

REPORT NO. TRC-93-N06

NEW CAR ASSESSMENT PROGRAM (NCAP)

FRONTAL BARRIER IMPACT TEST

TOYOTA MOTOR COMPANY

1994 TOYOTA T100

PICKUP

NHTSA NO. MR5103

TRC TEST NO. 931222

PREPARED BY:

TRANSPORTATION RESEARCH CENTER INC.

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EAST LIBERTY, OHIO 43319



JANUARY 14, 1994

FINAL REPORT

PREPARED FOR:

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

OFFICE OF MARKET INCENTIVES

ROOM NO. 5313 (NRM-22)

400 SEVENTH STREET, S.W.

WASHINGTON, D.C. 20590

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1. Report No. TRC-93-N06	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle NEW CAR ASSESSMENT PROGRAM (NCAP), FRONTAL BARRIER IMPACT TEST OF A 1994 TOYOTA T100 PICKUP TRUCK NHTSA NO. MR5103		5. Report Date JANUARY 14, 1994	
		6. Performing Organization Code TRC	
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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. DTNH22-90-D-22121	
12. Sponsoring Agency Name and Address U. S. Department of Transportation National Highway Traffic Safety Administration Office of Market Incentives 400 Seventh St., S.W., Washington, DC 20590		13. Type of Report and Period Covered FINAL REPORT DEC. 1993 - JAN. 1994	
		14. Sponsoring agency Code NRM-22	
15. Supplemental Notes			
16. Abstract A 56 kph (35 mph) frontal load cell barrier impact test was conducted on a 1994 Toyota T100 pickup, NHTSA No. MR5103, at Transportation Research Center Inc. on December 22, 1993. This test was conducted to obtain new car assessment and research data indicant of FMVSS 208, 212, 219 (partial), and 301 performance. The barrier impact velocity was 56.0 kph. The vehicle's maximum static crush was 555 millimeters. The ambient temperature was 21° C. The driver's Head Injury Criteria (HIC) was 601. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 47.3 g. The driver's chest maximum deflection was 44 millimeters. The driver's left and right femur maximum axial forces were 4129 N and 3479 N, respectively. The passenger's HIC was 568. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 40.2 g. The passenger's left and right femur maximum axial forces were 2097 N and 3157 N, respectively.			
17. Key Words 56.3 KPH (35 MPH) Frontal Barrier Impact Test: New Car Assessment Program (NCAP) FMVSS 208, "Occupant Crash Protection" FMVSS 212, "Windshield Retention" FMVSS 219, "Windshield Zone Intrusion" FMVSS 301, "Fuel System Integrity"		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Admin. 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. No. of Pages 281	22. Price

METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures				Approximate Conversions from Metric Measures			
Symbol	When You Know	Multiply by	To Find	Symbol	When You Know	Multiply by	To Find
LENGTH				LENGTH			
in	inches	2.54	cm	mm	millimeters	0.04	inches
ft	feet	30	m	cm	centimeters	0.4	inches
yd	yards	0.9	m	m	meters	3.3	feet
mi	miles	1.6	km	km	kilometers	1.1	yards
						0.5	miles
AREA				AREA			
in ²	square inches	6.5	cm ²	cm ²	square centimeters	0.16	square inches
ft ²	square feet	0.09	m ²	m ²	square meters	1.2	square yards
yd ²	square yards	0.8	m ²	km ²	square kilometers	0.4	square miles
mi ²	square miles	2.6	km ²	ha	hectares (10,000 m ²)	2.5	acres
	acres	0.4	ha				
MASS (weight)				MASS (weight)			
oz	ounces	28	g	g	grams	0.035	ounces
lb	pounds	0.45	kg	kg	kilograms	2.2	pounds
	short tons (2000 lb)	0.9	t	t	tonnes (1000 kg)	1.1	short tons
VOLUME				VOLUME			
tsp	teaspoons	5	ml	ml	milliliters	0.03	fluid ounces
Tbsp	tablespoons	15	ml	l	liters	2.1	pints
fl oz	fluid ounces	30	ml	l	liters	1.06	quarts
c	cups	0.24	l	l	liters	0.26	gallons
pt	pints	0.47	l	m ³	cubic meters	35	cubic feet
qt	quarts	0.95	l	m ³	cubic meters	1.3	cubic yards
gal	gallons	3.8	l				
fl ³	fluid feet	0.03	m ³				
yd ³	cubic yards	0.76	m ³				
TEMPERATURE (exact)				TEMPERATURE (exact)			
°F	Fahrenheit temperature	5/9 (after subtracting 32)	°C	°C	Celsius temperature	9/5 (then add 32)	°F

*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 285, Units of Weights and Measures, Price \$2.25, SO Catalog No. C13.10286.

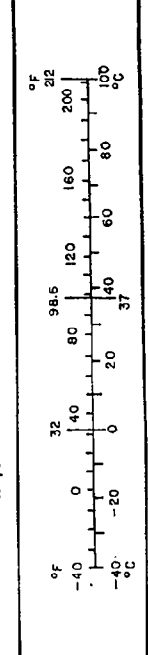


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SECTION 1.0

PURPOSE AND TEST PROCEDURE

PURPOSE

This 56 kph (35 mph) frontal barrier impact test is part of the New Car Assessment Program (NCAP) conducted for the National Highway Traffic Safety Administration's (NHTSA) Office of Market Incentives by Transportation Research Center Inc. (TRC) under Contract No. DTNH22-90-D-22121.

The purpose of this test was to obtain new car assessment and research data for vehicle crashworthiness and occupant restraint system performance for the subject vehicle, a 1994 Toyota T100, NHTSA No. MR5103, at an impact speed in excess of the current 48 kph (30 mph) FMVSS 208 requirements.

TEST PROCEDURE

This test was conducted in accordance with NHTSA's Laboratory Indicant Test Procedure, New Car Assessment Program, dated January 1, 1990. Data was obtained indicant of FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Retention"; FMVSS 219, "Windshield Zone Intrusion"; and FMVSS 301, "Fuel System Integrity," performance.

The test vehicle was instrumented with nine (9) accelerometers to measure longitudinal axis accelerations. The driver's and passenger's restraint systems were instrumented with four (4) seat belt load cells to measure lap belt tension and shoulder belt tension, two (2) string potentiometers to measure shoulder belt displacement, and two (2) linear potentiometers to measure shoulder belt stretch. The vehicle impacted a frontal load cell barrier instrumented with thirty-six (36) barrier face load cells. The vehicle's specified impact velocity range was 55.5 to 57.1 kph.

The test vehicle contained two (2) 50th percentile adult male anthropomorphic test devices (dummies). One (1) Part 572E dummy was seated in the left front outboard designated seating position. One (1) Part 572B dummy was positioned in the right front outboard designated seating position. The dummies were positioned according to the dummy placement procedures specified in Appendices VII and VIII of the Laboratory Indicant Test Procedure. This test was the second use of the driver dummy which was previously used in the NHTSA No. MP5108 test and the second use of the passenger dummy which was previously used in the NHTSA No. MR0204 test.

Both dummies were instrumented with head and chest accelerometers to measure longitudinal, lateral, and vertical accelerations, and with left and right femur load cells to measure axial forces. Each Part 572E dummy's instrumentation also included a chest potentiometer to measure longitudinal deflection and a six-axis neck load cell to measure longitudinal, lateral, and vertical forces and moments.

The seventy-six (76) data channels were multiplexed and recorded on two (2) 14-track tape drives. The data was digitally sampled at 12,500 samples per second and processed per section IP11 of the Laboratory Indicant Test Procedure.

The crash event was recorded by one (1) real-time panning motion picture camera and sixteen (16) high-speed motion picture cameras. The pre- and post-test conditions were recorded by one (1) real-time motion picture camera.

The vehicle, occupant, and load cell barrier data are presented in Section 2.0. The occupant, camera, and vehicle measurements are presented in Section 3.0. Appendix A contains the still photographic prints. Appendix B contains the dummy, vehicle, and load cell barrier data plots. Appendix C contains the dummy certification data. Appendix D contains miscellaneous test information. Appendix E contains the restraint system instructions from the owner's manual.

SECTION 2.0

FRONTAL BARRIER IMPACT TEST SUMMARY

TEST RESULTS SUMMARY

This frontal load cell barrier test was conducted at TRC on December 22, 1993.

The test vehicle, a 1994 Toyota T100, NHTSA No. MR5103, was equipped with a 3.0-liter inline engine, automatic transmission, power steering, and power brakes. The vehicle's test weight was 1815 KG. The vehicle's impact speed was 56.0 kph. The vehicle sustained 555 mm of static crush during the impact.

The driver's Head Injury Criteria (HIC) was 601. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 47.3 g. The driver's chest maximum deflection was 44 mm. The driver's left and right femur maximum axial forces were 4129 N and 3479 N, respectively.

The passenger's HIC was 568. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 40.2 g. The passenger's left and right femur maximum axial forces were 2097 N and 3157 N, respectively.

There was no loss of windshield periphery retention.

There was no penetration through the windshield.

Following the impact, no fluid spilled from the vehicle's fuel system prior to the static rollover test or during any portion of the static rollover test.

DATA ACQUISITION EXPLANATIONS

The passenger's shoulder belt force load cell, SHBF2, recorded questionable data spikes at 24 and 63 milliseconds. The data acquisition circuit was checked after the test. No cause for the data spikes could be found.

The passenger's lap belt outboard force load cell, LBOF1, recorded multiple questionable data spikes beginning at 62 milliseconds. The data acquisition circuit was checked after the test. No cause for the data spikes could be found.

TABLE 1 CRASH TEST SUMMARY

```

NHTSA NO.: MR5103          TEST TYPE: Frontal Load Cell Barrier

TEST DATE: 12/22/93        TEST TIME: 1433          AMBIENT TEMP.: 21° C

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1994/Toyota/T100/pickup

VEHICLE TEST WEIGHT (KG): 1815

IMPACT ANGLE (DEG)1: 0

IMPACT VELOCITY (KPH)2:    PRIMARY = 56.0          SECONDARY = 56.0

MAXIMUM STATIC CRUSH (MM): 555

AVERAGE REBOUND (MM): 503

DUMMIES:          Driver #192          Passenger #713

TYPE:             Part 572 E           Part 572 B

LOCATION:           Left front           Right front

RESTRAINT:         3-point unbelt       3-point unbelt
                   and airbag

NUMBER OF DATA CHANNELS: 76

NUMBER OF CAMERAS: HIGH-SPEED 16       REAL-TIME 2

```

¹With respect to tow track centerline.

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

TABLE 2 TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Toyota Motor Corporation

MAKE/MODEL: Toyota/T100 VIN: JT4VD10A2R0017288

BODY STYLE: pickup MODEL YEAR: 1994

NHTSA NO.: MR5103 COLOR: White

ENGINE DATA: TYPE: inline CYLINDERS: 6 DISPLACEMENT: 3.0-liter

TRANSMISSION DATA: 4 SPEED, MANUAL, X AUTOMATIC, FWD, X RWD, 4WD

DATE VEHICLE RECEIVED: 12/22/93 ODOMETER READING: 95

DEALER'S NAME AND ADDRESS: Performance Toyota
4248 Morse Rd.
Columbus, OH 43230

ACCESSORIES:

POWER STEERING	Yes	AUTOMATIC TRANSMISSION	Yes
POWER BRAKES	Yes	AUTOMATIC SPEED CONTROL	No
POWER SEATS	No	TILTING STEERING WHEEL	No
POWER WINDOWS	No	TELESCOPING STEERING WHEEL	No
TINTED GLASS	Yes	AIR CONDITIONING	No
RADIO	No	ANTI-SKID BRAKE	No
CLOCK	Yes	REAR WINDOW DEFROSTER	No
OTHER	None		

REMARKS:

1. IS THE VEHICLE STOCK THROUGHOUT? Yes
2. DOES VEHICLE SHOW EVIDENCE OF PRIOR ACCIDENT HISTORY? No
3. DOES VEHICLE SHOW ANY SIGNIFICANT CORROSION? No
4. CONDITION OF THE FRONT/REAR BUMPER AND FRAME: Good

CERTIFICATION DATA FROM VEHICLE'S LABEL:

VEHICLE MANUFACTURED BY: Toyota Motor Corporation

DATE OF MANUFACTURE: 10/93 VIN: JT4VD10A2R0017288

GVWR: 5000 LBS.

GAWR: FRONT: 2550 LBS., REAR: 3090 LBS.

TABLE 2 TEST VEHICLE INFORMATION CONT'D

TIRES ON VEHICLE (MFR., LINE, SIZE): Bridgestone SF 408, P235/75R15

TIRE PRESSURE WITH MAXIMUM CAPACITY VEHICLE LOAD: FRONT: 280 kPa
REAR: 280 kPa

SPARE TIRE (MFR., SIZE): Bridgestone SF 408, P235/75R15

TYPE OF SEATS: FRONT: Bench
REAR: NA

TYPE OF FRONT SEAT BACKS: Non-adjustable

MAXIMUM WIDTH: 1910 MM

WHEELBASE: 3095 MM

LOCATION OF LABEL STATING TIRE DATA:

The label was located on the driver's B pillar.

TIRE & CAPACITY DATA FROM VEHICLE'S LABEL:

RECOMMENDED TIRE SIZE: P215/75R15

RECOMMENDED COLD TIRE PRESSURE: FRONT: 33 psi; REAR: 35 psi

DESIGNATED SEATING CAPACITY: NA FRONT NA REAR
NA TOTAL

VEHICLE CAPACITY WEIGHT: NA KG

TEST VEHICLE ATTITUDE (ALL MEASUREMENTS ARE IN MILLIMETERS):

DELIVERED ATTITUDE: LF 819; RF 814; LR 824; RR 817

PRE-TEST ATTITUDE: LF 813; RF 804; LR 788; RR 782

POST-TEST ATTITUDE: LF 850; RF 797; LR 788; RR 772

TABLE 2 TEST VEHICLE INFORMATION CONT'D

WEIGHT OF TEST VEHICLE AS RECEIVED (WITH MAXIMUM FLUIDS):

RIGHT FRONT	442 KG	RIGHT REAR	336 KG
LEFT FRONT	422 KG	LEFT REAR	334 KG
TOTAL FRONT WEIGHT	864 KG	(56.3% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	670 KG	(43.7% OF TOTAL VEHICLE WEIGHT)	
TOTAL DELIVERED WEIGHT	1534 KG		

CALCULATION OF TEST VEHICLE'S TARGET TEST WEIGHT:

RCLW¹ = RATED CARGO AND LUGGAGE WEIGHT

UDW = UNLOADED DELIVERED WEIGHT (1534 KG)

VCW = VEHICLE CAPACITY WEIGHT (136)

DSC = DESIGNATED SEATING CAPACITY (NA)

RCLW¹ = VCW - 150 (DSC) = NA

TARGET TEST WEIGHT=UDW + RCLW¹ + (NO. OF HYBRID III DUMMIES X 76 KG/DUMMY)
+ (NO. OF HYBRID II DUMMIES X 74 KG/DUMMY)

TARGET TEST WEIGHT = 1534 + 136 + 76 + 74

TARGET TEST WEIGHT = 1820 KG

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 131 KG OF CARGO WEIGHT:

RIGHT FRONT	472 KG	RIGHT REAR	450 KG
LEFT FRONT	453 KG	LEFT REAR	440 KG
TOTAL FRONT WEIGHT	925 KG	(51.0% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	890 KG	(49.0% OF TOTAL VEHICLE WEIGHT)	
TOTAL TEST WEIGHT	1815 KG	(0.3% UNDER TARGET TEST WEIGHT)	

WEIGHT OF BALLAST SECURED IN VEHICLE: 11 KG

COMPONENTS REMOVED TO MEET TARGET TEST WEIGHT: Spare tire

CG = 1518 MM REARWARD OF FRONT WHEEL CENTERLINE

¹Cargo weight for multi-purpose passenger vehicles, trucks, and buses is the vehicle's rated cargo and luggage weight from the vehicle's label or 136 KG, whichever is less.

TABLE 3 POST-IMPACT DATA

TEST NUMBER: 931222 NHTSA NO.: MR5103
TEST DATE: 12/22/93 TEST TIME: 1433
TEST TYPE: Frontal load cell barrier IMPACT ANGLE: 0°
AMBIENT TEMPERATURE AT IMPACT AREA: 21° C
TEMPERATURE IN OCCUPANT COMPARTMENT: 21° C
IMPACT VELOCITY: PRIMARY = 56.0 KPH SECONDARY = 56.0 KPH

(SPECIFIED RANGE = 55.5 TO 57.1 KPH)

DISTANCE FROM VEHICLE TO BARRIER: ENTERING VELOCITY TRAP = 356 MM

EXITING VELOCITY TRAP = 51 MM

TEST VEHICLE STATIC CRUSH (ALL MEASUREMENTS ARE IN MILLIMETERS):

OVERALL LENGTH OF TEST VEHICLE: PRE-TEST: L 5205; C 5285; R 5200

POST-TEST: L 4738; C 4736; R 4713

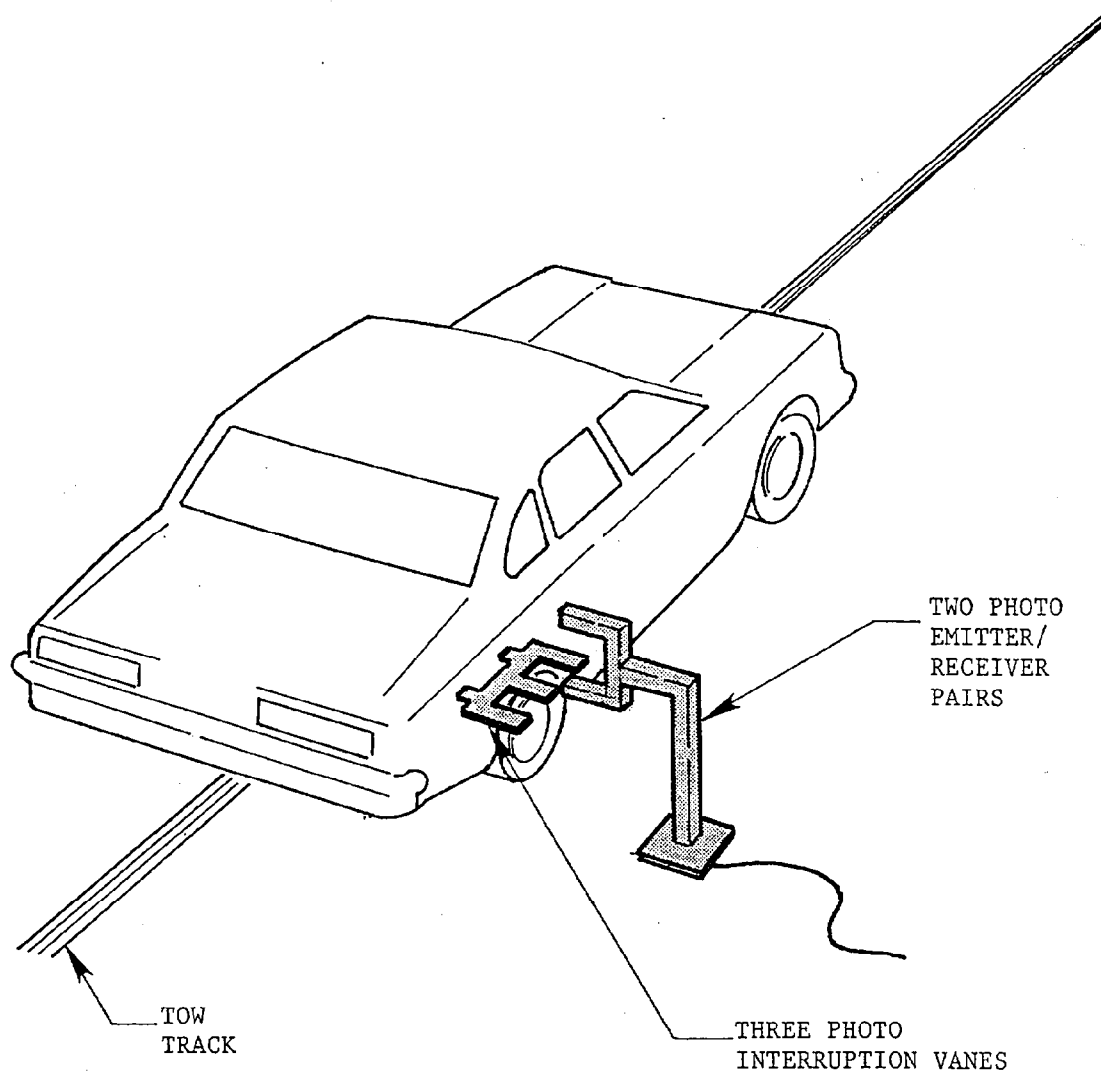
TOTAL CRUSH: L 467; C 549; R 487

AVERAGE CRUSH: 501

TEST VEHICLE REBOUND FROM FLAT BARRIER
(ALL MEASUREMENTS ARE IN MILLIMETERS):

DISTANCE FROM TEST VEHICLE TO BARRIER: L 500; C 508; R 500; AVG. 503

FIGURE 1 IMPACT VELOCITY MEASUREMENT SYSTEM



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

The vanes have 305-millimeter spacing.

FIGURE 2 ACCIDENT INVESTIGATION DIVISION DATA
FOR 56 KPH (35 MPH) FRONTAL BARRIER IMPACT

VEHICLE MAKE/MODEL/BODY STYLE: Toyota/T100/pickup

VEHICLE NHTSA NO.: MR5103; VIN: JT4VD10A2R0017288

MODEL YEAR: 1994; BUILD DATE: 10/93; TEST DATE: 12/22/93

VEHICLE SIZE CATEGORY: pickup; TEST WEIGHT: 1815 KG

VEHICLE WHEELBASE: 3095 MM

MAXIMUM WIDTH: 1910 MM

FRONT OVERHANG: 826 MM

COLLISION DEFORMATION
CLASSIFICATION (CDC) CODE: 12FDEW3

CRUSH DEPTH
MEASUREMENTS:

C1 =	<u>467</u>	MM
C2 =	<u>515</u>	MM
C3 =	<u>540</u>	MM
C4 =	<u>555</u>	MM
C5 =	<u>530</u>	MM
C6 =	<u>487</u>	MM

MIDPOINT OF DAMAGE: D = VEHICLE CENTERLINE
(LONGITUDINAL)

LENGTH OF DAMAGED
REGION: L = 1626 MM

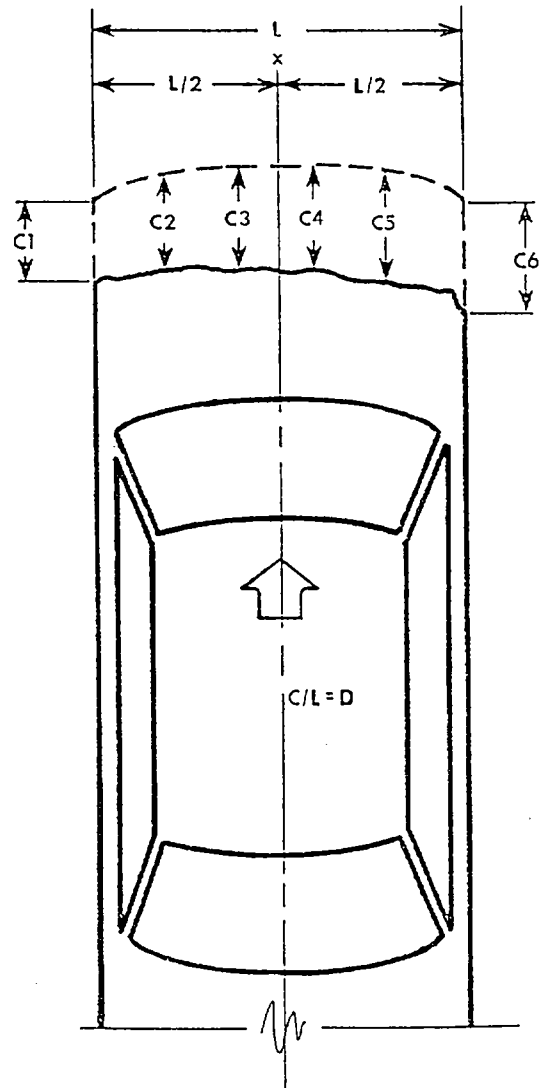
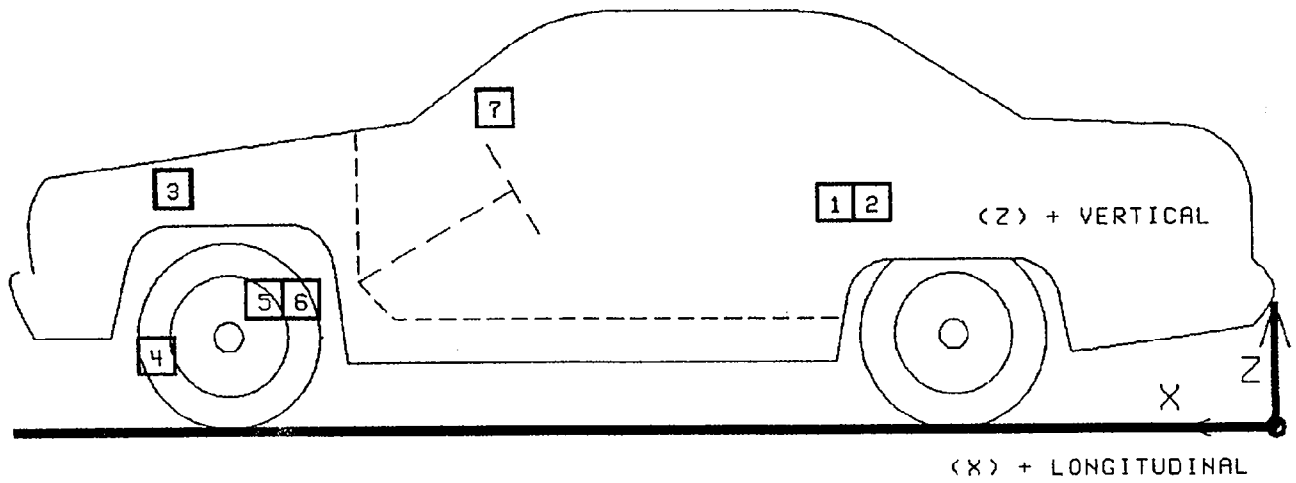
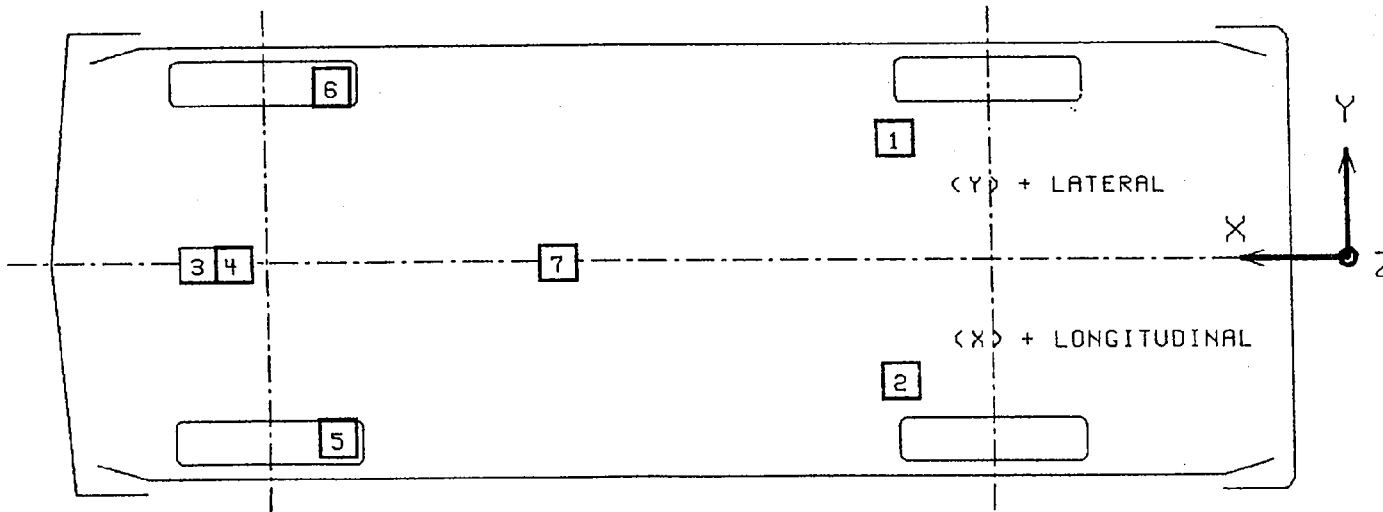


FIGURE 3 VEHICLE ACCELEROMETER PLACEMENT



SIDE VIEW



BOTTOM VIEW

TABLE 4

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 931222

No. LOCATION	X*	Y*	Z*	POSITIVE DIRECTION MAX G MSEC	NEGATIVE DIRECTION MAX G MSEC
1 LEFT REAR SEAT CROSSMEMBER LONGITUDINAL REDUNDANT	2425	730	496	2.8 187.8 2.8 164.8	44.2 50.1 45.0 49.9
2 RIGHT REAR SEAT CROSSMEMBER LONGITUDINAL REDUNDANT	2435	-720	482	2.3 165.4 2.5 161.7	41.6 48.1 42.4 48.0
3 ENGINE TOP LONGITUDINAL	635	-15	1030	28.1 51.0	106.5 29.4
4 ENGINE BOTTOM LONGITUDINAL	855	115	375	14.5 71.7	108.4 36.2
5 RIGHT BRAKE CALIPER LONGITUDINAL	905	-656	358	48.3 21.1	131.1 15.8

TABLE 4

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY CONTINUED

TEST NUMBER 931222

No. LOCATION	X*	Y*	Z*	POSITIVE		NEGATIVE	
				DIRECTION		DIRECTION	
				MAX G MSEC		MAX G MSEC	
6 LEFT BRAKE CALIPER LONGITUDINAL	905	656	363	25.5	65.8	111.8	16.2
7 INSTRUMENT PANEL CENTER LONGITUDINAL	1405	0	1186	15.7	101.6	58.3	62.6

* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES. X-AXIS
LOCATIONS ARE MEASURED REARWARD FROM THE FRONT BUMPER.

REFERENCE: X: + FORWARD ACCELERATION
Y: + LEFT FROM VEHICLE CENTERLINE
Z: + UP FROM GROUND LEVEL

TABLE 5 POST-IMPACT DUMMY/VEHICLE DATA

VISIBLE DUMMY CONTACT POINTS:

	DRIVER #192	PASSENGER #713
HEAD	<u>Airbag</u>	<u>Chest and right knee</u>
CHEST	<u>Airbag</u>	<u>None</u>
ABDOMEN	<u>None</u>	<u>None</u>
LEFT KNEE	<u>Instrument panel</u>	<u>Instrument panel</u>
RIGHT KNEE	<u>Instrument panel</u>	<u>Instrument panel</u>

DOOR OPENING:

	LEFT	RIGHT
FRONT	<u>Easy</u>	<u>Easy</u>
REAR	<u>NA</u>	<u>NA</u>

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
FRONT	<u>None</u>	<u>None</u>
REAR	<u>NA</u>	<u>NA</u>

GLAZING DAMAGE:

The entire windshield cracked on impact.

OTHER NOTABLE IMPACT EFFECTS:

The right front tire deflated after impact.

TABLE 6 FMVSS 208 DATA SUMMARY

VEH. YR./MAKE/MODEL/BODY STYLE: 1994/Toyota/T100/pickupVEH. NHTSA NO.: MR5103; TEST DATE: 12/22/93

	DRIVER DUMMY #192	PASSENGER DUMMY #713
<u>MAXIMUM ACCELERATIONS (G):</u>		
HEAD X-AXIS	-60.5	-79.1
HEAD Y-AXIS	12.6	-49.8
HEAD Z-AXIS	-17.7	-136.2
HEAD RESULTANT	62.1	164.6
CHEST X-AXIS	-49.3	-39.0
CHEST Y-AXIS	5.5	-17.6
CHEST Z-AXIS	14.9	16.4
CHEST RESULTANT ¹	47.3	40.2
CHEST RESULTANT TIME INTERVAL (SEC.) ¹	.003	.003
<u>HEAD INJURY CRITERIA (HIC) VALUES:</u>		
HIC ²	601	568
HIC STARTING TIME (SEC.)	.043	.079
HIC ENDING TIME (SEC.)	.079	.115
AVG. HEAD RESULTANT ACCEL. DURING HIC TIME INTERVAL (G)	48.9	47.8
<u>MAXIMUM CHEST DEFLECTIONS (MM):</u>		
CHEST X-AXIS	44	NA
MAXIMUM CHEST DEFLECTION TIME (SEC)	.068	NA
<u>MAXIMUM COMPRESSIVE FEMUR FORCES (N):</u>		
LEFT FEMUR	4129	2097
RIGHT FEMUR	3479	3157
<u>MAXIMUM SEAT BELT FORCES (N):</u>		
LAP BELT ³	6101	5491
SHOULDER BELT ³	6422	8376

NOTE: ALL VALUES LISTED MUST BE OCCURRING DURING PRIMARY IMPACT EVENT.
(HEAD ACCELERATIONS LISTED MUST BE DURING HIC TIME INTERVAL.)

¹0.003 SEC. MINIMUM DURATION.

²THE MAXIMUM HIC TIME INTERVAL IS 36 MILLISECONDS.

³See DATA ACQUISITION EXPLANATIONS

TABLE 7 HYBRID III NECK DATA SUMMARY

VEH. YR./MAKE/MODEL/BODY STYLE: 1994/Toyota/T100/pickup

VEHICLE NHTSA NO.: MR5103; TEST DATE: 12/22/93

MAXIMUM VALUES:	DRIVER	PASSENGER
	DUMMY #192	DUMMY #713
NECK X-AXIS FORCE (N)	607	NA
NECK Y-AXIS FORCE (N)	-263	NA
NECK Z-AXIS FORCE (N)	2466	NA
NECK MOMENT ABOUT X AXIS (N-M)	20	NA
NECK MOMENT ABOUT Y AXIS (N-M)	-42	NA
NECK MOMENT ABOUT Z AXIS (N-M)	18	NA

NOTE: ALL VALUES LISTED MUST BE OCCURRING DURING PRIMARY IMPACT EVENT.

DUMMY KINEMATIC SUMMARY

DRIVER DUMMY

Upon impact, the driver dummy translated forward on the seat impacting both knees into the instrument panel. The dummy's head and chest impacted the airbag. The driver dummy was restrained by the airbag and three-point unbelt. The dummy rebounded rearward into the seat back with the dummy's head contacting the head restraint. The driver dummy came to rest in the driver's seat restrained by the three-point unbelt.

RIGHT FRONT PASSENGER DUMMY

Upon impact, the right front passenger dummy translated forward on the seat impacting both knees into the instrument panel. The dummy's upper torso and head rotated downward and to the right with the dummy's head impacting the dummy's chest and right knee. The right front passenger dummy was restrained by the three-point unbelt. The dummy rebounded rearward and slightly to the left into the seat back as the dummy's head rotated rearward. The right front passenger dummy came to rest in the right front passenger's seat leaning slightly to the left and restrained by the three-point unbelt.

TABLE 8 SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

	<u>DRIVER</u>	<u>PASSENGER</u>
<u>BELT LENGTH DATA:</u>		
BELT LENGTH FROM TRIM PANEL EXIT TO BOLT HOLE ANCHOR POINT FOR CONTINUOUS WEBBING SYSTEMS.	3048	3264
SHOULDER BELT LENGTH AS MEASURED ON PART 572 DUMMY.	870	890
LAP BELT LENGTH AS MEASURED ON PART 572 DUMMY.	915	965
<u>SHOULDER BELT SPOOL-OFF LENGTH:</u>		
AS DETERMINED BY FILM ANALYSIS	36	89
AS DETERMINED MECHANICALLY	38	92
AS DETERMINED ELECTRONICALLY	58	99
<u>BELT STRETCH LENGTH (MM/M):</u>		
AS MEASURED MECHANICALLY	0	0
AS MEASURED ELECTRONICALLY	0	0
<u>RETRACTOR LOCK-UP TIME (MS):</u>		
AS DETERMINED BY SHOULDER BELT SPOOL-OFF	60	76

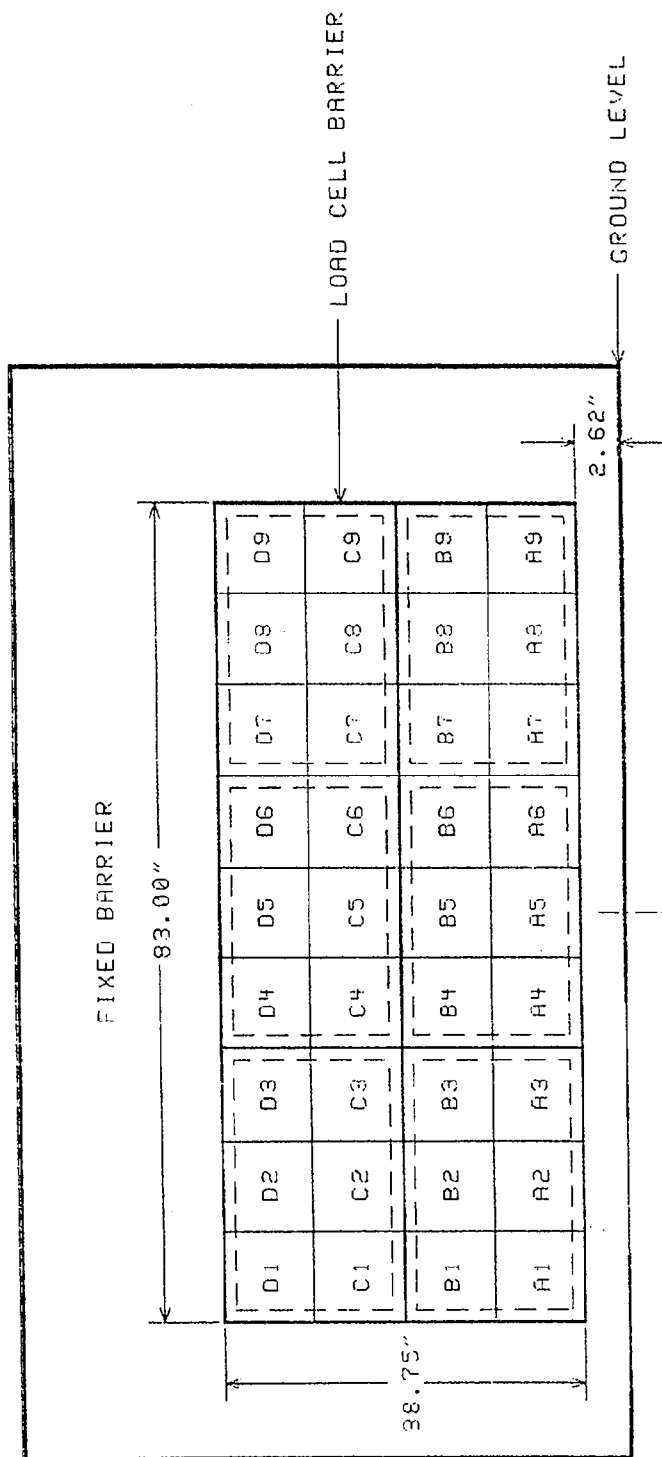
ALL MEASUREMENTS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

FIGURE 4

LOAD CELL BARRIER CONFIGURATION

FRONT VIEW

36 LOAD CELLS
4 ROWS
9 COLUMNS



GROUP 1: A1 THRU B3
GROUP 2: A4 THRU B6
GROUP 3: A7 THRU B9
GROUP 4: C1 THRU D3
GROUP 5: C4 THRU D6
GROUP 6: C7 THRU D9

TABLE 9

LOAD CELL BARRIER DATA SUMMARY

TEST NUMBER 931222

LOCATION	POSITIVE DIRECTION KN	MSEC	NEGATIVE DIRECTION KN	MSEC
TOTAL GROUP 1	1.6	282.4	157.3	15.0
TOTAL GROUP 2	1.4	282.6	193.1	15.8
TOTAL GROUP 3	0.9	226.2	91.7	14.9
TOTAL GROUP 4	1.0	226.3	54.8	11.5
TOTAL GROUP 5	1.1	166.1	292.8	37.0
TOTAL GROUP 6	1.6	282.2	55.2	14.1

TABLE 9

LOAD CELL BARRIER DATA SUMMARY CONTINUED

TEST NUMBER 931222

LOCATION	POSITIVE		NEGATIVE	
	DIRECTION		DIRECTION	
	KN	MSEC	KN	MSEC
TOTAL LOAD CELL FORCE	6.9	282.5	563.8	15.1

TENSION IS POSITIVE
COMPRESSION IS NEGATIVE

SECTION 3.0

FMVSS 212, 219 (PARTIAL), AND 301 DATA

FIGURE 5 FMVSS 212 TEST DATA

DETAILS OF WINDSHIELD MOUNTING SUCH AS RETENTION METHOD, TRIM TYPE, ETC.:

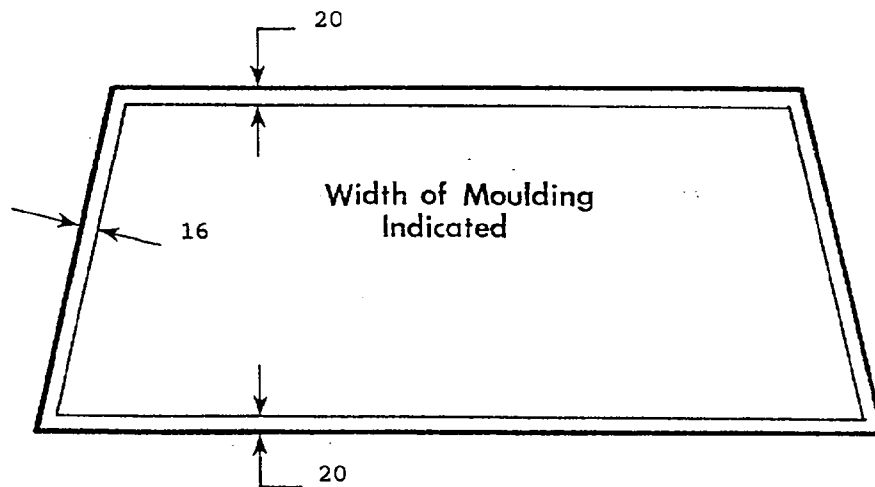
Plastic trim around outer perimeter, adhesive around inner perimeter.

FMVSS 212 REQUIREMENTS: The post-test periphery retention amount must be at least 75% of the pre-test periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of windshield for vehicles equipped with automatic restraint systems for front occupants.

WINDSHIELD PERIPHERY MEASUREMENTS:

	PRE-TEST	POST-TEST	PERCENT RETENTION
RIGHT SIDE	2075	2075	100.0
LEFT SIDE	2075	2075	100.0
TOTAL	4150	4150	100.0

PRE-TEST WINDSHIELD MOUNTING MATERIAL TEMPERATURE: 21° C



FRONT VIEW OF WINDSHIELD¹

LOSS OF WINDSHIELD RETENTION LENGTHS:

NA

ALL DISTANCE MEASUREMENTS ARE IN MILLIMETERS.

¹INDICATE AREAS OF LOSS OF RETENTION, IF ANY, ON WINDSHIELD DIAGRAM.

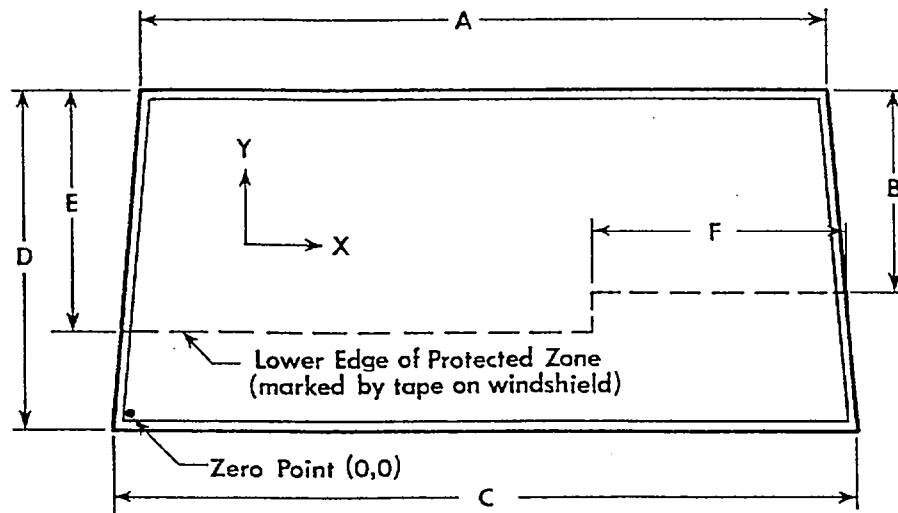
FIGURE 6 FMVSS 219 TEST DATA

PROTECTED ZONE LOWER EDGE REQUIREMENT:

The lower edge of the protected zone is determined by placing a 165-millimeter diameter rigid sphere weighing 6.8 kg in a position such that it simultaneously contacts the inner surface of the windshield and the top surface of the instrument panel including padding. Draw the locus of points on the inner surface of the windshield contactable by the sphere across the width of the instrument panel. From the outermost contactable points, extend the locus line horizontally to the edges of the windshield, and then draw a line on the inner surface of the windshield below and 13 millimeters from the locus line. The LOWER EDGE OF THE PROTECTED ZONE is the longitudinal projection onto the outer surface of the windshield of this line.

WINDSHIELD MEASUREMENTS:

A = 1315
 B = 353
 C = 1625
 D = 677
 E = 450
 F = 580



FRONT VIEW

METHOD OF ADHERING PROTECTED ZONE TEMPLATE TO WINDSHIELD: NA

AREAS OF WINDSHIELD TEMPLATE PENETRATION

GREATER THAN 6.0 MM: NA

COORDINATES

	X	Y
1.		
2.		
3.		

AREAS OF WINDSHIELD PENETRATION, BELOW THE PROTECTED ZONE, THROUGH THE INNER SURFACE OF THE WINDSHIELD: None

1.
2.
3.

ALL MEASUREMENTS ARE IN MILLIMETERS.

TABLE 10 FUEL SYSTEM DATA

MAKE/MODEL: Toyota/T100

NHTSA NO.: MR5103

FUEL SYSTEM CAPACITY: 91.0 LITERS (FROM OWNER'S MANUAL)

USABLE CAPACITY: 90.1 LITERS (FURNISHED BY COTR)

TEST VOLUME RANGE: 82.9 LITERS TO 84.7 LITERS (92-94% OF USABLE)

ACTUAL TEST VOLUME: 83.8 LITERS (WITH ENTIRE FUEL SYSTEM FILLED)

TEST FLUID TYPE: STODDARD SOLVENT

SPECIFIC GRAVITY: 0.764

KINEMATIC VISCOSITY: 0.99 CENTISTOKES

TEST FLUID COLOR: PURPLE

DETAILS OF FUEL SYSTEM: The fuel tank is located along the right side,
in front of the rear axle. The fuel filler is on the right. The fuel
lines run along the right side to the front.

ELECTRIC FUEL PUMP: Yes FUEL INJECTION: Yes

DOES ELECTRIC FUEL PUMP OPERATE WITH IGNITION SWITCH "ON" AND THE ENGINE NOT
OPERATING? No

TABLE 11 FMVSS 301 POST-IMPACT TEST DATA

TEST VEHICLE NHTSA NO.: MR5103; TEST DATE: 12/22/93

VEHICLE MAKE/MODEL/BODY STYLE: Toyota/T100/pickup

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:

- X FRONTAL (56 KPH)
 OBLIQUE (48 KPH) WITH ° BARRIER FACE
FIRST CONTACTING (DRIVER/PASS.) SIDE.
 REAR MOVING BARRIER (48 KPH)
 LATERAL MOVING BARRIER (32 KPH)

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

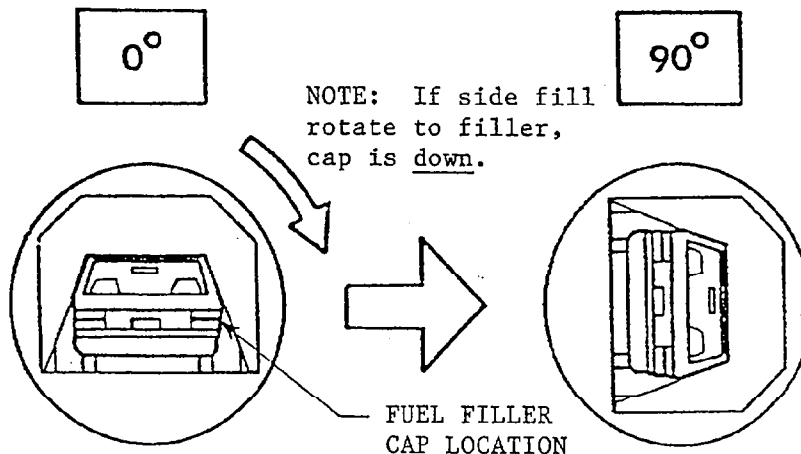
	TEST RESULTS	MAXIMUM ALLOWABLE
1. FROM IMPACT UNTIL VEHICLE MOTION CEASES - - -	0 G	28 G
2. 5 MINUTE PERIOD AFTER VEHICLE MOTION CEASES -	0 G	142 G
3. NEXT 25 MINUTES AFTER 5 MINUTE PERIOD - - - -	0 G	28 G/MN

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 7 FMVSS 301 STATIC ROLLOVER TEST DATA

NHTSA NO.: MR5103
TEST PHASE



STATIC ROLLOVER MACHINE ROTATION TIME INFORMATION: (Spec. Range = 1-3 min.)

TIME REQ. FOR MACHINE TO ROTATE 90° = 2 minutes, 00 seconds

FMVSS 301 POSITION HOLD TIME = 5 minutes, 00 seconds

TOTAL - - - - - = 7 minutes, 00 seconds

NEXT WHOLE MINUTE INTERVAL - - - - - = 7 minutes

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

<u>0° TO 90° ROTATION (FUEL FILLER CAP DOWN)</u>	<u>TEST RESULTS</u>	<u>MAXIMUM ALLOWABLE</u>
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - -	0 G	142 G
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - -	0 G	28 G
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - -	0 G	28 G

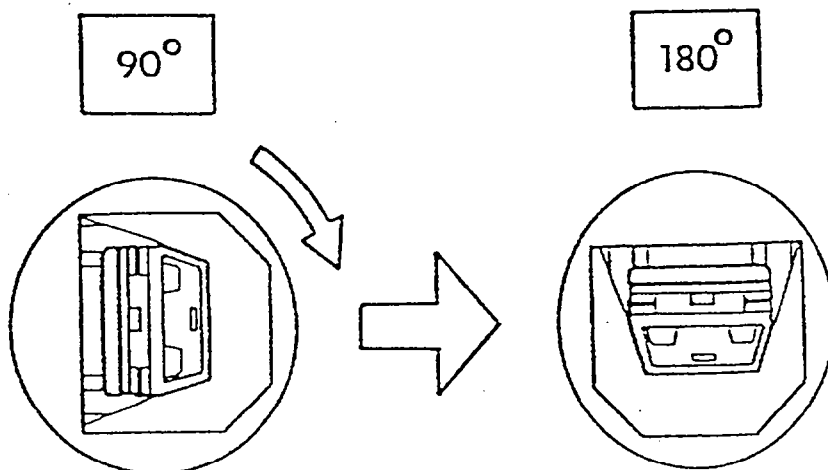
FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 7 FMVSS 301 STATIC ROLLOVER TEST DATA, CONT'D.

NHTSA NO.: MR5103

TEST PHASE



STATIC ROLLOVER MACHINE ROTATION TIME INFORMATION: (Spec. Range = 1-3 min.)

TIME REQ. FOR MACHINE TO ROTATE 90° = 2 minutes, 00 seconds

FMVSS 301 POSITION HOLD TIME = 5 minutes, 00 seconds

TOTAL - - - - - = 7 minutes, 00 seconds

NEXT WHOLE MINUTE INTERVAL - - - - = 14 minutes

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

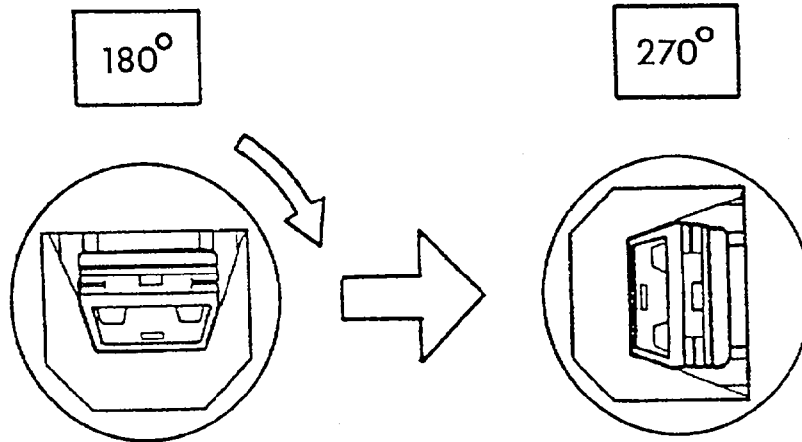
<u>90° TO 180° ROTATION</u>	<u>TEST RESULTS</u>	<u>MAXIMUM ALLOWABLE</u>
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - -	0 G	142 G
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - -	0 G	28 G
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - -	0 G	28 G

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 7 FMVSS 301 STATIC ROLLOVER TEST DATA, CONT'D.

NHTSA NO.: MR5103
TEST PHASE



STATIC ROLLOVER MACHINE ROTATION TIME INFORMATION: (Spec. Range = 1-3 min.)

TIME REQ. FOR MACHINE TO ROTATE 90° = 2 minutes, 00 seconds
FMVSS 301 POSITION HOLD TIME = 5 minutes, 00 seconds
TOTAL - - - - - = 7 minutes, 00 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 5 MINUTES FROM ONSET OF ROTATION - - - - -	0 G	142 G
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - -	0 G	28 G
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - -	0 G	28 G

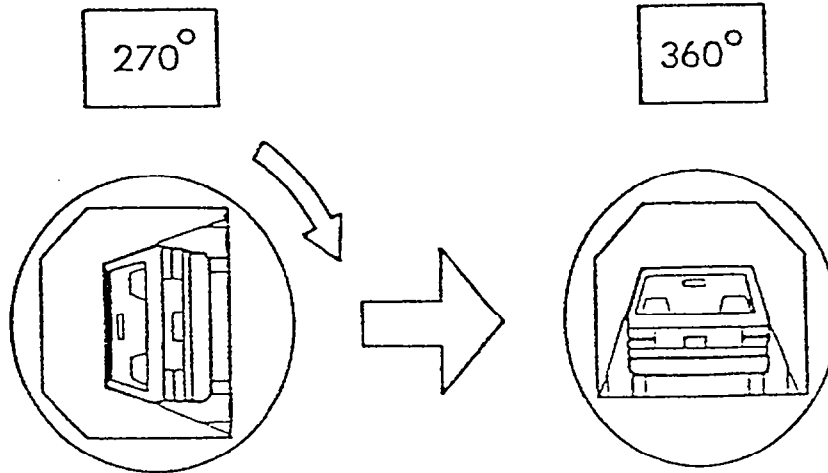
FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 7 FMVSS 301 STATIC ROLLOVER TEST DATA, CONT'D.

NHTSA NO.: MR5103

TEST PHASE



STATIC ROLLOVER MACHINE ROTATION TIME INFORMATION: (Spec. Range = 1-3 min.)

TIME REQ. FOR MACHINE TO ROTATE 90° = 2 minutes, 00 seconds

FMVSS 301 POSITION HOLD TIME = 5 minutes, 00 seconds

TOTAL - - - - - = 7 minutes, 00 seconds

NEXT WHOLE MINUTE INTERVAL - - - - - = 28 minutes

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

<u>270° TO 360° ROTATION</u>	<u>TEST RESULTS</u>	<u>MAXIMUM ALLOWABLE</u>
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - -	0 G	142 G
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - -	0 G	28 G
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - -	0 G	28 G

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

SECTION 4.0

VEHICLE, OCCUPANT, AND CAMERA INFORMATION

FIGURE 8

DUMMY MEASUREMENT LOCATIONS FOR FRONT SEAT OCCUPANTS

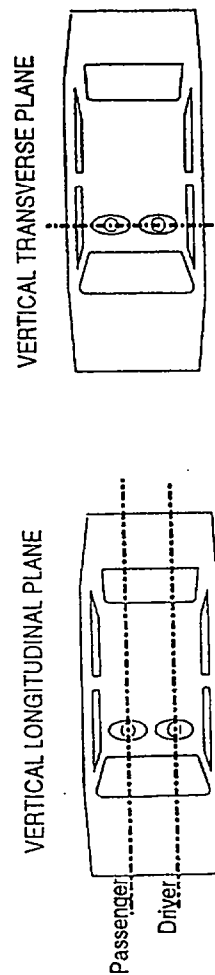
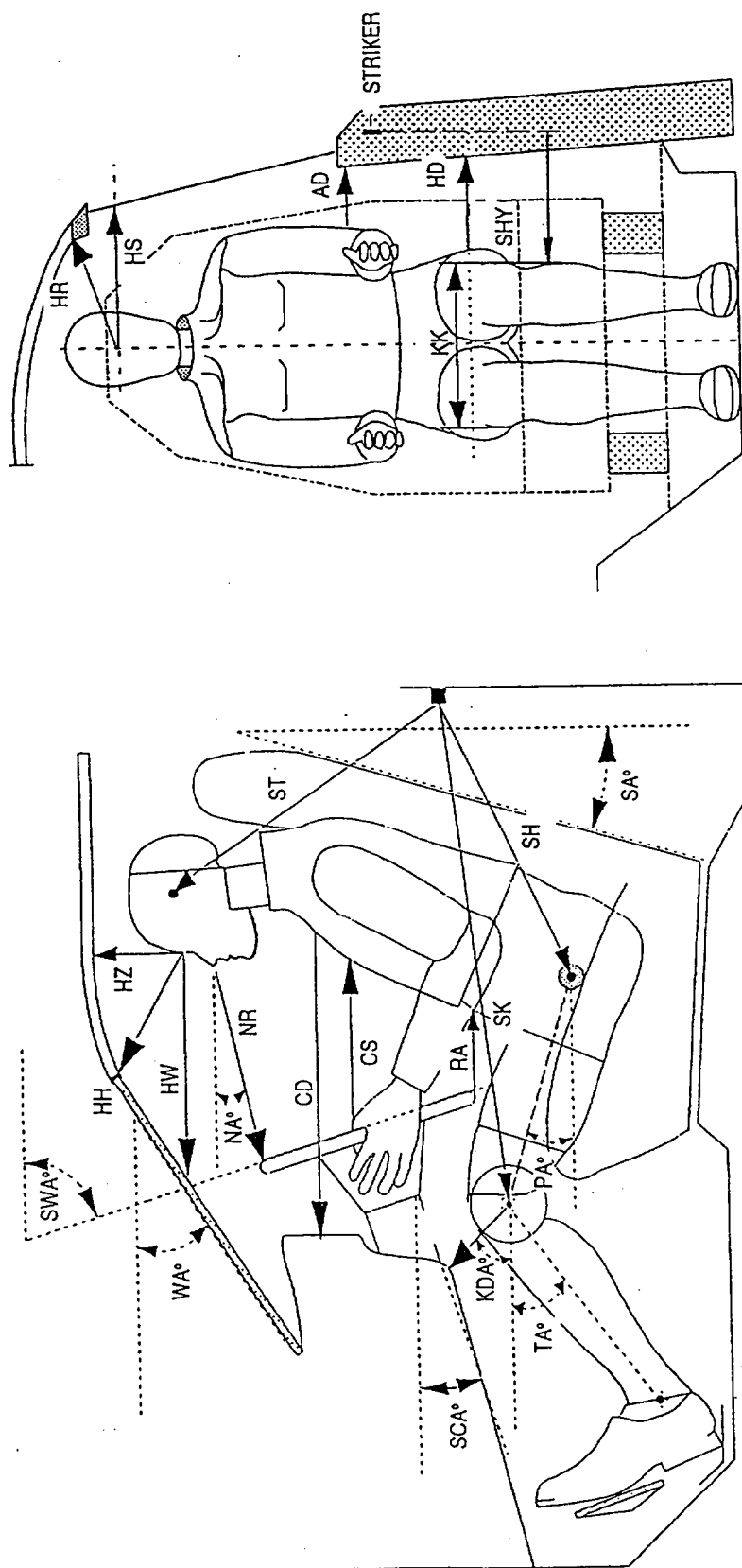
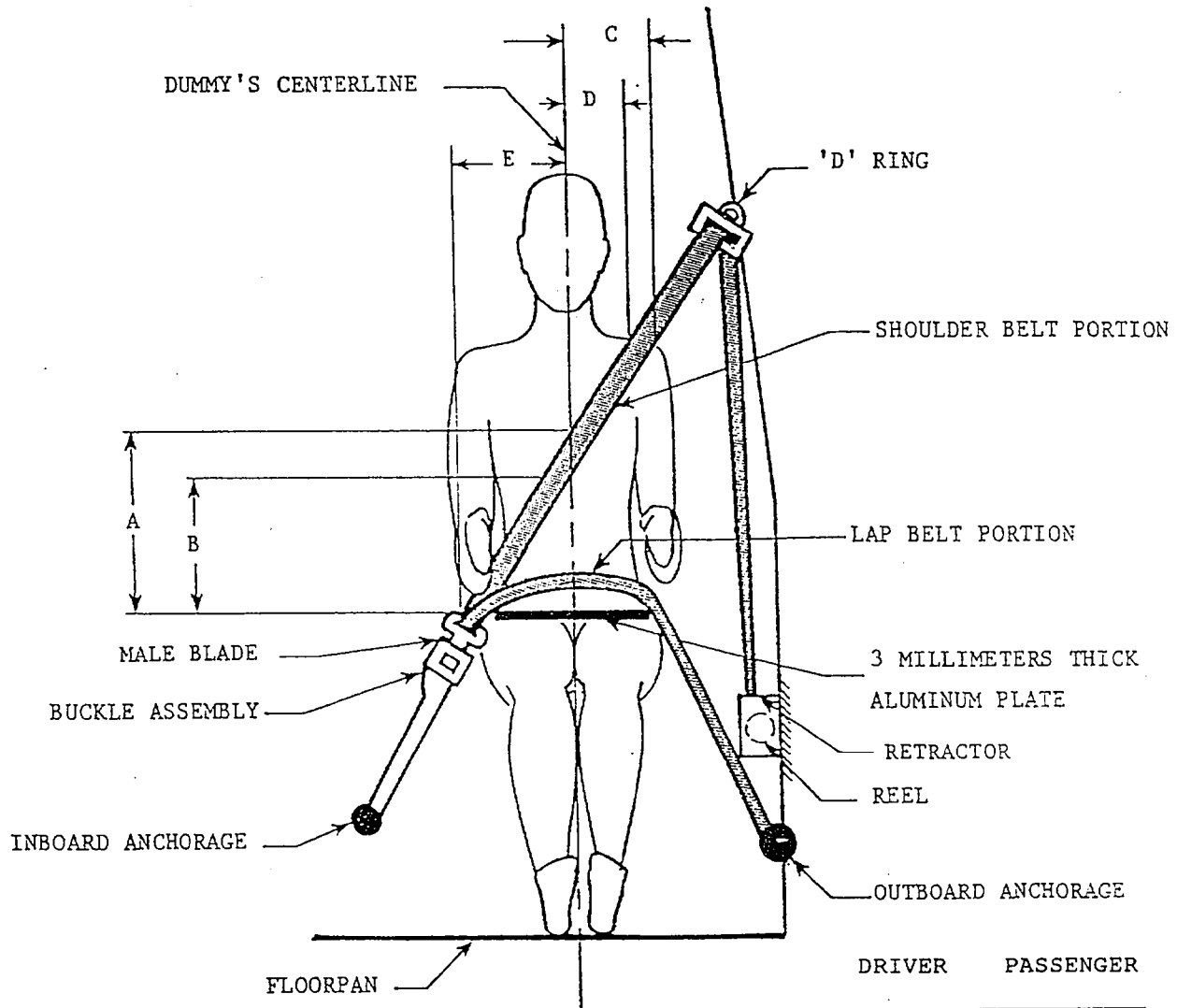


TABLE 12 DUMMY MEASUREMENT DATA FOR FRONT SEAT OCCUPANTS

DESIGNATION	TYPE OF MEASUREMENT	DRIVER (SERIAL #192)	PASSENGER (SERIAL #713)
WA°	WINDSHIELD ANGLE	39	NA
SWA°	STEERING WHEEL ANGLE	25	NA
SCA°	STEERING COLUMN ANGLE	65	NA
SA°	SEAT BACK ANGLE	19	19
HZ	HEAD TO ROOF	212	163
HH	HEAD TO HEADER	364	429
HW	HEAD TO WINDSHIELD	523	514
HR	HEAD TO SIDE HEADER	238	198
NR	NOSE TO RIM	363	NA
NA	NOSE TO RIM ANGLE	14	NA
CD	CHEST TO DASH	527	624
CS	STEERING WHEEL TO CHEST	247	NA
RA	RIM TO ABDOMEN	165	NA
KDL	LEFT KNEE TO DASH	194	262
KDR	RIGHT KNEE TO DASH	195	259
KDA	OUTBOARD KNEE TO DASH ANGLE	33	34
PA°	PELVIC ANGLE	23	15
TA°	TIBIAL ANGLE	36	30
KK	KNEE TO KNEE	360	298
ST	STRIKER TO HEAD	604	565
	STRIKER TO HEAD ANGLE	63	72
SK	STRIKER TO KNEE	754	721
	STRIKER TO KNEE ANGLE	-2	-4
SH	STRIKER TO H-POINT	392	334
	STRIKER TO H-POINT ANGLE	-17	-20
SHY	STRIKER TO H-POINT (Y DIR.)	257	225
HS	HEAD TO SIDE WINDOW	322	294
HD	H-POINT TO DOOR	165	160
AD	ARM TO DOOR	120	101

THE SEAT BACK ANGLE (SA°) IS MEASURED RELATIVE TO VERTICAL, ALL OTHER ANGLES ARE MEASURED RELATIVE TO HORIZONTAL.
 ALL ANGLE MEASUREMENTS ARE IN DEGREES.
 ALL DISTANCE MEASUREMENTS ARE IN MILLIMETERS.

FIGURE 9 SEAT BELT POSITIONING DATA



	DRIVER	PASSENGER
A - TOP SURFACE OF ALUMINUM PLATE TO BELT UPPER EDGE	386	325
B - TOP SURFACE OF ALUMINUM PLATE TO BELT LOWER EDGE	300	235
C - DUMMY CENTERLINE TO OUTER EDGE OF BELT AT CHEST FLESH TOP	138	155
D - DUMMY CENTERLINE TO INNER EDGE OF BELT AT CHEST FLESH TOP	71	105
LAPBELT TENSION (N)	13	18
SHOULDER BELT TENSION (N)	18	13
ADJUSTABLE SEAT BELT ANCHORAGE POSITION	one down from uppermost	one down from uppermost

ALL DISTANCE MEASUREMENTS ARE IN MILLIMETERS.

FIGURE 10
CAMERA POSITIONS

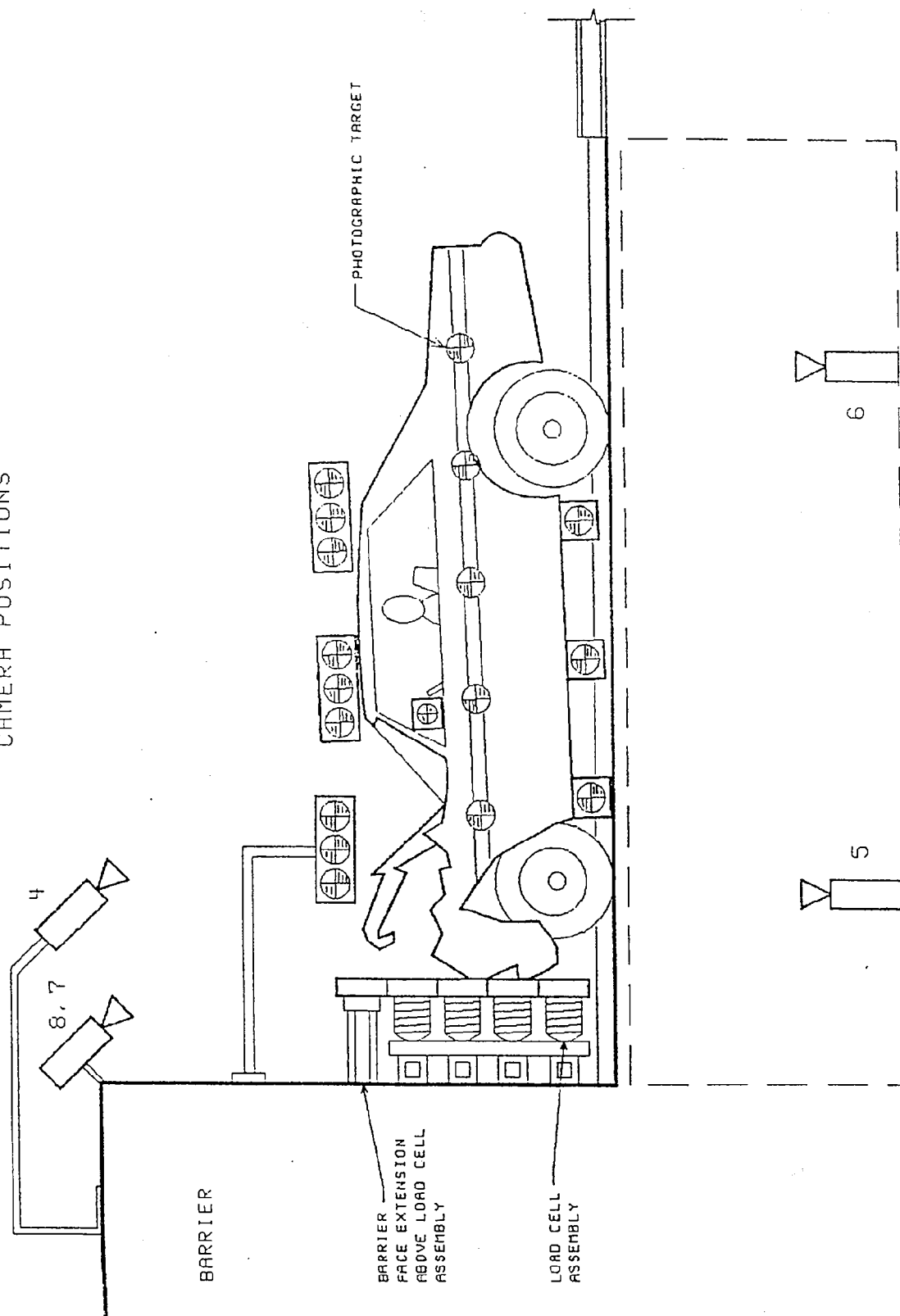


FIGURE 10
CAMERA POSITIONS, CONTINUED

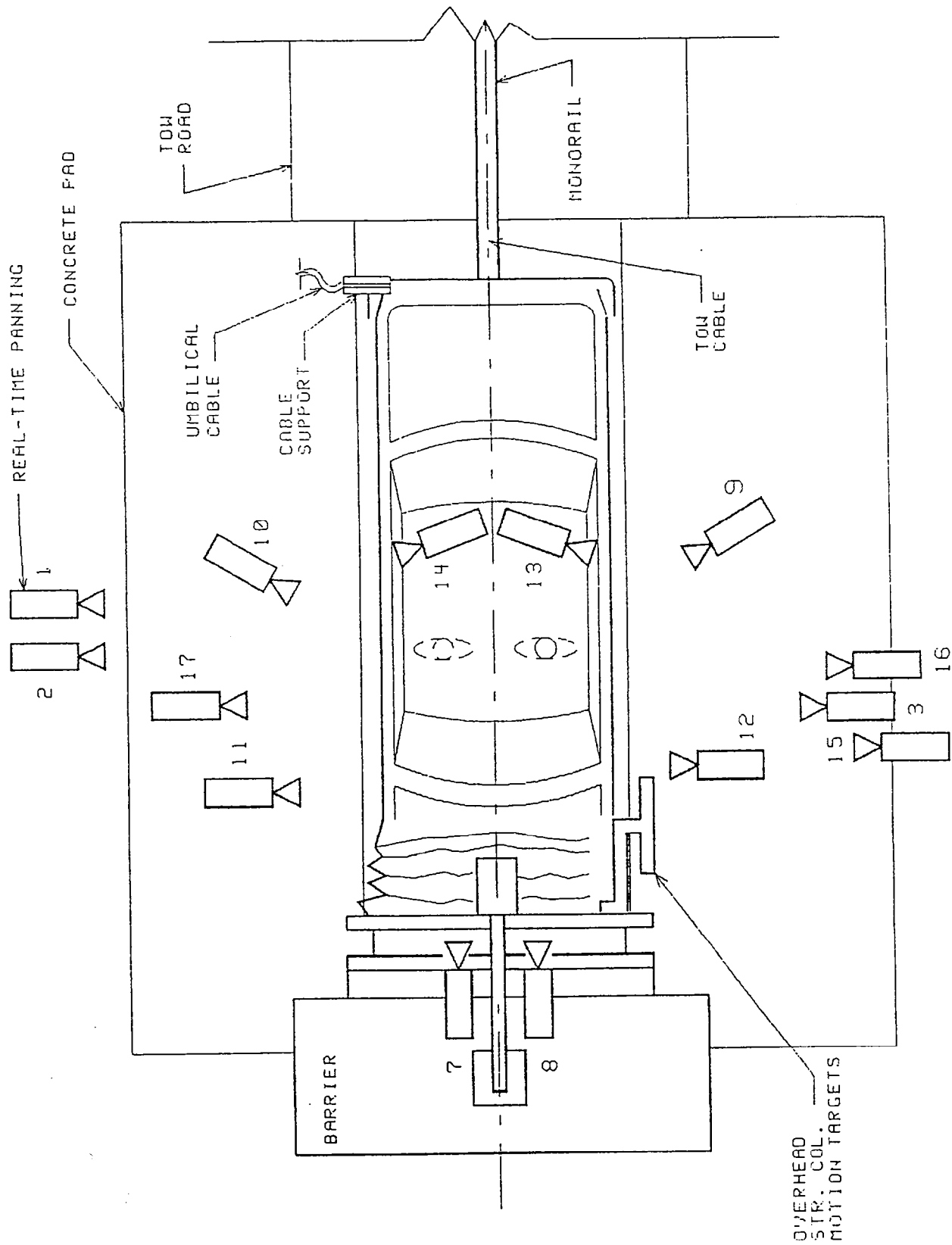


TABLE 13 MOTION PICTURE CAMERA LOCATIONS

CAMERA NO.	VIEW	CAMERA POSITIONS (MM) ¹			ANGLE ² (DEG)	FILM PLANE TO HEAD		FILM SPEED (FPS)
		X	Y	Z		TARGET (MM)	LENS (MM)	
1	Real-time panning	-3607	-12802	1549	NA	NA	16	24
2	Vehicle crush	-2065	-6767	942	-2	NA	13	498
3	Dummy kinematics	-1054	7493	1118	-12	6223	25	1000
4	Windshield damage	-925	0	2489	-40	NA	13	485
5	Crush & fluid spillage	-1283	0	-2347	90	NA	13	1015
6	Fluid spillage	-2522	0	-2515	90	NA	13	998
7	Passenger kinematics	-114	-351	2159	-40	NA	17	505
8	Driver kinematics	-173	368	2159	-41	NA	17	500
9	Driver kinematics	-4572	1854	2591	-27	2362	25	498
10	Passenger kinematics	-4674	-1880	2540	-26	2108	25	495
11	Windshield intrusion ³	-968	-7775	1118	0	NA	50	NA
12	Windshield intrusion ³	-1346	7859	1074	0	NA	50	NA
13	Driver seat belt movement	NA	NA	NA	NA	NA	13	498
14	Passenger seat belt movement	NA	NA	NA	NA	NA	13	502
15	Column movement	-2464	7264	2616	-14	NA	25	502
16	Column movement	-2464	7264	1908	-9	NA	25	508
17	Passenger kinematics	-986	-5354	1151	7	5436	25	1008

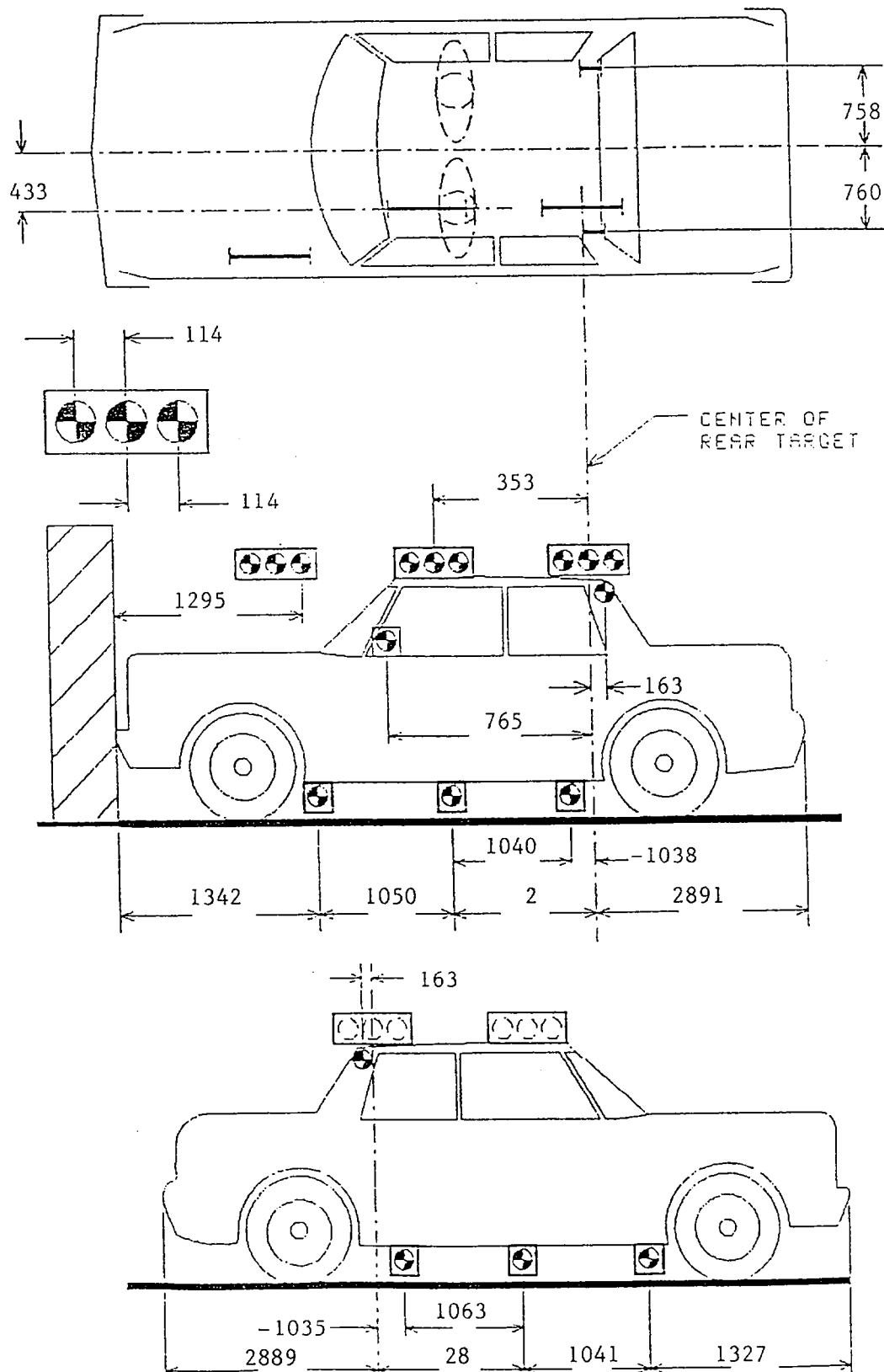
¹ +X = Film plane forward of barrier face

+Y = Film plane to left of monorail centerline

+Z = Film plane above ground level

² +Angle = Film plane angled upward from horizontal plane³ No film as a result of the film breaking in the cameras during the test.

FIGURE 11 VEHICLE TARGET LOCATIONS



All measurements are in millimeters.

FIGURE 12 PRE-TEST AND POST-TEST MEASUREMENT POINTS

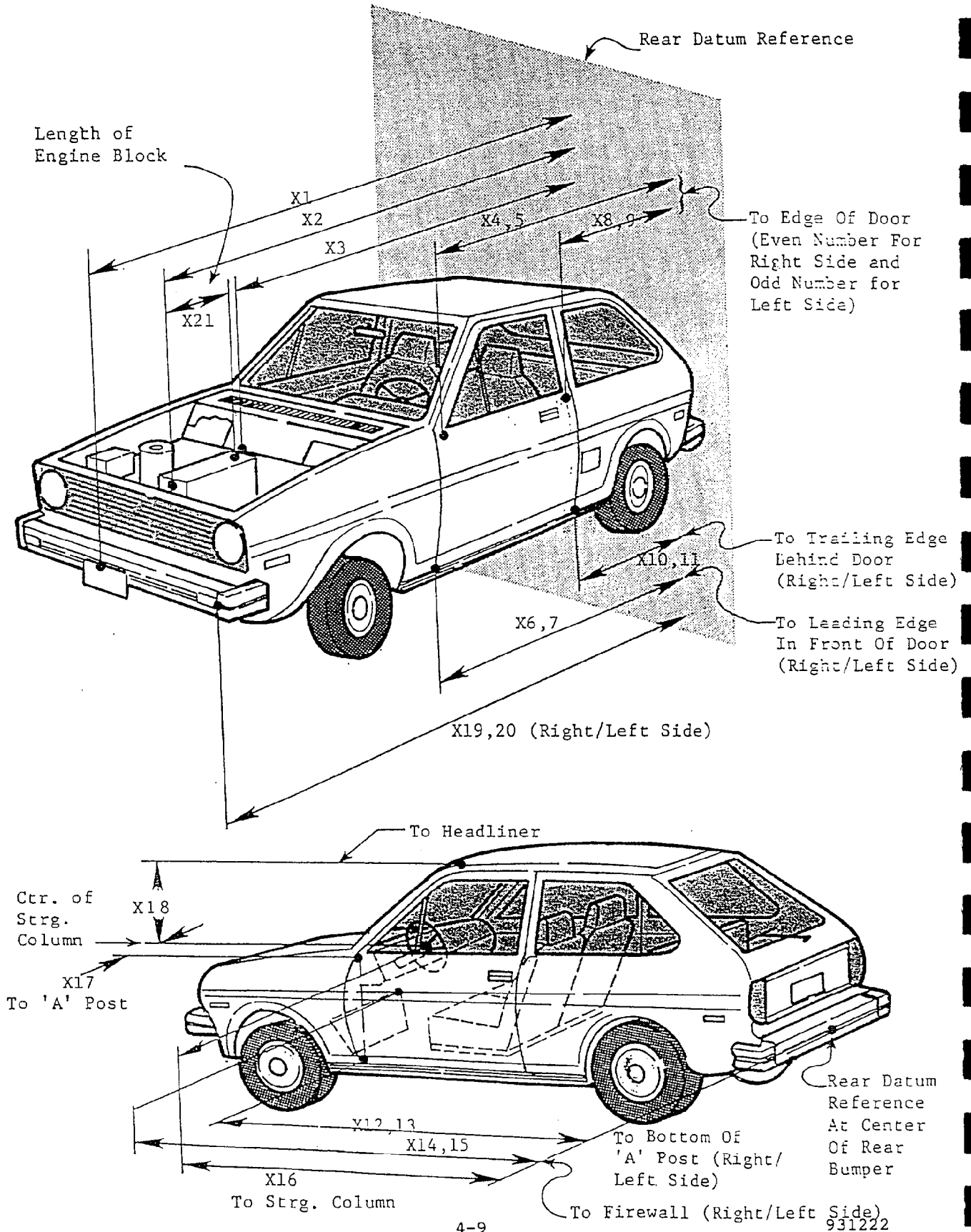


TABLE 14 IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL: Toyota/T100 TEST NUMBER: 931222

NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST	DIFF.
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	5285	4736	549
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	4725	4606	119
X3	REAR SURFACE OF VEHICLE TO FIREWALL	4190	4186	4
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	3955	3977	-22
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	3950	3973	-23
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	3947	3917	30
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	3932	3935	-3
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	2787	2810	-23
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	2782	2812	-30
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	2802	2779	23
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	2794	2796	-2
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	3935	3940	-5
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	3932	3940	-8
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	4185	4172	13
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	4200	4218	-18
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	3505	3610	-105
X17	CENTER OF STEERING COLUMN TO "A" POST	280	264	16
X18	CENTER OF STEERING COLUMN TO HEADLINER	450	370	80
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	5200	4713	487
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	5205	4738	467
X21	LENGTH OF ENGINE BLOCK	530	530	0

All measurements are in millimeters.

APPENDIX A

PHOTOGRAPHS

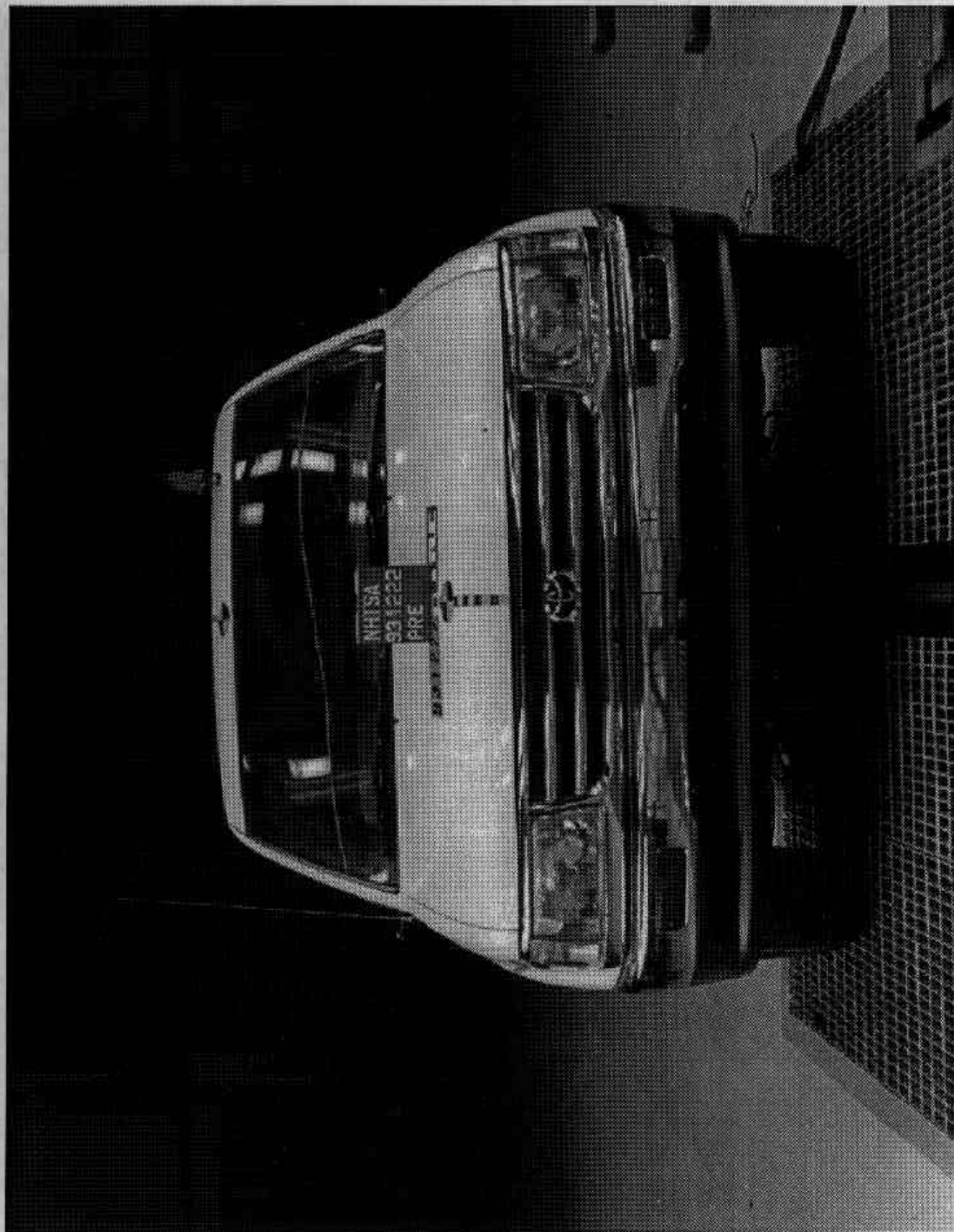


Figure A-1. PRE-TEST FRONT VIEW
A-2

931222

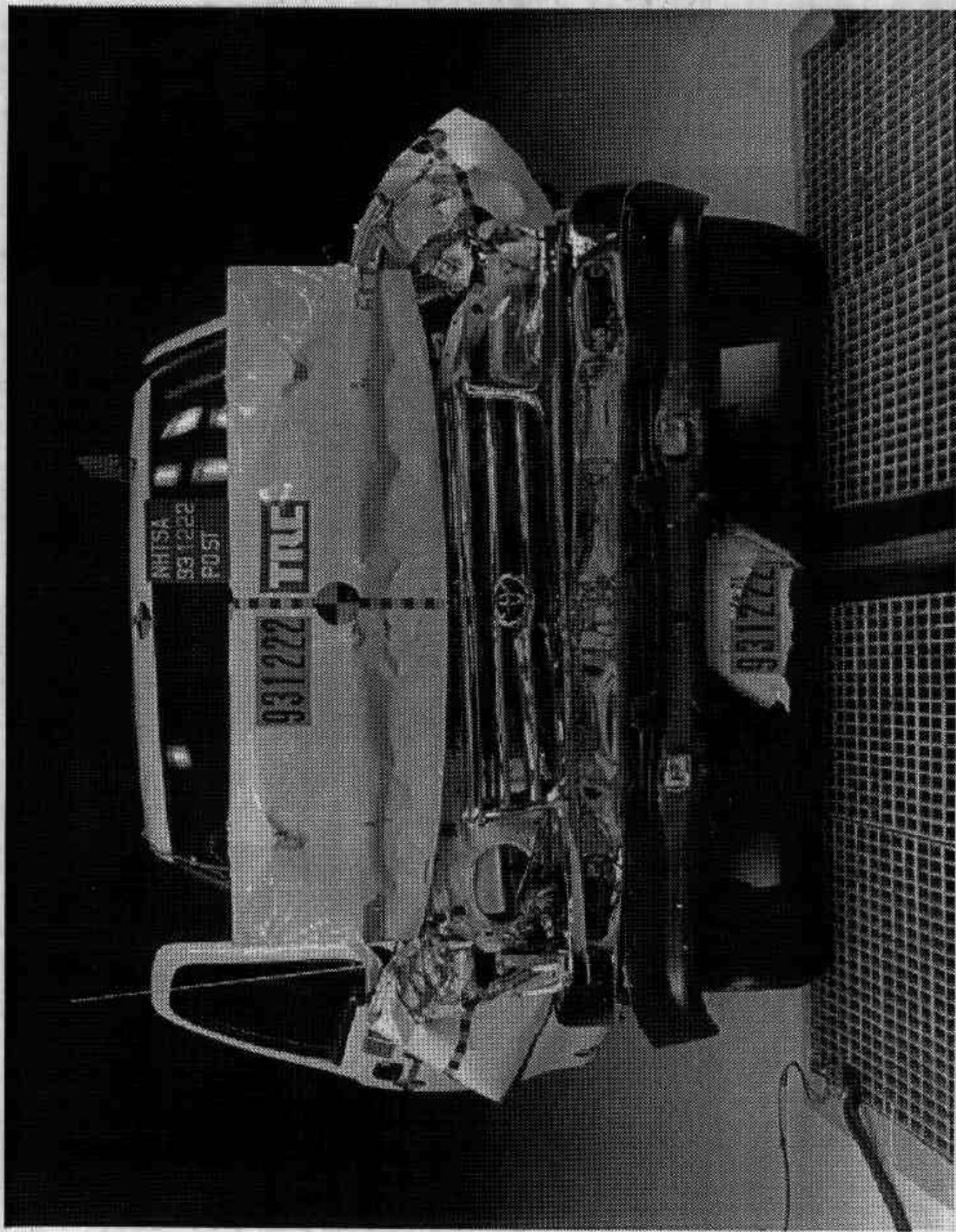


Figure A-2. POST-TEST FRONT VIEW

A-3

931222

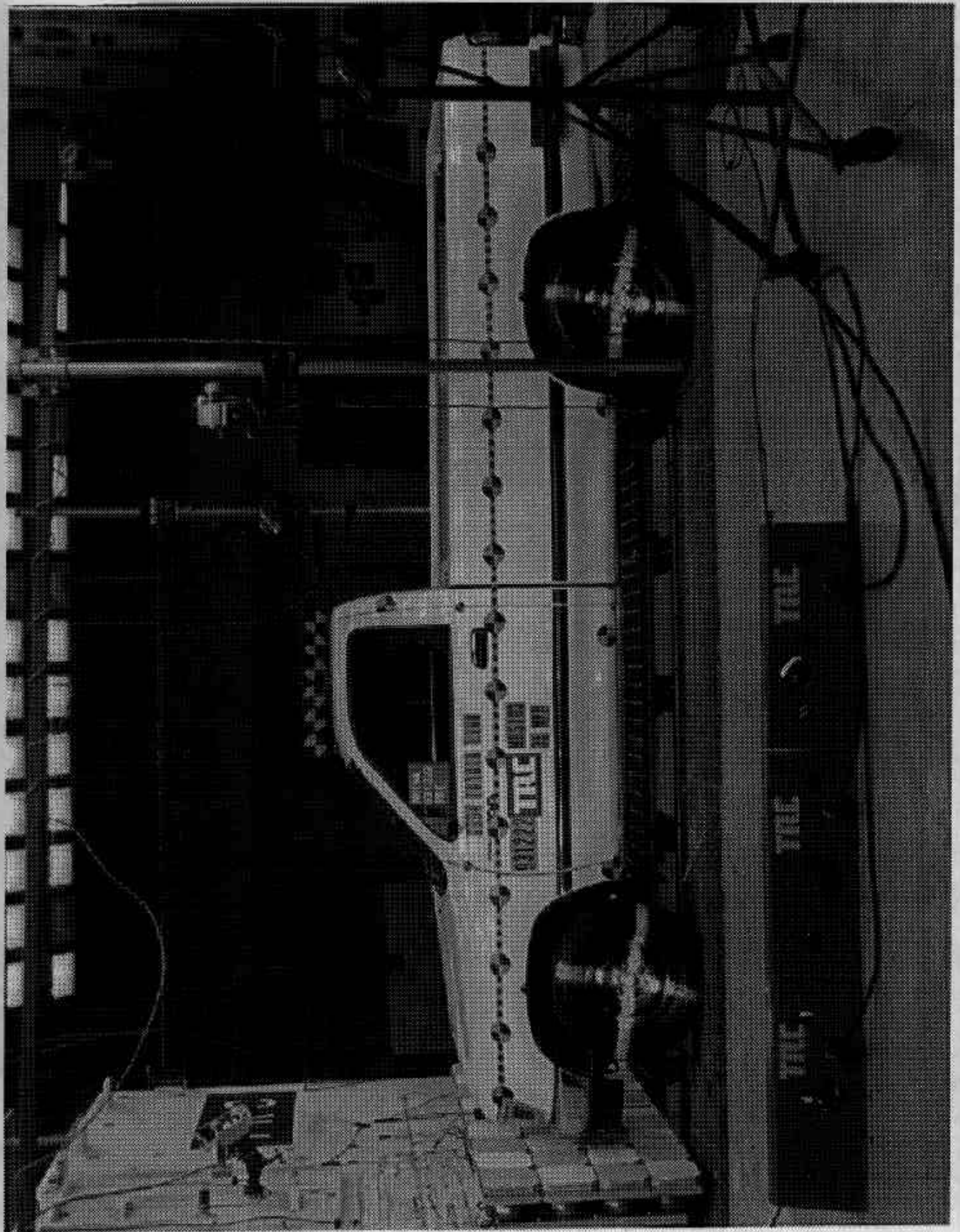


Figure A-3. PRE-TEST LEFT SIDE VIEW

A-4

931222

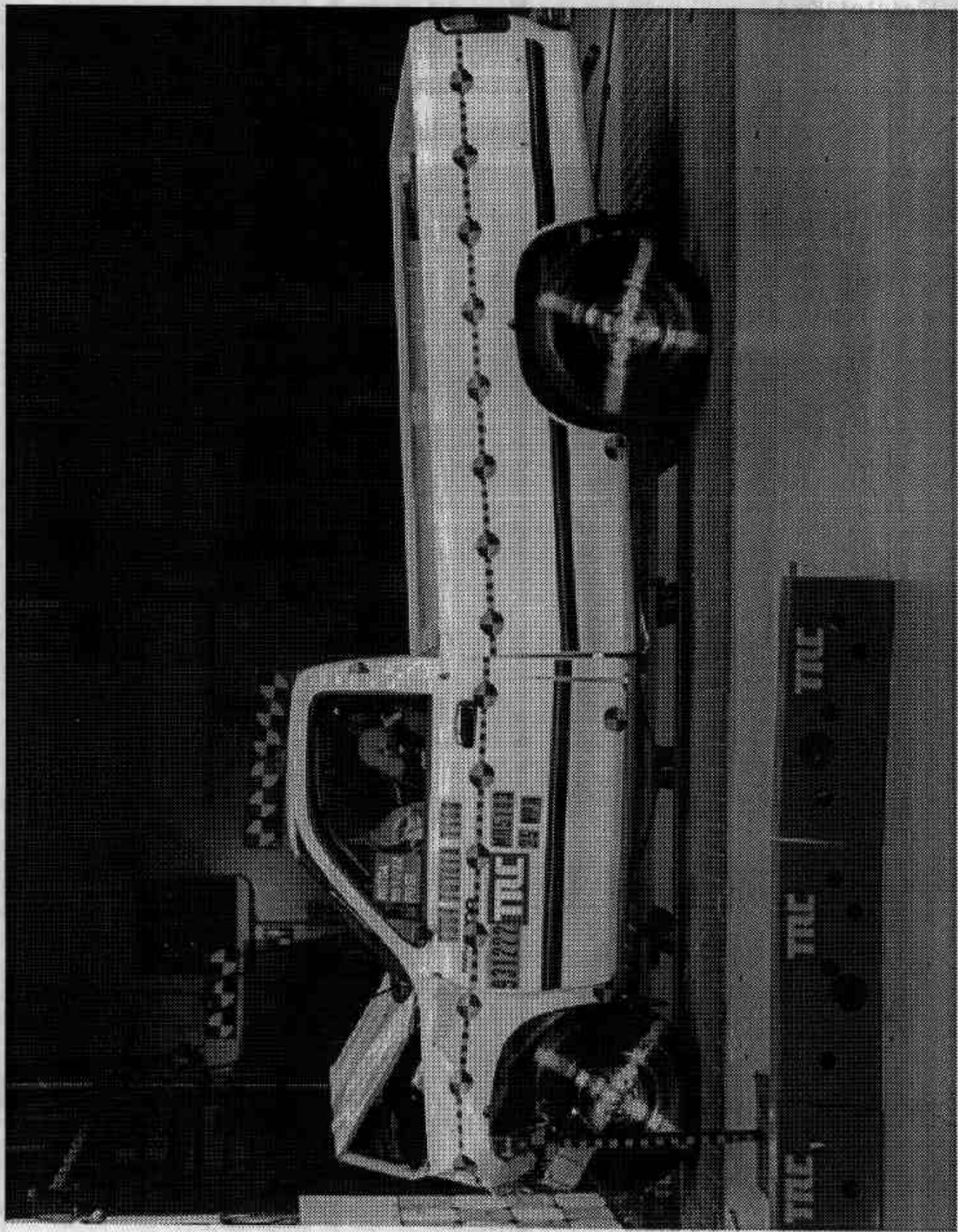


Figure A-4. POST-TEST LEFT SIDE VIEW

A-5

931222

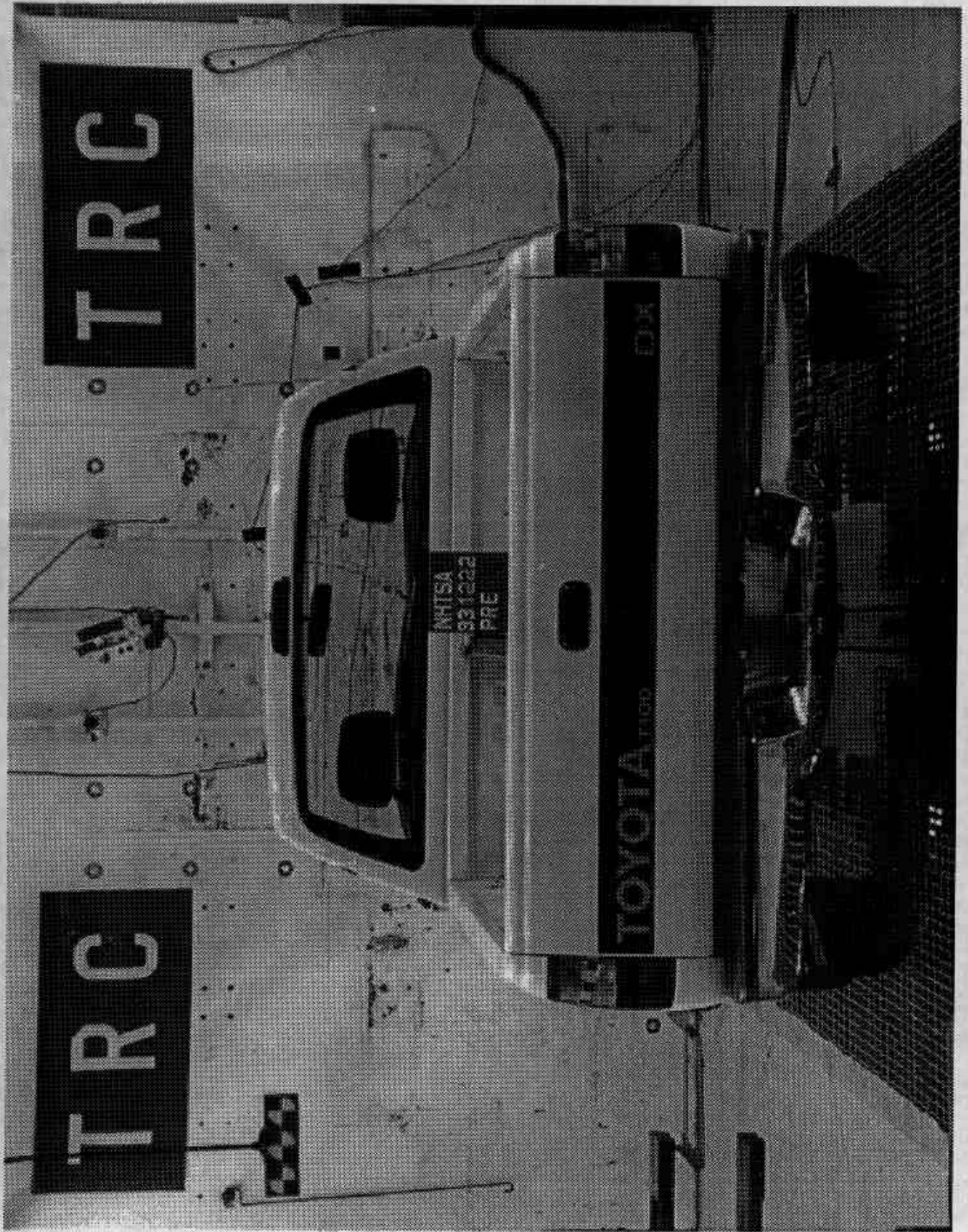


Figure A-5. PRE-TEST REAR VIEW

A-6

931222

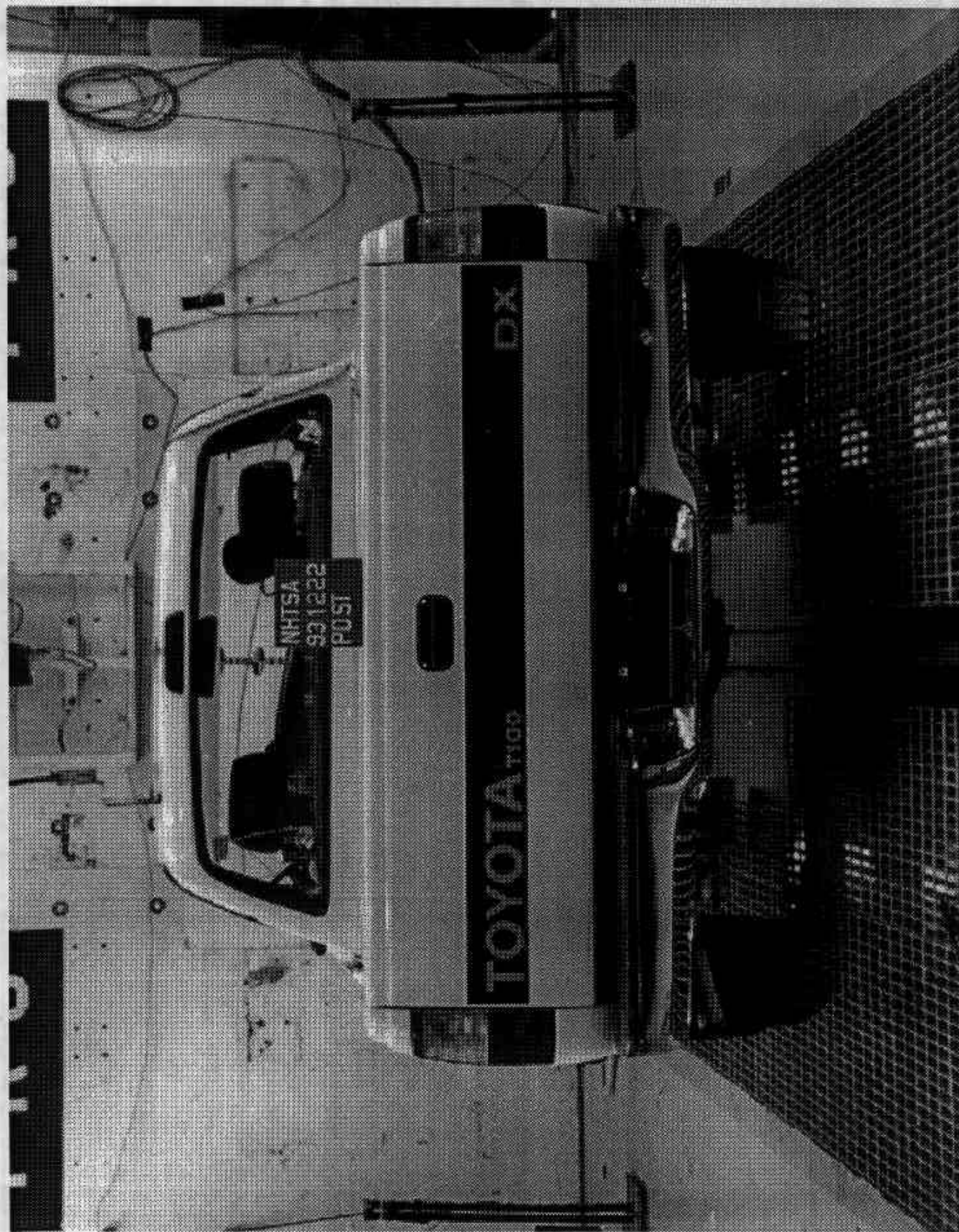


Figure A-6. POST-TEST REAR VIEW
A-7

931222

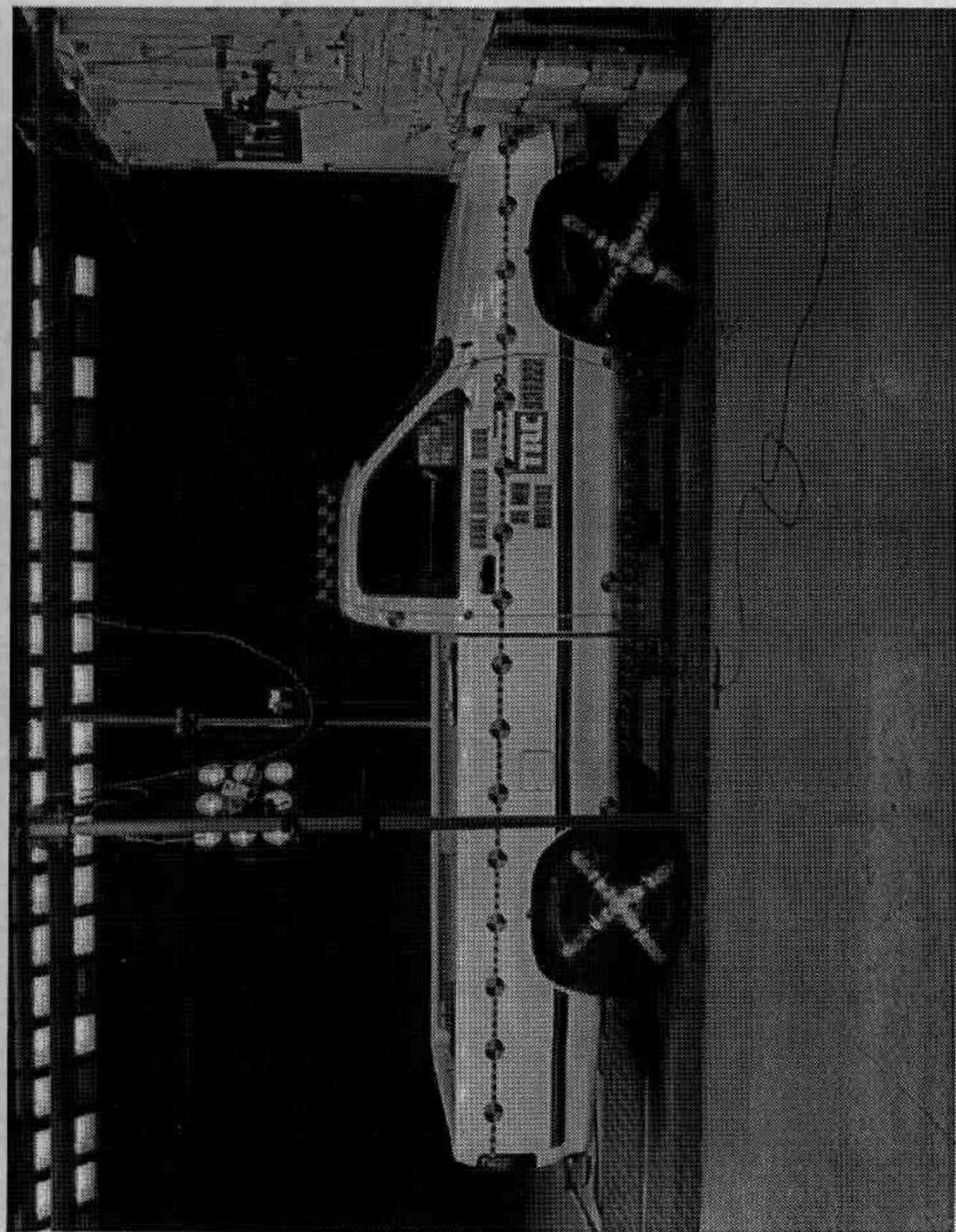


Figure A-7. PRE-TEST RIGHT SIDE VIEW

A-8

931222

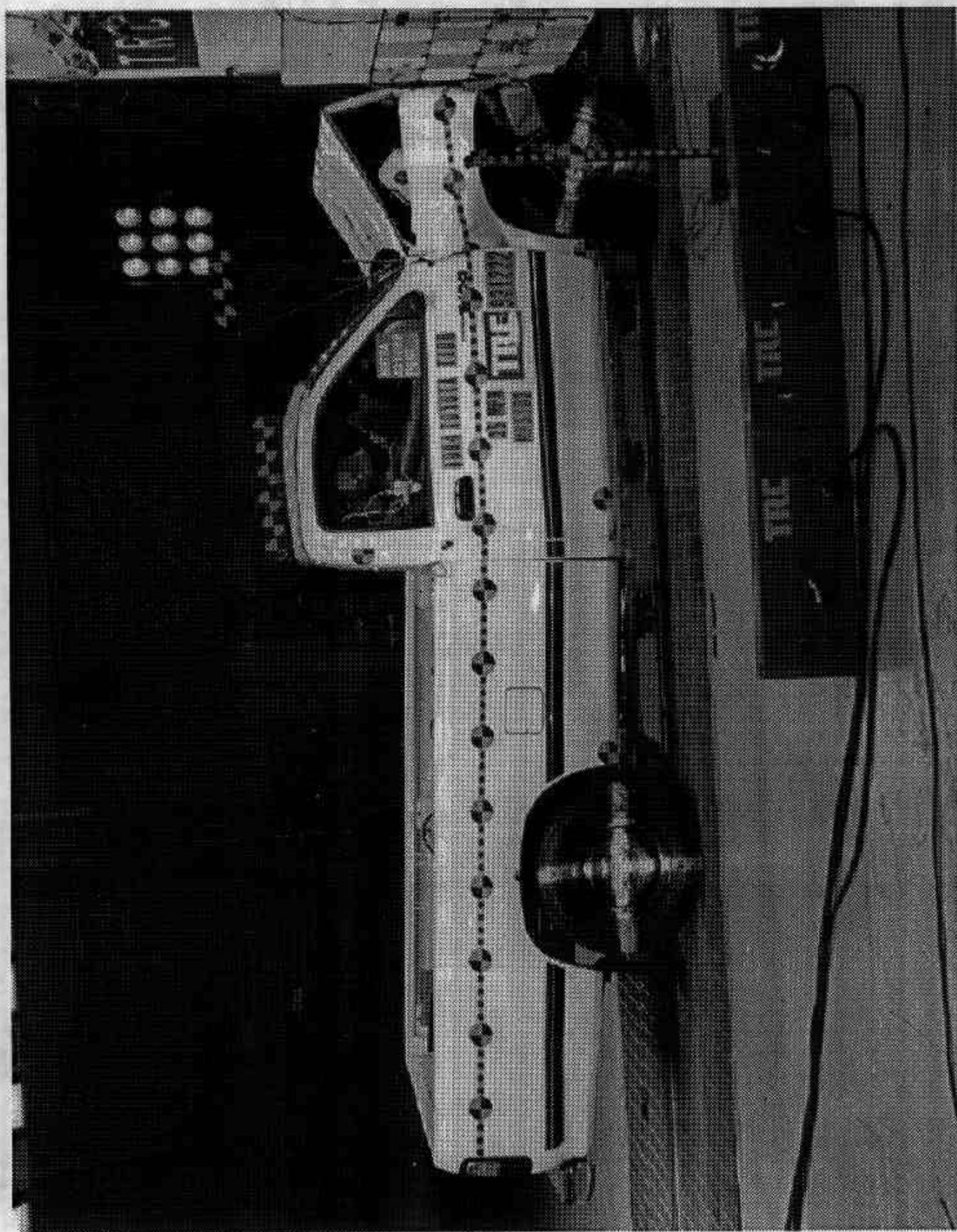


Figure A-8. POST-TEST RIGHT SIDE VIEW
A-9

931222

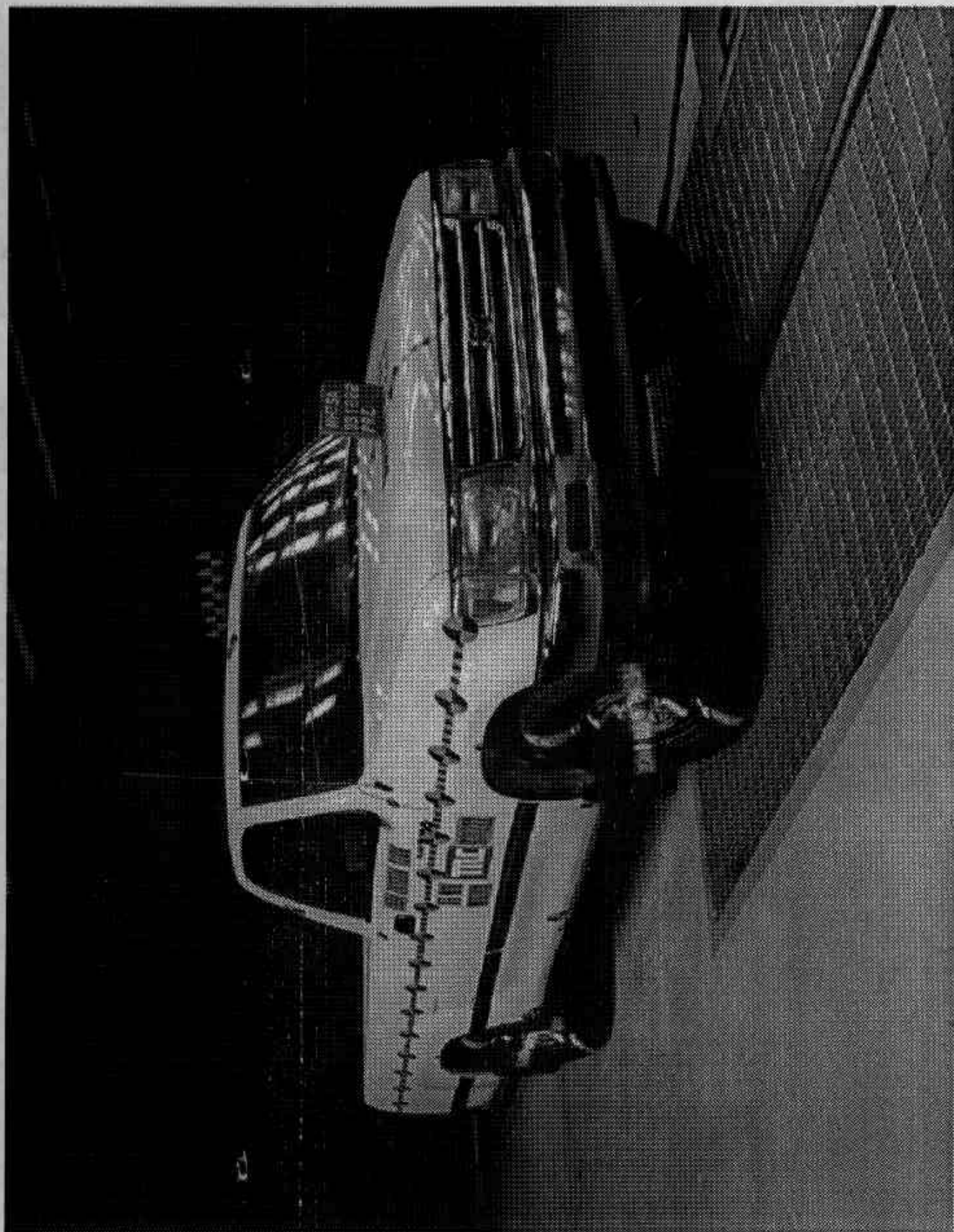


Figure A-9. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

A-10

931222



Figure A-10. POST-TEST RIGHT FRONT THREE-QUARTER VIEW

A-11

931222



Figure A-11. PRE-TEST LEFT REAR THREE-QUARTER VIEW
A-12

931222

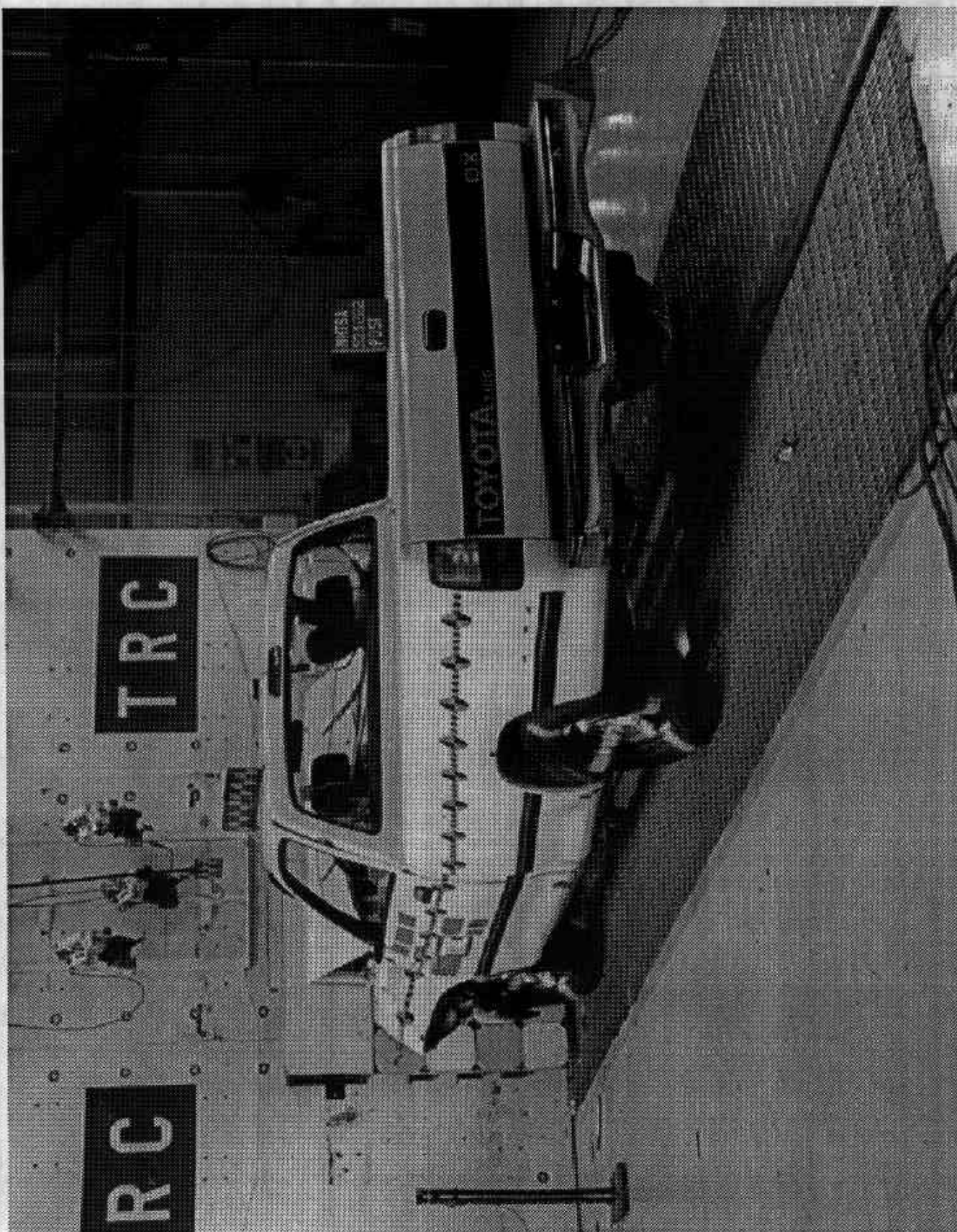


Figure A-12. POST-TEST LEFT REAR THREE-QUARTER VIEW

A-13

931222

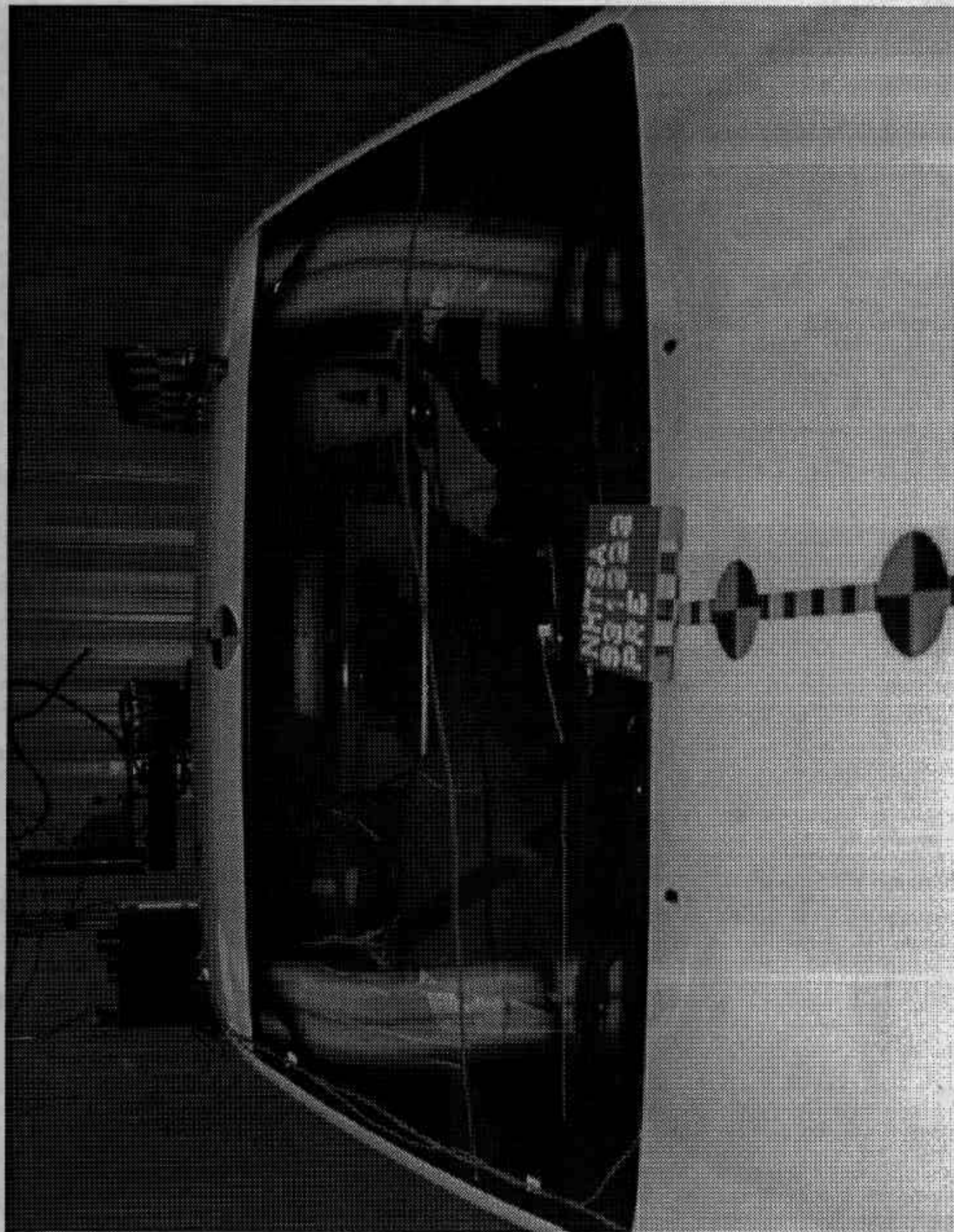


Figure A-13. PRE-TEST WINDSHIELD VIEW

A-14

931222

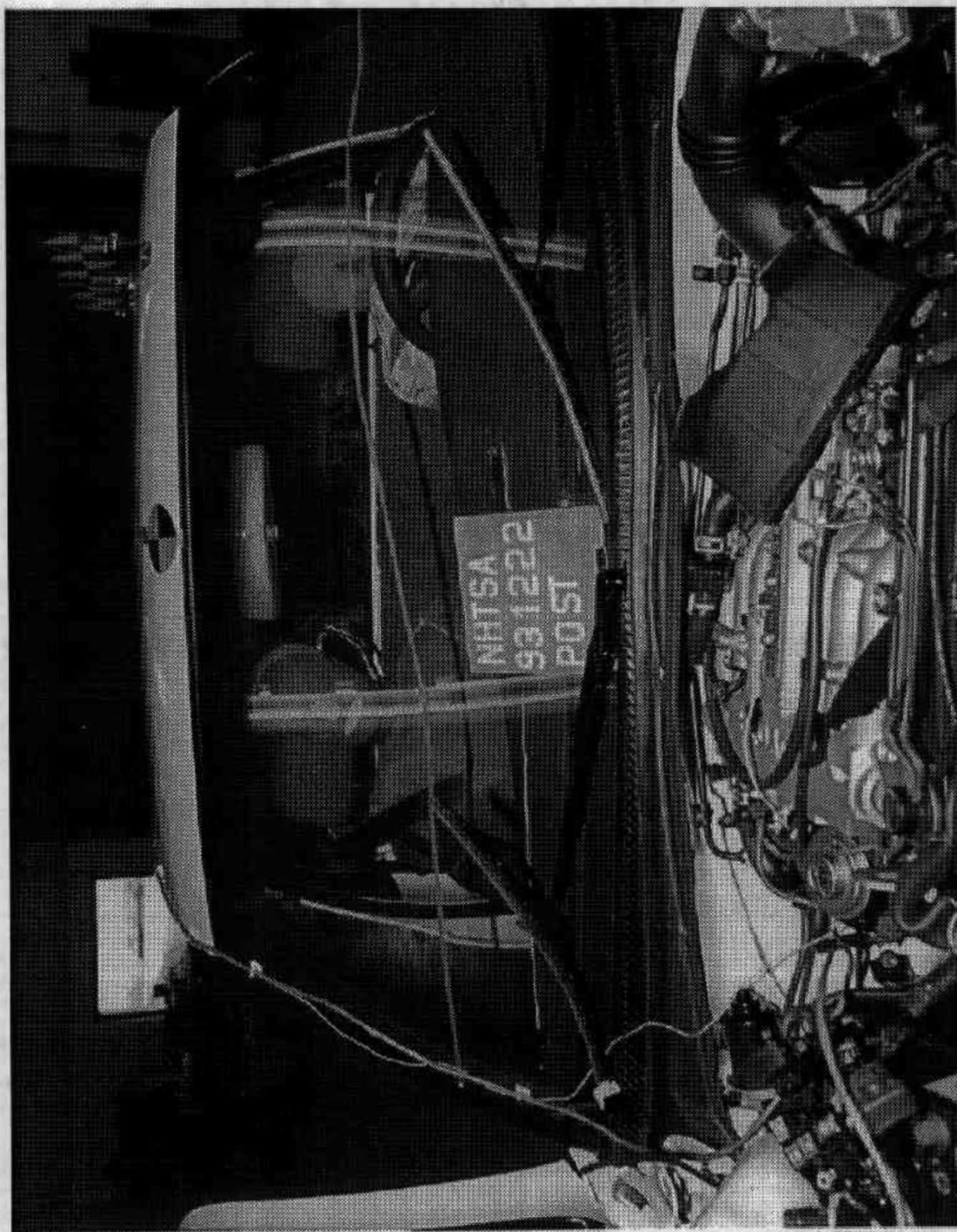


Figure A-14. POST-TEST WINDSHIELD VIEW
A-15

931222

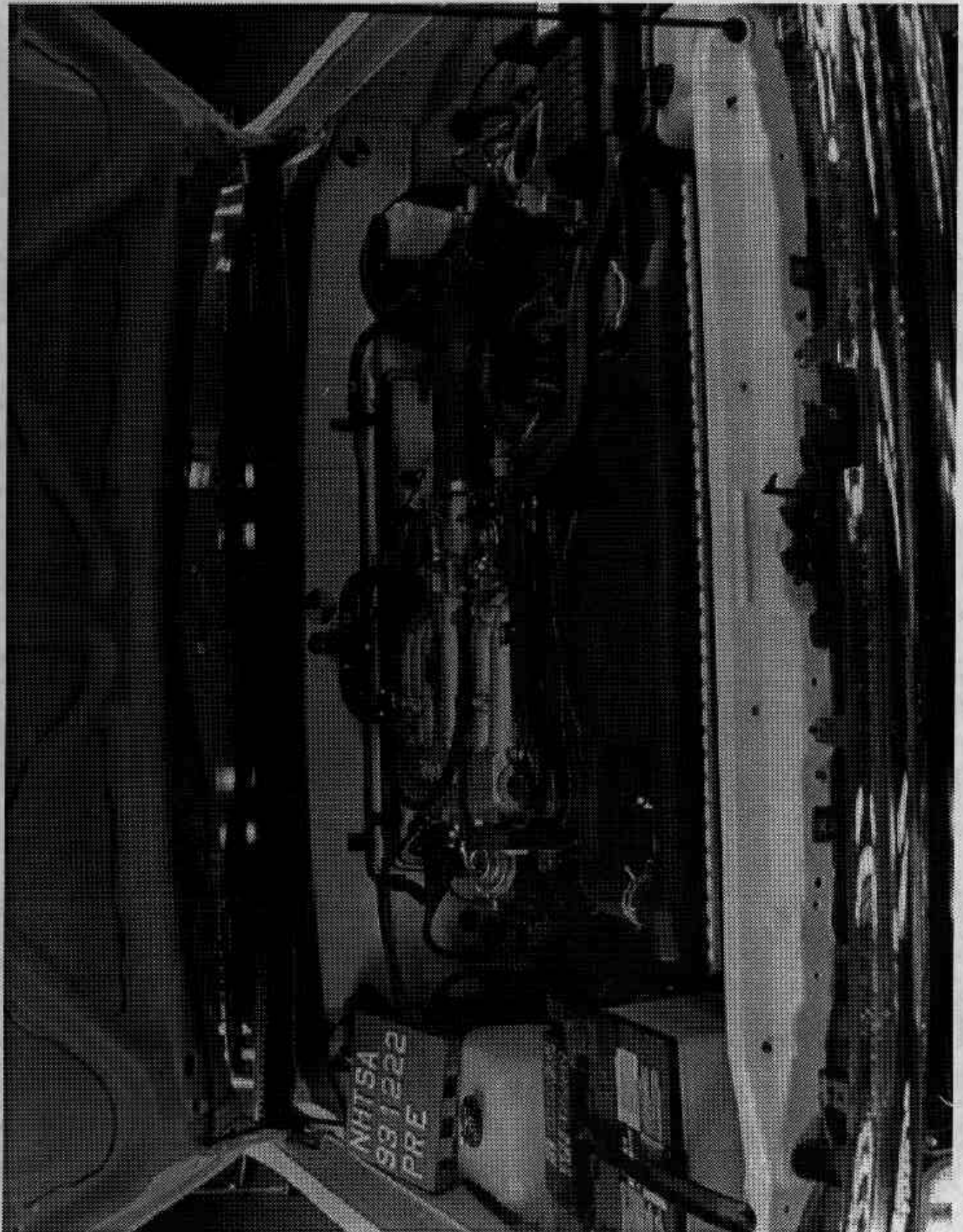


Figure A-15. PRE-TEST ENGINE COMPARTMENT VIEW

A-16

931222

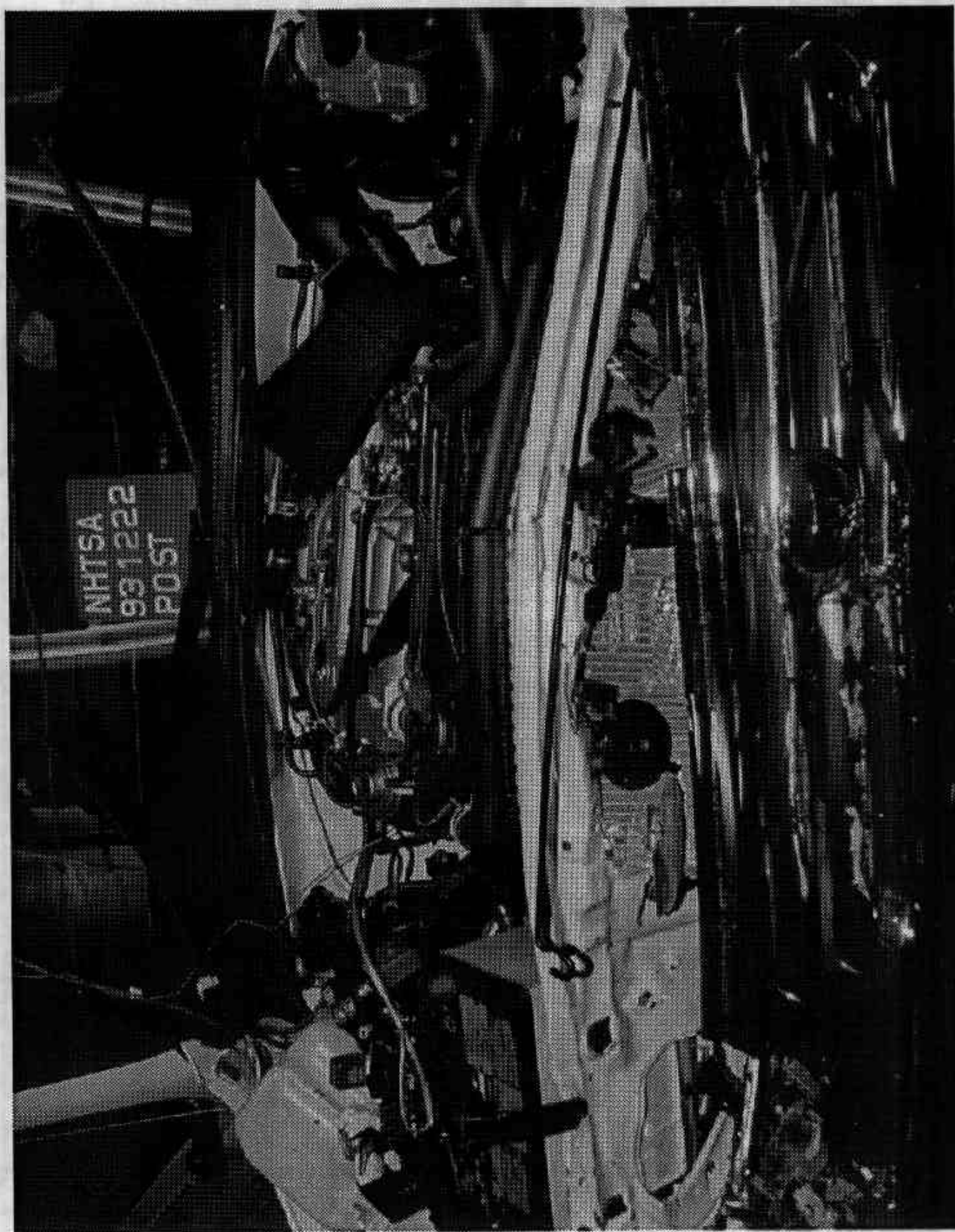


Figure A-16. POST-TEST ENGINE COMPARTMENT VIEW

A-17

931222



Figure A-17. PRE-TEST FUEL FILLER CAP VIEW
A-18

931222

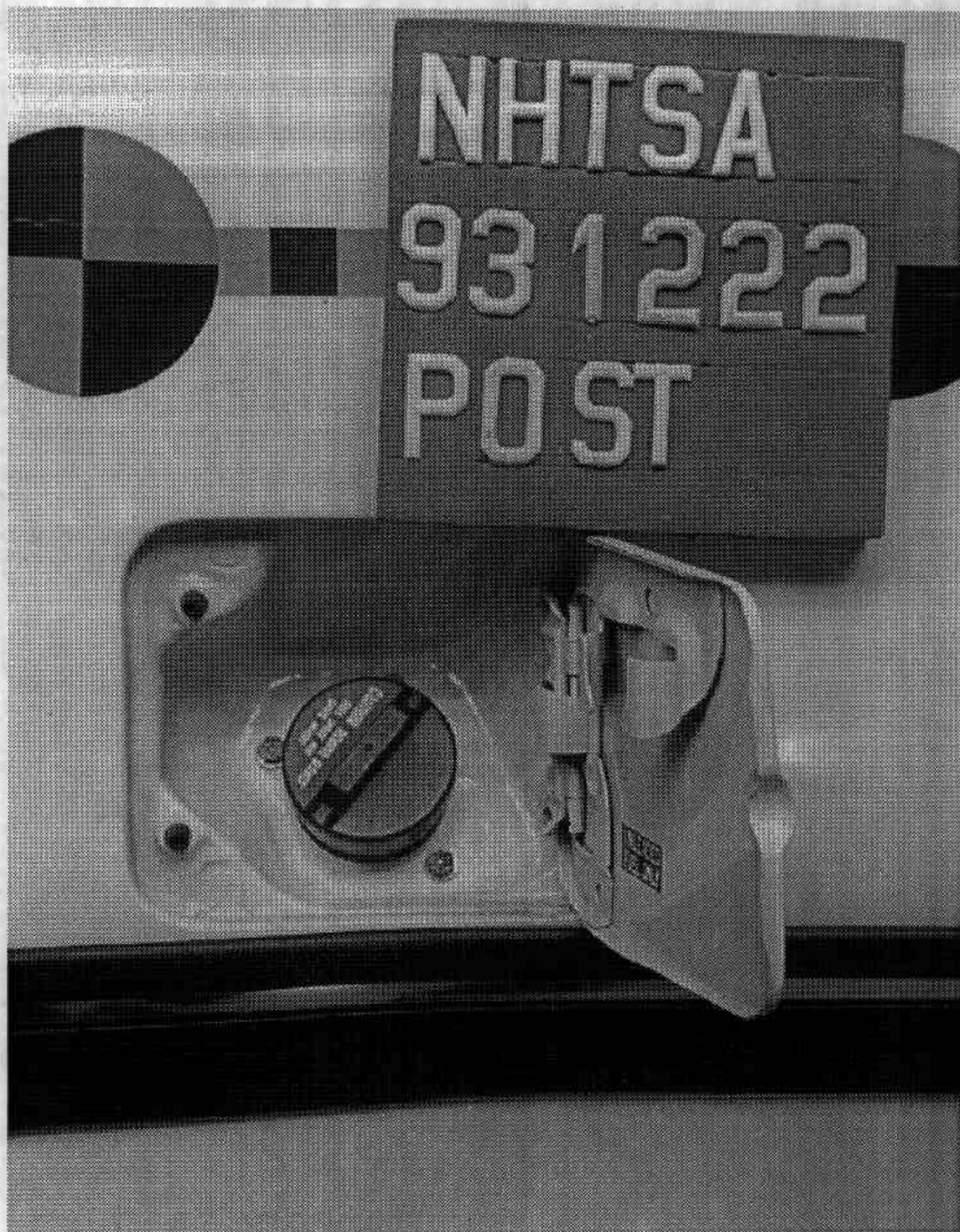


Figure A-18. POST-TEST FUEL FILLER CAP VIEW

A-19

931222



Figure A-19. PRE-TEST FUEL FILLER NECK VIEW

A-20

931222

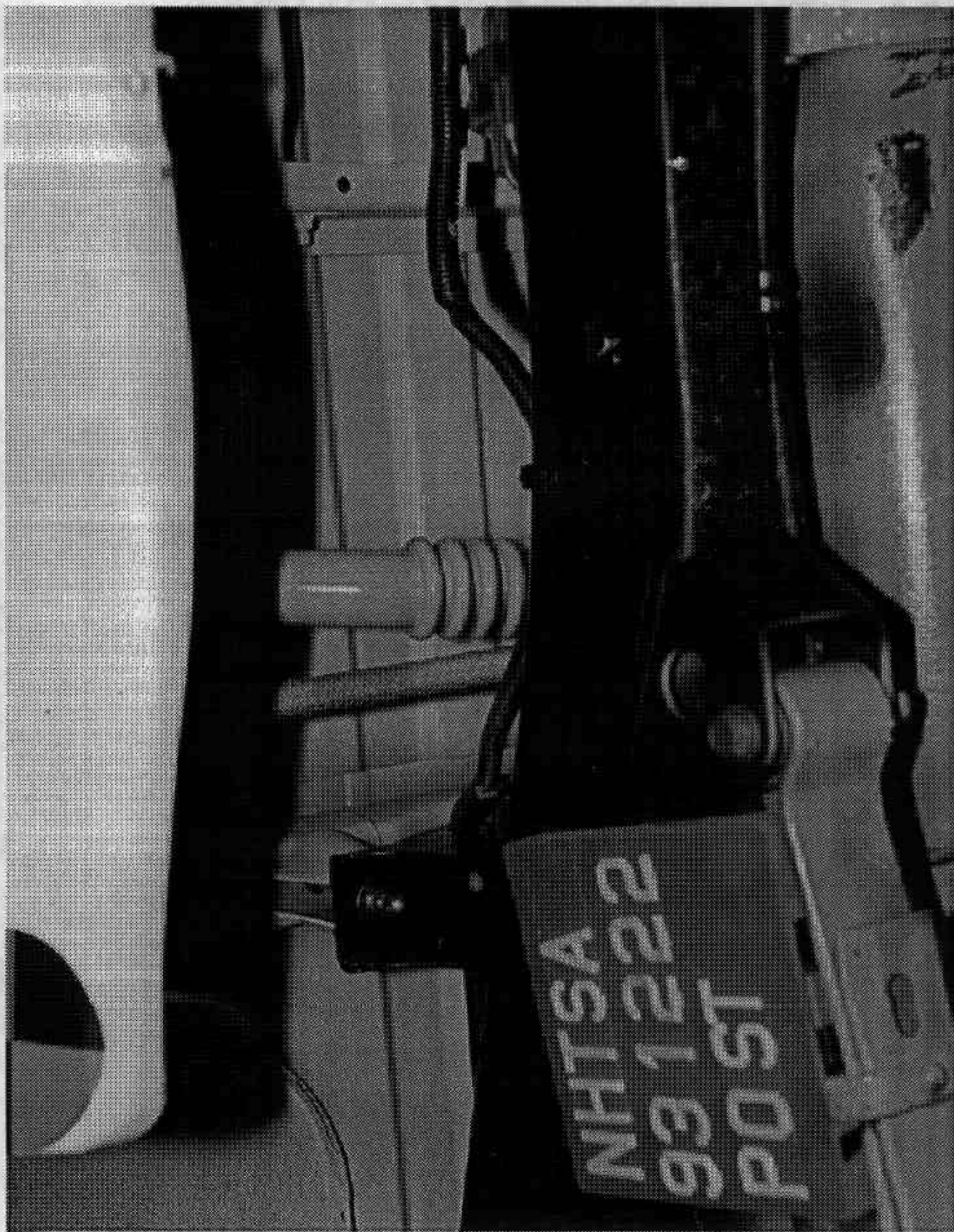


Figure A-20. POST-TEST FUEL FILLER NECK VIEW
A-21

931222

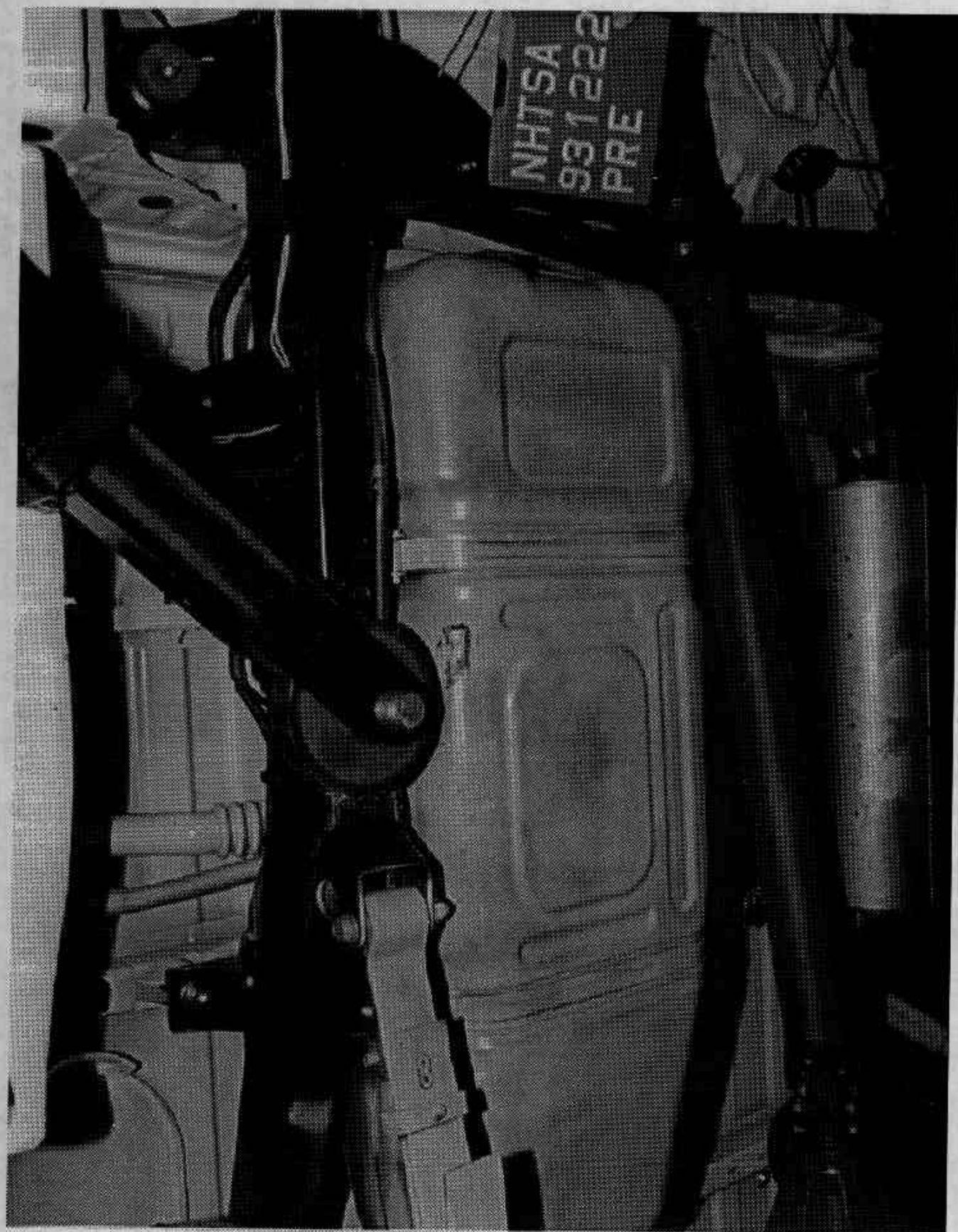


Figure A-21. PRE-TEST FUEL FILLER NECK & TANK VIEW

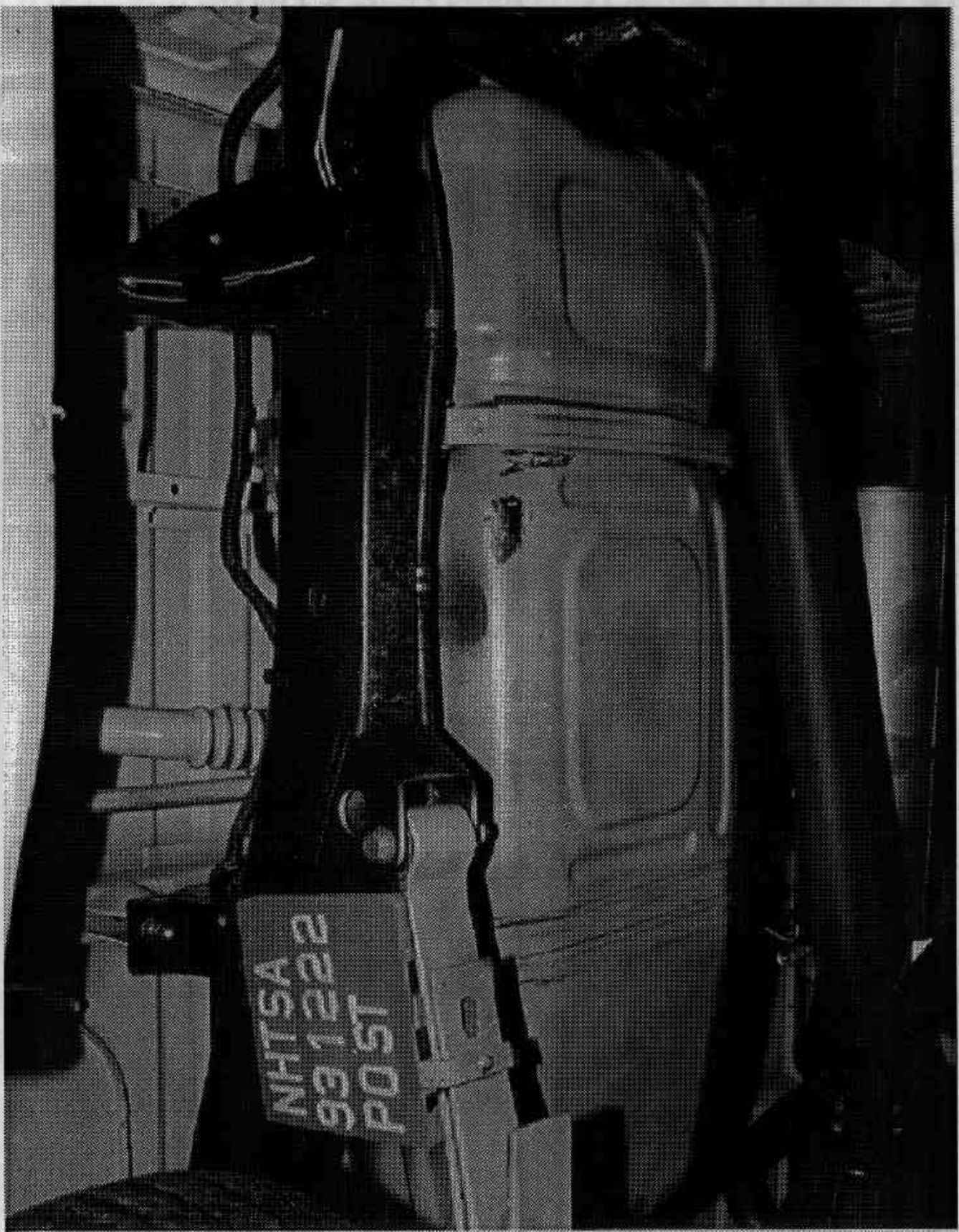


Figure A-22. POST-TEST FUEL FILLER NECK & TANK VIEW

A-23

931222

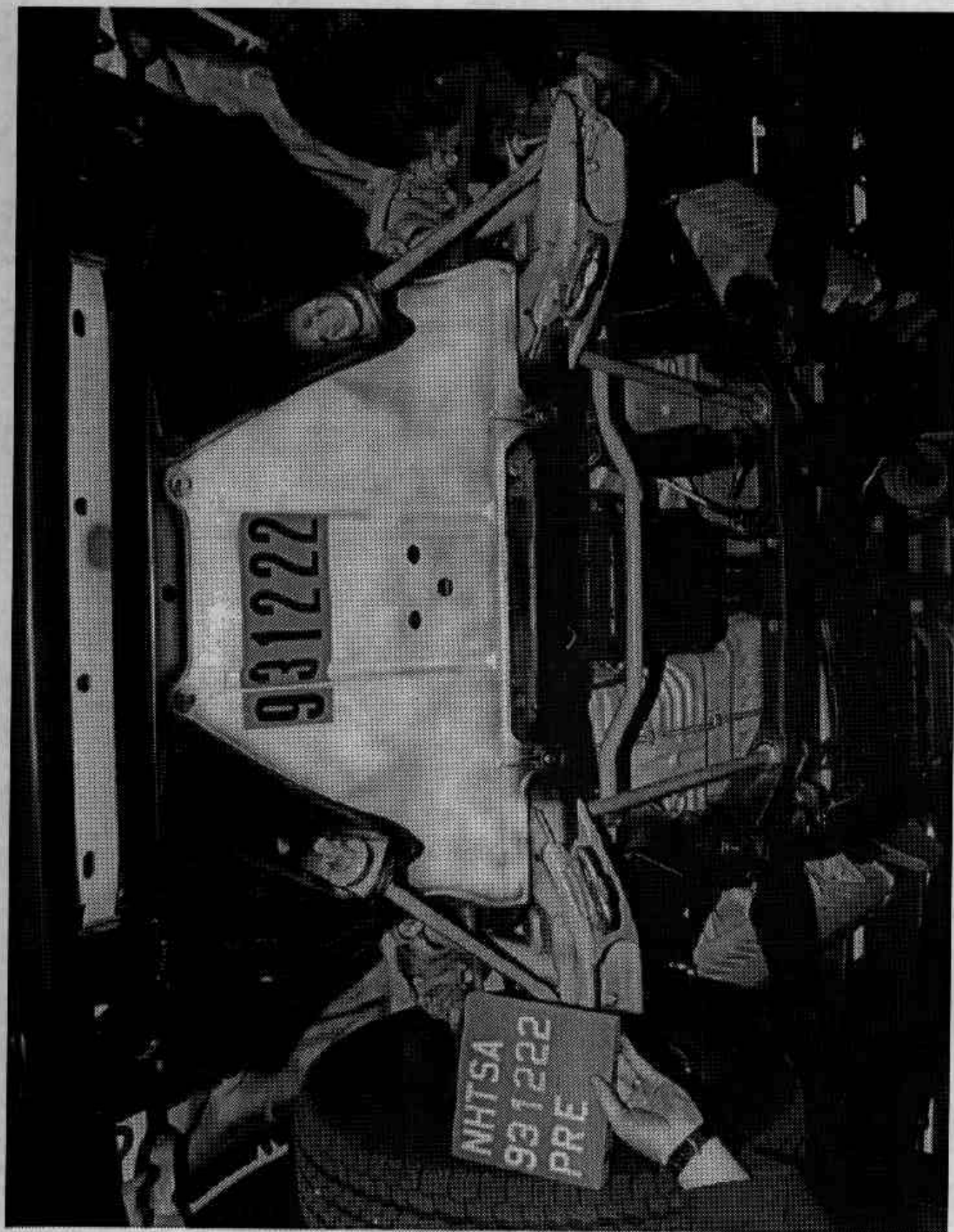


Figure A-23. PRE-TEST FRONT UNDERBODY VIEW

A-24

931222

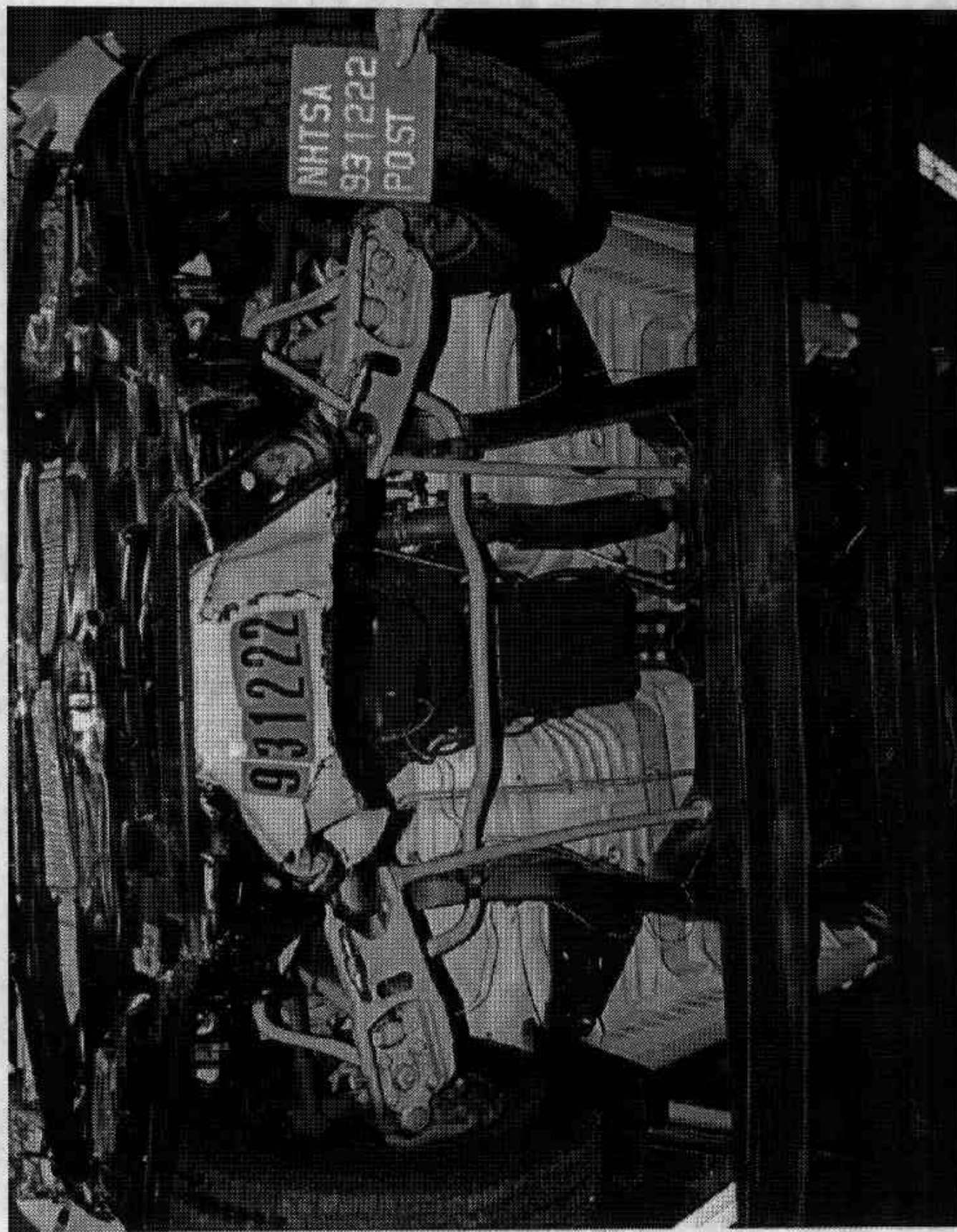


Figure A-24. POST-TEST FRONT UNDERBODY VIEW
A-25

931222

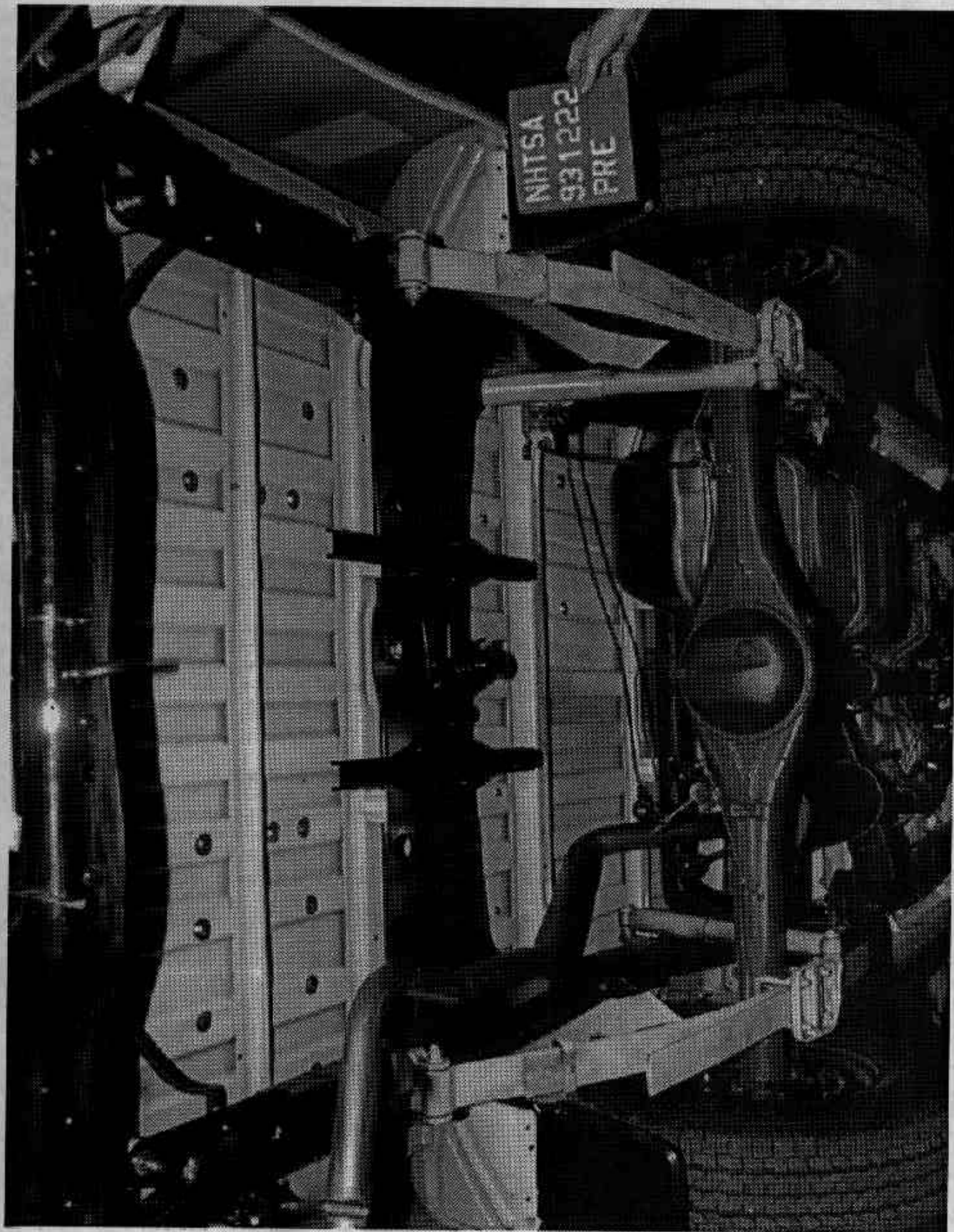


Figure A-25. PRE-TEST REAR UNDERBODY VIEW

A-26

931222

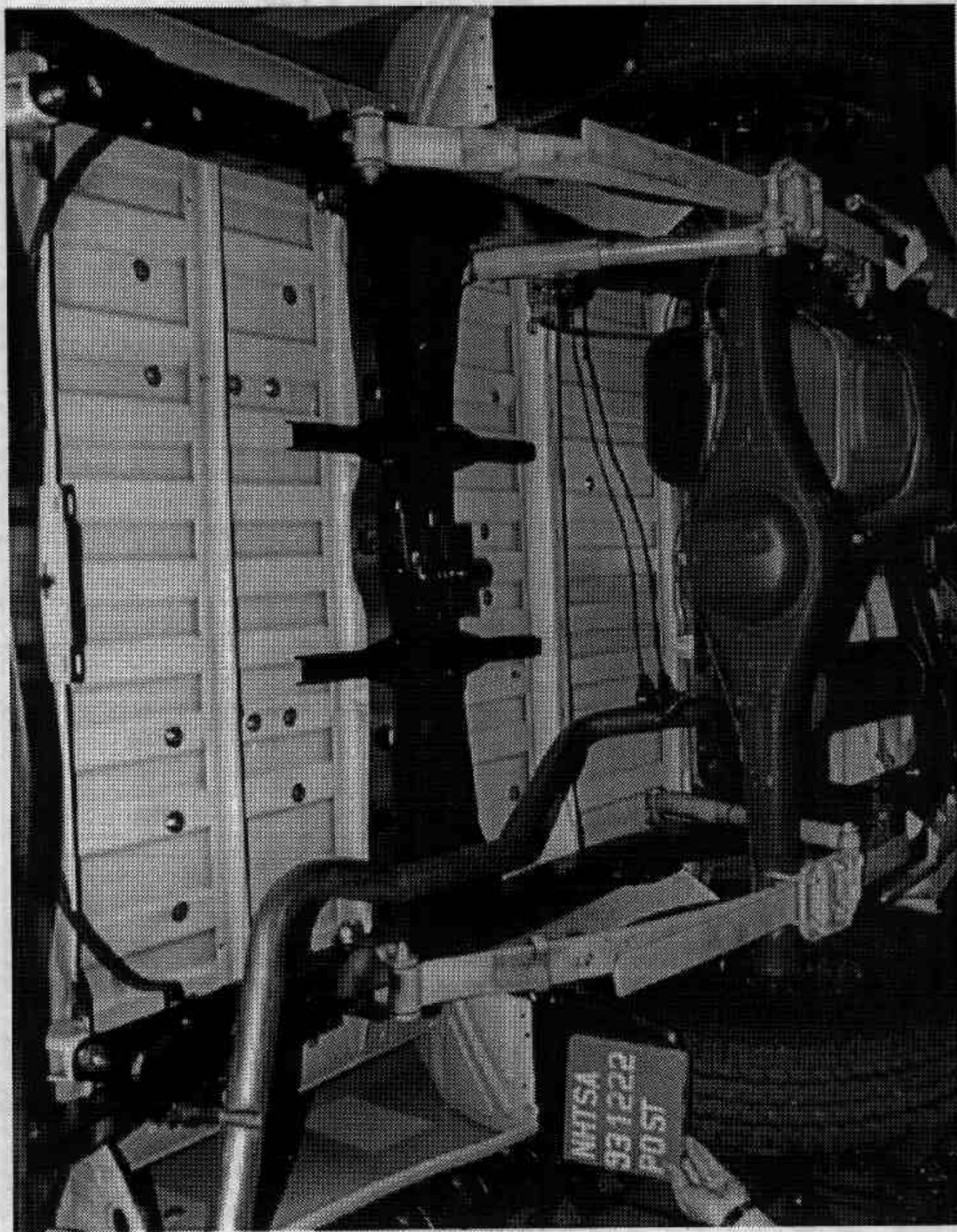


Figure A-26. POST-TEST REAR UNDERBODY VIEW
A-27

931222

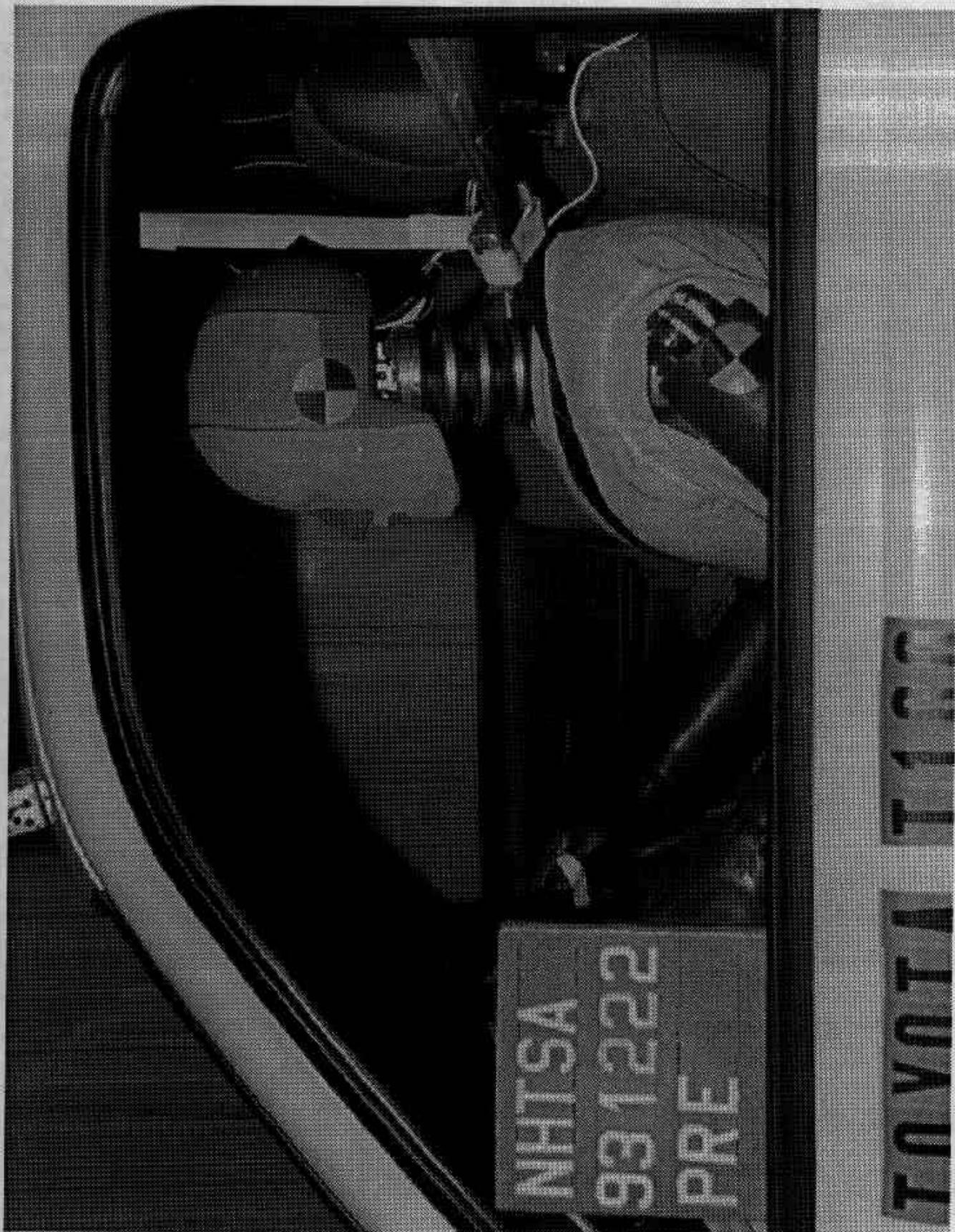


Figure A-27. PRE-TEST DRIVER DUMMY POSITION VIEW

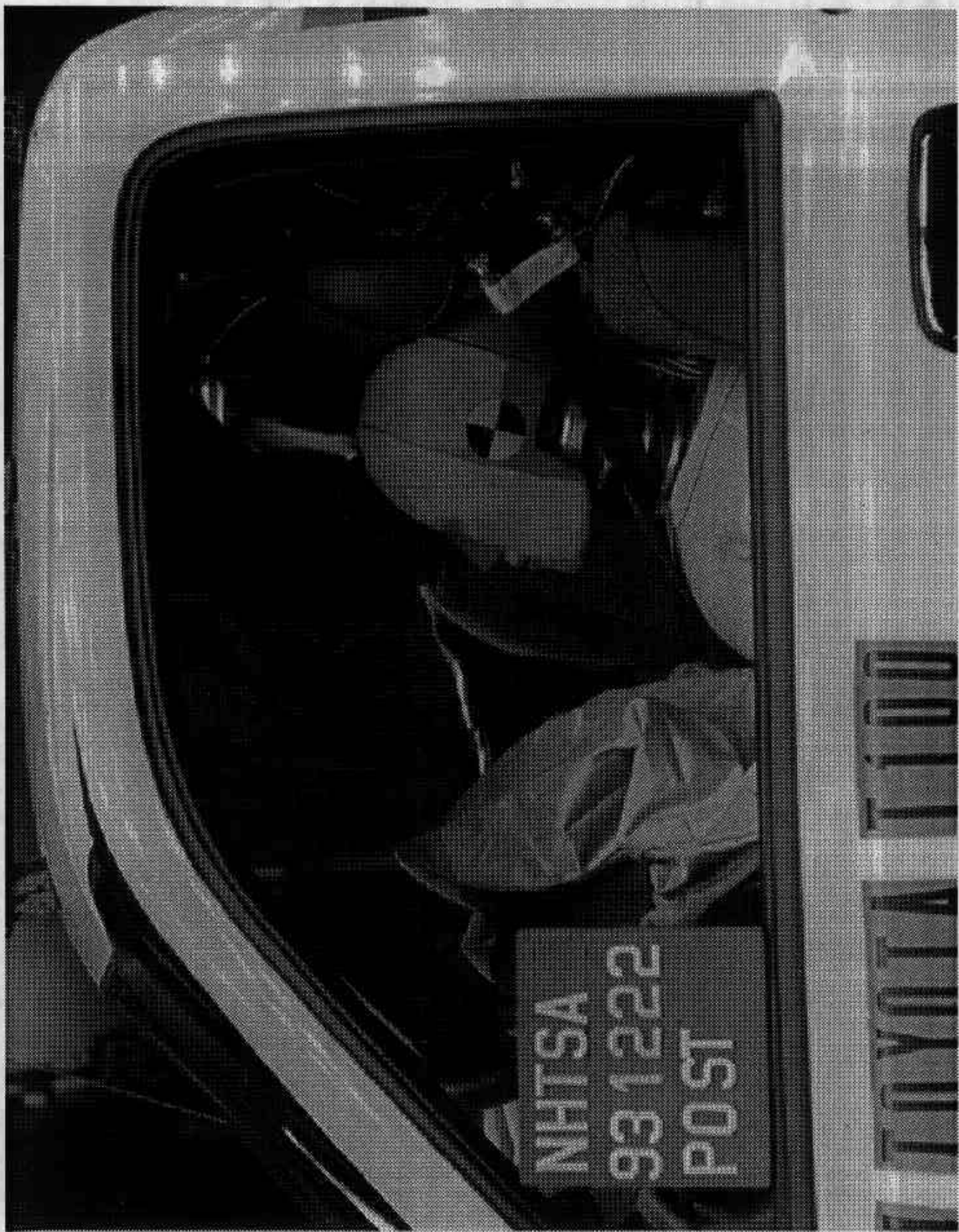


Figure A-28. POST-TEST DRIVER DUMMY POSITION VIEW

A-29

931222



Figure A-29. PRE-TEST PASSENGER DUMMY POSITION VIEW

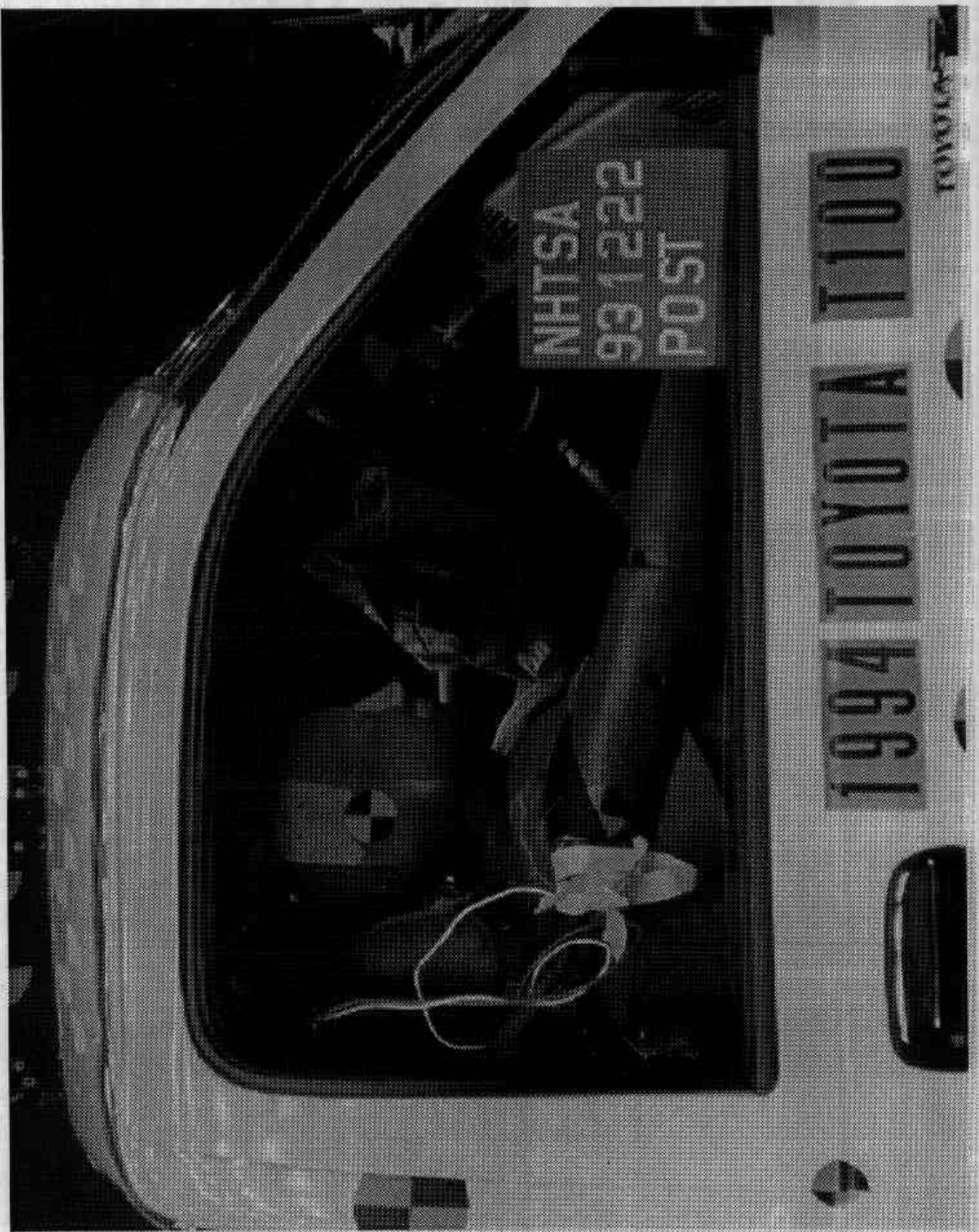


Figure A-30. POST-TEST PASSENGER DUMMY POSITION VIEW

A-31

931222

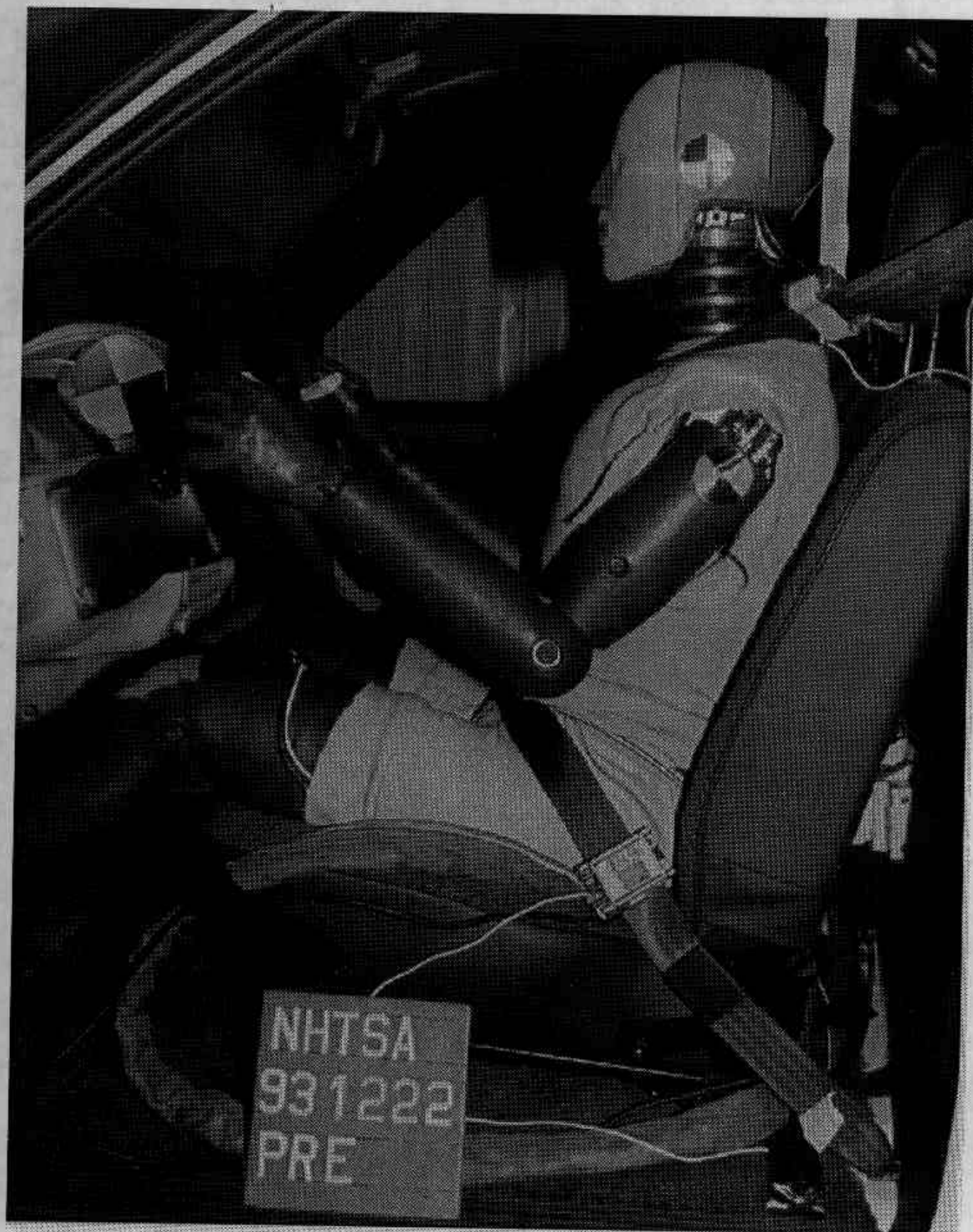


Fig. A-31. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1

A-32

931222

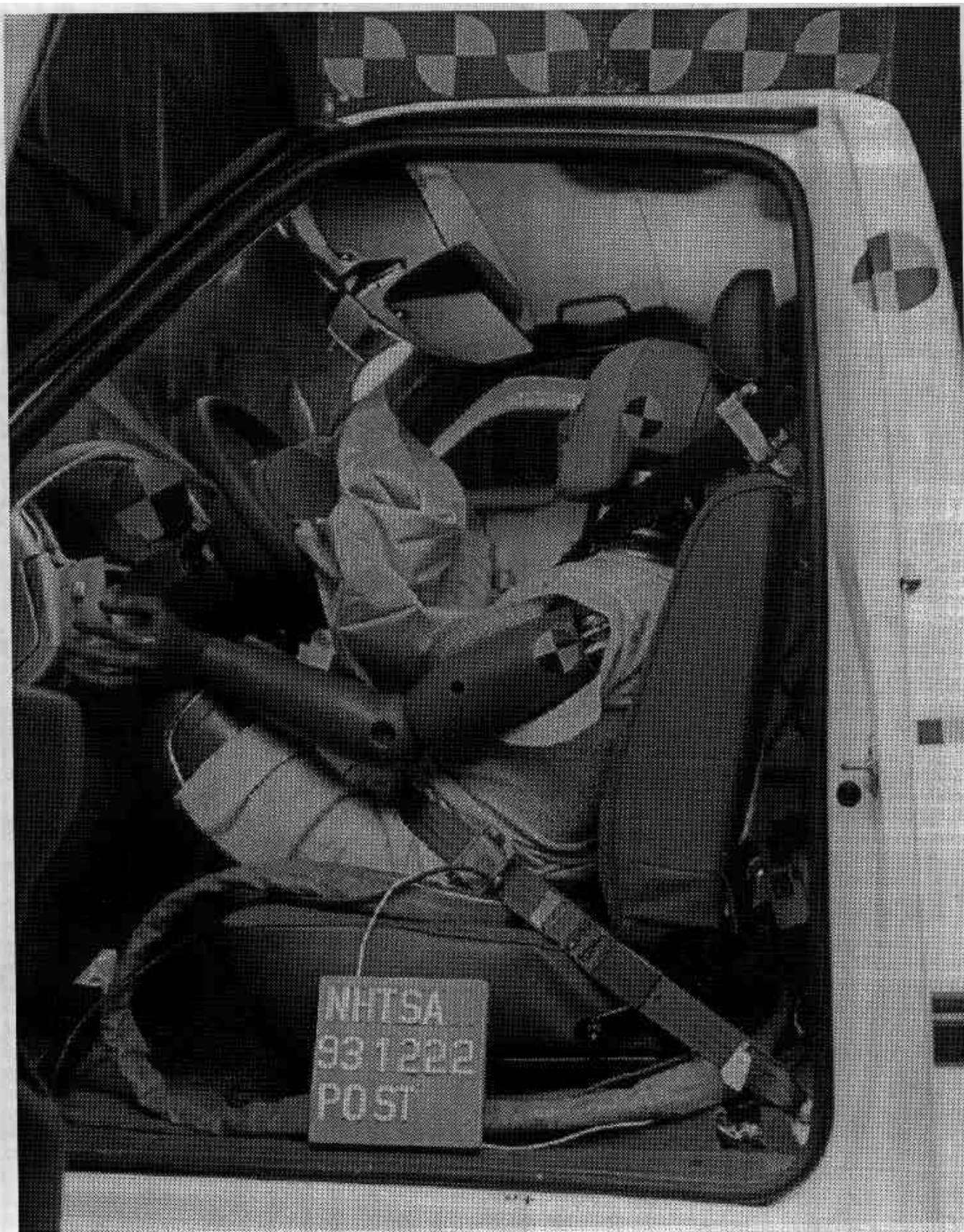


Fig A-32. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1
A-33 931222

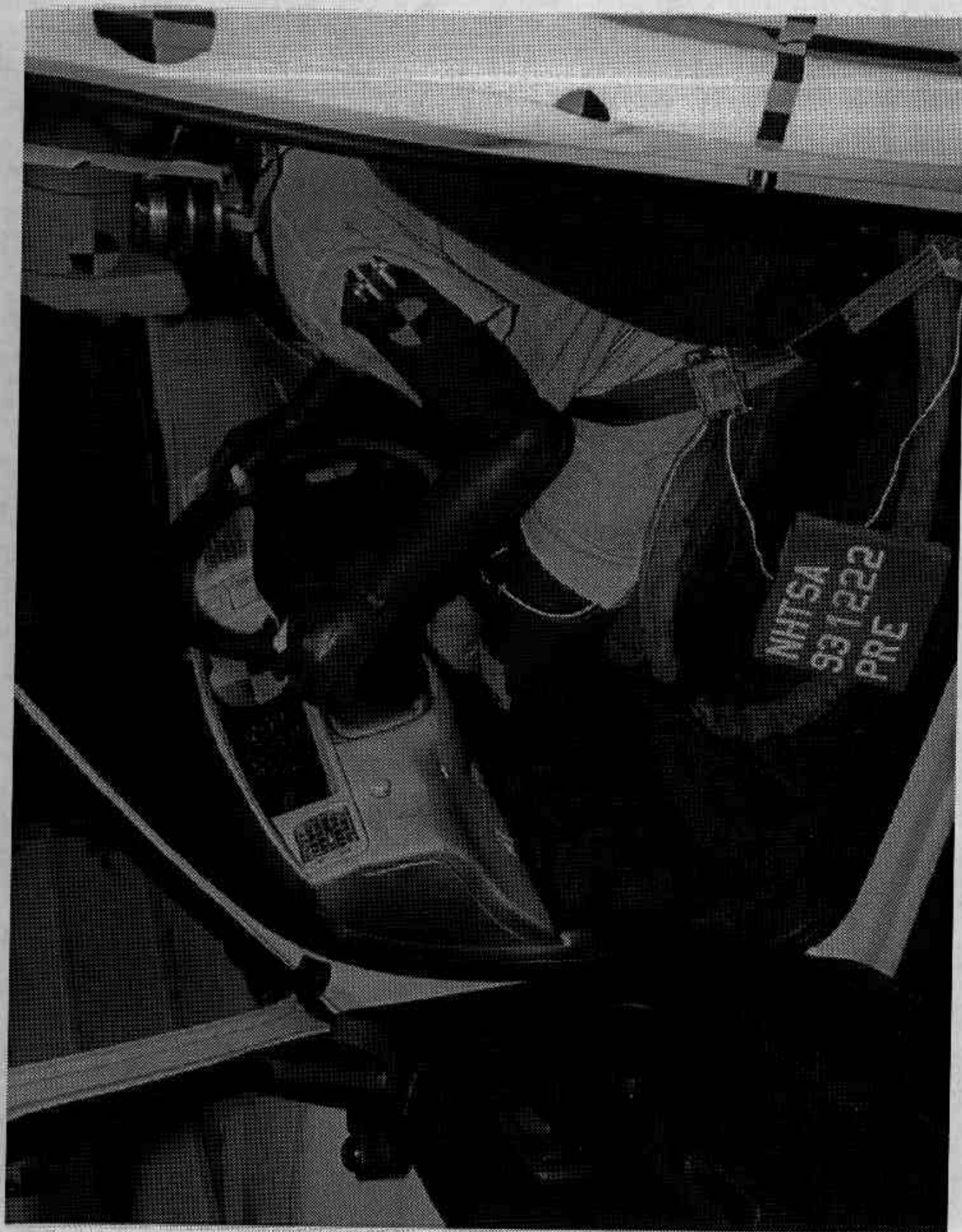


Fig. A-33. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2

A-34

931222

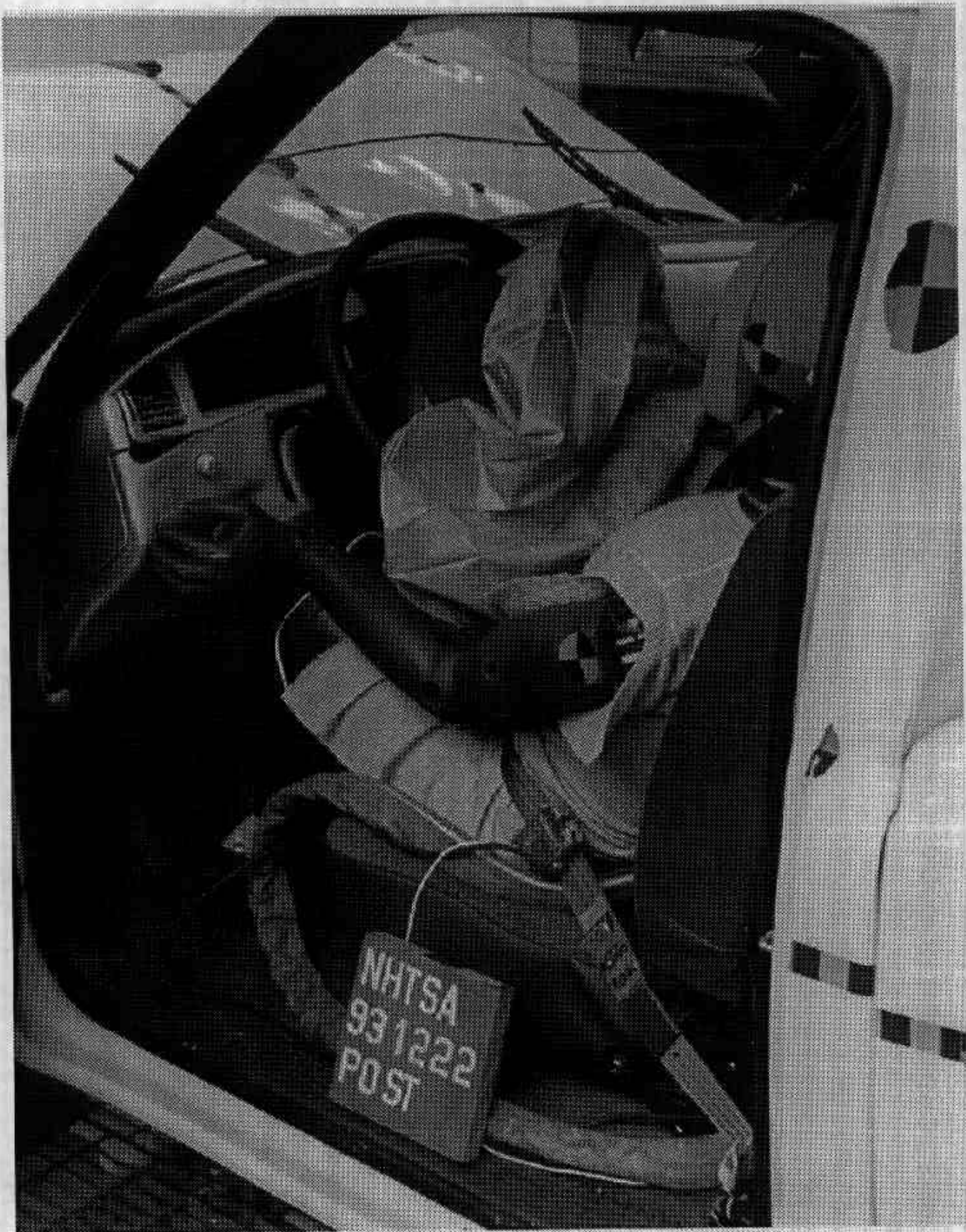


Fig A-34. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2
A-35 931222



Fig. A-35. PRE-TEST PASS.DUMMY & VEHICLE INTERIOR - VIEW 1

A-36

931222



Fig. A-36. POST-TEST PASS.DUMMY & VEHICLE INTERIOR - VIEW 1
A-37 931222



Fig. A-37. PRE-TEST PASS. DUMMY & VEHICLE INTERIOR - VIEW 2

A-38

931222



Fig. A-38. POST-TEST PASS, DUMMY & VEHICLE INTERIOR - VIEW 2
A-39 931222

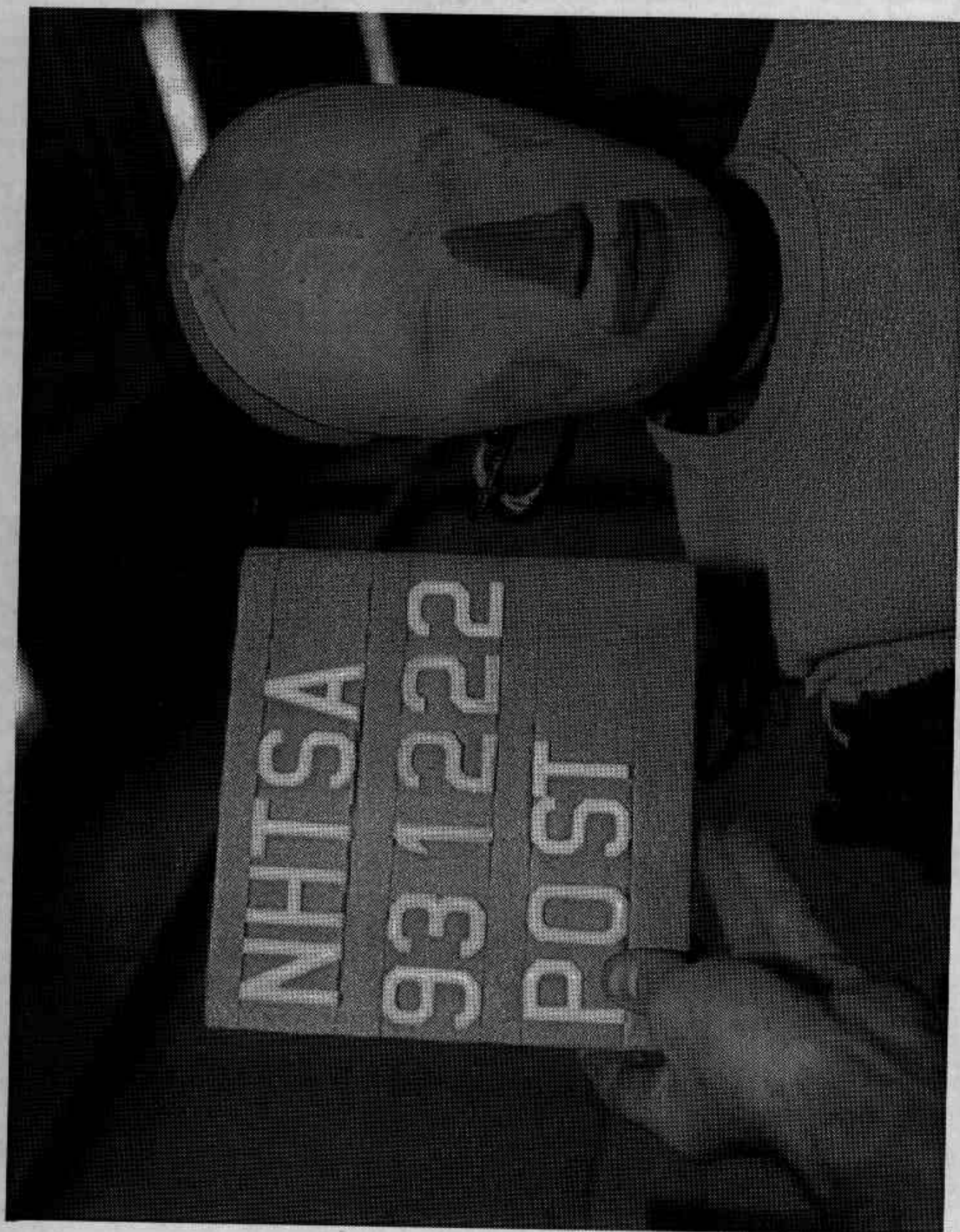


Fig. A-39. POST-TEST DRIVER DUMMY HEAD CONTACT - VIEW 1

A-40

931222



Figure A-40. POST-TEST DRIVER DUMMY HEAD CONTACT - VIEW 2
A-41 931222

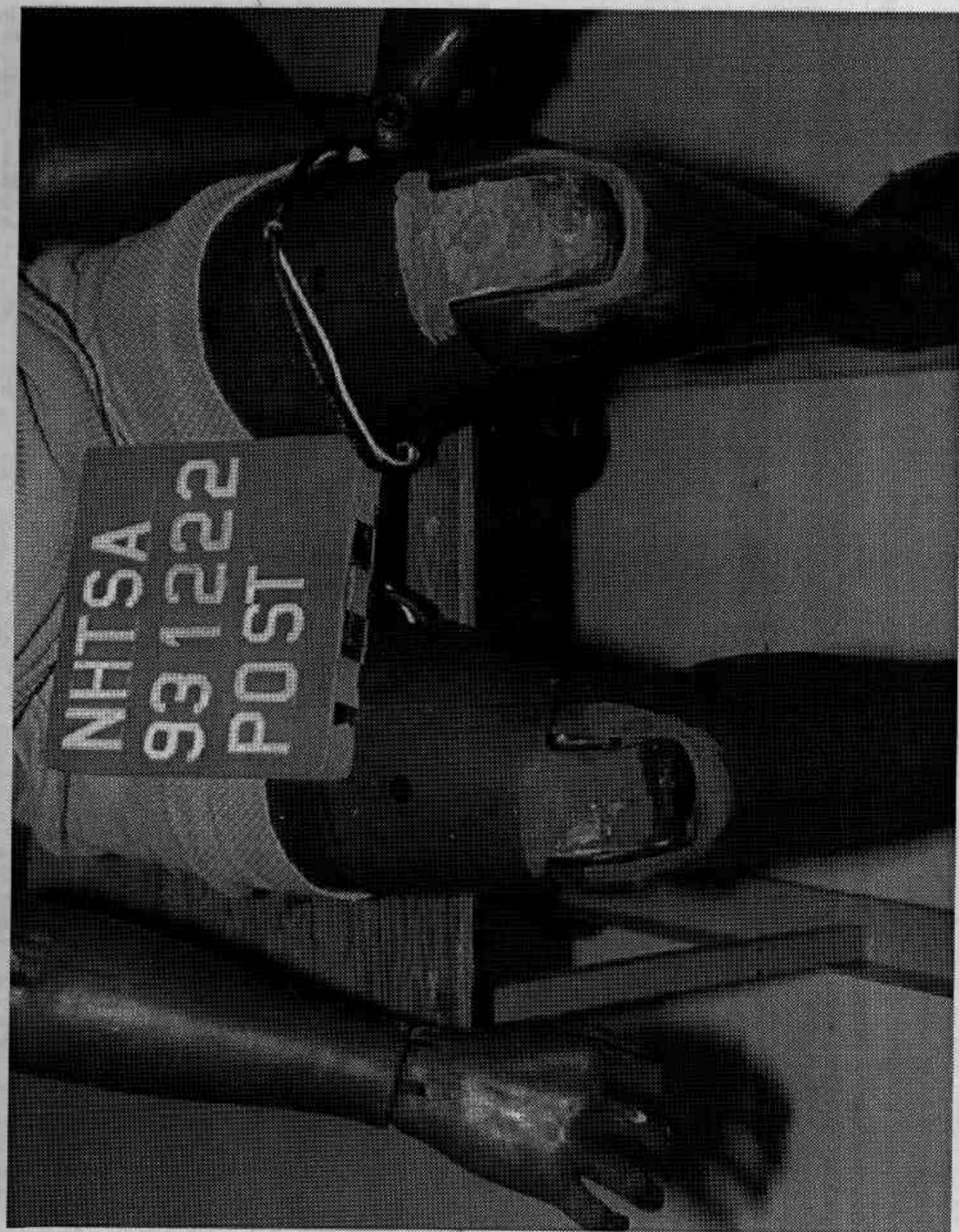


Figure A-41. POST-TEST DRIVER DUMMY KNEE CONTACT - VIEW 1

A-42

931222

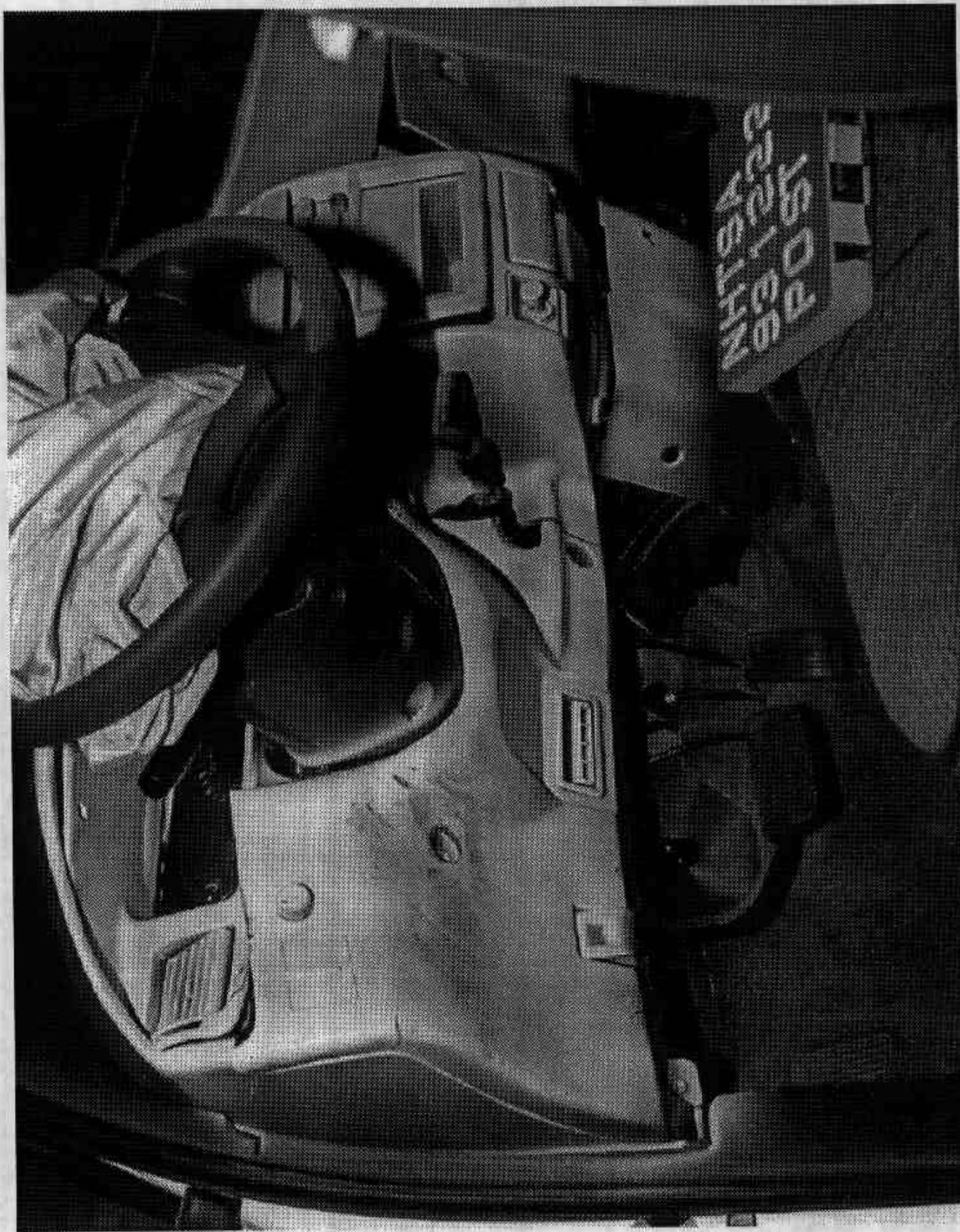


Figure A-42. POST-TEST DRIVER DUMMY KNEE CONTACT - VIEW 2

A-43

931222

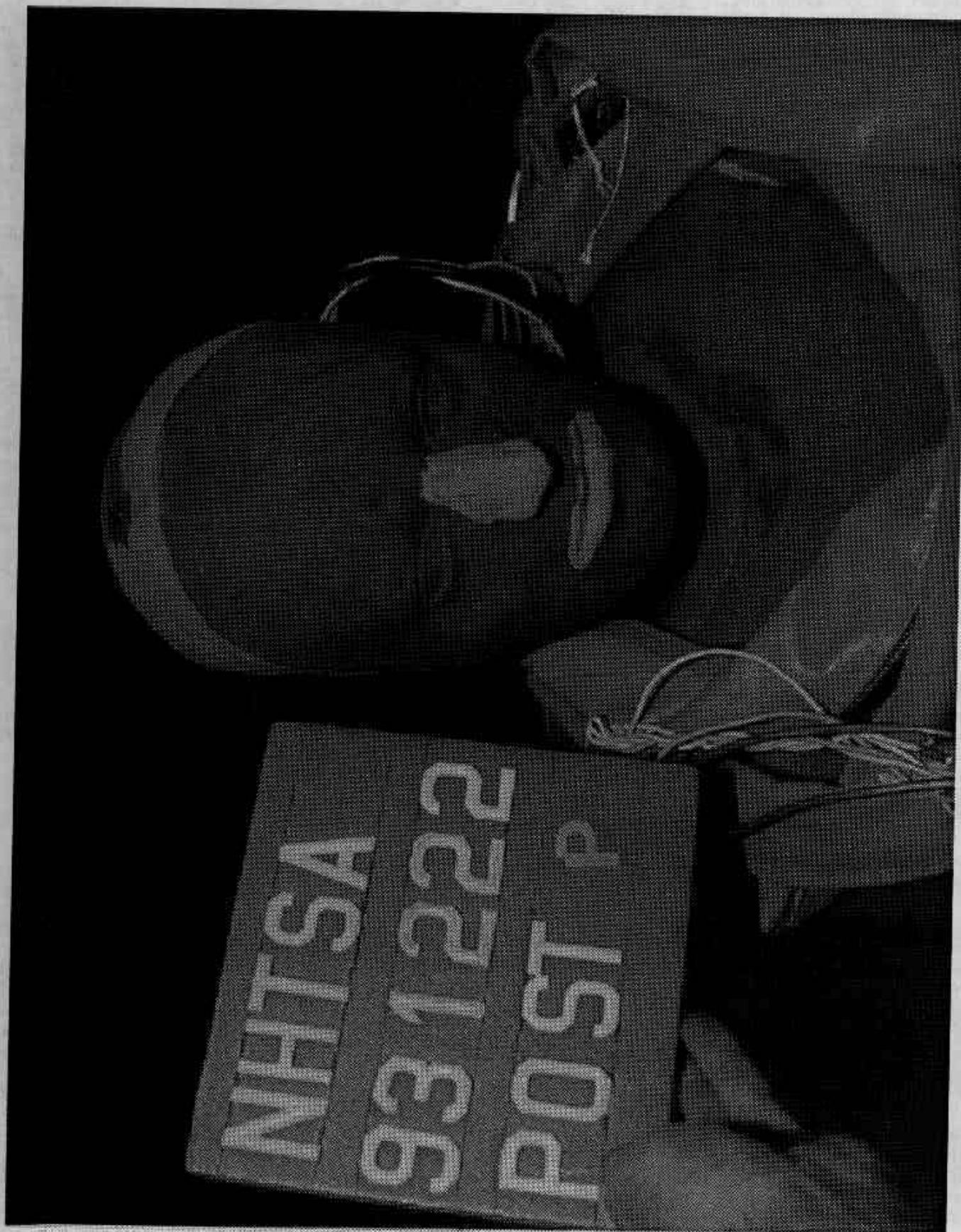


Figure A-43. POST-TEST PASSENGER DUMMY HEAD CONTACT VIEW

A-44

931222



Fig. A-44. POST-TEST PASSENGER DUMMY KNEE CONTACT - VIEW I
A-45 931222



Fig. A-45. POST-TEST PASSENGER DUMMY KNEE CONTACT - VIEW 2

A-46

931222

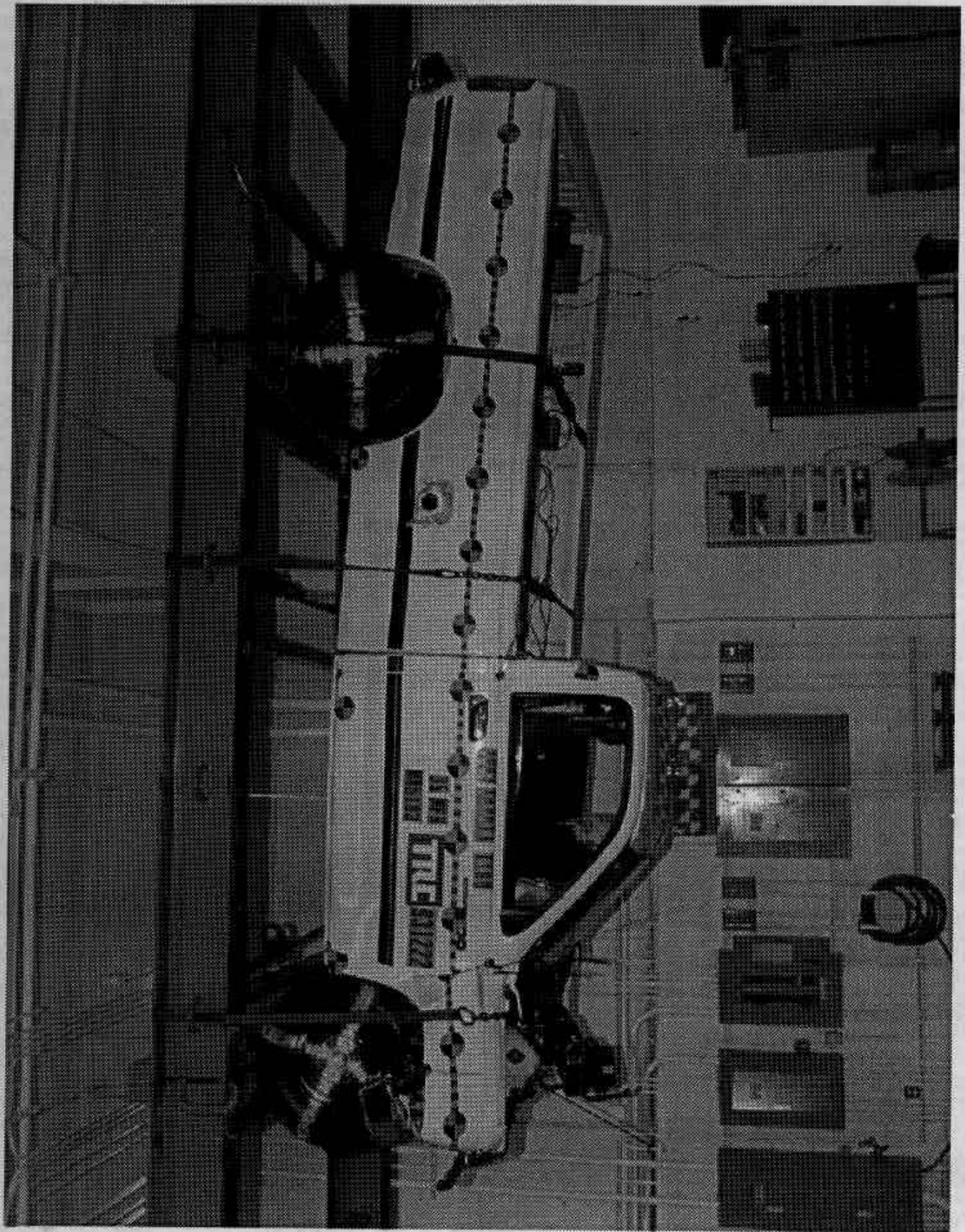


Fig A-47. POST-TEST VEHICLE ON STATIC ROLLOVER MACHINE

A-48

931222

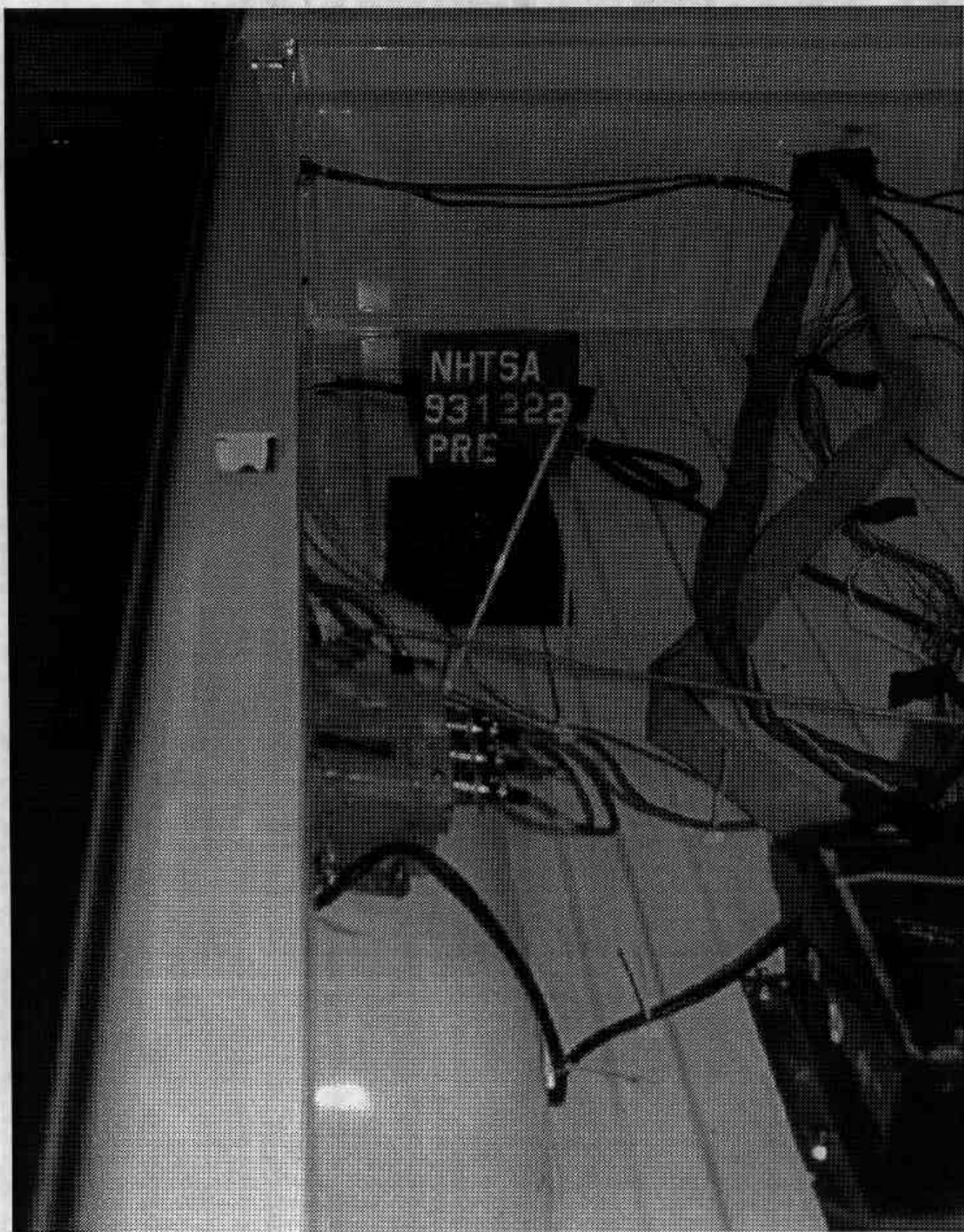


Figure A-48. PRE-TEST BALLAST LOCATION VIEW
A-49

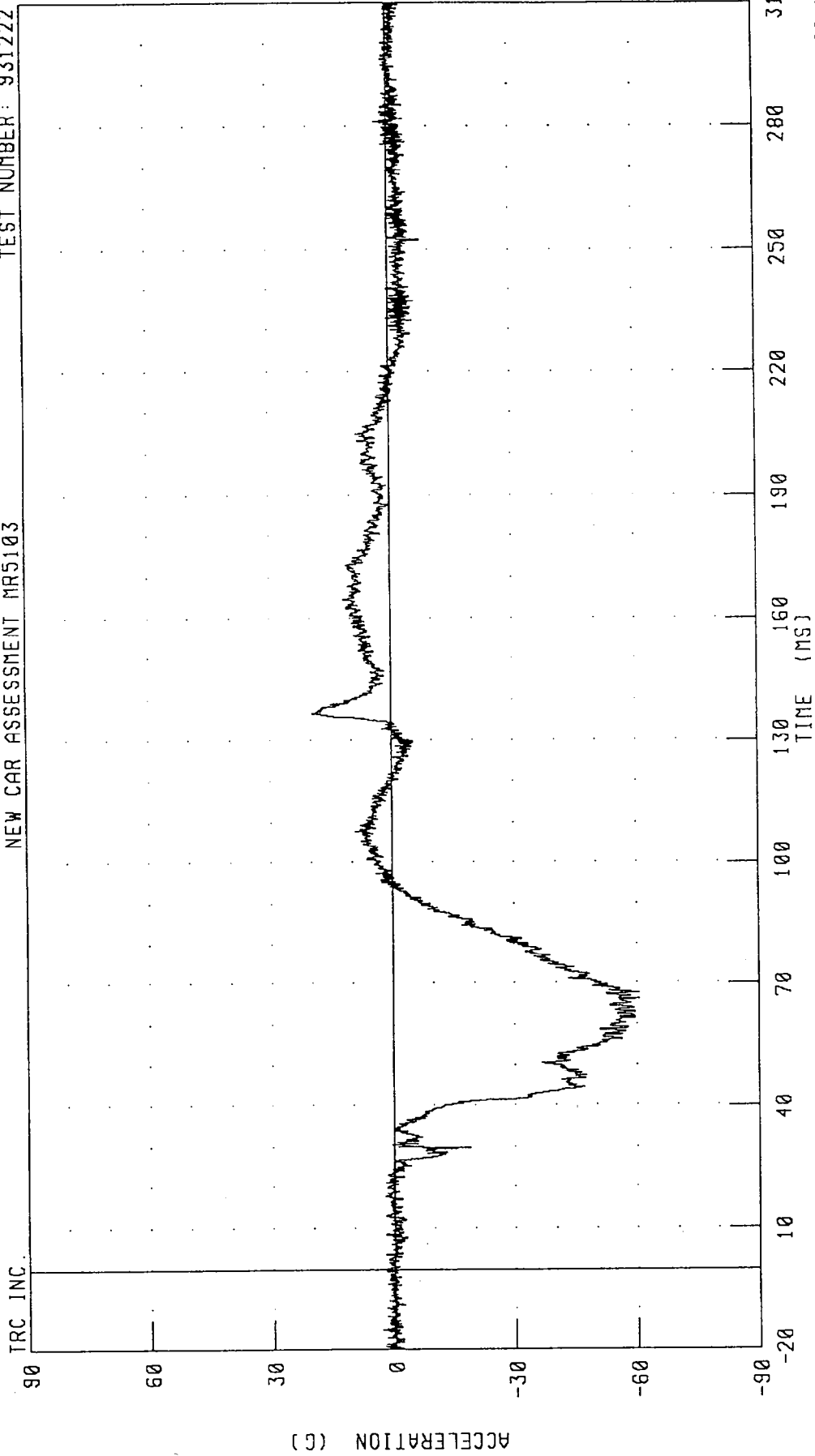
931222

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER

DRIVER HEAD X-AXIS ACCELERATION

NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

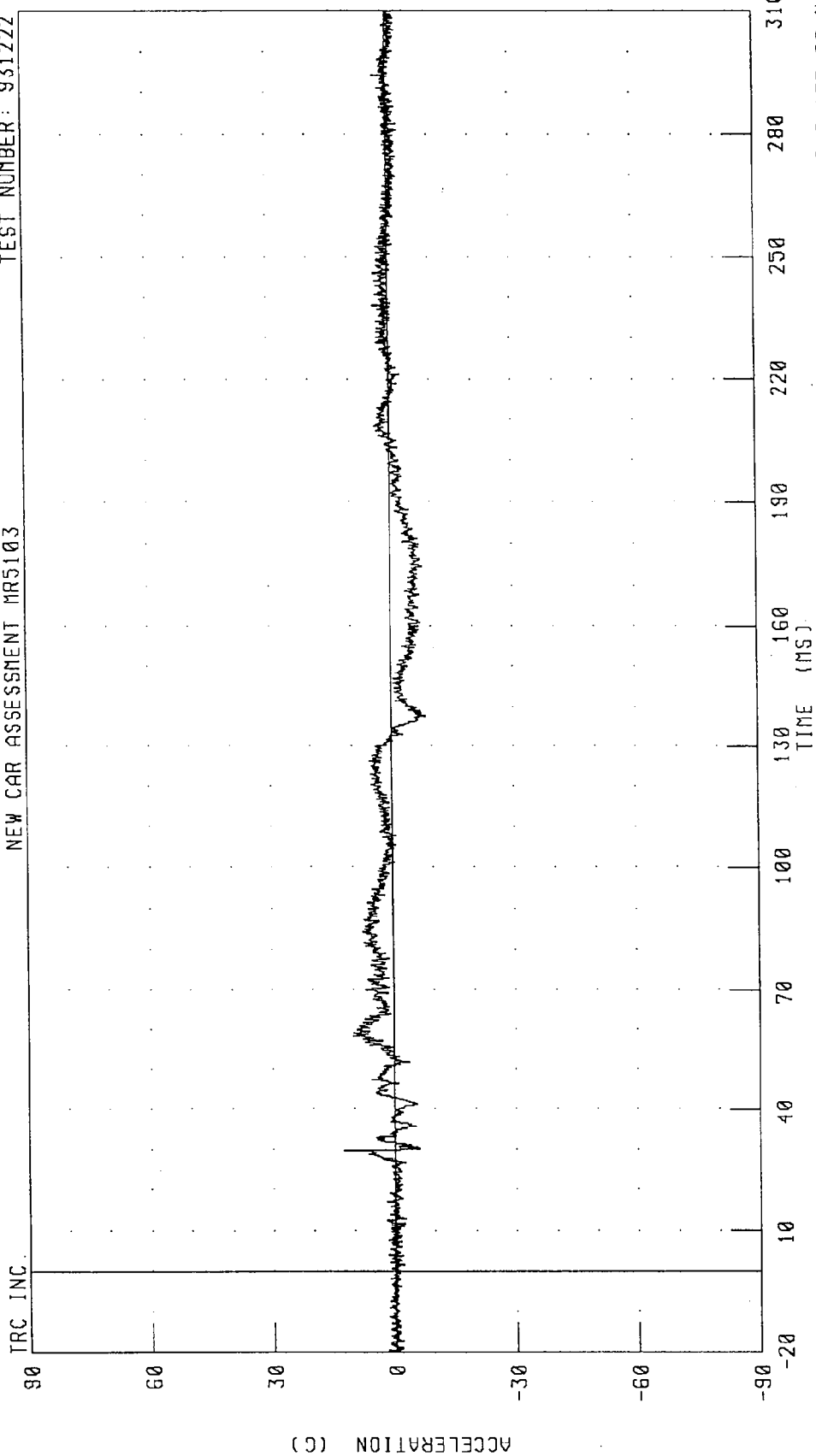


CHANNEL: HEDXG1 FILTER: CH CLASS 1000

PEAK DATA: 19 60 G @ 136 64 MS, -60 47 G @ 66 08 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 DRIVER HEAD Y-AXIS ACCELERATION
 NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222



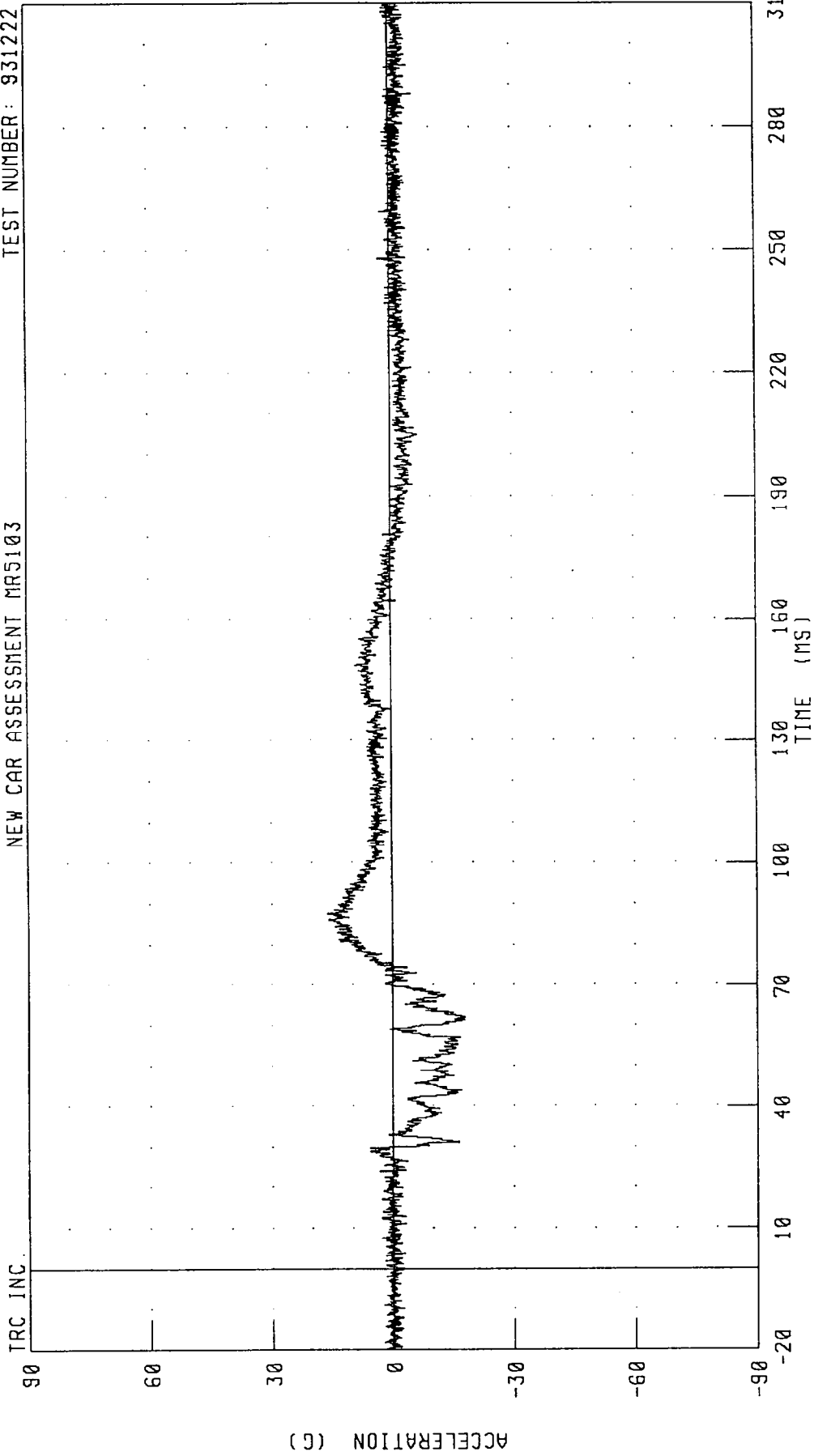
CHANNEL: HEDYGI FILTER: CH. CLASS 1000

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER

DRIVER HEAD Z-AXIS ACCELERATION

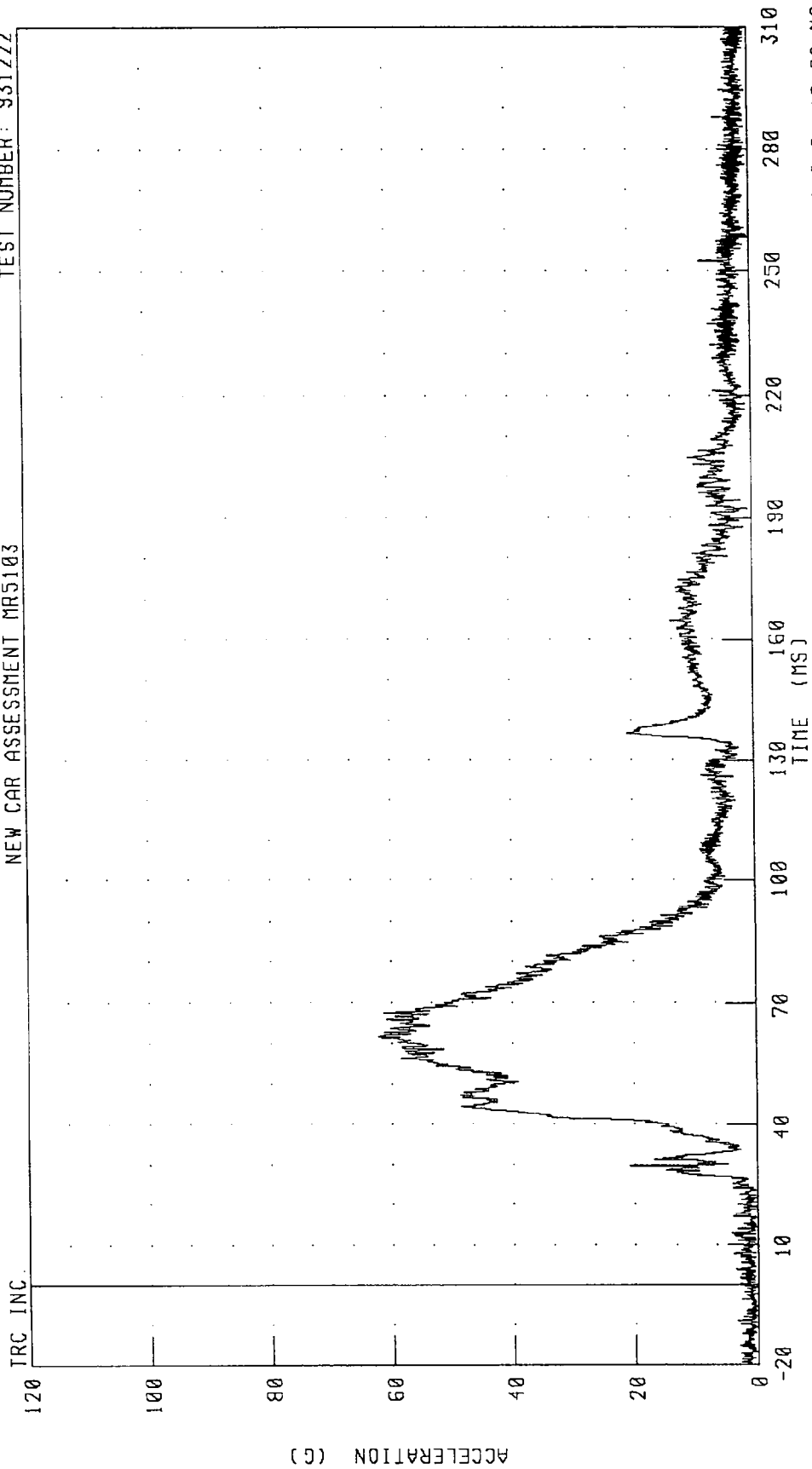
NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222



1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 DRIVER HEAD RESULTANT ACCELERATION
 NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222



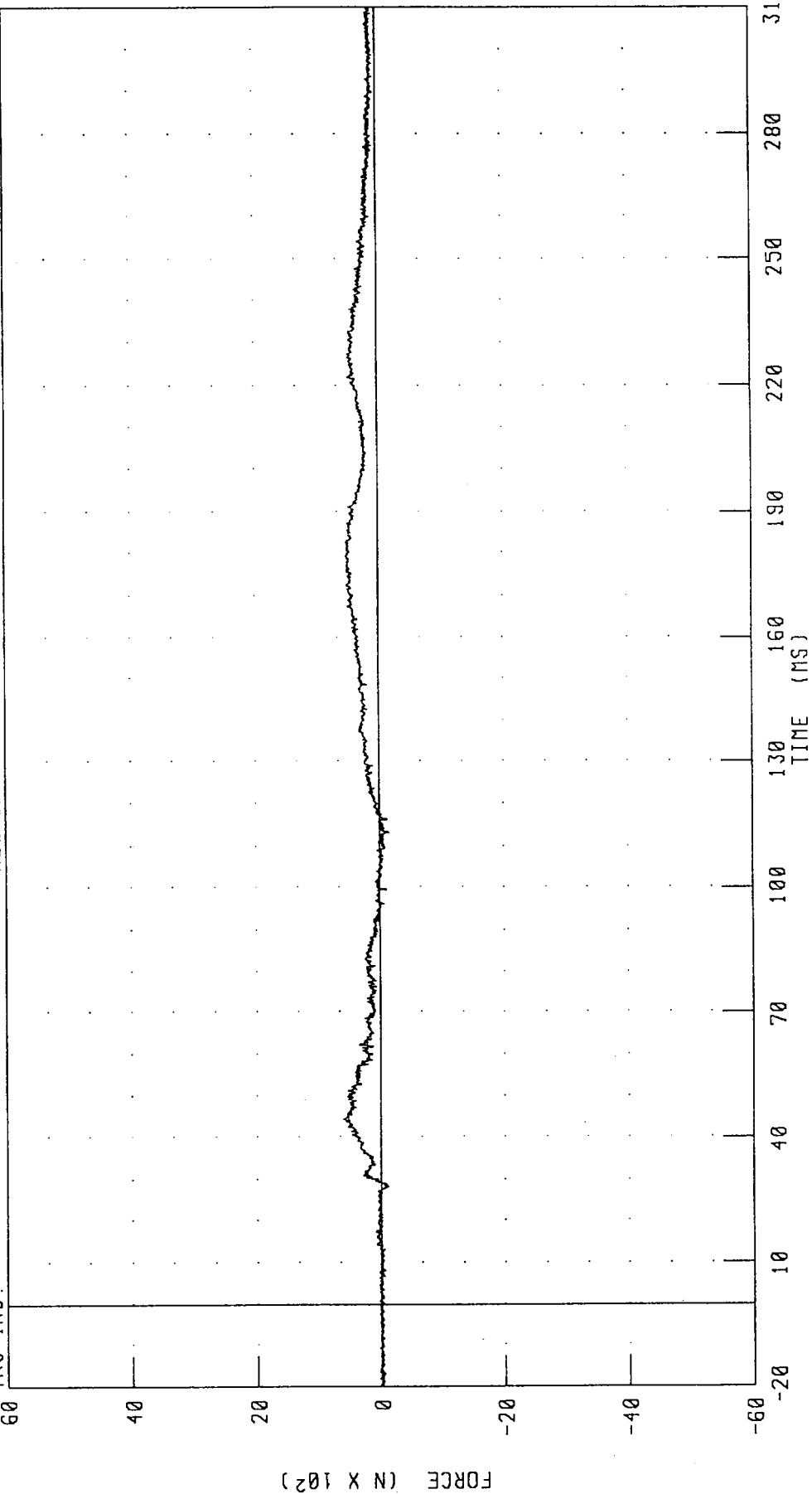
PEAK DATA: 62.13 G @ 61.84 MS; 0.08 G @ -16.80 MS

CHANNEL: HEDRG1 FILTER: CH. CLASS 1000

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
DRIVER NECK X-AXIS SHEAR FORCE
NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

TRC INC.

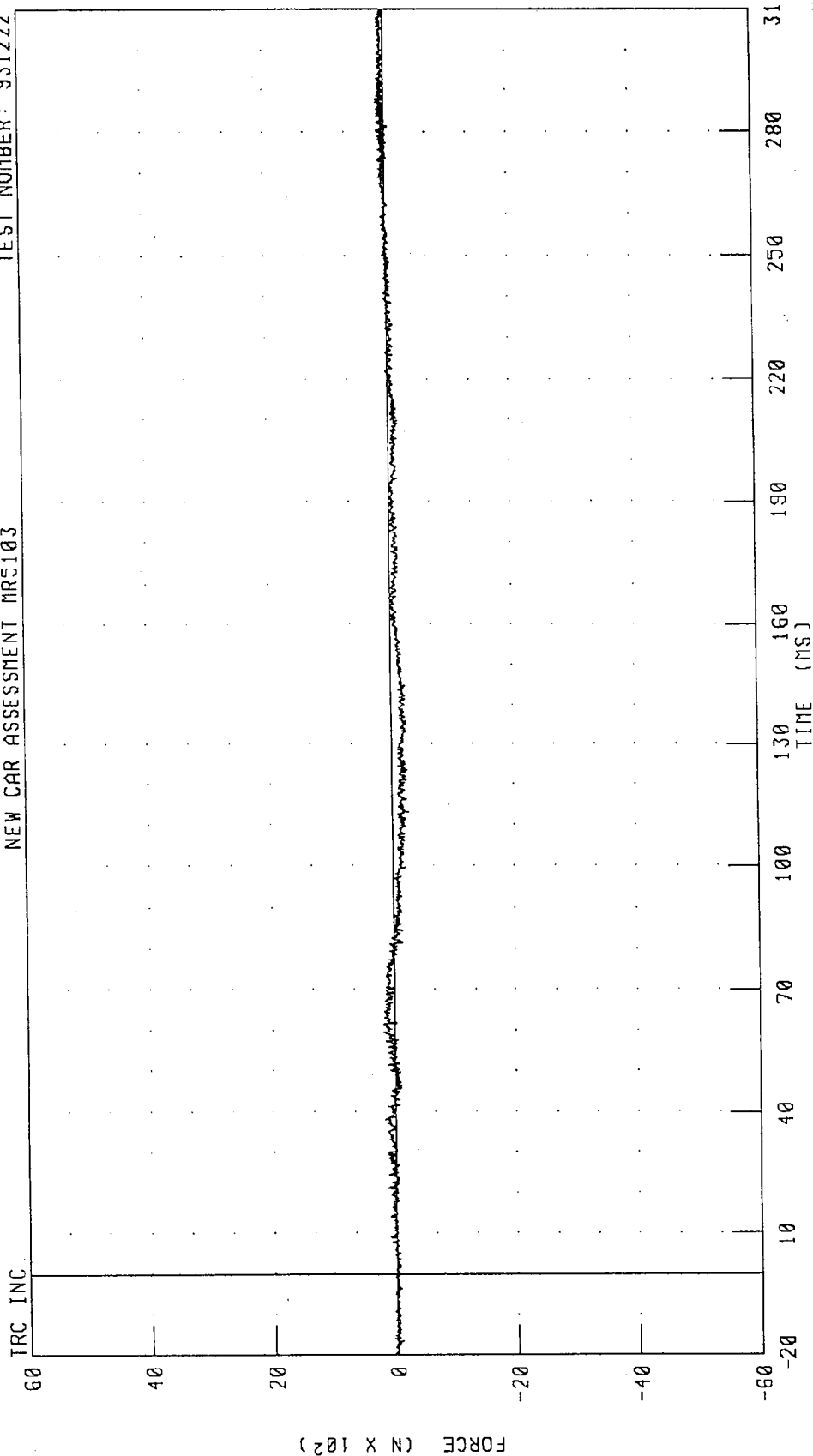


CHANNEL: NEKXF1 FILTER: CH. CLASS 1000

PEAK DATA 607 06 N @ 44.24 MS; -146 20 N @ 113.20 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 DRIVER NECK Y-AXIS SHEAR FORCE
 NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

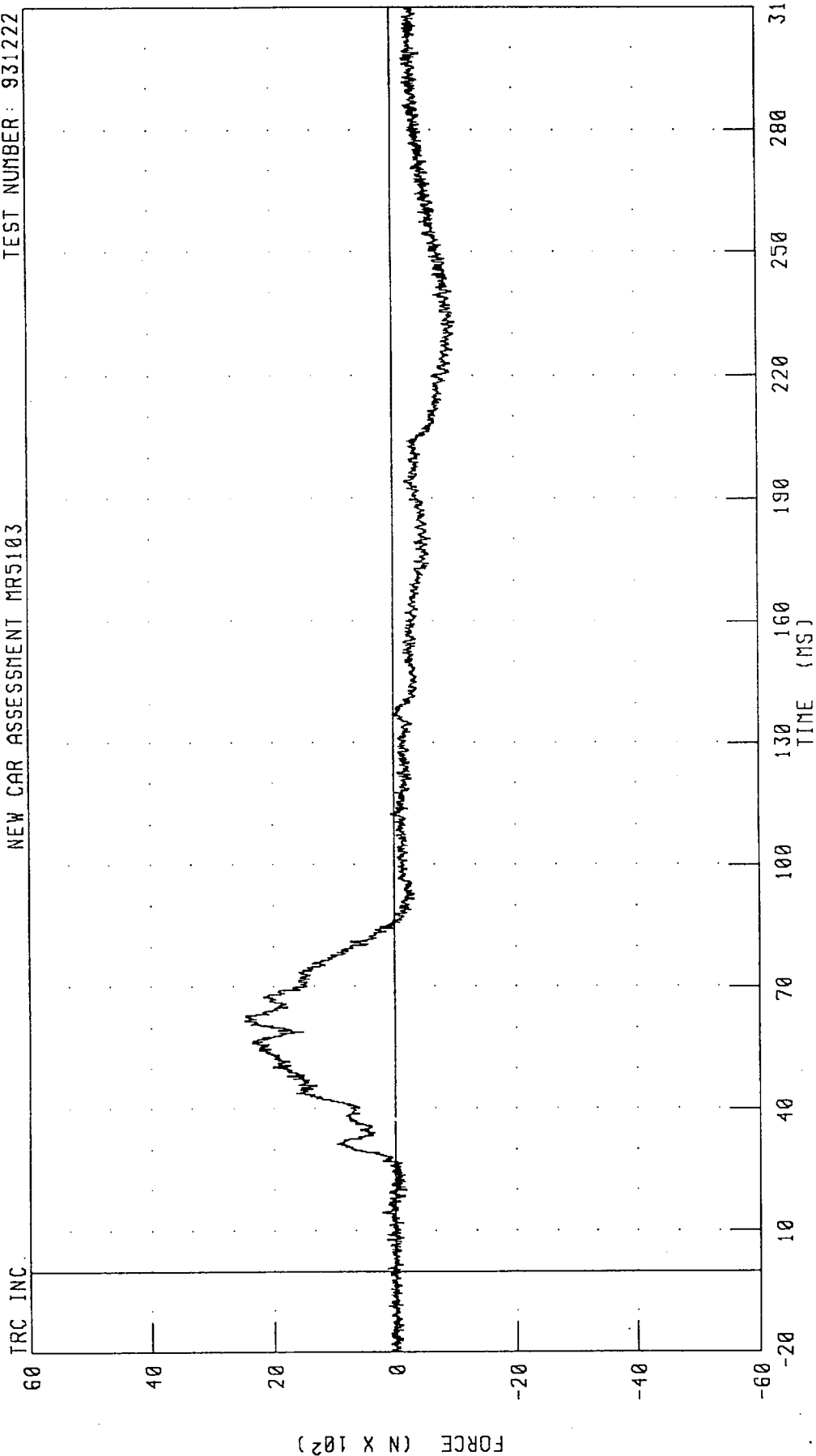


PEAK DATA: 191.81 N @ 59.28 MS, -263.13 N @ 113.12 MS

CHANNEL: NEKYF1 FILTER: CH: CLASS 1000

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 DRIVER NECK Z-AXIS AXIAL FORCE
 NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

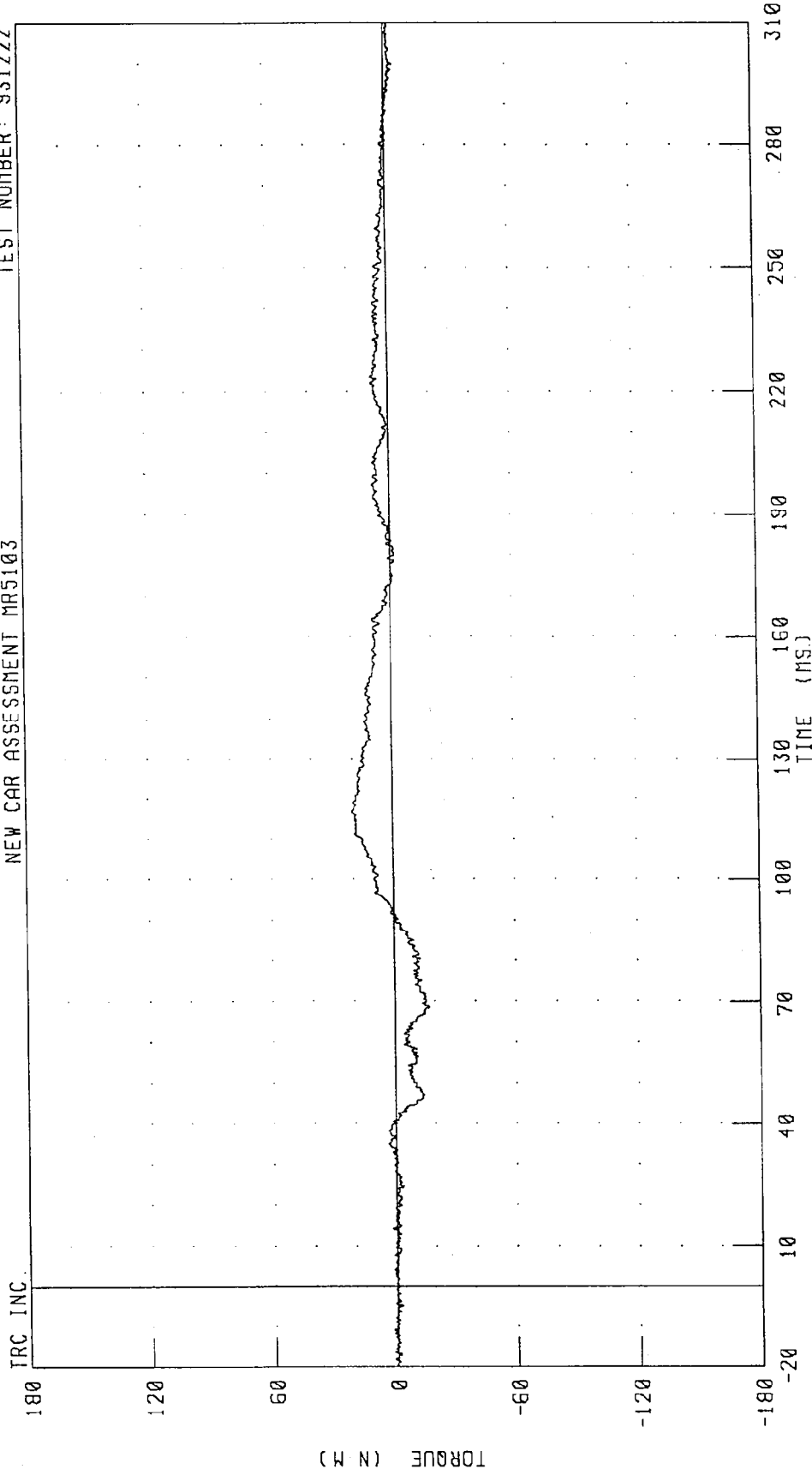


PEAK DATA: 2465 57 N @ 61.68 MS; -1026 61 N @ 232.88 MS

CHANNEL: NEKZF1 FILTER: CH CLASS 1000

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 DRIVER NECK MOMENT ABOUT X AXIS
 NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222



PEAK DATA: 20 46 N M @ 116.88 MS; -17 31 N M @ 68.64 MS

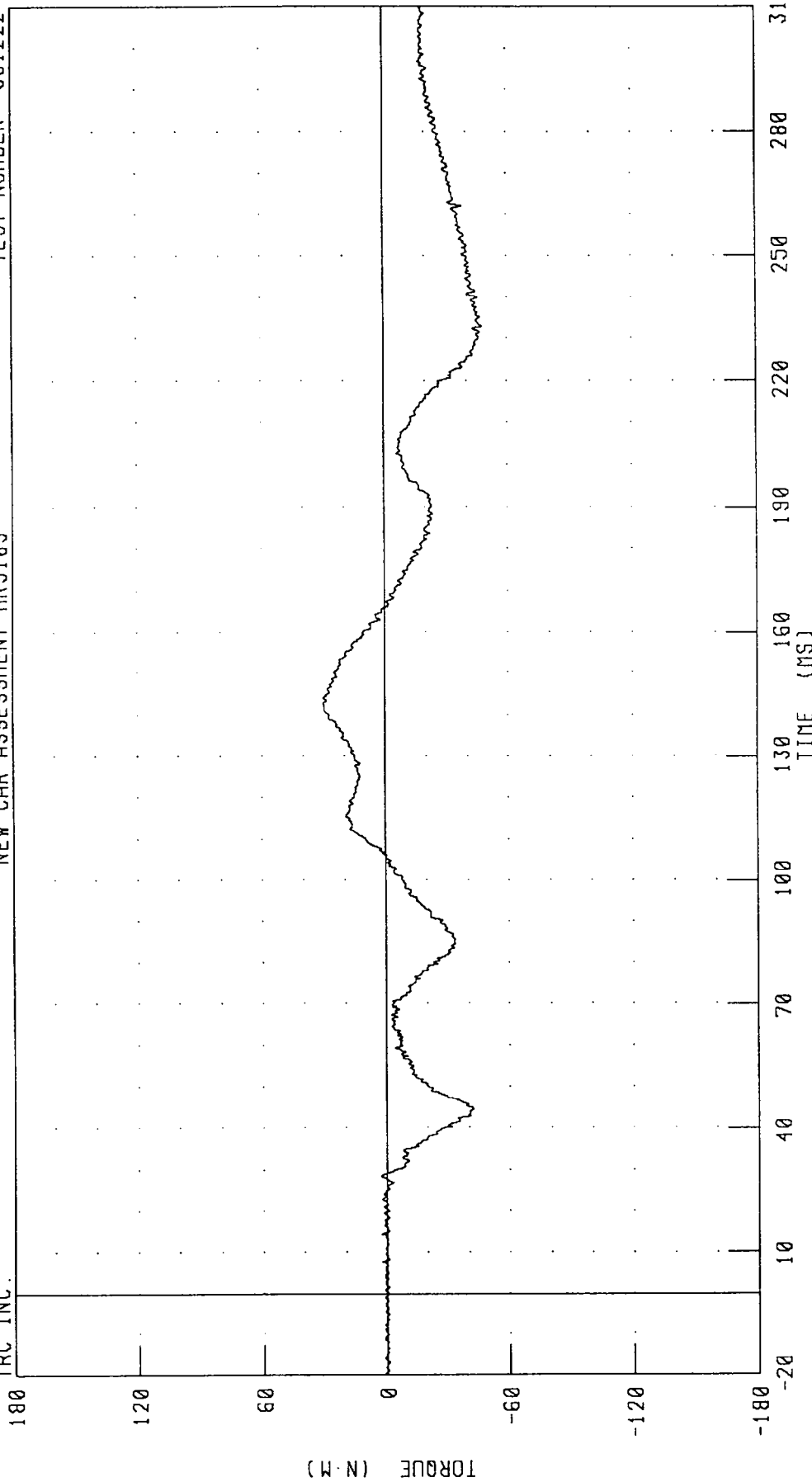
CHANNEL: NEKXMI FILTER: CH CLASS 600

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
DRIVER NECK MOMENT ABOUT Y AXIS

TEST NUMBER: 931222

NEW CAR ASSESSMENT MR5103

TRC INC.

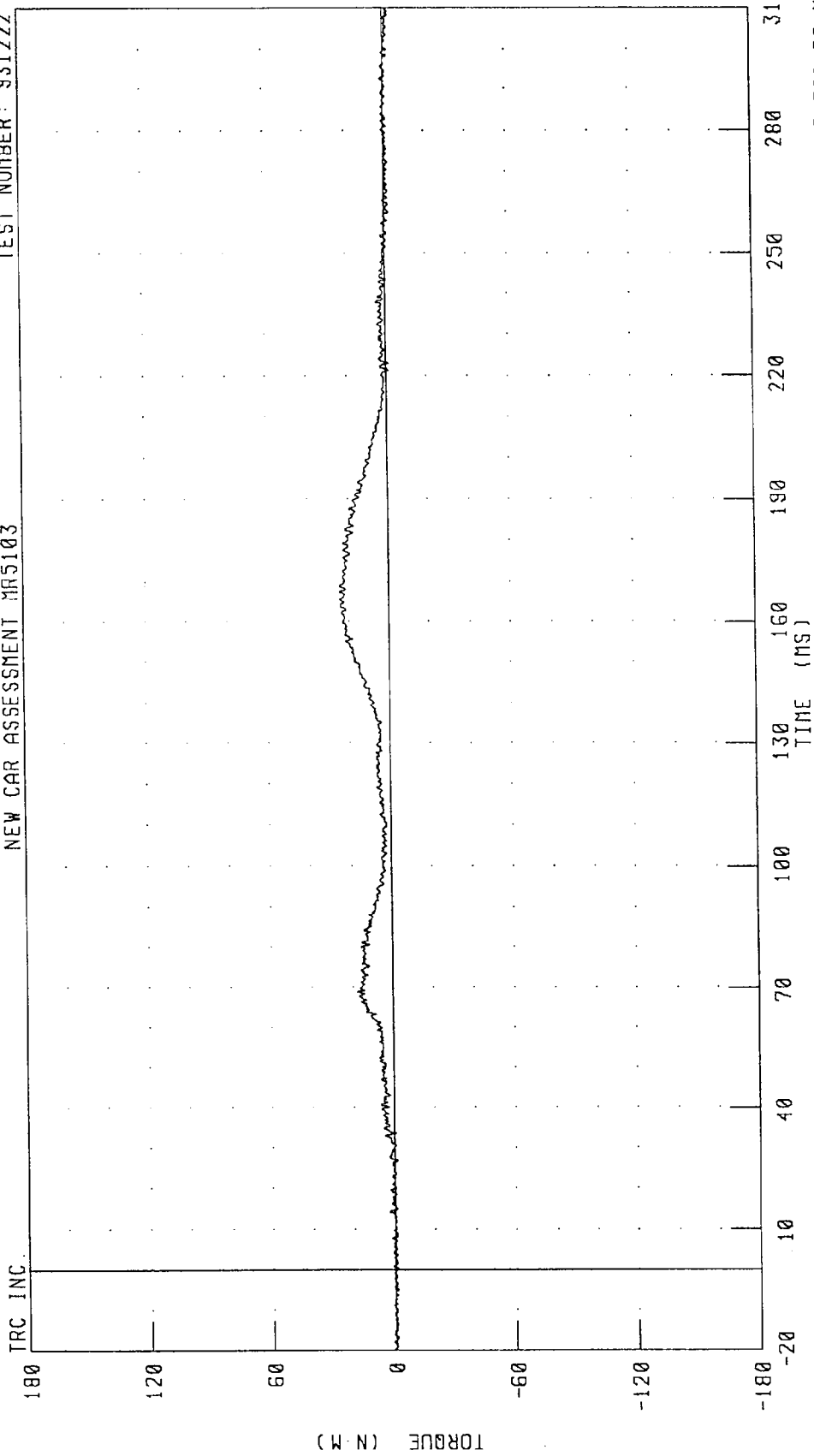


CHANNEL: NEKYM1 FILTER: CH. CLASS 600

PEAK DATA: 30.18 N·M @ 144.08 MS, -47.63 N·M @ 233.04 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 DRIVER NECK MOMENT ABOUT Z AXIS
 NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222



PEAK DATA: 24.45 N.M @ 167.44 MS; -2.42 N.M @ 308.32 MS

CHANNEL: NEKZM1 FILTER: CH. CLASS 600

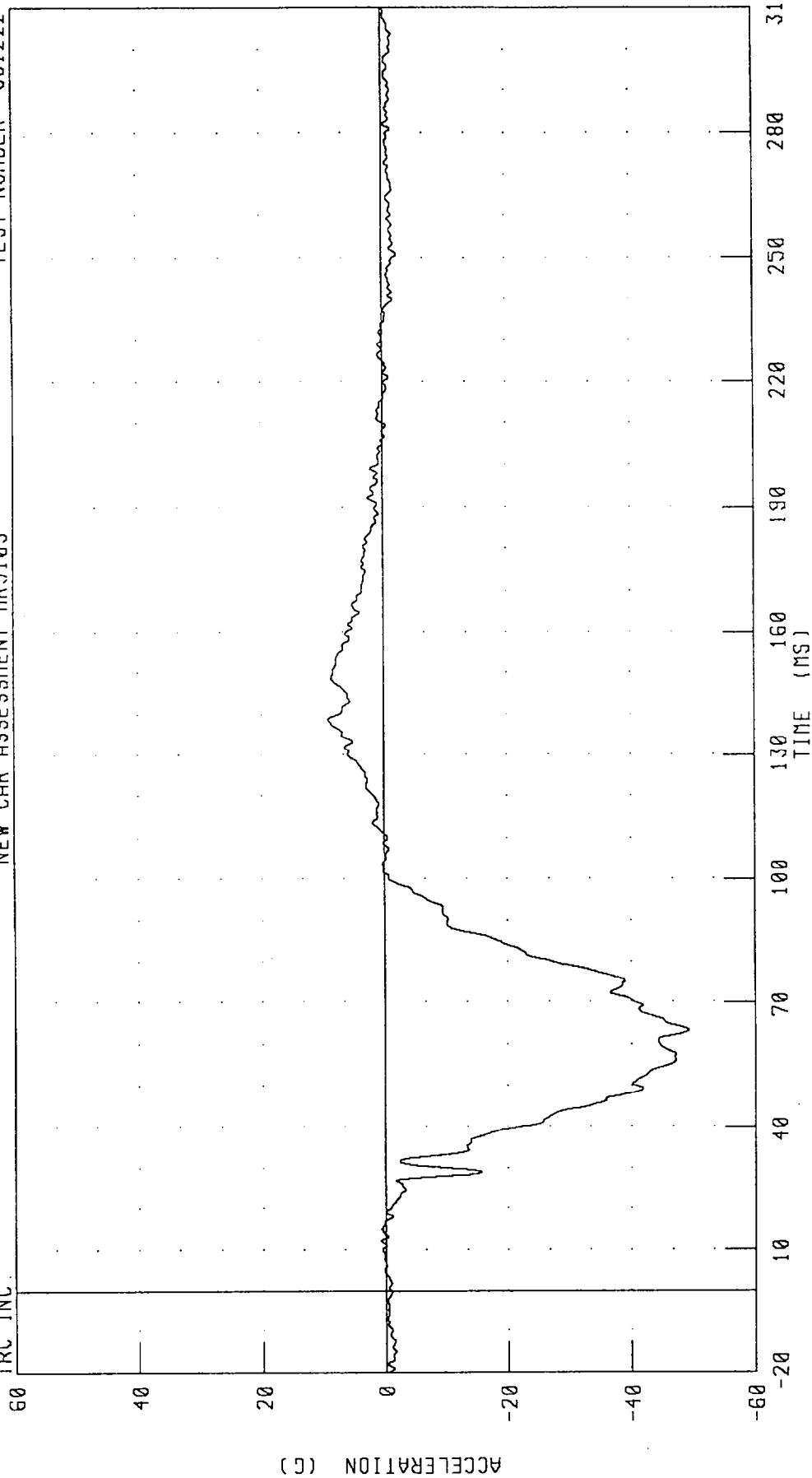
1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER

DRIVER CHEST X-AXIS ACCELERATION

NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

TRC INC.

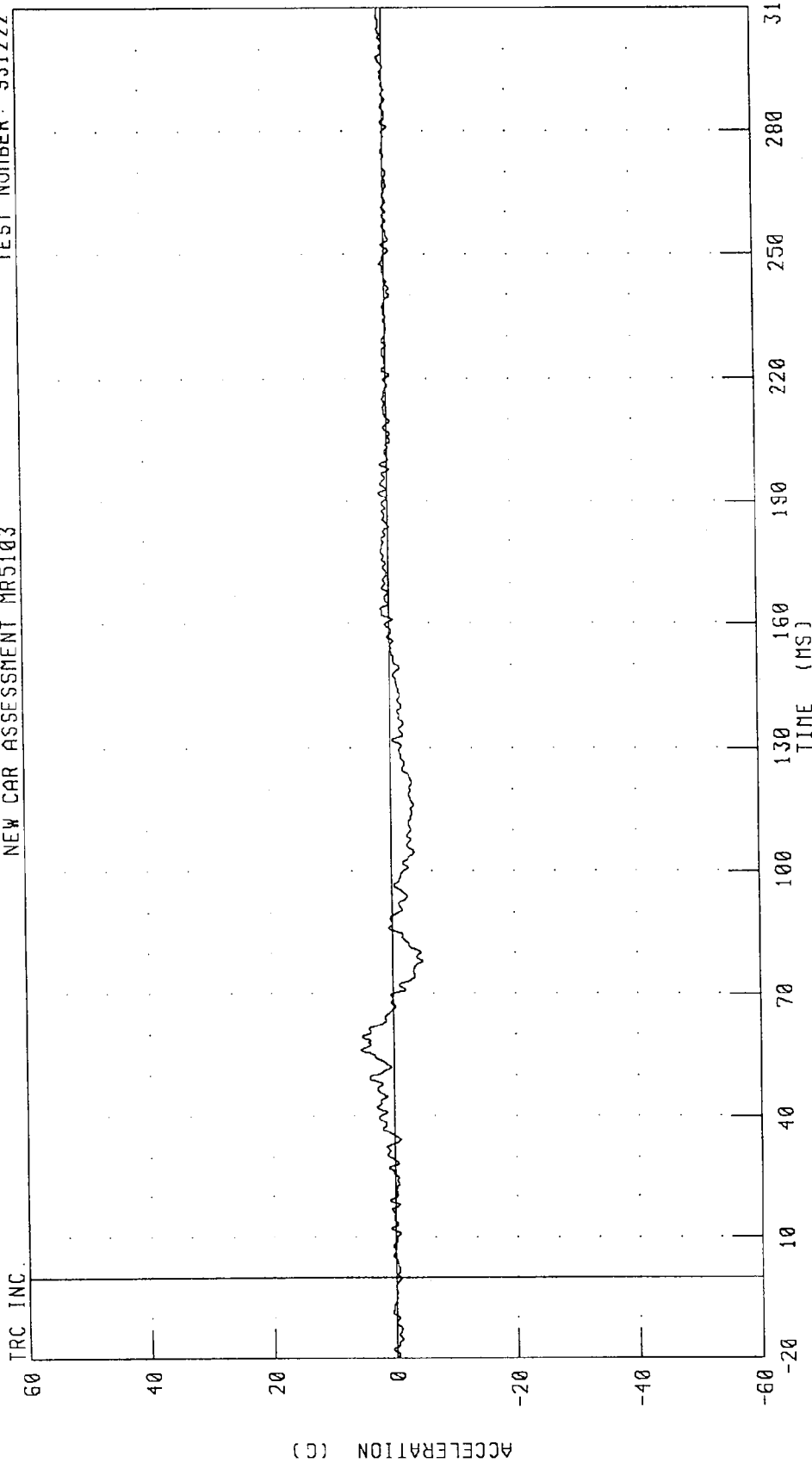


CHANNEL: CSTXG1 FILTER: CH. CLASS 180

PEAK DATA: 9.08 G @ 138.80 MS, -49.27 G @ 63.36 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST Y-AXIS ACCELERATION
NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

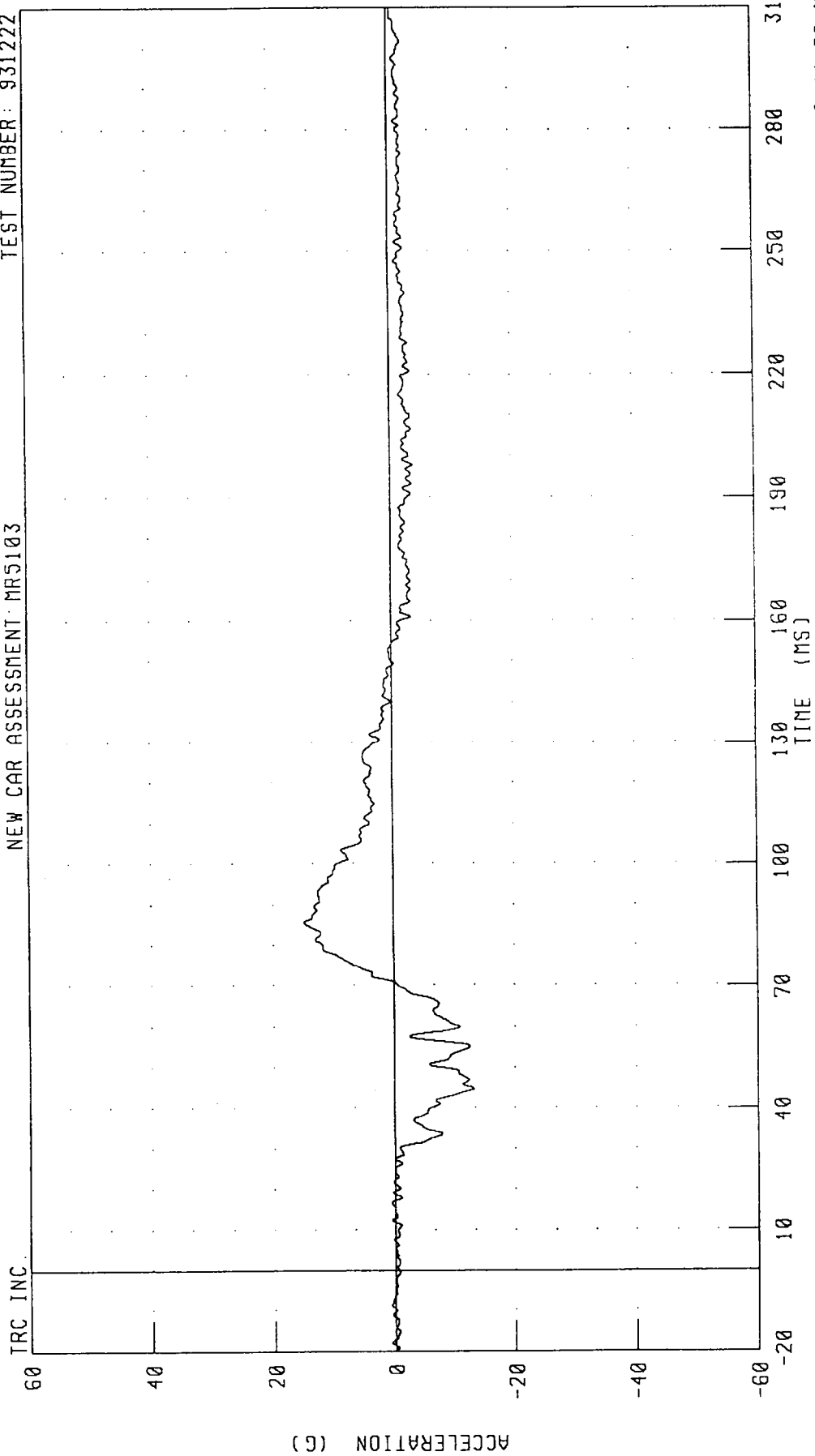


1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER

DRIVER CHEST Z-AXIS ACCELERATION

NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

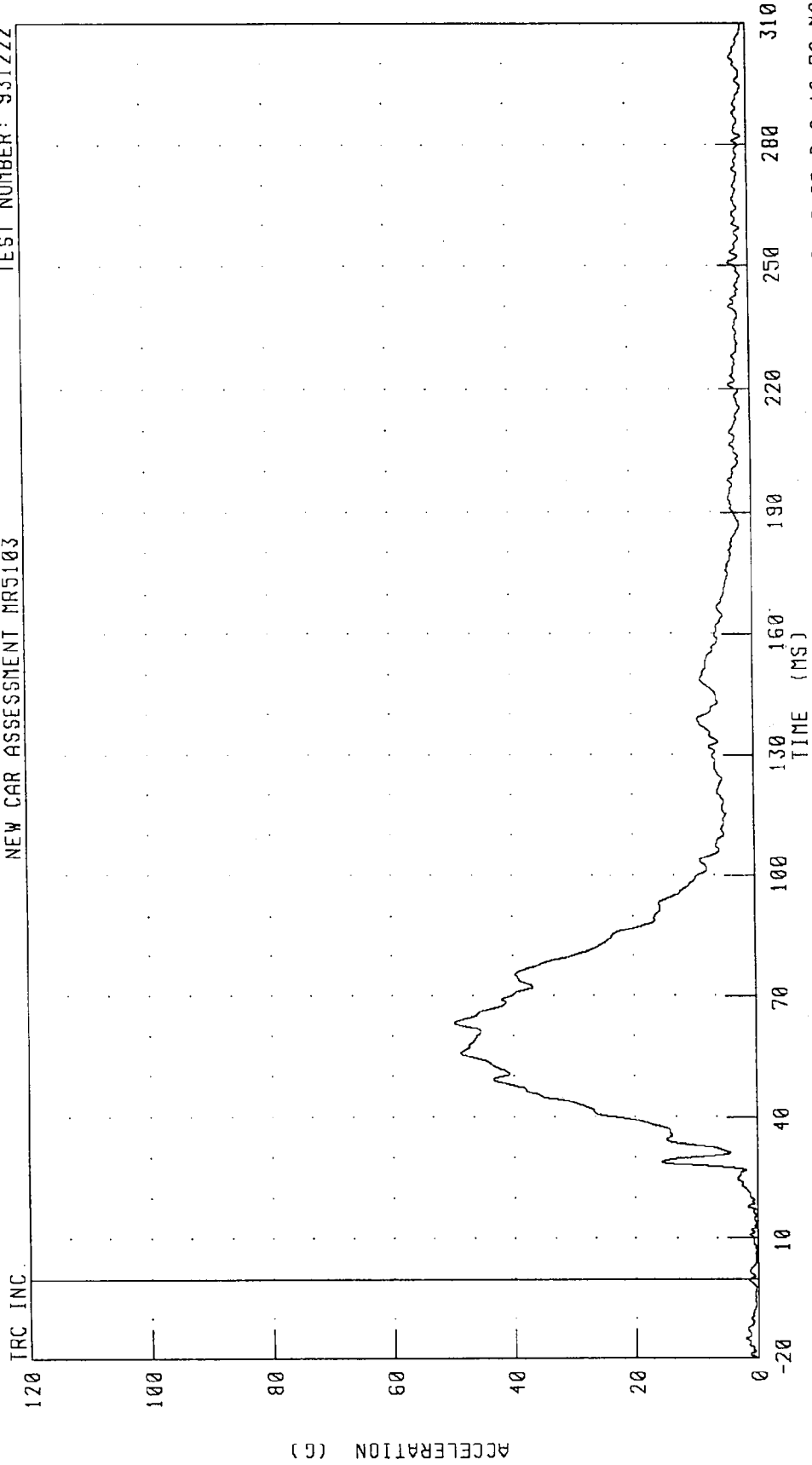


CHANNEL: CSTZG1 FILTER: CH. CLASS 180

PEAK DATA: 14.94 G @ 85.68 MS; -13.19 G @ 44.80 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 DRIVER CHEST RESULTANT ACCELERATION
 NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222



PEAK DATA 49.73 G @ 63.36 MS; 0.09 G @ 12.72 MS

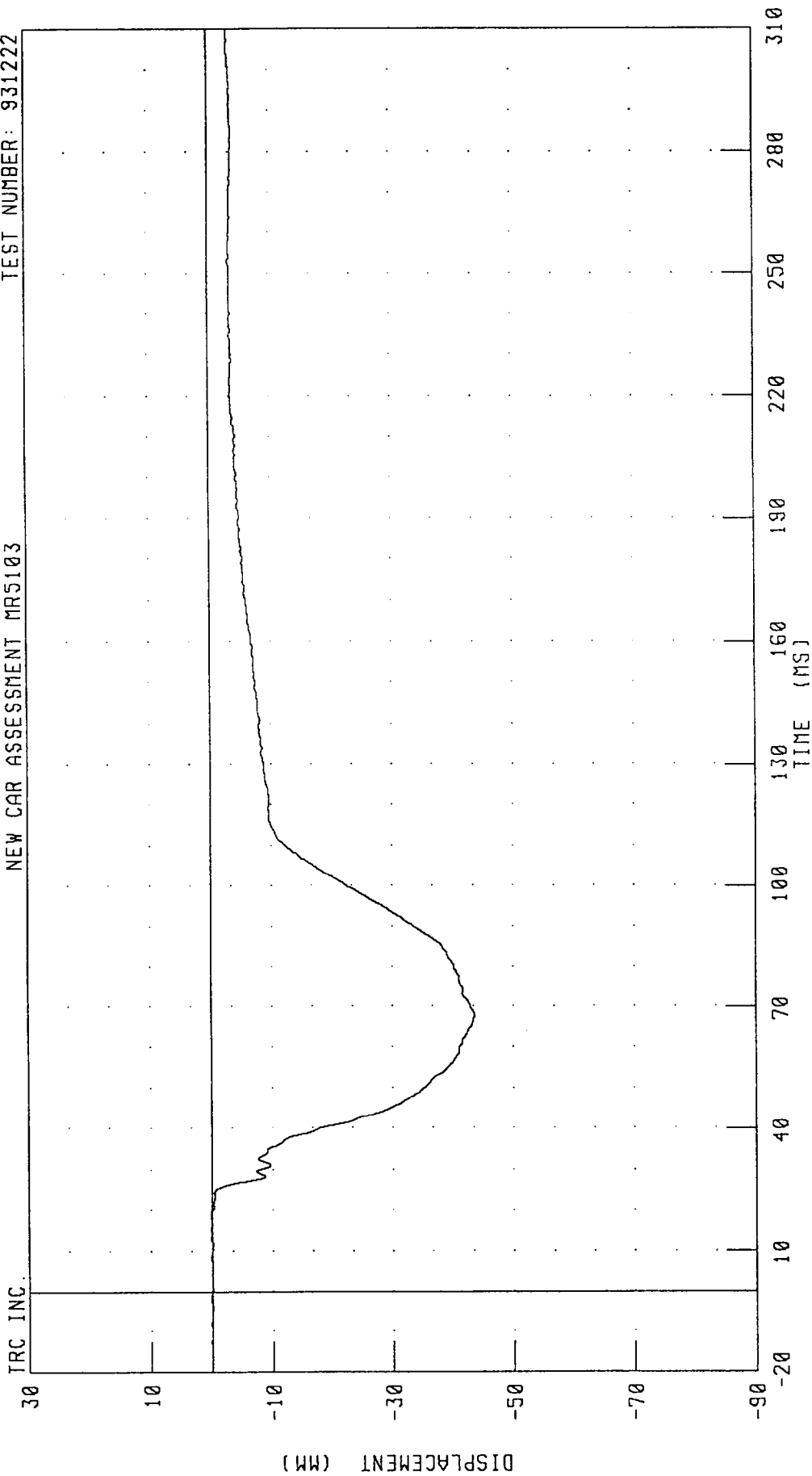
CHANNEL: CSTRG1 FILTER: CH. CLASS 180

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER

DRIVER CHEST DEFLECTION

NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

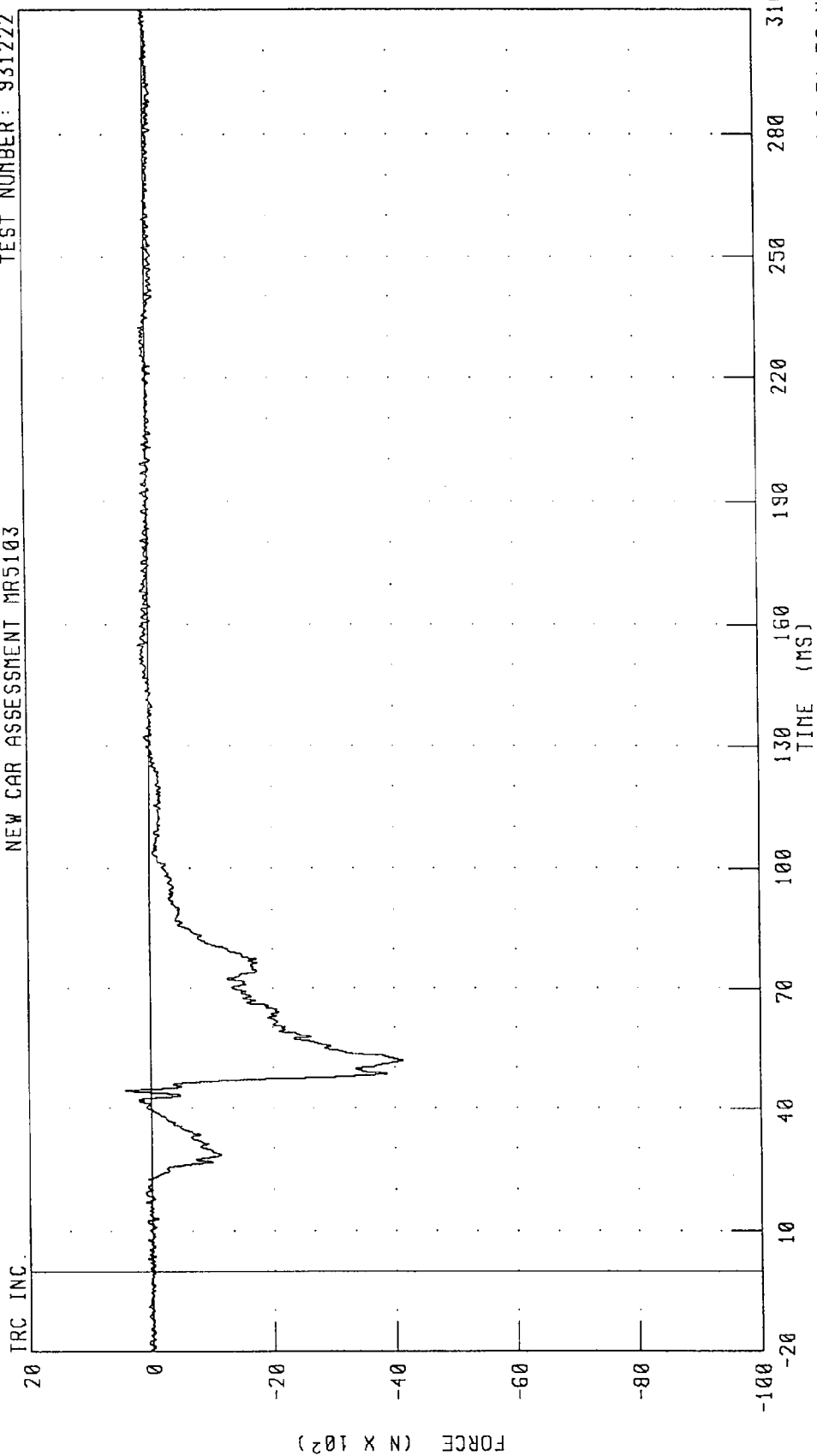


CHANNEL: CSTX01 FILTER: CH. CLASS 180

PEAK DATA: 0 21 MM @ 12.96 MS; -43.53 MM @ 67.84 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 DRIVER LEFT FEMUR FORCE
 NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

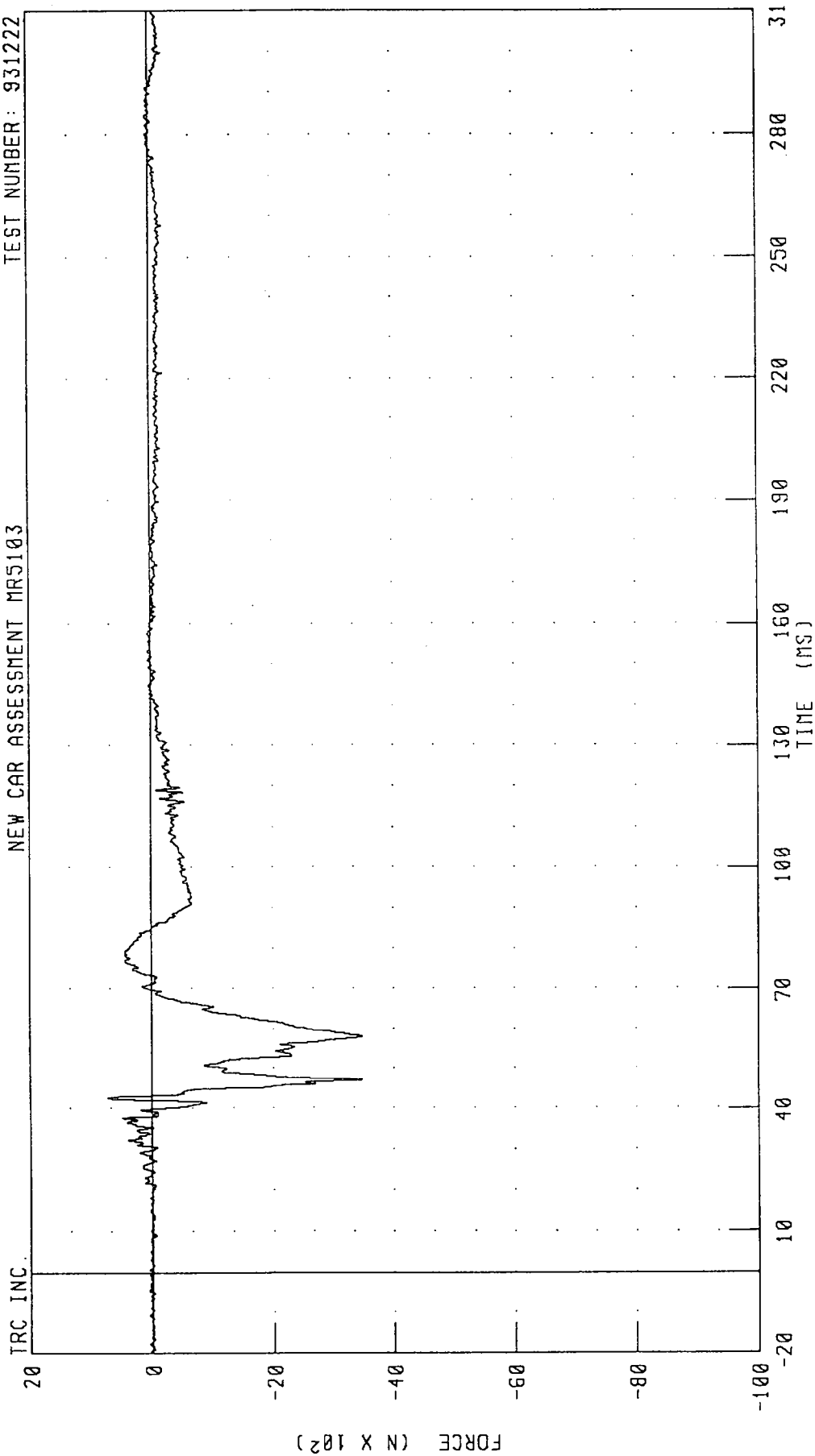


PEAK DATA: 413.44 N @ 44.40 MS; -4128.63 N @ 51.76 MS

CHANNEL: LFMF1 FILTER: CH. CLASS 600

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
DRIVER RIGHT FEMUR FORCE
NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

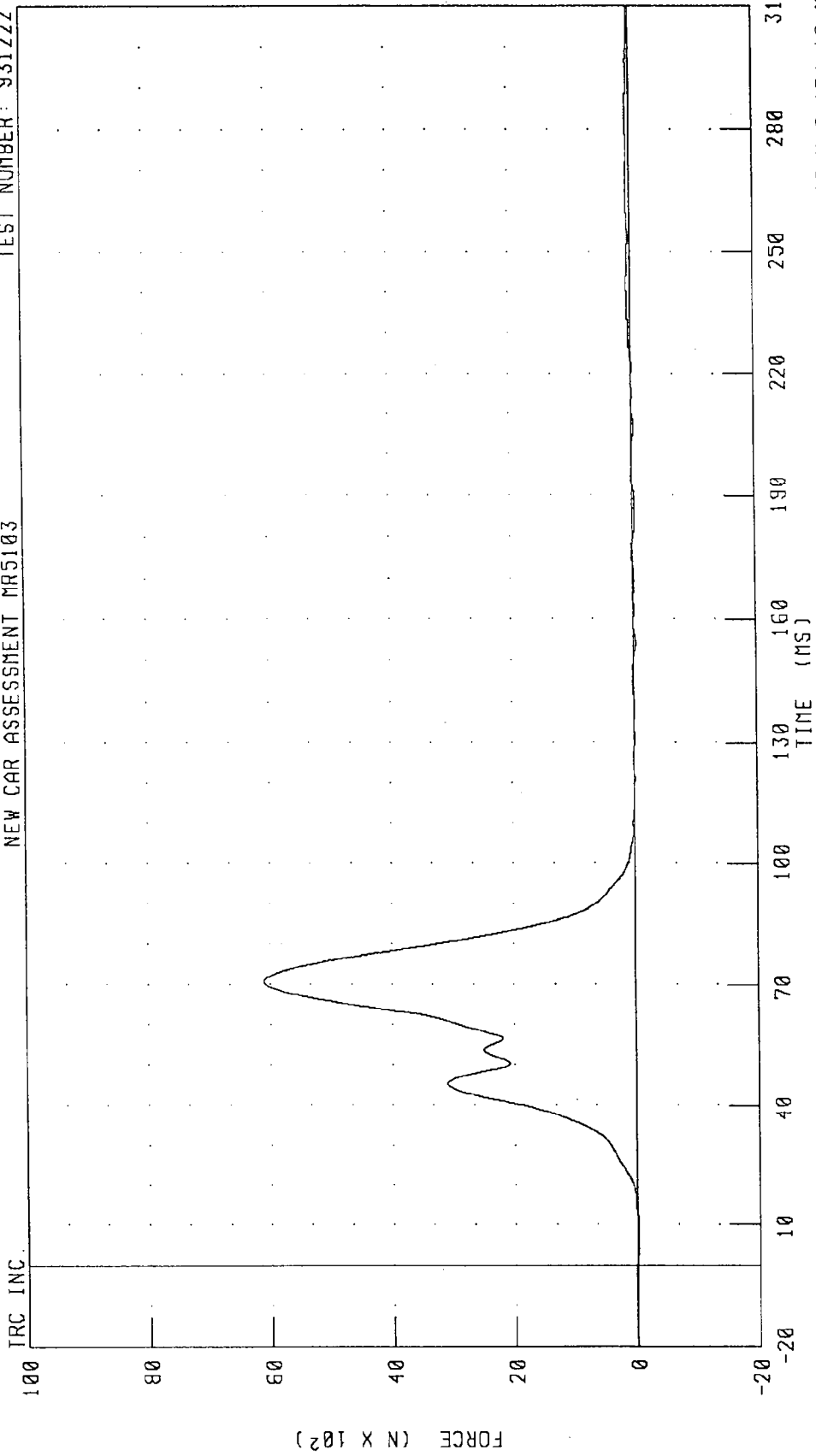


CHANNEL: RFMF1 FILTER: CH. CLASS 600

PEAK DATA 717 14 N @ 42.56 MS; -3478.57 N @ 58.00 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 DRIVER LAP BELT OUTBOARD FORCE
 NEW CAR ASSESSMENT MRS103

TEST NUMBER: 931222



CHANNEL: LBOFI FILTER: CH. CLASS 60

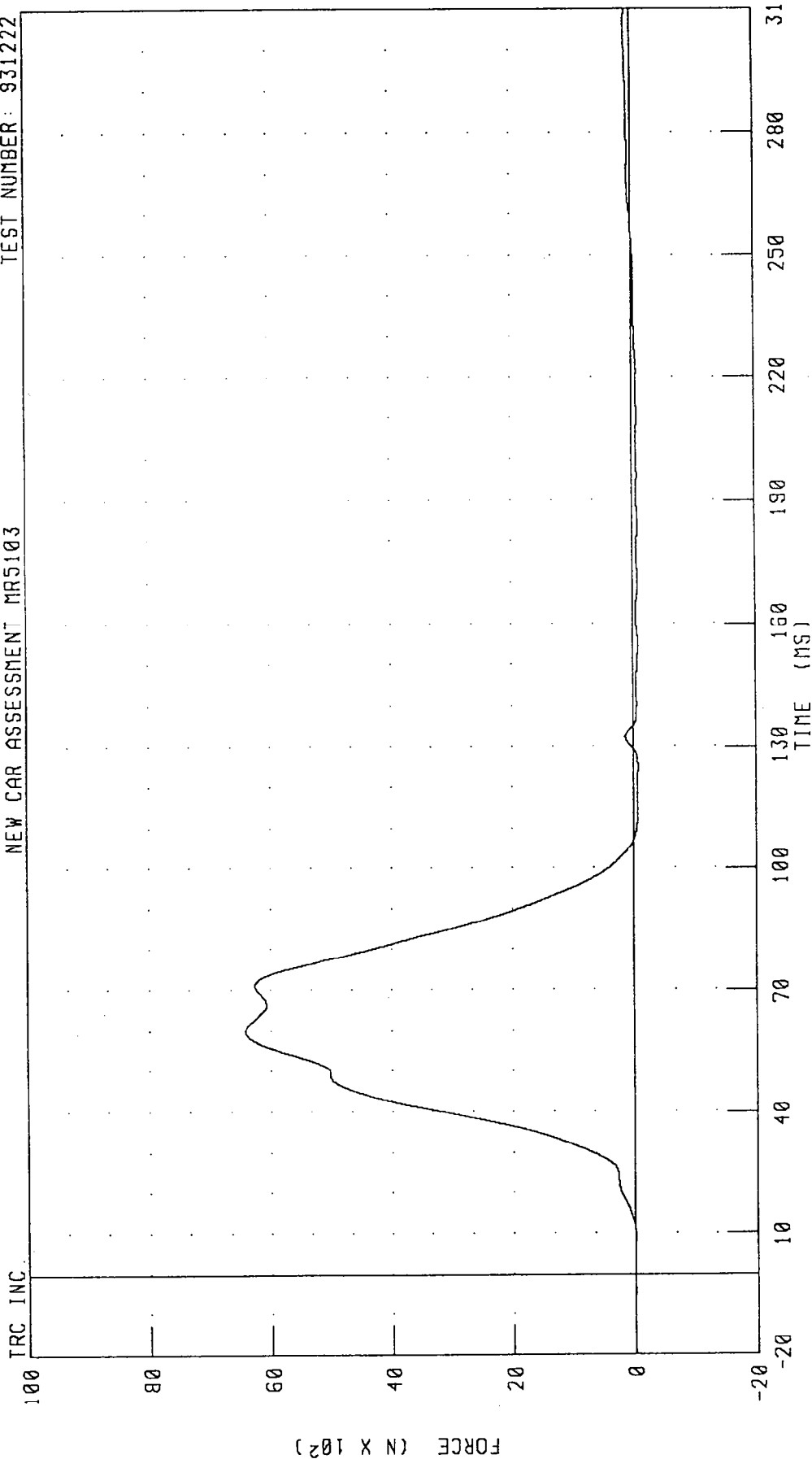
PEAK DATA: 6100.71 N @ 70.00 MS, -40.62 N @ 154.16 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER

DRIVER SHOULDER BELT FORCE

NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

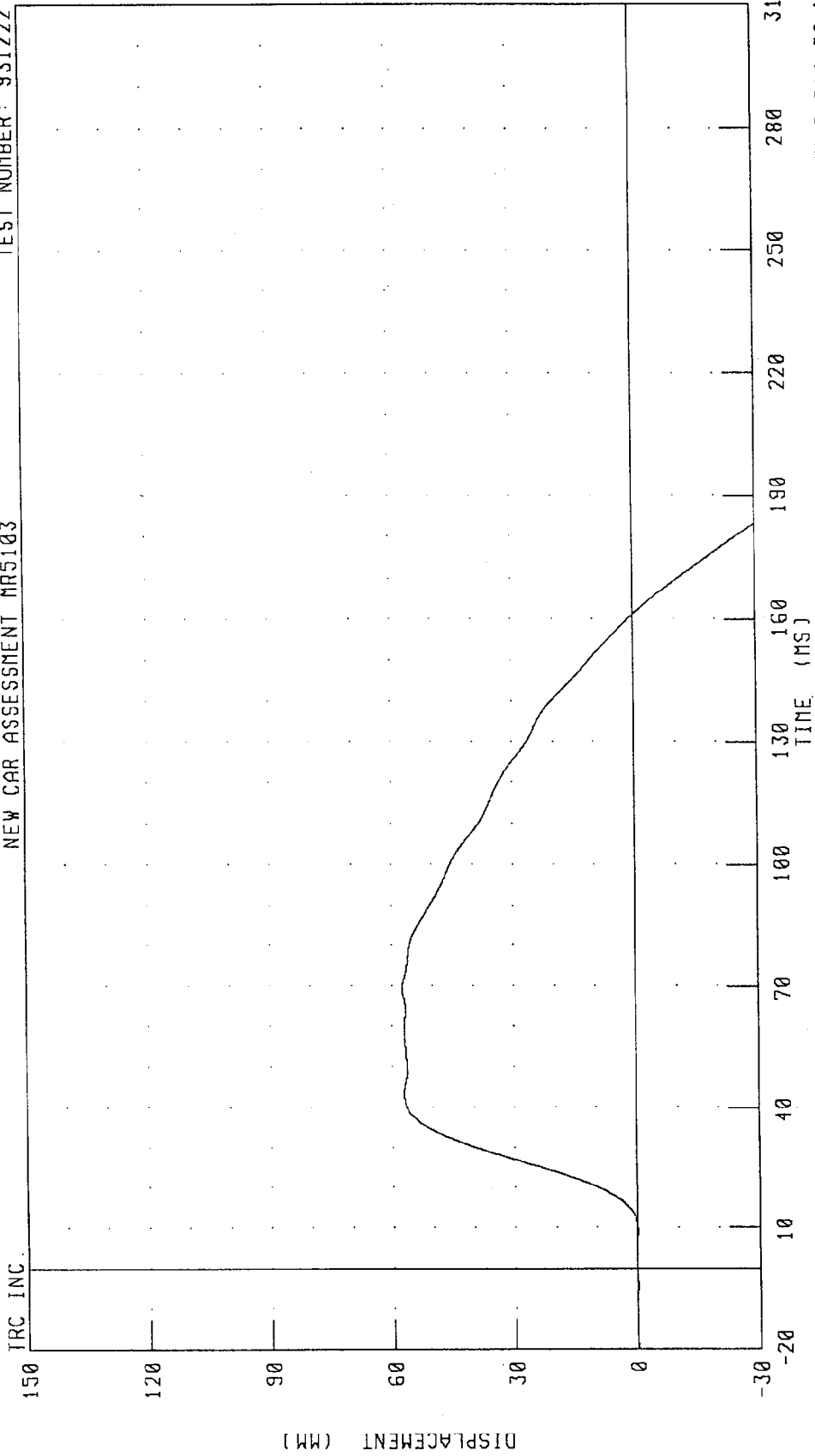


PEAK DATA 6422 34 N @ 59.92 MS, -87.48 N @ 186.24 MS

CHANNEL: SHBF1 FILTER: CH. CLASS 60

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 DRIVER SHOULDER BELT DISPLACEMENT
 NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222



PEAK DATA: 57.52 MM @ 69.36 MS; -59.29 MM @ 214.32 MS

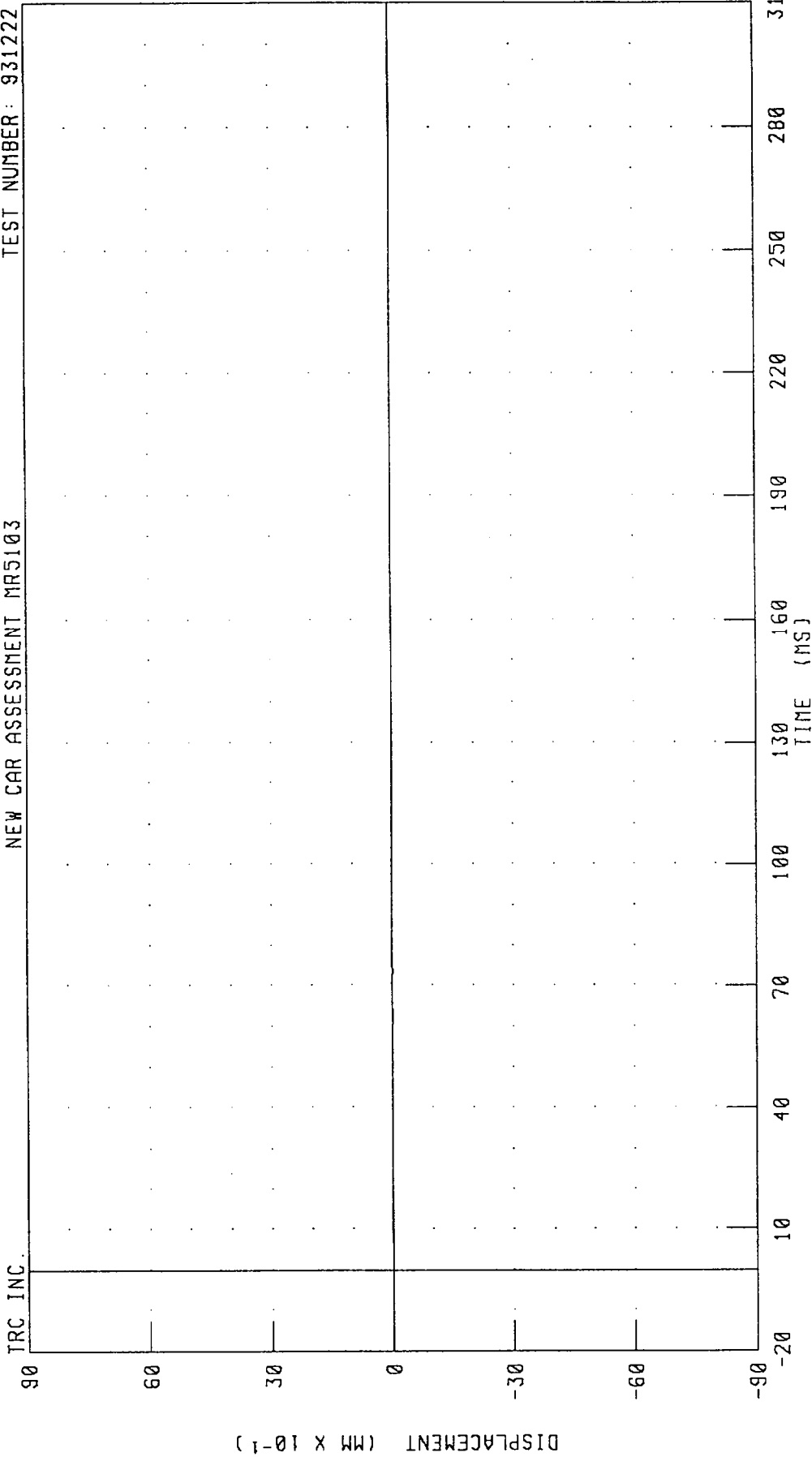
CHANNEL: SHBD1 FILTER: CH CLASS 60

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER

DRIVER SEAT BELT EXTENSION

NEW CAR ASSESSMENT MR5103

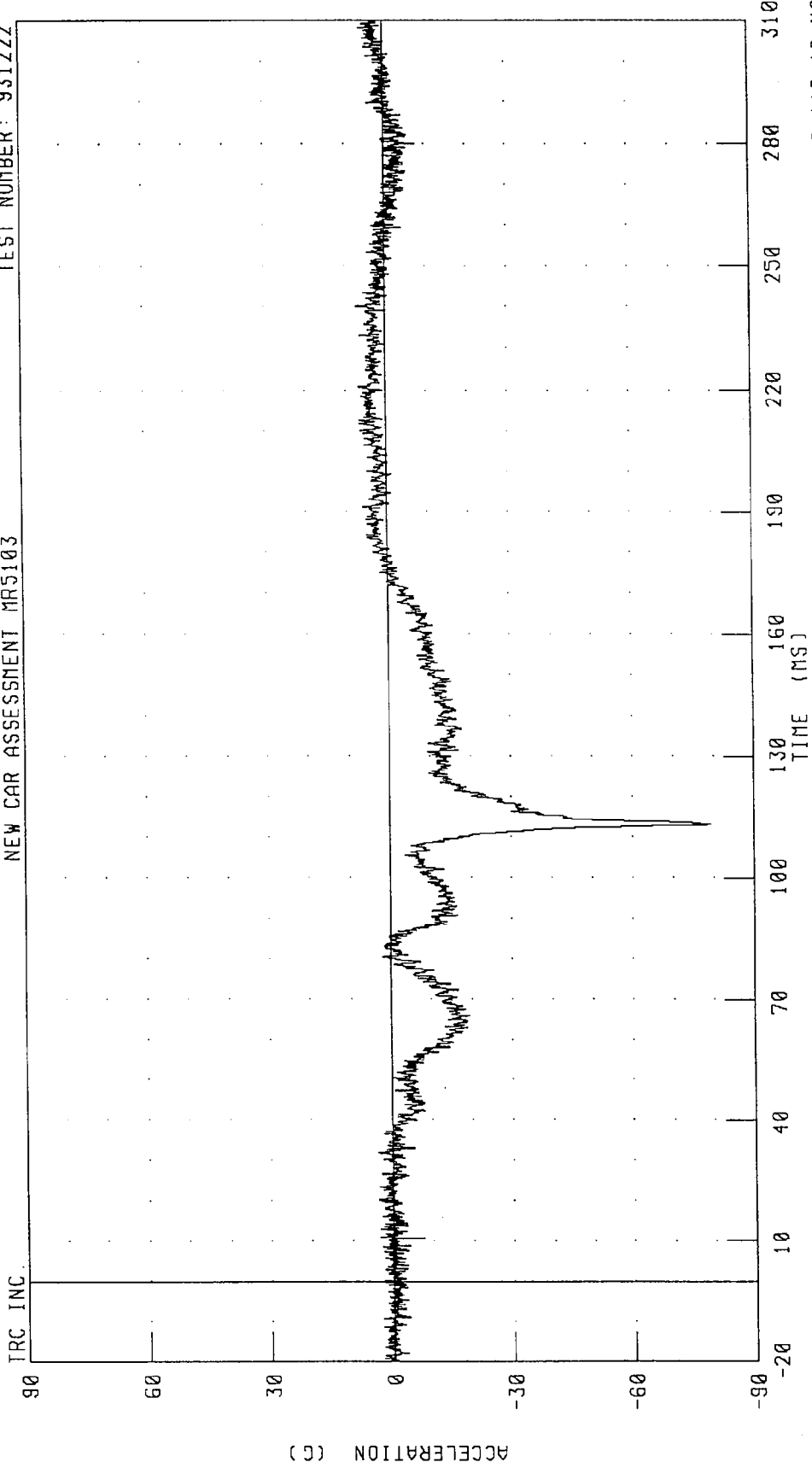
TEST NUMBER: 931222



CHANNEL: SBED1 FILTER: CH CLASS 60

1984 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD X-AXIS ACCELERATION
NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

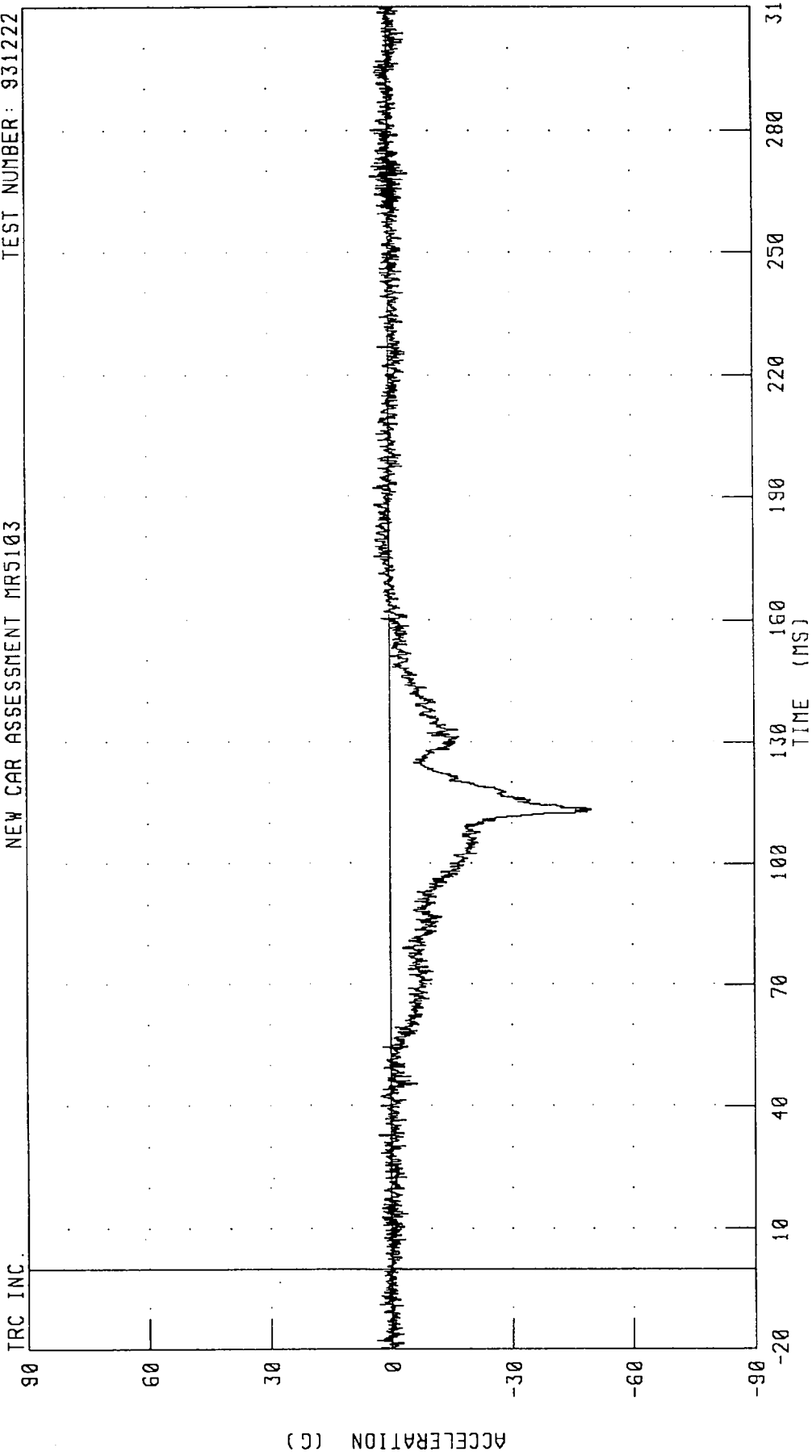


CHANNEL: HEDXG2 FILTER: CH. CLASS 1000

PEAK DATA: 7 22 G @ 240.00 MS; -79.13 G @ 113.12 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD Y-AXIS ACCELERATION
NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

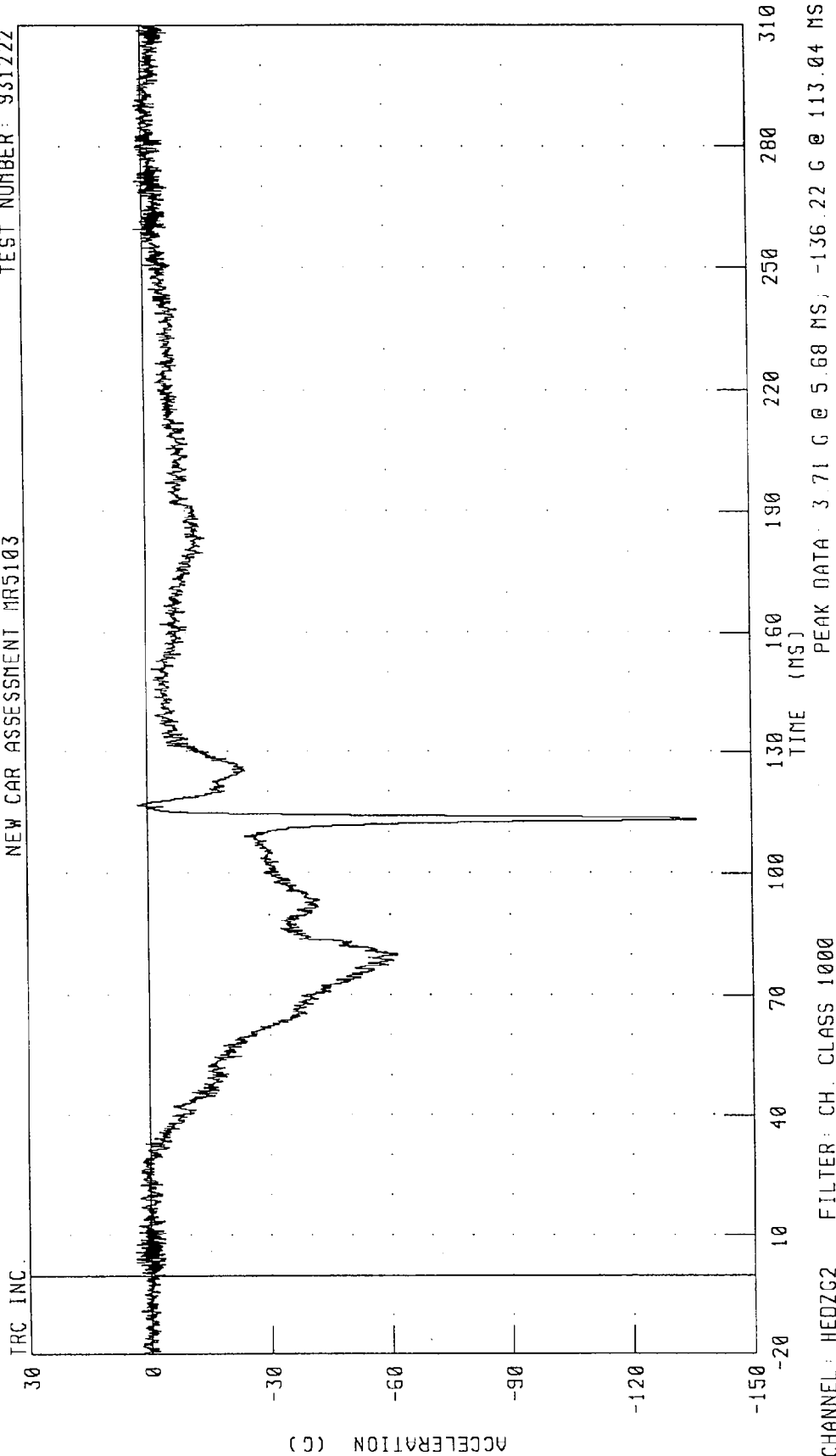


CHANNEL: HEDYG2 FILTER: CH. CLASS 1000

PEAK DATA: 4.35 G @ 268.72 MS, -49.78 G @ 113.52 MS

1984 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD Z-AXIS ACCELERATION
NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222



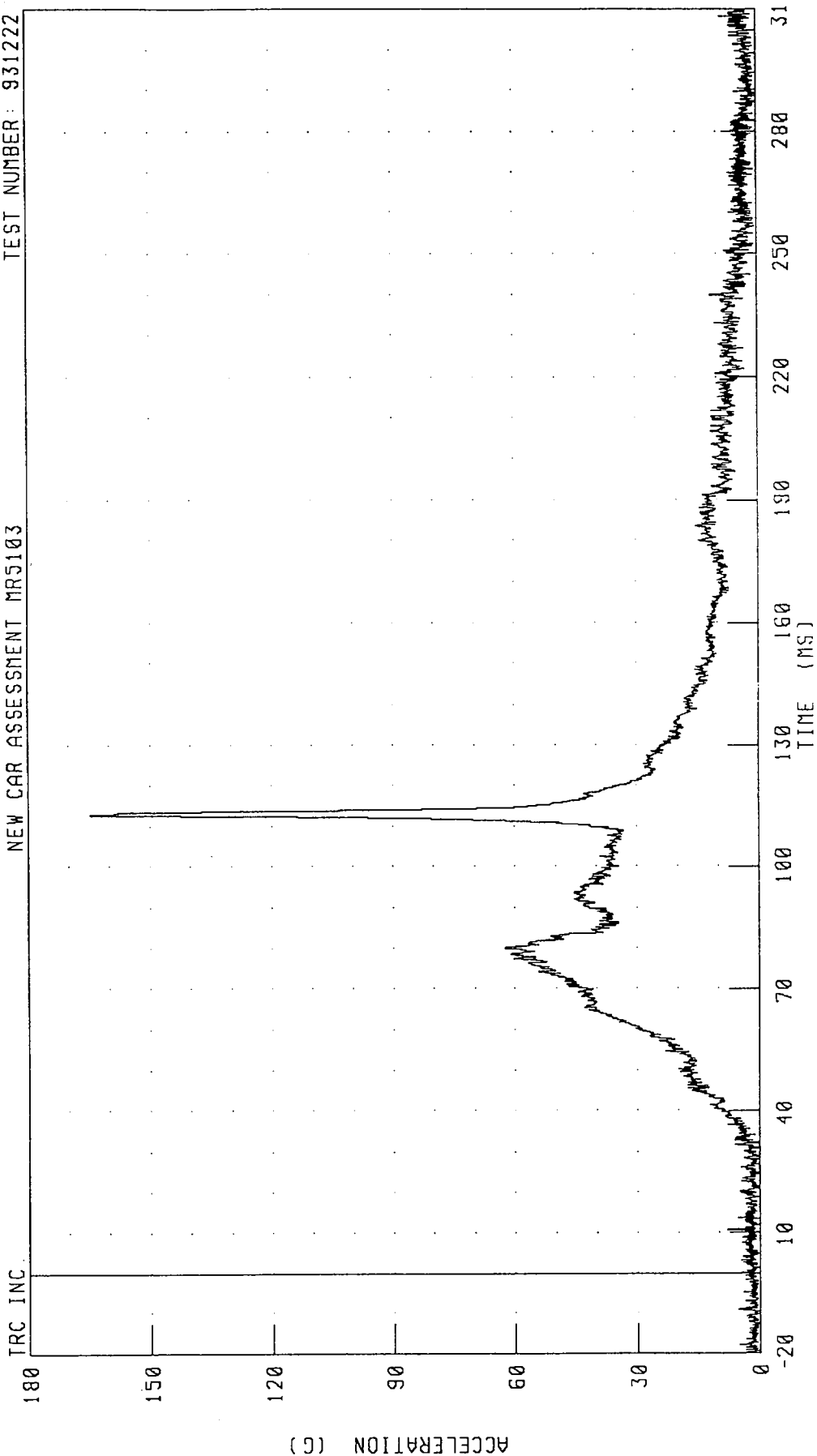
CHANNEL: HEDZG2 FILTER: CH. CLASS 1000

PEAK DATA: 3.71 G @ 5.68 MS, -136.22 G @ 113.04 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD RESULTANT ACCELERATION

NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222



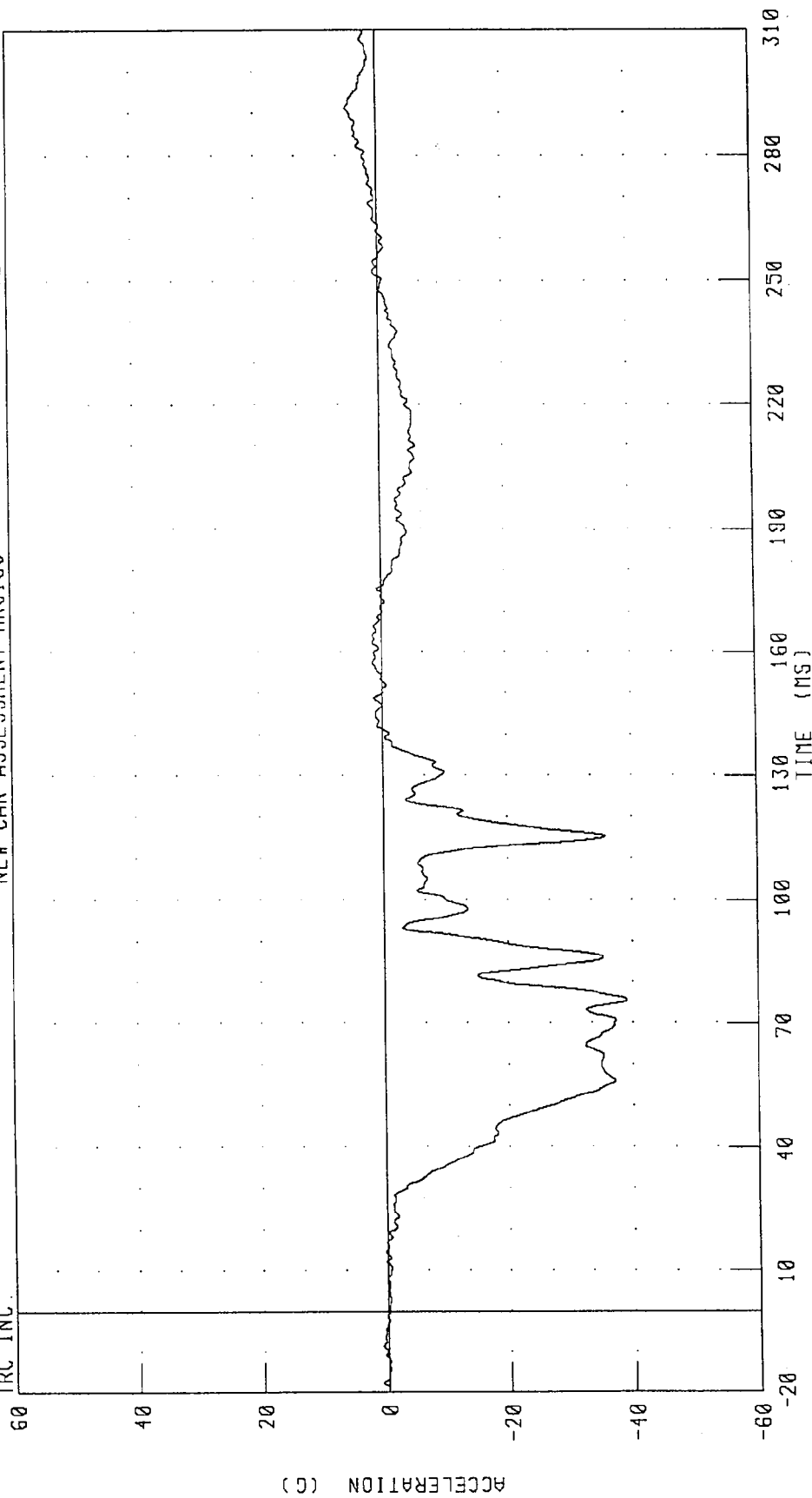
CHANNEL: HEDRC2 FILTER: CH CLASS 1000

PEAK DATA 164.59 G @ 113.04 MS, 0.13 G @ 28.32 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST X-AXIS ACCELERATION
NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

TRC INC.

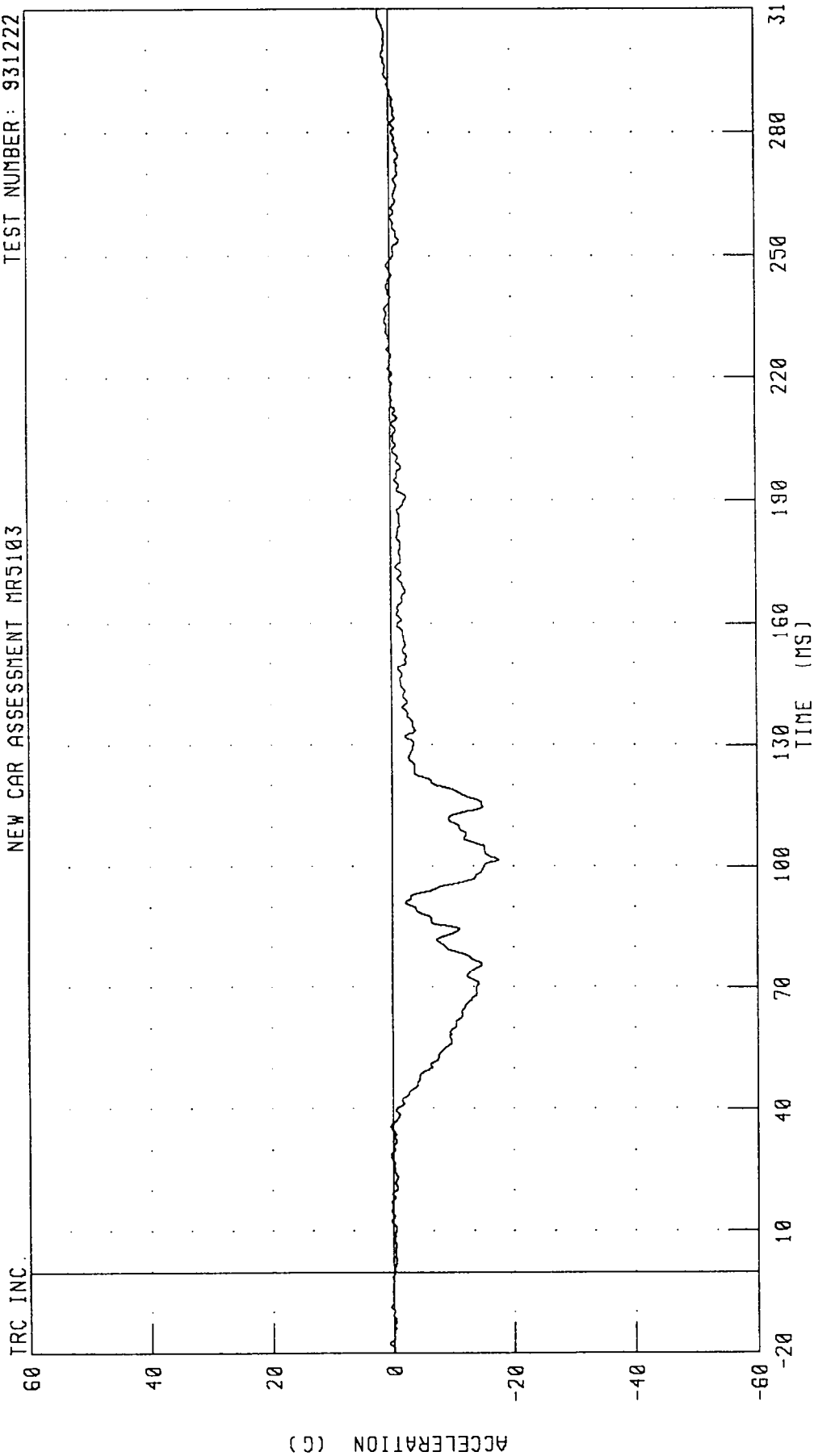


PEAK DATA: 5.01 G @ 291.28 MS, -39.01 G @ 75.68 MS

CHANNEL: CSTXG2 FILTER: CH. CLASS 180

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 PASSENGER CHEST Y-AXIS ACCELERATION
 NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

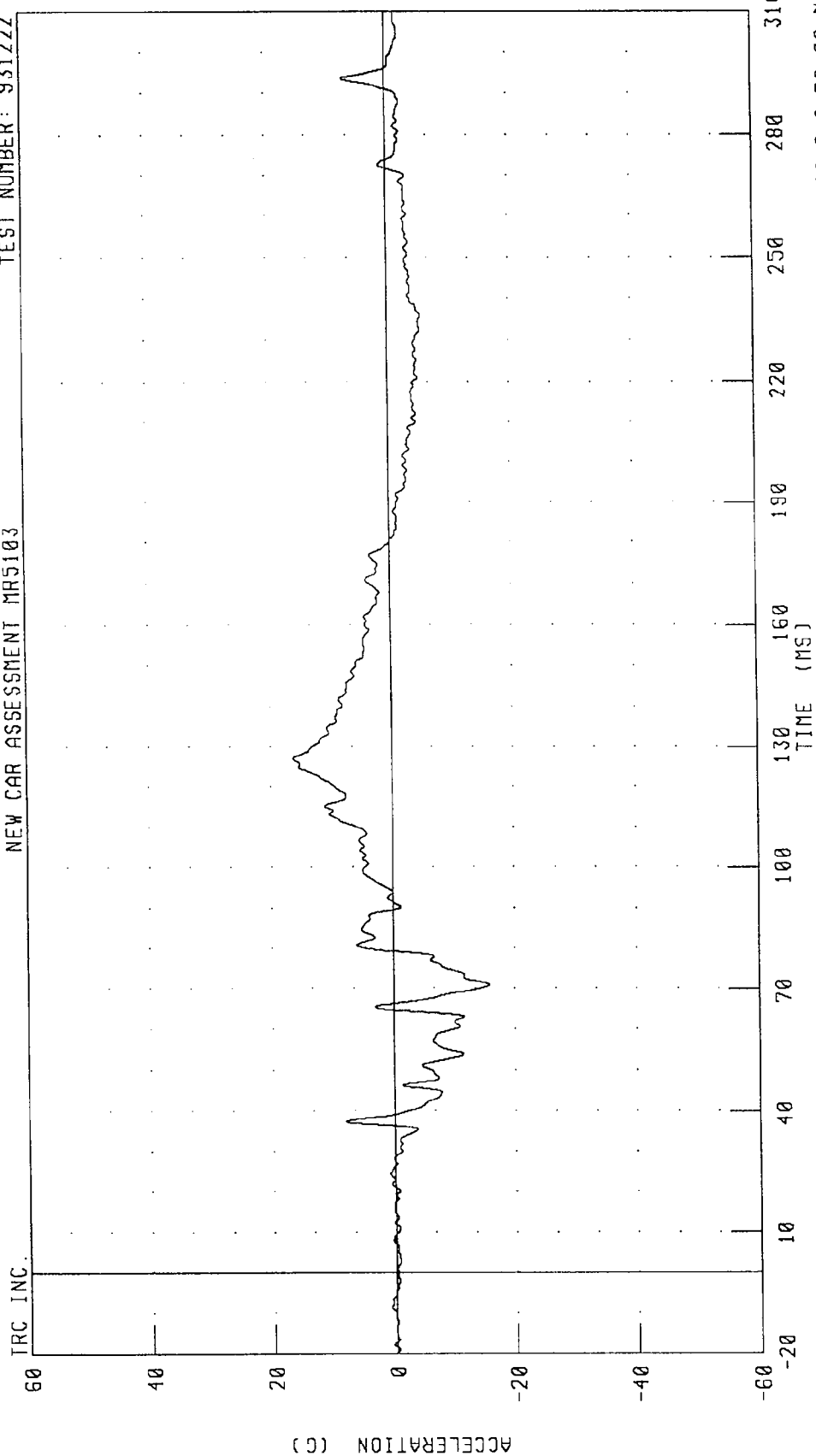


CHANNEL: CSTYG2 FILTER: CH. CLASS 180

PEAK DATA: 1 78 G @ 308.56 MS; -17.55 G @ 101.76 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST Z-AXIS ACCELERATION
NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

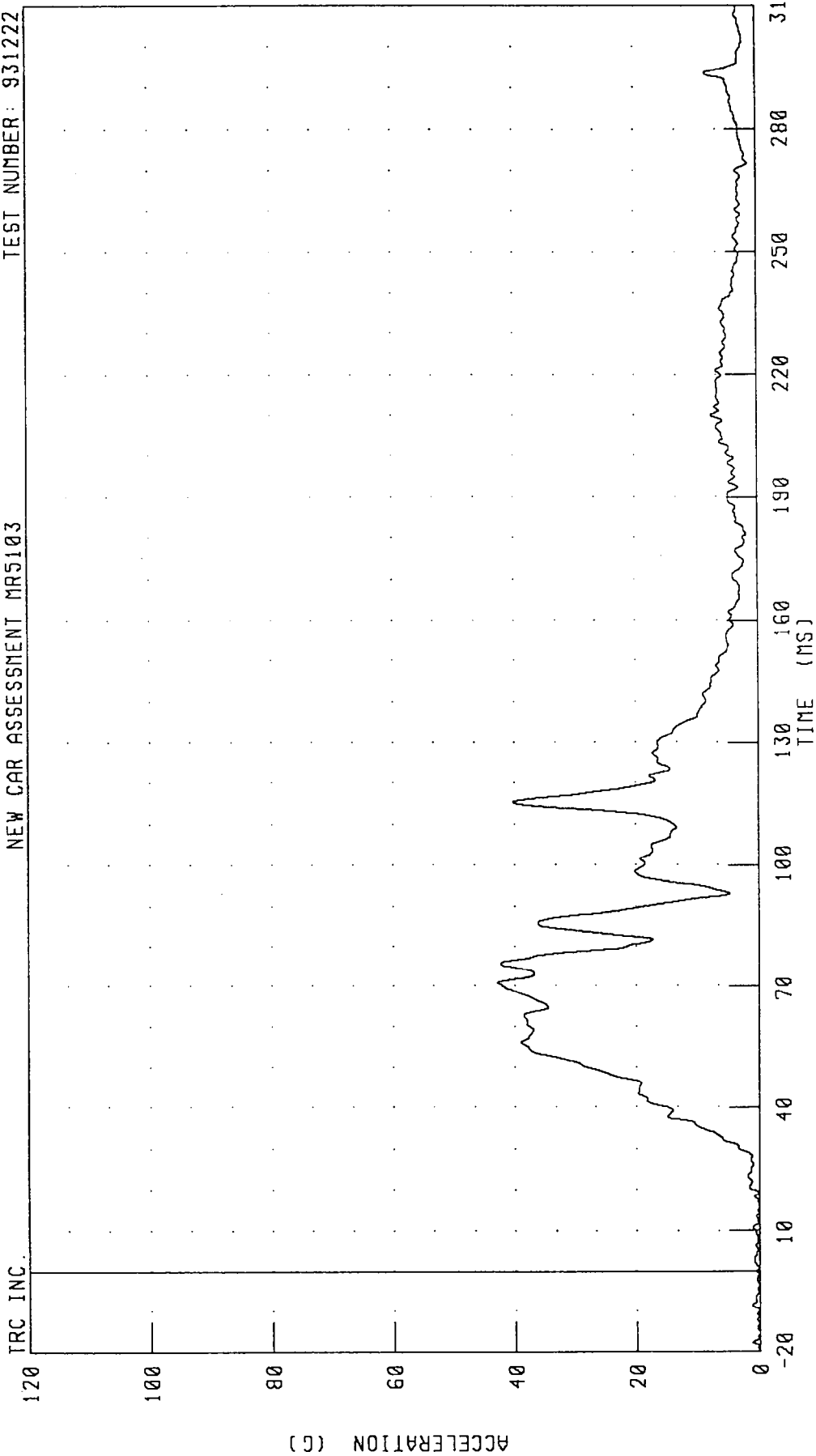


CHANNEL: CSTZG2 FILTER: CH. CLASS 180

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST RESULTANT ACCELERATION

NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

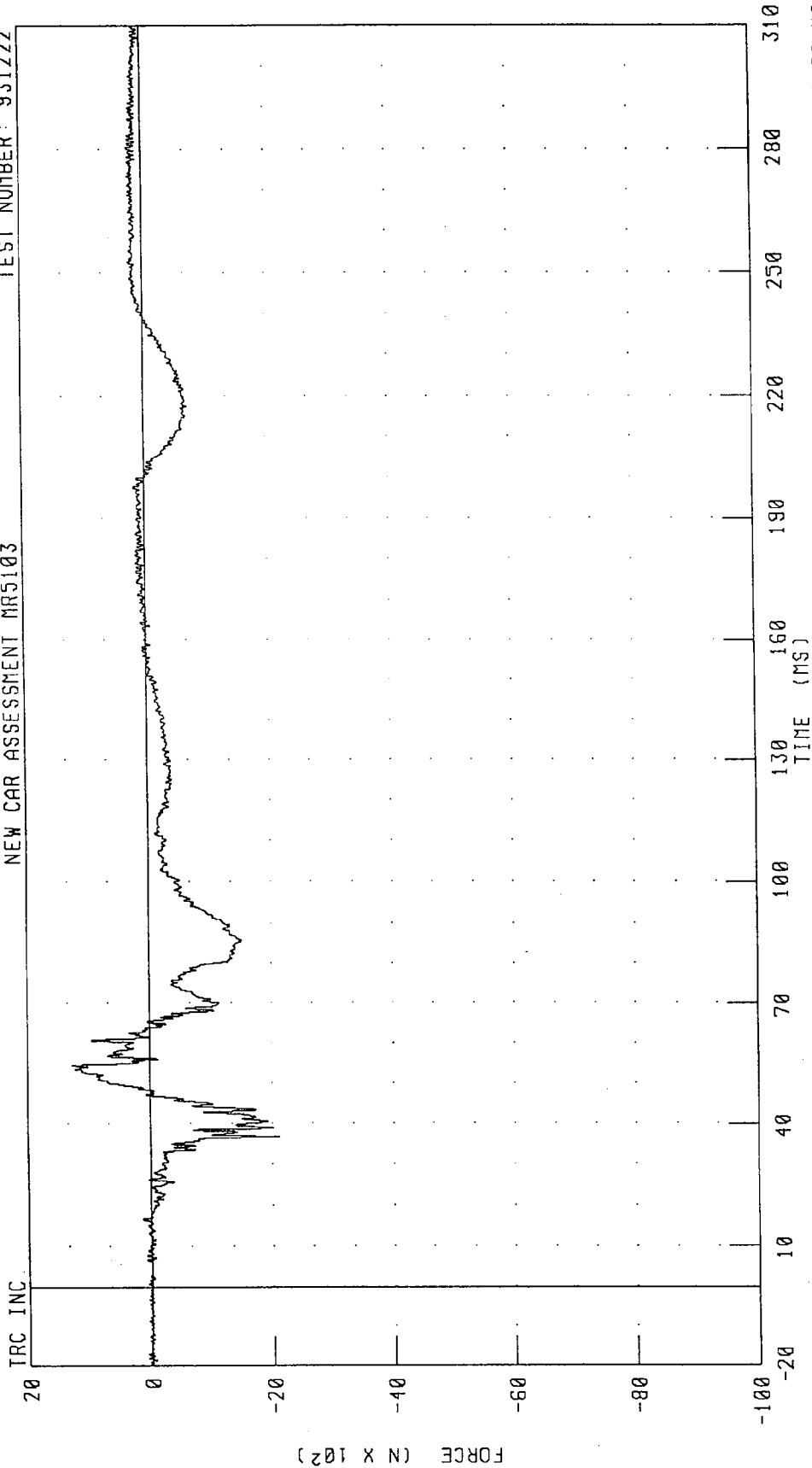


CHANNEL: CSTRG2 FILTER: CH. CLASS 180

PEAK DATA 42.88 G @ 70.88 MS, 0.02 G @ -15.76 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
PASSENGER LEFT FEMUR FORCE
NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222



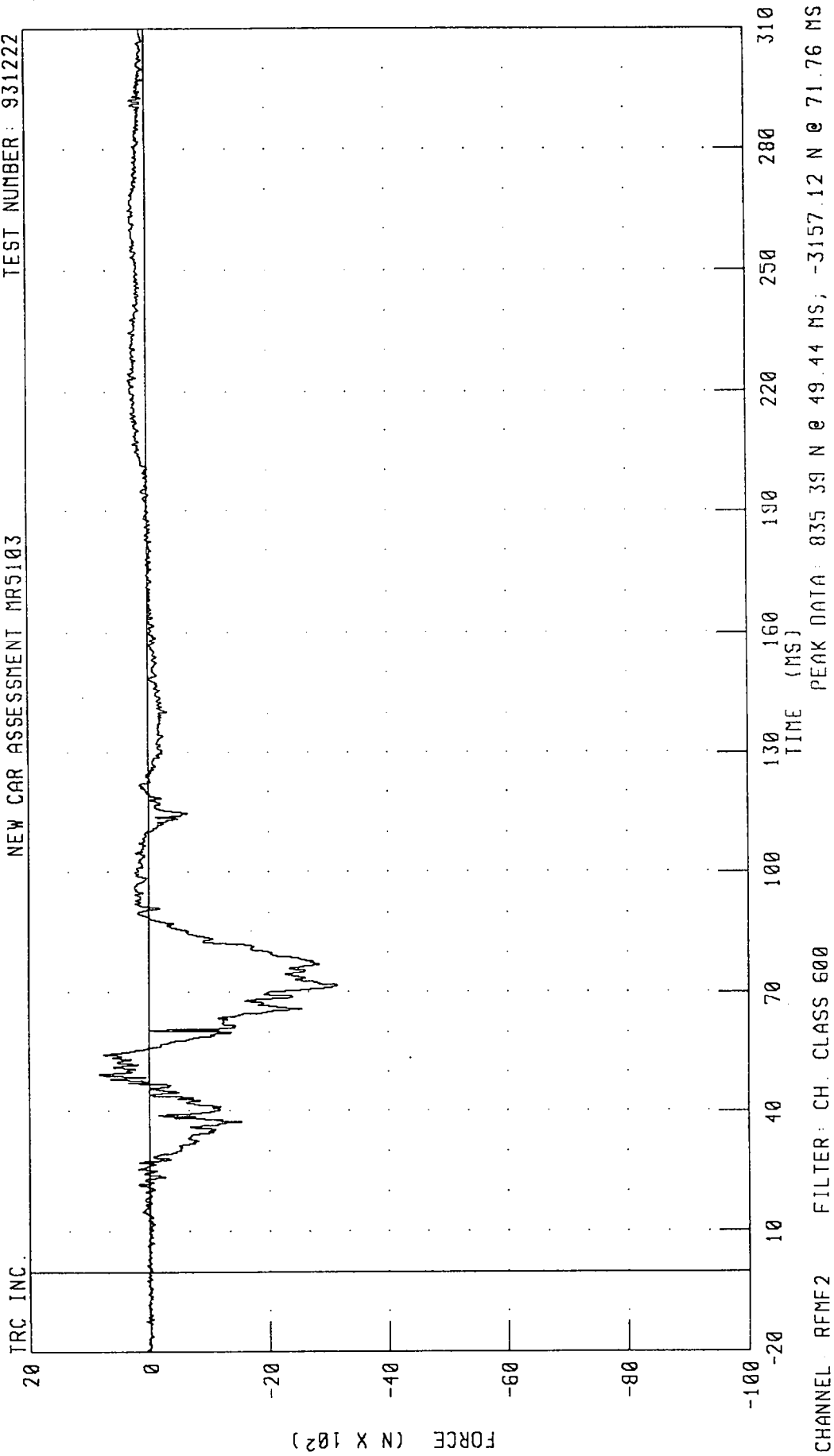
CHANNEL: LFMF2 FILTER: CH CLASS 600

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER

PASSENGER RIGHT FEMUR FORCE

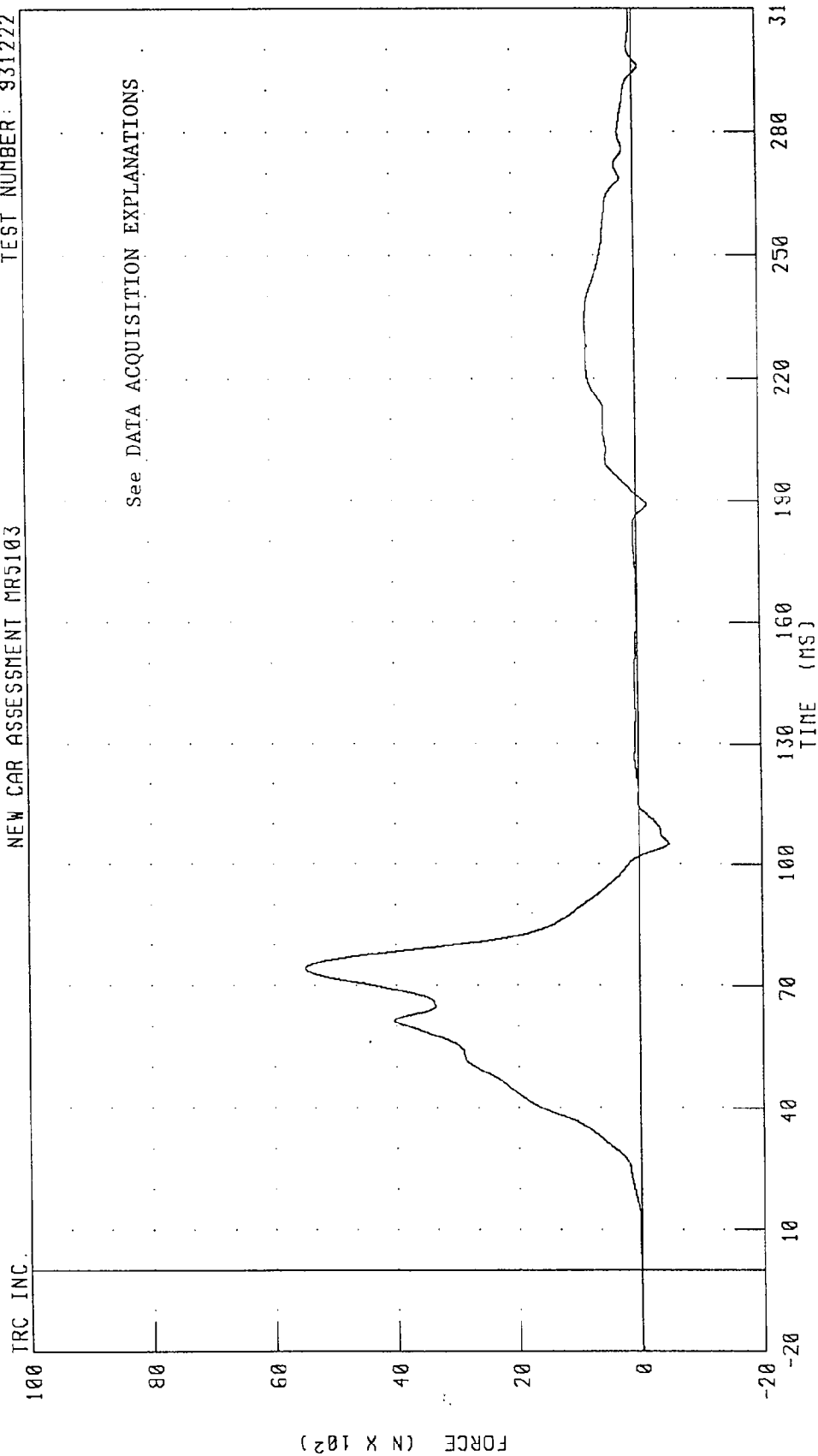
NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222



1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
PASSENGER LAP BELT OUTBOARD FORCE
NEW CAR ASSESSMENT MR5103

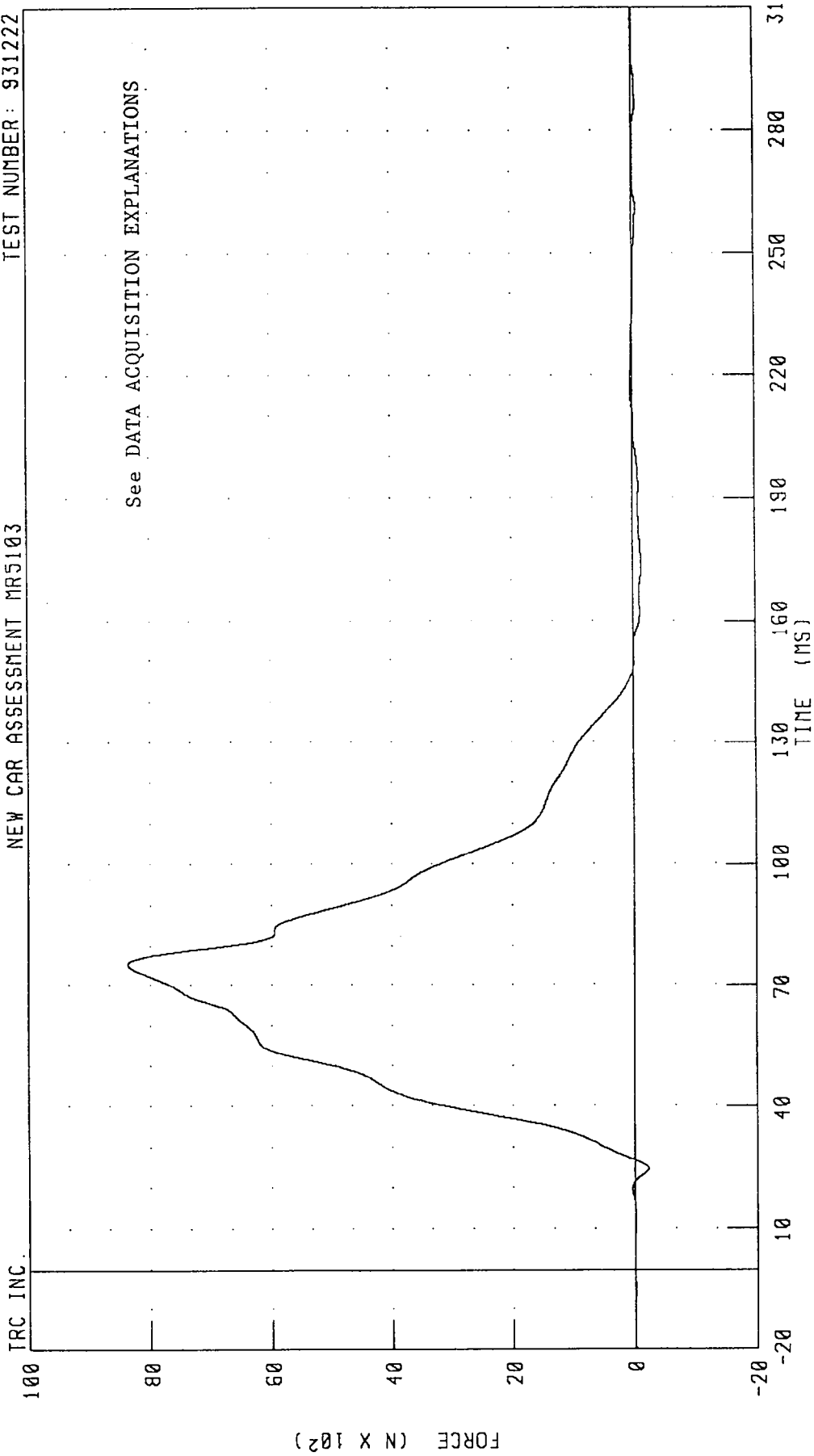
TEST NUMBER: 931222



CHANNEL: LBOF2 FILTER: CH. CLASS 60
PEAK DATA: 5490 83 N @ 74 32 MS, -480 35 N @ 105 12 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 PASSENGER SHOULDER BELT FORCE
 NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

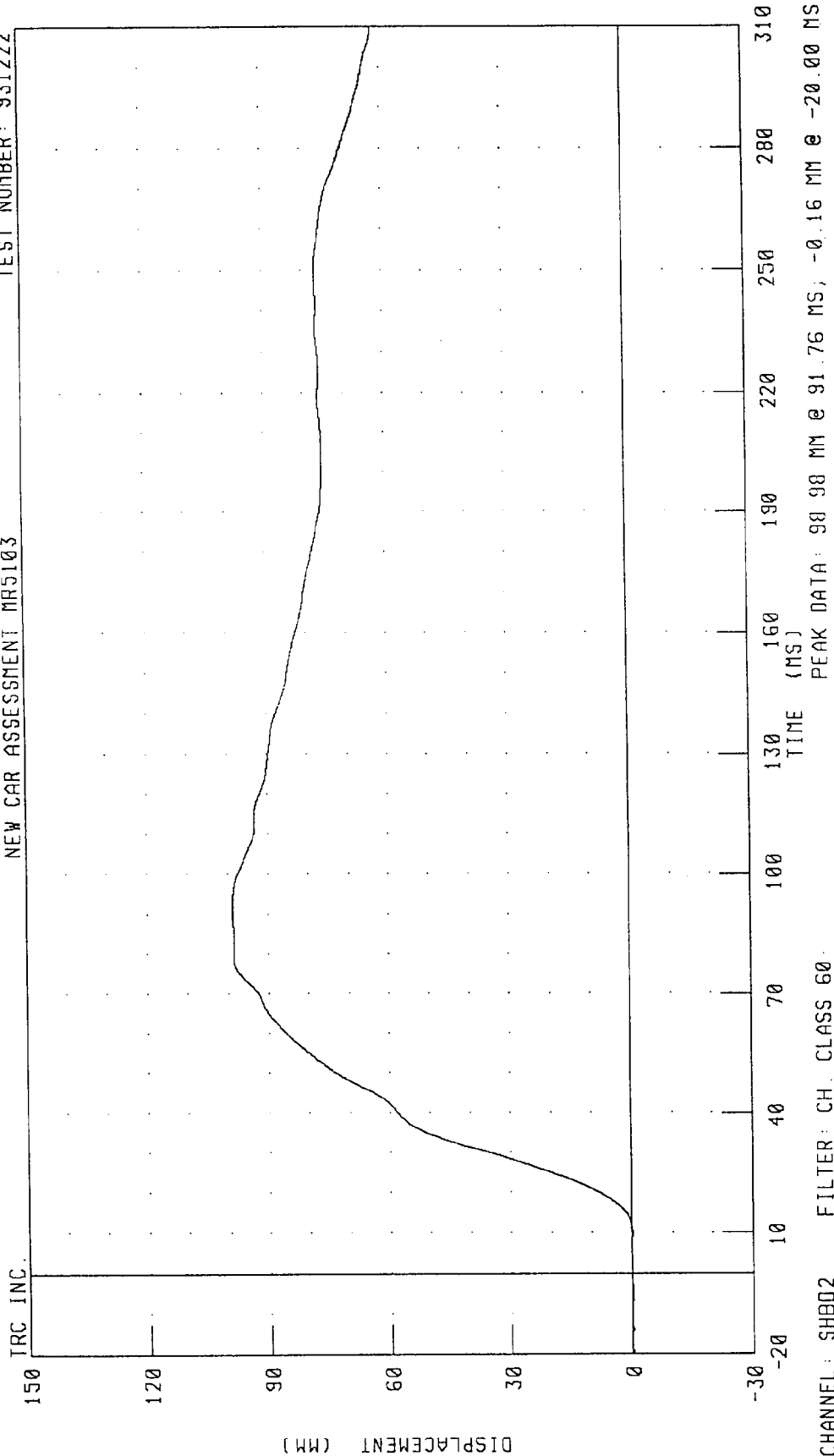


CHANNEL: SHBF2 FILTER: CH. CLASS 60

PEAK DATA: 8375 64 N @ 75.28 MS; -221 19 N @ 24.64 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
PASSENGER SHOULDER BELT DISPLACEMENT
NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222



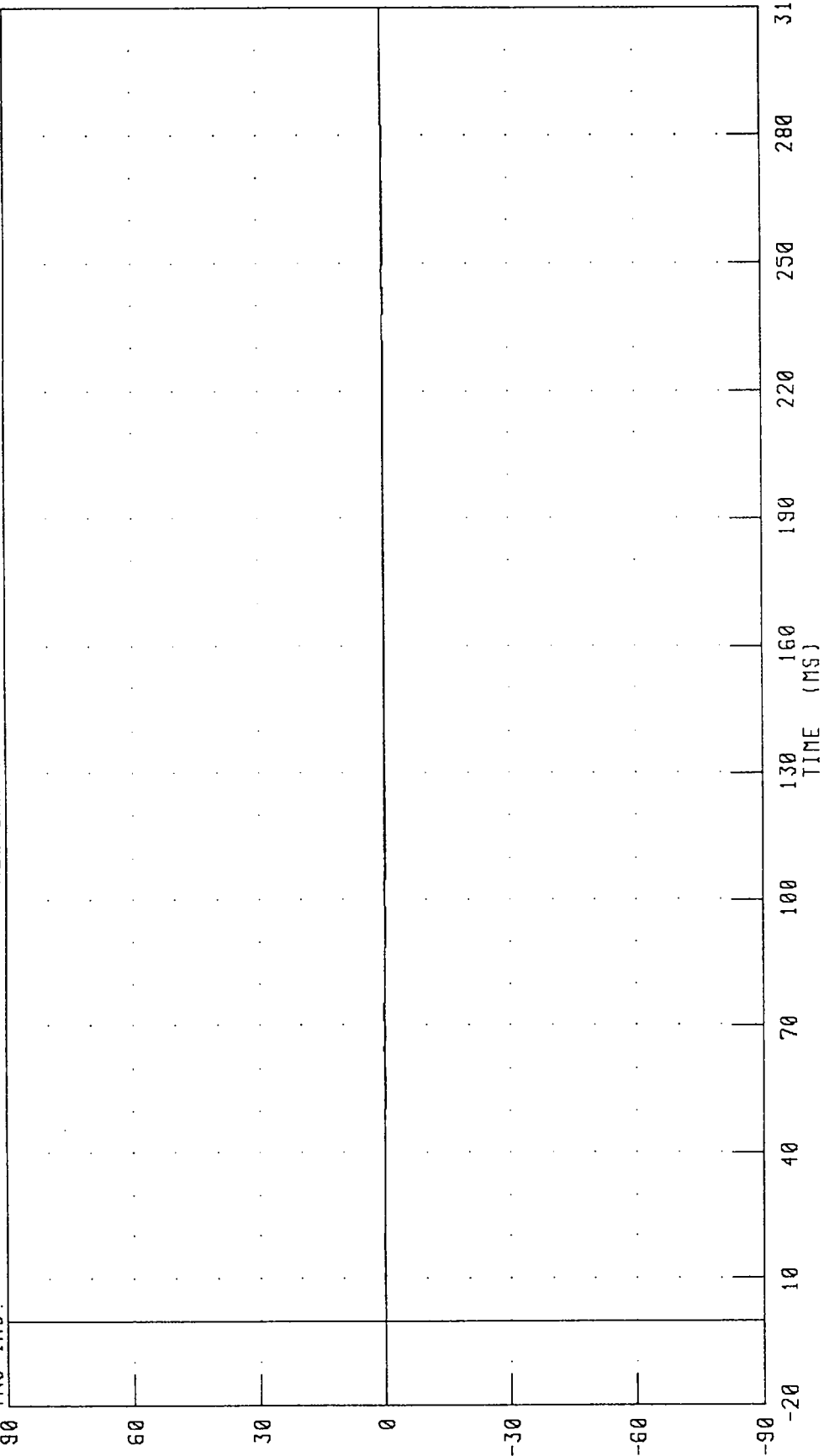
CHANNEL: SHB02 FILTER: CH. CLASS 60

PEAK DATA: 98 98 MM @ 91.76 MS; -0.16 MM @ -20.00 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
PASSENGER SEAT BELT EXTENSION
NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

TRC INC.



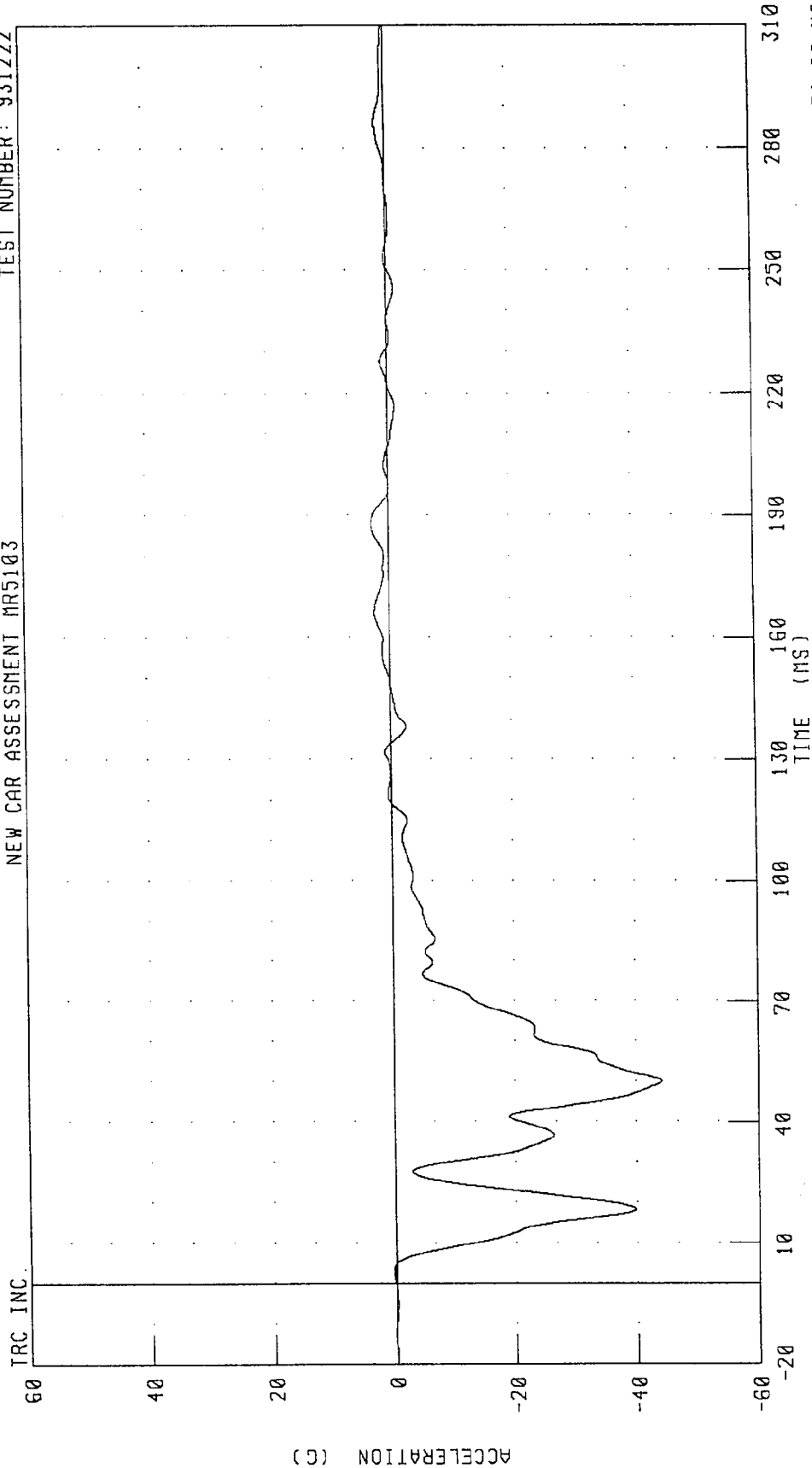
PEAK DATA: 0.03 MM @ 72.96 MS; -0.03 MM @ 68.16 MS

FILTER: CH. CLASS 60

CHANNEL: S8ED2

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 LEFT REAR SEAT X-AXIS ACCELERATION
 NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222



CHANNEL: TLRXG1 FILTER: CH. CLASS 60

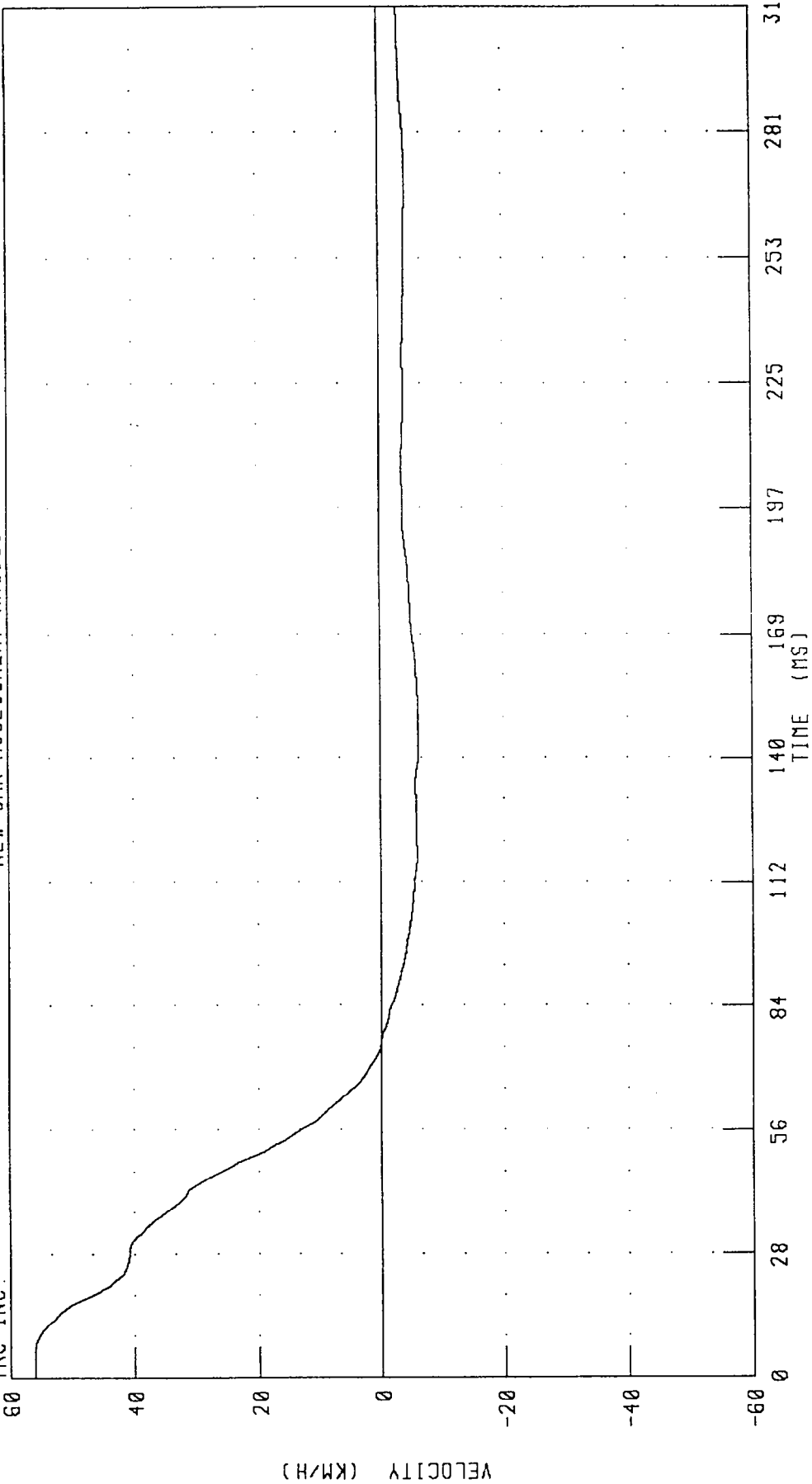
1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER

LEFT REAR SEAT X-AXIS VELOCITY

NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

TRC INC.

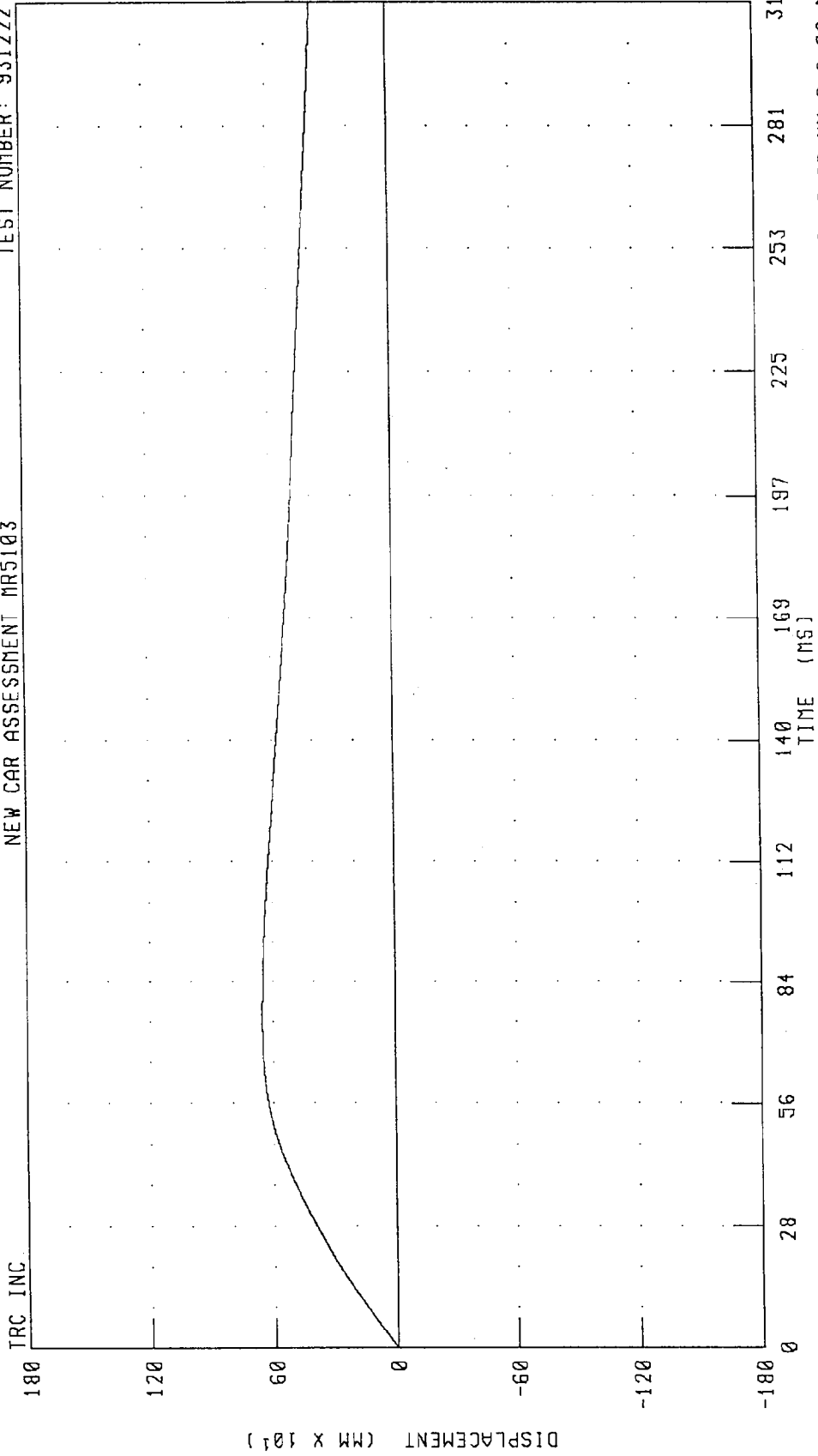


PEAK DATA: 56.03 KM/H @ 3.60 MS; -6.15 KM/H @ 147.36 MS

CHANNEL: TLRXV1 FILTER: CH. CLASS 180

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 LEFT REAR SEAT X-AXIS DISPLACEMENT
 NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222



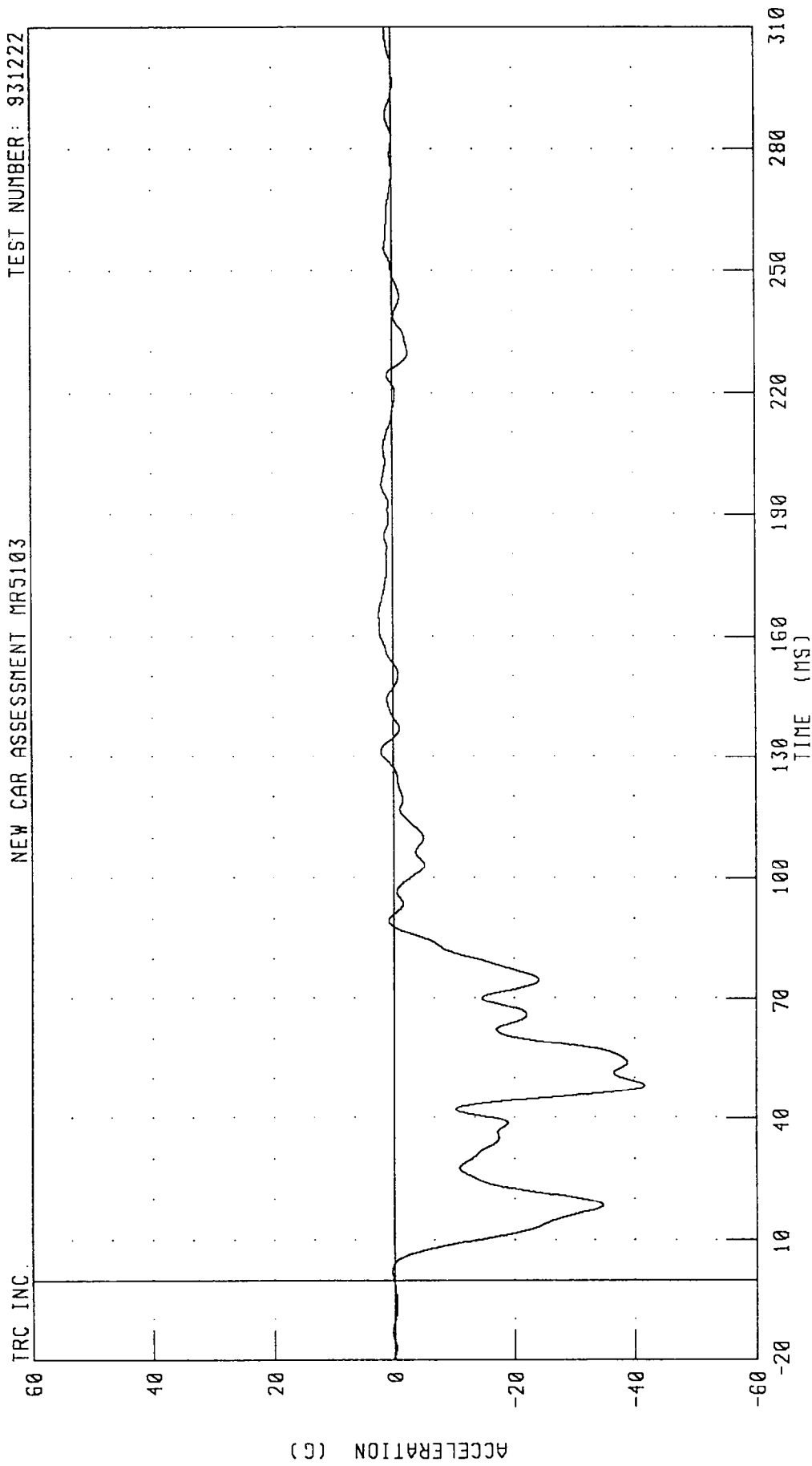
PEAK DATA: 653.33 MM @ 76.24 MS; 0 00 MM @ 0.00 MS

CHANNEL: TLRX01 FILTER: CH. CLASS 180

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 RIGHT REAR SEAT X-AXIS ACCELERATION

NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

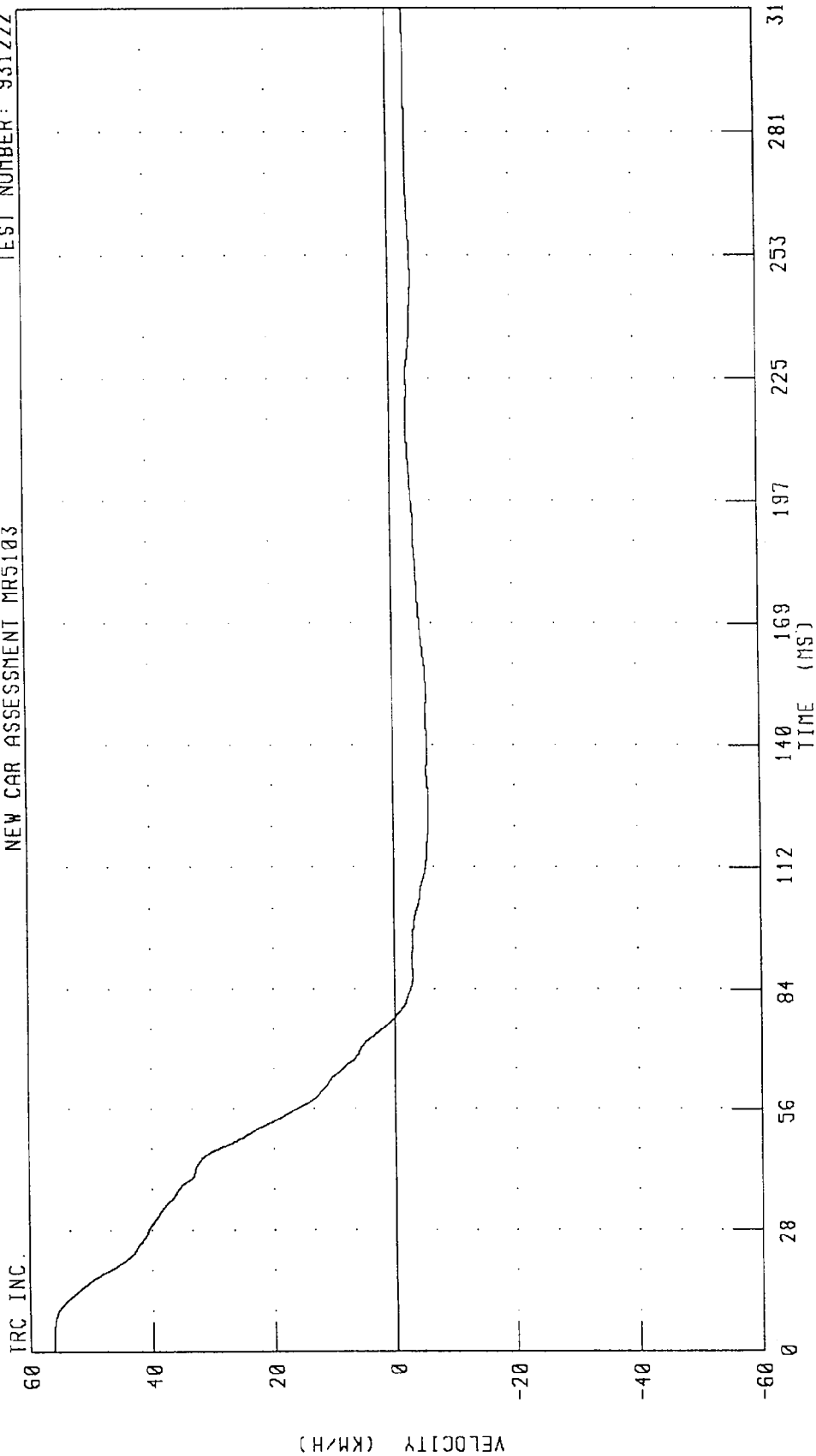


CHANNEL: TRRXG1 FILTER: CH. CLASS 60

PEAK DATA: 2.31 G @ 165.36 MS; -41.56 G @ 48.08 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
RIGHT REAR SEAT X-AXIS VELOCITY
NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

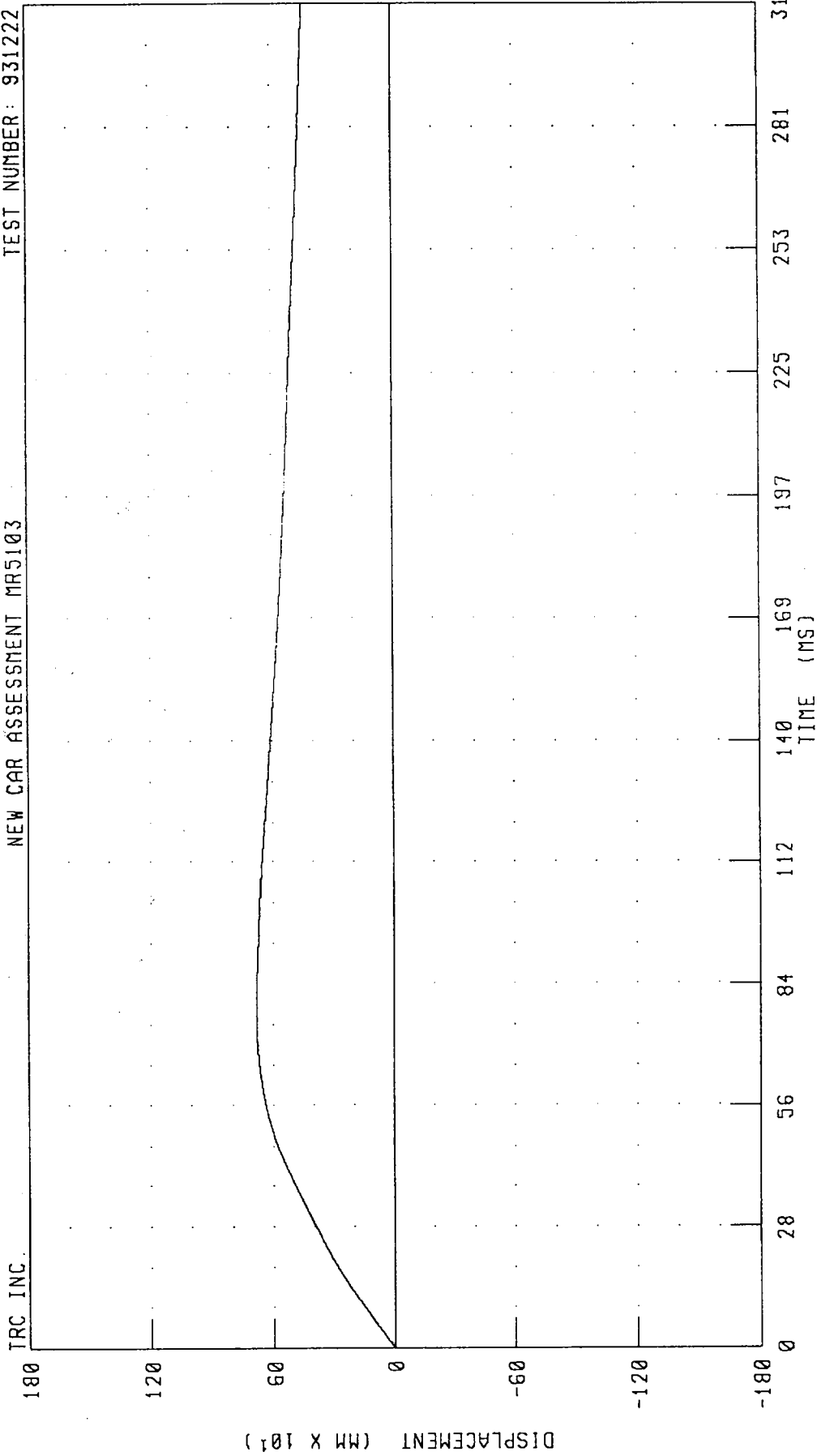


1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER

RIGHT REAR SEAT X-AXIS DISPLACEMENT

NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

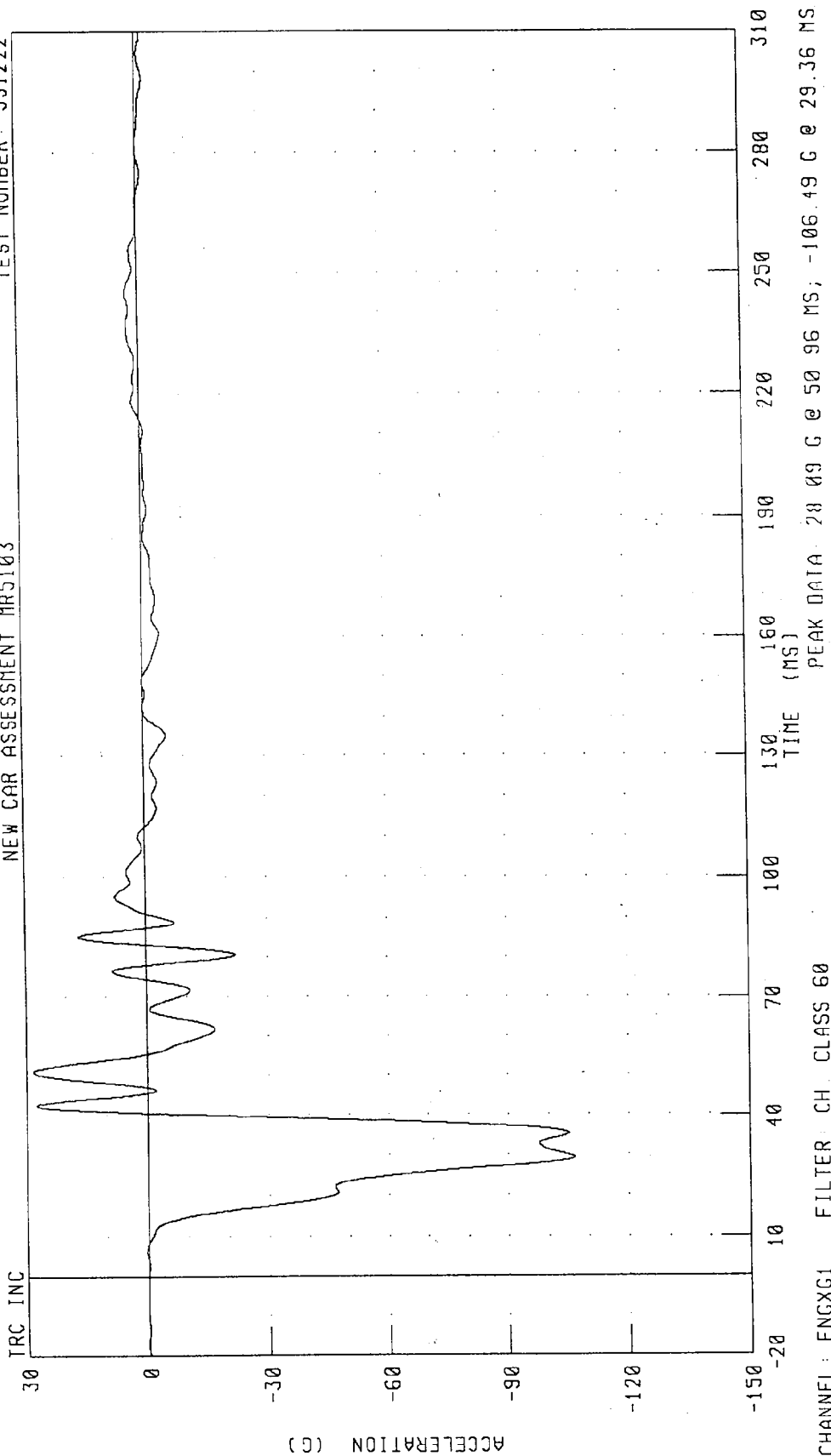


CHANNEL: TRRXD1 FILTER: CH. CLASS 180

PEAK DATA: 603.44 MM @ 78.00 MS, 0.00 MM @ 0.00 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
ENGINE TOP X-AXIS ACCELERATION
NEW CAR ASSESSMENT MR5103

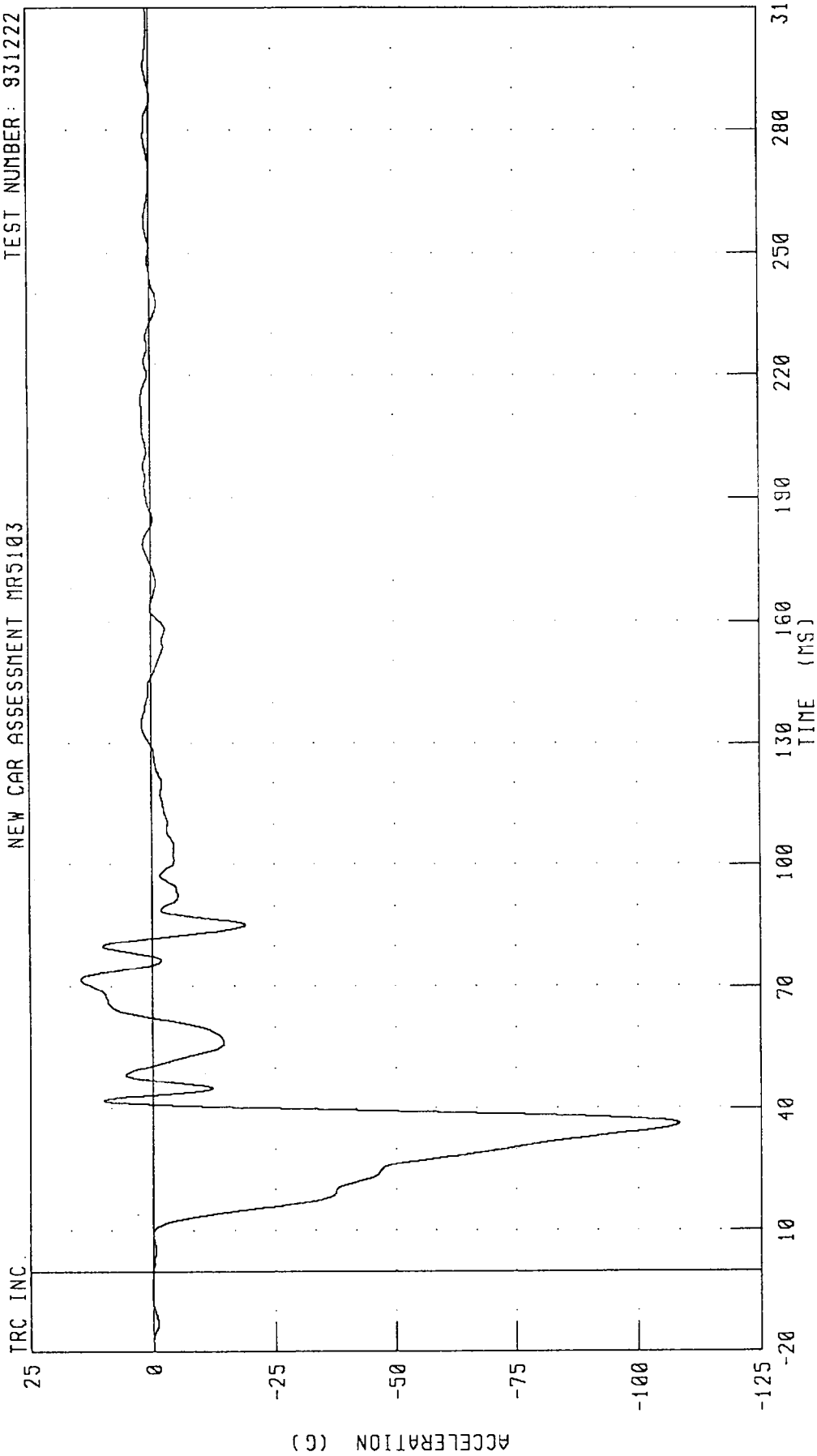
TEST NUMBER: 931222



CHANNEL: ENGXG1 FILTER: CH. CLASS 60

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 ENGINE BOTTOM X-AXIS ACCELERATION
 NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

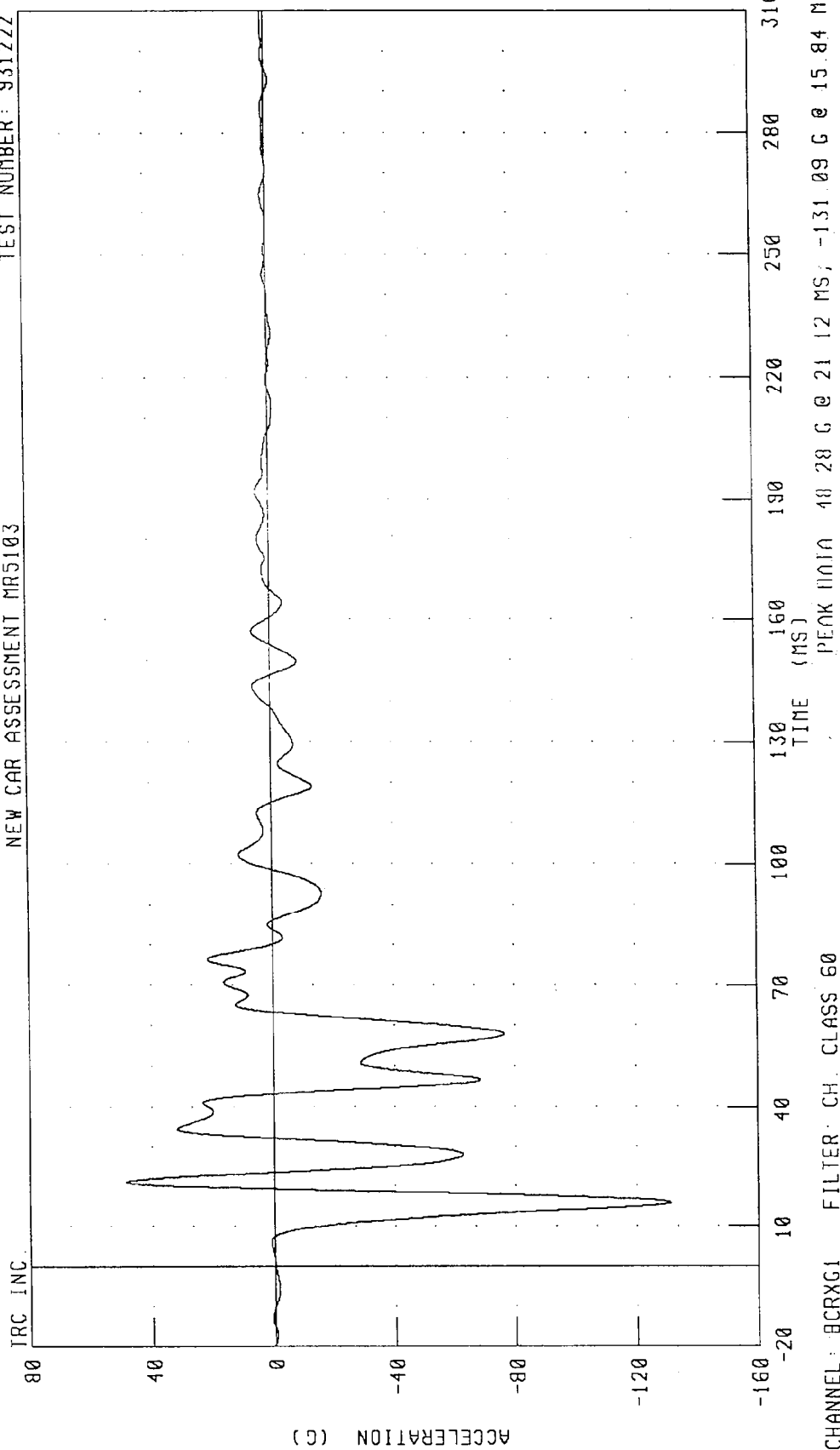


CHANNEL: ENGXC2 FILTER: CH CLASS 60

PEAK DATA 14.52 G @ 71.68 MS, -108.41 G @ 36.24 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 RIGHT BRAKE CALIPER X-AXIS ACCELERATION
 NEW CAR ASSESSMENT MR5103

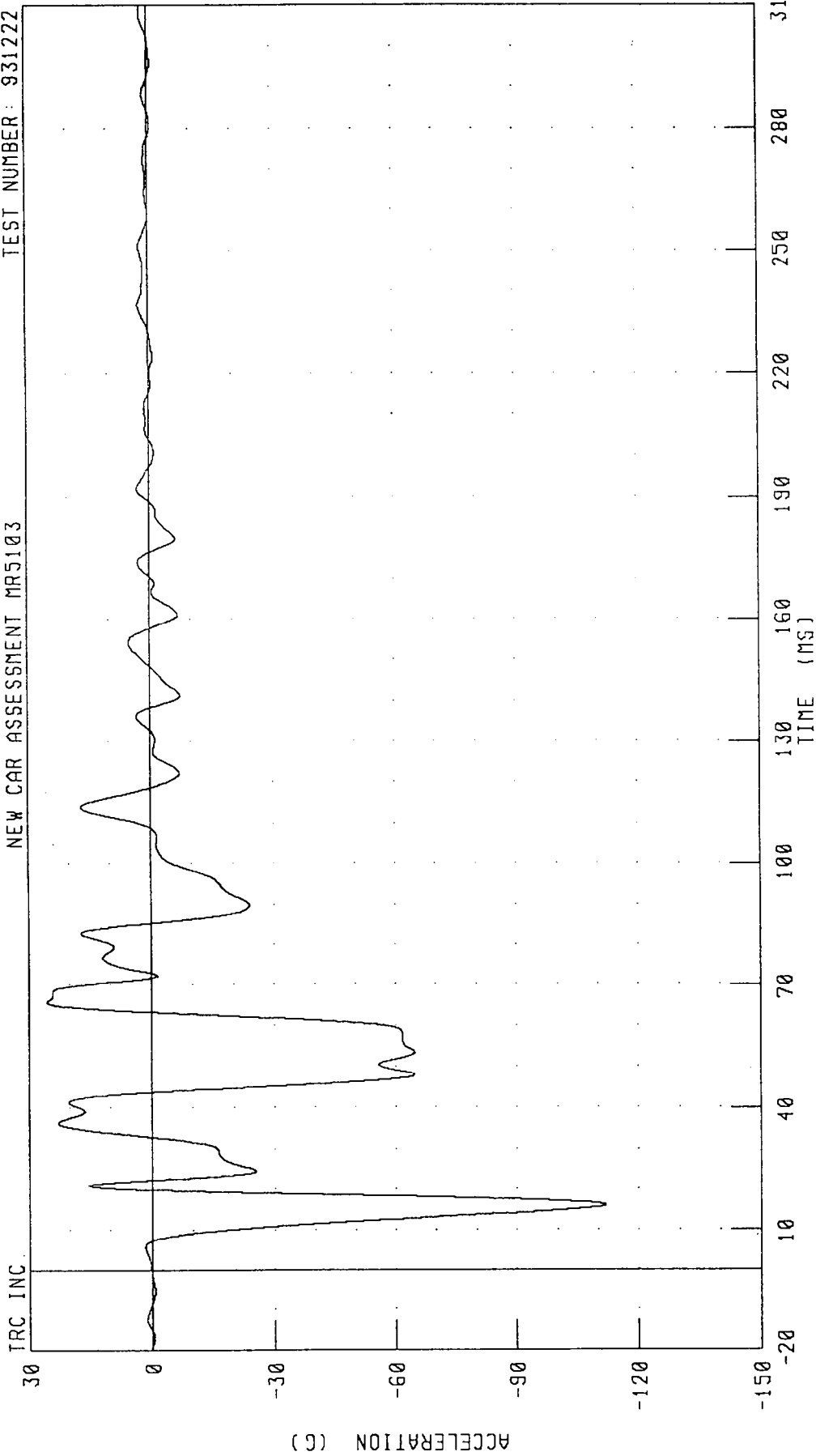
TEST NUMBER: 931222



1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
LEFT BRAKE CALIPER X-AXIS ACCELERATION

NEW CAR ASSESSMENT MR5103

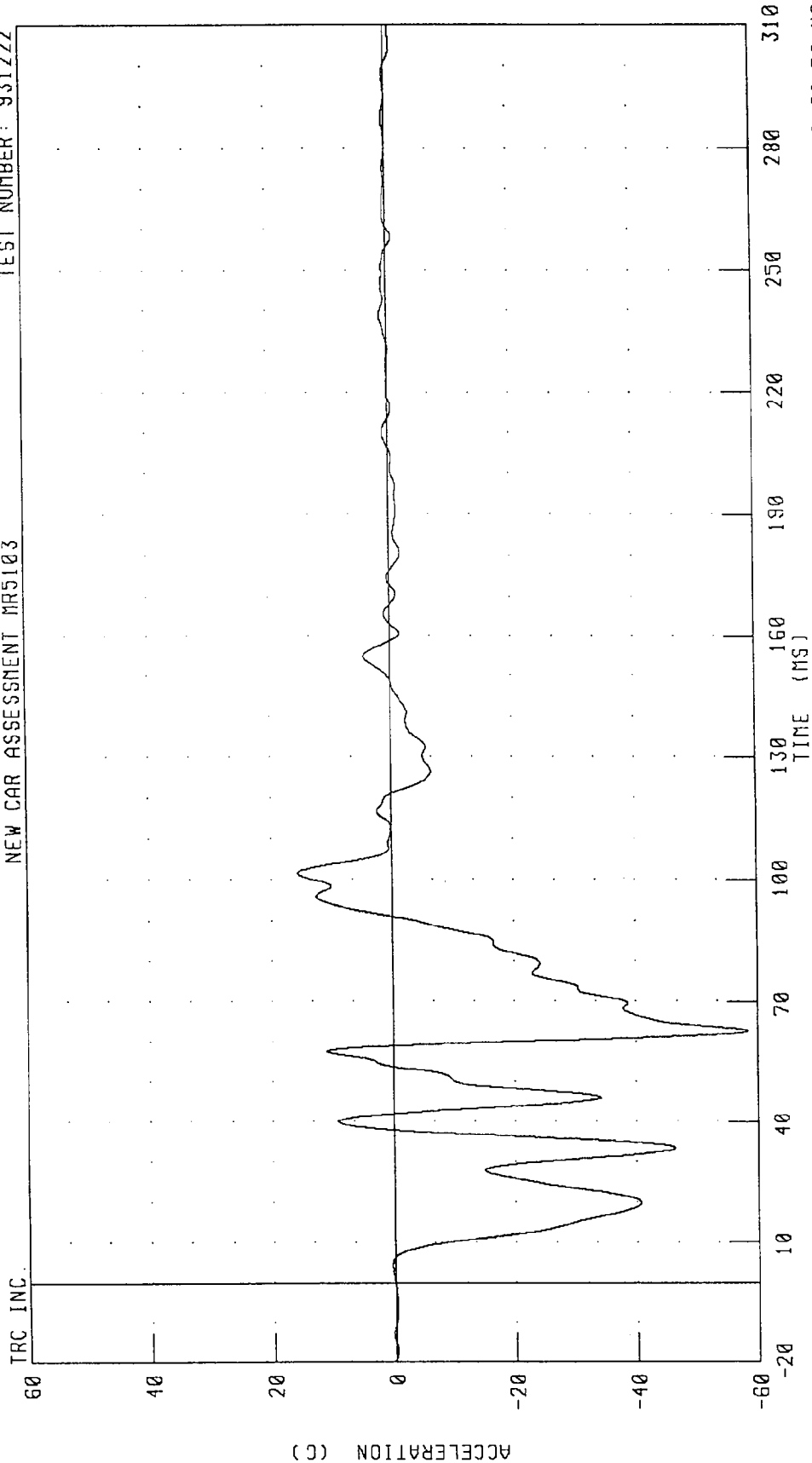
TEST NUMBER: 931222



CHANNEL: BCLXG1 FILTER: CH. CLASS 60

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
INSTRUMENT PANEL CENTER X-AXIS ACCELERATION
NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

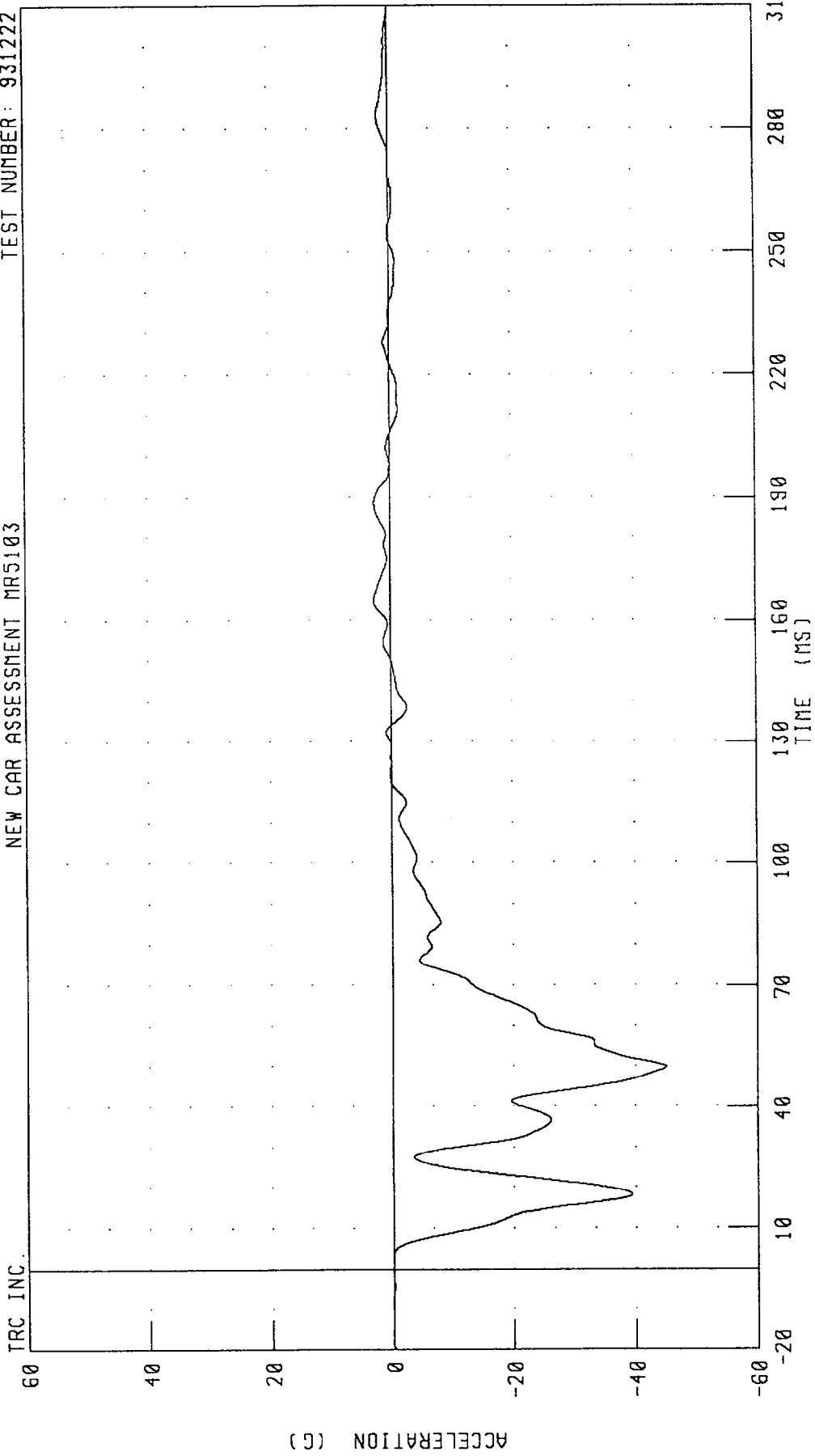


CHANNEL: 0PCXG1 FILTER: CH. CLASS 60

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
LEFT REAR SEAT REDUNDANT X-AXIS ACCELERATION

NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

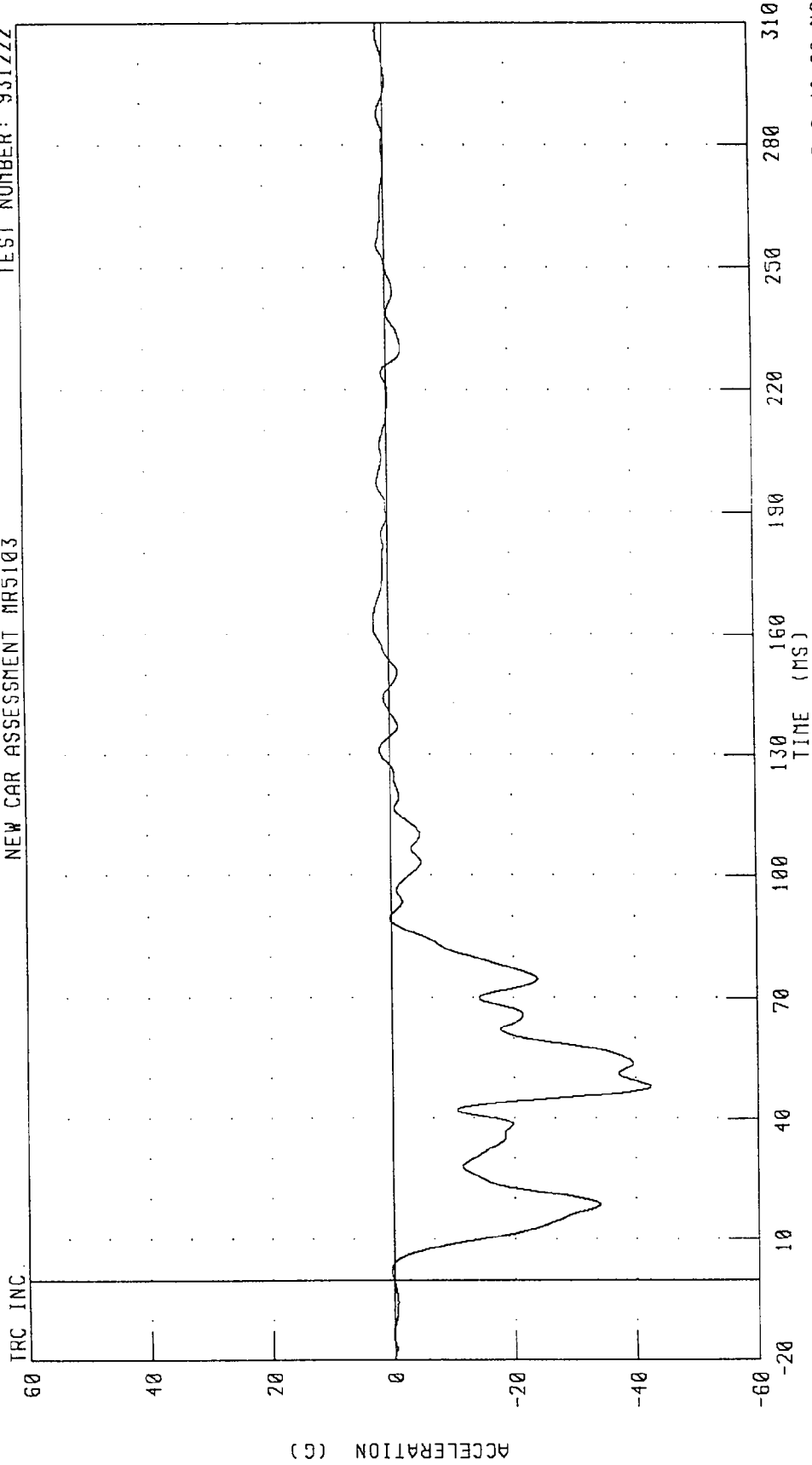


CHANNEL: TLRXGA FILTER: CH. CLASS 60

PEAK DATA: 2.78 G @ 164.80 MS; -45.00 G @ 164.80 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 RIGHT REAR SEAT REDUNDANT X-AXIS ACCELERATION
 NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222



CHANNEL: TRRXGA FILTER: CH. CLASS 60

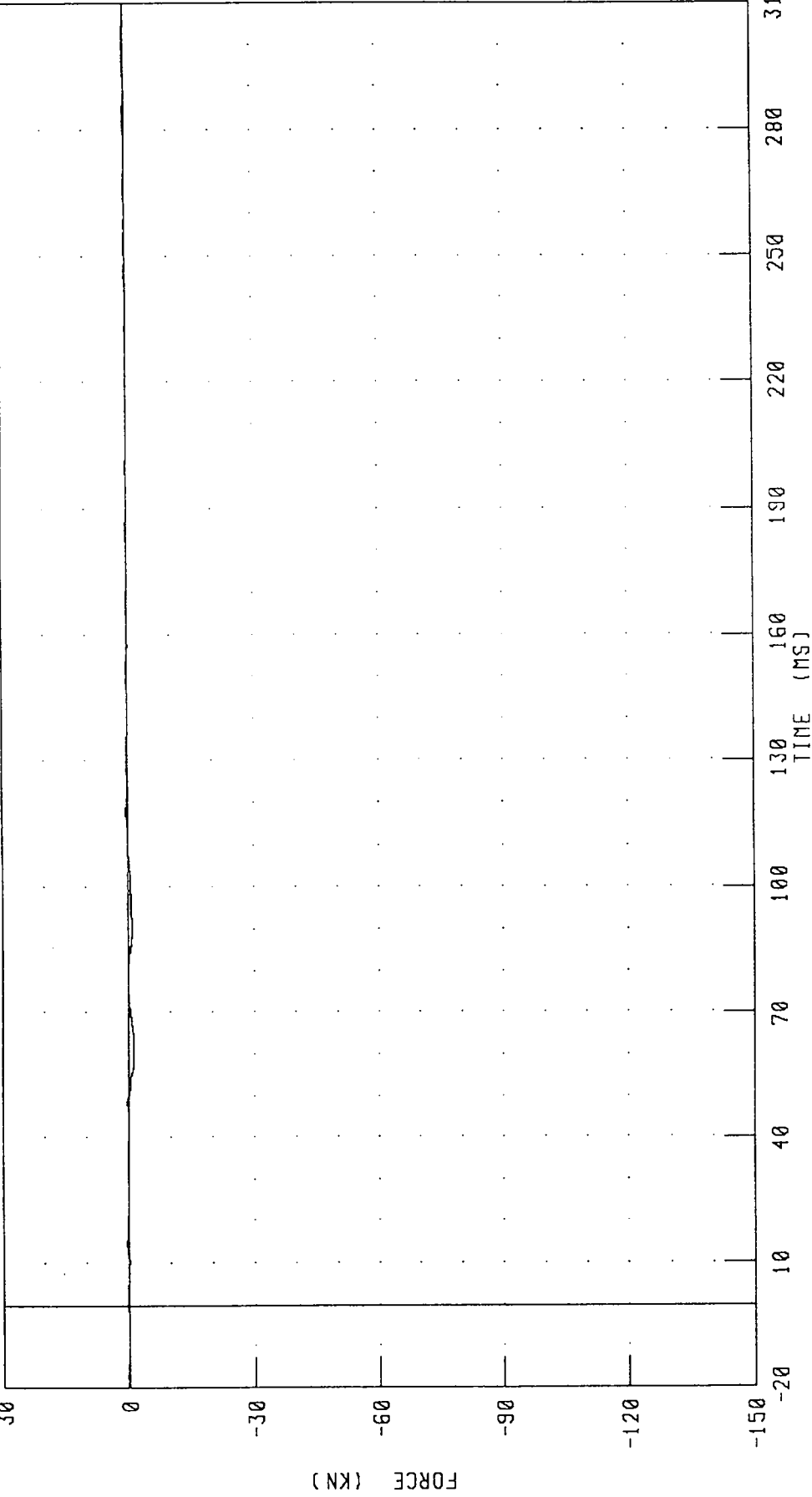
PEAK DATA 2 46 G @ 161.68 MS; -42.35 G @ 48.00 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A1 FORCE

TEST NUMBER: 931222

NEW CAR ASSESSMENT MR5103

TRC, INC.

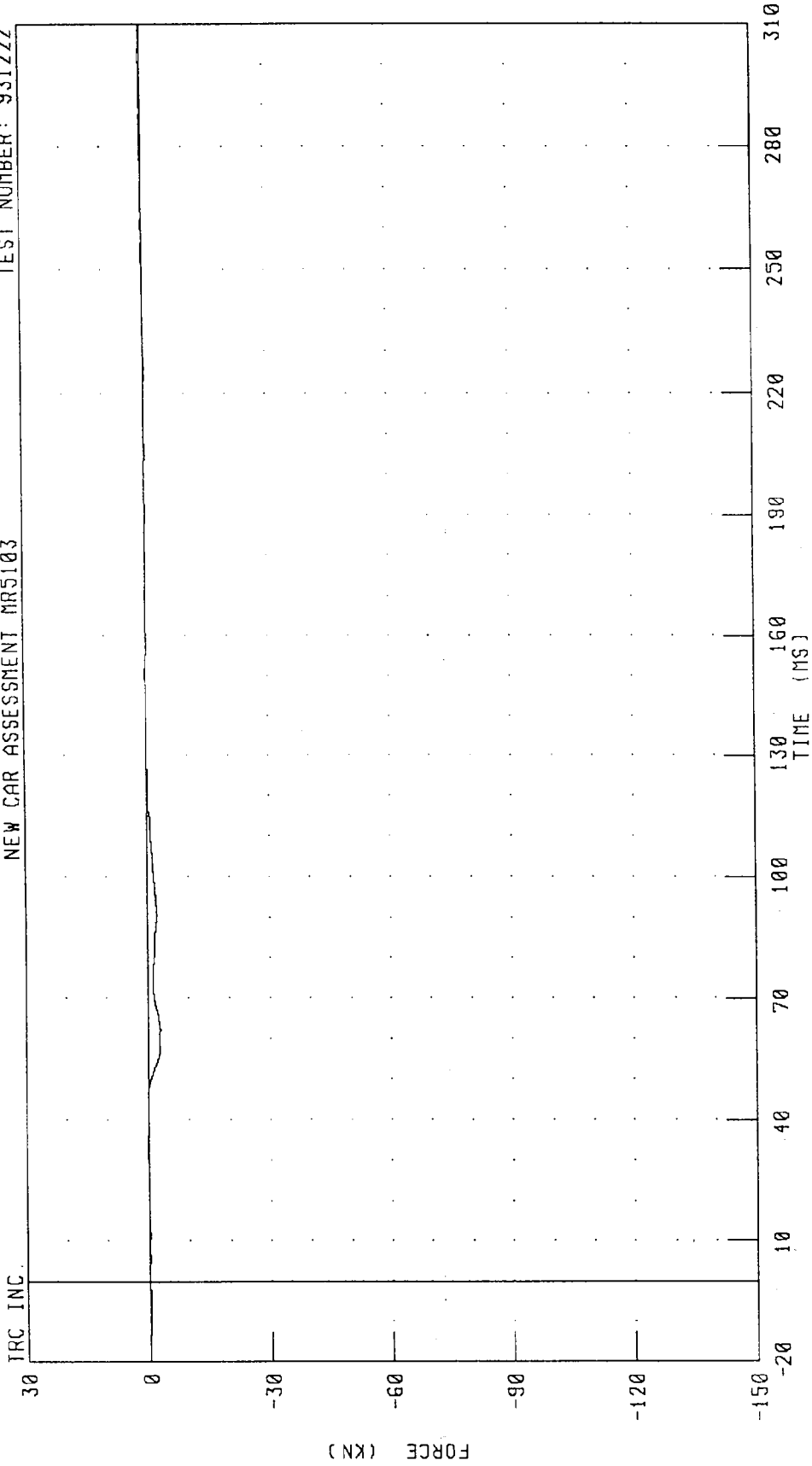


CHANNEL: BA1F FILTER: CH. CLASS 60

931222

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A2 FORCE
NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222



CHANNEL: BA2F FILTER: CH. CLASS 60

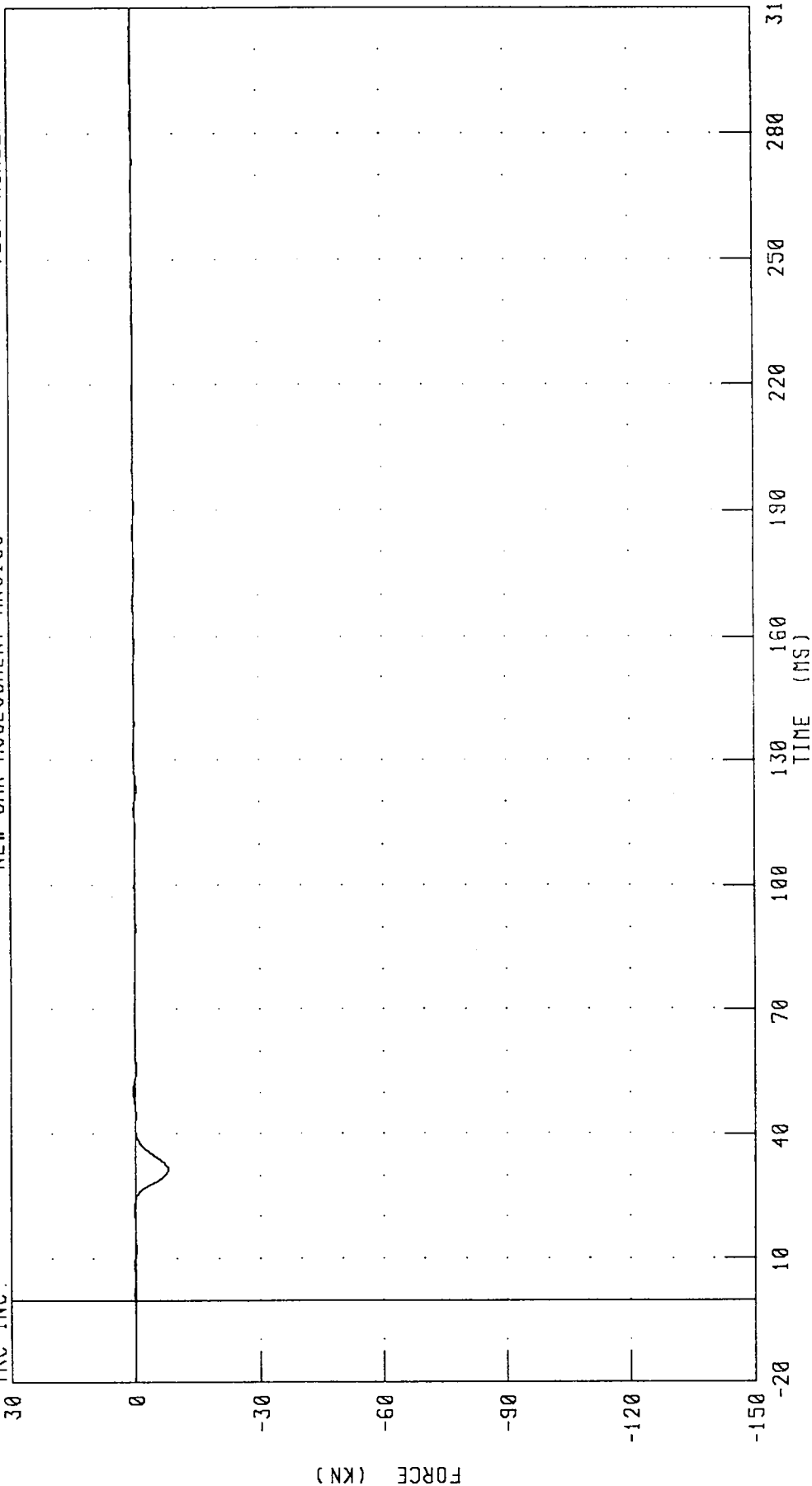
PEAK DATA 0 35 KN @ 302.50 MS; -2 96 KN @ 62.08 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A3 FORCE

TEST NUMBER: 931222

NEW CAR ASSESSMENT MR5103

TRC INC.

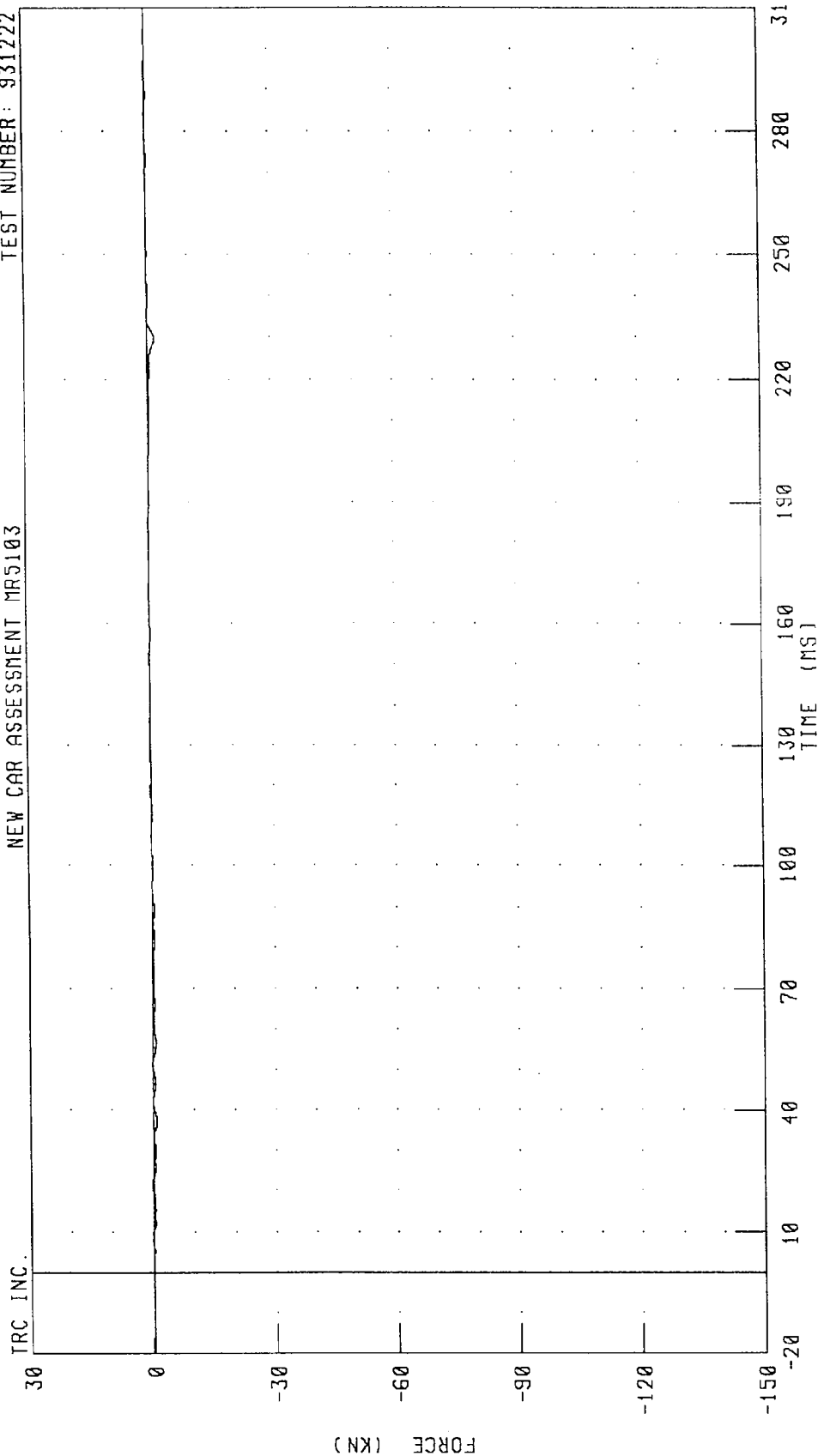


CHANNEL: BA3F FILTER: CH. CLASS 60

PEAK DATA 0.47 KN @ 50.64 MS, -7.88 KN @ 31.52 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A4 FORCE
 NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222



PEAK DATA: 0.33 KN @ 131.60 MS; -1.81 KN @ 229.76 MS

CHANNEL: BA4F FILTER: CH. CLASS 60

FORCE (KN)

TIME (MS)

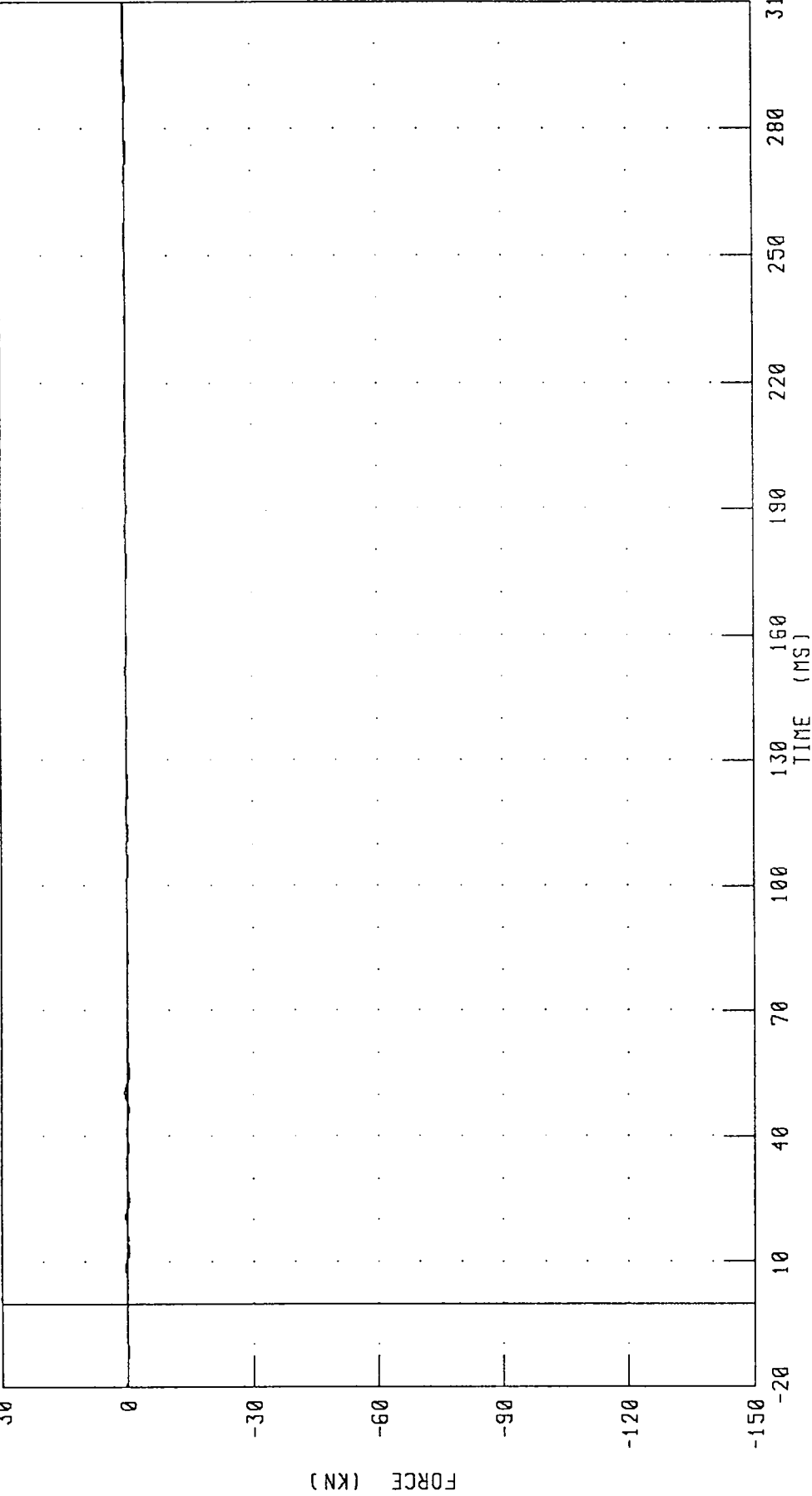
TRC INC.

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A5 FORCE

TEST NUMBER: 931222

NEW CAR ASSESSMENT MR5103

TRC INC.



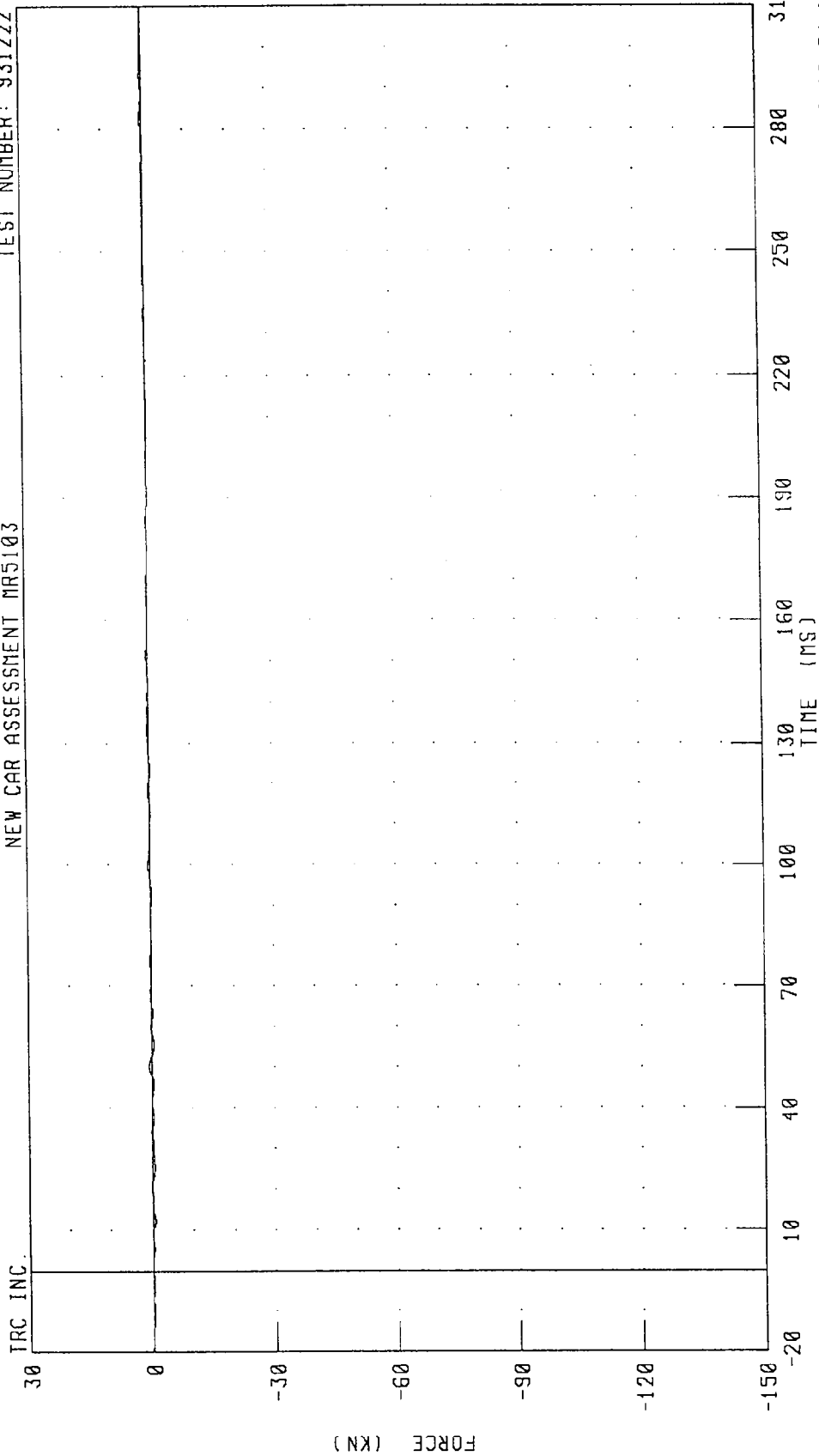
PEAK DATA: 0.61 KN @ 50.64 MS; -0.58 KN @ 55.12 MS

FILTER: CH. CLASS 60

CHANNEL: BASF

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A6 FORCE
 NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222



PEAK DATA 0.61 KN @ 50.24 MS, -0.71 KN @ 12.24 MS

FILTER: CH. CLASS 60

CHANNEL: B6F

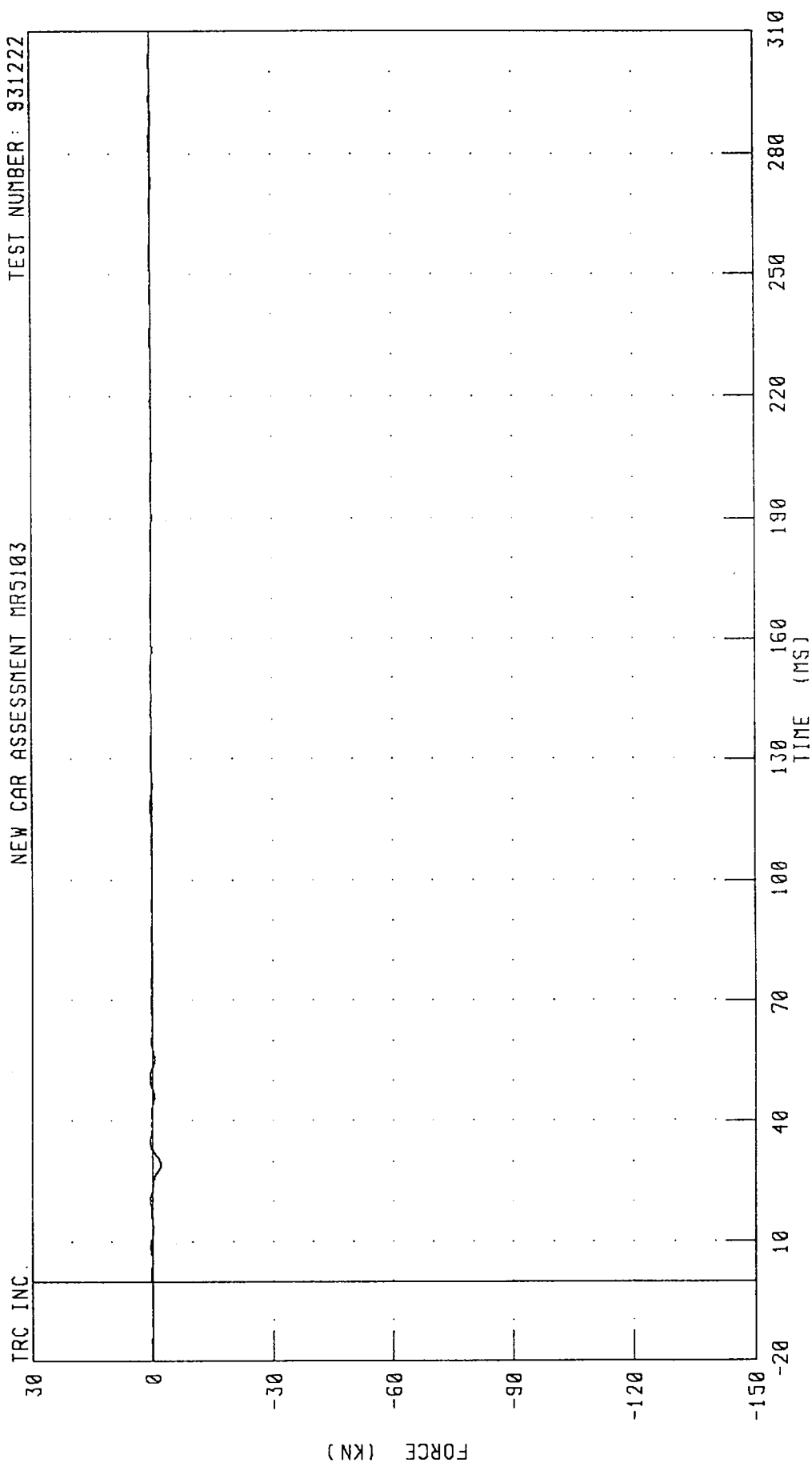
FORCE (KN)

TIME (MS)

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A7 FORCE

NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

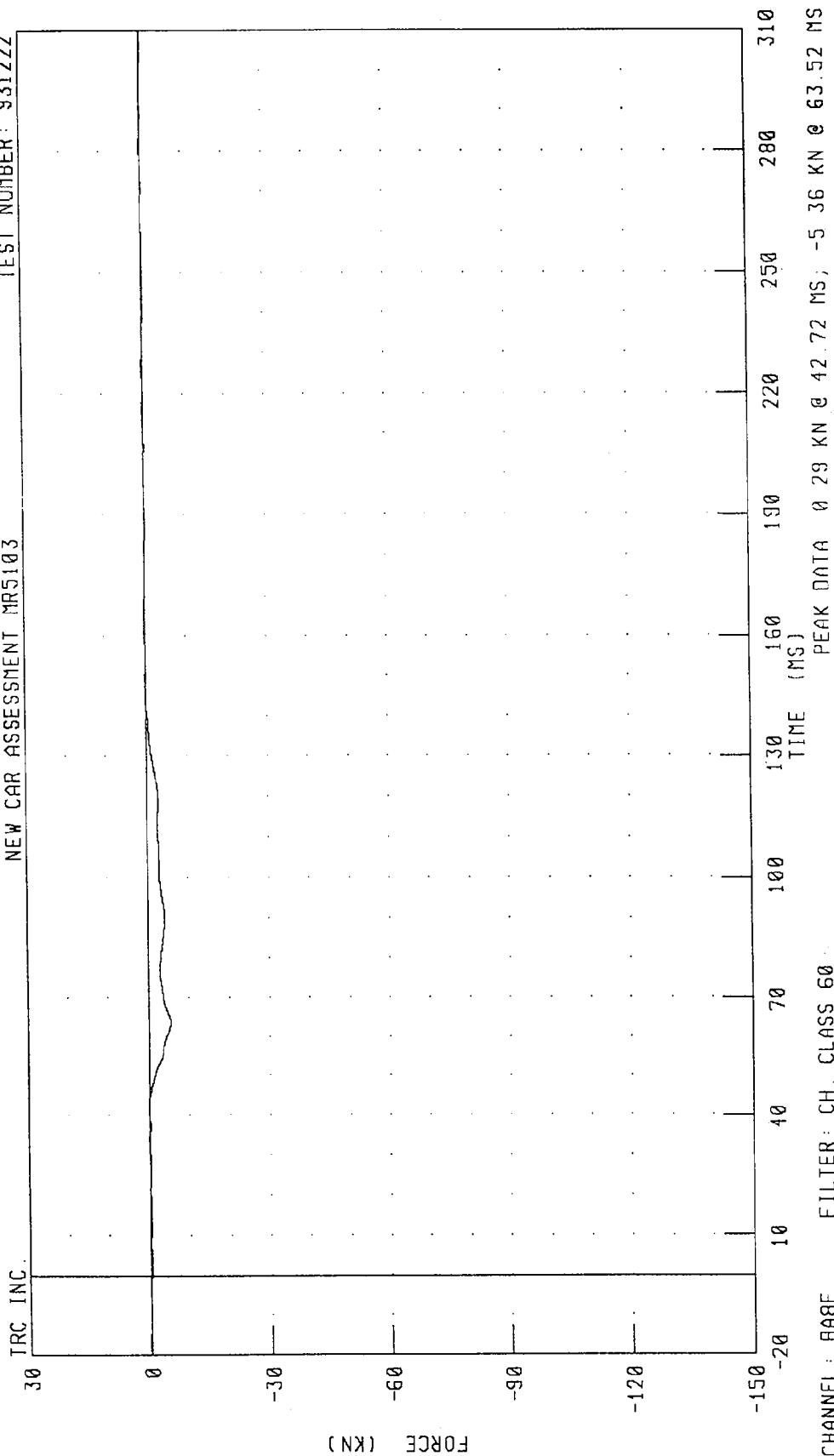


CHANNEL: BA7F FILTER: CH. CLASS 60

PEAK DATA 0.56 KN @ 34.88 MS, -2.10 KN @ 29.36 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A8 FORCE
 NEW CAR ASSESSMENT MRS103

TEST NUMBER: 931222



PEAK DATA 0 29 KN @ 42.72 MS, -536 KN @ 63.52 MS

FILTER: CH. CLASS 60

CHANNEL: BA8F

FORCE (KN)

TIME (MS)

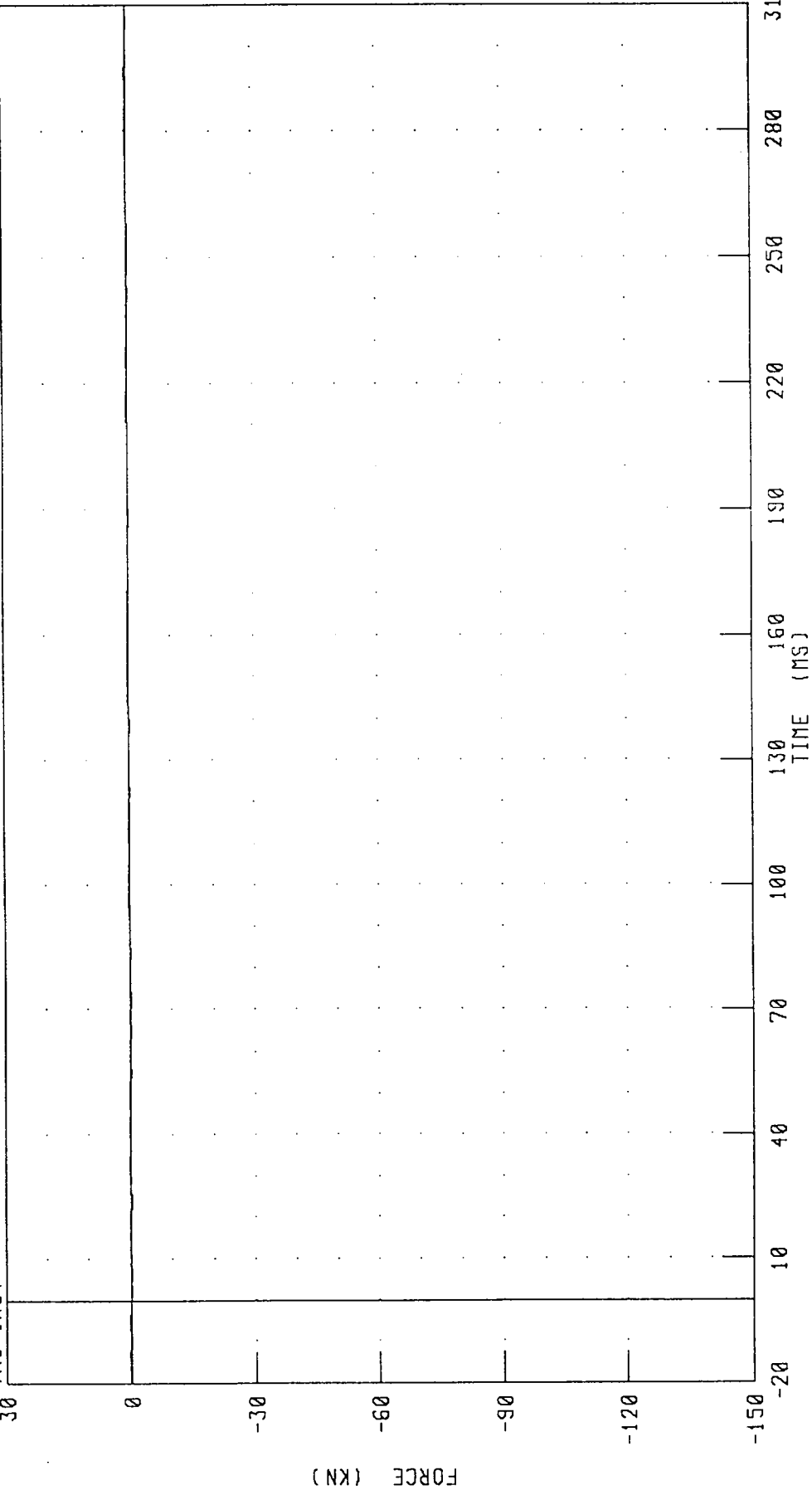
TRC INC.

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A9 FORCE

TEST NUMBER: 931222

NEW CAR ASSESSMENT MR5103

TRC INC.

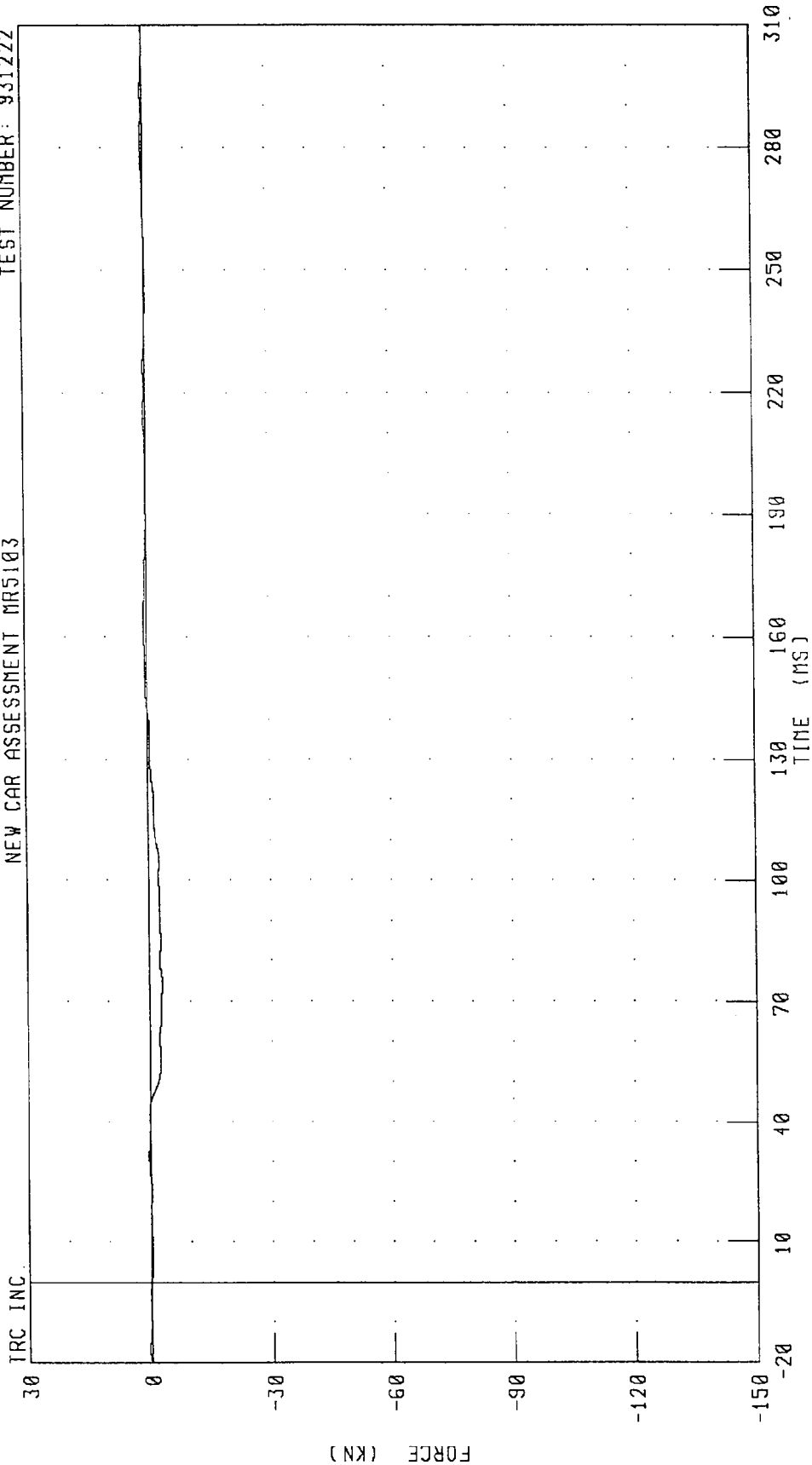


CHANNEL: BASF

FILTER: CH. CLASS 60

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION B1 FORCE
 NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222



PEAK DATA 0 70 KN @ 166.64 MS; -3.12 KN @ 73.84 MS

CHANNEL: 6B1F FILTER: CH. CLASS 60

FORCE (KN)

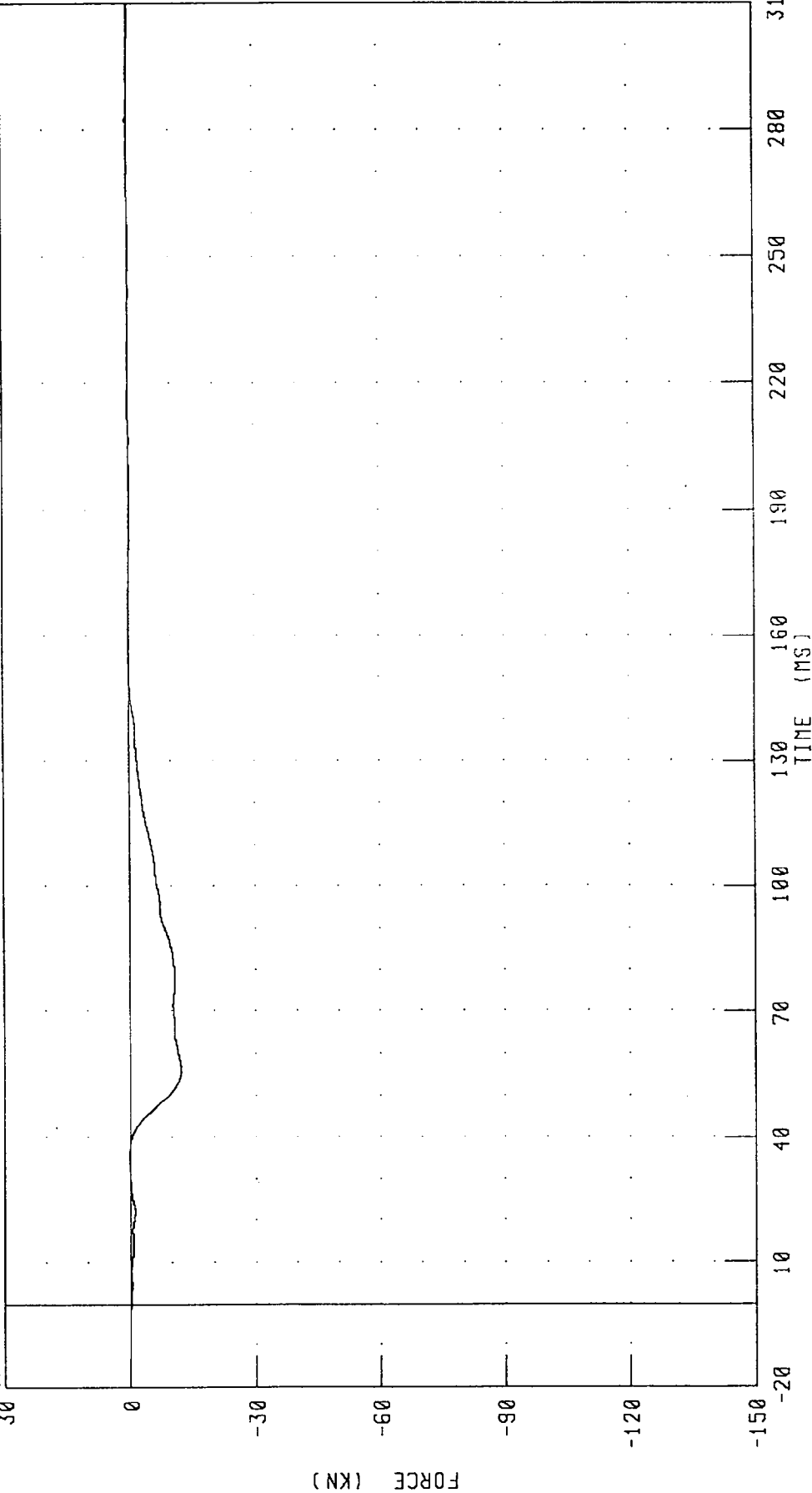
TIME (MS)

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B2 FORCE

TEST NUMBER: 931222

NEW CAR ASSESSMENT NR5103

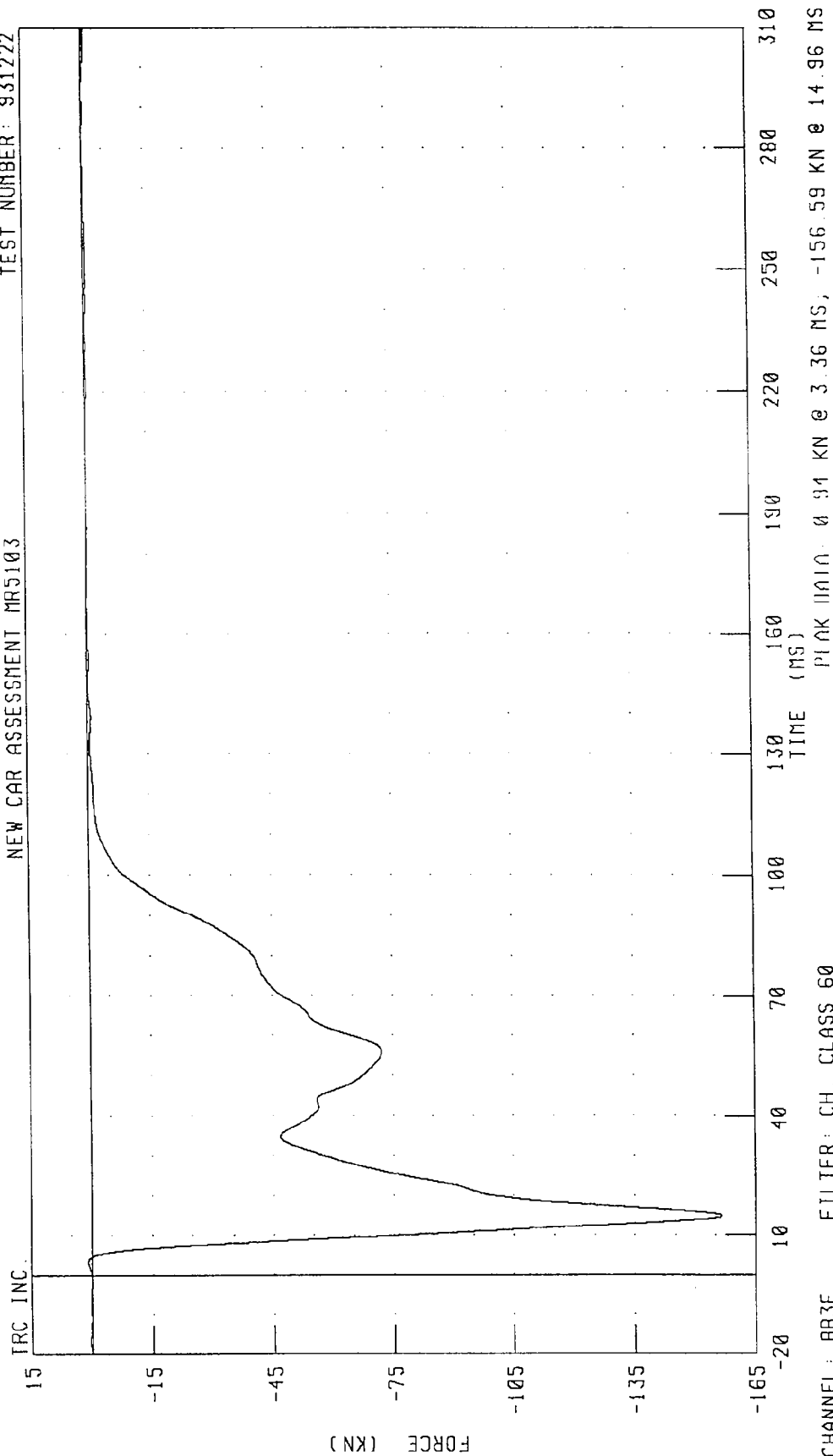
TRC INC.



CHANNEL: BB2F FILTER: CH CLASS 60

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION B3 FORCE
 NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222



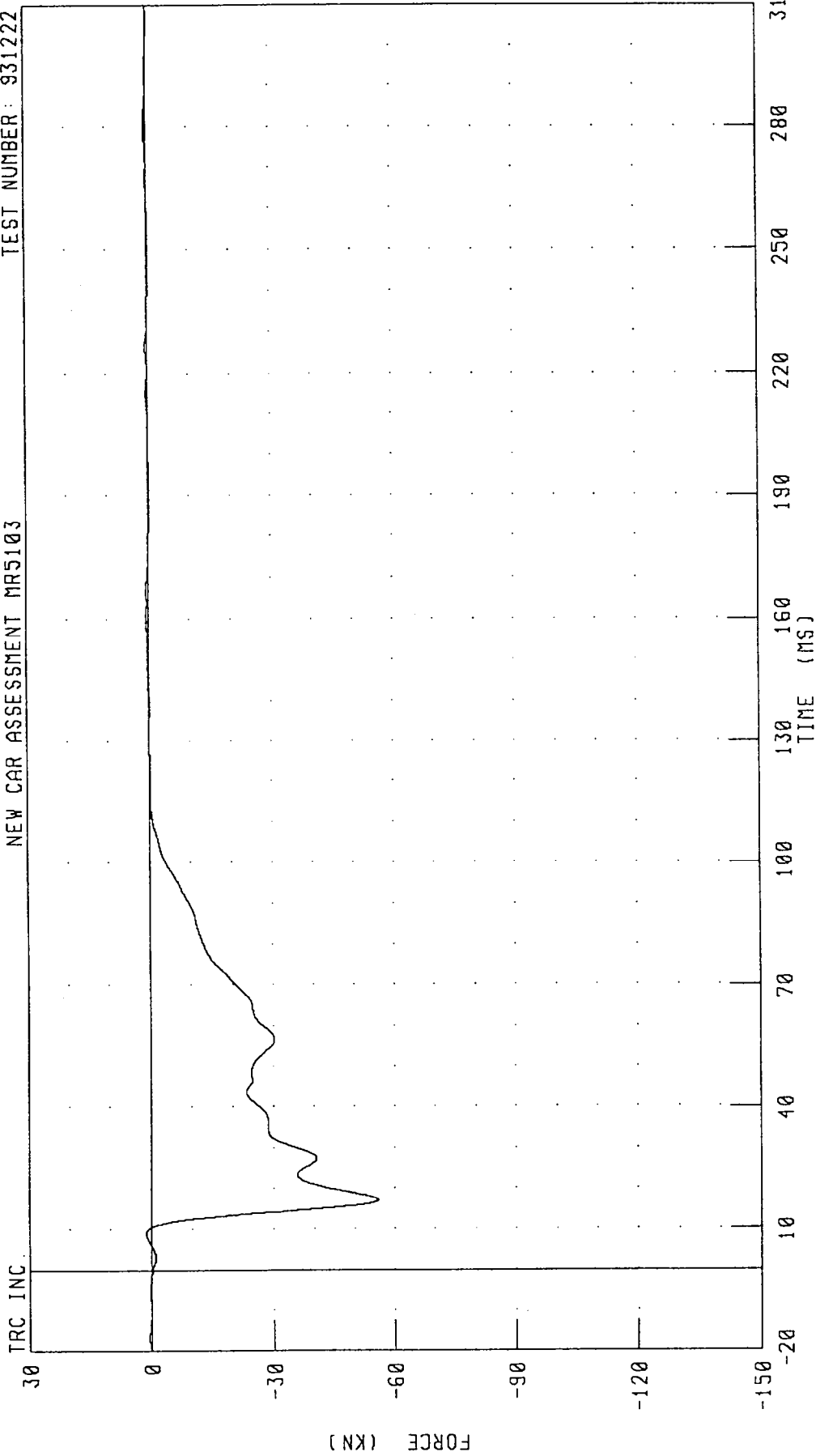
CHANNEL: BB3F FILTER: CH. CLASS 60

PEAK MAX: 0.91 KN @ 3.36 MS, -156.59 KN @ 14.96 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B4 FORCE

NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

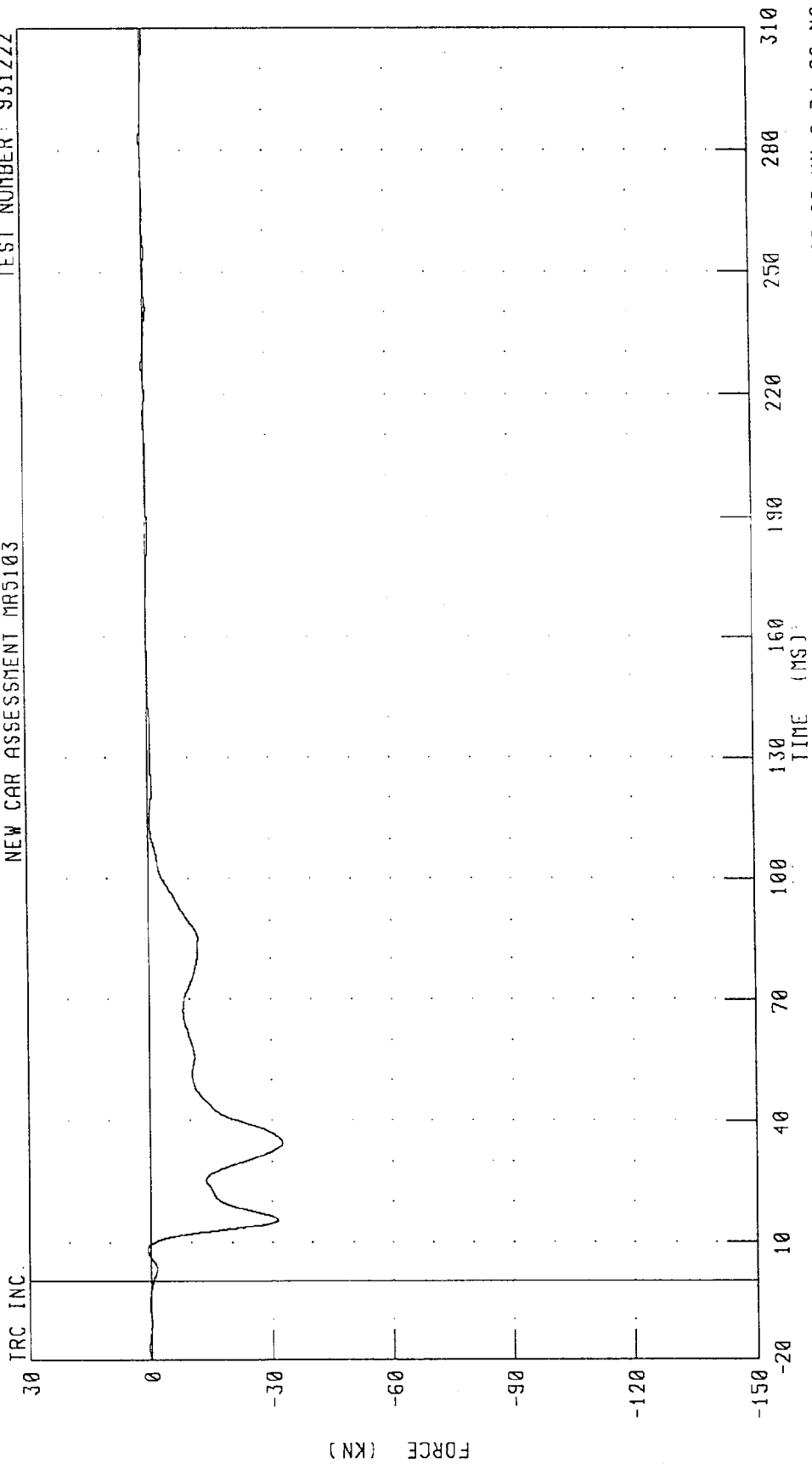


PEAK DATA: 1.30 KN @ 8.88 MS; -55.89 KN @ 17.04 MS

CHANNEL: BB4F FILTER: CH. CLASS 60

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B5 FORCE
NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222



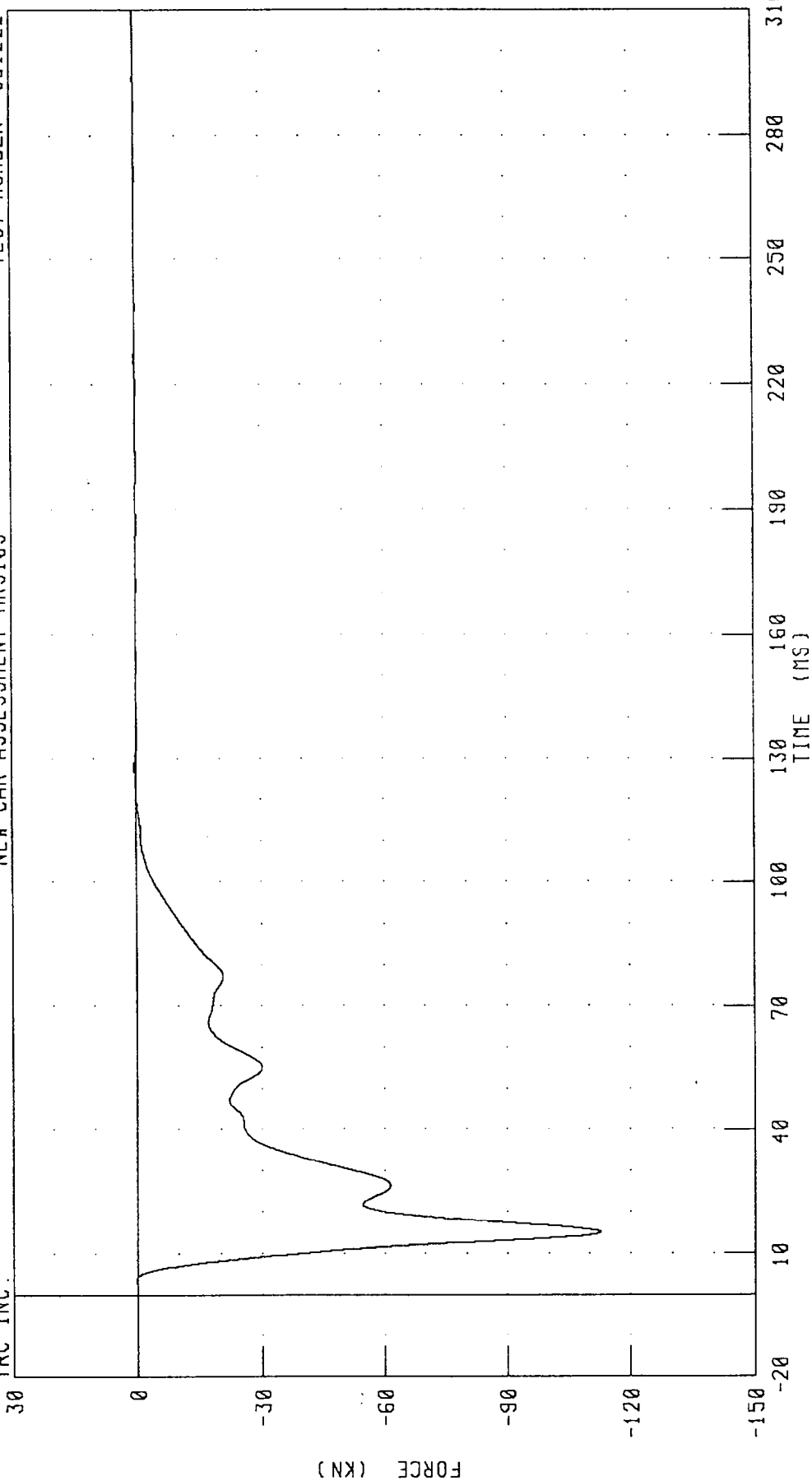
PEAK DATA: 0.70 KN @ 8.16 MS, -32.66 KN @ 34.80 MS

CHANNEL: 885F FILTER: CH. CLASS 60

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION B6 FORCE
 NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

TRC INC.



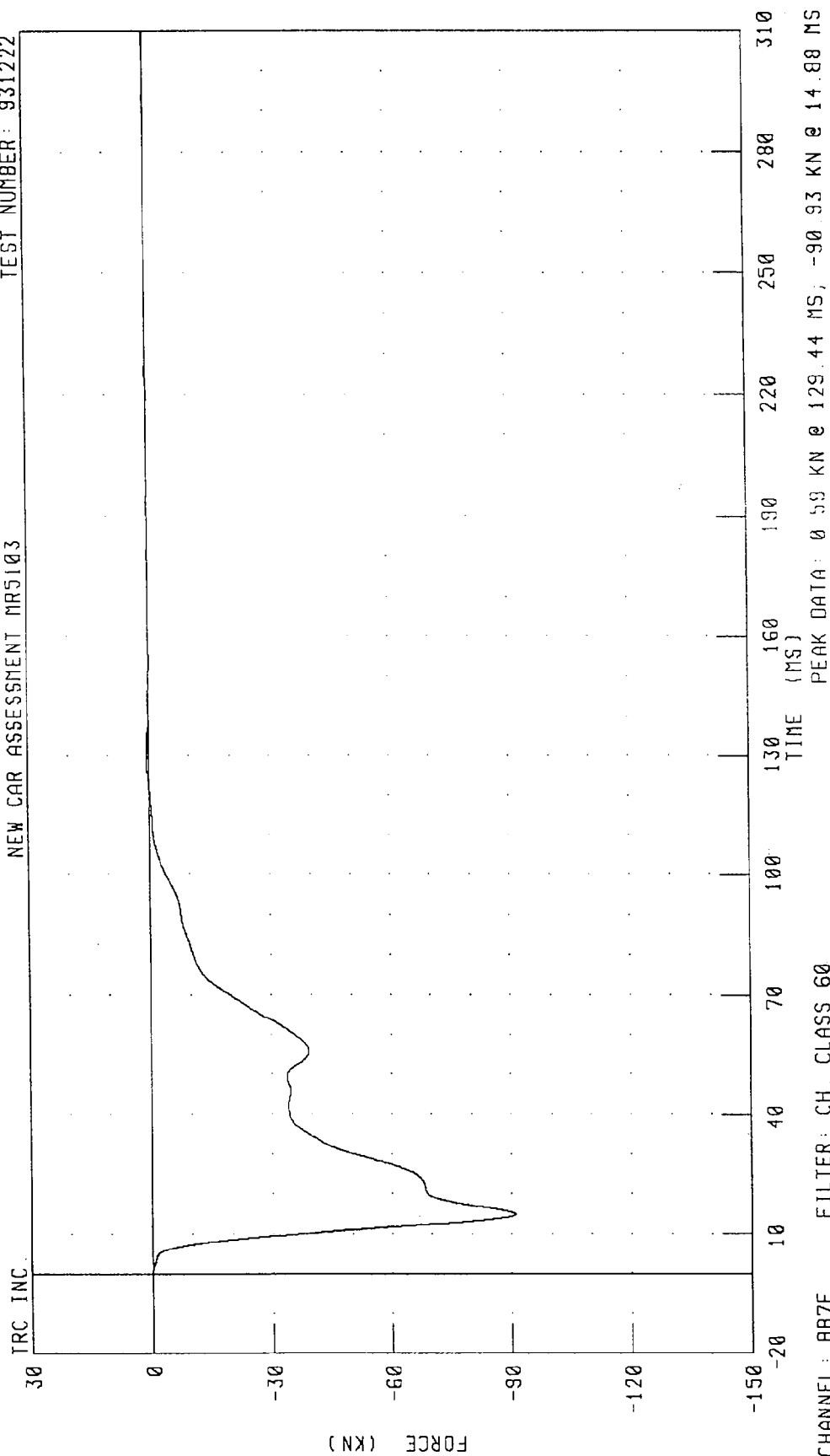
PEAK DATA: 0.41 KN @ 127.84 MS, -112.79 KN @ 15.12 MS

FILTER: CH. CLASS 60

CHANNEL: BB6F

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION B7 FORCE
 NEW CAR ASSESSMENT NR5103

TEST NUMBER: 931222



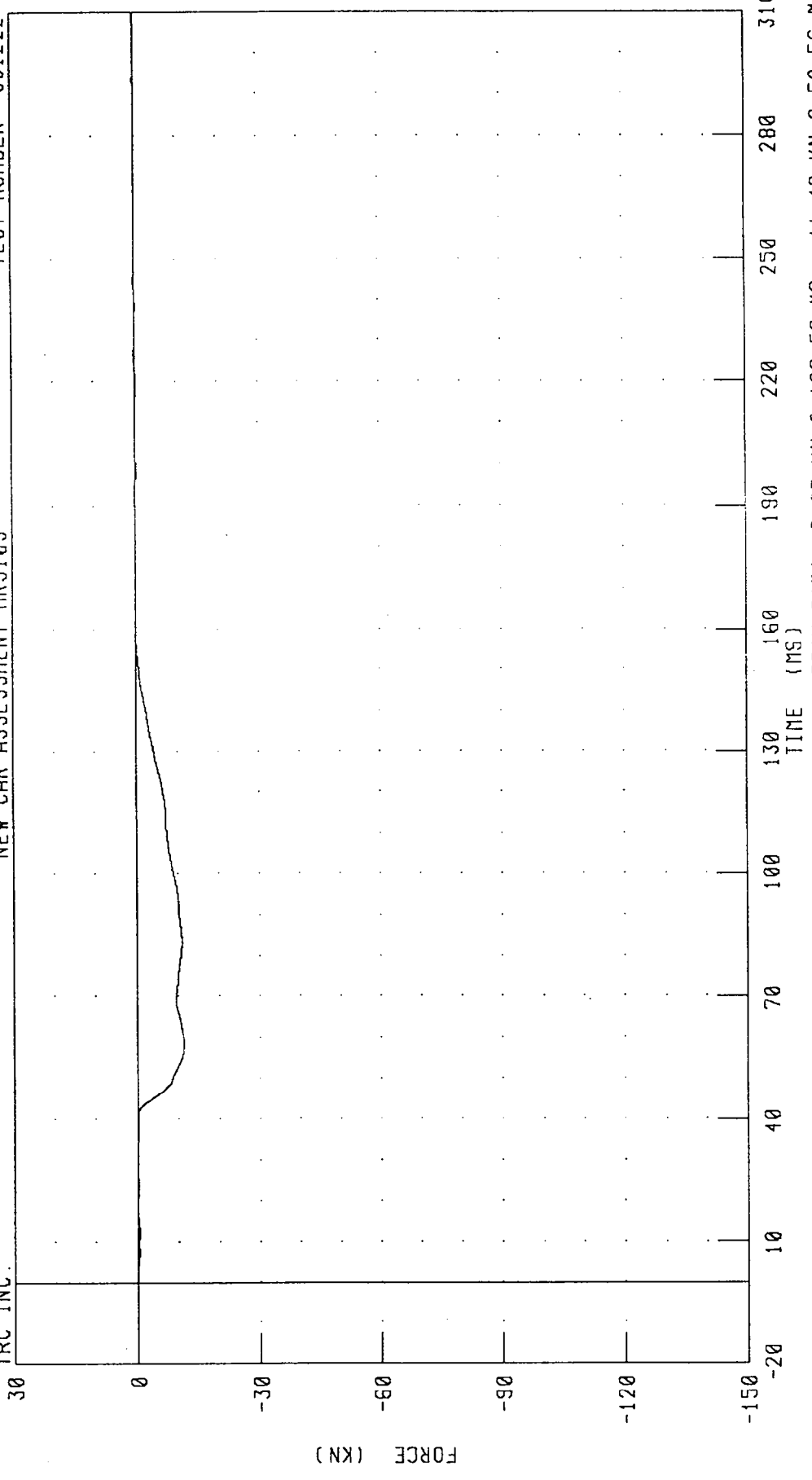
CHANNEL: BB7F FILTER: CH. CLASS 60

PEAK DATA: 0.59 KN @ 129.44 MS; -90.93 KN @ 14.88 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B8 FORCE
NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

TRC INC.

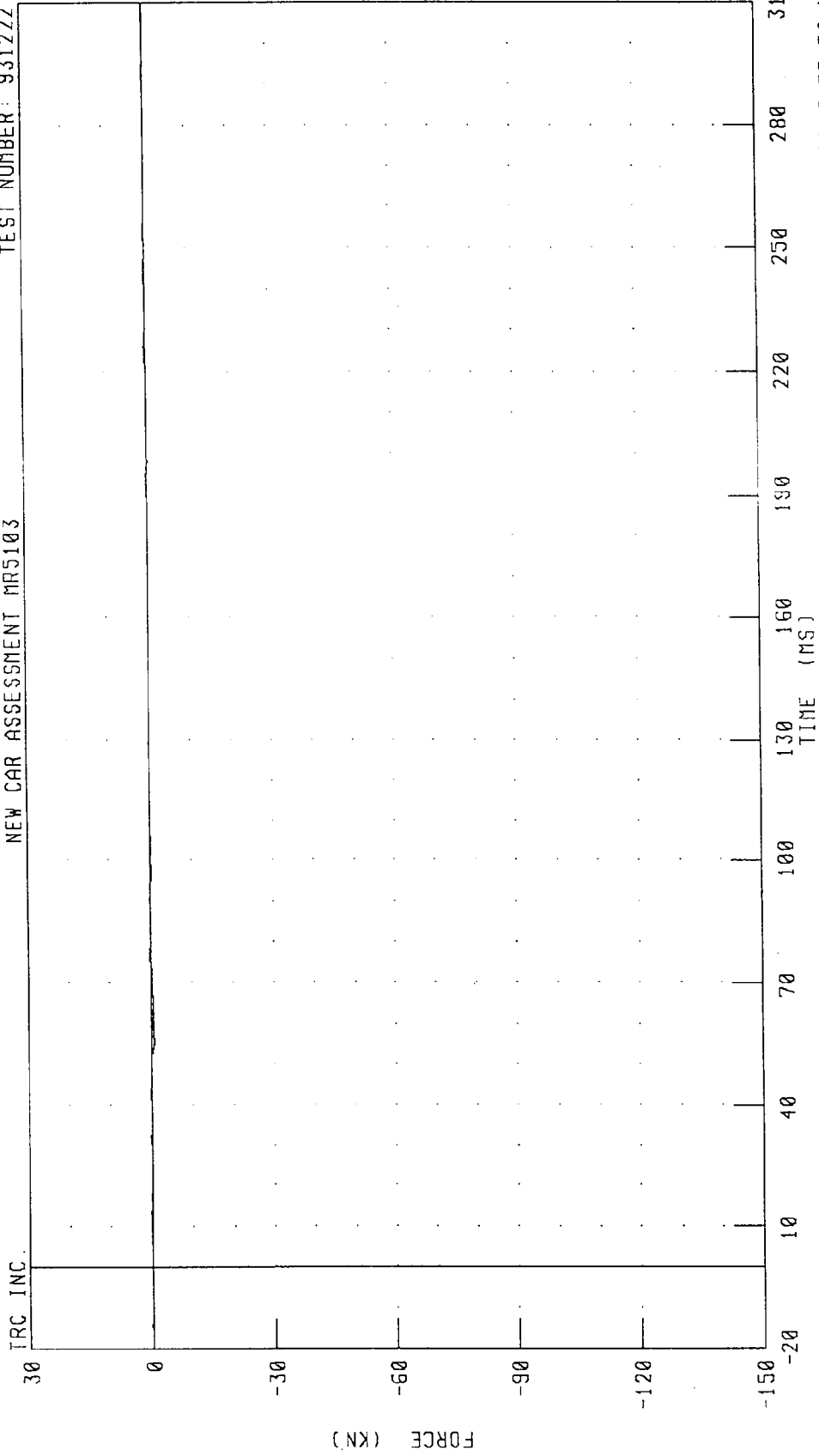


PEAK DATA: 0 23 KN @ 192.56 MS, -11.42 KN @ 58.56 MS

CHANNEL: BB8F FILTER: CH. CLASS 60

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION B9 FORCE
 NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222



PEAK VALUE 0.34 KN @ 226.08 MS, -0.70 KN @ 55.52 MS

FILTER: CH CLASS 60

CHANNEL: BB9F

FORCE (KN)

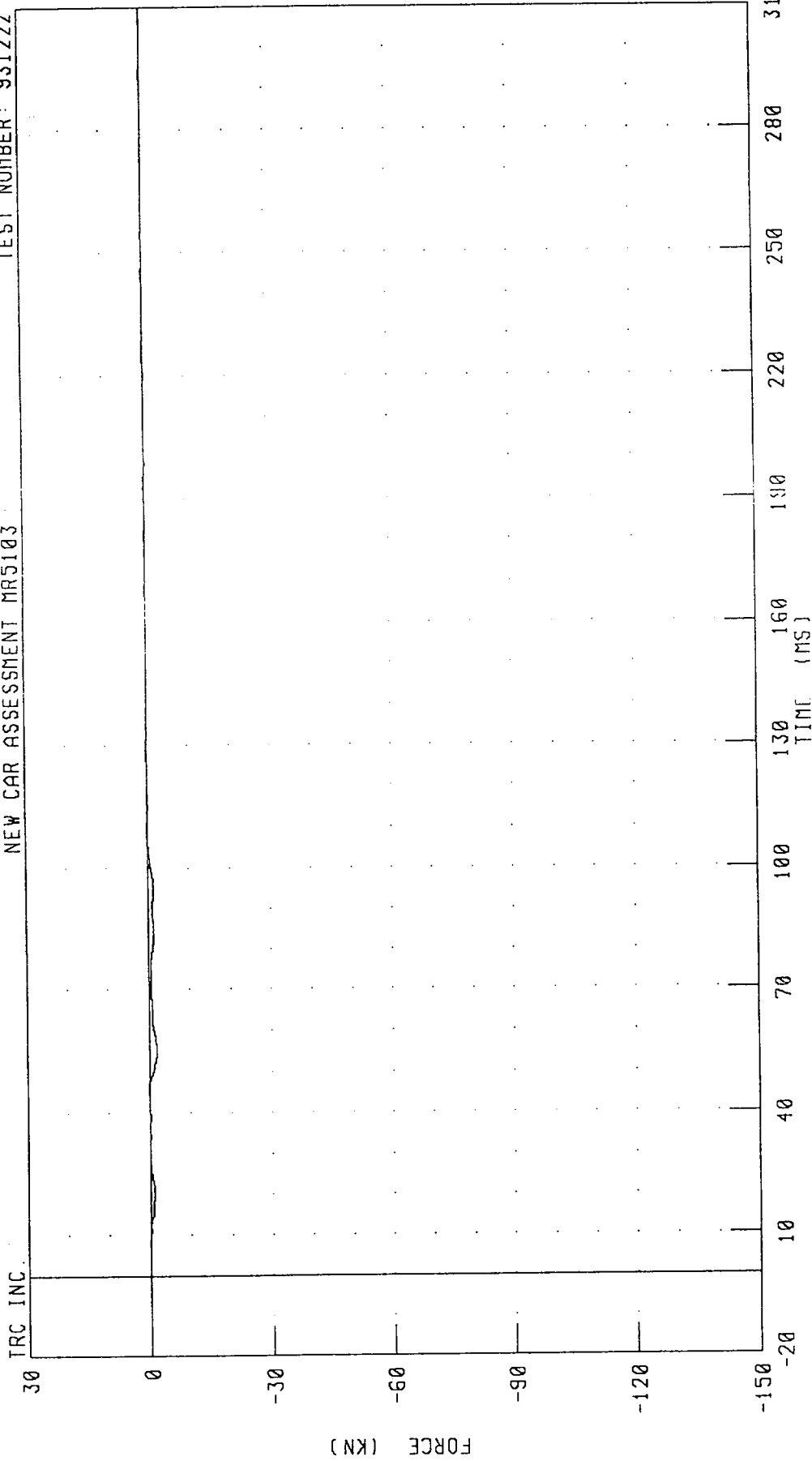
TIME (MS)

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER

LOAD CELL BARRIER POSITION C1 FORCE

NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222



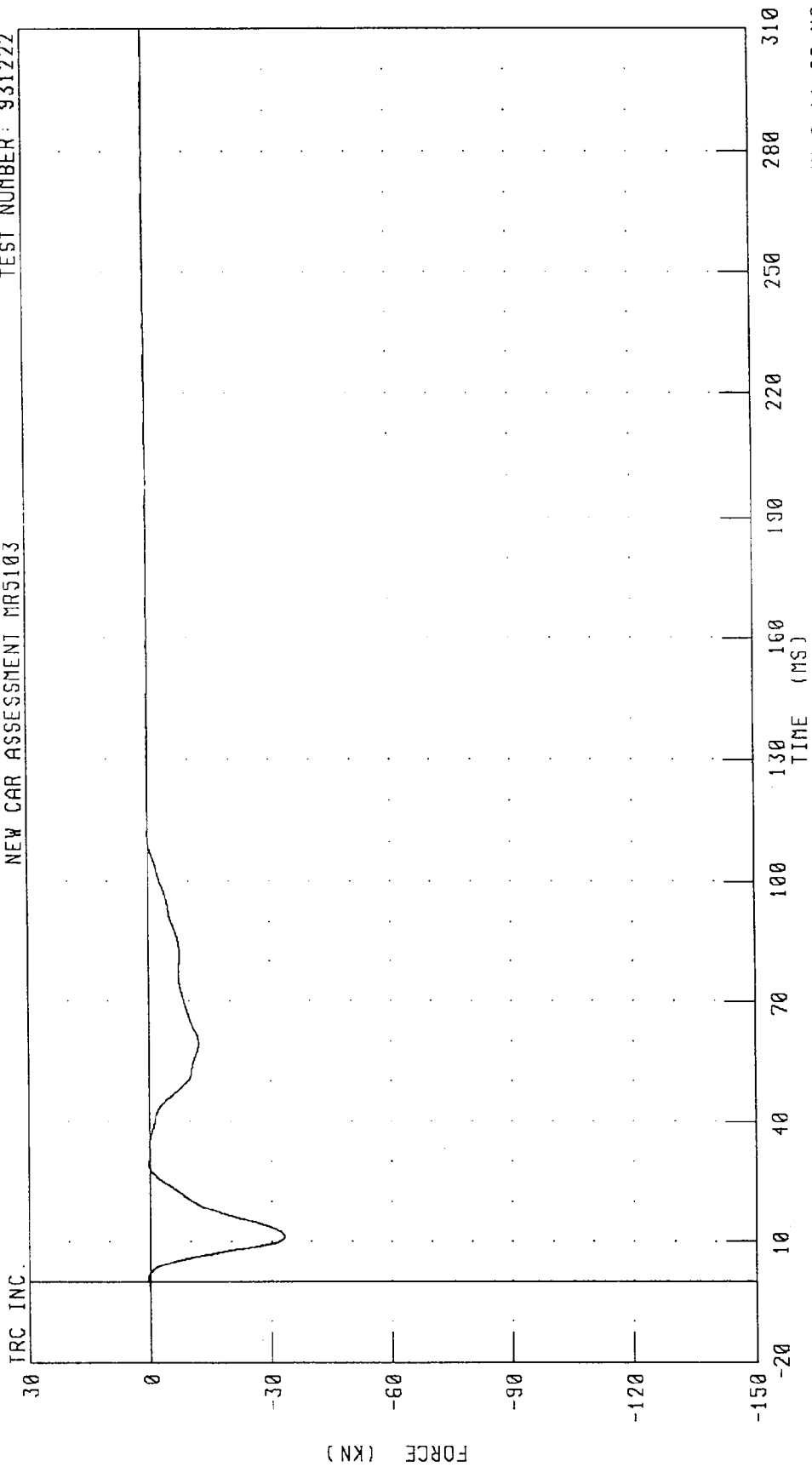
CHANNEL: BC1F

FILTER: CH. CLASS 60

PEAK UNITS: 175 KN @ 54.80 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C2 FORCE
 NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222



PEAK DATA: 0.36 KN @ 0.64 MS, -33.34 KN @ 11.20 MS

CHANNEL: BC2F FILTER: CH. CLASS 60

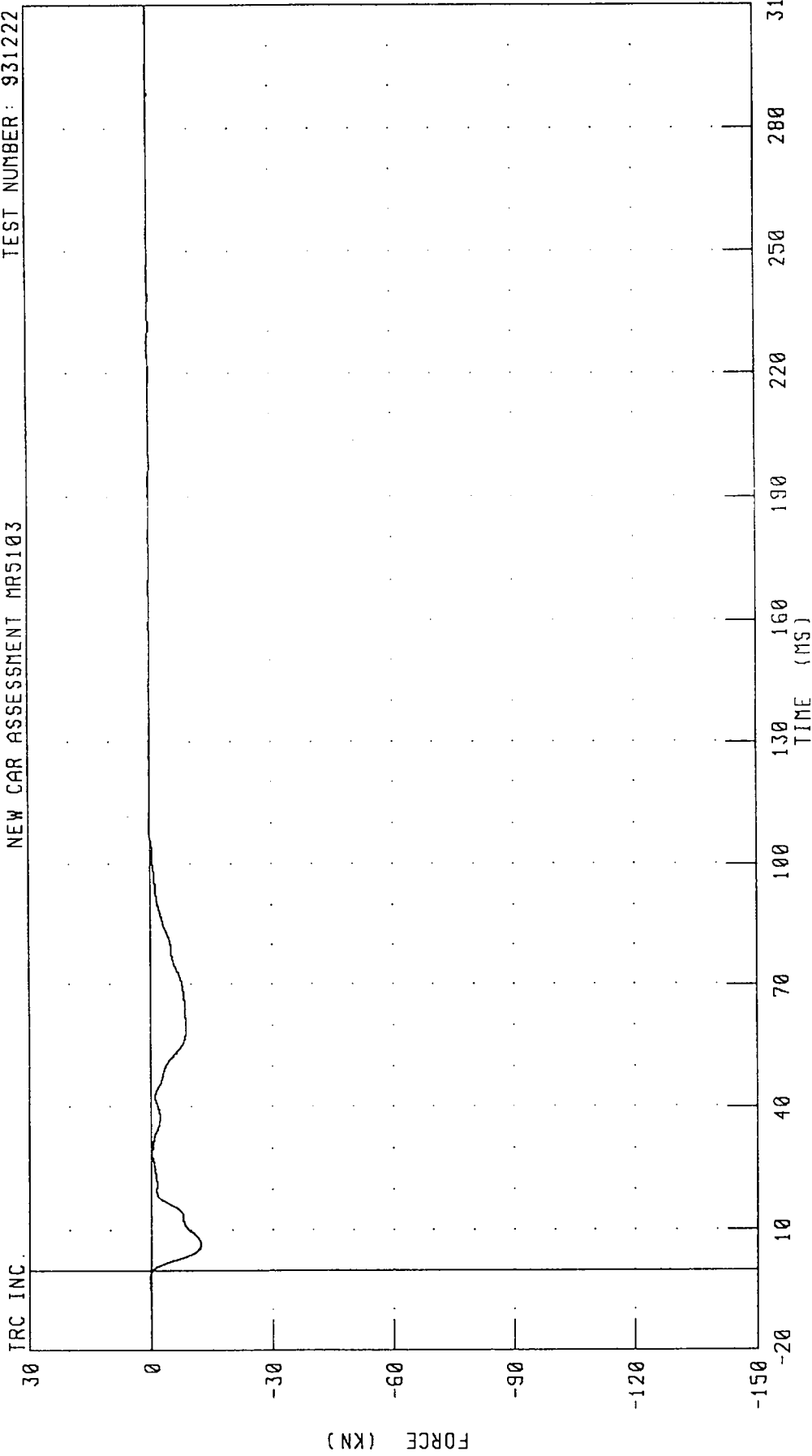
FORCE (KN)

TIME (MS)

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C3 FORCE

NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222



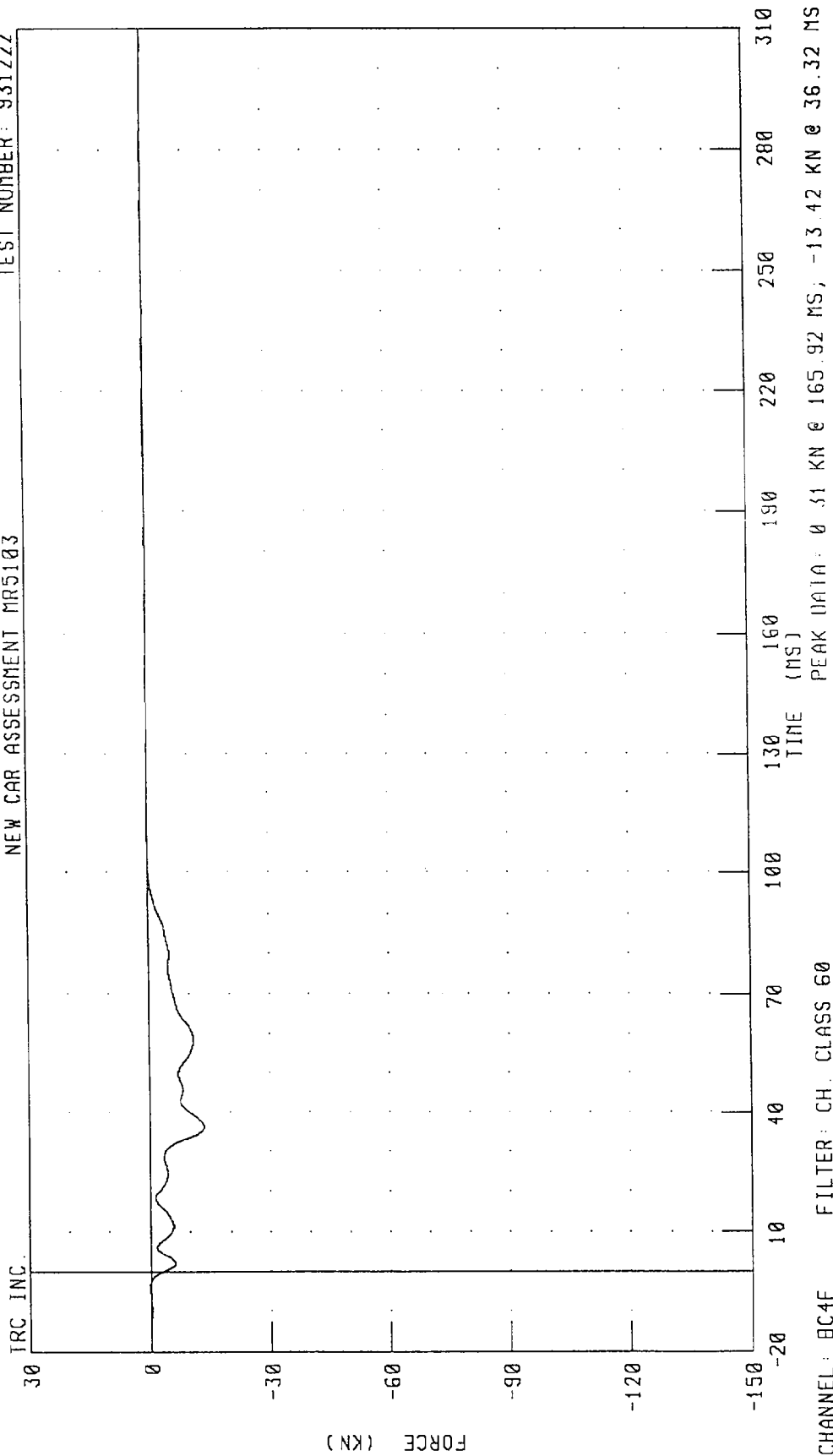
PEAK DATA 0.33 KN @ -2.00 MS, -12.25 KN @ 6.32 MS

FILTER: CH. CLASS 60

CHANNEL: BC3F

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C4 FORCE
 NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222



PEAK DATA: 0.51 KN @ 165.92 MS, -13.42 KN @ 36.32 MS

CHANNEL: BC4F FILTER: CH CLASS 60

FORCE (KN)

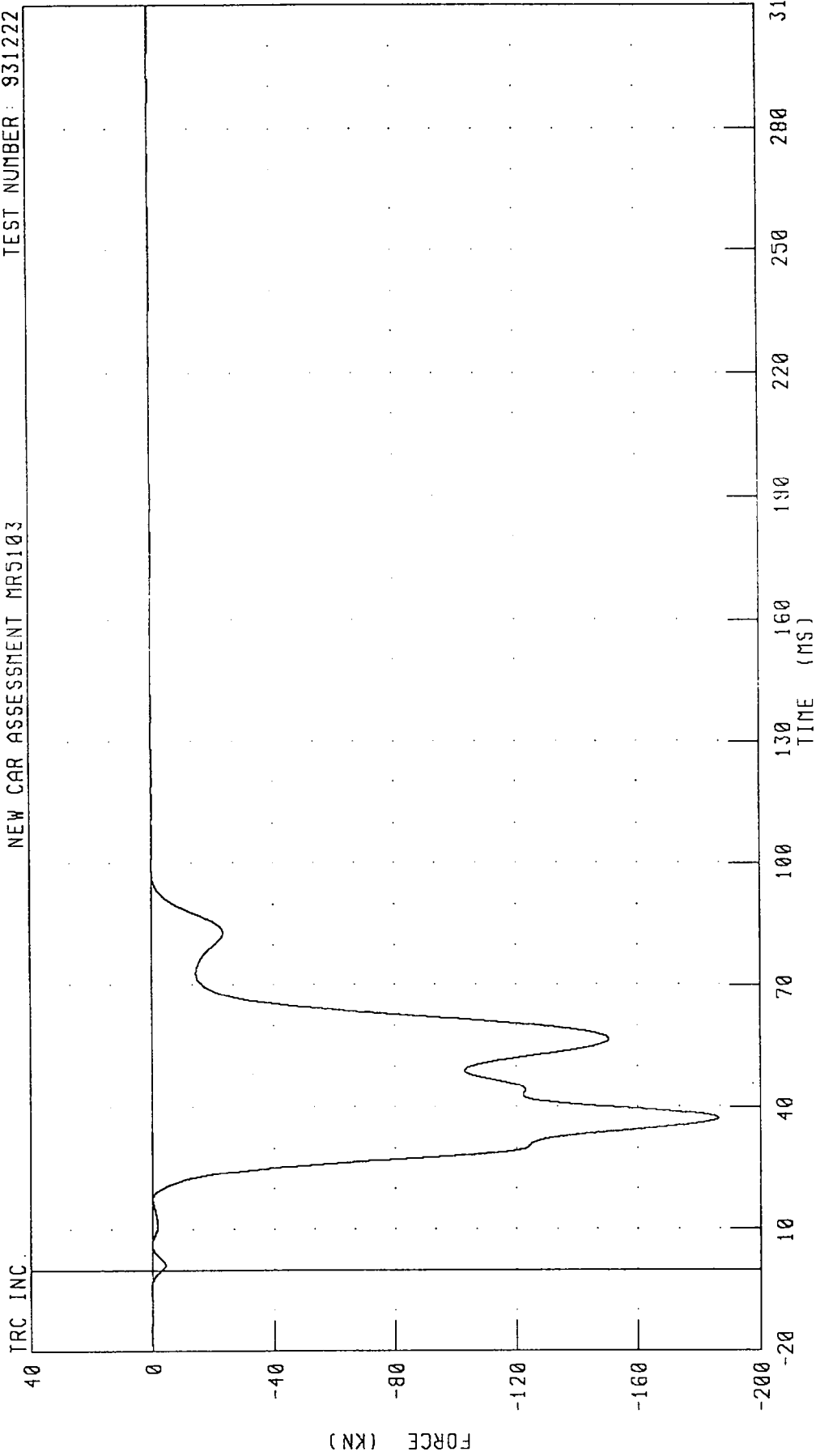
TIME (MS)

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER

LOAD CELL BARRIER POSITION C5 FORCE

NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

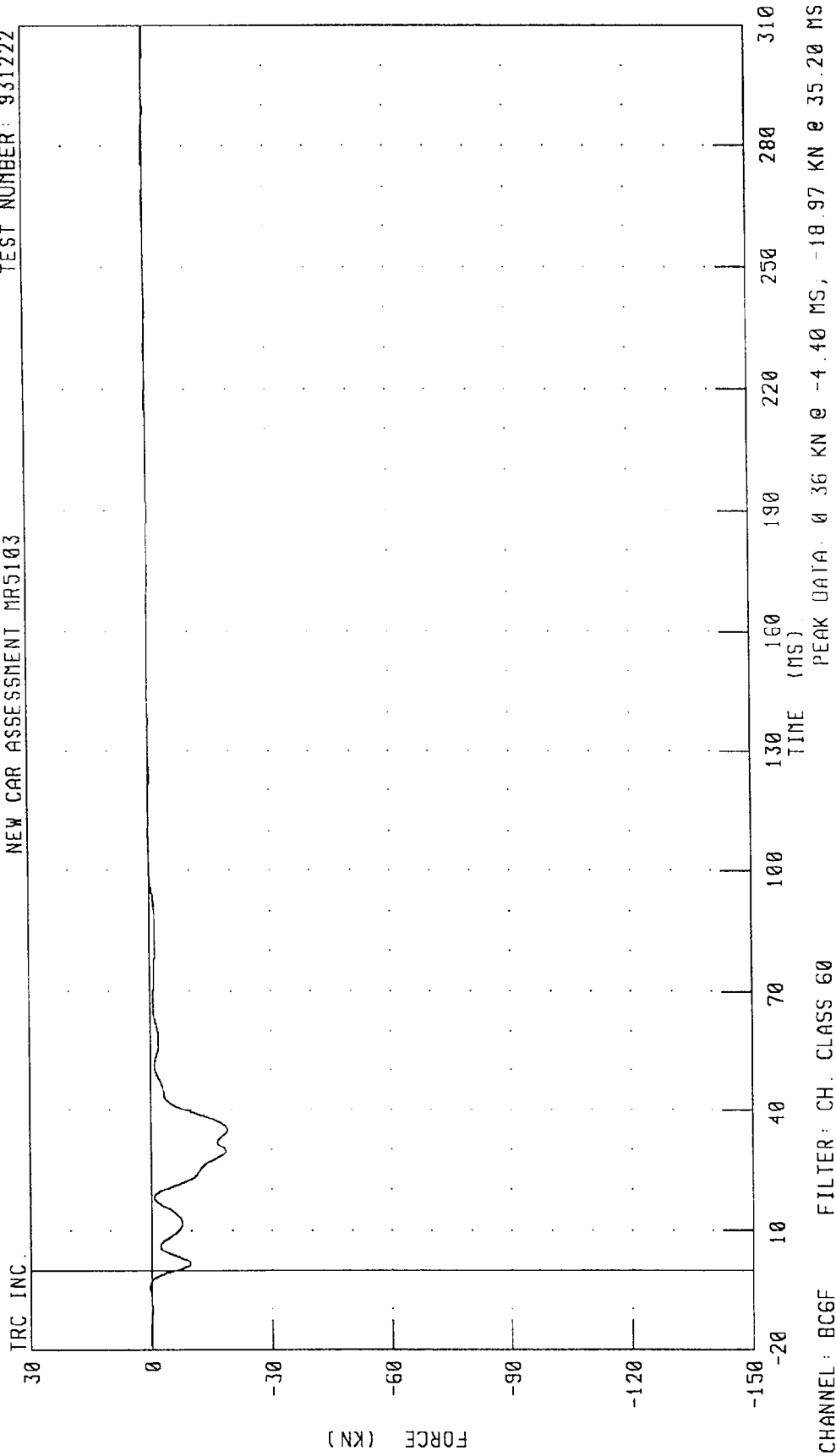


CHANNEL: BC5F FILTER: CH CLASS 60

PEAK DATA 0 22 KN @ -4 72 MS, -186.42 KN @ 37.36 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C6 FORCE
 NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222



PEAK DATA: 0 36 KN @ -4.40 MS, -18.97 KN @ 35.20 MS

CHANNEL: BCGF FILTER: CH. CLASS 60

FORCE (KN)

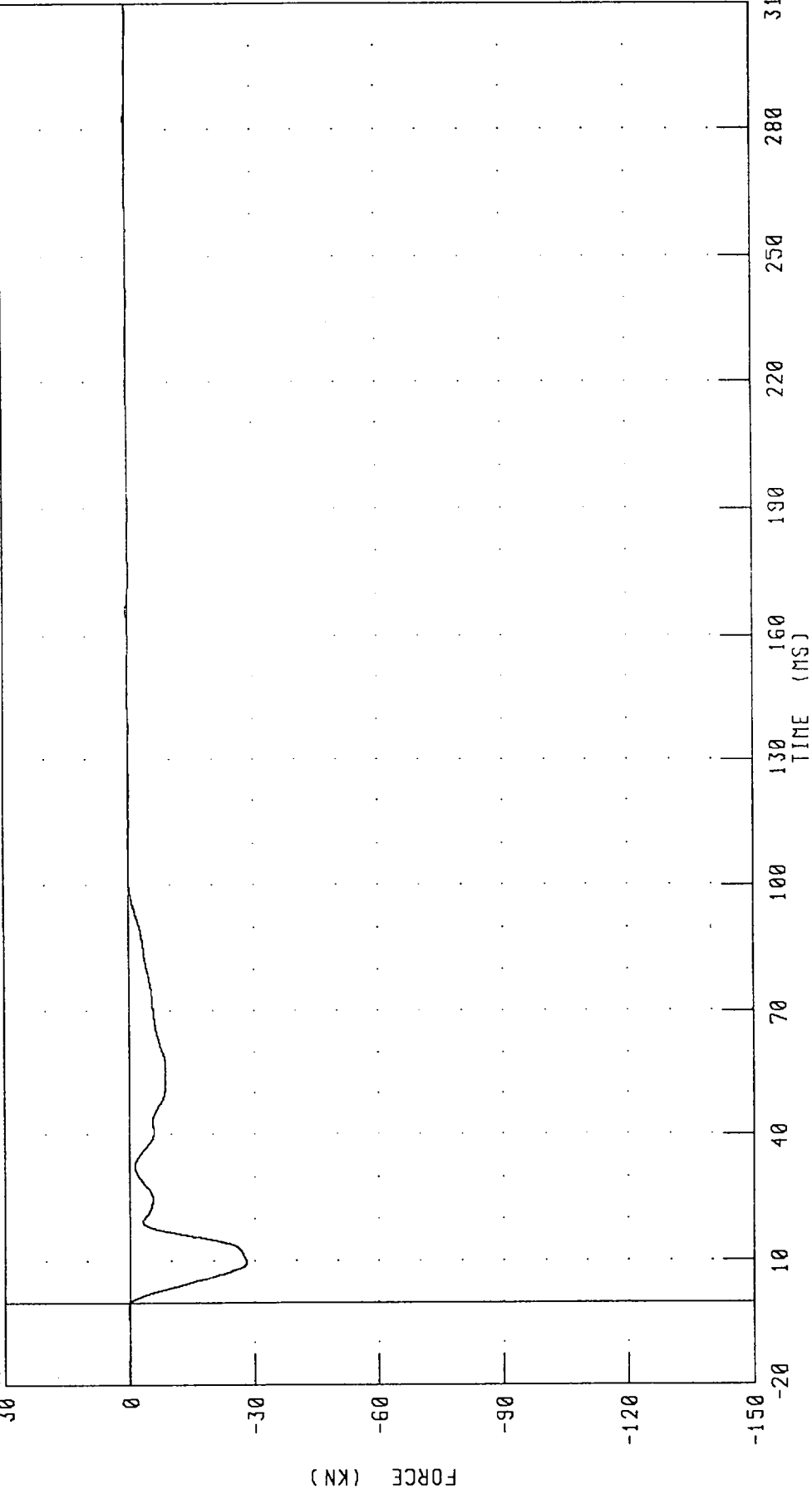
TIME (MS)

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C7 FORCE

TEST NUMBER: 931222

NEW CAR ASSESSMENT MR5103

TRC INC.

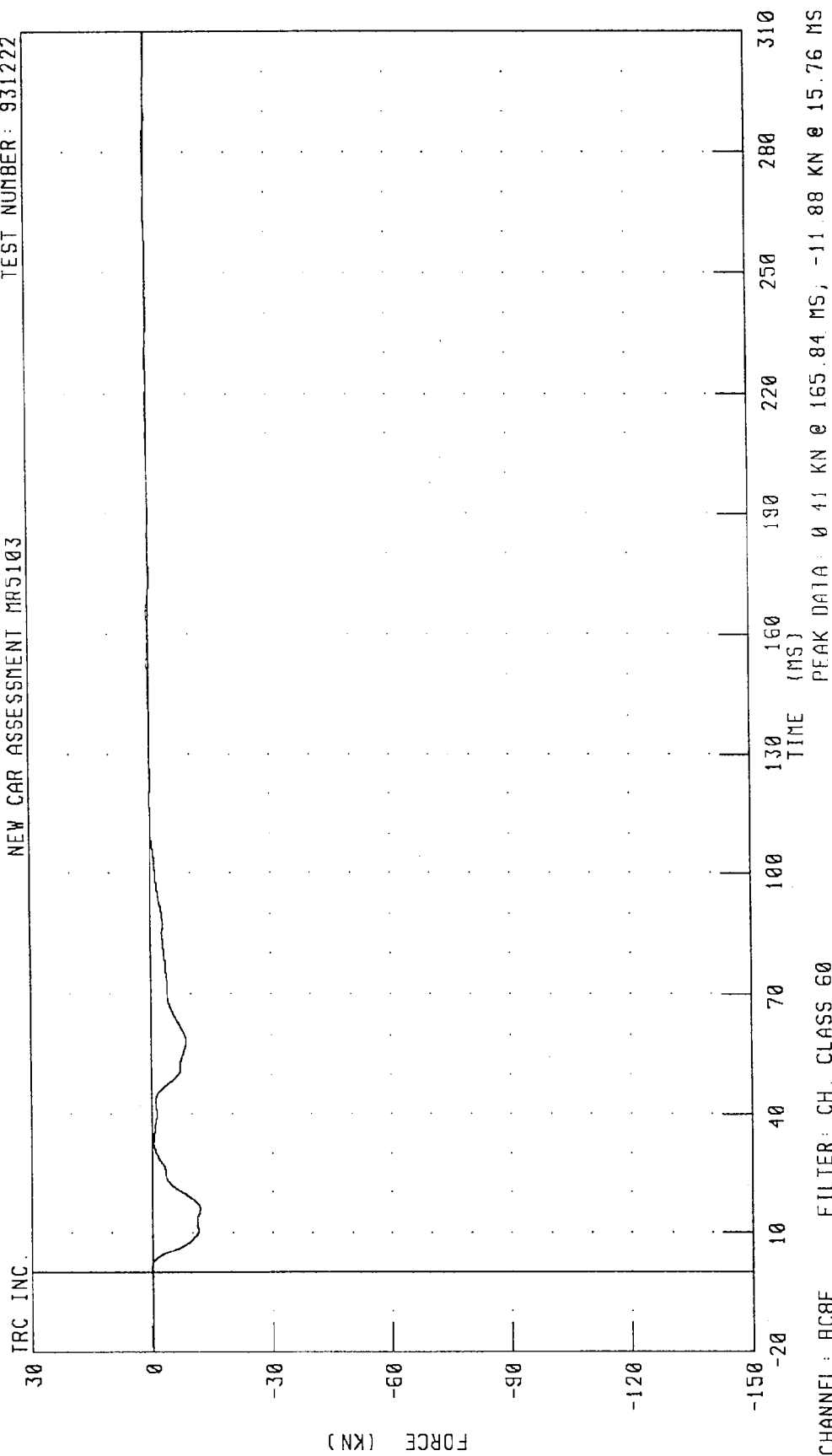


CHANNEL: BC7F FILTER: CH. CLASS 60

PEAK DATA: 0.39 KN @ 166.00 MS, -28.09 KN @ 9.52 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C8 FORCE
 NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

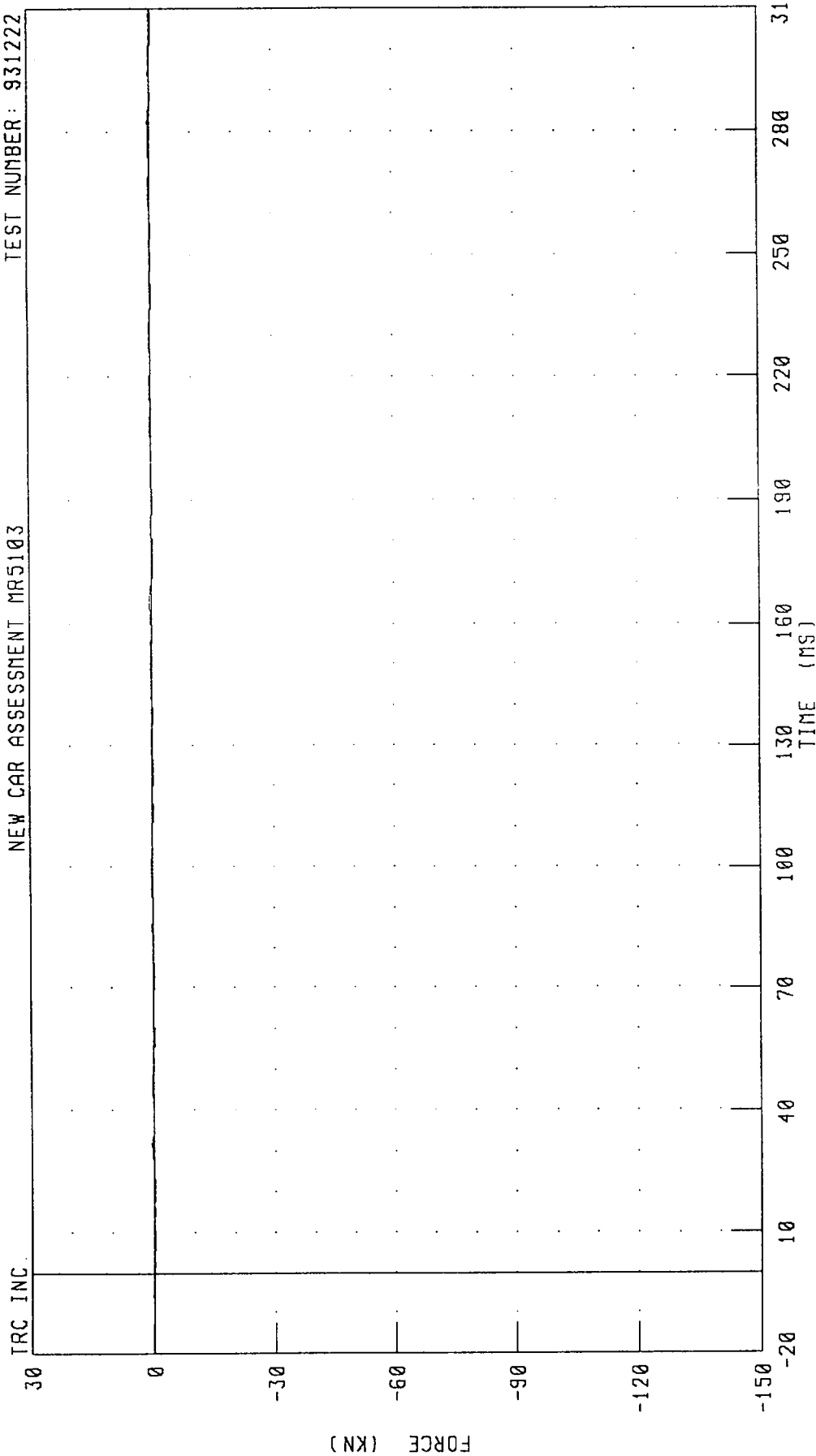


CHANNEL: BC8F FILTER: CH. CLASS 60

PEAK DATA: 0 41 KN @ 165.84 MS, -11.88 KN @ 15.76 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C9 FORCE
 NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

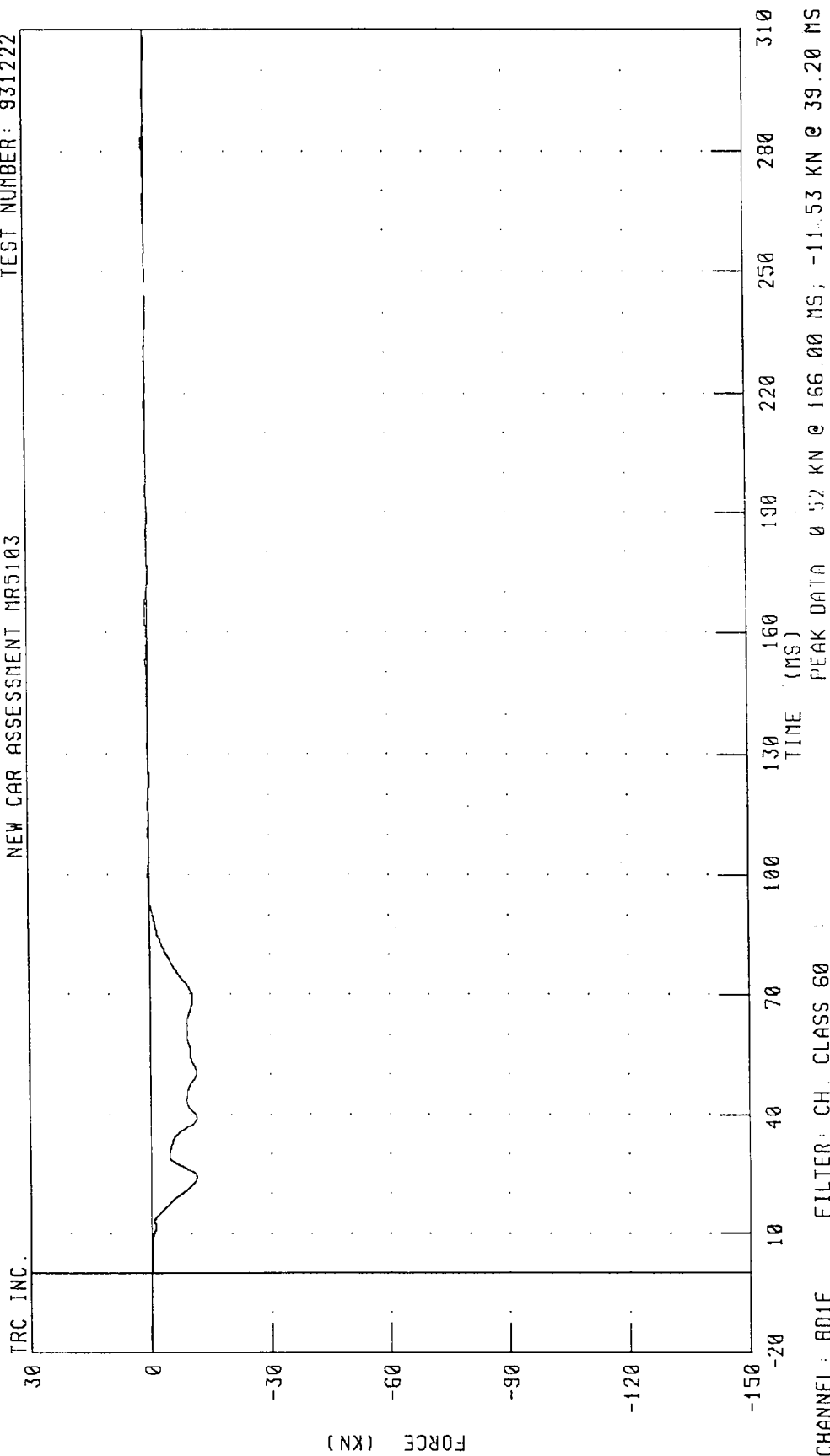


CHANNEL: BC9F FILTER: CH. CLASS 60

PEAK DATA 0 13 KN @ 166.00 MS; -0.40 KN @ 189.60 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION D1 FORCE
 NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222



PEAK DATA 0.52 KN @ 166.00 MS; -11.53 KN @ 39.20 MS

CHANNEL: 801F FILTER: CH. CLASS 60

FORCE (KN)

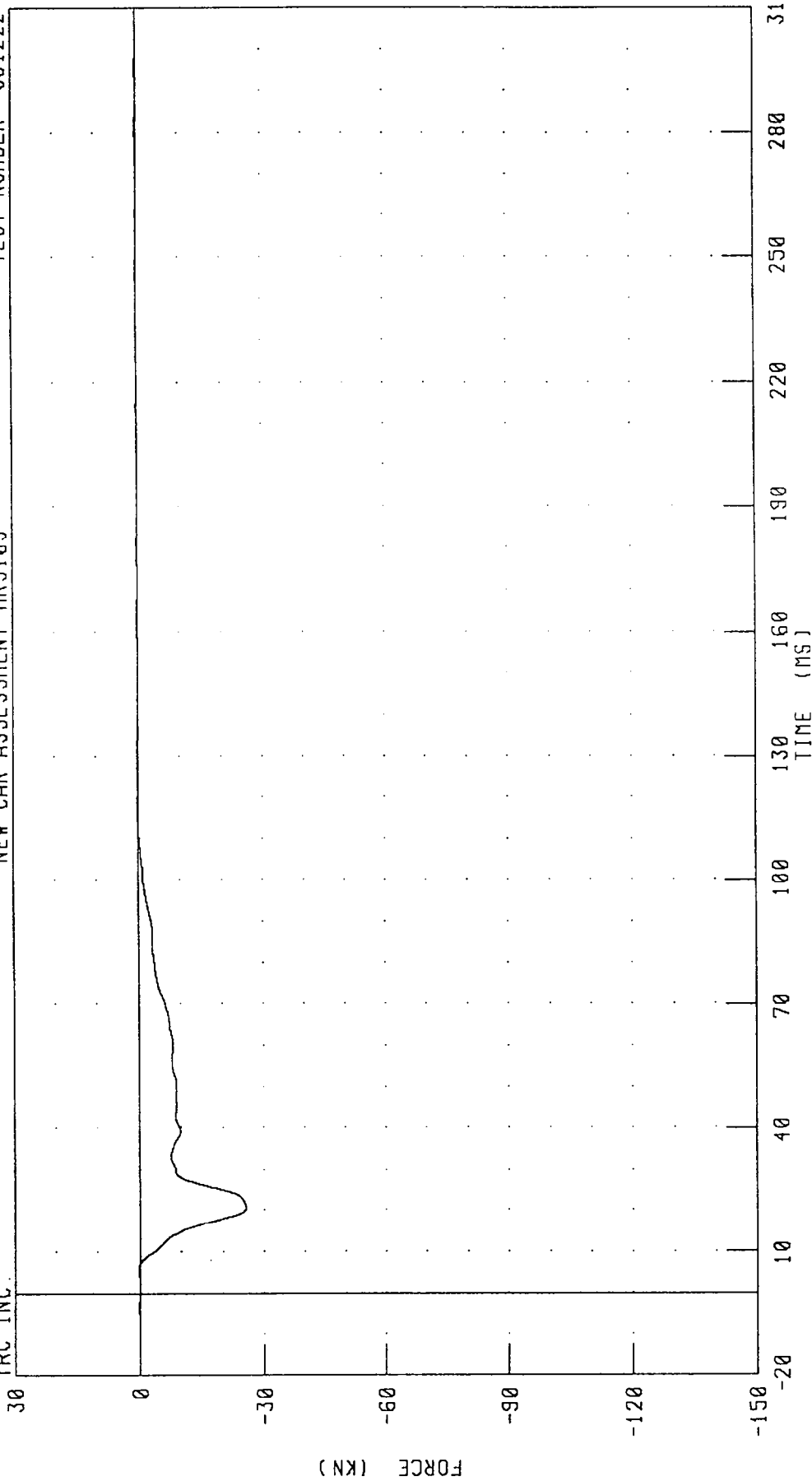
TIME (MS)

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D2 FORCE

TEST NUMBER: 931222

NEW CAR ASSESSMENT MR5103

TRC INC.

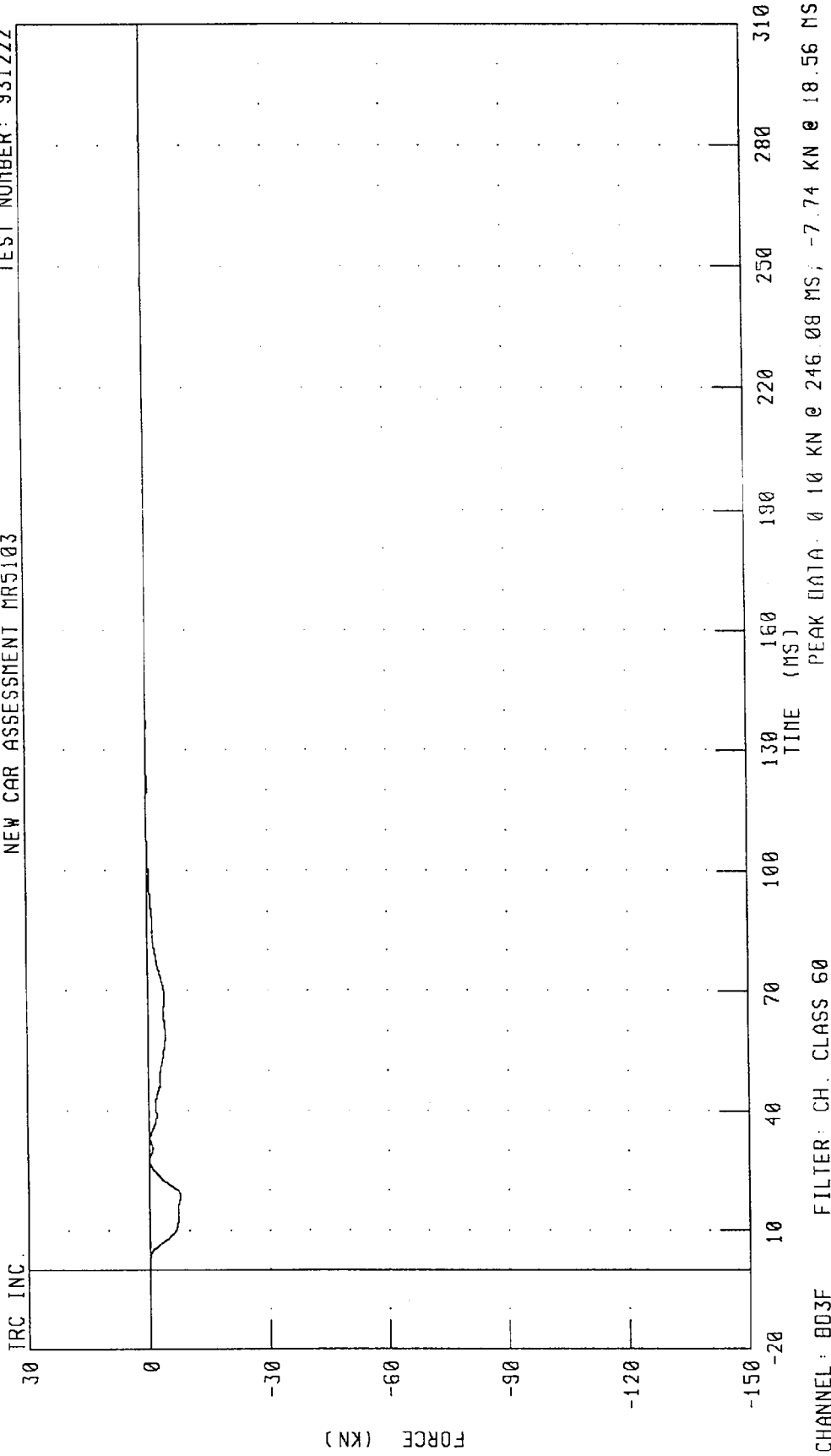


CHANNEL: 802F FILTER: CH. CLASS 60

PEAK VALUE: -25.61 KN @ 128.96 MS, -25.61 KN @ 20.48 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D3 FORCE
NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

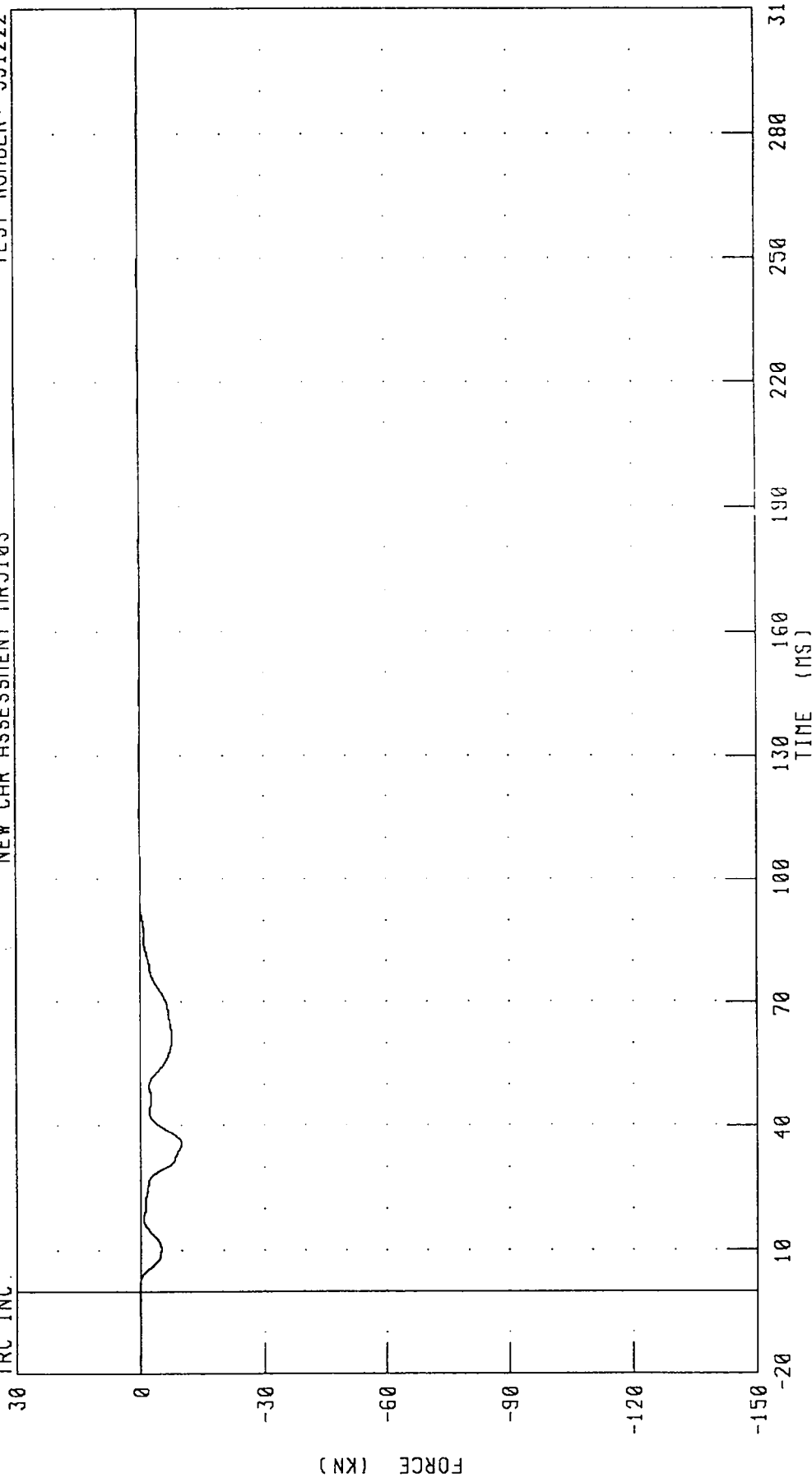


1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D4 FORCE

TEST NUMBER: 931222

NEW CAR ASSESSMENT MR5103

TRC INC.



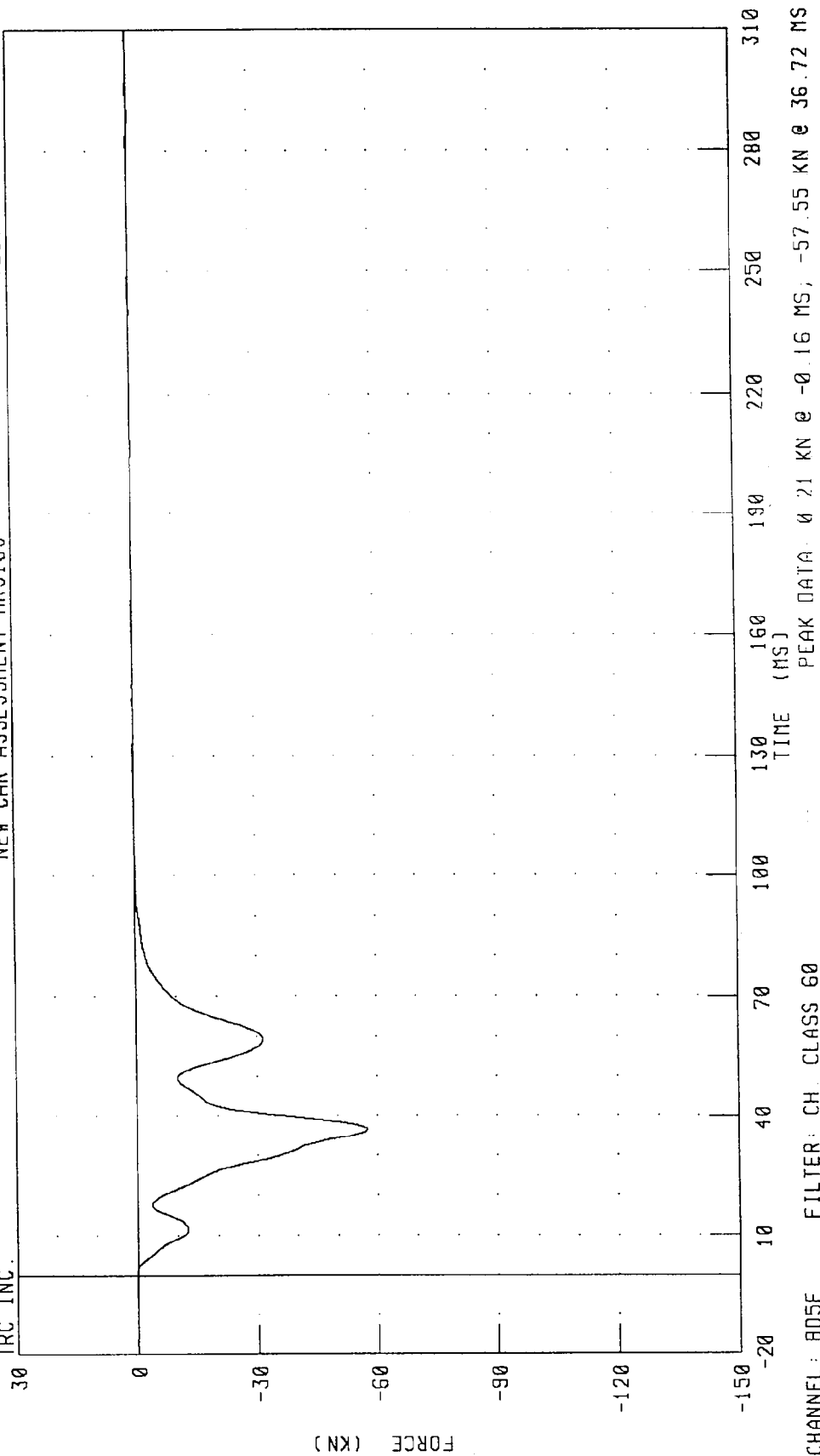
CHANNEL: BD4F FILTER: CH. CLASS 60

PEAK DATA 0 21 KN @ 282.08 MS; -10.01 KN @ 35.76 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION D5 FORCE
 NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

TRC INC.

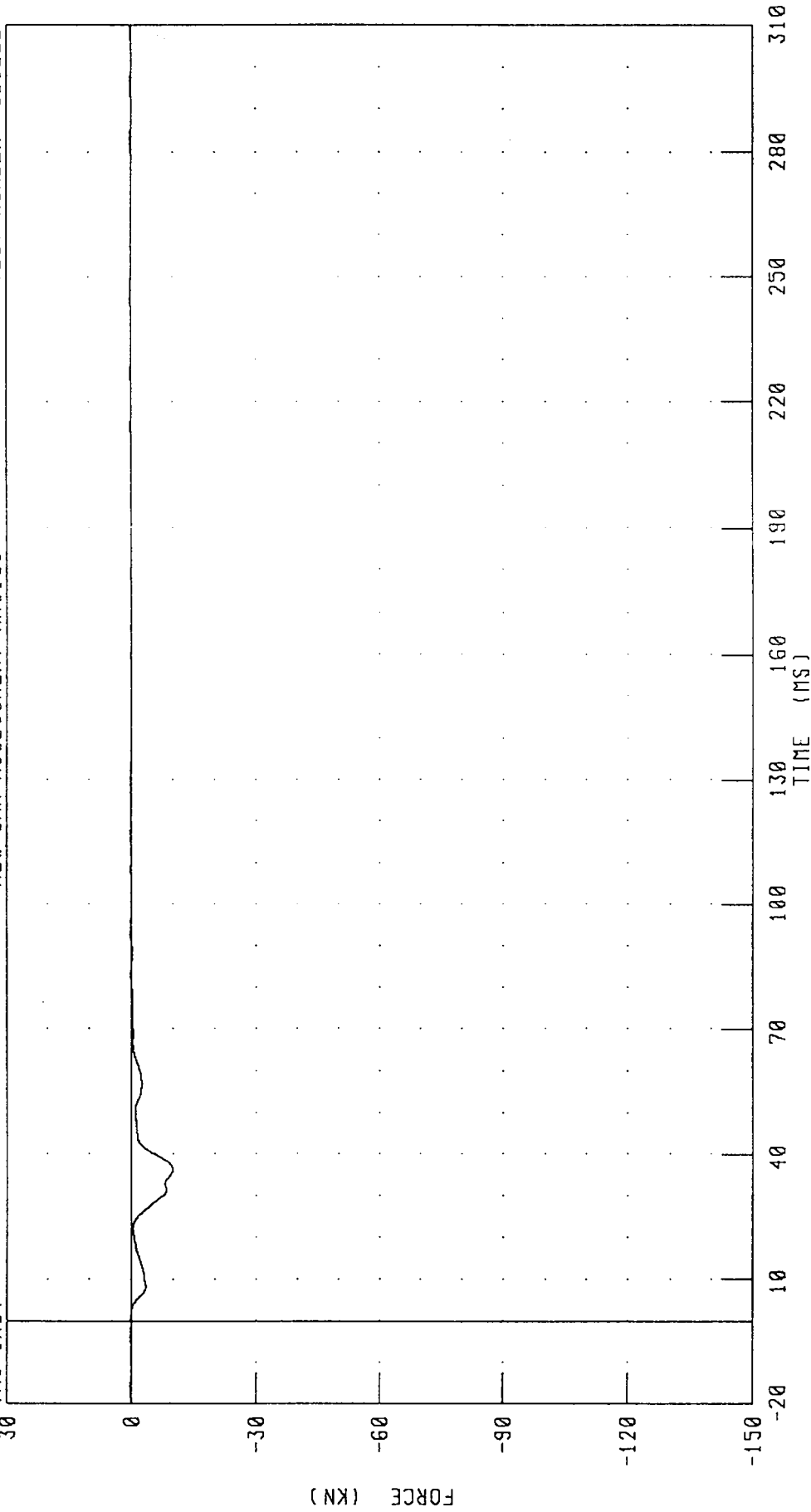


PEAK DATA: 0.21 KN @ -0.16 MS, -57.55 KN @ 36.72 MS

CHANNEL: BD5F FILTER: CH CLASS 60

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D6 FORCE

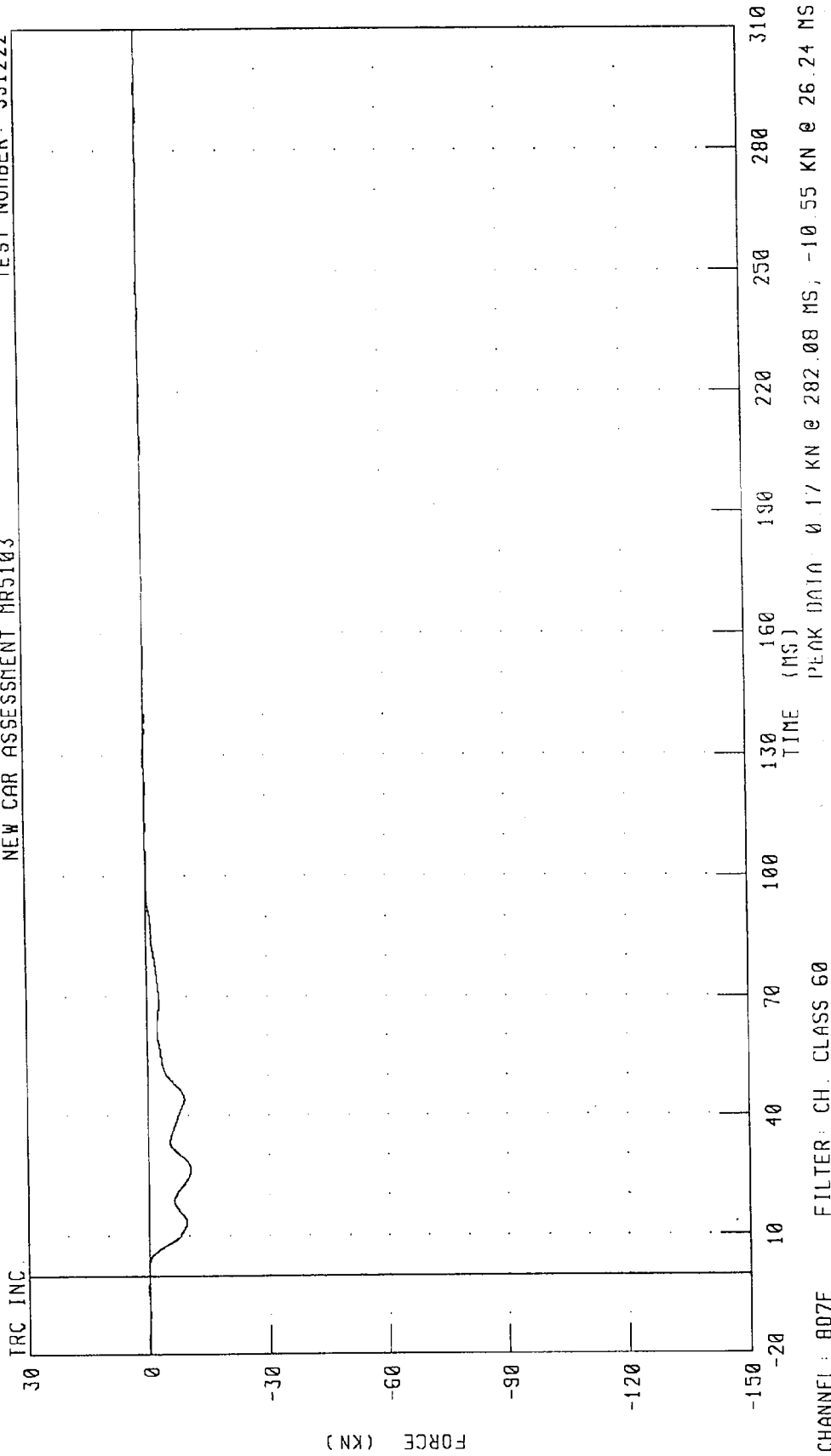
TRC INC. NEW CAR ASSESSMENT MR5103 TEST NUMBER: 931222



CHANNEL: BD6F FILTER: CH. CLASS 60 PEAK DATA 0.21 KN @ 93.92 MS; -9.92 KN @ 36.32 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION D7 FORCE
 NEW CAR ASSESSMENT NR5103

TEST NUMBER: 931222



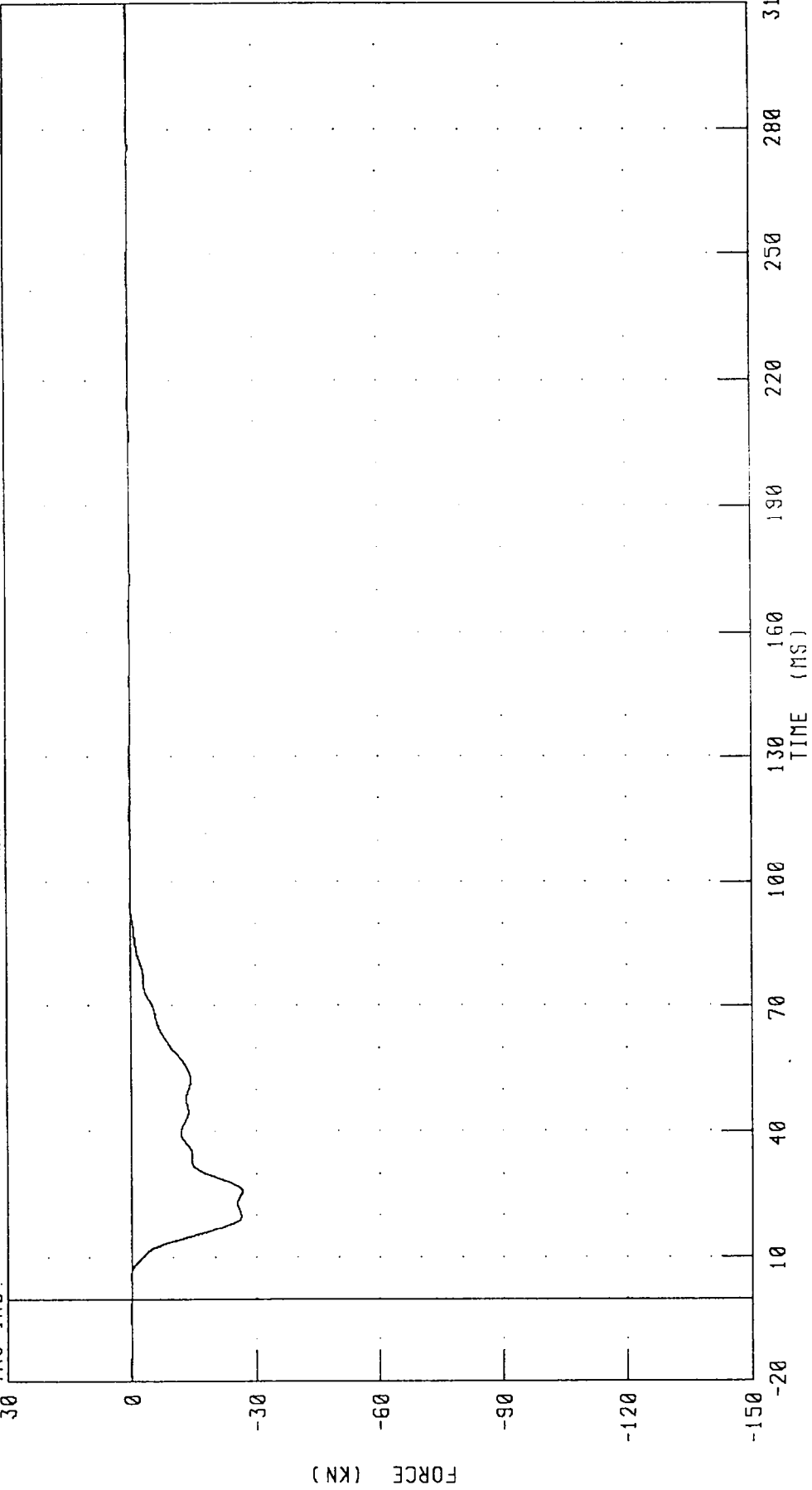
1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER

LOAD CELL BARRIER POSITION 08 FORCE

NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

TRC INC.

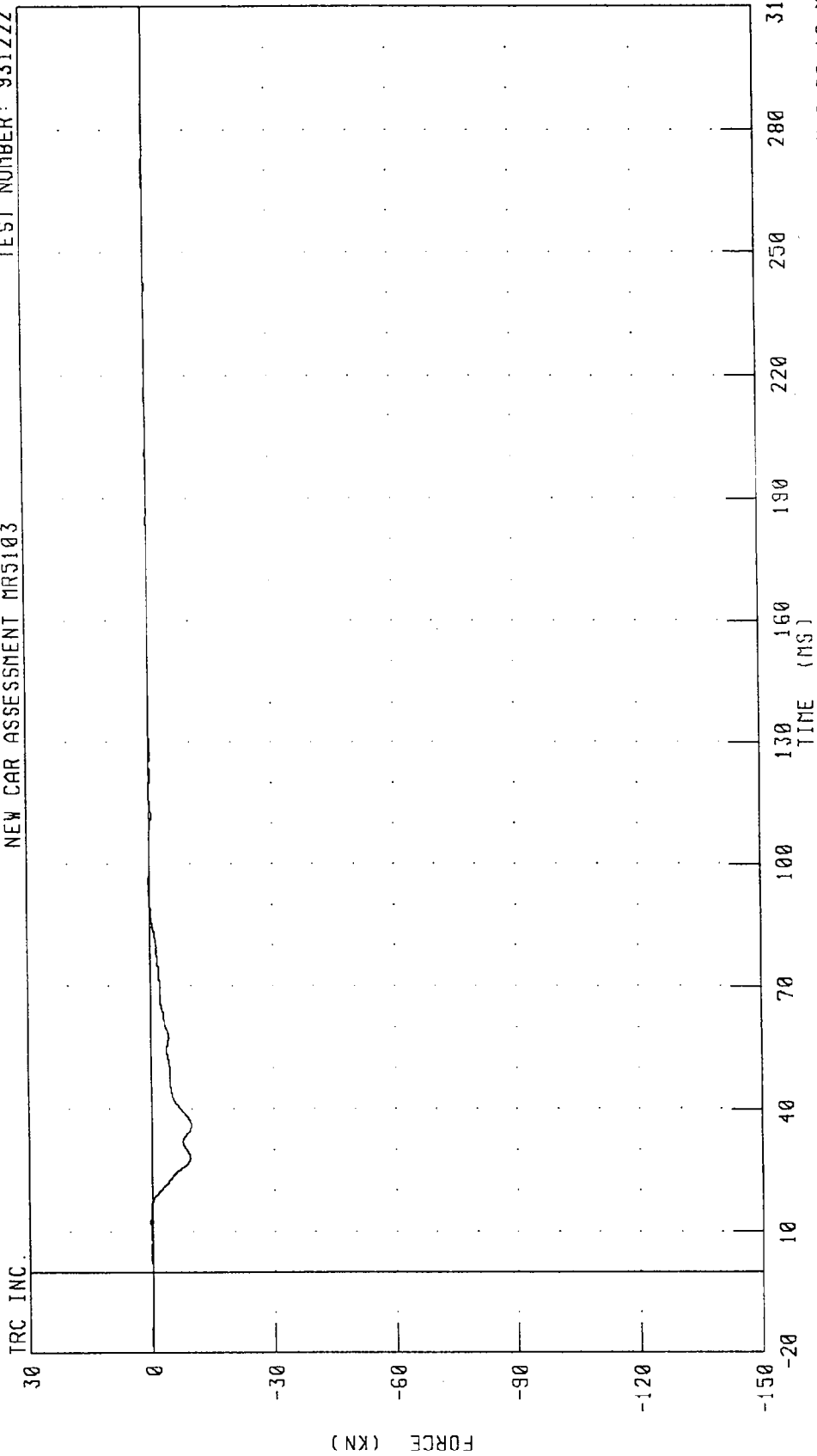


CHANNEL: B08F FILTER: CH. CLASS 60

PEAK DATA 0 26 KN @ 282.08 MS, -26.64 KN @ 25.92 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION D9 FORCE
 NEW CAR ASSESSMENT MRS103

TEST NUMBER: 931222



PEAK DATA: 0.36 KN @ 12.32 MS, -9.67 KN @ 36.16 MS

CHANNEL: BD9F FILTER: CH. CLASS 60

FORCE (KN)

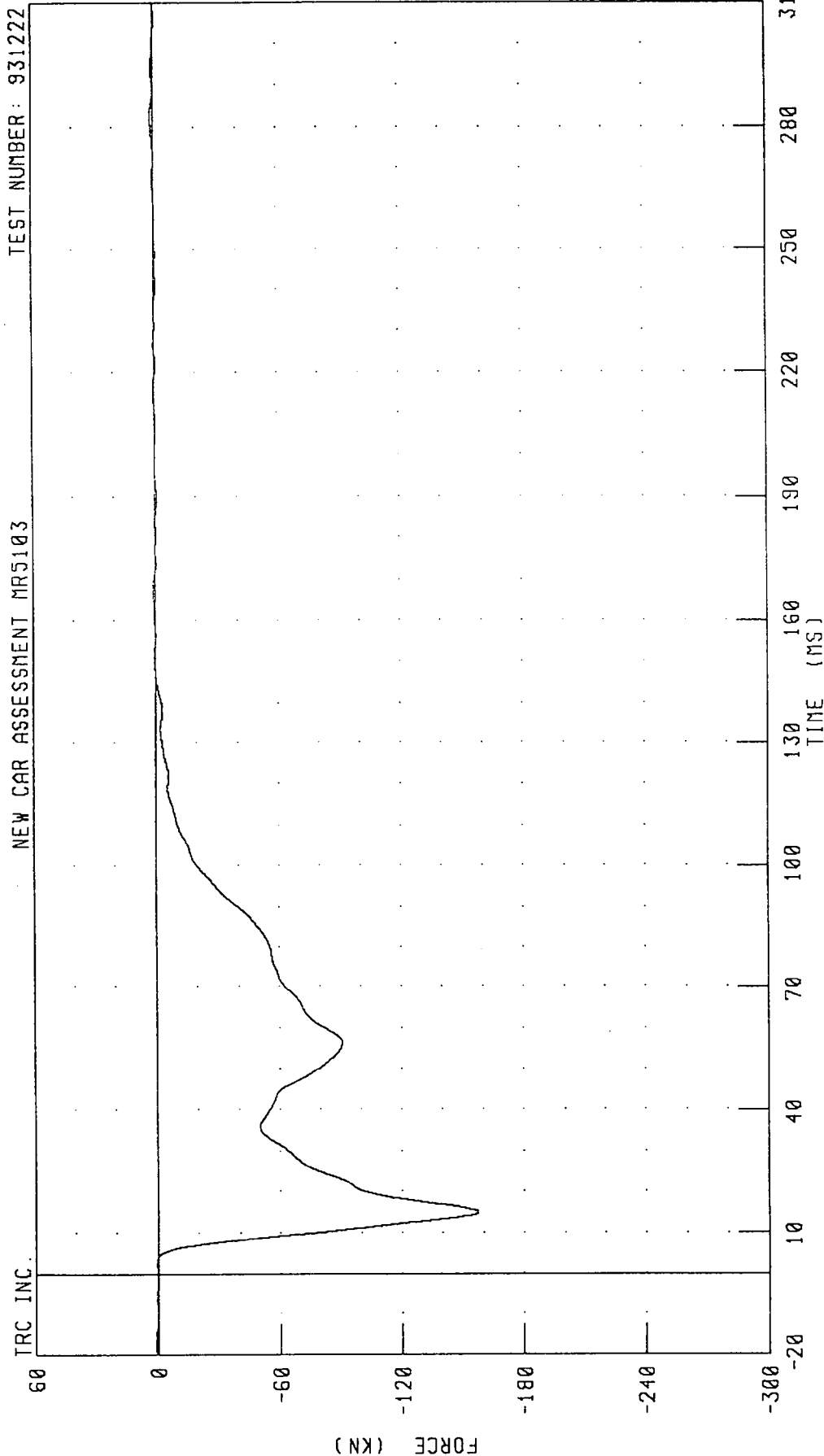
TIME (MS)

TRC INC.

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 1 FORCE TOTAL

TEST NUMBER: 931222

NEW CAR ASSESSMENT MR5103

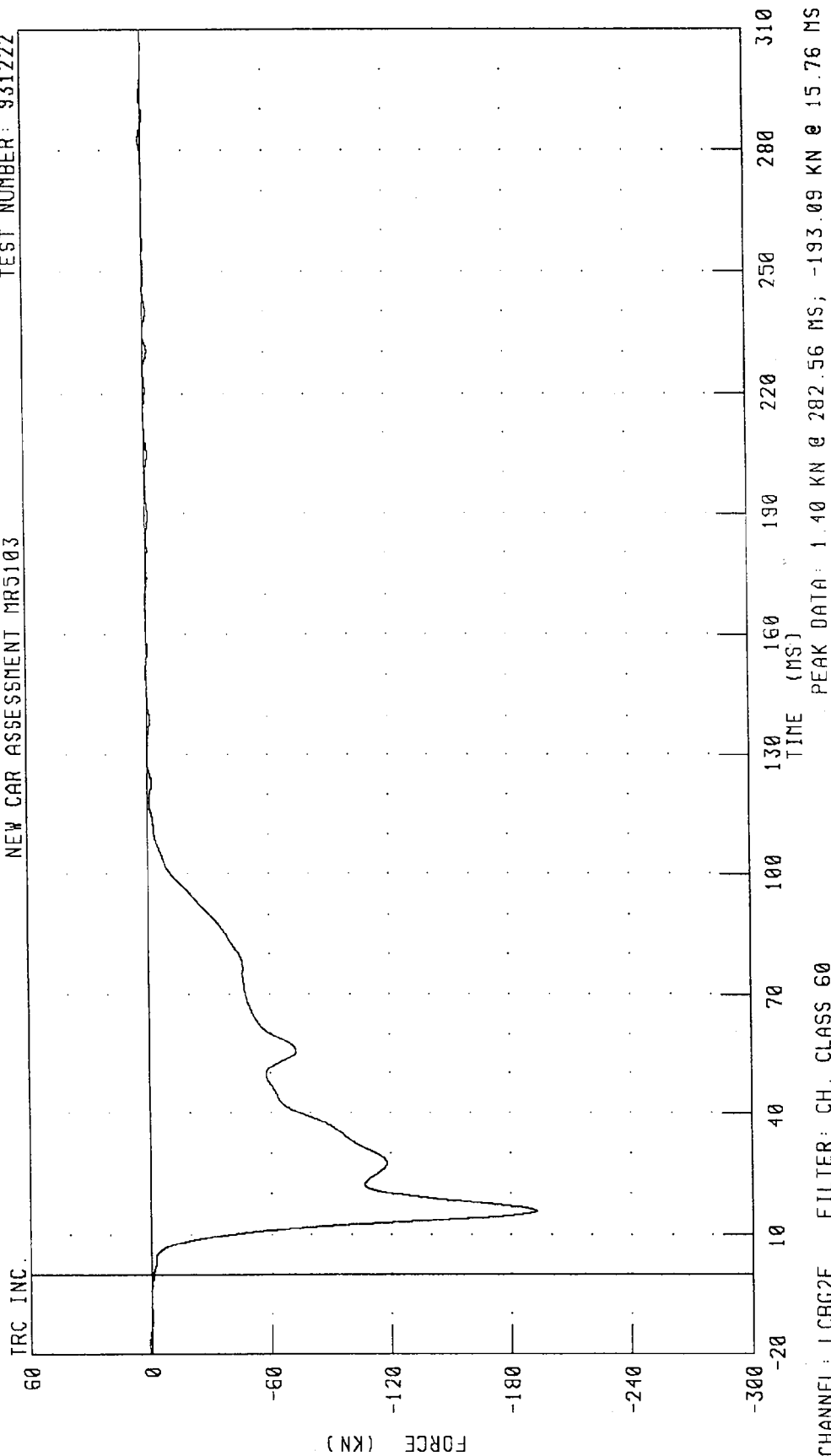


CHANNEL: LCBGIF FILTER: CH. CLASS 60

PEAK DATA 1 64 KN @ 282 40 MS, -157.28 KN @ 14.96 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 2 FORCE TOTAL

NEW CAR ASSESSMENT MR5103 TEST NUMBER: 931222



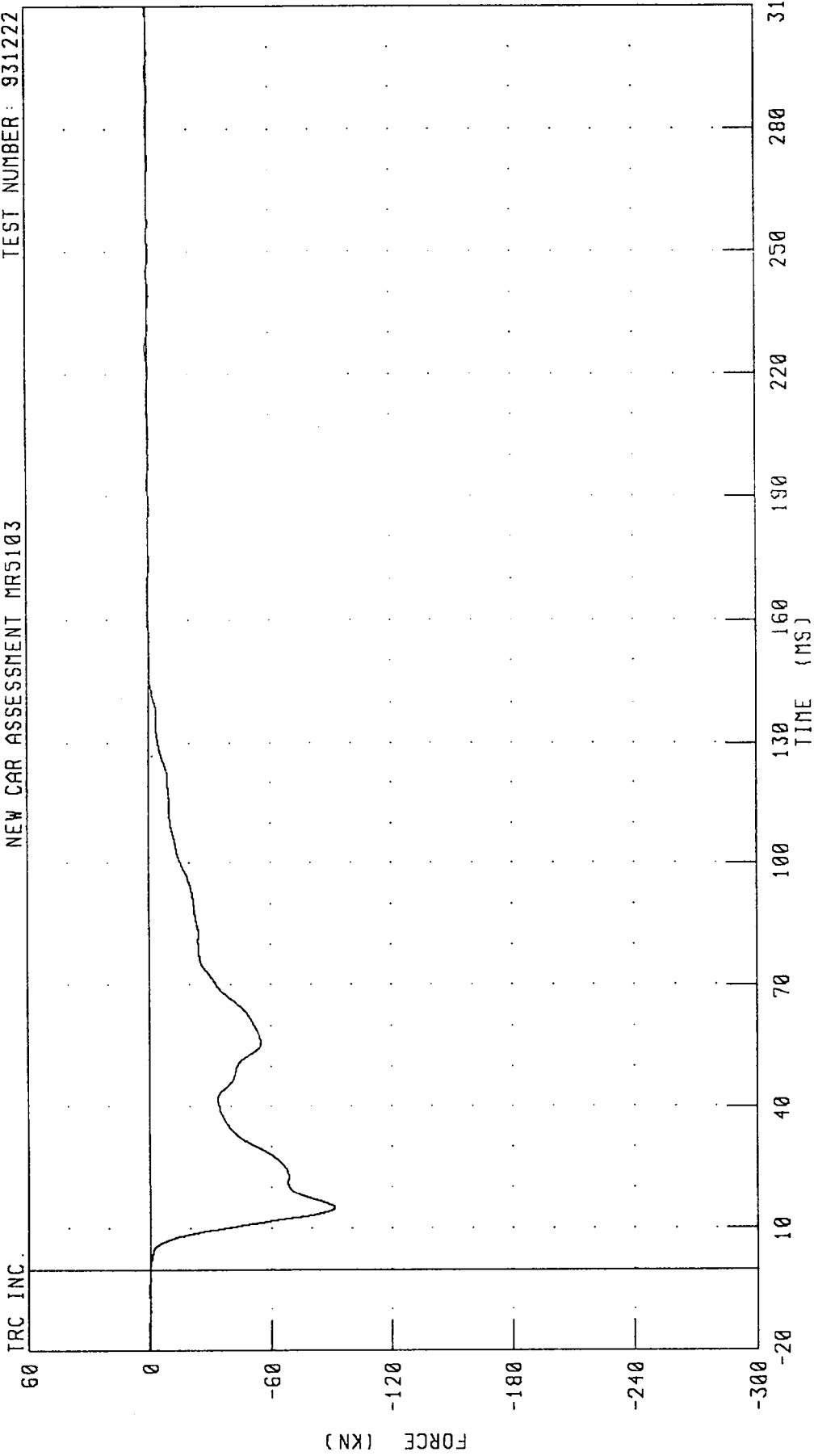
CHANNEL: LCBG2F FILTER: CH. CLASS 60

PEAK DATA: 1.40 KN @ 282.56 MS; -193.09 KN @ 15.76 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 3 FORCE TOTAL

NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222

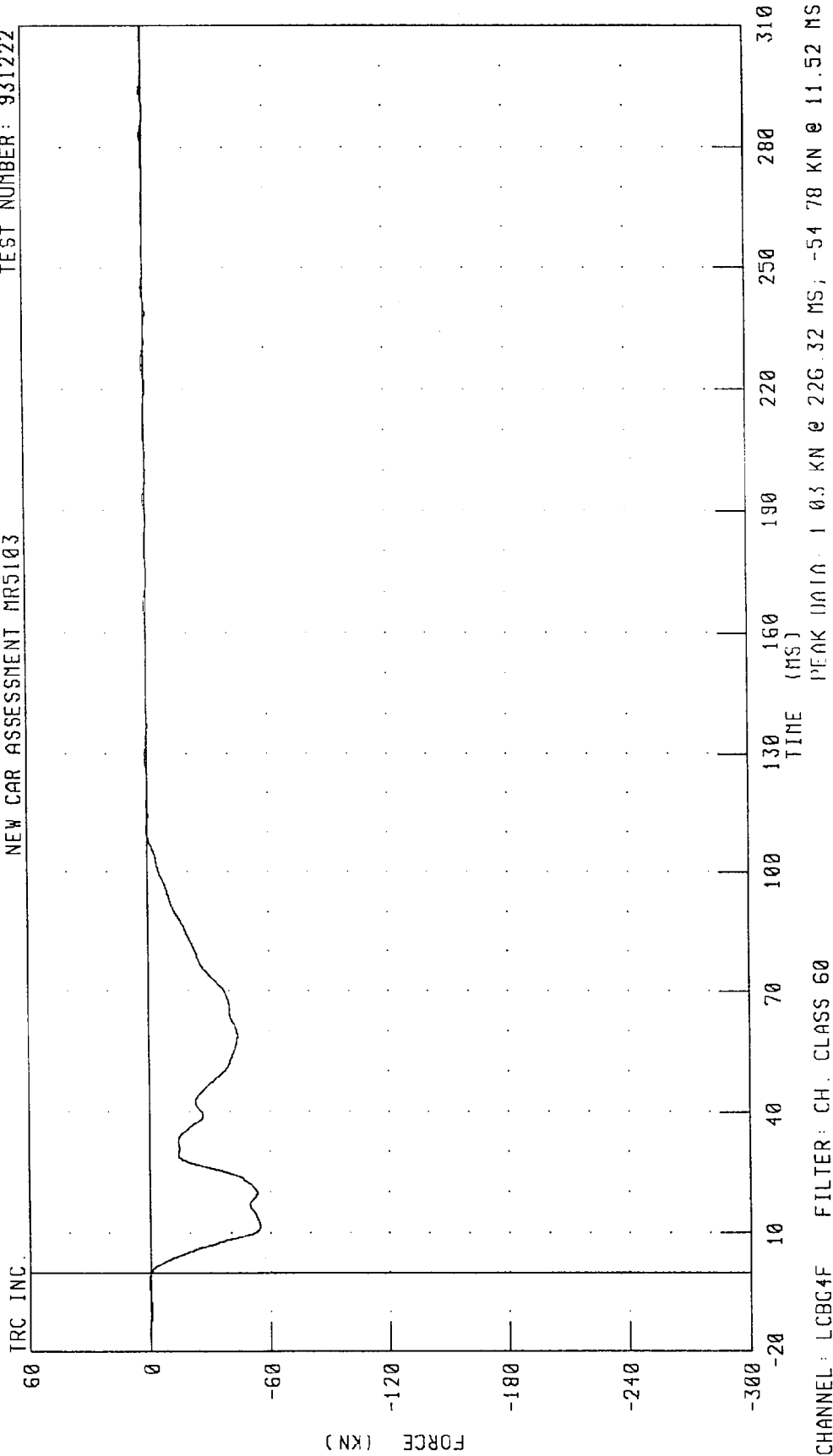


CHANNEL: LCBG3F FILTER: CH. CLASS 60

PEAK DATA: 0 92 KN @ 226.16 MS; -91.73 KN @ 14.88 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER GROUP # 4 FORCE TOTAL
 NEW CAR ASSESSMENT NR5103

TEST NUMBER: 931222



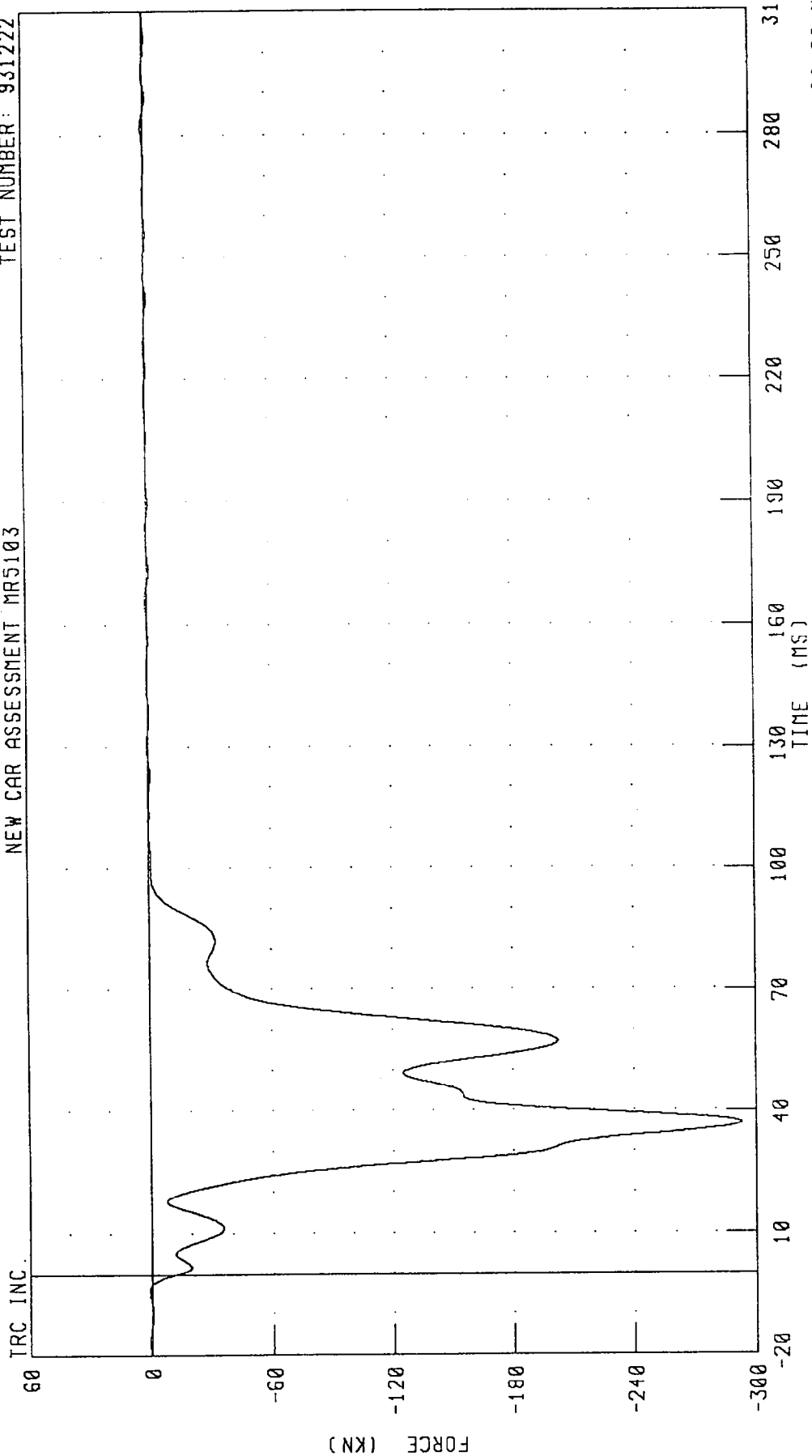
CHANNEL: LCBG4F FILTER: CH. CLASS 60

PEAK DATA: 1 0.3 KN @ 226.32 MS, -54.78 KN @ 11.52 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 5 FORCE TOTAL

NEW CAR ASSESSMENT MR5103

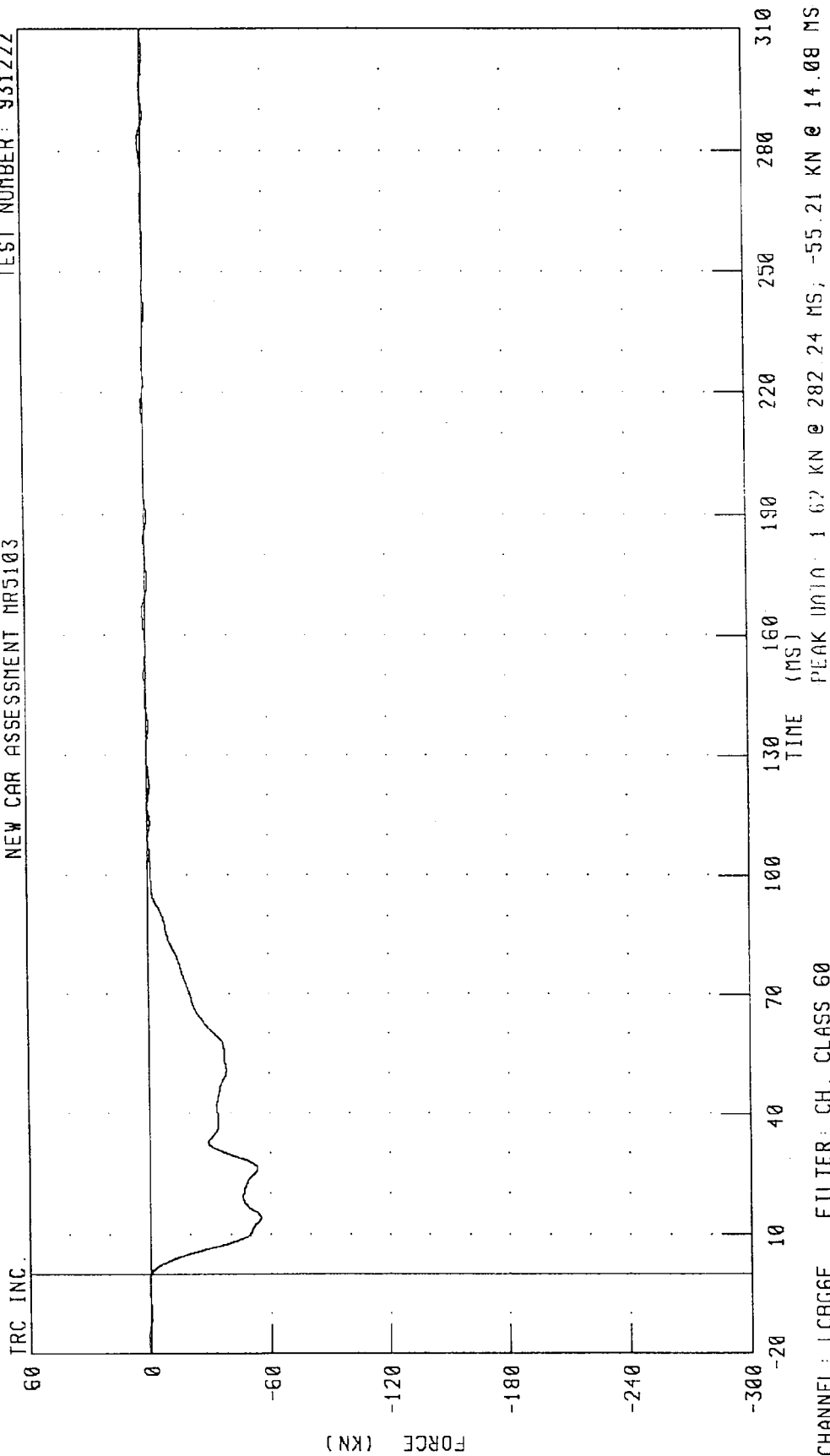
TEST NUMBER: 931222



CHANNEL: LCBG5F FILTER: CH. CLASS 60 PEAK DATA 1 14 KN @ -4 24 MS; -292.77 KN @ 36.96 MS

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 6 FORCE TOTAL
NEW CAR ASSESSMENT NR5103

TEST NUMBER: 931222

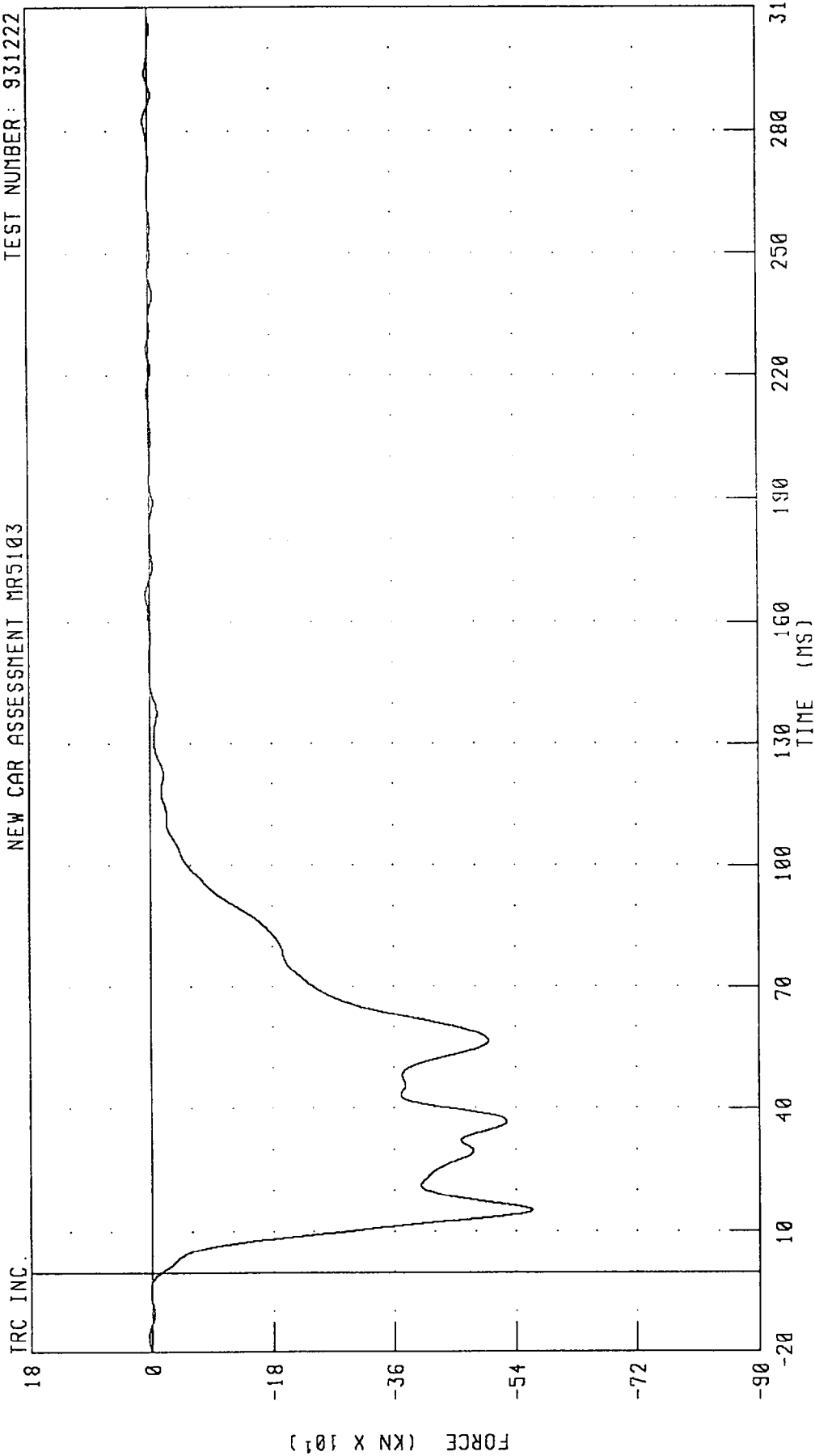


1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER

TOTAL LOAD CELL BARRIER FORCE

NEW CAR ASSESSMENT MR5103

TEST NUMBER: 931222



PEAK DATA: 6.88 KN @ 282.48 MS; -563.79 KN @ 15.12 MS

FILTER: CH. CLASS 60

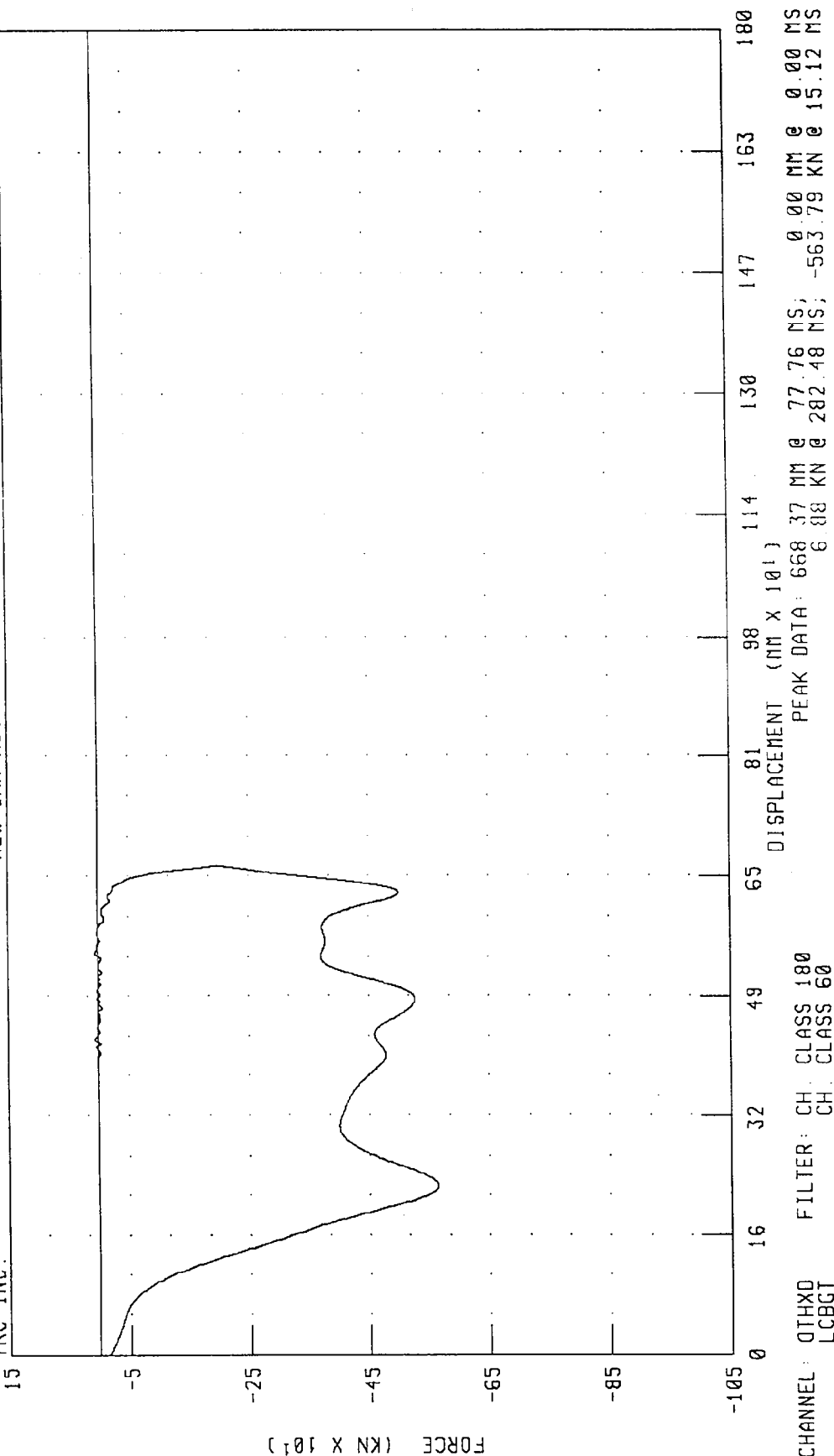
CHANNEL: LCBGT

1994 TOYOTA T100 INTO FRONTAL LOAD CELL BARRIER
TOTAL LOAD CELL BARRIER FORCE VS AVERAGE VEHICLE X-AXIS DISPLACEMENT

TEST NUMBER: 931222

NEW CAR ASSESSMENT MR5103

TRC INC.



CHANNEL: QTHXD FILTER: CH: CLASS 180
LCBGT CH: CLASS 60
DISPLACEMENT (MM X 10¹) PEAK DATA: 668.37 MM @ 77.76 MS; 0.00 MM @ 0.00 MS
6.98 KN @ 282.48 MS; -563.79 KN @ 15.12 MS

APPENDIX C

DUMMY CERTIFICATION DATA

PRE-TEST CERTIFICATION DATA

DRIVER DUMMY S/N: 192

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III EXTERNAL DIMENSIONS
192 ARL

21-OCT-93

TRC 192C16ED1 572E SN192 EXT.DIMENSION CAL16

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	980. MM
WAIST CIRCUMFERENCE (Z)		836 - 866 MM	848. MM
CHEST DEPTH (O)		213 - 229 MM	218. MM
H-POINT HEIGHT (C)		84 - 89 MM	84. MM
H-POINT FROM SEATBACK (D)		135 - 140 MM	136. 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	147. 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	450. MM
KNEE PIVOT HEIGHT (M)		485 - 500 MM	493. MM
FOOT LENGTH (P)		252 - 267 MM	259. MM
FOOT BREADTH (W)		91 - 107 MM	102. 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	206. MM
SHOULDER-ELBOW LENGTH (I)		330 - 345 MM	340. MM
BACK OF ELBOW TO WRIST PIVOT (G)		290 - 305 MM	295. MM

TEST MEETS SPECIFICATIONS

TECHNICIAN Pete Foss

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III

25-OCT-93

TRC INC. 192C16HD1

572E SN192 HEAD DROP CAL 16

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	32.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	228.45 G
PEAK LATERAL ACCELERATION	15 G MAX	-2.56 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

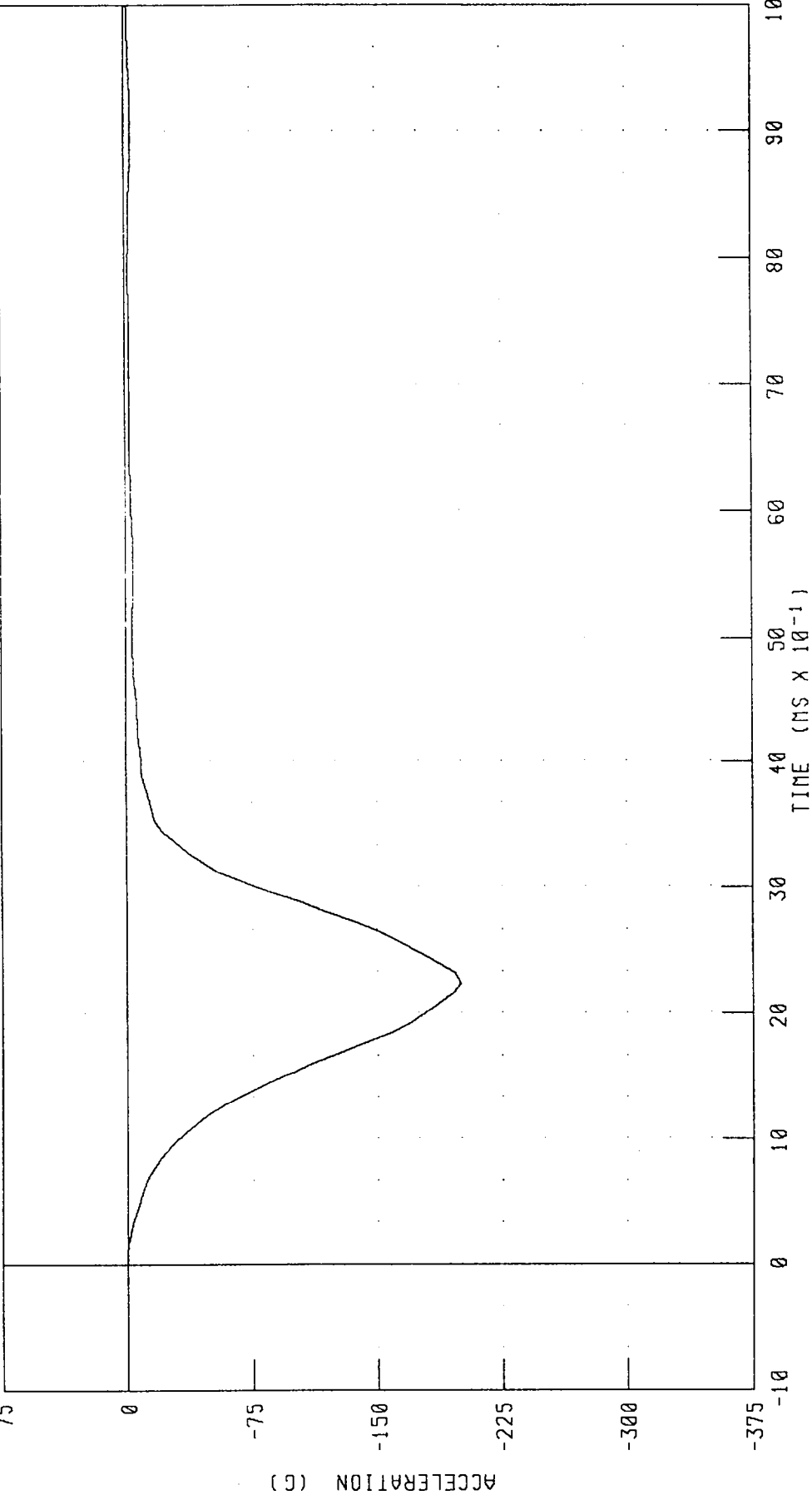
TECHNICIAN Pete FST

PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION X AXIS

572E SN192 HEAD DROP CAL 16 RUN NUMBER 011094.1424,2

TRC TEST NUMBER 192C16HD1

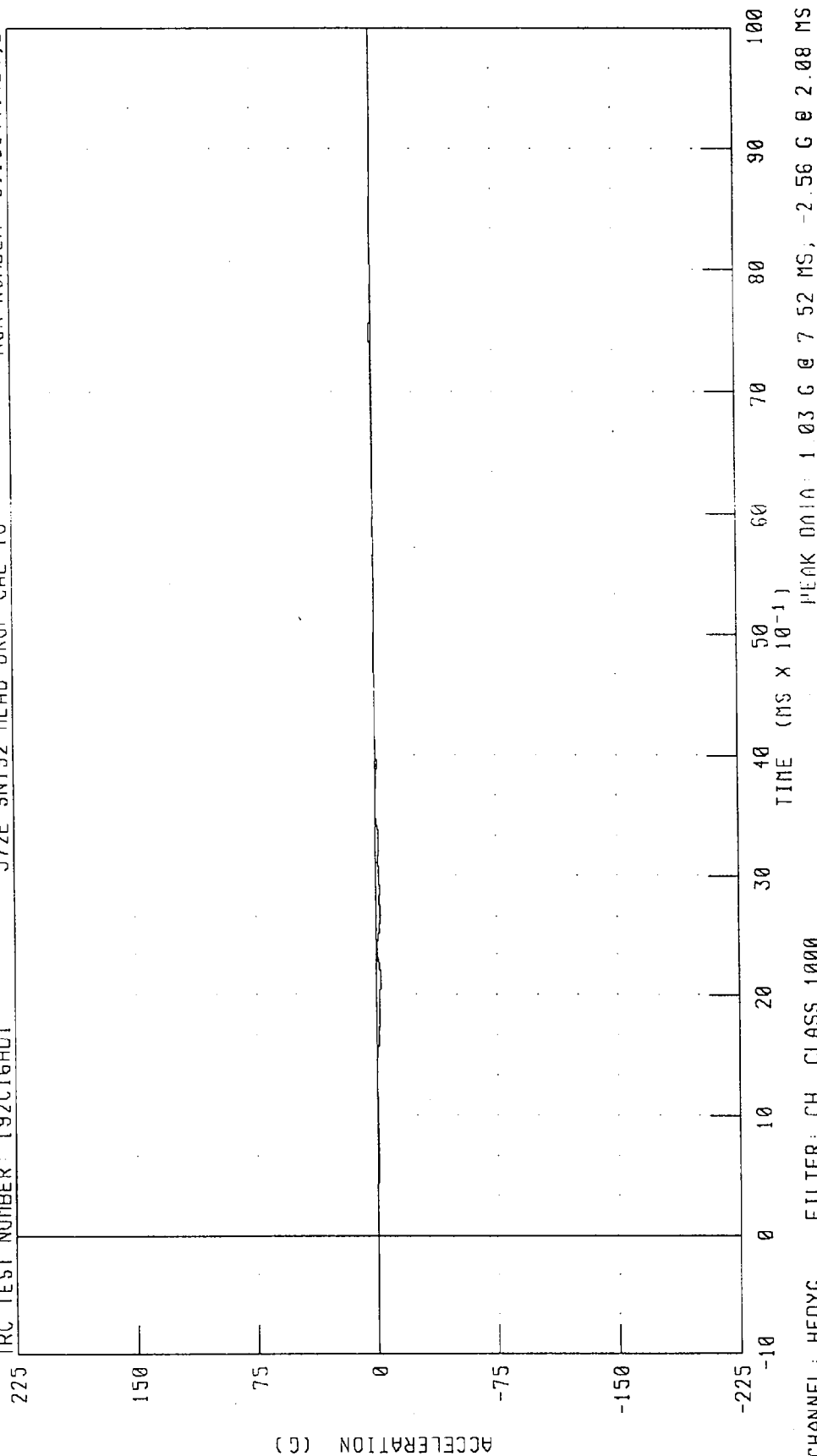


CHANNEL: HEDXC FILTER: CH. CLASS 1000

PEAK DATA 0 03 G @ 0 00 MS, -200 04 G @ 2.24 MS

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

TRC TEST NUMBER: 192C16HD1 572E SN192 HEAD DROP CAL 16 RUN NUMBER 011094.1424,2



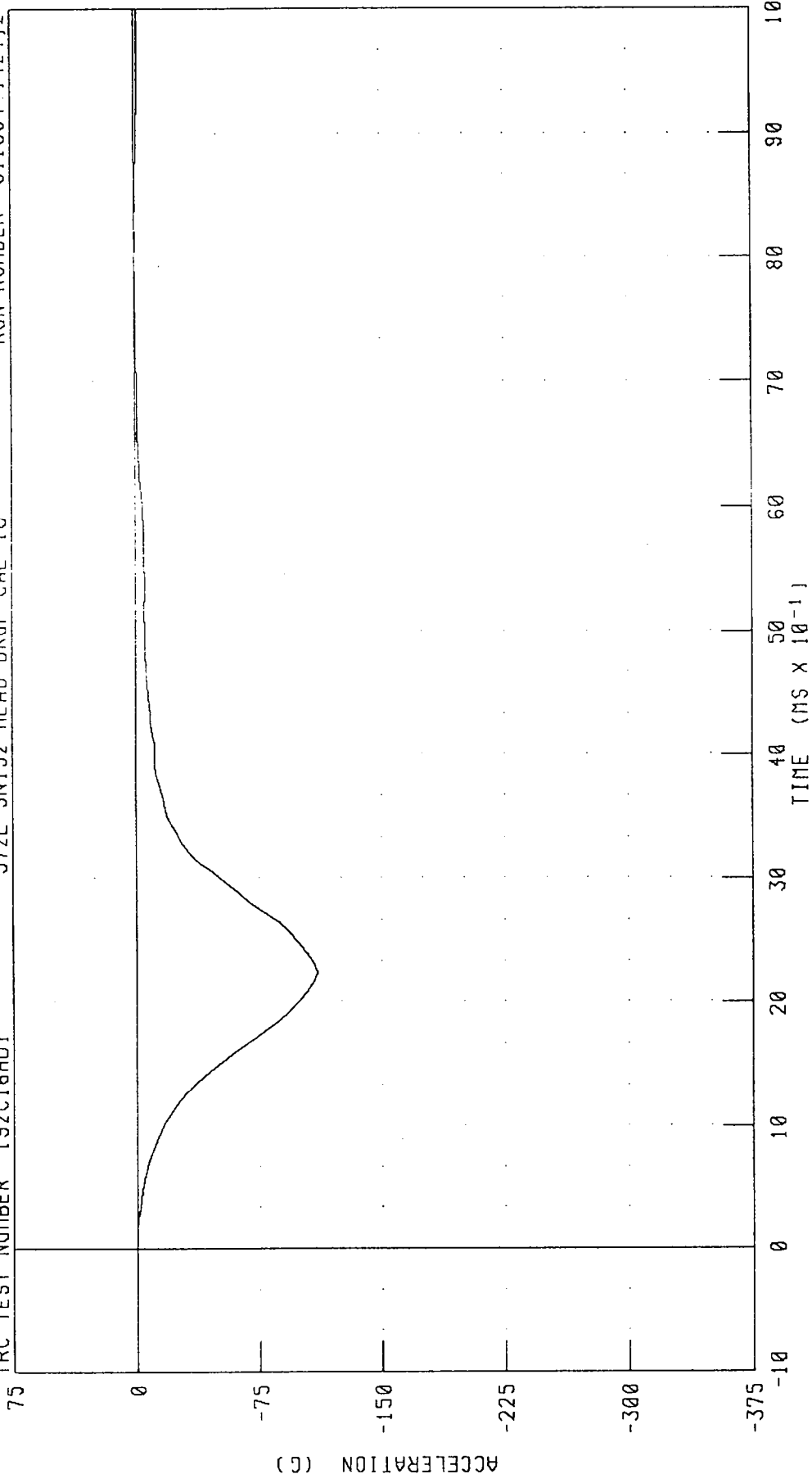
CHANNEL: HEDYC FILTER: CH. CLASS 1000

PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Z AXIS

572E SN192 HEAD DROP CAL 16 RUN NUMBER 011094 1424.2

TRC TEST NUMBER 192C16HD1



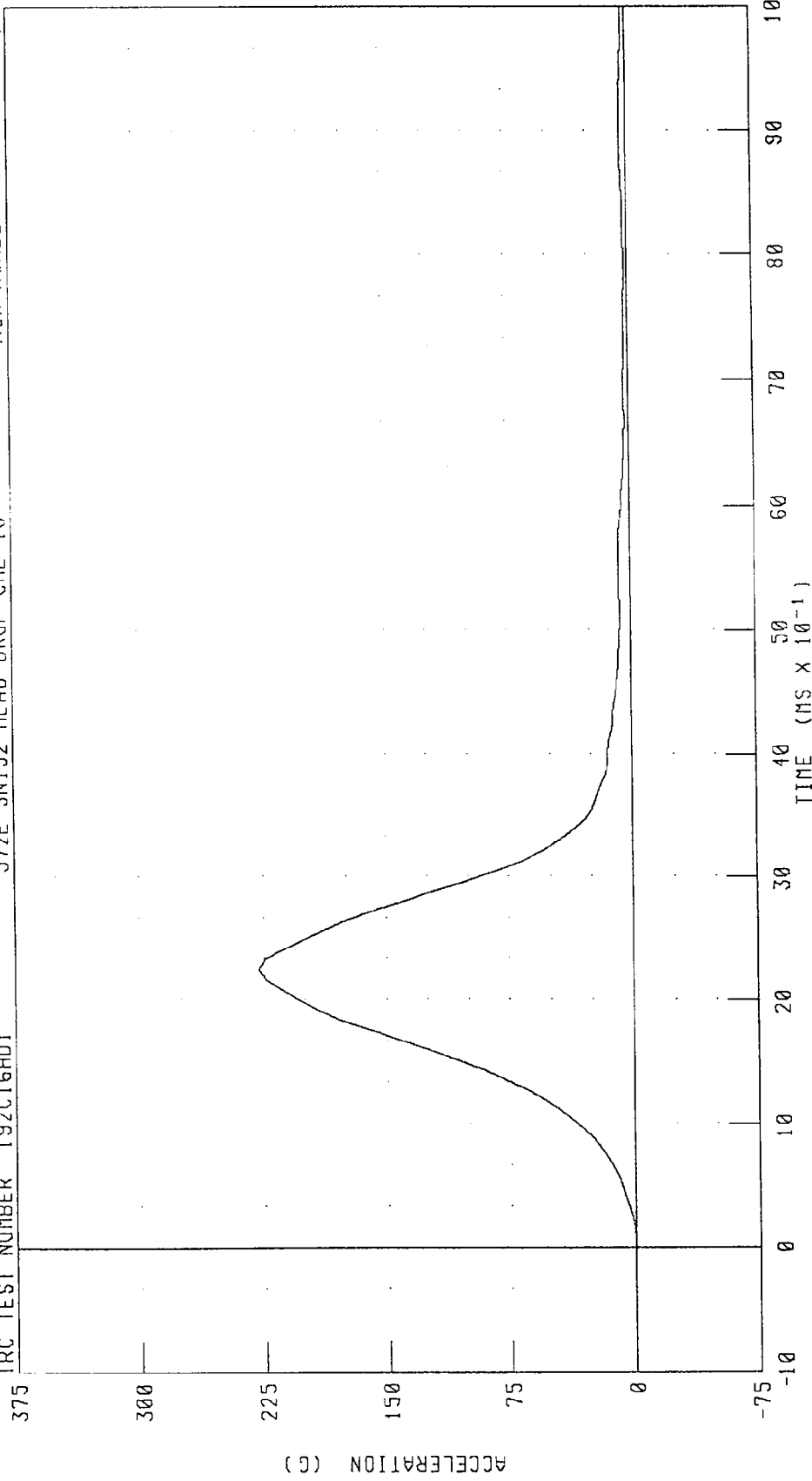
CHANNEL: HEDZG FILTER: CH. CLASS 1000

PEAK DATA 0 01 G @ -0.80 MS, -110 32 G @ 2.24 MS

PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION
572E SN192 HEAD DROP CAL 16

RUN NUMBER 011094 1424,2

TRC TEST NUMBER 192C16HD1



PEAK DATA 228.45 G @ 2.24 MS; 0.03 G @ -0.72 MS

CHANNEL: HEDRG FILTER: CH. CLASS 1000

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST

HYBRID III

21-OCT-93

6 AXIS NECK TRANSDUCER
TRC 192C16NF1

572E SN192 NECK FLEXION CAL16

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY		10 - 70 %	51.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	7.03 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	25.12 G
	20 MS	17.60 - 22.60 G	20.89 G
	30 MS	12.50 - 18.50 G	17.50 G
MAX PENDULUM G		29 G MAX	25.80 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	17.68 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	37.13 MS
D PLANE	MAX	64 - 78 DEG.	68.83 DEG.
ROTATION	TIME	57 - 64 MS	58.38 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	89.01 NM
	TIME	47 - 58 MS	49.50 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	115.38 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	105.63 MS

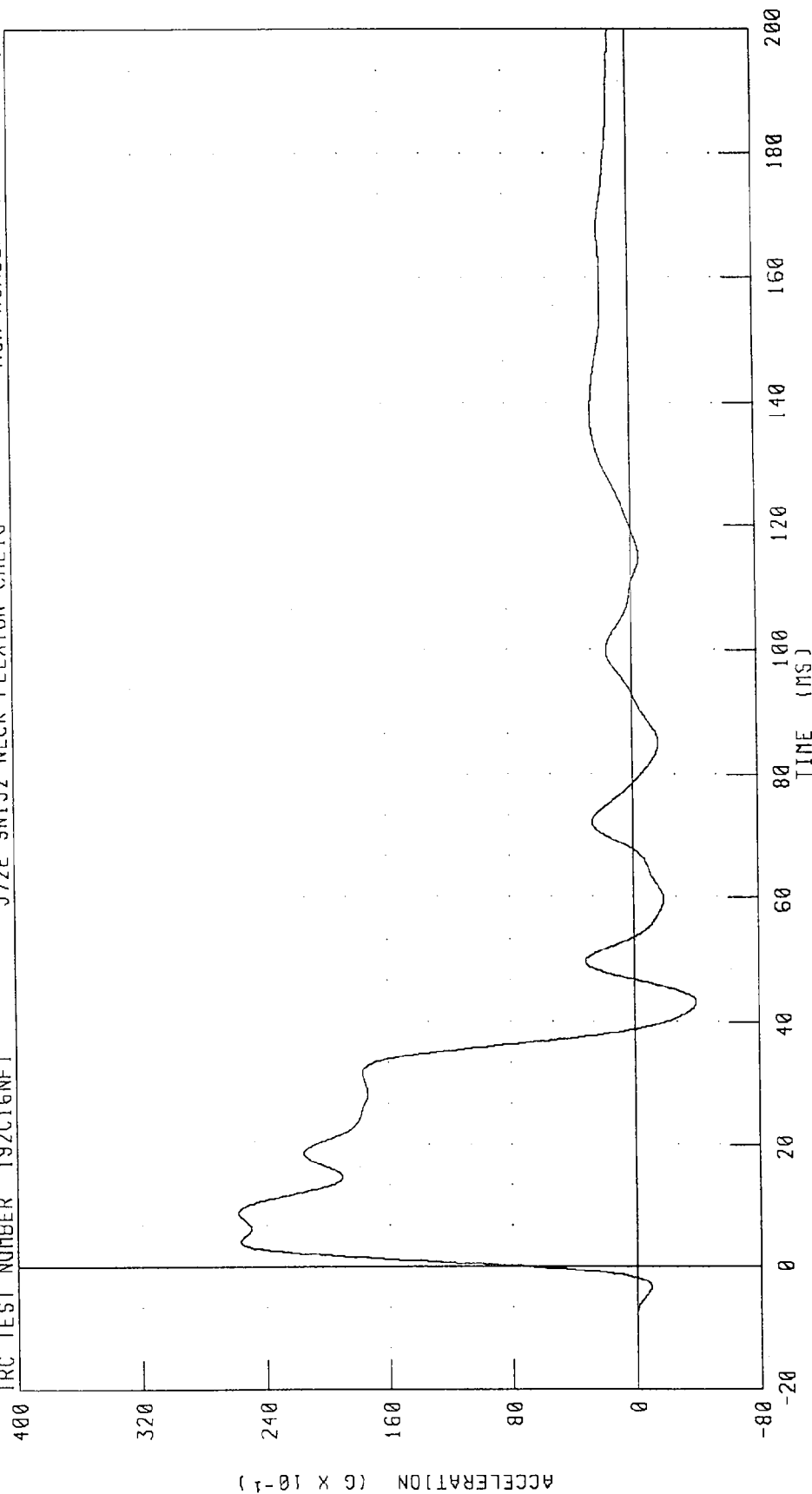
TEST MEETS SPECIFICATIONS

TECHNICIAN

Pete Smith

PART 572-E HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION

IRC TEST NUMBER 192C16NF1 572E SN192 NECK FLEXION CAL16 RUN NUMBER 011094 1424,1



PEAK DATA: 25.81 G @ 8.63 MS, -3.94 G @ 43.13 MS

CHANNEL: PENXG FILTER: CH CLASS 60

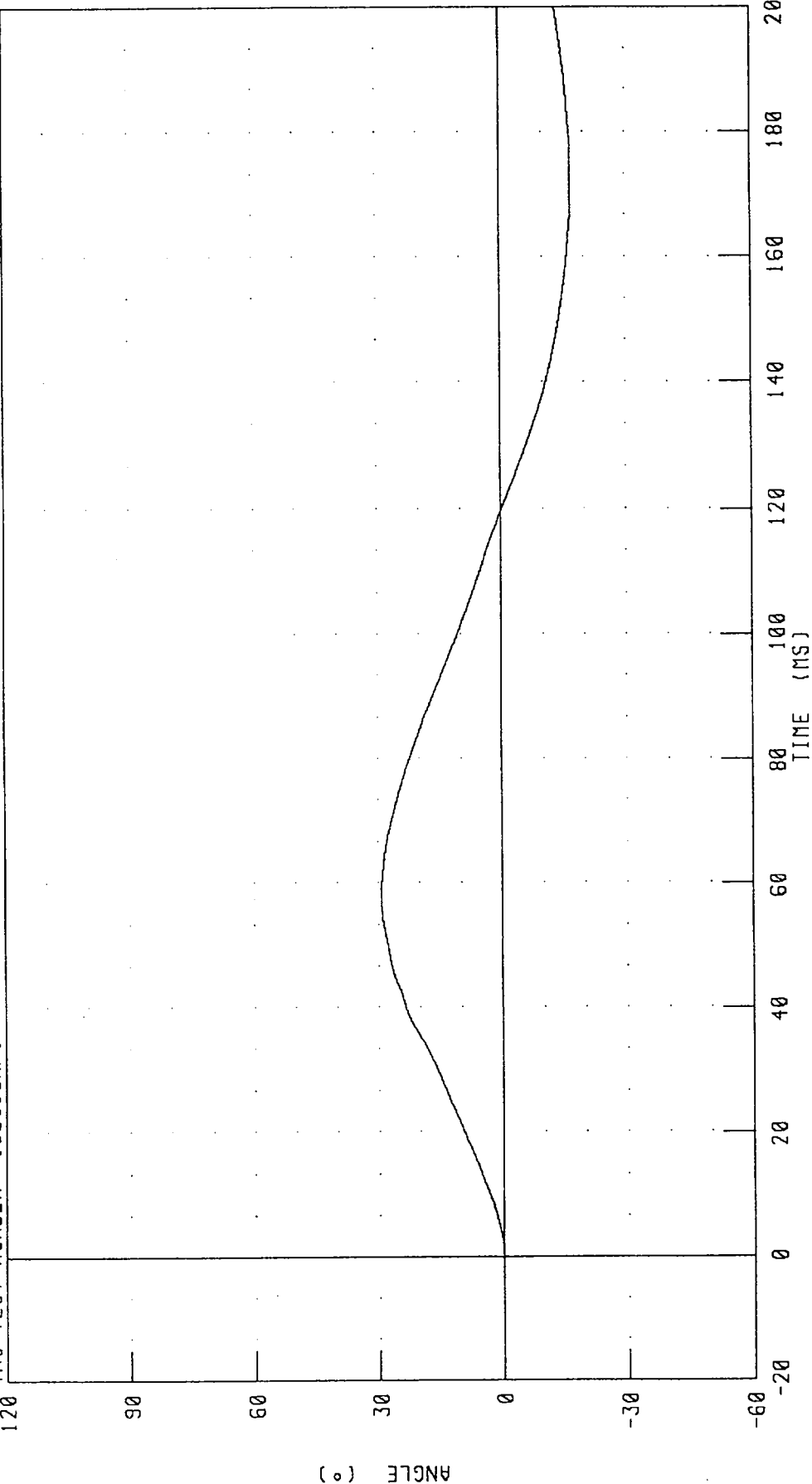
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 192C16NF1

572E SN192 NECK FLEXION CAL16

RUN NUMBER: 011094.1424.1



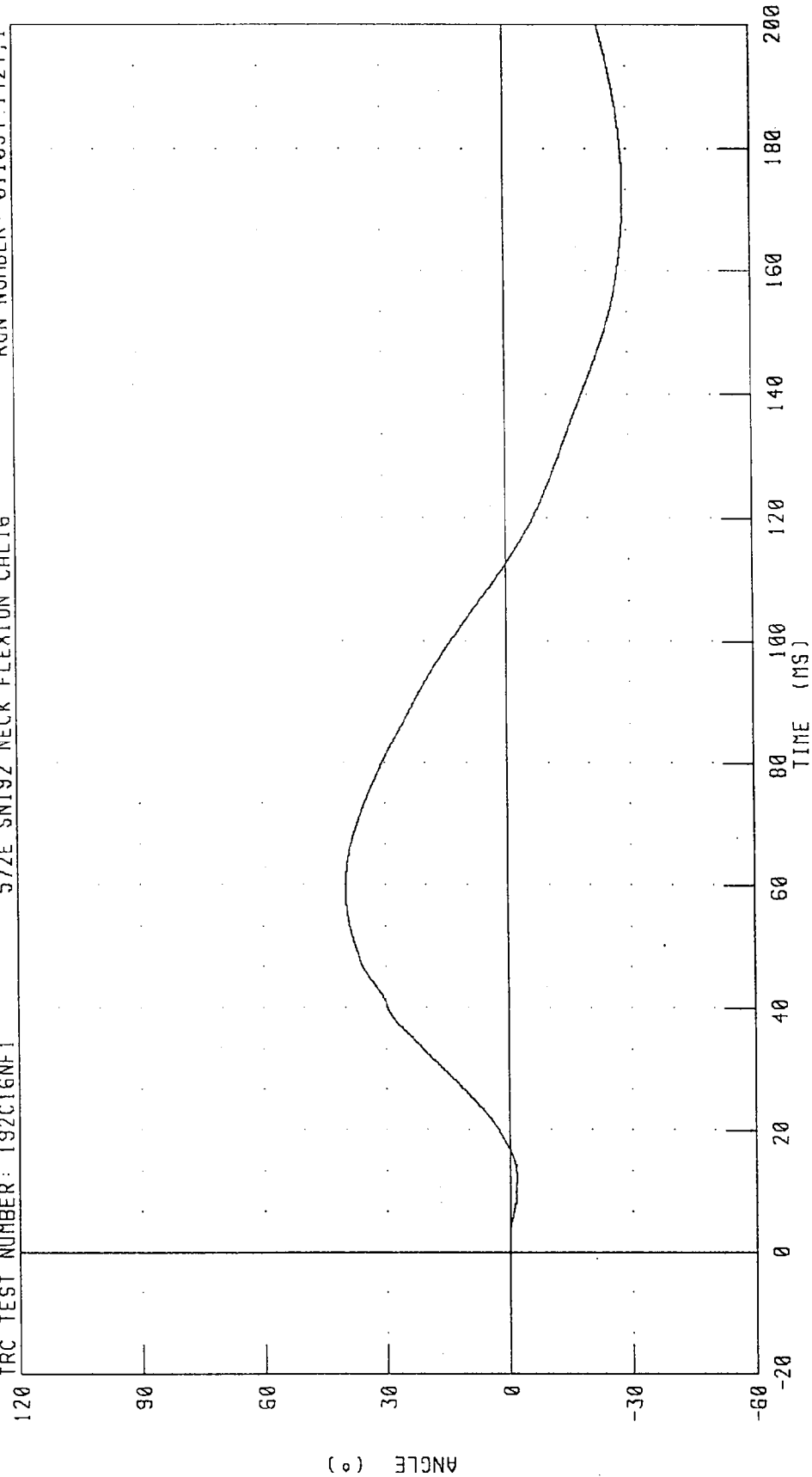
CHANNEL: BETA FILTER: CH. CLASS 60

PEAK DATA: 29.22 ° @ 57.63 MS; -16.96 ° @ 176.25 MS

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

TRC TEST NUMBER: 192C16NF1 RUN NUMBER: 011094 1424;1

572E SN192 NECK FLEXION CAL16



CHANNEL: THETA FILTER: CH. CLASS 60 PEAK DATA: 39.63 ° @ 59.50 MS; -28.83 ° @ 169.75 MS

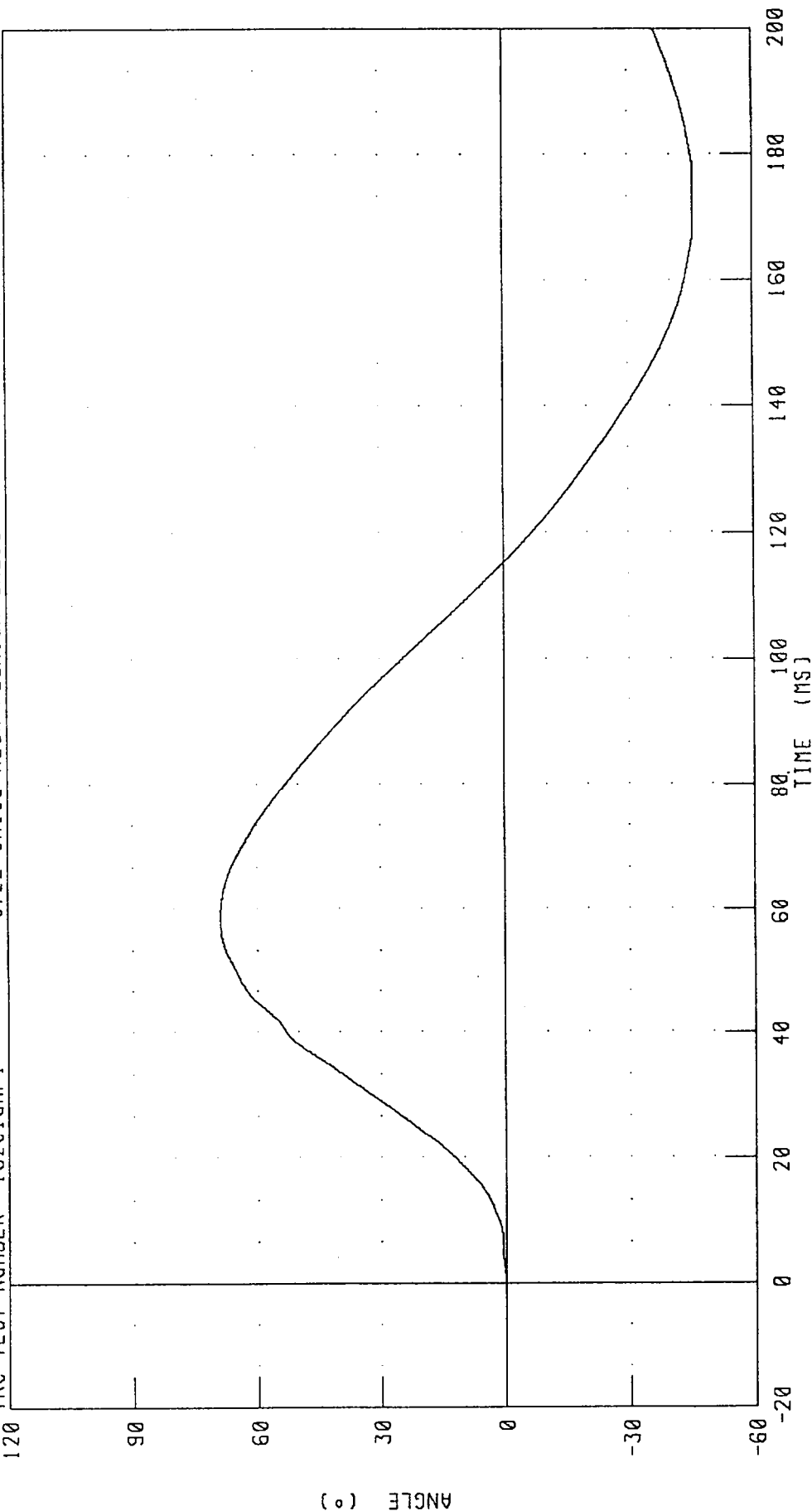
ANGLE (°)

TIME (MS)

PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 192C16NF1 572E SN192 NECK FLEXION CAL16 RUN NUMBER: 011094.1424;1



CHANNEL: TOTAL FILTER: CH. CLASS 60 PEAK DATA 68.83 ° @ 58.38 MS, -45.78 ° @ 176.00 MS

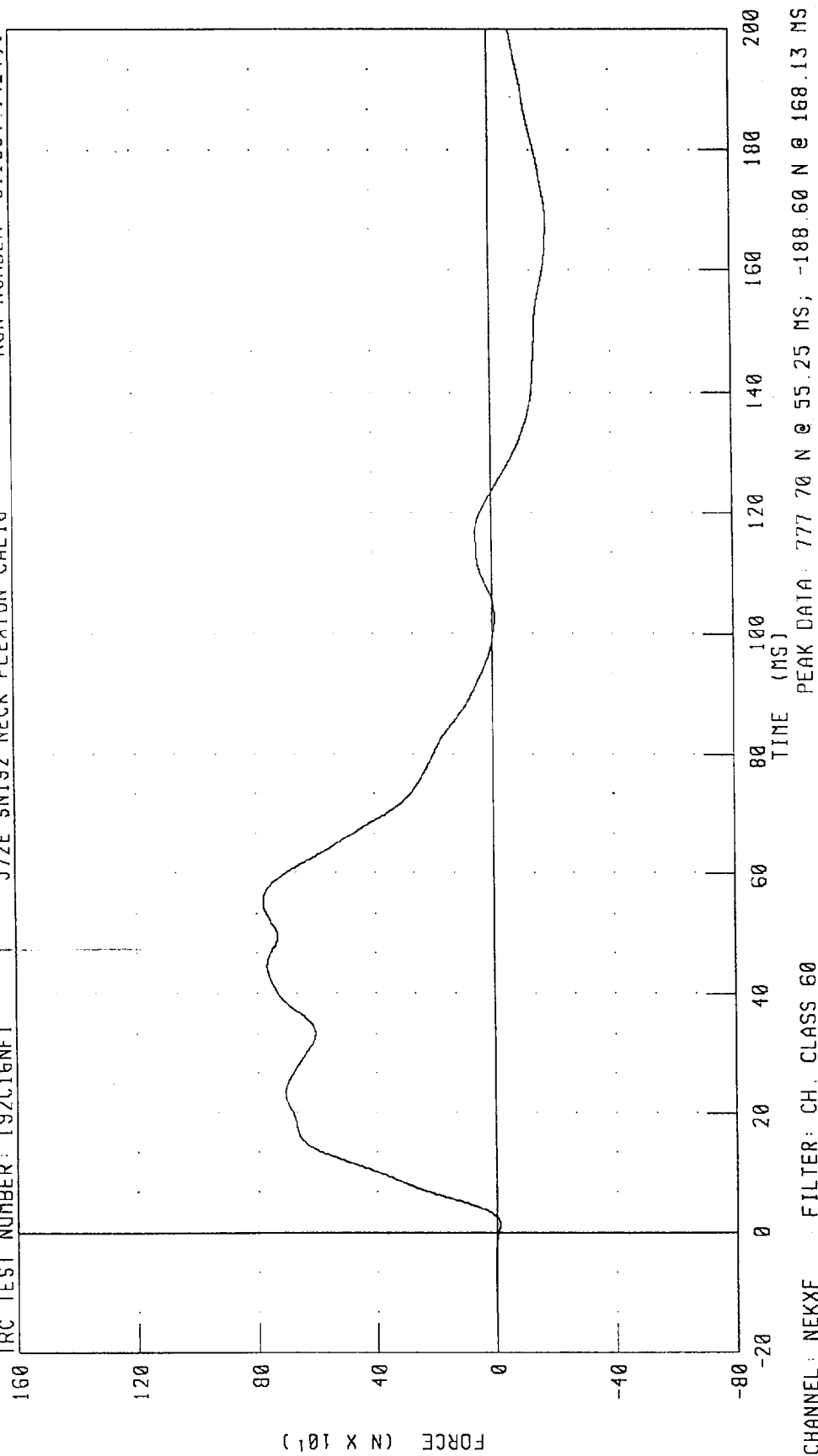
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

572E SN192 NECK FLEXION CAL16

RUN NUMBER: 011094.1424.1

TRC TEST NUMBER: 192C16NF1



CHANNEL: NEKXF FILTER: CH. CLASS 60

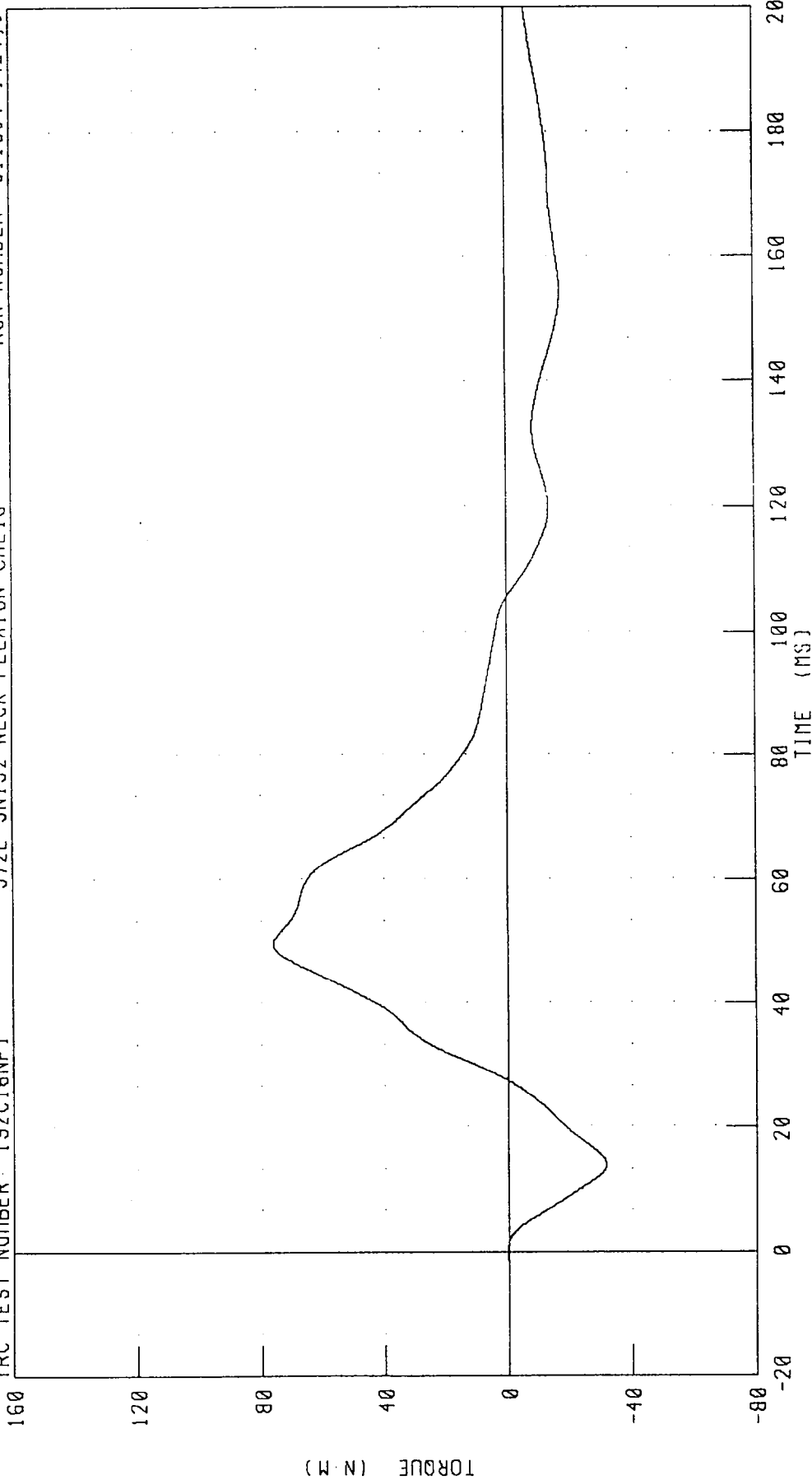
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 192C16NF1

572E SN192 NECK FLEXION CAL16

RUN NUMBER 011094 1424.1



PEAK DATA: 76 01 N M @ 49 50 MS, -31 50 N M @ 13.88 MS

CHANNEL: NEKYM FILTER: CH. CLASS 60

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

RUN NUMBER 011094.1424,1

572E SN192 NECK FLEXION CAL16

TRC TEST NUMBER 192C16NF1

160

120

80

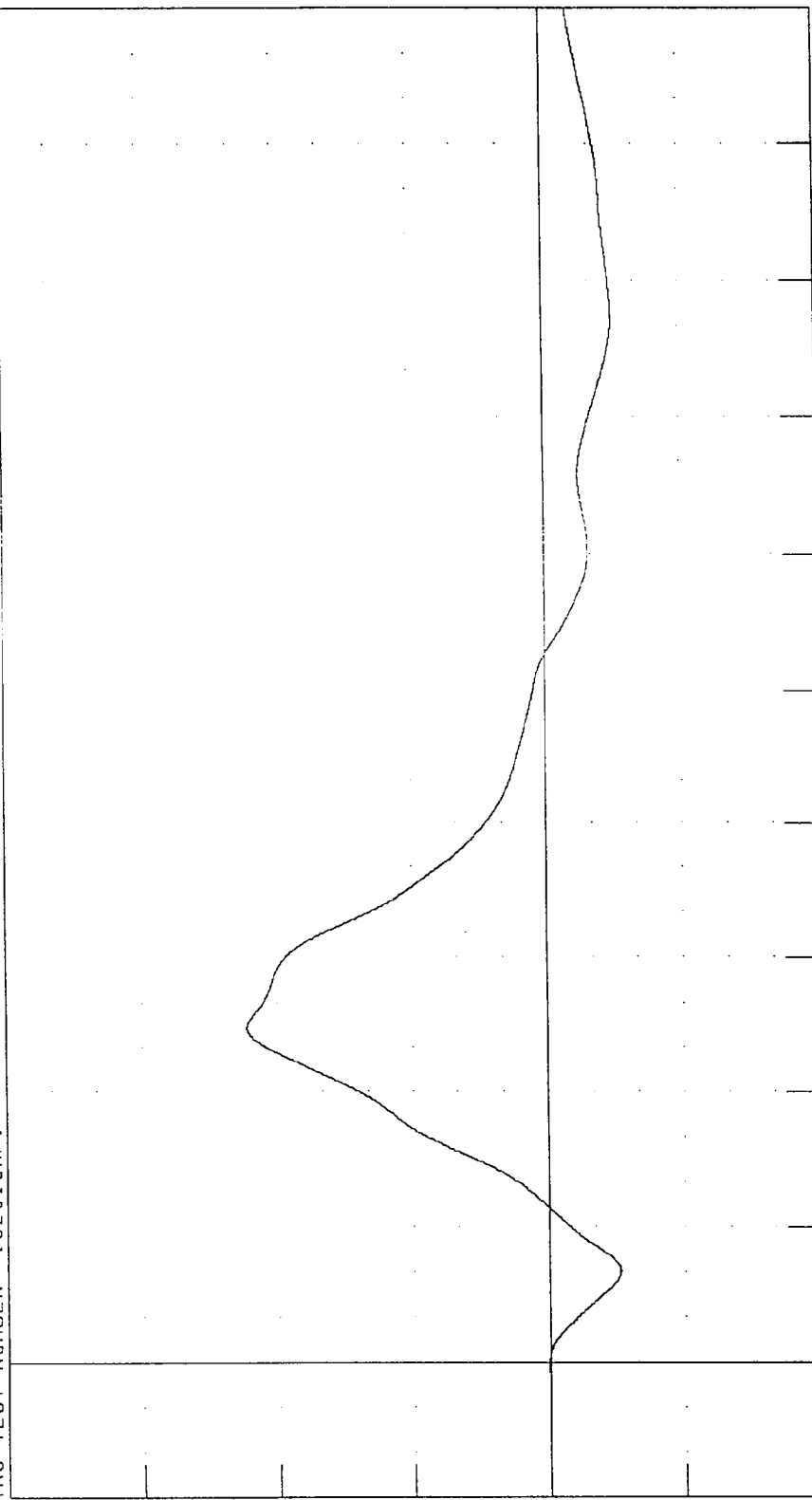
40

0

-40

-80

TORQUE (N·M)



TIME (MS)

PIAK DATA 89 01 N M @ 49.50 MS, -20.79 N·M @ 13.38 MS

FILTER: CH. CLASS 60

CHANNEL: NEKOM

TRANSPORTATION RESEARCH CENTER INC.

NECK EXTENSION TEST

HYBRID III

21-OCT-93

6 AXIS NECK TRANSDUCER
TRC 192C16NE1

572E SN192 NECK EXT. CAL16

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY		10 - 70 %	51.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.00 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	19.41 G
	20 MS	14.00 - 19.00 G	16.67 G
	30 MS	11.00 - 16.00 G	13.24 G
MAX PENDULUM G		22 G MAX	20.39 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	13.19 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	40.25 MS
D PLANE	MAX	81 - 106 DEG.	93.31 DEG.
ROTATION	TIME	72 - 82 MS	75.88 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-57.36 NM
	TIME	65 - 79 MS	71.63 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	157.88 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	141.38 MS

TEST MEETS SPECIFICATIONS

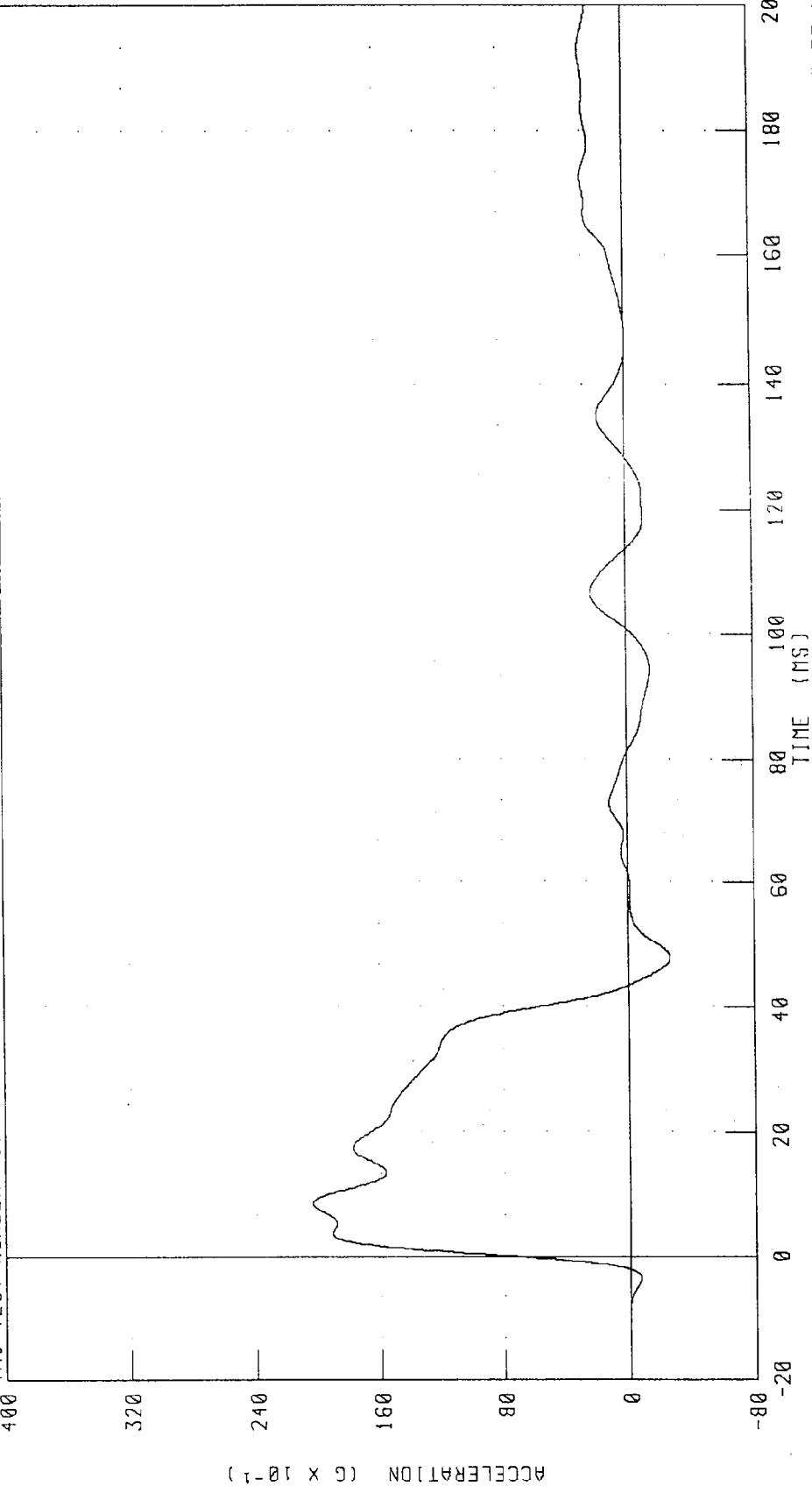
TECHNICIAN Pete Ford

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
 PENDULUM DECELERATION

TRC TEST NUMBER 192C16NE1

572E SN192 NECK EXT CAL16

RUN NUMBER 011094 1424;1



CHANNEL: PENXG FILTER: CH CLASS 60

PEAK DATA 20.40 G @ 8.50 MS, -2.64 G @ 47.75 MS

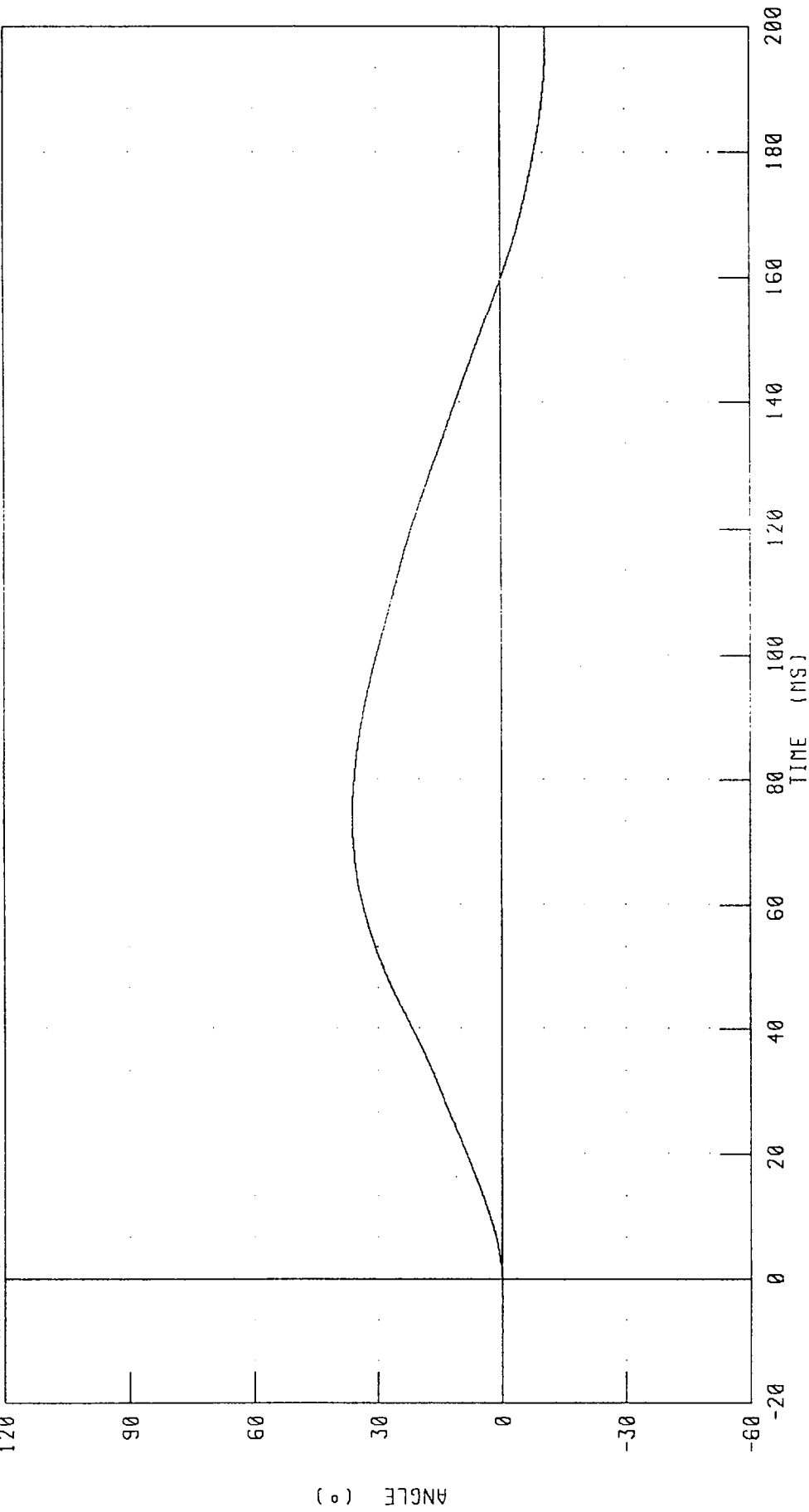
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 192C16NE1

572E SN192 NECK EXT CAL16

RUN NUMBER 011094.1424.1



CHANNEL: BETA FILTER: CH CLASS 60

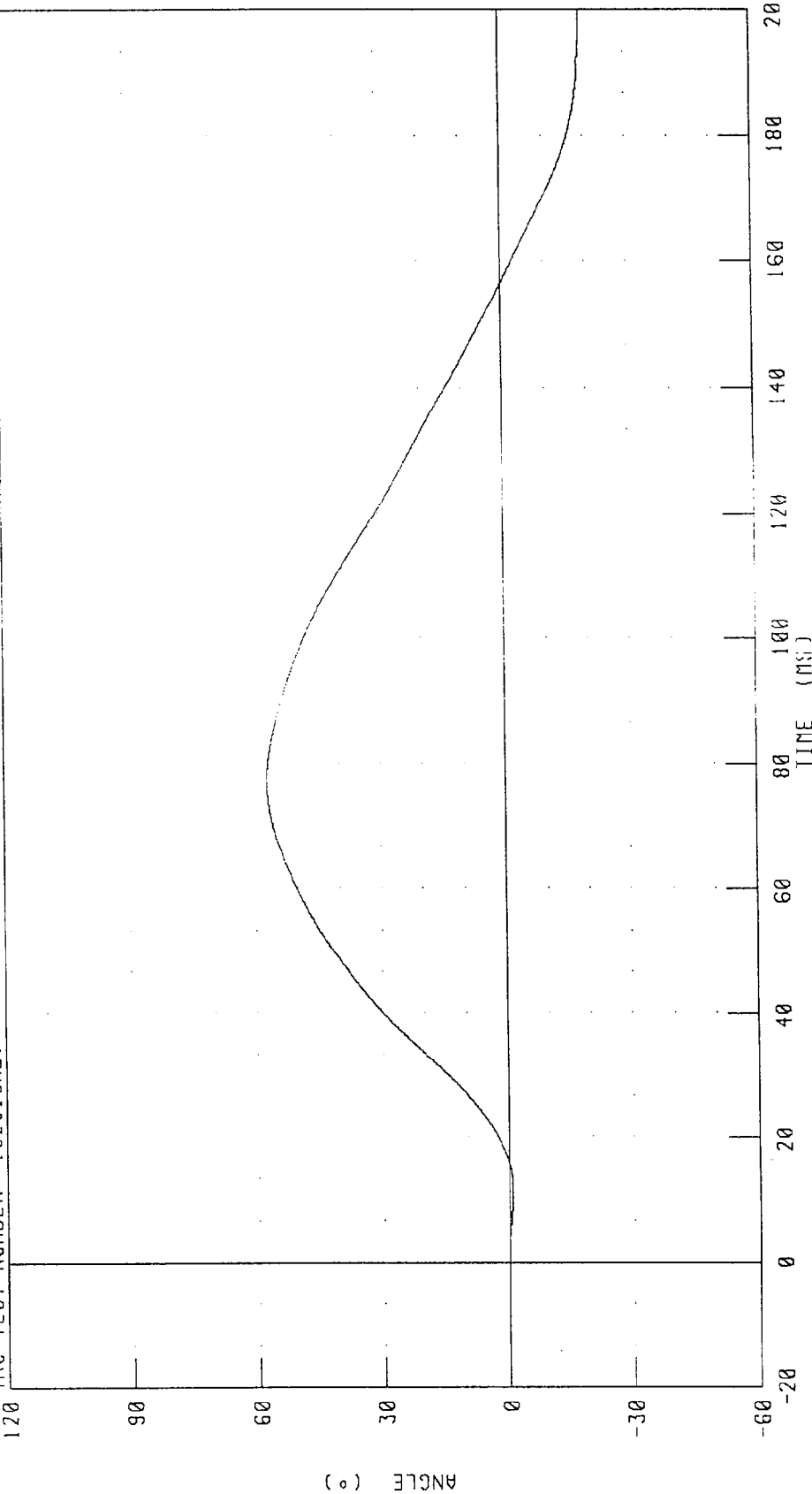
PEAK INFO: 36.22 ° @ 74.13 MS, -10.91 ° @ 198.25 MS

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

RUN NUMBER 011094 1424.1

572E SN192 NECK EXT CAL16

IRC TEST NUMBER 192C16NE1



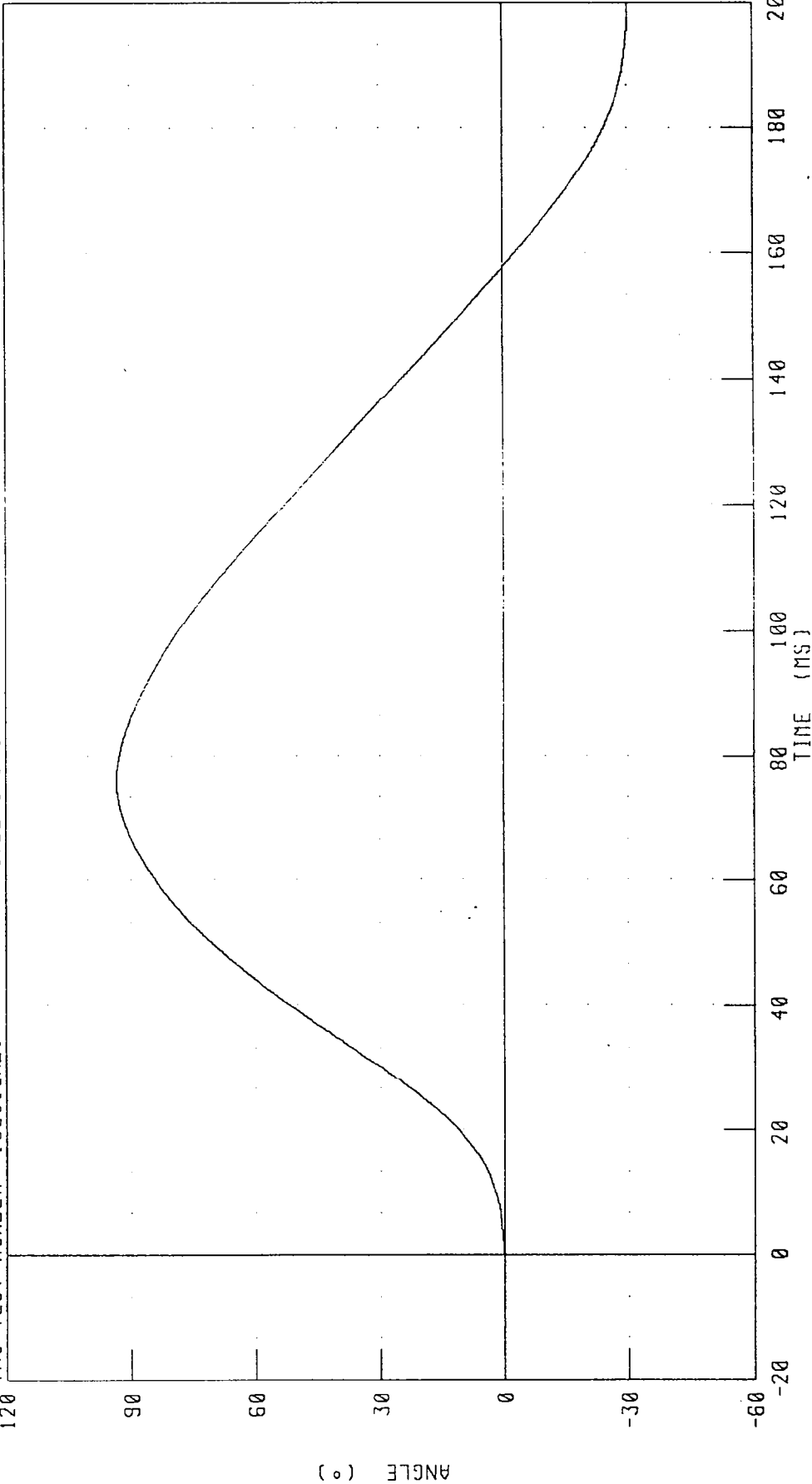
PEAK MAX 57.20 ° @ 77.13 MS; -19.38 ° @ 198.13 MS

CHANNEL: THETA FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

IRC TEST NUMBER: 192C16NE1 572E SN192 NECK EXT CAL16 RUN NUMBER: 011094.1424;1



CHANNEL: TOTAN FILTER: CH. CLASS 60 PFAK DATA 93.31 ° @ 75.88 MS, -30.29 ° @ 198.13 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

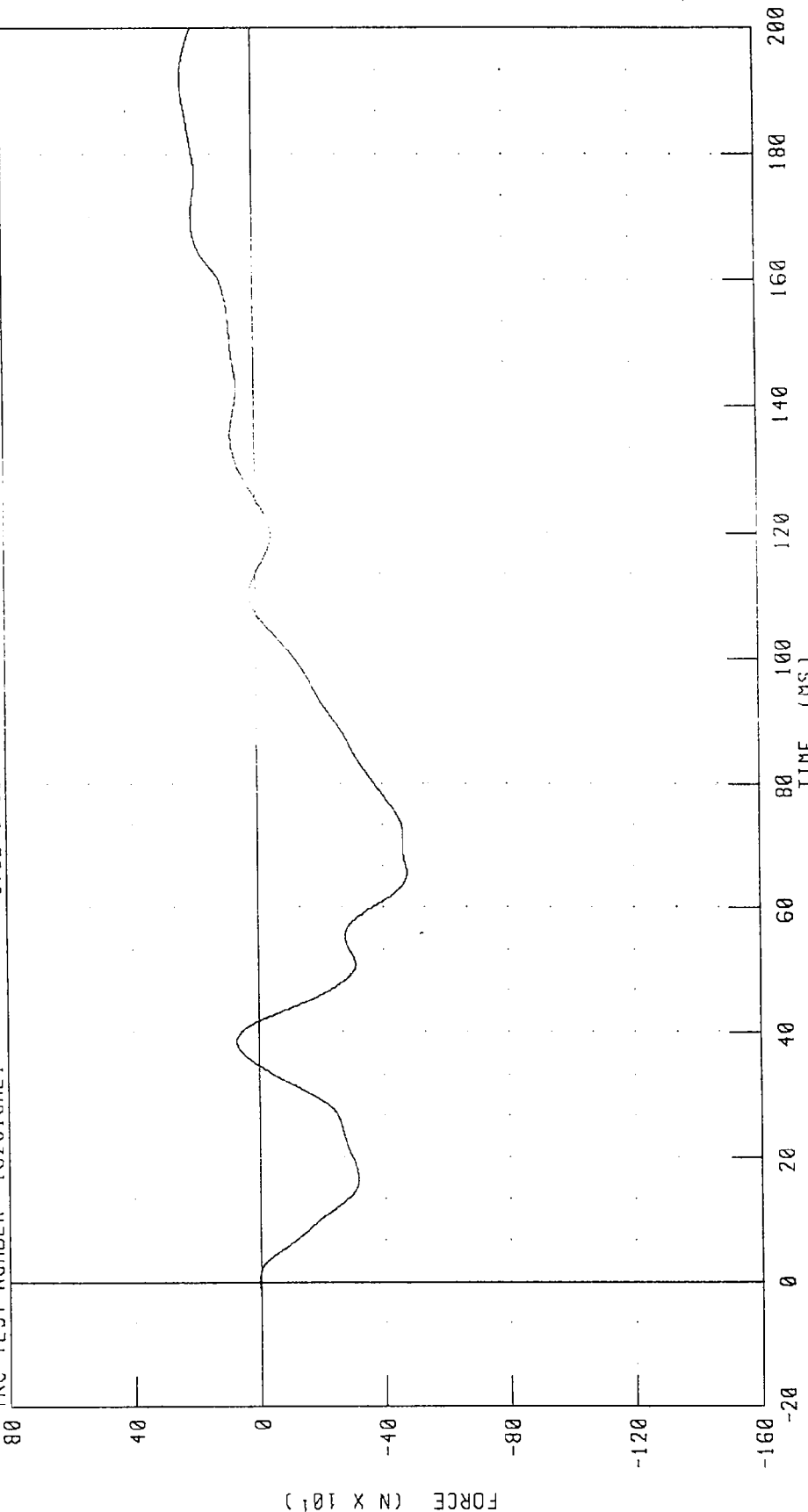
NECK FORCE X AXIS

572E SN192 NECK EXT CALIB

572E SN192 NECK EXT CALIB

TRC TEST NUMBER 192C16NE1

RUN NUMBER 011094 1424.1



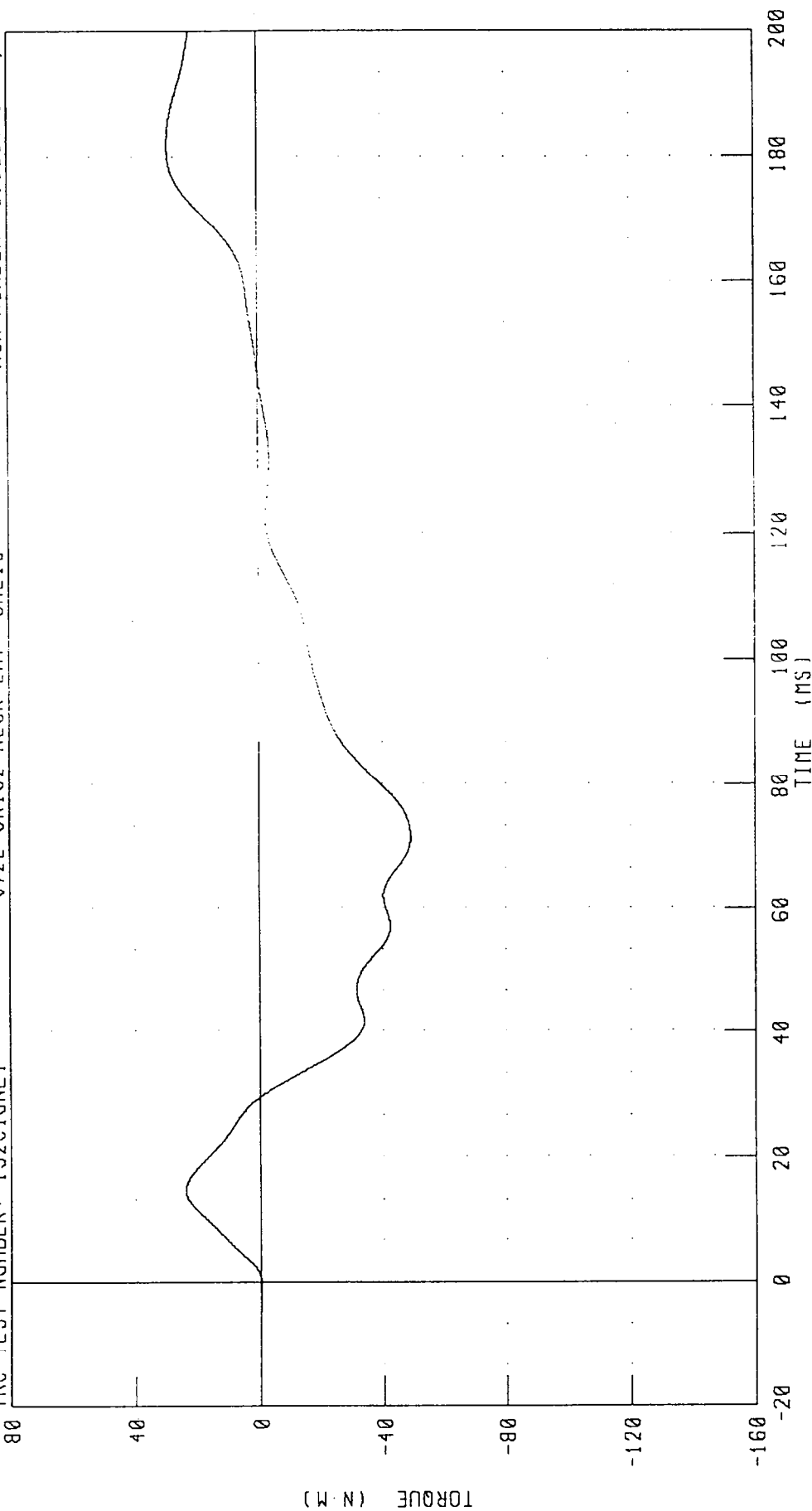
CHANNEL: NEKXF FILTER: CH. CLASS 60

PEAK DATA 22/ 48 N @ 192.00 MS; -476 44 N @ 65.50 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 192C16NE1 572E SN192 NECK EXT CAL16 RUN NUMBER 011094 1424,1



PEAK DATA 28.65 N-M @ 181.75 MS; -49.09 N-M @ 71.63 MS

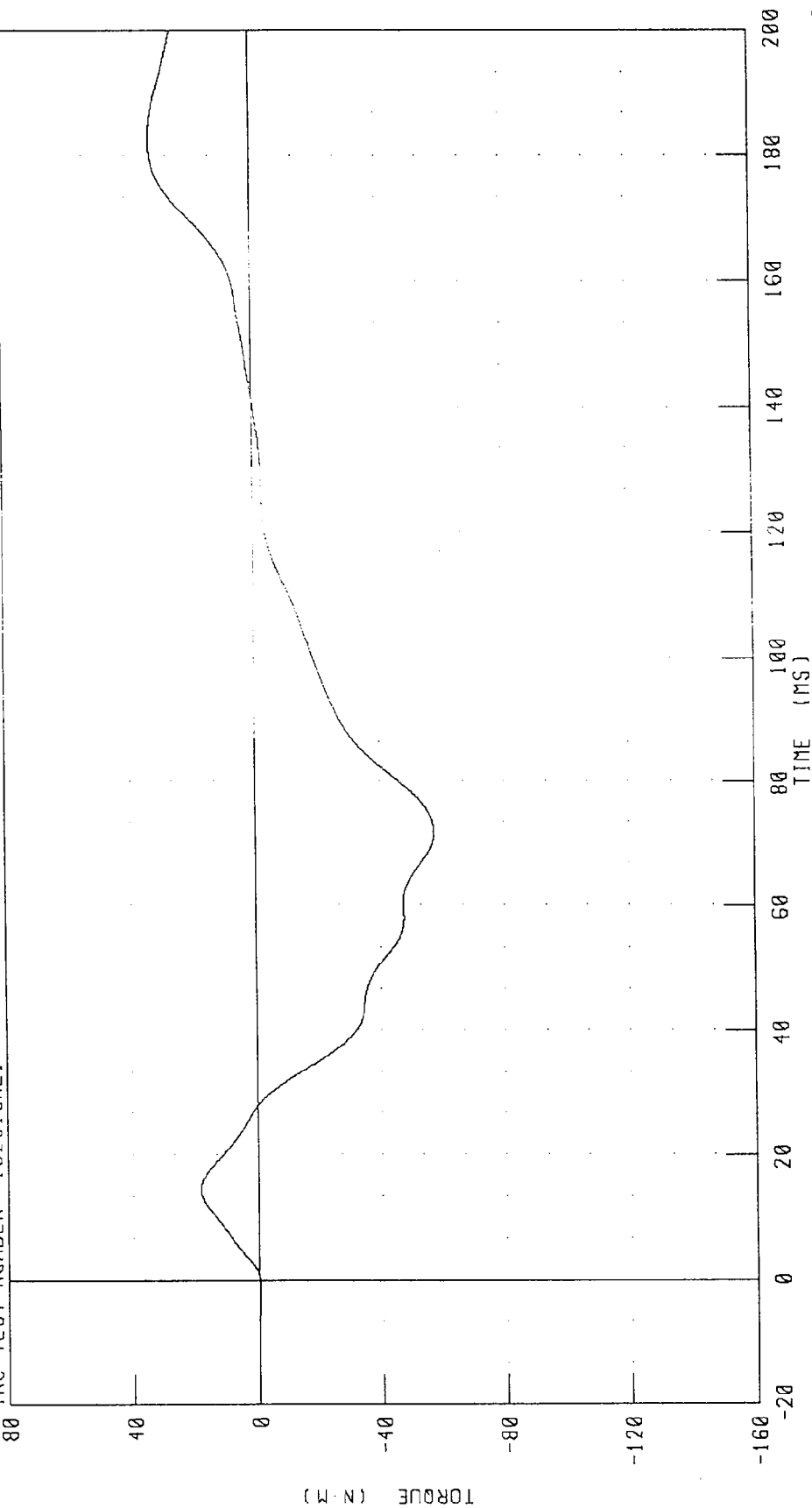
CHANNEL: NEKYM FILTER: CH. CLASS 60

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

RUN NUMBER 011094 1424,1

572E SN192 NECK EXT CAL16

TRC TEST NUMBER: 192C16NE1



PEAK DATA 32.20 N M @ 182.50 MS; -57.36 N M @ 71.63 MS

CHANNEL: NECKM FILTER: CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III

25-OCT-93

TRC

192C16TH1

572E SN192 H.S.THORAX CAL16

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	47.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.68 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	71.0 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5443. N
INTERNAL HYSTERESIS	69% - 85%	72.4%

TEST MEETS SPECIFICATIONS

TECHNICIAN

Lita B. S.

PART 572-E HYBRID III THORAX CALIBRATION
 PENDULUM DECELERATION

572E SN192 H S THORAX CAL16 RUN NUMBER 011094 1424,1

IRC TEST NUMBER 192C16TH1

50

40

30

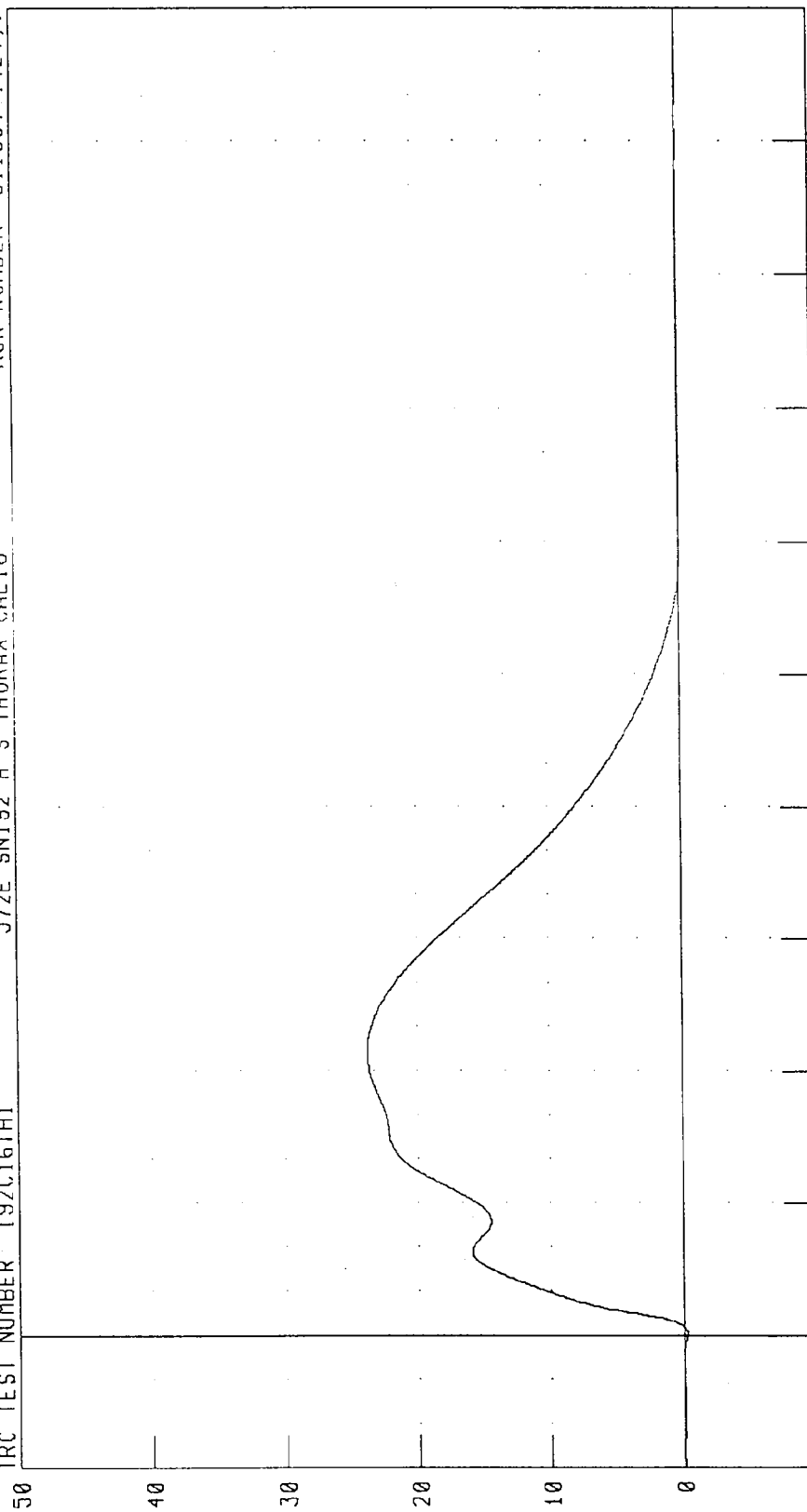
20

10

0

-10

ACCELERATION (G)



TIME (MS)

100 90 80 70 60 50 40 30 20 10 0

CHANNEL: PENXC FILTER: CH. CLASS 180

PIAK DATA 23 76 G @ 21 50 MS, -0.20 G @ 0.13 MS

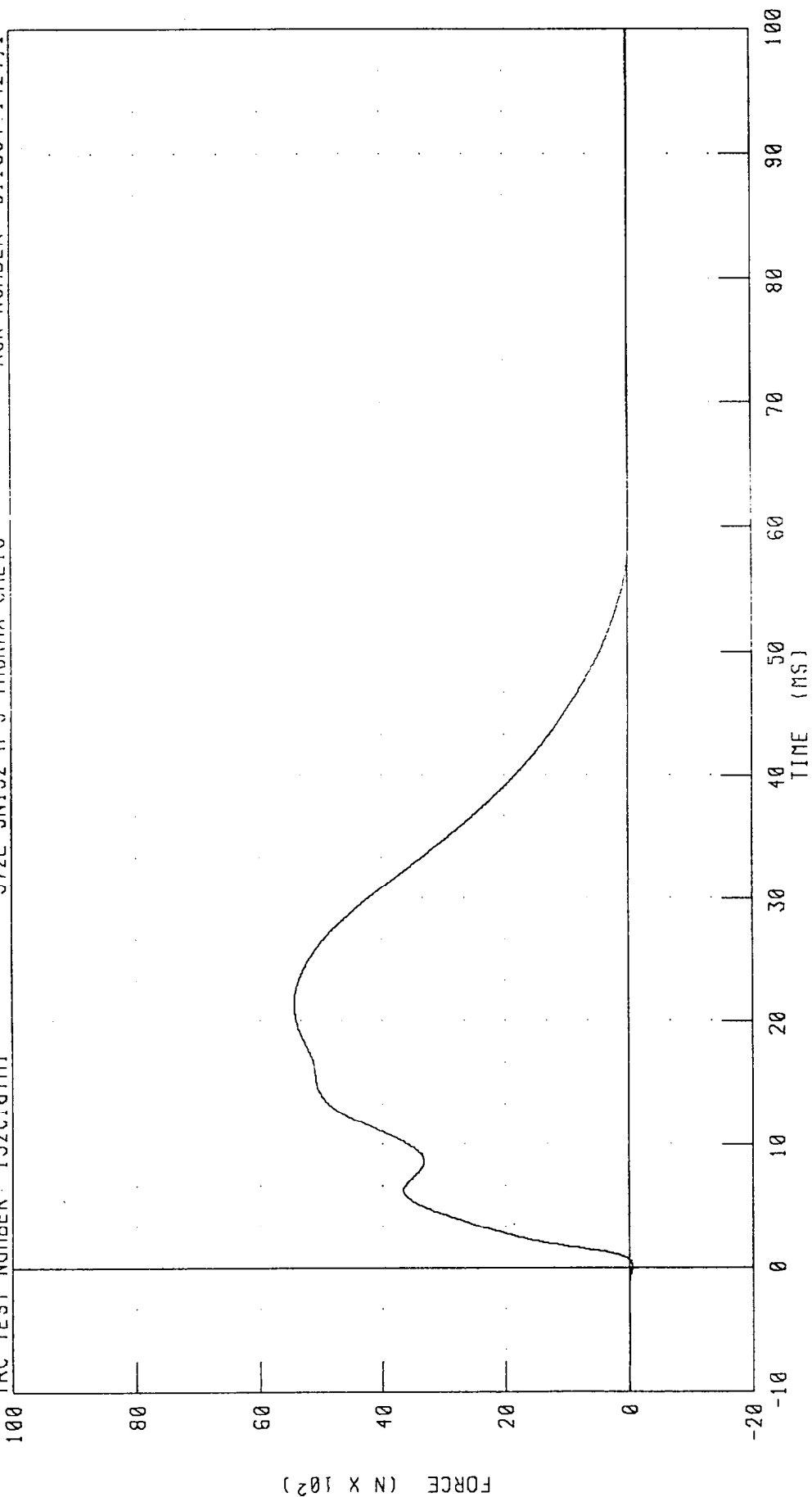
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM FORCE

572E SN192 H S THORAX CAL16

RUN NUMBER 011094 1424.1

TRC TEST NUMBER: 192C16TH1



CHANNEL: PENXF FILTER: CH. CLASS 180

PEAK DATA 544.3 23 N @ 21.50 MS, -45.31 N @ 0.13 MS

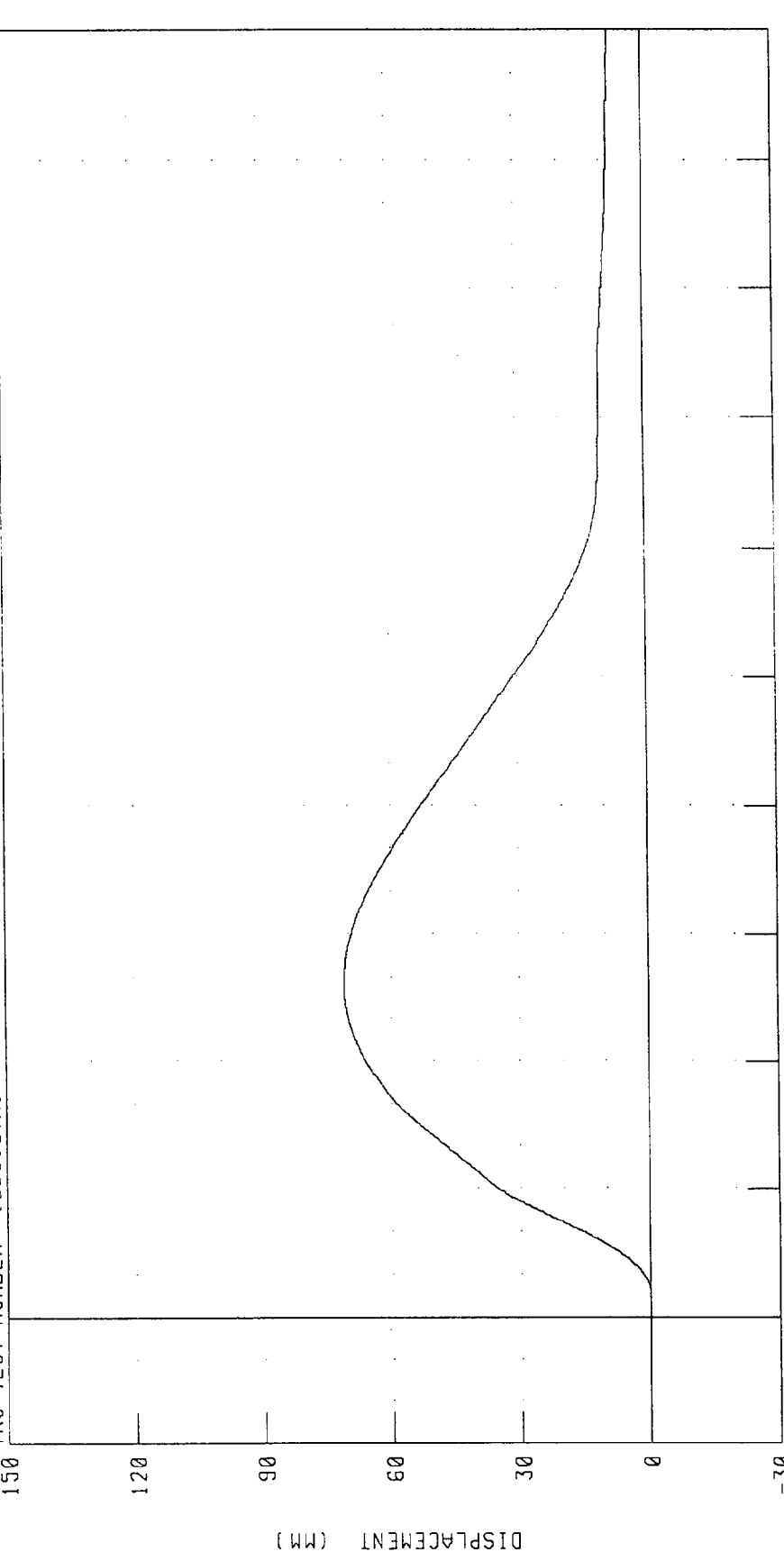
PART 572-E HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

572E SN192 H S THORAX CAL16

RUN NUMBER 011094 1424,1

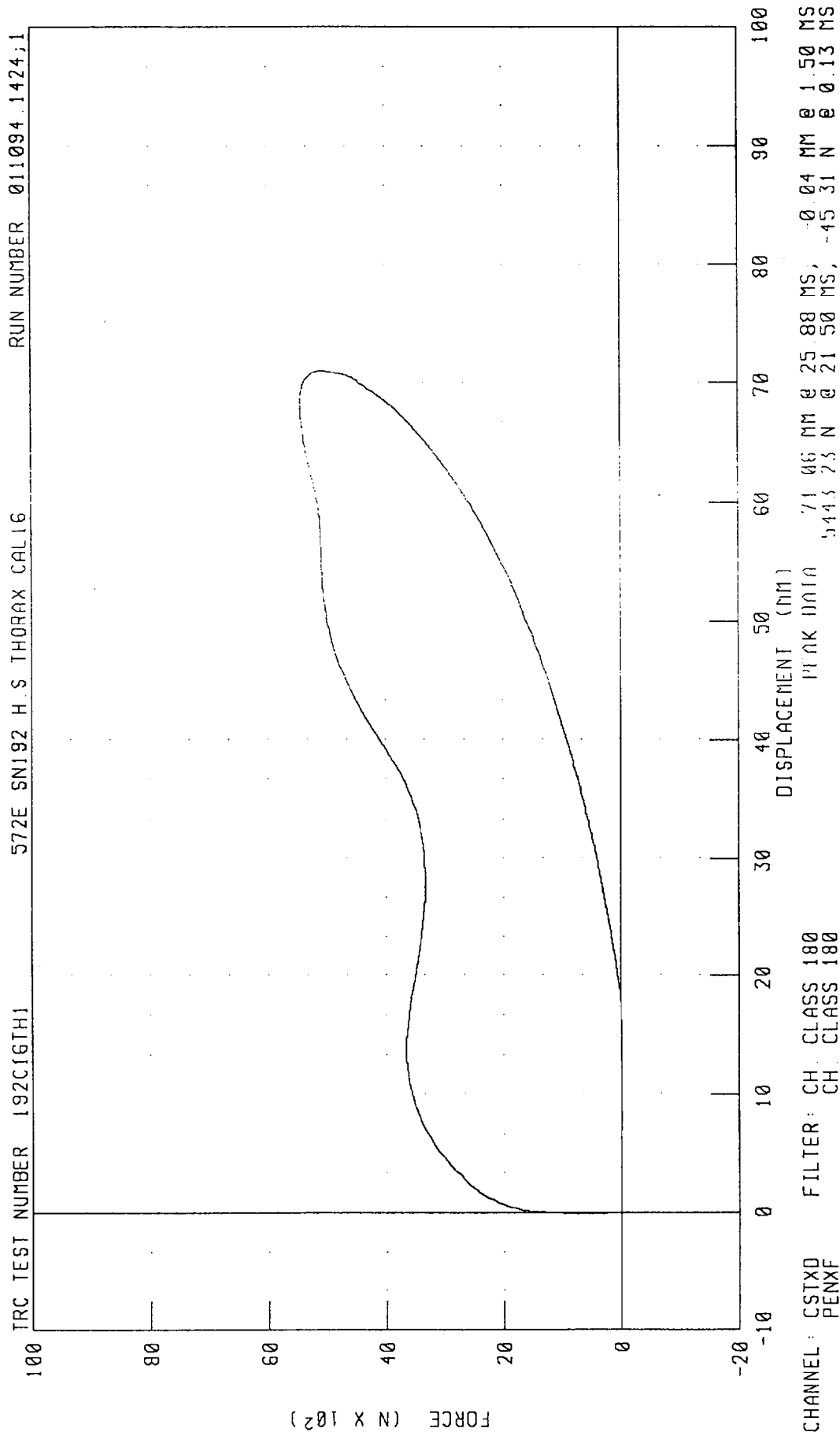
IRC TEST NUMBER 192C16TH1



PEAK DATA: 71.06 MM @ 25.88 MS, -0.04 MM @ 1.50 MS

CHANNEL: CSTXD FILTER: CH. CLASS 180

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



TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III

25-OCT-93

TRC

192C16RK1

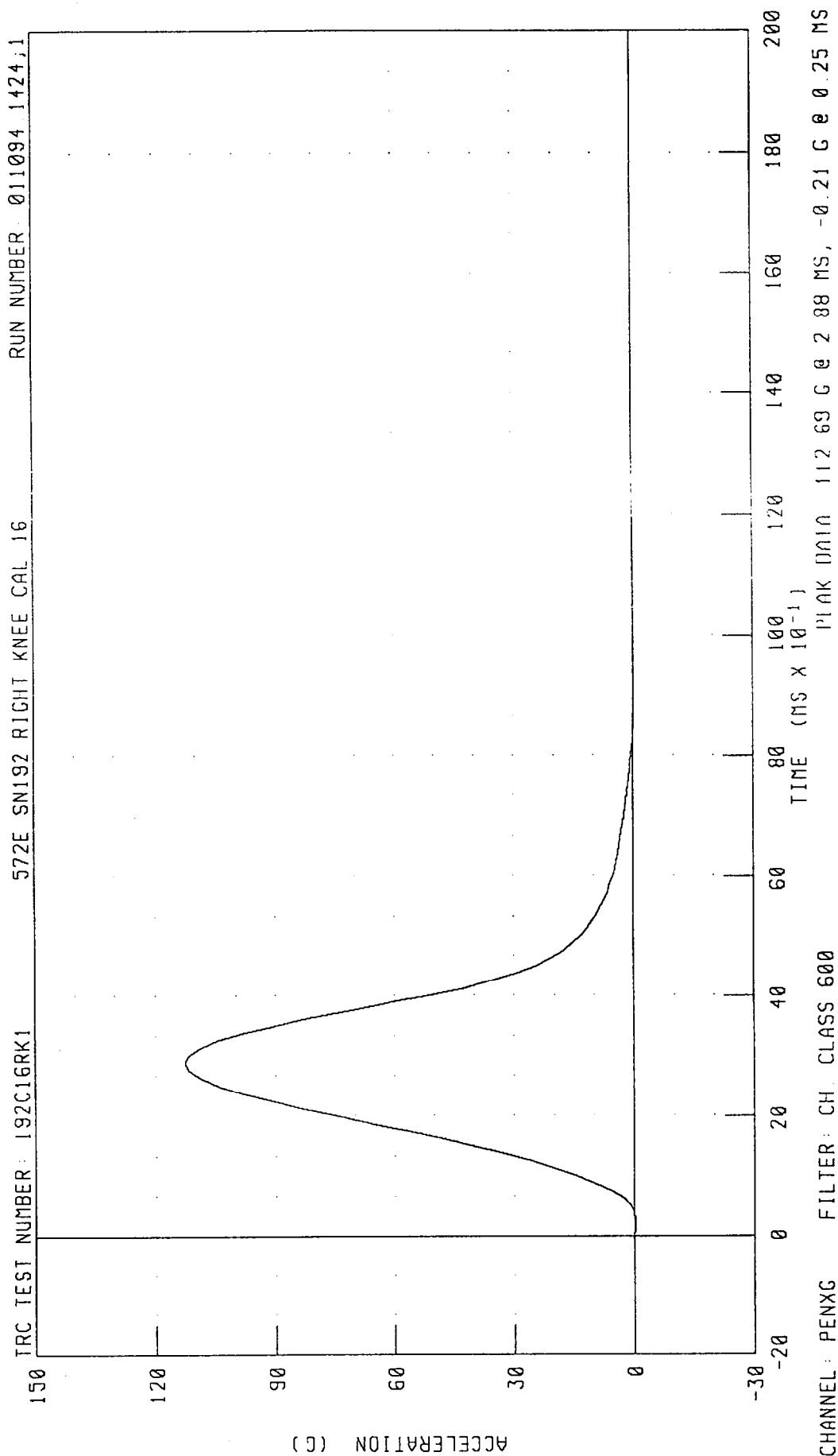
572E SN192 RIGHT KNEE CAL 16

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	45.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.09 M/S
PEAK KNEE IMPACT FORCE PROBE WEIGHT	4714 - 5783 N 5.0 KG	5513.5 N

TEST MEETS SPECIFICATIONS

TECHNICIAN Pete Ford

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



PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND)

572E SN192 RIGHT KNEE CAL 16

RUN NUMBER 011094 1424,1

TRC TEST NUMBER: 192C16RK1

75

60

45

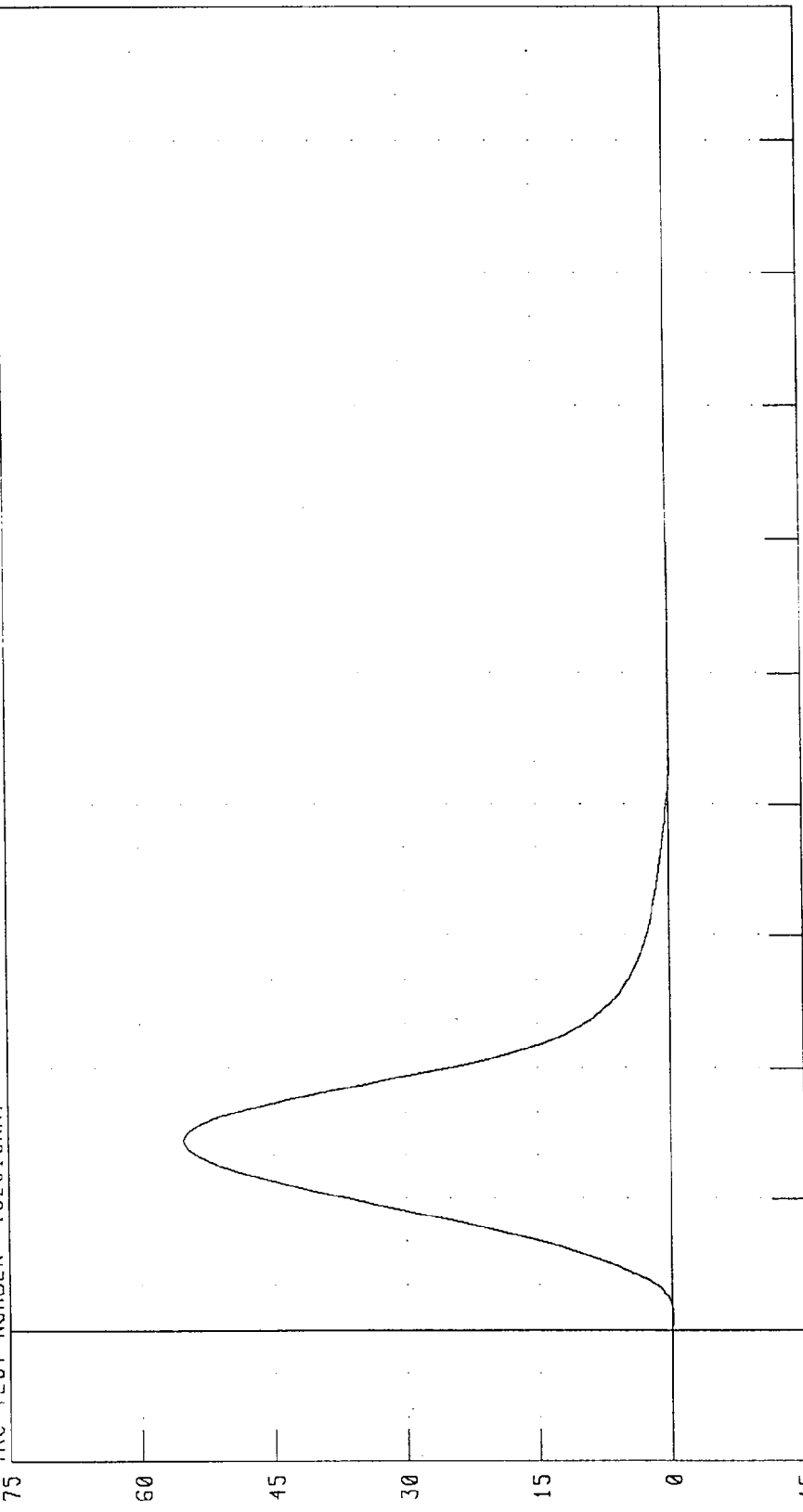
30

15

0

-15

FORCE (N X 10²)



TIME (MS X 10⁻¹)

200

180

160

140

120

100

80

60

40

20

0

PEAK 0010 5513 57 N @ 2.88 MS, -10.13 N @ 0.25 MS

FILTER: CH. CLASS 600

CHANNEL: PENXF

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III

25-OCT-93

TRC

192C16LK1

572E SN192 LEFT KNEE CAL 16

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	45.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.09 M/S
PEAK KNEE IMPACT FORCE	4714 - 5783 N	4831.5 N
PROBE WEIGHT	5.0 KG	

TEST MEETS SPECIFICATIONS

TECHNICIAN Pete Font

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

RUN NUMBER 011094 1424,2

TRC TEST NUMBER: 182C16LK1

572E SN192 LEFT KNEE CAL 16

150

120

90

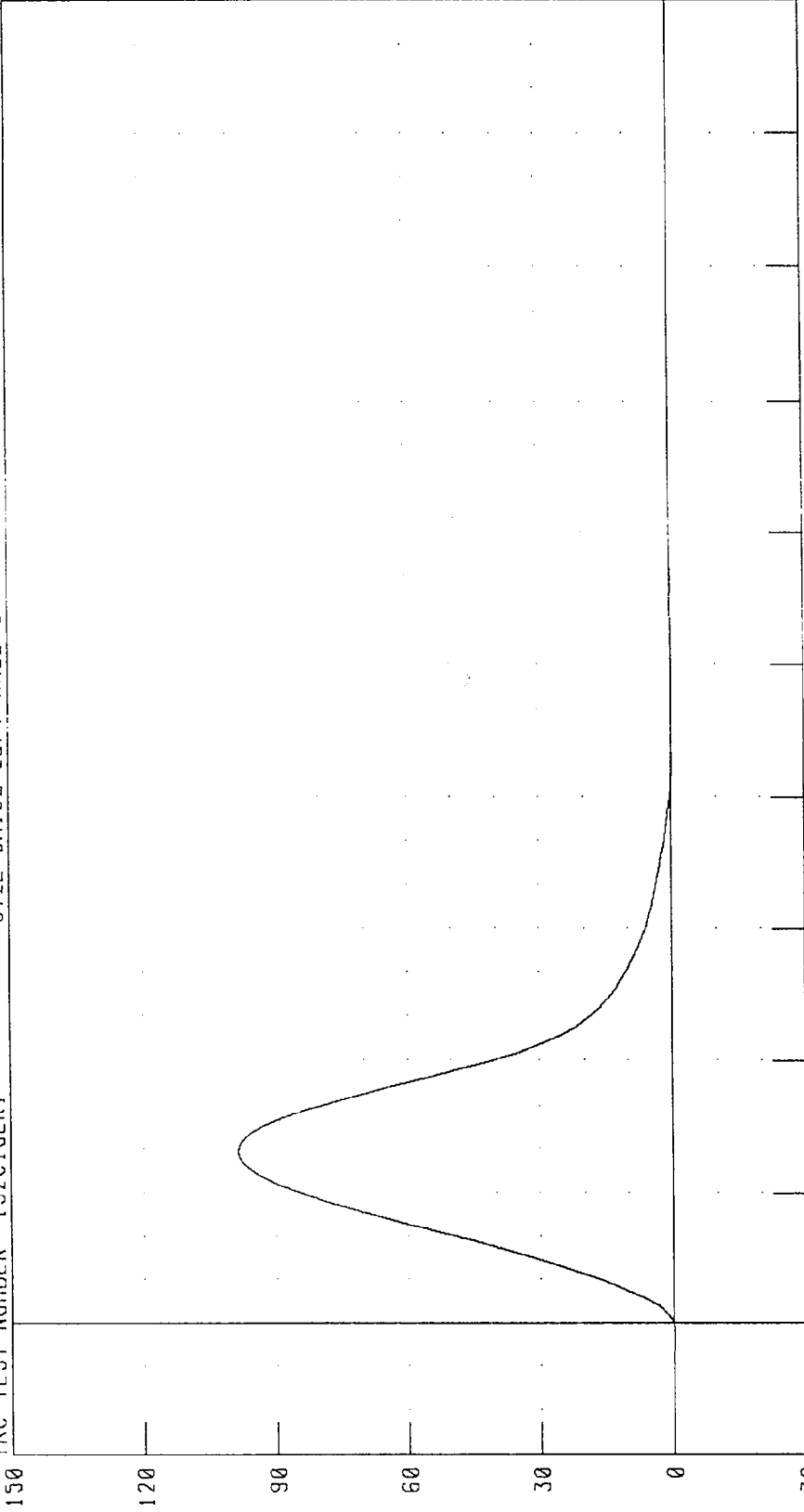
60

30

0

-30

ACCELERATION (G)



TIME (MS X 10⁻¹)

PEAK DATA 98.75 G @ 2.63 MS; -0.24 G @ -0.13 MS

CHANNEL: PENXG FILTER: CH. CLASS 600

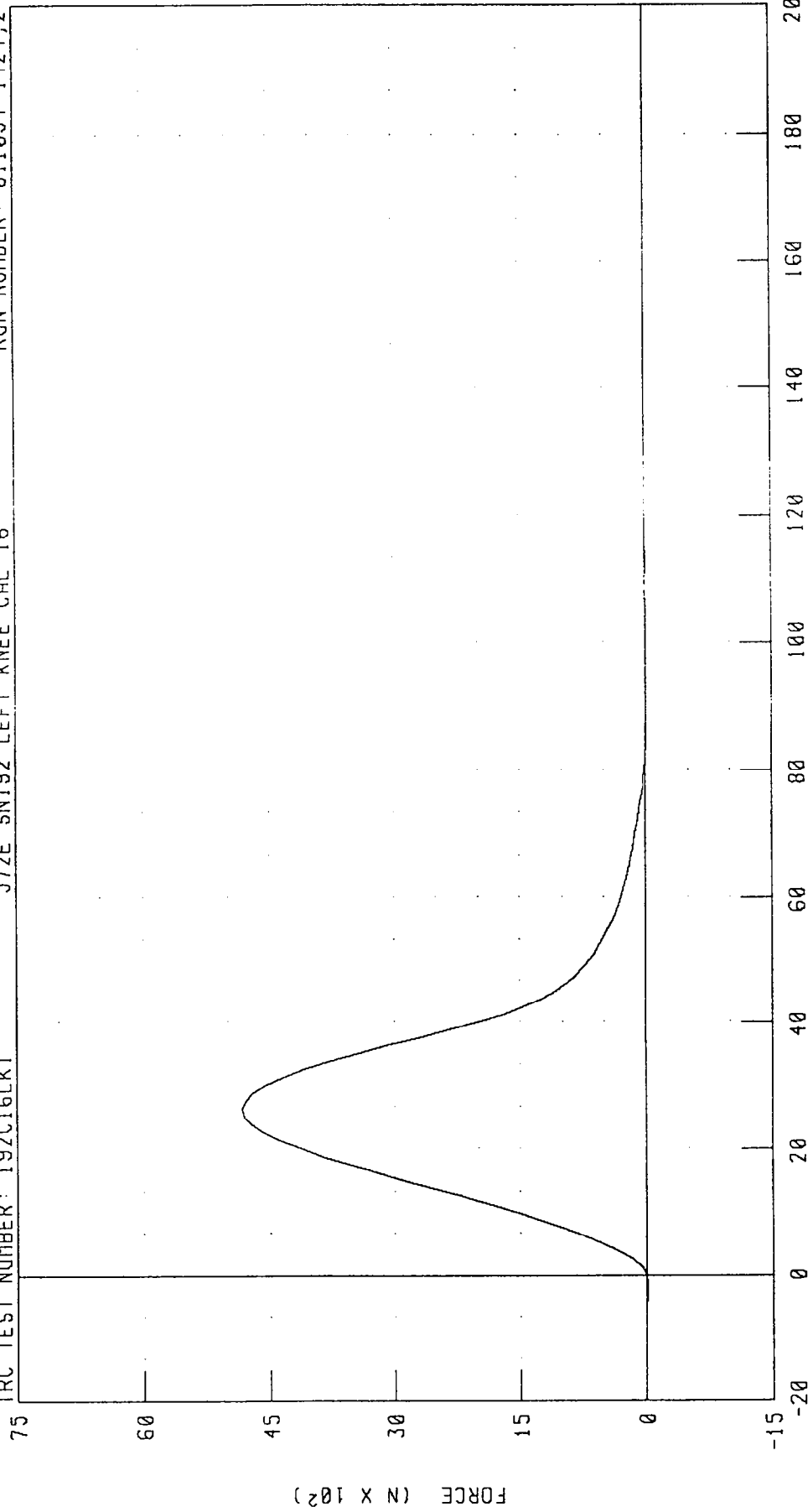
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND)

572E SN192 LEFT KNEE CAL 16

RUN NUMBER: 011094 1424;2

TRC TEST NUMBER: 192C16LK1



TIME (MS $\times 10^{-1}$)

PEAK VALUE 48.31 55 N @ 2.63 MS, -11.75 N @ -0.13 MS

CHANNEL: PENXF FILTER: CH. CLASS 600

PRE-TEST CERTIFICATION DATA

PASSENGER DUMMY S/N: 713

TRANSPORTATION RESEARCH CENTER INC.
EXTERNAL DIMENSIONS
PART 572B

19-NOV-93

TRC INC. TEST NO: ED71308
SN 713 HUMANOID

572B SN713 EXT.DIMENSION CAL08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9 - 25.5 C	21.0 C
RELATIVE HUMIDITY	10 - 70 %	53 %
SITTING HEIGHT	904 - 909 MM	904. MM
SHOULDER PIVOT HEIGHT	553 - 569 MM	561. MM
HIP PIVOT HEIGHT	99 MM	REFERENCE
HIP PIVOT FROM BACKLINE	122 MM	REFERENCE
KNEE PIVOT FROM BACKLINE	511 - 526 MM	521. MM
REAR OF HEAD FROM BACKLINE	43 MM	REFERENCE
CHEST DEPTH	231 - 241 MM	239. MM
SHOULDER WIDTH	452 - 467 MM	455. MM
CHEST CIRCUMFERENCE OVER NIPPLES	935 - 965 MM	958. MM
WAIST CIRCUMFERENCE AT MIN. GIRTH	798 - 828 MM	818. MM
HIP WIDTH	356 - 391 MM	378. MM
KNEE PIVOT FROM FLOOR	490 - 506 MM	498. MM

DUMMY MEETS SPECIFICATIONS

TECHNICIAN

Pete Frank

RUN NUMBER: 112293.1034

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

PART 572B

19-NOV-93

TRC INC.

TEST NO: HD71308

572B SN 713 HEAD DROP CAL 08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9 - 25.5 C	21.0 C
RELATIVE HUMIDITY	10 - 70 %	53 %
PEAK RESULTANT ACCELERATION	210 - 260 G	235.05 G
TIME ABOVE 100 G LEVEL	0.9 - 1.5 MS	1.27 MS
PEAK LATERAL ACCELERATION	10 G MAX	-2.02 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Pete Ford

RUN NUMBER: 111993.0955;1

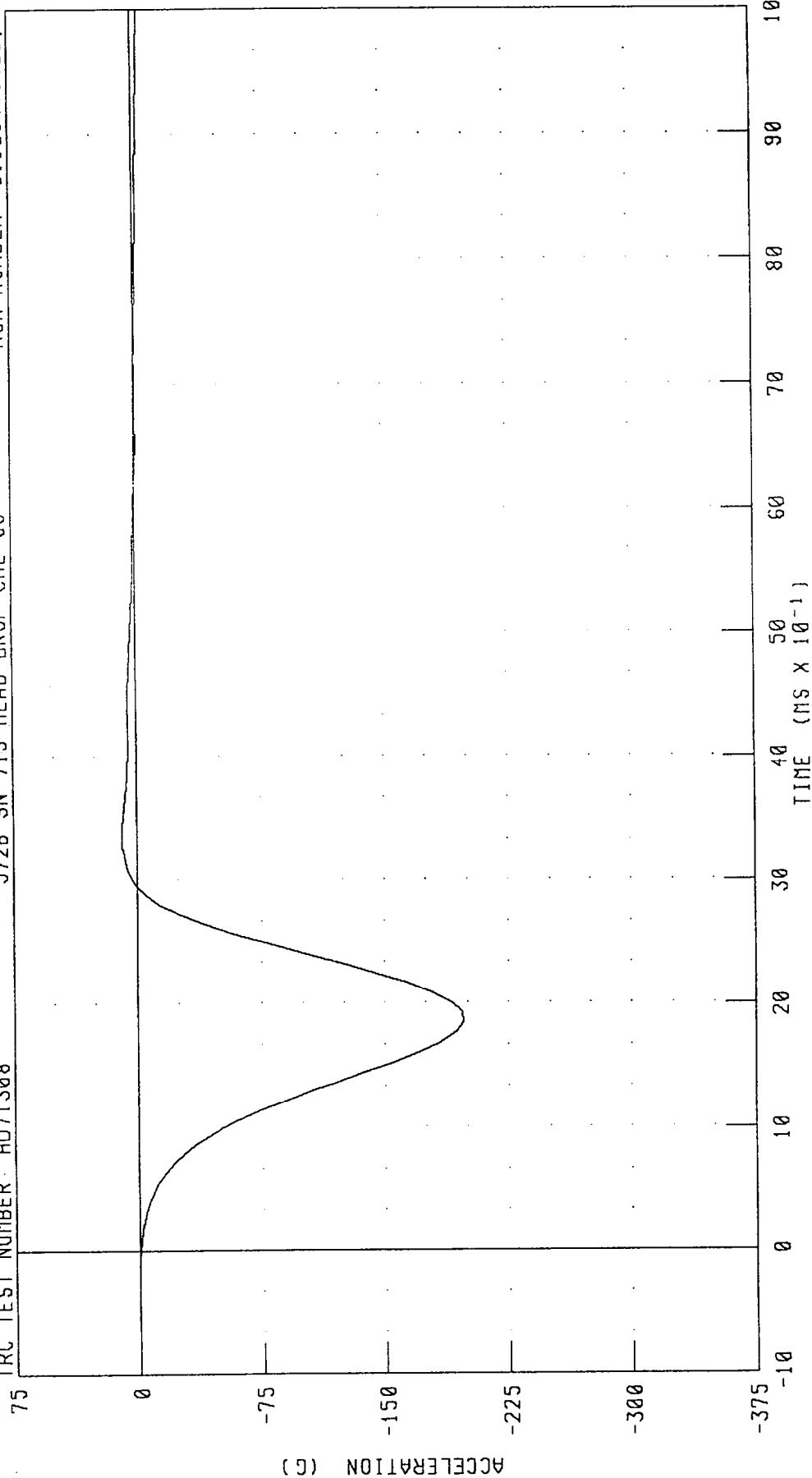
PART 572-B HYBRID II HEAD DROP CALIBRATION

HEAD ACCELERATION X AXIS

572B SN 713 HEAD DROP CAL 08

RUN NUMBER 011094 1430.1

TRC TEST NUMBER: HD71308



PEAK DATA 9.09 G @ 3.36 MS; -197.50 G @ 1.84 MS

FILTER: CH. CLASS 1000

CHANNEL: HEDXG

PART 572-B HYBRID II HEAD DROP CALIBRATION

HEAD ACCELERATION Y AXIS

572B SN 713 HEAD DROP CAL 08 RUN NUMBER 011094.1430.1

TRC TEST NUMBER: H071308

225

150

75

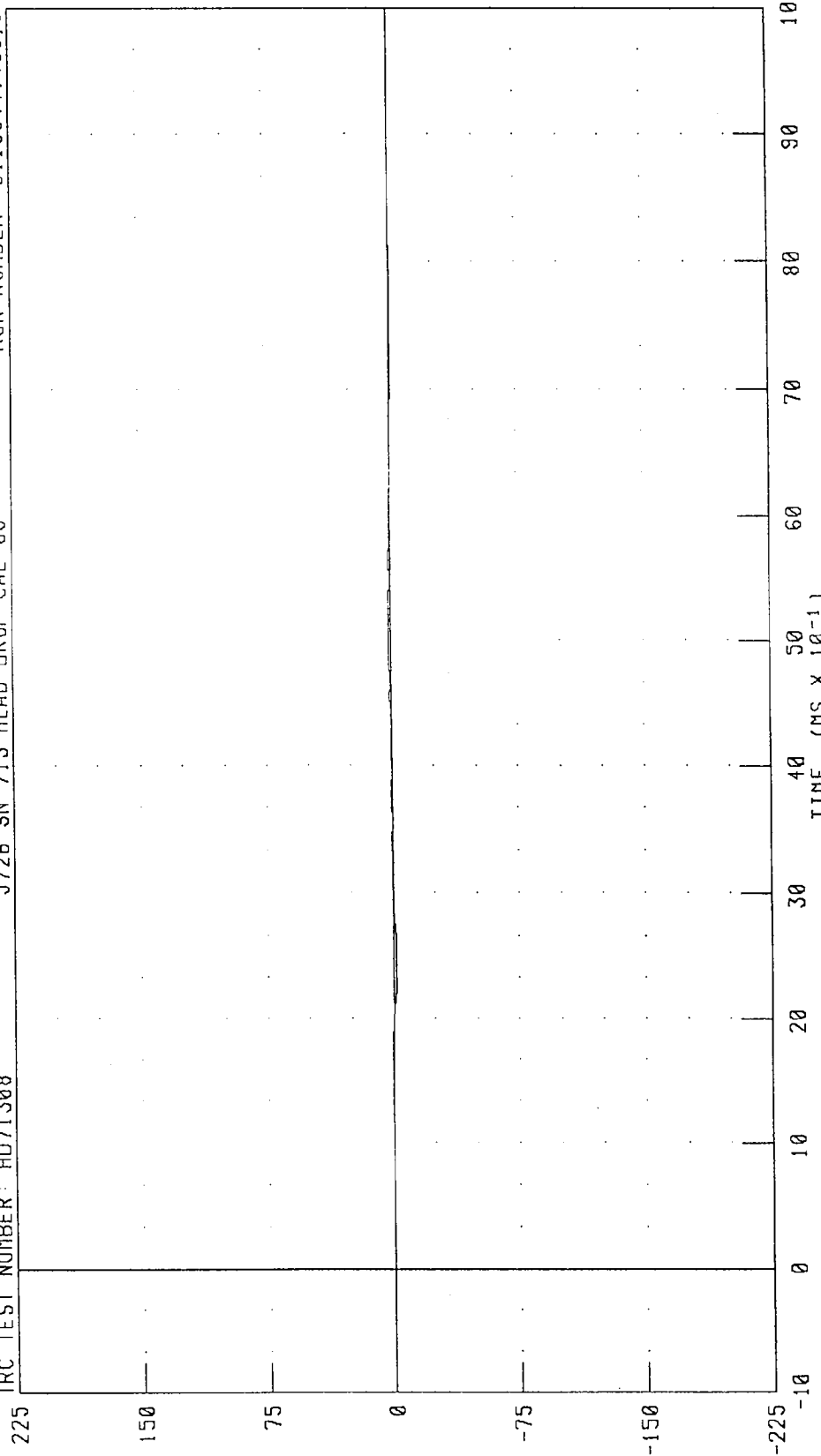
0

-75

-150

-225

ACCELERATION (G)



TIME (MS X 10⁻¹)

PEAK DATA: 1.54 G @ 5.28 MS; -2.02 G @ 2.40 MS

CHANNEL: HEDYG FILTER: CH. CLASS 1000

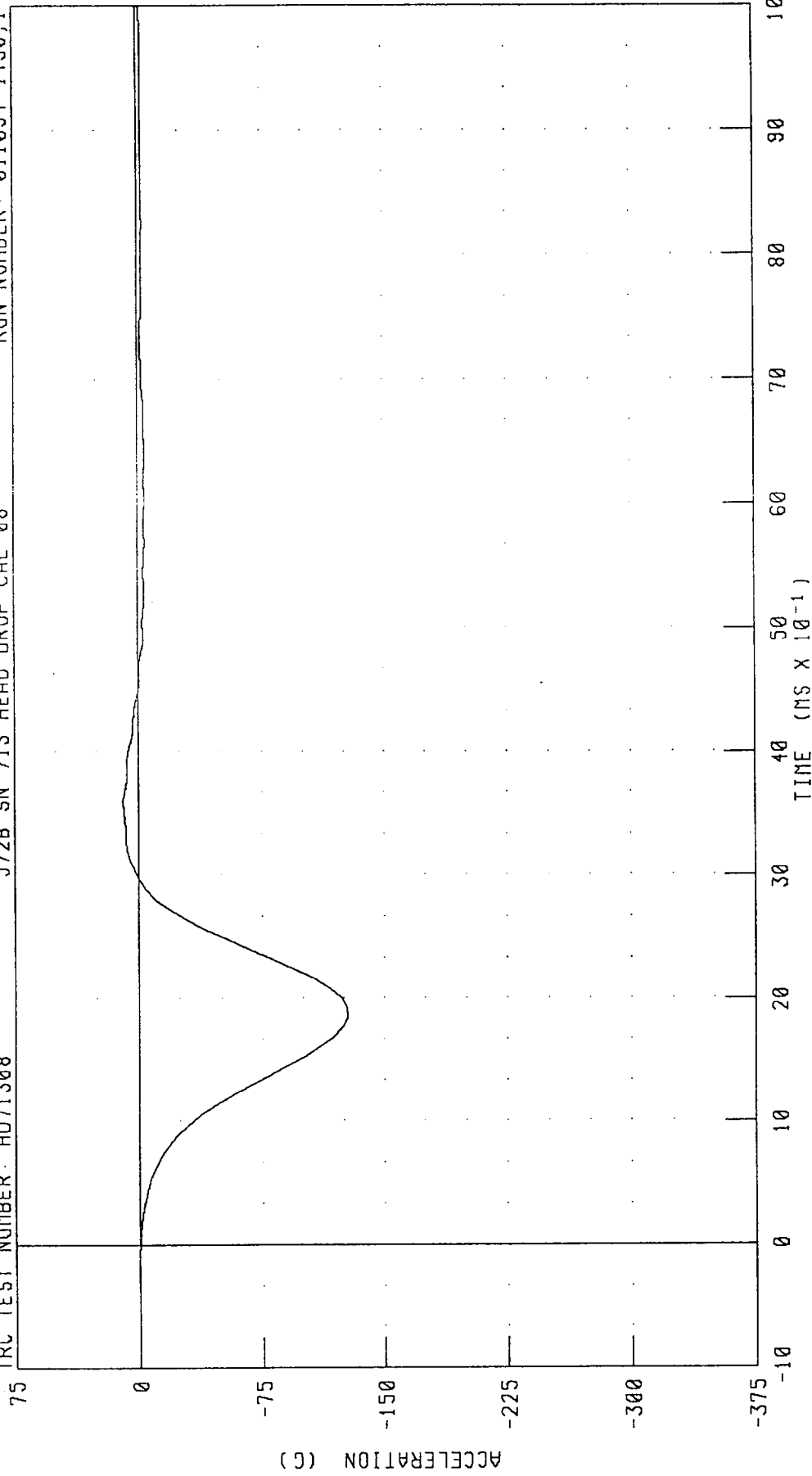
PART 572-B HYBRID II HEAD DROP CALIBRATION

HEAD ACCELERATION Z AXIS

572B SN 713 HEAD DROP CAL 08

RUN NUMBER 011094 1430;1

TRC TEST NUMBER H071308



CHANNEL: HEDZG FILTER: CH. CLASS 1000

PEAK DATA 9 32 G @ 3.60 MS; -127.45 G @ 1.84 MS

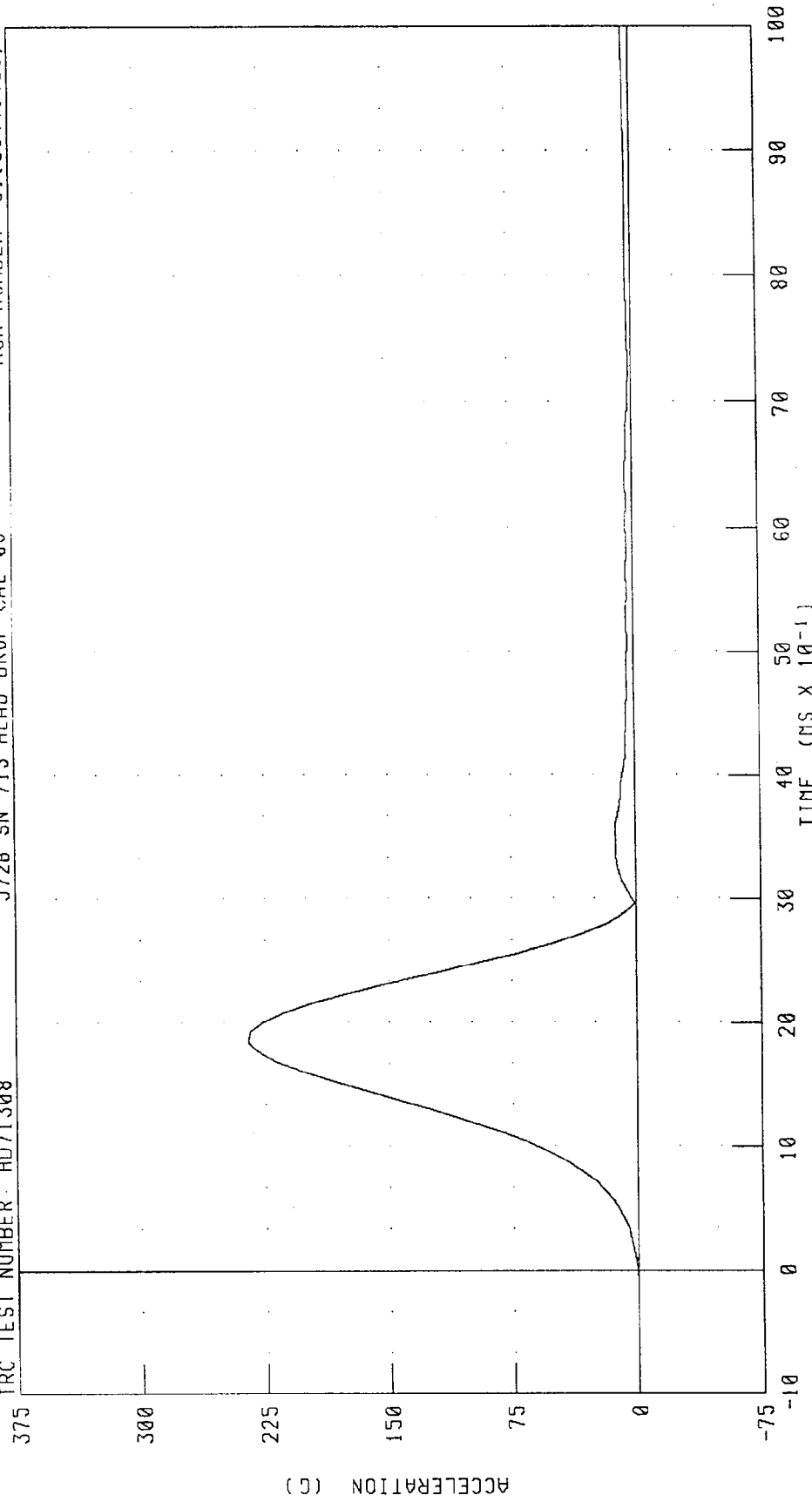
PART 572-B HYBRID II HEAD DROP CALIBRATION

HEAD RESULTANT ACCELERATION

572B SN 713 HEAD DROP CAL 08

IRC TEST NUMBER: HD71308

RUN NUMBER 011094.1430.1



CHANNEL: HEDRG FILTER: CH. CLASS 1000

PEAK DATA 235.05 G @ 1.84 MS; 0.01 G @ -0.88 MS

TRANSPORTATION RESEARCH CENTER INC.

NECK PENDULUM TEST

PART 572B

19-NOV-93

TRC INC. TEST NO: HN71308

572B SN 713 HEAD/NECK CAL 08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9 - 25.5 C	21.0 C
RELATIVE HUMIDITY	10 - 70 %	53 %
PENDULUM VELOCITY	6.55 - 7.77 M/S	7.28 M/S
PENDULUM DECELERATION:		
T1 - T2 TIME (5 - 20 G)	3 MS MAX	1.69 MS
T2 - T3 TIME (20 - 20 G)	25 - 30 MS	28.60 MS
T3 - T4 TIME (20 - 5 G)	10 MS MAX	3.57 MS
AVG. G LEVEL T2 - T3	20 - 24 G	23.99 G
MAXIMUM ROTATION ANGLE	63 - 73 DEG.	70.47 DEG.
PEAK HEAD RESULTANT ACCEL	26 G MAX	22.40 G

TEST PARAMETER	SPECIFICATION		TEST RESULTS	
ROTATION ANGLE (DEGREES)	TIME (MS)	CHORDAL DISP. (MM)	TIME (MS)	CHORDAL DISP. (MM)
0	-2.0 - +2.0	-12.7 - +12.7	1.12	0.06
30	25.6 - 34.4	53.3 - 78.7	29.67	64.67
60	40.3 - 51.7	109.2 - 134.6	45.14	122.43
MAX	53.2 - 66.8	127.0 - 152.4	62.16	140.83
60	67.0 - 83.0	109.2 - 134.6	78.02	119.26
30	85.4 - 104.6	53.3 - 78.7	96.97	56.24
0	101.0 - 123.0	-12.7 - +12.7	111.17	2.44

DUMMY MEETS SPECIFICATIONS

SND: 151.13 MM

TECHNICIAN

Pete Faust

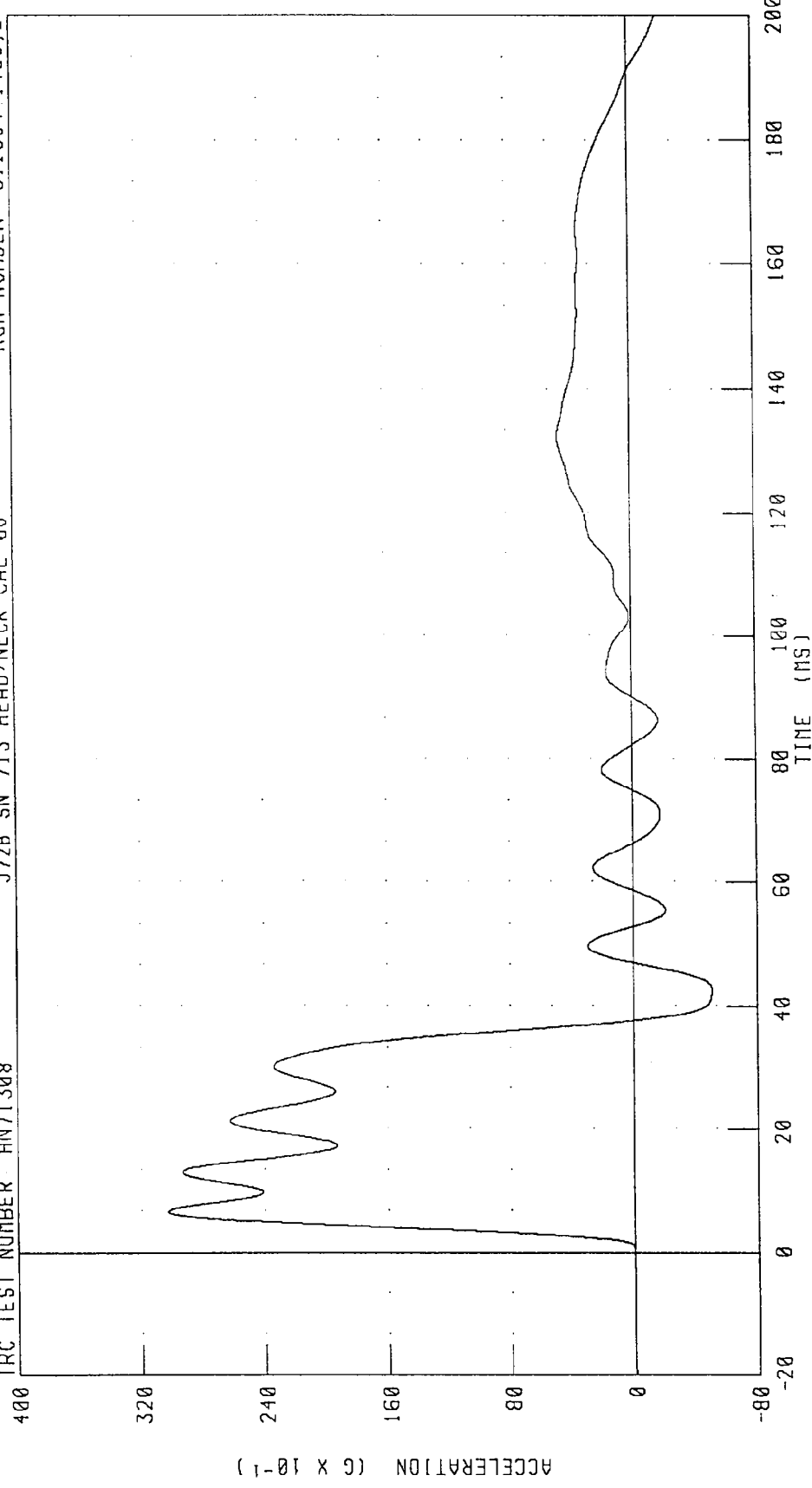
RUN NUMBER: 111993.1050;2

PART 572-B HYBRID II HEAD/NECK CALIBRATION
 PENDULUM DECELERATION

RUN NUMBER: 011094.1430,2

572B SN 713 HEAD/NECK CAL 08

TRC TEST NUMBER HN71308



PEAK DATA 30.32 G @ 6.56 MS; -5.05 G @ 42.56 MS

CHANNEL: PENXG FILTER: CH. CLASS 60

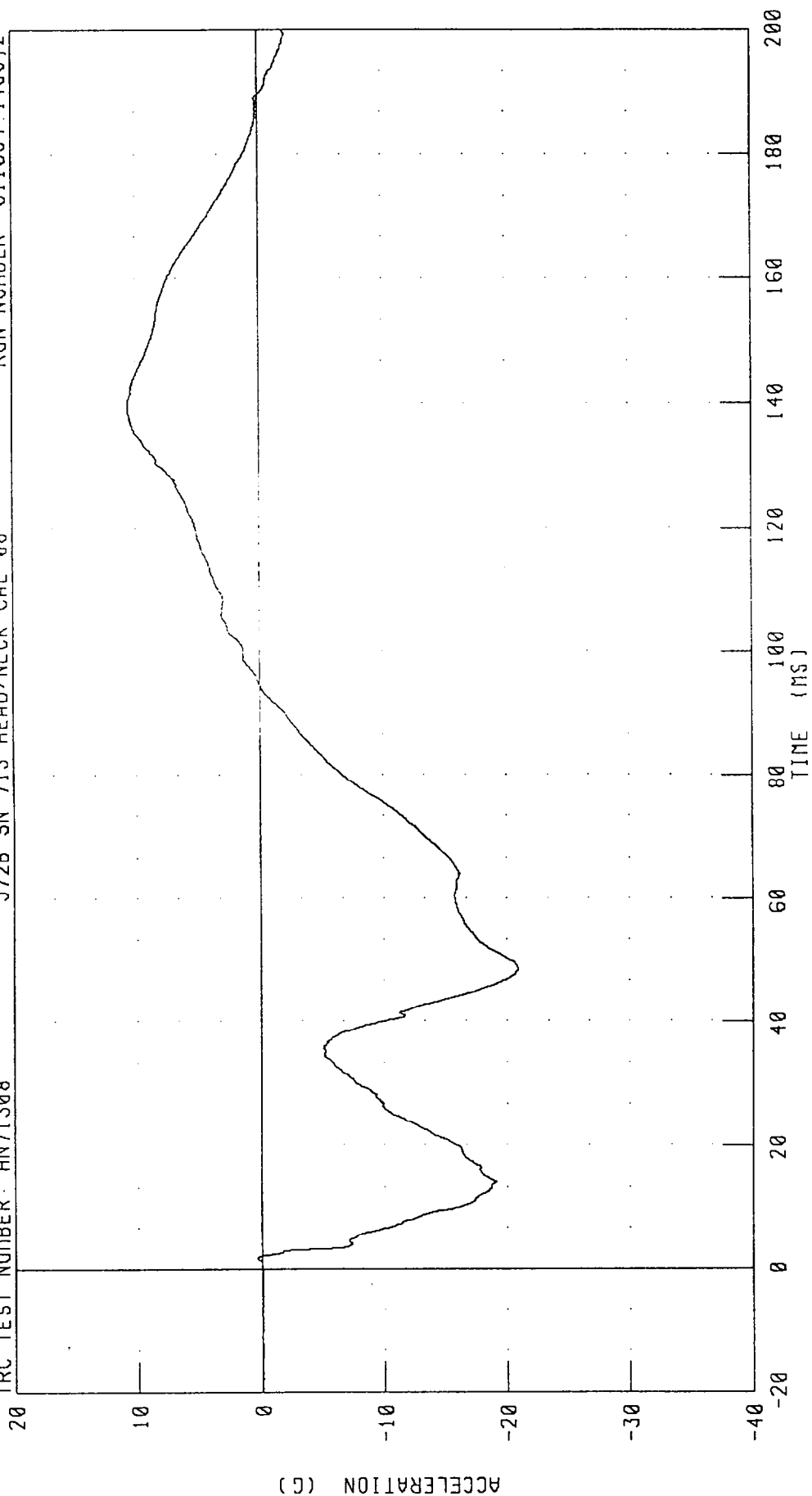
PART 572-B HYBRID II HEAD/NECK CALIBRATION

HEAD ACCELERATION X AXIS

TRC TEST NUMBER: HN71308

572B SN 713 HEAD/NECK CAL 08

RUN NUMBER 011094.1430;2



CHANNEL: HEDXG FILTER: CH. CLASS 1000

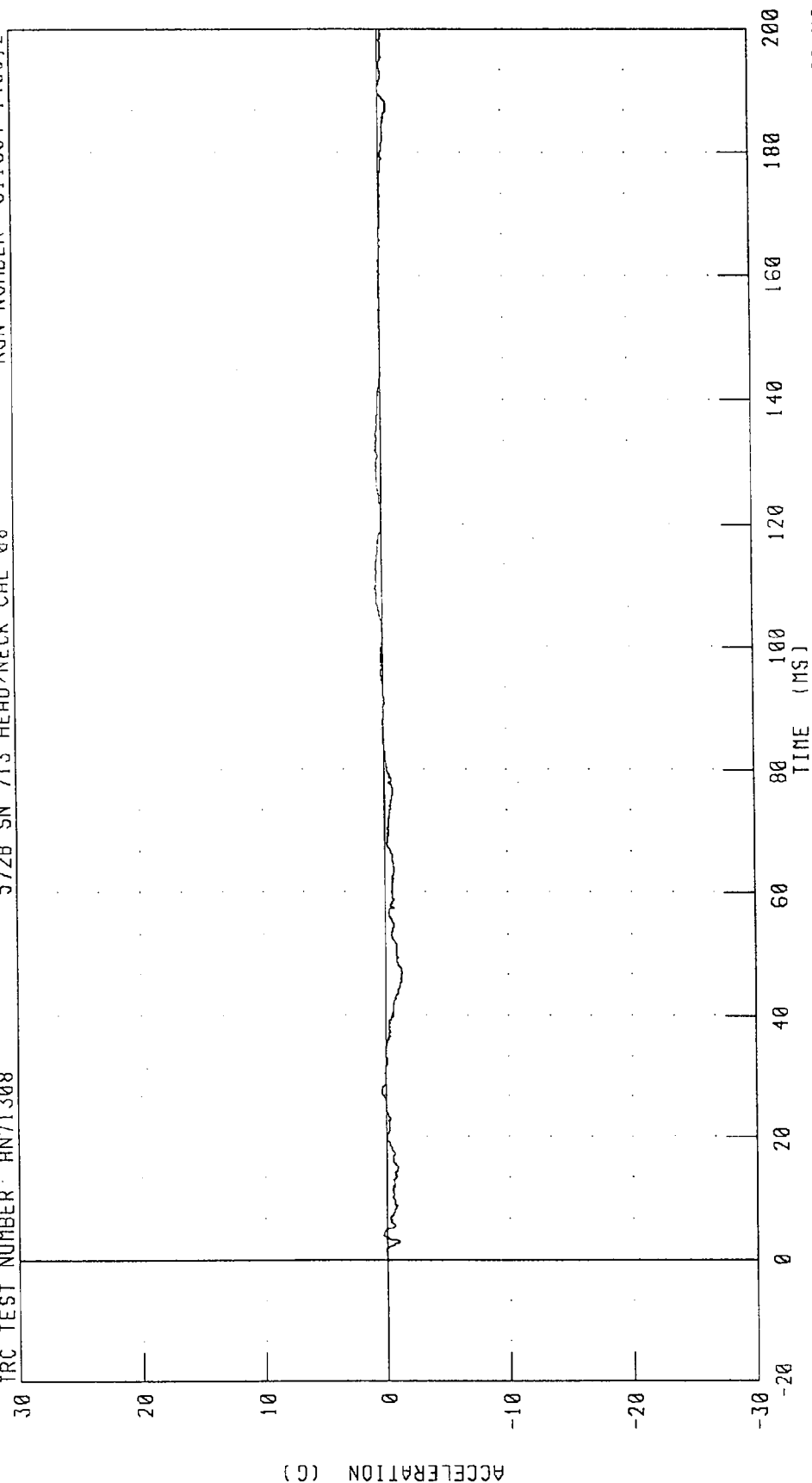
PEAK DATA 10.62 G @ 138.48 MS; -20.92 G @ 48.72 MS

PART 572-B HYBRID II HEAD/NECK CALIBRATION

HEAD ACCELERATION Y AXIS

572B SN 713 HEAD/NECK CAL 08 RUN NUMBER 011094 1430,2

TRC TEST NUMBER HN71308



PEAK DATA 0 60 G @ 109.44 MS; -1.34 G @ 46.80 MS

CHANNEL: HEDYG FILTER: CH. CLASS 1000

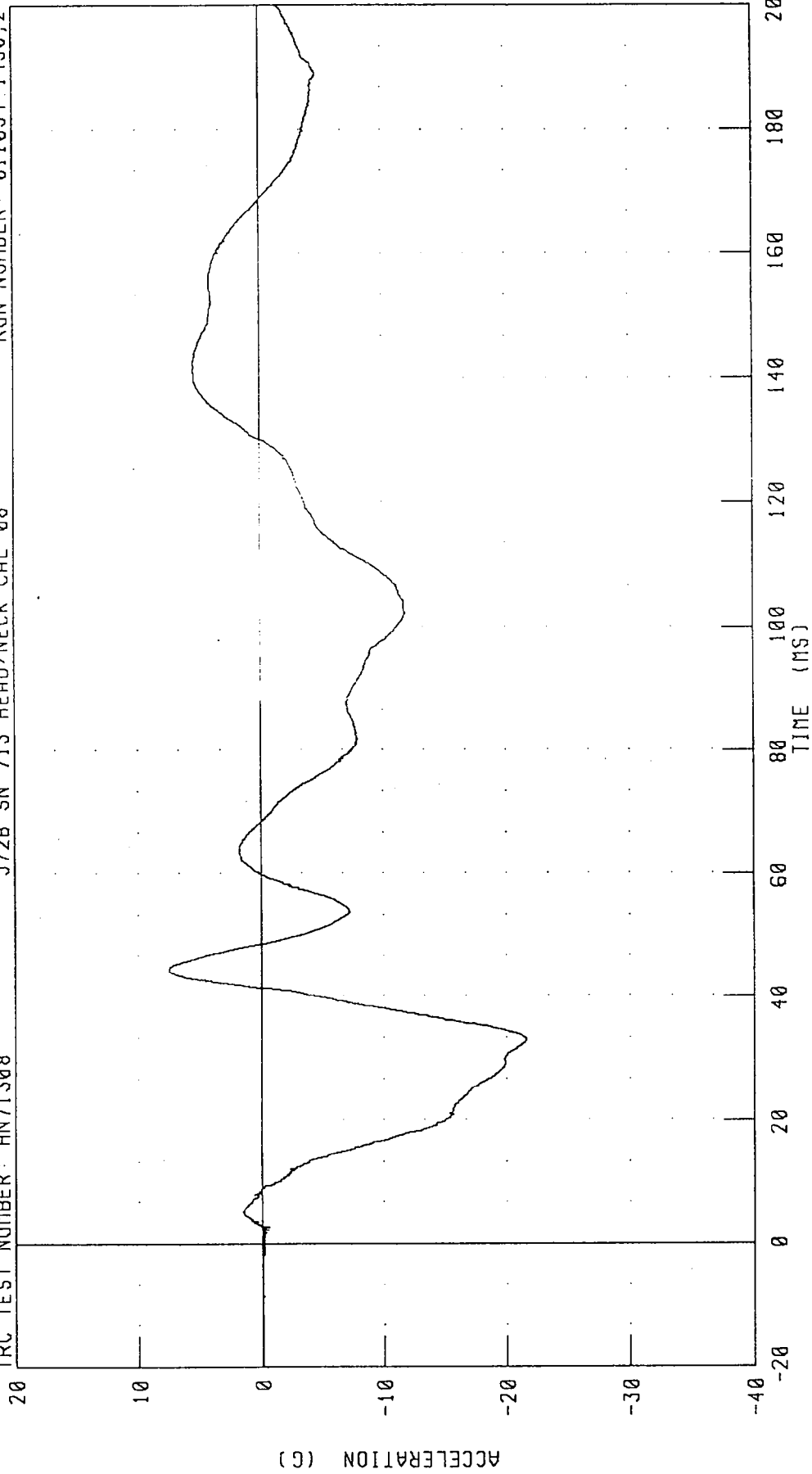
PART 572-B HYBRID II HEAD/NECK CALIBRATION

HEAD ACCELERATION Z AXIS

TRC TEST NUMBER: HN71308

572B SN 713 HEAD/NECK CAL 08

RUN NUMBER: 011094 1430,2



CHANNEL: HEDZG FILTER: CH. CLASS 1000

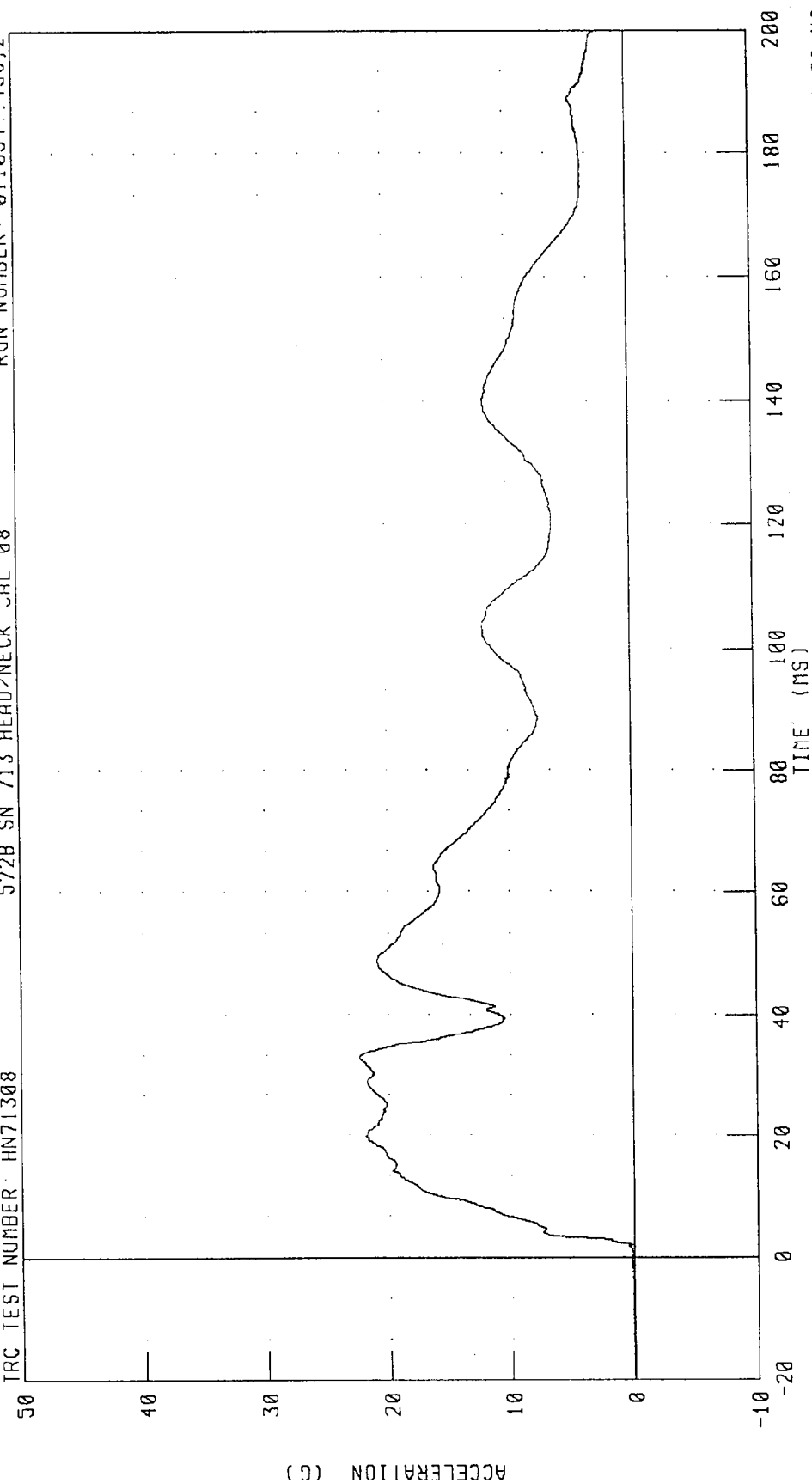
PLANK DATA 7.55 G @ 44.16 MS, -21.60 G @ 33.04 MS

PART 572-B HYBRID II HEAD/NECK CALIBRATION
 HEAD RESULTANT ACCELERATION

572B SN 713 HEAD/NECK CAL 08

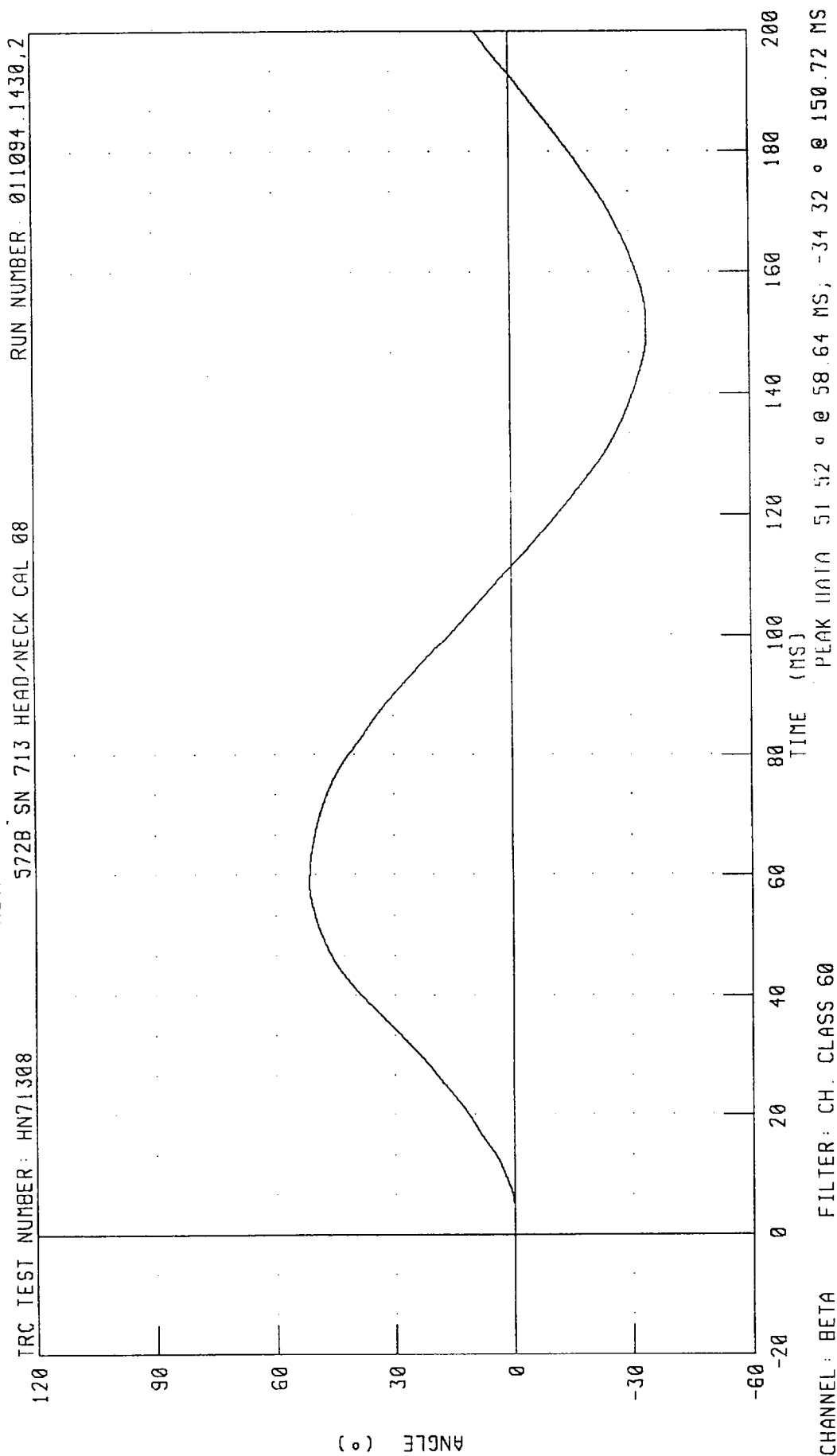
TRC TEST NUMBER HN71308

RUN NUMBER 011094 1430,2



CHANNEL: HEDRG FILTER: CH. CLASS 1000

PART 572-B HYBRID II HEAD/NECK CALIBRATION
 ROTATION ABOUT THE BASE OF THE NECK



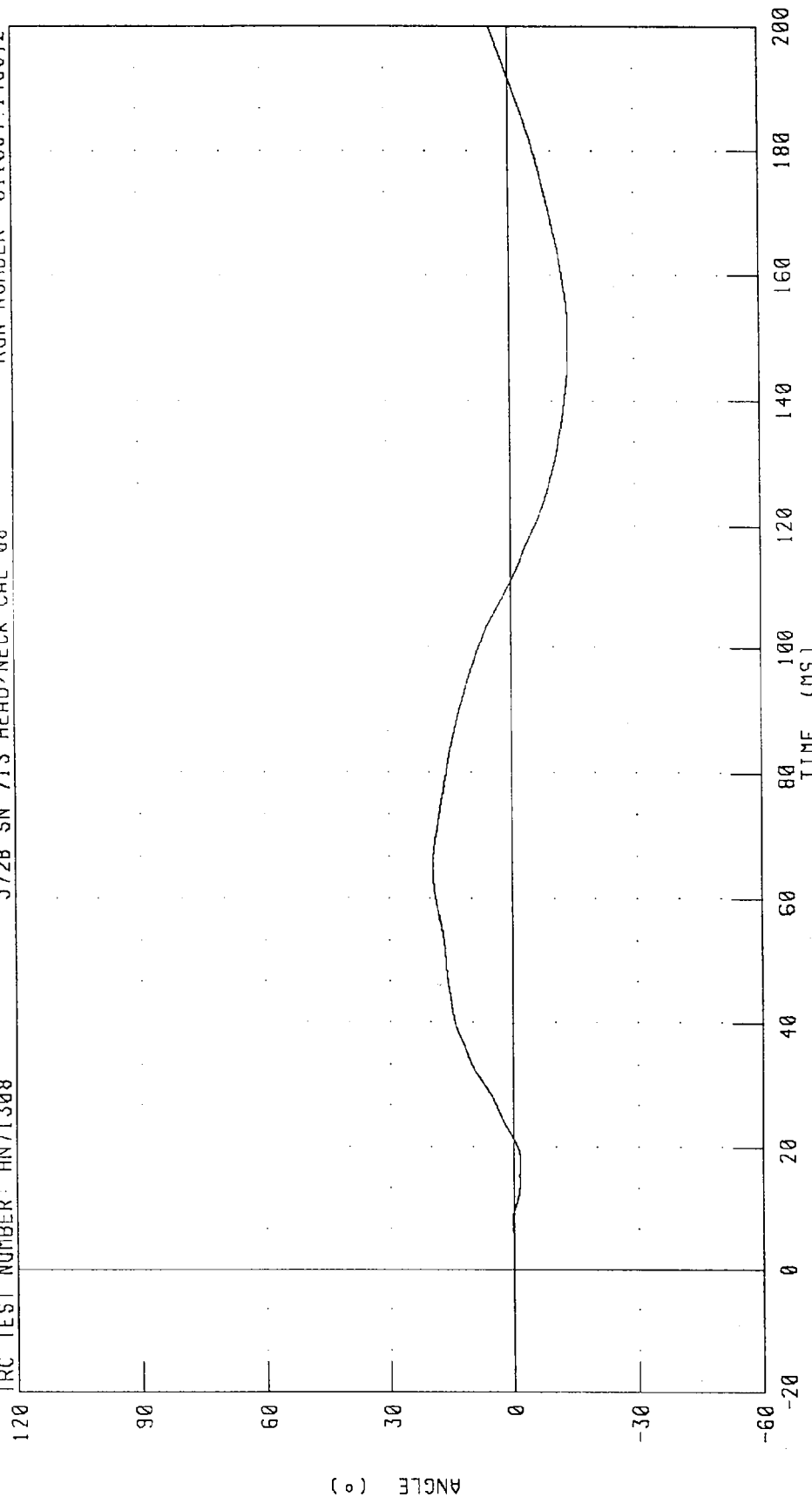
PART 572-B HYBRID II HEAD/NECK CALIBRATION

ROTATION ABOUT THE HEAD C C

572B SN 713 HEAD/NECK CAL 08

RUN NUMBER: 011094.1430.2

TRC TEST NUMBER: HN71308



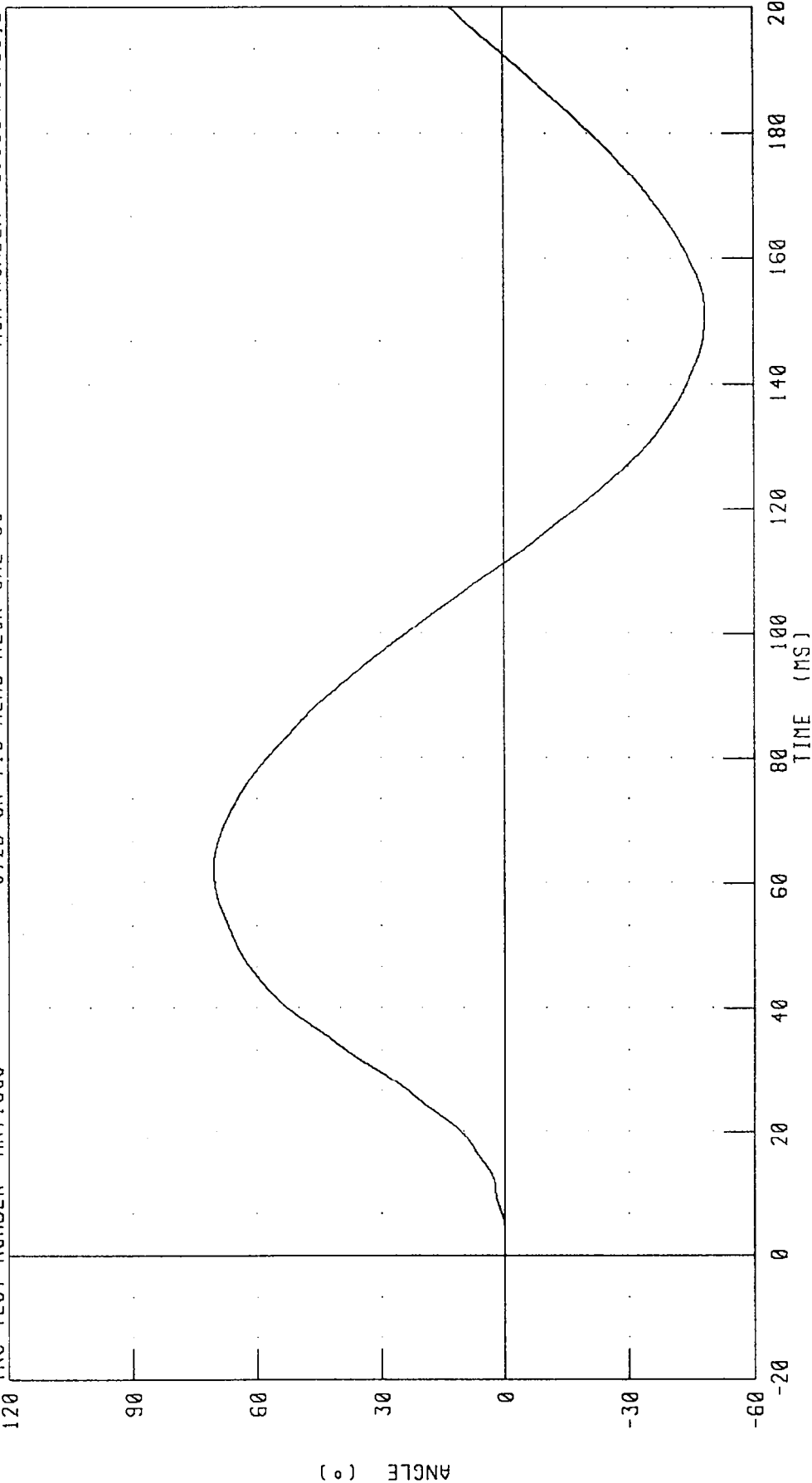
CHANNEL: THETA FILTER: CH. CLASS 60

PEAK DATA: 19.37 ° @ 64.80 MS; -13.93 ° @ 146.16 MS

PART 572-B HYBRID II HEAD/NECK CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER HN71308 572B SN 713 HEAD/NECK CAL 08 RUN NUMBER 011094 1430.2



CHANNEL: TOTAN FILTER: CH. CLASS 60

PEAK UNIA 70 47 ° @ 62.16 MS, -48.18 ° @ 150.88 MS

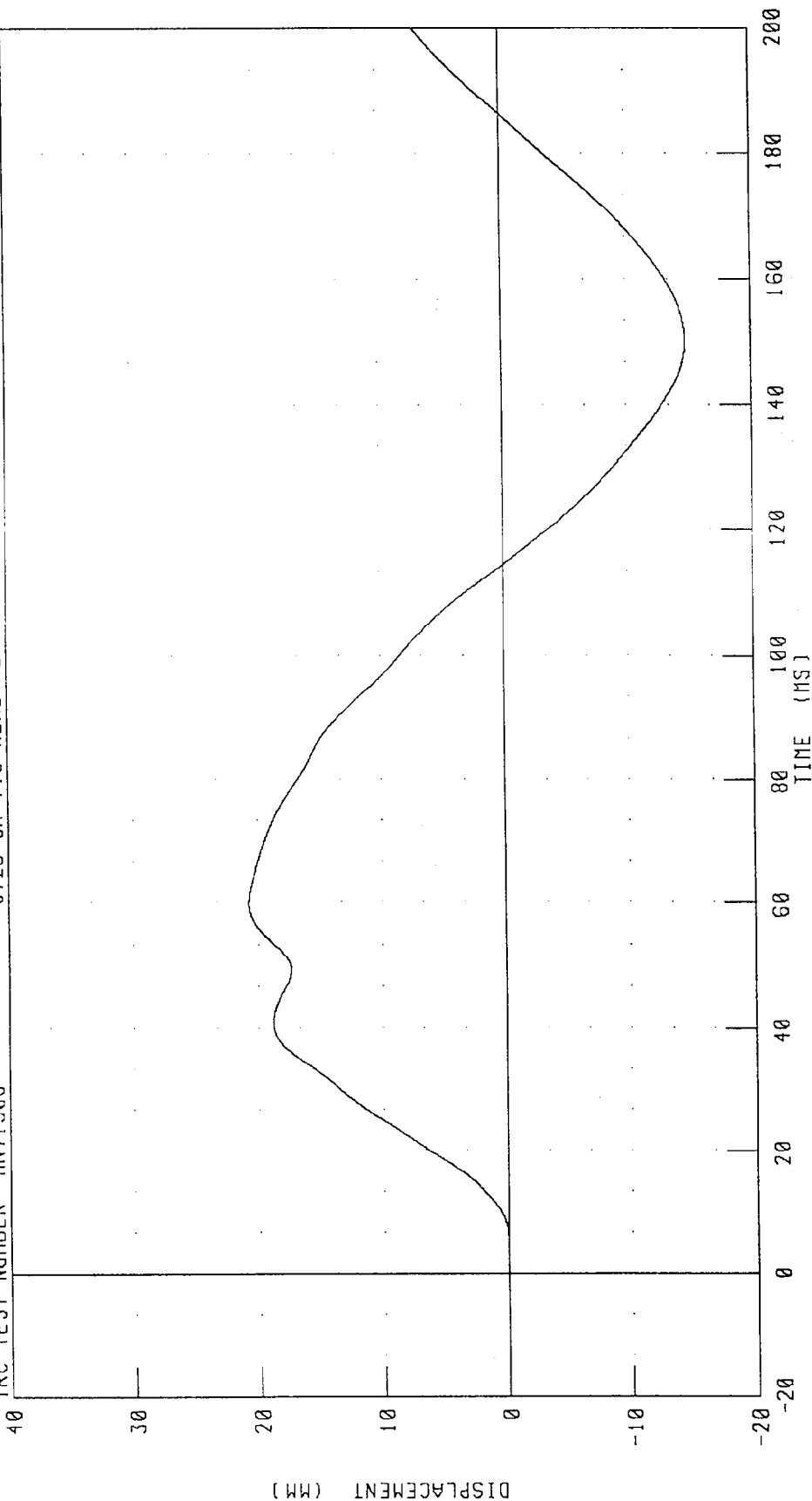
PART 572-B HYBRID II HEAD/NECK CALIBRATION

NECK DISPLACEMENT Z AXIS

572B SN 713 HEAD/NECK CAL 08

TRC TEST NUMBER HN71308

RUN NUMBER: 011094 1430,2



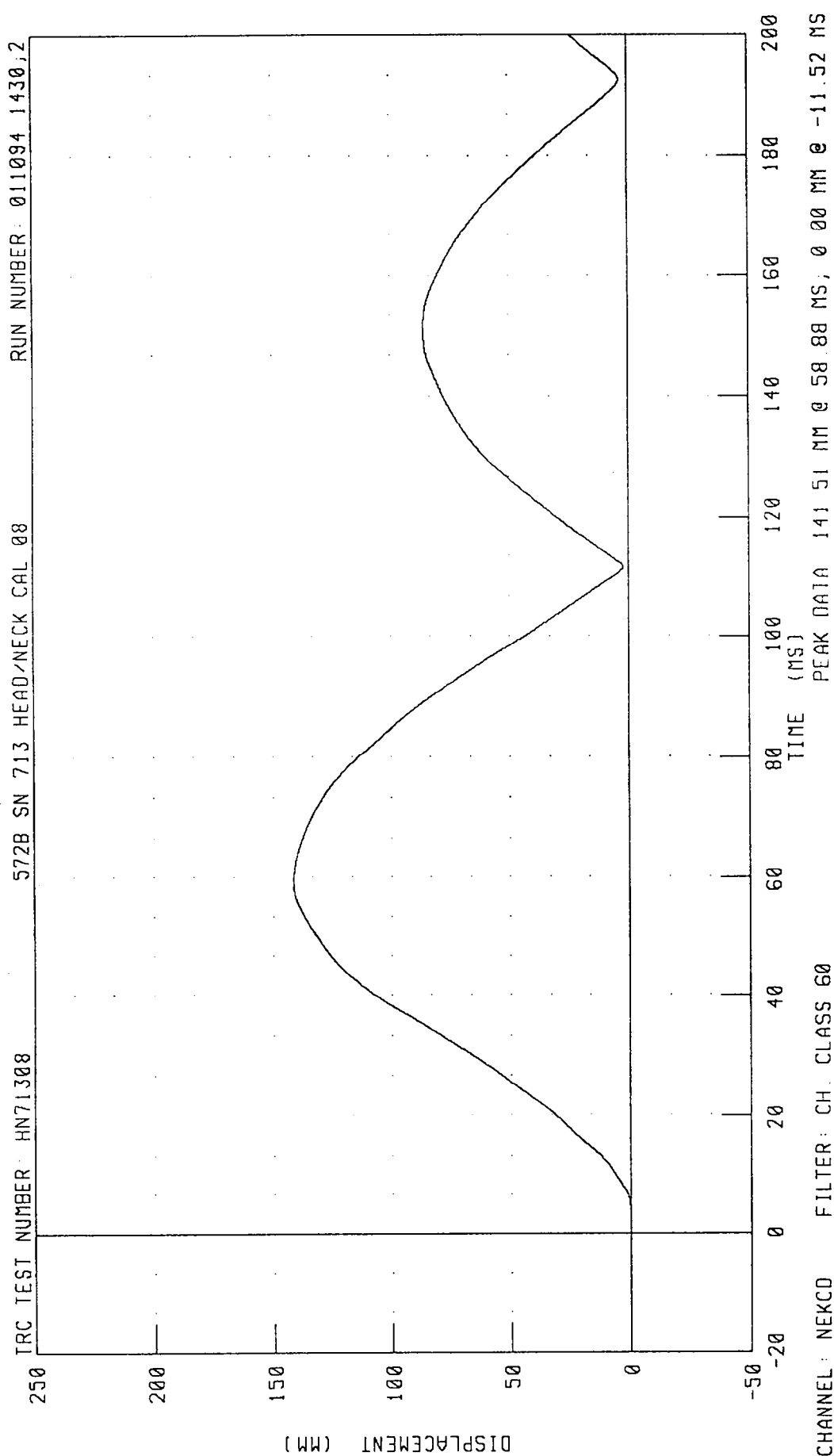
PEAK DATA 20.73 MM @ 59.84 MS; -14.74 MM @ 150.24 MS

CHANNEL: NEKZD FILTER: CH. CLASS 60

PART 572-B HYBRID II HEAD/NECK CALIBRATION

NECK CHORDAL DISPLACEMENT

TRC TEST NUMBER HN71308 572B SN 713 HEAD/NECK CAL 08 RUN NUMBER 011094 1430.2



CHANNEL: NEKCD FILTER: CH. CLASS 60

PEAK DATA 141 51 MM @ 58.88 MS, 0 00 MM @ -11.52 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

PART 572B

22-NOV-93

TRC INC. TEST NO: TL71308

572B SN 713 L.S.THORAX CAL 08

TEST PARAMETER	LOW SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	18.9 - 25.5 C	21.0 C
RELATIVE HUMIDITY	10 - 70 %	55 %
PENDULUM VELOCITY	4.22 - 4.31 M/S	4.29 M/S
PEAK STERNUM DEFLECTION	28 MM MAX.	25.69 MM
PEAK RESISTIVE FORCE	6450. N MAX.	5846. N
INTERNAL HYSTERESIS	50 - 70 %	59.1 %

SCD: 53.34 MM

DUMMY MEETS SPECIFICATIONS

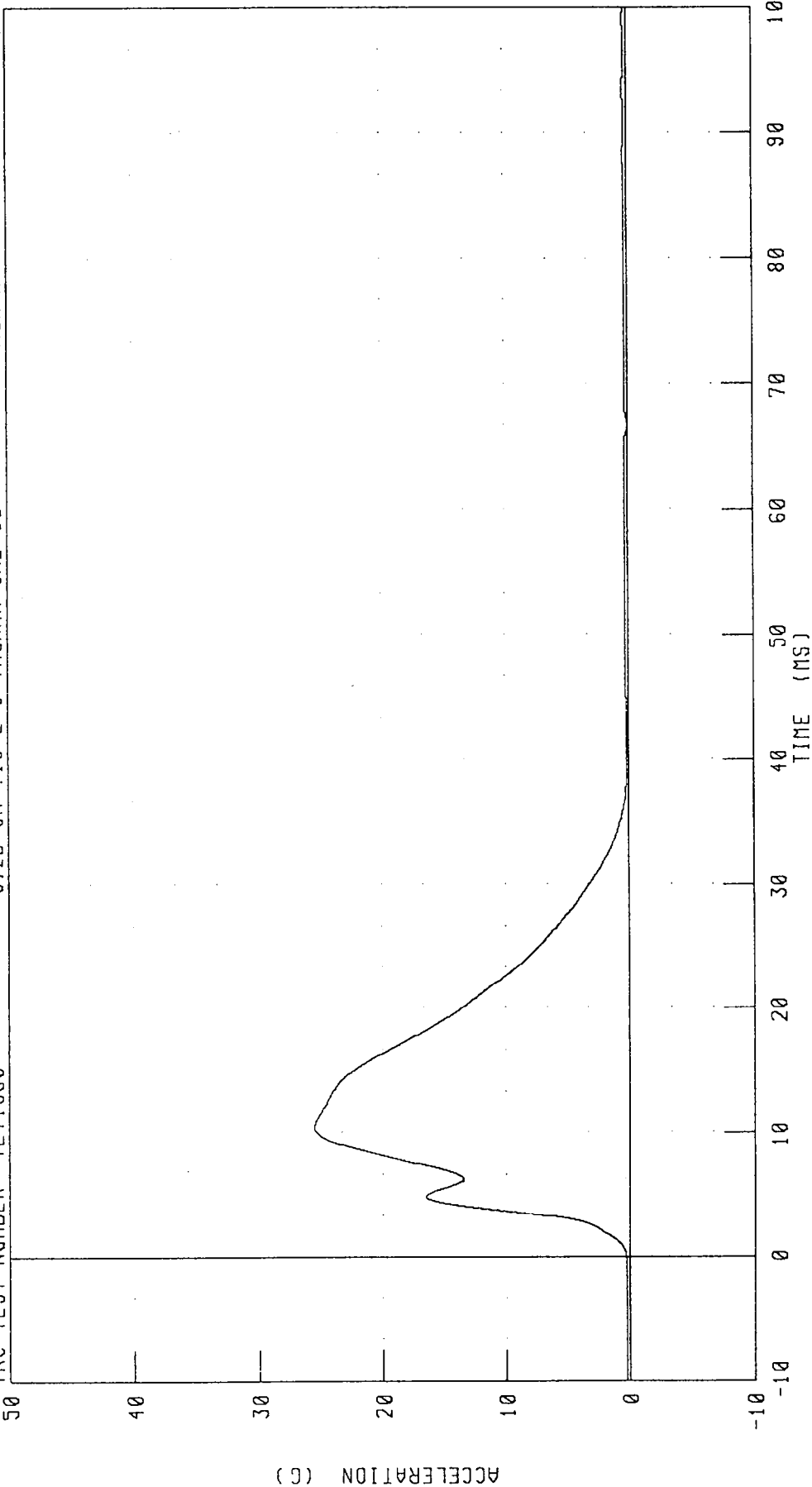
TECHNICIAN Pete B. S.

RUN NUMBER: 112293.0838;1

PART 572-B HYBRID II THORAX CALIBRATION (4 3 M/SEC)

PENDULUM DECELERATION

TRC TEST NUMBER TL71308 572B SN 713 L S THORAX CAL 08 RUN NUMBER 011094 1430.1



CHANNEL: PENXC FILTER: CH CLASS 180

PEAK DATA: 25 52 G @ 10.40 MS; 0 05 G @ 66.64 MS

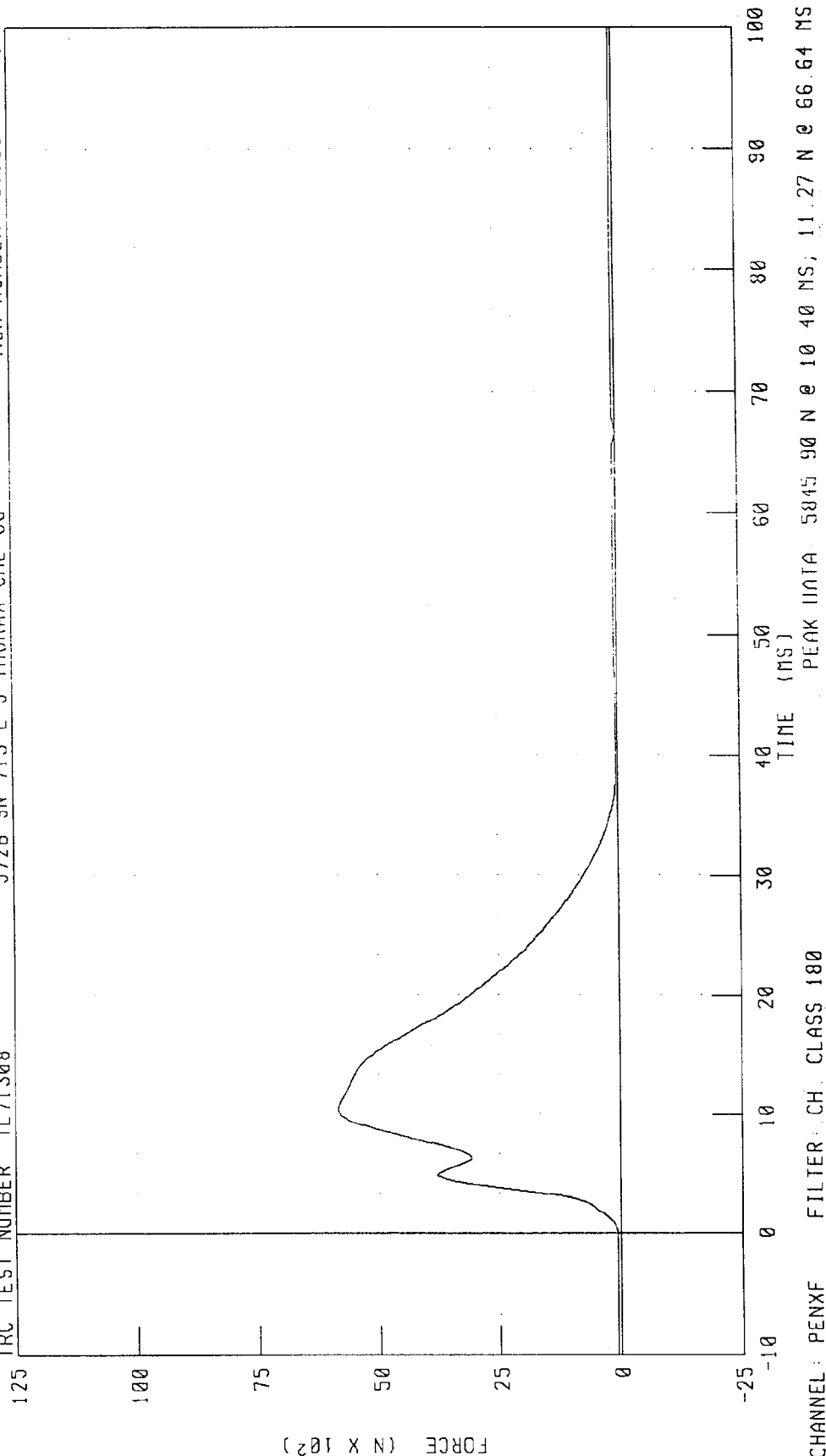
PART 572-B HYBRID II THORAX CALIBRATION (4 3 M/SEC)

PENDULUM FORCE

RUN NUMBER 011094 1430.1

572B SN 713 L S THORAX CAL 08

TRC TEST NUMBER TL71308



PEAK UNTA 5845 90 N @ 10 40 MS, 11.27 N @ 66.64 MS

CHANNEL: PENXF FILTER: CH CLASS 180

PART: 572-B HYBRID II THORAX CALIBRATION (4 3 M/SEC)

STERNUM DISPLACEMENT

TRC TEST NUMBER TL71308 572B SN 713 L S THORAX CAL 00 RUN NUMBER 011094 1430,1



PEAK DATA 25.69 MM @ 14.32 MS, 0.00 MM @ -1.68 MS

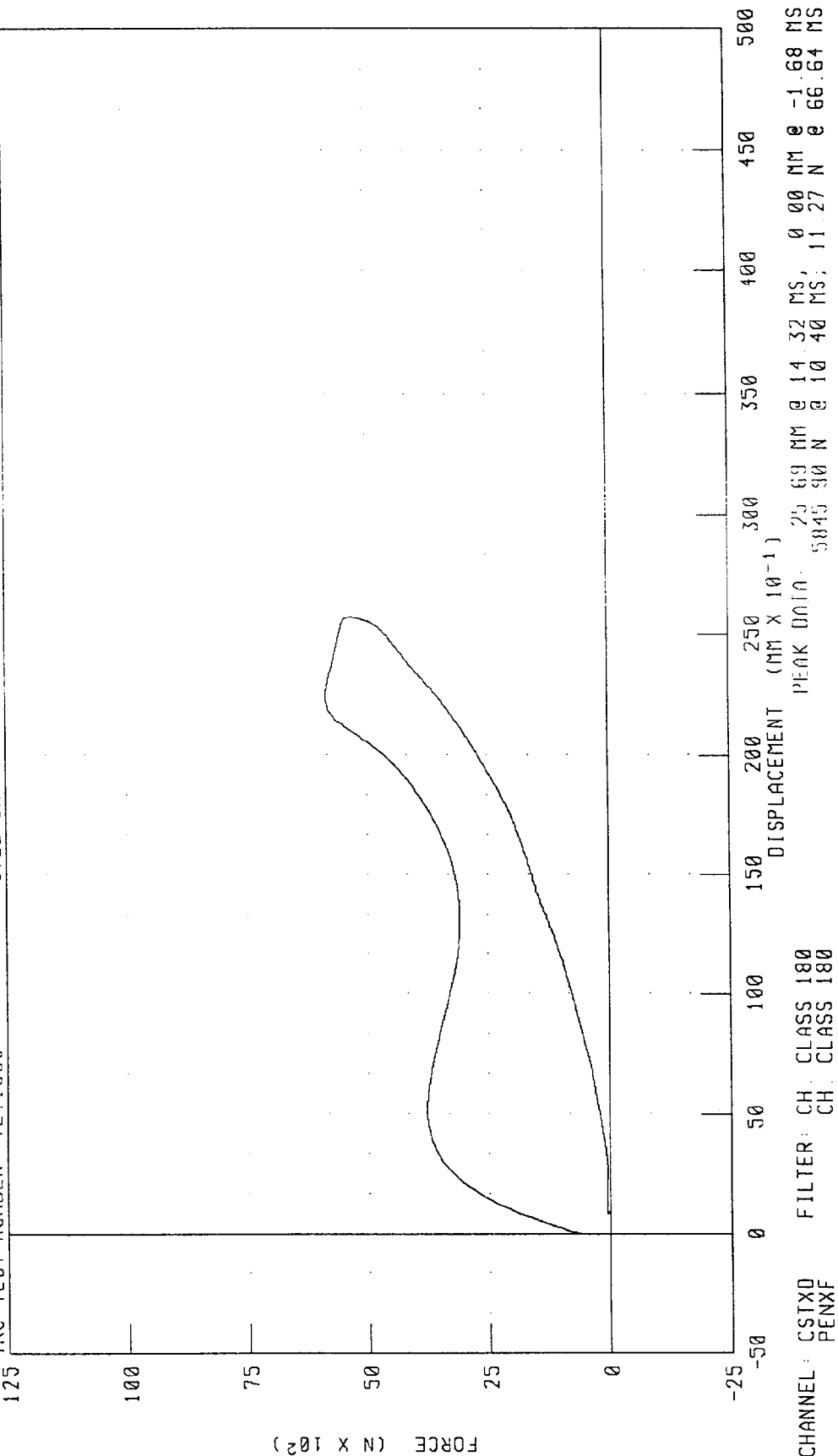
CHANNEL: CSTXD FILTER: CH. CLASS 180

PART 572-B HYBRID II THORAX CALIBRATION (4.3 M/SEC)
CHEST DISPLACEMENT VS PENDULUM FORCE

TRC TEST NUMBER JL71308

572B SN 713 L S THORAX CAL 08

RUN NUMBER 011094 1430.1



TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

PART 572B

22-NOV-93

TRC INC.

TEST NO: TH71308

572B SN 713 H.S.THORAX CAL 08

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	18.9 - 25.5 C	21.0 C
RELATIVE HUMIDITY	10 - 70 %	55 %
PENDULUM VELOCITY	6.64 - 6.77 M/S	6.68 M/S
PEAK STERNUM DEFLECTION	43 MM MAX.	39.95 MM
PEAK RESISTIVE FORCE	10009. N MAX.	8921. N
INTERNAL HYSTERESIS	50 - 70 %	60.2 %

SCD: 53.34 MM

DUMMY MEETS SPECIFICATIONS

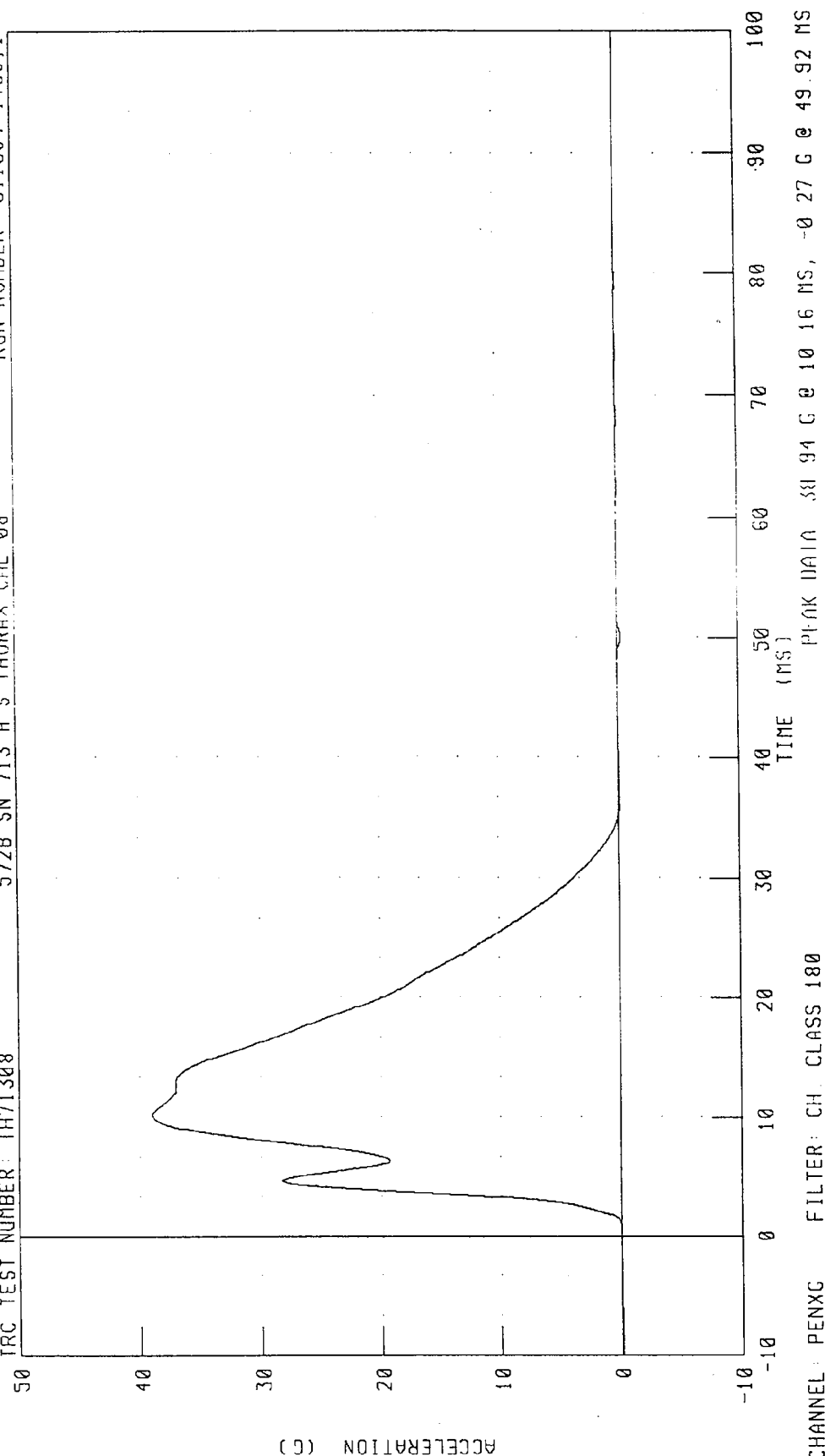
TECHNICIAN



RUN NUMBER: 112293.0907;1

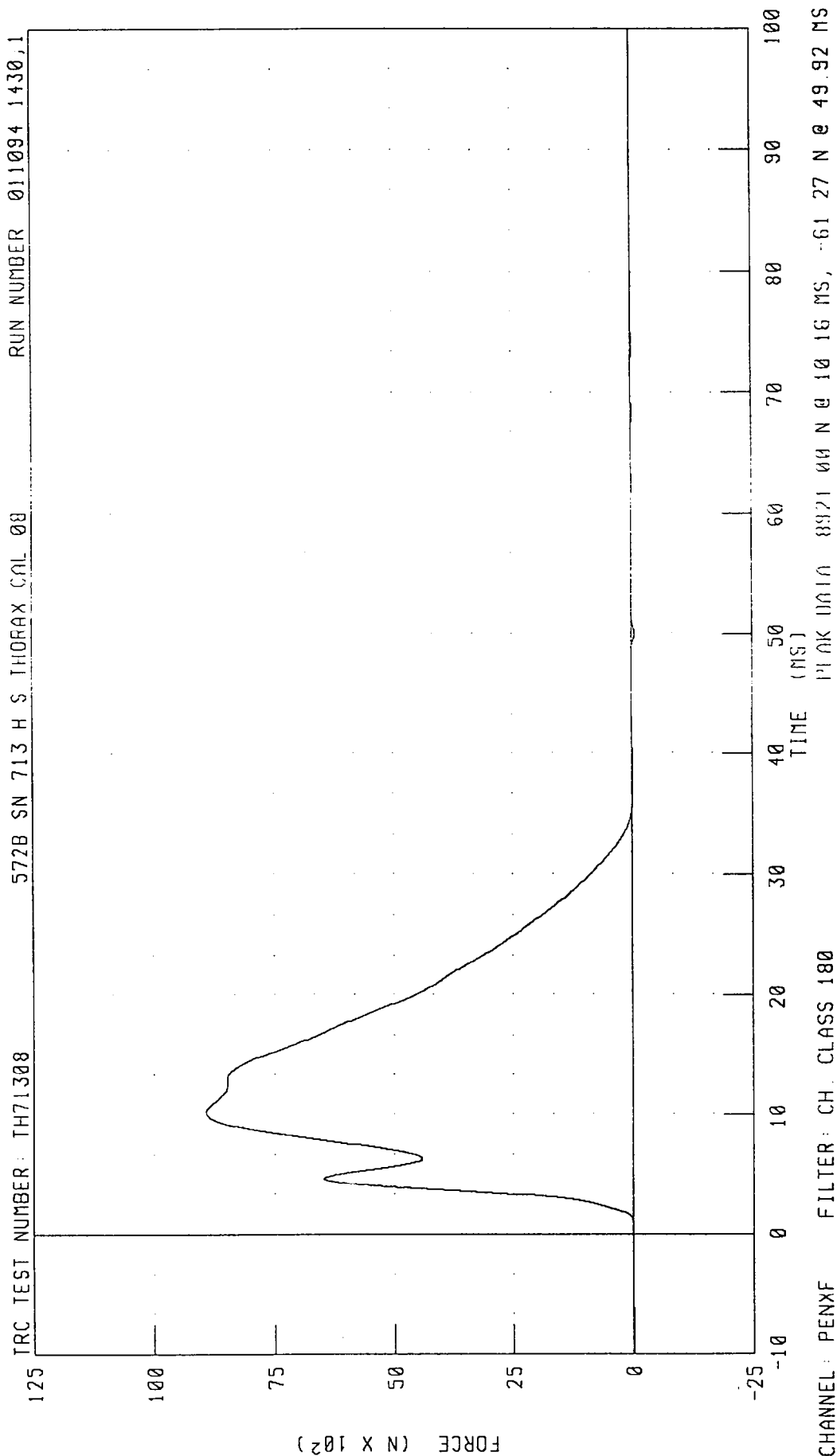
PART 572-B HYBRID II THORAX CALIBRATION (6.7 M/SEC.)
 PENDULUM DECELERATION

TRC TEST NUMBER: TH71308 572B SN 713 H S THORAX CAL 00 RUN NUMBER 011094 1430.1



PART 572-B HYBRID II THORAX CALIBRATION (6.7 M/SEC)

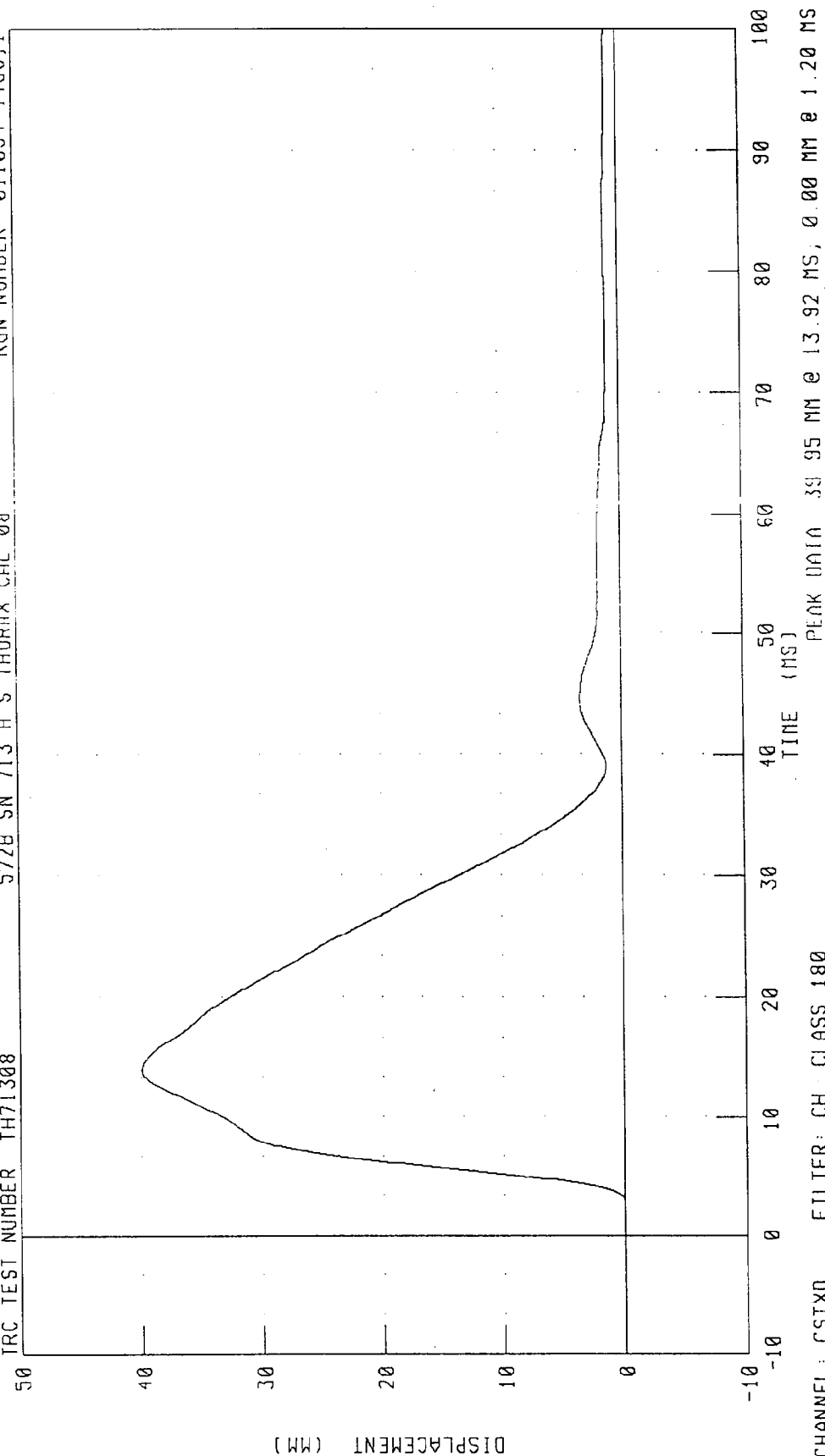
PENDULUM FORCE



PART 572-B HYBRID II THORAX CALIBRATION (6.7 M/SEC)

STERNUM DISPLACEMENT

IRC TEST NUMBER TH71308 572B SN 713 H S THORAX CAL 08 RUN NUMBER 011094 1430;1

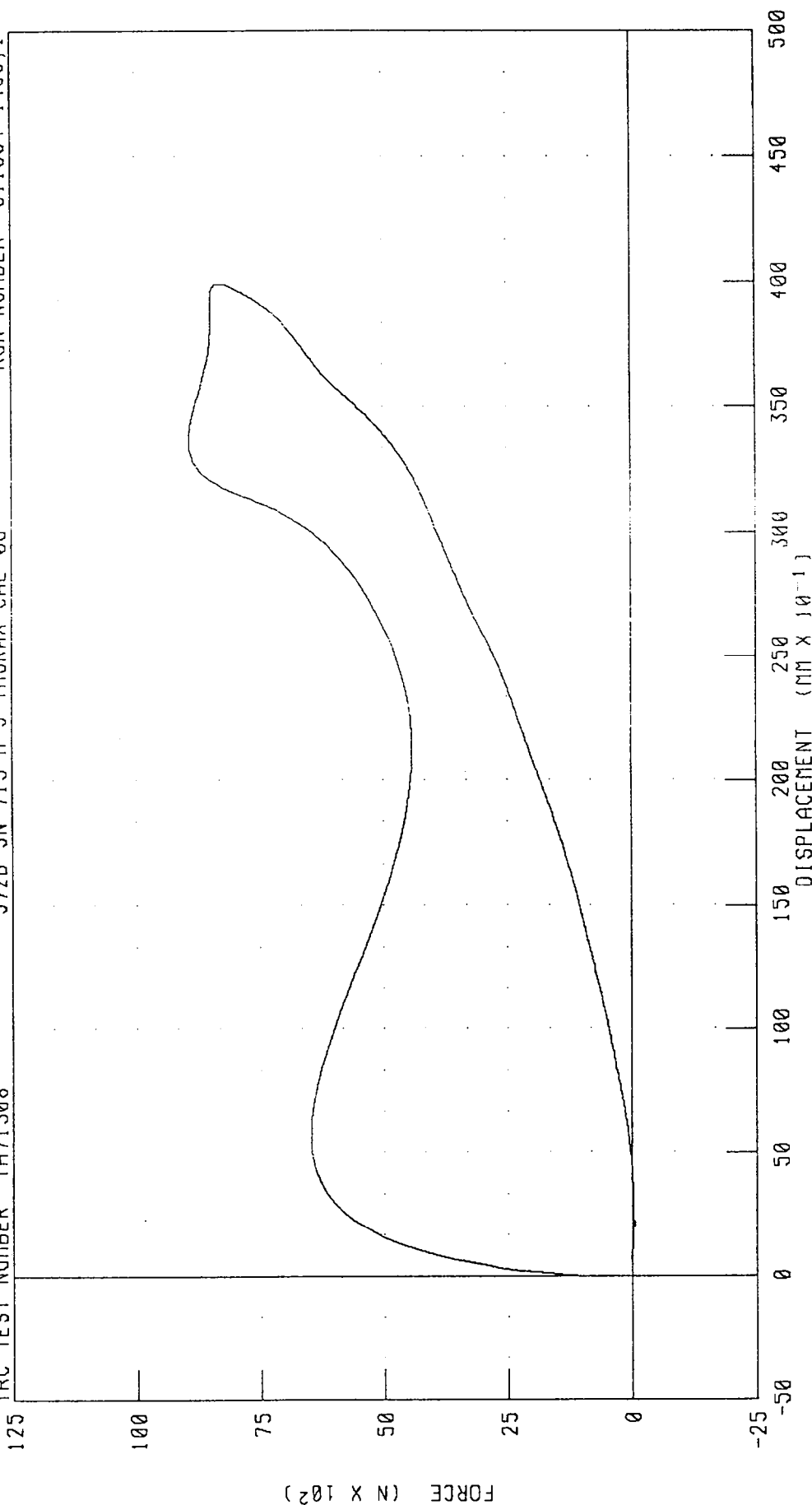


CHANNEL: CSTXD FILTER: CH: CLASS 180

PART 572-B HYBRID II THORAX CALIBRATION (6.7 N/SEC)

CHEST DISPLACEMENT VS PENDULUM FORCE

TRC TEST NUMBER TH71308 572B SN 713 H S THORAX CAL 08 RUN NUMBER 011094 1430.1



CHANNEL: CSTXD FILTER: CH CLASS 180
 PENXF CH CLASS 180
 DISPLACEMENT (MM X 10⁻¹)
 PEAK UNITS
 39.95 MM @ 13.92 MS, 0.00 MM @ 1.20 MS
 89.21 MM @ 10.16 MS, -61.27 N @ 49.92 MS

TRANSPORTATION RESEARCH CENTER INC.

ABDOMEN COMPRESSION TEST

PART 572B

19-NOV-93

TRC INC.

TEST NO: AB71308

572B SN 713 ABDOM COMPR CAL 08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9 - 25.5 C	21.0 C
RELATIVE HUMIDITY	10 - 70 %	53 %
FORCE AT 0.00 MM DISP.	44.48 N	44.48 N
FORCE AT 12.7 MM DISP.	102.30 - 160.13 N	130.42 N
FORCE AT 19.1 MM DISP.	160.13 - 222.40 N	190.29 N
FORCE AT 25.4 MM DISP.	222.40 - 280.22 N	267.55 N
FORCE AT 33.0 MM DISP.	324.70 - 391.42 N	380.97 N

DUMMY MEETS SPECIFICATIONS

TECHNICIAN

Rita Ford

RUN NUMBER: 111993.1118;1

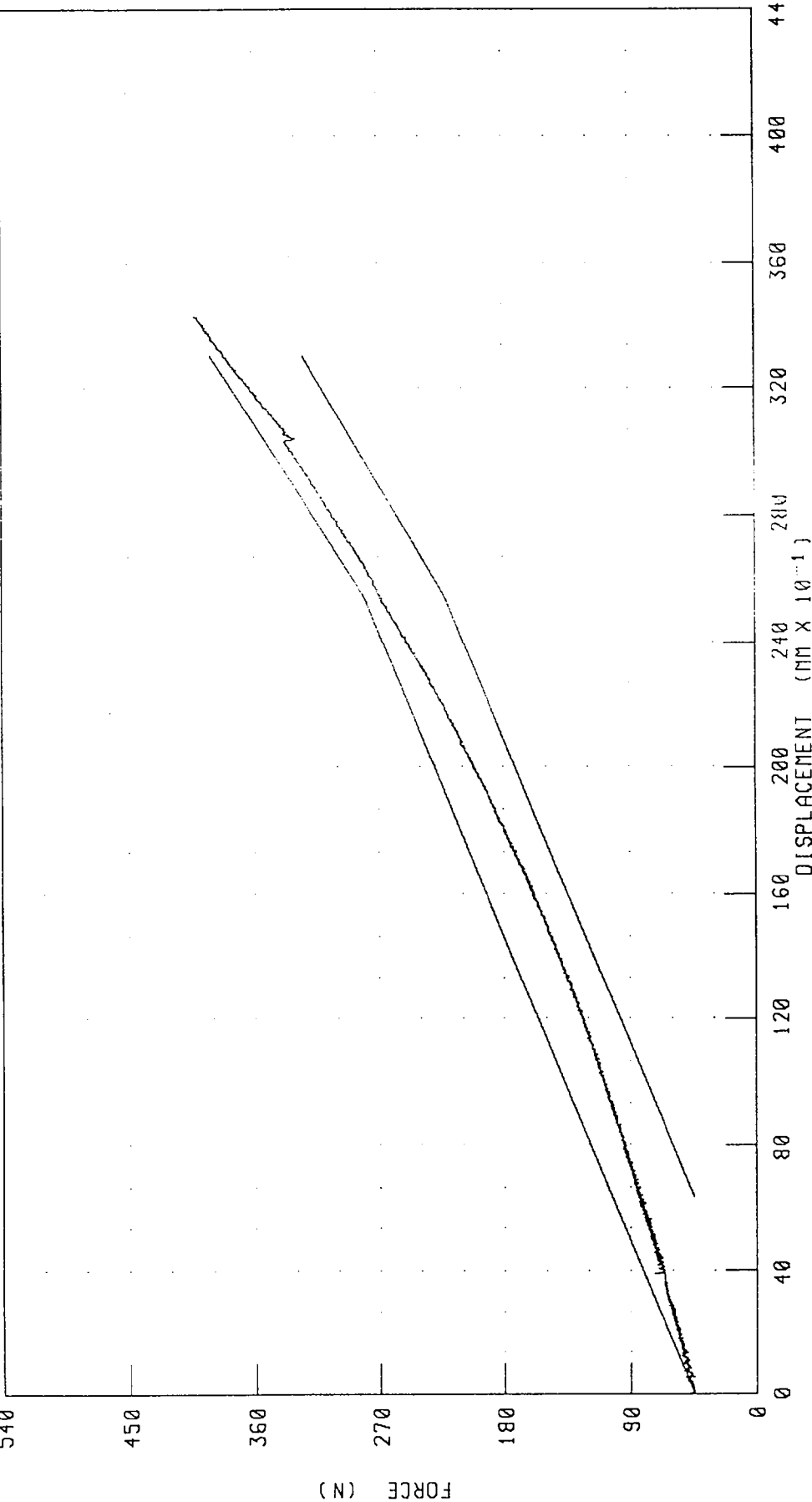
PART 572-B HYBRID II ABDOMEN CALIBRATION

ABDOMEN FORCE VS DISPLACEMENT

TRC TEST NUMBER: AB71308

572B SN 713 ABDOM COMP CAL 08

RUN NUMBER 011094 1443.1



CHANNEL: ABXD FILTER: CII CLASS 1000
ABXF CH. CLASS 1000

PIPK DATA

54 30 MM @ 4 43 S, -0 01 MM @ 0 00 S
402 11 N @ 4 43 S, 44.26 N @ 0 00 S

TRANSPORTATION RESEARCH CENTER INC.

LUMBAR FLEXION TEST

PART 572B

19-NOV-93

TRC INC.

TEST NO: LF71308

572B SN713 LUMBAR FLEX CAL08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9 - 25.5 C	21.0 C
RELATIVE HUMIDITY	10 - 70 %	53 %
FORCE AT 0 DEG. FLEXION	-26.69 - +26.69 N	0.00 N
FORCE AT 20 DEG. FLEXION	97.86 - 151.24 N	137.89 N
FORCE AT 30 DEG. FLEXION	151.24 - 204.62 N	160.13 N
FORCE AT 40 DEG. FLEXION	204.62 - 258.00 N	217.95 N
NET RETURN ANGLE	< 12 DEG.	5.09 DEG.

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Pete G. A.

RUN NUMBER: 112293.1040

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

PART 572B

22-NOV-93

TRC INC.

TEST NO: RK71308

572B SN 713 R.KNEE IMP CAL 08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9 - 25.5 C	21.0 C
RELATIVE HUMIDITY	10 - 70 %	55 %
PENDULUM VELOCITY	2.06 - 2.15 M/S	2.15 M/S
PEAK KNEE IMPACT FORCE	8229 - 11121 N	8474.89 N
DURATION ABOVE 4448 N	>=1.7 MS	1.98 MS

DUMMY MEETS SPECIFICATIONS

TECHNICIAN *Pete R. S.*

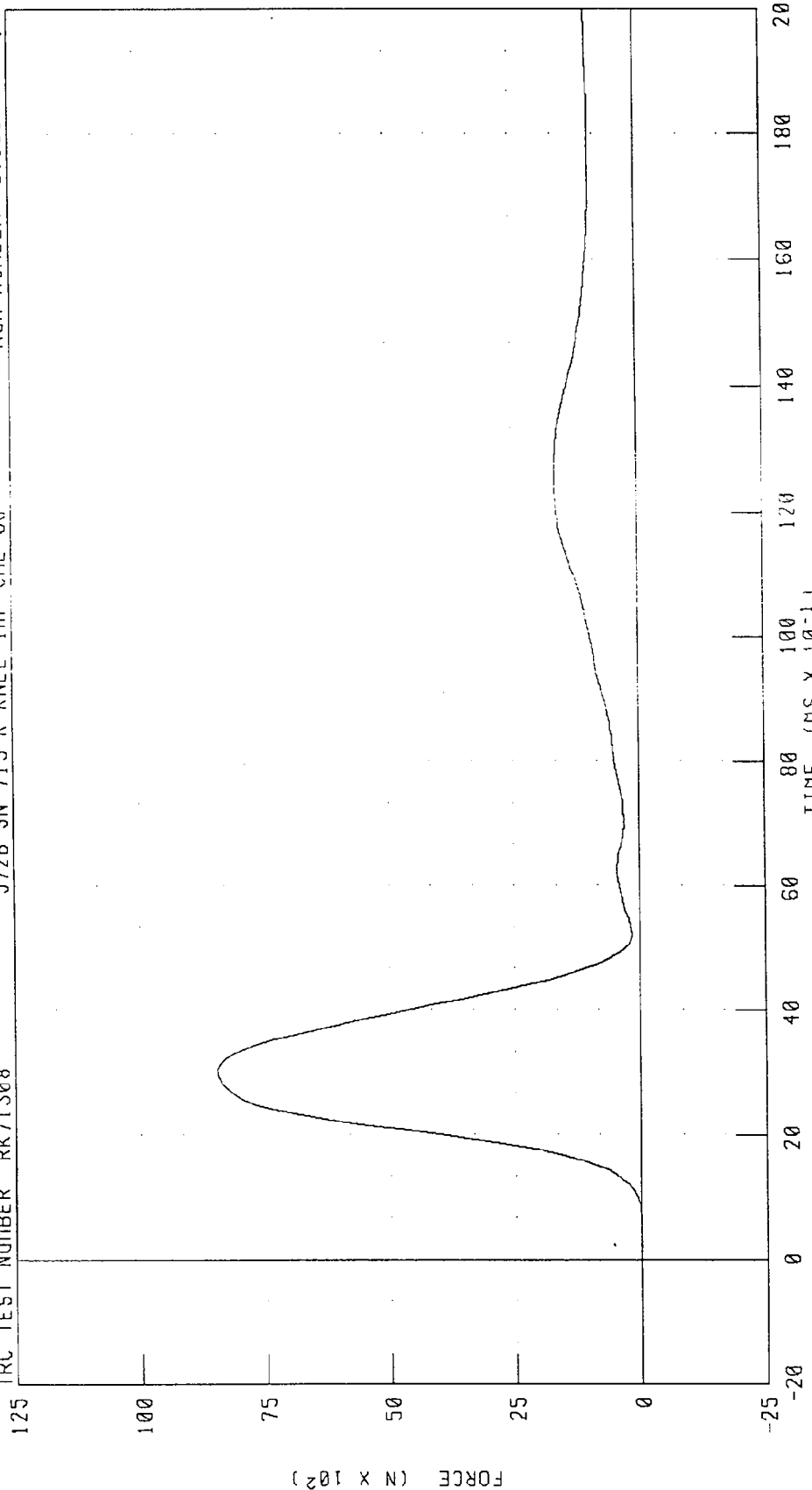
RUN NUMBER: 112293.1005;3

PART 572-B HYBRID II RIGHT KNEE CALIBRATION

RIGHT FEMUR FORCE

572B SN 713 R KNEE IMP CAL 00 RUN NUMBER 011094 1430.3

IRC TEST NUMBER RK71308



PEAK DATA: 8474 89 N @ 3.04 MS, -0.38 N @ -0.88 MS

CHANNEL: RFMF FILTER: CH. CLASS 600

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

PART 572B

22-NOV-93

TRC INC.

TEST NO: LK71308

572B SN 713 L.KNEE IMP CAL 08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9 - 25.5 C	21.0 C
RELATIVE HUMIDITY	10 - 70 %	55 %
PENDULUM VELOCITY	2.06 - 2.15 M/S	2.15 M/S
PEAK KNEE IMPACT FORCE	8229 - 11121 N	8927.93 N
DURATION ABOVE 4448 N	≥ 1.7 MS	1.87 MS

DUMMY MEETS SPECIFICATIONS

TECHNICIAN *Pete Fount*

RUN NUMBER: 112293.0955;2

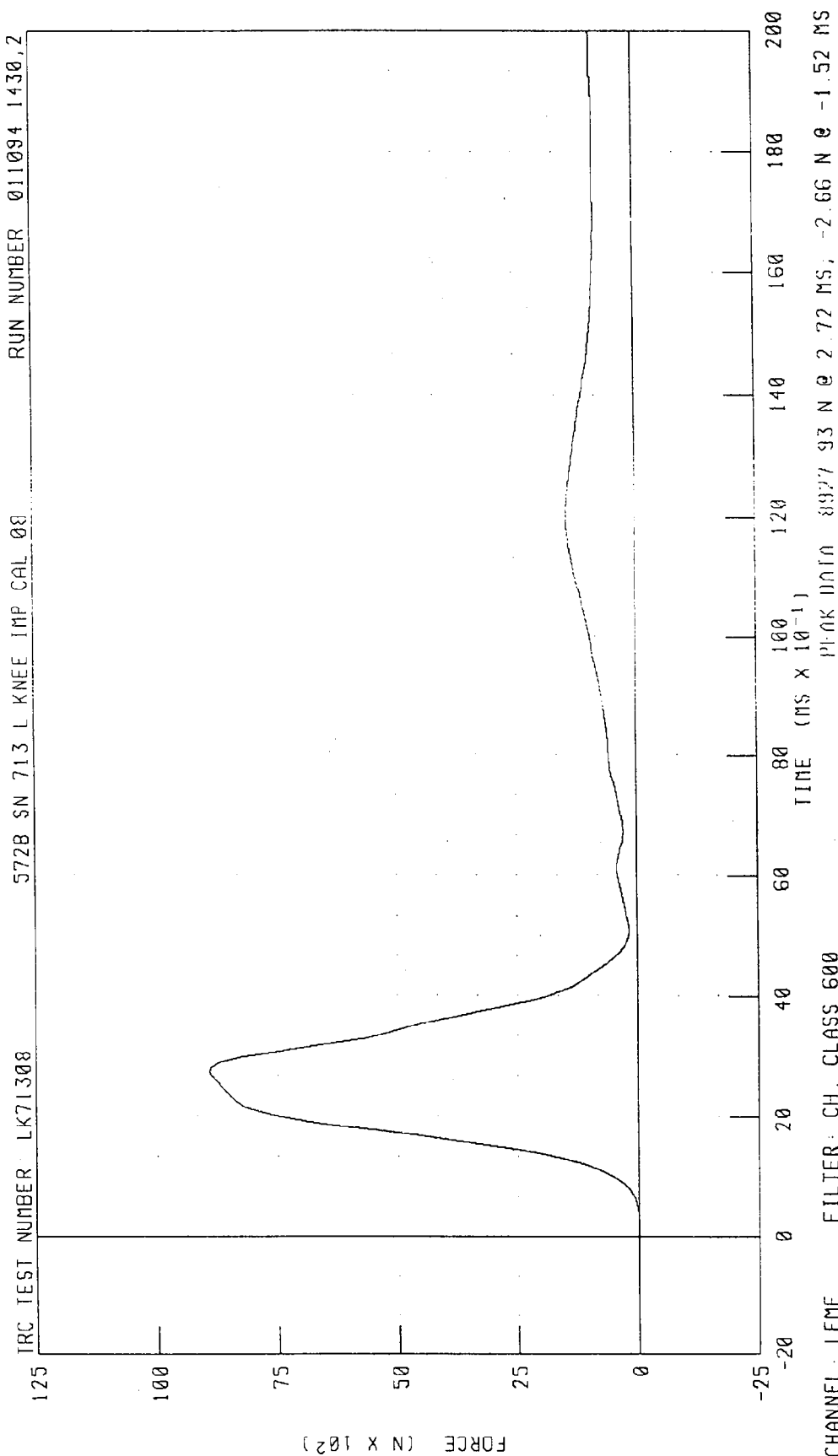
PART 572-8 HYBRID II LEFT KNEE CALIBRATION

LEFT FEMUR FORCE

IRC TEST NUMBER LK71308

572B SN 713 L KNEE IMP CAL 08

RUN NUMBER 011094 1430,2



APPENDIX D

MISCELLANEOUS TEST INFORMATION

DUMMY INSTRUMENT CALIBRATIONS

DRIVER DUMMY #192

	SERIAL NO.	MODEL NO.	MFR.	CALIBRATION DATE	
				LAST	DUE
HEAD X-AXIS ACCEL.	AAL82	7264	ENDEVCO	09/14/93	03/14/94
Y-AXIS ACCEL.	A84JJ	7264	ENDEVCO	09/14/93	03/14/94
Z-AXIS ACCEL.	DB81H	7264	ENDEVCO	10/19/93	04/19/94
CHEST X-AXIS ACCEL.	ACCJO	7264	ENDEVCO	09/14/93	03/14/94
Y-AXIS ACCEL.	AC708	7264	ENDEVCO	09/14/93	03/14/94
Z-AXIS ACCEL.	CW59H	7264	ENDEVCO	09/14/93	03/14/94
LEFT FEMUR FORCE LOAD CELL	986	2430	GSE	09/23/93	03/23/94
RIGHT FEMUR FORCE LOAD CELL	987	2430	GSE	09/23/93	03/23/94
*NECK X-AXIS FORCE LOAD CELL	085	1716	DENTON	09/20/93	03/20/94
Y-AXIS FORCE LOAD CELL	085	1716	DENTON	09/20/93	03/20/94
Z-AXIS FORCE LOAD CELL	085	1716	DENTON	09/20/93	03/20/94
*NECK MOMENT ABOUT X-AXIS LOAD CELL	085	1716	DENTON	09/20/93	03/20/94
MOMENT ABOUT Y-AXIS LOAD CELL	085	1716	DENTON	09/20/93	03/20/94
MOMENT ABOUT Z-AXIS LOAD CELL	085	1716	DENTON	09/20/93	03/20/94
*CHEST DEFLECTION POTENTIOMETER	87313-96	81422A	VERNITECH	09/24/93	03/24/94
LAP BELT FORCE LOAD CELL	616	3419	LEBOW	08/24/93	02/24/94
SHOULDER BELT FORCE LOAD CELL	610	3419	LEBOW	08/23/93	02/23/94
SHOULDER BELT SPOOL-OUT POTENTIOMETER	A12889	PT-101-50A	CELESCO	12/22/93	06/22/94
SHOULDER BELT STRETCH POTENTIOMETER	2690	2051414101	BOURNES	09/23/93	03/23/94

*HYBRID III USE ONLY.

DUMMY INSTRUMENT CALIBRATIONS

RIGHT FRONT PASSENGER DUMMY #713

	SERIAL NO.	MODEL NO.	MFR.	CALIBRATION DATE	
				LAST	DUE
HEAD X-AXIS ACCEL.	CT44H	7264	ENDEVCO	09/10/93	03/10/94
Y-AXIS ACCEL.	AAMT5	7264	ENDEVCO	09/10/93	03/10/94
Z-AXIS ACCEL.	ACCM9	7264	ENDEVCO	09/10/93	03/10/94
CHEST X-AXIS ACCEL.	AAMJ5	7264	ENDEVCO	10/10/93	04/10/94
Y-AXIS ACCEL.	AC8B8	7264	ENDEVCO	09/10/93	03/10/94
Z-AXIS ACCEL.	CR63H	7264	ENDEVCO	09/10/93	03/10/94
LEFT FEMUR FORCE LOAD CELL	964	2430	GSE	11/10/93	05/10/94
RIGHT FEMUR FORCE LOAD CELL	982	2430	GSE	11/10/93	05/10/94
*NECK X-AXIS FORCE LOAD CELL					
Y-AXIS FORCE LOAD CELL					
X-AXIS FORCE LOAD CELL					
*NECK MOMENT ABOUT X-AXIS LOAD CELL					
MOMENT ABOUT Y-AXIS LOAD CELL					
MOMENT ABOUT Z-AXIS LOAD CELL					
*CHEST DEFLECTION POTENTIOMETER					
LAP BELT FORCE LOAD CELL	764	3419	LEBOW	08/23/93	02/23/94
SHOULDER BELT FORCE LOAD CELL	236	3419	LEBOW	08/23/93	02/23/94
SHOULDER BELT SPOOL-OUT POTENTIOMETER	A02465	PT-101-40A	CELESCO	12/23/93	06/23/94
SHOULDER BELT STRETCH POTENTIOMETER	2191	2051414101	BOURNES	09/23/93	03/23/94

*HYBRID III USE ONLY.

VEHICLE AND CALIBRATION LABORATORY INSTRUMENT CALIBRATIONS

VEHICLE ACCELEROMETERS

	SERIAL NO.	MODEL NO.	MFR.	CALIBRATION DATE	
				LAST	DUE
LEFT REAR SEAT CROSSMEMBER X-AXIS	CW87H	7264	ENDEVCO	11/29/93	05/29/94
LEFT REAR SEAT CROSSMEMBER X-AXIS REDUN	DR52J	7264	ENDEVCO	09/01/93	05/11/94
RIGHT REAR SEAT CROSSMEMBER X-AXIS	DA06H	7264	ENDEVCO	10/12/93	04/12/94
RIGHT REAR SEAT CROSSMEMBER X-AXIS REDUN	CP34H	7264	ENDEVCO	08/12/93	02/12/94
ENGINE TOP X-AXIS	CK32H	7264	ENDEVCO	09/01/93	03/01/94
ENGINE BOTTOM X-AXIS	CJ66H	7264	ENDEVCO	10/12/93	04/12/94
RIGHT BRAKE CALIPER X-AXIS	DA88H	7264	ENDEVCO	11/29/93	05/29/94
LEFT BRAKE CALIPER X-AXIS	CL83H	7264	ENDEVCO	09/01/93	03/01/94
INSTRUMENT PANEL CENTER X-AXIS	BM06J	7264	ENDEVCO	11/04/93	05/04/94

CALIBRATION LABORATORY INSTRUMENTS

	SERIAL NO.	MODEL NO.	MFR.	CALIBRATION DATE	
				LAST	DUE
NECK BENDING PENDULUM ACCEL.	CB27	7232	ENDEVCO	10/04/93	04/04/94
NECK BENDING ROTARY POTENTIOMETER	NA	35435-1-102	BOURNES	MFR. SPECIFICATION	
NECK BENDING LINEAR POTENTIOMETER	NA	5184-2051846003	BOURNES	10/06/93	04/06/94
THORAX/HYBRID II FEMUR PEND. ACCEL.	CC64	7232	ENDEVCO	10/06/93	04/06/94
LUMBAR FLEXION FORCE GAUGE	NA	DPPH-50	CHATILLON	05/03/89	REPAIRED
LUMBAR FLEXION ROTATION GAUGE	CP17-0601-1	7020	HUMPHREY	MFR. SPECIFICATION	
ABDOMEN COMPRESSION DISPL. GAUGE	4075-175	80294-2051941504	BOURNES	10/06/93	04/06/94
ABDOMEN COMPRESSION FORCE GAUGE	3443	3167	LEBOW	10/06/93	04/06/94
HYBRID III FEMUR PEND. ACCEL.	CG83	7232	ENDEVCO	10/06/93	04/06/94

SIGN CONVENTION
NHTSA DATA TAPE REFERENCE GUIDE

ACCELEROMETERS: +X: FORWARD
 +Y: LEFTWARD
 +Z: UPWARD

POTENTIOMETERS: +CHEST LONGITUDINAL DEFLECTION: OUTWARD
 +CHEST LATERAL DEFLECTION: LEFTWARD
 +SEAT BELT DISPLACEMENT: OUTWARD
 +SEAT BELT EXTENSION: ELONGATION
 +KNEE SLIDER DISPLACEMENT: DISTANCE BETWEEN FEMUR
 AND TIBIA INCREASED
 (IN RELATION TO A
 SEATED DUMMY)

LOAD CELLS: +FEMUR FORCE: TENSION
 +SEAT BELT FORCE: TENSION
 +BARRIER FORCE: TENSION

NECK LOAD CELLS: +X FORCE: HEAD PUSHED FORWARD
 +Y FORCE: HEAD PUSHED LEFTWARD
 +Z FORCE: HEAD PULLED UPWARD (TENSION ON NECK)
 +X MOMENT: RIGHT EAR ROTATING TOWARD RIGHT SHOULDER
 +Y MOMENT: CHIN ROTATING TOWARD CHEST
 +Z MOMENT: CHIN ROTATING TOWARD LEFT SHOULDER

TIBIA LOAD CELLS: +X FORCE: TENSION
 +Y FORCE: TENSION
 +Z FORCE: TENSION
 +X MOMENT: BOTTOM OF TIBIA MOVING LEFTWARD
 +Y MOMENT: BOTTOM OF TIBIA MOVING REARWARD

FREQUENCY RESPONSE CLASSES

SAE J211 OCT88

TYPICAL TEST MEASUREMENTS

CHANNEL CLASS

Vehicle Structural Accelerations for use in:

Total vehicle comparison	60
Collision simulation input	60
Component analysis	600
Integration for velocity or displacement	180

Barrier Face Forces 60

Belt Restraint System Loads 60

Anthropomorphic Test Device

Head accelerations (linear and angular) 1000

Neck

Forces 1000

Moments 600

Thorax

Spine accelerations 180

Rib accelerations 1000

Sternum accelerations 1000

Deflections 180

Lumbar

Forces 1000

Moments 1000

Pelvis

Accelerations 1000

Forces 1000

Moments 1000

Femur/Knee/Tibia/Ankle

Forces 600

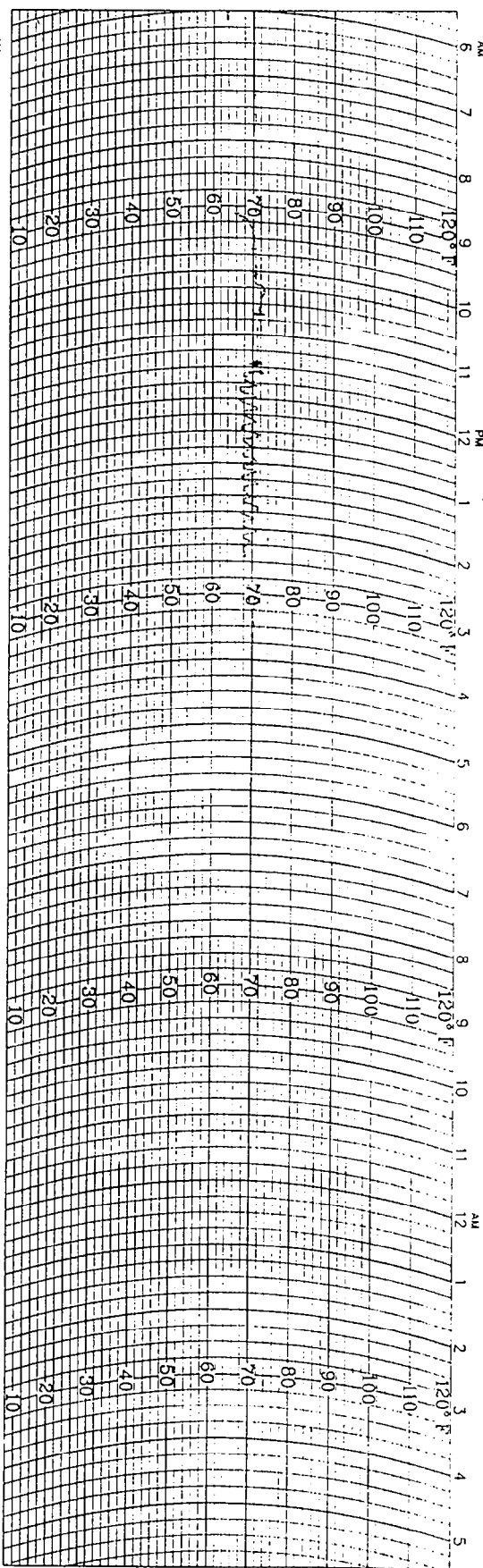
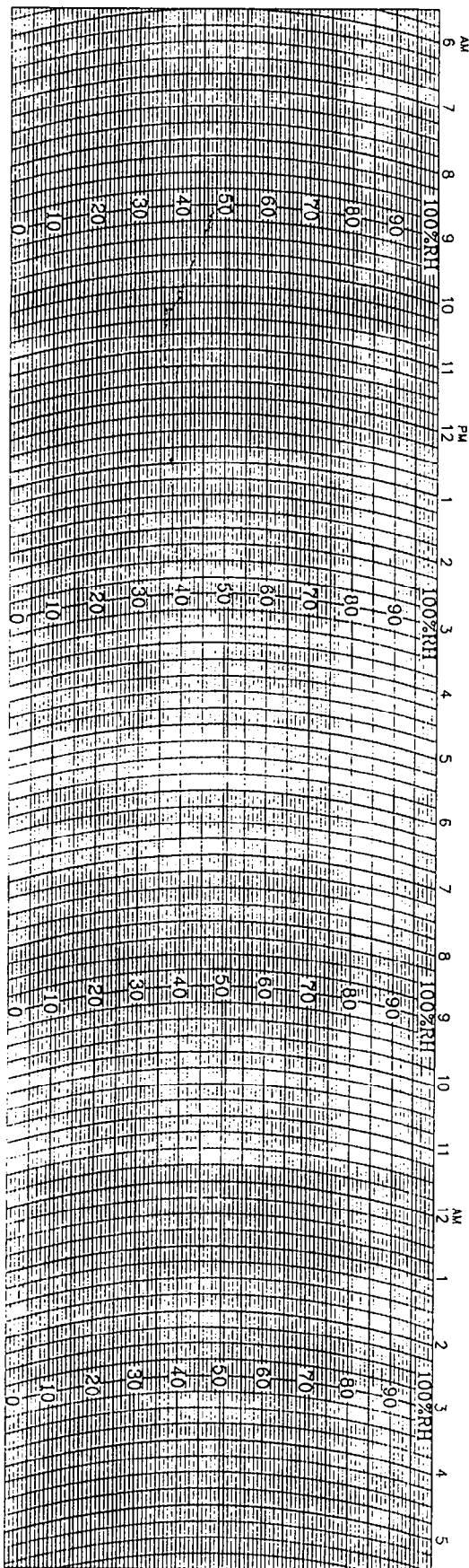
Moments 600

Displacements 180

Sled Accelerations 60

Steering Column Loads 600

Headform Accelerations 1000



WeatherMeasure
WEATHERtronics
 Division of QUALIMETRICS, Inc.

P.O. BOX 41039
 SACRAMENTO, CA 95841
 PHONE: (916) 923-0055

HYGROTHERMOGRAPH
 1 DAY

CHART NO. M699:23
 C311-D-hf
 ECN 2717
 6-9-87

STATION _____ DATE ON _____ DATE OFF _____

APPENDIX E

RESTRAINT SYSTEM INSTRUCTIONS FROM OWNER'S MANUAL

When you fold the seatback, the armrest retracts to avoid hitting the manual transmission gear shift lever.

To prevent damage to the armrest, avoid putting heavy loads on it.

**Seat belts—
—Seat belt precautions**

Toyota recommends that the driver and passengers in the vehicle be properly restrained at all times with the seat belts provided. Failure to do so could increase the chance of injury and/or the severity of injury in accidents.

Baby or small child. Use a child restraint system which fits your vehicle. See "Child restraint" for details.

Child. If a child is too large for a child restraint system, the child should sit in the seat and must be restrained using the vehicle's seat belt. Do not allow the child to stand up or kneel on the seat:

The child must be restrained with the lap/shoulder belt. If the shoulder belt falls across the child's neck or face, move the seat fully backward so that the belt lays across the child's shoulder. If the shoulder belt cannot be positioned correctly, move the child to the center position and use the center lap belt.

Small-framed person or youth in a 3-point type seat belt. On models with a bench seat, have a small-framed person or youth sit slightly closer to the center of the vehicle (so the shoulder belt does not cross over the neck). On models with separate seats, move the seat fully backward.

Pregnant woman. Toyota recommends the use of a seat belt. Ask your doctor for specific recommendations. The lap belt should be worn securely and as low as possible over the hips and not on the waist.

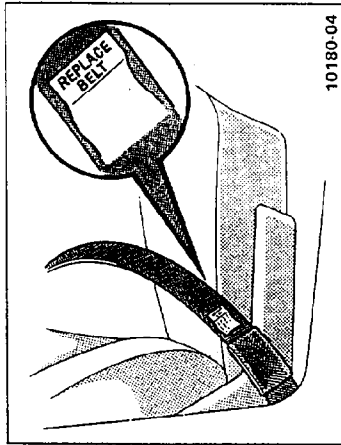
Injured person. Toyota recommends the use of a seat belt. Depending on the injury, however, first check with your doctor.

CAUTION: Persons should ride in their seats properly wearing their seat belts whenever the vehicle is moving. Otherwise, they are much more likely to suffer serious bodily injury in the event of sudden braking or a collision.

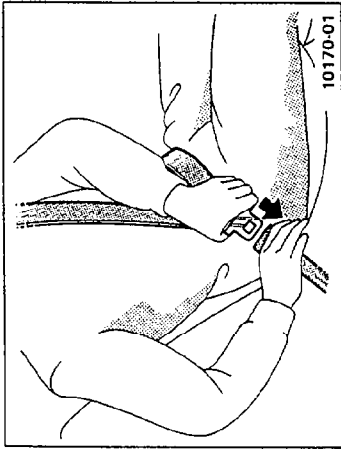
When using the seat belts, observe the following:

- Use the belt for only one person at a time. Do not use a single belt for two or more people—even children.
- Avoid reclining the seatbacks too much. The seat belts provide maximum protection when the seatbacks are in the upright position. (See the seat adjustment instructions.)
- Be careful not to damage the belt webbing or hardware. Take care that they do not get caught or pinched in the seat or doors.

—Outside seat belts



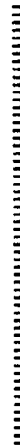
10180-04



10170-01

- Inspect the belt system periodically. Check for cuts, fraying, and loose parts. Damaged parts should be replaced. Do not disassemble or modify the system.
- Keep the belts clean and dry. If they need cleaning, use a mild soap solution or lukewarm water. Never use bleach, dye, or abrasive cleaners—they may severely weaken the belts.
- Replace the belt assembly if it has been used in a severe impact. The entire assembly should be replaced even if damage is not obvious.

- Replace the seat belt if the warning label under the sleeve can be seen. The warning label, "REPLACE BELT", will appear if the belt receives a severe impact or other force.



Adjust the seat as needed and sit up straight and well back in the seat. To fasten your belt, pull it out of the retractor and insert the tab into the buckle.

You will hear a click when the tab locks into the buckle.

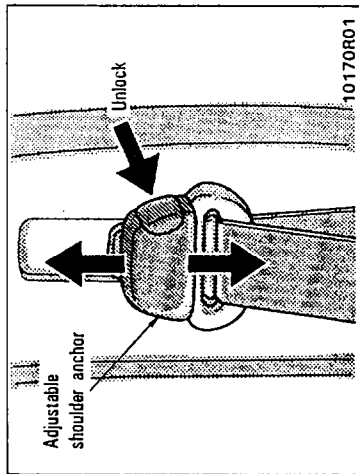
The seat belt length automatically adjusts to your size and the seat position.

The retractor will lock the belt during a sudden stop or on impact. It also may lock if you lean forward too quickly. A slow, easy motion will allow the belt to extend, and you can move around freely.

If the seat belt cannot be pulled out of the retractor, firmly pull the belt and release it. You will then be able to smoothly pull the belt out of the retractor.

When the passenger's shoulder belt is completely extended and is then retracted even slightly, the belt is locked in that position and cannot be extended. This feature is used to hold the child restraint system securely. (For details, see "Child restraint" in this chapter.) To free the belt again, fully retract the belt and then pull the belt out once more.

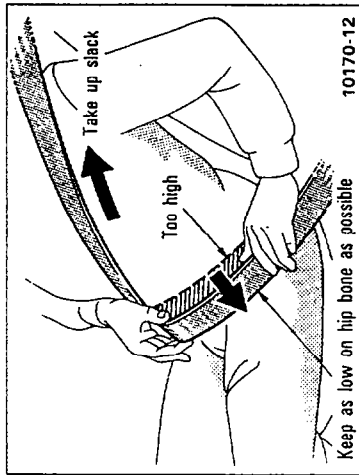
CAUTION: After inserting the tab, make sure the connection is secure and the belt is not twisted.



Adjust the shoulder anchor position to your size.

To raise the anchor position, push the anchor up. To lower the anchor position, push the lock release button and slide the anchor down. After the adjustment, make sure the anchor is locked in position.

CAUTION: Always be sure that the belt is positioned across your shoulder, as close to your neck as possible; not on your upper arm or neck. Failure to do so could reduce the amount of protection in an accident and increase the chance of injury.



Adjust the position of the lap and shoulder belts.

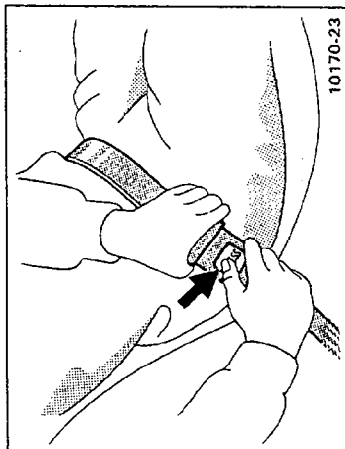
Position the lap belt as low as possible on your hips—not on your waist, then adjust it to a snug fit by pulling the shoulder portion upward through the latch plate.

CAUTION:

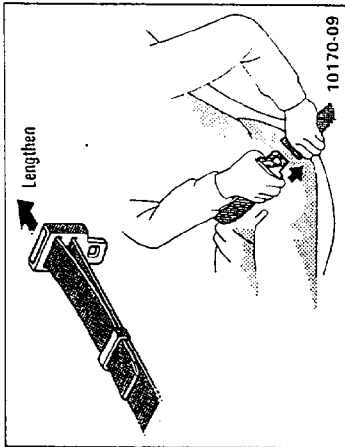
- High-positioned lap belts and loose-fitting shoulder belts both could increase the chance of injury due to sliding under the lap belt during an accident.

- For your safety, do not place the shoulder belt under your arm.

—Center seat belt



To release the belt, press the buckle-release button and allow the belt to retract. If the belt does not retract smoothly, pull it out and check for kinks or twists. Then make sure it remains untwisted as it retracts.

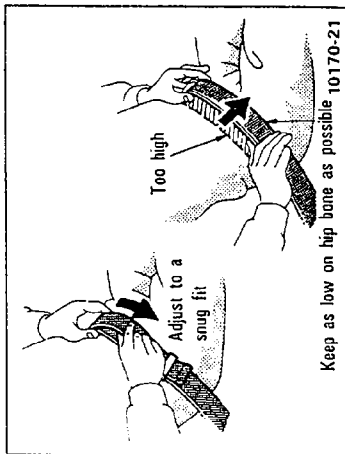


Sit up straight and well back in the seat. To fasten your belt, insert the tab into the buckle.

You will hear a click when the tab locks into the buckle.

If the belt is not long enough for you, hold the tab at a right angle to the belt and pull on the tab.

CAUTION: After inserting the tab, make sure the connection is secure and the seat belt extender is not twisted.



Remove excess length of the belt and adjust the belt position.

To shorten the belt, pull the free end of the belt.

Position the lap belt as low as possible on your hips—not on your waist, then adjust it to a snug fit.

CAUTION: High-positioned lap belts could increase the chance of injury due to sliding under the lap belt during an accident.

—Seat belt extender

If your seat belt cannot be fastened securely because it is not long enough, a personalized seat belt extender is available from your Toyota dealer free of charge.

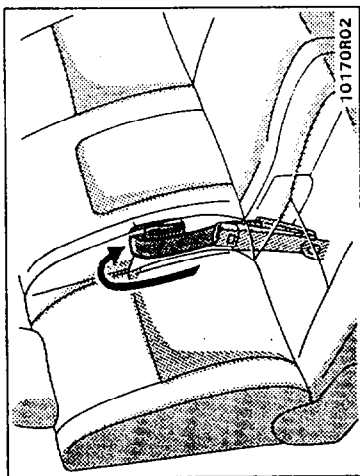
Please contact your local Toyota dealer so that the dealer can order the proper required length for the extender. Bring the heaviest coat you expect to wear for proper measurement and selection of length. Additional ordering information is available at your Toyota dealer.

CAUTION: ~~~~~

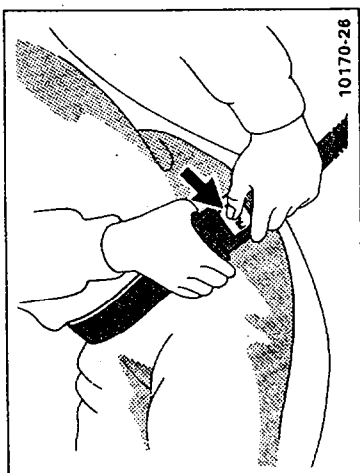
When using the seat belt extender, observe the following. Failure to follow these instructions could result in less effectiveness of the seat belt restraint system in case of vehicle accident, increasing the chance of personal injury.

- Never use the seat belt extender if you can fasten the seat belt without it.
- Remember that the extender provided for you may not be safe when used on a different vehicle, or for another person and at different seating position than the one originally intended for.

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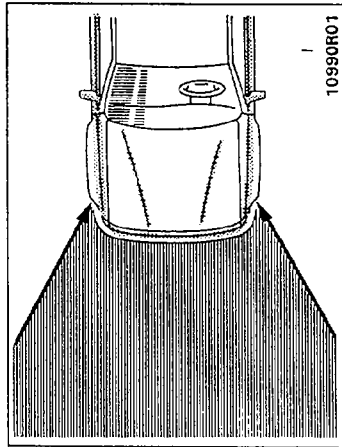


SR5 grade models: When a center seat belt is not in use, store it in the seat side pocket.



To release the belt, press the buckle-release button.

## SRS airbag

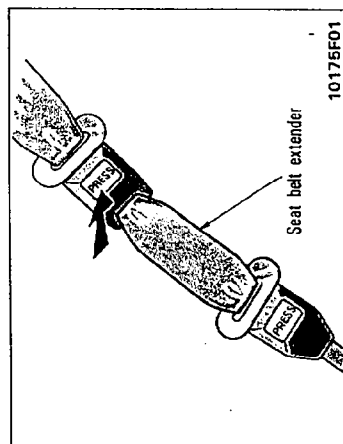


The SRS (Supplemental Restraint System) airbag is designed to be activated in response to a severe frontal impact within the shaded area between the arrows in the illustration, and to provide the driver with further protection in addition to the primary protection provided by the driver's seat belt.

The SRS airbag system is not designed to protect the driver from an impact from the side or rear, a vehicle overturn or frontal collision at low speeds.

For instructions and precautions concerning the seat belt system, see "Seat belts".

**CAUTION:** After inserting the tab, make sure the connection is secure and the seat belt extender is not twisted.



To connect the extender to the seat belt, insert the tab into the seat belt buckle so that the "PRESS" signs on the buckle-release buttons of the extender and the seat belt are both facing outward as shown.

You will hear a click when the tab locks into the buckle.

When releasing the seat belt, press on the buckle-release button on the extender, not on the seat belt. This helps prevent damage to the vehicle interior and extender itself.

When not in use, remove the extender and store in the vehicle for future use.

1990R02

Steering wheel pad assembly  
(airbag and inflator)

Center airbag  
sensor assembly

SRS airbag  
warning light

Components of supplemental restraint system

Front airbag sensors

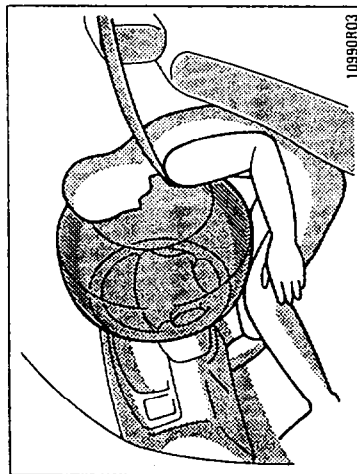
The center airbag sensor assembly consists of a safing sensor and center airbag sensor. In the event of a severe frontal impact, a front airbag sensor and safing sensor, or center airbag sensor and safing sensor detect the shock, the center airbag sensor assembly triggers the inflator, and the inflator fills the airbag to help restrain the driver's forward motion.

When the SRS airbag inflates, an operating noise will be heard and a small amount of smoke-like gas will be released. This gas is harmless and does not indicate that a fire is occurring.

**CAUTION:** Do not modify or remove any component or wiring, such as the steering wheel, column cover, center airbag sensor assembly or front airbag sensors. Doing any of these may cause sudden SRS airbag inflation or disable the system, which could result in personal injury.

**NOTICE:**

**Do not perform any of the following changes without prior approval from Toyota dealers. Repairs or service of this kind can interfere with proper operation of the SRS airbag system in some cases.**



## Child restraint — —Child restraint precautions

Toyota strongly urges the use of child restraint systems for children small enough to use it.

The laws of all fifty states in the U.S.A. and Canada now require the use of a child restraint system.

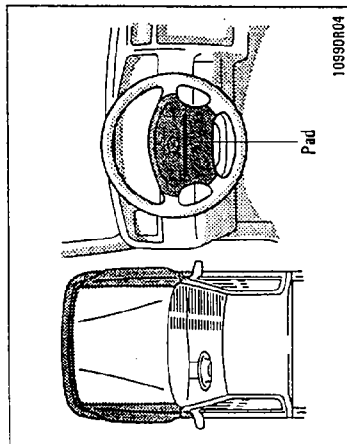
**CAUTION:**   
For effective protection in automobile accidents and sudden stops, children must be properly restrained. Holding a child in your arms is not a substitute for a child restraint system. In an accident, the child can be crushed against the windshield, or between you and the vehicle's interior if you are unrestrained.

In the following cases, contact your Toyota dealer as soon as possible:

- The SRS airbag system malfunctions. This SRS airbag system has a service reminder indicator to indicate operating problems. See "Service reminder indicators and warning buzzers" in Chapter 1-5.
- The SRS airbag has been inflated.
- The front part of the vehicle (shown in the illustration) was involved in an accident which was not of the extent to cause the SRS airbag to inflate.
- The pad section of the steering wheel (shown in the illustration) is scratched, cracked, or otherwise damaged.

### NOTICE:

Do not disconnect the battery cables before contacting your Toyota dealer.



- Installation of electronic items such as a mobile two-way radio or cassette tape player.
- Modification of the suspension system.
- Modification of the front end structure.
- Attachment of a snow plow, winches or any other equipment to the front end.
- Repairs made on or near the front fenders, front and rear console, steering column or steering wheel.