

2408

Report Numbers: TRC-95-V004

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

Deformable Impactor into Rear of
1996 Ford Mustang
at 80 kph with 70% Right Side Overlap
TRC Test Number: 960224

Prepared by:
Transportation Research Center Inc.
10820 State Route 347
East Liberty, OH 43319



March 23, 1996

Final Report

Prepared for:
John A. Volpe National Transportation Systems Center
Vehicle Crashworthiness Division, DTS-74
Kendall Square
Cambridge, MA 02142-1093

8043

This Final Test Report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTRS57-95-C-00011.

This publication is distributed by the U. S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings, and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Report Prepared By:

Craig A. Markusic
Craig A. Markusic, Senior Project Engineer
Transportation Research Center Inc.

Date 3/30/96

Report Approved By:

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

Date 3/30/96

Final Report Accepted By:

Contracting Officer's Technical Representative (COTR),
NHTSA, Office of Vehicle Safety Compliance

Date _____

1. Report No. TRC-95-V004	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Final Report of Deformable Impactor into Rear of 1996 Ford Mustang with 70% Right Side Overlap		5. Report Date March 23, 1996	
		6. Performing Organization Code TRC	
7. Author(s) C. A. Markusic, Senior Project Engineer, TRC		8. Performing Organization Report No. TRC-95-V004	
9. Performing Organization Name and Address Transportation Research Center Inc. 10820 State Route 347 East Liberty, OH 43319		10. Work Unit No. (TRAIS)	
		11. Contract or Grant No. DTRS57-95-C-00011	
12. Sponsoring Agency Name and Address John A. Volpe National Transportation Systems Center Vehicle Crashworthiness Division, DTS-74 Kendall Square Cambridge, MA 02142-1093		13. Type of Report and Period Covered Final Report February - March 1996	
		14. Sponsoring Agency Code NEF-30	
15. Supplemental Notes			
16. Abstract An 80 kph deformable impactor rear crash test with 70% overlap was conducted on a 1996 Ford Mustang 2-door coupe at Transportation Research Center Inc. on February 24, 1996. This test was conducted to determine vehicle and occupant response in the rear 70% right side overlap test mode. The test vehicle's weight was 1628 kg. The impactor's velocity was 80.3 kph. The impactor's weight was 1344 kg. The vehicle's maximum crush was 643 millimeters. The ambient temperature was 11° C. The driver's Head Injury Criteria (HIC) was 1586. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 41.8 g. The driver's chest maximum deflection was 3 mm. The driver's left and right femur maximum axial forces were 535 N and 553 N, respectively. The passenger's HIC was 583. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 53.6 g. The passenger's chest maximum deflection was 4 mm. The passenger's left and right femur maximum axial forces were 592 N and 898 N, respectively.			
17. Key Words Rear Impact Full Scale Crash Testing for Upgrade of FMVSS 301 Test Procedure		18. Distribution Statement Copies of this report are available from: NHTSA Technical Reference Division Nassif Building, Room 5108 400 Seventh Street, S.W. Washington, DC 20590	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. Number of Pages 245	22. Price

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	2.5	square kilometers	km ²
	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons	0.9	tonnes	t
	(2000 lb)			
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 x 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price \$2.25, SD Catalog No. C13.10286.

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

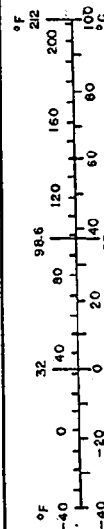


Table of Contents

<u>Section</u>	<u>Description</u>	<u>Page</u>
1.0	Purpose and Test Procedure	1
2.0	Rear Deformable Barrier Impact Test Summary	5
3.0	FMVSS 301 Data	16
4.0	Vehicle, Moving Deformable Barrier, Occupant, and Camera Measurements	24
Appendix A	Photographs	A-1
Appendix B	Data Plots	B-1
Appendix C	Dummy Calibration Information	C-1
Appendix D	Miscellaneous Test Information	D-1

List of Tables

<u>Number</u>	<u>Description</u>	<u>Page</u>
1	Crash Test Summary	8
2	Test Vehicle Information	10
3	Post-Impact Data	13
4	Dummy Injury Criteria	17
5	Fuel System Data	18
6	FMVSS 301 Post-Impact Test Data	19
7	Impacted Vehicle Measurements	26
8	Vehicle Measurements	27
9	Test Vehicle Rear Profile Data	29
10	Pre- and Post-Test Position of Vehicle Accelerometer Mounting Locations	32
11	Moving Deformable Barrier Face Static Crush	33
12	Dummy Measurement Data for Front Seat Occupants	36
13	Motion Picture Camera Locations	39

List of Figures

<u>Number</u>	<u>Description</u>	<u>Page</u>
1	Impact Velocity Measurement System	14
2	Accident Investigation Division Data	15
3	FMVSS 301 Static Rollover Test Data	20
4	Pre-test and Post-test Measurement Points	25
5	Vehicle Target Locations	28
6	Vehicle Accelerometer Mounting Locations	31
7	Moving Deformable Barrier Face Crush	34
8	Dummy Measurement Locations for Front Seat Occupants	35
9	Seat Belt Positioning Data	37
10	Camera Positions	38

List of Photographs

<u>Description</u>	<u>Figure</u>
Pre-Test Front View	A-1
Pre-Test Left Front Three-Quarter View	A-2
Post-Test Left Front Three-Quarter View	A-3
Pre-Test Left Side View	A-4
Post-Test Left Side View	A-5
Pre-Test Left Rear Three-Quarter View	A-6
Post-Test Left Rear Three-Quarter View	A-7
Pre-Test Rear View	A-8
Post-Test Rear View	A-9
Pre-Test Right Rear Three-Quarter View	A-10
Post-Test Right Rear Three-Quarter View	A-11
Pre-Test Right Side View	A-12
Post-Test Right Side View	A-13
Pre-Test Right Front Three-Quarter View	A-14
Pre-Test Front Underbody View	A-15
Post-Test Front Underbody View	A-16
Pre-Test Rear Underbody View	A-17
Post-Test Rear Underbody View	A-18
Pre-Test Fuel Tank View	A-19
Post-Test Fuel Tank View	A-20
Pre-Test Windshield View	A-21
Pre-Test Barrier to Vehicle Alignment View - Left	A-22
Pre-Test Barrier to Vehicle Alignment View - Overhead	A-23
Pre-Test Driver Dummy Position View	A-24
Post-Test Driver Dummy Position View	A-25
Pre-Test Passenger Dummy Position View	A-26
Post-Test Passenger Dummy Position View	A-27

List of Photographs

<u>Description</u>	<u>Figure</u>
Pre-Test Driver Dummy & Vehicle Interior - View 1	A-28
Pre-Test Driver Dummy & Vehicle Interior - View 2	A-29
Pre-Test Passenger Dummy & Vehicle Interior - View 1	A-30
Pre-Test Passenger Dummy & Vehicle Interior - View 2	A-31
Post-Test Driver Dummy Head Contact - View 1	A-32
Post-Test Driver Dummy Head Contact - View 2	A-33
Post-Test Driver Dummy Head Contact - View 3	A-34
Post-Test Driver Dummy Knee Contact View	A-35
Post-Test Passenger Dummy Head Contact - View 1	A-36
Post-Test Passenger Dummy Head Contact - View 2	A-37
Post-Test Passenger Dummy Head Contact - View 3	A-38
Post-Test Passenger Dummy Knee Contact View	A-39
Impact Event	A-40
Post-Test Vehicle on Static Rollover Device	A-41

Section 1.0

Purpose and Test Procedure

Purpose

This crash test was conducted to determine vehicle and occupant response in the 80 kph rear impact with 70% right side overlap test mode. The test was performed on a 1996 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 deformable barrier face was positioned 229 mm from ground level.

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

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

The seventy-six (76) data channels were digitally sampled at 12,500 samples per second and processed per Sections 11.13 through 11.15 of the Laboratory Test Procedure TP-208-09.

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

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

Section 2.0

Rear Deformable Barrier Impact Test Summary

Test Results Summary

This 80 kph rear crash test with 70% right side overlap was conducted at TRC on February 24, 1996.

The test vehicle, a 1996 Ford Mustang 2-door coupe, was equipped with airbags and three-point unibelts at the driver's and right front passenger's seating positions. The vehicle's test weight was 1628 kg. The vehicle's maximum static crush was 643 mm.

The driver's HIC was 1586. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 41.8 g. The driver's chest maximum deflection was 3 mm. The driver's left and right femur maximum compressive forces were 535 N and 553 N, respectively.

The right front passenger's HIC was 583. The right front passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 53.6 g. The right front passenger's chest maximum deflection was 4 mm. The right front passenger's left and right femur maximum compressive forces were 592 N and 898 N, respectively.

A trace amount of fuel system fluid spilled during the impact event. No fuel system fluid spillage occurred during the static rollover test.

Data Acquisition Explanations

The driver's head Position 1 X-axis accelerometer, HD1XG1, recorded questionable data throughout the impact event as a result of the accelerometer mounting block being loose.

The left front seat back mid X-axis accelerometer, TLFXG2, lost data at 101 milliseconds as a result of the accelerometer's cable being damaged by the vehicle's crush on impact.

Table 1 Crash Test Summary

Test type:	80 kph rear impact with 70% right side overlap
Test date:	02/24/96
Test time:	1455
Ambient temperature at impact area:	11° C
Vehicle year/make/ model/body style:	1996/Ford/Mustang/2-door coupe
Vehicle test weight:	1628 kg
Impact angle ¹ :	180°
Impact velocity ² :	
Primary:	80.3 kph
Secondary ³ :	81.6 kph
Maximum static crush:	643 mm
Number of cameras:	
High-speed:	13
Door opening data:	
Left-front:	Easy
Right-front:	Easy

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 #34</u>	<u>Passenger #35</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:	Seat back deformed	Seat back deformed
Visible dummy contact points:		
Head:	Front seat back and rear seat back	Rear seat back
Chest:	None	None
Abdomen:	None	None
Left knee:	Steering wheel	None
Right knee:	Steering wheel	None

Table 2 Test Vehicle Information

Vehicle year/make/
model/body style: 1996/Ford/Mustang/2-door coupe

Color: Black

VIN: 1FALP4040TF108564

Engine data:

Placement: Longitudinal/Inline

Cylinders: 6

Displacement: 3.8 liters

Transmission data: 5 speed, X manual, ___ automatic, ___ overdrive

Final drive: ___ fwd, X rwd, ___ 4wd

Date vehicle received:

Odometer reading: 103

Dealer's name
and address: West-Herr FLM of Dansville Inc.
P.O. Box 436
Dansville, NY 14437

Accessories:

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

Certification data from vehicle's label:

Vehicle manufactured by: Ford Motor Company in U.S.A.

Date of manufacture: 08/95

VIN: 1FALP4040TF108564

GVWR: 1946 kg

GAWR: Front: 1050 kg

Rear: 908 kg

Table 2 Test Vehicle Information, Cont'd.

Size of tires on vehicle: P205/65R15
Spare tire: Temporary
Type of front seats: Bucket

Tire & capacity data from vehicle's label:

Recommended tire size: P205/65R15

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: 720 mm RF: 726 mm LR: 725 mm RR: 730 mm

Fully loaded attitude: LF: 703 mm RF: 710 mm LR: 680 mm RR: 685 mm

Pre-test attitude: LF: 703 mm RF: 697 mm LR: 697 mm RR: 690 mm

Table 2 Test Vehicle Information, Cont'd.

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

Right front	390	kg	Right rear	303	kg
Left front	410	kg	Left rear	305	kg
Total front weight	800	kg	(56.8% of total vehicle weight)		
Total rear weight	608	kg	(43.2% of total vehicle weight)		
Total delivered weight	1408	kg			

Calculation of test vehicle's target test weight:

RCLW = Rated Cargo and Luggage Weight

UDW = Unloaded Delivered Weight (1408 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 = 1408 + 45 + 152 = 1605 kg

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

Right front	453	kg	Right rear	361	kg
Left front	462	kg	Left rear	352	kg
Total front weight	915	kg	(56.2% of total vehicle weight)		
Total rear weight	713	kg	(43.8% of total vehicle weight)		
Total test weight	1628	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, alternator, and water pump.

CG rearward of front wheel centerline: 1131 mm

Vehicle Wheelbase: 2583 mm

¹ From vehicle's tire load label.

Table 3 Post-Impact Data

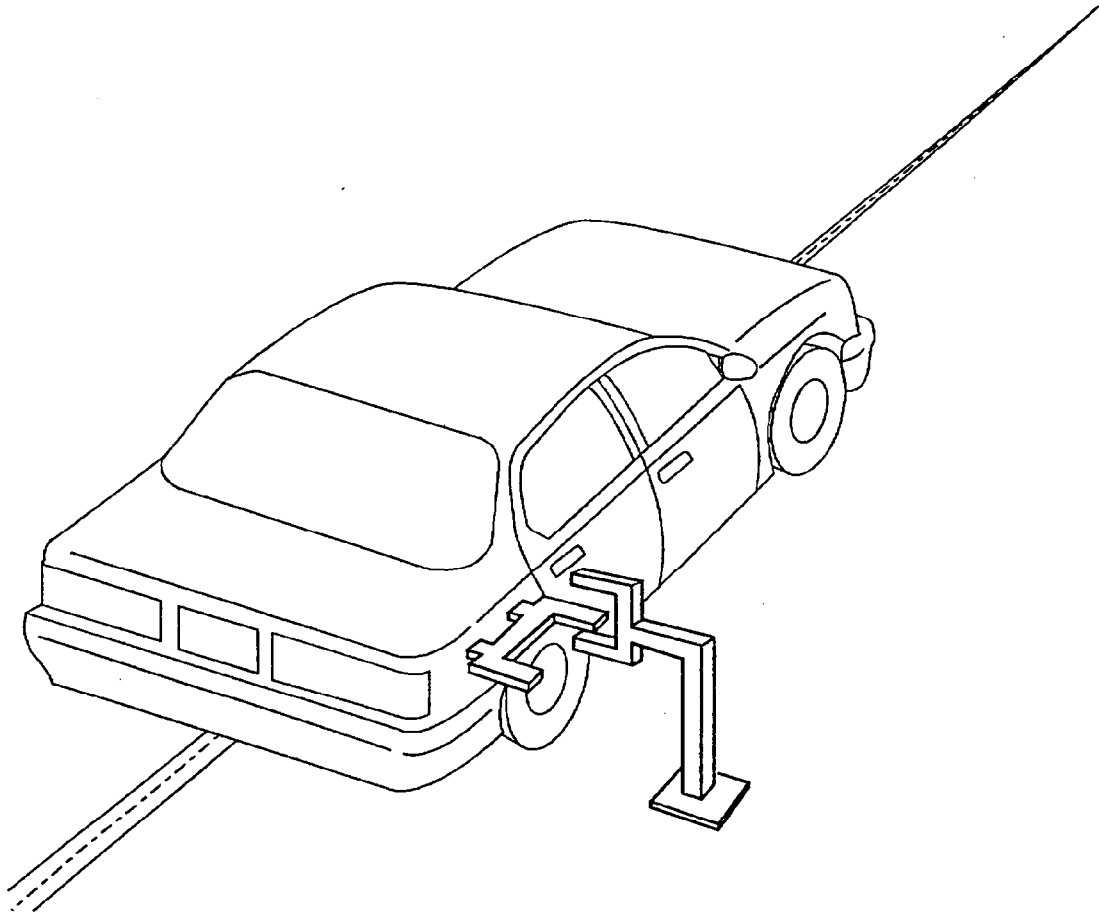
Test number: 960224
Test date: 02/24/96
Test time: 1455
Test type: 80 kph rear impact with 70% right side overlap
Impact angle: 180°
Ambient temperature
at impact area: 11° C
Temperature in
occupant compartment: 21° C
Impact velocity:
Primary: 80.3 kph
Secondary: 81.6 kph
Specified range: 78.5 to 81.5 kph
Distance from vehicle to barrier:
Entering velocity trap: 356 mm
Exiting velocity trap: 51 mm

Test vehicle static crush:

Overall length of test vehicle:

Pre-test:	L: 4312 mm	C: 4382 mm	R: 4313 mm
Post-test:	L: 4087 mm	C: 3810 mm	R: 3702 mm
Total crush:	L: 225 mm	C: 572 mm	R: 611 mm
Average crush:	469 mm		

Figure 1 Impact Velocity Measurement System



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

The vanes have 305-millimeter spacing.

Figure 2 Accident Investigation Division Data

Test date: 02/24/96
Vehicle year/make/
model/body style: 1996/Ford/Mustang/2-door coupe
VIN: 1FALP4040TF108564
Build date: 08/95
Test weight: 1628 kg
Vehicle wheelbase: 2583 mm
Maximum width: 1820 mm
Front overhang: 1005 mm

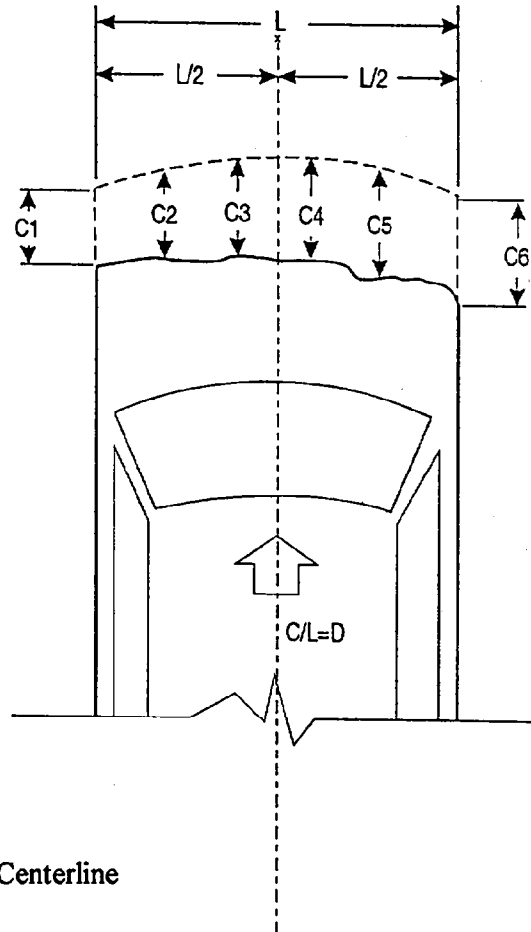
Collision Deformation

Classification (CDC) Code: 06BDEW5

Crush depth
measurements: C1: 216 mm
C2: 419 mm
C3: 556 mm
C4: 561 mm
C5: 643 mm
C6: 582 mm

Midpoint of damage: D: Vehicle Longitudinal Centerline

Length of damaged
region: L: 1422 mm



Section 3.0

FMVSS 301 Data

Table 4 Dummy Injury Criteria

Maximum Acceleration

	Head				Chest		
	X	Y	Z	R	X	Y	Z
Driver	135.6 g	48.5 g	-60.3 g	149.0 g	44.2 g	6.8 g	-14.0 g
Passenger	59.8 g	27.3 g	-62.4 g	80.6 g	67.9 g	9.5 g	-12.2 g

Maximum Femur Compressive Force

	Left Femur	Right Femur
Driver	535 N	553 N
Passenger	592 N	898 N

Head Injury Criteria¹

	HIC	Time t ₁	Time t ₂
Driver	1586	109.9 ms	121.1 ms
Passenger	583	92.8 ms	115.1 ms

Head Maximum Resultant Acceleration²

	Acceleration	Time t ₁	Time t ₂
Driver	137.8 g	114.3 ms	117.3 ms
Passenger	63.5 g	101.9 ms	106.3 ms

Chest Maximum Resultant Acceleration²

	Acceleration	Time t ₁	Time t ₂
Driver	41.8 g	100.9 ms	103.8 ms
Passenger	53.6 g	91.4 ms	94.4 ms

Maximum Chest Deflection

Driver	3 mm
Passenger	4 mm

¹ As defined in FMVSS No. 208

² Defined as equal to or exceeding 0.003 sec. duration

Table 5 Fuel System Data

Vehicle year/make/model/body style:	1996 Ford/Mustang/2-door coupe
Fuel system capacity:	15.4 (from owner's manual)
Usable capacity:	15.4 gal (furnished by COTR)
Test volume range:	14.2 gal to 14.5 gal (92-94% of usable)
Actual test volume:	14.3 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: 02/24/96

Vehicle year/make/model/body style: 1996/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:

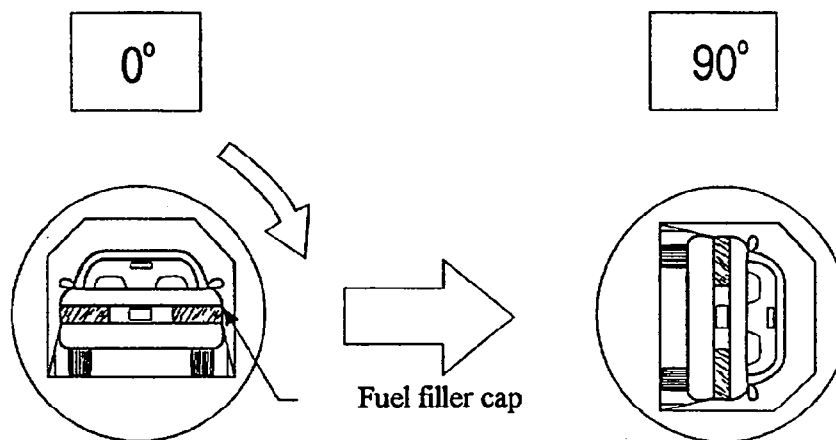
	Test <u>Results</u>	Maximum <u>Allowable</u>
1. From impact until vehicle motion ceases	Trace	28 g
2. 5-Minute period after vehicle motion ceases	0 g	140 g
3. Next 25 minutes after 5-minute period	0 g	28 g/1 min

Fuel system fluid spillage location(s): Trace fuel system fluid spillage from filler cap area.

Figure 3 FMVSS 301 Static Rollover Test Data

NHTSA number: RT0219

Test phase



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

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

FMVSS 301 position hold time = 5 minutes, 0 seconds

Total = 7 minutes, 0 seconds

Next whole minute interval = 7 minutes

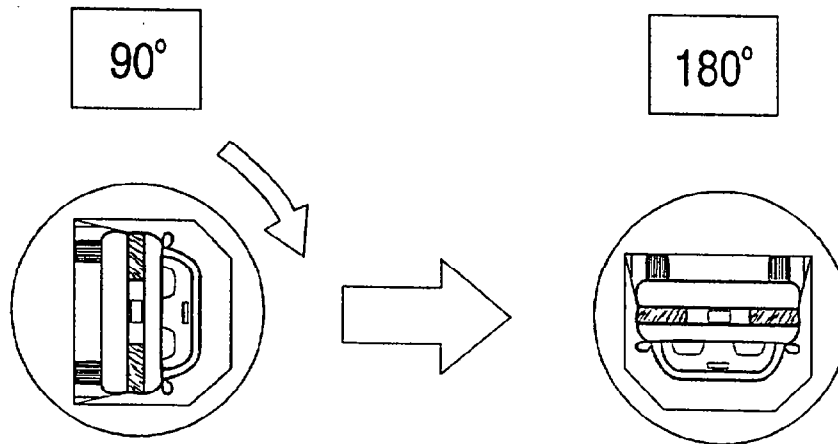
Fuel system fluid spillage measurements:

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

Fuel system fluid spillage location(s): None

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

Test phase



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

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

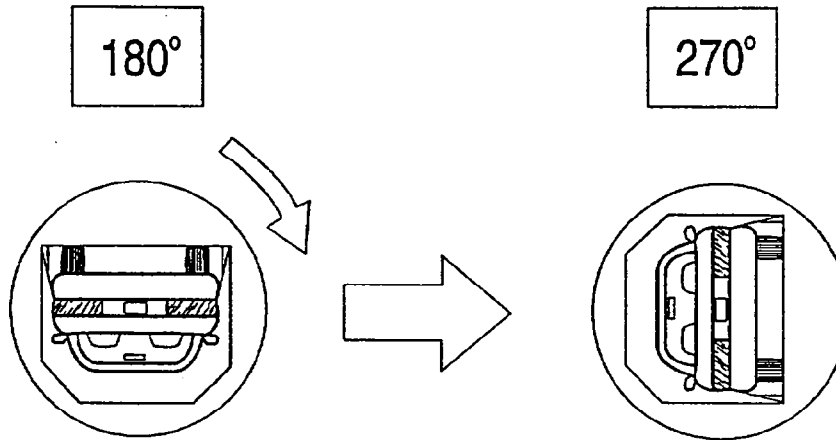
Fuel system fluid spillage measurements:

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

Fuel system fluid spillage location(s): None

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

Test phase



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

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

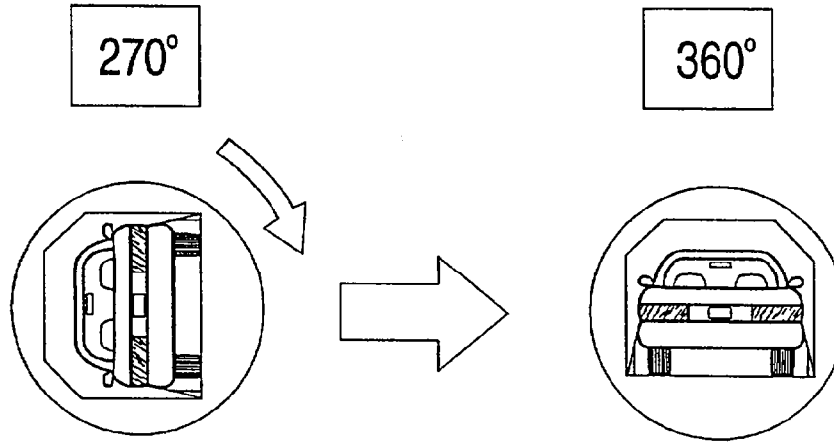
Fuel system fluid spillage measurements:

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

Fuel system fluid spillage location(s): None

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

Test phase



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

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

Fuel system fluid spillage measurements:

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

Fuel system fluid spillage location(s): None

Section 4.0

Vehicle, Moving Deformable Barrier, Occupant, and Camera Measurements

Figure 4 Pre-test and Post-test Measurement Points

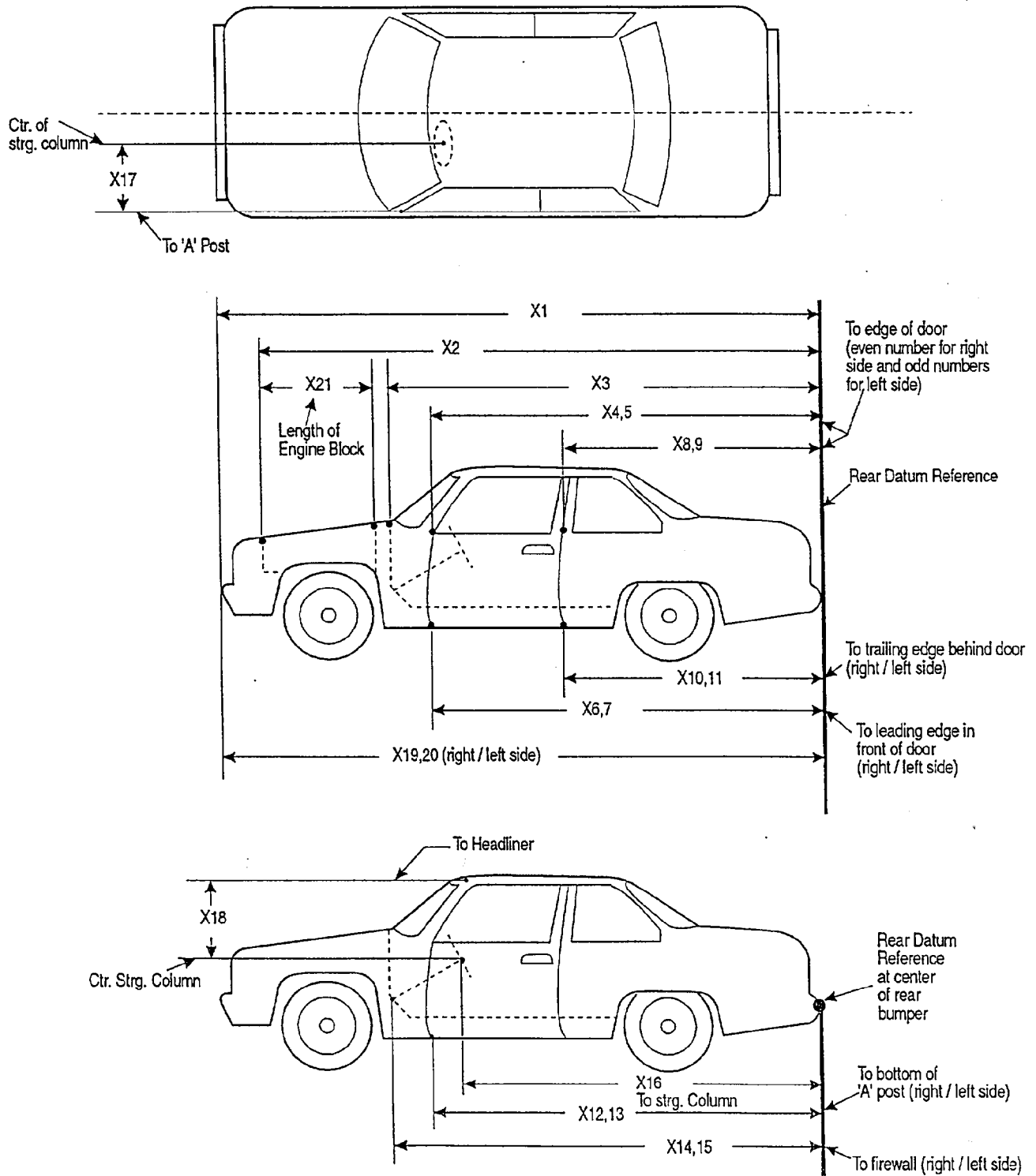


Table 7 Impacted Vehicle Measurements

Vehicle year/make/model/body style: 1996/Ford/Mustang/2-door coupe

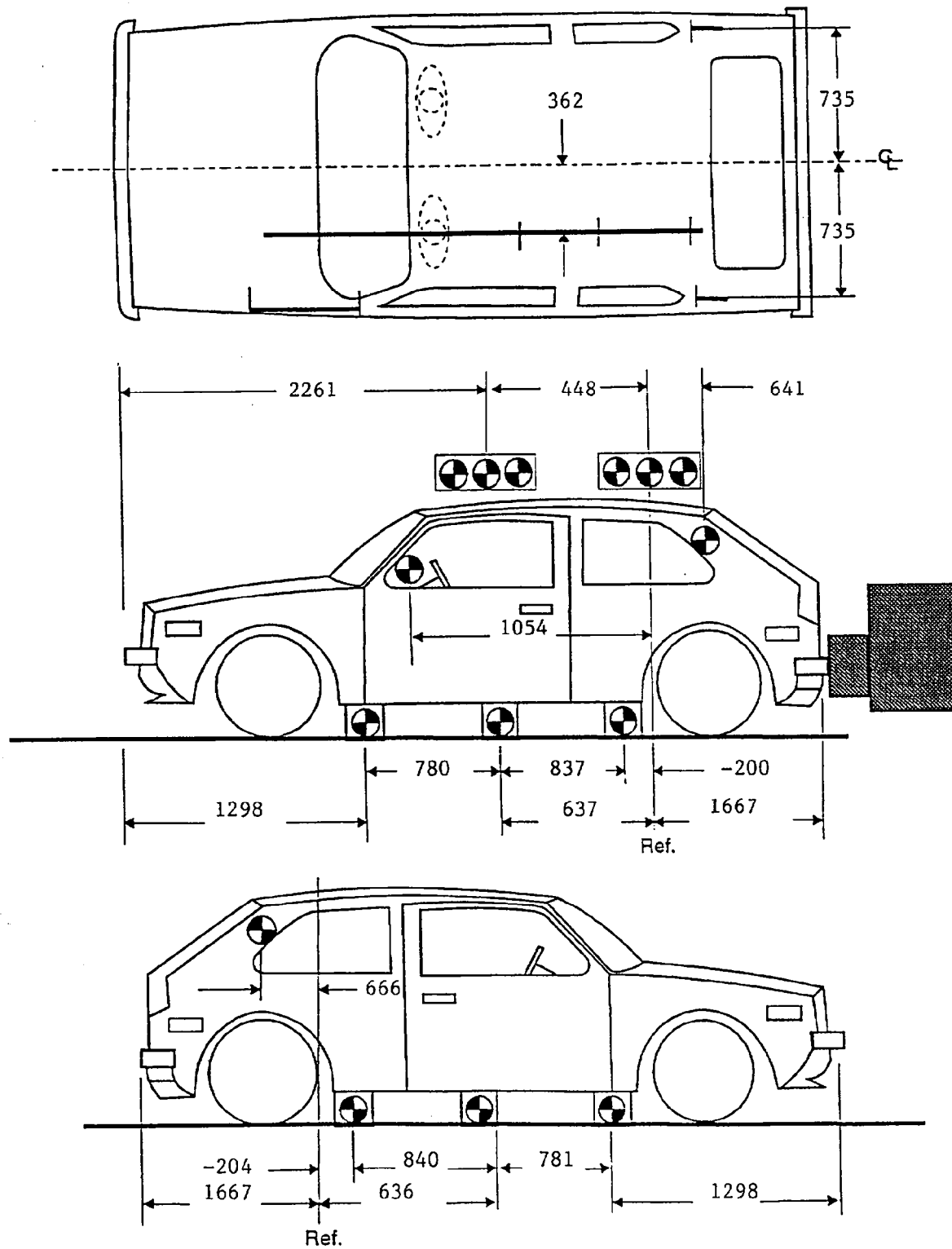
Test Number: 960224

No.	Type of measurement	Pre-test	Post-test	Diff.
X1	Total length of vehicle at centerline	4382 mm	3810 mm	572 mm
X2	Rear surface of vehicle to front of engine block	676 mm	706 mm	-30 mm
X3	Rear surface of vehicle to firewall	1226 mm	1109 mm	117 mm
X4	Rear surface of vehicle to upper leading edge of right door	1414 mm	1402 mm	12 mm
X5	Rear surface of vehicle to upper leading edge of left door	1424 mm	1433 mm	-9 mm
X6	Rear surface of vehicle to lower leading edge of right door	1353 mm	1345 mm	8 mm
X7	Rear surface of vehicle to lower leading edge of left door	1361 mm	1359 mm	2 mm
X8	Rear surface of vehicle to upper trailing edge of right door	2741 mm	2727 mm	14 mm
X9	Rear surface of vehicle to upper trailing edge of left door	2746 mm	2753 mm	-7 mm
X10	Rear surface of vehicle to lower trailing edge of right door	2701 mm	2681 mm	20 mm
X11	Rear surface of vehicle to lower trailing edge of left door	2701 mm	2698 mm	3 mm
X12	Rear surface of vehicle to bottom of "A" post on right side	1480 mm	1478 mm	2 mm
X13	Rear surface of vehicle to bottom of "A" post on left side	1493 mm	1488 mm	5 mm
X14	Rear surface of vehicle to firewall - right side	1131 mm	1133 mm	-2 mm
X15	Rear surface of vehicle to firewall - left side	1126 mm	1128 mm	-2 mm
X16	Rear surface of vehicle to steering wheel center	1885 mm	1895 mm	-10 mm
X17	Center of steering column to "A" post	333 mm	313 mm	20 mm
X18	Center of steering column to headliner	406 mm	354 mm	52 mm
X19	Rear surface of vehicle to right side of front bumper	4313 mm	3702 mm	611 mm
X20	Rear surface of vehicle to left side of front bumper	4312 mm	4087 mm	225 mm
X21	Length of engine block	370 mm	370 mm	0 mm

Table 8 Vehicle Measurements

No.	Description of Measurement	Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	4382	3810	572
X2	Front Surface of Vehicle to Bottom of "A" Post of Right Side	1480	1478	2
X3	Front Surface of Vehicle to Bottom of "A" Post of Left Side	1493	1488	5
X4	Front Surface of Vehicle to Right Side of Rear Bumper	4313	3702	611
X5	Front Surface of Vehicle to Left Side of Rear Bumper	4312	4087	225
X6	Right Front Sill to Ground Plane	180	190	-10
X7	Left Front Sill to Ground Plane	185	226	-41
X8	Right Rear Sill to Ground Plane	187	123	64
X9	Left Rear Sill to Ground Plane	195	150	45
X10	Wheelbase of Vehicle - Left Side	2583	2515	68
X11	Width of Vehicle at Maximum Width Point	1820	1936	-116
X12	Front Surface of Vehicle to Engine Target	676	706	-30
X13	Front Surface of Vehicle to Compartment Target	2261	2250	11
X14	Front Surface of Vehicle to Rear Bumper Target	4304	3764	540
X15	Wheelbase of Vehicle - Right Side	2583	2318	265

Figure 5 Vehicle Target Locations



(Dimensions in Millimeters)

Table 9 Test Vehicle Rear Profile Data

X-axis measurements referenced to a plane 430 millimeters forward of the front bumper 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	4718	4782	4797	4797	4778	4726
	Y	710	427	150	143	428	709
	Z	840	850	858	859	856	848
Top of rear bumper	X	4730	4773	4789	4790	4773	4725
	Y	710	424	142	146	430	709
	Z	594	596	599	600	597	590
Center of trunk	X	4601	4654	4673	4673	4652	4582
	Y	708	425	142	144	439	716
	Z	404	406	408	410	407	401
		Post-Test Profile					
		Vehicle Left			Vehicle Right		
		pt. 1	pt. 2	pt. 3	pt. 4	pt. 5	pt. 6
Bottom of rear bumper	X	4485	4417	4297	4310	4273	4191
	Y	675	385	149	135	435	700
	Z	154	134	156	208	211	200
Top of rear bumper	X	4514	4354	4233	4229	4130	4143
	Y	650	376	142	151	430	694
	Z	344	325	315	635	324	385
Center of trunk	X	4455	4356	4475	4480	4294	4104
	Y	623	325	140	144	529	750
	Z	609	629	635	661	572	525

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

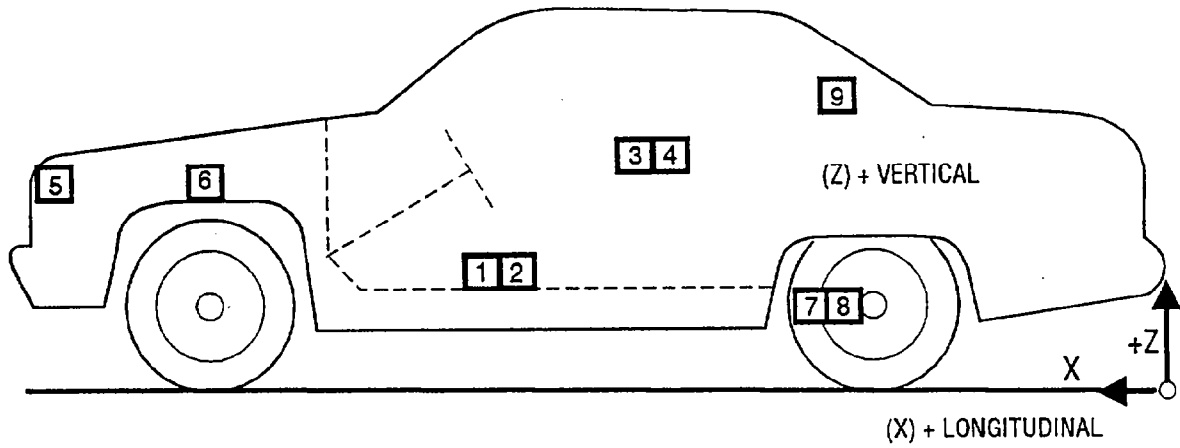
		Change					
		Vehicle Left			Vehicle Right		
		pt. 1	pt. 2	pt. 3	pt. 4	pt. 5	pt. 6
Bottom of rear bumper	X	233	365	500	487	505	535
	Y	-35	-42	-1	8	-7	9
	Z	-686	-716	-702	-651	-645	-648
Top of rear bumper	X	216	419	556	561	643	582
	Y	-60	-48	0	-5	0	15
	Z	-250	-271	-284	35	-273	-205
Center of trunk	X	146	298	198	193	358	478
	Y	-85	-100	-2	0	-90	-34
	Z	205	223	227	251	165	124

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

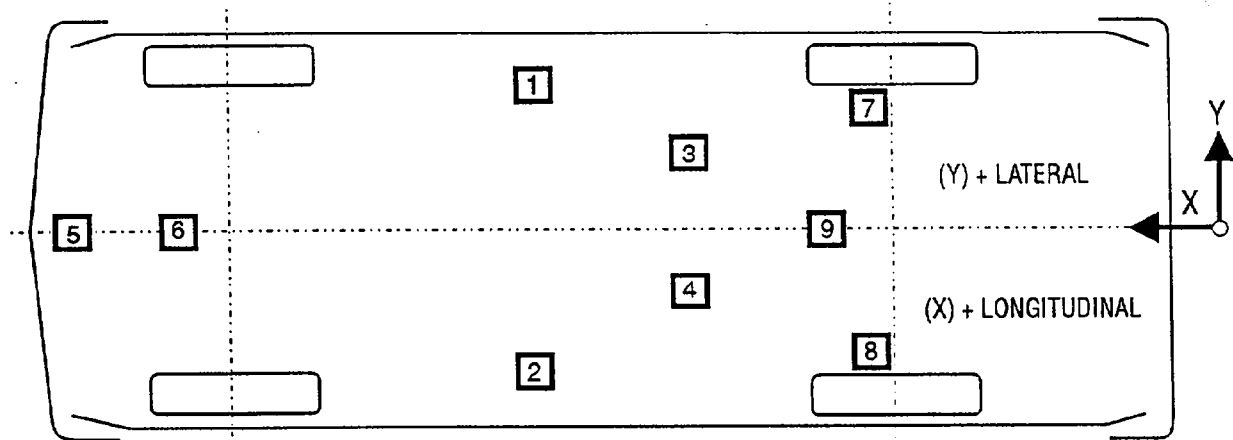
+Y: Left from vehicle longitudinal centerline

+Z: Up from ground

Figure 6 Vehicle 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	1819 mm	547 mm	260 mm
	Post	1895 mm	547 mm	329 mm
	Change	-76 mm	0 mm	69 mm
Right front seat outboard mounting rail	Pre	1819 mm	-547 mm	268 mm
	Post	1906 mm	-547 mm	324 mm
	Change	-81 mm	0 mm	56 mm
Left front seat back (mid-point of seat)	Pre	2459 mm	347 mm	820 mm
	Post	2539 mm	347 mm	670 mm
	Change	-80 mm	0 mm	-150 mm
Right front seat back (mid-point of seat)	Pre	2459 mm	-347 mm	803 mm
	Post	2509 mm	-350 mm	683 mm
	Change	-50 mm	-3 mm	-120 mm
Radiator support	Pre	147 mm	20 mm	745 mm
	Post	151 mm	20 mm	830 mm
	Change	-4 mm	0 mm	85 mm
Top of engine	Pre	875 mm	22 mm	820 mm
	Post	862 mm	22 mm	850 mm
	Change	13 mm	0 mm	30 mm
Left rear wheel axle	Pre	3326 mm	360 mm	310 mm
	Post	3232 mm	360 mm	240 mm
	Change	94 mm	0 mm	-70 mm
Right rear wheel axle	Pre	3326 mm	-350 mm	310 mm
	Post	3133 mm	-350 mm	230 mm
	Change	193 mm	0 mm	-80 mm
Rear package shelf (top of rear seat back)	Pre	3529 mm	0 mm	970 mm
	Post	3470 mm	0 mm	940 mm
	Change	59 mm	0 mm	-30 mm

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

Zero distance at barrier centerline¹

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

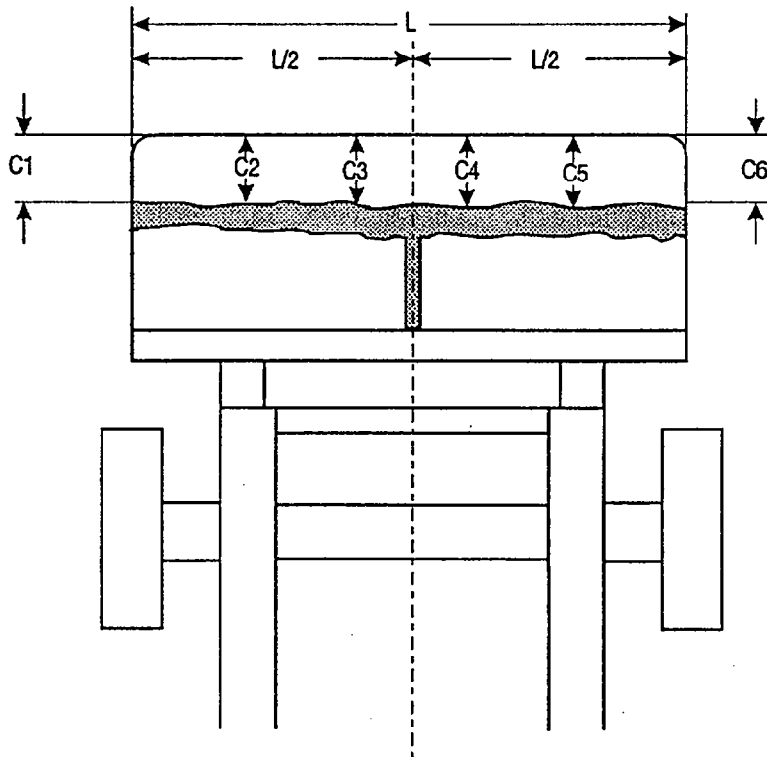
Static crush (mm)

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.

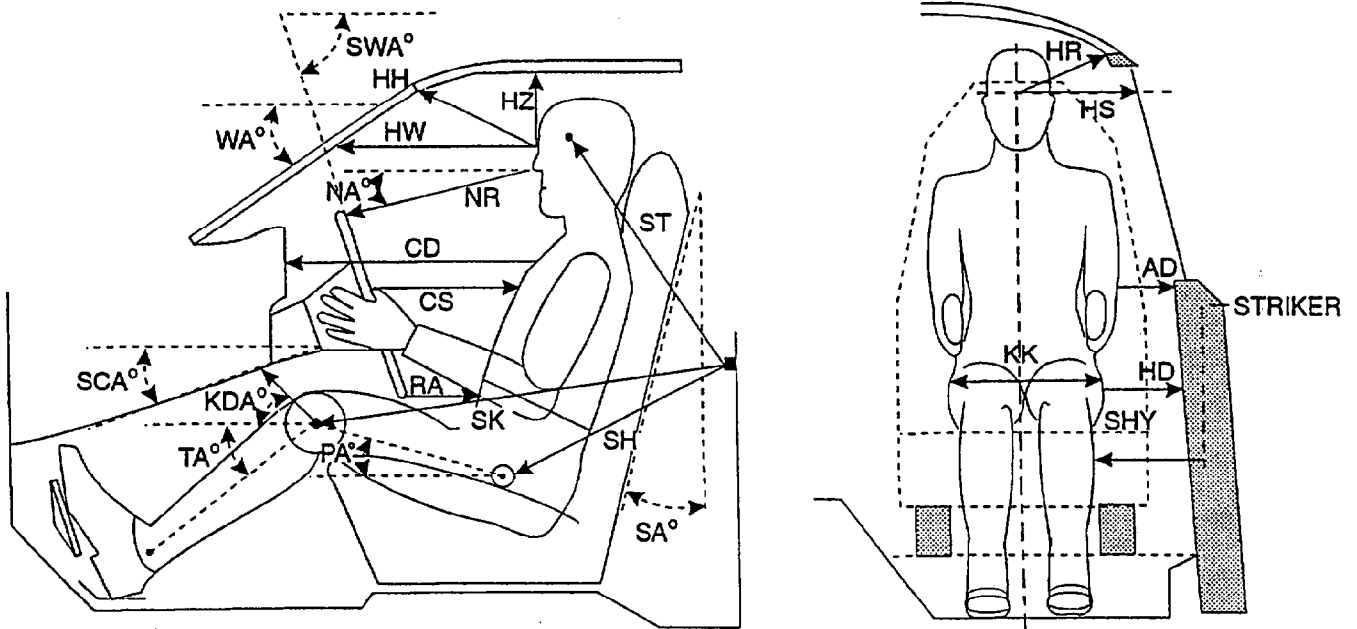
Figure 7 Moving Deformable Barrier Face Crush



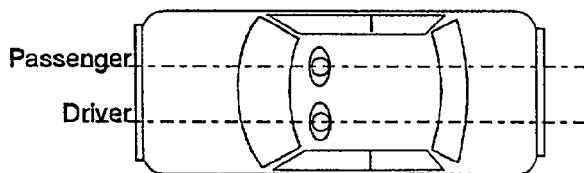
Notes: L is pre-test length of contact surface.
C1 through C6 are spaced equally apart.
CL is moving barrier centerline.

	Pre-test	Post-test	Crush
L	1422 mm		
C1	245 mm	173 mm	-72 mm
C2	229 mm	238 mm	9 mm
C3	227 mm	346 mm	119 mm
C4	228 mm	400 mm	172 mm
C5	228 mm	453 mm	225 mm
C6	250 mm	520 mm	270 mm
CL	228 mm	365 mm	137 mm

Figure 8 Dummy Measurement Locations for Front Seat Occupants



VERTICAL LONGITUDINAL PLANE



VERTICAL TRANSVERSE PLANE

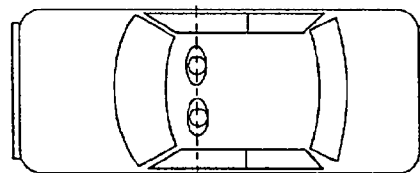
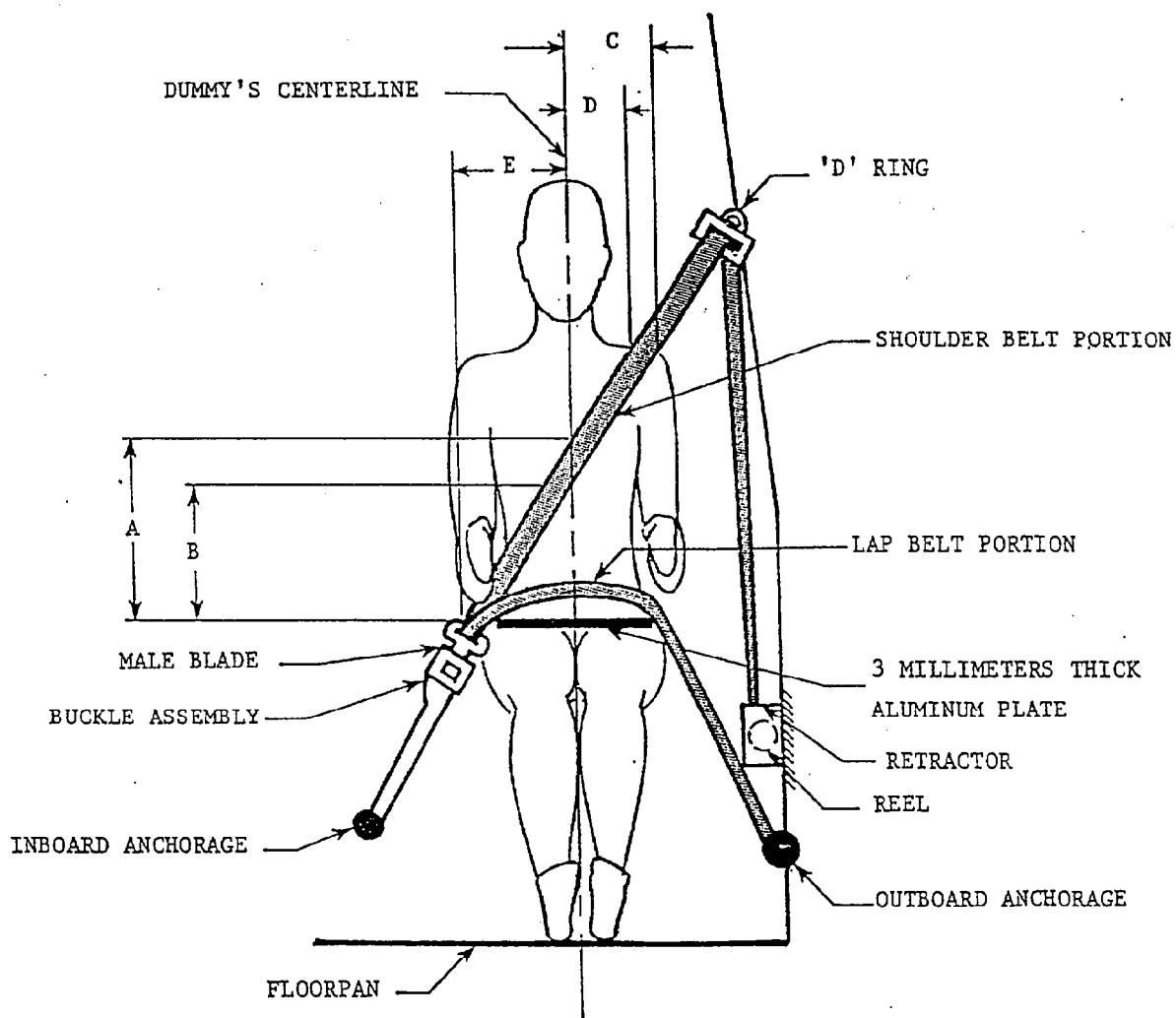


Table 12 Dummy Measurement Data For Front Seat Occupants

Designation	Type of Measurement	Driver (Serial #34)	Passenger (Serial #35)
WA	Windshield angle	27°	NA
SWA	Steering wheel angle	63°	NA
SCA	Steering column angle	27°	NA
SA	Seat back angle	21°	21°
HZ	Head to roof	155 mm	139 mm
HH	Head to header	265 mm	278 mm
HW	Head to windshield	451 mm	447 mm
HR	Head to side header	192 mm	195 mm
NR	Nose to rim	365 mm	NA
NA	Nose to rim angle	15°	NA
CD	Chest to dash	523 mm	516 mm
CS	Steering wheel to chest	291 mm	NA
RA	Rim to abdomen	166 mm	NA
KDL	Left knee to dash	152 mm	148 mm
KDR	Right knee to dash	148 mm	136 mm
KDA	Outboard knee to dash angle	35°	25°
PA	Pelvic angle	25°	25°
TA	Tibial angle	32°	38°
KK	Knee to knee	316 mm	257 mm
ST ¹	Striker to head	628 mm	627 mm
	Striker to head angle	-54°	-67°
SK ¹	Striker to knee	895 mm	910 mm
	Striker to knee angle	0°	1°
SH ¹	Striker to H-point	520 mm	551 mm
	Striker to H-point angle	-13°	-15°
SHY	Striker to H-point (Y dir.)	227 mm	201 mm
HS	Head to side window	289 mm	292 mm
HD	H-point to door	113 mm	111 mm
AD	Arm to door	66 mm	69 mm

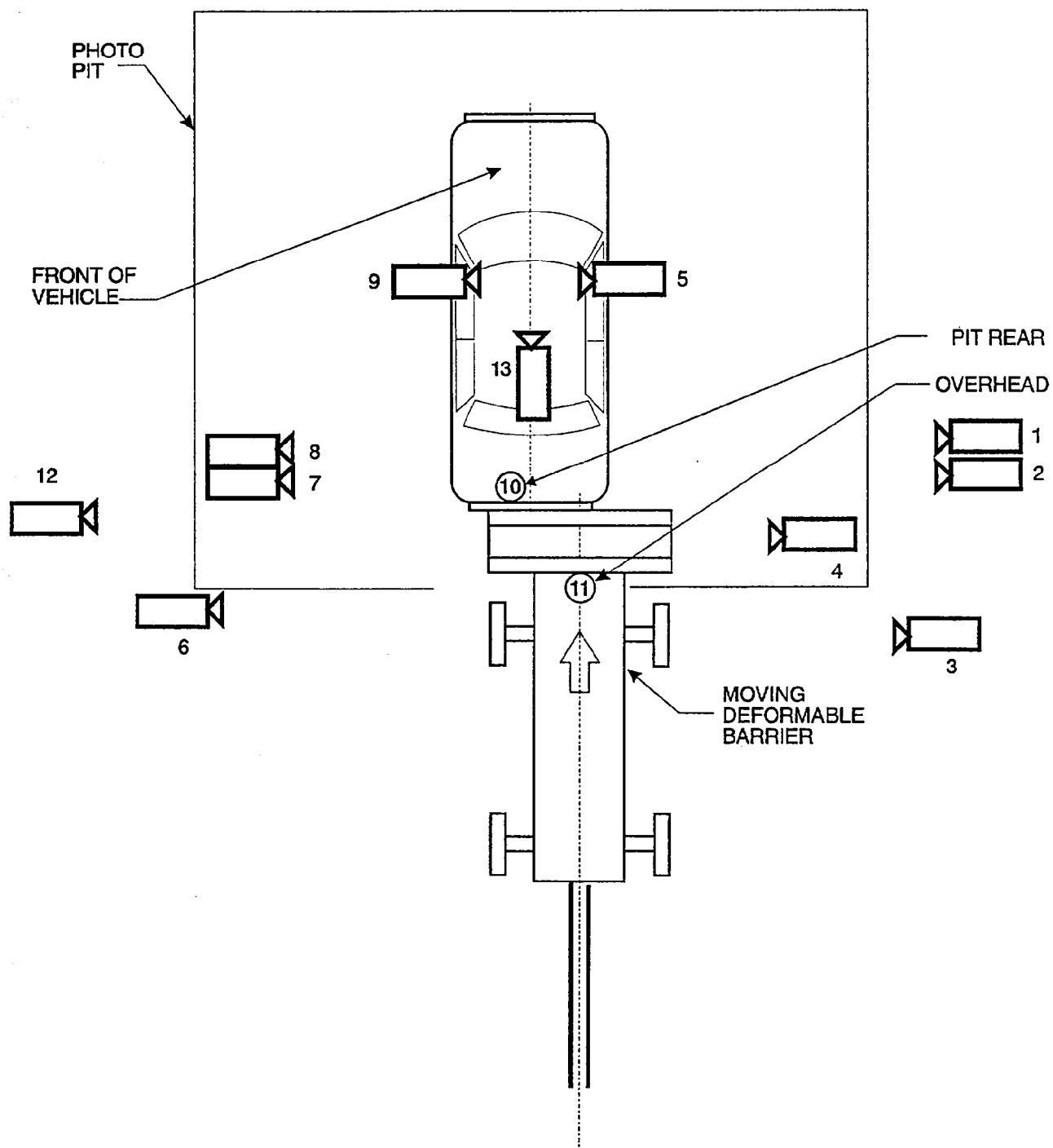
The seat back angle (SA°) is measured relative to vertical, all other angles are measured relative to horizontal.

Figure 9 Seat Belt Positioning Data



		Driver	Passenger
A	Top surface of aluminum plate to belt upper edge	340 mm	395 mm
B	Top surface of aluminum plate to belt lower edge	258 mm	305 mm
C	Dummy centerline to outer edge of belt at chest flesh top	125 mm	88 mm
D	Dummy centerline to inner edge of belt at chest flesh top	70 mm	31 mm
E	Dummy centerline to intersection of upper torso belt and lap belt	228 mm	295 mm

Figure 10 Camera Positions



Test number: 960224

Table 13 Motion Picture Camera Locations

Vehicle year/make/model/body style: 1996/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	770 frames/s
2	Right side overall	-356	13970	1123	0°	0°	13 mm	802 frames/s
3	Right MDB	NA	NA	NA	0°	0°	25 mm	345 frames/s
4	Right close-up	737	5867	826	-3°	0°	17 mm	962 frames/s
5	Right front passenger onboard	NA	NA	NA	NA	NA	8 mm	382 frames/s
6	Left side MDB	1245	-13411	826	0°	0°	25 mm	975 frames/s
7	Left side close-up	737	-6629	851	-3°	0°	17 mm	1005 frames/s
8	Left side vehicle	2438	-15646	1201	-2°	0°	25 mm	1000 frames/s
9	Driver onboard	NA	NA	NA	NA	NA	8 mm	527 frames/s
10	Underbody vehicle	NA	NA	NA	90°	0°	17 mm	1000 frames/s
11	Overhead	NA	NA	NA	90°	0°	13 mm	NA ⁴ frames/s
12	Left side overall	1219	-14122	1147	0°	0°	13 mm	1002 frames/s
13	Seat back view	NA	NA	NA	NA	NA	8 mm	420 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 Camera did not run during test

Appendix A

Photographs

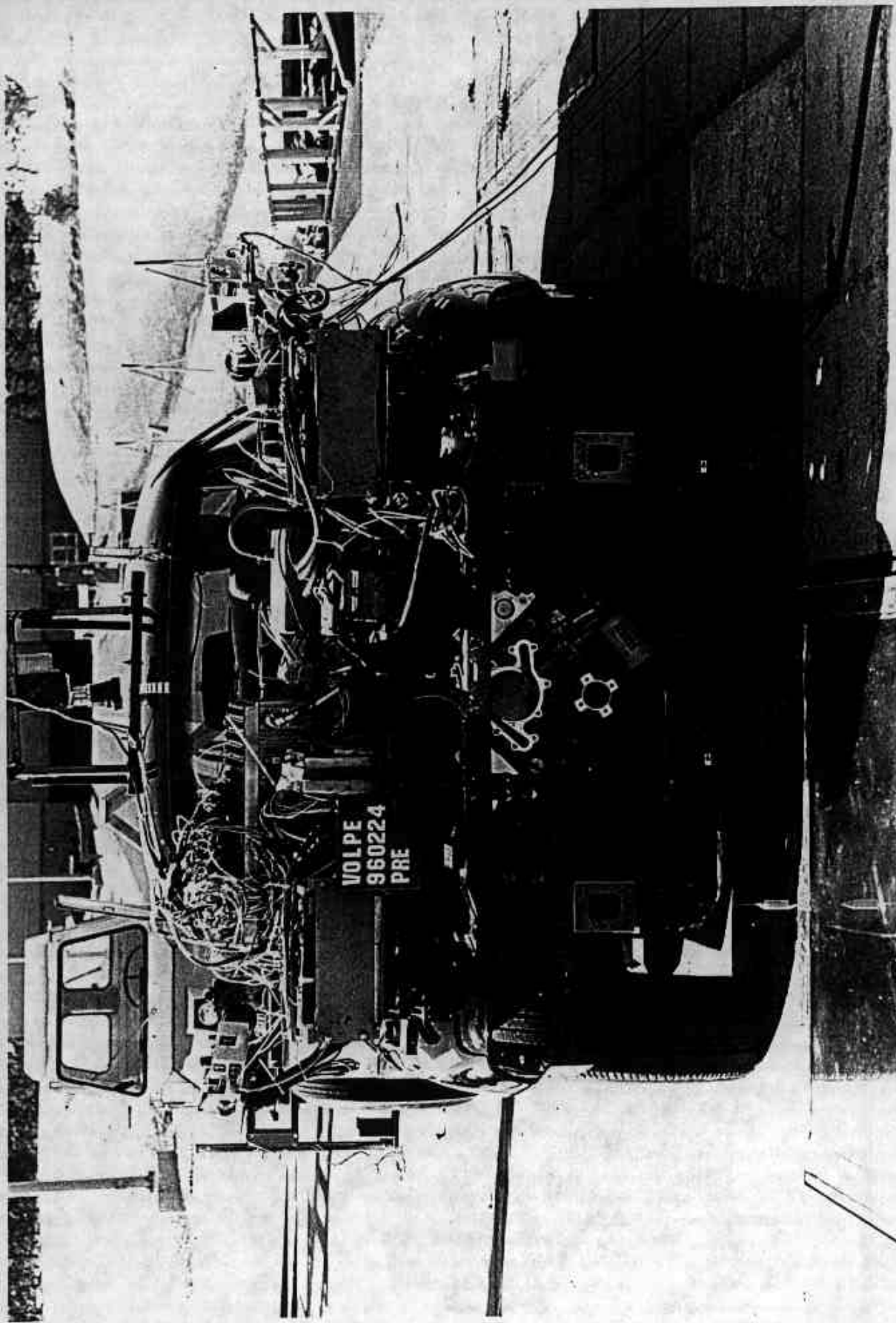


Figure A-1 Pre-Test Front View

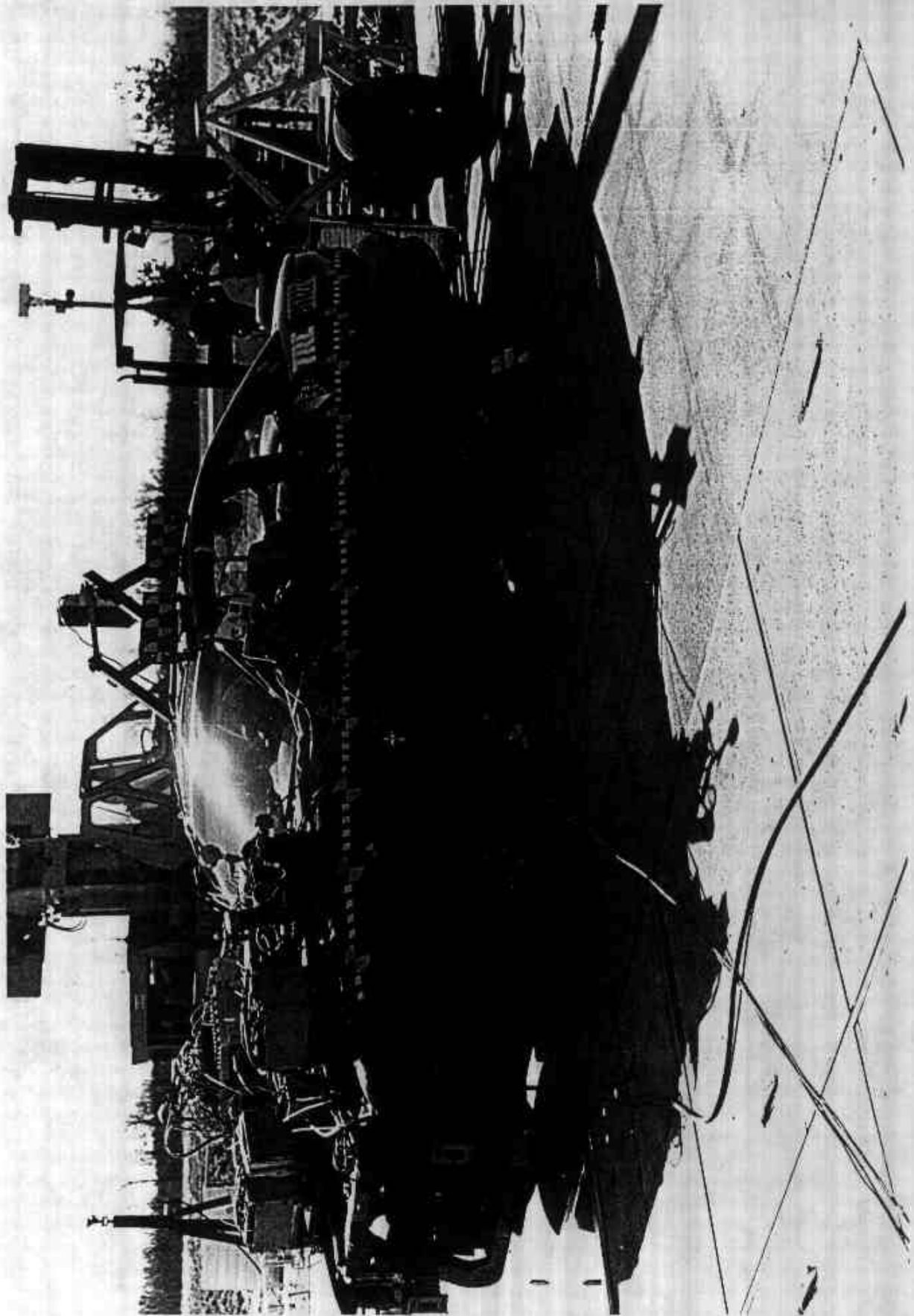


Figure A-2 Pre-Test Left Front Three-Quarter View

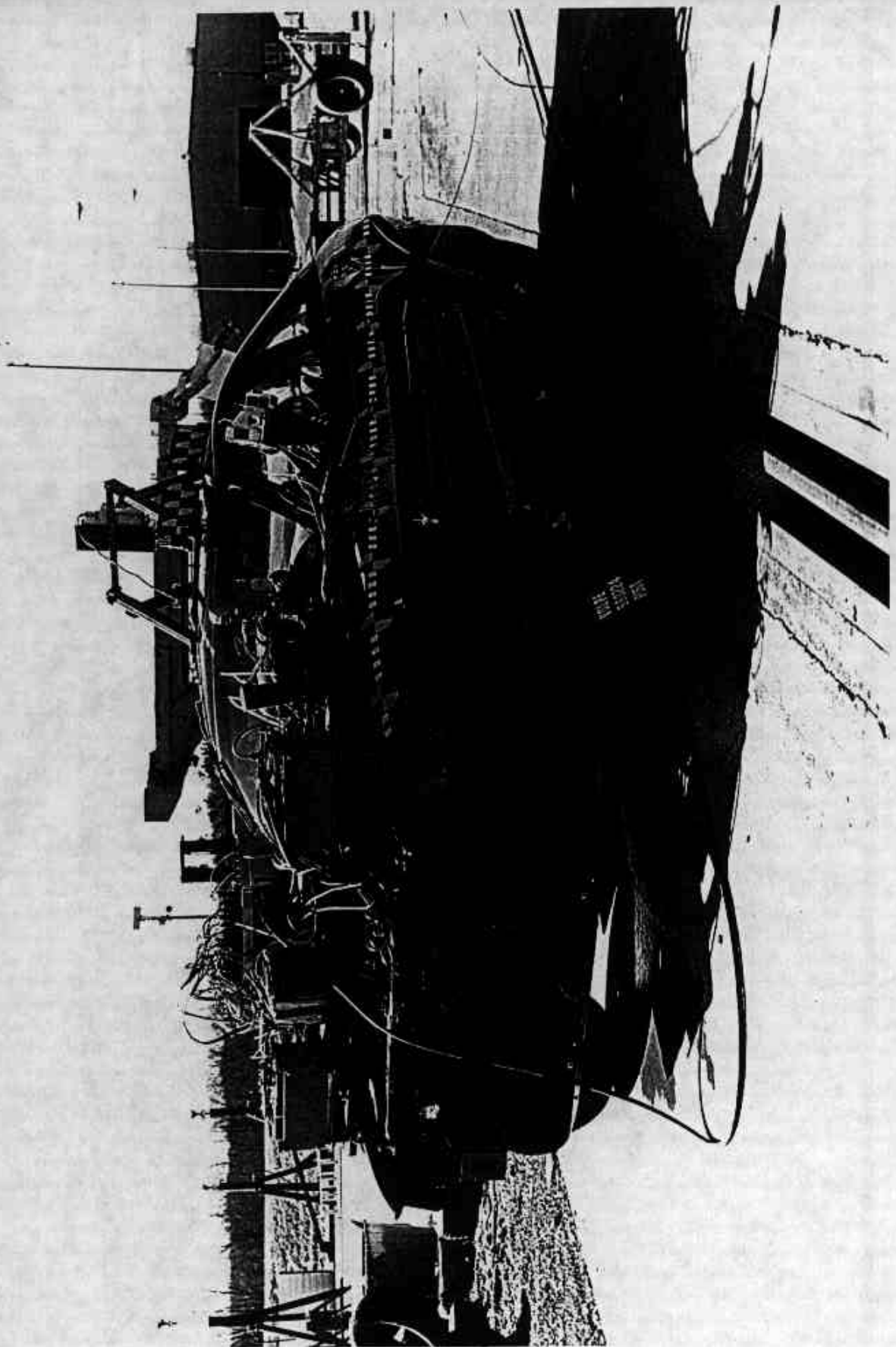


Figure A-3 Post-Test Left Front Three-Quarter View

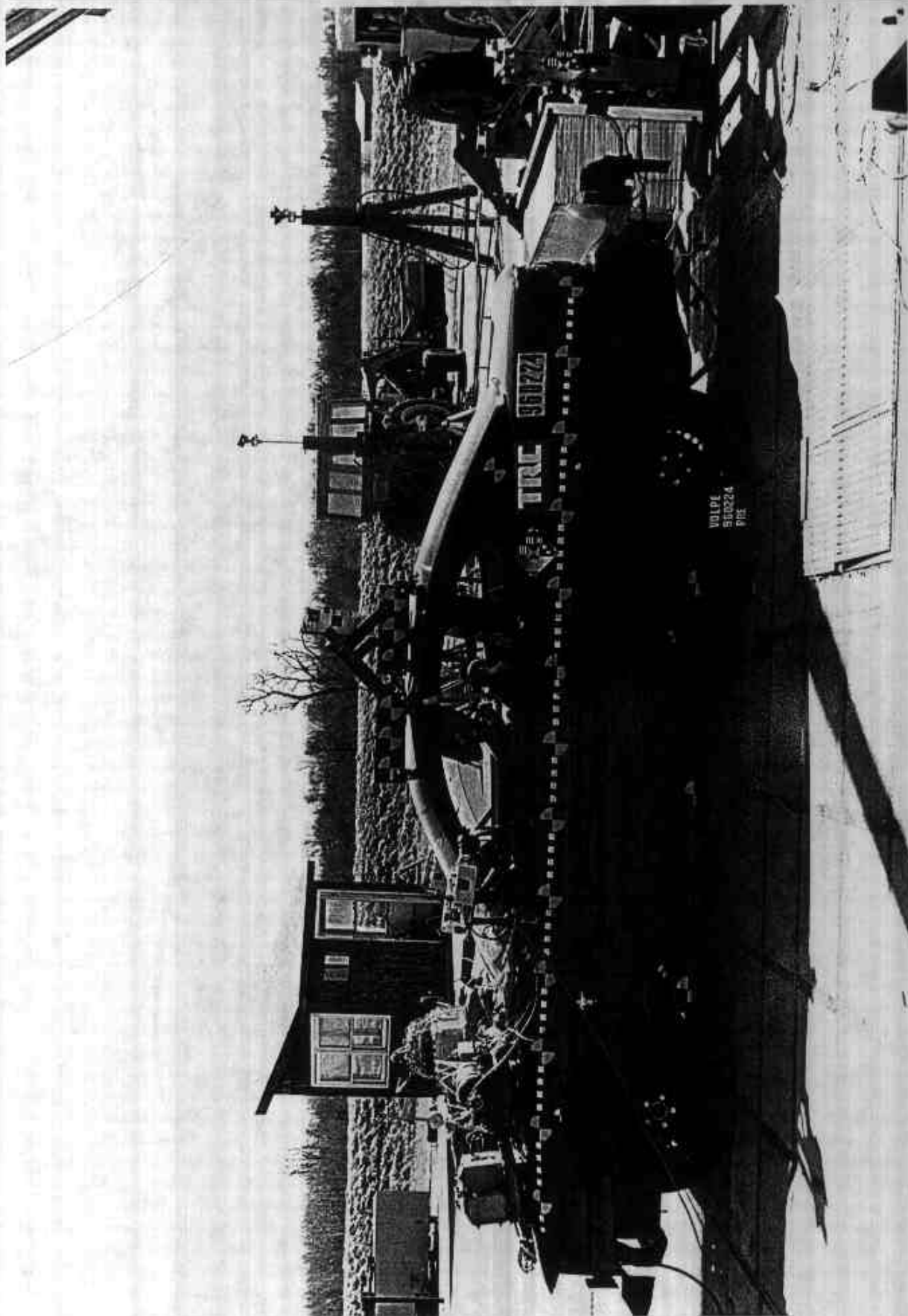


Figure A-4 Pre-Test Left Side View

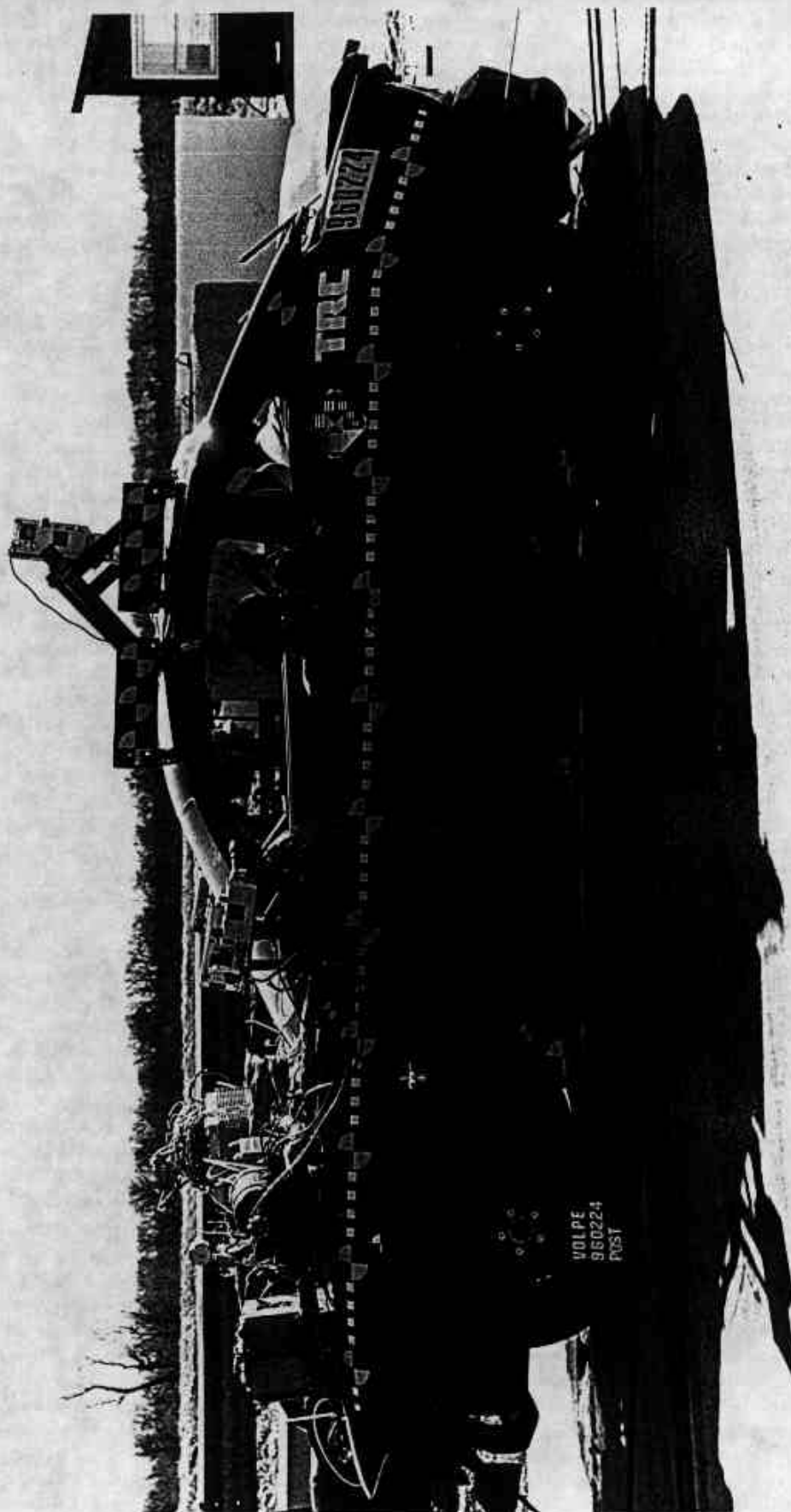


Figure A-5 Post-Test Left Side View

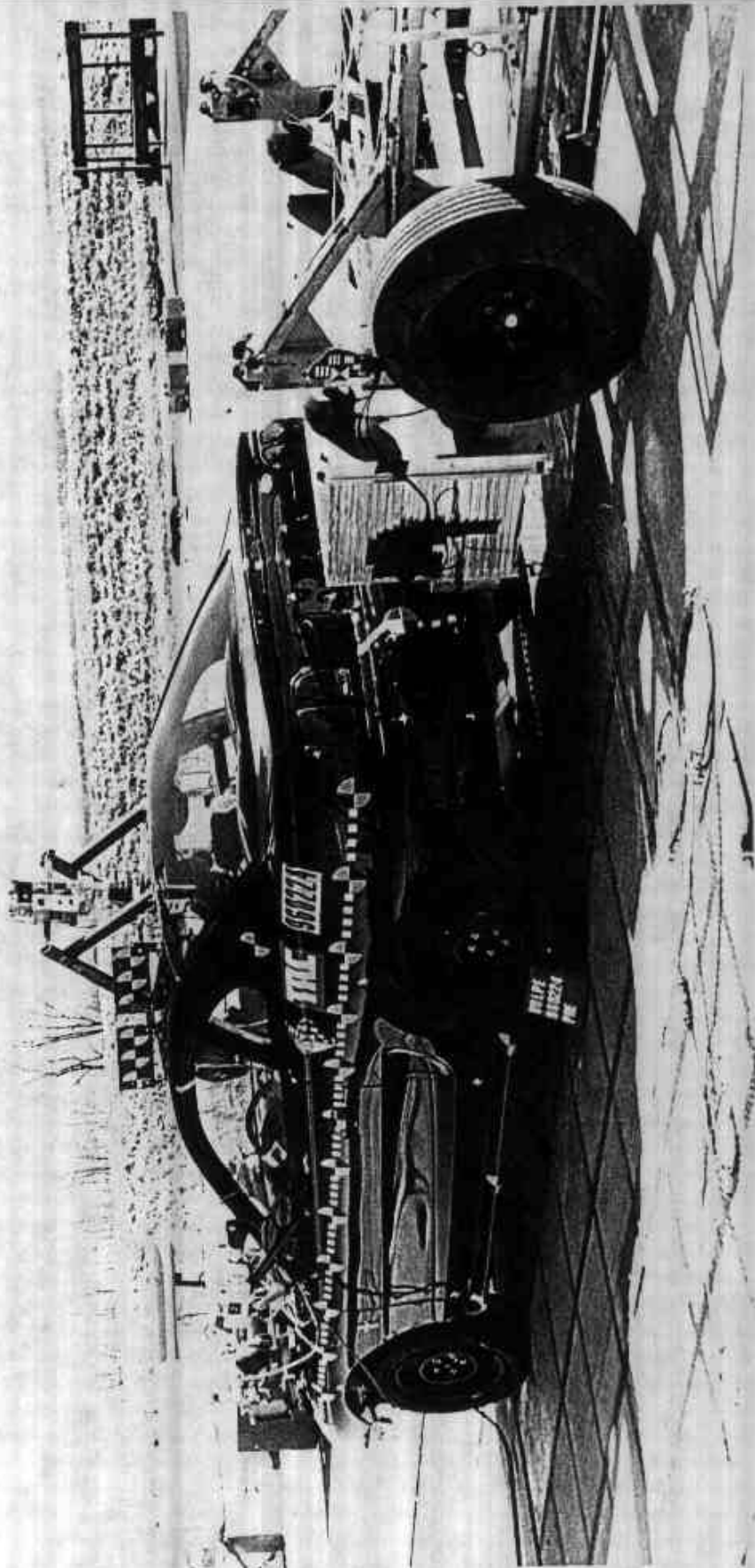


Figure A-6 Pre-Test Left Rear Three-Quarter View

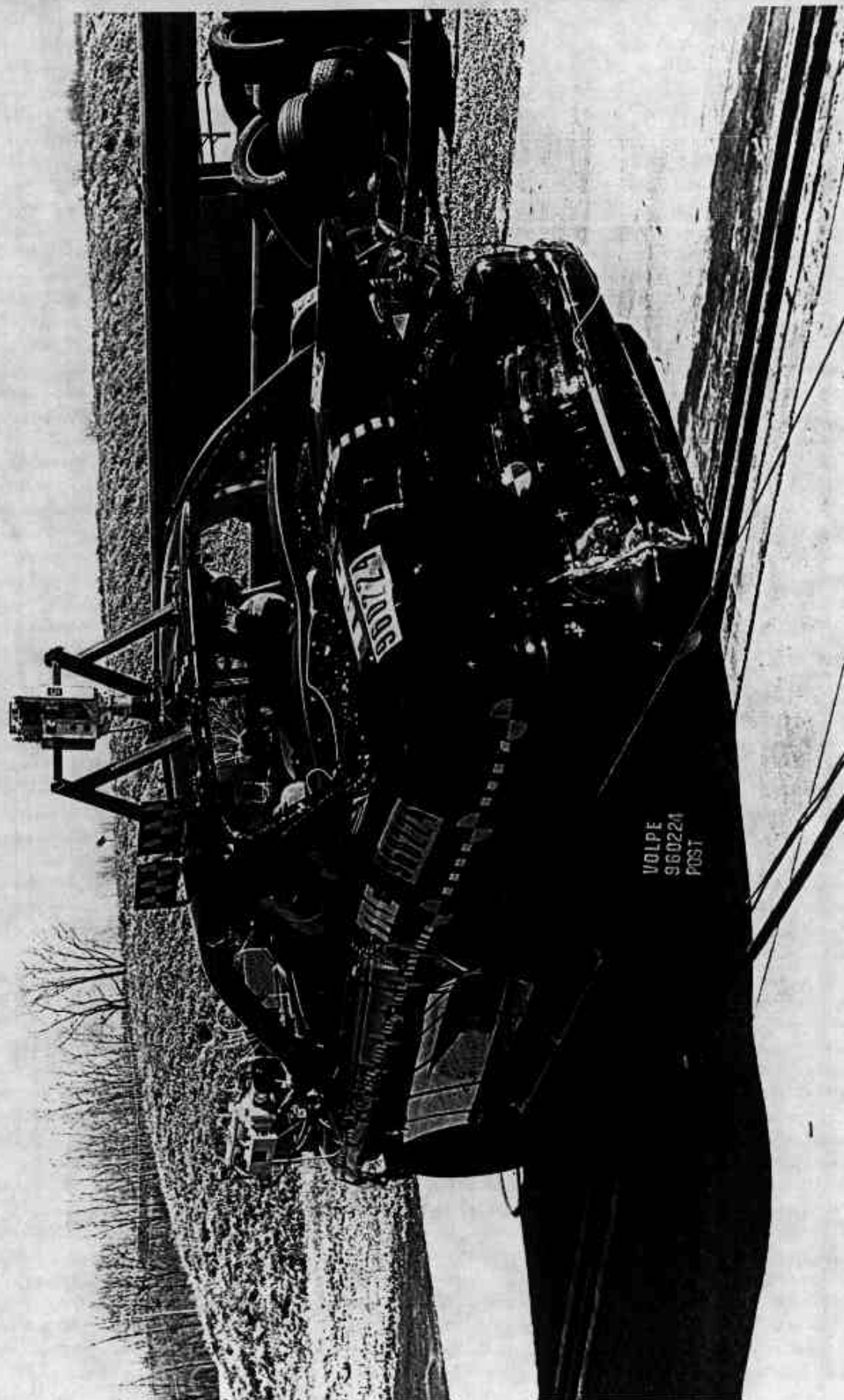


Figure A-7 Post-Test Left Rear Three-Quarter View

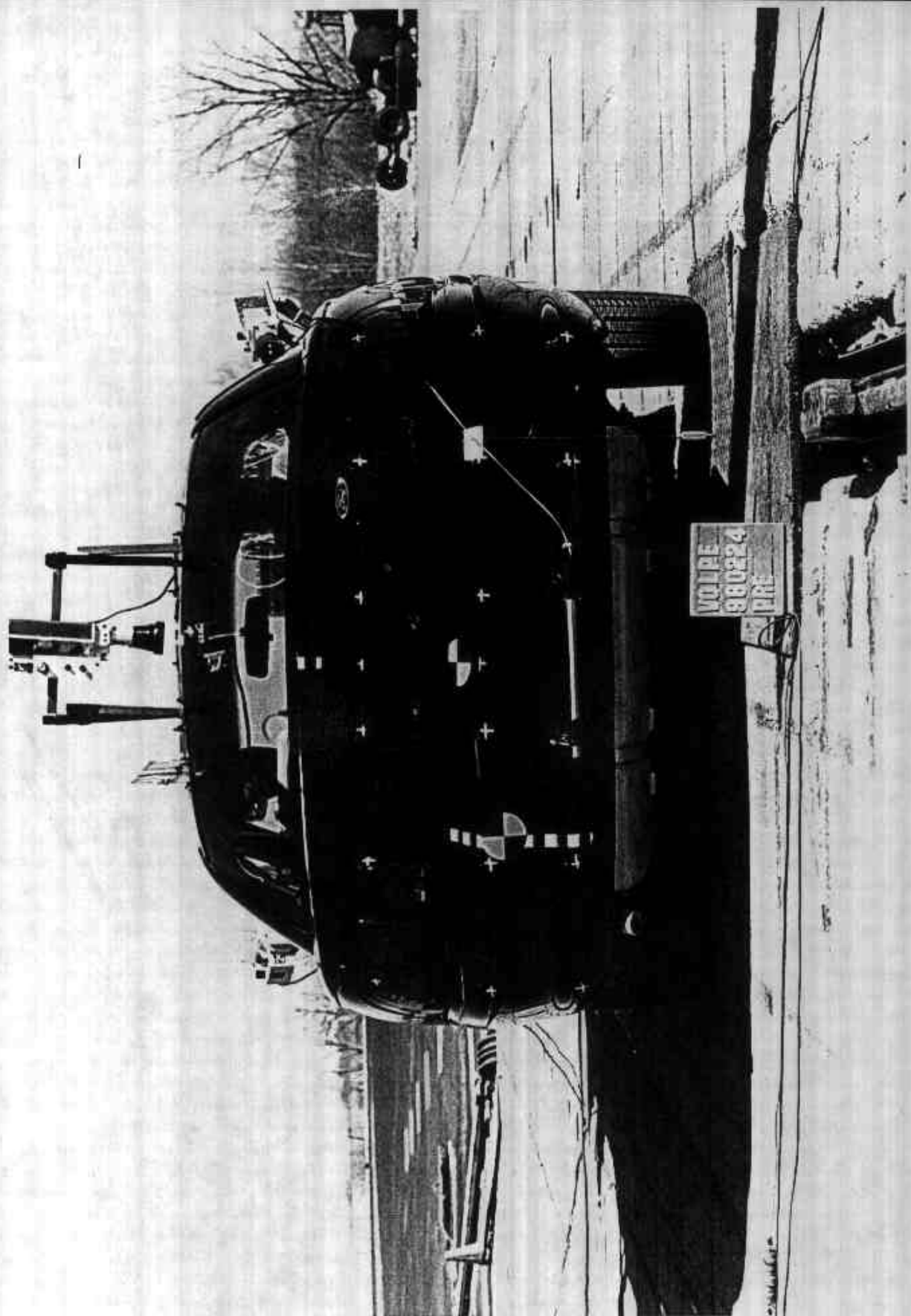


Figure A-8 Pre-Test Rear View

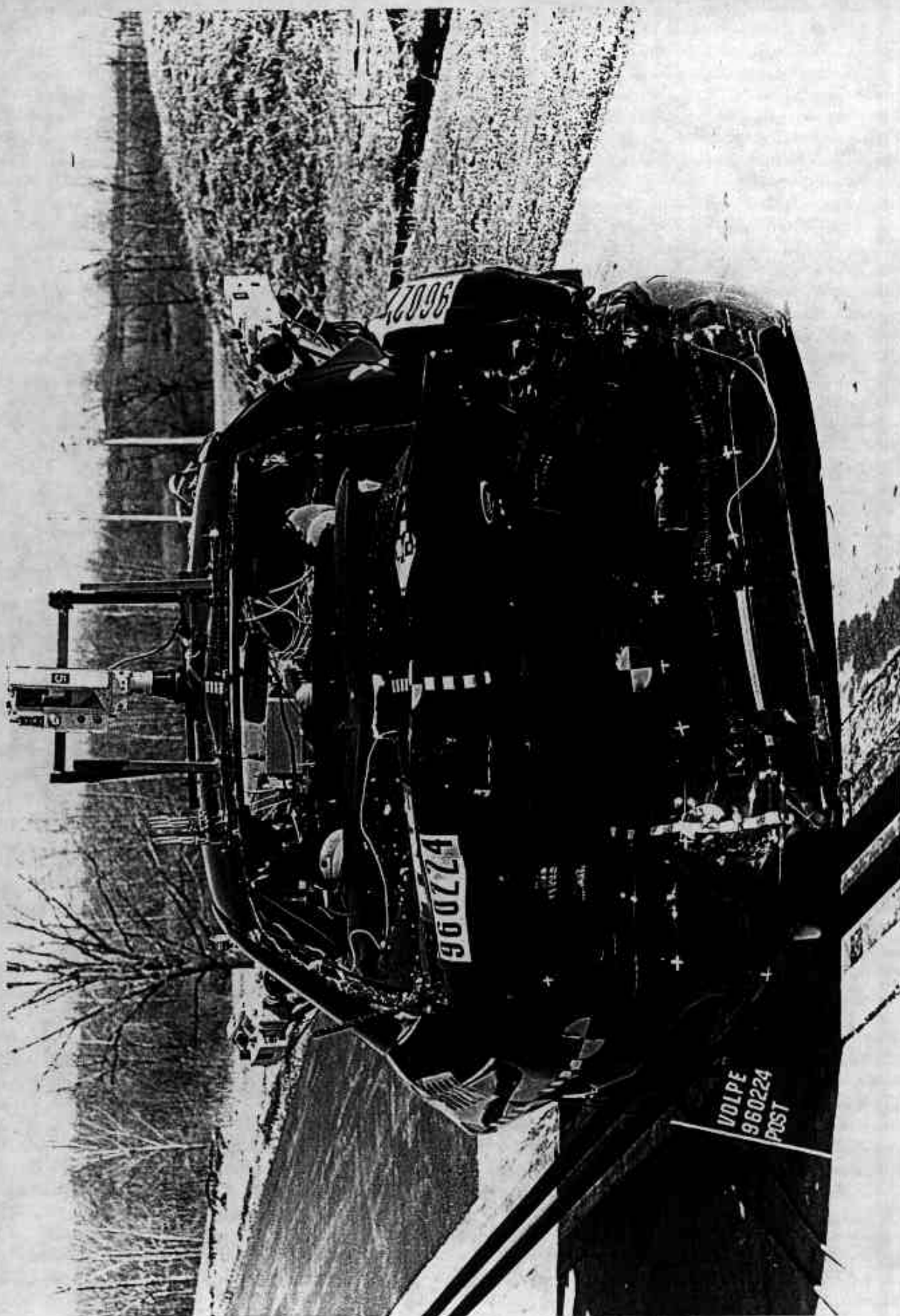


Figure A-9 Post-Test Rear View

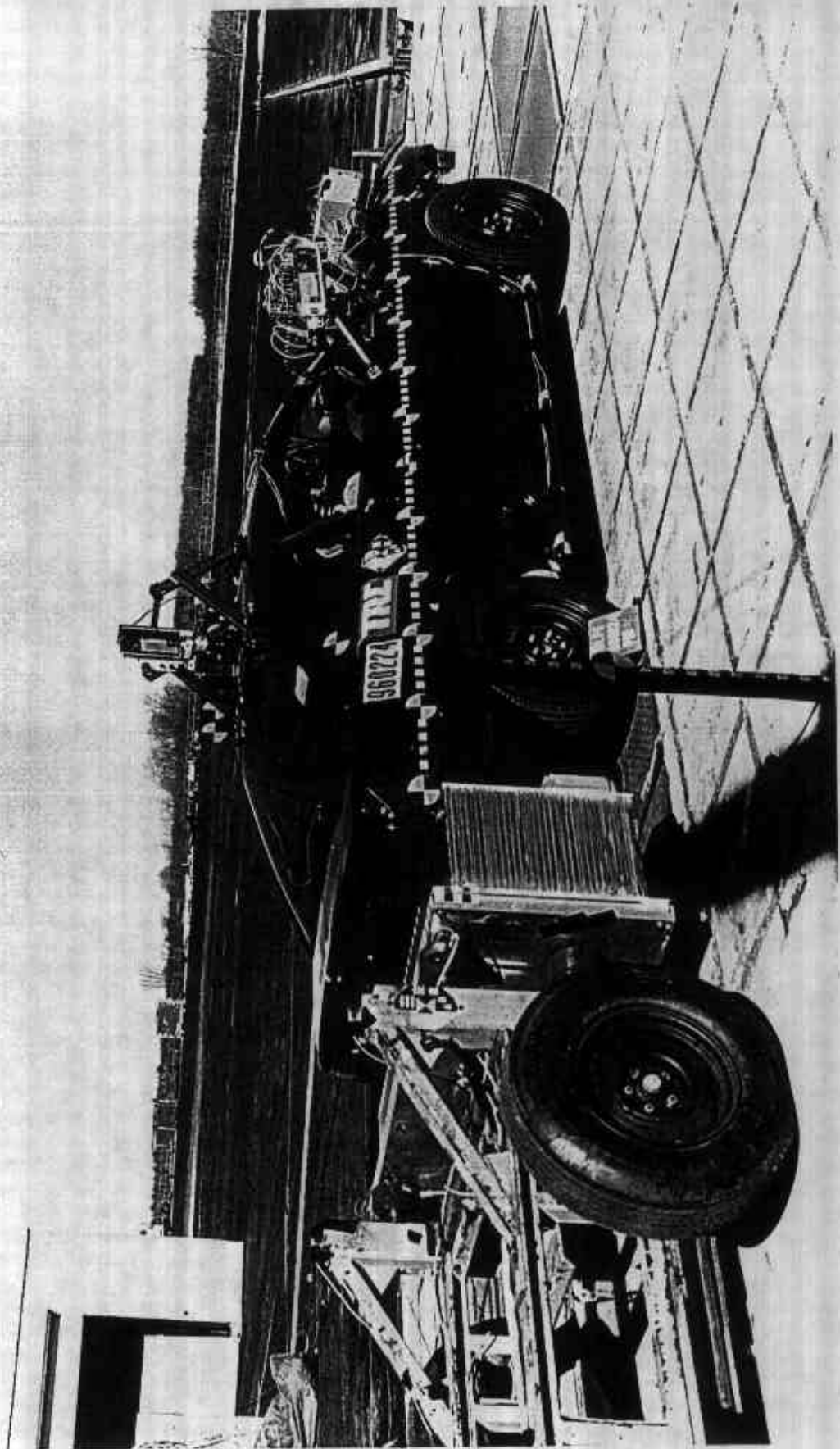


Figure A-10 Pre-Test Right Rear Three-Quarter View

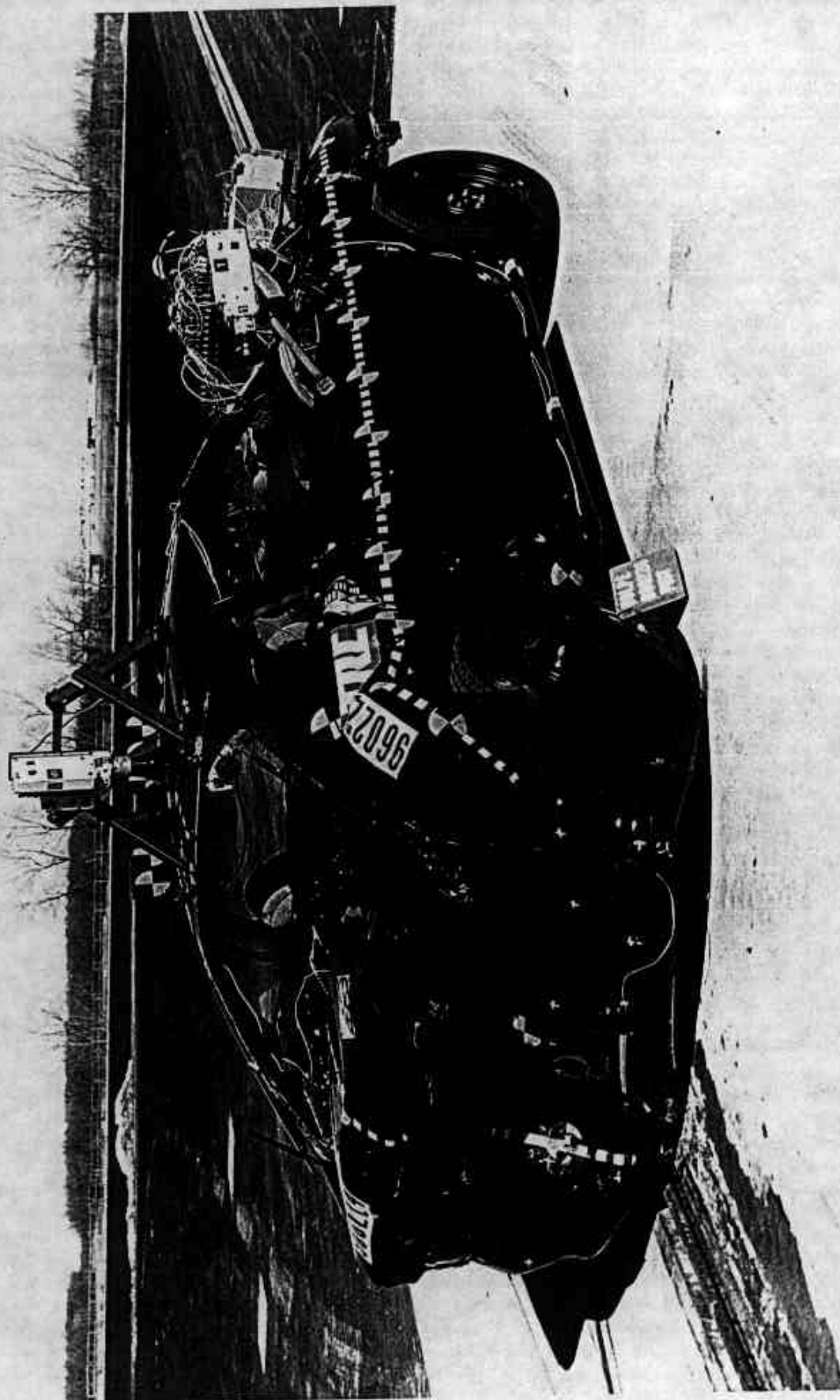


Figure A-11 Post-Test Right Rear Three-Quarter View

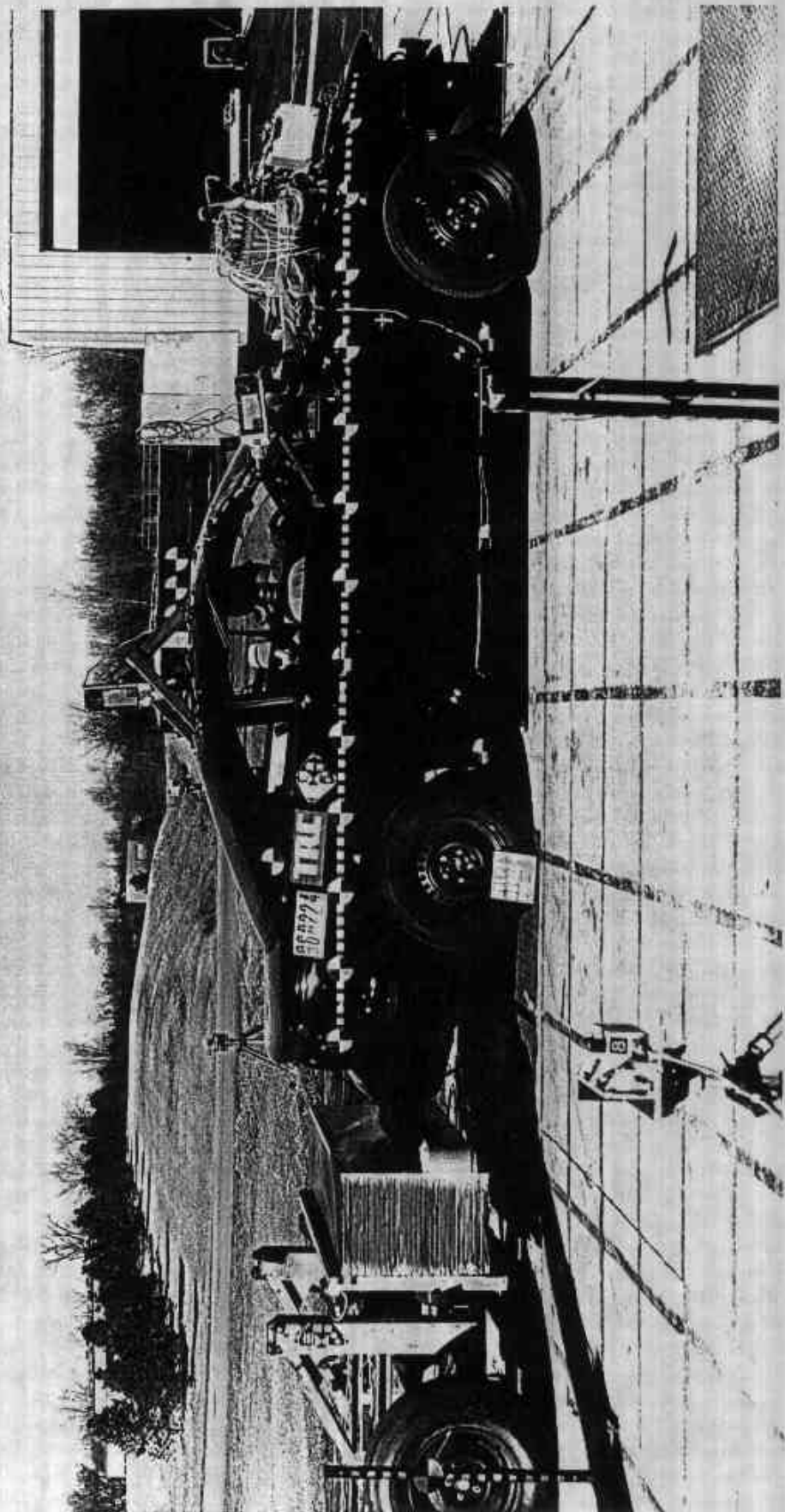


Figure A-12 Pre-Test Right Side View

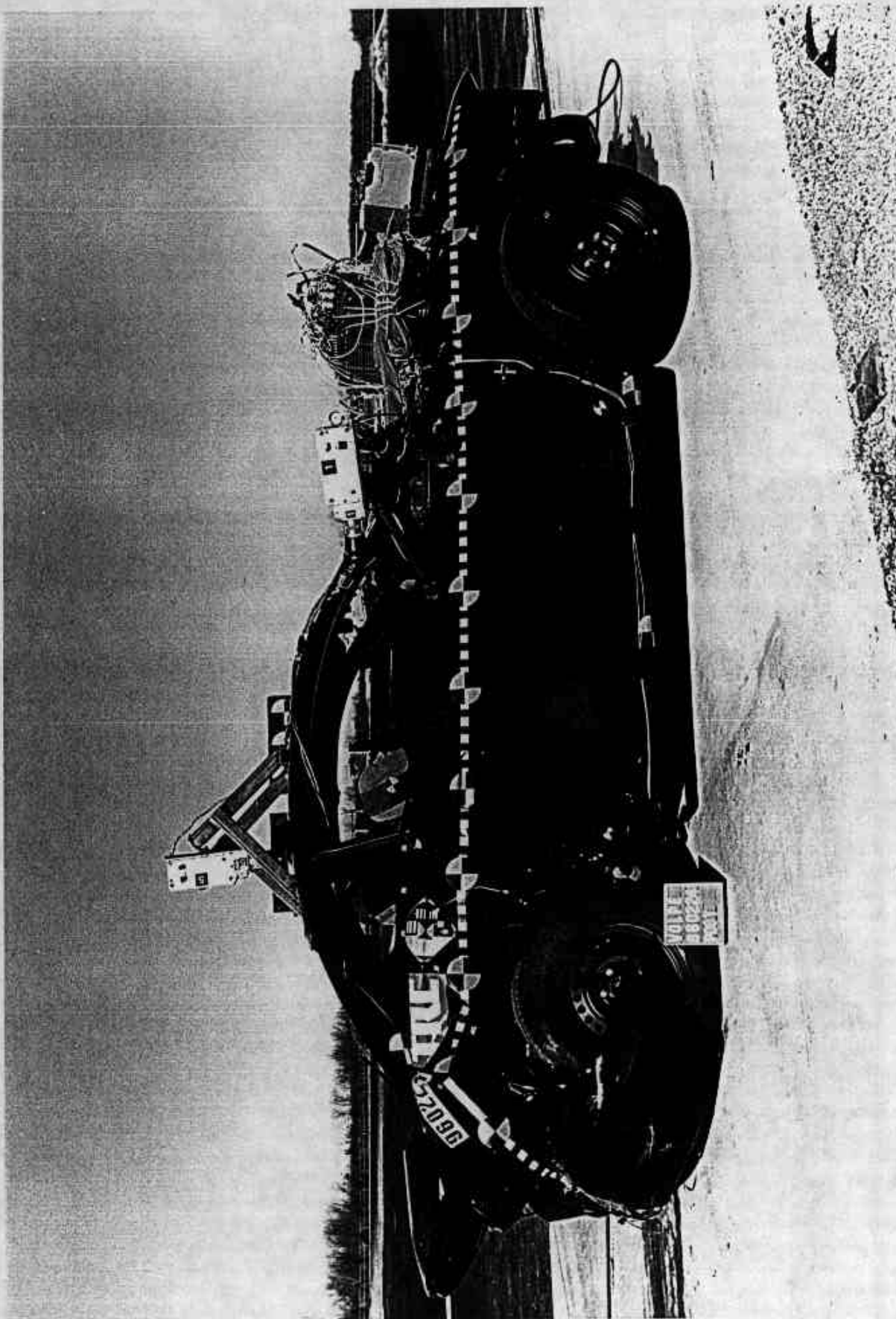


Figure A-13 Post-Test Right Side View

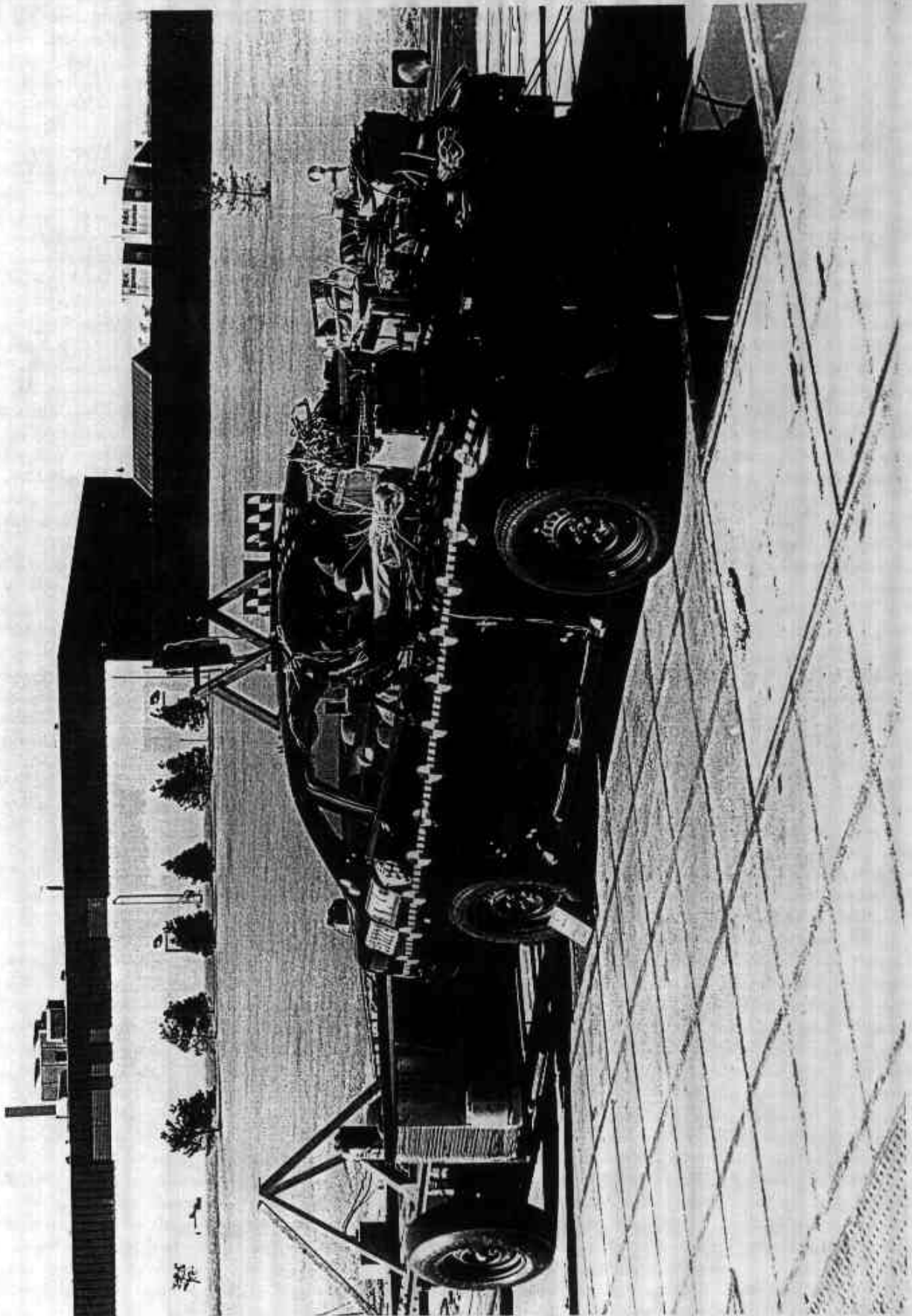


Figure A-14 Pre-Test Right Front Three-Quarter View

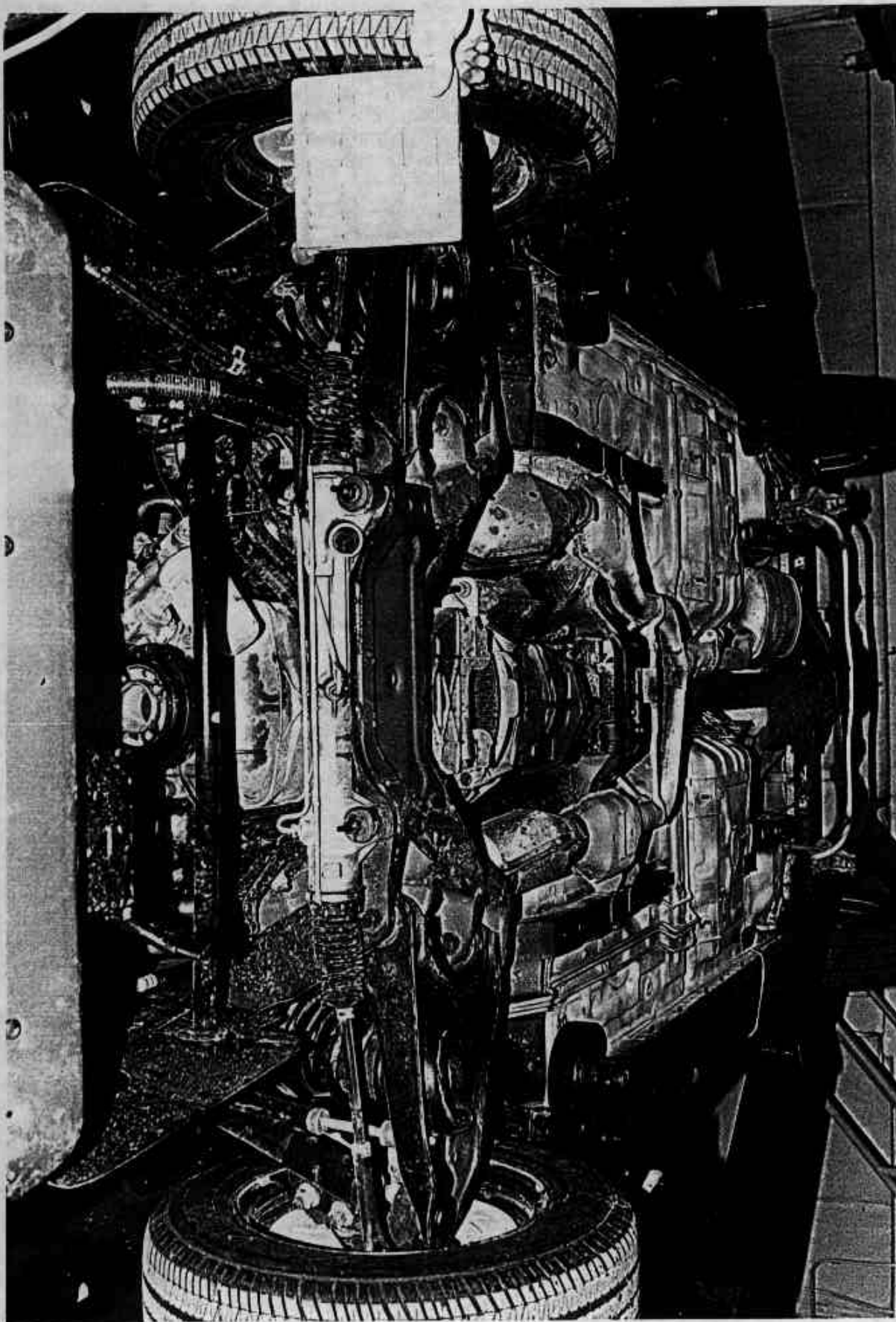


Figure A-15 Pre-Test Front Underbody View

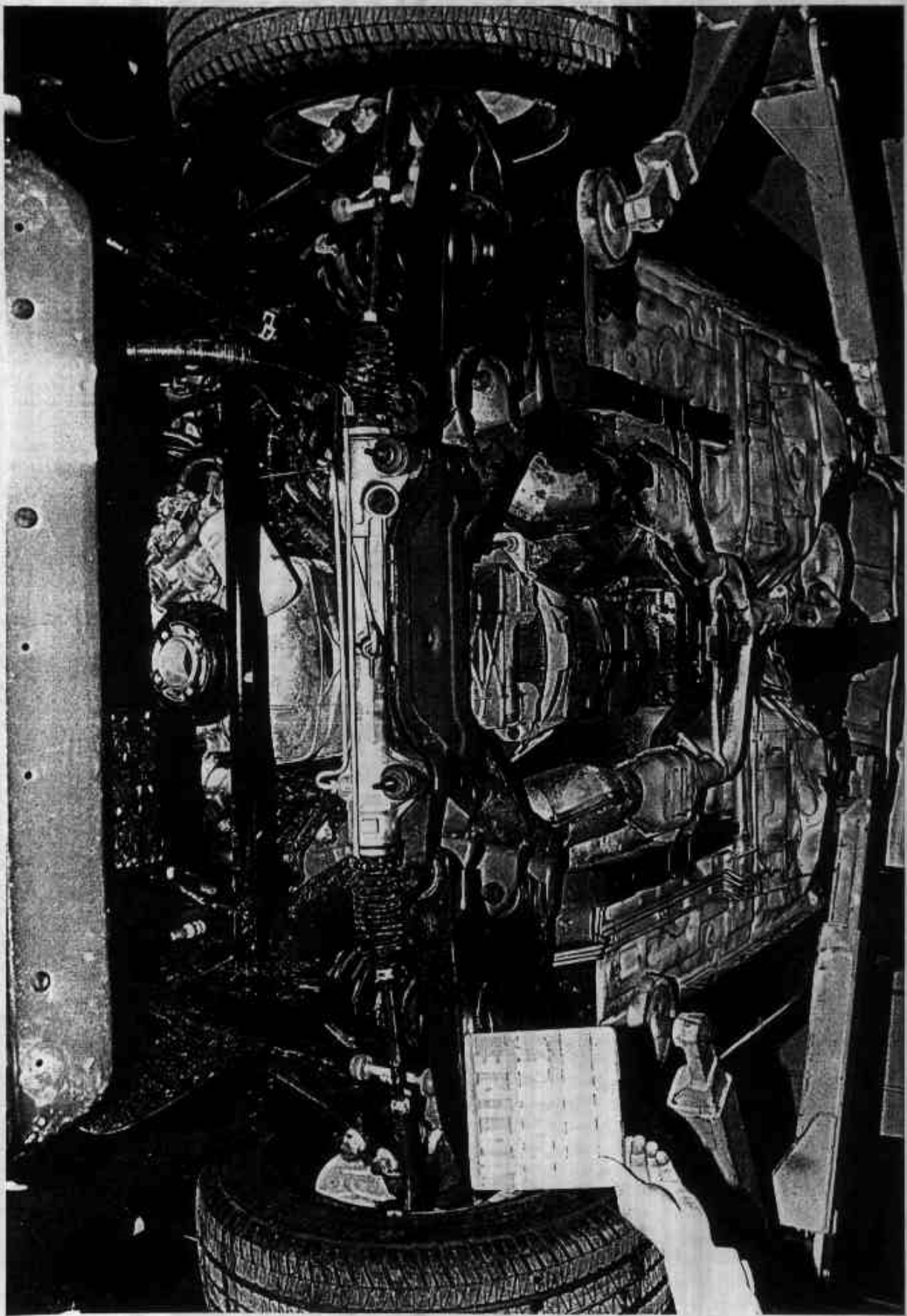


Figure A-16 Post-Test Front Underbody View

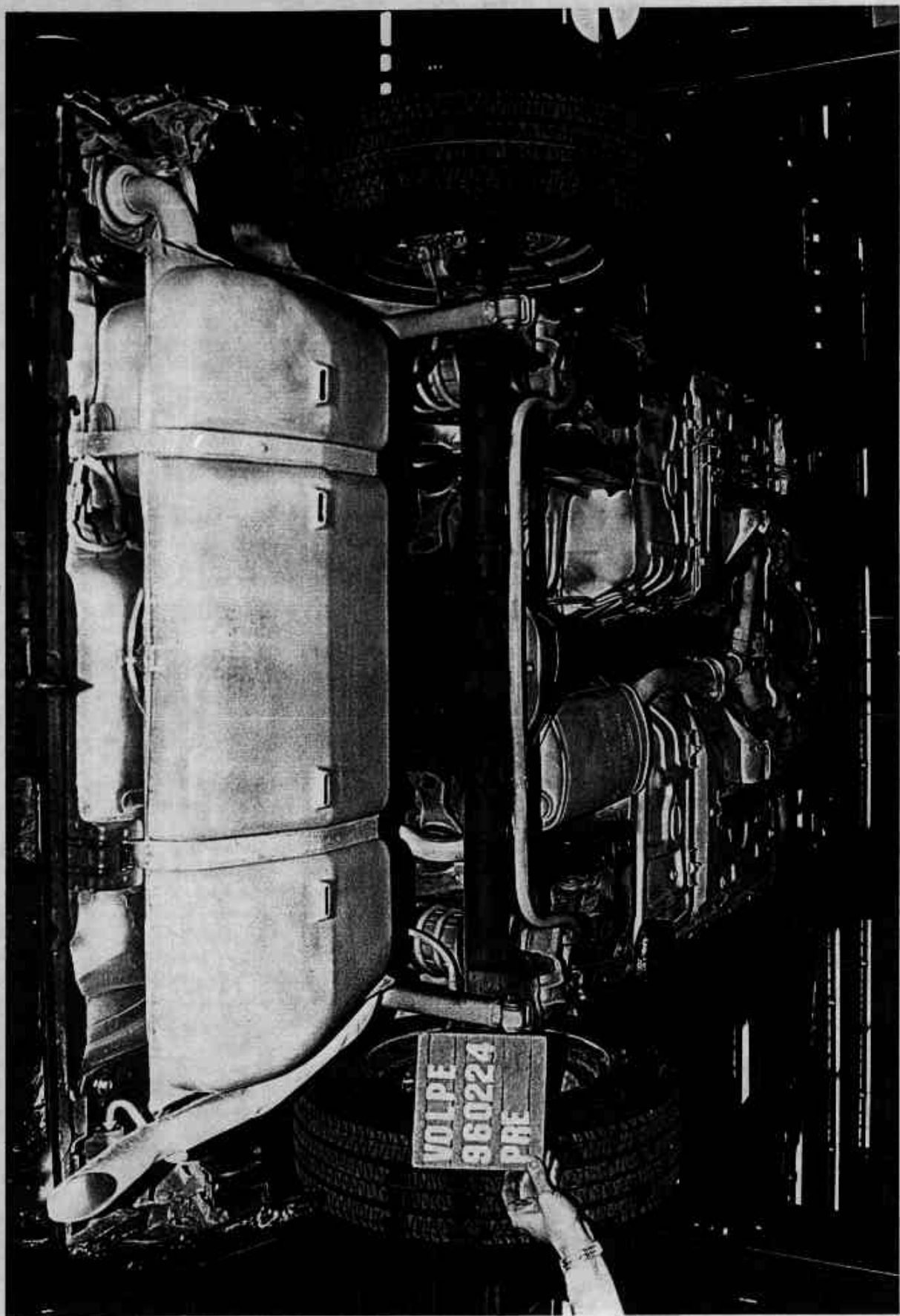


Figure A-17 Pre-Test Rear Underbody View

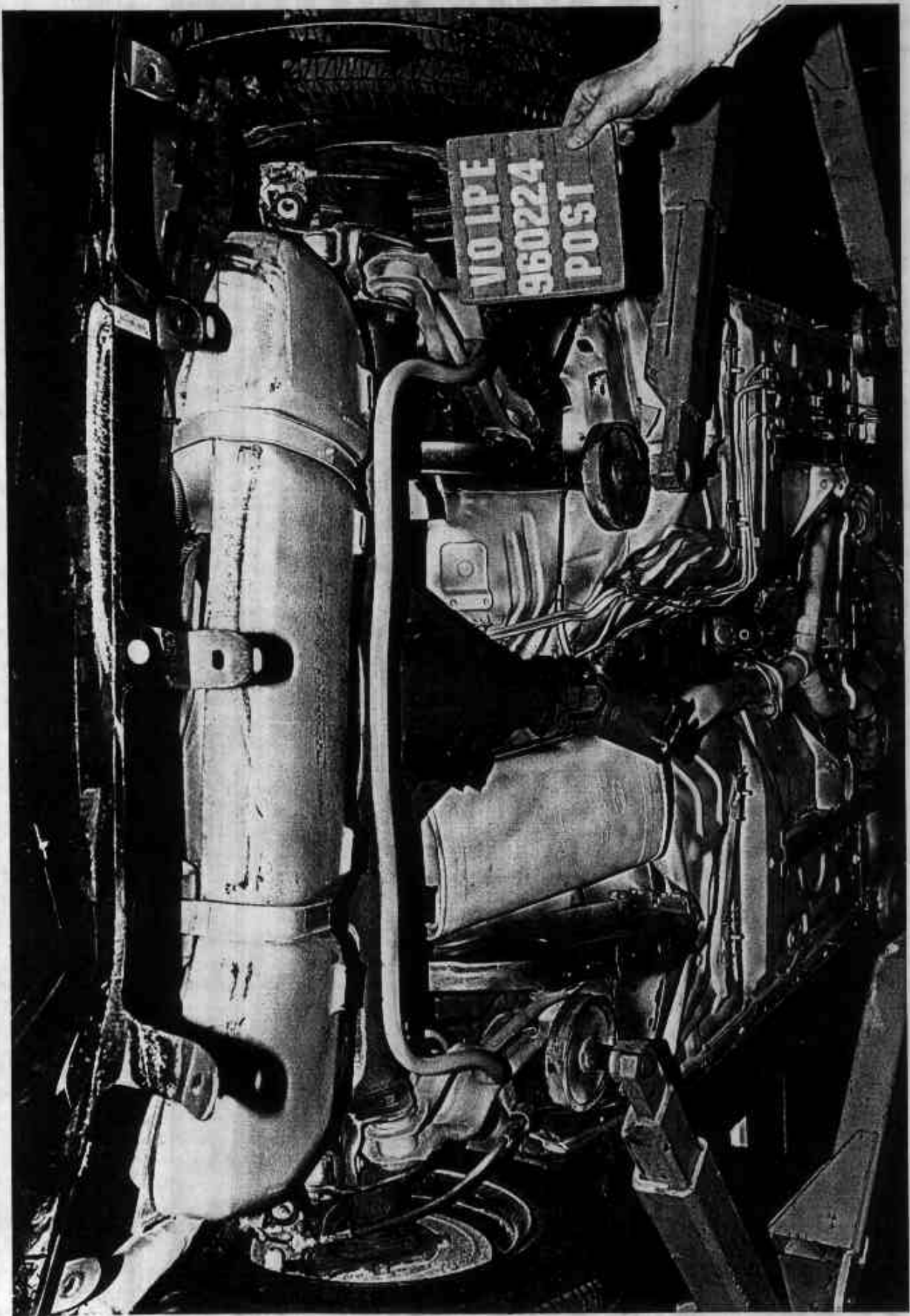


Figure A-18 Post-Test Rear Underbody View

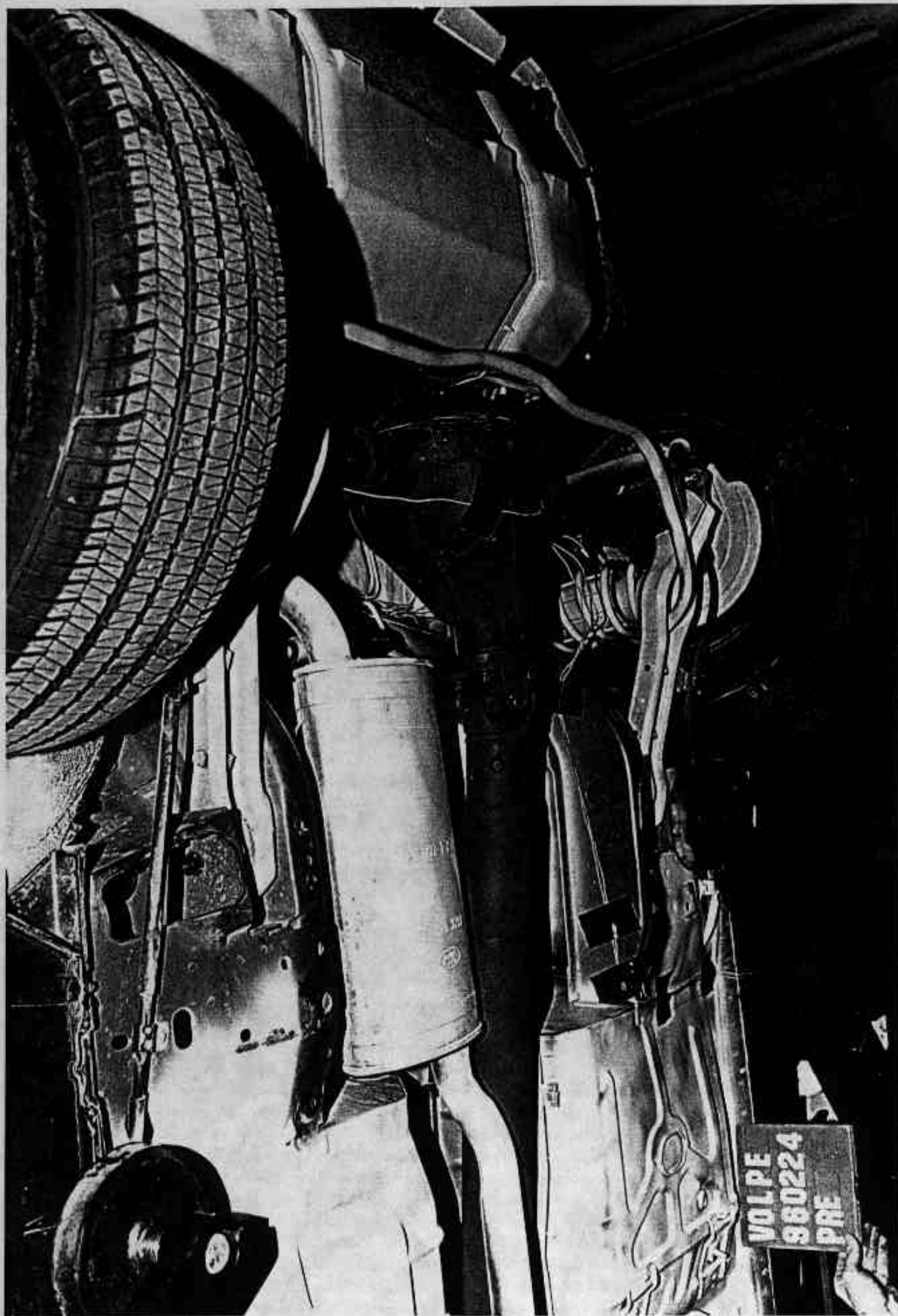


Figure A-19 Pre-Test Fuel Tank View



Figure A-20 Post-Test Fuel Tank View



Figure A-21 Pre-Test Windshield View

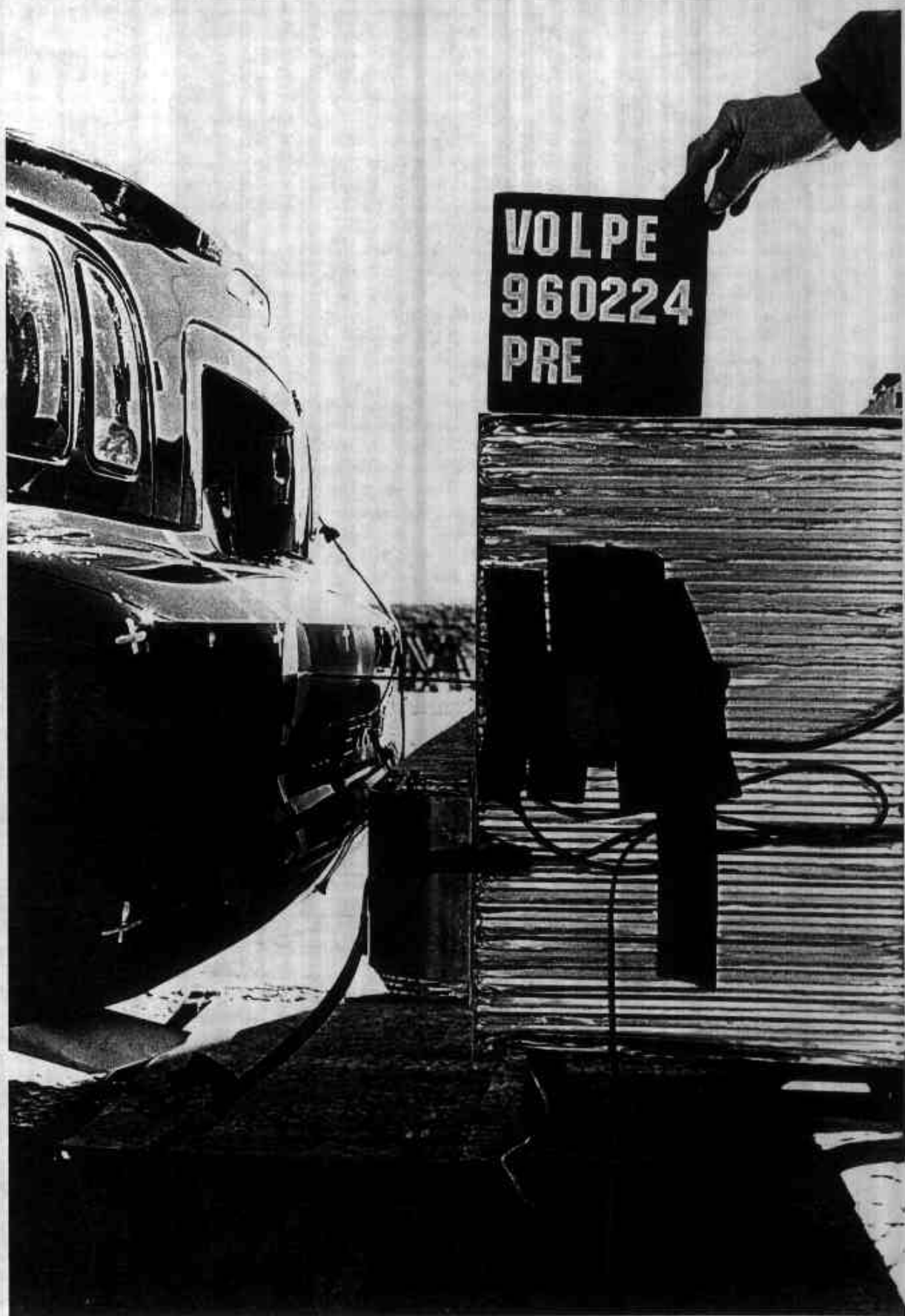


Figure A-22 Pre-Test Barrier to Vehicle Alignment View - Left

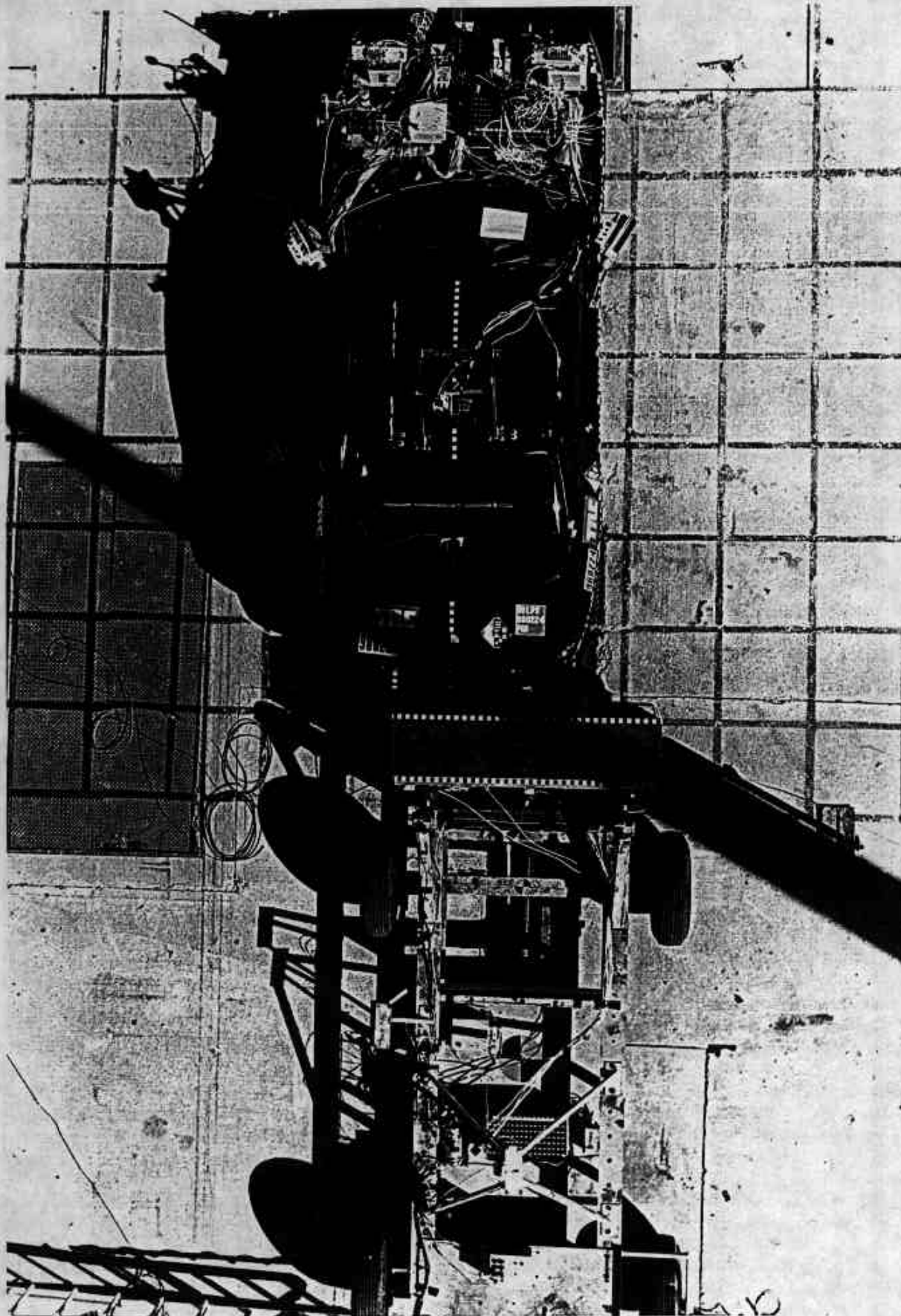


Figure A-23 Pre-Test Barrier to Vehicle Alignment View - Overhead



Figure A-24 Pre-Test Driver Dummy Position View

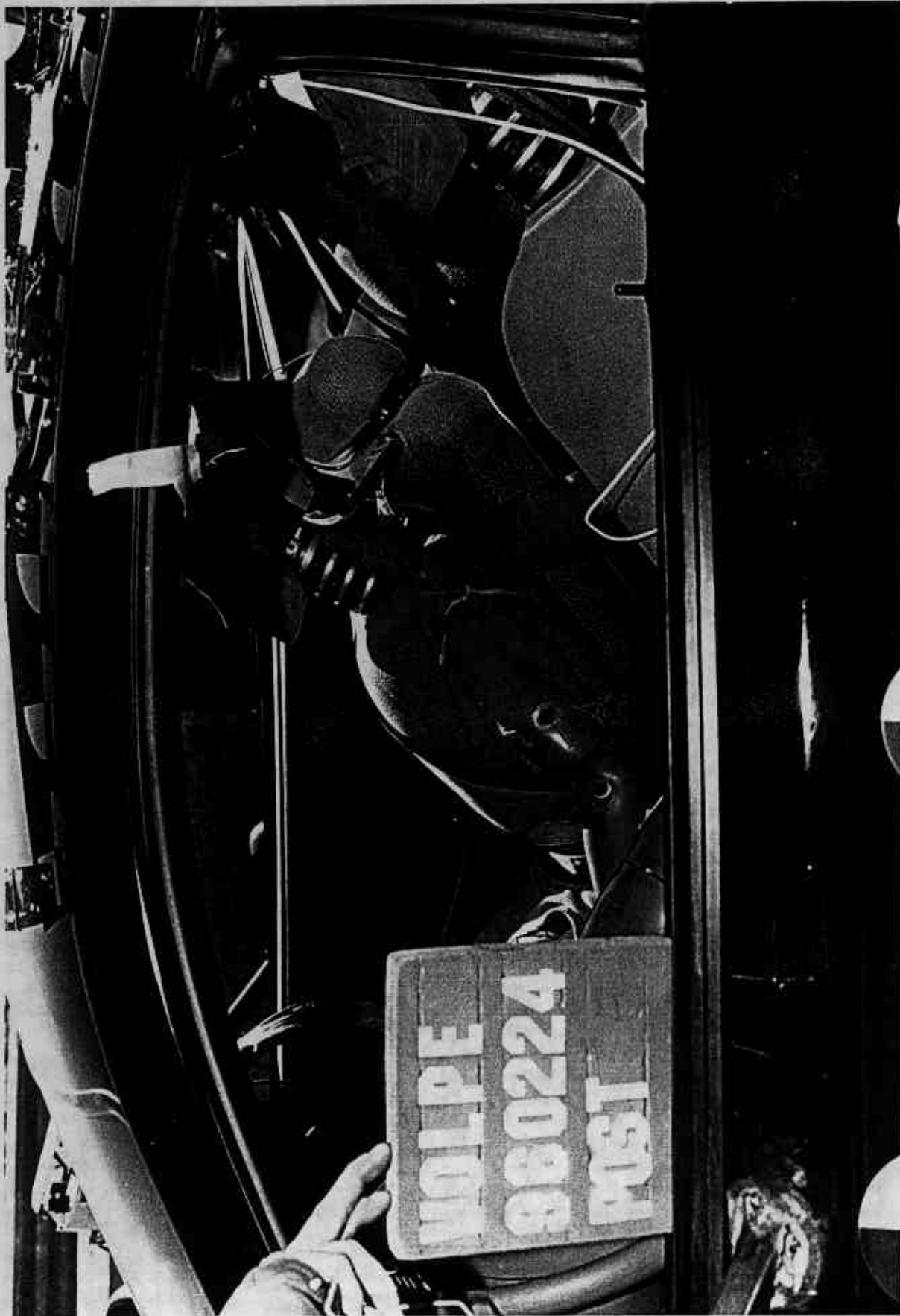


Figure A-25 Post-Test Driver Dummy Position View

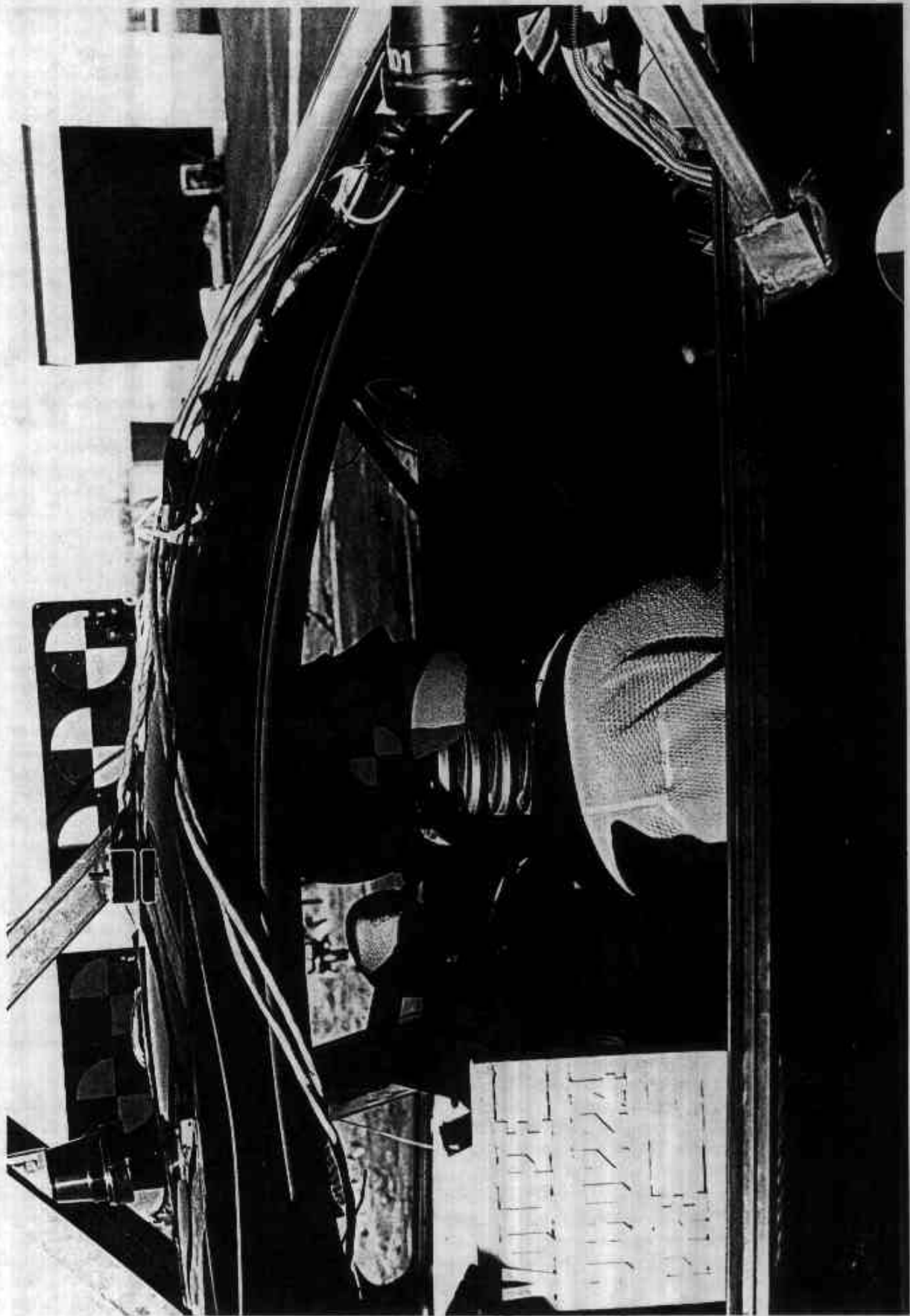


Figure A-26 Pre-Test Passenger Dummy Position View

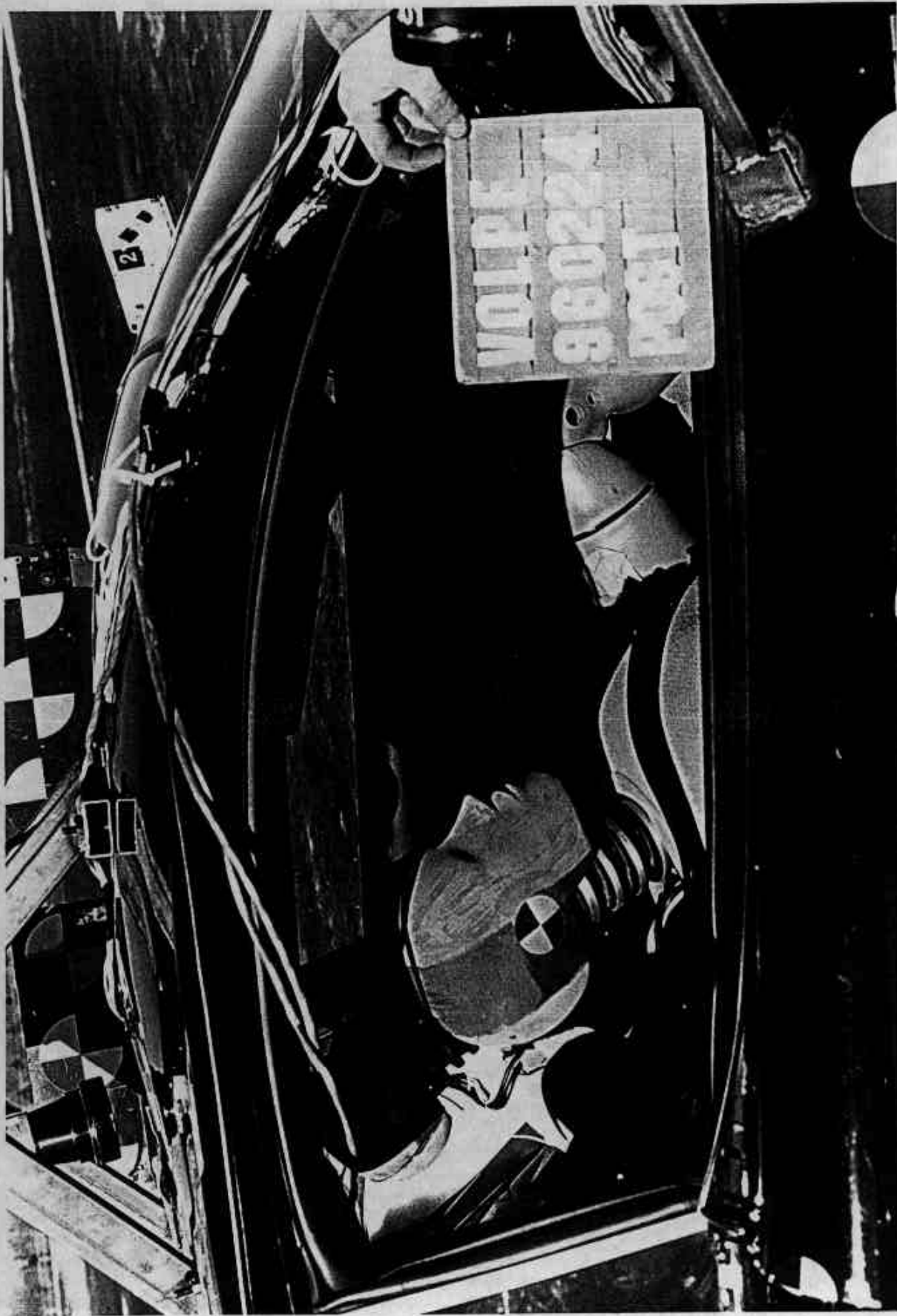


Figure A-27 Post-Test Passenger Dummy Position View

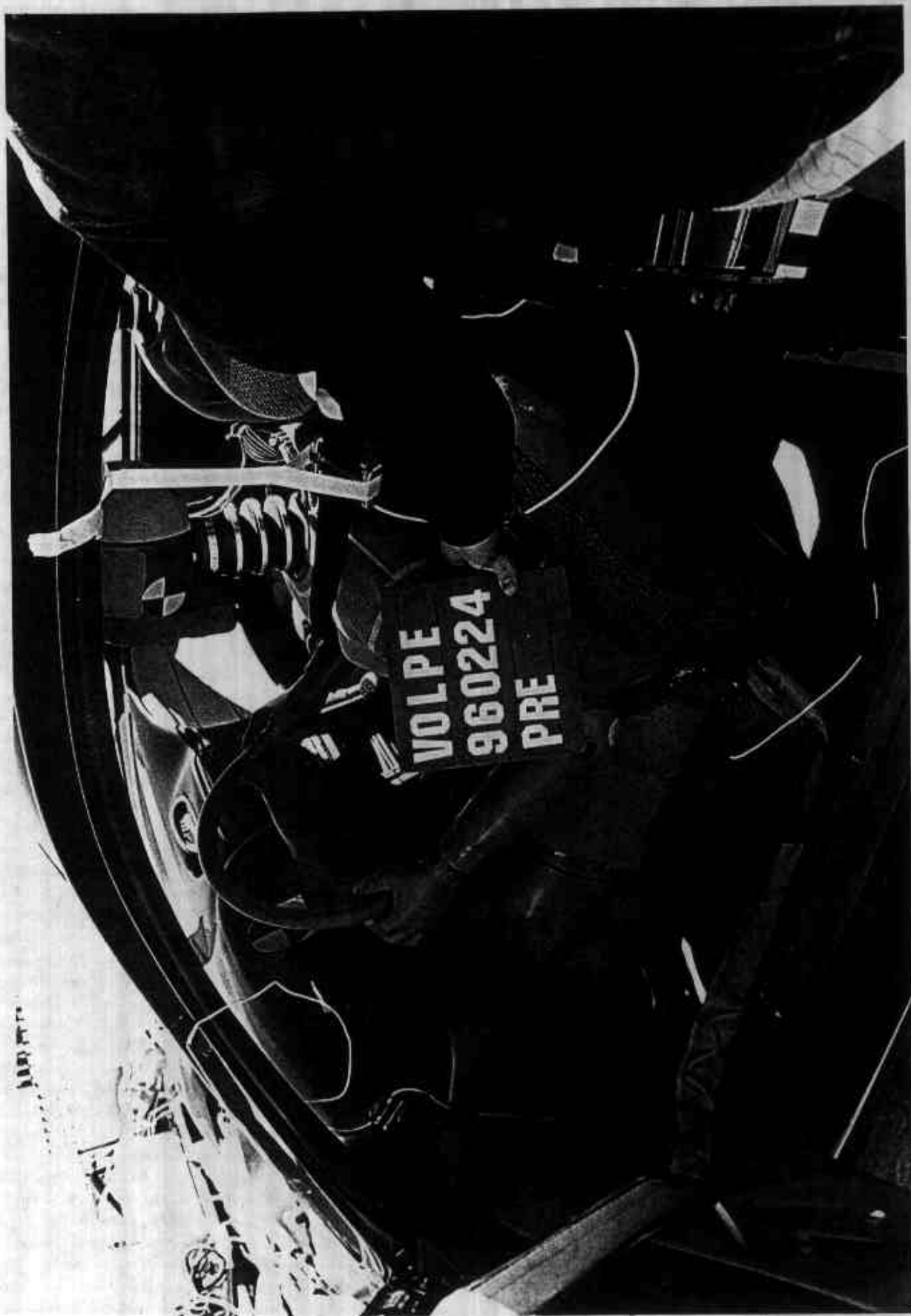


Figure A-28 Pre-Test Driver Dummy & Vehicle Interior - View 1



Figure A-29 Pre-Test Driver Dummy & Vehicle Interior - View 2



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



Figure A-31 Pre-Test Passenger Dummy & Vehicle Interior - View 2

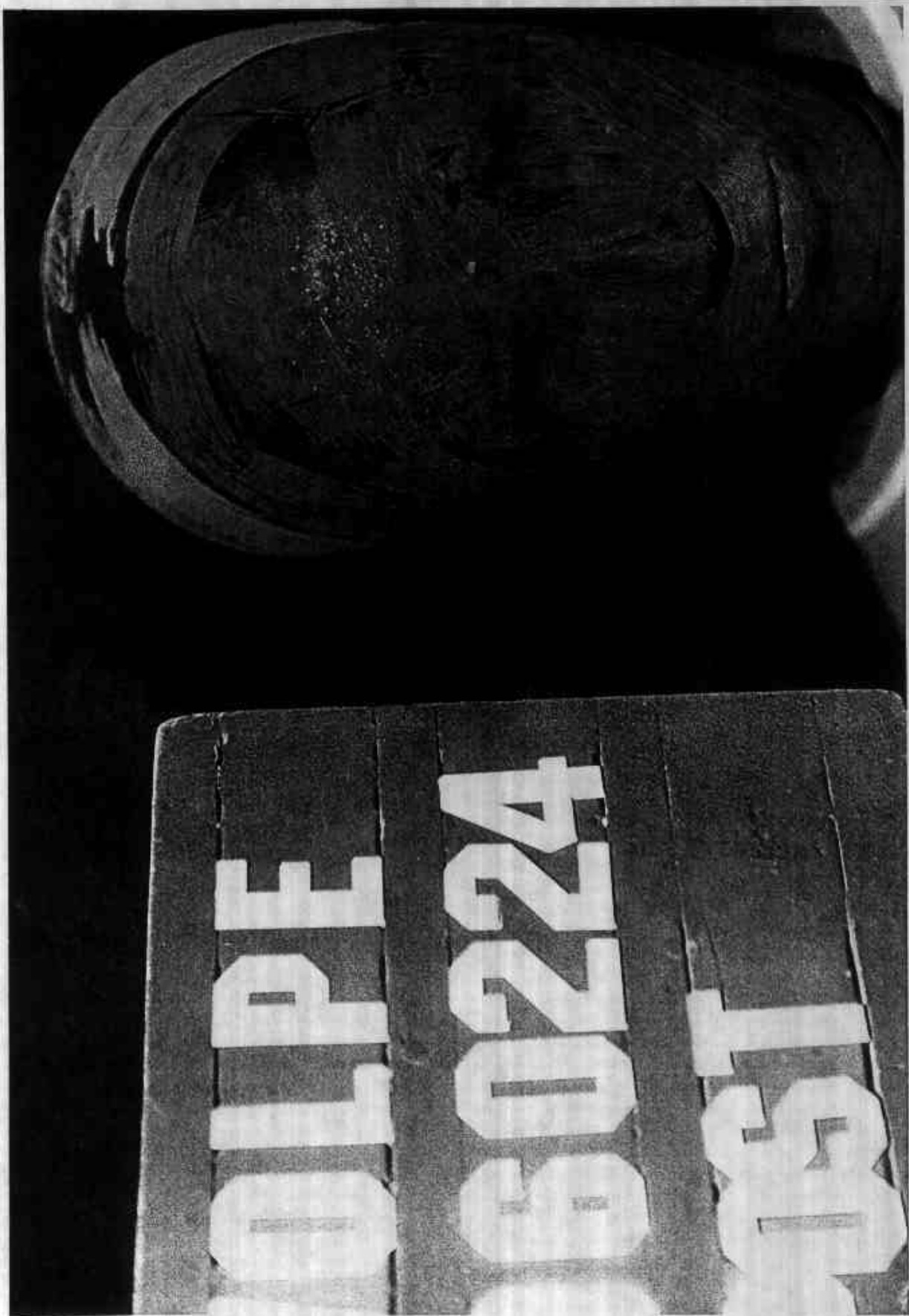


Figure A-32 Post-Test Driver Dummy Head Contact - View 1

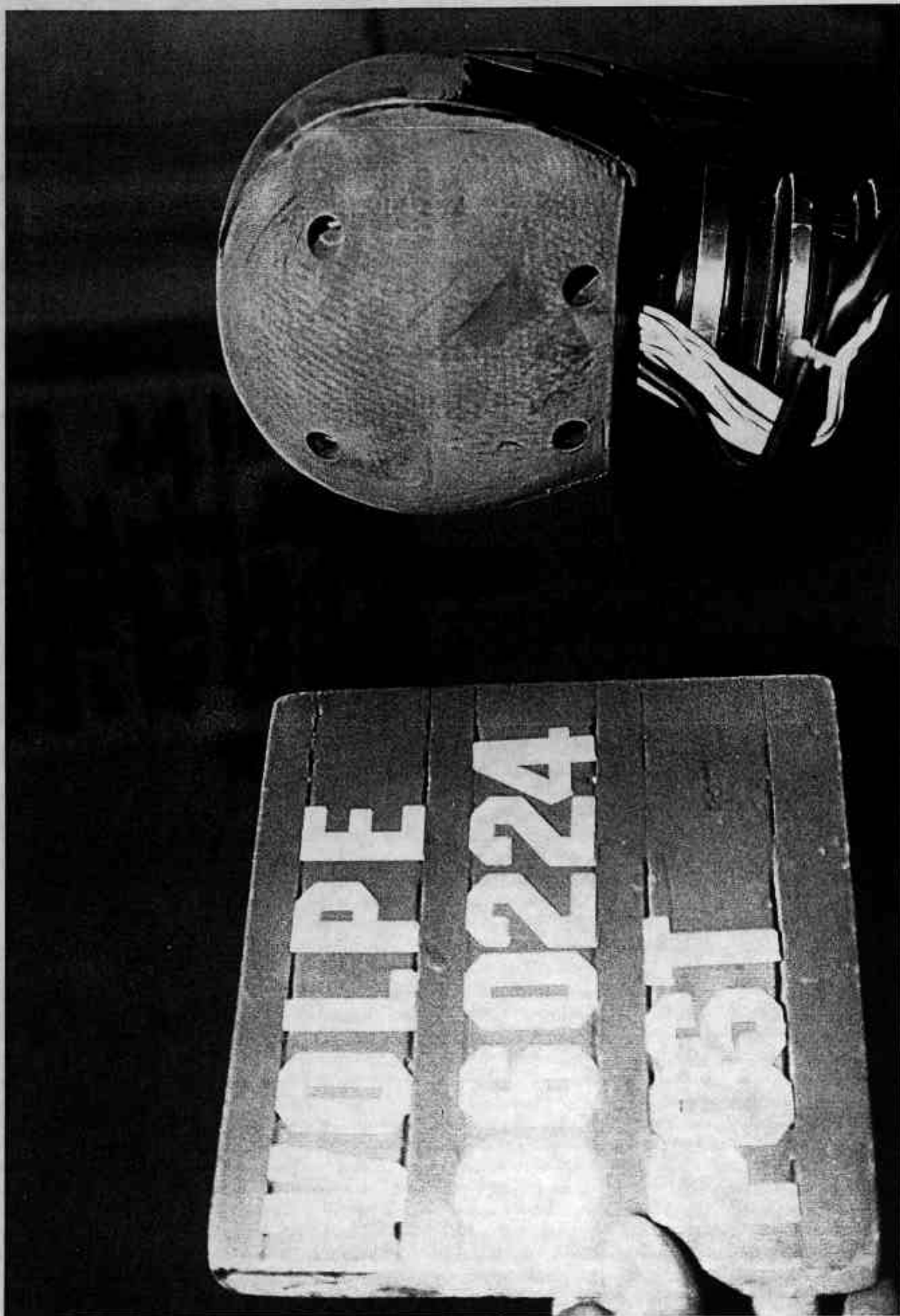


Figure A-33 Post-Test Driver Dummy Head Contact - View 2

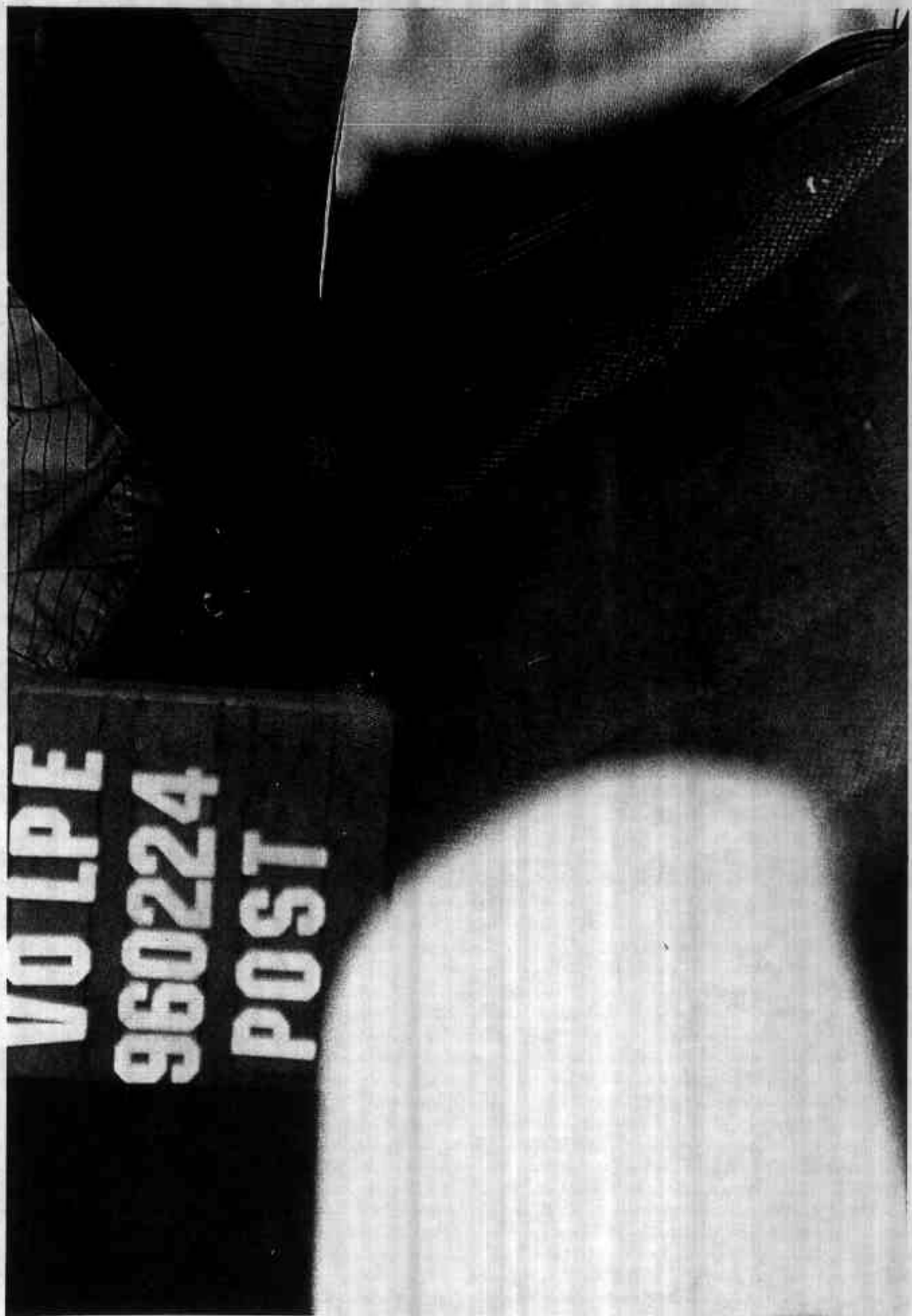


Figure A-34 Post-Test Driver Dummy Head Contact - View 3



Figure A-35 Post-Test Driver Dummy Knee Contact View

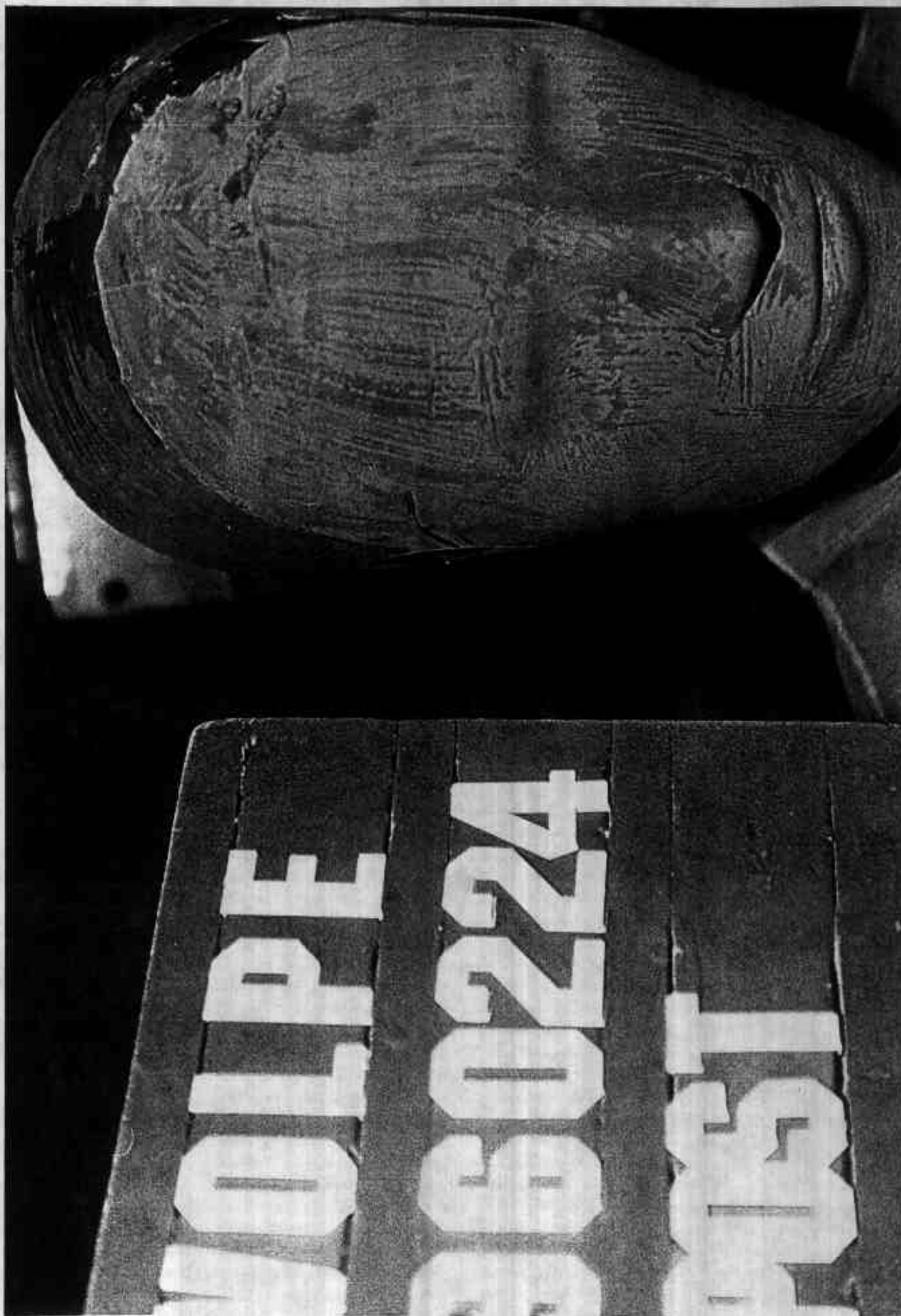


Figure A-36 Post-Test Passenger Dummy Head Contact - View 1

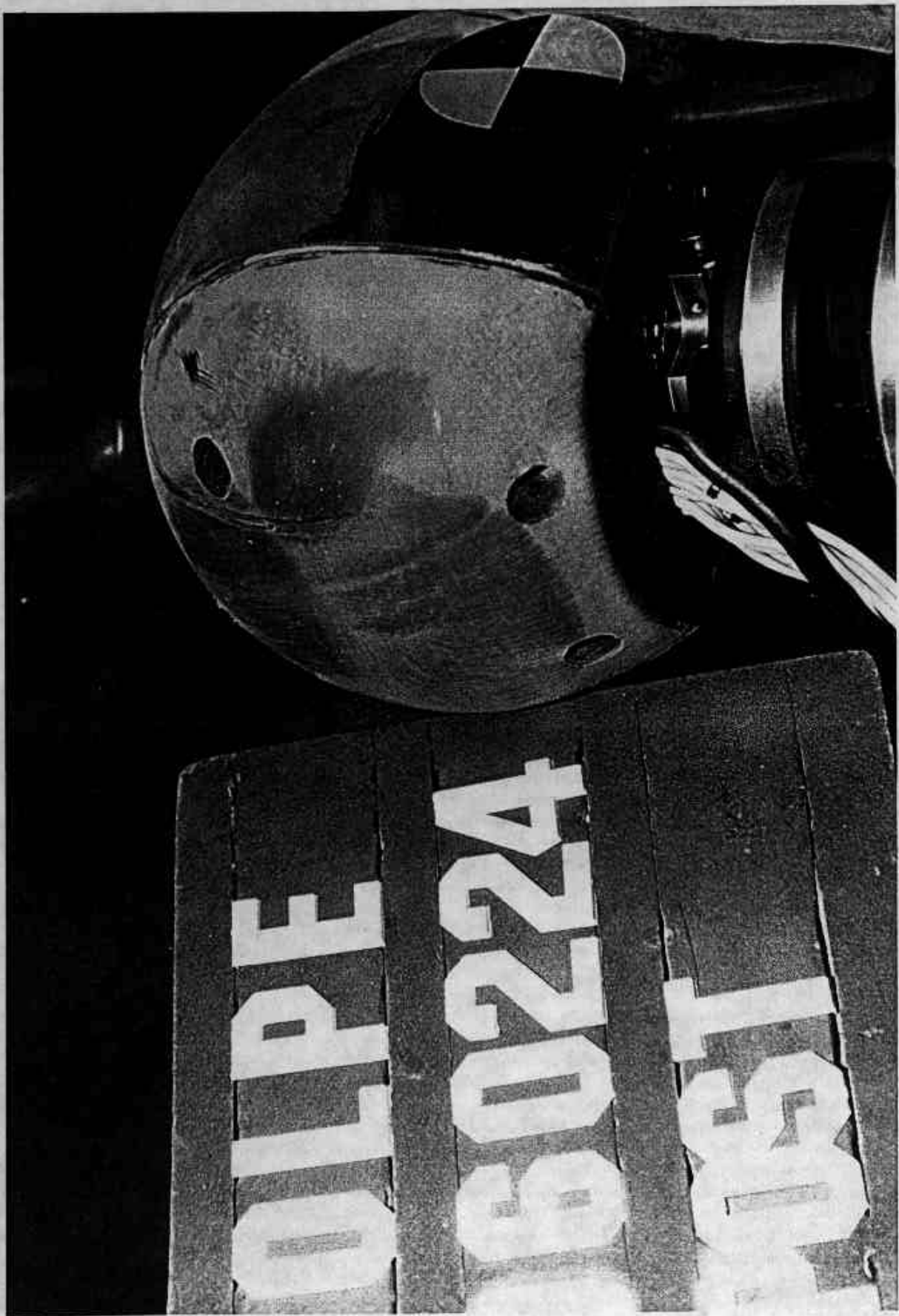


Figure A-37 Post-Test Passenger Dummy Head Contact - View 2



Figure A-38 Post-Test Passenger Dummy Head Contact - View 3



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

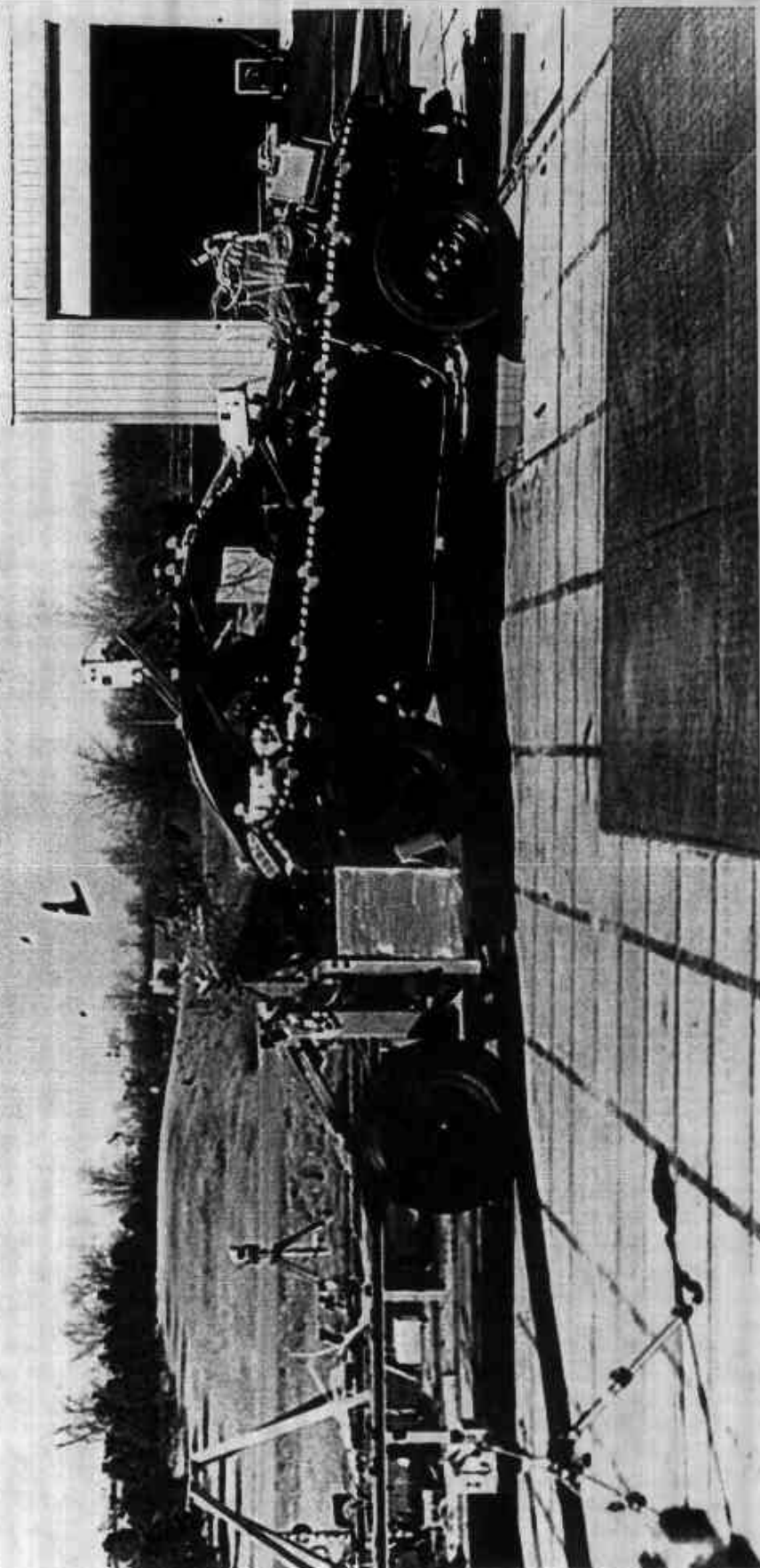


Figure A-40 Impact Event

A-41

960224

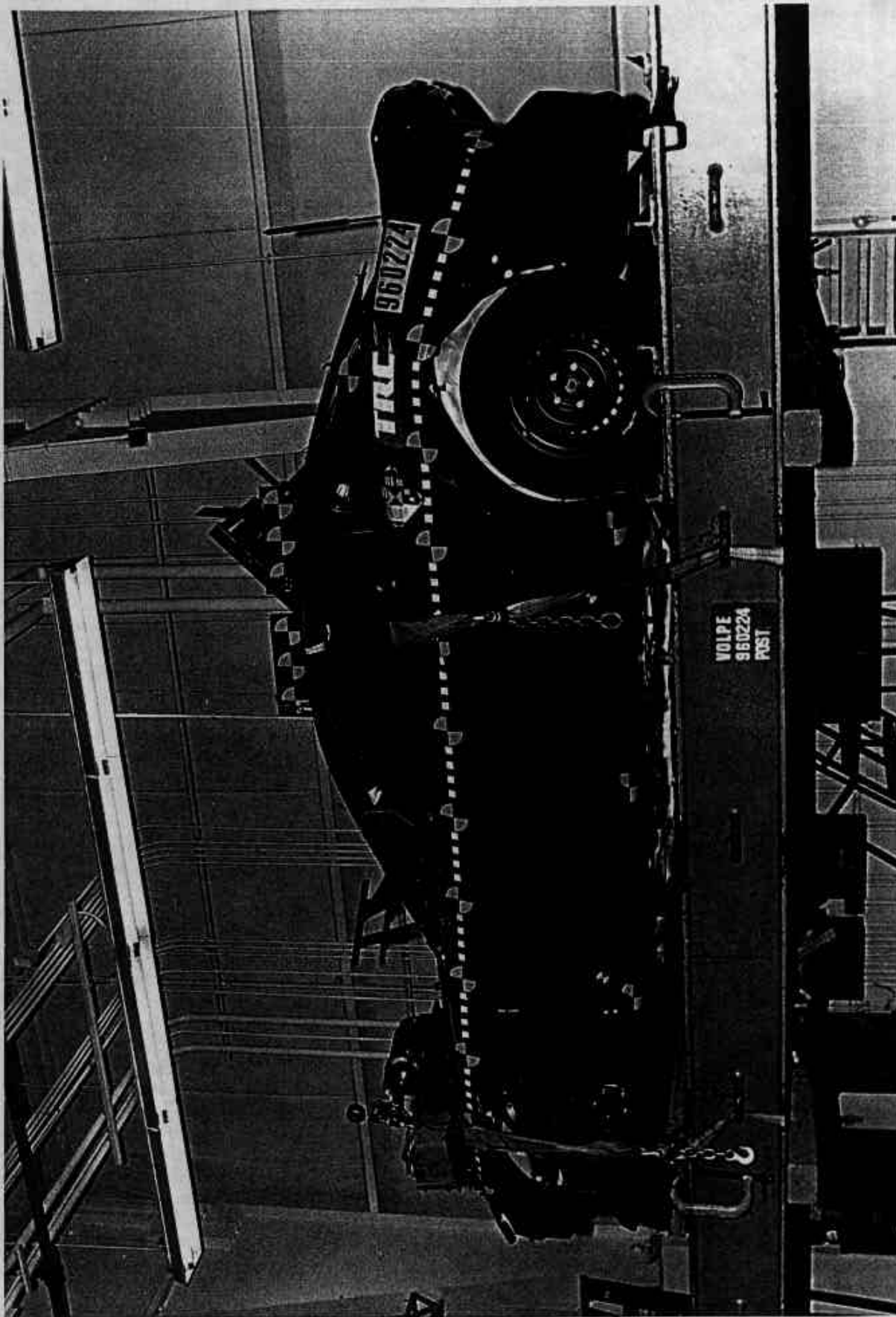


Figure A-41 Post-Test Vehicle on Static Rollover Device

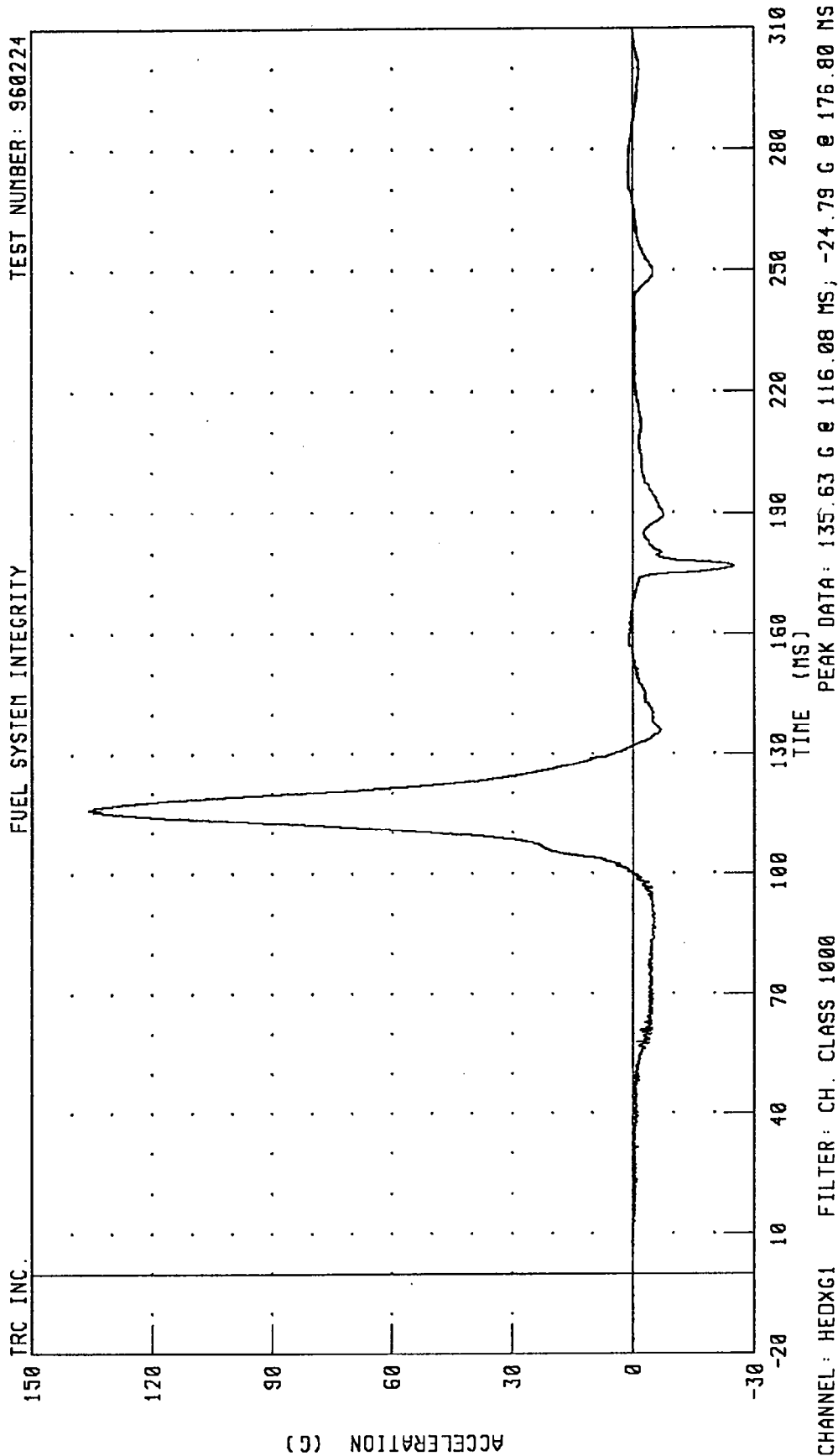
Appendix B

Data Plots

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 FORD MUSTANG AT 80 KPH AND 70% OVERLAP
DRIVER HEAD X-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY

TEST NUMBER: 960224

TRC INC.

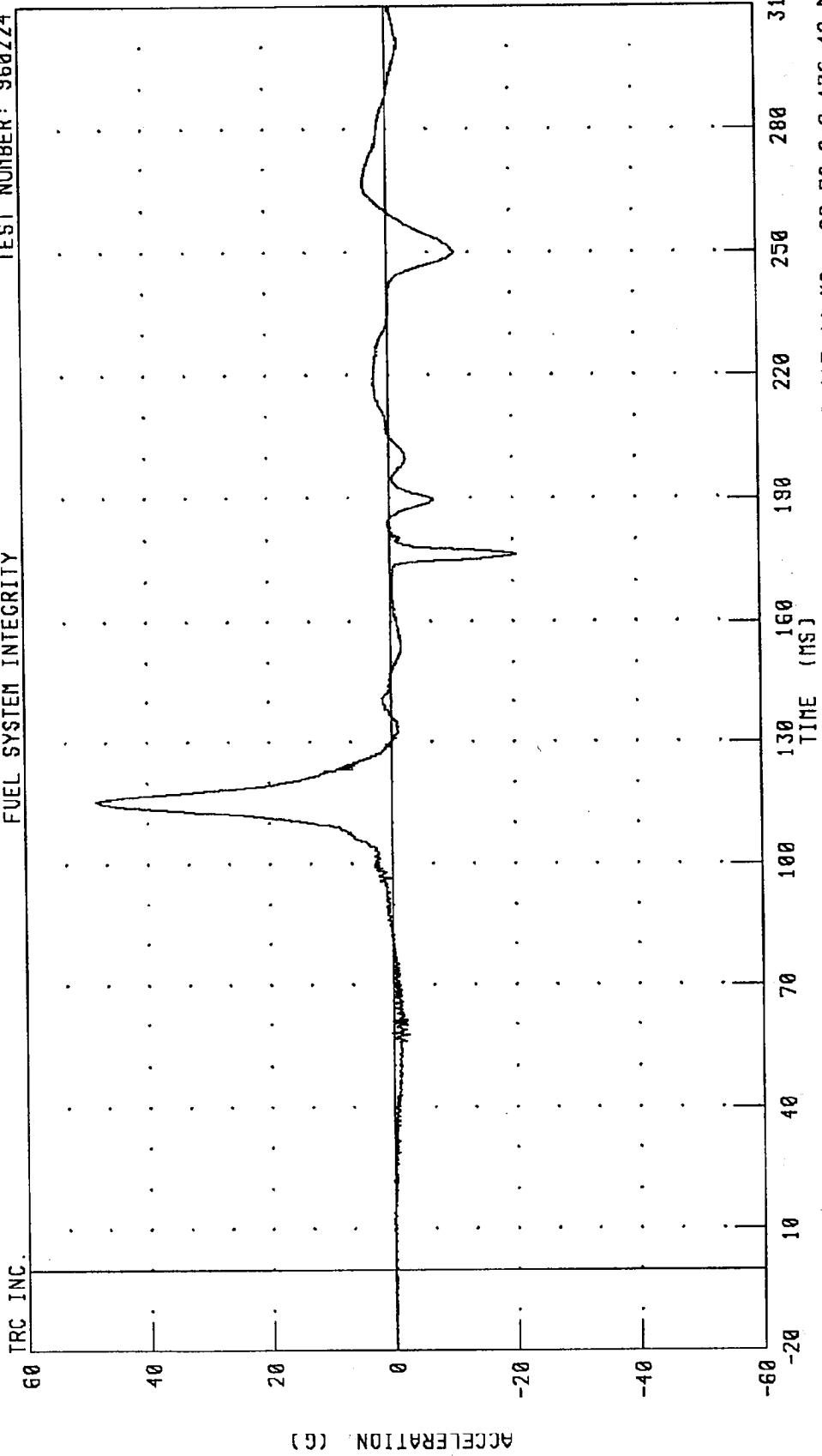


CHANNEL: HEDXG1 FILTER: CH. CLASS 1000

PEAK DATA: 135.63 G @ 116.08 MS; -24.79 G @ 175.80 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 FORD MUSTANG AT 80 KPH AND 70% OVERLAP
DRIVER HEAD Y-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY

TEST NUMBER: 960224



CHANNEL: HEDYG1 FILTER: CH. CLASS 1000

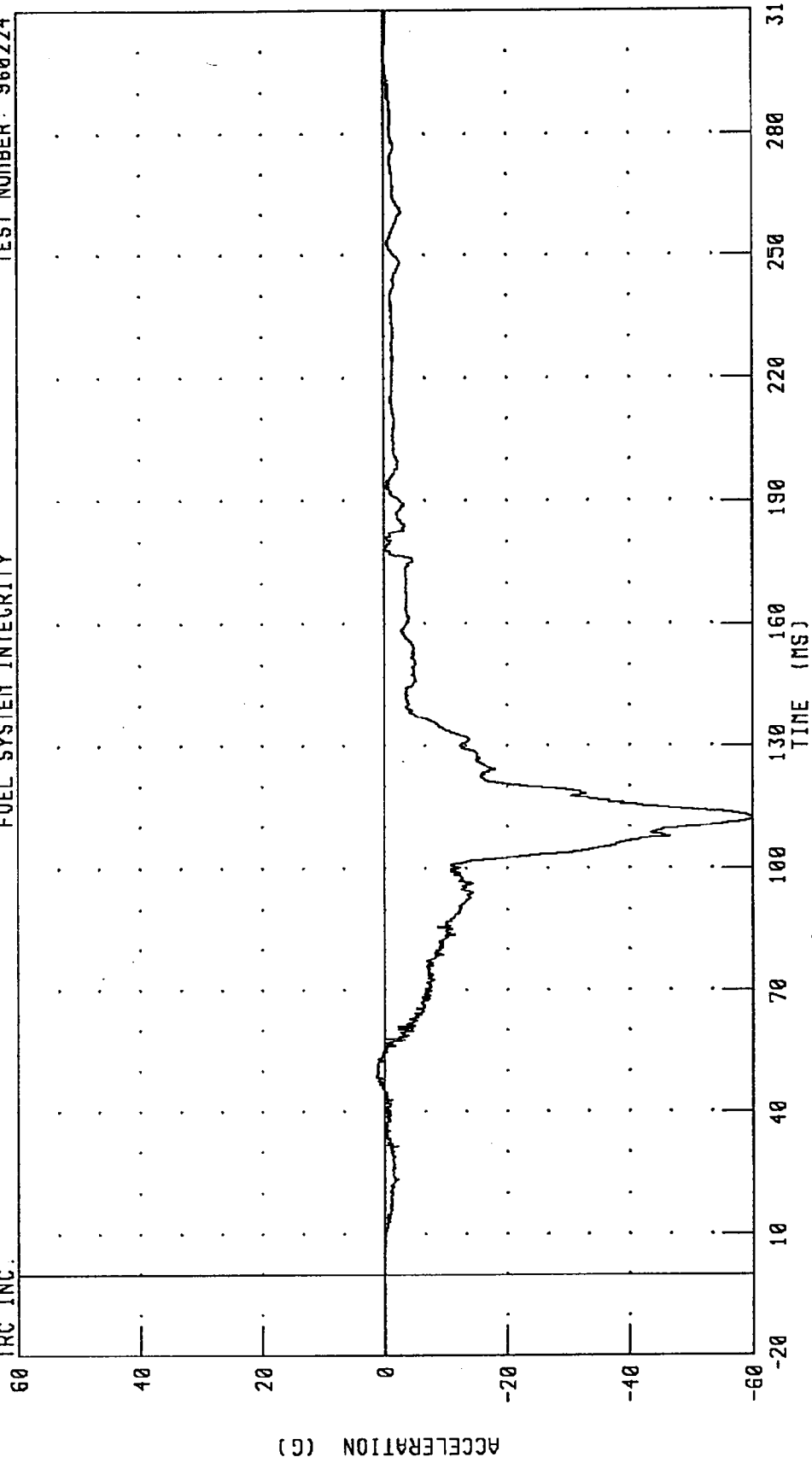
PEAK DATA: 48.52 G @ 115.44 MS; -20.72 G @ 176.48 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 FORD MUSTANG AT 80 KPH AND 70% OVERLAP
 DRIVER HEAD Z-AXIS ACCELERATION

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



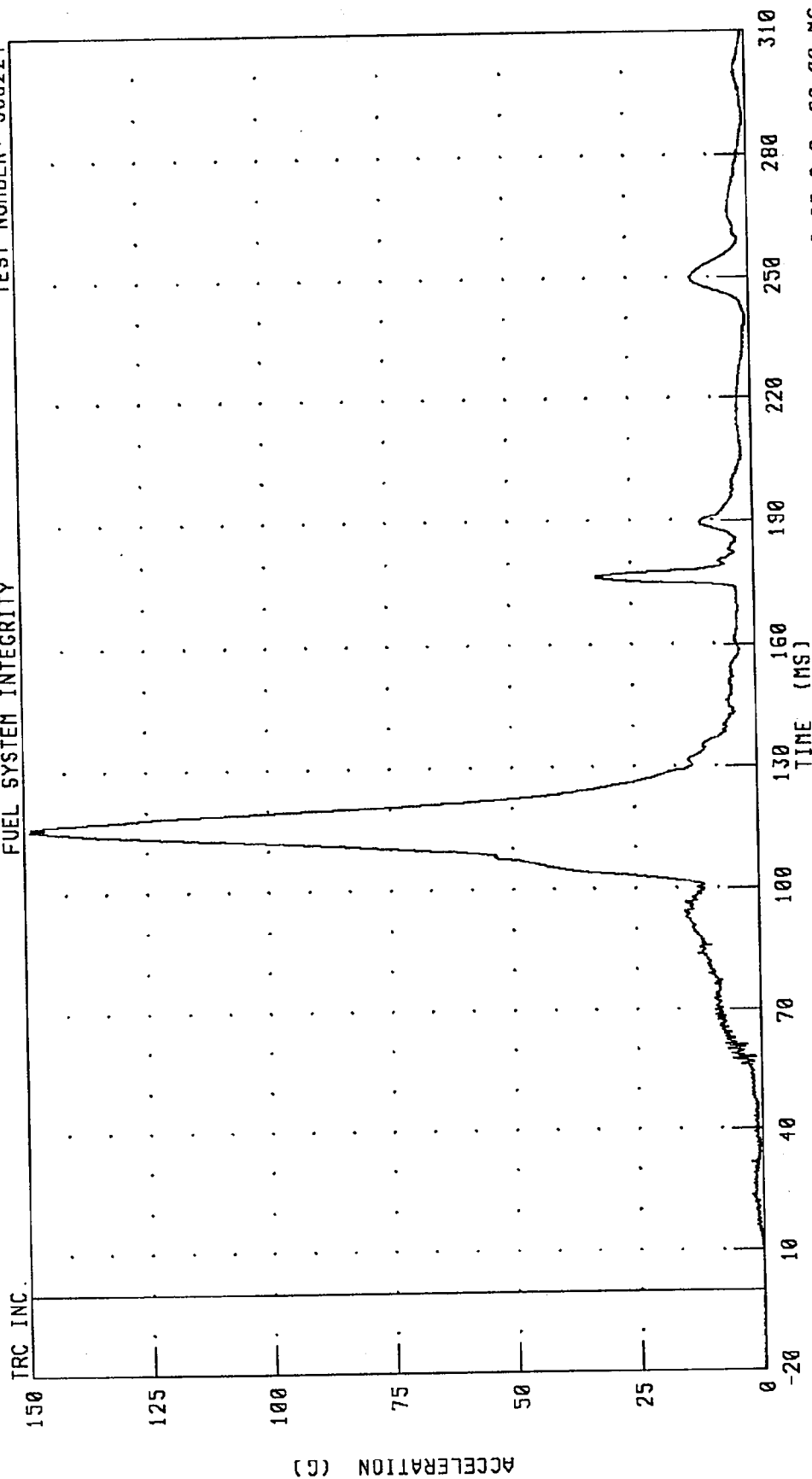
PEAK DATA: 1.39 G @ 48.40 MS; -60.26 G @ 112.08 MS

CHANNEL: HEDZG1 FILTER: CH. CLASS 1000

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY



CHANNEL: HEDRG1 FILTER: CH. CLASS 1000

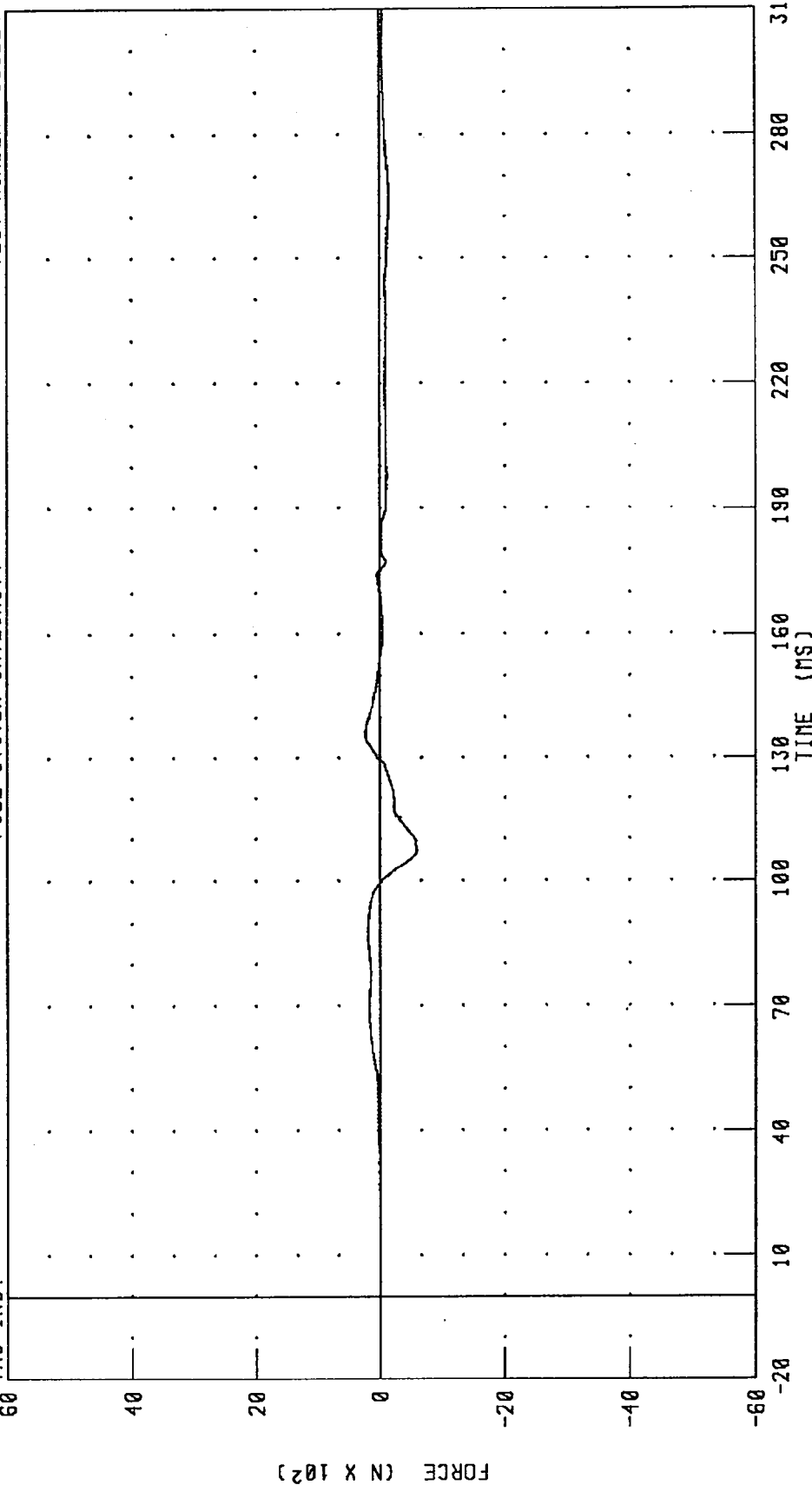
PEAK DATA: 148.99 G @ 115.52 MS; 0.03 G @ -20.00 MS

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

60 IRC INC.



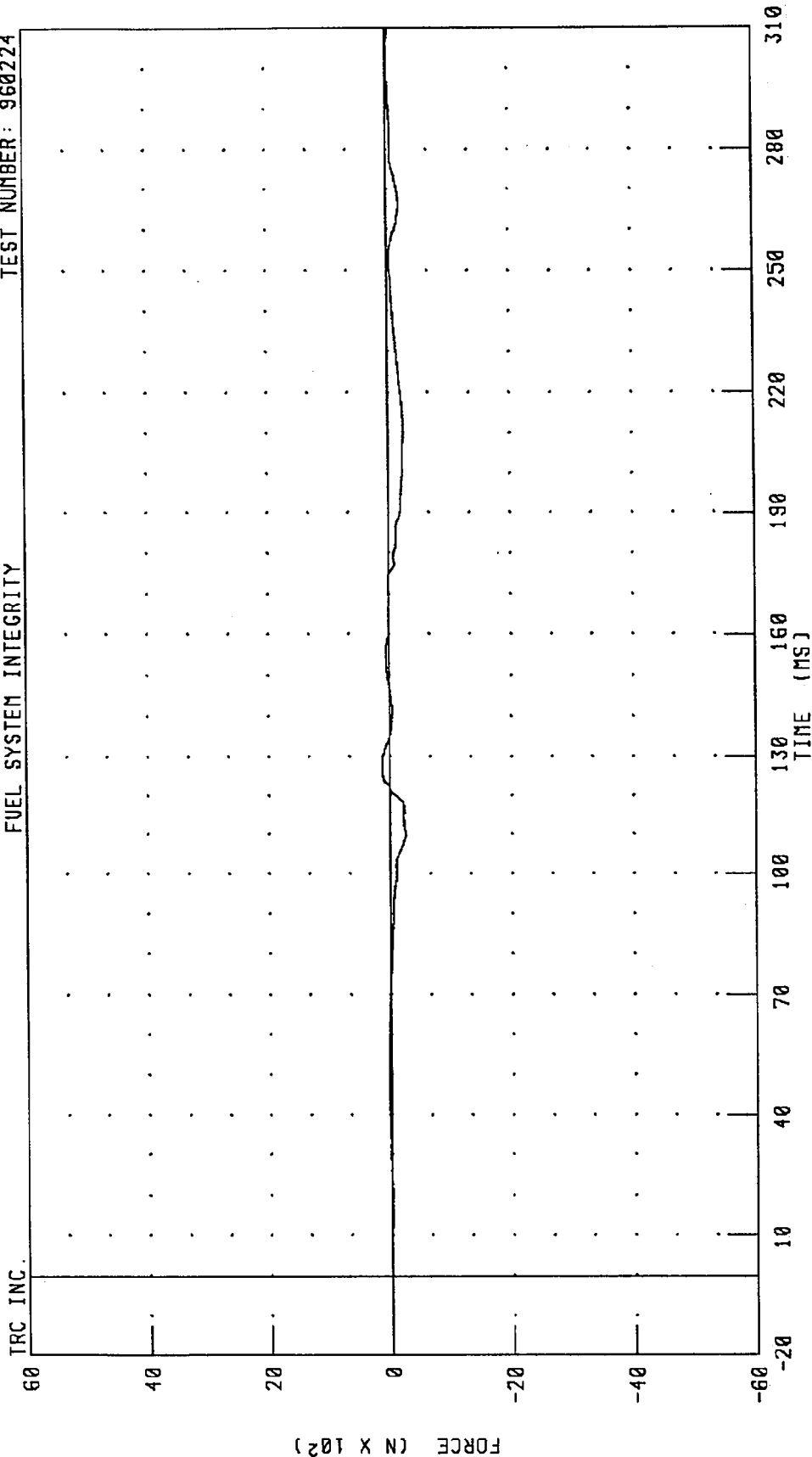
PEAK DATA: 239.27 N @ 136.00 MS; -603.45 N @ 107.36 MS

CHANNEL: NEKXF1 FILTER: CH. CLASS 1000

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

TEST NUMBER: 960224

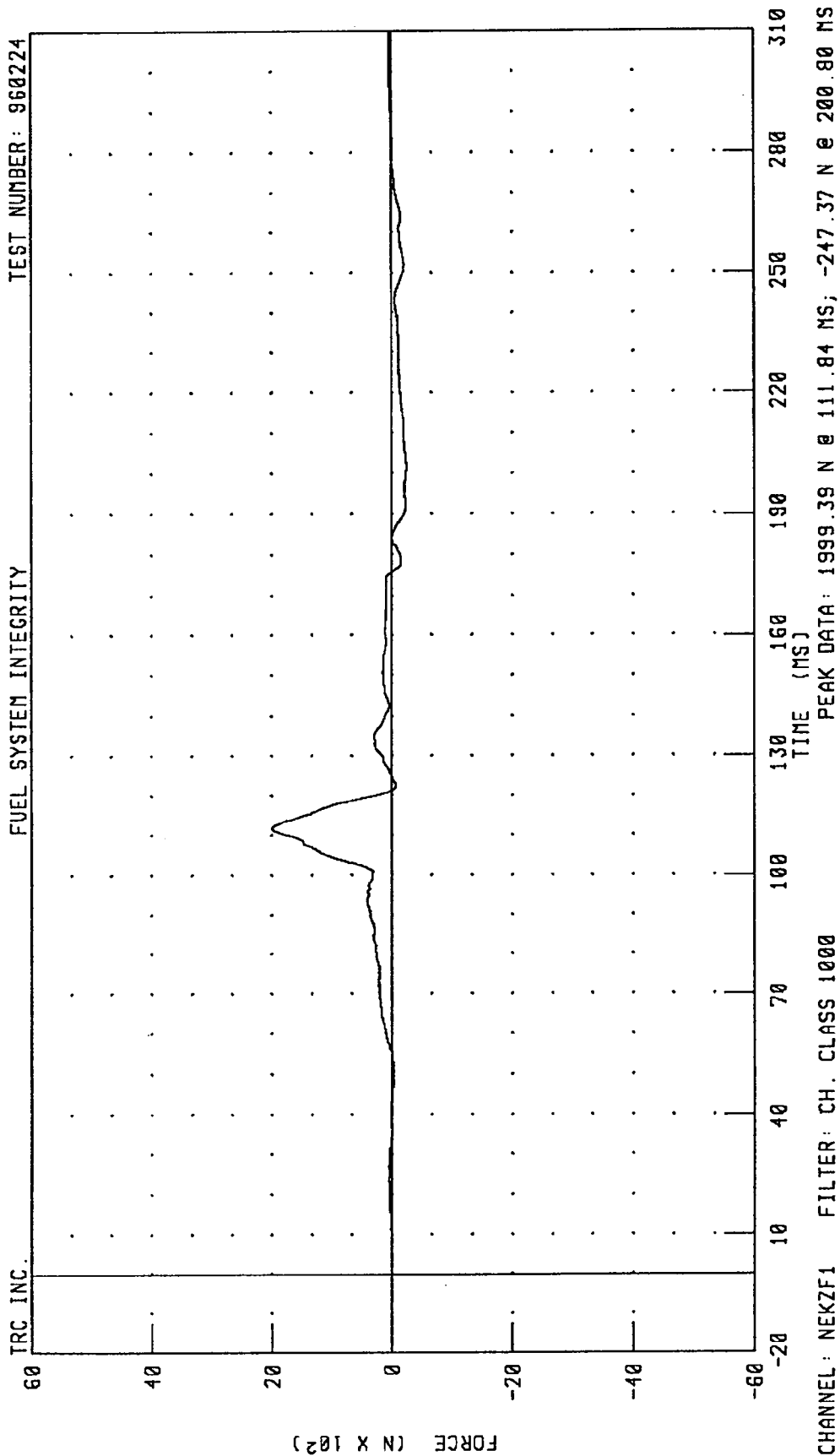
FUEL SYSTEM INTEGRITY



PEAK DATA: 125.99 N @ 126.72 MS; -274.20 N @ 109.76 MS

CHANNEL: NEKYF1 FILTER: CH. CLASS 1000

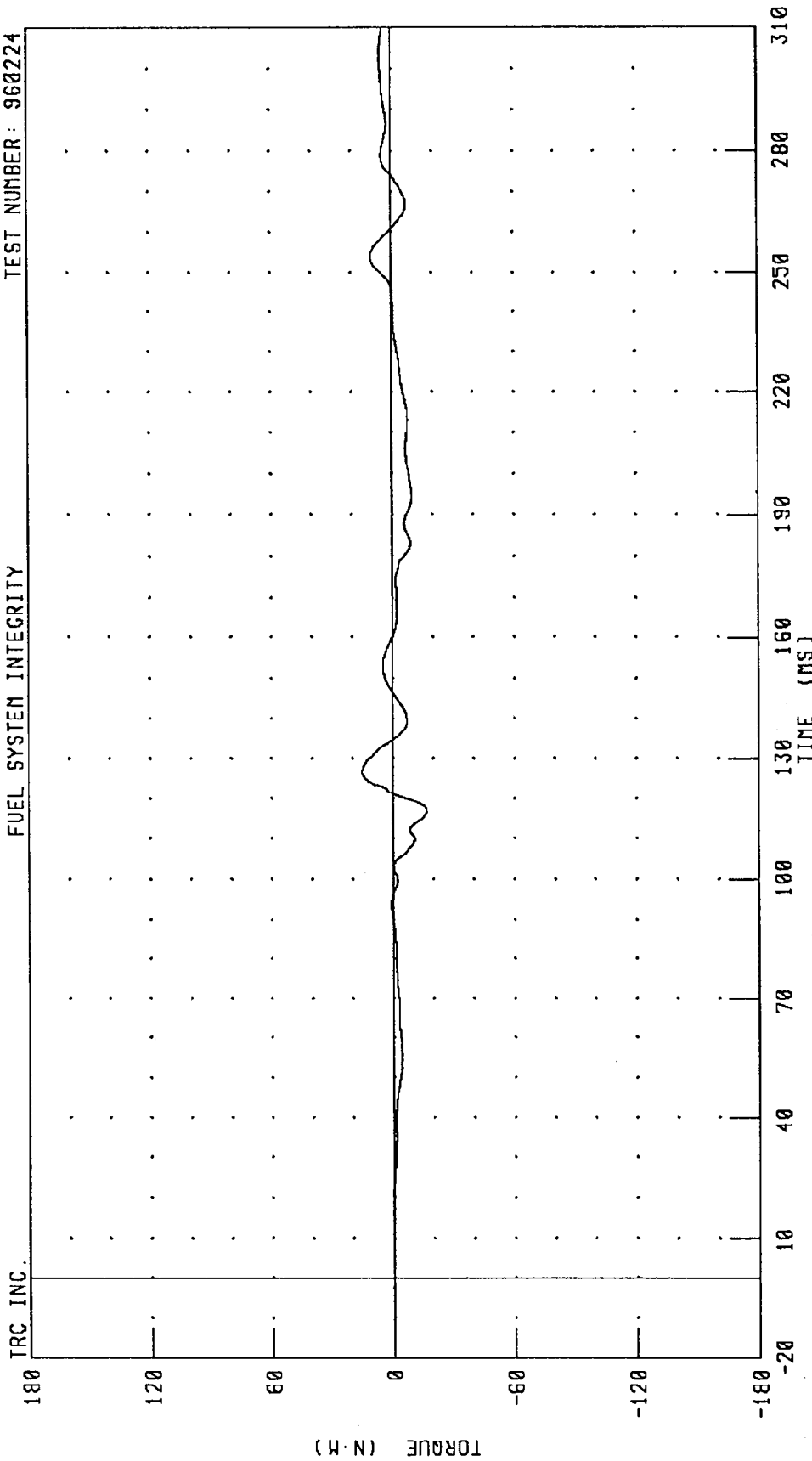
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 FORD MUSTANG AT 80 KPH AND 70% OVERLAP
 DRIVER UPPER NECK Z-AXIS AXIAL FORCE



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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

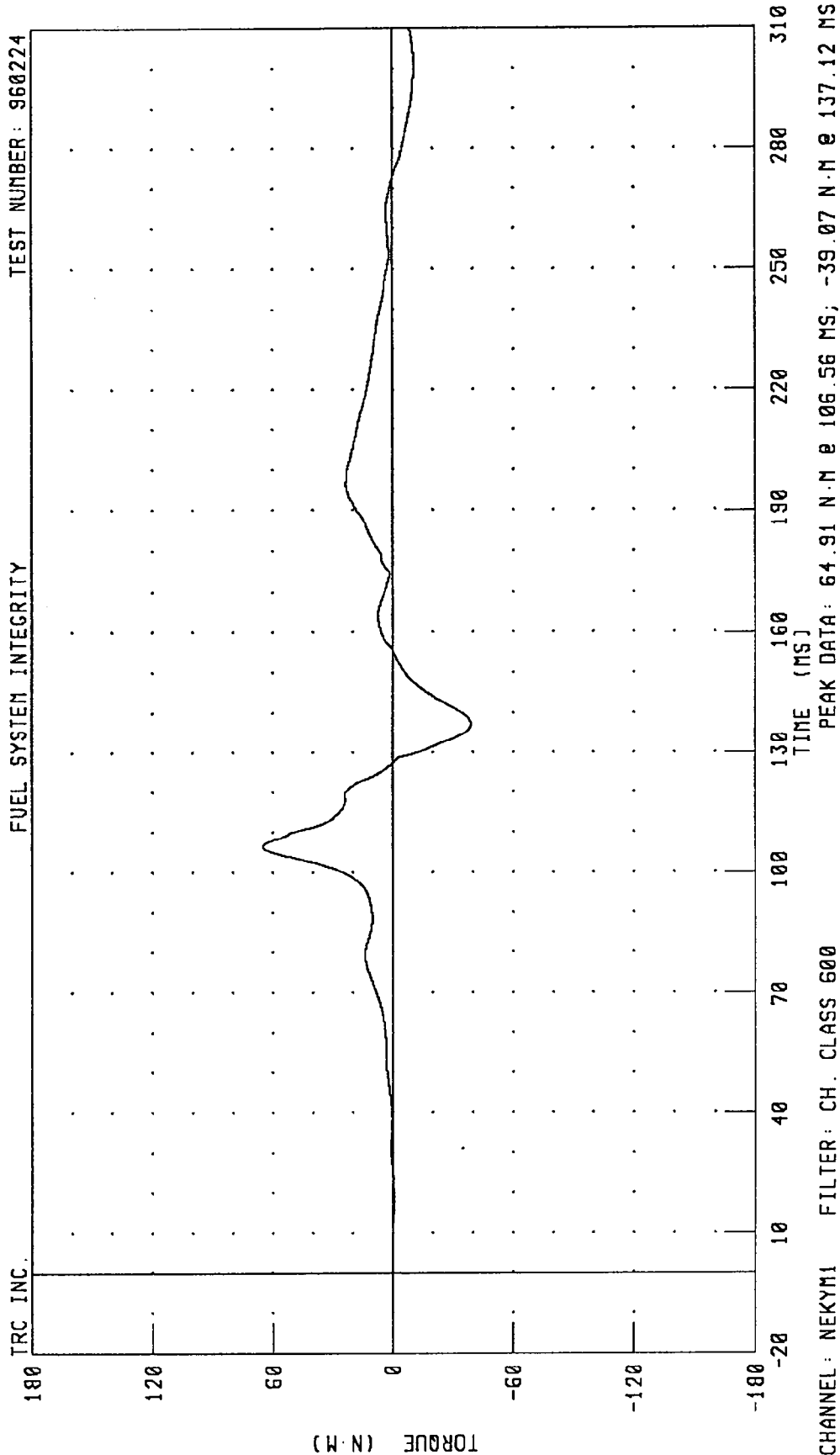


CHANNEL: NEKXMI FILTER: CH. CLASS 600

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

TEST NUMBER: 960224

TRC INC.



CHANNEL: NEKYM1 FILTER: CH. CLASS 600

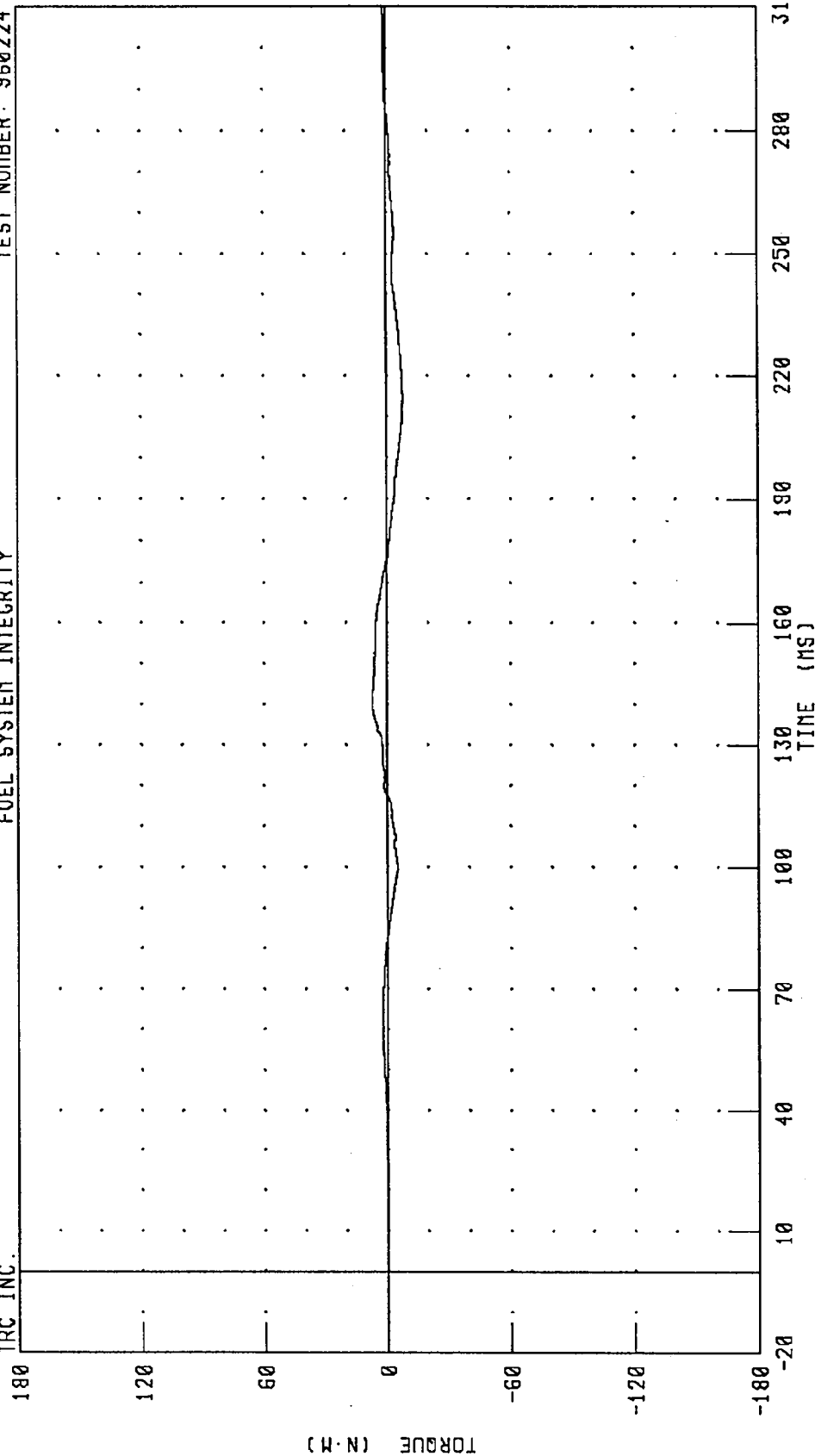
PEAK DATA: 64.91 N.M @ 106.56 MS; -39.07 N.M @ 137.12 MS

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

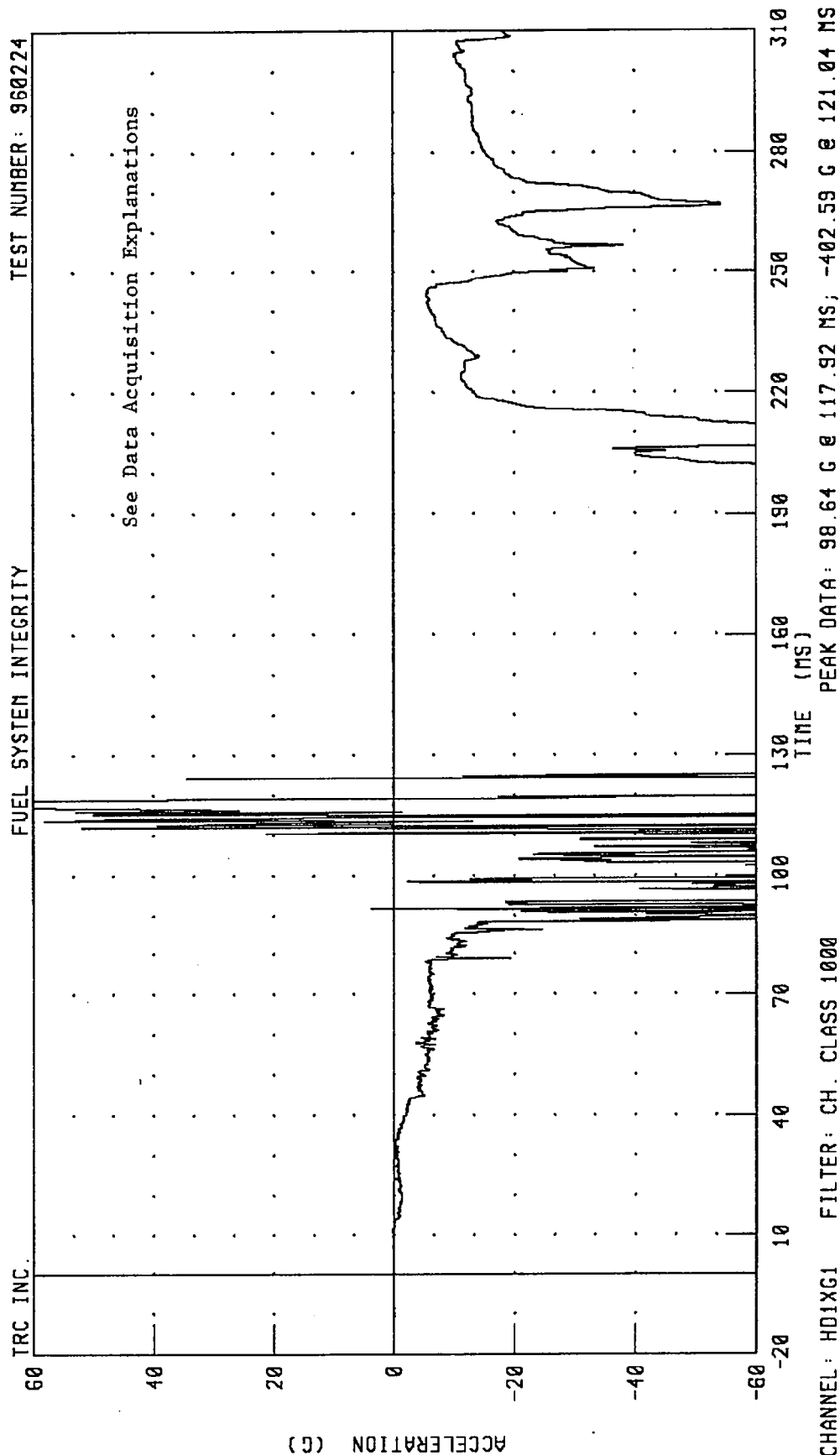
TRC INC.



PEAK DATA: 7.36 N·m @ 141.92 ms; -7.93 N·m @ 215.04 ms

CHANNEL: NEKZM1 FILTER: CH. CLASS 600

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



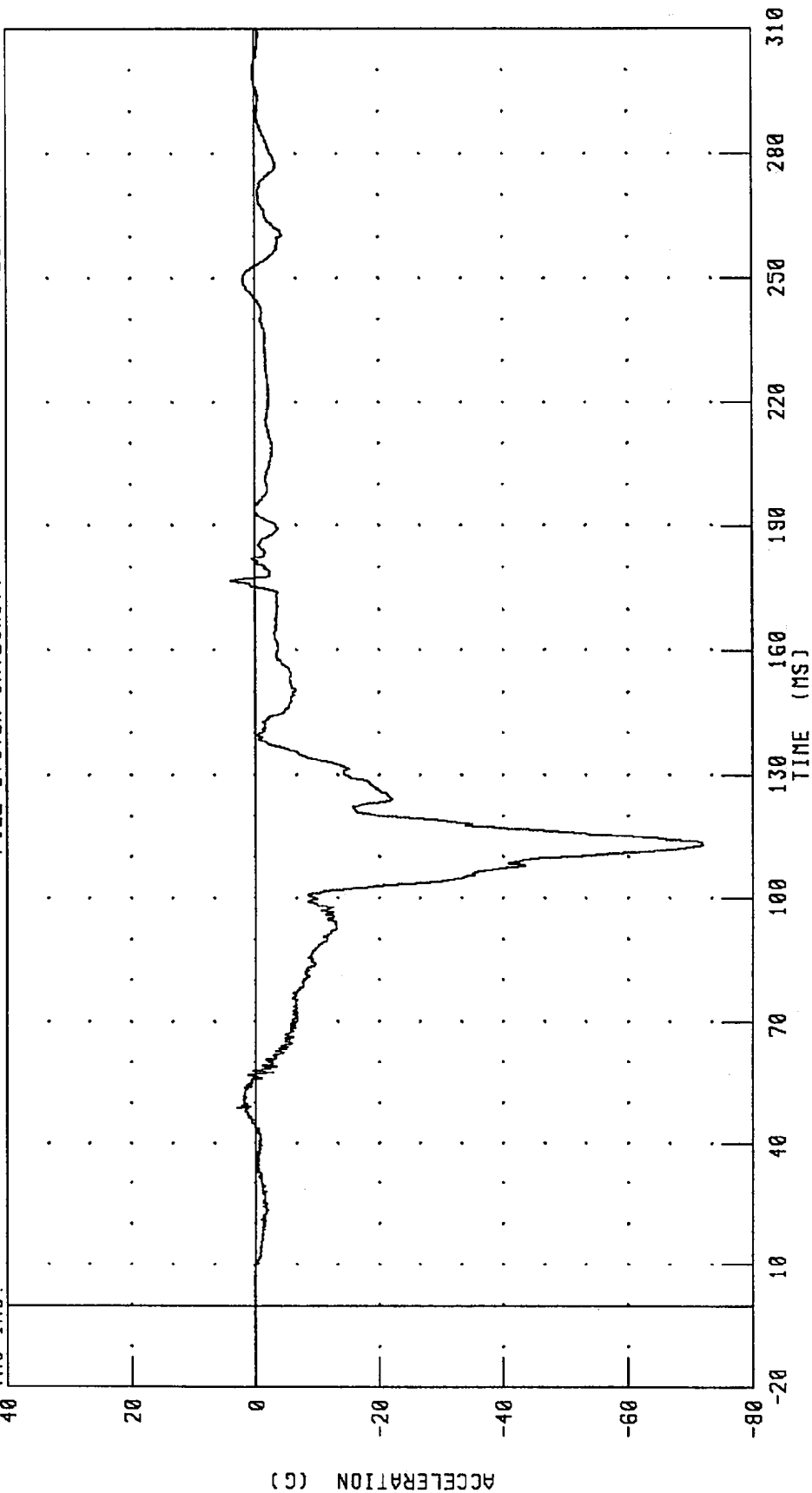
CHANNEL: HD1XG1 FILTER: CH. CLASS 1000

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 3.87 G @ 176.80 MS; -71.94 G @ 112.88 MS

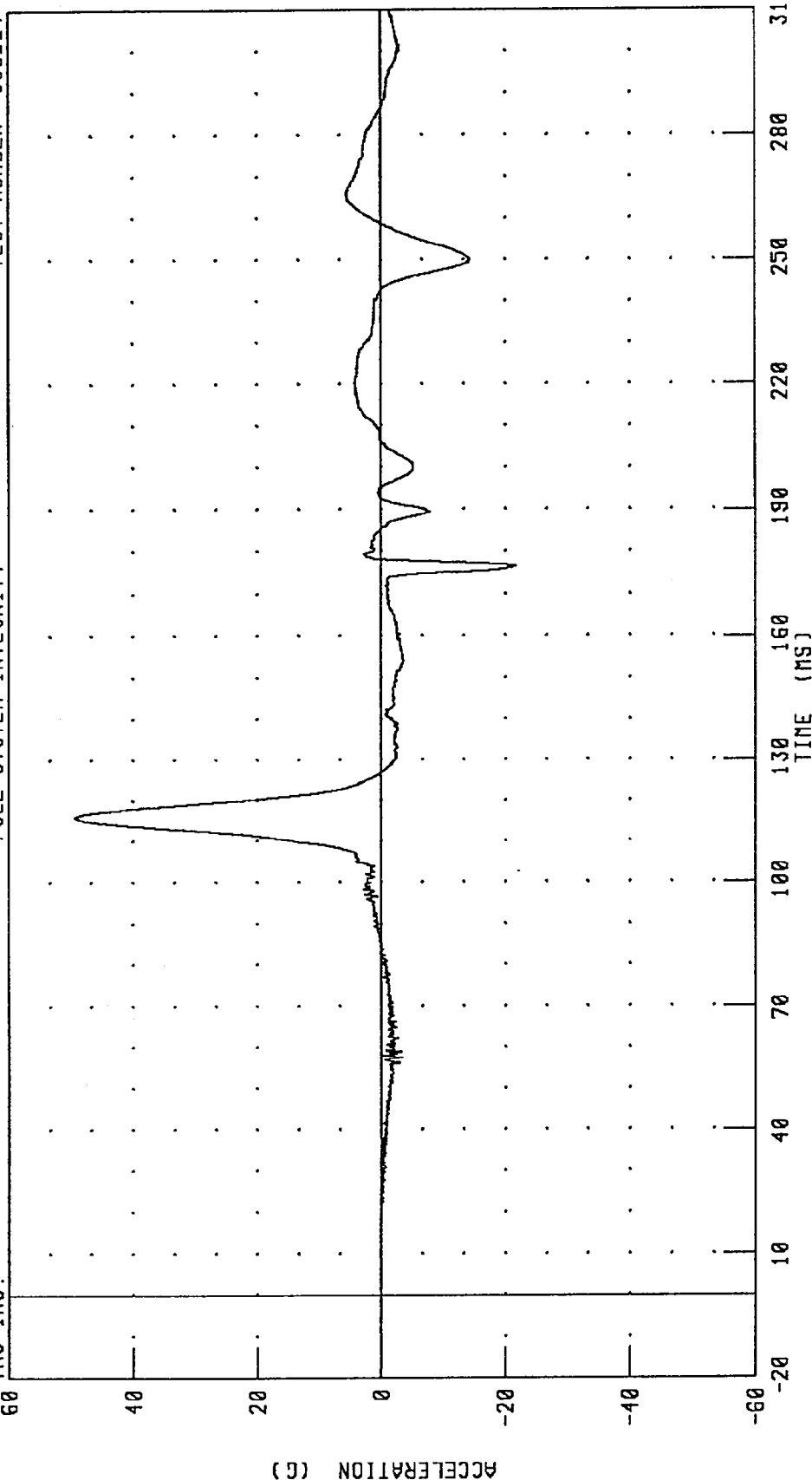
CHANNEL: HD1ZG1 FILTER: CH. CLASS 1000

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.

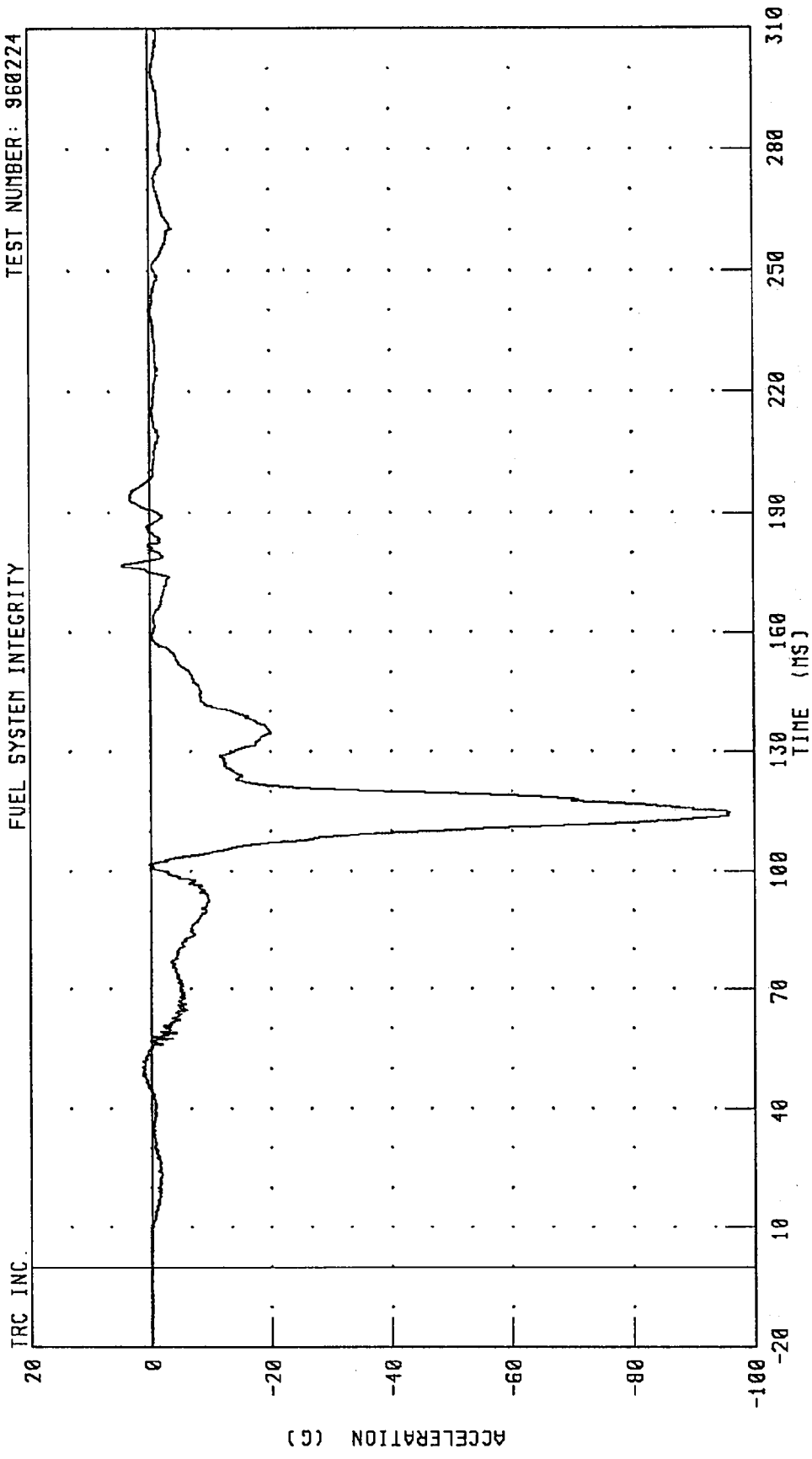


PEAK DATA: 49.26 G @ 116.08 MS; -21.61 G @ 176.40 MS

CHANNEL: HD2YG1 FILTER: CH. CLASS 1000

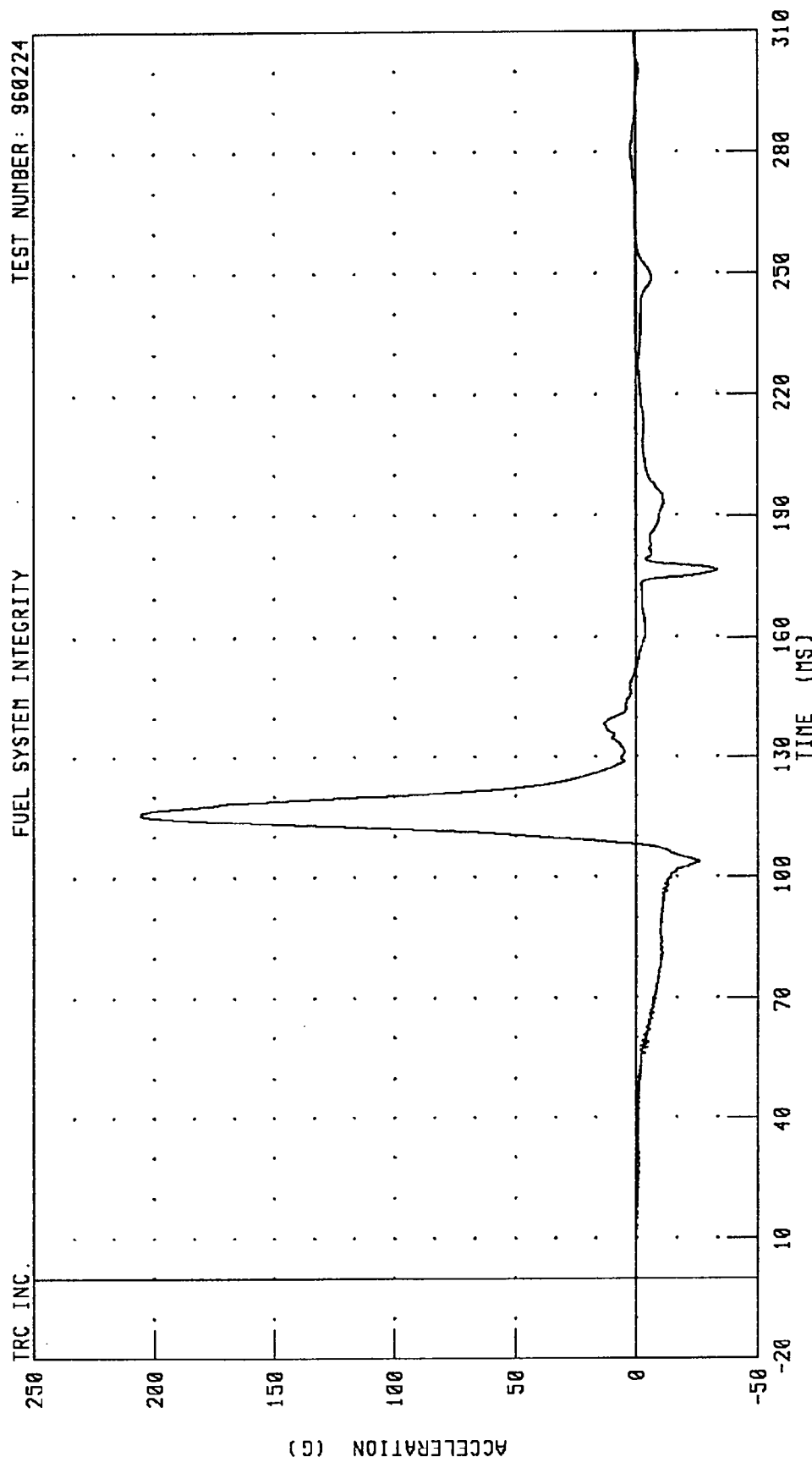
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 FORD MUSTANG AT 80 KPH AND 70% OVERLAP
 DRIVER HEAD POSITION 2 Z-AXIS ACCELERATION

TEST NUMBER: 960224



CHANNEL: HD22G1 FILTER: CH. CLASS 1000 PEAK DATA: 4.58 G @ 176.88 MS; -95.87 G @ 114.64 MS

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



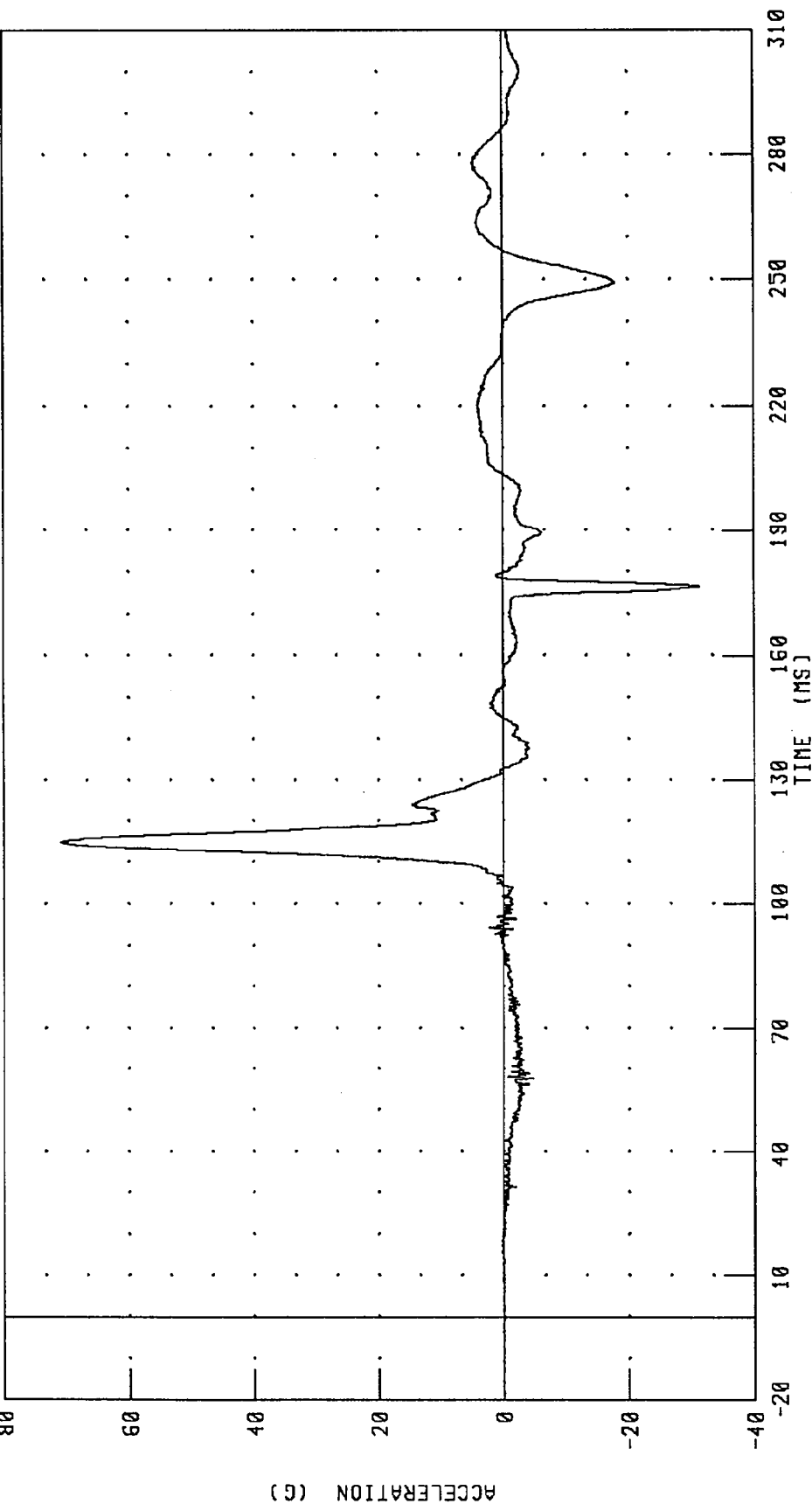
CHANNEL: HD3XG1 FILTER: CH. CLASS 1000 PEAK DATA: 205.76 G @ 115.52 MS; -33.36 G @ 176.72 MS

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: HD3YG1 FILTER: CH. CLASS 1000

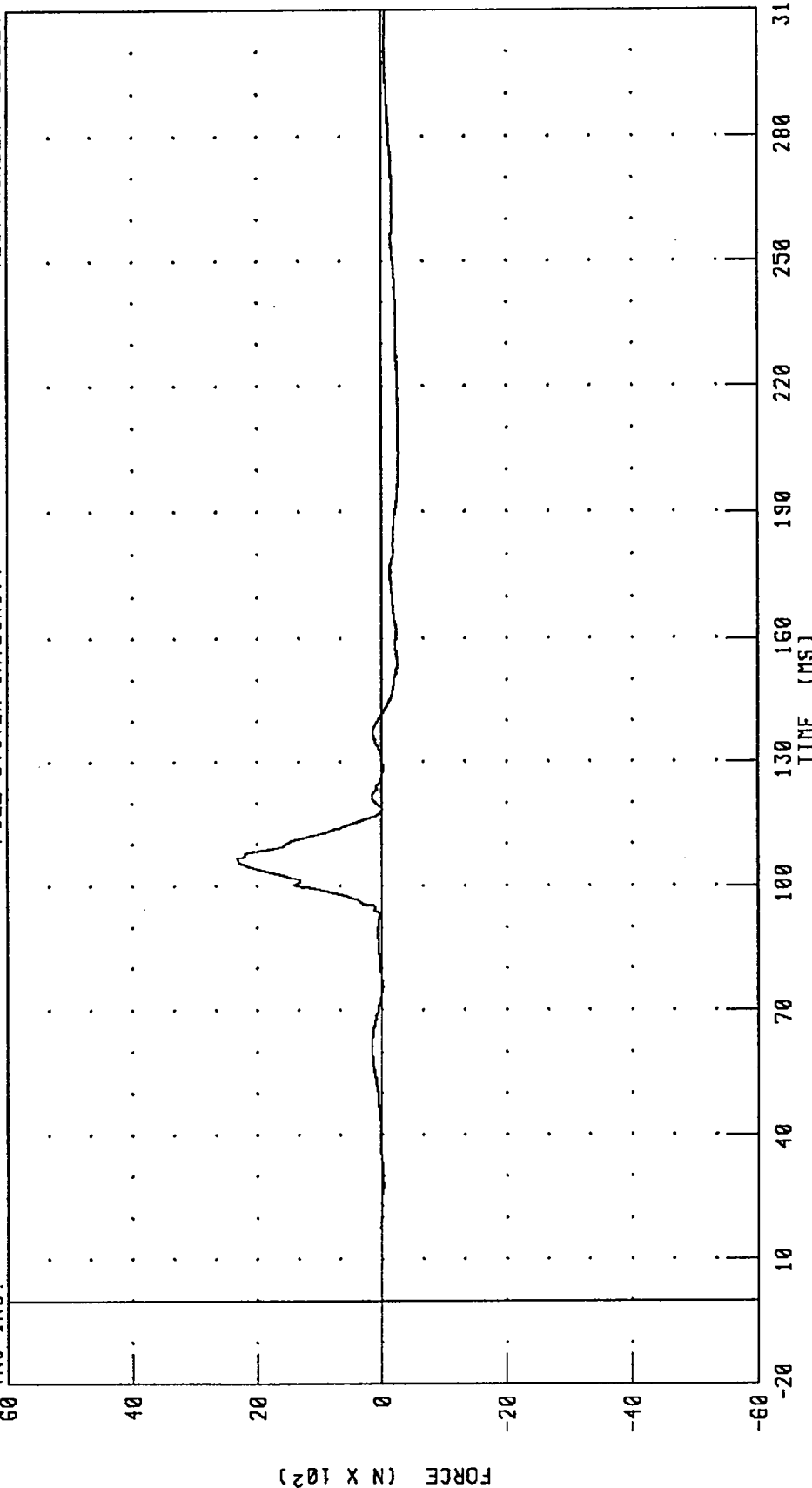
PEAK DATA: 70.73 G @ 114.88 MS; -31.21 G @ 176.48 MS

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: NKLXF1 FILTER: CH. CLASS 1000

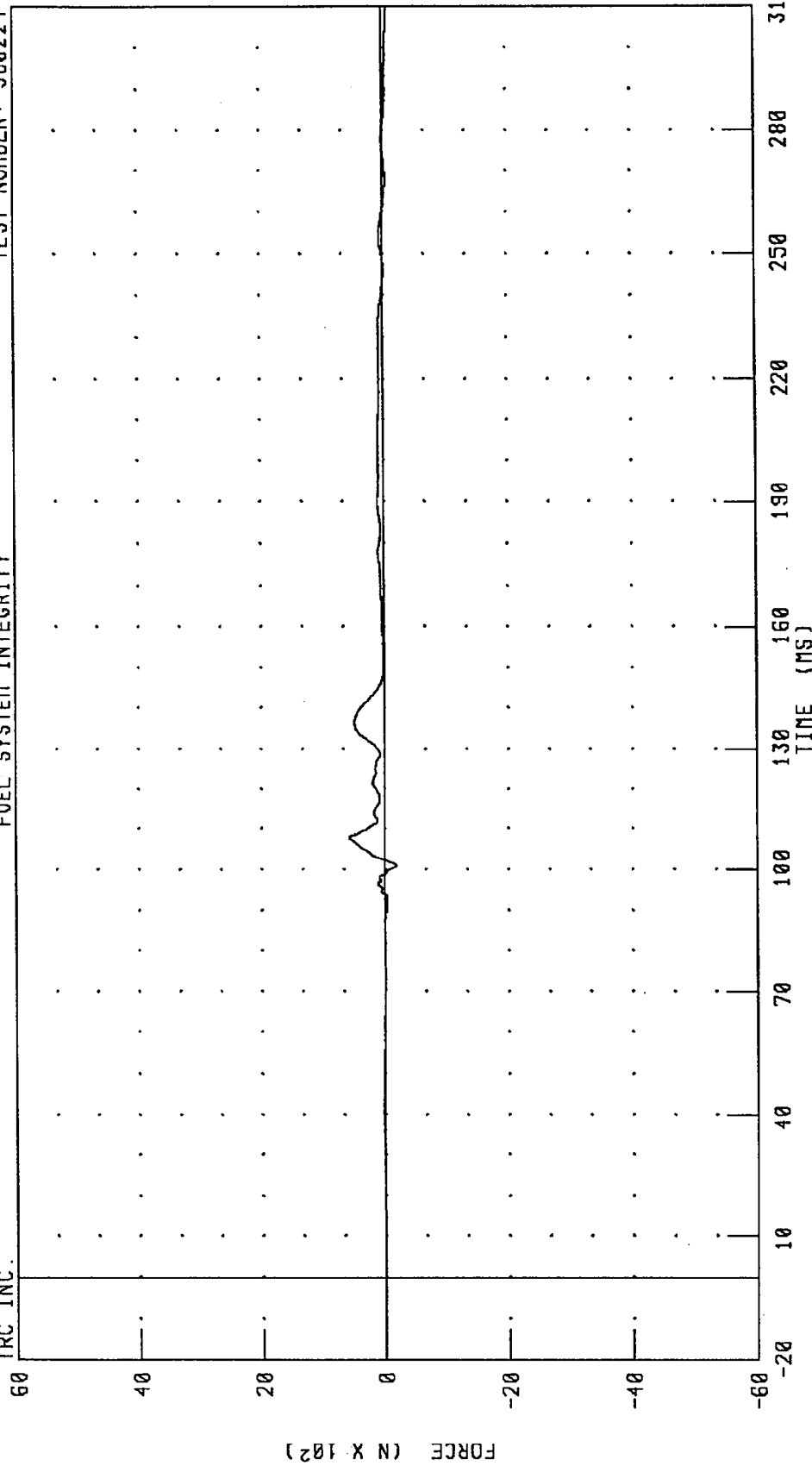
PEAK DATA: 2327.02 N @ 106.48 MS; -280.00 N @ 203.76 MS

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 580.40 N @ 107.68 MS; -189.39 N @ 100.88 MS

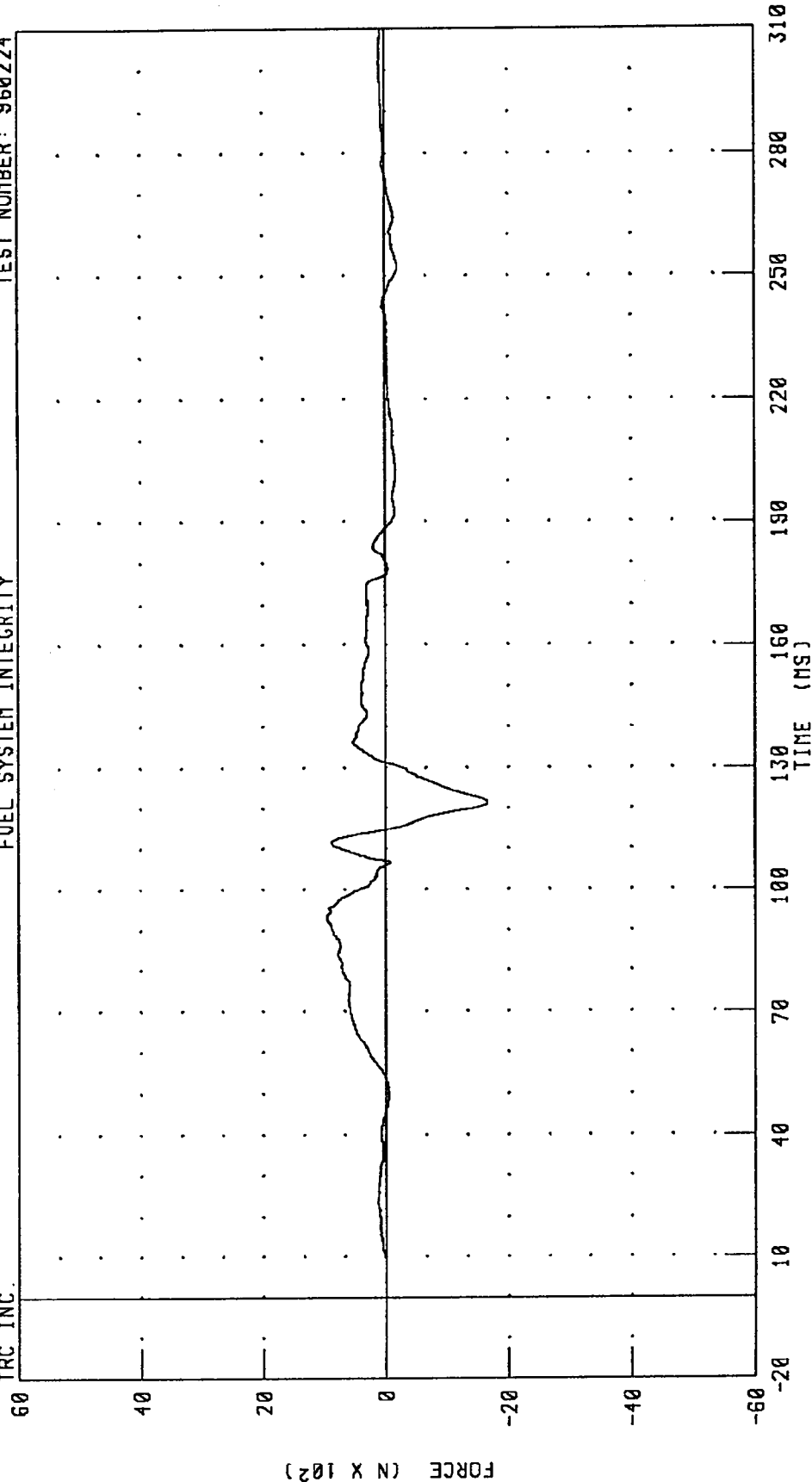
CHANNEL: NKLYF1 FILTER: CH. CLASS 1000

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: NKLZF1 FILTER: CH. CLASS 1000

PEAK DATA: 951.94 N @ 92.64 MS; -1663.57 N @ 121.36 MS

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.

180

120

60

0

-60

-120

-180

TORQUE (N·M)



PEAK DATA: 28.98 N·M @ 111.36 MS; -23.17 N·M @ 134.96 MS

CHANNEL: NKLXMI FILTER: CH. CLASS 600

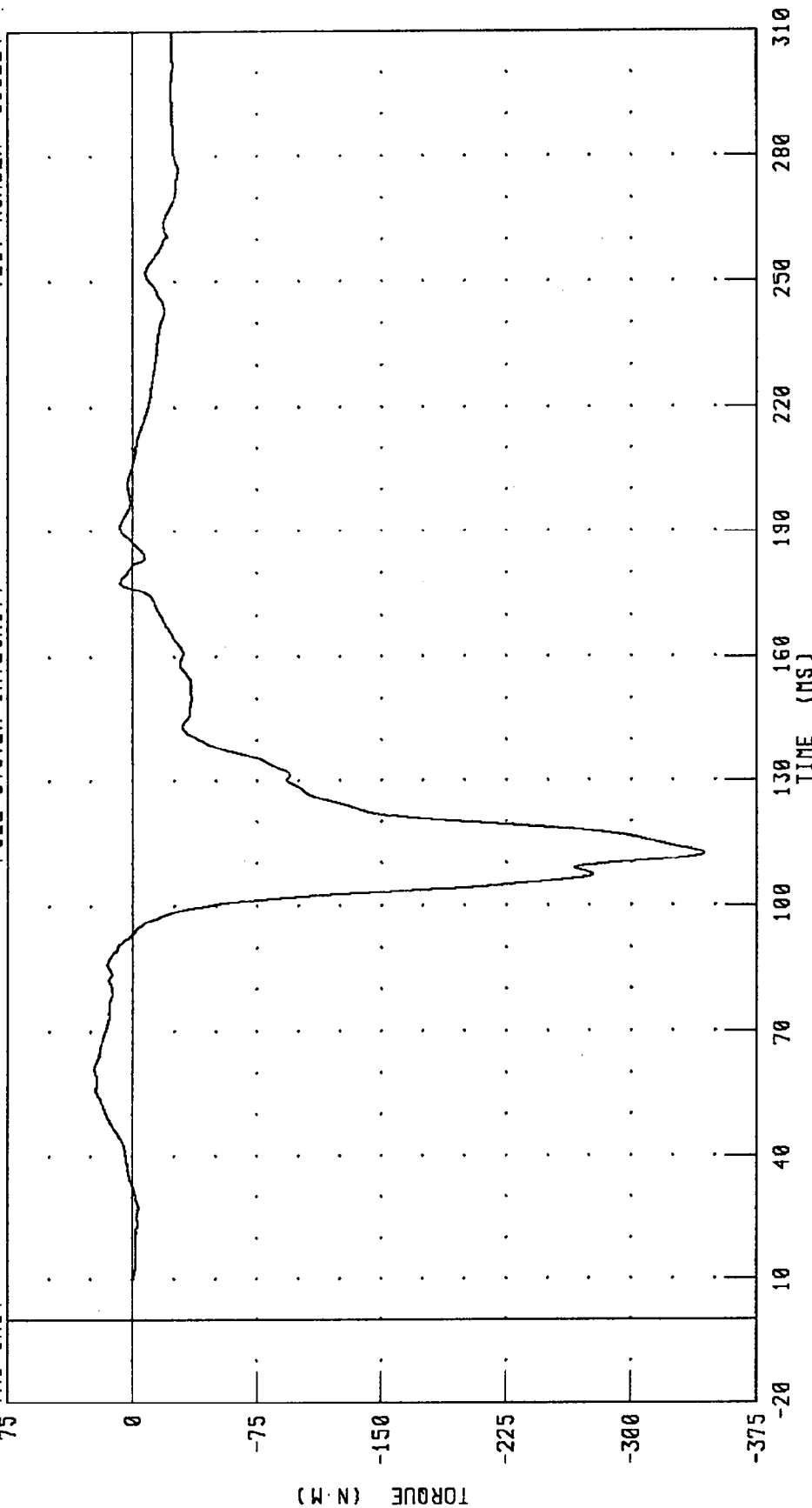
960224

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: NKLYM1 FILTER: CH. CLASS 600

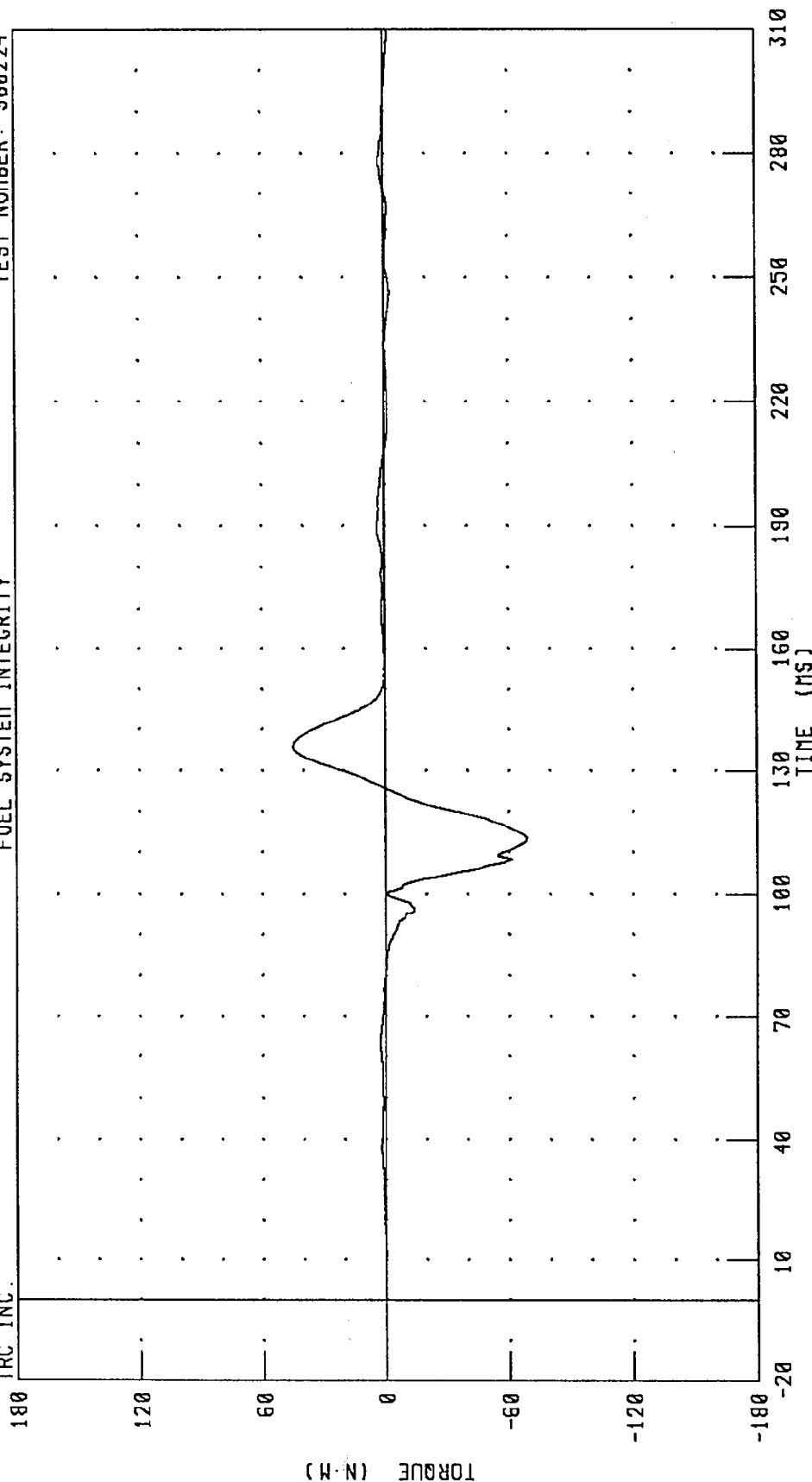
PEAK DATA: 22.61 N.M @ 60.88 MS; -343.89 N.M @ 112.56 MS

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.

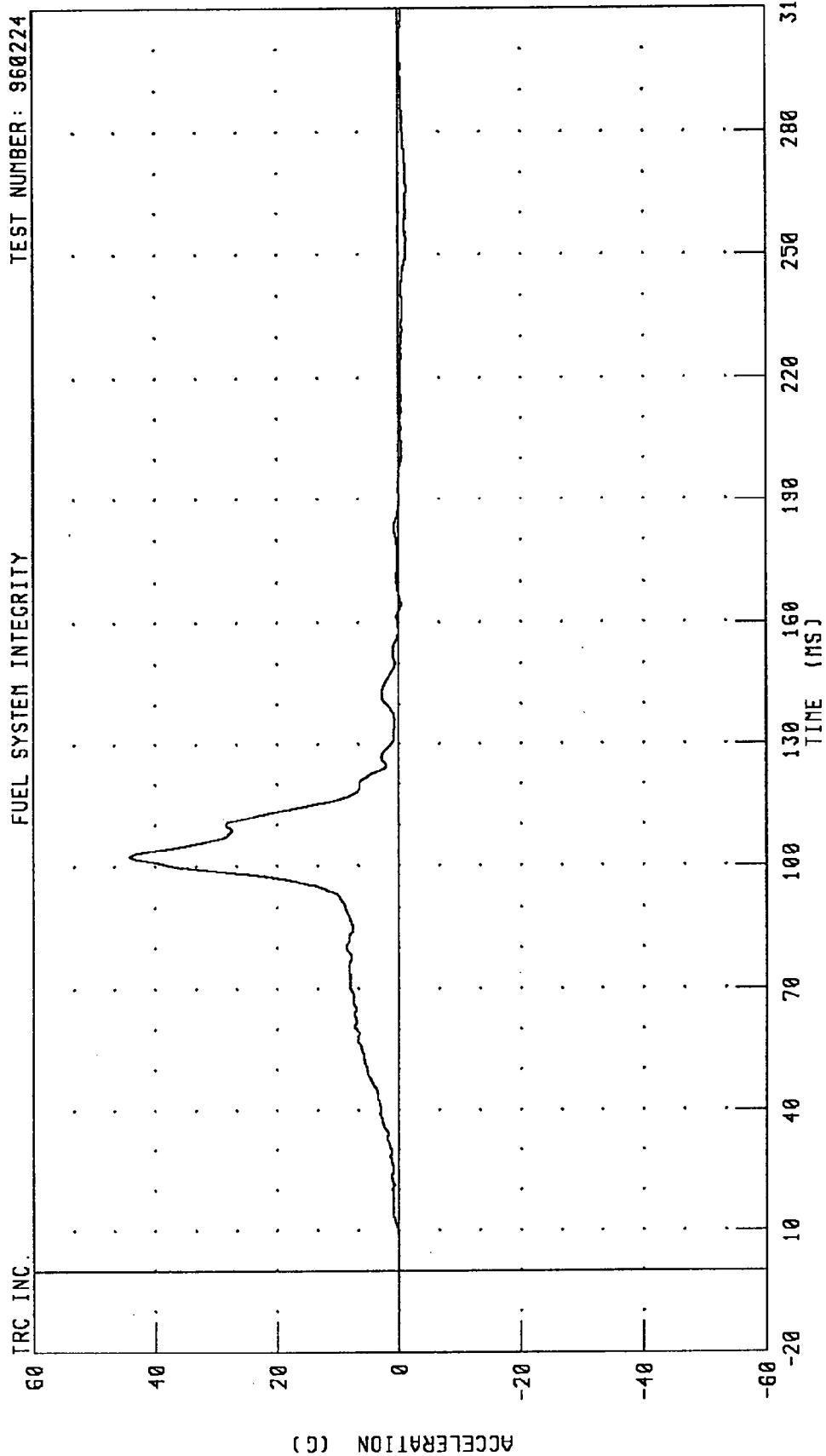


PEAK DATA: 45.04 N·M @ 135.60 MS; -68.81 N·M @ 113.60 MS

CHANNEL: NKLZM1 FILTER: CH. CLASS 600

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 FORD MUSTANG AT 80 KPH AND 70% OVERLAP
 DRIVER CHEST X-AXIS ACCELERATION
 FUEL SYSTEM INTEGRITY

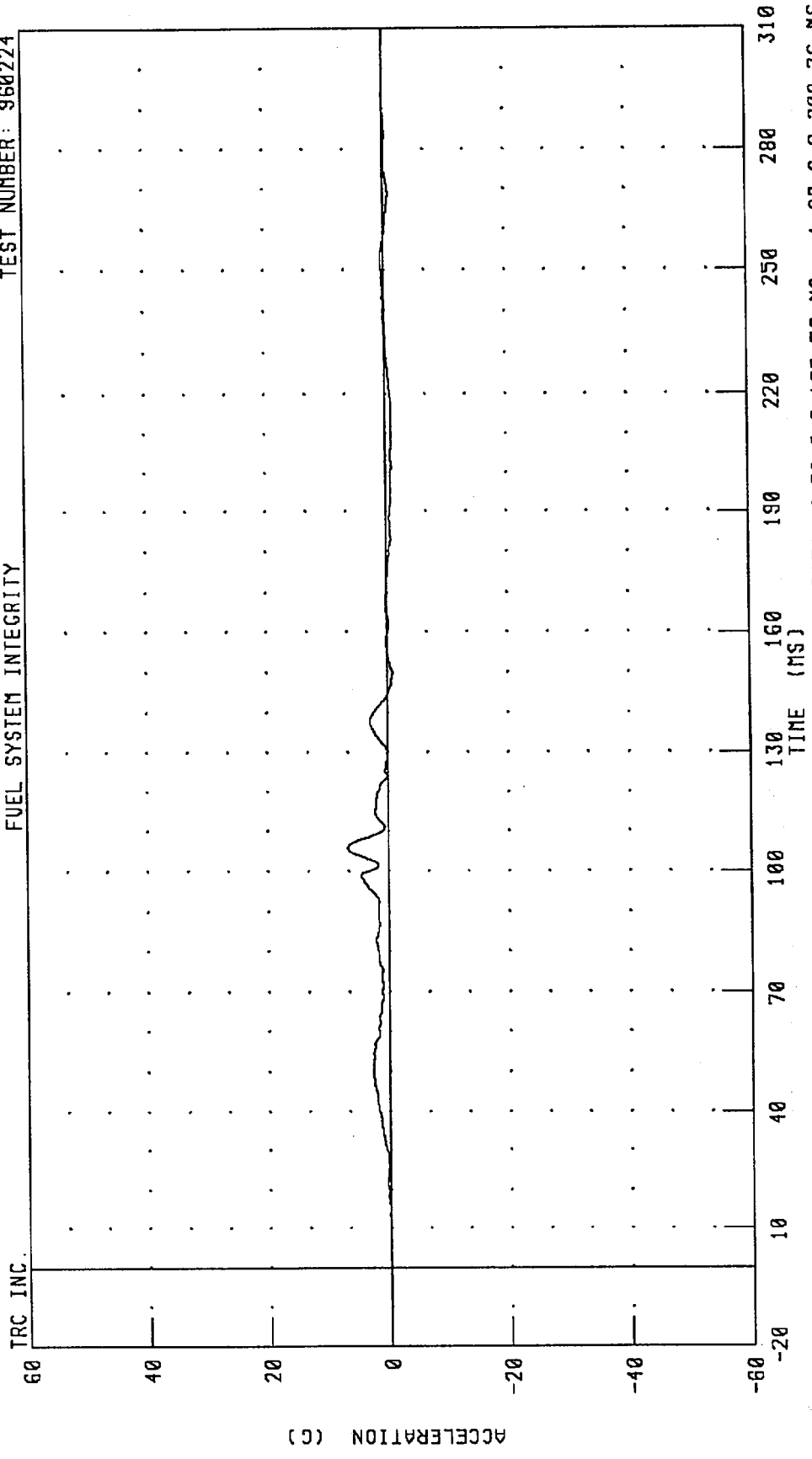
TEST NUMBER: 960224



CHANNEL: CSTXG1 FILTER: CH. CLASS 180

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

TEST NUMBER: 960224



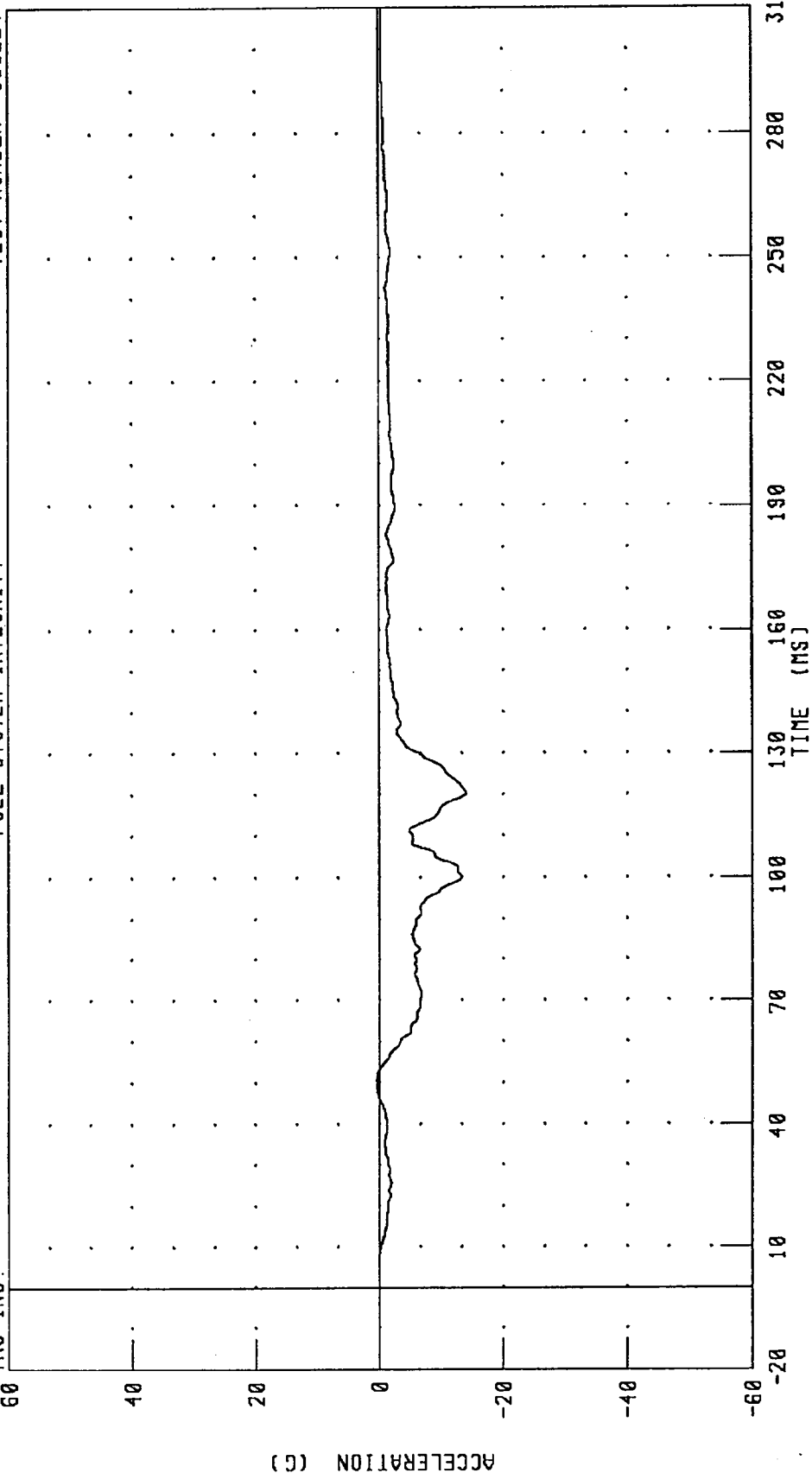
CHANNEL: CSTYG1 FILTER: CH. CLASS 180

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.

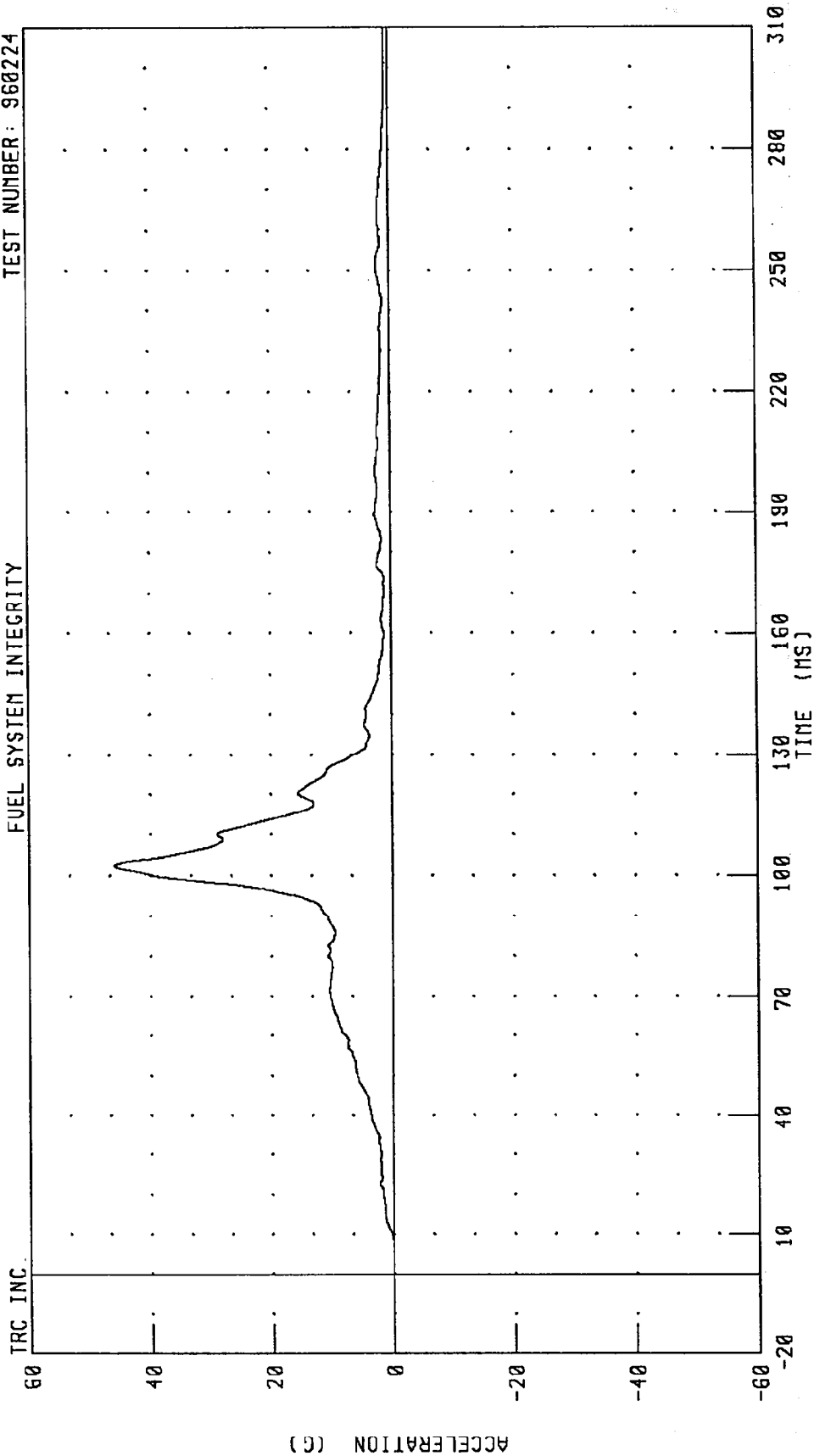


CHANNEL: CSTZG1 FILTER: CH. CLASS 180

PEAK DATA: 0.43 G @ 50.64 MS; -14.04 G @ 120.40 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 FORD MUSTANG AT 80 KPH AND 70% OVERLAP
 DRIVER CHEST RESULTANT ACCELERATION
 FUEL SYSTEM INTEGRITY

TEST NUMBER: 960224



CHANNEL: CSTRG1 FILTER: CH. CLASS 180

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 FORD MUSTANG AT 80 KPH AND 70% OVERLAP

DRIVER CHEST DEFLECTION

FUEL SYSTEM INTEGRITY

TRC INC.

100

DISPLACEMENT (MM)

8-28

960224

TEST NUMBER: 960224

CHANNEL: CSTXD1

FILTER: CH. CLASS 180

PEAK DATA: 3.15 MM @ 113.52 MS; -0.08 MM @ 257.44 MS

TIME (MS)

100

70

40

10

-20

-33

-66

-100

130

160

190

220

250

280

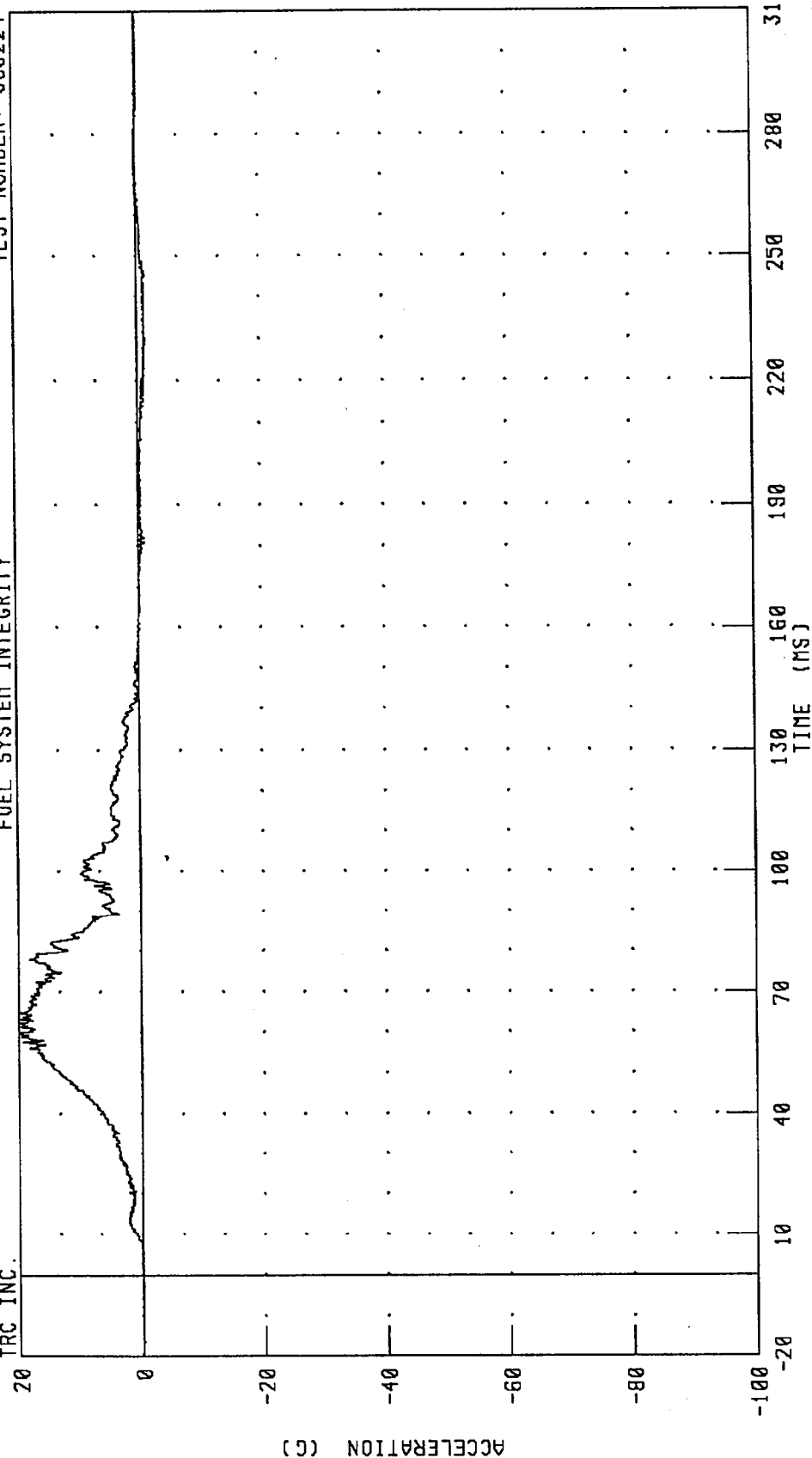
310

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.

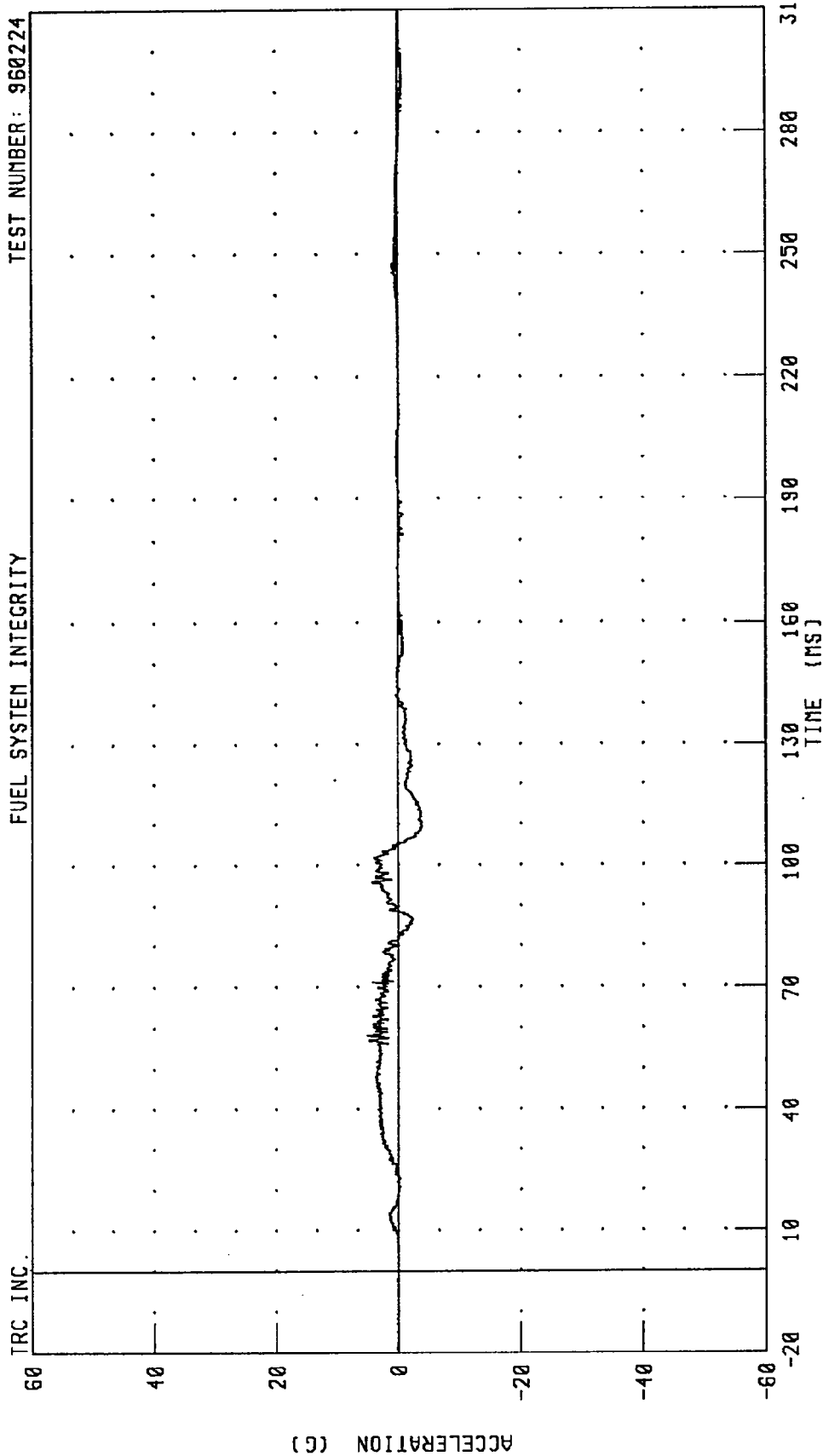


PEAK DATA: 20.23 G @ 59.84 MS; -1.37 G @ 228.64 MS

CHANNEL: PEVXG1 FILTER: CH. CLASS 1000

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

TEST NUMBER: 960224



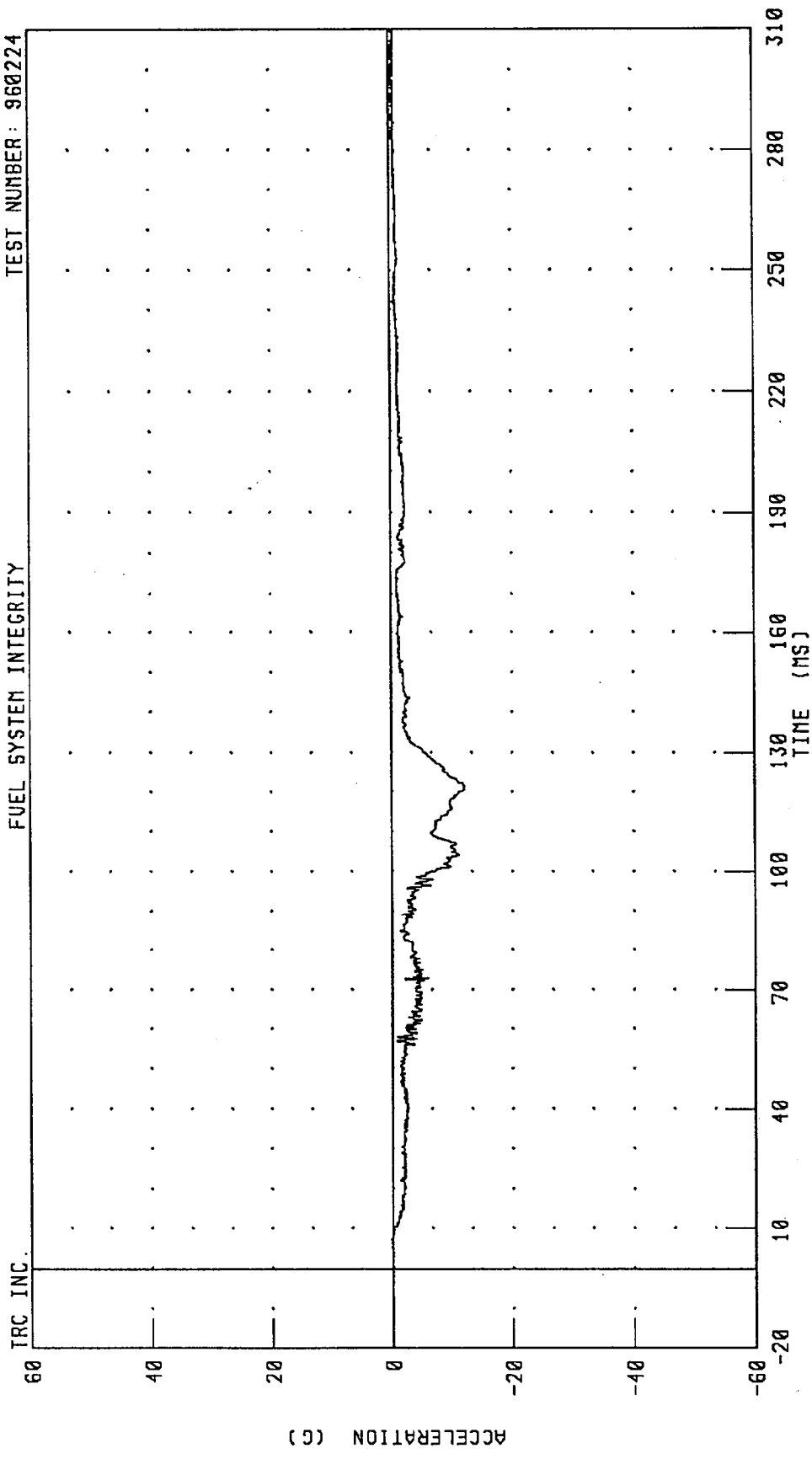
CHANNEL: PEVYG1 FILTER: CH. CLASS 1000

PEAK DATA: 5.08 G @ 58.00 MS, -3.91 G @ 109.44 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 FORD MUSTANG AT 80 KPH AND 70% OVERLAP
 DRIVER PELVIS Z-AXIS ACCELERATION

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY



PEAK DATA: 0.19 G @ 5.28 MS; -12.01 G @ 120.48 MS

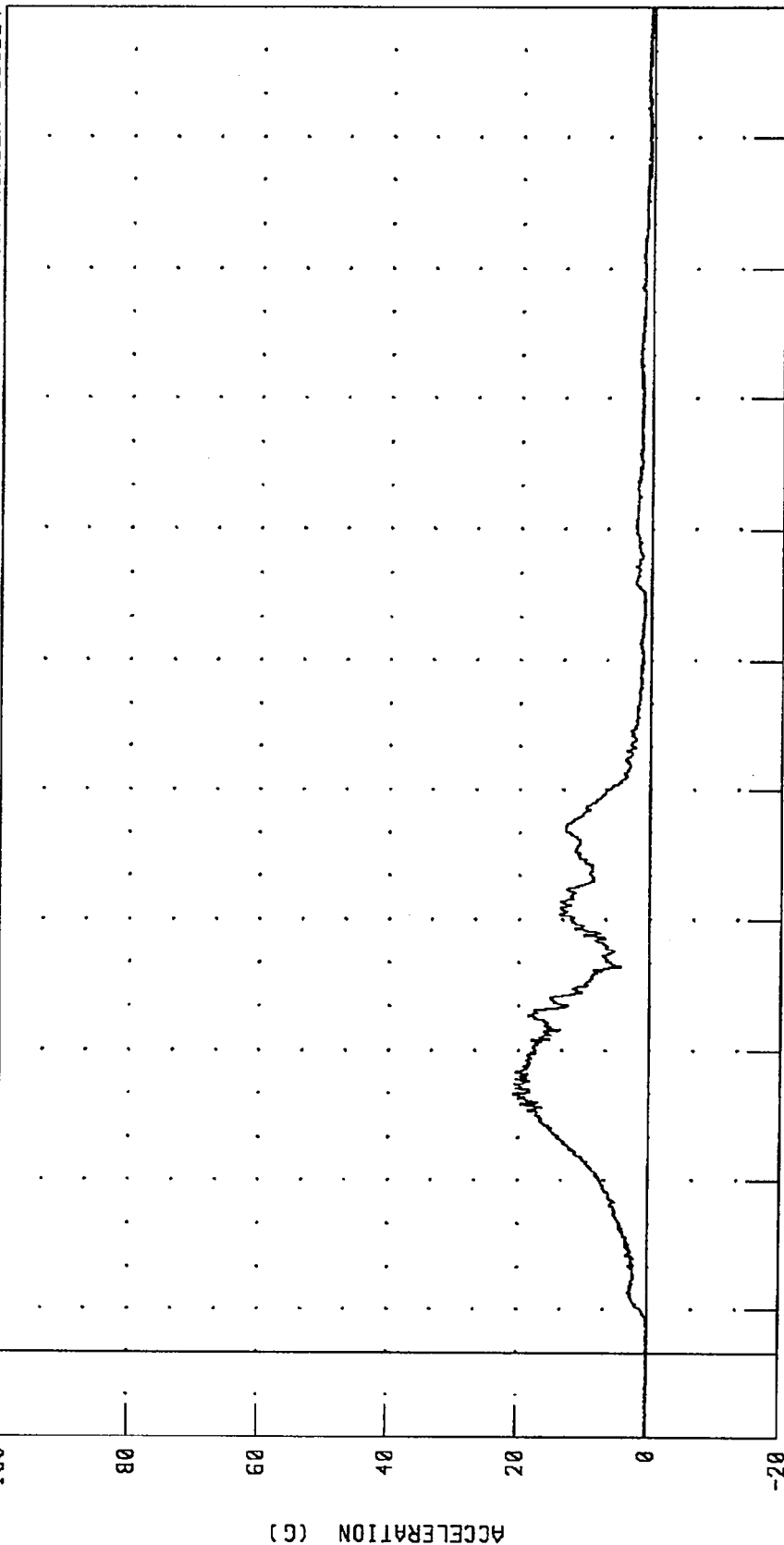
CHANNEL: PEVZG1 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 FORD MUSTANG AT 80 KPH AND 70% OVERLAP
 DRIVER PELVIS RESULTANT ACCELERATION

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.

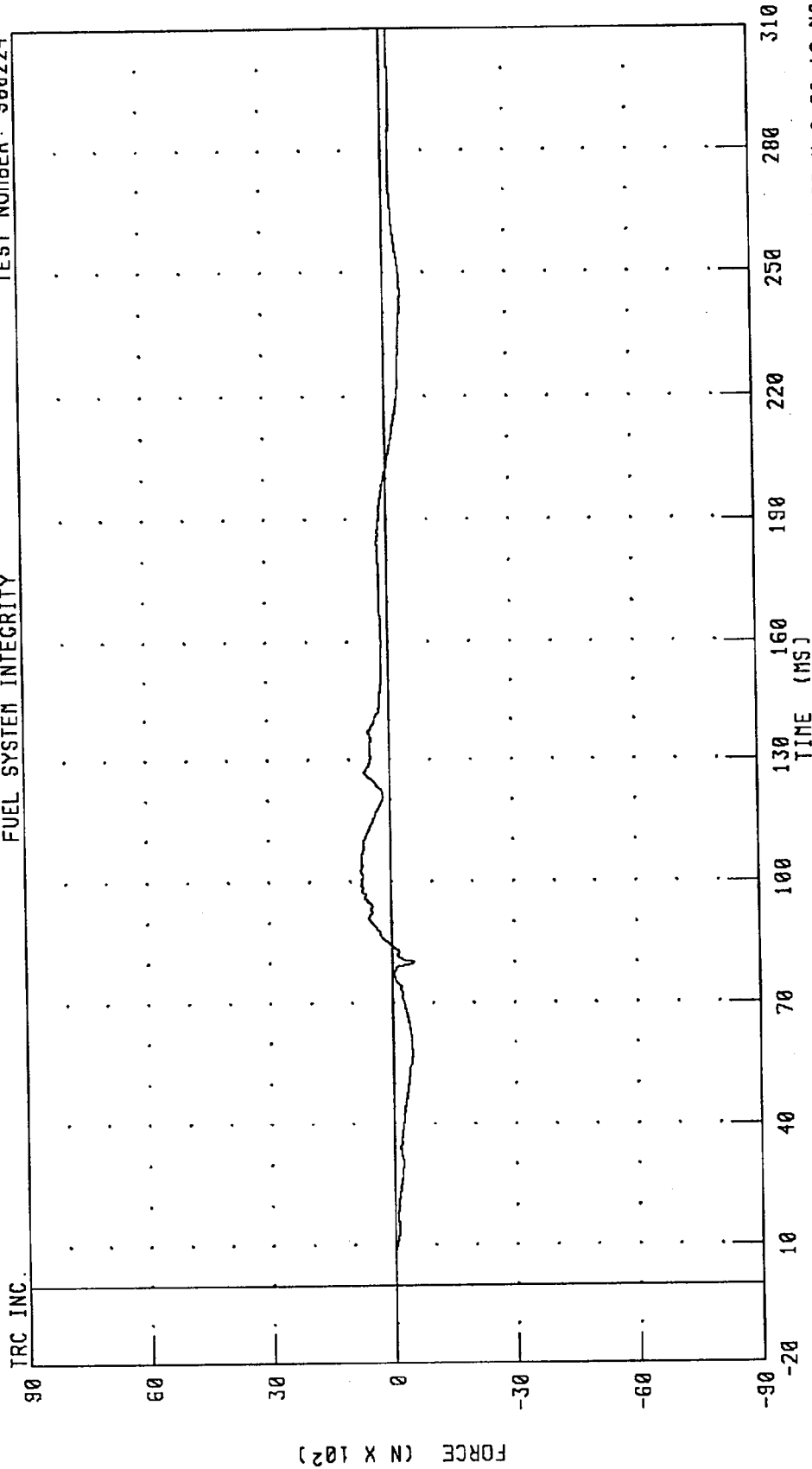


CHANNEL: PEVRG1 FILTER: CH. CLASS 1000

PEAK DATA: 20.70 G @ 59.92 MS; 0.01 G @ -20.00 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 FORD MUSTANG AT 80 KPH AND 70% OVERLAP
 DRIVER LEFT FEMUR FORCE
 FUEL SYSTEM INTEGRITY

TEST NUMBER: 960224



PEAK DATA: 736.60 N @ 102.56 MS; -534.80 N @ 80.16 MS

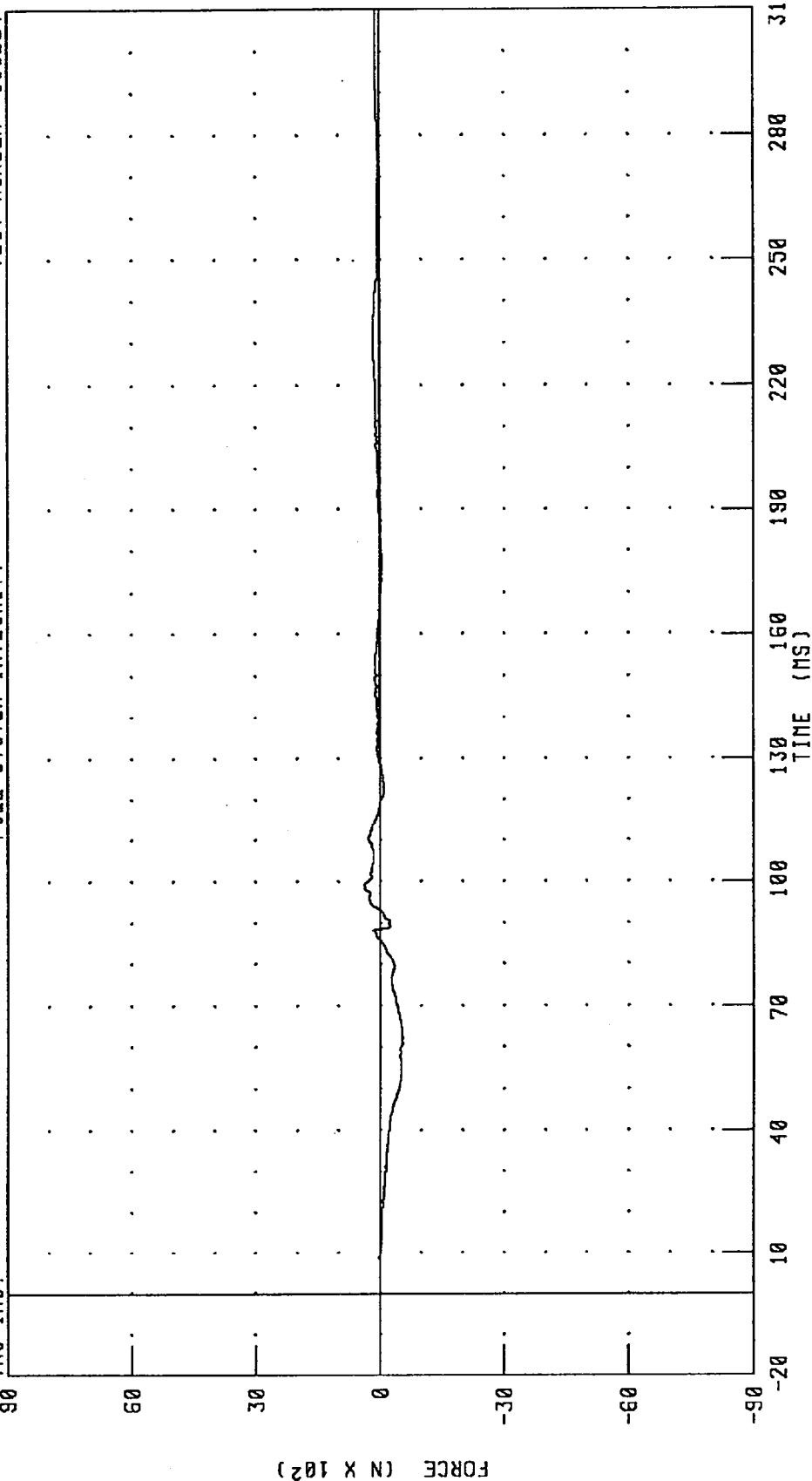
CHANNEL: LFMF1 FILTER: CH. CLASS 600

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 386.58 N @ 99.20 MS; -553.14 N @ 60.80 MS

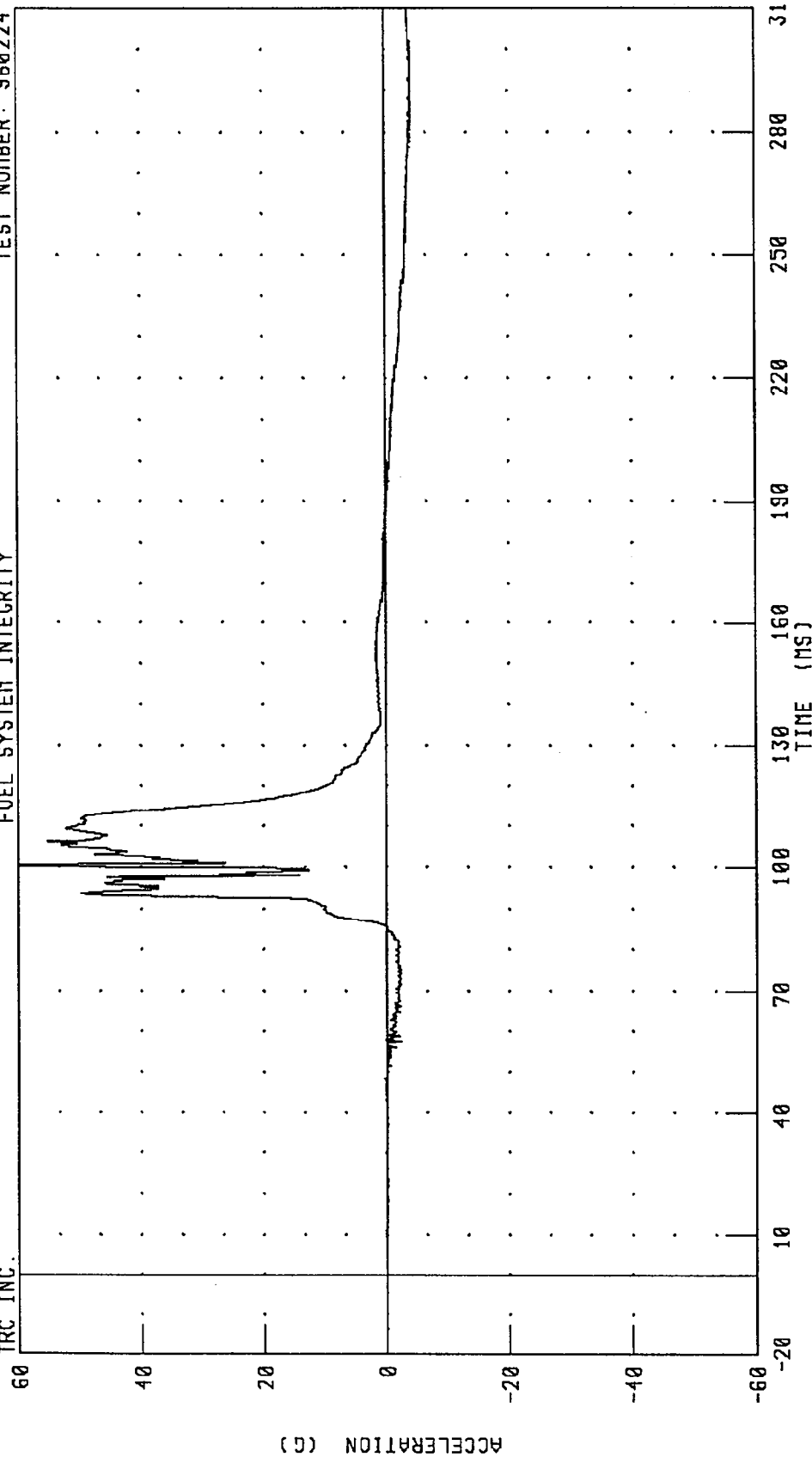
CHANNEL: RFMF1 FILTER: CH. CLASS 600

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.

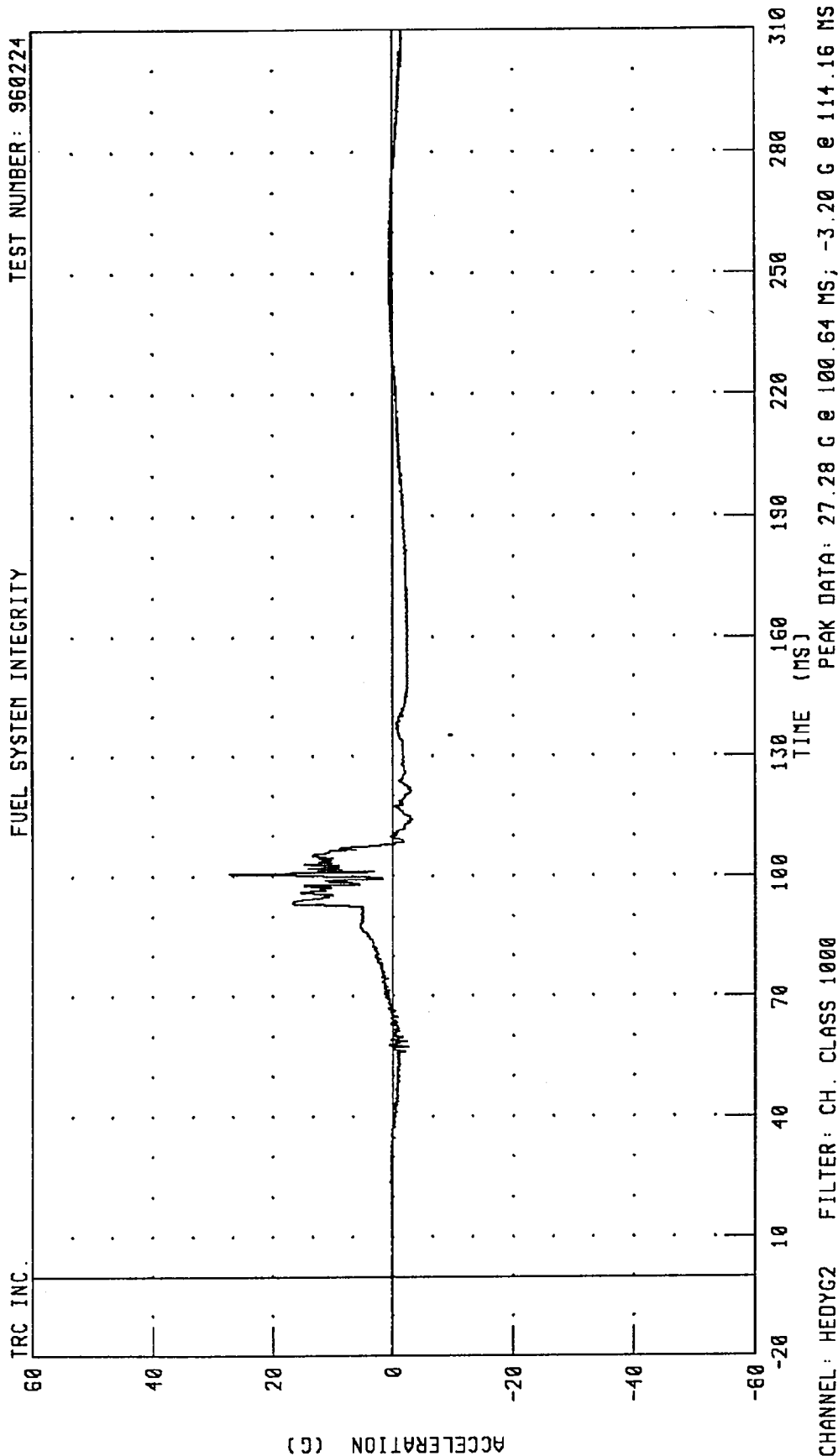


CHANNEL: HEDXC2 FILTER: CH. CLASS 1000

PEAK DATA: 59.78 G @ 100.24 MS; -4.14 G @ 276.40 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 FORD MUSTANG AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION

FUEL SYSTEM INTEGRITY TEST NUMBER: 960224

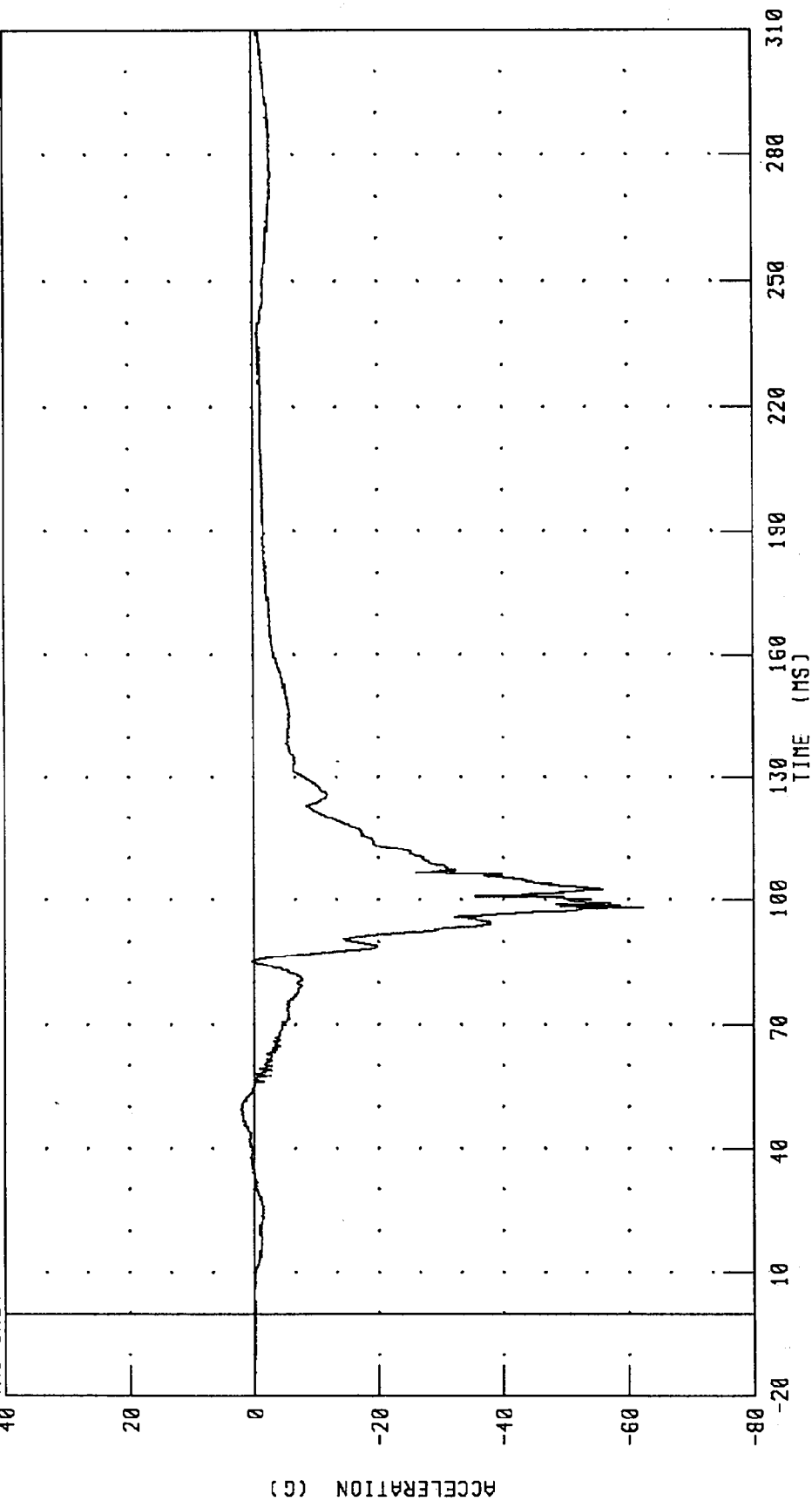


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 FORD MUSTANG AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER HEAD Z-AXIS ACCELERATION

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: HEDZG2 FILTER: CH. CLASS 1000

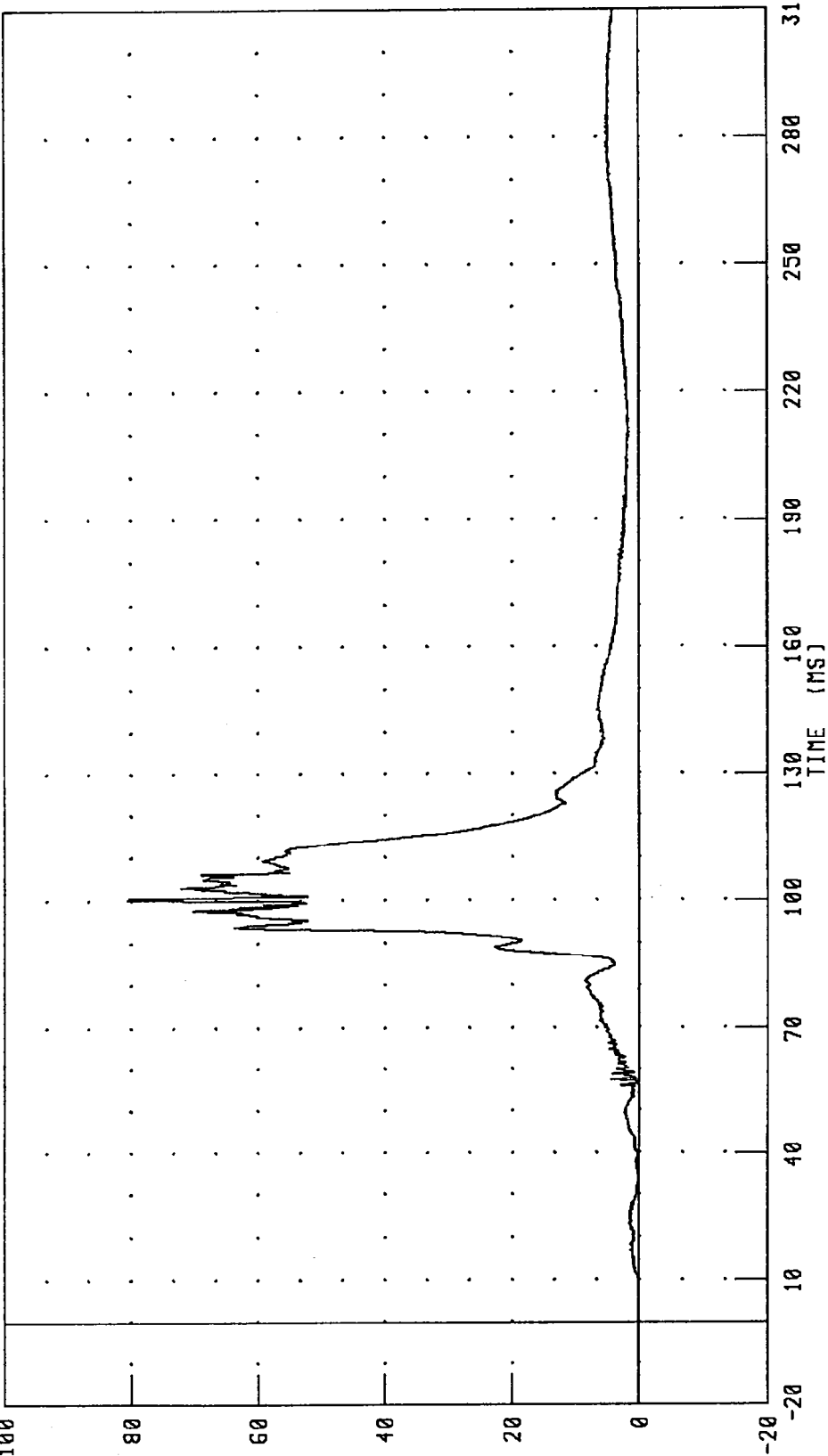
PEAK DATA: 2.21 G @ 49.36 MS, -62.36 G @ 98.16 MS

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 80.60 G @ 100.24 MS; 0.08 G @ -19.84 MS

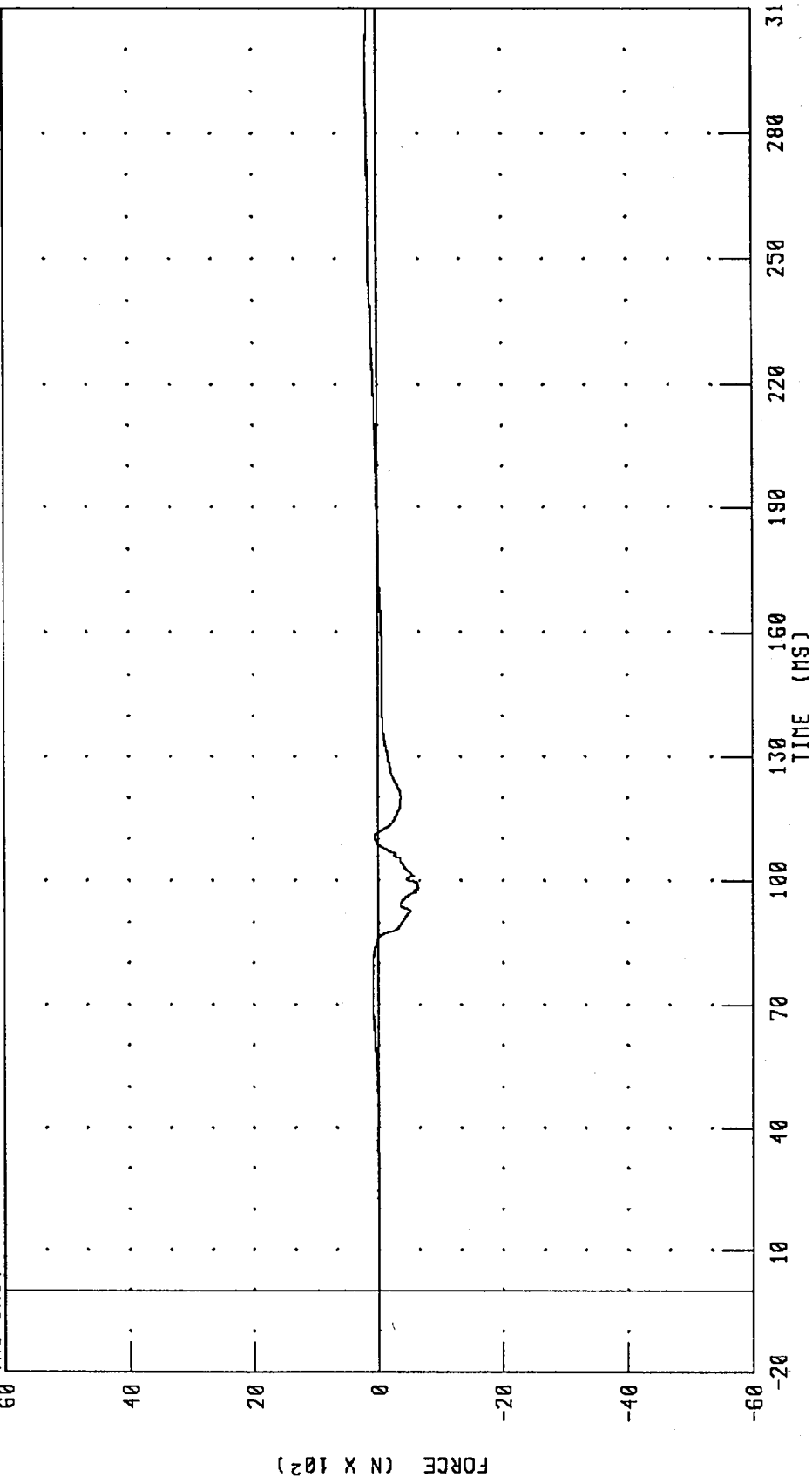
CHANNEL: HEDRG2 FILTER: CH. CLASS 1000

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 167.09 N @ 287.28 MS; -645.61 N @ 98.08 MS

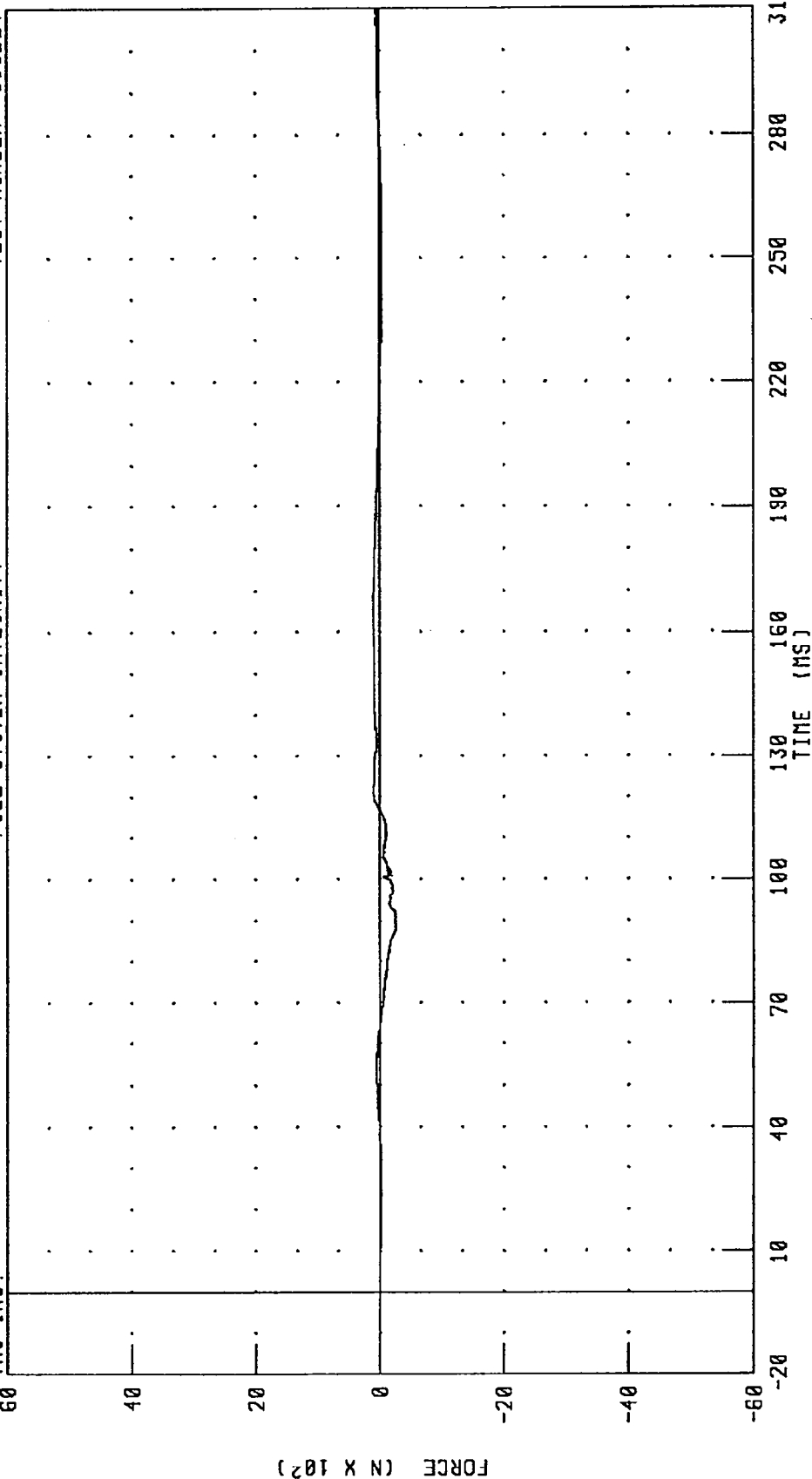
CHANNEL: NEKXF2 FILTER: CH. CLASS 1000

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 100.46 N @ 121.12 MS; -264.61 N @ 88.00 MS

CHANNEL: NEKYF2 FILTER: CH. CLASS 1000

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

TEST NUMBER: 960224

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: NEKZF2 FILTER: CH. CLASS 1000

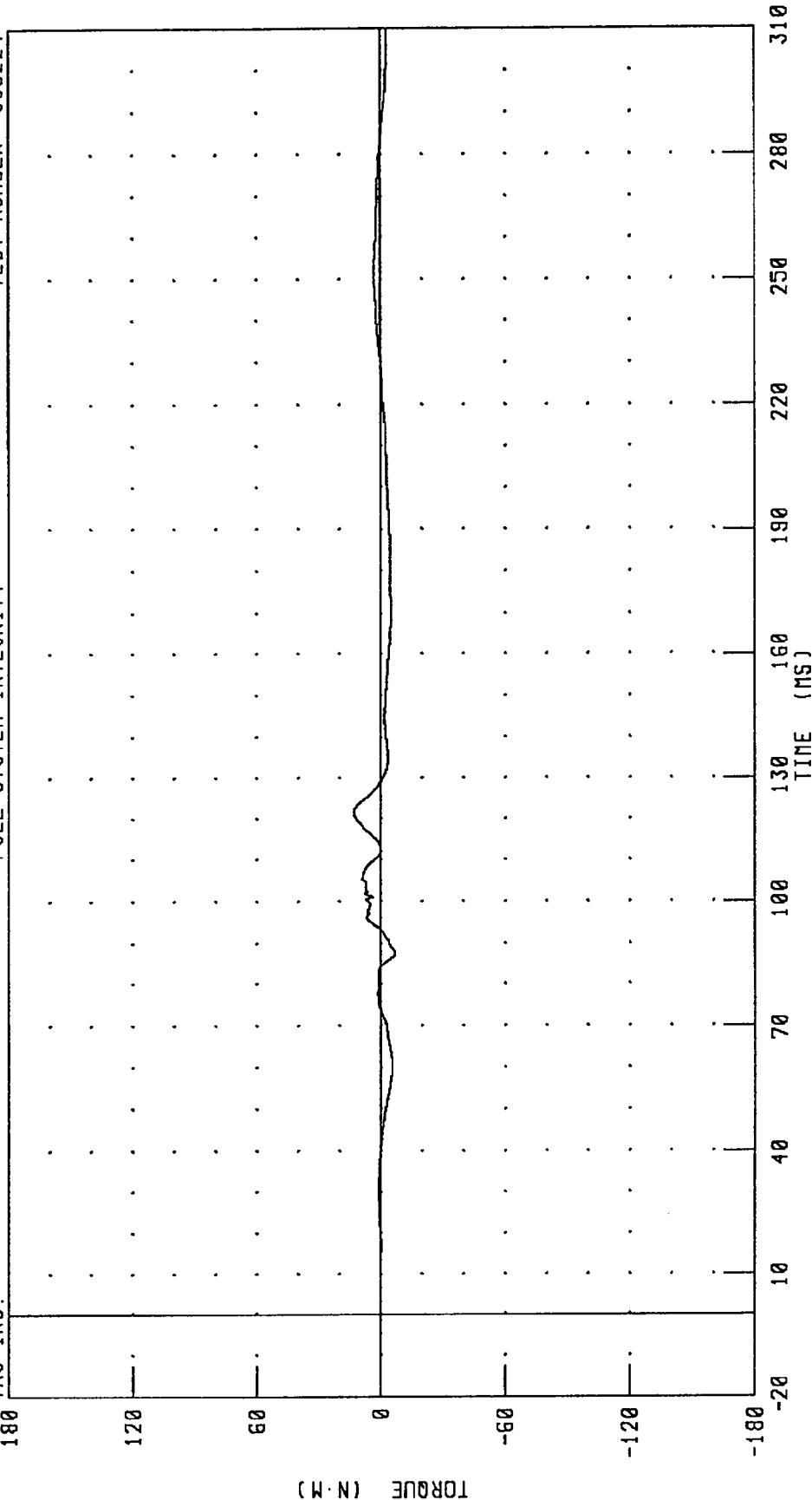
PEAK DATA: 3083.86 N @ 108.08 MS; -89.23 N @ 48.24 MS

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



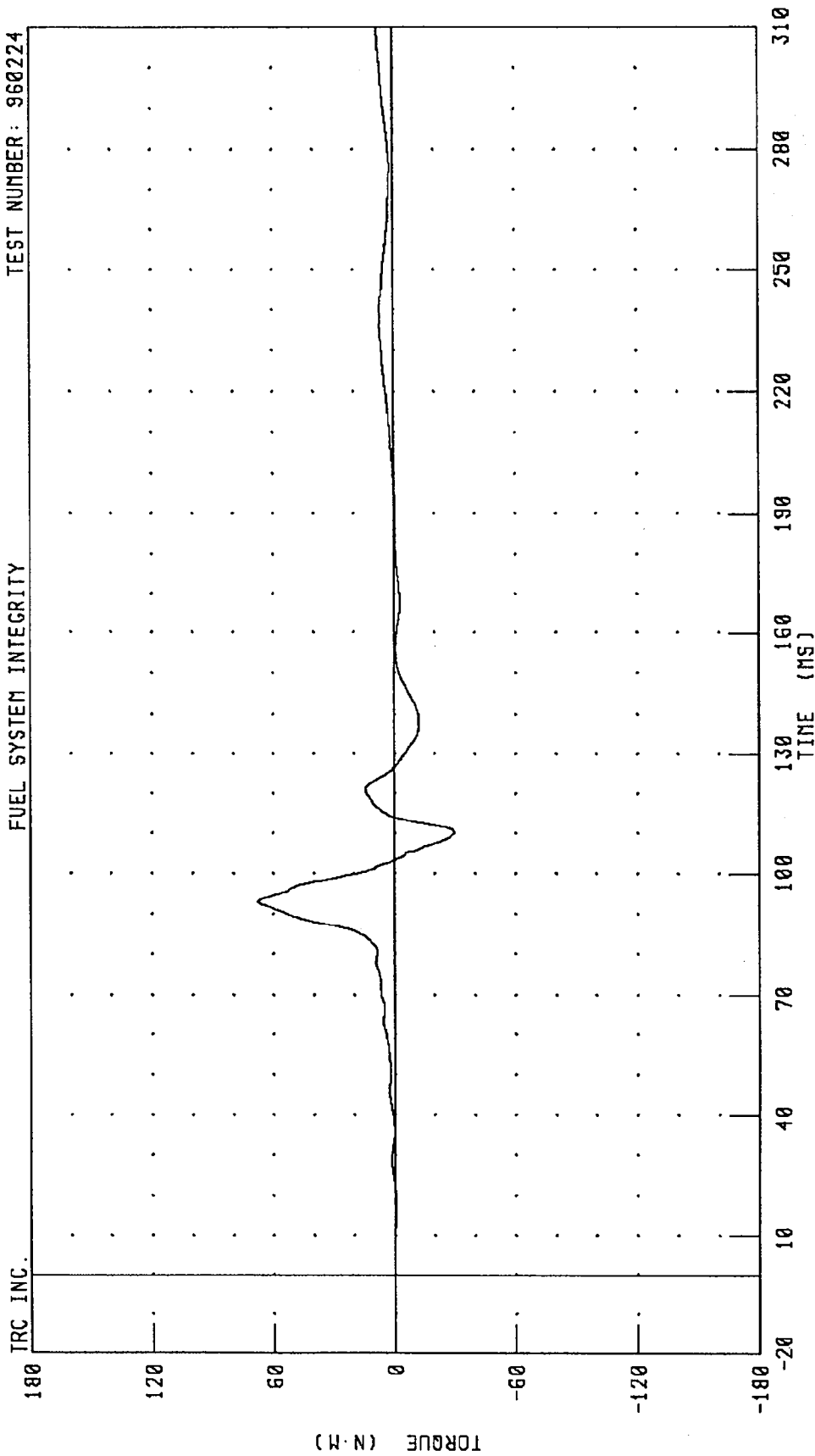
PEAK DATA: 12.97 N.M @ 121.84 MS; -7.07 N.M @ 87.84 MS

CHANNEL: NEXXM2 FILTER: CH. CLASS 600

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY



CHANNEL: NEKYM2 FILTER: CH. CLASS 600

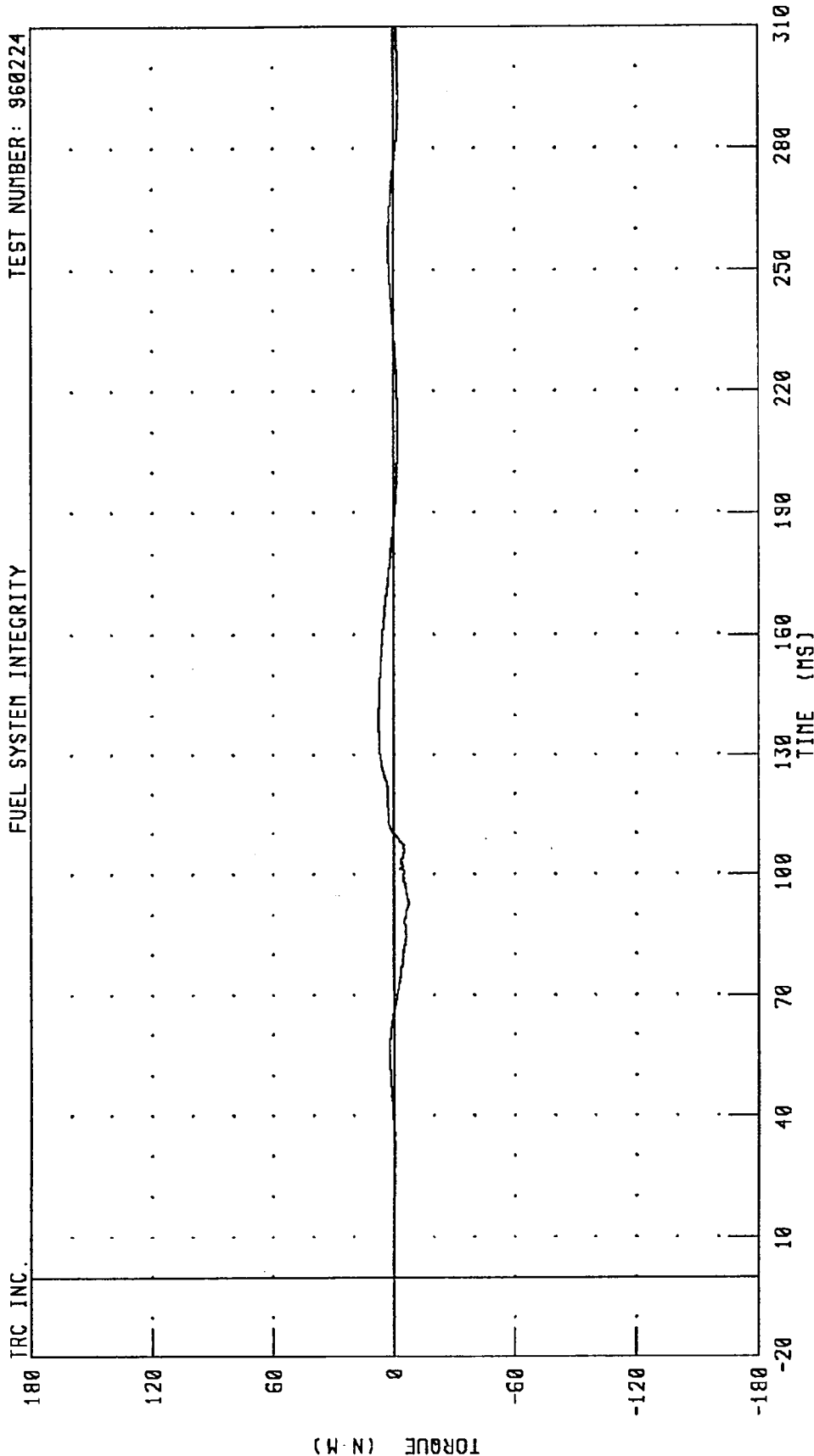
PEAK DATA: 67.87 N-M @ 93.04 MS; -29.71 N-M @ 110.32 MS

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

IRC INC.



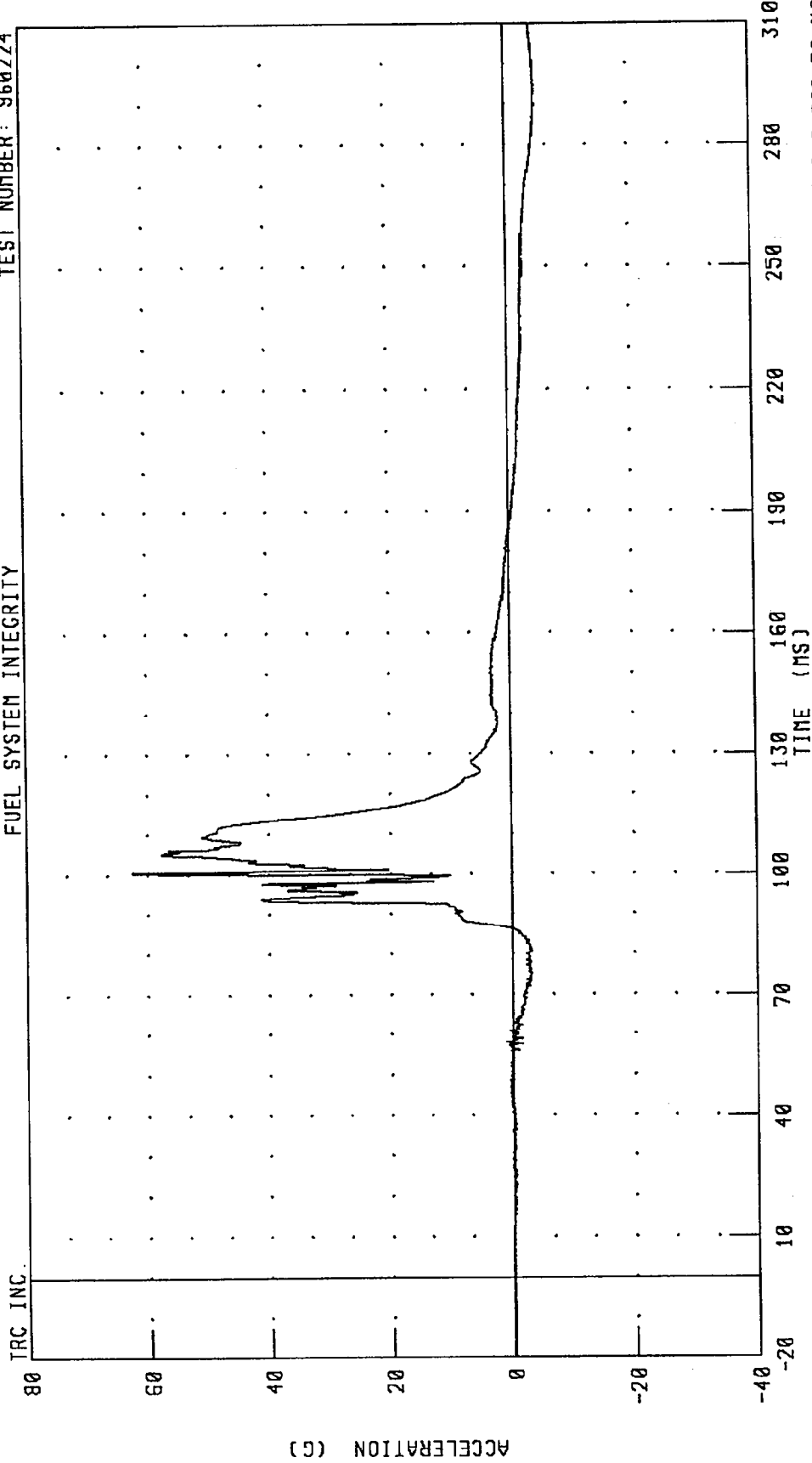
PEAK DATA: 7.49 N-M @ 138.32 MS; -7.55 N-M @ 93.04 MS

CHANNEL: NEKZM2 FILTER: CH. CLASS 600

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

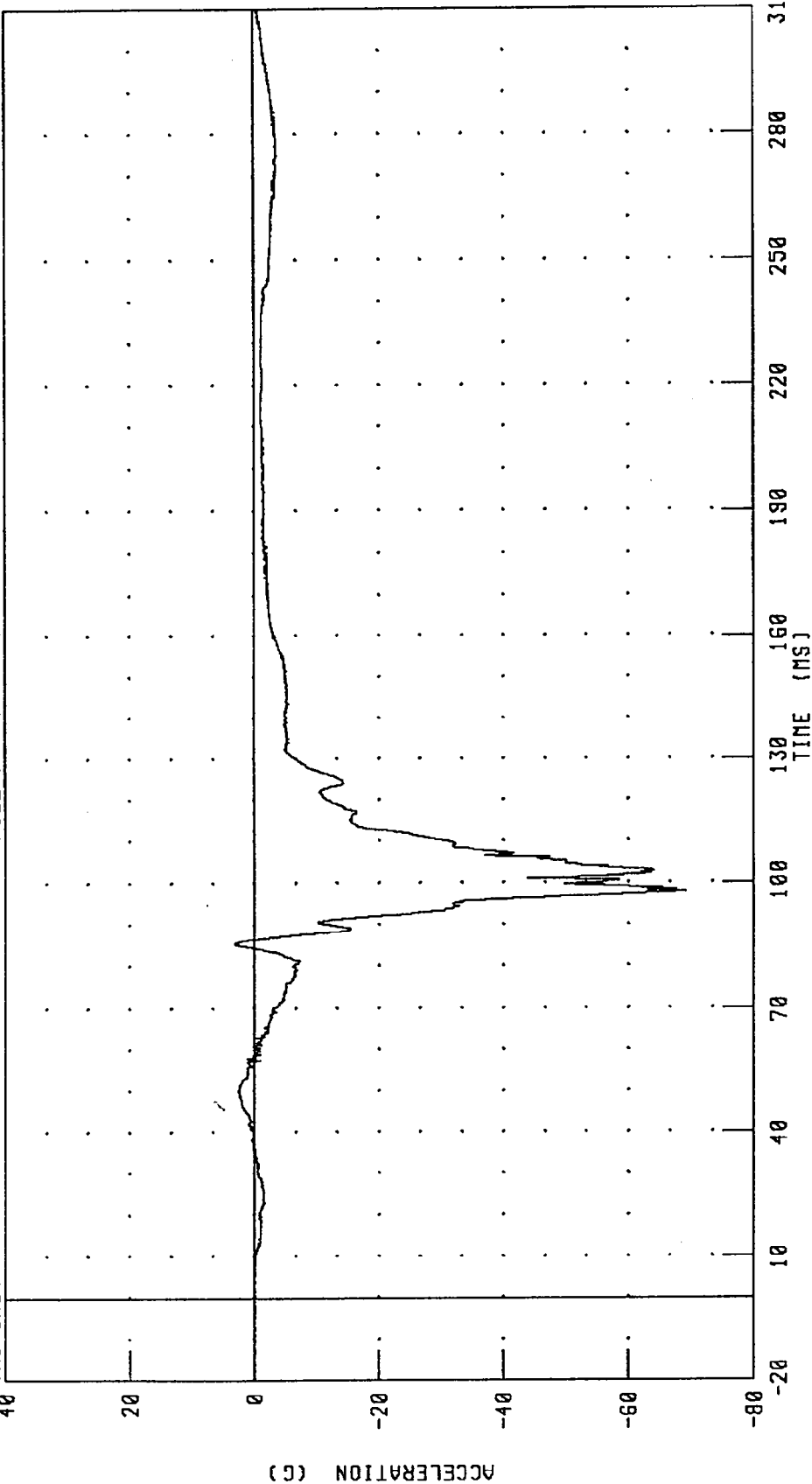


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 FORD MUSTANG AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER HEAD POSITION 1 Z-AXIS ACCELERATION

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: HD1ZG2 FILTER: CH. CLASS 1000

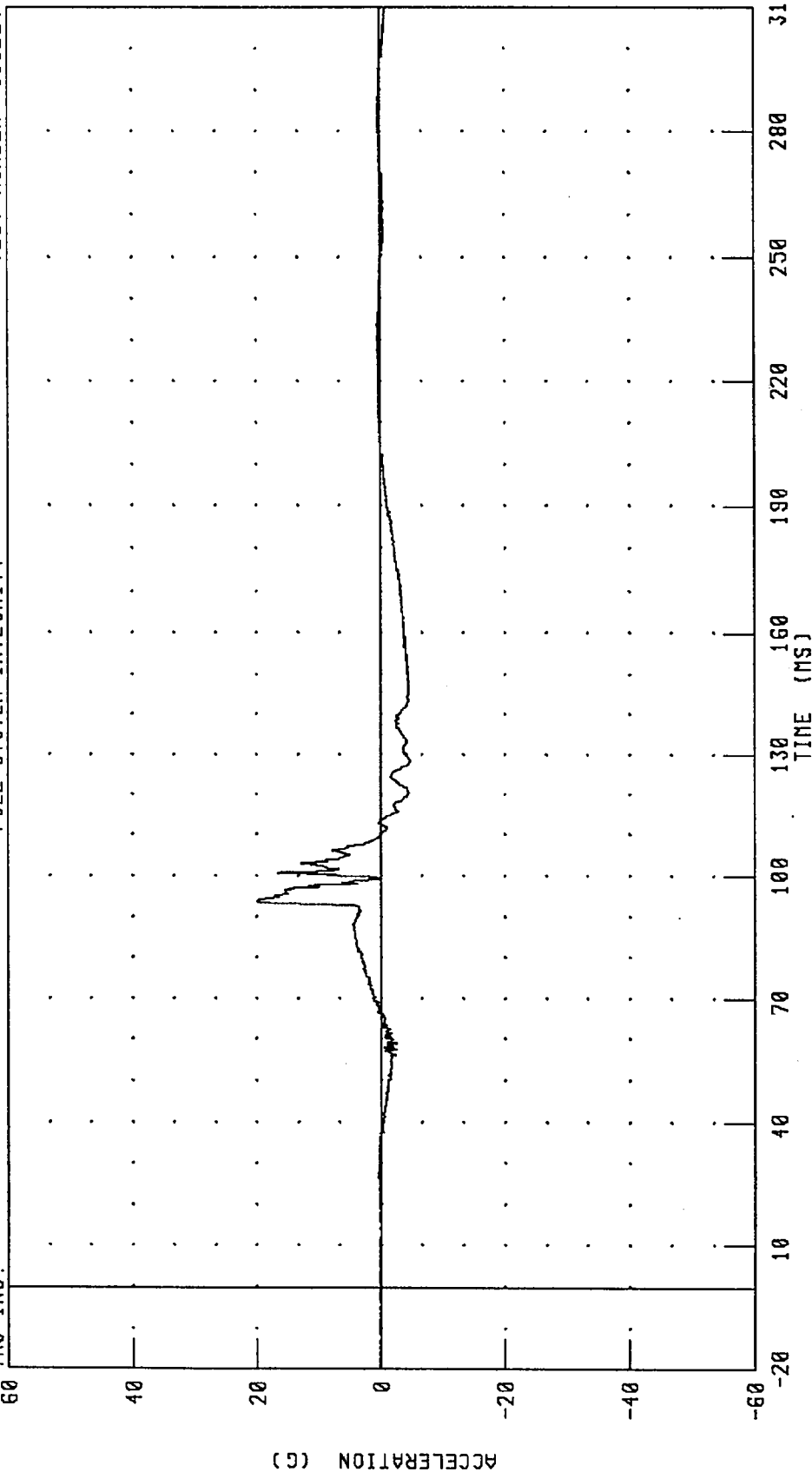
PEAK DATA: 2.98 G @ 85.28 MS; -69.14 G @ 97.92 MS

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: HD2YG2 FILTER: CH. CLASS 1000

PEAK DATA: 20.00 G @ 93.76 MS; -4.77 G @ 128.08 MS

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.

40

20

0

-20

-40

-60

-80

ACCELERATION (G)

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

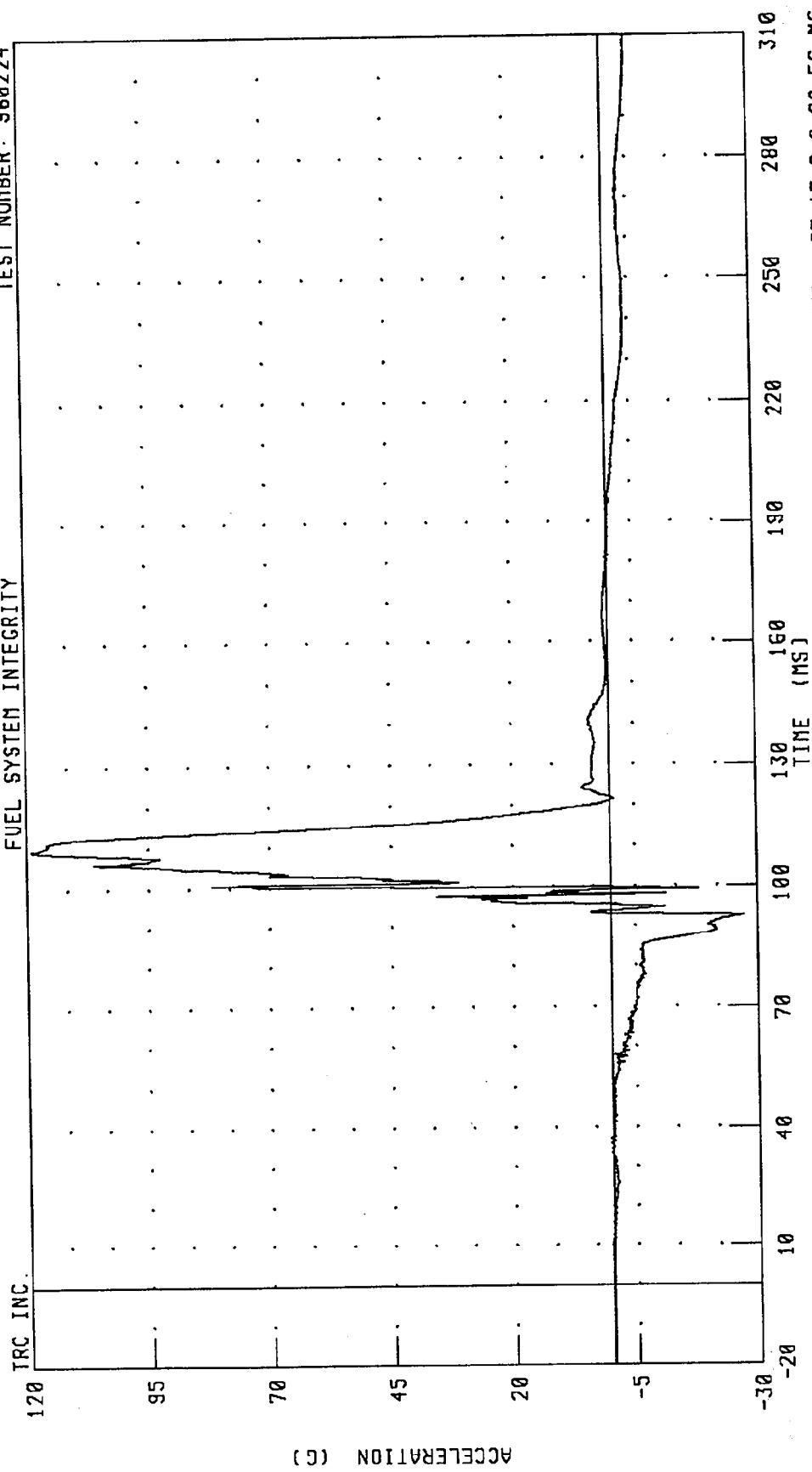
CHANNEL: HD2ZG2 FILTER: CH. CLASS 1000

PEAK DATA: 7.92 G @ 90.72 MS; -73.38 G @ 109.36 MS

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY



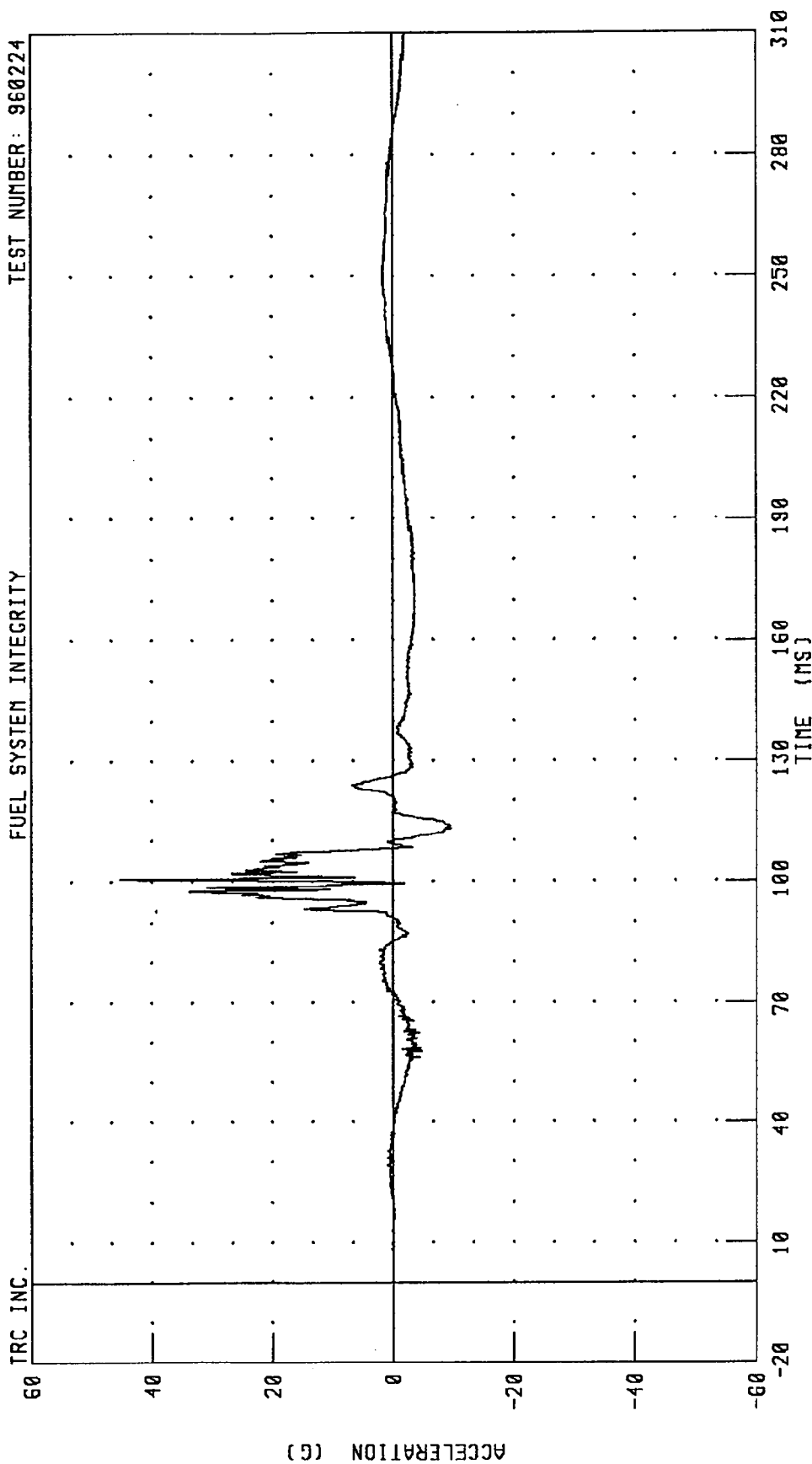
CHANNEL: HD3XG2 FILTER: CH. CLASS 1000

PEAK DATA: 119.08 G @ 109.52 MS, -27.15 G @ 92.56 MS

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY



CHANNEL: HD3YG2 FILTER: CH. CLASS 1000

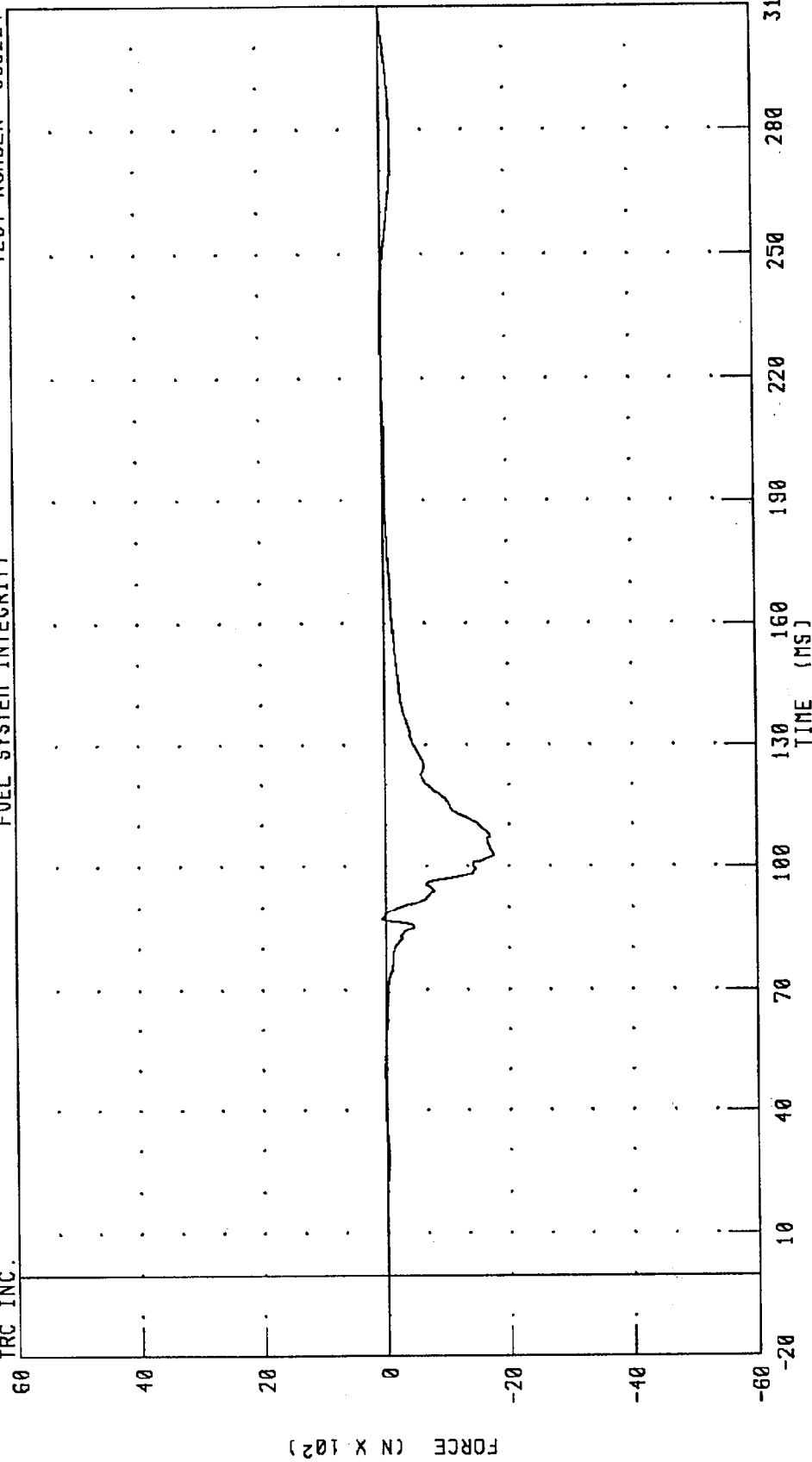
PEAK DATA: 45.16 G @ 100.64 MS; -9.66 G @ 113.12 MS

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 64.69 N @ 87.20 MS; -1761.97 N @ 102.96 MS

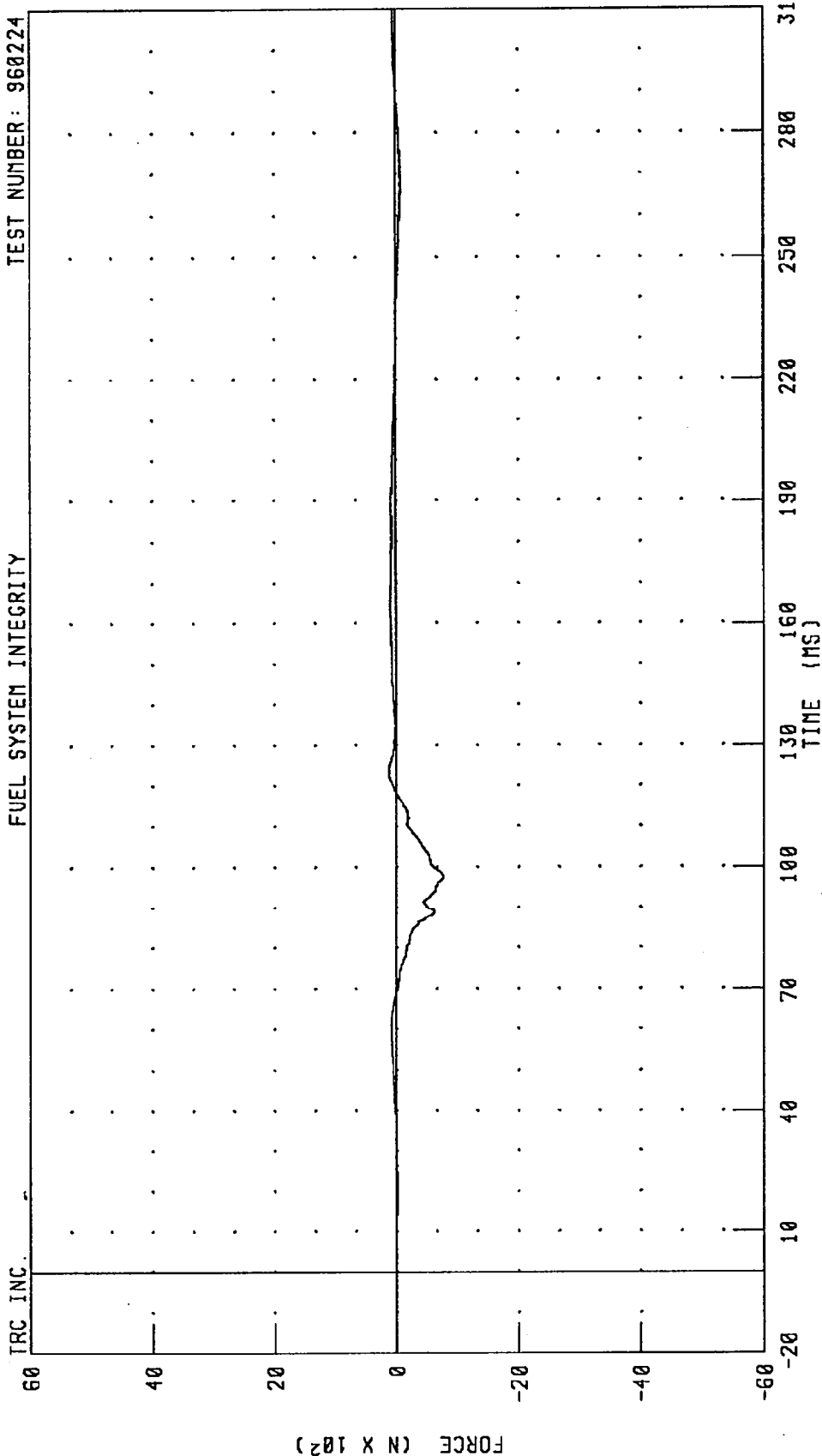
CHANNEL: NKLXF2 FILTER: CH. CLASS 1000

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: NKLYF2 FILTER: CH. CLASS 1000

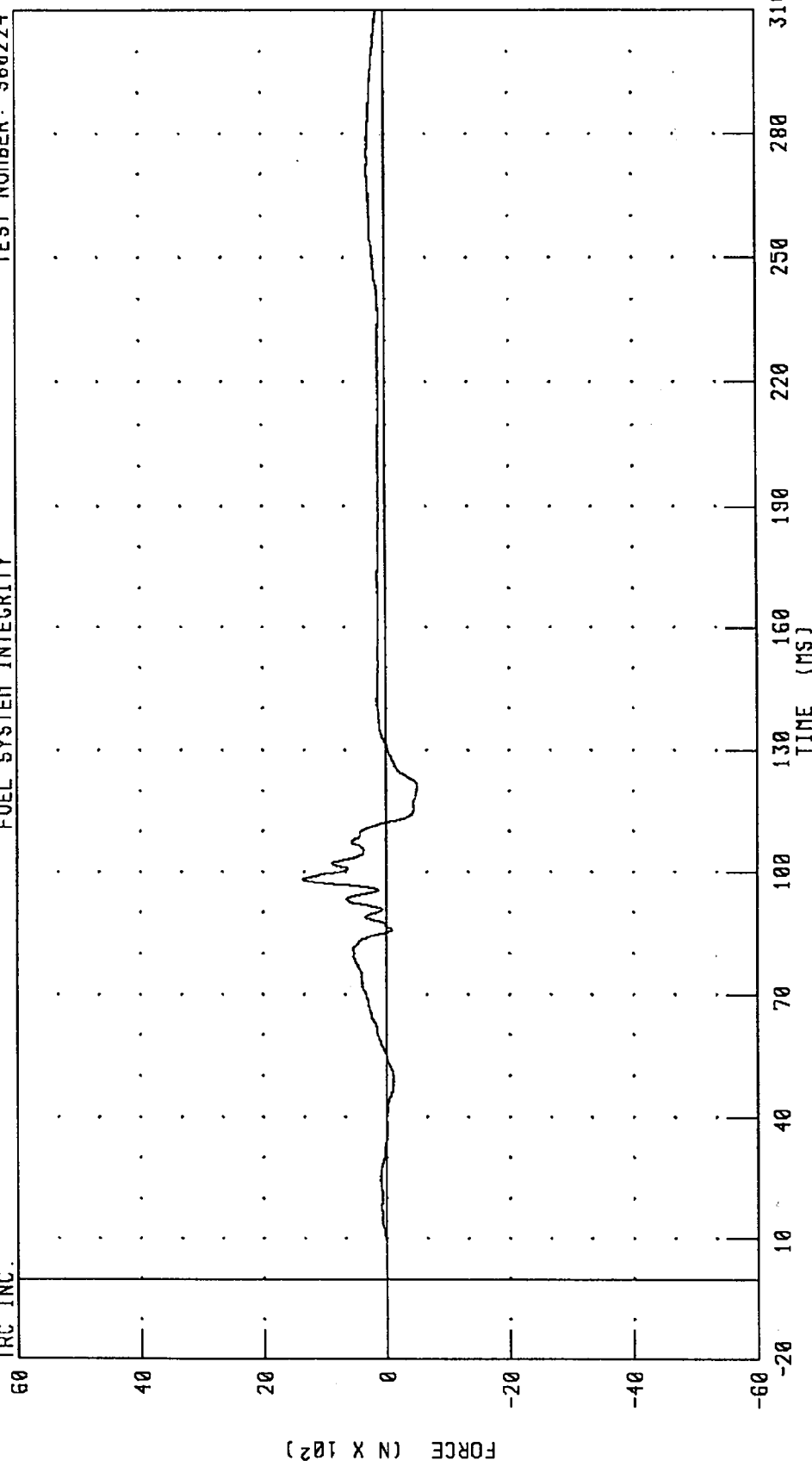
PEAK DATA: 124.51 N e 123.20 MS; -755.40 N e 97.28 MS

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



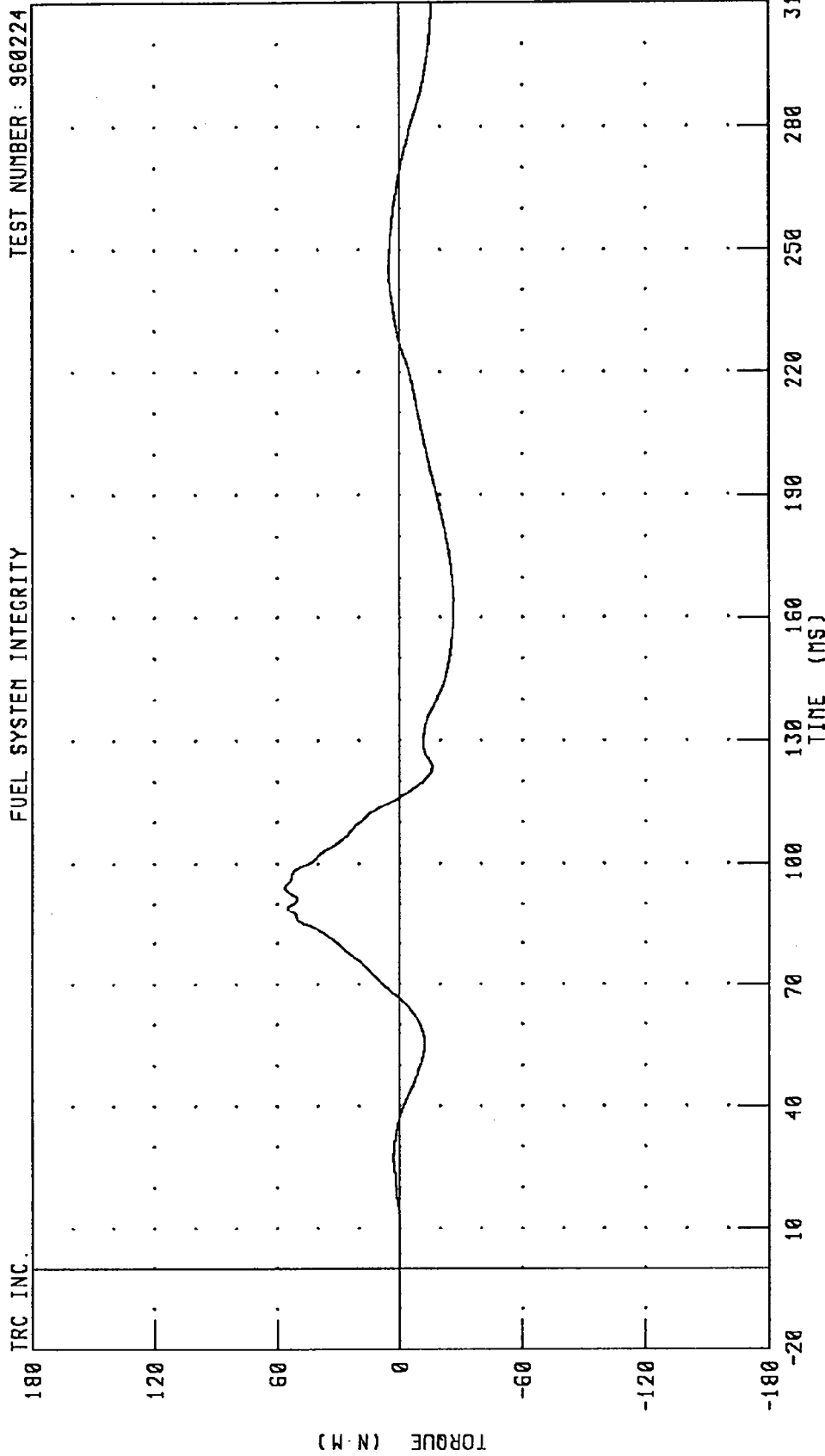
PEAK DATA: 1363.28 N @ 98.16 MS; -512.36 N @ 121.36 MS

CHANNEL: NKLZF2 FILTER: CH. CLASS 1000

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY



CHANNEL: NKLX12 FILTER: CH. CLASS 600

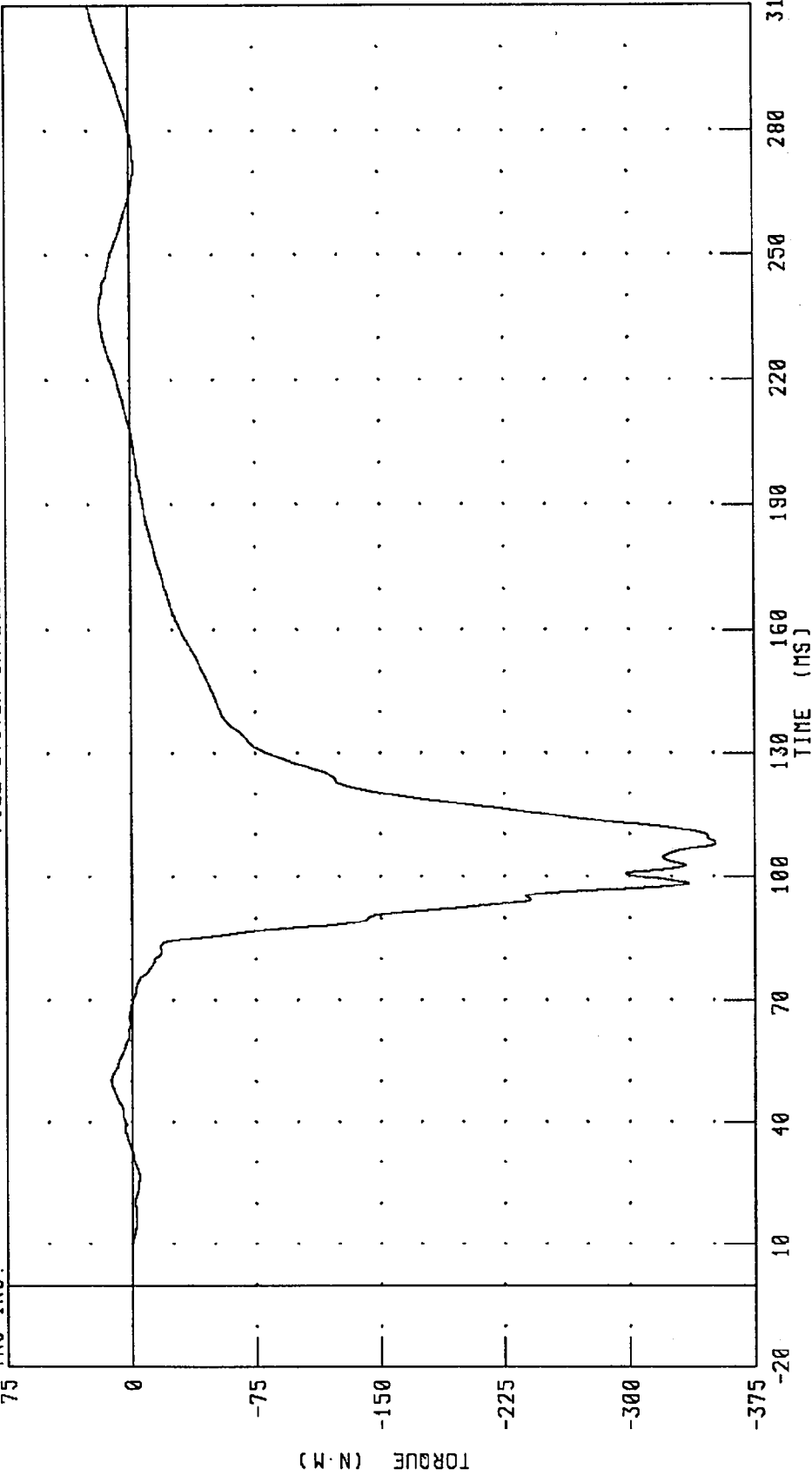
PEAK DATA: 56.28 N-M @ 94.16 MS; -26.67 N-M @ 164.48 MS

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: NKLYM2 FILTER: CH. CLASS 600

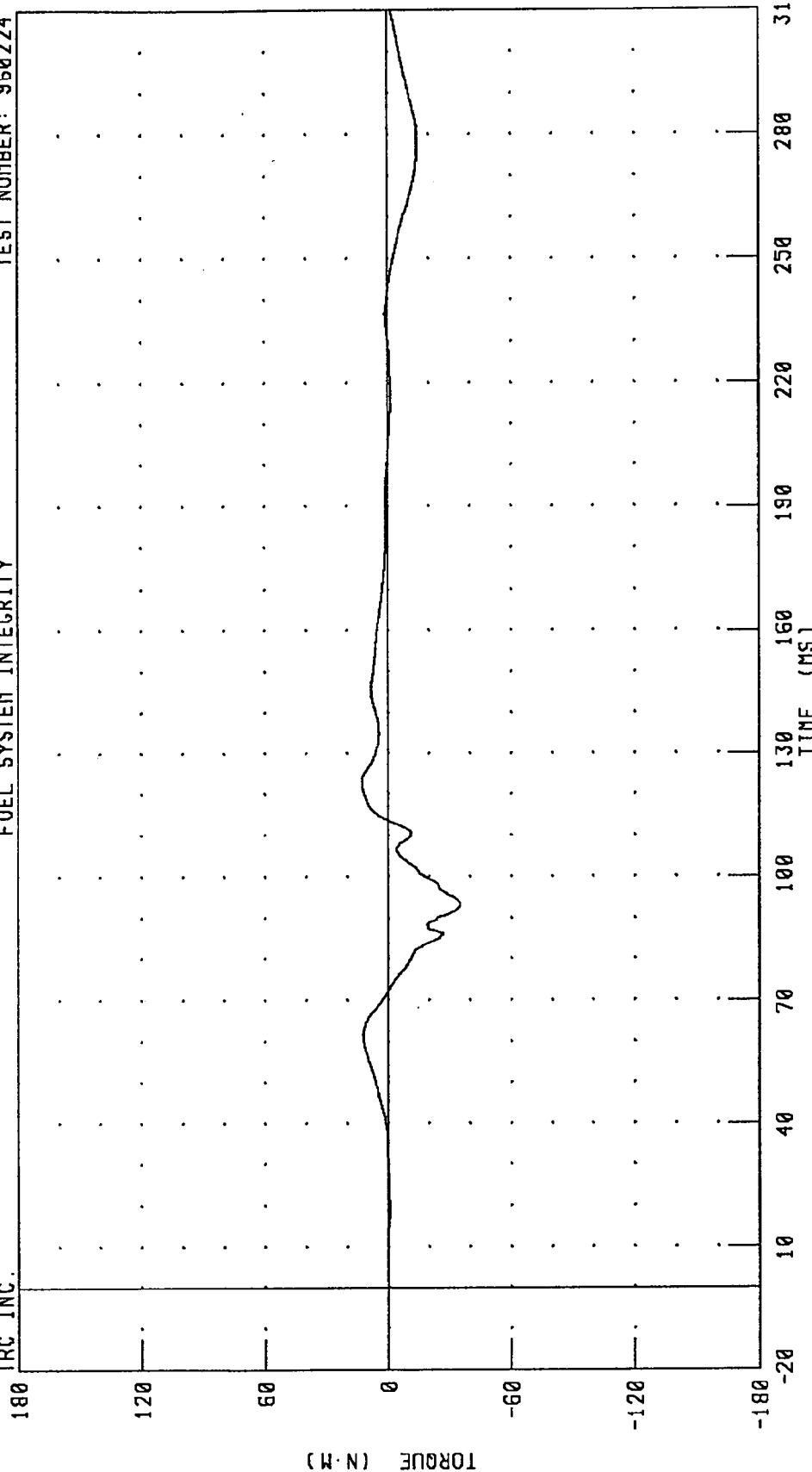
PEAK DATA: 23.91 N.M @ 309.60 MS; -351.54 N.M @ 107.84 MS

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 12.92 N·m @ 122.56 ms; -35.19 N·m @ 93.20 ms

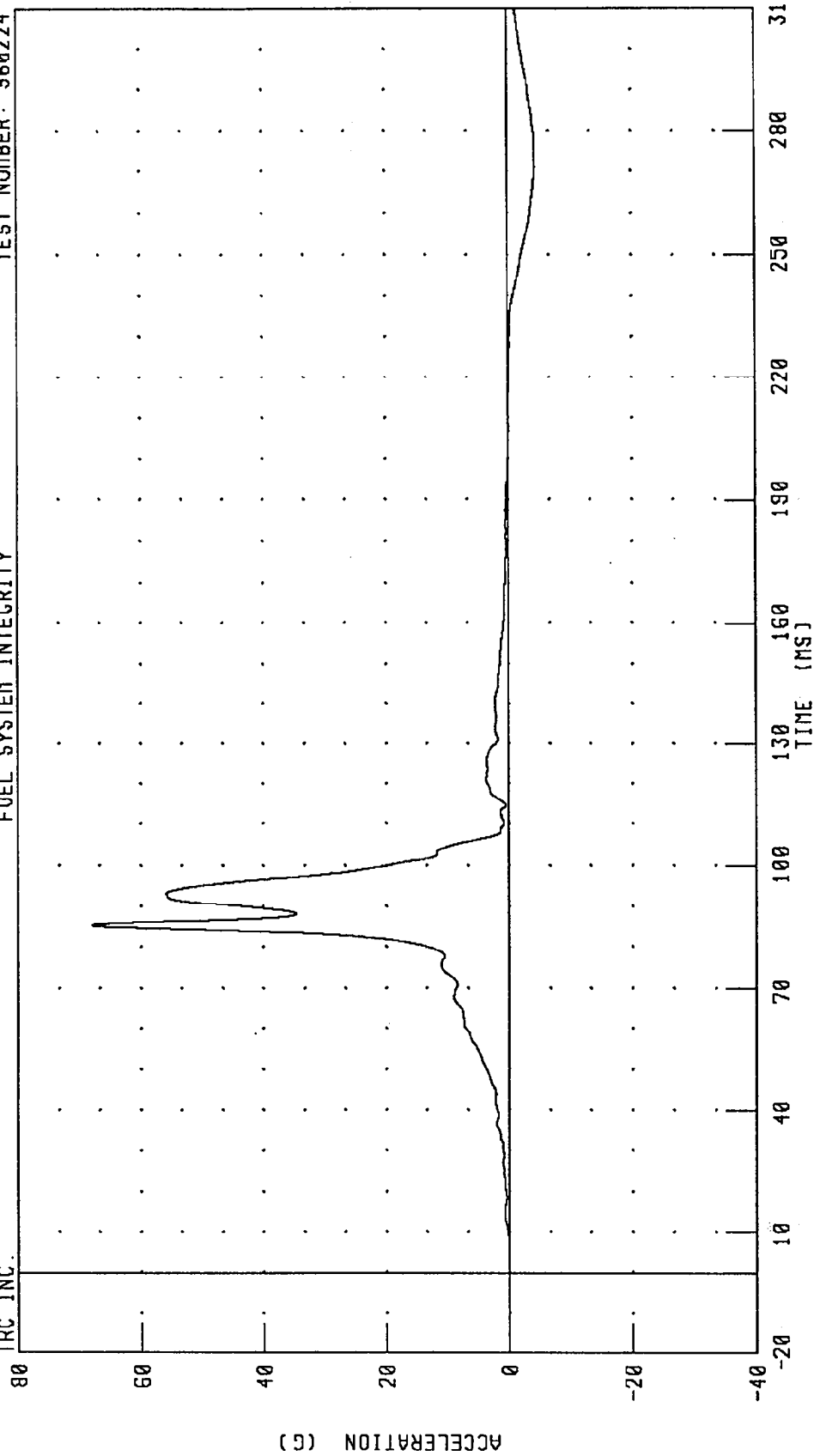
CHANNEL: NKLZM2 FILTER: CH. CLASS 600

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 67.94 G @ 85.44 MS; -4.46 G @ 271.04 MS

CHANNEL: CSTXG2 FILTER: CH. CLASS 180

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.

60

40

20

0

-20

-40

-60

ACCELERATION (G)

310

280

250

220

190

160

130

100

70

40

10

-20

TIME (MS)

CHANNEL: CSTYG2 FILTER: CH. CLASS 180

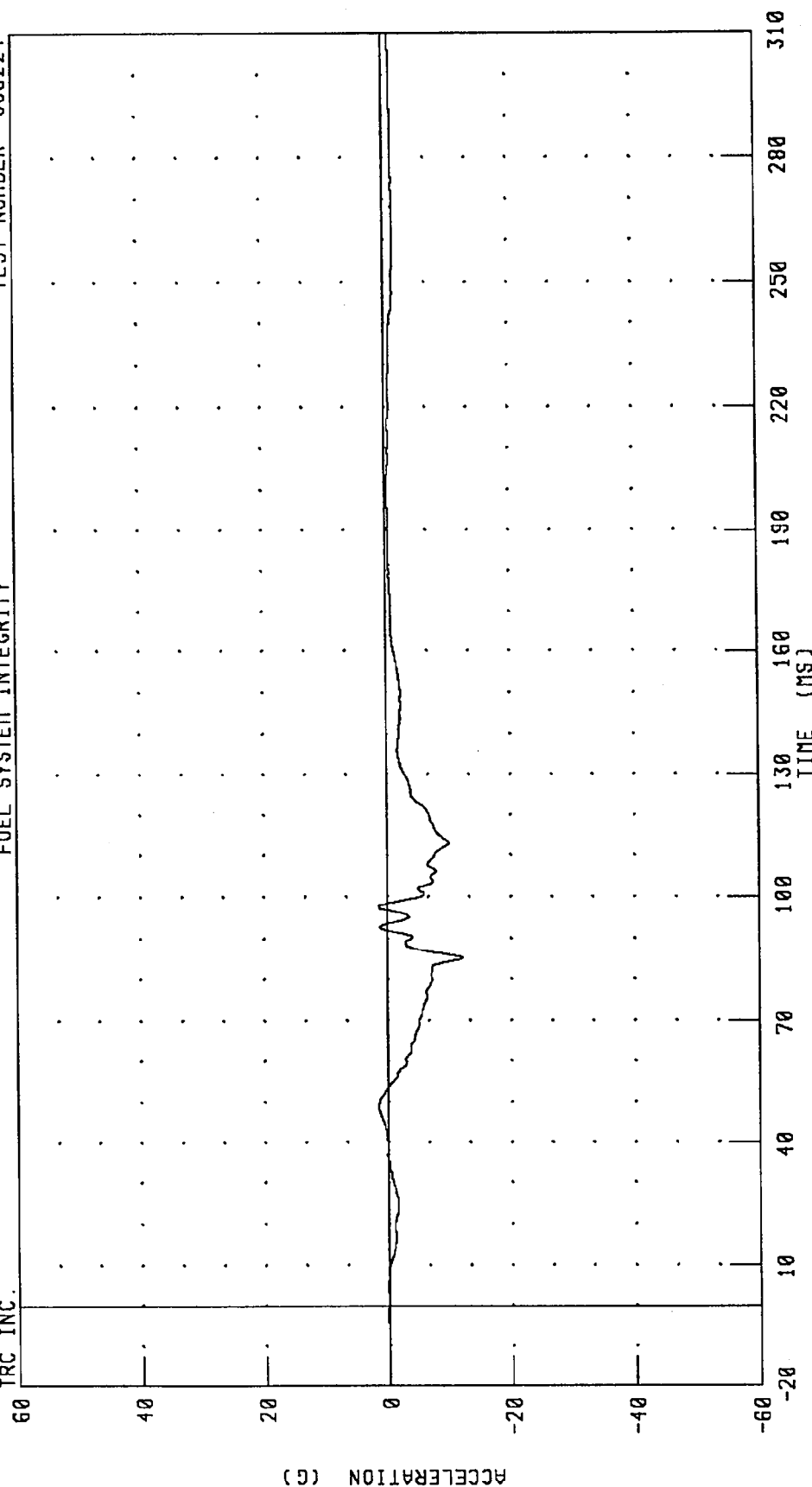
PEAK DATA: 9.54 G @ 85.12 MS; -5.04 G @ 98.48 MS

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

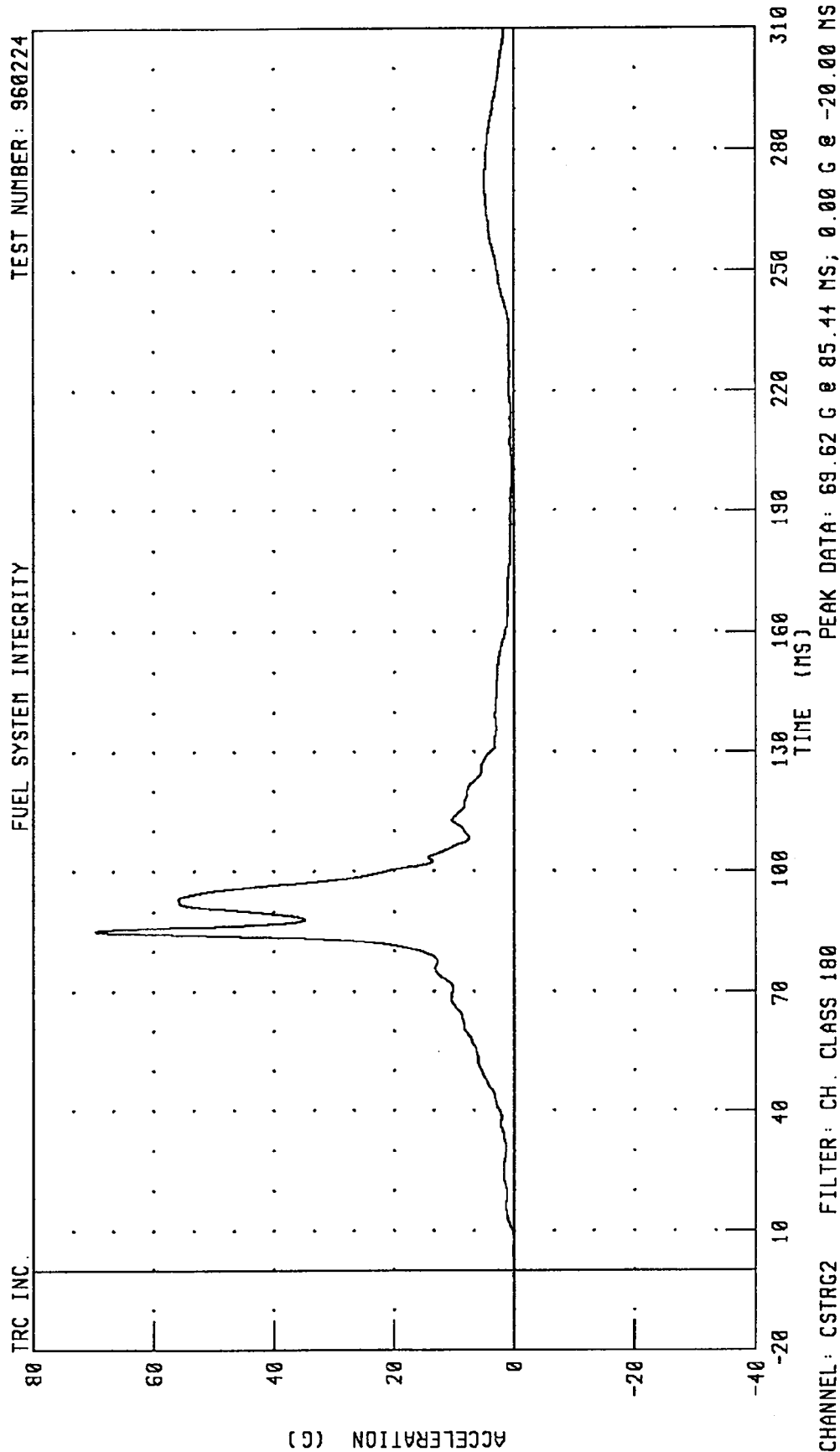
TRC INC.



PEAK DATA: 1.55 G @ 48.56 MS; -12.18 G @ 85.28 MS

CHANNEL: CSTZG2 FILTER: CH. CLASS 180

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

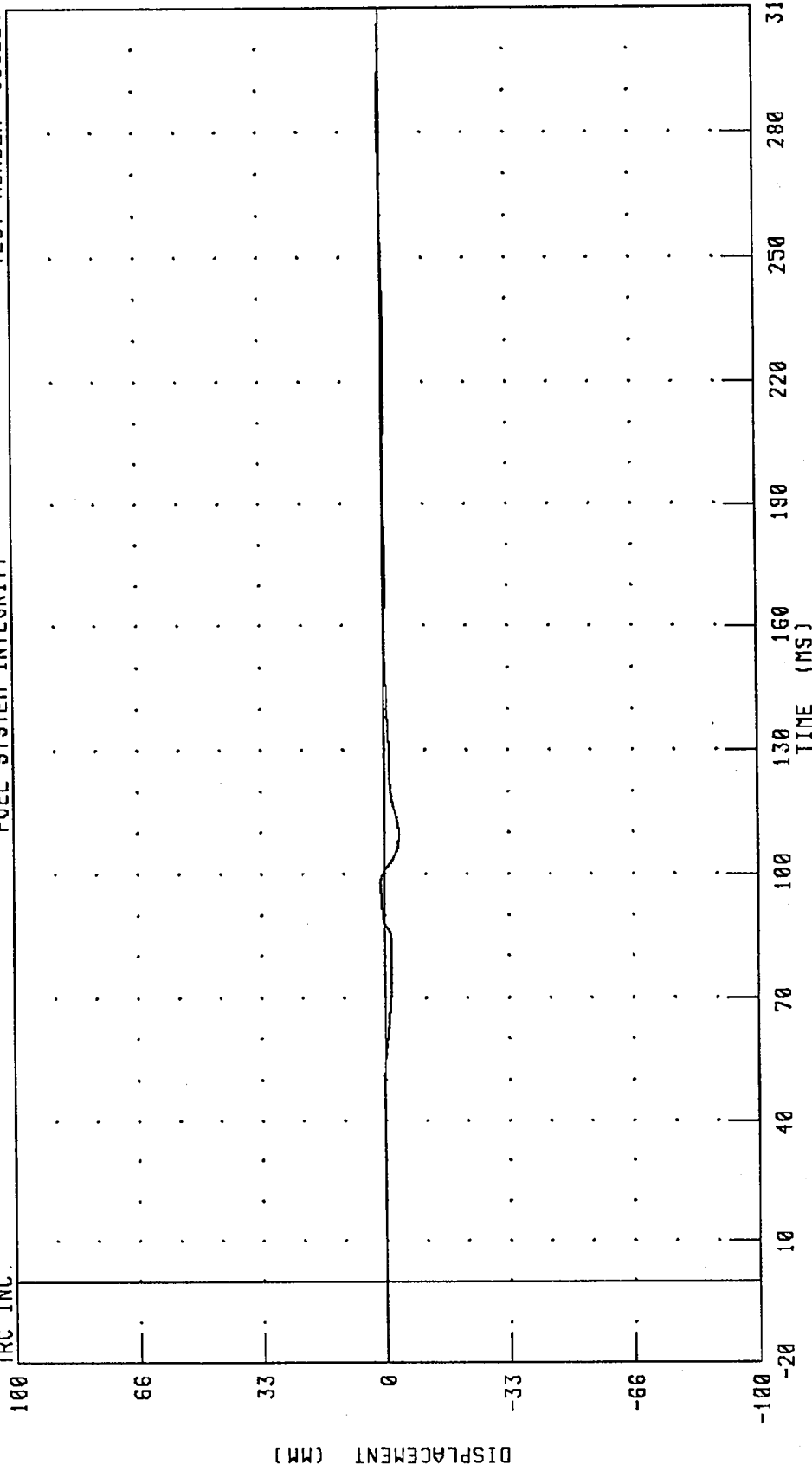


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 FORD MUSTANG AT 80 KPH AND 70% OVERLAP
 RIGHT FRONT PASSENGER CHEST DEFLECTION

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 1.27 MM @ 97.68 MS; -3.92 MM @ 109.52 MS

CHANNEL: CSTXD2 FILTER: CH. CLASS 180

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 FORD MUSTANG AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER PELVIS X-AXIS ACCELERATION

FUEL SYSTEM INTEGRITY

TRC INC.

TEST NUMBER: 960224

ACCELERATION (G)

TIME (MS)

CHANNEL: PEVXC2

FILTER: CH. CLASS 1000

PEAK DATA: 23.49 G @ 85.60 MS; -4.15 G @ 257.12 MS

960224

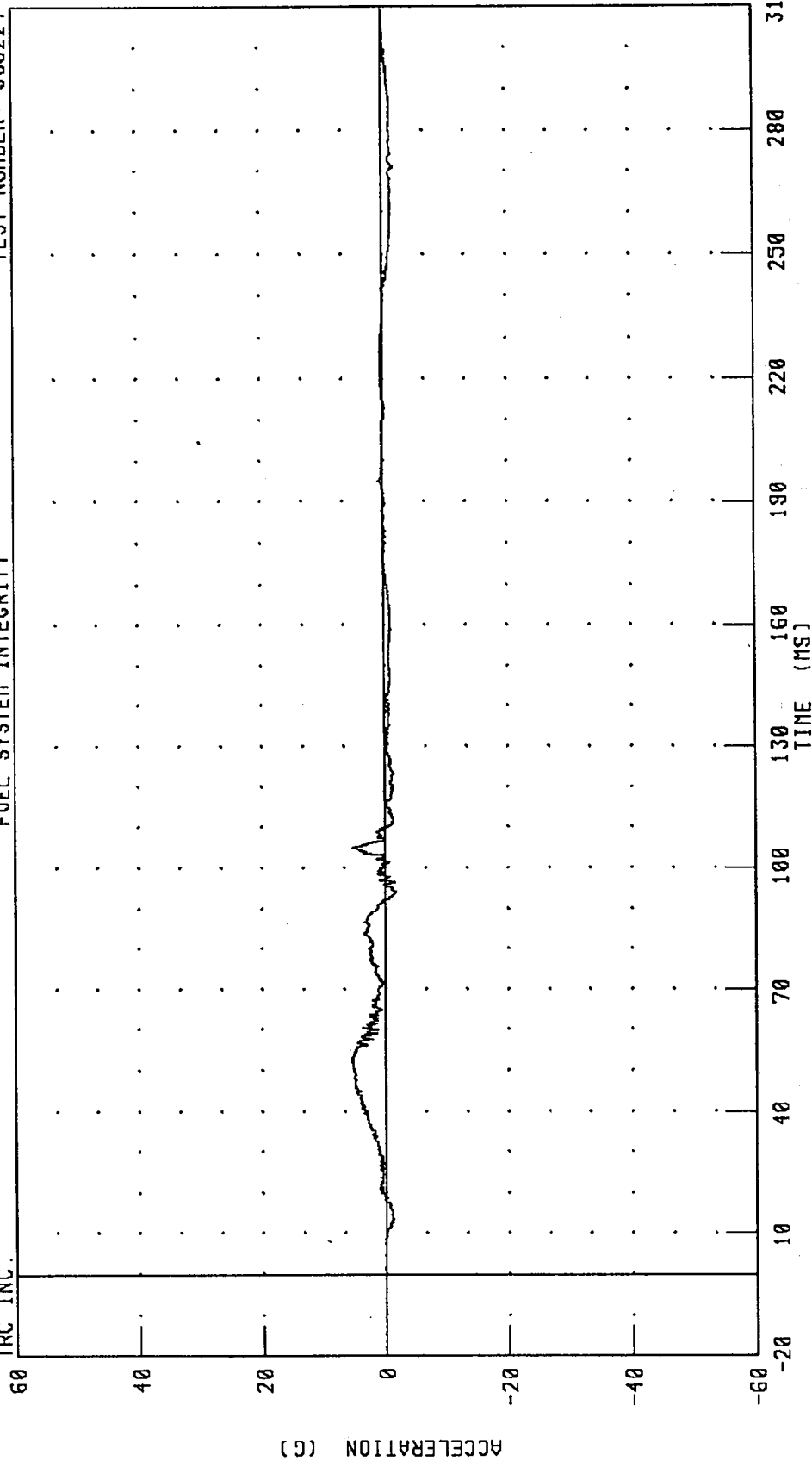
B-62

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



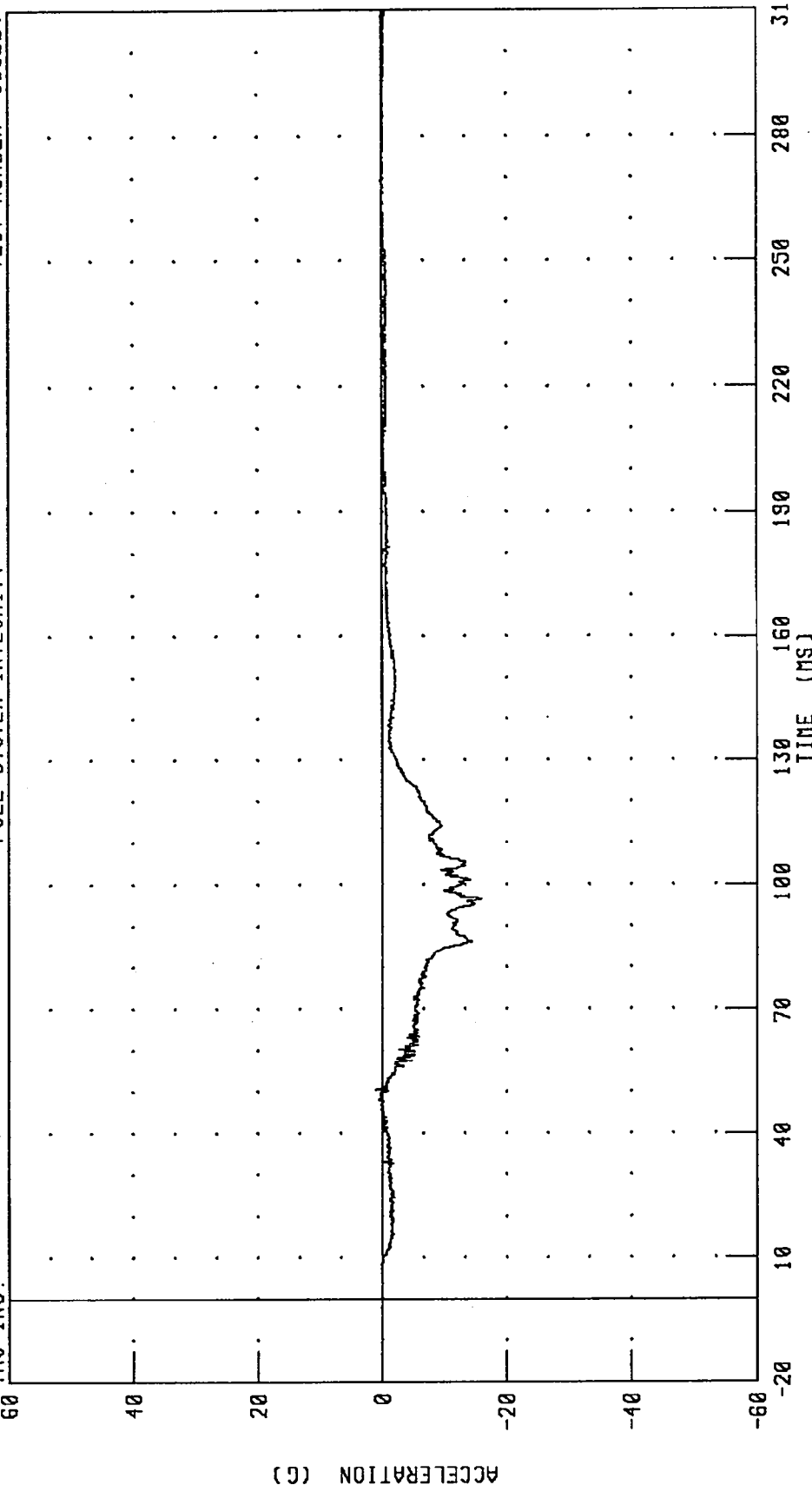
CHANNEL: PEVYG2 FILTER: CH. CLASS 1000

PEAK DATA: 5.49 G @ 52.00 MS; -1.77 G @ 94.16 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 FORD MUSTANG AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER PELVIS Z-AXIS ACCELERATION

FUEL SYSTEM INTEGRITY TEST NUMBER: 960224

TRC INC.



PEAK DATA: 0.97 G @ 50.48 MS; -15.91 G @ 96.40 MS

CHANNEL: PEVZG2 FILTER: CH. CLASS 1000

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.

100

80

60

40

20

0

-20

ACCELERATION (G)

-20

10

40

70

100

130

160

190

220

250

280

310

TIME (MS)

CHANNEL: PEVRG2

FILTER: CH. CLASS 1000

PEAK DATA: 27.76 G @ 96.48 MS; 0.03 G @ -20.00 MS

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.

90

60

30

0

-30

-60

-90

FORCE (N X 10²)

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

CHANNEL: LFMF2 FILTER: CH. CLASS 600

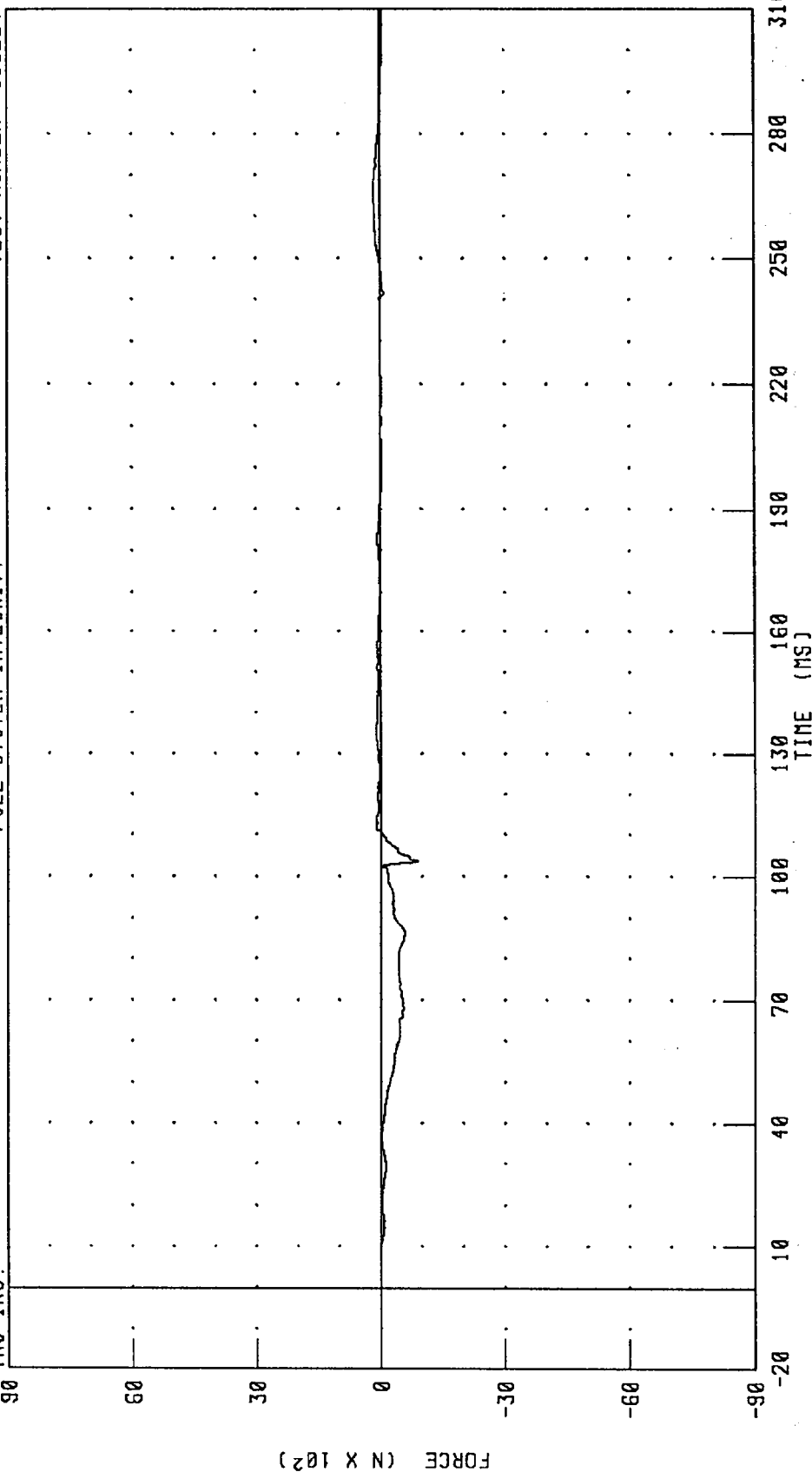
PEAK DATA: 236.31 N @ 125.60 MS; -592.08 N @ 260.80 MS

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 157.81 N @ 266.24 MS; -897.96 N @ 103.60 MS

FILTER: CH. CLASS 600

CHANNEL: RFMF2

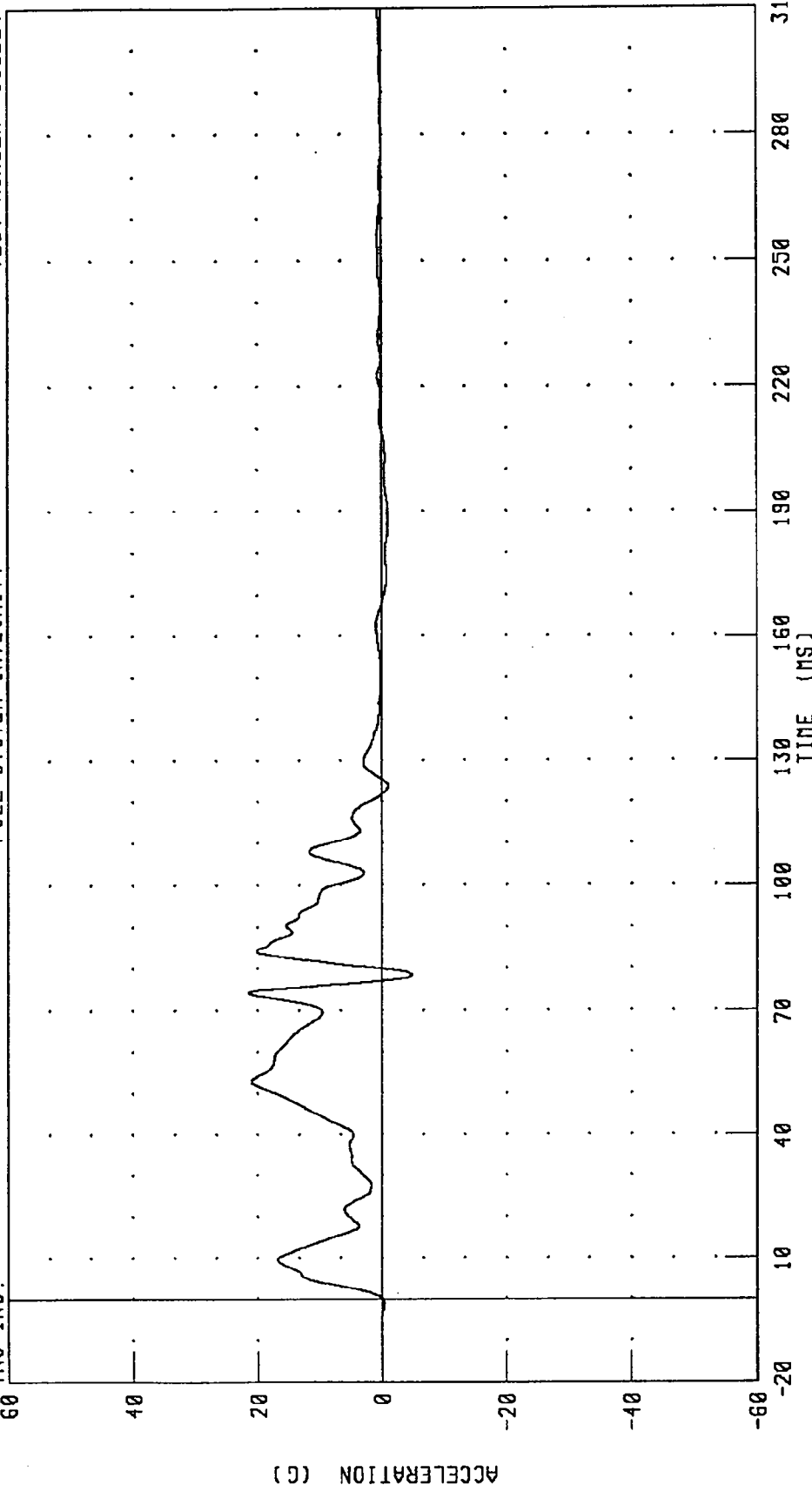
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 FORD MUSTANG AT 80 KPH AND 70% OVERLAP
FRONT SEAT OUTBOARD MOUNTING RAIL X-AXIS ACCELERATION

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.

60



CHANNEL: TLFY01 FILTER: CH. CLASS 60

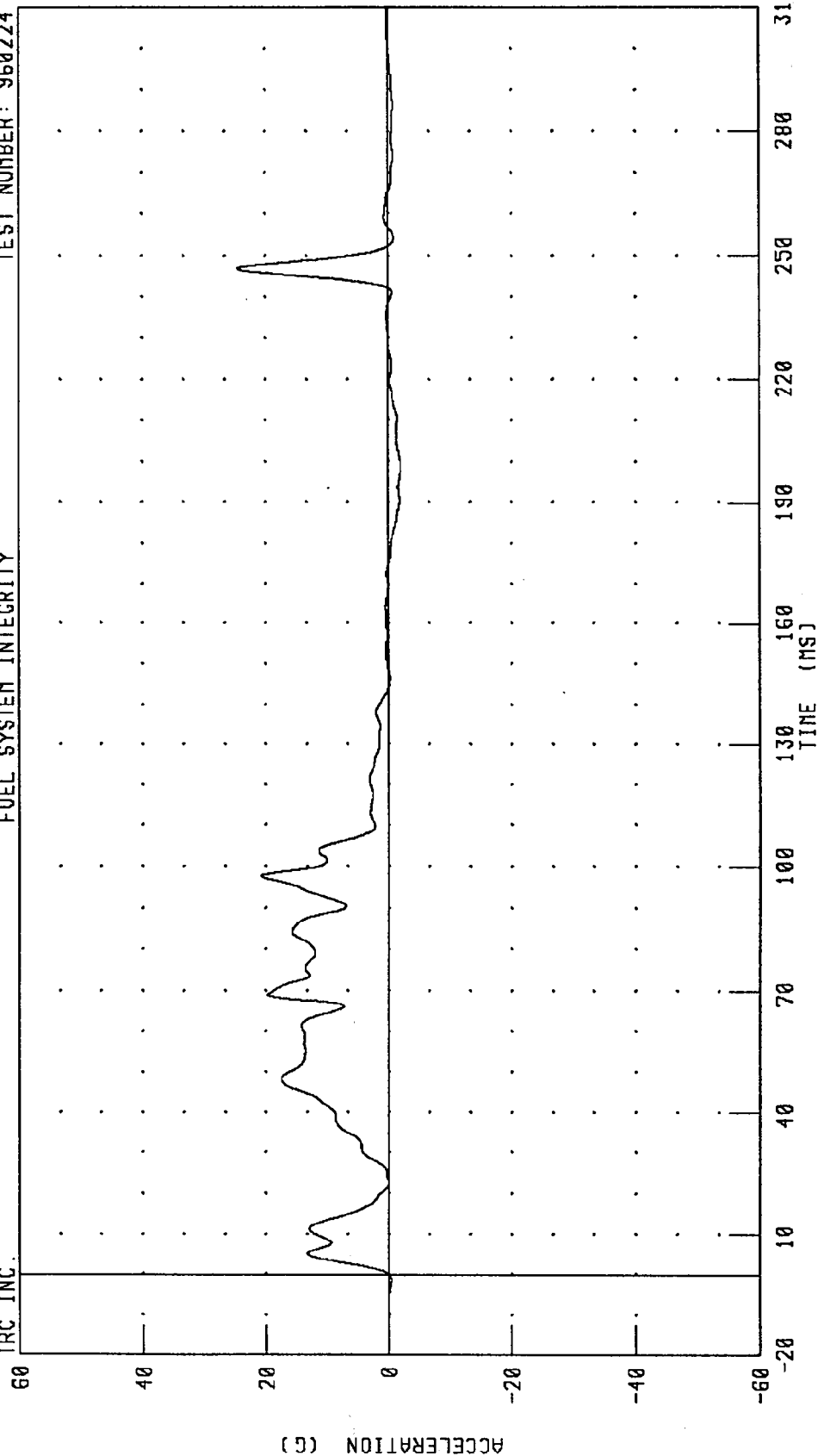
PEAK DATA: 21.53 G @ 74.32 MS; -4.78 G @ 78.48 MS

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 24.50 G @ 247.04 MS; -2.00 G @ 199.28 MS

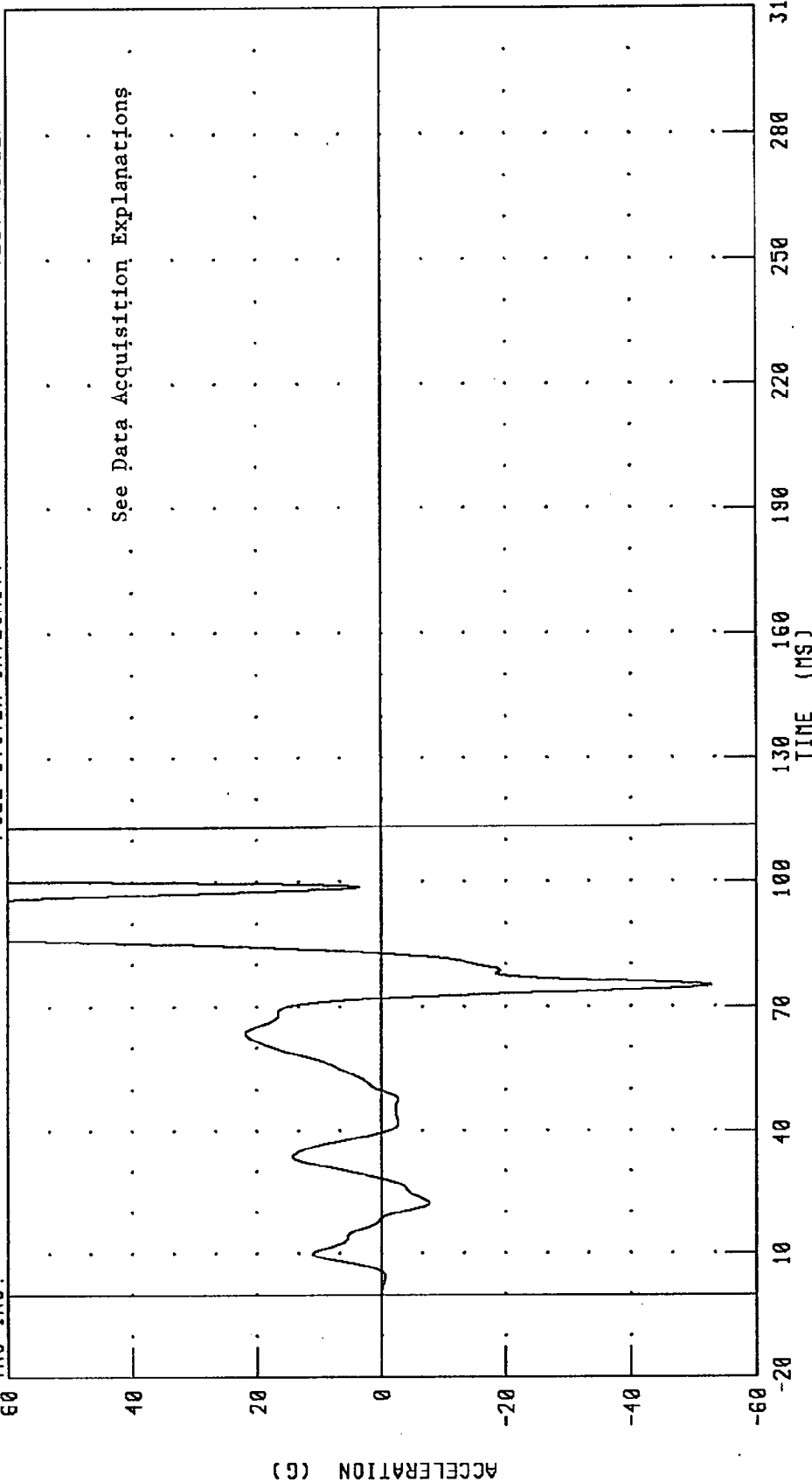
CHANNEL: TRFXG1 FILTER: CH. CLASS 60

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: TLFXG2 FILTER: CH. CLASS 60

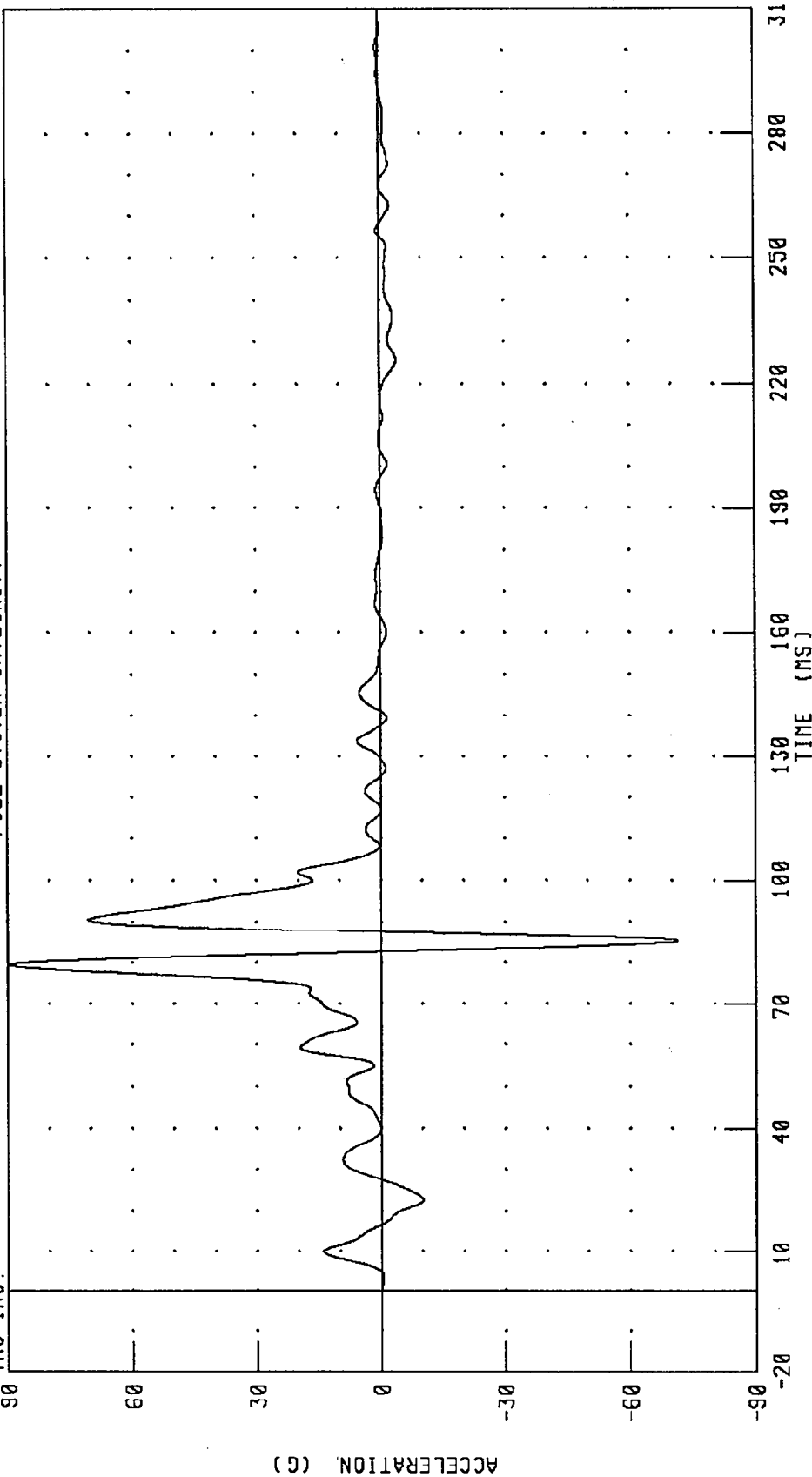
PEAK DATA: 433.18 G @ 108.88 MS; -430.70 G @ 117.60 MS

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



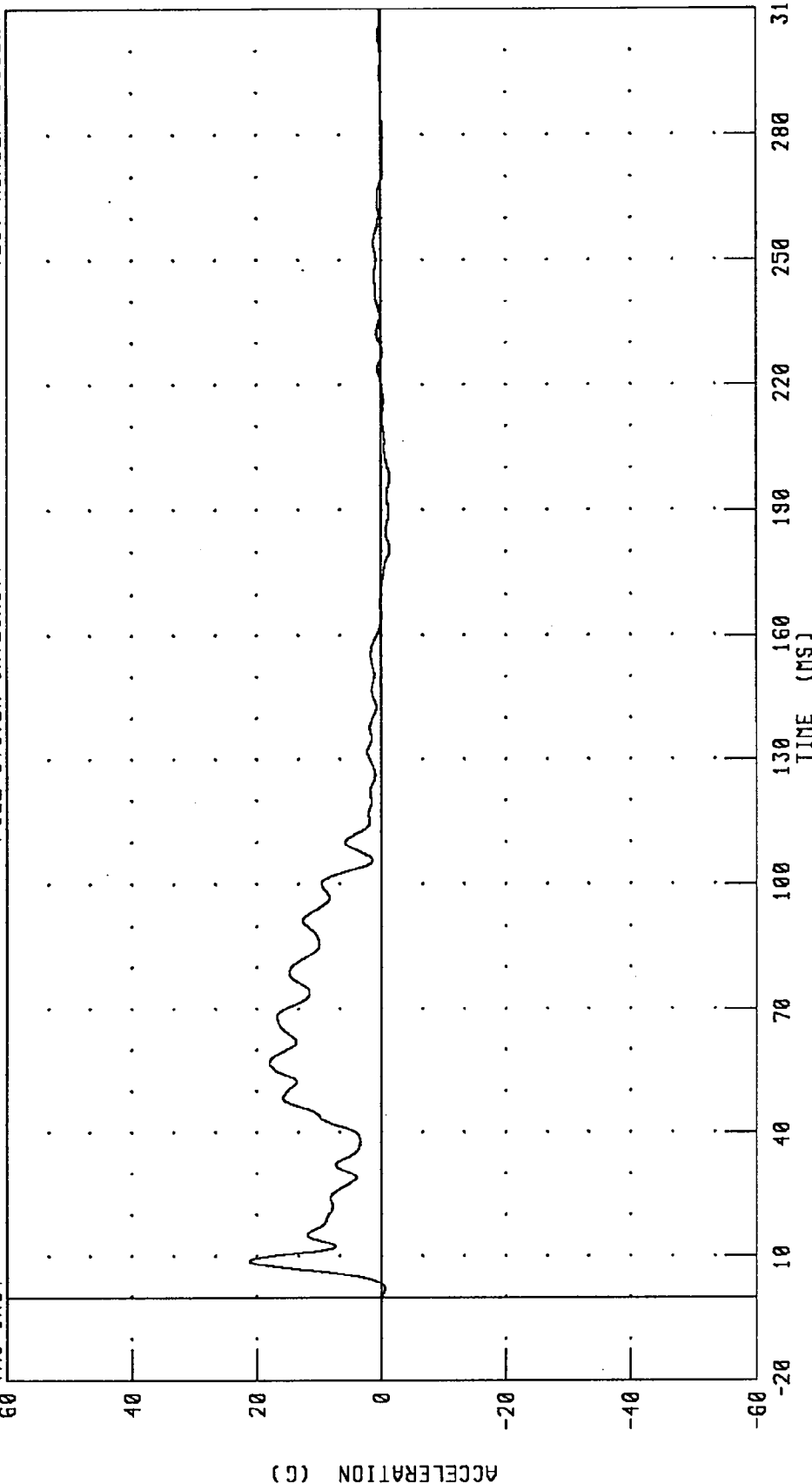
CHANNEL: TRFXG2 FILTER: CH. CLASS 60

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



PEAK DATA: 21.10 G @ 8.88 MS; -1.38 G @ 180.72 MS

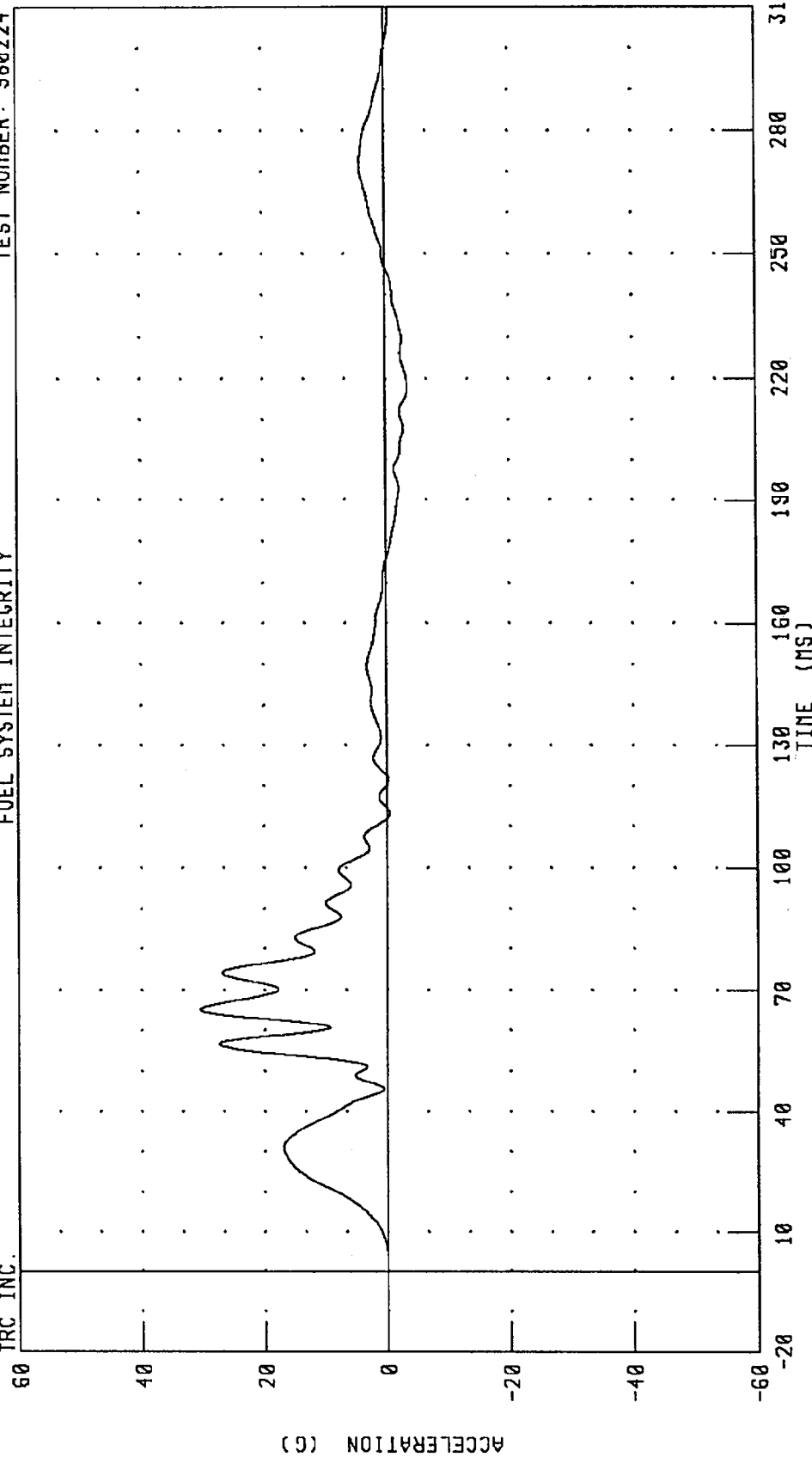
CHANNEL: FFCXC FILTER: CH. CLASS 60

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 FORD MUSTANG AT 80 KPH AND 70% OVERLAP
ENGINE TOP X-AXIS ACCELERATION

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



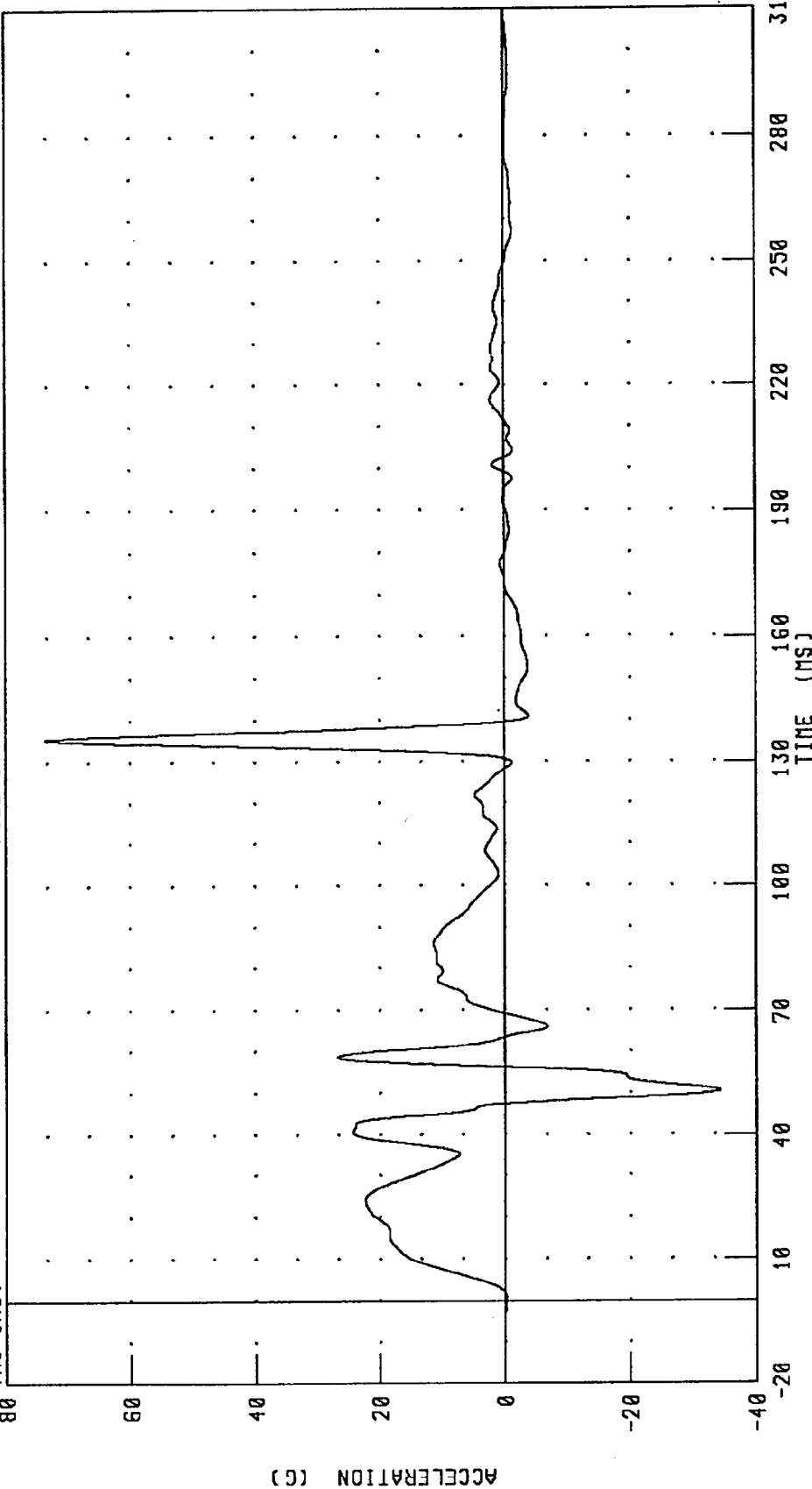
CHANNEL: ENGCG FILTER: CH. CLASS 60

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



CHANNEL: RAXXG1 FILTER: CH. CLASS 60

PEAK DATA: 73.76 G @ 135.52 MS; -34.23 G @ 50.48 MS

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.

60

40

20

0

-20

-40

-60

ACCELERATION (G)

TIME (MS)

130

160

190

220

250

280

310

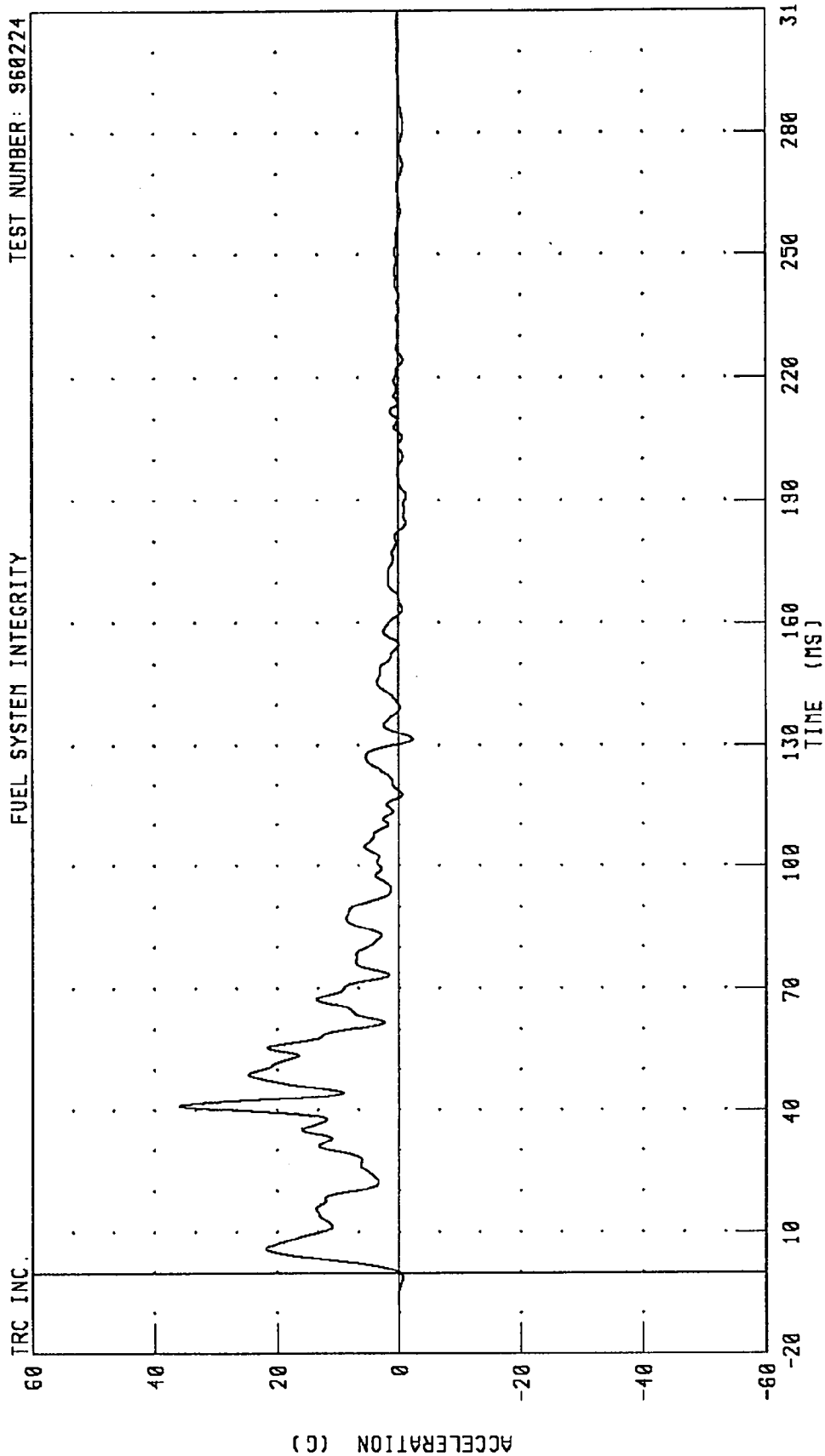
PEAK DATA: 37.70 G @ 61.92 MS; -39.59 G @ 52.88 MS

CHANNEL: RAXXG2 FILTER: CH. CLASS 60

960224

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

TEST NUMBER: 960224



CHANNEL: TCRXG FILTER: CH. CLASS 60

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.

100

80

60

40

20

0

-20

FORCE (N X 10²)

TIME (MS)

130

160

190

220

250

280

310

340

370

400

430

460

500

CHANNEL: SHBFI

FILTER: CH. CLASS 60

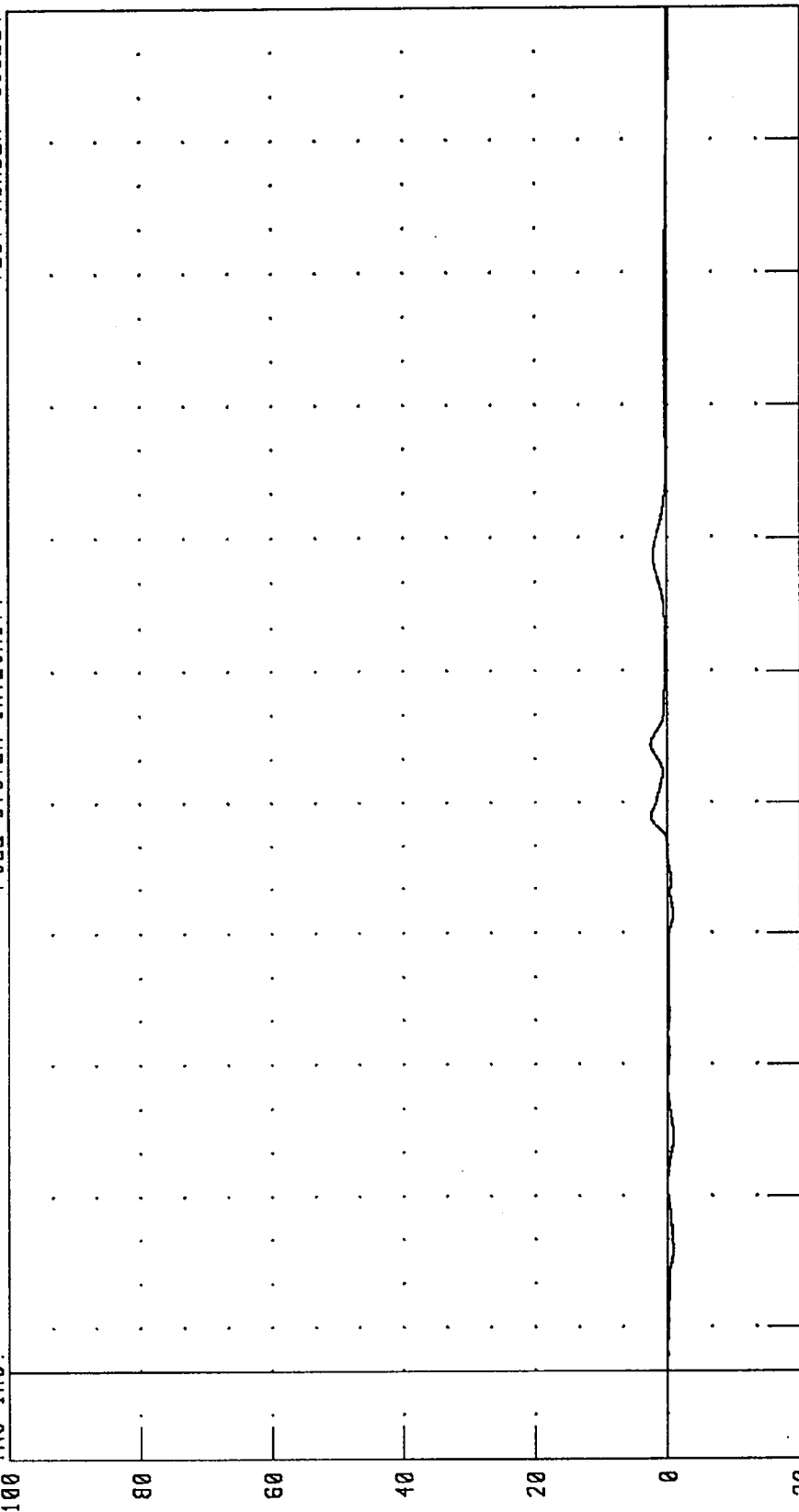
PEAK DATA: 122.02 N @ 160.16 MS; -110.64 N @ 98.80 MS

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



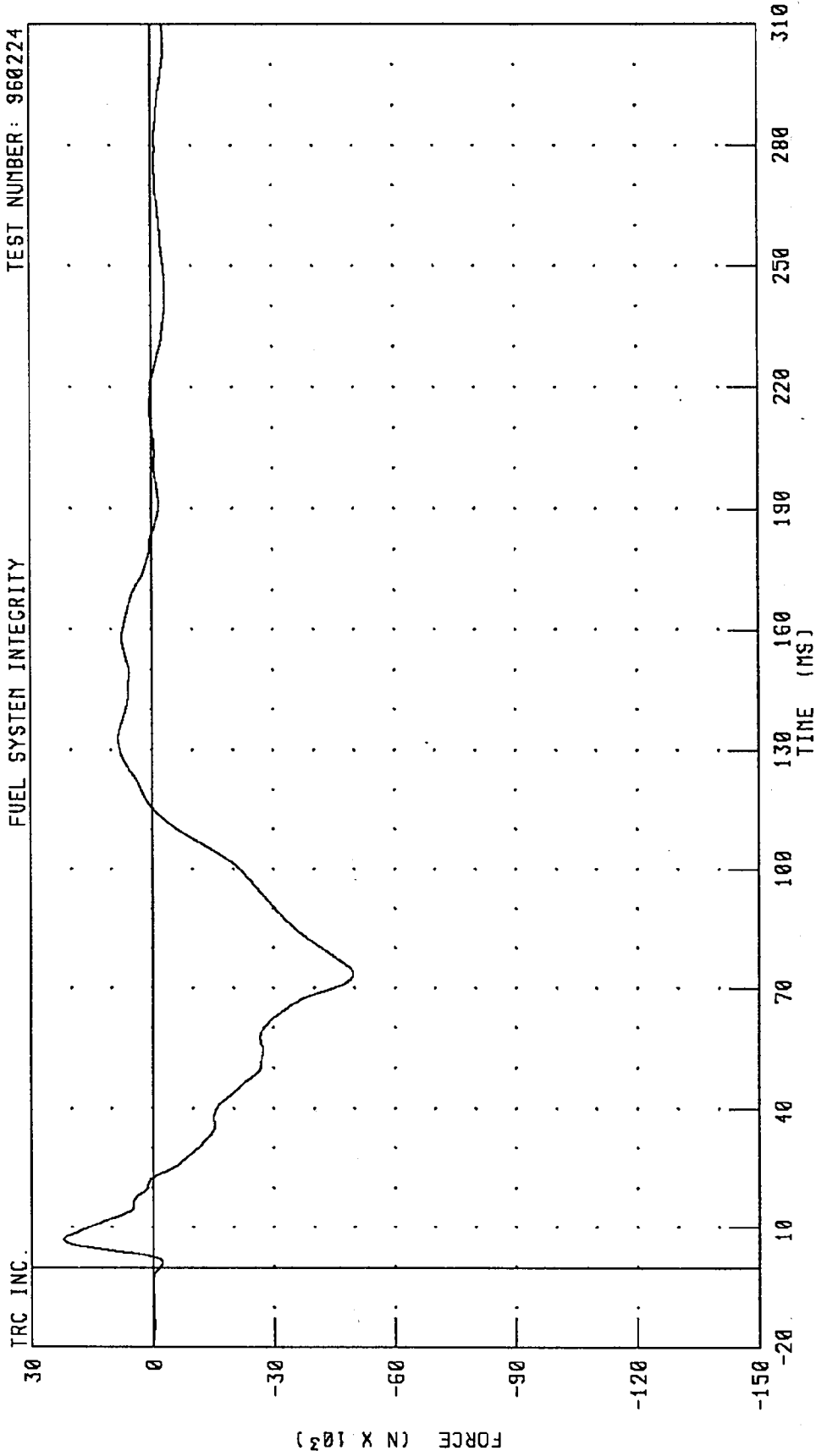
PEAK DATA: 250.72 N @ 143.28 MS; -81.76 N @ 53.20 MS

CHANNEL: LBOFI FILTER: CH. CLASS 60

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY



PEAK DATA: 21979.39 N @ 6.80 MS; -49615.12 N @ 73.52 MS

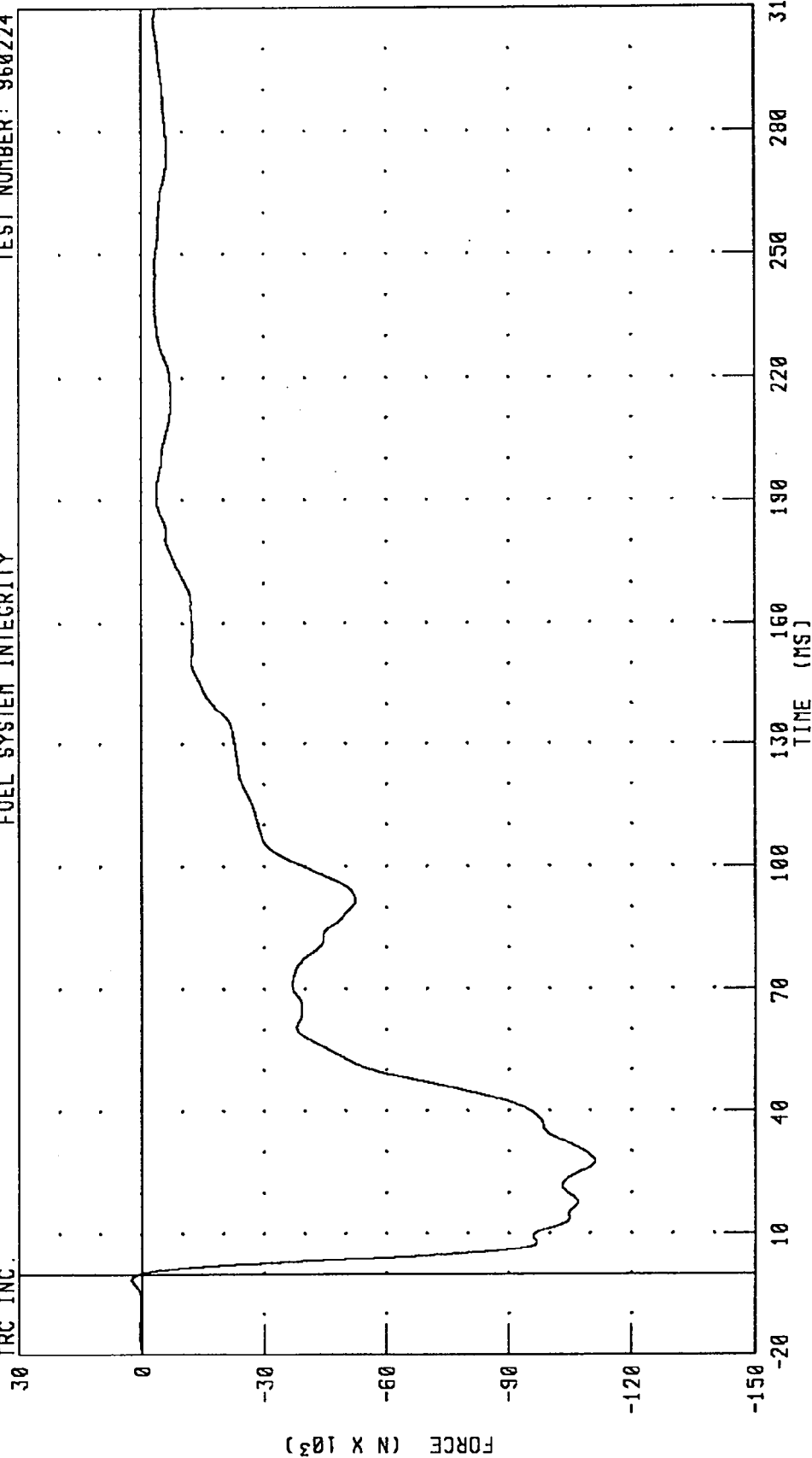
CHANNEL: BFFXF1 FILTER: CH. CLASS 60

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 FORD MUSTANG AT 80 KPH AND 70% OVERLAP
BARRIER FRONT BOTTOM LEFT FORCE

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.



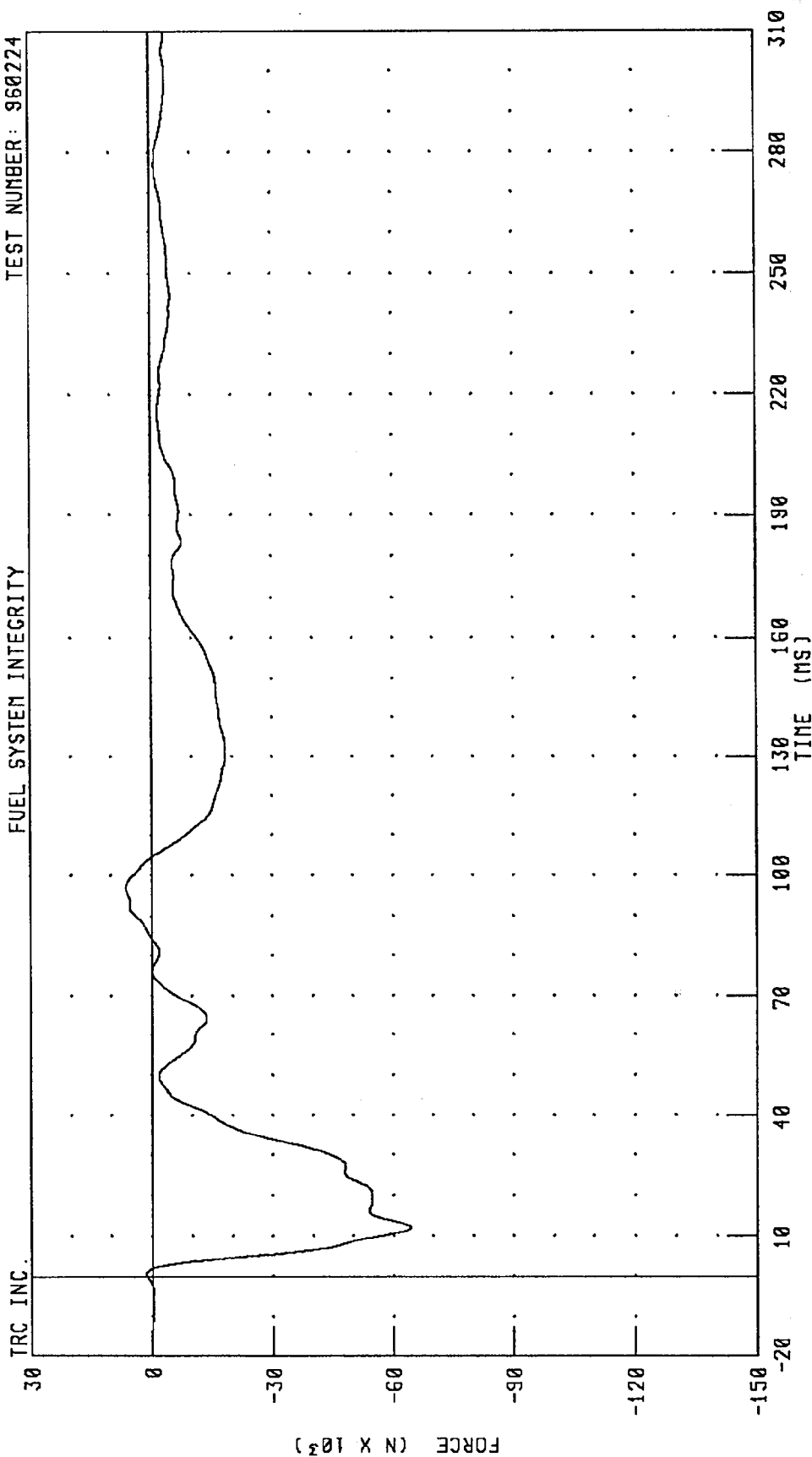
PEAK DATA: 2412.67 N @ -1.28 MS; -111016.91 N @ 27.76 MS

CHANNEL: BFFXF2 FILTER: CH. CLASS 60

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY



CHANNEL: BFFXF3 FILTER: CH. CLASS 60

PEAK DATA: 6294.65 N @ 96.80 MS; -64250.23 N @ 12.08 MS

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

TEST NUMBER: 960224

FUEL SYSTEM INTEGRITY

TRC INC.

30

0

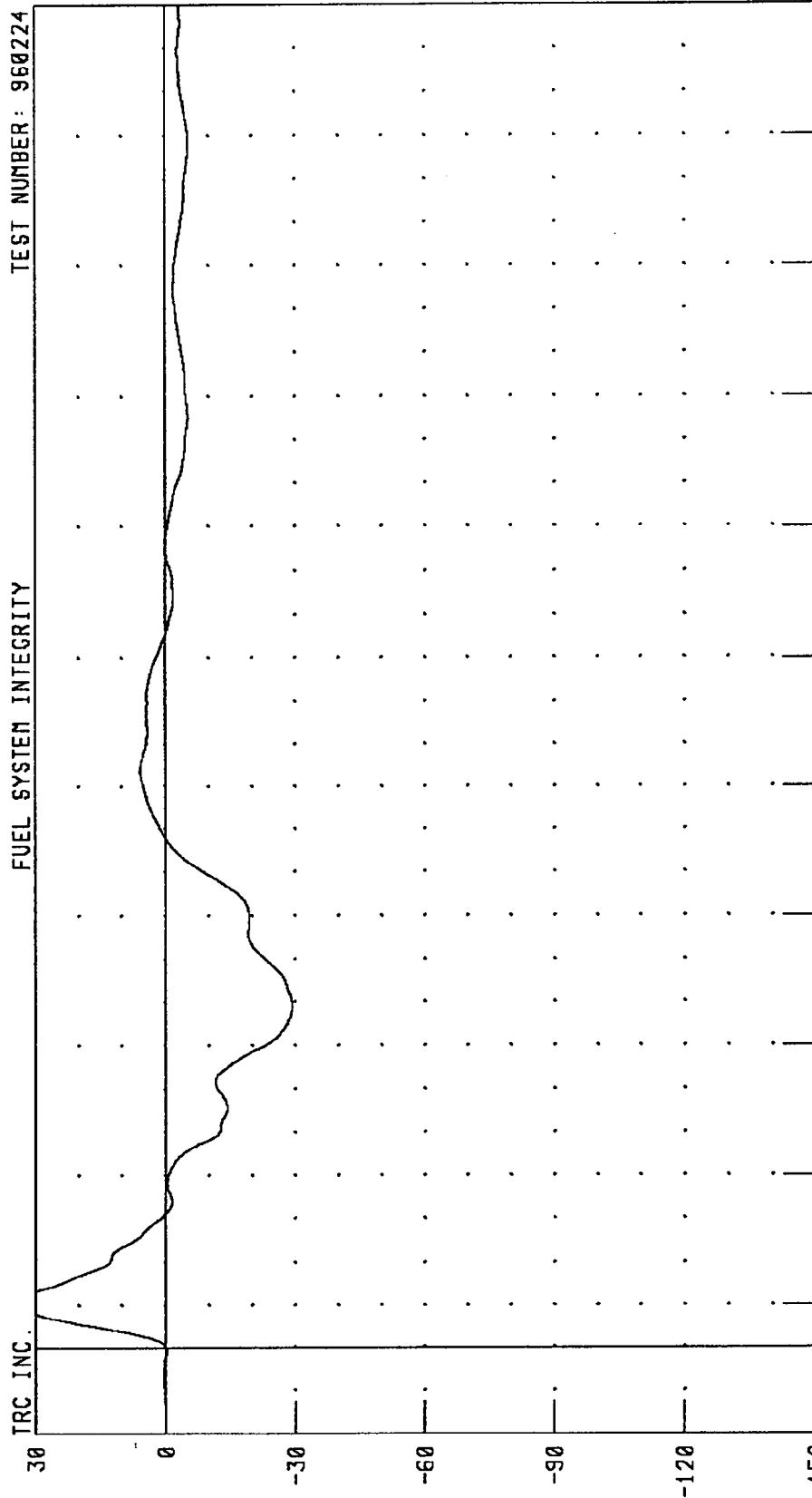
-30

-60

-90

-120

-150

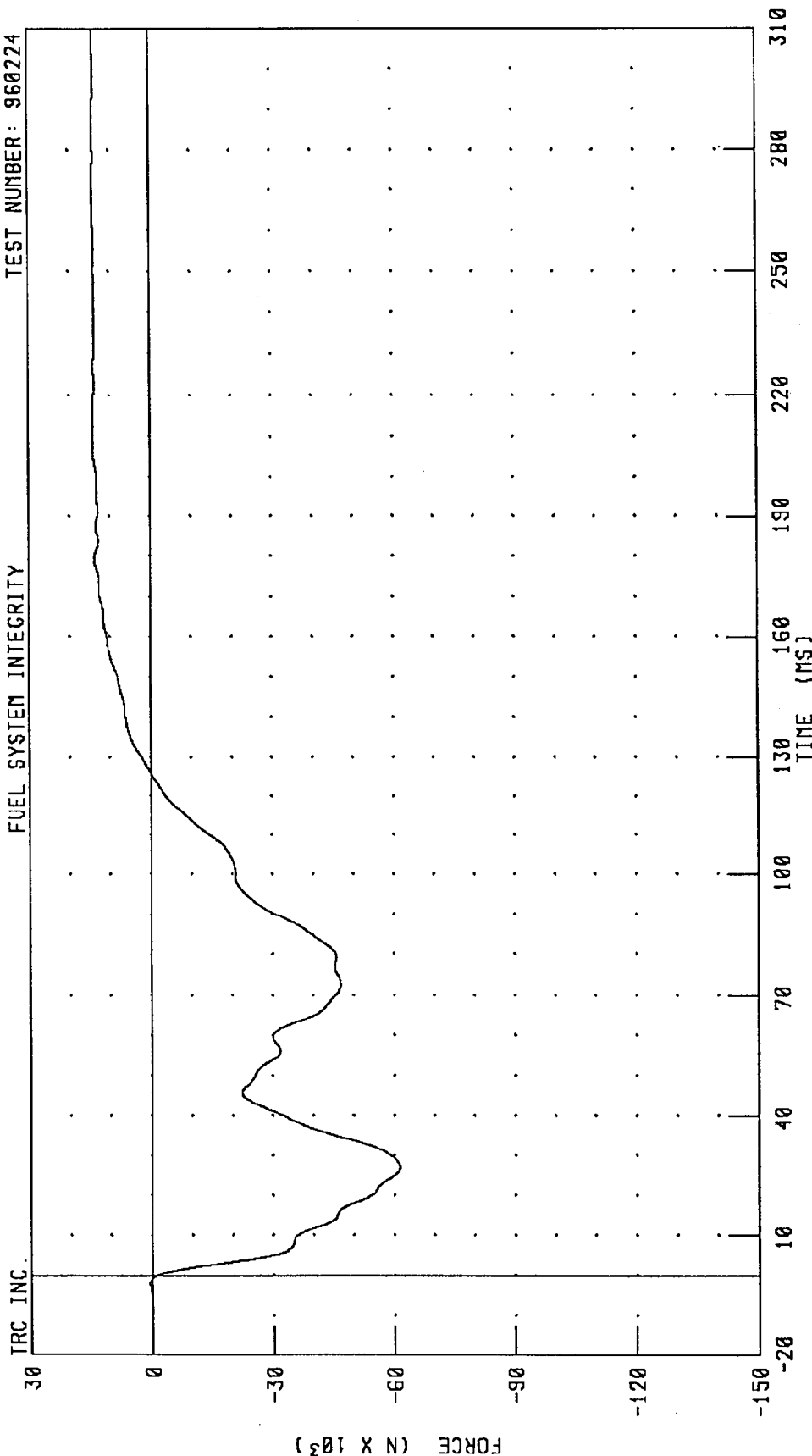


PEAK DATA: 35019.79 N @ 11.04 MS; -29263.28 N @ 79.04 MS

CHANNEL: BFFXF4 FILTER: CH. CLASS 60

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 FORD MUSTANG AT 80 KPH AND 70% OVERLAP
 BARRIER FRONT CENTER FORCE
 FUEL SYSTEM INTEGRITY

TEST NUMBER: 960224



PEAK DATA: 14003.40 N @ 213.36 MS; -61404.23 N @ 27.04 MS

CHANNEL: BFFXF5 FILTER: CH. CLASS 60

Appendix C

Dummy Calibration Information

Pre-Test Calibration

Serial Number 34

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III EXTERNAL DIMENSIONS

34 VECTOR

11-JUL-95

TRC INC.

TEST NO: 34C1ED1

572E SN34 EXT.DIMENSION CAL01

TEST PARAMETER	(DIMEN.)	SPECIFICATION	TEST RESULTS
LOCATION FOR CHEST CIRCUMFERENCE (AA)		429 - 434 MM	432. MM
LOCATION FOR WAIST CIRCUMFERENCE (BB)		226 - 231 MM	229. MM
CHEST CIRCUMFERENCE	(Y)	970 -1001 MM	991. MM
WAIST CIRCUMFERENCE	(Z)	836 - 866 MM	856. MM
CHEST DEPTH	(O)	213 - 229 MM	218. MM
H-POINT HEIGHT	(C)	84 - 89 MM	86. MM
H-POINT FROM SEATBACK	(D)	135 - 140 MM	137. MM
SKULL CAP TO BACKLINE	(H)	41 - 46 MM	43. MM
TOTAL SITTING HEIGHT	(A)	879 - 889 MM	884. MM
THIGH CLEARANCE	(F)	140 - 155 MM	155. MM
BUTTOCK KNEE LENGTH	(K)	579 - 605 MM	602. MM
BUTTOCK POPLITEAL LENGTH	(N)	452 - 478 MM	472. MM
POPLITEAL HEIGHT	(L)	429 - 455 MM	439. MM
KNEE PIVOT HEIGHT	(M)	485 - 500 MM	498. MM
FOOT LENGTH	(P)	252 - 267 MM	254. MM
FOOT BREADTH	(W)	91 - 107 MM	97. MM
SHOULDER PIVOT FROM BACKLINE	(E)	84 - 94 MM	91. MM
SHOULDER BREADTH	(V)	422 - 437 MM	427. MM
SHOULDER PIVOT HEIGHT	(B)	506 - 521 MM	513. MM
ELBOW REST HEIGHT	(J)	191 - 211 MM	208. MM
SHOULDER-ELBOW LENGTH	(I)	330 - 345 MM	335. MM
BACK OF ELBOW TO WRIST PIVOT	(G)	290 - 305 MM	295. MM

DUMMY MEETS SPECIFICATIONS
TECHNICIAN Chris M. S. M. S. M. S.

RUN NUMBER: 071295.1424

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III

16-FEB-96

TRC INC.

TEST NO: 34C1HD2

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 %	26.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	249.74 G
PEAK LATERAL ACCELERATION	15 G MAX	-8.72 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

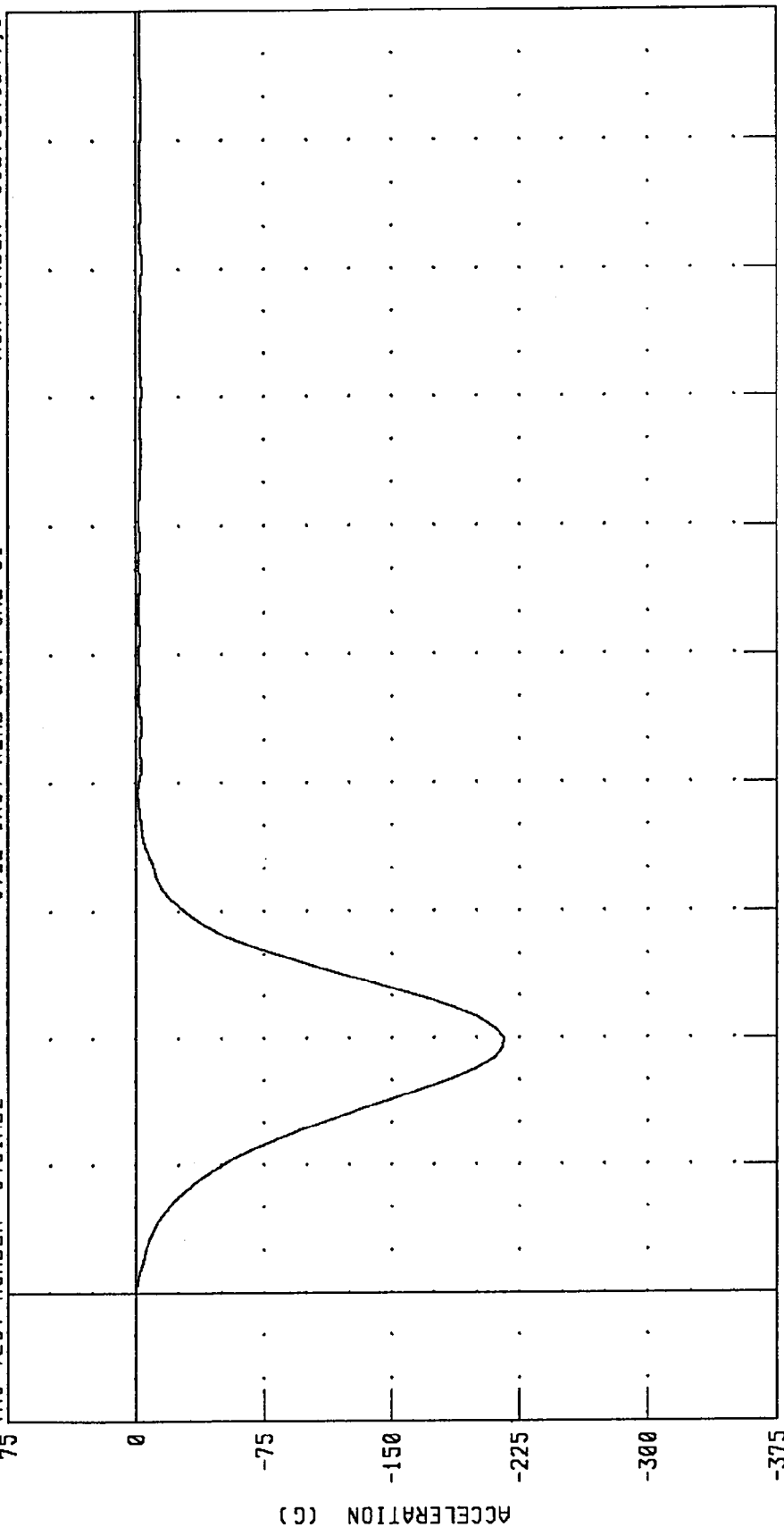
TECHNICIAN Chas. Middel

RUN NUMBER: 021696.1441;1

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

RUN NUMBER: 032796.0847;1

TRC TEST NUMBER: 34CIH02



PEAK DATA: 0.21 G @ -0.08 MS; -215.71 G @ 2.00 MS

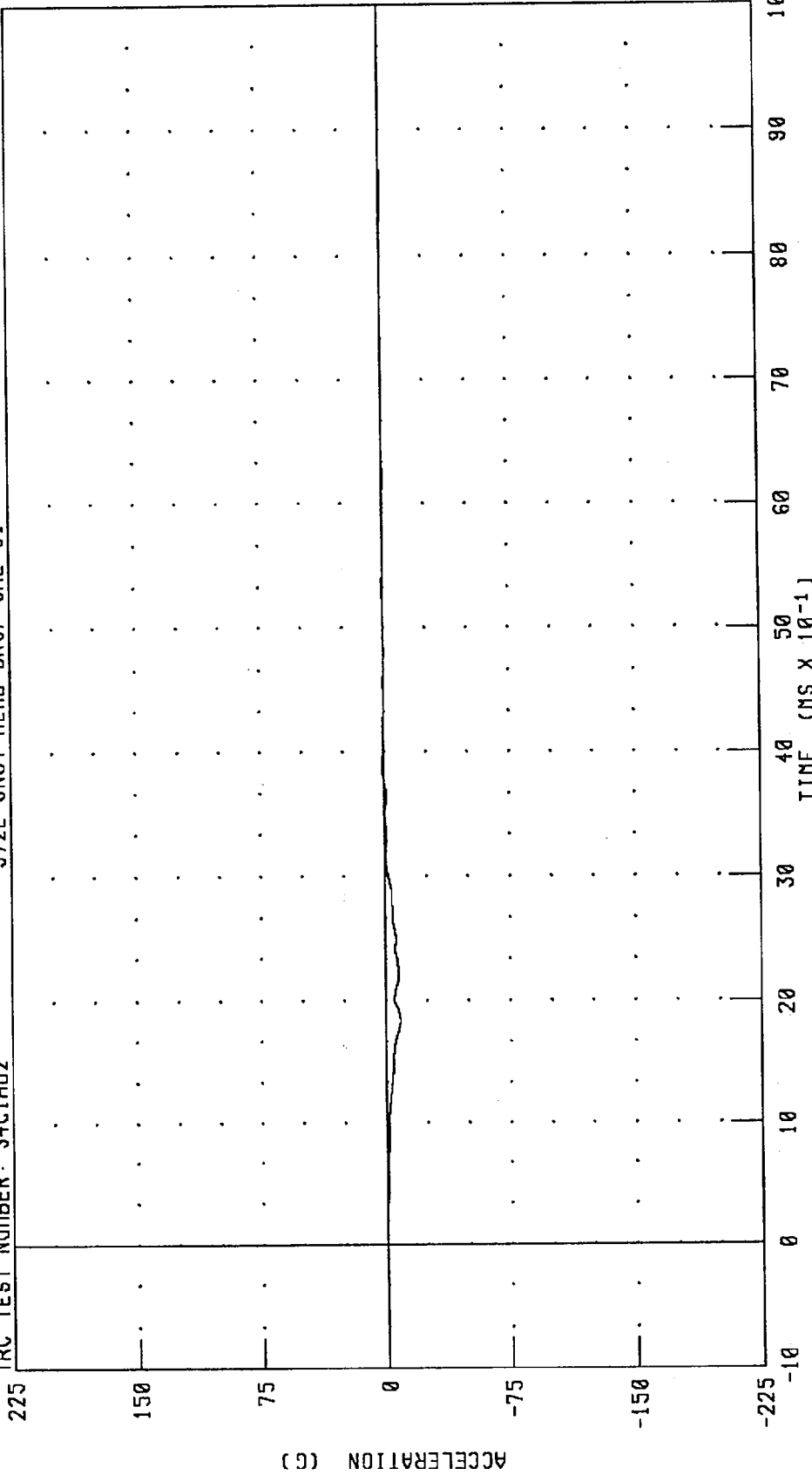
CHANNEL: HEDXG FILTER: CH. CLASS 1000

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

TRC TEST NUMBER: 34CIHD2

572E SN34 HEAD DROP CAL 01

RUN NUMBER: 032796.0847;1



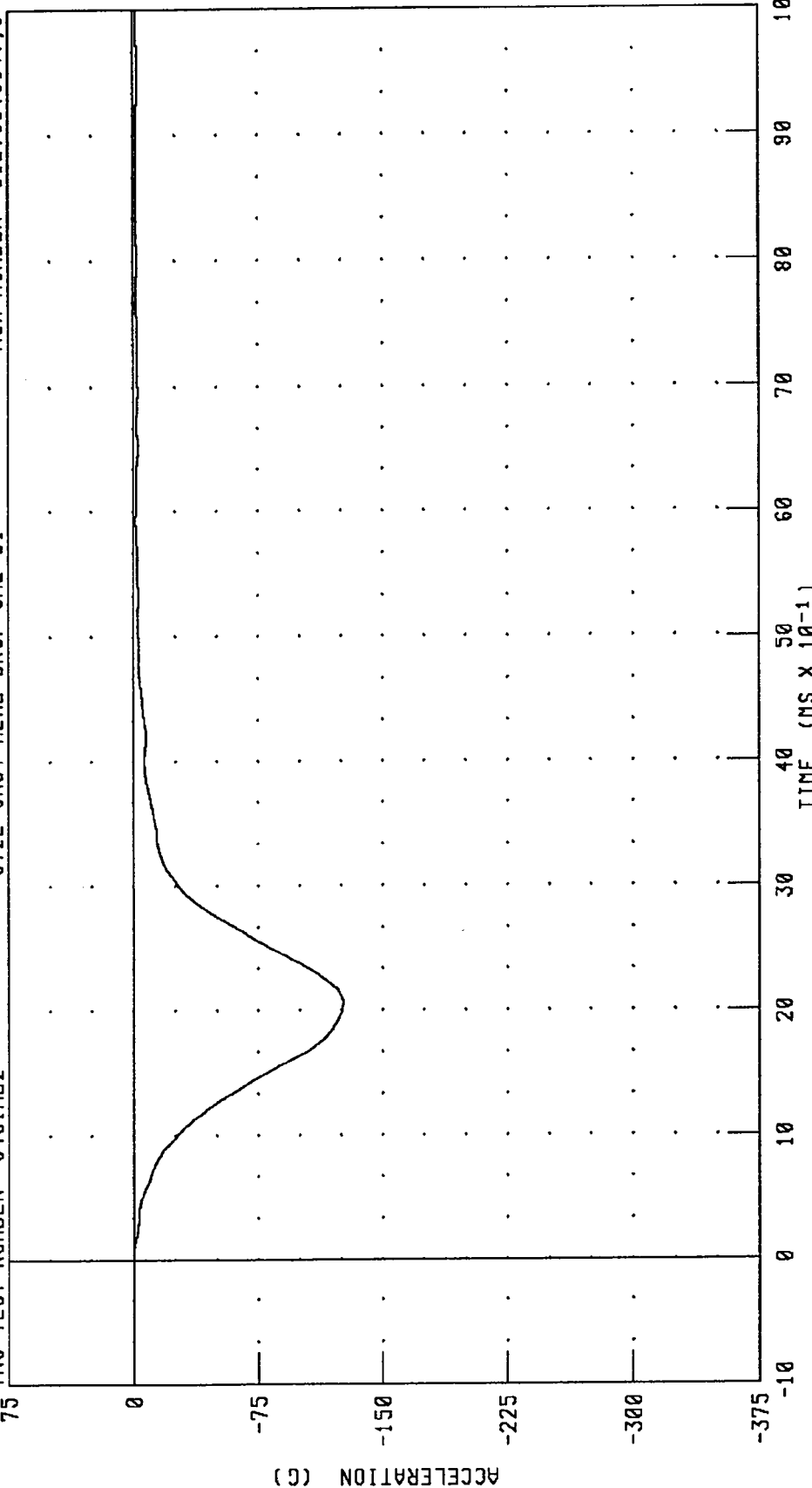
PEAK DATA: 1.25 G @ 3.84 MS; -8.73 G @ 1.84 MS

CHANNEL: HEDYG FILTER: CH. CLASS 1000

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

RUN NUMBER: 032796.0847;1

TRC TEST NUMBER: 34C1HD2



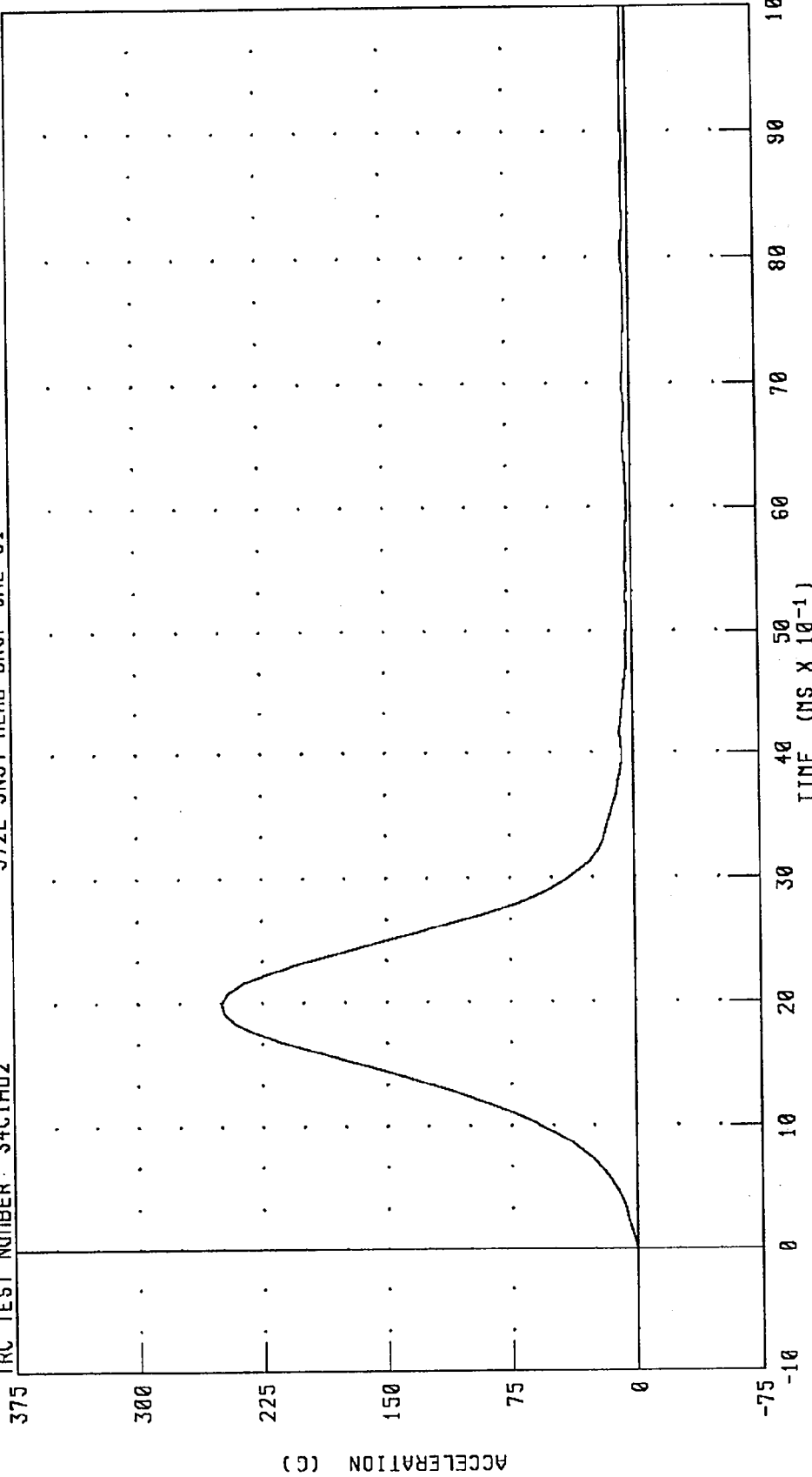
PEAK DATA: 0.04 G @ 0.00 MS; -126.37 G @ 2.08 MS

CHANNEL: HEDZG FILTER: CH. CLASS 1000

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

RUN NUMBER: 032796.0847;1

TRC TEST NUMBER: 34CIHD2



PEAK DATA: 249.75 G @ 2.00 MS; 0.07 G @ -0.16 MS

CHANNEL: HEDRG FILTER: CH. CLASS 1000

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

HYBRID III

11-JUL-95

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

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

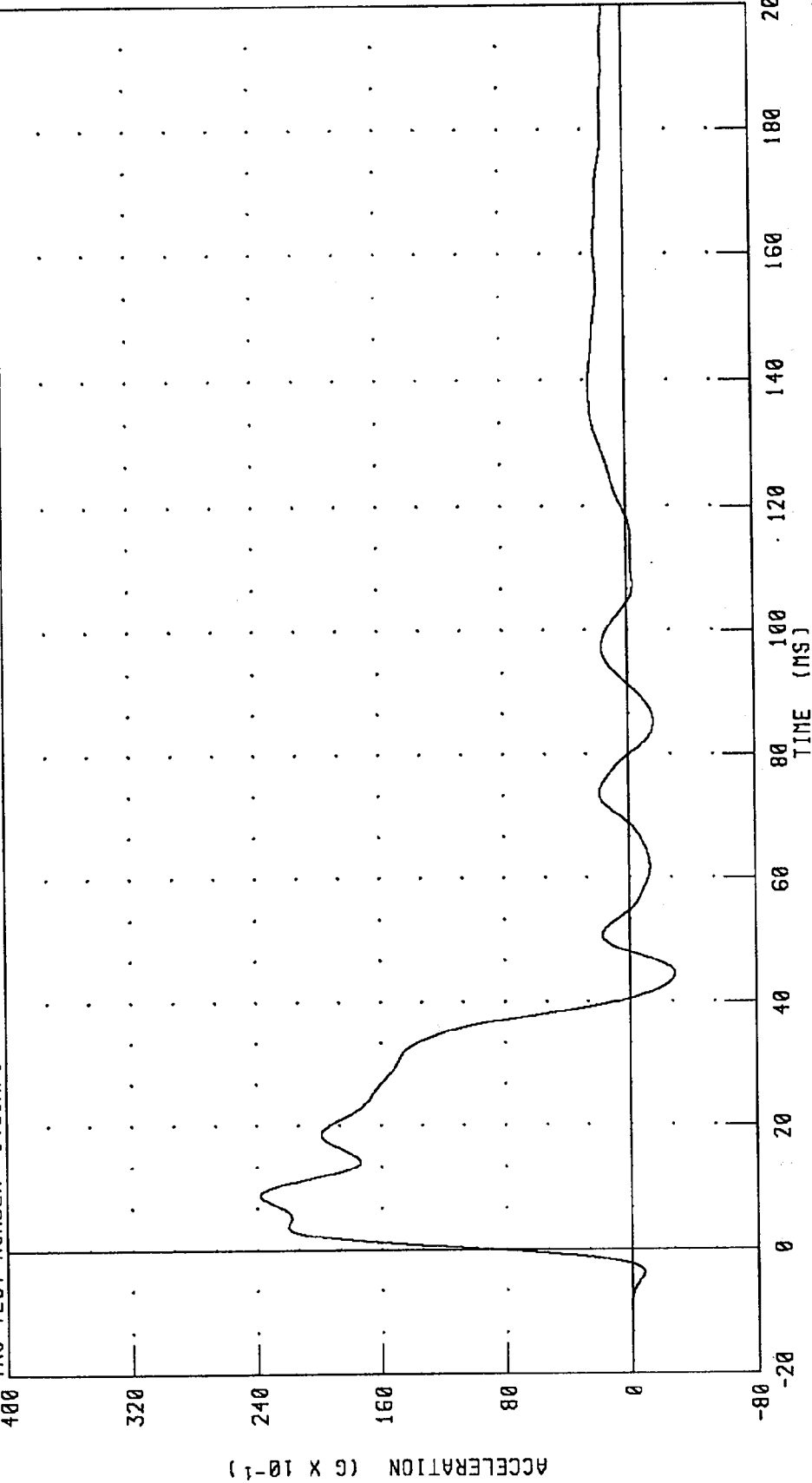
TEST MEETS SPECIFICATIONS

TECHNICIAN Chas Middelst

RUN NUMBER: 071195.1004;1

PART 572-E HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION

TRC TEST NUMBER: 34CINF1 572E SN34 NECK FLEXION CAL01 RUN NUMBER: 032796.0847;1



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

CHANNEL: PENXC FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK FLEXION CALIBRATION

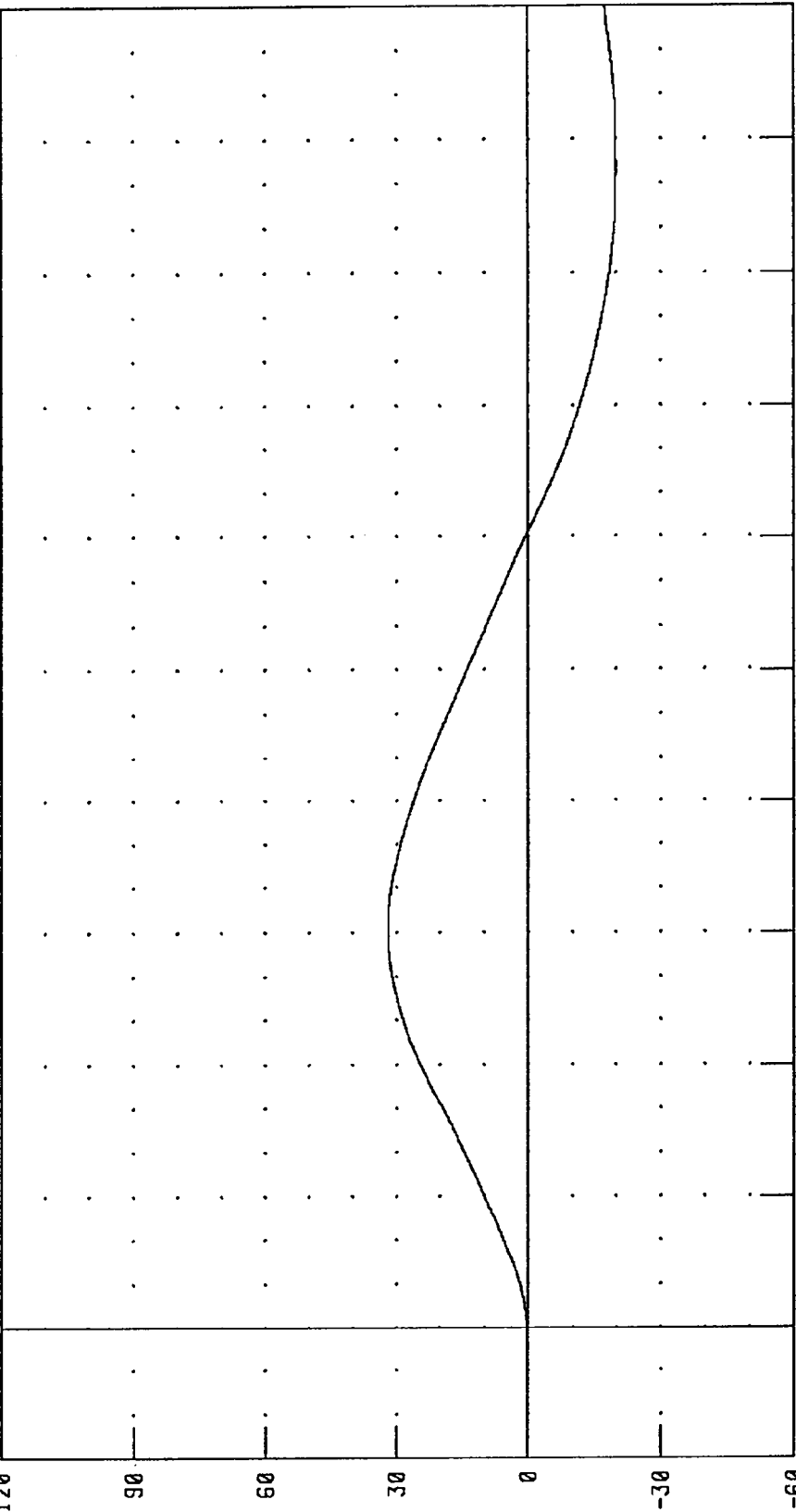
ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 34CINF1

572E SN34 NECK FLEXION CAL01

RUN NUMBER: 032796.0847;1

120



ANGLE (°)

TIME (MS)

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

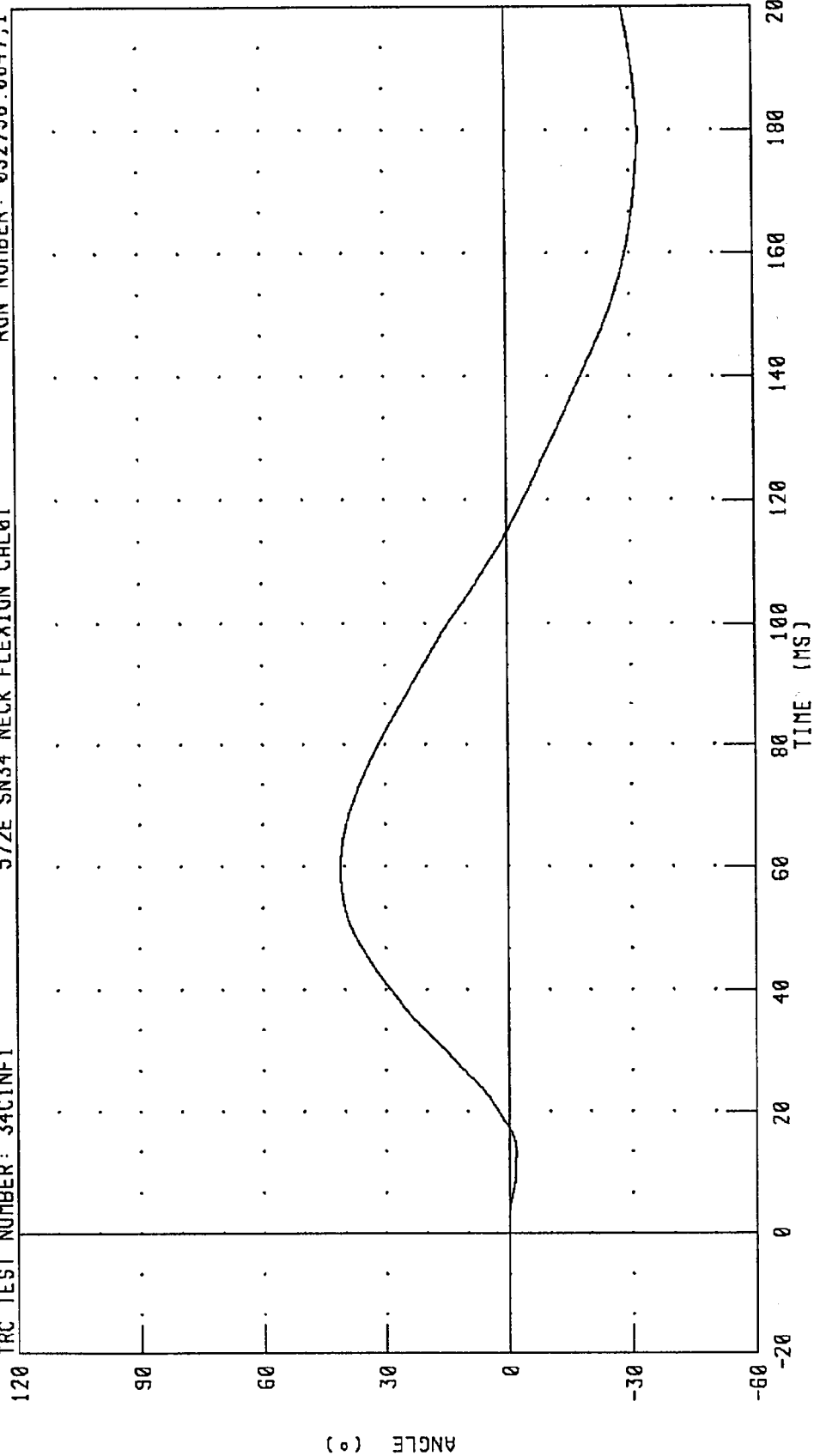
CHANNEL: BETA FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 34CINF1

572E SN34 NECK FLEXION CAL01

RUN NUMBER: 032796.0847;1



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: 032796.0847;1

120

90

60

30

0

-30

-60

ANGLE (°)

TIME (MS)

80

100

120

140

160

180

200

CHANNEL: TOTAN

FILTER: CH. CLASS 60

PEAK DATA:

72.73 ° @ 60.24 MS;

-51.93 ° @ 177.44 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 34CINF1

572E SN34 NECK FLEXION CAL01

RUN NUMBER: 032796.0847;1

160

120

80

40

0

-40

-80

TIME (MS)

200

180

160

140

120

100

80

60

40

20

0

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

CHANNEL: NEKXF FILTER: CH. CLASS 60

9602224

C-14

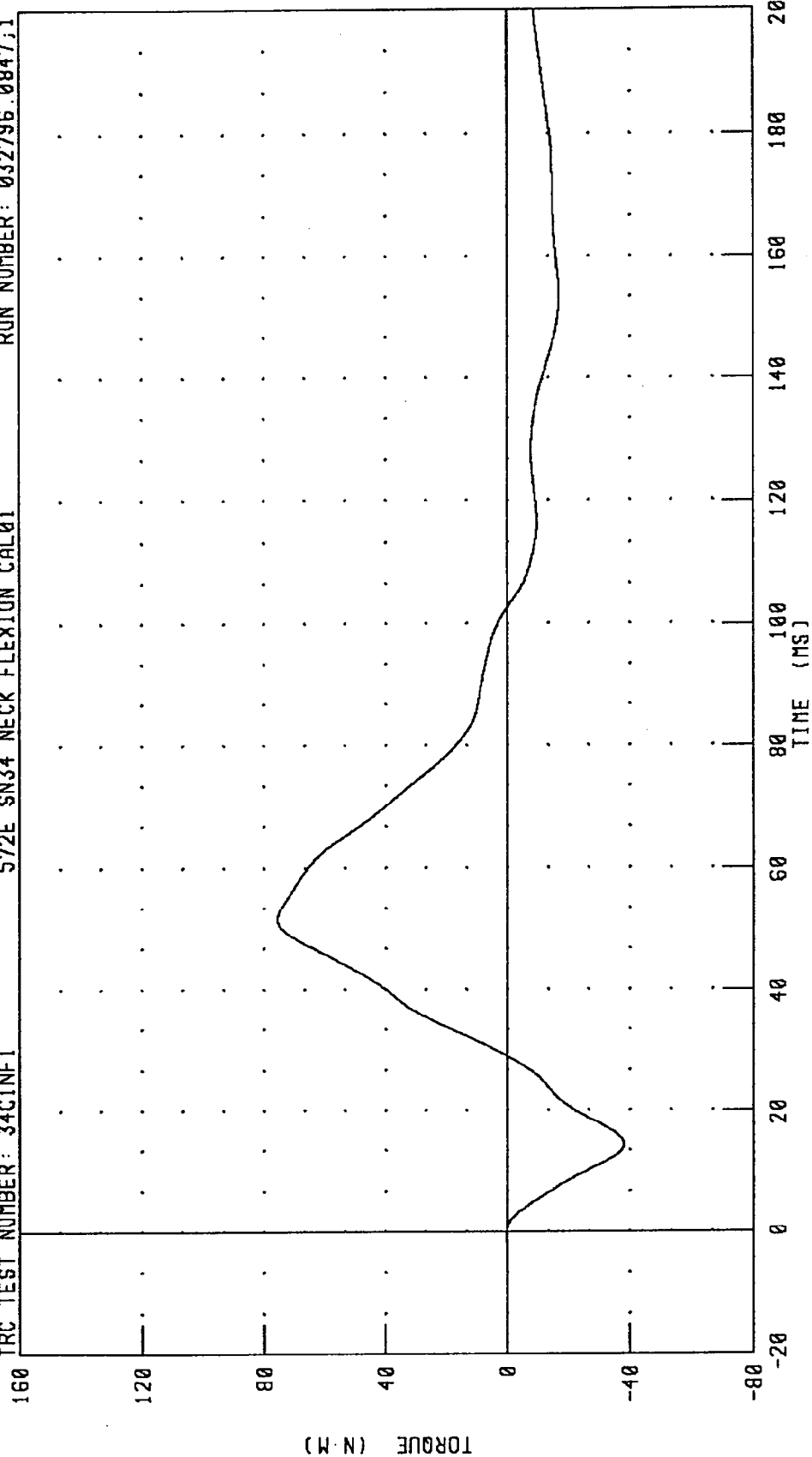
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 34CINF1

572E SN34 NECK FLEXION CAL01

RUN NUMBER: 032795.0847.1

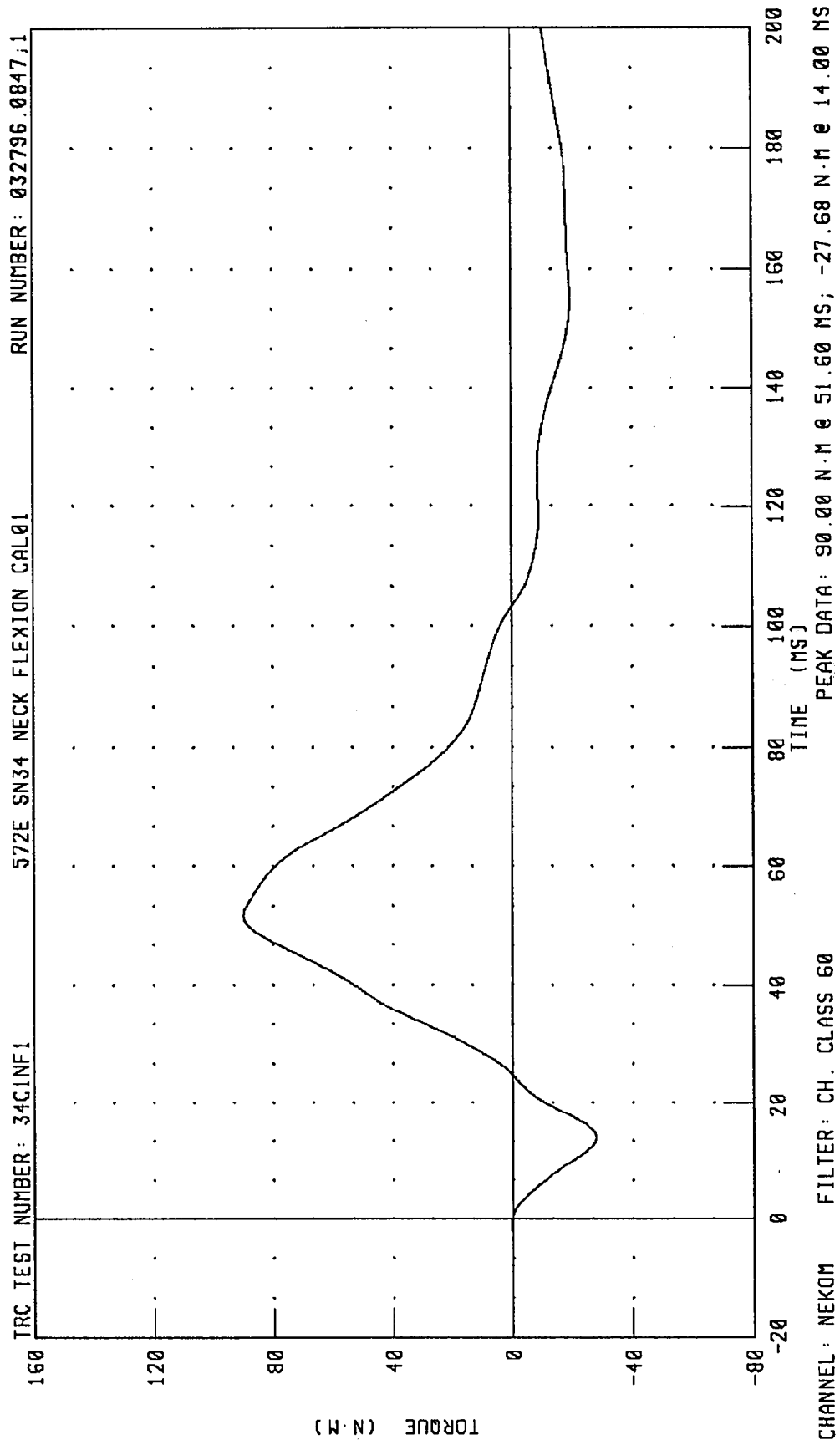


PEAK DATA: 75.60 N.M @ 51.52 MS; -37.99 N.M @ 14.32 MS

FILTER: CH. CLASS 60

CHANNEL: NEKYM

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



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

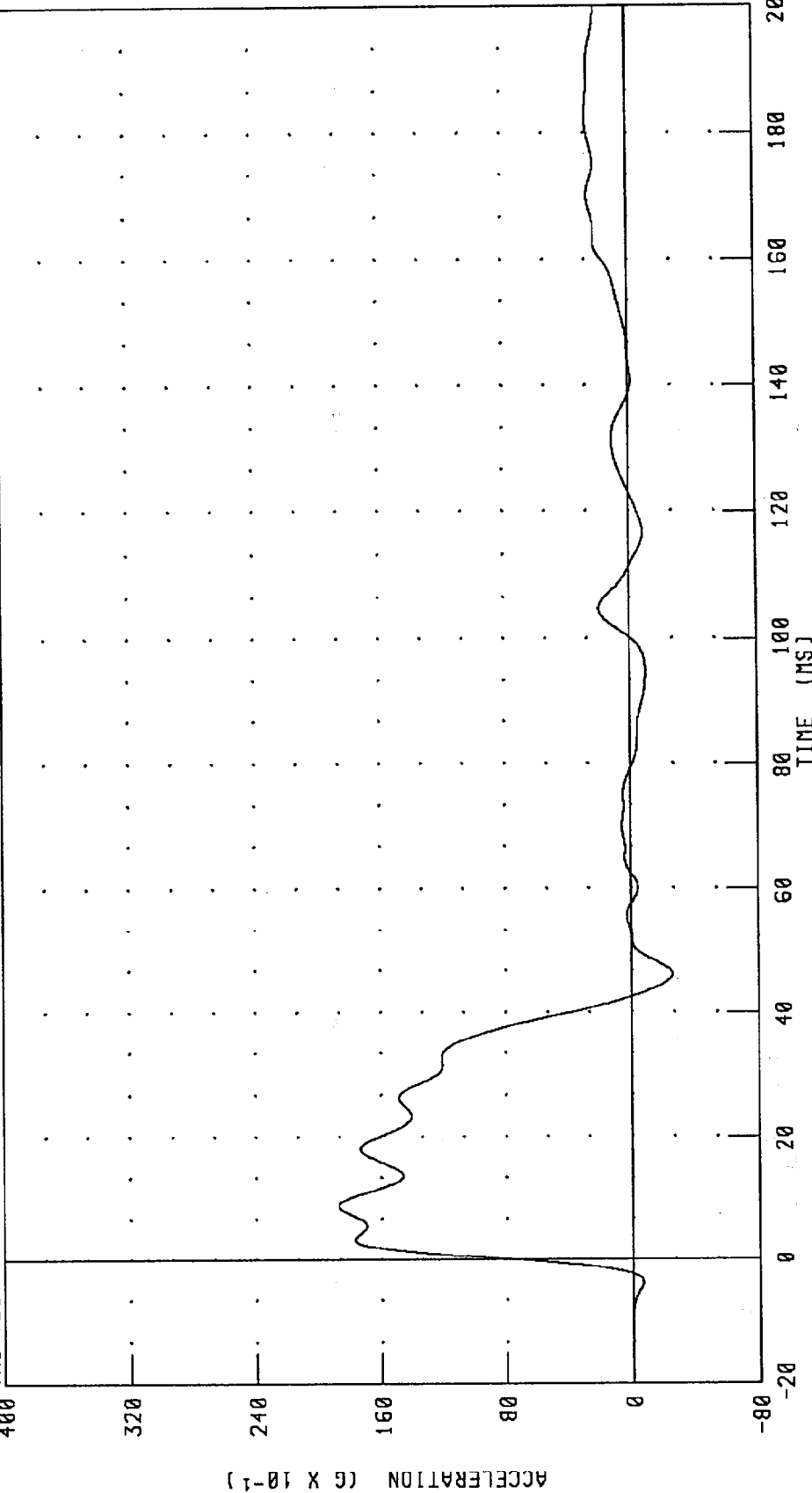
TECHNICIAN

Chas. Middel

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: 032796.0847.2



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

CHANNEL: PENXG FILTER: CH. CLASS 60

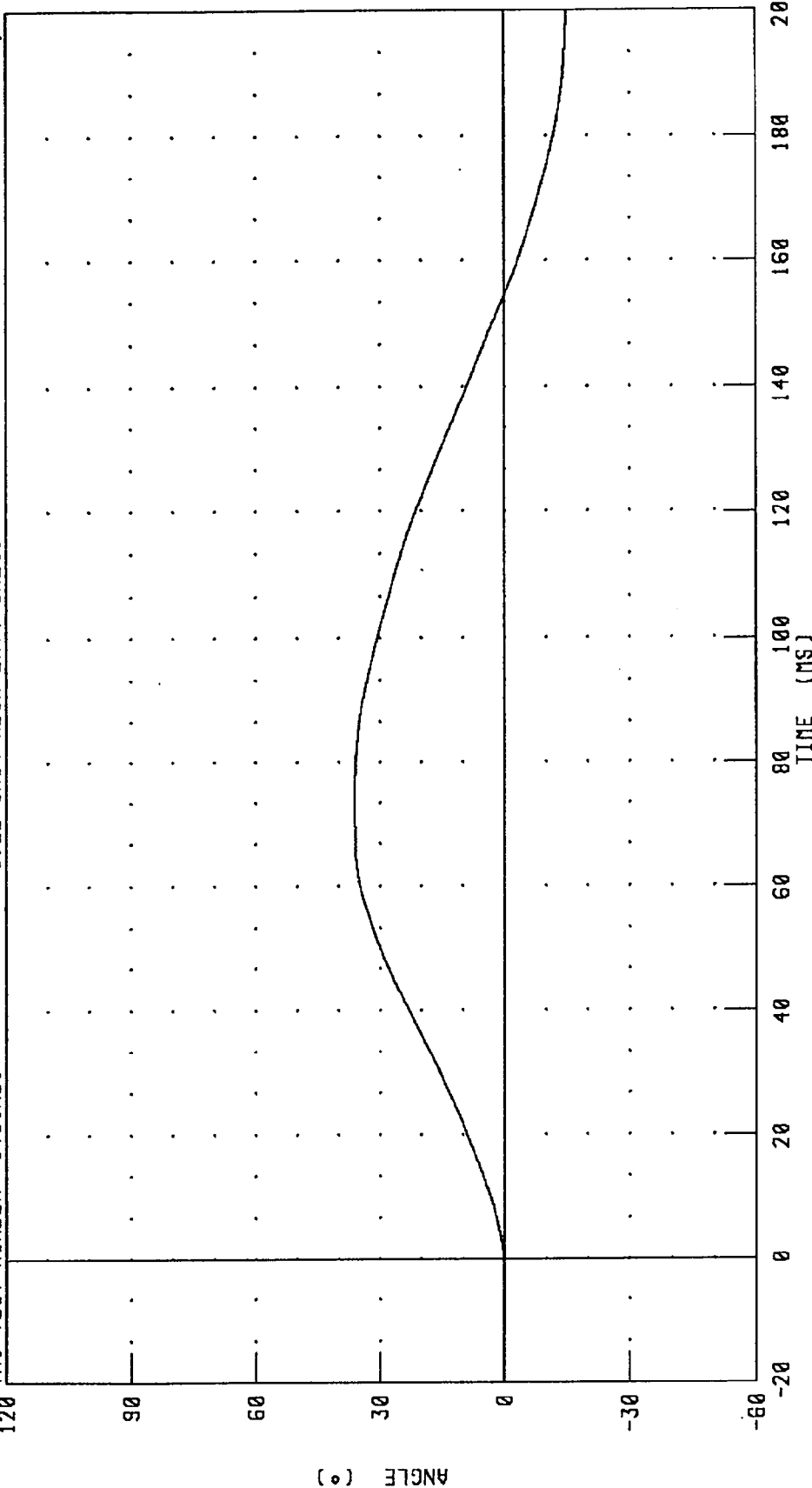
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 34CINE1

572E SN34 NECK EXT. CAL01

RUN NUMBER: 032796.0847;2



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

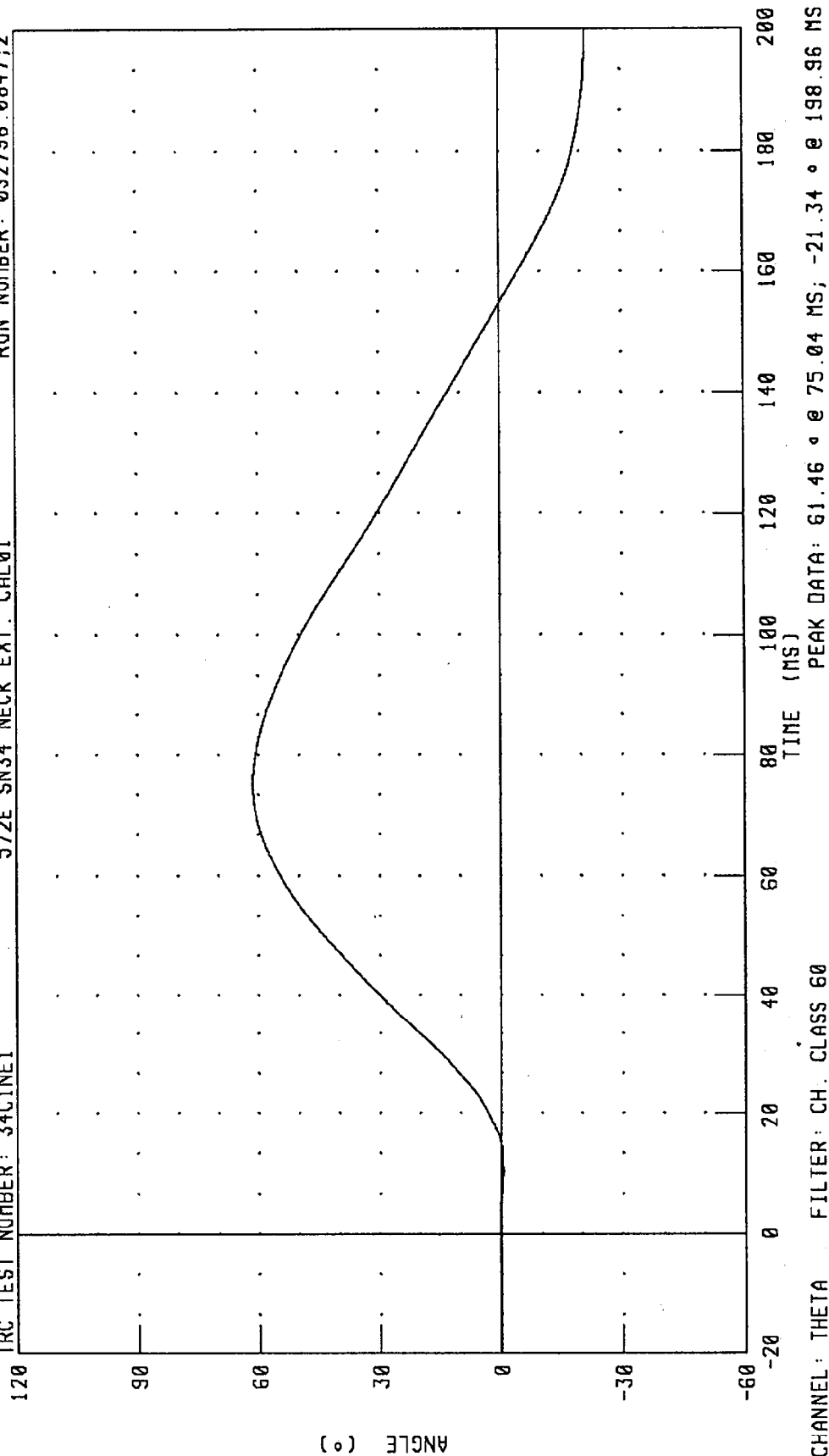
CHANNEL: BETA FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 34CINE1

572E SN34 NECK EXT. CAL01

RUN NUMBER: 032796.0847;2



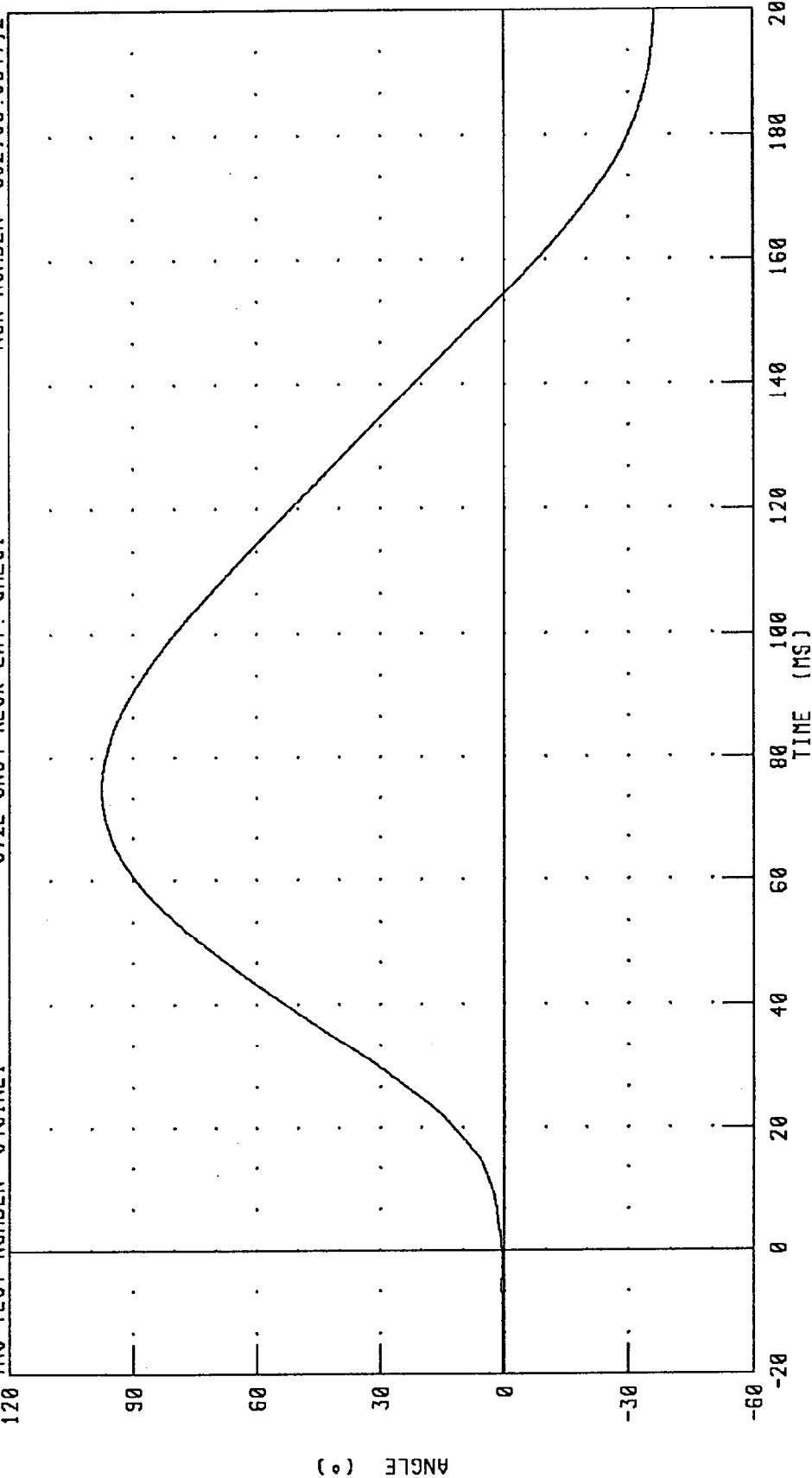
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 34CINE1

572E SN34 NECK EXT. CAL01

RUN NUMBER: 032796.0847;2



CHANNEL: TOTAL FILTER: CH. CLASS 60

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

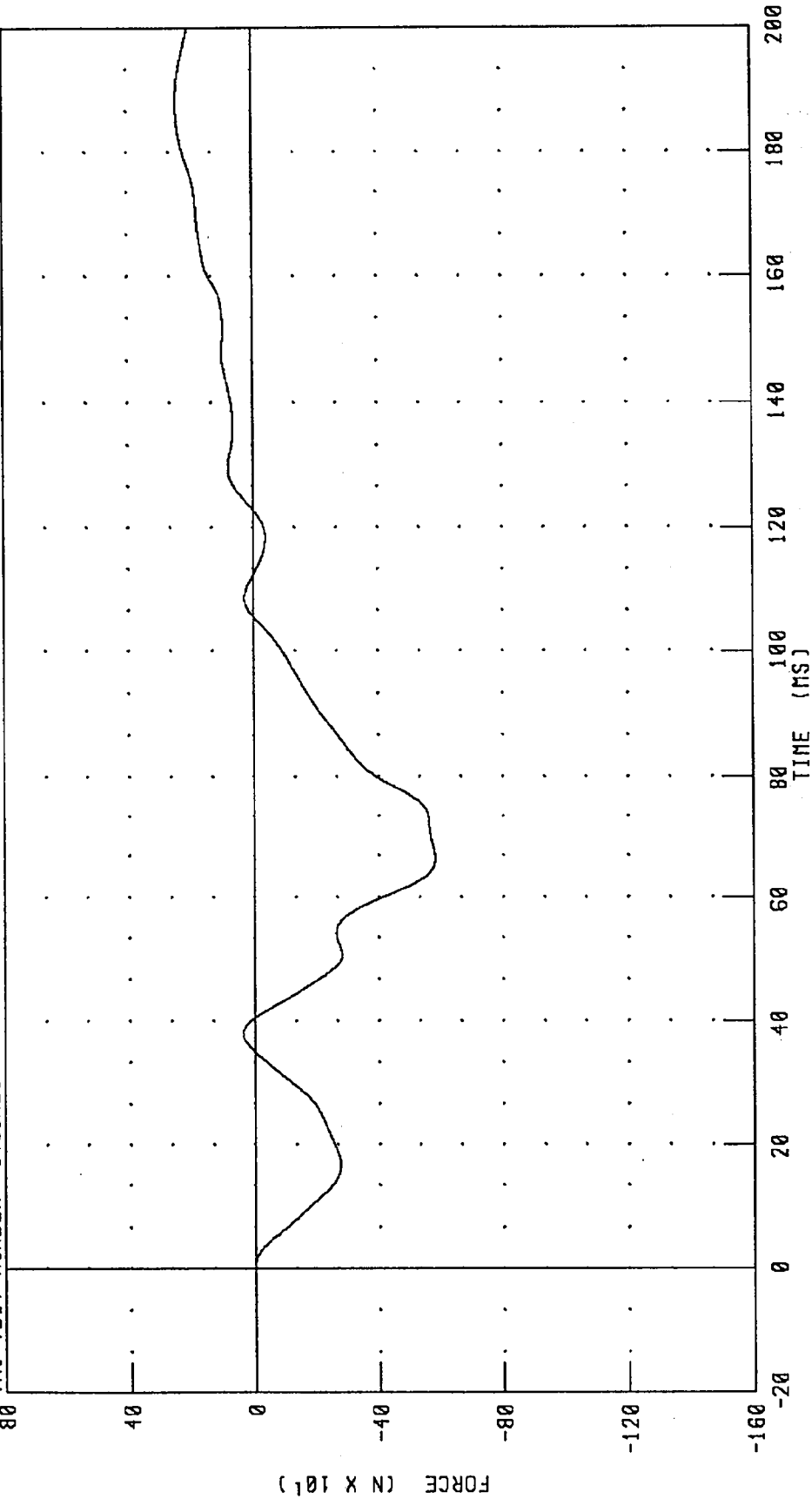
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 34C1NE1

572E SN34 NECK EXT. CAL01

RUN NUMBER: 032796.0847;2



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

CHANNEL: NEKXF FILTER: CH. CLASS 60

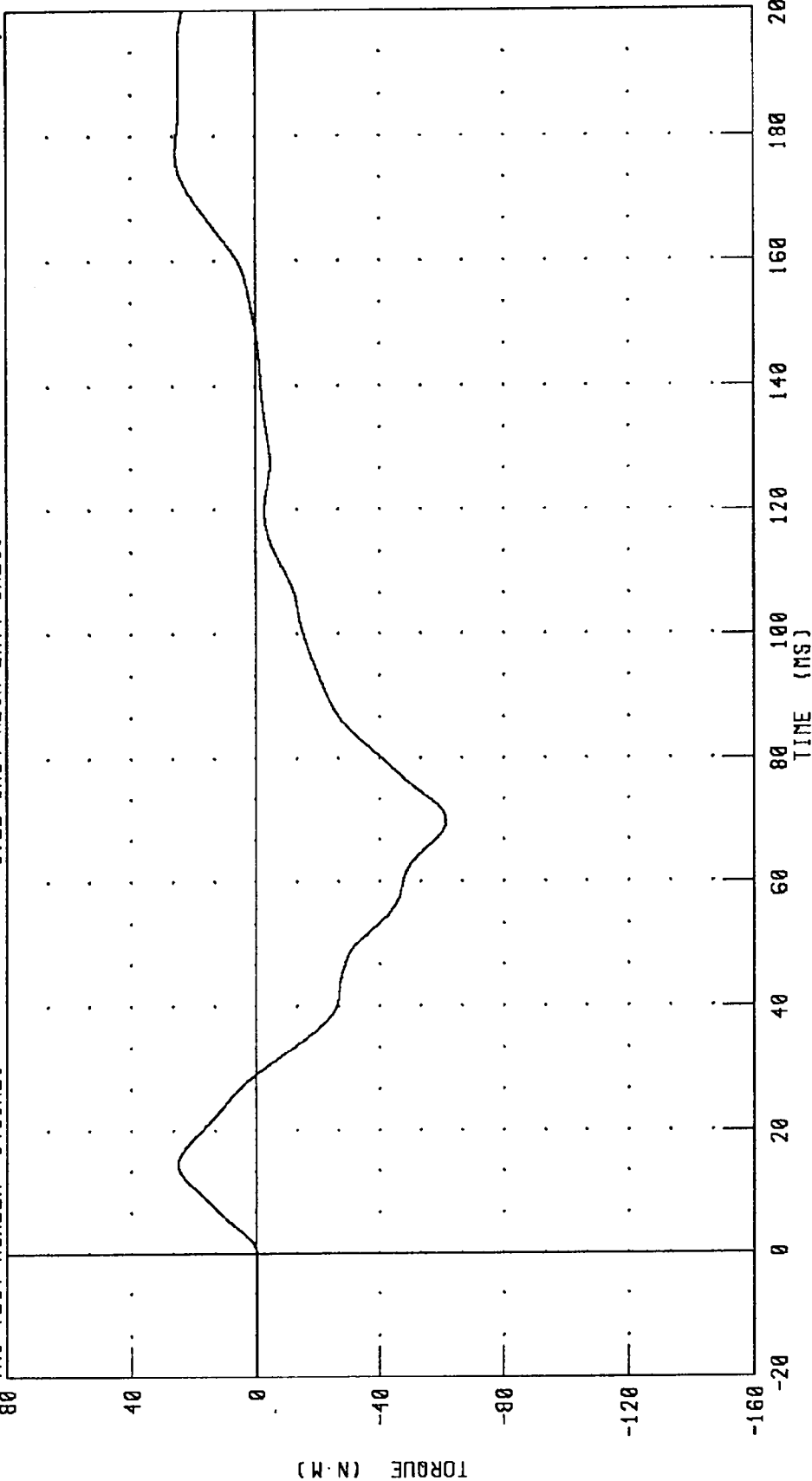
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 34CINE1

572E SN34 NECK EXT. CAL01

RUN NUMBER: 032796.0847;2



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

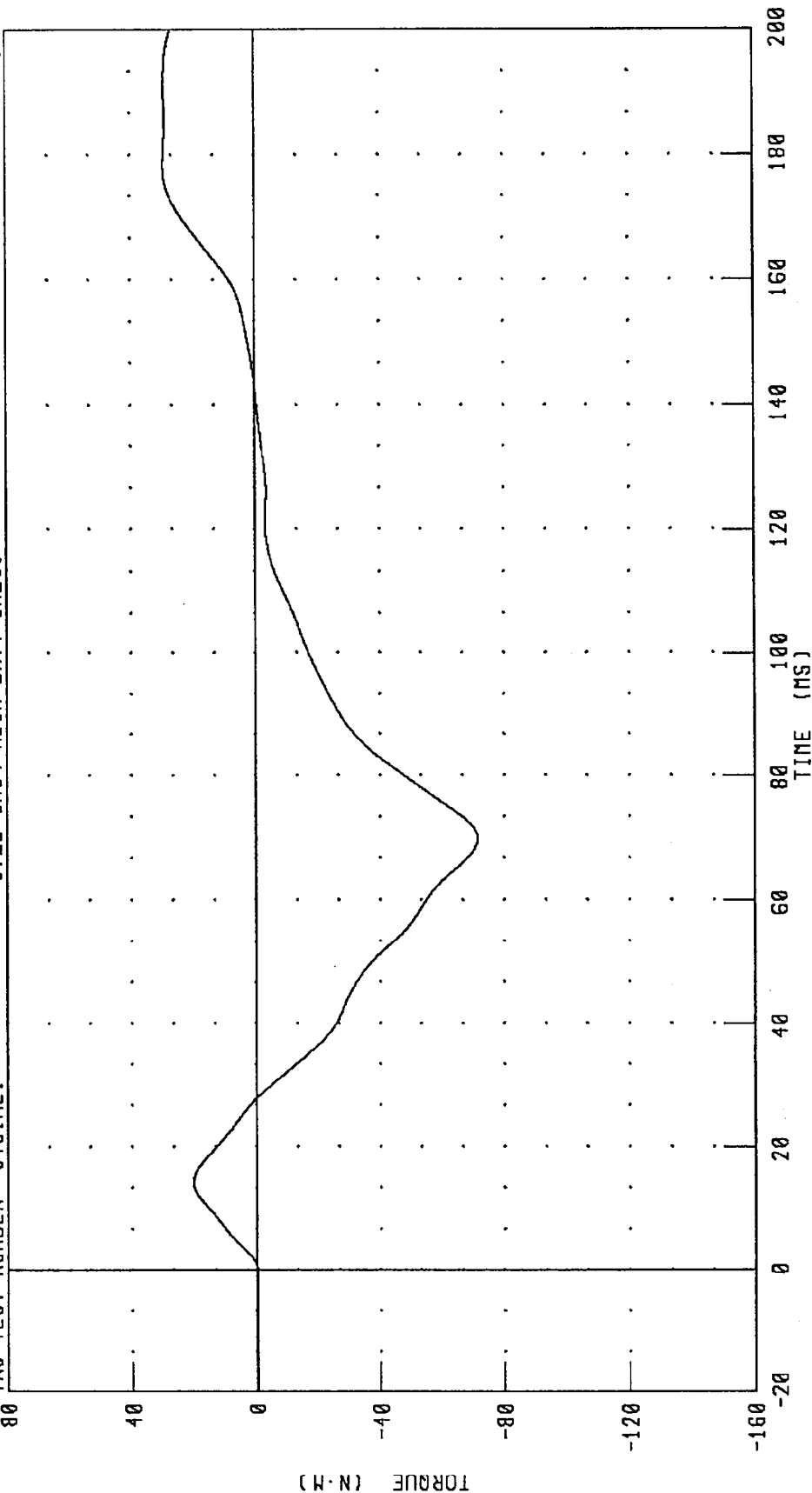
CHANNEL: NEKYM FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 34CINE1

572E SN34 NECK EXT. CAL01

RUN NUMBER: 032796.0847;2



PEAK DATA: 29.29 N-M @ 178.48 MS; -71.59 N-M @ 69.76 MS

CHANNEL: NEKOM FILTER: CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III

16-FEB-96

TRC INC.

TEST NO: 34C1TH2

572E SN34 H.S.THORAX CAL01

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

TEST MEETS SPECIFICATIONS

TECHNICIAN

Chris Middel

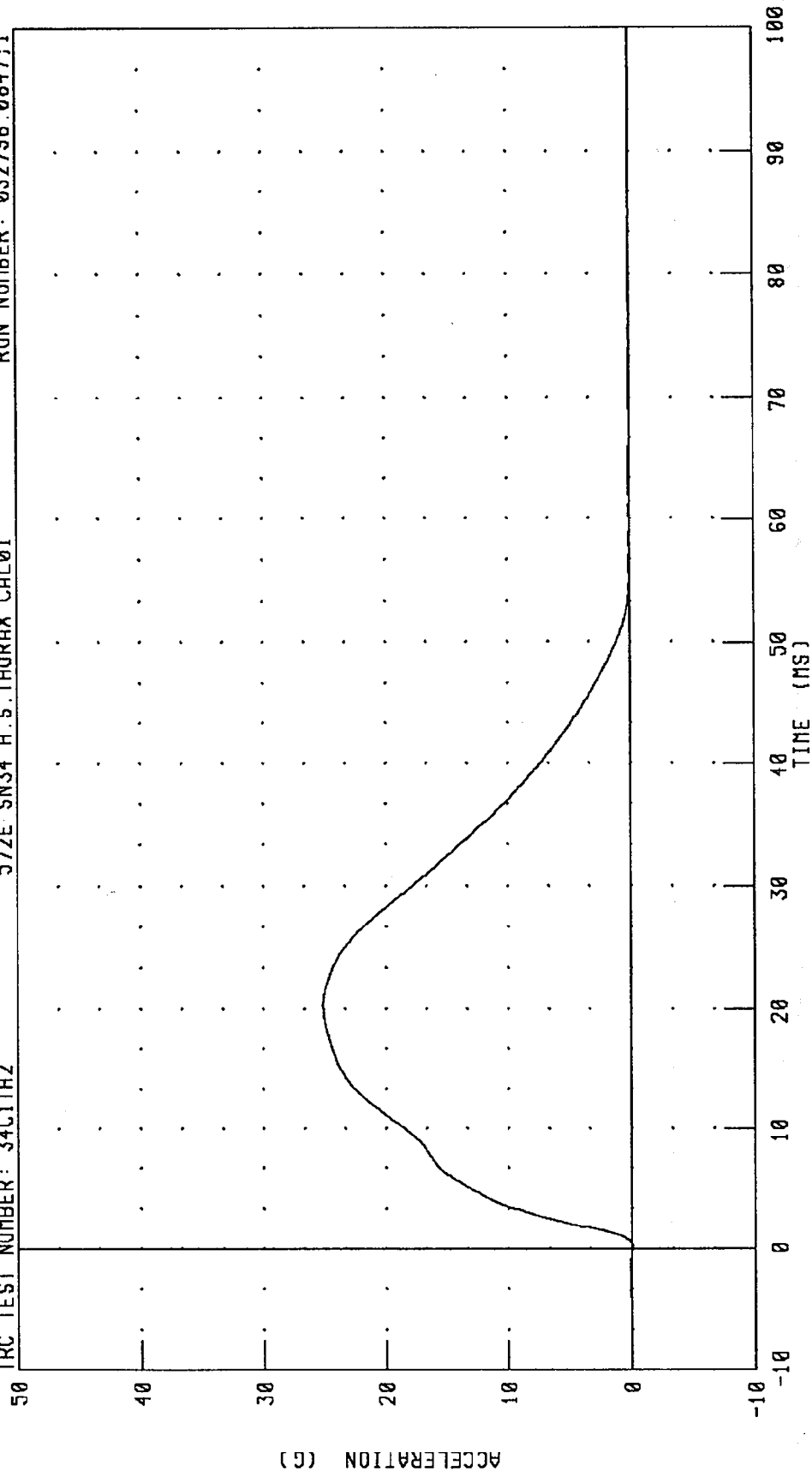
RUN NUMBER: 021696.1507;1

PART 572-E HYBRID III THORAX CALIBRATION
 PENDULUM DECELERATION

TRC TEST NUMBER: 34C1TH2

572E SN34 H.S.THORAX CAL01

RUN NUMBER: 032796.0847;1



CHANNEL: PENXG FILTER: CH. CLASS 180

PART 572-E HYBRID III THORAX CALIBRATION

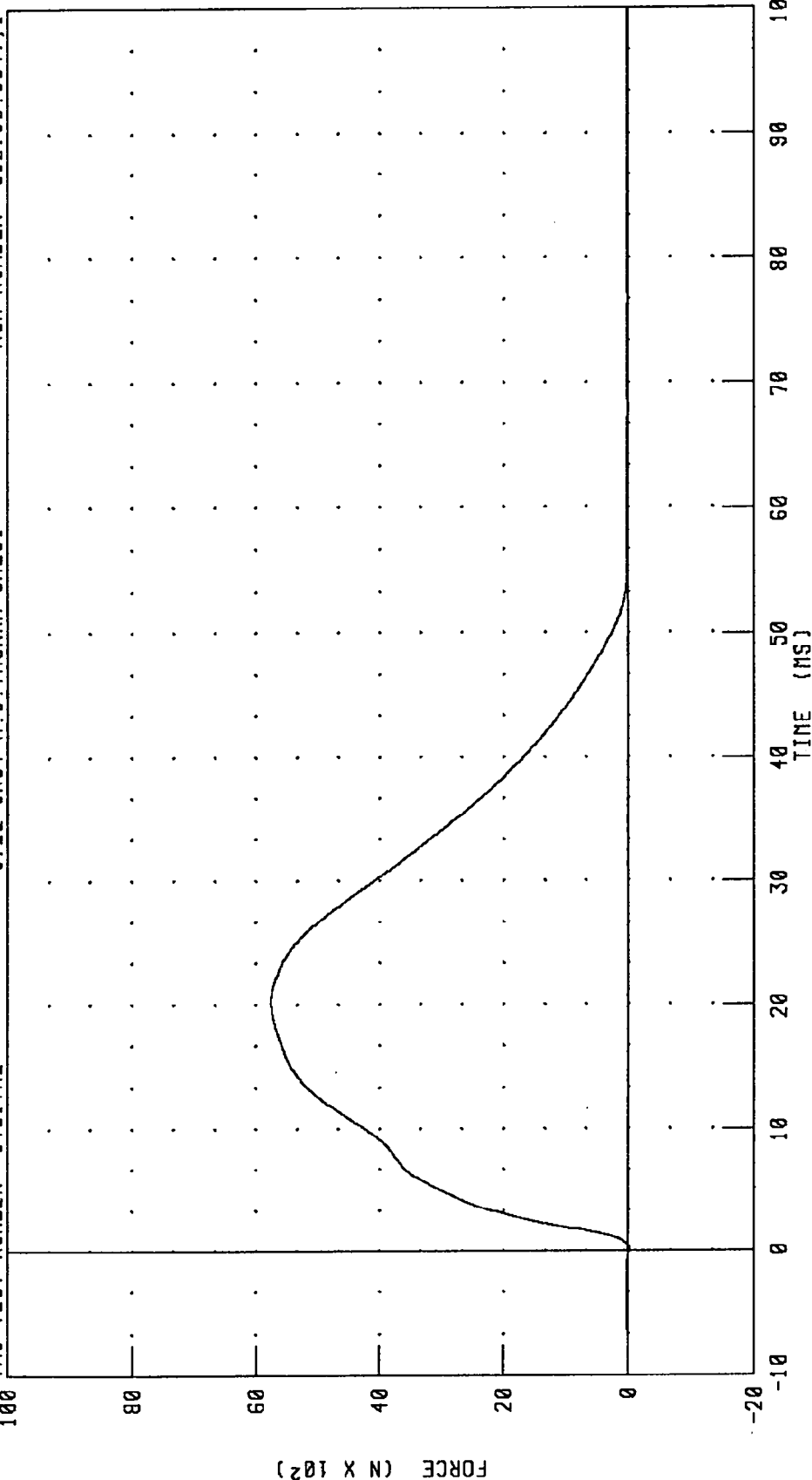
PENDULUM FORCE

TRC TEST NUMBER: 34C1TH2

572E SN34 H.S. THORAX CAL01

RUN NUMBER: 032796.0847;1

100



PEAK DATA: 5757.30 N @ 20.24 MS; -6.72 N @ 0.08 MS

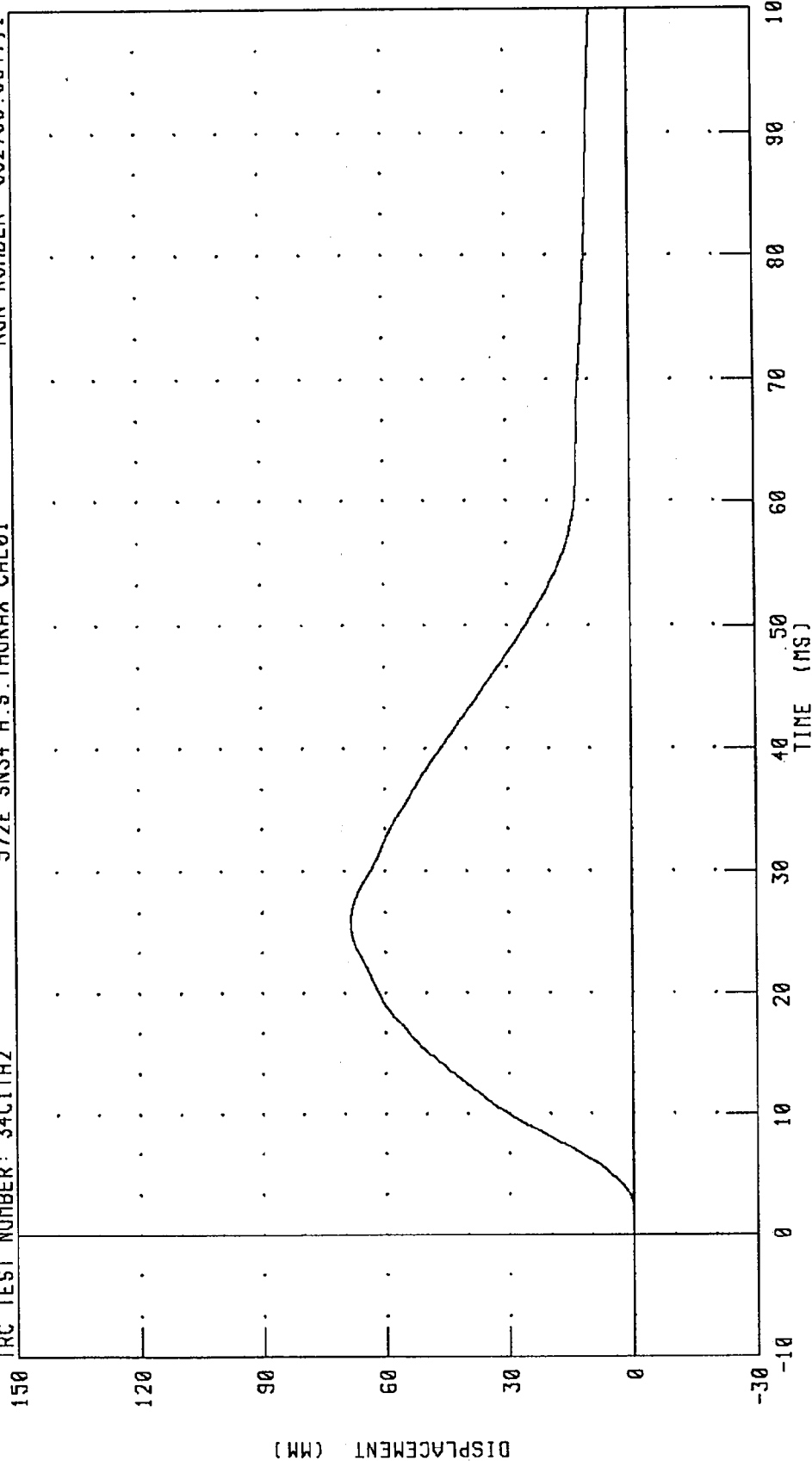
CHANNEL: PENXF FILTER: CH. CLASS 180

PART 572-E HYBRID III THORAX CALIBRATION STERNUM DISPLACEMENT

TRC TEST NUMBER: 34C1TH2

572E SN34 H.S.THORAX CAL01

RUN NUMBER: 032796.0847,1



PEAK DATA: 68.38 MM @ 25.76 MS; -0.04 MM @ -9.68 MS

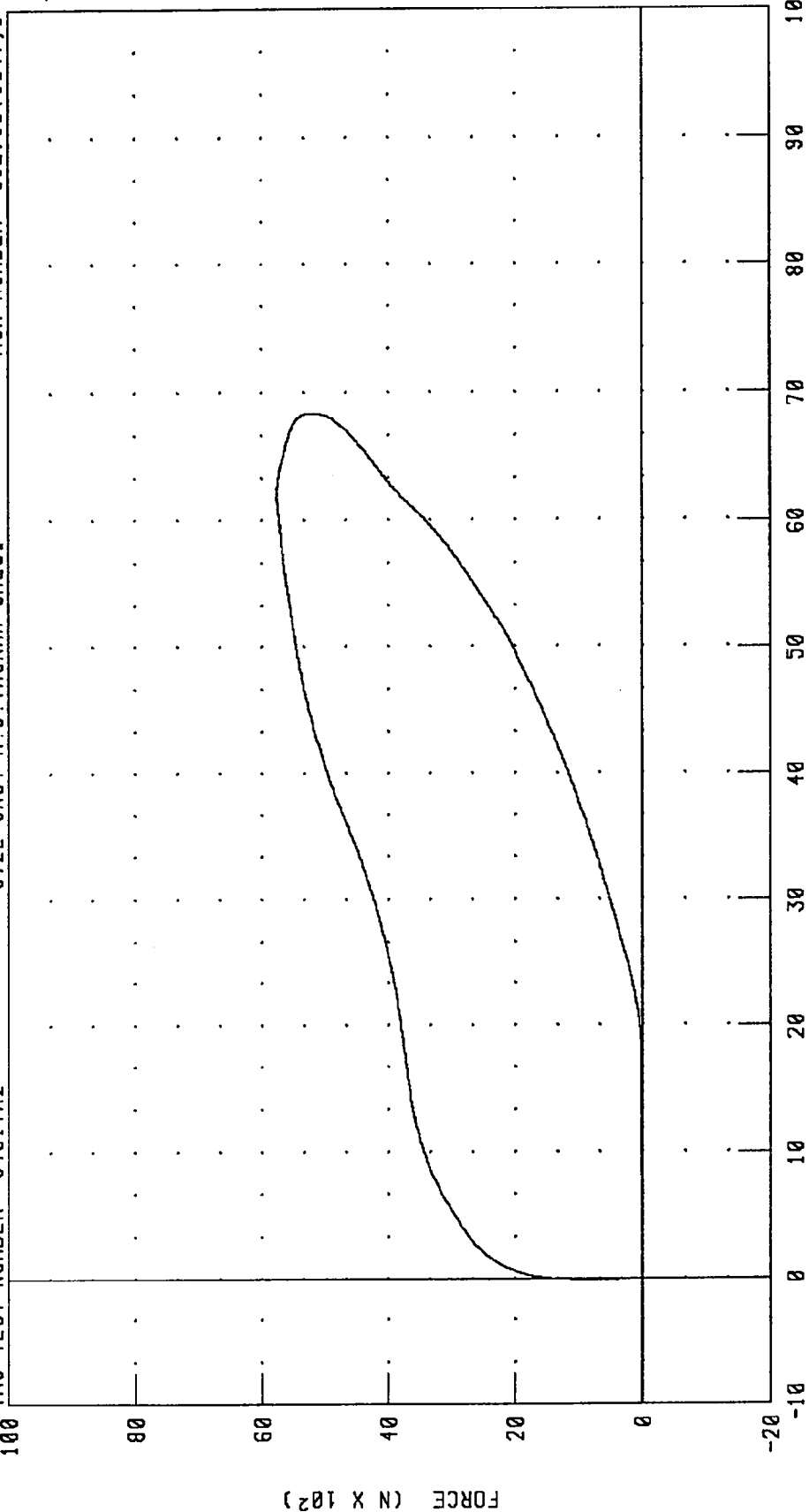
CHANNEL: CSTXD FILTER: CH. CLASS 180

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

IRC TEST NUMBER: 34C1TH2

572E SN34 H.S.THORAX CAL01

RUN NUMBER: 032795.0847;1



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

PEAK DATA:

68.38 MM @ 25.76 MS; -0.04 NM @ -9.68 MS
5757.30 N @ 20.24 MS; -6.72 N @ 0.08 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III

11-JUL-95

TRC INC.

TEST NO: 34C1RK1

572E SN34 RIGHT KNEE CAL 01

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

TEST MEETS SPECIFICATIONS

TECHNICIAN

Don M. Licht

RUN NUMBER: 071195.1244;1

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

TRC TEST NUMBER: 34CIRK1

572E SN34 RIGHT KNEE CAL 01

RUN NUMBER: 032796.0847;1

150

120

90

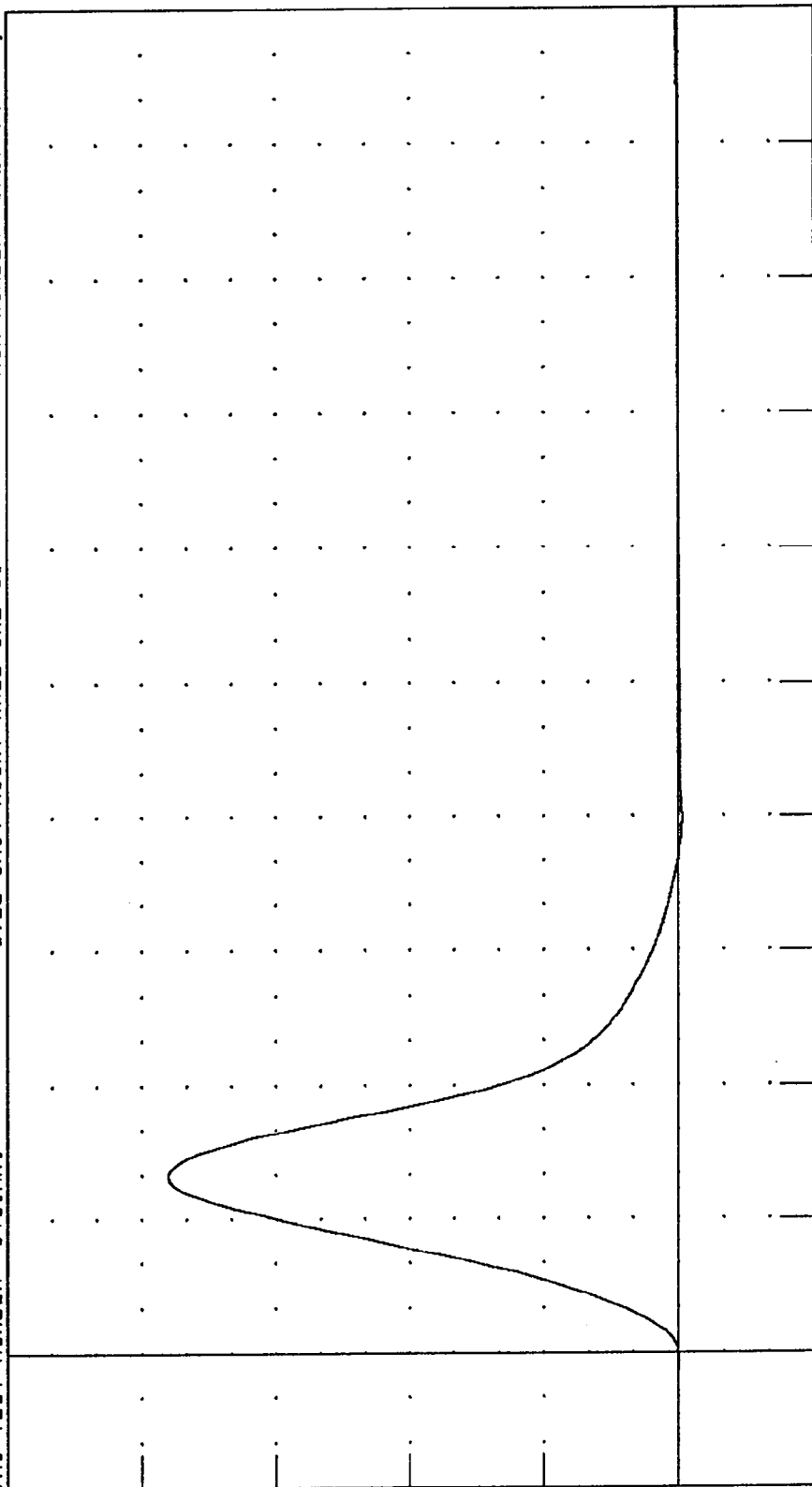
60

30

0

-30

ACCELERATION (G)



TIME (MS X 10⁻¹)

200

180

160

140

120

100

80

60

40

20

0

-20

CHANNEL: PENXG FILTER: CH. CLASS 600

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

PART 572-E HYBRID III RIGHT KNEE CALIBRATION

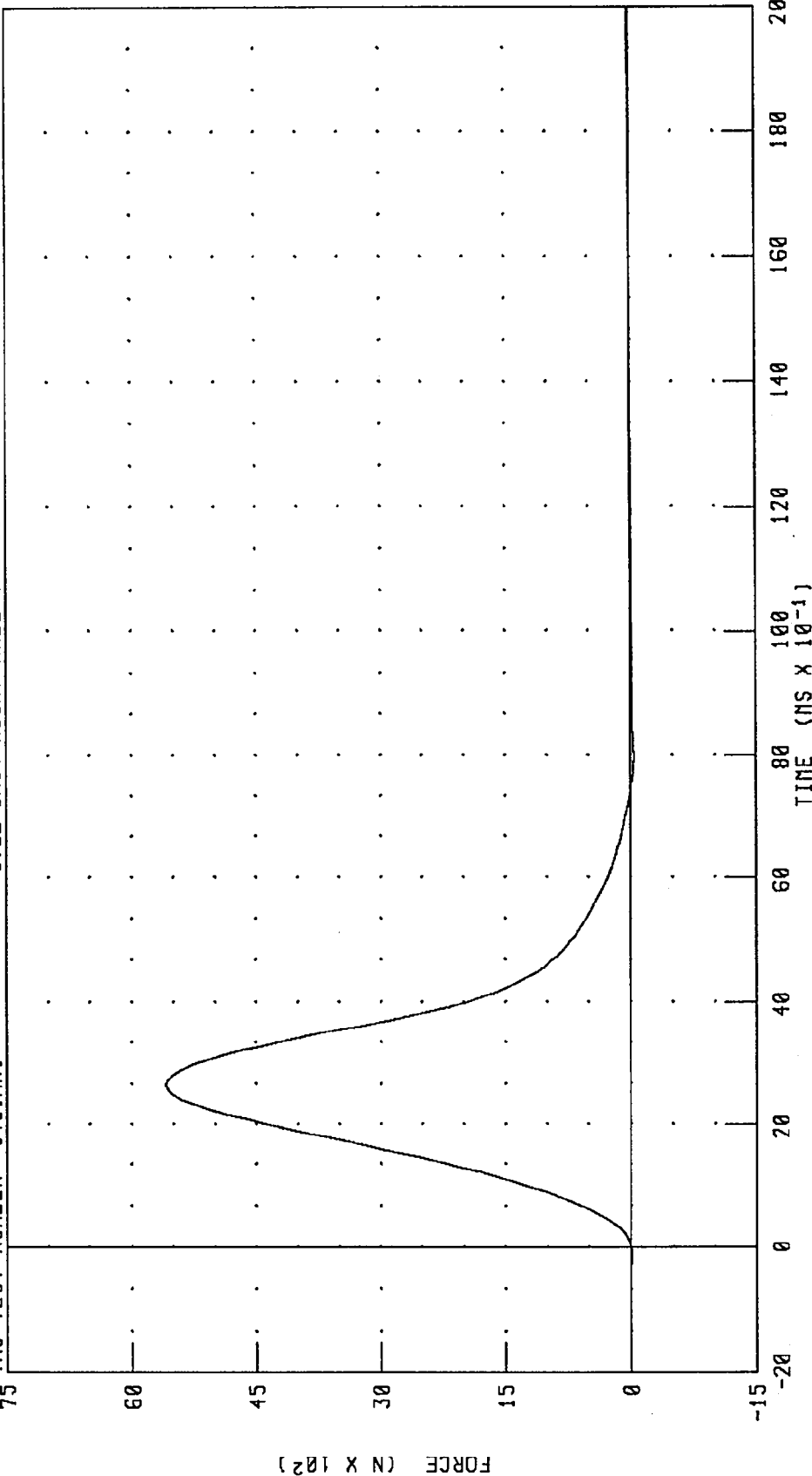
PENDULUM FORCE (5 KG PEND.)

572E SN34 RIGHT KNEE CAL 01

RUN NUMBER: 032796.0847;1

TRC TEST NUMBER: 34CIRK1

75



PEAK DATA: 5589.18 N @ 2.64 MS; -42.00 N @ 7.92 MS

FILTER: CH. CLASS 600

CHANNEL: PENXF

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 Middht

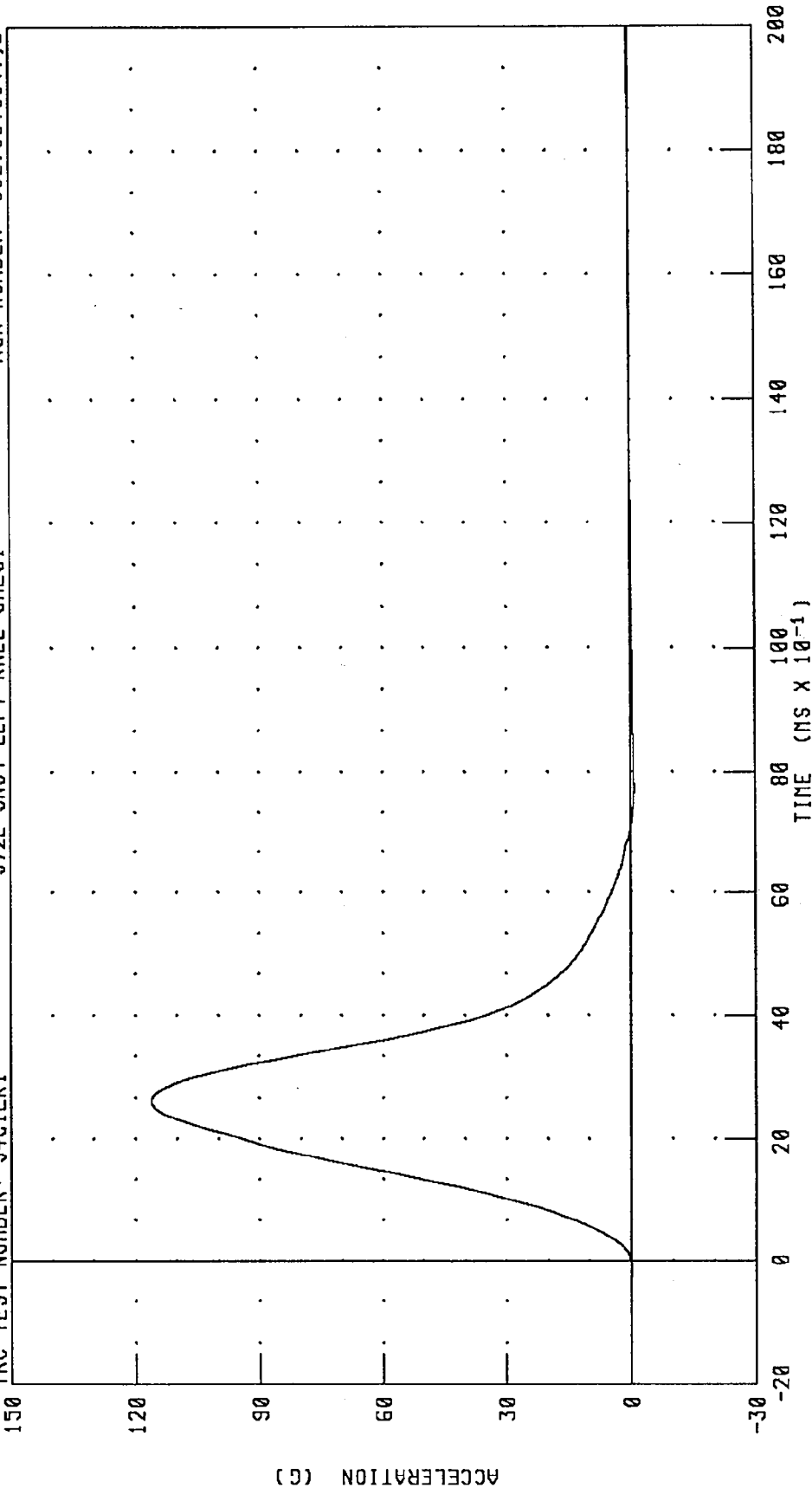
RUN NUMBER: 071195.1240;2

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

TRC TEST NUMBER: 34C1LK1

572E SN34 LEFT KNEE CAL01

RUN NUMBER: 032796.0847;2



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

CHANNEL: PENXG FILTER: CH. CLASS 600

PART 572-E HYBRID III LEFT KNEE CALIBRATION

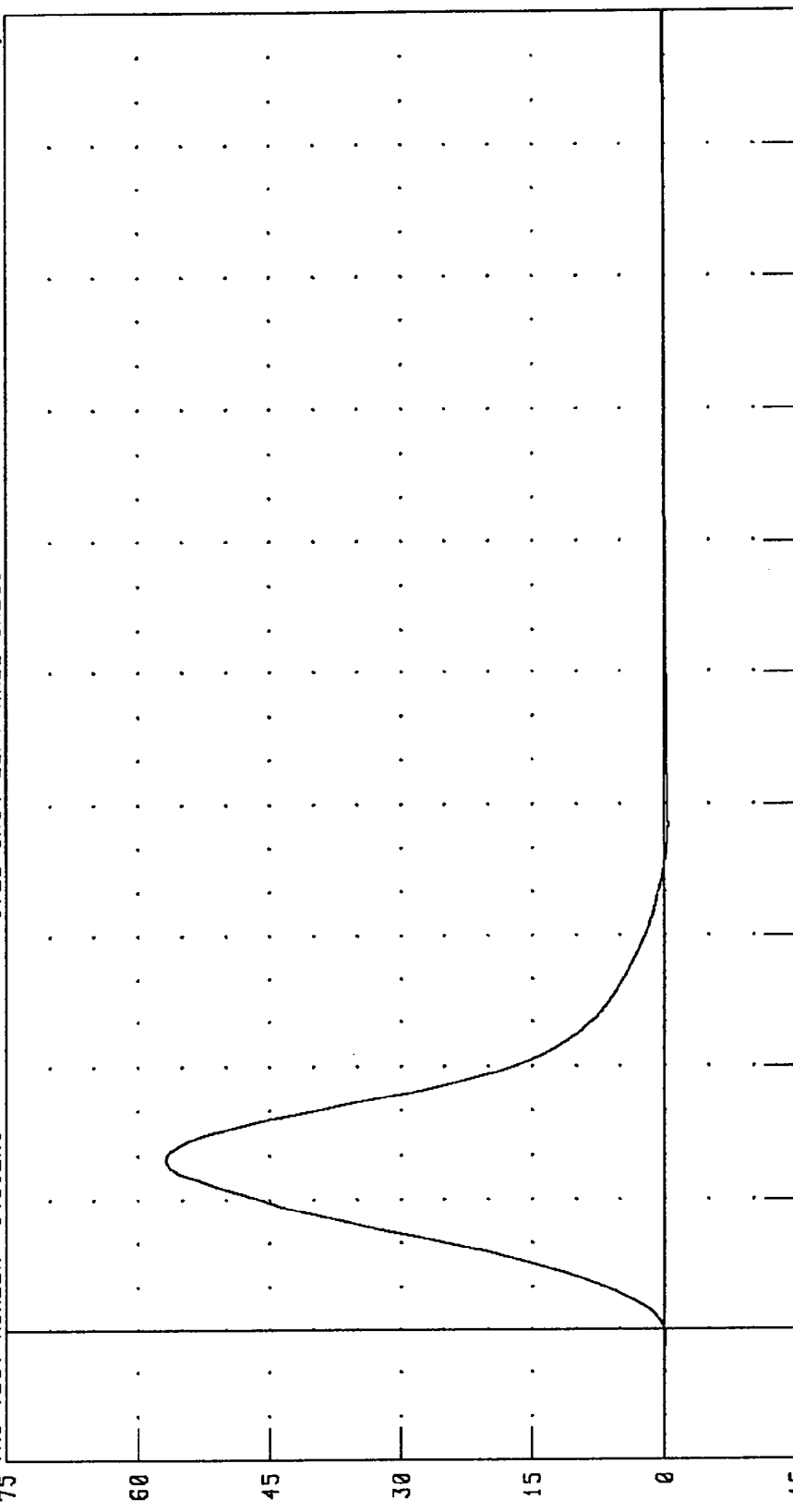
PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 34C1LK1

572E SN34 LEFT KNEE CAL01

RUN NUMBER: 032796.0847;2

75



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

CHANNEL: PENXF FILTER: CH. CLASS 600

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 Chris Mischke

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

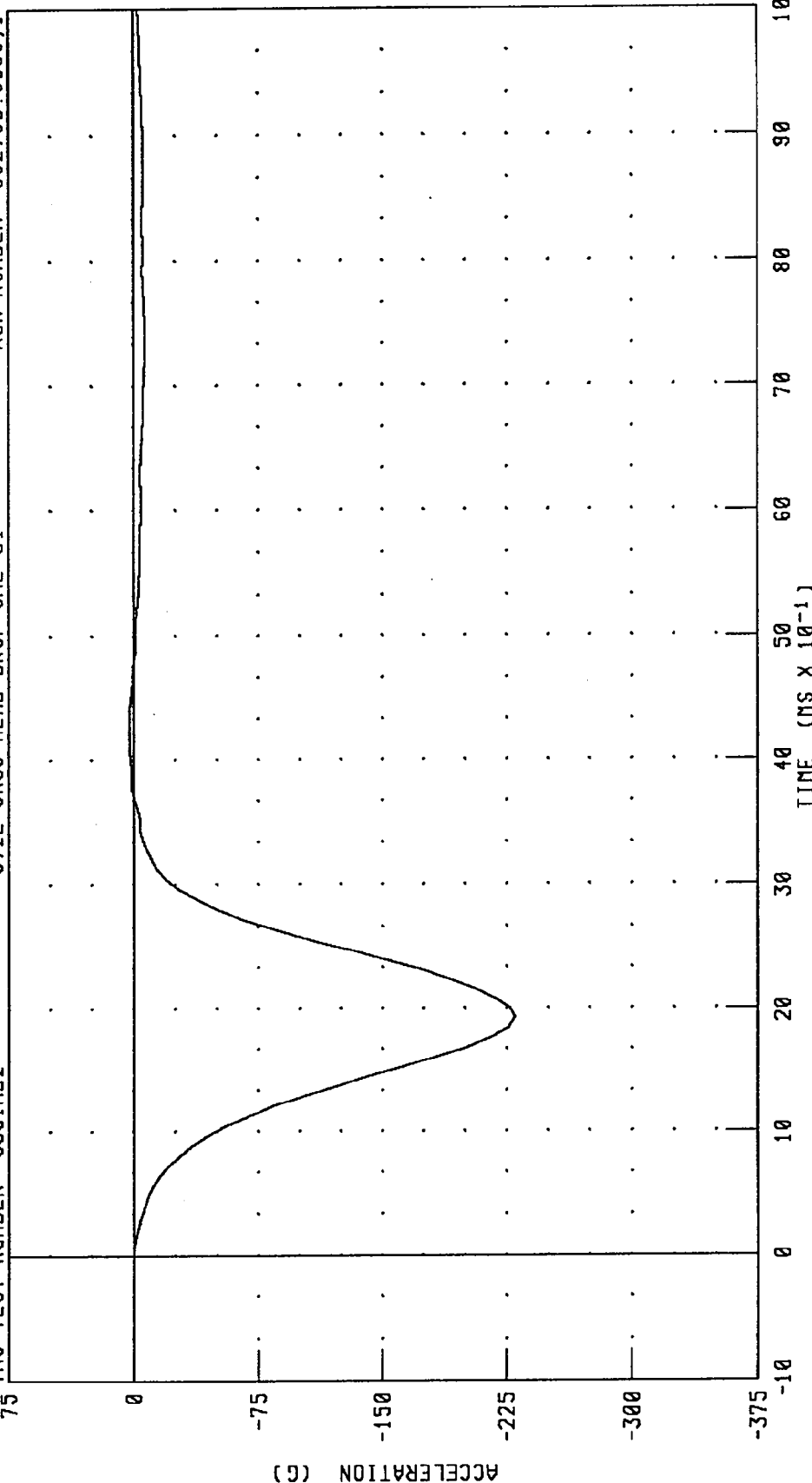
Chris Middleton

RUN NUMBER: 110995.1358;1

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

RUN NUMBER: 032796.0900;1

TRC TEST NUMBER: 35C1H02



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

CHANNEL: HEDXC FILTER: CH. CLASS 1000

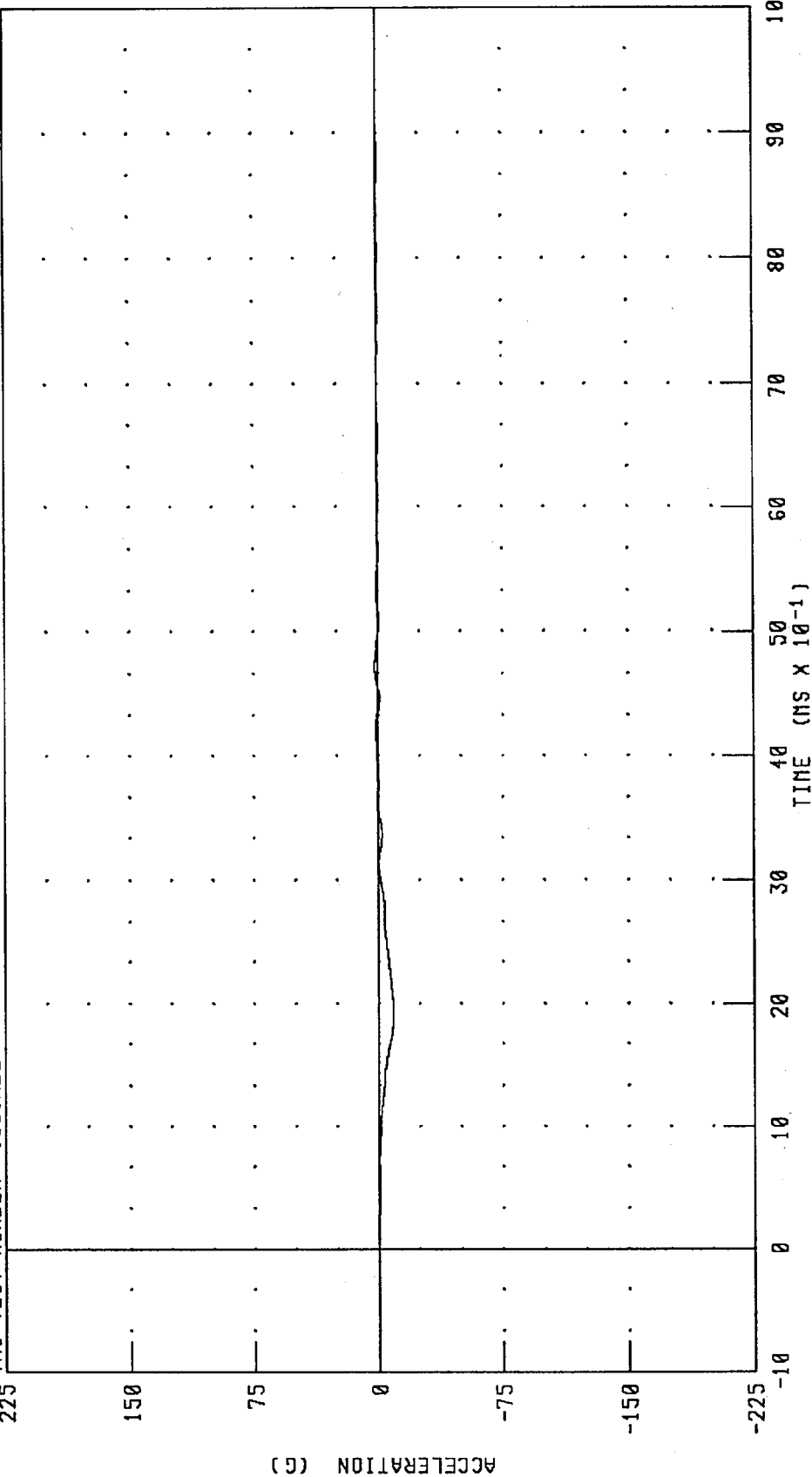
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

TRC TEST NUMBER: 35C1H02

572E SN35 HEAD DROP CAL 01

RUN NUMBER: 032796.0900;1

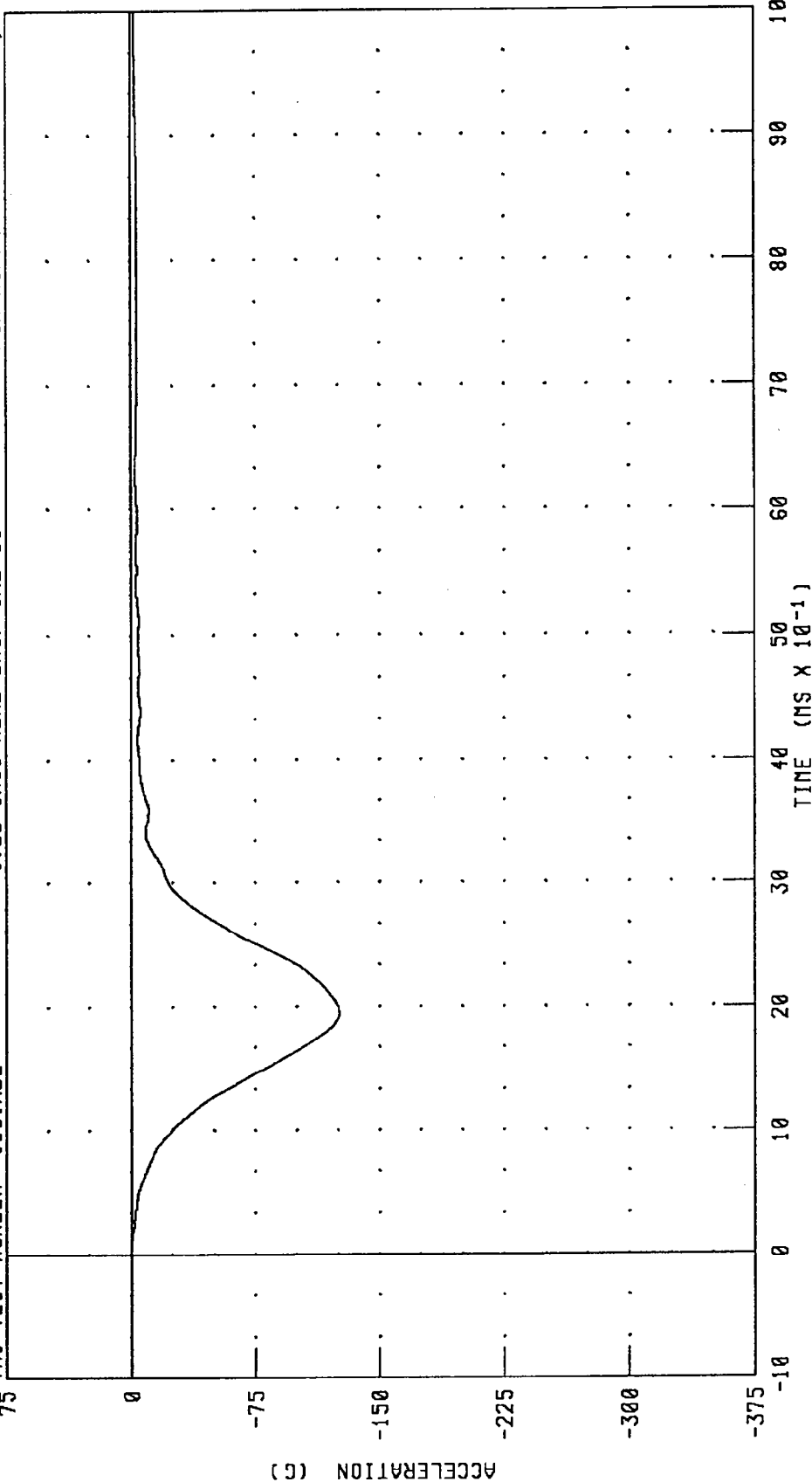


CHANNEL: HEDYG FILTER: CH. CLASS 1000

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

RUN NUMBER: 032796.0900;1

TRC TEST NUMBER: 35C1HD2



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

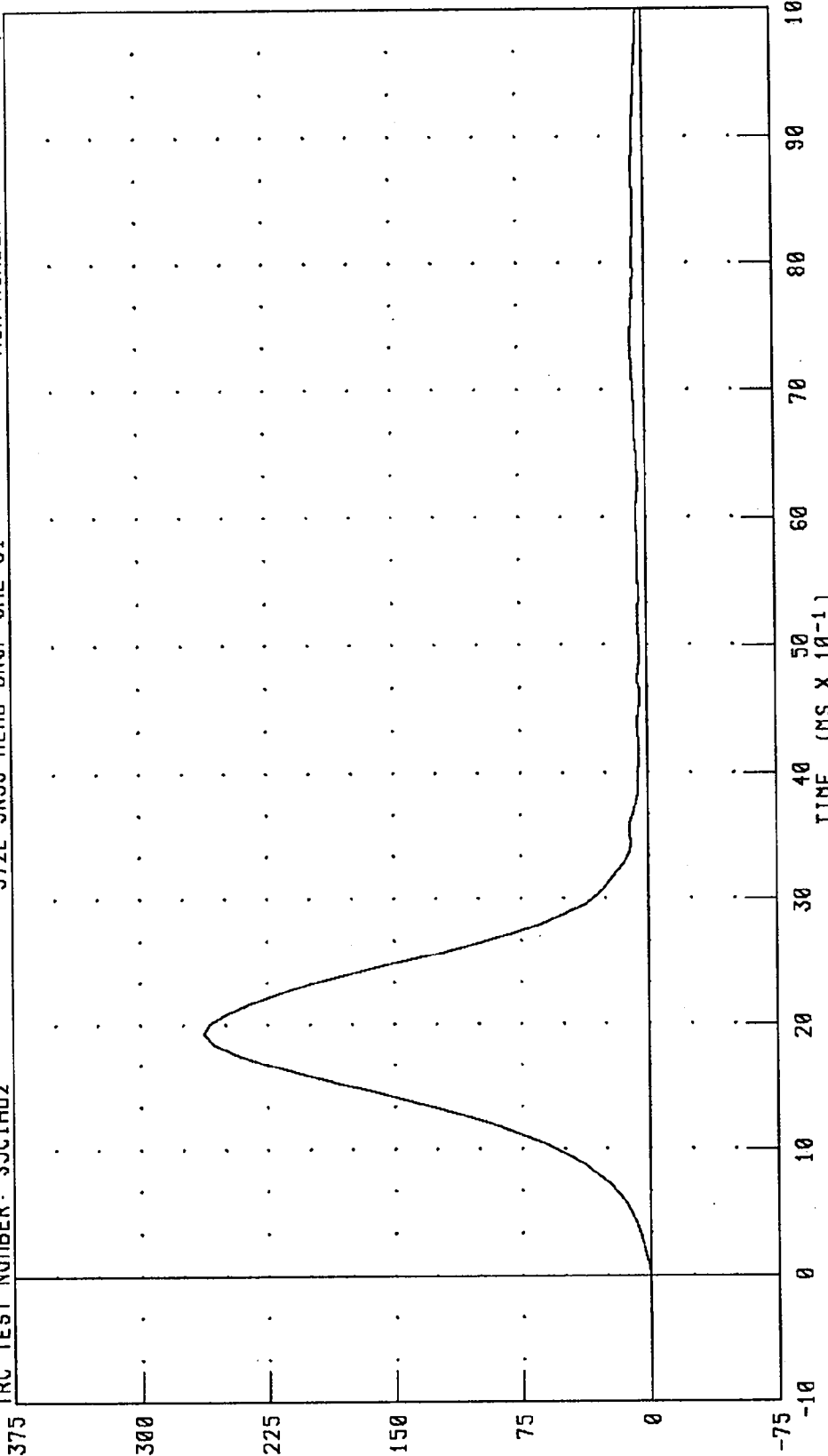
CHANNEL: HEDZG FILTER: CH. CLASS 1000

PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: 35C1HD2

572E SN35 HEAD DROP CAL 01

RUN NUMBER: 032796.0900;1



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

CHANNEL: HEDRG FILTER: CH. CLASS 1000

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

HYBRID III

11-JUL-95

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

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

TEST MEETS SPECIFICATIONS

TECHNICIAN Chris Miedt

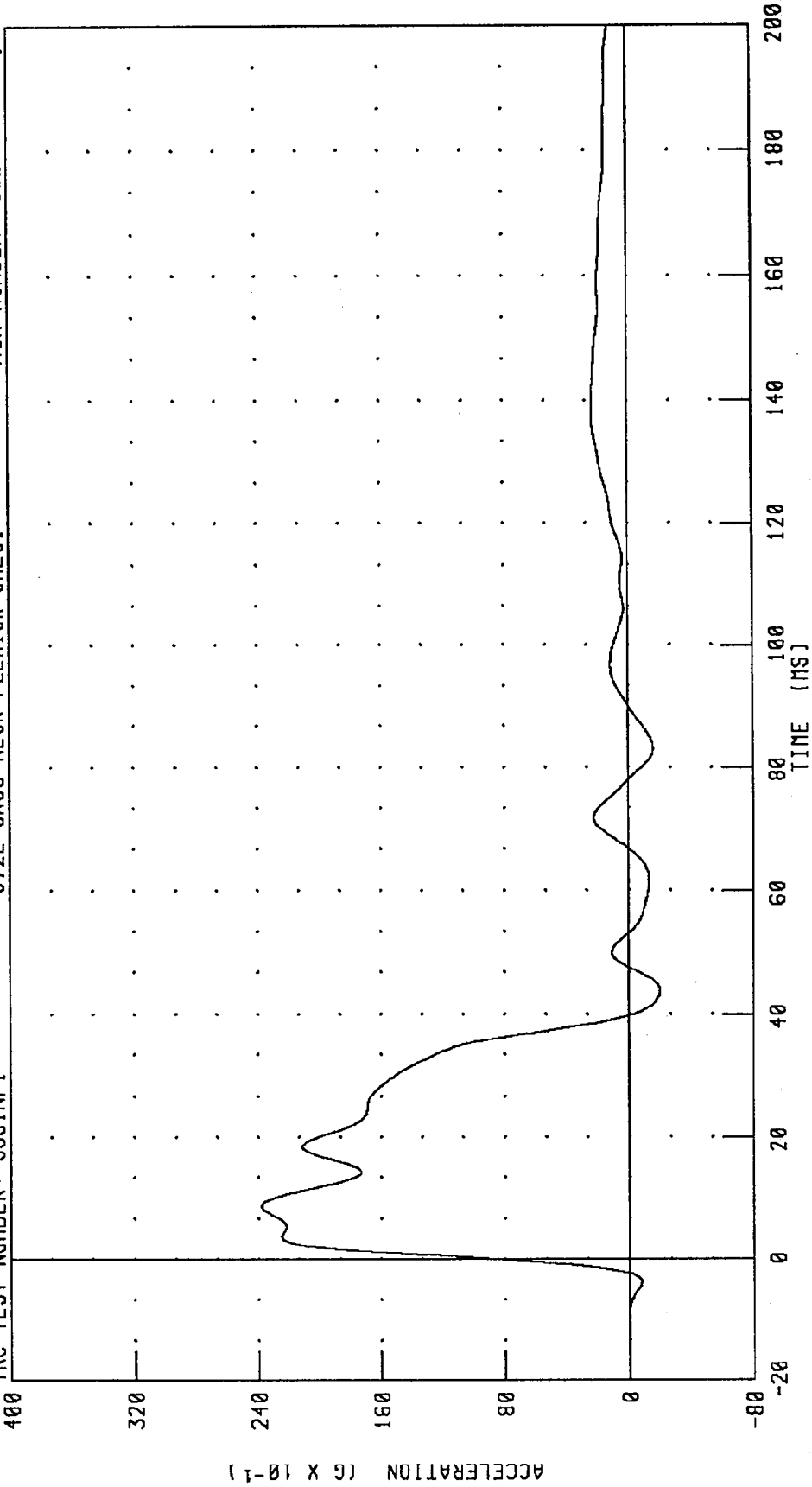
RUN NUMBER: 071195.0843;2

PART 572-E HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION

TRC TEST NUMBER: 35CINF1

572E SN35 NECK FLEXION CAL01

RUN NUMBER: 032736.0900;2



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

CHANNEL: PENXG FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN35 NECK FLEXION CAL01

TRC TEST NUMBER: 35C1NF1

120

90

60

30

0

-30

-60

ANGLE (°)

0

20

40

60

80

100

120

140

160

180

200

TIME (MS)

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

CHANNEL: BETA

FILTER: CH. CLASS 60

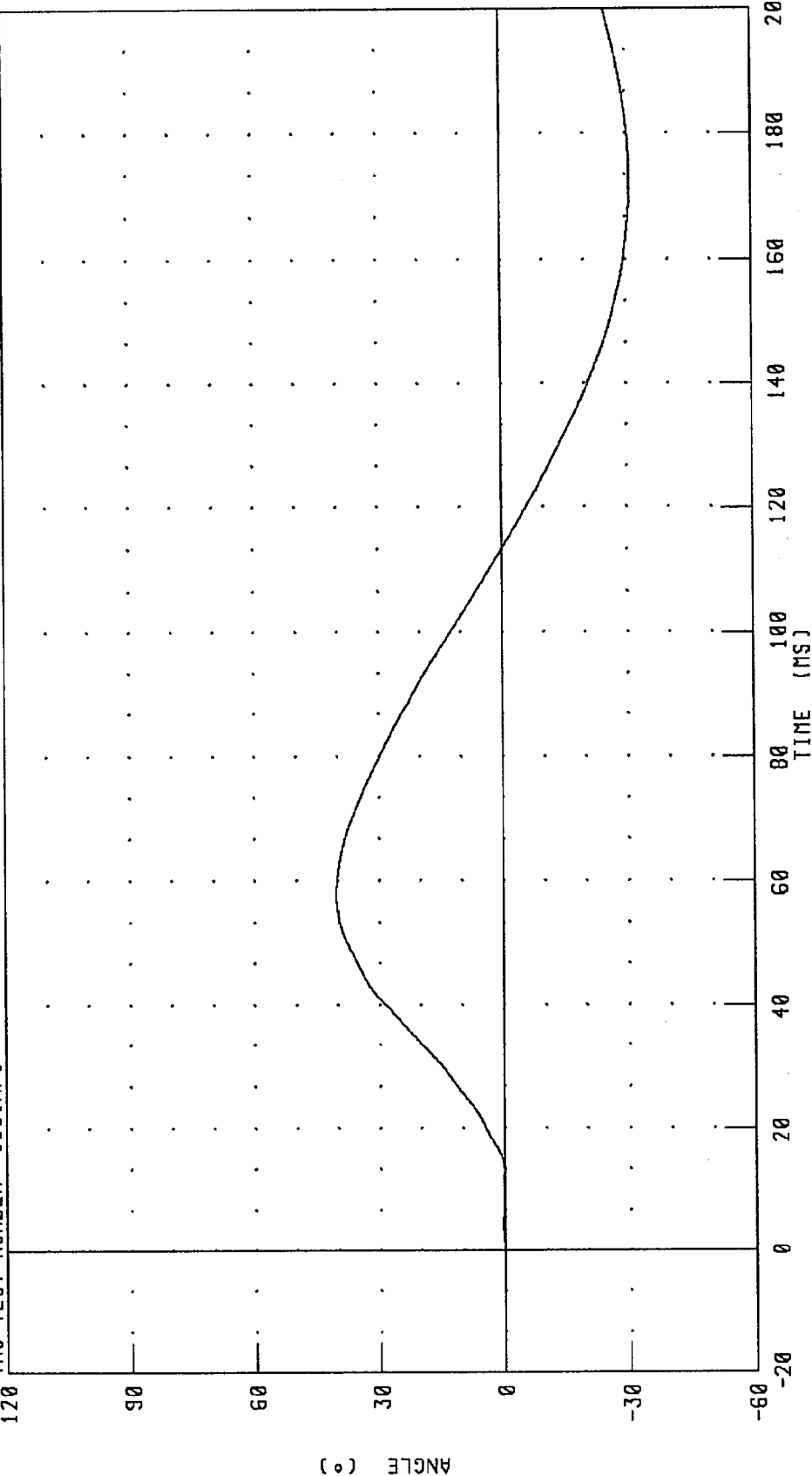
RUN NUMBER: 032796.0900;2

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

TRC TEST NUMBER: 35CINF1

572E SN35 NECK FLEXION CAL01

RUN NUMBER: 032796.0900.2



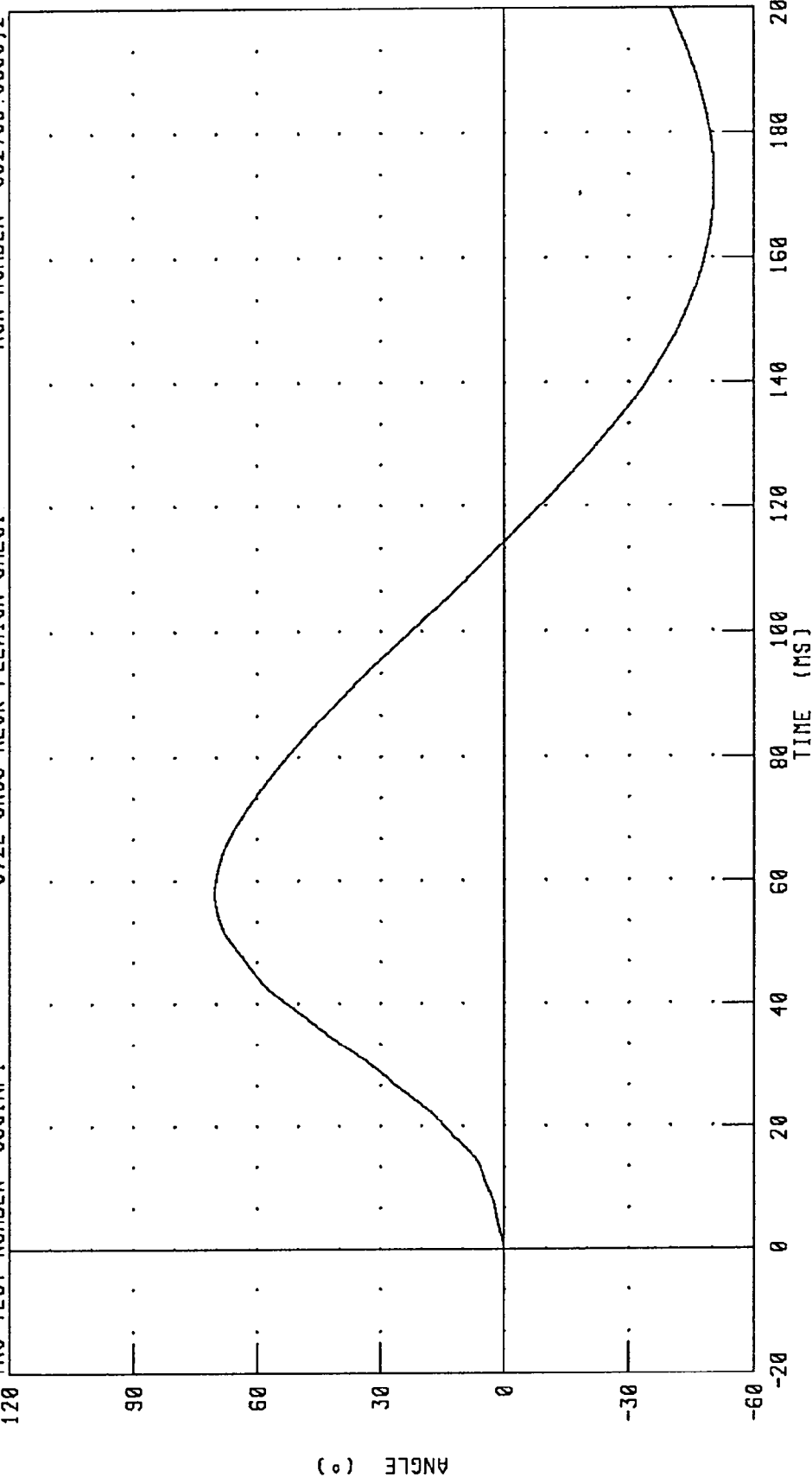
PEAK DATA: 40.37 ° @ 57.76 MS, -30.85 ° @ 169.84 MS

CHANNEL: THETA FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 35CINF1 572E SN35 NECK FLEXION CAL01 RUN NUMBER: 032796.0900;2



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

CHANNEL: TOTAN FILTER: CH. CLASS 60

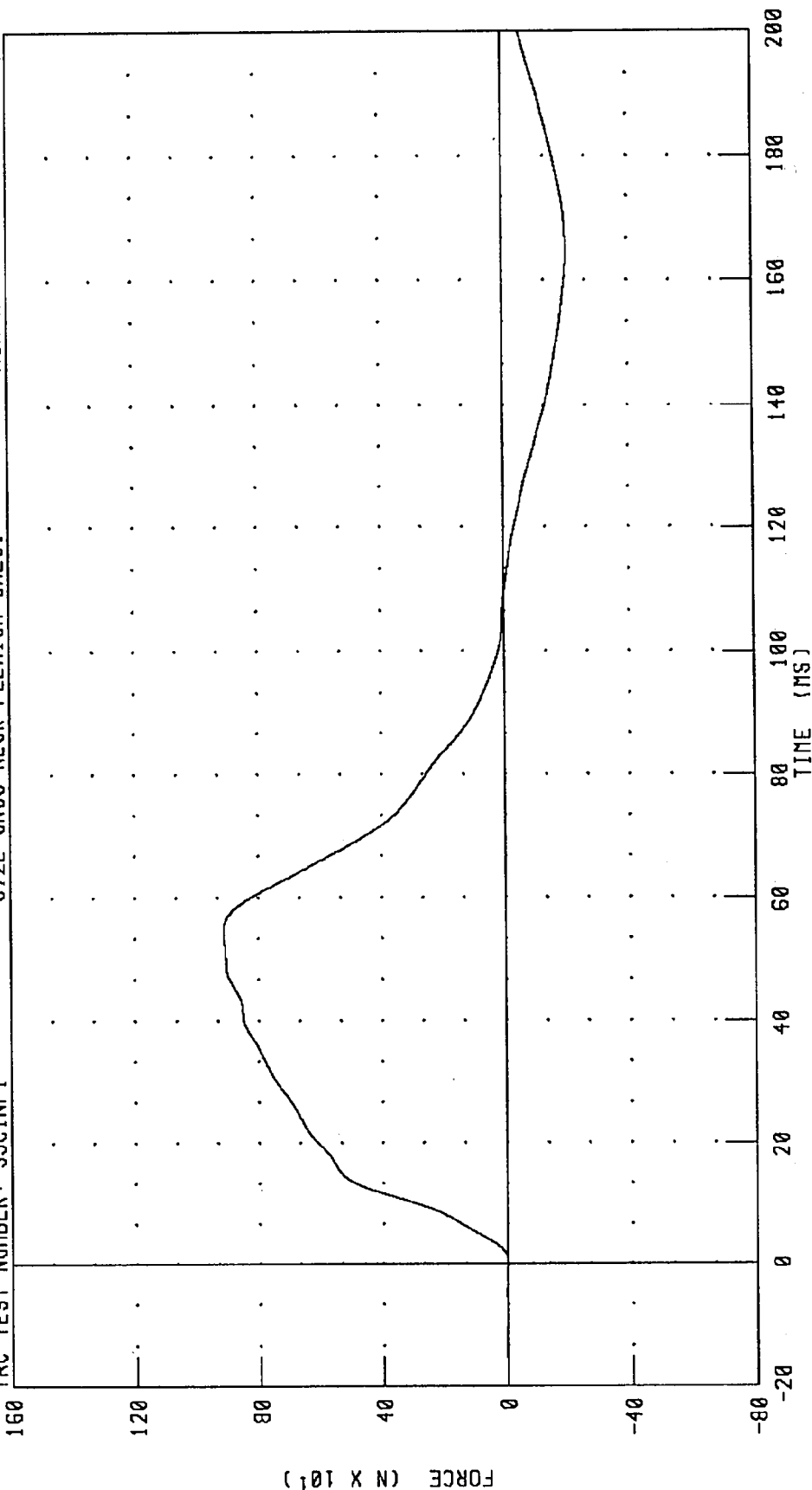
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 35C1NF1

572E SN35 NECK FLEXION CAL01

RUN NUMBER: 032796.0900;2



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

CHANNEL: NEKXF FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 35CINF1

572E SN35 NECK FLEXION CAL01

RUN NUMBER: 032796.0900;2

160

120

80

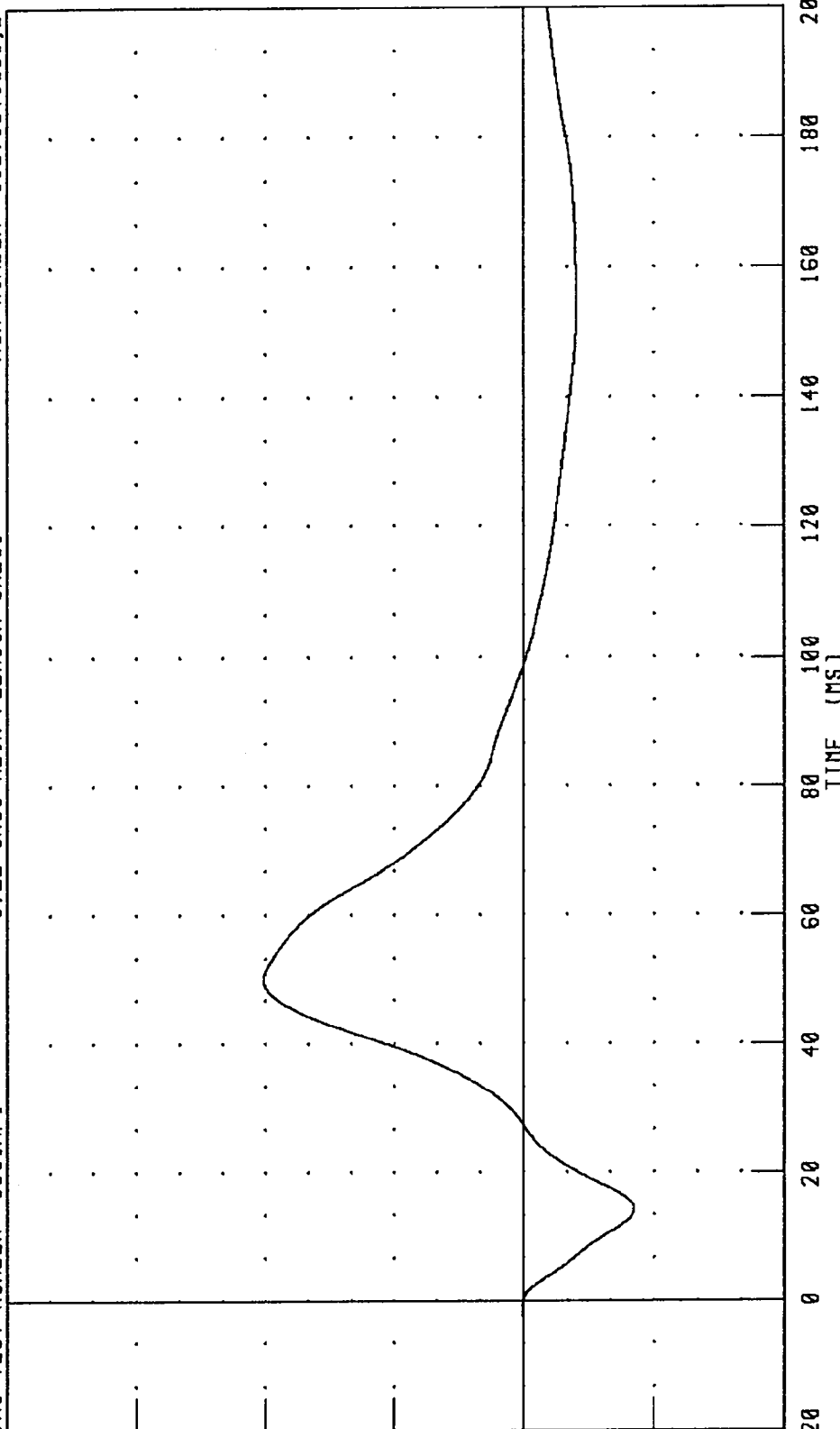
40

0

-40

-80

TORQUE (N·M)



TIME (MS)

200

180

160

140

120

100

80

60

40

20

0

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

FILTER: CH. CLASS 60

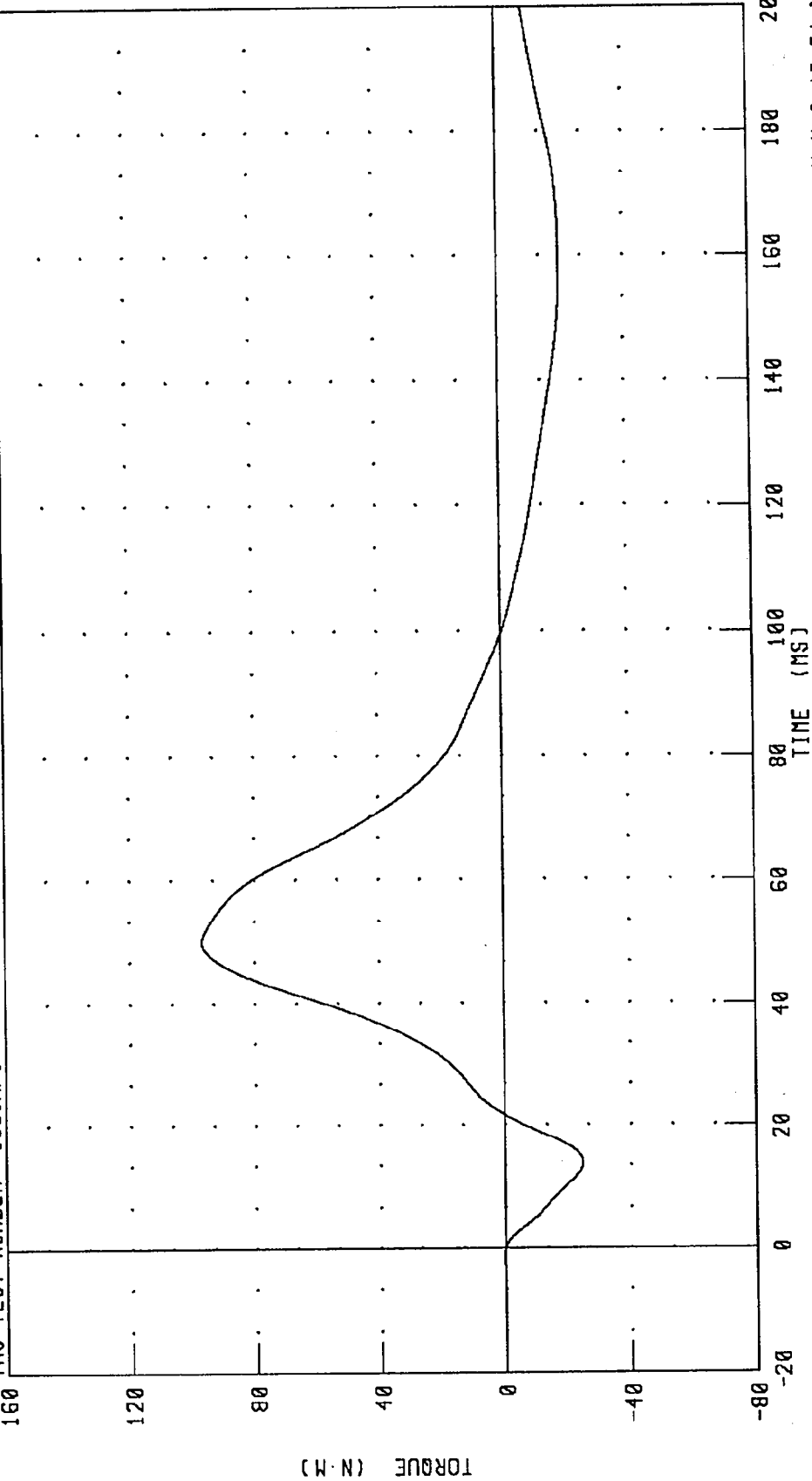
CHANNEL: NEKYM

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

TRC TEST NUMBER: 35CINF1

572E SN35 NECK FLEXION CAL01

RUN NUMBER: 032796.0900;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

Chris Middelt

RUN NUMBER: 071195.0855;1

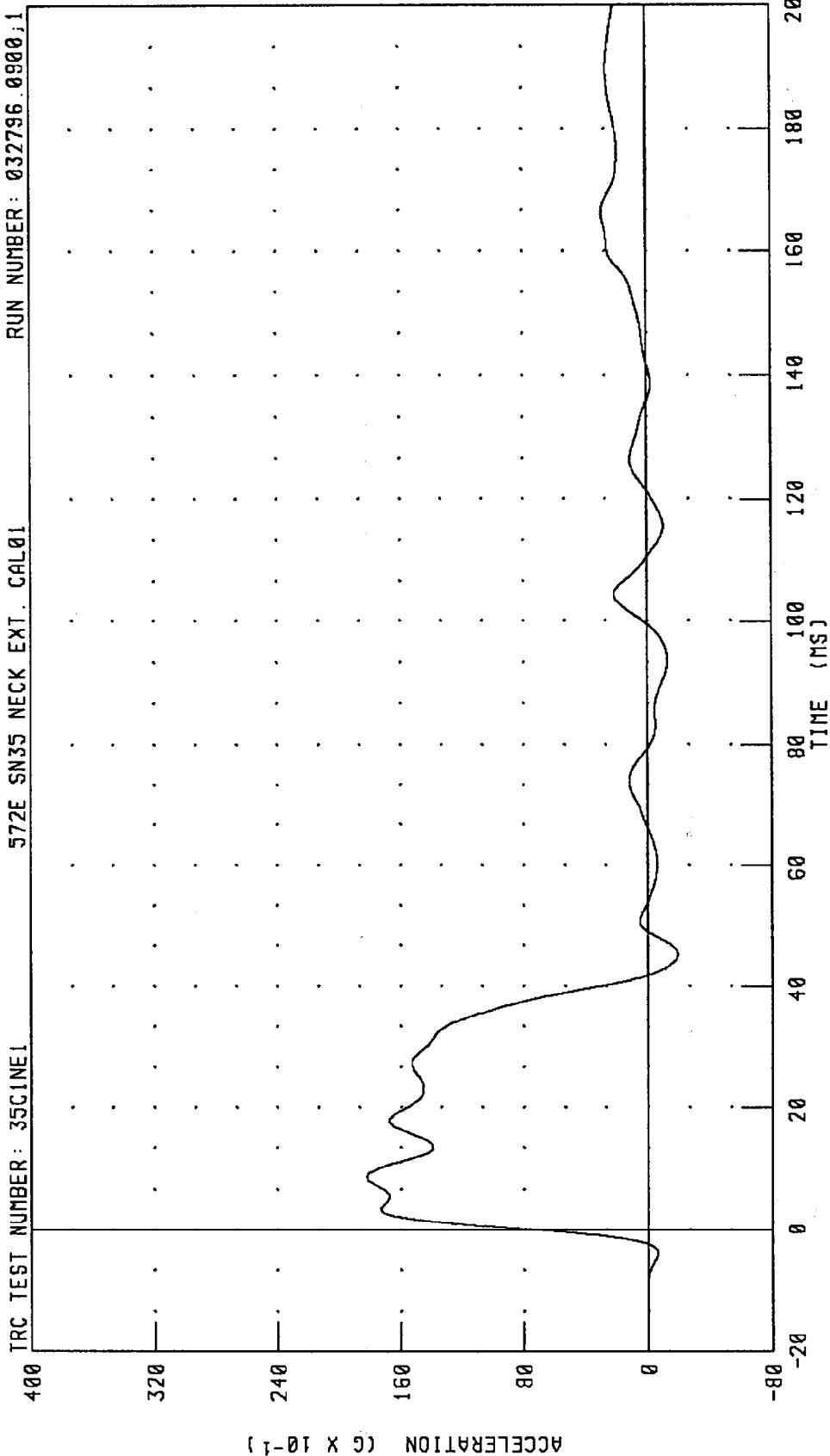
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 35C1NE1

572E SN35 NECK EXT. CAL01

RUN NUMBER: 032796.0900,1



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

CHANNEL: PENXG FILTER: CH. CLASS 60

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 (°)

0

20

40

60

80

100

120

140

160

180

200

TIME (MS)

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

CHANNEL: BETA

FILTER: CH. CLASS 60

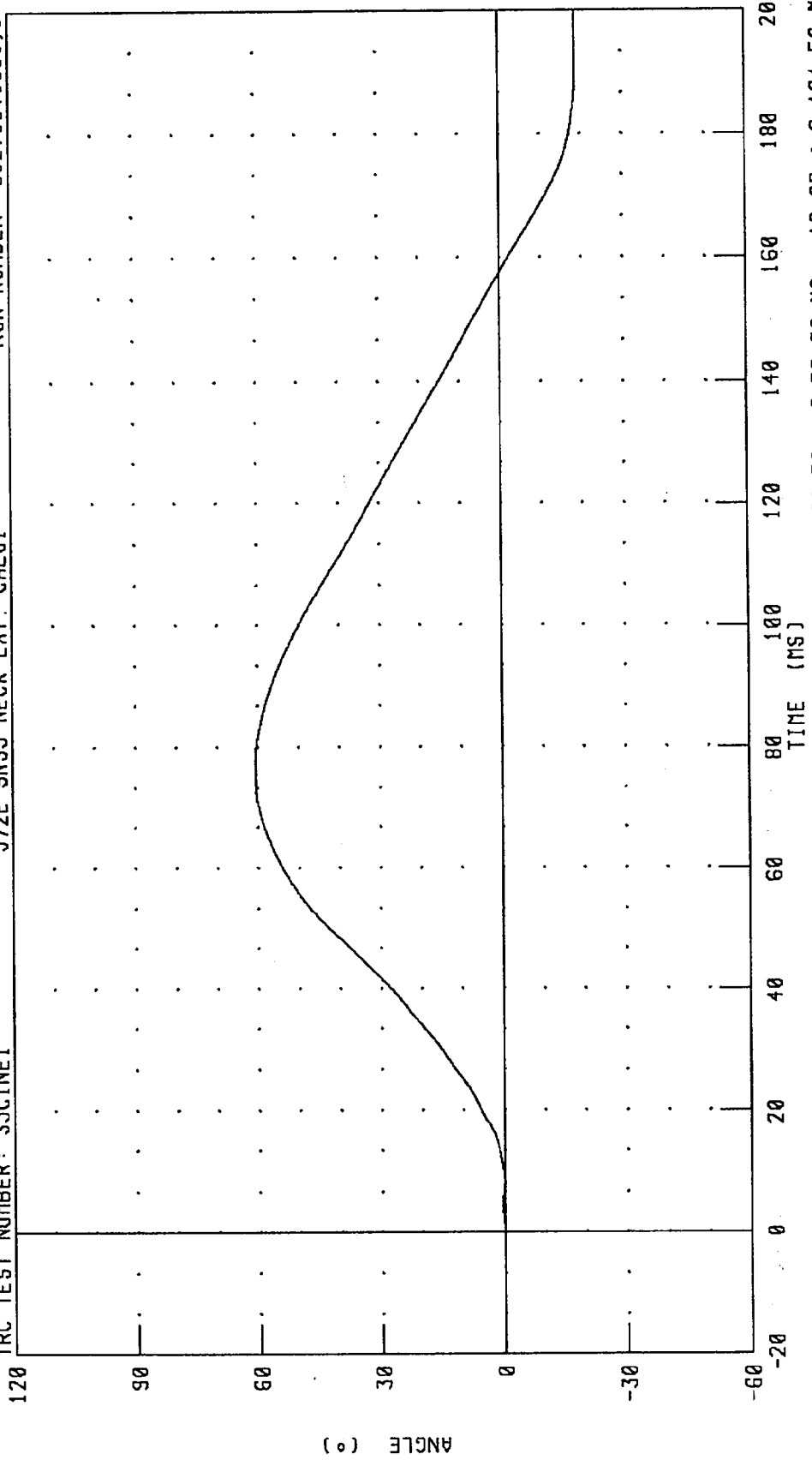
RUN NUMBER: 032796.0900;1

960224

C-53

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

TRC TEST NUMBER: 35CINE1 572E SN35 NECK EXT. CAL01 RUN NUMBER: 032796.0900;1



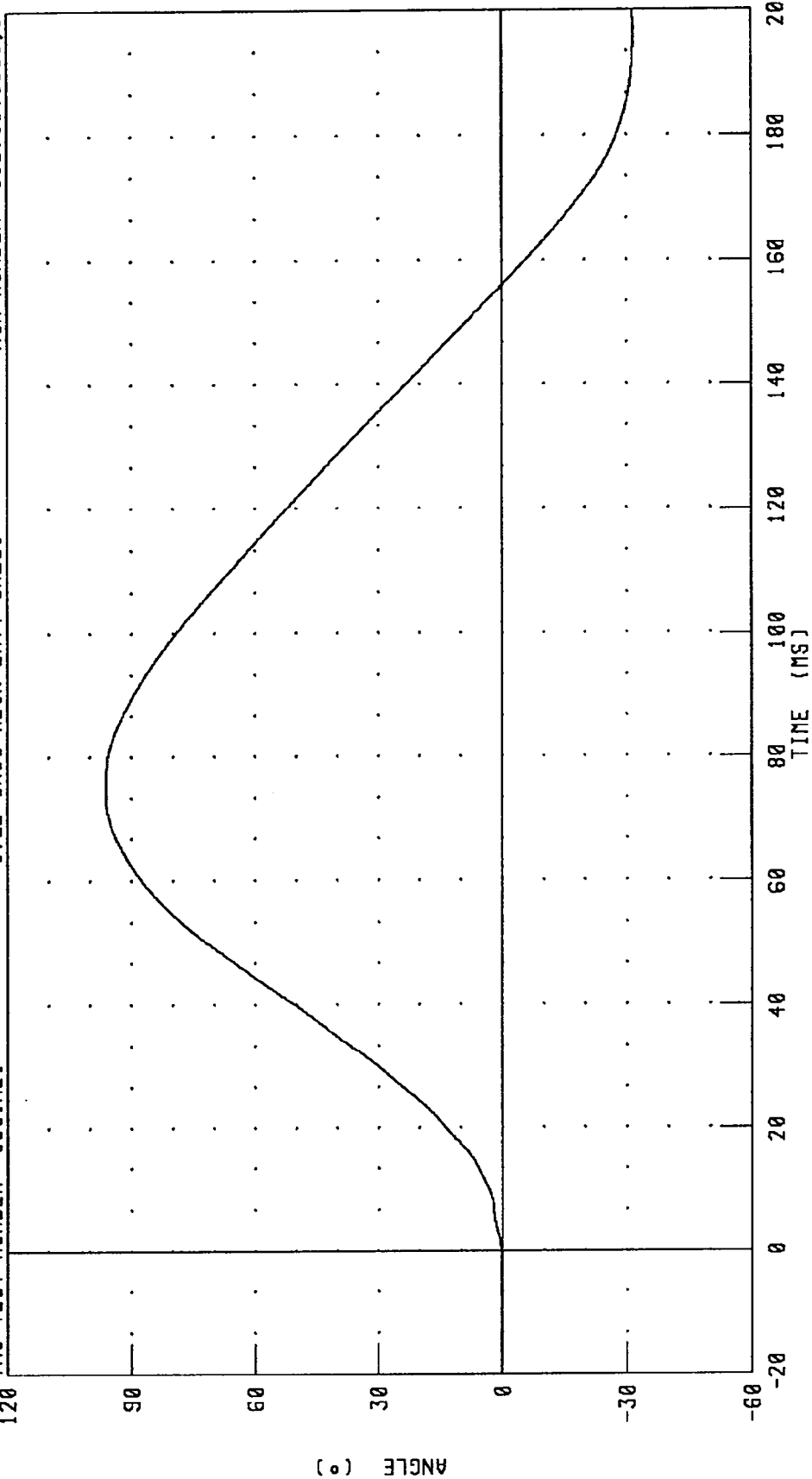
CHANNEL: THETA FILTER: CH. CLASS 60

TOTAL ROTATION

170 TRC TEST NUMBER: 35C1NE1

572E SN35 NECK EXT. CALØ1

RUN NUMBER: 032796.0900;1



CHANNEL: TOTAN FILTER: CH. CLASS 60

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

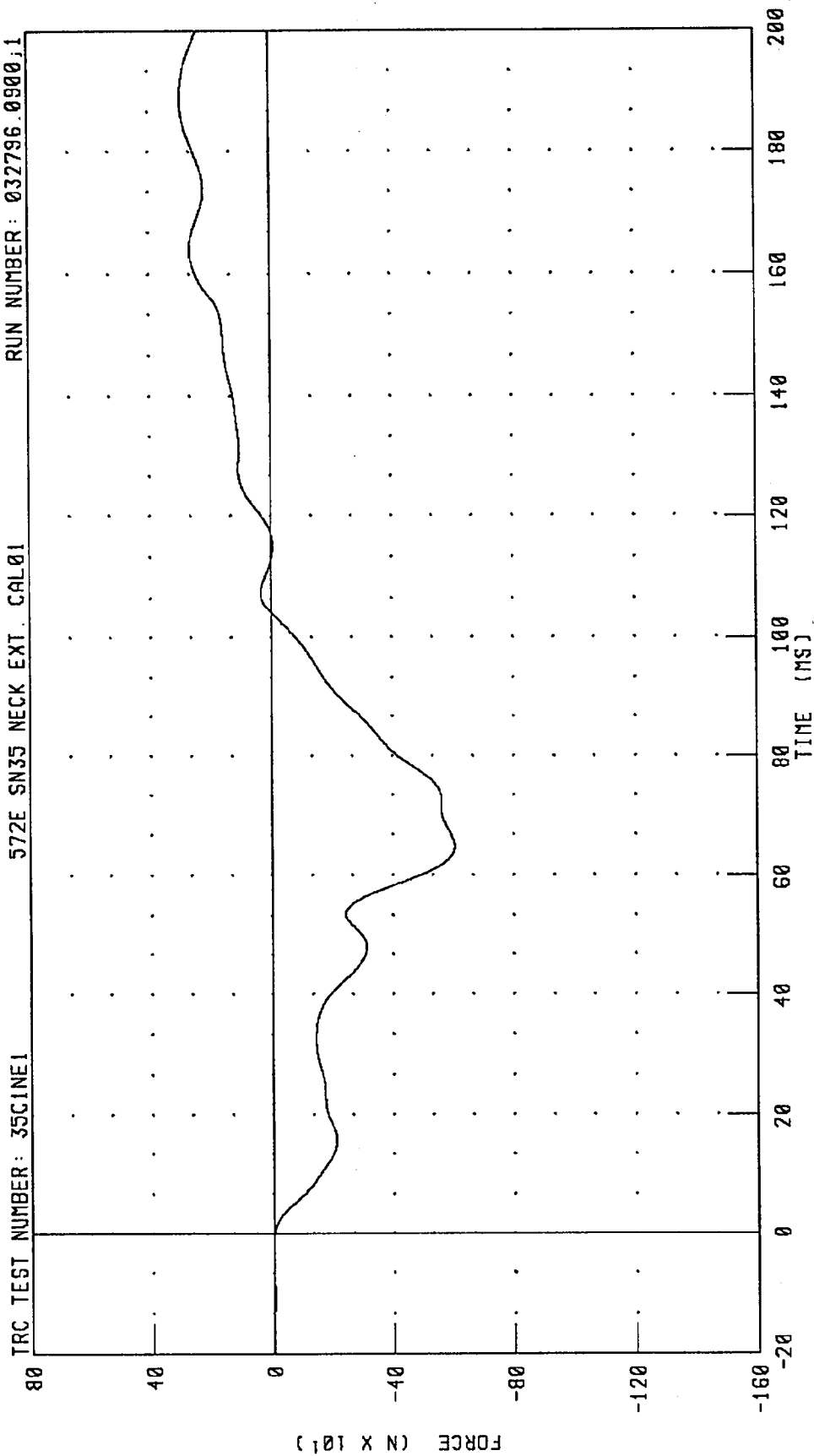
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 35CINE1

572E SN35 NECK EXT. CAL01

RUN NUMBER: 032796.0900,1



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

CHANNEL: NEKXF FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

IRC TEST NUMBER: 35C1NE1

572E SN35 NECK EXT. CAL01

RUN NUMBER: 032796.0900;1

80

40

0

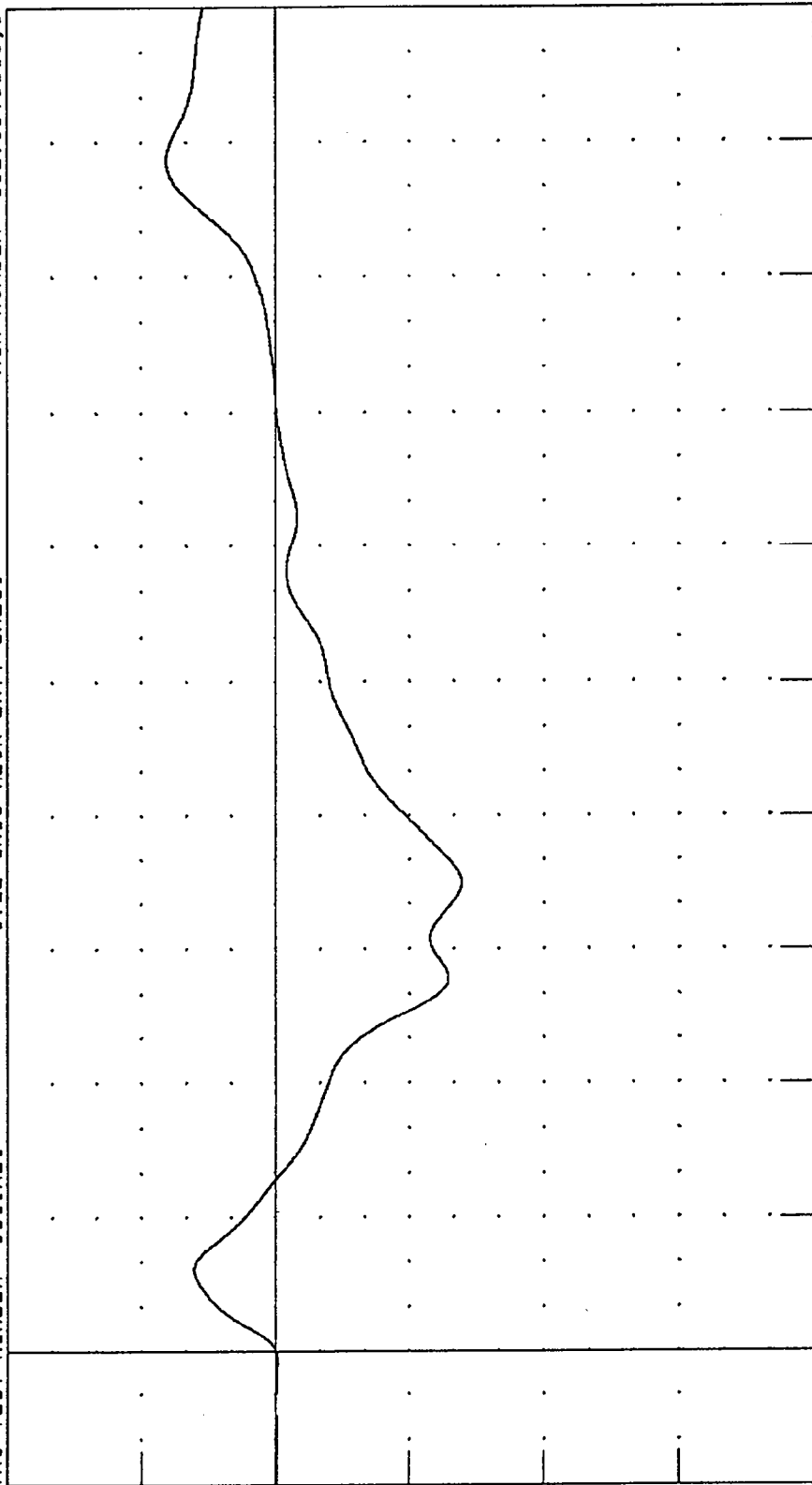
-40

-80

-120

-160

TORQUE (N·M)



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

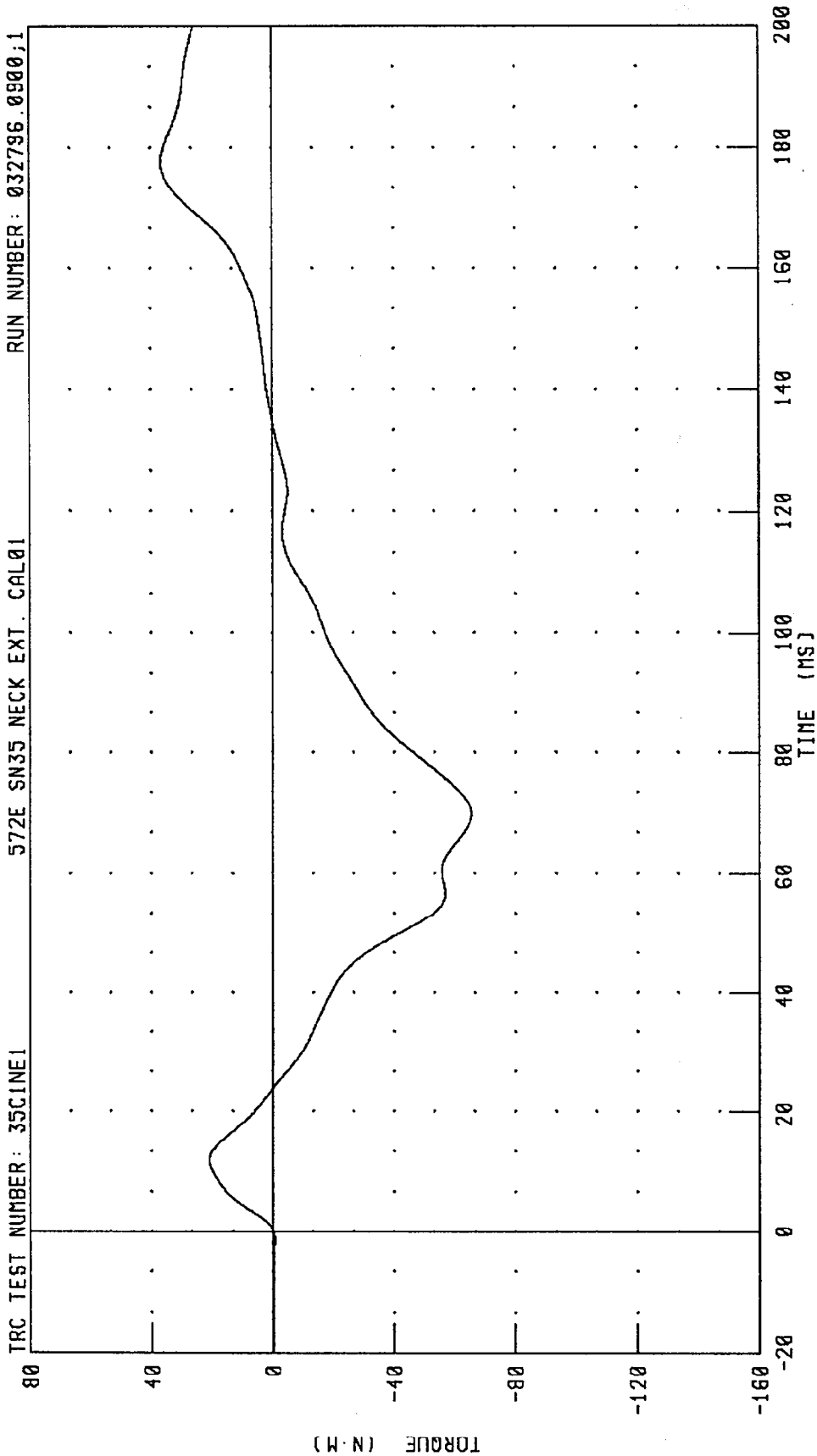
CHANNEL: NEKYM FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 35C1NE1

572E SN35 NECK EXT. CAL01

RUN NUMBER: 032796.0900;1



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

FILTER: CH. CLASS 60

CHANNEL: NEK0M

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. Middel

RUN NUMBER: 071195.1433;1

PART 572-E HYBRID III THORAX CALIBRATION
 PENDULUM DECELERATION

RUN NUMBER: 032796.0900;1

572E SN35 H.S. THORAX CAL01

TRC TEST NUMBER: 35C1TH1

50

40

30

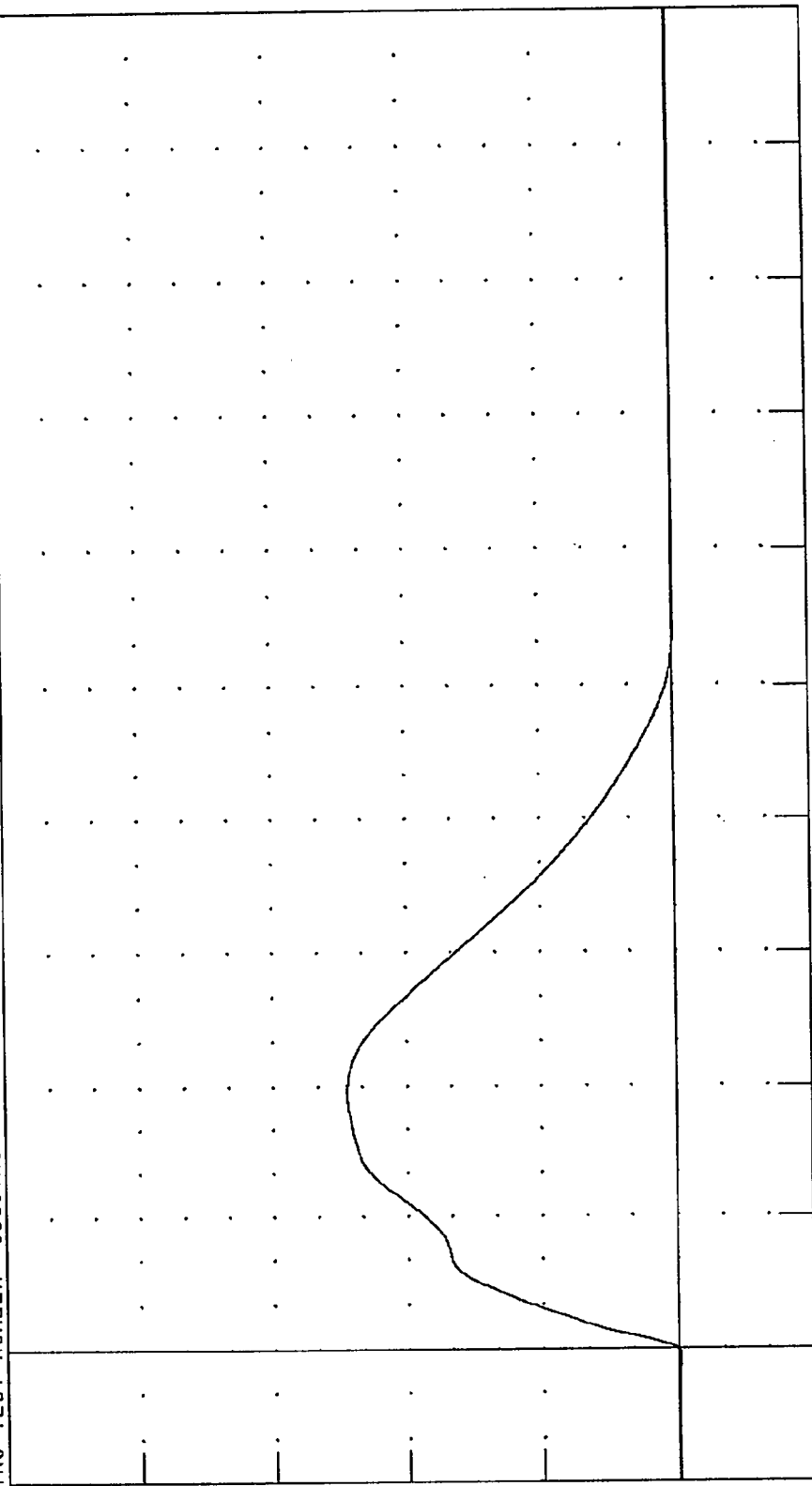
20

10

0

-10

ACCELERATION (G)



TIME (MS)

100

90

80

70

60

50

40

30

20

10

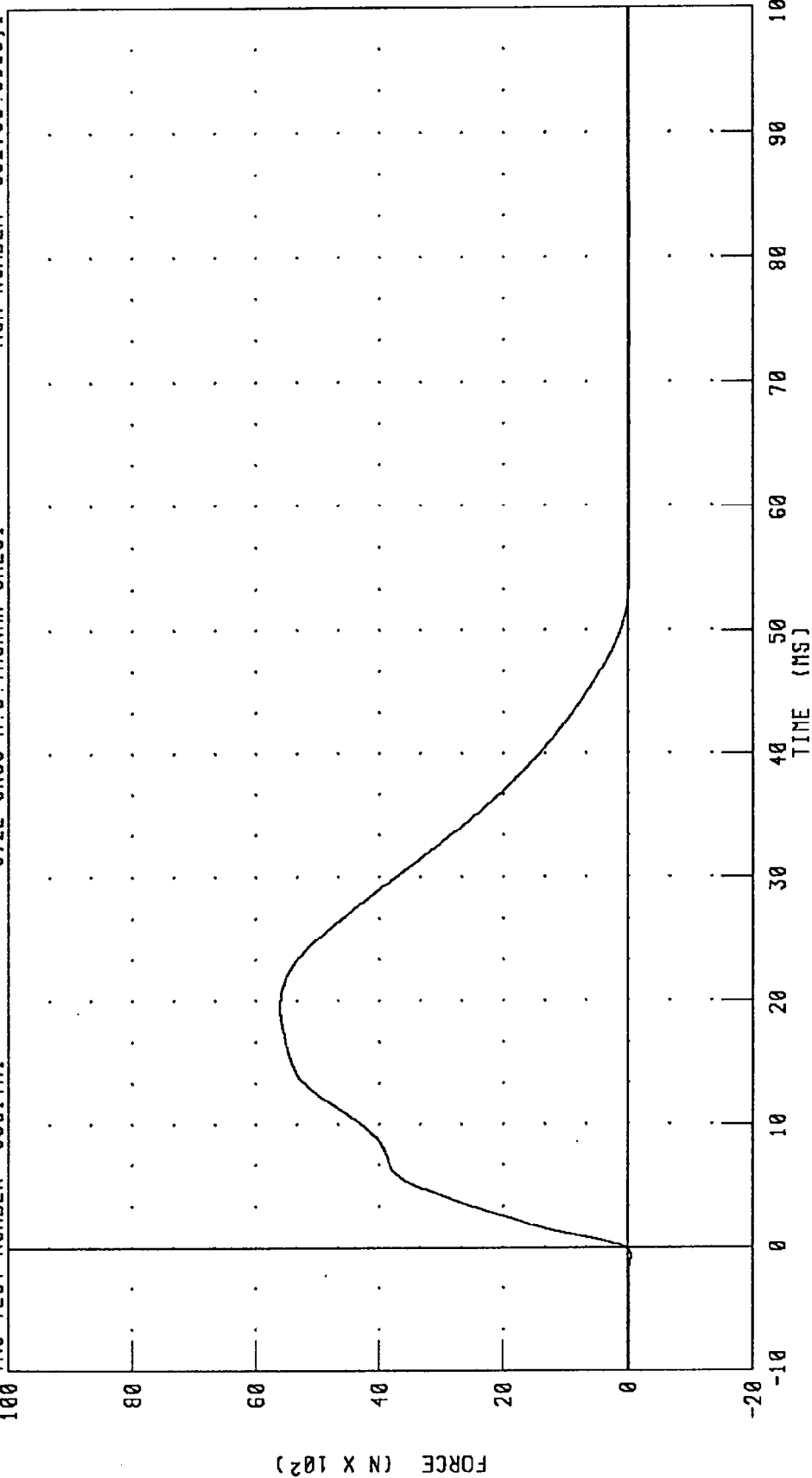
0

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

CHANNEL: PENXG FILTER: CH. CLASS 180

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM FORCE

IRC TEST NUMBER: 35C1TH1 572E SN35 H.S. THORAX CAL01 RUN NUMBER: 032796.0900;1



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

CHANNEL: PENXF FILTER: CH. CLASS 180

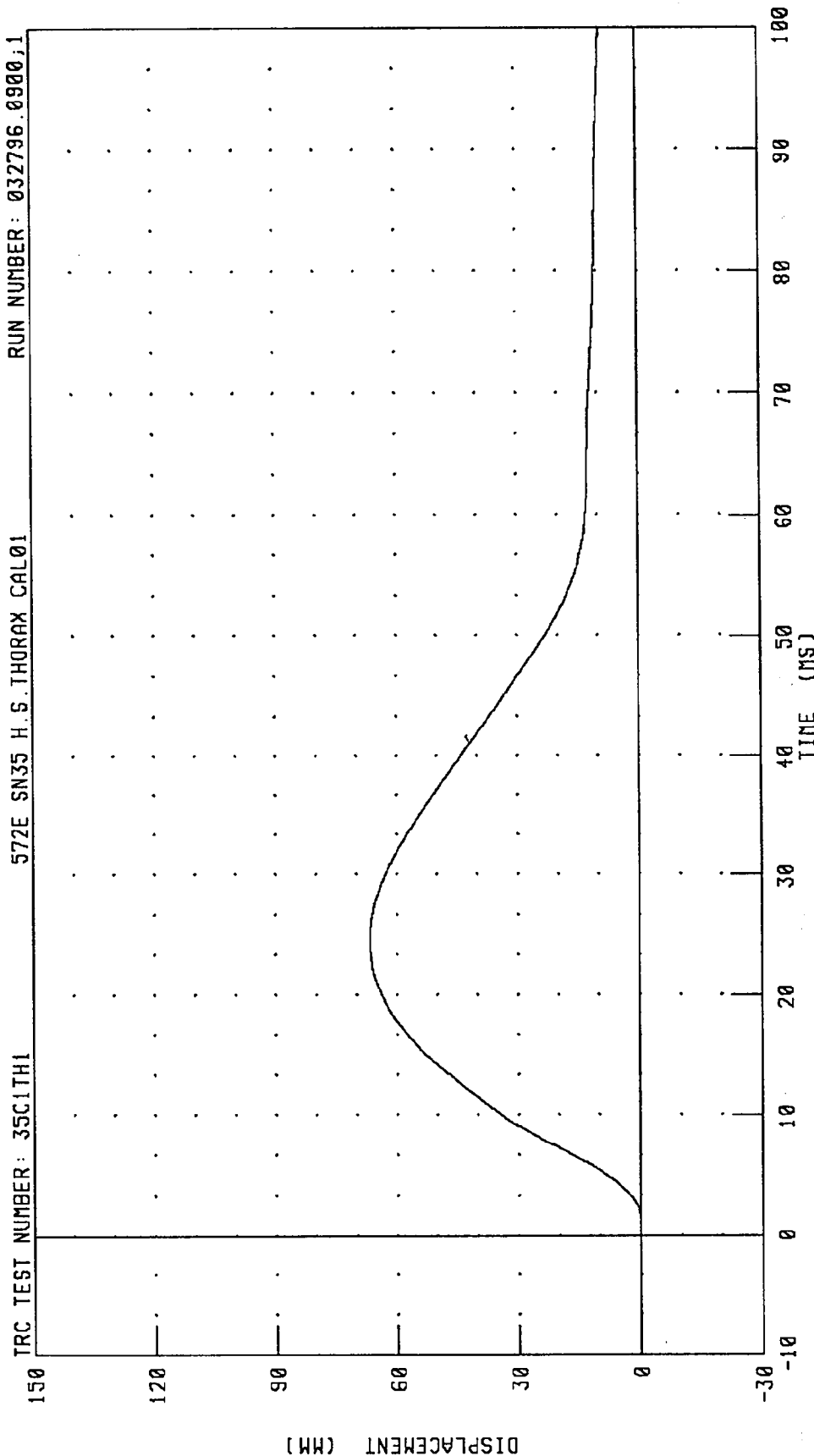
PART 572-E HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

TRC TEST NUMBER: 35C1TH1

572E SN35 H.S.THORAX CAL01

RUN NUMBER: 032796.0900;1



CHANNEL: CSTXD FILTER: CH. CLASS 180

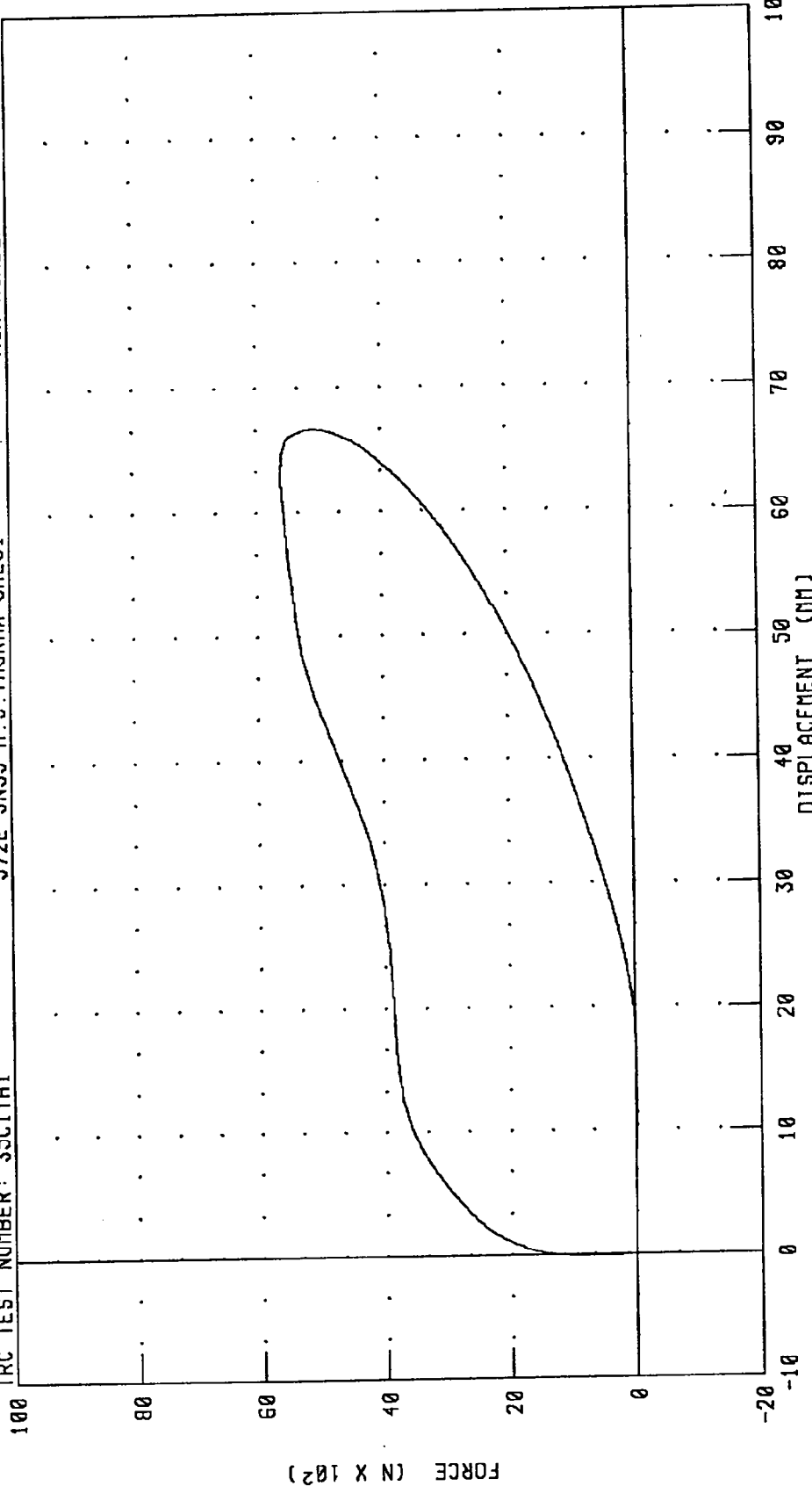
PEAK DATA: 66.71 MM @ 24.64 MS; -0.05 MM @ 0.96 MS

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

TRC TEST NUMBER: 35C1TH1

572E SN35 H.S. THORAX CAL01

RUN NUMBER: 032796.0900;1



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

FILTER: CH. CLASS 180
CH. CLASS 180

CHANNEL: CSTXD
PENXF

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. Middel

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: 032796.0900.3

150

120

90

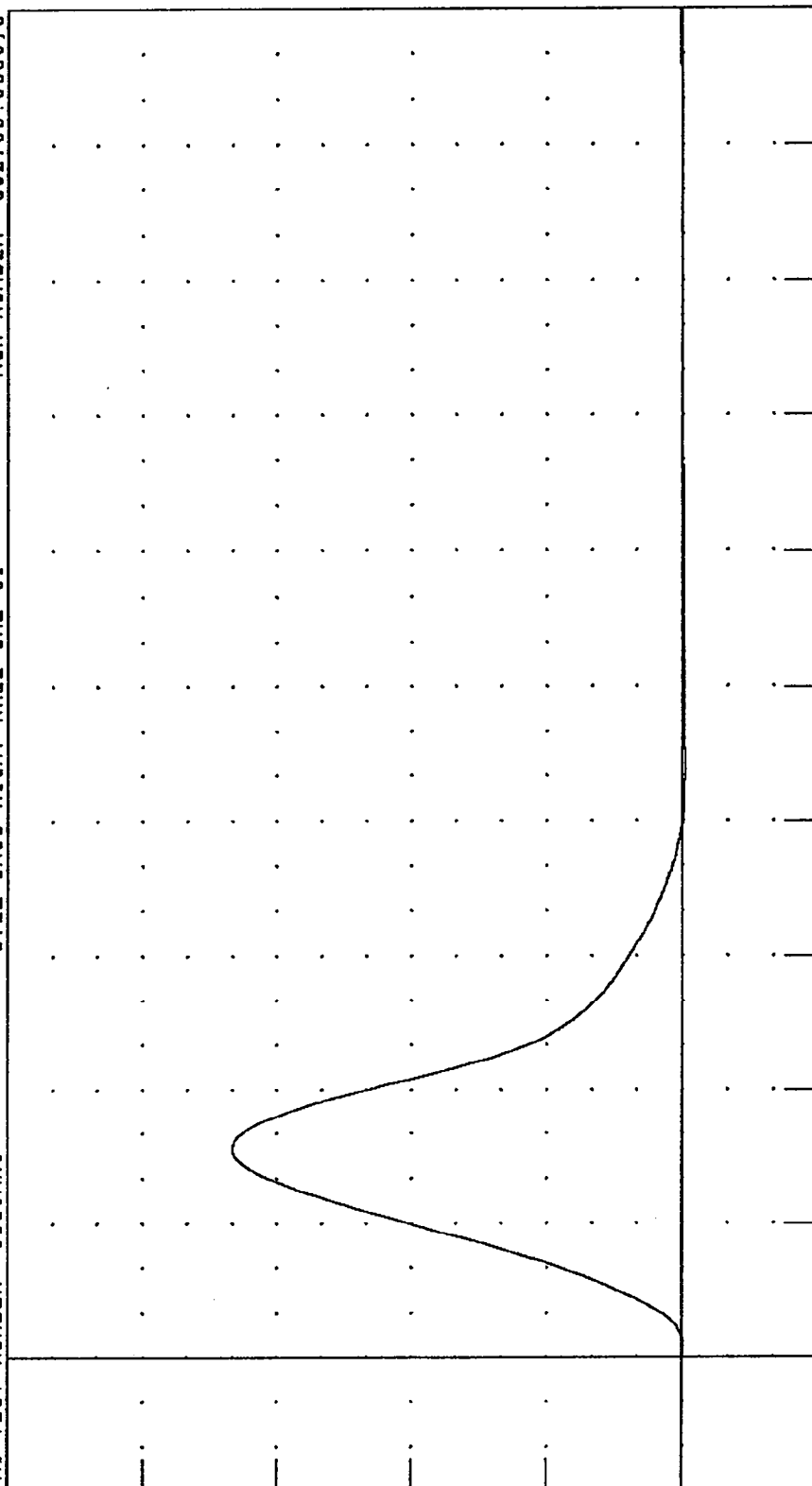
60

30

0

-30

ACCELERATION (G)



TIME (MS X 10⁻¹)

200

180

160

140

120

100

80

60

40

20

0

-20

CHANNEL: PENXG

FILTER: CH. CLASS 600

PEAK DATA:

100.02 G @ 3.12 MS; -0.64 G @ 8.88 MS

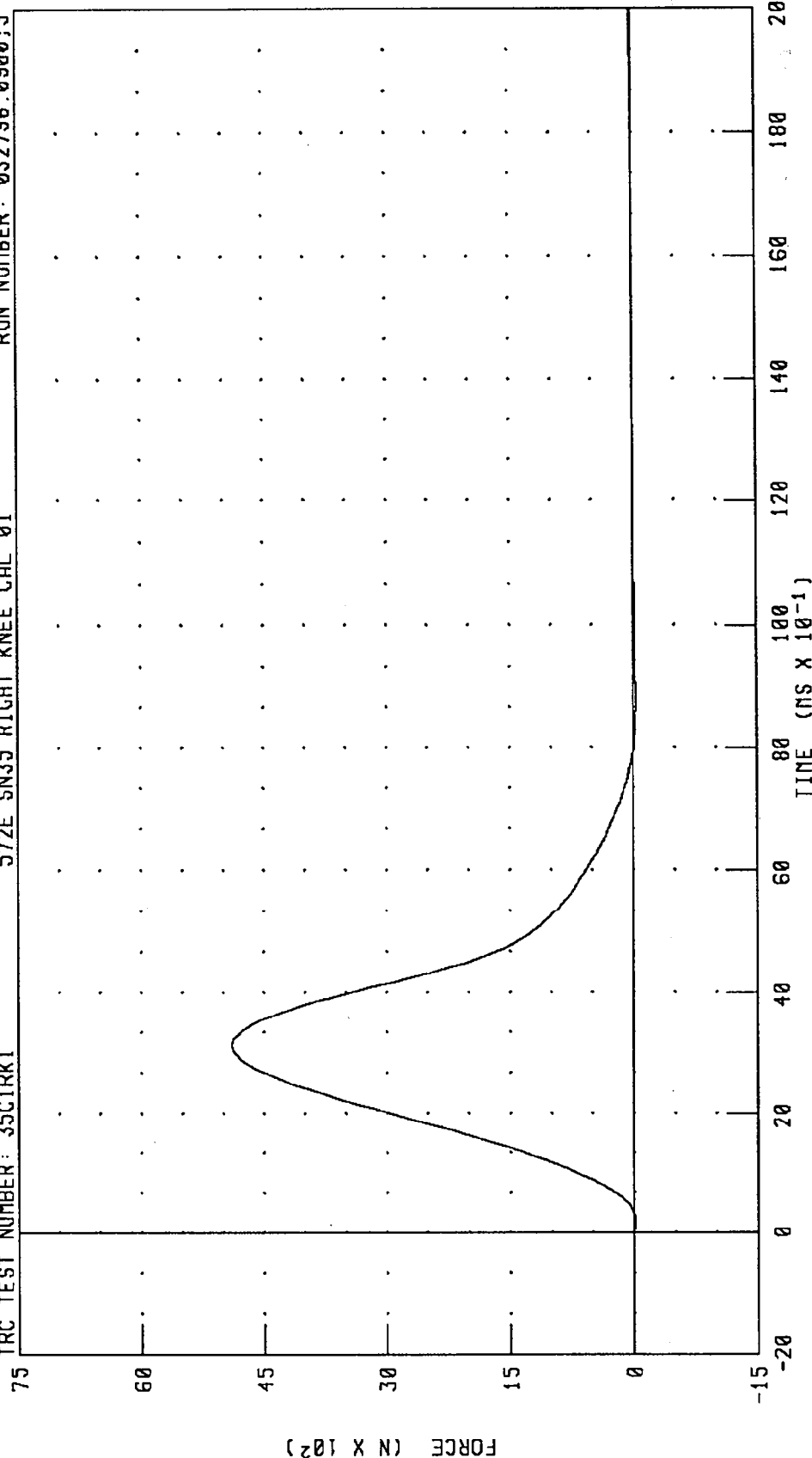
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 35CIRK1

572E SN35 RIGHT KNEE CAL 01

RUN NUMBER: 032796.0900.3



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

Chas. Middleton

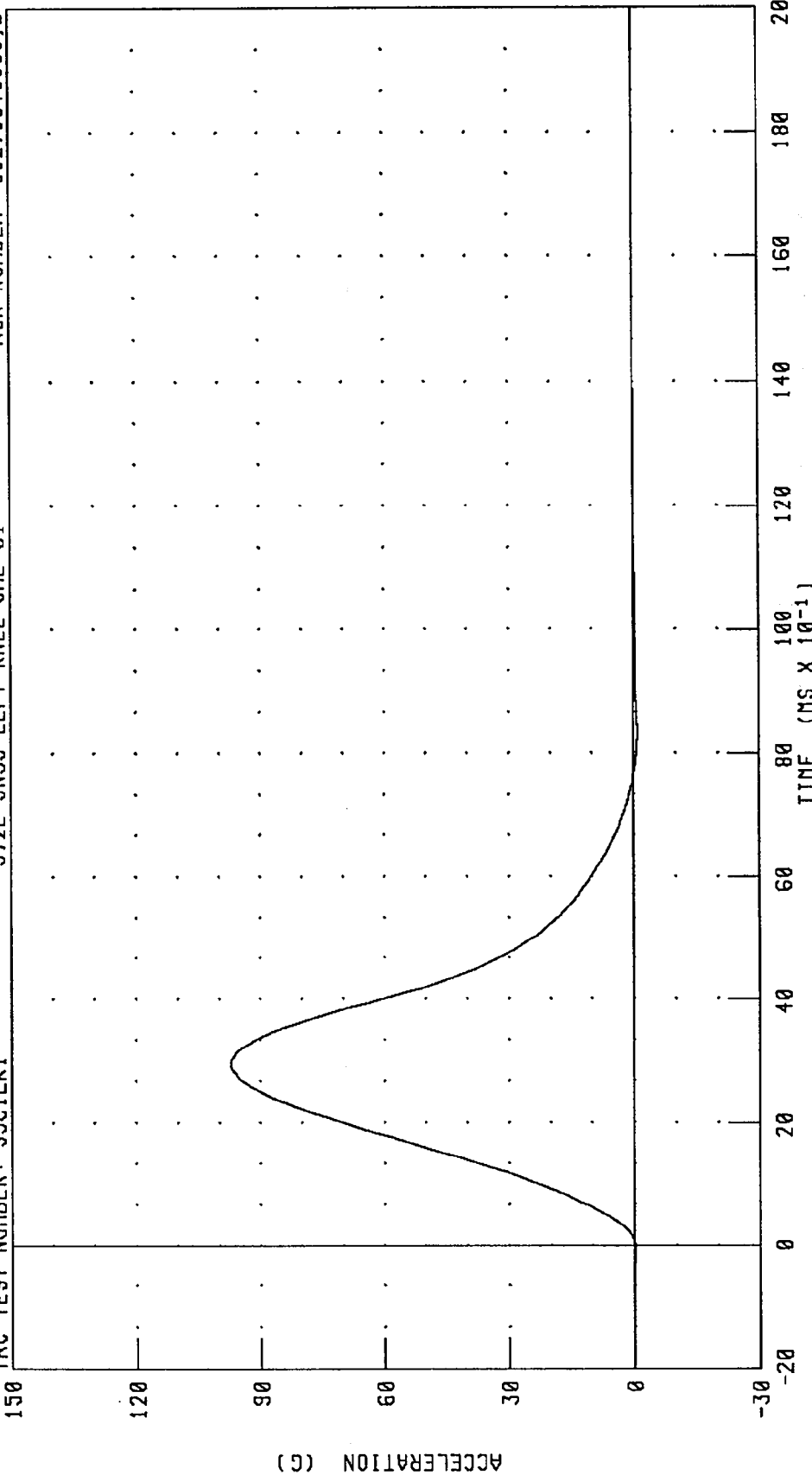
RUN NUMBER: 071195.1251;2

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: 032796.0900.2



PEAK DATA: 97.04 G @ 2.95 MS; -0.87 G @ 8.32 MS

CHANNEL: PENXG FILTER: CH. CLASS 600

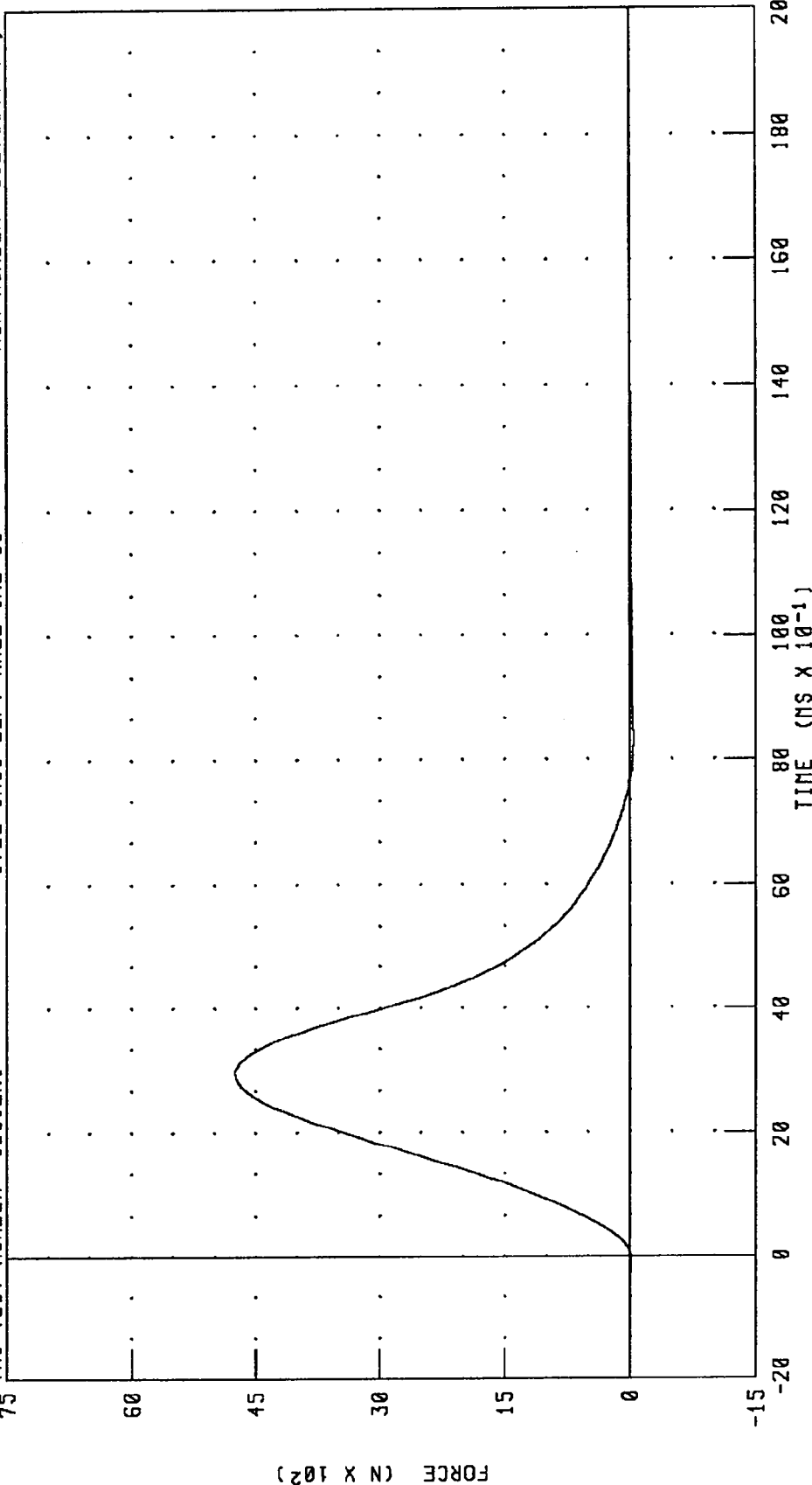
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 35C1LK1

572E SN35 LEFT KNEE CAL 01

RUN NUMBER: 032796.0900;2



CHANNEL: PENXF FILTER: CH. CLASS 600

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

Appendix D

Miscellaneous Test Information

Sign Convention
NHTSA Data Tape Reference Guide

Accelerometers:

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

Potentiometers:

+Chest longitudinal deflection: Outward
+Chest lateral deflection: Leftward
+Seat belt displacement: Outward
+Seat belt extension: Elongation
+Knee slider displacement: Distance between femur and tibia

increased

(in relation to a seated dummy)

Load cells:

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

Neck load cells:

+X force: Head pushed forward
+y force: Head pushed leftward
+Z force: Head pulled upward (tension on neck)
+X moment: Right ear rotating toward right shoulder
+Y moment: Chin rotating toward chest
+Z moment: Chin rotating toward left shoulder

Tibia load cells:

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

Frequency Response Classes

SAE J211 OCT88

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