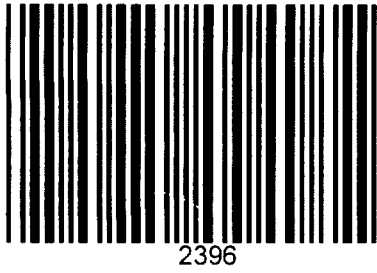


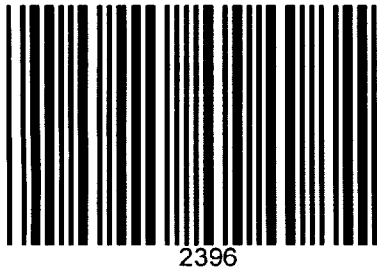
2396

1710

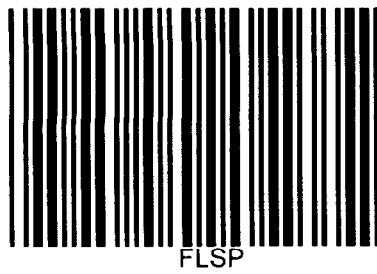
1st Bar Code = 6.70 cpi, 1.25in high, 2:1 ratio;
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2nd Bar Code =6.70 cpi, 1.25in high, 2:1 ratio;
x=1, dx=6.5; y=5 dy=1.25



2396



2396



V2396



U.S. Department
of Transportation

**National Highway
Traffic Safety
Administration**



DOT HS 808 359

March 1996

Final Report

Reducing Heavy Truck Aggressiveness Moving Heavy Truck into a 1987 Ford Taurus 4-Door Sedan at 91.9 kph

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16. Abstract This report documents a crash test that was conducted for research and development in support of reducing heavy truck aggressiveness. This test was conducted with a 1987 Ford Taurus 4-door sedan, VIN 1FABP5245HG279598, at Transportation Research Center Inc. on March 14, 1995. The test vehicle was impacted on the left front of the vehicle by the heavy truck. The struck vehicle contained ten (10) accelerometers and one (1) instrumented Hybrid III driver dummy.			
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METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km

AREA				
in ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
	acres	0.4	hectares	ha

MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t

VOLUME				
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft ³	cubic feet	0.03	cubic meters	m ³
yd ³	cubic yards	0.76	cubic meters	m ³

TEMPERATURE (exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C
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Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi

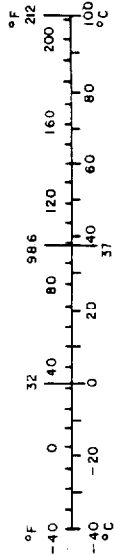
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares (10,000 m ²)	2.5	acres	

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
----	---------------------	-------------------	------------------------	----



* 1 in = 2.54 cm exactly. For other exact conversions and more detailed tables, see NBS Monograph 160, 1975, and NBS Monograph 161, 1975. Units of Weights and Measures, Page 52-55, SI Catalog No. C13.10-280.

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Section 1.0

Purpose and Test Summary

Purpose and Test Summary

This test was conducted as research in support of reducing heavy truck aggressiveness. This test was conducted on March 14, 1995.

The test vehicle, a 1987 Ford Taurus 4-door sedan, was equipped with a 3.0-liter, 6-cylinder, transverse gasoline engine and a 3-speed automatic transmission. The test weight of the vehicle was 1579 kg. The vehicle was instrumented with six (6) longitudinal axis accelerometers, three (3) lateral axis accelerometers, one (1) vertical axis accelerometer and two (2) seat belt force load cells. One (1) Part 572E dummy was seated in the left front outboard seating position according to the dummy placement procedure specified in Appendix B and Optional Appendix C of Laboratory Procedure TP-208-09. The dummy was instrumented in the head, chest, and pelvis with longitudinal, lateral, and vertical accelerometers. The dummy was also instrumented with two (2) femur load cells, and a chest deflection potentiometer.

The stationary vehicle was impacted in the left front at 0 degrees by a moving heavy truck at 91.9 kph. The intended impact engagement was the left front 50% of the car with the left front of the truck.

The moving heavy truck's test weight was 9793 kg. The truck was equipped with a standard bumper extended 16 inches forward of the standard location. The truck was instrumented with two (2) longitudinal and lateral axis accelerometers and two (2) vertical axis accelerometers.

The dummy's head injury criterion, HIC, was 872. The dummy's chest deceleration with 3 milliseconds minimum duration was 63.8 g. The dummy's maximum chest deflection was 31.4 mm. The dummy's maximum left femur force was 5856 N. The dummy's maximum right femur force was 15,025 N.

The vehicle, dummy, and heavy truck data were multiplexed and recorded on a 14-channel analog tape deck. The analog data was digitally sampled at 12,500 samples per second. The data was digitally filtered as per SAE J211 OCT88.

The test was filmed by one (1) real-time panning motion picture camera and five (5) high-speed motion picture cameras operating at approximately 1000 frames per second.

Section 2.0 contains the vehicle, dummy, truck, and test data. Appendix A contains the pre- and post-test still photographs. Appendix B contains the final test data plots. Appendix C contains dummy certification information. Appendix D contains miscellaneous test information.

Data Acquisition Explanations

The vehicle's engine bottom X-axis acceleration data channel, ENGXG2, stopped recording data after approximately 89 milliseconds because the device's cable was cut by vehicle crush.

The driver dummy's right femur force data channel, RFMF1, exceeded its device's rated full scale output at approximately 66 milliseconds.

Section 2.0

Vehicle, Dummy, Truck and Test Data

Table 1 Crash Test Summary

Test type:	Heavy Truck into Stationary Vehicle
Test date:	03/14/95
Test time:	1321
Ambient temperature:	21° C
Vehicle:	1987 Ford Taurus 4-door sedan
Vehicle test weight:	1579 kg
Impact angle: ¹	0°
Impact velocity: ²	Primary = 91.9 kph Secondary = 91.9 kph
Maximum static crush:	257 mm
Dummies:	Driver #043
Type:	Part 572 E
Location:	Left front
Restraint:	3-point unbelt
Number of data channels:	30
Number of cameras:	
High-speed	5
Real-time	1

¹ With respect to two track centerline.

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

Table 2 Test Vehicle Information

Vehicle manufacturer:	Ford Motor Company
Make/model:	Ford/Taurus
VIN:	1FABP5245HG279598
Model year:	1987
Body style:	4-door sedan
Color:	Red
Engine data:	
Type:	Transverse
Cylinders:	6
Displacement:	3.0-liter
Transmission data:	<u>3</u> Speed, <u> </u> Manual, <u>X</u> Automatic, <u>X</u> FWD, <u> </u> RWD, <u> </u> 4WD
Date vehicle received:	NA
Odometer reading:	14,727
Dealer's name and address:	NA

Accessories:

Power steering	Yes	Automatic transmission	Yes
Power brakes	Yes	Automatic speed control	Yes
Power seats	No	Tilting steering wheel	Yes
Power windows	No	Telescoping steering wheel	No
Tinted glass	Yes	Air conditioning	Yes
Radio	Yes	Anti-skid brake	No
Clock	No	Rear window defroster	Yes
Other	None		

Certification data from vehicle's label:

Vehicle manufactured by:	Ford Motor Company
Date of manufacture:	07/87
VIN:	1FABP5245HG279598
GVWR:	4595 lbs.
GAWR: Front:	2507 lbs.
Rear:	2133 lbs.

Table 2 Test Vehicle Information, Cont'd.

Tires on vehicle (mfr., line, size): Cooper, Cobra Radial G/T, P205/70SR14

Tire pressure with maximum capacity vehicle load: Front: 240 kPa
Rear: 240 kPa

Spare tire (mfr., line, size): None

Type of seats: Front: Bucket
Rear: Bench

Type of front seat backs: Manually adjustable

Maximum width: 1811 mm

Wheelbase: 2682 mm

Location of "Recommended Tire Pressure" label:

The label was located on the passenger's rear door jam.

Data from vehicle's "Recommended Tire Pressure" label:

Recommended tire size: P205/70SR14

Recommended cold tire pressure: Front: 35 psi
Rear: 35 psi

Seating capacity: Front: 2
Rear: 3
Total: 5

Cargo load: 900 lbs.

Test vehicle attitude:

Delivered attitude: LF 688 mm; RF 704 mm; LR 641 mm; RR 654 mm

Pre-test attitude: LF 690 mm; RF 702 mm; LR 582 mm; RR 590 mm

Post-test attitude: LF NA¹; RF 631 mm; LR 560 mm; RR 628 mm

¹ Left front fender destroyed during impact event.

Table 2 Test Vehicle Information, Cont'd.

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

Right front	450 kg	Right rear	237 kg
Left front	447 kg	Left rear	246 kg
Total front weight	897 kg	(65.0% of total vehicle weight)	
Total rear weight	483 kg	(35.0% of total vehicle weight)	
Total test weight	1380 kg		
Target test weight ¹	1581 kg		

Weight of test vehicle:

Right front	456 kg	Right rear	312 kg
Left front	475 kg	Left rear	336 kg
Total front weight	931 kg	(59.0% of total vehicle weight)	
Total rear weight	648 kg	(41.0% of total vehicle weight)	
Total test weight	1579 kg		

Weight of ballast secured in vehicle cargo area: None

Components removed to meet target test weight: None

CG rearward of front wheel centerline: 1080 mm

¹ The target test weight was established during Test 920507.

Table 3 Truck Information

Weight Distribution:

Front: 2656 kg

Rear: 7137 kg

Axle Spacing:

Front: 3835 mm

Rear: 1308 mm

Distance of C.G.
behind front axle: 3257 mm

Bumper Description: Stock truck bumper extended forward 406 mm

Truck Damage: The left portion of the bumper was pushed rearward and upward. Bumper was cracked where it is mounted to the truck frame bracket. Truck steering box was also broken.

Table 4 Post-Impact Data

Test number:	950314
Date of test:	03/14/95
Time of test:	1321
Type of test:	Heavy Truck into Stationary Vehicle
Impact angle: ¹	0°
Ambient temperature at impact area:	21° C
Temperature in occupant compartment:	21° C
Impact velocity:	
Primary	91.9 kph
Secondary	91.9 kph
Distance from heavy truck to vehicle:	
Entering trap	381 mm
Exiting trap	51 mm

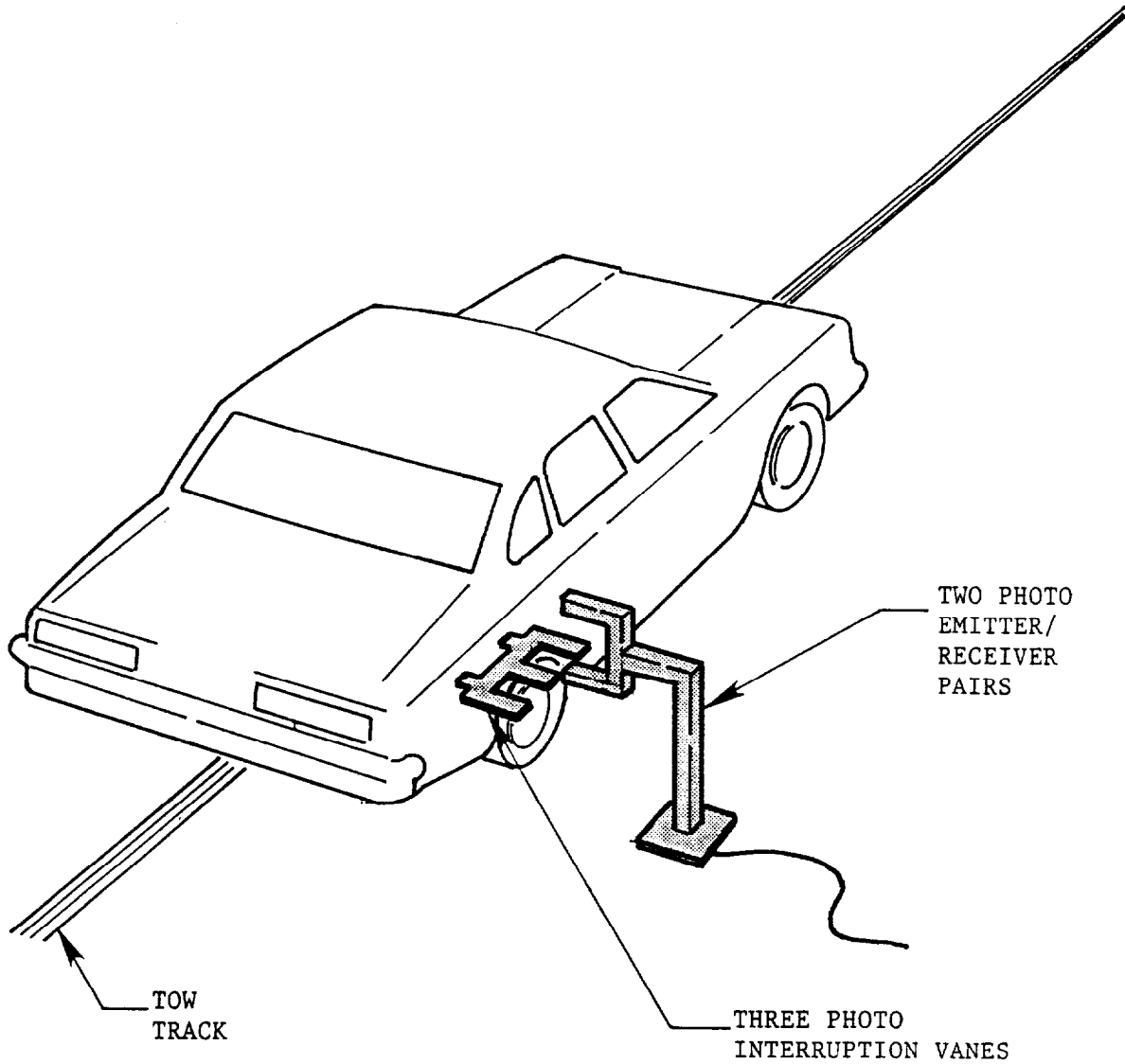
Test vehicle static crush:

Overall length of test vehicle:

Pre-test:	L	4628 mm;	C	4775 mm;	R	4633 mm
Post-test:	L	4420 mm;	C	4518 mm;	R	4642 mm
Total crush:	L	208 mm;	C	257 mm;	R	-9 mm
Average crush:	152 mm					

¹ As measured clockwise from the subject vehicle's front longitudinal centerline.

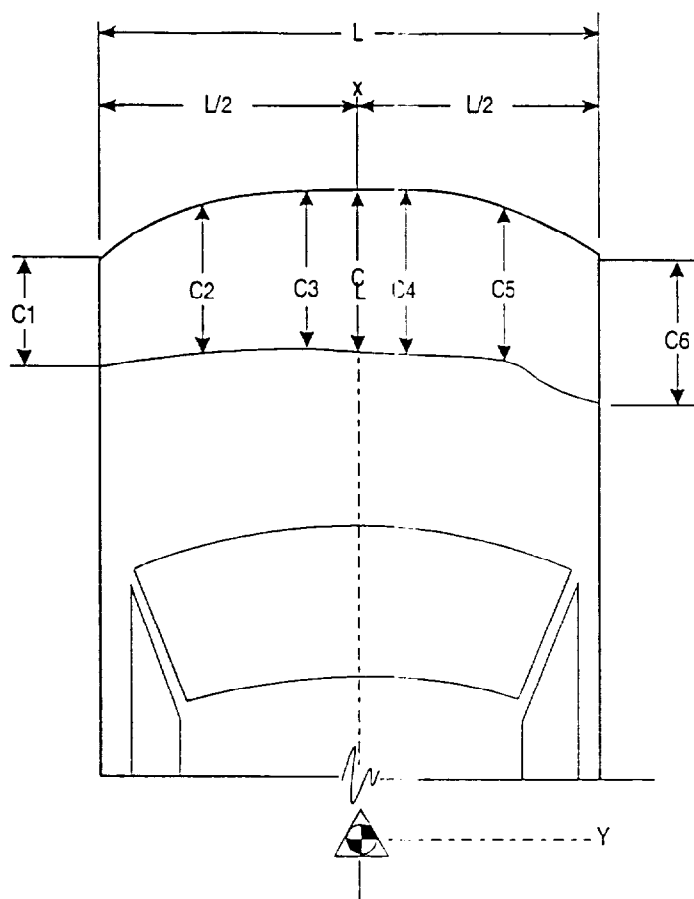
Figure 1 Impact Velocity Measurement System



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

The vanes have 305-millimeter spacing.

Figure 2 Vehicle Crush



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

Vehicle: 1987 Ford Taurus

	Pre-test	Post-test ¹	Crush
L	1523 mm		
C1	4628 mm	4420 mm	208 mm
C2	4715 mm	4461 mm	254 mm
C3	4757 mm	4509 mm	248 mm
C4	4763 mm	4547 mm	216 mm
C5	4715 mm	4598 mm	117 mm
C6	4633 mm	4642 mm	-9 mm
CL	4775 mm	4518 mm	257 mm

¹ Post-test measurements taken to plane of front bumper mounting flanges because the front bumper was destroyed during the impact event.

Figure 3 Pre-Test and Post-Test Measurement Points

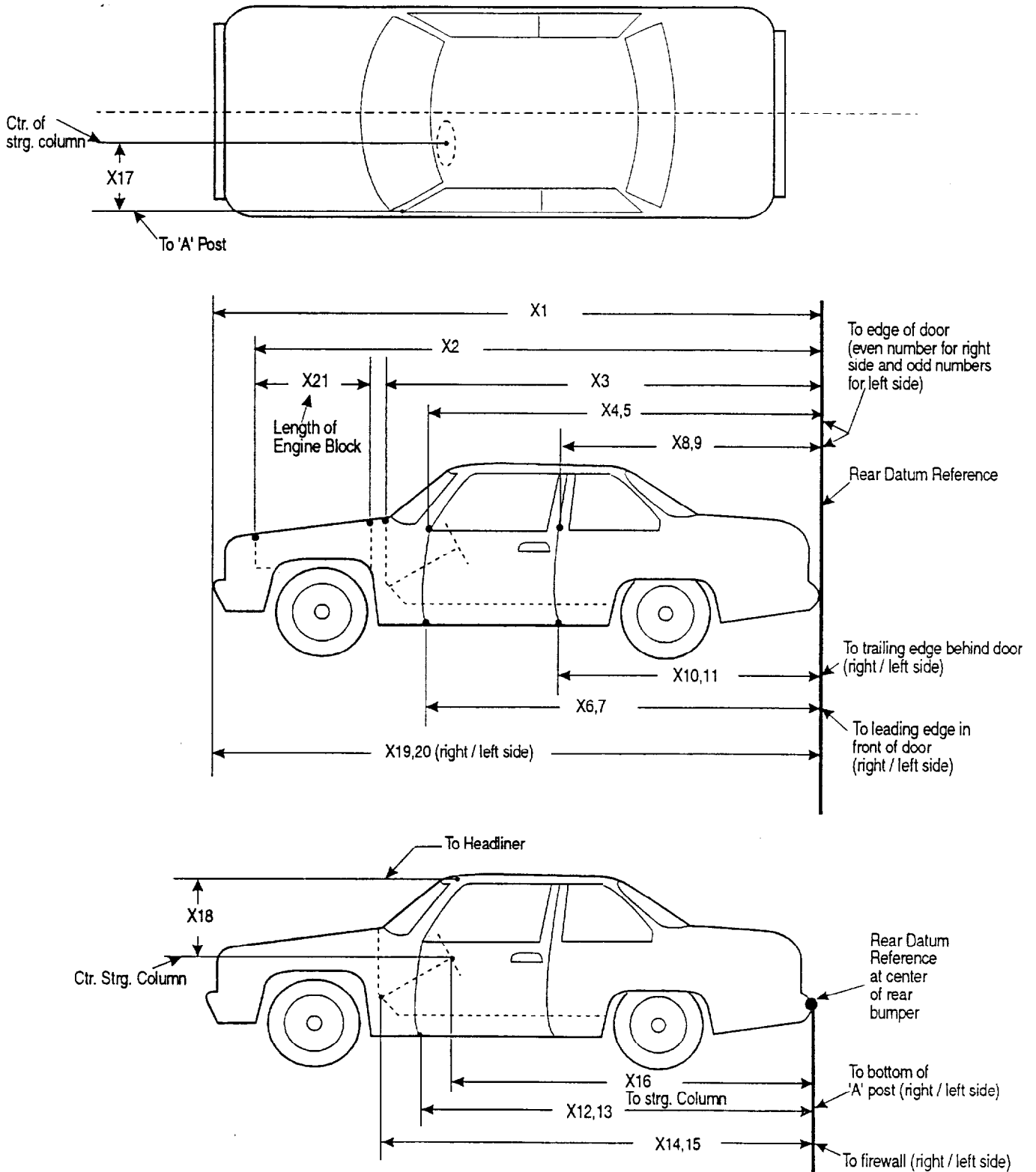
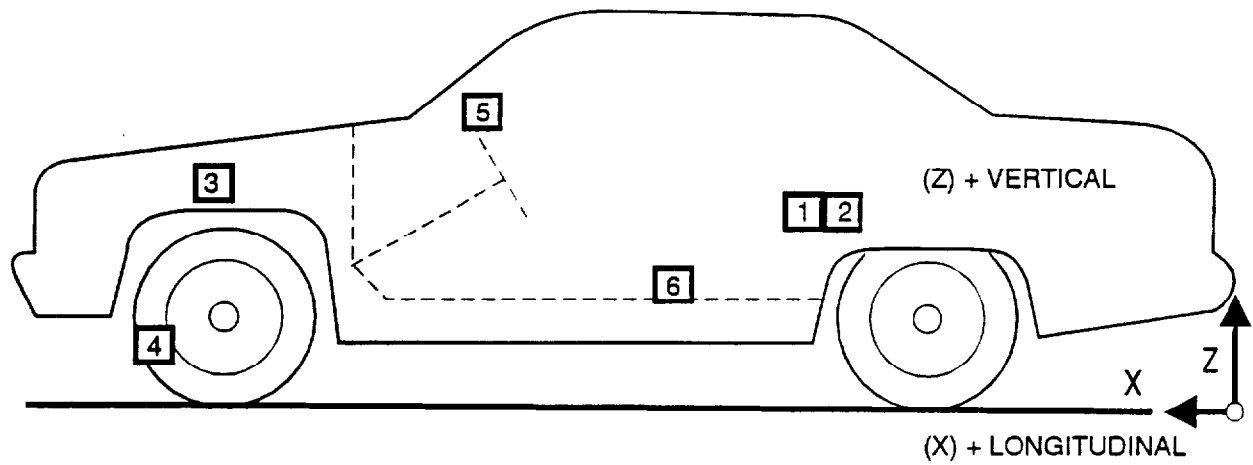


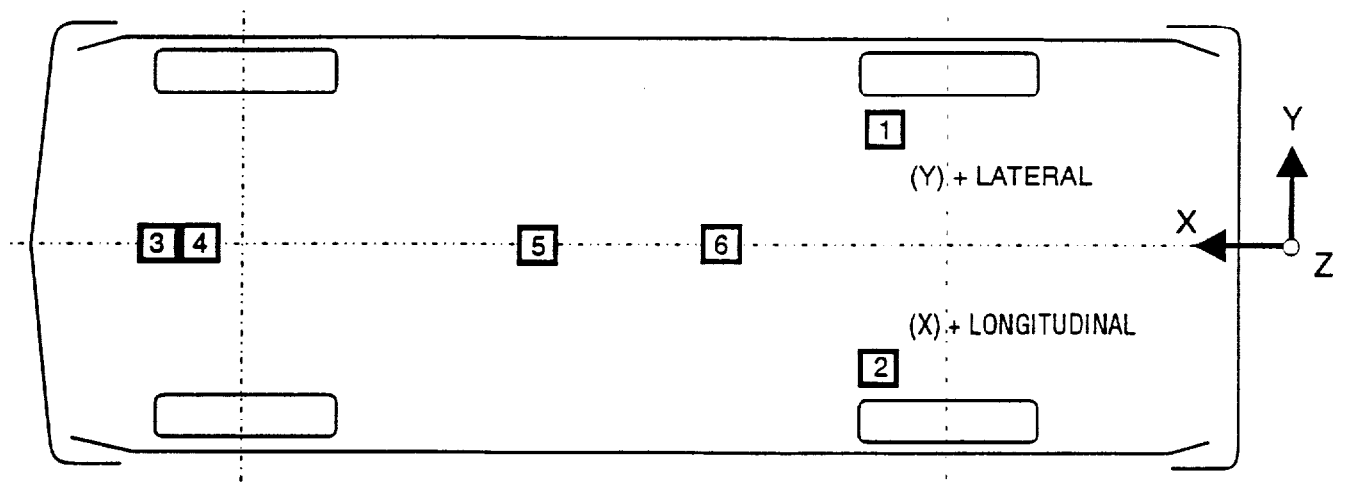
Table 5 Impacted Vehicle Measurements

<u>Vehicle Make/Model:</u> Ford/Taurus		<u>Test Number:</u> 950314					
No.	Type of measurement	Pre-test		Post-test		Diff.	
X1	Total length of vehicle at centerline	4775	mm	4518	mm	257	mm
X2	Rear surface of vehicle to front of engine block	4222	mm	4153	mm	69	mm
X3	Rear surface of vehicle to firewall	3594	mm	3356	mm	238	mm
X4	Rear surface of vehicle to upper leading edge of right door	3296	mm	3332	mm	-36	mm
X5	Rear surface of vehicle to upper leading edge of left door	3295	mm	NA		NA	
X6	Rear surface of vehicle to lower leading edge of right door	3238	mm	3226	mm	12	mm
X7	Rear surface of vehicle to lower leading edge of left door	3238	mm	NA		NA	
X8	Rear surface of vehicle to upper trailing edge of right door	2216	mm	2250	mm	-34	mm
X9	Rear surface of vehicle to upper trailing edge of left door	2209	mm	NA		NA	
X10	Rear surface of vehicle to lower trailing edge of right door	2205	mm	2200	mm	5	mm
X11	Rear surface of vehicle to lower trailing edge of left door	2205	mm	NA		NA	
X12	Rear surface of vehicle to bottom of "A" post on right side	3246	mm	3246	mm	0	mm
X13	Rear surface of vehicle to bottom of "A" post on left side	3239	mm	NA		NA	
X14	Rear surface of vehicle to firewall - right side	3544	mm	3642	mm	-98	mm
X15	Rear surface of vehicle to firewall - left side	3551	mm	3420	mm	-131	mm
X16	Rear surface of vehicle to steering wheel center	2810	mm	2562	mm	248	mm
X17	Center of steering column to "A" post	286	mm	NA		NA	
X18	Center of steering column to headliner	418	mm	696	mm	-278	mm
X19	Rear surface of vehicle to right side of front bumper	4628	mm	4420	mm	208	mm
X20	Rear surface of vehicle to left side of front bumper	4633	mm	4642	mm	-9	mm
X21	Length of engine block	482	mm	482	mm	0	mm

Figure 4 Vehicle Accelerometer Placement



SIDE VIEW



BOTTOM VIEW

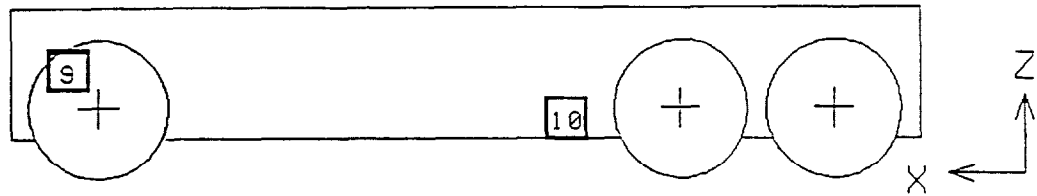
Table 6 Vehicle Accelerometer Locations and Data Summary

TEST NUMBER: 950314 No. LOCATION	X	Y	Z	POSITIVE DIRECTION	NEGATIVE DIRECTION
1 LEFT REAR SEAT CROSSMEMBER LONGITUDINAL LATERAL	2018 mm	687 mm	313 mm	3.3 g @ 106.4 ms 10.5 g @ 133.0 ms	31.1 g @ 60.3 ms 15.6 g @ 67.0 ms
2 RIGHT REAR SEAT CROSSMEMBER LONGITUDINAL LATERAL	2024 mm	-688 mm	318 mm	1.3 g @ 305.8 ms 12.6 g @ 146.5 ms	20.8 g @ 56.4 ms 13.2 g @ 49.2 ms
3 ENGINE TOP LONGITUDINAL	4173 mm	146 mm	760 mm	25.2 g @ 71.8 ms	85.5 g @ 55.0 ms
4 ENGINE BOTTOM LONGITUDINAL ¹	4099 mm	-20 mm	176 mm	1051.0 g @ 93.1 ms	56.2 g @ 47.7 ms
5 INSTRUMENT PANEL CENTER LONGITUDINAL	3201 mm	-14 mm	952 mm	43.7 g @ 174.6 ms	78.9 g @ 63.7 ms
6 CENTER OF GRAVITY LONGITUDINAL LATERAL VERTICAL RESULTANT	2636 mm	0 mm	347 mm	7.6 g @ 115.8 ms 14.0 g @ 145.4 ms 28.6 g @ 67.8 ms 30.9 g @ 77.7 ms	24.4 g @ 77.3 ms 15.1 g @ 77.3 ms 16.8 g @ 49.3 ms

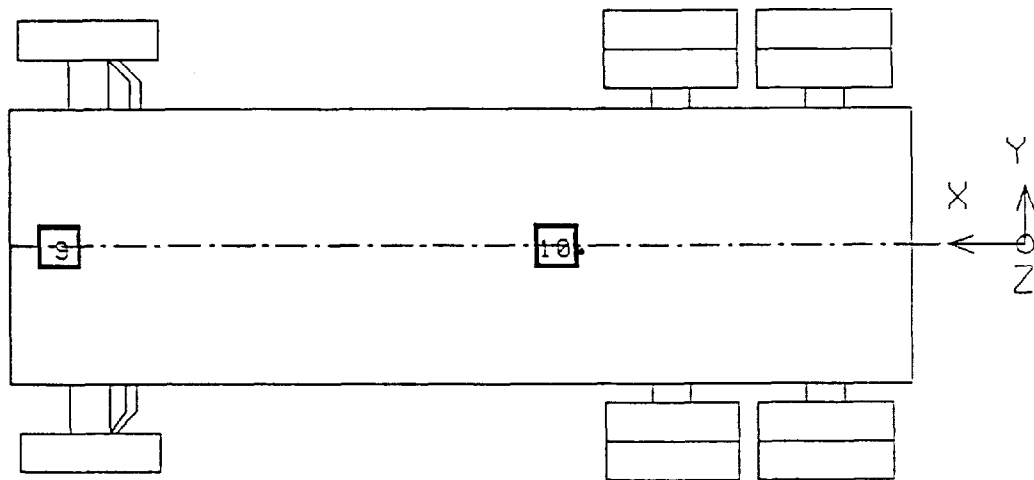
REFERENCE: X: + FORWARD FROM REAR BUMPER
Y: + LEFTWARD FROM VEHICLE CENTERLINE
Z: + UPWARD FROM GROUND LEVEL

¹See DATA ACQUISITION EXPLANATIONS

Figure 5 Heavy Truck Accelerometer Placement



SIDE VIEW



BOTTOM VIEW

Table 7 Heavy Truck Accelerometer locations and Data Summary

TEST NUMBER: 950314				POSITIVE		NEGATIVE	
No. LOCATION	X	Y	Z	DIRECTION		DIRECTION	
9 FRONT FRAME	6160 mm	0 mm	658 mm				
CROSSMEMBER							
LONGITUDINAL				14.9 g	@ 85.3 ms	18.3 g	@ 78.5 ms
LATERAL				11.5 g	@ 135.1 ms	17.4 g	@ 74.2 ms
VERTICAL				25.6 g	@ 87.8 ms	9.0 g	@ 32.3 ms
RESULTANT				27.0 g	@ 87.6 ms		
10 CENTER OF GRAVITY	2527 mm	0 mm	1050 mm				
LONGITUDINAL				5.0 g	@ 92.7 ms	9.5 g	@ 73.0 ms
LATERAL				8.1 g	@ 83.5 ms	6.5 g	@ 91.8 ms
VERTICAL				5.0 g	@ 112.6 ms	4.9 g	@ 96.4 ms
RESULTANT				10.5 g	@ 73.3 ms		

REFERENCE: X: + FORWARD FROM TRAILING EDGE OF TRUCK
Y: + LEFT FROM TRUCK CENTERLINE
Z: + UP FROM GROUND LEVEL

Table 8 Dummy Data Summary

TEST NUMBER: 950314

DRIVER DUMMY SERIAL NUMBER: 043

POSITIVE
DIRECTION

NEGATIVE
DIRECTION

HEAD ACCELERATION

LONGITUDINAL	4.9 g	@ 307.0 ms	115.2 g	@ 102.1 ms
LATERAL	8.6 g	@ 139.4 ms	77.0 g	@ 107.4 ms
VERTICAL	14.5 g	@ 68.1 ms	63.7 g	@ 99.5 ms
RESULTANT	128.1 g	@ 102.0 ms		
HIC	872 from 93.5 to 111.1			

CHEST ACCELERATION

LONGITUDINAL	11.3 g	@ 129.4 ms	53.9 g	@ 99.0 ms
LATERAL	9.9 g	@ 221.7 ms	47.2 g	@ 98.5 ms
VERTICAL	13.4 g	@ 94.3 ms	19.4 g	@ 88.0 ms
RESULTANT	72.7 g	@ 98.6 ms		
3 MSEC	63.8			

CHEST DEFLECTION

LONGITUDINAL	0.2 mm	@ 7.4 ms	31.4 mm	@ 89.0 ms
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PELVIS ACCELERATION

LONGITUDINAL	10.6 g	@ 123.0 ms	198.1 g	@ 66.1 ms
LATERAL	88.7 g	@ 66.1 ms	30.9 g	@ 104.6 ms
VERTICAL	68.9 g	@ 66.2 ms	64.1 g	@ 67.0 ms
RESULTANT	227.3 g	@ 66.1 ms		

FEMUR LOAD

LEFT	176.3 N	@ 26.4 ms	5856.4 N	@ 85.7 ms
RIGHT	3329.7 N	@ 191.4 ms	15025.1 N	@ 66.2 ms

POSITIVE DIRECTION

LONGITUDINAL: FORWARD
 LATERAL: LEFTWARD
 VERTICAL: UPWARD
 FORCE: TENSION

NEGATIVE DIRECTION

LONGITUDINAL: REARWARD
 LATERAL: RIGHTWARD
 VERTICAL: DOWNWARD
 FORCE: COMPRESSION

Table 9 Post-Impact Dummy/Vehicle Data

Visible Dummy Contact Points:

	<u>Driver #043</u>	<u>Passenger #NA</u>
Head	A-pillar	
Chest	Steering wheel rim	
Abdomen	None	
Left knee	Instrument panel	
Right knee	Instrument panel	

Door Opening:

	<u>Left</u>	<u>Right</u>
Front	NA, door destroyed	
Rear	Tools required	

Seat Movement:

	<u>Seat Back Failure</u>	<u>Seat Shift</u>
Front	None	
Rear	NA	

Glazing Damage:

The entire windshield was cracked and the left half was broken out during the impact event. The driver's door glass was shattered during the impact event.

Other Notable Impact Effects:

Left A-pillar broken at base. Left front quarter panel and door destroyed and torn away from vehicle.

Dummy Kinematic Summary

Upon impact, the driver dummy translated forward across the driver's seat and both knees impacted the lower instrument panel. The right side of the dummy's thorax impacted the steering wheel rim and the dummy's head hit the driver's side A-pillar. The dummy then came to rest sitting in the driver's seat facing forward and leaning toward the right.

Figure 6 Dummy Measurement Locations for Front Seat Occupants

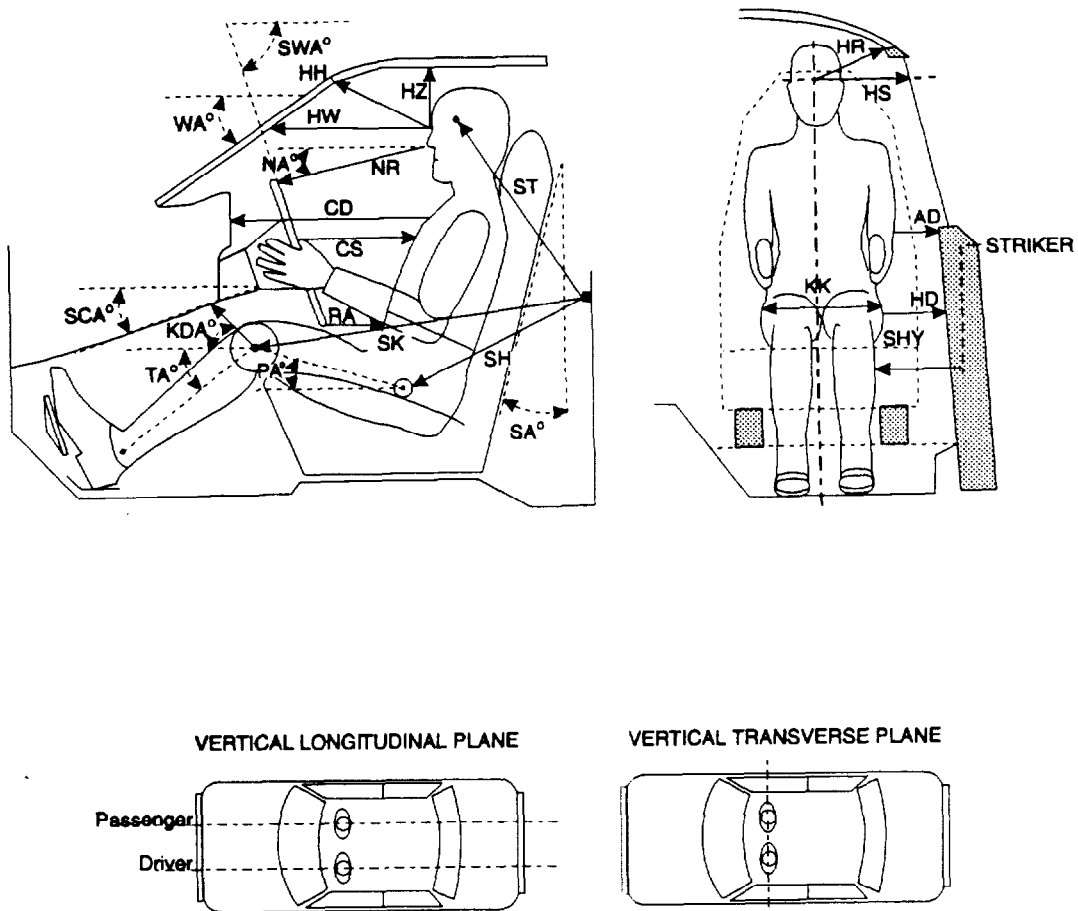


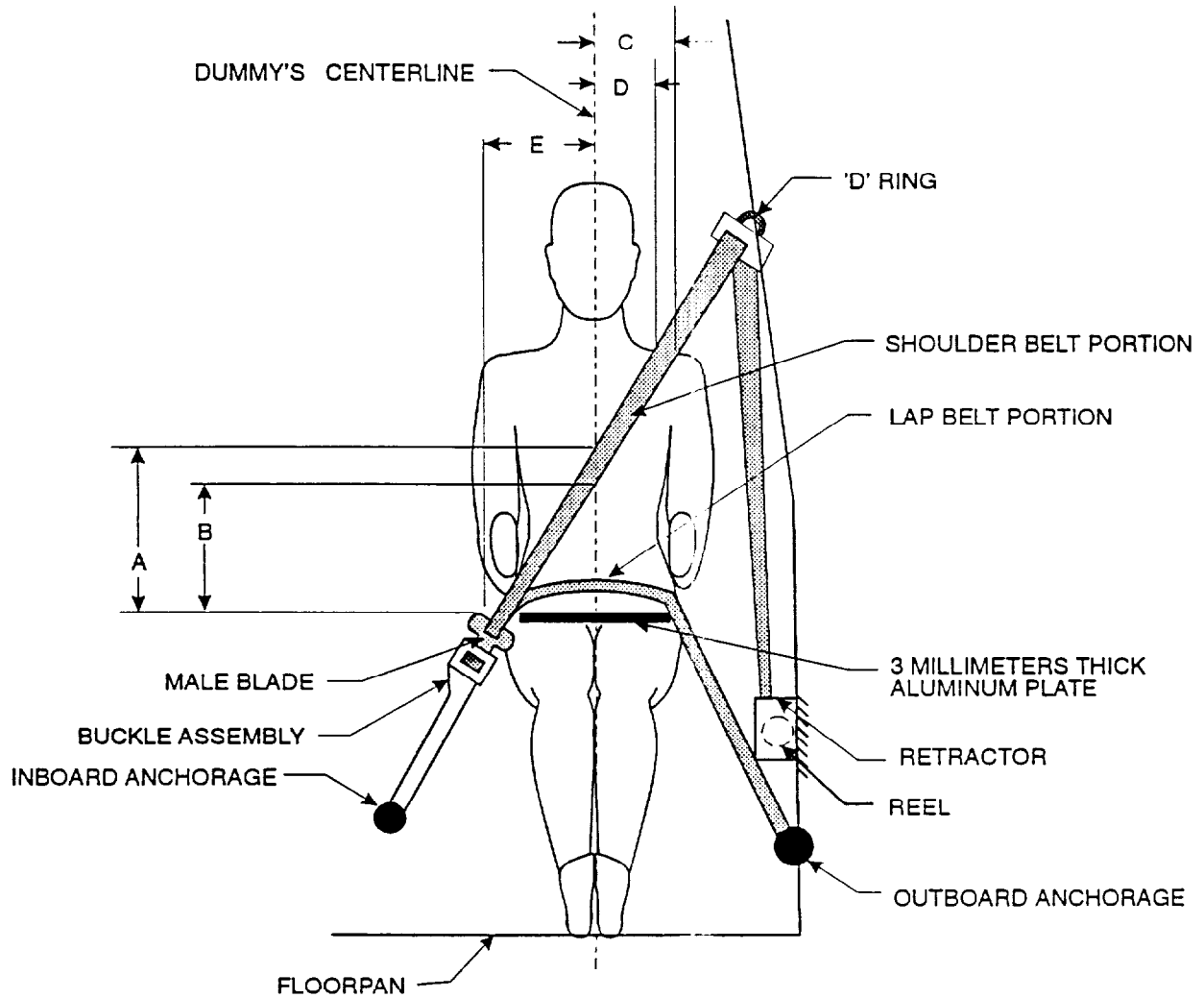
Table 10 Dummy Measurement Data For Front Seat Occupants

Designation	Type of Measurement	Driver (Serial #043)	Passenger (Serial #NA)
WA	Windshield angle	29°	
SWA	Steering wheel angle	68°	
SCA	Steering column angle	23°	
SA	Seat back angle	23°	
HZ	Head to roof	184 mm	
HH	Head to header	363 mm	
HW	Head to windshield	568 mm	
HR	Head to side header	196 mm	
NR	Nose to rim	427 mm	
NA	Nose to rim angle	12°	
CD	Chest to dash	573 mm	
CS	Steering wheel to chest	359 mm	
RA	Rim to abdomen	226 mm	
KDL	Left knee to dash	204 mm	
KDR	Right knee to dash	211 mm	
KDA	Outboard knee to dash angle	30°	
PA	Pelvic angle	22°	
TA	Tibial angle	34°	
KK	Knee to knee	265 mm	
ST ¹	Striker to head	480 mm	
	Striker to head angle	-86°	
SK ¹	Striker to knee	578 mm	
	Striker to knee angle	10°	
SH ¹	Striker to H-point	269 mm	
	Striker to H-point angle	52°	
SHY	Striker to H-point (Y dir.)	258 mm	
HS	Head to side window	290 mm	
HD	H-point to door	170 mm	
AD	Arm to door	110 mm	

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

¹ A negative angle indicates the measurement point was located above the striker.

Figure 7 Seat Belt Positioning Data

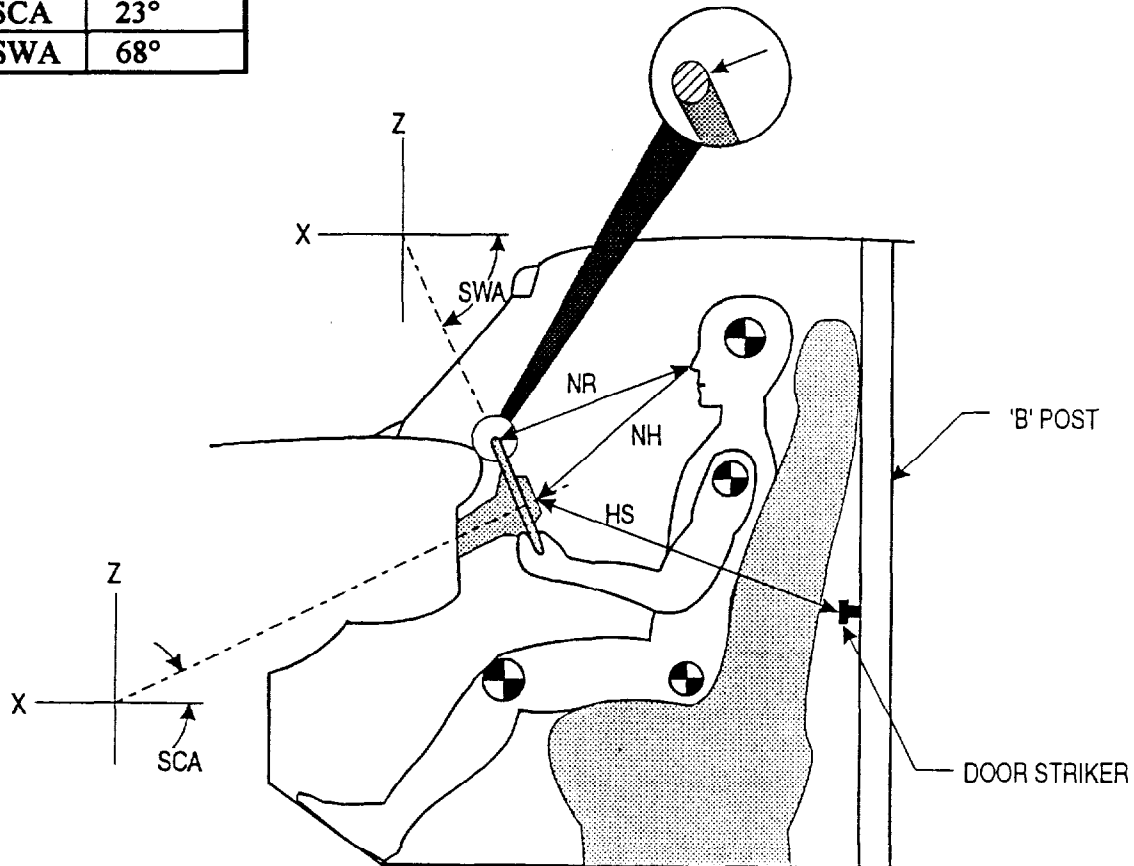


		Driver	Passenger
A	Top surface of aluminum plate to belt upper edge	388	NA
B	Top surface of aluminum plate to belt lower edge	300	NA
C	Dummy centerline to outer edge of belt at chest flesh top	108	NA
D	Dummy centerline to inner edge of belt at chest flesh top	45	NA
E	Dummy centerline to intersection of upper torso belt and lap belt	253	NA

All distance measurements are in millimeters.

Figure 8 Driver Dummy To Steering Column/Wheel Assembly Data

NR	427 mm
NH	440 mm
HS	593 mm
SCA	23°
SWA	68°



Position of steering column tilting and telescoping adjustments, if any:

The steering column was fastened in the middle of the adjustment range.

- NR** = Distance from tip of dummy's nose to top rear surface of steering wheel rim.
- NH** = Distance from tip of dummy's nose to center of steering column hub.
- HS** = Distance from center of steering column hub to the forward surface of the door lock striker pin.
- SCA** = Angle of steering column relative to horizontal.
- SWA** = Angle of steering wheel relative to horizontal.

Figure 9 Camera Positions

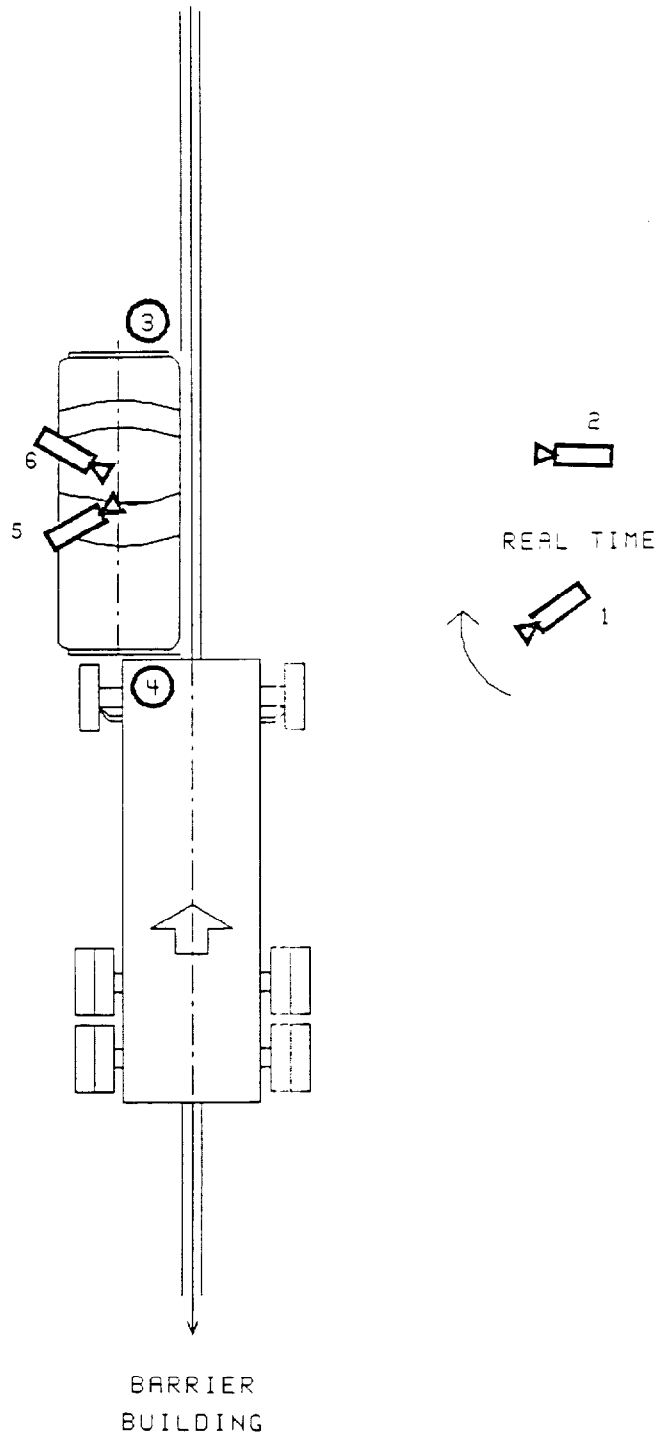


Table 11 Motion Picture Camera Information

Camera Number	Location	Type	Lens (mm)	Speed (Fps)	Purpose of Camera Data
1	Left panning	Bolex	16	24	Real-time documentation
2	Left wide	Photosonic	13	1005	Vehicle dynamics
3	Overhead wide	Photosonic	8.5	998	Vehicle dynamics
4	Onboard truck	Photosonic	8	1025	Vehicle dynamics
5	Onboard car front	Photosonic	8	1000	Dummy kinematics
6	Onboard car rear	photosonic	8	1005	Dummy kinematics



Figure A-1 Pre-Test Front View



Figure A-2 Post-Test Front - View 1



Figure A-3 Post-Test Front - View 2



Figure A-4 Post-Test Left Front Three-Quarter - View 1



Figure A-5 Post-Test Left Front Three-Quarter - View 2



Figure A-6 Post-Test Left Front Three-Quarter - View 3

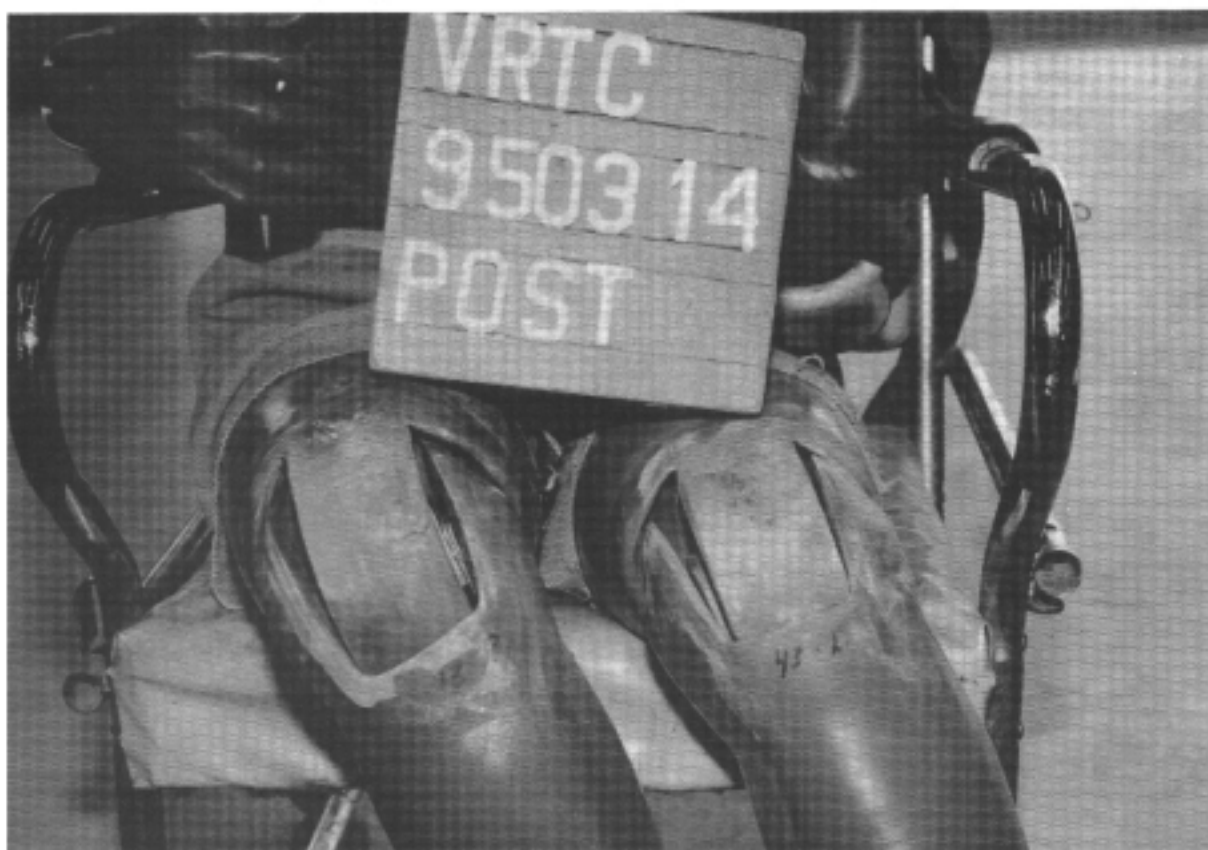


Figure A-41 Post-Test Driver Dummy Knee Contact View

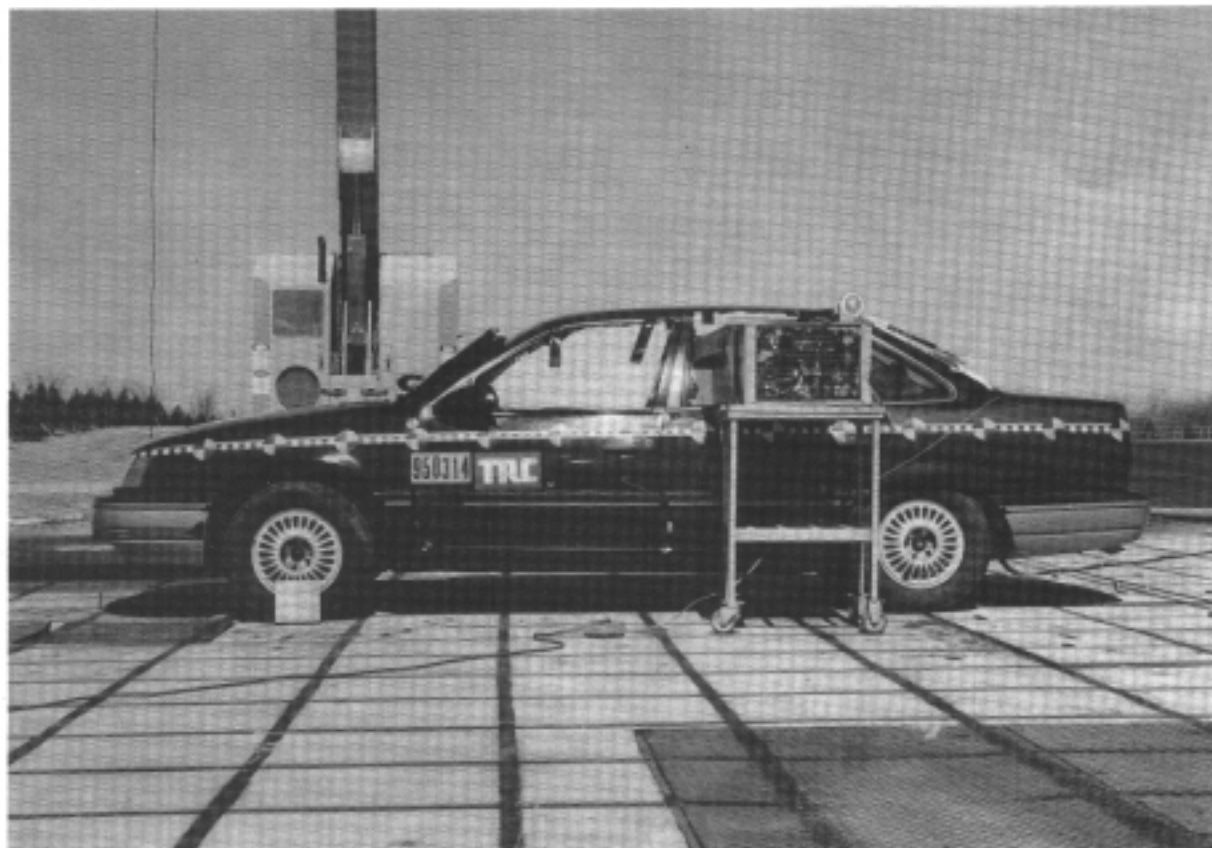


Figure A-7 Pre-Test Left Side View



Figure A-8 Post-Test Left Side View



Figure A-39 Post-Test Driver dummy and Vehicle Interior - View 4



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



Figure A-9 Pre-Test Rear View



Figure A-10 Post-Test Rear View



Figure A-37 Post-Test Driver dummy and Vehicle Interior - View 2



Figure A-38 Post-Test Driver dummy and Vehicle Interior - View 3

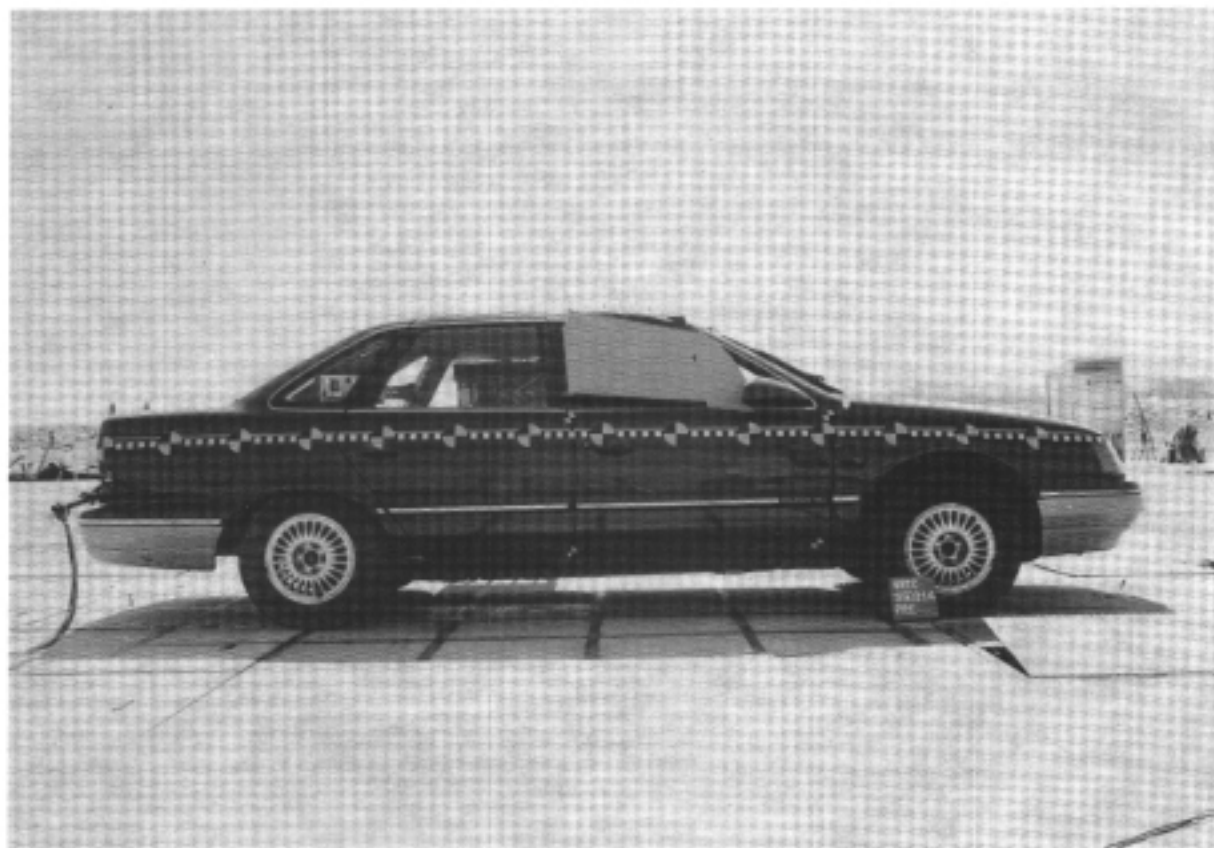


Figure A-11 Pre-Test Right Side View



Figure A-12 Post-Test Right Side View

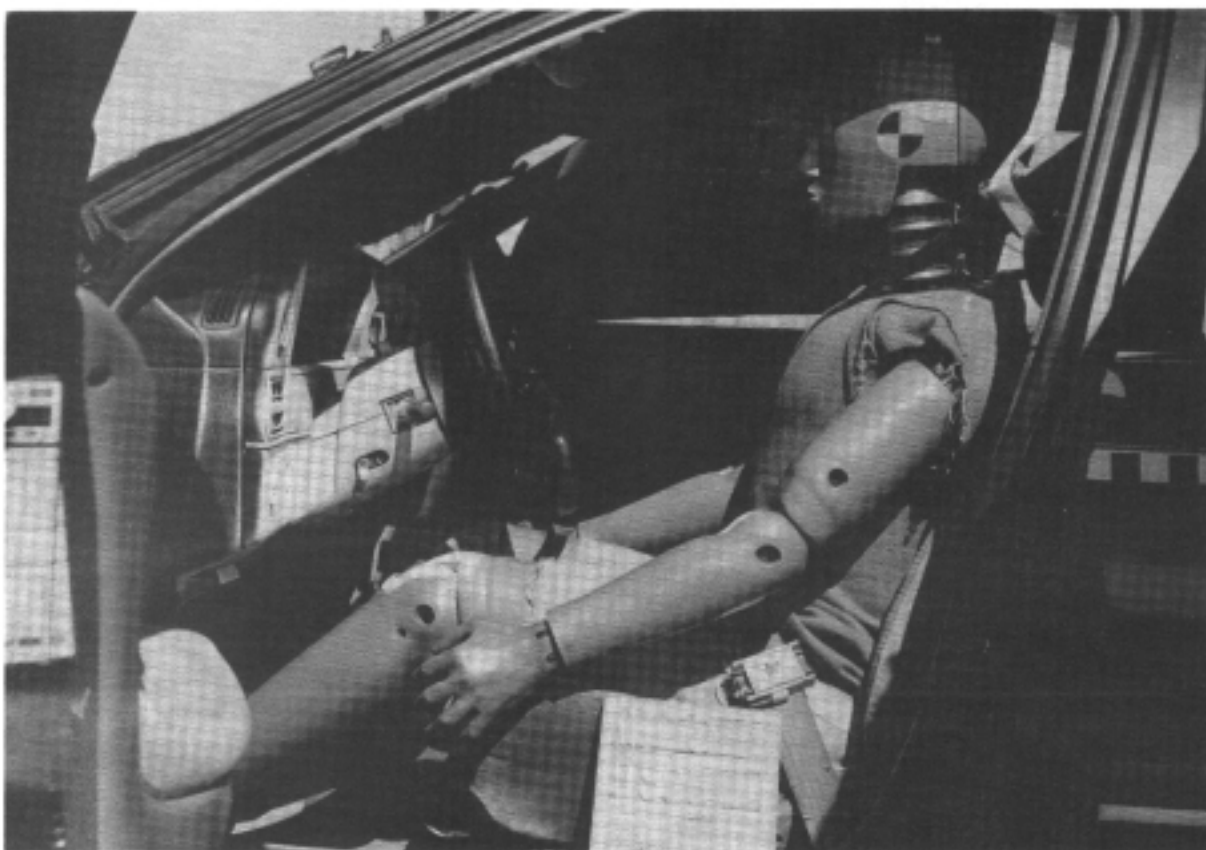


Figure A-35 Pre-Test Dummy and Vehicle Interior - View 2



Figure A-36 Post-Test Driver dummy and Vehicle Interior - View 1



Figure A-13 Pre-Test Right Front Three-Quarter View



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



Figure A-33 Pre-Test Driver Dummy Position View



Figure A-34 Pre-Test Dummy and Vehicle Interior - View 1



Figure A-16 Pre-Test Front Underbody View



Figure A-17 Post-Test Front Underbody View

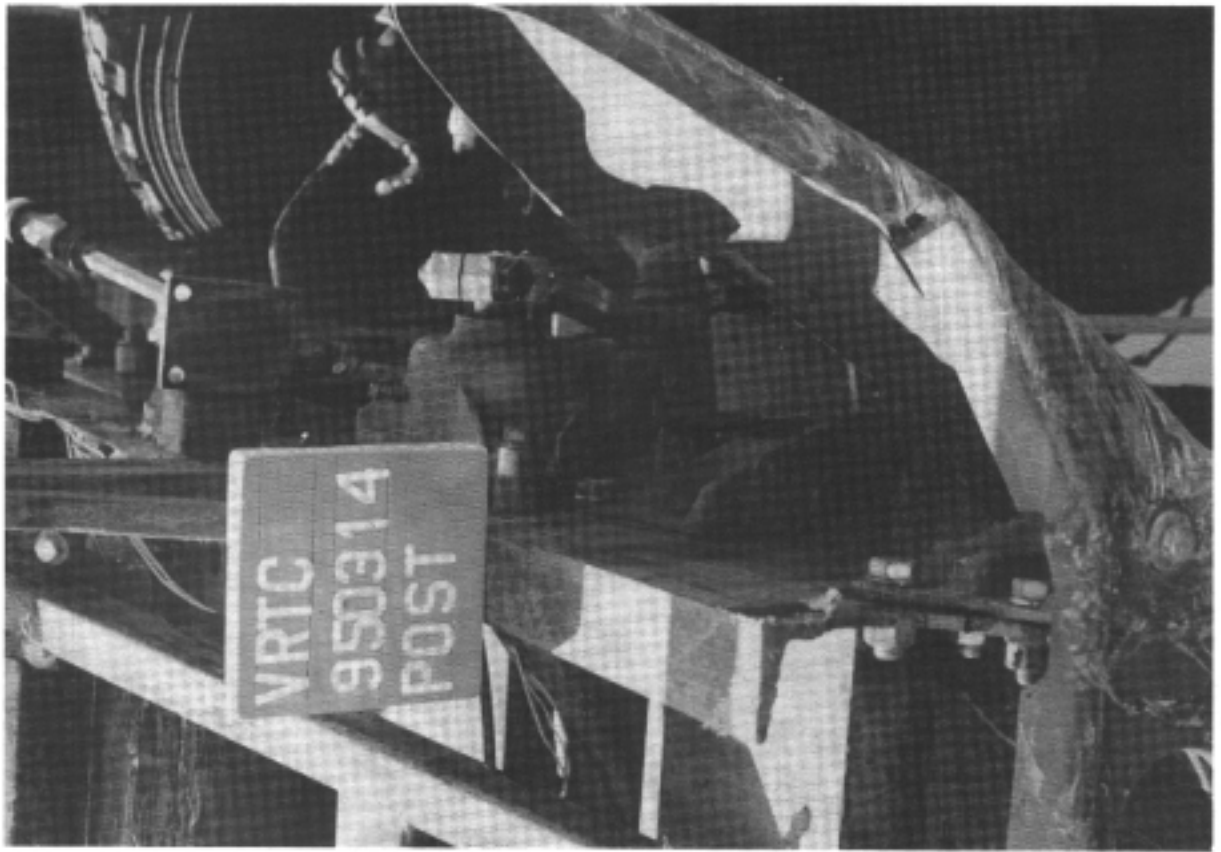


Figure A-31 Post-Test Truck Damage - View 3

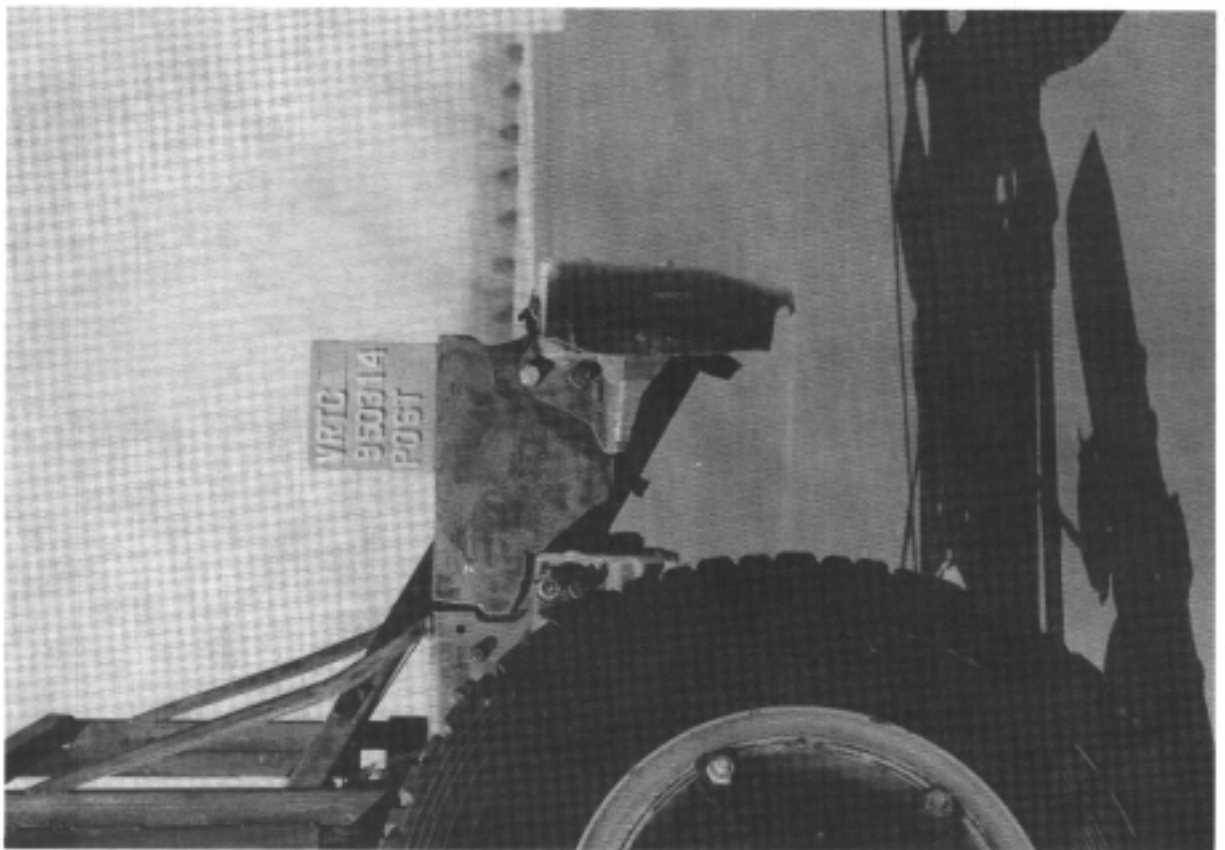


Figure A-32 Post-Test Truck Damage - View 4



Figure A-15 Pre-Test Engine Compartment View



Figure A-29 Post-Test Truck Damage - View 1



Figure A-30 Post-Test Truck Damage - View 2

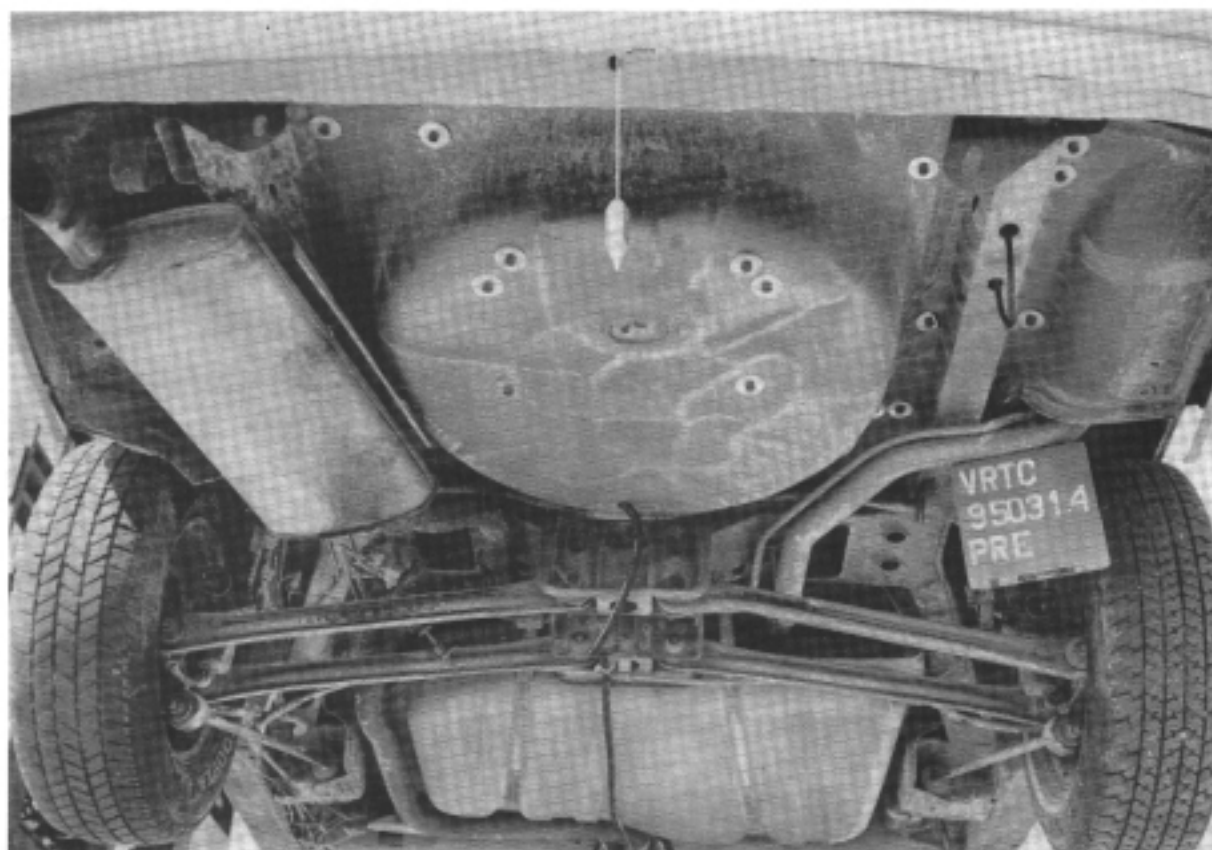


Figure A-18 Pre-Test Rear Underbody View

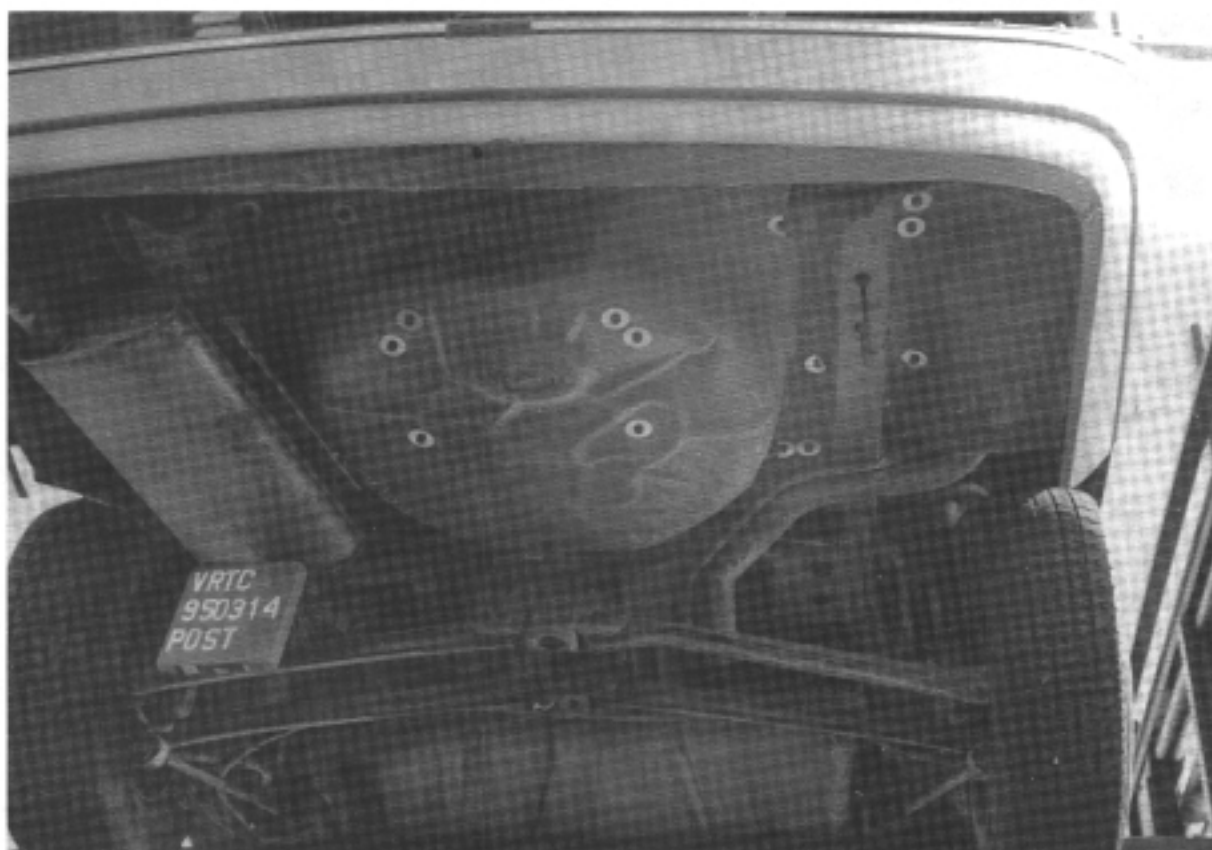


Figure A-19 Post-Test Rear Underbody View

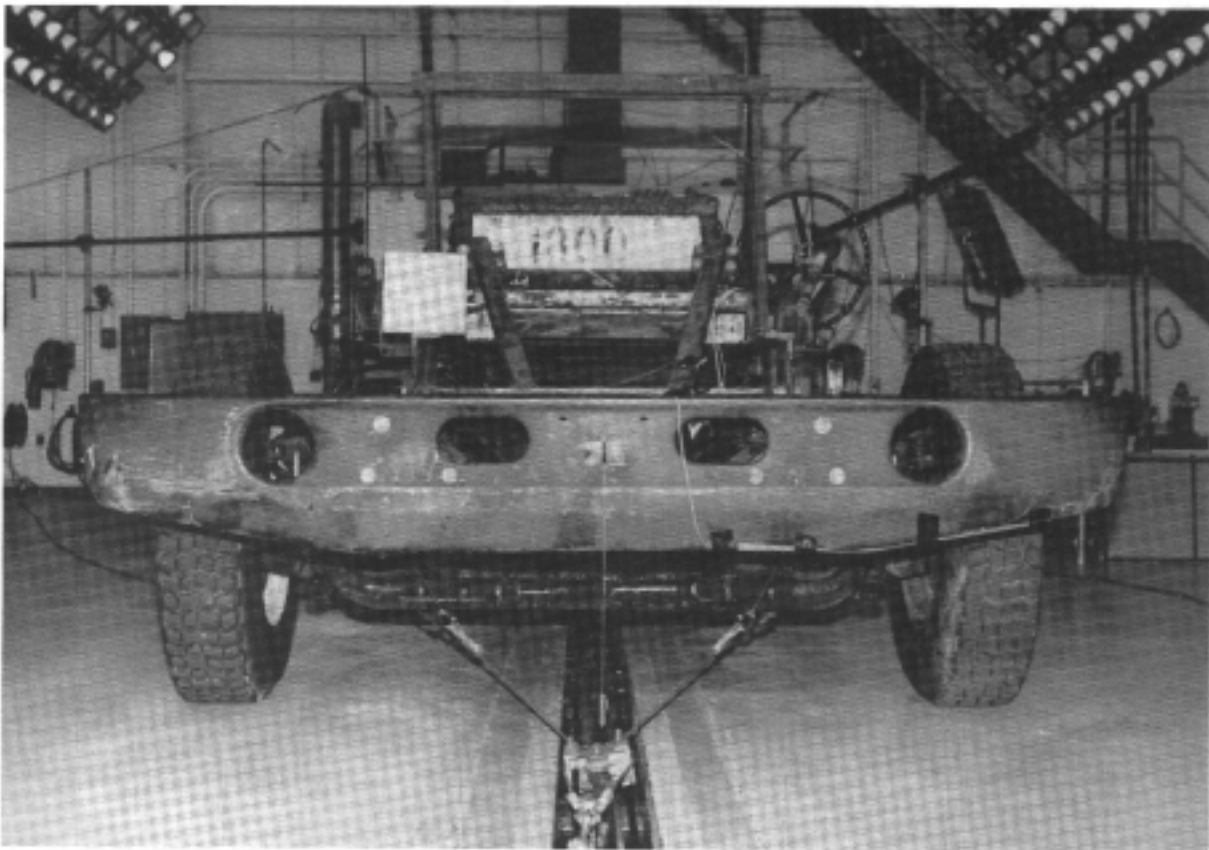


Figure A-27 Pre-Test Truck Front View

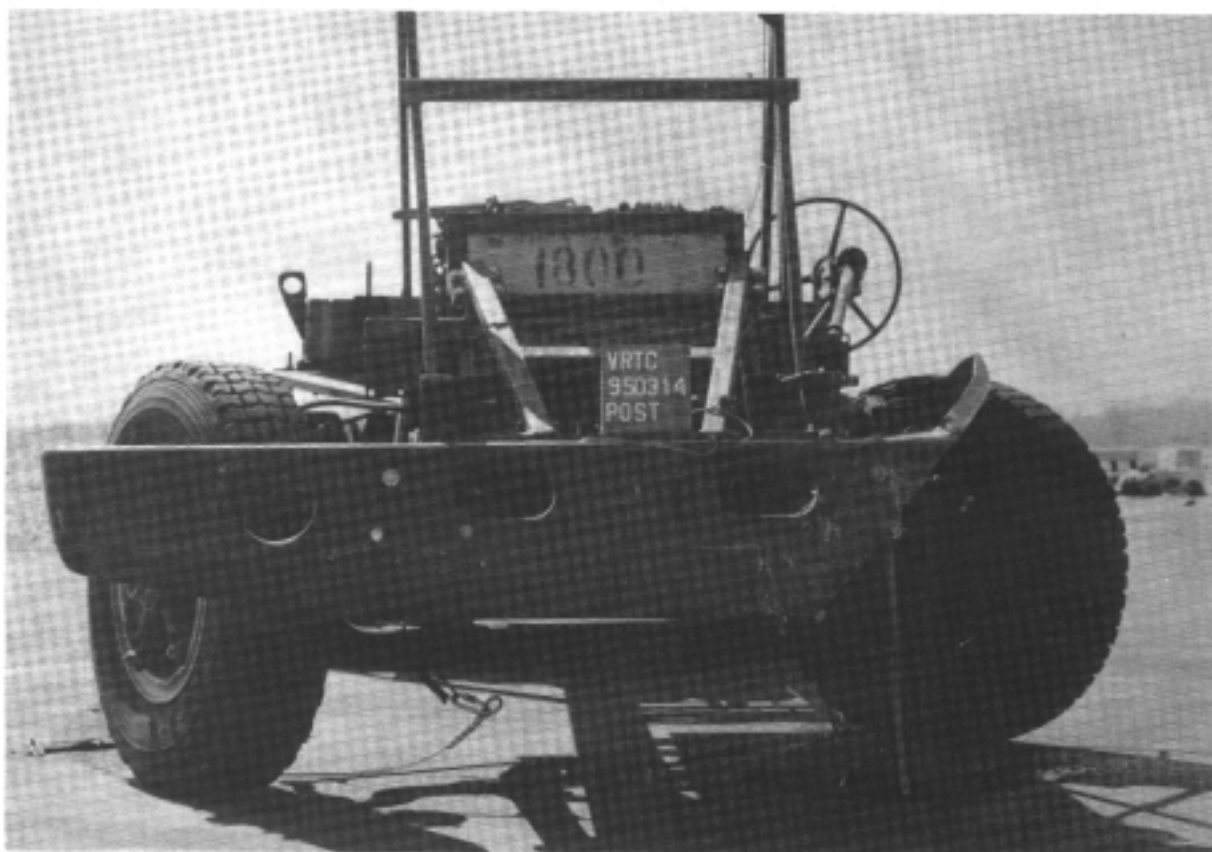


Figure A-28 Post-Test Truck Front View



Figure A-20 Pre-Test Windshield View



Figure A-21 Post-Test Windshield - View 1



Figure A-25 Pre-Test Bumper Engagement - View 1



Figure A-26 Pre-Test Bumper Engagement - View 2



Figure A-22 Post-Test Windshield - View 2

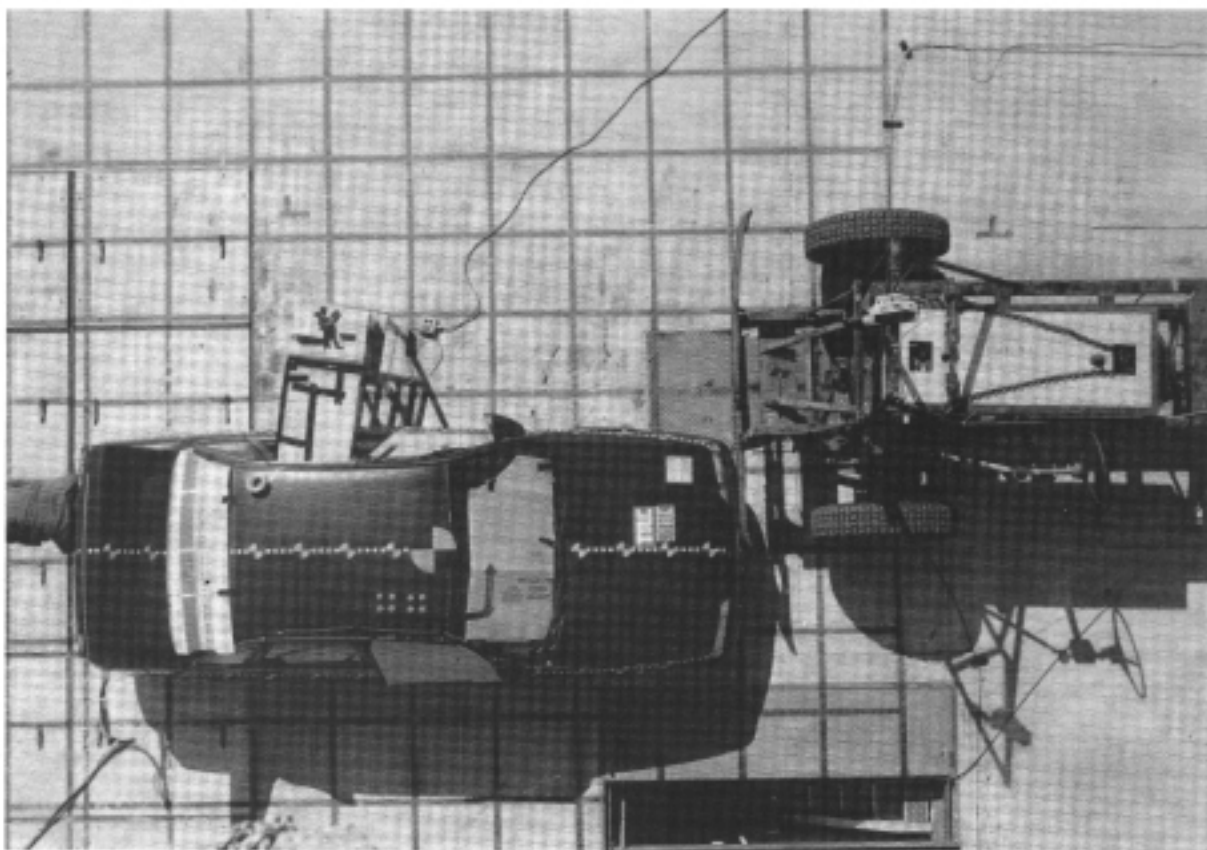


Figure A-23 Pre-Test Overhead View

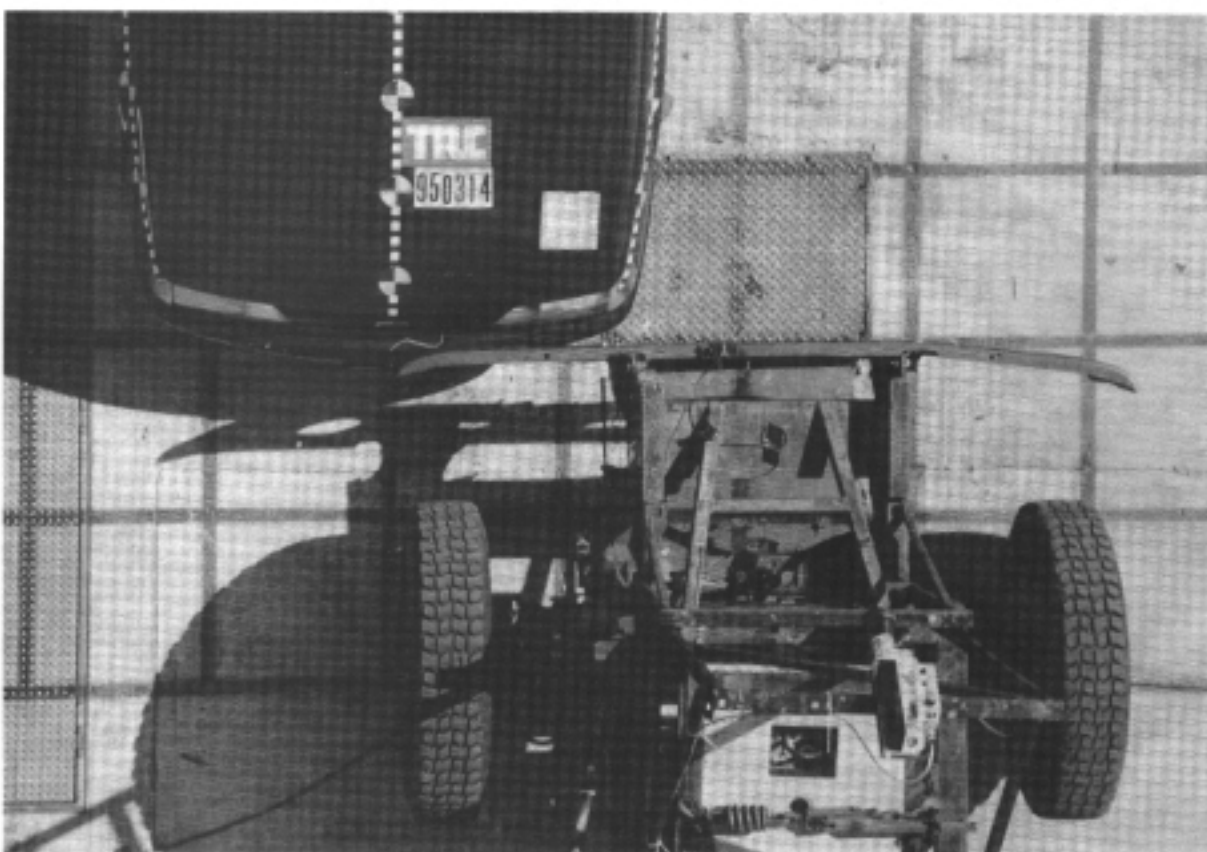


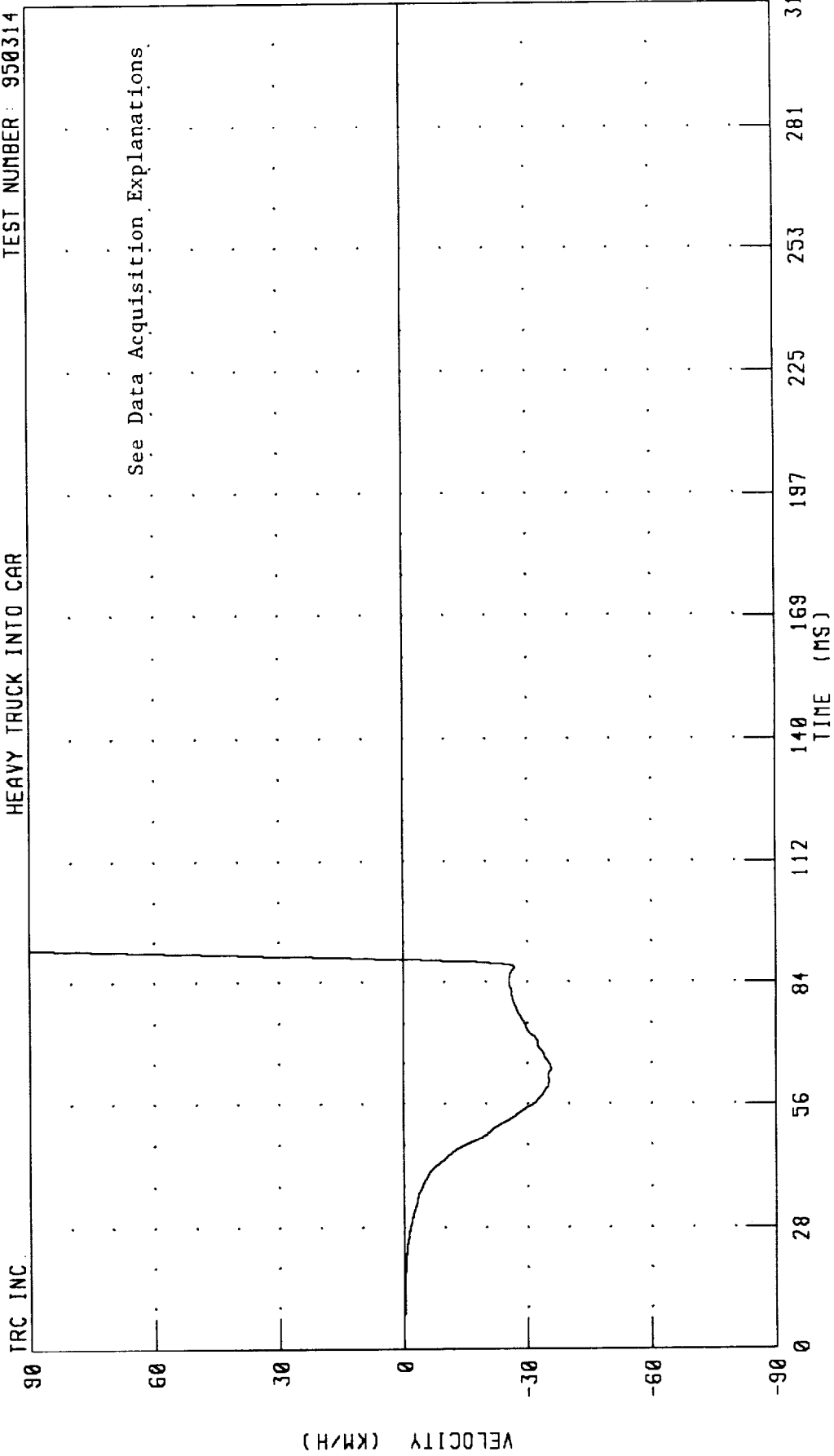
Figure A-24 Pre-Test Overhead Close-up View

Appendix B

Data Plots

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS ENGINE BOTTOM X-AXIS VELOCITY HEAVY TRUCK INTO CAR

TEST NUMBER: 950314

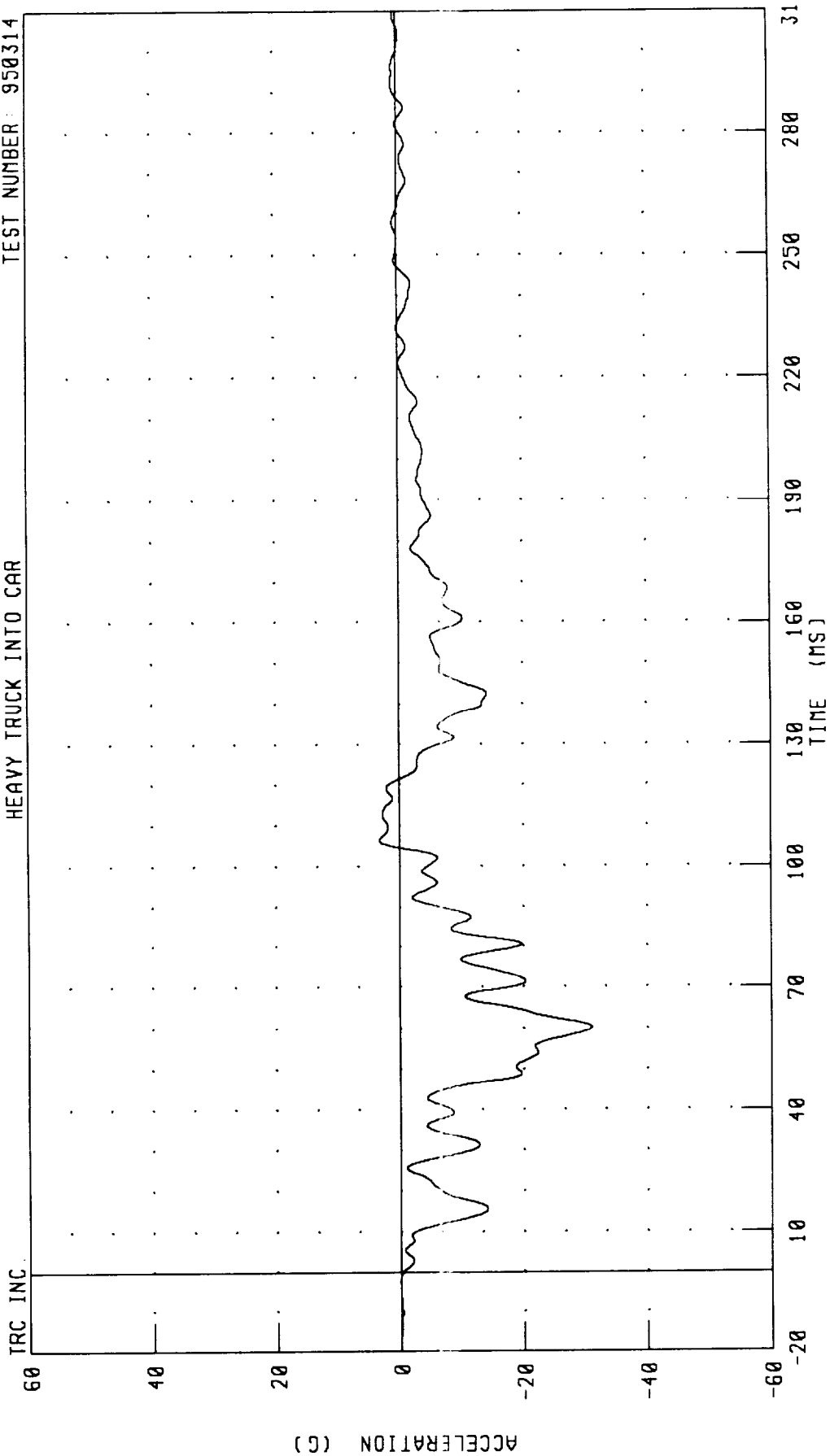


CHANNEL: ENGXY2 FILTER: CH. CLASS 180

PEAK DATA: 7369.50 KM/H @ 310.00 MS, -35.75 KM/H @ 64.40 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
LEFT REAR SEAT X-AXIS ACCELERATION
HEAVY TRUCK INTO CAR

TEST NUMBER: 950314



CHANNEL: TLRXG2 FILTER: CH. CLASS 60

PEAK DATA: 3.26 G @ 106.40 MS, -31.07 G @ 60.32 MS

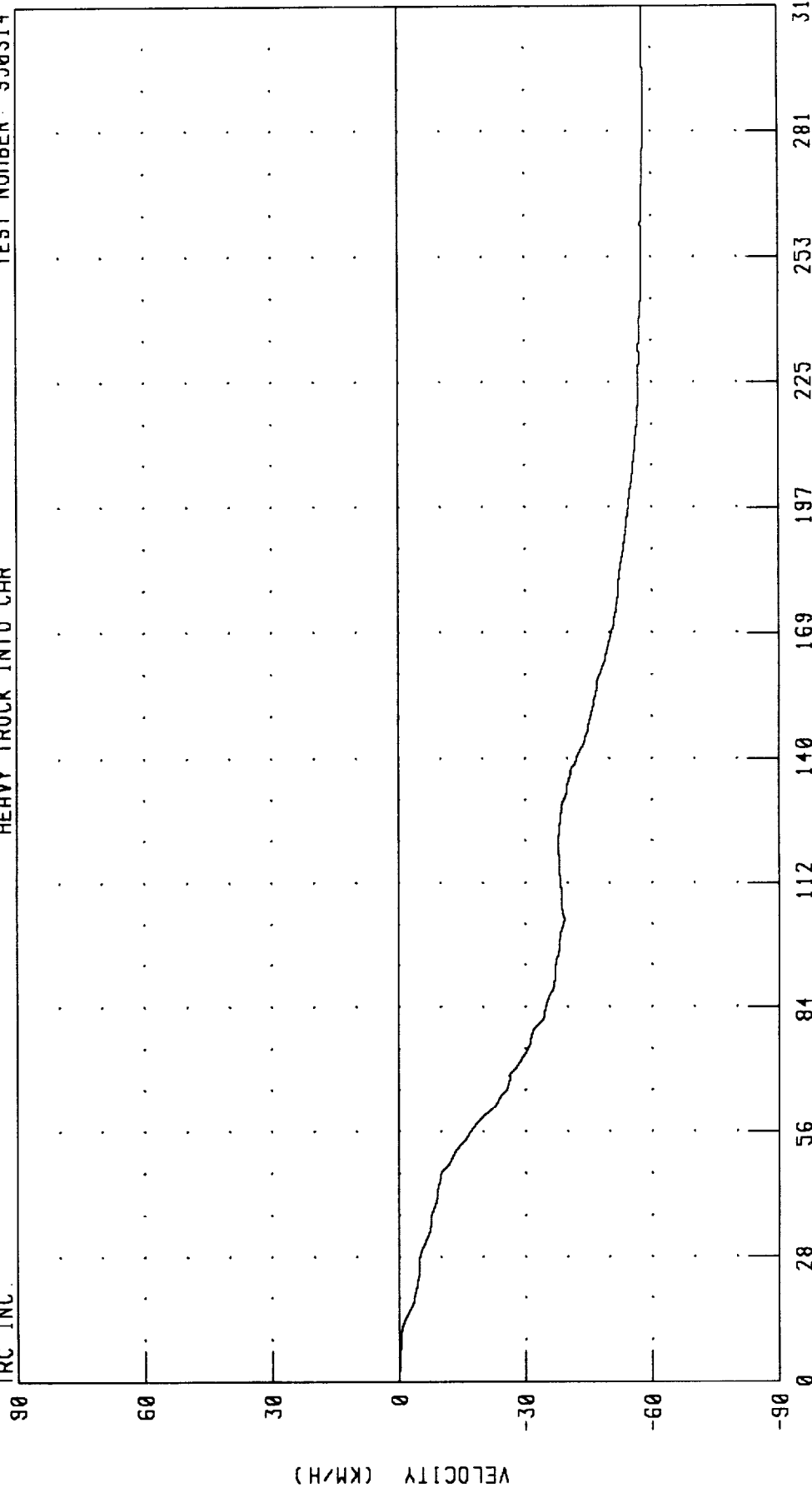
HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS

LEFT REAR SEAT X-AXIS VELOCITY

TEST NUMBER: 950314

HEAVY TRUCK INTO CAR

TRC INC.

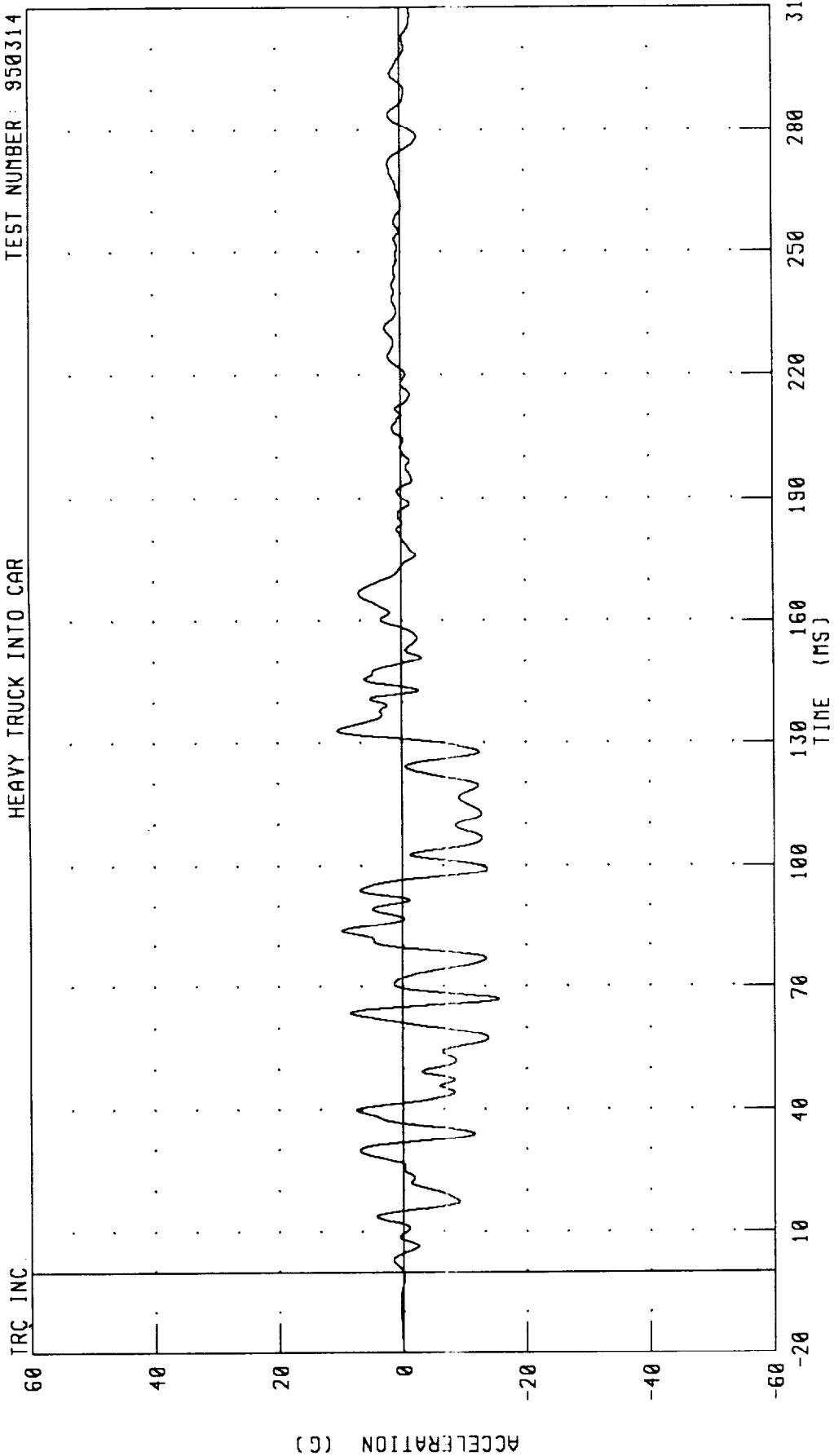


CHANNEL: TLRXV2 FILTER: CH. CLASS 180

PEAK DATA: 0.01 KM/H @ 1.44 MS, -58.23 KM/H @ 288.56 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
LEFT REAR SEAT Y-AXIS ACCELERATION
HEAVY TRUCK INTO CAR

TEST NUMBER: 950314

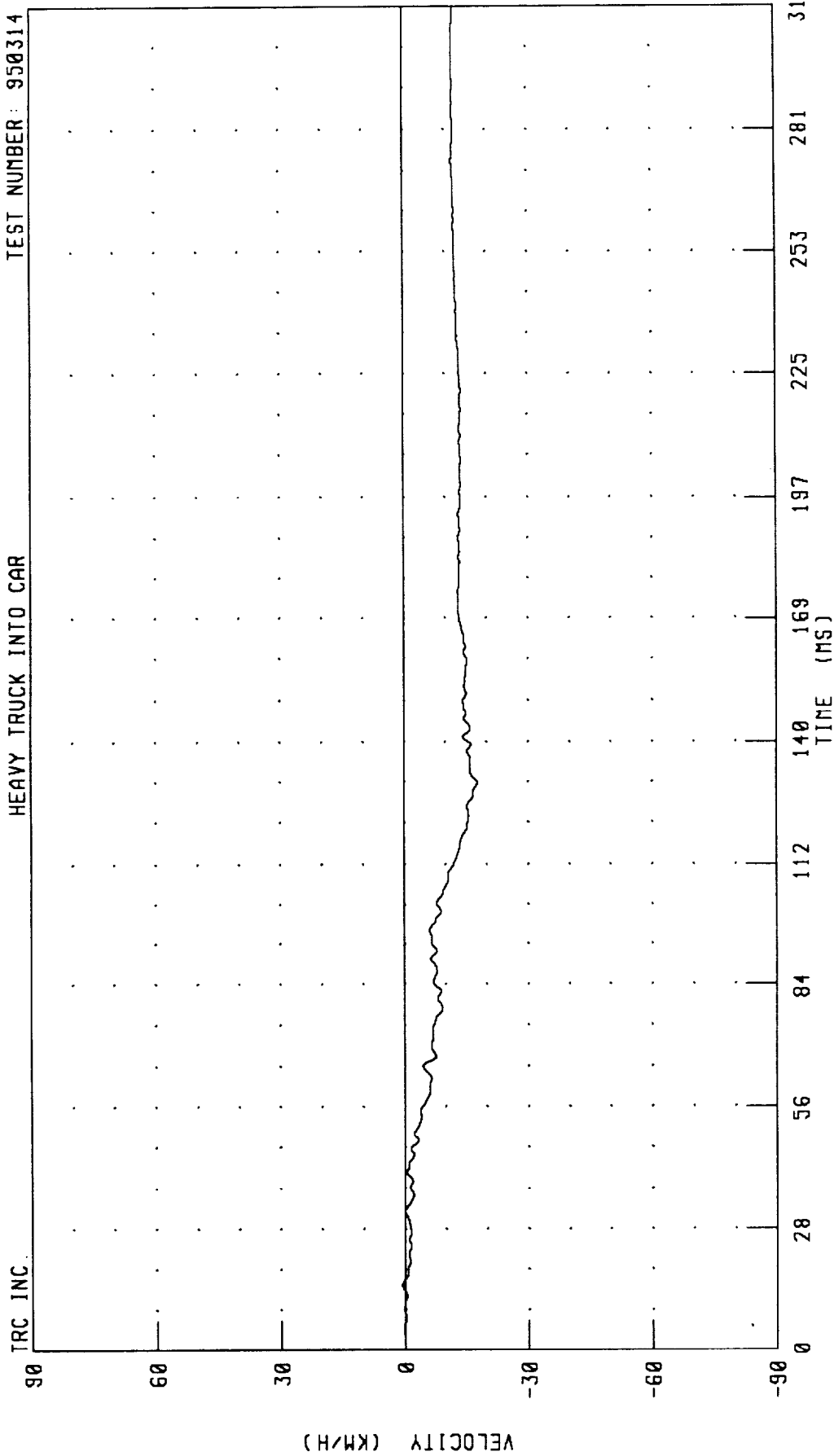


CHANNEL: TLRYG2 FILTER: CH CLASS 60

PEAK DATA: 10 49 G @ 132 96 MS, -15 61 G @ 67 04 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
 LEFT REAR SEAT Y-AXIS VELOCITY
 HEAVY TRUCK INTO CAR

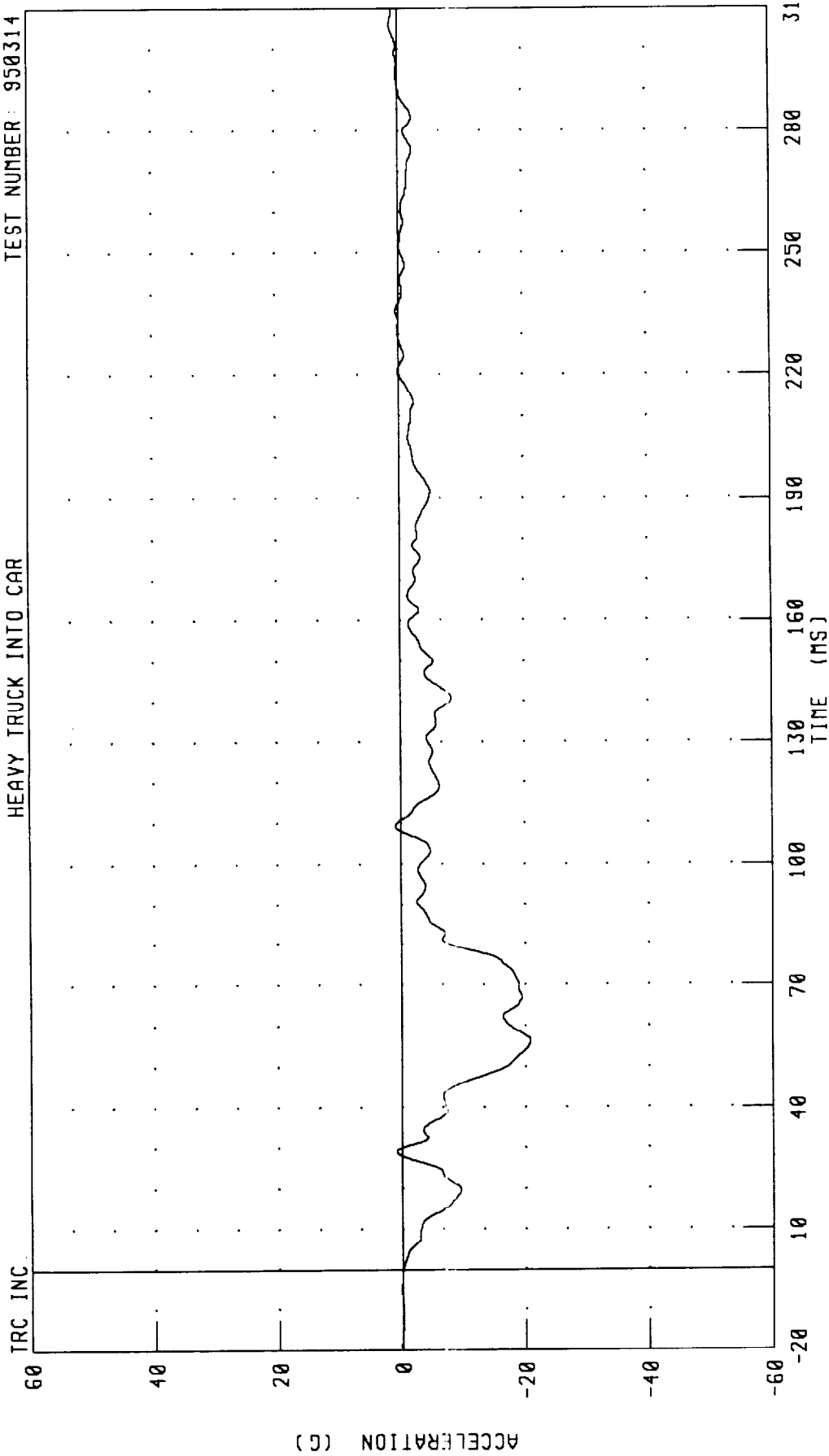
TEST NUMBER: 950314



CHANNEL: TLRYV2 FILTER: CH CLASS 180

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
RIGHT REAR SEAT X-AXIS ACCELERATION
HEAVY TRUCK INTO CAR

TEST NUMBER: 950314



CHANNEL: TRRXG2 FILTER: CH CLASS 60

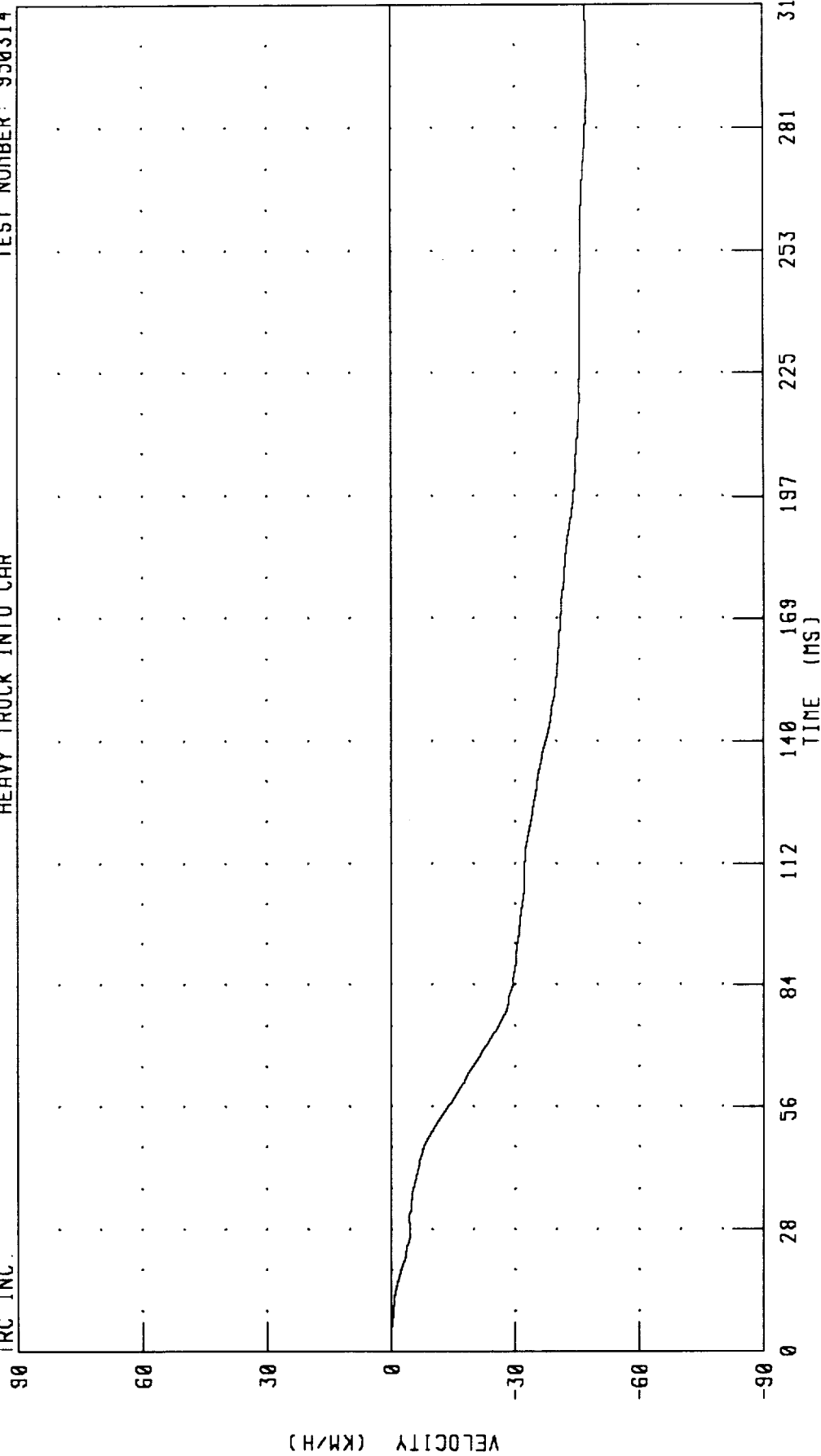
PEAK DATA: 1.30 G @ 305.84 MS, -20.83 G @ 56.40 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS RIGHT REAR SEAT X-AXIS VELOCITY

TEST NUMBER: 950314

HEAVY TRUCK INTO CAR

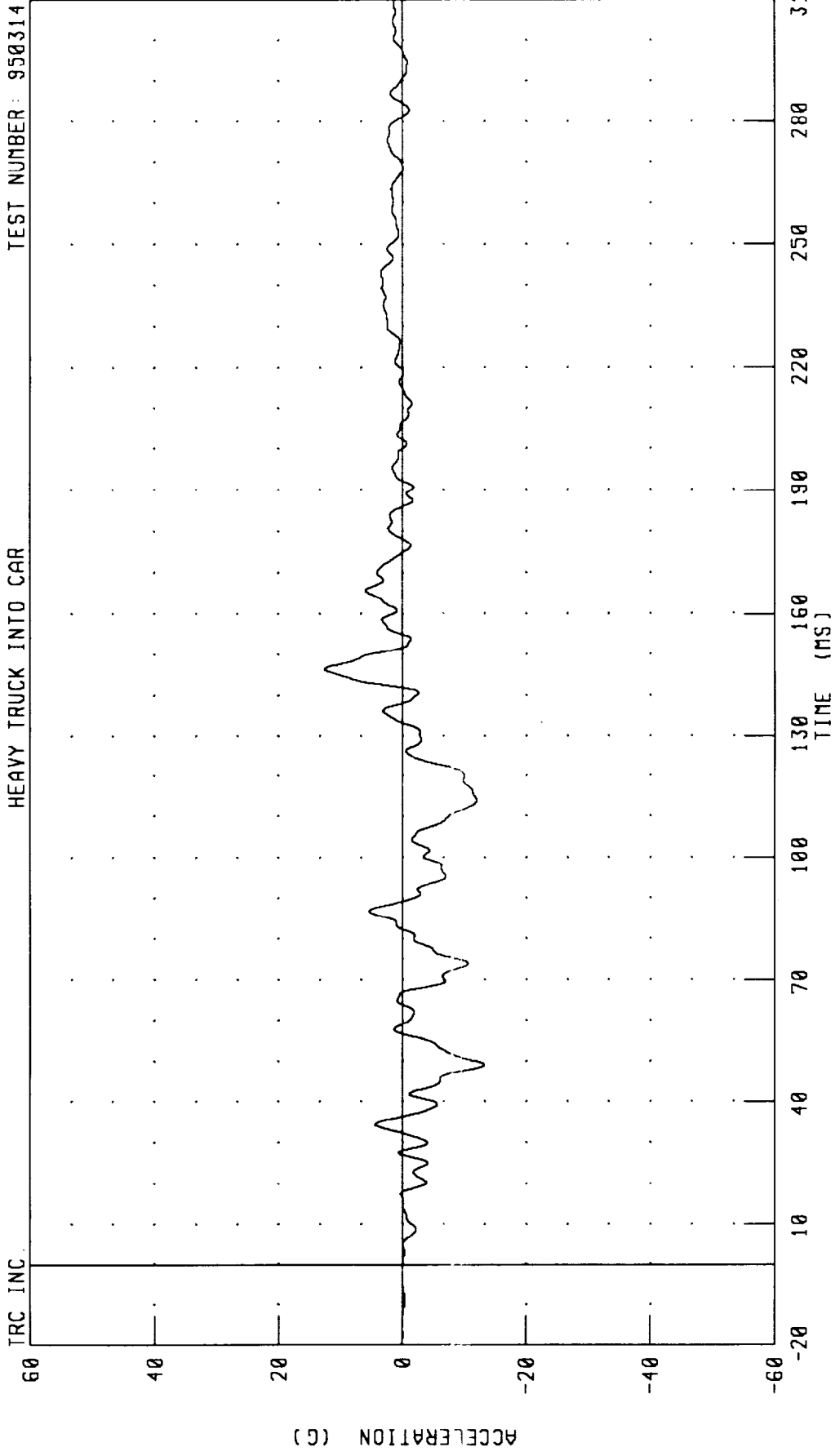
TRC INC.



CHANNEL: TRRXV2 FILTER: CH. CLASS 180

PEAK DATA: 0.00 KM/H @ 0.00 MS, -47.39 KM/H @ 291.36 MS

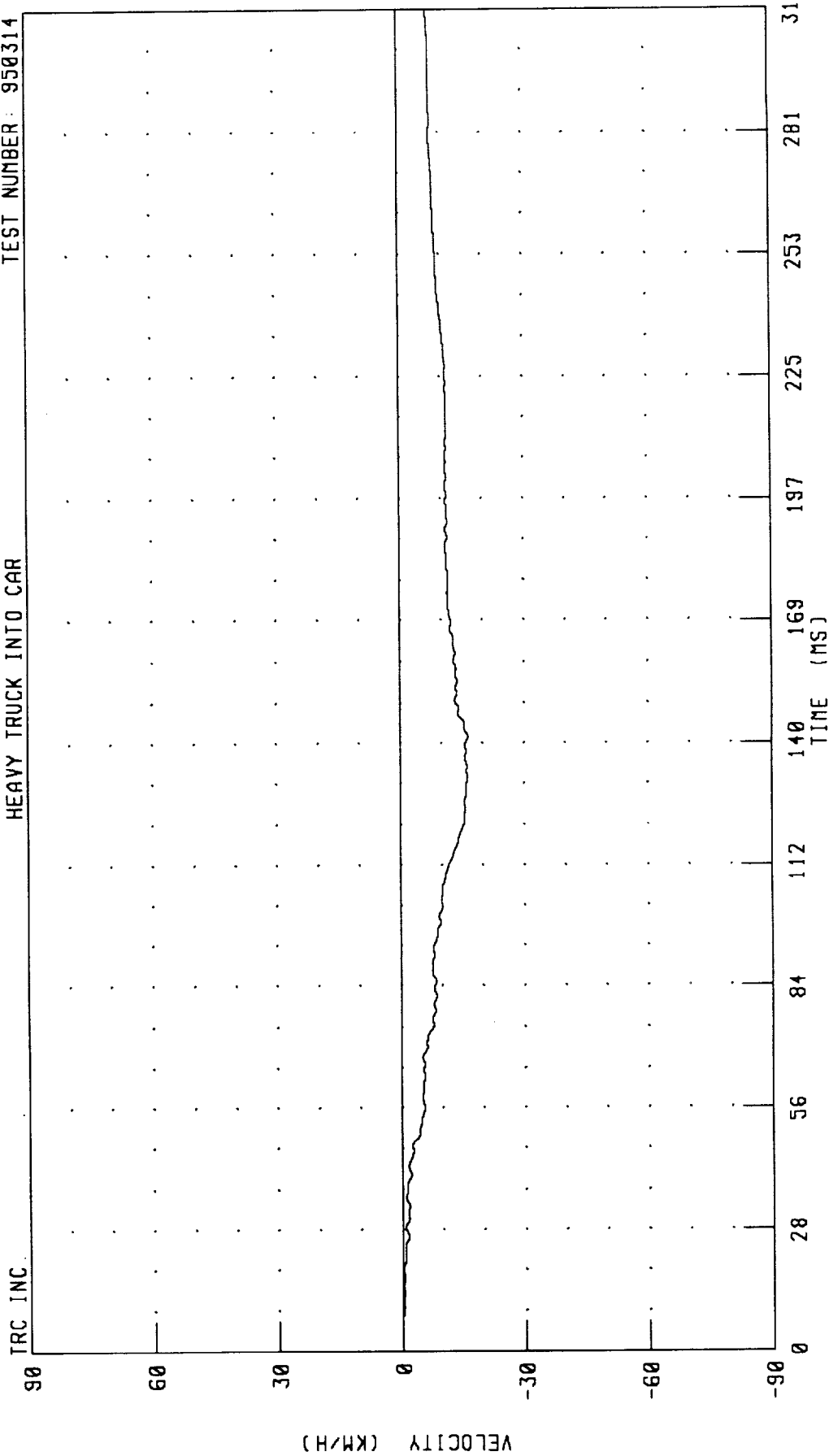
HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
RIGHT REAR SEAT Y-AXIS ACCELERATION



CHANNEL: TTRYC2 FILTER: CH. CLASS 60

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
RIGHT REAR SEAT Y-AXIS VELOCITY
HEAVY TRUCK INTO CAR

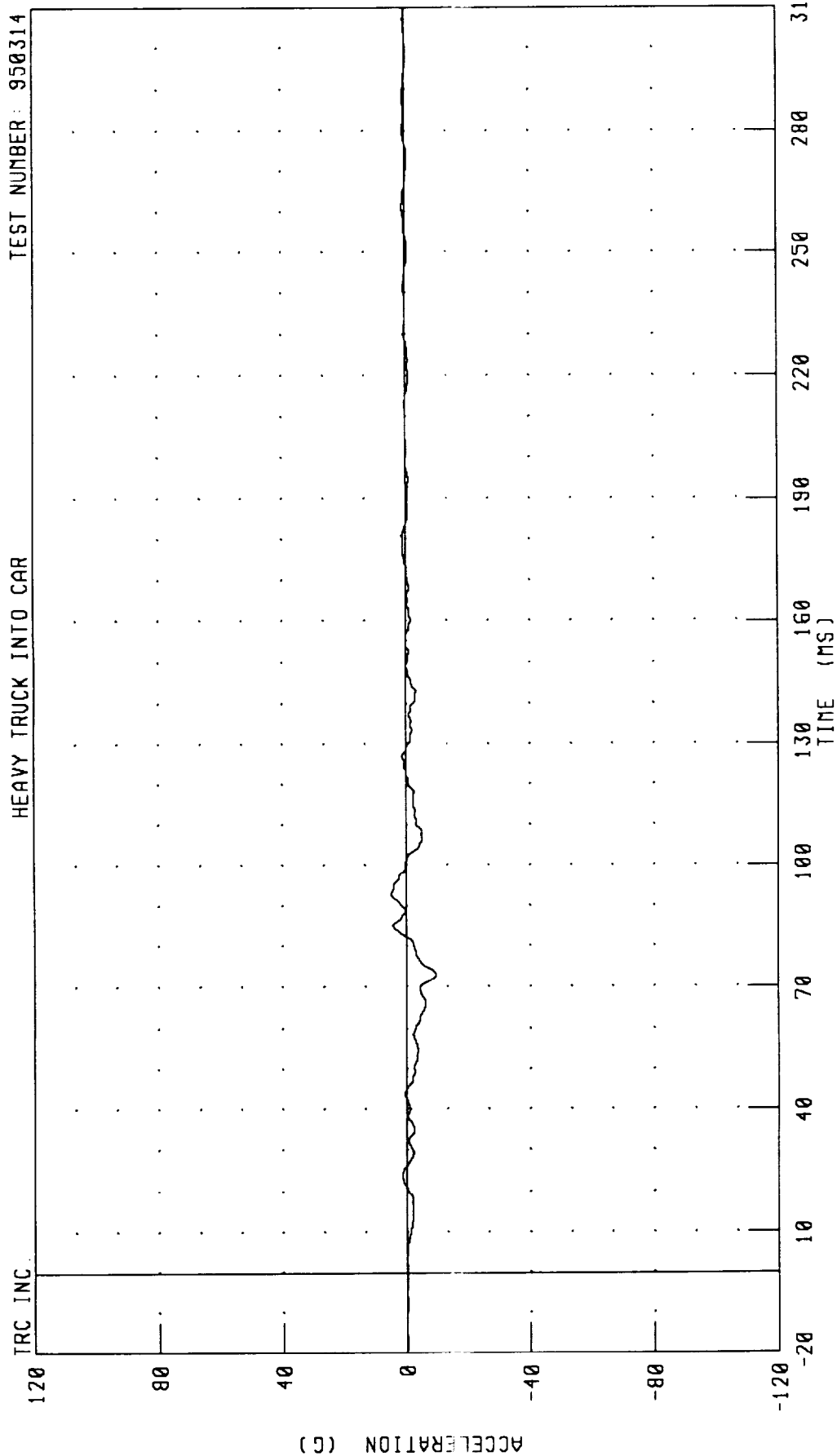
TEST NUMBER: 950314



CHANNEL: TRRYV2 FILTER: CH. CLASS 180

PEAK DATA: 0.02 KM/H @ 6.48 MS, -16.47 KM/H @ 142.40 MS

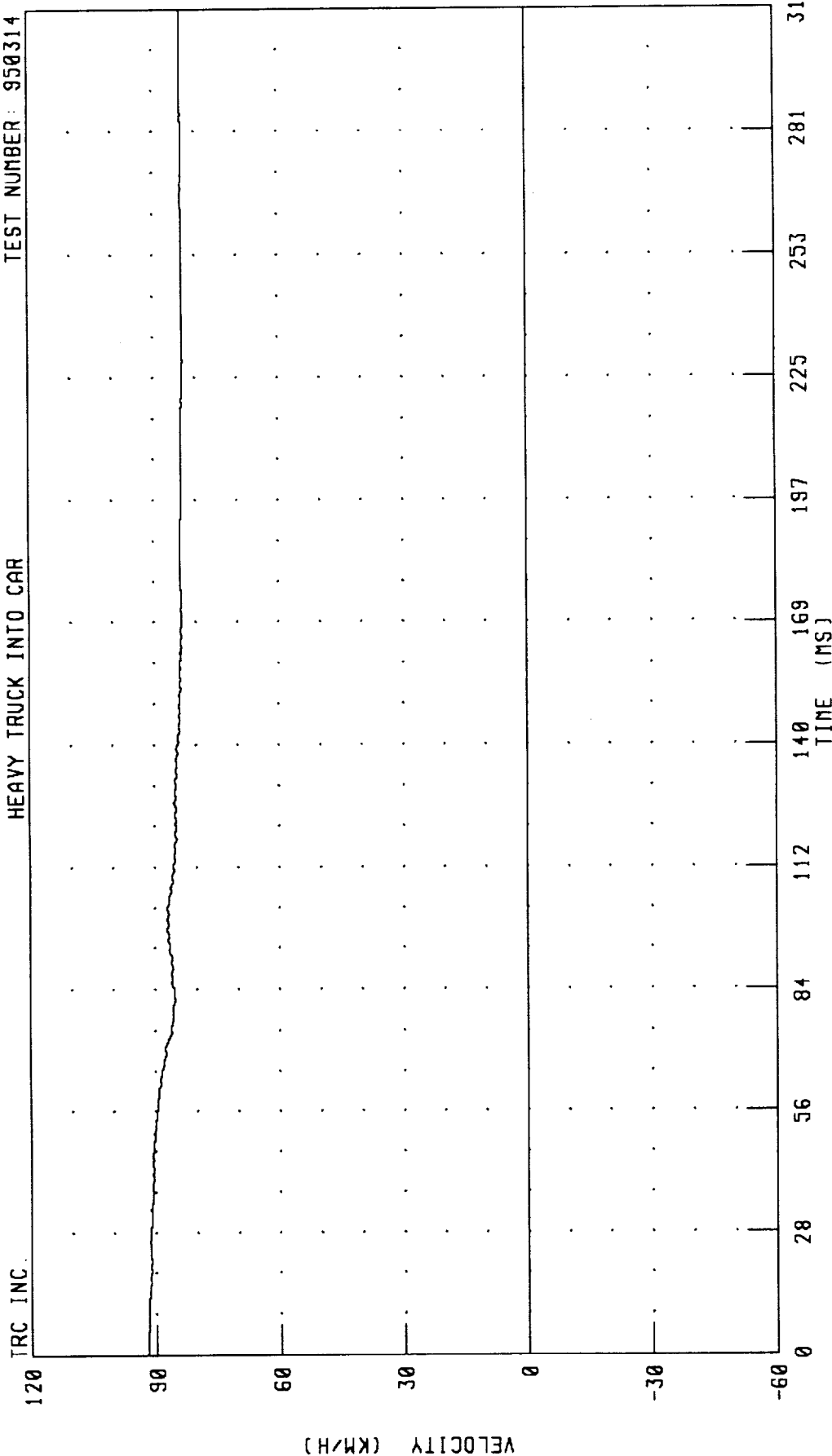
HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
TRUCK CENTER OF GRAVITY X-AXIS ACCELERATION



CHANNEL: VCGXG1 FILTER: CH. CLASS 60

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS TRUCK CENTER OF GRAVITY X-AXIS VELOCITY

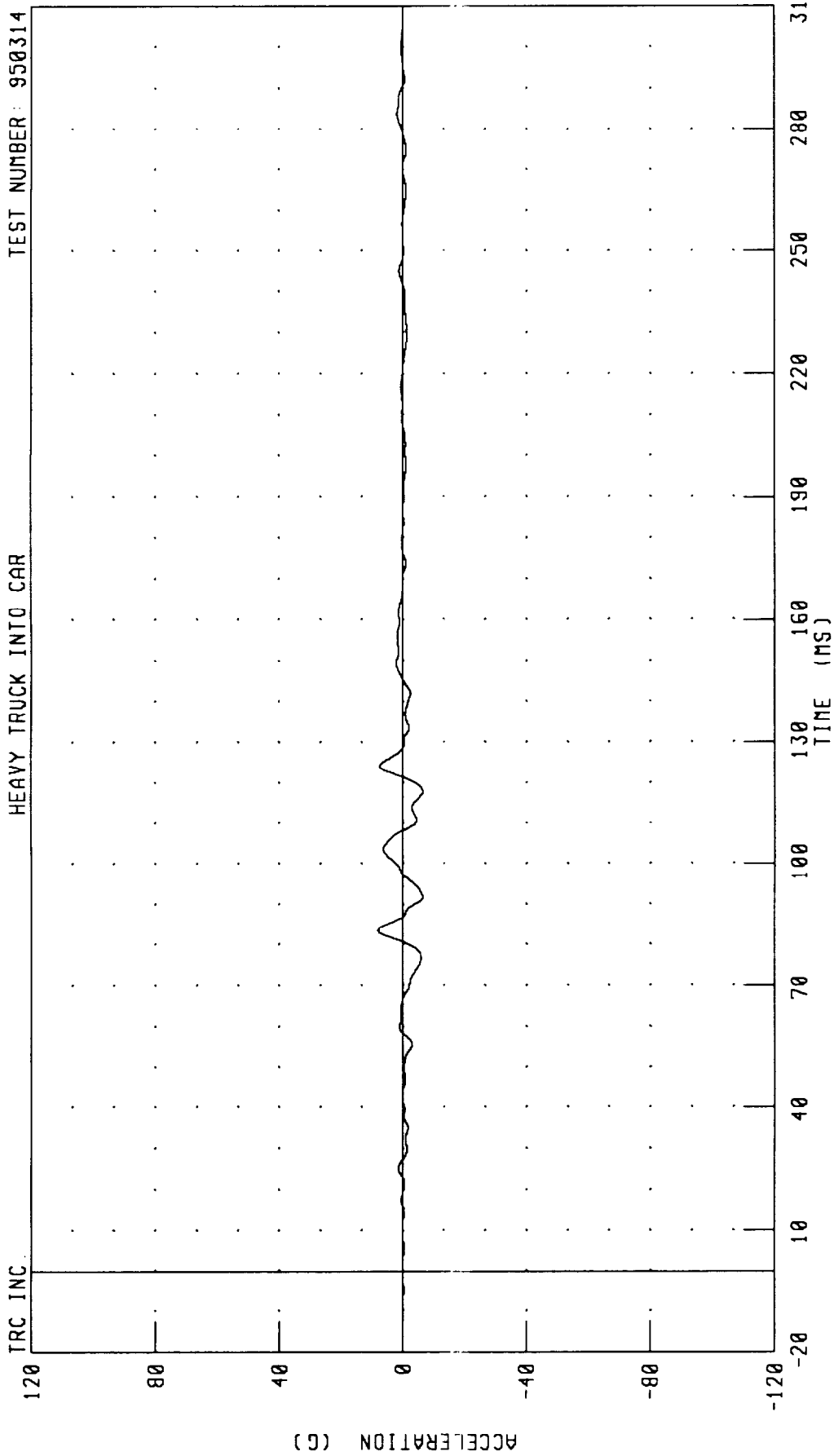
TEST NUMBER: 950314



CHANNEL: VCGXV1 FILTER: CH CLASS 180

PEAK DATA: 91.90 KM/H @ 0.00 MS, 82.95 KM/H @ 229.20 MS

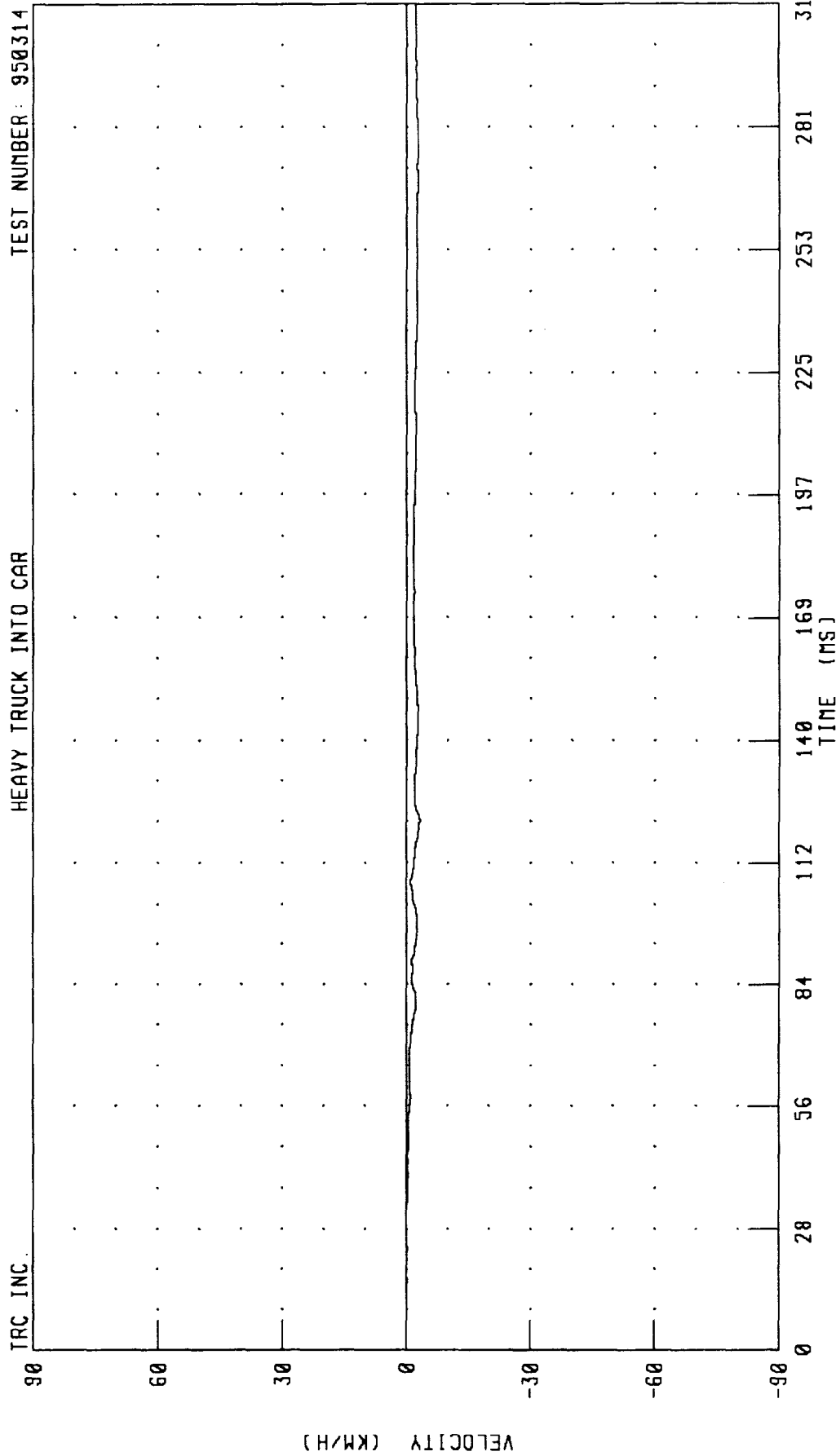
HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
TRUCK CENTER OF GRAVITY Y-AXIS ACCELERATION



CHANNEL: VCGYG1 FILTER: CH CLASS 60

PEAK DATA: 8 10 G @ 83 52 MS; -6 49 G @ 91 76 MS

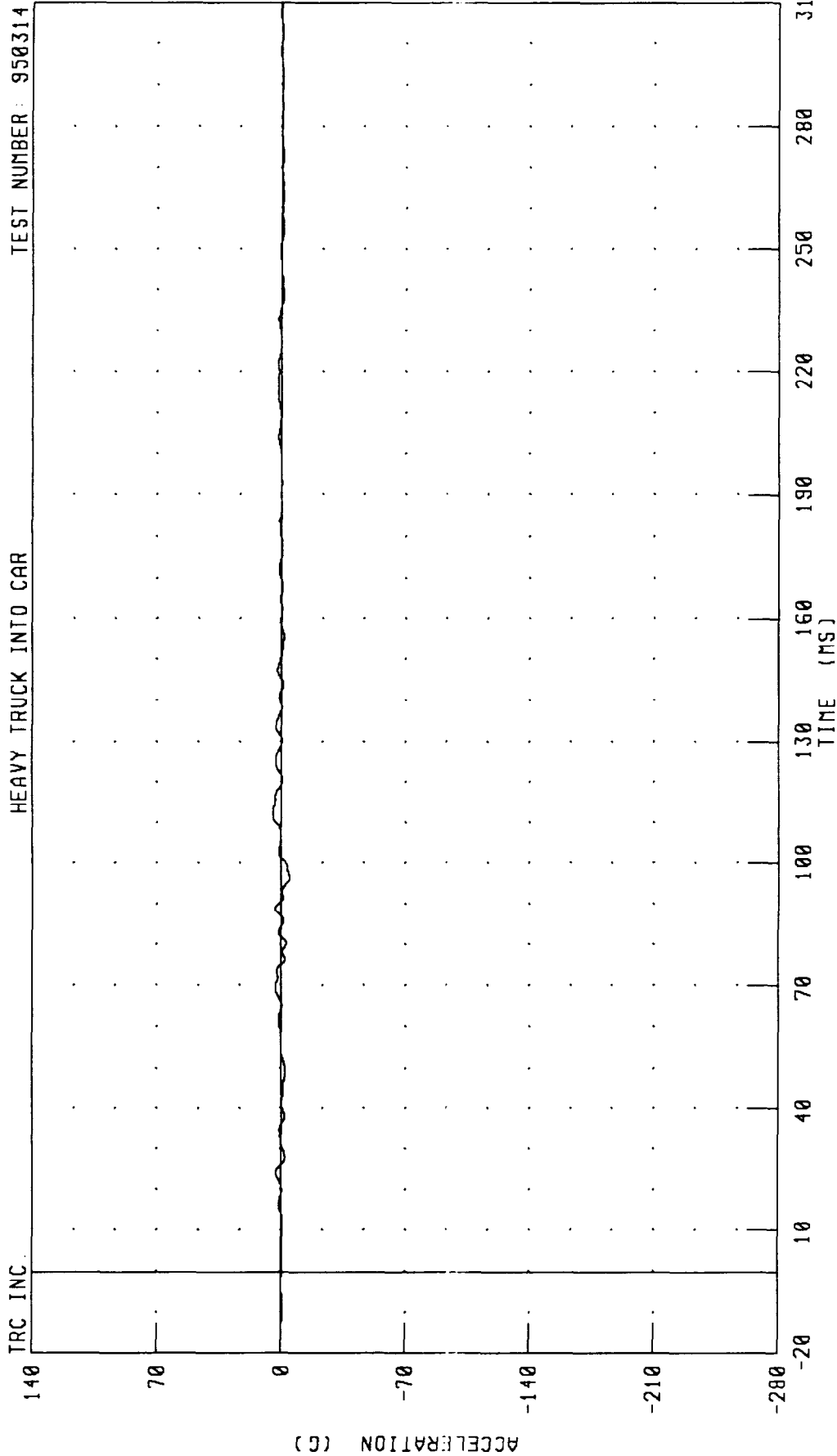
HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS TRUCK CENTER OF GRAVITY Y-AXIS VELOCITY



CHANNEL: VCGYV1 FILTER: CH. CLASS 180

PEAK DATA: 0.14 KM/H @ 27.44 MS, -3.18 KM/H @ 122.24 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS TRUCK CENTER OF GRAVITY Z-AXIS ACCELERATION



CHANNEL: VCGZG1 FILTER: CH. CLASS 60

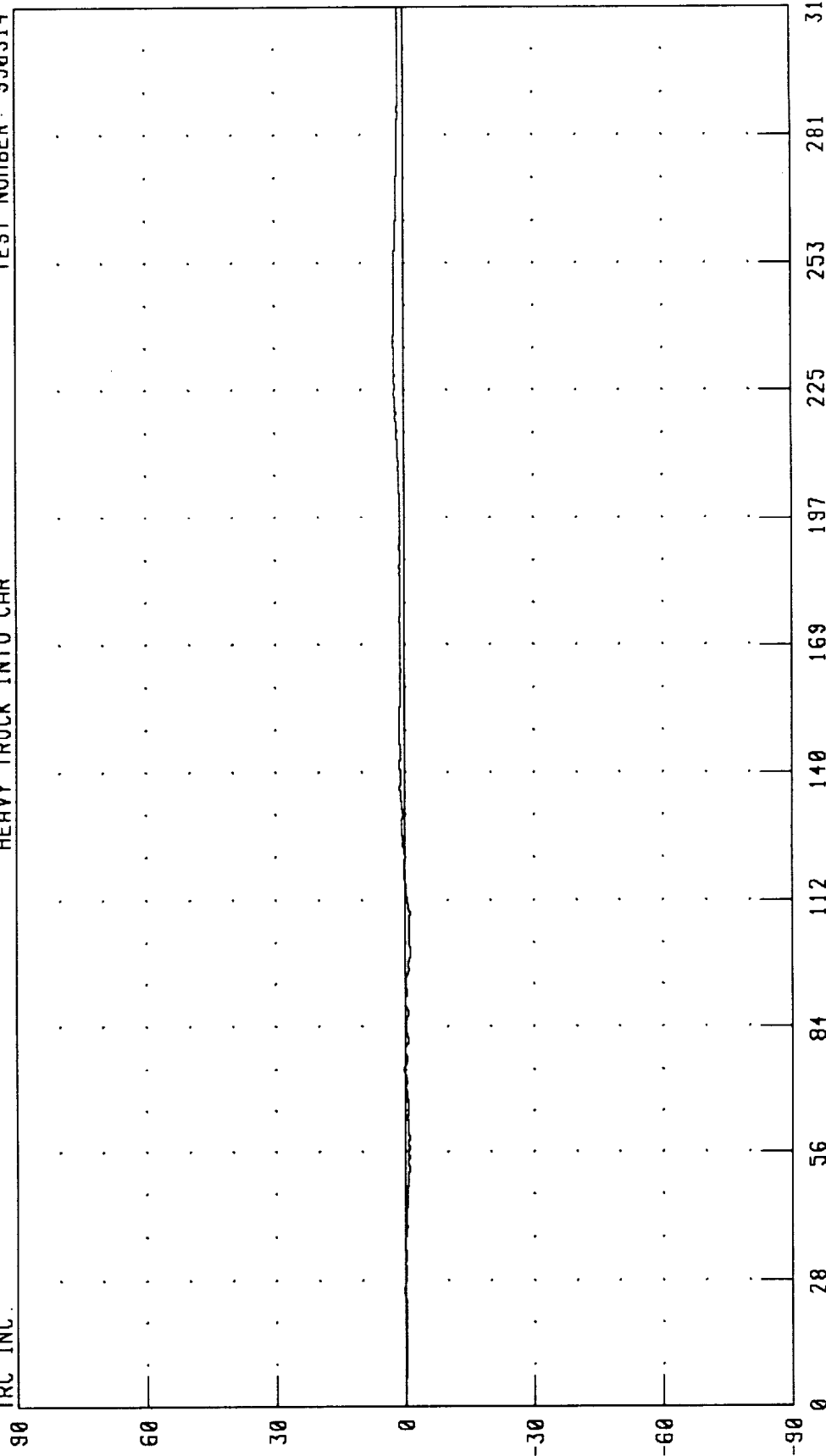
PEAK DATA: 5.02 G @ 112.56 MS, -4.92 G @ 96.40 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS TRUCK CENTER OF GRAVITY Z-AXIS VELOCITY

TEST NUMBER: 950314

HEAVY TRUCK INTO CAR

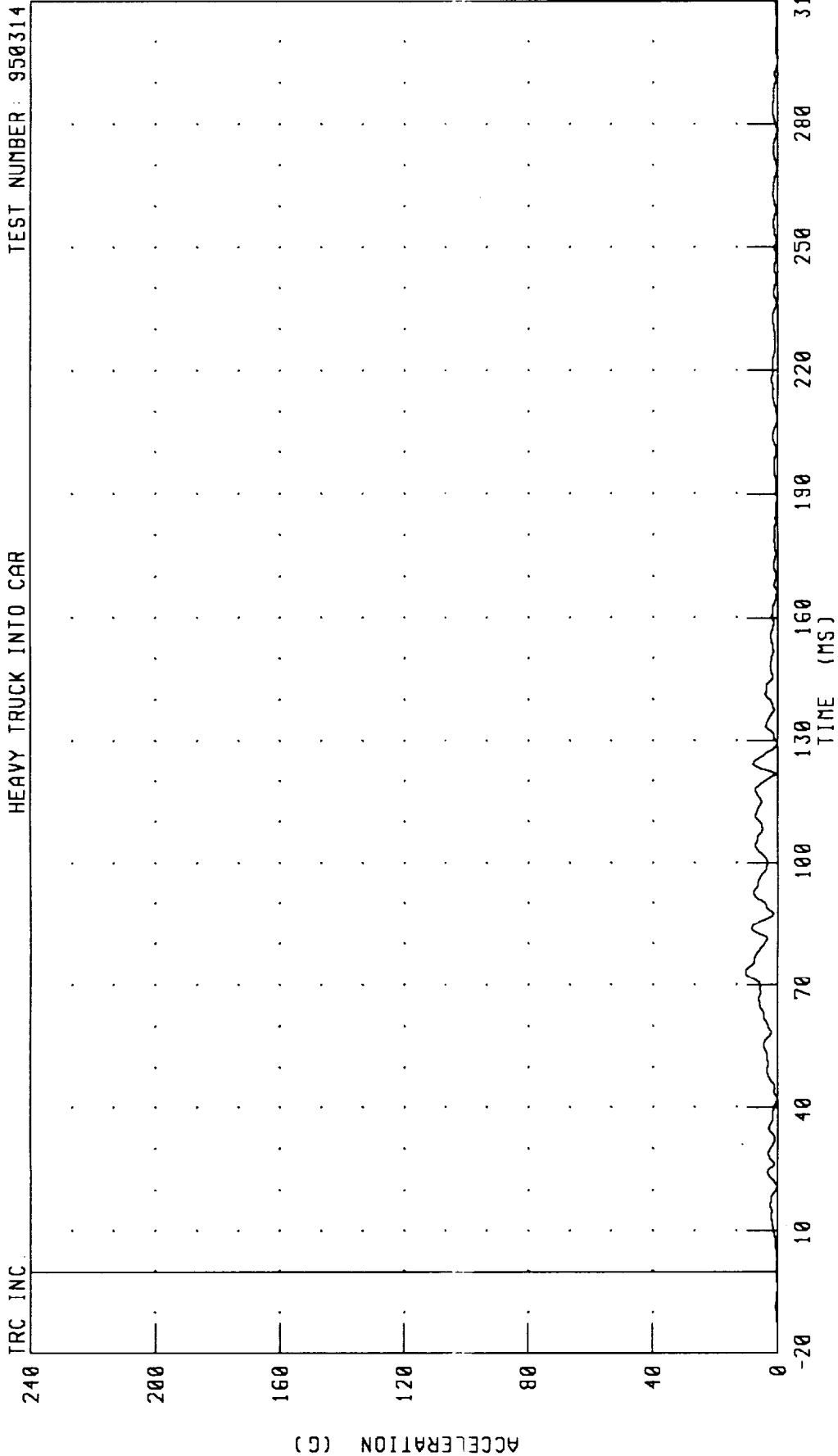
TRC INC.



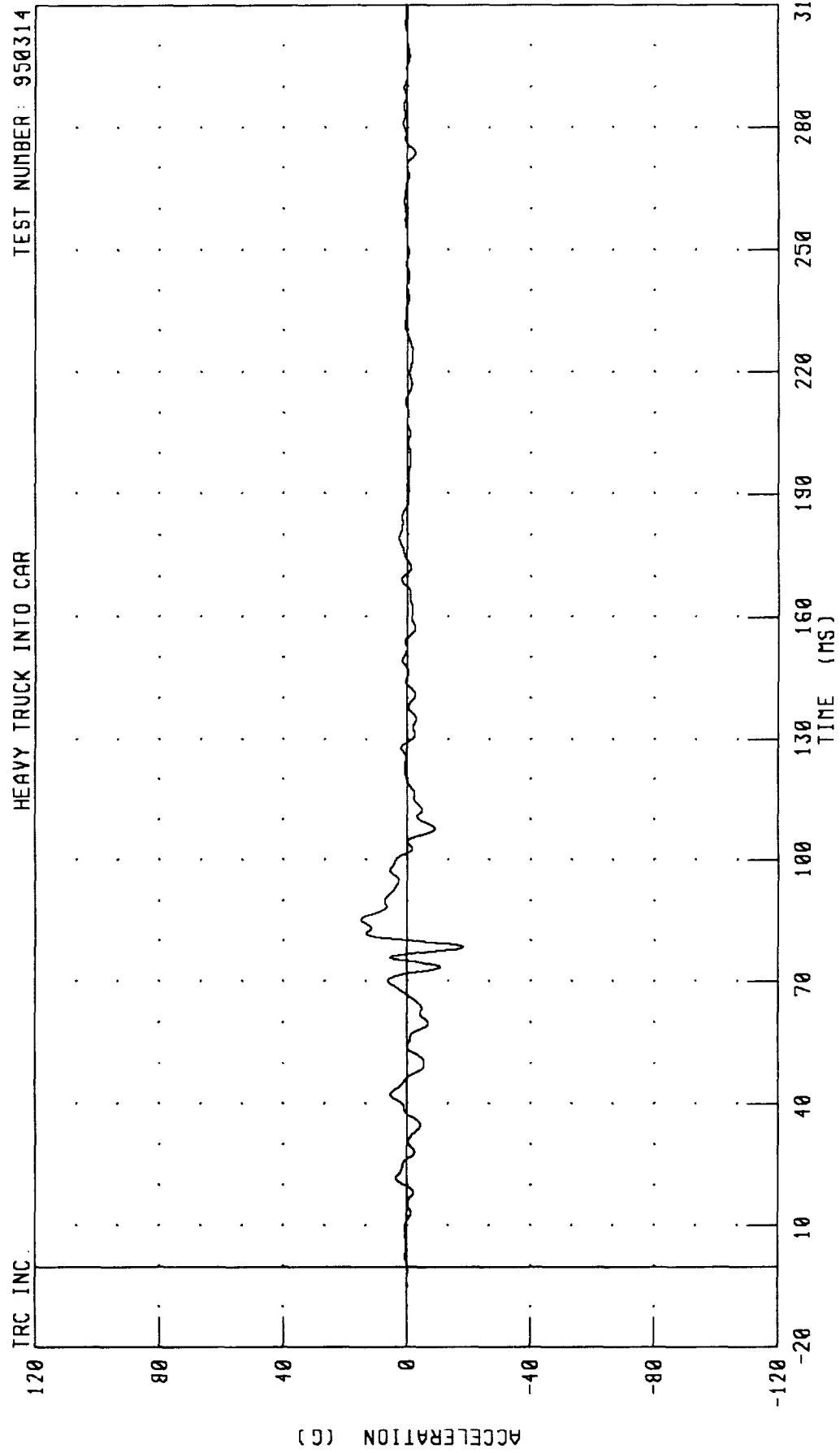
CHANNEL: VCGZV1 FILTER: CH. CLASS 180

PEAK DATA: 2.45 KM/H @ 235.60 MS, -1.28 KM/H @ 101.04 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
TRUCK CENTER OF GRAVITY RESULTANT ACCELERATION



HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
TRUCK FRONT FRAME CROSSMEMBER X-AXIS ACCELERATION

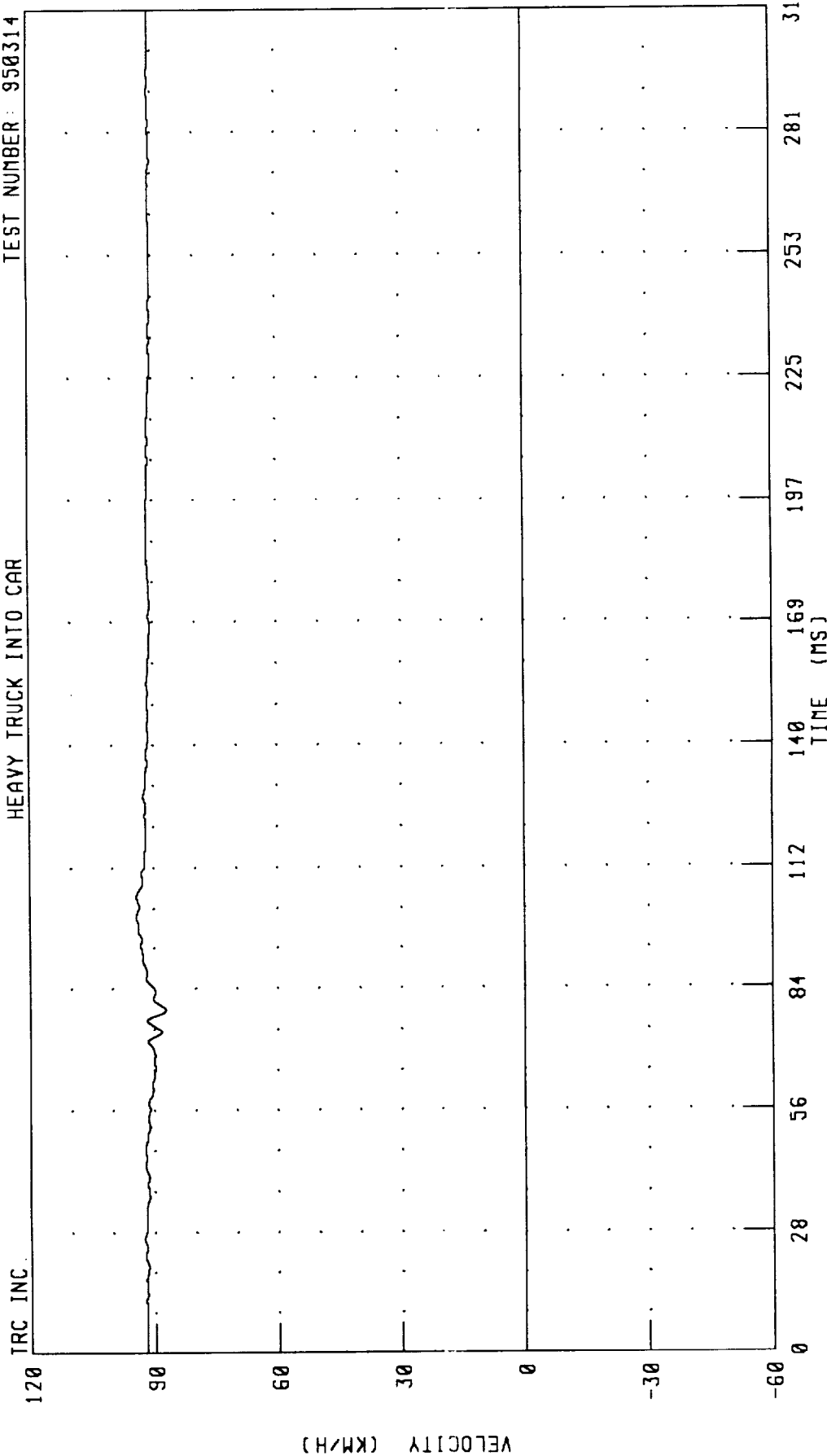


CHANNEL: FFCXG1 FILTER: CH. CLASS 60

PEAK DATA: 14.91 G @ 85.28 MS; -18.26 G @ 78.48 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS TRUCK FRONT FRAME CROSSMEMBER X-AXIS VELOCITY HEAVY TRUCK INTO CAR

TEST NUMBER: 950314

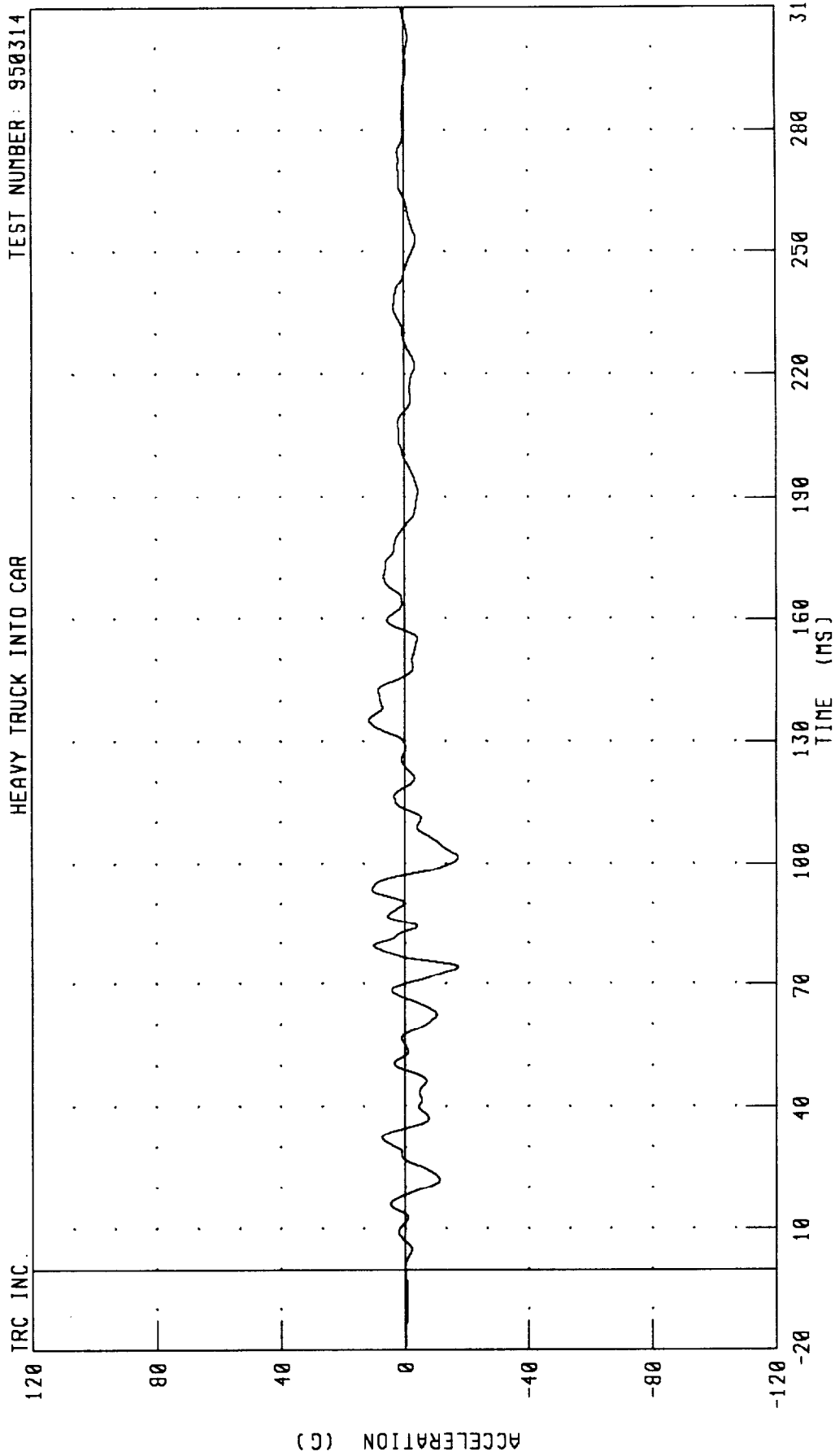


CHANNEL: FFCXV1 FILTER: CH CLASS 180

PEAK DATA: 94.33 KM/H @ 101.36 MS, 87.10 KM/H @ 79.68 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
TRUCK FRONT FRAME CROSSMEMBER Y-AXIS ACCELERATION
HEAVY TRUCK INTO CAR

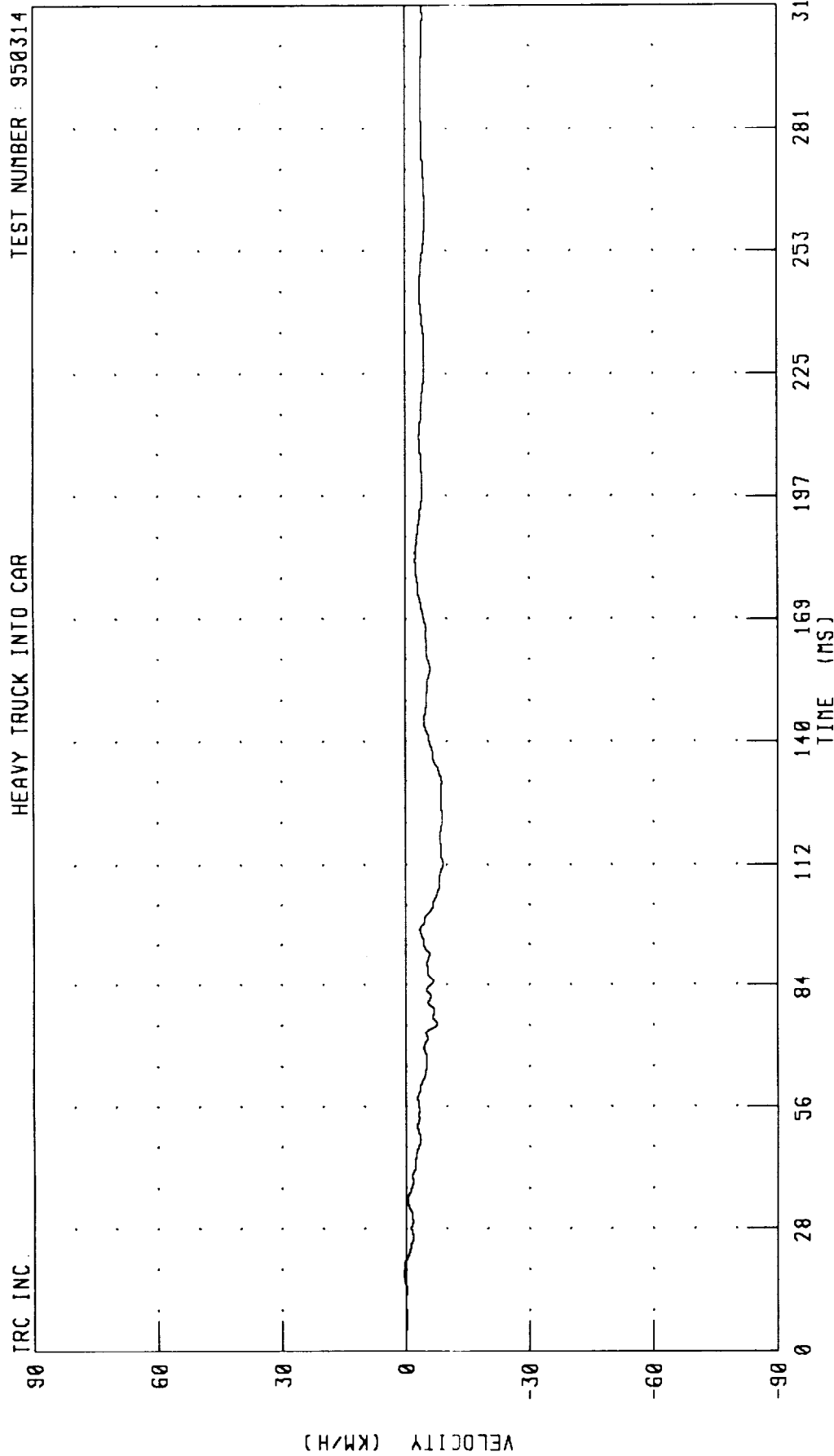
TEST NUMBER: 950314



CHANNEL: FFCY61 FILTER: CH. CLASS 60

PEAK DATA: 11.51 G @ 135.12 MS, -17.36 G @ 74.16 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
TRUCK FRONT FRAME CROSSMEMBER Y-AXIS VELOCITY

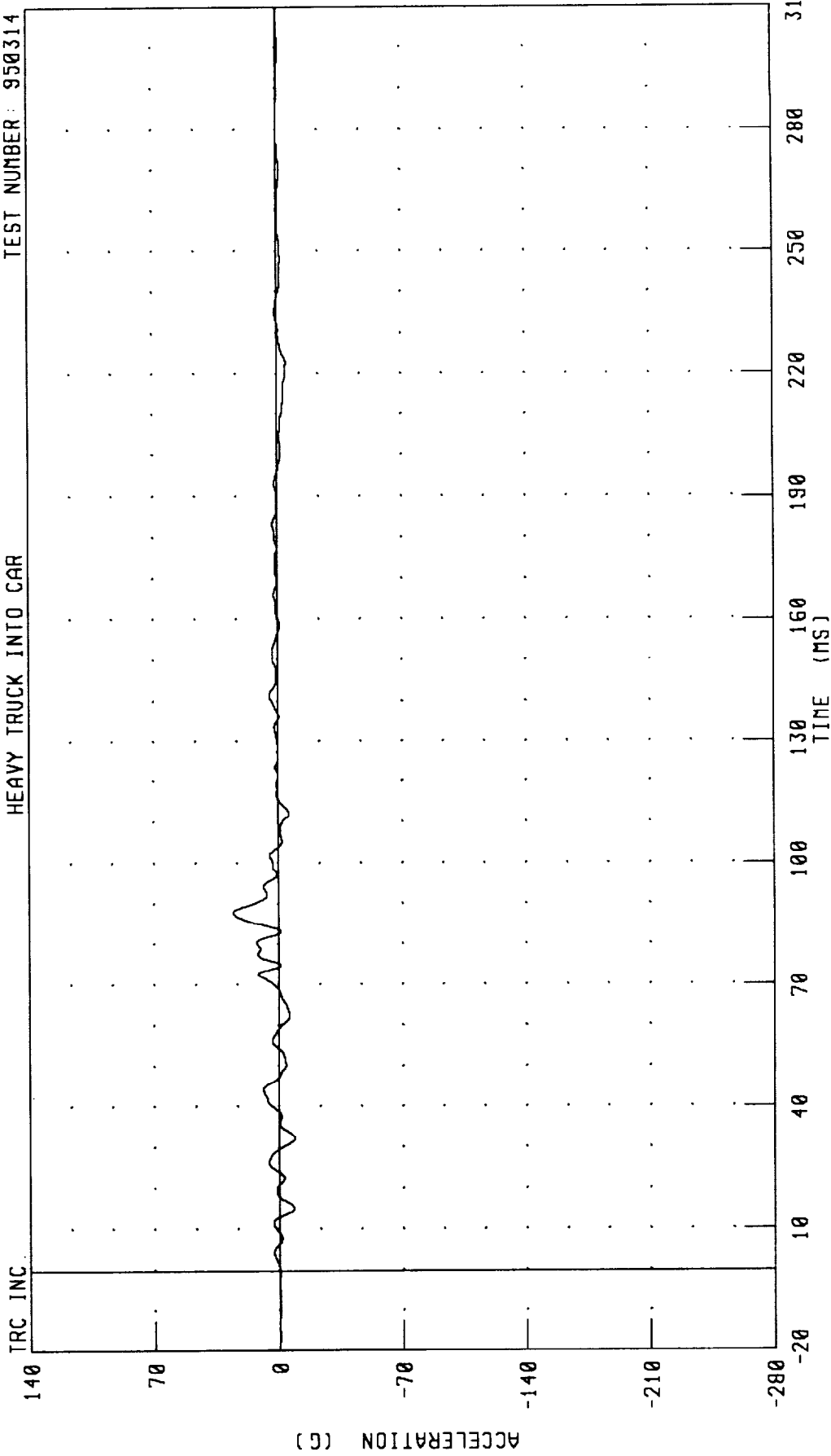


CHANNEL: FFCYV1 FILTER: CH CLASS 180

PEAK DATA: 0 50 KM/H @ 17 76 MS, -9 09 KM/H @ 112 96 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
TRUCK FRONT FRAME CROSSMEMBER Z-AXIS ACCELERATION
HEAVY TRUCK INTO CAR

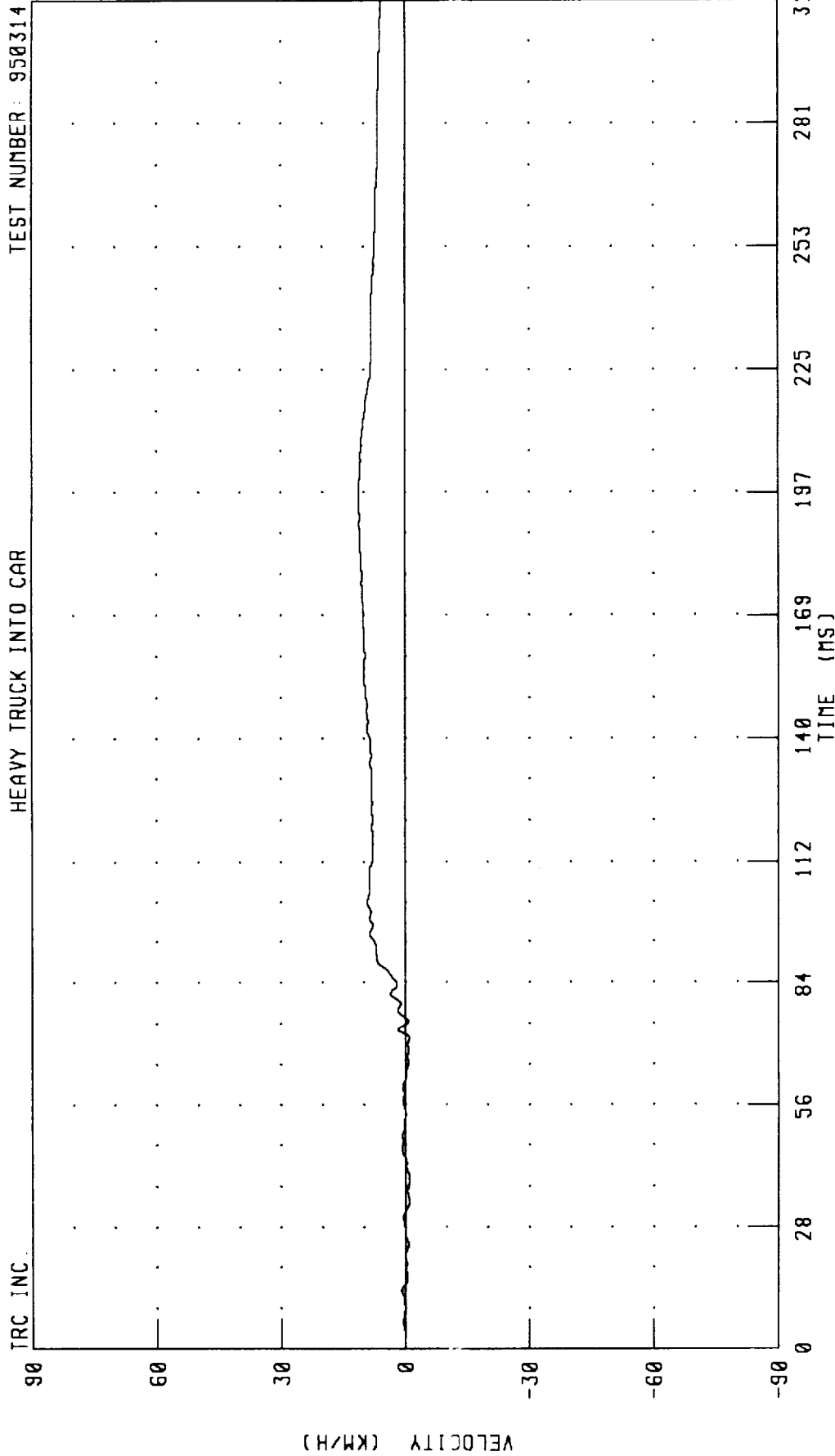
TEST NUMBER: 950314



CHANNEL: FFCZG1 FILTER: CH. CLASS 60

PEAK DATA: 25.61 G @ 87.84 MS, -8.96 G @ 32.32 MS

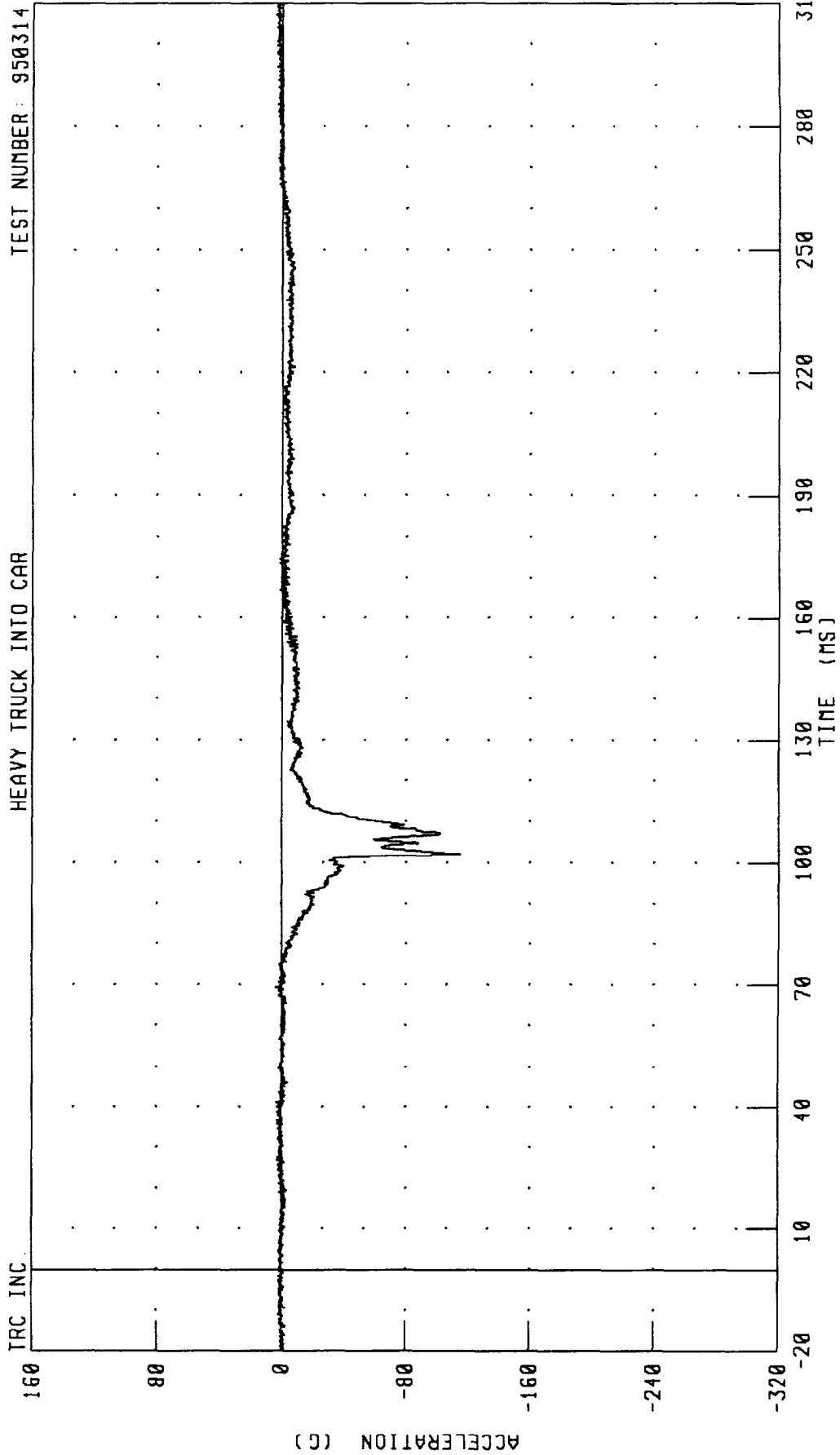
HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS TRUCK FRONT FRAME CROSSMEMBER Z-AXIS VELOCITY



CHANNEL: FFCZV1 FILTER: CH CLASS 180

PEAK DATA: 11.29 KM/H @ 195.20 MS, -1.10 KM/H @ 71.84 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
DRIVER HEAD X-AXIS ACCELERATION
HEAVY TRUCK INTO CAR



CHANNEL: HEDXC1 FILTER: CH. CLASS 1000

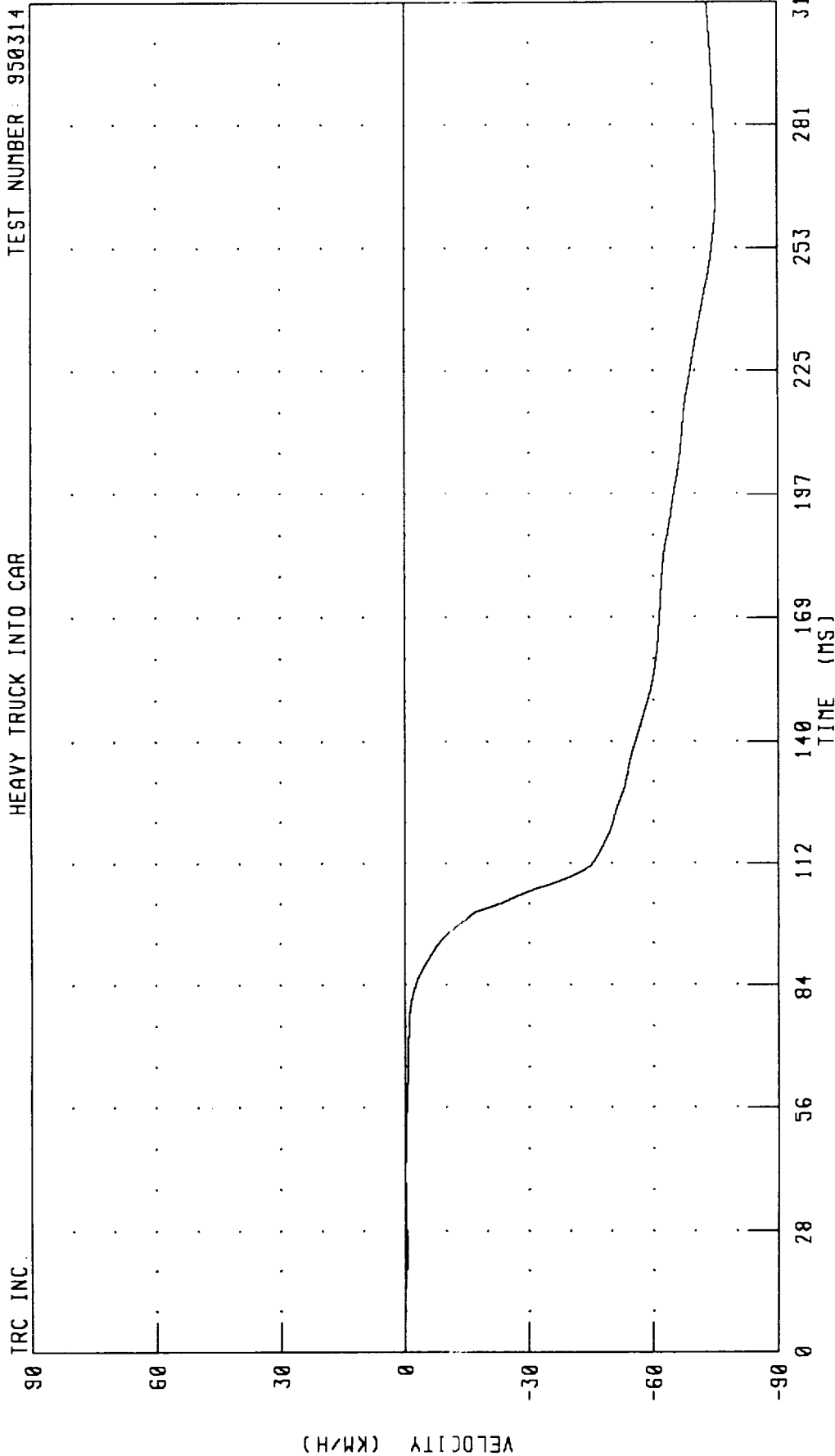
PEAK DATA: 4.92 G @ 307.04 MS, -115.21 G @ 102.08 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS

DRIVER HEAD X-AXIS VELOCITY

HEAVY TRUCK INTO CAR

TEST NUMBER: 950314

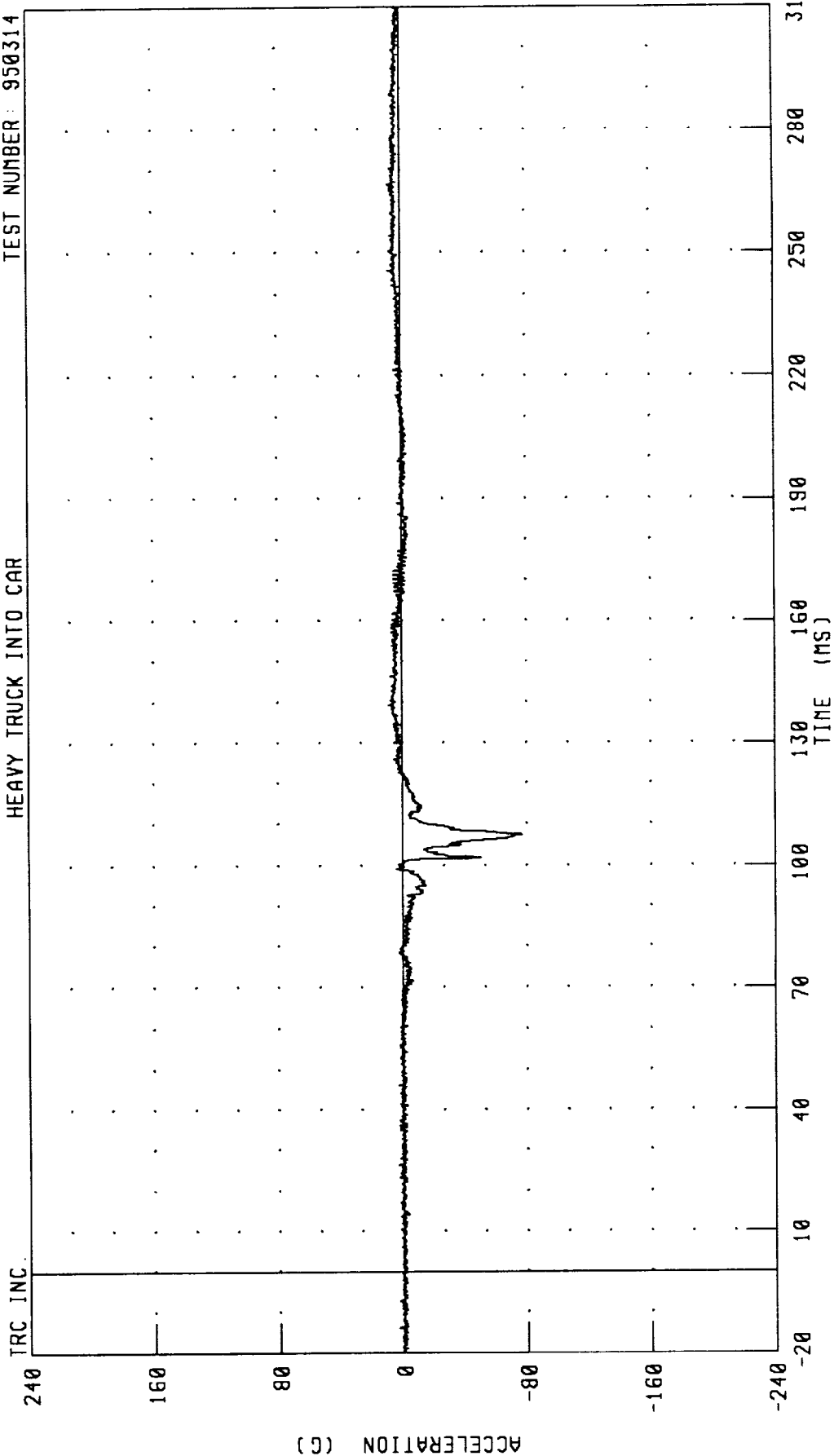


CHANNEL: HEDXV1 FILTER: CH. CLASS 180

PEAK DATA: 0.07 KM/H @ 7.36 MS, -75.14 KM/H @ 266.48 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
DRIVER HEAD Y-AXIS ACCELERATION
HEAVY TRUCK INTO CAR

TEST NUMBER: 950314



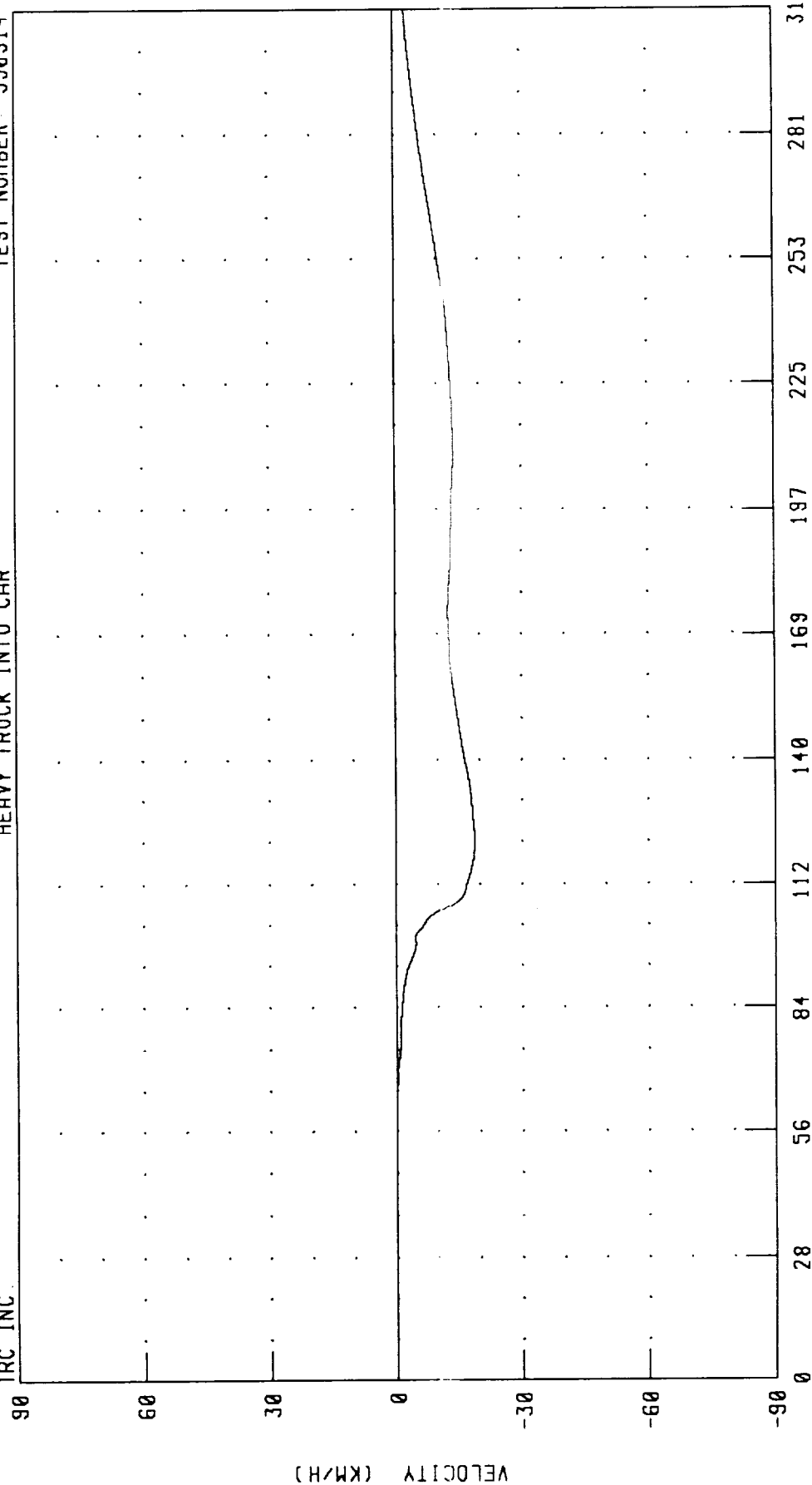
CHANNEL: HEDYG1 FILTER: CH CLASS 1000

PEAK DATA: 8.58 G @ 139.36 MS, -77.03 G @ 107.36 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
DRIVER HEAD Y-AXIS VELOCITY
HEAVY TRUCK INTO CAR

TEST NUMBER: 950314

TRC INC.



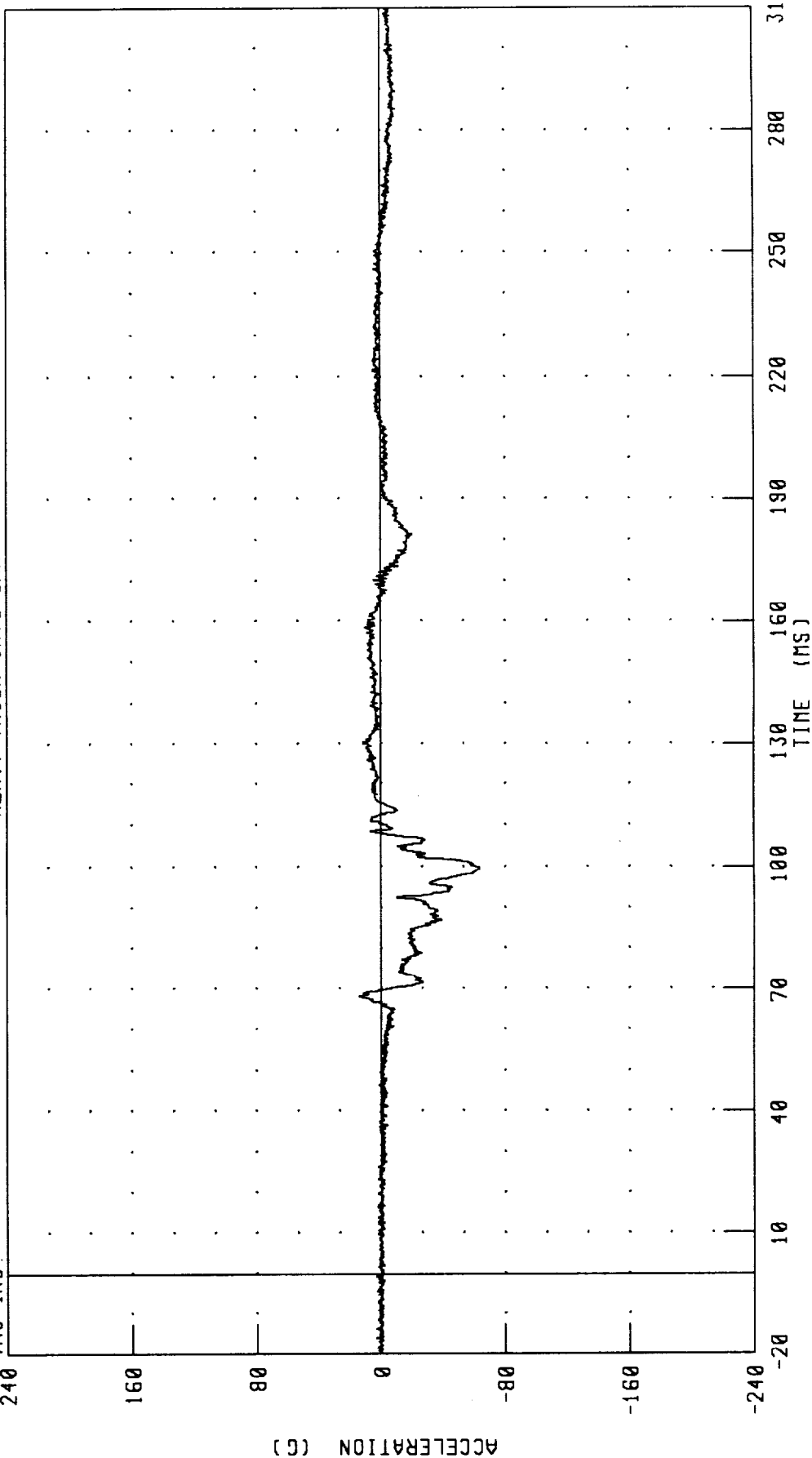
CHANNEL: HEDYV1 FILTER: CH. CLASS 180

PEAK DATA: 0.00 KM/H @ 27.04 MS, -18.81 KM/H @ 122.16 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
DRIVER HEAD Z-AXIS ACCELERATION
HEAVY TRUCK INTO CAR

TEST NUMBER: 950314

TRC INC.



CHANNEL: HED7G1 FILTER: CH. CLASS 1000

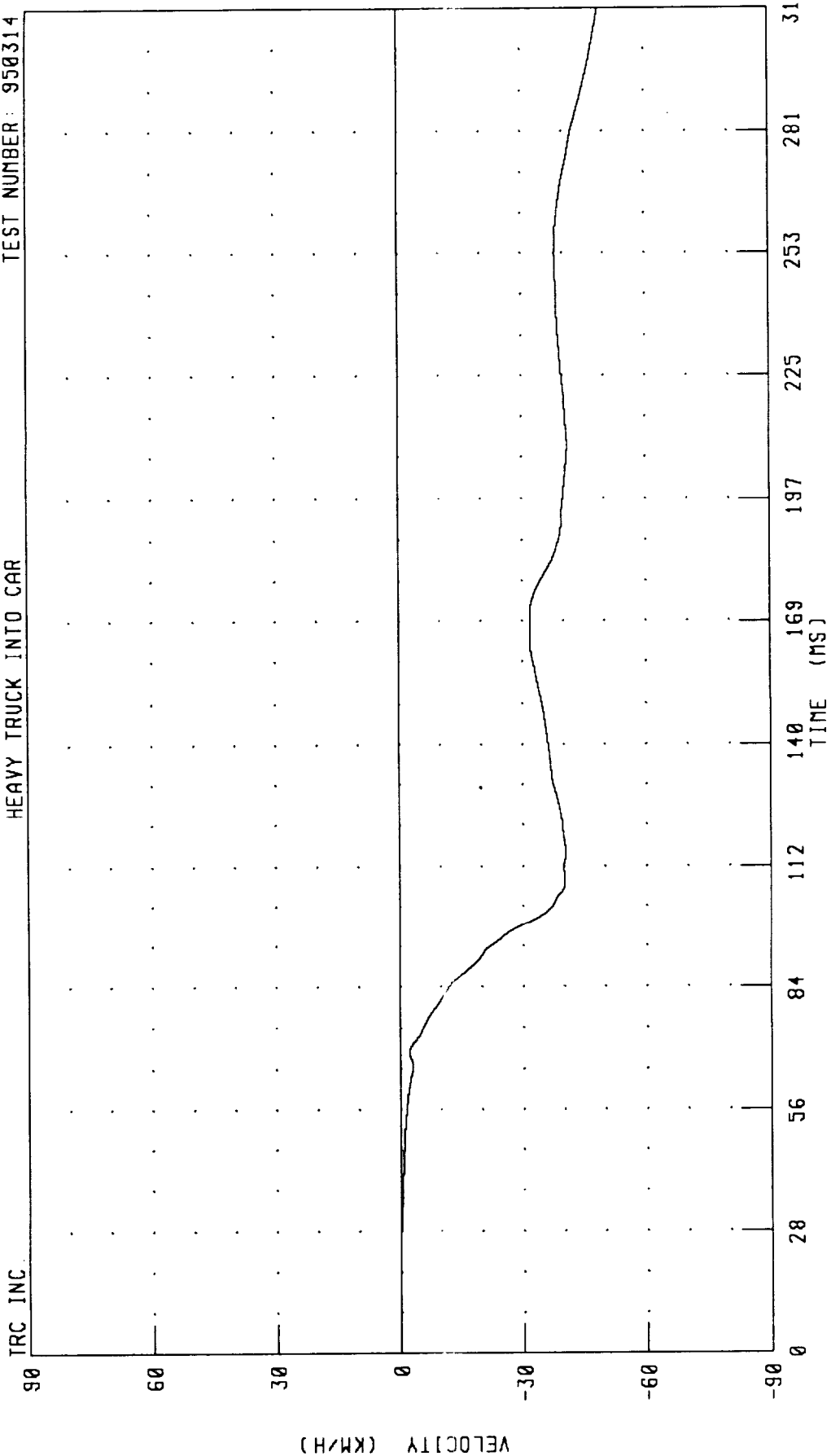
PEAK DATA: 14.50 G @ 68.08 MS, -63.71 G @ 99.52 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS

DRIVER HEAD Z-AXIS VELOCITY

HEAVY TRUCK INTO CAR

TEST NUMBER: 950314

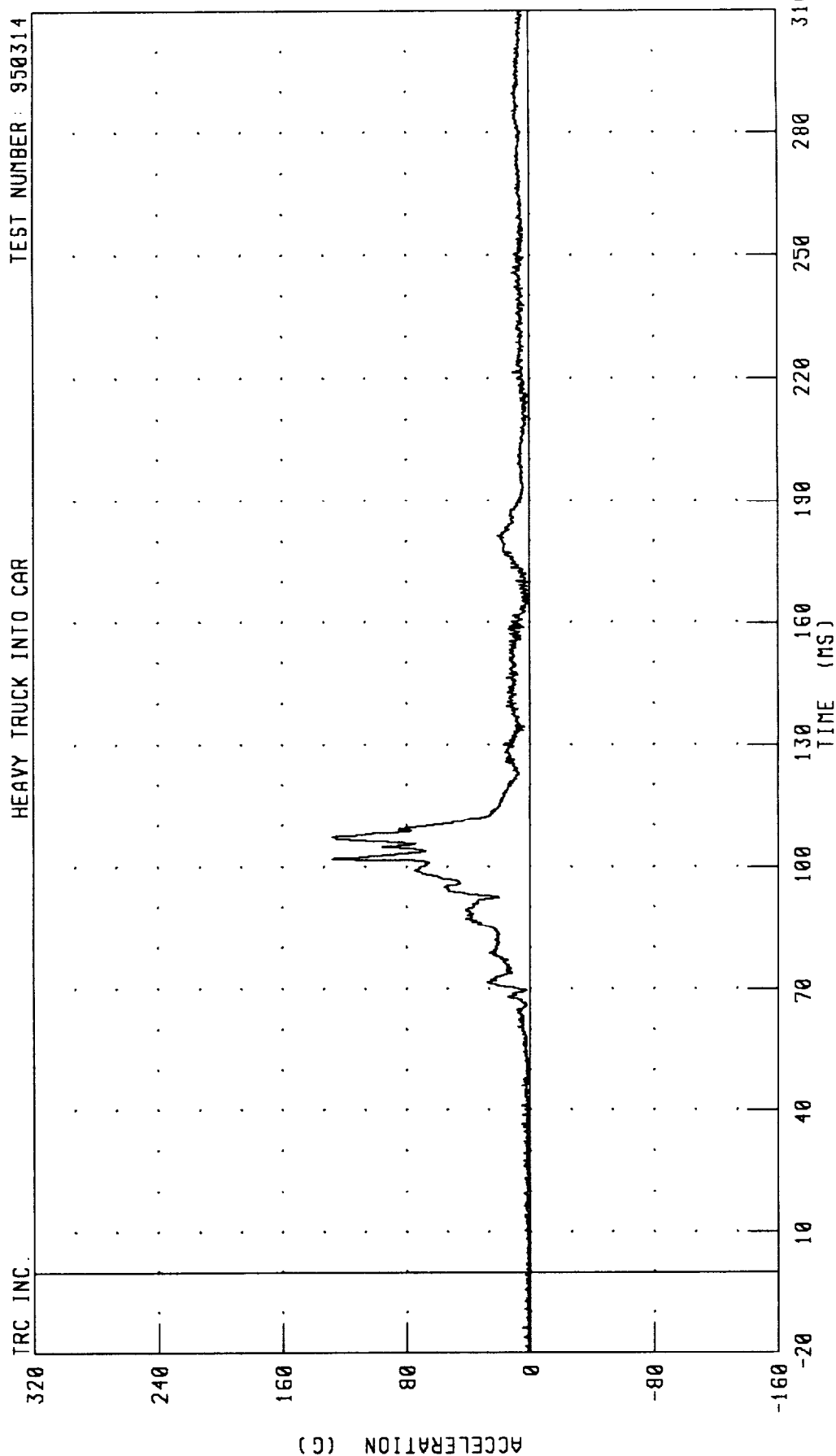


CHANNEL: HEDZV1 FILTER: CH: CLASS 180

PEAK DATA: 0.02 KM/H @ 17.36 MS, -48.86 KM/H @ 310.00 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
DRIVER HEAD RESULTANT ACCELERATION
HEAVY TRUCK INTO CAR

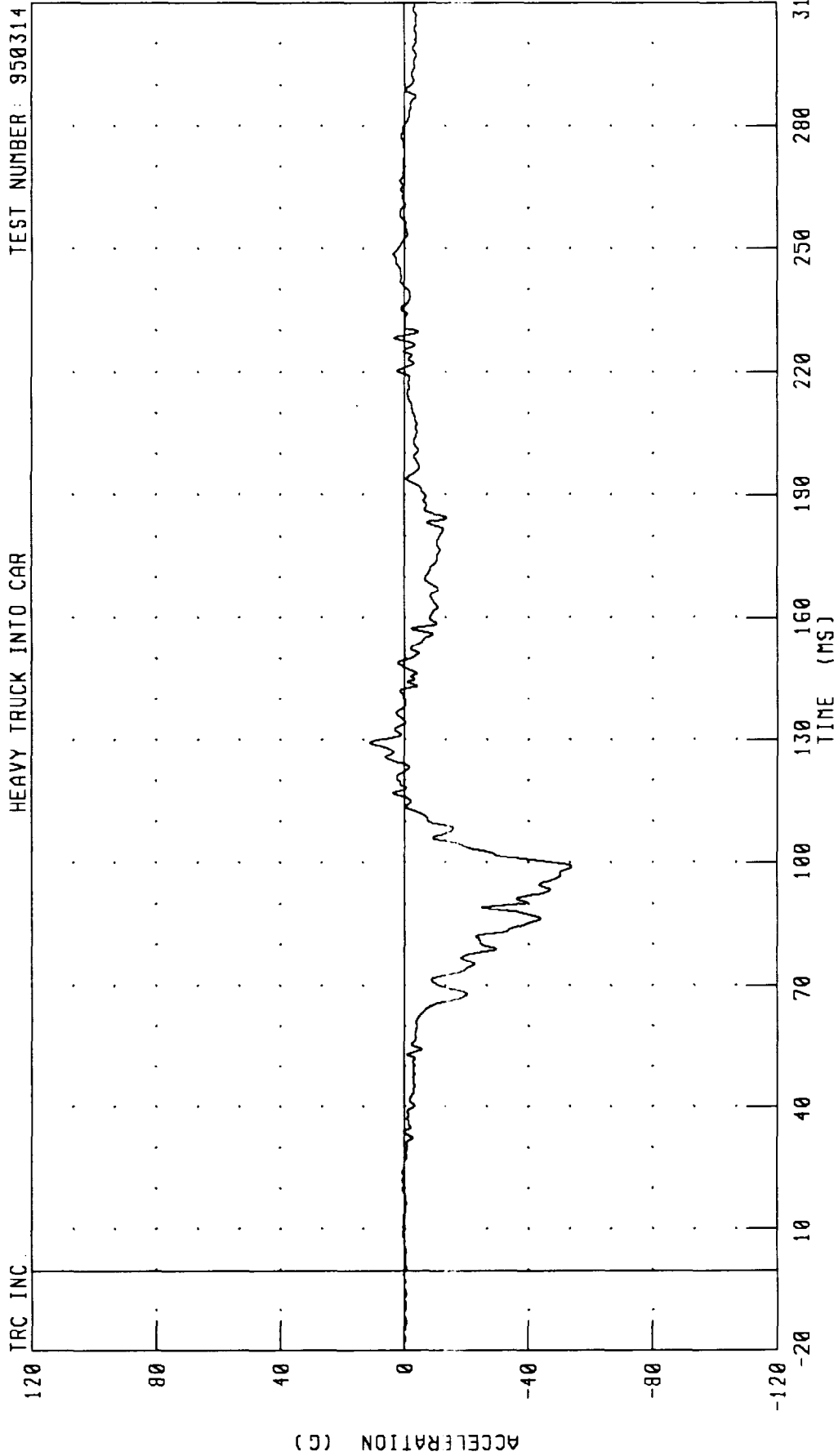
TEST NUMBER: 950314



CHANNEL: HEDRG1 FILTER: CH. CLASS 1000

PEAK DATA: 128.06 G @ 102.00 MS, 0.03 G @ 7.92 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
DRIVER CHEST X-AXIS ACCELERATION



CHANNEL: CSTXG1 FILTER: CH. CLASS 180

PEAK DATA: 11.31 G @ 129.36 MS, -53.92 G @ 99.04 MS

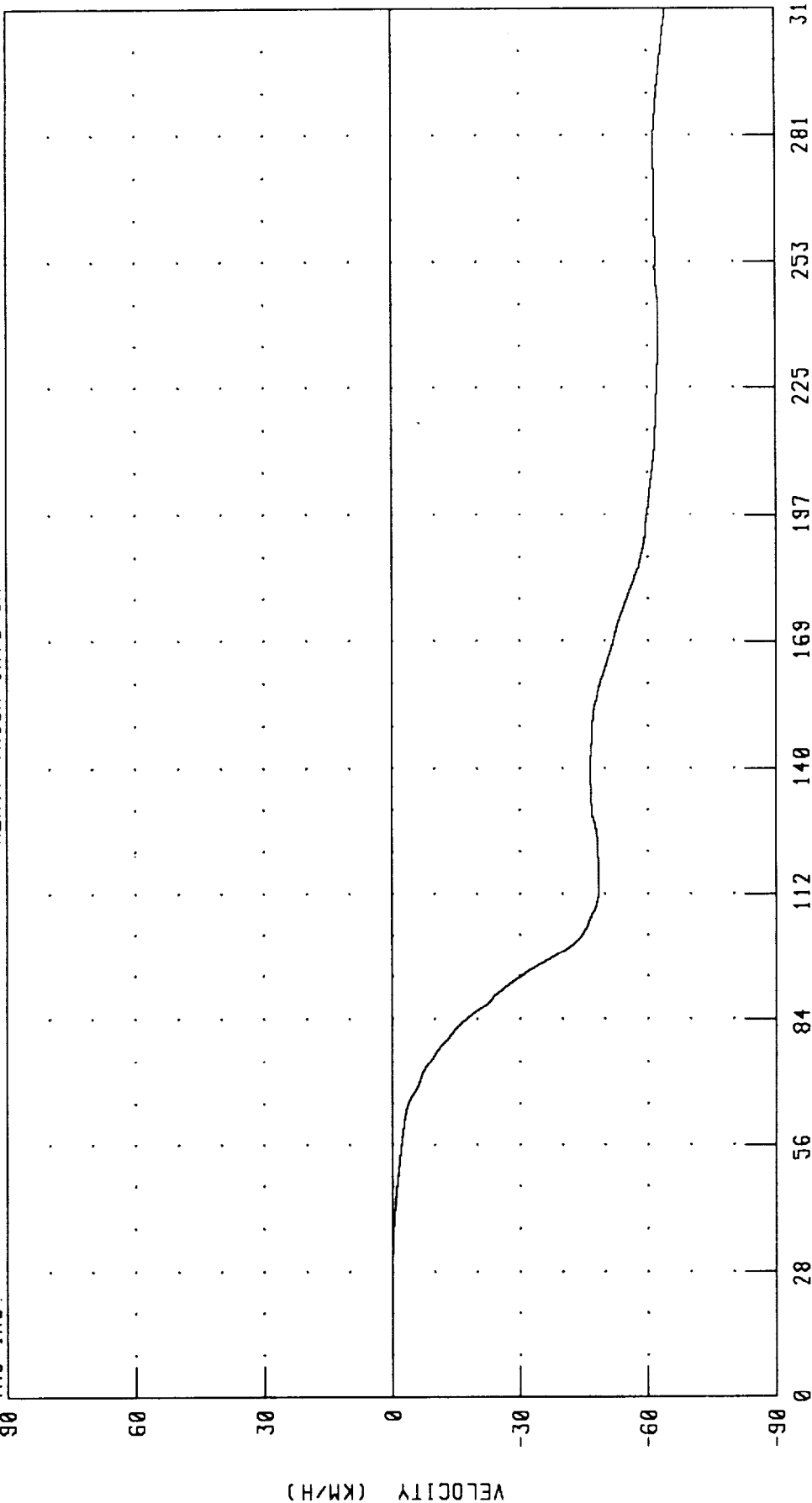
HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS

DRIVER CHEST X-AXIS VELOCITY

HEAVY TRUCK INTO CAR

TEST NUMBER: 950314

TRC INC

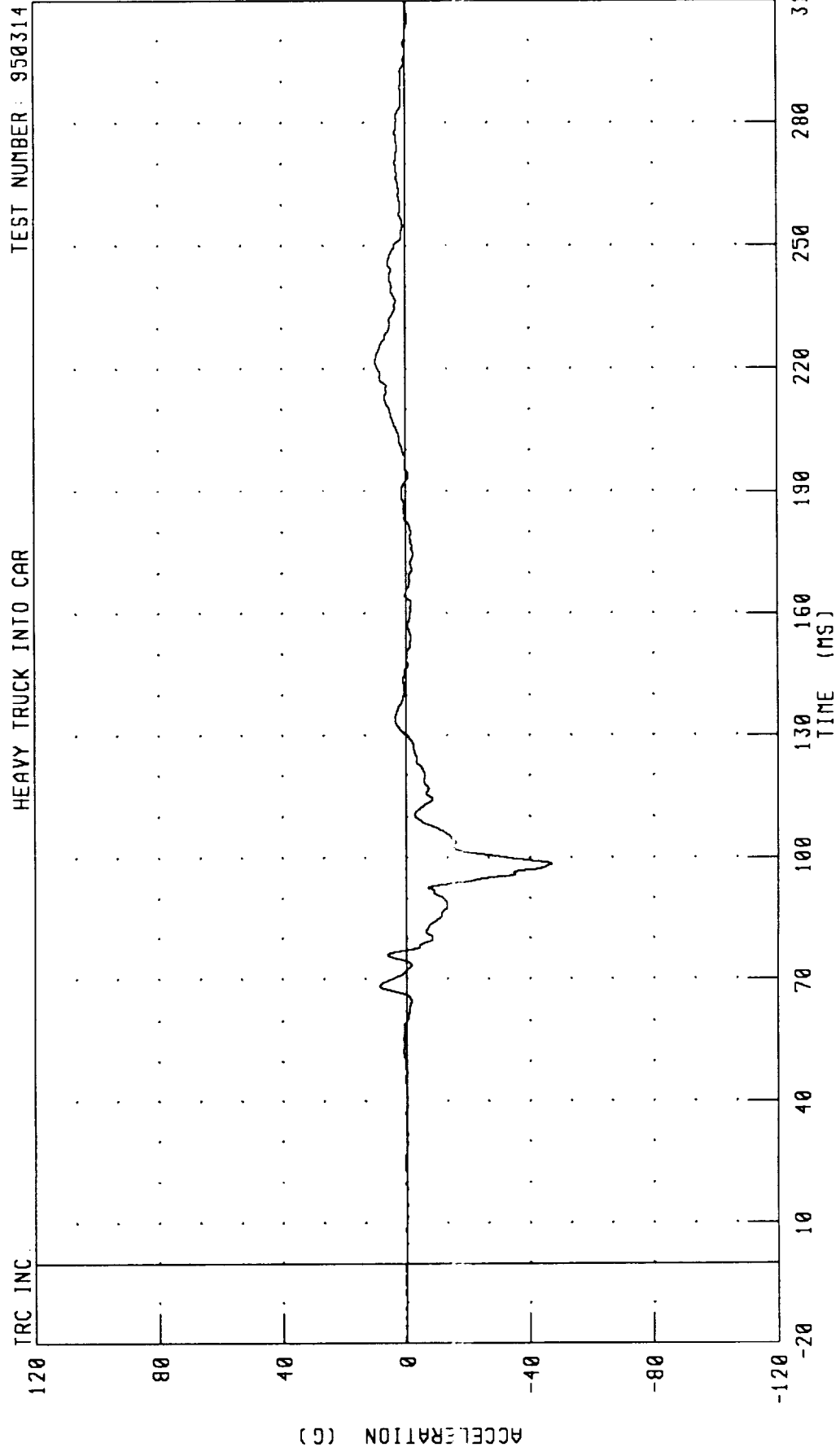


CHANNEL: CSTXV1 FILTER: CH CLASS 180

PEAK DATA: 0.05 KM/H @ 26.72 MS, -64.35 KM/H @ 310.00 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
 DRIVER CHEST Y-AXIS ACCELERATION
 HEAVY TRUCK INTO CAR

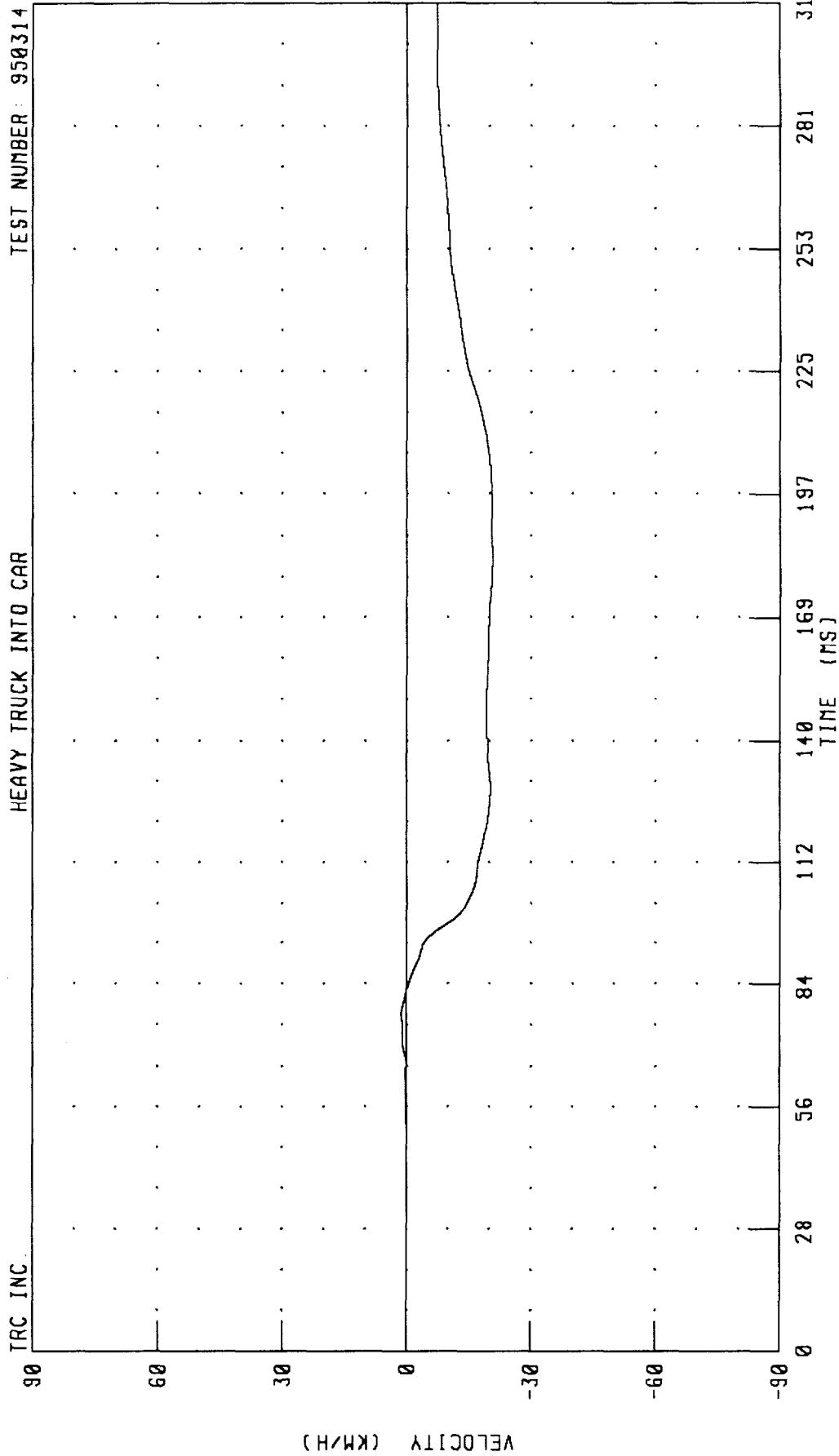
TEST NUMBER: 950314



CHANNEL: CSTYG1 FILTER: CH CLASS 180

PEAK DATA: 9.89 G @ 221.68 MS, -47.20 G @ 98.48 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS DRIVER CHEST Y-AXIS VELOCITY HEAVY TRUCK INTO CAR

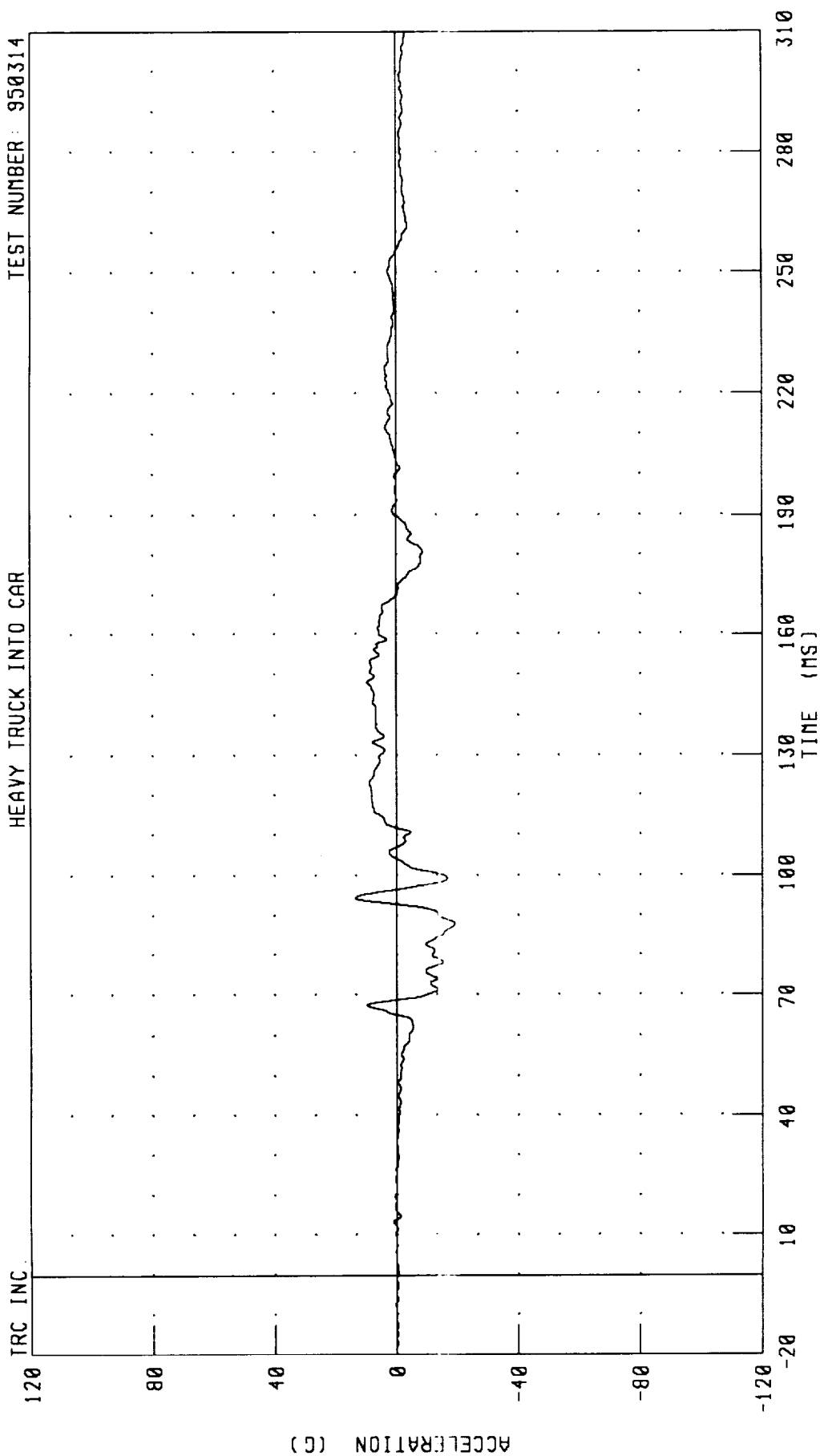


CHANNEL: CSTYV1 FILTER: CH. CLASS 180

PEAK DATA: 1.31 KM/H @ 77.20 MS, -20.73 KM/H @ 182.64 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS DRIVER CHEST Z-AXIS ACCELERATION HEAVY TRUCK INTO CAR

TEST NUMBER: 950314



CHANNEL: CSTZG1 FILTER: CH CLASS 180

PEAK DATA: 13.44 G @ 94.32 MS, -19.44 G @ 88.00 MS

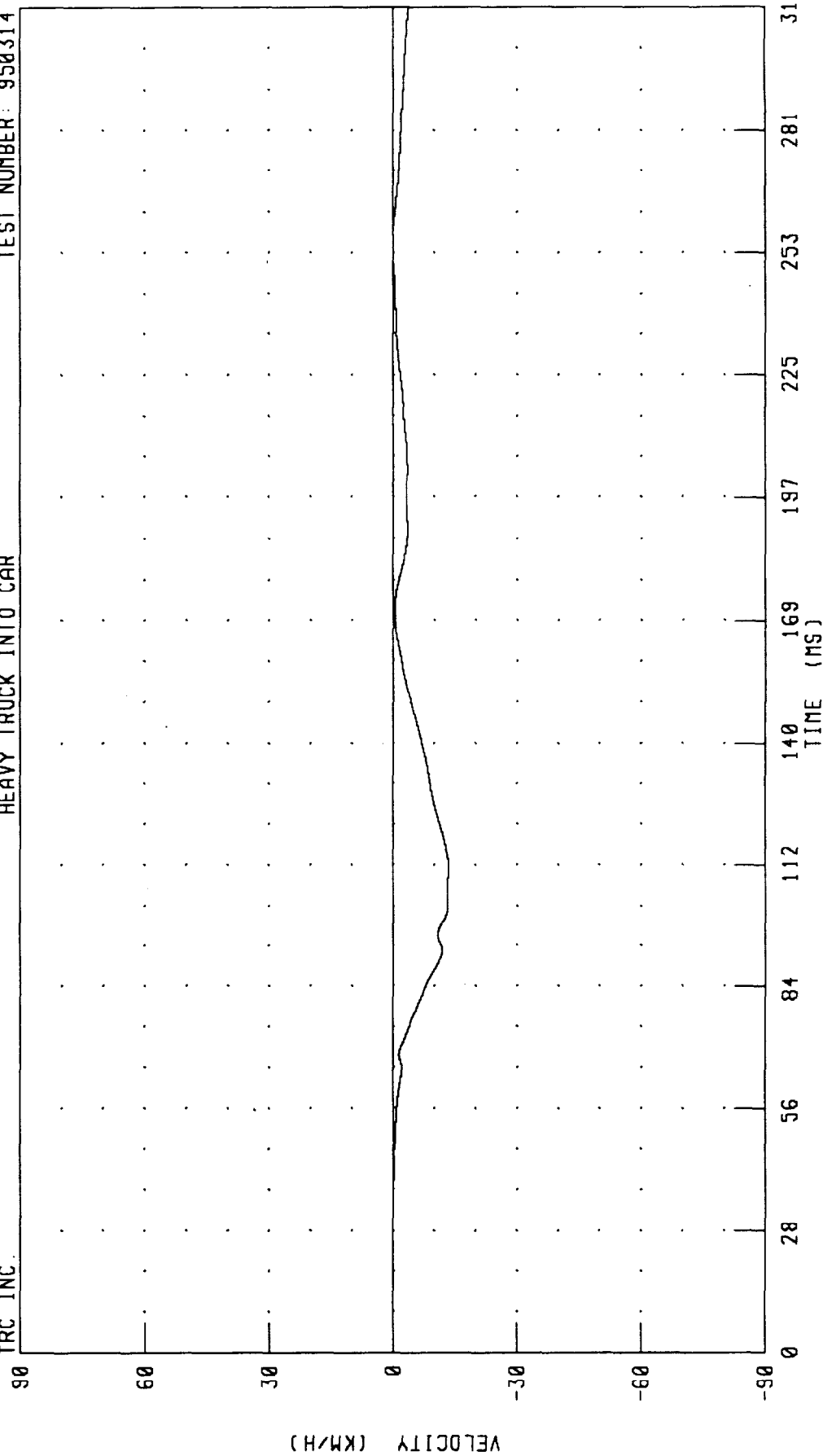
HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS

DRIVER CHEST Z-AXIS VELOCITY

HEAVY TRUCK INTO CAR

TEST NUMBER: 950314

TRC INC.

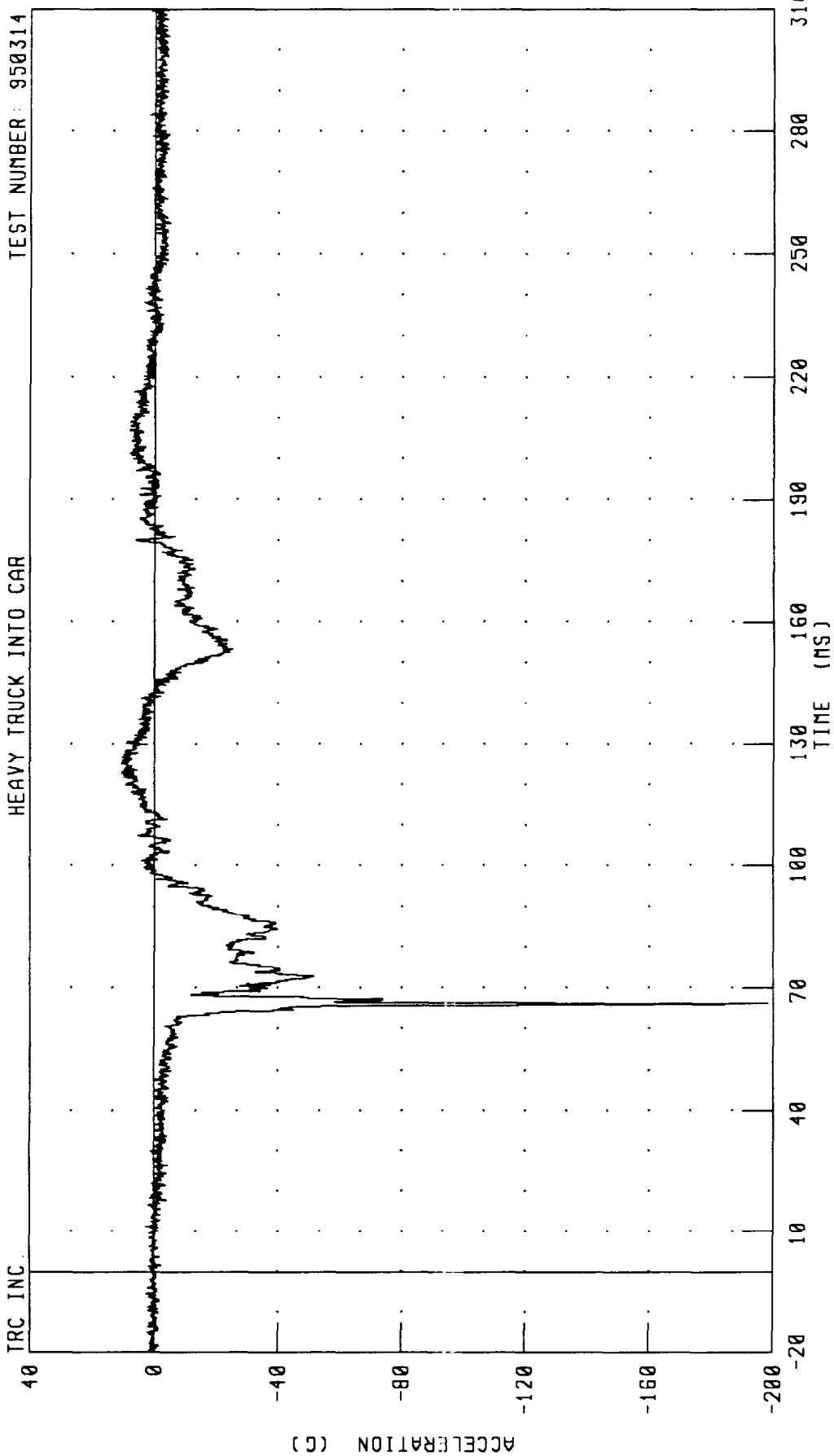


CHANNEL: CSTZV1 FILTER: CH. CLASS 180

PEAK DATA: 0.09 KM/H @ 255.76 MS, -13.57 KM/H @ 111.84 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
DRIVER PELVIS X-AXIS ACCELERATION
HEAVY TRUCK INTO CAR

TEST NUMBER: 950314



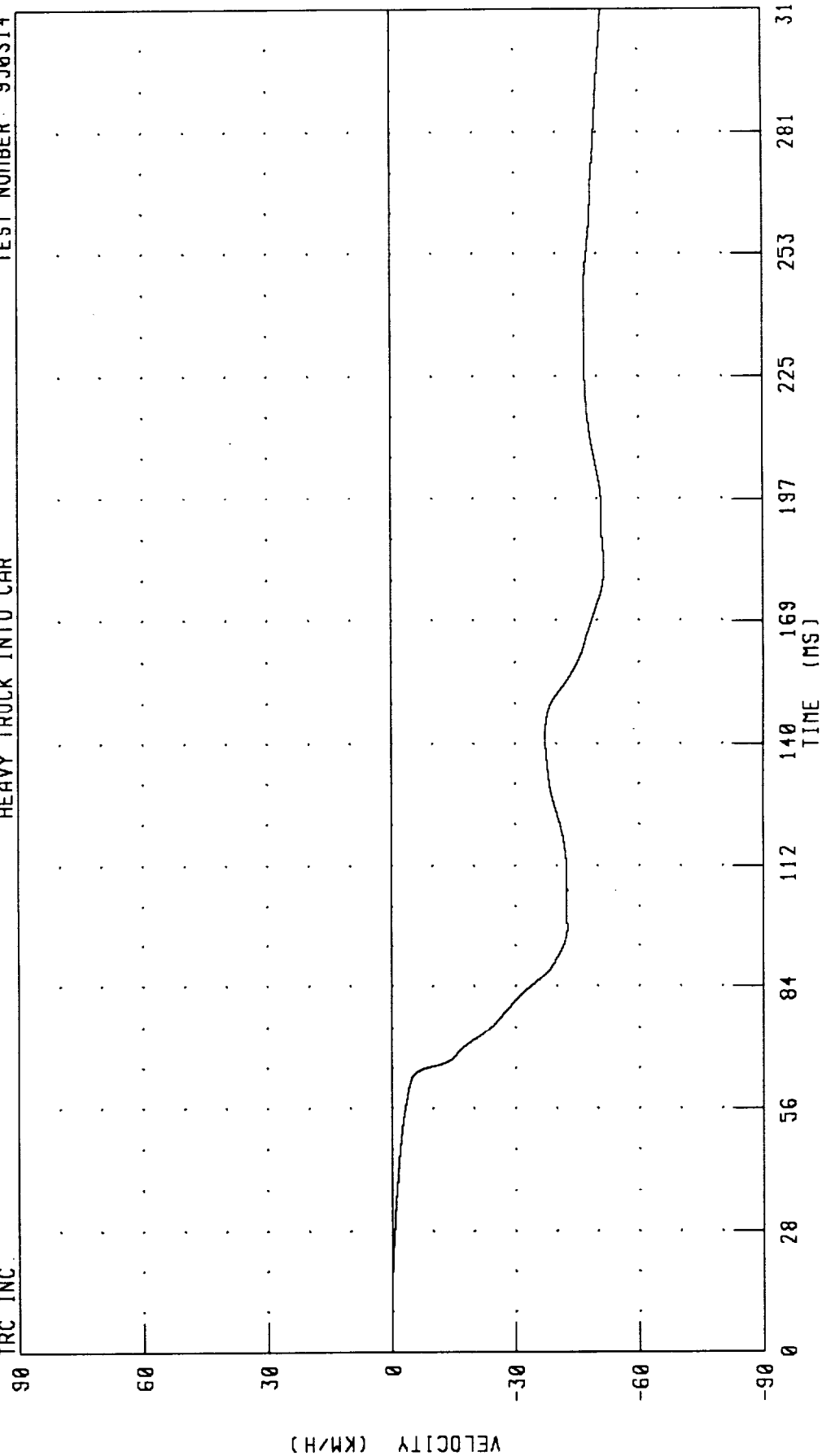
CHANNEL: PEVXG1 FILTER: CH CLASS 1000

PEAK DATA: 10 60 G @ 122.96 MS, -198.14 G @ 66.08 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
DRIVER PELVIS X-AXIS VELOCITY
HEAVY TRUCK INTO CAR

TEST NUMBER: 950314

TRC INC.

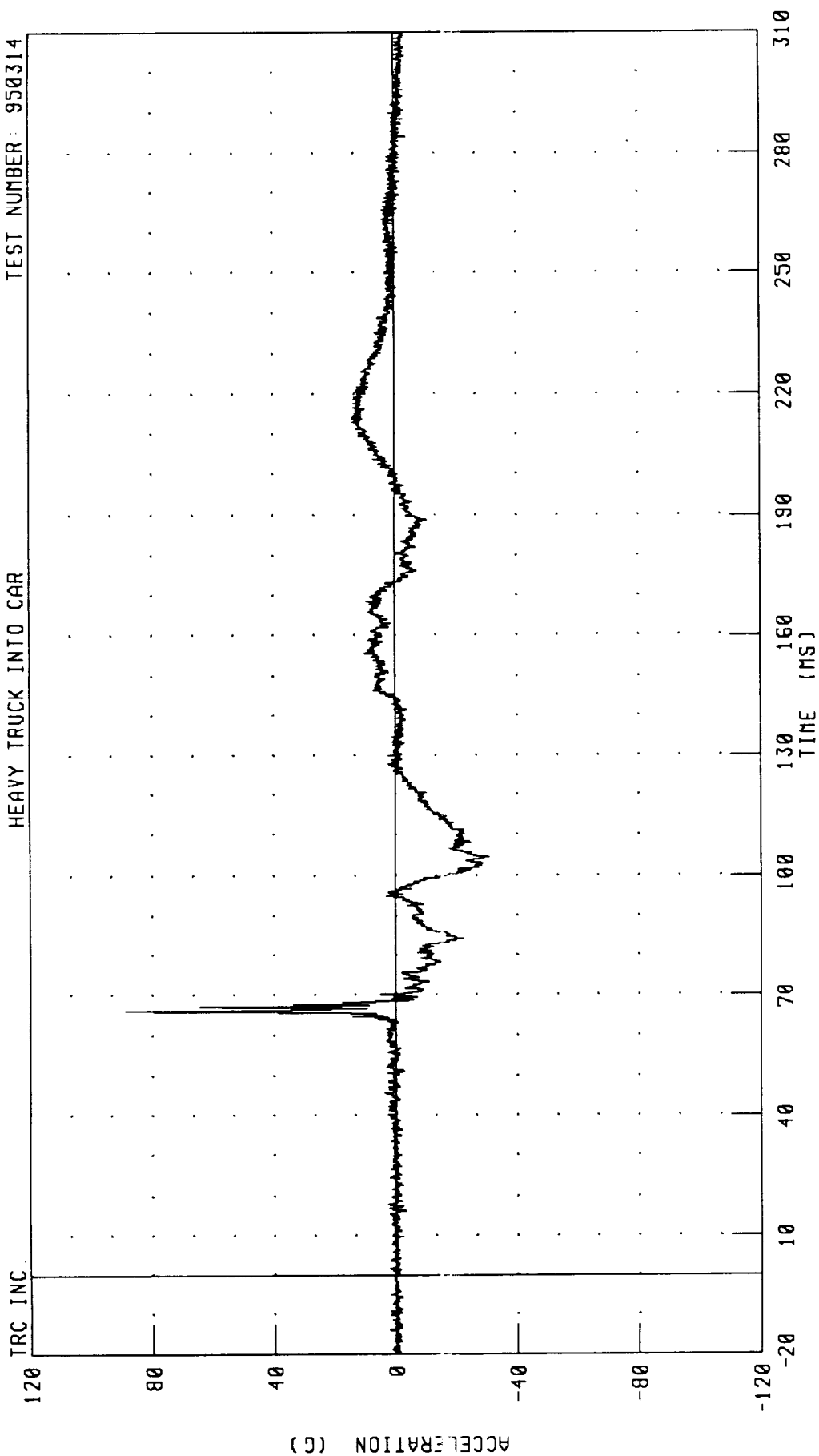


CHANNEL: PEVXV1 FILTER: CH CLASS 180

PEAK DATA: 0 03 KM/H @ 9 84 MS, -51 56 KM/H @ 183 28 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
DRIVER PELVIS Y-AXIS ACCELERATION
HEAVY TRUCK INTO CAR

TEST NUMBER: 950314

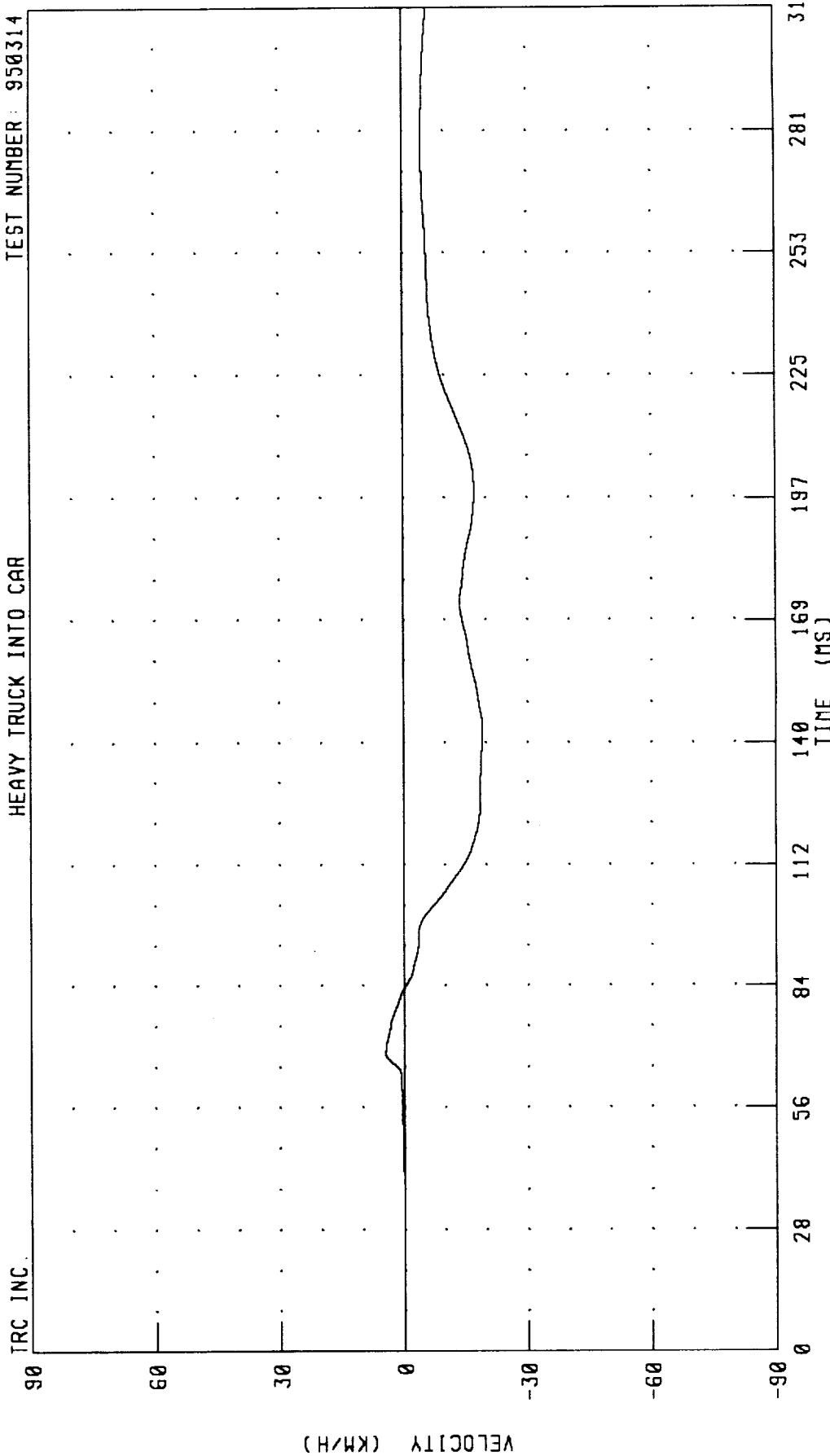


CHANNEL: PEVYG1 FILTER: CH. CLASS 1000

PEAK DATA: 88 66 G @ 66 08 MS, -30 95 G @ 104 56 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS DRIVER PELVIS Y-AXIS VELOCITY HEAVY TRUCK INTO CAR

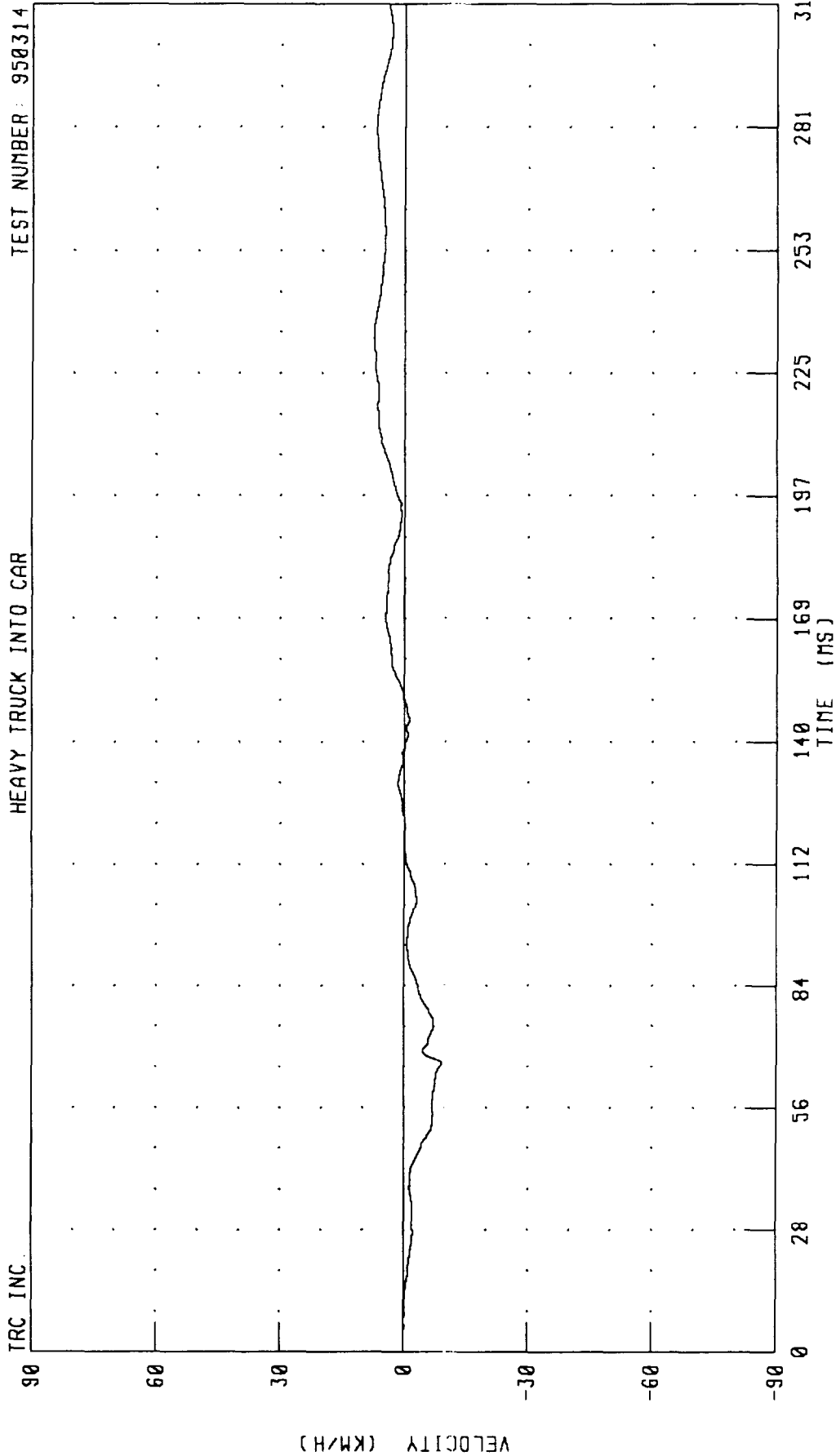
TEST NUMBER: 950314



CHANNEL: PEVYV1 FILTER: CH CLASS 180

PEAK DATA: 4 51 KM/H @ 68.80 MS, -19.16 KM/H @ 144.24 MS

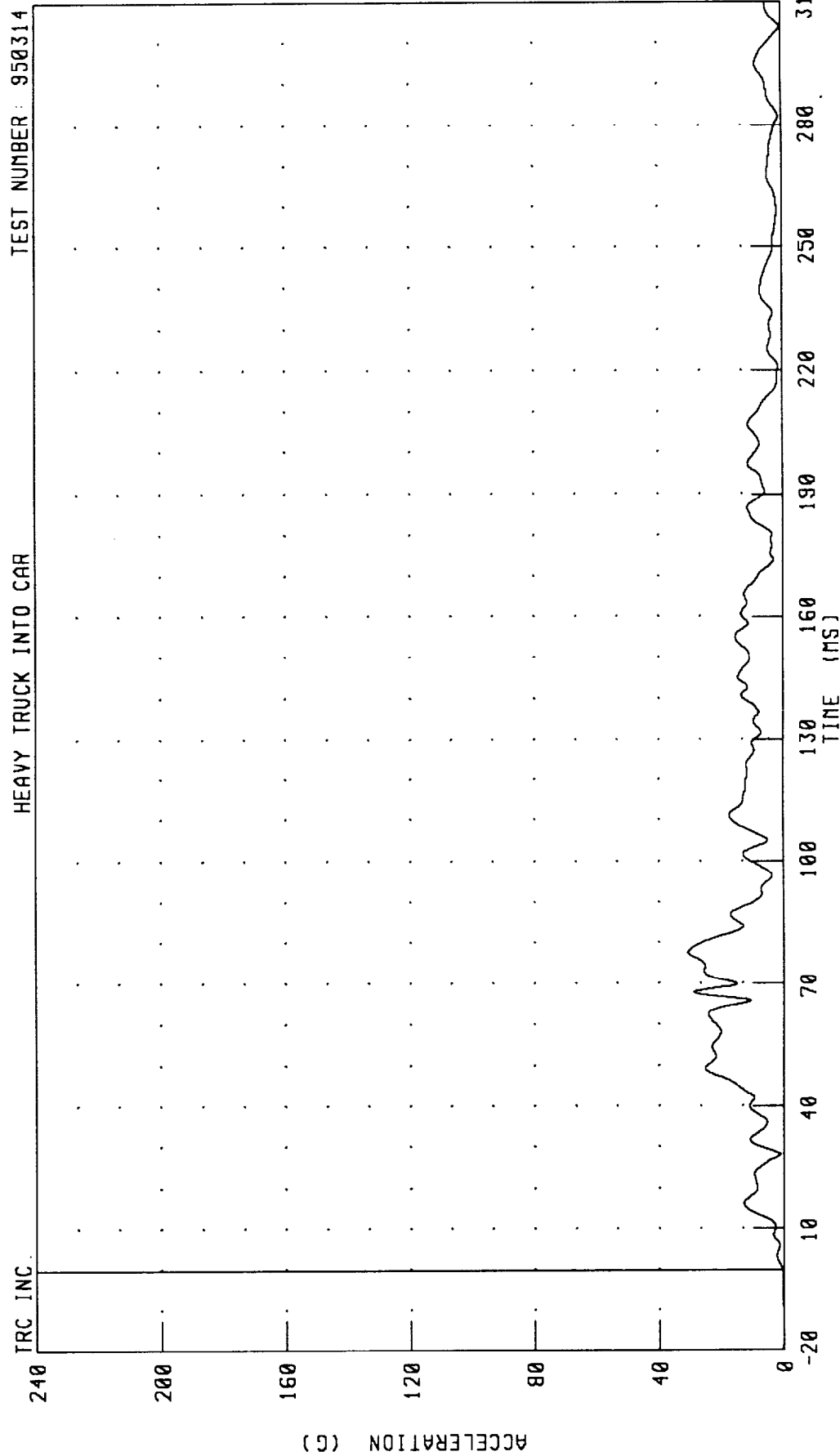
HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS CAR CENTER OF GRAVITY Z-AXIS VELOCITY HEAVY TRUCK INTO CAR



CHANNEL: VCGZV2 FILTER: CH. CLASS 180

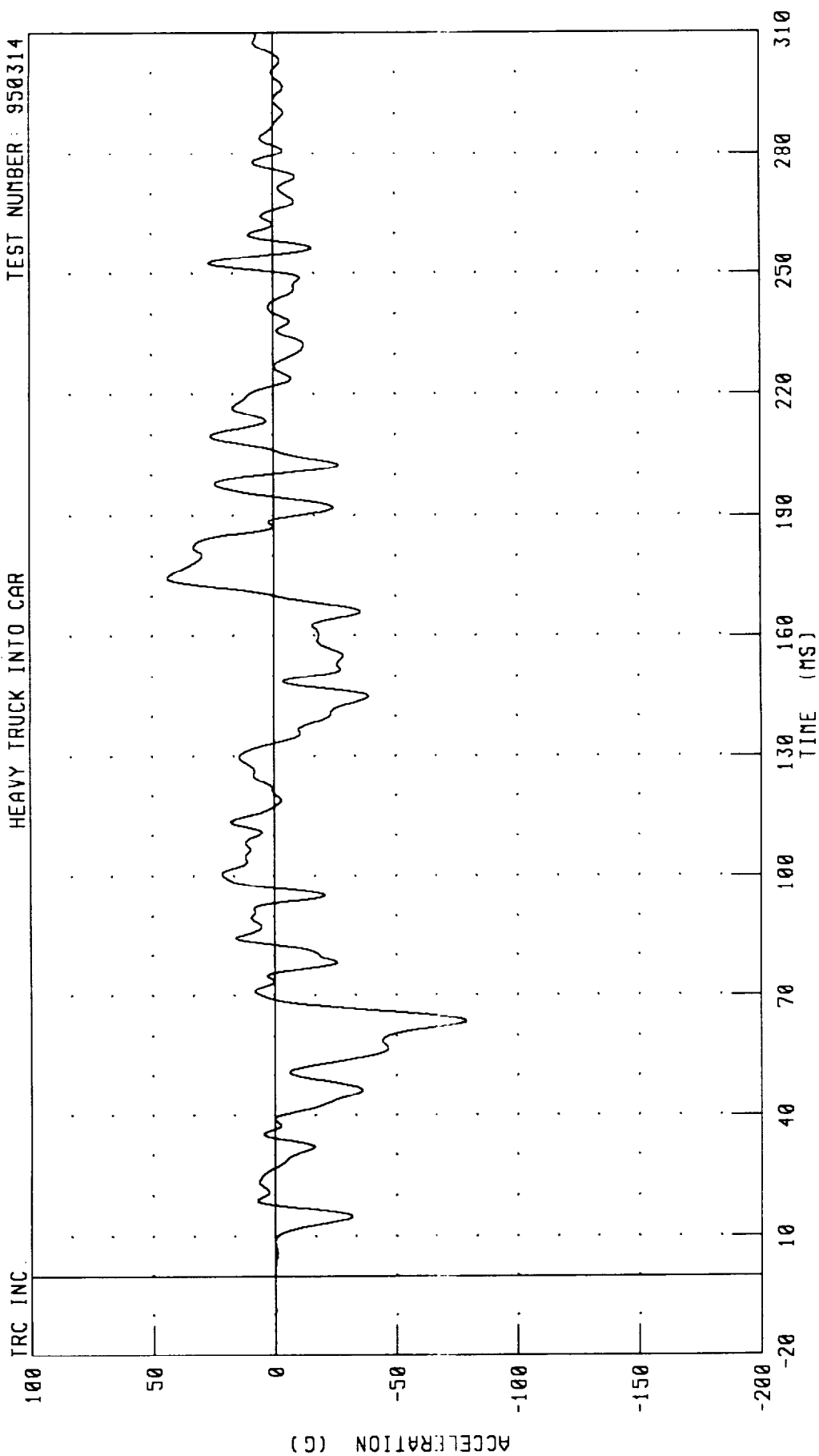
PEAK DATA: 7.52 KM/H @ 233.52 MS, -9.19 KM/H @ 66.48 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS CAR CENTER OF GRAVITY RESULTANT ACCELERATION



HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
INSTRUMENT PANEL CENTER X-AXIS ACCELERATION
HEAVY TRUCK INTO CAR

TEST NUMBER: 950314



CHANNEL: DPCXG2 FILTER: CH CLASS 60

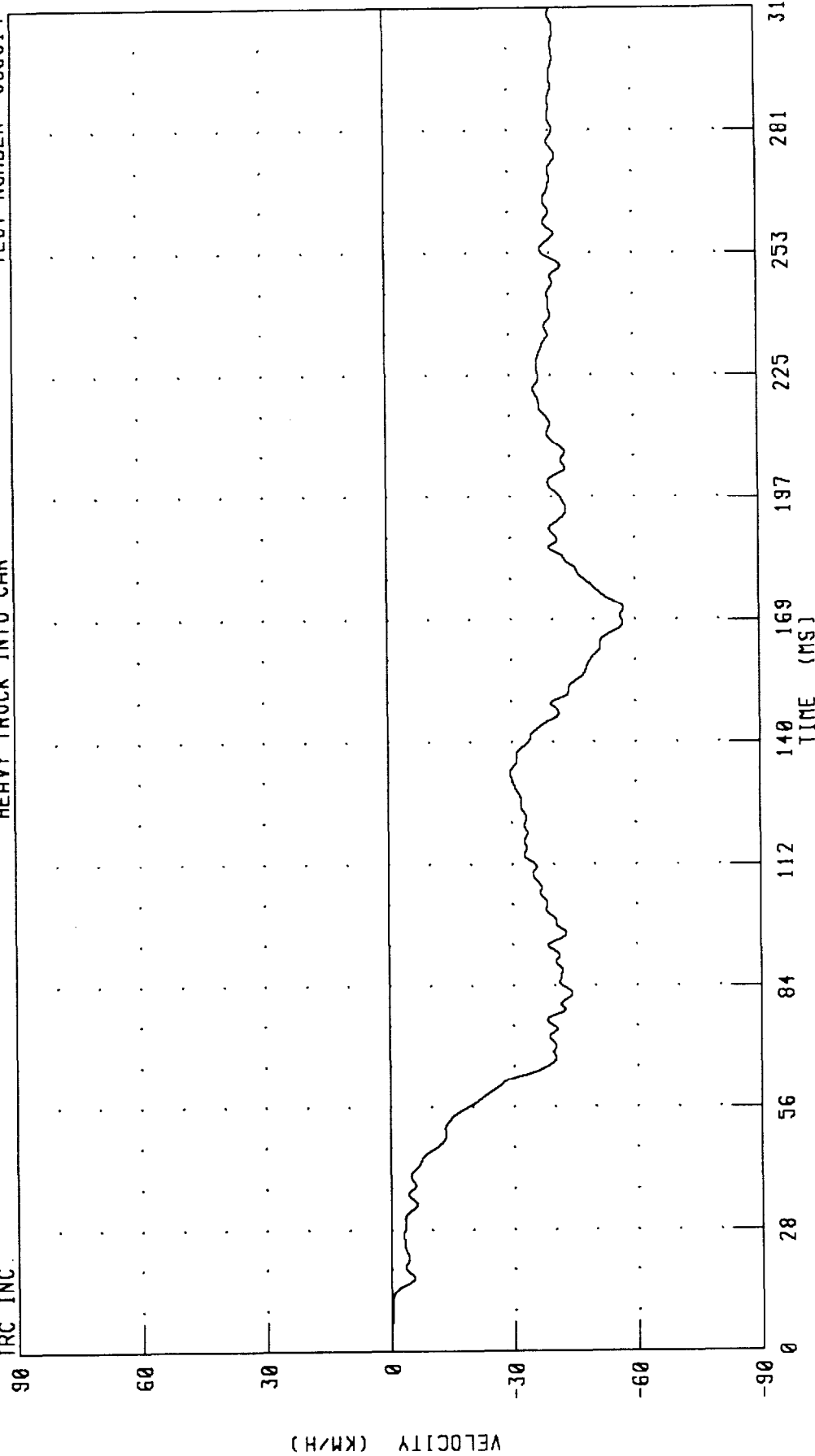
PEAK DATA: 43.72 G @ 174.56 MS, -78.92 G @ 63.68 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
INSTRUMENT PANEL CENTER X-AXIS VELOCITY

TEST NUMBER: 950314

HEAVY TRUCK INTO CAR

TRC INC.

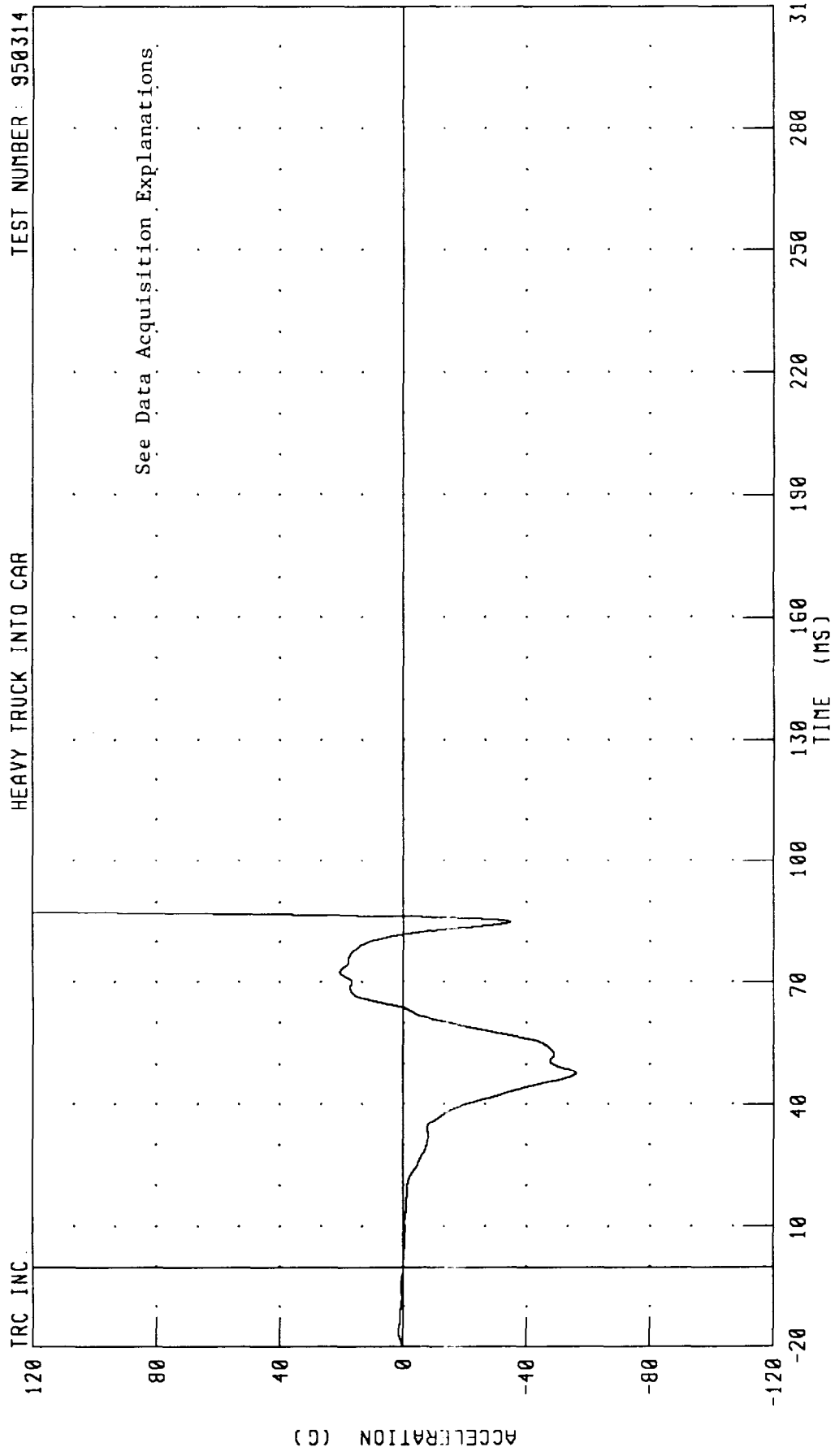


CHANNEL: OPCXV2 FILTER: CH. CLASS 180

PEAK DATA: 0 00 KM/H @ 1 92 MS, -57 26 KM/H @ 171 84 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
 ENGINE BOTTOM X-AXIS ACCELERATION
 HEAVY TRUCK INTO CAR

TEST NUMBER: 950314



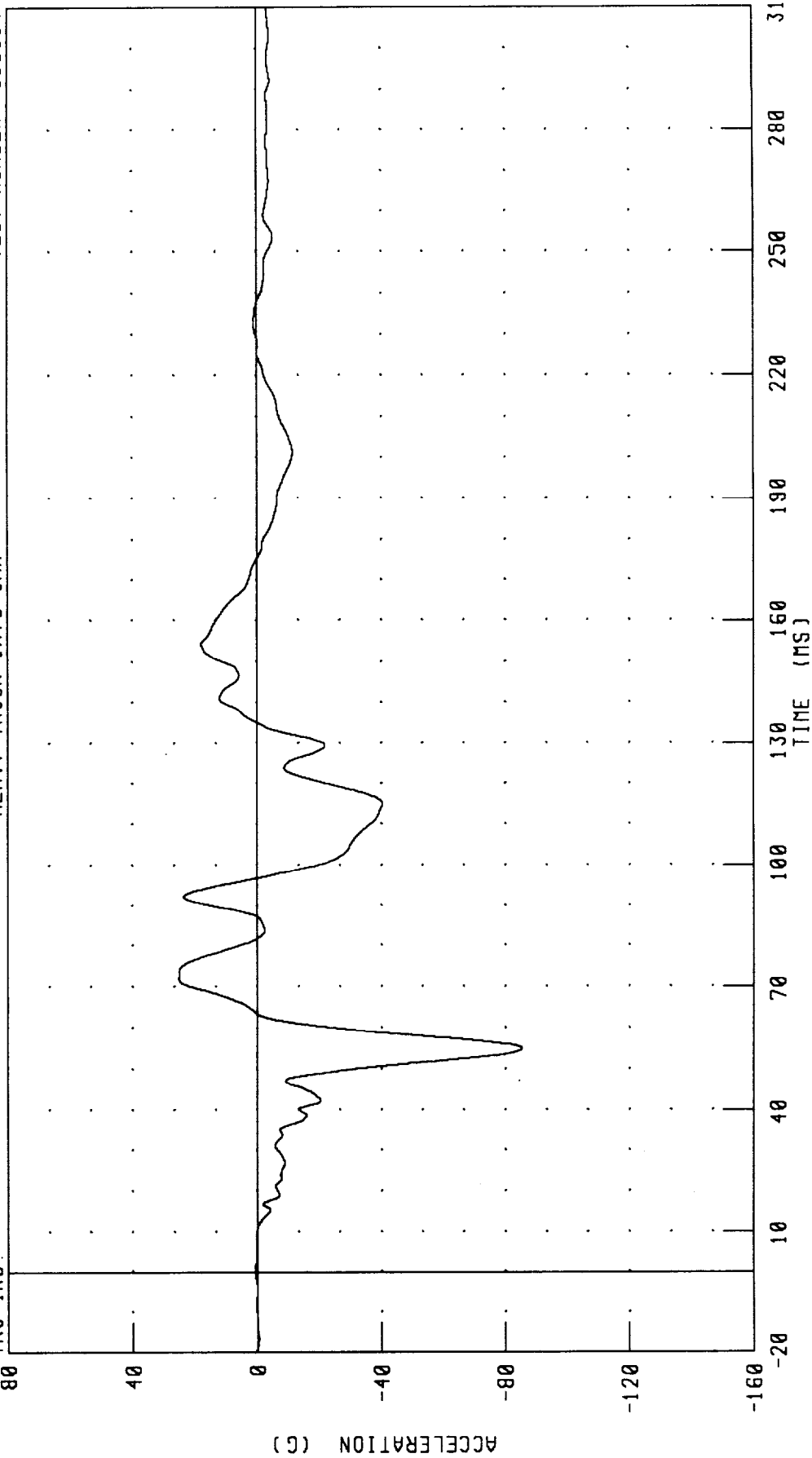
CHANNEL: ENGXC2 FILTER: CH. CLASS 60

PEAK DATA: 1051 00 G @ 93.12 MS, -56.21 G @ 47.68 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
ENGINE TOP X-AXIS ACCELERATION
HEAVY TRUCK INTO CAR

TEST NUMBER: 950314

TRC INC.



CHANNEL: ENG1 FILTER: CH. CLASS 60

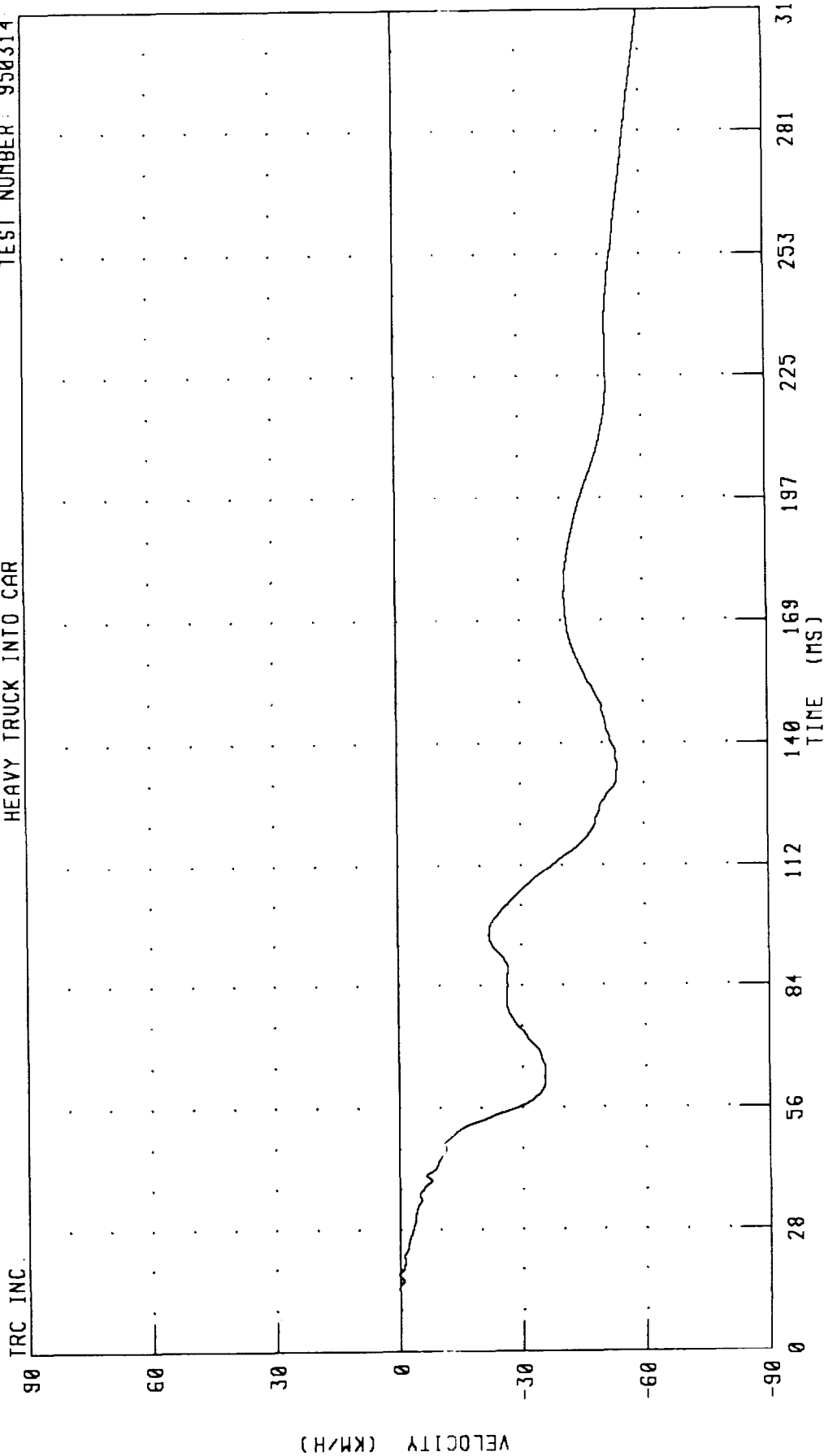
PEAK DATA: 25.23 G @ 71.84 MS, -85.48 G @ 54.96 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS

ENGINE TOP X-AXIS VELOCITY

HEAVY TRUCK INTO CAR

TEST NUMBER: 950314



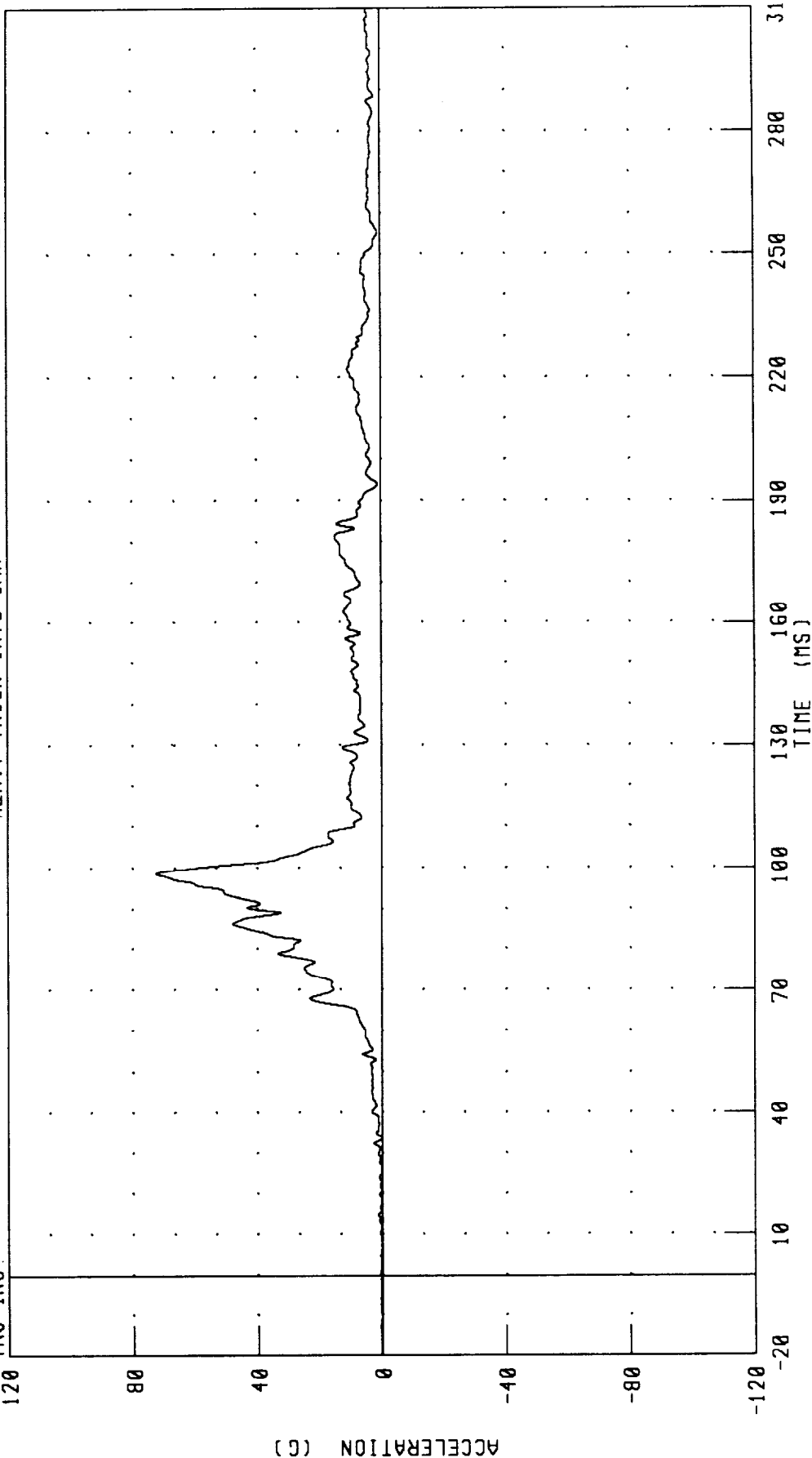
PEAK DATA: 0.26 KM/H @ 17.76 MS, -59.78 KM/H @ 310.00 MS

CHANNEL: ENG1V1 FILTER: CH. CLASS 180

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS DRIVER CHEST RESULTANT ACCELERATION HEAVY TRUCK INTO CAR

TEST NUMBER: 950314

TRC INC.



CHANNEL: CSTRG1 FILTER: CH. CLASS 180

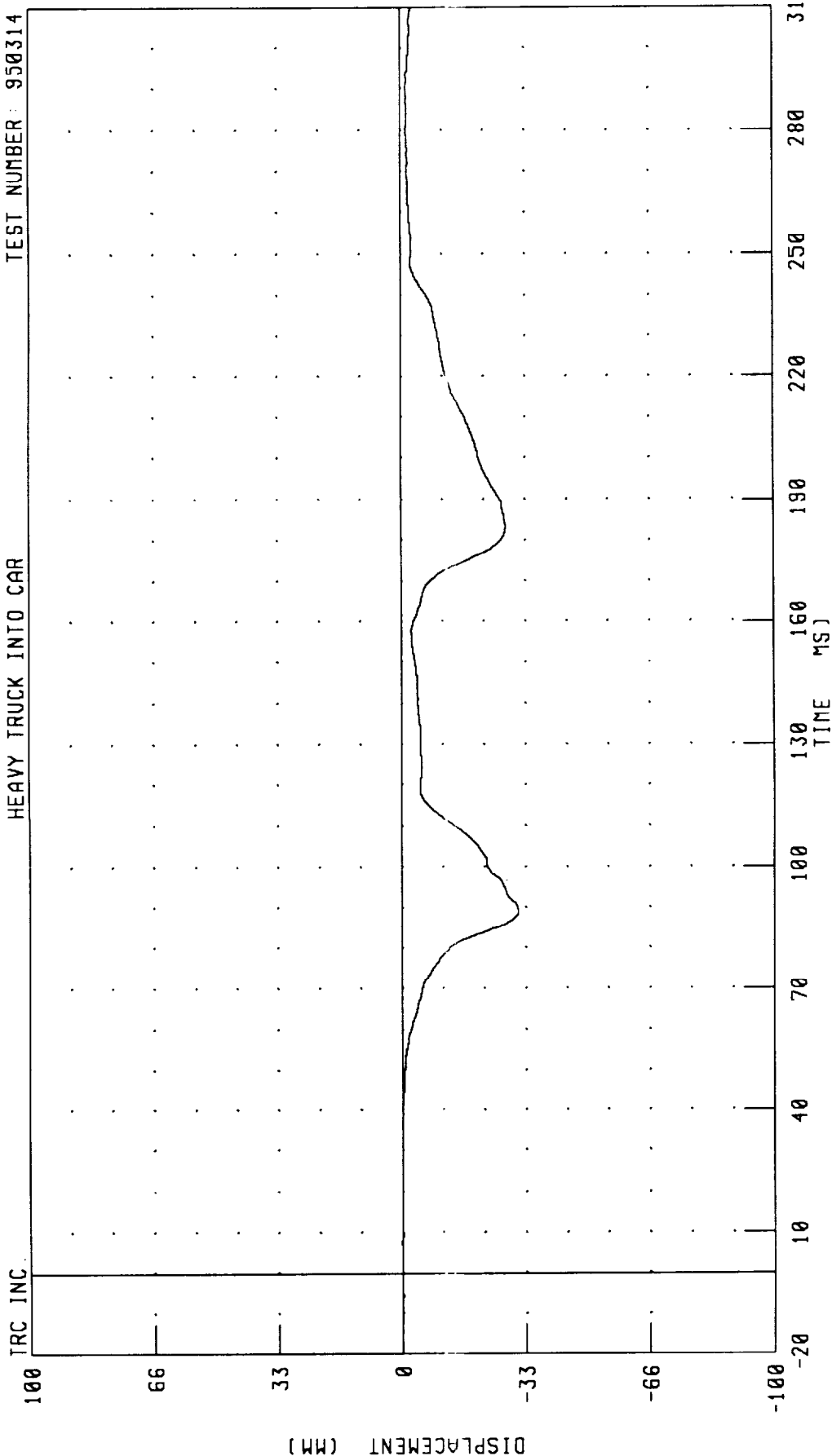
PEAK DATA: 72.67 G @ 98.64 MS, 0.07 G @ -20.00 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS

DRIVER CHEST DEFLECTION

HEAVY TRUCK INTO CAR

TEST NUMBER: 950314



CHANNEL: CSTXD1 FILTER: CH CLASS 180

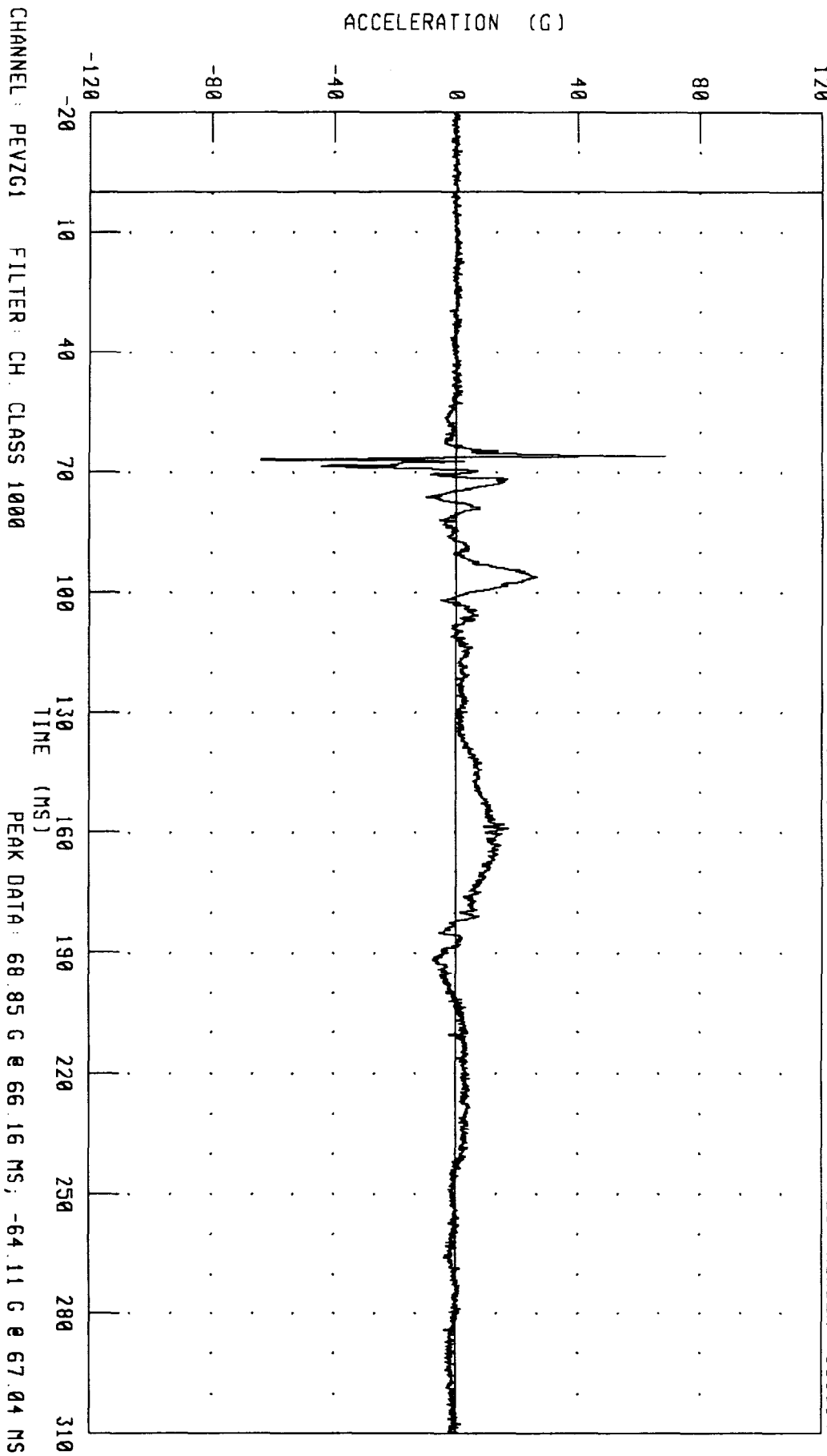
PEAK DATA: 0 24 MM @ 7.44 MS, -31.35 MM @ 88.96 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
DRIVER PELVIS Z-AXIS ACCELERATION

TRC INC.

HEAVY TRUCK INTO CAR

TEST NUMBER: 950314

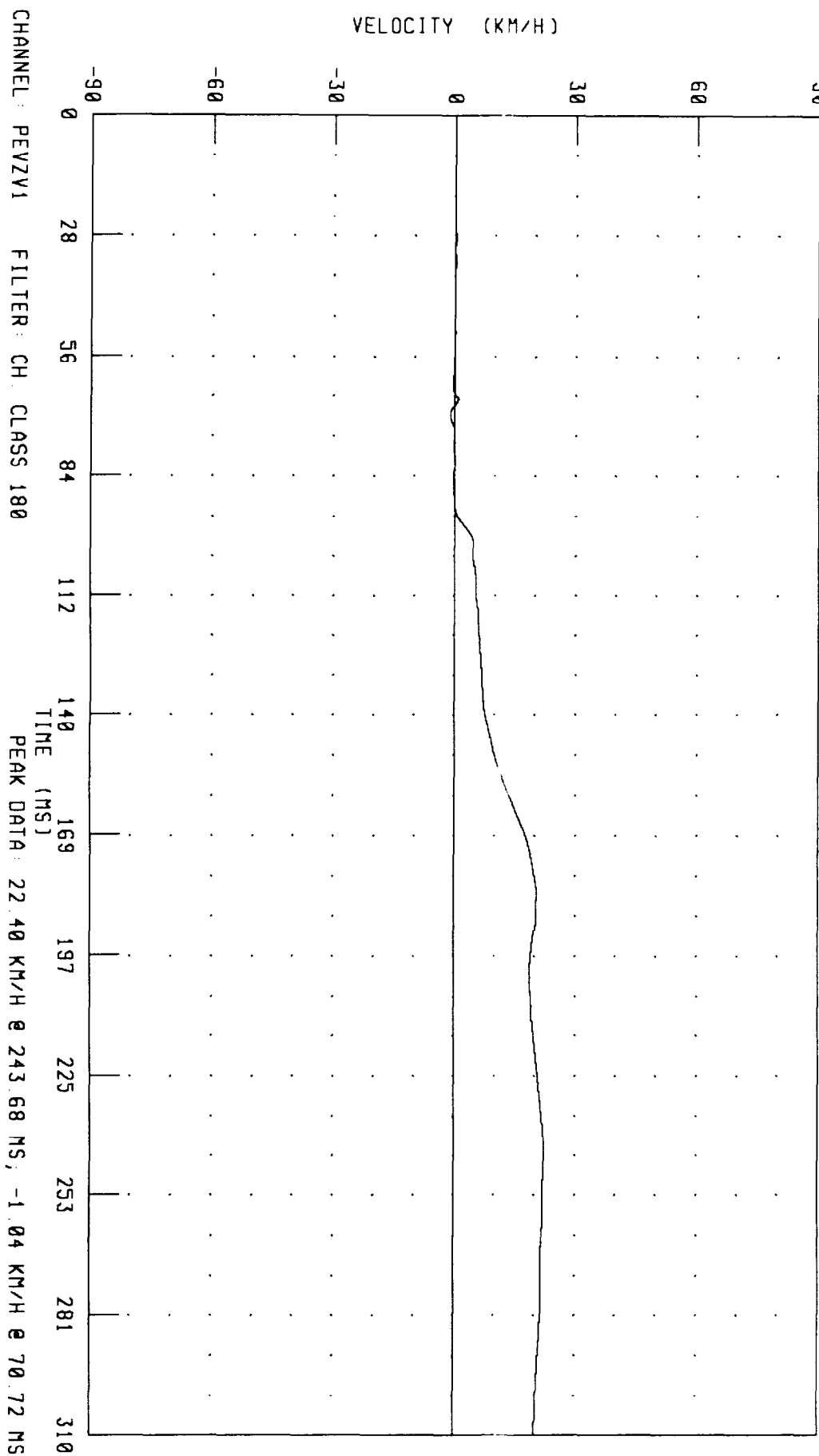


HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
DRIVER PELVIS Z-AXIS VELOCITY

TRC INC.

HEAVY TRUCK INTO CAR

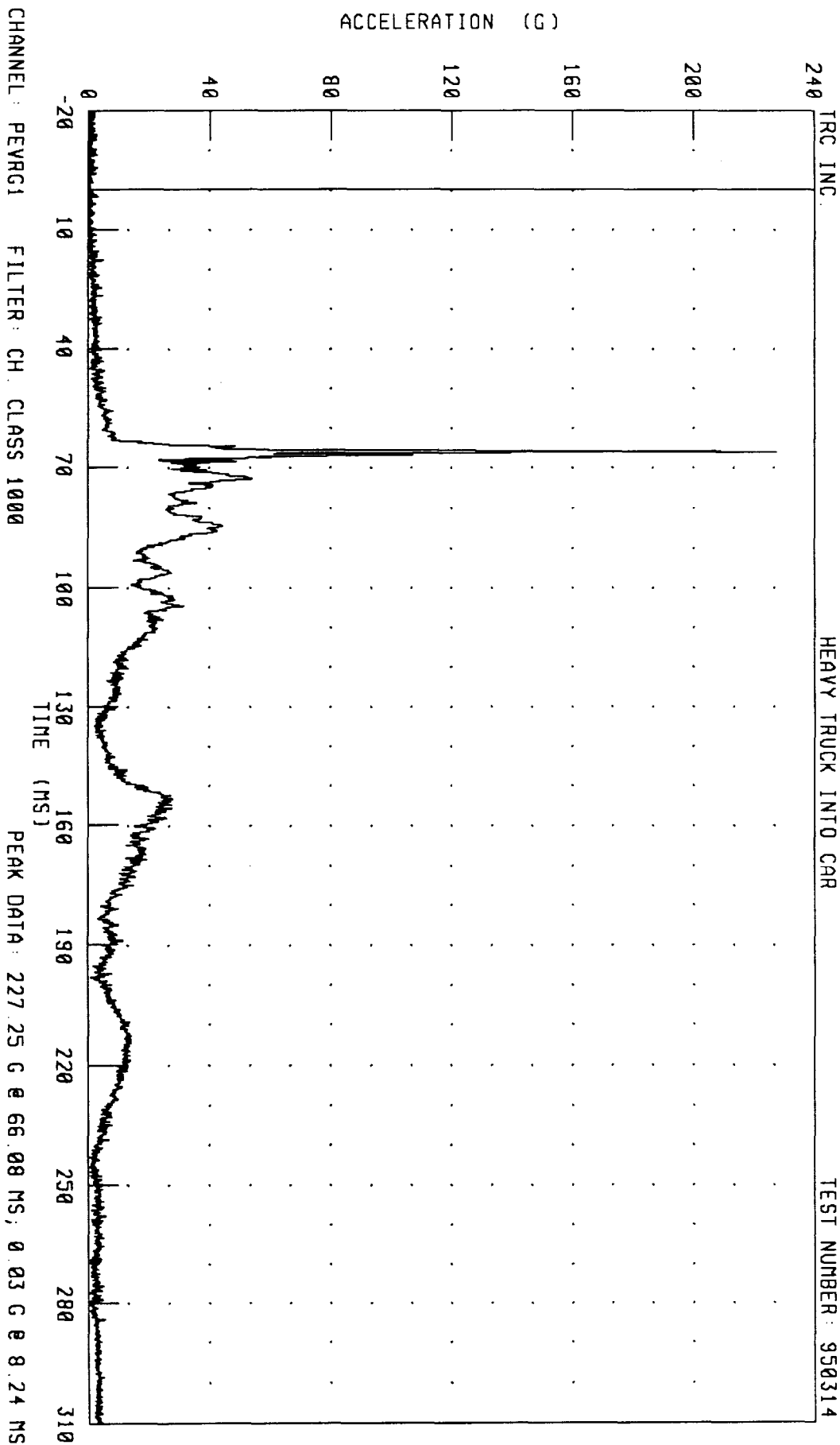
TEST NUMBER: 950314



HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
DRIVER PELVIS RESULTANT ACCELERATION

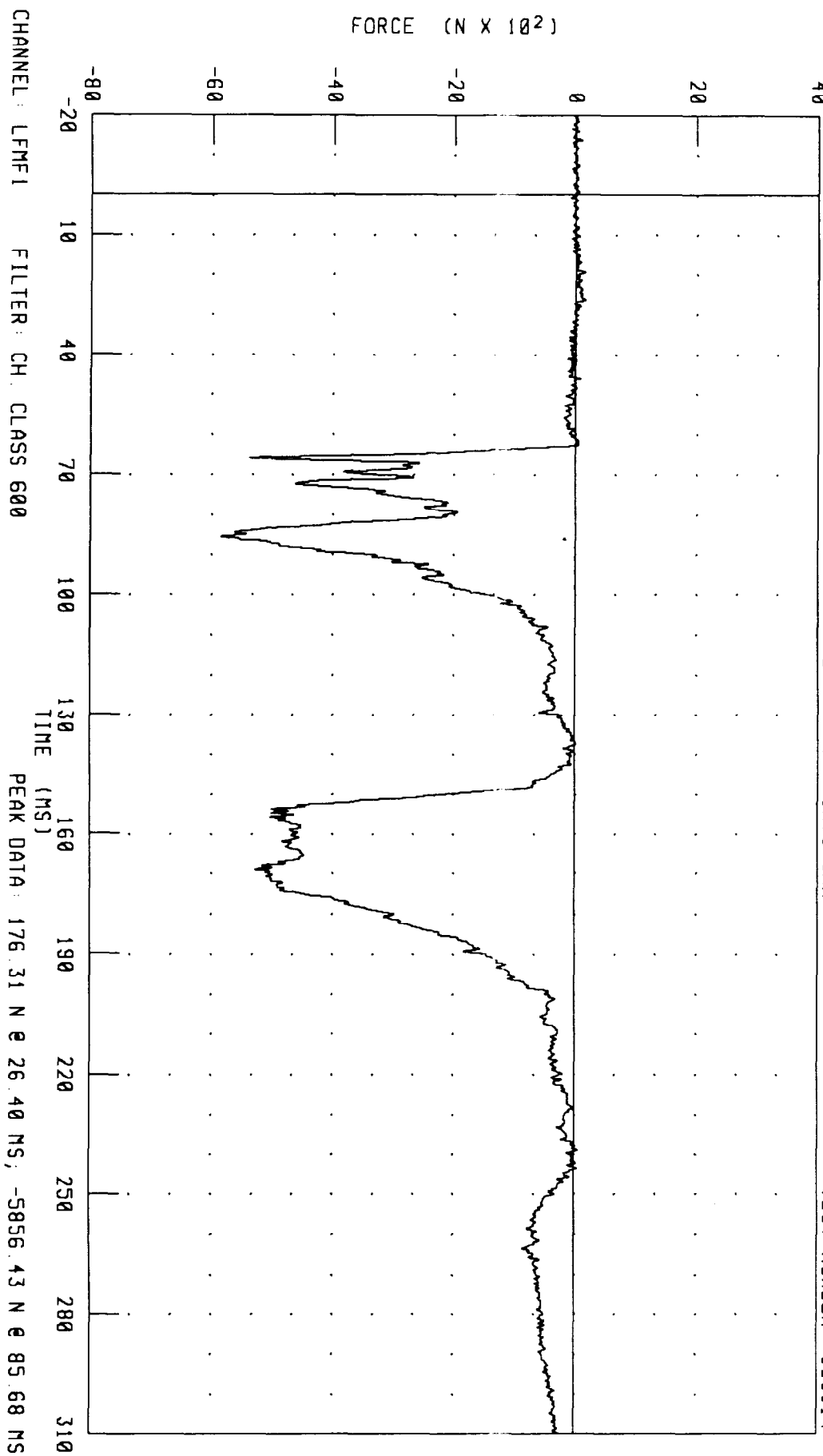
HEAVY TRUCK INTO CAR

TEST NUMBER: 950314



HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
DRIVER LEFT FEMUR FORCE
HEAVY TRUCK INTO CAR

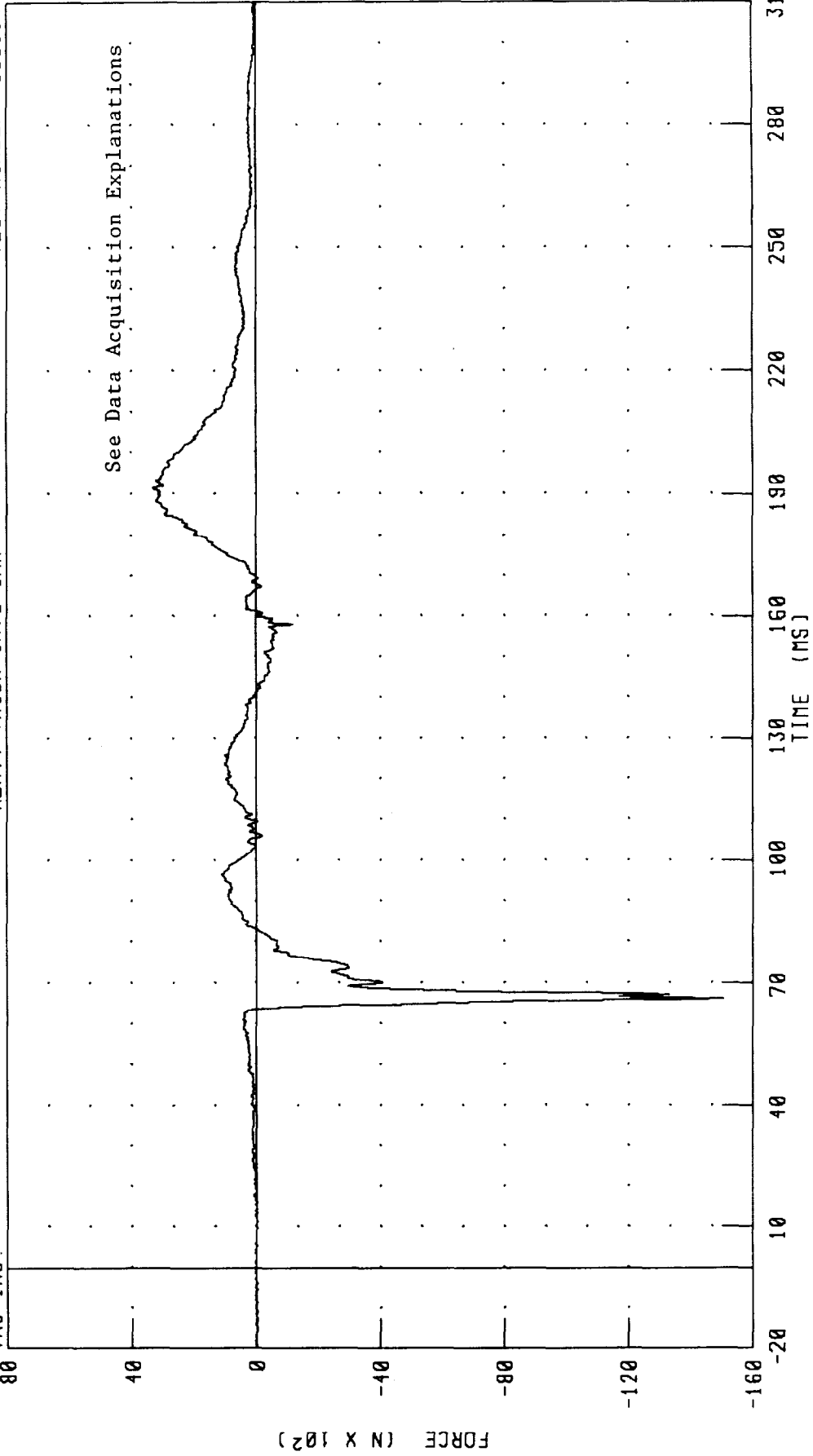
TEST NUMBER: 950314



HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
DRIVER RIGHT FEMUR FORCE
HEAVY TRUCK INTO CAR

TEST NUMBER: 950314

TRC INC.



CHANNEL: RFMF1 FILTER: CH CLASS 600

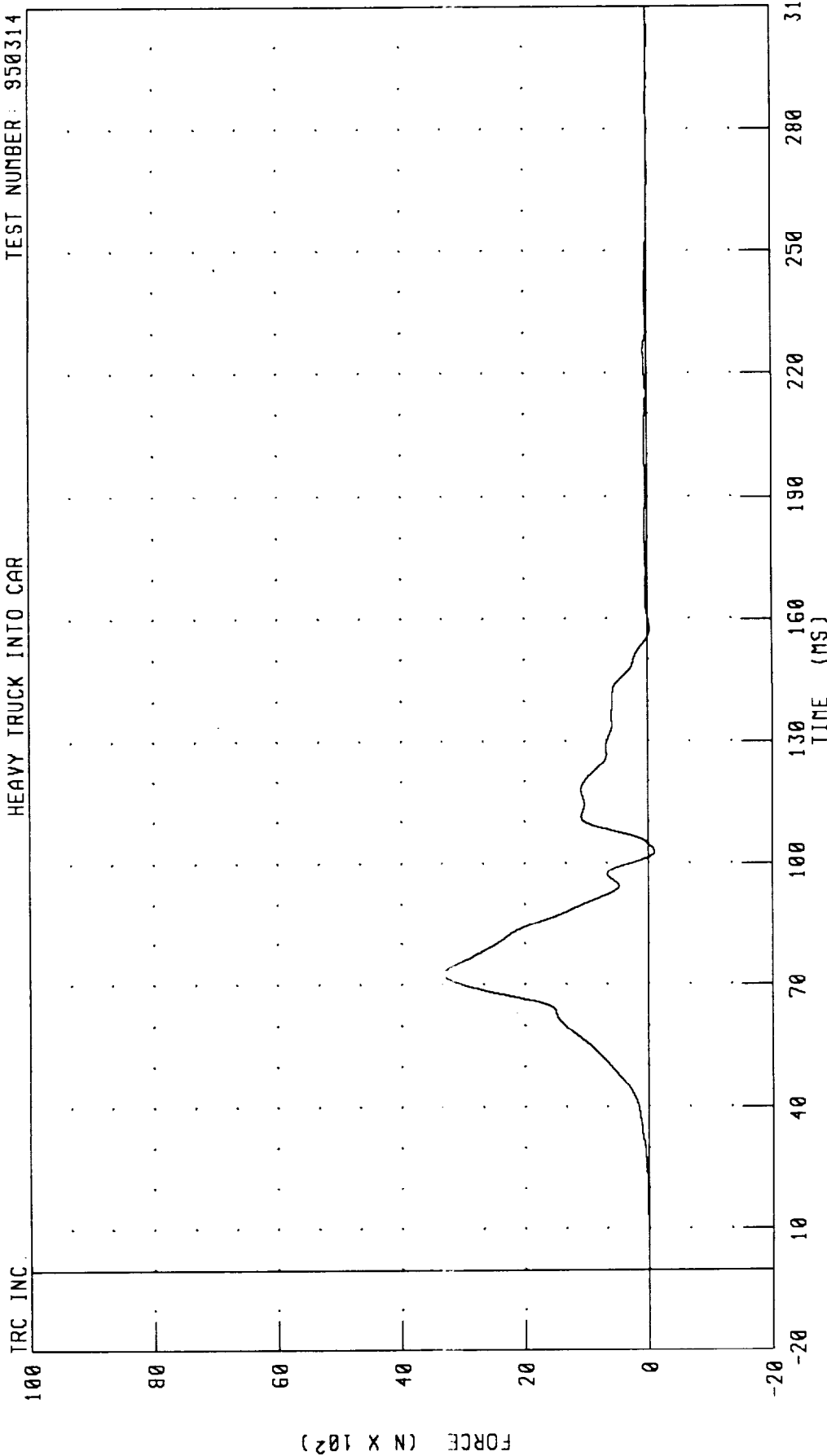
PEAK DATA: 3329.74 N @ 191.44 MS; -15025.06 N @ 66.16 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS

DRIVER LAP BELT OUTBOARD FORCE

HEAVY TRUCK INTO CAR

TEST NUMBER: 950314



CHANNEL: LBOFI FILTER: CH CLASS 60

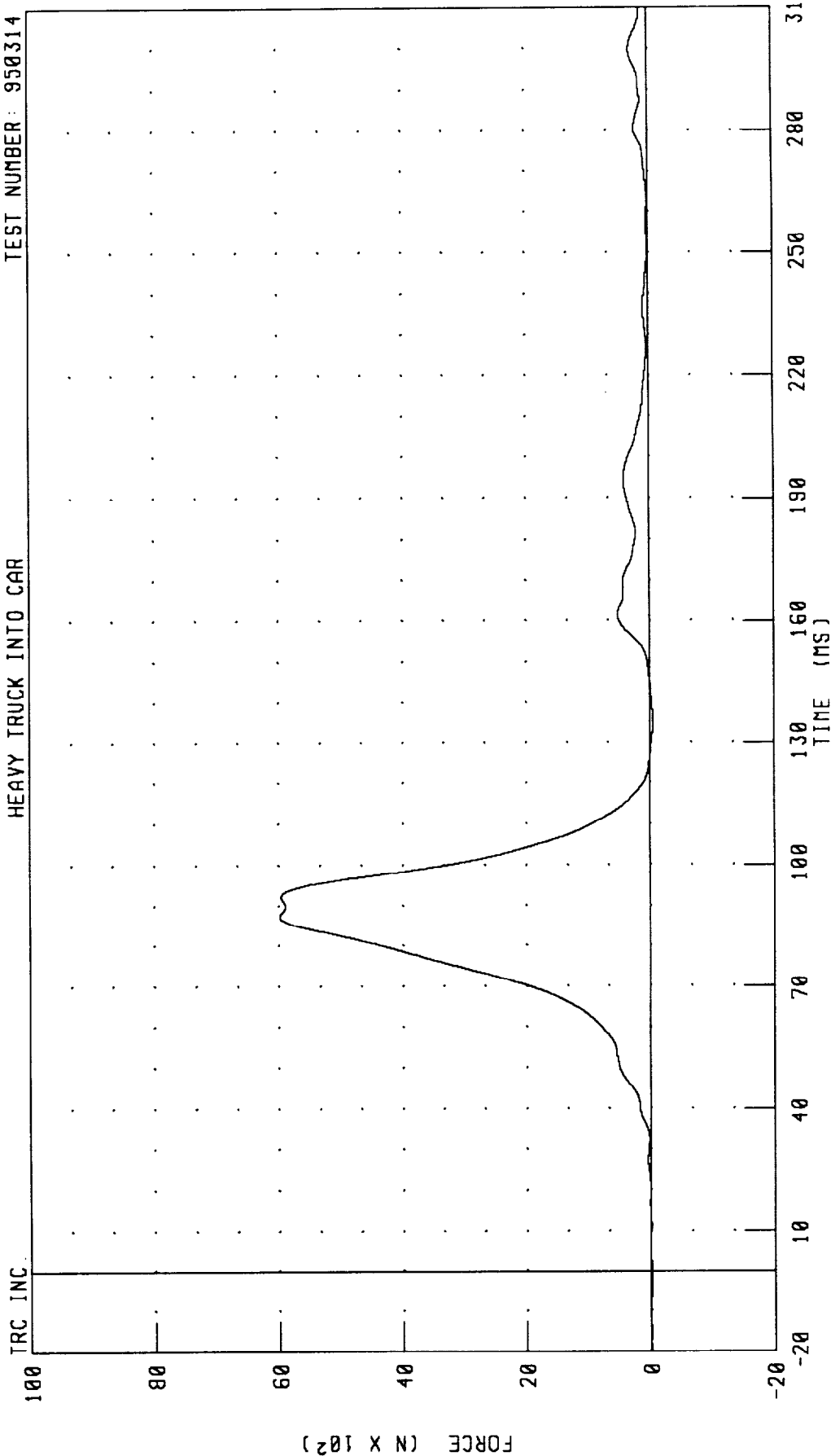
PEAK DATA: 3326 19 N e 72 72 MS; -101 54 N e 102 80 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS

DRIVER SHOULDER BELT FORCE

HEAVY TRUCK INTO CAR

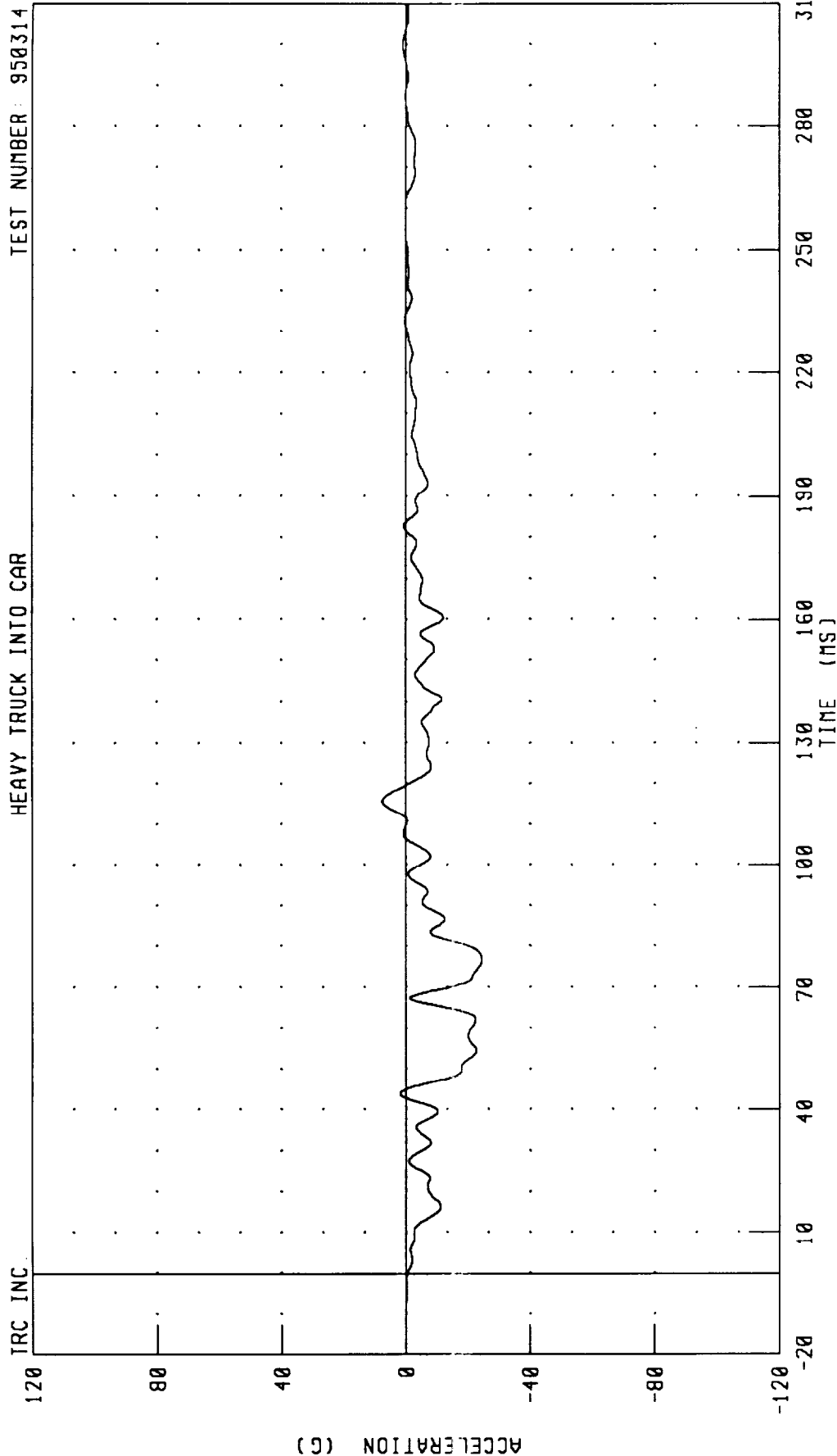
TEST NUMBER: 950314



CHANNEL: SHBF1 FILTER: CH CLASS 60

PEAK DATA: 5987.41 N @ 87.28 MS; -42.31 N @ 136.32 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
CAR CENTER OF GRAVITY X-AXIS ACCELERATION

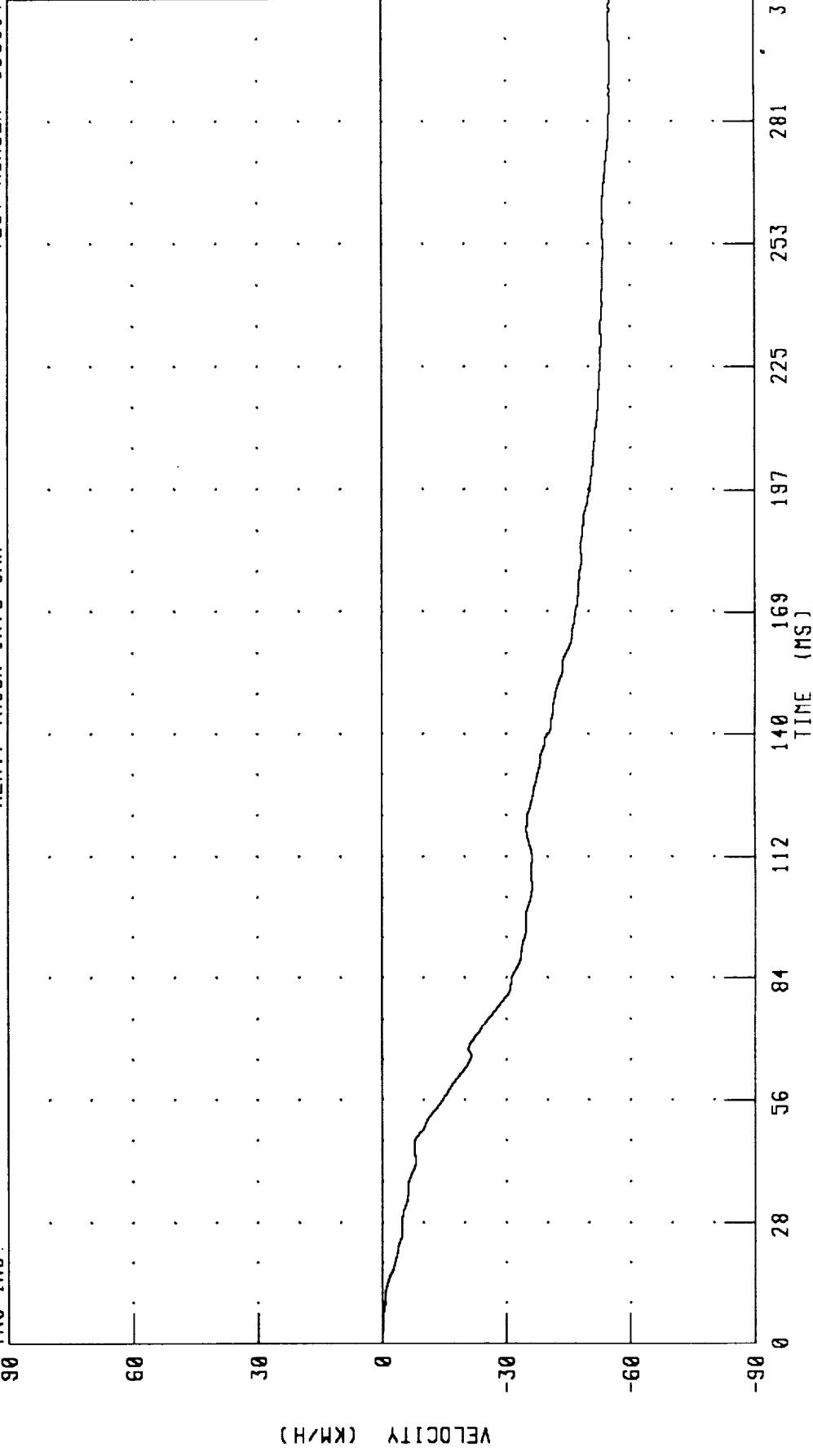


CHANNEL: VCGXG2 FILTER: CH. CLASS 60

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS CAR CENTER OF GRAVITY X-AXIS VELOCITY

TRC INC. TEST NUMBER: 950314

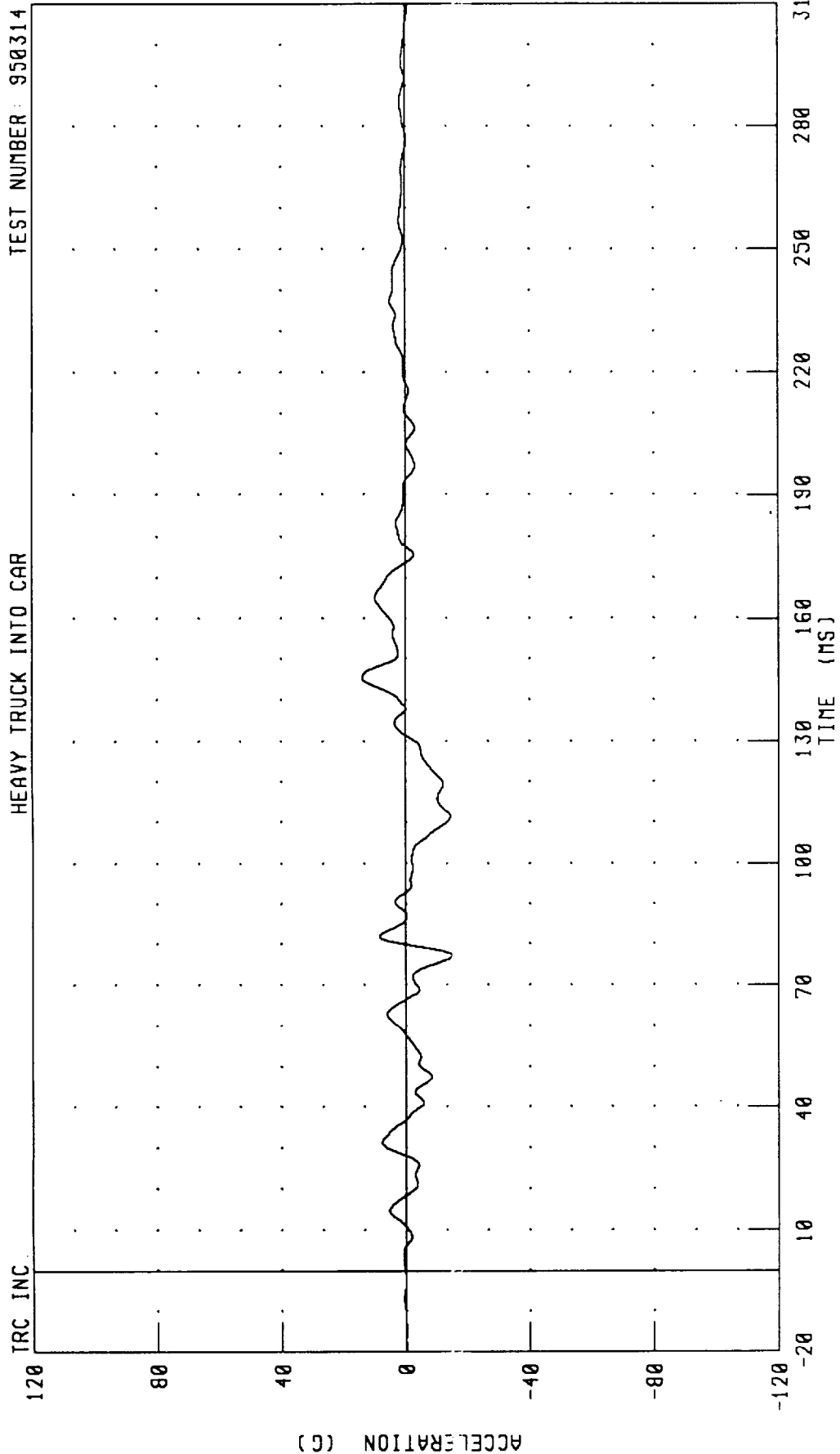
HEAVY TRUCK INTO CAR



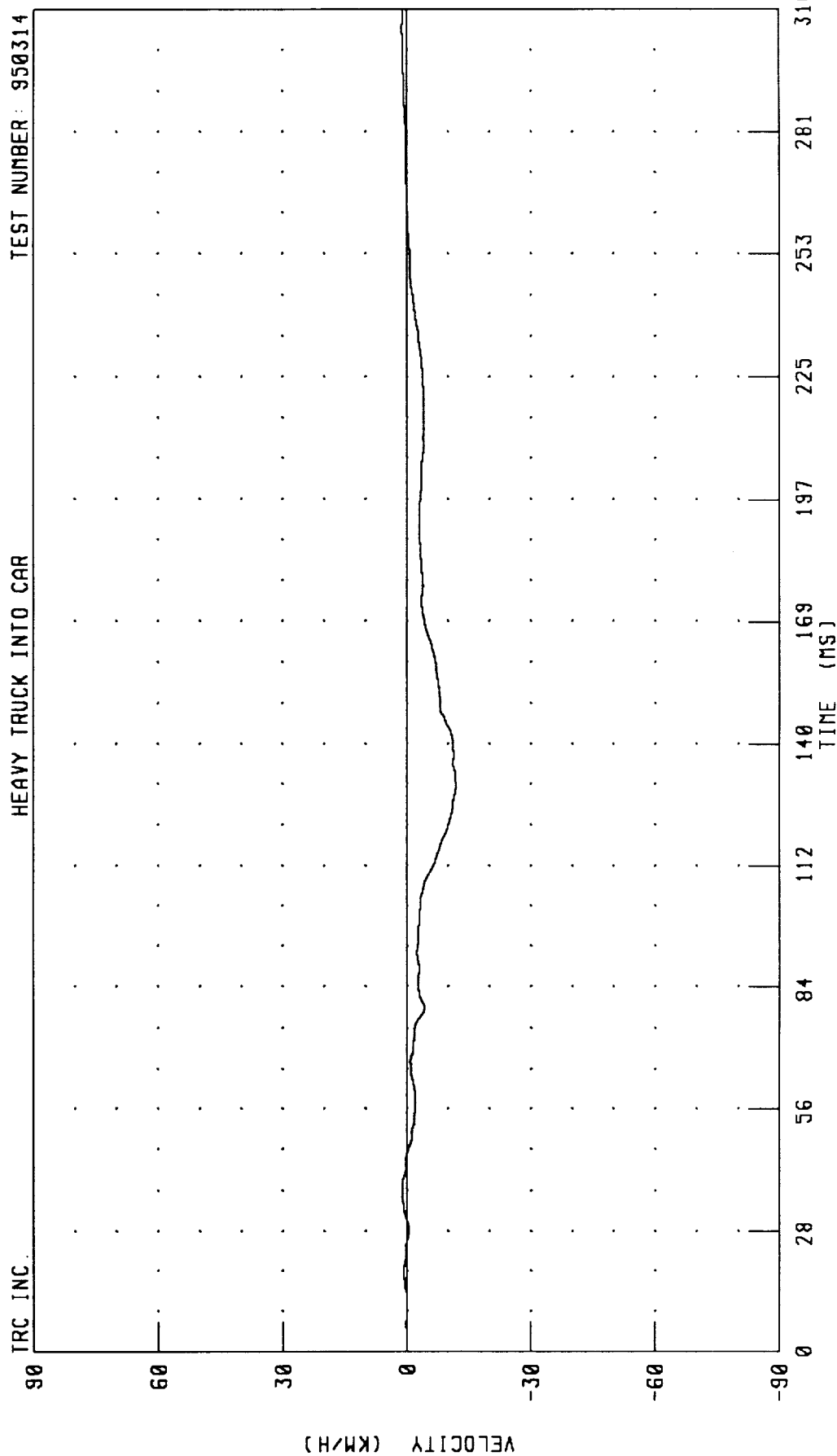
CHANNEL: VCGXV2 FILTER: CH CLASS 180

PEAK DATA: 0.00 KM/H @ 0.00 MS, -55.08 KM/H @ 296.64 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
CAR CENTER OF GRAVITY Y-AXIS ACCELERATION



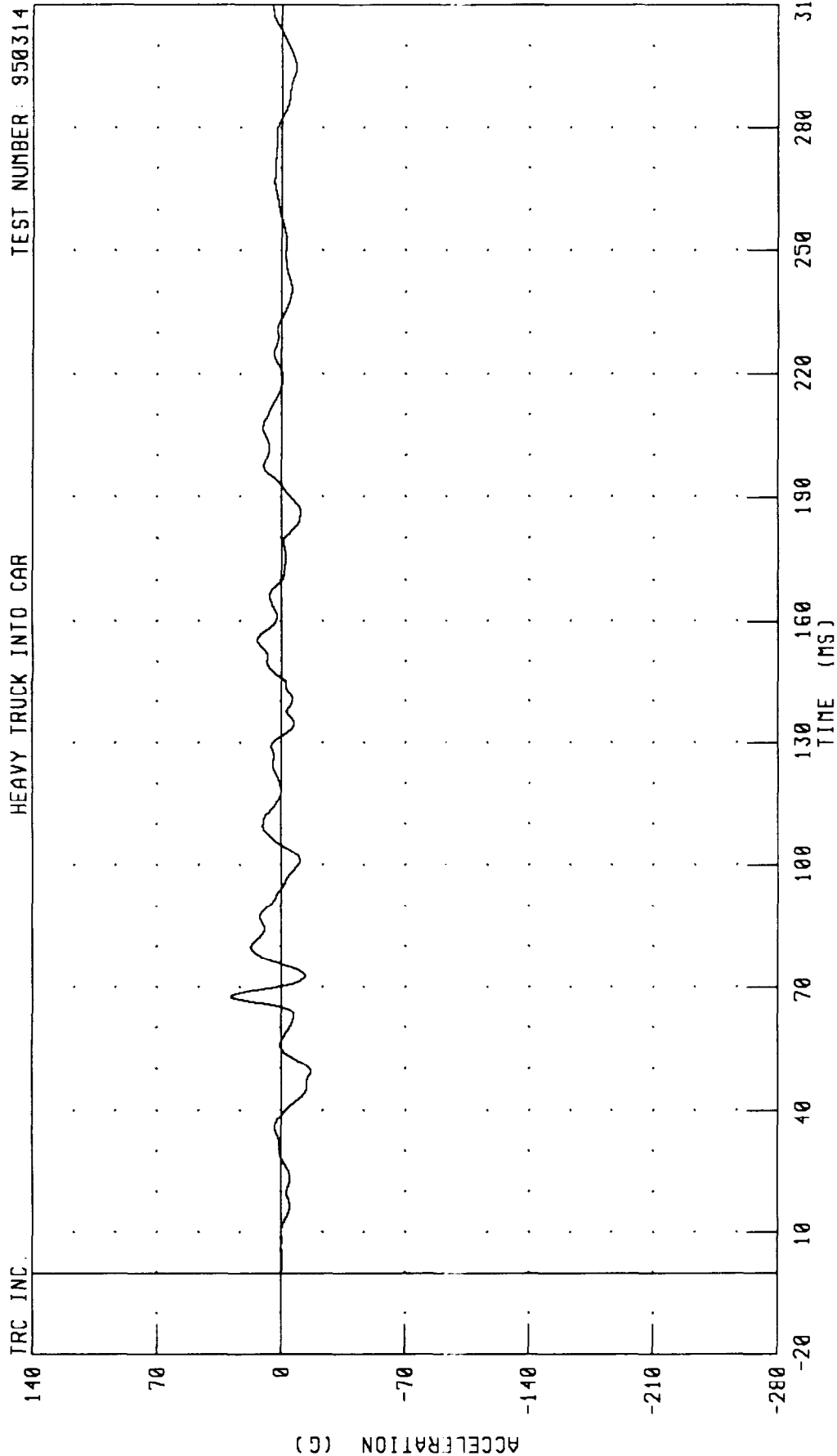
HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
CAR CENTER OF GRAVITY Y-AXIS VELOCITY



CHANNEL: VCGYV2 FILTER: CH. CLASS 180

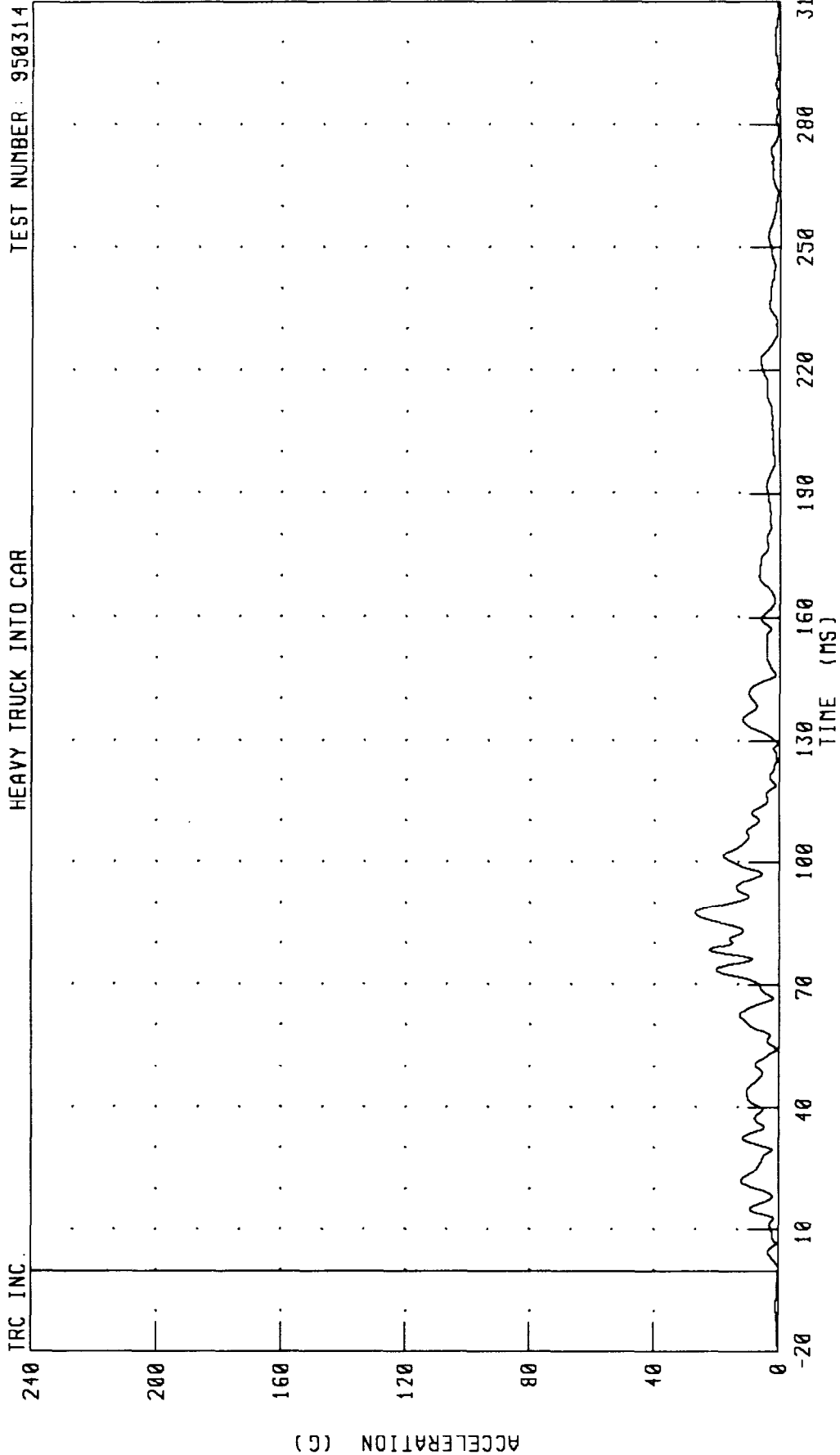
PEAK DATA: 1.18 KM/H @ 305.44 MS, -11.84 KM/H @ 131.04 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS CAR CENTER OF GRAVITY Z-AXIS ACCELERATION



CHANNEL: VCGZG2 FILTER: CH. CLASS 60 PEAK DATA: 28 63 G @ 67 76 MS, -16 78 G @ 49 28 MS

HEAVY TRUCK INTO LEFT 50% OF 1987 FORD TAURUS
TRUCK FRONT FRAME CROSSMEMBER RESULTANT ACCELERATION



CHANNEL: FFCRG1 FILTER: CH. CLASS 60

PEAK DATA: 27.03 G @ 87.60 MS; 0.13 G @ -19.44 MS

Appendix C

Dummy Certification Information

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III EXTERNAL DIMENSIONS

043 HUMANOID

06-MAR-95

TRC INC.

TEST NO: 43C10ED1

572E SN043 EXT.DIMENSION CAL10

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	998. MM
WAIST CIRCUMFERENCE	(Z)	836 - 866 MM	856. MM
CHEST DEPTH	(O)	213 - 229 MM	221. MM
H-POINT HEIGHT	(C)	84 - 89 MM	89. 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	881. MM
THIGH CLEARANCE	(F)	140 - 155 MM	155. MM
BUTTOCK KNEE LENGTH	(K)	579 - 605 MM	599. MM
BUTTOCK POPLITEAL LENGTH	(N)	452 - 478 MM	472. MM
POPLITEAL HEIGHT	(L)	429 - 455 MM	429. MM
KNEE PIVOT HEIGHT	(M)	485 - 500 MM	493. MM
FOOT LENGTH	(P)	252 - 267 MM	262. MM
FOOT BREADTH	(W)	91 - 107 MM	102. MM
SHOULDER PIVOT FROM BACKLINE	(E)	84 - 94 MM	94. MM
SHOULDER BREADTH	(V)	422 - 437 MM	427. MM
SHOULDER PIVOT HEIGHT	(B)	506 - 521 MM	513. MM
ELBOW REST HEIGHT	(J)	191 - 211 MM	203. MM
SHOULDER-ELBOW LENGTH	(I)	330 - 345 MM	338. MM
BACK OF ELBOW TO WRIST PIVOT	(G)	290 - 305 MM	292. MM

DUMMY MEETS SPECIFICATIONS
TECHNICIAN Pete FSA

RUN NUMBER: 030895.0736

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III

07-MAR-95

TRC INC.

TEST NO: 43C10HD1

572E SN043 HEAD DROP CAL 10

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	52.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	263.40 G
PEAK LATERAL ACCELERATION	15 G MAX	-3.90 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN

Pete FSA

RUN NUMBER: 030795.0748;2

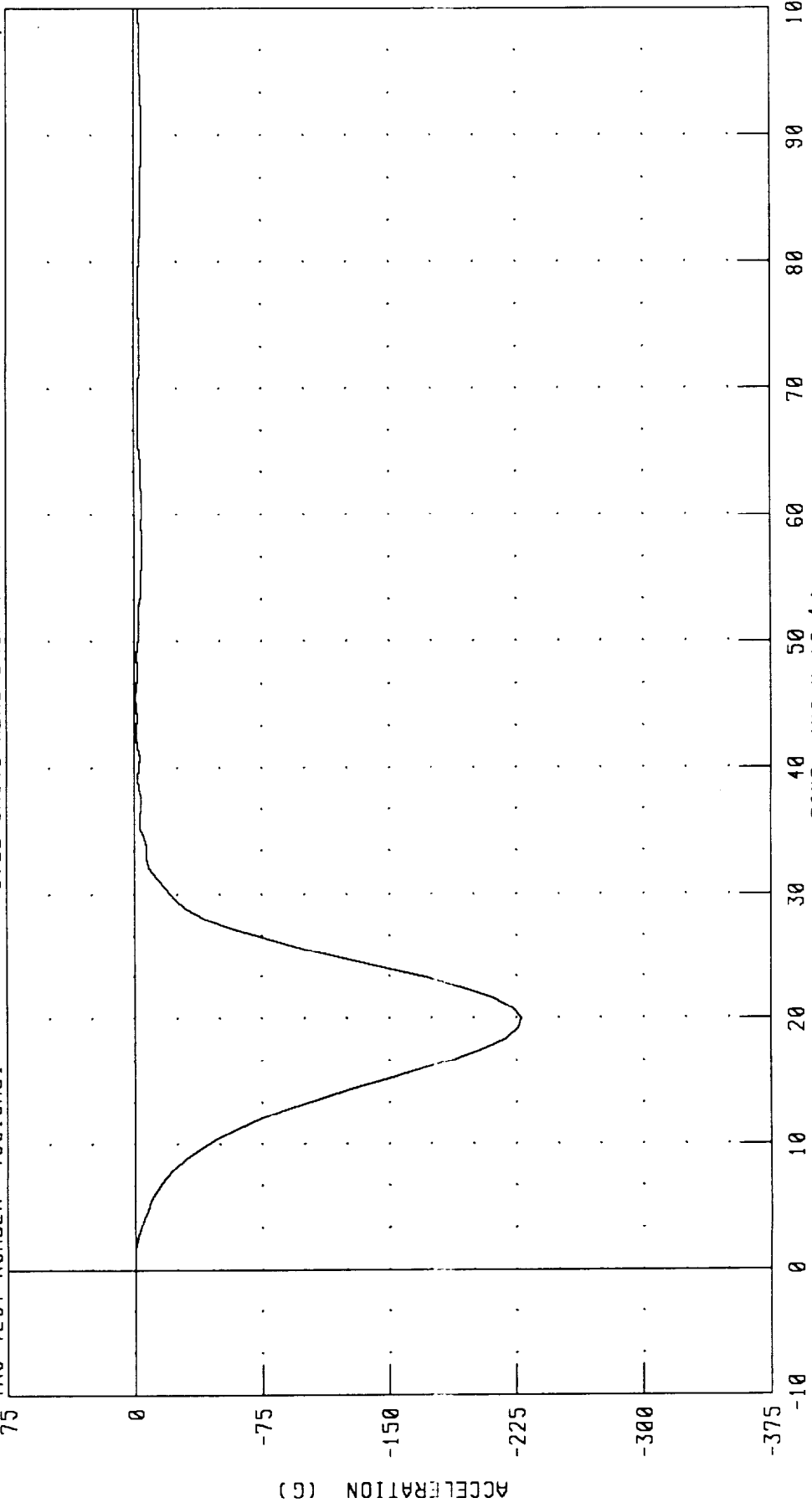
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION X AXIS

TRC TEST NUMBER: 43C10HD1

572E SN043 HEAD DROP CAL 10

RUN NUMBER: 030795 0748.2



CHANNEL: HEDXG FILTER: CH. CLASS 1000

PEAK DATA: 0.21 G @ -0.16 MS, -227.90 G @ 2.00 MS

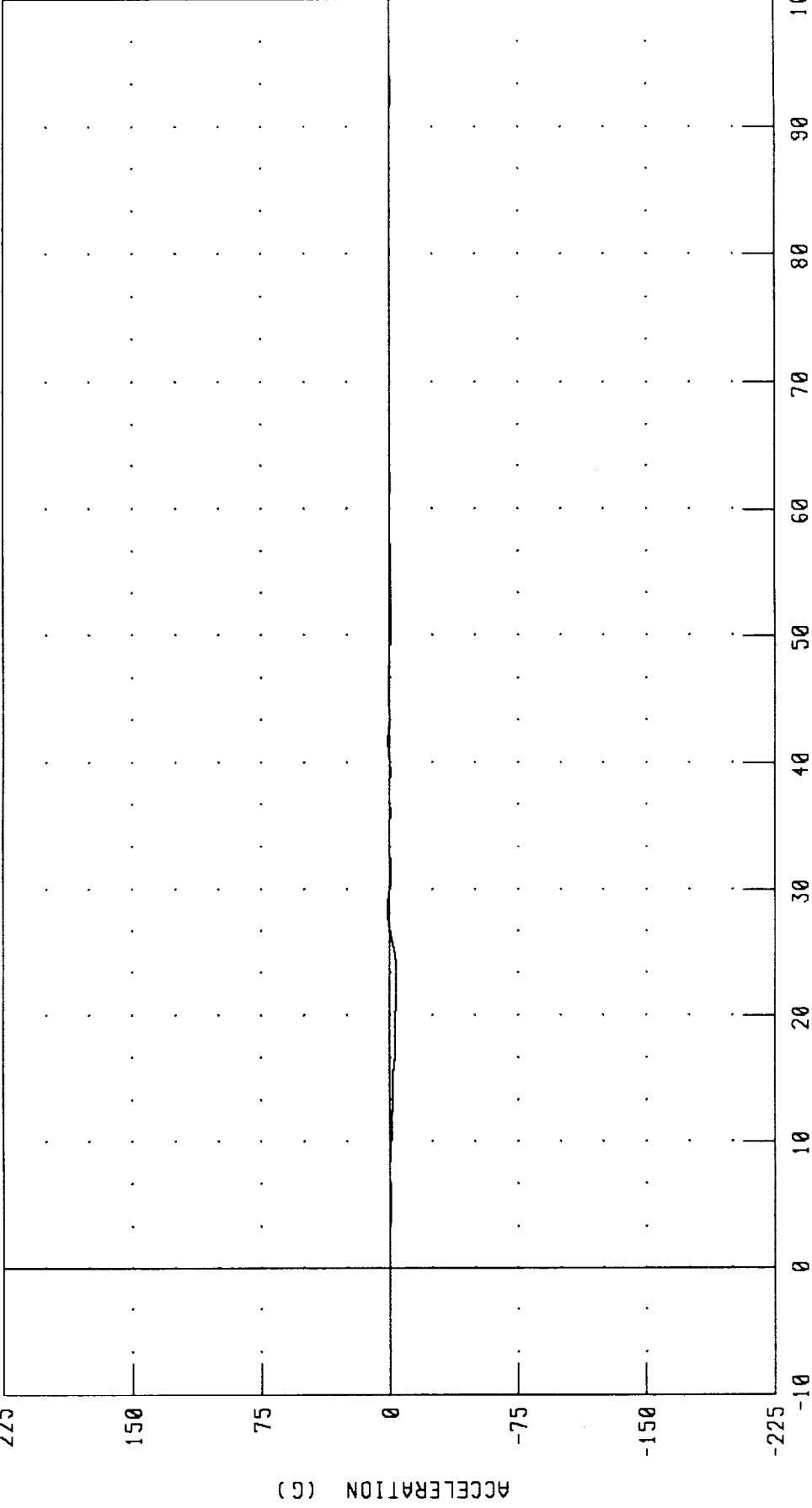
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

TRC TEST NUMBER: 43C10HD1

572E SN043 HEAD DROP CAL 10

RUN NUMBER: 030795.0748,2



CHANNEL: HEDYG FILTER: CH CLASS 1000

PEAK DATA: 1.37 G @ 2.88 MS, -3.90 G @ 2.32 MS

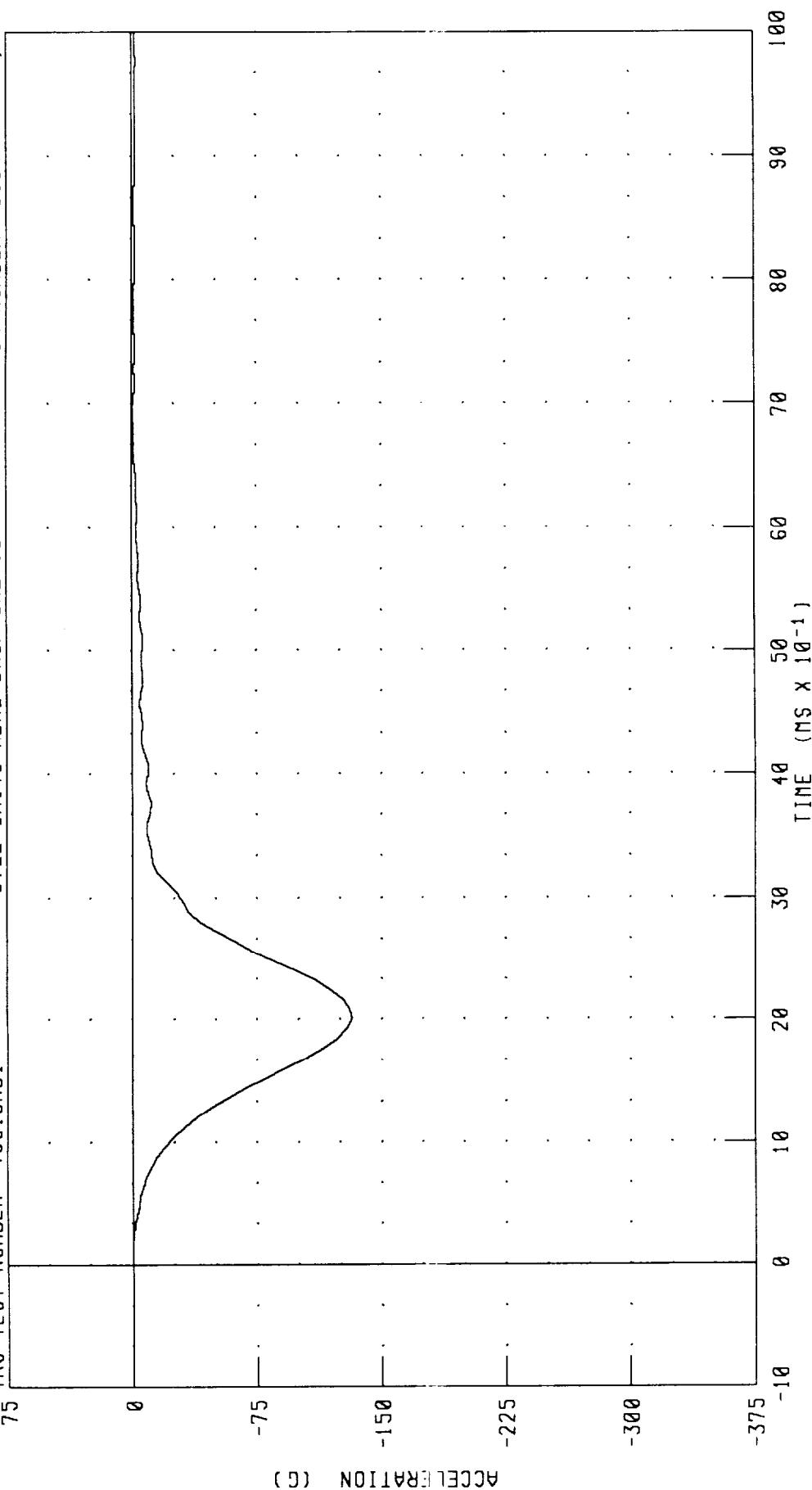
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Z AXIS

TRC TEST NUMBER: 43C10HD1

572E SN043 HEAD DROP CAL 10

RUN NUMBER: 030795 0748.2



CHANNEL: HEDZG FILTER: CH. CLASS 1000

PEAK DATA: 0 09 G @ -0 80 MS, -132 02 G @ 2 00 MS

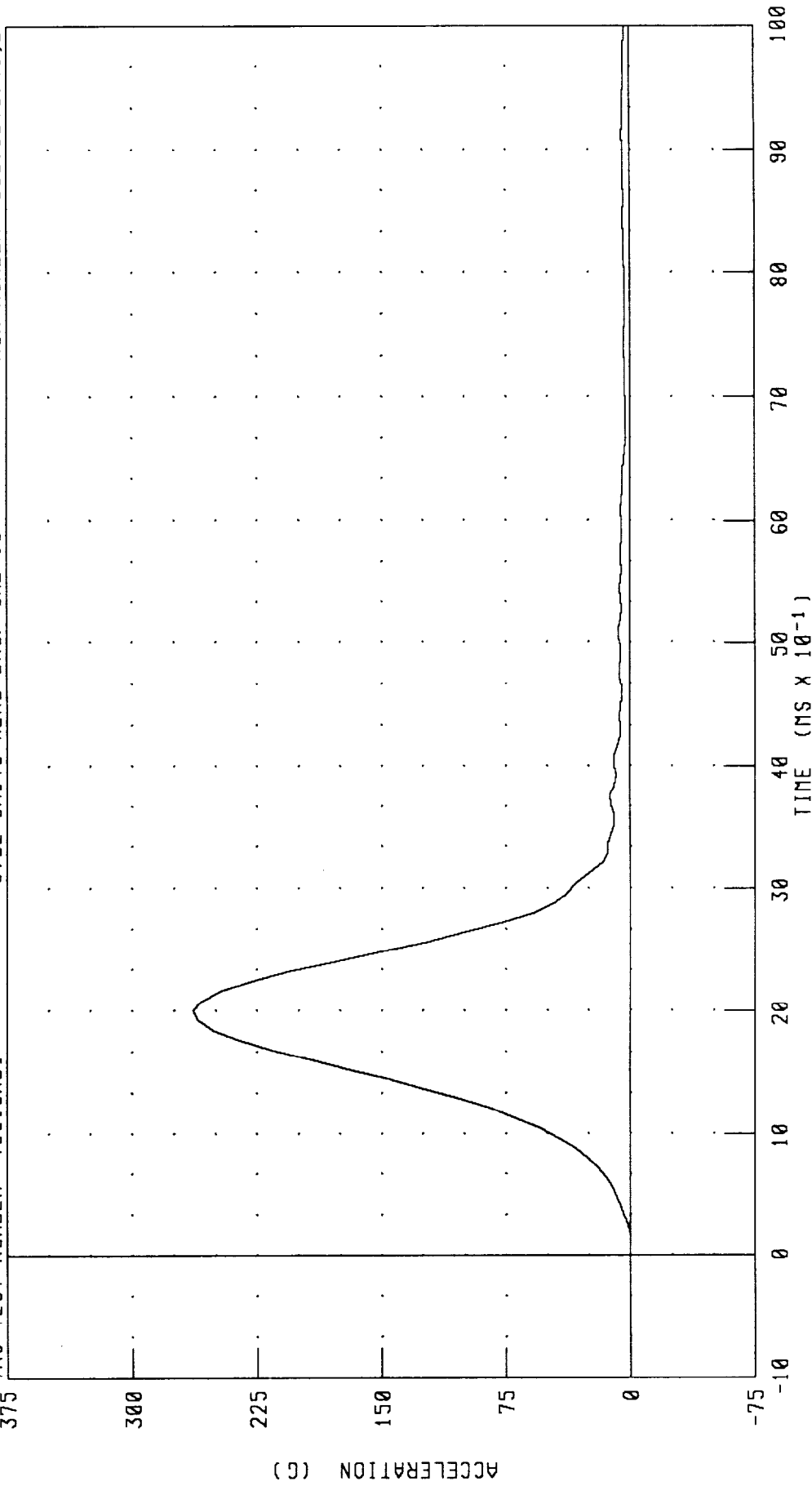
PART 572-E HYBRID III HEAD CALIBRATION

HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: 43C10HD1

572E SN043 HEAD DROP CAL 10

RUN NUMBER: 030795 0748,2



CHANNEL: HEDRG FILTER: CH CLASS 1000

PEAK DATA: 263 40 G @ 2 00 MS, 0.03 G @ -0.48 MS

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

HYBRID III

07-MAR-95

TRC INC. TEST NO: 43C10NF1 572E SN043 NECK FLEXION CAL10

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	52.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	7.06 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	24.04 G
	20 MS	17.60 - 22.60 G	20.93 G
	30 MS	12.50 - 18.50 G	17.00 G
MAX PENDULUM G		29 G MAX	24.94 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	16.94 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	37.76 MS
D PLANE	MAX	64 - 78 DEG.	69.51 DEG.
ROTATION	TIME	57 - 64 MS	59.28 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	97.34 NM
	TIME	47 - 58 MS	51.12 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	116.80 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	97.52 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN

Pete G-S

RUN NUMBER: 030795.0838;1

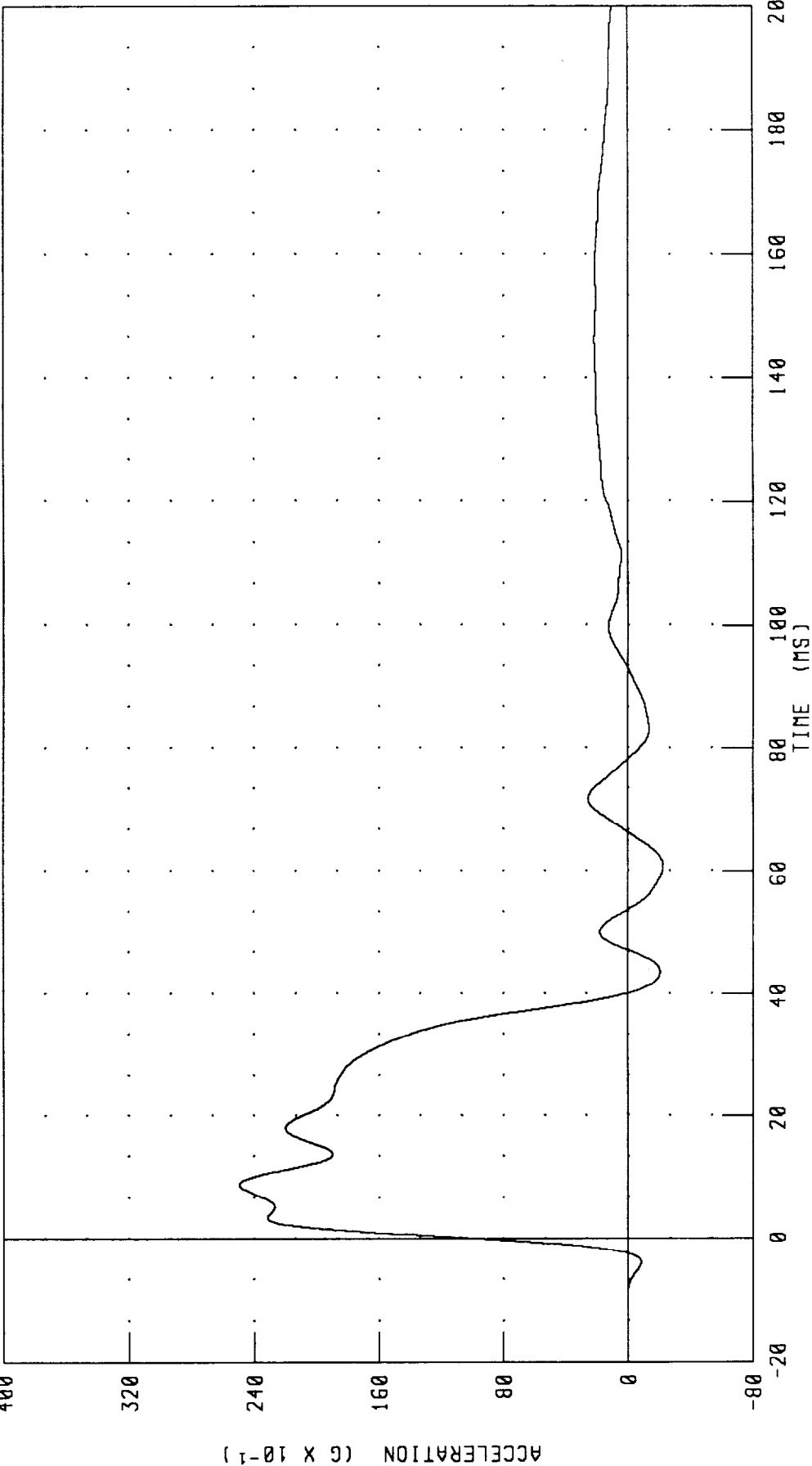
PART 572-E HYBRID III NECK FLEXION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 43C10NF1

572E SN043 NECK FLEXION CAL10

RUN NUMBER: 030795 0848,1



CHANNEL: PENXG FILTER: CH. CLASS 60

PEAK DATA: 24.94 G @ 8.72 MS, -2 24 G @ 60.72 MS

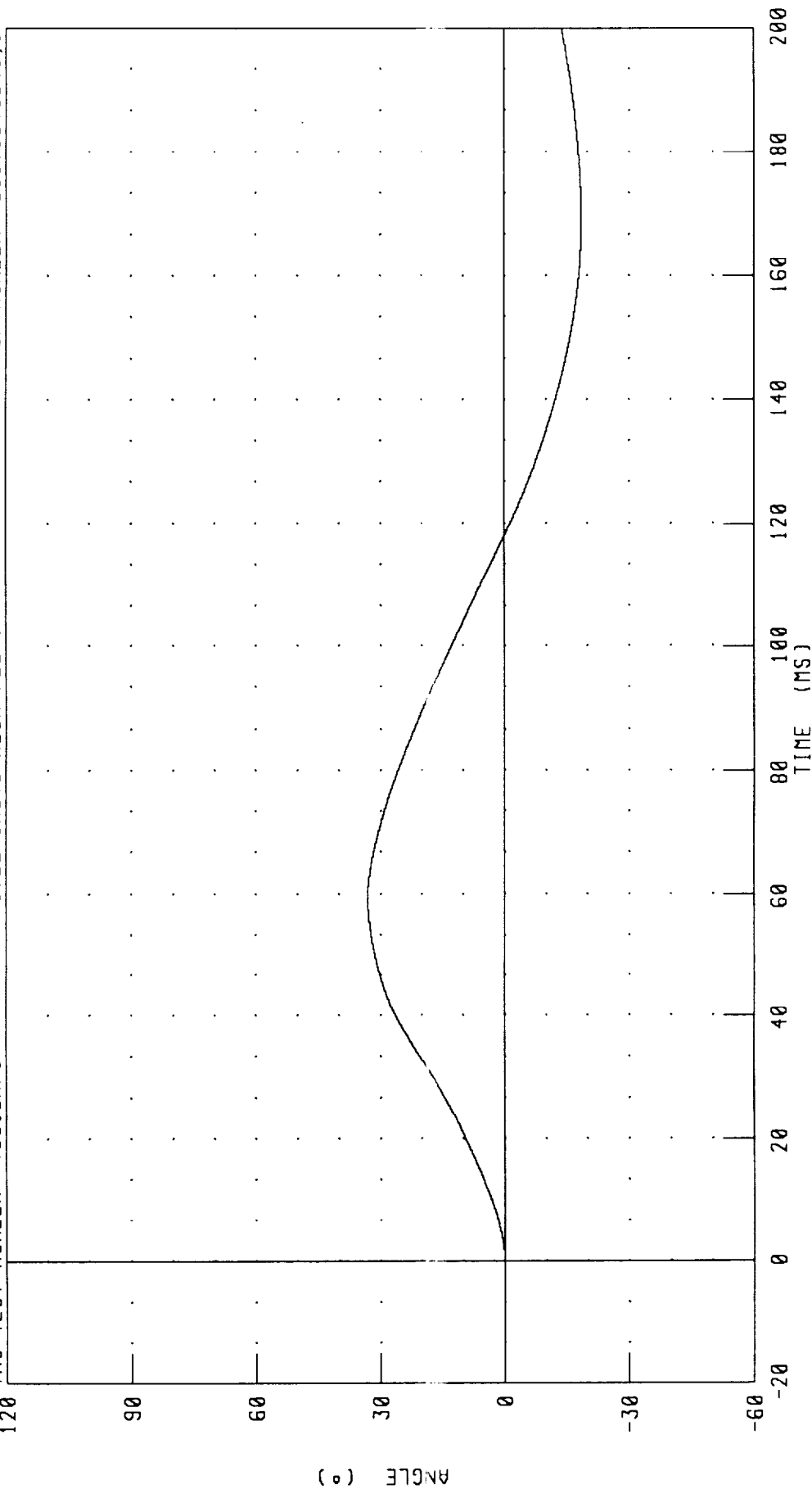
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER : 43C10NF1

572E SN043 NECK FLEXION CAL10

RUN NUMBER : 030795 0848,1



CHANNEL : BETA FILTER : CH CLASS 60

PEAK DATA : 33 04 ° @ 59 28 MS, -18 60 ° @ 168 88 MS

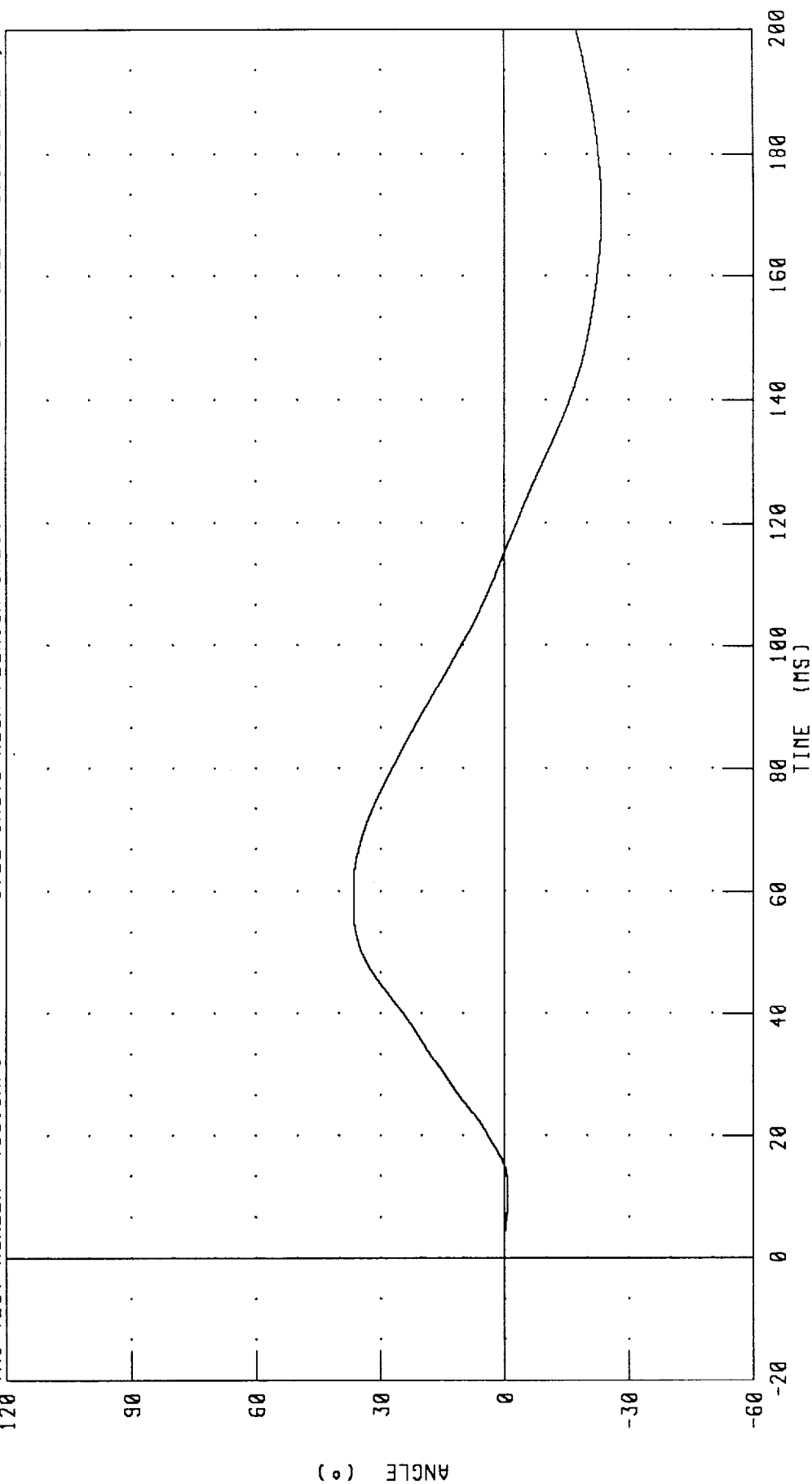
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 43C10NF1

572E SN043 NECK FLEXION CAL10

RUN NUMBER: 030795 0848,1



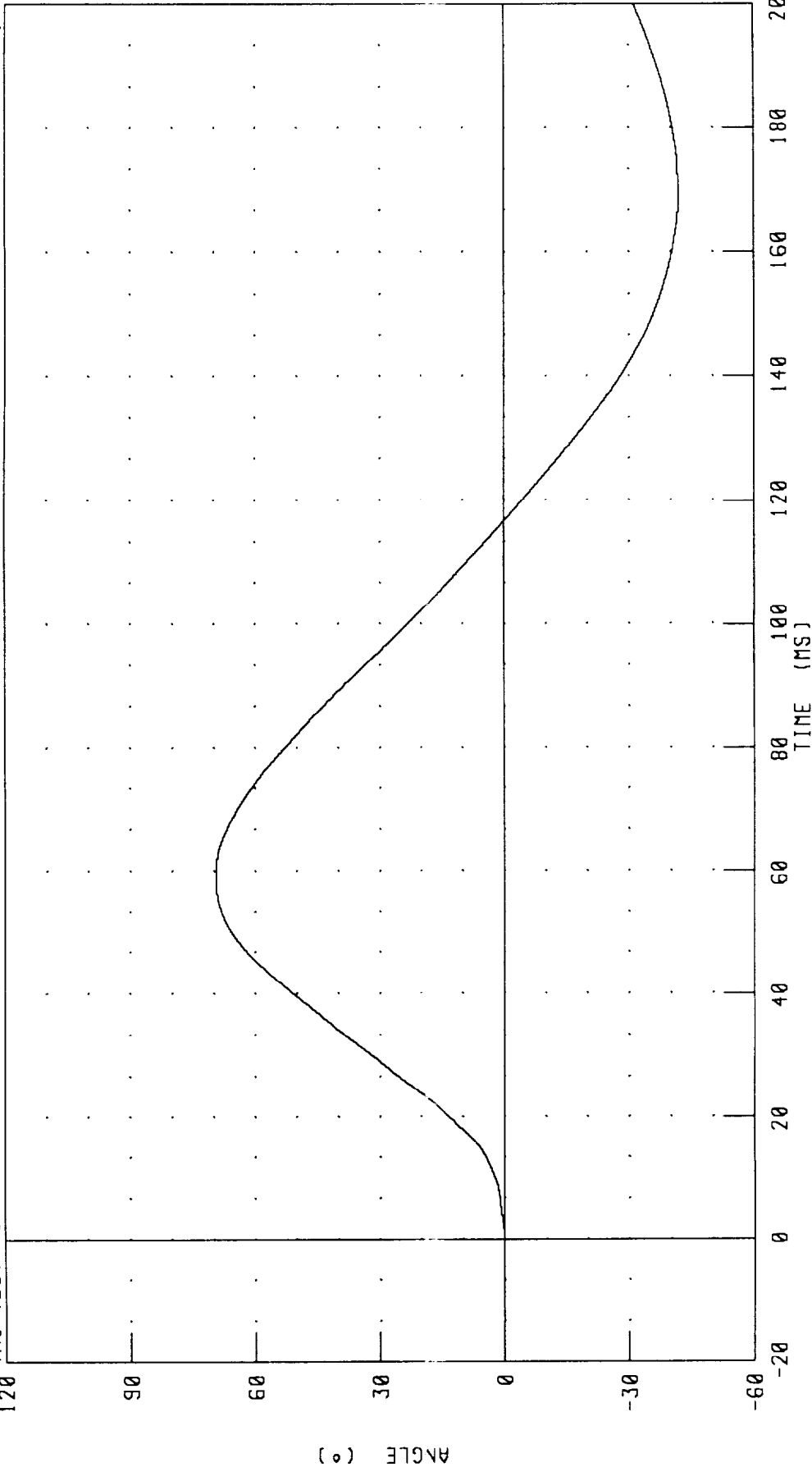
CHANNEL: THETA FILTER: CH. CLASS 60

PEAK DATA: 36.48 ° @ 58.00 MS, -23.26 ° @ 173.52 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 43C10NF1 572E SN043 NECK FLEXION CAL10 RUN NUMBER: 030795 0848,1



CHANNEL: TOTAN FILTER: CH. CLASS 60

PEAK DATA: 69 51 ° @ 59 28 MS, -41 85 ° @ 168 64 MS

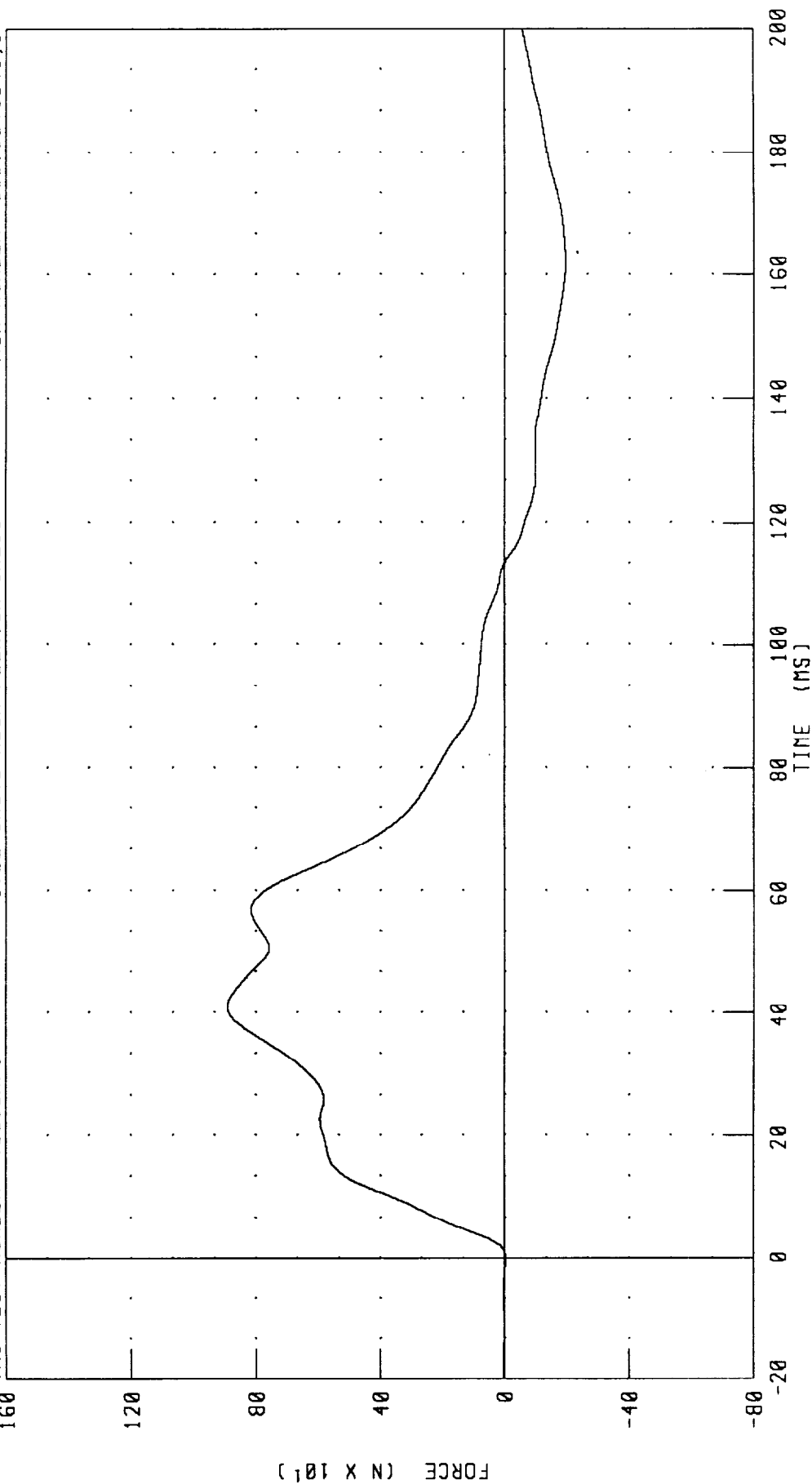
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 43C10NF1

572E SN043 NECK FLEXION CAL10

RUN NUMBER: 030795 0848.1



CHANNEL: NEKXF FILTER: CH. CLASS 60

PEAK DATA: 892.70 N @ 40.88 MS; -195.69 N @ 161.92 MS

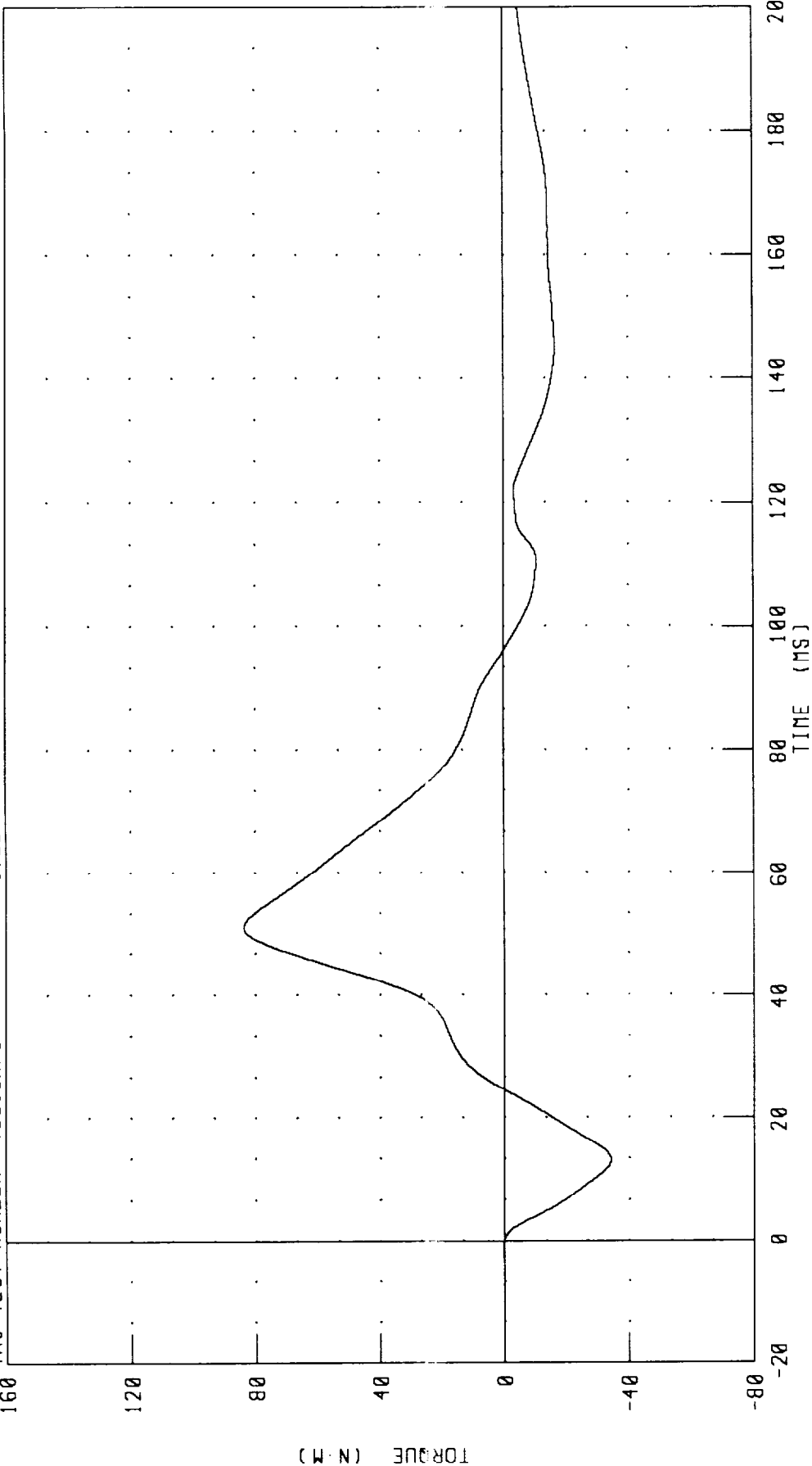
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 43C10NF1

572E SN043 NECK FLEXION CAL10

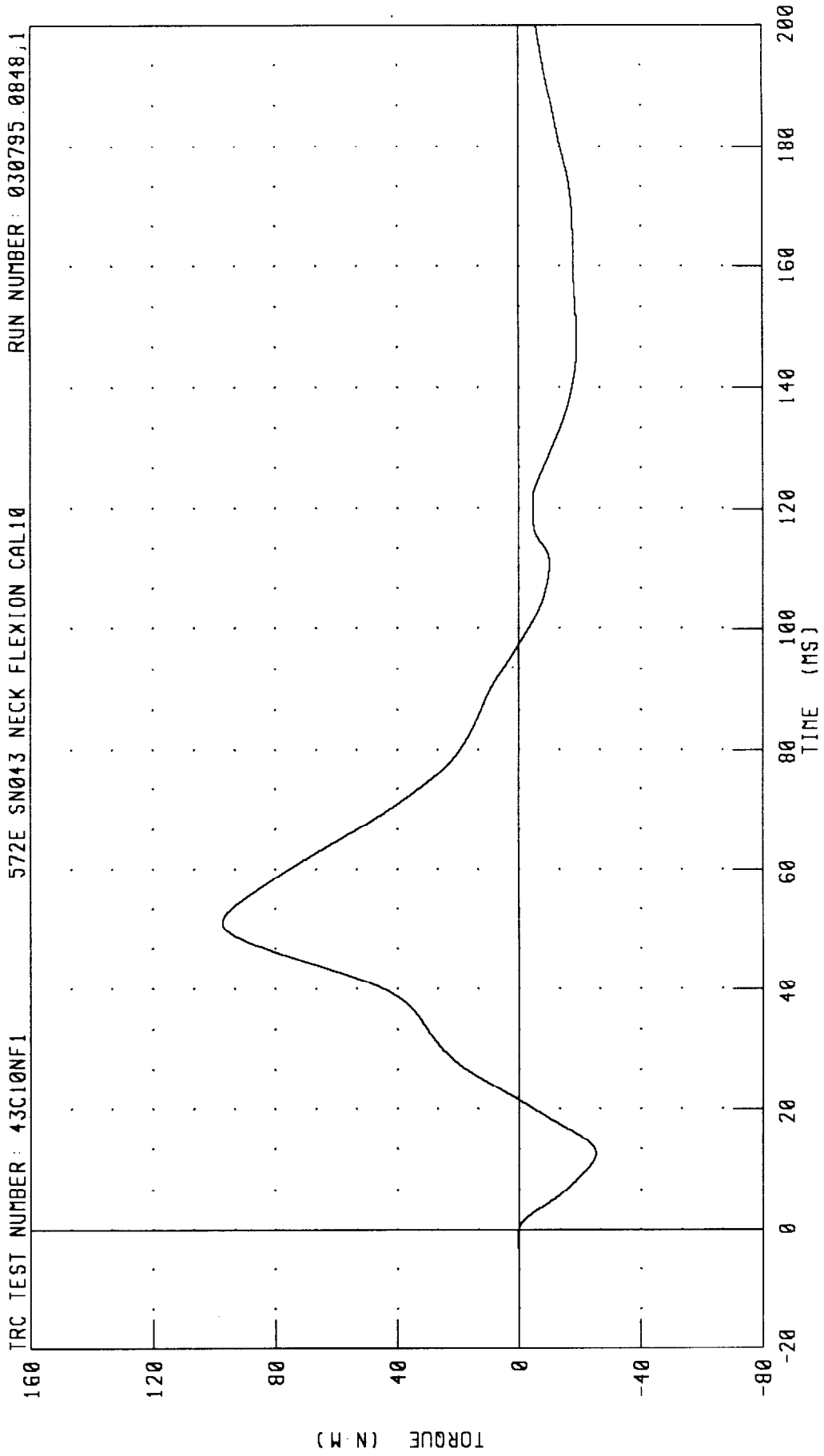
RUN NUMBER: 030795 0848,1



CHANNEL: NEKYM FILTER: CH. CLASS 60

PEAK DATA: 83.83 N·M @ 51.04 MS, -34.11 N·M @ 113.12 MS

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



CHANNEL: NEKOM FILTER: CH. CLASS 60 PEAK DATA: 97.34 N·M @ 51.12 MS, -25.22 N·M @ 12.64 MS

TRANSPORTATION RESEARCH CENTER INC.

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

HYBRID III

07-MAR-95

TRC INC. TEST NO: 43C10NE1 572E SN043 NECK EXT. CAL10

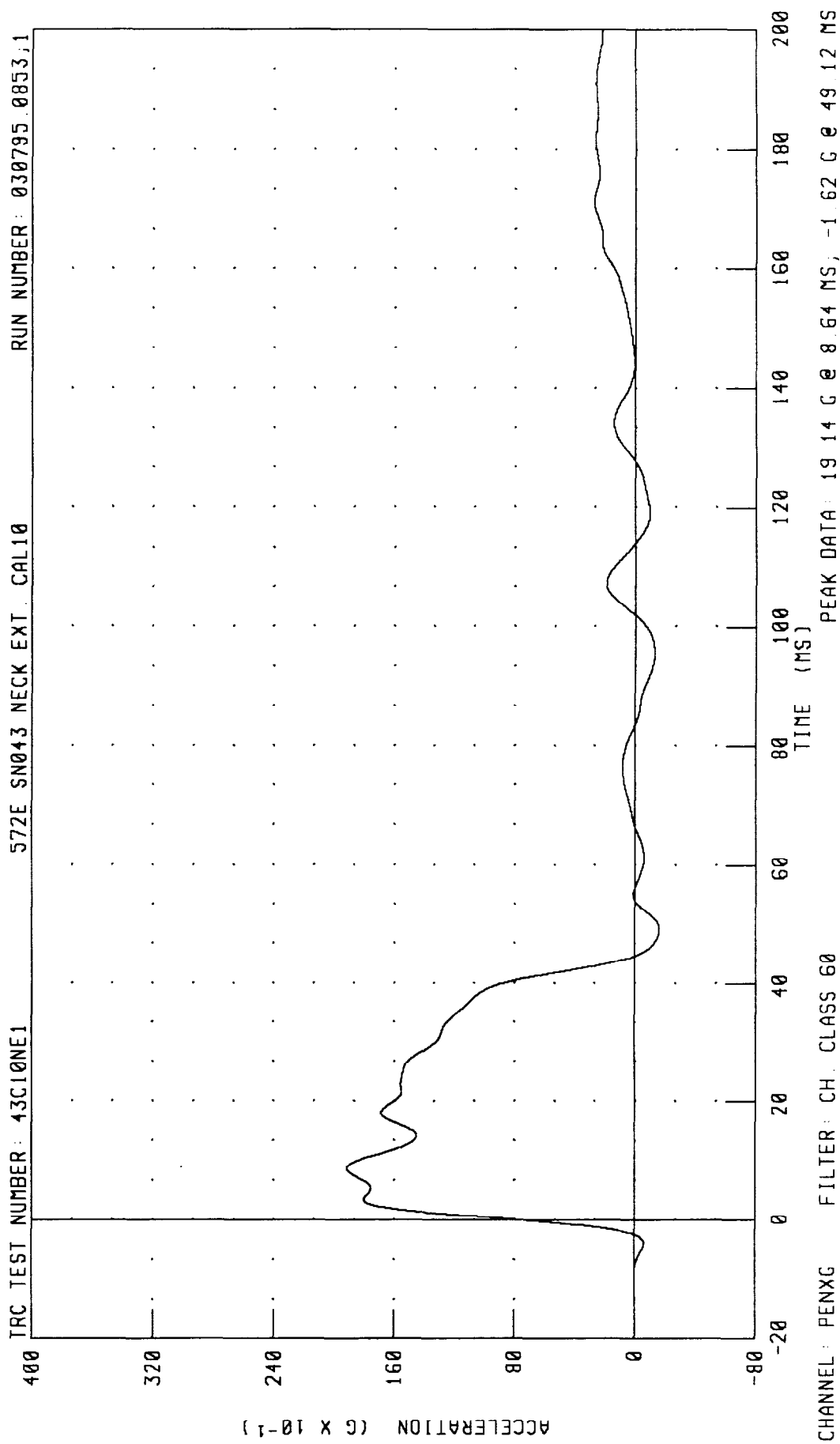
TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	52.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.00 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	18.40 G
	20 MS	14.00 - 19.00 G	15.99 G
	30 MS	11.00 - 16.00 G	13.17 G
MAX PENDULUM G		22 G MAX	19.14 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	13.14 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	41.84 MS
D PLANE	MAX	81 - 106 DEG.	91.06 DEG.
ROTATION	TIME	72 - 82 MS	76.00 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-60.04 NM
	TIME	65 - 79 MS	70.56 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	158.00 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	137.52 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Pete E. S.

RUN NUMBER: 030795.0852;1

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
PENDULUM DECELERATION



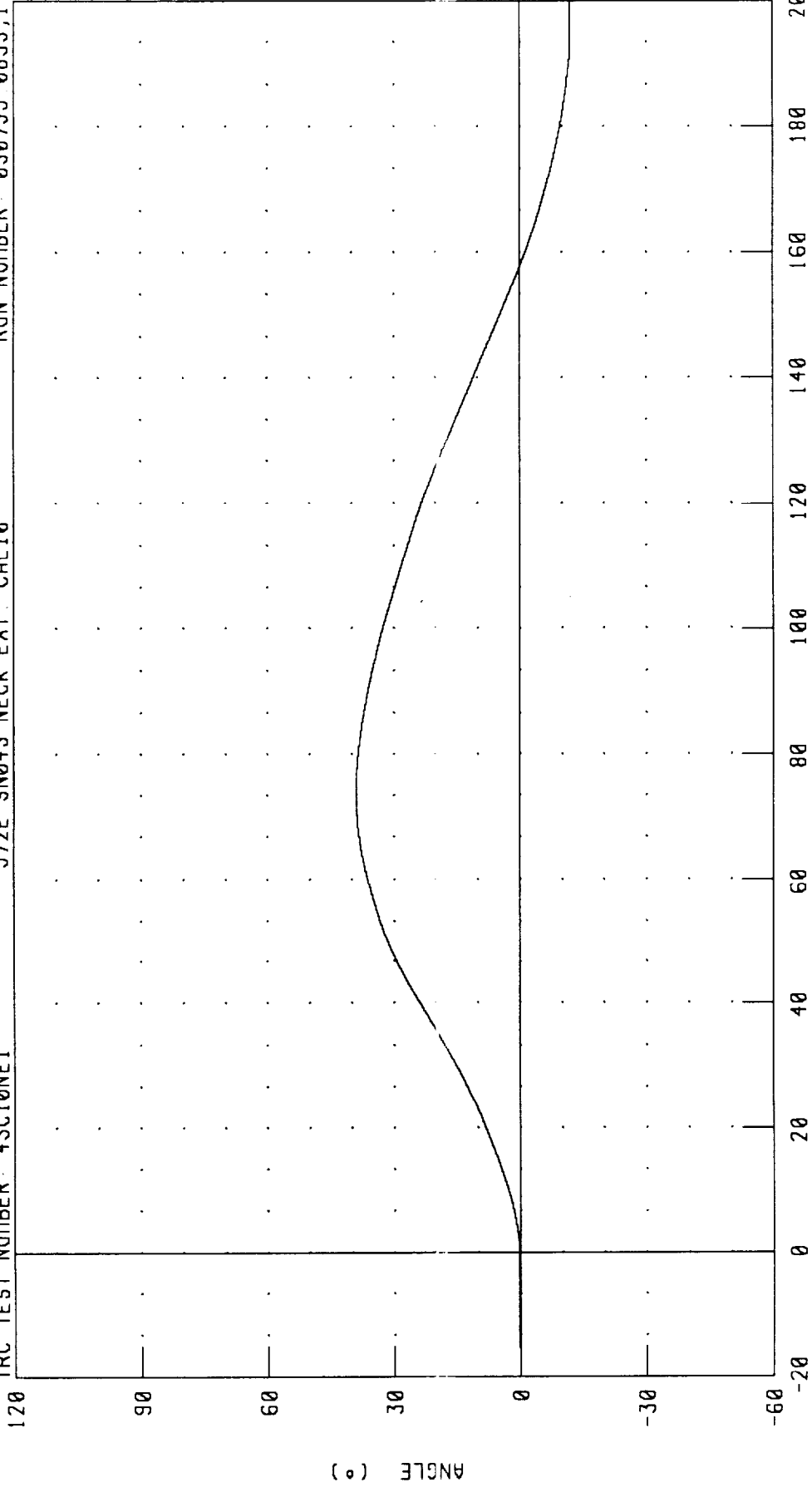
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 43C10NE1

572E SN043 NECK EXT. CAL10

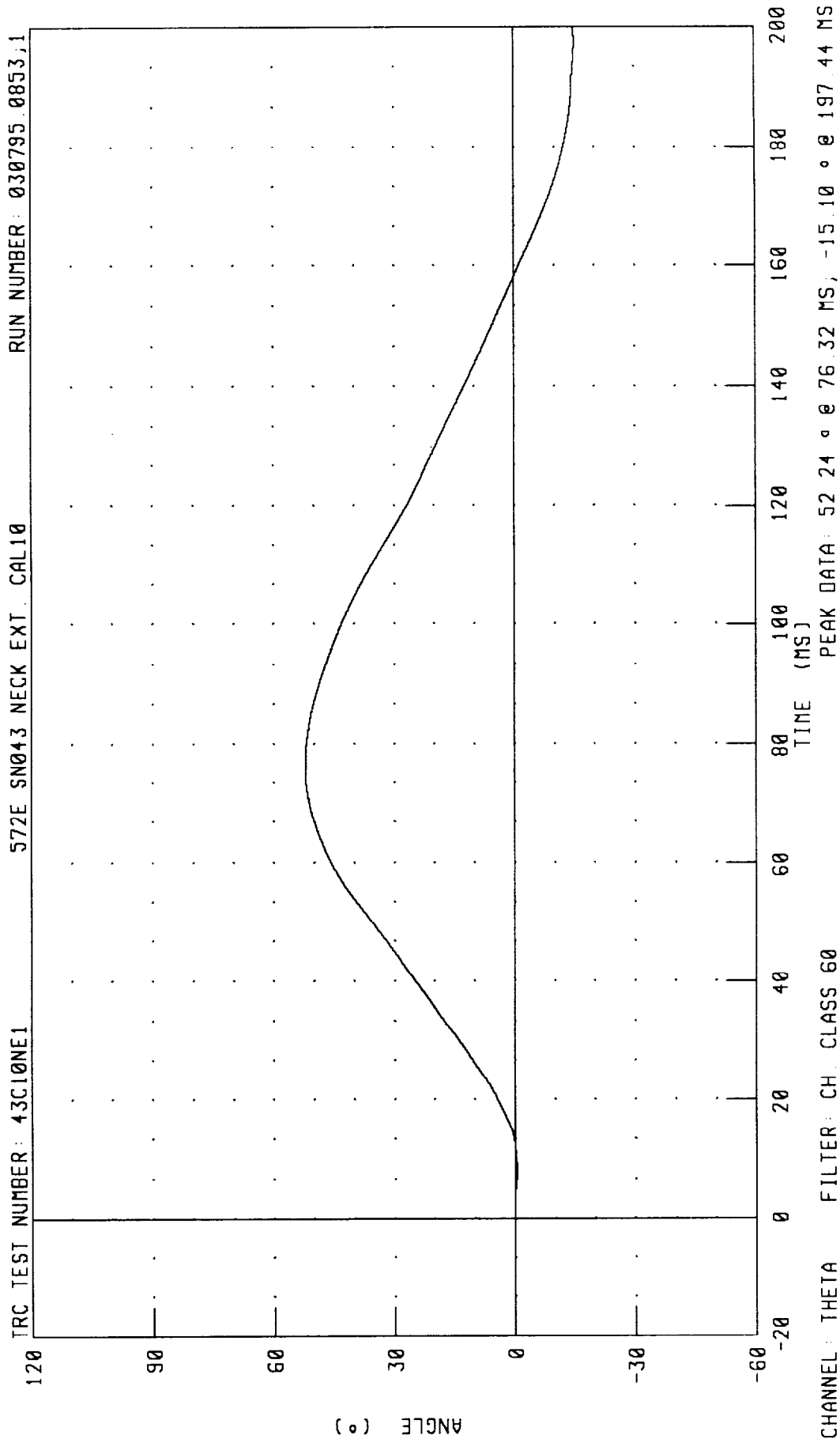
RUN NUMBER: 030795 0853;1



CHANNEL: BETA FILTER: CH. CLASS 60

PEAK DATA: 38.84 ° @ 73.76 MS, -11.93 ° @ 199.52 MS

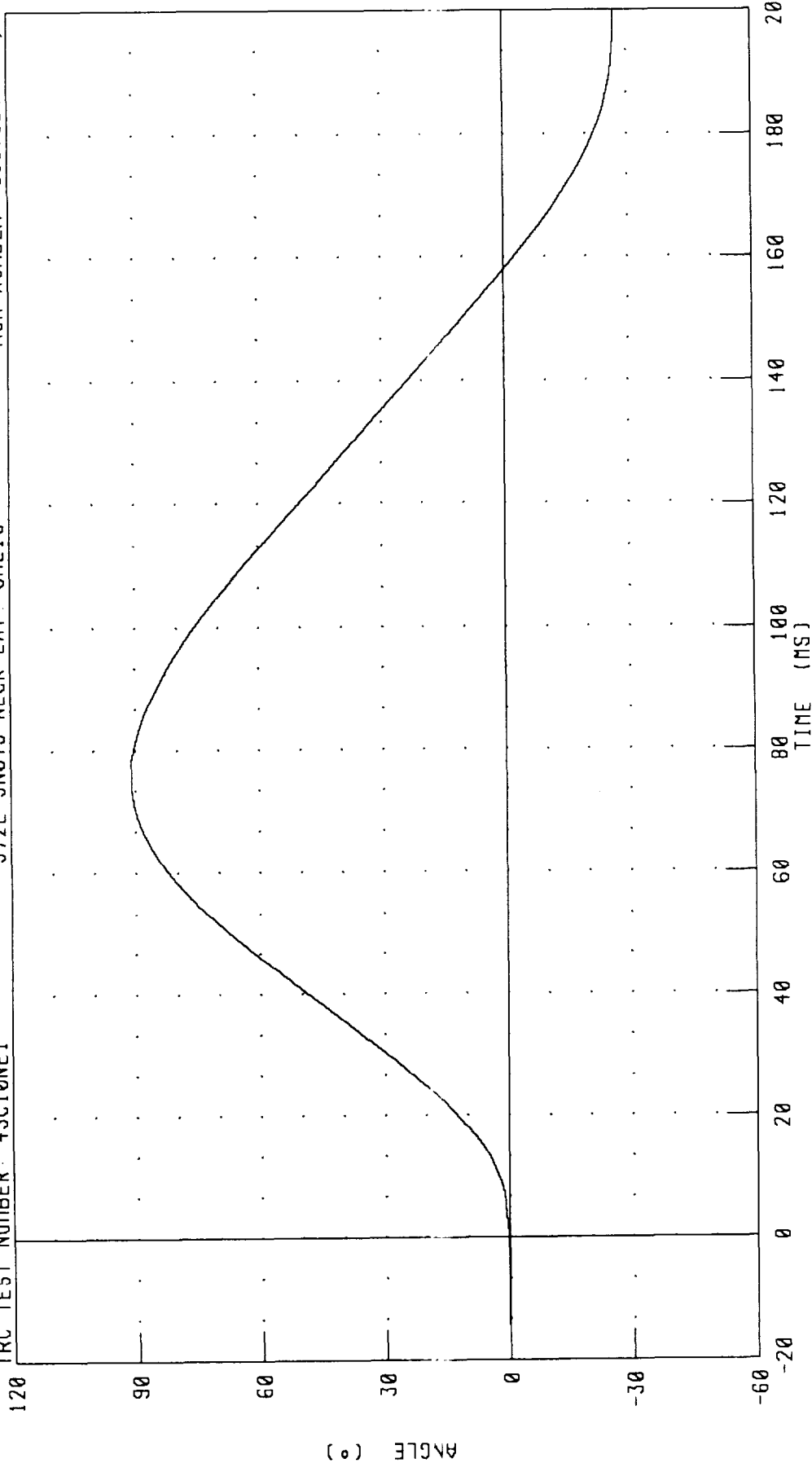
PART 572-E HYBRID III NECK EXTENSION CALIBRATION
 ROTATION ABOUT OCCIPITAL CONDYLE



PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 43C10NE1 572E SN043 NECK EXT. CAL10 RUN NUMBER: 030795 0853,1



PEAK DATA: 91.07 ° @ 76.00 MS, -27.00 ° @ 198.00 MS

CHANNEL: TOTAL FILTER: CH. CLASS 60

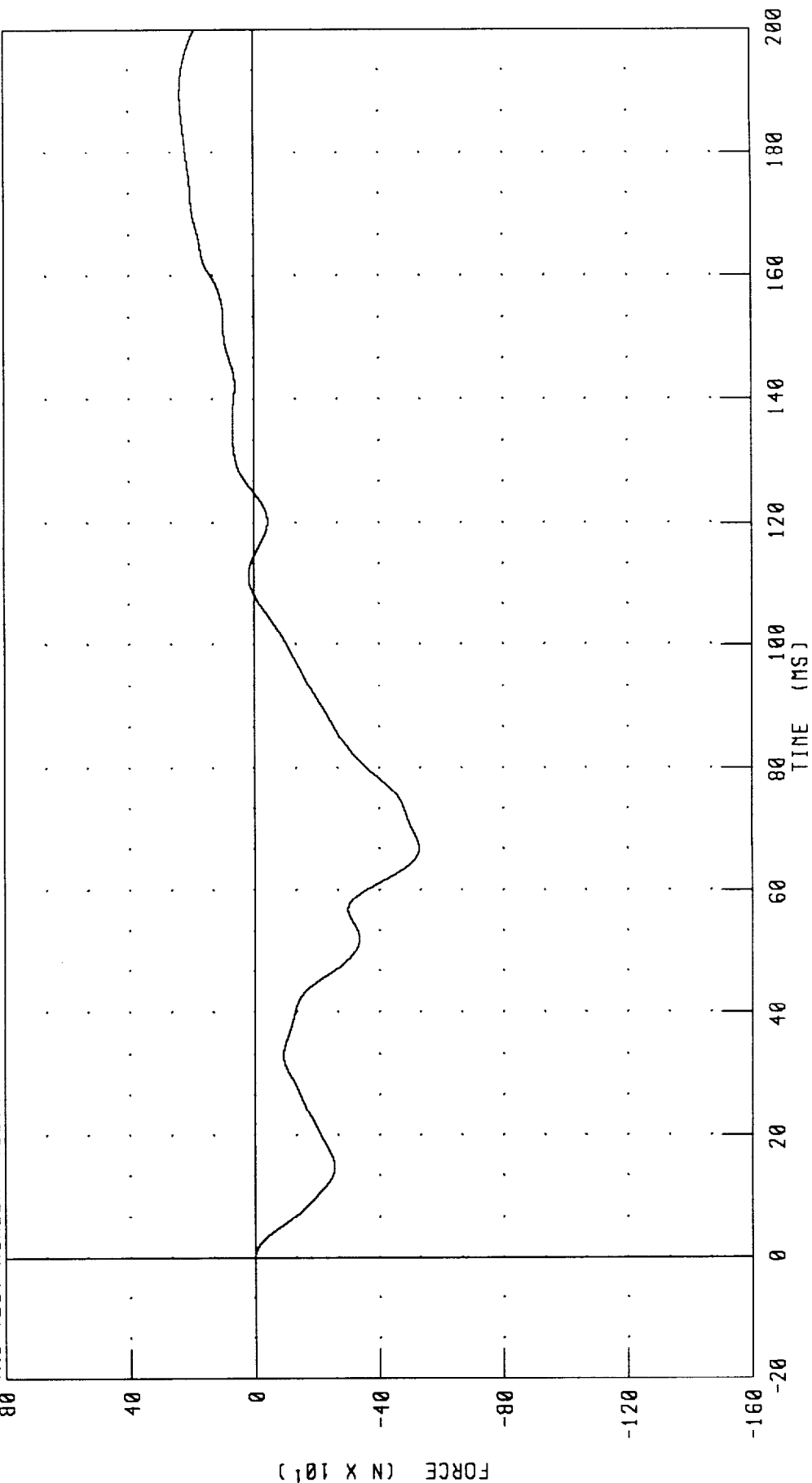
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 43C10NE1

572E SN043 NECK EXT CAL10

RUN NUMBER: 030795 0853,1



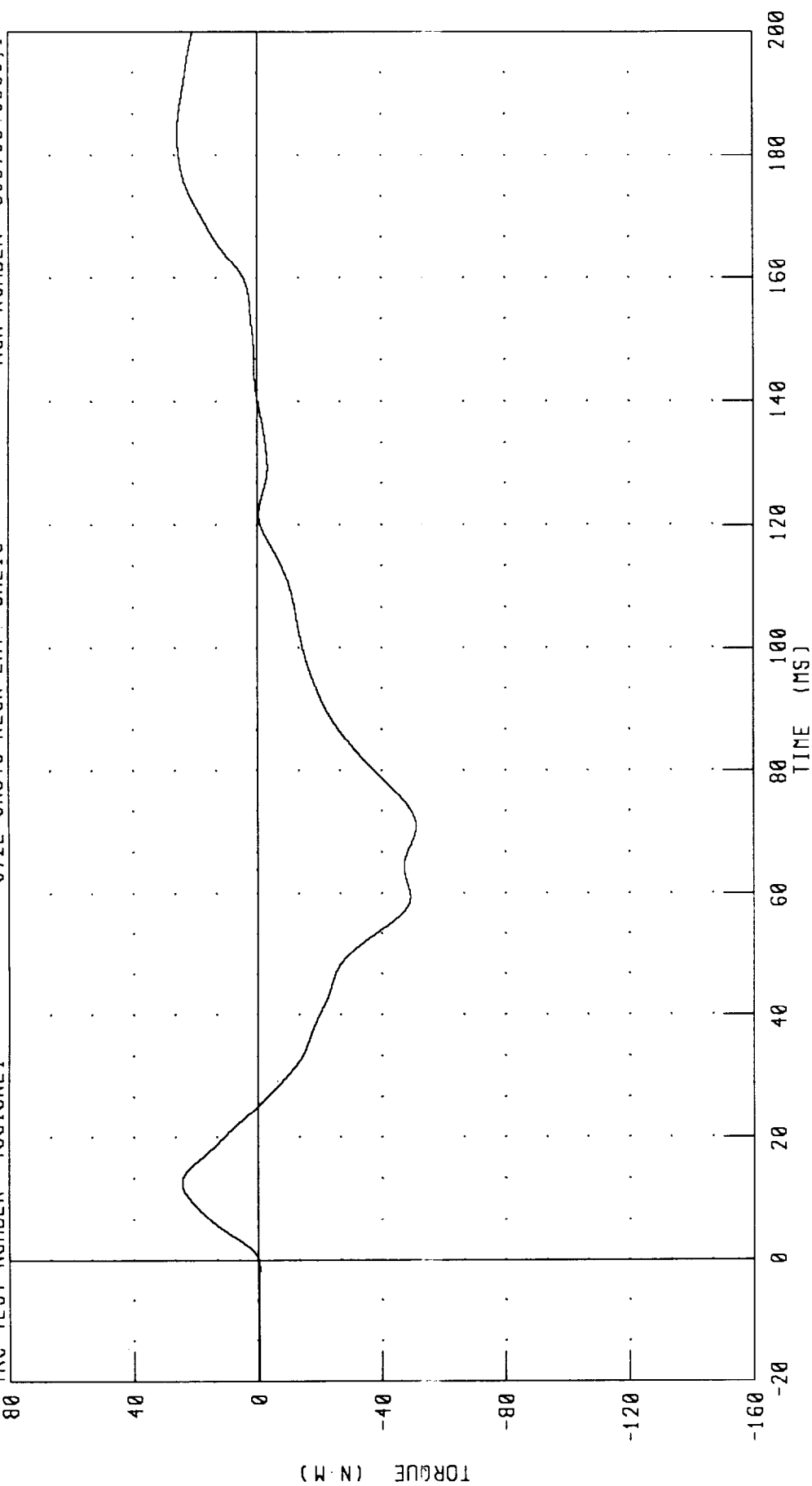
CHANNEL: NEKXF FILTER: CH CLASS 60

PEAK DATA: 235.39 N @ 189.44 MS, -528.86 N @ 66.80 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

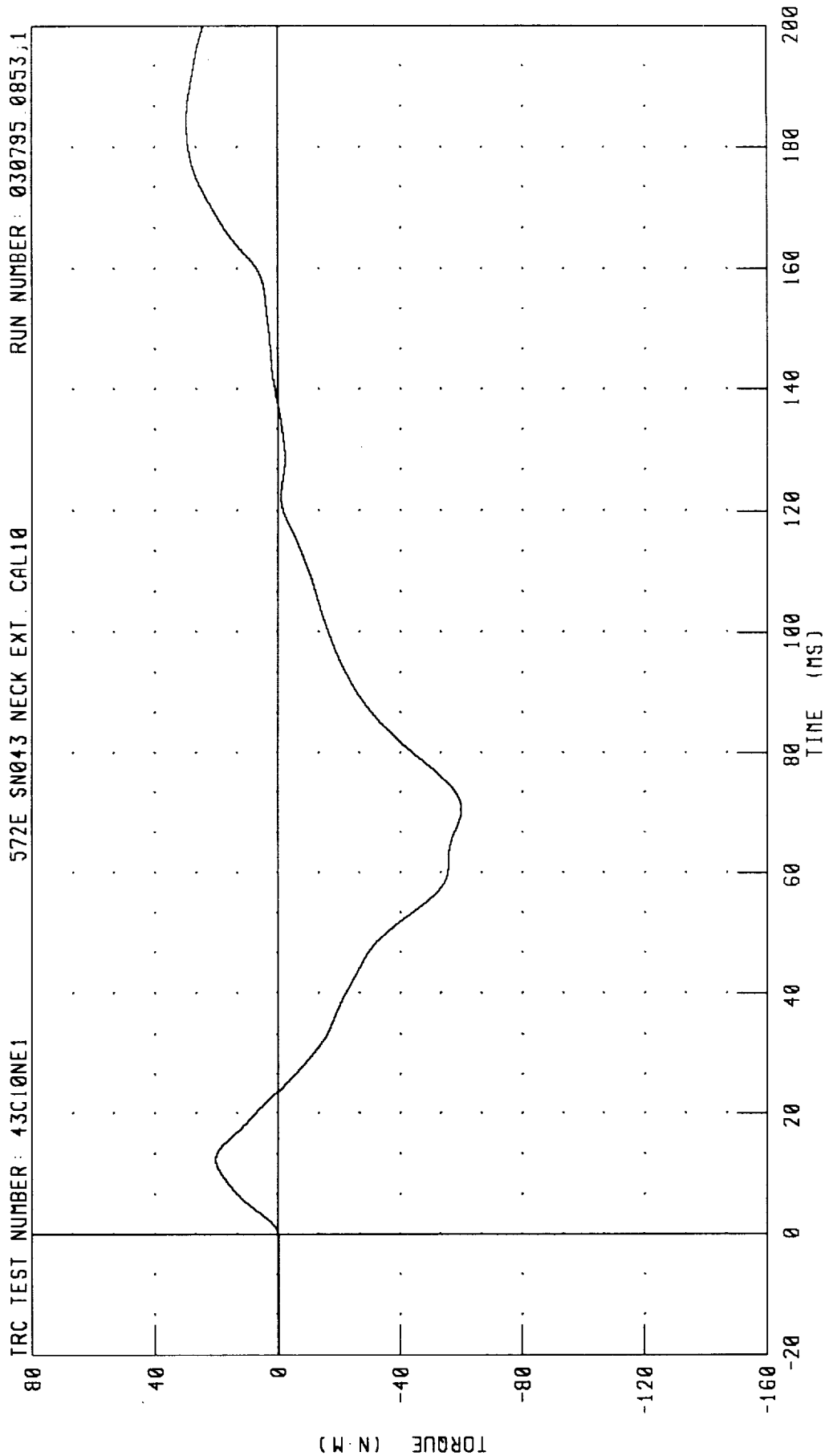
TRC TEST NUMBER: 43C10NE1 572E SN043 NECK EXT CAL10 RUN NUMBER: 030795 0853,1



CHANNEL: NEKYM FILTER: CH CLASS 60

PEAK DATA: 25 72 N M @ 183 52 MS, -51 16 N M @ 70 88 MS

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



CHANNEL: NEKOM FILTER: CH. CLASS 60

PEAK DATA: 29.75 N M @ 184.00 MS, -60.04 N M @ 70.56 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III

08-MAR-95

TRC INC.

TEST NO: 43C10TH2

572E SN043 H.S.THORAX CAL10

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	40.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.68 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	64.1 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5296. N
INTERNAL HYSTERESIS	69% - 85%	75.4%

TEST MEETS SPECIFICATIONS

TECHNICIAN P. J. F. S.

RUN NUMBER: 030895.0723;1

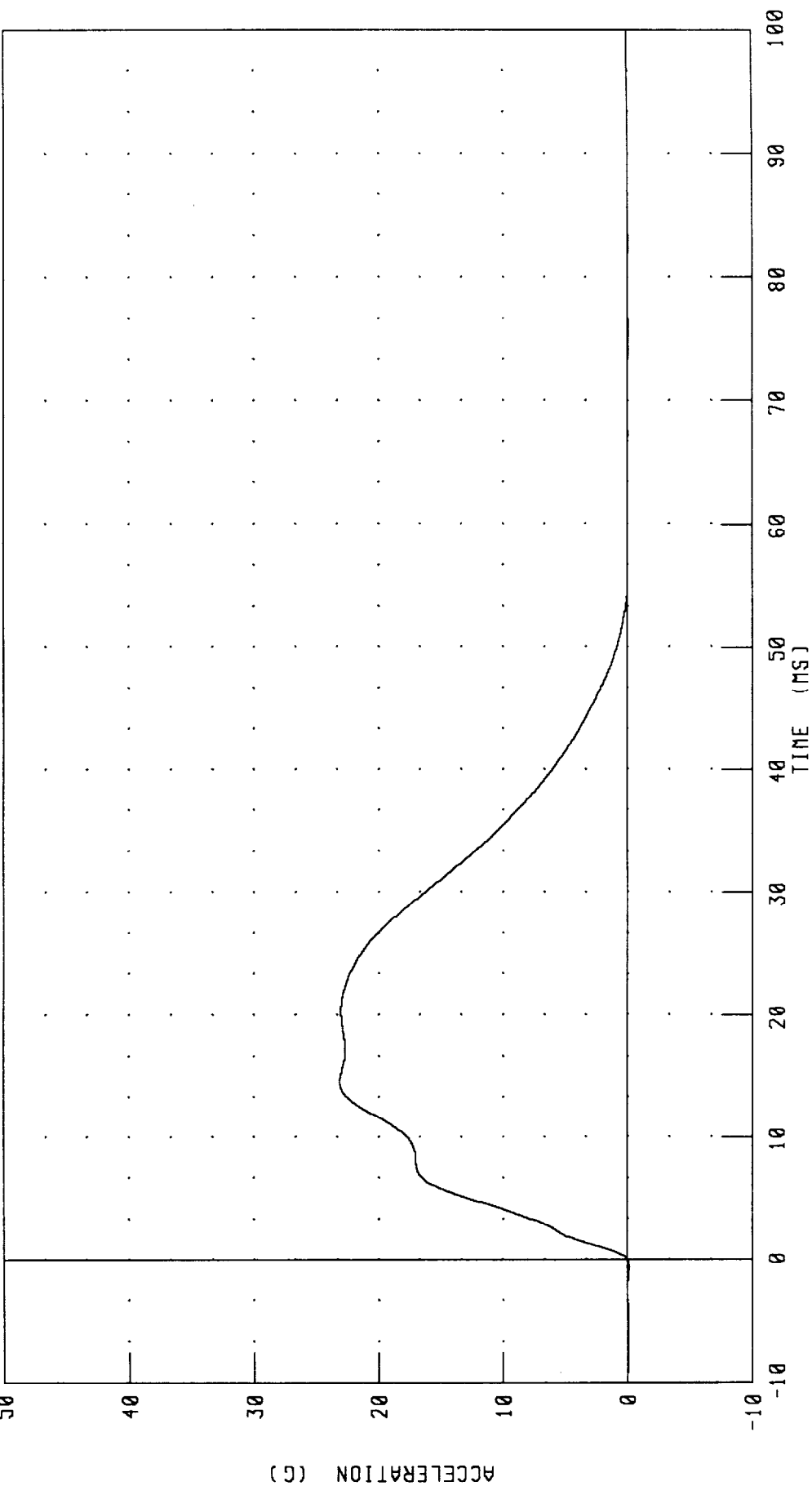
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 43C10TH2

572E SN043 H S THORAX CAL10

RUN NUMBER: 030895 0724,1



CHANNEL: PENXC FILTER: CH CLASS 180

PEAK DATA: 23.12 G @ 14.56 MS, -0.11 G @ -0.64 MS

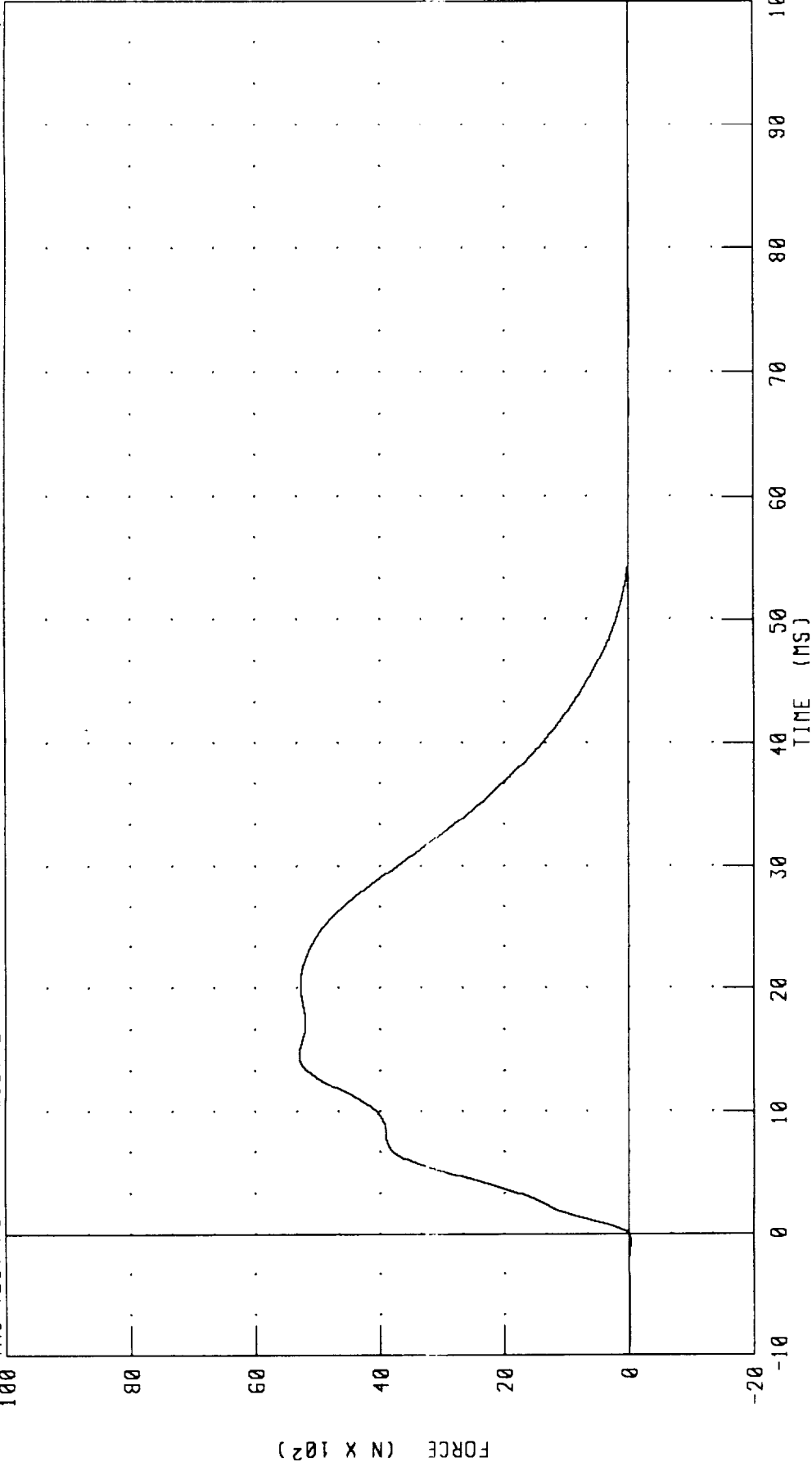
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM FORCE

TRC TEST NUMBER: 43C10TH2

572E SN043 H S THORAX CAL10

RUN NUMBER: 030895 0724,1



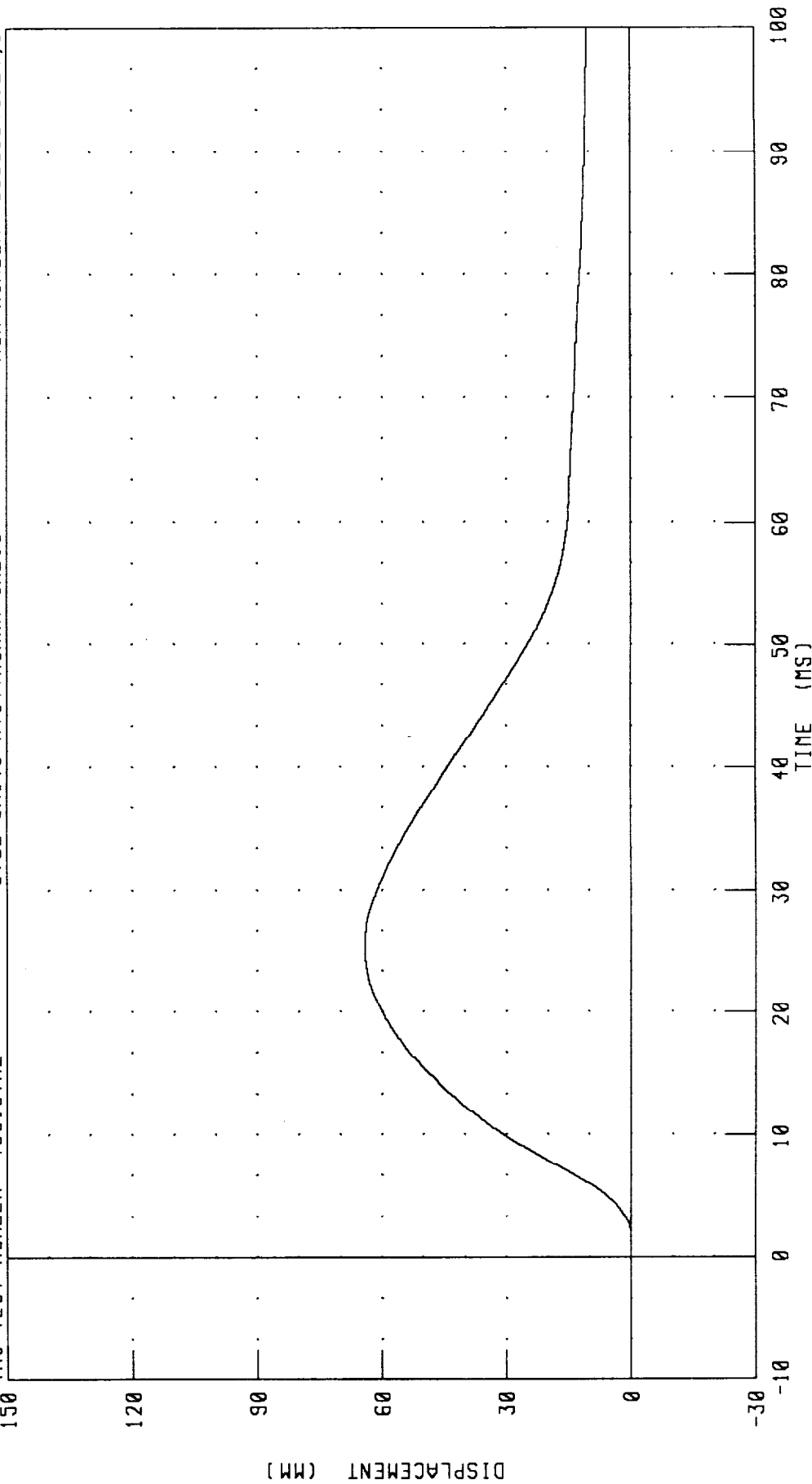
CHANNEL: PENXF FILTER: CH CLASS 180

PEAK DATA: 5296 73 N @ 14 56 MS, -25 81 N @ -0 64 MS

PART 572-E HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

TRC TEST NUMBER: 43C10TH2 572E SN043 H S THORAX CAL10 RUN NUMBER: 030895 0724,1



CHANNEL: CSTXD FILTER: CH CLASS 180

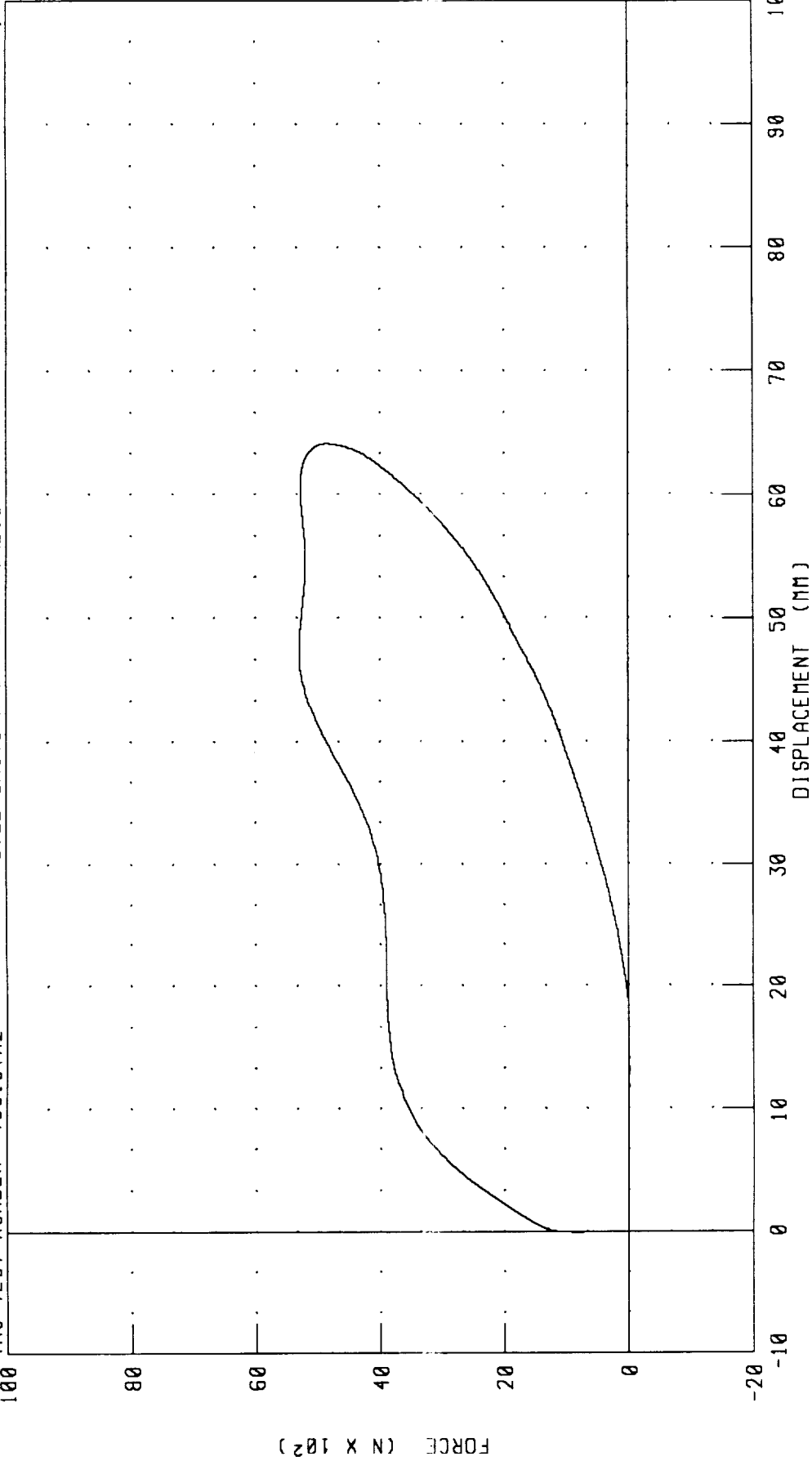
PEAK DATA: 64 16 MM @ 25 28 MS, -0 02 MM @ 1 44 MS

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

IRC TEST NUMBER: 43C10TH2

572E SN043 H S THORAX CAL10

RUN NUMBER: 030895 0724.1



CHANNEL: CSTXD
PENXF

FILTER: CH CLASS 180
CH CLASS 180

DISPLACEMENT (MM)
PEAK DATA:

64.16 MM @ 25.28 MS, -0.02 MM @ 1.44 MS
5296.73 N @ 14.56 MS, -25.81 N @ -0.64 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III

06-MAR-95

TRC INC.

TEST NO: 43C10RK1

572E SN043 RIGHT KNEE CAL 10

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5272.7 N

TEST MEETS SPECIFICATIONS

TECHNICIAN

Pete Fournier

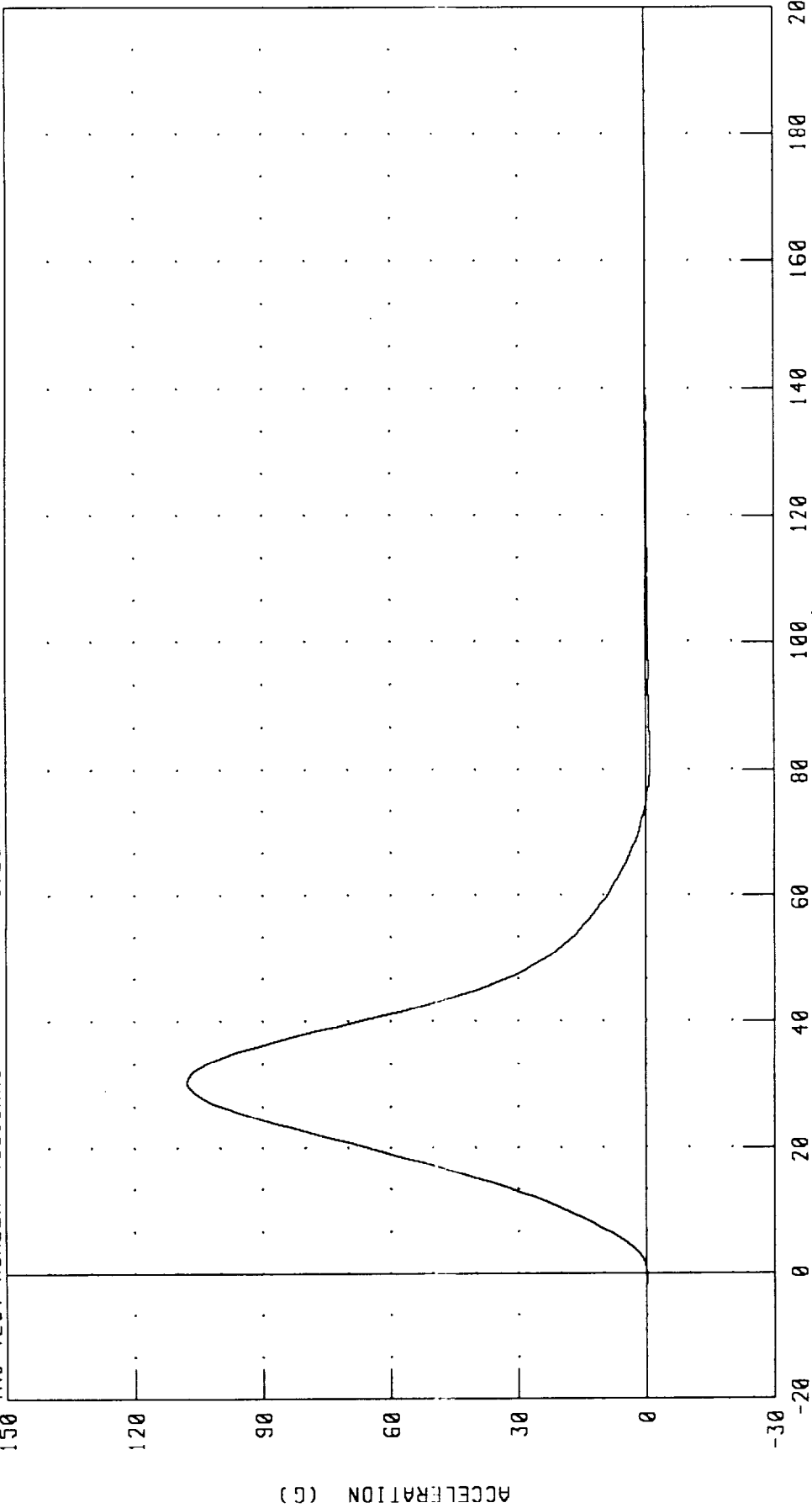
RUN NUMBER: 030695.1447;1

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

TRC TEST NUMBER: 43C10RK1

572E SN043 RIGHT KNEE CAL 10

RUN NUMBER: 030695 1448.1



CHANNEL: PENXG FILTER: CH. CLASS 600

PEAK DATA: 107.77 G @ 3.04 MS, -1.02 G @ 8.24 MS

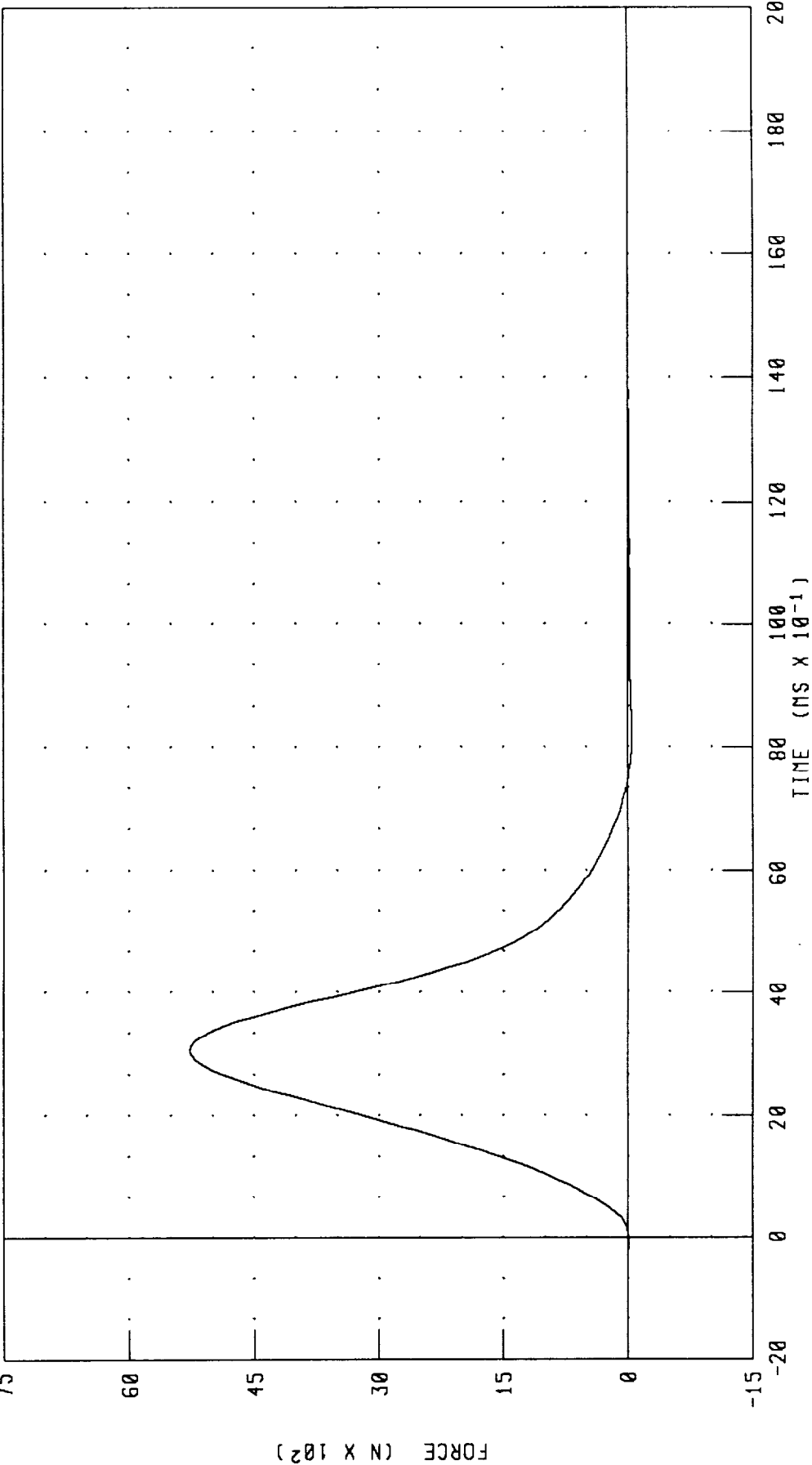
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

572E SN043 RIGHT KNEE CAL 10

TRC TEST NUMBER: 43C10RK1

RUN NUMBER: 030695.1448.1



CHANNEL: PENXF FILTER: CH CLASS 600

PEAK DATA: 5272.79 N @ 3.04 MS; -49.69 N @ 8.24 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III

07-MAR-95

TRC INC.

TEST NO: 43C10LK1

572E SN043 LEFT KNEE CAL 10

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	52.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5110.1 N

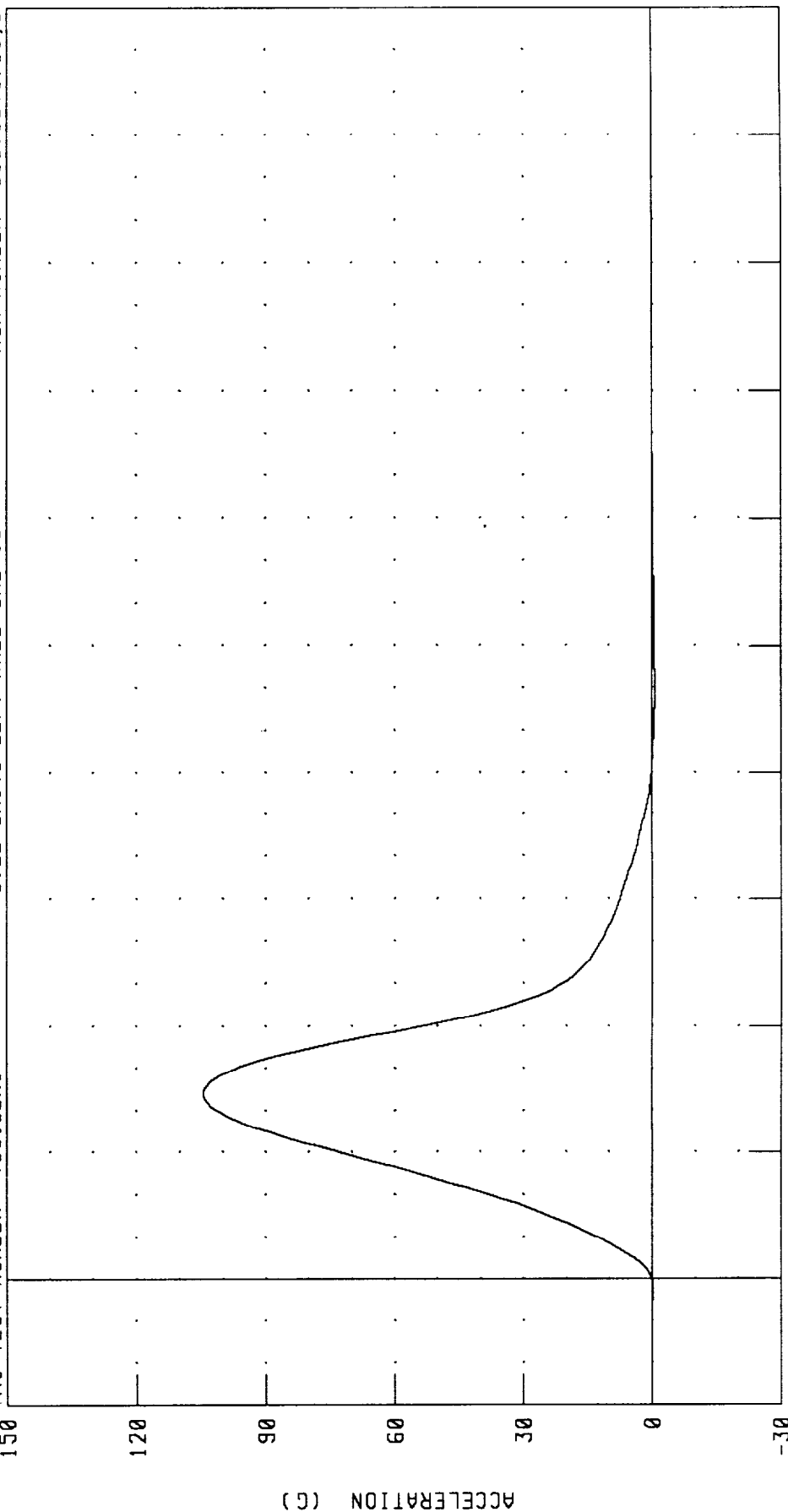
TEST MEETS SPECIFICATIONS

TECHNICIAN Pete F. S.

RUN NUMBER: 030795.0732;3

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

TRC TEST NUMBER: 43C10LK1 572E SN043 LEFT KNEE CAL 10 RUN NUMBER: 030795 0735,3



CHANNEL: PENXG FILTER: CH. CLASS 600

PEAK DATA: 104.44 G @ 29.96 MS, -0.62 G @ 9.36 MS

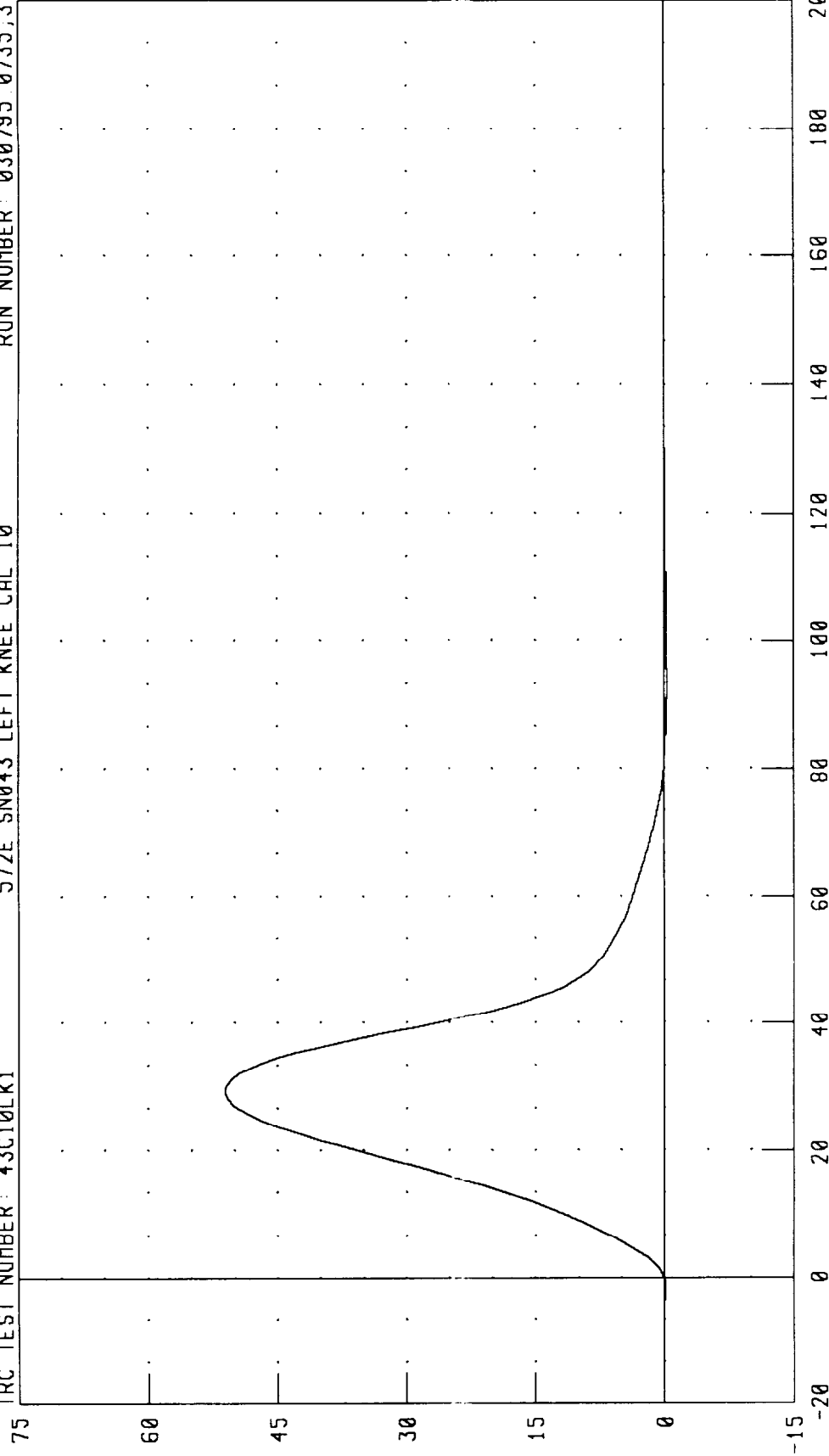
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

572E SN043 LEFT KNEE CAL 10

RUN NUMBER: 030795 0735,3

TRC TEST NUMBER: 43C10LK1



CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 5110 17 N @ 2 96 MS, -30 25 N @ 9 36 MS

Appendix D

Miscellaneous Test Information

Dummy Instrumentation Placement

Dummy Mfr. & S/N: Humanoid/043

Seating Position: Driver

Location	Axis	Mfr.	Model	S/N	Orientation (+ Sensing)
Head Acceleration	X	Endevco	7264	DC54J	Rear
Head Acceleration	Y	Endevco	7264	EY99J	Left
Head Acceleration	Z	Endevco	7264	EH75J	Up
Chest Acceleration	X	Endevco	7264	DC72J	Front
Chest Acceleration	Y	Endevco	7264	BC26J	Left
Chest Acceleration	Z	Endevco	7264	DG50J	Up
Chest Deflection	X	Servo	14CB1-2897	CP043	Outward
Pelvis Acceleration	X	Endevco	7264	BF42J	Rear
Pelvis Acceleration	Y	Endevco	7264	FJ66J	Left
Pelvis Acceleration	Z	Endevco	7264	DG56J	Up
Left Femur Force		GSE	2435	739	Tension
Right Femur Force		GSE	2430	741	Tension

Vehicle Instrumentation Information

Test No. 950314

No.	Location	Axis	Mfr.	Model	S/N	Orientation (+ Sensing)
1	Left Rear Seat Crossmember					
	Longitudinal	X	Endevco	7264	BF04	Front
	Lateral	Y	Endevco	7264	BH91J	Right
2	Right Rear Seat Crossmember					
	Longitudinal	X	Endevco	7264	AS95	Rear
	Lateral	Y	Endevco	7264	AT38	Left
3	Engine Top Longitudinal	X	Endevco	7264	AW52	Front
4	Engine Bottom Longitudinal	X	Endevco	7264	AP87	Rear
5	Instrument Panel Center					
	Longitudinal	X	Endevco	7264	AN45	Front
6	Vehicle Center of Gravity					
	Longitudinal	X	Endevco	7264	AY66	Front
	Lateral	Y	Endevco	7264	AZ67	Left
	Vertical	Z	Endevco	7264	AU31	Up
	Lap Belt Outboard Force		Lebow	3419	127	Tension
	Shoulder Belt Outboard Force		Lebow	3419	612	Tension

Heavy Truck Instrumentation Information

No.	Location	Axis	Mfr.	Model	S/N	Orientation (+ Sensing)
9	Front Frame Crossmember					
	Longitudinal	X	Endevco	7264	AK21	Rear
	Lateral	Y	Endevco	7264	BE97J	Left
	Vertical	Z	Endevco	7264	BC75J	Up
10	Center of Gravity					
	Longitudinal	X	Endevco	7264	AG24	Front
	Lateral	Y	Endevco	7264	BA46	Left
	Vertical	Z	Endevco	7264	BF99J	Up

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:

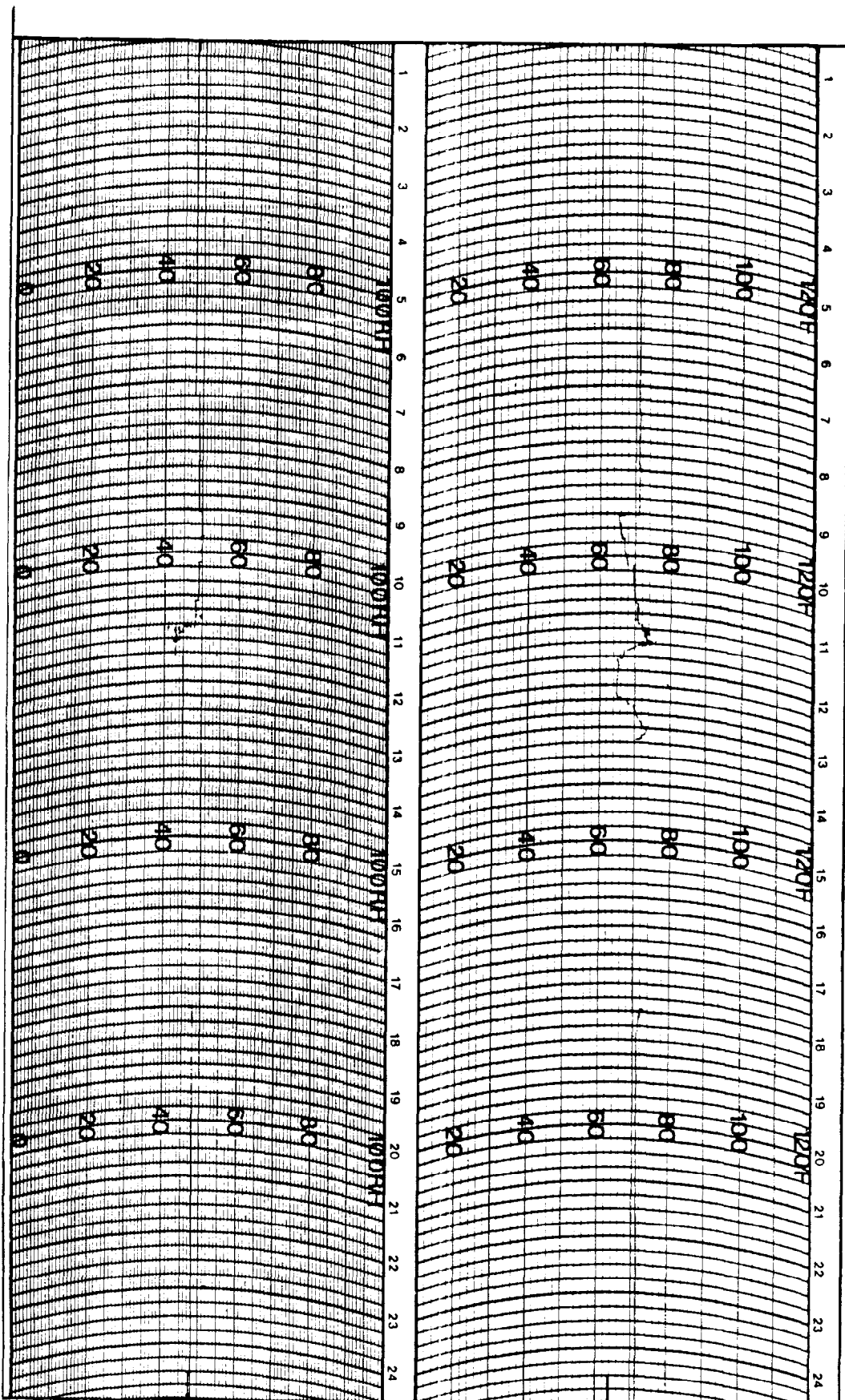
+Femur Force: tension
+Seat Belt Force: tension
+Barrier Force: tension

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



WEATHER MEASURE
PO BOX 41257
SACRAMENTO, CA 95841
PHONE (916) 481-7565

HYGROTHERMOGRAPH
1 DAY

CHART # C311 D HF
PART # 699123

STATION 950314

DATE ON

DATE OFF

Occupant Compartment Thermograph