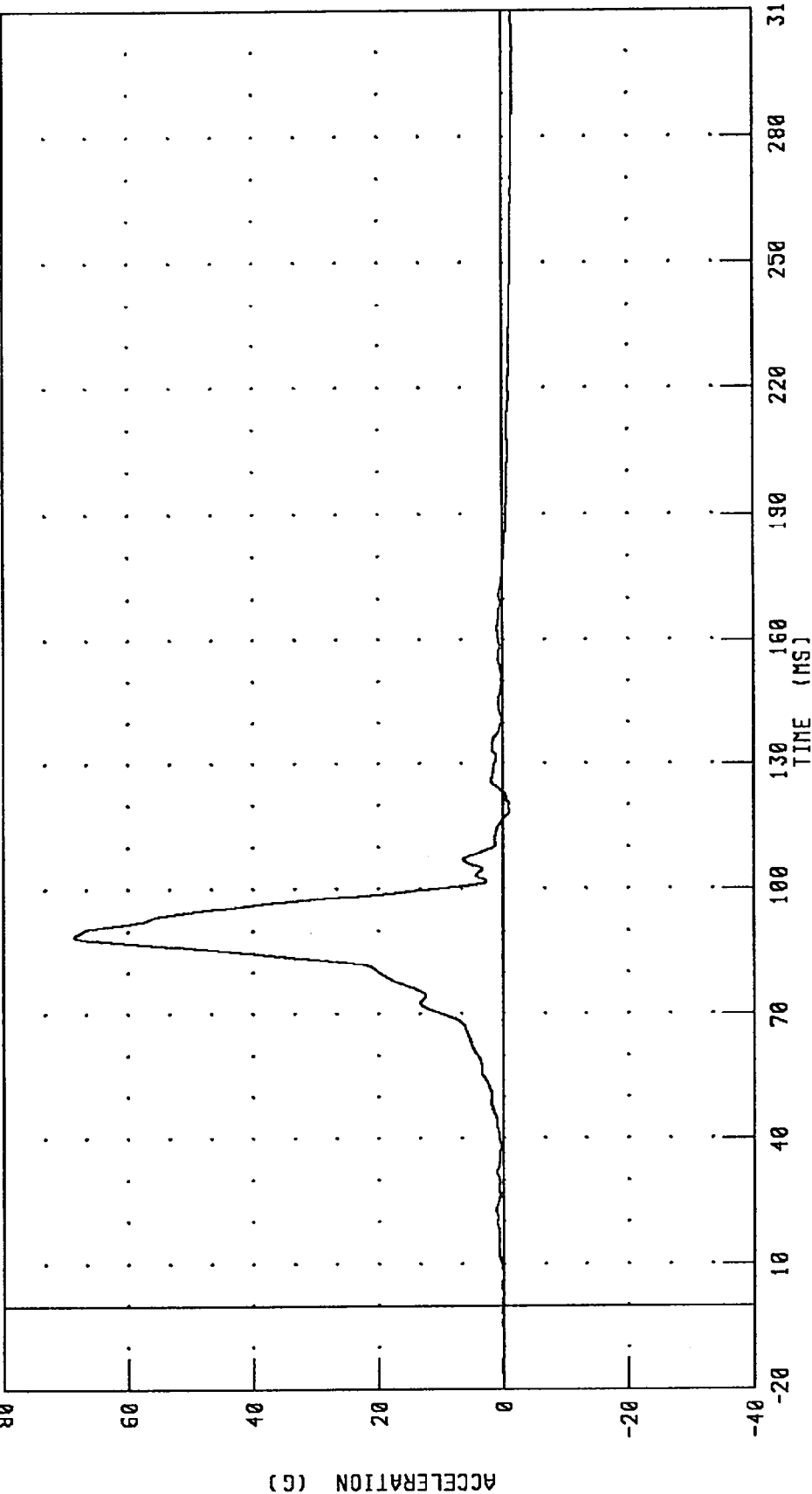
CHANNEL: NKLZM2 FILTER: CH. CLASS 600

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: CSTXG2 FILTER: CH. CLASS 180

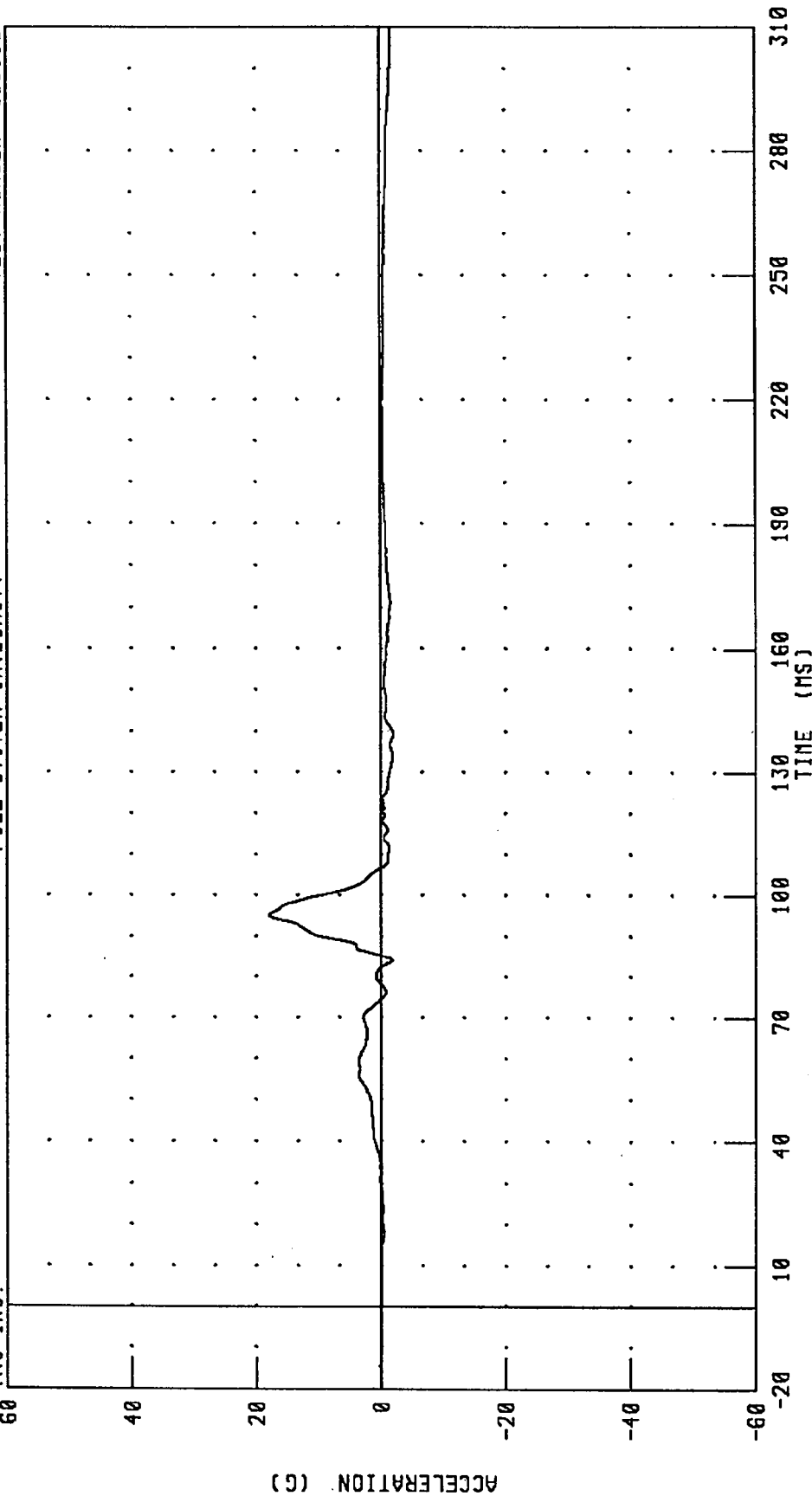
PEAK DATA: 68.62 G @ 88.96 MS; -1.75 G @ 300.80 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
RIGHT FRONT PASSENGER CHEST Y-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

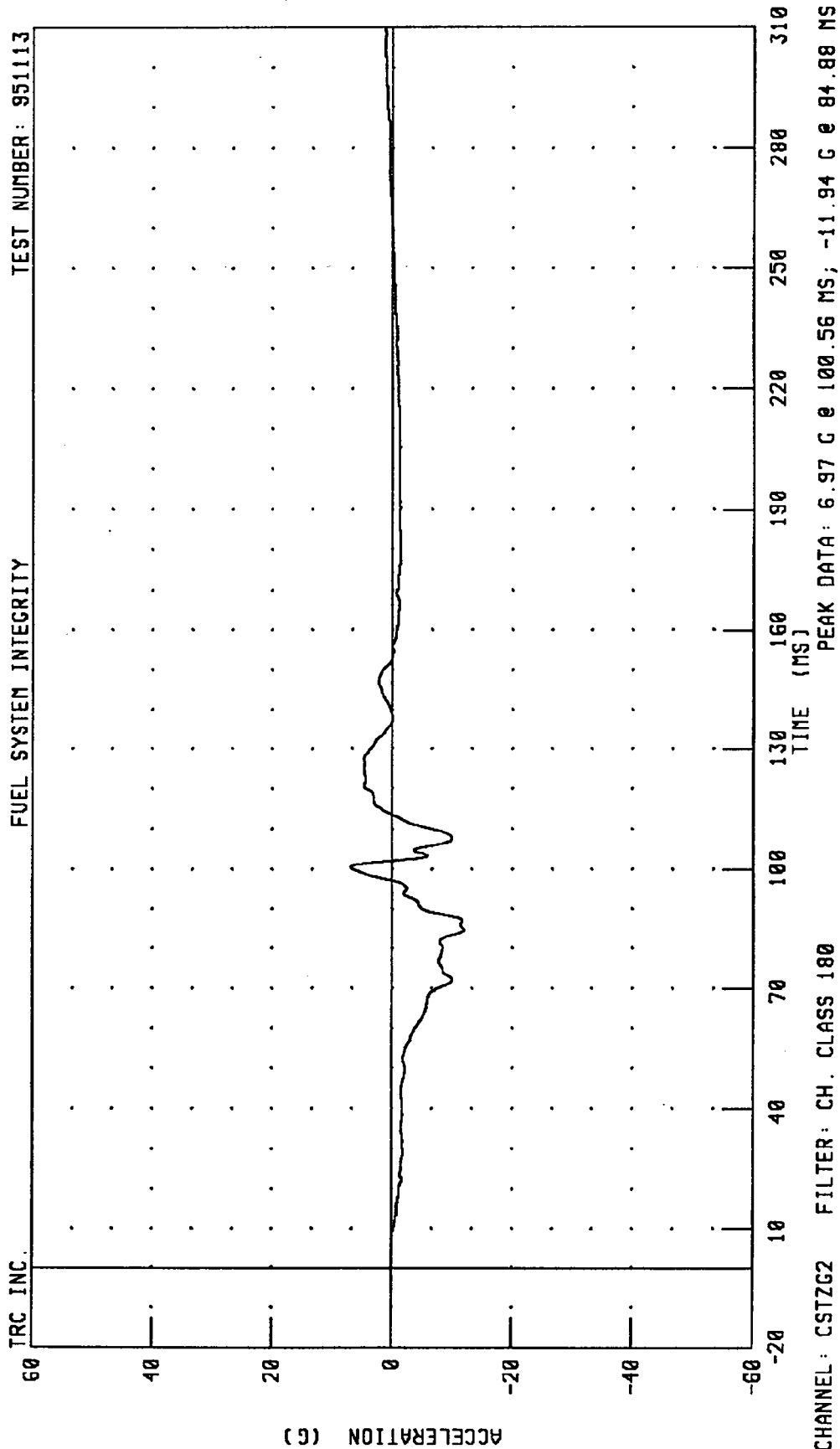
TRC INC.



PEAK DATA: 18.03 G @ 95.20 MS; -2.07 G @ 139.36 MS

CHANNEL: CSTYG2 FILTER: CH. CLASS 180

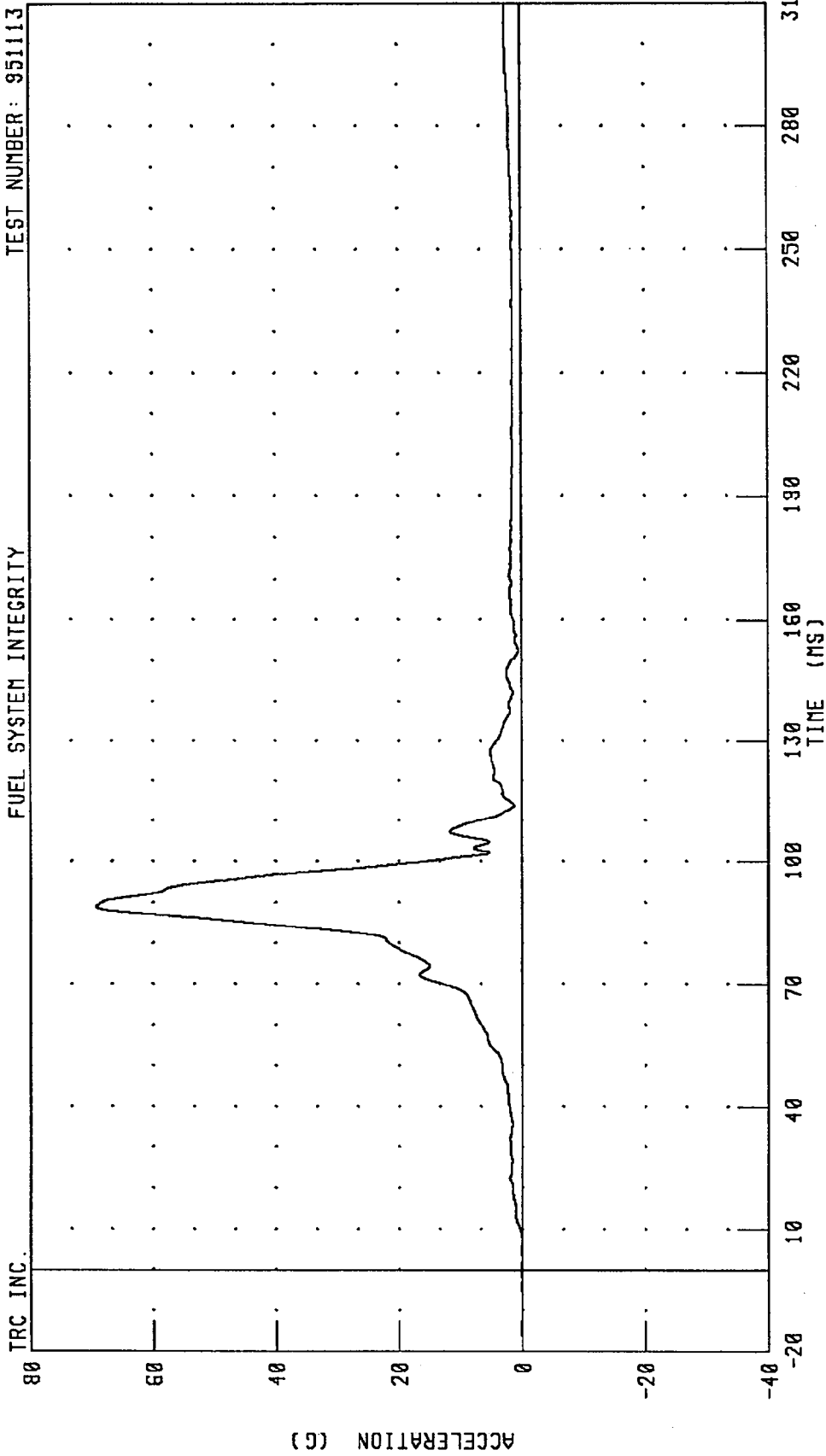
MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
RIGHT FRONT PASSENGER CHEST Z-AXIS ACCELERATION



MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY



PEAK DATA: 69.29 G @ 88.96 MS; 0.01 G @ -20.00 MS

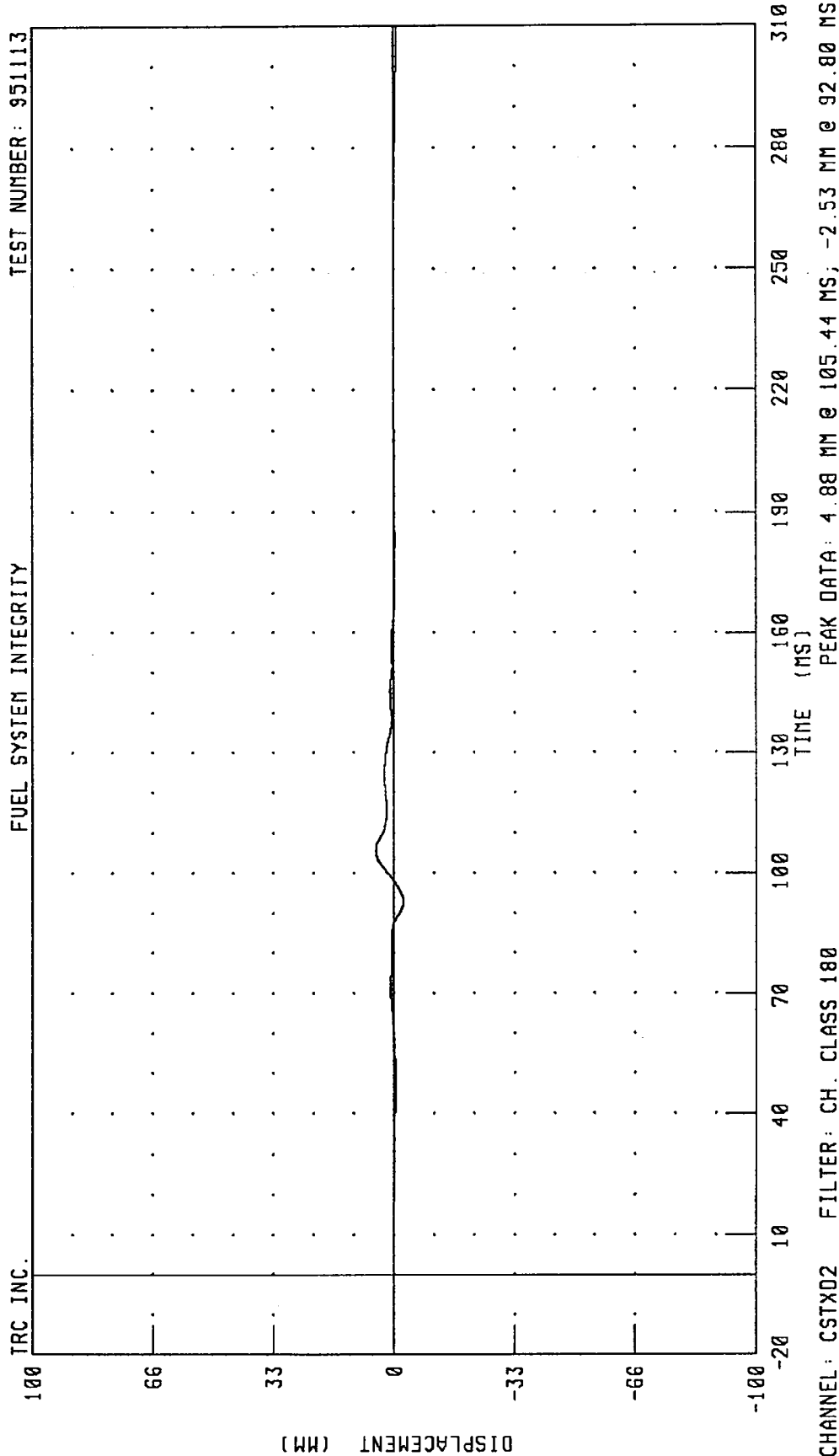
CHANNEL: CSTRG2 FILTER: CH. CLASS 180

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
RIGHT FRONT PASSENGER CHEST DEFLECTION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



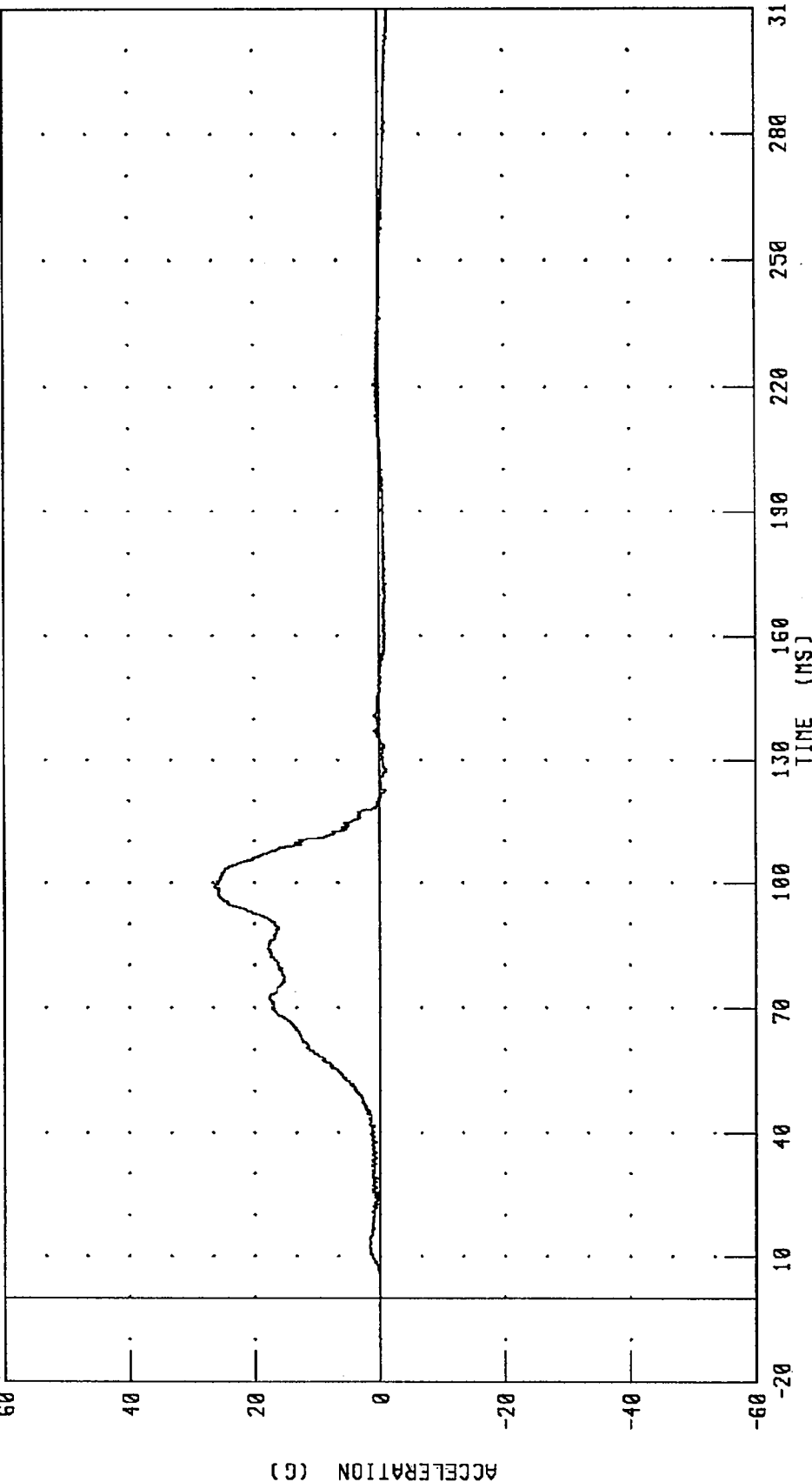
CHANNEL: CSTXD2 FILTER: CH. CLASS 180

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
RIGHT FRONT PASSENGER PELVIS X-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 26.42 G @ 99.04 MS; -1.57 G @ 302.88 MS

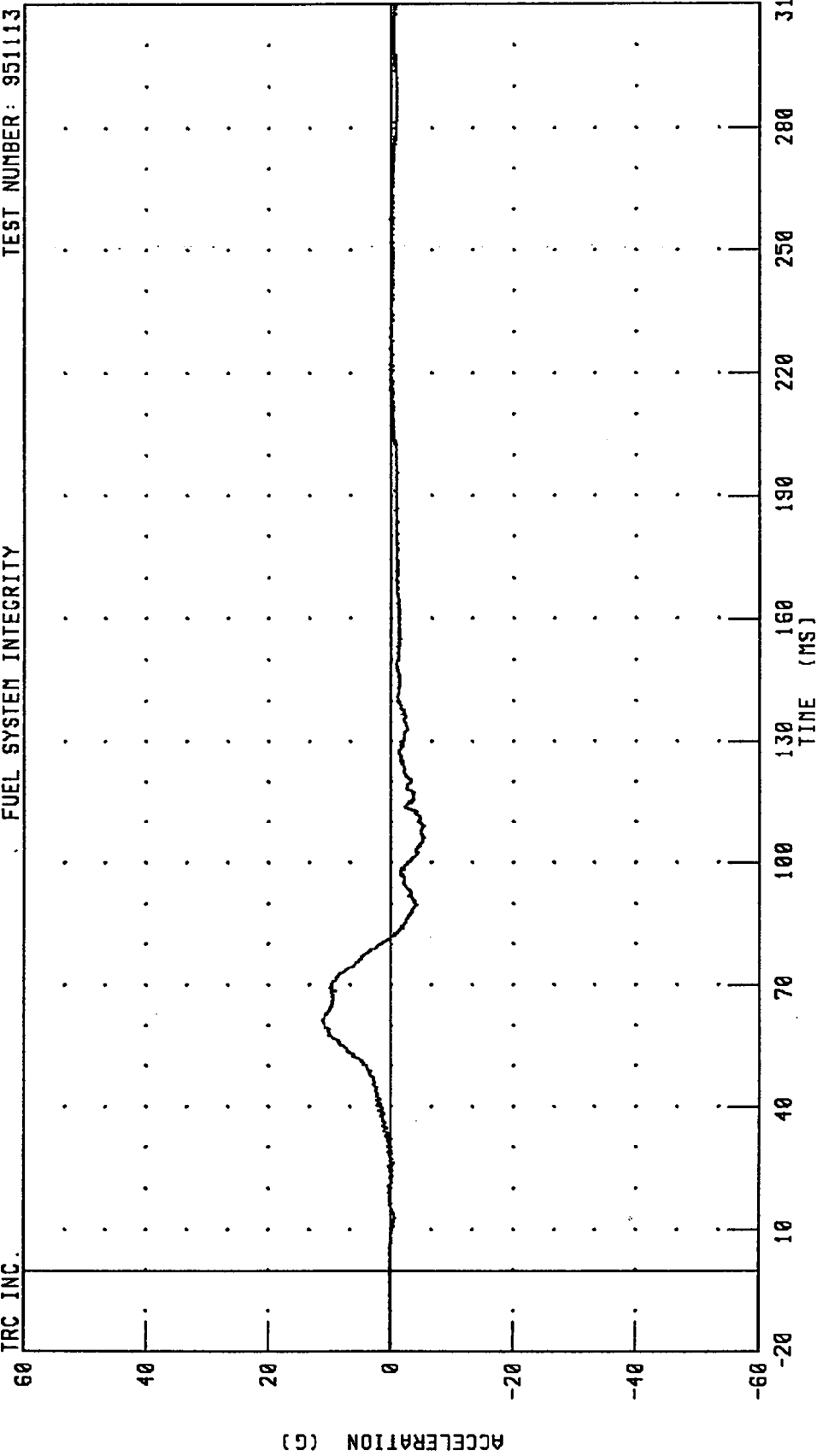
CHANNEL: PEVXG2 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 RIGHT FRONT PASSENGER PELVIS Y-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 11.21 G @ 61.12 MS; -5.49 G @ 106.08 MS

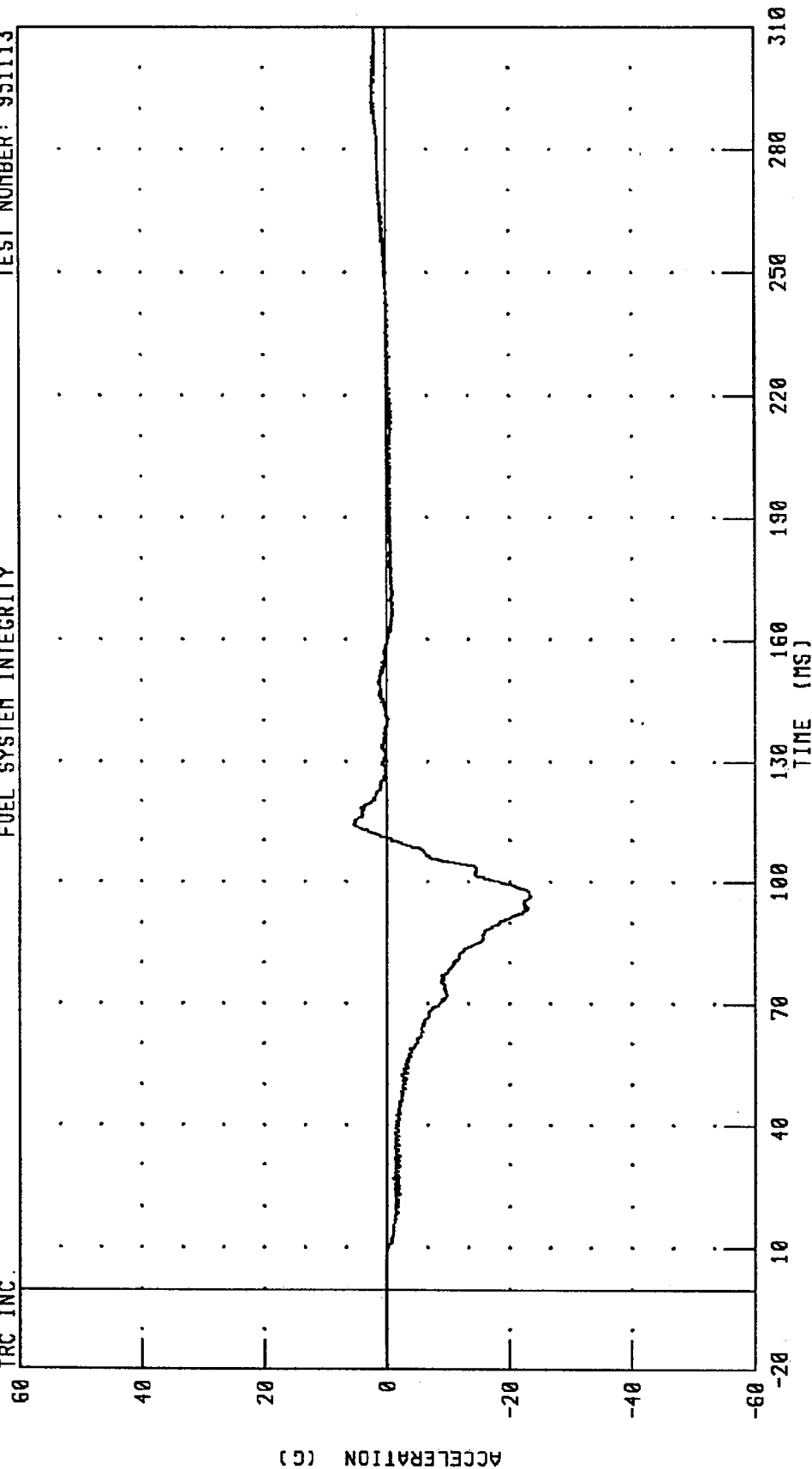
CHANNEL: PEVYG2 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
RIGHT FRONT PASSENGER PELVIS Z-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

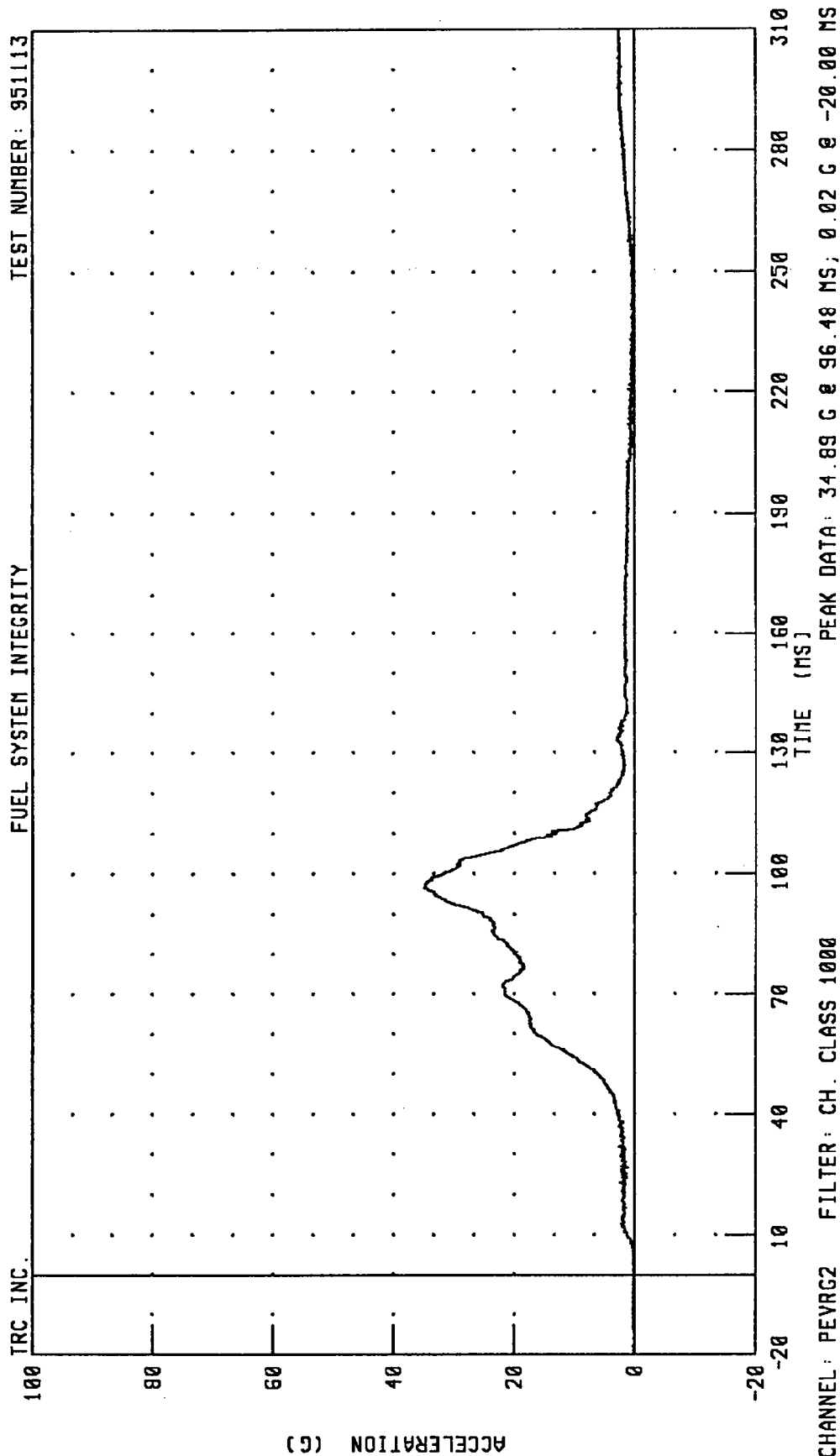
TRC INC.



PEAK DATA: 5.49 G @ 113.92 MS; -23.57 G @ 96.48 MS

CHANNEL: PEVZG2 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
RIGHT FRONT PASSENGER PELVIS RESULTANT ACCELERATION



MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
RIGHT FRONT PASSENGER LEFT FEMUR FORCE

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.

90

60

30

0

-30

-60

-90

FORCE (N X 10²)

TIME (MS)

130

160

190

220

250

280

310

PEAK DATA: 156.62 N @ 133.84 MS; -681.77 N @ 95.28 MS

CHANNEL: LFMF2

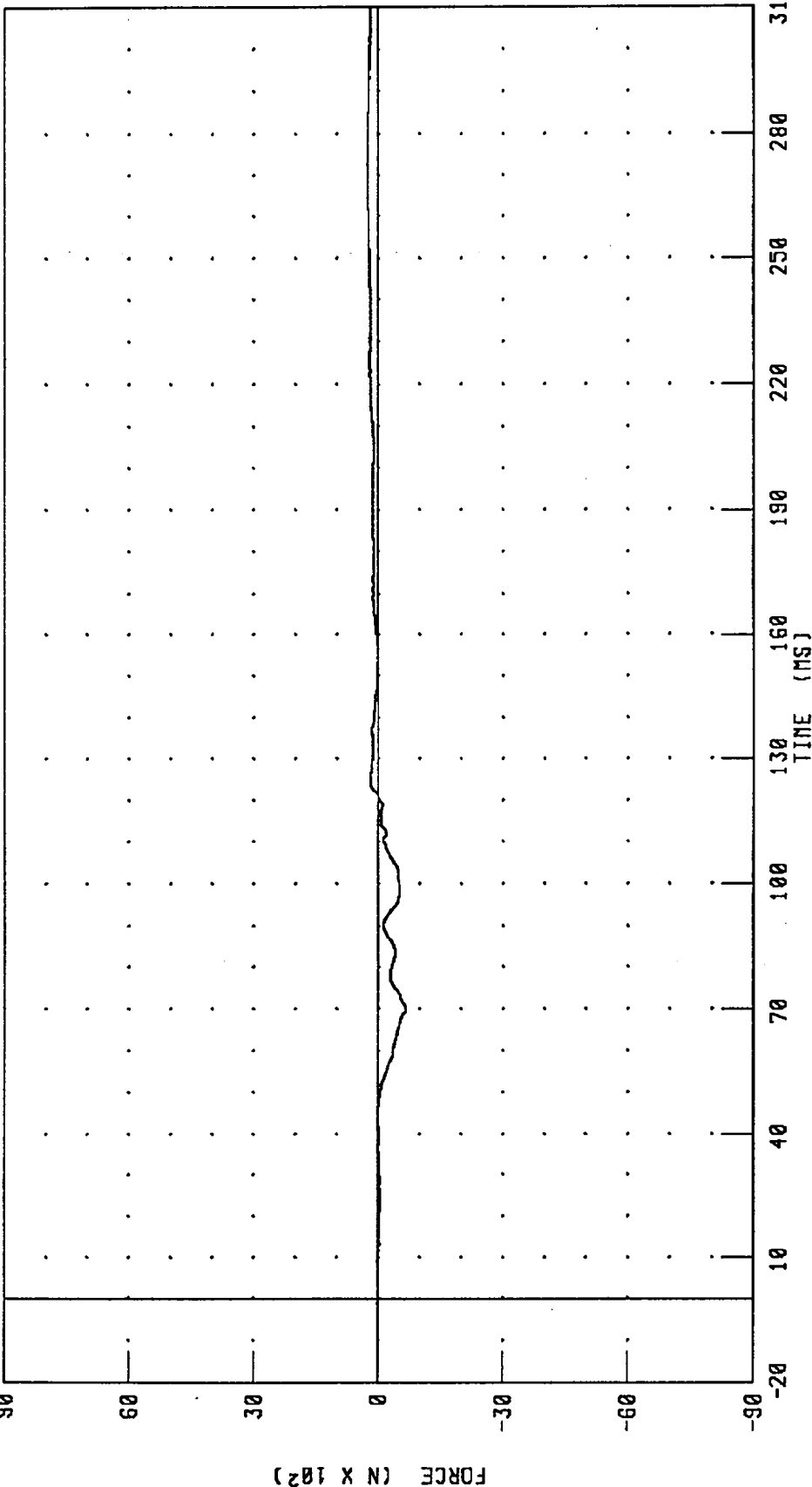
FILTER: CH. CLASS 600

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
RIGHT FRONT PASSENGER RIGHT FEMUR FORCE

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 265.74 N @ 272.08 MS; -662.82 N @ 69.60 MS

FILTER: CH. CLASS 600

CHANNEL: RFMF2

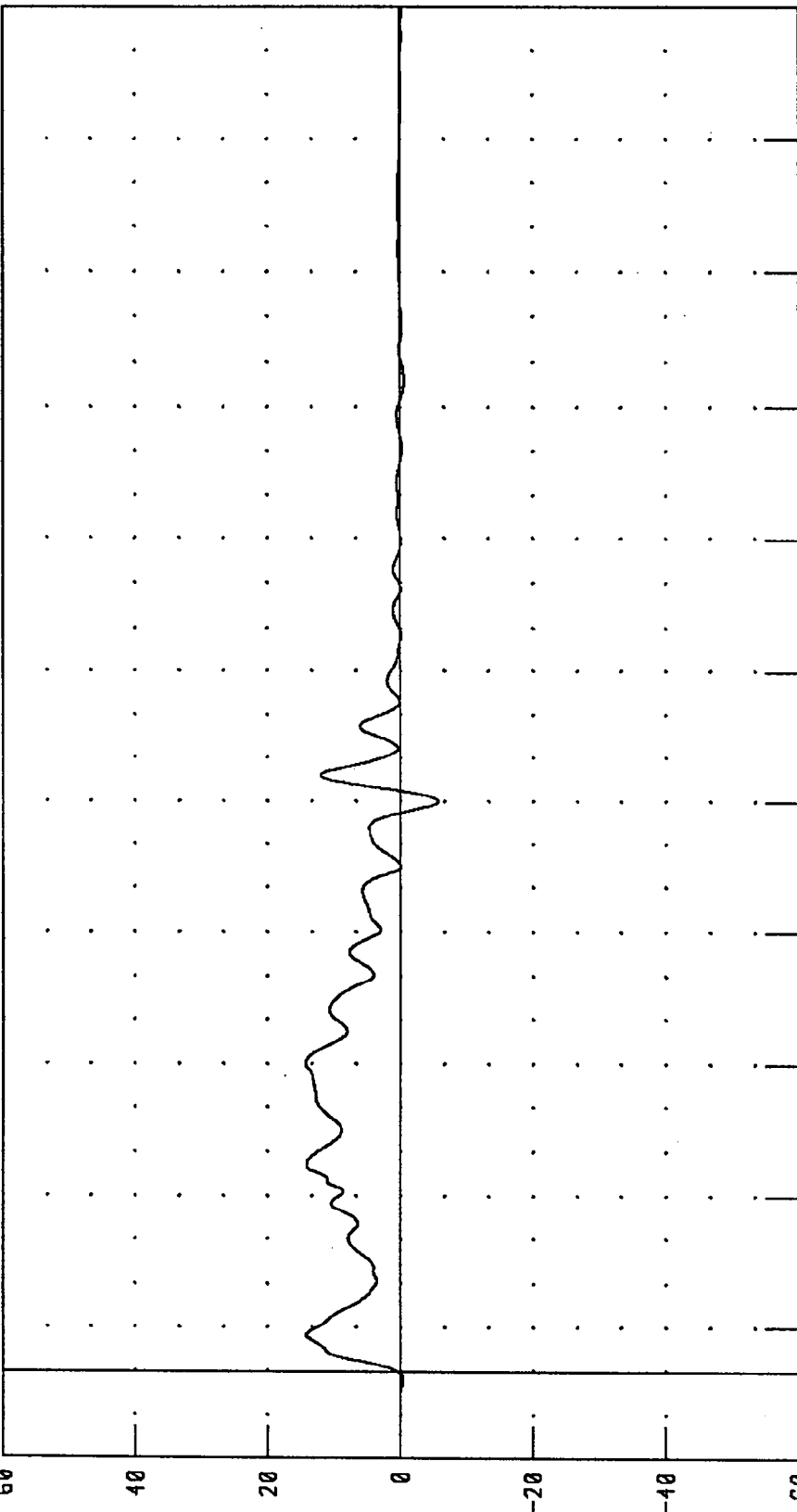
MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
FRONT SEAT OUTBOARD MOUNTING RAIL X-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.

60



ACCELERATION (G)

TIME (MS)

310

280

250

220

190

160

130

100

70

40

10

-20

-40

-60

PEAK DATA: 14.29 G @ 8.16 MS; -5.75 G @ 130.08 MS

CHANNEL: TLFXG1 FILTER: CH. CLASS 60

951113

B-68

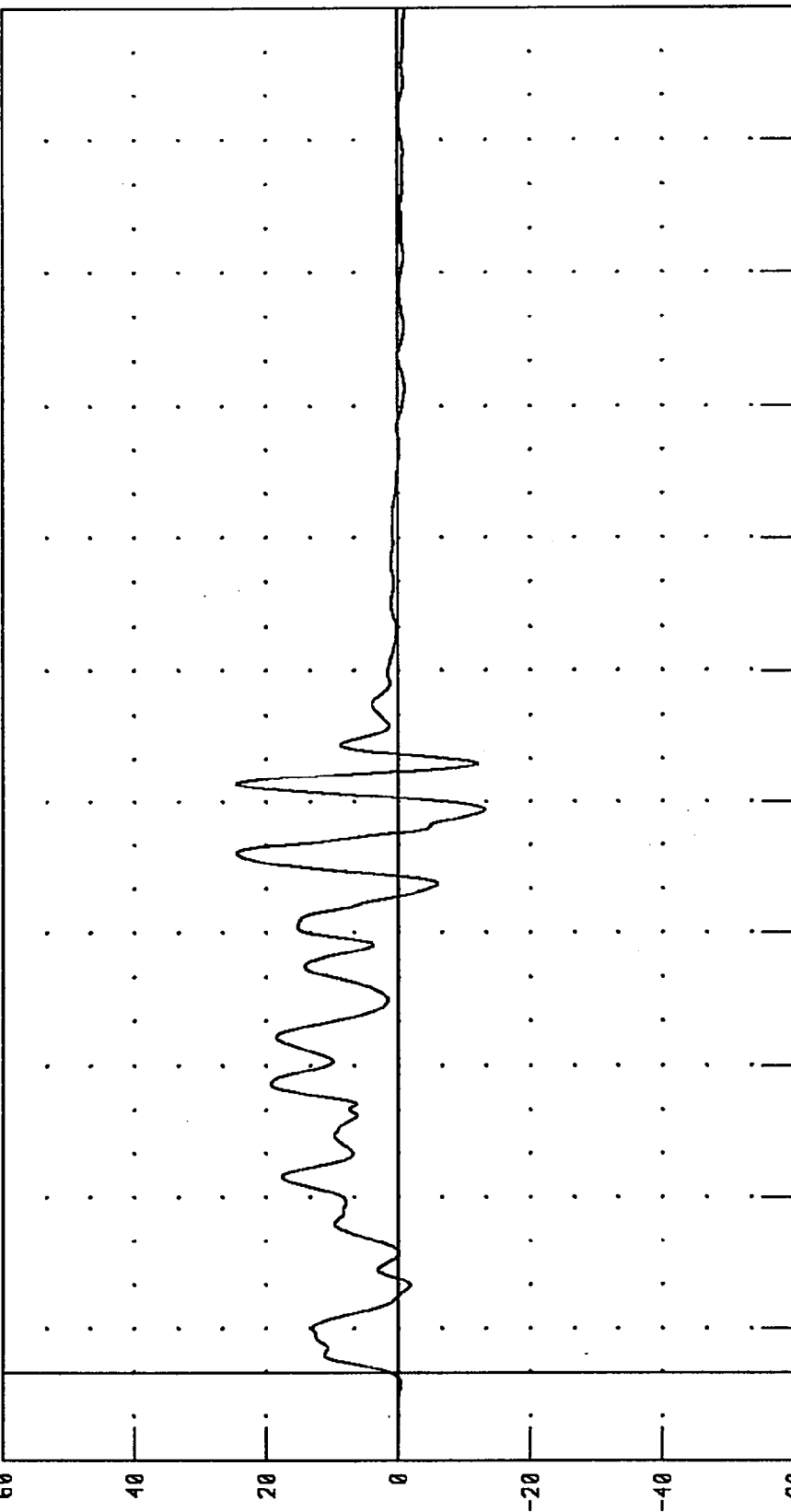
MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
FRONT SEAT OUTBOARD MOUNTING RAIL X-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.

60



ACCELERATION (G)

-60

-40

-20

0

20

40

60

TIME (MS)

10

20

30

40

50

60

70

80

90

100

110

120

130

140

150

160

170

180

190

200

210

220

230

240

250

260

270

280

290

300

310

CHANNEL: TRFXG1

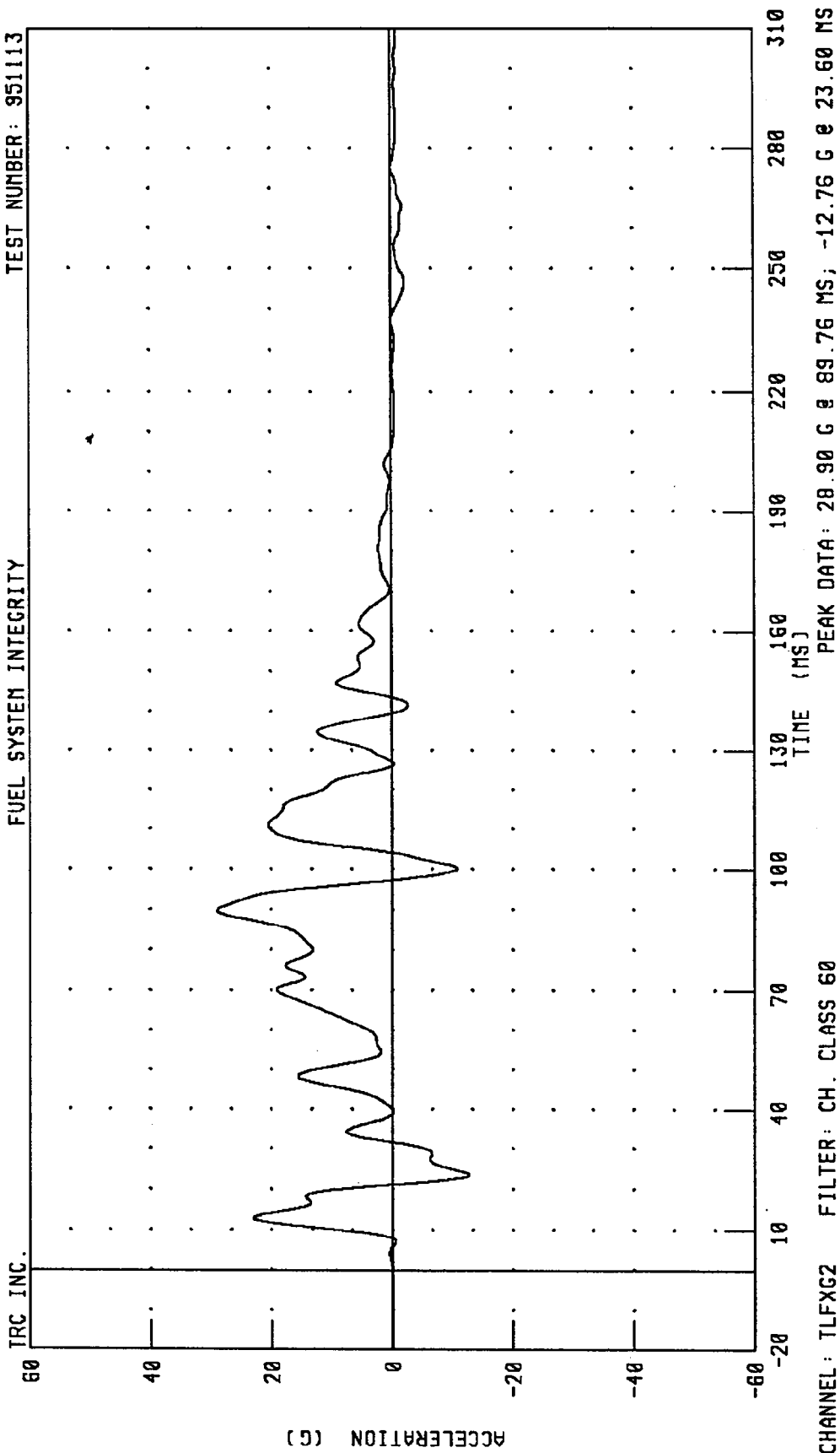
FILTER: CH. CLASS 60

PEAK DATA: 24.59 G @ 134.24 MS; -13.15 G @ 128.16 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
FRONT SEAT BACK MID X-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY



CHANNEL: TLFXG2 FILTER: CH. CLASS 60

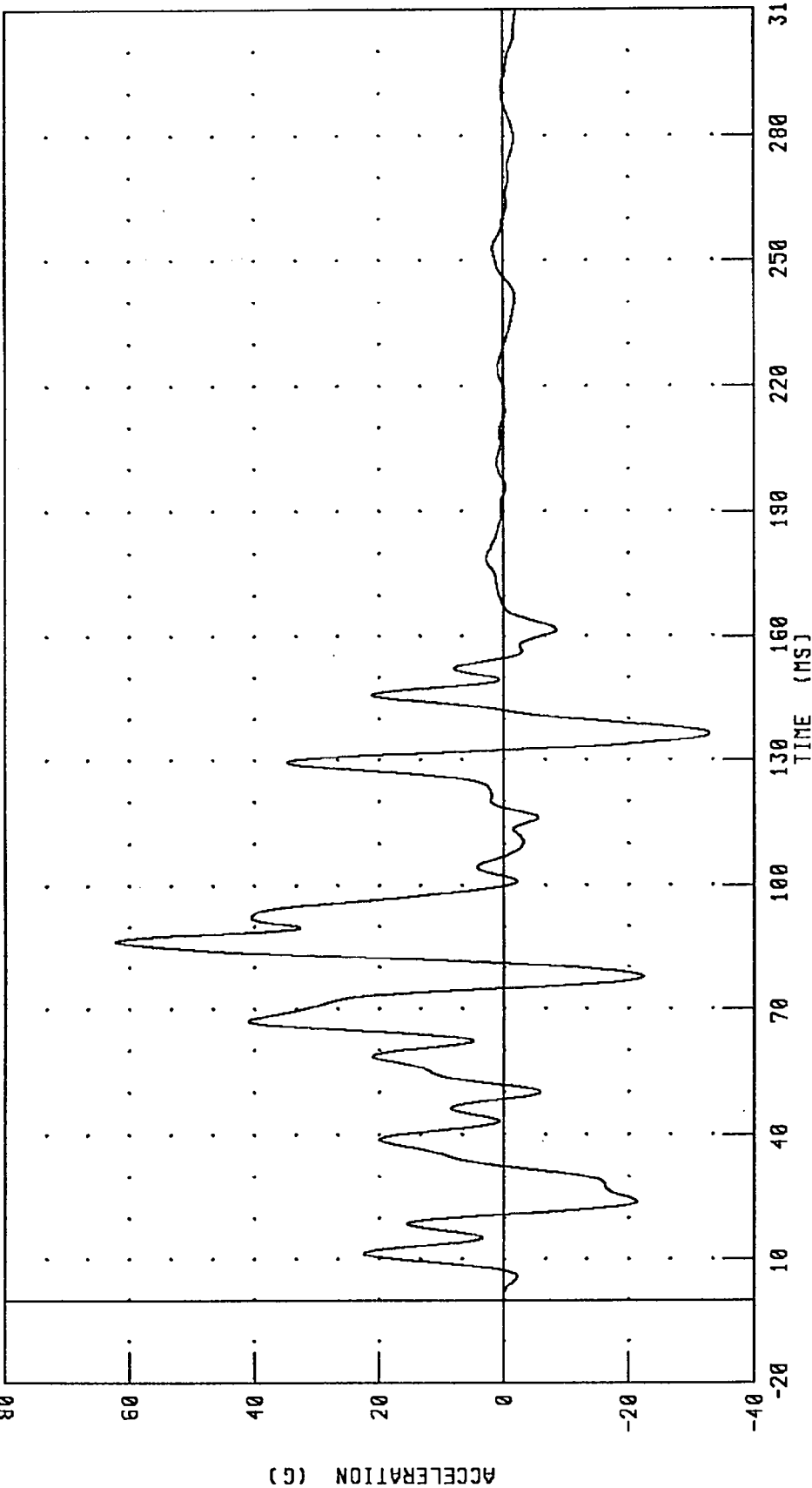
PEAK DATA: 28.90 G @ 89.76 MS, -12.76 G @ 23.60 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
FRONT SEAT BACK MID X-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 62.11 G @ 86.64 MS; -32.86 G @ 136.48 MS

CHANNEL: TRFXG2 FILTER: CH. CLASS 60

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
RADIATOR SUPPORT X-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.

60

40

20

0

-20

-40

-60

ACCELERATION (G)

TIME (MS)

310

280

250

220

190

160

130

100

70

40

10

-20

CHANNEL: FFCXG

FILTER: CH. CLASS 60

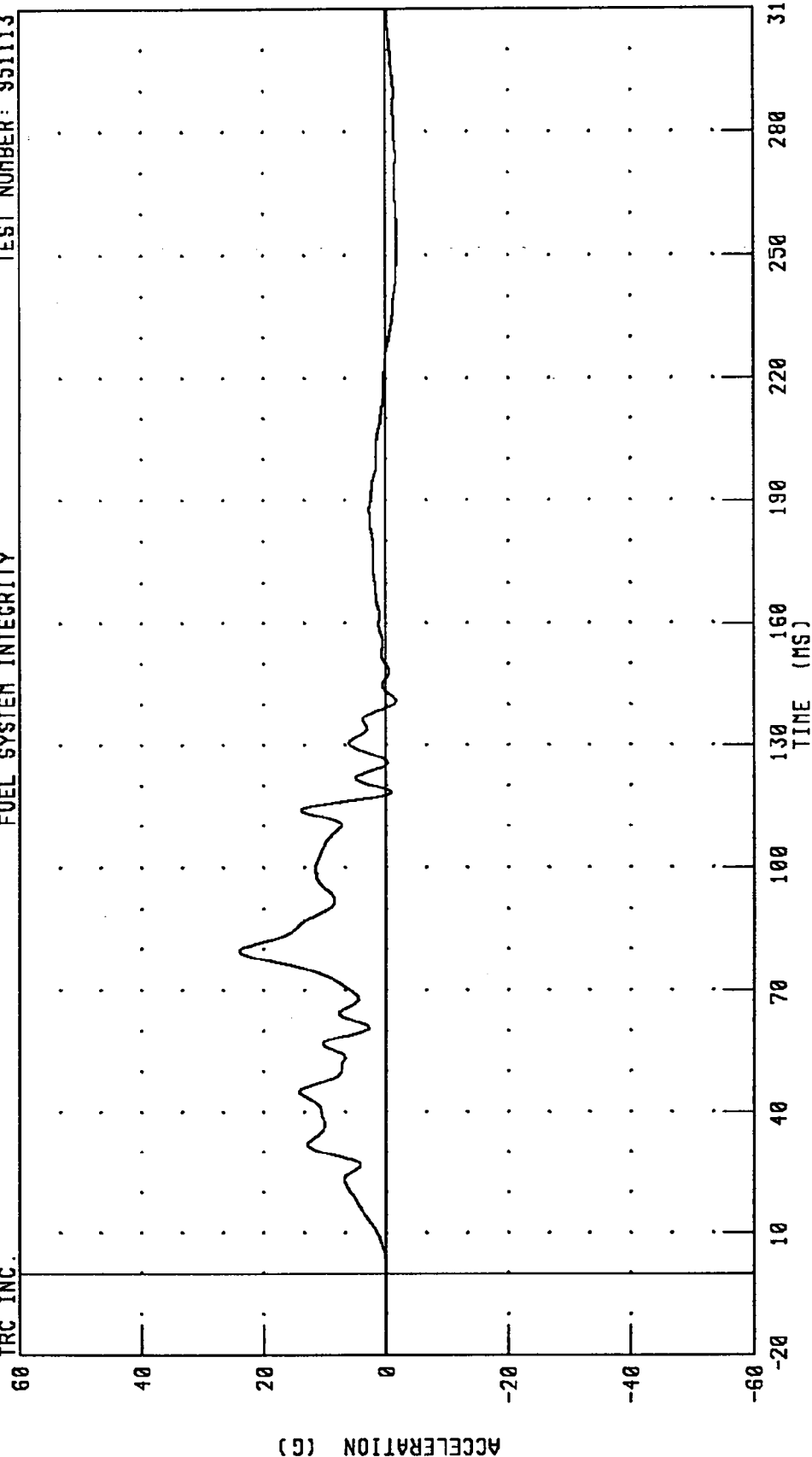
PEAK DATA: 21.22 G @ 20.00 MS; -15.02 G @ 147.68 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
ENGINE TOP X-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 24.13 G @ 79.60 MS; -1.93 G @ 251.20 MS

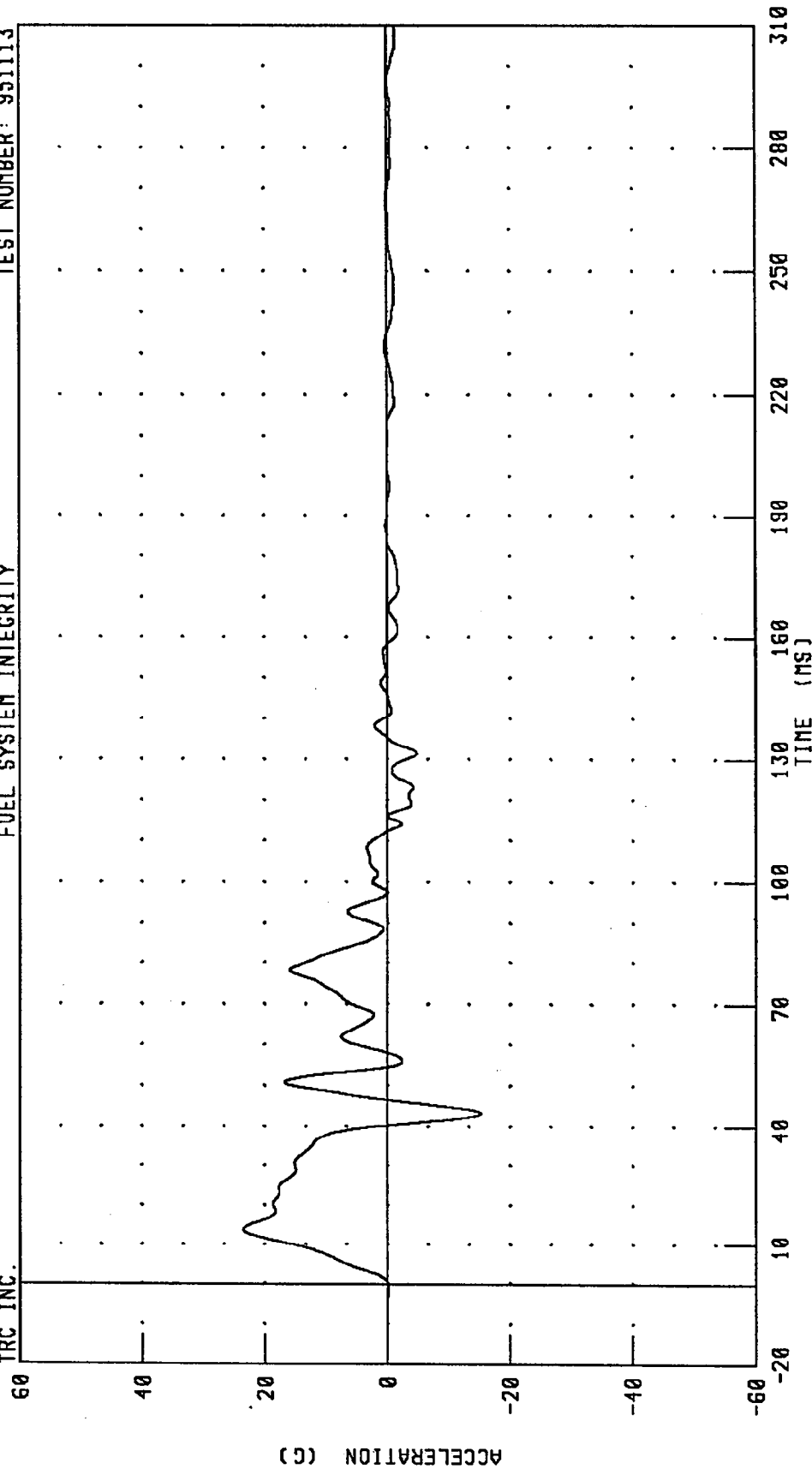
CHANNEL: ENGCG FILTER: CH. CLASS 60

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 REAR WHEEL AXLE X-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



951113

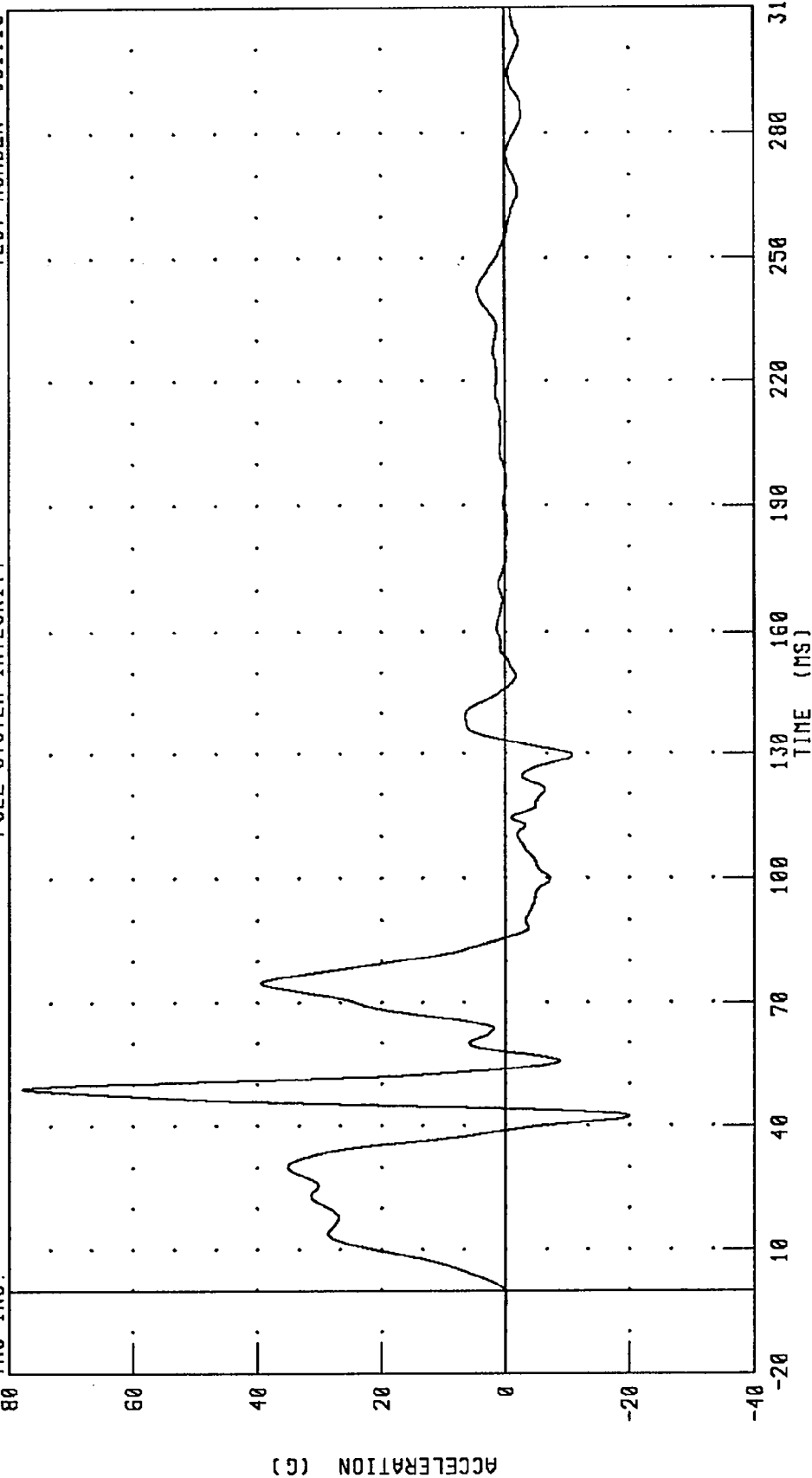
CHANNEL: RAXXG1 FILTER: CH. CLASS 60

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 REAR WHEEL AXLE X-AXIS ACCELERATION

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



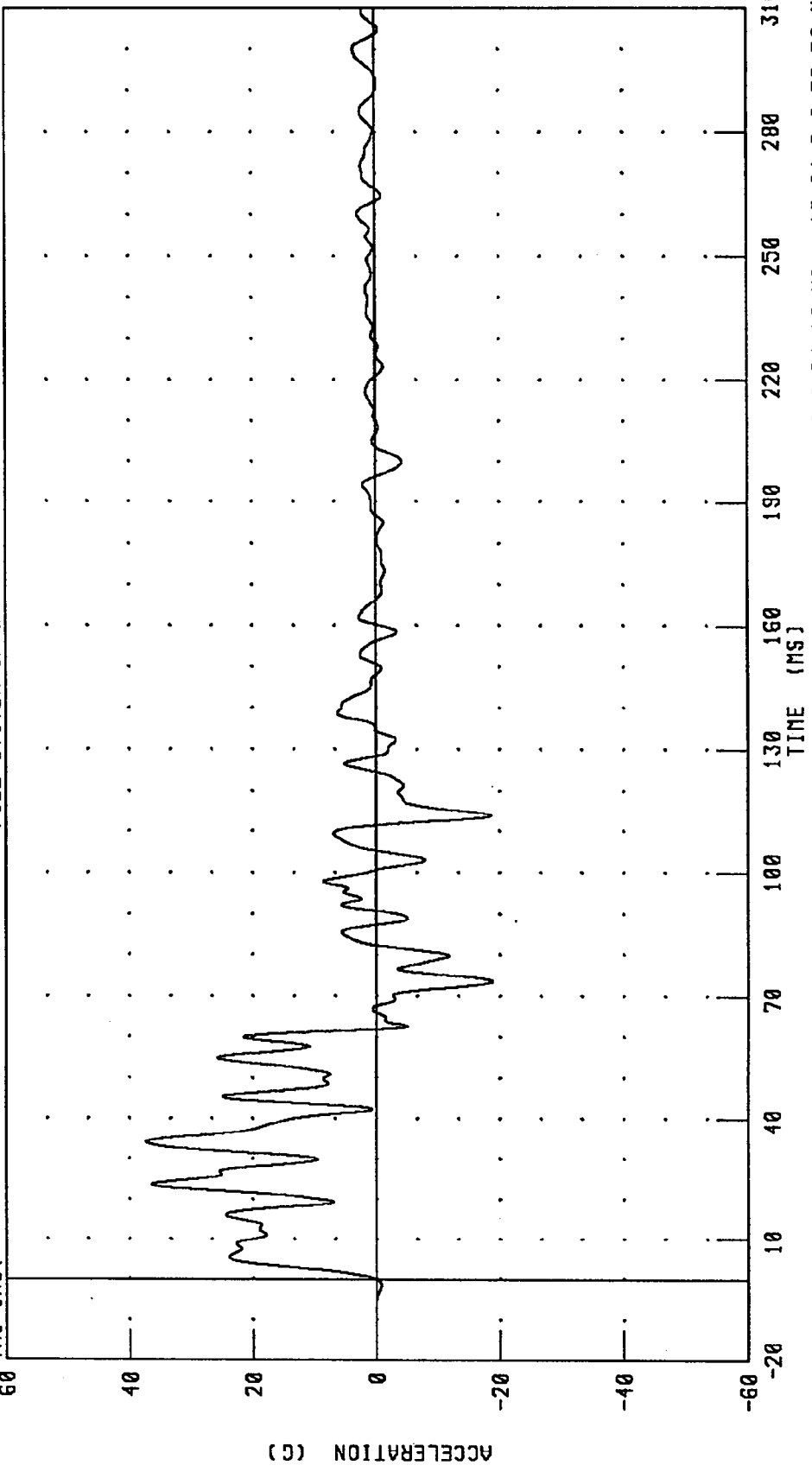
CHANNEL: RAXXG2 FILTER: CH. CLASS 60

PEAK DATA: 77.88 G @ 48.88 MS; -19.91 G @ 42.32 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
PACKAGE SHELF X-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY

TEST NUMBER: 951113

TRC INC.



PEAK DATA: 37.37 G @ 34.16 MS; -18.84 G @ 73.76 MS

CHANNEL: TCRXG FILTER: CH. CLASS 60

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
DRIVER SHOULDER BELT FORCE

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.

100

80

60

40

20

0

-20

FORCE (N X 10²)

310

280

250

220

190

160

130

100

70

40

10

-20

TIME (MS)

PEAK DATA: 199.83 N @ 309.36 MS; -24.03 N @ 103.28 MS

FILTER: CH. CLASS 60

CHANNEL: SHBFI

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 DRIVER LAP BELT OUTBOARD FORCE

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.

100

80

60

40

20

0

-20

FORCE (N X 10²)

TIME (MS)

310

280

250

220

190

160

130

100

70

40

10

-20

PEAK DATA: 155.84 N @ 54.48 MS; -185.19 N @ 138.08 MS

CHANNEL: LBOF1 FILTER: CH. CLASS 60

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
BARRIER FRONT TOP LEFT FORCE

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.

30

0

-30

-60

-90

-120

-150

FORCE (N X 10³)

TIME (MS)

130

160

190

220

250

280

310

PEAK DATA: 2499.18 N @ 246.24 MS; -77546.23 N @ 15.36 MS

CHANNEL: BFFXF1

FILTER: CH. CLASS 60

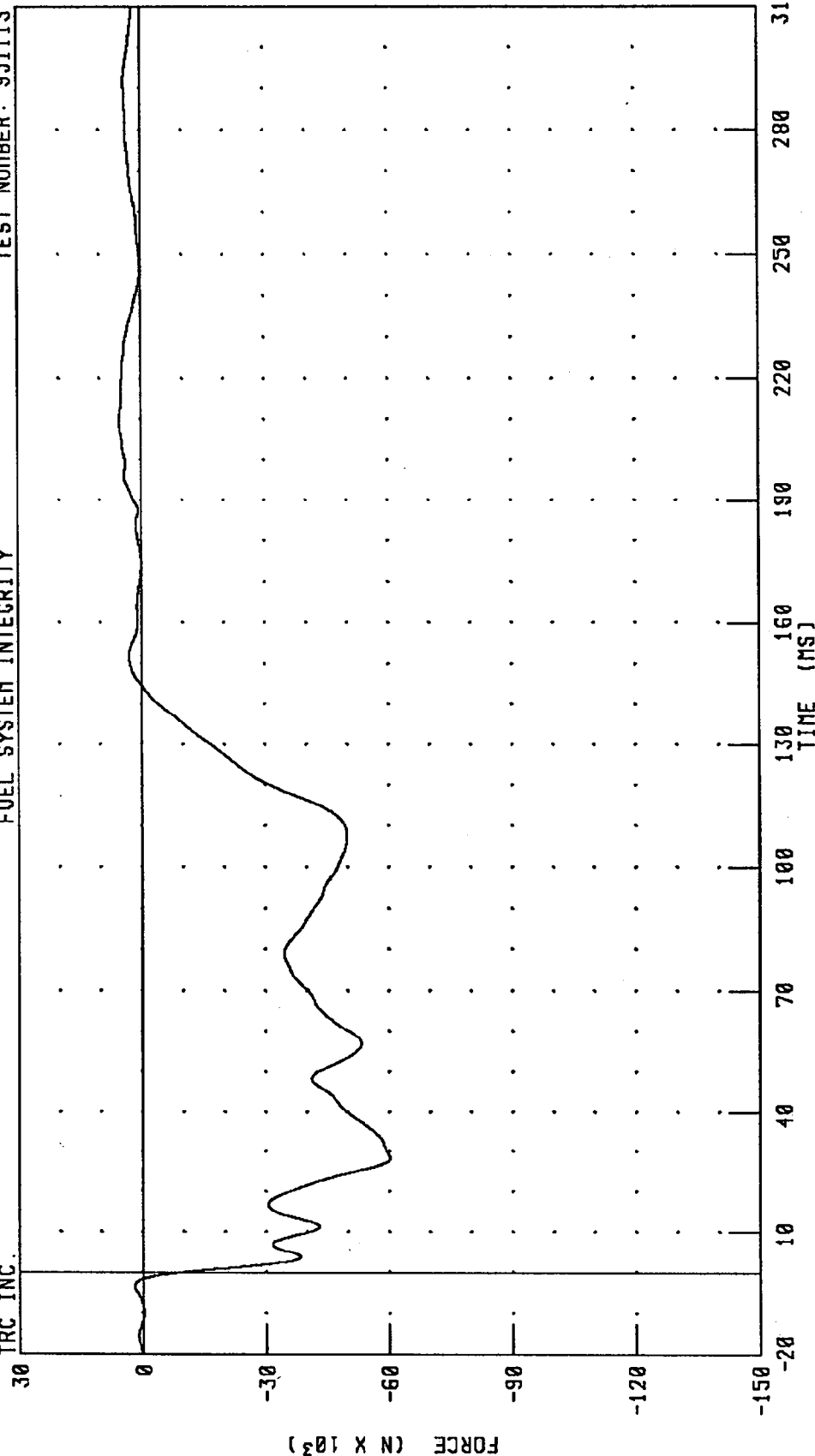
951113

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
 BARRIER FRONT BOTTOM LEFT FORCE

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 5343.71 N @ 209.68 MS; -60250.75 N @ 28.40 MS

CHANNEL: BFFXF2 FILTER: CH. CLASS 60

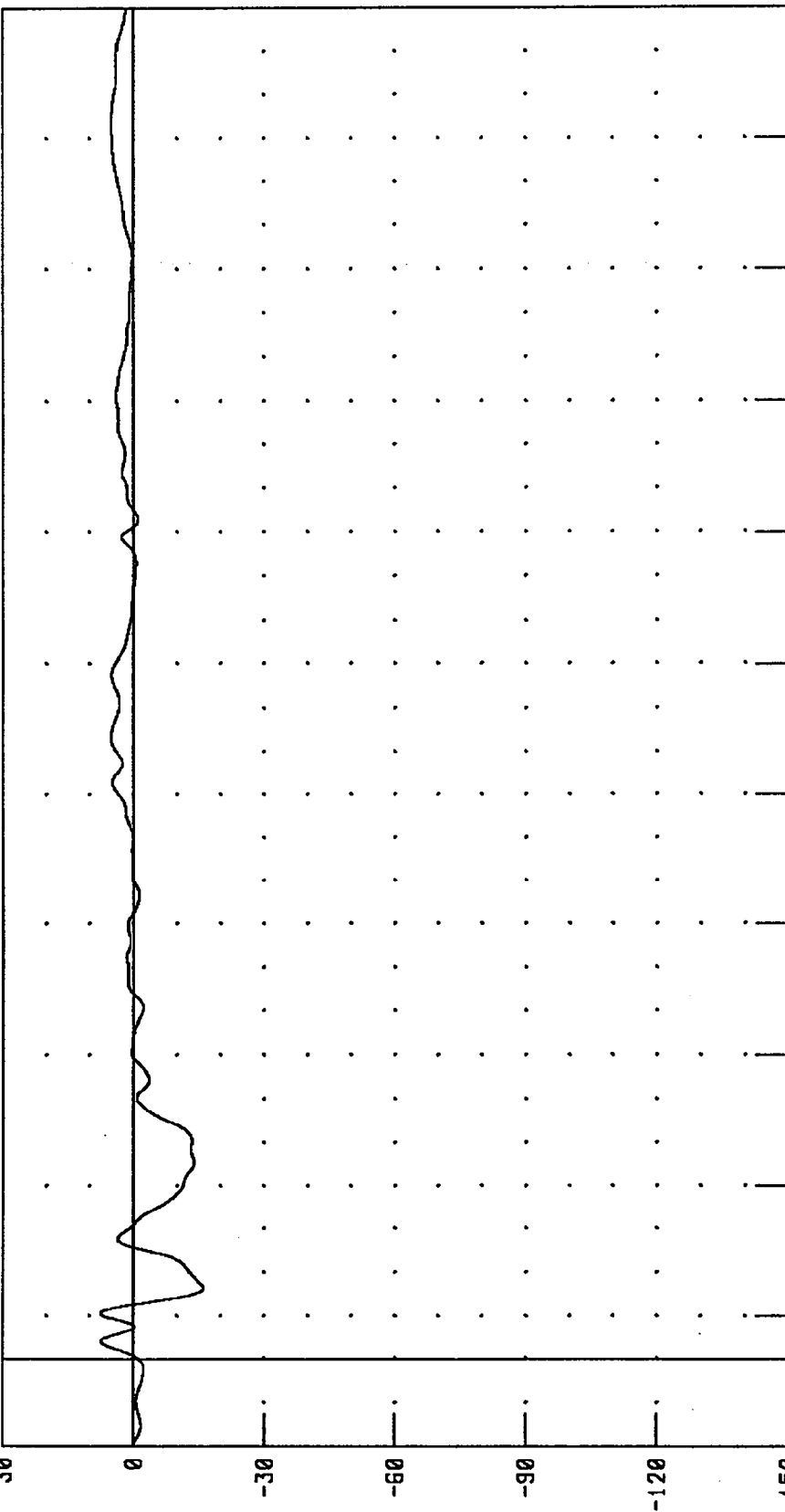
MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
BARRIER FRONT BOTTOM RIGHT FORCE

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.

30



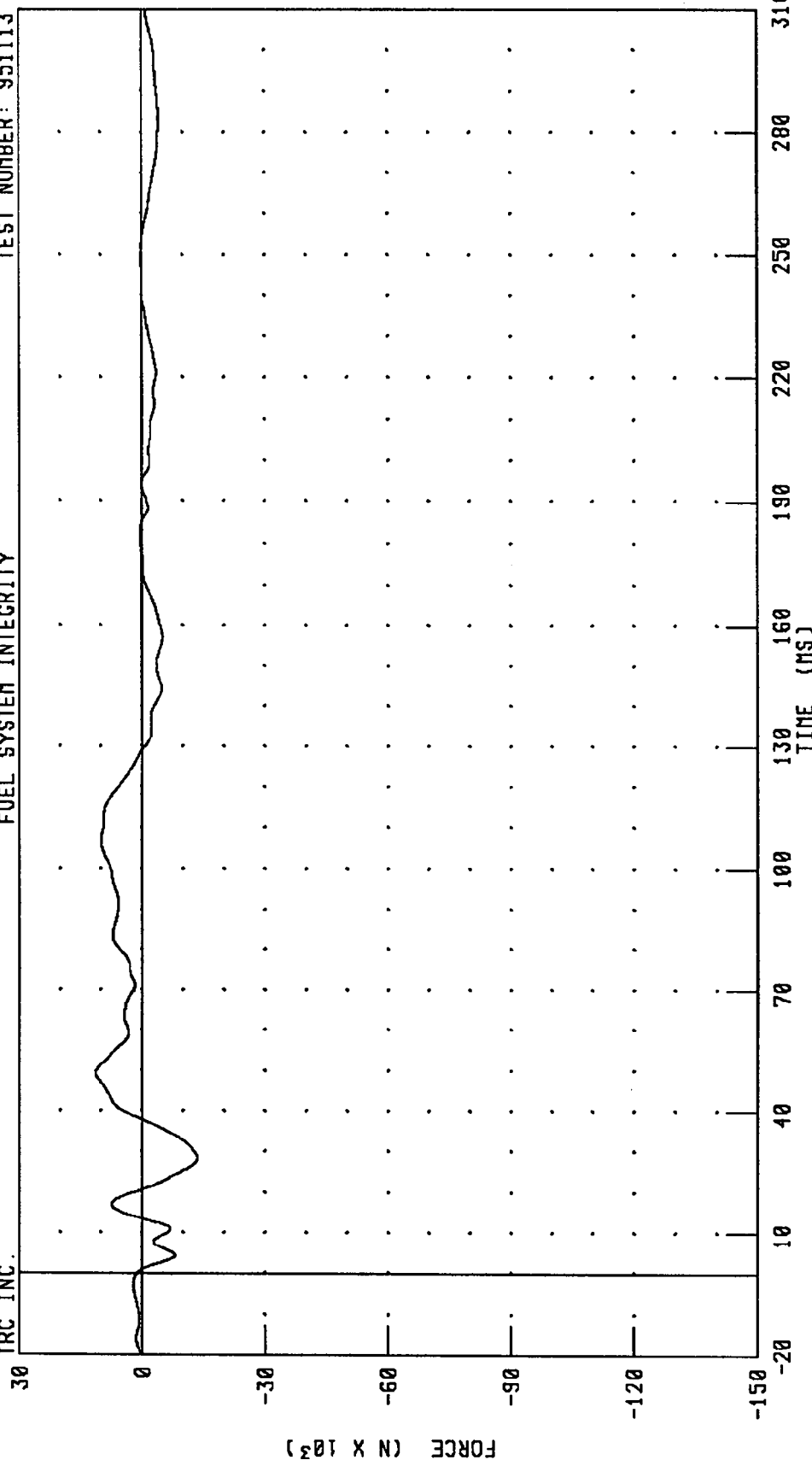
CHANNEL: BFFXF3 FILTER: CH. CLASS 60
PEAK DATA: 7420.27 N @ 10.64 MS; -16150.59 N @ 16.32 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
BARRIER FRONT TOP RIGHT FORCE

TEST NUMBER: 951113

FUEL SYSTEM INTEGRITY

TRC INC.

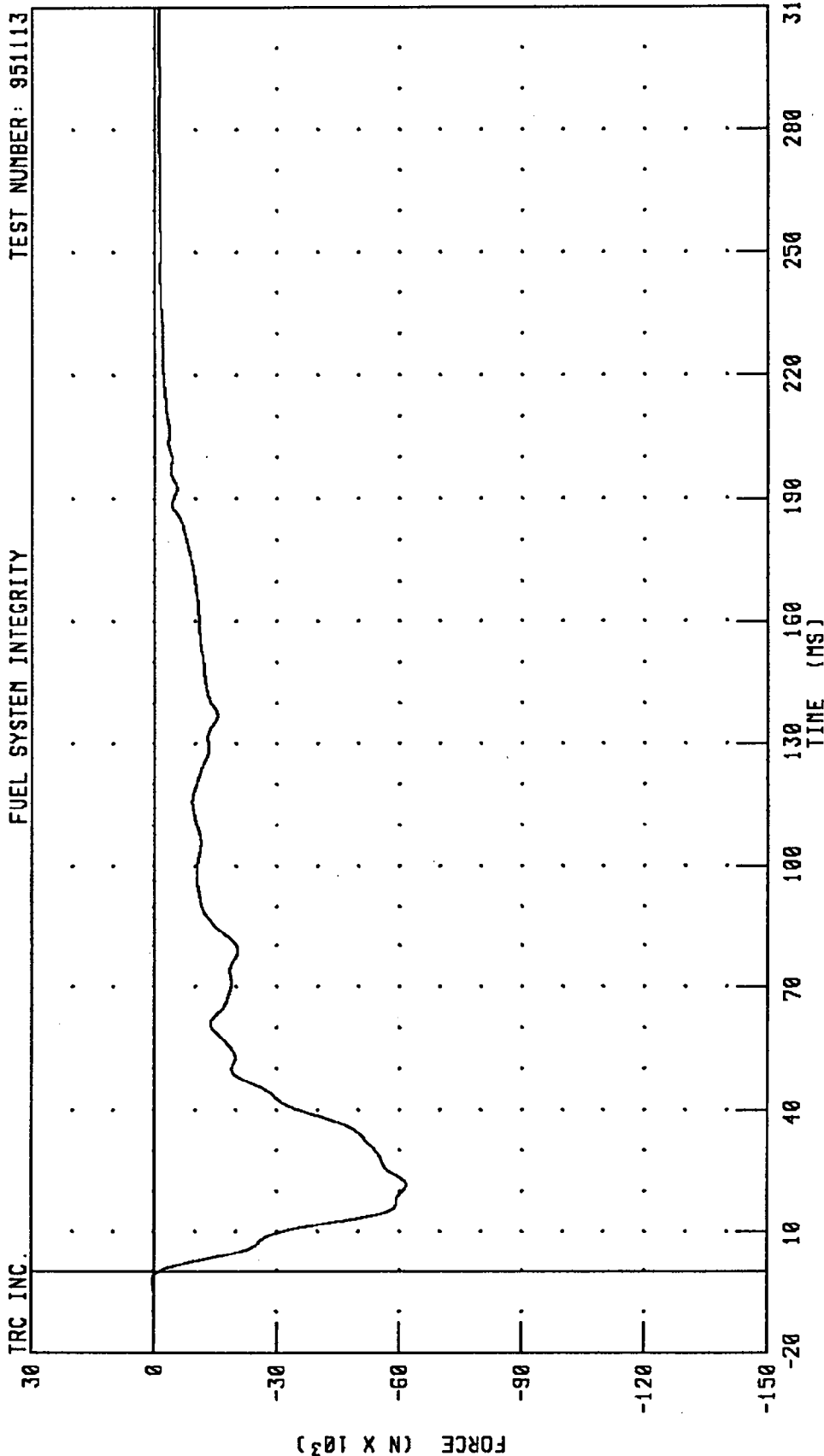


PEAK DATA: 11401.74 N @ 49.28 MS; -13460.92 N @ 28.24 MS

CHANNEL: BFFXF4 FILTER: CH. CLASS 60

MOVING DEFORMABLE BARRIER INTO REAR OF A 1993 FORD MUSTANG AT 80 KPH AND 50% OVERLAP
BARRIER FRONT CENTER FORCE

FUEL SYSTEM INTEGRITY TEST NUMBER: 951113



CHANNEL: BFFXFS FILTER: CH. CLASS 60 PEAK DATA: 441.71 N @ -2.40 MS; -61771.92 N @ 21.60 MS

Appendix C

Dummy Calibration Information

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

Ken H. Holt

RUN NUMBER: 071295.1437

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III

09-NOV-95

TRC INC.

TEST NO: 35C1HD2

572E SN35 HEAD DROP CAL 01

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

TEST MEETS SPECIFICATIONS

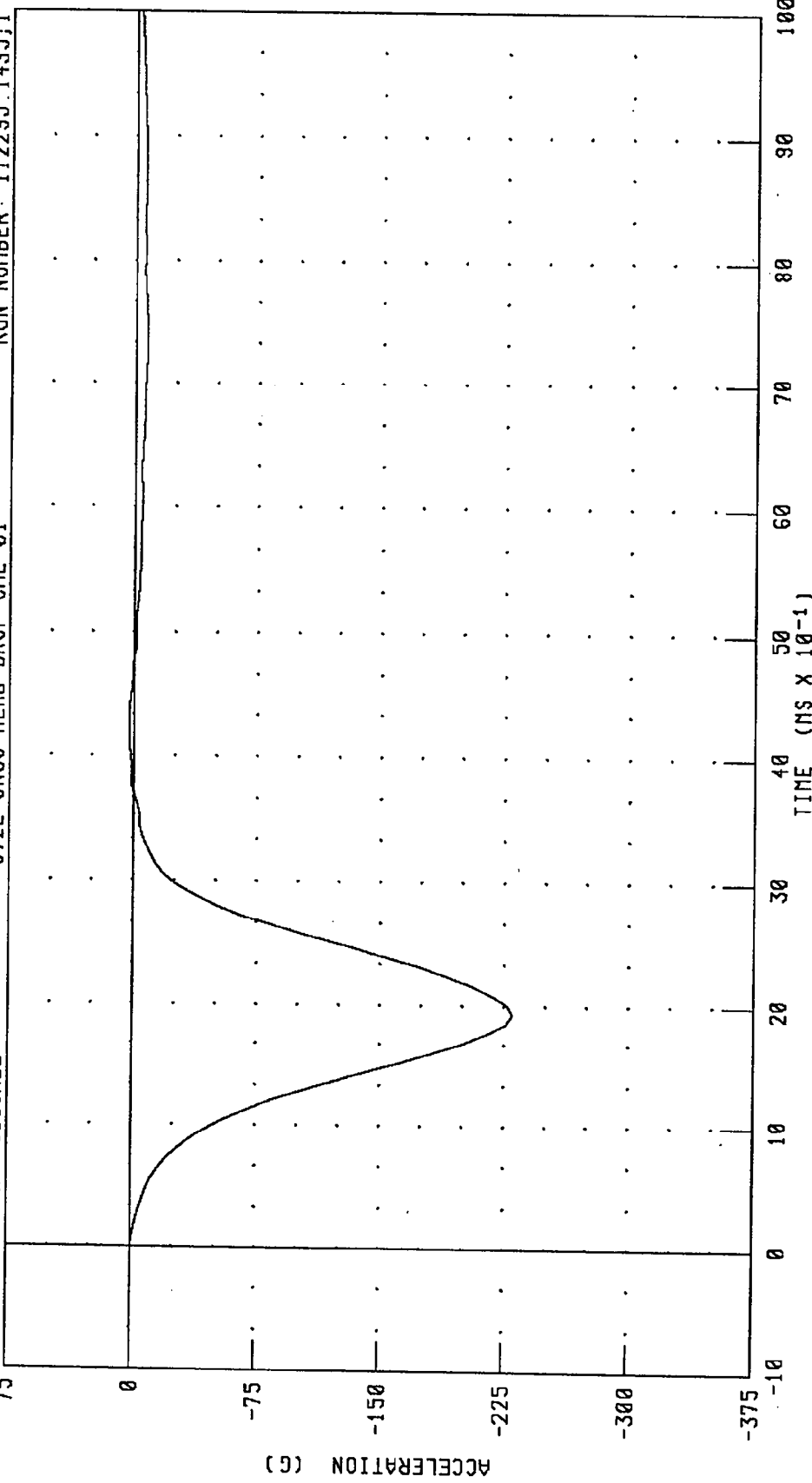
TECHNICIAN

Chas. Middel

RUN NUMBER: 110995.1358;1

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

TRC TEST NUMBER: 35C1HD2 572E SN35 HEAD DROP CAL 01 RUN NUMBER: 112295.1435;1



CHANNEL: HEDXC FILTER: CH. CLASS 1000

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

PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

TRC TEST NUMBER: 35C1H02

572E SN35 HEAD DROP CAL 01

RUN NUMBER: 112295.1435;1

225

150

75

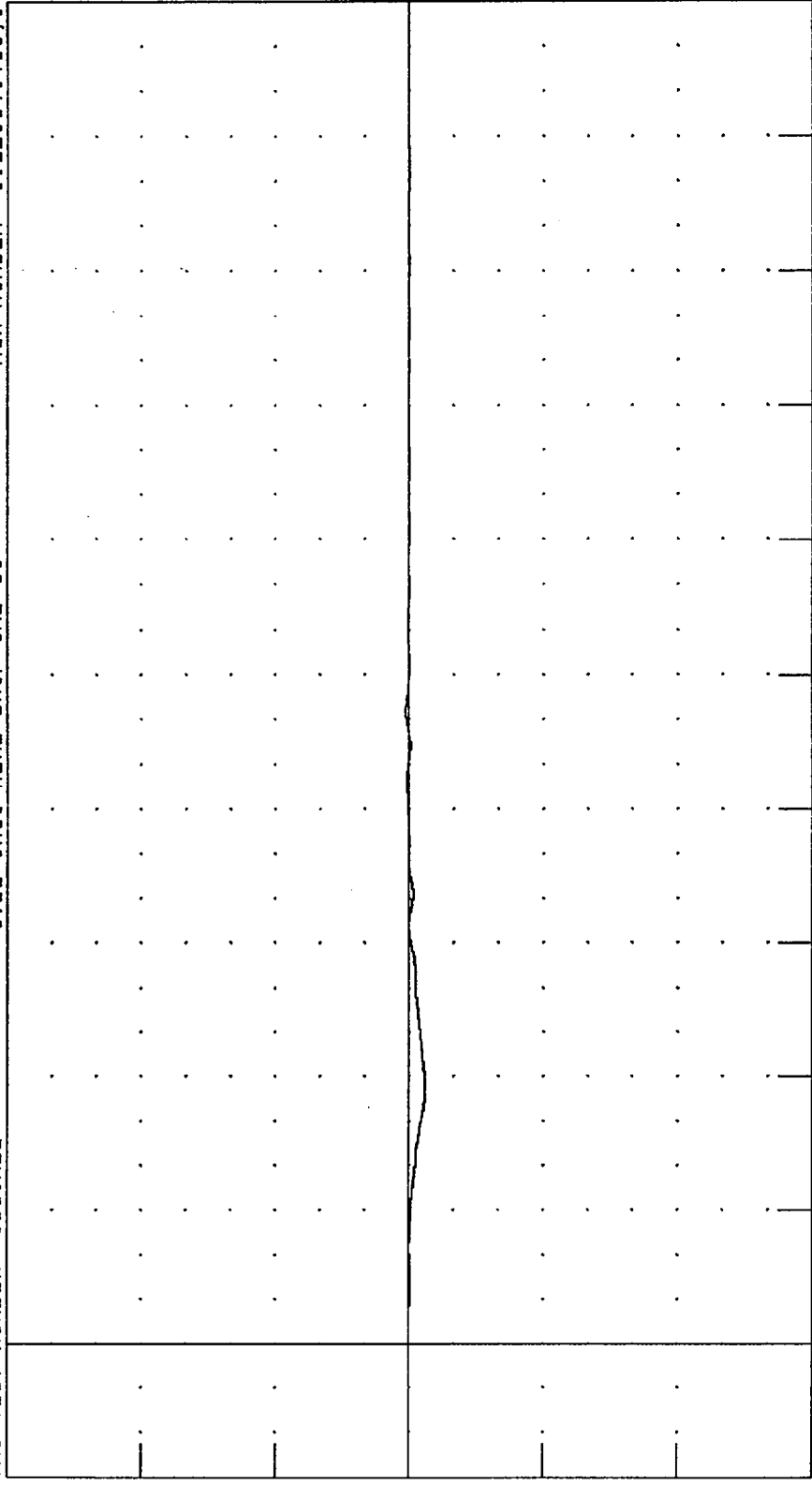
0

-75

-150

-225

ACCELERATION (G)



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

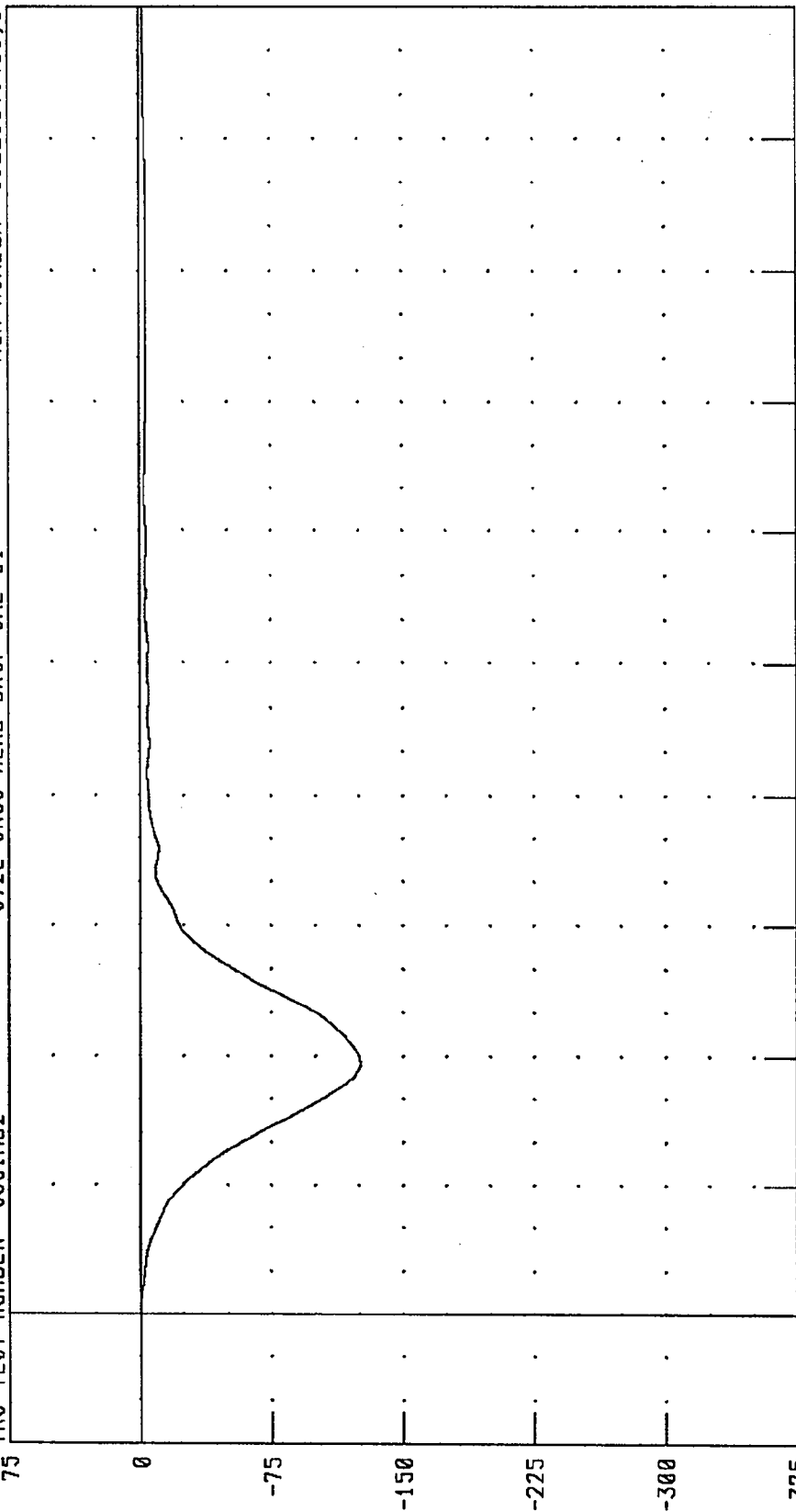
CHANNEL: HEDYC FILTER: CH. CLASS 1000

PART 572-E HYBRID III HEAD CALIBRATION
 HEAD ACCELERATION Z AXIS
 572E SN35 HEAD DROP CAL 01

TRC TEST NUMBER: 35C1HD2

RUN NUMBER: 112295.1435,1

75



ACCELERATION (G)

TIME (MS X 10⁻¹)

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

FILTER: CH. CLASS 1000

CHANNEL: HEDZG

PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: 35C1H02

572E SN35 HEAD DROP CAL 01

RUN NUMBER: 112295.1435;1

375

300

225

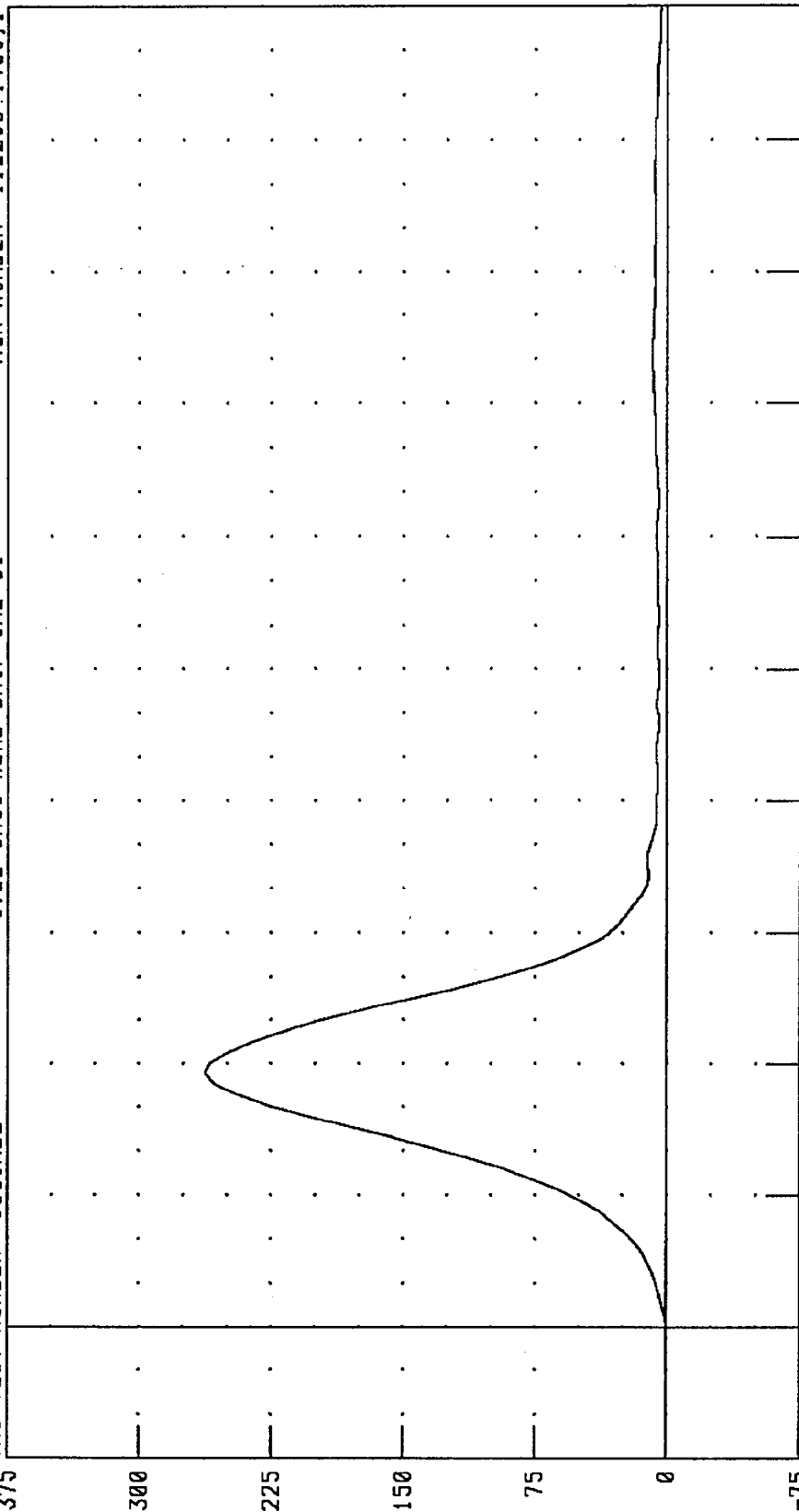
150

75

0

-75

ACCELERATION (G)



TIME (MS X 10⁻¹)

CHANNEL: HEDRG FILTER: CH. CLASS 1000

PEAK DATA: 262.45 G @ 1.92 MS; 0.02 G @ -0.32 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	MAX	64 - 78 DEG.	70.37 DEG.
ROTATION	TIME	57 - 64 MS	58.00 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	96.89 NM
	TIME	47 - 58 MS	50.00 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	114.48 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	99.60 MS

TEST MEETS SPECIFICATIONS

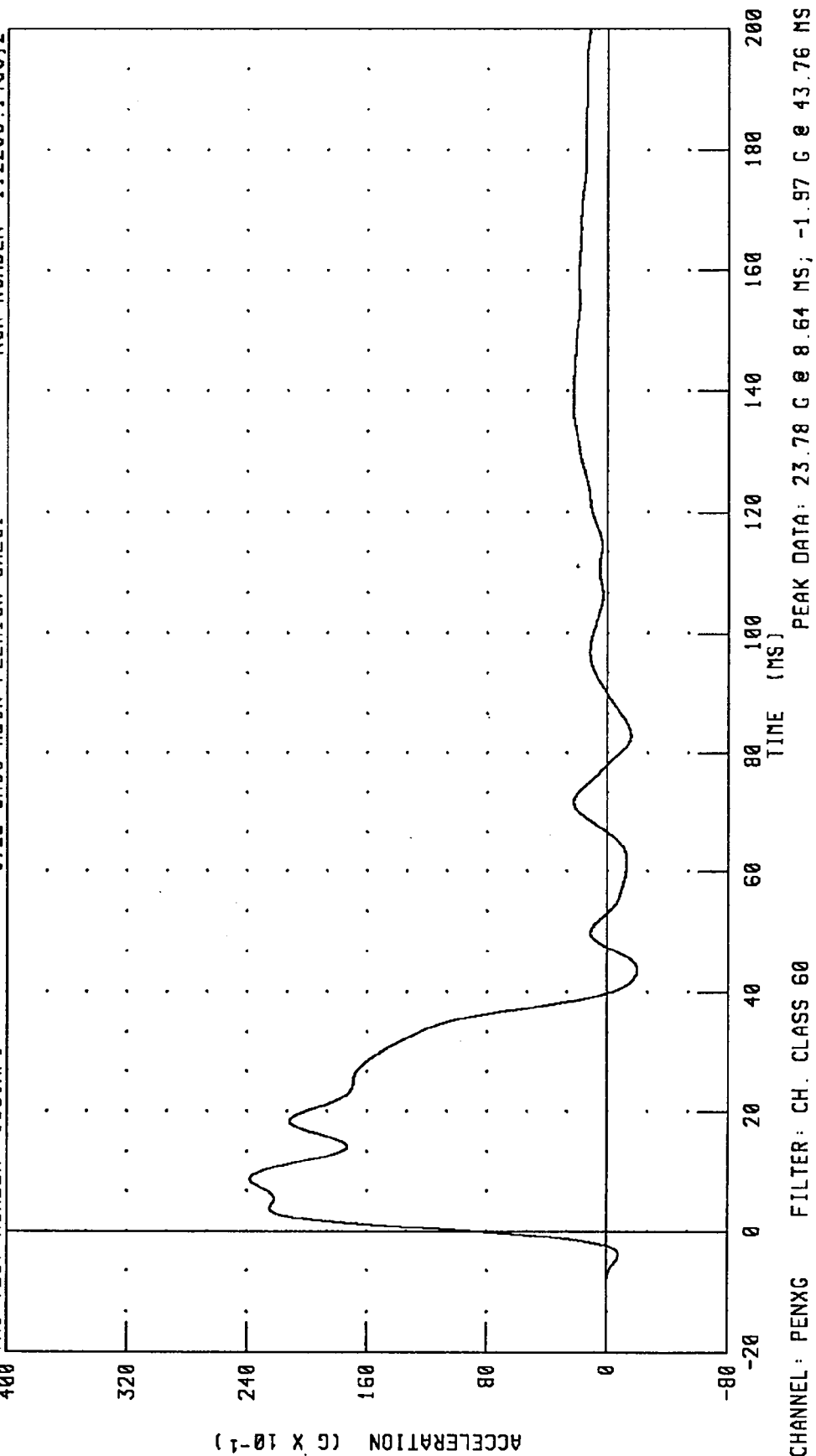
TECHNICIAN Chris M. Wilt

RUN NUMBER: 071195.0843;2

PART 572-E HYBRID III NECK FLEXION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 35CINF1 572E SN35 NECK FLEXION CAL01 RUN NUMBER: 112295.1435;2



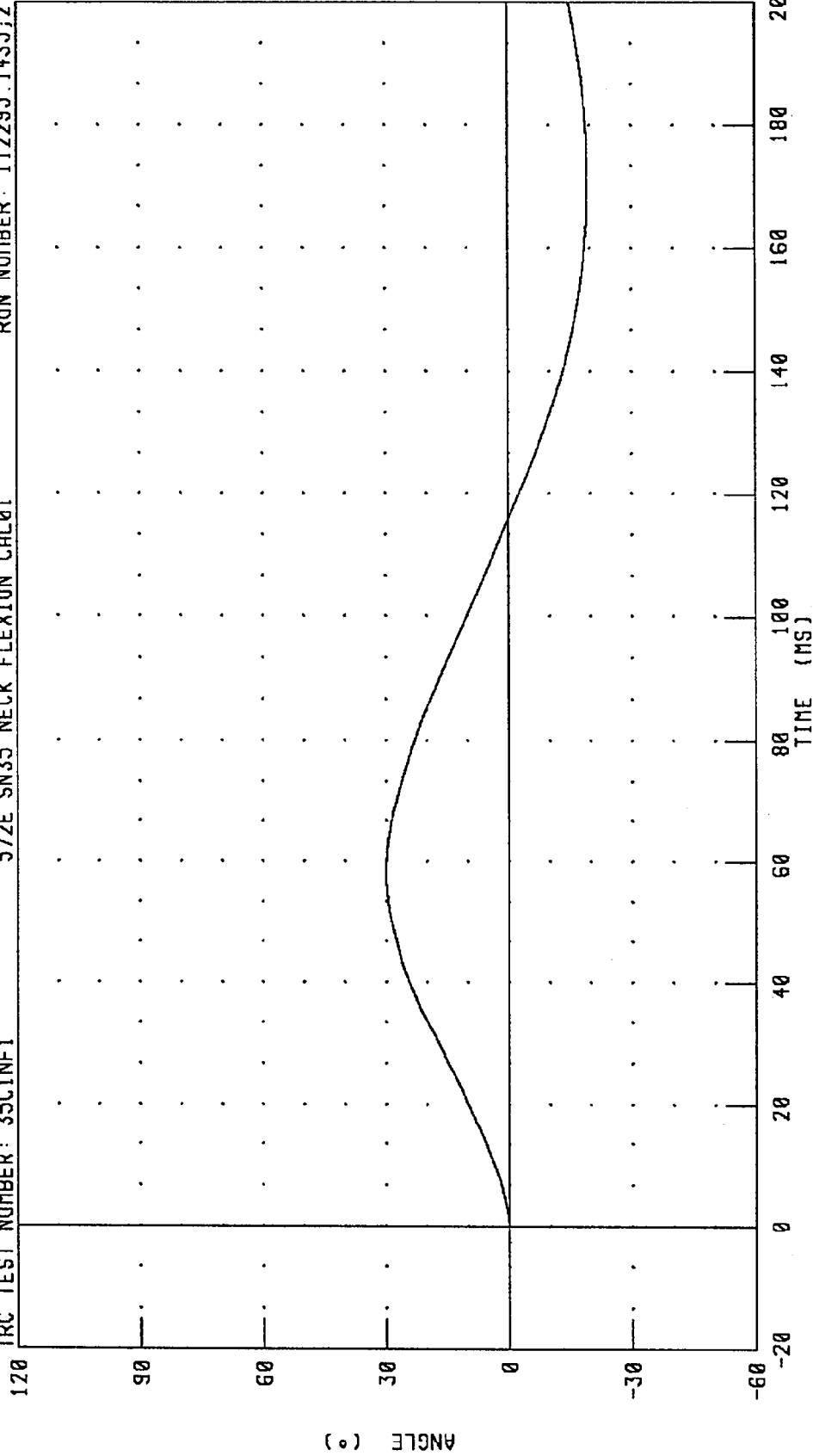
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN35 NECK FLEXION CAL01

RUN NUMBER: 112295.1435;2

TRC TEST NUMBER: 35CINF1



PEAK DATA: 30.01 ° @ 58.24 MS; -19.33 ° @ 167.52 MS

FILTER: CH. CLASS 60

CHANNEL: BETA

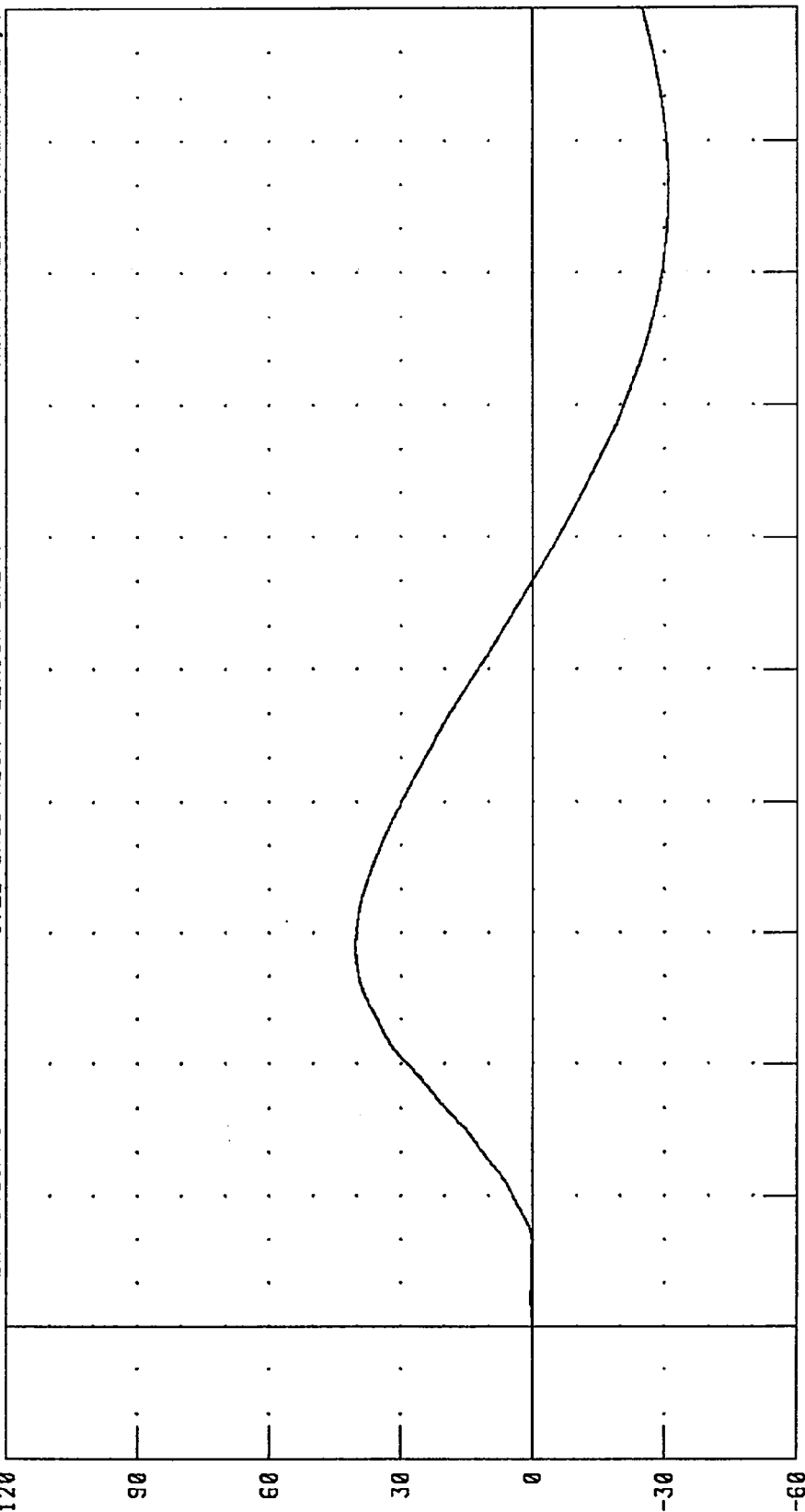
PART 572-E HYBRID III NECK FLEXION CALIBRATION
 ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 35CINF1

572E SN35 NECK FLEXION CAL01

RUN NUMBER: 112295.1435;2

120



ANGLE (°)

TIME (MS)

PEAK DATA: 40.37 ° @ 57.76 MS; -30.85 ° @ 169.84 MS

CHANNEL: THETA FILTER: CH. CLASS 60

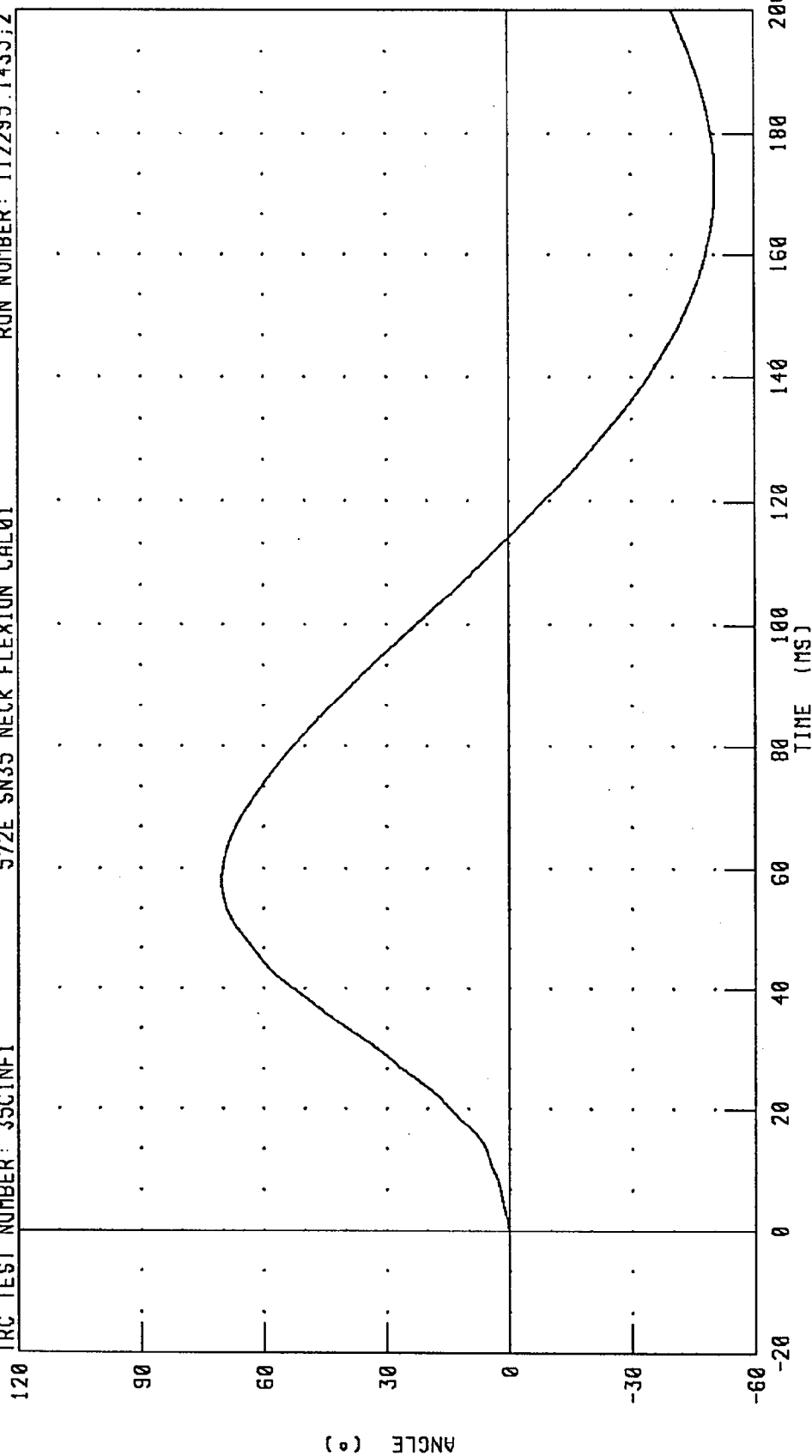
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 35C1NF1

572E SN35 NECK FLEXION CAL01

RUN NUMBER: 112295.1435;2



PEAK DATA: 70.38 ° @ 58.00 MS; -50.17 ° @ 169.52 MS

CHANNEL: TOTAN FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 35CINF1

572E SN35 NECK FLEXION CAL01

RUN NUMBER: 112295.1435;2

160

120

80

40

0

-40

-80

FORCE (N X 10¹)

TIME (MS)

200

180

160

140

120

100

80

60

40

20

0

-20

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

FILTER: CH. CLASS 60

CHANNEL: NEKXF

PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 35CINF1

572E SN35 NECK FLEXION CAL01

RUN NUMBER: 112295.1435;2

160

120

80

40

0

-40

-80

TORQUE (N·M)



TIME (MS)

200

180

160

140

120

100

80

60

40

20

0

-20

CHANNEL: NEKYM

FILTER: CH. CLASS 60

PEAK DATA: 80.78 N·M @ 50.00 MS;

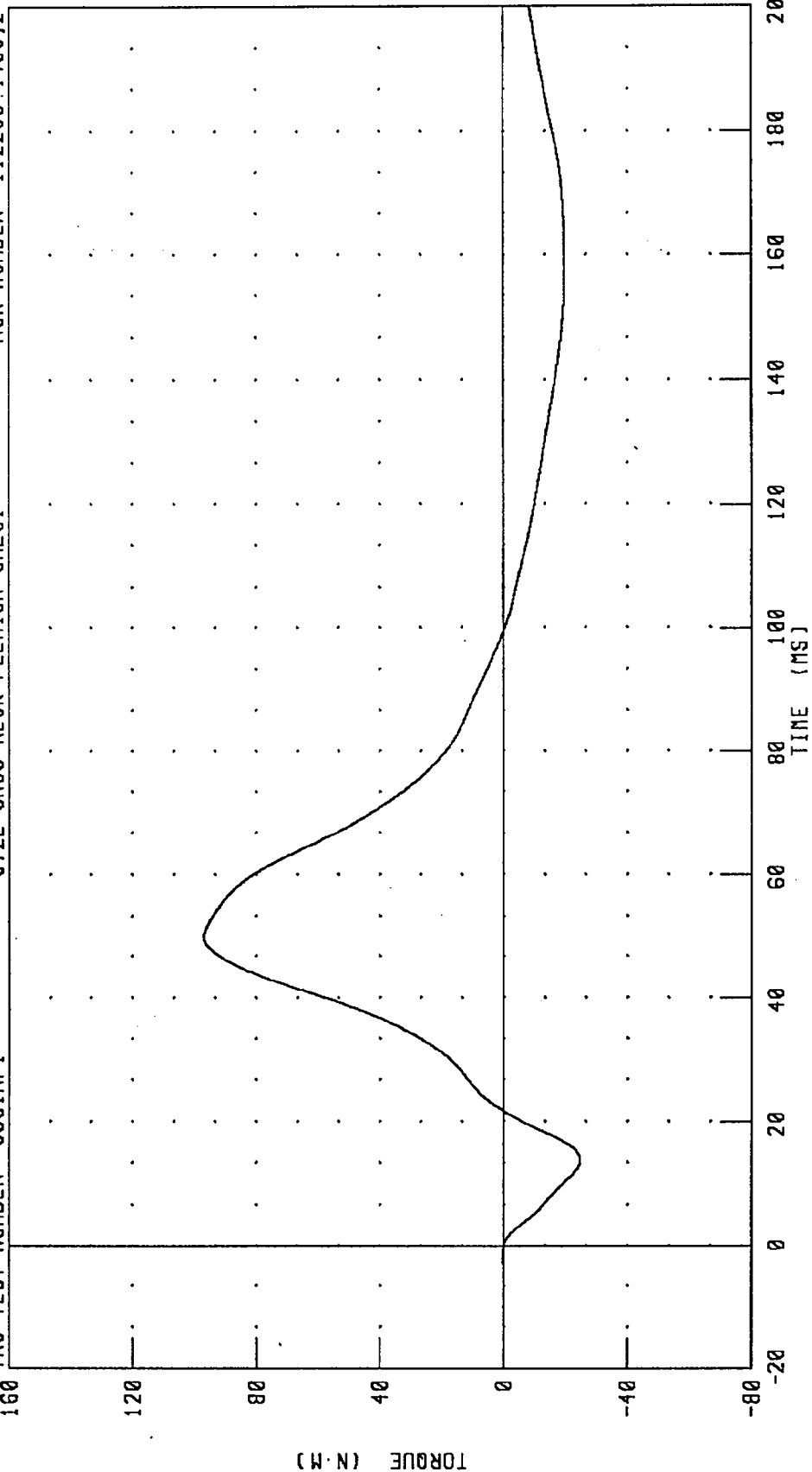
-33.90 N·M @ 14.24 MS

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

TRC TEST NUMBER: 35CINF1

572E SN35 NECK FLEXION CAL01

RUN NUMBER: 112295.1435;2



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

CHANNEL: NEKOM FILTER: CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

HYBRID III

11-JUL-95

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

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

RUN NUMBER: 071195.0855;1

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 35CINE1

572E SN35 NECK EXT. CAL01

RUN NUMBER: 112295.1435;1

400

320

ACCELERATION (G X 10⁻¹)

240

160

80

0

-80

-20

0

20

40

60

80

100

120

140

160

180

200

TIME (MS)

PEAK DATA: 18.21 G @ 8.64 MS; -1.91 G @ 45.20 MS

CHANNEL: PENXG

FILTER: CH. CLASS 60

9511156

81-18

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN35 NECK EXT. CAL01

TRC TEST NUMBER: 35CINE1

120

90

60

30

0

-30

-60

ANGLE (°)

TIME (MS)

80 100 120 140 160 180 200

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

CHANNEL: BETA FILTER: CH. CLASS 60

RUN NUMBER: 112295.1435;1

9511110

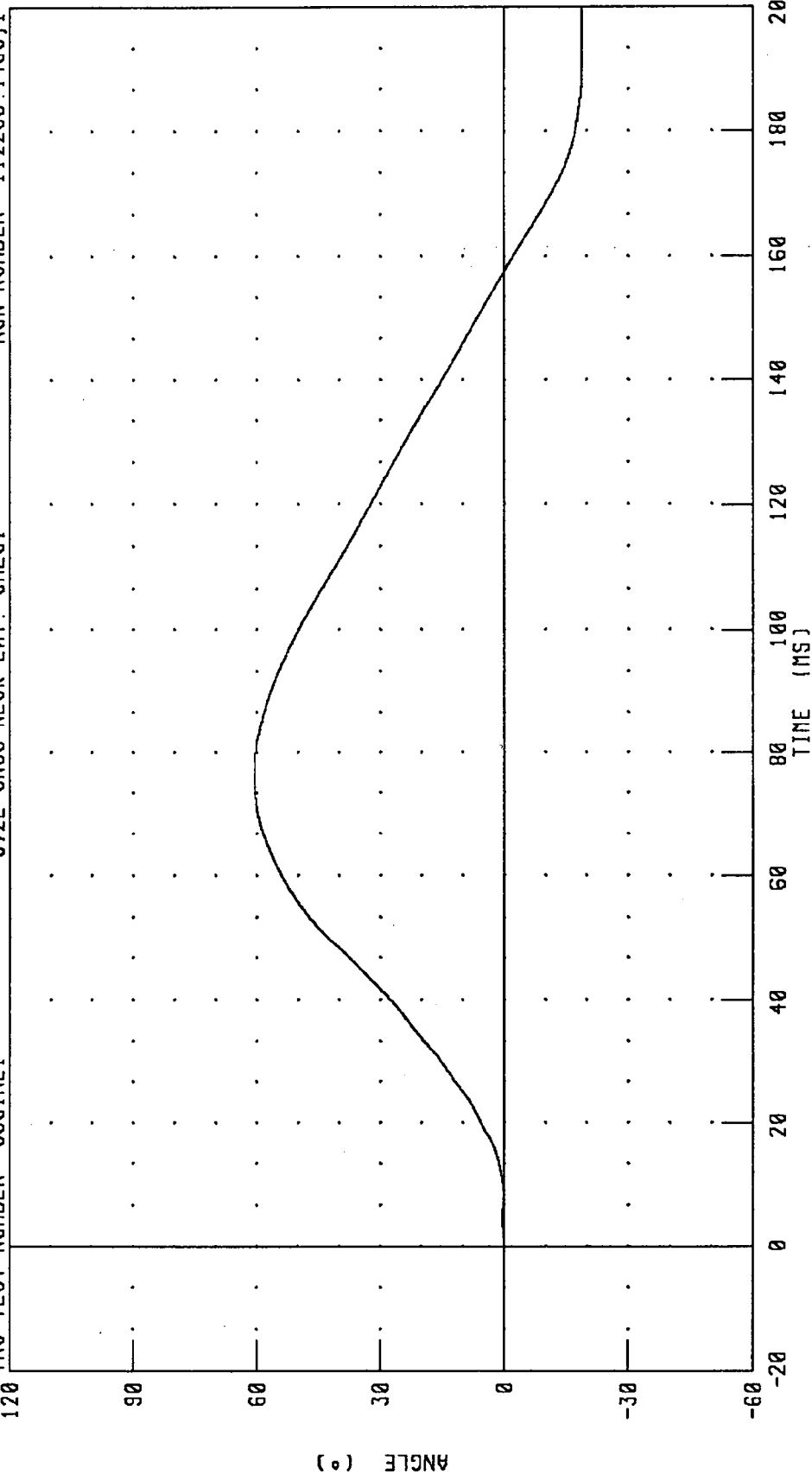
C-19

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

TRC TEST NUMBER: 35CINE1

572E SN35 NECK EXT. CAL01

RUN NUMBER: 112295.1435;1



PEAK DATA: 60.59 ° @ 76.32 MS; -18.87 ° @ 194.56 MS

CHANNEL: THETA FILTER: CH. CLASS 60

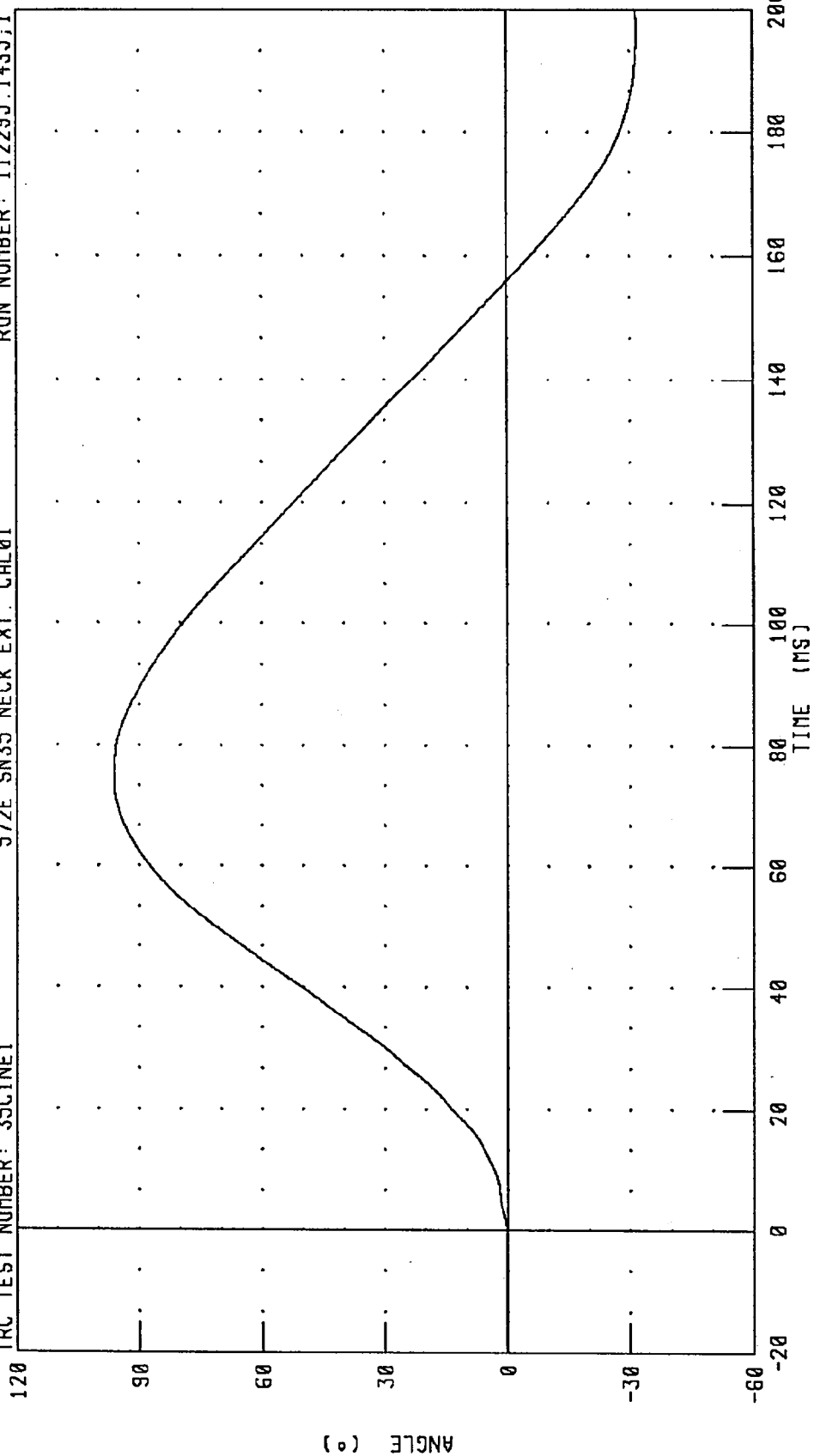
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 35CINE1

572E SN35 NECK EXT. CAL01

RUN NUMBER: 112295.1435.1



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

CHANNEL: TOTAN FILTER: CH. CLASS 60

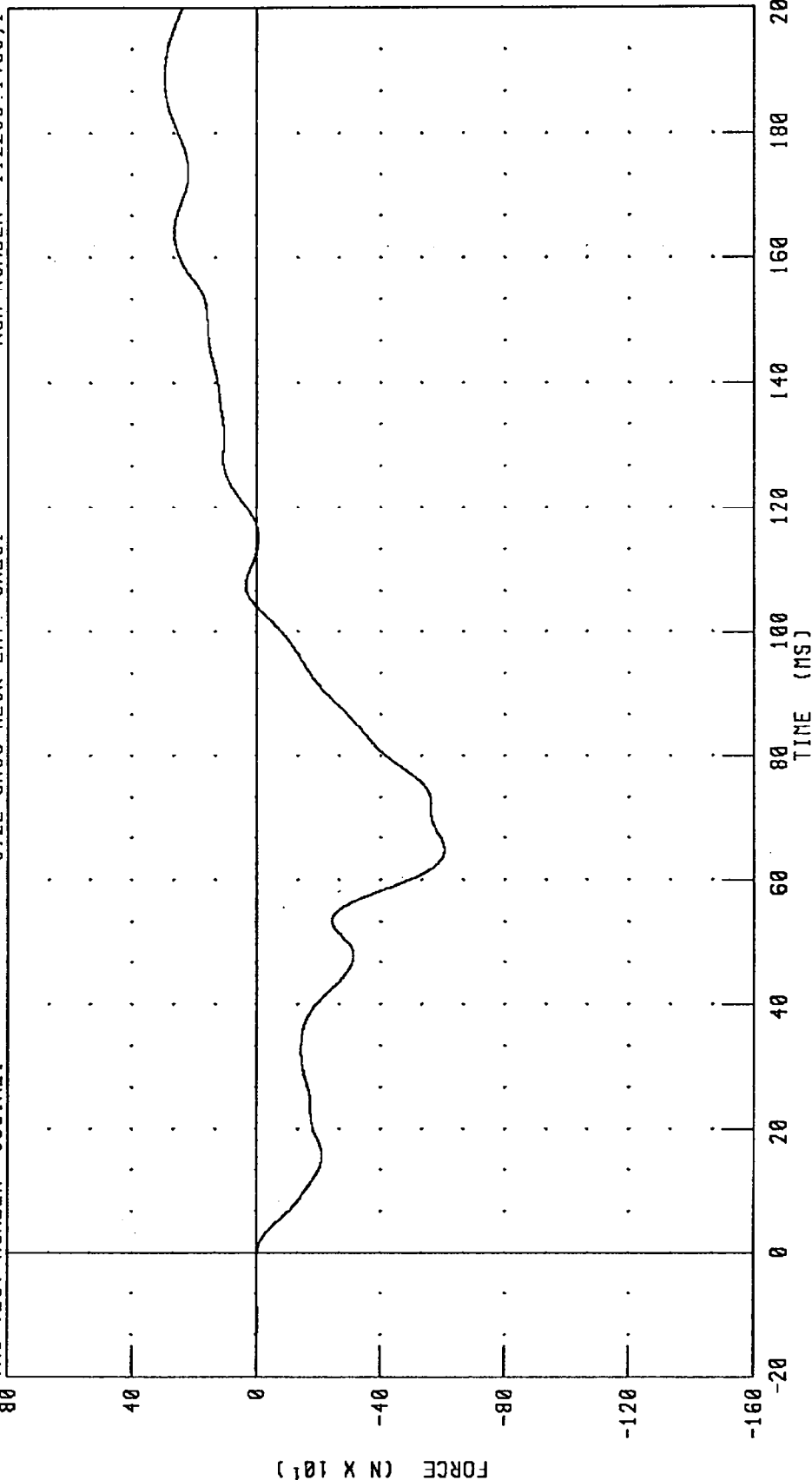
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 35CINE1

572E SN35 NECK EXT. CAL01

RUN NUMBER: 112295.1435,1



CHANNEL: NEKXF FILTER: CH. CLASS 60

PEAK DATA: 294.85 N @ 188.88 MS; -605.24 N @ 64.72 MS

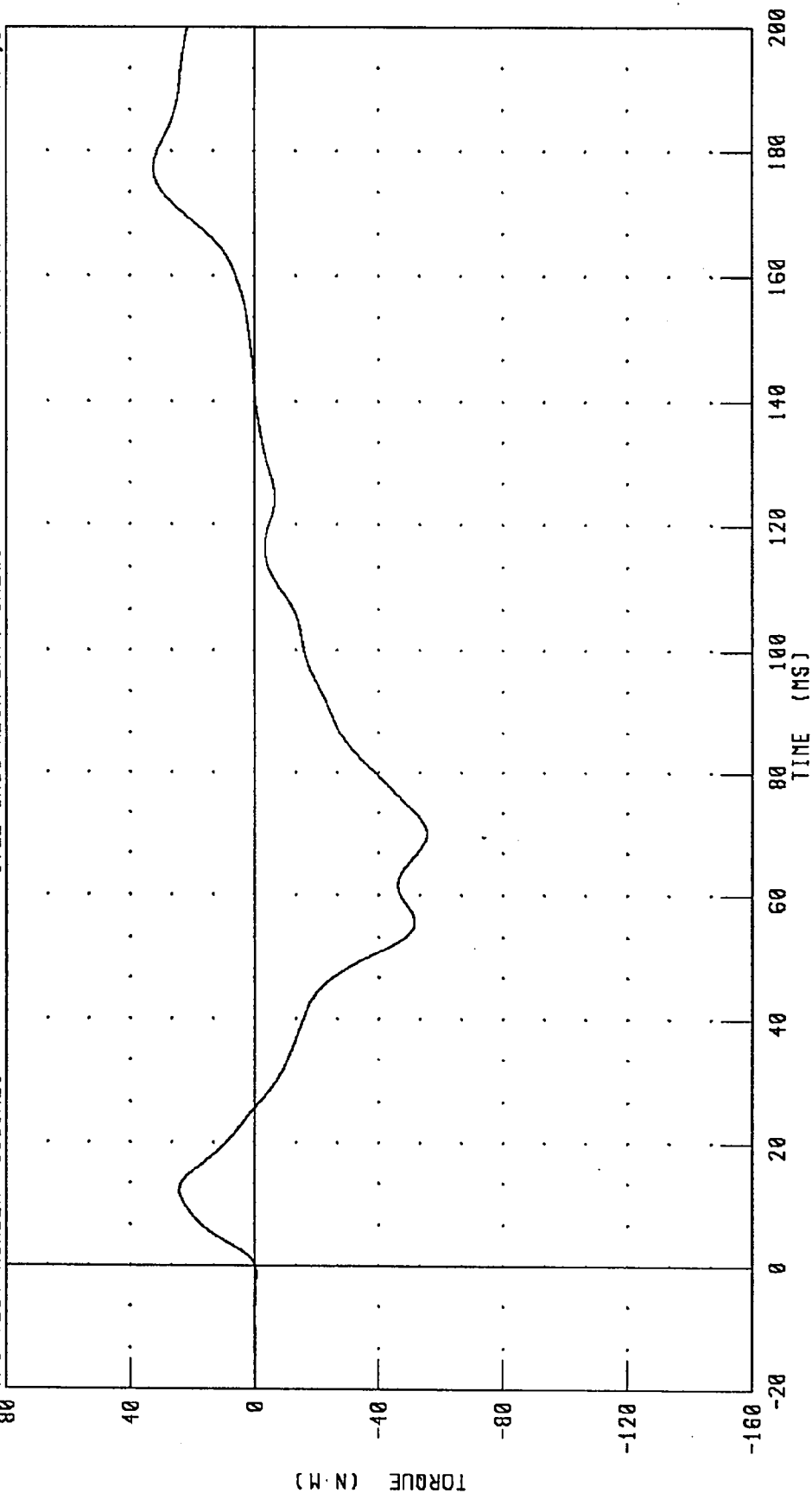
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

IRC TEST NUMBER: 35CINE1

572E SN35 NECK EXT. CAL01

RUN NUMBER: 112295.1435;1



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

CHANNEL: NEKYM FILTER: CH. CLASS 60

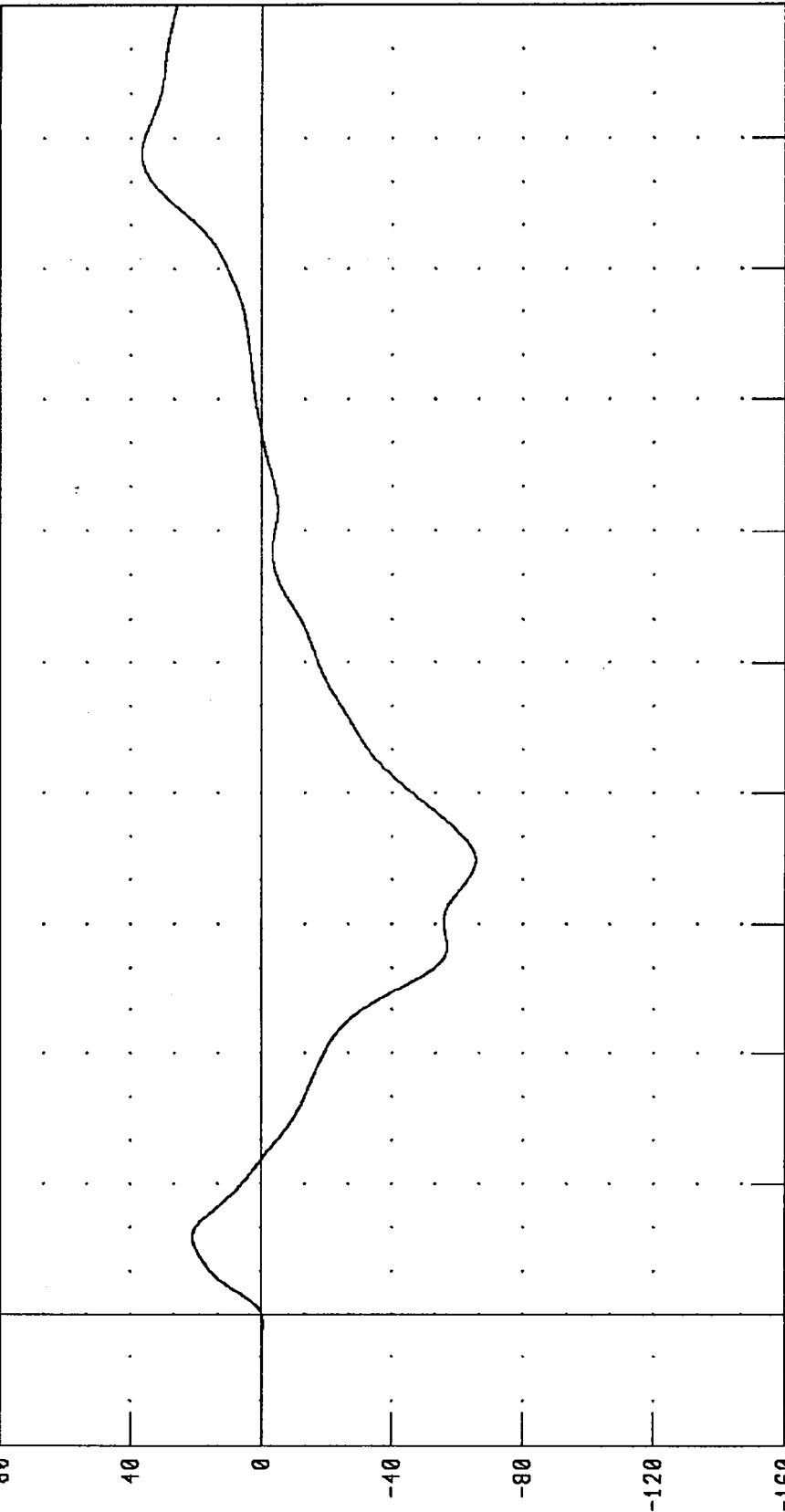
PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 35CINE1

572E SN35 NECK EXT. CAL01

RUN NUMBER: 112295.1435;1

80



TORQUE (N.M)

TIME (MS)

200

180

160

140

120

100

80

60

40

20

0

-20

-40

-60

-80

-100

-120

-140

-160

CHANNEL: NEKOM

FILTER: CH. CLASS 60

PEAK DATA: 36.57 N.M @ 177.68 MS; -65.59 N.M @ 69.76 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III

11-JUL-95

TRC INC.

TEST NO: 35C1TH1

572E SN35 H.S.THORAX CAL01

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

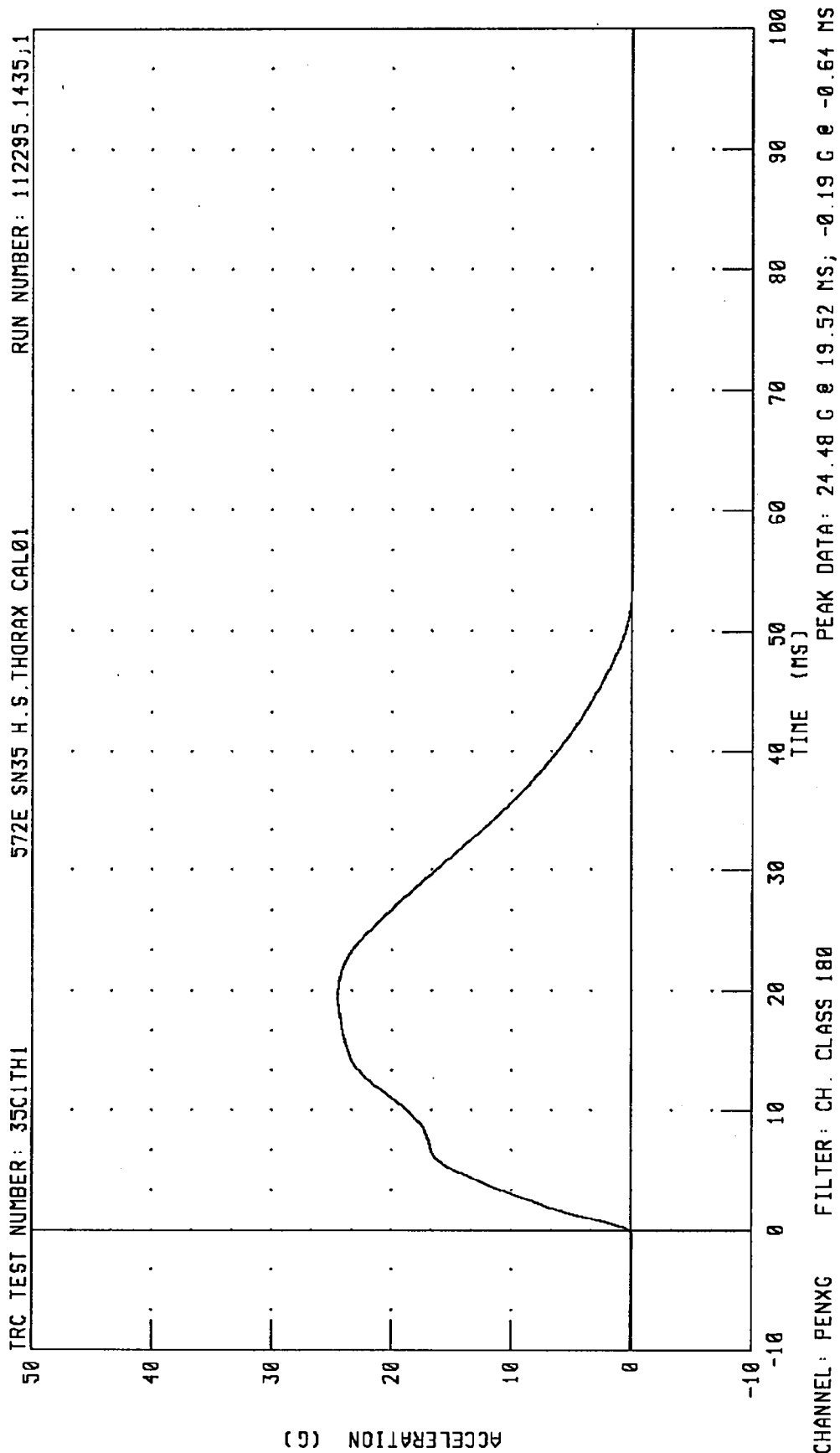
TEST MEETS SPECIFICATIONS

TECHNICIAN

Chas. M. Hildt

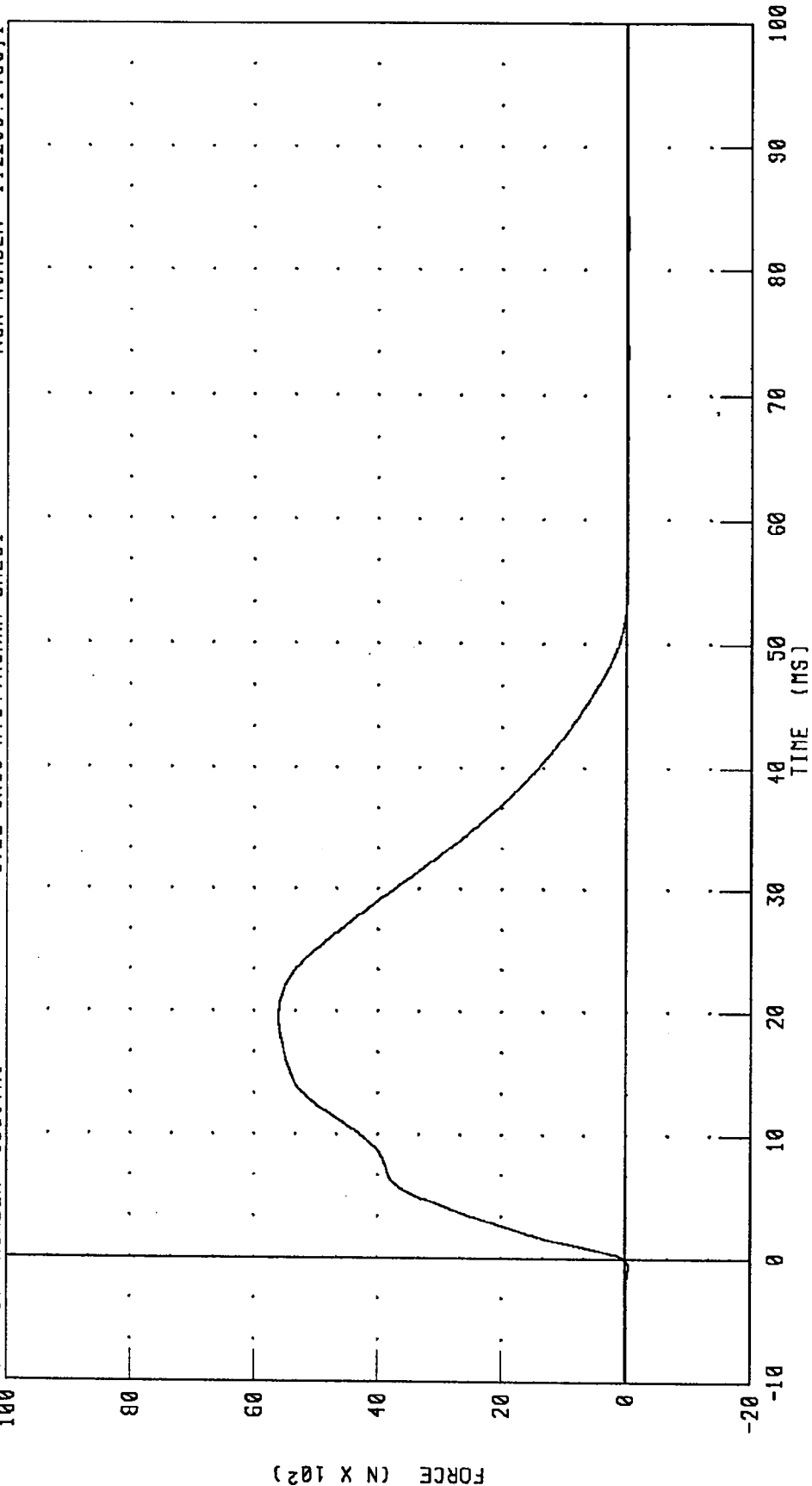
RUN NUMBER: 071195.1433;1

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION



PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM FORCE

TRC TEST NUMBER: 35C1TH1 572E SN35 H.S. THORAX CAL01 RUN NUMBER: 112295.143511



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

CHANNEL: PENXF FILTER: CH. CLASS 180

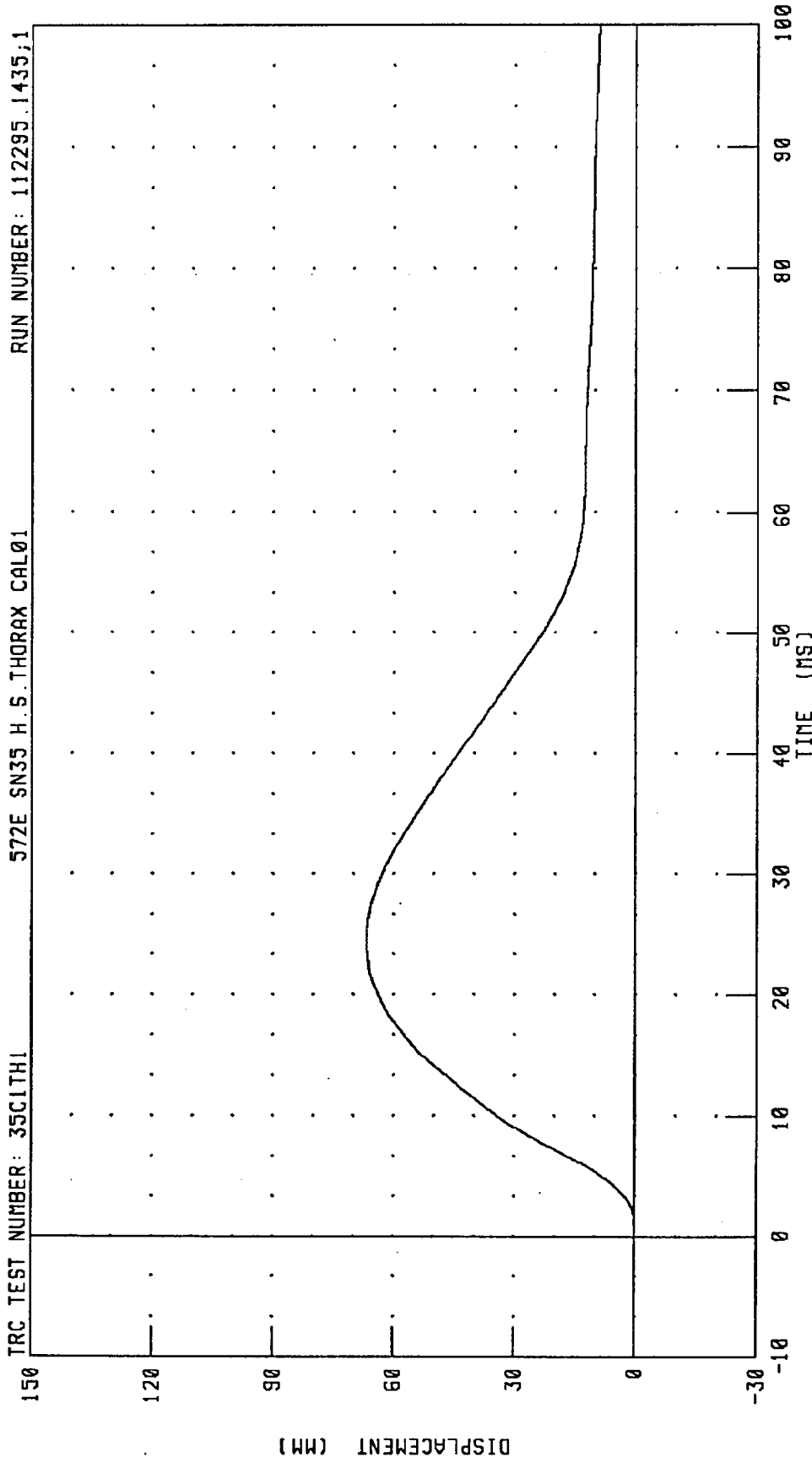
PART 572-E HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

TRC TEST NUMBER: 35C1TH1

572E SN35 H.S.THORAX CAL01

RUN NUMBER: 112295.1435;1



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

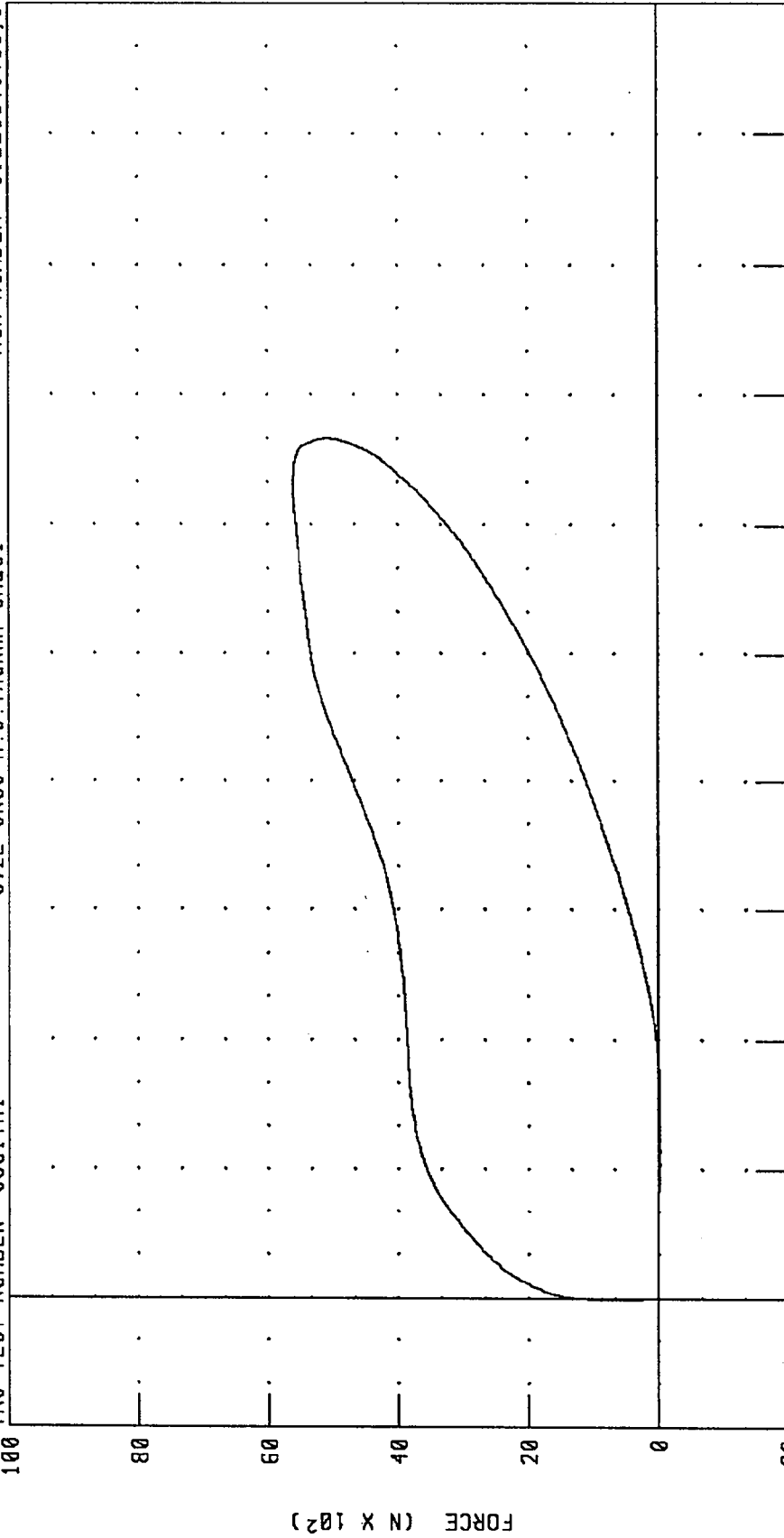
CHANNEL: CSTXD FILTER: CH. CLASS 180

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

TRC TEST NUMBER: 35C1TH1

572E SN35 H.S. THORAX CAL01

RUN NUMBER: 112295.1435.1



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

DISPLACEMENT (MM) PEAK DATA: 66.71 MM @ 24.64 MS; -0.05 MM @ 0.96 MS
5608.25 N @ 19.52 MS; -42.97 N @ -0.64 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III

11-JUL-95

TRC INC.

TEST NO: 35C1RK1

572E SN35 RIGHT KNEE CAL 01

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

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. M. Mittle

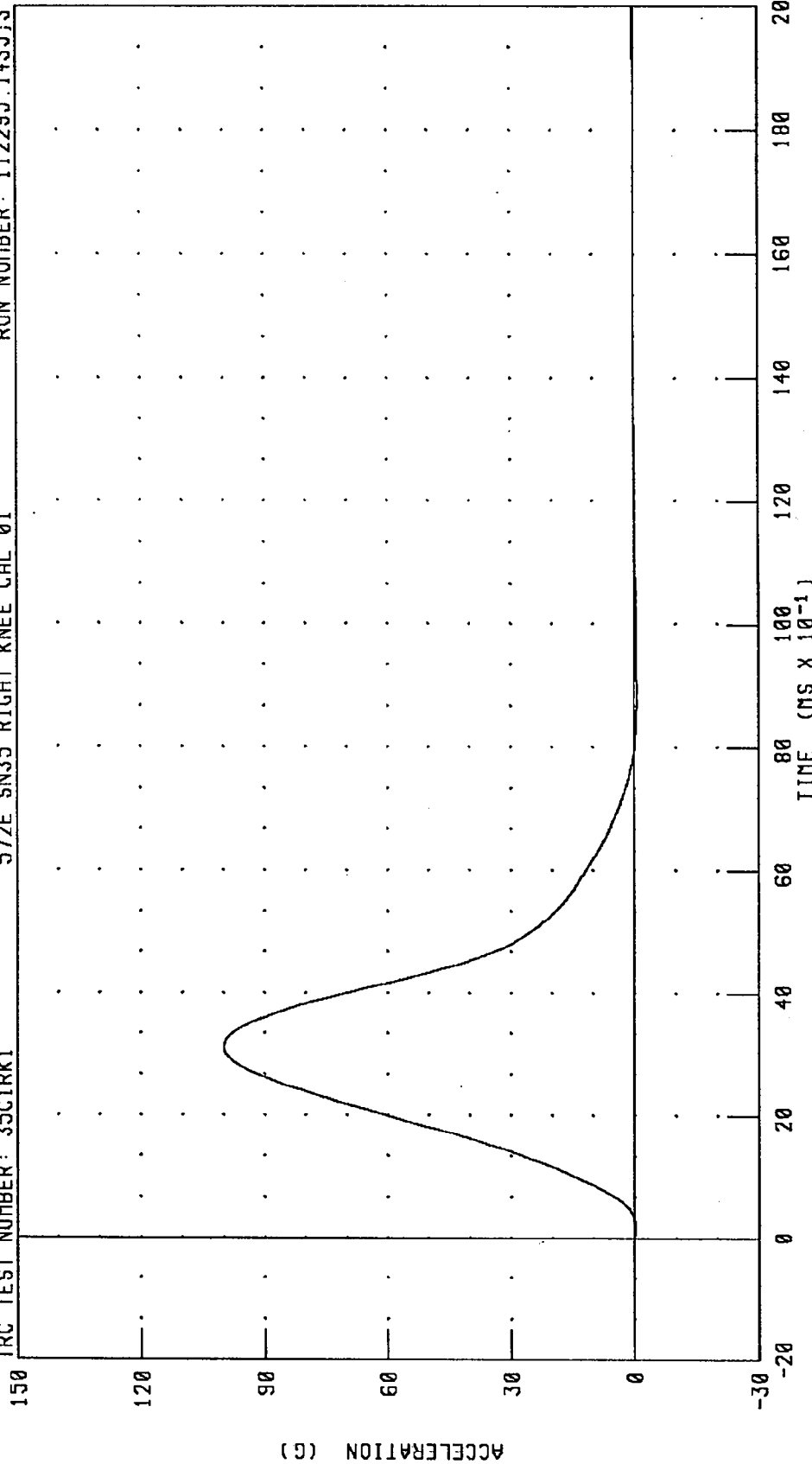
RUN NUMBER: 071195.1336;3

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

TRC TEST NUMBER: 35CIRK1

572E SN35 RIGHT KNEE CAL 01

RUN NUMBER: 112295.1435,3

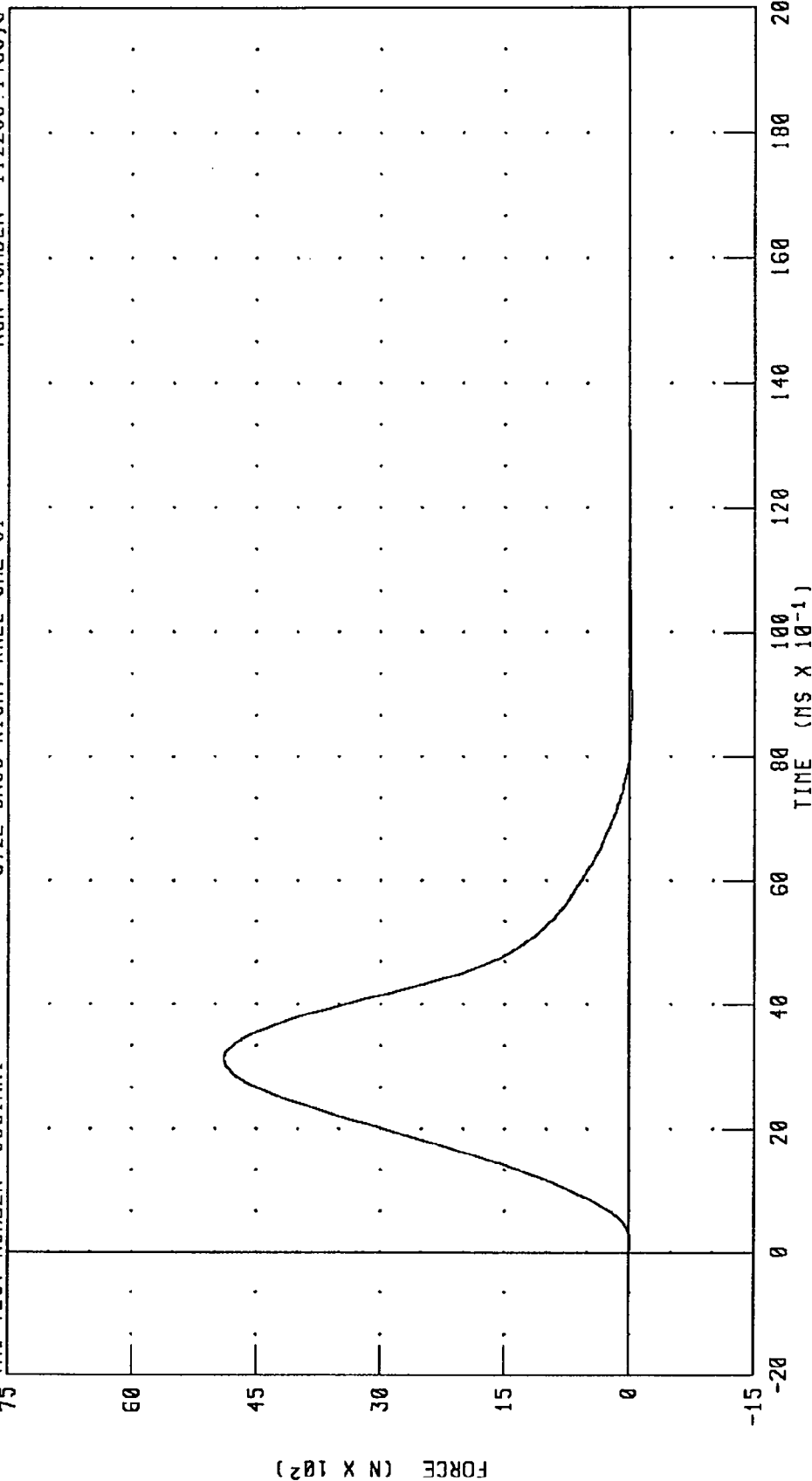


CHANNEL: PENXG FILTER: CH. CLASS 600

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

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

IRC TEST NUMBER: 35CIRK1 572E SN35 RIGHT KNEE CAL 01 RUN NUMBER: 112295.1435;3



PEAK DATA: 4893.61 N @ 3.12 MS; -31.34 N @ 8.88 MS

CHANNEL: PENXF FILTER: CH. CLASS 600

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 Chris. Mittel

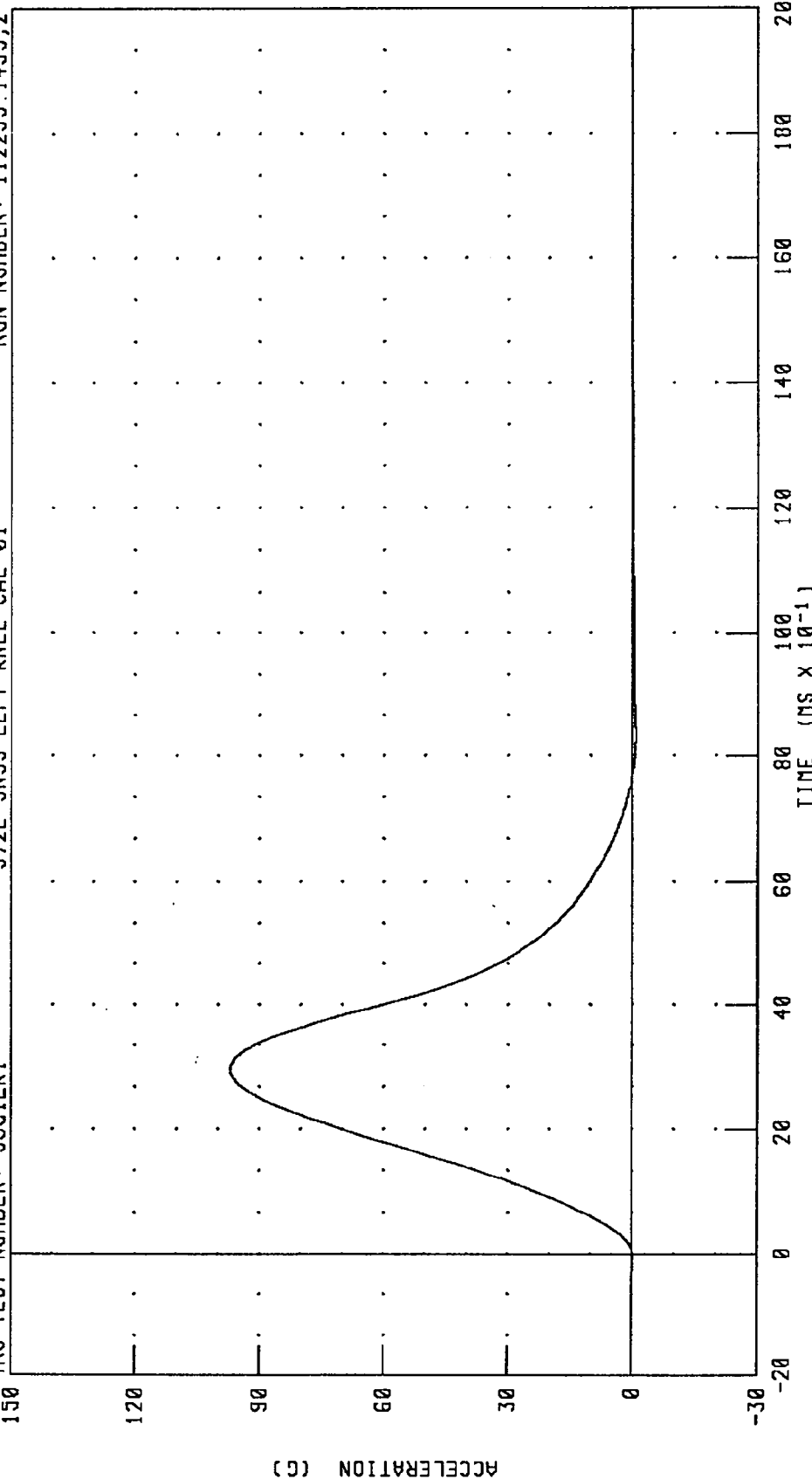
RUN NUMBER: 071195.1251;2

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: 112295.1435;2



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

CHANNEL: PENXG FILTER: CH. CLASS 600

PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

572E SN35 LEFT KNEE CAL 01

TRC TEST NUMBER: 35C1LK1

75

60

45

30

15

0

-15

TIME (NS X 10⁻¹)

80

100

120

140

160

180

200

PEAK DATA: 4747.92 N @ 2.96 MS; -42.49 N @ 8.32 MS

CHANNEL: PENXF

FILTER: CH. CLASS 600

9511110

C-35

9511110

9511110

9511110

9511110

9511110

9511110

9511110

9511110

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

Chas. M. Middle

RUN NUMBER: 071295.1424

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III

11-JUL-95

TRC INC.

TEST NO: 34C1HD1

572E SN34 HEAD DROP CAL 01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	63.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	252.75 G
PEAK LATERAL ACCELERATION	15 G MAX	3.52 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN Char. M. Milt

RUN NUMBER: 071195.0807;1

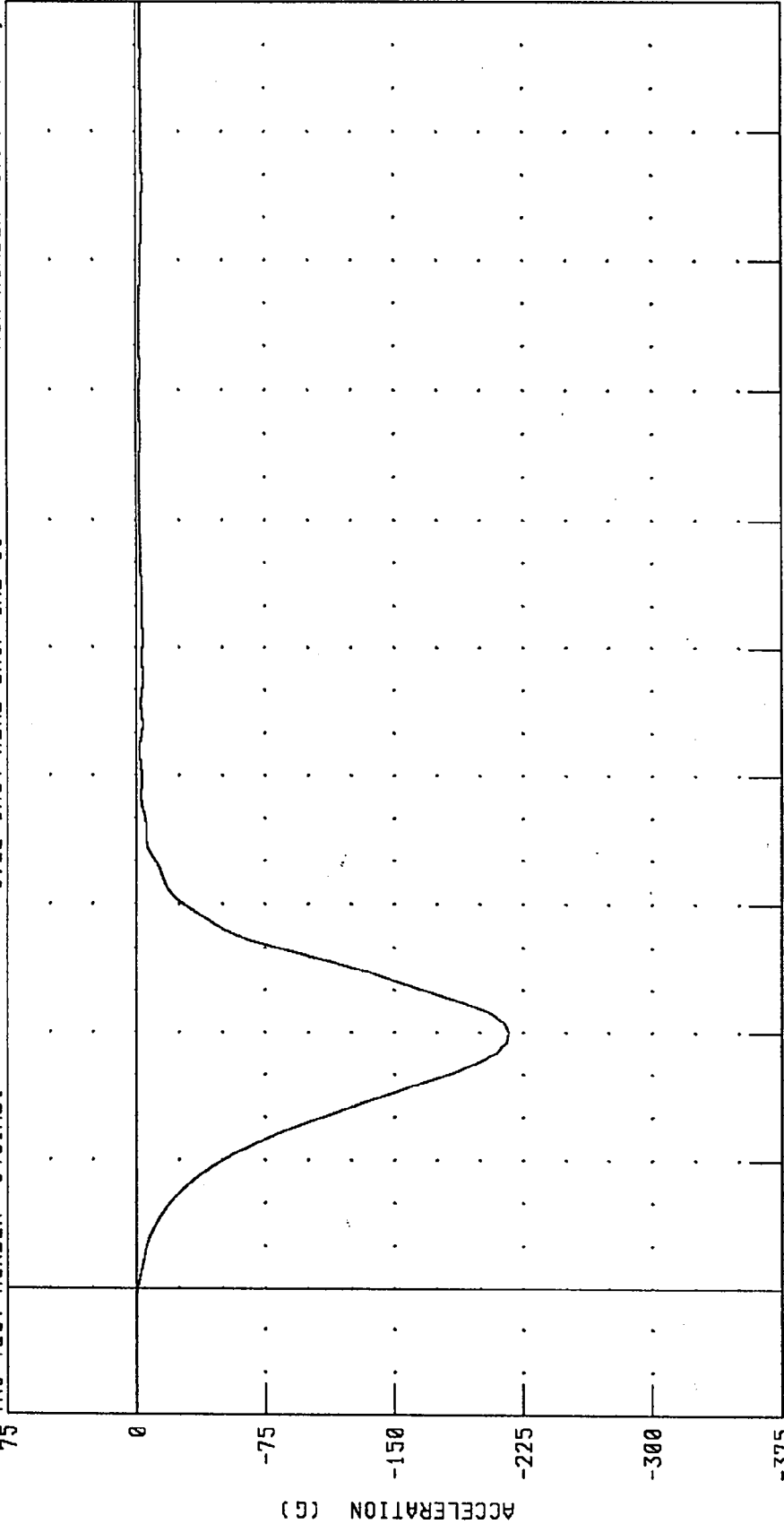
PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION X AXIS

TRC TEST NUMBER: 34CIHD01

572E SN34 HEAD DROP CAL 01

RUN NUMBER: 112295.144L;1

75

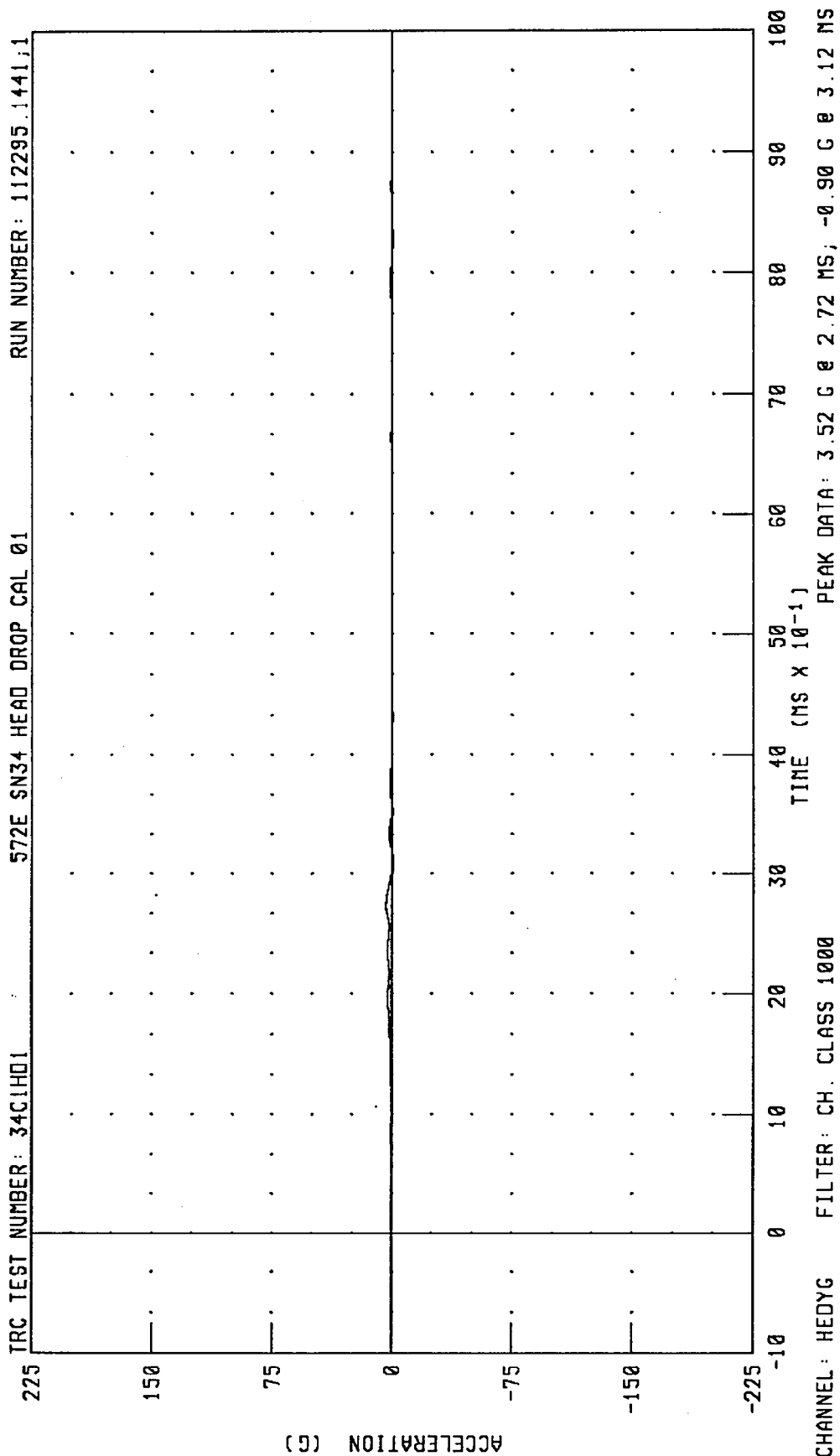


TIME (MS X 10⁻¹)

PEAK DATA: 0.23 G @ -0.56 MS; -216.87 G @ 2.00 MS

CHANNEL: HEDXC FILTER: CH. CLASS 1000

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



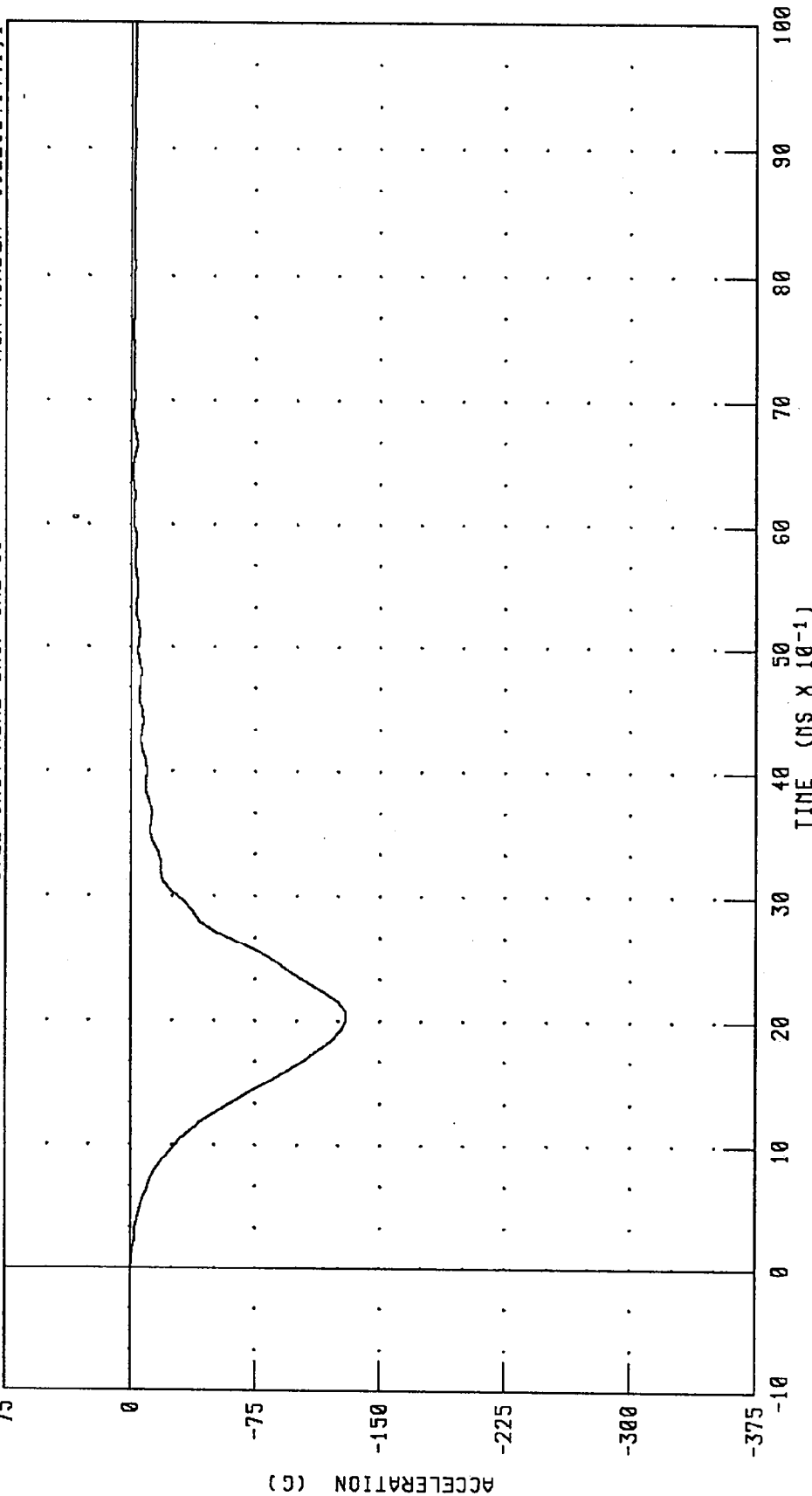
CHANNEL: HEDYG FILTER: CH. CLASS 1000

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

TRC TEST NUMBER: 34CIHQ1

572E SN34 HEAD DROP CAL 01

RUN NUMBER: 112295.1441;1



PEAK DATA: 0.08 G @ -0.88 MS; -129.78 G @ 2.00 MS

CHANNEL: HEDZG FILTER: CH. CLASS 1000

PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: 34C1H01 RUN NUMBER: 112295.1441;1

572E SN34 HEAD DROP CAL 01

375

300

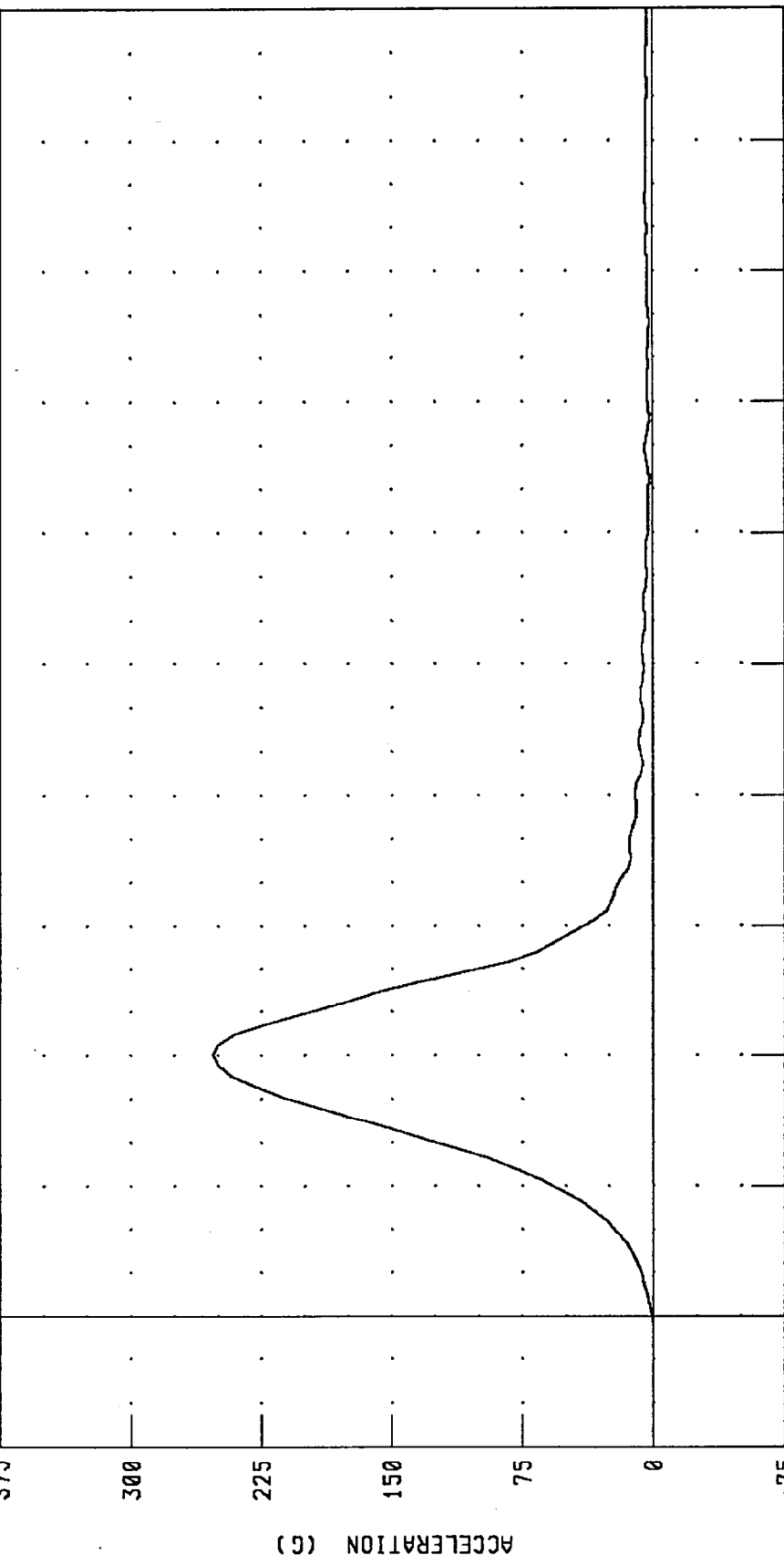
225

150

75

0

-75



PEAK DATA: 252.75 G @ 2.00 MS; 0.07 G @ -0.08 MS

TIME (MS X 10⁻¹)

30

40

50

60

70

80

90

100

CHANNEL: HEDRG

FILTER: CH. CLASS 1000

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

HYBRID III

11-JUL-95

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

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

Chas. M. Jell

RUN NUMBER: 071195.1004;1

PART 572-E HYBRID III NECK FLEXION CALIBRATION
 PENDULUM DECELERATION

IRC TEST NUMBER: 34CINF1

572E SN34 NECK FLEXION CAL01

RUN NUMBER: 112295.1441;1

400

320

ACCELERATION (G X 10⁻¹)

240

160

80

0

-80

200

180

160

140

120

100

80

60

40

20

0

-20

TIME (MS)

CHANNEL: PENXG FILTER: CH. CLASS 60

PEAK DATA: 23.79 G @ 8.80 MS; -2.85 G @ 44.48 MS

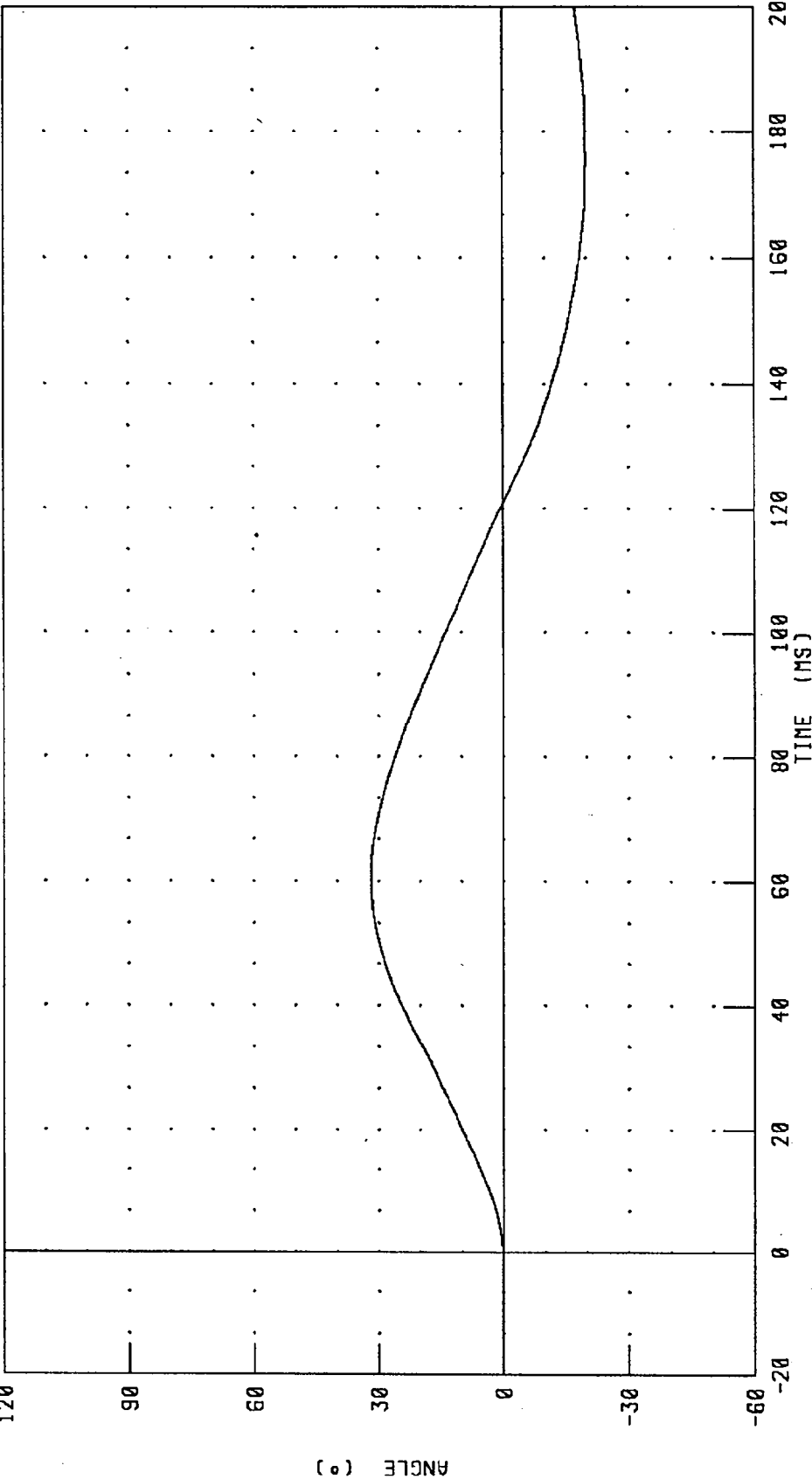
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN34 NECK FLEXION CAL01

TRC TEST NUMBER: 34CINF1

RUN NUMBER: 112295.1441,1



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

CHANNEL: BETA FILTER: CH. CLASS 60

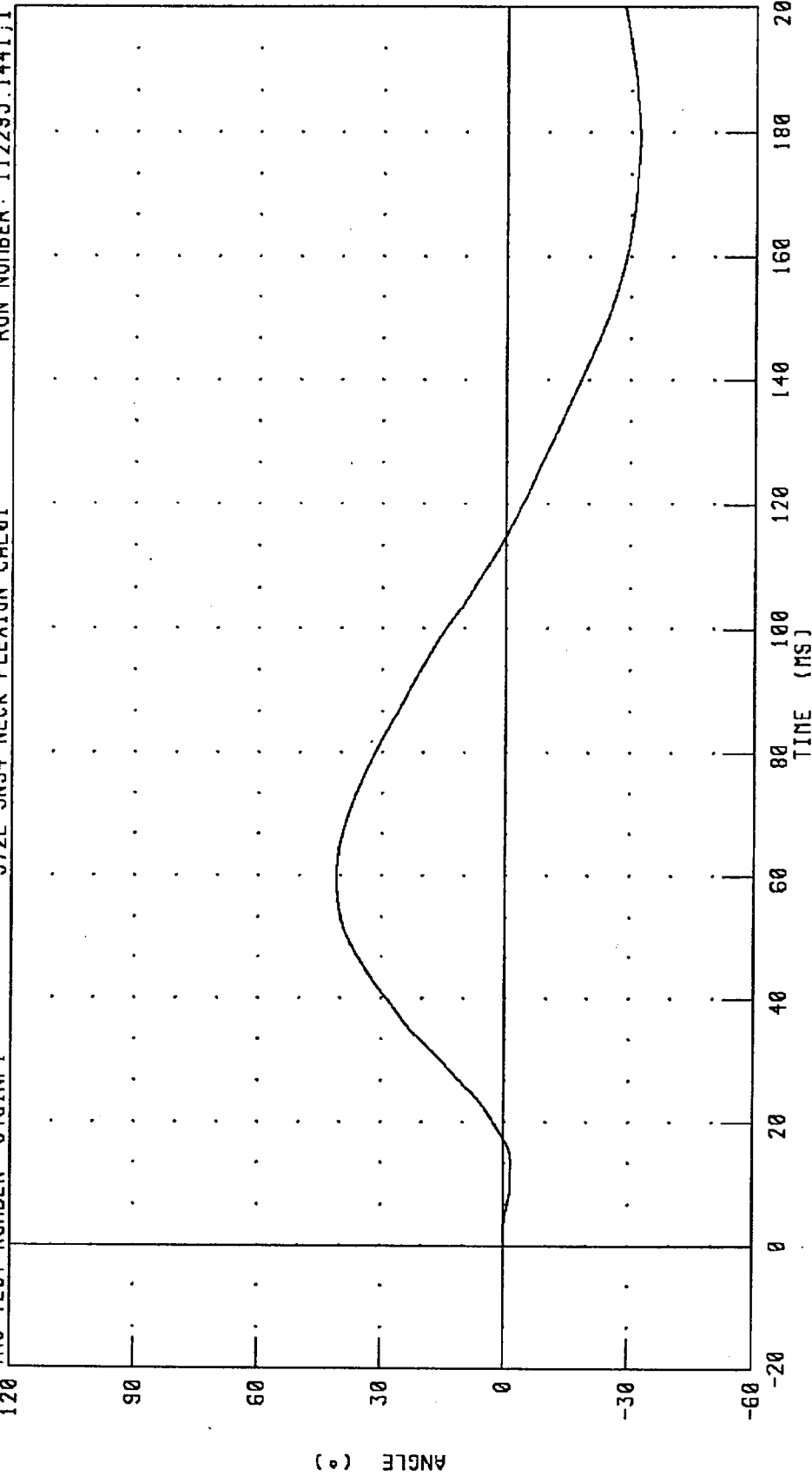
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 34CINF1

572E SN34 NECK FLEXION CAL01

RUN NUMBER: 112295.1441j1



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

CHANNEL: THETA FILTER: CH. CLASS 60

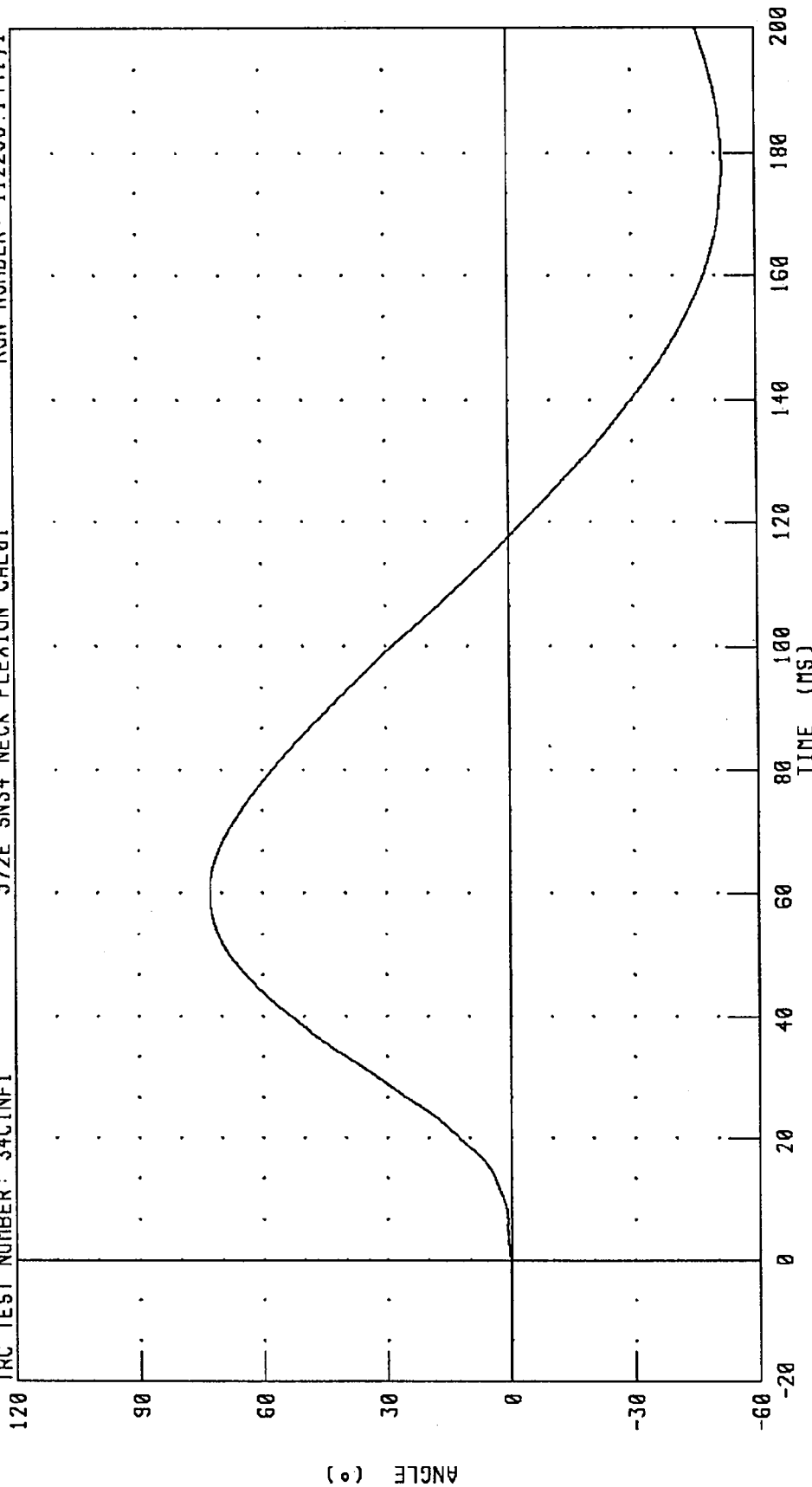
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 34CINF1

572E SN34 NECK FLEXION CAL01

RUN NUMBER: 112295.1441;1



CHANNEL: TOTAL FILTER: CH. CLASS 60

PEAK DATA: 72.73 ° @ 60.24 MS; -51.93 ° @ 177.44 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 34CINF1

572E SN34 NECK FLEXION CAL01

RUN NUMBER: 112295.1441,1

160

120

80

40

0

-40

-80

FORCE (N X 10¹)

TIME (MS)

200

180

160

140

120

100

80

60

40

20

0

-20

PEAK DATA: 832.72 N @ 46.80 MS; -192.96 N @ 169.52 MS

FILTER: CH. CLASS 60

CHANNEL: NEKXF

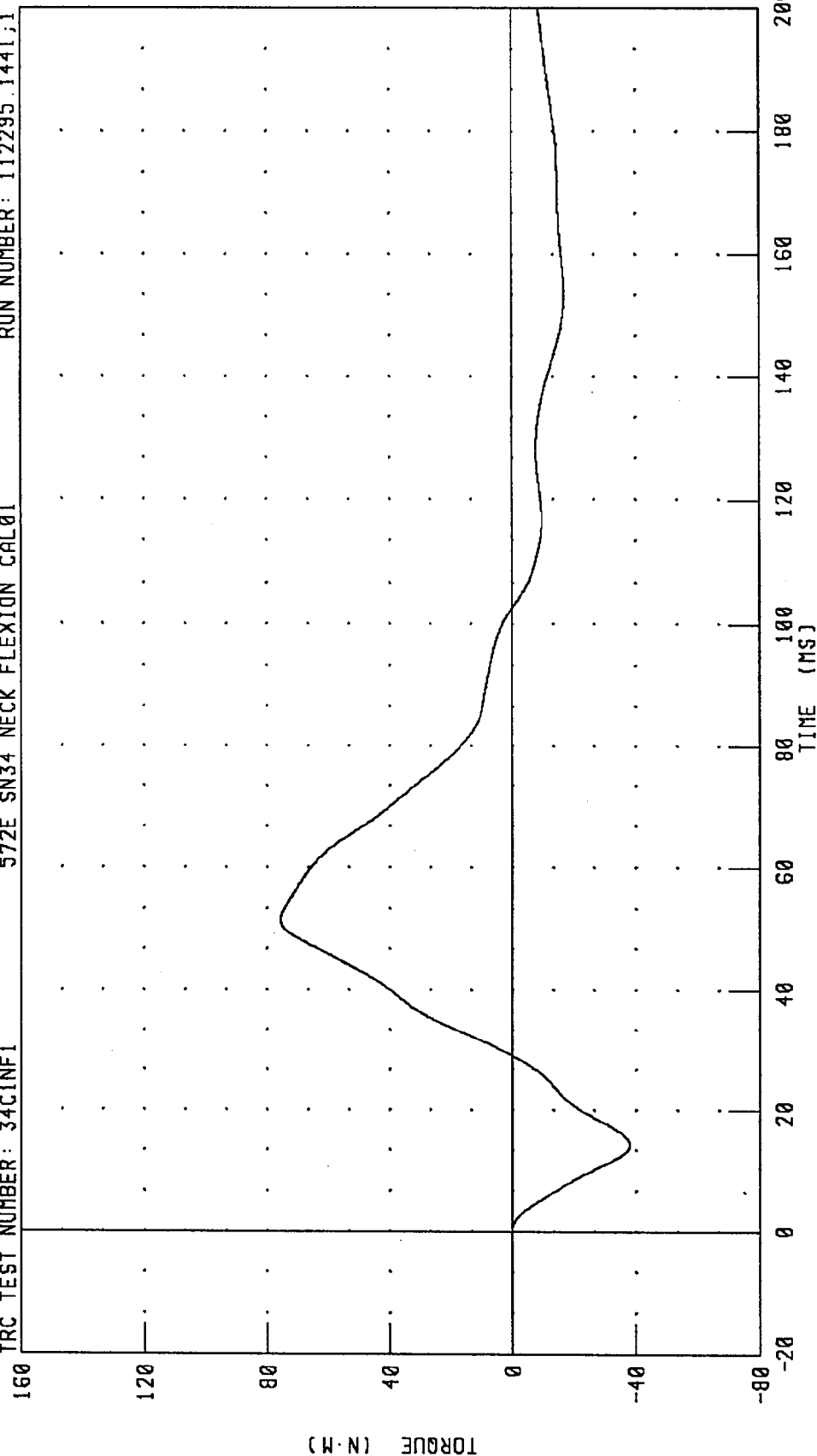
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 34C1NF1

572E SN34 NECK FLEXION CAL01

RUN NUMBER: 112295.144L;1

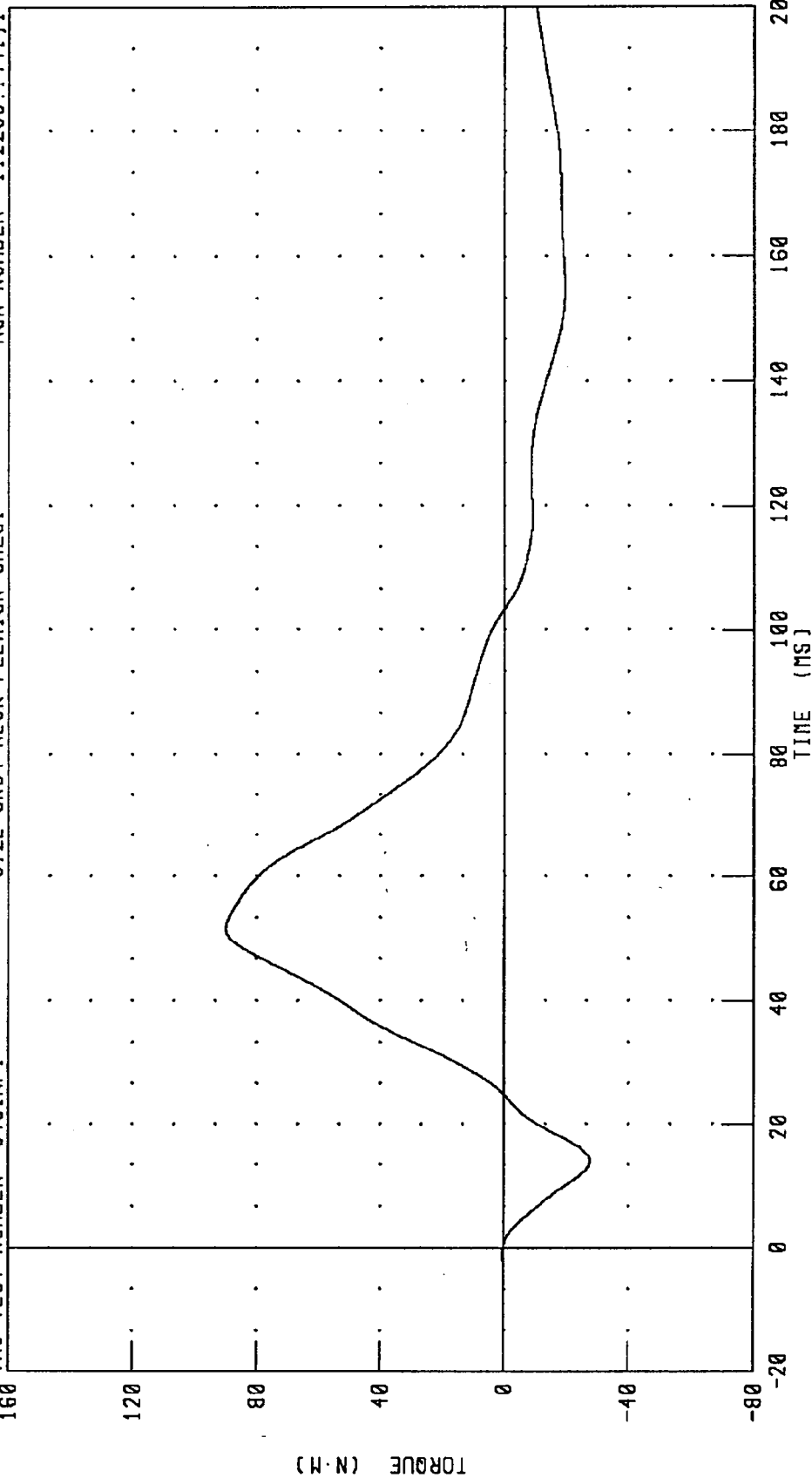


PEAK DATA: 75.60 N·M @ 51.52 MS; -37.99 N·M @ 14.32 MS

CHANNEL: NEKYM FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 34CINF1 572E SN34 NECK FLEXION CAL01 RUN NUMBER: 112295.1441,1



PEAK DATA: 90.00 N·M @ 51.60 MS; -27.68 N·M @ 14.00 MS

CHANNEL: NEKOM FILTER: CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

HYBRID III

11-JUL-95

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

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

TEST MEETS SPECIFICATIONS

TECHNICIAN Ch. M. Smith

RUN NUMBER: 071195.1058;2

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 34CINE1

572E SN34 NECK EXT. CAL01

RUN NUMBER: 112295.1441;2

400

320

ACCELERATION (G X 10⁻¹)

240

160

80

0

-80

200

TIME (MS)

180

160

140

120

100

80

60

40

20

0

-20

PEAK DATA: 18.74 G @ 8.80 MS; -2.54 G @ 46.08 MS

FILTER: CH. CLASS 60

CHANNEL: PENXG

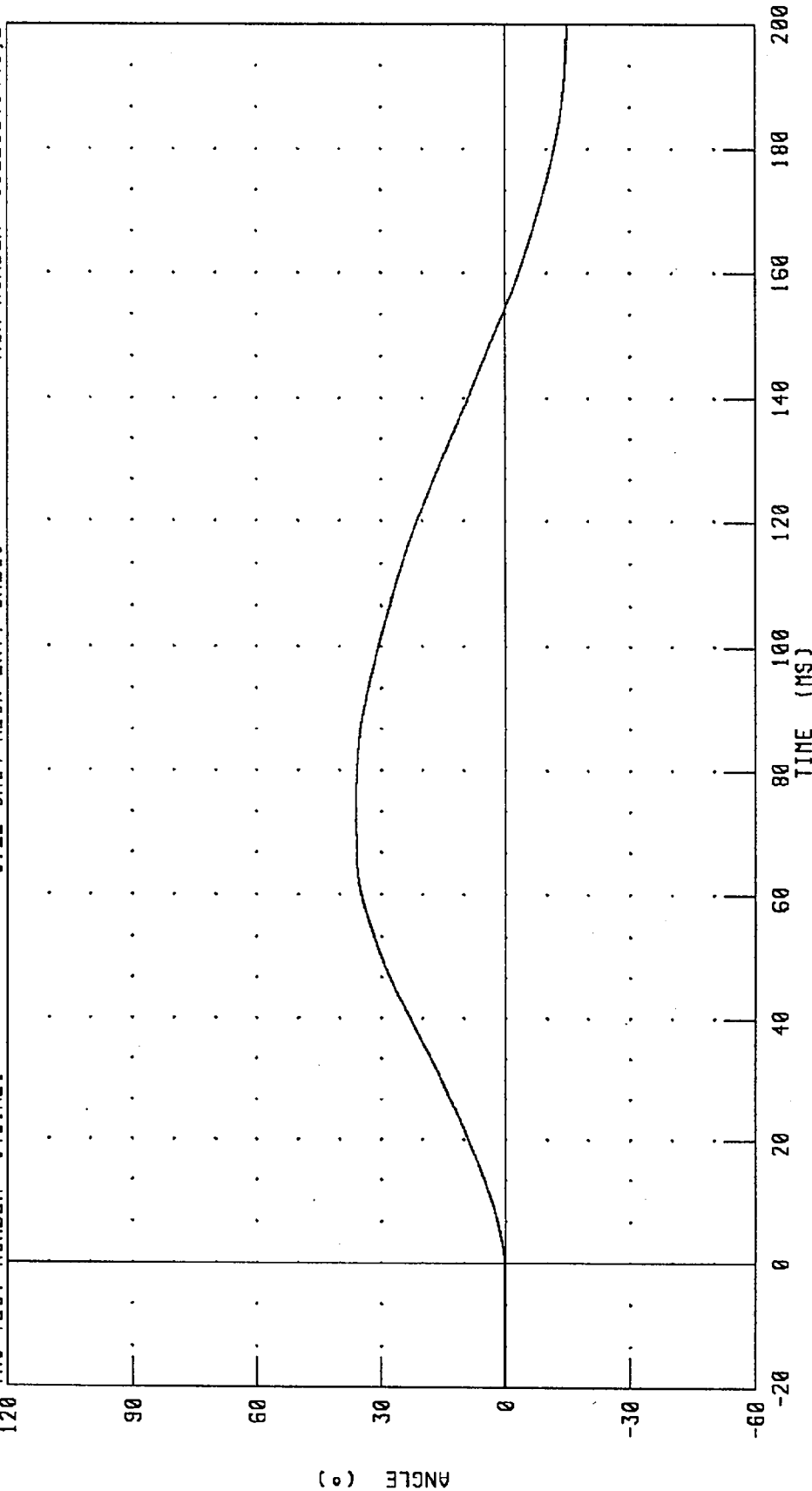
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 34CINEL

572E SN34 NECK EXT. CAL01

RUN NUMBER: 112295.1441;2



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

FILTER: CH. CLASS 60

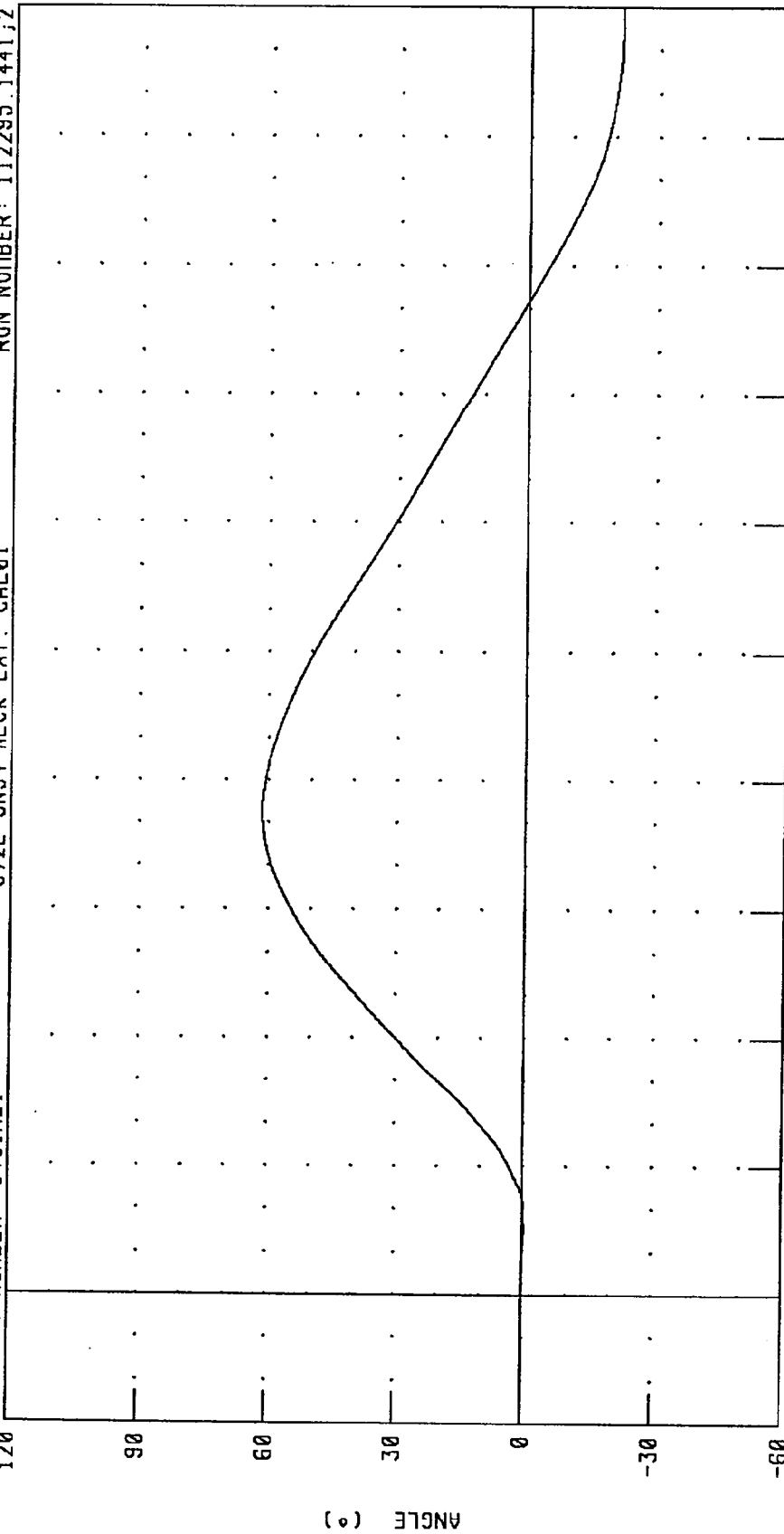
CHANNEL: BETA

ANGLE (°)

TIME (MS)

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

IRC TEST NUMBER: 34CINE1 572E SN34 NECK EXT. CAL01 RUN NUMBER: 112295.1441;2



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

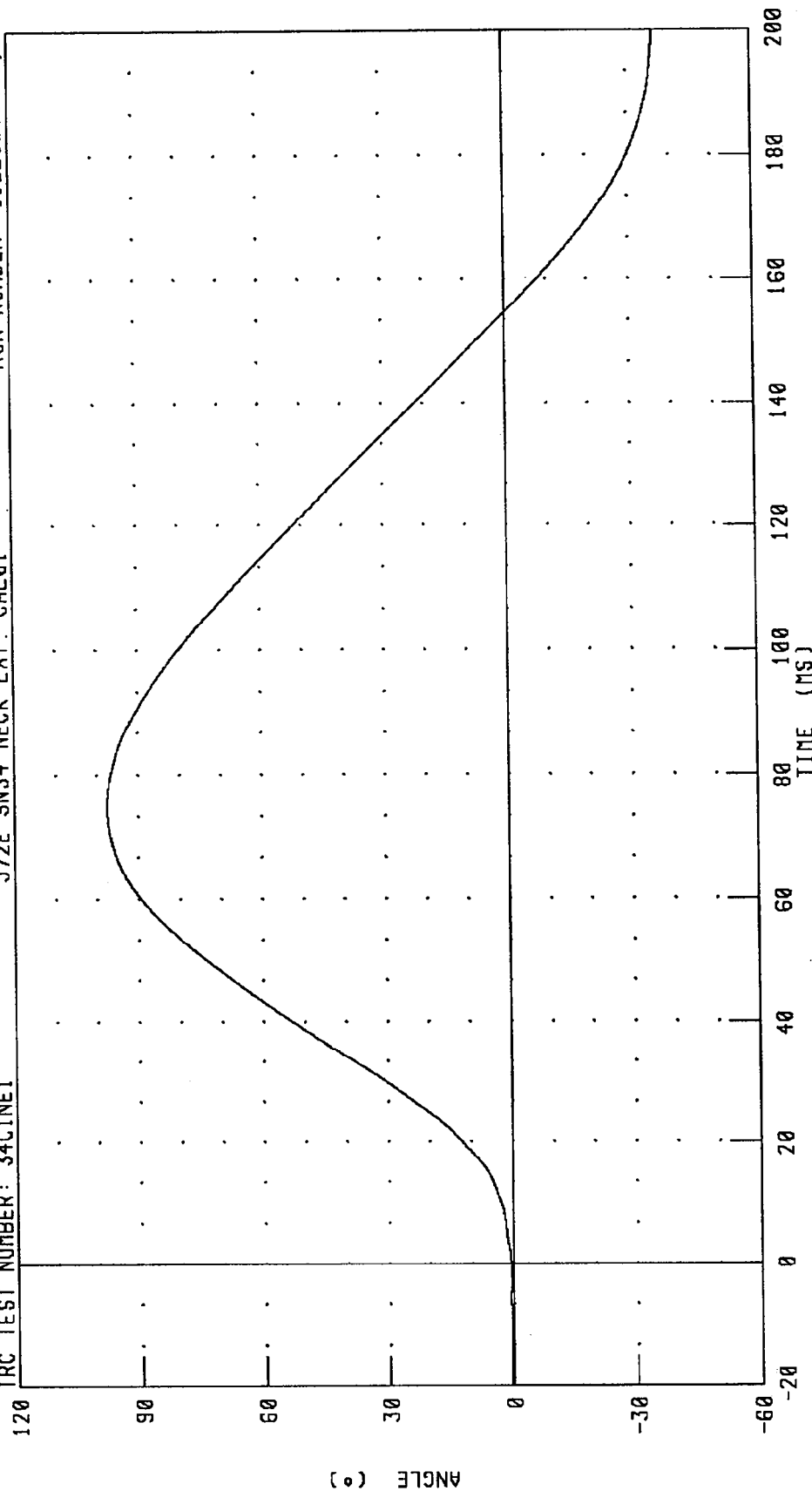
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 34CINE1

572E SN34 NECK EXT. CAL01

RUN NUMBER: 112295.1441.2



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

CHANNEL: TOTAL FILTER: CH. CLASS 60

ANGLE (°)

TIME (MS)

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 34C1NE1

572E SN34 NECK EXT. CAL01

RUN NUMBER: 112295.1441;2

80

40

0

-40

-80

-120

-160

FORCE (N X 10¹)

200

180

160

140

120

100

80

60

40

20

0

-20

TIME (MS)

PEAK DATA: 242.60 N @ 188.08 MS, -581.96 N @ 66.08 MS

FILTER: CH. CLASS 60

CHANNEL: NEKXF

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 34CINE1

572E SN34 NECK EXT. CAL01

RUN NUMBER: 112295.1441,2

80



TORQUE (N-M)

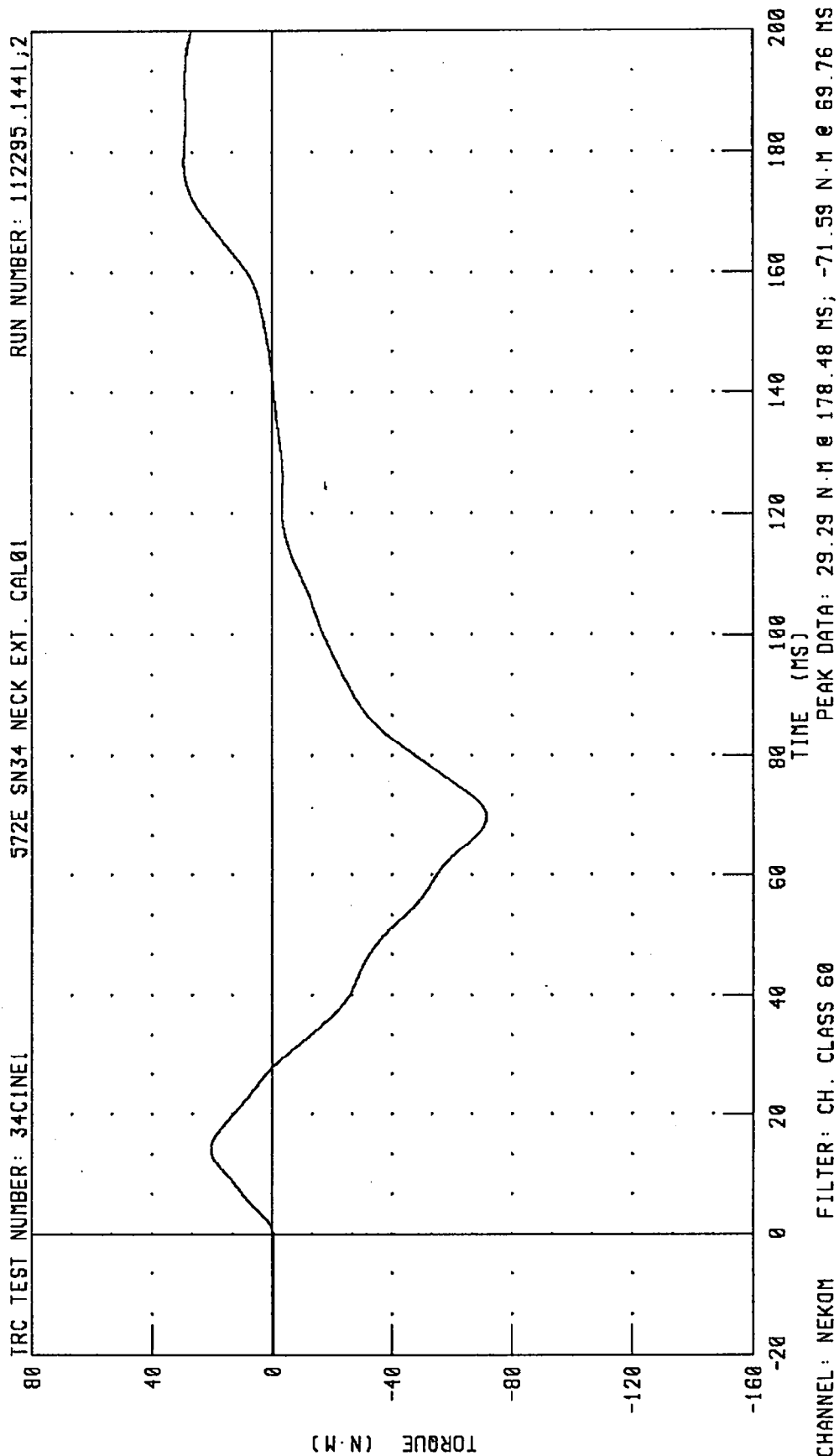
TIME (MS)

PEAK DATA: 25.59 N-M @ 177.36 MS; -61.48 N-M @ 69.84 MS

CHANNEL: NEKYM FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 34CINE1 572E SN34 NECK EXT. CAL01 RUN NUMBER: 112295.1441;2



CHANNEL: NEKOM FILTER: CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III

11-JUL-95

TRC INC.

TEST NO: 34C1TH1

572E SN34 H.S.THORAX CAL01

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.2 DEG. C
RELATIVE HUMIDITY	10 - 70 %	63.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.65 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	66.4 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5532. N
INTERNAL HYSTERESIS	69% - 85%	73.5%

TEST MEETS SPECIFICATIONS

TECHNICIAN

Chas. M. Smith

RUN NUMBER: 071195.1502;1

PART 572-E HYBRID III THORAX CALIBRATION
 PENDULUM DECELERATION

TRC TEST NUMBER: 34C1TH1

572E SN34 H.S. THORAX CAL01

RUN NUMBER: 112295.1441.1

50

40

30

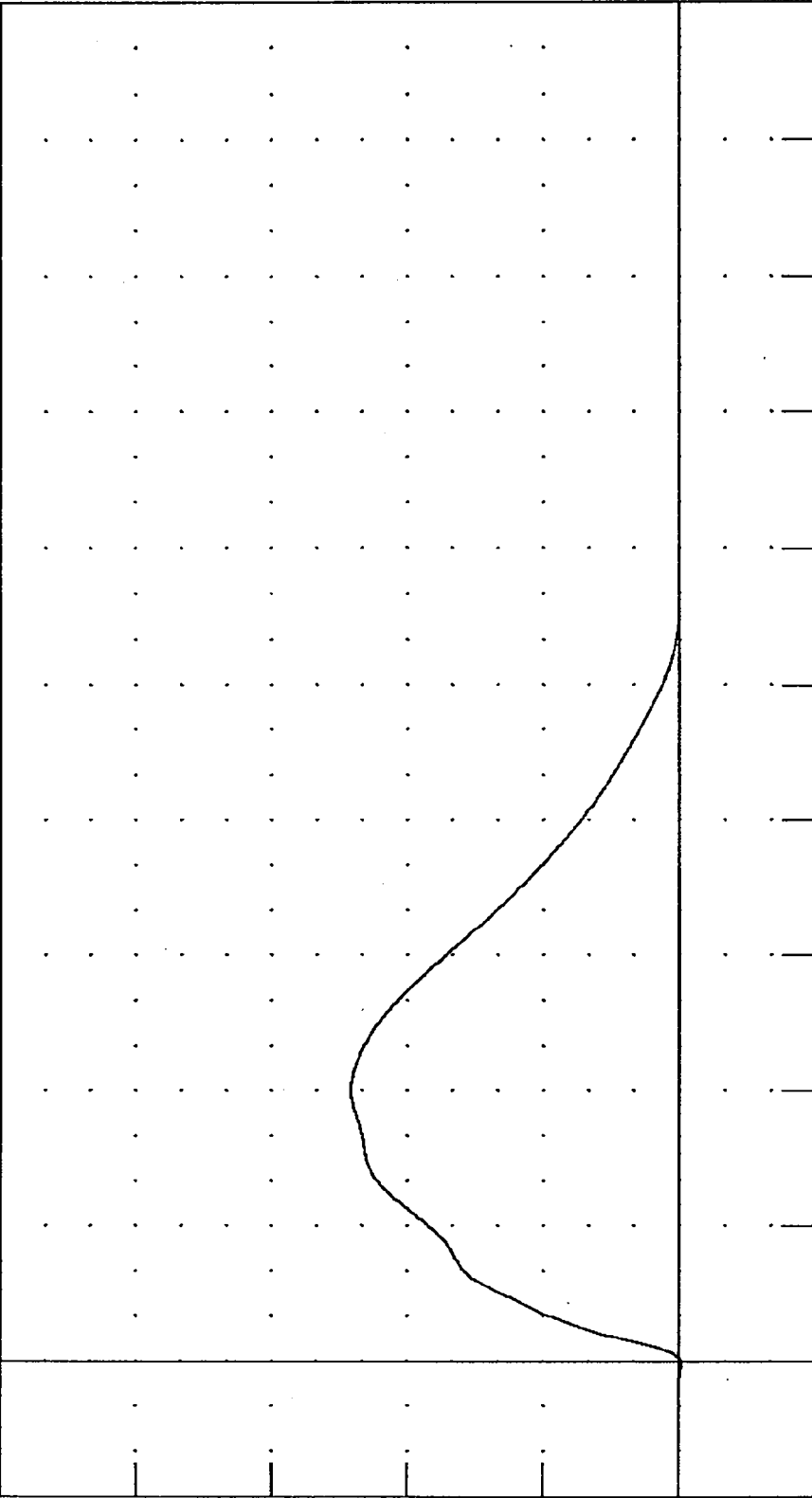
20

10

0

-10

ACCELERATION (G)



-10

0

10

20

30

40

50

60

70

80

90

100

TIME (MS)

CHANNEL: PENXG

FILTER: CH. CLASS 180

PEAK DATA: 24.15 G @ 20.08 MS; -0.13 G @ -0.24 MS

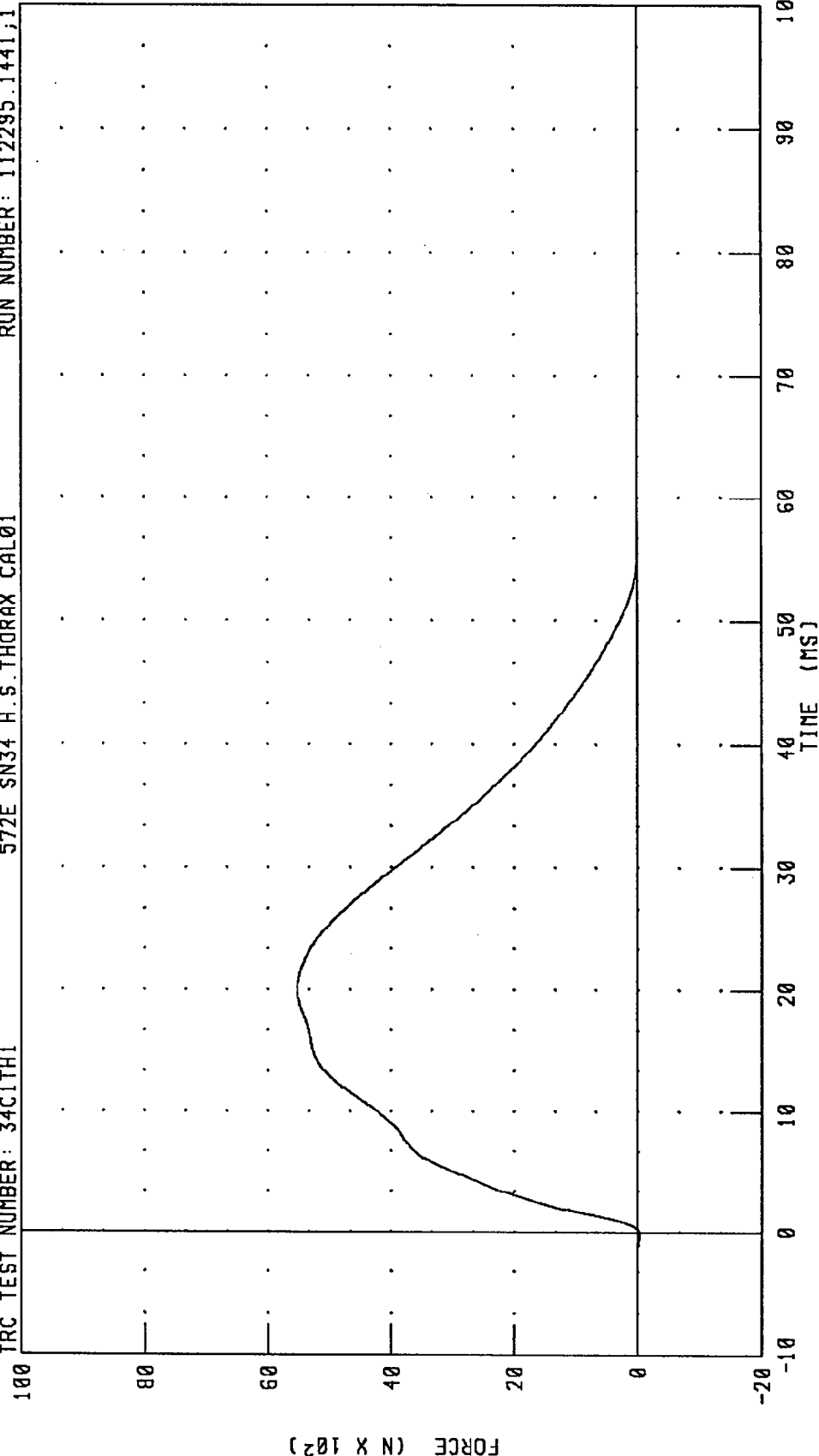
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM FORCE

572E SN34 H.S.THORAX CAL01

IRC TEST NUMBER: 34CITH1

RUN NUMBER: 112295.1441;1

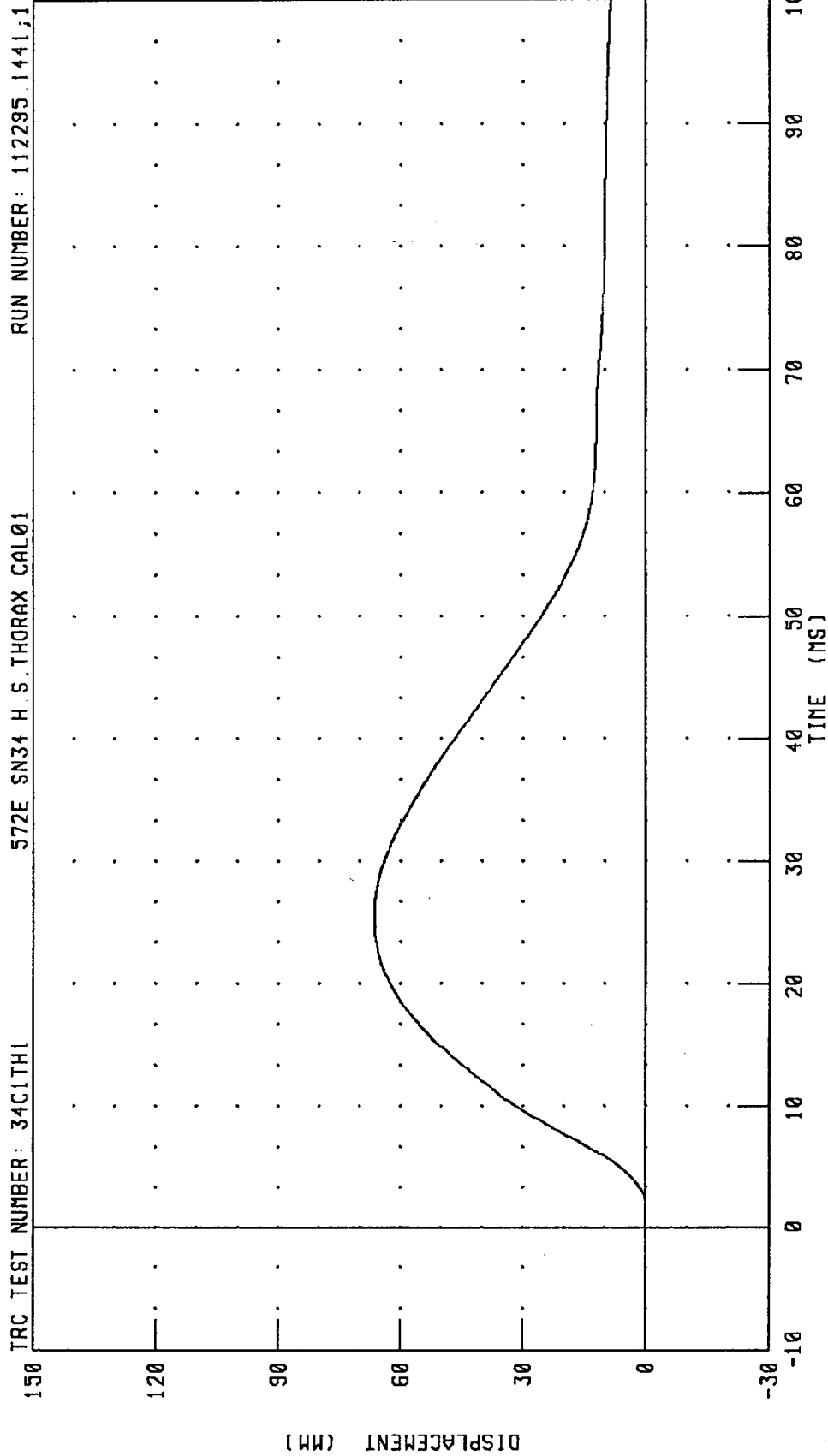


PEAK DATA: 5532.43 N @ 20.08 MS; -28.67 N @ -0.24 MS

CHANNEL: PENXF FILTER: CH. CLASS 180

PART 572-E HYBRID III THORAX CALIBRATION
STERNUM DISPLACEMENT

TRC TEST NUMBER: 34C1TH1 572E SN34 H.S. THORAX CAL01 RUN NUMBER: 112295.1441;1



PEAK DATA: 66.46 MM @ 25.36 MS; -0.05 MM @ 1.52 MS

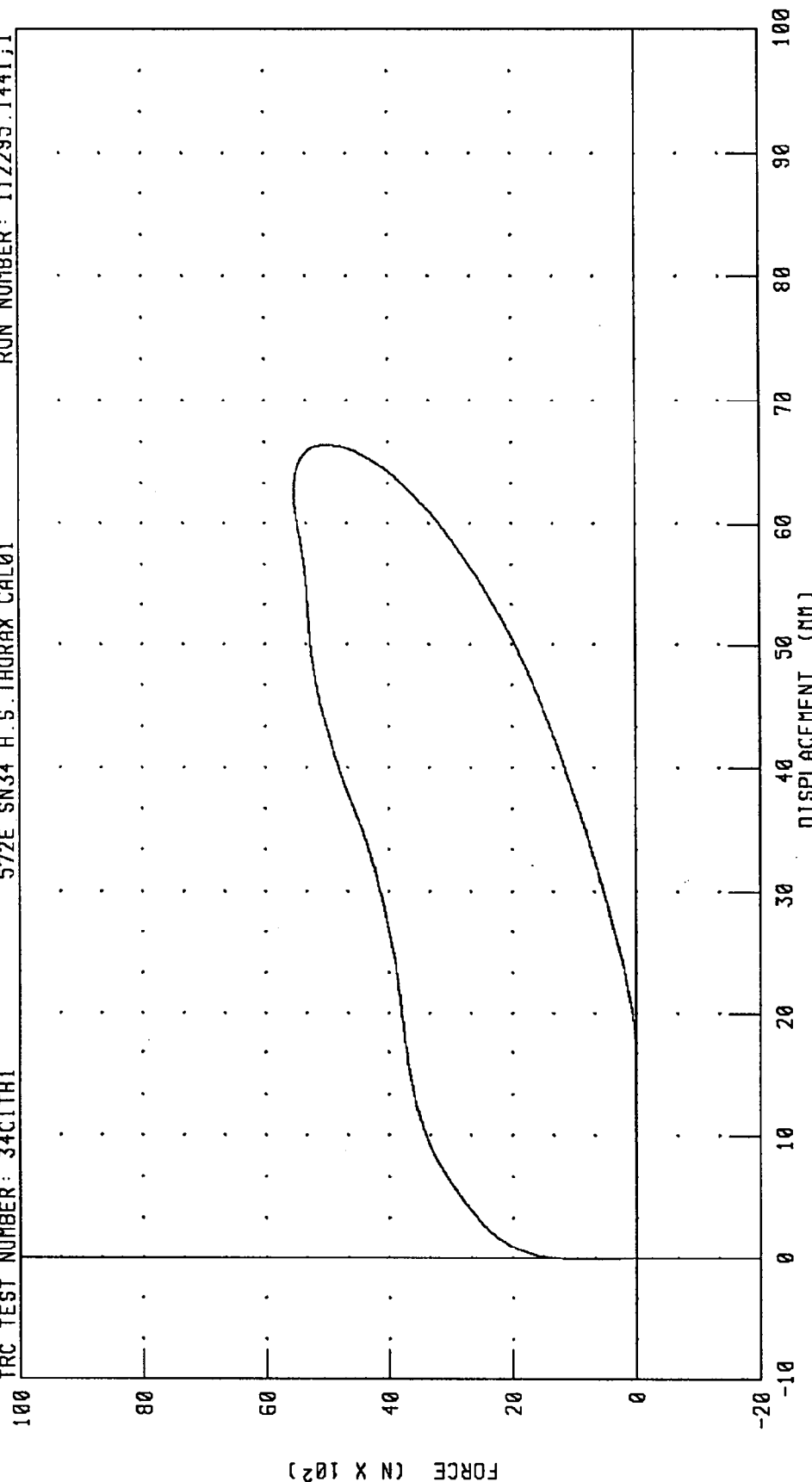
CHANNEL: CSTXD FILTER: CH. CLASS 180

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

TRC TEST NUMBER: 34CITH1

572E SN34 H.S. THORAX CAL01

RUN NUMBER: 112295.1441,1



CHANNEL: CSTXD
PENXF

FILTER: CH. CLASS 180
CH. CLASS 180

PEAK DATA: 66.46 MM @ 25.36 MS;
5532.43 N @ 20.08 MS;

-0.05 NM @ 1.52 MS
-28.67 N @ -0.24 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III

11-JUL-95

TRC INC.

TEST NO: 34C1RK1

572E SN34 RIGHT KNEE CAL 01

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

TEST MEETS SPECIFICATIONS

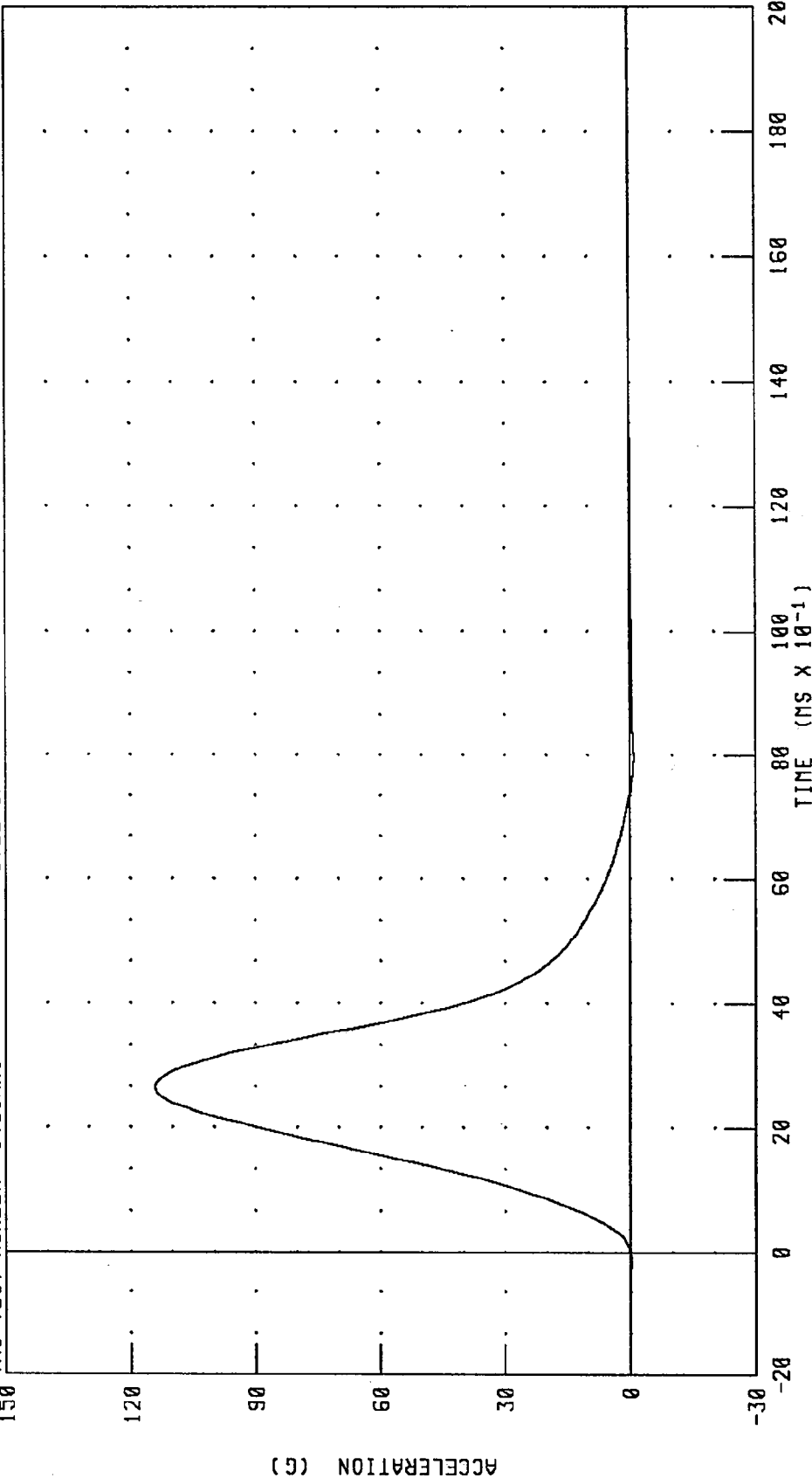
TECHNICIAN

Char. M. J. Holt

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: 112295.1441,1



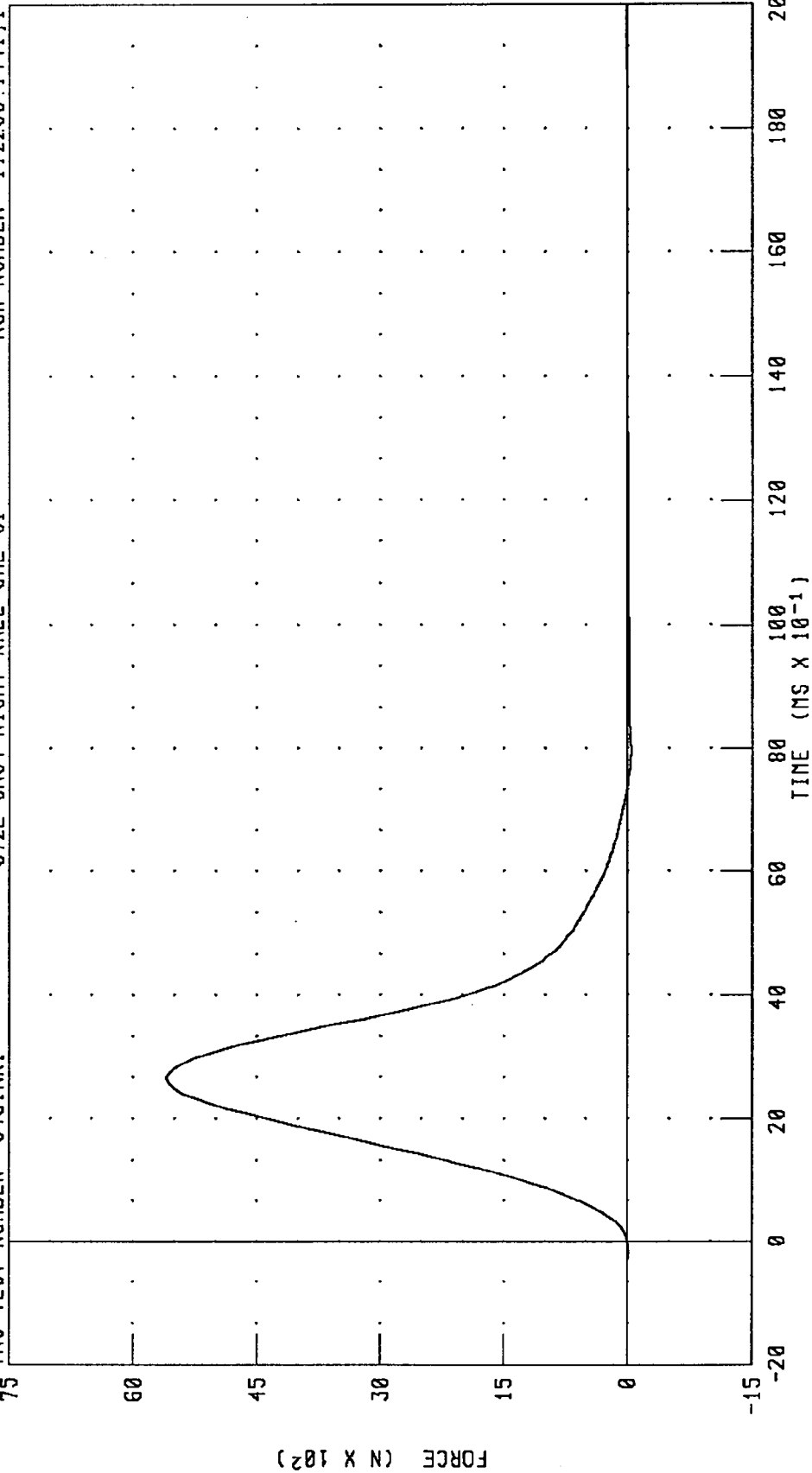
PEAK DATA: 114.23 G @ 2.64 MS; -0.86 G @ 7.92 MS

CHANNEL: PENXG FILTER: CH. CLASS 600

PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 34CIRK1 572E SN34 RIGHT KNEE CAL 01 RUN NUMBER: 112295.1441;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

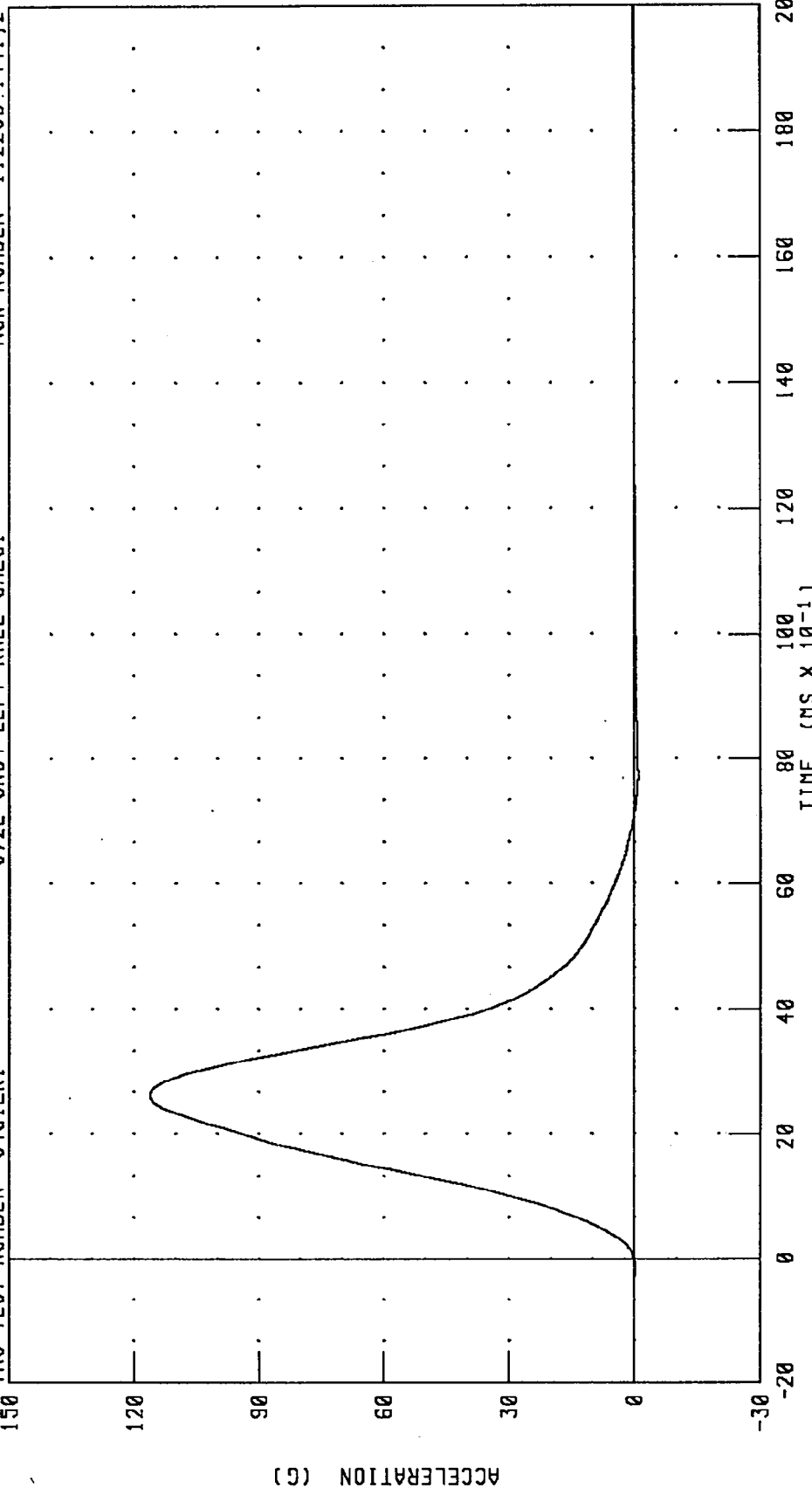
TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Millh

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: 112295.1441;2



CHANNEL: PENXC FILTER: CH. CLASS 600

PEAK DATA: 116.17 G @ 2.64 MS; -0.84 G @ 7.68 MS

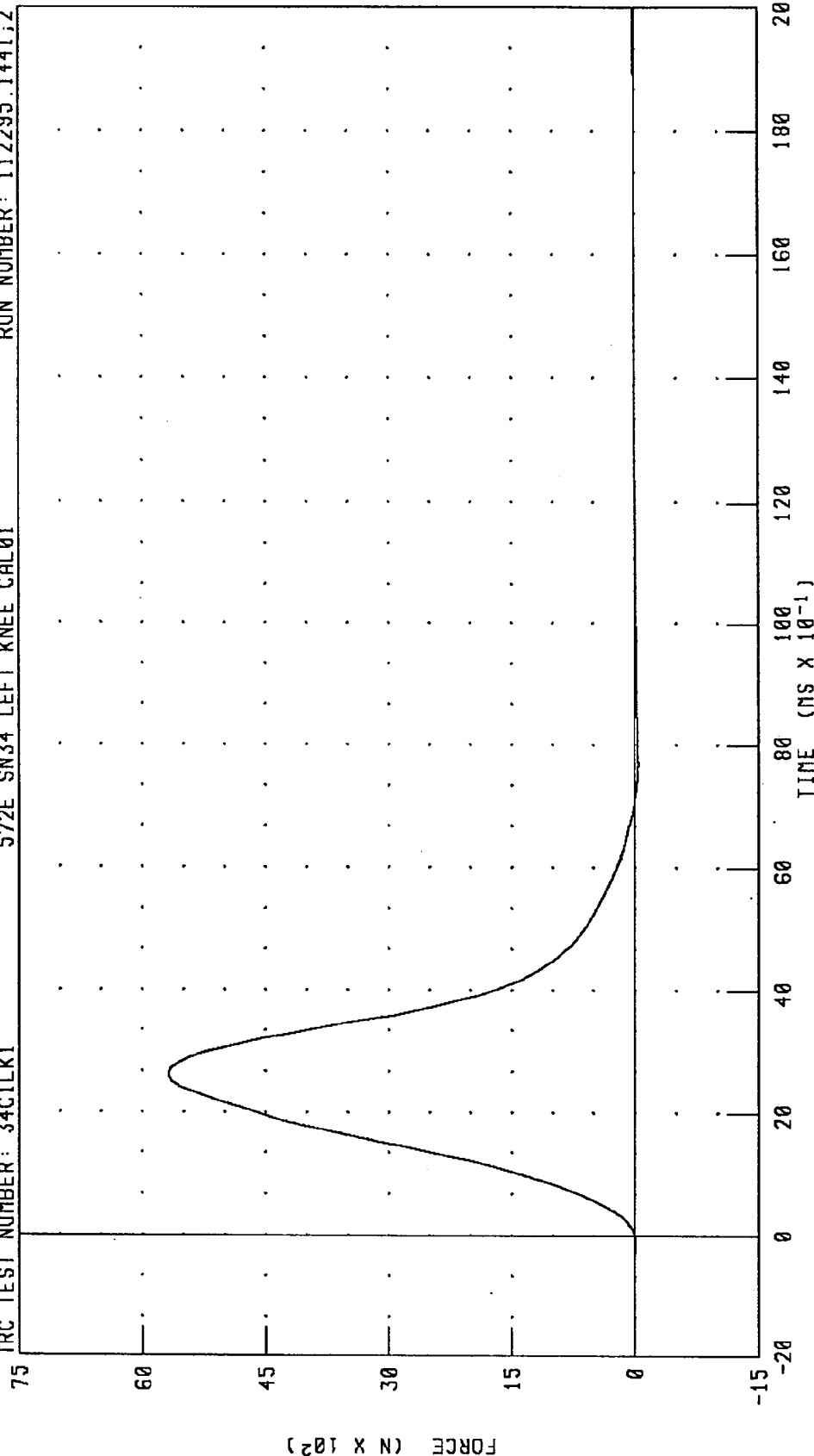
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 34C1LK1

572E SN34 LEFT KNEE CAL01

RUN NUMBER: 112295.1441;2



CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 5684.20 N @ 2.64 MS; -41.11 N @ 7.68 MS

Appendix D

Miscellaneous Test Information

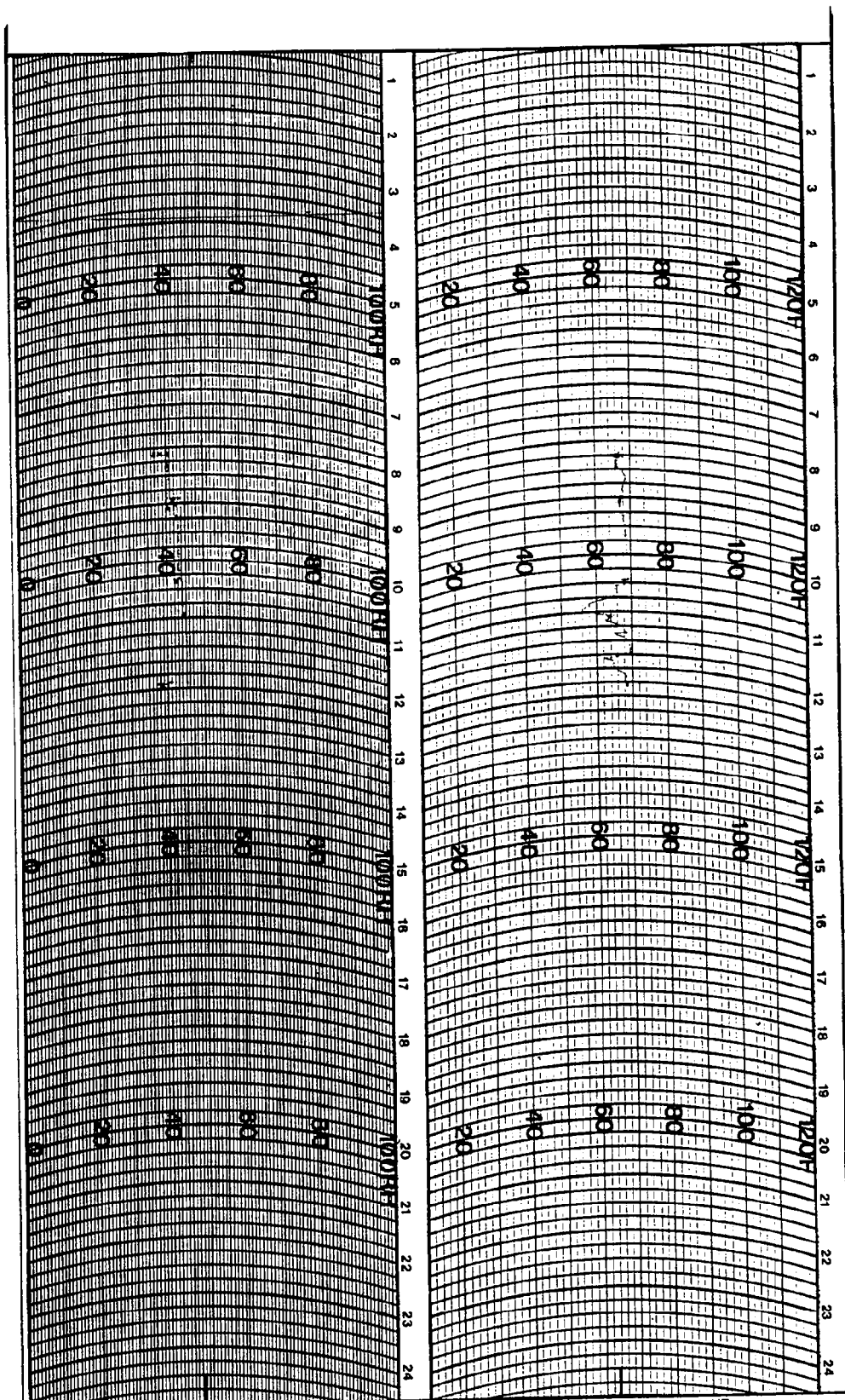
Sign Convention
NHTSA Data Tape Reference Guide

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

Frequency Response Classes

SAE J211 OCT88

<u>Typical Test Measurements</u>	<u>Channel Class</u>
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 951113 DATE ON _____ DATE OFF _____